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# Requirements and Guidance Notes for Ground Probing and Wall Probing Radar

OfW 350

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# Ground Probing and Wall Probing Radars

## What are Ground Probing and Wall Probing Radars?

- 1.1 A Ground Probing Radar (“GPR”) uses radio waves for the purpose of detecting or obtaining images of buried objects or determining the physical properties beneath the ground. The emissions from a GPR are intentionally directed down into the ground for this purpose, and systems are designed to operate only when in contact with or within close proximity to the ground. Wall Probing Radars (WPR) radiate directly into a "wall". The "wall" may be a building material structure, the side of a bridge, the wall of a mine or another physical structure that absorbs a significant part of the signal transmitted by the radar.

## Do I need a licence to use GPR/WPR?

- 1.2 Section 1(1) of the Wireless Telegraphy Act 2006 makes it an offence for any person to establish or use any station for wireless telegraphy or to install or use any apparatus for wireless telegraphy except under and in accordance with a licence granted by Ofcom under that section unless the radio device is exempt from licensing requirements.
- 1.3 Under exemption regulations made in 2015 to implement a European Commission Decision, qualifying Ultra-Wideband devices (which use very large bandwidth transmitting high data rates over short distances but at very low power levels) may be used without a licence including some radar and detection devices.
- 1.4 However, except for such licence-exempt devices the use of GPR/WPR meeting the technical criteria set out in this notice requires a licence.

## Do I need to pay a licence fee?

- 1.5 The licence fee is £50. Once Ofcom has received your GPR/WPR application form OfW 349 (available from the Ofcom website) an invoice will be sent to you. When the licence fee has been paid, Ofcom will issue you with a licence which authorises you to operate your GPR/WPR radio equipment (the “Radio Equipment”).
- 1.6 A further fee of £50 is payable every three years from the initial issue date of the licence. Although it is your responsibility to pay the fee on or before the anniversary date, we will normally send you a reminder beforehand.
- 1.7 If you do not pay the fee by the relevant date, the licence may be revoked and continued use of the equipment would be an offence under the Wireless Telegraphy Act 2006.

## Requirements relating to the use of the licence

### Technical Requirements

1.8 As GPR/WPR shares spectrum with a variety of other radio users it is necessary for Ofcom to be able to assess the level of use and any potential impact this may have had on other radio users. In order to do this Ofcom requires that a log of use is kept by licensees, and that this is to be provided to Ofcom at any time upon request. The information to be included in the Log should include, at a minimum:

- the model number of the Radio Equipment;
- details of every location at which the Radio Equipment is used;
- the date and duration of use for each time the Radio Equipment is used;
- the type of use; and
- the frequency band used to operate the Radio Equipment.

1.9 The Radio Equipment must comply with the technical requirements shown below.

<b>Ground Probing and Wall Probing Radars.</b>
<p>The use of 30–12400 MHz by GPR/WPR employing wide band pulse techniques is permitted on a non-interference basis with the following conditions:</p> <ol style="list-style-type: none"> <li>1. That peak powers do not exceed the figures shown in the tables below.</li> <li>2. That a specification be written to cover these devices.</li> <li>3. That a code of practice be written to cover the use of these types of equipment.</li> <li>4. That a label should be prominently attached to the equipment warning that use could be stopped on request by a duly authorised person and that operators must be instructed not to operate the equipment in close proximity to other receiving equipment.</li> </ol> <p>In addition, the device must be fitted with an anti-tilt mechanism.</p>

**Table 1: Maximum mean e.i.r.p. density**

Frequency range (MHz)	Maximum mean e.i.r.p. density (dBm/MHz)
<230	-65
230 - 1000	-60
1000 - 1600	-65 (note 1*)
1600 - 3400	-51.3
3400 - 5000	-41.3
5000 - 6000	-51.3
>6000	-65

\*Note 1. In addition to the maximum mean e.i.r.p. density given in the table above, a maximum mean e.i.r.p. density of -75dBm/kHz applies in the RNSS bands 1164 – 1215 MHz and 1559 – 1610 MHz in case of spectral lines in these bands.

Additionally, the radiated peak power of any undesired emission emanating from GPR/WPR imaging systems shall not exceed the limits given in Table 2 below:

**Table 2: Maximum Peak Power\***

Frequency range (MHz)	Maximum peak power
30 - 230	-44.5 dBm/ 120 kHz (e.r.p.)
230 – 1000	-37.5 dBm/ 120 kHz (e.r.p.)
1000 – 18000	-30 dBm/ MHz (e.i.r.p.)

\*The method of measurements for peak power values are stated in EN 302 066

### Additional usage requirement

- 1.10 Licensees must only operate the Radio Equipment so that it is in contact with, or in close proximity to the ground or wall and so that the emissions from the Radio Equipment are at all times directed into the ground or wall. The Radio Equipment must employ a deactivation mechanism which automatically deactivates the Radio Equipment when normal use is interrupted.
- 1.11 As GPR/WPR shares spectrum with other radio users it is important that equipment is used at all times in a way that minimises the risk of interference to other radio users as far as possible. For this reason Licensees are recommended to operate in accordance with a code of practice which defines these behaviours and is available at <http://www.eurogpr.org/vn2/index.php/introduction-to-gpr/code-of-practice>.

### Use in vicinity of Radio Astronomy Sites

- 1.12 GPR/WPR operation in the UK is not normally permitted within 7km of the radio astronomy sites listed in 1.14 below, as GPR/WPR equipment could interfere with the sensitive receiver equipment used at these sites.
- 1.13 There are six UK radio astronomy sites around which use is not permitted without special clearance. Ofcom will inform licensees of any revision to this list if necessary to reflect changes in radio astronomy activity within the UK.
- 1.14 The Radio Astronomy sites and their National Grid Reference coordinates are:
- Defford SO 90684368
  - Cambridge TL 39495425
  - Knockin SJ 31812056
  - Darnhall SJ 63486093
  - Jodrell Bank SJ 79507110
  - Pickmere SJ 70337590

and site maps are provided at the end of this document.

### Clearance requests

- 1.15 In order to request authorisation to operate GPR/WPR equipment within 7 km of these sites, a licensee must submit a request form OfW351 (available on the Ofcom website). Operators are advised to submit requests at least three weeks before the planned use of the Radio Equipment. Ofcom will liaise with radio astronomy users and attempt to facilitate the request. A licensee must not use GPR/WPR apparatus within these areas unless Ofcom has given written authorisation to do so.
- 1.16 On some occasions it may not be possible to permit use. In such cases, it may be possible to agree to the use of the Radio Equipment on alternative dates depending on the project schedule for the radio astronomy observations.

### Contact Information

- 1.17 If you have any technical questions, please contact David Donachie on 020 7981 3173 or [david.donachie@ofcom.org.uk](mailto:david.donachie@ofcom.org.uk).
- 1.18 For general licensing queries, please contact Gordon Drake on 020 7981 3157 or [gordon.drake@ofcom.org.uk](mailto:gordon.drake@ofcom.org.uk)

### Payment Information

- 1.19 After your application is received an invoice will be e-mailed to you with details to enable payment to be made online. Alternatively, if you wish to pay by cheque payable to Ofcom, please send this to Ofcom, PO Box 1285, Warrington WA1 9GL, stating the invoice number and any other relevant references.

# Radio Astronomy locations

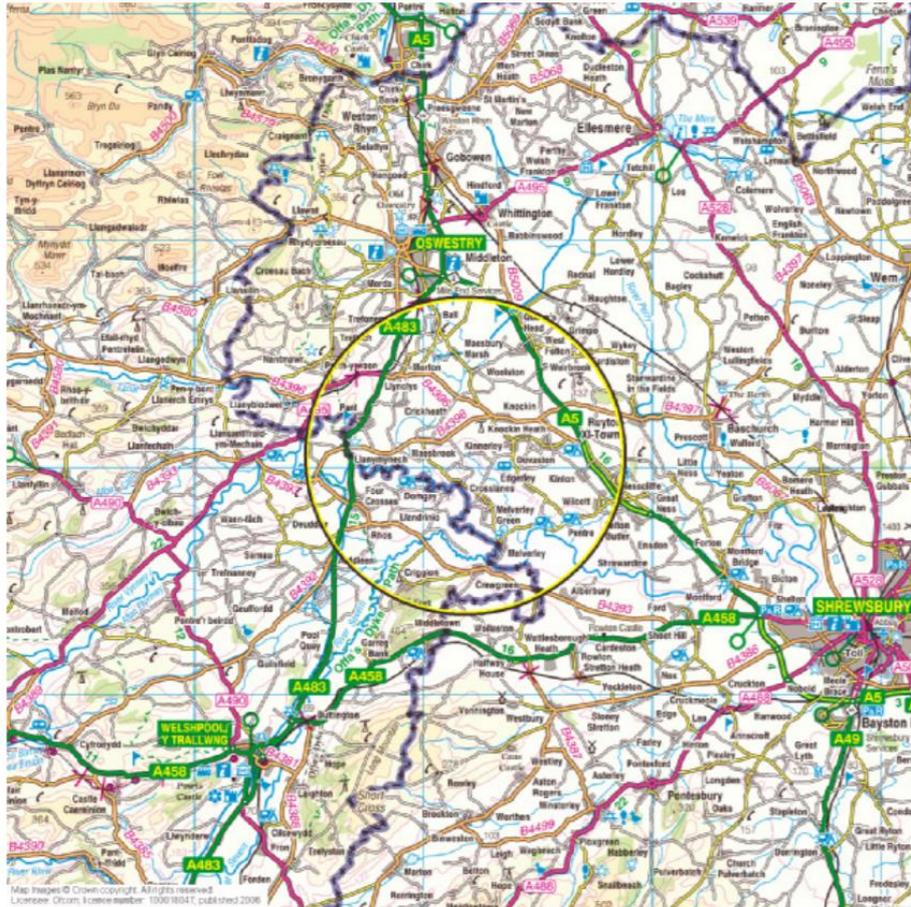
## Cambridge



## Jodrell Bank, Pickmere and Darnhall



## Knockin



## Defford

