TEST REPORT

Report No.		ICRT-TR-E231299-0A
Client	Name	CanTops Co., Ltd.
	Address	A 1002-1008, Digital Empire BLDG, 16,Deogyeong-daero 1556beon-gil, Yeongtong-gu, Suwon-si, Gyeonggi-do,16690, South Korea
Product name		RFID Reader
Model name		CTS-RFID-LM24
Voltages		DC 24 V
Place of test		■ Inside test ☐ Field test Address: 112, 113 Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea
Date of test		07. May. 2023 ~ 08. May. 2023
Test Method/Item		FCC rule part 1.1307
Test Results		Refer to 4. RF Exposure
Affirmation	Tested by Seong-Hun, Jeong (Signature)	Technical Manager Tae-Yang, Yoon (Signature)

☐ The above test report is certified that the above mentioned products have been tested for the sample.

☐ The above test report is not related to accreditation by KS Q ISO/IEC 17025 and Korea Laboratory Accreditation scheme.

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2023. 06. 13

INTERNATIONAL CERTIFICATION REGISTRAR

ICRT-QPA-17-03 Rev.2

Contents

Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
ICRT-TR-E231299-0A	2023. 06. 13	Initial Issue	All

1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant information

Applicant	CanTops Co., Ltd.
Address	A 1002-1008, Digital Empire BLDG, 16, Deogyeong-daero 1556beon-gil, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16690, South Korea
Contact Person	Sang-Gyu, Han
Telephone No.	82-10-4607-6910
Fax No.	82-31-303-5233
E-mail	sghan@cantops.biz

1.2 Manufacturer Information

Applicant	CanTops Co., Ltd.
Address	A 1002-1008, Digital Empire BLDG, 16, Deogyeong-daero 1556beon-gil, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16690, South Korea

1.3 Test Laboratory Information

Laboratory	ICR Co., Ltd.
Address	112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea
Telephone No.	+82-2-6351-9002
Fax No.	+82-2-6351-9007
KOLAS No.	KT652
KC & FCC	KR0165

1.4 Measurement Uncertainty

Parameter	Uncertainty for ICR	Limit
Occupied Channel Bandwidth	0.19%	±5 %
RF output power, conducted	0.90 ㏈	±1.5 ㏈
Power Spectral Density, conducted	1.51 ㏈	±3 ㏈
Unwanted Emissions, conducted	1.36 ㏈	±3 ㏈
Supply voltages	0.02%	±3 %
Time	0.58%	±5 %
All emissions, radiated (Under the 1 ㎓)	3.22 ㏈	±6 ㏈
All emissions, radiated (Above the 1 ㎓)	3.67 ㏈	±6 ㏈

2. Equipment under Test(EUT) Information

2.1 General Information

Product Name	RFID Reader
Brand Name	CanTops
Model Name	CTS-RFID-LM24
Additional Model Name	CTS-RFID-LM21
FCC ID	RMN-CTS-RFID-LM24
Power Supply	DC 24 V
Antenna Port	4

2.2 Additional Information

Equipment Class	DCD - Part 15 Low Power Transmitter Below 1705 kHz	
Operating Frequency	134.2 ㎑	
Channel Number	1	
Modulation Type	ASK	
Maximum output power	91.42 dBμV/m	
Antenna Type	CTS-STBA-EC-1-0400	Coil Antenna (Rectangular Type)
	CTS-RFID-AO01-0400	Coil Antenna (Stick Type)
	CTS-RFID-AB01-0400	Coil Antenna (Stick Type)
	CTS-RFID-AC01-0400	Coil Antenna (Stick Type)

2.3 Operation Description

- The product has 4 antenna ports, and they do not operate simultaneously.
  Consumers connect and use one of the four types of antennas provided by the manufacturer.
  The test was conducted by connecting 4 types of antennas to each of the 4 ports.

2.4 Additional model information

- CTS-RFID-LM21 is a simple structure change model in which the antenna port is blocked by a wall from
  the CTS-RFID-LM24 model. It is the same as using only the first PORT of the CTS-RFID-LM24 model.

2.5 Modifications of EUT

- None

3. Test Summary

3.1 Test standards and results

FCC rule part 1.1307			
Clause	Test items	Applied	Results
FCC rule part 1.1307	Radiofrequency radiation exposure.	■	PASS

4. Result

4.1 RF Exposure

4.1.1 Regulation

FCC rule part 1.1307(b)
KDB 447498 D04 Interim General RF Exposure Guidance v01

Part 1.1307(b)(3) - Determination of exemption.

(i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

KDB 447498 D04 2.1.2 - 1-mW Test Exemption

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

4.1.2 Evaluation Method

OET Bulletin 65 Section 3: Methods of Predicting Human Exposure

* Equation 1

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

S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

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

EIRP = equivalent (or effective) isotropically radiated power

OET Bulletin 65 Section 2: FCC Exposure Guidelines and Their Application

* Equation 2

$$S = E \times H = \frac{E^2}{10Z_0}$$

S = power density (in appropriate units, e.g. mW/cm2)

E = electric field strength (V/m)

H = magnetic field strength (A/m)

Z_0 = Impedance of free space (Ω)

* Equation 3, By equations 1 and 2

$$EIRP(dBm) = E(dB\mu V/m) - 104.77 + 20Log[R(m)]$$

EIRP at distance R = 3 m

$$EIRP(dBm) = E(dB\mu V/m) - 95.23$$

4.1.3 Limit

FCC rule part 1.1307(b)(3)

For determination of exemption. available maximum time-averaged power is no more than *1 mW*, regardless of separation distance

4.1.4 Result

Mode	Frequency [kHz]	Maximum field strength @3m (dBμV/m)	Calculated E.I.R.P. (dBm)	Maximum Output power (mW)	Limit (mW)	Result
RFID	133.9	91.42	-3.81	0.42	1	PASS

END OF REPORT.