RF Exposure Report

Report No.:	SA191209C13
FCC ID:	WIYT910 (For module) WIYUPT1000-BV (For Host)
Test Model:	LE910-NA1 (For module) UPT1000B (For Host)
Received Date:	Dec. 09, 2019
Date of Evaluation:	Feb. 17 ~ Feb. 21, 2020
Issued Date:	Feb. 26, 2020
Applicant:	CASTLES TECHNOLOGY CO., LTD.
Address:	6F, NO. 207-5, SEC. 3, BEIXIN RD., XINDIAN DISTRICT, NEW TAIPEI CITY 23143, TAIWAN (R. O. C.)
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
SA191209C13	Original release.	Feb. 26, 2020

1 Certificate of Conformity

Product:	LTE module (for module) POS Terminal (For Host)
Brand:	Telit (for module) CASTLES TECHNOLOGY (For Host)
Test Model:	LE910-NA1 (For module) UPT1000B (For Host)
Sample Status:	Identical Prototype
Applicant:	CASTLES TECHNOLOGY CO., LTD.
Date of Evaluation:	Feb. 17 ~ Feb. 21, 2020
Standards:	FCC Part 2 (Section 2.1091)
References Test Guidance:	KDB 447498 D01 General RF Exposure Guidance v06 IEEE C95.3 -2002

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 RF characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Feb. 26, 2020

Polly Chien / Specialist

Approved by : _____ , **Date:** Feb. 26, 2020

Bruce Chen / Senior Project Engineer

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				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	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^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.

3 Calculation Result of Maximum Conducted Power

For module (Model: LE910-NA1, FCC ID: WIYT910)

Frequency Band (MHz)	Output Power ERP / EIRP (dBm)	Output Power ERP / EIRP (mW)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WCDMA Band 2	23.5	223.872	20	0.045	1
WCDMA Band 5	23.3	213.796	20	0.043	0.55
LTE Band 2	24.1	257.040	20	0.051	1
LTE Band 4	23.6	229.087	20	0.046	1
LTE Band 5	22.7	186.209	20	0.037	0.55
LTE Band 12	21.7	147.911	20	0.029	0.47
LTE Band 13	21.3	134.896	20	0.027	0.52

For Host:

Frequency Band (MHz)	Max. AV Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2.4G Bluetooth	9.63	-0.1	20	0.002	1

Mode	Electric field (dBuV/m) @3m	Max. Power EIRP (dBm)	Max. Power EIRP (mW)	Power Density (mW/cm^2)	Limit (mW/cm^2)
NFC	66.8	-28.43	0.001435	0.0000003	0.978

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. Max. power EIRP (dBm) = Field Strength (dBuV/m)@3m - 95.23, Output power (mW) = $10^{(\text{Max power(dBm)} / 10)}$.

For antenna gain:

Frequency Band	Antenna Gain (dBi)
2.4G Bluetooth	-0.1
698-791MHz	0
824-960MHz	1.61
1710-2170MHz	1.95

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

1. WWAN + BT = 0.043/0.55 + 0.002/1 = 0.078+0.002=0.080
2. WWAN + NFC = 0.043/0.55+ 0.0000003/0.978 = 0.078+0.00000031=0.078
3. WWAN + BT + NFC = 0.043/0.55 + 0.002/1 + 0.0000003/0.978 = 0.078+0.002+0.0007=0.080

Therefore the maximum calculations of above situations are less than the “1” limit.

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