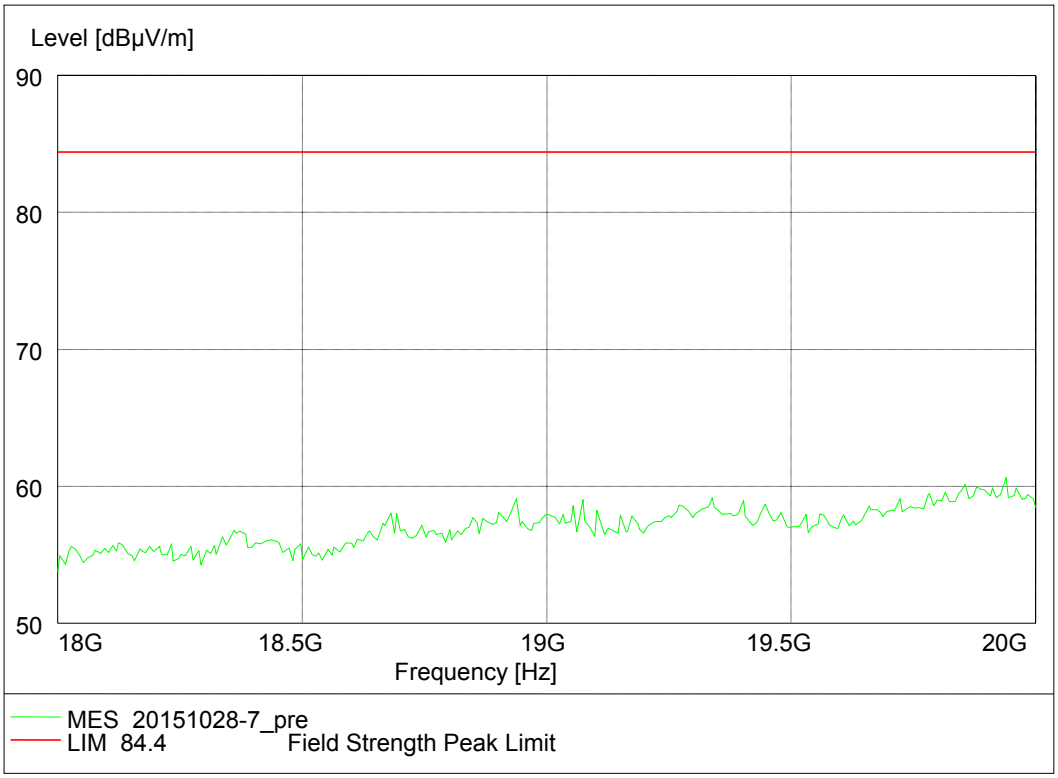
Channel Position T - QPSK - 18GHz - 20GHz



Configuration L-MIMO-MC 1 (2C)

Maximum Output Power 46.0dBm per port, LTE Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position M_{RFBW}	1942.5MHz + 1977.5MHz

Channel Position M_{RFBW} - QPSK

No emissions were detected within 20dB of the limit.

Configuration L-MIMO-MC 2 (3C)

Maximum Output Power 46.0dBm per port, LTE Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position M_{RFBW}	1942.5MHz + 1972.5MHz + 1977.5MHz

Channel Position M_{RFBW} - QPSK

No emissions were detected within 20dB of the limit.

Configuration G+W-MIMO-MC 1 (1G+1W)

Maximum Output Power 46.0dBm per port, WCDMA Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position M_{RFBW}	(G) 1940.2MHz + (W) 1977.6MHz

Channel Position M_{RFBW} – GSM GMSK / WCDMA 16QAM

No emissions were detected within 20dB of the limit.

Configuration G+L-MIMO-MC 1 (1G+1L)

Maximum Output Power 46.0dBm per port, LTE Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position M_{RFBW}	(G) 1940.2MHz + (L) 1977.5MHz

Channel Position M_{RFBW} – GSM GMSK / LTE QPSK

No emissions were detected within 20dB of the limit.

Configuration W+L-MIMO-MC 1 (1W+1L)

Maximum Output Power 46.0dBm per port, WCDMA Bandwidth 5.0MHz, LTE Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position M_{RFBW}	(W) 1942.4MHz + (L) 1977.5MHz

Channel Position M_{RFBW} – WCDMA 16QAM / LTE QPSK

No emissions were detected within 20dB of the limit.

Limit	-13dBm / 84.4dBµV/m.

Remarks

The EUT does not exceed -13dBm / 84.4dBµV/m at the measured frequencies.

2.5 CONDUCTED SPURIOUS EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 24, Clause 24.238 (a)
Industry Canada RSS-133, Clause 6.5

2.5.2 Equipment Under Test

RRUS 32 B2, KRC 161 414/1, S/N: D16Q673439

2.5.3 Date of Test and Modification State

17 September to 16 October 2015 - Modification State 0

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Environmental Conditions

Ambient Temperature	23.5 - 25.5°C
Relative Humidity	39.0 - 53.0%

2.5.6 Test Method

The test was applied in accordance with test method requirements of FCC Part 24 and RSS-133.

In accordance with FCC CFR 47 Part 24, Clause 24.238 (a), any emissions outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P)dB, and the measurement should be performed with a resolution bandwidth of 1MHz.

The spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using an attenuator and the frequency spectrum investigated from 9kHz to 20GHz. The resolution bandwidth of 1MHz was employed for frequency band 9kHz to 20GHz. The spectrum analyzer detector was set to RMS.

For MIMO mode configurations, the limit was adjusted with a correction of -6.02dB [10Log4] by using the Measure and Add 10Log(N) dB technique according to FCC KDB 662911 D01 Multiple Transmitter Output v02r01 accounting for simultaneous transmission from antenna ports RF A , B, C and RF D. Then the limit was adjust to -19.02dBm.

The measurements were performed on the output connector RF A. Limited complementary measurement were done at output conector RF B to RF D to verify identical performance for both transmitter chains in MIMO mode.

The maximum path loss across the measurement band was used as the reference level offset to ensure worst case.

The worst results are shown in the plots below.

2.5.7 Test Results

Remark:

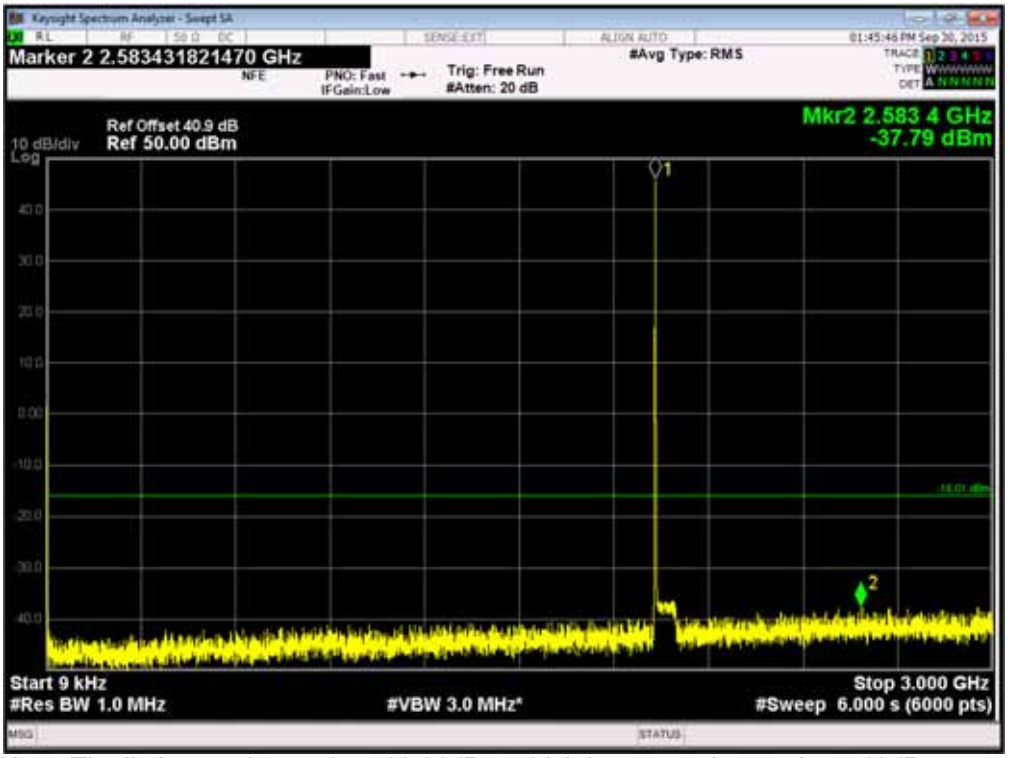
The emissions at 9kHz on the plots was not generated by the test object.

Configuration G-SC

Maximum Output Power 46.0dBm per port

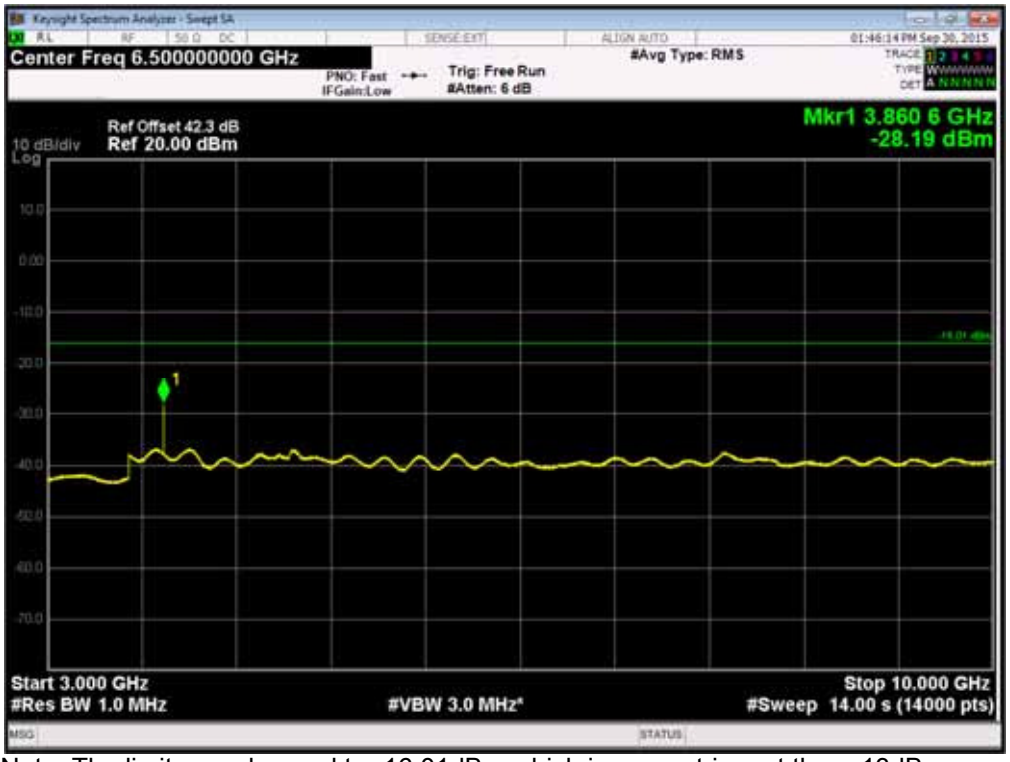
Channel Position	Bandwidth	Channel Frequency
Channel Position B	250 kHz	1930.4MHz
Channel Position M	250 kHz	1960.0MHz
Channel Position T	250 kHz	1989.6MHz

Channel Position B - GMSK - 9kHz - 3GHz



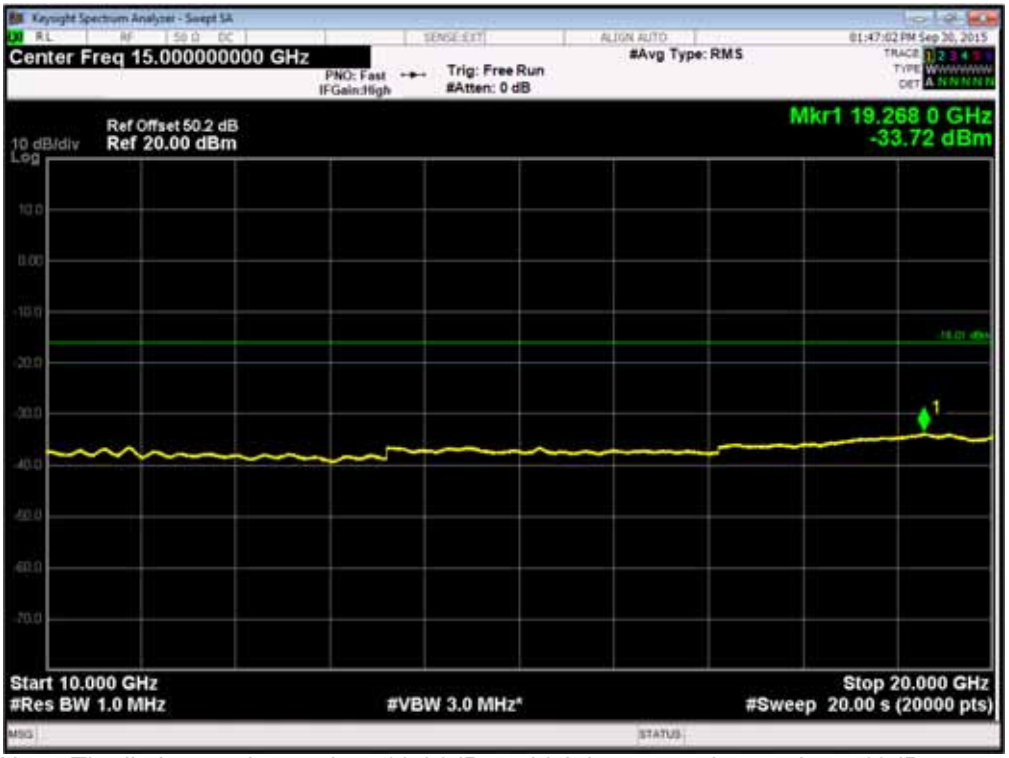
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position B - GMSK - 3GHz - 10GHz



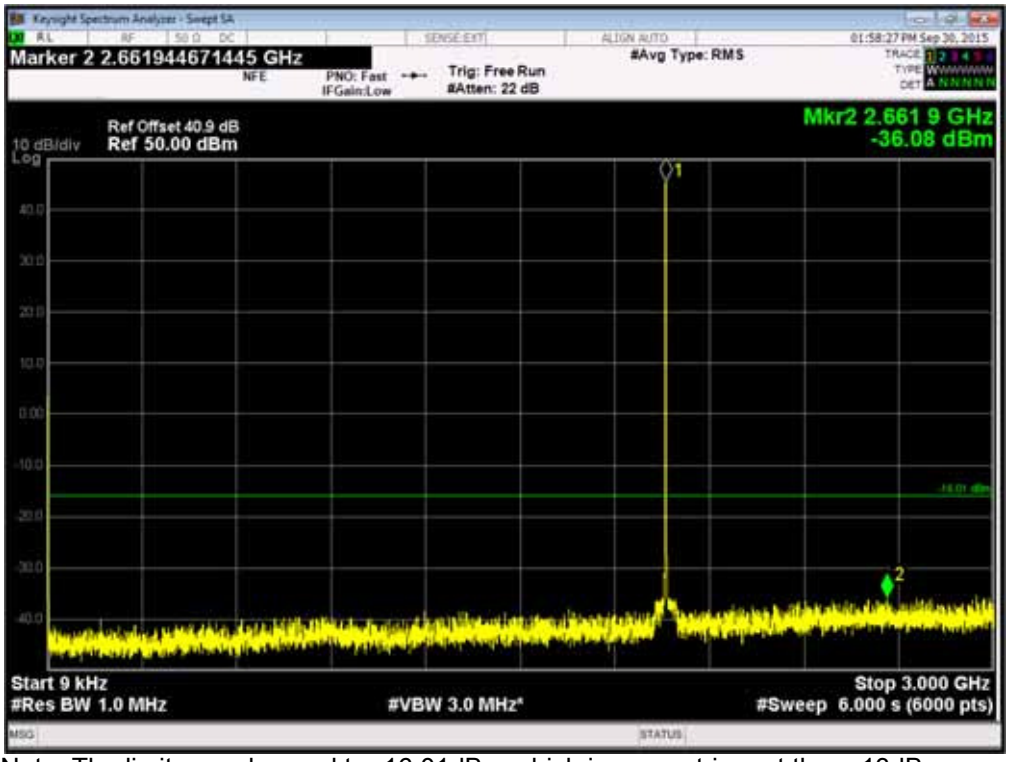
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position B - GMSK - 10GHz - 20GHz



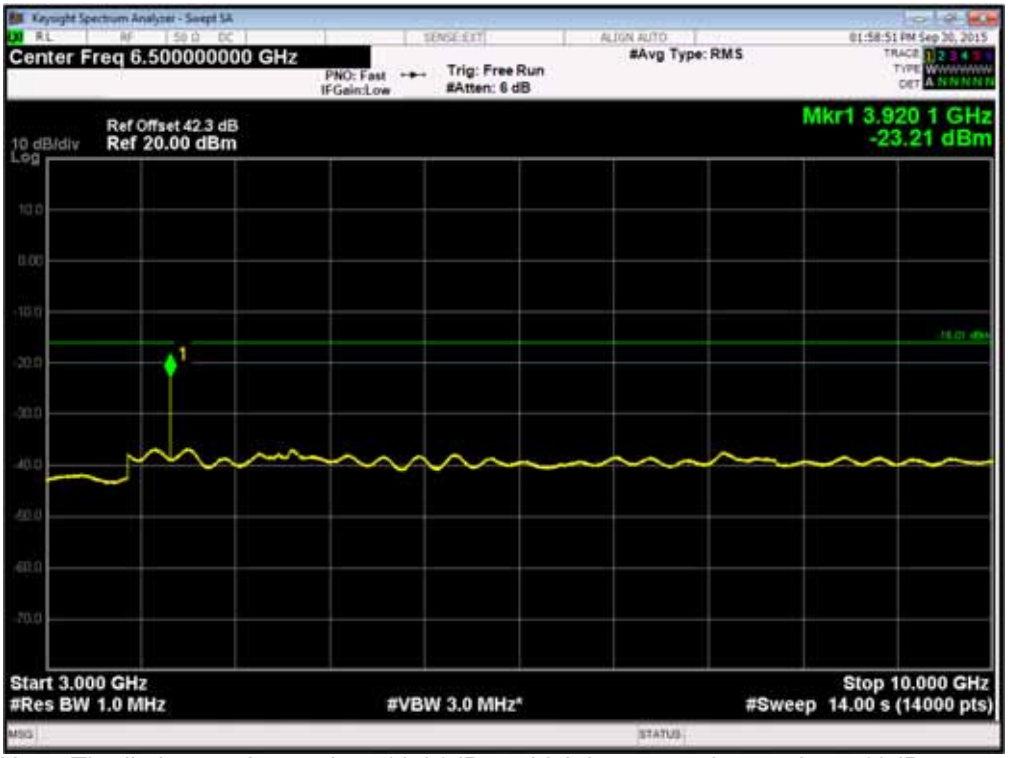
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position M - GMSK - 9kHz - 3GHz



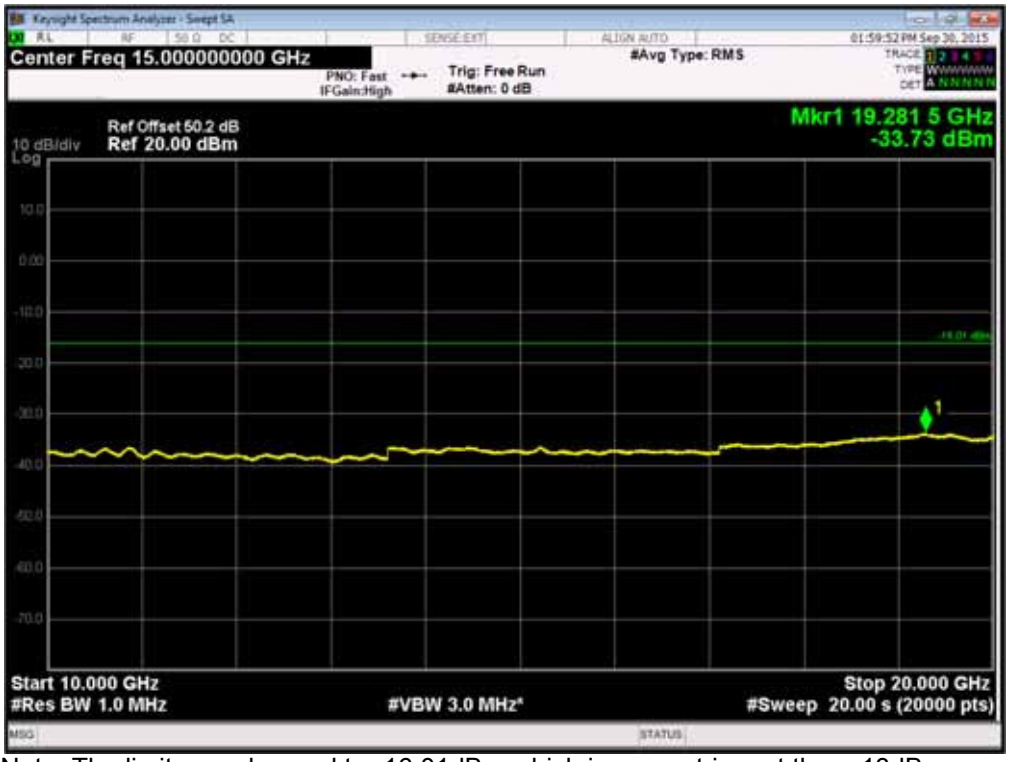
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position M - GMSK - 3GHz - 10GHz



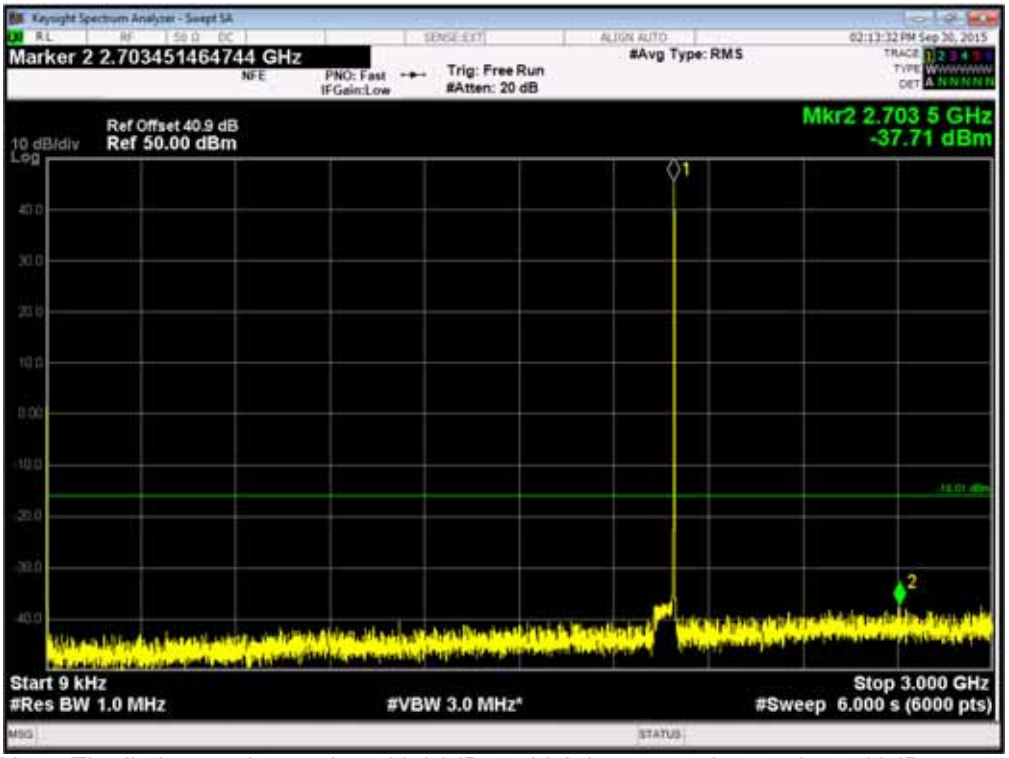
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position M - GMSK - 10GHz - 20GHz



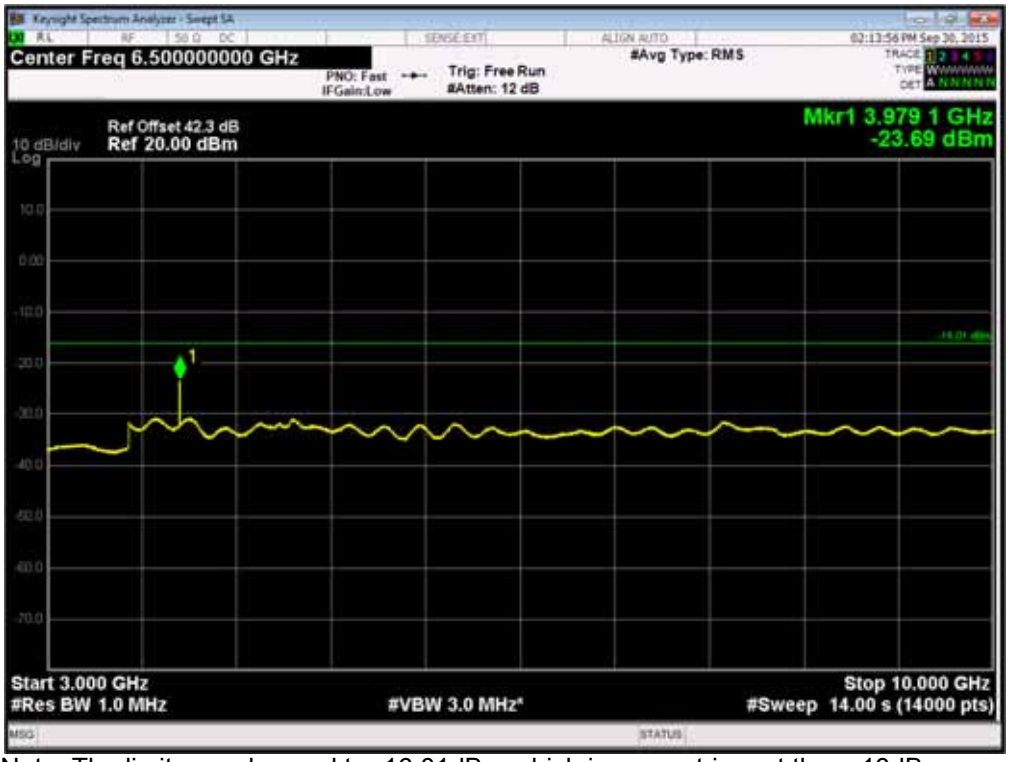
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position T - GMSK - 9kHz - 3GHz



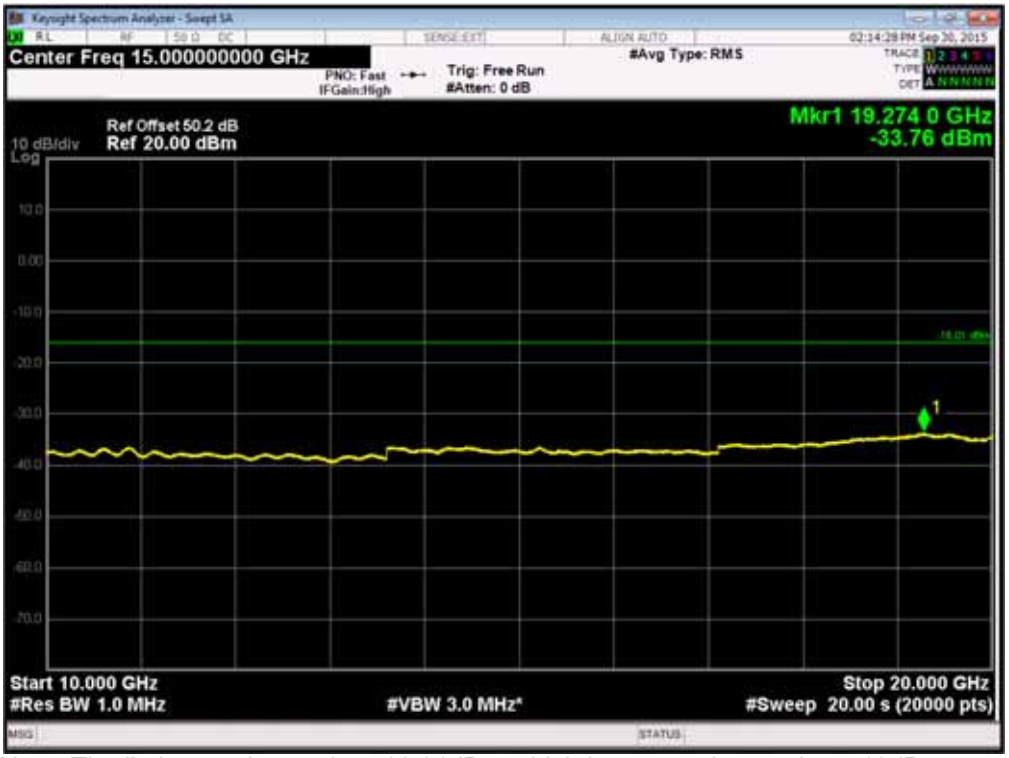
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position T - GMSK - 3GHz - 10GHz



Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position T - GMSK - 10GHz - 20GHz



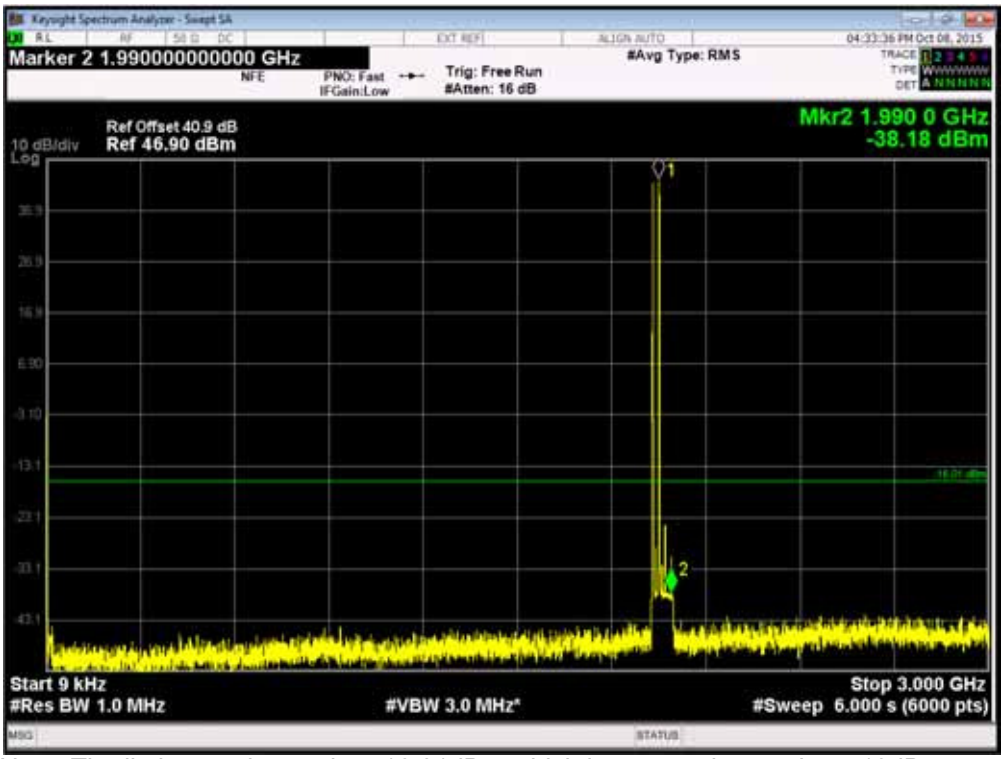
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Configuration G-MC

Maximum Output Power 46.0dBm per port

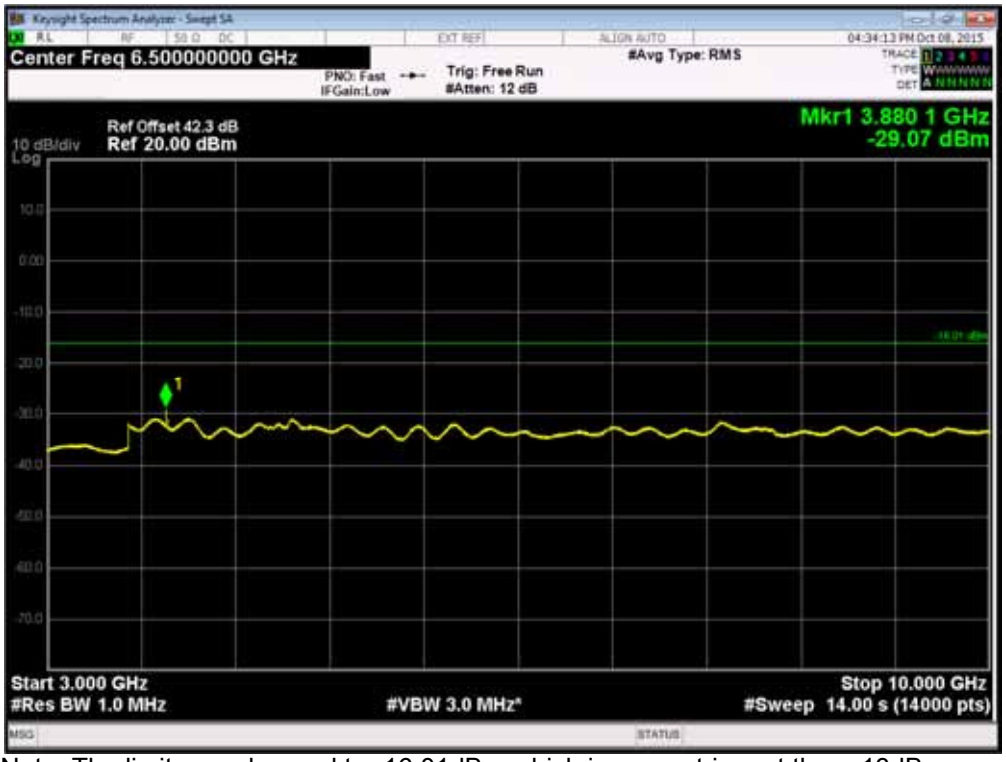
Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	250 kHz	1930.4MHz + 1949.8MHz
Channel Position M_{RFBW}	250 kHz	1950.2MHz + 1969.8MHz
Channel Position T_{RFBW}	250 kHz	1970.2MHz + 1989.6MHz

Channel Position B_{RFBW} - GMSK - 9kHz - 3GHz



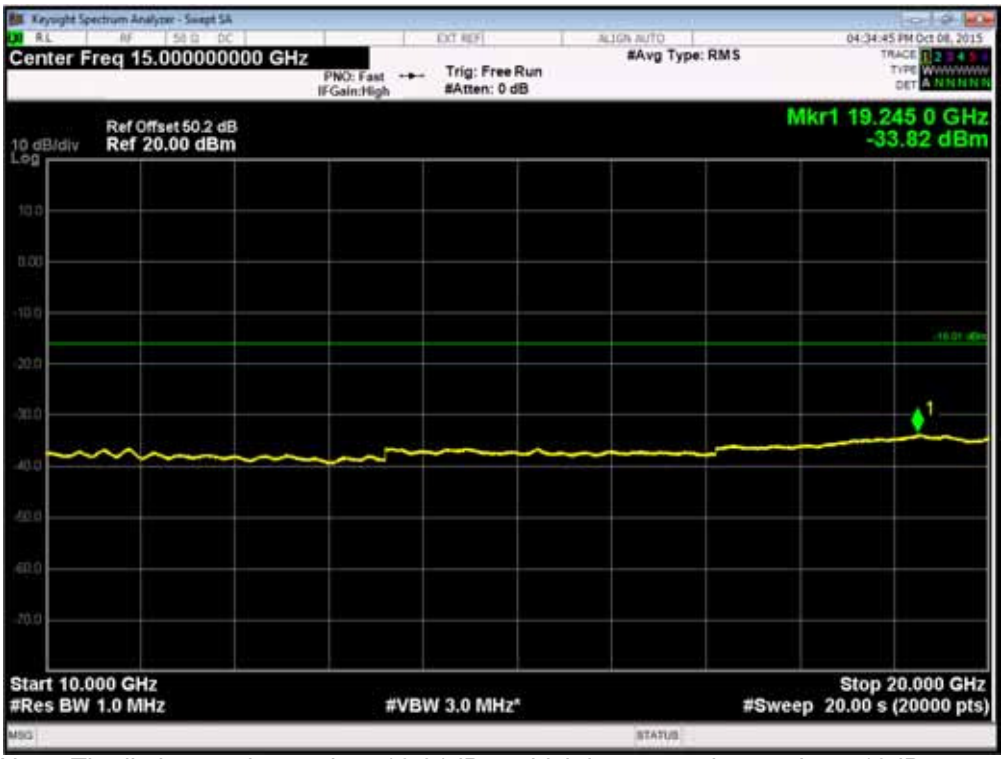
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position B_{RFBW} - GMSK - 3GHz - 10GHz



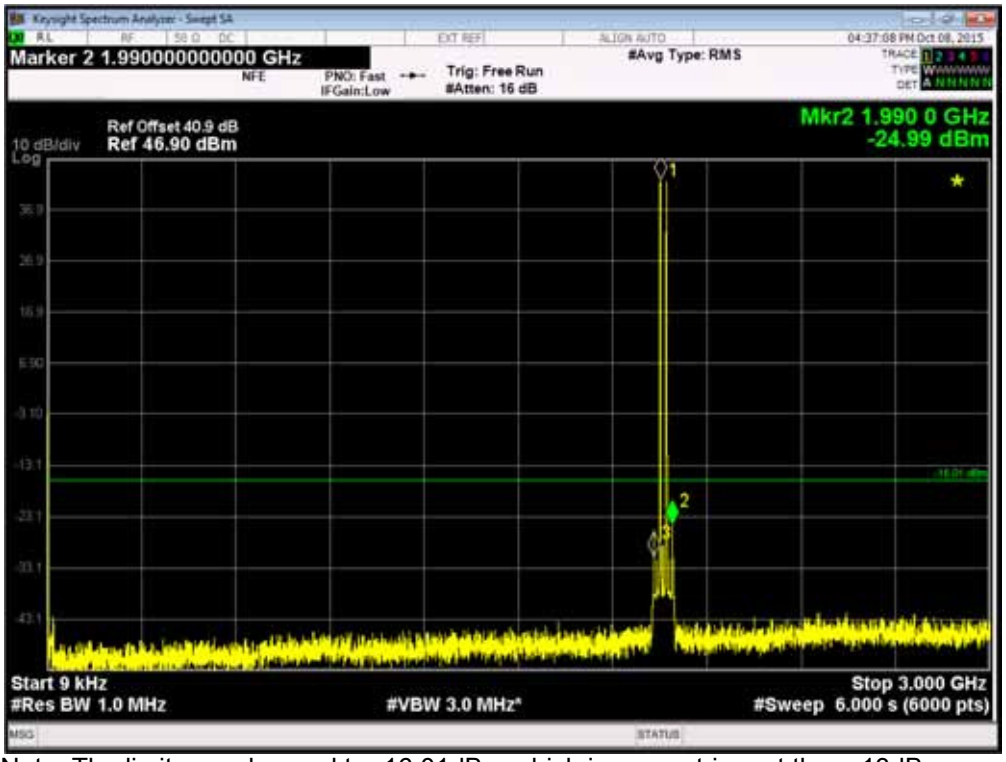
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position B_{RFBW} - GMSK - 10GHz - 20GHz



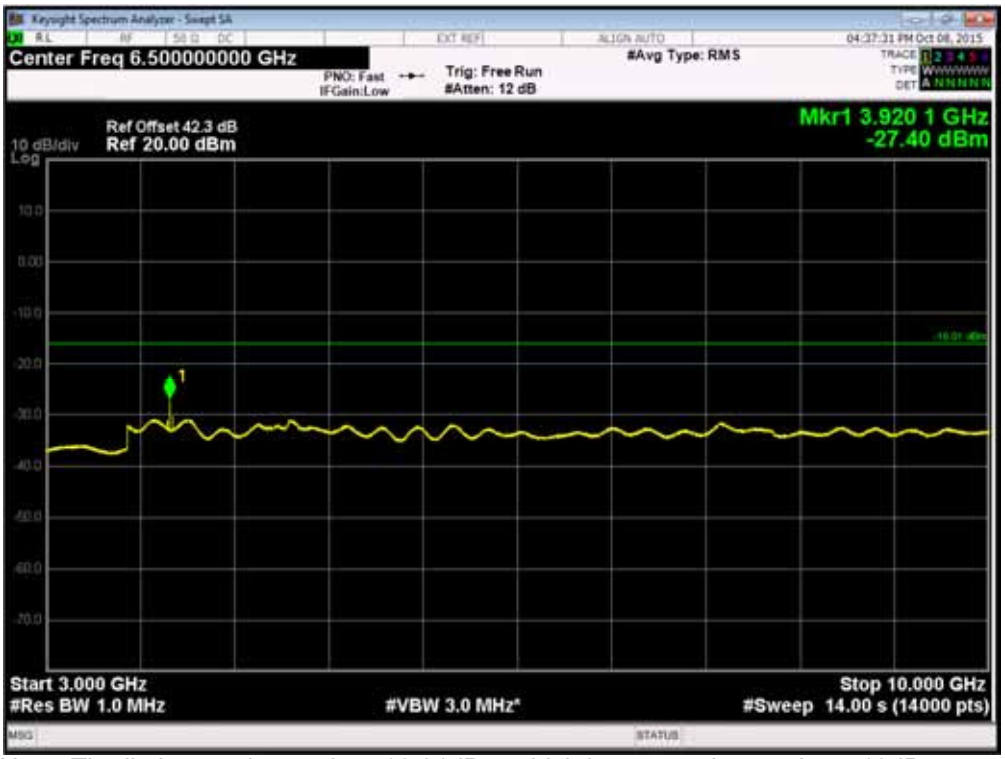
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position M_{RFBW} - GMSK - 9kHz - 3GHz



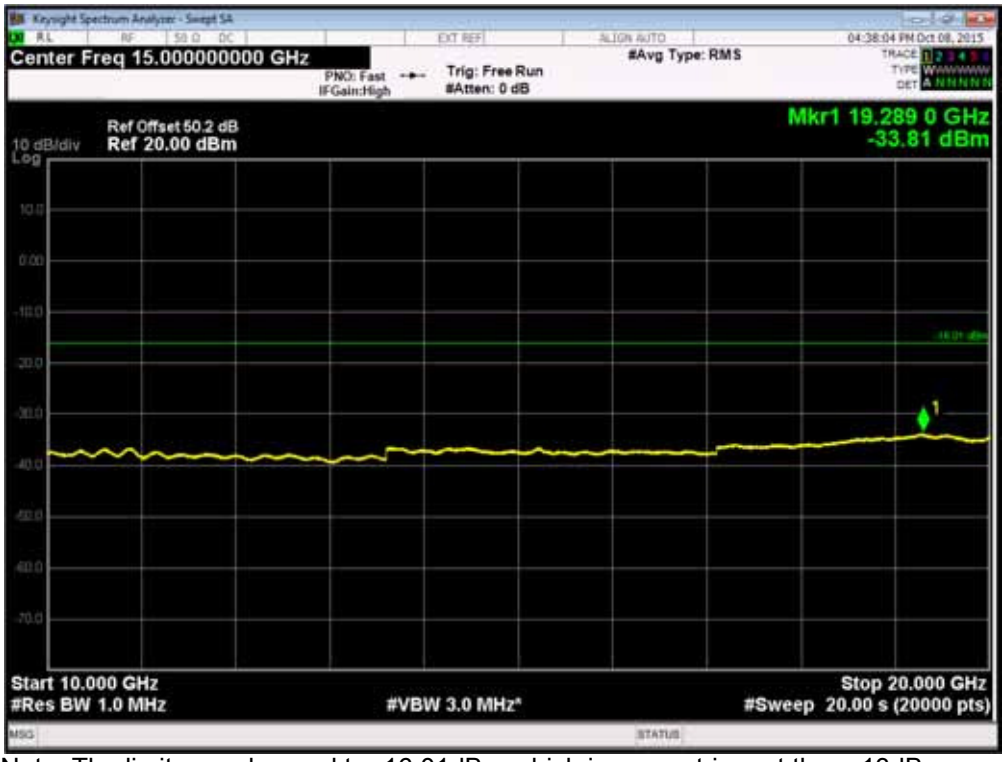
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position M_{RFBW} - GMSK - 3GHz - 10GHz



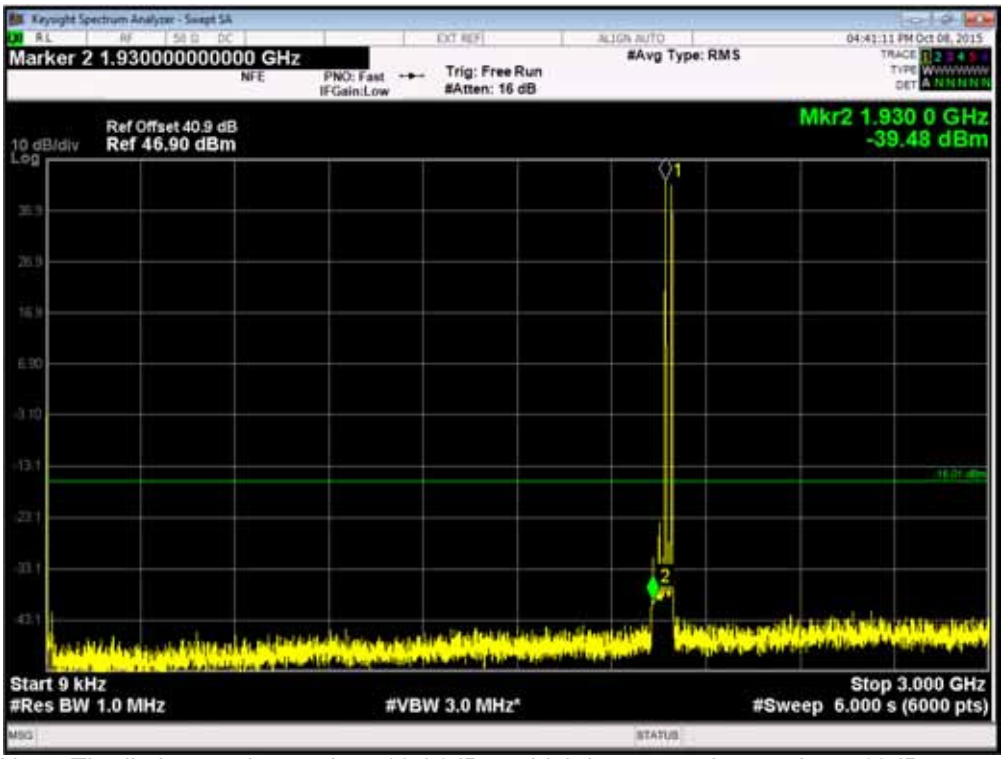
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position M_{RFBW} - GMSK - 10GHz - 20GHz



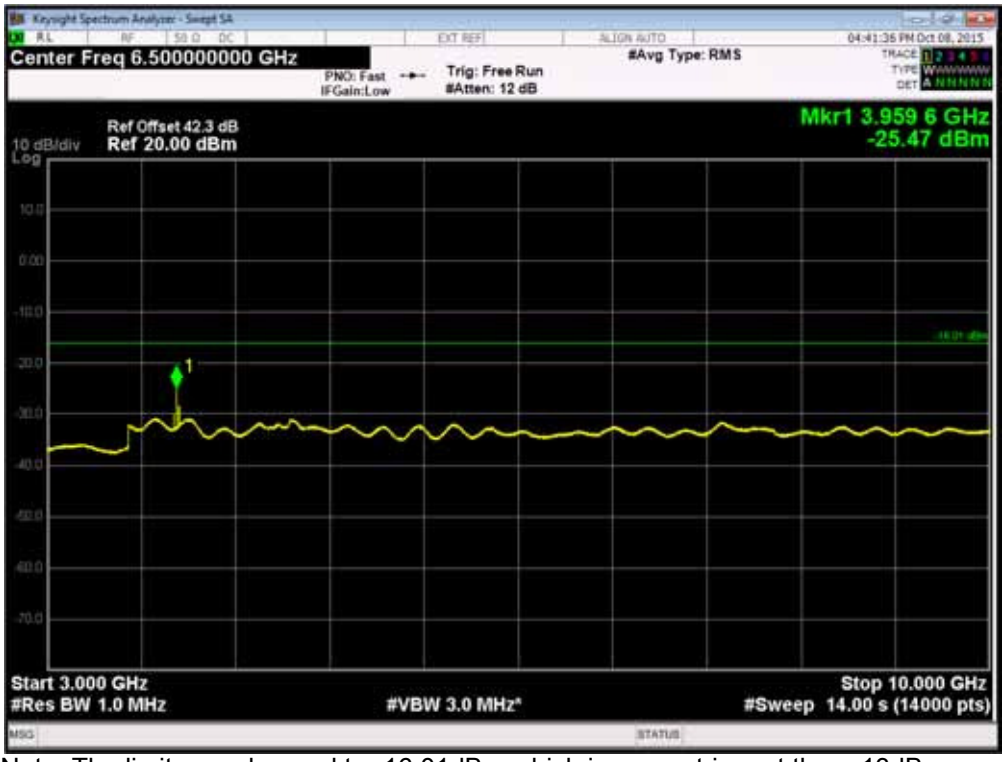
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position T_{RFBW} - GMSK - 9kHz - 3GHz



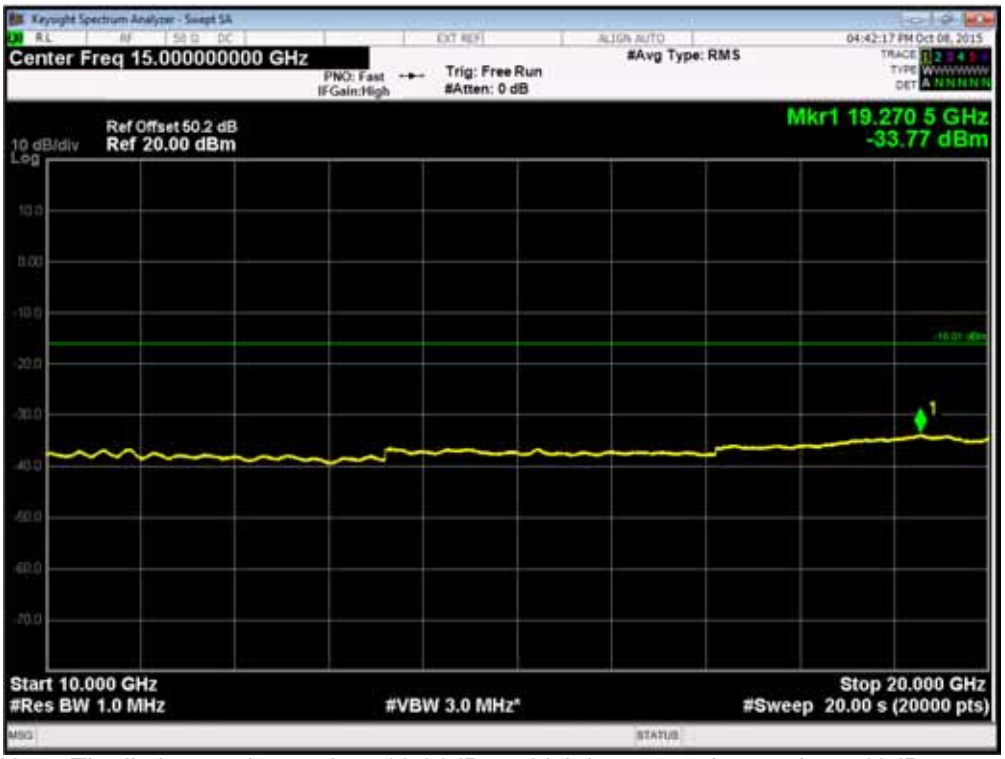
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position T_{RFBW} - GMSK - 3GHz - 10GHz



Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Channel Position T_{RFBW} - GMSK - 10GHz - 20GHz



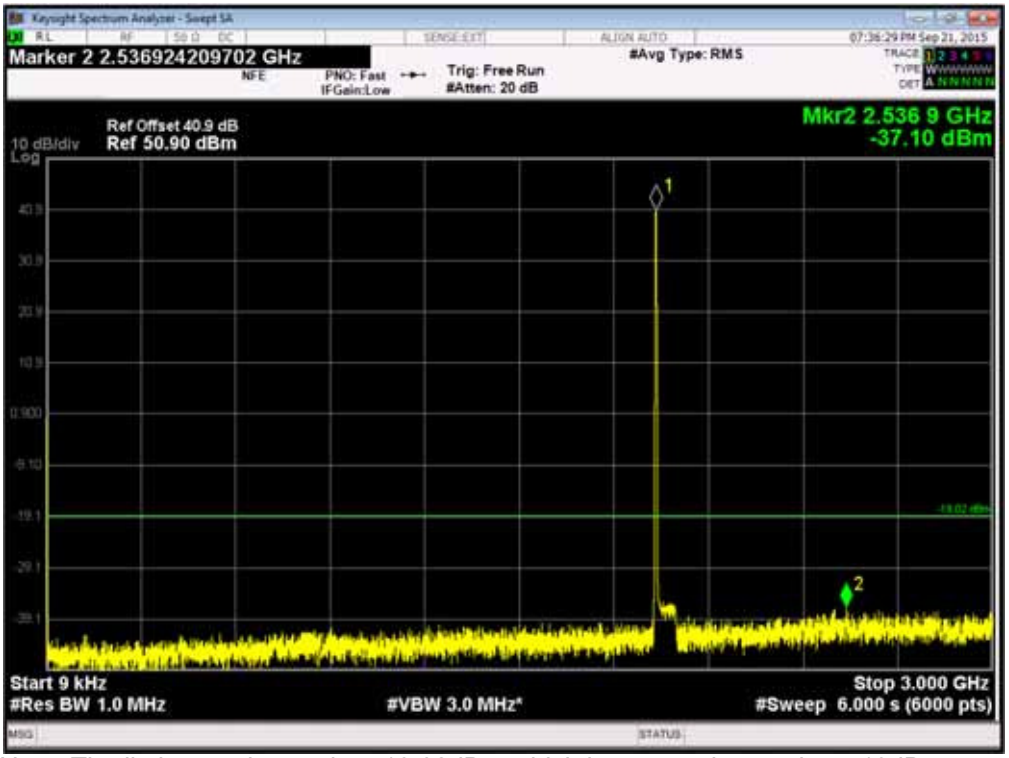
Note: The limit was changed to -16.01dBm which is more stringent than -13dBm.

Configuration W-SC

Maximum Output Power 46.0dBm per port

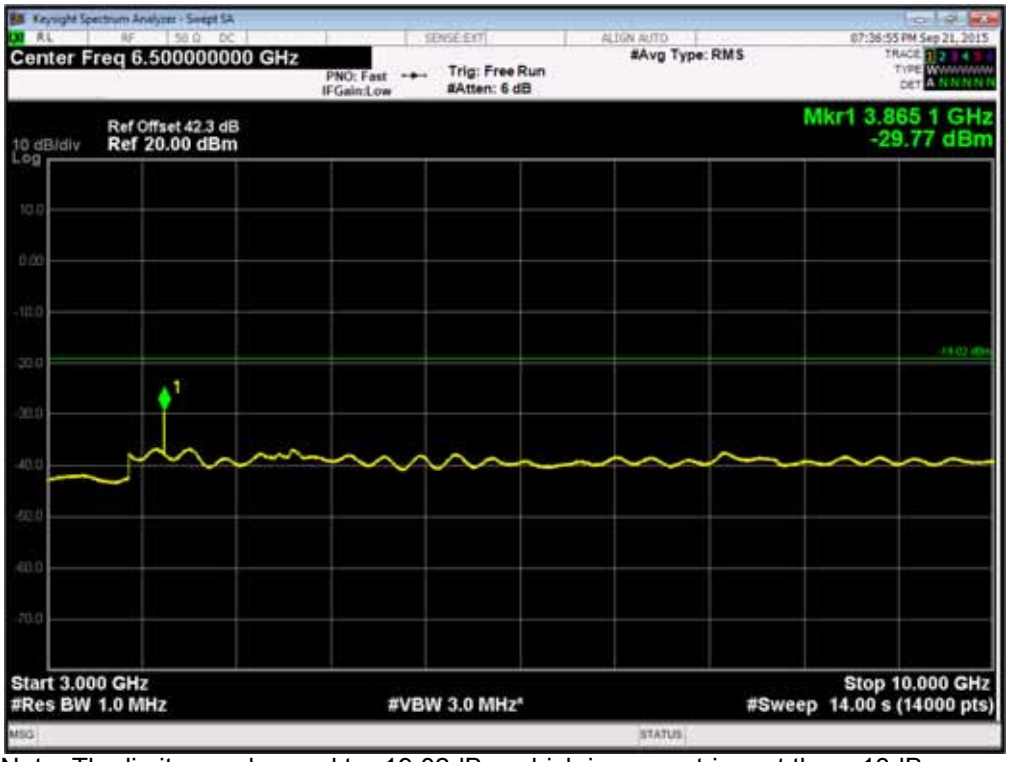
Channel Position	Bandwidth	Channel Frequency
Channel Position B	5.0 MHz	1932.4MHz
Channel Position M	5.0 MHz	1960.0MHz
Channel Position T	5.0 MHz	1987.6MHz

Channel Position B - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



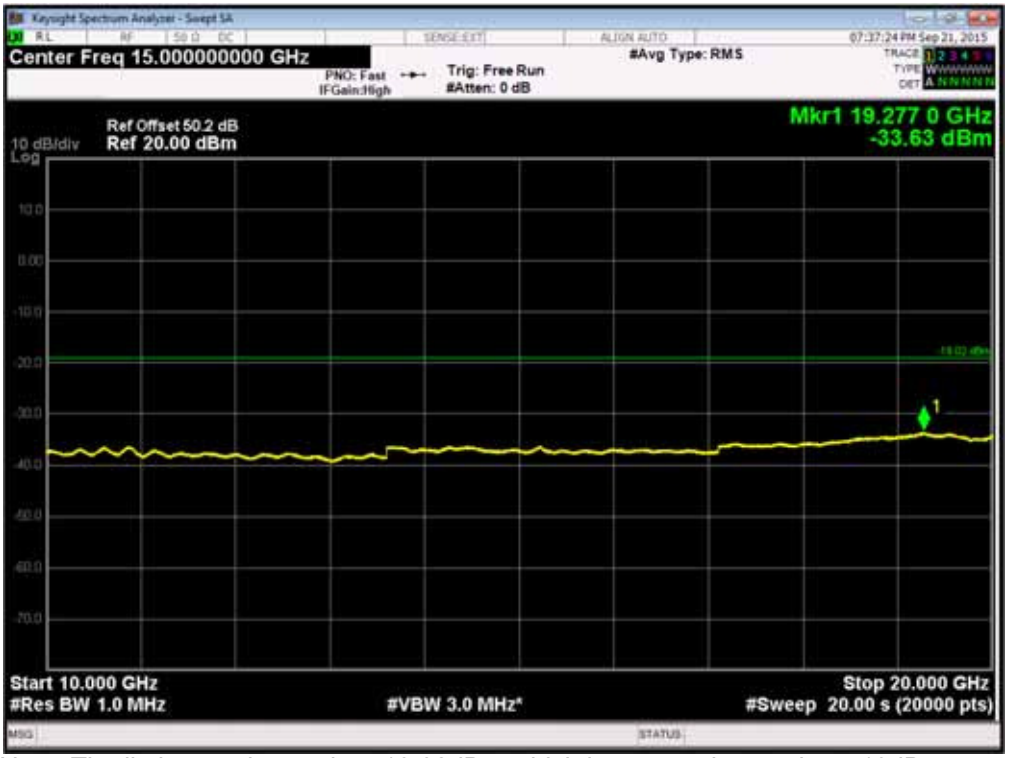
Note: The limit was changed to -19.02dBm which is more stringent than -13dBm.

Channel Position B - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



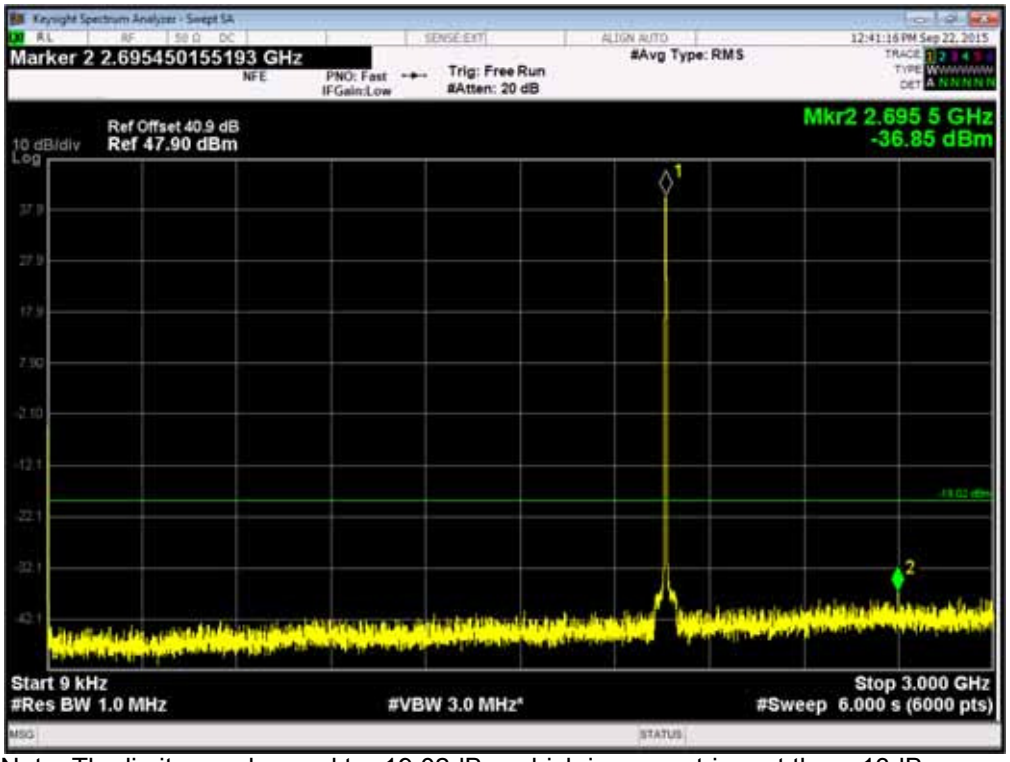
Note: The limit was changed to -19.02dBm which is more stringent than -13dBm.

Channel Position B - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



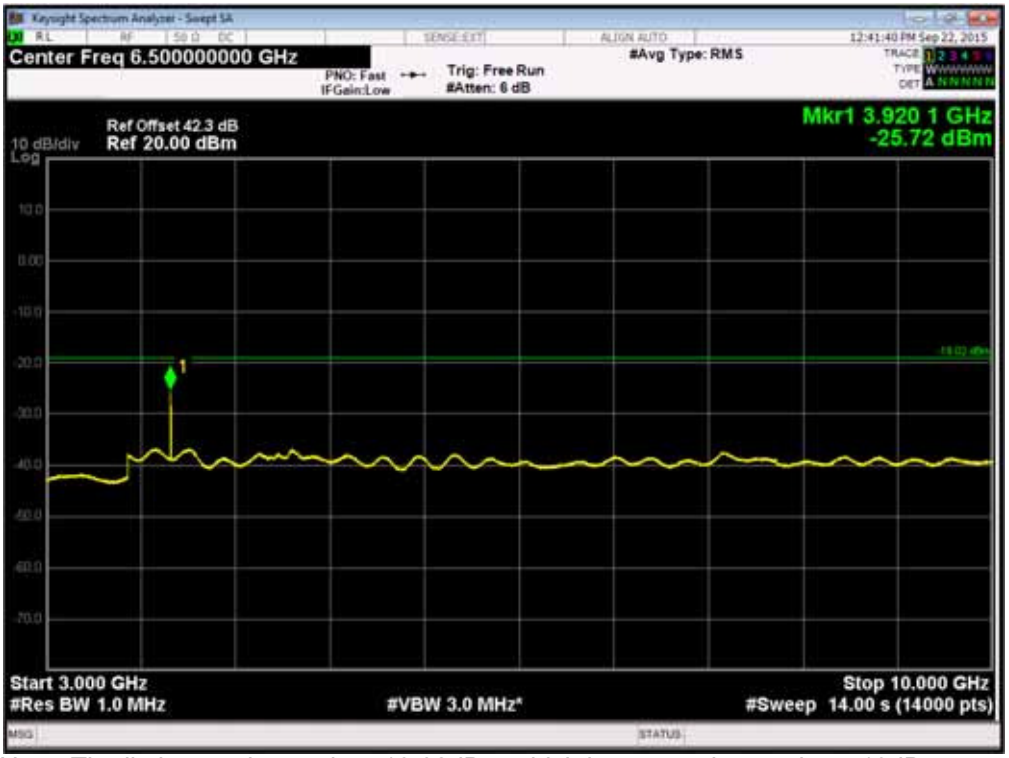
Note: The limit was changed to -19.02dBm which is more stringent than -13dBm.

Channel Position M - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



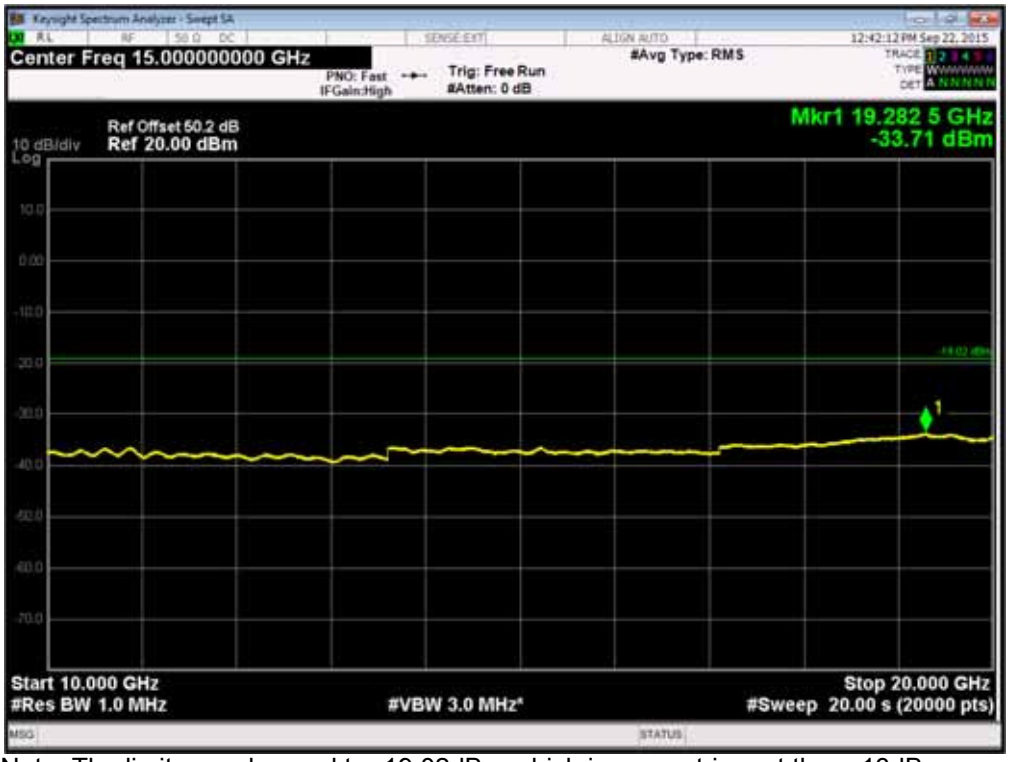
Note: The limit was changed to -19.02dBm which is more stringent than -13dBm.

Channel Position M - QPSK / Bandwidth 5.0MHz - 3GHz – 10GHz



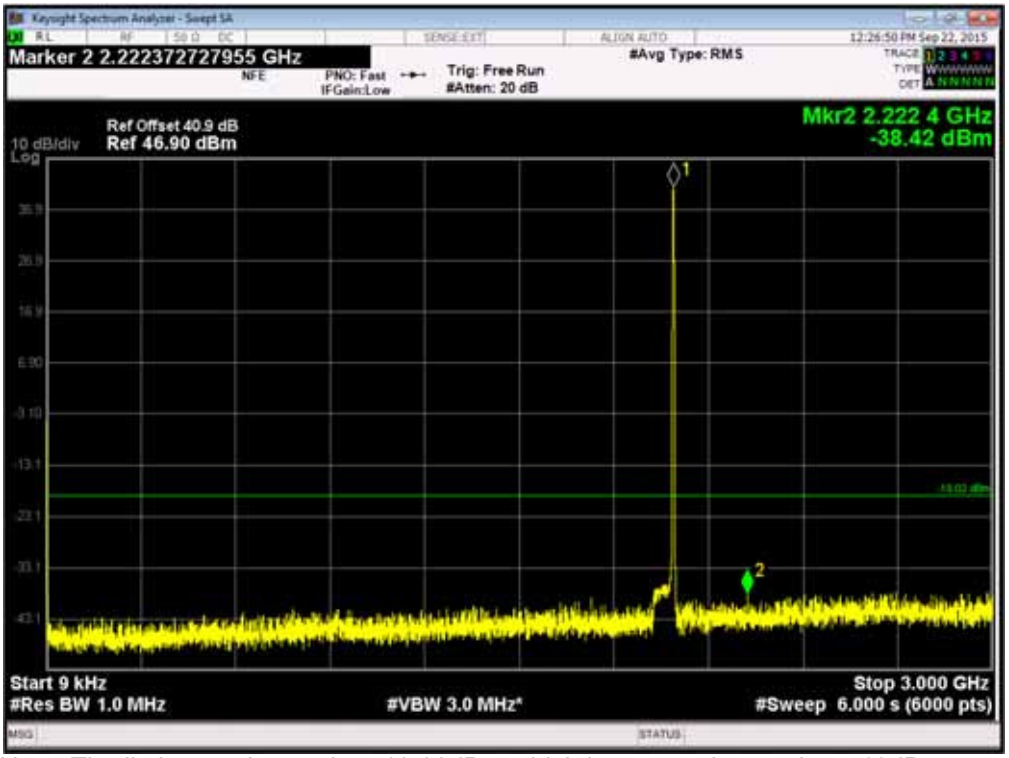
Note: The limit was changed to -19.02dBm which is more stringent than -13dBm.

Channel Position M - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



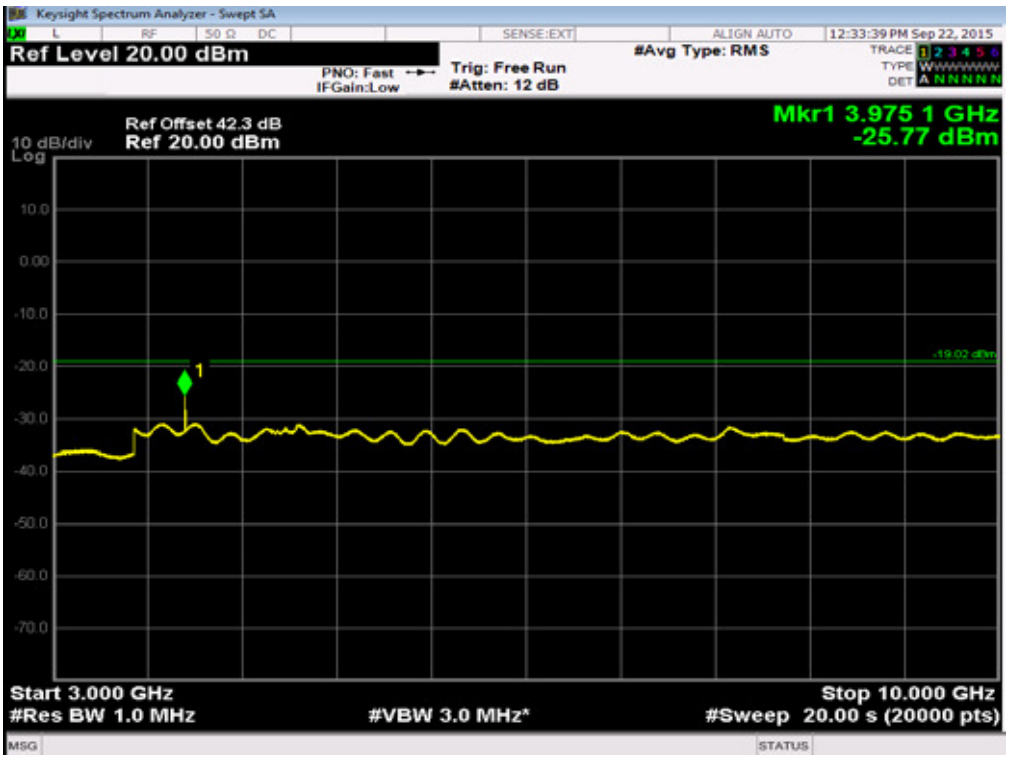
Note: The limit was changed to -19.02dBm which is more stringent than -13dBm.

Channel Position T - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



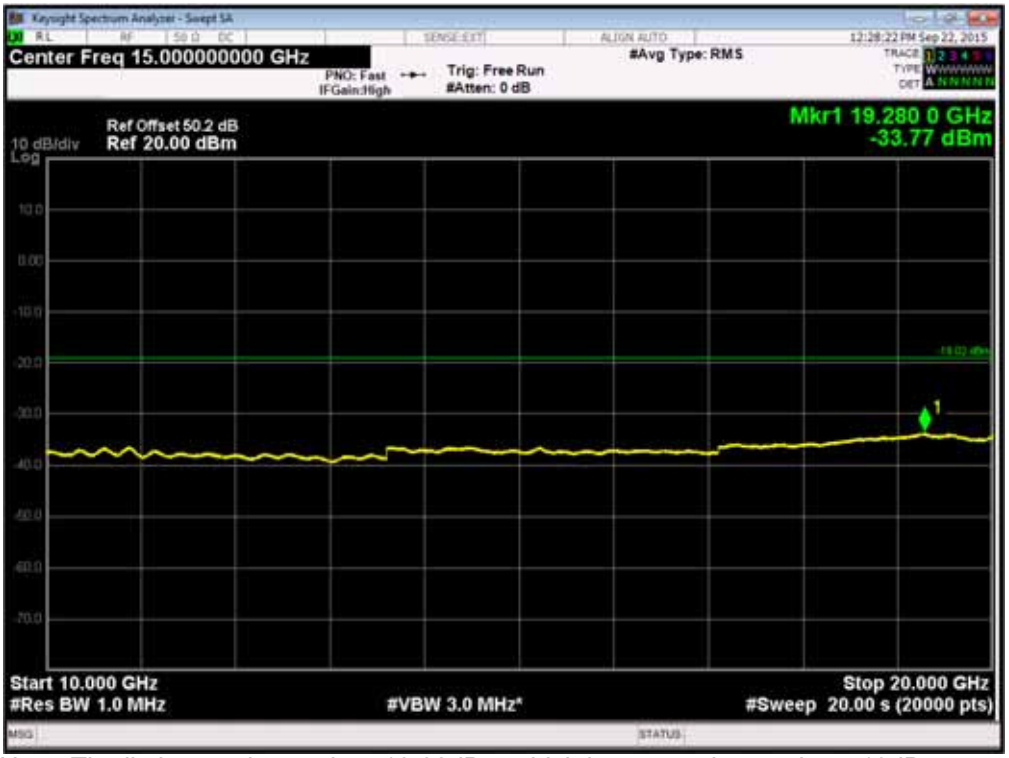
Note: The limit was changed to -19.02dBm which is more stringent than -13dBm.

Channel Position T - QPSK / Bandwidth 5.0MHz - 3GHz – 10GHz



Note: The limit was changed to -19.02dBm which is more stringent than -13dBm.

Channel Position T - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



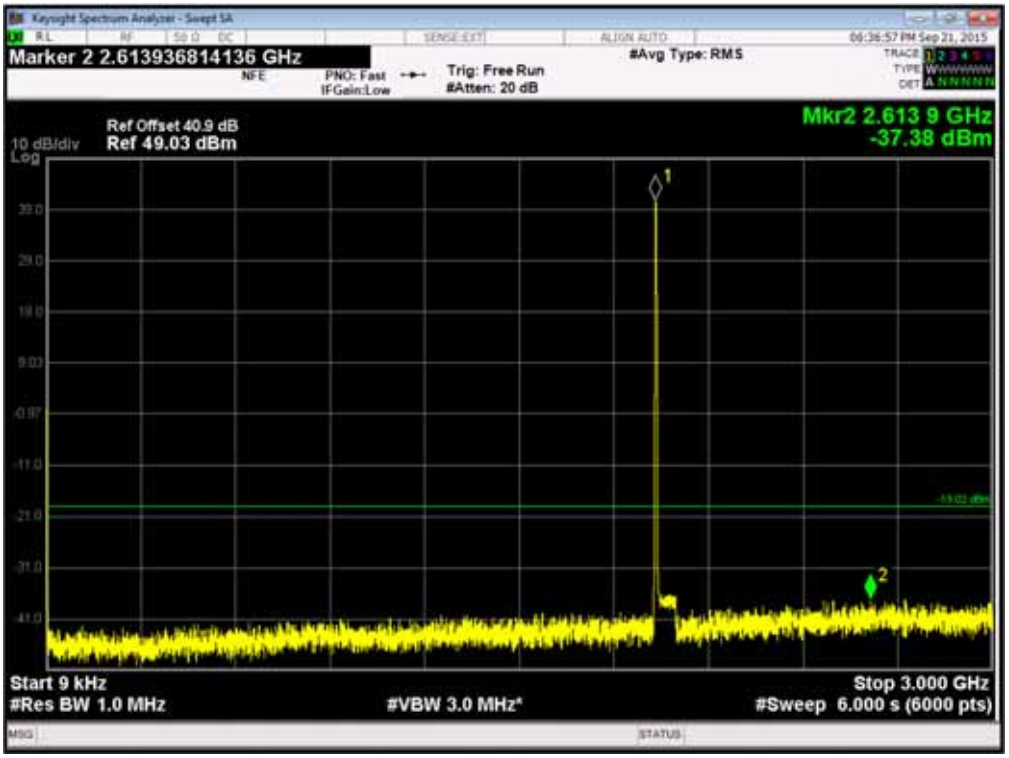
Note: The limit was changed to -19.02dBm which is more stringent than -13dBm.

Configuration W-MIMO-SC

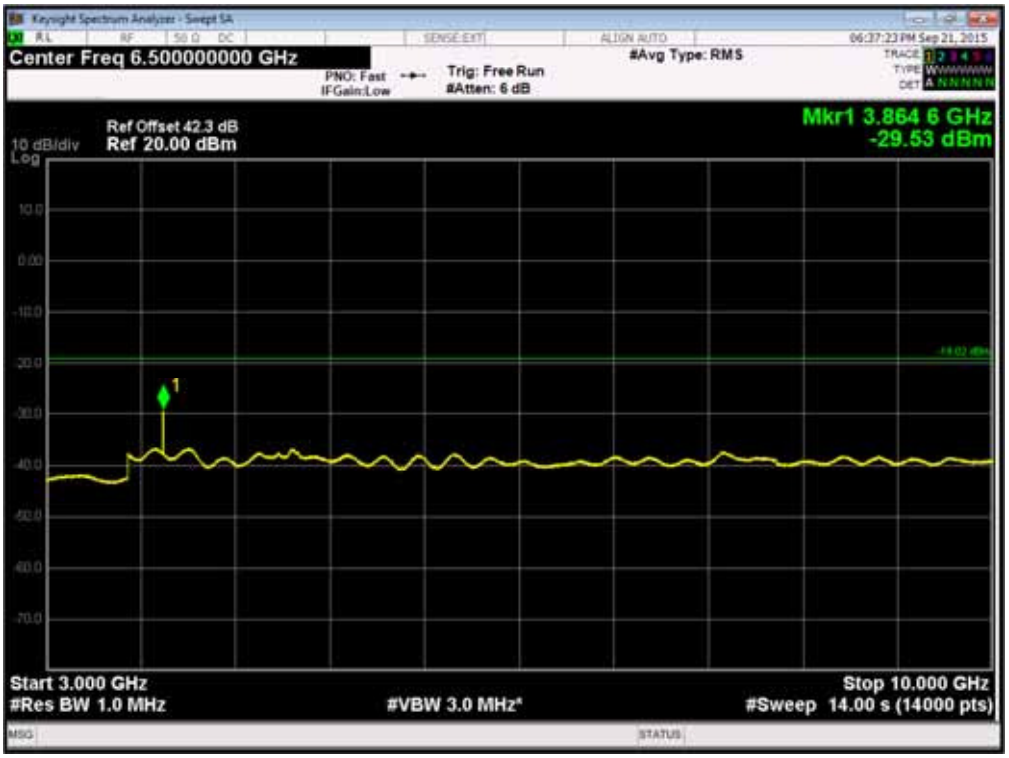
Maximum Output Power 46.0dBm per port

Channel Position	Bandwidth	Channel Frequency
Channel Position B	5.0 MHz	1932.4MHz
Channel Position M	5.0 MHz	1960.0MHz
Channel Position T	5.0 MHz	1987.6MHz

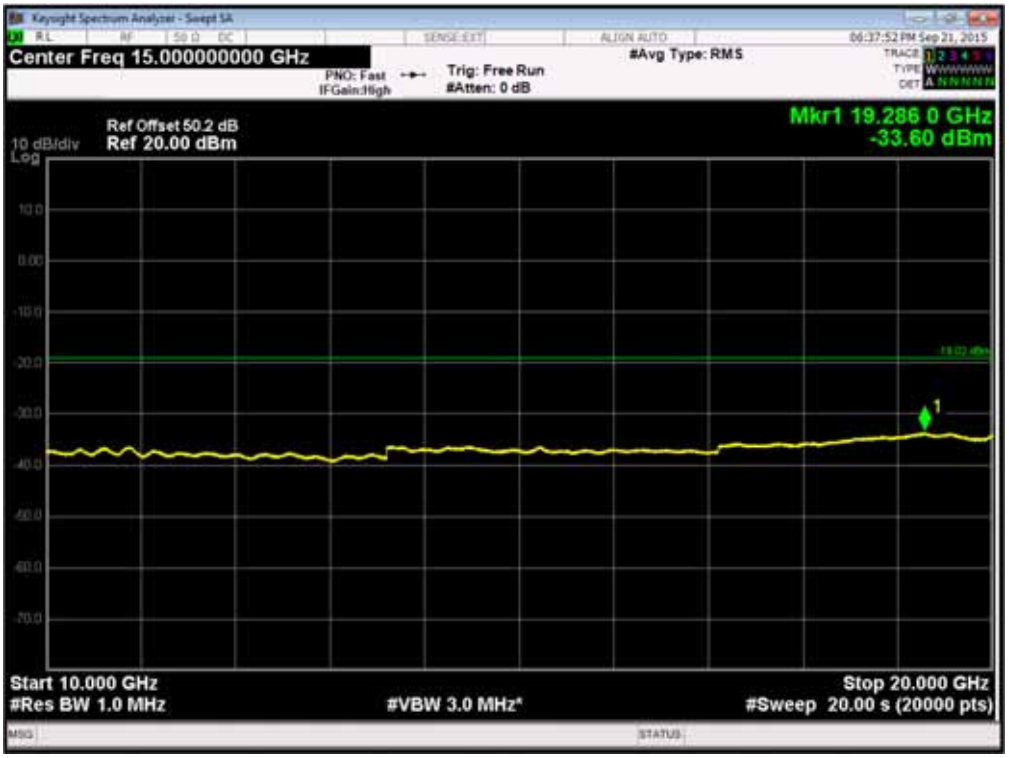
Channel Position B - 16QAM / Bandwidth 5.0MHz - 9kHz - 3GHz



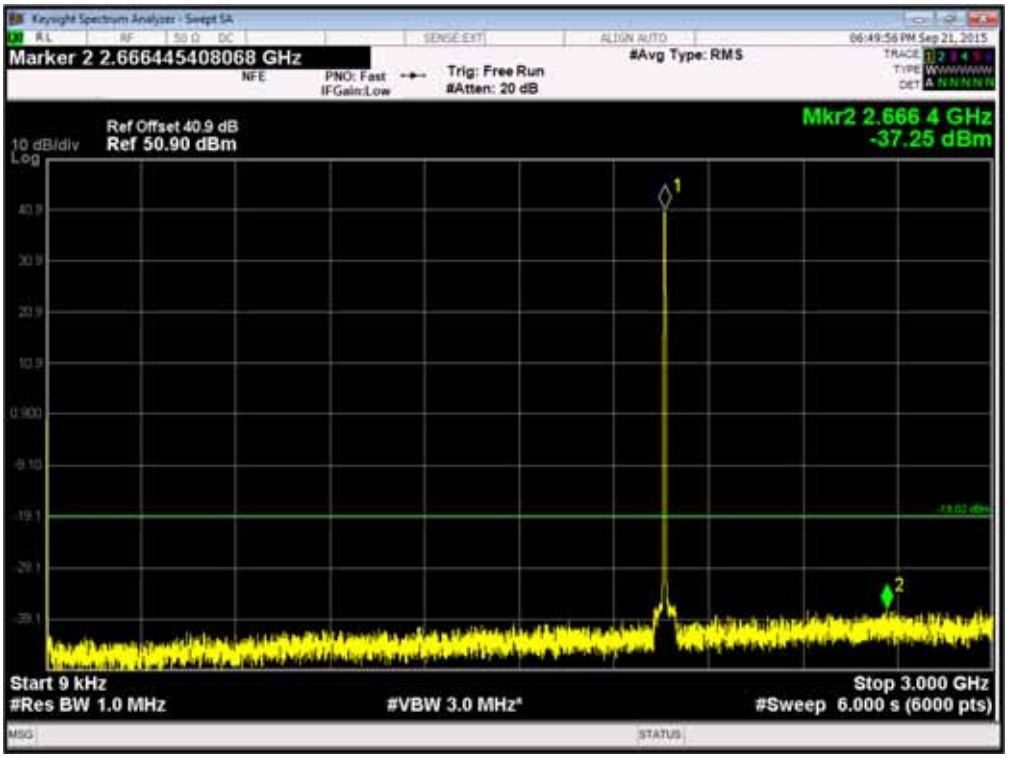
Channel Position B - 16QAM / Bandwidth 5.0MHz - 3GHz - 10GHz



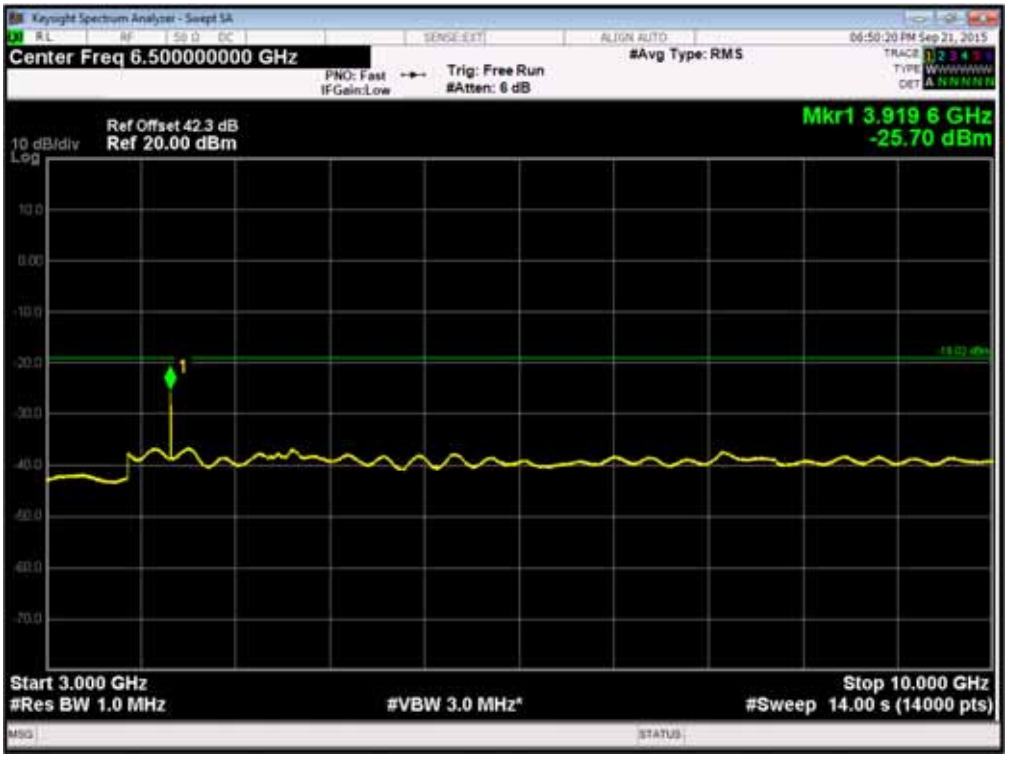
Channel Position B - 16QAM / Bandwidth 5.0MHz - 10GHz - 20GHz



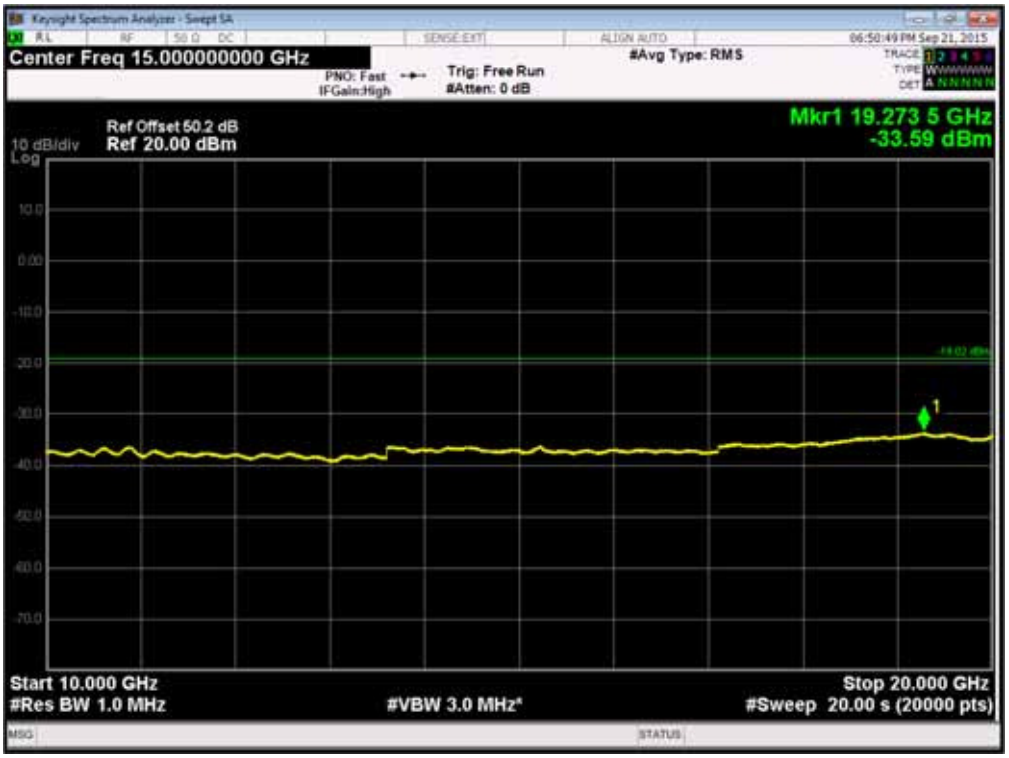
Channel Position M - 16QAM / Bandwidth 5.0MHz - 9kHz - 3GHz



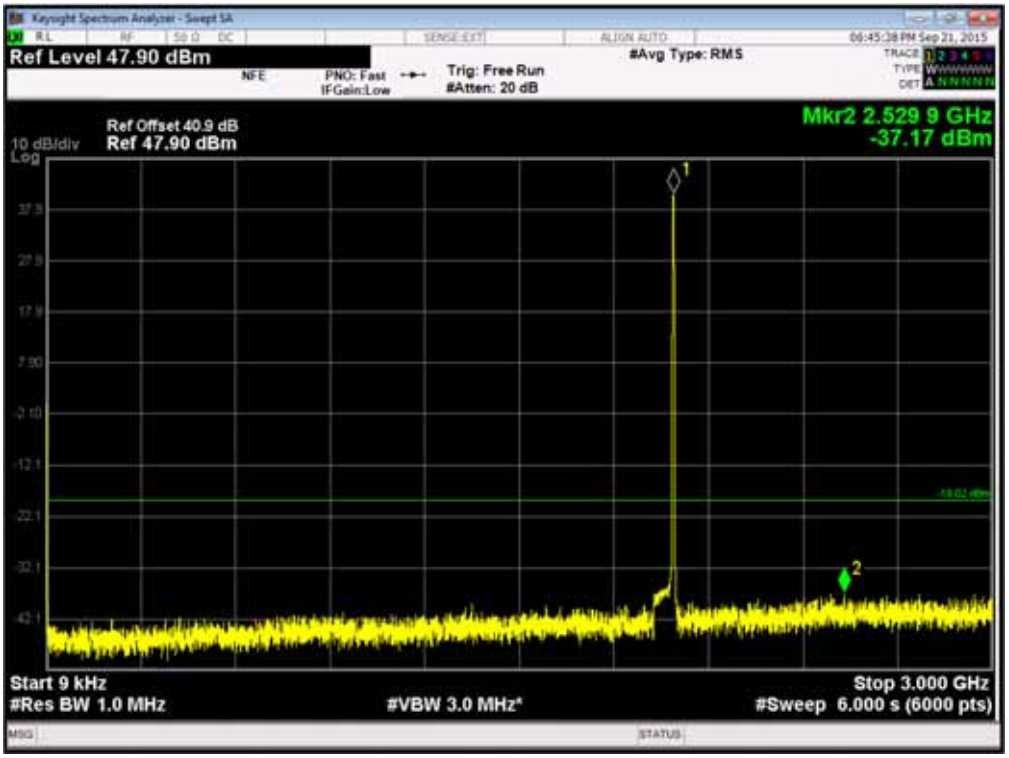
Channel Position M - 16QAM / Bandwidth 5.0MHz - 3GHz - 10GHz



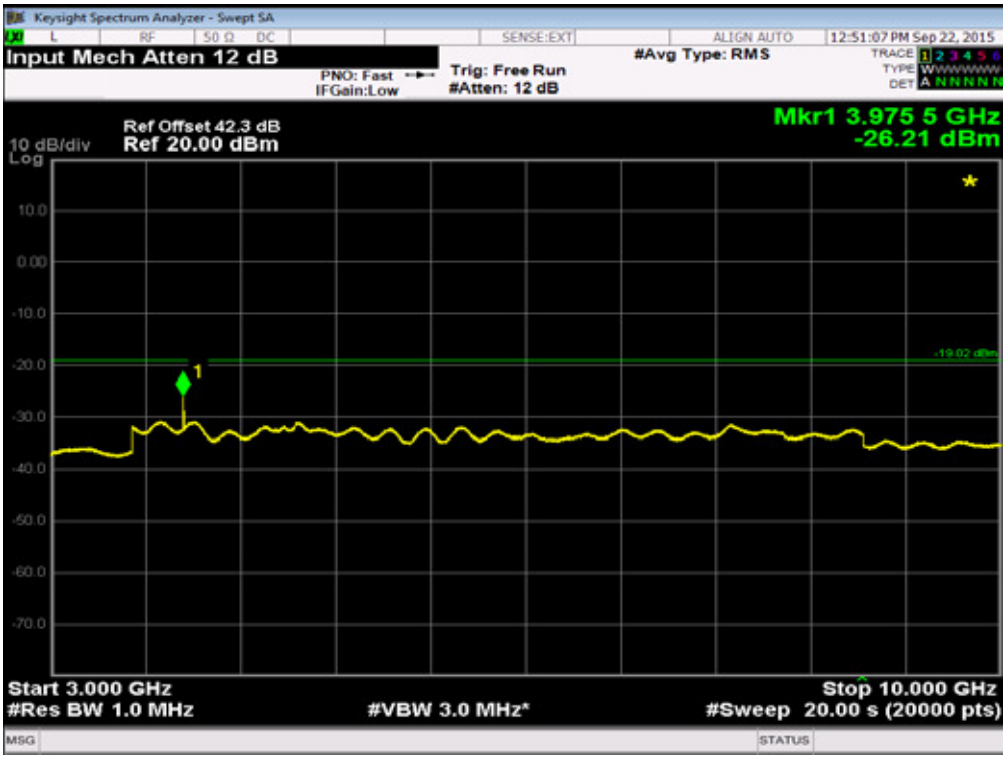
Channel Position M - 16QAM / Bandwidth 5.0MHz - 10GHz - 20GHz



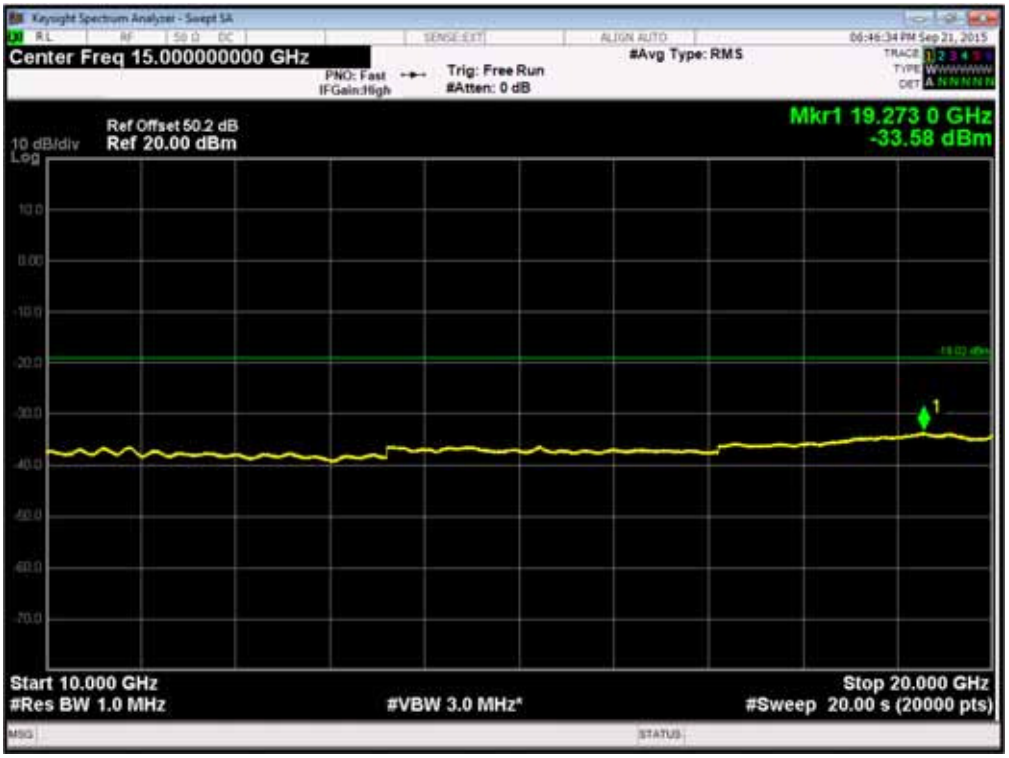
Channel Position T - 16QAM / Bandwidth 5.0MHz - 9kHz - 3GHz



Channel Position T - 16QAM / Bandwidth 5.0MHz - 3GHz - 10GHz



Channel Position T - 16QAM / Bandwidth 5.0MHz - 10GHz - 20GHz

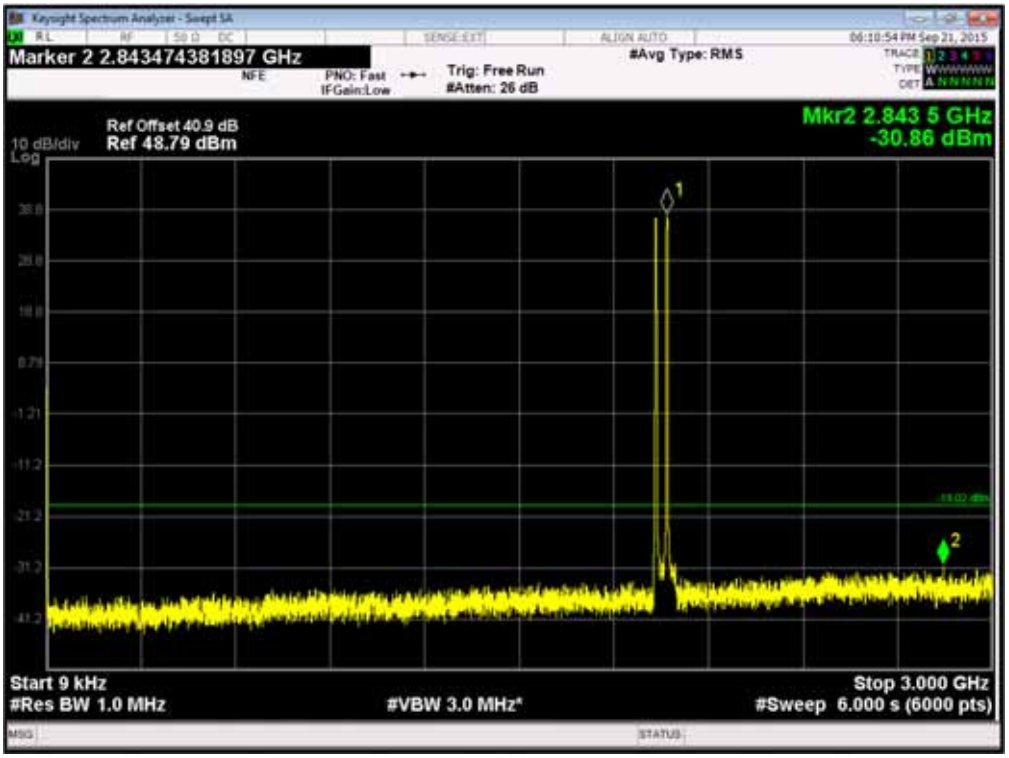


Configuration W-MIMO-MC (2C)

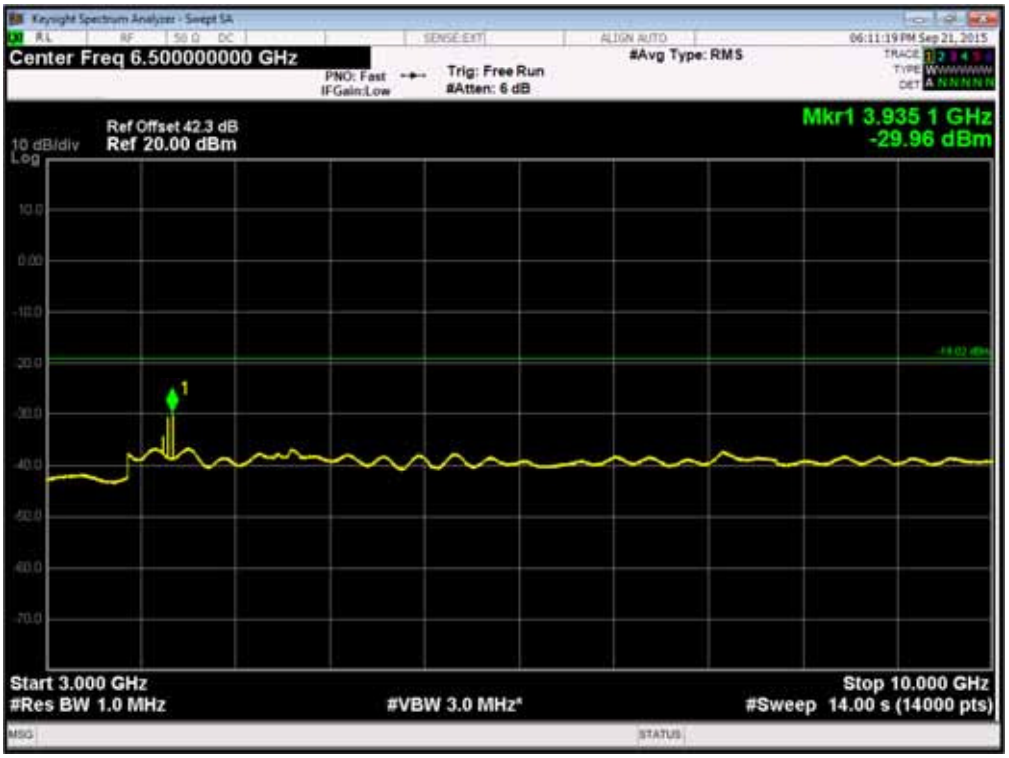
Maximum Output Power 46.0dBm per port

Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	5.0 MHz	1932.4MHz + 1967.6MHz
Channel Position M_{RFBW}	5.0 MHz	1942.4MHz + 1977.6MHz
Channel Position T_{RFBW}	5.0 MHz	1952.4MHz + 1987.6MHz

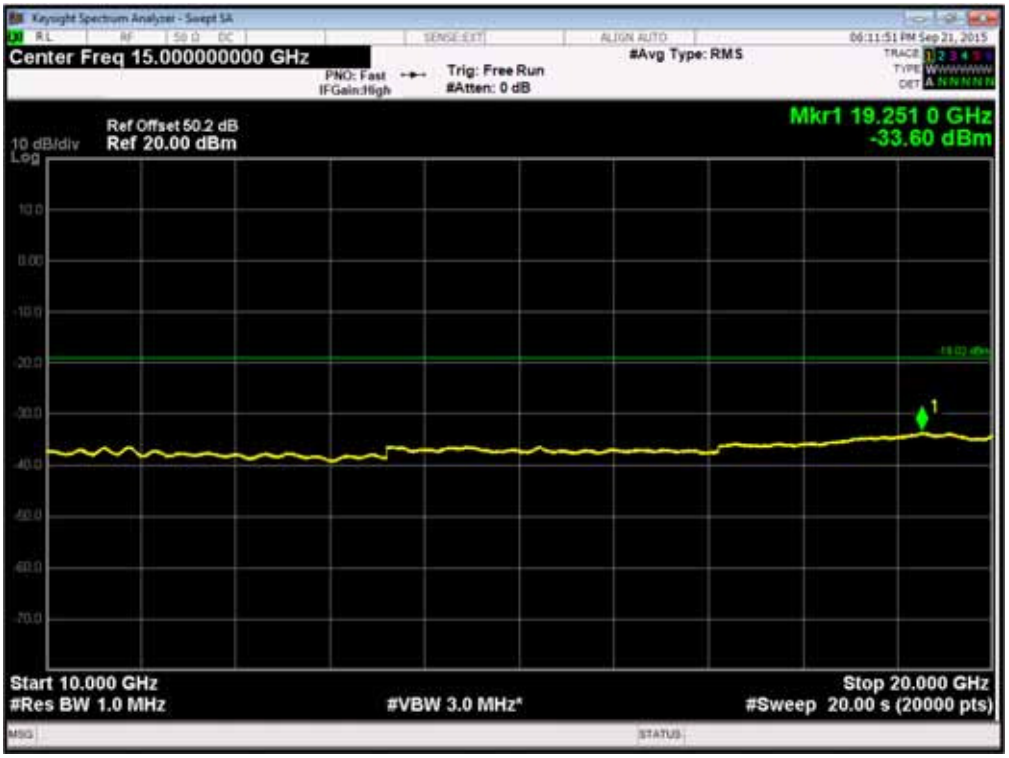
Channel Position B_{RFBW} - 16QAM / Bandwidth 5.0MHz - 9kHz - 3GHz



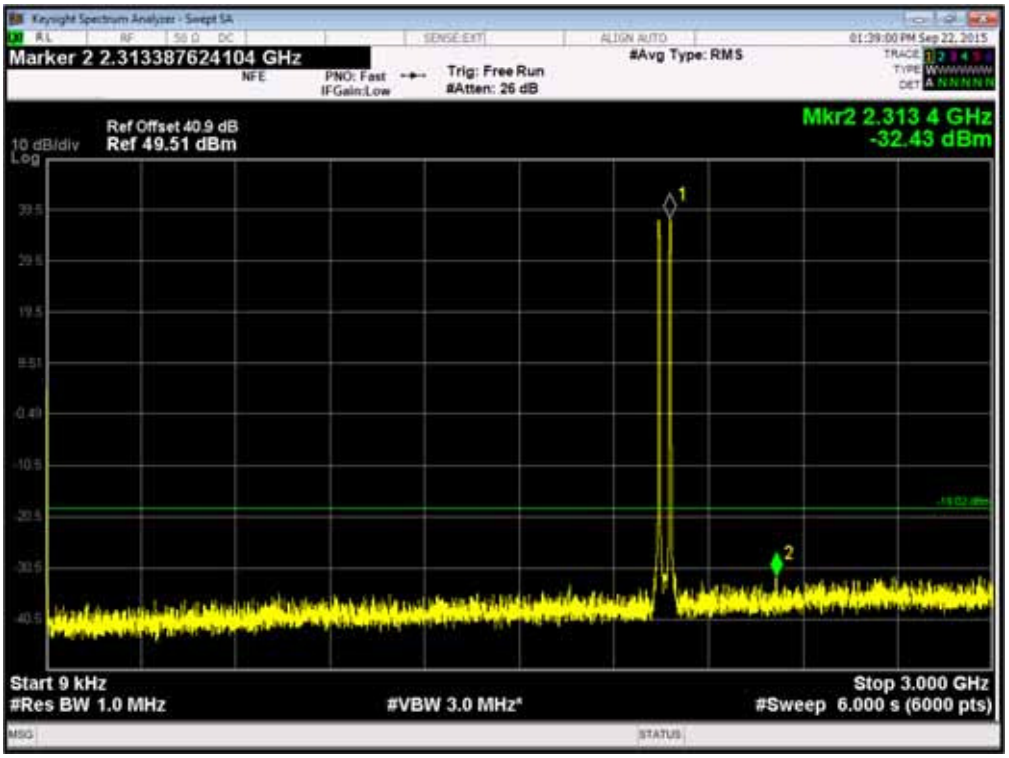
Channel Position B_{RFBW} - 16QAM / Bandwidth 5.0MHz - 3GHz - 10GHz



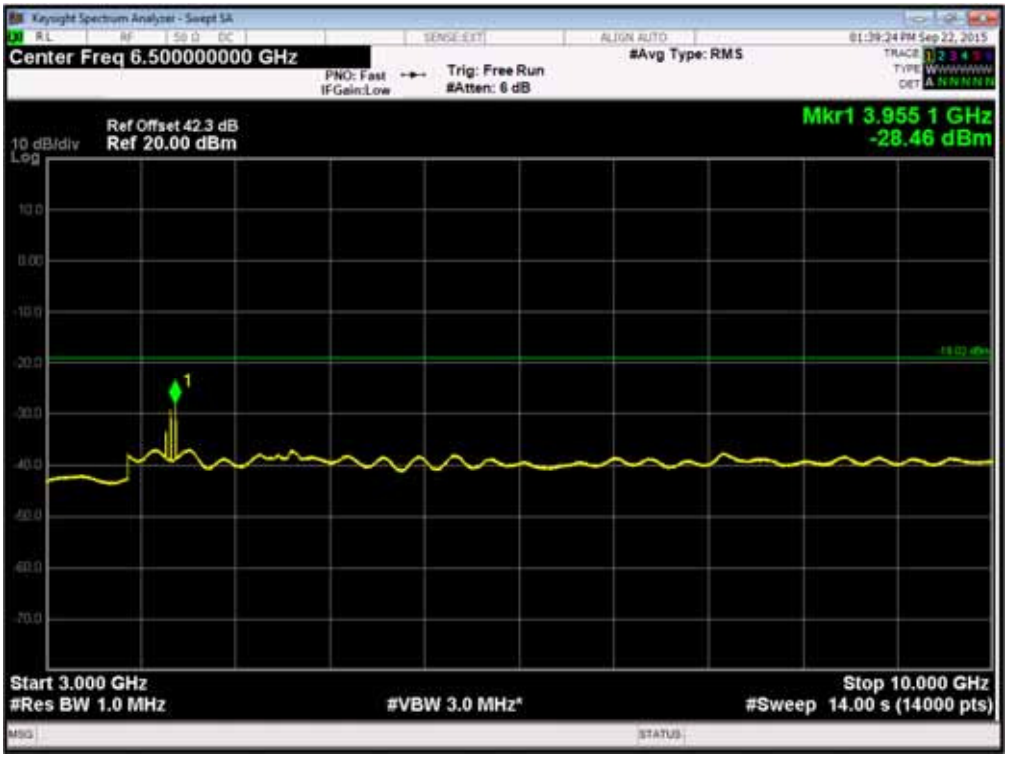
Channel Position B_{RFBW} - 16QAM / Bandwidth 5.0MHz - 10GHz - 20GHz



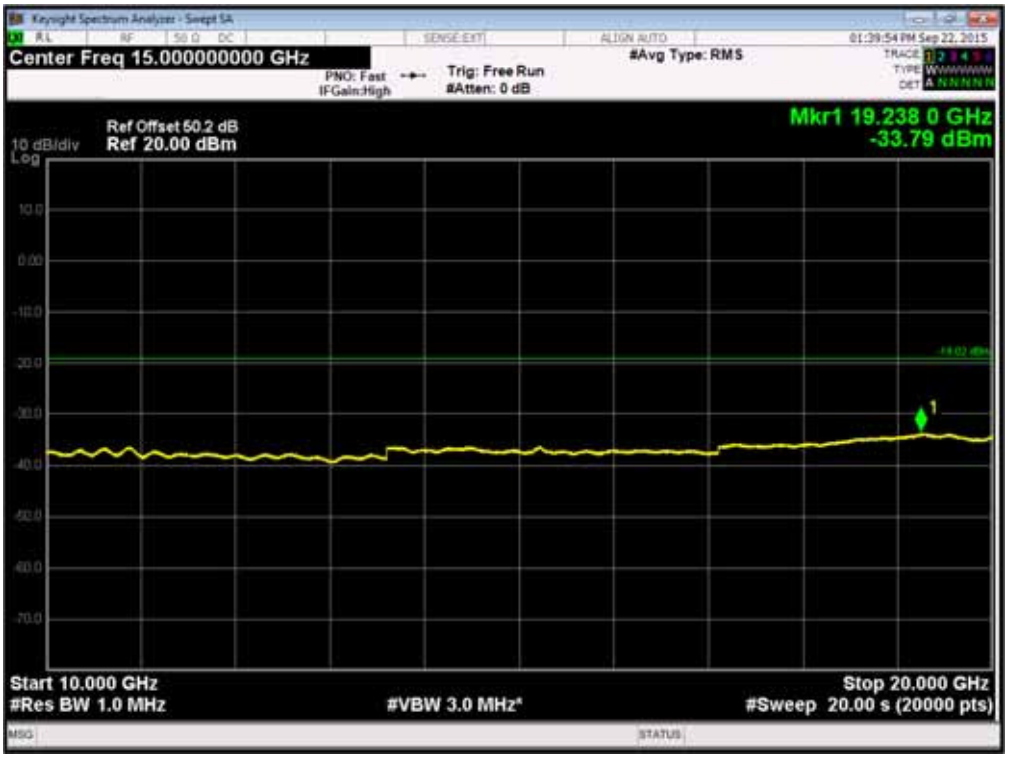
Channel Position M_{RFBW} - 16QAM / Bandwidth 5.0MHz - 9kHz - 3GHz



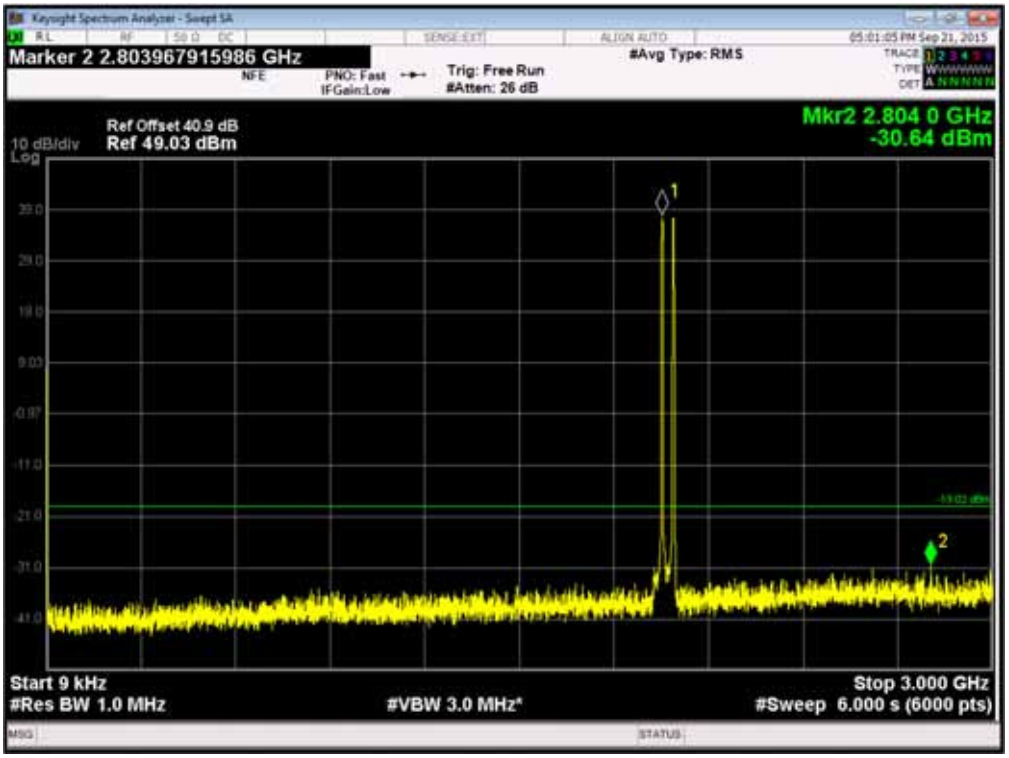
Channel Position M_{RFBW} - 16QAM / Bandwidth 5.0MHz - 3GHz - 10GHz



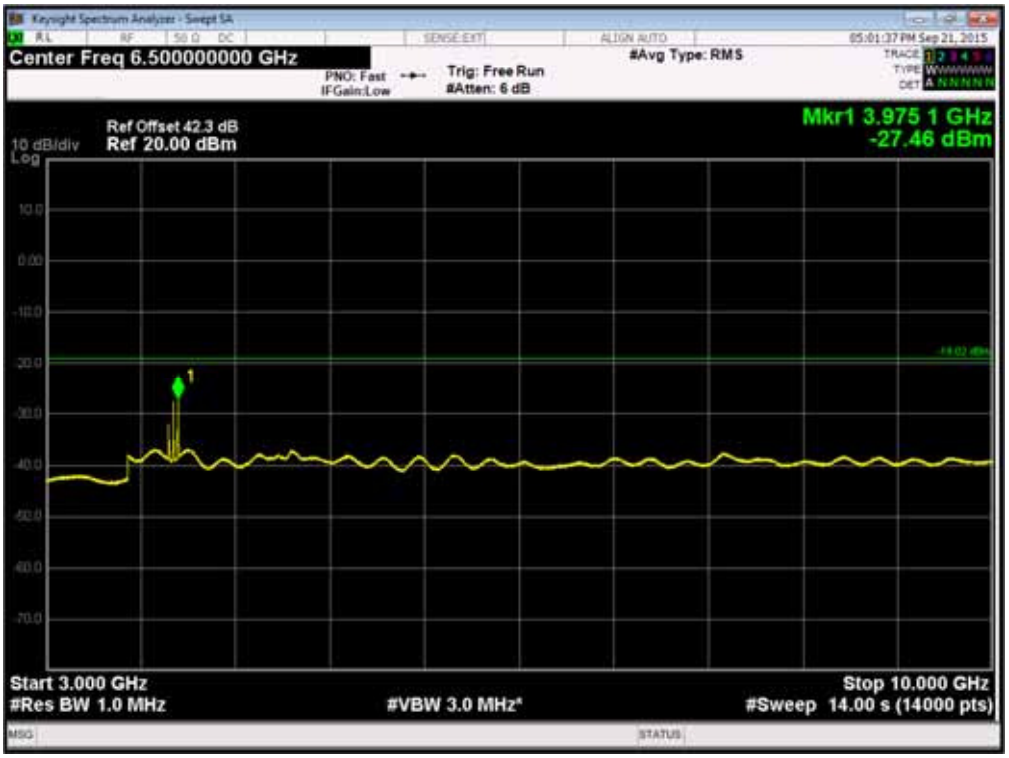
Channel Position M_{RFBW} - 16QAM / Bandwidth 5.0MHz - 10GHz - 20GHz



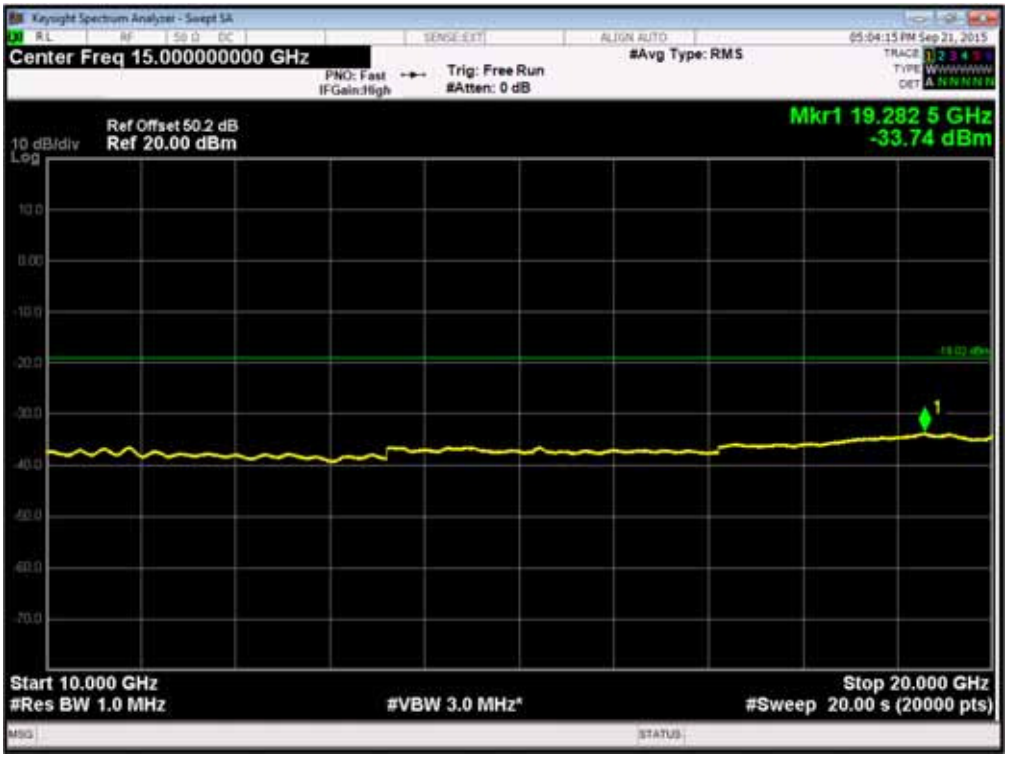
Channel Position T_{RFBW} - 16QAM / Bandwidth 5.0MHz - 9kHz - 3GHz



Channel Position T_{RFBW} - 16QAM / Bandwidth 5.0MHz - 3GHz - 10GHz



Channel Position T_{RFBW} - 16QAM / Bandwidth 5.0MHz - 10GHz - 20GHz



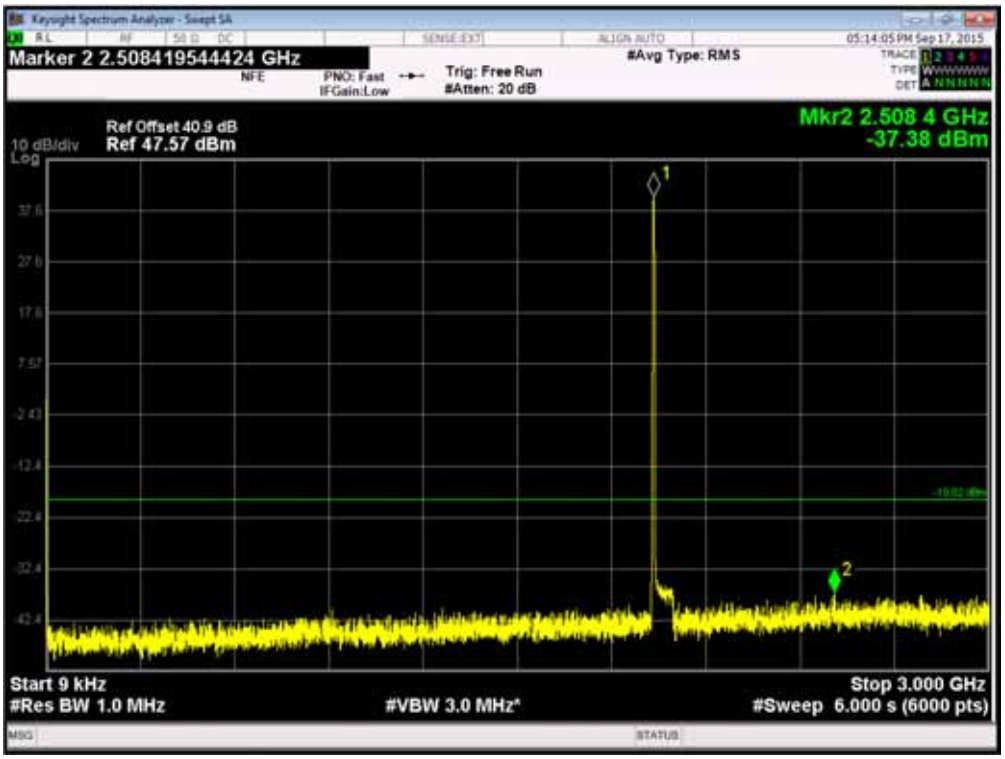
Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per port

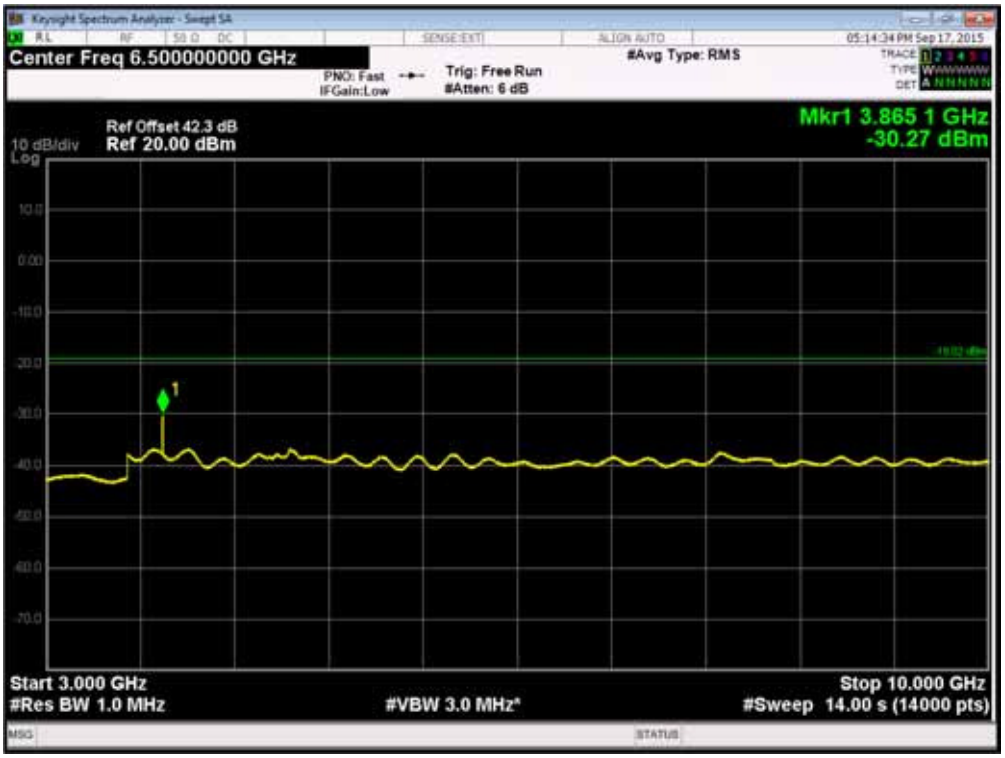
Channel Position	Bandwidth	Channel Frequency
Channel Position B	5.0 MHz	1932.5MHz
Channel Position M	5.0 MHz	1960.0MHz
Channel Position T	5.0 MHz	1987.5MHz

Channel Position	Bandwidth	Channel Frequency
Channel Position B	20.0 MHz	1940.0MHz
Channel Position M	20.0 MHz	1960.0MHz
Channel Position T	20.0 MHz	1980.0MHz

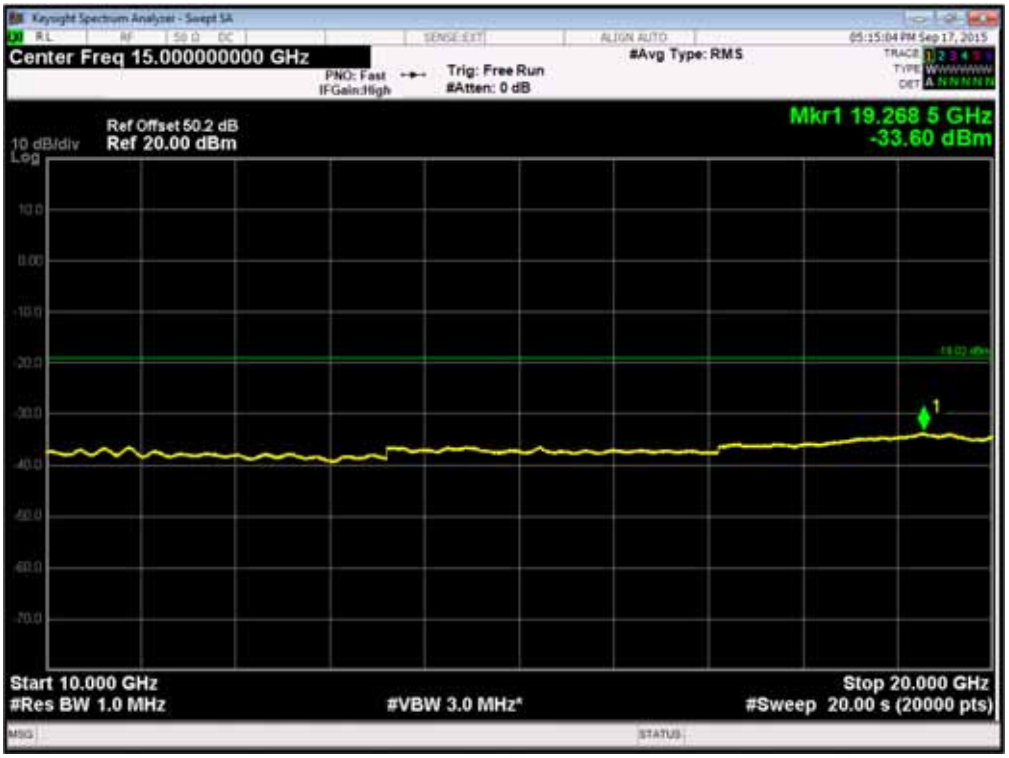
Channel Position B - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



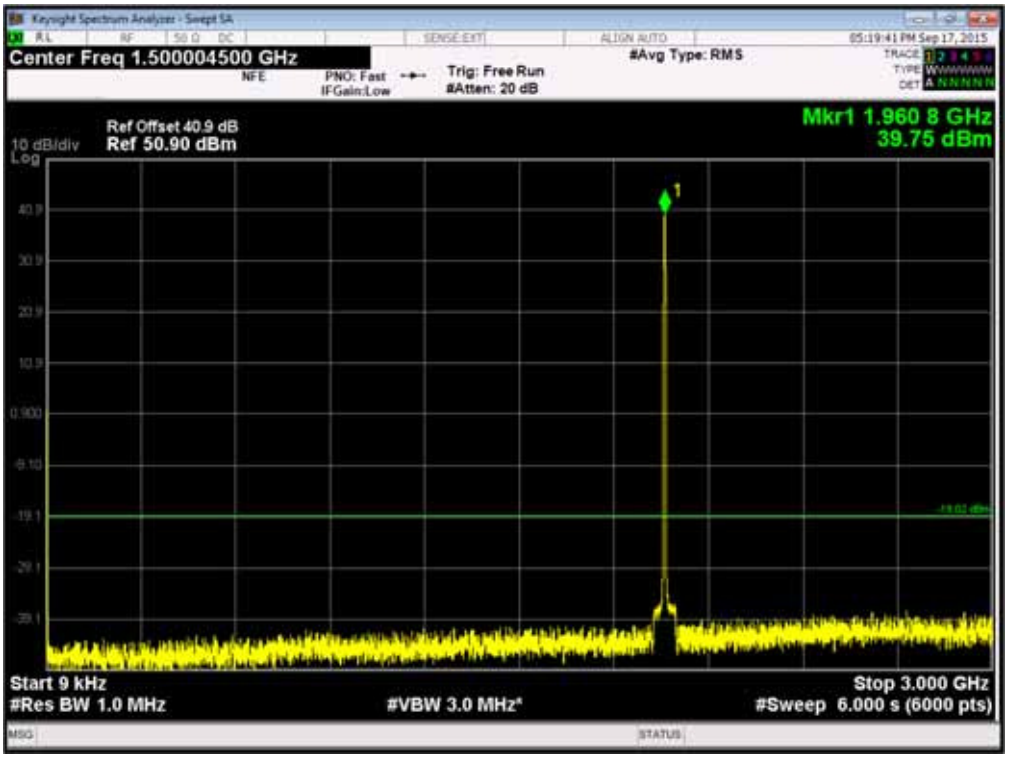
Channel Position B - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



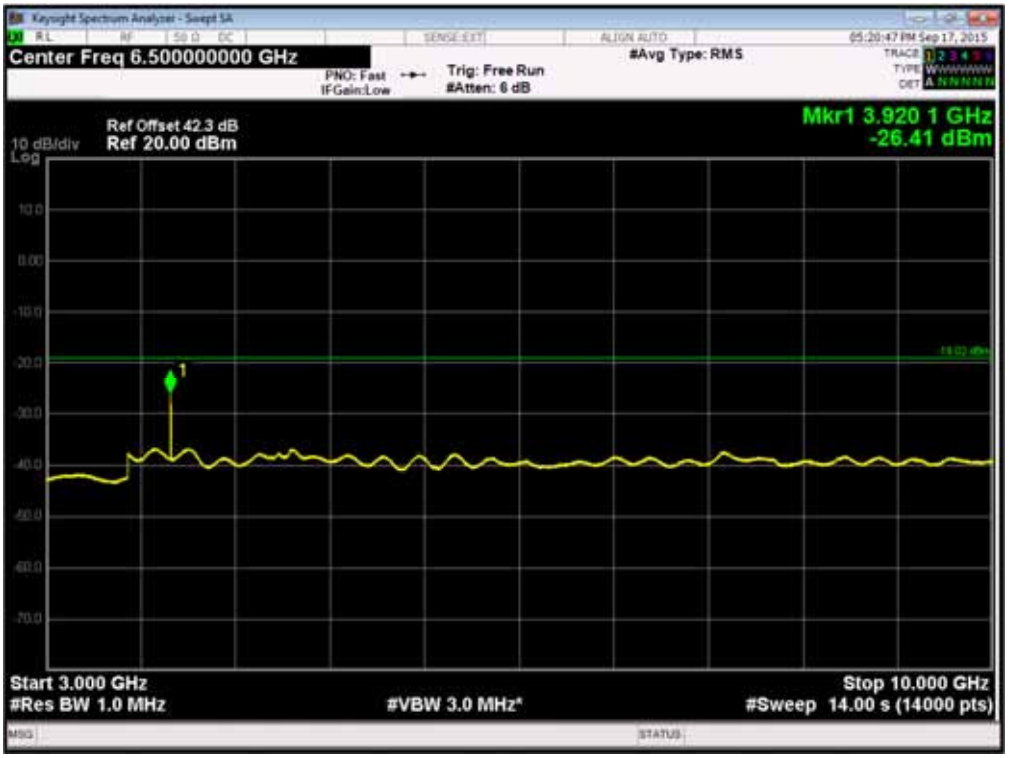
Channel Position B - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



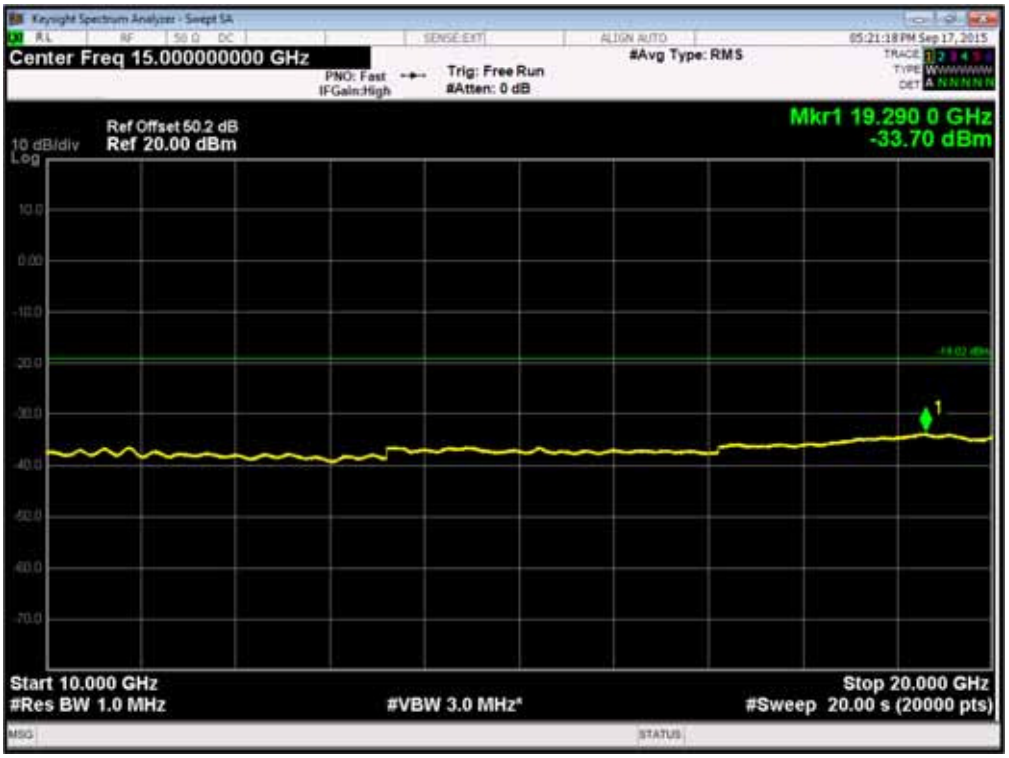
Channel Position M - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



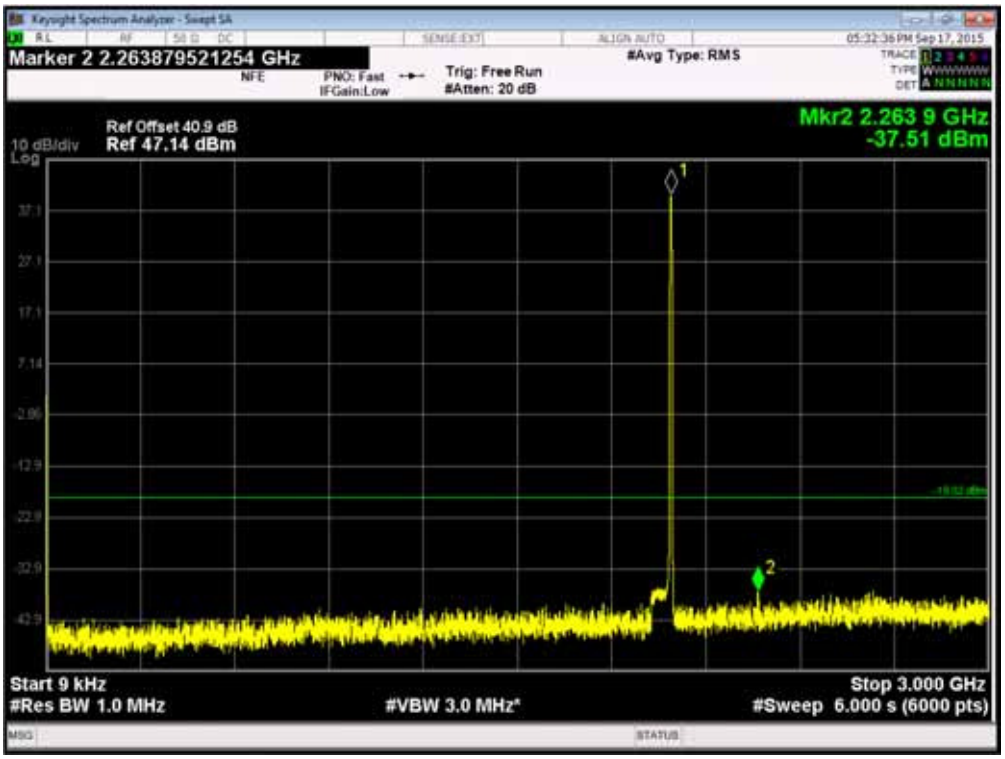
Channel Position M - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



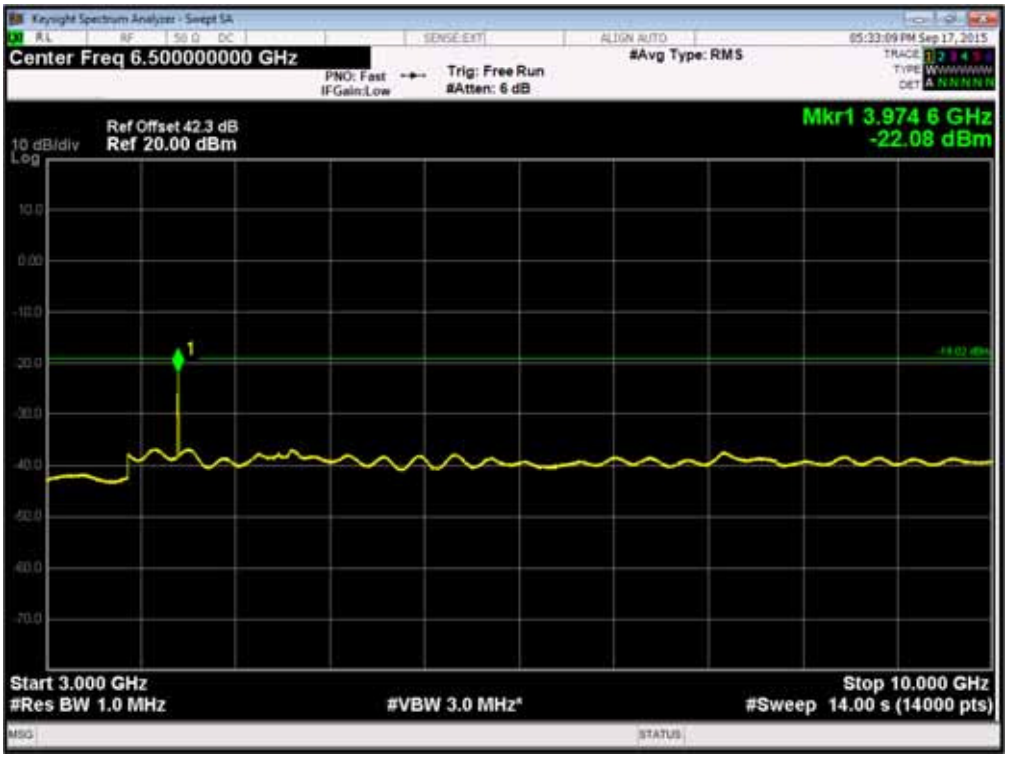
Channel Position M - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



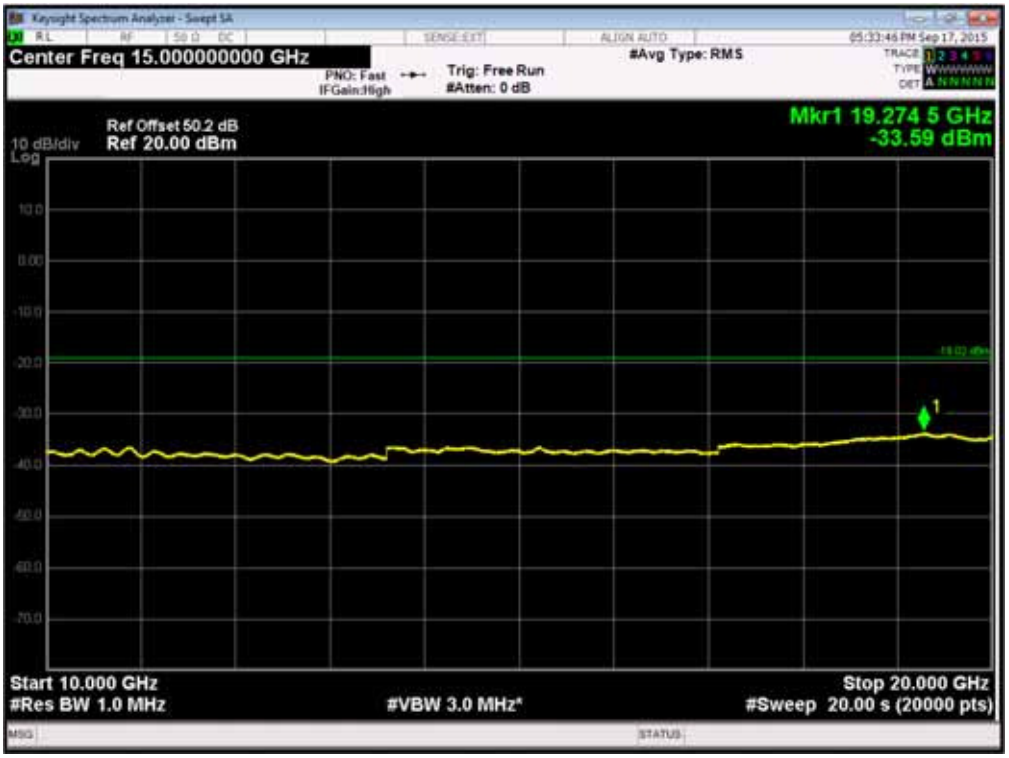
Channel Position T - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



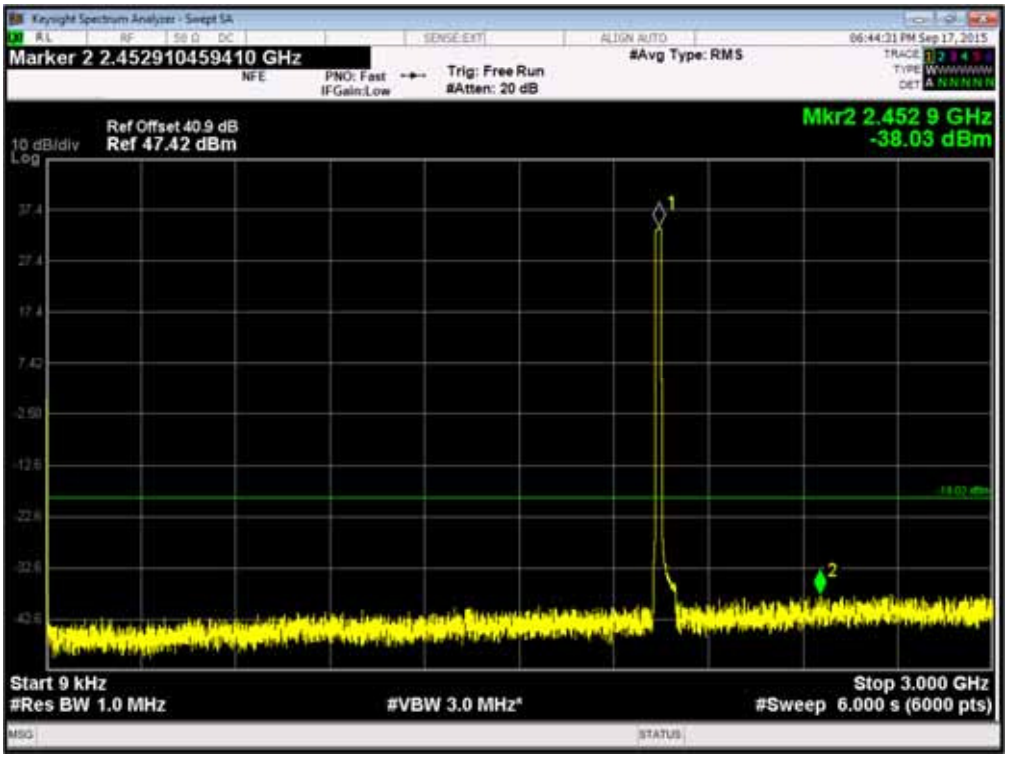
Channel Position T - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



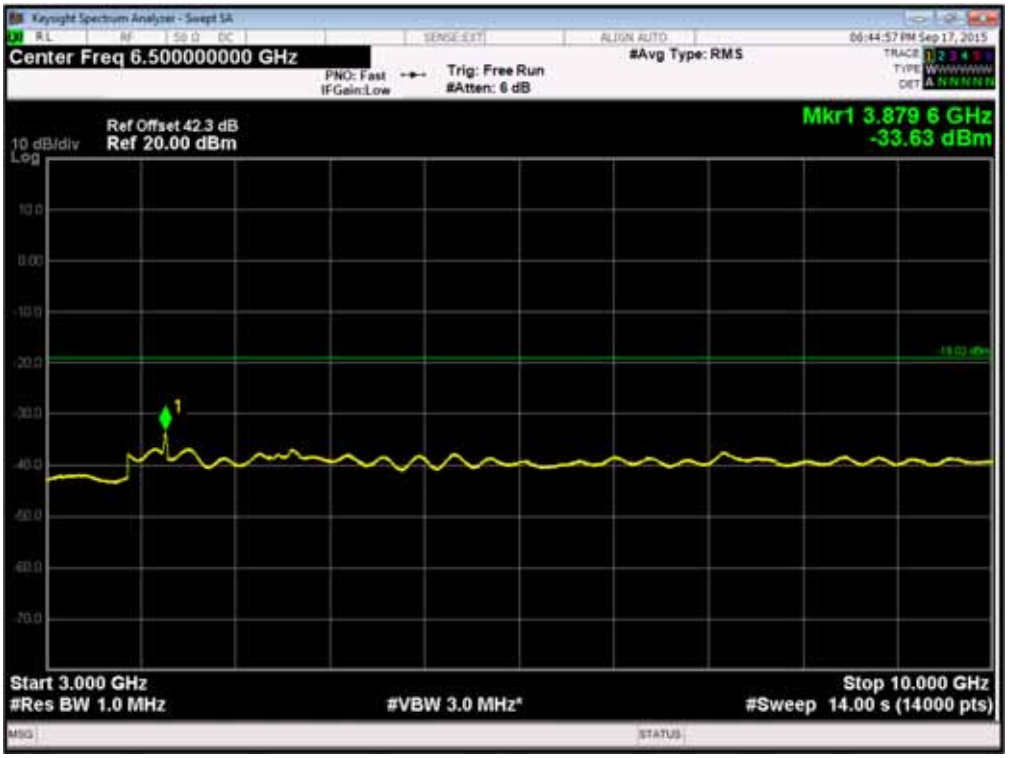
Channel Position T - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



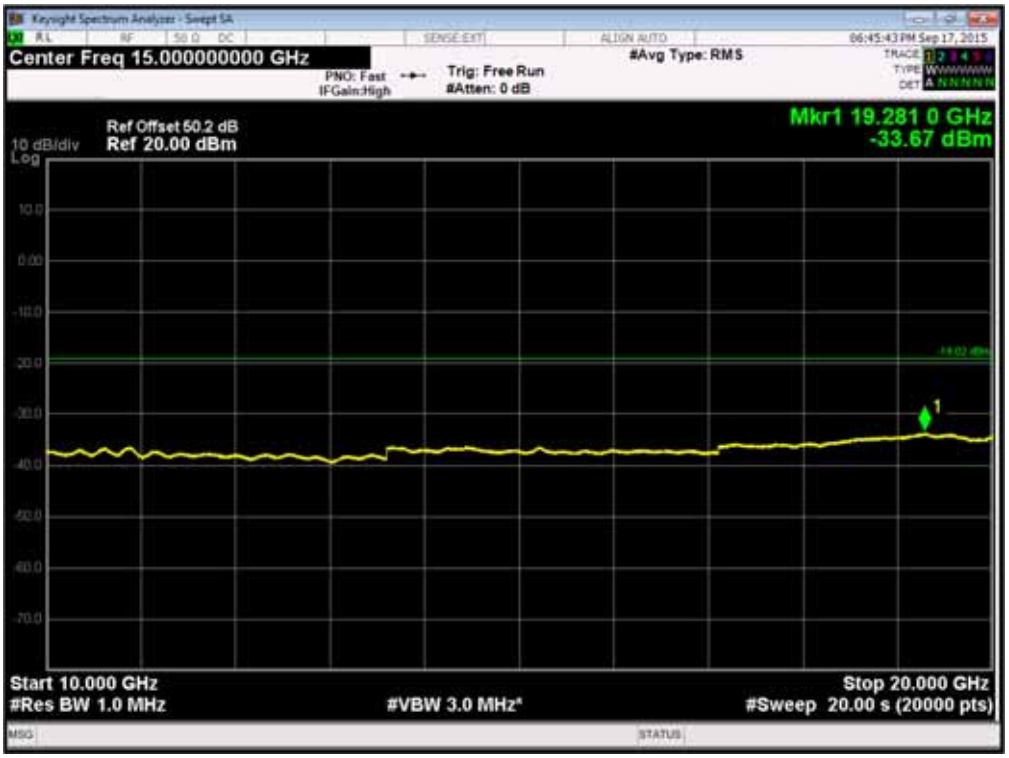
Channel Position B - QPSK / Bandwidth 20.0MHz - 9kHz - 3GHz



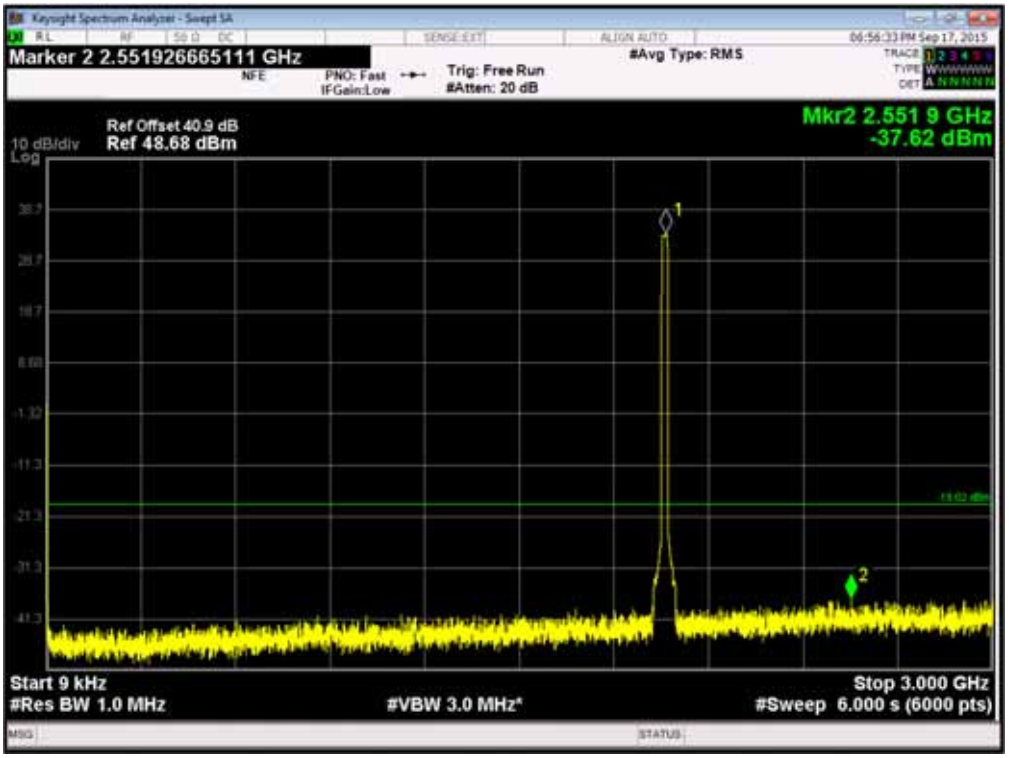
Channel Position B - QPSK / Bandwidth 20.0MHz - 3GHz - 10GHz



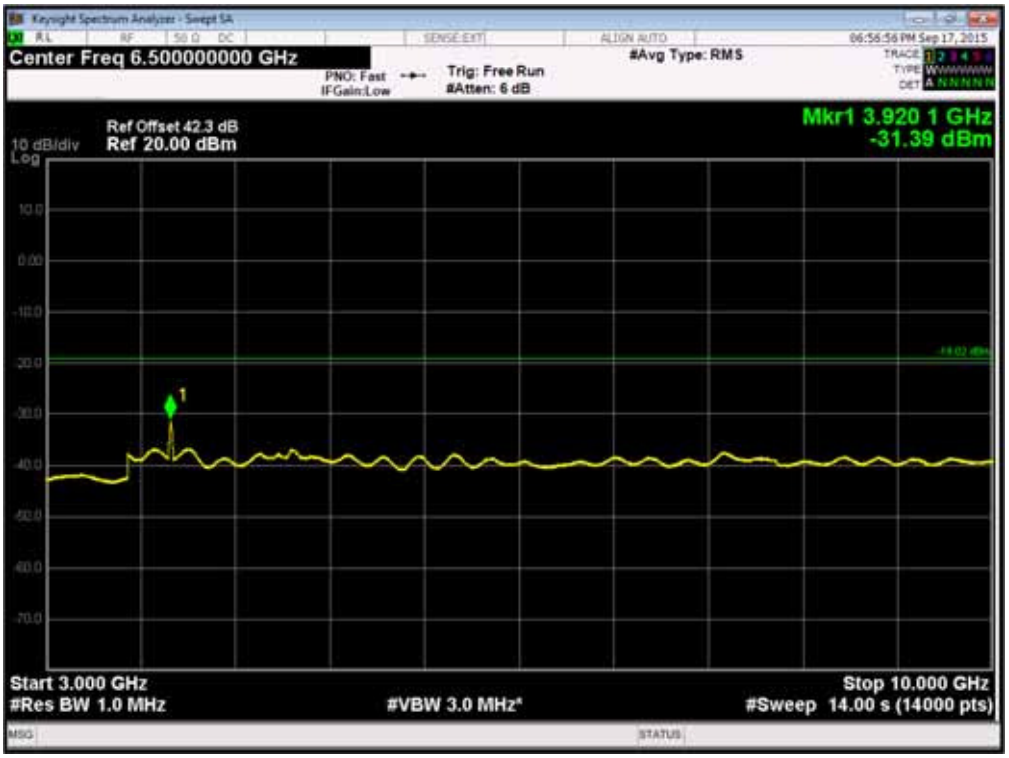
Channel Position B - QPSK / Bandwidth 20.0MHz - 10GHz - 20GHz



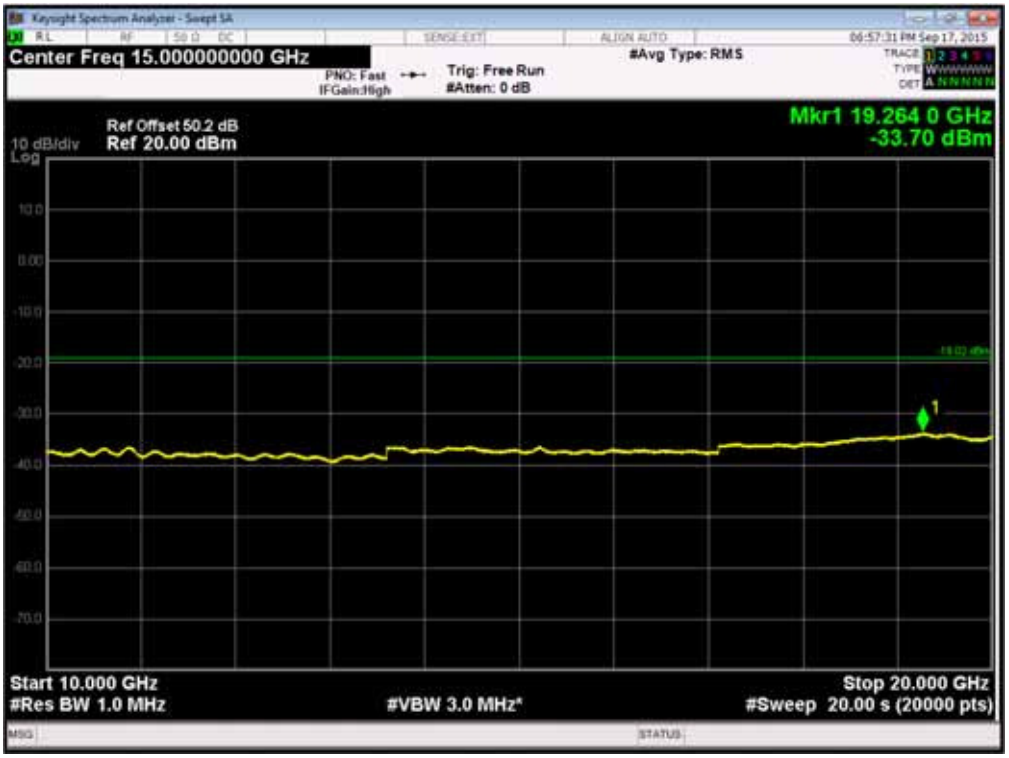
Channel Position M - QPSK / Bandwidth 20.0MHz - 9kHz - 3GHz



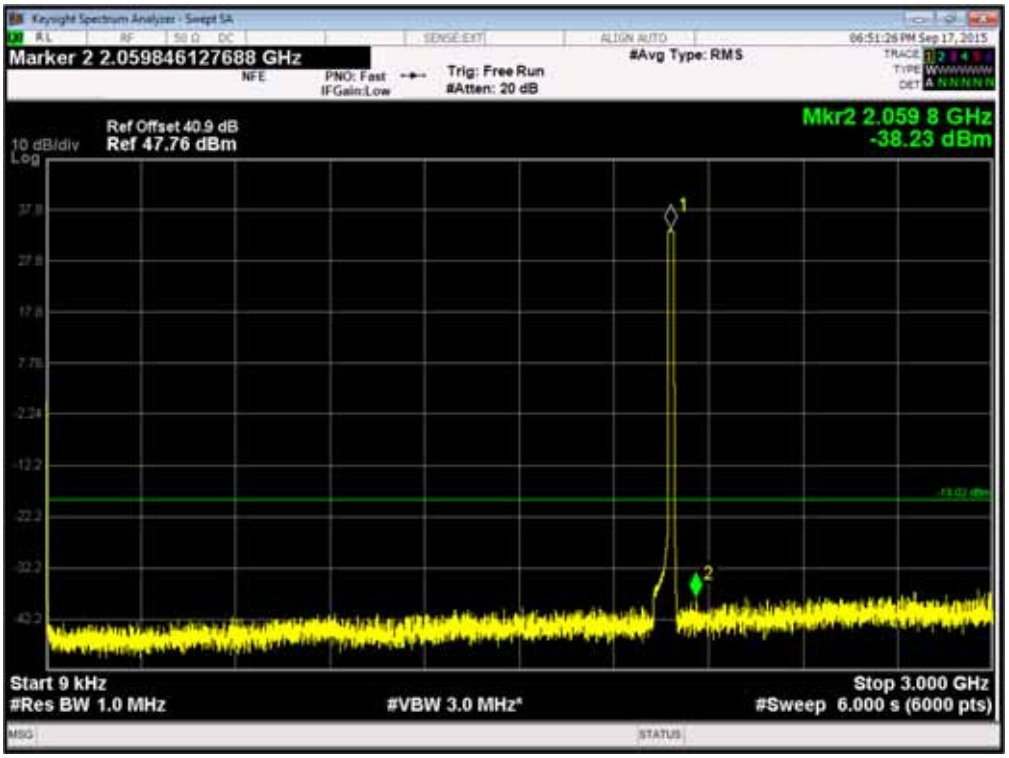
Channel Position M - QPSK / Bandwidth 20.0MHz - 3GHz - 10GHz



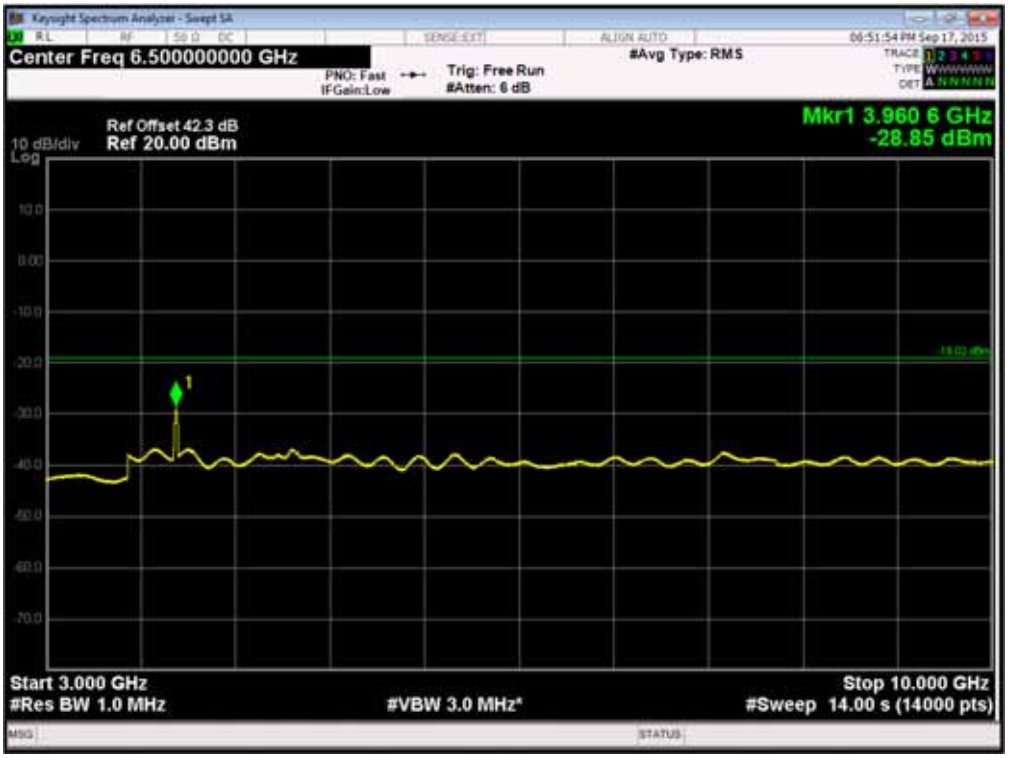
Channel Position M - QPSK / Bandwidth 20.0MHz - 10GHz - 20GHz



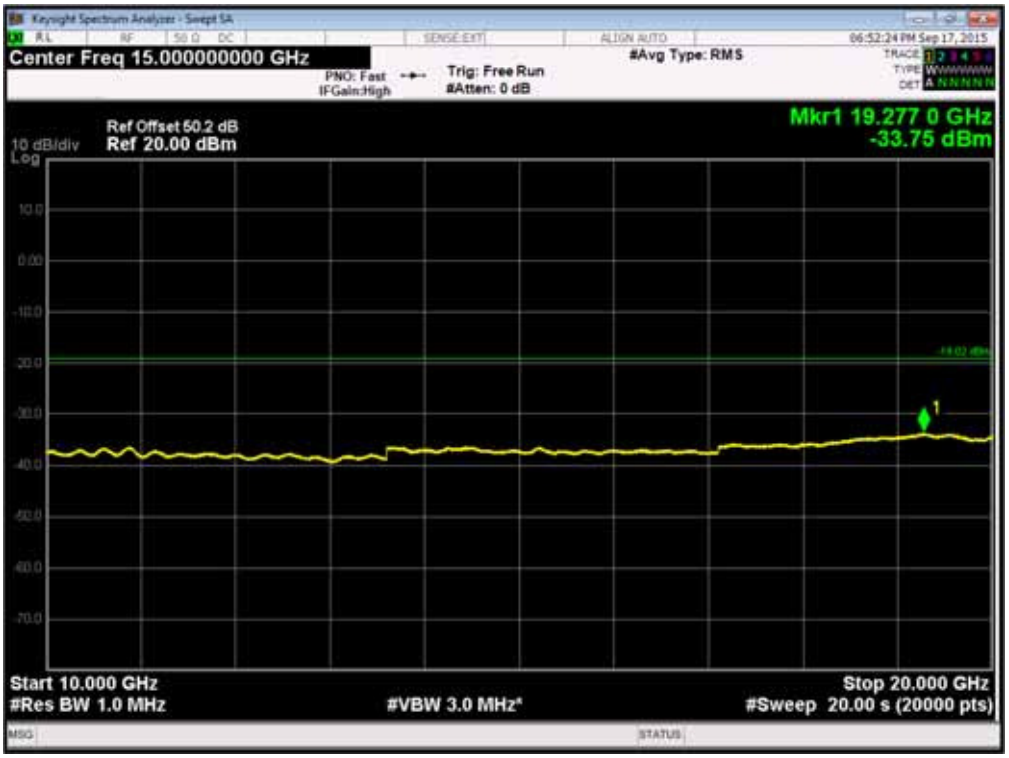
Channel Position T - QPSK / Bandwidth 20.0MHz - 9kHz - 3GHz



Channel Position T - QPSK / Bandwidth 20.0MHz - 3GHz - 10GHz



Channel Position T - QPSK / Bandwidth 20.0 MHz - 10GHz - 20GHz



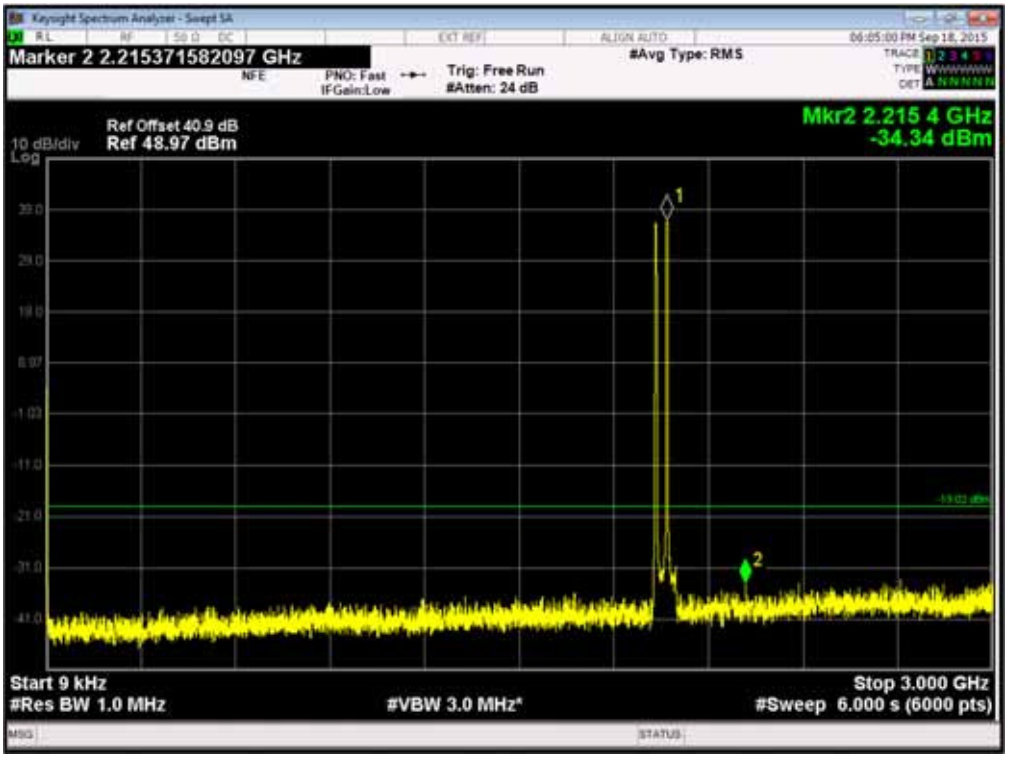
Configuration L-MIMO-MC 1 (2C)

Maximum Output Power 46.0dBm per port

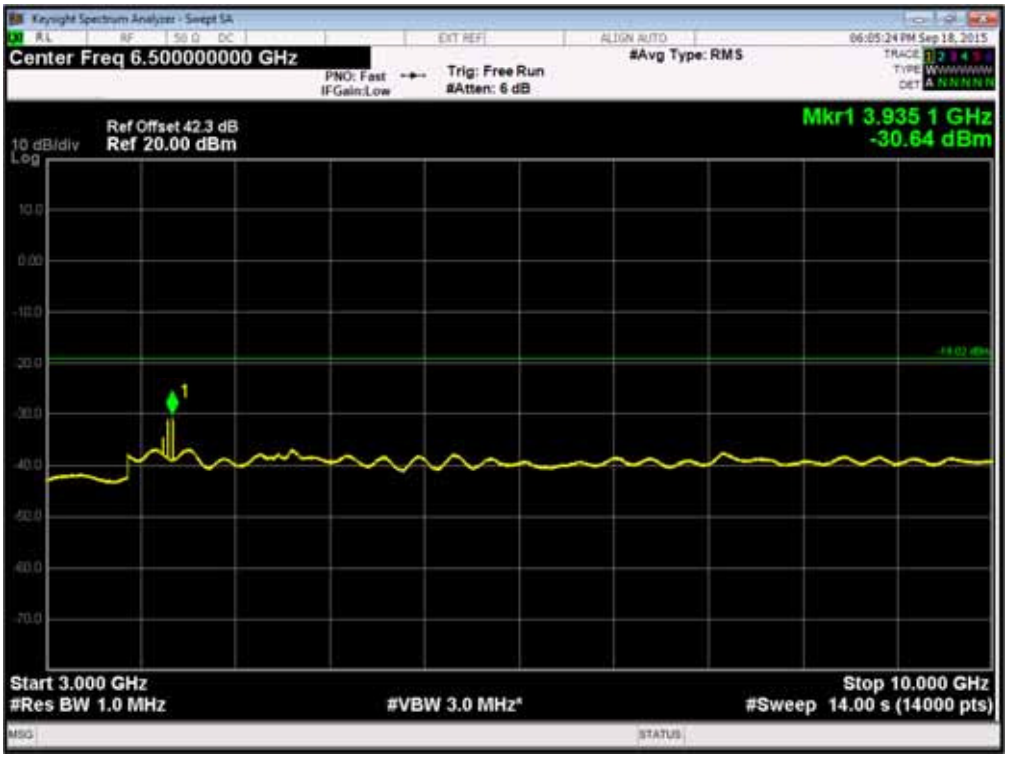
Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	5.0 MHz	1932.5MHz + 1967.5MHz
Channel Position M_{RFBW}	5.0 MHz	1942.5MHz + 1977.5MHz
Channel Position T_{RFBW}	5.0 MHz	1952.5MHz + 1987.5MHz

Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	20.0 MHz	1940.0MHz + 1960.0MHz
Channel Position M_{RFBW}	20.0 MHz	1950.0MHz + 1970.0MHz
Channel Position T_{RFBW}	20.0 MHz	1960.0MHz + 1980.0MHz

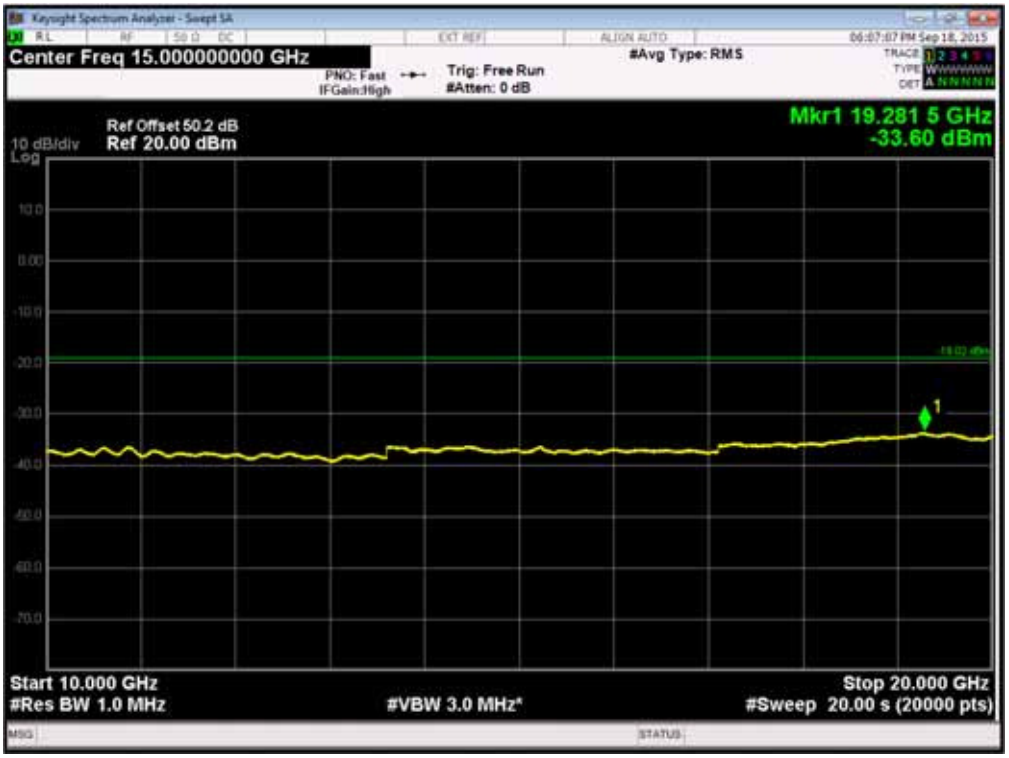
Channel Position B_{RFBW} - QPSK / Bandwidth 5.0 MHz - 9kHz - 3GHz



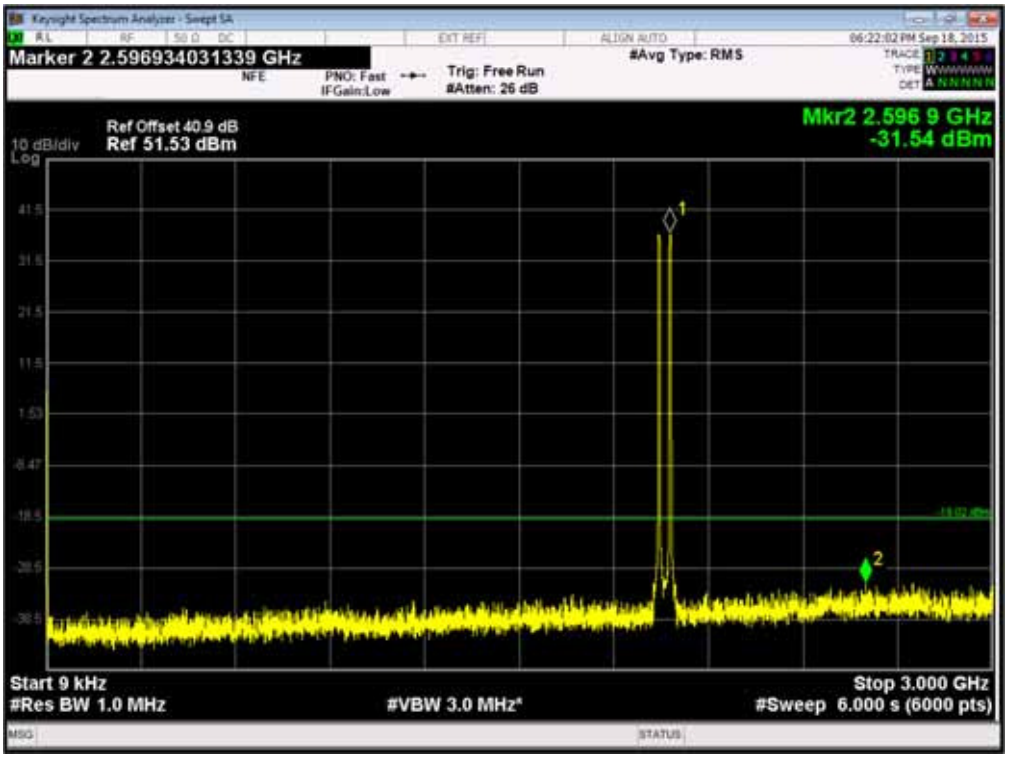
Channel Position B_{RFBW} - QPSK / Bandwidth 5.0 MHz - 3GHz - 10GHz



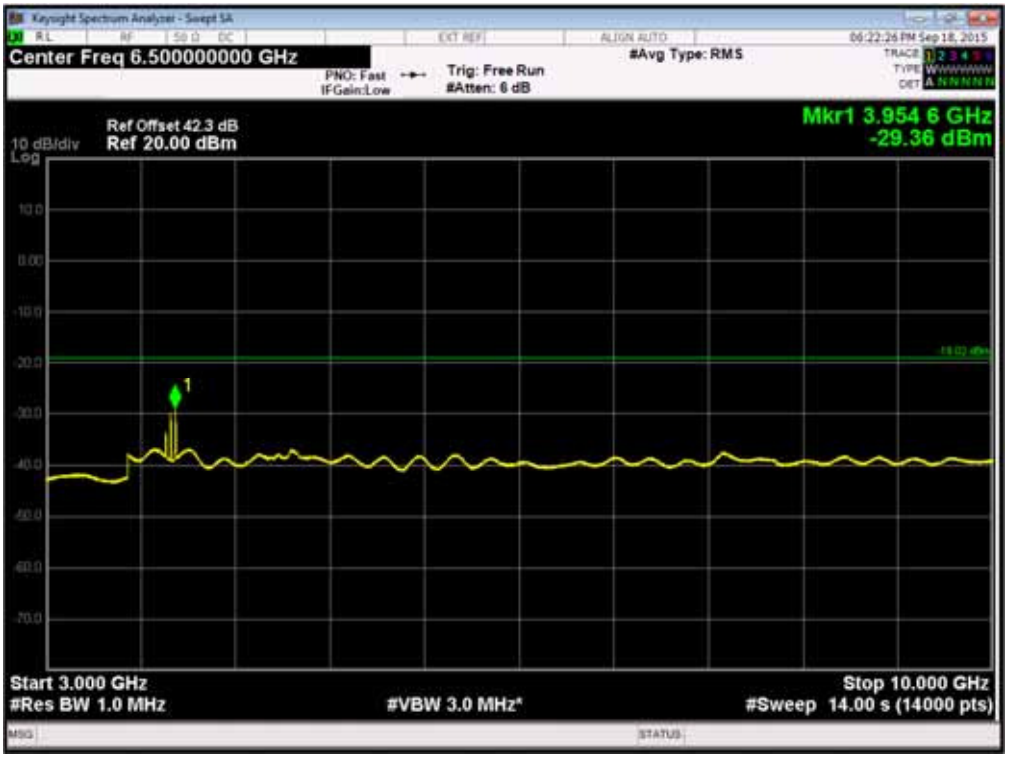
Channel Position B_{RFBW} - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



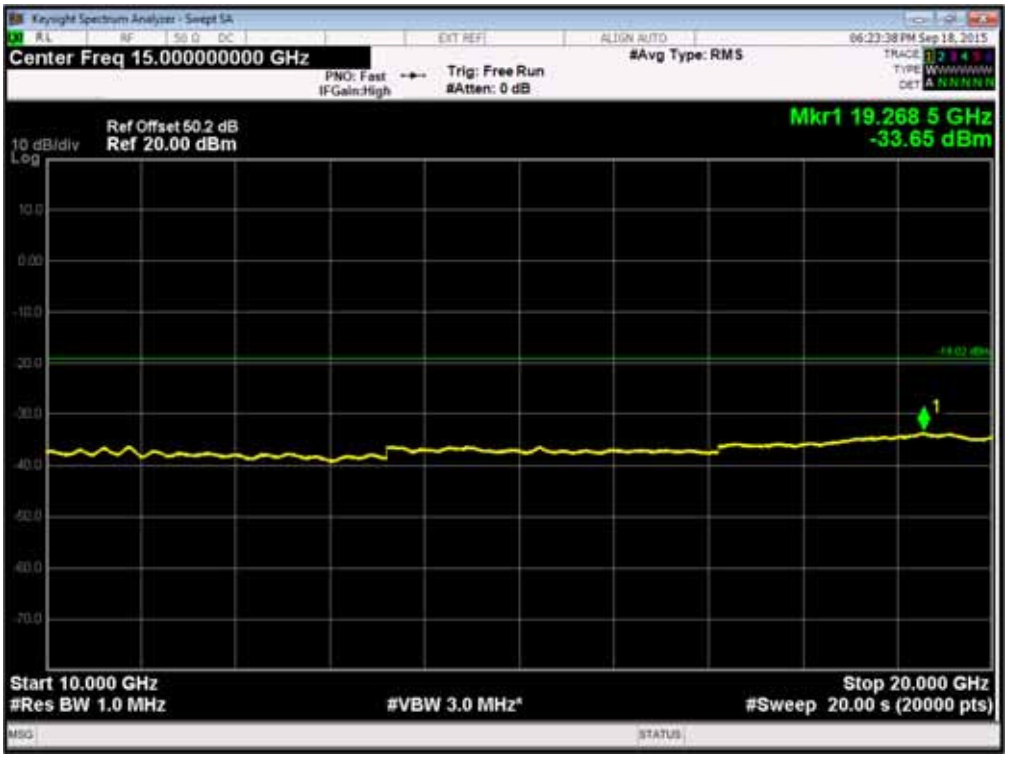
Channel Position M_{RFBW} - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



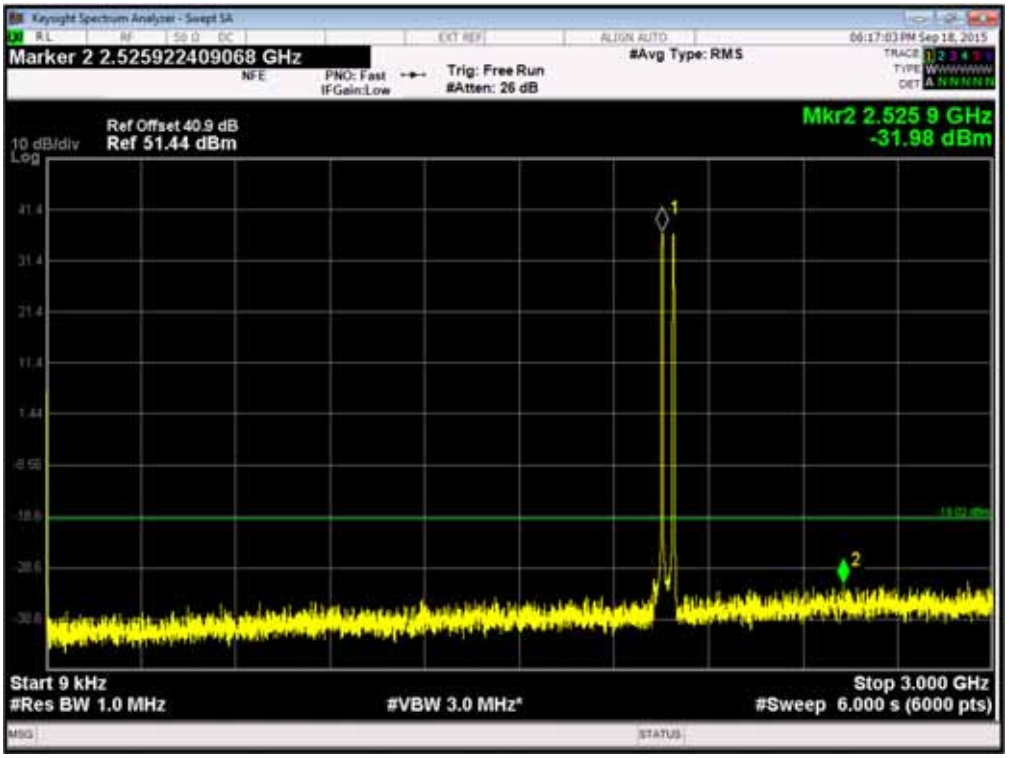
Channel Position M_{RFBW} - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



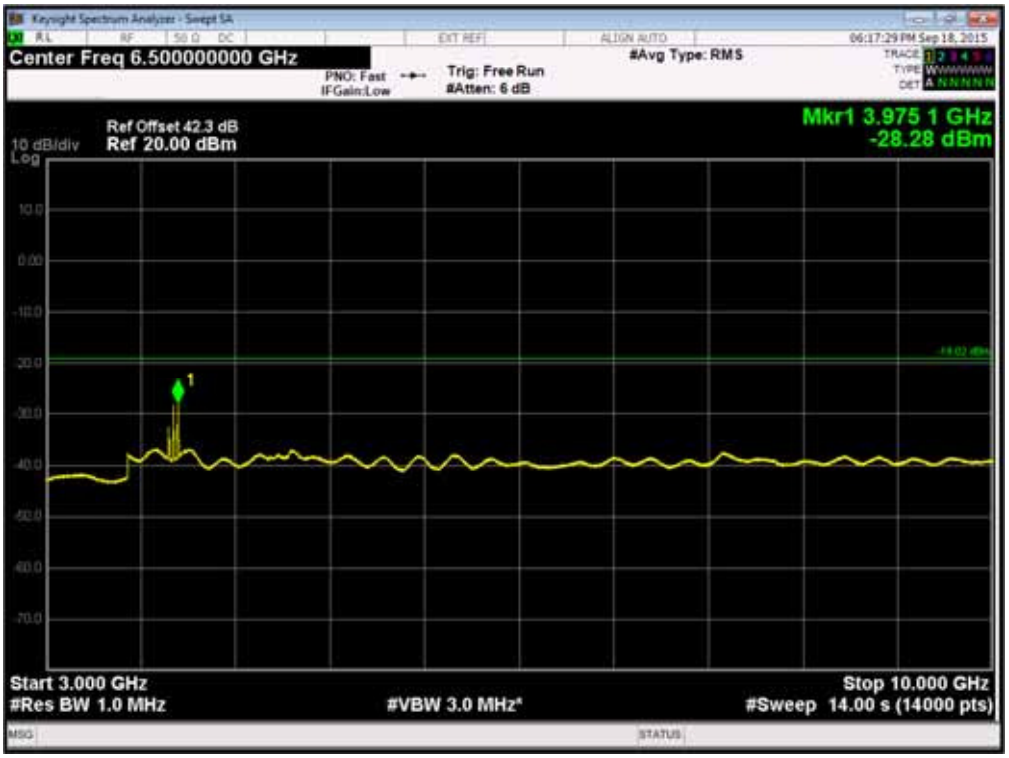
Channel Position M_{RFBW} - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



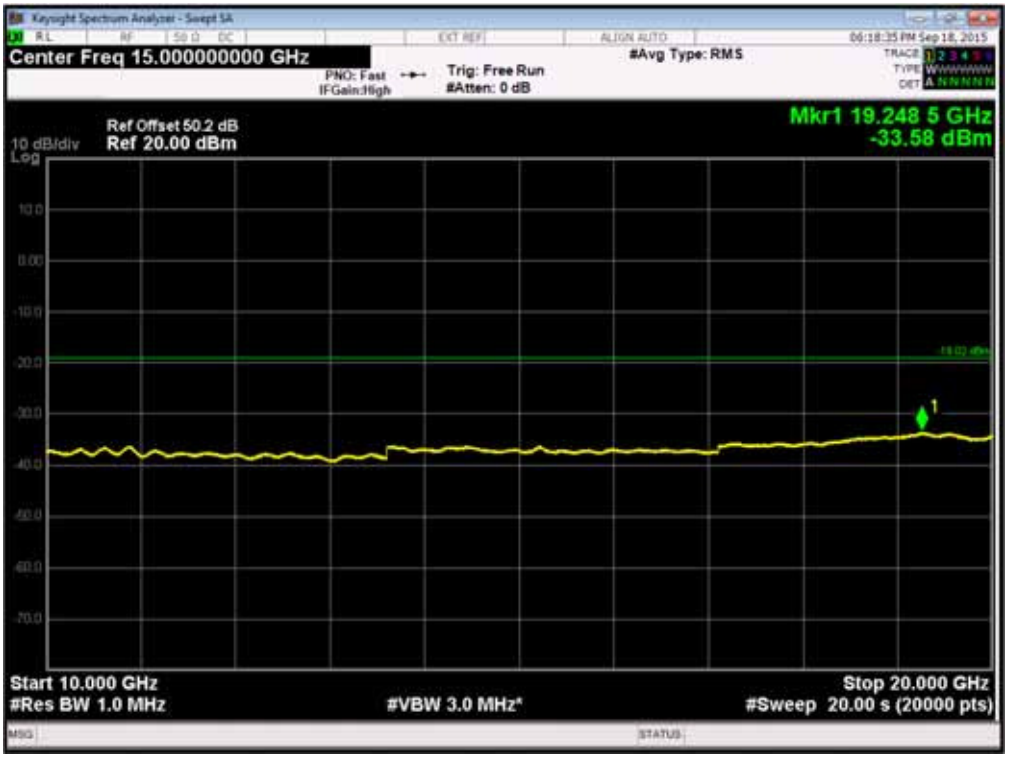
Channel Position T_{RFBW} - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



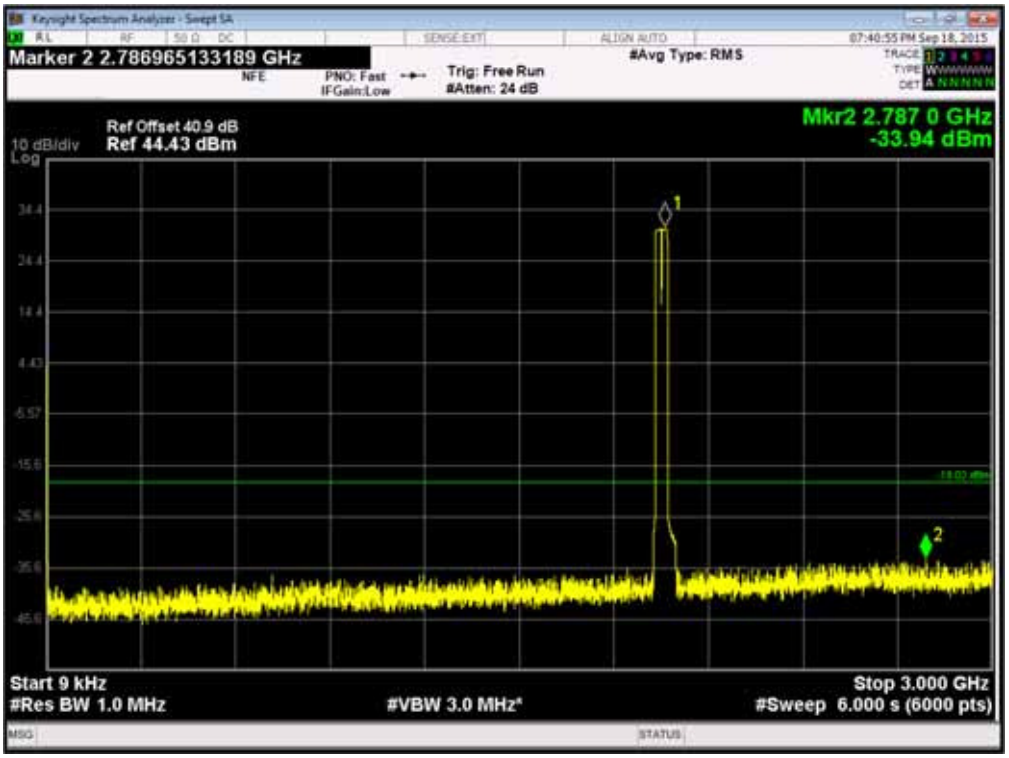
Channel Position T_{RFBW} - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



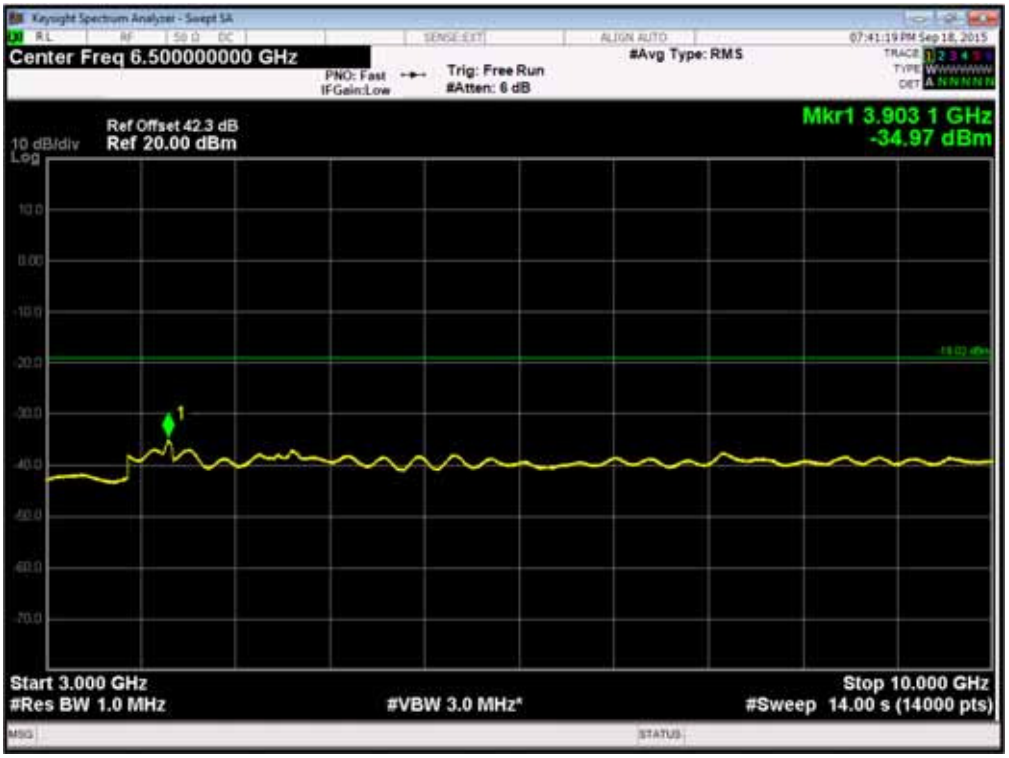
Channel Position T_{RFBW} - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



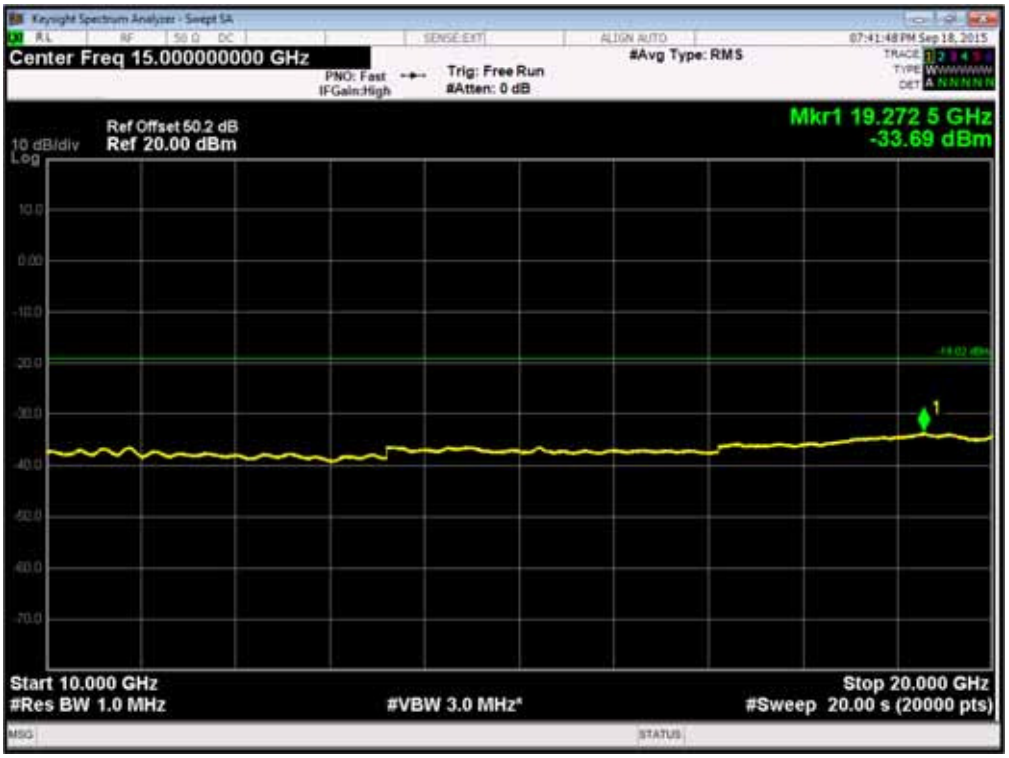
Channel Position B_{RFBW} - QPSK / Bandwidth 20.0MHz - 9kHz - 3GHz



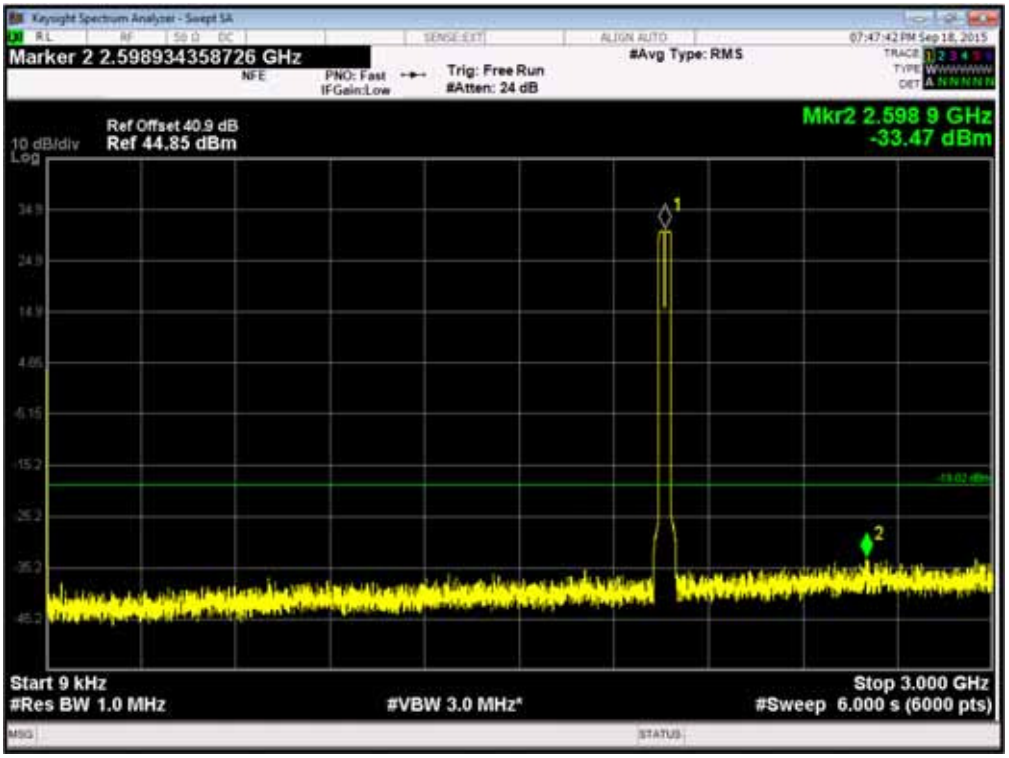
Channel Position B_{RFBW} - QPSK / Bandwidth 20.0MHz - 3GHz - 10GHz



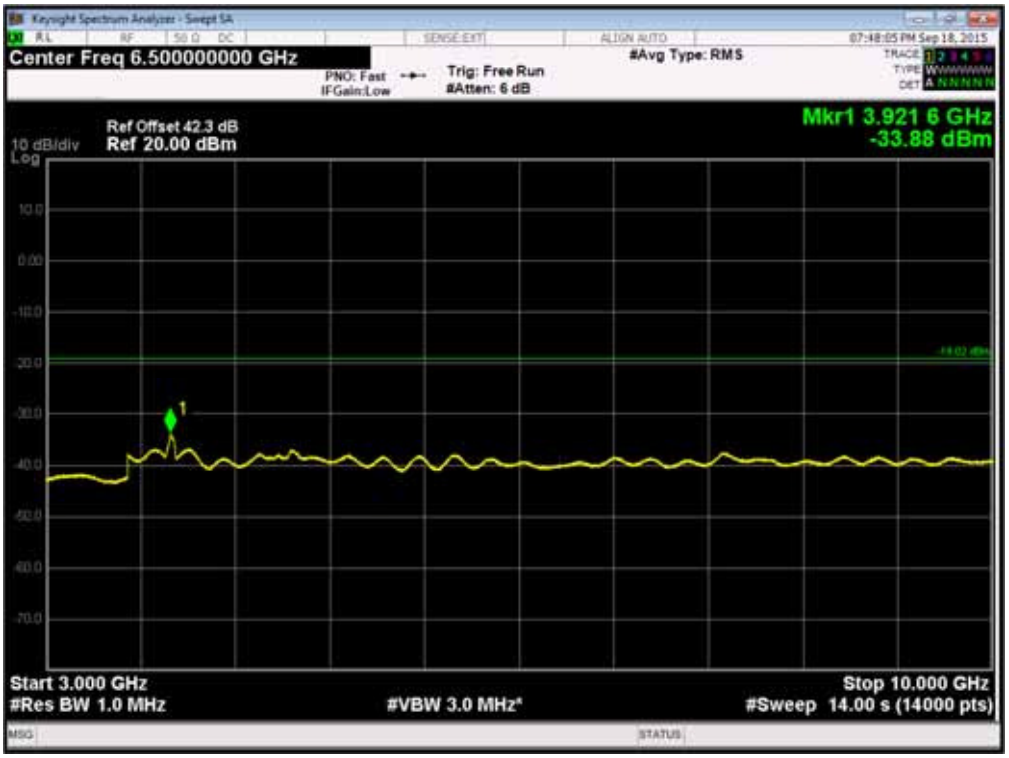
Channel Position B_{RFBW} - QPSK / Bandwidth 20.0MHz - 10GHz - 20GHz



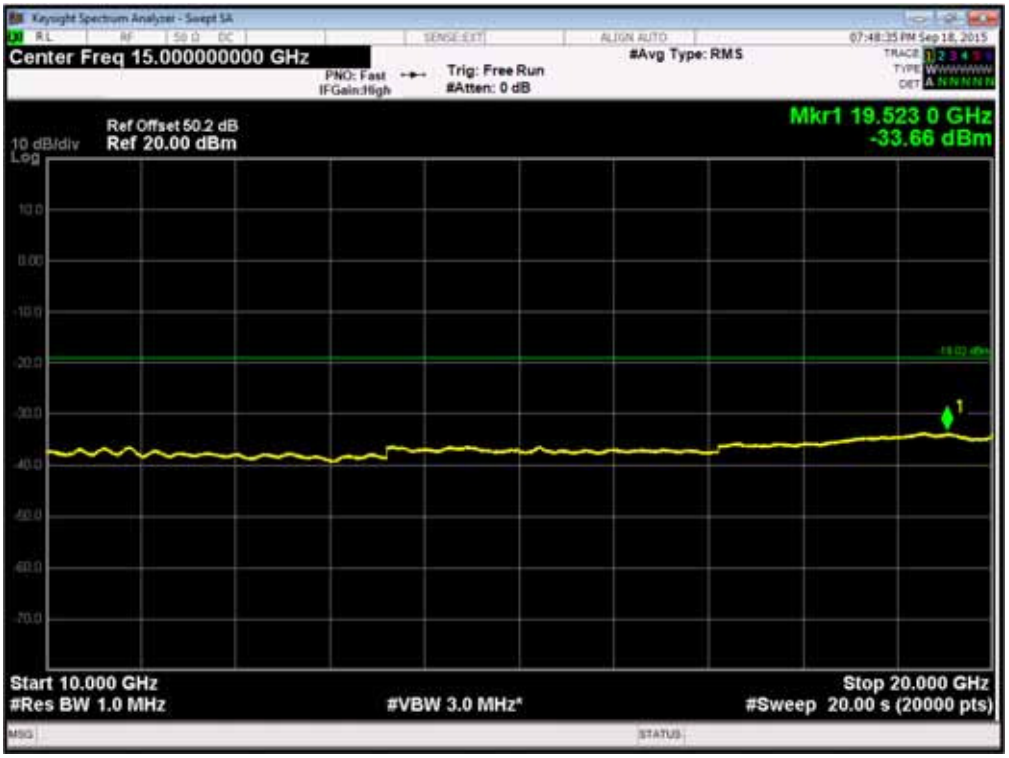
Channel Position M_{RFBW} - QPSK / Bandwidth 20.0MHz - 9kHz - 3GHz



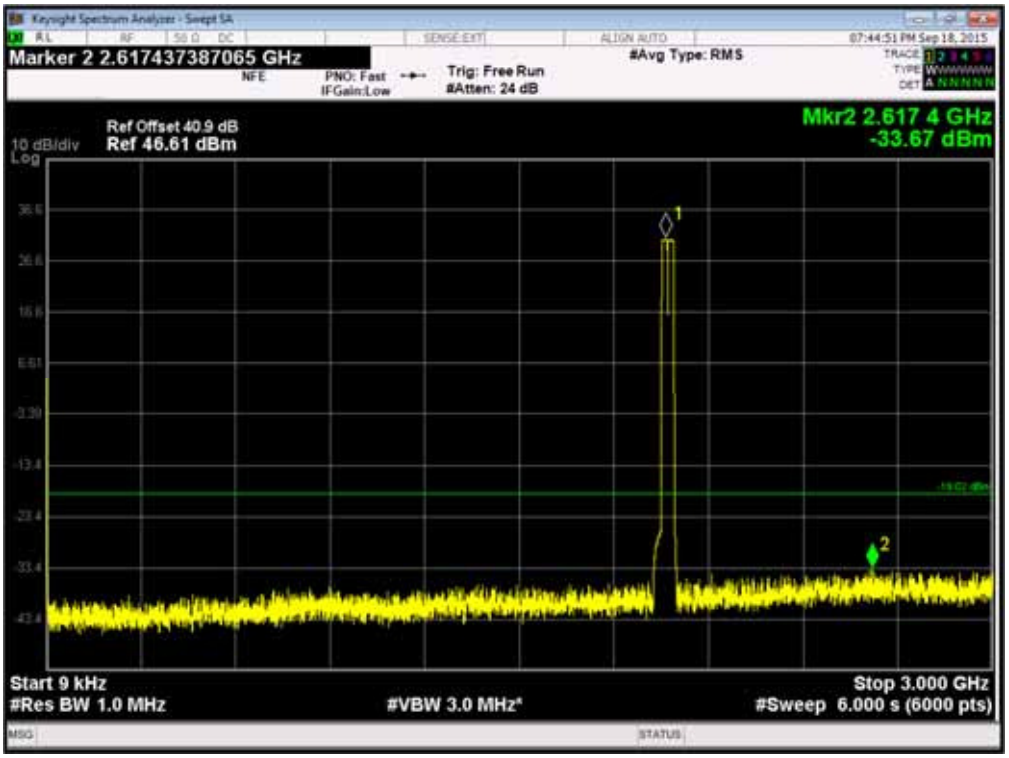
Channel Position M_{RFBW} - QPSK / Bandwidth 20.0MHz - 3GHz - 10GHz



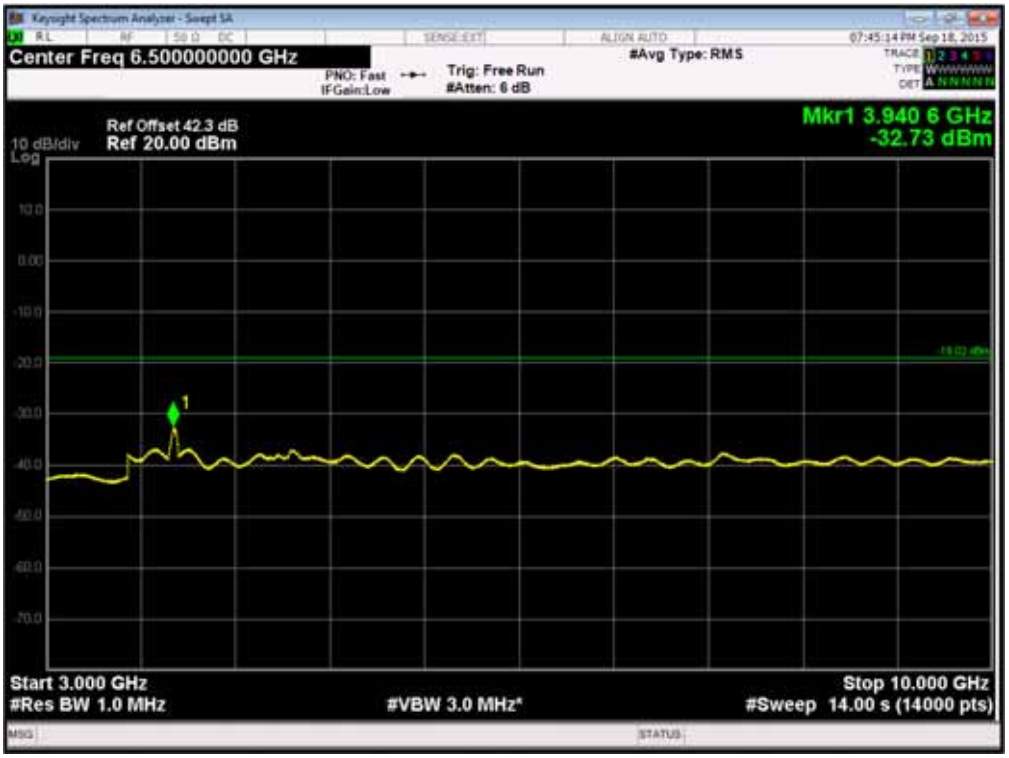
Channel Position M_{RFBW} - QPSK / Bandwidth 20.0MHz - 10GHz - 20GHz



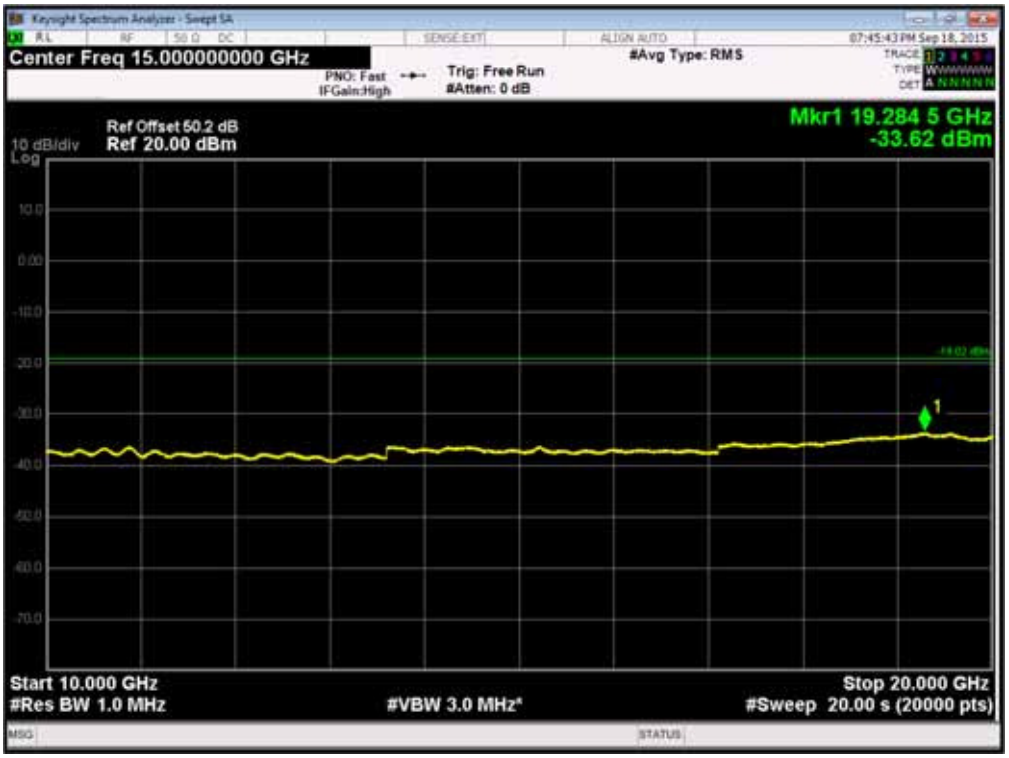
Channel Position T_{RFBW} - QPSK / Bandwidth 20.0MHz - 9kHz - 3GHz



Channel Position T_{RFBW} - QPSK / Bandwidth 20.0MHz - 3GHz - 10GHz



Channel Position T_{RFBW} - QPSK / Bandwidth 20.0MHz - 10GHz - 20GHz



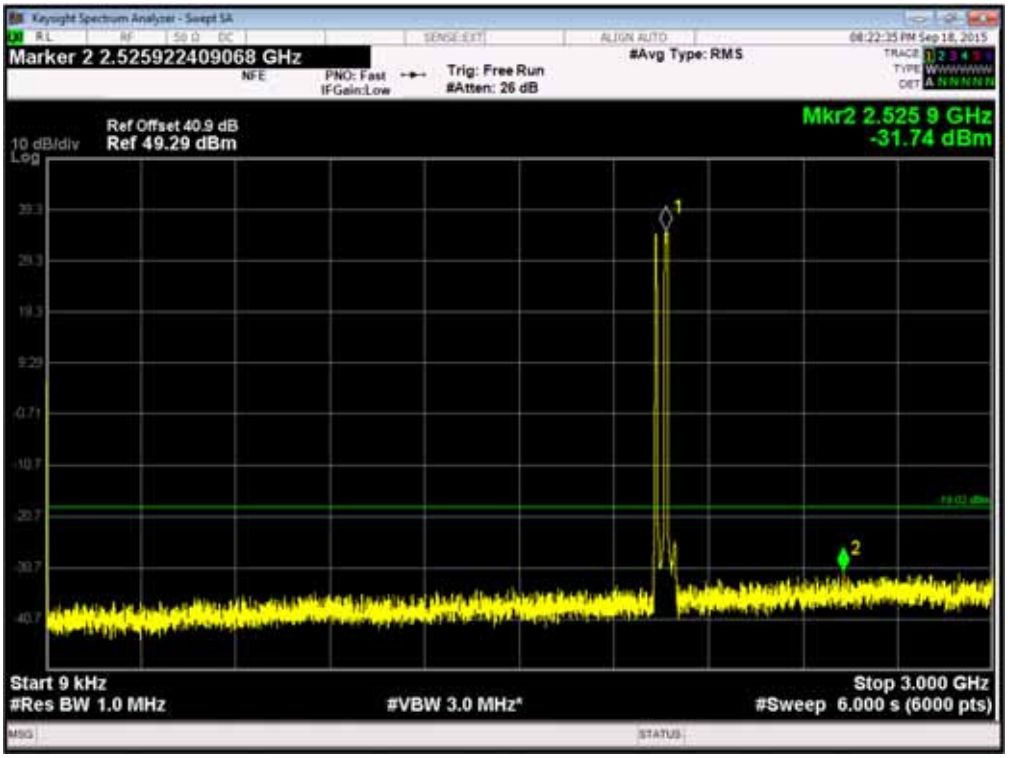
Configuration L-MIMO-MC 2 (3C)

Maximum Output Power 46.0dBm per port

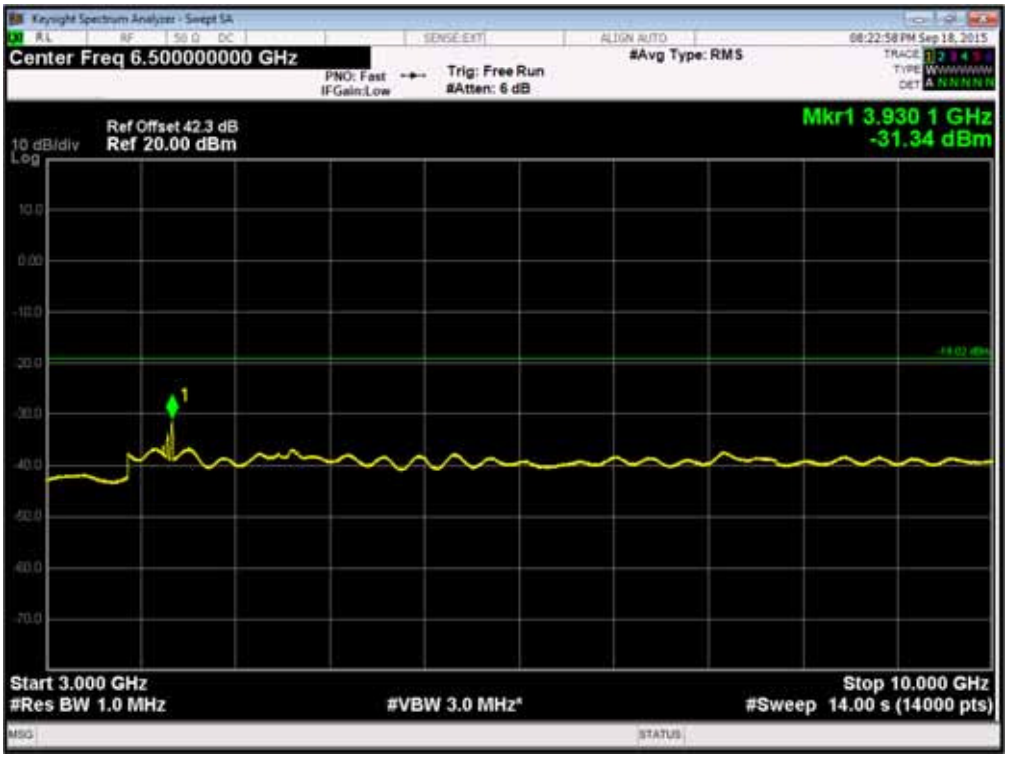
Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	5.0 MHz	1932.5MHz + 1962.5MHz + 1967.5MHz
Channel Position M_{RFBW}	5.0 MHz	1942.5MHz + 1972.5MHz + 1977.5MHz
Channel Position T_{RFBW}	5.0 MHz	1952.5MHz + 1982.5MHz + 1987.5MHz

Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	10.0 MHz	1935.0MHz + 1955.0MHz + 1965.0MHz
Channel Position M_{RFBW}	10.0 MHz	1945.0MHz + 1965.0MHz + 1975.0MHz
Channel Position T_{RFBW}	10.0 MHz	1955.0MHz + 1975.0MHz + 1985.0MHz

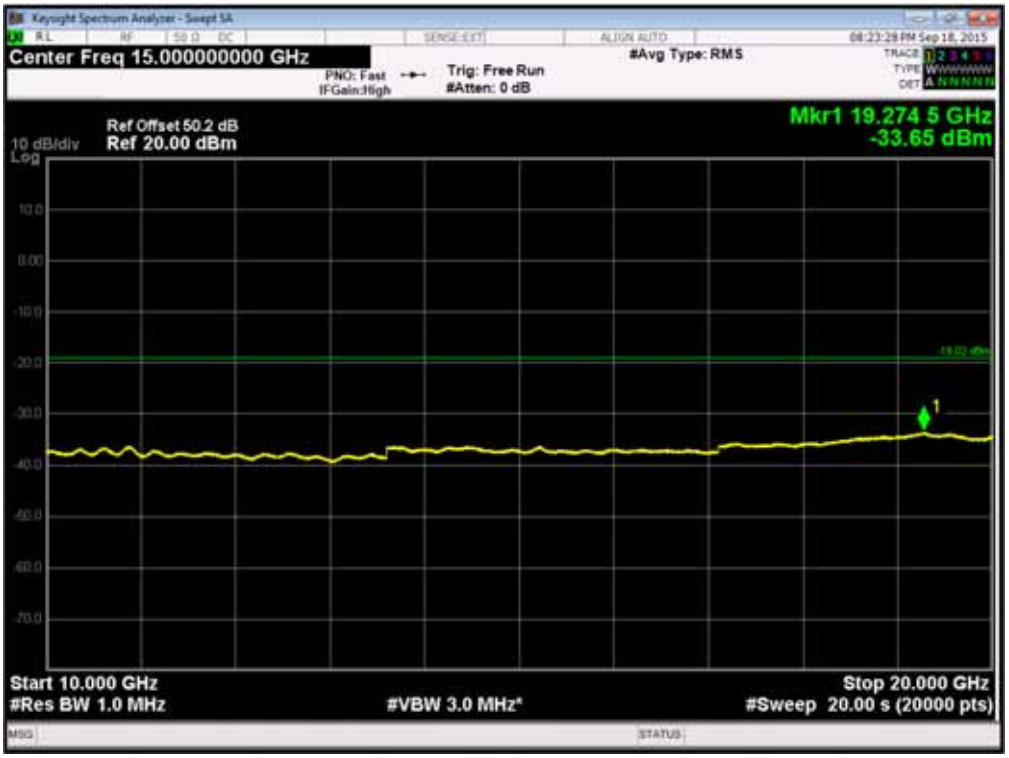
Channel Position B_{RFBW} - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



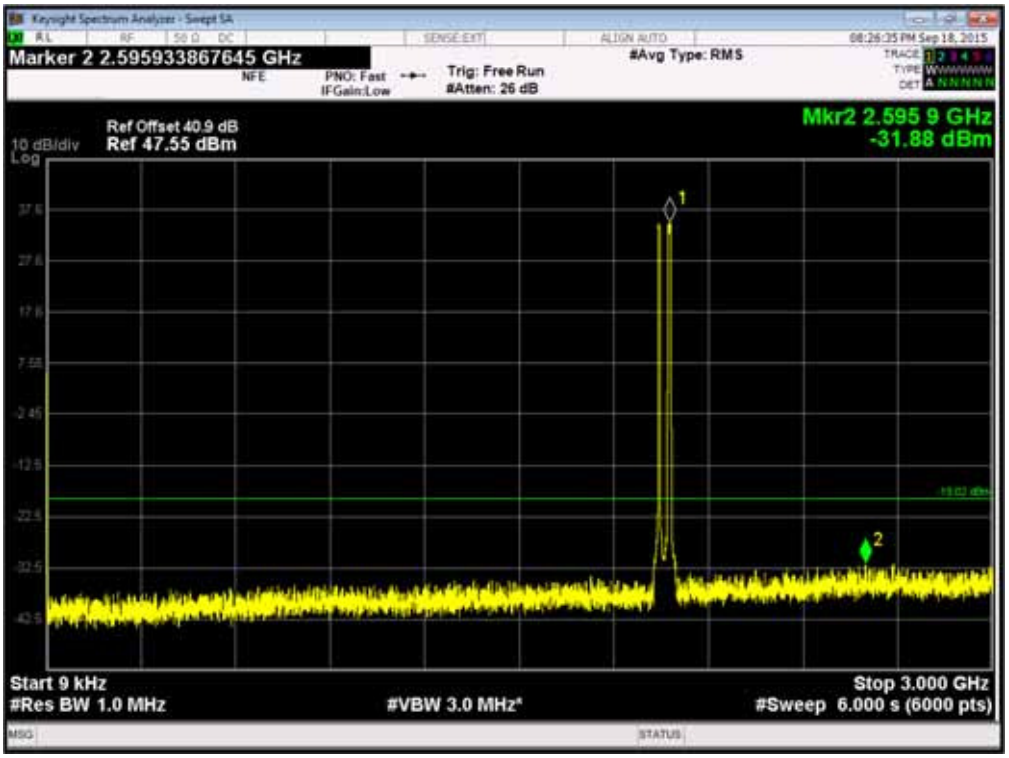
Channel Position B_{RFBW} - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



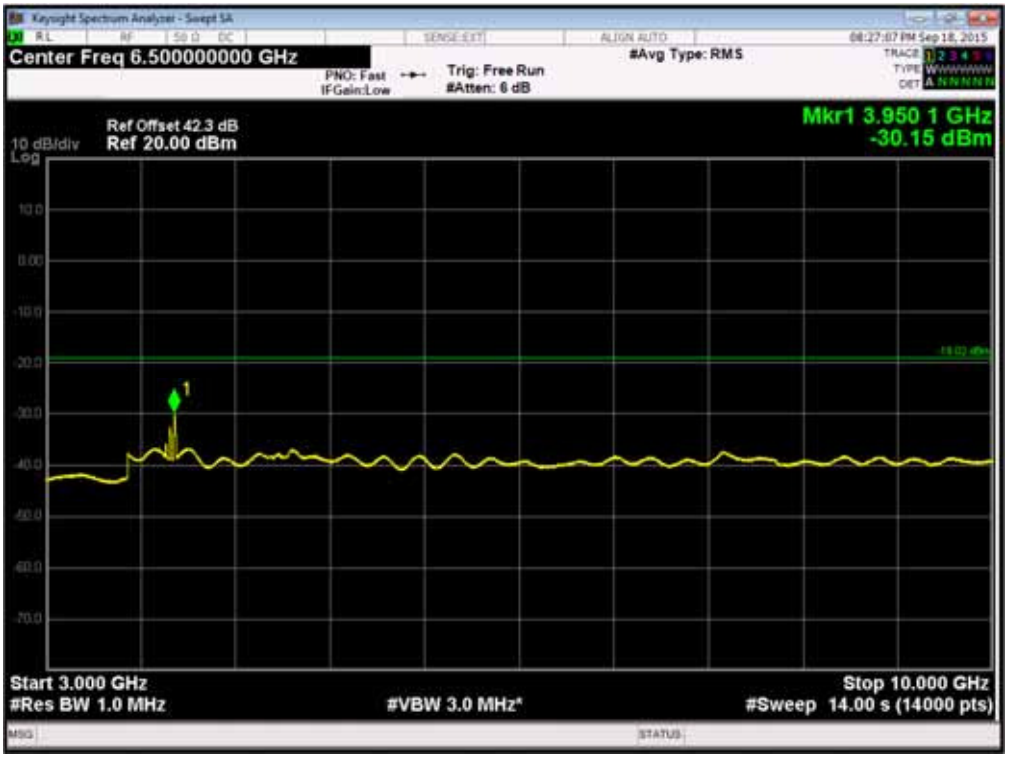
Channel Position B_{RFBW} - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



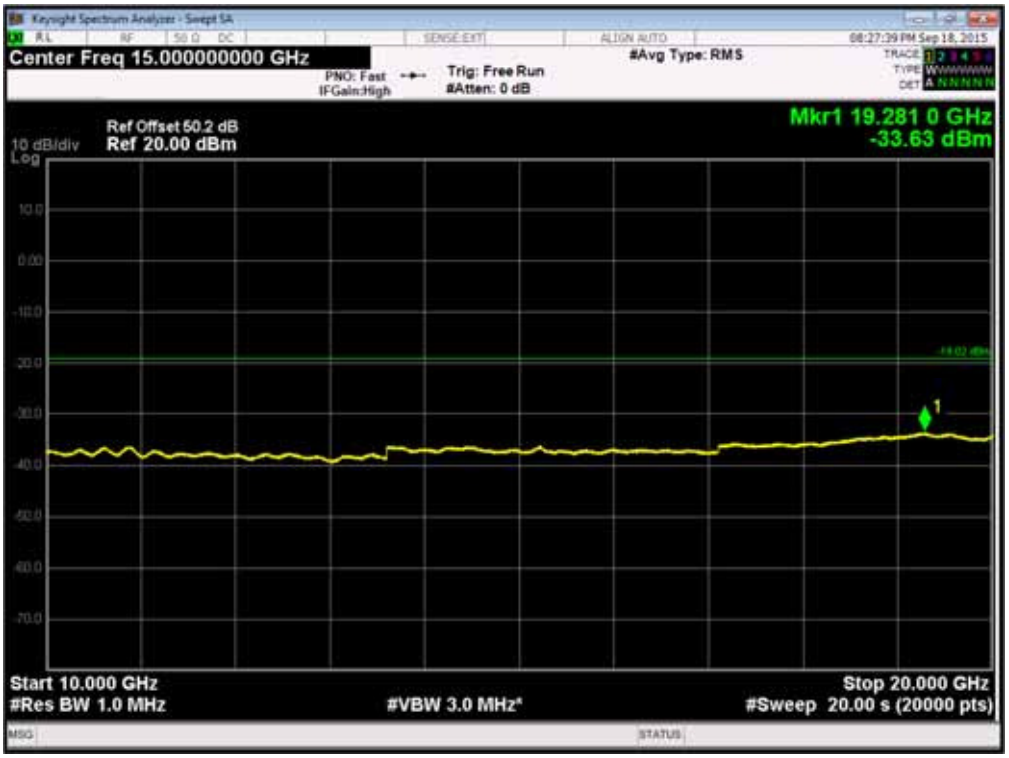
Channel Position M_{RFBW} - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



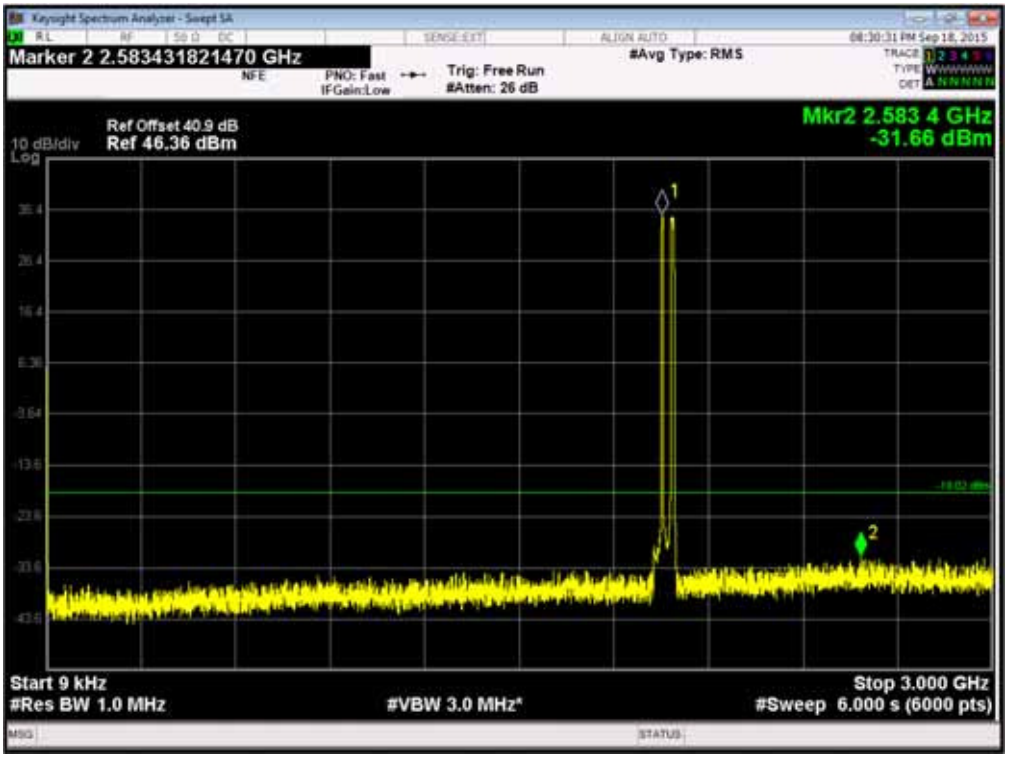
Channel Position M_{RFBW} - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



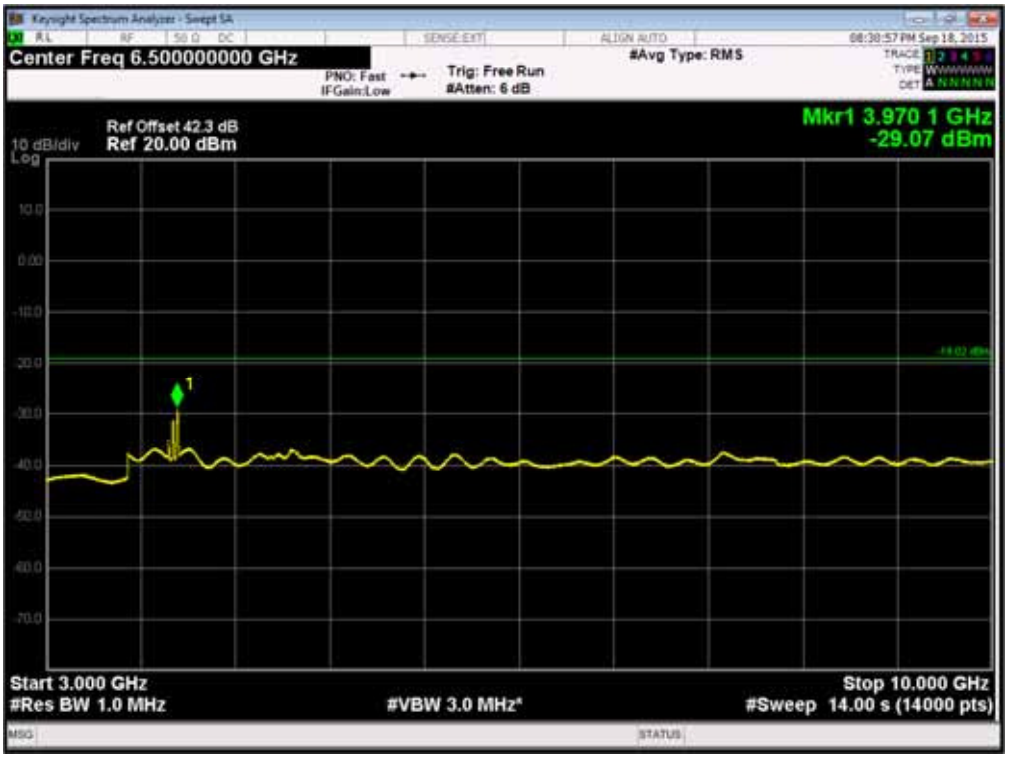
Channel Position M_{RFBW} - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



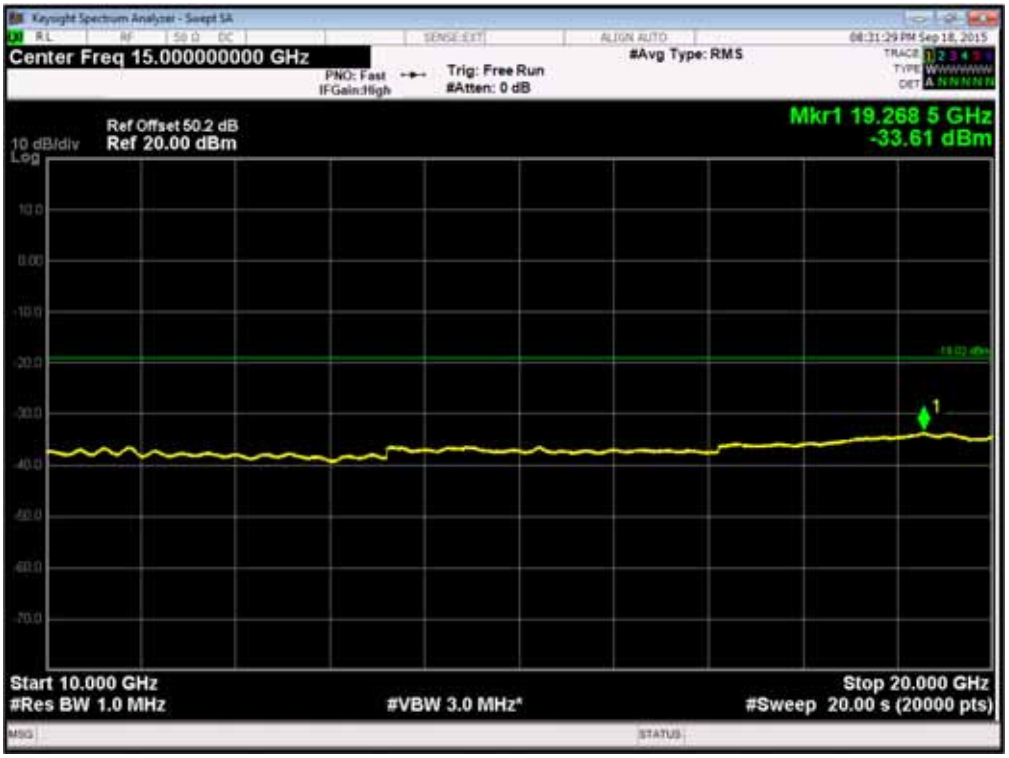
Channel Position T_{RFBW} - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



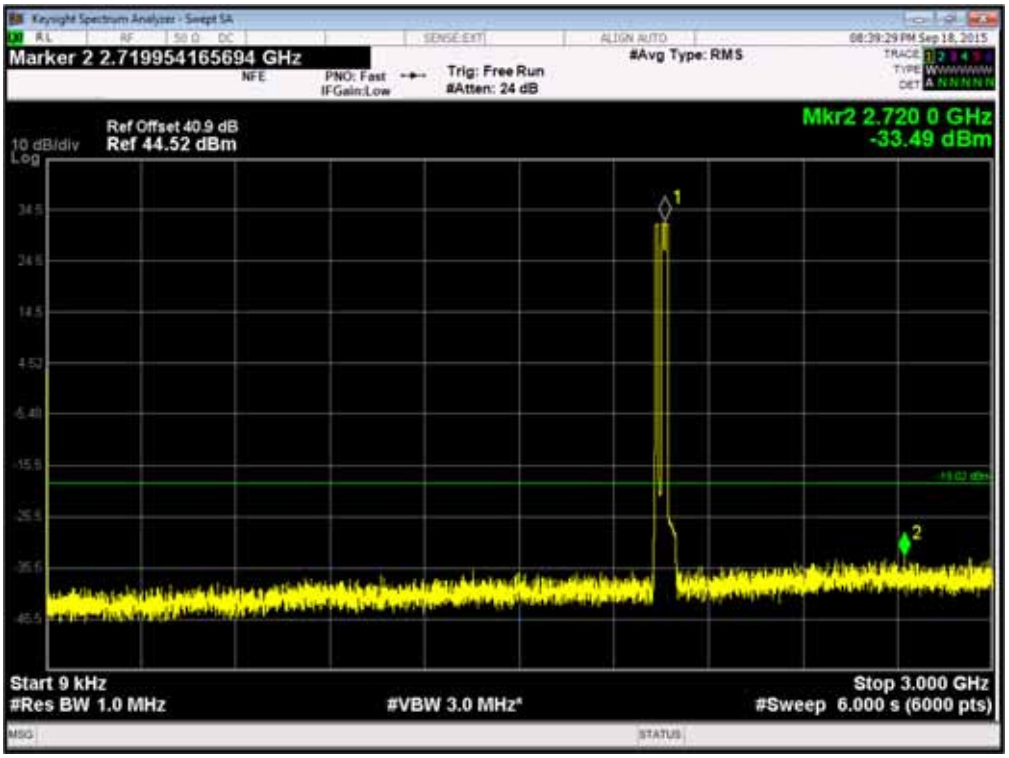
Channel Position T_{RFBW} - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



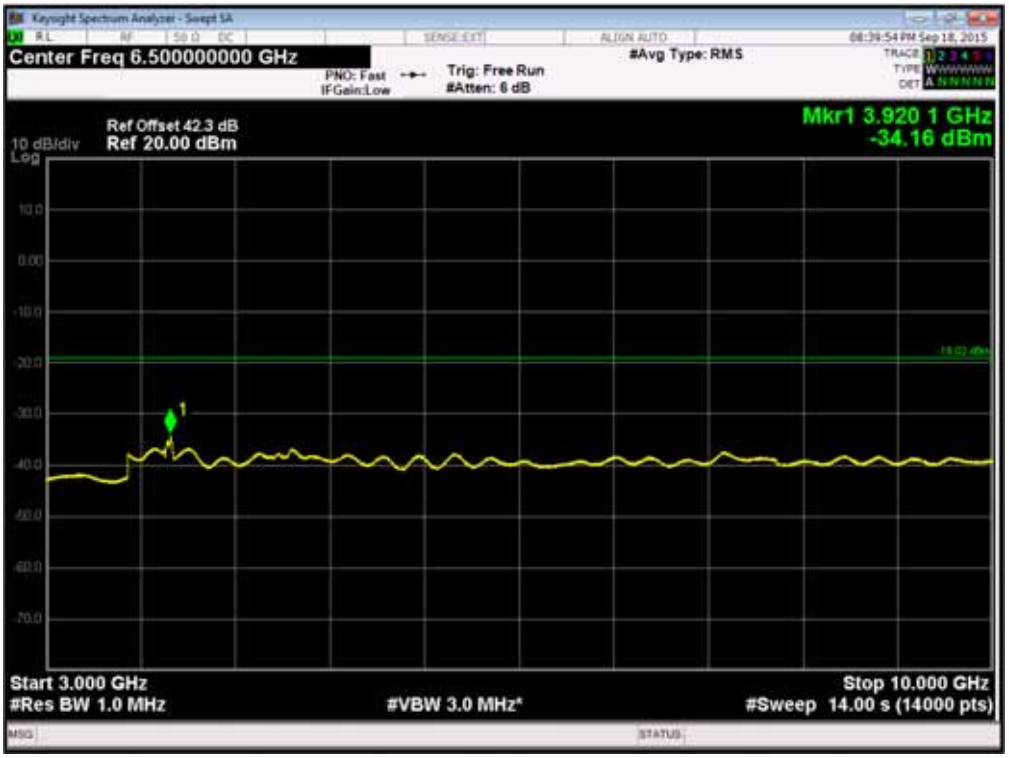
Channel Position T_{RFBW} - QPSK / Bandwidth 5.0MHz - 10GHz - 20GHz



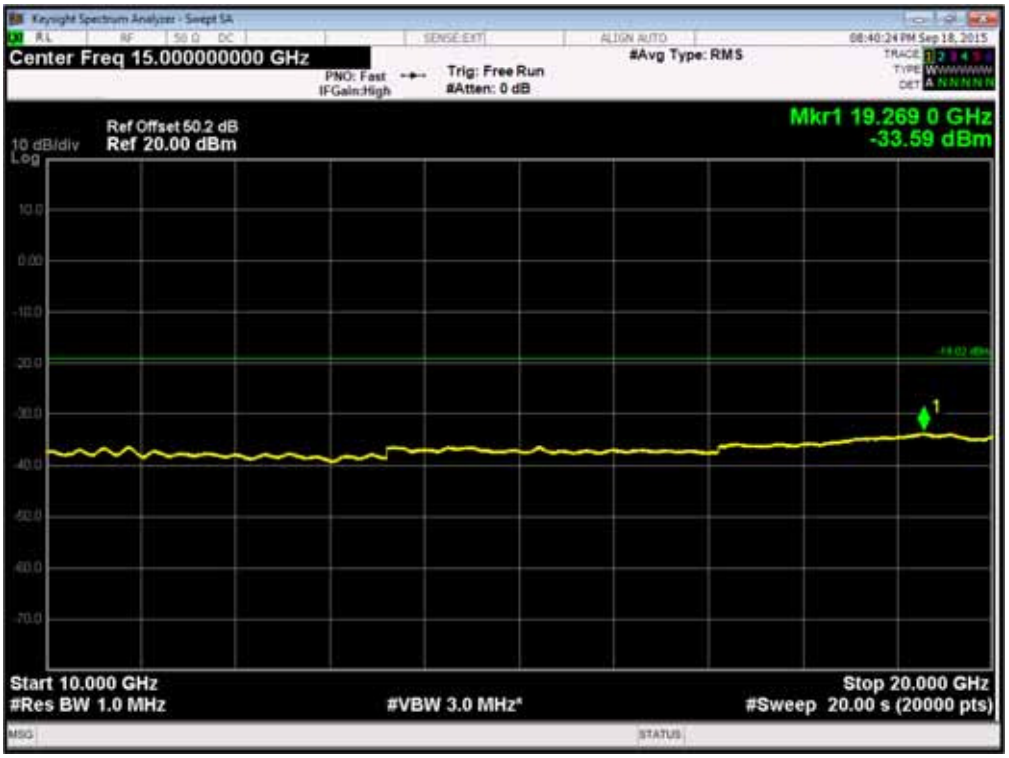
Channel Position B_{RFBW} - QPSK / Bandwidth 10.0MHz - 9kHz - 3GHz



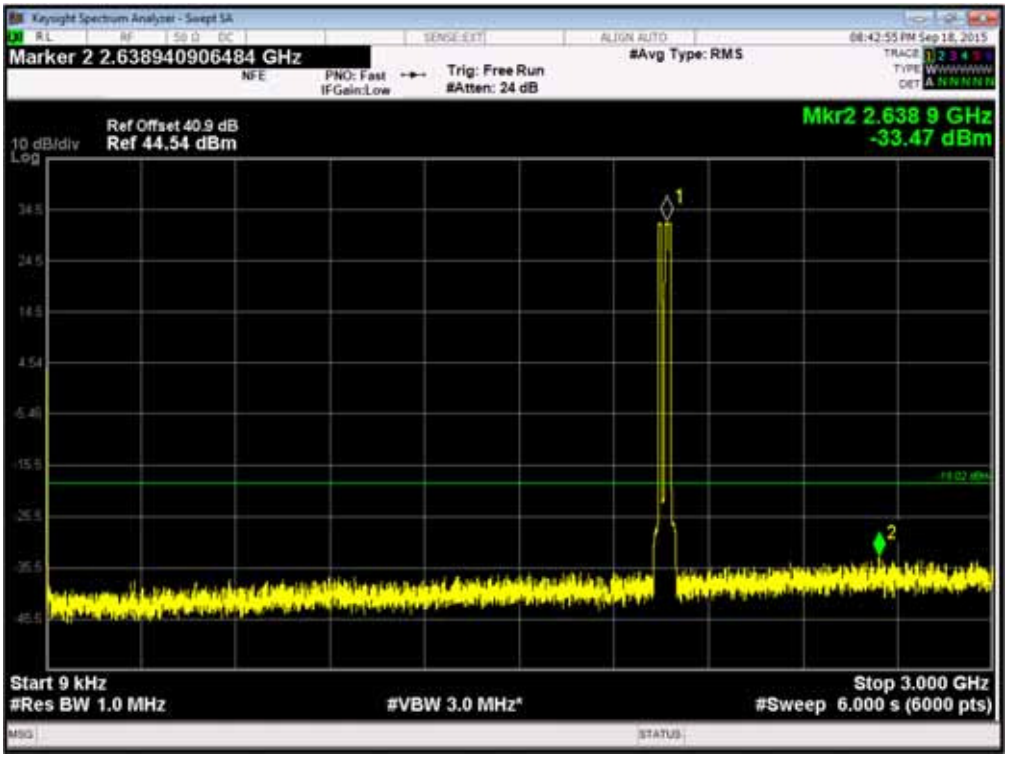
Channel Position B_{RFBW} - QPSK / Bandwidth 10.0MHz - 3GHz - 10GHz



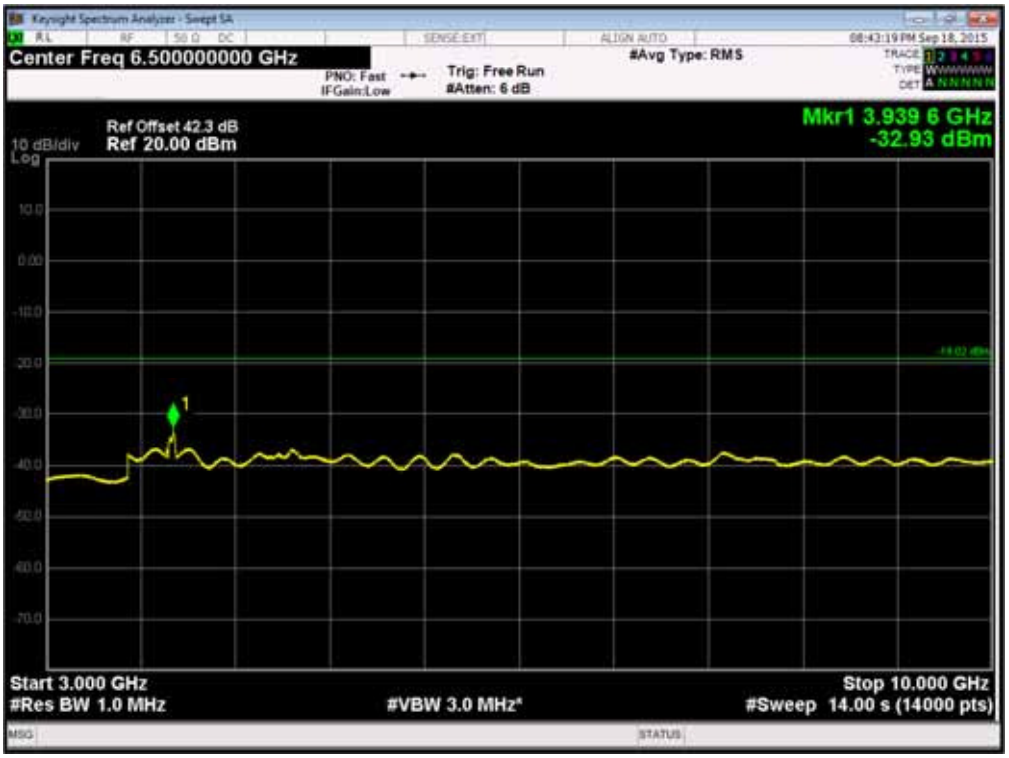
Channel Position B_{RFBW} - QPSK / Bandwidth 10.0MHz - 10GHz - 20GHz



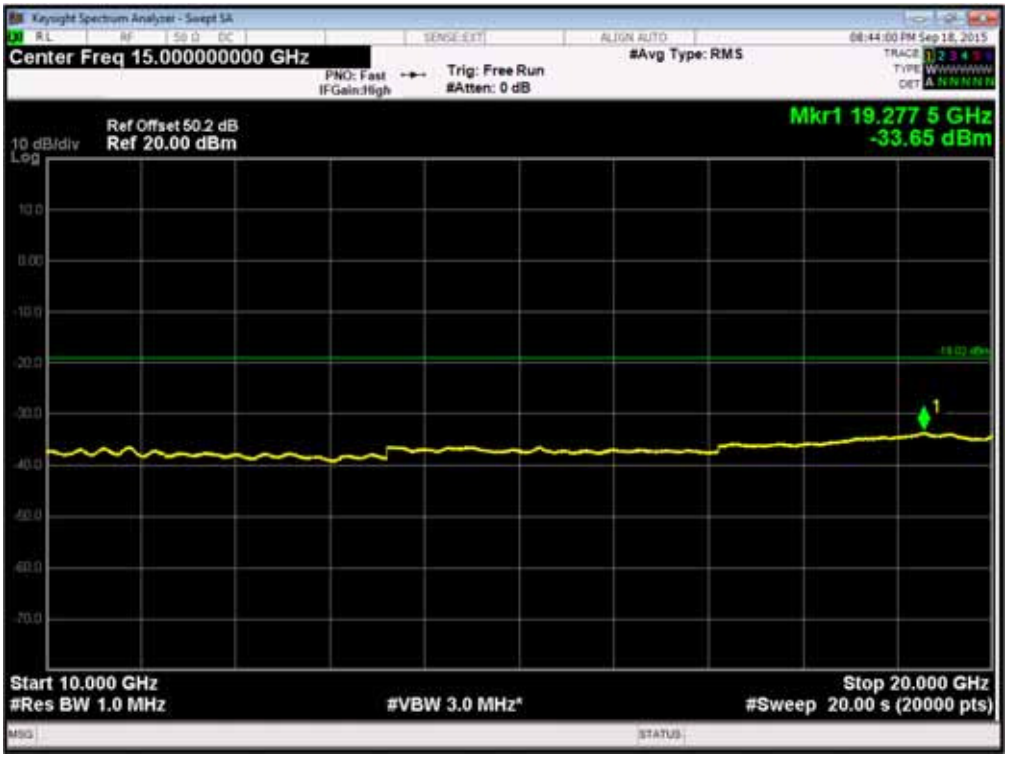
Channel Position M_{RFBW} - QPSK / Bandwidth 10.0MHz - 9kHz - 3GHz



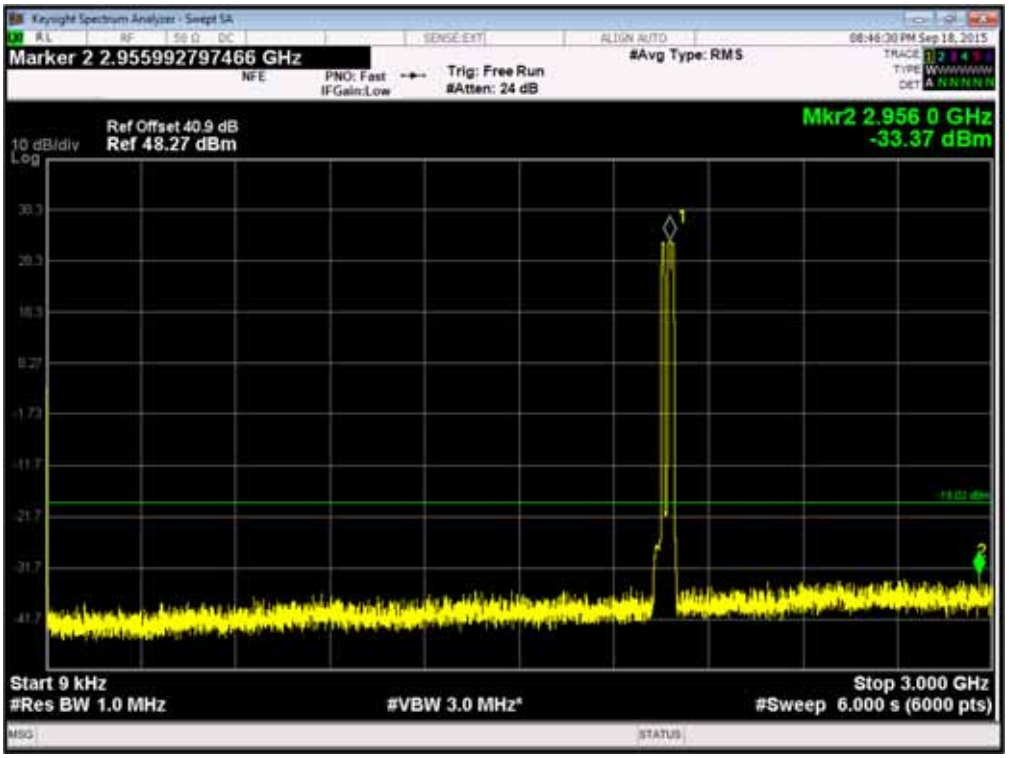
Channel Position M_{RFBW} - QPSK / Bandwidth 10.0MHz - 3GHz - 10GHz



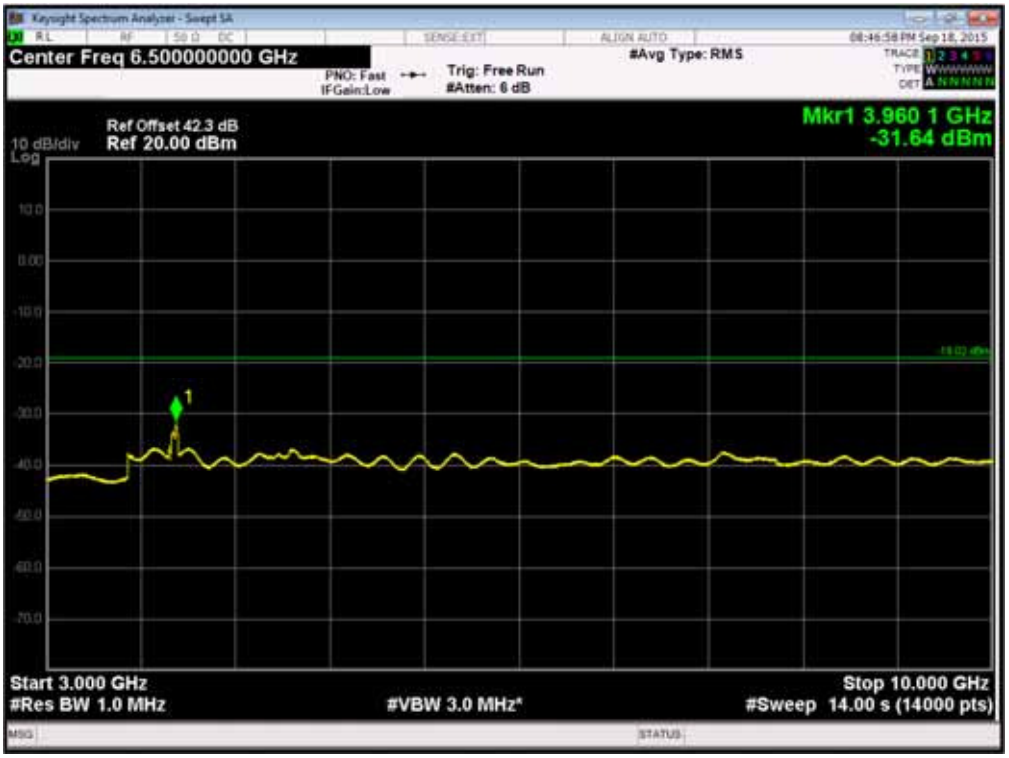
Channel Position M_{RFBW} - QPSK / Bandwidth 10.0MHz - 10GHz - 20GHz



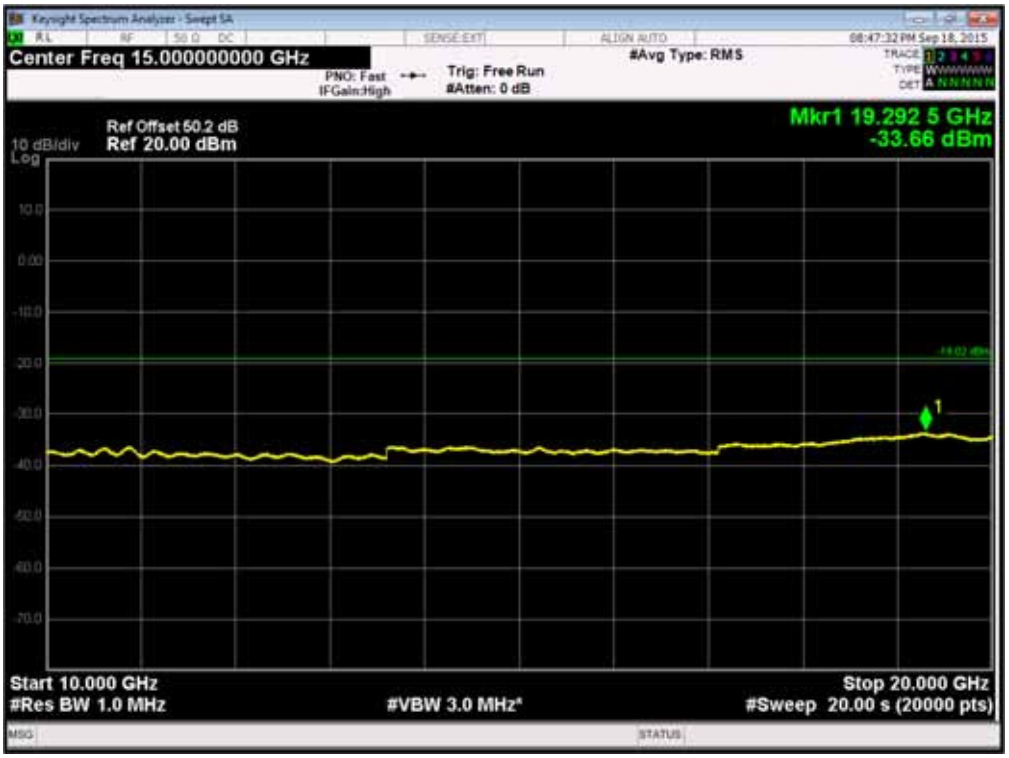
Channel Position T_{RFBW} - QPSK / Bandwidth 10.0MHz - 9kHz - 3GHz



Channel Position T_{RFBW} - QPSK / Bandwidth 10.0MHz - 3GHz - 10GHz



Channel Position T_{RFBW} - QPSK / Bandwidth 10.0MHz - 10GHz - 20GHz

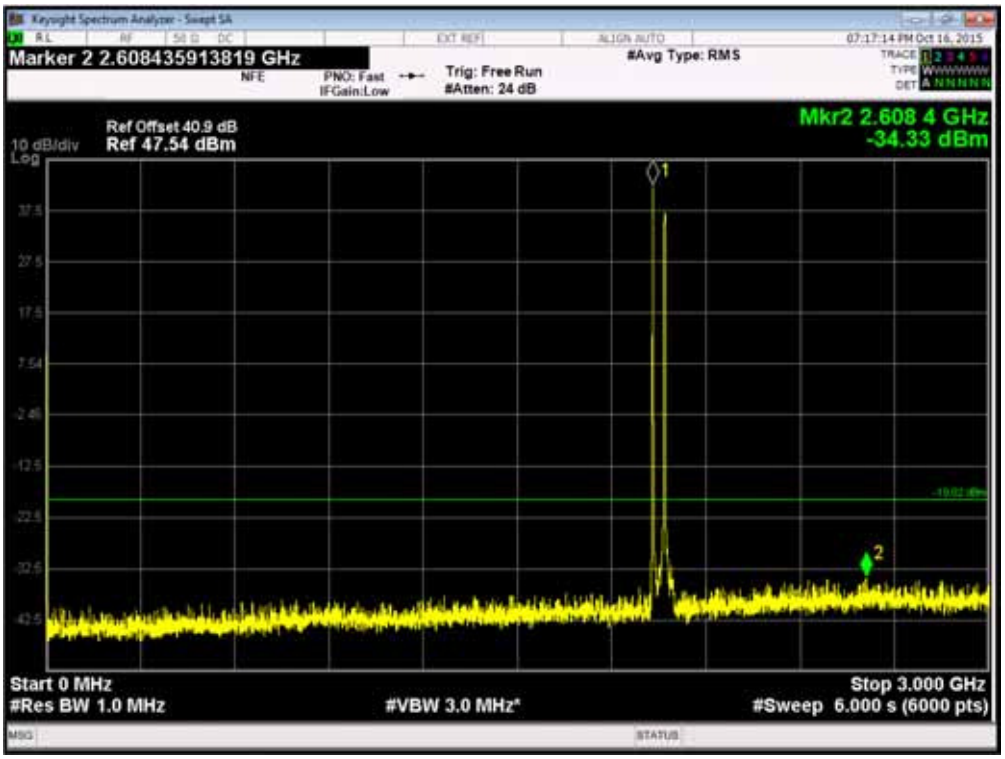


Configuration G+W-MIMO-MC 1 (1G+1W)

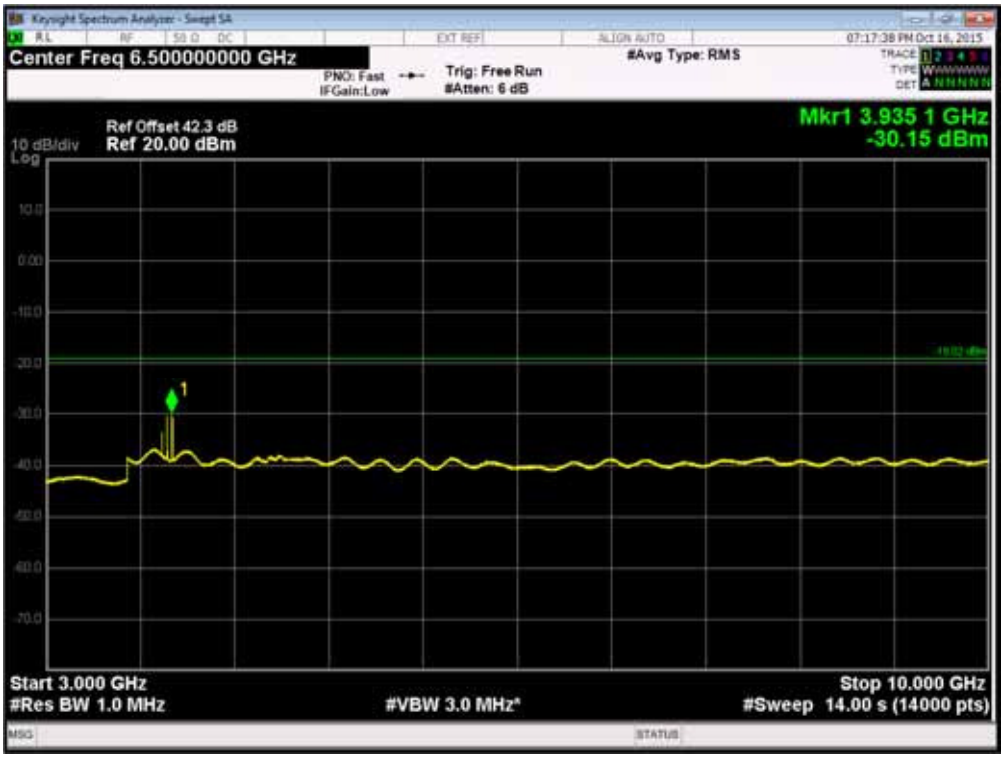
Maximum Output Power 46.0dBm per port

Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	G: 250 kHz W: 5.0 MHz	(G) 1930.4MHz + (W) 1967.6MHz
Channel Position M_{RFBW}	G: 250 kHz W: 5.0 MHz	(G) 1940.2MHz + (W) 1977.6MHz
Channel Position T_{RFBW}	G: 250 kHz W: 5.0 MHz	(G) 1950.2MHz + (W) 1987.6MHz

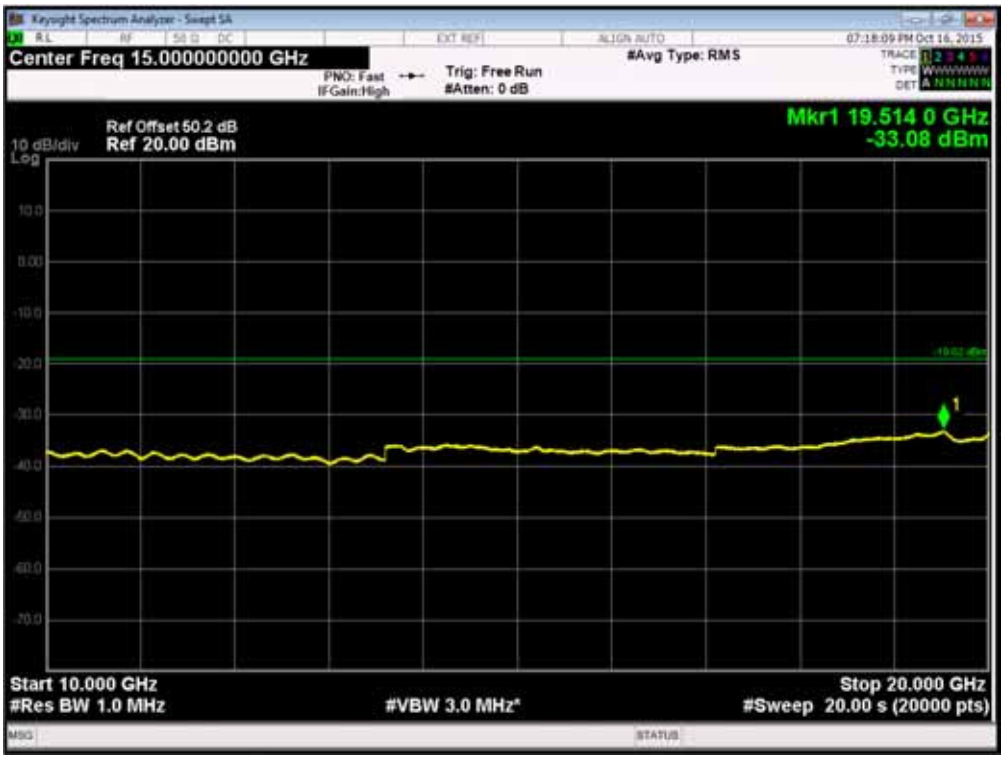
Channel Position B_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 9kHz - 3GHz



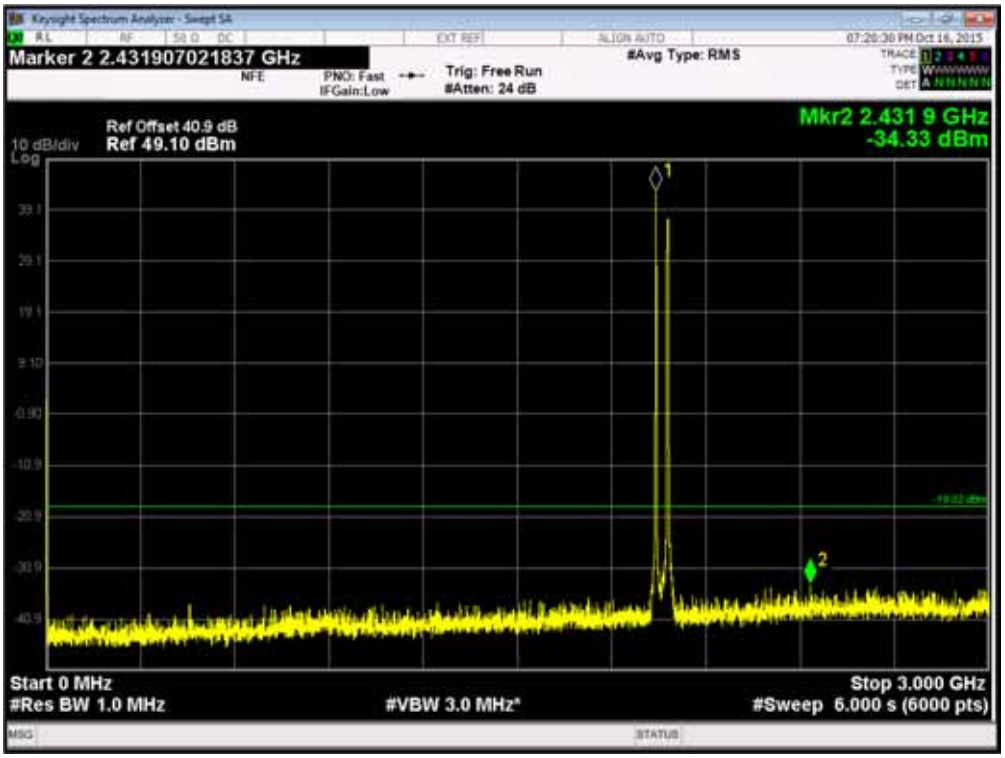
Channel Position B_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 3GHz - 10GHz



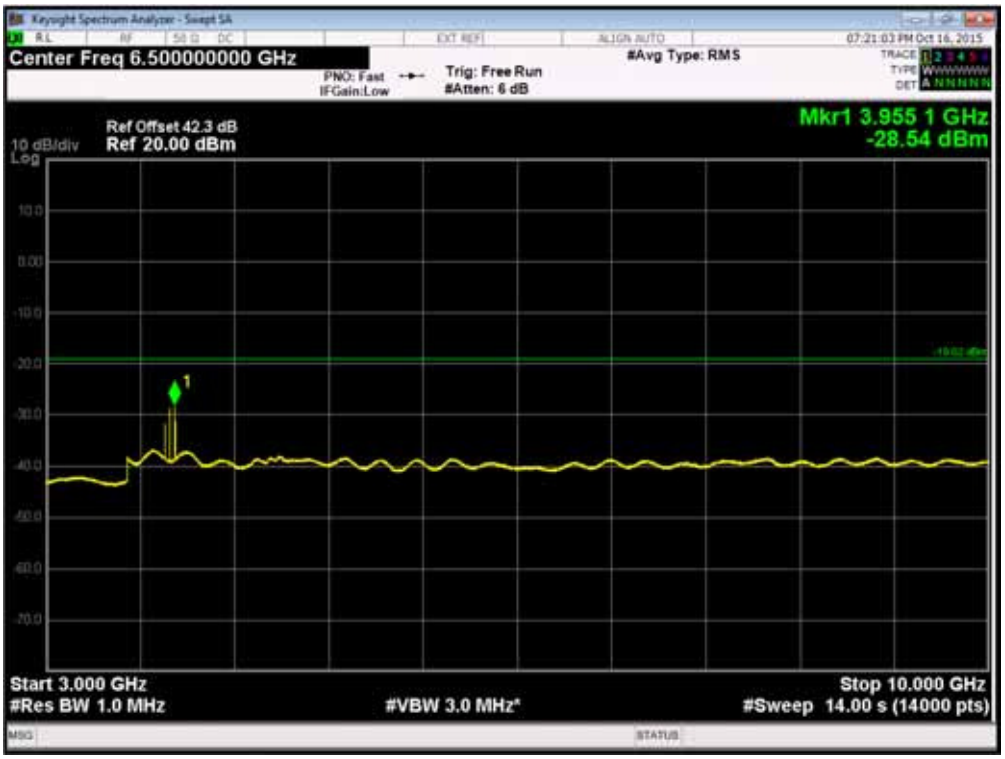
Channel Position B_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 10GHz - 20GHz



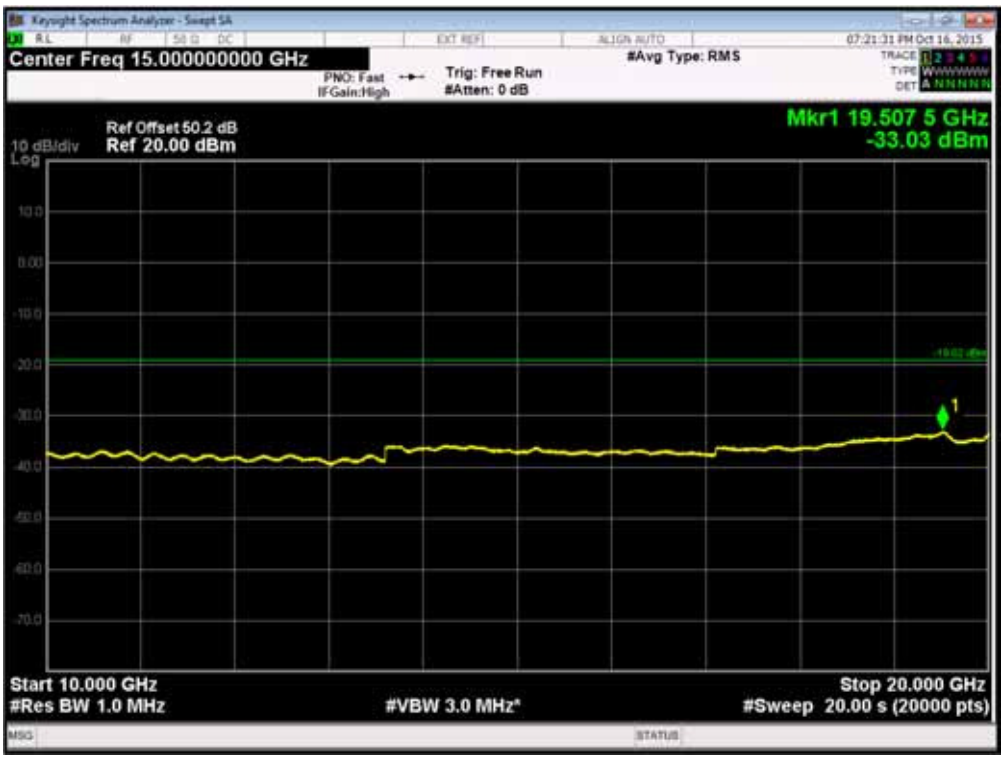
Channel Position M_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 9kHz - 3GHz



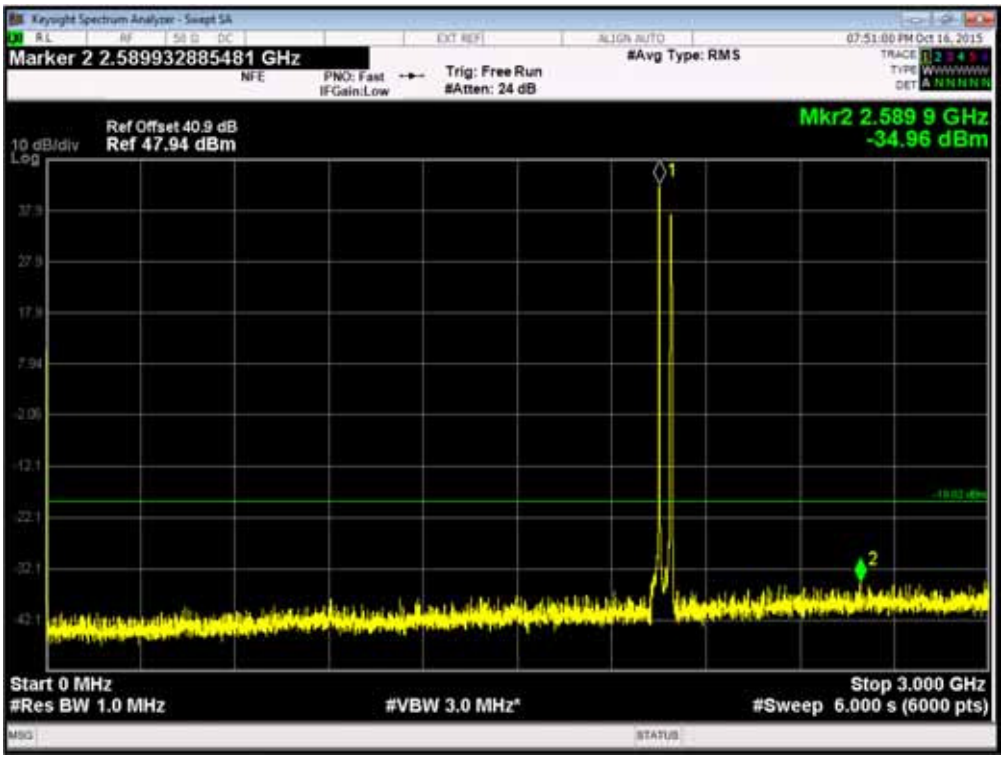
Channel Position M_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 3GHz - 10GHz



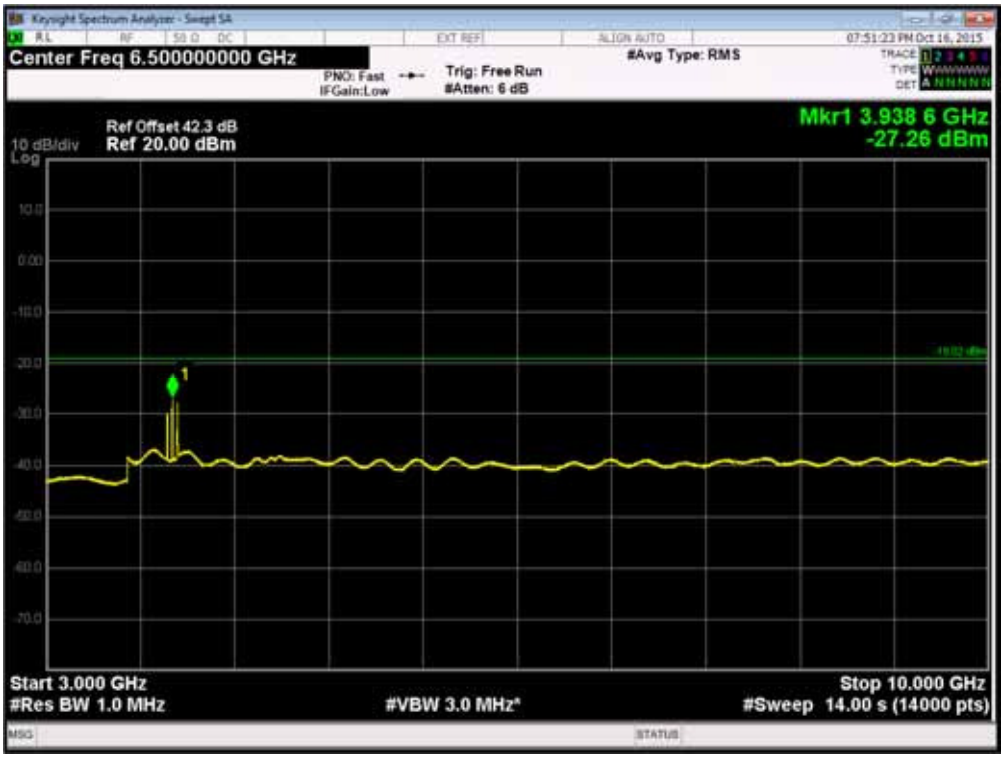
Channel Position M_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 10GHz - 20GHz



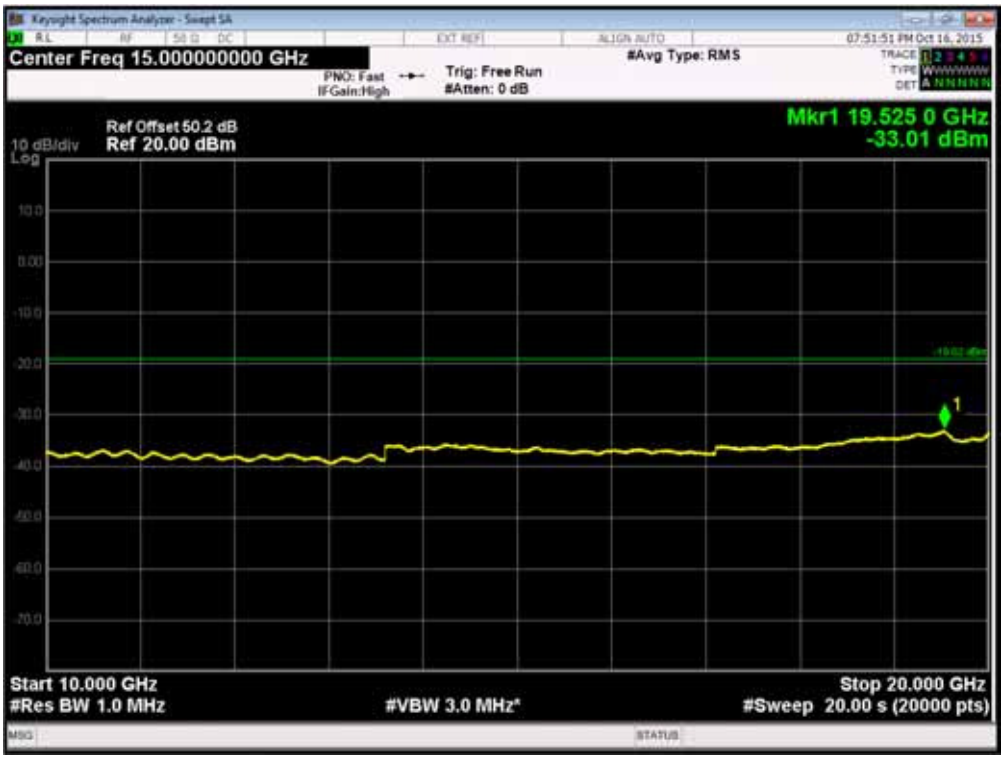
Channel Position T_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 9kHz - 3GHz



Channel Position T_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 3GHz - 10GHz



Channel Position T_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 10GHz - 20GHz

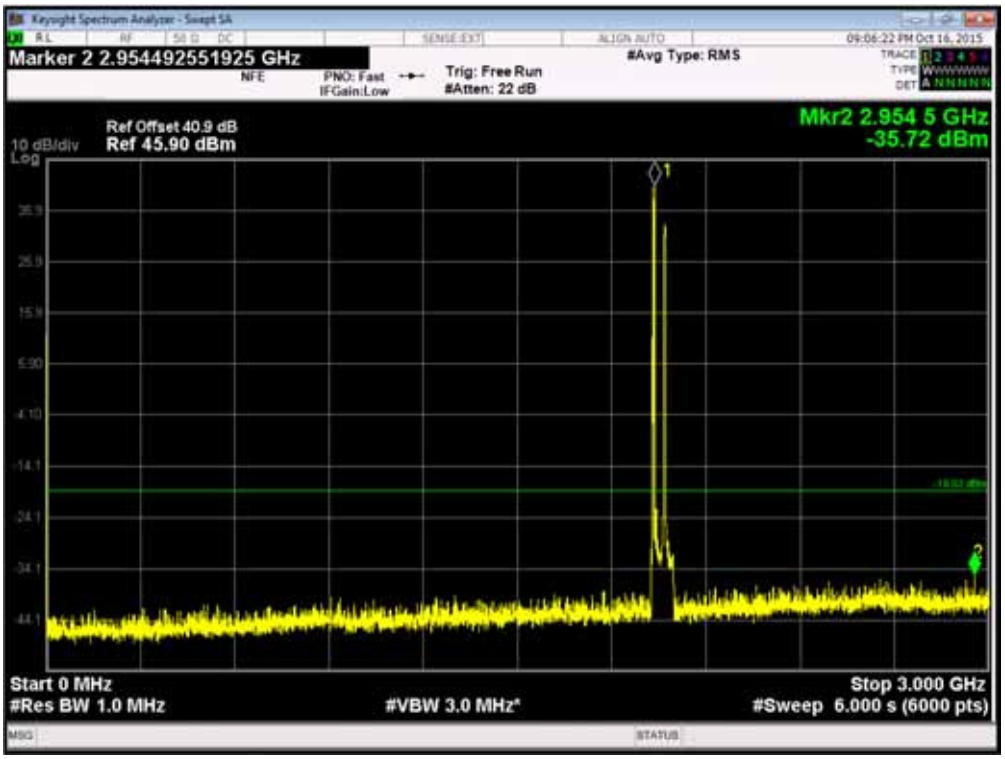


Configuration G+W-MIMO-MC 3 (2G+1W)

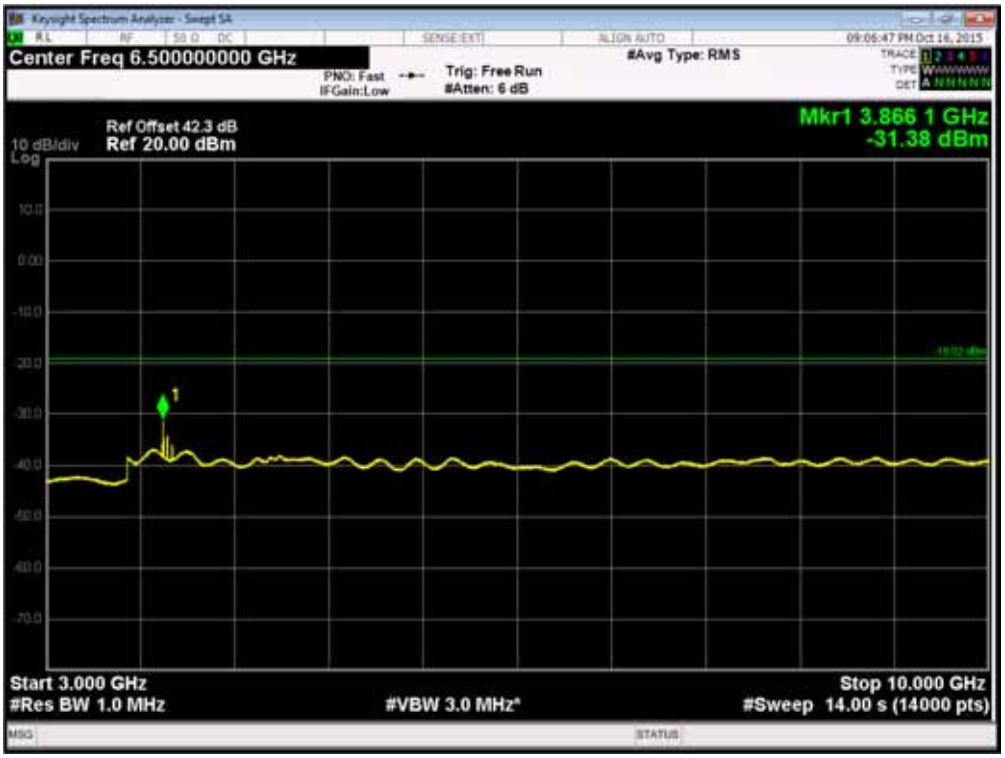
Maximum Output Power 46.0dBm per port

Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	G: 250 kHz W: 5.0 MHz	(G) 1930.4MHz + (G) 1935.8MHz + (W) 1967.6MHz
Channel Position M_{RFBW}	G: 250 kHz W: 5.0 MHz	(G) 1940.2MHz + (G) 1945.8MHz + (W) 1977.6MHz
Channel Position T_{RFBW}	G: 250 kHz W: 5.0 MHz	(G) 1950.2MHz + (G) 1955.8MHz + (W) 1987.6MHz

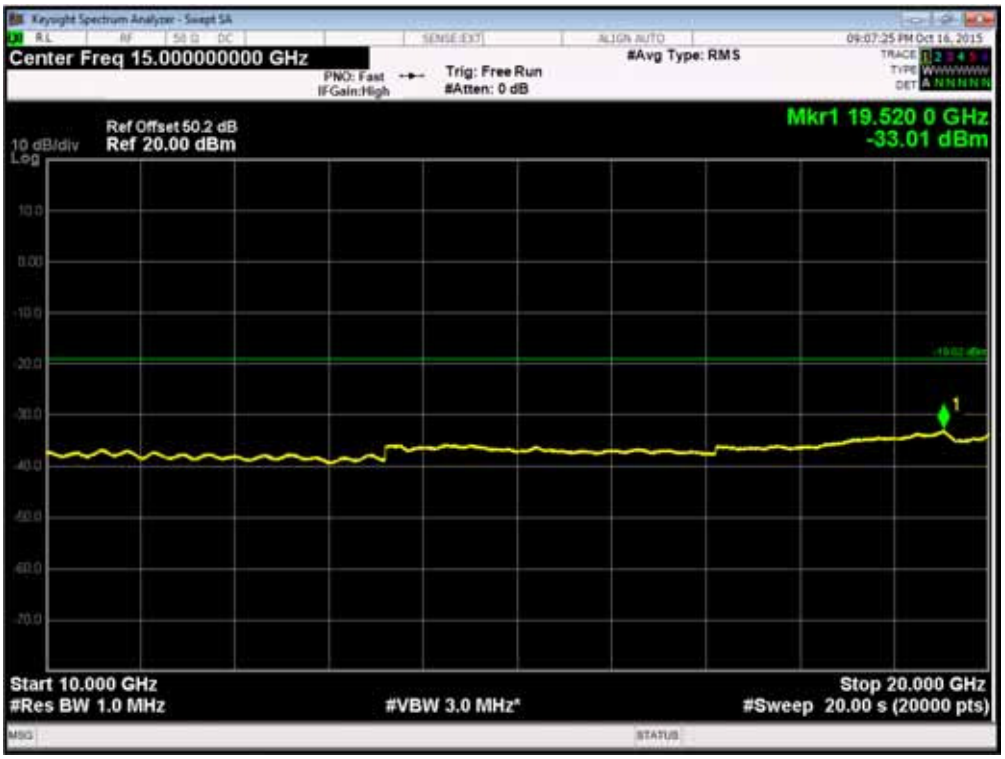
Channel Position B_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 9kHz - 3GHz



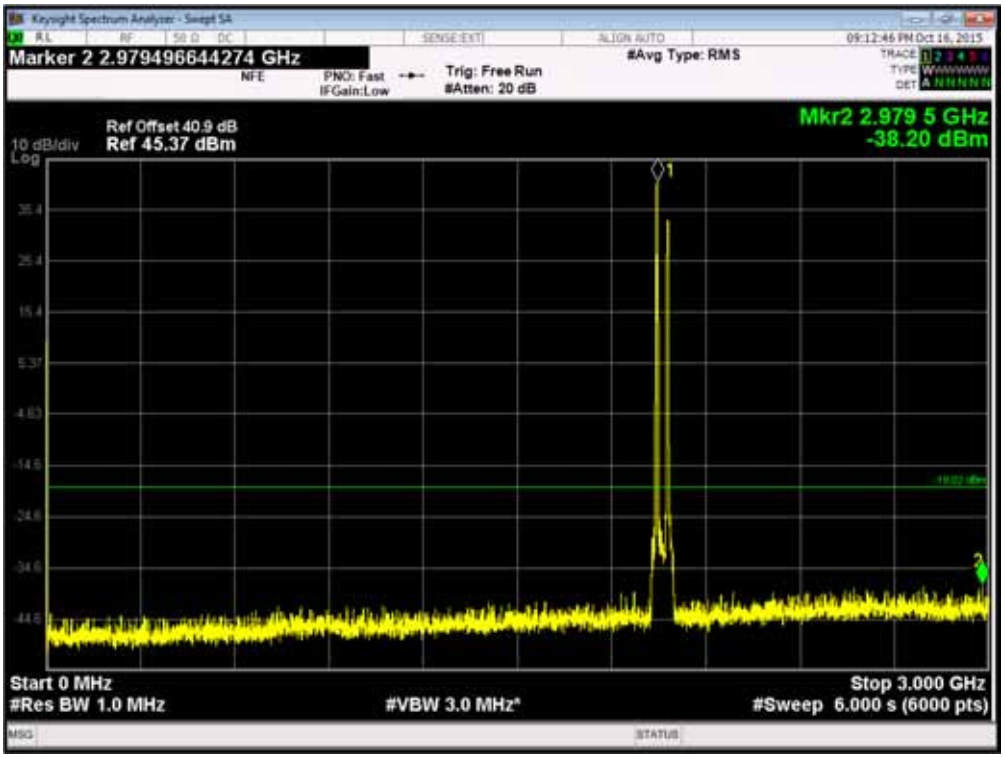
Channel Position B_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 3GHz - 10GHz



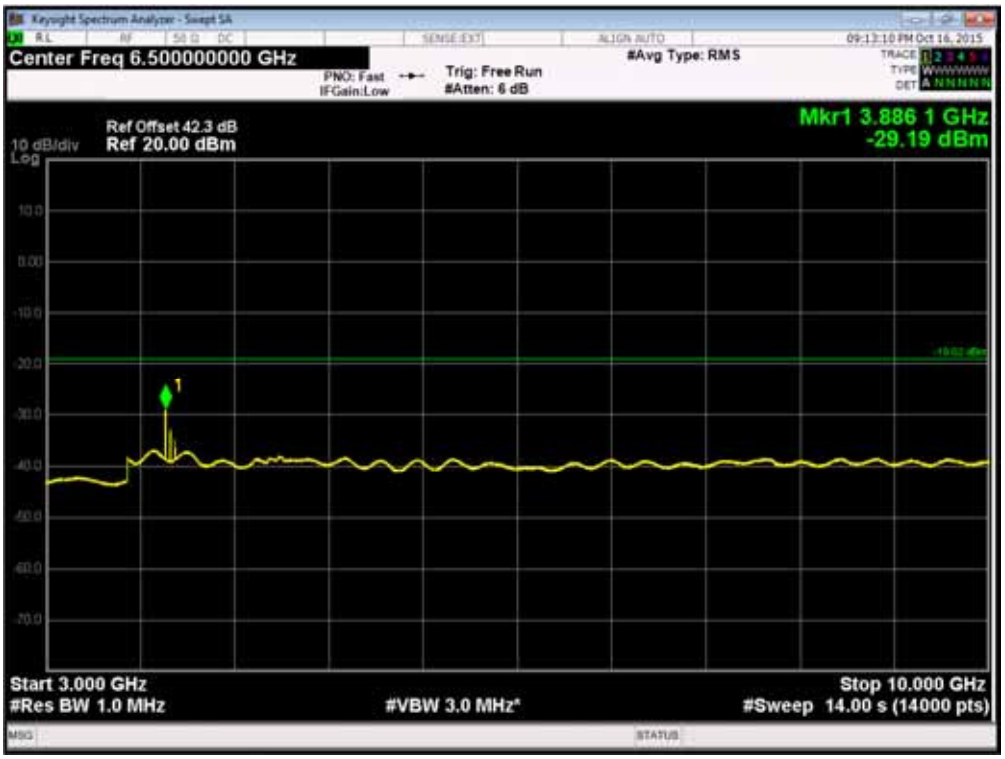
Channel Position B_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 10GHz - 20GHz



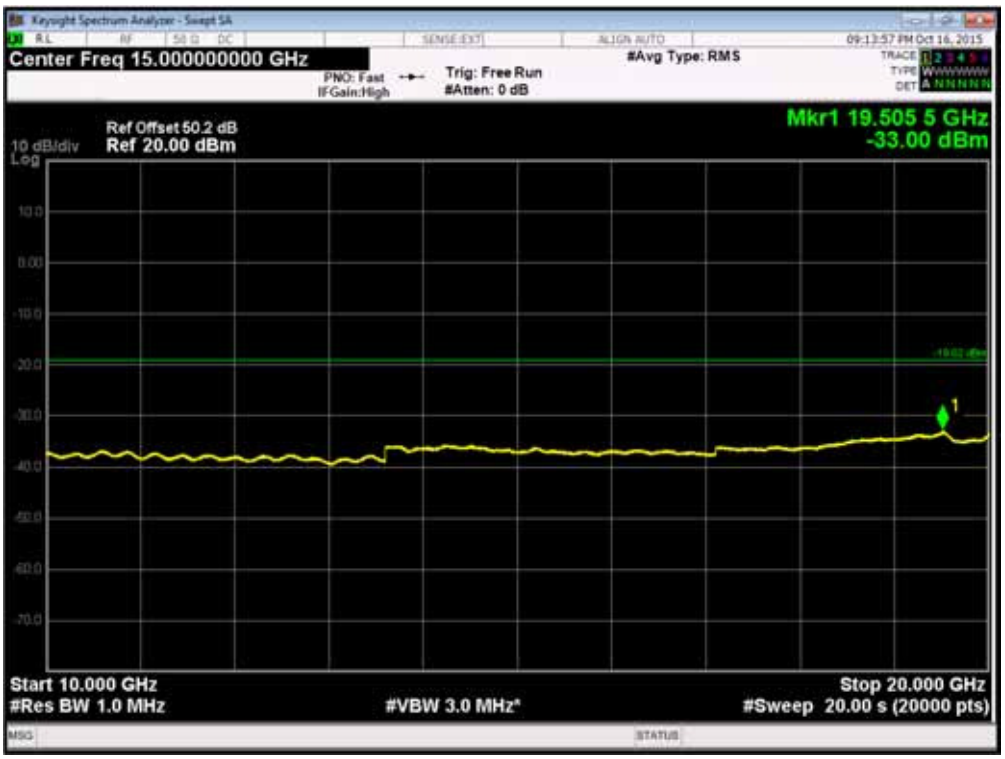
Channel Position M_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 9kHz - 3GHz



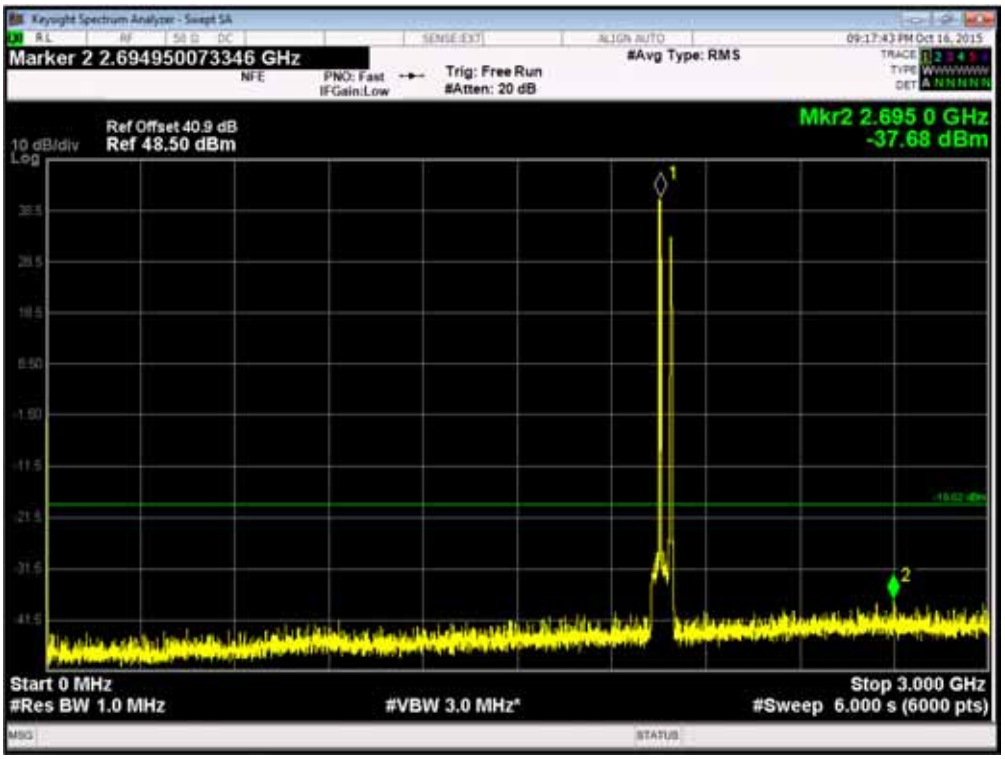
Channel Position M_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 3GHz - 10GHz



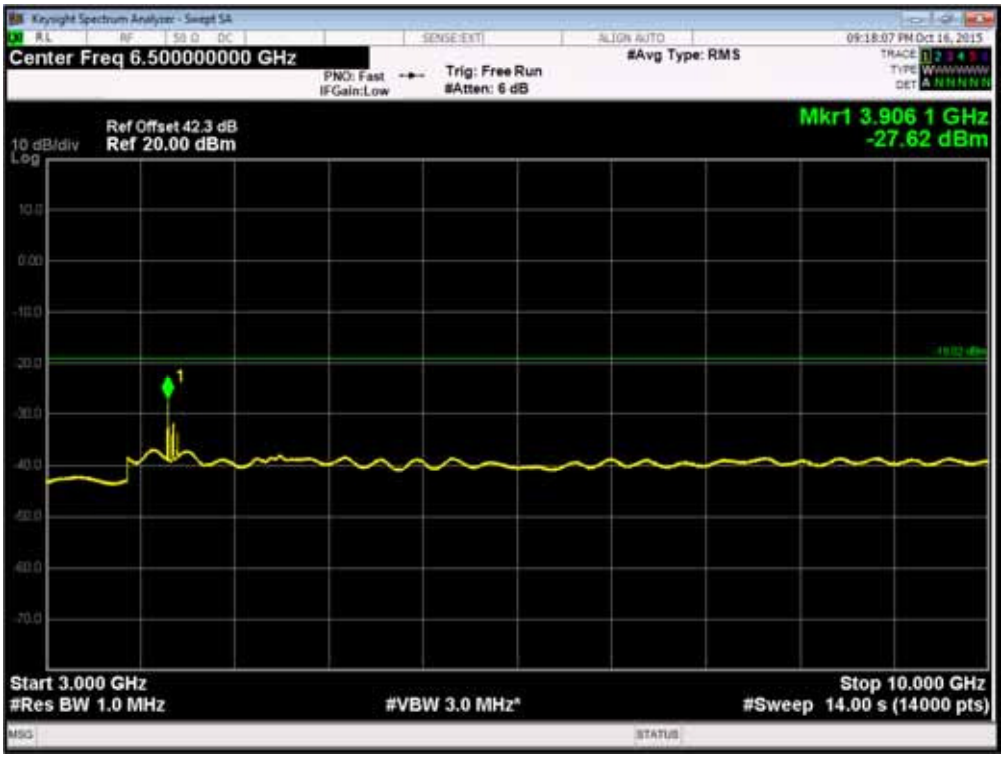
Channel Position M_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 10GHz - 20GHz



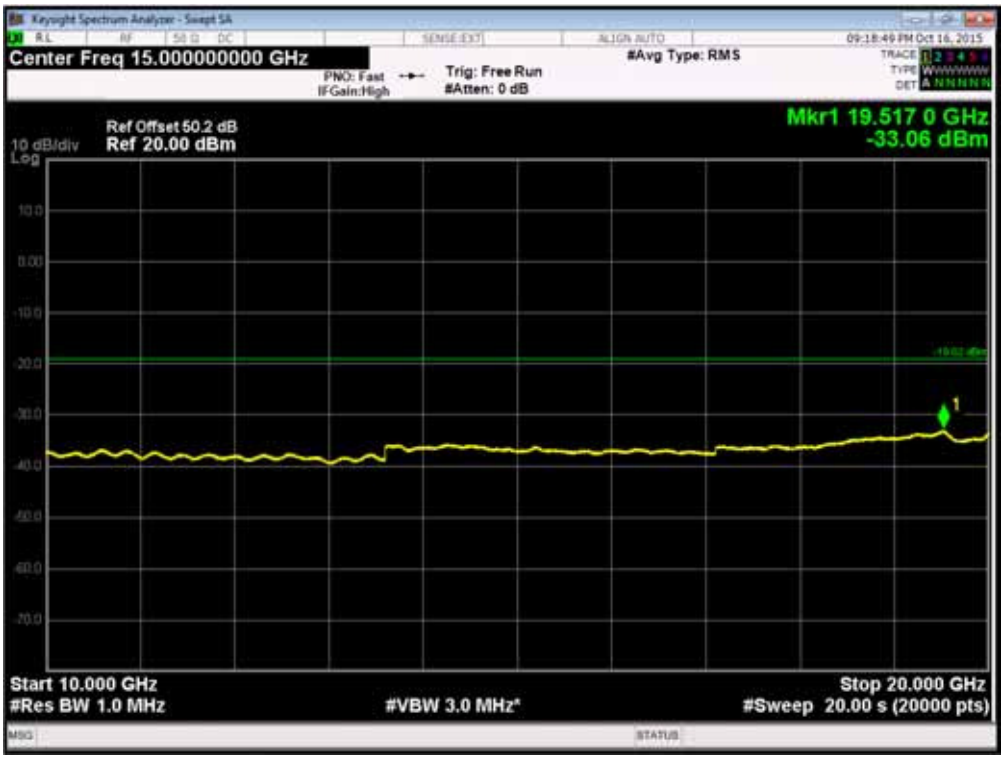
Channel Position T_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 9kHz - 3GHz



Channel Position T_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 3GHz - 10GHz



Channel Position T_{RFBW} - GSM GMSK / WCDMA 16QAM: Bandwidth 5.0 MHz - 10GHz - 20GHz

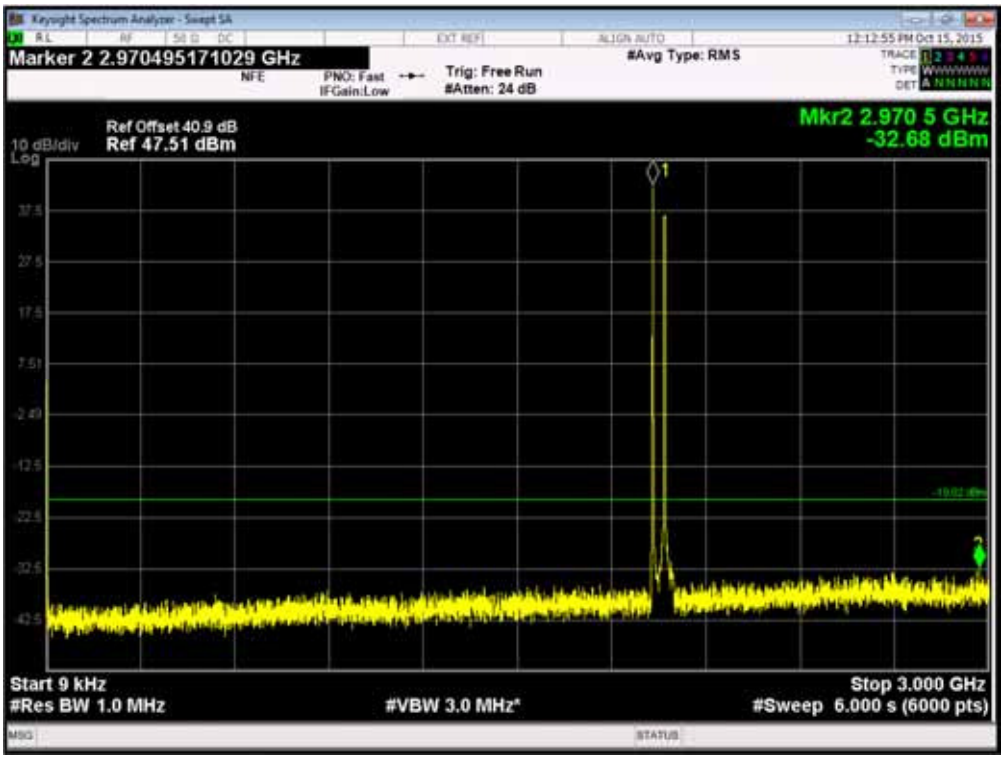


Configuration G+L-MIMO-MC 1 (1G+1L)

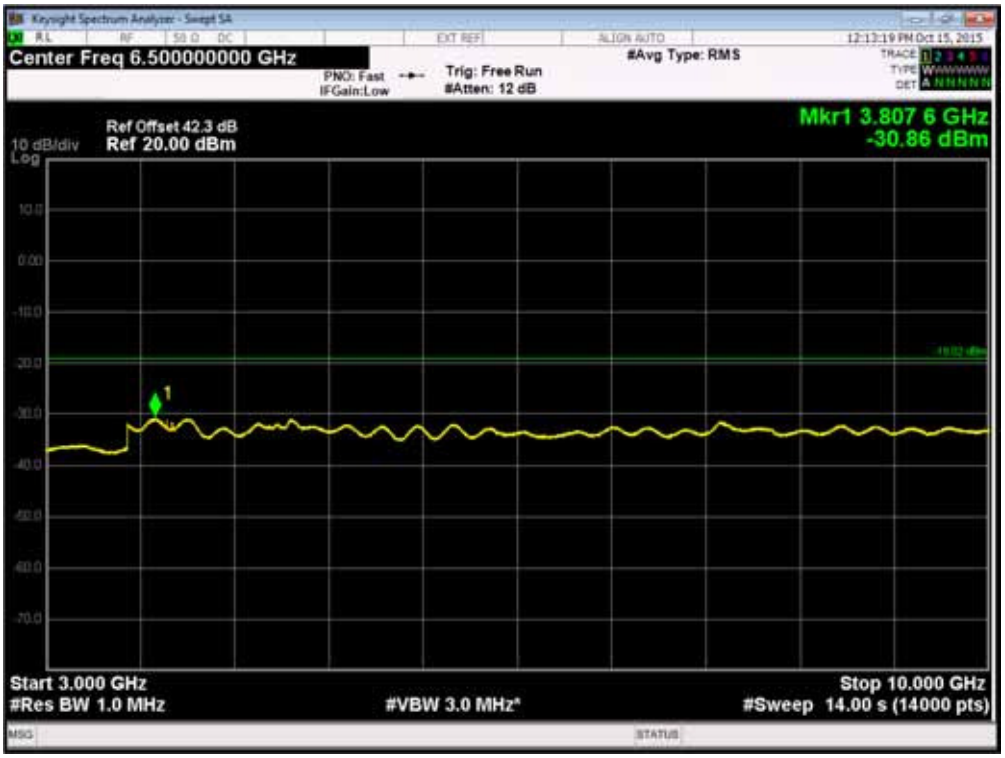
Maximum Output Power 46.0dBm per port

Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	G: 250 kHz L: 5.0 MHz	(G) 1930.4MHz + (L) 1967.5MHz
Channel Position M_{RFBW}	G: 250 kHz L: 5.0 MHz	(G) 1940.2MHz + (L) 1977.5MHz
Channel Position T_{RFBW}	G: 250 kHz L: 5.0 MHz	(G) 1950.2MHz + (L) 1987.5MHz

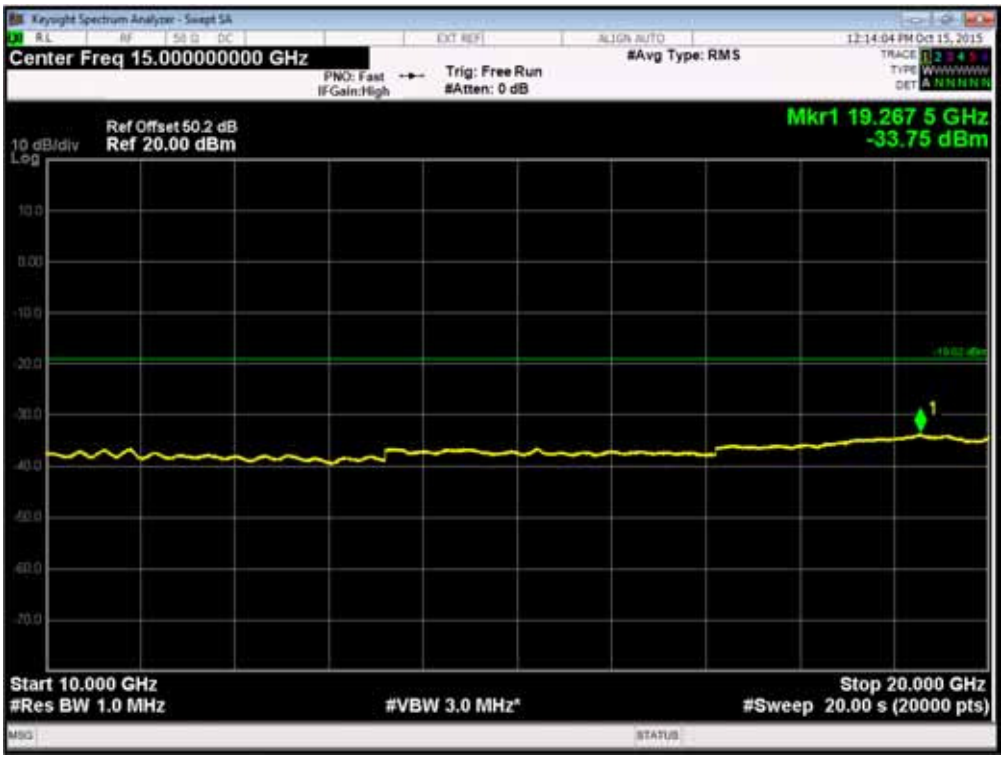
Channel Position B_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz



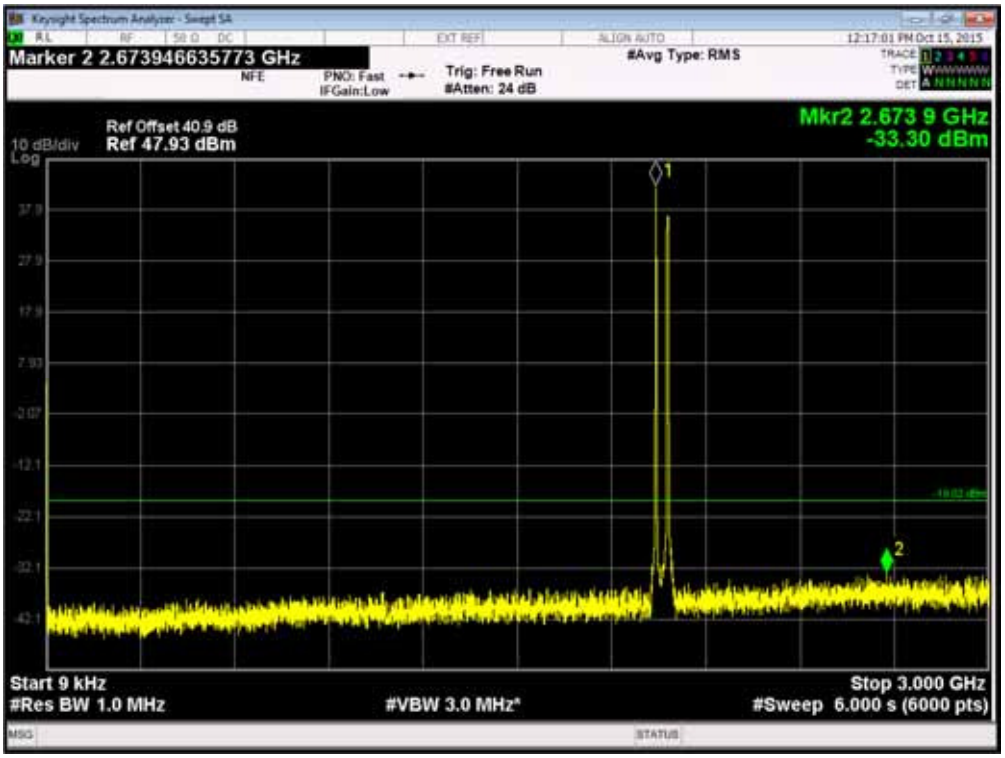
Channel Position B_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz



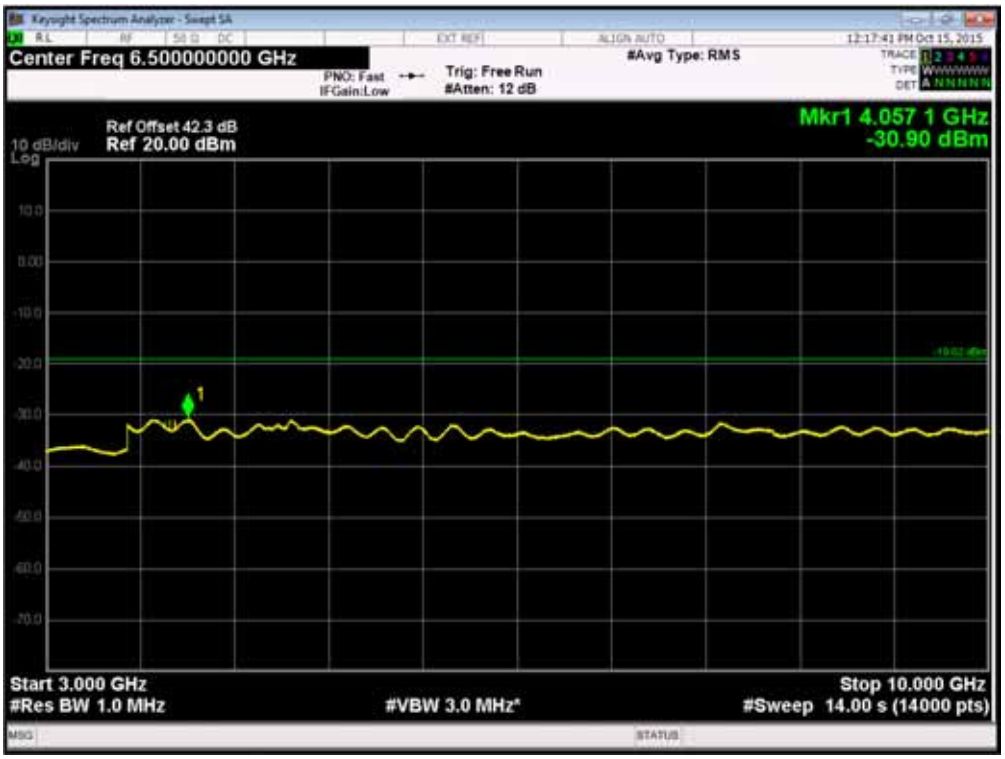
Channel Position B_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz



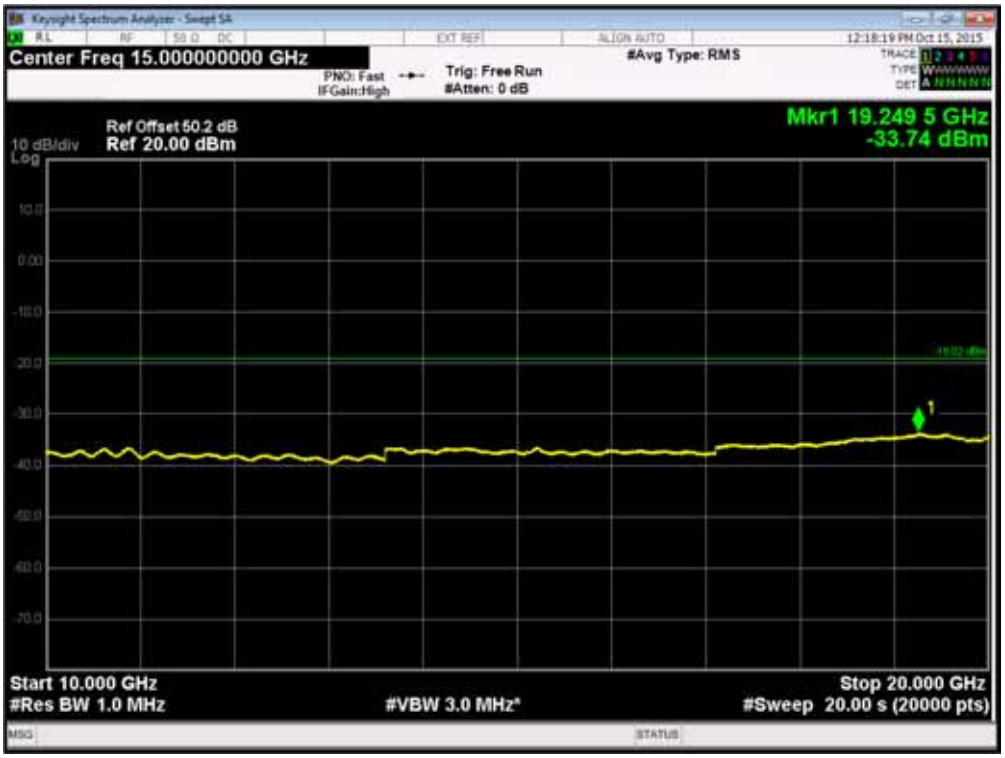
Channel Position M_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz



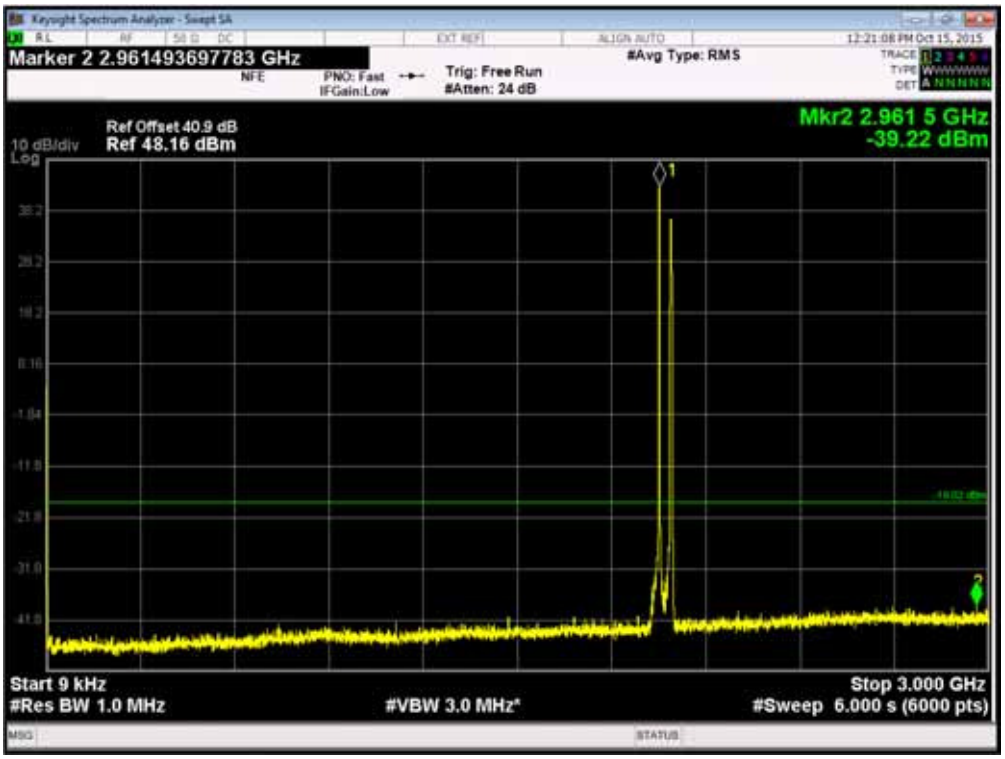
Channel Position M_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz



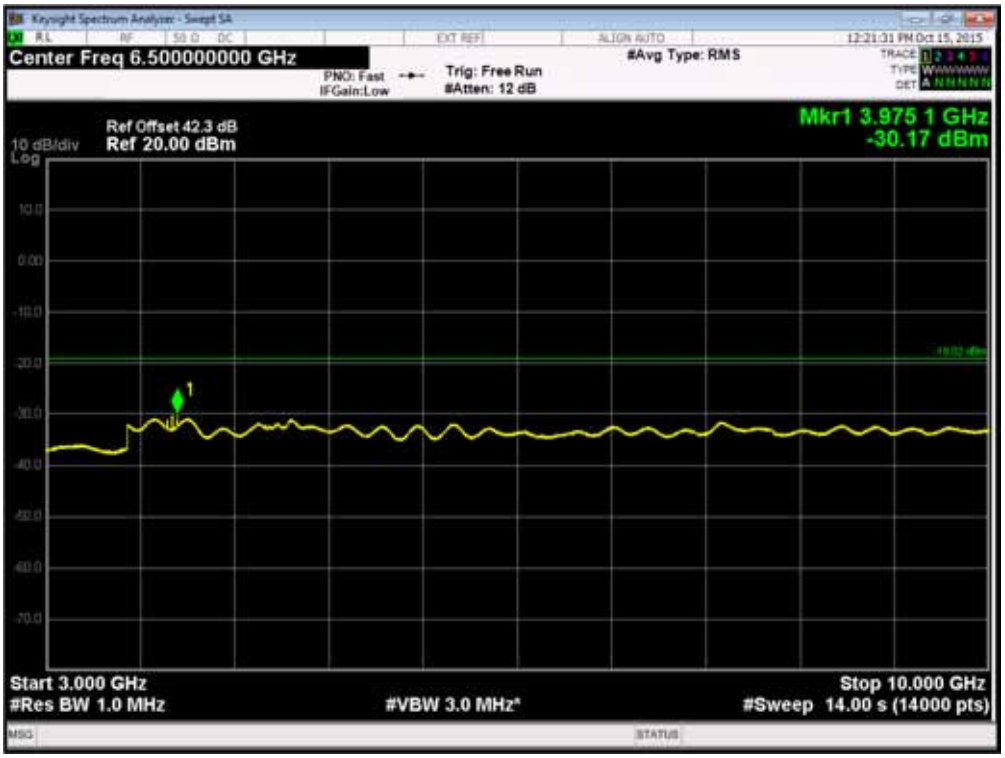
Channel Position M_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz



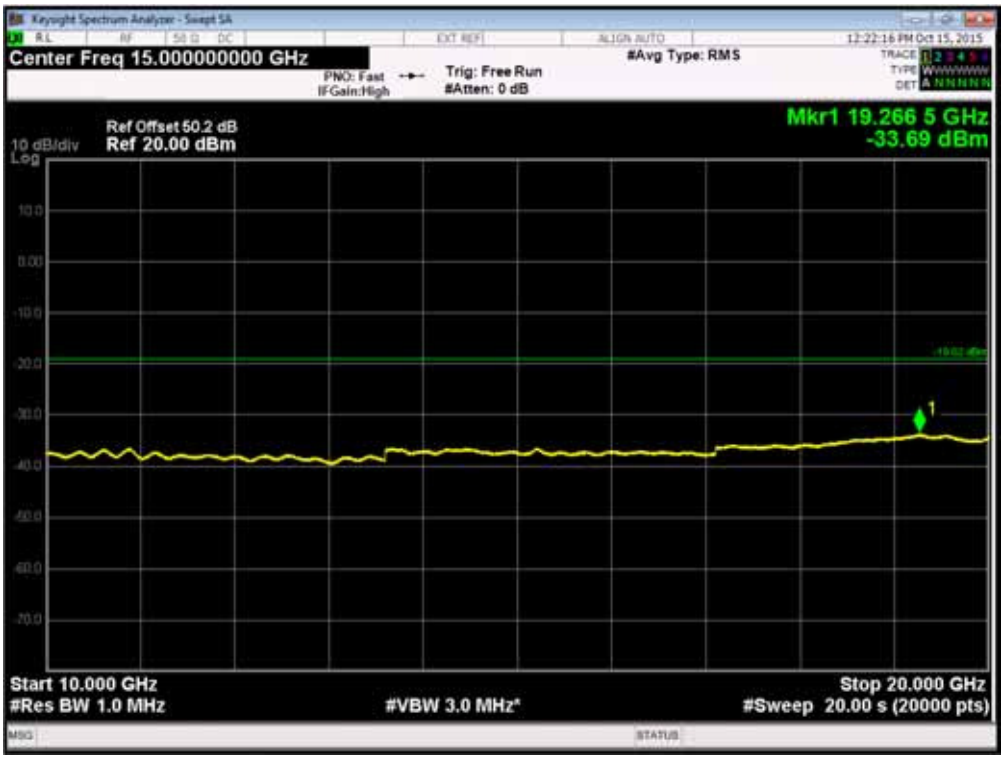
Channel Position T_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz



Channel Position T_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz



Channel Position T_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz

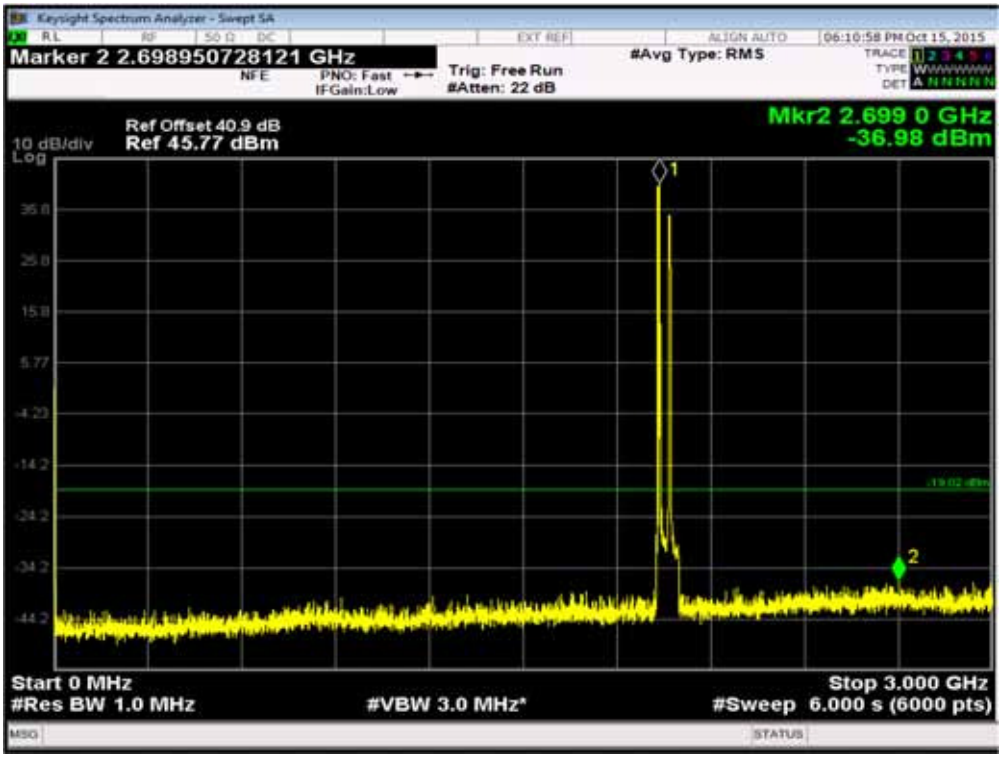


Configuration G+L-MIMO-MC 4 (2G+1L)

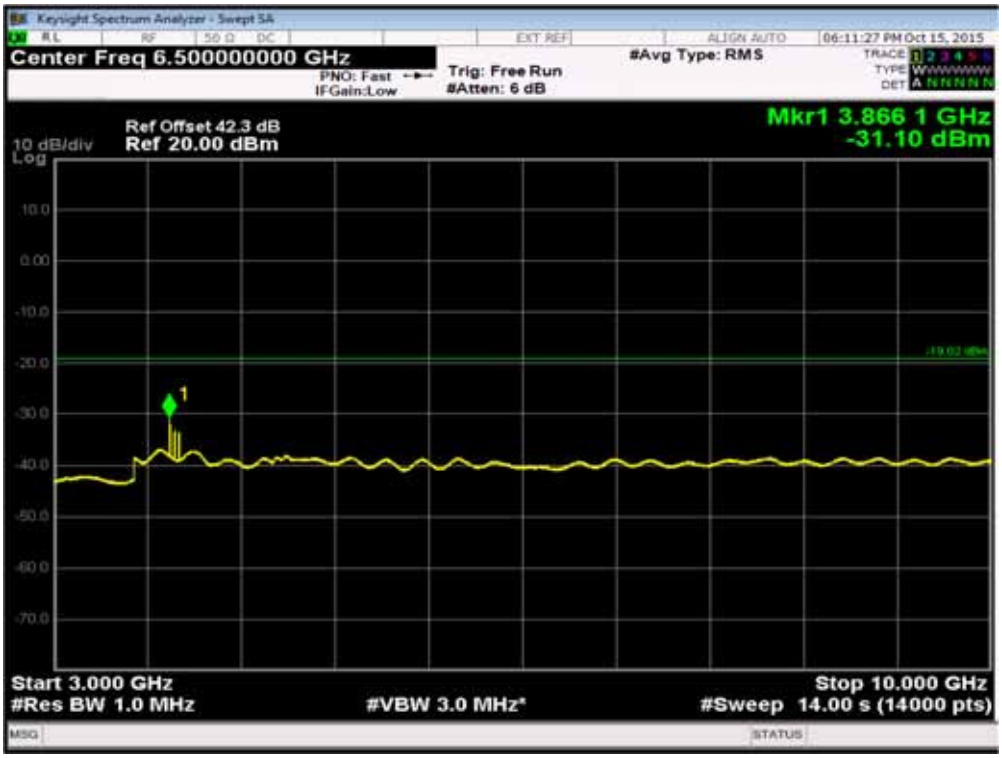
Maximum Output Power 46.0dBm per port

Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	G: 250 kHz L: 5.0 MHz	(G) 1930.4MHz + (G) 1935.8MHz + (W) 1967.5MHz
Channel Position M_{RFBW}	G: 250 kHz L: 5.0 MHz	(G) 1940.2MHz + (G) 1945.8MHz + (W) 1977.5MHz
Channel Position T_{RFBW}	G: 250 kHz L: 5.0 MHz	(G) 1950.2MHz + (G) 1955.8MHz + (W) 1987.5MHz

Channel Position B_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz

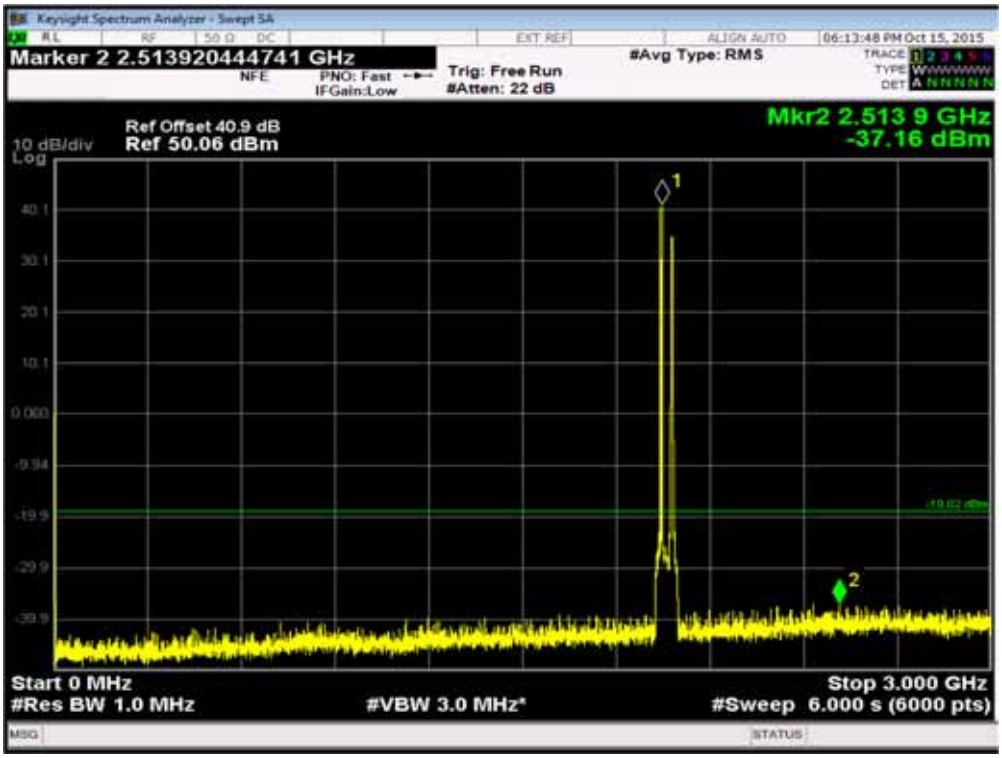


Channel Position B_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz

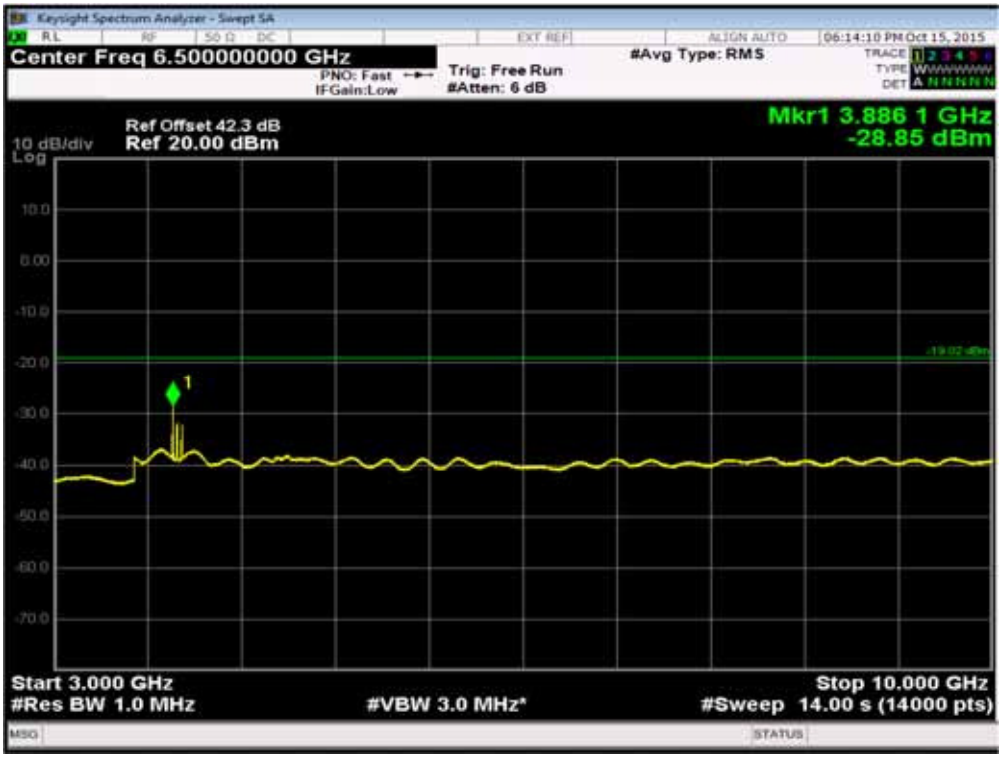


Channel Position B_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz

Channel Position M_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz

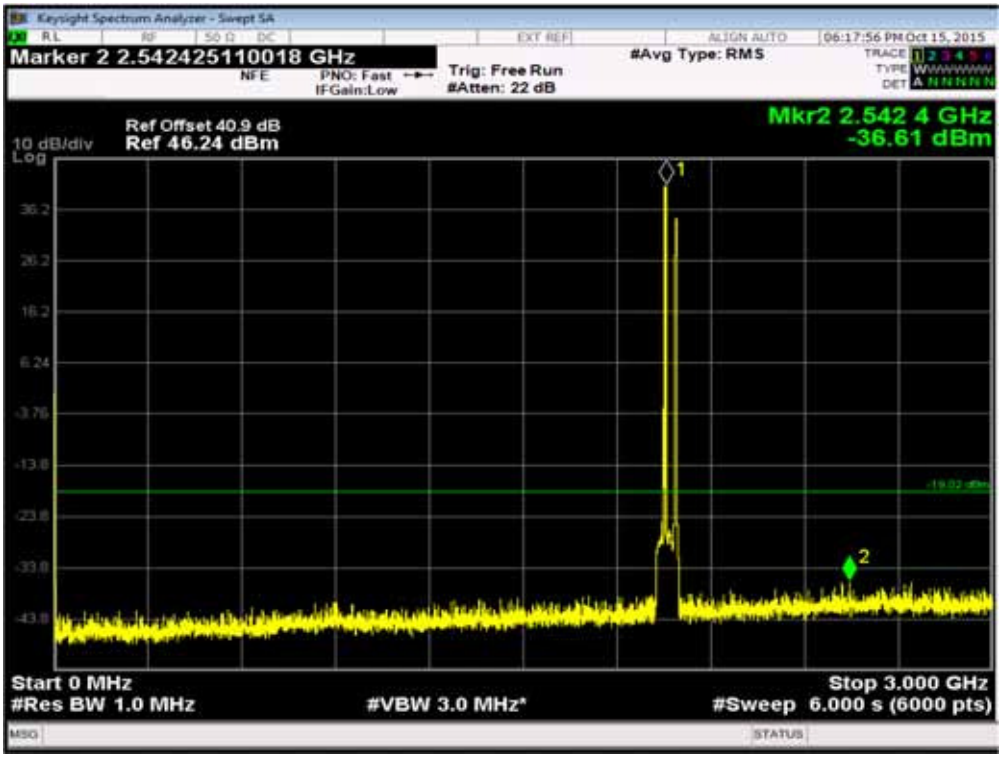


Channel Position M_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz

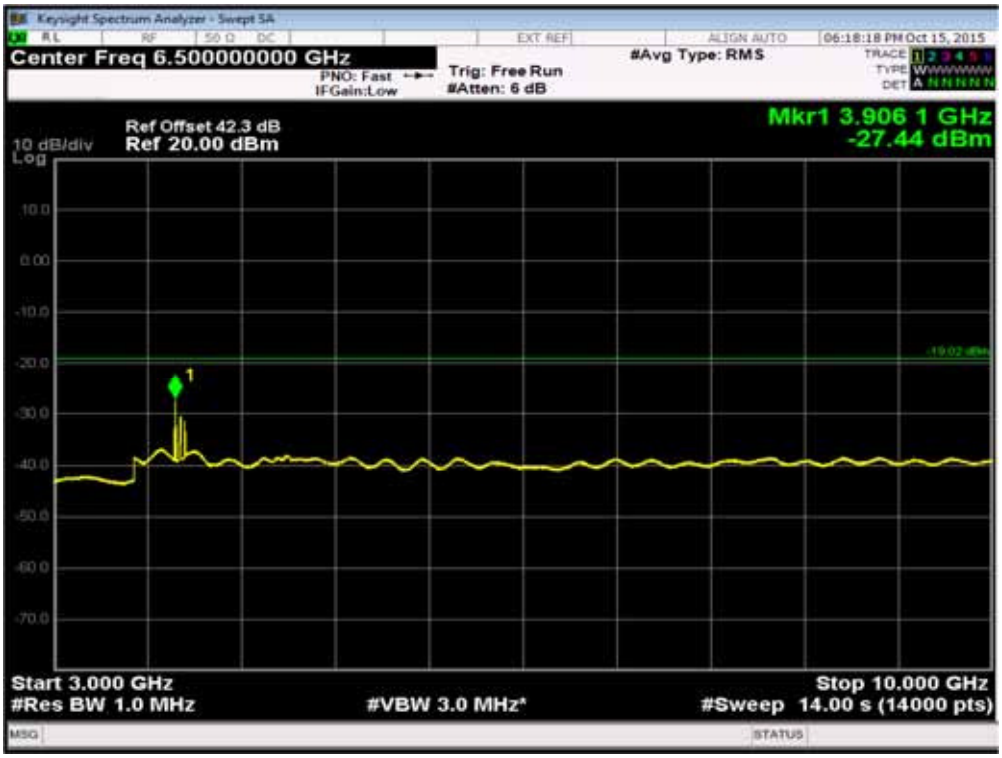


Channel Position M_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz

Channel Position T_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz



Channel Position T_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz



Channel Position T_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz

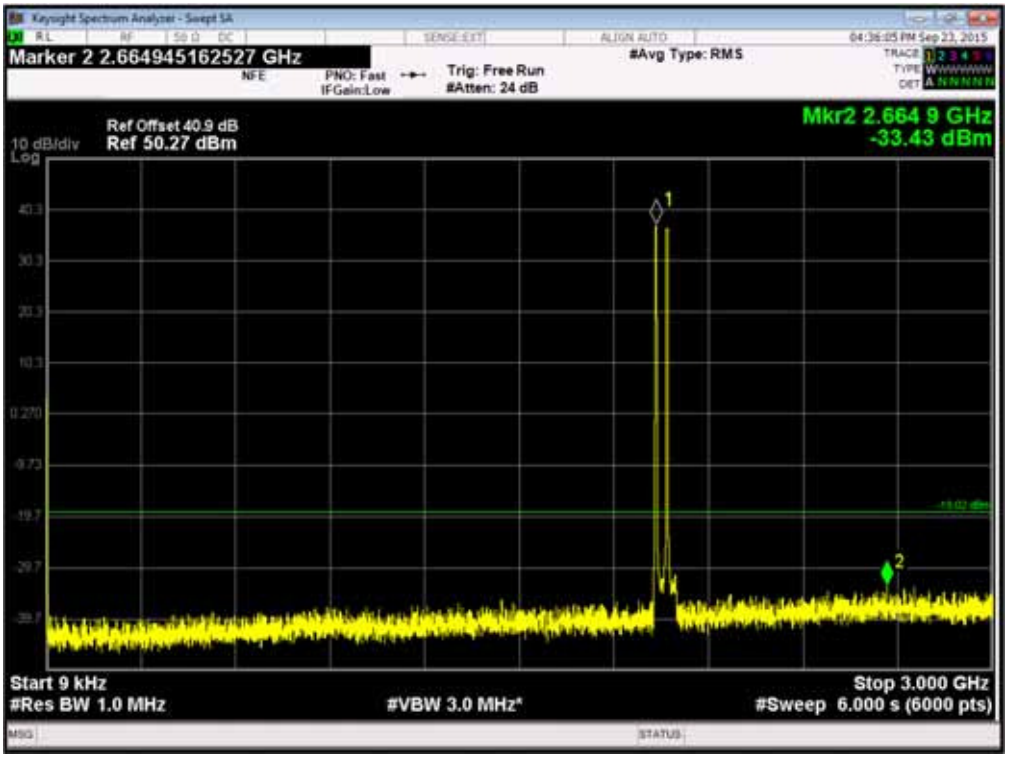
Configuration W+L-MIMO-MC 1 (1W+1L)

Maximum Output Power 46.0dBm per port

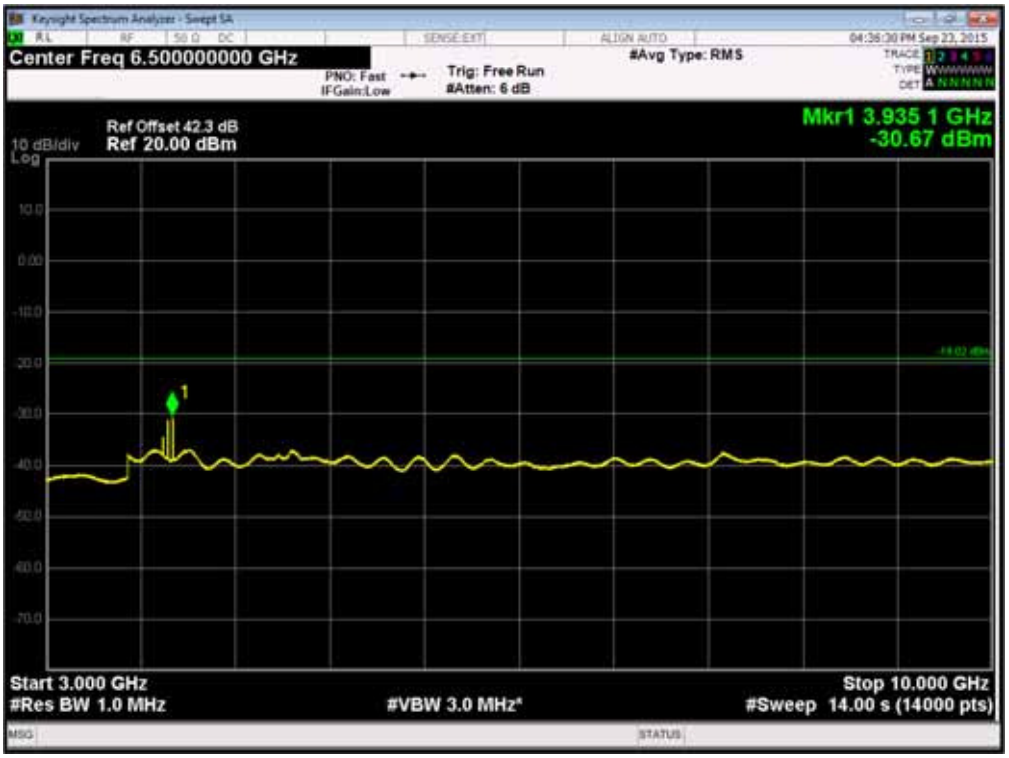
Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	W: 5.0 MHz L: 5.0 MHz	(W) 1932.4MHz + (L) 1967.5MHz
Channel Position M_{RFBW}	W: 5.0 MHz L: 5.0 MHz	(W) 1942.4MHz + (L) 1977.5MHz
Channel Position T_{RFBW}	W: 5.0 MHz L: 5.0 MHz	(W) 1952.4MHz + (L) 1987.5MHz

.

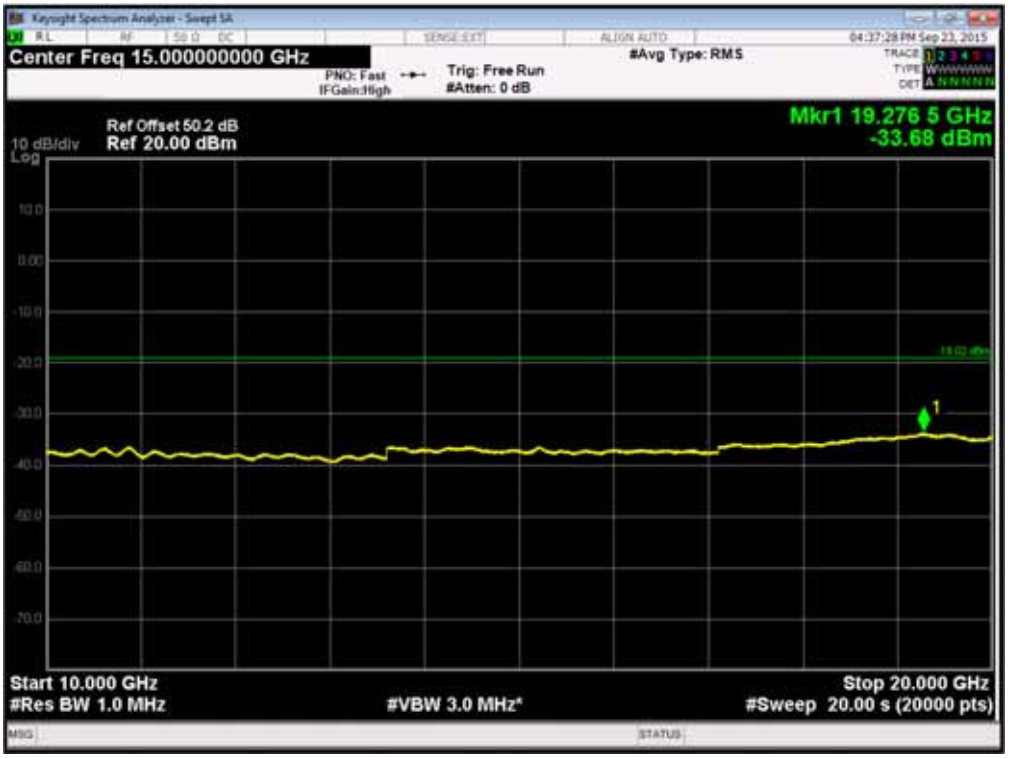
Channel Position B_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz



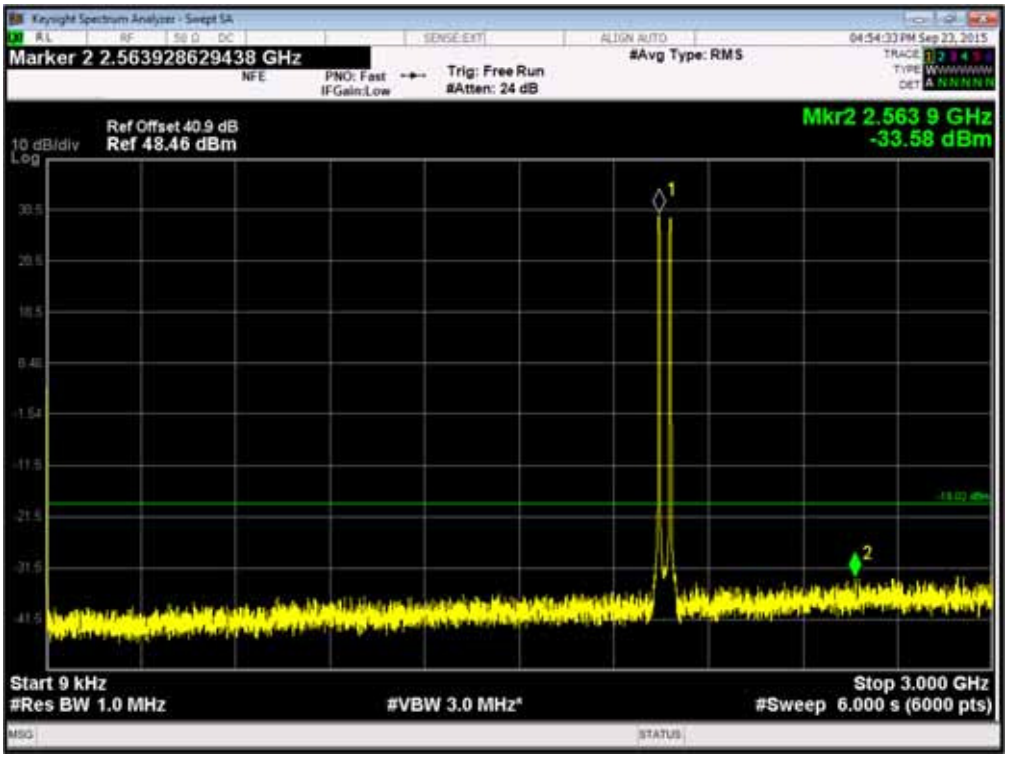
Channel Position B_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz



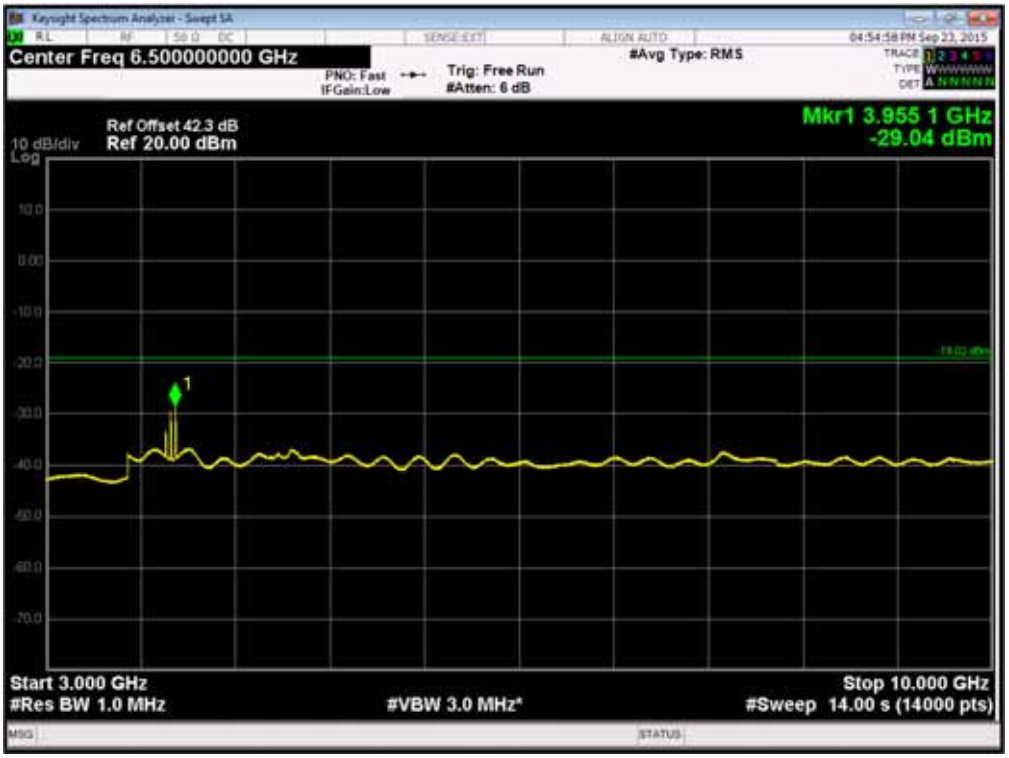
Channel Position B_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz



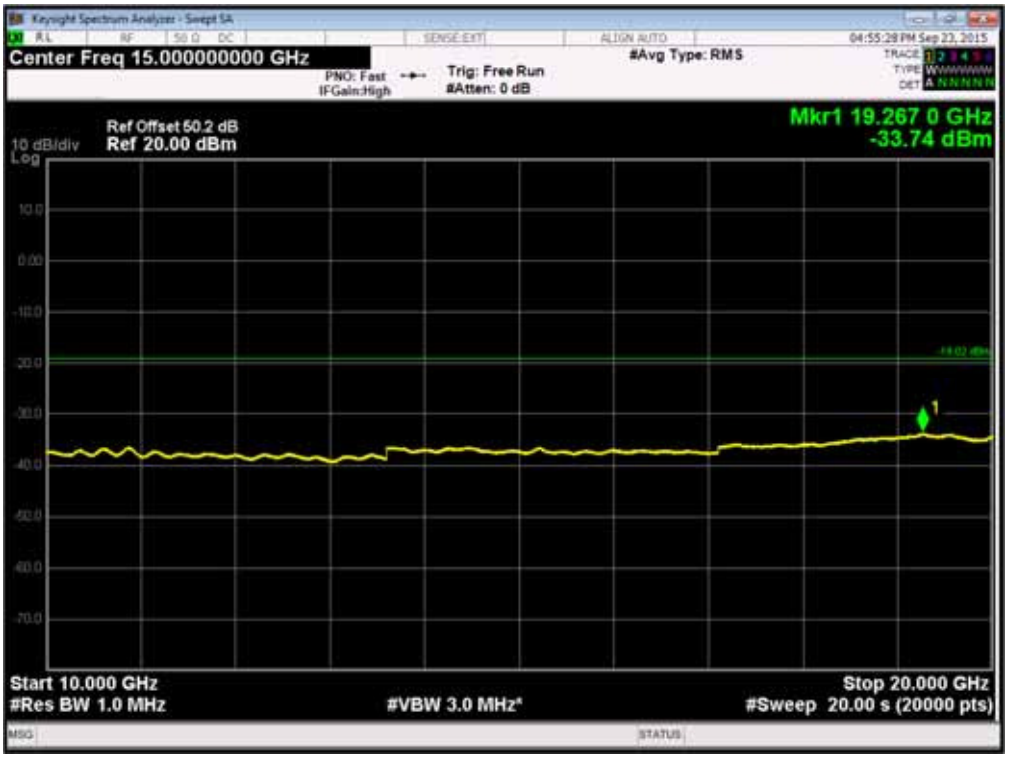
Channel Position M_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz



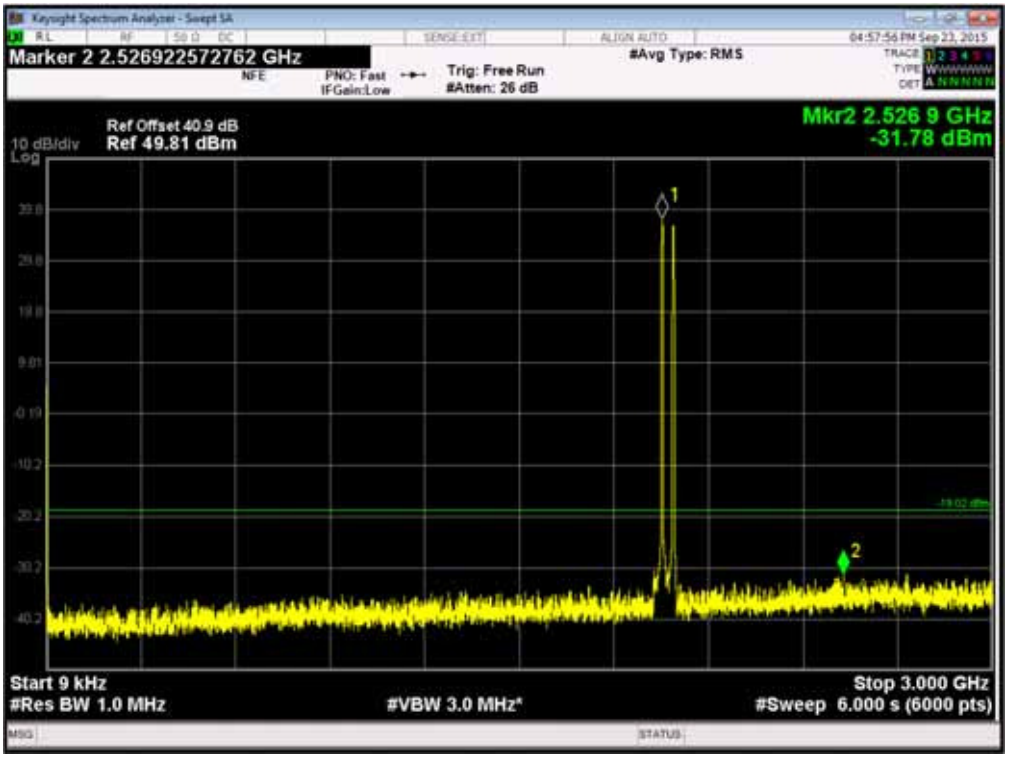
Channel Position M_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz



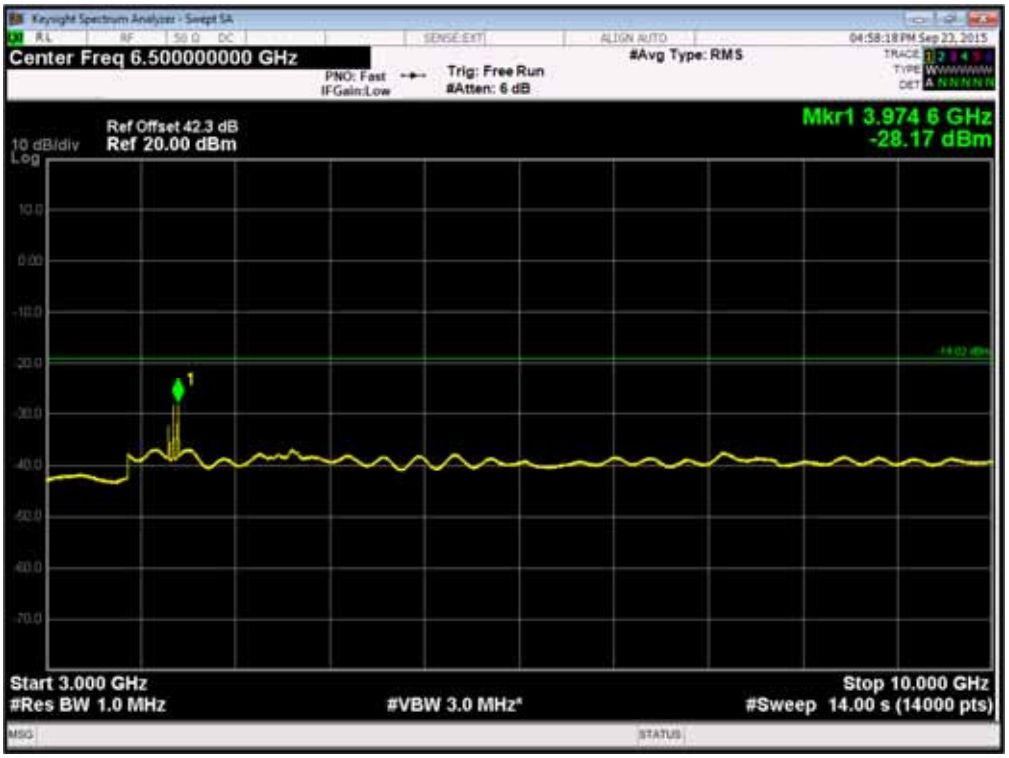
Channel Position M_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz



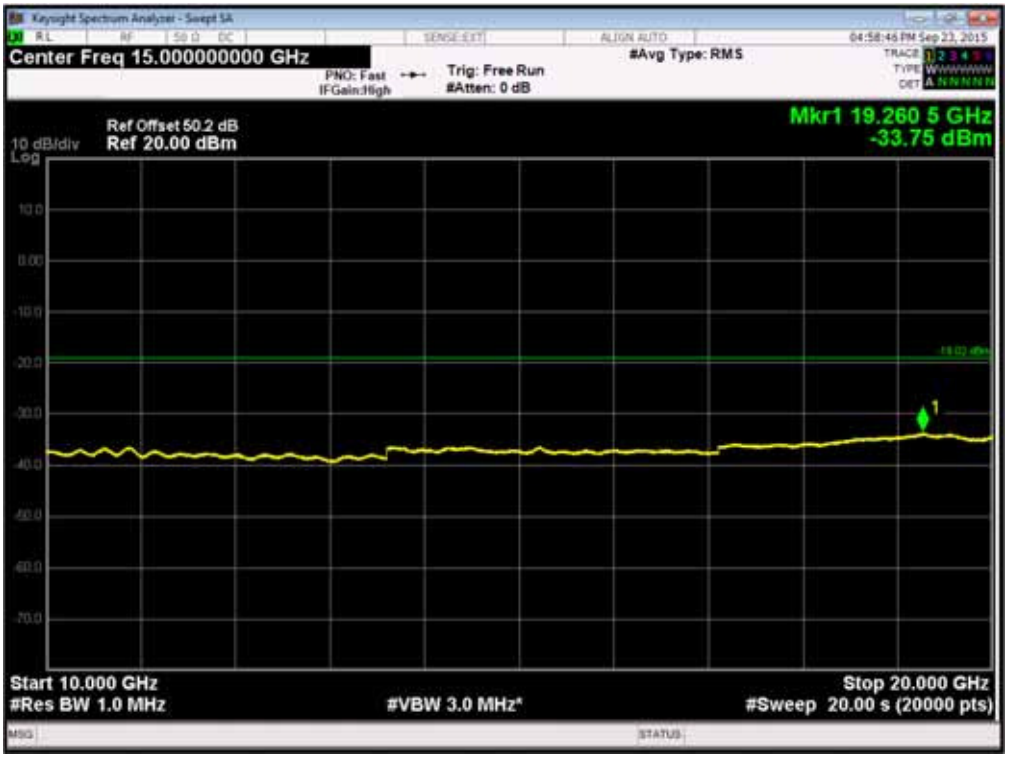
Channel Position T_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz



Channel Position T_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz



Channel Position T_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz

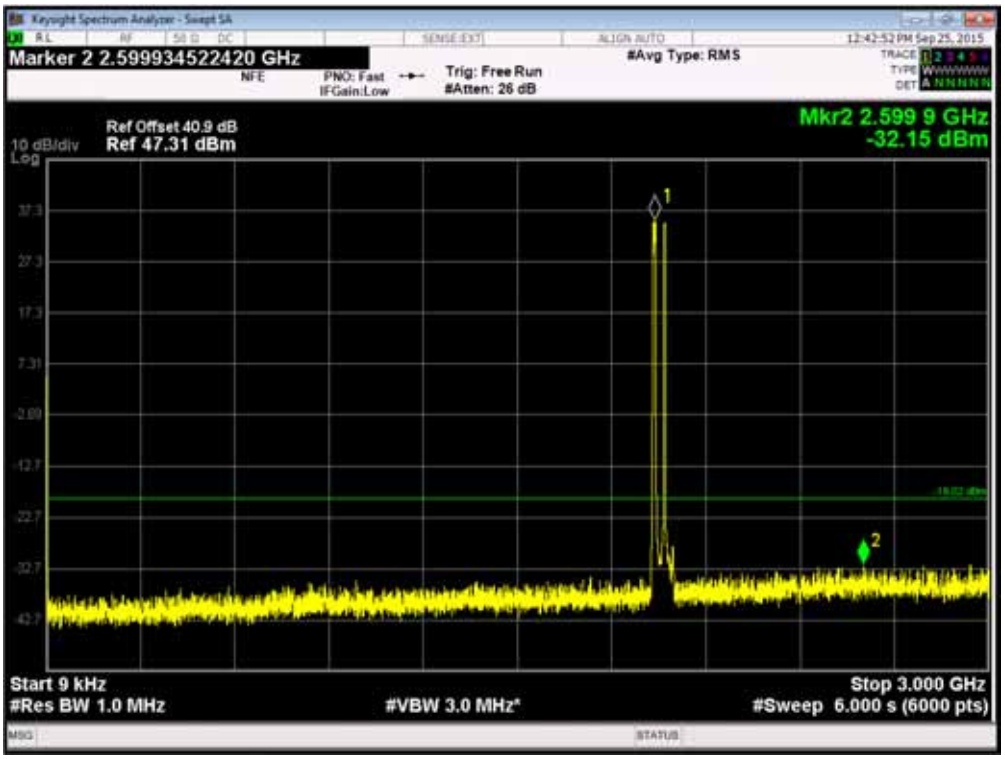


Configuration W+L-MIMO-MC 4 (2W+1L)

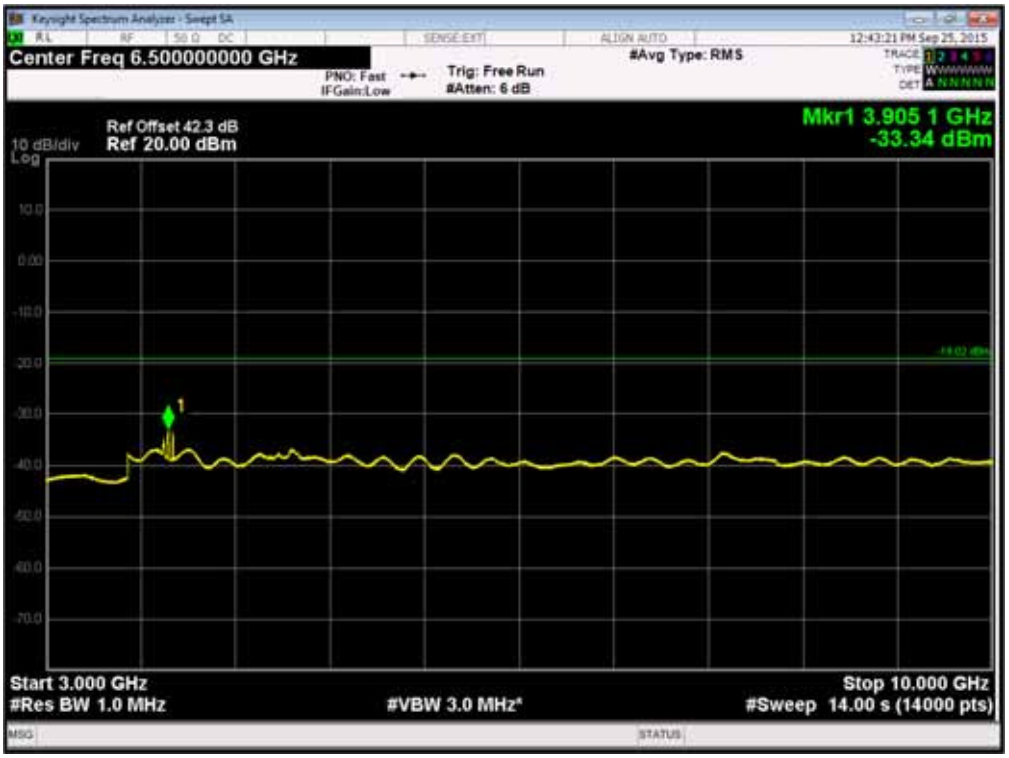
Maximum Output Power 46.0dBm per port

Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	W: 5.0 MHz L: 5.0 MHz	(W) 1932.4MHz + (W) 1937.4MHz + (L) 1967.5MHz
Channel Position M_{RFBW}	W: 5.0 MHz L: 5.0 MHz	(W) 1942.4MHz + (W) 1947.4MHz + (L) 1977.5MHz
Channel Position T_{RFBW}	W: 5.0 MHz L: 5.0 MHz	(W) 1952.4MHz + (W) 1957.4MHz + (L) 1987.5MHz

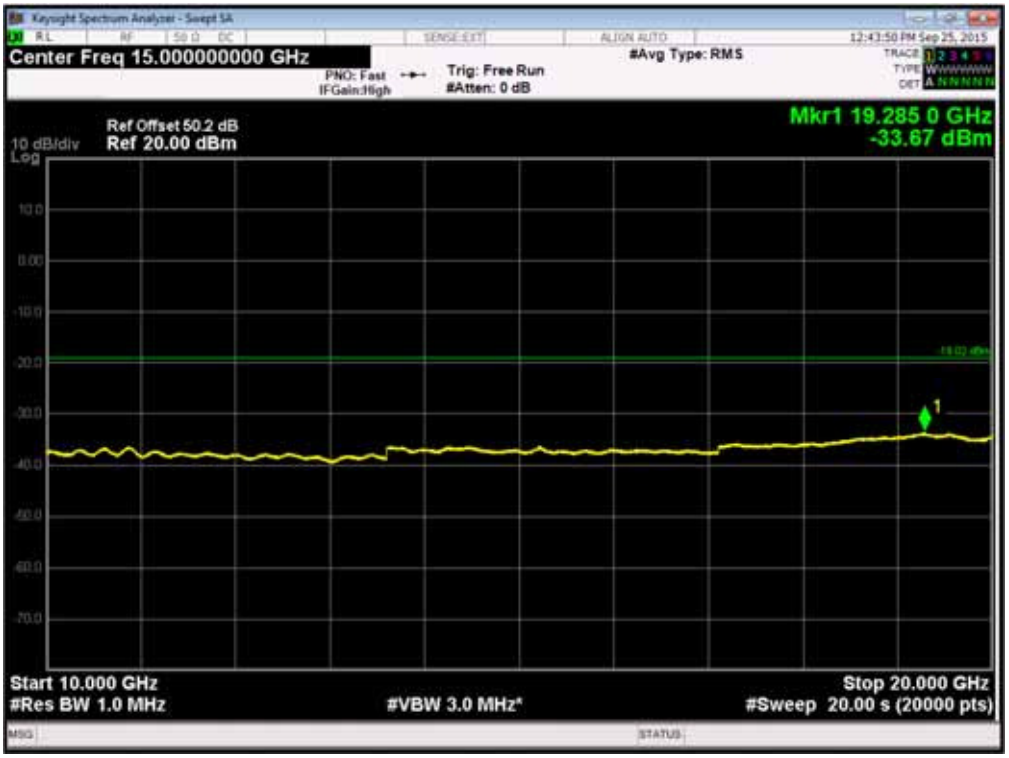
Channel Position B_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz



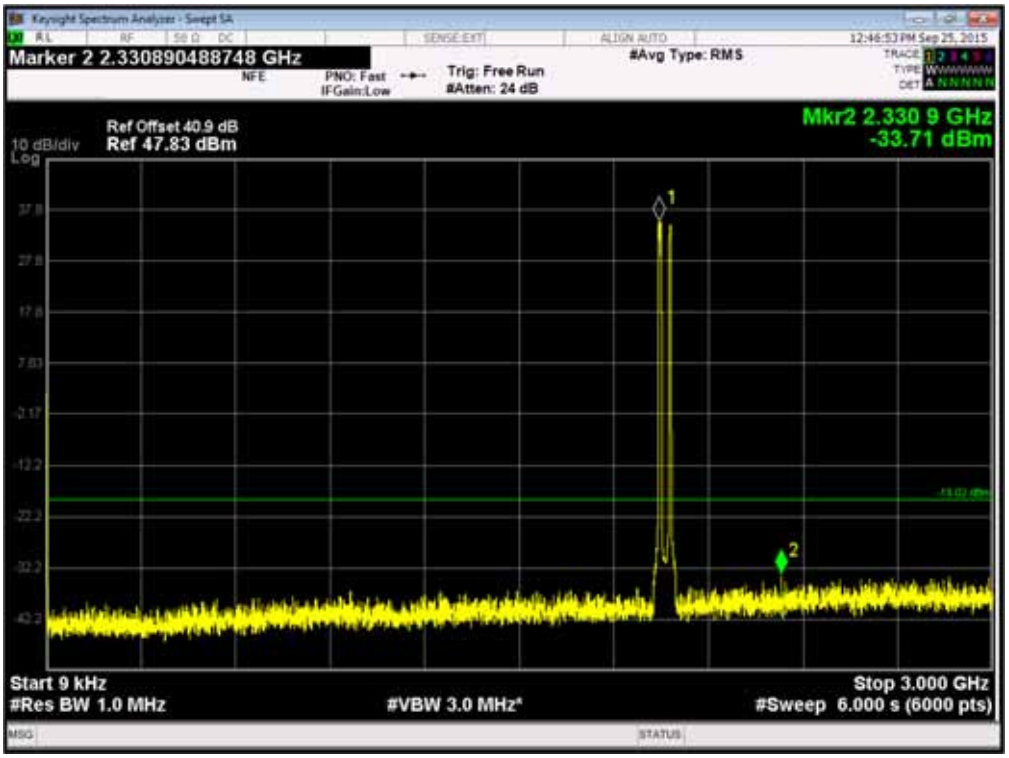
Channel Position B_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz



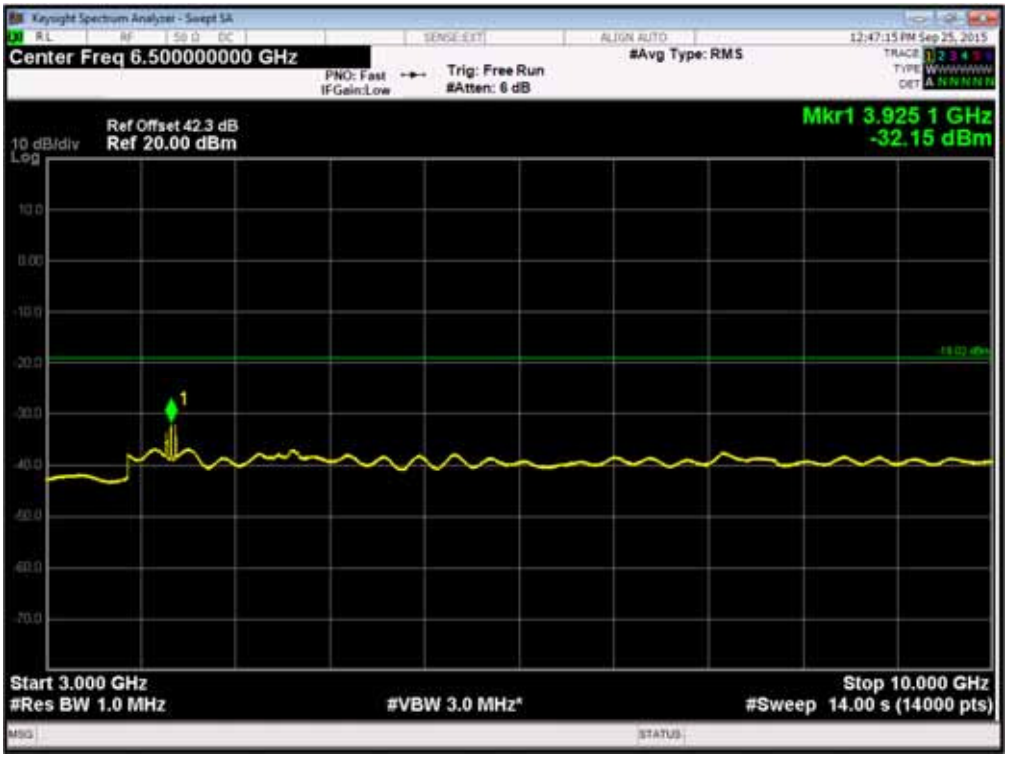
Channel Position B_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz



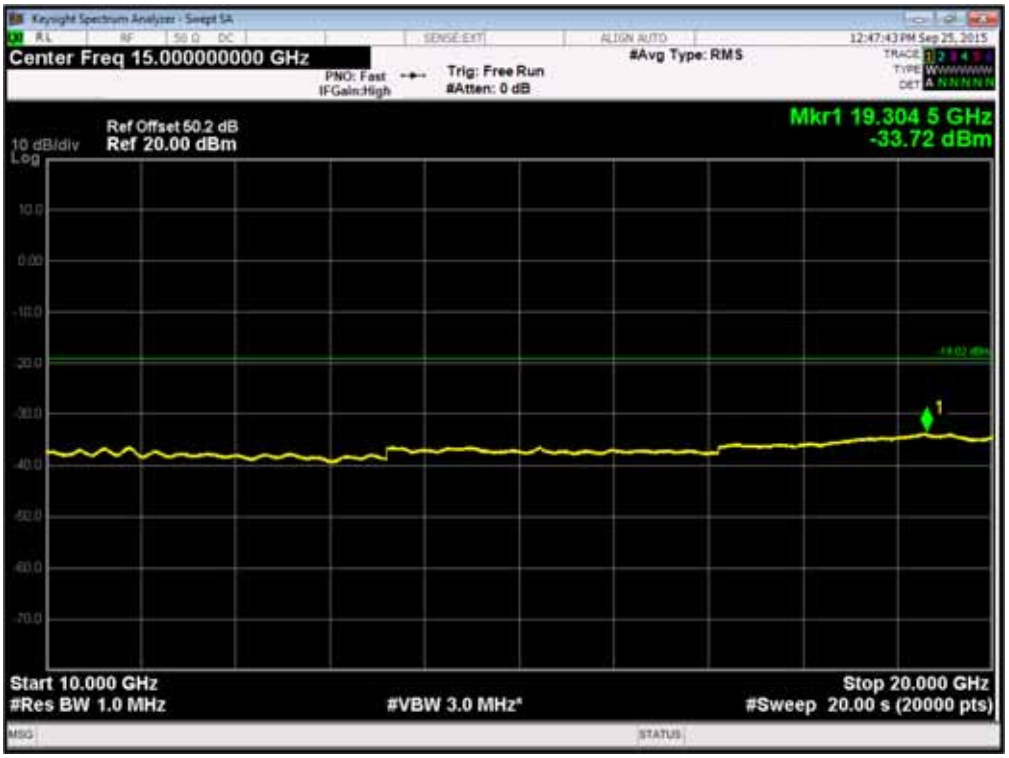
Channel Position M_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz



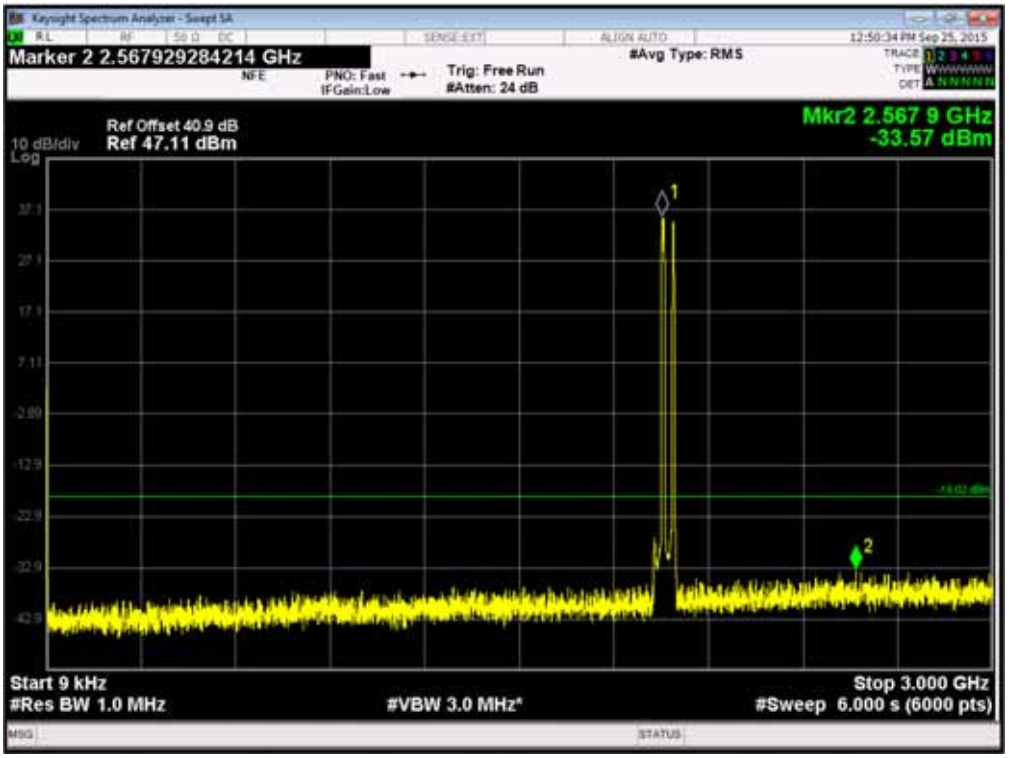
Channel Position M_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz



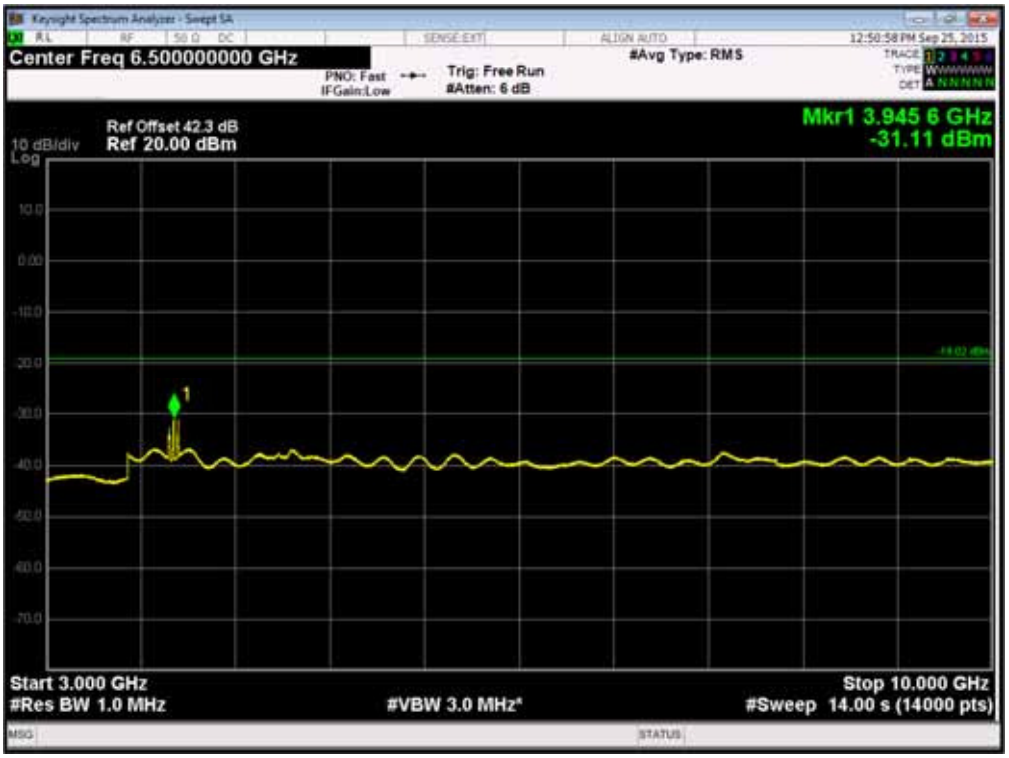
Channel Position M_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz



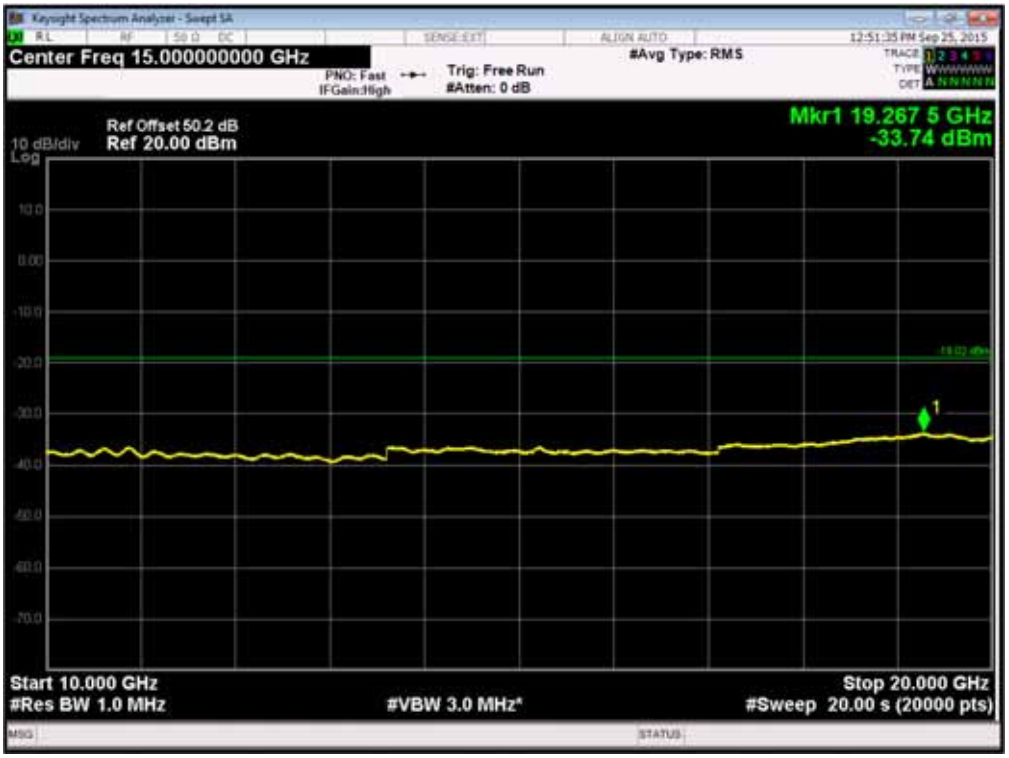
Channel Position T_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 9kHz - 3GHz



Channel Position T_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 3GHz - 10GHz



Channel Position T_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 5.0 MHz - 10GHz - 20GHz



Limit	-13dBm for outside a licensee's frequency band(s) of operation

Remarks

All the unwanted emissions of EUT does not exceed the limitations at the frequency range of 9kHz to 20GHz.

2.6 FREQUENCY STABILITY

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 24, Clause 24.235
Industry Canada RSS-133, Clause 6.3

2.6.2 Equipment Under Test

RRUS 32 B2, KRC 161 414/1, S/N: D16Q673439

2.6.3 Date of Test and Modification State

28, 29 and 30 September 2015 - Modification State 0

2.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.5 Environmental Conditions

Ambient Temperature	20.2 - 24.5°C
Relative Humidity	41.0 - 56.0%

2.6.6 Test Method

The test was applied in accordance with test method requirements of FCC Part 24 and RSS-133.

Frequency Error – Temperature Variation

The EUT was tested over the temperature range -30˚C to +50˚C in 10˚C steps with -48 VDC Power Supply. At each temperature step, the Base Station was configured to transmit an [RAT]* at maximum power on the middle channel of the operating band. After achieving thermal balance, the averages of 200 transmission bursts were measured and the result recorded.

Frequency Error – Voltage Variation

The EUT was tested at the supplied voltages varied from 85 to 115 percent of the nominal values of -48 VDC. At +20˚C, the Base Station was configured to transmit an [RAT]* at maximum power on the bottom, middle and top channel of the operating band. The average of 200 transmission bursts was measured and the result recorded.

[RAT]*: GSM - GSM Single Carrier with all timeslots active with GMSK modulation
WCDMA - Test Model 1 Single Carrier with QPSK modulation
LTE (5.0 MHz OBW) - Test Model E-TM1.1 Single Carrier with QPSK modulation

2.6.7 Test Results

Frequency Error – Temperature Variation

Configuration G-SC

Maximum Output Power 46.0dBm per port, Channel Bandwidth 250kHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)		
		Channel Position B (1930.4MHz)	Channel Position M (1960.0MHz)	Channel Position T (1989.6MHz)
-48.0	-30°C	-11.72	-12.62	13.62
	-20°C	10.95	12.01	14.67
	-10°C	10.57	14.28	13.02
	0°C	-11.60	-11.45	-14.17
	+10°C	-14.61	12.51	14.28
	+20°C	10.21	12.02	14.00
	+30°C	10.99	10.10	12.99
	+40°C	13.43	-14.93	-12.69
	+50°C	12.40	-15.34	11.82

Configuration W-SC

Maximum Output Power 46.0dBm per port, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)		
		Channel Position B (1932.4MHz)	Channel Position M (1960.0MHz)	Channel Position T (1987.6MHz)
-48.0	-30°C	4.89	6.21	7.01
	-20°C	5.56	6.85	6.94
	-10°C	-5.42	-6.02	7.42
	0°C	-4.76	5.10	7.67
	+10°C	4.77	5.51	6.07
	+20°C	5.80	-7.12	6.01
	+30°C	5.89	5.67	5.97
	+40°C	5.21	-5.43	6.18
	+50°C	4.48	-4.68	5.36

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per port, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)		
		Channel Position B (1932.5MHz)	Channel Position M (1960.0MHz)	Channel Position T (1987.5MHz)
-48.0	-30°C	3.92	-4.32	4.46
	-20°C	-4.19	-4.43	4.40
	-10°C	4.34	3.97	4.11
	0°C	3.59	-4.51	-4.40
	+10°C	-3.91	3.78	-4.43
	+20°C	-4.12	-3.80	3.80
	+30°C	3.94	-3.86	4.13
	+40°C	3.10	3.81	3.72
	+50°C	3.72	-4.19	3.79

Frequency Error – Voltage Variation

Configuration G-SC

Maximum Output Power 46.0dBm per port, Channel Bandwidth 250kHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)		
		Channel Position B (1930.4MHz)	Channel Position M (1960.0MHz)	Channel Position T (1989.6MHz)
-40.8	+20°C	10.31	-13.49	-11.88
-48.0		10.21	12.02	14.00
-55.2		11.77	13.83	15.40

Configuration W-SC

Maximum Output Power 46.0dBm per port, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)		
		Channel Position B (1932.4MHz)	Channel Position M (1960.0MHz)	Channel Position T (1987.6MHz)
-40.8	+20°C	-5.35	5.94	7.14
-48.0		5.80	-7.12	6.01
-55.2		5.67	-6.81	6.89

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per port, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)		
		Channel Position B (1932.5MHz)	Channel Position M (1960.0MHz)	Channel Position T (1987.5MHz)
-40.8	+20°C	-4.11	3.59	3.92
-48.0		-4.12	-3.80	3.80
-55.2		3.31	3.57	3.48

Limit	FCC: The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.
	IC: ±1.0 ppm

Remarks

The frequency stablity of the EUT is sufficient to keep it within limit at any temperature and voltage interval across the measured range.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Maximum Output Power and Peak to Average Ratio - Conducted					
Network Analyzer	Agilent	5071C	MY46105235	12	11-Aug-2016
Power Meter	Rohde & Schwarz	NRP2	104221	12	20-Mar-2016
Power Sensor	Rohde & Schwarz	NRP-Z11	121216	12	17-Mar-2016
Power Sensor	Rohde & Schwarz	NRP-Z51	102309	12	11-Aug-2016
Spectrum Analyser	Keysight	N9030A	MY54490502	12	27-Apr-2016
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4016	-	O/P MON
Load	Shanghai Huaxiang	TF150	09032343	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
Load	Shanghai Huaxiang	TF150	06081410	-	O/P MON
DC Power Supply	Ericsson	PSU AC 08	BR83767592	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	14-Dec-2015
Thermo-hygrometer	AZ Instruments	8705	9151665	12	10-Dec-2015
Occupied Bandwidth					
Network Analyzer	Agilent	5071C	MY46105235	12	11-Aug-2016
Spectrum Analyser	Keysight	N9030A	MY54490502	12	27-Apr-2016
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4016	-	O/P MON
Load	Shanghai Huaxiang	TF150	09032343	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
Load	Shanghai Huaxiang	TF150	06081410	-	O/P MON
DC Power Supply	Ericsson	PSU AC 08	BR83767592	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	14-Dec-2015
Thermo-hygrometer	AZ Instruments	8705	9151665	12	10-Dec-2015
Band Edge					
Network Analyzer	Agilent	5071C	MY46105235	12	11-Aug-2016
Spectrum Analyser	Keysight	N9030A	MY54490502	12	27-Apr-2016
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4016	-	O/P MON
Load	Shanghai Huaxiang	TF150	09032343	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
Load	Shanghai Huaxiang	TF150	06081410	-	O/P MON
DC Power Supply	Ericsson	PSU AC 08	BR83767592	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	14-Dec-2015
Thermo-hygrometer	AZ Instruments	8705	9151665	12	10-Dec-2015
Conducted Spurious Emission					
Network Analyzer	Agilent	5071C	MY46105235	12	11-Aug-2016
Spectrum Analyser	Keysight	N9030A	MY54490502	12	27-Apr-2016
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4016	-	O/P MON
Load	Shanghai Huaxiang	TF150	09032343	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
Load	Shanghai Huaxiang	TF150	06081410	-	O/P MON
DC Power Supply	Ericsson	PSU AC 08	BR83767592	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	14-Dec-2015
Thermo-hygrometer	AZ Instruments	8705	9151665	12	10-Dec-2015

Radiated Spurious Emissions					
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081910	-	O/P MON
Load	Shanghai Huaxiang	TF150	06081410	-	O/P MON
Load	Shanghai Huaxiang	TF150	05112214	-	O/P MON
EMI Receiver	Rohde & Schwarz	ESI40	100015	12	20-Aug-2016
Ultra Log Test Antenna	Rohde & Schwarz	HL562	100167	12	20-Aug-2016
Double-Ridge Waveguide Horn Antenna	Rohde & Schwarz	HF 906	100030	12	20-Aug-2016
Pyramidal Horn Antenna	EMCO	3160-09	-	-	-
Semi Anechoic Chamber	Frankonia	23.18m×16.88m×9.60m	-	12	20-Aug-2016
Antenna Master	Frankonia	MA 260	-	12	20-Aug-2016
Relay Switch Unit	Rohde & Schwarz	331.1601.31	338965002	-	TU
DC Power Supply	Ericsson	PSU AC 08	BR83767592	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	14-Dec-2015
Thermo-hygrometer	AZ Instruments	8705	9151665	12	10-Dec-2015
Frequency Stability					
Network Analyzer	Agilent	5071C	MY46105235	12	11-Aug-2016
Spectrum Analyser	Keysight	N9030A	MY54490502	12	27-Apr-2016
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4016	-	O/P MON
Load	Shanghai Huaxiang	TF150	09032343	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
Load	Shanghai Huaxiang	TF150	06081410	-	O/P MON
Climate Chamber	Shang Hai Zengda	ZTH100U	10080003	-	O/P MON
DC Power Supply	Ericsson	PSU AC 08	BR83767592	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	14-Dec-2015
Thermo-hygrometer	AZ Instruments	8705	9151665	12	10-Dec-2015

N/A – Not Applicable
OP MON – Output Monitored with Calibrated Equipment

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Discipline	Frequency / Parameter	MU
Conducted Maximum Peak Output Power	30MHz to 10GHz Amplitude	0.5dB*
Conducted Emissions	30MHz to 40GHz Amplitude	3.0dB*
Frequency stability	30MHz to 2GHz	$<\pm 1 \times 10^{-7}$
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Worst case error for both Time and Frequency measurement 12 parts in 10^6		

* In accordance with CISPR 16-4

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).