

SGS Explores the Power of RedCap: Bridging the Gap Between Performance and Efficiency in 5G

EAST SUSSEX, UNITED KINGDOM, January 21, 2025 /EINPresswire.com/ -- Ben Kuo, Global Mobile Communication Head at SGS, the world's leading testing, inspection and certification company, takes a close look at 5G RedCap – reduced capacity – and highlights the need for robust compliance testing to ensure performance and interoperability.

We are becoming ever more reliant on technology. From self-driving automobiles to fitness trackers and smart televisions, connectivity is vital to our everyday lives. As the name suggests, 5G is the fifth generation of the cellular network. It is a global wireless standard that, unlike previous generations, can operate on low-, mid- and high-band frequencies. This capability means it can deliver faster connections – up to ten gigabits per second (Gbps) to smartphones. It also means devices can be automatically updated to ensure optimized performance.

However, the ability to download a 4K movie to a smart device in seconds comes with costs – both financial and in terms of battery drain. While consumers may be willing to accept these limitations in devices that deliver a visible, enhanced experience, the same is not true of more everyday devices, such as fitness trackers, smartwatches, health monitors and traffic sensors.

These devices, and the consumers who use them, would all benefit from connection to the 5G network, especially as governments and mobile networks begin to phase out earlier cellular



RedCap is bridging the gap between performance and efficiency in 5G

networks. As communication service providers transition from 4G to 5G, 5G RedCap is emerging as the preferred platform for future-proofing new IoT designs.

Introduced as part of the Third-Generation Partnership Project (3GPP) 5G NR (New Radio) Release 17 (Rel-17), RedCap caters to devices like fitness trackers and smartwatches that benefit from the faster speeds of 5G without incurring the negatives of higher costs and poor battery life. Instead of needing frequent charging every few days, these devices could last weeks before needing a recharge. This efficiency is achieved by operating in a narrower bandwidth, thereby consuming less power. Such performance is sufficient for devices that require lower data rates and do not need the 'full power' of 5G.



Ben Kuo, Global Mobile Communication Head, SGS

An additional benefit of RedCap is that the devices it supports are simpler, with fewer transmitting and receiving antennae. This not only reduces production costs but also results in devices being more affordable, compact and less complex.

Types of device

RedCap NR offers diverse use cases that expand the functionality of 5G networks while optimizing for specific requirements:

- Video surveillance – these applications typically require a video bitrate of 2–4 Mbps
- Wearables – devices such as smartwatches and fitness trackers need a bitrate of 5-50 Mbps in download and 2 to 5 Mbps in upload
- Industrial wireless sensors – these sensors often operate effectively with a reference bitrate of less than 2 Mbps

For wearables, this efficiency can extend battery life to last up to 1-2 weeks. In the case of industrial wireless sensors, battery life could reach several years, making them ideal for long-term deployments in demanding environments.

RedCap user equipment (UE) operates across two frequency ranges:

- Frequency range 1 (FR1) – 410 MHz to 7125 MHz
- Frequency range 2 (FR2) – 24250 MHz – 52600 MHz and 71000 MHz

The maximum bandwidth for RedCap UE is 20 MHz in FR1 and 100 MHz in FR2.[i] This contrasts with baseline NR devices, which must support 100 MHz in FR1 and 200 MHz in FR2. By operating within these narrower bandwidths, RedCap devices provide a streamlined alternative to full-power 5G equipment, reducing size, cost and power requirements without compromising essential performance.

Compliance Testing

As with all cellular equipment, RedCap devices must undergo rigorous testing to ensure compliance with safety and performance requirements. Both the Global Certification Forum (GCF) and PTCRB have added support for 5G RedCap to their certification programs. These programs combine conformance testing and interoperability testing, conducted in approved laboratories, with field trials on commercial networks. This process verifies the quality of interoperability, ensuring that RedCap UE operates correctly on different networks, vendor infrastructures, etc.

Wireless technology developers and manufacturers should be encouraged to seek support from recognized GCF/PTCRB test organizations with capability to support the following regulatory areas:

- Radio frequency (RF) transmitter and receiver – verifying signal transmission and reception
- Protocol – ensuring adherence to communication standards
- Radio resource management (RRM) – optimizing network resources
- Demodulation (Demod) – evaluating minimum performance requirements for both conducted and radiated signals
- UICC testing – standardized execution of USIM and USAT operations

SGS is a recognized GCF/PTCRB test organization, offering cutting-edge testing capabilities in Asia and North America. Backed by a global network of state-of-the-art testing facilities, SGS ensures compliance with regulatory requirements, enabling seamless global market access – no matter where equipment is used in the world.

[\[i\] A Glimpse into RedCap NR devices](#)

About SGS

SGS is the world's leading testing, inspection and certification company. We operate a network of over 2,700 laboratories and business facilities across 119 countries, supported by a team of 99,250 dedicated professionals. With over 145 years of service excellence, we combine the precision and accuracy that define Swiss companies to help organizations achieve the highest standards of quality, safety and compliance.

Our brand promise – when you need to be sure – underscores our commitment to trust, integrity and sustainability, enabling businesses to thrive with confidence. We proudly deliver our expert services through the SGS name and trusted specialized brands, including Brightsight,

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