RF Exposure Evaluation Declaration

FCC ID: Q9DAPIN0514515

APPLICANT: Hewlett Packard Enterprise Company

Application Type: Certification

Product: ACCESS POINT

Model No.: APIN0514, APIN0515

Trademark: aruba a Hewlett Packard Enterprise company , Hewlett Packard Enterprise

FCC Classification: Digital Transmission System (DTS)
Unlicensed National Information Infrastructure (UNII)

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Testing Laboratory
3261

Revision History

Report No.	Version	Description	Issue Date	Note
1807TW0111-U5	Rev. 01	Initial report	08-30-2018	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	ACCESS POINT
Model No.:	APIN0514, APIN0515
Brand Name:	aruba a Hewlett Packard Enterprise company , Hewlett Packard Enterprise
Wi-Fi Specification:	802.11a/b/g/n/ac/ax
Bluetooth Specification:	v4.2 single mode
Zigbee Specification:	802.15.4
Software Version:	F.0.8
Operating Temperature:	0 ~ 50 °C
Power Type:	AC Adapter or POE input
Operating Environment:	Indoor Use

Note: The difference between models is that EUT use different antenna and appearance, APIN0514 use some external antennas, but APIN0515 use internal antenna, other hardware and software are the same. Besides, each model has its own power parameter value.

1.2. Antenna Description

Model No.: APIN0514

Antenna No.	Directionality	Frequency Band (GHz)	Model No.	Max Peak Gain (dBi)	BF Gain (dBi)	CDD Directional Gain (dBi)	
						For Power	For PSD
Wi-Fi External Antenna List (2.4GHz 2*2 MIMO, 5GHz 4*4 MIMO)							
1	Omni	2.4	AP-ANT-40	**4.0**	3.01	4.0	7.01
		5		5.0	6.02	5.0	11.02
2	Omni	2.4	AP-ANT-19	3.0	3.01	3.0	6.01
		5		**6.0**	6.02	6.0	12.02
3	Omni	2.4	AP-ANT-1W	3.8	3.01	3.8	6.81
		5		5.8	6.02	5.8	11.82
4	Omni	2.4	AP-ANT-13B	2.3	3.01	2.3	5.31
		5		4.0	6.02	4.0	10.02
5	Omni	2.4	AP-ANT-20W	**2.0**	3.01	2.0	5.01
		5		**2.0**	6.02	2.0	8.02
6 (Note 3)	Directional	2.4	AP-ANT-45	4.5	0.00	4.5	4.50
		5		5.5	3.01	5.5	8.51
7 (Note 3)	Directional	2.4	AP-ANT-48	**8.5**	0.00	8.5	8.5
		5		**8.5**	3.01	8.5	11.51
Bluetooth & ZigBee Internal Antenna							
PCB		2.4		4.9			

Model No.: APIN0515

Directionality	Frequency Band (GHz)	Max Peak Gain (dBi)	BF Gain (dBi)	CDD Directional Gain (dBi)	
				For Power	For PSD
Wi-Fi Internal Antenna List (2.4GHz 2*2 MIMO, 5GHz 4*4 MIMO)					
Omni	2.4	3.77	3.01	3.77	6.78
Omni	5	4.55	5.97	4.55	10.52
Bluetooth & ZigBee Internal Antenna					
PCB	2.4	3.5			

Note:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.
   For CDD transmissions, directional gain is calculated as follows, N_{ANT} = 2, N_{SS} = 1.
   If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.
   - For power spectral density (PSD) measurements on all devices,
     Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;
   - For power measurements on IEEE 802.11 devices,
     Array Gain = 0 dB for N_{ANT} ≤ 4;
2. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac/ax, not include 802.11a/b/g. Directional gain = G_{ANT} + BF Gain, BF Gain was declared by the applicant.
3. Two antennas have Cross-Polarized design, the detail see the antenna specification.

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where
Pd = power density in mW/cm^2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 3.1416
r = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, $1mW/cm^2$. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Result of RF Exposure Evaluation

Product	ACCESS POINT
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.2.

Maximum EIRP for each model

Test Mode	Frequency Band (MHz)	Max Conducted Power (dBm)	Antenna Gain (dBi)	Max EIRP (dBm)
Model No.: APIN0514				
BLE	2402 ~ 2480	7.29	4.9	12.19
ZigBee	2405 ~ 2480	6.69	4.9	11.59
802.11b/g/n	2412 ~ 2462	21.19	2.0	23.19
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	24.14	2.0	26.14
Model No.: APIN0515				
BLE	2402 ~ 2480	7.95	3.5	11.45
ZigBee	2405 ~ 2480	6.98	3.5	10.48
802.11b/g/n	2412 ~ 2462	21.27	3.77	25.04
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	24.37	4.55	28.92

Model No.: APIN0514

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)
BLE	2402 ~ 2480	12.19	0.0033	1
ZigBee	2405 ~ 2480	11.59	0.0029	1
802.11b/g/n	2412 ~ 2462	23.19	0.0415	1
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	26.14	0.0818	1

CONCULISON:

Both of the WLAN 2.4GHz Band, WLAN 5GHz Band, BLE or ZigBee Band can transmit simultaneously.

The max Power Density at R (20 cm) = $0.0033mW/cm^2 + 0.0415mW/cm^2 + 0.0818mW/cm^2 = 0.1266mW/cm^2 < 1mW/cm^2$.

Therefore, the Min Safety Distance is 20cm.

Model No.: APIN0515

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)
BLE	2402 ~ 2480	11.45	0.0028	1
ZigBee	2405 ~ 2480	10.48	0.0022	1
802.11b/g/n	2412 ~ 2462	25.04	0.0635	1
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	28.92	0.1551	1

CONCULISON:

Both of the WLAN 2.4GHz Band, WLAN 5GHz Band, BLE or ZigBee band can transmit simultaneously.

The max Power Density at R (20 cm) = $0.0028mW/cm^2 + 0.0635mW/cm^2 + 0.1551mW/cm^2 = 0.2214mW/cm^2 < 1mW/cm^2$.

Therefore, the Min Safety Distance is 20cm.

The End