

## Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-1877/16-01-12

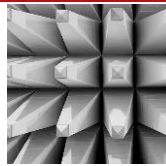
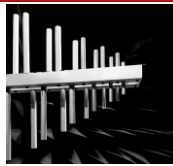
| Certification numbers and labeling requirements |                                                                              |
|-------------------------------------------------|------------------------------------------------------------------------------|
| FCC ID                                          | 2AJRS-ISDR                                                                   |
| IC number                                       | 21407-ISDR                                                                   |
| HVIN (Hardware Version Identification Number)   | iSDR-DN150-E1-C1<br>iSDR-DN100-E1-C1<br>iSDR-DN080-E1-C1<br>iSDR-DN050-E1-C1 |
| PMN (Product Marketing Name)                    | iSDR                                                                         |
| FVIN (Firmware Version Identification Number)   | E3                                                                           |
| HMN (Host Marketing Name)                       | -/-                                                                          |

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### Document authorized:

DN: cn=Thomas Vogler, o=CETECOM ICT  
Services GmbH, ou=VOG-150728,  
email=thomas.vogler@cetecom.com, c=DE  
Datum: 2016.09.26 12:03:39 +02'00'

Thomas Vogler  
Lab Manager  
Radio Communications & EMC



### EUT technologies:

| Technologies:                | Max. antenna gain of different antennas: | Max EIRP: (normal mode) |
|------------------------------|------------------------------------------|-------------------------|
| 76 GHz Distance radar        | DN50: 29.0 dBi                           | 15.8 dBm                |
| 76 GHz Distance radar        | DN80: 33.0 dBi                           | 19.8 dBm                |
| 76 GHz Distance radar        | DN100: 35.0 dBi                          | 21.8 dBm                |
| <b>76 GHz Distance radar</b> | <b>DN150: 39.0 dBi</b>                   | <b>25.8 dBm</b>         |

### 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

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 <sup>2</sup> ) | Averaging Time (minutes) |
|-----------------------|-------------------------------------|--------------------------|
| 300 -1500             | f/1500                              | 30                       |
| 1500 - 100000         | 1.0                                 | 30                       |

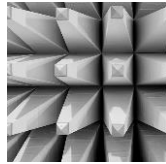
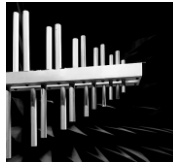
where f = Frequency (MHz)

### Prediction: worst case

|    |                                     |                          |
|----|-------------------------------------|--------------------------|
|    |                                     | > 1500 MHz               |
|    | Technology                          | Radar @ 76 GHz           |
| PG | Max EIRP                            | 25.8 dBm                 |
| R  | Distance                            | 20 cm                    |
| S  | MPE limit for uncontrolled exposure | 1 mW/cm <sup>2</sup>     |
|    | <b>Calculated Power density:</b>    | 0.076 mW/cm <sup>2</sup> |

**This prediction demonstrates the following:**

The power density levels for FCC at a distance of 20 cm are below the maximum levels allowed by regulations.



### 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  $4.49/f^{0.5} \text{ W}$  (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  $1.31 \times 10^{-2} f^{0.6834} \text{ W}$  (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: worst case

|    | Technology                 | Radar<br>@ 76 GHz |
|----|----------------------------|-------------------|
| PG | Maximum EIRP (dBm)         | 25.8 dBm          |
|    | Maximum EIRP (W)           | 0.38 mW           |
|    | Exclusion Limit from above | 5 W               |

**Conclusion:** RF exposure evaluation is not required.

For applications where minimum distance to radiating element is 20cm Annex C of RSS-102 should be filled out.