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# COMMISSION IMPLEMENTING DECISION (EU) 2026/883

## of 21 April 2026

## on the harmonisation of radio spectrum for use by radiodetermination applications in the 116-260 GHz frequency band

*(notified under document C(2026) 2519)*

**(Text with EEA relevance)**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Decision No 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision) ([1]), and in particular Article 4(3) thereof,

Whereas:

(1) Radiodetermination devices using the sub-terahertz 116-260 GHz frequency band, such as sensors and radars, are short-range devices. They are suitable for a range of uses fulfilling various measurement and detection tasks in industrial automation, such as measuring and determining physical characteristics like presence, distance, velocity or material properties of a target object, in order to support digitisation of industrial production. For instance, vehicular radars can be used for driving assistance, contactless gesture control, presence detection, and vital sign monitoring. New semiconductor technologies are available that can make use of spectrum above 100 GHz and thus enable further development of radiodetermination devices.

(2) The European Conference of Postal and Telecommunications Administrations ('CEPT') has conducted coexistence studies concerning radiodetermination devices using the 116-260 GHz frequency band and radiocommunication services (Radio Astronomy Service, Fixed Service, Earth Exploration Satellite Service passive and Amateur Service) operating in the same frequency band and in adjacent bands. Radiodetermination devices using the 116-260 GHz frequency band should be installed and used outside defined exclusion zones and, where appropriate, exterior vehicular radars should reduce their power in defined restriction zones in order to protect radio astronomy service stations according to the harmonised technical conditions set out in this Decision.

(3) The permanent mandate issued to the CEPT, pursuant to Article 4(2) of Decision No 676/2002/EC, includes updating the Annex to Commission Decision 2006/771/EC ([2]) on short-range devices, in order to reflect technological and market developments. The CEPT response to that mandate also included a report ([3]) of 8 March 2024. In that report, the Commission was invited to consider a separate Decision on radiodetermination applications in the 116-260 GHz frequency band, considering that harmonised technical conditions for radiodetermination applications in that band should not be part of the Annex to Decision 2006/771/EC, as the format of these conditions is not compatible with that of the harmonised technical conditions for short-range devices referred to in the Annex to that Decision.

(4) The CEPT report proposes to harmonise technical conditions for the use of radio spectrum by the following eight categories of radiodetermination applications: (i) generic indoor surveillance radars; (ii) radiodetermination systems for industry automation; (iii) level probing radars; (iv) contour determination and acquisition radars; (v) tank level probing radars; (vi) radiodetermination systems for industry automation in shielded environments; (vii) exterior vehicular radars; and (viii) in-cabin vehicular radars.

([1]) OJ L 108, 24.4.2002, p. 1, ELI: http://data.europa.eu/eli/dec/2002/676(1)/oj.

([2]) Commission Decision 2006/771/EC of 9 November 2006 on harmonisation of the radio spectrum for use by short-range devices (OJ L 312, 11.11.2006, p. 66, ELI: http://data.europa.eu/eli/dec/2006/771(2)/oj).

([3]) CEPT Report 86 – report from the CEPT to the European Commission in response to the Permanent Mandate on short-range devices: 'Harmonised technical parameters for SRD radiodetermination applications in the frequency range 116-260 GHz', approved on 8 March 2024 by the Electronic Communications Committee, link: https://docdb.cept.org/document/28605.

(5) As radiodetermination applications use spectrum with low emission power and short-range emission capability, their potential to cause interference to other spectrum users is limited. They can share frequency bands with other services without causing harmful interference and can coexist with other short-range devices. Their use of spectrum should therefore not be subject to any individual right to use parts of the 116-260 GHz frequency band, if the harmonised technical conditions set out in this Decision are met. As a result, radiodetermination applications that satisfy those harmonised technical conditions should be subject to no more than a general authorisation under national law.

(6) The notion of 'designating and making available' in the context of this Decision refers to the following steps: (i) adapting the national frequency allocation/utilisation plan or table, to include the intended use of the band under the harmonised technical conditions of this Decision; and (ii) taking all necessary steps to ensure that the use of the band by the radiodetermination applications is allowed, thereby letting potential users know that such applications could be used under the harmonised technical parameters. The latter includes preparing the band for its intended use by: (i) adopting the appropriate legal framework in order to allow the use of the spectrum in accordance with the harmonised technical conditions; and (ii) if that spectrum use is subject to general authorisation in a Member State, adopting the national legal measure that subjects the radiodetermination applications to a general authorisation, setting out the harmonised technical conditions of use.

(7) The measures provided for in this Decision are in accordance with the opinion of the Radio Spectrum Committee,

HAS ADOPTED THIS DECISION:

*Article 1*

This Decision harmonises the technical conditions for the availability and efficient use of radio spectrum in the 116-260 GHz frequency band in the Union by radiodetermination applications.

*Article 2*

For the purposes of this Decision, the following definitions shall apply:

(1) 'non-interference and non-protected basis' means that no harmful interference may be caused to any radiocommunication service and that no claim may be made for protection of these devices against interference originating from radiocommunication services;

(2) 'equivalent isotropically radiated power' or 'e.i.r.p.' means the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).

*Article 3*

Within six months after this Decision takes effect, Member States shall designate and make available radio spectrum in the 116-260 GHz frequency band for radiodetermination applications, on a non-interference and non-protected basis, as laid down in the Annex.

*Article 4*

Article 3 shall not affect the right of Member States to allow the use of the 116-260 GHz frequency band for radiodetermination applications under less restrictive conditions than those specified in the Annex.

*Article 5*

Member States shall monitor the use of the 116-260 GHz frequency band and report their findings to the Commission upon request or at their own initiative to allow a timely review of this Decision.

*Article 6*

This Decision is addressed to the Member States.

Done at Brussels, 21 April 2026.

*For the Commission*
Henna VIRKKUNEN
*Executive Vice-President*

*ANNEX*

**PART I**

**TECHNICAL REQUIREMENTS FOR RADIODETERMINATION APPLICATIONS REFERRED TO IN ARTICLES 1 AND 3**

## 1. GENERIC INDOOR SURVEILLANCE RADARS

Generic indoor surveillance radars are used to measure and determine physical characteristics like presence, velocity or material properties of, or the distance to, a target object. Generic indoor surveillance radars are intended for private indoor use and are classified into two categories: (a) handheld and mobile radars; and (b) fixed generic indoor surveillance radars. Devices falling under the first category are portable and moveable inside the building, whereas devices falling under the second category shall remain in a permanently fixed position.

Generic indoor surveillance radars shall not be subject to any individual right to use the designated parts of the 116-260 GHz frequency band if the following requirements are met:

(1) all generic indoor surveillance radars (handheld/mobile and fixed) shall only be operated indoors (that is to say inside a building) or inside similarly shielded environments;

(2) fixed generic indoor surveillance radars shall be installed at a permanent fixed position indoors (that is to say inside a building) or inside similarly shielded environments;

(3) users and installers shall ensure that fixed generic indoor surveillance radars, although installed inside a building, do not perform a function outside the building structure, such as the detection of people outside the building (for example, through-wall imaging);

(4) for fixed generic indoor surveillance radars, the maximum mean e.i.r.p. for elevations above 0° shall be limited to 12 dBm (8 dB below the maximum mean e.i.r.p. of 20 dBm);

(5) the provider shall inform the users and installers of fixed generic indoor surveillance radars about the installation requirements and additional special mounting instructions.

### 1.1. **Handheld and mobile generic indoor surveillance radars**

Technical requirements for handheld and mobile generic indoor surveillance radars

| Designated frequency band | Maximum mean e.i.r.p. (Note 1) | Maximum mean e.i.r.p. spectral density (Note 2) | Maximum peak e.i.r.p. (Note 5) | Spectrum access and mitigation requirements (Note 3) | Minimum unwanted emissions attenuation (Note 4) |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| 122,25-130 GHz | 10 dBm | - 20 dBm/MHz | 20 dBm | $\sum T_{meas} \leq 400$ ms within Tobs = 1 s is equivalent to a maximum duty cycle of 40 % | 20 dB |

| Technical requirements for handheld and mobile generic indoor surveillance radars | | | | | |
|---|---|---|---|---|---|
| Designated frequency band | Maximum mean e.i.r.p. (Note 1) | Maximum mean e.i.r.p. spectral density (Note 2) | Maximum peak e.i.r.p. (Note 5) | Spectrum access and mitigation requirements (Note 3) | Minimum unwanted emissions attenuation (Note 4) |
| | A | B | C | D | E |
| 134-148,5 GHz | 10 dBm | - 20 dBm/MHz | 20 dBm | $\sum T_{meas} \leq 400$ ms within Tobs = 1 s is equivalent to a maximum duty cycle of 40 % | 20 dB |

Note 1: Mean e.i.r.p. within the Operating Frequency Range (OFR) (see Note 4) and during $T_{meas}$ (time when transmission is on).
Note 2: These limits should be measured with a Root Mean Square (RMS) detector and averaging time of 1 ms.
Note 3: The maximum duty cycle is not included in the mean e.i.r.p. and mean e.i.r.p. spectral density values. Consequently, these values must be reduced by 4 dB when averaging over the observation time $T_{obs}$ = 1 s because of the inclusion of the maximum duty cycle of 40 %.
Note 4: The OFR is defined over the 20 dB reduction of the intentional transmission ('20 dB bandwidth') radiated by the equipment into the air. The unwanted emissions attenuation applies to the frequencies outside the OFR and shall be applied to the mean e.i.r.p. spectral density and the peak e.i.r.p. The measurement bandwidth for the unwanted emissions domain is 1 MHz.
Note 5: The peak e.i.r.p. shall be measured/evaluated in 1 GHz bandwidth.

### 1.2. **Fixed generic indoor surveillance radars**

| Technical requirements for fixed generic indoor surveillance radars | | | | | |
|---|---|---|---|---|---|
| Designated frequency band | Maximum mean e.i.r.p. (Note 1) | Maximum mean e.i.r.p. spectral density (Note 2) | Maximum peak e.i.r.p. (Note 5) | Spectrum access and mitigation requirements (Note 3) | Minimum unwanted emissions attenuation (Note 4) |
| | A | B | C | D | E |
| 122,25-130 GHz | 20 dBm and 12 dBm > 0°elevation | -10 dBm/MHz and -18 dBm/MHz > 0° elevation | 30 dBm and 22 dBm > 0° elevation | $\sum T_{meas} \leq 100$ ms within Tobs = 1 s is equivalent to a maximum duty cycle of 10 % | 20 dB |
| 134-148,5 GHz | 20 dBm and 12 dBm > 0° elevation | -10 dBm/MHz and -18 dBm/MHz > 0° elevation | 30 dBm and 22 dBm > 0° elevation | $\sum T_{meas} \leq 100$ ms within Tobs = 1 s is equivalent to a maximum duty cycle of 10 % | 20 dB |

Note 1: Mean e.i.r.p. within the OFR (see Note 4) and during $T_{meas}$ (time when transmission is on).
Note 2: These limits should be measured with an RMS detector and averaging time of 1 ms.
Note 3: The maximum duty cycle is not included in the mean e.i.r.p. and mean e.i.r.p. spectral density values. Consequently, these values must be reduced by 10 dB when averaging over the observation time $T_{obs}$ = 1 s because of the inclusion of the maximum duty cycle of 10 %.
Note 4: The OFR is defined over the 20 dB reduction of the intentional transmission ('20 dB bandwidth') radiated by the equipment into the air. The unwanted emissions attenuation applies to the frequencies outside the OFR and shall be applied to the mean e.i.r.p. spectral density and the peak e.i.r.p. The measurement bandwidth for the unwanted emissions domain is 1 MHz.
Note 5: The peak e.i.r.p. shall be measured/evaluated in 1 GHz bandwidth.

## 2. **RADIODETERMINATION SYSTEMS FOR INDUSTRY AUTOMATION (RDI)**

RDI are used to measure and determine physical characteristics like presence, velocity or material properties of, or the distance to, a target object located primarily in open-air areas. RDI are intended for industrial automation purposes and professional use only.

RDI shall not be subject to any individual right to use the designated parts of the 116-260 GHz frequency band if the following requirements are met:

(1) RDI shall be operated for industrial purposes only;

(2) installation and maintenance of RDI shall be performed by professionally trained personnel only;

(3) RDI shall not be marketed to private end-user customers;

(4) installers shall ensure that there are no unwanted obstacles in the main beam of the antenna in order to minimise unintentional reflections and scattering;

(5) outdoor RDI shall only be installed at heights from 0 m to 3 m above ground;

(6) the provider shall inform the users and installers of RDI about the installation requirements and additional special mounting instructions;

(7) for RDI using an antenna gain less than 20 dBi, the maximum conducted peak output power shall be limited to 15 dBm.

Technical requirements for RDI

| Designated frequency band | Maximum duty cycle | Maximum mean e.i.r.p. spectral density (Note 2) | Maximum peak e.i.r.p. (Note 3) | Minimum unwanted emissions attenuation (Note 1) |
|---|---|---|---|---|
| | A | B | C | D |
| 174,8-182 GHz | 5 % | - 13,8 dBm/MHz | 31 dBm | 20 dB |
| 185-190 GHz | 5 % | - 13,8 dBm/MHz | 31 dBm | 20 dB |
| 231,5-250 GHz | 5 % | - 25,6 dBm/MHz | 31 dBm | 20 dB |

Note 1: The OFR is defined over the 20 dB reduction of the intentional transmission ('20 dB bandwidth') radiated by the equipment into the air. The unwanted emissions attenuation applies to the frequencies outside the OFR and shall be applied to the mean e.i.r.p. spectral density and the peak e.i.r.p. The measurement bandwidth for the unwanted emissions domain is 1 MHz.

Note 2: The maximum duty cycle of 5 % is already included in this mean e.i.r.p. limit value. Consequently, the given mean e.i.r.p. spectral density limit is valid for averaging over the entire measurement cycle $T_{meas_cycle}$ of the device including any $T_{off}$ times in 1 MHz resolution bandwidth of the measuring receiver.

Note 3: The peak e.i.r.p. shall be measured/evaluated in 1 GHz bandwidth.

3. **LEVEL PROBING RADARS (LPR)**

LPR are used to measure and determine the distance to the surface of a target material (for example, liquids and solids) located primarily in open-air areas or inside tanks with non-attenuating shells (for example, plastic tanks) and thus indirectly the amount or volume of the available material. LPR are also used to measure other physical characteristics such as the velocity of the surface or properties of the target material. LPR are intended for industrial and professional use only.

LPR shall not be subject to any individual right to use the designated parts of the 116-260 GHz frequency band if the following requirements are met:

(1) LPR shall be operated for industrial purposes only;

(2) installation and maintenance of LPR shall be performed by professionally trained individuals only;

(3) LPR shall not be marketed to private end-user customers;

(4) LPR shall be installed at a permanent fixed position pointing downwards towards the ground;

(5) LPR shall not operate while being moved, or while inside a moving container;

(6) installers shall ensure that there are no unwanted obstacles in the main beam of the antenna in order to minimise unintentional reflections and scattering;

(7) the provider shall inform the users and installers of LPR about the installation requirements and additional special mounting instructions;

(8) the peak e.i.r.p. for elevations above 0° shall be limited to 0 dBm;

(9) for LPR using an antenna gain less than 20 dBi, the maximum conducted peak output power shall be limited to 15 dBm.

Technical requirements for LPR

| Designated frequency band | Maximum duty cycle | Maximum mean e.i.r.p. spectral density (Note 2) | Maximum peak e.i.r.p. (Note 3) | Minimum unwanted emissions attenuation (Note 1) |
|---|---|---|---|---|
| | A | B | C | D |
| 116-148,5 GHz | 5 % | - 8,0 dBm/MHz | 37 dBm | 20 dB |
| 167-182 GHz | 5 % | - 6,0 dBm/MHz | 37 dBm | 20 dB |
| 231,5-250 GHz | 5 % | - 6,0 dBm/MHz | 37 dBm | 20 dB |

Note 1: The OFR is defined over the 20 dB reduction of the intentional transmission ('20 dB bandwidth') radiated by the equipment into the air. The unwanted emissions attenuation applies to the frequencies outside the OFR and shall be applied to the mean e.i.r.p. spectral density and the peak e.i.r.p. The measurement bandwidth for the unwanted emissions domain is 1 MHz.

Note 2: The duty cycle of 5 % is already included in this mean e.i.r.p. limit value. Consequently, the given mean e.i.r.p. spectral density is valid for averaging over the entire measurement cycle $T_{meas_cycle}$ of the device including any $T_{off}$ times in 1 MHz resolution bandwidth of the measuring receiver.

Note 3: The peak e.i.r.p. shall be measured/evaluated in 1 GHz bandwidth.

4. **CONTOUR DETERMINATION AND ACQUISITION RADARS (CDR)**

CDR are used to measure and determine a multiplicity of distance values to the surface of a target material located primarily in open-air areas or inside tanks with non-attenuating shells (for example, plastic tanks). The distance information is used to form a digital contour representation of the bulk material surface and can subsequently be used to precisely determine the amount or volume of the available material in the respective measurement scenario. CDR are also used to measure other physical characteristics of the target surface. CDR are intended for industrial and professional use only.

CDR are classified into two categories: (a) digital beamforming CDR (DBF-CDR); and (b) mechanical and phased-array CDR (M-CDR and PA-CDR). This classification is based on the acquisition of the angular direction information, which can be achieved by mechanical tilting of a single antenna (M-CDR) and/or by electronic beam steering using parallel operation of multiple antenna elements (PA-CDR). In case of a multiplexed operation of multiple antenna elements, a digital beamforming (DBF-CDR) receiver architecture is achieved.

Neither category of CDR shall be subject to any individual right to use the designated parts of the 116-260 GHz frequency band if the following requirements are met:

(1) CDR shall be operated for industrial purposes only;

(2) installation and maintenance of CDR shall be performed by professionally trained individuals only;

(3) CDR shall not be marketed to private end-user customers;

(4) CDR shall be installed at a permanent fixed position;

(5) CDR shall not operate while being moved;

(6) installers shall ensure that there are no unwanted obstacles in the main beam of the antenna in order to minimise unintentional reflections and scattering;

(7) the provider shall inform the users and installers of CDR about the installation requirements and additional special mounting instructions;

(8) for CDR using an antenna gain less than 20 dBi, the maximum conducted peak output power shall be limited to 15 dBm.

### 4.1. **DBF-CDR**

DBF-CDR shall be pointing vertically downwards towards the ground.

Technical requirements for DBF-CDR

| Designated frequency band | Maximum duty cycle | Maximum mean e.i.r.p. spectral density (Note 2) | Maximum peak e.i.r.p. (Note 3) | Minimum unwanted emissions attenuation (Note 1) |
|---|---|---|---|---|
| | A | B | C | D |
| 116-148,5 GHz | 10 % | - 32,6 dBm/MHz | 15 dBm | 20 dB |
| 167-182 GHz | 10 % | - 29,0 dBm/MHz | 15 dBm | 20 dB |
| 231,5-250 GHz | 10 % | - 23,0 dBm/MHz | 15 dBm | 20 dB |

Note 1: The OFR is defined over the 20 dB reduction of the intentional transmission ('20 dB bandwidth') radiated by the equipment into the air. The unwanted emissions attenuation applies to the frequencies outside the OFR and shall be applied to the mean e.i.r.p. spectral density and the peak e.i.r.p. The measurement bandwidth for the unwanted emissions domain is 1 MHz.

Note 2: The duty cycle of 10 % is already included in this mean e.i.r.p. value. Consequently, the given mean e.i.r.p. spectral density is valid for averaging over the entire measurement cycle $T_{meas_cycle}$ of the device including any $T_{off}$ times in 1 MHz resolution bandwidth of the measuring receiver.

Note 3: The peak e.i.r.p. shall be measured/evaluated in 1 GHz bandwidth.

### 4.2. **M-CDR and PA-CDR**

Technical requirements for M-CDR and PA-CDR

| Designated frequency band | Maximum duty cycle | Maximum mean e.i.r.p. spectral density (Note 2) | Maximum peak e.i.r.p. (Note 3) | Minimum unwanted emissions attenuation (Note 1) |
|---|---|---|---|---|
| | A | B | C | D |
| 116-148,5 GHz | 10 % | - 12,0 dBm/MHz | 28,6 dBm | 20 dB |
| 167-182 GHz | 10 % | - 9,0 dBm/MHz | 34,6 dBm | 20 dB |
| 231,5-250 GHz | 10 % | - 6,0 dBm/MHz | 37 dBm | 20 dB |

Note 1: The OFR is defined over the 20 dB reduction of the intentional transmission ('20 dB bandwidth') radiated by the equipment into the air. The unwanted emissions attenuation applies to the frequencies outside the OFR and shall be applied to the mean e.i.r.p. spectral density and the peak e.i.r.p. The measurement bandwidth for the unwanted emissions domain is 1 MHz.

Note 2: The duty cycle of 10 % is already included in this mean e.i.r.p. value. Consequently, the given mean e.i.r.p. spectral density is valid for averaging over the entire measurement cycle $T_{meas_cycle}$ of the device including any $T_{off}$ times in 1 MHz resolution bandwidth of the measuring receiver.

Note 3: The peak e.i.r.p. shall be measured/evaluated in 1 GHz bandwidth.

The following additional requirements apply to M-CDR and PA-CDR:

(1) M-CDR and PA-CDR shall continuously maintain a spatially scanning behaviour of the antenna's main beam direction throughout operation;

(2) the maximum tilting angle of the antenna's main beam direction in relation to the vertical axis towards the ground shall never exceed 60°;

(3) the peak e.i.r.p. for elevations above 0° shall be limited to 0 dBm.

5. **TANK LEVEL PROBING RADARS (TLPR)**

TLPR are used to measure and determine the distance to the surface of a target material (for example, liquids and solids) inside shielded tanks and containers and thus indirectly the amount or volume of the available material. TLPR are also used to measure other physical characteristics such as velocity or properties of the target material. TLPR are intended for industrial and professional use only.

TLPR shall not be subject to any individual right to use the designated parts of the 116-260 GHz frequency band if the following requirements are met:

(1) TLPR shall be operated for industrial purposes only;

(2) installation and maintenance of TLPR shall be performed by professionally trained individuals only;

(3) TLPR shall not be marketed to private end-user customers;

(4) TLPR shall be installed at a permanent fixed position at a closed metallic tank or concrete tank, or a similar enclosure structure made of comparable attenuating material;

(5) flanges and attachments to the TLPR shall provide the necessary microwave sealing by design;

(6) when necessary, sight glasses shall be coated with a microwave-proof coating (that is to say electrically conductive or microwave absorbing coating);

(7) manholes or connection flanges attached to the tank shall be closed while the TLPR is in operation to ensure a low level of leakage of the signal into the free space outside the tank;

(8) the provider shall inform the users and installers of TLPR about the installation requirements and additional special mounting instructions;

(9) for TLPR using an antenna gain less than 20 dBi, the maximum conducted peak output power shall be limited to 15 dBm.

Technical requirements for TLPR

| Designated frequency band | Maximum duty cycle | Maximum mean e.i.r.p. spectral density (Note 2) | Maximum peak e.i.r.p. (Note 3) | Minimum unwanted emissions attenuation (Note 1) |
|---|---|---|---|---|
| | A | B | C | D |
| 116-148,5 GHz | 100 % | 12 dBm/MHz | 42 dBm | 20 dB |
| 167-182 GHz | 100 % | 12 dBm/MHz | 42 dBm | 20 dB |
| 231,5-250 GHz | 100 % | 12 dBm/MHz | 42 dBm | 20 dB |

Note 1: The OFR is defined over the 20 dB reduction of the intentional transmission ('20 dB bandwidth') radiated by the equipment into the air. The unwanted emissions attenuation applies to the frequencies outside the OFR and shall be applied to the mean e.i.r.p. spectral density and the peak e.i.r.p. The measurement bandwidth for the unwanted emissions domain is 1 MHz.

Note 2: The given mean e.i.r.p. spectral density is valid for averaging over the entire measurement cycle $T_{meas_cycle}$ of the device including any $T_{off}$ times in 1 MHz resolution bandwidth of the measuring receiver.

Note 3: The peak e.i.r.p. shall be measured/evaluated in 1 GHz bandwidth.

6. **RADIODETERMINATION SYSTEMS FOR INDUSTRY AUTOMATION IN SHIELDED ENVIRONMENTS (RDI-S)**

RDI-S are used to sense unique frequency-dependent material properties and/or wideband frequency responses (for example, S-parameters to extract other physical properties) of target objects inside buildings (indoors) or inside similarly shielded environments. Examples of RDI-S are radar sensors for plastic extrusion thickness measurement or for non-destructive testing. RDI-S are intended for industrial and professional use only.

RDI-S shall not be subject to any individual right to use the designated parts of the 116-260 GHz frequency band if the following requirements are met:

(1) the OFR shall be equal to or higher than 35 GHz, including discontinuities for the passive bands;

(2) RDI-S shall be operated for industrial purposes only;

(3) installation and maintenance of RDI-S shall be performed by professionally trained individuals only;

(4) RDI-S shall not be marketed to private end-user customers;

(5) RDI-S shall only be operated indoors (that is to say inside a building) or inside similarly shielded environments;

(6) installers shall ensure that the device's main beam is not pointing towards windows or other weak shielded parts of the shielded environment; the direction of main radiation shall be indicated on the specific radiodetermination device;

(7) installers shall ensure that there are no unwanted obstacles in the main beam of the antenna in order to minimise unintentional reflections and scattering;

(8) the provider shall inform the users and installers of RDI-S about the installation requirements and additional special mounting instructions;

(9) for RDI-S using an antenna gain less than 20 dBi, the maximum conducted peak output power shall be limited to 15 dBm.

| Technical requirements for RDI-S | | | | |
|---|---|---|---|---|
| Designated frequency band | Maximum duty cycle | Maximum mean e.i.r.p. spectral density (Note 2) | Maximum peak e.i.r.p. (Note 4) | Maximum unwanted emission limits (Notes 1 & 3) |
| | A | B | C | D |
| 116-122,5 GHz | 100 % | - 5 dBm/MHz | 45 dBm | -15 dBm/MHz mean e.i.r.p. spectral density (Note 2)<br>and<br>35 dBm peak e.i.r.p. (Note 4) |
| 122,5-123 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 123-130 GHz | 100 % | + 10 dBm/MHz | 60 dBm | |
| 130-134 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 134-141 GHz | 100 % | + 10 dBm/MHz | 60 dBm | |
| 141-148,5 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 151,5-158,5 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 158,5-164 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 167-174,5 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 174,5-174,8 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 174,8-182 GHz | 100 % | + 10 dBm/MHz | 60 dBm | |
| 185-190 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 191,8-200 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 209-226 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 231,5-235 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |

| Technical requirements for RDI-S | | | | |
|---|---|---|---|---|
| Designated frequency band | Maximum duty cycle | Maximum mean e.i.r.p. spectral density (Note 2) | Maximum peak e.i.r.p. (Note 4) | Maximum unwanted emission limits (Notes 1 & 3) |
| | A | B | C | D |
| 235-238 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 238-241 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 241-244 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 244-246 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 246-250 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |
| 252-260 GHz | 100 % | - 5 dBm/MHz | 45 dBm | |

Note 1: The OFR is defined over the 10 dB reduction of the intentional transmission ('10 dB bandwidth') radiated by the equipment into the air. The unwanted emission limits apply to the frequencies outside the OFR. The measurement bandwidth for the unwanted emissions domain is 1 MHz.

Note 2: The given mean e.i.r.p. spectral density is valid for averaging over the entire measurement cycle $T_{meas_cycle}$ of the device including any $T_{off}$ times in 1 MHz resolution bandwidth of the measuring receiver.

Note 3: These limits also apply to emissions in passive bands subject to RR No 5.340 within the frequency range 116-260 GHz.

Note 4: The peak e.i.r.p. shall be measured/evaluated in 1 GHz bandwidth.

7. **EXTERIOR VEHICULAR RADARS (EVR)**

EVR are classified into two categories: (a) front radars; and (b) corner radars and short-range/ultra-short-range radars. Front and corner radars are used for driving assistance applications requiring long- and medium-range measurement such as automatic cruise control, lane keep, lane change assist, automatic emergency braking, etc. Applications providing the vehicle with a higher degree of autonomy require short-range and ultra-short-range radars for front, side and rear view, to enable 360° sensing. These radars make it possible to obtain a wide field of view (elevation and azimuth) in the close proximity of the vehicle and enable features like automated parking assistance or autonomous valet parking.

EVR shall not be subject to any individual right to use the designated parts of the 116-260 GHz frequency band if the following requirements are met:

(1) unwanted emission limits in the 116-122,25 GHz band for any type of radar depend on the maximum duty cycle and elevation. For radars with a maximum duty cycle (measured over the signal repetition time of the radar) of up to 50 %, for elevations up to 35° the maximum mean e.i.r.p. density shall stay below 50 dBm/MHz, and for elevations above 35° below -76 dBm/MHz. For radars with a maximum duty cycle higher than 50 %, for elevations up to 35° the maximum mean e.i.r.p. density shall stay below -53 dBm/MHz, and for elevations above 35° below -79 dBm/MHz;

(2) unwanted emissions in the 130-134 GHz band shall stay below a maximum mean power spectral density of -33 dBm/MHz e.i.r.p. for front radars and of 36 dBm/MHz e.i.r.p. for corner radars and short-range/ultra-short-range radars. Additionally, the maximum peak e.i.r.p. within 1 GHz shall be below 2 dBm for front radars and below -1 dBm for corner radars and short-range/ultra-short-range radars;

(3) unwanted emission limits in the 148,5-151 GHz band for any type of radar depend on the maximum duty cycle and elevation. For radars with a maximum duty cycle (measured over the signal repetition time of the radar) of up to 50 %, for elevations up to 35° the maximum mean e.i.r.p. density shall stay below -44 dBm/MHz, and for elevations above 35° below -70 dBm/MHz. For radars with a maximum duty cycle higher than 50 %, for elevations up to 35° the maximum mean e.i.r.p. density shall stay below -47 dBm/MHz, and for elevations above 35° below -73 dBm/MHz;

(4) EVR applications shall implement a mechanism to automatically disable the EVR transmission within the specified 'exclusion zones' around radio astronomy service (RAS) stations, or another mitigation technique providing equivalent protection for these stations without driver intervention;

(5) EVR applications supporting the use of the 123-130 GHz and 134-141 GHz bands shall implement a power reduction mitigation technique in 'restriction zones' around RAS stations, or another mitigation technique providing equivalent protection for these stations without driver intervention.

Technical requirements for EVR

| Designated frequency band | Front radars | | Corner and short/ultra-short range radars | |
|---|---|---|---|---|
| | Maximum mean e.i.r.p. (Note) | Maximum peak e.i.r.p. | Maximum mean e.i.r.p. (Note) | Maximum peak e.i.r.p. |
| 122,25-130 GHz | 32 dBm | | 9 dBm | |
| 134-141 GHz | 32 dBm | | 9 dBm | |
| 141-148,5 GHz | - 6 dBm within 1 GHz | -1 dBm within 1 GHz | -6 dBm within 1 GHz | -1 dBm within 1 GHz |

Note: Mean e.i.r.p. is the radiated mean power during transmitter signal repetition time as defined in ETSI EN 303 883-1, clause 5.3,1, meaning the effect of duty cycle is included.

8. **IN-CABIN VEHICULAR RADARS (IVR)**

IVR include contactless gesture control, presence detection (including baby/child detection) and monitoring of vital signs, such as respiration rate, heart rate and heart rate variation. The use of higher frequency ranges further reduces the risk of interference with other automotive radars (for example, 77 GHz or 79 GHz radars) or wireless communication devices using the 60 GHz band. With the increasing miniaturisation, angular resolution offers the possibility to discriminate between multiple seats inside a car with a single radar sensor with beamforming or multiple input multiple output (MIMO) capability.

IVR shall not be subject to any individual right to use the designated parts of the 116-260 GHz frequency band if the following requirements are met:

(1) unwanted emissions in the 116-122,25 GHz band shall stay below a maximum mean e.i.r.p. density of -45 dBm/MHz;

(2) unwanted emissions in the 130-134 GHz band shall stay below a maximum mean e.i.r.p. density of -17 dBm/GHz and a peak e.i.r.p. of -4 dBm/GHz;

(3) unwanted emissions in the 148,5-151 GHz band shall stay below a maximum mean e.i.r.p. density of -39 dBm/MHz;

(4) downwards antenna orientation;

(5) for convertible cars, emissions occurring outside the car at elevations above 0° shall be 15 dB lower than the power levels specified in the table below;

(6) minimum bandwidth of 1 GHz;

(7) IVR applications shall implement a mechanism to automatically disable the IVR transmission within the specified 'exclusion zones' around RAS stations, or another mitigation technique providing equivalent protection for these stations without driver intervention.

Technical requirements for IVR

| Designated frequency band | Maximum mean e.i.r.p. spectral density | Maximum mean e.i.r.p. over the bandwidth | Maximum peak e.i.r.p. over the bandwidth |
|---|---|---|---|
| 122,25-130 GHz | - 30 dBm/MHz | 3 dBm | 16 dBm |
| 134-148,5 GHz | - 30 dBm/MHz | 3 dBm | 16 dBm |

Note: Mean e.i.r.p. is the radiated mean power during transmitter signal repetition time as defined in ETSI EN 303 883-1, clause 5.3,1, meaning the effect of duty cycle is included.

**PART II**

**PROTECTION OF RADIO ASTRONOMY SERVICE (RAS) STATIONS**

The table in this Part lists the RAS stations in EU Member States operating in the 116-260 GHz range.

| Country | Observatory name and location | Geographic latitude | Geographic longitude |
|---|---|---|---|
| France | NOEMA, Plateau de Bure | 44°38′02″ N | 05°54′28″ E |
| France | MAÏDO, La Réunion | 21°04′46″ S | 55°23′01″ E |
| Spain | IRAM 30 m, Pico Veleta | 37°04′06″ N | 03°23′55″ W |
| Spain | GroundBIRD, Tenerife | 28°18′01,8″ N | 16°30′37,0″ W |

**PART III**

**EXCLUSION ZONES AROUND RAS STATIONS TO BE IMPLEMENTED BY DIFFERENT CATEGORIES OF RADIODETERMINATION APPLICATIONS**

The table in this Part specifies the radius of the applicable exclusion zones for each specific radiodetermination application.

| Categories of radiodetermination devices | Exclusion zone around RAS station |
|---|---|
| Handheld/mobile generic indoor surveillance radars | 1,6 km |
| Fixed generic indoor surveillance radars | 10,7 km |
| Radiodetermination systems for industry automation (RDI) | 20,0 km |
| Level probing radars (LPR) | 13,0 km |
| Contour determination and acquisition radars (CDR) | 20,0 km |
| Radiodetermination systems for industry automation in shielded environments (RDI-S) | 13,2 km |
| Exterior vehicular radars (EVR) | 3,0 km |
| In-cabin vehicular radars (IVR) | 3,0 km |

**PART IV**

**RESTRICTION ZONES AROUND RAS STATIONS IN WHICH EXTERIOR VEHICULAR RADARS (EVR) SHALL IMPLEMENT A POWER REDUCTION MITIGATION TECHNIQUE**

EVR shall implement a power reduction mitigation technique in restriction zones around RAS stations.