



RF Exposure Evaluation Declaration

FCC ID: Q9DAPIN0318

APPLICANT: Hewlett Packard Enterprise Company


Application Type: Certification

Product: ACCESS POINT


Model No.: APIN0318

Trademark:  

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

Reviewed By : 

(Paddy Chen)

Approved By : 

(Chenz Ker)



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
1710TW0107-U5	Rev. 01	Initial report	01-10-2018	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	ACCESS POINT
Model No.:	APIN0318
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 ~ 55 °C
Power Type:	POE input
Operating Environment:	Indoor Use

Note: The applicant has provided one POE adapter (Manufacturer: MICROSEMI & Model: PD-9001GR/AT/AC) for approval testing that is not for sale.

1.2. Antenna Description

Antenna No.	Polarization	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
2	Omni	2.4	AP-ANT-19	3.0	3.01	3.0	6.01
		5		6.0		6.02	6.0
3	Omni	2.4	AP-ANT-1W	3.8	3.01	3.8	6.81
		5		5.8		6.02	5.8
4	Omni	2.4	AP-ANT-13B	2.3	3.01	2.3	5.31
		5		4.0		6.02	4.0
5	Omni	2.4	AP-ANT-20W	2.0	3.01	2.0	5.01
		5		2.0		6.02	2.0
6	Omni	2.4	AP-ANT-32	2.0	3.01	2.0	5.01
		5		4.0		6.02	4.0
7 (Note 3)	Directional	2.4	AP-ANT-45	4.5	0.0	4.5	4.50
		5		5.5		3.01	5.5
8 (Note 3)	Directional	2.4	AP-ANT-48	8.5	0.0	8.5	8.5
		5		8.5		3.01	8.5
Bluetooth Internal Antenna							
PCB		2.4		6.8			

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 = $G_{ANT} + \text{Array Gain}$, 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 $N_{ANT} \leq 4$;

Note 2: 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.

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

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)
Omni Antenna				
BLE	2402 ~ 2480	4.91	6.8	11.71
802.11b/g/n	2412 ~ 2462	25.43	7.01	32.44
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	23.85	12.02	35.87
Directional Antenna				
BLE	2402 ~ 2480	4.91	6.8	11.71
802.11b/g/n	2412 ~ 2462	25.40	8.5	33.90
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	27.39	8.5	35.89

For Omni 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 = 22 cm (mW/cm ²)
BLE	2402 ~ 2480	11.71	0.0029	1	0.0024
802.11b/g/n	2412 ~ 2462	32.44	0.3489	1	0.2884
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	35.87	0.7687	1	0.6353

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) = $0.0029\text{mW/cm}^2 + 0.3489\text{mW/cm}^2 + 0.7687\text{mW/cm}^2 = 1.1205\text{mW/cm}^2 > 1\text{mW/cm}^2$.

The max Power Density at R (22 cm) = $0.0024\text{mW/cm}^2 + 0.2884\text{mW/cm}^2 + 0.6353\text{mW/cm}^2 = 0.9261\text{mW/cm}^2 < 1\text{mW/cm}^2$.

Therefore, the Min Safety Distance is 22cm.

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 = 23 cm (mW/cm ²)
BLE	2402 ~ 2480	11.71	0.0029	1	0.0022
802.11b/g/n	2412 ~ 2462	33.90	0.4883	1	0.3693
802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	35.89	0.7722	1	0.5839

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) = $0.0029\text{mW/cm}^2 + 0.4883\text{mW/cm}^2 + 0.7722\text{mW/cm}^2 = 1.2635\text{mW/cm}^2 > 1\text{mW/cm}^2$.

The max Power Density at R (23 cm) = $0.0022\text{mW/cm}^2 + 0.3693\text{mW/cm}^2 + 0.5839\text{mW/cm}^2 = 0.9914\text{mW/cm}^2 < 1\text{mW/cm}^2$.

Therefore, the Min Safety Distance is 23cm.

————— The End —————