

RF EXPOSURE EVALUATION REPORT

Application No.: FYCR2206000259AT

Applicant: ZK Technology LLC DBA ZK Teco

Address of Applicant: 200 Centennial Ave, Suite 211, Piscataway, New Jersey, 08854 United States

Manufacturer: ZK Technology LLC DBA ZK Teco

Address of Manufacturer: 200 Centennial Ave, Suite 211, Piscataway, New Jersey, 08854 United States

Factory: Armatura Tech Co.,Ltd

Address of Factory: 999/43 Moo 15 Bangsaothong, Samutprakarn 10570, Thailand
999/120-121 Moo15 Bangsaothong, Samutprakarn 10570, Thailand

Equipment Under Test (EUT):

EUT Name: DATA COLLECTION TERMINAL

Model No.: Please refer to section 2. ♣

♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

Trade Mark:



FCC ID: 2AUC7-ULT7G2

Standard(s) : 47 CFR Part 1.1307
47 CFR Part 2.1091
447498 D01 General RF Exposure Guidance v06

Date of Receipt: 2022-06-28

Date of Evaluation: 2022-07-18 to 2022-07-28

Date of Issue: 2022-08-01

Evaluation Result:	Pass*
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* In the configuration evaluated, the EUT complied with the standards specified above.



Winkey Wang
EMC Technical Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2022-08-01		Original

Authorized for issue by:				
		Tree Zhan		
		Tree Zhan/Project Engineer		
		Winkey Wang		
		Winkey Wang/Reviewer		



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3 General Information

3.1 General Description of E.U.T.

Product Type:	☐ Portable device
	☒ Mobile device
	☐ Fixed device

3.2 Details of E.U.T.

Power supply:	DC 12V 3A or powered by POE DC 48V . Adapter Model:FJ-SW1203000U Input: AC 100-240V 50/60Hz 1.5A Output: DC 12V 3A
For 2.4G WIFI:	
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11;802.11n(HT40):7
Channel Spacing:	5MHz
Antenna Type:	PIFA Antenna
Antenna Gain:	2.37dBi
For 5G WIFI:	
Operation Frequency (20MHz):	U-NII-1: 5180-5240MHz; U-NII-2A: 5260-5320MHz; U-NII-2C: 5500-5700MHz; U-NII-3: 5745-5825MHz
Operation Frequency (40MHz):	U-NII-1: 5190-5230MHz; U-NII-2A: 5270-5310MHz; U-NII-2C: 5510-5670MHz; U-NII-3: 5755-5795MHz
Operation Frequency (80MHz):	U-NII-1: 5210MHz; U-NII-2A: 5290MHz; U-NII-2C: 5530-5610MHz; U-NII-3: 5775MHz
Moudulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK); 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM); 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Channel Spacing:	802.11a/n(HT20)/ac(HT20): 20MHz; 802.11n(HT40)/ac(HT40): 40MHz; 802.11ac(HT80): 80MHz
DFS Function:	Slave without Radar detection
TPC Function:	Without TPC function
Antenna Type:	PIFA Antenna
Antenna Gain:	2.71dBi

Remark: The WiFi, RFID could not transmit simultaneously.



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Declaration of EUT Family Grouping:

Model No.: ULTIMA-200-G2, ULTIMA-G2, ULTIMA-BAR, ULTIMA-MAG, ULTIMA-SILKID, ULTIMA-LUM, ULTIMA-PRO, ULTIMA-PLUS, ORION -G2, ORION-BAR, ORION-MAG, ORION-TC1, ORION-SILKID, ORION-LUM, ORION-PRO, Orion-PLUS, CRONUS-200-G2, CRONUS-G2, CRONUS-BAR, CRONUS-MAG, CRONUS-SILKID, CRONUS-LUM, CRONUS-PRO, CRONUS-PLUS, PLATO-G2, PLATO-BAR, PLATO-MAG, PLATO-SILKID, PLATO-LUM, PLATO-PRO, PLATO-PLUS, ULTIMA-FACE, ULTIMA-TOUCHLESS, ULTIMA--FT(face with thermal) , ULTIMA-T(thermal), ULTIMA-P(for printer), ULT-MAG, ULT-BAR, ULT-SILKID, ULT-FACE, ULT-FT, ULT-SLKID-MTPRO, ULT-face-MTPRO, ULT-FT-MTPRO, ULT-PRO, WTPURULT200-G2, ULTIMA-FACE-G2, ULT-FACE-G2, ULTIMA-FT-G2, ULT-FT-G2

Only the model ULTIMA-200-G2 was tested, since according to the declaration from the applicant, the electrical circuit design, PCB layout, components used, internal wiring and functions were identical for all the above models, with only difference on model name and color.

3.3 Separation Distance

Minimum test separation distance:	20cm
Remark: This minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander.	



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3.4 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc. Shenzhen branch.

Fuyong lab. Xinlong TechnoPark, Fengtang Road, Fuyong Subdistrict, Bao'an, Shenzhen, China

Tel: +86 755 8866 3988 Fax: +86 755 2671 0594

No tests were sub-contracted.

3.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 6606.01)**

Compliance Certification Services (Kunshan) Inc. Shenzhen branch is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6606.01.

- **FCC –Designation Number: CN1322**

Compliance Certification Services (Kunshan) Inc. Shenzhen branch has been recognized as an accredited testing laboratory.

Designation Number: CN1322. Test Firm Registration Number: 718073

- **Innovation, Science and Economic Development Canada**

Compliance Certification Services (Kunshan) Inc. Shenzhen branch has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0129.

IC#: 28189.

3.6 Deviation from Standards

None

3.7 Abnormalities from Standard Conditions

None



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4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 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)	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/f ²)	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/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

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



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4.2 EUT RF Exposure Evaluation

For 2.4G WIFI:

Antenna Gain: 2.37dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.73 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Max Conducted Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Result
2412	16.31	73.79	0.025	1.0000	PASS

Note: Refer to report No. FYCR220600025901 for EUT test Max Conducted Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For 5G WiFi:

Antenna Gain: 2.71dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.87 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Max Conducted Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Result
5580	9.36	16.11	0.006	1.0000	PASS

Note: Refer to report No. FYCR220600025902 for EUT test Max Conducted Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

--End of the Report--



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