

Comparison Application Note :

Signal Source Analyzer versus E5052B

Application

This note reports the comparison of phase noise and spurious signal measurement results between Berkeley Nucleonics Model 7300 and Keysight E5052B.

Introduction

This paper provides measurement result comparison between the Model 7300 and the E5052B.

The device under test is a Texas Instruments EVM LMX2592.

All measurements were taken from the same DUT. Instrument settings of the 7300 and E5052B have been set to default.

Compared is absolute phase noise at 6 GHz with phase noise and spurious at 6GHz + 5 kHz.



Results

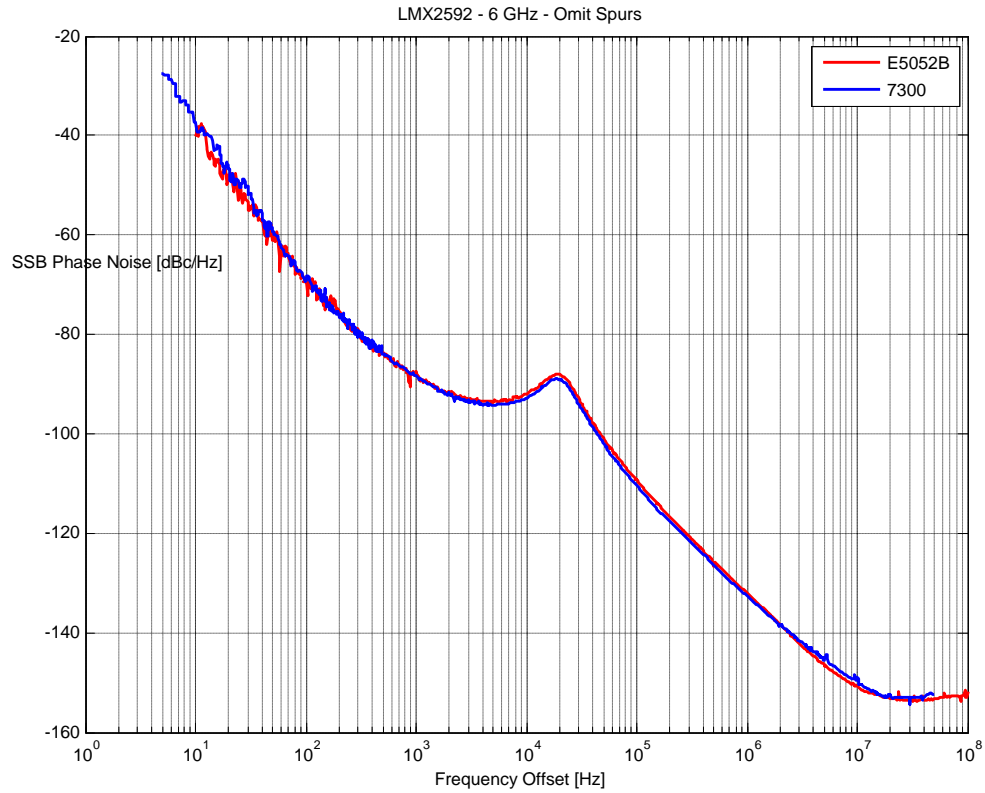


Figure 1: 6 GHz carrier : no spurs

Figure 1 shows phase noise at 6 GHz over 10 Hz to 50 MHz offset. Excellent agreement within 1 dB is found.

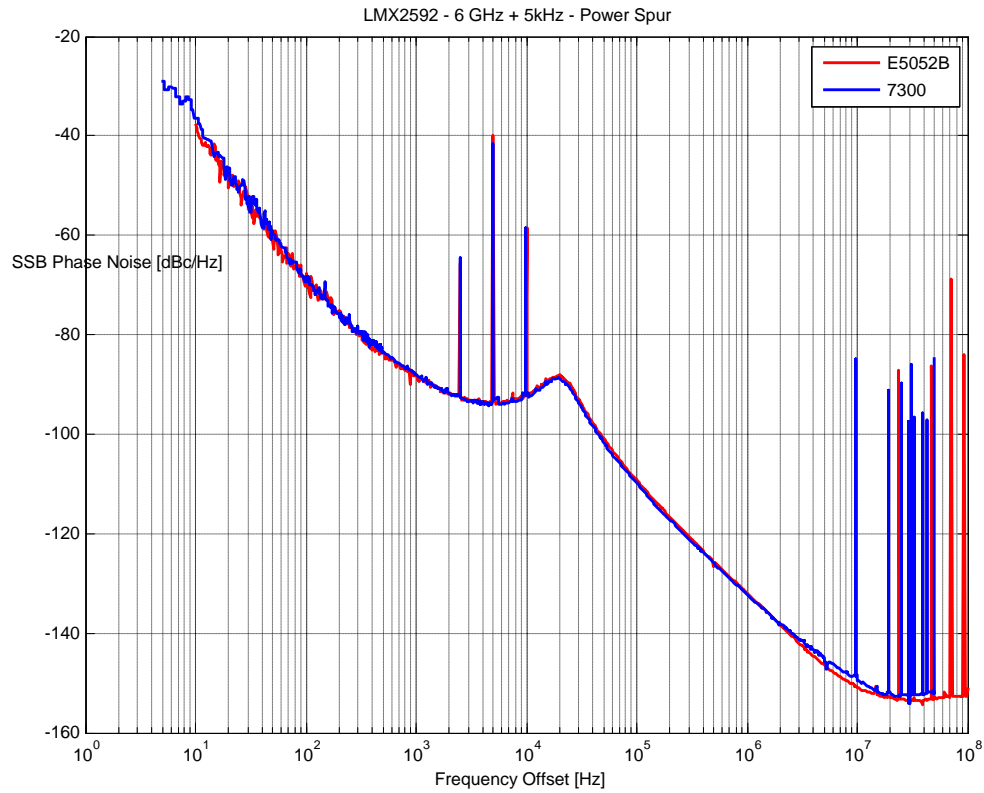


Figure 2: 6 GHz + 5 kHz carrier : spurs visible at 2.5, 5 and 10 kHz

Figure 2 shows phase noise at 6.000005 GHz over 10 Hz to 50 MHz offset.

The spurious are displayed as real power.

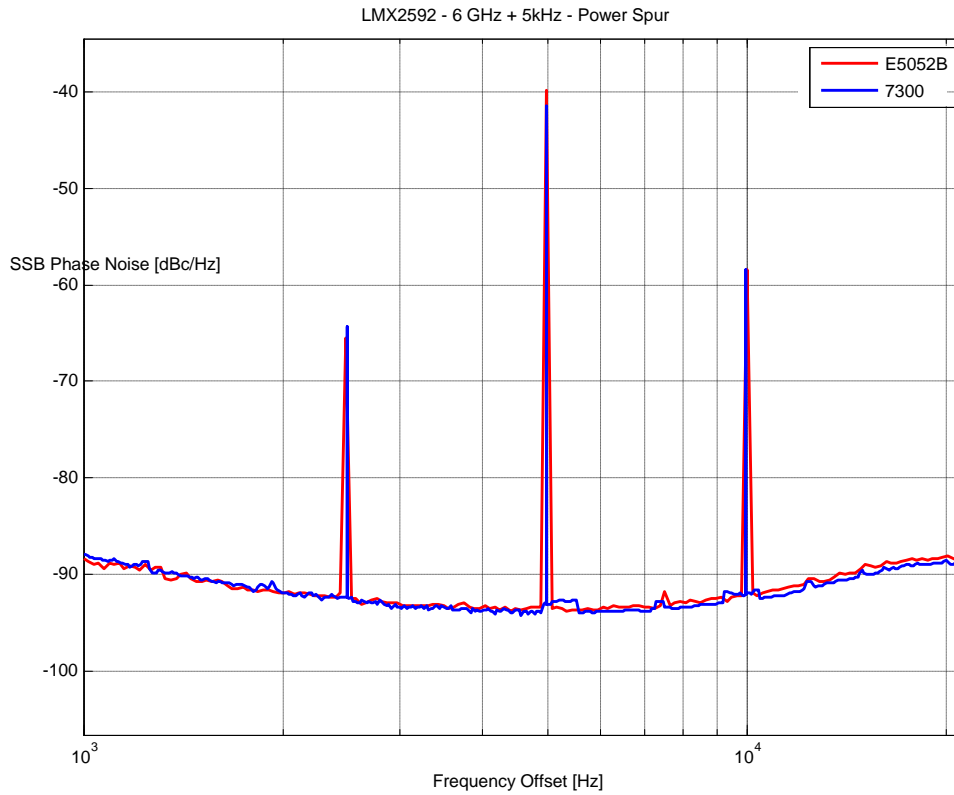


Figure 3: Zoom to Spurs

Figure 3 zooms in on Figure 2 around the 5 kHz spurious. Spurious response is in agreement within 1.5 dB.

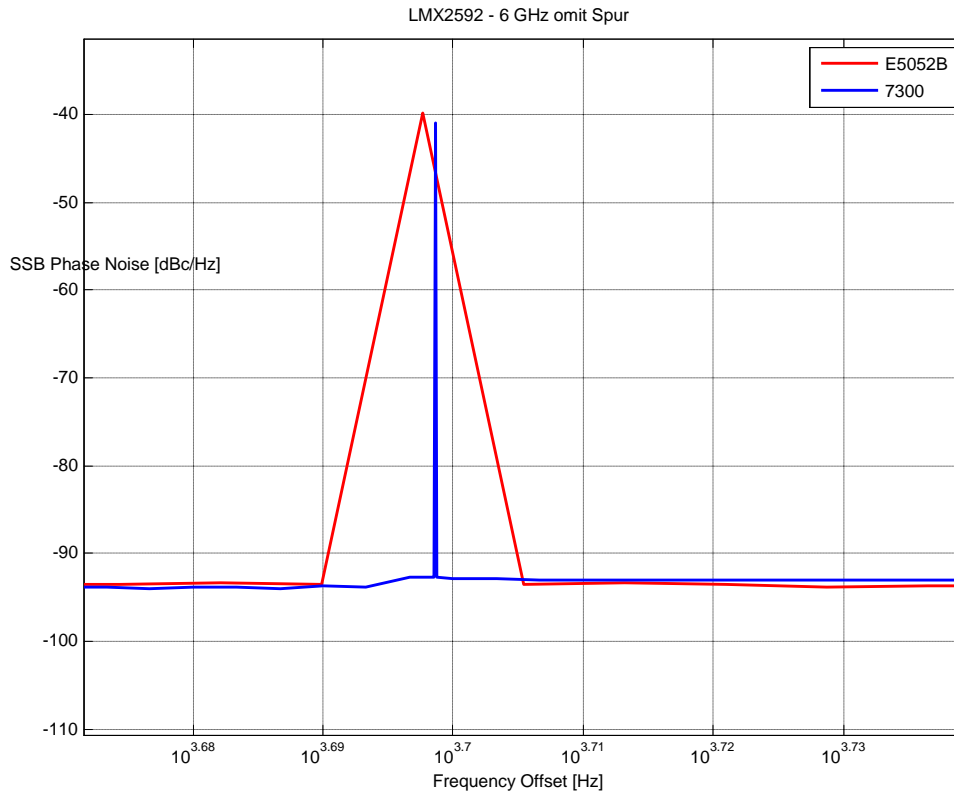


Figure 4: Zoom to 5 kHz Spur

Figure 4 zooms in around the 5 kHz spur. Spur response is in agreement within 1 dB. While displayed differently, the calculated equivalent power of the spur is equal in dBm.

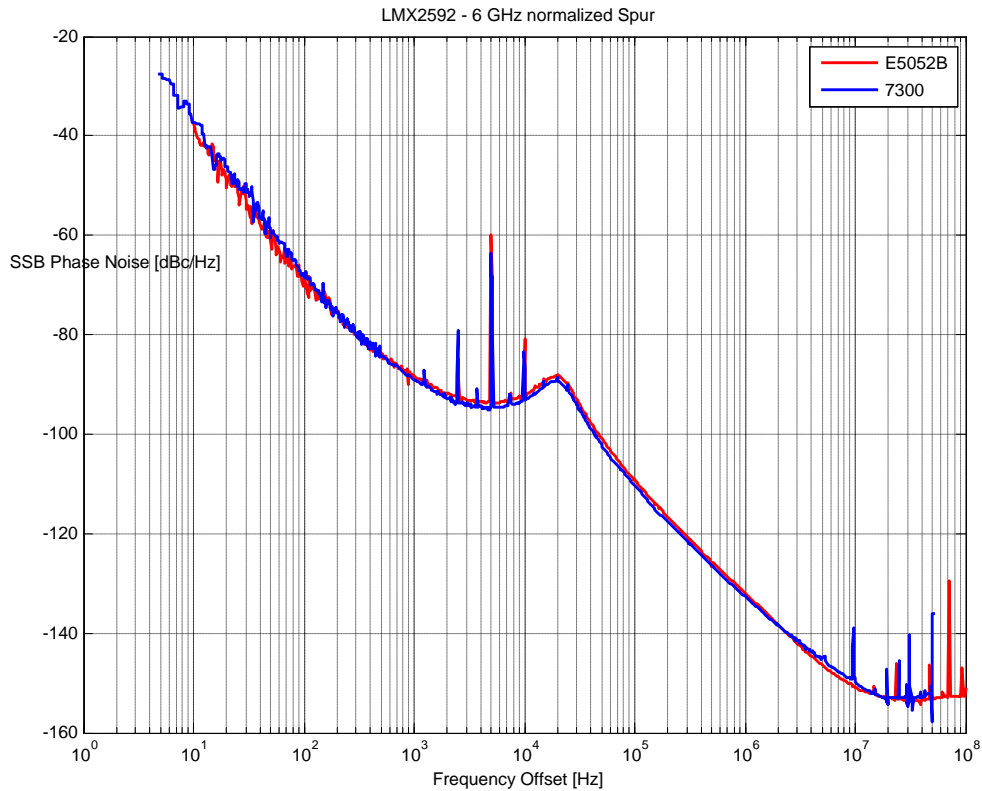


Figure 5: Normalized view of spurs

Figure 5 shows phase noise at 6.000005 GHz over 10 Hz to 50 MHz offset.

The spurious are displayed normalized to 1 Hz bandwidth.

Conclusion

Comparison of BNC Model 7300 and Keysight E5052B phase noise and spurious amplitude and location reveal very good agreement over a wide offset range. Phase noise and spurious amplitude agree widely within < 1dB.



Equipment	7070/7300	Agilent E5052B & E5053A
Freq. range	5 MHz to 7 / 26 GHz	10 MHz to 7/26 GHz
Offset range	0.01 Hz to 50 MHz	1 Hz to 100 MHz
PhN Sensitivity at 1 GHz	Standard Option LN Ext. Refs	
@ 1 Hz	-52 / -80 / -120	-60 / - / -
@ 10 Hz	-85 / -100 / -130	-91 / - / -
@ 1 kHz	-135 / -135 / -165	-128 / - / -
@ 10 kHz	-145 / -145 / -175	-137 / - / -
@ 100 kHz	-155 / -155 / -180	-144 / - / -
@ 1 MHz	-160 / -160 / -180	-160 / - / -
Measurement Speed (ATE, 1kHz, 1 corr)	150 ms	>450 ms
Input power range	-15 to +20 dBm	-15 to +20 dBm
Uncertainty	<3 dB	< 3 dB
< 100 Hz	< 2 dB	< 2 dB
> 100 Hz		
Internal / External References	Y / Y	Y / N
MEASUREMENT MODES		
Absolute phase noise	Y	Y
Residual phase & amplitude noise	Y	N
Pulsed absolute / residual phase noise measurement	Y / Y	N
Amplitude noise measurement	Q4 / 2016	Y
VCO test bench	Y	Y
Transient measurement	Y	Y
INTERFACES		
GPIO	Y (optional)	Y
USB/TMC	Y	Y
LAN	Y	Y
VISA/SCPI	Y	Y
Power Consumption	25 W	300 W
Weight	17.5 lb	38.8 lb