RF EXPOSURE EVALUATION REPORT

FCC ID	:	XIA-NTC140
Equipment	:	LTE M2M Router 4G M2M Router
Brand Name	:	Netcomm Wireless
Model Name	:	NTC-140-01
Applicant	:	NetComm Wireless Limited 18-20 Orion Road Lane Cove, NSW 2066 Australia
Manufacturer	:	NetComm Wireless Limited 18-20 Orion Road Lane Cove, NSW 2066 Australia
Standard	:	47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated in accordance with 47 CFR Part 2.1091 for the device and pass the limit.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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Jones Tsai

Approved by: Jones Tsai / Manager

SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory

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History of this test report

Report No.	Version	Description	Issued Date
FA441109-04	Rev. 01	Initial issue of report	Jul. 12, 2018
FA441109-04	Rev. 02	Revised Applicant and Manufacturer address.	Jul. 18, 2018

1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	LTE M2M Router 4G M2M Router
Brand Name	Netcomm Wireless
Model Name	NTC-140-01
FCC ID	XIA-NTC140
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz CDMA2000 BC0: 824.7 MHz ~ 848.31 MHz CDMA 2000 BC1: 1851.25 MHz ~ 1908.75 MHz CDMA 2000 BC10: 817.9 MHz ~ 823.1 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz
Mode	GPRS/EGPRS RMC 12.2Kbps Rel 99 HSDPA HSUPA DC-HSDPA CDMA2000 : 1xRTT/1xEv-Do(Rev.0)/1xEv-Do(Rev.A) LTE: QPSK, 16QAM
HW Version	V1.0
SW Version	V2.0.23.20
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Antenna Information		
Antenna 1	Manufacturer	NetCommWireless
	Part number	ANT-0050
Antenna 2	Manufacturer	NetCommWireless
	Part number	ANT-0024

Reviewed by: Eric Huang

Report Producer: Wan Liu

2. Maximum RF average output power among production units

Band / Mode			Average power(dBm)
GSM	850	GPRS (GMSK, 1 Tx slot)	33.0
		GPRS (GMSK, 2 Tx slots)	33.0
		EDGE (8PSK, 1 Tx slot)	28.0
		EDGE (8PSK, 2 Tx slots)	27.0
		EDGE (8PSK, 3 Tx slots)	27.0
		EDGE (8PSK, 4 Tx slots)	27.0
	1900	GPRS (GMSK, 1 Tx slot)	30.0
		GPRS (GMSK, 2 Tx slots)	30.0
		EDGE (8PSK, 1 Tx slot)	27.0
		EDGE (8PSK, 2 Tx slots)	26.0
		EDGE (8PSK, 3 Tx slots)	26.0
		EDGE (8PSK, 4 Tx slots)	26.0
WCDMA		Band II	24.0
		Band IV	24.0
		Band V	24.0
CDMA		BC 0	24.5
		BC 1	24.5
		BC10	24.5
LTE		Band 2	24.0
		Band 4	24.0
		Band 5	24.0
		Band 13	24.0
		Band 17	24.0
		Band 25	24.0

3. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)
GPRS 850 (1 Tx slot)	824.2	5.65	33	38.650	7.328	922.571	0.184	0.549
GPRS 850 (2 Tx slots)	824.2	5.65	33	38.650	7.328	1840.772	0.366	0.549
EGPRS 850 (1 Tx slot)	824.2	5.65	28	33.650	2.317	291.743	0.058	0.549
EGPRS 850 (2 Tx slots)	824.2	5.65	27	32.650	1.841	462.381	0.092	0.549
EGPRS 850 (3 Tx slots)	824.2	5.65	27	32.650	1.841	690.240	0.137	0.549
EGPRS 850 (4 Tx slots)	824.2	5.65	27	32.650	1.841	922.571	0.184	0.549
GPRS 1900 (1 Tx slot)	1850.2	4.17	30	34.170	2.612	328.852	0.065	1.000
GPRS 1900 (2 Tx slots)	1850.2	4.17	30	34.170	2.612	656.145	0.131	1.000
EGPRS 1900 (1 Tx slot)	1850.2	4.17	27	31.170	1.309	164.816	0.033	1.000
EGPRS 1900 (2 Tx slots)	1850.2	4.17	26	30.170	1.040	261.216	0.052	1.000
EGPRS 1900 (3 Tx slots)	1850.2	4.17	26	30.170	1.040	389.942	0.078	1.000
EGPRS 1900 (4 Tx slots)	1850.2	4.17	26	30.170	1.040	521.195	0.104	1.000
WCDMA Band 2	1852.4	4.17	24	28.170	0.656	656.145	0.131	1.000
WCDMA Band 4	1712.4	3.70	24	27.700	0.589	588.844	0.117	1.000
WCDMA Band 5	826.4	5.65	24	29.650	0.923	922.571	0.184	0.551
CDMA2000 BC0	824.7	5.65	24.5	30.150	1.035	1035.142	0.206	0.550
CDMA2000 BC1	1851.3	4.17	24.5	28.670	0.736	736.207	0.147	1.000
CDMA2000 BC10	817.9	3.37	24.5	27.870	0.612	612.350	0.122	0.545
LTE Band 2	1850.7	4.17	24	28.170	0.656	656.145	0.131	1.000
LTE Band 4	1710.7	3.70	24	27.700	0.589	588.844	0.117	1.000
LTE Band 5	824.7	5.65	24	29.650	0.923	922.571	0.184	0.550
LTE Band 13	779.5	3.37	24	27.370	0.546	545.758	0.109	0.520
LTE Band 17	706.5	1.66	24	25.660	0.368	368.129	0.073	0.471
LTE Band 25	1850.7	4.17	24	28.170	0.656	656.145	0.131	1.000

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.