

Appendix “F“**Rail Line Radio Systems****1 Basic and substitute rail line connection**

1.1 Radio equipment units¹⁾ on the railway infrastructure operated by SŽDC are used for basic or substitute rail line radio connection or emergency connection.

1.2 The basic rail line radio connection is intended for current voice communication between the locomotive driver and the station dispatcher²⁾ and among machine drivers as well as data communication between moving terminals and fixed radio equipment units (also unmanned) with defined quality³⁾ on rail lines equipped with relevant radio infrastructure.

1.3 Substitute rail line radio connection is intended for radio communication between the locomotive driver and the station dispatcher from overwhelming majority of points on the line within the area controlled by station dispatcher. Only defined types of radio units can be used for substitute radio connection. The grade of radio communication usable for substitute connection shall be specified by the IM for individual rail lines, considering efficient coverage of rail line sections with radio signal. Substitute rail line connection must not be used permanently instead of basic radio connection.

1.4 Emergency connection is intended for emergency voice communication between the locomotive driver and the station dispatcher of a relevant controlled area in case of failure or emergency operation of the locomotive, however, till the time of vehicle arrival to the destination station of the train at the latest. Emergency voice connection must not be used as a permanent replacement of basic or substitute radio connection. In case of using emergency connection, the maximum train speed is limited to 100 km/h.

1.5 The relevant document for the current system of basic and substitute rail line radio connection or emergency connection on individual rail lines equipped with relevant infrastructure shall be Table no. 01 TTP. A summary list is also being published on SŽDC website www.szdc.cz, link “Rádiové sítě” <http://www.szdc.cz/provozovani-drahy/radiove-site.html>.

1.6 Technical specifications of train-based radio equipment units as well as principles of their realisation on the railway infrastructure operated by SŽDC are provided in “*SŽDC Directive No 35 setting technical specifications for radio equipment units and principles of their preparation and implementation on the infrastructure owned by the state*”.

¹⁾ See Section 71 of Regulation No. 173/1995 Coll. (Rules of Railway Operation).

²⁾ Term “station dispatcher” has been used here as an aggregate designation of employees qualified for organization and control of railway traffic. Where unambiguous definitions are required, Specification SŽDC D1 has been used.

³⁾ For GSM-R specified in UIC EIRENE project, functionality requirement specification (FRS) version 7.3.0, March 2012, and system requirement specification (SRS) version 15.3.0, March 2012 (at the time of drawing up this Declaration), for TRS defined by UIC Recommendation no. 751-3.

2 Used rail line radio systems

2.1 Mobile radio network GSM-R

Operator	Mobile terminal network presentation
Správa železniční dopravní cesty, state organization	GSM-R CZ

2.1.1 The GSM-R system ensures radio connection, voice communication and data transmission between moving terminals (on-board radio stations - so-called cab radio, mobile phones etc.) and fixed stations by station equipment (dispatcher terminals, automated data radio installations, dispatcher terminals, workplaces of station dispatchers etc.) and connection with other electronic communication networks (railway service telephone network, public telephone or mobile phone networks etc.).

2.1.2 The GSM-R system works in the frequency band of 900 MHz and is based on the GSM public telephone networks' standard, enhanced according to the UIC project by other railway-specific functionalities included in the EIRENE technical documentation. The system is interoperable, being part of the control and safety subsystem, class A⁴).

2.1.3 The following documents can be found on SŽDC website www.szdc.cz, link "Radio networks":

- general operation and business conditions for non-public services of electronic communication provided within a closed SŽDC GSM mobile phone network, business terms and conditions for providing services and using the GSM-R system,
- way of ordering, issuing and verification of SIM cards activation and
- list of moving terminals approved for use of the device on railway infrastructure owned by the Czech Republic and for its operating within the GSM-R system.
- as well as other operational and organisational information.

2.1.4 Rail lines with installed the GSM-R system shall be identified by signals using information "Prepare GSM-R unit for registration"⁵) which are being installed as a rule, in the vicinity of entry warning signal of the operating control point equipped with GSM-R system, signals using information "Radio system start"⁶), which is installed at the point where GSM-R system should be registered in the system and also on the state border. At branching from lines equipped with the GSM-R system and not equipped with another radio system (systems TRS, ASCOM or SRV network, lines are being marked with signals using information "GSM-R radio system end"^{6a}

2.1.5 Anticipated GSM-R system building procedure is being published on SŽDC website www.szdc.cz, link "Rádiové síť" <http://www.szdc.cz/provozovani-drahy/radiove-site.html>.

⁴) Regulation no. 352/2004 Coll., On Operational and Technical Interconnectivity of European Railway System; Directive 2008/57/of the European Parliament and Council on the interoperability of the rail system within the Community and technical specification of interoperability of the "Control and Safety" subsystem as amended by Commission Decision 2006/679/ES and Decisions 2006/860/ES, 2007/153/ES, 2008/386/ES, 2010/79/ES a 2012/88/ES.

⁵) See art. 1233 of Internal SŽDC Regulation D1 „Transport and Signalling“.

⁶) See art. 1234 of Internal SŽDC Regulation D1 „Transport and Signalling“ and also Internal SŽDC (ČD) Regulation Z11 „Radio System Operation“ including related Amending provisions.

^{6a} See art. 1235 of Internal SŽDC Regulation D1 „Transport and Signalling“.

2.1.6 On some rail lines, connection of moving stations (equipped with GSM-R terminals) and fixed stations can be enabled by using so called national roaming in public GSM Network of the relevant GSM operator. In this event, adequate and reliable coverage of various operating points and rail lines with GSM signal cannot be guaranteed and specific GSM-R functionalities, particularly REC (*Railway Emergency Call*), *Group Call* and LDA (*Location Depending Addressing*) may not be available.

2.1.7 List of foreign operators of GSM-R systems which agreements on network connection and international roaming have been concluded with as of the day of this Network Statement publication:

Serial Number	Operator	Network Indication on the terminal		
1.	Deutsche Bahn AG, DB-Netz, Germany	GSM-R D	or	262-10
2.	Österreichische Bundesbahnen, Austria	GSM-R A		232-91
3.	ProRail, The Netherlands	GSM-R NL		204-21
4.	Železnice Slovenskej republiky, Slovakia*)	GSM-R SK		231-99
*) As of the day of publication				

A current list of roaming partners can be found on SŽDC website www.szdc.cz, link “Rádiové sítě” <http://www.szdc.cz/provozovani-drahy/radiove-site.html>.

2.1.8 The infrastructure part of the GSM-R CZ has an implemented national application “Function STIOP in the GSM-R system” according to SŽDC technical specifications No TS 3/2014-S, allowing the infrastructure servicing personnel to activate in a given area a remote stop of hauling vehicles with vehicle radio stations connected with the main valve of the running breaking system through a locomotive adapter and equipped with a SIM-card of the GSM-R CZ network. In case the vehicle radio station is registered in a GSM public mobile phone network of a GSM operator within the so-called “national roaming” (see 2.1.6), the “Function STIOP in the GSM-R system” cannot be used.

2.2 Rail line radio system (TRS)

2.2.1 The TRS system ensures radio connection, voice communication between the dispatcher, station dispatcher, machinery operator and eventually other employees of entities involved in railway transport organization and control with the locomotive driver and transfer of routine encoded information (commands, reports).

2.2.2 The system is in line with basic functions resulting from provisions in the recommendation UIC 751–3 and works within frequency band 450 MHz. The system is interoperable and constitutes a part of the control and safety subsystem, class B⁴).

2.2.3 On the rail line, all used TRS channel groups are identified using information “Switch over channel group⁷⁾”, the signal of which is installed at the point where the channel group will be changed by radio station operator or where switching over from GSM-R to TRS occurs. At branching from lines equipped with the GSM-R system and not equipped with another radio system (systems TRS, ASCOM or SRV network, lines are being marked with signals using information ”GSM-R radio system end”^{6a}

2.2.4 The following documents can be found on SŽDC website www.szdc.cz, link “Radio networks“:

- list of line sections with TRS system and
- list of locomotive radio stations approved for use in the TRS System on the railway infrastructure owned by the Czech Republic and operating in the TRS system. These radio stations, including documentation of their installation in existing railway vehicles are subject to the same approval procedure as in case of railway vehicle modification.

2.2.5 TRS vehicle radio station can also have functionality for communication in 150 MHz frequency range (for needs of radio connection in other rail line or local radio networks).

2.2.6 Where necessary (e.g. for implementation of remote-controlled interlocking plants), TRS system can be temporarily (before installation of GSM-R network) build on other lines as well. Relevant notification including the effective date will be published on the Infrastructure Operation Portal six months before.

2.3 ASCOM system

2.3.1 The ASCOM system is intended for radio connection, voice communication between the station dispatcher and machine driver of the hauling vehicle being within the range of the basic radio station, located in relevant railway station and communication between the machine driver and other employees involved in operating rail transport.

2.3.2 The ASCOM system works in simplex or semi-duplex mode, frequency range 450 MHz. The system is not interoperable and its further development has been discontinued. In next future, it should be replaced by GSM-R or TRS system.

2.3.3 ASCOM frequency channels are identified using information “Switch over channel group⁵⁾” on the railway line. At branching from lines equipped with the GSM-R system and not equipped with another radio system (systems TRS, ASCOM or SRV network, lines are being marked with signals using information ”GSM-R radio system end”

2.3.4 A list of rail lines where this system has been installed can be found on SŽDC website www.szdc.cz, link “Radio networks“.

2.4 Simplex connection, 150 MHz frequency range

2.4.1 Simplex connection system in rail line and local networks in 150 MHz range (so called SRV network) is intended for radio communication between the station dispatcher and machine driver of the hauling vehicle within the range of the basic radio station, installed in relevant operating control point and communication between the machine driver and other employees involved in operating rail transport. The system is not interoperable.

⁷⁾ See art. 1232 of Internal SŽDC Regulation D1 “Transport and Signalling”.

^{6a} See art. of Internal SŽDC Regulation D1 „Transport and Signalling”.

2.4.2 The system is intended for coverage of operating control points with radio signal, coverage of other rail line sections cannot be guaranteed.

2.4.3 The following radio stations are used in railway infrastructure:

- selective voice-frequency calling for train → station dispatcher direction and voice calls towards train, or
- voice calls of any station.

2.4.4 Simplex frequencies used on the rail operation control are identified by using information “Switch over channel group⁸”. At branching from lines equipped with the GSM-R system and not equipped with another radio system (systems TRS, ASCOM or SRV network, lines are being marked with signals using information ”GSM-R radio system end”

2.4.5 List of rail lines with this system used for railway traffic control can be found on SŽDC website www.szdc.cz, link “Radio networks“.

2.4.6 Simplex connection systems within 150 MHz frequency range that use 25 kHz channel span (band width for transmission) can only be operated up to 31 December 2014; those using 12,5 kHz channel span and operated on assigned frequencies can also be operated after this date without limitation. Further development of these systems for rail line radio connection is not anticipated, for railway transport control they are created only exceptionally in well-founded cases.

2.4.7 Local simplex radio connection networks within 150 MHz frequency range are also used in railway operation for control of specific technological processes (shunting control, wagon listing, wagon examiners, track repair and maintenance etc.). This connection has been referred to in this document for completeness sake; it will be used on as-necessary basis, either by the IM or individual RUs.

2.4.8 Radio installations within 150 MHz frequency range working with channel spacing 25 kHz cannot be used since 1 January 2017.

3 Conditions of access to the railway infrastructure

3.1 Hauling and control vehicles (hereinafter “hauling vehicles”) operating on a line equipped with railway radio infrastructure (GSM-R, TRS, ASCOM or SRV) must have terminals supporting basic radio connection for voice communication between the driver and persons involved in control and organisation of railway transport and transmission of relevant signals, commands, messages or data between the railway infrastructure and hauling vehicles (in both directions). These terminals must be fully compatible and able to co-operate with the infrastructure part of used train radio systems in all functionalities.

3.2 On lines where rail operation is organized and controlled pursuant to SŽDC Regulation D3 and where specific interlock plants (hereinafter: radio block⁸) have been installed, hauling vehicles must be equipped with terminals allowing normal communication and co-operation between the vehicle and radio block from the date of putting radio block in permanent operation.

3.3 Where mobile telephone (GMS-R) or a portable radio station (in the systems TRS and ASCOM or the SRV network) are temporarily installed as terminal units on the hauling vehicle, such terminal units must be connected to stationary outer antenna of the hauling

⁸ **A Radio block** is a technical installation enabling management and control of rail transport in an allocated area by form of authenticated permissions to a ride, transmitted to hauling and control vehicles by a radio network with data information transfer and a follow-up control of these vehicles’ running based on issued permissions.

vehicle, main power supply being provided from recharged on-board vehicle battery; the terminal must also have 8 W RF power output in GSM-R or 5 to 10 W in the systems TRS and ASCOM or the SRV network.

3.4 Any hauling vehicle with radio station not allowing basic radio connection on the relevant operated line (e.g. due to failure, repair of infrastructure, unavailability due to extraordinary transport situation, e.g. re-routing etc.) must have technology for substitute radio connection.

3.5 If basic radio connection cannot be established from the hauling vehicle, the driver shall inform the relevant dispatcher (indicated in Rules of Operation of the relevant radio connection network) about existing communication possibilities of the hauling vehicle before entering into the relevant controlled area (line section). The dispatcher shall be liable for defining a mode of communication for substitute radio connection and communication of this mode to relevant persons involved in railway transport control and organisation. In the course of substitute radio connection, dispatchers, station dispatchers and hauling vehicle drivers shall also use calling marks assigned to relevant substitute radio connection.

3.6 If any hauling vehicle does not comply with conditions for substitute radio connection, it must not be dispatched to the area (line section) with train radio connection infrastructure.

3.7 In time of operation in “train” transport mode, special hauling vehicles shall use basic radio connection compatible with the relevant line for communication with the station dispatcher. If a special hauling vehicle design does not allow building in a vehicle part of relevant radio communication devices, substitute radio connection can be used for communication with the station dispatcher, subject to prior consent of the relevant dispatcher (see art. 3.5).

3.8 Provisions in art. 3.1 shall not apply to radio connection installed in historic locomotives and historic special hauling vehicles used for extraordinary historic/ nostalgic journeys at celebrations, anniversaries and/or railway promotion events as well as moving trains to/from these events or moving these locomotives to/from repair shops or depot workshops, however, these vehicles/trains must always have at least emergency connection for communication between the station dispatcher and driver and/or train crew. The mode of communication and/or calling numbers must always be indicated in specific application for railway capacity allocation issued by the relevant RU or in a relevant system application of the IM for these journeys and access to these applications must be provided for operation control and railway transport organization employees.

3.9 Contrary to Art. 3.1, the implementation of the “Function STOP in the GSM-R system” according to Art. 2.1.8 on hauling vehicles is not a condition for access to the infrastructure operated by SŽDC; its use is regulated by local Operation rules.

4 Consent for product use on the railway infrastructure operated by SŽDC

4.1 Use of radio terminals in trains on the railway infrastructure owned by the state must be approved by SŽDC.

4.2 The approval procedure is described in SŽDC Directive No 34 for putting into operation products being part of communication and safety systems and electro technical and power engineering systems on the railway infrastructure owned by the state as published on the Infrastructure Operation Portal.

4.3 The requirement for approval for use pursuant to paragraph 1 of this article does not concern GSM-R station mobile terminals if they have been duly put into operation in accordance with valid legislation in force.

5 Final provisions

5.1 The final date for operating original rail line radio connection on lines not equipped with any infrastructure parts of train radio installations or on lines where installed infrastructure will be modified as of the effective date of this Network Statement will be announced on the Infrastructure Operation Portal six months in advance.

5.2 On lines where existing train radio equipment is being replaced by a new GSM-R digital radio system both systems will be operated concurrently where it is technically possible for a period of two months since the date of putting the GSM-R system into operation at maximum. In such a case, the obligation given by Art.3.1 applies accordingly, i.e. hauling vehicles must be equipped for a transition period with a vehicle terminal fully compatible at least with one of the systems being in use.

5.3 On border lines with the GSM-R built on SŽDC side and no such system has been established on the foreign side yet, hauling and control vehicles registered abroad can be equipped for communication on SŽDC network differently from the provision of Art. 3.1 only with a mobile GSM-R that does not comply with conditions as set by Art. 3.3. The above-mentioned difference applies only for rides between the state border and the first station on SŽDC network. Operational and organizational issues will be regulated by GSM-Operational regulations or the Health and Transport Documentation of the respective operating points.