



REGULATORY COMPLIANCE TEST REPORT

**TAIWAN LP0002 January 2018
(UNII Bands, Section 4.7)**

Report No.: HPEN141-T6 Rev B (Wi-Fi)

Manufacturer: Hewlett Packard Enterprise

Applicant: 慧與科技股份有限公司

Equipment Name: Wireless Network Sensor

Brand: ARUBA

Model: ASIN0301



REGULATORY COMPLIANCE TEST REPORT

Manufacturer: Hewlett Packard Enterprise

Model: ASIN0301

To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)

Test Report Serial No.: HPEN141-T6 Rev B (Wi-Fi)

This report supersedes: NONE

Applicant: 慧與科技股技有限公司
台北市南港區經貿二路66號10之1

Issue Date: 22nd January 2020

This Test Report is Issued Under the Authority of:

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MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2005. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-01.pdf>



Accredited Laboratory

A2LA has accredited

MiCOM LABS

Pleasanton, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 14th day of May 2018.



President and CEO
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2019

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.



1.2. RECOGNITION

MiCOM Labs, Inc has widely recognized wireless testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA countries. MiCOM Labs test reports are accepted globally.

Country	Recognition Body	Status	Phase	Identification No.
USA	Federal Communications Commission (FCC)	TCB	-	US0159 Listing #: 102167
Canada	Industry Canada (IC)	FCB	APEC MRA 2	US0159 Listing #: 4143A-2 4143A-3
Japan	MIC (Ministry of Internal Affairs and Communication)	CAB	APEC MRA 2	RCB 210
	VCCI	--	--	A-0012
Europe	European Commission	NB	EU MRA	NB 2280
Australia	Australian Communications and Media Authority (ACMA)	CAB	APEC MRA 1	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	CAB	APEC MRA 1	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	CAB	APEC MRA 1	
Singapore	Infocomm Development Authority (IDA)	CAB	APEC MRA 1	
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)	CAB	APEC MRA 1	
Vietnam	Ministry of Communication (MIC)	CAB	APEC MRA 1	

EU MRA – European Union Mutual Recognition Agreement.

NB – Notified Body

APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement. Recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.

Phase I - recognition for product testing

Phase II – recognition for both product testing and certification

1.3. PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065:2012. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-02.pdf>



United States of America – Telecommunication Certification Body (TCB)
Industry Canada – Certification Body, CAB Identifier – US0159
Europe – Notified Body (NB), NB Identifier - 2280
Japan – Recognized Certification Body (RCB), RCB Identifier - 210



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft	12 th August 2019	Draft for comment
Rev A	9 th January 2020	Initial Release
Rev B	22 nd January 2020	Changed "Company" into "Manufacturer"

In the above table the latest report revision will replace all earlier versions.

3. TEST RESULT CERTIFICATE

Manufacturer: Hewlett Packard Enterprise 3333 Scott Blvd. Santa Clara, California 95054 USA	Tested By: MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Model: ASIN0301	Telephone: +1 925 462 0304
Equipment Type: Mobile & Portable Client Device	Fax: +1 925 462 0306
S/N's: Conducted Testing: TWHXKRY005 Radiated Testing: TWHXKRY00P DFS Testing: TWHXKRY00Q	
Test Date(s): 31 st July – 10 th September 2019	Website: www.micomlabs.com

STANDARD(S)	TEST RESULTS
Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)	EQUIPMENT COMPLIES

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:



Graeme Grieve
Quality Manager MiCOM Labs, Inc.

Gordon Hurst
President & CEO MiCOM Labs, Inc.

4. REFERENCES AND MEASUREMENT UNCERTAINTY

4.1. Normative References

REF.	PUBLICATION	YEAR	TITLE
I	Taiwan LP0002	10 January 2018	Low-power Radio-frequency Devices Technical Regulations
II	KDB 662911 D01 V02r01	Oct 31 2013	Guidance for measurement of output emission of devices that employ single transmitter with multiple outputs or systems with multiple transmitters operating simultaneously in the same frequency band
III	KDB 926956 D01 v02	22nd August 2016	U-NII Device Transition Plan
IV	KDB 905462 D03 v01r02	22nd August 2016	UNII clients without radar detection new rules
V	KDB 905462 D02 v02	April 8 2016	UNII DFS compliance procedures new rules
VI	KDB 789033 D02 V02r01	14th December, 2017	Guidelines for Compliance Testing Of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
VII	FCC 06-96	Jun 30 2006	Memorandum Opinion and Order
VIII	FCC 47 CFR Part 15.407	2016	Radio Frequency Devices; Subpart E –Unlicensed National Information Infrastructure Devices
XI	FCC 47 CFR Part 2.1033	2016	FCC requirements and rules regarding photographs and test setup diagrams.
XII	ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices
XIII	ANSI C63.4	2014	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
XIV	CISPR 32	2015	Electromagnetic compatibility of multimedia equipment - Emission requirements
XV	A2LA	August 2018	R105 - Requirement's When Making Reference to A2LA Accreditation Status
XVI	M 3003	Edition 3 Nov.2012	Expression of Uncertainty and Confidence in Measurements
XVII	ETSI TR 100 028	2001-12	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics

4.2. Test and Uncertainty Procedure

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

5. PRODUCT DETAILS AND TEST CONFIGURATIONS

5.1. Technical Details

Details	Description
Purpose:	Test of the Hewlett Packard Enterprise Aruba User Experience Insight to Taiwan LP0002 Low Power Radio-Frequency Devices Technical Regulations
Manufacturer:	Hewlett Packard Enterprise 3333 Scott Blvd. Santa Clara, California 95054 USA
Applicant:	慧與科技股技有限公司 台北市南港區經貿二路66號10之1
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Test report reference number:	HPEN141-T6
Date EUT received:	30 th July 2019
Dates of test (from - to):	31 st July – 10 th September 2019
No of Units Tested:	3
Product Family Name:	Aruba User Experience Insight Sensor
Model(s):	ASIN0301
Location for use:	Indoors
Declared Frequency Range(s):	5150 - 5250; 5250 - 5350; 5470 - 5725; 5725 - 5850 MHz;
Technology:	2x2 MIMO Client Device without radar detection
Type of Modulation:	OFDM
EUT Modes of Operation:	802.11a; 802.11ac-20/40/80; 802.11n HT-20/40;
Declared Nominal Output Power (dBm):	+21 dBm
Rated Input Voltage and Current:	+55Vdc, 0.6A
Operating Temperature Range:	-10°C to +45°C
Equipment Dimensions:	26cm x 7.2cm x 4.2cm
Weight:	<1kg
Hardware Rev:	P2A
Software Rev:	Software Rev: 4.14.76-armada-18.12.3
Product Application:	Mobile & Portable Client Devices

5.2. Scope Of Test Program

Aruba Networks, Hewlett Packard Enterprise Company ASIN0301

The scope of the test program was to test the Aruba Networks, Hewlett Packard Enterprise Company ASIN0301, Aruba User Experience Insight configurations in the frequency ranges 5150 - 5250 MHz; 5250 - 5350 MHz; 5470 - 5725 MHz; 5725 - 5850 MHz; for compliance against the following specification:

Taiwan LP0002 10th January 2018 (UNII Bands, Section 4.7)

Low Power Radio-Frequency Devices Technical Regulations

The applicant will not provide the accompanying accessories with the equipment when sold. The accessories are provided by the laboratory (or the applicant) and inspected simultaneously.

Hewlett Packard Enterprise ASIN0301 - Wireless Network Sensor



5.3. Equipment Model(s) and Serial Number(s)

Type (EUT/ Support)	Equipment Description	Manufacturer	Model No.	Serial No.
EUT Conducted	Mobile & Portable Client Device	Hewlett Packard Enterprise	ASIN0301	TWHXKRY005
EUT Radiated	Mobile & Portable Client Device	Hewlett Packard Enterprise	ASIN0301	TWHXKRY00P
EUT Radiated & DFS	Mobile & Portable Client Device	Hewlett Packard Enterprise	ASIN0301	TWHXKRY00Q
Support	POE Power Supply	D-Link	EBU-101-T2	--
Support	Test Equipment	MiCOM Labs	MiTest	ML512

5.4. Antenna Details

Type	Manufacturer	Model	Family	Gain (dBi)	BF Gain	Dir BW	X-Pol	Frequency Band (MHz)
integral	Aruba	AB1	STAMP	4.9	3.0	360	-	5150 - 5850

BF Gain - Beamforming Gain
 Dir BW - Directional BeamWidth
 X-Pol - Cross Polarization

5.5. Cabling and I/O Ports

Port Type	Max Cable Length	# of Ports	Screened	Connector Type	Data Type	Data Rate(s)
USB	5m	1	Yes	USB	Digital	Unknown
Ethernet PoE IN	>30m	1	No	RJ45	Packet	10,100,1000

5.6. Test Configurations

Results for the following configurations are provided in this report:

Operational Mode(s) (802.11a/b/g/n/ac)	Data Rate with Highest Power MBit/s	Channel Frequency (MHz)		
		Low	Mid	High
5150 - 5250 MHz				
a	6	5,180.00	5,200.00	5,240.00
ac-80	29.3	5,210.00	--	--
HT-20	6.5	5,180.00	5,200.00	5,240.00
HT-40	13.5	5,190.00	--	5,230.00
5250 - 5350 MHz				
a	6	5,260.00	5,300.00	5,320.00
ac-80	29.3	--	--	5,290.00
HT-20	6.5	5,260.00	5,300.00	5,320.00
HT-40	13.5	5,270.00	--	5,310.00
5470 - 5725 MHz				
a	6	5,500.00	5,580.00	5,720.00
ac-80	29.3	5,530.00	5,610.00	5,690.00
HT-20	6.5	5,500.00	5,580.00	5,720.00
HT-40	13.5	5,510.00	5,550.00	5,710.00
5725 - 5850 MHz				
a	6	5,745.00	5,785.00	5,825.00
ac-80	29.3	5,775.00	--	5,775.00
HT-20	6.5	5,745.00	5,785.00	5,825.00
HT-40	13.5	5,755.00	--	5,795.00

5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. NONE

5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE

6. TEST SUMMARY

List of Measurements

Test Header	Result	Data Link
Peak Transmit Power	Complies	View Data
26 dB & 99% Bandwidth	Complies	View Data
6 dB & 99% Bandwidth	Complies	View Data
Power Spectral Density	Complies	View Data
Frequency Stability	Complies	-
Dynamic Frequency Selection (DFS)	Complies	-
Channel Availability Check	*Not Required	-
Initial CAC	*Not Required	-
Beginning CAC	*Not Required	-
End CAC	*Not Required	-
Channel Close / Transmission Time	Complies	View Data
Non-Occupancy Period	Complies	View Data
Probability of Detection	*Not Required	-
Detection Bandwidth	*Not Required	-
Radiated	Complies	-
TX Spurious & Restricted Band Emissions	Complies	View Data
Restricted Edge & Band-Edge Emissions	Complies	View Data
Digital Emissions (0.03 – 1 GHz)	Complies	See MiCOM Labs Test Report HPEN141-G3 FCC Part 15B
AC Wireline	Complies	See MiCOM Labs Test Report HPEN141-G3 FCC Part 15B
Maximum Permissible Exposure	Complies	See MiCOM Labs Test Report HPEN141-FCC MPE
RF Unique Connector	Complies	-

*EUT is a client device without radar detection

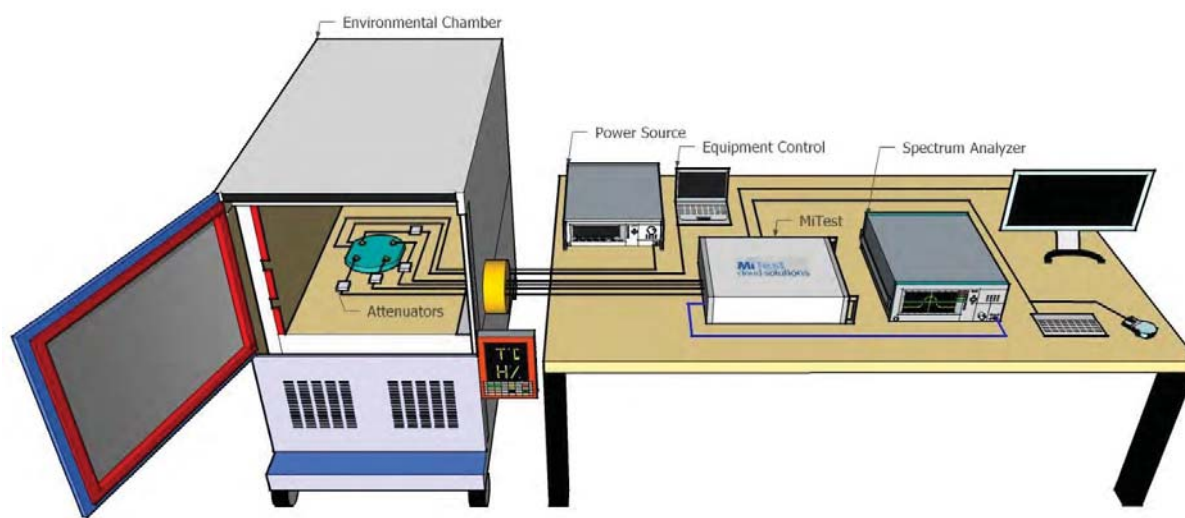
Simultaneous Transmission

The ASIN0301 operates using two technologies BLE and Wi-Fi, these modes of operation can transmit simultaneously. Simultaneous transmission testing was performed to ensure continuous compliance when operating in this mode. No issues were found on the ASIN0301 during the radiated spurious examination where both technologies operated simultaneously

7. TEST EQUIPMENT CONFIGURATION(S)

7.1. Conducted Test Setup

MiTest Automated Test System



A full system calibration was performed on the test station and any resulting system losses (or gains) were considered in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
#3 SA	MiTest Box to SA	Fairview Microwave	SCA1814-0101-72	#3 SA	20 Sep 2019
#3P1	EUT to MiTest box port 1	Fairview Microwave	SCA1814-0101-72	#3P1	20 Sep 2019
#3P2	EUT to MiTest box port 2	Fairview Microwave	SCA1814-0101-72	#3P2	20 Sep 2019
#3P3	EUT to MiTest box port 3	Fairview Microwave	SCA1814-0101-72	#3P3	20 Sep 2019
#3P4	EUT to MiTest box port 4	Fairview Microwave	SCA1812-0101-72	#3P4	20 Sep 2019
249	Resistance Thermometer	Thermotronics	GR2105-02	9340 #2	30 Oct 2019
361	Desktop for RF#1, Labview Software installed	Dell	Vostro 220	WS RF#1	Not Required
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	12 Oct 2019
398	MiTest RF Conducted Test Software	MiCOM	MiTest ATS	Version 4.1	Not Required
405	DC Power Supply 0-60V	Agilent	6654A	MY4001826	Cal when used
408	USB to GPIB interface	National Instruments	GPIB-USB HS	14C0DE9	Not Required



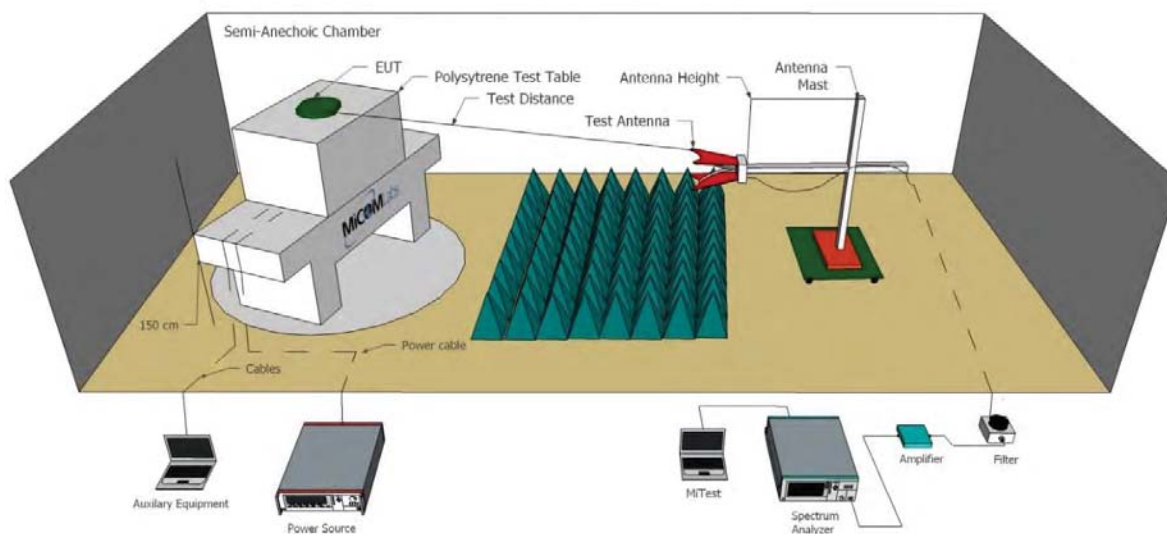
Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

436	USB Wideband Power Sensor	Boonton	55006	8731	14 Sep 2019
440	USB Wideband Power Sensor	Boonton	55006	9178	22 Sep 2019
441	USB Wideband Power Sensor	Boonton	55006	9179	20 Sep 2019
442	USB Wideband Power Sensor	Boonton	55006	9181	6 Oct 2019
445	PoE Injector	D-Link	DPE-101GL	QTAH1E2000625	Not Required
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2019
515	MiTest Cloud Solutions RF Test Box	MiCOM	2nd Gen with DFS	515	20 Sep 2019
75	Environmental Chamber	Thermatron	SE-300-2-2	27946	24 Feb 2020

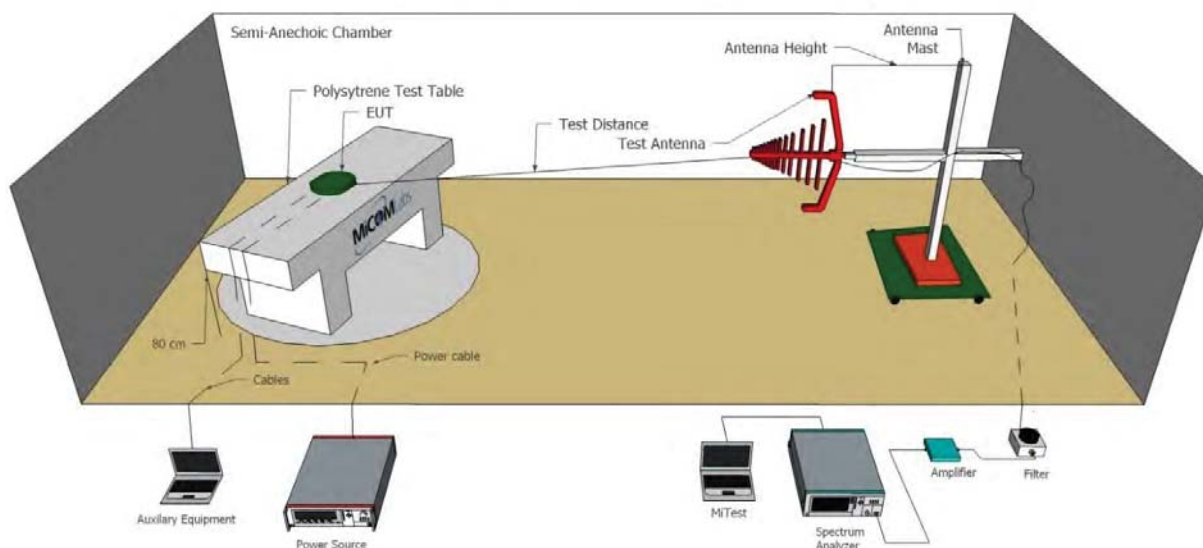
7.2. Radiated Emissions - 3m Chamber

The following tests were performed using the radiated test set-up shown in the diagram below. Radiated emissions above and below 1GHz.

Radiated Emissions Above 1GHz Test Setup



Radiated Emissions Below 1GHz Test Setup

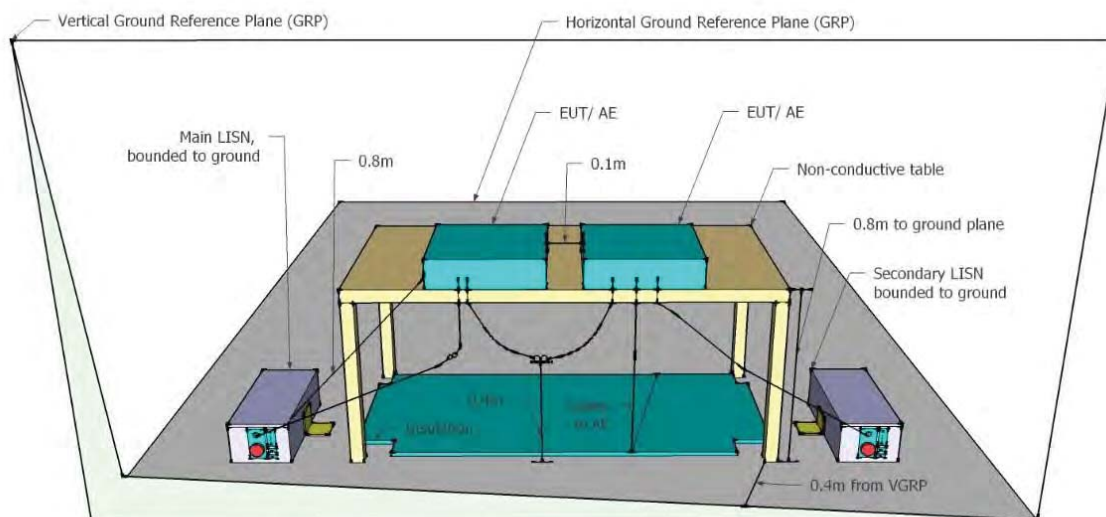


A full system calibration was performed on the test station and any resulting system losses (or gains) were considered in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CU101	04R08507	Not Required
298	3M Radiated Emissions Chamber Maintenance Check	MiCOM	3M Chamber	298	21 Apr 2020
336	Active Loop Antenna	Emco	6502	00060498	29 Nov 2019
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	4 Apr 2020
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	12 Oct 2019
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	12 Apr 2020
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	12 Oct 2019
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	12 Apr 2020
410	Desktop Computer	Dell	Inspiron 620	WS38	Not Required
411	Mast/Turntable Controller	Sunol Sciences	SC98V	060199-1D	Not Required
412	USB to GPIB Interface	National Instruments	GPIB-USB HS	11B8DC2	Not Required
413	Mast Controller	Sunol Science	TWR95-4	030801-3	Not Required
415	Turntable Controller	Sunol Sciences	Turntable Controller	None	Not Required
416	Gigabit ethernet filter	ETS-Lingren	Gigafoil 260366	None	Not Required
447	MiTest Rad Emissions Test Software	MiCOM	Rad Emissions Test Software Version 1.0	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	9 Oct 2019
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	9 Oct 2019
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	9 Oct 2019
465	Low Pass Filter DC-1000 MHz	Mini-Circuits	NLP-1200+	VUU01901402	9 Oct 2019
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	24 Sep 2019
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	24 Sep 2019
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2019
518	Cable - Amp to Antenna	SRC Haverhill	157-3051574	518	24 Sep 2019

7.3. ac Wireline Emissions

Test Setup – Power Input / Output Port



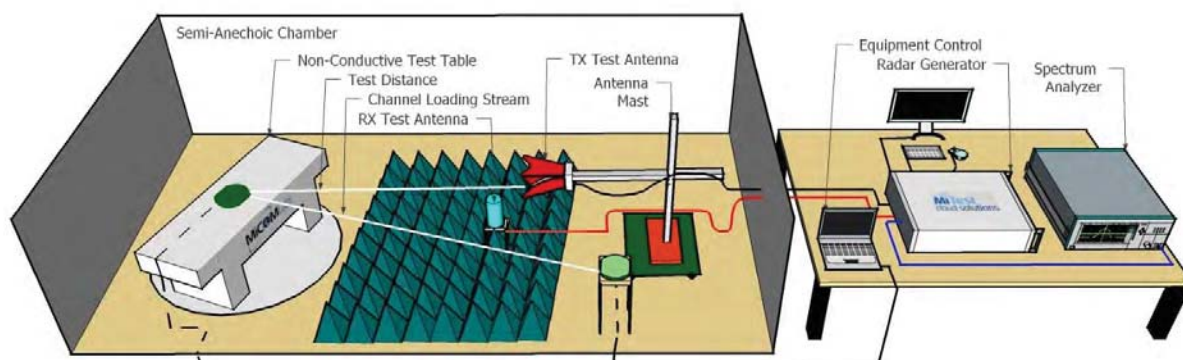
A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
184	Pulse Limiter	Rhode & Schwarz	ESH3Z2	357.8810.52	6 Oct 2019
190	LISN (two-line V-network)	Rhode & Schwarz	ESH3Z5	836679/006	18 Oct 2019
378	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100107/040	12 Oct 2019
295	Conducted Emissions Chamber Maintenance Check	MiCOM	Conducted Emissions Chamber	295	18 Sep 2019
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	11 Sep 2019
316	Dell desktop computer workstation	Dell	Desktop	WS04	Not Required
372	AC Variable PS	California Instruments	1251P	L06951	Cal when used
388	LISN (3 Phase) 9kHz - 30MHz	Rohde & Schwarz	ESH2-Z5	892107/022	20 Oct 2019
496	MiTest Conducted Emissions test software.	MiCOM	Conducted Emissions Test Software Version 1.0	496	Not Required
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2019

7.4. Dynamic Frequency Selection (DFS)

Setup for Radiated DFS testing in 3 m chamber where the EUT is the Client device communicating with Master device over the air. Radar Test Waveforms are injected from the MiTest equipment and detected by the Master.

Dynamic Frequency Selection (DFS) - Radiated



A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
0507	Power Meter EPM Series	Agilent	E4418B	MY40511221	20 Oct 2019
104	Antenna Horn 1-18GHz	Electro-Mechanics	3115	9205-3882	28 Sep 2019
117	Low Power Sensor - 70dBm to -20dBm 50 MHz - 50GHz	HP	8487D	3318A00371	21 Sep 2019
207	Radiated Immunity Chamber Maintenance Check	MiCOM	Rad Imm Chamber	207	18 Sep 2019
444	SMA Cable Assembly	ETS-Lindgren	RFC-NMS-100-SMS-256 IN	001	Cal when used
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2019
71	Spectrum Analyser 9KHz-50GHz	HP	8565E	3425A00181	18 Sep 2019
DFS PCIe#1	PCIe cable for Aeroflex	National Instruments	PCIe cable	None	Not Required
512	MiTest DFS Test System	MiCOM Labs Inc.	MiTest	3C:FD:FE:9F:B4:58	15 Sep 2019

8. MEASUREMENT AND PRESENTATION OF TEST DATA

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Data'.

Test and report automation was performed by [MiTest](#). [MiTest](#) is an automated test system developed by MiCOM Labs. [MiTest](#) is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.



The MiCOM Labs "[MiTest](#)" Automated Test System" (Patent Pending)

9. TEST RESULTS

9.1. Maximum Conducted Output Power

Conducted Test Conditions for Maximum Conducted Output Power			
Standard:	Taiwan LP0002	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	Maximum Conducted Output Power	Rel. Humidity (%):	32 - 45
Standard Section(s):	4.7.3.1 (2) (A), 4.7.3.2 (1), 4.7.3.3. (1)	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Maximum Conducted Output Power Measurement

Method PM (Measurement using an RF average power meter). KDB 789033 defines a methodology using an average wideband power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate center frequency. All operational modes and frequency bands were measured independently and the resultant calculated. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported separately. A summation (Σ) of each antenna port output power is provided which includes any offset due to Duty Cycle Correction Factor (DCCF). Testing was performed under ambient conditions at nominal voltage.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document. Supporting Information

Calculated Power = $A + G + Y + 10 \log (1/x) \text{ dBm}$

A = Total Power [$10 \cdot \log_{10} (10^{a/10} + 10^{b/10} + 10^{c/10} + 10^{d/10})$]

G = Antenna Gain

Y = Beamforming Gain

x = Duty Cycle (average power measurements only)

Limits Maximum Conducted Output Power

Operating Frequency Band 5150-5250 MHz

15. 407 (a)(1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. 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).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are

used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Operating Frequency Band 5250-5350 and 5470 – 5725 MHz

15. 407 (a)(2)

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Operating Frequency Band 5725 – 5850 MHz

15. 407 (a)(3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

NOTE: All recorded power settings incorporate any reduction in output power brought about as a result of radiated spurious emissions and radiated band-edge testing.



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5180.0	16.22	13.62	--	--	18.12	Not Applicable	30.00	-11.88	
5200.0	18.34	18.18	--	--	21.27	Not Applicable	30.00	-8.73	
5240.0	18.23	18.21	--	--	21.23	Not Applicable	30.00	-8.77	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5210.0	13.43	12.81	--	--	16.14	Not Applicable	28.10	-11.96	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	1.33 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5180.0	15.37	12.70	--	--	17.25	Not Applicable	28.10	-10.85	
5200.0	18.40	16.45	--	--	20.54	Not Applicable	28.10	-7.56	
5240.0	18.34	16.55	--	--	20.55	Not Applicable	28.10	-7.55	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	1.33 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5190.0	12.38	12.70	--	--	15.55	Not Applicable	28.10	-12.55	
5230.0	16.16	16.40	--	--	19.29	Not Applicable	28.10	-8.81	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	1.33 dB

Equipment Configuration for Peak Transmit Power

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5260.0	16.22	18.22	--	--	20.34	30.862	24.00	-3.66	
5300.0	16.11	18.19	--	--	20.28	24.609	24.00	-3.72	
5320.0	14.93	11.59	--	--	16.58	19.960	24.00	-7.42	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	?2.81 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results									
Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5290.0	11.41	9.94	--	--	13.75	82.405	22.10	-8.35	

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5260.0	16.26	18.19	--	--	20.34	30.301	22.10	-1.76	
5300.0	16.08	18.15	--	--	20.25	29.659	22.10	-1.85	
5320.0	16.30	18.12	--	--	20.31	20.120	22.10	-1.79	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	?2.81 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5270.0	16.62	18.58	--	--	20.72	72.946	22.10	-1.38	
5310.0	13.22	9.83	--	--	14.86	41.363	22.10	-7.24	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5500.0	14.70	11.44	--	--	16.38	19.880	23.98	-7.60	
5580.0	16.91	18.25	--	--	20.64	36.072	24.00	-3.36	
5720.0	17.23	18.25	--	--	20.78	35.912	24.00	-3.22	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5530.0	10.04	10.17	--	--	13.12	82.405	22.10	-8.98	
5610.0	17.96	18.39	--	--	21.19	196.794	22.10	-0.91	
5690.0	14.03	14.34	--	--	17.20	235.511	22.10	-4.90	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5500.0	12.57	12.93	--	--	15.76	20.120	22.10	-6.34	
5580.0	16.97	18.42	--	--	20.77	41.162	22.10	-1.33	
5720.0	17.25	18.36	--	--	20.85	40.762	22.10	-1.25	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5510.0	11.61	11.79	--	--	14.71	40.561	22.10	-7.39	
5550.0	16.83	18.26	--	--	20.61	85.531	22.10	-1.49	
5710.0	16.19	17.25	--	--	19.76	86.533	22.10	-2.34	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Equipment Configuration for Peak Transmit Power

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5745.0	18.05	18.63	--	--	21.36	Not Applicable	30.00	-8.64	
5785.0	17.79	18.18	--	--	21.00	Not Applicable	30.00	-9.00	
5825.0	16.47	18.07	--	--	20.35	Not Applicable	30.00	-9.65	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11ac-80	Duty Cycle (%):	98.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5775.0	18.07	18.27	--	--	21.18	Not Applicable	28.10	-6.92	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	1.33 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
 To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
 Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5745.0	17.21	18.34	--	--	20.82	Not Applicable	28.10	-7.28	
5785.0	16.80	18.29	--	--	20.62	Not Applicable	28.10	-7.48	
5825.0	16.58	18.21	--	--	20.48	Not Applicable	28.10	-7.62	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	1.33 dB



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5755.0	16.90	18.12	--	--	20.56	Not Applicable	28.10	-7.54	
5795.0	16.67	18.13	--	--	20.47	Not Applicable	28.10	-7.63	

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	1.33 dB

9.2. 26 dB & 99% Bandwidth

Conducted Test Conditions for 26 dB and 99% Bandwidth			
Standard:	Taiwan LP0002	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	26 dB and 99 % Bandwidth	Rel. Humidity (%):	32 - 45
Standard Section(s):	4.7.2.3	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		
Test Procedure for 26 dB and 99% Bandwidth Measurement Emission bandwidth: For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points (one below and one above the carrier center frequency) that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1 % of the emission bandwidth of the device being measured. Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported. Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.			

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5180.0	19.719	19.719	--	--	19.719	19.719		
5200.0	28.778	25.251	--	--	28.778	25.251		
5240.0	32.144	29.739	--	--	32.144	29.739		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5180.0	16.673	16.673	--	--	16.673	16.673		
5200.0	16.914	16.914	--	--	16.914	16.914		
5240.0	16.994	16.834	--	--	16.994	16.834		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5210.0	83.687	82.405	--	--	83.687	82.405		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5210.0	76.633	76.313	--	--	76.633	76.313		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5180.0	20.120	20.120	--	--	20.120	20.120		
5200.0	37.194	21.403	--	--	37.194	21.403		
5240.0	21.563	21.563	--	--	21.563	21.563		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5180.0	17.715	17.715	--	--	17.715	17.715		
5200.0	18.036	17.715	--	--	18.036	17.715		
5240.0	17.796	17.796	--	--	17.796	17.796		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5190.0	41.202	40.561	--	--	41.202	40.561		
5230.0	85.050	55.311	--	--	85.050	55.311		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5190.0	36.393	36.232	--	--	36.393	36.232		
5230.0	38.717	36.393	--	--	38.717	36.393		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Measurement Results								
Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5260.0	41.202	30.862	--	--	41.202	30.862		
5300.0	38.557	24.609	--	--	38.557	24.609		
5320.0	20.361	19.960	--	--	20.361	19.960		
Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5260.0	17.796	16.754	--	--	17.796	16.754		
5300.0	17.555	16.834	--	--	17.555	16.834		
5320.0	16.673	16.673	--	--	16.673	16.673		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Measurement Results								
Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5290.0	82.405	112.224	--	--	112.224	82.405		
Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5290.0	76.633	76.313	--	--	76.633	76.313		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5260.0	41.443	30.301	--	--	41.443	30.301		
5300.0	29.659	29.659	--	--	29.659	29.659		
5320.0	20.120	20.200	--	--	20.200	20.120		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5260.0	17.916	16.834	--	--	17.916	16.834		
5300.0	16.834	16.834	--	--	16.834	16.834		
5320.0	17.715	17.715	--	--	17.715	17.715		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5270.0	75.992	72.946	--	--	75.992	72.946		
5310.0	41.363	43.447	--	--	43.447	41.363		
Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5270.0	37.675	36.874	--	--	37.675	36.874		
5310.0	36.393	36.232	--	--	36.393	36.232		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:		Mac Address 204C0380E4BE	

Test Measurement Results

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5500.0	19.880	20.040	--	--	20.040	19.880		
5580.0	38.156	36.072	--	--	38.156	36.072		
5720.0	38.036	35.912	--	--	38.036	35.912		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5500.0	16.673	16.673	--	--	16.673	16.673		
5580.0	19.118	17.315	--	--	19.118	17.315		
5720.0	20.321	17.395	--	--	20.321	17.395		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5530.0	82.405	82.405	--	--	82.405	82.405		
5610.0	196.794	199.599	--	--	199.599	196.794		
5690.0	151.343	166.253	--	--	166.253	151.343		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5530.0	76.313	76.313	--	--	76.313	76.313		
5610.0	99.399	92.986	--	--	99.399	92.986		
5690.0	77.435	76.954	--	--	77.435	76.954		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5500.0	20.120	20.361	--	--	20.361	20.120		
5580.0	41.804	41.162	--	--	41.804	41.162		
5720.0	42.926	40.762	--	--	42.926	40.762		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5500.0	17.635	17.715	--	--	17.715	17.635		
5580.0	23.327	19.118	--	--	23.327	19.118		
5720.0	23.086	19.238	--	--	23.086	19.238		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Port Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5510.0	42.164	40.561	--	--	42.164	40.561		
5550.0	93.407	85.531	--	--	93.407	85.531		
5710.0	89.659	86.533	--	--	89.659	86.533		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5510.0	36.553	36.393	--	--	36.553	36.393		
5550.0	50.261	38.076	--	--	50.261	38.076		
5710.0	51.363	38.677	--	--	51.363	38.677		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

9.3. 6 dB & 99% Bandwidth

Conducted Test Conditions for 6 dB and 99% Bandwidth			
Standard:	Taiwan LP0002	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	6 dB and 99 % Bandwidth	Rel. Humidity (%):	32 - 45
Standard Section(s):	4.7.5	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		
Test Procedure for 6 dB and 99% Bandwidth Measurement The bandwidth at 6 dB and 99 % is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. The Resolution Bandwidth was set to 100 kHz. Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported. Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document. 4.7.5 Within the 5.725 GHz~5.850 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.			

Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:		Mac Address 204C0380E4BE	

Test Measurement Results

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz)				6 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5745.0	16.353	16.353	--	--	16.353	16.353		
5785.0	16.353	16.353	--	--	16.353	16.353		
5825.0	16.353	16.353	--	--	16.353	16.353		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5745.0	17.315	16.513	--	--	17.315	16.513		
5785.0	17.315	16.834	--	--	17.315	16.834		
5825.0	17.154	16.834	--	--	17.154	16.834		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	802.11ac-80	Duty Cycle (%):	98.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Measurement Results								
Test Frequency	Measured 6 dB Bandwidth (MHz)				6 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5775.0	75.752	75.752	--	--	75.752	75.752		
Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5775.0	90.180	77.355	--	--	90.180	77.355		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz)				6 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5745.0	17.555	17.555	--	--	17.555	17.555		
5785.0	17.635	17.635	--	--	17.635	17.635		
5825.0	17.555	17.555	--	--	17.555	17.555		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5745.0	19.078	18.036	--	--	19.078	18.036		
5785.0	18.517	17.956	--	--	18.517	17.956		
5825.0	18.357	18.036	--	--	18.357	18.036		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz)				6 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5755.0	35.591	35.431	--	--	35.591	35.431		
5795.0	35.752	35.752	--	--	35.752	35.752		
Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5755.0	37.355	36.713	--	--	37.355	36.713		
5795.0	36.393	36.393	--	--	36.393	36.393		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

9.4. Power Spectral Density

Conducted Test Conditions for Power Spectral Density			
Standard:	Taiwan LP0002	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	Power Spectral Density	Rel. Humidity (%):	32 - 45
Standard Section(s):	4.7.3.1 (2) (A), 4.7.3.2 (1), 4.7.3.3. (1)	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Power Spectral Density

The in-band power spectral density was measured using the test technique specified in KDB 789033. A 1 MHz measurement bandwidth was implemented for the analyzer sweep. Once the sweep is complete the analyzer trace data is downloaded and used for post processing purposes.

Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured separately. The Peak Power Spectral Density is the highest level found across the emission bandwidth. With multiple antenna port measurements the numerical analyzer data from each port is summed (à) and a link to this additional graphic is provided.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.

Measure and sum the spectra across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The individual spectra are then summed mathematically in linear power units. Unlike in-band power measurements, in which the sum involves a single measured value (output power) from each output, measurements for compliance with PSD limits involve summing entire spectra across corresponding frequency bins on the various outputs. Consistency is maintained for any device with multiple transmitter outputs to be certain the individual outputs are all aligned with the same span and same number of points. In this instance, the linear power spectrum value within the first spectral bin of output 0 is summed with that in the first spectral bin of output 1, and the first spectral bin of output 2, and so on up to the Nth output to obtain the true value for the first frequency bin of the summed spectrum. The summed spectrum value for each frequency bin is computed in this fashion. These summed spectral values were post processed and the resulting numerical and graphical data presented.

NOTE: It may be observed that spectrum in some plots break the limit line however this in itself does NOT constitute a failure. In all cases a spectrum summation plot is provided in order to prove compliance. A failure occurs only after the summation of all spectrum plots have been summed and are found to be greater than the limit line.

Supporting Information

Calculated Power = $A + 10 \log (1/x)$ dBm

A = Total Power Spectral Density [$10 \cdot \log_{10} (10^{a/10} + 10^{b/10} + 10^{c/10} + 10^{d/10})$]

x = Duty Cycle

Limits Power Spectral Density

Operating Frequency Band 5150-5250 MHz (Indoor Access)

4.7.3.1 (2) (B) The maximum power spectral density shall be less than or equal to 17 dBm in any 1 MHz band.

4.7.3.1 (2) (C) If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dBi that the directional gain of the antenna exceeds 6 dBi.

Operating Frequency Band 5250-5350 and 5470 – 5725 MHz

4.7.3.2 (2) The maximum power spectral density shall be less than or equal to 11 dBm in any 1 MHz band.

4.7.3.2 (3) If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dBi that the directional gain of the antenna exceeds 6 dBi.

Operating Frequency Band 5725 – 5850 MHz

4.7.3.3 (2) The maximum power spectral density shall be less than or equal to 30 dBm in any 500 kHz band.

4.7.3.3 (3) Fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

4.7.3.3 (4) In addition to (3), if transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dBi that the directional gain of the antenna exceeds 6 dBi.



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5180.0	2.242	-1.566	--	--	3.795	17.0	-13.2
5200.0	4.152	4.047	--	--	7.179	17.0	-9.8
5240.0	4.110	4.037	--	--	7.159	17.0	-9.9

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).



Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.56 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5210.0	-7.631	-8.115	--	--	-4.381	15.1	-19.5

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

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Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5180.0	1.074	-1.652	--	--	3.008	15.1	-12.1
5200.0	4.000	2.080	--	--	6.196	15.1	-8.9
5240.0	4.005	2.212	--	--	6.275	15.1	-8.8

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

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Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5190.0	-4.890	-4.522	--	--	-1.619	15.1	-16.7
5230.0	-0.886	-0.853	--	--	2.217	15.1	-12.9

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

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Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5260.0	1.768	3.929	---	---	6.069	11.0	-4.9
5300.0	1.679	3.903	---	---	6.012	11.0	-5.0
5320.0	0.709	-2.624	---	---	2.394	11.0	-8.6

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	?2.81 dB

DCCF - Duty Cycle Correction Factor

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Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.56 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5290.0	-10.181	-11.284	--	--	-7.275	9.1	-16.4

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

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Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5260.0	1.875	3.812	--	--	6.018	9.1	-3.1
5300.0	1.744	3.890	--	--	6.002	9.1	-3.1
5320.0	-0.320	-4.724	--	--	1.096	9.1	-8.0

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

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Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5270.0	0.114	2.023	--	--	4.222	9.1	-4.9
5310.0	-4.252	-7.772	--	--	-2.632	9.1	-11.7

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

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Title: Hewlett Packard Enterprise, Aruba User Experience Insight
To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5500.0	0.395	-3.211	--	--	2.053	11.0	-9.0
5580.0	2.716	3.826	--	--	6.363	11.0	-4.6
5720.0	2.985	3.580	--	--	6.350	11.0	-4.7

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

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To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.56 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5530.0	-12.007	-11.498	--	--	-8.358	9.1	-17.5
5610.0	-3.371	-2.744	--	--	0.387	9.1	-8.7
5690.0	-3.542	-3.018	--	--	0.166	9.1	-8.9

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

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To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5500.0	-1.916	-1.870	---	---	1.200	9.1	-7.9
5580.0	2.798	3.883	---	---	6.441	9.1	-2.7
5720.0	2.807	3.605	---	---	6.251	9.1	-2.9

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

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To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5510.0	-6.294	-6.593	--	--	-3.416	9.1	-12.5
5550.0	0.125	1.076	--	--	3.725	9.1	-5.4
5710.0	0.482	0.705	--	--	3.621	9.1	-5.5

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Power Spectral Density

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/500 KHz)						
MHz	a	b	c	d	dBm/500 KHz	dBm/500 KHz	dB
5745.0	0.743	-6.955	--	--	1.488	30.0	-28.5
5785.0	0.404	0.811	--	--	3.711	30.0	-26.3
5825.0	-0.953	0.538	--	--	2.931	30.0	-27.1

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

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To: Taiwan LP0002 January 2018 (UNII Bands, Section 4.7)
Serial #: HPEN141-T6 Rev B (Wi-Fi)

Equipment Configuration for Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	98.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Summation Peak Marker + DCCF (+0.09 dB)	Limit	Margin
	Port(s) (dBm/500 KHz)						
MHz	a	b	c	d	dBm/500 KHz	dBm/500 KHz	dB
5775.0	-7.018	-5.451	---	---	0.075	28.1	-28.0

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

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