An Coimisiún um
**Rialáil Cumarsáide**
Commission for
**Communications Regulation**

# Licensing of GNSS Repeaters

**Information Notice**

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**An Coimisiún um Rialáil Cumarsáide**
**Commission for Communications Regulation**
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# Content

# 1 Background Information

1.1 Global Navigation Satellite System ("GNSS") is a general term describing any satellite constellation that provides positioning, navigation, and timing ("PNT" services) on a global or regional basis. GNSS is a radionavigation-satellite service as it uses radio waves to enable airborne, maritime and terrestrial receivers to determine their global position to aid navigation.

1.2 A GNSS repeater operates by receiving a live satellite signal at an external antenna and re-radiates those same signals within an indoor environment, where direct GNSS reception is typically not possible due to signal attenuation. The primary benefit of a GNSS repeater is that it enables GNSS receivers to maintain continuity of satellite tracking and system synchronisation while indoors. By providing a valid GNSS environment, receivers can preserve satellite identification and timing data. When the receiver is brough back outdoors into direct satellite visibility, it can reacquire the previously lost satellite signal.

1.3 A GNSS Repeater provides the user with a position and timing signals which maintains receiver synchronisation with satellites. Therefore, a GNSS repeater is a radiodetermination service.

1.4 ComReg stated in its Radio Spectrum Management Operating Plan for 2025 – 2028 (24/99a), that it intends to provide an authorisation regime to allow the operation of GNSS repeaters at fixed locations to users of professional applications in line with recommendations set out in Electronic Communications Committee ("ECC") Recommendation (10)02.

***ECC Reports and Recommendation regarding the use of GNSS Repeaters***

1.5 GNSS repeaters operating at high powers can potentially interfere with legitimate GNSS signals and disrupt national navigation and positioning services. The ECC published Reports 129[1] and 145[2] (the "ECC Reports") to identify the services that could suffer interference from GNSS repeaters and to consider appropriate technical requirements to authorise their use.

1.6 The ECC subsequently published Recommendations (10)02 which provides guidance on an authorisation regime for GNSS repeaters and methods to limit the potential for harmful interference to GNSS receivers receiving in the same band and in areas adjacent to the repeater coverage area.

[1] ECC Report 129 – Technical and operational provisions required for the use of GNSS repeaters – published 5 February 2009

[2] ECC Report 145 – Regulatory Framework for Global Navigation satellite system (GNSS) repeaters – published 7 June 2010

1.7 The purpose of the Information Notice is to set out how ComReg will authorise the use of GNSS Repeaters in Ireland. This authorisation approach has been informed by ECC Recommendations (10)02, the ECC Reports[3][4], and a review of how other European national regulatory administrations authorise the use of GNSS repeaters.

# 2 Licensing of GNSS Repeaters

2.1 GNSS is a radionavigation-satellite service and GNSS Repeaters provide positioning and timing signals to maintain receiver synchronisation with satellites. The existing radiodetermination regulations[5] provides an appropriate licensing regime for GNSS Repeaters. Therefore, any parties proposing to deploy a GNSS Repeater must submit a licence application to ComReg to assess whether a licence can be granted.

2.2 The Radiodetermination Licence Guidelines and Application Form have been updated to include the licensing of GNSS Repeaters:

(a) ComReg Document 11/07R3; and

(b) ComReg Document 11/07dR2

Completed application forms or queries are to be sent to licensing@comreg.ie

***Operational Requirements***

2.3 The operation of GNSS Repeaters will be restricted to:

- operating only within the following frequency bands:
  - 1164 – 1215 MHz
  - 1215 – 1300 MHz
  - 1559 – 1610 MHz
- Fixed indoor site-specific use only permitted; and
- to professional applications, such as:
  - Government, local, and public bodies responsible for public safety and security;
  - Civilian aviation industry, such as aircraft and avionics manufacturers

[3] ECC Report 129 – Technical and operational provisions required for the use of GNSS repeaters – published 5 February 2009
[4] ECC Report 145 – Regulatory Framework for Global Navigation satellite system (GNSS) repeaters – published 7 June 2010
[5] S.I. No. 369 of 2009 – Wireless Telegraphy (Radio determination, Air Traffic and Maritime Services) Regulations, 2009, as amended.

and relevant maintenance facilities;

- Manufacturers of GNSS chipsets and integrators of such chipsets into other equipment;
- Manufacturing, production and test facilities where GNSS is an integral part of the finished product; and
- Operators of indoor facilities where emergency services need to continue tracking GNSS where it is otherwise unavailable.

- Any proposed deployments of GNSS Repeaters within a 6km radius of airports will be individually assessed to ensure no interference is caused to Aircraft and Air Traffic Services. This will require coordination with AirNav Ireland. The applicant may be required, as part of the application process, to provide evidence that no interference will be caused to such services.

***Technical Conditions***

2.4 The technical requirements for the operation of GNSS repeaters are as follows:

- The maximum system gain is limited to a value of 45 dB and that the e.i.r.p of any amplified GNSS defined signal cannot exceed -77 dBm;

- The maximum output power of the GNSS repeater, when subject to signals that are not defined as GNSS type signals used for radionavigation, is restricted to a limit of -20 dBm:

  - This limit applies to the out of band emissions of non-GNSS type signals that have been received and amplified within the GNSS repeater bands defined above; and
  - This limit also applies to any emissions of non-GNSS type signals, that have been partly amplified, and that are adjacent to, but outside of the GNSS repeater bands.

- That chaining two or more GNSS repeaters to increase overall system gain above +45 dB is not permitted as this may increase the risk of harmful inference;

- GNSS Repeaters must incorporate filtering, which can be associated with the receiver and transmit antennas, or by separate filters. The filter response must be centred at the carrier frequency of the GNSS signal to be radiated and the -3 dB points must be ± 20 MHz;

- For a repeater operating in the 1164-1215 MHz band the filtering must provide at least 37 dB of rejection at frequencies below 1151 MHz;

- At 1300 MHz, the repeater combined filtering losses (antenna related and any installed filter) must exceed 45dB; and

- In the case of a repeater operating in the band 1559-1610 MHz, and designed to re-radiate signals centred on the 1575.42 MHz:
    - 5dB of filtering must be provided at the 1559 MHz band edge; and
    - At least 10 dB of filtering must be provided at the 1610 MHz band-edge.

***Further Information***

2.5 Further information can be found in ComReg's Radiodetermination, Air Traffic and Maritime Services Licence Guidelines.[6]

[6] See ComReg Document 11/03R "*Radiodetermination, Air Traffic and Maritime Services Licence Guidelines"* available at www.comreg.ie