# **INTERFERENCE HUNTING IN TDD NETWORKS**

Trace minimum hold function with the R&S®MNT100, R&S®PR200, R&S®PR100 and R&S®DDF007



# 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 the two as well as any other unwanted signals present in the same spectrum. This makes interference hunting extremely difficult.



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

# **Rohde & Schwarz solution**

The R&S<sup>®</sup>PR200 portable monitoring receiver, the R&S<sup>®</sup>PR100 portable receiver, the R&S<sup>®</sup>MNT100 RF interference locator and the R&S<sup>®</sup>DDF007 portable direction finder provide a trace minimum hold function with adap-

Application Card | Version 02.00

tive detector that enables users to effectively suppress TDD signals and show persistent interferers on the spectrum display. This method provides better visualization of persistent interferers on the spectrum and waterfall display. It is particularly useful for detecting and tracking a constant interferer that is continuously present in the air. When using the trace minimum hold method to home in on the interferer, it is recommended to sweep the handheld directional antenna slowly to allow sufficient time for updating the signal level on the display.

### Easy steps to set up the measurement

In FFM mode, tune the center frequency to TDD frequency and set trace mode to minimum hold.

IF-PAN Leve	I Reference	+15dBµV	
IF-PAN Level Range		60 dB	
IF-PAN Display Mode		Min Hold	
Waterfall Le	vel Reference	+18dBµV	
Waterfall Level Range		60 dB	
Waterfall Color Table		Default	
Auto Range			
Range	✓ Peak ► ▲ Zoom ▼	Hold	Marker
F2	F3	F4	F5

Press [DISP] button followed by [F2] Range, scroll to "IF-PAN Display Mode" (see blue frame) and select "Min Hold".

Measure Time Mode		Manua			
Measure Time		+50.0 r	ns		
Measuring Mode		Contin	Continuous		
External Trace for Diff Mode		Off			
Param		Diff Mode	Suppress		
F2	F3	F4	F5		

To set the measurement time, press [SCAN] button followed by [F2] Param and set "Measure Time Mode" to "Manual" (see blue frame).

Set "Measure Time" so that it provides sufficient suppression of the TDD signals as well as fast tracking of the interferer level, i.e. recommended setting = 50 ms.

**ROHDE&SCHWARZ** 

Make ideas real



8.V. 2.4 kHz	FM	Max Peak	AFC: Off	A	off i	SQL: -	91 dBm
A 26	05.000	000 MH	z -100	).2 dBr	n		
-111			RX				
-121							
-131	M North and	and the second second		ur	1 tel 1 d		A. 1
HIAN MANY	1, 1 Mercult VAA	and the standard sector	AN A	n Minima.	penynpromp	www.	Mangha Mangh
IF-PAN Freq	>K 2 605.00	00 000 MHz KN	10 MH	z	6.25	kHz	50.0 ms
							den ser en s En ser en ser
GPS N 1° 20.	35950' E	103° 57.90269'	Alt.	5.2m	Sate	ellites: 1	ال. 0
Save Screen	Save	User	GP	S	Date:	7	Time:

FFM mode (10 MHz). With the trace minimum hold function enabled and the measurement time set to 50 ms, both downlink and uplink TDD signals are suppressed and the relatively persistent interferer at 2602 MHz can be easily identified.

# A 2 605.000 000 MHz -139.5 dBm Arr -110 -122 -134 -139 -134

PSCAN mode showing entire TDD-LTE band (2600 MHz to 2615 MHz). With the trace minimum hold in PSCAN mode, it is also possible to suppress both DL and UL TDD signals and make the interferer at 2602 MHz visible in the spectrum.

### The theory behind the trace minimum hold function

The trace minimum hold function makes use of a negative FFT detector to determine the trace level. By changing the measurement time, i.e. charging constant of the detector, it is possible to make the detector output level adapt to the interferer behavior.



With TDD signal time much shorter than the detector measurement time, the detector does not have sufficient time to charge up to the signal peak and therefore appear as a low level in the minimum hold trace.

On the other hand, an interferer with relatively long duration allows the detector to charge to signal peak and therefore appear as a high level in the signal trace. Such an interferer will then stand out in the spectrum view.

Designation	Туре	Order No.
Portable monitoring receiver, 8 kHz to 8 GHz	R&S <sup>®</sup> PR200	4500.5002.02
Portable receiver, 9 kHz to 7.5 kHz	R&S <sup>®</sup> PR100	4079.9011.02
Portable direction finder, 9 kHz to 7.5 kHz (RX mode)	R&S°DDF007	4090.5019.02
RF interference locator, 600 MHz to 6 GHz, LOC1 package	R&S <sup>®</sup> MNT100	4081.0218.00
RF interference locator, 600 MHz to 6 GHz, LOC3 package	R&S <sup>®</sup> MNT100	4081.0230.00

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