

**Maximum Permissible Exposure Report****1. Product Information**

Product name	2-in-1 NFC Smart Card Reader
Test Model	ZW-12026-12
Additional Model No.	ZW-12026-12C, ZW-12026-13, ZW-12026-13C, ZW-12026-14, ZW-12026-14C, ZW-12026-15, ZW-12026-15C, CR12, CR12C, CR13, CR13C, CR14, CR14C, CR15, CR15C
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Power Supply	Input: DC 5V
Hardware Version	/
Software Version	/
Operating Frequency	13.56MHz
Modulation Type	ASK
Antenna Description	Internal Antenna, 0dBi(Max.)
Exposure category	General population/uncontrolled environment
EUT Type	Production Unit
Device Type	Fixed Device



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## 2. Evaluation Method

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is  $\leq 1.0$ . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

## 3. Limit

### 3. 1 Refer Evaluation Method

[ANSI C95.1–2019](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz

[FCC KDB publication 447498 D01 General 1 RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

[FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.

[FCC CFR 47 part2 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices.



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### 3. 2 Limit

#### Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100)*	6
3.0 – 30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

#### Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
Limits for Occupational/Uncontrolled Exposure				
0.3 – 3.0	614	1.63	(100)*	30
3.0 – 30	824/f	2.19/f	(180/f <sup>2</sup> )*	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

### 4. MPE Calculation Method

#### Test Procedure

TX frequency range: 13.56MHz

Device category: Fixed Device (Distance: 20cm) Max.

Field Strength: 42.45dBuV/m @3m

Field Strength:  $42.45 + 40\log(3/0.2) = 89.43$  dBuV/m @20cm



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## 5. Measurement Results

### 5.1 Standalone MPE Evaluation

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons.

Frequency	Field Strength(dBuV/m)	Electric Field Strength(V/m)	Electric Field Strength(V/m) Limits
13.56MHz	89.43	0.03	135.84

*Remark:*

1. MPE evaluate distance is 20cm from user manual provide by manufacturer.

### 5.2 Simultaneous Transmission MPE Evaluation

The EUT equiped with one module and one antenna. So no need consider simultaneous transmission.

## 6. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

-----THE END OF REPORT-----



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