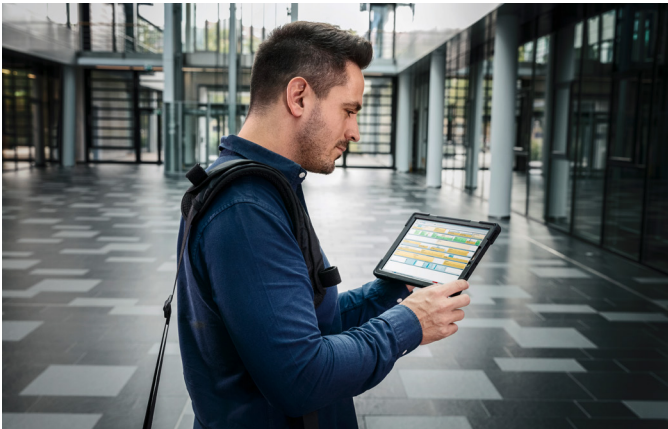


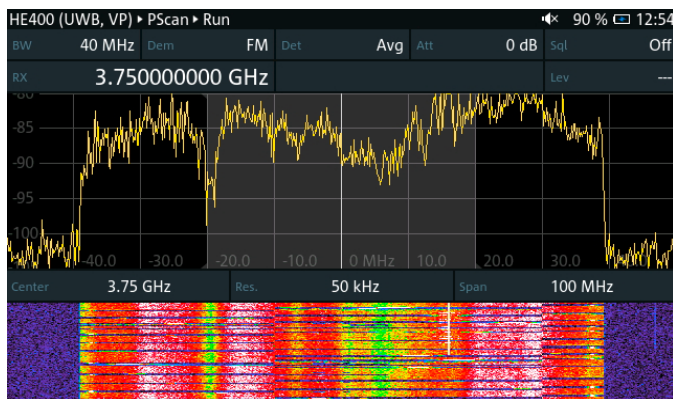
INTERFERENCE HUNTING FOR CRITICAL INFRASTRUCTURE

Gated mode measurements in private 5G networks



Your task

At critical infrastructure sites, reliable availability of the required frequency spectrum is paramount. Any radiocommunications failure can pose a major safety risk, which is why fast and effective detection, analysis and location of interfering emissions at critical infrastructure sites is crucial. In the private 5G networks used at many critical infrastructure locations, interference hunting can be extremely challenging. Rohde&Schwarz spectrum monitoring systems protect these facilities.



100 MHz spectrum and waterfall display of 5G signals with a temporary interferer at 3.75 GHz

In time division duplex (TDD) networks, the downlink (DL) and uplink (UL) use the same frequency band in different timeslots. Private TDD networks do not follow standardization requirements for synchronization signal block (SSB) and can be configured to specific needs. Because they are public networks, they tend to have more uplink traffic. When viewing such TDD signals on a conventional spectrum display, it is impossible to differentiate between uplink and downlink or distinguish any other unwanted signals present in the same spectrum. In public networks, the standardized UL timeslot can be used for gated measurements and interference hunting, as described in the application card "Interference hunting in TDD networks" (PD 3608.3632.92). This is not suitable for private 5G TDD networks, however, which makes interference hunting in private 5G TDD networks nearly impossible without manually shutting down the network.

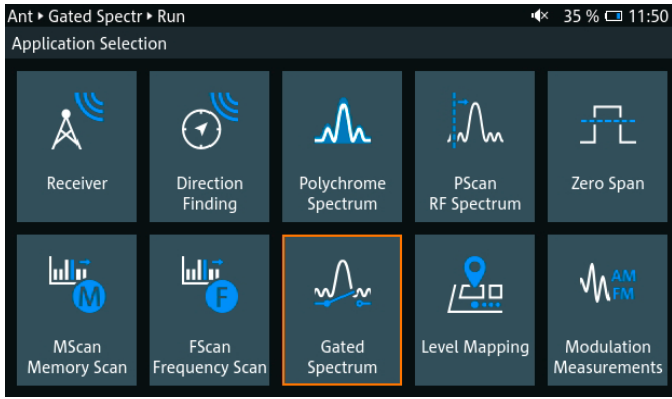
Rohde & Schwarz solution

The R&S®PR200 portable monitoring receiver offers gated spectrum operation. Other well-known applications like homing can be used in combination with the gated spectrum. In the gated spectrum, the receiver can be triggered to display spectrum only during a specified timeslot – e.g. the 70 μ s guard interval between UL and DL in 5G TDD. This makes it easier to see interferers occupying the same frequency as the desired signal, enabling interference hunting in private networks.

Activating gated spectrum on the R&S®PR200

The gated spectrum function requires the R&S®CS-ZS time domain measurement option in the R&S®PR200. This function can be selected in the app menu and enables the user to set the recurring gate period, as well as the length and position of the gate. Via the app configurations, the persistent gated mode can be activated to conduct measurements in other functions on the R&S®PR200, such as level mapping (R&S®CS-MAP option) or panorama scan (R&S®CS-PS option).

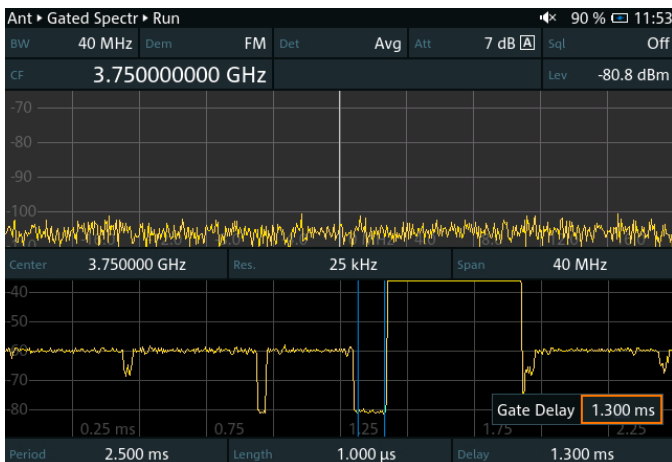




Gated spectrum can be activated from the app menu

How to take advantage of the guard interval

1. Identify the bandwidth of the private network frequencies using the panorama scan (PScan) app with its scan speed
2. Start the gated spectrum app to display the time domain of the frequency range of interest. Use the trace mode (max. hold) with the highest possible periodic period (for 5G, 40 ms) to identify the period of a guard interval (swipe the 40 MHz real-time bandwidth if necessary)
3. Set the gate period either to one radio frame (10 ms) or a periodic portion of the frame (e.g. 2.5 ms). Shorten the gate length and position the gate delay to fit into the guard interval
4. Activate the persistent gate mode in the app configurations to operate other R&S®PR200 apps in the gated mode
5. Use the PScan app to search the whole frequency range of the 5G TDD (e.g. 200 MHz) network for an interferer



Gate period within the guard interval, allowing the persistent gate mode to operate other R&S®PR200 apps

Advantages of gated mode measurements using the R&S®PR200

- ▶ Split screen displaying the signal spectrum and time domain display simultaneously
- ▶ Effective identification of the systematic timeslots in the time domain as the guard interval between UL and DL in private 5G TDD networks
- ▶ Gate length can be set to 5 μ s and the gate can be positioned as desired in relation to the timeslot
- ▶ Extend the defined gated timeslot to other well established R&S®PR200 measurement function apps, such as level mapping or panorama scan in a bandwidth suitable to scan 200 MHz, as is necessary for 5G



Typical configuration for interference hunting consisting of the R&S®PR200 portable monitoring receiver and the R&S®HE400UWB antenna module



Interference hunting with the R&S®HE400UWB antenna module

Ordering information

Designation	Type	Order No.
Portable monitoring receiver, 8 kHz to 8 GHz	R&S®PR200	4500.5002.02
Software options		
Time domain measurement	R&S®CS-ZS	4500.7111.02
Panorama scan	R&S®CS-PS	4500.7070.02

Rohde & Schwarz GmbH & Co. KG
www.rohde-schwarz.com

Rohde & Schwarz training
www.training.rohde-schwarz.com
Rohde & Schwarz customer support
www.rohde-schwarz.com/support

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG
Trade names are trademarks of the owners
PD 5216.4062.92 | Version 01.00 | April 2024 (sk)
Interference hunting for critical infrastructure
Data without tolerance limits is not binding | Subject to change
© 2024 Rohde & Schwarz GmbH & Co. KG | 81671 Munich, Germany

