
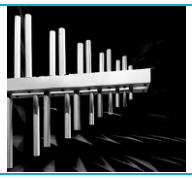
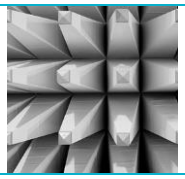

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BNetzA-CAB-02/21-102

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-03

# Maximum Permissible Exposure (MPE) & Exposure evaluation

## Report identification number: 1-8602/19-01-06-A

| Certification numbers and labeling requirements | |
|---|---|
| FCC ID | PJMLRU1002A |
| IC number | 6633A-LRU1002A |
| HVIN (Hardware Version Identification Number) | ID LRU1002A |
| PMN (Product Marketing Name) | ID ISC.LRU1002-FCC |
| FVIN (Firmware Version Identification Number) | -/- |
| HMN (Host Marketing Name) | -/- |

Version –A: calculation with declared minimum safety distance of 34 cm.

This report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

## Document authorised:

Thomas Vogler

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**EUT technologies:**

| Technologies: | Max. power conducted: (AVG) | Max. antenna gain: | Min. pathloss: |
|---|---|---|---|
| RFID Reader<br>ISM 902 – 928 MHz | Declared 30 dBm | 2 different antenna types:<br>see tables below | see tables below |

See CTC advanced test report 1-8602/18-01-04 for reference

**Prediction of MPE limit at given distance - FCC**

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG / 4\pi R^2$

where: S = Power density
P = Power input to the antenna
G = Antenna gain
R = Distance to the center of radiation of the antenna
PG = Output Power including antenna gain

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled “Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure”

| Frequency Range (MHz) | Power Density (mW/cm$^2$) | Averaging Time (minutes) |
|---|---|---|
| 300 -1500 | f/1500 | 30 |
| 1500 - 100000 | 1.0 | 30 |

where f = Frequency (MHz)

Prediction for **declared minimum safety distance of 34 cm**:

| | | | |
|---|---|---|---|
| | Technology | ISM 902 - 928 | ISM 902 - 928 |
| | Antenna | Feig ID ISC.ANT.U290/290-FCC | Feig ID ISC.ANT.U580/290-FCC |
| P | Maximum output power | 30 dBm | 30 dBm |
| PG | EIRP | 35.2 dBm | 35.9 dBm |
| | **Distance:** | **34 cm** | **34 cm** |
| S | MPE limit for uncontrolled exposure | 0.60 mW/cm$^2$ | 0.60 mW/cm$^2$ |
| | **Calculated Power density:** | **0.228 mW/cm²** | **0.268 mW/cm²** |
| | **Percentage of limit:** | **38.0 %** | **44.6 %** |
| | **Collocation (Multiplexed use of both antennas at 50% duty cycle each)** | **0.248 mW/cm²** | |
| | **Percentage of limit:** | **41.34 %** | |

**Prediction of MPE limit at given distance - IC**

RSS-102, Issue 5, 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$W (adjusted for tune-up tolerance), where $f$ is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2}\ f^{0.6834}$ W (adjusted for tune-up tolerance), where $f$ is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

Prediction for **declared minimum safety distance of 34 cm**:

| | Technology | ISM 902 - 928 | ISM 902 - 928 |
|---|---|---|---|
| | Antenna | Feig ID ISC.ANT.U290/290-FCC | Feig ID ISC.ANT.U580/290-FCC |
| P | Maximum output power | 30 dBm | 30 dBm |
| PG | EIRP | 35.2 dBm | 35.9 dBm |
| | **Distance:** | **34 cm** | **34 cm** |
| S | MPE limit for uncontrolled exposure | 2.73 W/m² | 2.73 W/m² |
| | **Calculated Power density limit at 34 cm:** $S = PG / 4\pi R^2$ | **2.28 W/m²** | **2.68 W/m²** |
| | **Percentage of limit:** | **83.5 %** | **98 %** |
| | **Collocation (Multiplexed use of both antennas at 50% duty cycle each)** | **2.48 W/m²** | |
| | **Percentage of limit:** | **90.88 %** | |