

## Information from Norway on the GSM-R interference issue

### *Introduction*

At RSC meeting #42 under agenda item 7, the issue of GSM-R interference was presented by ERA/DG MOVE. The presentation was followed by a discussion and the meeting decided to collect information to the next RSC meeting.

In Norway the licences for the mobile operators in the 900 MHz band were changed after a substantial refarming process back in 2009/2010. The licences were changed to become technology neutral so that the operators for instance could use 900 MHz spectrum to provide UMTS based services. During the process several meetings were held between the Norwegian spectrum authorities<sup>1</sup>, the commercial mobile operators and the GSM-R operator Jernbaneverket (Norwegian National Rail Administration). The meeting series concluded on the conditions that are laid down in the revised frequency licences, both for the mobile operators and for Jernbaneverket. The revised licences were issued in June 2011.

In this document Norwegian authorities present the licence conditions used and the experience so far of practicing these conditions.

### *The licence conditions*

In each of the licences in the 900 MHz band and for the GSM-R licence, special conditions have been laid down to provide protection to the GSM-R service as well as to the public mobile service. In the following an unofficial translation of the conditions laid down in the licences for the 900 MHz band is presented.

### **Section 9.2/10.2 in the licences - Protection of GSM-R**

When transmission technology other than GSM is introduced in the commercial mobile networks, GSM-R operating in the frequency band 876-880 / 921-925 MHz shall be protected at the same level as when GSM is the technology used (in the commercial networks).

The licensee is obliged to cooperate with Jernbaneverket in the planning phase and before a base station with other technologies than GSM is put into operation. This applies both for new base stations (new sites) and where the licensee changes technology from GSM to another technology on existing base stations.

When a new base station is planned, a notification shall be sent before site acquisition. When a change is made to an existing base station, a notification shall be sent before the base station is put into operation.

The basic principle in the coordination procedure is that all parties are responsible for their own networks. The party experiencing interference is obliged to undertake necessary and possible measures to improve the network quality in their own network in order to ensure a reasonable quality of service before any measures should be undertaken by the counterpart.

Costs for making changes in a network shall be paid by the owner of the network in which changes are made.

The licensee shall notify Jernbaneverket when the following conditions are met:

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<sup>1</sup> The Ministry of Transport and Communications and The Norwegian Post and Telecommunications Authority

- The distance from the base station to a railway line is less than or equal to 700 meters. For base stations without line of sight to the railway line, or which are mounted indoors, there is no notification requirement.

Procedures and time frames for cooperation and coordination are given in Annex 1. The licensee and Jernbaneverket can agree on other procedures and details than those given in Annex 1. Such an agreement should be made in writing.

Notification shall follow the criteria in this licence, and as long as the licensee follows these conditions for cooperation with Jernbaneverket, the licensee is not responsible for the quality in the GSM-R network or for any damages following a reduction in quality.

If, despite successful coordination, interferences still occur, the licensee is obliged to cooperate with Jernbaneverket in order to try to solve the problem by implementing necessary measures.

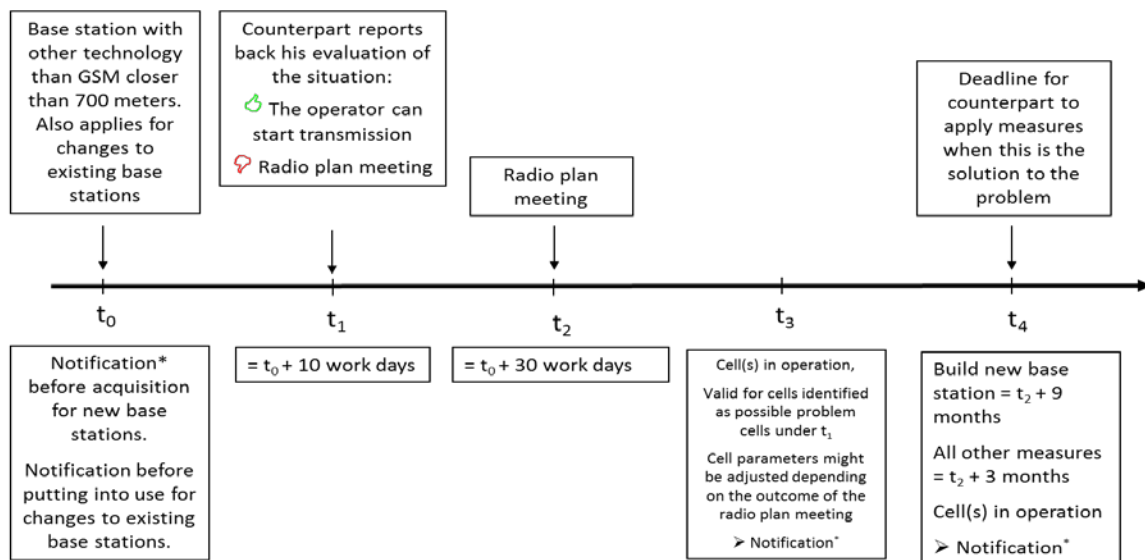
If the licensee chooses to start operating a base station with a technology other than GSM in cases where coordination has not been achieved, Jernbaneverket must be informed about the specific point in time when the station will be put into operation. If Jernbaneverket can prove that the use of the base stations will cause significant disturbances for GSM-R, the licensee shall make necessary measures on the base stations to cease the disturbances.

If a conflict arises from the coordination activities, the Norwegian Post and Telecommunications Authority (NPT) may, after request from one of the parties involved, be involved as an arbitrator. The arbitration is a voluntary, non-binding process with a neutral third party (NPT). NPT shall seek to contribute to an agreement between the parties involved. The main responsibility for reaching an agreement lies with the parties involved. The task of the NPT is first and foremost to help the parties to reach an agreement. If arbitration ends without reaching an agreement, NPT might take a decision, including setting conditions necessary to reach an agreement between the parties.

## Annex 1 in the licences – Requirements for notifications and routines for cooperation and coordination

In Figure 1 a time line for cooperation is shown. Jernbaneverket and the mobile operators will decide on details concerning the radio planning meetings involved. Other details in the planning and implementation of the coordination routines might be agreed between the parties involved. Such agreements should be made in writing.

Possible problematic sites – timeline for cooperation



\* Notification by email:

Figure 1 - Timeline for cooperation

In the coordination process the radio planners shall have the possibility to assess several possible measures to find a satisfactory solution. In the following a non-exhaustive list of such measures is presented:

- Location of a notified base station
  - o Choice of location and co-location
- Antenna configuration
  - o Changing of antenna sectors, placement, distance between antennas, changing of the antenna type, adjustment of the antenna height, tilt or direction
- Technology/parameters
  - o Consider to change carrier frequency/frequency band/technology, reduce output power (EIRP)
- Establish a new site or in other ways improve the coverage for the GSM-R system or the public mobile system respectively

To make it possible for Jernbaneverket and the mobile operators to evaluate each base station's influence on their own radio networks, necessary data on coverage and/or base station parameters should be exchanged: Geographical position, height, antenna model, antenna direction, antenna tilt, EIRP and carrier frequency.

### ***The experience so far***

The licences were amended in June 2011 and the mobile operators have had the possibility to use other technologies than GSM since then. To date approximately 2150 sectors have been put into operation with UMTS900. This corresponds to approximately 1030 base stations. NPT has no detailed information on the number of base stations located within a distance of 700 meters from the railway line, but considering the cities in which these base stations are placed, this number must be considerable.

The NPT has so far not received any reports of harmful interference. Furthermore, no requests to take part as an arbitrator between an operator and Jernbaneverket have been received by the NPT. This indicates that the cooperation and coordination process is handled by the involved parties without major difficulties.

If the Commission wishes, Norway can provide an update at a later stage when further experience has been gained.