RF Exposure Evaluation Declaration

FCC ID: Q9DAPEX058457

APPLICANT: Hewlett Packard Enterprise Company

Application Type: Certification

Product: ACCESS POINT

Model No.: APEX0587, APEX0584, APEX0585

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
2105TW0005-U6	Rev. 01	Initial Report	12-31-2021	Valid

CONTENTS

1. Product Information

1.1. Equipment Description

Product Name	ACCESS POINT
Model No.	APEX0587, APEX0584, APEX0585
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Bluetooth Specification	v5.0 single mode, BLE only
ZigBee Specification	802.15.4
Operating Temperature	-40 ~ 65 °C
Power Type	AC input or PoE input
Operating Environment	Outdoor Use
Antenna Information	Refer to Section 1.2
Remark: Note 1: The difference between three models is that the EUT use different antenna and appearance, other hardware and software are the same. Each model has its own power parameter value. Note 2: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.2. Antenna Description

APEX0585

Polarization	Frequency Band (GHz)	Max Peak Gain (dBi)	30 Degree ANT Gain (dBi)	CDD Directional Gain (dBi)		BF Gain (dBi)
				For Power	For PSD	
Wi-Fi Internal Antenna (4*4 MIMO)						
Omni (Note 2)	2.4 ~ 2.5	3.0	N/A	3.00	6.01	6.01
	5.15 ~ 5.85	4.5	-5.00	4.50	7.51	7.51
Bluetooth / ZigBee Internal Antenna						
Omni	2.4 ~ 2.5	4.8				

APEX0584

Polarization	Frequency Band (GHz)	Model No.	Max Peak Gain (dBi)	30 Degree ANT Gain (dBi)	BF Gain (dBi)	CDD Directional Gain (dBi)	
						For Power	For PSD
Wi-Fi External Antenna List (4*4 MIMO)							
Omni (Note 2)	2.4 ~ 2.5	ANT-2x2-2005	5.0	N/A	8.01	5.0	8.01
Omni (Note 2)	5.15 ~ 5.85	ANT-2x2-5005	5.0	0	8.01	5.0	8.01
Omni (Note 2)	5.15 ~ 5.85	ANT-2x2-5010	10.0	0	13.01	10.0	13.01
Directional (Note 2)	2.4 ~ 2.5	ANT-2x2-2714	14.0	N/A	17.01	14.0	17.01
Directional (Note 2)	2.4 ~ 2.5	ANT-2x2-2314	14.0	N/A	14.00	14.0	14.00
Directional (Note 2)	5.15 ~ 5.85	ANT-3x3-5712	11.5	1.5	14.51	11.5	14.51
Directional (Note 2)	5.15 ~ 5.85	ANT-4x4-5314	14.0	6.0	17.01	14.0	17.01
Directional (Note 2)	2.4 ~ 2.5	ANT-4x4-D608	7.5	N/A	10.51	7.5	10.51
	5.15 ~ 5.85		7.5	4.5	10.51	7.5	10.51
Directional (Note 2)	2.4 ~ 2.5	ANT-4x4-D100	5.0	N/A	8.01	5.0	8.01
	5.15 ~ 5.85		5.0	4.0	8.01	5.0	8.01
Bluetooth / ZigBee Internal Antenna							
Omni	2.4 ~ 2.5		5.0				

APEX0587

Polarization	Frequency Band (GHz)	Max Peak Gain (dBi)	30 Degree ANT Gain (dBi)	CDD Directional Gain (dBi)		BF Gain (dBi)
				For Power	For PSD	
Wi-Fi Internal Antenna (4*4 MIMO)						
Omni (Note 2)	2.4 ~ 2.5	5.7	N/A	5.70	8.71	8.71
	5.15 ~ 5.85	5.2	5.2	5.20	8.21	8.21
Bluetooth / ZigBee Internal Antenna						
Omni	2.4 ~ 2.5	6.3				

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 $N_{ANT} \leq 4$;

The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac/ax, not include 802.11a/b/g.

2. These antennas are cross polarized design, the detail refer to antenna specification. Directional gain calculation refer to KDB 662911 section F)2)c).

3. For APEX0584, low gain antenna (ANT-2x2-2005 & ANT-2x2-5005) was selected to perform all RF testing that can got maximum power setting, high gain different type antenna (ANT-2x2-2314 & ANT-4x4-5314) was selected to perform radiated spurious emission and band edge testing. High gain antenna power setting will be reduced according to difference value of antenna gain declared by applicant.

2. RF Exposure Evaluation

2.1. Test Limit

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

Product	ACCESS POINT
Test Item	RF Exposure Evaluation

Maximum EIRP for each model

Test Mode	Frequency Band (MHz)	Max Conducted Power (dBm)	Antenna Gain (dBi)	Max EIRP (dBm)
APEX0584				
Bluetooth-LE	2402 ~ 2480	7.27	5.0	12.27
ZigBee	2405 ~ 2480	10.05	5.0	15.05
802.11b/g/n/ax	2412 ~ 2462	28.43	5.0	33.43
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	28.25	5.0	33.25
APEX0585				
Bluetooth-LE	2402 ~ 2480	7.27	4.8	12.07
ZigBee	2405 ~ 2480	10.05	4.8	14.85
802.11b/g/n/ax	2412 ~ 2462	28.43	3.0	31.43
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	28.43	4.5	32.93
APEX0587				
Bluetooth-LE	2402 ~ 2480	7.27	6.3	13.57
ZigBee	2405 ~ 2480	10.05	6.3	16.35
802.11b/g/n/ax	2412 ~ 2462	28.43	5.7	34.13
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	28.25	5.2	33.45

Model No.: APEX0584

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	12.27	0.0034	1
ZigBee	2405 ~ 2480	15.05	0.0064	1
802.11b/g/n	2412 ~ 2462	33.43	0.4383	1
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	33.25	0.4205	1

CONCLUSION:

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

The max Power Density at R (20 cm) = $0.0064mW/cm^2 + 0.4383mW/cm^2 + 0.4205mW/cm^2 = 0.8651mW/cm^2 < 1mW/cm^2$.

Therefore, the Min Compliance Distance is 20cm.

Model No.: APEX0585

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	12.07	0.0032	1
ZigBee	2405 ~ 2480	14.85	0.0061	1
802.11b/g/n	2412 ~ 2462	31.43	0.2765	1
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	32.93	0.3906	1

CONCLUSION:

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

The max Power Density at R (20 cm) = $0.0061mW/cm^2 + 0.2765mW/cm^2 + 0.3906mW/cm^2 = 0.6732mW/cm^2 < 1mW/cm^2$.

Therefore, the Min Compliance Distance is 20cm.

Model No.: APEX0587

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	13.57	0.0045	1
ZigBee	2405 ~ 2480	16.35	0.0086	1
802.11b/g/n	2412 ~ 2462	34.13	0.5149	1
802.11a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	33.45	0.4403	1

CONCLUSION:

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

The max Power Density at R (20 cm) = $0.0086mW/cm^2 + 0.5149mW/cm^2 + 0.4403mW/cm^2 = 0.9638mW/cm^2 < 1mW/cm^2$.

Therefore, the Min Compliance Distance is 20cm.

The End