

## 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.

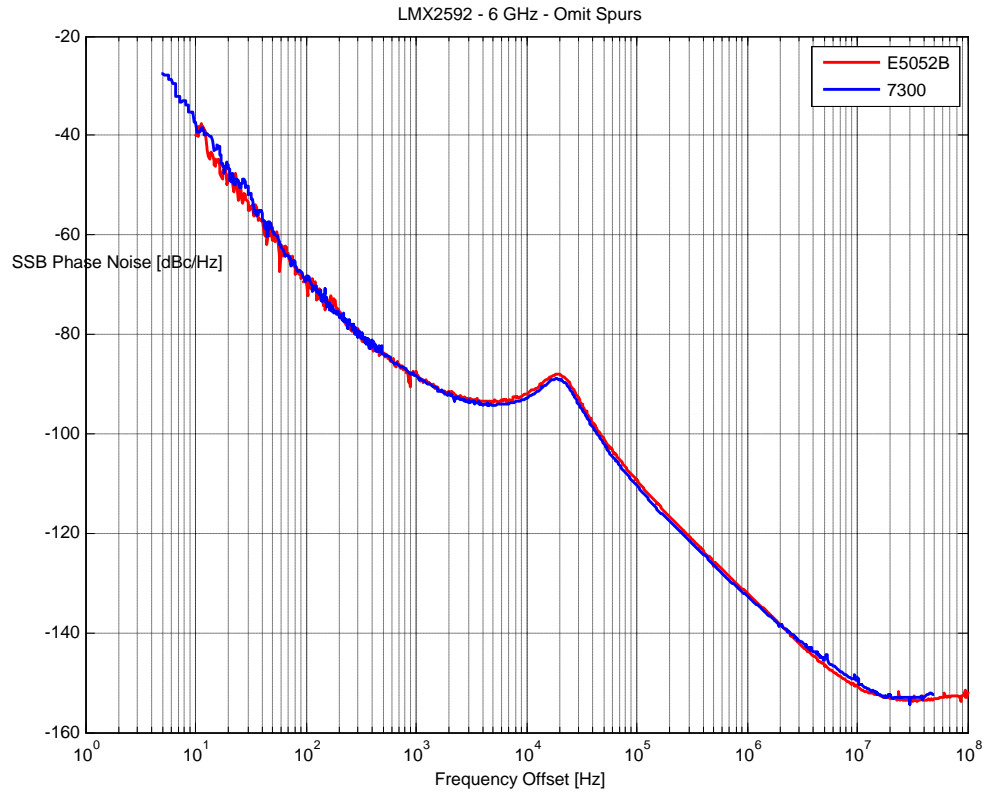
The device under test is a Texas Instruments EVM LMX2592.

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.

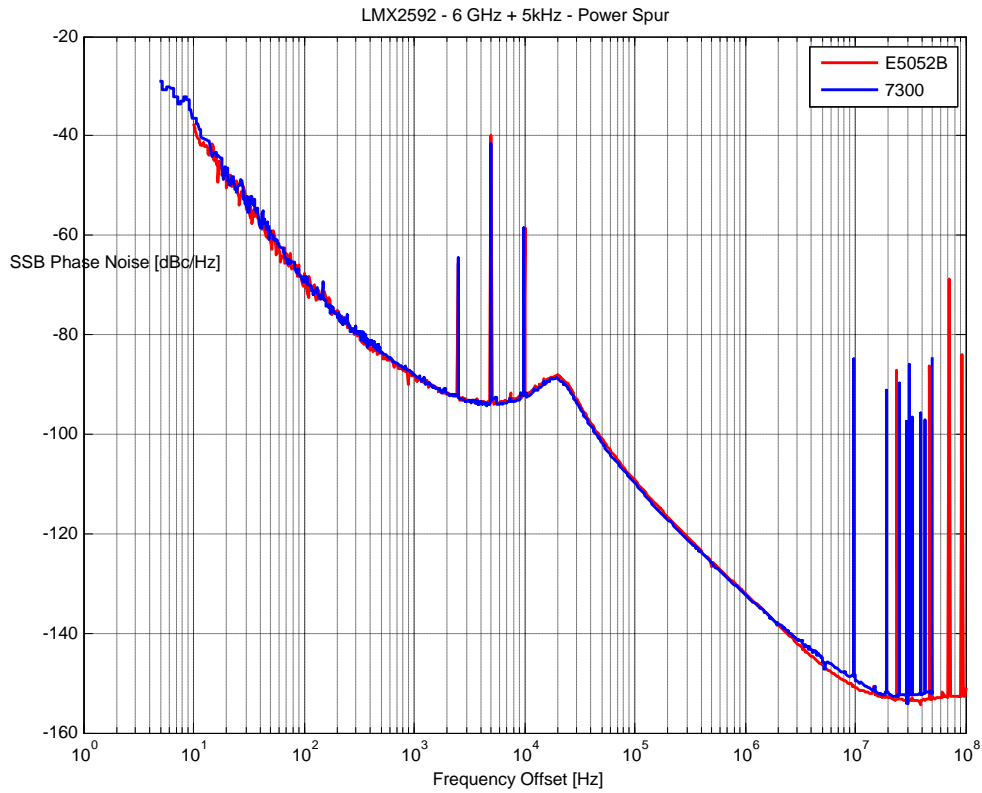


## Results



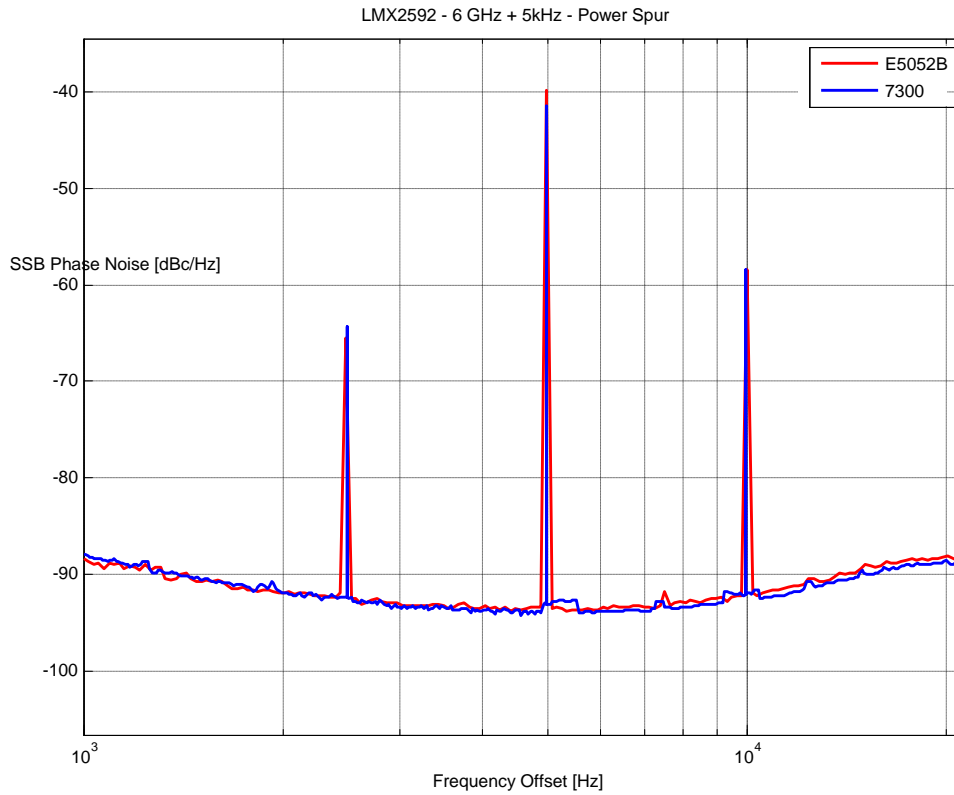
**Figure 1:** 6 GHz carrier : no spurs

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



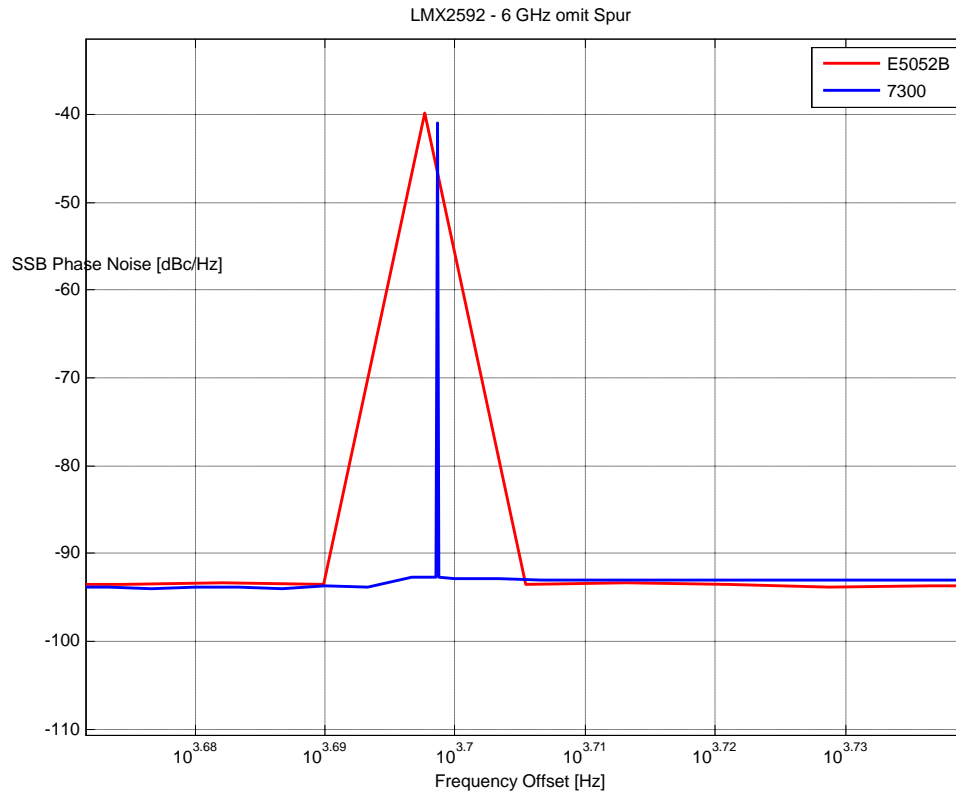
**Figure 2:** 6 GHz + 5 kHz carrier : spurs visible at 2.5, 5 and 10 kHz

Figure 2 shows phase noise at 6.000005 GHz over 10 Hz to 50 MHz offset.  
 The spurious are displayed as real power.



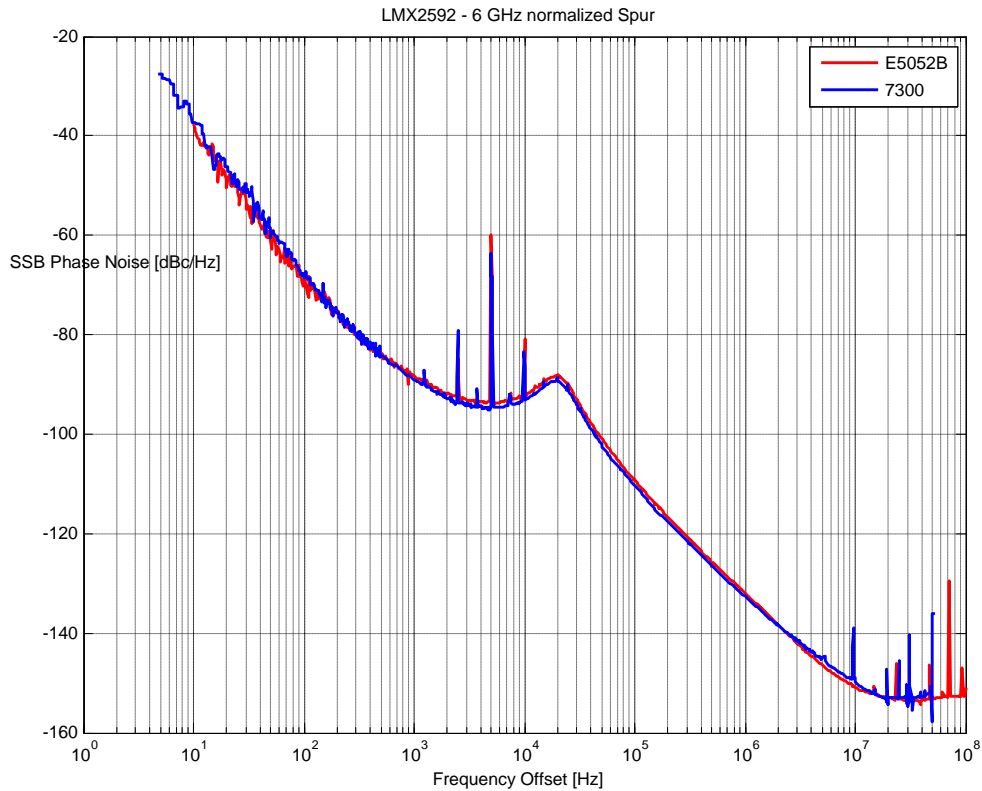
**Figure 3:** Zoom to Spurs

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
<b>Freq. range</b>	5 MHz to 7 / 26 GHz	10 MHz to 7/26 GHz
<b>Offset range</b>	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
<b>MEASUREMENT MODES</b>		
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
<b>INTERFACES</b>		
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
List Price	\$38,500/\$49,995	\$154,000