

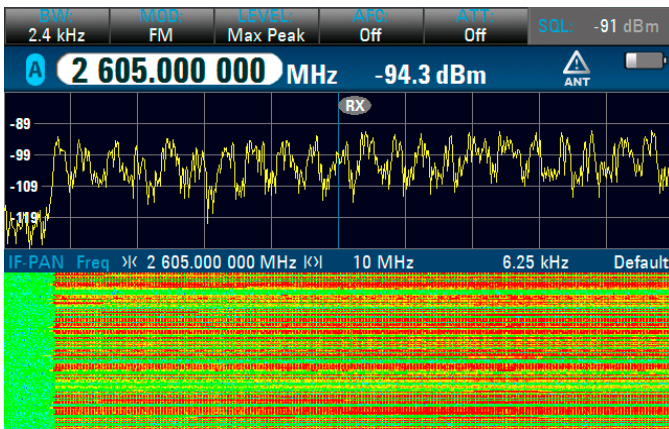
INTERFERENCE HUNTING IN TDD NETWORKS

Polychrome display method with the R&S®PR100, R&S®PR200, R&S®DDF007 and R&S®MNT100



Your task

In time division duplex (TDD) networks, the downlink (DL) and uplink (UL) use the same frequency band in different timeslots. When viewing such TDD signals on a conventional spectrum display, it is impossible to differentiate between the two and any other unwanted signals present in the same spectrum. This makes interference hunting extremely difficult.



10 MHz real-time spectrum and waterfall display of partial TDD-LTE signal with a relatively persistent interferer at 2602 MHz.

Rohde & Schwarz solution

The R&S®PR100 and the R&S®PR200 portable receivers, the R&S®MNT100 RF interference locator and the R&S®DDF007 portable direction finder provide a polychrome display that enables users to visually separate two or more pulsing signals that occupy the same frequency spectrum. This method enables simultaneous monitoring of TDD signals as well as interferers. The user can hunt for interference and, at the same time, remain aware of the signal environment. When using the polychrome display to home in on the interferer, we recommend sweeping the handheld directional antenna slowly to allow sufficient time for updating the signal level on the display.

Simple and quick setup steps

For the R&S®PR100, R&S®MNT100 and R&S®DDF007, the polychrome display is available only in fixed frequency mode (FFM). Make the following settings:

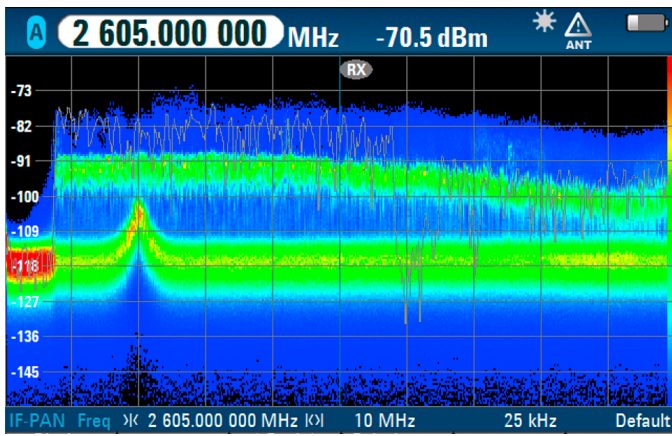
RX
RX + Spectrum
Spectrum
Spectrum + Waterfall
Waterfall
Dual Spectrum

In FFM mode, tune the center frequency to TDD frequency. Press [DISP] button followed by [F1] Display Mode, select "Spectrum" or "RX + Spectrum" display.

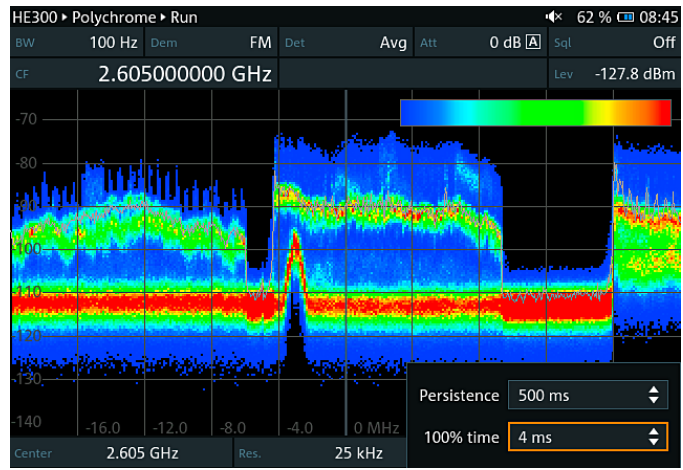
Polychrome IF Panorama	On
100% Time	+15.0 ms
Persistence	+500.0 ms
Polychrome FFT Speed	1X
Upper Time Limit	+15.0 ms
Lower Time Limit	+0.0 s
Clear Polychrome	
Color Mapping	Manual

Press [F4] Polychrome Param button and turn on Polychrome IF Panorama. Adjust 100% Time to obtain a good display contrast between interferers and TDD signals, e.g. 15 ms.

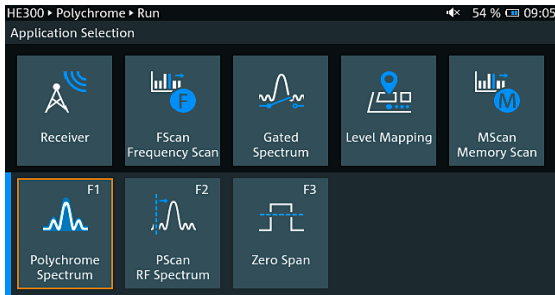




Constant interferer that is continuously emitting at 2602 MHz will appear in red and become obvious in the spectrum display.



On the R&S®PR200, press App Config button followed by [F6] Config to adjust 100% Time for good display contrast between interferer and TDD signals. With 40 MHz span, the user observes the complete 15 MHz wide TDD-LTE signal with the interference superimposed at 2602 MHz.



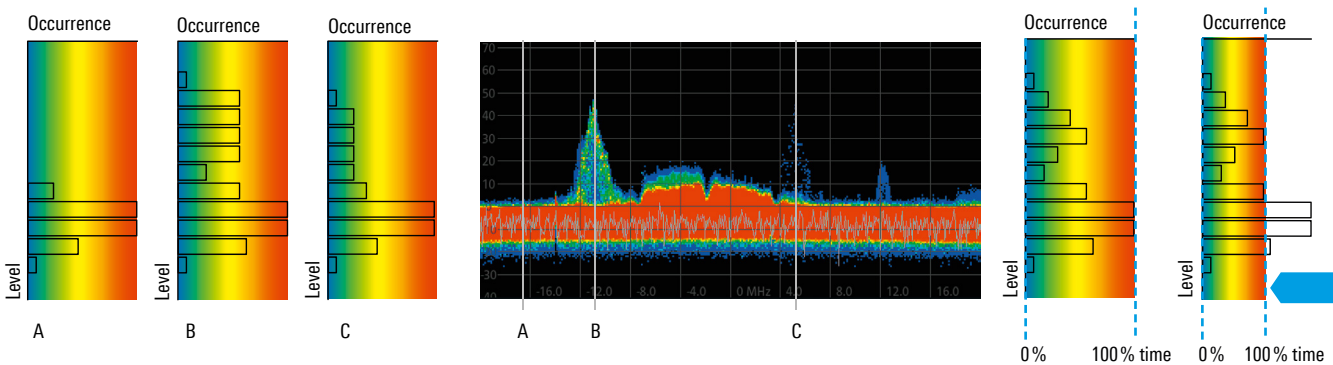
On the R&S®PR200, select Polychrome Spectrum from the App menu.

Polychrome display

In polychrome display mode, the frequency of occurrence of a signal is presented as a histogram. In the example below, a histogram is produced for each FFT bin of the signals at locations A, B and C. The histogram shows the distribution of signal level values and is mapped to a color scale with the following limits:

- ▶ Upper limit: 100% = red
- ▶ Lower limit: 0% = black

Signals that occur very frequently, such as noise, will appear in red, allowing the user to visually differentiate pulsing signals that occupy the same frequency spectrum.



Example of signal at locations A, B and C of the spectrum display with their respective histogram on the left. Red indicates high frequency of occurrence while blue shows lower frequency of occurrence.

The 100% time limit can be adjusted to give better visualization of signals that occur less frequently.

Ordering information	Designation, order no.			
Option	R&S®PR100	R&S®PR200	R&S®DDF007	R&S®MNT100
Polychrome spectrum display	R&S®PR100-PC, 4096.2828.02	R&S®CS-PC, 4500.7040.02	R&S®DDF007-PC, 4090.5102.02	standard

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