Commission for
Communications Regulation

Submissions to Information Notice

Licensing Regime for GSM for Railway Operations

Submissions received from respondents

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[1] Although marked as confidential, Silver Springs Networks subsequently indicated to ComReg that their submission was not in fact confidential.

1 ESB Networks

Comments Regarding ComReg's proposed licensing regime for the GSM-R spectrum band -

ComReg Document Number 10/84

ESB Networks Response

Status: **Issued**

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ESB Networks Comments on ComReg's GSM-R Licensing Regime Paper

ESBN welcomes this opportunity to Comment on ComReg's paper and provide an input into the process for licensing of GSM-R spectrum. ESBN notes ComReg's views on the principles for Licensing of the GSM-R spectrum and its basis in harmonisation of spectrum usage throughout Europe. ESB understands that the primary designated use for this spectrum if for GSM-R purposes.

Electricity networks are a vital national infrastructure that support economic development and enable supply of electricity to all customers which is an essential service. Electricity networks are fundamental to the delivery of EU and national sustainability targets.

Key National Sustainability Targets include

1. Supply 40% of the Electrical Energy on the island from Renewable sources both at a macro and micro level.
2. Contribute to an overall reduction in energy usage of 20%.
3. Significant improvement in energy efficiency.
4. Comply with the EU directive in relation to smart metering.
5. 10% of car transportation to be fuelled through electricity

These targets will be enabled by a strong electricity system with ubiquitous embedded intelligence supported by a dedicated, reliable, secure and economic telecommunications infrastructure with adequate bandwidth. This evolution is sometimes described as smart networks or smart grid.

Wireless technologies will need to feature strongly in the smart networks infrastructure for Ireland because smart metering and smart grid services to at least one third of the population can only be delivered economically using wireless technology. This is due to the rural settlement pattern in Ireland and the resulting structure of the electrical distribution network.

Based on the work carried out to date in examining currently available communications technologies in the context of The National Smart Metering Plan, Phase 1 Technology Trials we believe that currently available wireless technologies are far from ideal in terms of performance, total cost of ownership and control. As Comreg is no doubt aware control is a key issue in the context of a vital national infrastructure.

It is imperative therefore that ESBN is able to access sufficient suitable spectrum to deploy telecommunications systems to continue to carry out its functions in a safe, efficient and effective manner and to meet emerging smart metering and smart network requirements.

ESBN believes that spectrum in the sub 1GHz band would best suit these requirements as a critical infrastructure asset for communications to support the Electricity Sector. This needs to be available to the Electricity industry to enable Smart Networks to support the long term requirements of the energy industry, its customers and the state. This network will facilitate safety, security of supply, energy efficiency and consumer choice through the provision of timely and accurate information, real time communications with the meter and home and it will facilitate the adoption of distributed generation from renewable sources.

A number of initiatives are in train to standardise communications technology for utilities and several of these involve the use of spectrum in the sub-GHz bands. One key initiative is the IEEE 802.15.4 taskforce.

The aim of IEEE 802.15.4g Smart Utility Networks (SUN) task force is to create a PHY amendment to 802.15.4 to provide a global standard that facilitates very large scale process control applications such as the utility smart-grid and smart metering network capable of supporting large, geographically diverse networks with minimal infrastructure, with potentially millions of fixed endpoints.

The first Task Group meeting was held in January 2009. The formation of the Task Group was spurred at the behest of utilities in the US, where many vendors have competing (yet proprietary) sub-GHz FHSS (Frequency-hopping spread spectrum) solutions. A common PHY standard will allow multiple silicon vendors to build commoditized solutions, de-risking Smart Meter and Smart Grids purchasing decisions of utilities and, importantly, de-risking the approval decisions of the utility regulators. Silicon vendors participating in the Task Group include Analog Devices (ADI), Atmel, Texas Instruments, Freescale Semiconductor, NXP, and others.

While IEEE standards specify frequency ranges within which radios will operate, the standards are more “reactive” than they are “prescriptive”. For instance, in the US, spectrum has been set aside for unlicensed use at 900 MHz; many utilities leverage this spectrum for metering and grid applications. In China, the government is earmarking 470 – 510 MHz for metering and grids; the IEEE specification defines radio operation in that band. In Europe, however, there is very little sub-GHz spectrum available.

Sub-GHz spectrum is important to utilities in that it allows for increased coverage and lower overall infrastructure costs, and it allows radio signals to penetrate obstructions and get into hard-to-reach places, where meters often reside, which is a significant problem in the Irish context.

ESBN is aware of vendors who can operate on currently under used spectrum in Ireland: such as 870 – 872, 876 – 880, 915 – 917, and 921 – 925 MHz. The GSM-R band falls within the range of these equipments' capabilities. ESBN has an interest in the availability of spectrum in this range and bordering bands for use with a Smart Utility Network Solution.

This request to set aside underutilised spectrum, either on a primary or secondary use basis in the sub 1GHz band as a critical infrastructure asset for communications to support the Electricity Sector, meets several of the criteria outlined by ComReg in its strategy for the management of Spectrum in Ireland: -

- It provides for innovative technologies and services
- It maximises the economic and social returns from the use of radio spectrum;
- It ensures the efficient use of scarce radio spectrum resources

ESBN would urge ComReg to consider the Communications Infrastructure requirements of the Electricity Industry when licensing spectrum in this and bordering ranges and to make available spectrum which in not fully utilised. ESBN would furthermore ask ComReg to consider the possibility of co-existence of systems, using appropriate mitigation techniques, in these ranges.

2 Iarnród Éireann

Iarnrod Eireann response to ComReg Information Notice No. 10/84 dated 13th October 2010, 'Proposed licensing regime for GSM for railway operations spectrum'.

Iarnrod Eireann welcomes the publication of this Information Notice in relation to the proposed licensing regime for GSM-R spectrum and appreciates the opportunity to raise comment in this regard.

The response follows the structure of the Information Notice with reference to particular sections as appropriate.

2.2 Current Irish rail network communications

GSM-R has been developed through the UIC as the replacement technology for the various analogue radio communications systems used on mainline rail routes by railway operators throughout Europe. The focus is on interoperability of the High Speed railway network across Europe and the adoption of this common technology for use over national conventional rail lines. In the case of Ireland, all main intercity rail lines are classified as 'conventional' lines and fall under the scope of the TSIs (Technical Specification for Interoperability) which mandates the adoption of GSM-R.

The TSIs relate to 'heavy' rail and are not applicable for Light Rail or Metro networks. Iarnrod Eireann currently uses existing VHF/UHF spectrum allocations for maintenance activities and for safety critical communications between train drivers and signalling control centres. There are no TETRA networks in use for mainline rail and GSM-R has been mandated under EU directives for this application.

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

Note: Referenced document ECC/DEC/(02)05 has been amended on 26th June 2009: ECC Decision of 5th July 2002 on the designation and availability of frequency bands for railway purposes in the 876-880 MHz and 921-925 MHz bands.
http://www.erodocdb.dk/Docs/doc98/offical/pdf/ECCDEC0205amended.PDF

2.5 Inter-operability with United Kingdom

Iarnrod Eireann fully supports the intention of ComReg to establish a MoU with OfCom with regard to use of the GSM-R spectrum and see this as an essential requirement to derive the full benefits from GSM-R and ensure seamless interoperability between both rail networks. Iarnrod Eireann request that they be consulted in this process.

2.6 Co-existence with adjacent band services

Co-existence with WDMDS

It is noted that the WDMDS licensee is obliged to ensure non-interference with the GSM-R band, cover the cost of any mitigation techniques required to prevent harmful interference and make provision for any required guard bands from within the spectrum specified in the WDMDS licence.

Considering the safety-critical application of GSM-R in rail operations, Iarnrod Eireann are concerned in relation to the ability to enforce this requirement and in particular cover associated costs where mitigation may require additional equipment is fitted on board trains. Further investigation is possibly required to quantify this issue and establish where interference might occur. However, an obligation should be placed on the WDMDS licensee to implement mitigations within their own network, at their own cost, should interference occur. Furthermore, alterations and expansion of the WDMDS network should be assessed in advance for any potential interference with GSM-R to ensure that the safety integrity of the GSM-R network is not compromised.

Co-existence with 900MHz band
Iarnrod Eireann understand that interference issues between GSM-R and 900MHz systems may still be experienced with the implementation of the recommended guard band and that further investigation is being conducted by an ETSI Special Task Force working group, reference documentation: ETSI TS 102 933-1 V0.1.6 and ETSI TS 102 933-2 V0.1.4 in this regard.

The implementation of switchable filters on the GSM-R terminals is not a cost effective solution to mitigate an interference issue in one particular area. Considering that the train fleet is not captive, it would necessitate fitting the whole fleet of approximately 500 vehicles at an additional cost of approximately €4M (€8k per unit) which equates to the cost of the GSM-R terminal itself.

The proposal to assign frequencies from the lower end of the band and progressively move towards 880 MHz may mitigate this issue in the short term, however as the GSM-R network would expand to cover all four rail lines converging on Dublin, issues may emerge in the future. Consideration must be given to licensing the whole band to the rail infrastructure operator in this context.

Consideration should also be given to the future use of E-GSMR band.

3.1 Limited number of individual spectrum rights of use (licences) and demonstrated spectrum requirements
Iarnrod Eireann appreciates ComReg's role in ensuring the efficient use of limited spectrum resources and in this regard understands that Licensees must demonstrate the need for the spectrum requested.

In regard to GSM-R, criteria applicable to public commercial cellular infrastructure, e.g., ratio of users to RF channels, are not appropriate to assess GSM-R spectrum efficiency. GSM-R networks typically have a relatively small number of users with more emphasis on QoS, availability, redundancy, safety criticality, etc. then would be required of a public network.

Initial studies have indicated that practically the full GSM-R spectrum may be required in the longer term, particularly in the Greater Dublin Area where four rail lines converge. The initial requirement of a GSM-R voice network will need to be enhanced and duplicated to support the additional demands of ETCS in the future. On

the basis that Iarnrod Eireann is the national rail infrastructure provider, sufficient spectrum must be allocated to meet these long term requirements.

3.3 Licensing process

GSM-R is mandated for mainline rail under EU Directives and therefore the proposal to award licenses on a 'first-come, first-served' basis is not appropriate. Iarnrod Eireann is the national heavy rail infrastructure provider in the state and as such must be accommodated in relation to allocation of appropriate spectrum to comply with the Directive.

3.3.1 Key aspects

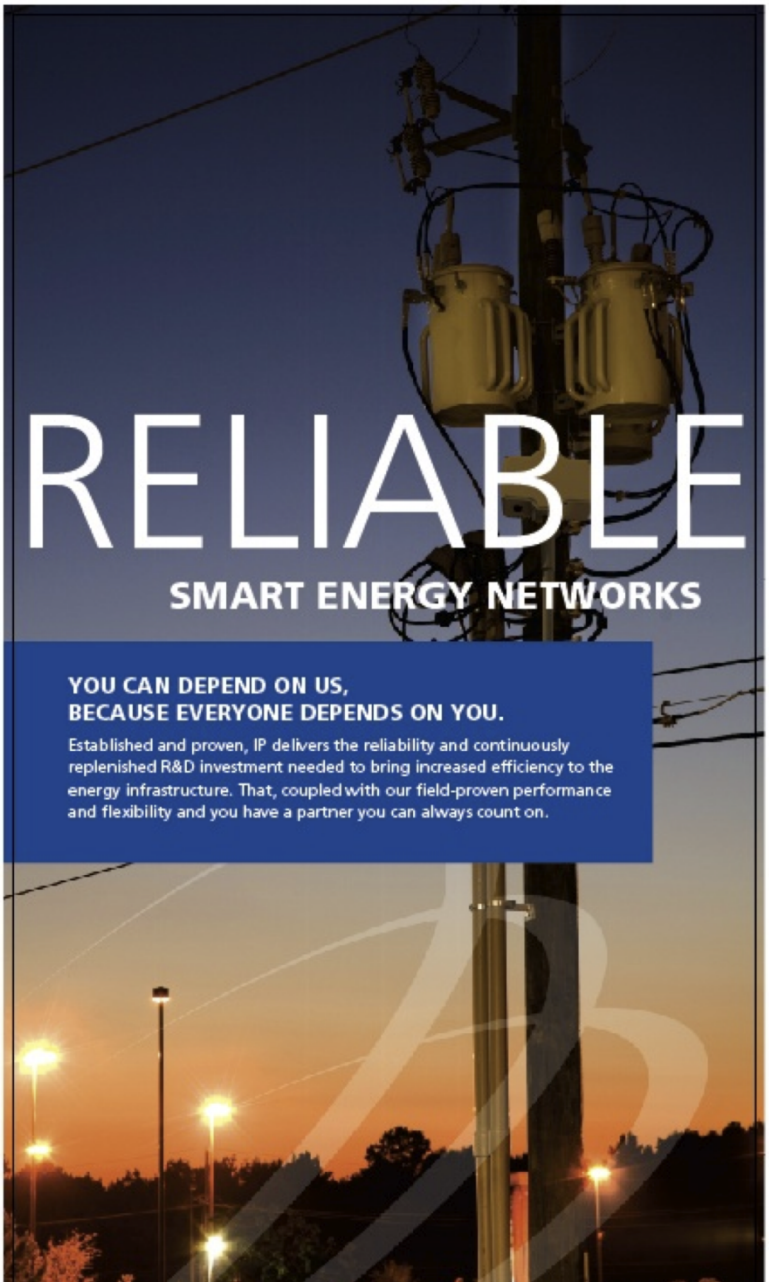
The proposal to limit the maximum duration of the licence to ten years, with an annual review, is not appropriate in the context that GSM-R/ETCS will become a mandated, fundamental requirement and prerequisite for railway safety and railways operations in the future. Provision must be included for a right of renewal beyond the ten year horizon. Considering the significant capital investment to implement GSM-R/ETCS that would have been incurred over the initial ten year period, and the restricted use of this spectrum for railway purposes in any event, there would appear to no justification for an automatic termination of the licence at that time.

In relation to the proposed spectrum fee, Iarnrod Eireann would like to make the following comments:

1. The adoption of GSM-R is mandated by EU Directives and is not an optional requirement of Iarnrod Eireann
2. The use of the spectrum is not revenue generating, rather is required to enhance the safety of rail operations and provide for safety-critical communications between train drivers and signalling control centres
3. In the longer term, when GSM-R has been fully implemented throughout the rail network, it will replace the existing VHF/UHF systems that are currently in use and these VHF/UHF allocations can be relinquished
4. GSM-R will replace the existing analogue systems, but will not provide any additional revenue streams
5. The use of GSM-R is limited to railway applications and cannot be used for public commercial communications services
6. The spectrum requirements are primarily dictated by the geography of the rail network coupled with the high availability and safety requirements rather than population density or extent of railway
7. Iarnrod Eireann would suggest that the usage fee should be based on that currently paid for the VHF/UHF spectrum allocation as no additional usage will be derived from the GSM-R network
8. Alternatively, based on the data quoted for other European countries, this would suggest a spectrum usage fee for 2 X 1 MHz of €27,120 per annum, on the basis of a population of 4.5M and route length of 1800km.

This note represents an initial response to the notice and Iarnrod Eireann would welcome the opportunity to further discuss these issues with ComReg prior to a final decision on the proposal being made.

3 Silver Spring Networks



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Response to "**Proposed licensing regime for GSM for railway operations spectrum**"

26 November 2010

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Silver Spring has made every effort to provide information that is complete and accurate as of the date that this response is provided. Silver Spring continually improves its technology and product offerings, and we recognize that Central Networks' project plans may evolve during the selection process as well. Therefore, Silver Spring will be pleased to update this response prior to contract negotiations, should it be selected as a vendor.

Silver Spring Networks is encouraged by ComReg's needs-based approach to the allocation of spectrum for GSM-R in the 876 – 880 / 921 – 925 MHz bands. Silver Spring Networks would like to call ComReg's attention to trends regarding Smart Utility Networking in adjacent bands and, as such, considers this response informational.

IEEE 802.15.4g

IEEE 802.15.4g Smart Utility Networks (SUN) Task Group's aim is to create a PHY amendment to 802.15.4 to provide a global standard that facilitates very large scale process control applications such as the utility smart-grid network capable of supporting large, geographically diverse networks with minimal infrastructure, with potentially millions of fixed endpoints.

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The Task Group's work is expected to be completed in early 2011 with silicon to follow shortly thereafter.

ETSI ERM TG28

While IEEE standards specify frequency ranges within which radios will operate, the standards are more "reactive" than they are "prescriptive" as related to gaining access to additional spectrum. For instance, in the US, spectrum has been set aside for unlicensed use at 900 MHz; many utilities leverage this spectrum for metering and grid applications. In China, the government is earmarking 470 – 510 MHz for metering and grids; the IEEE specification defines radio operation in that band. In Europe, however, there is very little sub-GHz spectrum available. Sub-GHz spectrum is important in that it allows radio signals to travel far, increasing coverage and lowering overall infrastructure costs, and it allows radio signals to penetrate obstructions and get into hard-to-reach places like basements, where meters often reside. This is of great interest to utilities across Europe and will result in great societal benefit in terms of green house gas reduction, energy independence, and savings to consumers.

In September 2009, New Work Items (NWIs) were created in ETSI ERM TG28 in order to legitimize the use of 870 – 876 MHz for utility applications. In September 2010, the NWI was completed; this Technical Report (TR 102 886) was immediately elevated to what is known as a System Reference Document.

The SM-CG (Smart Metering Coordination Group) under EC M/441 has recognized the development of work within ETSI ERM TG28 as a valid candidate as a communications standard. This bodes well for eventual compliance with the standards direction that EU member states might be expected to adhere to.