



RF Exposure Evaluation Declaration

FCC ID: Q9DAPEX037457

APPLICANT: Hewlett Packard Enterprise Company

Application Type: Certification

Product: ACCESS POINT

Model No.: APEX0374, APEX0375, APEX0377

Trademark:  

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

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The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.



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Revision History

Report No.	Version	Description	Issue Date	Note
1710TW0108-U5	Rev. 01	Initial report	10-16-2017	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	ACCESS POINT
Model No.:	APEX0374, APEX0375, APEX0377
Brand Name:	  a Hewlett Packard Enterprise company , Hewlett Packard Enterprise
Wi-Fi Specification:	802.11a/b/g/n/ac
Bluetooth Specification:	v4.0 single mode
Software Version:	R660.1.1.0.3.005
Operating Temperature:	-40 ~ 65 °C
Power Type:	POE input or AC adapter input
Operating Environment:	Outdoor Use

Note 1: The difference between three models is that the EUT use different antenna and appearance, other hardware and software are the same.

Note 2: The applicant provide one POE adapter (Manufacturer: MICROSEMI & Model: PD-9001GR/AT/AC) for approval testing, it is not for sale.

1.2. Antenna Description

Model No.: APEX0374

Antenna No.	Polarization	Frequency Band (GHz)	Model No.	Max Peak Gain (dBi)	30 Degree Antenna 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 (Note 3)	Omni	2.4	ANT-2x2-2005	5.0	N/A	0	5.0	5.00
2 (Note 3)	Omni	5	ANT-2x2-5005	5.0	0	3.0	5.0	8.01
3 (Note 3)	Directional	2.4	ANT-2x2-2314	14.0	N/A	0	14.0	14.00
4 (Note 3)	Directional	5	ANT-3x3-5712	11.5	1.5	3.0	11.5	14.51
5 (Note 3)	Directional	5	ANT-4x4-5314	14.0	6.0	3.0	14.0	17.01
6 (Note 3)	Directional	5	MT-484052/NVH	16.0	3.0	3.0	16.0	19.01
7 (Note 3)	Directional	2.4	ANT-3x3-D608	7.5	N/A	3.0	7.5	10.51
		5		7.5	4.5	3.0	7.5	10.51
8 (Note 3)	Directional	2.4	ANT-3x3-D100	5.0	N/A	3.0	5.0	8.01
		5		5.0	4.0	3.0	5.0	8.01
Bluetooth Internal Antenna								
PCB		2.4		3.0				

Model No.: APEX0377

Polarization	Frequency Band (GHz)	Max Peak Gain (dBi)	30 Degree Antenna 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)						
Directional (Note 3)	2.4	6.4	N/A	0.0	6.4	6.40
Directional (Note 3)	5	6.3	4.7	3.0	6.3	9.31
Bluetooth Internal Antenna						
PCB	2.4	6.7				

Model No.: APEX0375

Polarization	Frequency Band (GHz)	Max Peak Gain (dBi)	30 Degree Antenna 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)						
Directional (Note 3)	2.4	4.0	N/A	0.0	4.0	4.00
Directional (Note 3)	5	4.6	-4.0	3.0	4.6	7.61
Bluetooth Internal Antenna						
PCB	2.4	4.5				

Note:

- 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 = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows.
 - For power spectral density (PSD) measurements on all devices,
 Array Gain = $10 \log (N_{ANT}/ N_{SS}) \text{ dB} = 3.01$;
 - 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, not include 802.11a/b/g.
 Directional gain = $G_{ANT} + \text{BF Gain}$, BF Gain was declared by the applicant.
- These antennas have Cross-Polarized design, the detail see the antenna specification.
- For Model No.: APEX0374, we selected the max peak gain antenna of each type to perform RF testing.
 (Omni antenna 1# and 2#, Directional antenna 3# and 6#)

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: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

r = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1mW/cm². 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.: APEX0374 (Omni Antenna)				
BLE	2402 ~ 2480	4.65	3.0	7.65
802.11b/g/n	2412 ~ 2462	25.34	5.0	30.34
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	27.94	8.0	35.94
Model No.: APEX0374 (Directional Antenna)				
BLE	2402 ~ 2480	4.65	3.0	7.65
802.11b/g/n	2412 ~ 2462	21.90	14.0	35.90
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	19.90	16.0	35.90
Model No.: APEX0375				
BLE	2402 ~ 2480	4.71	4.5	9.21
802.11b/g/n	2412 ~ 2462	25.70	4.0	29.70
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	28.37	7.6	35.97
Model No.: APEX0377				
BLE	2402 ~ 2480	5.05	6.7	11.75
802.11b/g/n	2412 ~ 2462	25.66	6.4	32.06
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	26.53	9.3	35.83

Model No.: APEX0374

For Omni Antenna:

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)
BLE	2402 ~ 2480	7.65	0.0012	1
802.11b/g/n	2412 ~ 2462	30.34	0.2151	1
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	35.94	0.7811	1

Note:

CONCLUSION:

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

$$\text{The max Power Density at R (20 cm)} = 0.0012\text{mW/cm}^2 + 0.2151\text{mW/cm}^2 + 0.7811\text{mW/cm}^2 = 0.9974\text{mW/cm}^2 < 1\text{mW/cm}^2.$$

Therefore, the Min Safety Distance is 20cm.

Model No.: APEX0374

For Directional Antenna:

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 = 25 cm (mW/cm ²)
BLE	2402 ~ 2480	7.65	0.0012	1	0.0007
802.11b/g/n	2412 ~ 2462	35.90	0.7740	1	0.4953
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	35.90	0.7740	1	0.4953

CONCLUSION:

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

$$\text{The max Power Density at R (20 cm)} = 0.0012\text{mW/cm}^2 + 0.7740\text{mW/cm}^2 + 0.7740\text{mW/cm}^2 = 1.5492\text{mW/cm}^2 > 1\text{mW/cm}^2.$$

$$\text{The max Power Density at R (25 cm)} = 0.0007\text{mW/cm}^2 + 0.4953\text{mW/cm}^2 + 0.4953\text{mW/cm}^2 = 0.9914\text{mW/cm}^2 < 1\text{mW/cm}^2.$$

Therefore, the Min Safety Distance is 25cm.

Model No.: APEX0375

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)
BLE	2402 ~ 2480	9.21	0.0017	1
802.11b/g/n	2412 ~ 2462	29.70	0.1857	1
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	35.97	0.7866	1

CONCLUSION:

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

The max Power Density at R (20 cm) = $0.0017\text{mW/cm}^2 + 0.1857\text{mW/cm}^2 + 0.7866\text{mW/cm}^2 = 0.9739\text{mW/cm}^2 < 1\text{mW/cm}^2$.

Therefore, the Min Safety Distance is 20cm.

Model No.: APEX0377

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 = 21 cm (mW/cm ²)
BLE	2402 ~ 2480	11.75	0.0030	1	0.0027
802.11b/g/n	2412 ~ 2462	32.06	0.3197	1	0.2900
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	35.83	0.7616	1	0.6908

CONCLUSION:

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

The max Power Density at R (20 cm) = $0.0030\text{mW/cm}^2 + 0.3197\text{mW/cm}^2 + 0.7616\text{mW/cm}^2 = 1.0843\text{mW/cm}^2 > 1\text{mW/cm}^2$.

The max Power Density at R (21 cm) = $0.0027\text{mW/cm}^2 + 0.2900\text{mW/cm}^2 + 0.6908\text{mW/cm}^2 = 0.9835\text{mW/cm}^2 < 1\text{mW/cm}^2$.

Therefore, the Min Safety Distance is 21cm.

The End