

RF Exposure Evaluation Declaration

FCC ID : XBG-BA1GMNRCH12
Applicant : AVALUE TECHNOLOGY INCORPORATION
Application Type : Certification
Product : Intercom
Model Name : Monarch 12
Model Number : BUTTERFLYMX.M12.1
Trade Mark : 
FCC Classification : Digital Transmission System (DTS)
Unlicensed National Information Infrastructure (NII)
Received Date : September 13, 2022
Test Date : December 12, 2022

Tested By : *Owen Tsai*
(Owen Tsai)

Reviewed By : *Paddy Chen*
(Paddy Chen)

Approved By : *Chenz Ker*
(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
2209TWI301-U19	1.0	Original Report	2022-12-15	

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General Information

Applicant	AVALUE TECHNOLOGY INCORPORATION
Applicant Address	7F, 228, Lian-cheng Road, Zhonghe Dist., New Taipei City 235, Taiwan
Manufacturer	ButterflyMX, inc.
Manufacturer Address	44 West 28th Street, 4th Floor New York, NY 10001
Test Site	MRT Technology (Taiwan) Co., Ltd
Test Site Address	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
MRT FCC Registration No.	291082
Test Device Serial No.	N/A <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering

Test Facility / Accreditations

1. MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.
2. MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada.
3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.

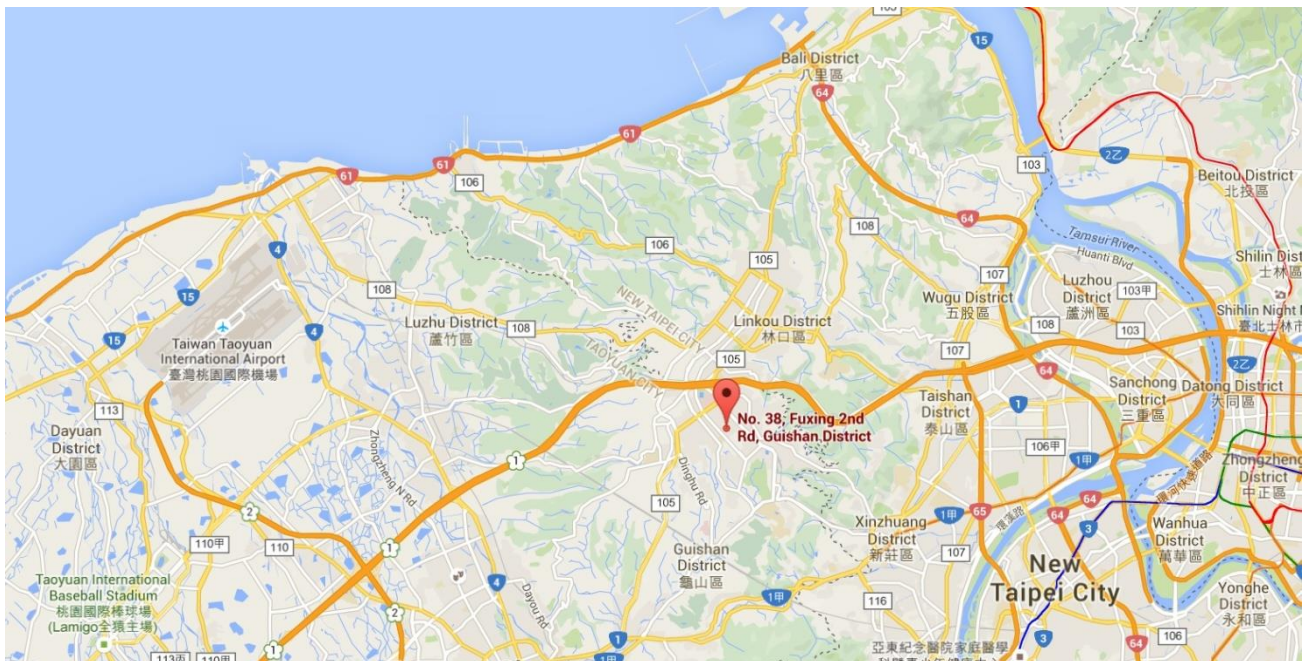
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada and Certification and Engineering Bureau.


1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Feature of Equipment under Test

Product Name	Intercom
Trade Mark	 ButterflyMX
Model Name	Monarch 12
Model Number	BUTTERFLYMX.M12.1
Supports Radios Spec.	<p>WPAN: Bluetooth Dual Mode: V5.0 RFID: 125kHz & 13.56MHz</p> <p>WLAN: 2.4G: 802.11b/g/n-20/n-40 5G: 802.11a/n-20/ac-20/n-40/ac-40/ac-80, Band 1,4</p> <p>WWAN: 4G: Band 2,4,5,7,12,13,25,26,38,41</p>
Accessory	
Power Adapter	<p>Brand Name: EDAC Model: EA10731F-240 Input: AC 100-240V~0.2A, 50-60Hz Output: DC 24.0V-2.08A</p>

2.2. Description of Available Antennas

Frequency Band (MHz)	Manufacturer	Part No.	Antenna Type	Peak Gain
BT/BLE	INPAQ	ACM3-5036-A1-CC-S	Chip	3.00dBi
WLAN 2.4G	INPAQ	ACM3-5036-A1-CC-S	Chip	3.00dBi
WLAN 5G	INPAQ	ACM3-5036-A1-CC-S	Chip	3.30dBi
WWAN	QUECTEL	YFCA002FA	FPCB	2.46dBi

3. RF Exposure Evaluation

3.1. 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.

3.2. Test Result of RF Exposure Evaluation

Product	Intercom
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 2.2.

Test Mode	Frequency Band (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (dBm)
BT/BLE	2402 ~ 2480	9.58	3.00	12.58
WLAN 2.4G	2412 ~ 2462	29.09	3.00	32.09
WLAN 5G	5180 ~ 5240 5745 ~ 5825	19.18	3.30	22.48
WWAN	1850 ~1915	24.41	2.46	26.87

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Compliance Distance (cm)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
BT/BLE	2402 ~ 2480	12.58	20	0.0036	1
WLAN 2.4G	2412 ~ 2462	32.09	20	0.3219	1
WLAN 5G	5180 ~ 5240 5745 ~ 5825	22.48	20	0.0352	1
WWAN	1850 ~1915	26.87	20	0.0968	1

CONCLUSION:

BT and WLAN 2.4GHz Band and WWAN can transmit simultaneously.

The max Power Density at R (20.00 cm) = $0.0036\text{mW/cm}^2 + 0.3219\text{mW/cm}^2 + 0.0968\text{mW/cm}^2 = 0.4223\text{mW/cm}^2 < 1\text{mW/cm}^2$.

BT and WLAN 5GHz Band and WWAN can transmit simultaneously.

The max Power Density at R (20.00 cm) = $0.0036\text{mW/cm}^2 + 0.0352\text{mW/cm}^2 + 0.0968\text{mW/cm}^2 = 0.1356\text{mW/cm}^2 < 1\text{mW/cm}^2$.

So the compliance distance is 20.00cm for device installed without any other radio equipment.

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