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FURTHER UPDATES TO WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW APT REPORT ON EMERGING CRITICAL APPLICATIONS OF IMT FOR INDUSTRIAL, SOCIETAL AND ENTERPRISE USERS

Background

At the 26th meeting of AWG, work was started on the drafting of a new APT Report on Emerging Critical Applications of IMT for Industrial, Societal and Enterprise Users and a draft outline of a working document to facilitate the APT members contributions to the next AWG meeting on this work item was developed in Document AWG/TMP-10.

Discussions

Over the years, analogue two-way radios have evolved to digital radio trunking technologies, such as P25 (Project 25) and TETRA. These technologies can provide digital voice quality, end-to-end encryption and other advanced features. However, due to bandwidth limitations, these two way radio networks are unable to support high speed mobile broadband and video applications that are vital for today's public safety, military, utilities, transportation, oil and gas, mining and other segments of the critical communications users.

The 3GPP-defined LTE and 5G NR standards have emerged as the leading candidates to fill this void. In the recent past, 3GPP based networks have been deployed to deliver critical broadband capabilities such as group communications, real-time mobile video, wirelessly connected robotics, and automation in industrial environments, etc. These networks range from nationwide public safety broadband platforms such as the United States' FirstNet (First Responder Network), South Korea's Safe-Net (National Disaster Safety Communications Network) and Britain's ESN (Emergency Services Network) to localized 5G/LTE networks covering utility companies and industries such as airports, marine ports, oil and gas production facilities, mining sites, factories and warehouses, etc.

Proposal

This contribution proposes further updates to the working document contained in AWG/TMP-10 in the attachment.

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WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW APT REPORT ON EMERGING CRITICAL APPLICATIONS OF IMT FOR INDUSTRIAL, SOCIETAL AND ENTERPRISE USERS

1. Scope

Development of a new APT Report on new/emerging critical applications of IMT-Advanced and IMT-2020 for industrial, societal and enterprise users.

2. Introduction

Post Covid-19, Many APT countries are working to restart their Industrial and Enterprises expeditiously. The Integration of Information technology (IT) to build an automated, agile and intelligence driven manufacturing and services Industry will require high speed mobile Connectivity. Today's industries, society and enterprises generate and use a huge amount of data in real time, which is moved and consumed at enormous rates so as to harness the advantages of digital technologies. Until now, connectivity has remained a critical barrier to realizing the full potential of what is collectively known as Industry 4.0.

A new generation of private 5G networks is emerging to address critical wireless communication requirements in public safety, operations of industries and critical infrastructure. These private networks are physical or virtual cellular systems that have been deployed for private use by a government, company or group of companies. Today's industrial automation is powered by ICT technology and this trend will increase manifold with advent of new IMT technologies such as 3GPP NR, leading to increased business efficiencies, improved safety and enhanced market agility. Industry 4.0 enables industries to fuse physical with digital processes by connecting all sensors, machines and workers in the most flexible way available. Tethering them to a wired network infrastructure is expensive and, ultimately, it will limit the possible applications of Industry 4.0. Industrial grade private wireless will unleash its real potential by providing the most flexible and cost-effective way to implement a wide range of Industry 4.0 applications. Current IT based automation solutions are well adapted for day-to-day business communications but are limited in reliability, security, predictable performance, multiuser capacity and mobility, all features which are required for operational applications that are business or mission critical. Similarly, applications in mines, port terminals or airports require large coverage area, low latency and challenging environments, which so far only two-way mission critical radios could meet. In both mining and port terminals, remotely operated, autonomous vehicles, such as trucks, cranes and straddle carriers are used requiring highly reliable mission critical mobile communications. Efficiencies of these type of users can be enhanced substantially by supplementing the mission critical voice communications with high-quality video and data support that is likely to become available from Releases 17/18 onwards in 3GPP IMT-2020

The emergence of ultrafast 5G technology in higher frequency bands provides manufacturers with this much needed reliable connectivity solutions, enabling critical communications for wireless control of machines and manufacturing robots, and this will unlock the full potential of Industry 4.0. Taking manufacturing, with thousands of factories with more than 100 employees, as an example, typical business cases revolve around controlling the production process, improving material management, improving safety, and introducing new tools. Research has shown that manufacturers can expect to see a tenfold increase in their returns on investment (ROIs) with 5G, while warehouse owners can expect a staggering fourteenfold increase in ROI. Fortunately, 5G is available in configurations perfectly suited to building industrial-strength private wireless networks to support Industry 4.0. They bring the best features of wireless and cable connectivity and have proven their capabilities both in large consumer mobile networks area as well as in many industrial segments. The time is ripe for many industries to leverage private and captive 5G to increase efficiencies and automation.

Apart from manufacturing, many other industries are also looking at 5G as the backbone for their equivalent of the Fourth Industrial Revolution. The opportunity to address industrial connectivity needs of a range of industries, including diverse segments with diverse needs, such as those in the mining, port, energy and utilities, automotive and transport, public safety, media and entertainment, healthcare, and education industries, among others.

Some recent trial of IMT in port operations demonstrated the "New Radio" capabilities such as ultra-reliable low-latency communication (URLLC), enhanced mobile broadband (eMBB) and network slicing with the use of 5G to support traffic light control, AR/VR headsets and IoT sensors mounted on mobile barges and provides countless possibilities to improve efficiency and sustainability in seaports and other complex and changing industrial environments. Similarly, in mining exploration sites, the drilling productivity could be substantially increased through automation of its drills alone. Additional savings from increased usage of equipment could also lead to lower capital expenditures for mines (CapEx) as well as a better safety and working environments for their personnel.

3. **Acronyms**
4. **Required capabilities of IMT for critical applications.**
5. **Use cases/applications**

5.1 Manufacturing

Even the most advanced factories of today still largely depend on inexpensive unlicensed wireless networks that have several drawbacks, such as interference in dense settings and complex fixed connections that are difficult to manage in large industrial settings. While the unlicensed spectrum is freely available, it is severally limited in quality of service (QoS) and support for mobility. In smart manufacturing, such networks cannot support the mobile requirements of automated guided vehicles (AGVs) or the even some of the faster moving arms of robots. It also does not support low power requirements of sensors and other IoT devices. Further, it cannot support the high density of sensors, devices, robots, workers and vehicles that are operating in a typical manufacturing plant.

Taking manufacturing, with thousands of factories with more than 100 employees, as an example, typical business cases revolve around controlling the production process, improving material management, improving safety, and introducing new tools. Research has shown that manufacturers can expect to see a tenfold increase in their returns on investment (ROIs) with IMT-2020, while warehouse owners can expect a staggering fourteenfold increase in ROI. Fortunately, IMT-2020 is available in configurations perfectly suited to building industrial-strength private wireless networks to support Industry 4.0. They bring the best features of wireless and cable connectivity and have proven their capabilities both in large consumer mobile networks area as well as in many industrial segments. The time is ripe for many industries to leverage private and captive IMT-2020 to increase efficiencies and automation.

5.2 Transportation/ Logistics

5.3 Construction

5.4 Healthcare

5.5 Mines

5.6 Oil Refineries

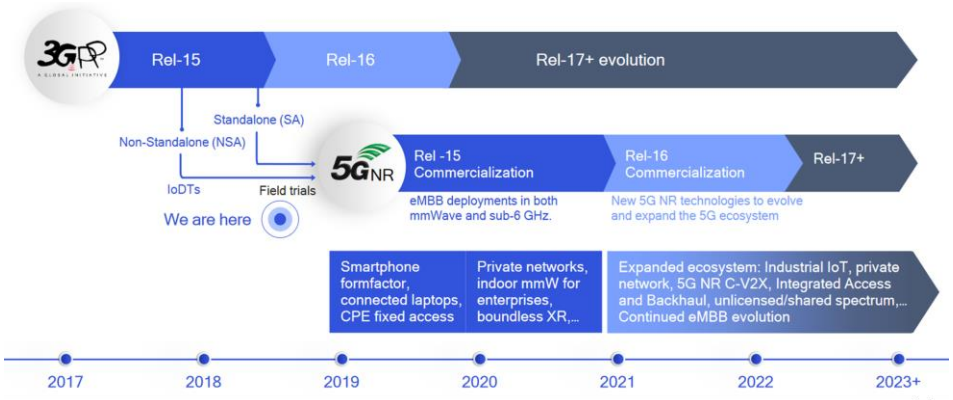
5.7 Container Ports

5.8 Enterprises

5.9 Utilities

5.10 Retail

6. Roadmap and Ecosystem



7. Examples of use IMT for Critical applications in APT countries (Attach annexes of examples from APT countries)

8. Regulatory and Security Aspects.

9. Spectrum Aspects

10. Summary