2 Ernerst Oppenheimer Avenue • Waterview Corner • Bruma • 2198• PO Box 655• Bruma• 2026 • South Africa
Telephone : +27 11 417 0000 • Facsmile: +23 11 417 0010

Ref: RSRR/-17/09/12-ASS/1/6/5-1/2-406

25 September 2012

Mr. Manyaapelo Richard Makgotlho

The Independent Communications Authority of South Africa

Private Bag XI0002

Sandton

2146

Dear Mr. Makgotlho,

RAILWAY SAFETY REGULATOR (RSR): WRITTEN REPRESENTATION: DRAFT FREQUENCY MIGRATION REGULATION AND FREQUENCY MIGRATION PLAN

Pursuant to the notice issued by the Independent Communications Authority of South Africa inviting comments regarding the Draft Frequency Migration Regulation and Frequency Migration Plan, the RSR hereby submits the attached written representation.

The RSR further requests an opportunity to make an oral representation regarding the plan as stipulated by the issued notice.

It will be appreciated if the confirmation for the oral representation could be provided in writing.

I trust that the attached representation will be received in order.

Regards

NKULULEKO POYA
CHIEF EXECUTIVE OFFICER
RAILWAY SAFETY REGULATOR

REPRESENATION TO DRAFT RADIO FREQUENCY SPECTRUM ALLOCATION

1. INTRODUCTION

The Independent Communications Authority of South Africa has published a draft plan for the re-allocation of frequency spectrum in South Africa. In this draft plan it is proposed that the rail operators, Transnet and the Passenger Rail Agency of South Africa (PRASA), vacate the 450-460 MHZ UHF frequency band that they are currently using for mission critical communication services, to an undefined destination frequency band. No timescale for this migration is proposed.

2. BACKGROUND

Historically the rail operators in South Africa always had a band of frequencies allocated to them for train control and operational use. This block of frequencies is unique to the rail operators, owned and operated by them with no third party users allowed in this band. This is in common with international practice, and this was put into practice in 1933 after the Leisk Commission confirmed the need for unique and dedicated telecommunication services for safe rail operations. This principle has been carried forward in successive cycles of legislation, pertaining to South Africa's major rail Network Operators viz Transnet and PRASA

Train control used to have a dedicated band allocated to them between 160-172MHZ. This band was in place up until the late 80's, subsequently the operator had to vacate the band. For operational purposes the rail operators had a block of frequencies in the 147-153 MHZ band, in the late 70's this band was moved to the 138-143 MHZ band. Included in this band were 100 simplex frequencies, with 25 KHZ channel spacing, used exclusively for shunting purposes. When the channel spacing was halved to 12,5 KHZ, all the "new" frequencies in this block were allocated to the rail operators.

This process had barely been completed when SABRE1 was implemented. Under SABRE1 (South African Band Re-planning Exercise part 1) the rail operators had to vacate their VHF block of frequencies, and were temporarily accommodated in the 450-470 MHZ band for train control, while the 450-460 MHZ band was cleared of users for the rail operator. The rail operators then migrated to the 450-460 MHZ incurring huge costs in doing so. In this band they now have 132 duplex frequencies. This block of frequencies is divided up for trunked radio channels (which have been used to create a national trunked radio network for train control consisting of 500 base stations and associated infrastructure), simplex shunt frequencies, radio train order channels, Overhead High Tension

Equipment (OHTE) telemetric switching, track wayside measuring and detecting equipment, and radio distributed power devices, within the borders of South Africa. End of train devices still operate in the 142 MHZ band, and there is a simplex VHF frequency in the 142 MHZ band for the exclusive use of the Blue Train and TFR technology management test trains that operates from time to time.

3. INTERNATIONAL PRACTICE

3.1 NORTHERN EUROPE

In Northern Europe, the geographical area that covers Germany, Italy, and France is densely populated and is mostly covered with metro like train operations, the train communications system used is the mandated EUROPEAN RAIL TRAFFIC MANAGEMENT SYSTEM (ERTMS) of which GSM-R is a sub system. This system is viable in high density areas and has over 4000 radio high sites installed, and guarantees safe train communication up to 500 kph. This system is being implemented to replace over 35 incompatible radio systems that is in use by the various rail operators in Europe. GSM-R in Europe operates in the 876-880 MHZ band for the data uplink, and 921-925 MHZ for the data downlink. However, there is a concern that when the Long Term Evolution - 4G (LTE) allocated bandwidth adjacent to Global Systems Mobile – Railway (GSM-R) is implemented in Europe, it will interfere with GSM-R. In the UK, over 14500km of GSM-R enabled railway is planned.

3.2 CHINA

In China GSM-R occupies 4 MHZ of bandwidth between 921-925 MHZ, the identical spectrum that has been set aside in South Africa for GSM-R. This equates to twenty channels with 200 KHZ channel spacing.

3.3 AUSTRALIA

In Australia the rail operators utilises the 403-420 MHZ UHF band for train control and operations, with a 450.05 MHZ emergency channel. This frequency band ensures 100% coverage in difficult terrain, and at the worst 95% coverage in all other terrain. In the densely populated urban areas of Australia the rail operators are investigating migrating to the 1800 MHZ GSM-R band, or they are in the process of implementing the move. In the rural areas that largely resemble the rural areas of South Africa, The Australian rail operators are lobbying their government to maintain the status quo.

3.4 NORTHERN AMERICA

In North America, inclusive of the geographical areas of the United States and Canada, a block of 97 VHF frequencies in the 160 MHZ band has been historically allocated to the Association of American Railroads (AAR) Very few railroads are allocated frequencies outside this band. End of train devices utilises a channel at 452.9375 MHZ. In 2008 the US Congress adopted a bill that will make it mandatory for all rail operators to install Positive train Control (PTC) in their trains. This is the American version of Automatic Train Control (ATC). For commercial reasons, and the availability of data radios, the operators have decided to migrate to the 220 MHZ frequency band, without the Federal Communications Commission (FCC) mandating it. The industry must use its own resources for the migration. There is concern however that the deadline for PTC installation by 2015 will not be met. There is a lobby underway for granting an extension of several years. The cost of the PTC system will be huge, estimated to be around $10 Billion, which may turn out to be unaffordable, and a major constraint to new rail operators wishing to establish themselves in the industry.

4. SOUTH AFRICAN PRACTICE

4.1 TRANSNET FREIGHT RAIL

Transnet operates trains in three spheres of business:

- Heavy haul ore lines
- Low density general freight lines in rural areas
- Rail services in the various South African ports

The heavy haul lines and the port service generally have heavy train traffic associated with them, and the rural branch lines and general freight corridors very low traffic volumes.

The low volume lines and the branch lines are mostly controlled with a Radio Train Order (RTO) system, and the busier general freight corridors would be controlled with the UHF national analogue trunked radio system mentioned in paragraph 2. Some use is also made of a dedicated GSM-like application contracted from MTN where this is viable

4.2 PASSENGER RAIL AGENCY OF SOUTH AFRICA

PRASA do not have backbone radio infrastructure. They have their own peripheral radio equipment that operates on the Transnet owned radio infrastructure. In the rural areas they operate on the RTO network, and in the various urban areas they operate on the Transnet trunked radio system. The railway lines in the urban areas generally have heavy rail traffic associated with them. Investigations are underway to determine whether GSM-R could be used in the short range high density commuter service areas, but this will not be viable over long distance routes

5. CONCLUSION

In terms of an analysis conducted in the rail industry, and confirmed by the RSR, theft and vandalism of safety critical assets such as signalling and communication copper cables, and equipment along the rail reserve have reached epidemic proportions, causing paralysis of the rail network that results in unsafe train operations and huge delays of the train services. This resulted in more and more mission critical services migrating to wireless technology. This is true for all the major rail operators and most of the smaller ones .There are a total of 350 licenced rail operators in South Africa at the moment which require some form of train authorisation and control varying from simple stand alone systems to large and complex networks . Irrespecive of size the fundamental need to for unique, dedicated, and interefeence free communication apply. Globally emerging train control technologies such as Automatic Train Protection, Advanced Train Control, Automatic Vehicle Identification, and overarching Positive Train Control, are all radio enabled technologies that rely on non-shared radio frequency spectrum for safe railway operations.

In the RSR's view the proposed new frequency spectrum allocation must make provision for effective dedicated non-shared radio frequency band allocations that will allow for safe and reliable train communications in the urban and rural areas of South Africa. In the urban areas of South Africa where commuter train services are in operation, the radio frequency plan must provide a non-shared radio frequency spectrum dedicated to safe railway operations that will be able to accommodate ATP or a similar technology for future implementation.

In the rural areas of South Africa, the frequency plan must provide a non-shared affordable radio frequency spectrum in the UHF band dedicated to safe railway operations that cater for railway lines with low density traffic. On these lines the status quo must either be maintained with the current radio frequency spectrum, or the destination radio frequency spectrum must be such that it allows for an affordable alternative to be adopted and implemented.