



RF Exposure Evaluation Declaration

FCC ID: Q9DAPEX037457

APPLICANT: Hewlett Packard Enterprise Company

Application Type: Class III Permissive Change

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-U9 | 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: |   |
| 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. Each model has its own power parameter value.

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 | 0.0 | 5.0 | 5.0 |
| 2 (Note 3) | Omni | 5 | ANT-2x2-5005 | 5.0 | 5.0 | 3.0 | 5.0 | 8.0 |
| 3 (Note 3) | Directional | 2.4 | ANT-2x2-2314 | 14.0 | N/A | 0.0 | 14.0 | 14.0 |
| 4 (Note 3) | Directional | 5 | ANT-3x3-5712 | 11.5 | 11.5 | 3.0 | 11.5 | 14.5 |
| 5 (Note 3) | Directional | 5 | ANT-4x4-5314 | 14.0 | 14.0 | 3.0 | 14.0 | 17.0 |
| 6 (Note 3) | Directional | 5 | MT-484052/NVH | 16.0 | 16.0 | 3.0 | 16.0 | 19.0 |
| 7 (Note 3) | Directional | 2.4 | ANT-3x3-D608 | 7.5 | N/A | 3.0 | 7.5 | 10.5 |
| | | 5 | | 7.5 | 7.5 | 3.0 | 7.5 | 10.5 |
| 8 (Note 3) | Directional | 2.4 | ANT-3x3-D100 | 5.0 | N/A | 3.0 | 5.0 | 8.0 |
| | | 5 | | 5.0 | 5.0 | 3.0 | 5.0 | 8.0 |
| Bluetooth Internal Antenna | | | | | | | | |
| PCB | | 2.4 | N/A | 3.0 | N/A | | | |

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 Power |
| 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 | 4.0 |
| Directional (Note 3) | 5 | 4.6 | -4.0 | 3.0 | 4.6 | 7.6 |
| Bluetooth Internal Antenna | | | | | | |
| PCB | | 2.4 | 4.5 | N/A | | |

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 Power |
| 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 | 6.4 |
| Directional (Note 3) | 5 | 6.3 | 6.3 | 3.0 | 6.3 | 9.3 |
| Bluetooth Internal Antenna | | | | | | |
| PCB | 2.4 | 6.7 | N/A | | | |

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 = $10 \log (N_{ANT}/ N_{SS})$ 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.

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: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

Pd = power density in mW/cm²

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/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 ~ 5320 | 27.94 | 8.0 | 35.94 |
| | 5500 ~ 5720 | | | |
| | 5745 ~ 5825 | | | |
| 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 ~ 5320 | 19.90 | 16.0 | 35.90 |
| | 5500 ~ 5720 | | | |
| | 5745 ~ 5825 | | | |
| 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 ~ 5320 | 28.37 | 7.6 | 35.97 |
| | 5500 ~ 5720 | | | |
| | 5745 ~ 5825 | | | |
| 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 ~ 5320 | 26.53 | 9.3 | 35.83 |
| | 5500 ~ 5720 | | | |
| | 5745 ~ 5825 | | | |

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 ~ 5320 | 35.94 | 0.7811 | 1 |
| | 5500 ~ 5720 | | | |
| | 5745 ~ 5825 | | | |

Note:

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) = $0.0012\text{mW/cm}^2 + 0.2151\text{mW/cm}^2 + 0.7811\text{mW/cm}^2 = 0.9974\text{mW/cm}^2 < 1\text{mW/cm}^2$.

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 ~ 5320 | 35.90 | 0.7740 | 1 | 0.4953 |
| | 5500 ~ 5720 | | | | |
| | 5745 ~ 5825 | | | | |

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) = $0.0012\text{mW/cm}^2 + 0.7740\text{mW/cm}^2 + 0.7740\text{mW/cm}^2 = 1.5492\text{mW/cm}^2 > 1\text{mW/cm}^2$.

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 ~ 5320 5500 ~ 5720 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 ~ 5320 5500 ~ 5720 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.

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