

## ***Internship proposal (6 months)***

### ***Impact of adjacent-channel interference from next-generation train radio system during the migration phase***

(référence LBR012019)

#### **Supervisor**

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#### **Overall context**

GSM-R, the radio communication system based on GSM and enhanced to support services required for train operation, has been adopted in most of the European countries on main railway lines. In order to fulfill railway operators' requirements evolving toward a larger use of the radio communication system with new applications, like closed-circuit television, and to overcome the upcoming GSM obsolescence, the design of a next-generation radio communication system for train-to-ground communications has started in Europe. In this context, Mitsubishi Electric R&D Centre Europe (MERCE) evaluates the system throughput of the 3GPP Long Term Evolution (LTE) mobile cellular system in a railway environment. MERCE also actively participates in the ETSI standardization activities on the next-generation radio communication system.

#### **Internship subject**

MERCE evaluates the system throughput of the 3GPP LTE mobile cellular system in a railway environment with realistic system-level evaluation taking into account typical railway deployment scenarios, including train density and speed, wayside base station deployment, propagation model and inter-cell interference. During the migration phase from the existing GSM-R system to the next-generation radio communication system, the two systems will coexist on adjacent bands and interfere with each other. The purpose of the internship is to evaluate the impact of the next-generation radio communication system on GSM-R performance through system level evaluation in migration scenarios identified by the railway community.

#### **Detailed objectives**

- Bibliographical survey on GSM-R, LTE and their application in railways
- Training on the existing LTE system level simulator
- Modelling of adjacent channel interference from a LTE system
- Design of a GSM-R link level simulator for building look-up tables for system-level evaluation
- System throughput evaluation of GSM-R with LTE adjacent channel interference and analysis
- Reporting

**Prerequisites**

- Digital Communications
- Matlab preferred
- English: Written and spoken

**Duration: 6 months****Period: From b/o 2019****Contact:** Magali BRANCHEREAU ([jobs@fr.mercede.mee.com](mailto:jobs@fr.mercede.mee.com))

Thank you to provide us an application letter and your CV mentioning the reference of the internship (both in Pdf versions).

The signature of an Internship Agreement with your school is mandatory.