RF Exposure Report

Report No.:	SA160104E05
FCC ID:	2AG56001
Test Model:	M3-EXT-PM1
Received Date:	Jan. 04, 2016
Test Date:	Jan. 07, 2016
Issued Date:	Mar. 18, 2016
Applicant:	DTECH Labs Inc.
Address:	21580 Beaumeade Circle, Suite 230, Ashburn, VA 20147-6007 United States
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (1):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
SA160104E05	Original release.	Mar. 18, 2016

1 Certificate of Conformity

Product:	M3-EXT-PM1 Module
Brand:	M3-EXT Peplink Computer Module
Test Model:	M3-EXT-PM1
Sample Status:	ENGINEERING SAMPLE
Applicant:	DTECH Labs Inc.
Test Date:	Jan. 08, 2016
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D01 General RF Exposure Guidance v06 IEEE C95.1-2005

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Wendy Wu , **Date:** Mar. 18, 2016

Wendy Wu / Specialist

Approved by : , **Date:** Mar. 18, 2016

May Chen / Manager

2 RF Exposure

2.1 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)
Limits For General Population / Uncontrolled Exposure				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

2.2 MPE 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

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as Mobile Device.

This product could be applied with a Cellular USB Dongle device, and the safe distance is 40cm for collocated radio.

This product could be applied with two Cellular USB Dongles devices, and the safe distance is 50cm for collocated radio.

This product could be applied with three Cellular USB Dongle devices, and the safe distance is 60cm for collocated radio.

2.4 Antenna Gain

Antenna No	Brand	Model	Antenna Type	Antenna Connector	Gain (dBi)	Frequency (GHz to GHz)
1	Laird	RD2458-5-RSMA	Dipole	RP-SMA	3	2.4~2.4835
2	Laird	RD2458-5-RSMA	Dipole	RP-SMA	3	2.4~2.4835

3 Calculation Result Of Maximum Conducted Power

For WLAN:

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	794.554	6.01	20	0.63074	1

NOTE:
2.4GHz: Directional gain = 3dBi + 10log(2) = 6.01dBi

For WLAN + Cellular USB Dongle

Condition	Combination	Technology			
1	WLAN only	WLAN (2.4GHz)	-	-	-
2	WLAN + one Cellular USB Dongle	WLAN (2.4GHz)	WWAN(2G/3G) or LTE(4G)	-	-
3	WLAN + two Cellular USB Dongles	WLAN (2.4GHz)	WWAN(2G/3G) or LTE(4G)	WWAN(2G/3G) or LTE(4G)	-
4	WLAN + three Cellular USB Dongles	WLAN (2.4GHz)	WWAN(2G/3G) or LTE(4G)	WWAN(2G/3G) or LTE(4G)	WWAN(2G/3G) or LTE(4G)

Condition 1					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	794.554	6.01	20	0.63074	1
Condition 2					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	794.554	6.01	40	0.15769	1
Frequency Band (MHz)	Max Power (mW)		Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
824-849	7000		40	0.34815	0.5495 (Note 1)

Condition 3					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	794.554	6.01	50	0.10092	1
Frequency Band (MHz)	Max Power (mW)		Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
824-849	7000		50	0.22282	0.5495 (Note 1)
824-849	7000		50	0.22282	0.5495 (Note 1)
Condition 4					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	794.554	6.01	60	0.07008	1
Frequency Band (MHz)	Max Power (mW)		Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
824-849	7000		60	0.15473	0.5495 (Note 1)
824-849	7000		60	0.15473	0.5495 (Note 1)
824-849	7000		60	0.15473	0.5495 (Note 1)

NOTE:

1. Limit of Electric field=F/1500

2. This product can operate with plug-in Cellular USB Dongle device which has maximum of 7W output power.

Conclusion:

All of the WLAN and Cellular USB Dongles can transmit simultaneously, the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
CPD = Calculation power density
LPD = Limit of power density

Condition 1:

Therefore, the worst-case situation is 0.63074 / 1 = 0.63074, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Condition 2:

Therefore, the worst-case situation is 0.15769 / 1 + 0.34815 / 0.5495 = 0.79131, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Condition 3:

Therefore, the worst-case situation is 0.10092 / 1 + 0.22282 / 0.5495 + 0.22282 / 0.5495 = 0.91197, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Condition 4:

Therefore, the worst-case situation is 0.07008 / 1 + 0.15473 / 0.5495 + 0.15473 / 0.5495 + 0.15473 / 0.5495 = 0.91489, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

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