RF Exposure Evaluation Declaration

FCC ID:	2A38RDAP640
APPLICANT:	Belden Hirschmann Industries (Suzhou) Ltd.
Application Type:	Certification
Product:	HIT Dragonfly Access Point
Model No.:	DAP640-RW, DAP640-US, DAP640-ME, DAP640-JP
Brand Name:	HIRSCHMANN IT
FCC Classification:	Digital Transmission System (DTS) Unlicensed National Information Infrastructure (NII)
Test Procedure(s):	KDB 447498 D01v06

Reviewed By: Sunny Sun

Approved By: Robin Wu

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

Revision History

Report No.	Version	Description	Issue Date	Note
2201RSU008-U8	Rev. 01	Initial Report	04-26-2022	Valid

General Information

Applicant:	Belden Hirschmann Industries (Suzhou) Ltd.
Applicant Address:	333 Yanhu Road, Huaqiao Town, Kunshan City, Jiangsu Province, P. R. China
Manufacturer:	Belden Hirschmann Industries (Suzhou) Ltd.
Manufacturer Address:	333 Yanhu Road, Huaqiao Town, Kunshan City, Jiangsu Province, P. R. China
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC accredited (MRT Designation No. CN1166) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.**

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	HIT Dragonfly Access Point
Model No.:	DAP640-RW, DAP640-US, DAP640-ME, DAP640-JP
Brand Name:	HIRSCHMANN IT
Wi-Fi Specification:	802.11a/b/g/n/ac/ax
Bluetooth Specification:	v5.1
Operating Temperature:	0 ~ 50 °C
Power Type:	PoE input or AC adapter input
Operating Environment:	Indoor Use

Remark:

1. Different models are only market requirements, all hardware and software are consistent.
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. Description of Available Antennas

Antenna Type	Frequency Band (GHz)	T_X Paths	Bandwidth (MHz)	Max Peak Gain (dBi)				Directional Gain (dBi)	
				Ant 0	Ant 1	Ant 2	Ant 3	CDD	Beamforming
Wi-Fi Internal Antenna List (2.4GHz 2*2 MIMO, 5GHz 4*4 MIMO)									
Omni Antenna	2400 ~ 2483.5	2	20, 40	3.5	3.5	--	--	3.5	6.51
	5150 ~ 5850	4	20	3.2	3.6	3.7	3.5	3.7	9.52
			40						
			80						

Bluetooth Internal Antenna		
Antenna Type	Frequency Band (GHz)	Max Peak Gain (dBi)
Omni Antenna	2400 ~ 2483.5	3.2

Scan Internal Antenna		
Antenna Type	Frequency Band (GHz)	Max Peak Gain (dBi)
Omni Antenna	2400 ~ 2483.5	3.5
	5150 ~ 5850	3.5

Note 1: The EUT supports Cyclic Delay Diversity (CDD) technology for 802.11a/b/g/n/ac/ax mode.

Note 2: The EUT also supports Beam Forming technology for 802.11n/ac/ax.

Note 3: The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

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 $N_{ANT} \leq 4$;

If antenna gains are not equal, Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain.

Note 4: The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac/ax, not include 802.11a/b/g. The directional gain = $10*\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/N_{ANT}]$dBi.

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

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 of RF Exposure Evaluation

Product	HIT Dragonfly Access Point
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Safety Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
Bluetooth	2402 ~ 2480	22.51	20	0.0355	1
Wi-Fi Mode	2412 ~ 2462	27.80		0.1199	
	5150 ~ 5250	33.67		0.4632	
	5250 ~ 5350	24.22		0.0526	
	5470 ~ 5725	27.40		0.1093	
	5725 ~ 5850	34.32		0.5379	
Scan Mode	2412 ~ 2462	14.75		0.0059	
	5150 ~ 5250	14.00		0.0050	
	5725 ~ 5850	14.30		0.0054	

CONCLUSION:

Note 1: The 2.4G & 5G can't work simultaneously of Scan Mode.

Note 2: The max Power Density at R (20 cm) = 0.0355 + 0.1199 + 0.1093 + 0.5379 mW/cm^2 = 0.8026 mW/cm^2 < 1 mW/cm^2.

Therefore, the compliance distance is 20cm.

The End

Appendix A – EUT Photograph

Refer to “2201RSU008-UE” file.