MPE REPORT

FCC

APPLICANT

Hewlett Packard Enterprise Company

MODEL NAME

APINH505

FCC ID

Q9DAPINH505

REPORT NUMBER

HCTA-E-2003-012-01

TEST REPORT

Date of Issue
April 16, 2020

Test Site
Hyundai C-Tech, Inc. dba HCT America, Inc.
1726 Ringwood Ave, San Jose, CA 95131, USA

Applicant	Hewlett Packard Enterprise Company
Applicant Address	3333 Scott Blvd, Santa Clara, CA 95054, USA
FCC ID	Q9DAPINH505
Model Name	APINH505
EUT Type	Access Point
FCC Classification	Digital Transmission System (DTS) Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s)	Part 1 (§1.1310), Part 2 (§2.1091)
Test Procedure	KDB 447498 D01 v06

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was in accordance with the procedures specified in §2.947. The results in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By	**Reviewed By**
Steve In	Sunwoo Kim
Test Engineer	Technical Manager

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REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HCTA-2003-012	March 29, 2020	Initial Issue
HCTA-2003-012-01	April 16, 2020	Revision due to worst-case maximum power tolerances reflected

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TABLE OF CONTENTS

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1. EUT DESCRIPTION

Model	APINH505	
EUT Type	Access Point	
Power Supply	AC Adapter : 100 – 240 VAC, 1.3 A, 50 – 60 Hz / PoE : 57 VDC	
RF Specification	WIFI 2.4 GHz : IEEE 802.11b/g/n/ax HE40 (2x2 MIMO) WIFI 5 GHz : IEEE 802.11a/n/ac/ax HE80 (2x2 MIMO) Bluetooth 5.0 LE ZigBee : IEEE 802.15.4	
Transmitter Chain	2x2 MIMO	
Antenna Specification	WIFI 2.4 GHz	3.28 dBi uncorrelated / 6.27 dBi correlated
	WIFI 5 GHz	2.85 dBi uncorrelated / 5.36 dBi correlated
	BLE / ZigBee	1.29 dBi (Peak Gain)
Operating Environment	Indoor	
Operating Temperature	0 °C – 40 °C	

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2. INTRODUCTION

2.1. LIMIT

The limit for Maximum Permissible Exposure (MPE), specified in FCC Rule Part §1.1310 listed in the table below, shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation specified in §1.1310 (b)

Frequency Range (MHz)	E- Field Strength (V/m)	H- Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (Minutes)
(A) Limits for Occupational / Controlled Exposure				
0.3 – 3.0	614	1.63	*100	6
3.0 – 30	1842 / f	4.89 / f	*900 / f^2	6
30 – 300	61.4	0.163	1.0	6
300 – 1,500	-	-	f / 300	6
1,500 – 100,000	-	-	5	6
(B) Limits for General Population / Uncontrolled Exposure				
0.3 – 1.34	614	1.63	*100	30
1.34 – 30	824 / f	2.19 / f	*180 / f^2	30
30 – 300	27.5	0.073	0.2	30
300 – 1,500	-	-	f / 1500	30
1,500 – 100,000	-	-	1.0	30

f = frequency in MHz, * = Plane-wave equivalent power density

2.2. MAXIMUM PERMISSIBLE EXPOSURE PREDICTION

Prediction of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S : Power density (mW/cm^2)
P : Output power to antenna (mW)
G : Antenna gain in linear scale
R : Distance between the center of radiator and observation point (cm)

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3. RESULT

3.1. MPE Calculation

Bluetooth LE				
Frequency (MHz)	2402	MHz		
MPE Limit (mW/cm²)	1.0	mW/cm²		
Distance (R)	20.0	Cm		
Output Power (P)	7	dBm	5.01	mW
Antenna Gain (G)	1.29	dBi	1.35	-
Power density (S) at distance 20 cm	**0.001342**	mW/cm²	at 20 cm separation distance	

IEEE 802.15.4 ZigBee				
Frequency (MHz)	2405	MHz		
MPE Limit (mW/cm²)	1.0	mW/cm²		
Distance (R)	20.0	Cm		
Output Power (P)	6.75	dBm	4.73	mW
Antenna Gain (G)	1.29	dBi	1.35	-
Power density (S) at distance 20 cm	**0.001267**	mW/cm²	at 20 cm separation distance	

WIFI 2.4 GHz				
Frequency (MHz)	2437	MHz		
MPE Limit (mW/cm²)	1.0	mW/cm²		
Distance (R)	20.0	Cm		
Output Power (P)	23	dBm	199.53	mW
Antenna Gain (G)	3.28	dBi	2.13	-
Power density (S) at distance 20 cm	**0.084475**	mW/cm²	at 20 cm separation distance	

WIFI 5 GHz				
Frequency (MHz)	5785	MHz		
MPE Limit (mW/cm²)	1.0	mW/cm²		
Distance (R)	20.0	Cm		
Output Power (P)	23	dBm	199.53	mW
Antenna Gain (G)	2.85	dBi	1.93	-
Power density (S) at distance 20 cm	**0.076512**	mW/cm²	at 20 cm separation distance	

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3.2. SUMMARY OF RESULTS

Mode	Frequency Range (MHz)	Ant Gain (dBi)	MPE Calculation (mW/cm^2)	MPE Ratio (PD/MPE Limit)
BLE	2402 – 2480	1.29	0.001342	0.001342
ZigBee	2405 – 2480	1.29	0.001267	0.001267
WIFI 2.4 GHz	2412 – 2462	3.28 [1)]	0.084475	0.084475
WIFI 5 GHz	5180 – 5240 5745 – 5825	2.85 [1)]	0.076512	0.076512

1) Uncorrelated directional gain was applied for the final MPE calculation.

The worst-case configuration is simultaneous transmission of WIFI dual band and Bluetooth LE since ZigBee does not transmit more 10% in any 100ms under normal operating condition. In addition, ZigBee and BLE cannot transmit at the same time, so the worst-case MPE will be WIFI 2.4 GHz + WIFI 5 GHz + BLE and the calculated MPE is 0.162329.

Sample Calculation

TOTAL MPE (20cm distance) = 0.001342/1.0 + 0.084475/1.0 + 0.076512/1.0 = **0.162329** < 1.0

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