



Information Notice

**Proposed licensing regime for GSM for
railway operations spectrum**

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1 Introduction

The purpose of this Information Notice is to:

- Provide background to the GSM for railway operations (GSM-R) spectrum band in Ireland, including:
 - details of current Irish rail network communications;
 - benefits of upgrading to use of GSM-R technology;
 - details of relevant CEPT¹ and European legislation and obligations which influence how this spectrum may be used in Ireland;
 - cross-border issues associated with this band;
 - co-existence with services in adjacent spectrum bands; and
- Set out the Commission for Communications Regulation's (ComReg) proposals for a licensing regime that would enable the future grant of a limited number of rights of use of spectrum in the GSM-R band (in the form of licences that would be issued under the Wireless Telegraphy Act, 1926 (as amended)).

Annex 1 provides a summary of the legislative framework, including relevant functions and powers, pursuant to which ComReg's proposals are being put forward.

ComReg's proposals have been prompted by its receipt of an expression of interest from, and subsequent discussions with, a rail network operator seeking spectrum rights of use in the GSM-R band.

¹ The European Conference of Postal and Telecommunications Administrations

2 Background on GSM-R spectrum band

2.1 GSM-R band

The GSM-R spectrum band in Ireland is defined as 876-880 MHz spectrum paired with 921-925 MHz spectrum (i.e. 2 x 3.8 MHz of spectrum after taking into account relevant guard band requirements). The GSM-R band and adjacent spectrum bands are shown in Figure 1.

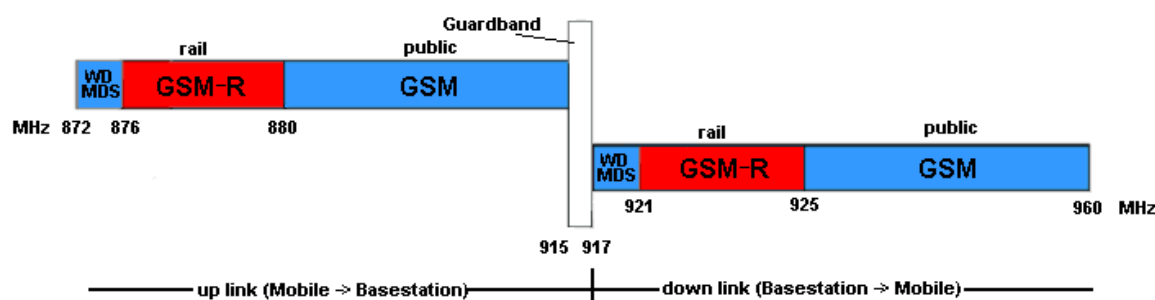


Figure 1: GSM-R and adjacent spectrum bands in Ireland

There are currently no GSM-R networks in operation in Ireland and, as such, GSM-R spectrum is currently unused.

2.2 Current Irish rail network communications

Currently, rail operators in Ireland predominantly use analogue rail communication systems (based on VHF/UHF Business Radio licences) however a digital system based on the Terrestrial Trunked Radio (TETRA) network is also in use.

Such analogue systems allow for voice communications in various non-contiguous VHF/UHF spectrum allocations with signalling, rail communications etc being operated on separate analogue systems. As a result, there are currently no analogue systems which combine and integrate voice and data into a complete automated rail communications system.

It is noted that the digital communications system, based on the digital Terrestrial Trunked Radio (TETRA) system which is in use, allows for integrated voice and data communication on one secure network.

2.3 Benefits of upgrading to GSM-R technology

GSM-R is a digital communications system, based on the use of GSM technology, which has been developed to replace the existing analogue VHF/UHF rail network communications system. GSM-R, in contrast to public mobile GSM, constitutes a *non-public* communications network for use by European railway operators.

Implementation of digital GSM-R networks should lead to improved communications between trains and control centres, and between trains and other trains as well as improved automation of safety of life systems. One system feature that makes this possible is the use of transceivers (so-called Eurobalise beacons), which are laid along the

Information Notice: Proposed licensing regime for GSM for railway operations spectrum track which transmits a train’s position and speed when a train passes over them. In turn, it receives back an agreement (or disagreement) to enter the next track and with a new permitted maximum speed. This functionality should increase the safety and efficiency of trains on the rail network as a whole.

A GSM-R network should also provide greater security for voice and data communications between railway operational staff, including drivers, dispatchers, shunting team members, train engineers, and station controllers. It also facilitates features such as group calling, voice broadcast, location-based connections, and call pre-emption in case of an emergency. In addition, GSM-R technology has a hierarchical architecture where emergency calls/systems take precedence and call connectivity on these systems have a much higher availability than those on regular GSM-900 networks.

Support is also provided for applications such as cargo tracking, in-train CCTV and at stations, and passenger information services.

2.4 CEPT & European Framework with regards to GSM-R spectrum

ComReg is proposing to make spectrum available for GSM-R use in conformity with Electronic Communications Committee (ECC) Decision ECC/DEC/(02)05² (“the ECC Decision”) (see **Annex 2**). The ECC Decision designates the frequency bands 876 – 880 MHz and 921 – 925 MHz for railway purposes on a European-wide basis, providing for 200 kHz channel spacings and 12.5 kHz Direct Mode Operation (DMO) channels.

The specific channel allocations detailed in the ECC Decision are outlined in **Tables 1** and **Table 2** below.

- 876-880 MHz (mobile station transmit) paired with 921-925 MHz (base station transmit) with a duplex separation of 45 MHz for duplex operation;

Centre frequency Mobile TX (MHz)	Centre Frequency Base Tx (MHz)
876.2000	921.2000
876.4000	921.4000
876.6000	921.6000
876.8000	921.8000
877.0000	922.0000
877.2000	922.2000
877.4000	922.4000
877.6000	922.6000
877.8000	922.8000
878.0000	923.0000
878.2000	923.2000
878.4000	923.4000
878.6000	923.6000
878.8000	923.8000
879.0000	924.0000
879.2000	924.2000

² [ECC Decision \(ECC/DEC/\(02\)05\)](#) on the designation and availability of frequency bands for railway purposes in the 876-880 MHz and 921-925 MHz bands.

879.4000	924.4000
879.6000	924.6000
879.8000	924.8000
880.0000 (see Note)	925.0000 (see Note)

Table 1: GSM-R 200 kHz channels spacings

Note: The frequency 880.0000 MHz paired with 925.0000 MHz may be considered as guard channel to other services in adjacent bands.

- 876.000 – 876.100 MHz for direct mode operation (DMO) using single frequency mode. The frequency spacing for DMO is 12.5 kHz:

Centre frequency Mobile TX/RX (MHz)
876.0125
876.0250
876.0375
876.0500
876.0625

Table 2: 12.5 kHz DMO channel spacings

Use of the GSM-R spectrum band in Ireland also falls within the scope of the European Directive 2008/57/EC³, which relates to the interoperability of European conventional rail systems and which specifies the technical details that said systems must meet. In particular, this Directive provides, amongst other things, that if a rail line is being upgraded then the relevant Member State must ensure that full interoperability with neighbouring Member States is provided for. For instance:

- Annex 1 of 2008/57/EC identifies the infrastructure elements required to achieve interoperability to include traffic management, tracking and navigation systems (in order to guarantee the safe and harmonious operation of the network and efficient traffic management);and
- Article 14(1) of 2008/57/EC provides that each Member State shall authorise the placing in service of those structural subsystems and that each Member State shall check the compatibility of these subsystems with the system into which they are being integrated.

2.5 Inter-operability with United Kingdom

In the context of the obligations of inter-operability identified above, it is noted that the UK has implemented GSM-R in mainland Great Britain. With regards to Northern Ireland, ComReg understands that that the roll out of a GSM-R network in same would take place following an economic feasibility study and on the basis that Ireland is planning to implement the same system.

³ [2008/57/EC](#): Directive on the interoperability of the rail system within Community.

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As part of its proposed GSM-R licensing regime and in furtherance of the obligations of inter-operability, ComReg is seeking to establish a Memorandum of Understanding (MoU) with the UK that would facilitate Irish and UK rail operators' use of spectrum in accordance with the above Directive, thereby facilitating full interoperability between respective networks.

2.6 Co-existence with adjacent band services.

As shown in **Figure 1** above, the GSM-R spectrum band is located between two spectrum bands in which different technologies types are currently used: WDMDS (Wideband Digital Mobile Data Services) and GSM-900.

Co-existence with WDMDS

Spectrum below the GSM-R band is currently assigned to Digiweb for the provision of WDMDS – providing broadband-type services to users within a limited geographical area, predominantly the Dublin area.

With regards to co-existence, ComReg notes that the WDMDS licensee:

- is obliged to ensure non-interference with both GSM in the 907 – 915 MHz part of the band and to make provisions for any future GSM-R systems in the 921 – 925 MHz part of the band (as outlined in ComReg05/08)⁴;
- is obliged to cover the cost of any mitigation techniques required to prevent harmful interference to users in adjacent bands; and
- is required to make provision for any guard bands required to prevent harmful interference to spectrum users in adjacent bands using spectrum specified in the WDMDS licence.

See:

- Directive 2009/114/EC of the European Parliament and of the Council of 16 September 2009 amending Council Directive 87/372/EEC on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community at: <http://eur-ex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0025:0027:EN:PDF> ; and
- Commission Decision of 16 October 2009 on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community (2009/766/EC) at: <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0032:0035:EN:PDF>

Co-existence with 900 MHz band

The use of the 900 MHz band (specifically, 880-915 MHz paired with 925-960 MHz) is the subject of, amongst other things, a European Directive and European Commission Decision both of which seek to harmonise the band across Europe for GSM, UMTS, as well as for other terrestrial systems capable of providing electronic communications

⁴ ComReg0580: Information Memorandum: Process for the Award of National Licences for the Provision of Wideband Digital Mobile Data Services.

Information Notice: Proposed licensing regime for GSM for railway operations spectrum services that can coexist with GSM systems.⁵ The future use of this band is the subject of on-going consultation by ComReg.⁶

With regards to co-existence, a 100 kHz guard band is currently implemented on the 900MHz band side of the GSM-R/GSM-900 band edge.

It is noted that interference between GSM-R and 900MHz systems can arise where these systems are deployed within the same geographical location. Such interference could include blocking effects and intermodulation distortion on the GSM-R system. In this regard, ECC Report 146⁷ states that the predominant interference effects are the blocking and adjacent channel performance of the GSM-R terminal, which, however, can be improved by additional filtering. For instance, new GSM-R receivers with narrower and switchable filters are being planned. This report also states that a carrier separation of 400 kHz (200 kHz between the edges of the channels) between 900 MHz multi carrier base transmit stations (MCBTS) and GSM-R is sufficient to avoid harmful interference to GSM-R downlink due to unwanted emissions from a MCBTS.

In light of the recommendations of the ECC Report and the importance of ensuring no interference between GSM-R and 900 MHz systems, ComReg therefore proposes to implement the guard channel spacing recommended in the ECC Report.

In addition, ComReg notes that further work is being carried out by European Commission working groups to investigate the compatibility between GSM-R and future 900 MHz technologies. As these studies could, amongst other things, conclude that greater guard band requirements may be needed, ComReg therefore proposes to issue GSM-R licences based on spectrum allocations from the lower end of the GSM-R band (i.e. from 876 MHz paired with 921 MHz) and progressively moving towards 880 MHz paired with 925 MHz).

Figure 2 below sets out the proposed channel assignments and guard bands for GSM-R interoperability between adjacent band services.

⁵ See: (a) Directive 2009/114/EC of the European Parliament and of the Council of 16 September 2009 amending Council Directive 87/372/EEC on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0025:0027:EN:PDF> ; and (b) Commission Decision of 16 October 2009 on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community (2009/766/EC) at: <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0032:0035:EN:PDF> .

⁶ The most recent ComReg document in relation to the 900 MHz band is ComReg 10/71, ([ComReg1071](#))

⁷"Compatibility between GSM MCBTS and other services (including GSM-R) operating in the 900 and 1800 MHz frequency bands" (June 2010)

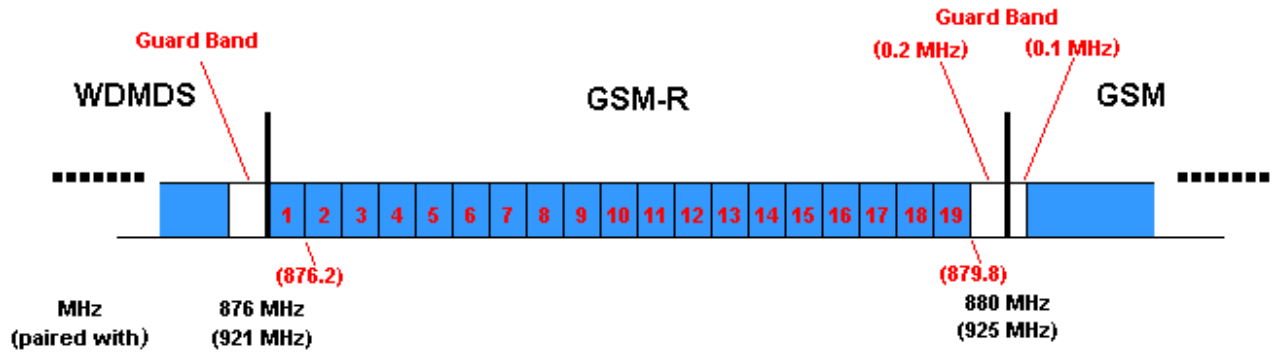


Figure 2: GSM-R channel assignments and guard bands.

3 Proposed GSM-R licensing framework

The following sets out ComReg's proposed licensing framework for GSM-R spectrum rights of use.

Taking account of the recommended carrier separation in ECC Report 146, ComReg notes that the amount of spectrum being made available for GSM-R is 2 x 3.8 MHz.

3.1 Limited number of individual spectrum rights of use (licences) and demonstrated spectrum requirements

In the present case, individual rights of use, in the form of licences that would be granted under the Wireless Telegraphy Act, are proposed to be issued in order to:

- Avoid harmful interference to the above identified services that could otherwise arise;
- Ensure technical quality of service, including conformity with the Directive and ECC Decision referred to above; and
- To ensure the efficient use of limited GSM-R spectrum.

In addition, as there is only a limited amount of spectrum allocated for GSM-R (2 x 3.8 MHz) ComReg considers, by implication that the number of GSM-R licences ought to be limited.

That said, and having due regard to the need to maximise benefits for users, facilitate the development of competition and ensure efficient use of GSM-R spectrum, it is proposed that no licensee would be granted rights of use to all 2 x 3.8 MHz of GSM-R spectrum.

Furthermore, and in light of the limited amount of GSM-R spectrum available and the need to ensure its efficient use, it is proposed that there would be a requirement for applicants for a GSM-R licence to satisfactorily demonstrate to ComReg the need for the spectrum requested. In this regard, ComReg would envisage the provision by applicants of a detailed network plan outlining, amongst other things, specific base station frequency re-use and loading. Moreover, ComReg reserves the right to obtain independent advice relating to such material and to consult as appropriate to determine the veracity of said material.

3.2 Services which could be provided using GSM-R spectrum rights of use

As noted above, the ECC Decision designates the GSM-R spectrum band for railway purposes on a European-wide basis.

The relevant Directive referred to above specifies that GSM-R spectrum may only be used by railway infrastructure operators engaged in the provision of railway network infrastructure or related ancillary services⁸. This infrastructure includes traffic management, tracking and navigation systems: technical installations for data processing

⁸ EC 2008/57/EC Annex II: List of subsystems.

Information Notice: Proposed licensing regime for GSM for railway operations spectrum and telecommunications intended for passenger services on these lines in order to guarantee the safe and harmonious operation of the network and efficient traffic management⁹.

Importantly, ComReg considers the above to specifically exclude the provision of any form of *public* mobile radio service (e.g per Directive 2004/50/EC Annex 3).

3.3 Licensing process

In light of the likely limited demand for GSM-R licences (due to the number of railway infrastructure operators in Ireland and the specific nature of services which can be provided with such licences) it is proposed that GSM-R licences to provide the services identified above would be granted on a first-come, first-served basis and subject to, amongst other things, satisfactory demonstration of spectrum requirements.

3.3.1 Key aspects

In addition to the above, it is proposed that the GSM-R licences would have the following key aspects:

- they would be issued on a national basis;
- GSM-R spectrum would be made available in channels of minimum bandwidth of 2 x 200 kHz - which correlates with the GSM-R standard channel allocations defined by the ECC Decision;
- GSM-R licences would have a maximum duration of ten years and be subject to annual renewal during this time period. ComReg notes that this proposed duration is consistent with licensing regimes for non-commercial service provision (for example, the TETRA licensing regime provides for a maximum ten year licence duration) and would appear appropriate for the services identified above and in light of likely investment timeframes. For the avoidance of doubt, at the end of the proposed ten year maximum duration, a GSM-R licence will fully expire and licensees will have no rights to renewal, extension or other form of prolongation of this term; and
- An annual spectrum usage fee for 2 x 1 MHz (pro-rated) of €79,900 per annum. In this regard, ComReg has undertaken a benchmarking process to establish what it considers to be the appropriate spectrum usage fee for GSM-R spectrum, having regard to the objective of ensuring the efficient use of this spectrum. This benchmarking analysis is set out in **Annex 3**.

⁹ EC2008/57/EC Annex I: Trans-European conventional rail system.

3.3.2 Proposed Licence Conditions

In addition, ComReg proposes to impose the following conditions on GSM-R licences:

- technical conditions as outlined in ETSI standards EN 301 502¹⁰ and EN 301 515¹¹ as to meet the obligations under the relevant Directive identified above and in order to protect services in adjacent spectrum bands¹²;
- the licensee will ensure that non-ionising radiation emissions from each radio installation operated under the licence for the purposes of the services identified above are within the limits specified by the guidelines published by the International Commission for Non-Ionising Radiation Protection (ICNIRP) and that it complies with any radiation emission standards adopted and published from time to time by ICNIRP, any standards of the European Committee for Electrotechnical Standards and any standards which may from time to time be specified by the European Union and that the wireless telegraphy apparatus operated under the Licence is not installed or operated at a location in a manner such as to be the cause of the aggregate non-ionising radiation emissions exceeding the limits specified by the guidelines published by the ICNIRP and that it complies with any radiation emission standards adapted and published by OCNIRP or its successors from time to time, any radiation emission standards of the European Committee for the Electrotechnical Standards and any radiation emission standards specified by national and European Community law;
- the licensee may not, without the consent of the Commission (which shall not be unreasonably withheld) assign the licence or any of the powers, duties or functions conferred by it or otherwise transfer any of the rights or obligations conferred by it;
- the Licensee complies with obligations under relevant international agreements relating to the use of apparatus or the frequencies to which they are assigned; and
- if the address of the Licensee or the person to whom the Licence has been assigned changes, the Licensee shall, as soon as possible, notify the Commission in writing of the change.

¹⁰ [EN 301 502](#) : Harmonized EN for Global System for Mobile communication (GSM); Base Station and Repeater equipment covering essential requirements under article 3.2 of R&TTE directive (GSM 13.21 version 8.1.2 Release 1999).

¹¹ [EN 301 515](#) : Global System For Mobile communication (GSM); Requirement for GSM operation on railways.

¹² These mechanisms are discussed further in the ECC Report 96 on the interoperability between adjacent band systems.

Submitting Comments

All comments regarding ComReg's proposed licensing regime for the GSM-R spectrum band are welcome and must be received by 5pm on **26 November 2010**.

Comments should be submitted to Ms. Sinéad Devey at sinead.devey@comreg.ie.

Please set out your reasoning and supporting information for any views expressed.

So as to promote openness and transparency of the consultation process, ComReg will publish all respondents' submissions, subject to the provisions of ComReg's *Guidelines on the Treatment of Confidential Information*¹³. We would request that electronic submissions be submitted in an unprotected format so that they can be appended into the ComReg submissions document for publishing electronically.

Please note

ComReg may conduct further consultations where it considers it appropriate and/or necessary to do so.

ComReg appreciates that issues raised in this paper may require respondents to provide confidential information if their comments are to be meaningful. As it is ComReg's policy to make all responses available on its web-site and for inspection generally, respondents to consultations are requested to clearly identify confidential material and place confidential material in a separate annex to their response. Such information will be treated in accordance with the provisions of ComReg's confidentiality guidelines referred to above.

In anticipation of correspondence on matters relating to the issues covered in this consultation, ComReg hereby gives notice that it will publish all material correspondence received in this regard, again subject ComReg's confidentiality guidelines referred to above.

¹³ ComReg 05/24 Response to Consultation - Guidelines on the treatment of confidential information - March 2005

Annex 1 - Legislative Framework

The following text identifies the key legislative provisions under which ComReg's licensing proposal for GSM-R is being put forward. It is not intended to be an exhaustive recitation of all relevant functions, obligations and duties.

The Communications Regulation Act, 2002 (as amended) ("the 2002 Act"), the Framework and Authorisation Regulations (S.I No. 307 of 2003 and S.I No. 306 of 2003 respectively), and the Wireless Telegraphy Acts set out, amongst other things, functions and objectives of ComReg that are relevant in the present context.

Apart from licensing and making regulations in relation to licences, these functions include the management of Ireland's radio frequency spectrum in accordance with ministerial Policy Directions under section 13 of the 2002 Act, which ComReg is to carry out effectively, and in a manner serving to ensure that the allocation and assignment of radio frequencies is based on objective, transparent, non-discriminatory and proportionate criteria.

ComReg's primary objectives in carrying out these functions in the context of electronic communications are to:

- promote competition;
- contribute to the development of the internal market;
- promote the interests of users within the Community; and
- ensure the efficient management and use of the radio frequency spectrum in Ireland.

In carrying out its functions, ComReg is required amongst other things, to:

- ensure that any measures taken by it are proportionate having regard to the objective of ensuring the efficient management and use of the radio frequency spectrum¹⁴;
- have regard to international developments with regard to electronic communications networks and electronic communications services, associated facilities, postal services, the radio frequency spectrum and numbering¹⁵; and
- take the utmost account of the desirability that the exercise of its functions aimed at achieving its radio frequency management objectives does not result in discrimination in favour of or against particular types of technology for the provision of ECS¹⁶.

Separately, pursuant to the Framework Regulations, ComReg is obliged to promote the harmonisation of use of radio frequencies across the European Community¹⁷.

Regulation 11 of the Authorisation Regulations also requires ComReg, without prejudice to Section 13 and 37 of the 2002 Act, to give due weight to the need to maximise benefits for users and to facilitate the development of competition, in circumstances where it

¹⁴ Section 12(3) of the 2002 Act (No. 20 of 2002).

¹⁵ Section 12(5) of the 2002 Act (No. 20 of 2002).

¹⁶ Section 12(6) of the 2002 Act (No. 20 of 2002).

¹⁷ Regulation 23(2) of the Electronic Communities (Electronic Communications Networks (Framework) Regulations 2003.

Information Notice: Proposed licensing regime for GSM for railway operations spectrum proposes to issue, pursuant to its powers under the Act of 1926, licences for a particular class or description of apparatus for wireless telegraphy for the provision of an electronic communication network or service, and considers that the limit of such licences ought to be limited.

Section 12(3) of the 2002 Act requires ComReg to comply with any policy direction given to ComReg by the Minister for Communications, Energy and Natural Resources (“the Minister”) as he or she considers appropriate to be followed by ComReg in the exercise of its functions. Section 10(1)(b) also requires ComReg, in managing the radio frequency spectrum, to do so in accordance with a direction of the Minister under Section 13 of the 2002 Act.

The Policy Directions which are most relevant in this regard include the following:

- **Policy Direction on Communications Objectives**

In carrying out its functions, the Commission shall have regard to:

- the Programme for Government 2002, including the provision of the Programme set out in the section “Building Peace and Justice” stating: “We will improve North-South infrastructural links and facilitate cross-border planning”, and the objectives set out in the section “Developing the Regions and the Islands” as well as the provisions relating to electronic communications set out in the section “Research, Development and Innovation”, equivalent positions in other Member States of the European Community; and

- **Policy Direction No.11 on the Management of the Radio Frequency Spectrum**

The Commission shall ensure that, in its management of the radio frequency spectrum, it takes account of the interests of all users of the radio frequency spectrum.

Annex 2 - ECC Decision (ECC/DEC/(02)05)

ELECTRONIC COMMUNICATIONS COMMITTEE
ECC Decision
of 5 July 2002
on the designation and availability of frequency bands
for railway purposes
in the 876-880 and 921-925 MHz bands
(ECC/DEC/(02)05)

EXPLANATORY MEMORANDUM

1 INTRODUCTION

This ECC Decision addresses the use of the bands 876-880 MHz and 921-925MHz, covered by ERC Recommendation 25-09, which are planned for railway operational applications on a European wide basis.

These systems will support railway operations and especially those in accordance with the EC Directive on the Interoperability of High Speed railway networks 1996/48/EC and the EC Directive 1999/569/EC concerning frequencies for railways.

2 BACKGROUND

The CEPT/ERC Recommendation T/R 22-01 details the allocation of frequencies in the 450MHz band for railway applications and the CEPT/ERC Recommendation T/R 25-09 details the allocation of frequencies for railway applications in the 900MHz band. This Decision has been developed to provide for the Recommendation T/R 22-01 on the use of the 450MHz allocation to be phased out and, following the DSI III, Recommendation T/R 25-09 covering the 900MHz allocation to be replaced by the present ECC Decision.

This ECC Decision covers exclusively the designation and especially the availability of frequency bands for duplex operation, single frequency simplex operation and frequency planning for railways. This means the relevant bands should be designated in the national frequency usage tables and should be made available by the administrations. As the railway equipment is designed to cover the frequency band 876-915 and 921-960MHz, additional allocations may be made on a national basis. The current software controlled radio equipment technology offers the flexibility with regard to different frequency availability situations within the CEPT member countries, which allows easily a European frequency planning. Separate ECC Decisions may be required to deal with the licence (telecommunications/service licence and/or radio licence) related matters and for the carriage and use of equipment throughout Europe.

DMO (Direct Mode Operation) is an additional simplex service for terminals operating in a GSM-R network. Information regarding the compatibility of UIC-DMO with GSM-R, TETRA and E-GSM can be found in ERC Report 86 of June 2000 ("Adjacent band compatibility of UIC direct mode with UIC GSM and 900 MHz TETRA - An analysis completed using a Monte Carlo based simulation tool").

To achieve the aim of taking a new step towards harmonisation and implementation of frequency spectrum for Railway Operational Applications, it has been decided to develop this Decision. The harmonisation on a European Basis would ease the implementation of Directives 1999/5/EC (the R&TTE Directive), 1996/48/EC (Interoperability of high speed railway networks), 2001/16/EC (Interoperability of conventional railway networks) and 1999/569/EC (Frequencies for railway operations).

3 REQUIREMENT FOR AN ECC DECISION

The allocation or designation of frequency bands for use by a service or system under specified conditions in CEPT member countries is laid down by law, regulation or administration action. It is considered necessary to designate and implement frequency bands for Railway Operational systems. Only the real availability of an appropriate amount of radio spectrum and not only the designation within the national frequency usage tables encourage manufacturers and operators to make the necessary investments in this radio communication technology. A commitment by CEPT member countries to implement an ECC Decision will provide a clear indication that the required frequency bands will be made available on time and on a European-wide basis. The dates of availability will be reviewed from time to time.

**ECC Decision
of 5 July 2002
on the designation and availability of frequency bands
for railway purposes in the 876-880 MHz and 921-925 MHz bands
(ECC/DEC/(02)05)**

“The European Conference of Postal and Telecommunications Administrations, considering

- a) that railway organisations are making increasingly extensive use of radio communications to facilitate the managing and operating of railway traffic and increase its safety; especially in accordance with the European Rail Traffic Management System and the European Directives 1996/48/EC and 2001/16/EC;
- b) that it is essential to be able to use common railway radio equipment in different countries in a common frequency band as well as for border crossing traffic;
- c) that the advanced frequency economic digital radio system developed by the Union Internationale des Chemins de fer (UIC) should cover the international requirements without excluding national requirements for non public radiocommunication of the railways and will replace most of the current analogue systems by 2010;
- d) that the amount of frequency spectrum required for railway purposes is different in different countries;
- e) that the introduction by the railways of this radio system will liberate frequencies presently used by railways; enabling CEPT Recommendation T/R 22-01 (2 x 0.5 MHz in the 450 MHz band for international railways without excluding national requirements) to be withdrawn in 2005;
- f) that the equipment must be capable of operating over the designated frequency band;

- g) that multilateral/bilateral agreements on frequency coordination in border areas can have an influence on the availability of radio spectrum;
- h) that European-wide harmonised use of frequencies would ease the implementation of Directive 1999/5/EC (the R&TTE Directive);
- i) that the equipment referred to in this ECC Decision should comply with the relevant European Telecommunication Standards (EN 301 502 and EN 301 419-7 for GSM-R , EN 300 086 for Direct Mode Operation (DMO));
- j) that the CEPT Recommendation ERC/REC 74-01 defines spurious emission limits for radio communication equipment;
- k) that in addition to the need for network interoperability, there is also a need for interoperability in the direct mode operation (DMO);
- l) that the systems operate in 200 kHz (within the GSM-R network) or 12.5 kHz (DMO) channel spacing;
- m) that not all of these frequencies will be available in some CEPT countries before the year 2005;
- n) that Administrations have the right to exercise frequency management which may affect the number of service suppliers, in conformity with their international trade obligations and to European Community legislation as far as EU Member States are concerned;
- o) that allocation, assignment and technical co-ordination of frequencies must be done in an objective, timely, impartial, transparent and non-discriminatory manner, and should not be more burdensome than necessary under international rules, in particular, to ensure the efficient use of frequency spectrum.

DECIDES

1. that the frequency requirements for international and national railway operations shall be met within the bands

- 876-880 MHz (mobile station transmit) paired with 921-925 MHz (base station transmit) with a duplex separation of 45 MHz for duplex operation

Centre frequency Mobile TX (MHz) /Centre Frequency Base Tx (MHz)	
876.2000	921.2000
876.4000	921.4000
876.6000	921.6000
876.8000	921.8000
877.0000	922.0000
877.2000	922.2000
877.4000	922.4000
877.6000	922.6000
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878.0000	923.0000
878.2000	923.2000
878.4000	923.4000
878.6000	923.6000
878.8000	923.8000
879.0000	924.0000
879.2000	924.2000
879.4000	924.4000
879.6000	924.6000

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879.8000 924.8000
880.0000 Note 1) 925.0000 Note 1)

Note 1) The frequency 880.0000 MHz paired with 925.0000 MHz may be considered as guard channel to other services in adjacent bands.

- 876.000 – 876.100 MHz for direct mode operation (DMO) using single frequency mode. The frequency spacing for DMO is 12.5 kHz.

Centre frequency Mobile TX/Rx (MHz)

876.0125
876.0250
876.0375
876.0500
876.0625

2. that these frequencies shall be made available according to requirements of the railways as soon as possible, but at least before 2006;

3. that this Decision will enter into force on 05 July 2002;

4. that CEPT Administrations shall communicate the national measures implementing this Decision to the ECC Chairman and the Office when the Decision is nationally implemented.”

Note:

Please check the CEPT web site (<http://www.cept.org/>) for the up to date position on the implementation of this and other ECC and ERC Decisions.

Annex 3 - GSM-R spectrum fee benchmarking analysis

The following benchmarking analysis was undertaken to enable determination of the appropriate GSM-R spectrum usage fee, having regard to the objective of ensuring the efficient use of this spectrum.

The benchmarking methodology used involves identifying and gathering sample data for GSM-R licence fees for comparable spectrum in other countries and adjusting these to provide a benchmarked fee price for Ireland. As the spectrum band is harmonised across Europe one and therefore is service-specific, the only way to benchmark the fee was to assess similar spectrum used in other countries.

The standard approach for determining spectrum fees is to consider a simple average price per head of population per MHz (i.e. the price divided by the population of the licensing region divided by the amount of spectrum in MHz available) across a cut of the sample data.

The sample data gathered¹⁸ from other EU Administrations for this benchmarking process to establish the appropriate level of GSM-R fees is set out in **Table 1** below.

In order to get a better idea of the appropriate fee to charge for GSM-R licences, the outliers of the UK and Spain have been excluded, in all the following calculations. The reasons for these exclusions are that the UK's fee structure was based on the GSM-900 MHz fee structure therefore would greatly overestimate this benchmarked fee if included. While Spain's fee was based on amount of GSM-R spectrum bandwidth use per km of rail line and so determining the fee could not be determined. As such in ComReg's view these outlier fees would give a misleading average GSM-R fee price per capita if included in the benchmarking process.

The average fee paid for GSM-R spectrum in the four European countries listed in **Table 1** below is €207,056.60. On a per capita basis, the GSM-R fee for Ireland equates to €79,900 per annum, for 2 x 1 MHz.

Accordingly, ComReg proposes that a **spectrum usage fee for 2 x 1 MHz (prorated) of €79,900 per annum.**

¹⁸ ComReg contacted numerous Administrations by email that have GSM-R networks in operation, requesting information with regards to the Licence fees they charge, as well as spectrum assigned, and all the Administrations that responded have been included in this fee calculation.

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Country	Population (Millions)	Spectrum	Planned Length of Rail to be upgraded (km)	Total Fees (€)	Include in Benchmarking (yes/no)
Denmark	5	2 x 4 MHz	2,000	121,200	yes
UK	60	2 x 4 MHz	14,000	3,532,968.30	no
Finland	5	2 x 4 MHz	5,800	242,726.4	yes
Spain	40	2 x 4 MHz	12,000	N/A	no
Switzerland	7.5	2 x 4 MHz	3,011	20,000	yes
Norway	4.6	2 x 4 MHz	3,000	444,300	yes

Table 1: GSM-R fees in other European countries