



INTERFERENCE HUNTING IN TDD NETWORKS

Rohde & Schwarz portable receivers and direction finders



For more information:

https://www.rohde-schwarz.com/IH-TDD_56279-661441

Your benefit	Features
Better visualization of persistent interferers on the spectrum and waterfall display	Trace minimum hold function makes use of negative FFT detector to measure and display the signal trace. The measurement time setting, which is equivalent to the time constant of the detector, allows the detector to adapt to the interferer with different signal duration.
Simultaneous monitoring of entire spectrum that includes TDD signals as well as interferers	The polychrome display allows the user to visualize both UL and DL signals as well as any unwanted transmission in the same spectrum. The user is able to perform interference hunting while remaining aware of the entire signal environment.
Simultaneous display and monitoring of the signal behavior (i.e. uplink or downlink), including the interferer over a particular time interval and ease of adjustments	The gated spectrum enables the time structure to be visualized. In the case of the TDD-based system, the gate (by means of 2 markers) can be configured on either the uplink or downlink timeslots to reveal the interfere that might have otherwise been masked. Additionally, the parallel display of the spectrum and magnitude combination offers the advantage that minimal disruption during monitoring or interference hunting. In event a drift in timing synchronization is experienced over time, which can be easily seen on the magnitude display, the user can simply re-adjust the gate via the rotary knob to position it back onto the selected time slot.

Challenge

- ▶ In time division duplex (TDD) networks such as TDD-LTE and 5G NR, the downlink (DL) and uplink (UL) use the same frequency band, meaning a single frequency band is divided into timeslots used by both DL and UL signals. When viewing such TDD signals on a conventional spectrum display, it is impossible to differentiate between the two signals or any unwanted signals present in the same spectrum. This makes interference hunting in TDD systems extremely difficult.

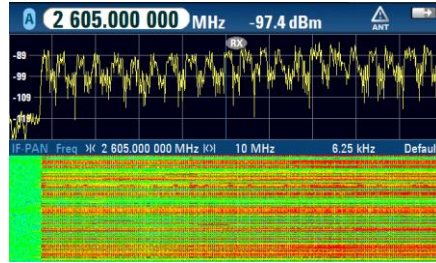
Solution

- ▶ Portable receivers from Rohde & Schwarz, such as R&S®PR100 and R&S®MNT100, as well as the R&S®DDF007 portable direction finder support a trace minimum hold function with adaptive detector that enables users to effectively suppress TDD signals and show persistent interferers on the spectrum display. This method is particularly useful in detecting and tracking a persistent interferer that is continuously present in the air.
- ▶ The portable devices also offer a polychrome display (option required) that allows user to visually separate two or more pulsing signals occupying the same frequency spectrum.
- ▶ R&S®PR200 supports gated spectrum function which allows user to separate uplink and downlink signals in time domain. User can choose to view the spectrum in any TDD time slot.

Setup overview

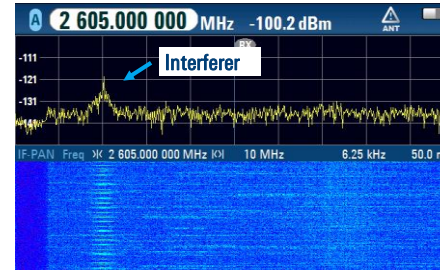


Typical setup: R&S®PR100 with R&S®HE400 portable directional antenna.

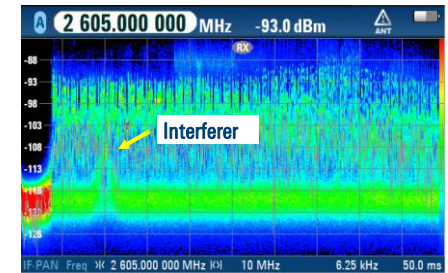


R&S®PR100 display: 10 MHz realtime spectrum and waterfall diagram of a partial TDD-LTE signal together with a relatively persistent interferer at 2602 MHz.

Trace minimum hold function and polychrome display

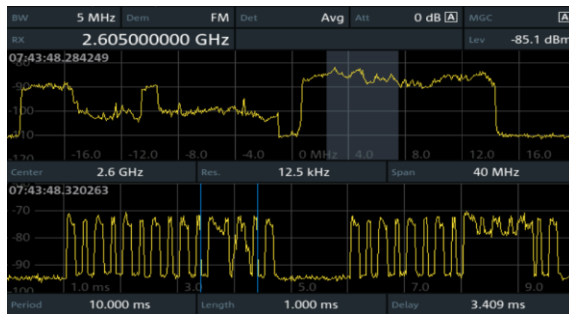


With the trace minimum hold function enabled, both DL and UL TDD signals are suppressed and a relatively persistent interferer at 2602 MHz can be easily identified.

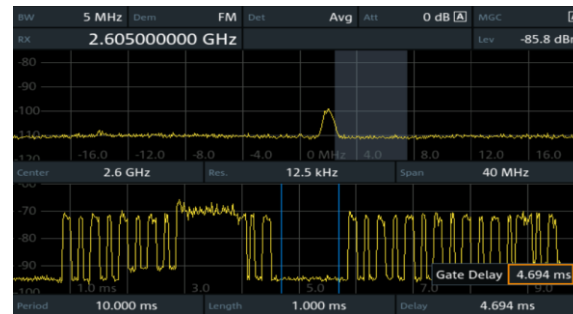


With the polychrome display, both TDD signals and interference at 2602 MHz can be visualized on a single display.

Gated spectrum (R&S®PR200)



When gate (two parallel blue cursors) is positioned at the downlink time slot, the downlink spectrum is observed on the top display.



When gate is shifted to the uplink time slot, the interferer can be observed clearly on the spectrum display.

Instrument choices

Specification	R&S®PR200	R&S®PR100	R&S®DDF007	R&S®MNT100
Frequency range (receive)	8 kHz to 8 GHz	9 kHz to 7.5 GHz	9 kHz to 7.5 GHz	600 MHz to 6 GHz
Important configuration				
Polychrome option	R&S®CS-IR	R&S®PR100-PC	R&S®DDF007-PC	Standard
Time domain measurement option (Gated Spectrum)	R&S®CS-ZS	-	-	-

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