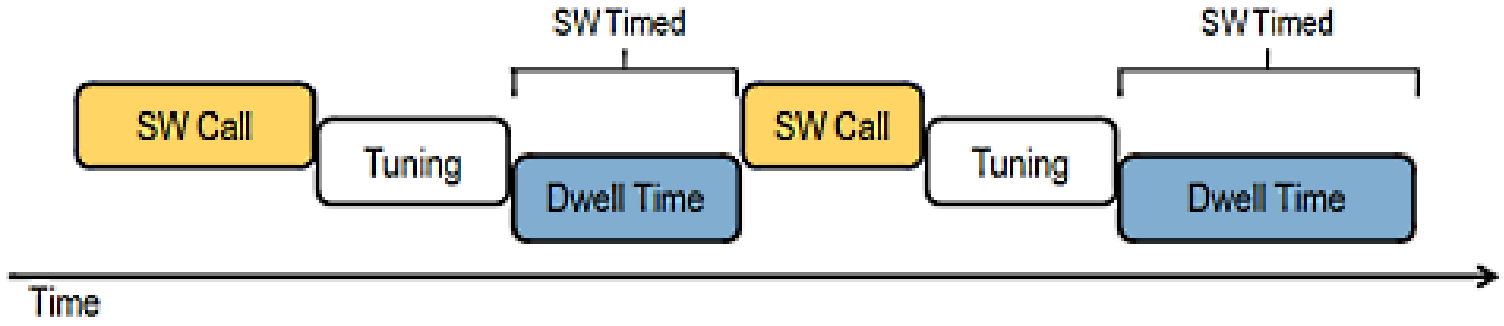
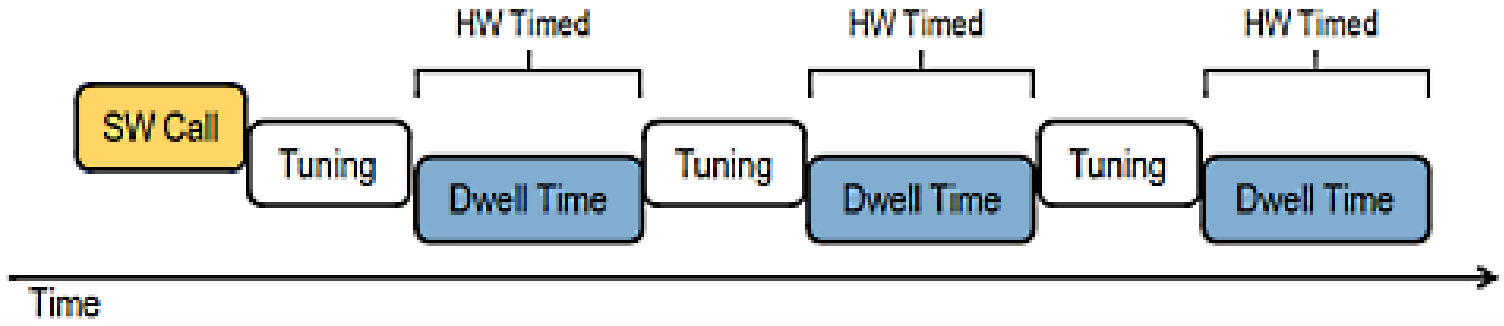
RF List Mode

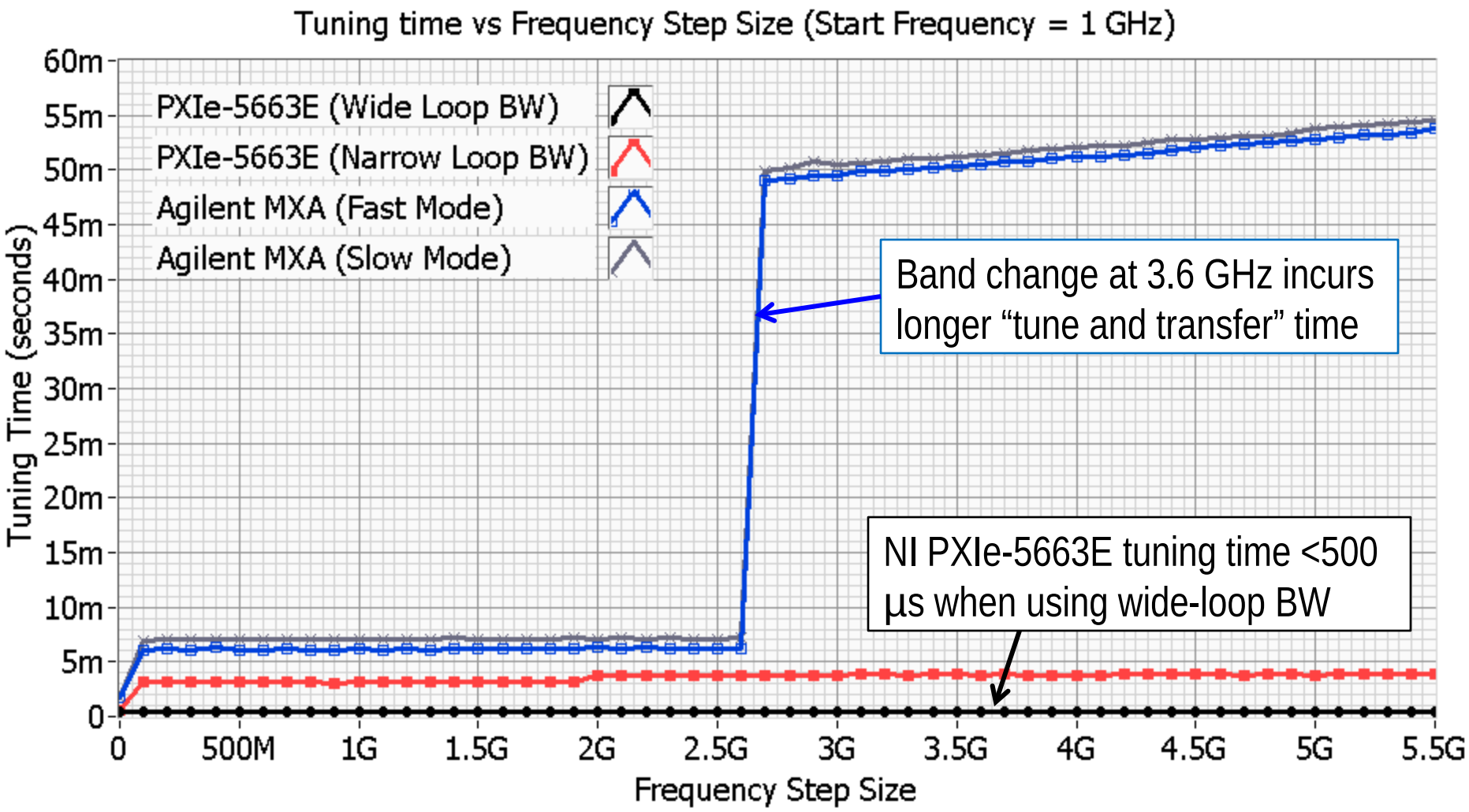
Configuration Changes **without** RF List Mode



Configuration Changes **with** RF List Mode



Tuning Time: NI PXIe-5663E Versus Agilent MXA



DEMO – PXIe 5665 List Mode Test

Agilent PXA

Peaks	Frequency
-12.3	1.00G
-51.6	2.00G
-79.9	5.00G
-79.2	10.0G
-80.3	14.0G

Time

694ms

NI PXIe-5665

Peaks	Frequency
-12.2	1.00G
-55.9	2.00G
-77.8	5.00G
-80.3	10.0G
-81.5	14.0G

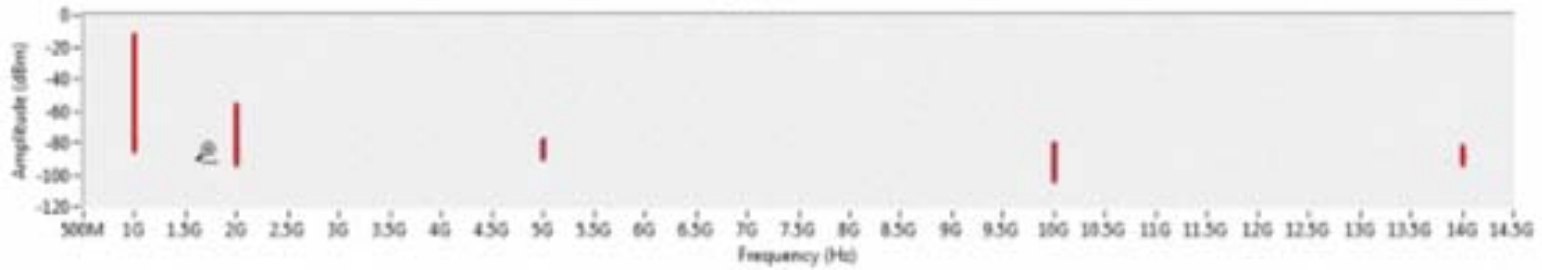
Time

404ms

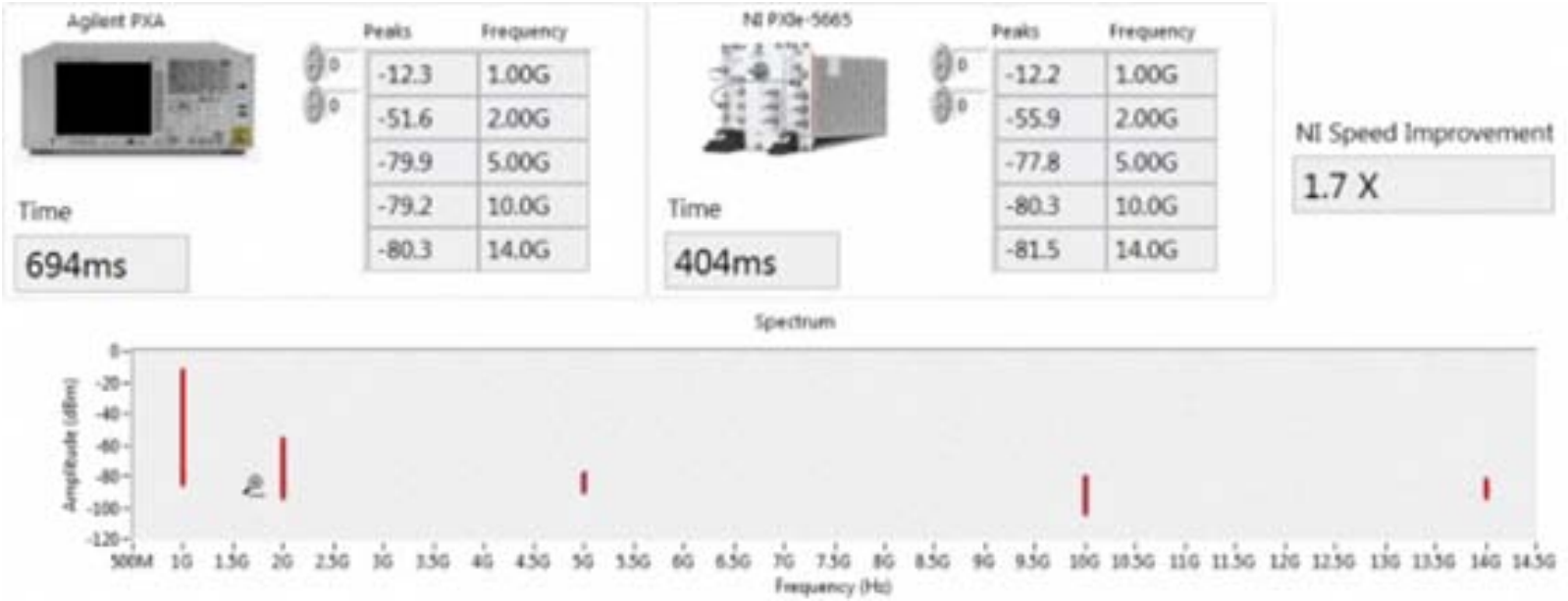
NI Speed Improvement

1.7 X

Spectrum



DEMO – PXIe 5665 List Mode Test



	Agilent PXA Time (ms)	NI 5665 Time (ms)
Time for List Mode + Peak Detect Test	700	400

Other Benchmark Data

Wireless LAN (802.11g)

Signal Type	NI PXIe-5663E Time	Agilent MXA Time*	Speedup
802.11a/g: EVM and Power	7.0 ms	93.9 ms	13.4X

**WLAN Measurements performed using N9077A-XFP, single acquisition composite measurement application (fast mode).*

LTE (3GPP Long Term Evolution)

Signal Type	NI PXIe-5663E Time**	Agilent MXA Time**	Speedup
5 MHz BW: EVM and Power	71 ms	541 ms	7.6X
10 MHz BW: EVM and Power	92 ms	703 ms	7.7X

*** All measurements made on a single subframe with auto detection turned OFF*

“Best” VSA Comparison

	NI PXIe-5665	Agilent PXA	R&S FSU
Base Price (14 GHz)	*$50,000*	*$70,000*	*$80,000*
Typical Phase Noise	- 129 dBc/Hz	- 131 dBc/Hz	- 133 dBc/Hz
Noise Floor (no pre-amp)	-154 dBm/Hz	- 155 dBm/Hz	- 156 dBm/Hz
Third Order Intercept	+24 dBm	+20 dBm	+25 dBm
ACLR – WCDMA	-87 dBc	- 89 dBc	- 87 dBc
EVM – WCDMA	0.4%	0.5%	0.5%

What all this means … Test Times

National Instruments Tests

LTE Generation		
LTE Mode Setup Time	62.5ms	
LTE Measurement Time	391ms	
NI WCDMA ACP Gen		
NI WCDMA Mode Setup Time	62.5ms	
NI WCDMA ACP Meas Time	93.7ms	

Total NI Acquisition Time 609ms

Agilent Tests

PXA LTE Generation		
PXA LTE Mode Setup Time	11.1s	
PXA LTE Measurement Time	1.27s	
PXA WCDMA ACP Gen		
PXA WCDMA Mode Setup	62.5ms	
PXA WCDMA ACP Meas Time	422ms	

Total Agilent Acquisition Time 12.8s

Stop

NI Improvement 21.1x

Summary

- Measurement speed is tricky to benchmark
  - Requires careful attention to measurement settings
  - Many instrument settings affect speed (traces and more)
  - Many tradeoffs: speed versus accuracy versus repeatability
- PXI designed for extremely fast measurements
  - Speed is a function of CPU performance (multicore)
  - Usually 3X to 20X faster than rack-and-stack
  - NI PXIe-5663E has accuracy similar to MXA
  - NI PXIe-5665E has accuracy similar to PXA