Maximum Permissible Exposure

FCC ID	:	2AF82-HC1570
IC	:	23322-HC1570
Applicant	:	Qbic Technology Co., Ltd.
Application Type	:	Certification
Product	:	Smart touch panel tablet
Model No.	:	Luminen 15
Brand Name	:	Qbic
FCC Rule Part(s)	:	Part 2.1091 (Mobile)
IC Standard	:	RSS 102 (issue5)
Received Date	:	August 09,2023

Tested By : Kaunaz Lee
(Kaunaz Lee)

Reviewed By : Paddy Chen
(Paddy Chen)

Approved By : Chenz Ker
(Chenz Ker)

Testing Laboratory
3261

evision History

Report No.	Version	Description	Issue Date	Note
2308TWN801-U3	1.0	Original Report	2023-09-14	

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General Information

Applicant	Qbic Technology Co., Ltd.
Applicant Address	26F-12, No. 99, Sec. 1, Xintai 5th Rd, Xizhi Dist, New Taipei City, 22175 Taiwan
Manufacturer	Qbic Technology Co., Ltd.
Manufacturer Address	26F-12, No. 99, Sec. 1, Xintai 5th Rd, Xizhi Dist, New Taipei City, 22175 Taiwan
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
MRT IC Registration No.	21723
Test Device Serial No.	N/A ☐ Production ☒ Pre-Production ☐ 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 Canada, EU and TELEC Rules.

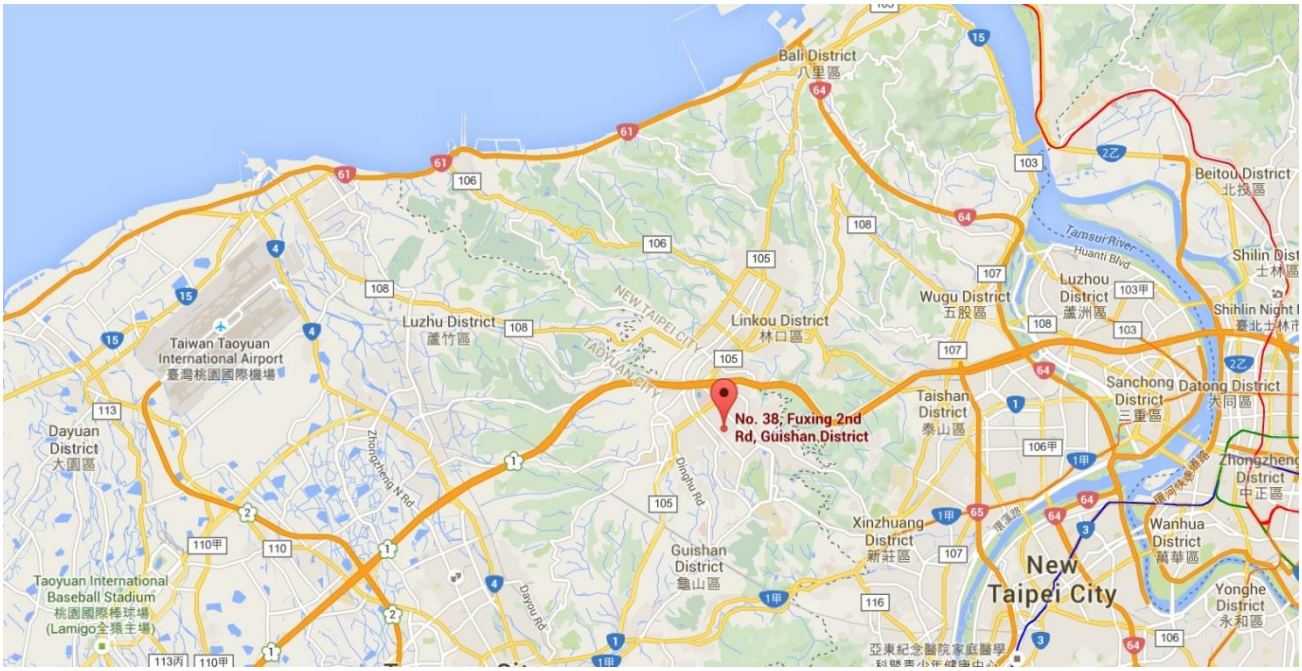
1. INTRODUCTION

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:	Smart touch panel tablet
Model No.:	Luminen 15
Brand Name:	Qbic
Supports Radios Spec.	**WLAN:** 2.4G: 802.11b/g/n-20/ax-20; 5G: 802.11a/n-20/ac-20/ax-20/n-40/ac-40/ax-40/ac-80/ax-80, Band 1~4 **WPAN:** Bluetooth Dual Mode: V5.3 NFC 13.56MHz
Accessory	
Adapter	Brand Name: HOIOTO Model: ADS-40RJ-12 12036E Input: AC 100-240V~50/60Hz Max 1.0A, Output: DC 12.0V, 3.0A 36.0W Cable Out: Non-shielding, 1.8m

2.2. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	T_X Paths	Max Antenna Gain (dBi)	CDD Directional Gain (dBi)	
				For Power	For PSD
Dipole Antenna	2402 ~ 2480	1	4.56	--	--
	2412 ~ 2462	2	4.56	4.56	7.57
	5150 ~ 5700	2	5.92	5.92	8.93

Note:

1. 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;

   - For power measurements on IEEE 802.11 devices,

   Array Gain = 0 dB for $N_{ANT} \leq 4$;

2. All messages of antenna were declared by manufacturer.

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(d)

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				
0.3-3.0	--	--	(100)	6
3.0-30	--	--	($900/f^2$)	6
30-300	--	--	1	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
0.3-1.34	--	--	(100)	30
1.34-30	--	--	($180/f^2$)	30
30-300	--	--	0.2	30
300-1500	--	--	f/1500	30
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.

3.2. Test Result of RF Exposure Evaluation

Product	Smart touch panel tablet
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)
NFC	13.56	--	--	-31.65
BT/BLE	2402 ~ 2480	9.67	4.56	14.23
802.11b/g/n/ax	2412 ~ 2462	21.91	4.56	26.47
802.11a/n/ac/ax	5180 ~ 5240 5260 ~ 5320 5500 ~ 5720 5745 ~ 5825	20.07	5.92	25.99

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Compliance Distance (cm)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
NFC	13.56	-31.65	20	0.0002176958	4.895
BT/BLE	2402 ~ 2480	14.23	20	0.0053	1
802.11b/g/n/ax	2412 ~ 2462	26.47	20	0.0883	1
802.11a/n/ac/ax	5180 ~ 5240 5260 ~ 5320 5500 ~ 5720 5745 ~ 5825	25.99	20	0.0790	1

Note:

Output power reference the following report:

NFC report number is 2308TWN801-U2 / BT report number is 2211TWN803-U1

BLE report number is 2211TWN803-U2 / WiFi 2.4GHz report number is 2211TWN803-U3

WiFi 5GHz report number is 2211TWN803-U4

CONCLUSION:

BT/BLE and WLAN 2.4GHz Band and WLAN 5GHz and NFC can transmit simultaneously.

The max Power Density at R (20.0cm) = 0.0053 + 0.0883 + 0.0790 + (0.0002176958/4.895) = $0.1726444731 mW/cm^2 < 1$.

So the compliance distance is 20.0cm for device installed without any other radio equipment.

The End