

## RF Exposure Report

**Report No.:** SA181109E05

**FCC ID:** 2AMRICR48NA

**Test Model:** CR48NA

**Series Model:** CXD2800

**Received Date:** Nov. 13, 2018

**Test Date:** Dec. 07, 2018

**Issued Date:** Feb. 20, 2019

**Applicant:** Connected IO

**Address:** 8304 Esters Boulevard, Suite 850, Irving, Texas United States 75063

**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:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

**FCC Registration /  
Designation Number:** 723255 / TW2022

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### Release Control Record

Issue No.	Description	Date Issued
SA181109E05	Original release.	Feb. 20, 2019

## 1 Certificate of Conformity

**Product:** Router

**Brand:** Connected IO, Netsurion

**Test Model:** CR48NA

**Series Model:** CXD2800

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Connected IO

**Test Date:** Dec. 07, 2018

**Standards:** FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

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.

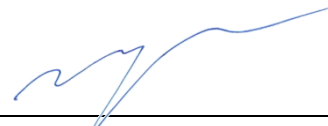
**Prepared by :**



**Date:** Feb. 20, 2019

Wendy Wu / Specialist

**Approved by :**



**Date:** Feb. 20, 2019

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 <sup>2</sup> )	Average Time (minutes)
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 <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

f = Frequency in MHz ; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Formula

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

where

Pd = power density in mW/cm<sup>2</sup>

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 23cm away from the body of the user.

So, this device is classified as **Mobile Device**.

## 2.4 Antenna Gain

WLAN							
Ant Set.	Chain No.	Brand	Model	Antenna Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	Chain 0	JOYMAX	TWX-1513RSXX-711	5	2.4~2.4835	Collinear	R-SMA
				5	5.15~5.85		
	Chain 1	JOYMAX	TWX-1513RSXX-711	5	2.4~2.4835	Collinear	R-SMA
				5	5.15~5.85		
2	Chain 0	JOYMAX	TWX-6141RSXX-711	3	2.4~2.4835	Microstrip	R-SMA
				5	5.15~5.85		
	Chain 1	JOYMAX	TWX-6141RSXX-711	3	2.4~2.4835	Microstrip	R-SMA
				5	5.15~5.85		
WWAN – 3G / LTE							
Ant Set	Transmitter Circuit	Brand	Model	Antenna Gain (dBi)	Frequency Range (MHz)	Antenna Type	Connector Type
1	Main	JOYMAX	YWX-6252SAXX-711	3	698~960	Microstrip	SMA
					1710~2710		
					2300~2700		
	Aux	JOYMAX	YWX-6252SAXX-711	3	698~960	Microstrip	SMA
					1710~2710		
					2300~2700		

Note:  
 1. For WLAN: Ant set 1 was selected for the final test.

## 2.5 Calculation Result of Maximum Conducted Power

### For WLAN

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
WLAN 2.4GHz	2437	683.343	8.01	23	0.65009	1
WLAN UNII-1	5230	59.941	8.01	23	0.05702	1
WLAN UNII-3	5745	139.597	8.01	23	0.13280	1

#### NOTE:

2.4GHz: Directional gain = 5dBi + 10log(2) = 8.01dBi

5GHz: Directional gain = 5dBi + 10log(2) = 8.01dBi

### For 3G/LTE <Worst case> (FCC ID: R17LE910NAV2)

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
UMTS Band V	826.4	229	3.00	23	0.06873	0.55093*

Note: \*Limit of Power Density = F/1500

#### Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

$WLAN\ 2.4GHz + WLAN\ 5GHz + 3G/LTE = 0.65009 / 1 + 0.13280 / 1 + 0.06873 / 0.55093 = 0.90764$

**Therefore the maximum calculations of above situations are less than the "1" limit.**

## Appendix

3G/LTE module

MPE Evaluation for FCC ID: R17LE910NAV2 Module

Mode	Equipment Category	Transmitter Range (MHz)		Maximum Power		Antenna Gain (dBi)	Power Density (mW/cm <sup>2</sup> )		Ratio
		Start	Stop	(dBm)	(W)		Vaule	Limit	
UMTS	Band II	1852.4	1907.6	23.655	0.232	3	0.06963	1	0.06963
	Band V	826.4	846.6	23.598	0.229	3	0.06873	0.55093	<b>0.12475</b>
LTE	Band 2	1850.7	1909.3	23.424	0.22	3	0.06603	1	0.06603
	Band 4	1710.7	1754.3	23.117	0.205	3	0.06153	1	0.06153
	Band 5	824.7	848.3	22.9	0.195	3	0.05853	0.5498	0.10646
	Band 12	699.7	715.3	22.856	0.193	3	0.05793	0.46646	0.12419
	Band 13	779.5	784.5	22.878	0.194	3	0.05823	0.51966	0.11205

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