Anritsu Advancing beyond

Rubidium™ MG362x1A Nonlinear and Interference Measurements

9 kHz to 20/43.5/70 GHz

Introduction

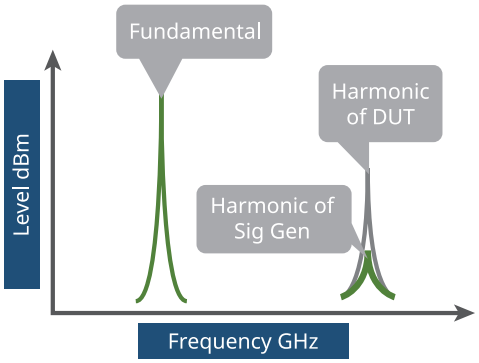
Single and dual tones are commonly used in tests that characterize the nonlinearity of active devices and systems. An example includes a 1 dB compression and IP2/IP3 intermodulation tests. Measuring nonlinearity provides information about how multiple signals interact and create additional components when processed by devices and systems. Manufacturers of devices, such as amplifiers and mixers, measure and specify P1 dB compression point and IP2/IP3 intermodulation.

In-band and out-of-band interference (C/I, blocking) are another class of nonlinear measurements made on all types of receivers. Typically an interfering signal, either CW or modulated, is combined with a wanted signal and input to the receiver. The interfering signal's frequency and amplitude are varied while keeping the wanted signal at a known level and frequency. The interfering signal's impact on the receiver's ability to decode wanted signal is characterized in terms of output error rate or throughput. Almost all communication standards such as 802.11xx, LTE, 5G, as well as many broadcast standards such as ATSC and DVB-T/S/H require some variant of receiver interference test described above.

Nonlinear and Interference Measurements

For accurate nonlinear measurements, it is important for a signal generator to have adequately high output power, low harmonics, sub harmonics, and non-harmonics. For instance, in a two tone IP3 test, if one of the signal generators has a significant second harmonic, it could combine additively with the second harmonic of fundamental generated by DUT and significantly increase the intermodulation products. It is also possible that the two second harmonic components could cancel each other depending on the phase difference between them and reduce the intermodulation products. This could result in an inaccurate IP2/IP3 measurement.

The Rubidium MG362x1A signal generator is well suited to make nonlinear measurements with its exceptionally low harmonics, subharmonics, and non-harmonics both at standard and high output power levels. Harmonics and subharmonics of the Rubidium signal generator are < –58 dBc and the non-harmonics are lower than –63 dBc, enabling users to make accurate nonlinear measurements without needing any additional filters in many applications. Nonlinear measurements are typically automated since the measurements are made at multiple frequency and power levels. Rubidium MG362x1A signal generator supports SCPI and native commands as well as lab view drivers to enable users to write automation code or scripts.



Frequency Range	Harmonic and Related *(Standard)*
31.25 MHz to <=1.3 GHz	–58 dBc
>1.3 GHz to <=43.5 GHz	–60 dBc
>43.5 GHz to <=70 GHz	–55 dBc

Frequency Range	Non Harmonic *(Standard)*
31.25 MHz to <=20 GHz	–70 dBc
>1.3 GHz to <=43.5 GHz	–63 dBc
>43.5 GHz to <=70 GHz	–63 dBc

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