

### **8.3. OUT OF BAND EMISSIONS**

#### **RULE PART(S)**

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53 and §90.691

#### **LIMITS**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

For mobile and portable stations operating in the 2305-2315 MHz: by a factor of not less than  $43 + 10 \log (P)$  dB on all frequencies between 2360 and 2365 MHz, and not less than  $70 + 10 \log (P)$  dB above 2365 MHz

For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

#### **TEST PROCEDURE**

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

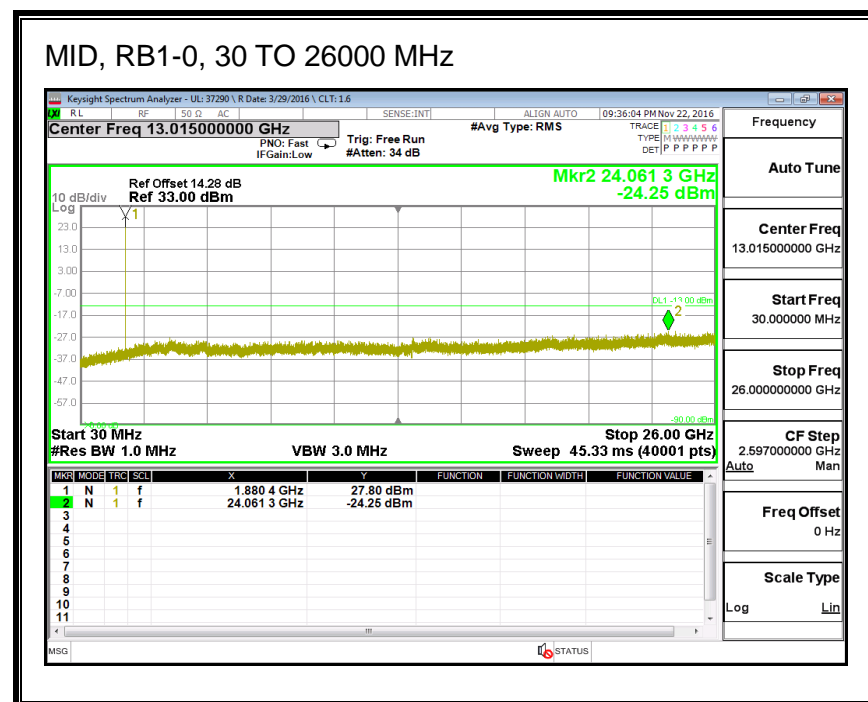
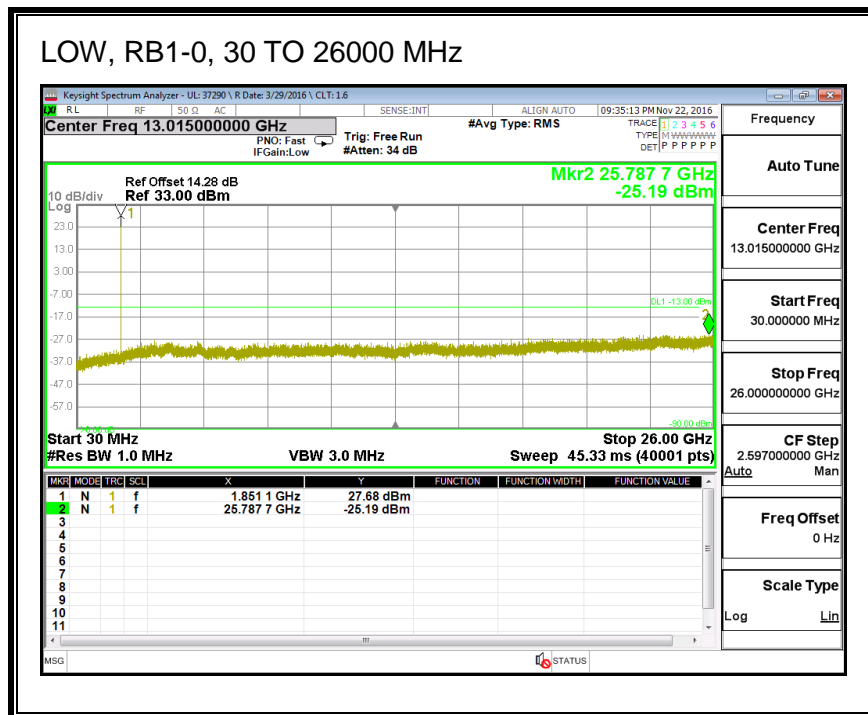
- Set display line at -13 dBm, -25dBm and -40dBm according to the band Limit
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

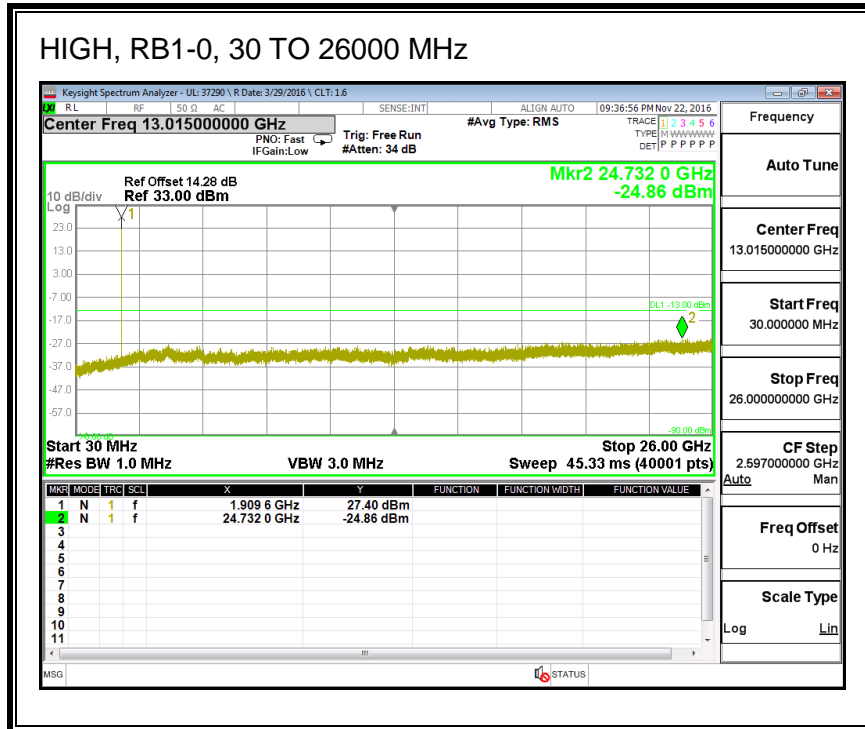
#### **MODES TESTED**

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 17
- LTE Band 25
- LTE Band 26
- LTE Band 27
- LTE Band 30
- LTE Band 41

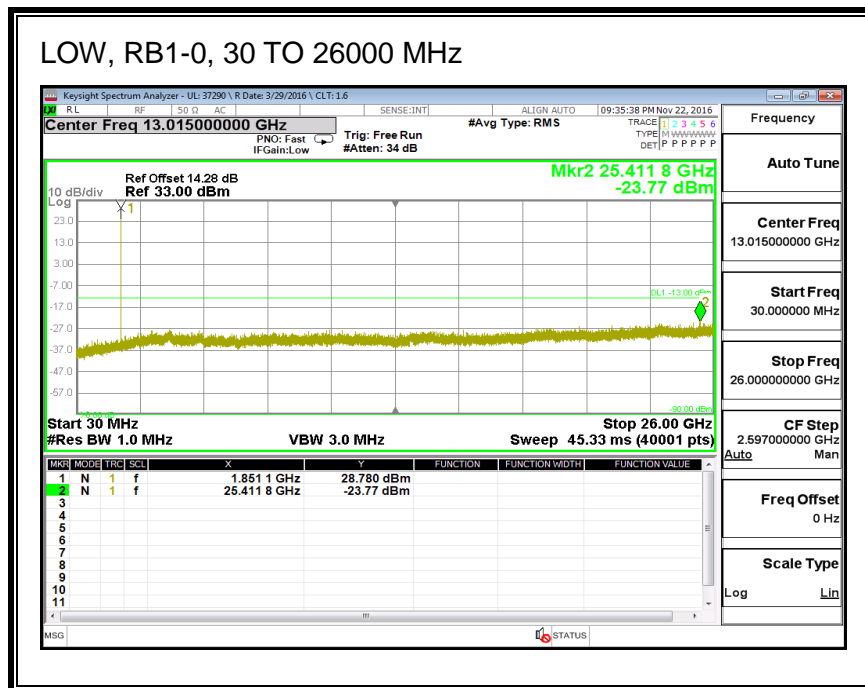
### 8.3.1. LTE BAND 2

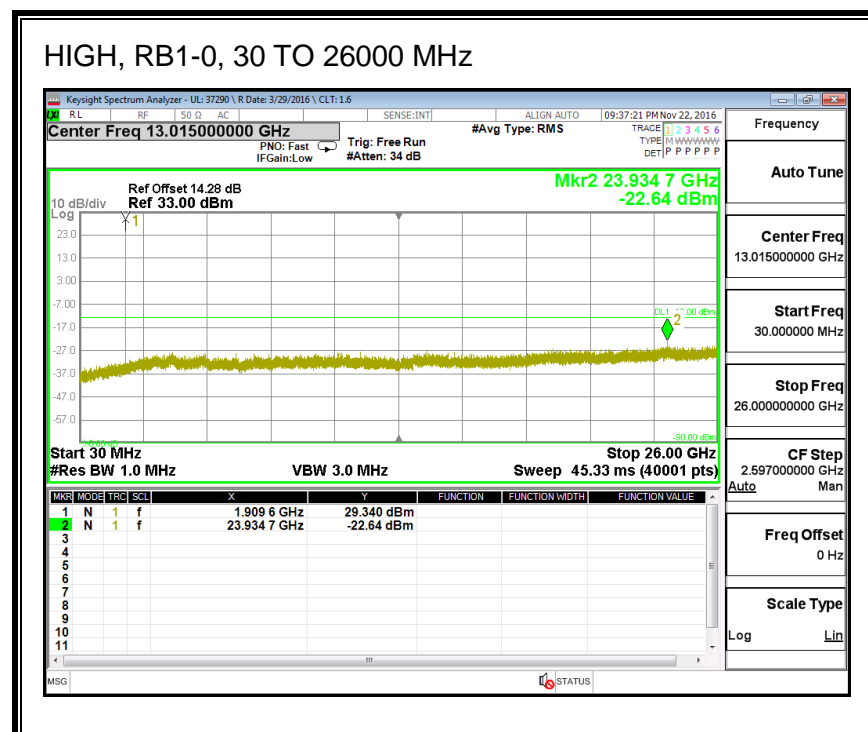
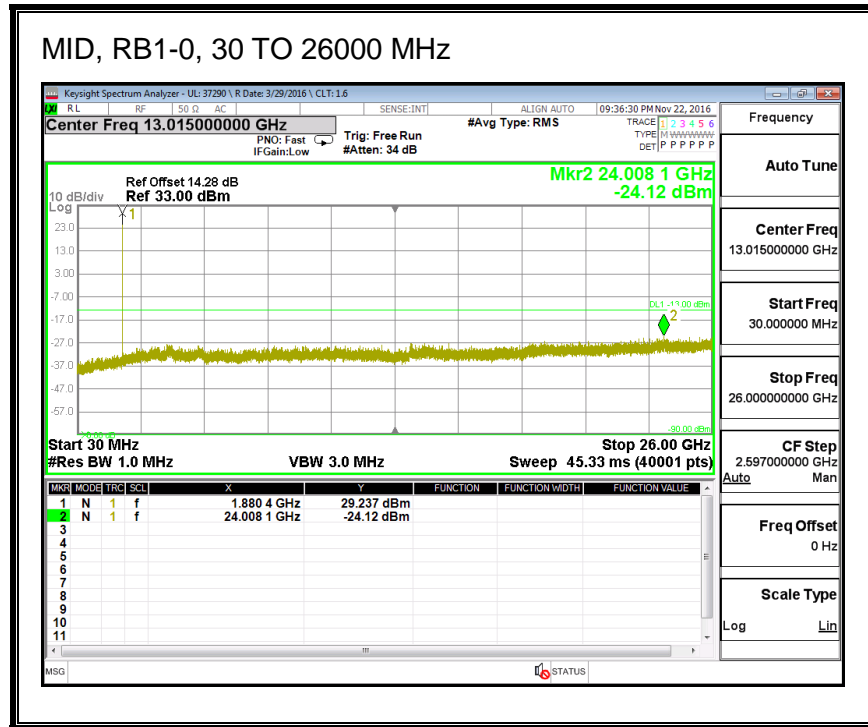
#### QPSK, (1.4 MHz BAND WIDTH)



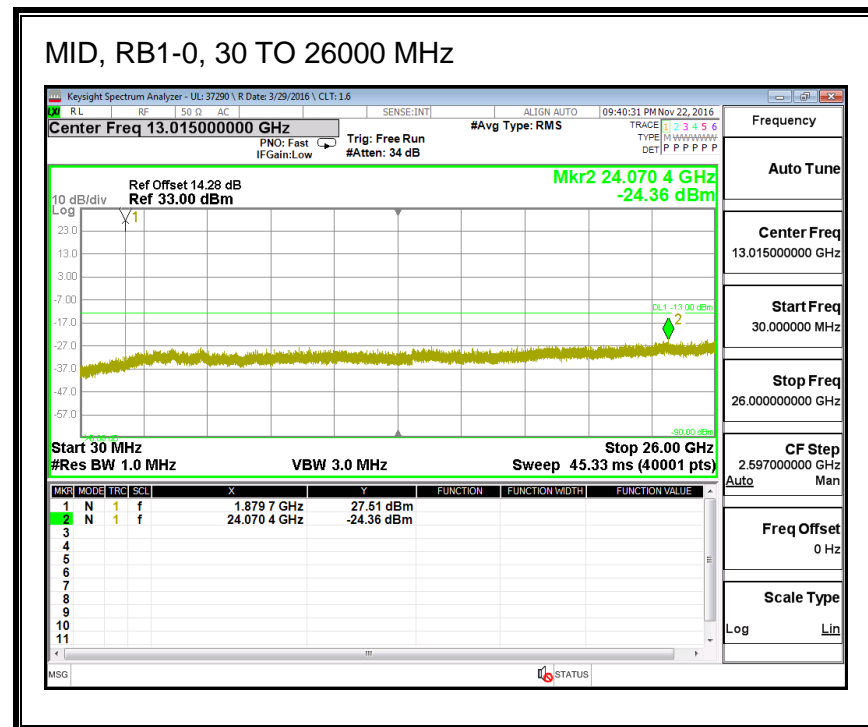
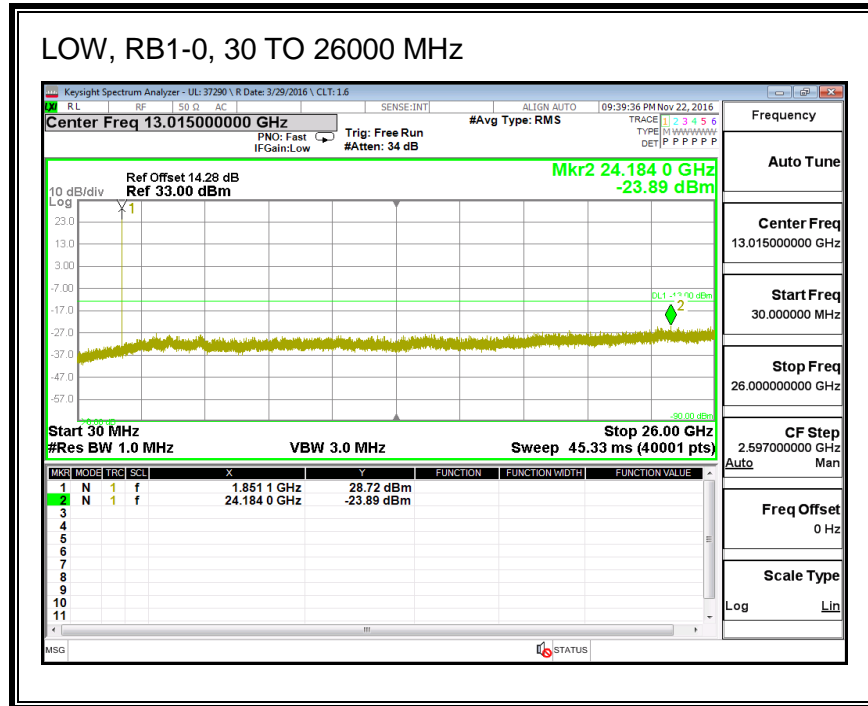


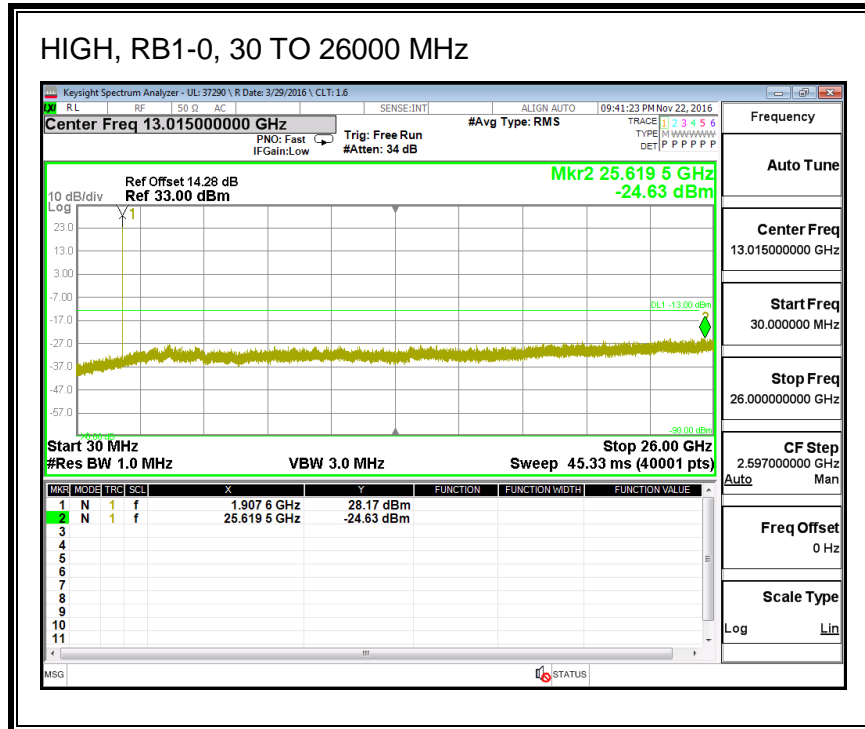
### 16QAM, (1.4 MHz BAND WIDTH)



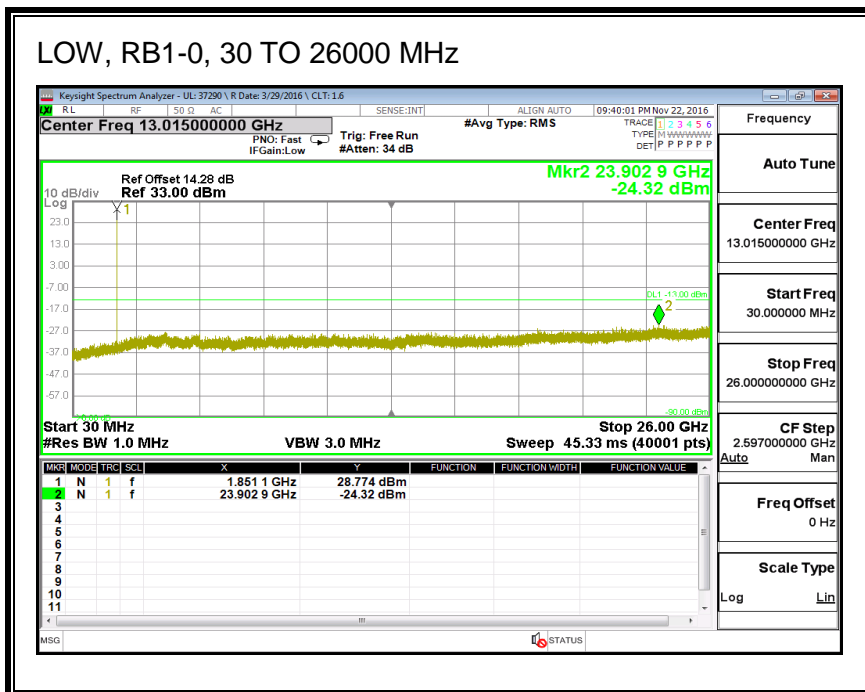


**QPSK, (3.0 MHz BAND WIDTH)**

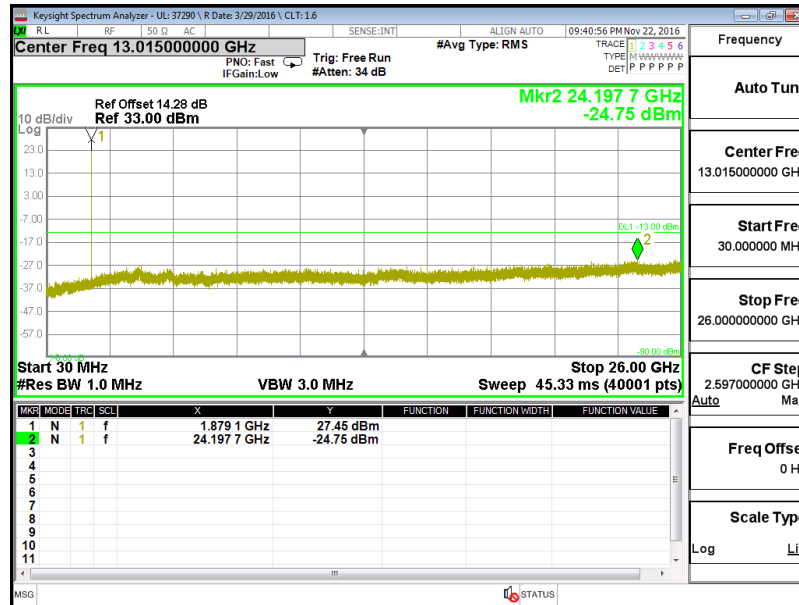




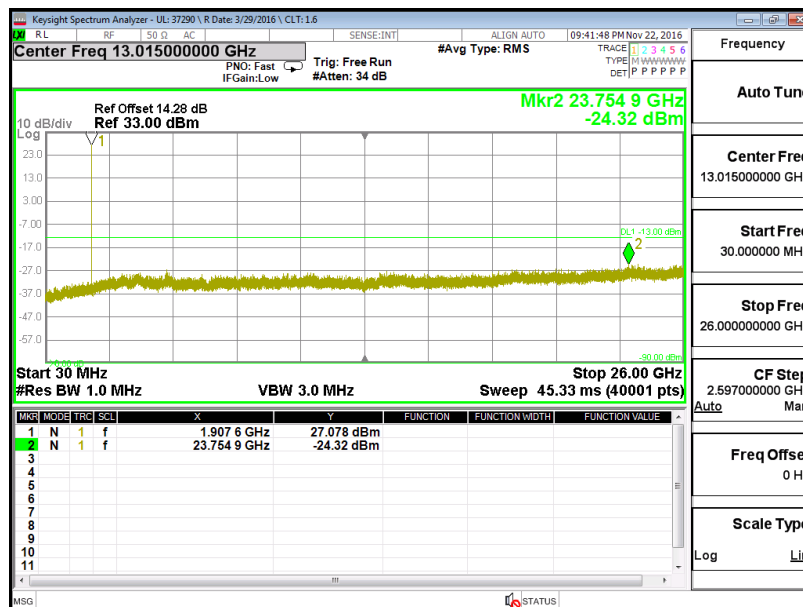
### 16QAM, (3.0 MHz BAND WIDTH)



### MID, RB1-0, 30 TO 26000 MHz

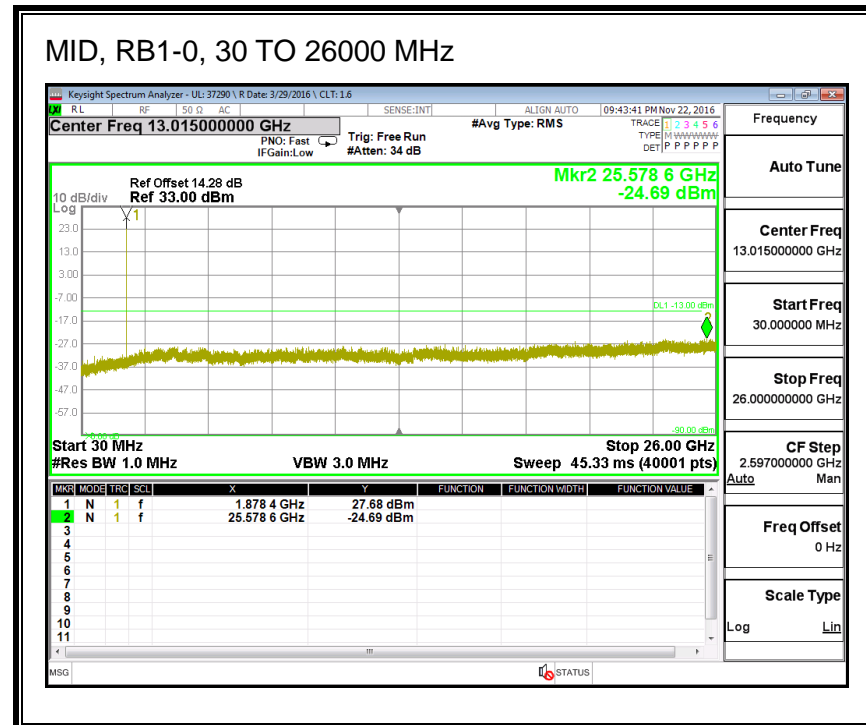
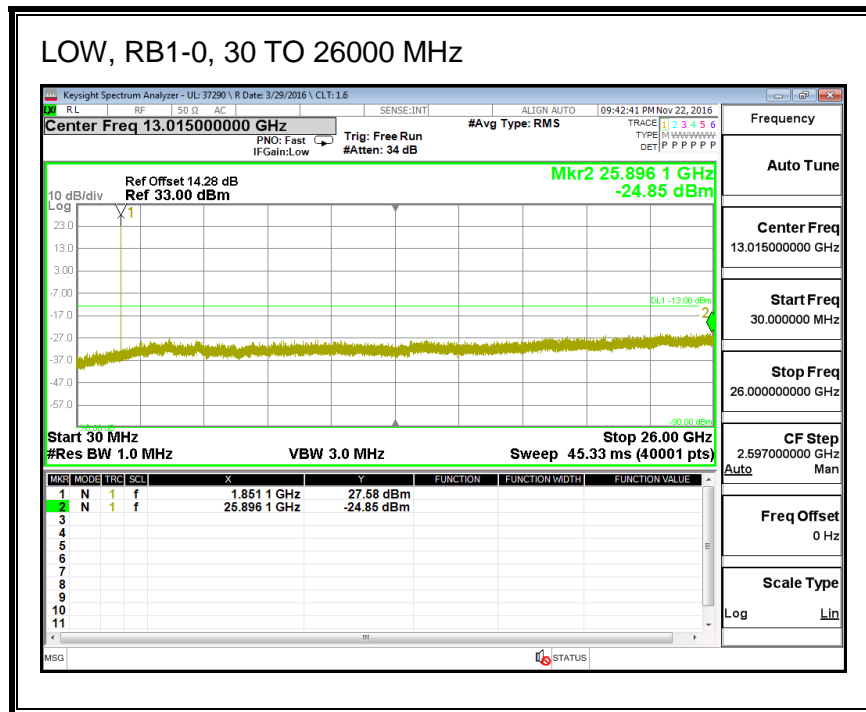


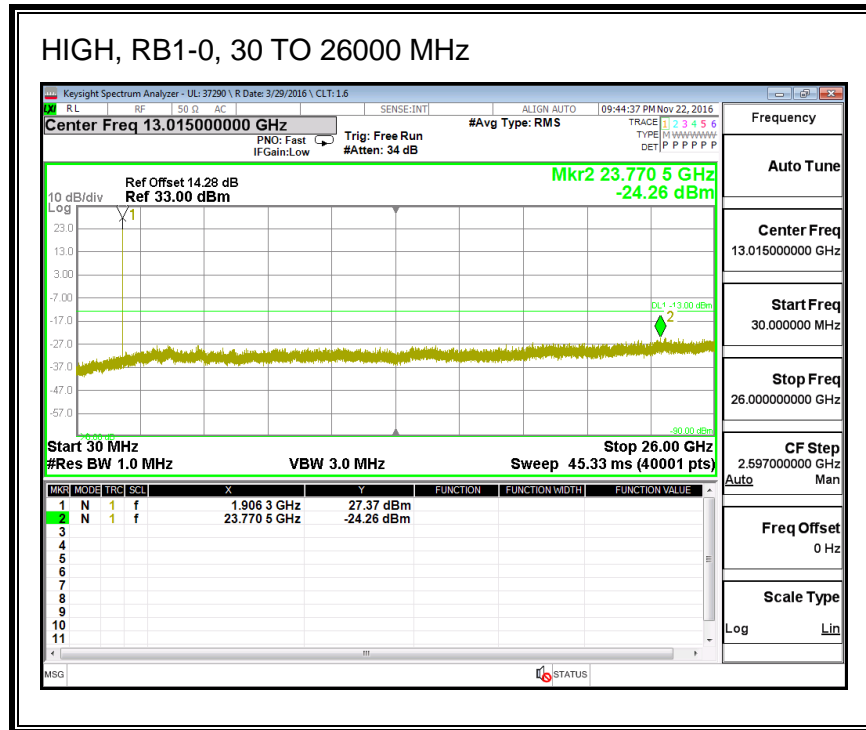
### HIGH, RB1-0, 30 TO 26000 MHz



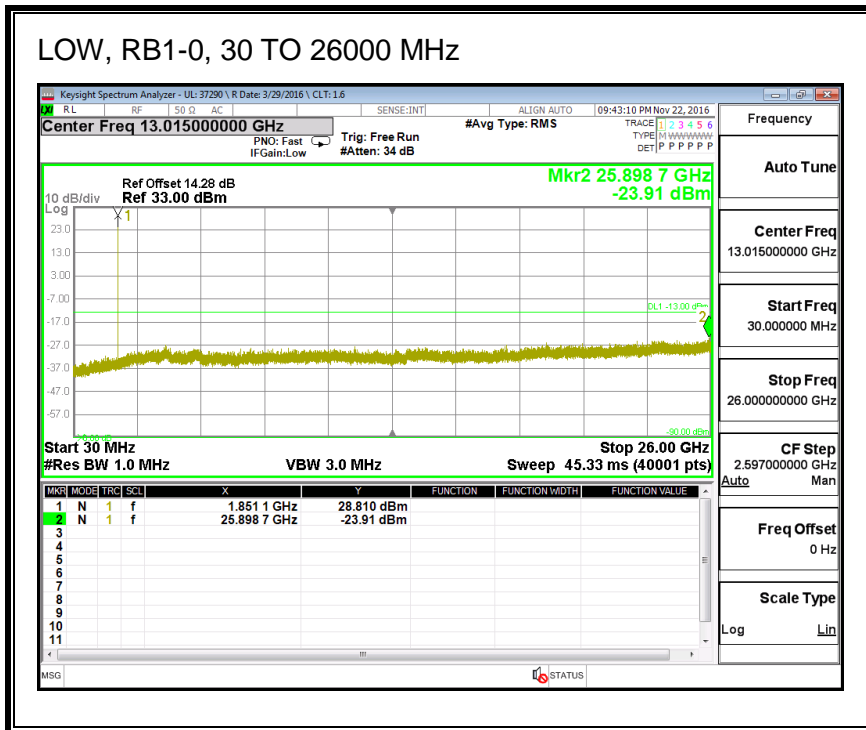


**QPSK, (5.0 MHz BAND WIDTH)**

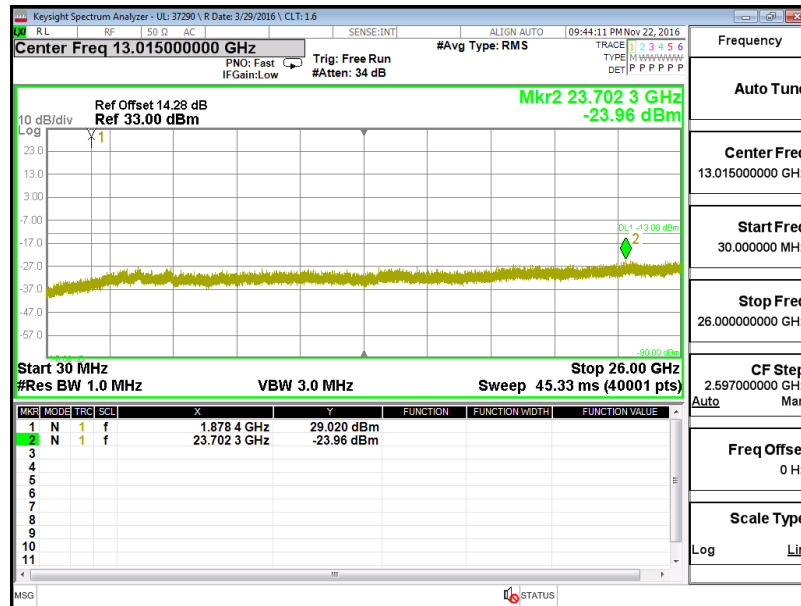




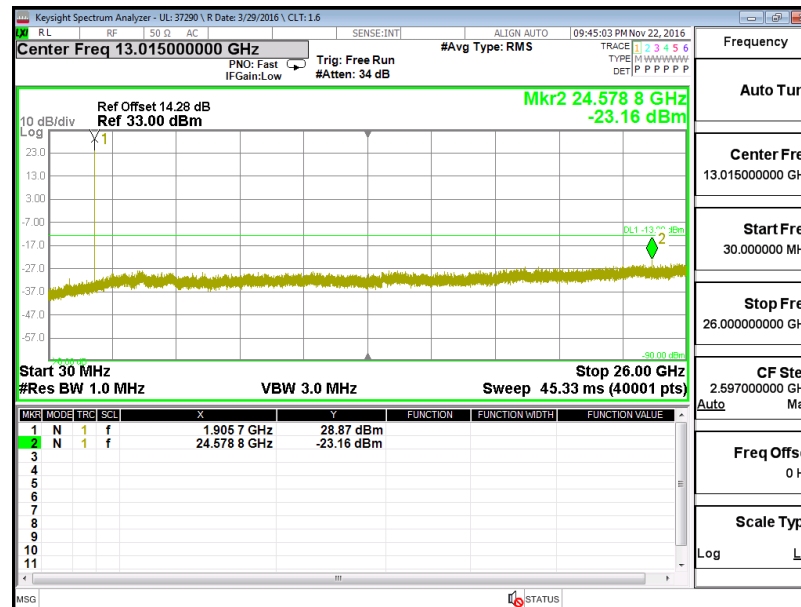
### 16QAM, (5.0 MHz BAND WIDTH)



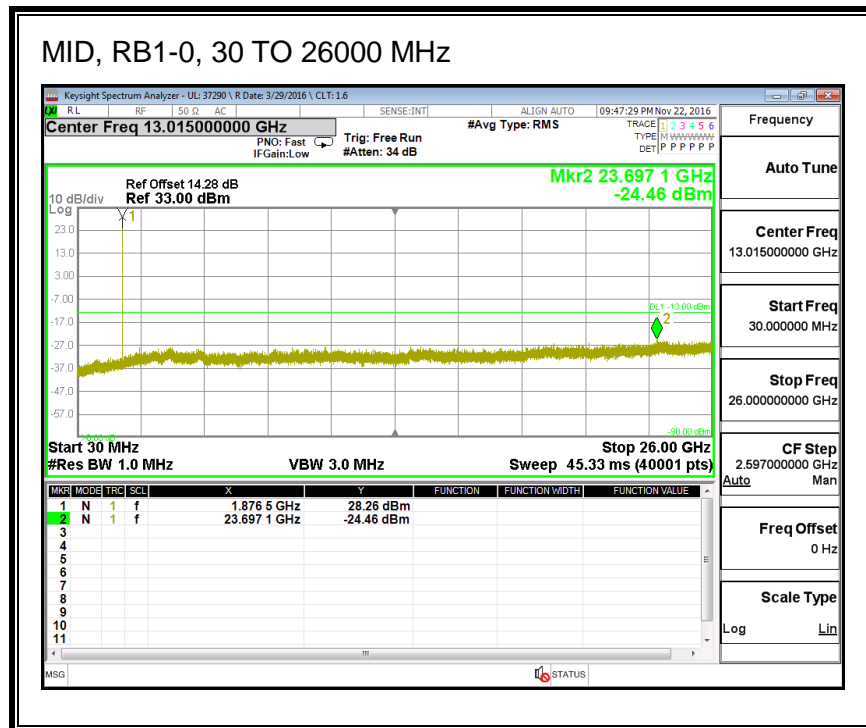
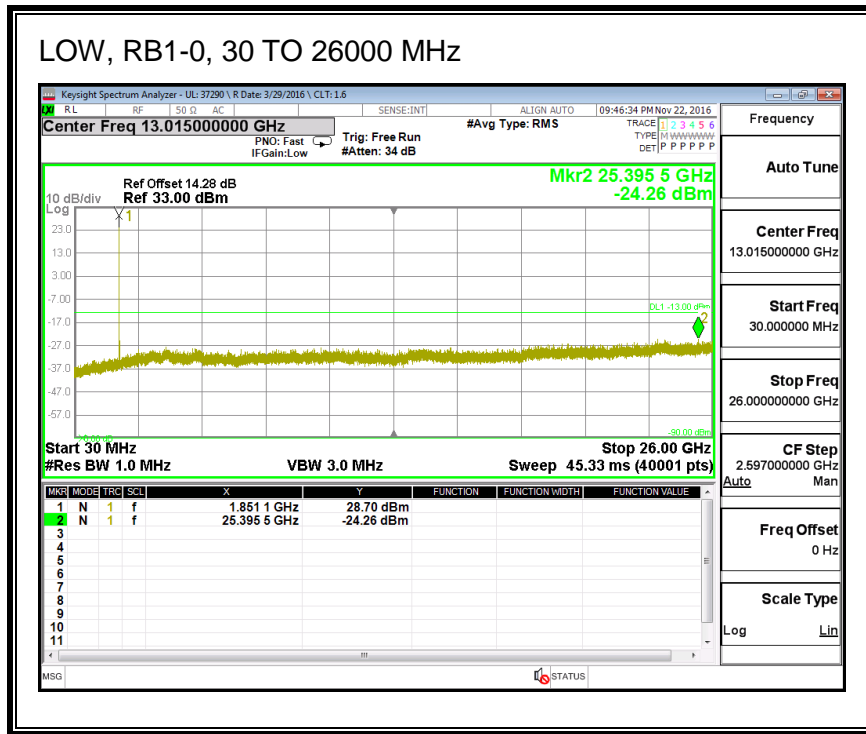
### MID, RB1-0, 30 TO 26000 MHz

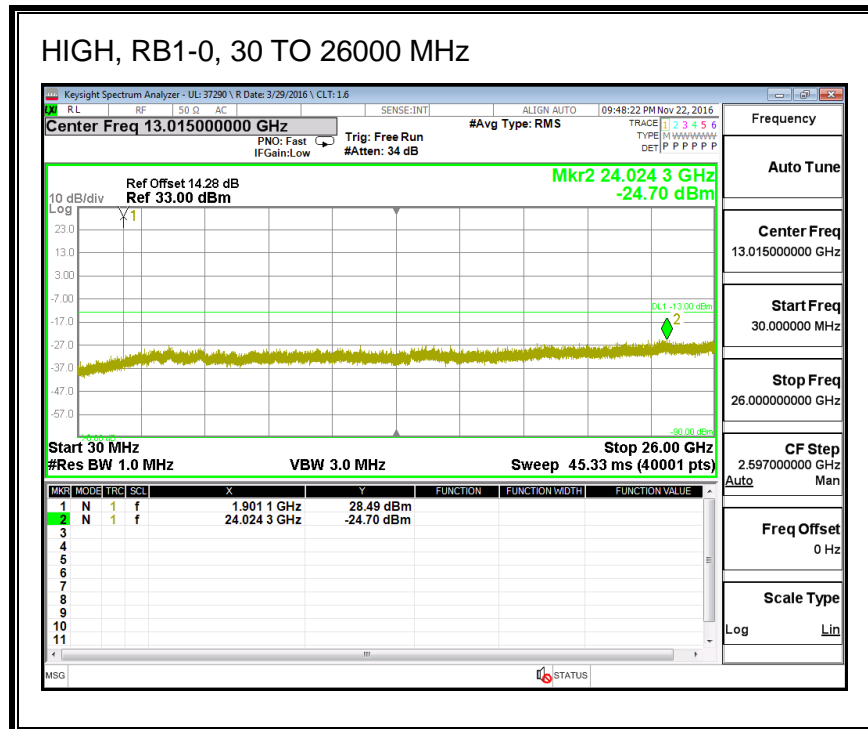


### HIGH, RB1-0, 30 TO 26000 MHz

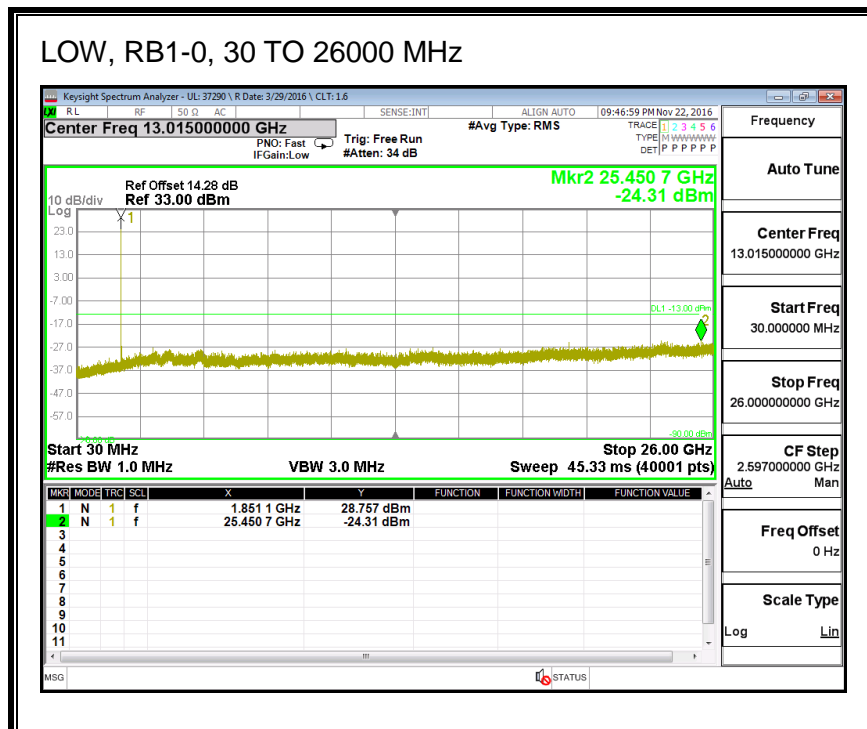


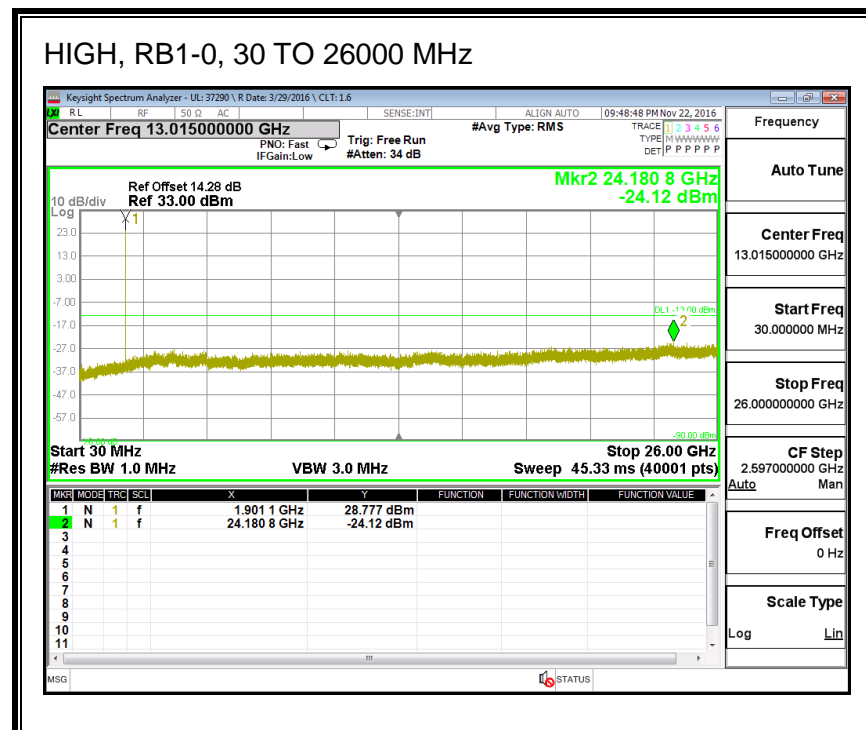
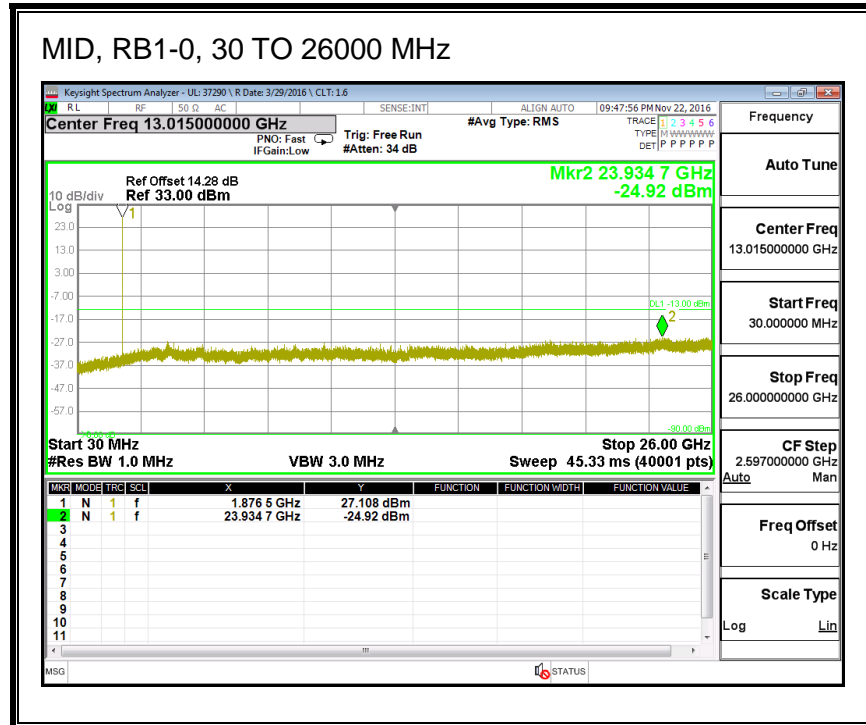
**QPSK, (10.0 MHz BAND WIDTH)**



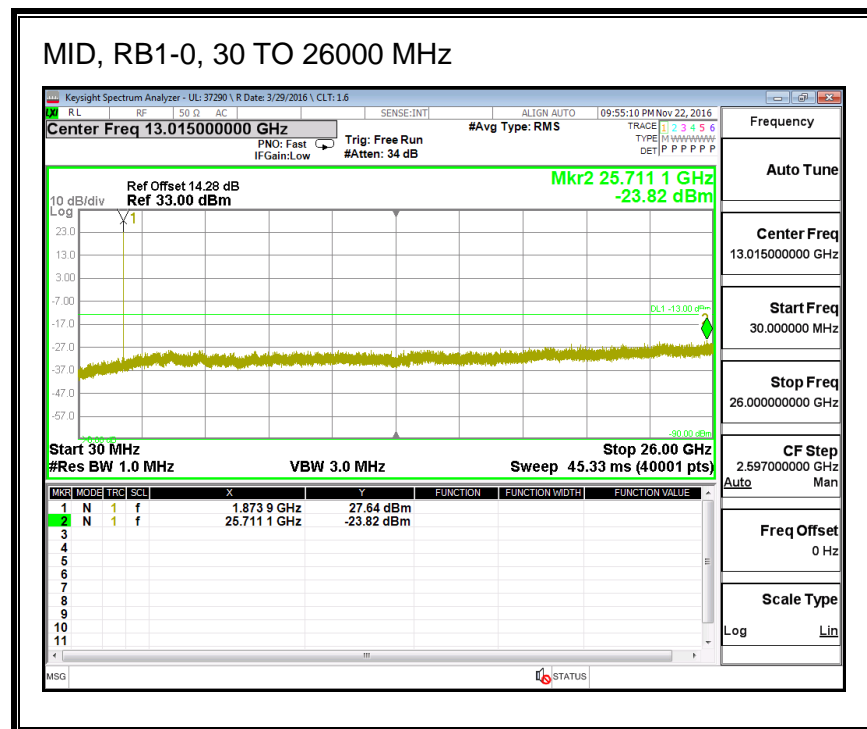
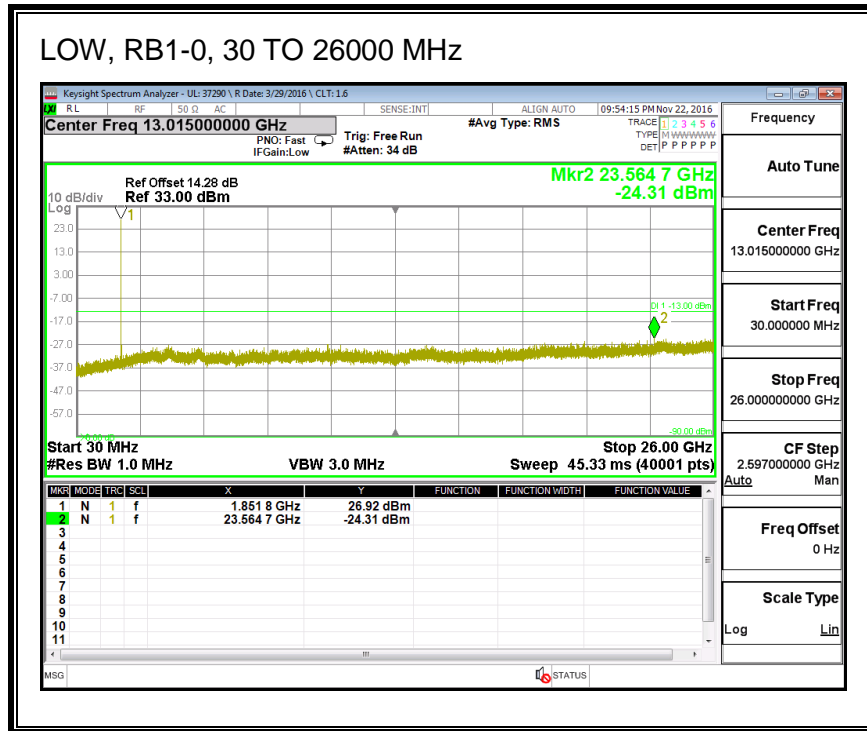


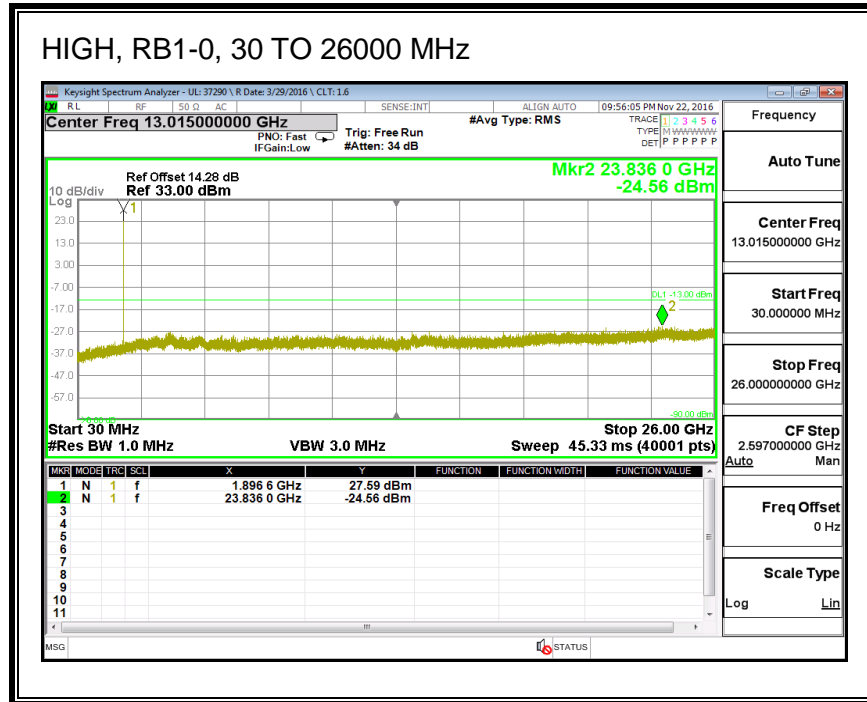
**16QAM, (10.0 MHz BAND WIDTH)**



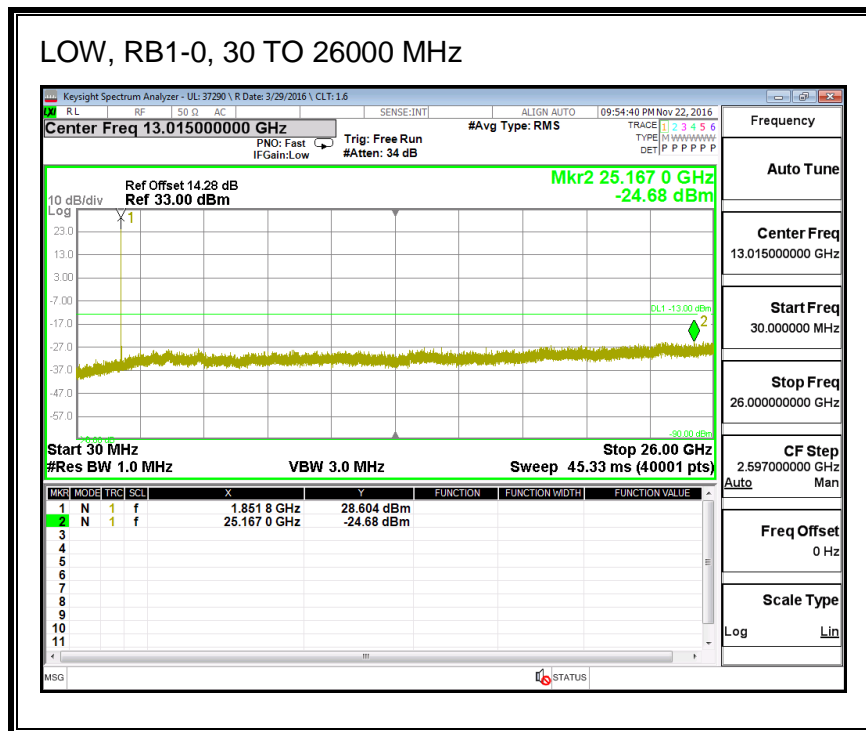


**QPSK, (15.0 MHz BAND WIDTH)**

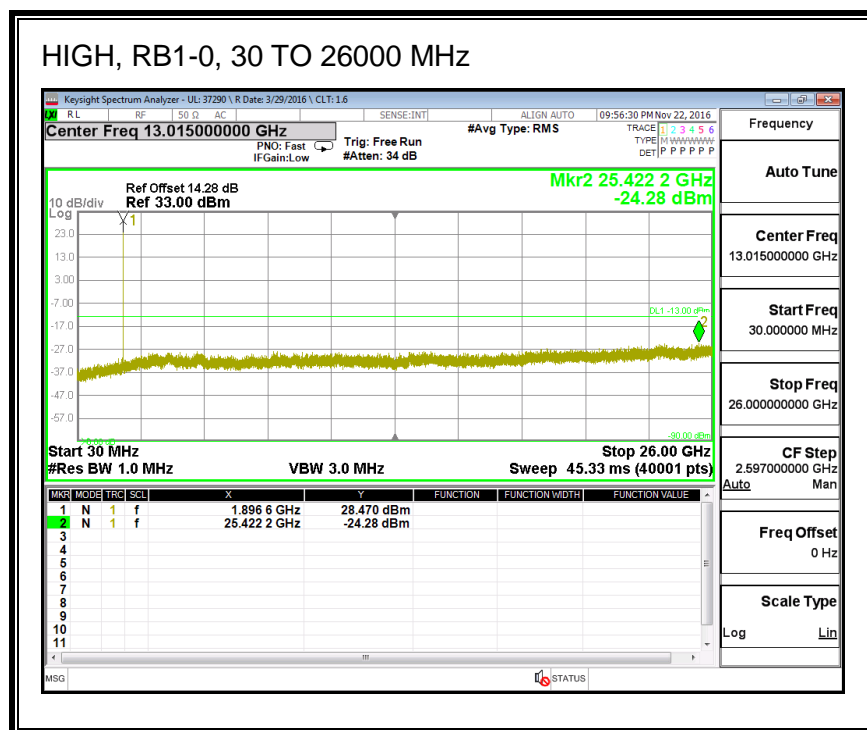
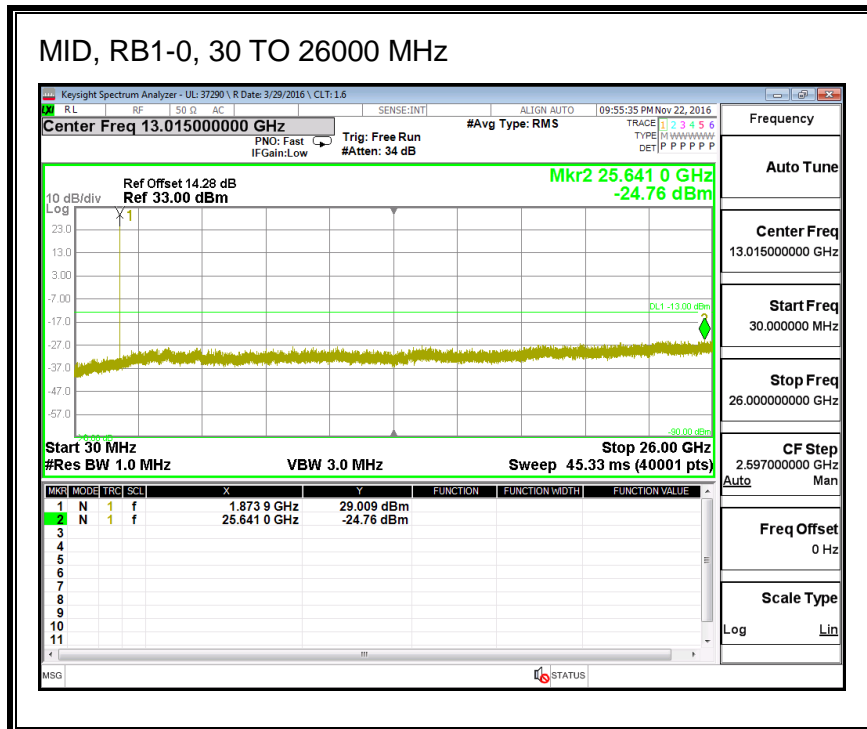




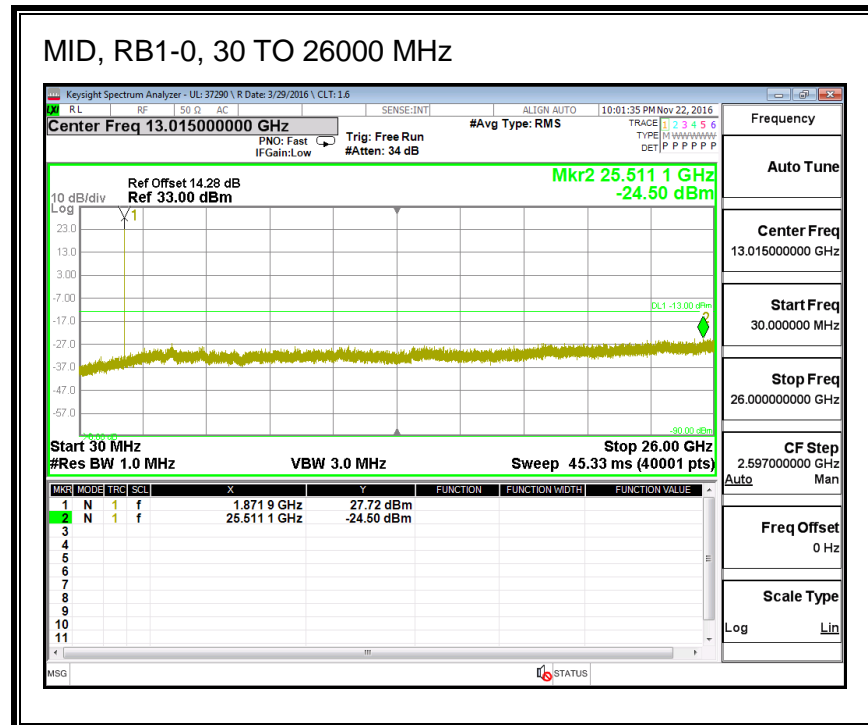
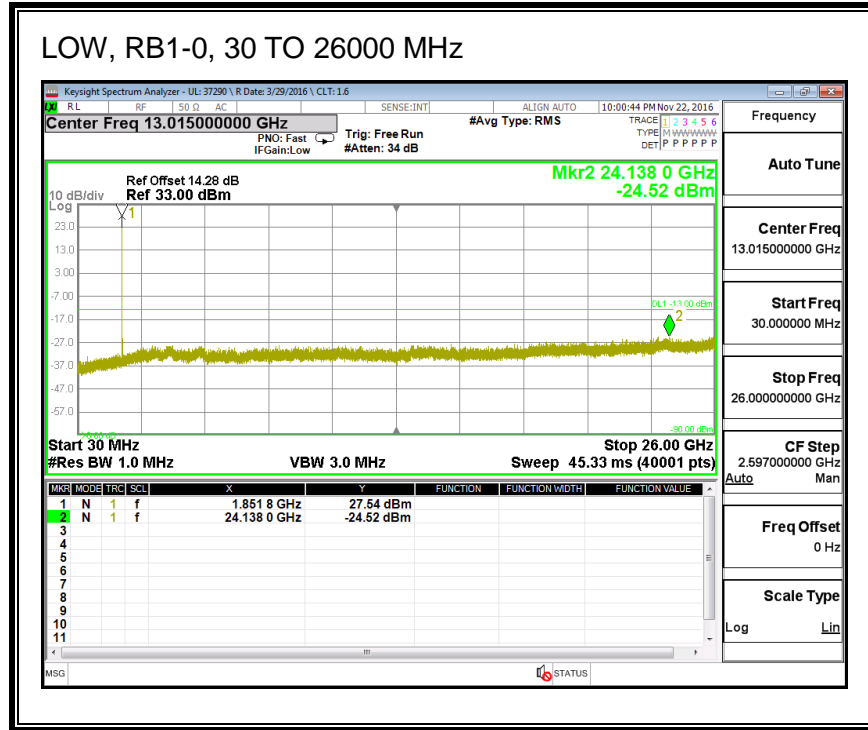
**16QAM, (15.0 MHz BAND WIDTH)**

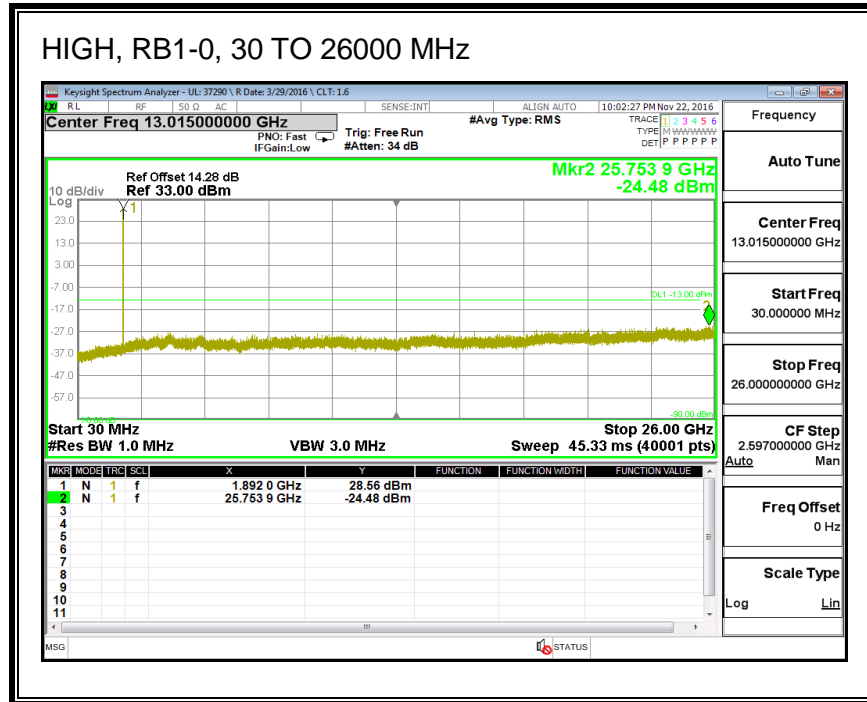




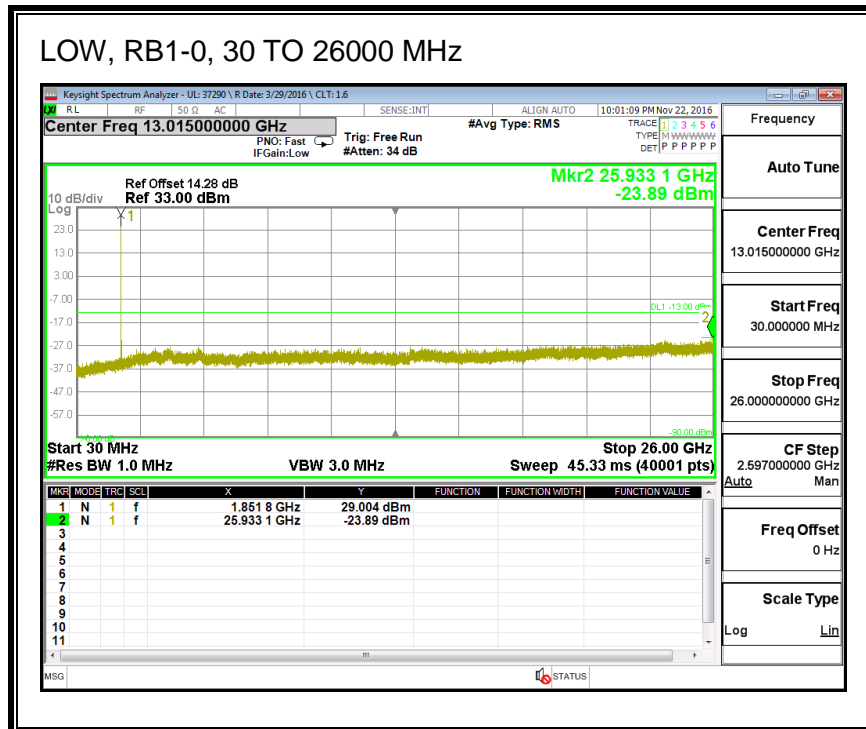


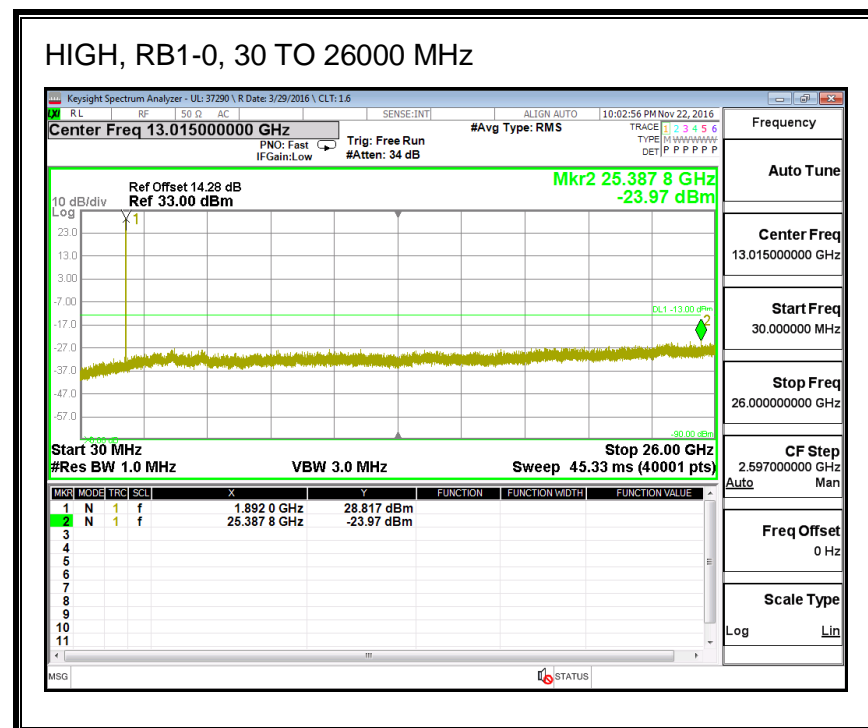
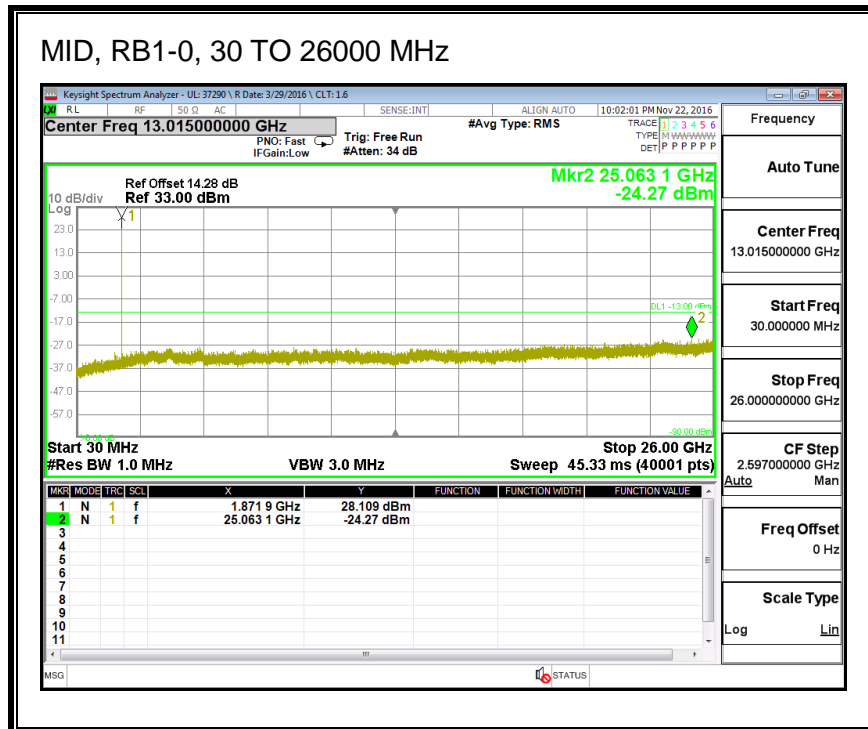
**QPSK, (20.0 MHz BAND WIDTH)**





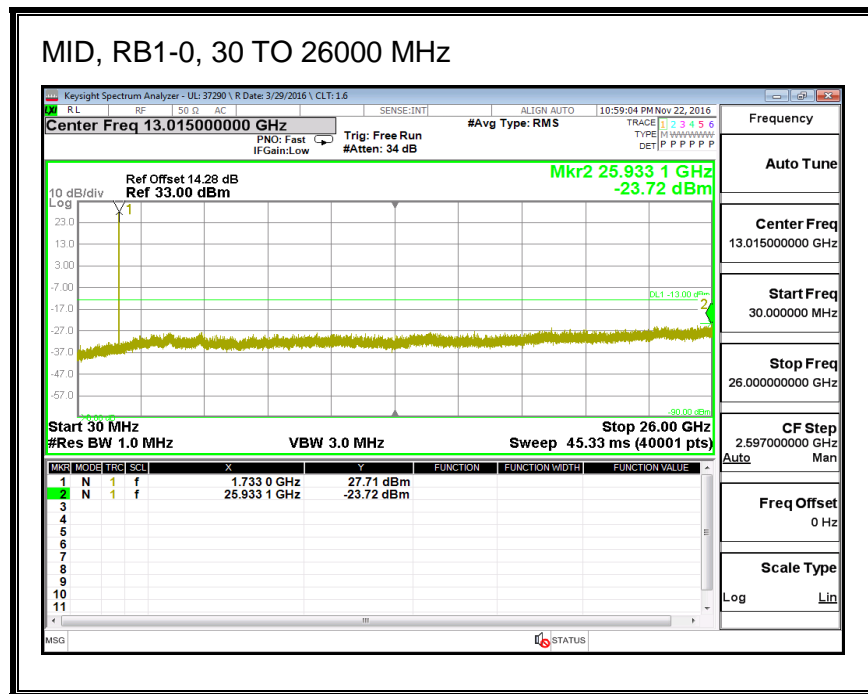
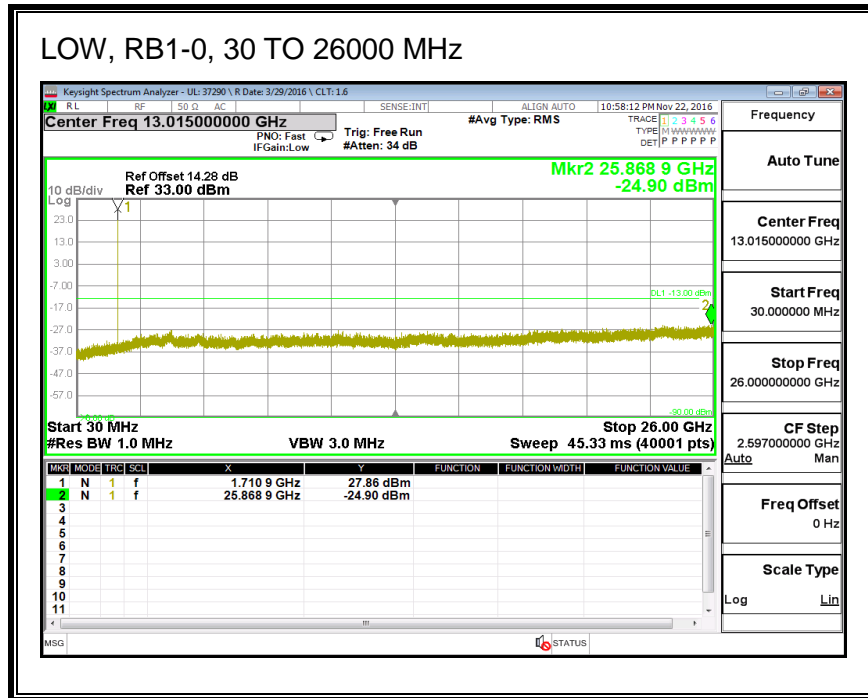
**16QAM, (20.0 MHz BAND WIDTH)**

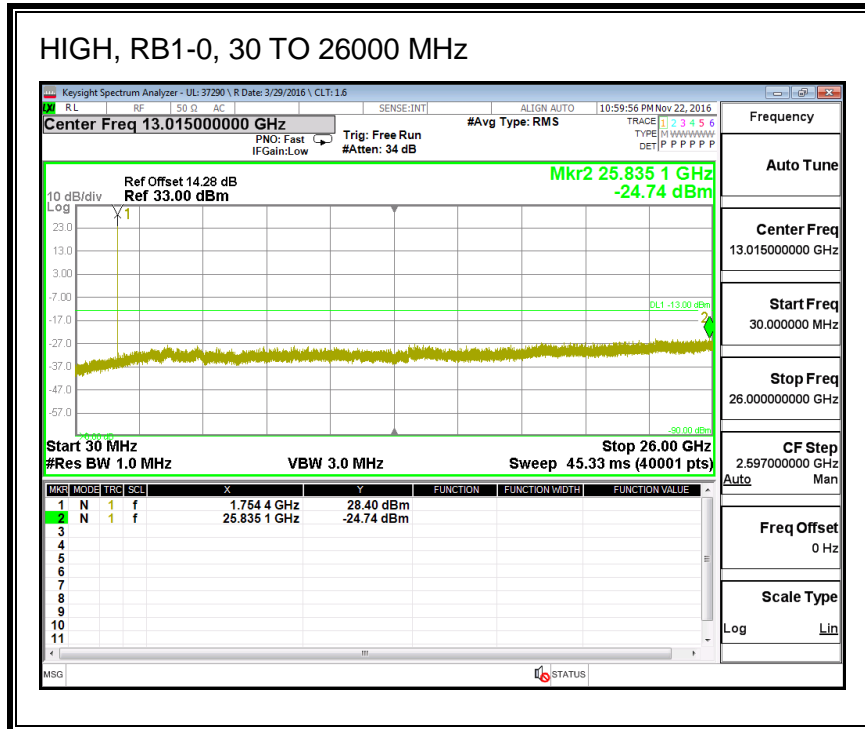




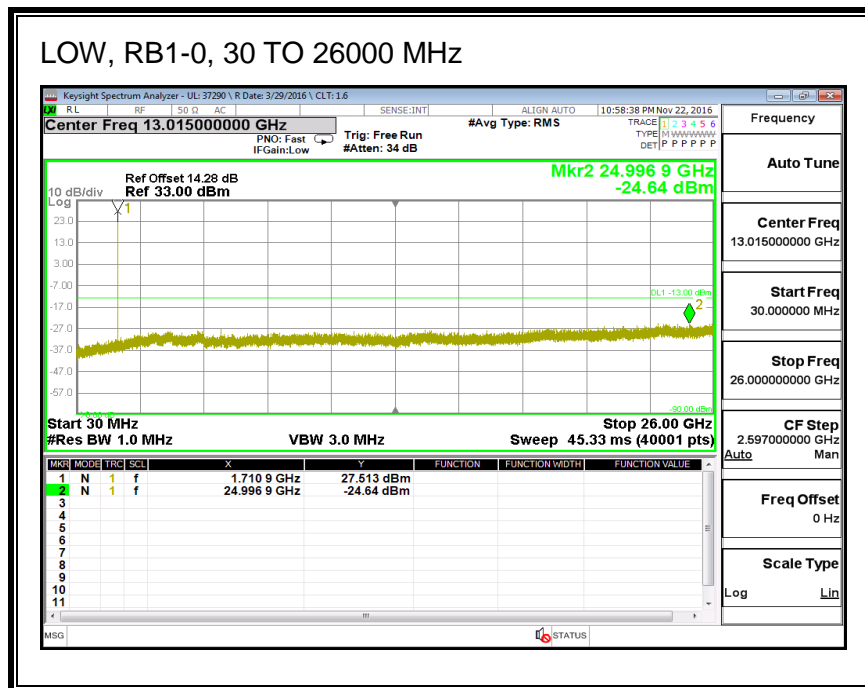
### 8.3.2. LTE BAND 4

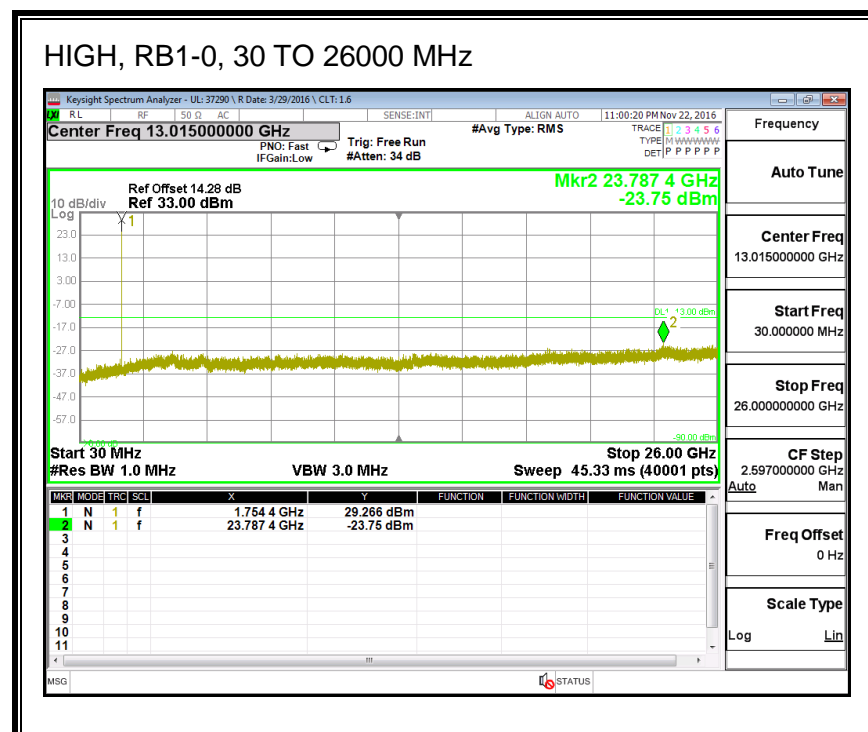
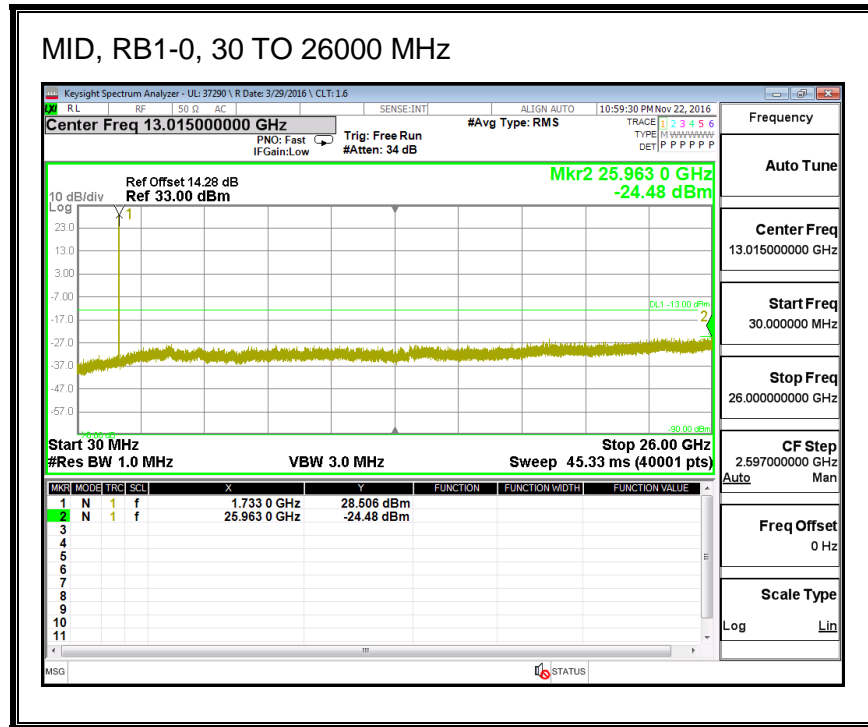
#### QPSK, (1.4 MHz BAND WIDTH)



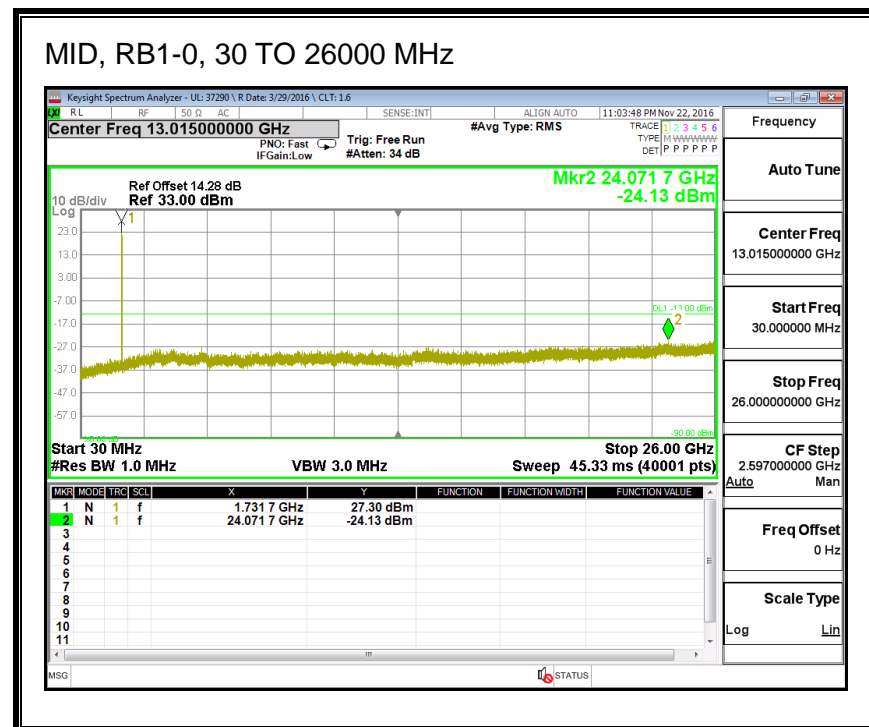
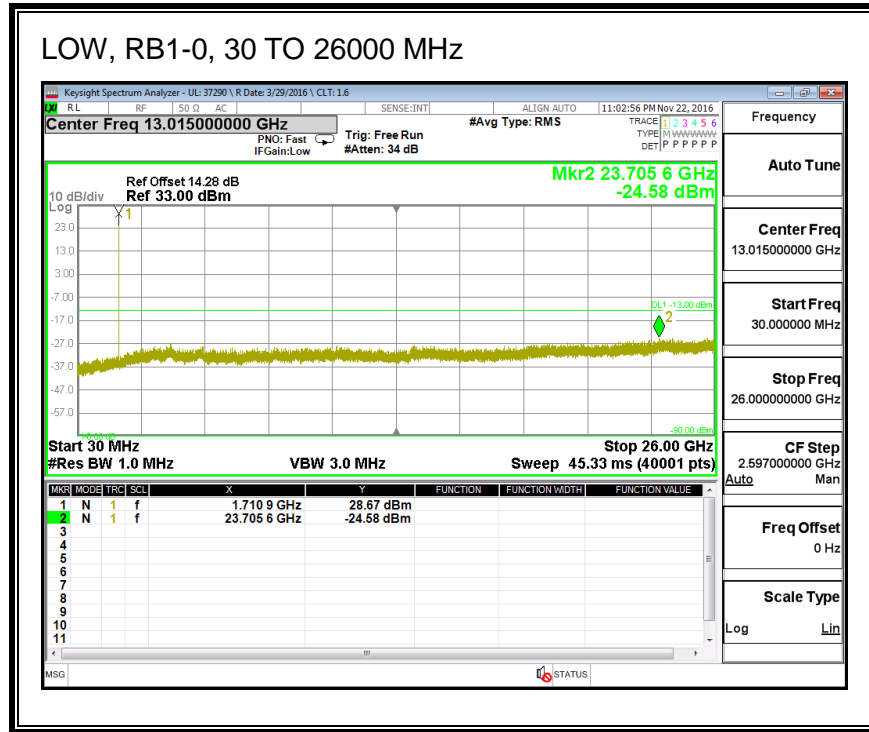


**16QAM, (1.4 MHz BAND WIDTH)**



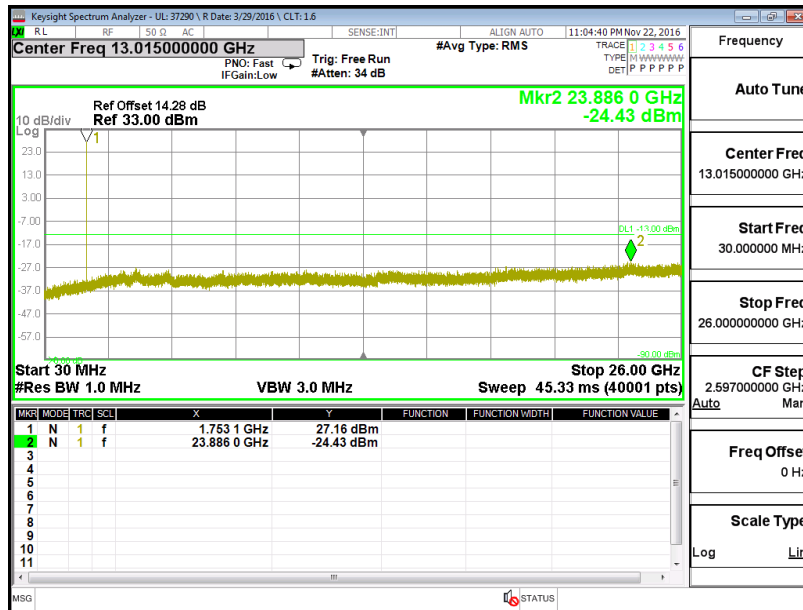


**QPSK, (3.0 MHz BAND WIDTH)**



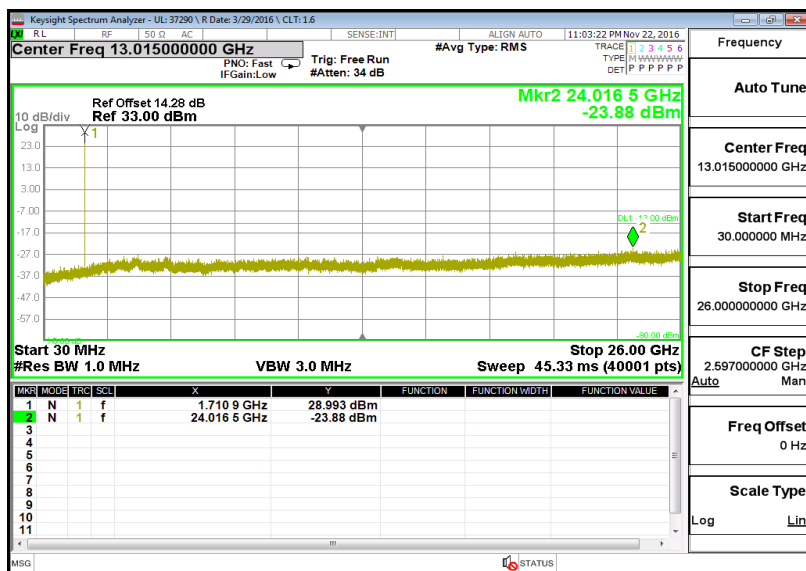


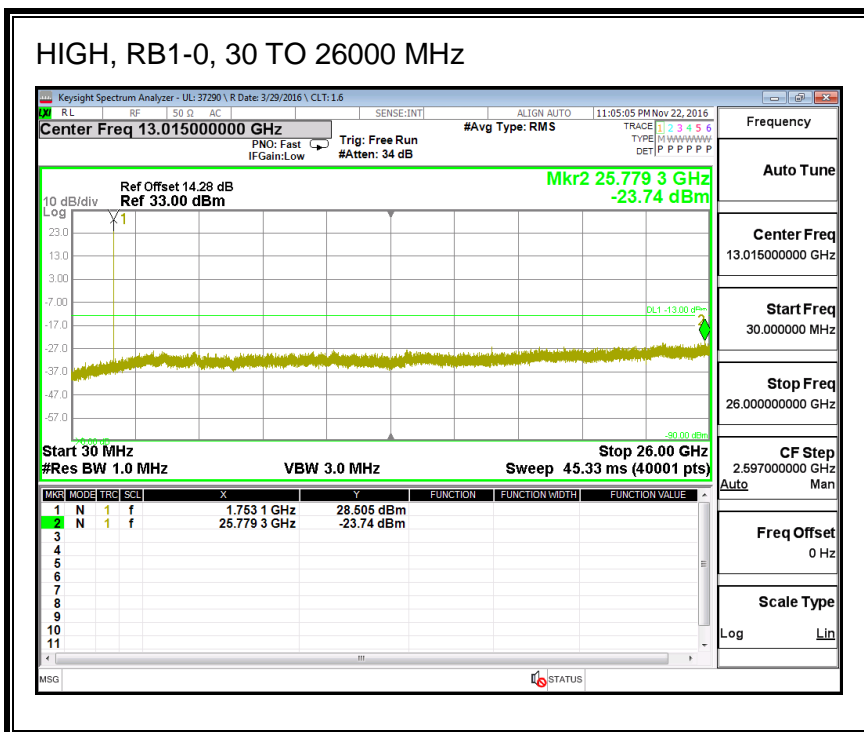
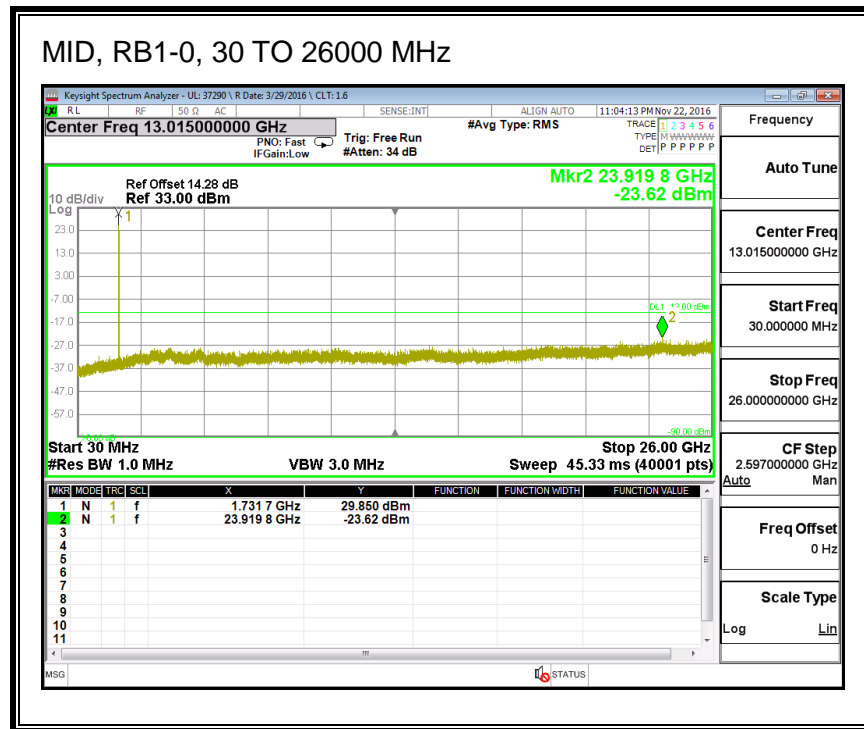
### HIGH, RB1-0, 30 TO 26000 MHz



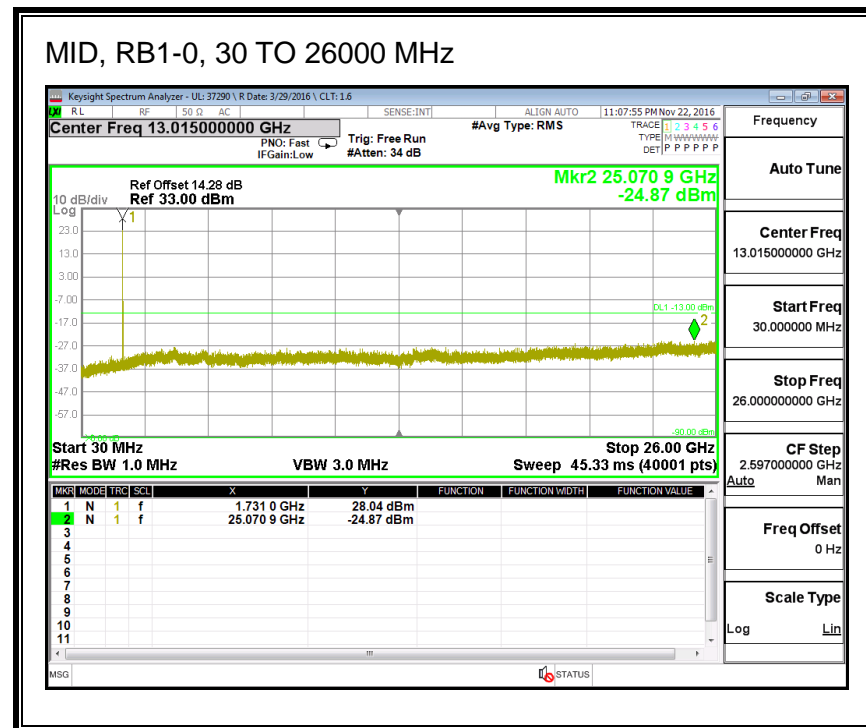
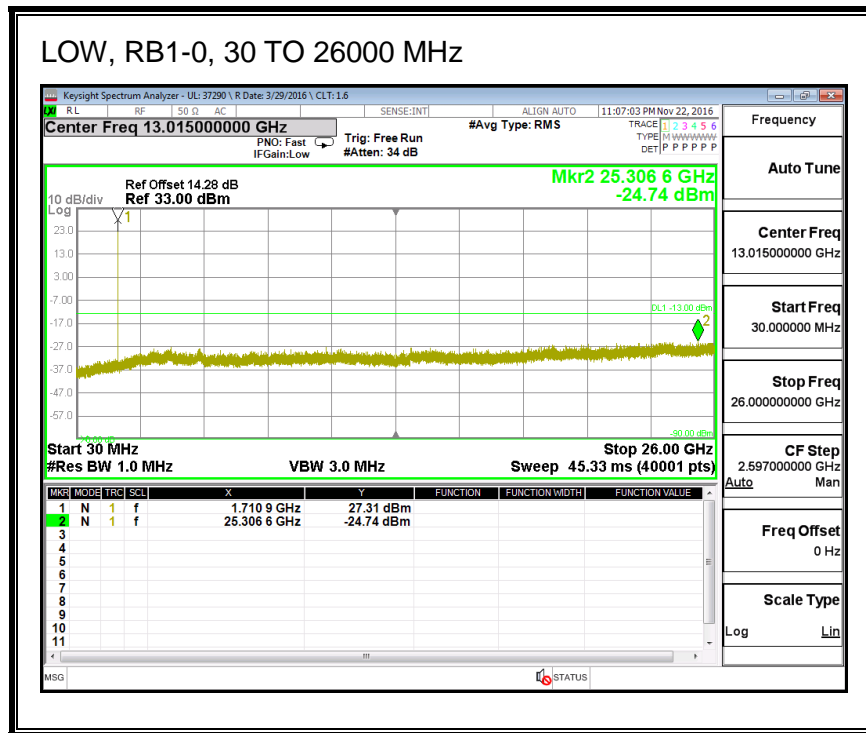
### 16QAM, (3.0 MHz BAND WIDTH)

### LOW, RB1-0, 30 TO 26000 MHz

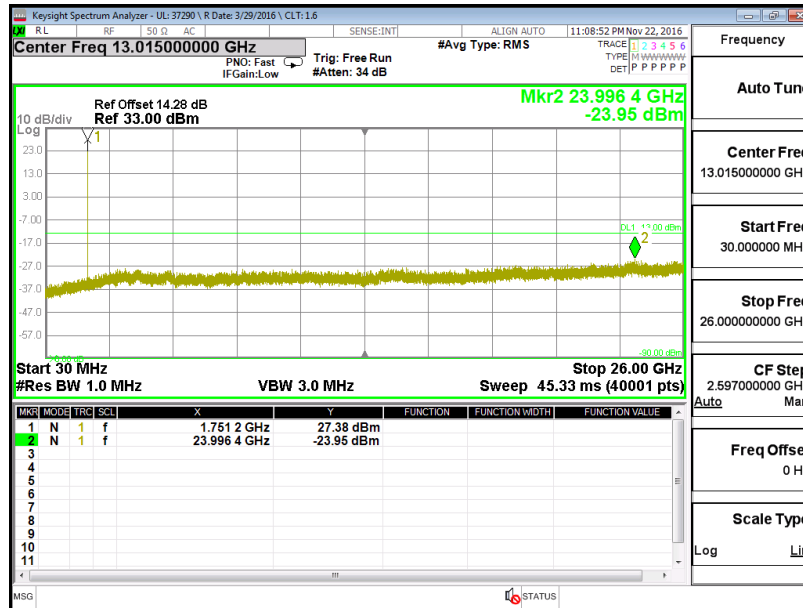




**QPSK, (5.0 MHz BAND WIDTH)**

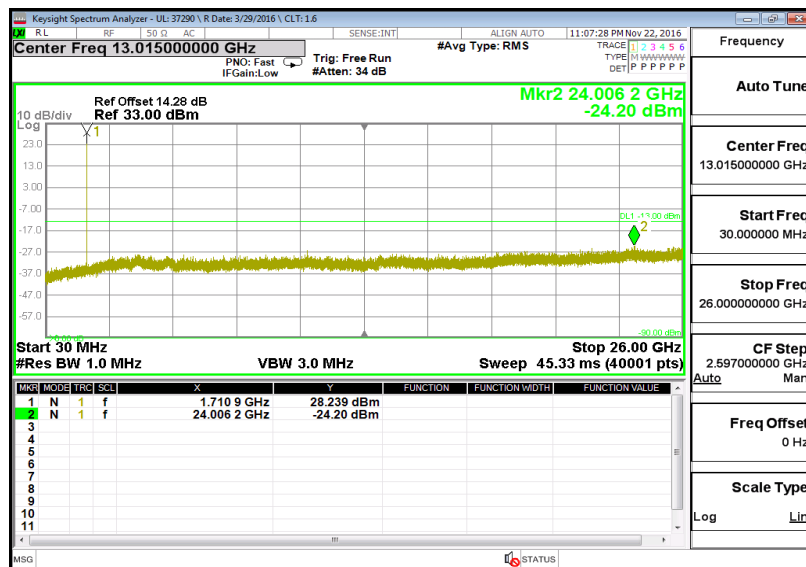


### HIGH, RB1-0, 30 TO 26000 MHz

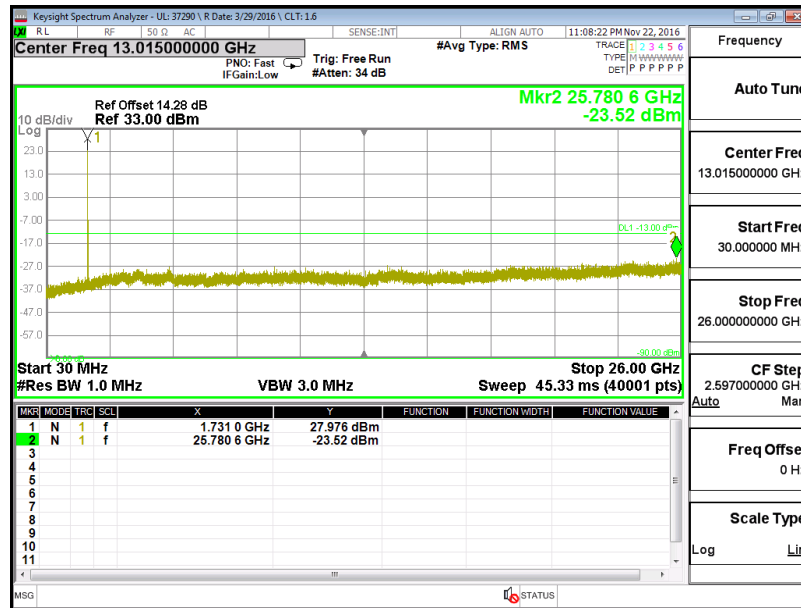


### 16QAM, (5.0 MHz BAND WIDTH)

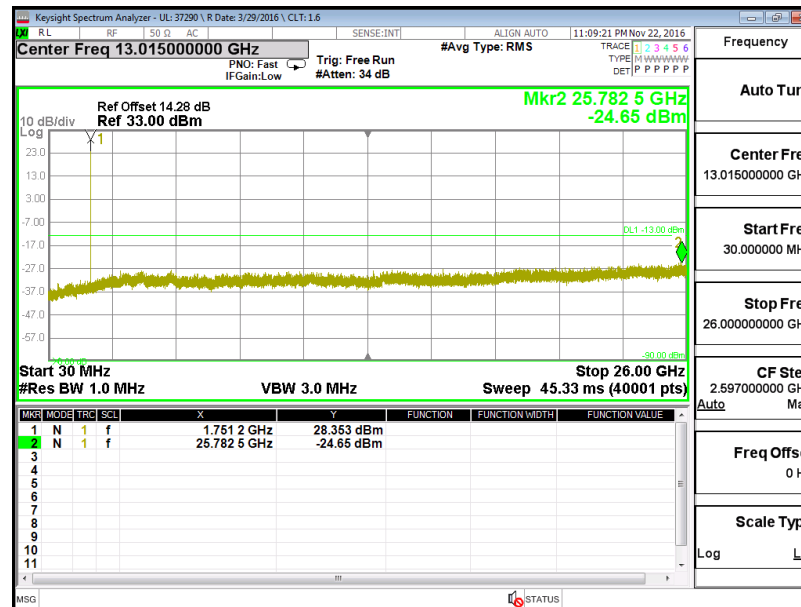
### LOW, RB1-0, 30 TO 26000 MHz



### MID, RB1-0, 30 TO 26000 MHz

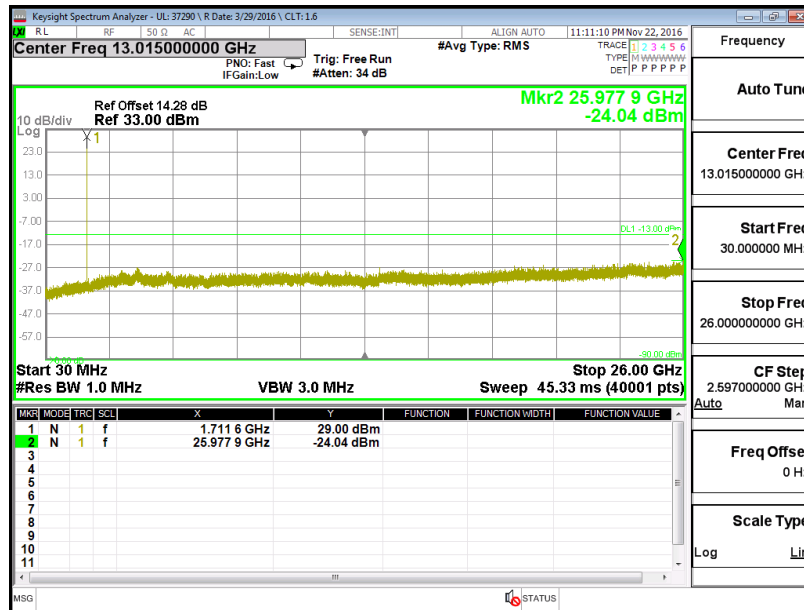


### HIGH, RB1-0, 30 TO 26000 MHz

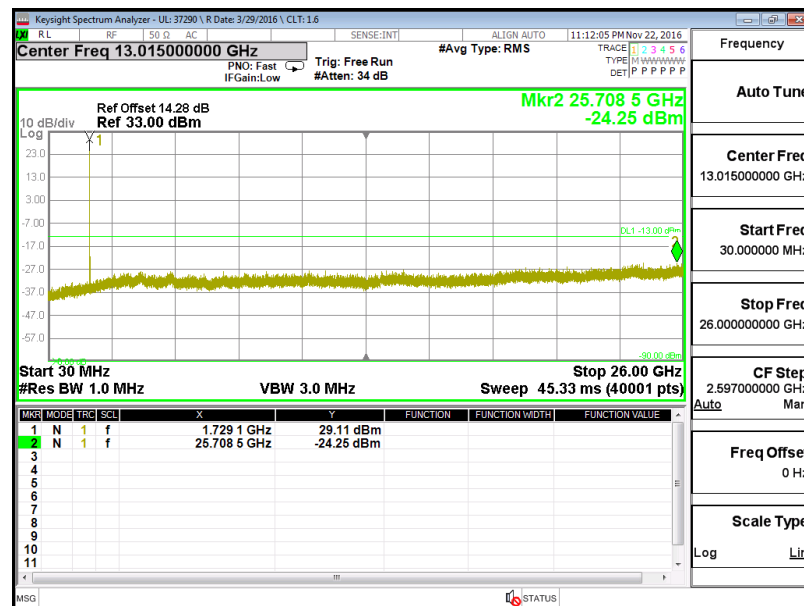


**QPSK, (10.0 MHz BAND WIDTH)**

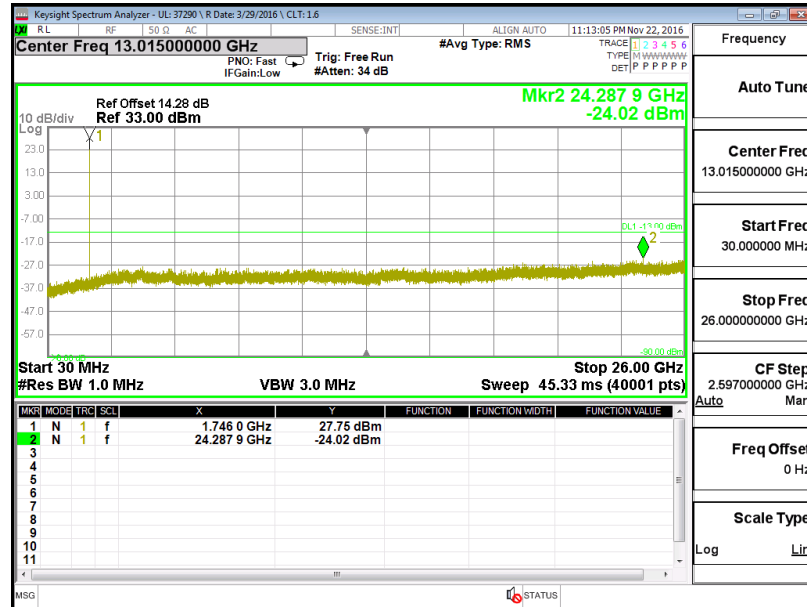
**LOW, RB1-0, 30 TO 26000 MHz**



**MID, RB1-0, 30 TO 26000 MHz**

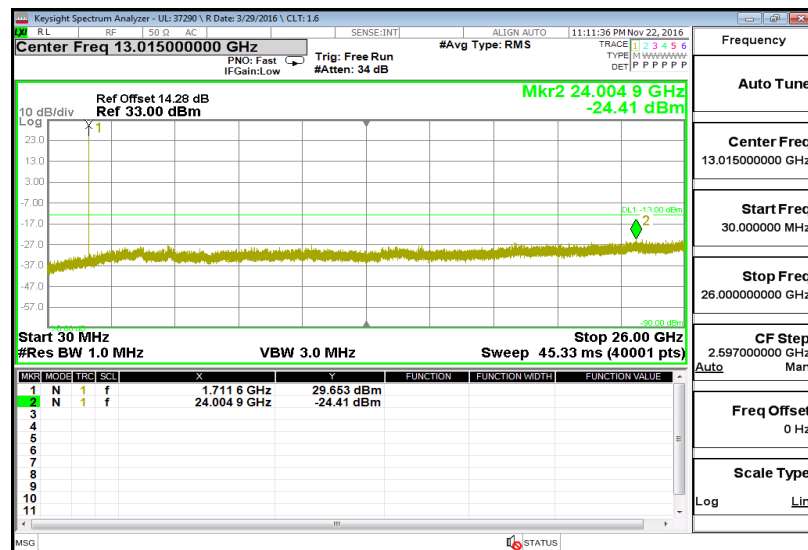


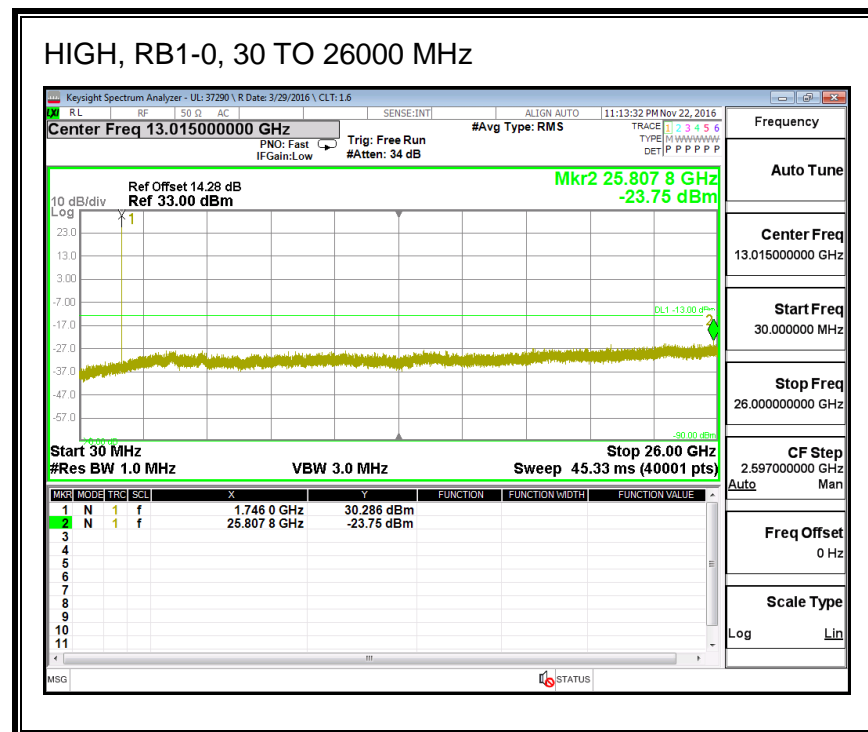
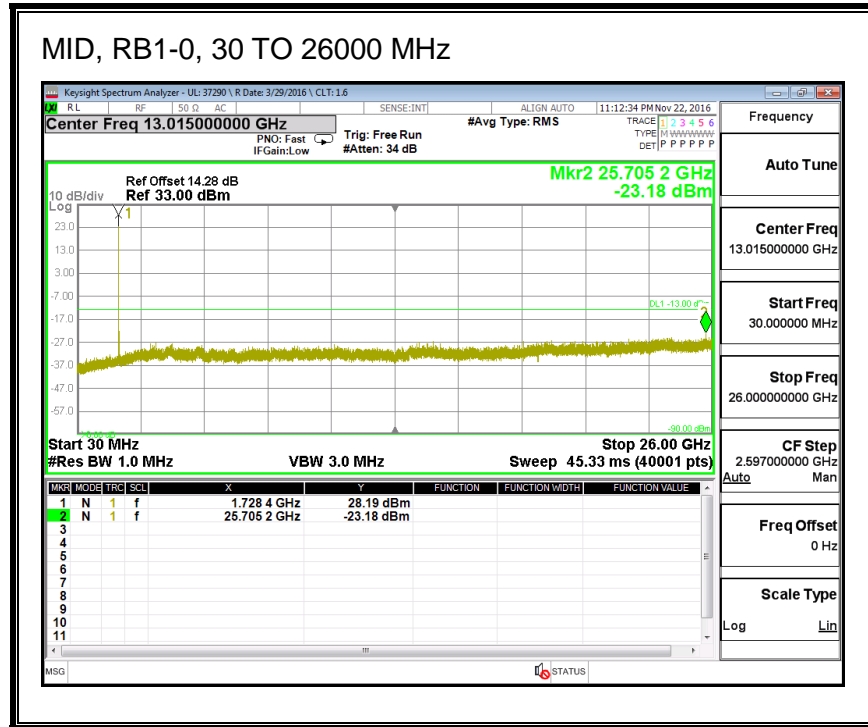
### HIGH, RB1-0, 30 TO 26000 MHz



### 16QAM, (10.0 MHz BAND WIDTH)

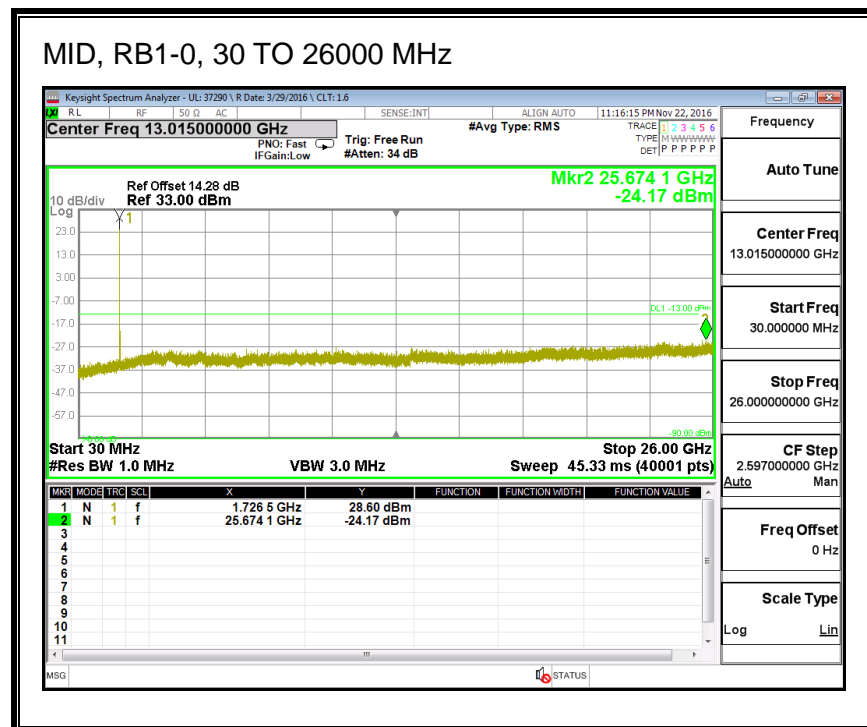
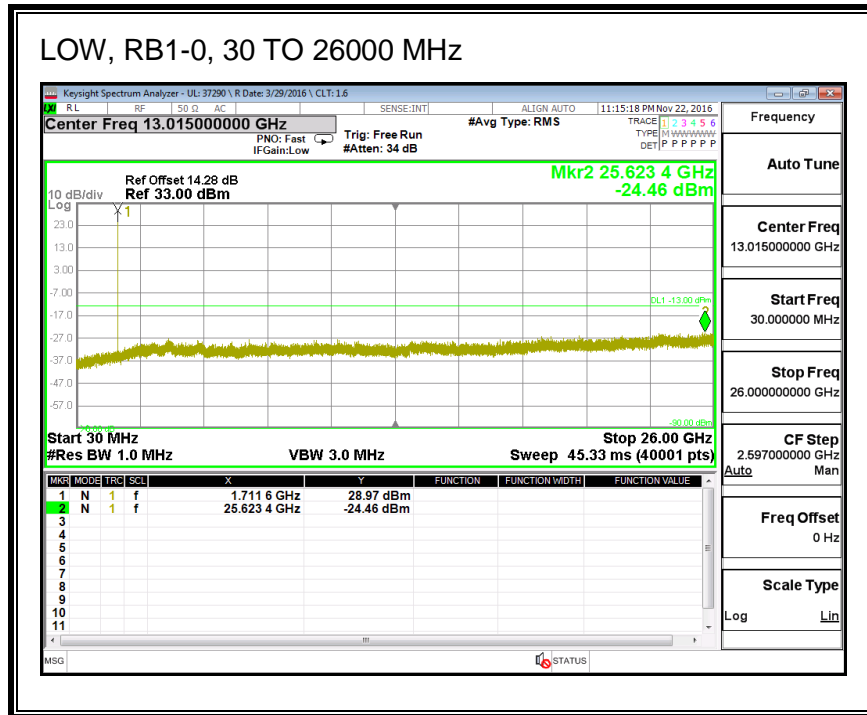
### LOW, RB1-0, 30 TO 26000 MHz

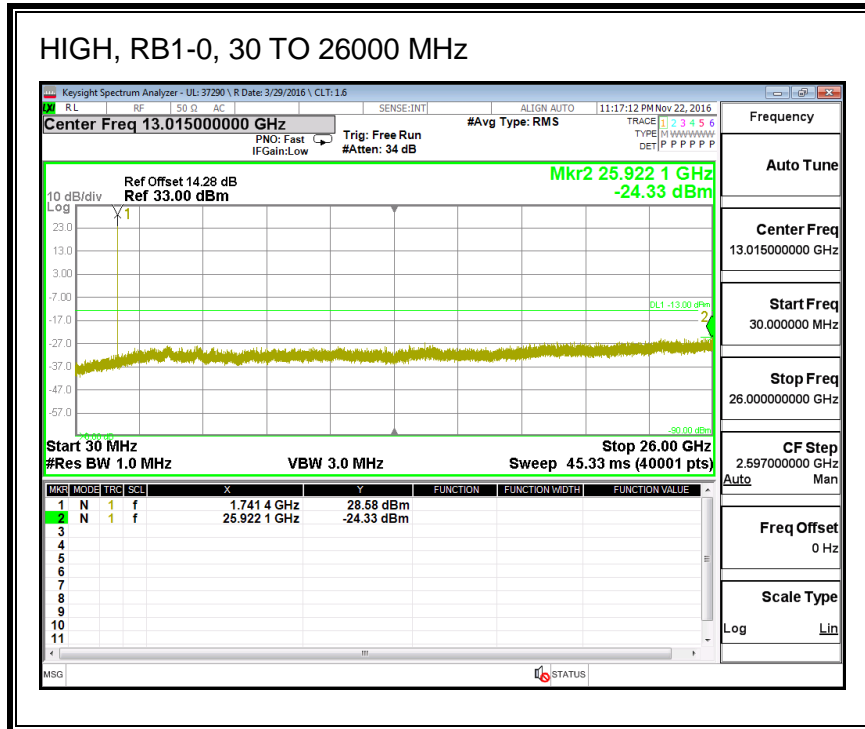




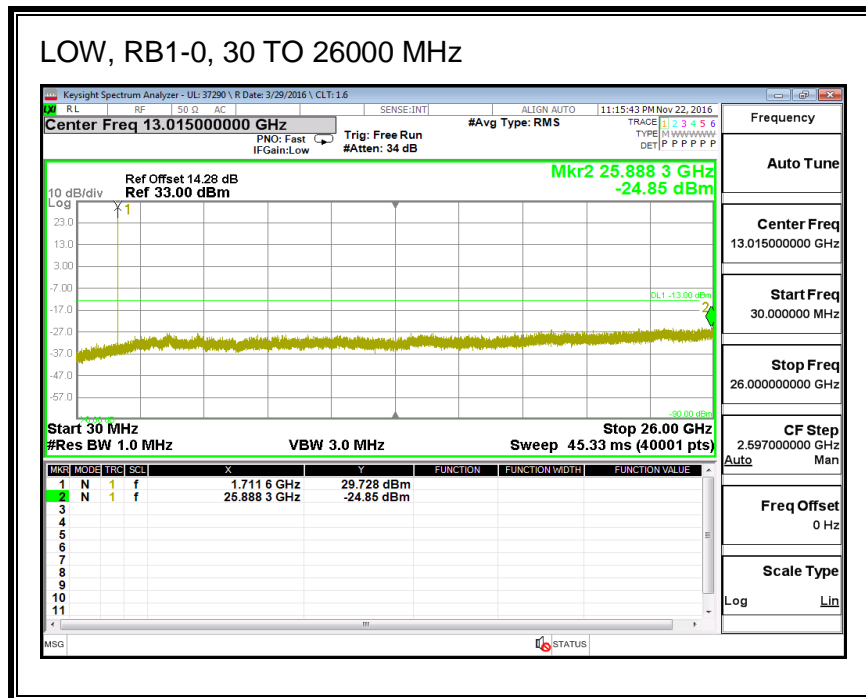


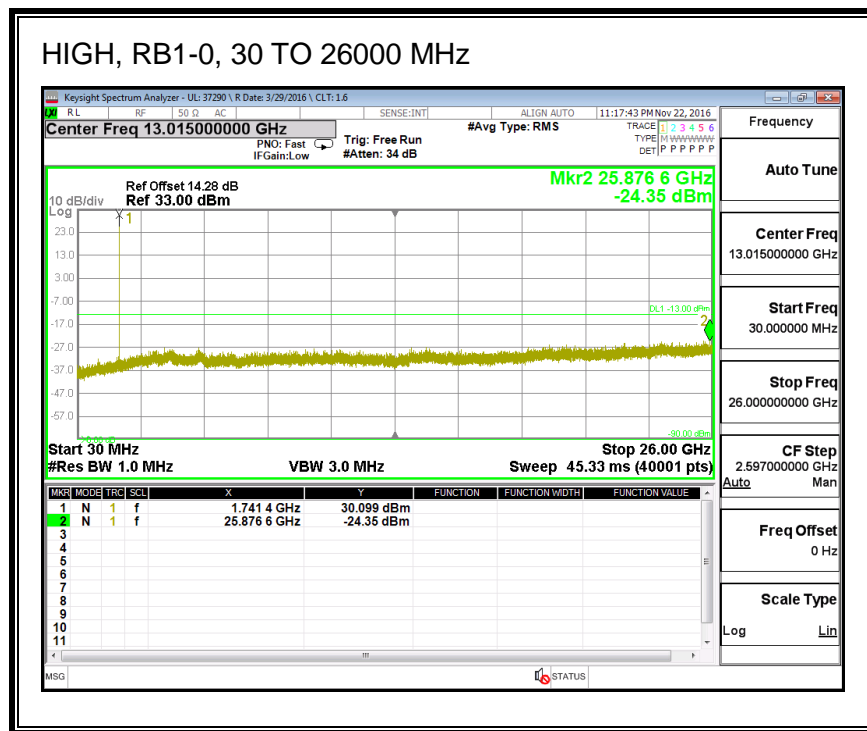
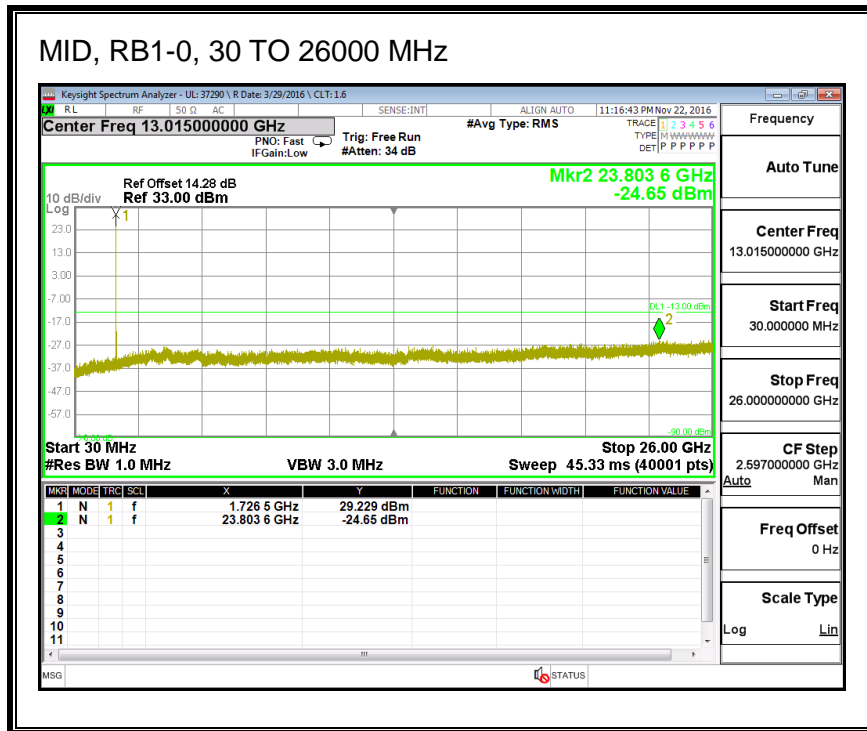
**QPSK, (15.0 MHz BAND WIDTH)**





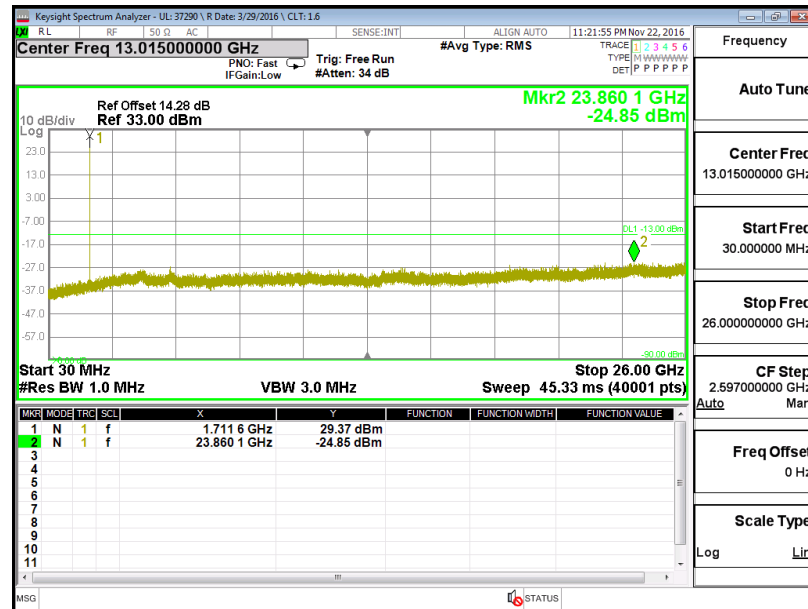
**16QAM, (15.0 MHz BAND WIDTH)**



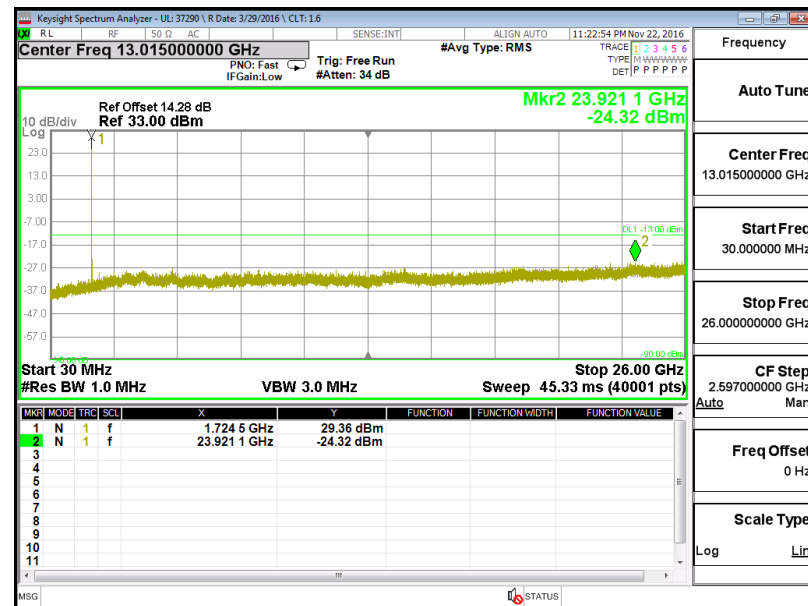


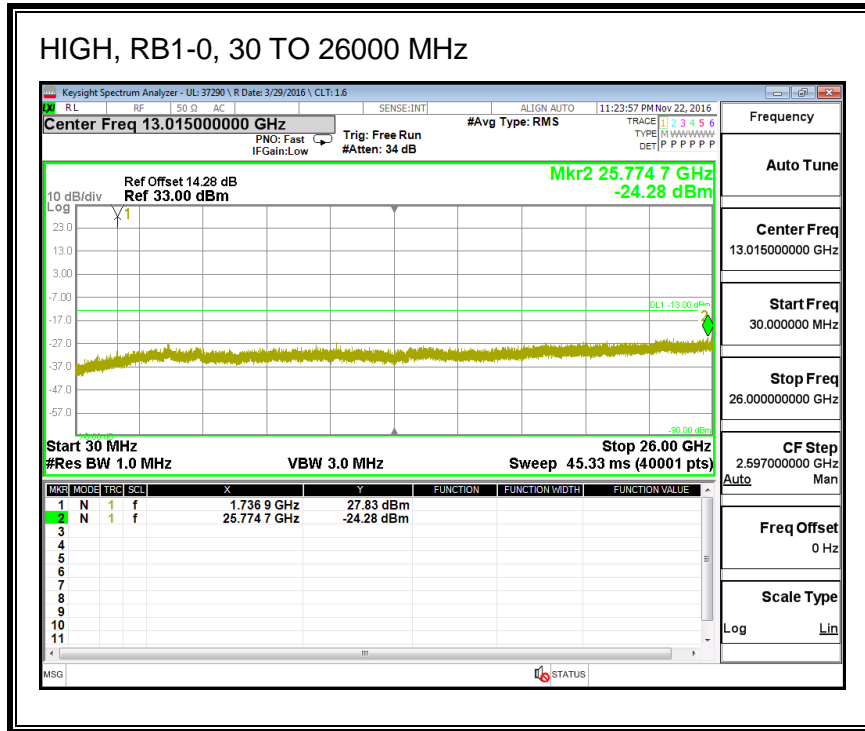
**QPSK, (20.0 MHz BAND WIDTH)**

**LOW, RB1-0, 30 TO 26000 MHz**

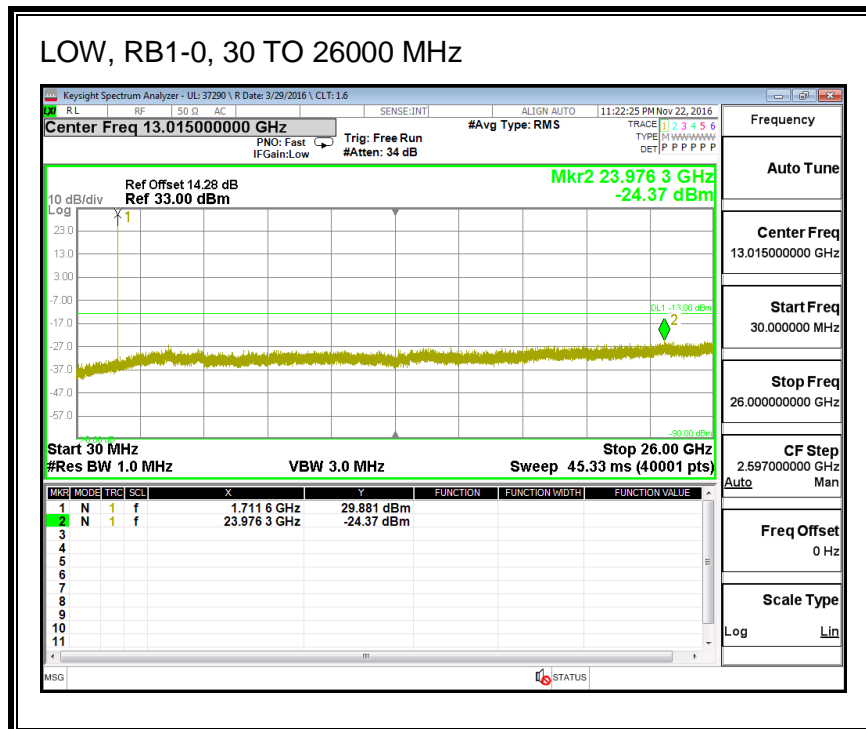


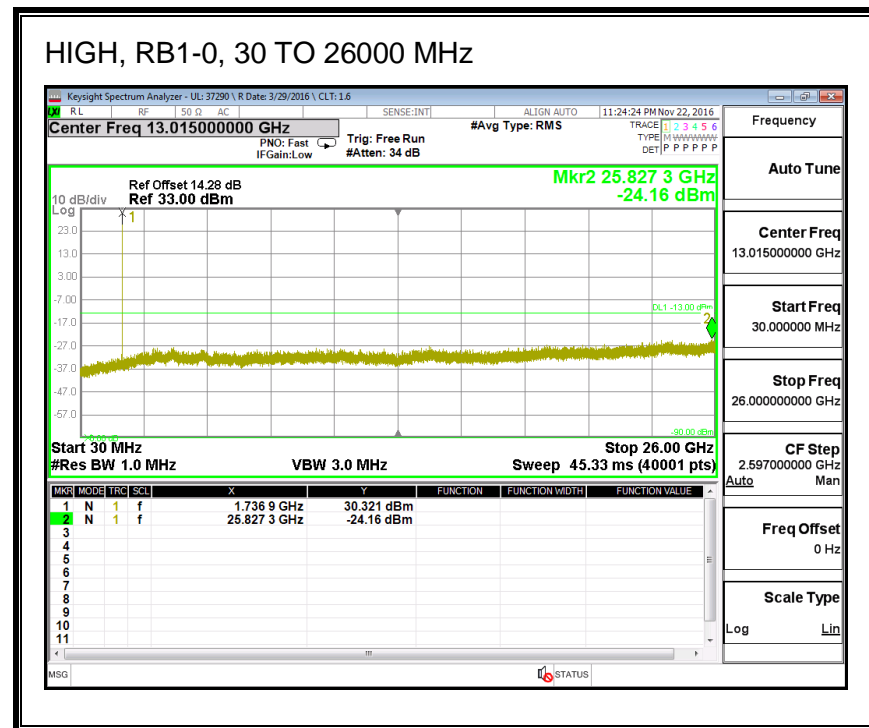
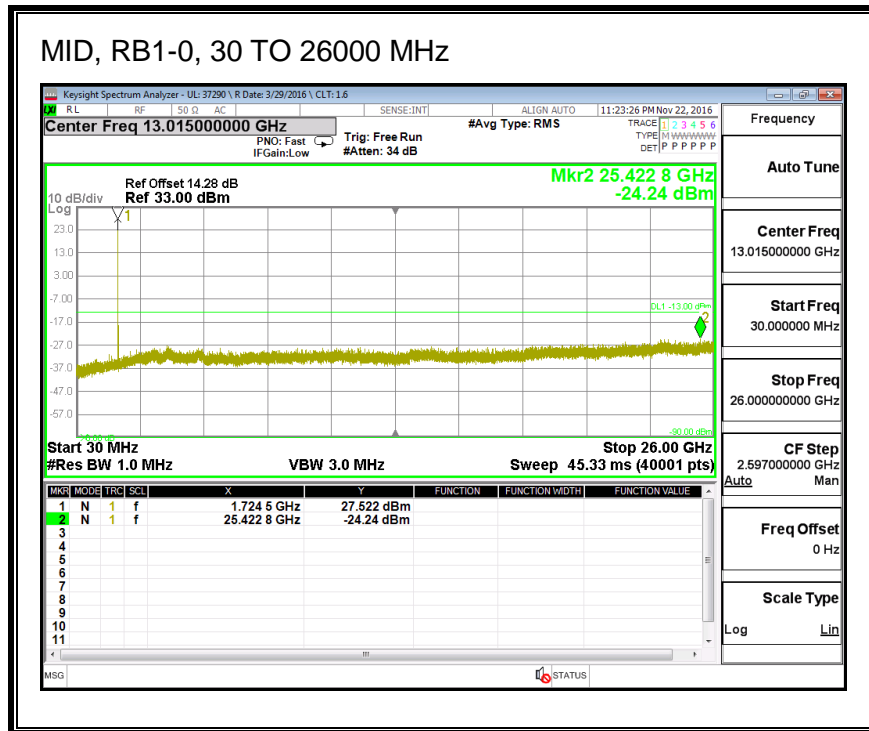
**MID, RB1-0, 30 TO 26000 MHz**





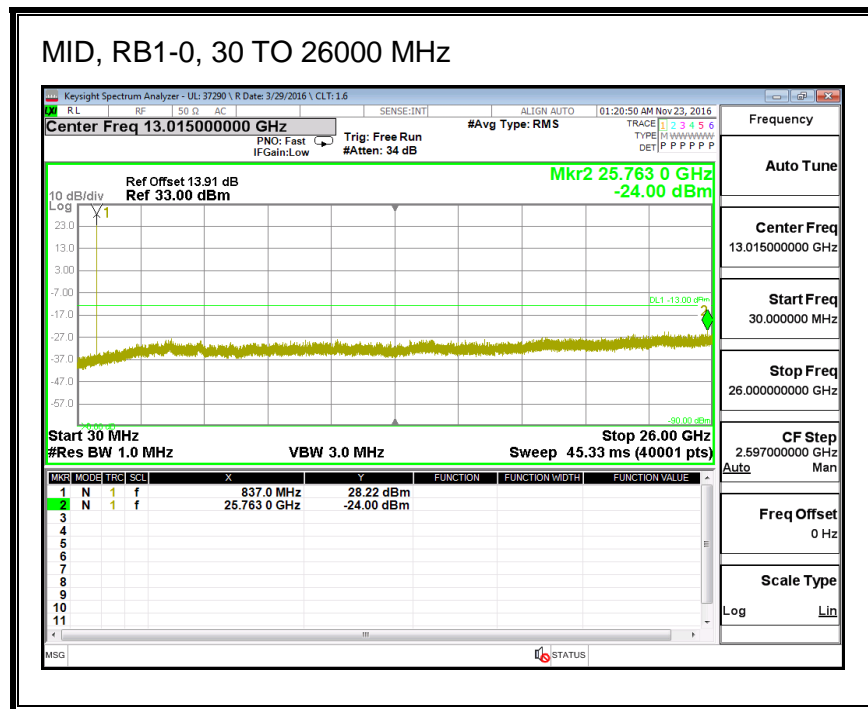
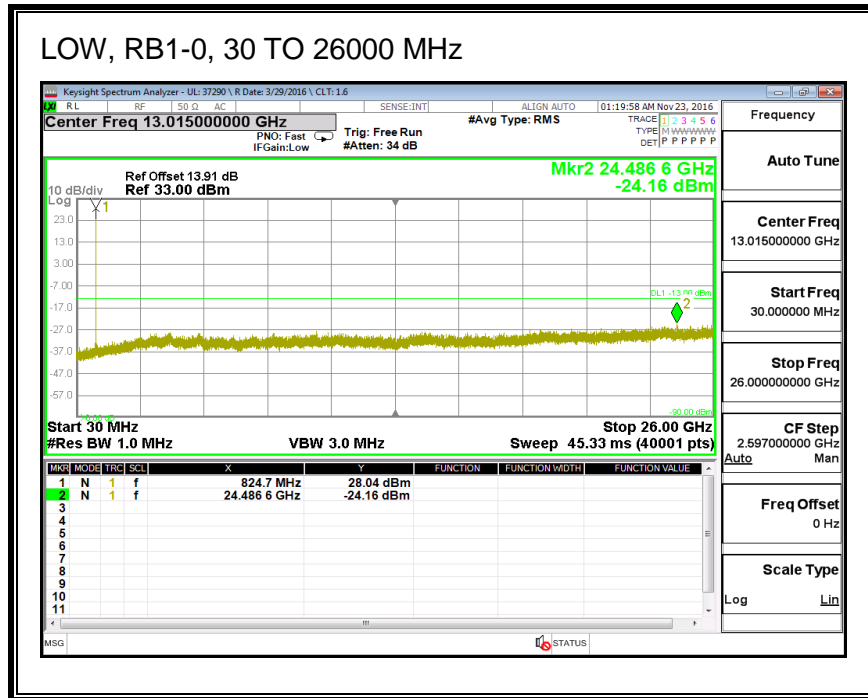
**16QAM, (20.0 MHz BAND WIDTH)**

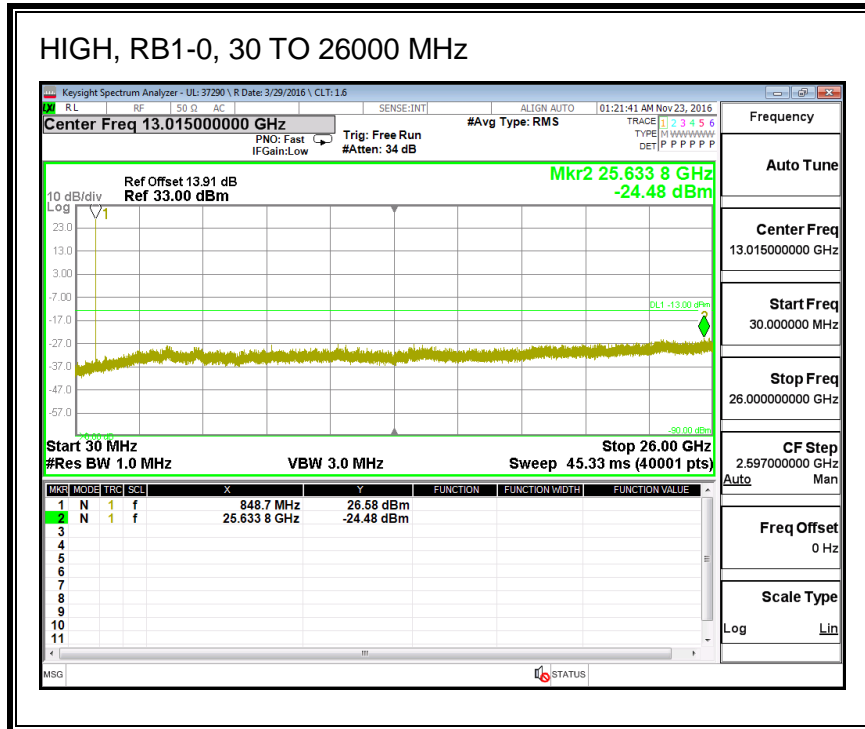




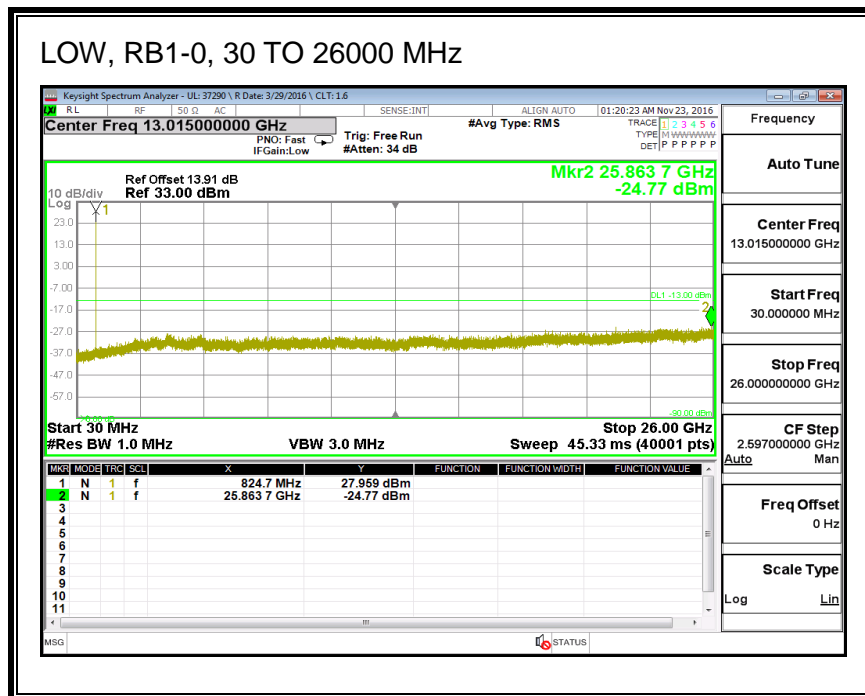
### 8.3.3. LTE BAND 5

#### QPSK, (1.4 MHz BAND WIDTH)

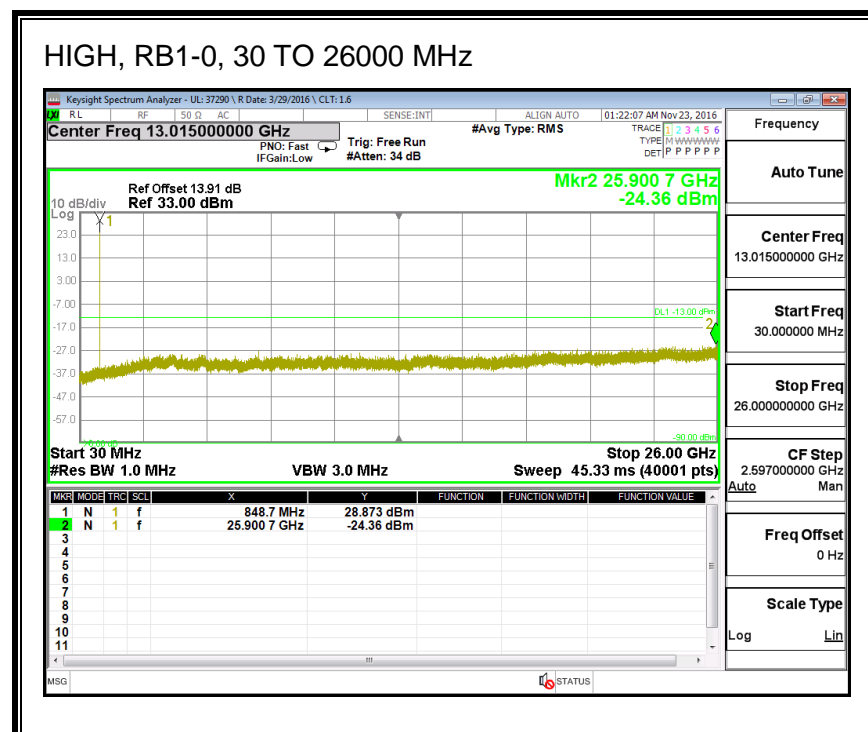
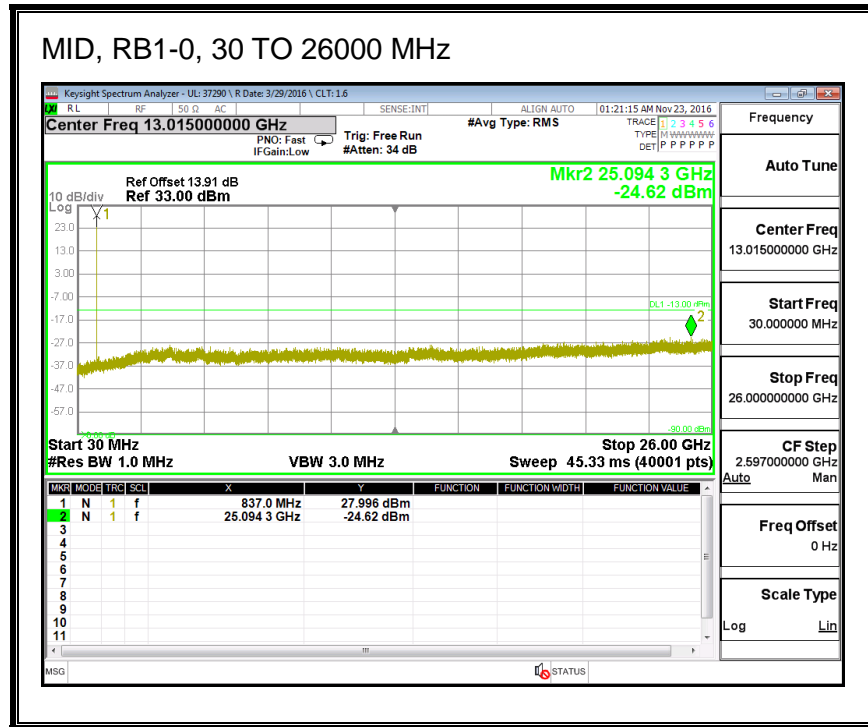




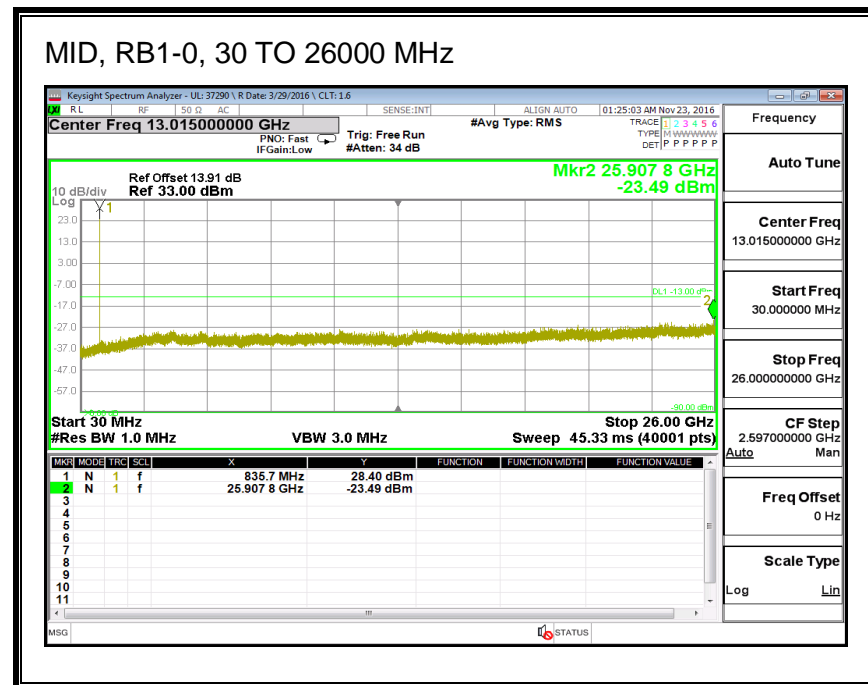
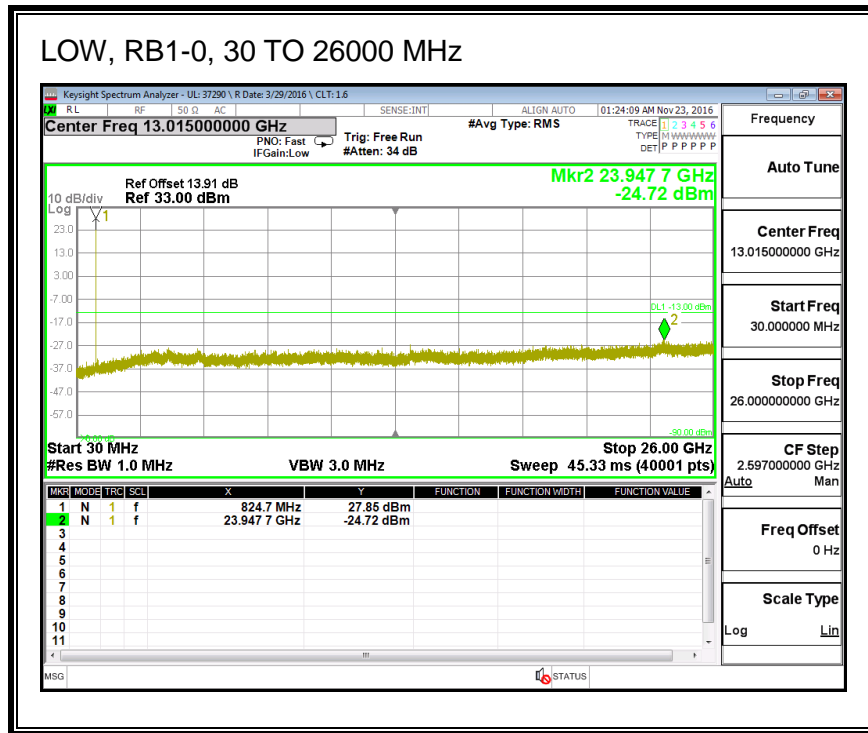
**16QAM, (1.4 MHz BAND WIDTH)**



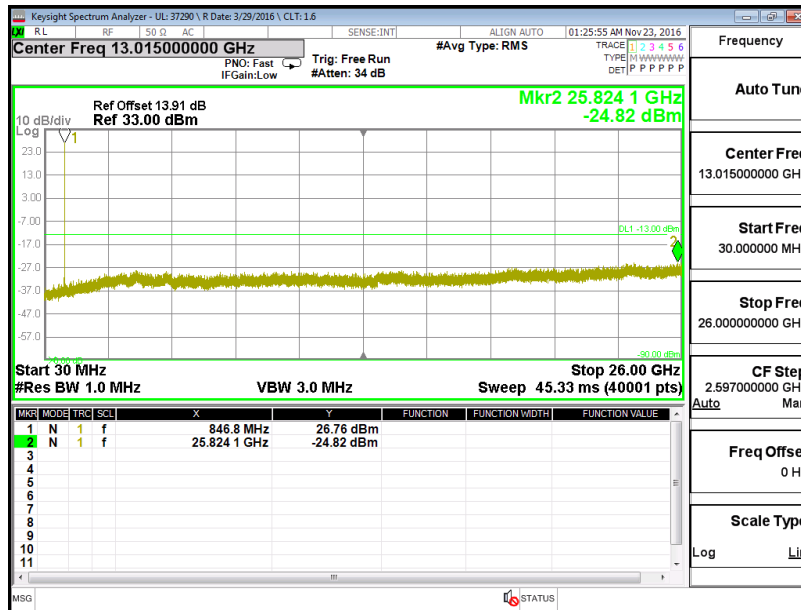




**QPSK, (3.0 MHz BAND WIDTH)**

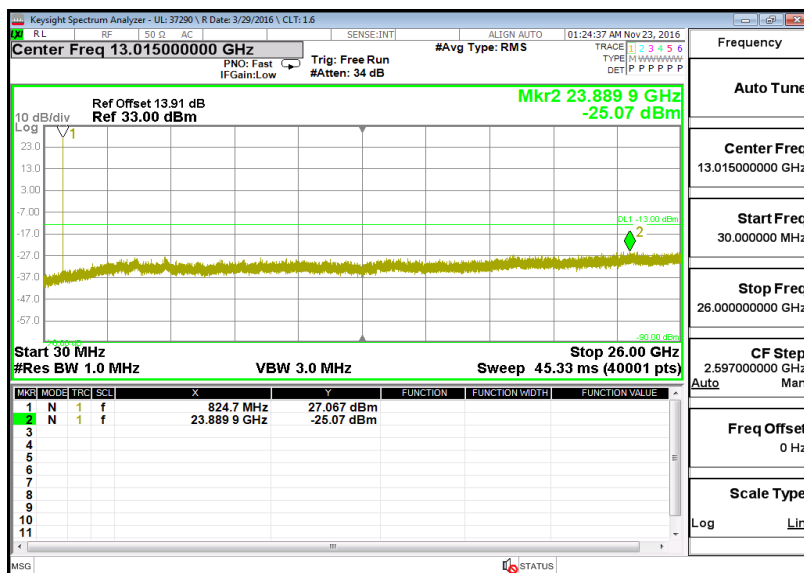


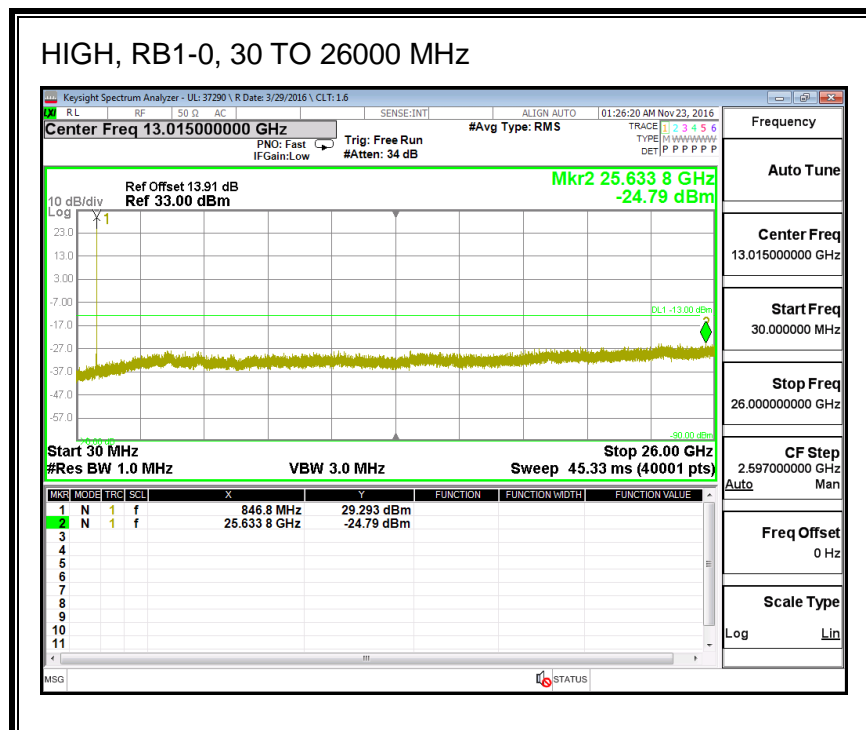
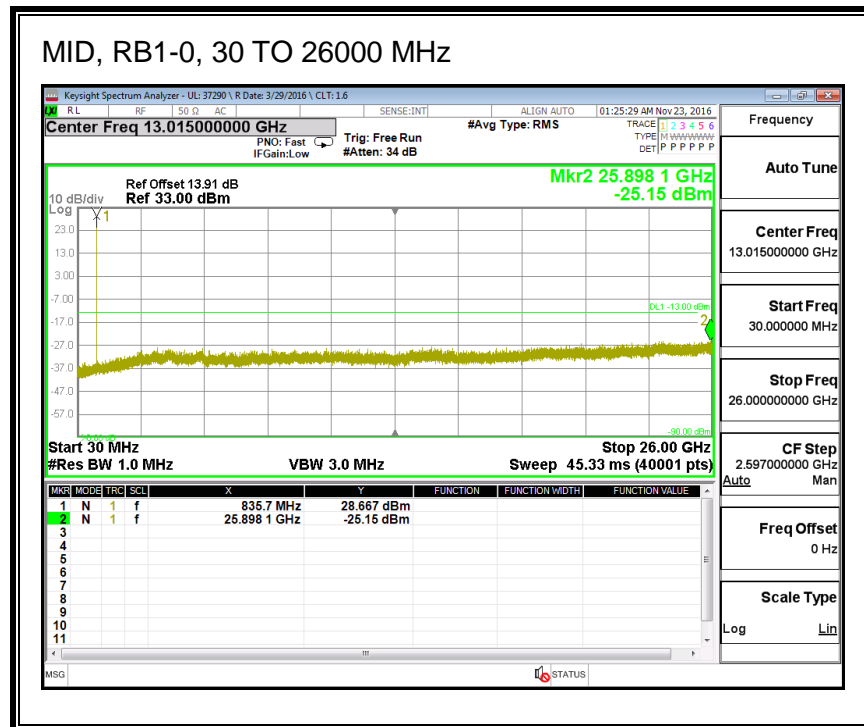
### HIGH, RB1-0, 30 TO 26000 MHz



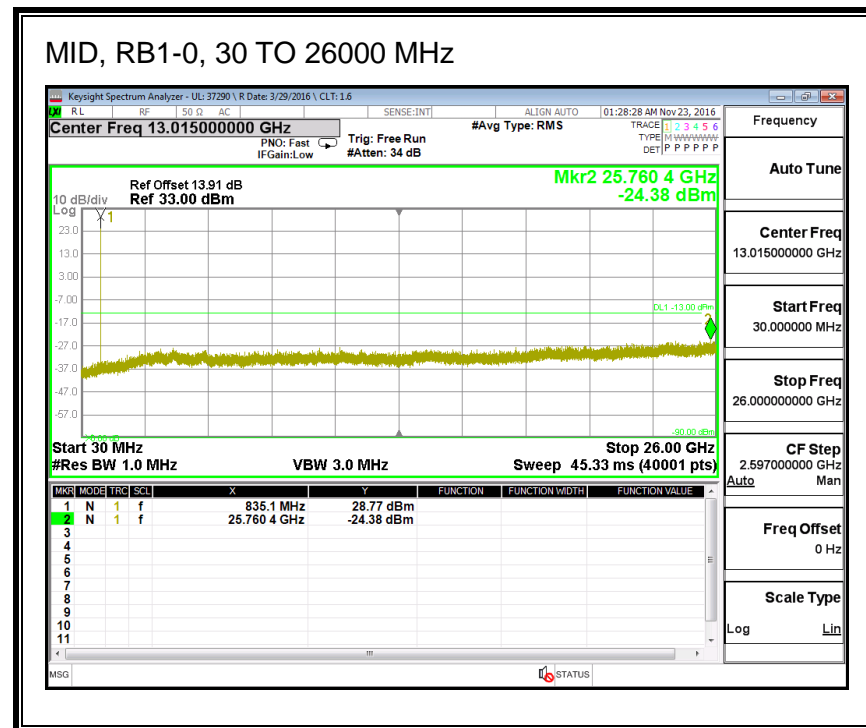
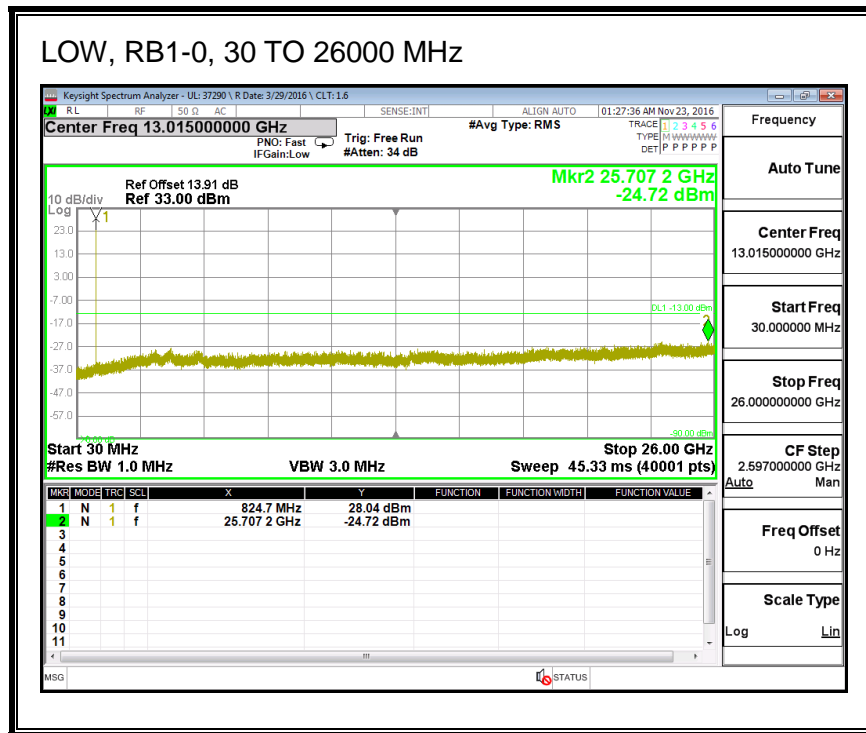
### 16QAM, (3.0 MHz BAND WIDTH)

### LOW, RB1-0, 30 TO 26000 MHz

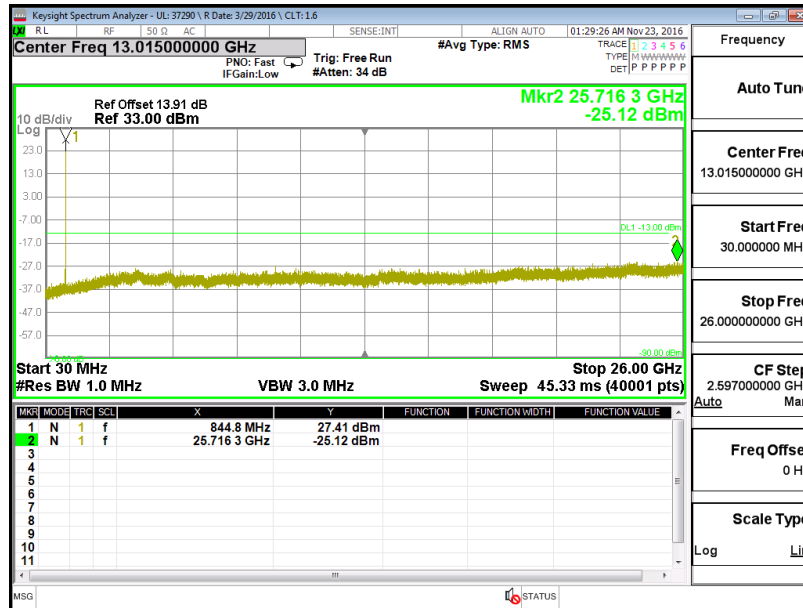




**QPSK, (5.0 MHz BAND WIDTH)**

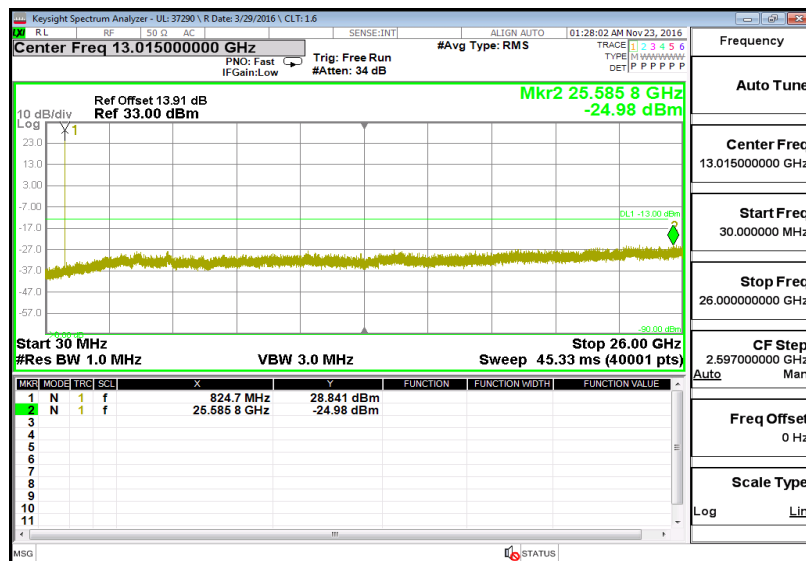


### HIGH, RB1-0, 30 TO 26000 MHz

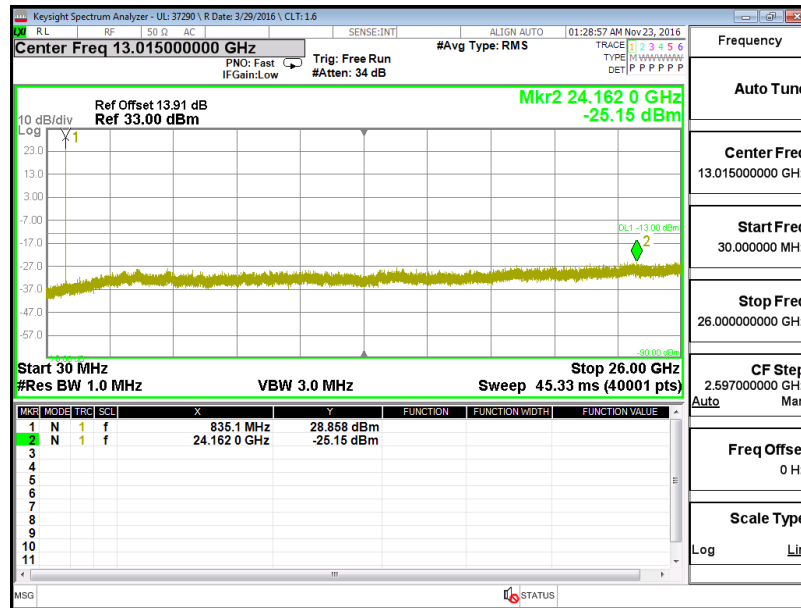


### 16QAM, (5.0 MHz BAND WIDTH)

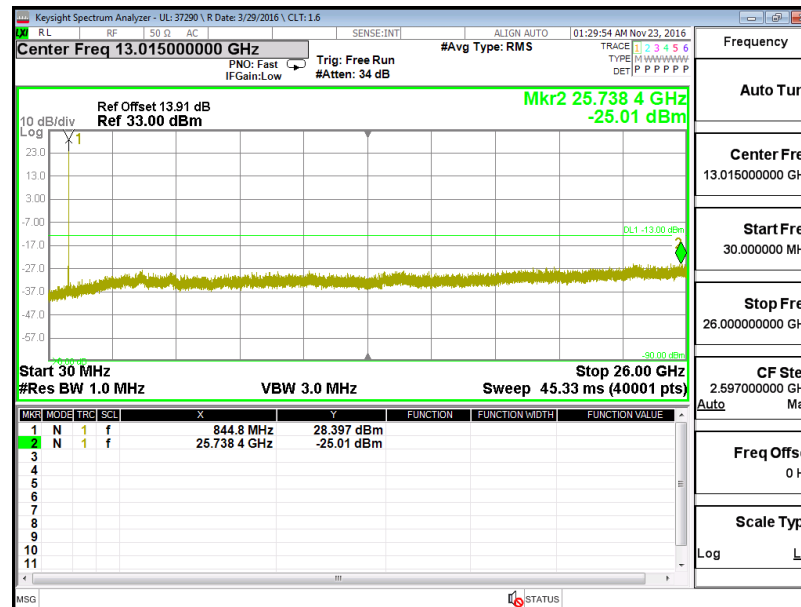
### LOW, RB1-0, 30 TO 26000 MHz



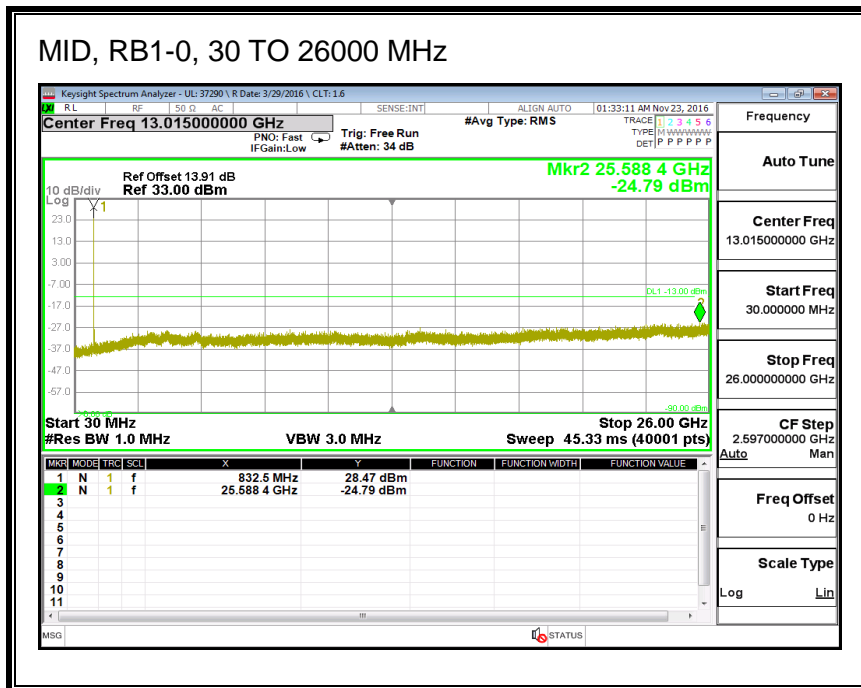
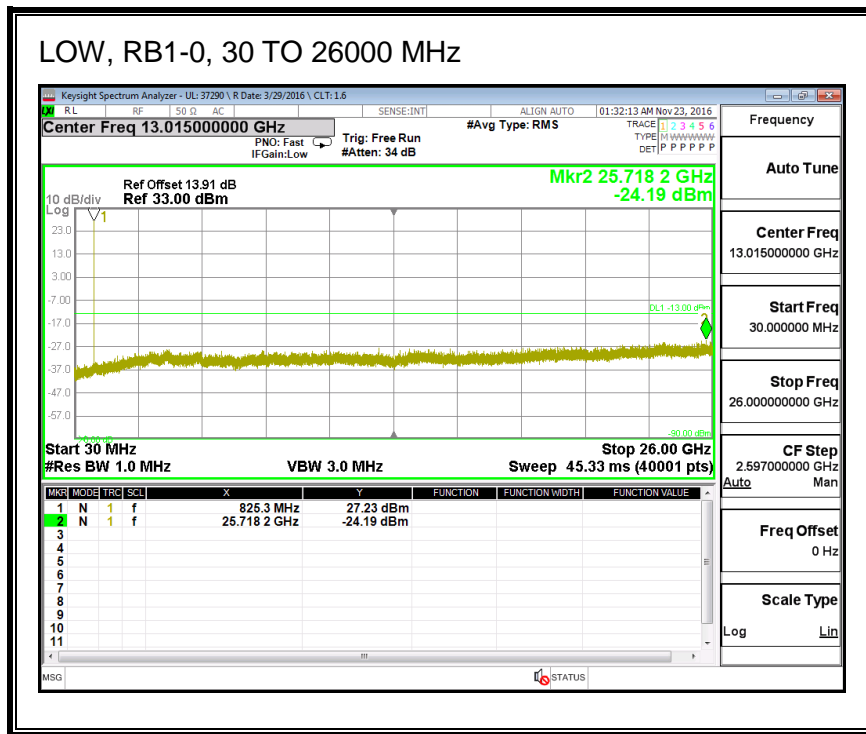
### MID, RB1-0, 30 TO 26000 MHz



### HIGH, RB1-0, 30 TO 26000 MHz

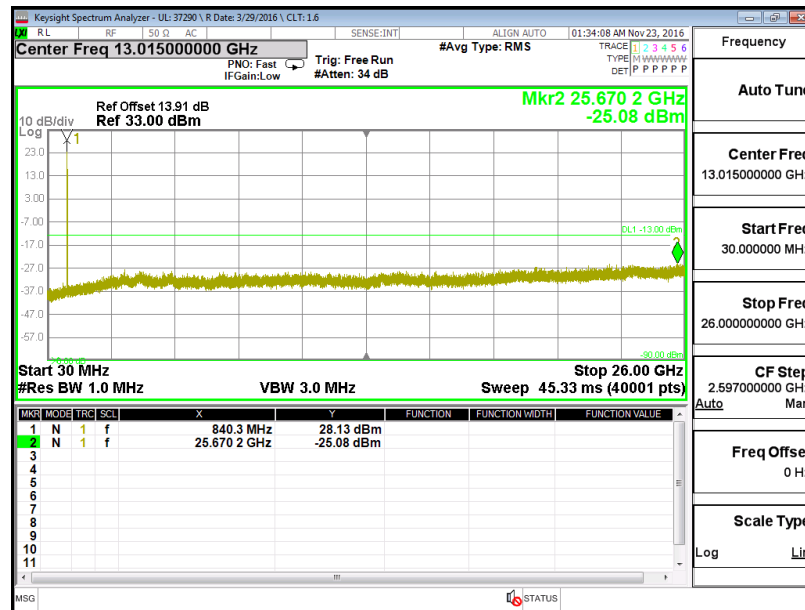


**QPSK, (10.0 MHz BAND WIDTH)**





### HIGH, RB1-0, 30 TO 26000 MHz



### 16QAM, (10.0 MHz BAND WIDTH)

### LOW, RB1-0, 30 TO 26000 MHz

