RF Exposure Evaluation Declaration

FCC ID: Q9DAPEX057457

APPLICANT: Hewlett Packard Enterprise Company

Application Type: Certification

Product: ACCESS POINT

Model No.: APEX0574, APEX0575, APEX0577

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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3261

Revision History

Report No.	Version	Description	Issue Date	Note
2003TW0002-U6	Rev. 01	Initial report	04-20-2020	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	ACCESS POINT
Model No.:	APEX0574, APEX0575, APEX0577
Wi-Fi Specification:	802.11a/b/g/n/ac/ax
Bluetooth Specification:	v4.2 single mode
Zigbee Specification:	802.15.4
Operating Temperature	-40 ~ 65 °C
Power Type	POE input
Operating Environment	Outdoor Use

Note: The difference between three models is that EUT use different antenna and appearance, other hardware and software are the same. Each model has its own power parameter value.

1.2. Antenna Description

Model No.: APEX0574

Antenna No.	Antenna Type	Frequency Band (GHz)	Model No.	Max Peak Gain (dBi)	30 Degree Ant Gain (dBi)	BF Dir Gain (dBi)	CDD Dir Gain (dBi)	
							For Power	For PSD
Wi-Fi External Antenna List (2.4GHz 2*2 MIMO, 5GHz 4*4 MIMO)								
1 (Note 3)	Omni	2.4	ANT-2x2-2005	5.0	N/A	5.0	5.0	5.0
2 (Note 3)	Omni	5	ANT-2x2-5005	5.0	0	8.01	5.0	8.01
3 (Note 3)	Omni	5	ANT-2x2-5010	10.0	0	13.01	10.0	13.01
4 (Note 3)	Directional	2.4	ANT-2x2-2314	14.0	N/A	14.0	14.0	14.0
5 (Note 3)	Directional	5	ANT-3x3-5712	11.5	1.5	14.51	11.5	14.51
6 (Note 3)	Directional	5	ANT-4x4-5314	14.0	6.0	17.01	14.0	17.01
7 (Note 3)	Directional	5	MT-484052/NVH	16.0	3.0	19.01	16.0	19.01
8 (Note 3)	Directional	2.4	ANT-3x3-D608	7.5	N/A	10.51	7.5	10.51
		5		7.5	4.5	10.51	7.5	10.51
9 (Note 3)	Directional	2.4	ANT-3x3-D100	5.0	N/A	8.01	5.0	8.01
		5		5.0	4.0	8.01	5.0	8.01
Bluetooth Internal Antenna								
PCB		2.4		4.2				

Model No.: APEX0577

Antenna Type	Frequency Band (GHz)	Max Peak Gain (dBi)	30 Degree Ant Gain (dBi)	BF Dir Gain (dBi)	CDD Dir Gain (dBi)	
					For Power	For PSD
Wi-Fi Internal Antenna List (2.4GHz 2*2 MIMO, 5GHz 4*4 MIMO)						
Directional (Note 3)	2.4	6.8	N/A	6.80	6.8	6.80
Directional (Note 3)	5	5.6	5.6	8.60	5.6	8.60
Bluetooth Internal Antenna						
PCB	2.4	8.4				

Model No.: APEX0575

Antenna Type	Frequency Band (GHz)	Max Peak Gain (dBi)	30 Degree Ant Gain (dBi)	BF Dir Gain (dBi)	CDD Dir Gain (dBi)	
					For Power	For PSD
Wi-Fi Internal Antenna List (2.4GHz 2*2 MIMO, 5GHz 4*4 MIMO)						
Omni (Note 3)	2.4	3.4	N/A	3.4	3.4	3.4
Omni (Note 3)	5	5.0	-2.7	8.0	5.0	8.0
Bluetooth Internal Antenna						
PCB	2.4	6.0				

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 or 4, 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 $N_{ANT} \leq 4$;
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. These 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)
APEX0574				
Bluetooth-LE	2402 ~ 2480	8.00	4.2	12.20
ZigBee	2405 ~ 2480	8.50	4.2	12.70
802.11b/g/n/ax	2412 ~ 2462	27.00	5.0	32.00
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	30.00	5.0	35.00
APEX0575				
Bluetooth-LE	2402 ~ 2480	8.00	6.0	14.00
ZigBee	2405 ~ 2480	8.50	6.0	14.50
802.11b/g/n/ax	2412 ~ 2462	27.00	3.4	30.40
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	30.00	5.0	35.00
APEX0577				
Bluetooth-LE	2402 ~ 2480	8.00	8.4	16.40
ZigBee	2405 ~ 2480	8.50	8.4	16.90
802.11b/g/n/ax	2412 ~ 2462	27.00	6.8	33.80
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	30.00	5.6	35.60

Note: Power tolerance was considered for conducted power assessment.

Model No.: APEX0574

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)
Bluetooth-LE	2402 ~ 2480	12.20	0.0033	1
ZigBee	2405 ~ 2480	12.70	0.0037	1
802.11b/g/n	2412 ~ 2462	32.00	0.3153	1
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	35.00	0.6291	1

CONCULISON:

Wi-Fi 2.4GHz & Wi-Fi 5GHz & Bluetooth-LE or ZigBee can transmit simultaneously.

The max Power Density at R (20 cm) = $0.0037mW/cm^2 + 0.3153mW/cm^2 + 0.6291mW/cm^2 = 0.9481mW/cm^2 < 1mW/cm^2$.

Therefore, the Min Safety Distance is 20cm.

Model No.: APEX0575

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)
Bluetooth-LE	2402 ~ 2480	14.00	0.0050	1
ZigBee	2405 ~ 2480	14.50	0.0056	1
802.11b/g/n	2412 ~ 2462	30.40	0.2181	1
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	35.00	0.6291	1

CONCULISON:

Wi-Fi 2.4GHz & Wi-Fi 5GHz & Bluetooth-LE or ZigBee can transmit simultaneously.

The max Power Density at R (20 cm) = $0.0056mW/cm^2 + 0.2181mW/cm^2 + 0.6291mW/cm^2 = 0.8529mW/cm^2 < 1mW/cm^2$.

Therefore, the Min Safety Distance is 20cm.

Model No.: APEX0577

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Power Density at R = 23 cm (mW/cm^2)
Bluetooth-LE	2402 ~ 2480	16.40	0.0087	1	0.0066
ZigBee	2405 ~ 2480	16.90	0.0097	1	0.0074
802.11b/g/n	2412 ~ 2462	33.80	0.4772	1	0.3609
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	35.60	0.7223	1	0.5462

CONCULISON:

Wi-Fi 2.4GHz & Wi-Fi 5GHz & Bluetooth-LE or ZigBee can transmit simultaneously.

The max Power Density at R (20 cm) = $0.0097mW/cm^2 + 0.4772mW/cm^2 + 0.7223mW/cm^2 = 1.2093mW/cm^2 > 1mW/cm^2$.

The max Power Density at R (23 cm) = $0.0074mW/cm^2 + 0.3609mW/cm^2 + 0.5462mW/cm^2 = 0.9145mW/cm^2 < 1mW/cm^2$.

Therefore, the Min Safety Distance is 23cm.

The End