RF Exposure Evaluation Report

Equipment	: M2.COM LoRa IoT Node
Brand Name	: Advantech
Model No.	: WISE-1510
FCC ID	: M82-WISE1510
Standard	: 47 CFR Part 2.1091
Applicant	: Advantech Co., Ltd. No.1, Alley 20, Lane 26, Rueiguang Rd., Neihu District,Taipei City, Taiwan, R.O.C.
Manufacturer	: Advantech Co., Ltd. No.1, Alley 20, Lane 26, Rueiguang Rd., Neihu District,Taipei City, Taiwan, R.O.C.

The product sample received on Dec. 28, 2016 and completely tested on Apr. 14, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit.

Cliff Chang
SPORTON INTERNATIONAL INC.

Testing Laboratory
1190

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA690609	Rev. 01	Initial issue of report	May 11, 2017

1 General Description

1.1 EUT General Information

RF General Information				
Evaluation Mode	**Frequency Range (MHz)**	**LoRa Mode**	**Operating Frequency (MHz)**	**Modulation Type**
LoRa	902-928	LoRa-500kHz	903.0-914.2 923.3-927.25	Chirp Spread Spectrum (CSS) modulation
		LoRa-125kHz	902.3-914.9	

1.2 Testing Location

Testing Location			
☐	HWA YA	ADD :	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
		TEL : 886-3-327-3456	FAX : 886-3-327-0973
☒	JHUBEI	ADD :	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
		TEL : 886-3-656-9065	FAX : 886-3-656-9085

2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	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

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

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:

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

Pd = $\frac{30 \times P \times G}{377 \times d^2}$

2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm2)	S Limit (mW/cm2)
LoRa-500kHz	1.80	18.42	20.22	0.10520	20	0.02093	0.61833