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How to select VSG6G1 VSG2G1 TSG4G1

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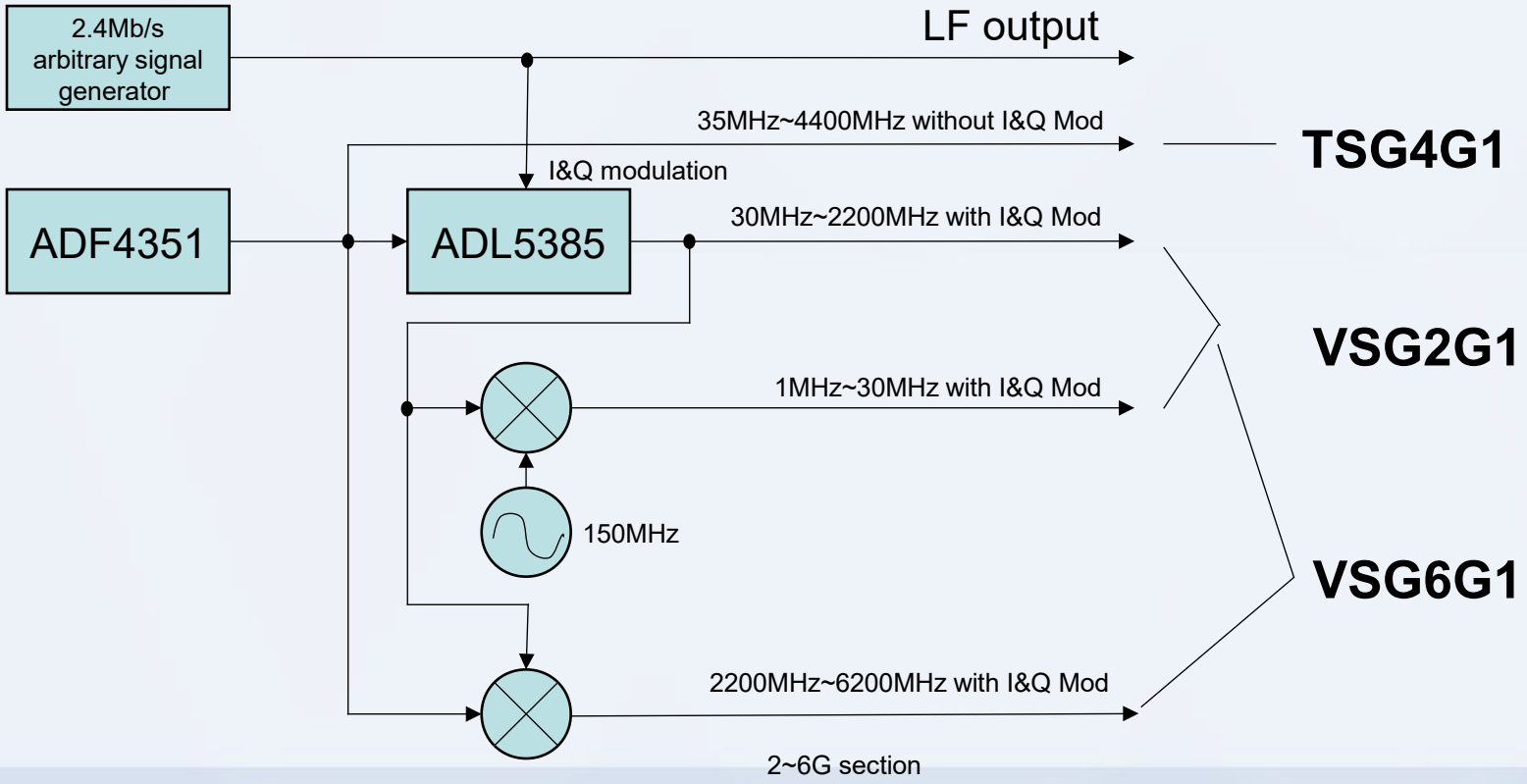
Configuration for RF signal generator



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Choosing the TSG4G1

• The TSG4G1 is suited to applications that don't need I&Q channel for generating modulation signals, and the frequency requirement is lower than 4.4GHz.
• The TSG4G1's signal output is from an ADF4351, with the output level calibrated and controlled.
• The TSG4G1 can also work uncalibrated with a large output level (up to 16dBm at some frequency points).
• Spurious signals are less when the output frequency is between 700MHz and 4400MHz, so the TSG4G1 can work with a power meter to test S11 andS21 at this band.
• The TSG4G1 works with pulse modulation, frequency sweeping and hopping.
• The TSG4G1 also have an LF signal output and a pulse signal output for lower frequency applications.

Limitations with the TSG4G1

• When the frequency is lower than 700MHz, more spurious signals will be apparent due to the ADF4351's RF divider. A divider design cannot be used to achieve problem-free low frequencies, and other solutions are too costly for the targeted price point. Any RF signal generator using a ADF4351/ADF4355/RFMD2081 combination will have this problem.

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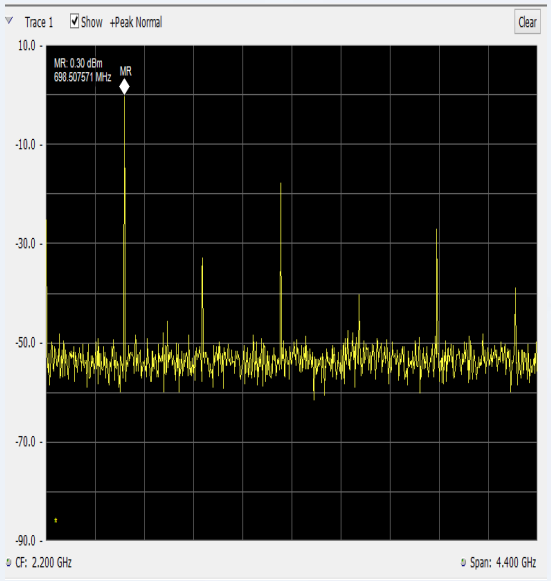
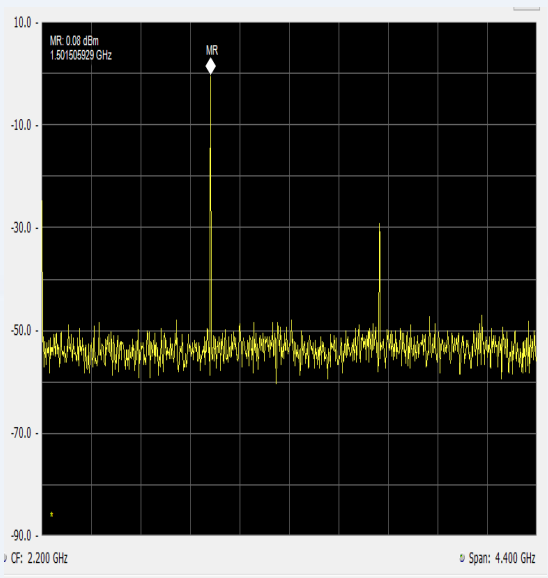
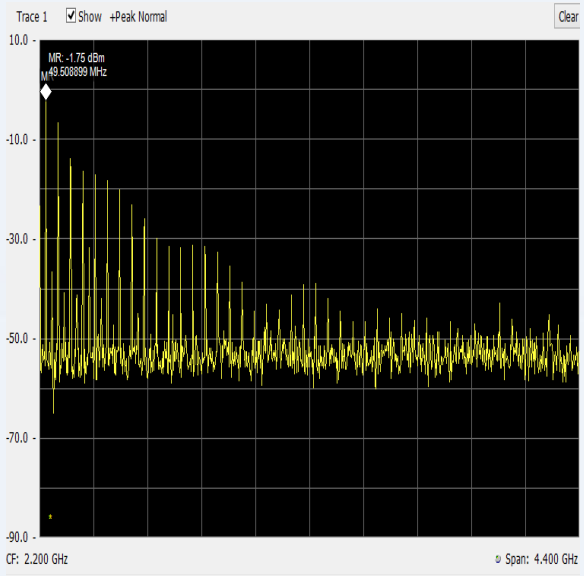
Choosing the TSG4G1



Output at 700MHz with spurious



Output at 1500MHz with spurious



Output at 50MHz with spurious

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Choosing the VSG2G1

• The VSG2G1 is suited to applications that need I&Q channels to generate modulation signals for testing an RF receiver with frequency requirements lower than 2.2GHz.
• The VSG2G1 signal output is from an ADL5385 with the output level calibrated and controlled.
• With I&Q modulation provided, the output signal is very useful for most communication systems. The VSG2G1 can generate signals from simple modulation types (e.g. FM) to more complex modulations (e.g. QAM)
• The I&Q engine in the TSG program provided can easily generate most common communication signals. Customers can use the program to build custom modulations as needed. The VSG2G1 can be used for many applications, ranging from radio to cellular phone testing, for instance.
• The ADL5385's bandwidth can extend to 500MHz. While the internal I&Q signal clock is only effective up to 2.4MHz, an external input works up to 500MHz bandwidth. High speed I&Q option will work with this interface to generate wide band modulation signals.
• The VSG2G1 can work with pulse modulation, frequency sweeping and hopping to generate various system signals such TDMA, CDMA, etc.
• The VSG2G1 also has both an LF signal output and a pulse signal output for lower frequency applications.

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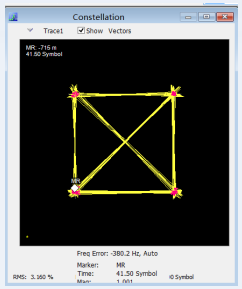
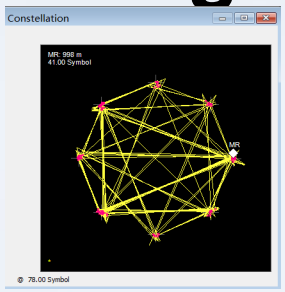
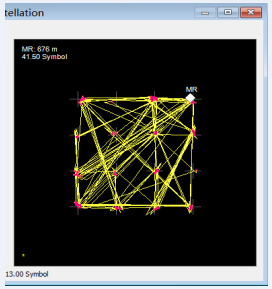
Choosing the VSG2G1



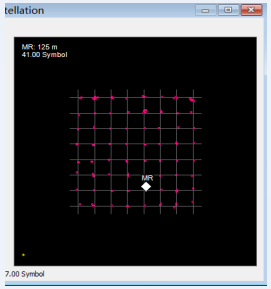
4PSK



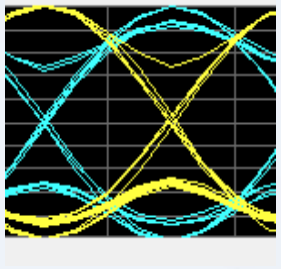
8PSK



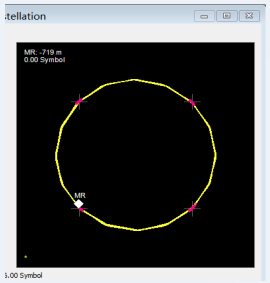
16QAM



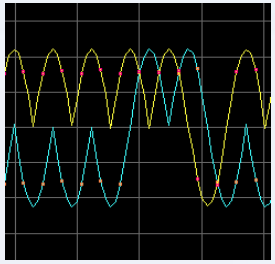
64QAM



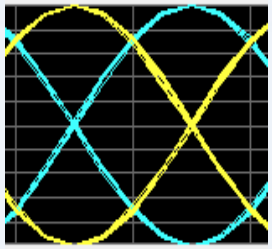
GMSK eye diagram



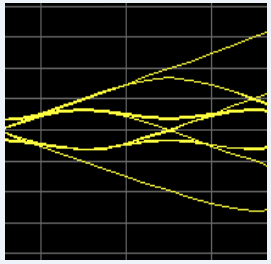
MSK constellation



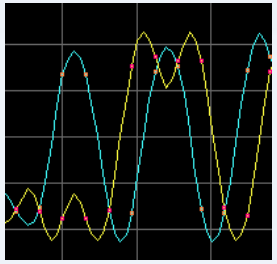
MSK I&Q waveform



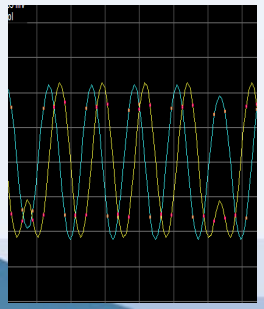
MSK eye diagram



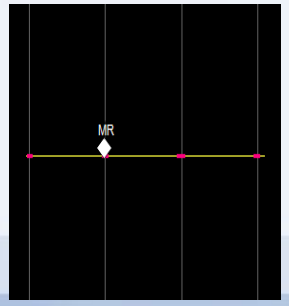
GMSK trellis diagram



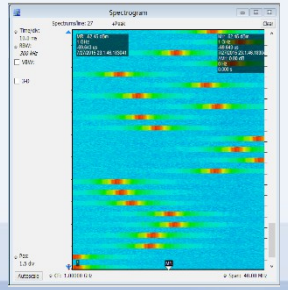
GMSK I&Q waveform



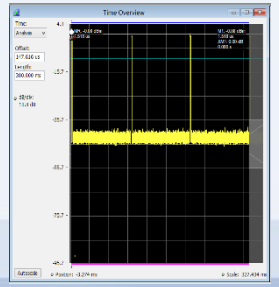
GFSK I&Q waveform



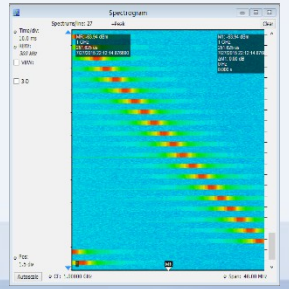
4FSK constellation



Hopping with pulse Mod/I&Q data



GSM frame



Sweeping with pulse Mod/I&Q data

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Choosing the VSG2G1

Limitation with the VSG2G1

• The VSG2G1 signal output is from an ADL5385, and the LO source is an ADF4351. It has same issue as the TSG4G1: the lower the frequency, increasing spurii will be naturally generated due to the RF divider.
• A solution for a modulator with ADL5385 +ADF4351 or using a single chip modulator RFMD2081 (PLL+ modulator) will have same issue because of the use of a PLL divider for generating low frequencies. The system design is simple to implement but a trade-off between the cost and performance.
• The harmonics cannot be easily removed, because cost limitations prevent the implementation of an RF tracking filter.
• If the VSG2G1 is used for testing radio receivers, then most receivers will feature a filter both at the front-end and at the internal IF section anyway, so spurious signals may not be a serious problem.

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Choosing the VSG6G1

• The VSG6G1 is ideal if your application needs I&Q channels to generate modulation signals for testing RF receivers, or the maximum output frequency is needed up to 6.2GHz.
• The VSG6G1 signal outputs are a combination of the VSG2G1 and the 2~6GHz section.
• The 2~6G section output comes from mixing the VSG2G1 output and the TSG4G1 output so that the 2~6G section looks like a tripler of the VSG2G1 signal.
• The VSG6G1 output is exactly same as the VSG2G1 from 1MHz~2.2GHz. Higher than 2.2GHz, the I&Q channels will only work based on frequency modulation. Please see the limitation section for details.
• The ADL5385's bandwidth can work up to 500MHz. While the internal I&Q signal clock range is only up to 2.4MHz, the external interface works up to 500MHz bandwidth. A high speed I&Q option will work with this interface to generate a wide band modulation signal.
• The VSG6G1 can work with pulse modulation, frequency sweeping and hopping to generate many different system signals such TDMA, CDMA, etc.
• The VSG6G1 also has an LF signal output and pulse signal output for lower frequency applications.

Choosing the VSG6G1

Limitation with the VSG6G1

• The VSG6G1 covers the VSG2G1 range, so that VSG2G1 issues will be the same on the VSG6G1. The lower the frequency, the more spurious signals will be generated due to the RF divider design.
• The 2~6G section works as a signal tripler, so more spurious signals will occur in the 2~6G section. For example, if the output frequency is 6GHz, sub-harmonic 2GHz and 4GHz spurious signals will appear - sometimes at higher levels.
• Also due to the Tripler design, phase distortion can occur in the 2~6G section. Phase modulation such as PSK, QAM, is not suited for working with the 2~6G section, since additional modulation is derived from the frequency shift. Signals insensitive to phase distortion, such as FSK/GFSK, are examples of the kind of modulations are ok.

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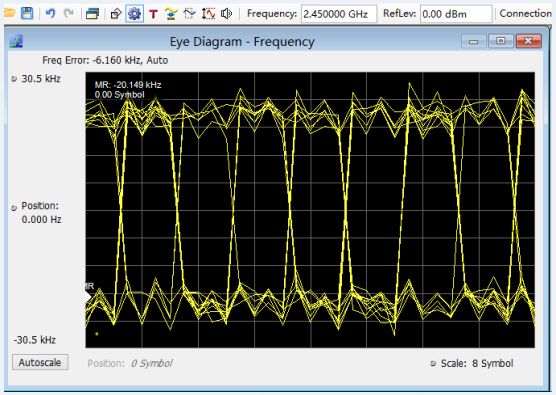
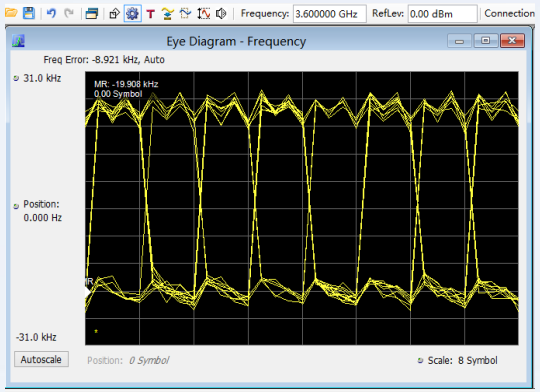
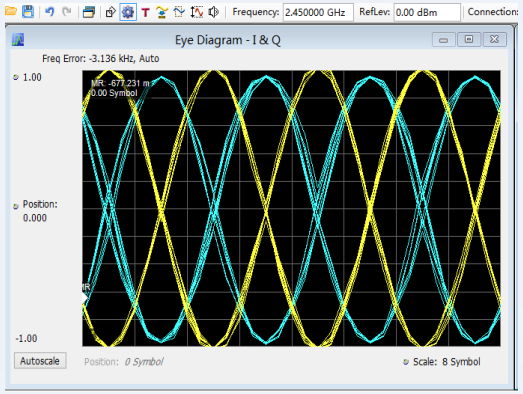
Choosing the VSG6G1



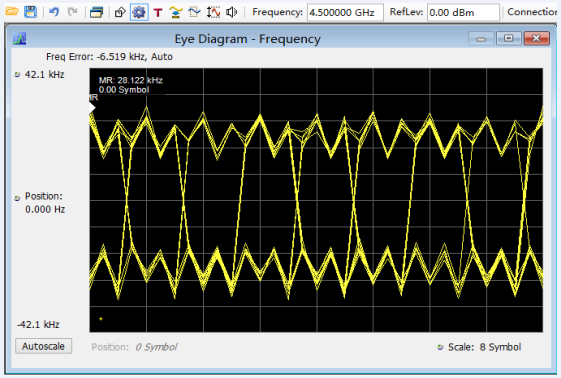
FSK eye diagram working at 2.45GHz



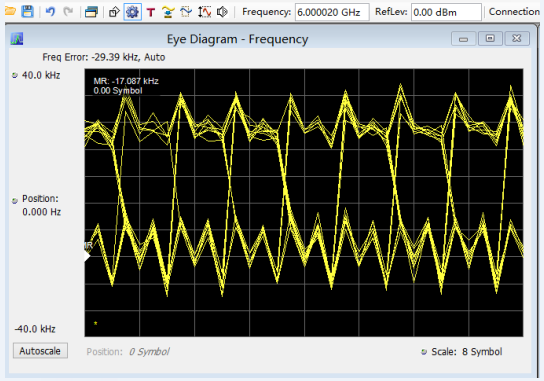
FSK eye diagram working at 3.6GHz



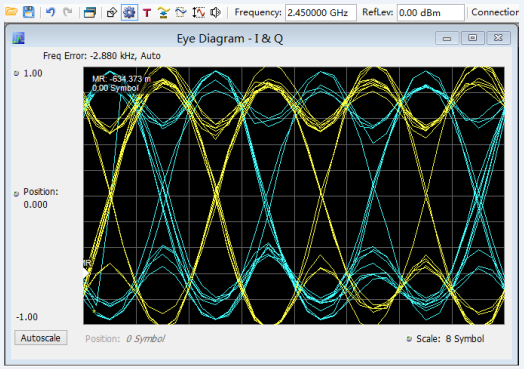
MSK eye diagram working at 2.45GHz



FSK eye diagram working at 4.5GHz



FSK eye diagram working at 6GHz



GMSK diagram working at 2.4GHz

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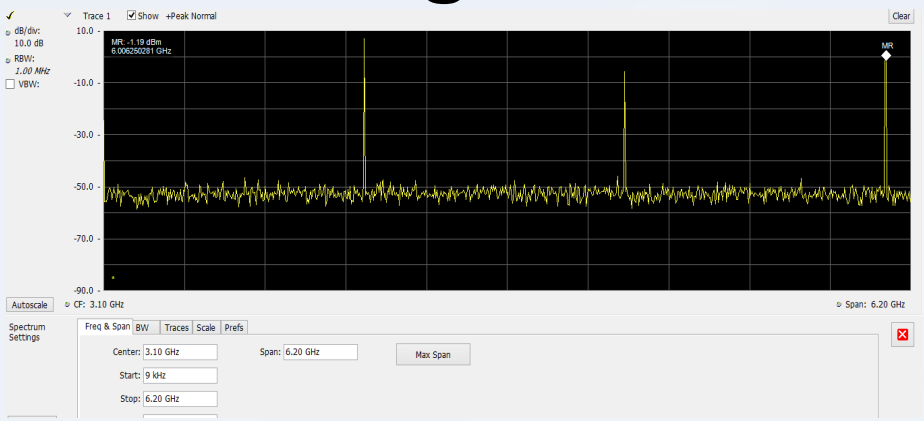
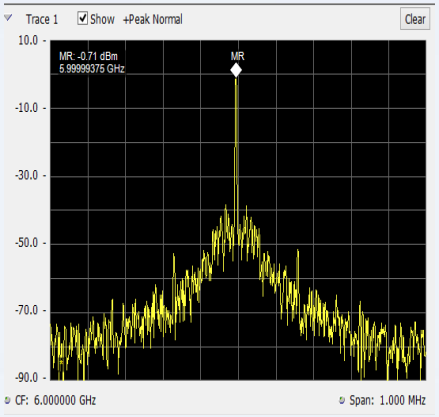
Choosing the VSG6G1

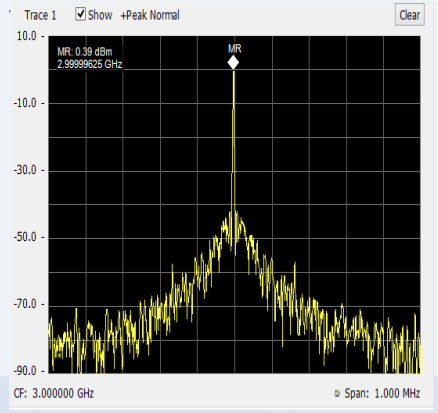


6GHz output signal with 2GHz,4GHz sub harmonics



6GHz signal spectrum

3GHz output signal with 1GHz,2GHz sub harmonics



3GHz signal spectrum