



Railways Gets 5 MHz Spectrum

Why in News

Recently, the Union Cabinet approved the allotment of **5 MHz spectrum in the 700 MHz frequency band** to the Indian Railways for **improving its communication and signalling systems**.

- Railways has also approved a indigenously developed **Train Collision Avoidance System (TCAS)**.

Key Points

▪ About:

- The **project, targeted to be completed in five years**, is estimated to **cost over Rs. 25,000 crore**.
- The **spectrum charges** will be levied based on formula as prescribed by Department of Telecommunications for Royalty Charges and License Fee for captive use as recommended by the [Telecom Regulatory Authority of India \(TRAI\)](#).
- With this spectrum, the **railways will introduce Long-Term Evolution (LTE)-based Mobile Train Radio Communication (MTRC)** on its routes.
 - The Railways **currently relies on optical fibre** for its communication network but with the allocation of fresh spectrum, it **will be able to use high-speed radio on a real-time basis**.
 - **LTE** is a **fourth-generation (4G) wireless standard** that provides increased network capacity and speed for cellphones and other cellular devices compared with third-generation (3G) technology.

▪ Benefits:

- **Seamless Connection:**
 - It will be used for modern signalling and train protection systems and ensure seamless communication between loco pilots and guards.
 - The purpose of the LTE for Indian Railways is to **provide secure and reliable voice**, video and data communication services for operational, safety and security applications.
- **Reduced Accidents & Delays:**
 - It will help **prevent train accidents and reduce delays** by enabling real-time interaction between the Loco Pilot, Station Master and the Control Centre.
- **Internet of Things:**
 - This will also enable the railways to undertake **Internet of Things (IoT)** based remote asset monitoring, particularly of coaches, wagons and locos, and monitor live video feed of **CCTV** cameras in the coaches to ensure efficient, safer and faster train operations.

- **IoT** is a **computing concept that describes the idea of everyday physical objects being connected to the internet** and being able to identify themselves to other devices.

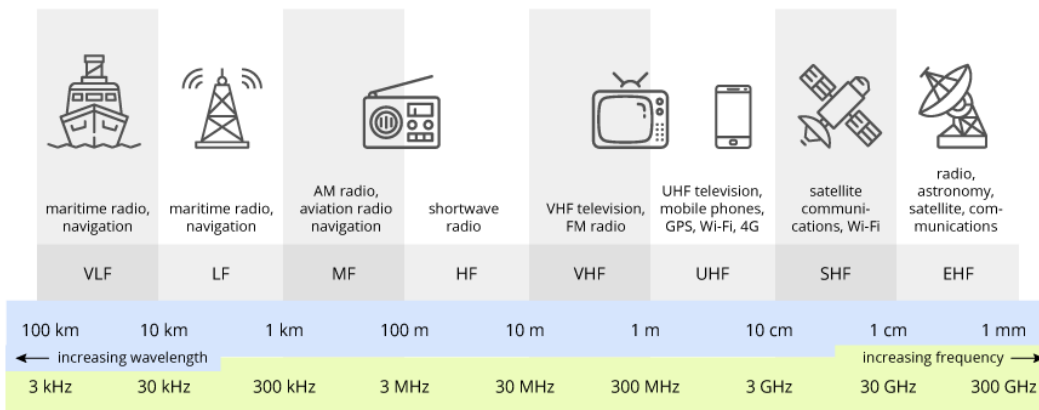
- **Train Collision Avoidance System (TCAS).**

- It is a microprocessor based control system, which **continuously monitors the speed, direction of travel, distance travelled**, aspect of the signal passed and alertness of the motorman and thus increases the safety of the railway system.
- It will help in **improving the safety and increasing the line capacity to accommodate more trains using the existing infrastructure**. The modern rail network will result in **reduced transportation cost and higher efficiency**.

Radio Spectrum

- The radio spectrum (also known as Radio Frequency or RF) is a part of the **electromagnetic spectrum**, electromagnetic waves in this frequency range are called radio frequency bands or simply '**radio waves**'.
- **Radio waves** have the longest wavelengths in the electromagnetic spectrum. These were discovered by Heinrich Hertz in the late 1880s.
- RF bands spread in the range between **30 kHz and 300 GHz** (alternative point of view offers coverage 3 KHz - 300 GHz).

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- To prevent interference between different users, the **generation and transmission of radio frequency bands is strictly regulated by national laws**, coordinated by an international body, the [International Telecommunication Union \(ITU\)](https://www.itu.int/).

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