

8.2. BANEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.359, §22.917, §24.238, §27.53, §90.691

LIMITS

FCC: §22.359, §22.917, §24.238, §27.53

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.

FCC: §90.210, and §90.691 (LTE BAND 26)

(a)(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(a)(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

FCC: §27.53

(c) For operations in the 776-788 MHz band, the power of any emission outside the 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, in accordance with the following:

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

FCC: §27.53 (LTE BAND 41)

(m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

(m)(4) 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. Show citation box.

TEST PROCEDURE

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

1. Set the spectrum analyzer span to include the block edge frequency.
2. Set a marker to point the corresponding band edge frequency in each test case.
3. Set display line at -13 dBm
4. Set resolution bandwidth to at least 1% of emission bandwidth.

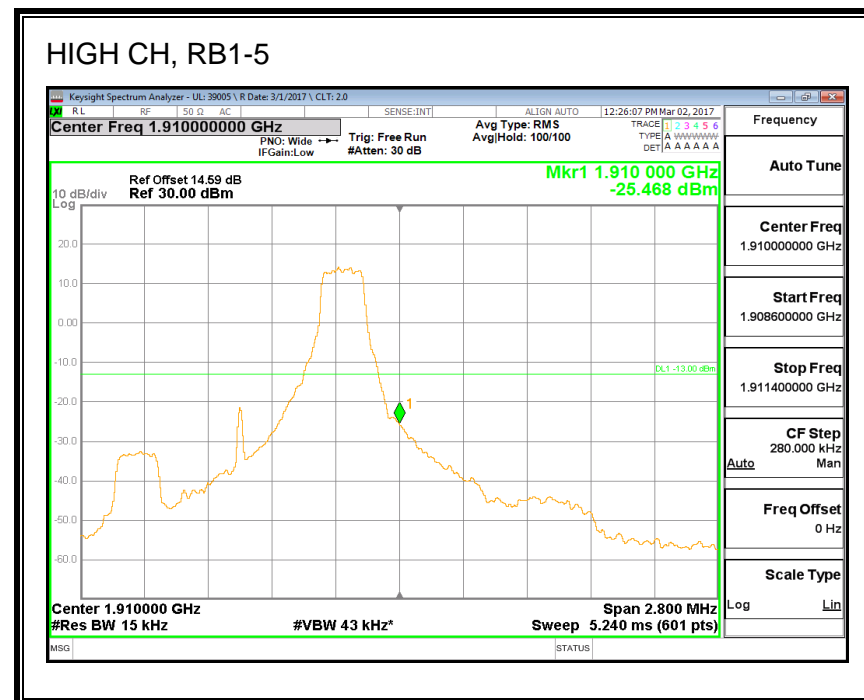
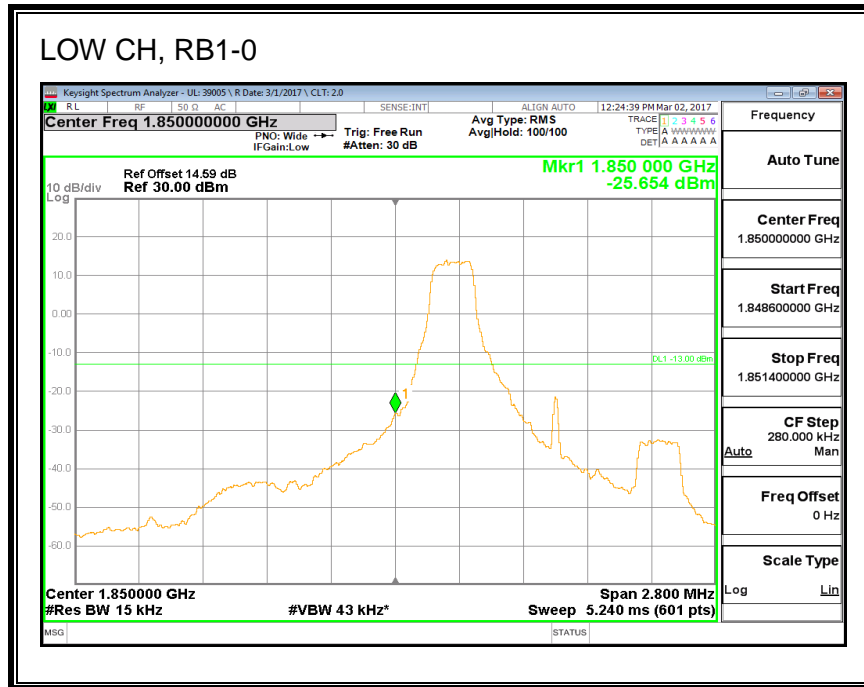
MODES TESTED

- 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 30
- LTE Band 41
- LTE Band 66

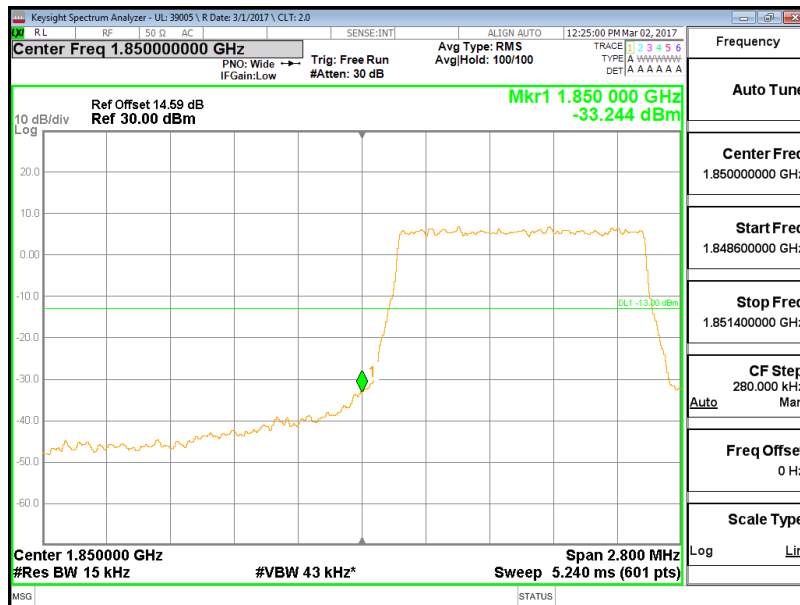
RESULTS

8.2.1. LTE BAND 2 BANDEDGE

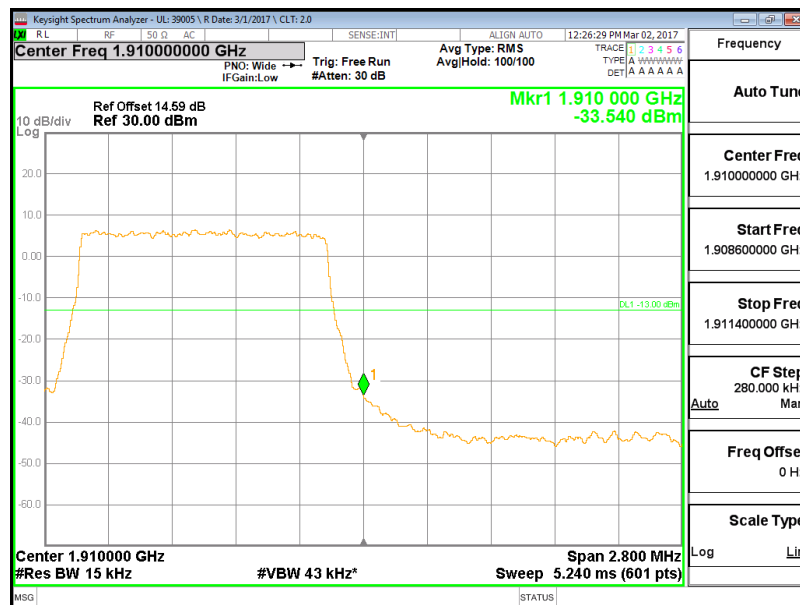
QPSK, (1.4 MHz BAND WIDTH)



LOW CH, RB6-0

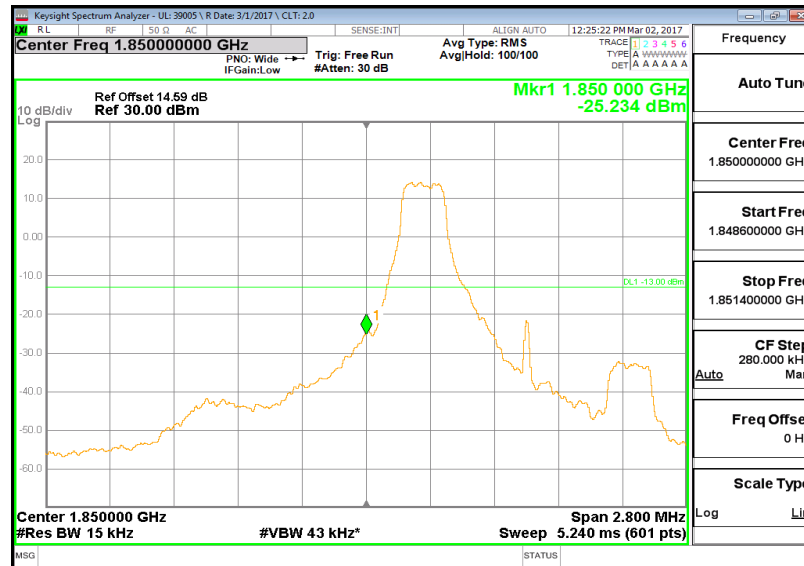


HIGH CH, RB6-0

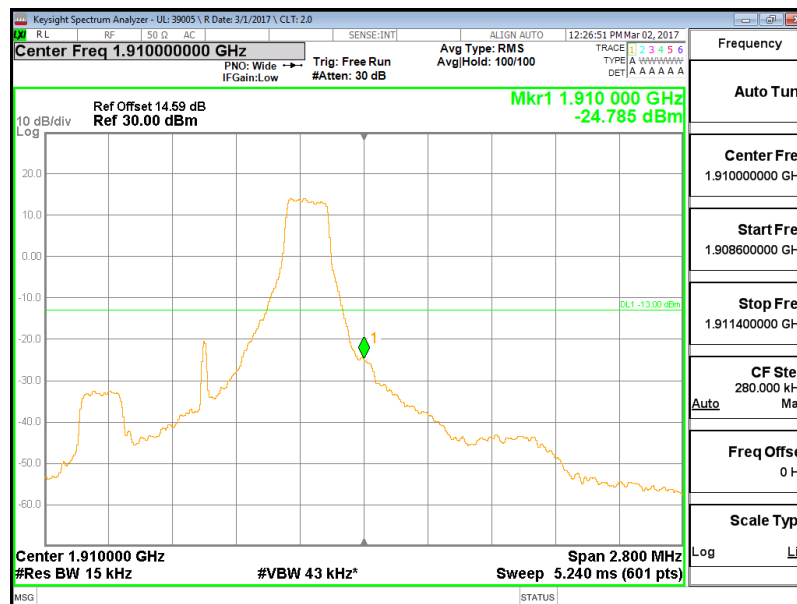


16QAM, (1.4 MHz BAND WIDTH)

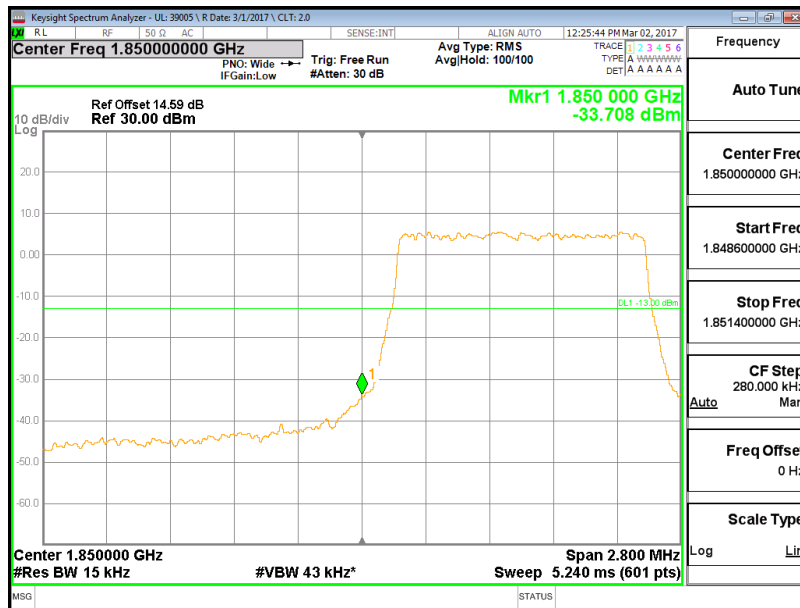
LOW CH, RB1-0



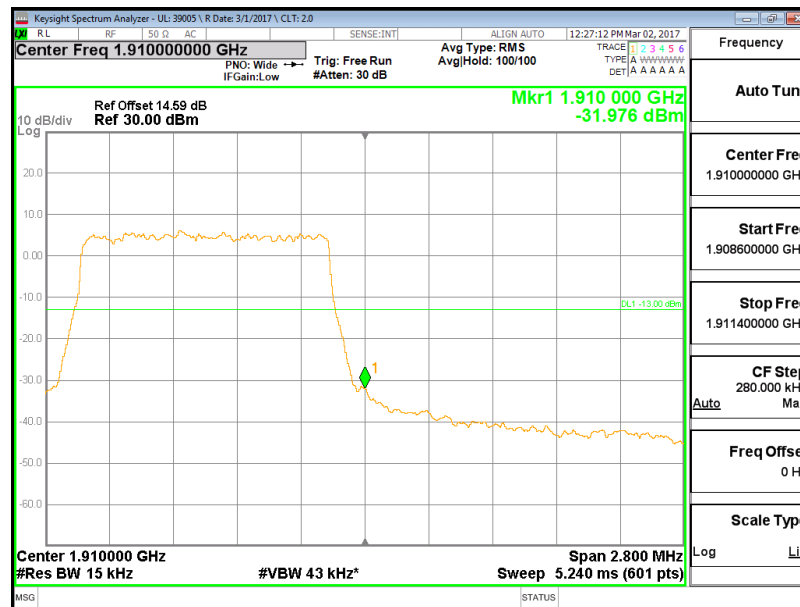
HIGH CH, RB1-5



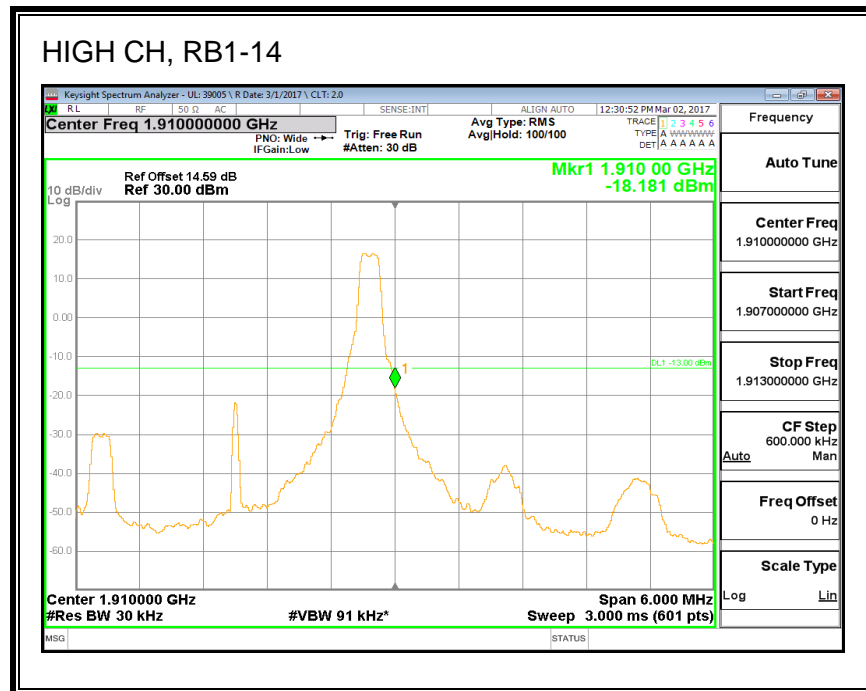
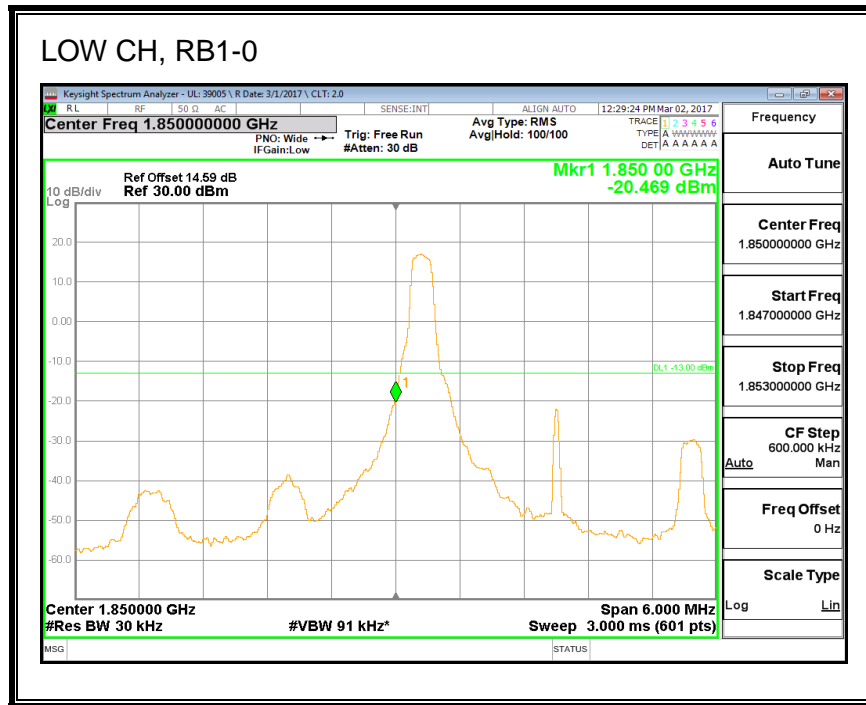
LOW CH, RB6-0



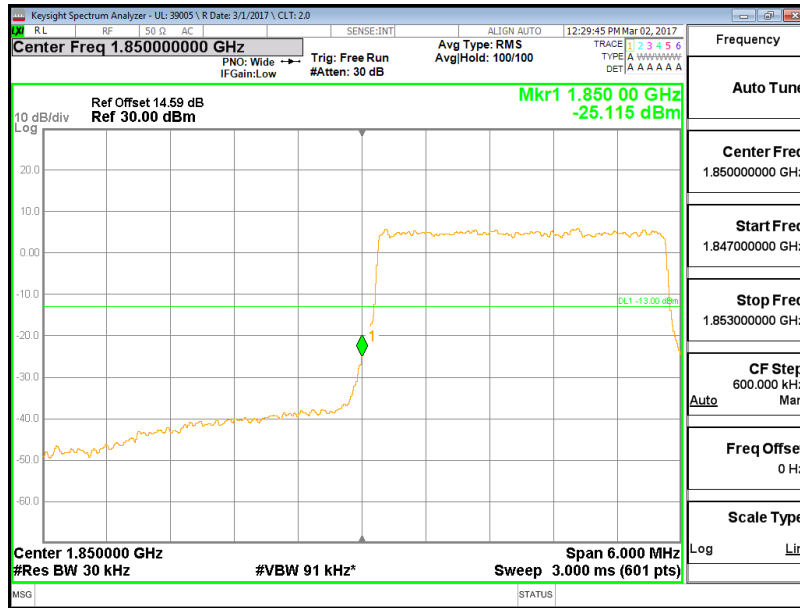
HIGH CH, RB6-0



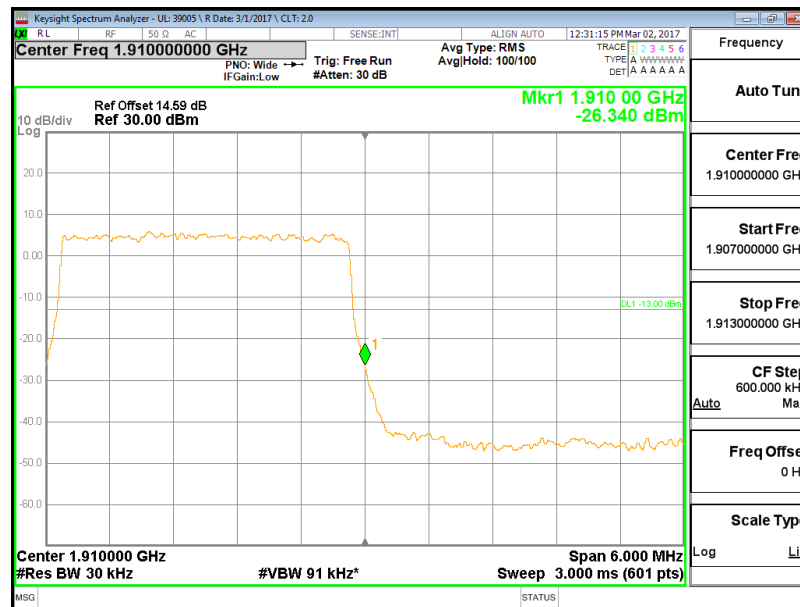
QPSK, (3.0 MHz BAND WIDTH)



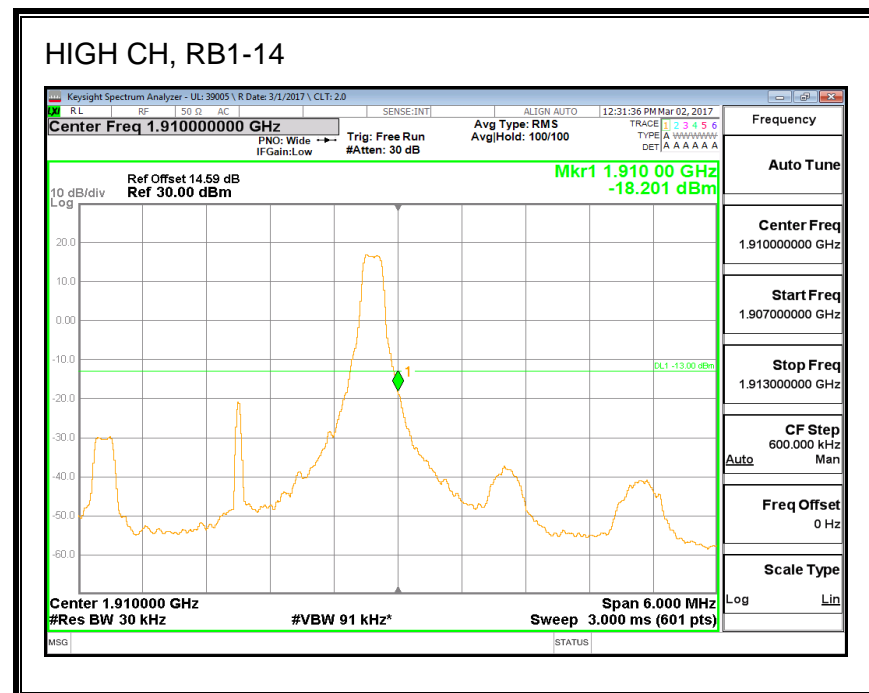
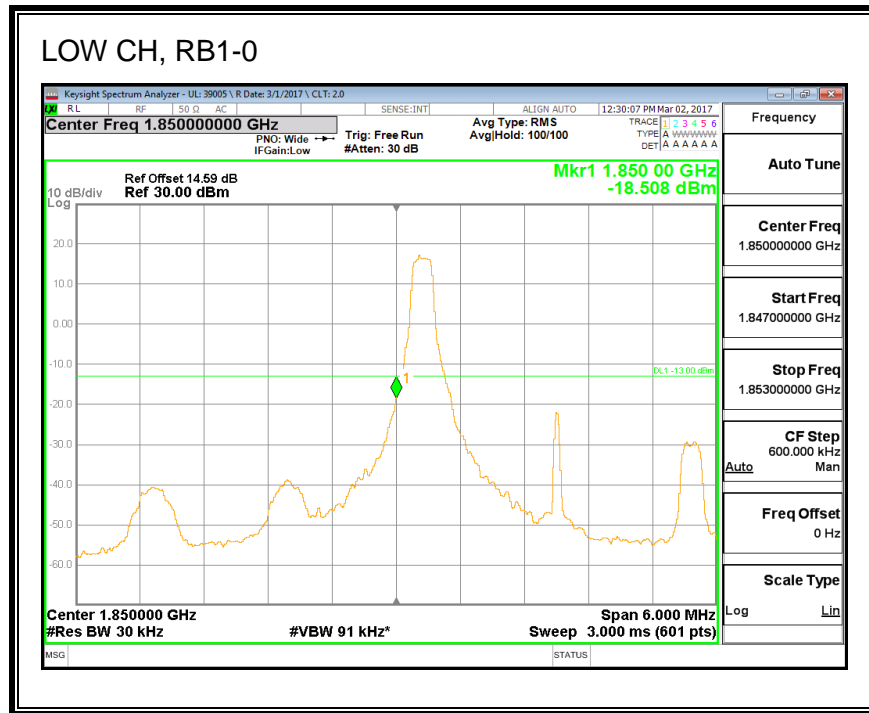
LOW CH, RB15-0



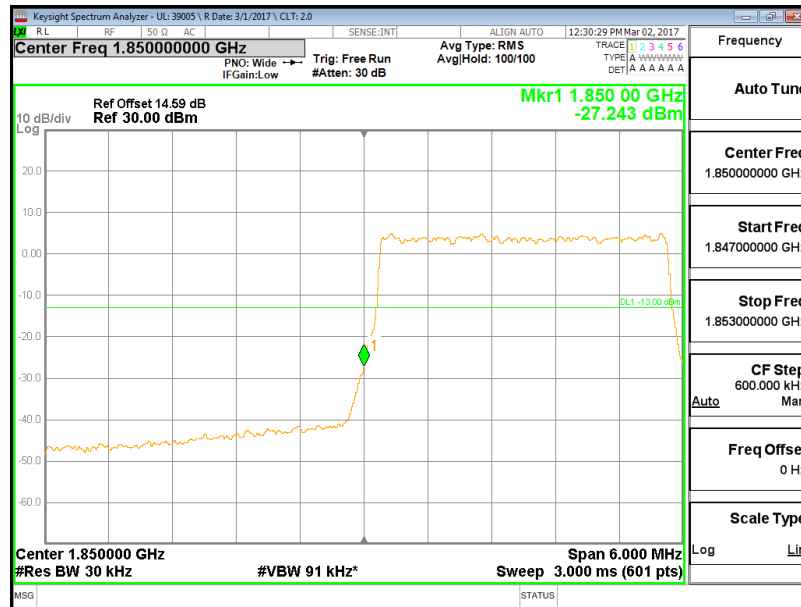
HIGH CH, RB15-0



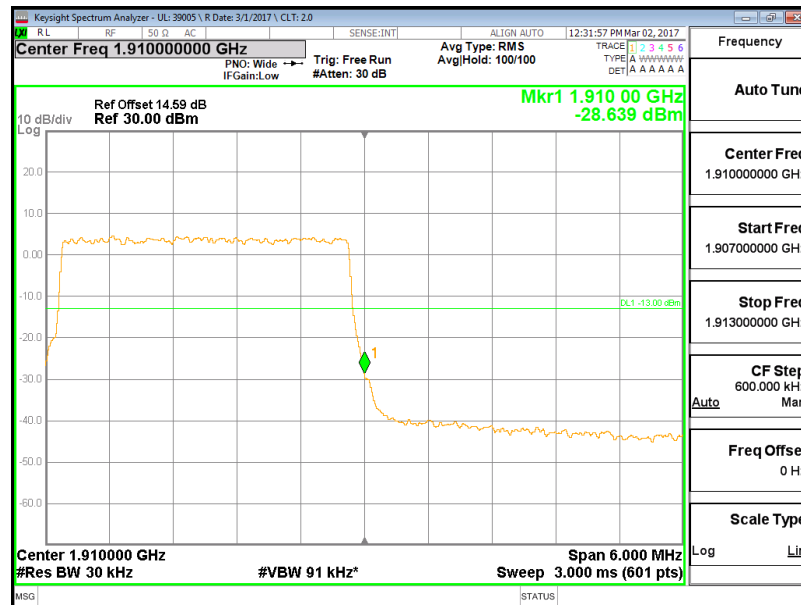
16QAM, (3.0 MHz BAND WIDTH)



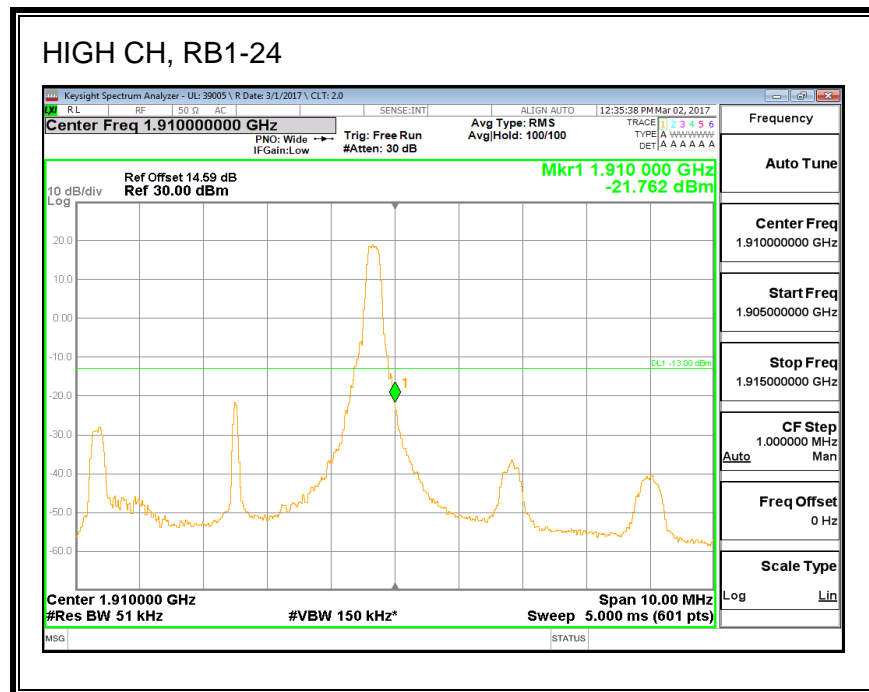
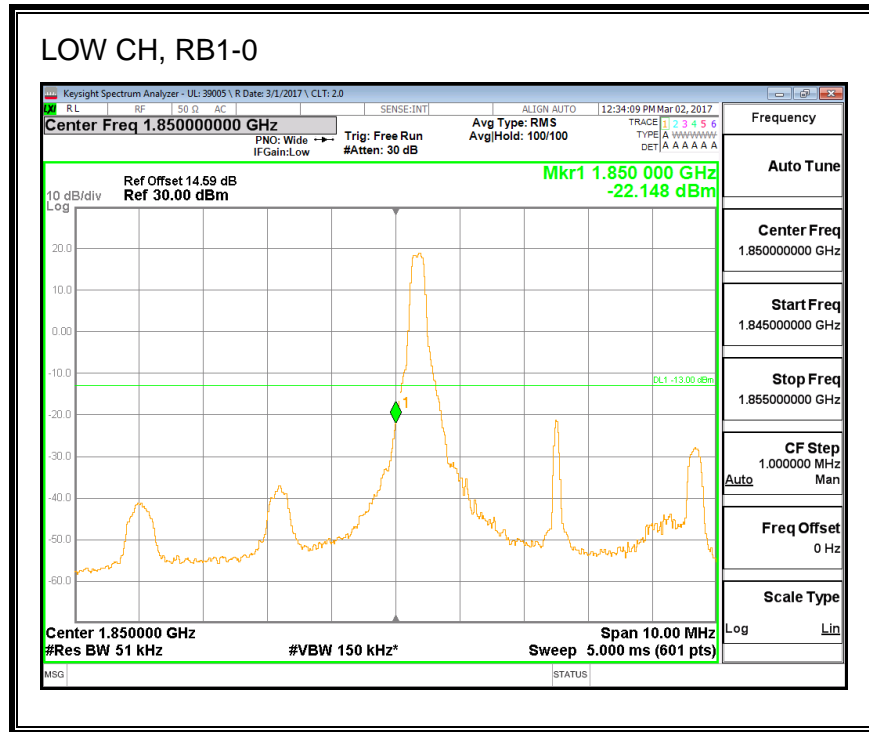
LOW CH, RB15-0



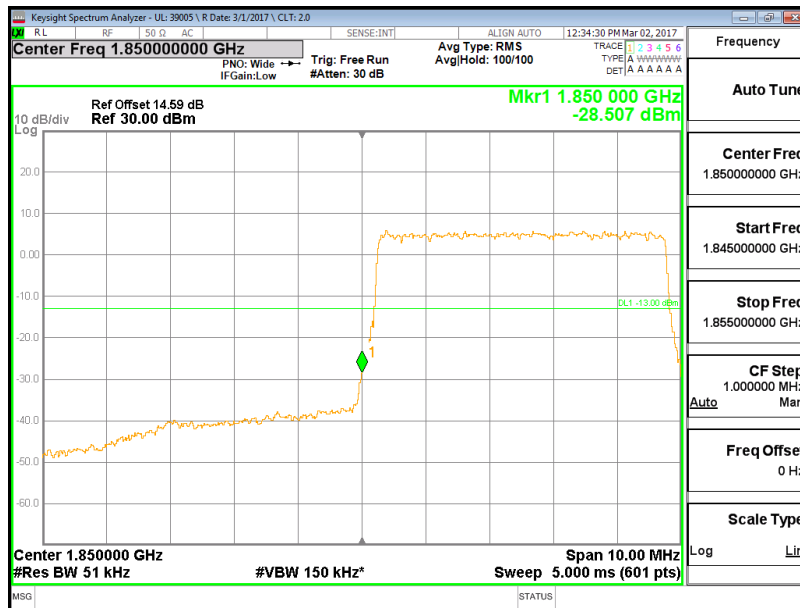
HIGH CH, RB15-0



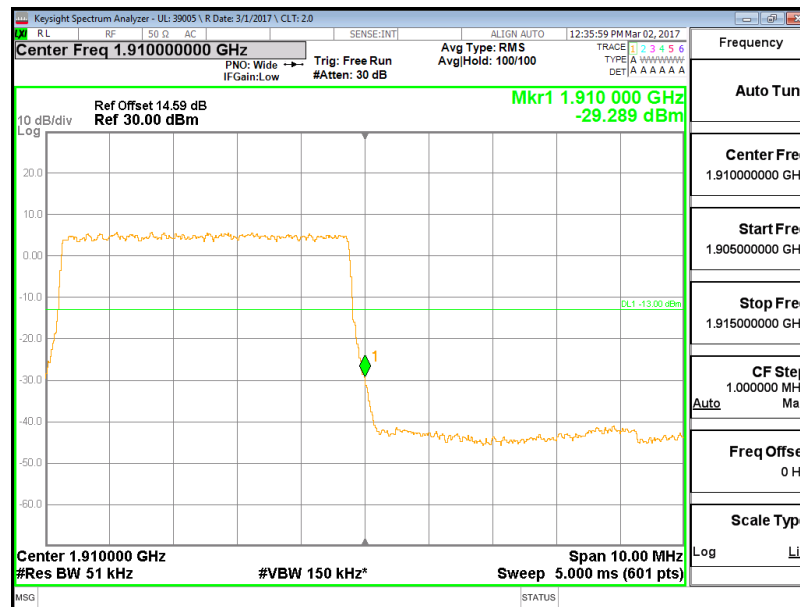
QPSK, (5.0 MHz BAND WIDTH)



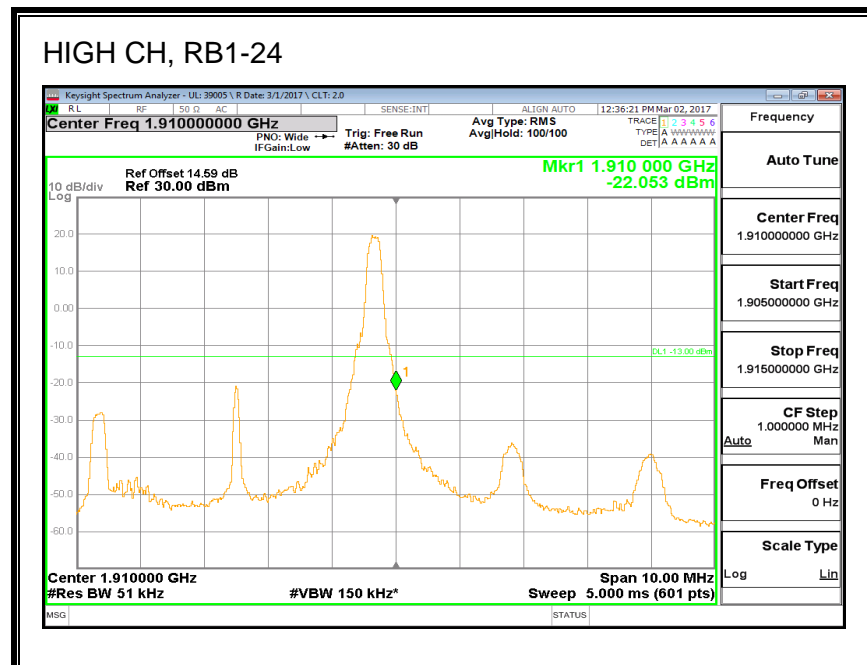
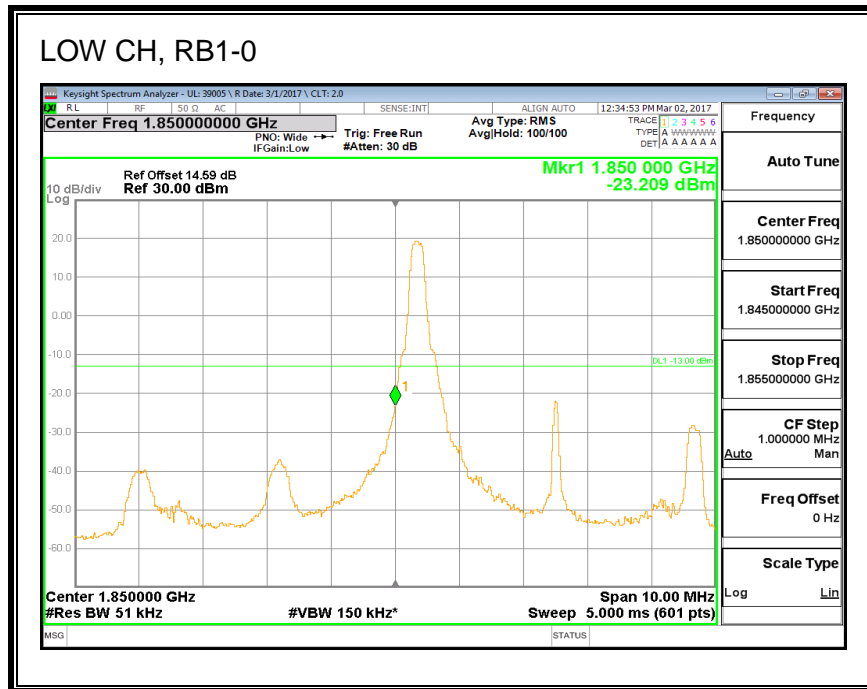
LOW CH, RB25-0



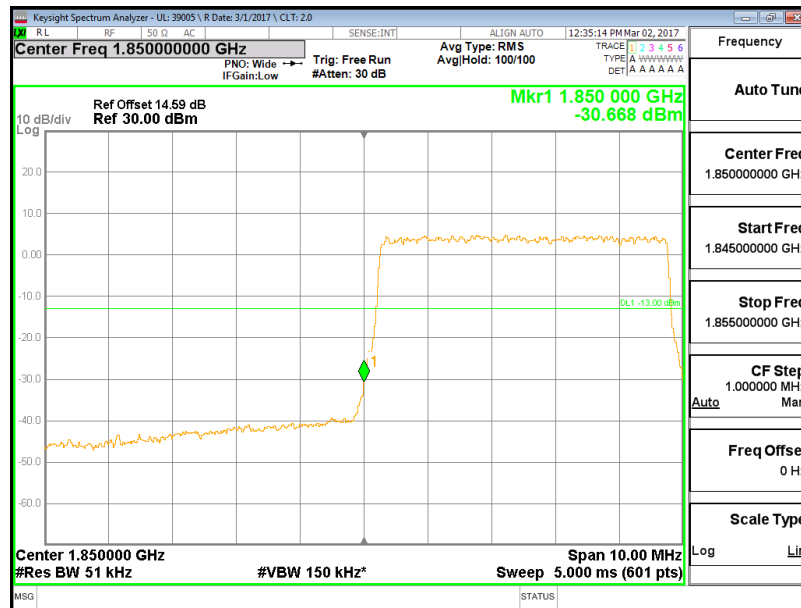
HIGH CH, RB25-0



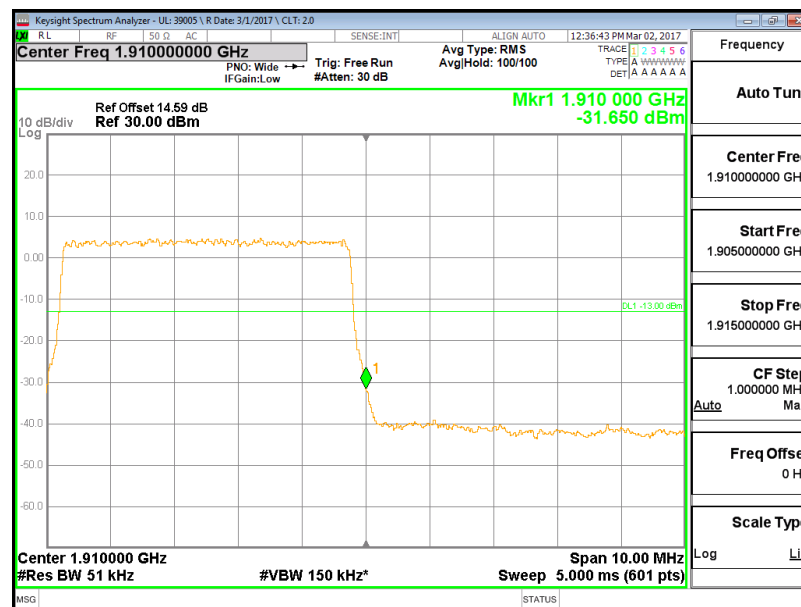
16QAM, (5.0 MHz BAND WIDTH)



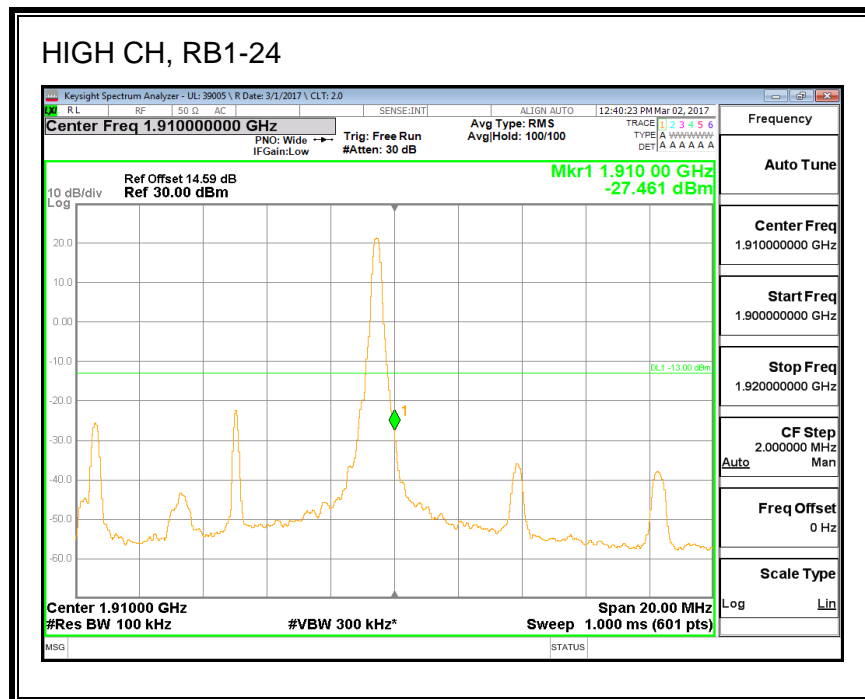
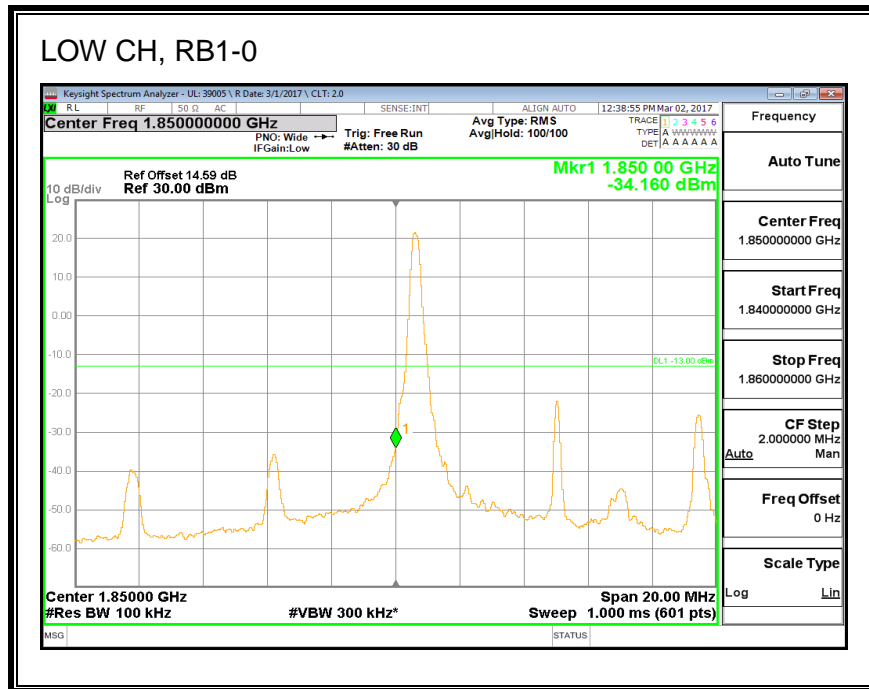
LOW CH, RB25-0

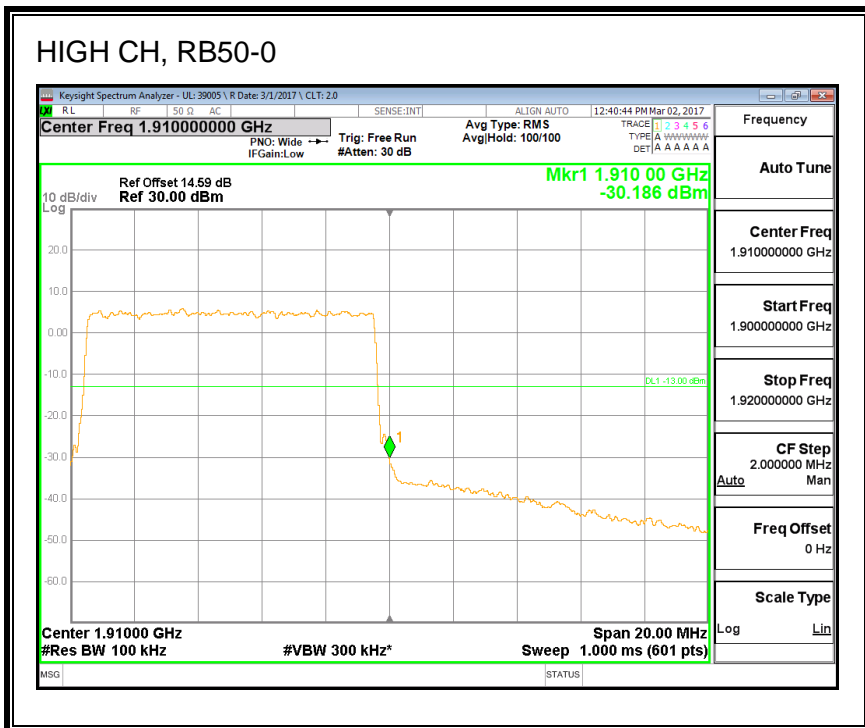
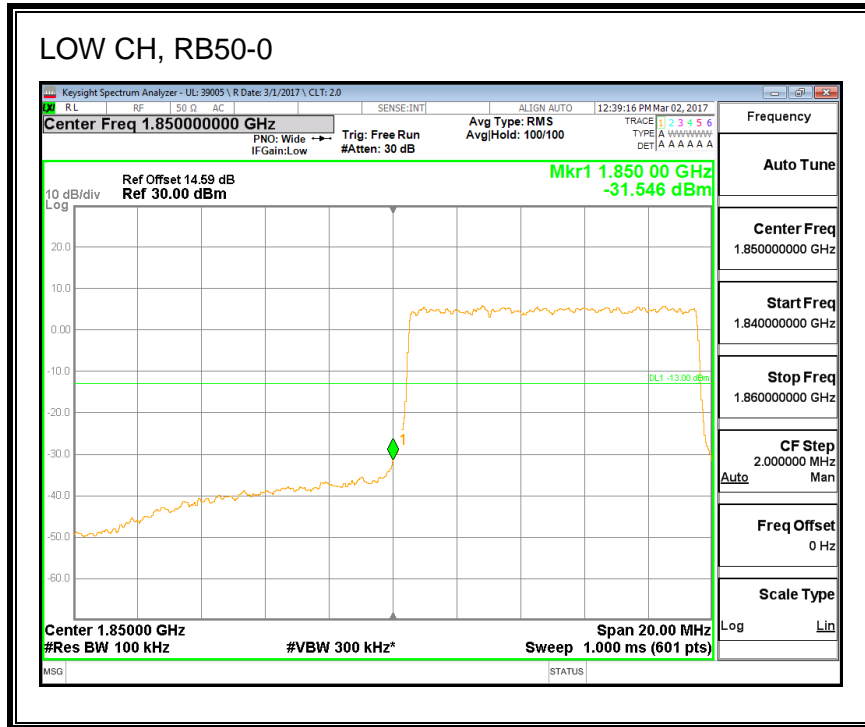


HIGH CH, RB25-0

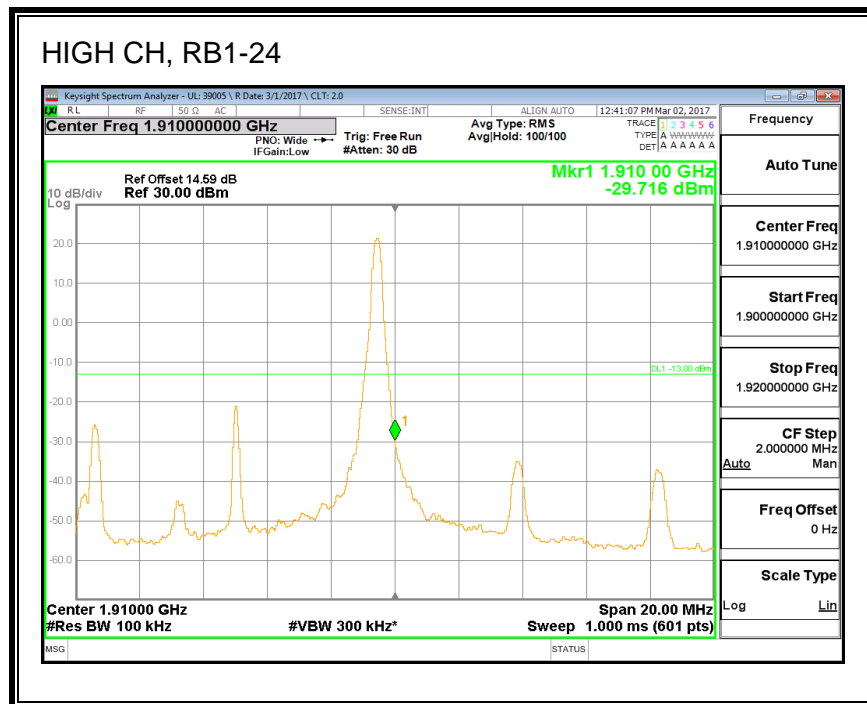
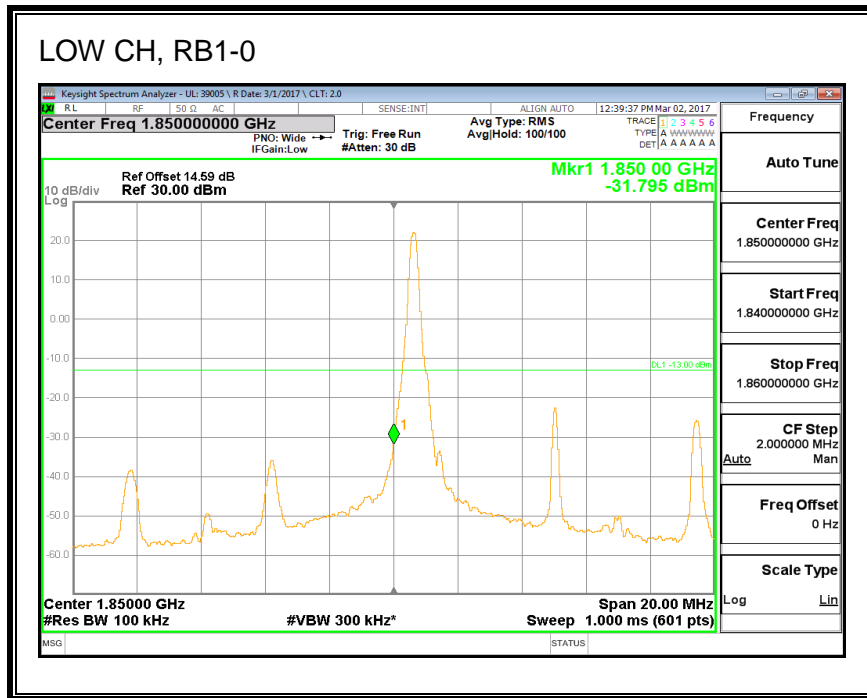


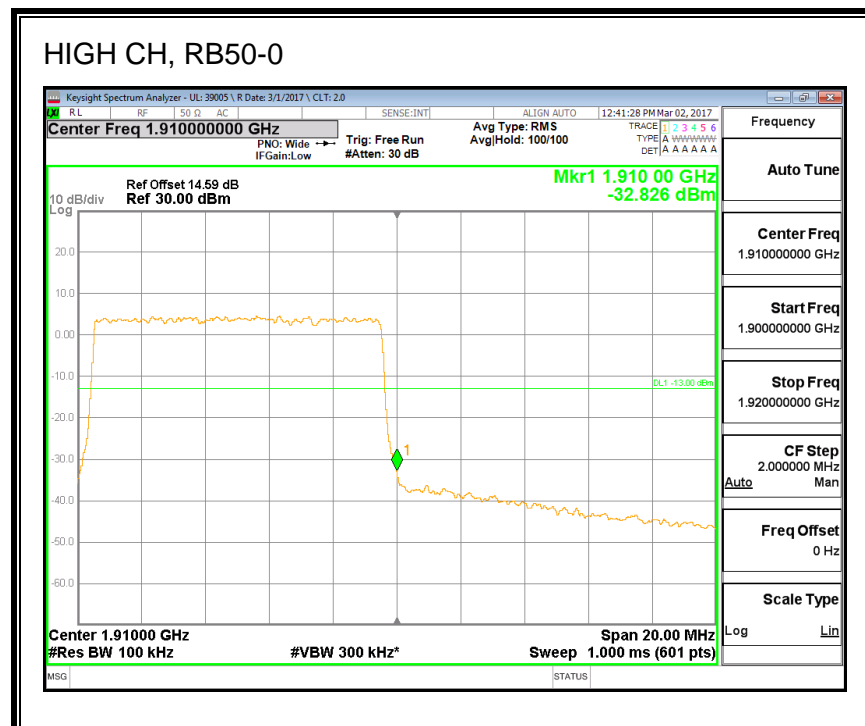
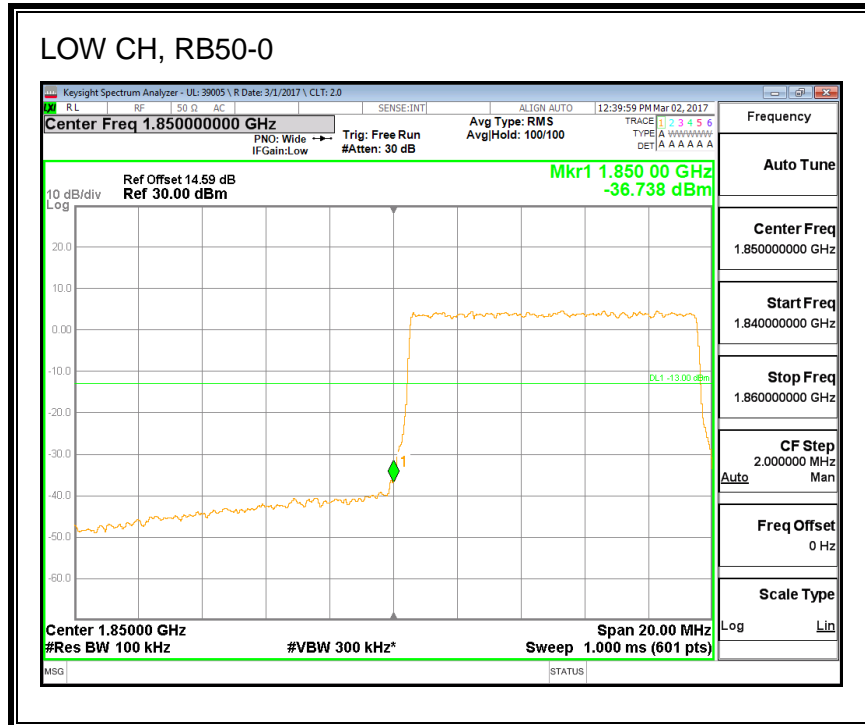
QPSK, (10.0 MHz BAND WIDTH)



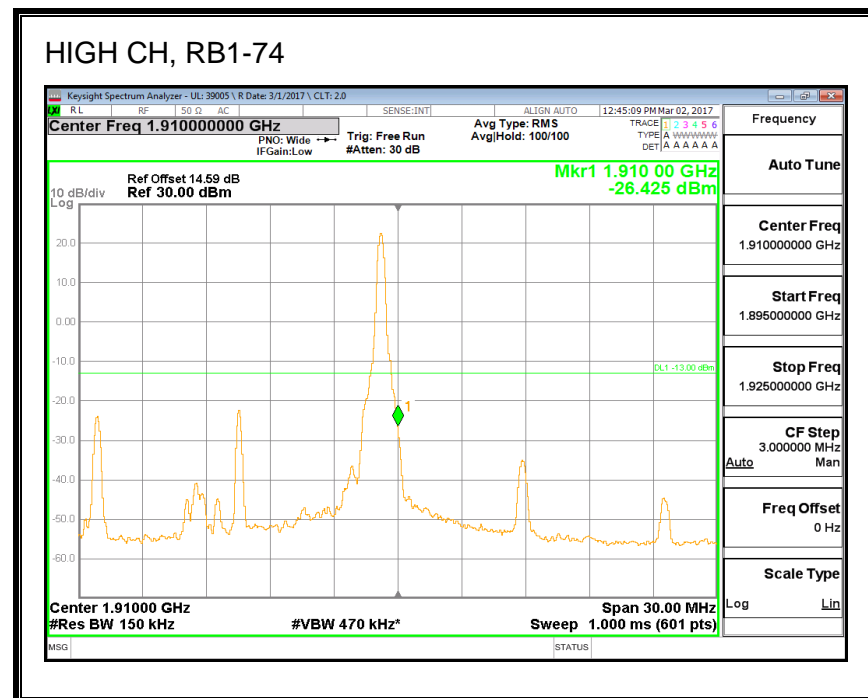
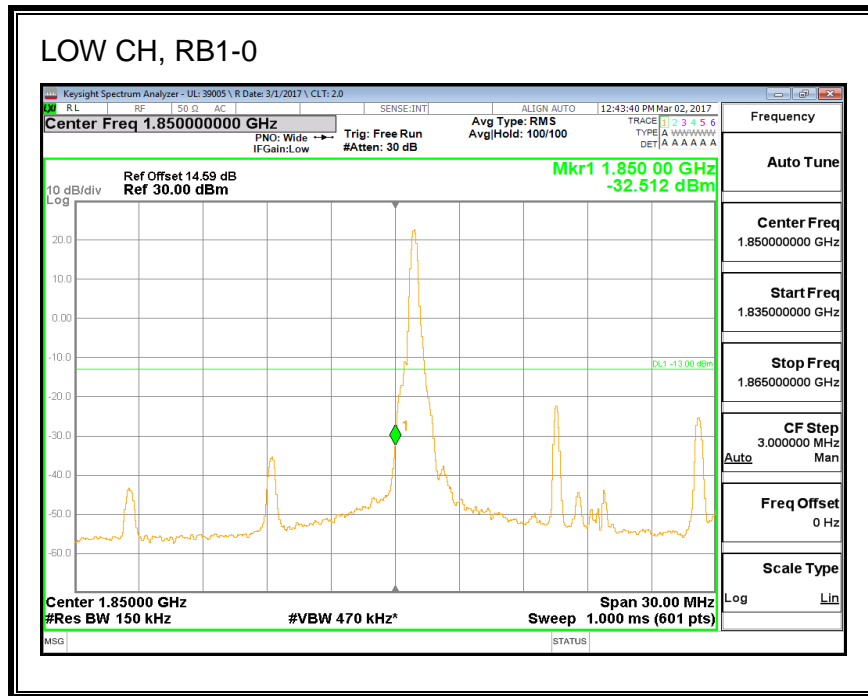


16QAM, (10.0 MHz BAND WIDTH)

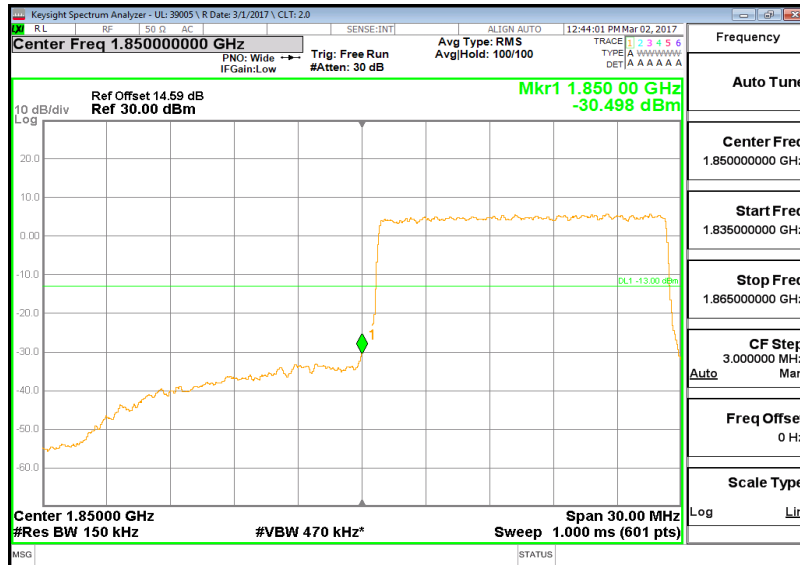




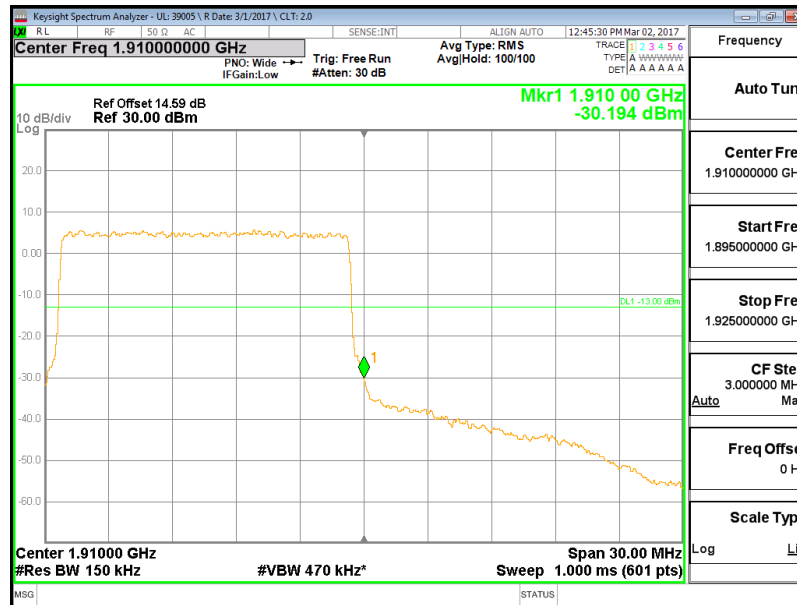
QPSK, (15.0 MHz BAND WIDTH)



LOW CH, RB75-0

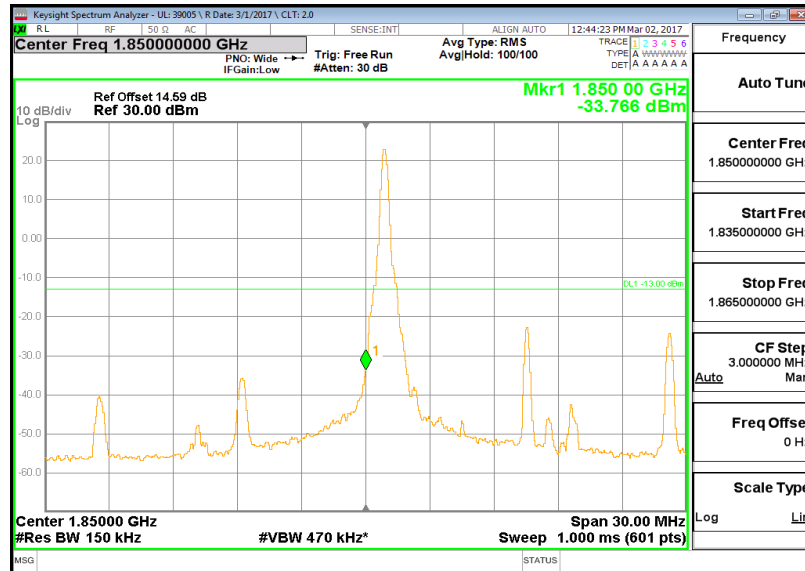


HIGH CH, RB75-0

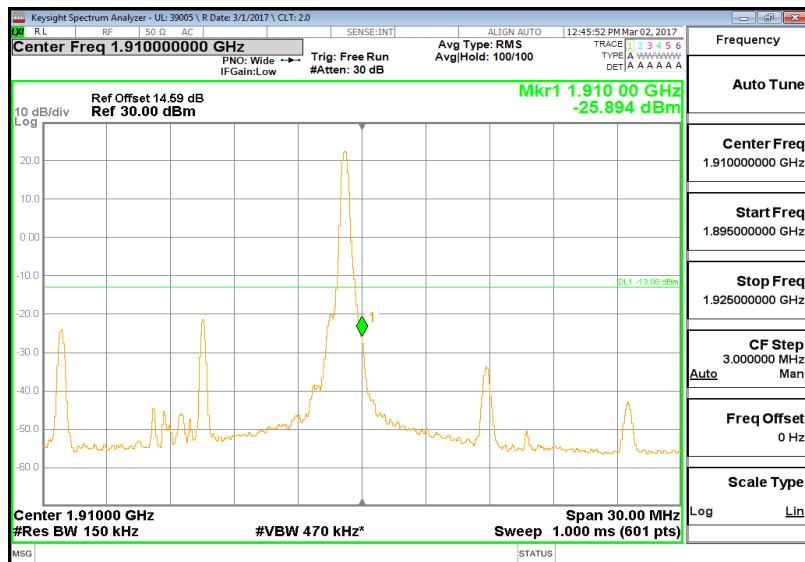


16QAM, (15.0 MHz BAND WIDTH)

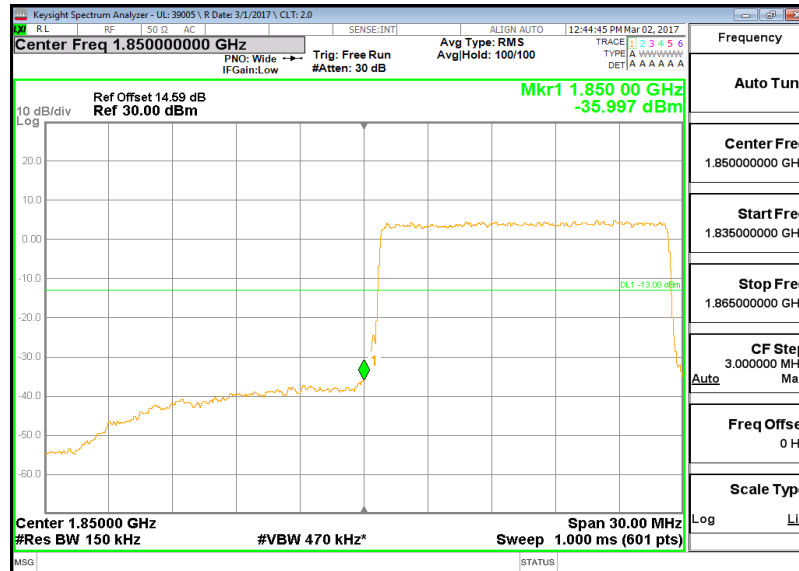
LOW CH, RB1-0



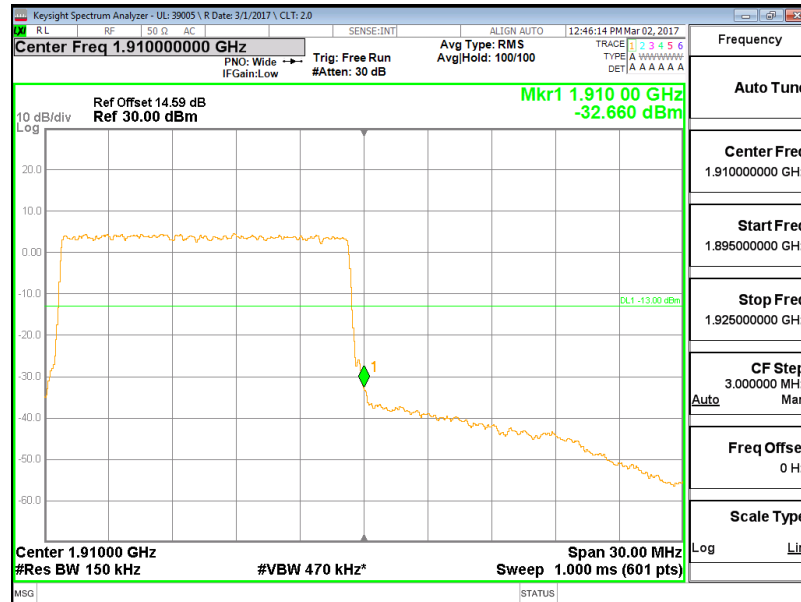
HIGH CH, RB1-74



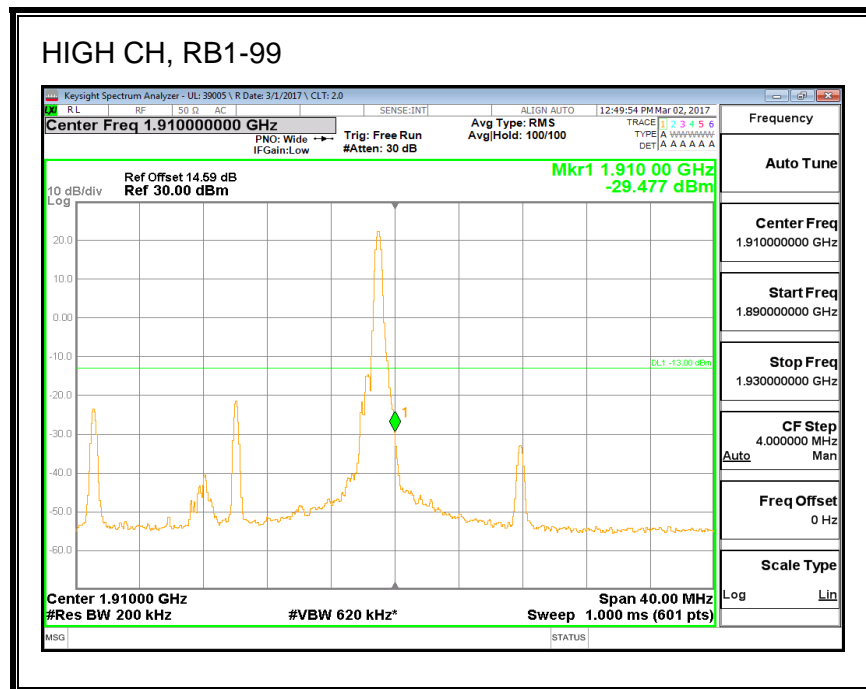
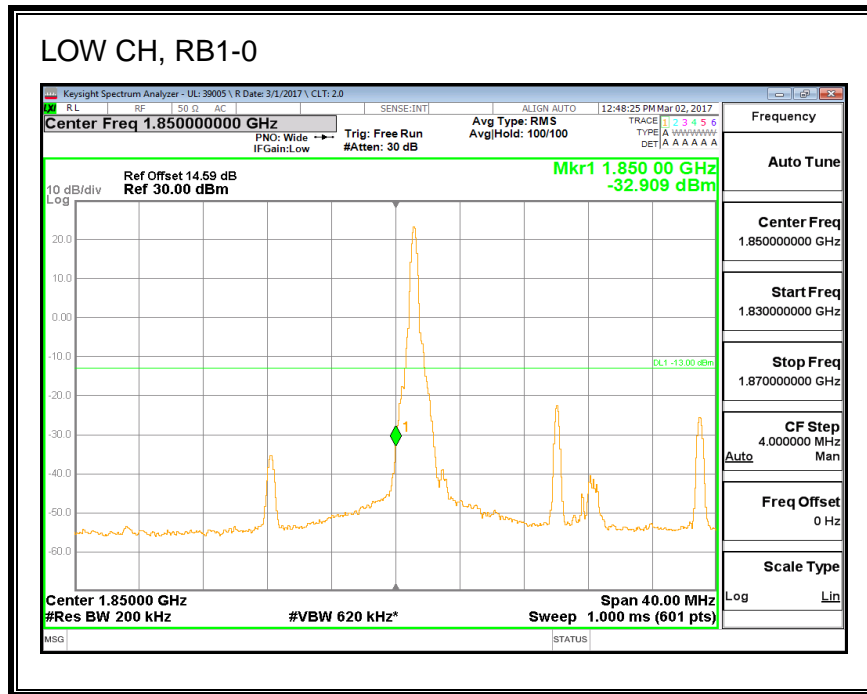
LOW CH, RB75-0



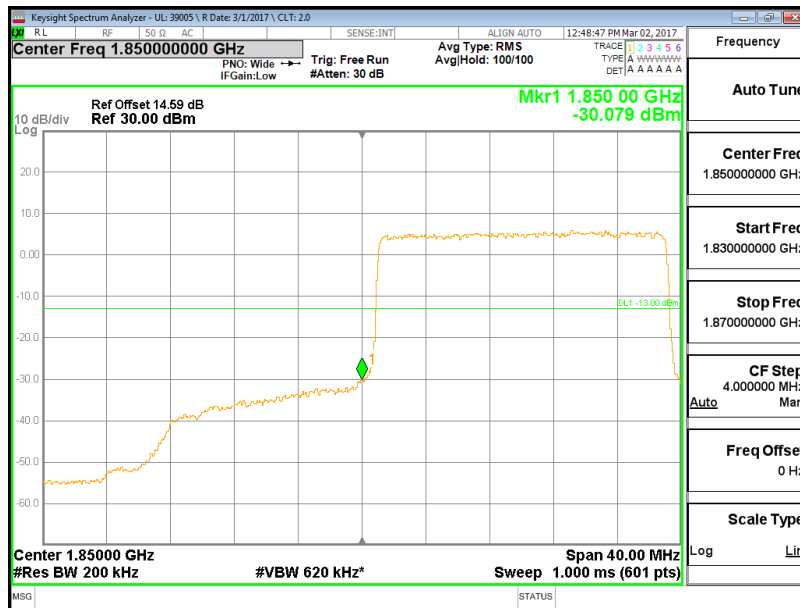
HIGH CH, RB75-0



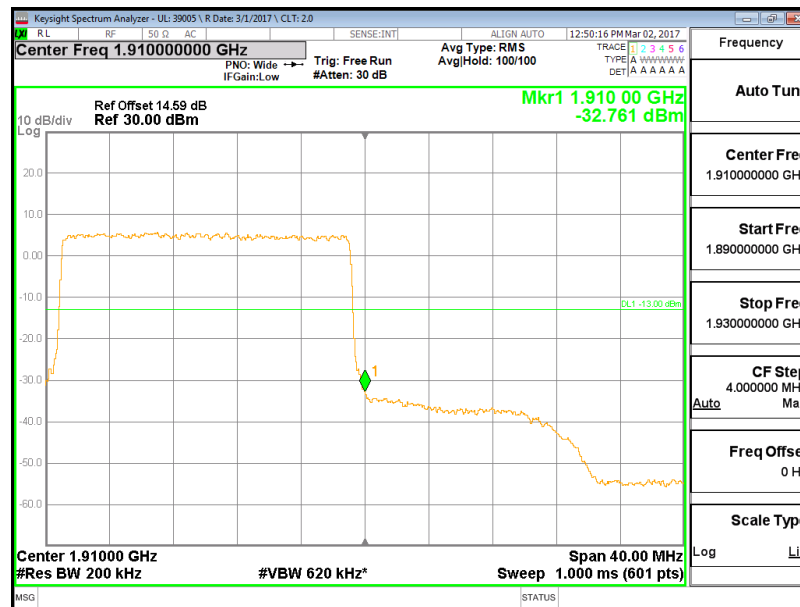
QPSK, (20.0 MHz BAND WIDTH)



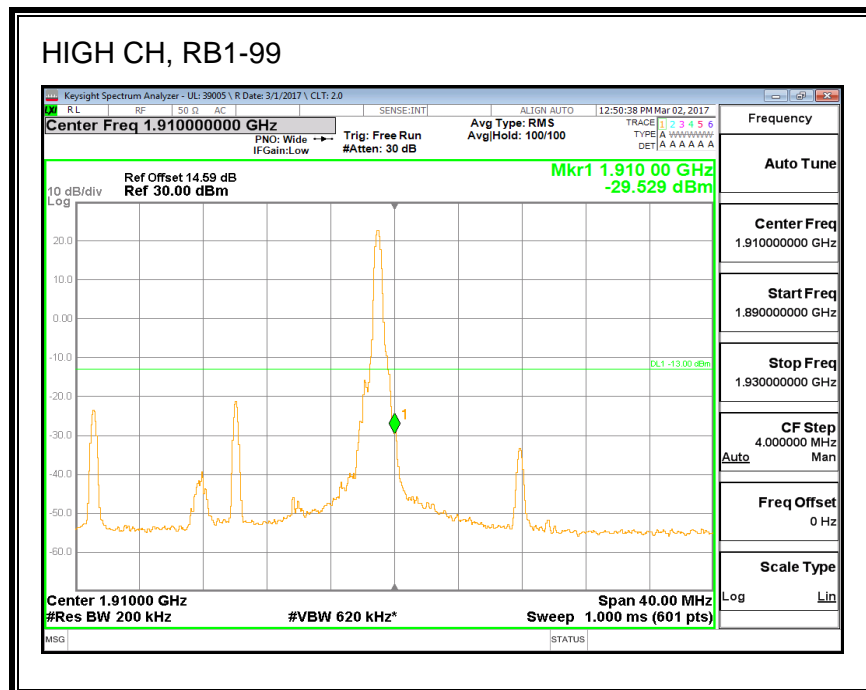
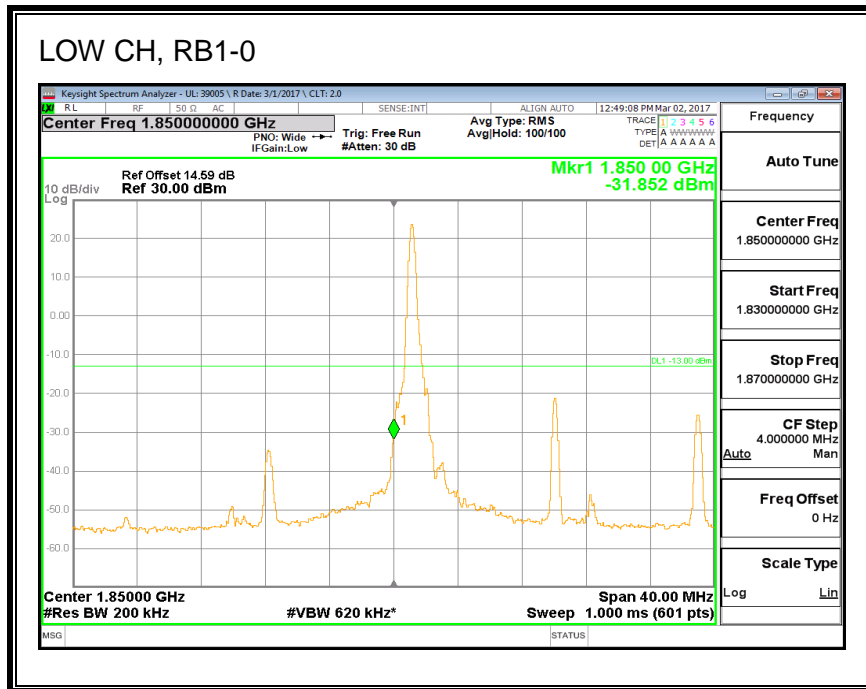
LOW CH, RB100-0

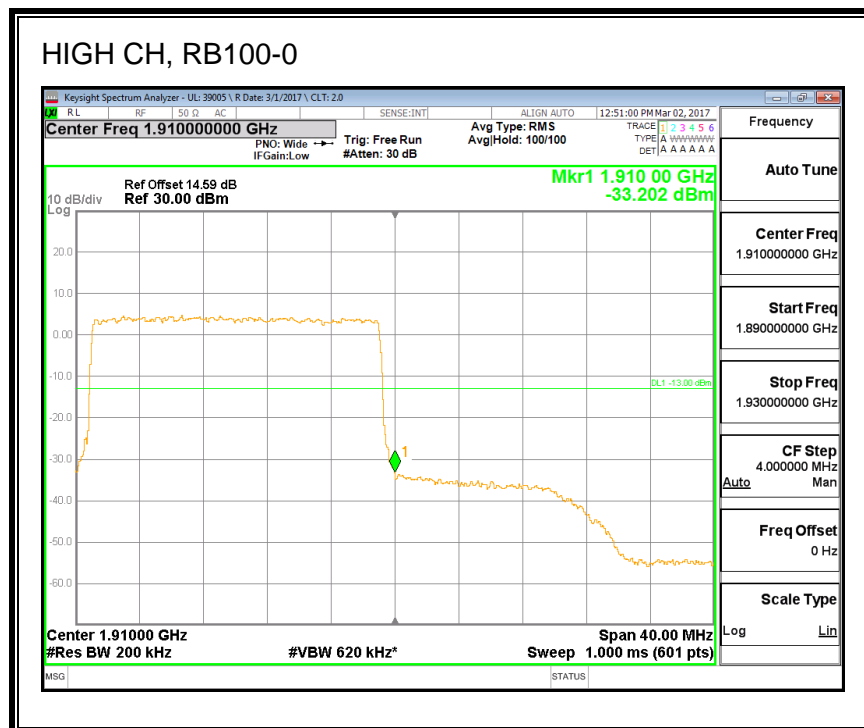
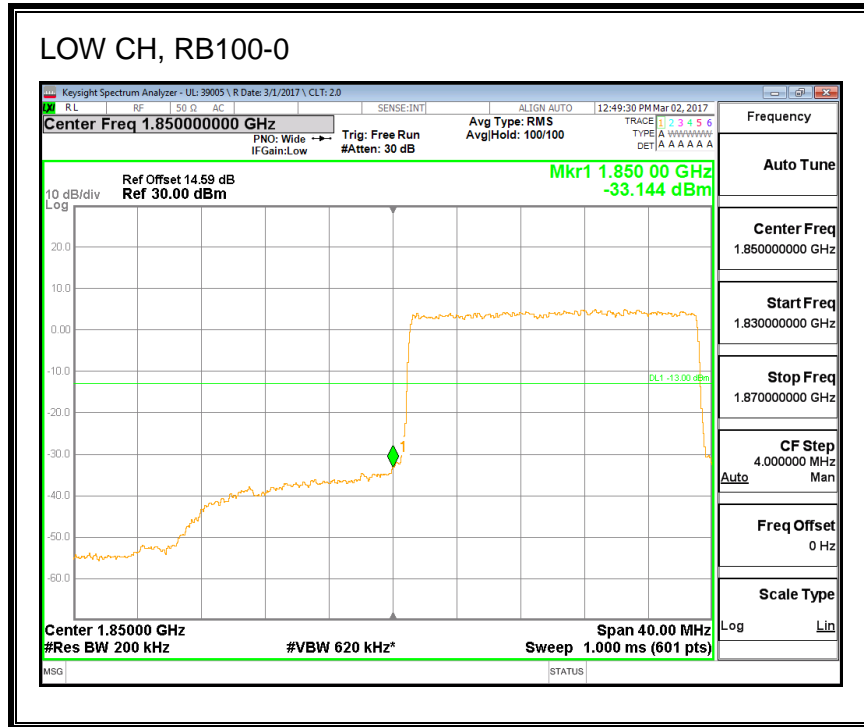


HIGH CH, RB100-0



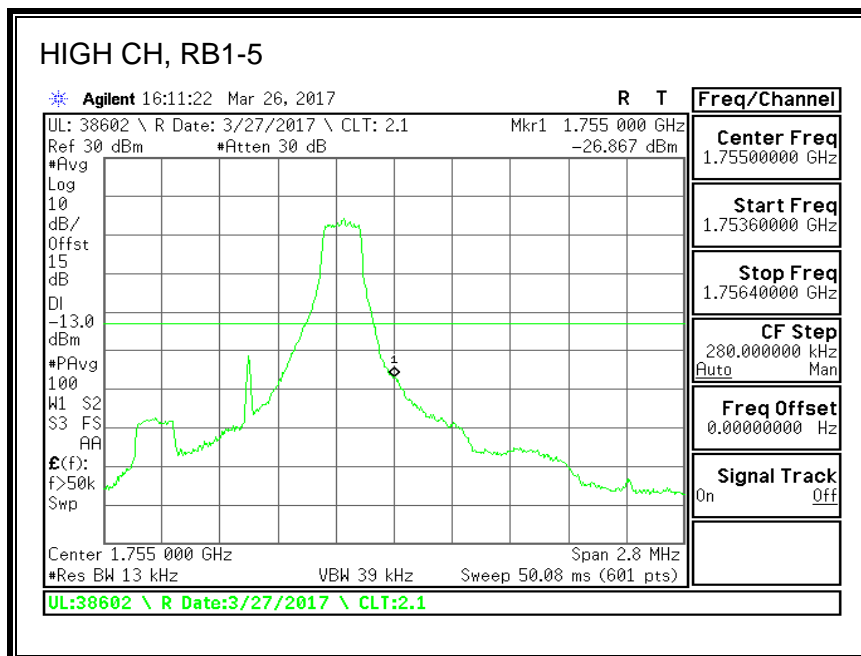
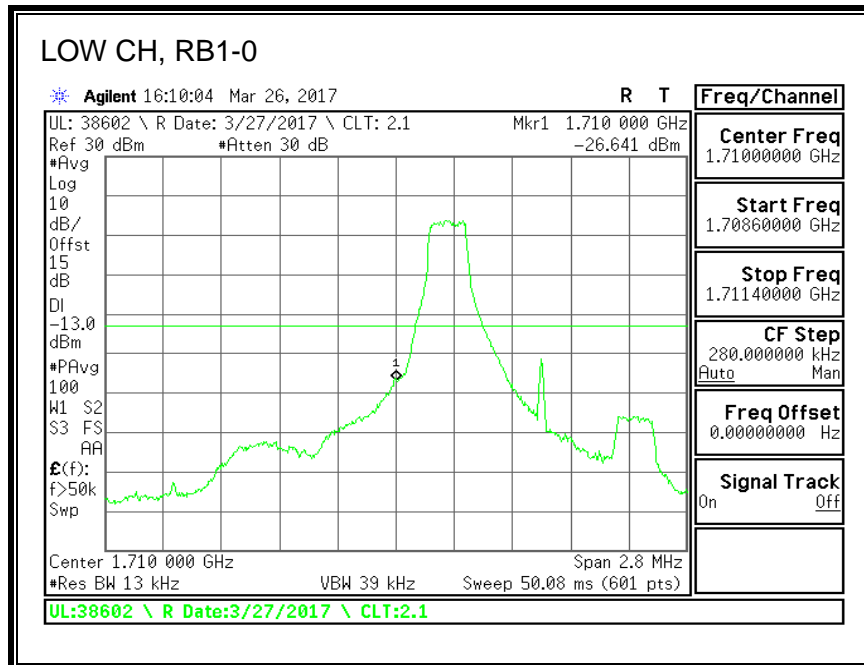
16QAM, (20.0 MHz BAND WIDTH)

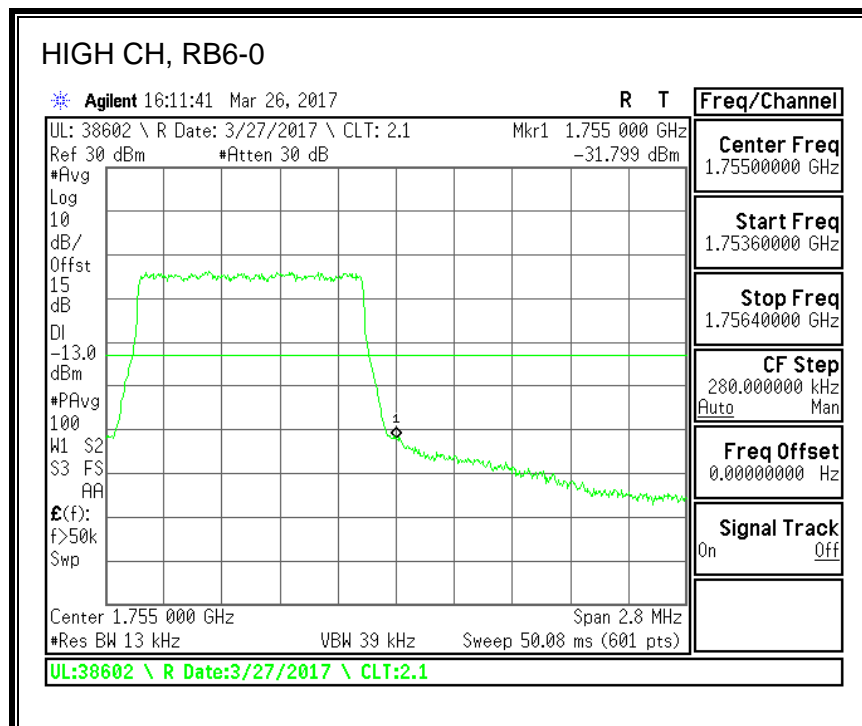
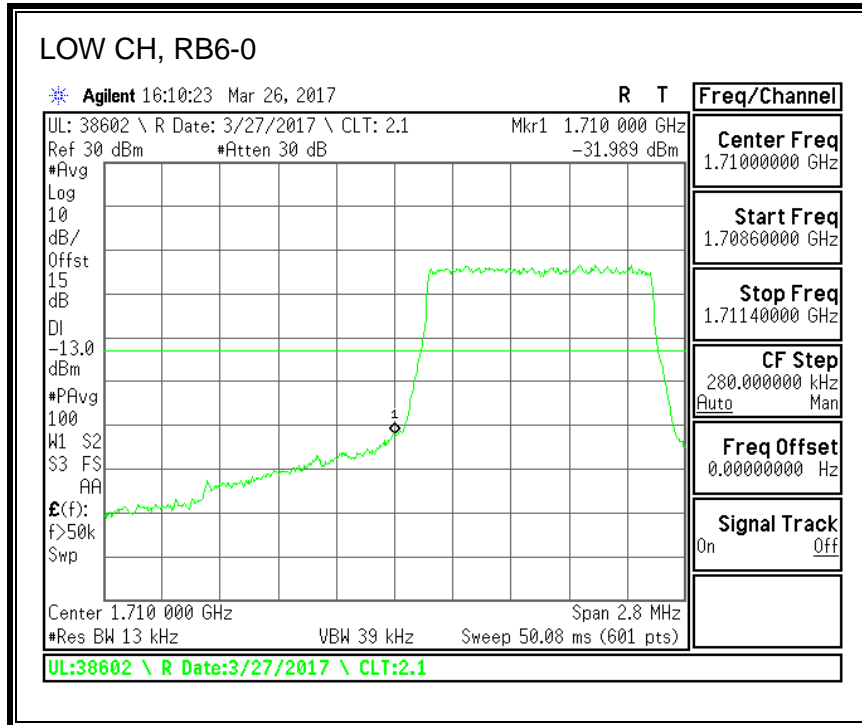




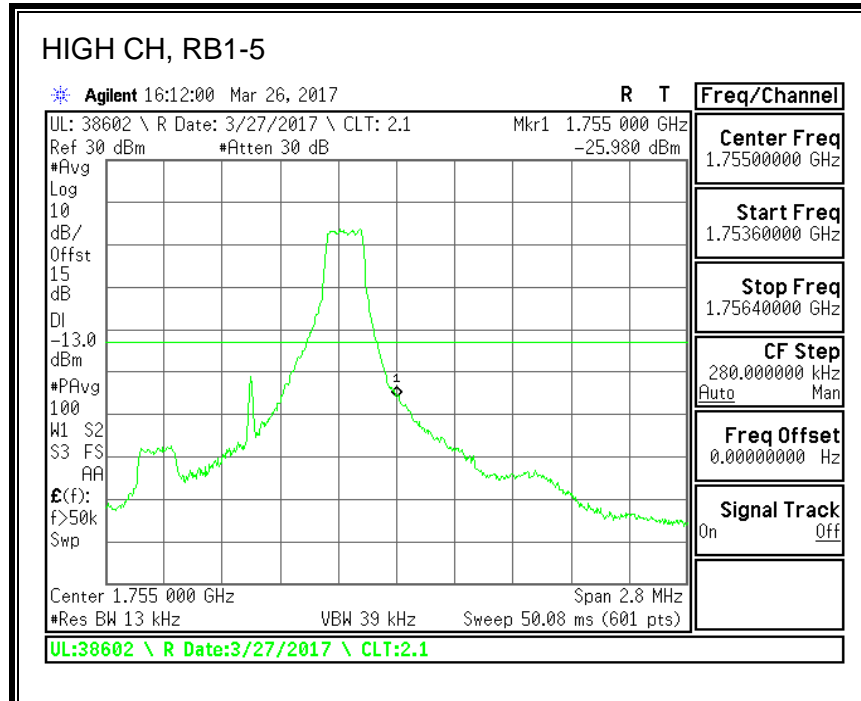
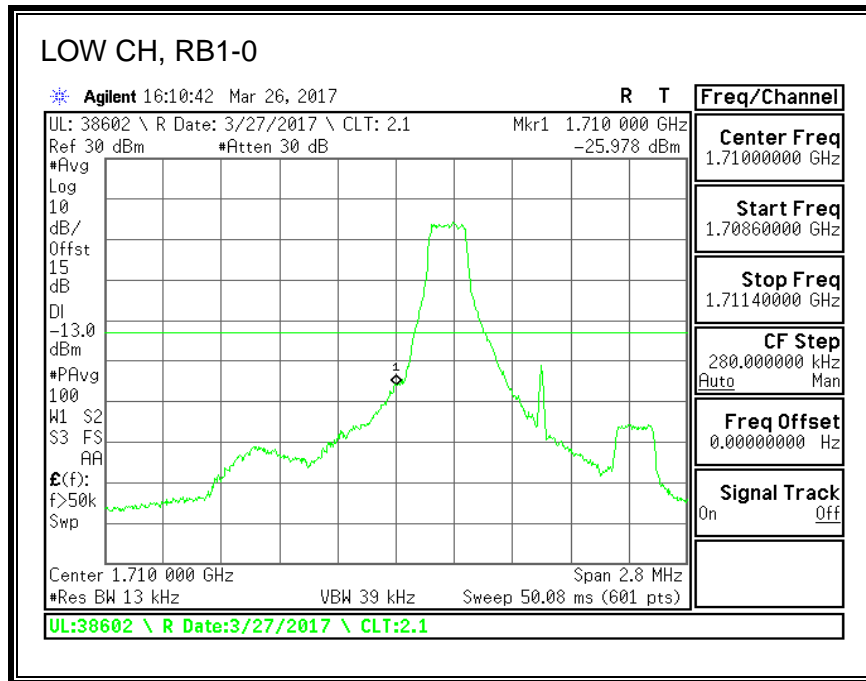
8.2.2. LTE BAND 4 BANDEDGE

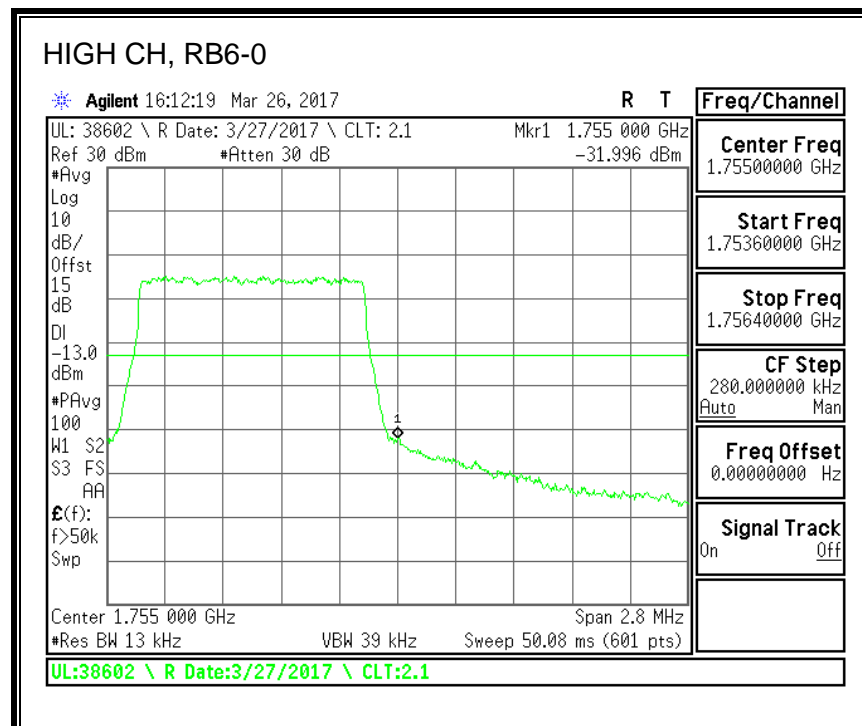
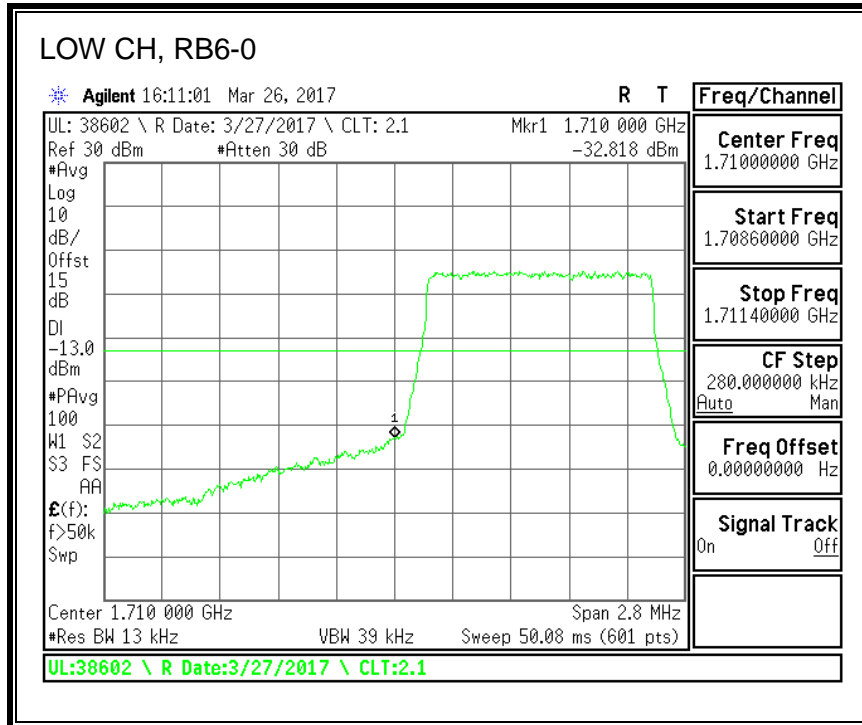
QPSK, (1.4 MHz BAND WIDTH)



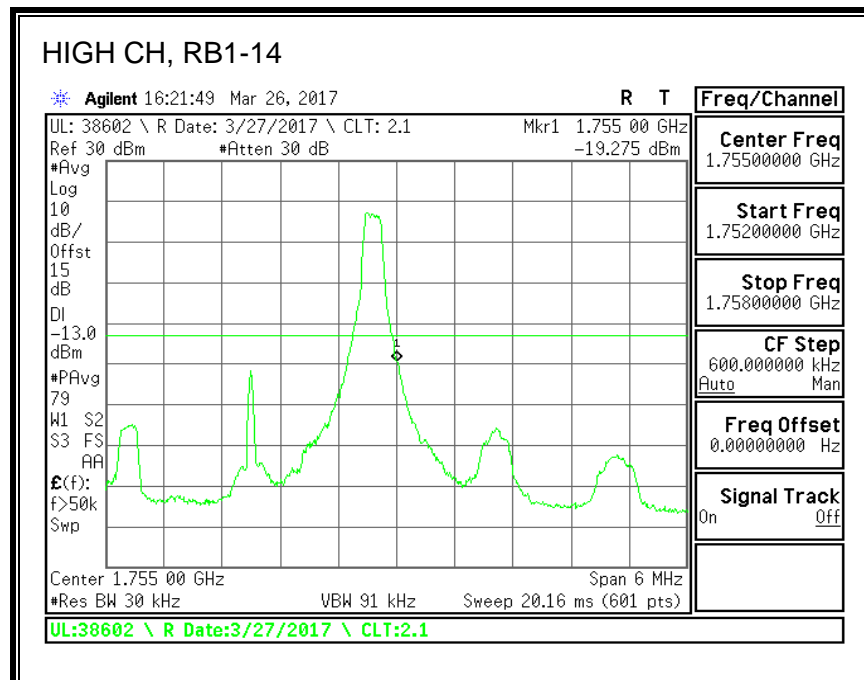
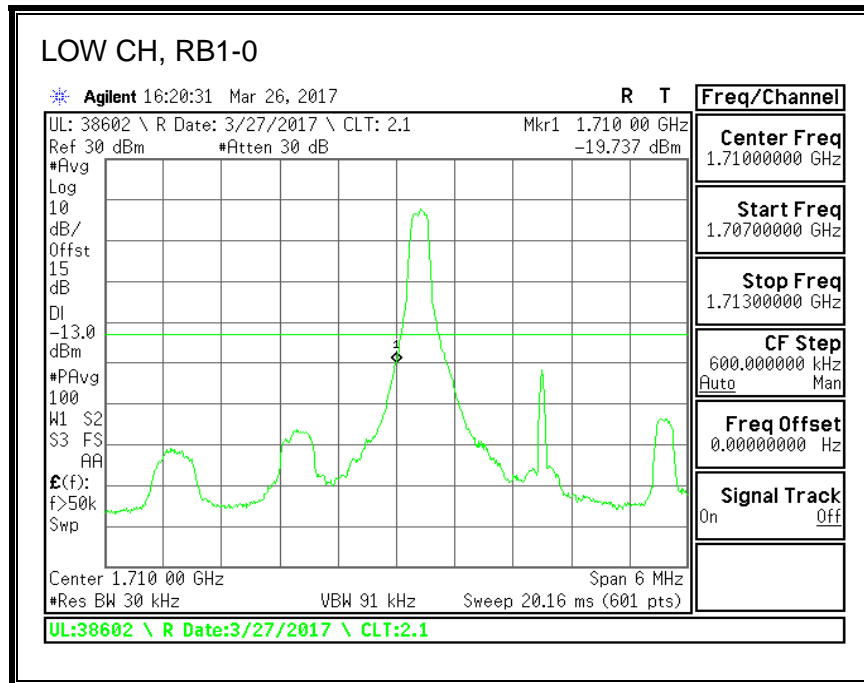


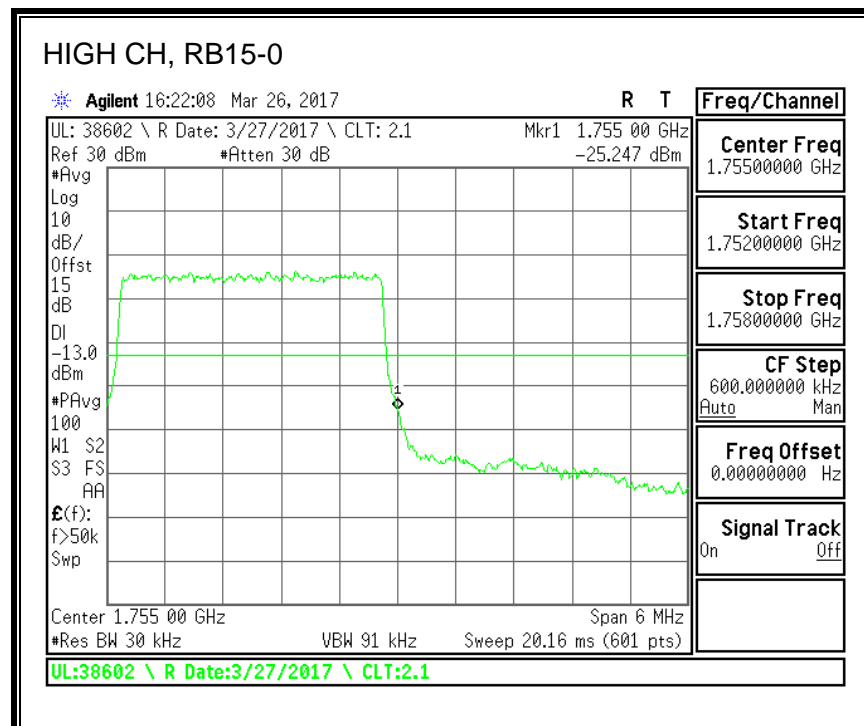
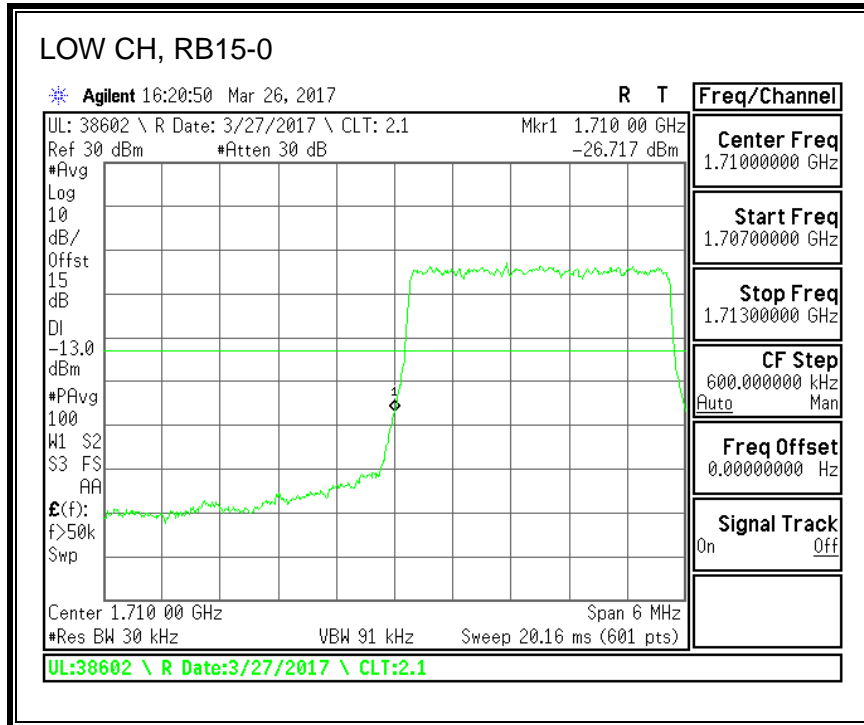
16QAM, (1.4 MHz BAND WIDTH)



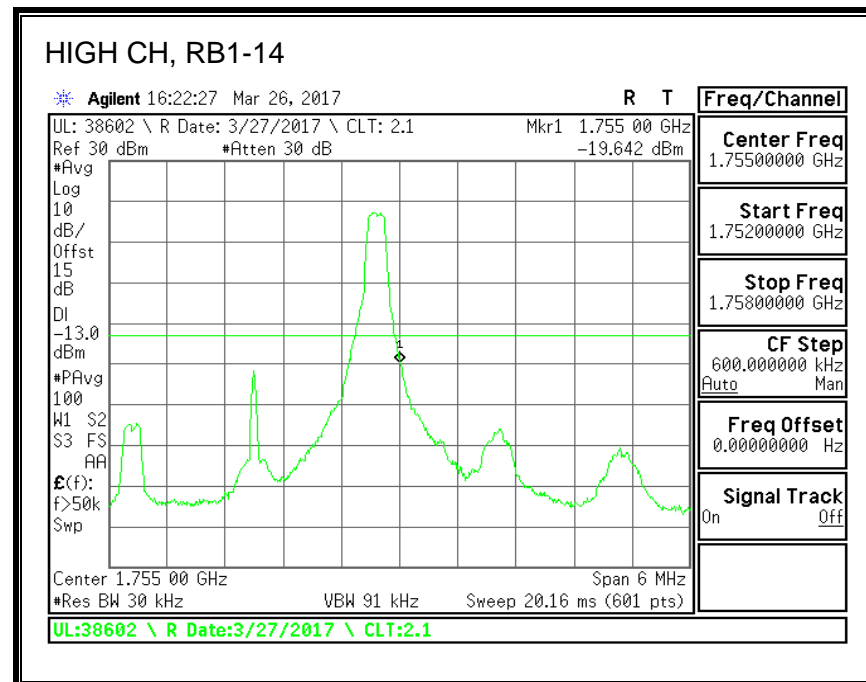
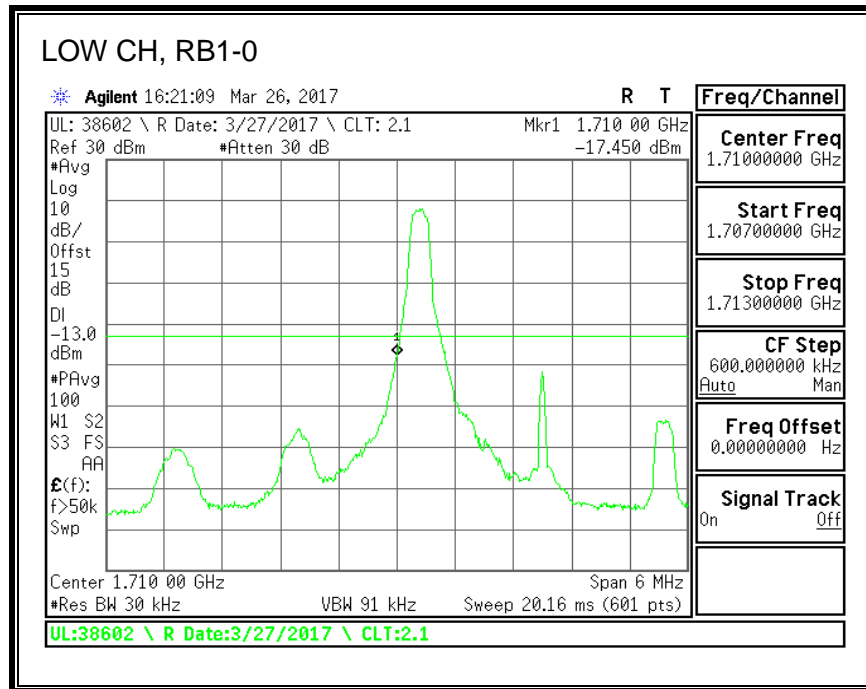


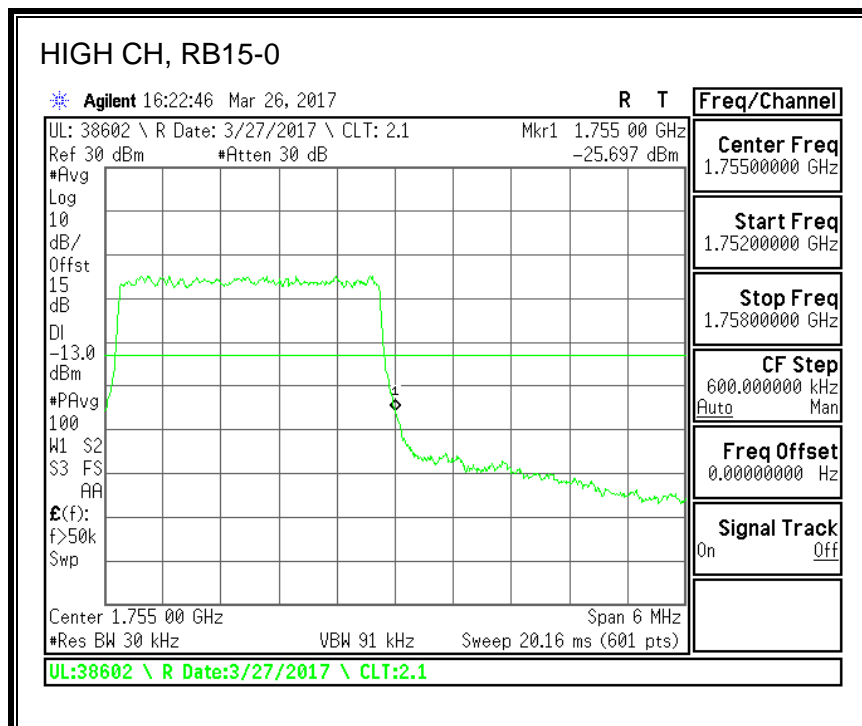
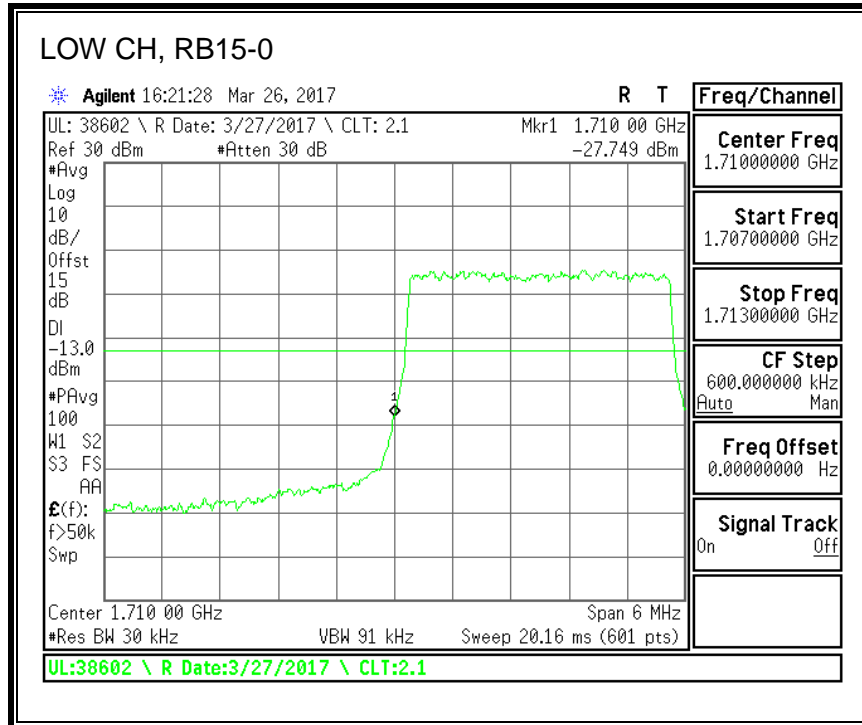
QPSK, (3.0 MHz BAND WIDTH)





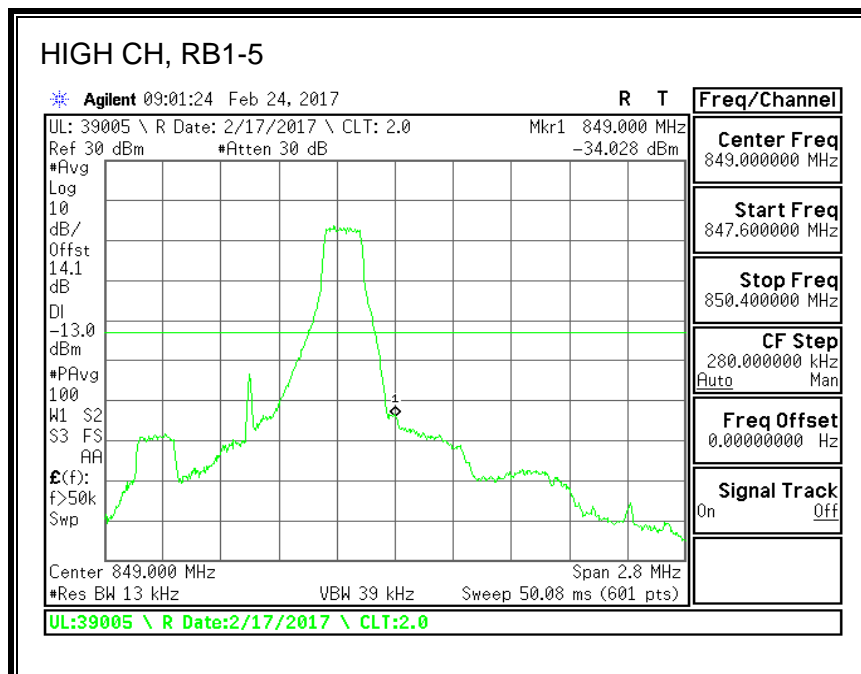
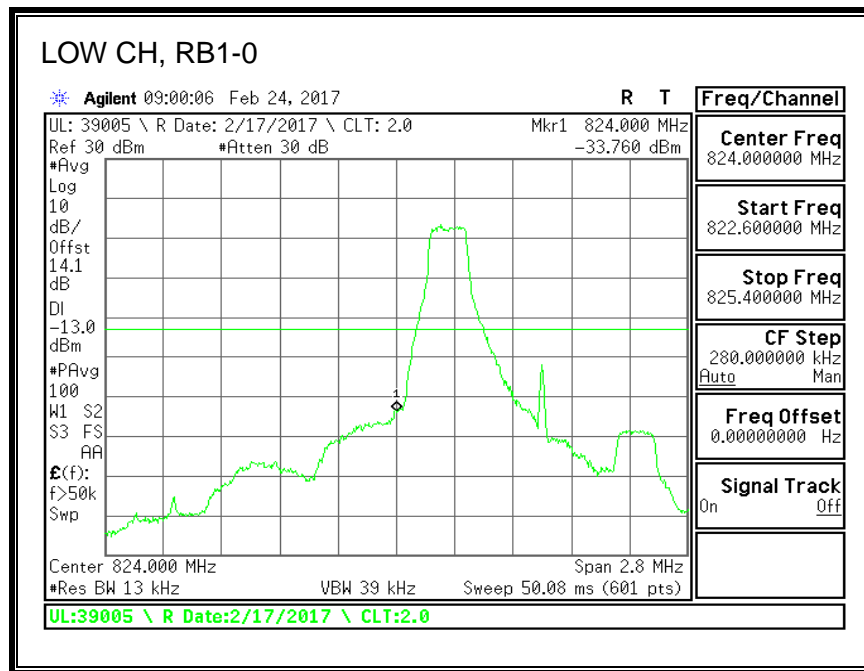
16QAM, (3.0 MHz BAND WIDTH)

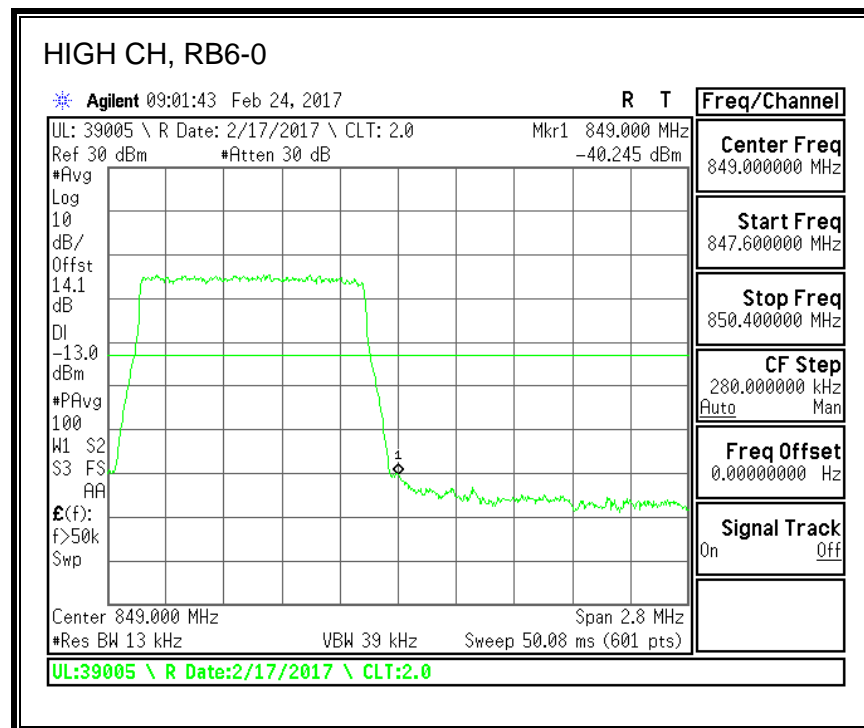
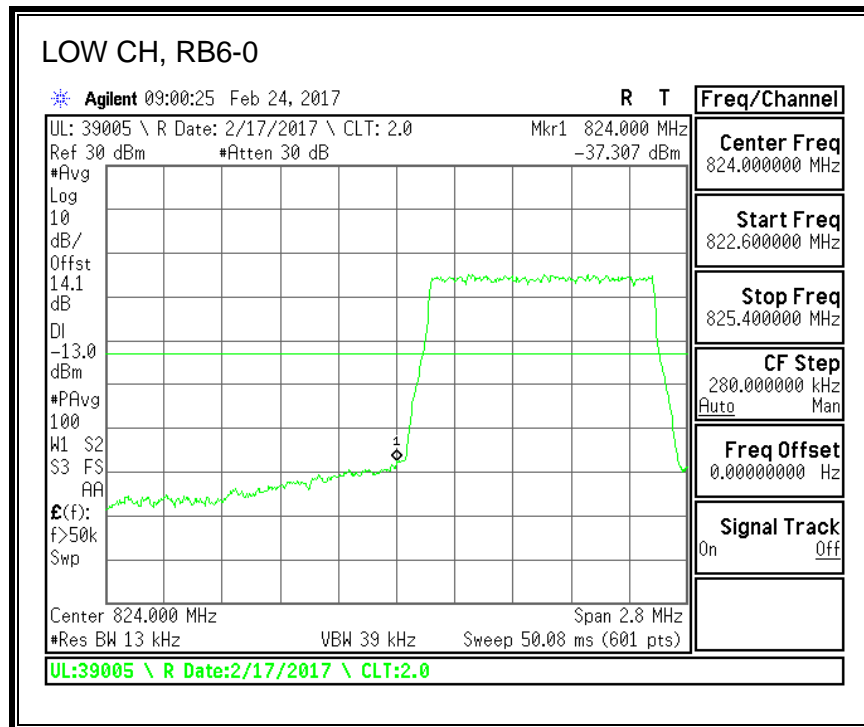




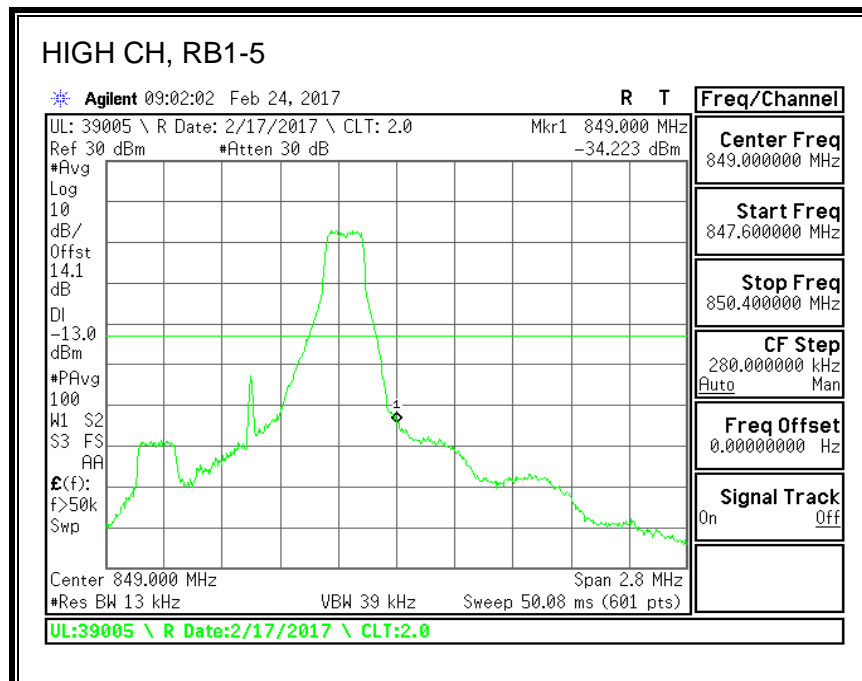
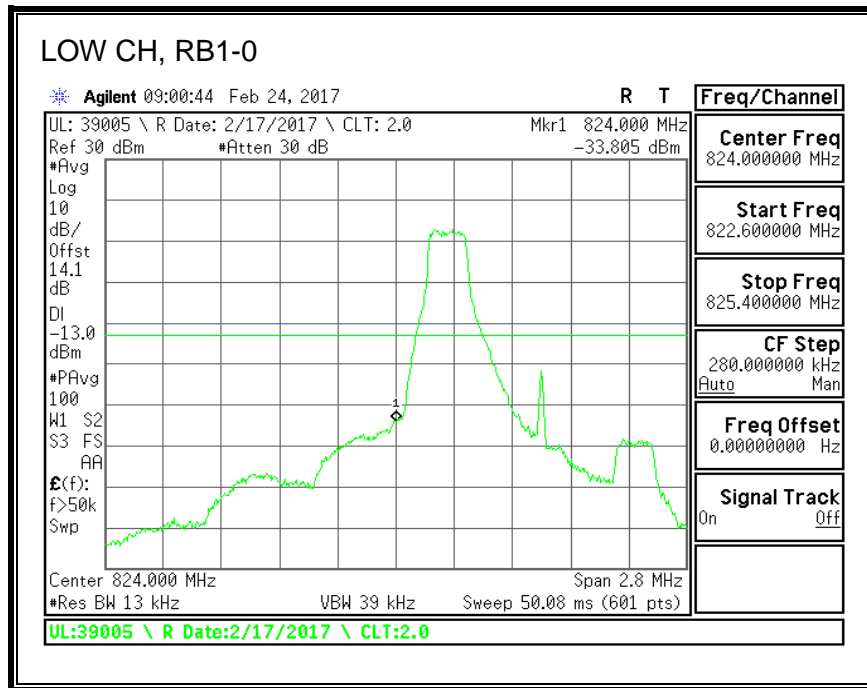
8.2.3. LTE BAND 5 BANDEDGE

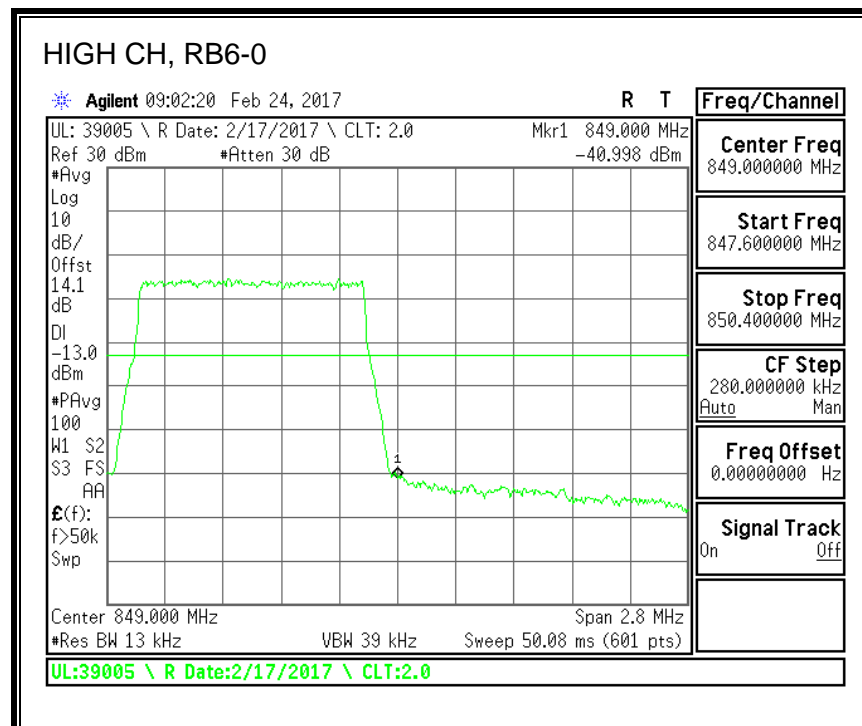
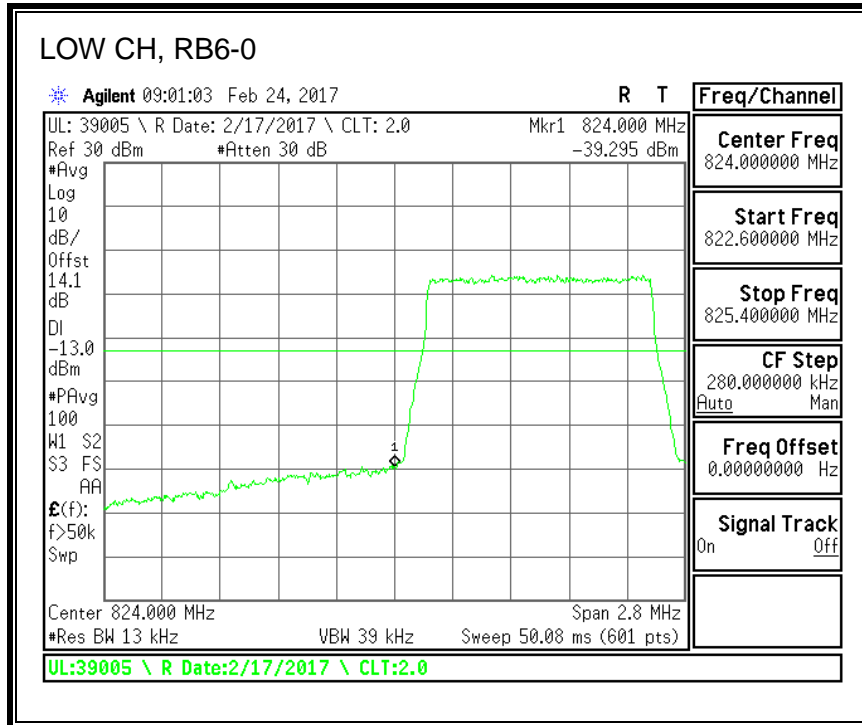
QPSK, (1.4 MHz BAND WIDTH)



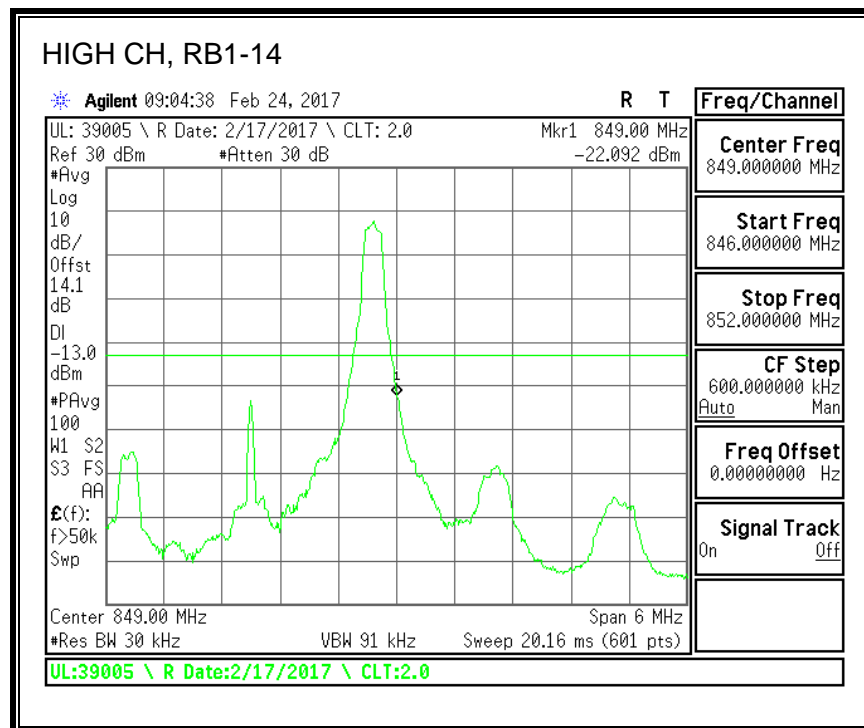
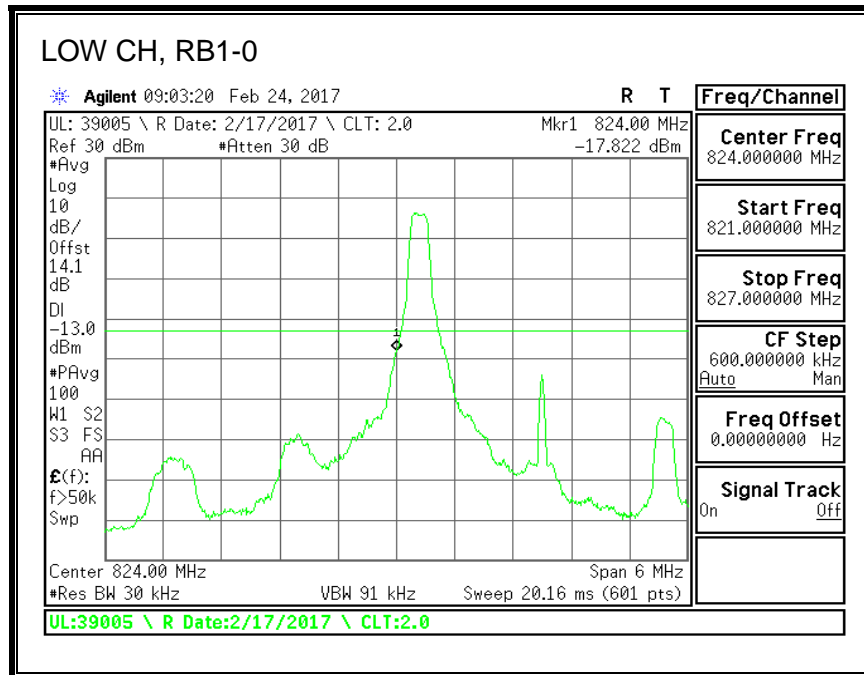


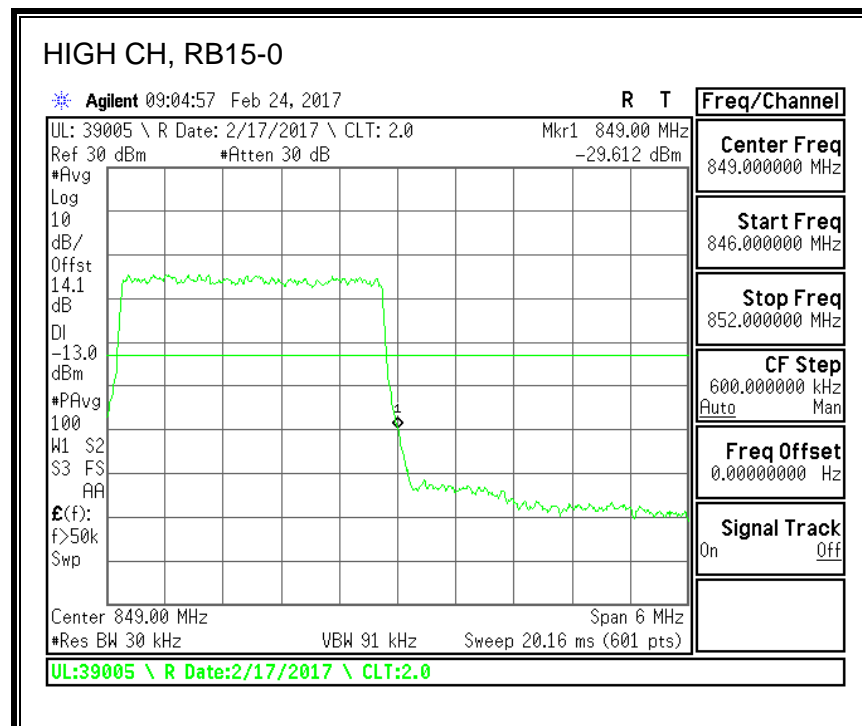
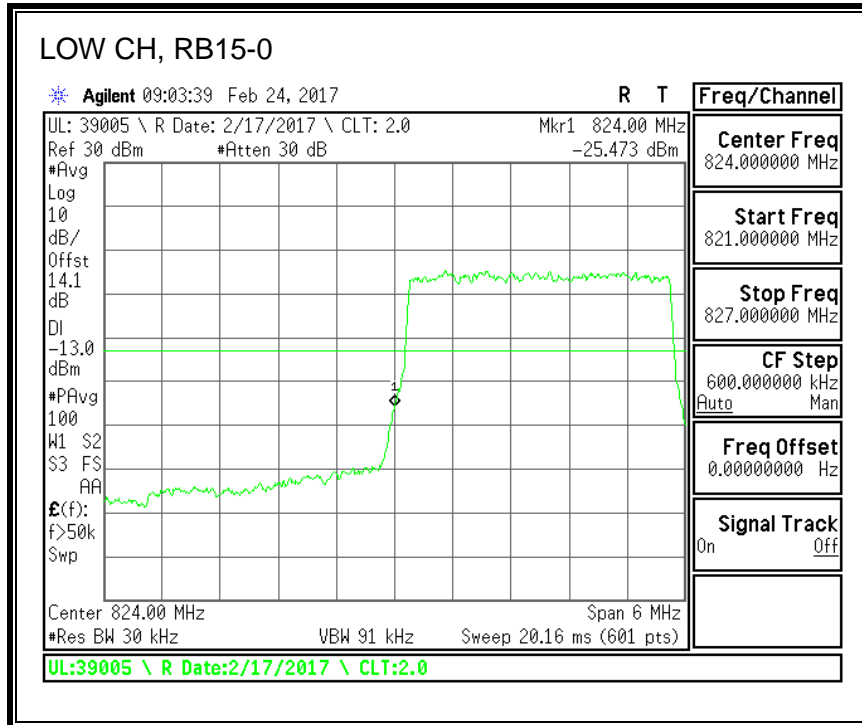
16QAM, (1.4 MHz BAND WIDTH)



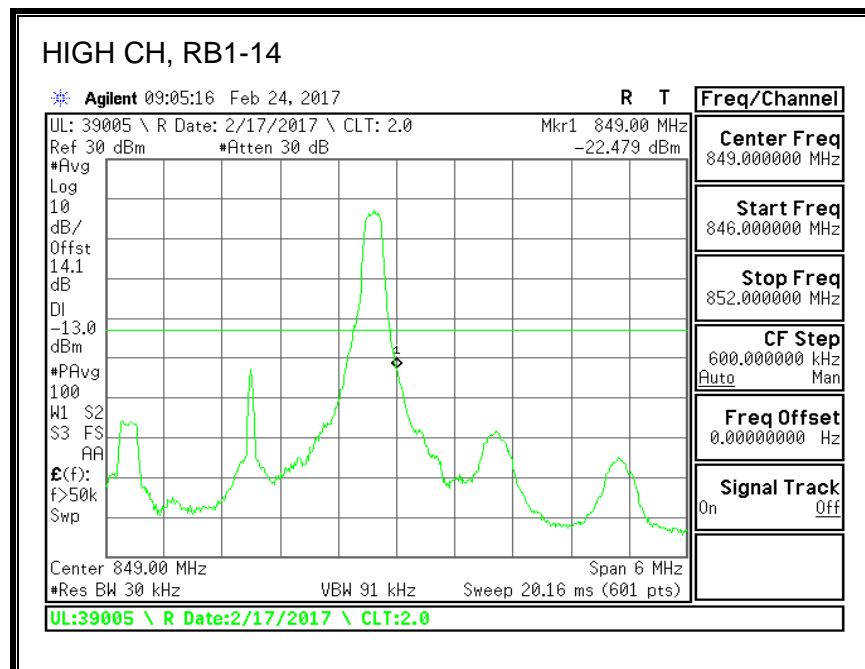
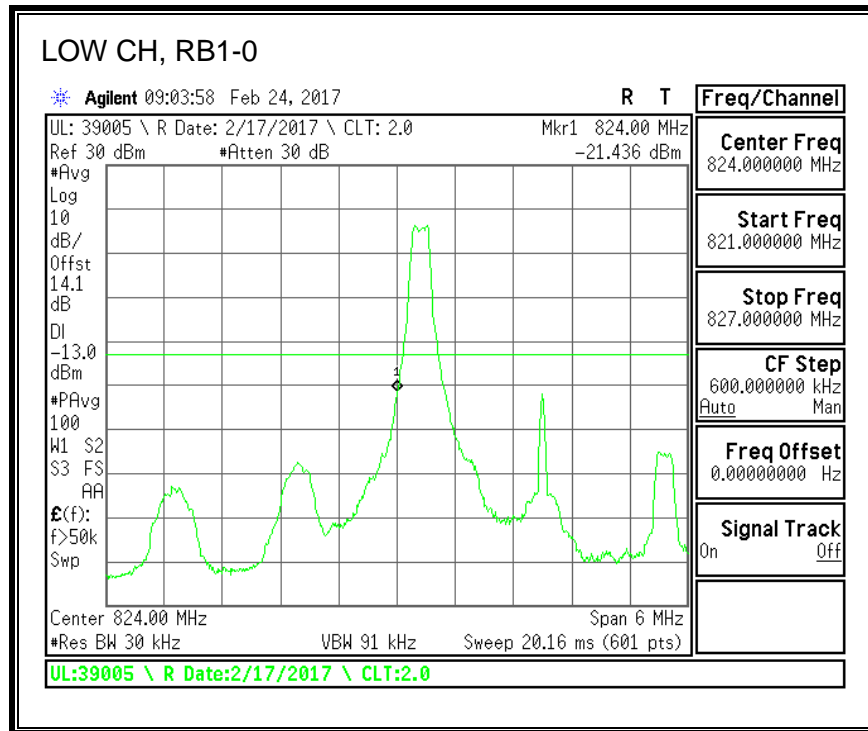


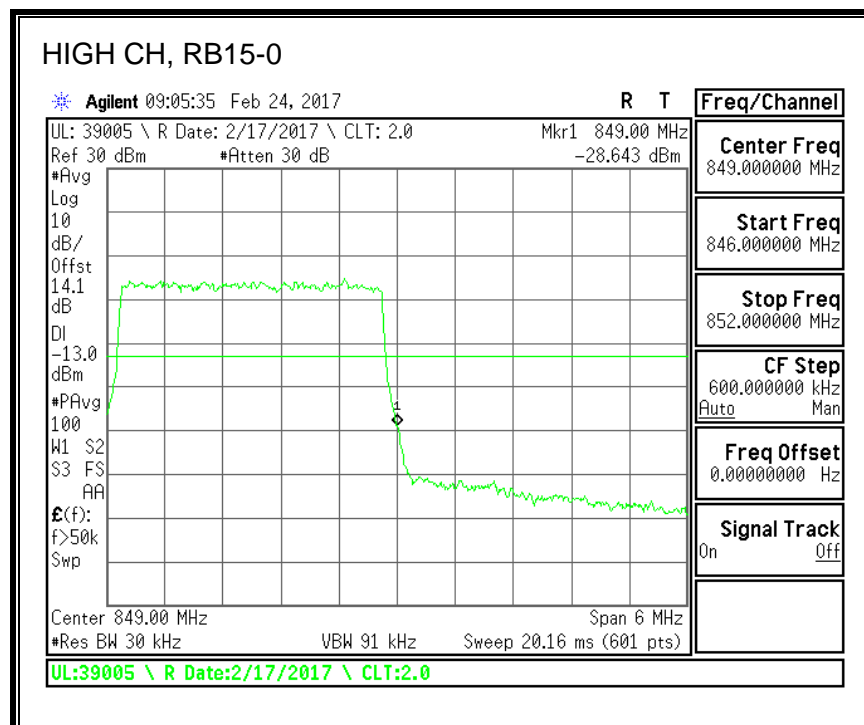
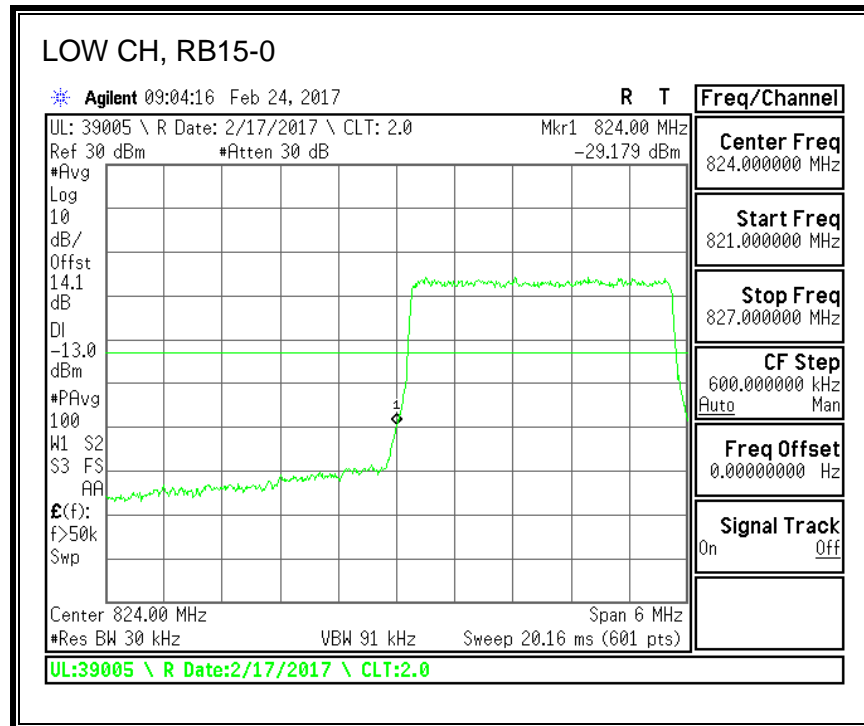
QPSK, (3.0 MHz BAND WIDTH)



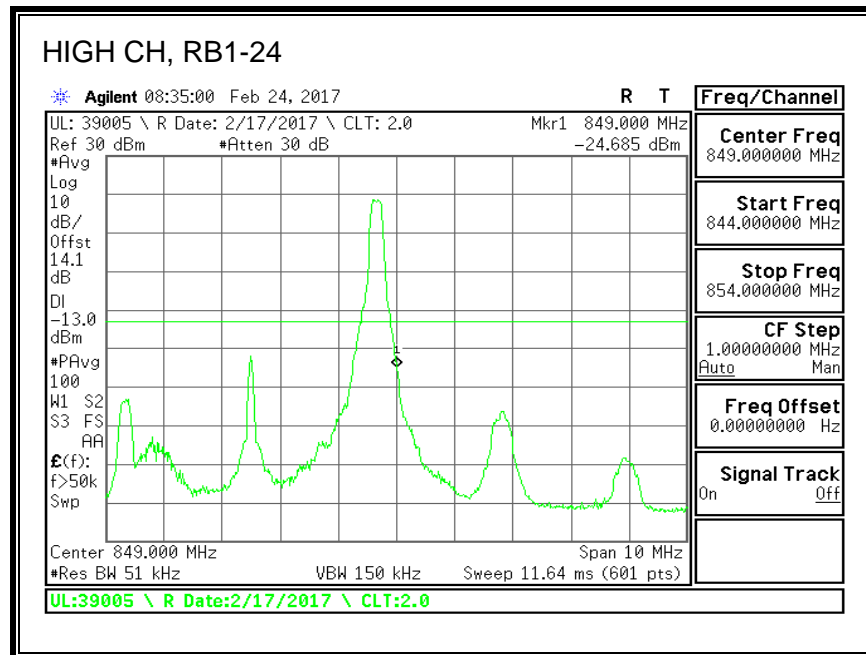
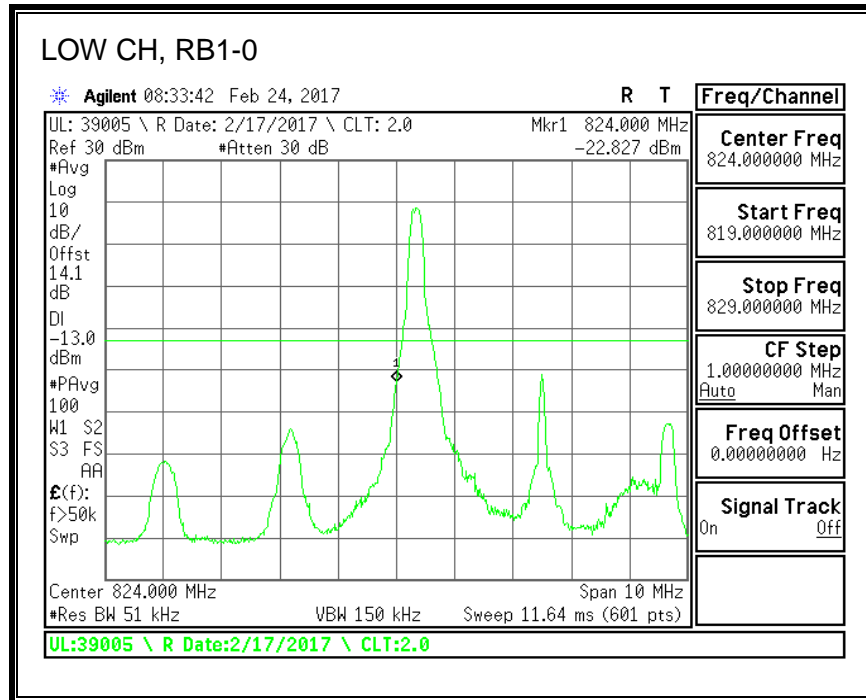


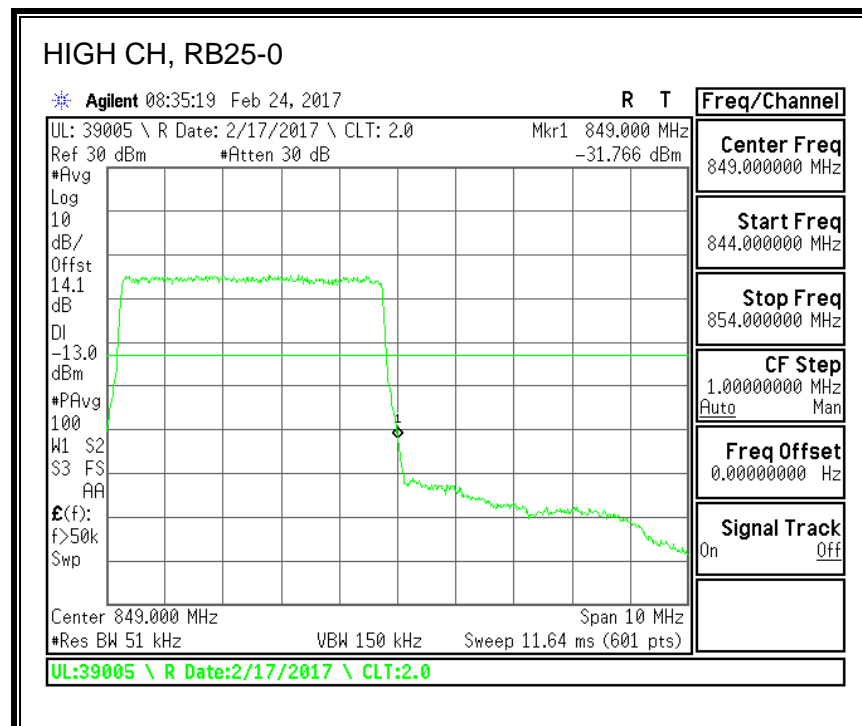
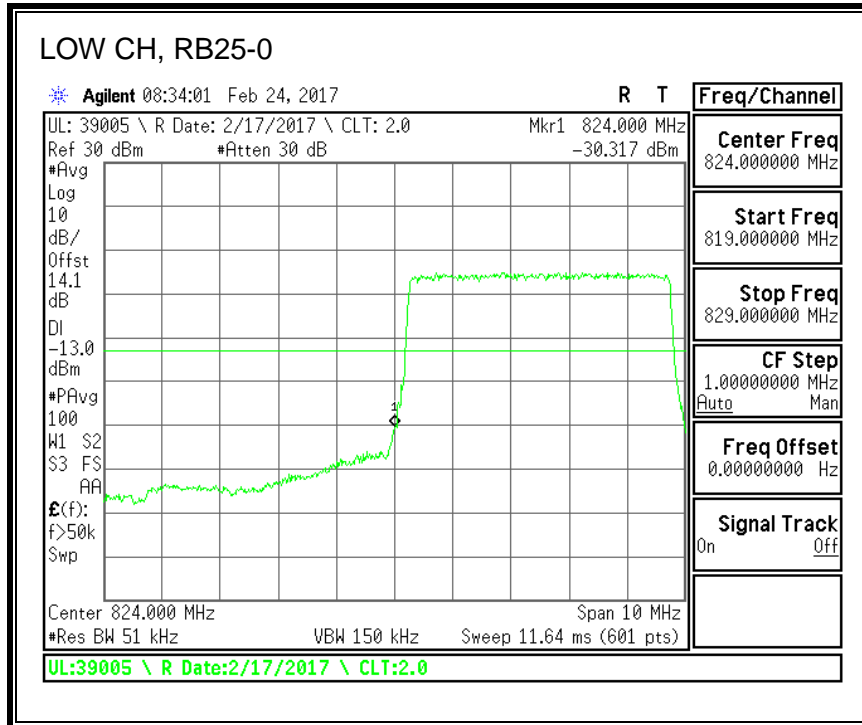
16QAM, (3.0 MHz BAND WIDTH)



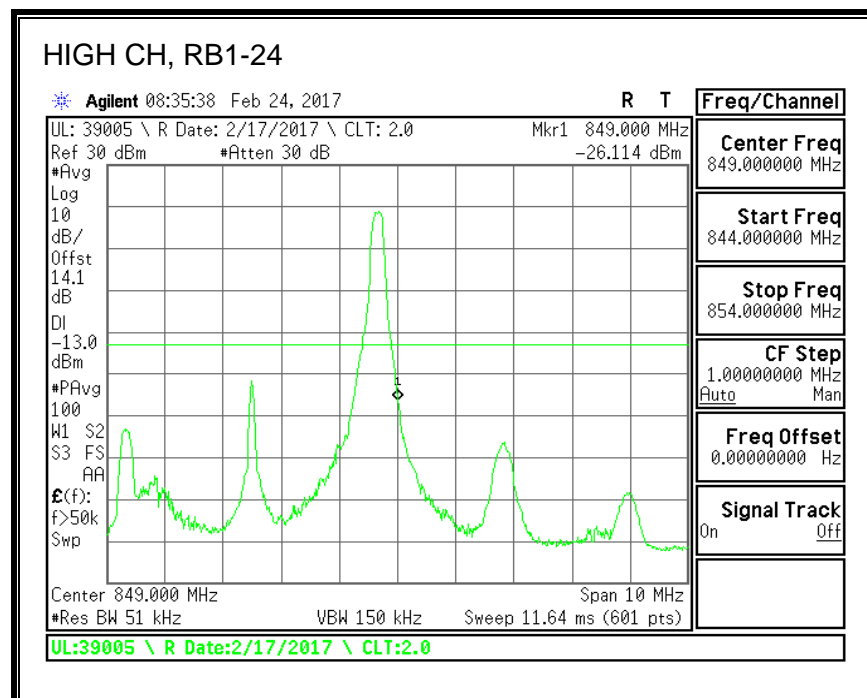
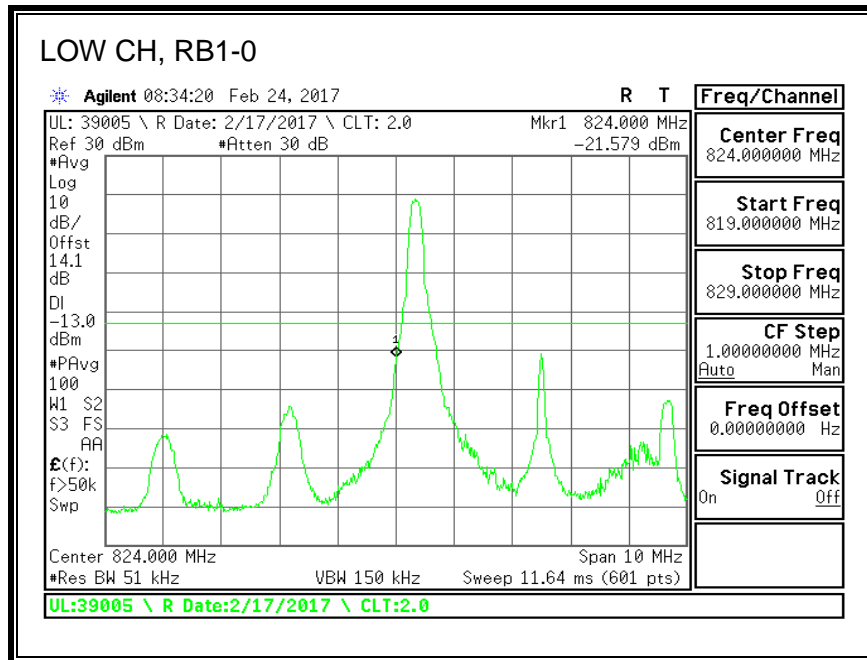


QPSK, (5.0 MHz BAND WIDTH)





16QAM, (5.0 MHz BAND WIDTH)

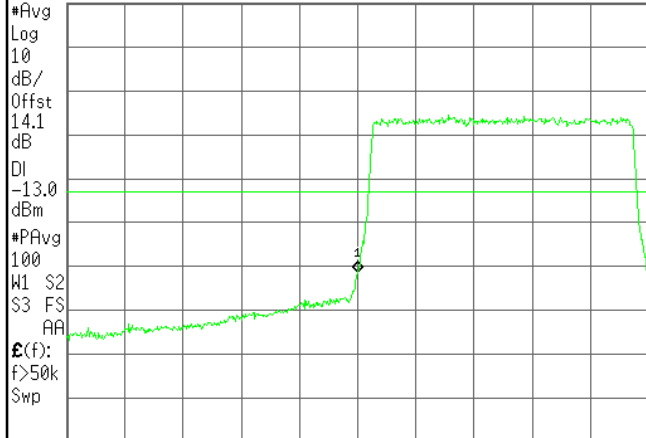


LOW CH, RB25-0

Agilent 08:34:39 Feb 24, 2017

R T

UL: 39005 \ R Date: 2/17/2017 \ CLT: 2.0 Mkr1 824.000 MHz
Ref 30 dBm *Atten 30 dB -31.280 dBm



Center 824.000 MHz Span 10 MHz
*Res BW 51 kHz VBW 150 kHz Sweep 11.64 ms (601 pts)

UL:39005 \ R Date:2/17/2017 \ CLT:2.0

Freq/Channel

Center Freq
824.000000 MHz

Start Freq
819.000000 MHz

Stop Freq
829.000000 MHz

CF Step
1.00000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

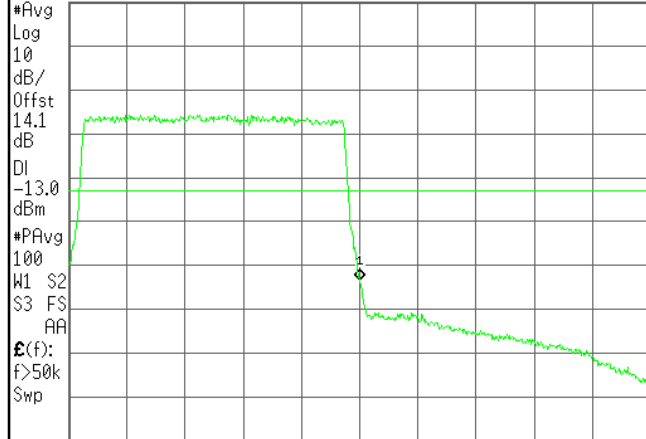
Signal Track
On Off

HIGH CH, RB25-0

Agilent 08:35:57 Feb 24, 2017

R T

UL: 39005 \ R Date: 2/17/2017 \ CLT: 2.0 Mkr1 849.000 MHz
Ref 30 dBm *Atten 30 dB -33.378 dBm



Center 849.000 MHz Span 10 MHz
*Res BW 51 kHz VBW 150 kHz Sweep 11.64 ms (601 pts)

UL:39005 \ R Date:2/17/2017 \ CLT:2.0

Freq/Channel

Center Freq
849.000000 MHz

Start Freq
844.000000 MHz

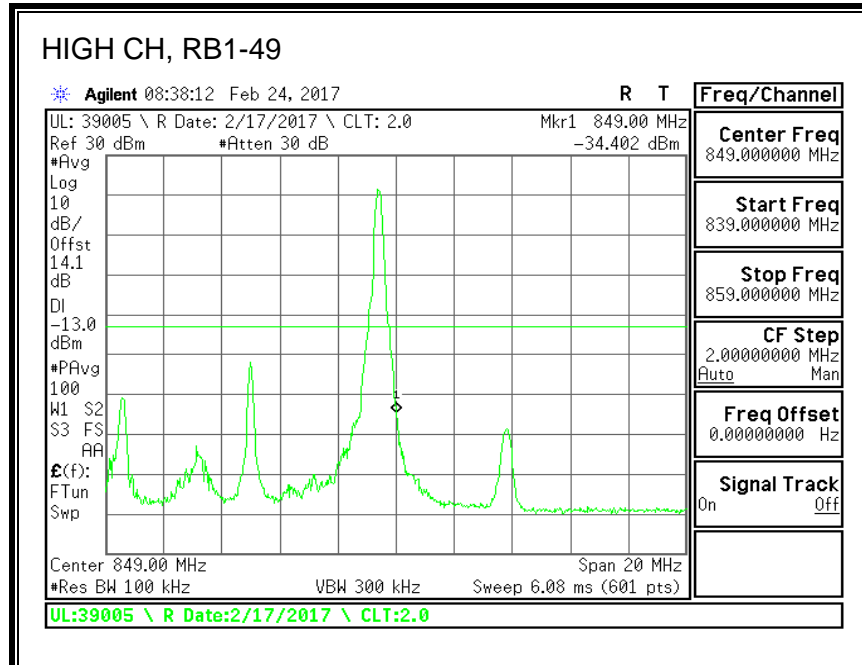
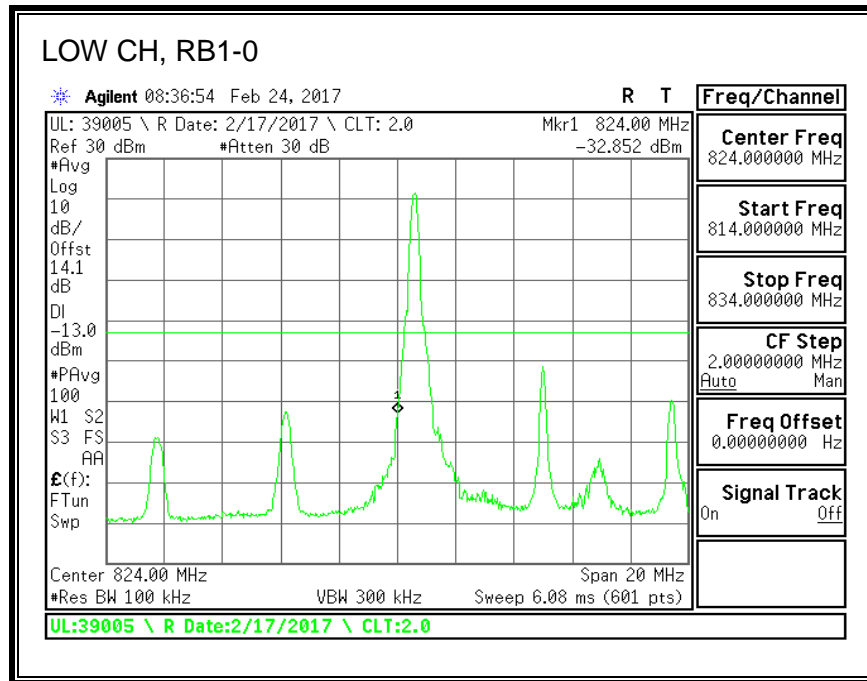
Stop Freq
854.000000 MHz

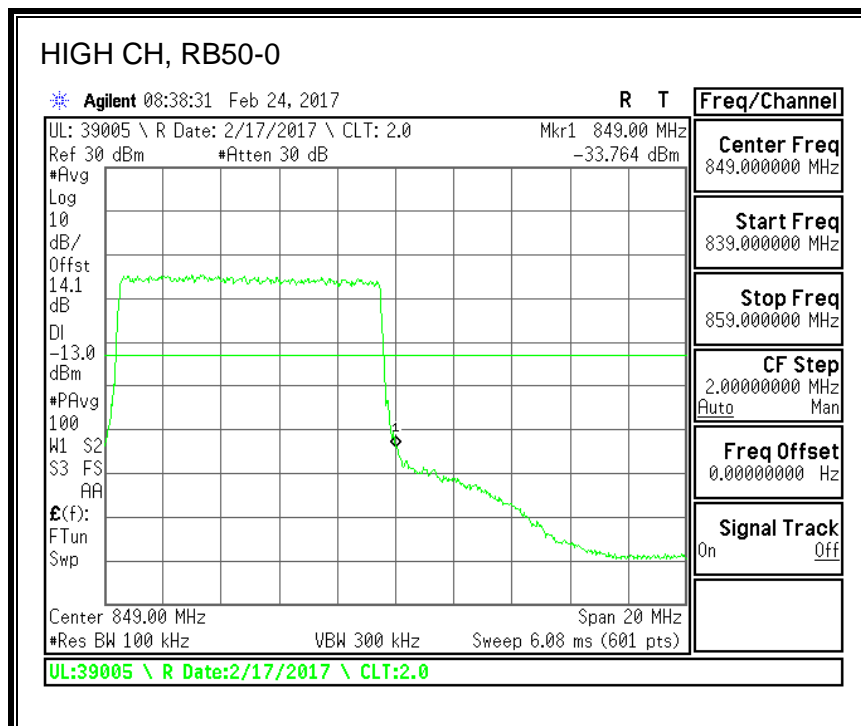
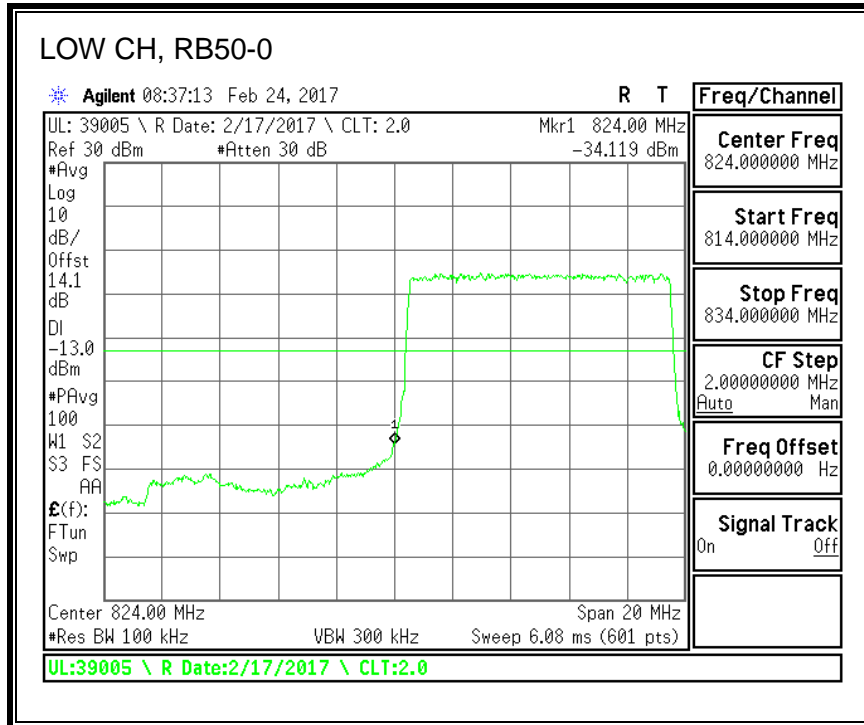
CF Step
1.00000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

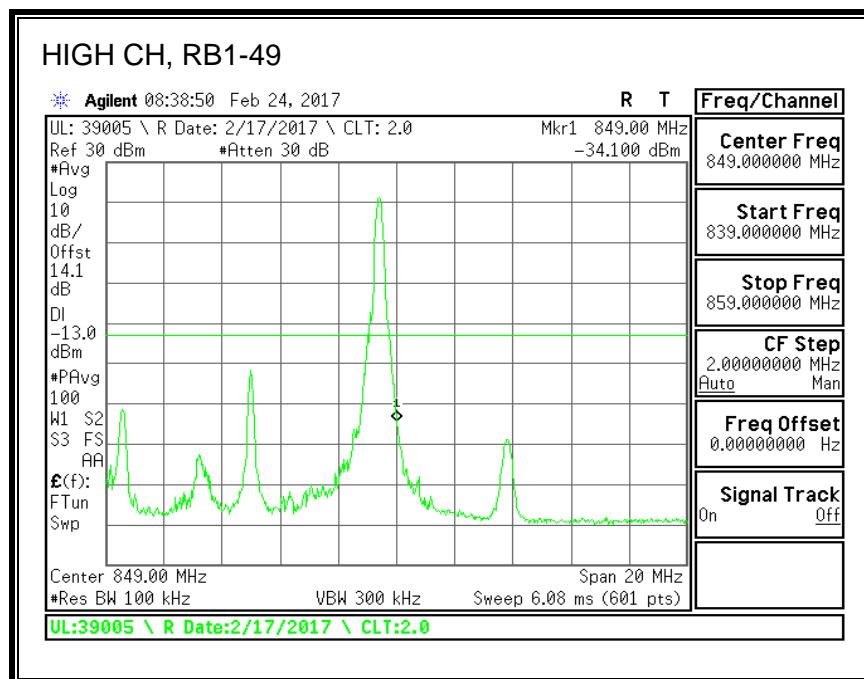
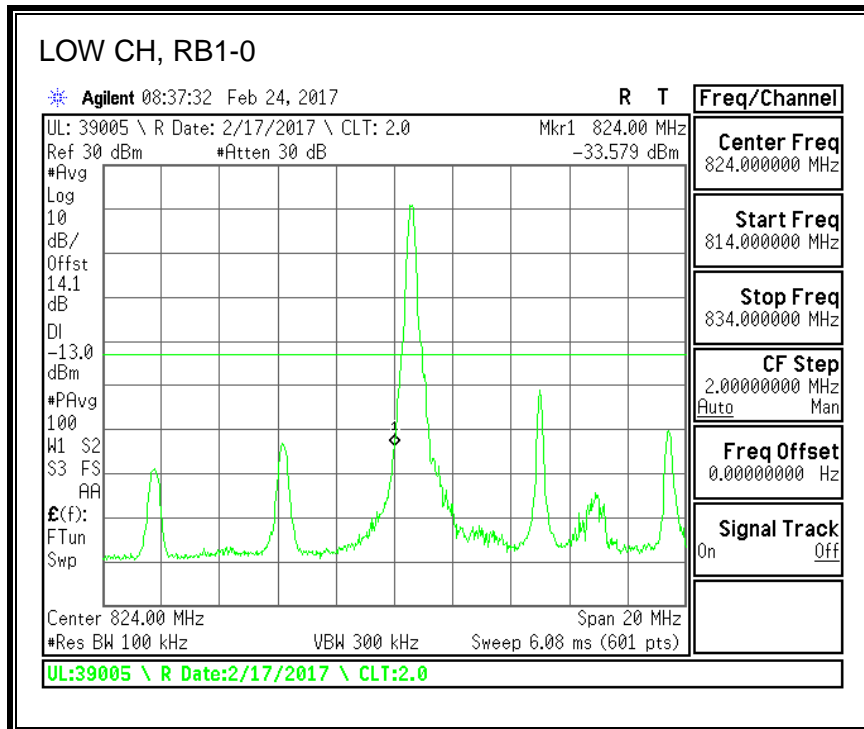
Signal Track
On Off

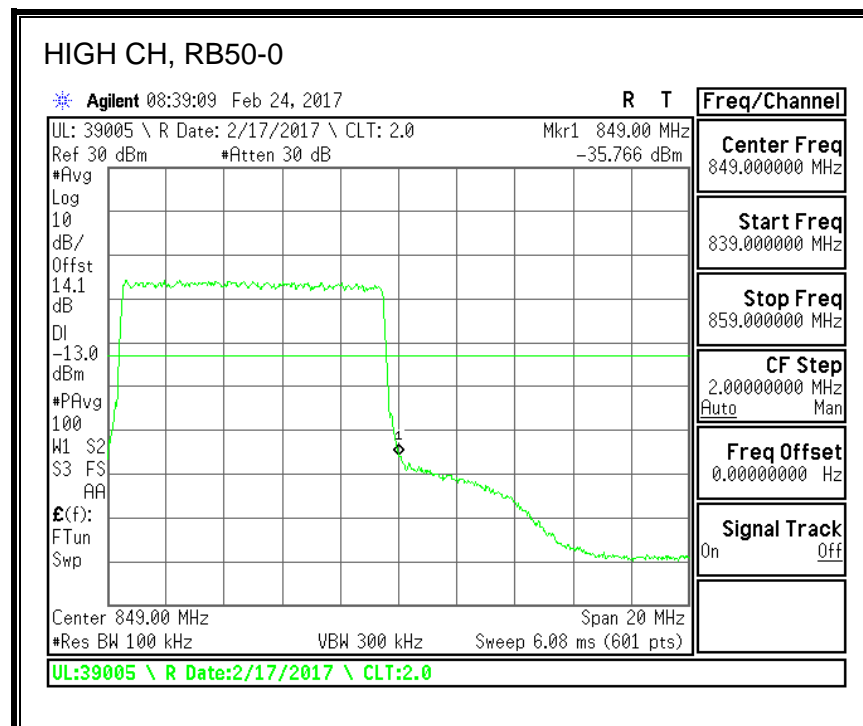
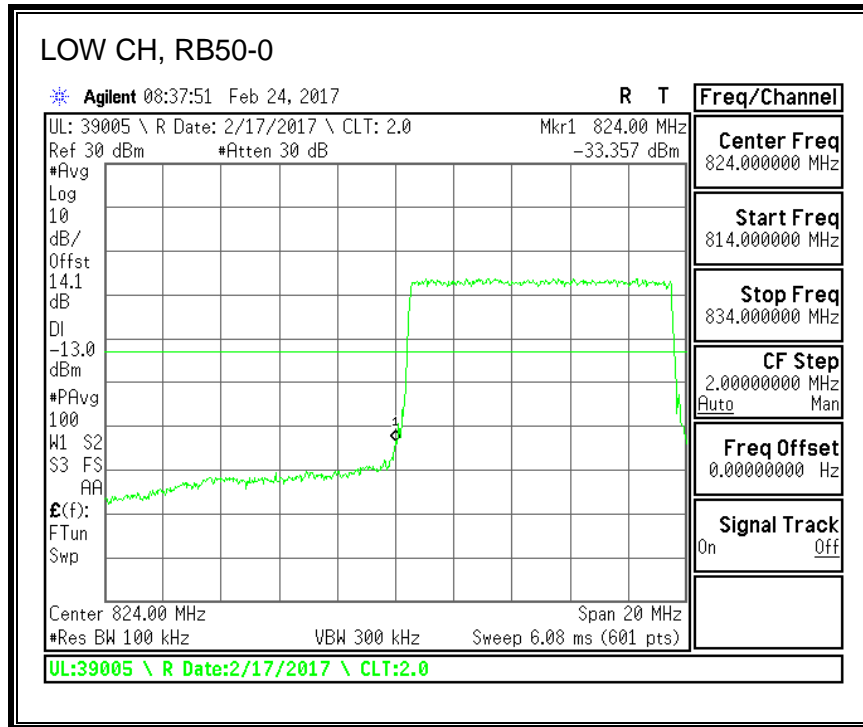
QPSK, (10.0 MHz BAND WIDTH)





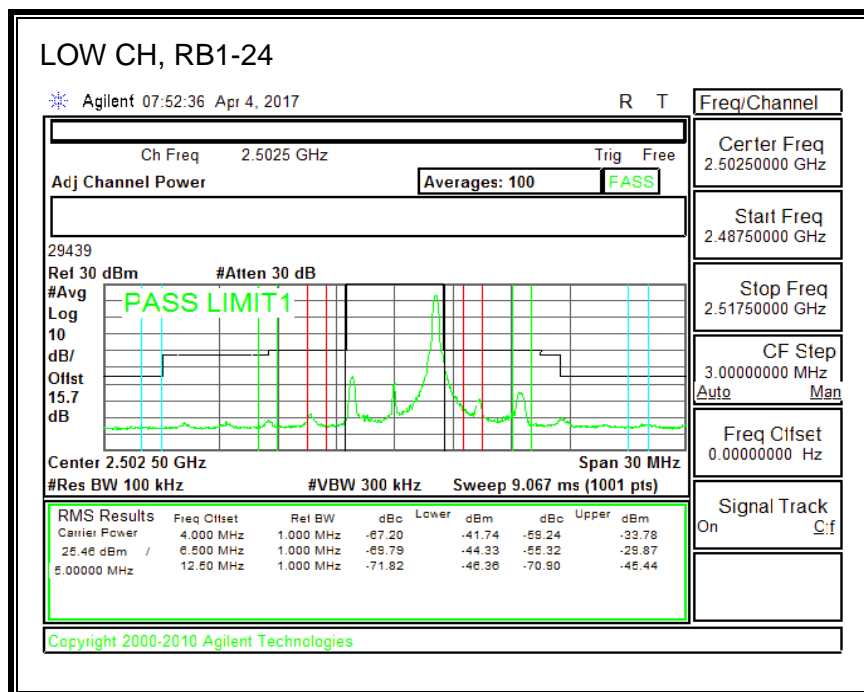
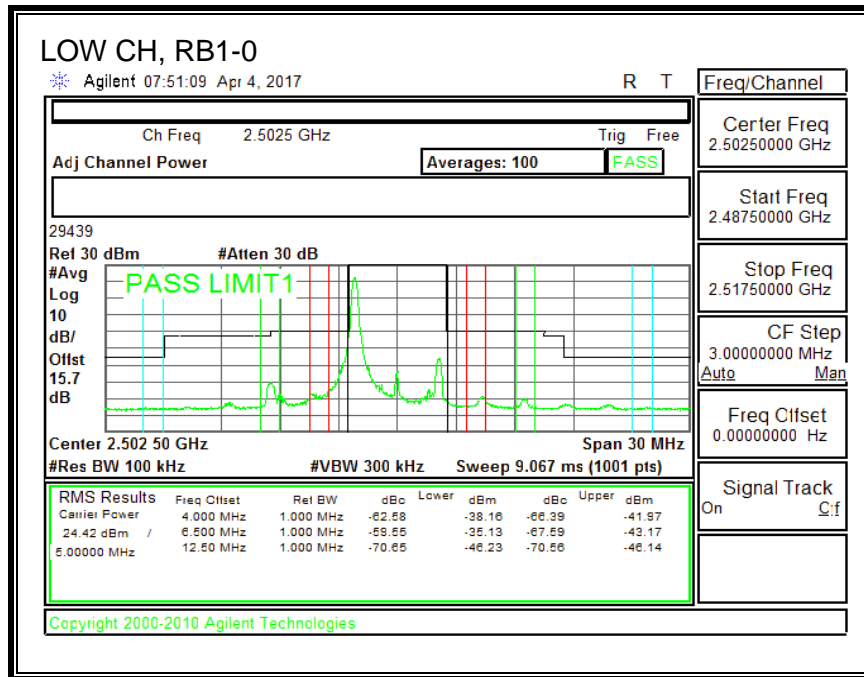
16QAM, (10.0 MHz BAND WIDTH)

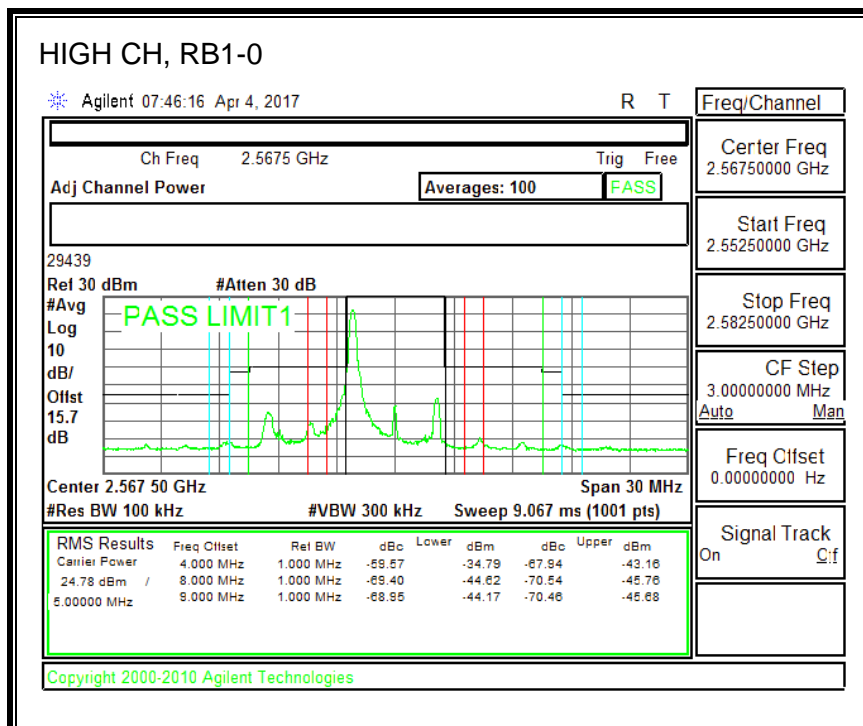
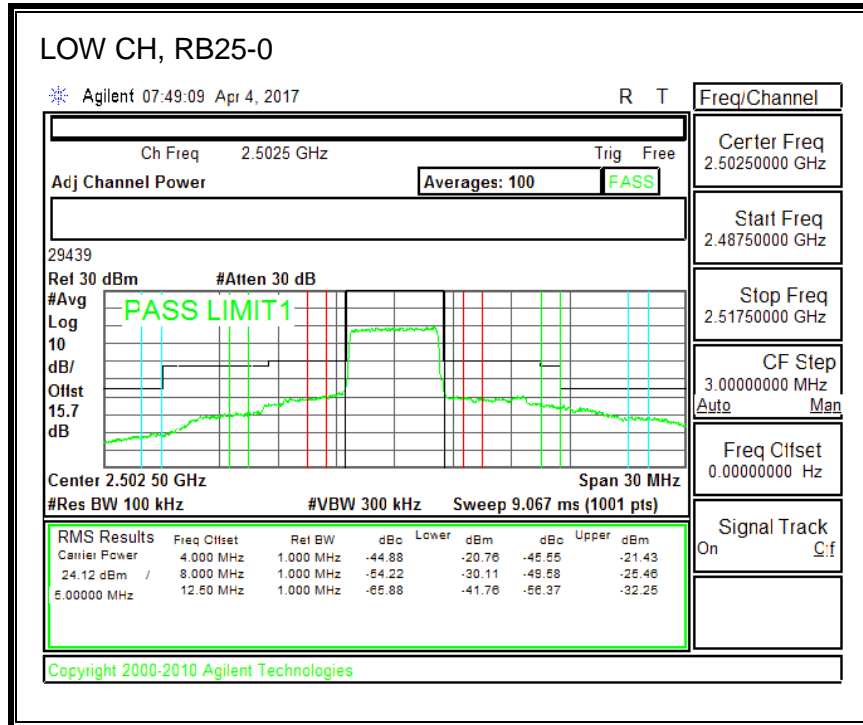


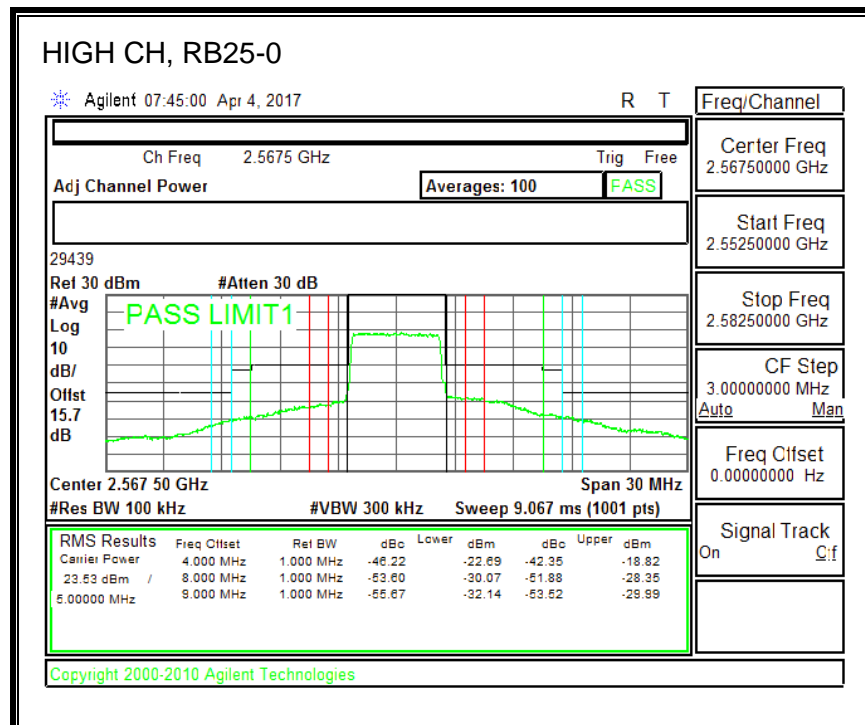
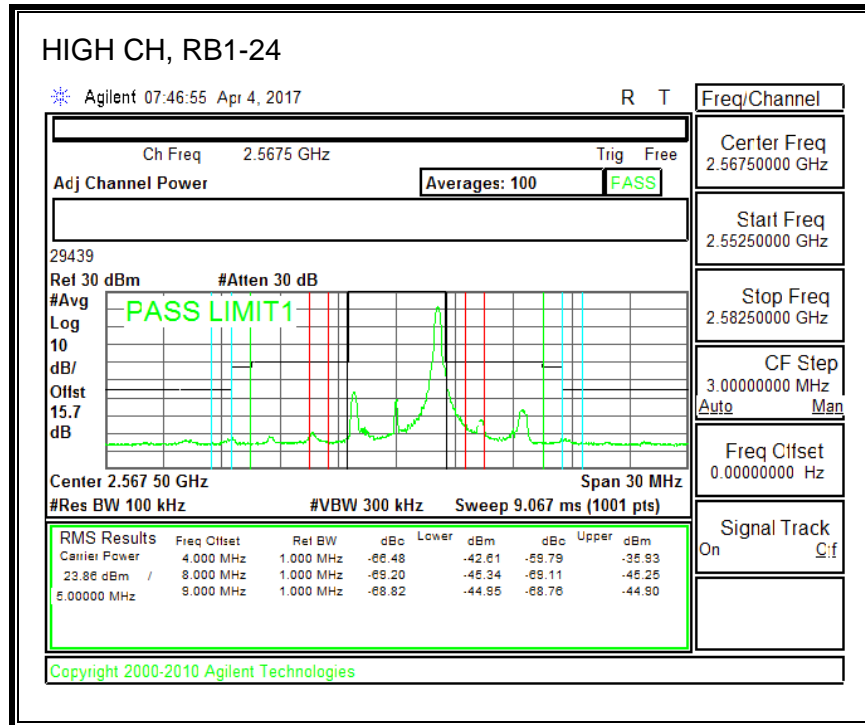


8.2.4. LTE BAND 7 ADJACENT CHANNEL POWER

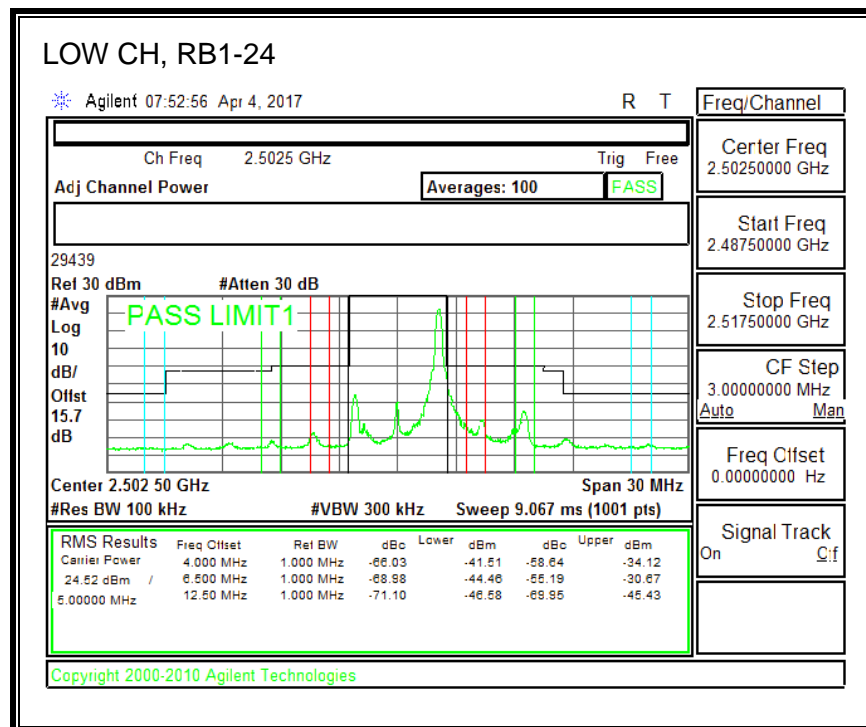
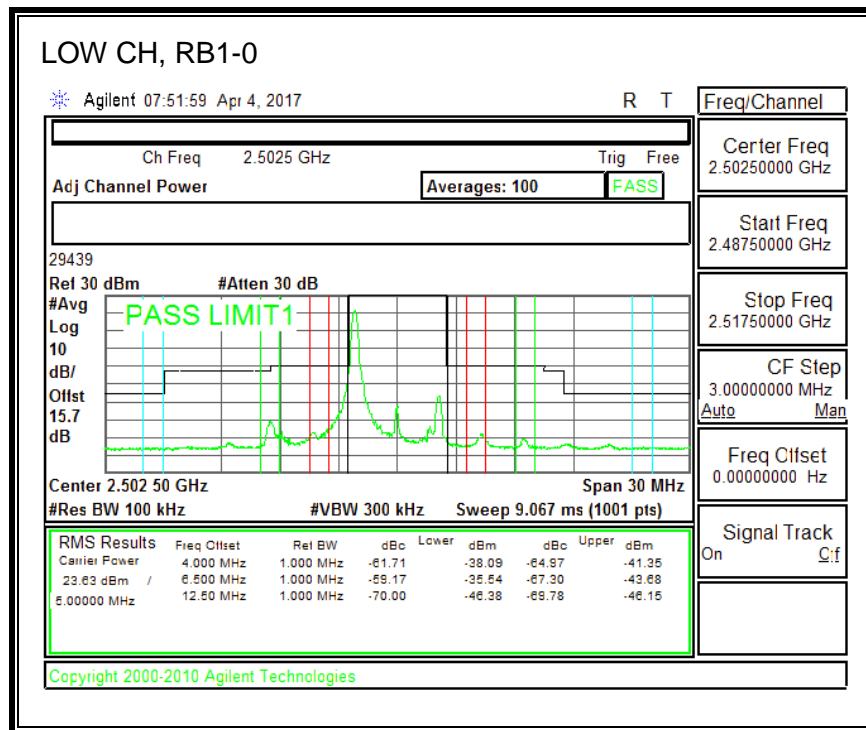
QPSK, (5.0 MHz BAND WIDTH)

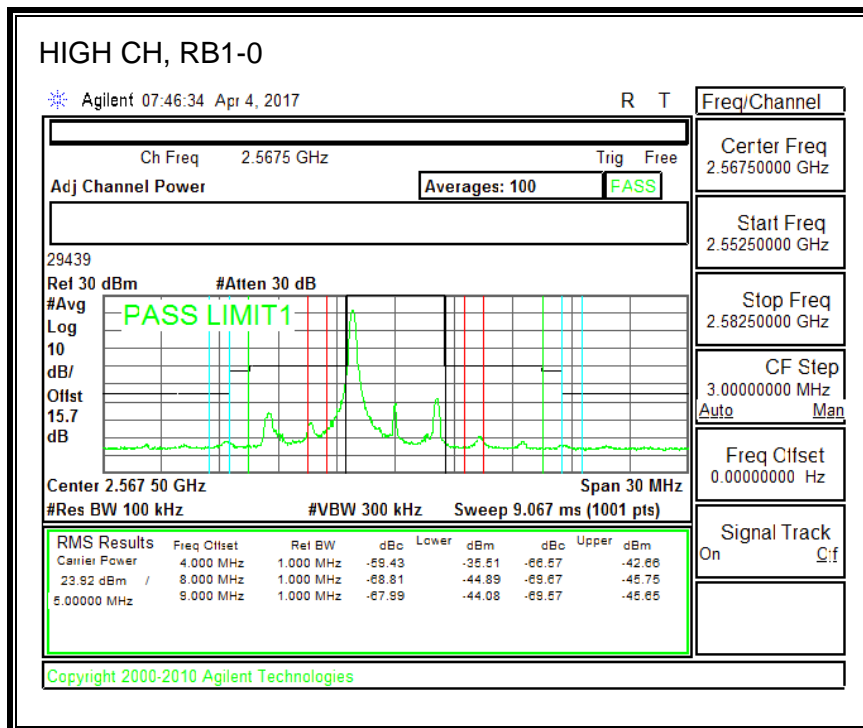
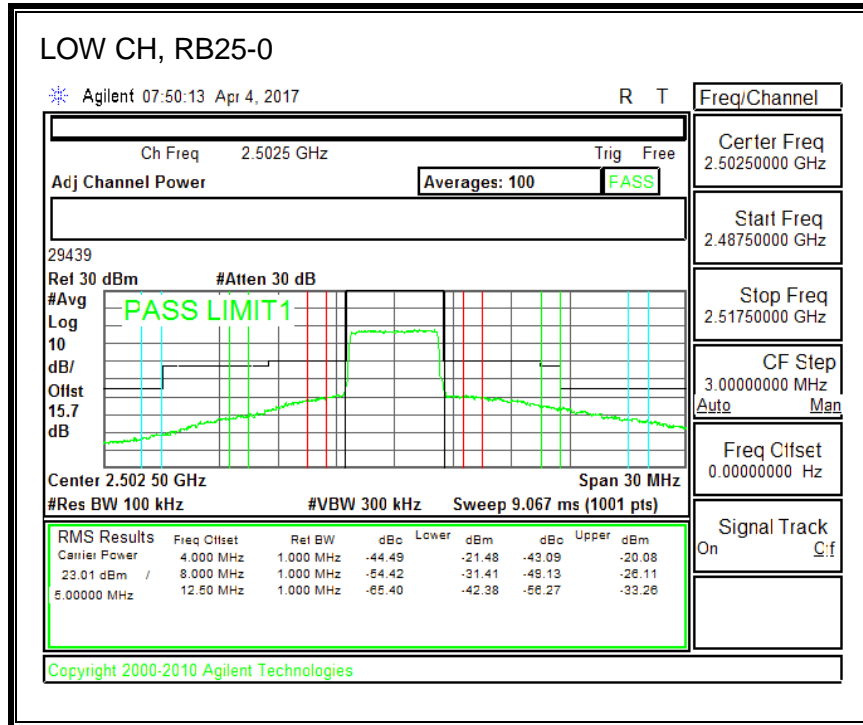


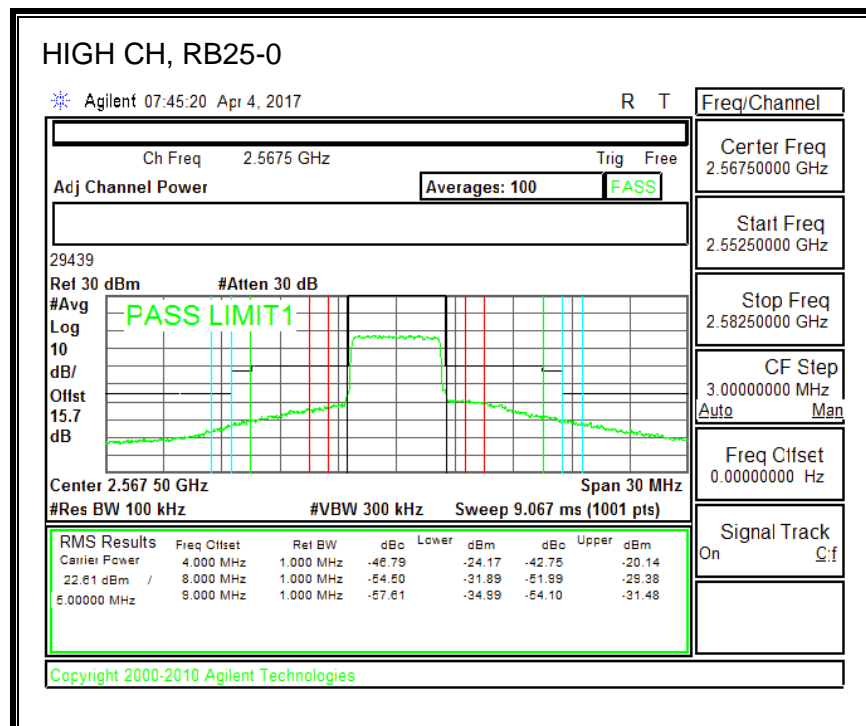
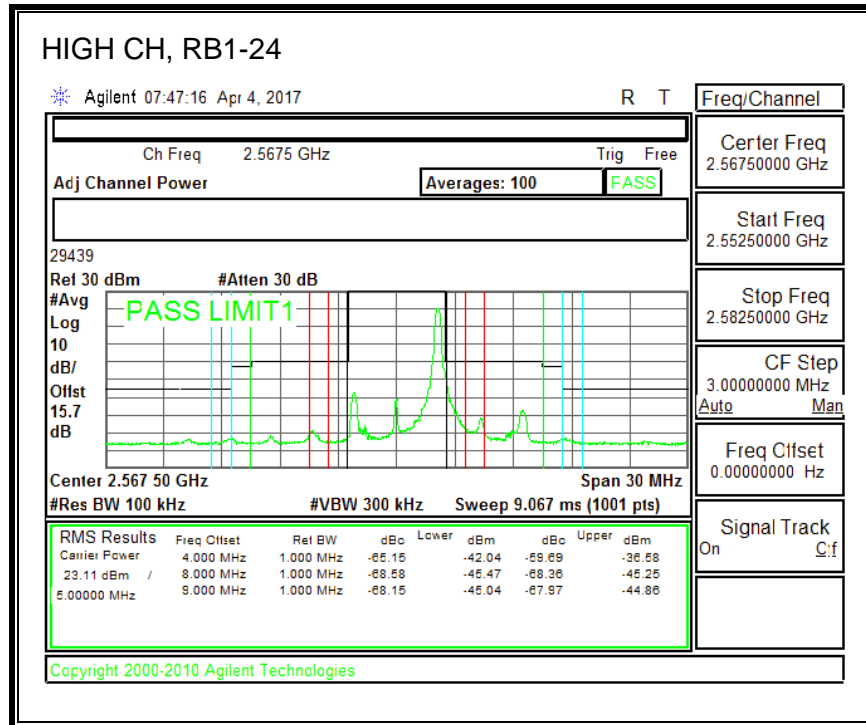




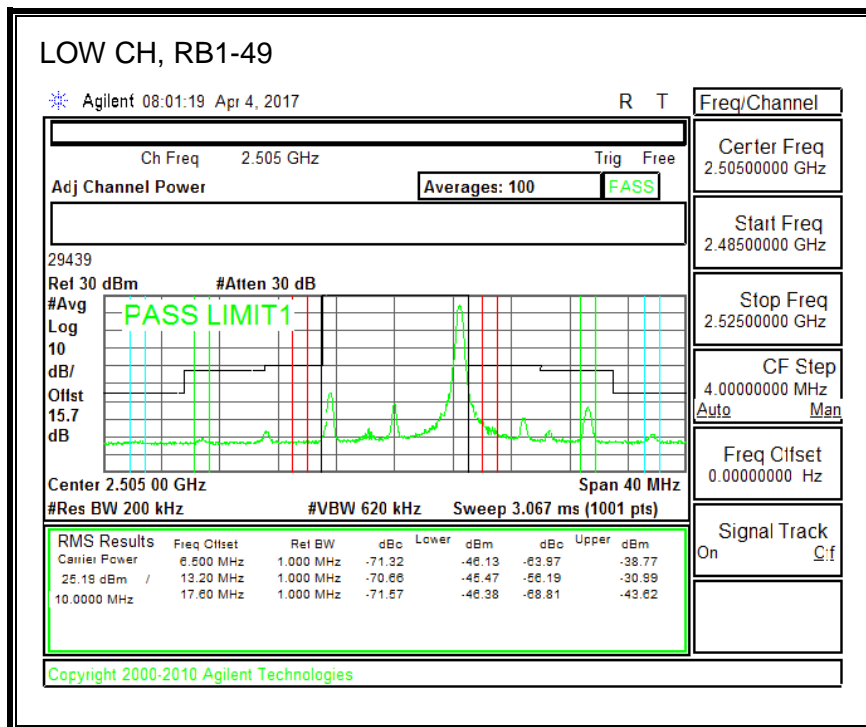
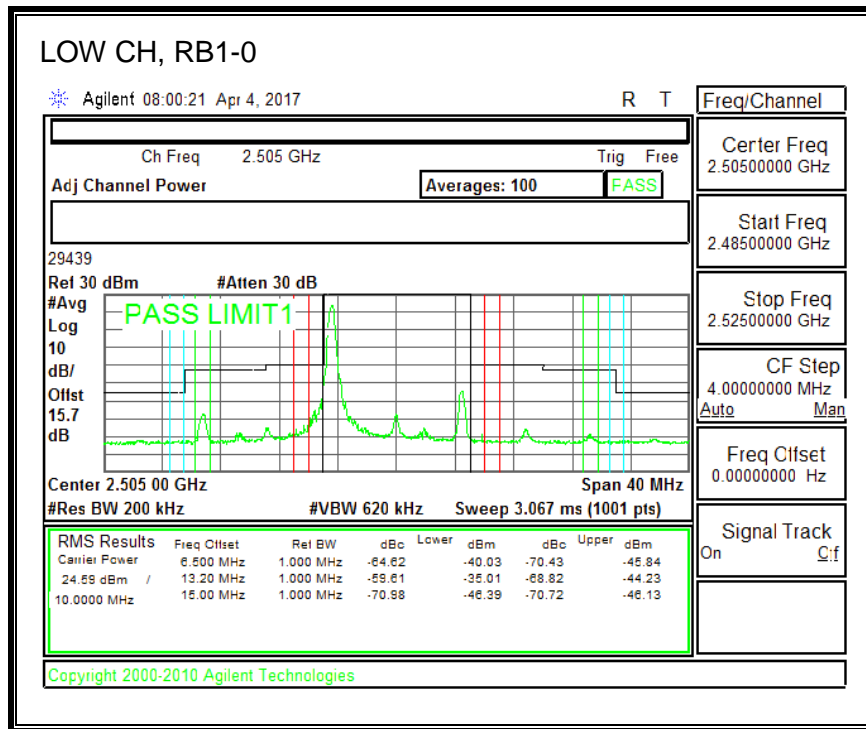
16QAM, (5.0 MHz BAND WIDTH)

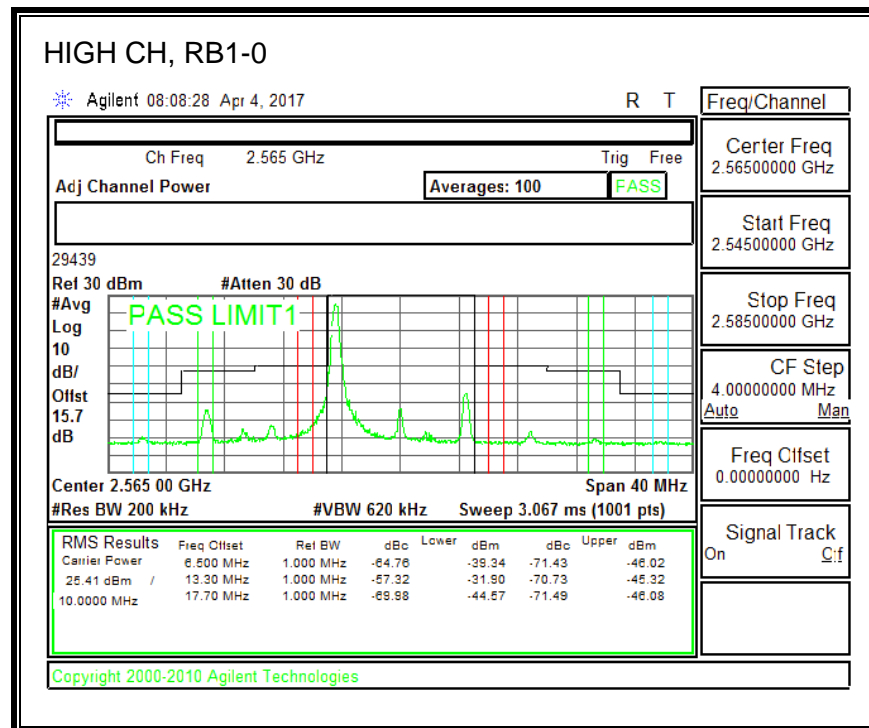
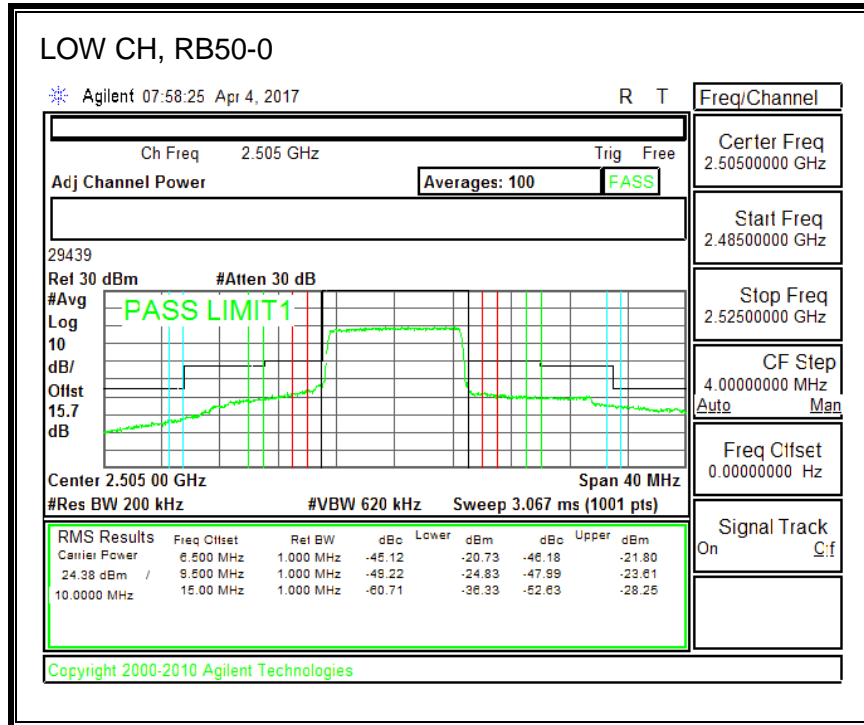


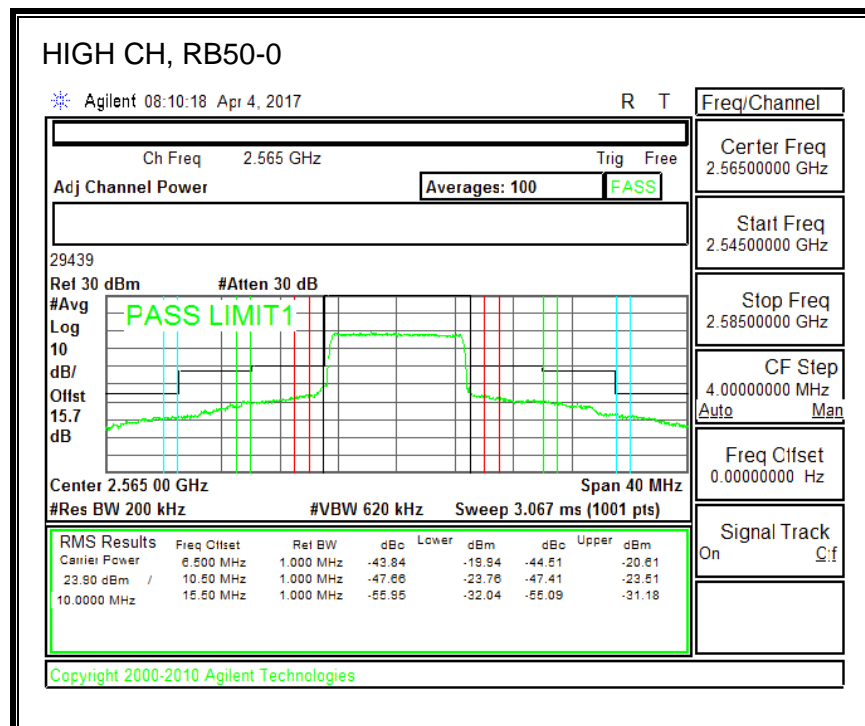
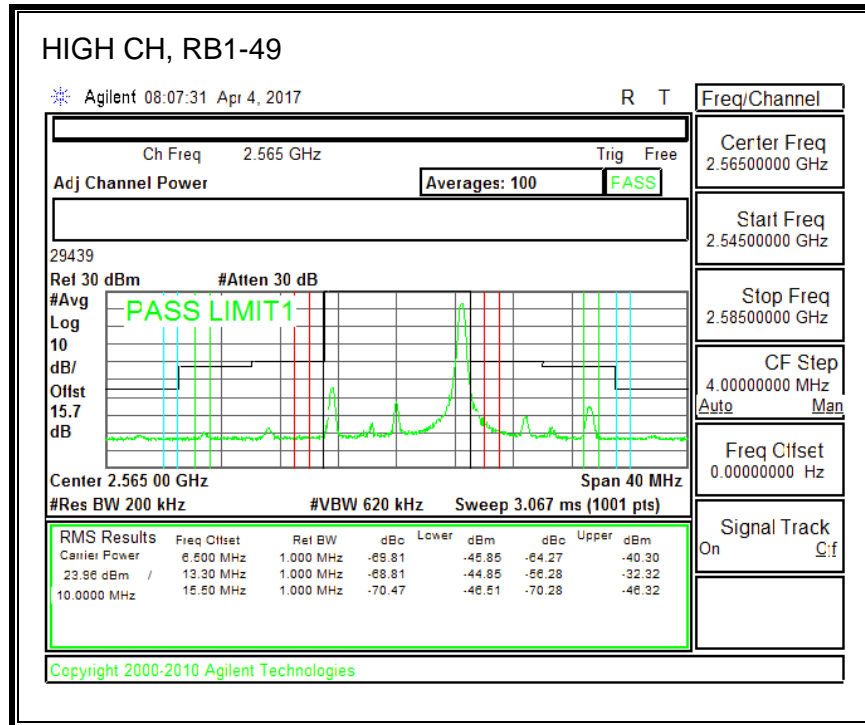




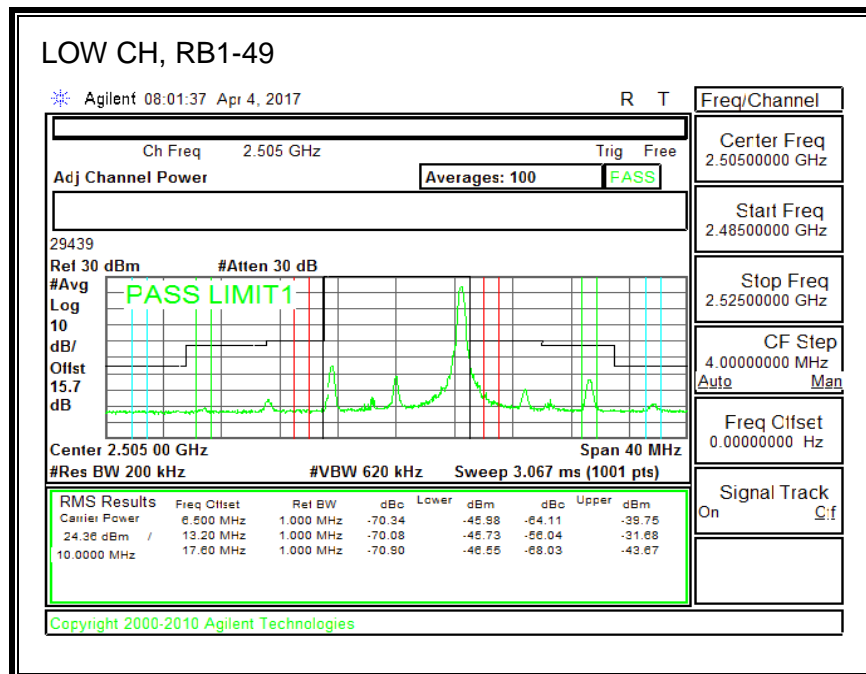
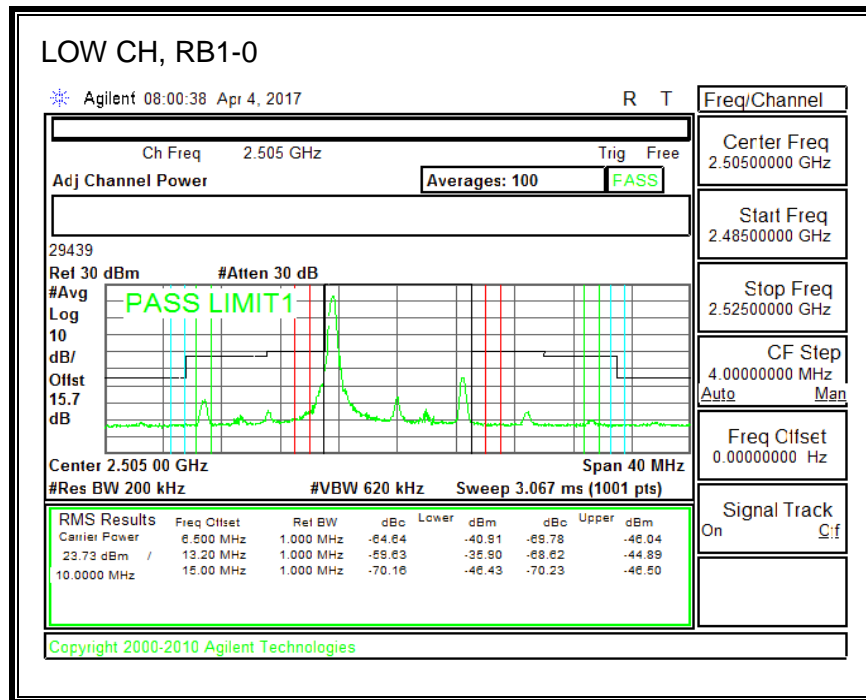
QPSK, (10.0 MHz BAND WIDTH)

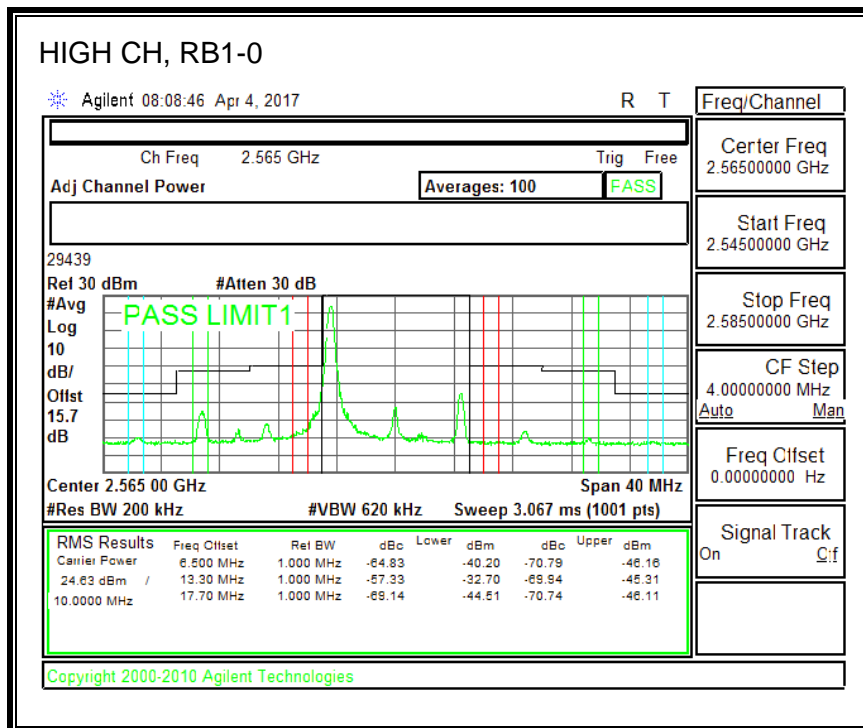
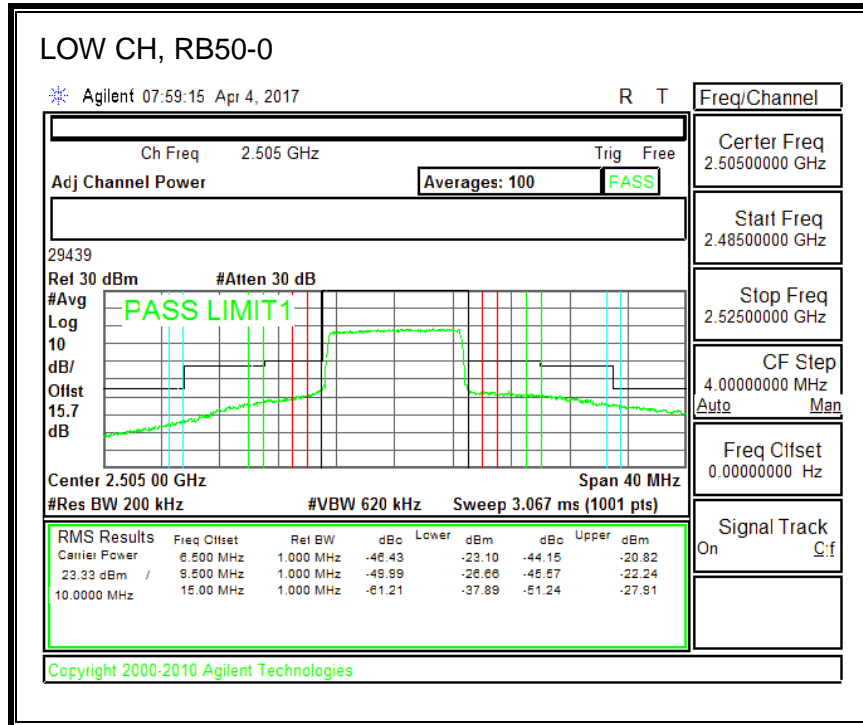


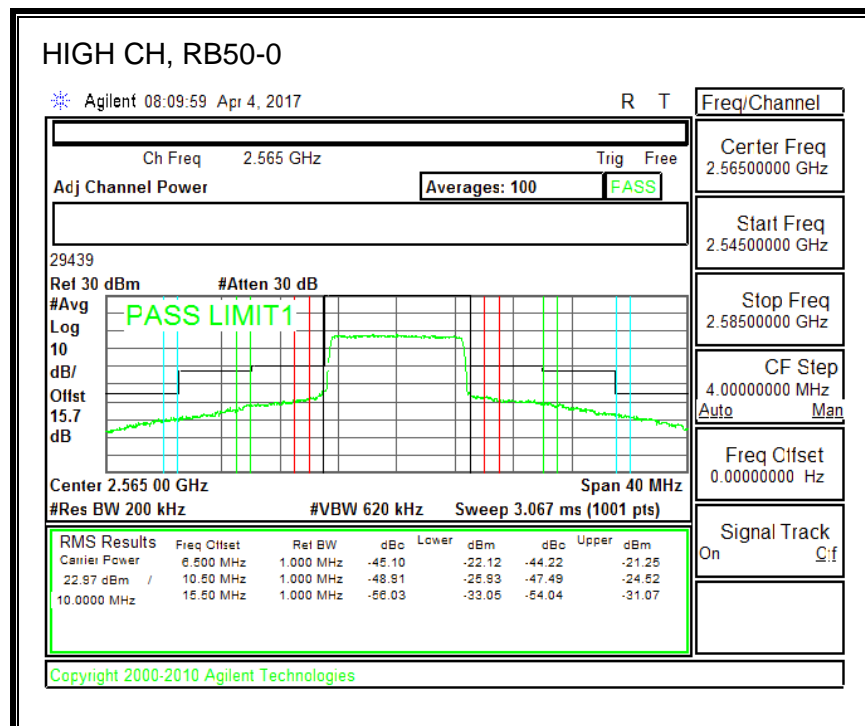
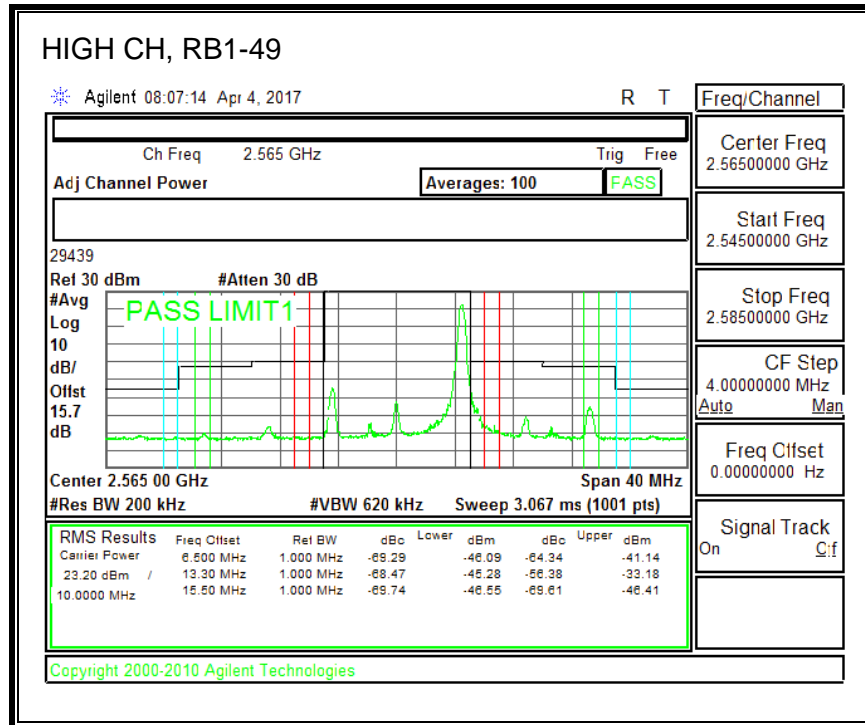




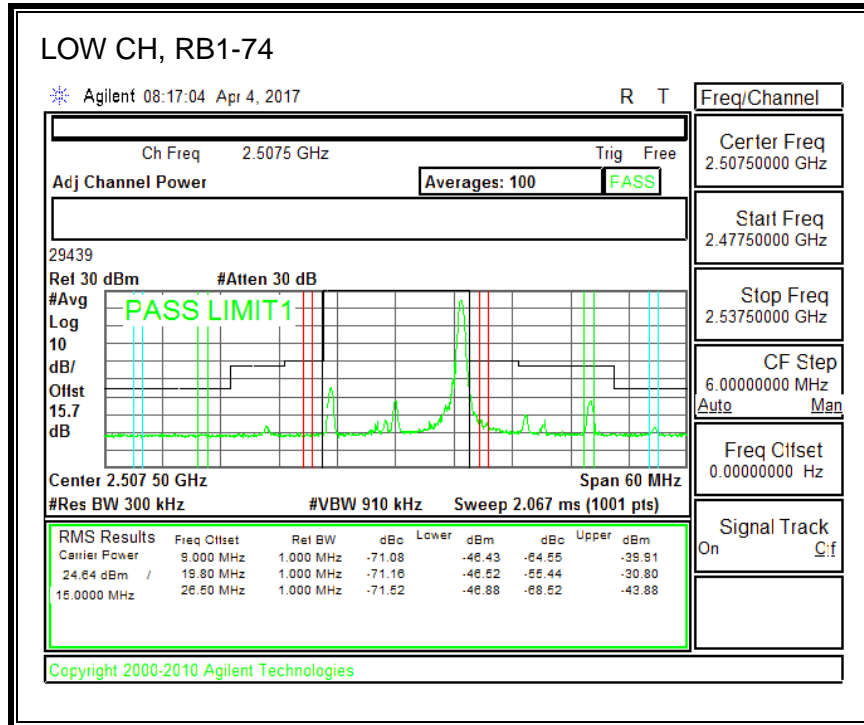
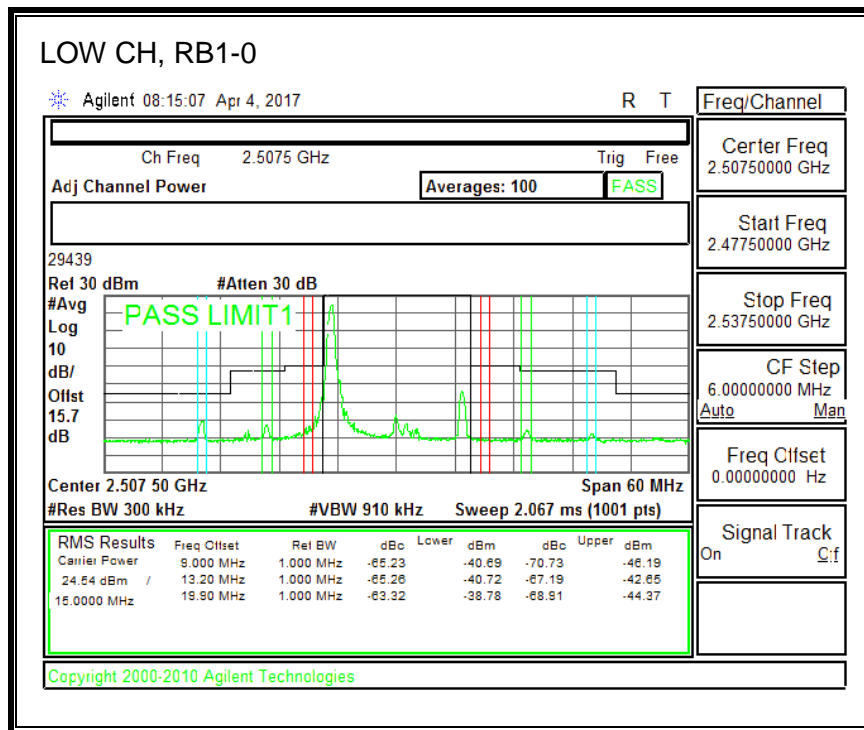
16QAM, (10.0 MHz BAND WIDTH)

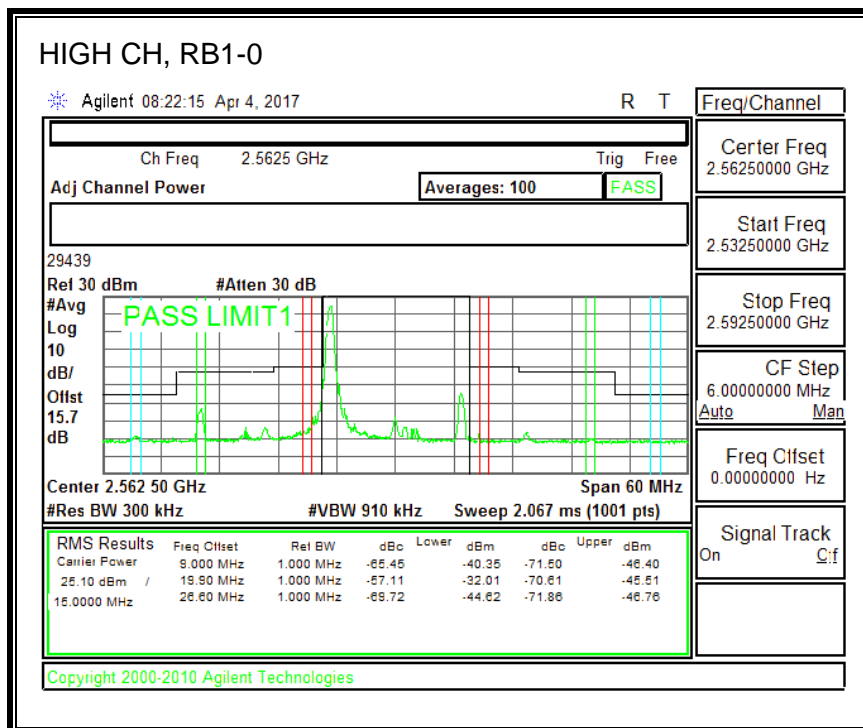
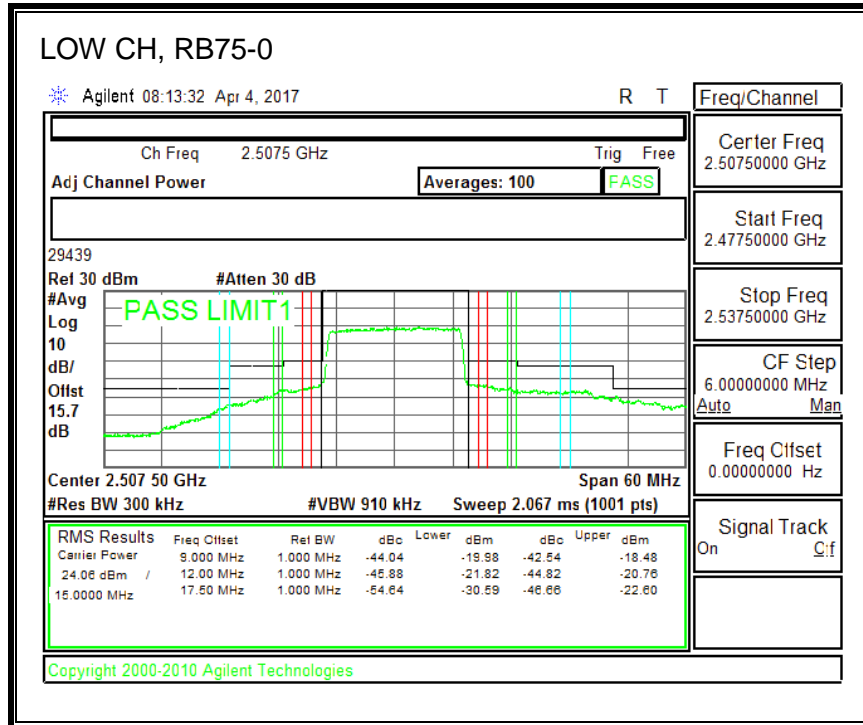


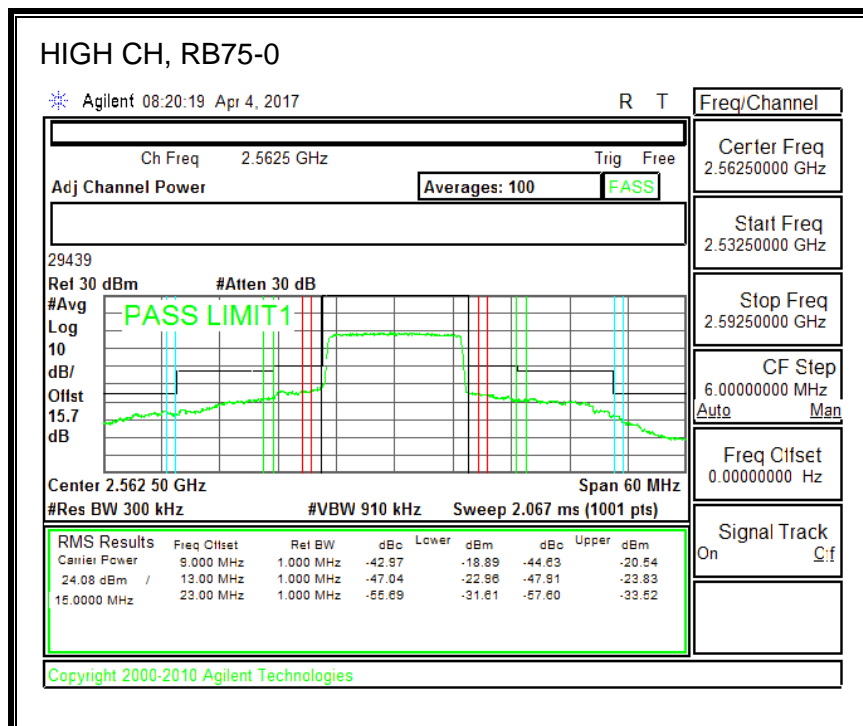
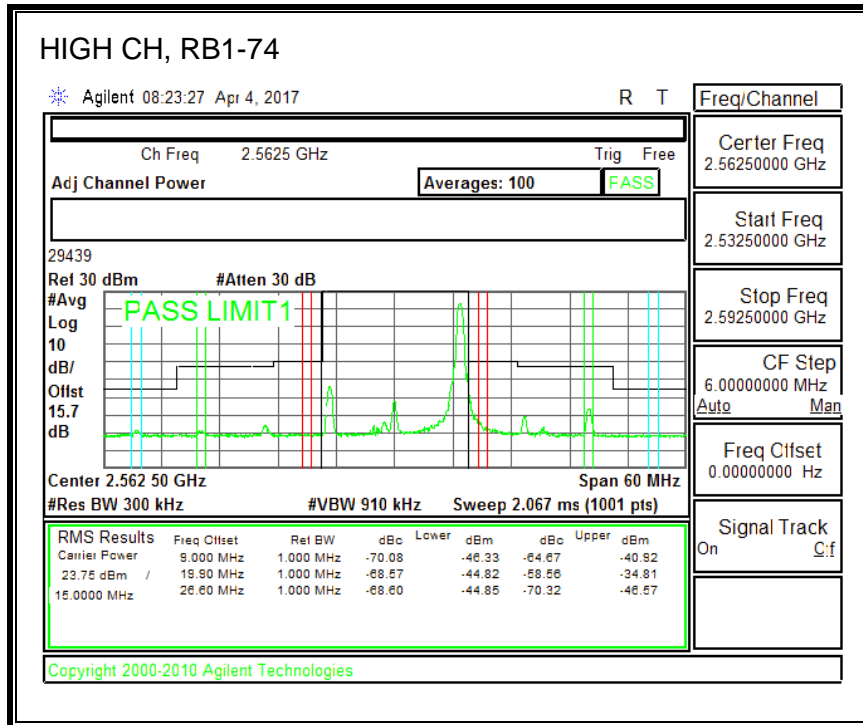




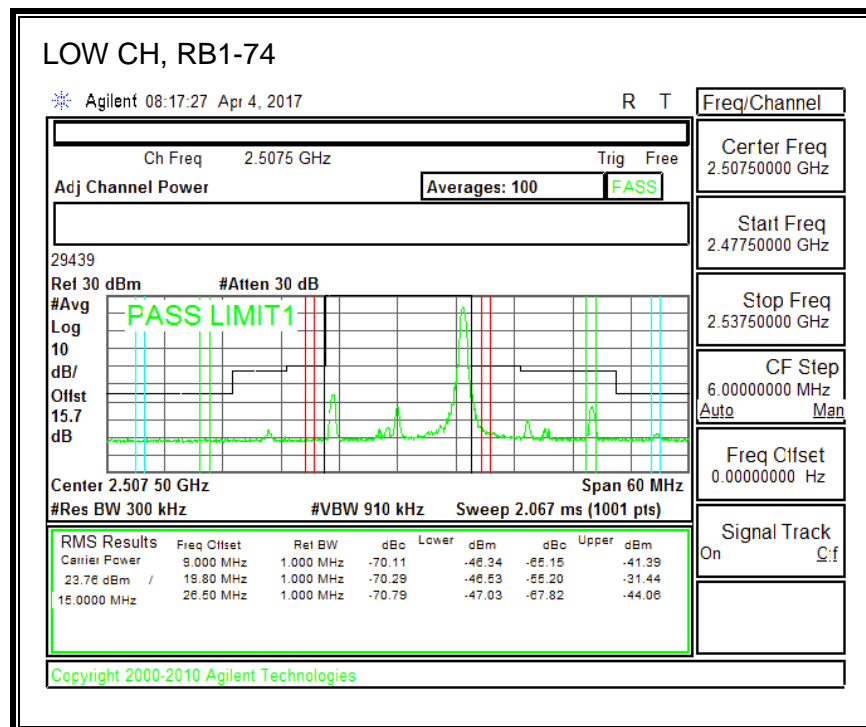
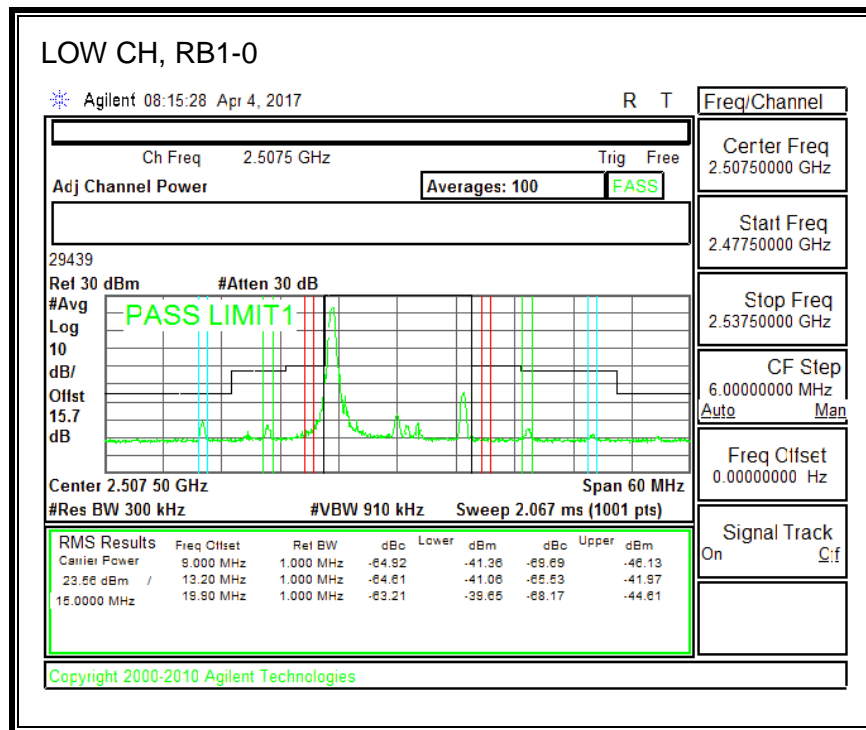
QPSK, (15.0 MHz BAND WIDTH)

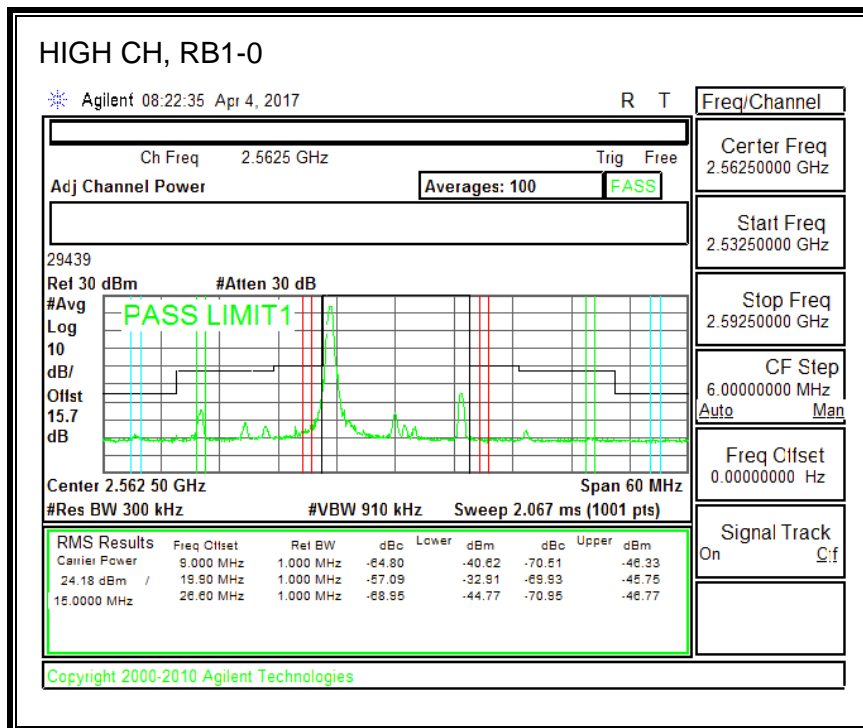
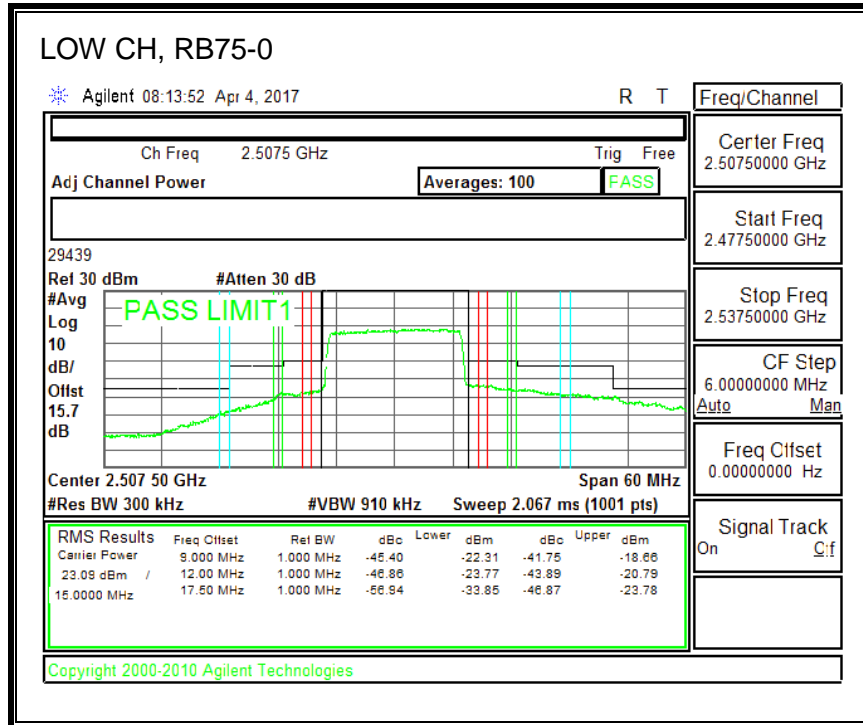


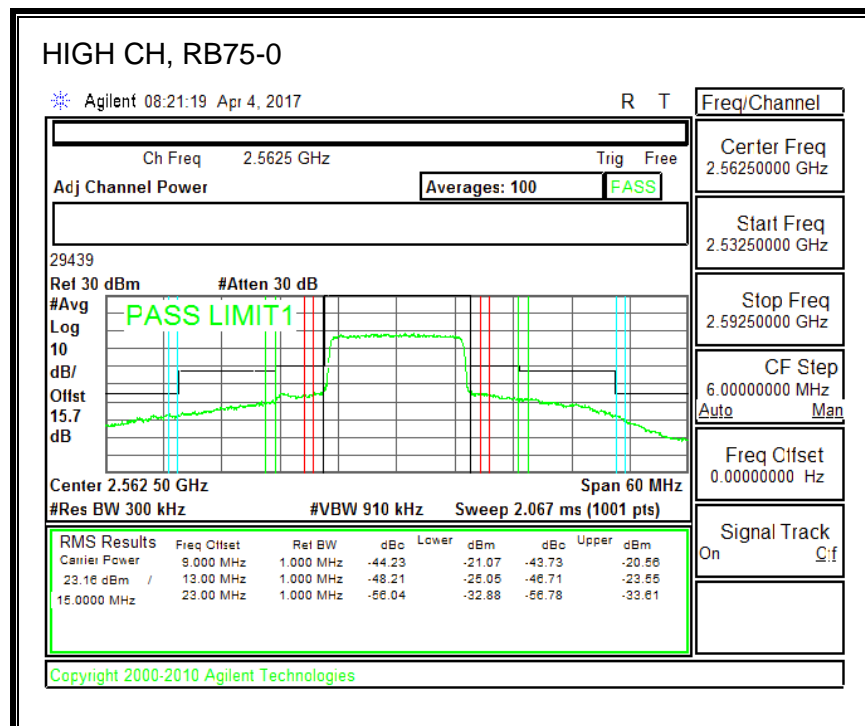
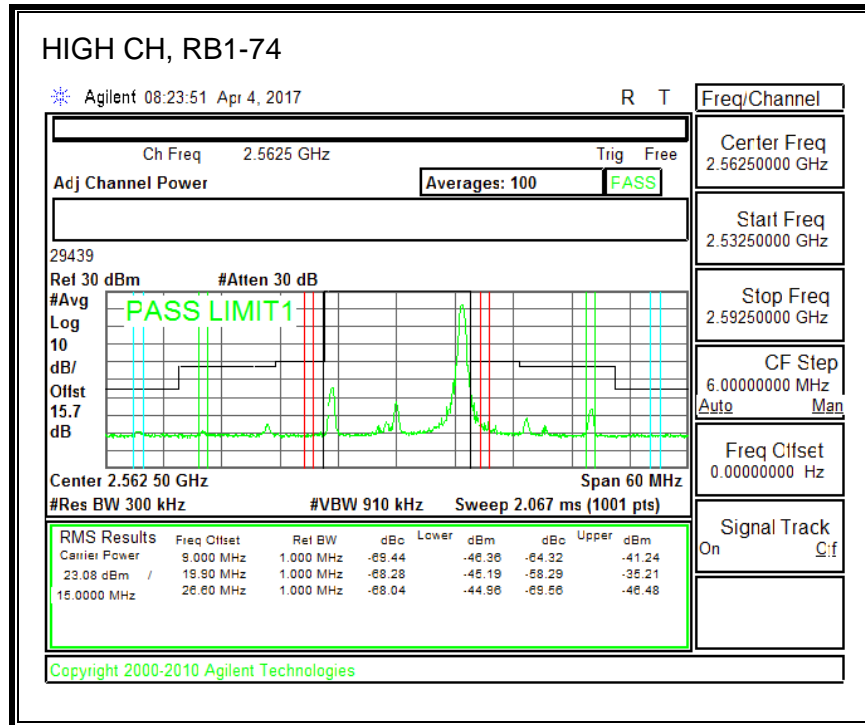




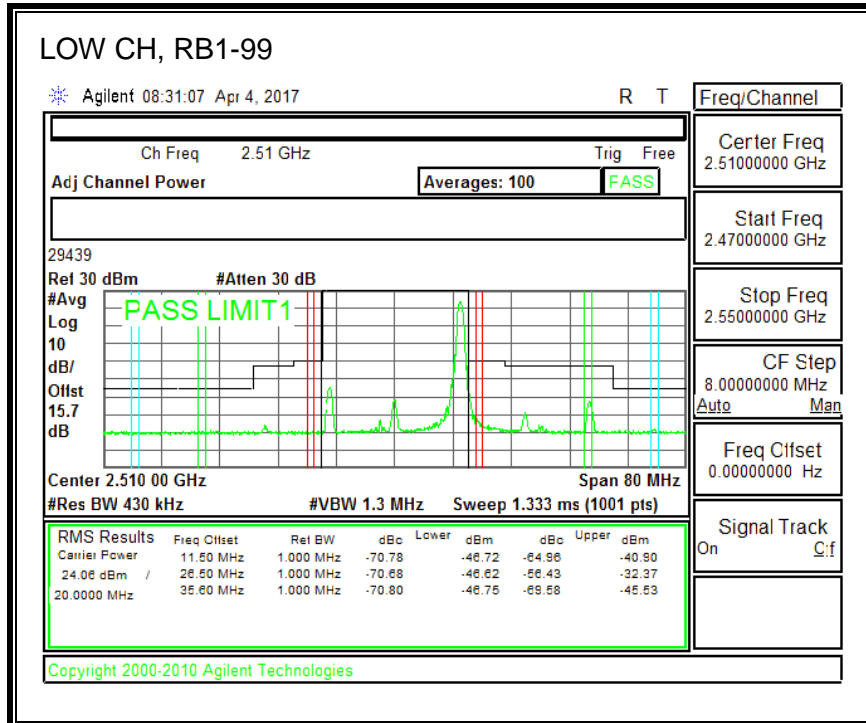
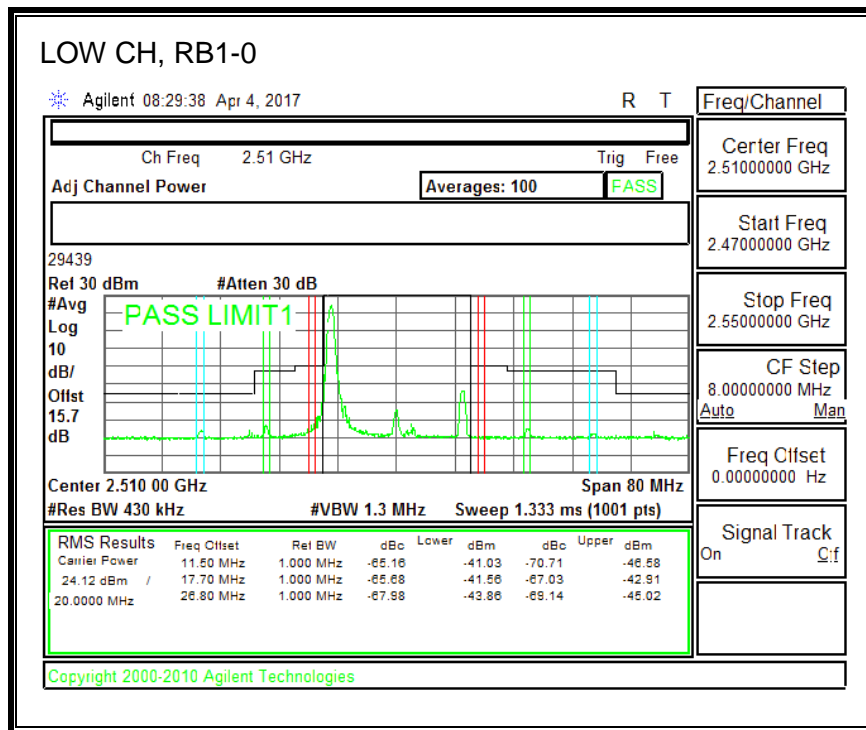
16QAM, (15.0 MHz BAND WIDTH)

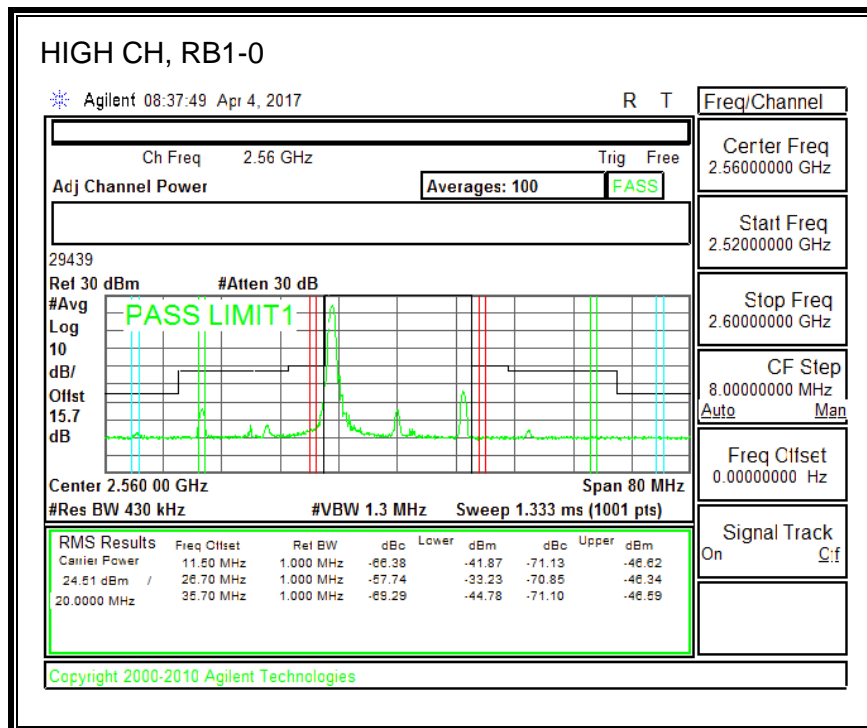
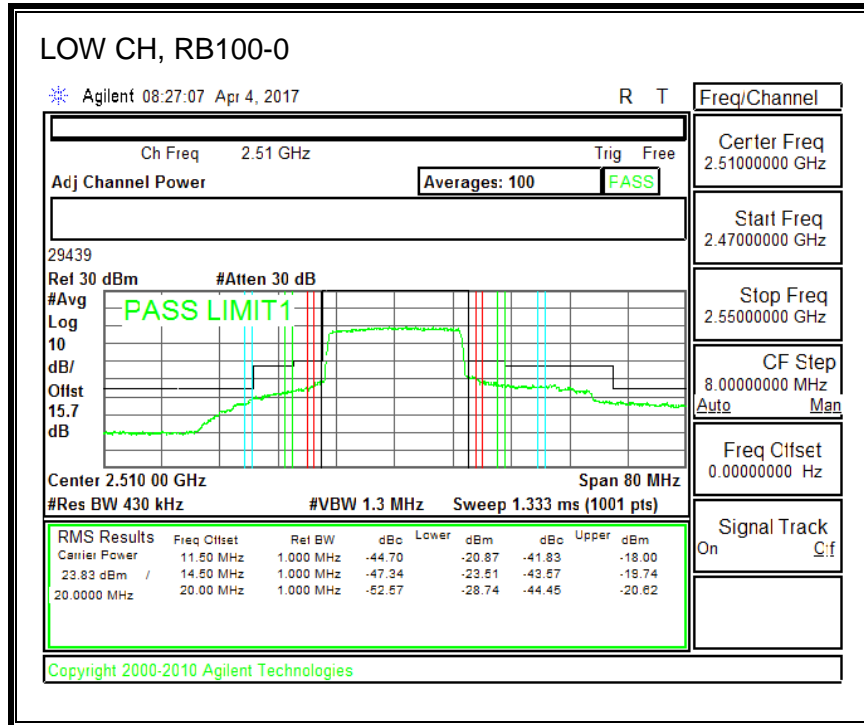


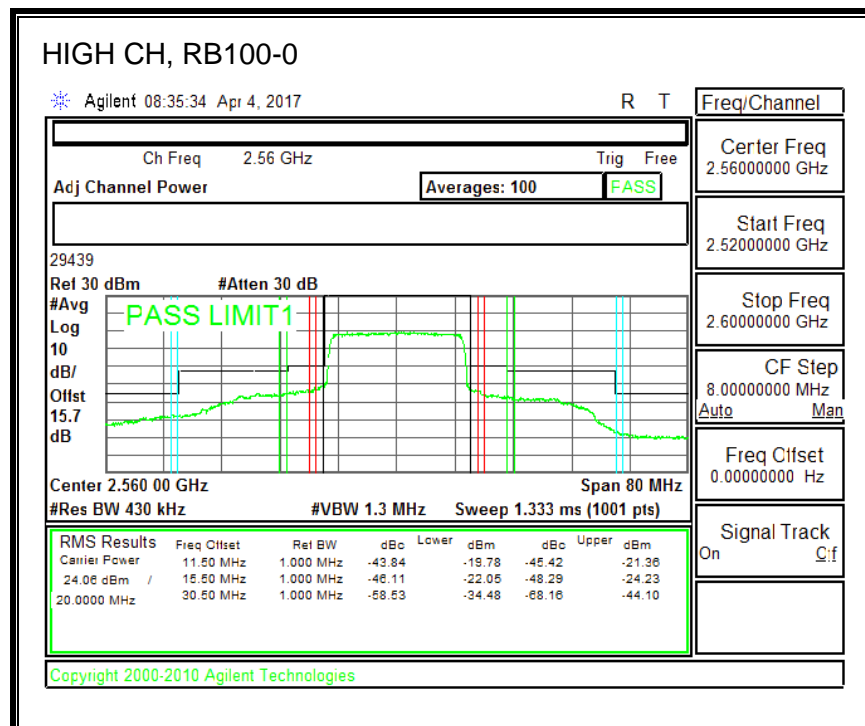
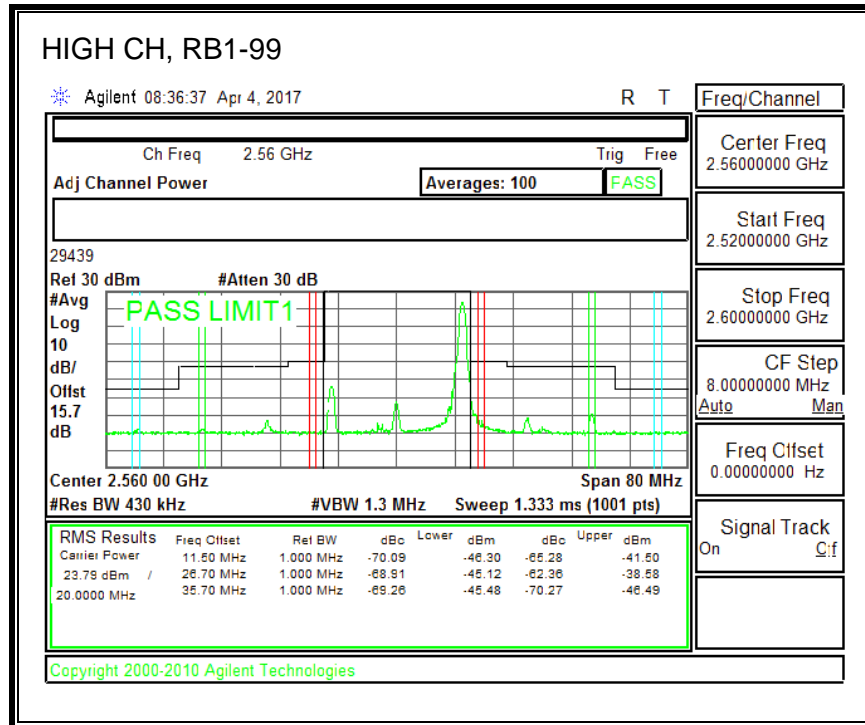




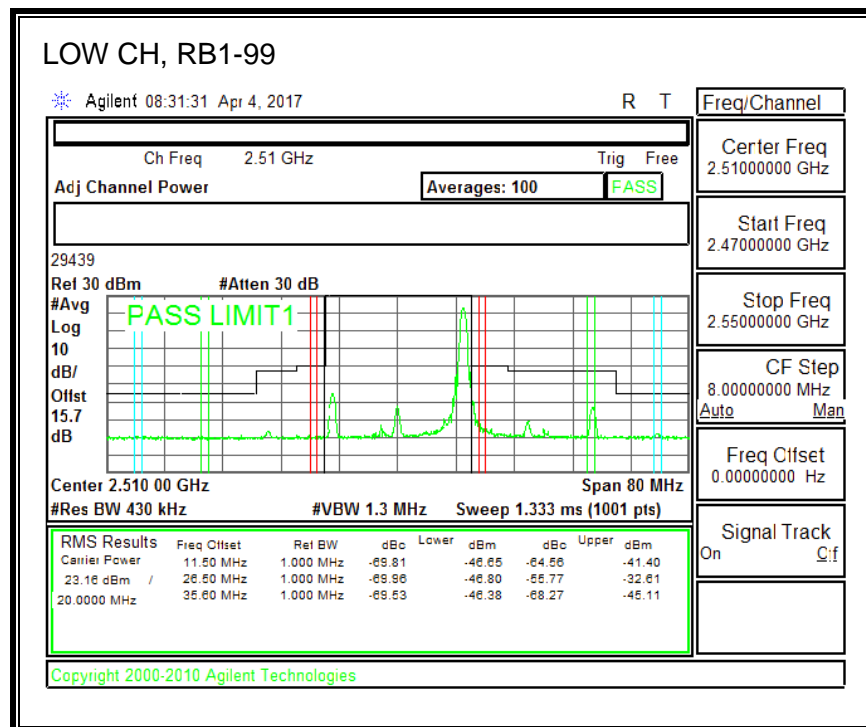
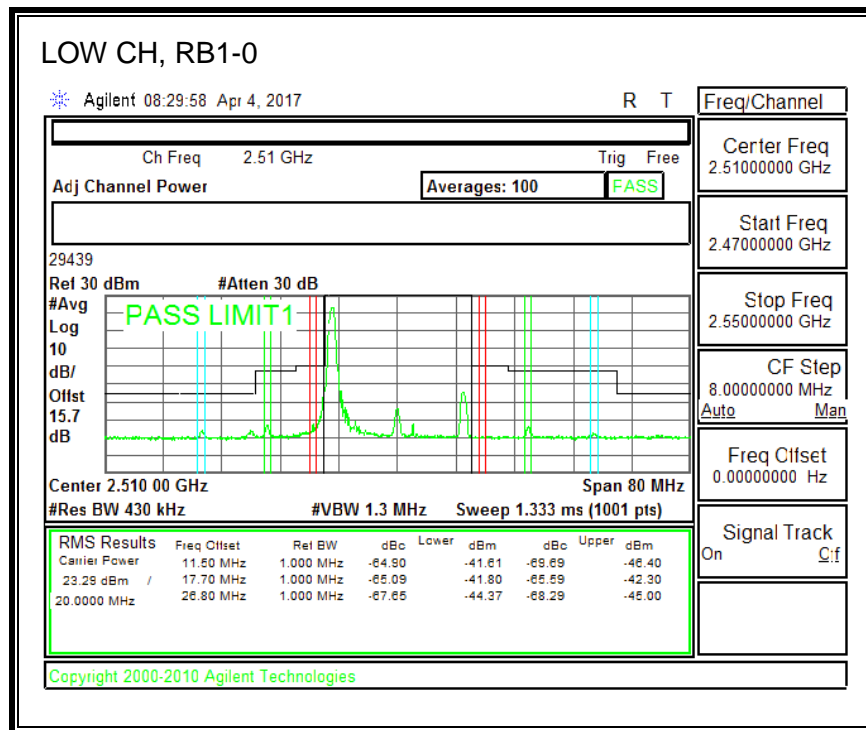
QPSK, (20.0 MHz BAND WIDTH)

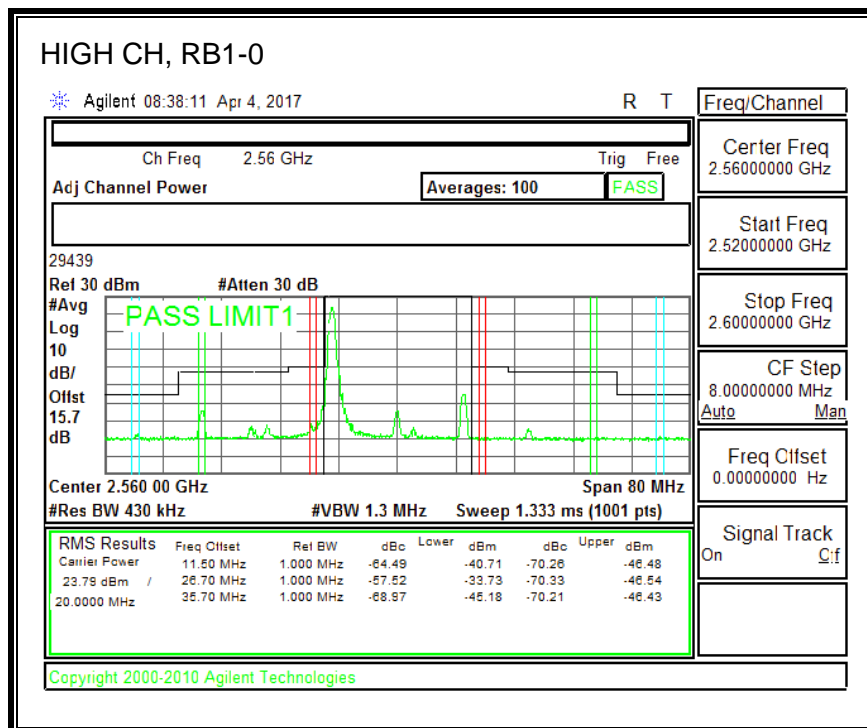
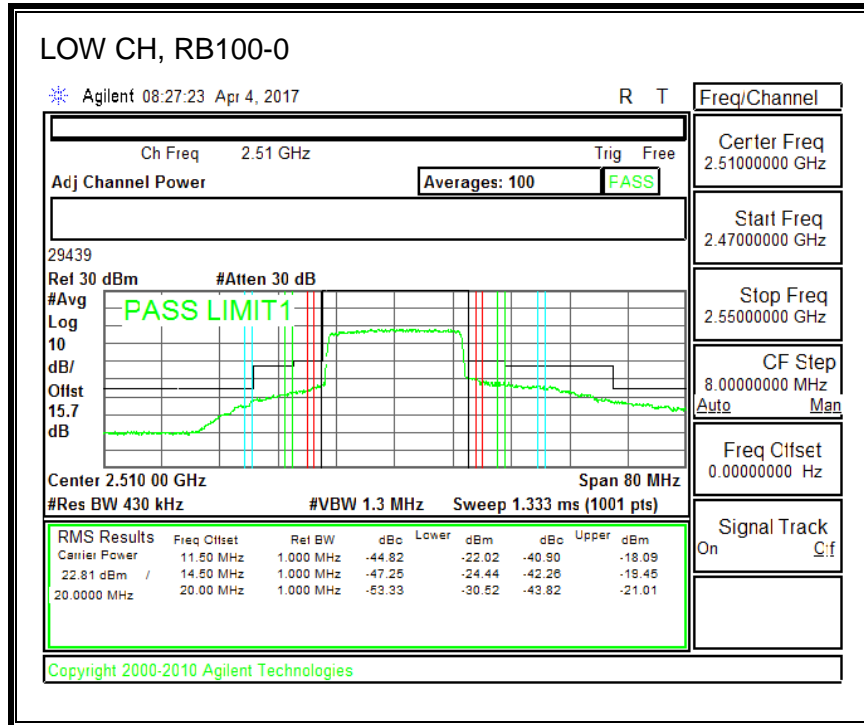


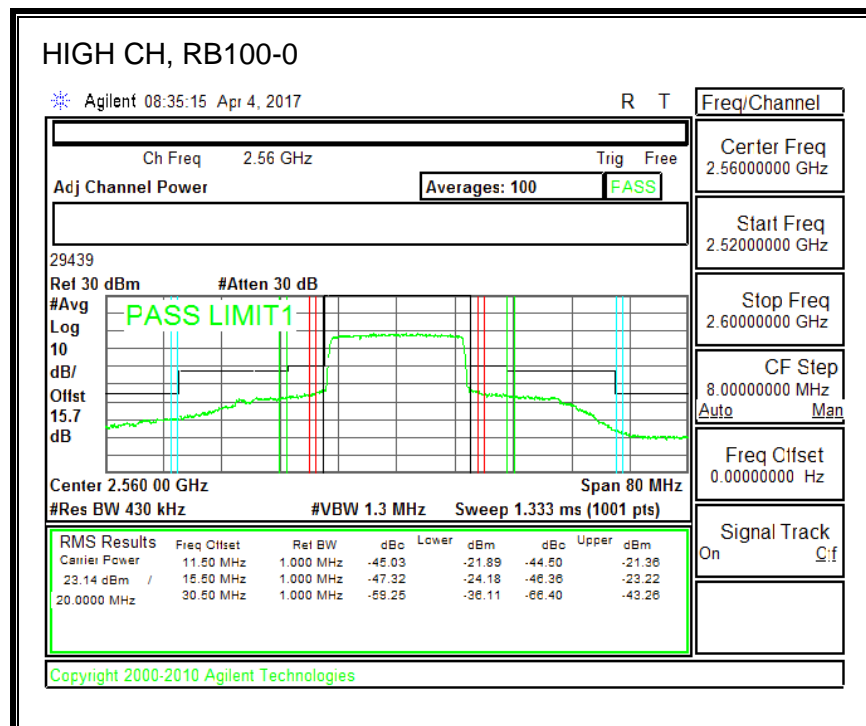
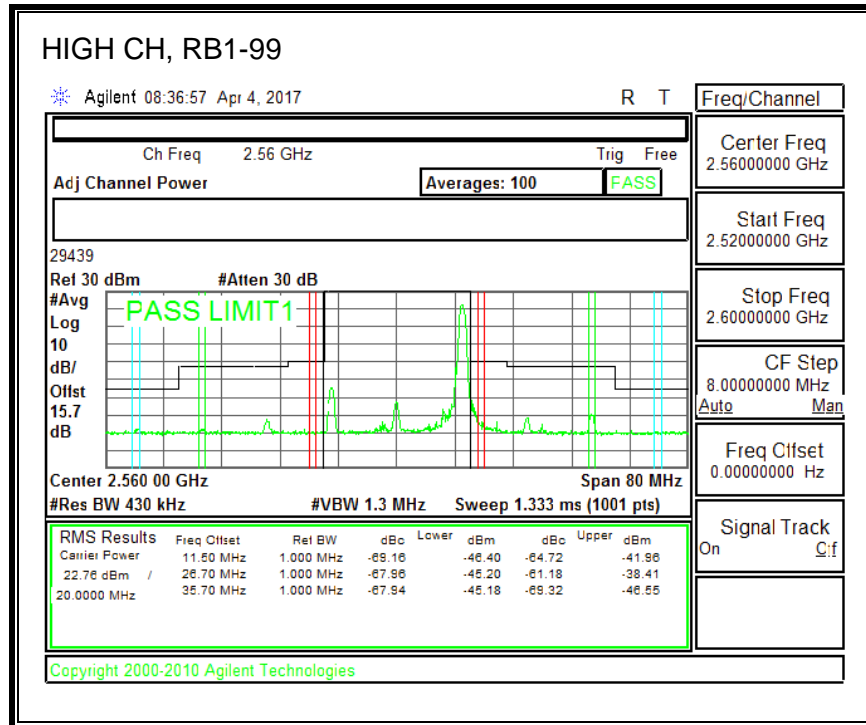




16QAM, (20.0 MHz BAND WIDTH)

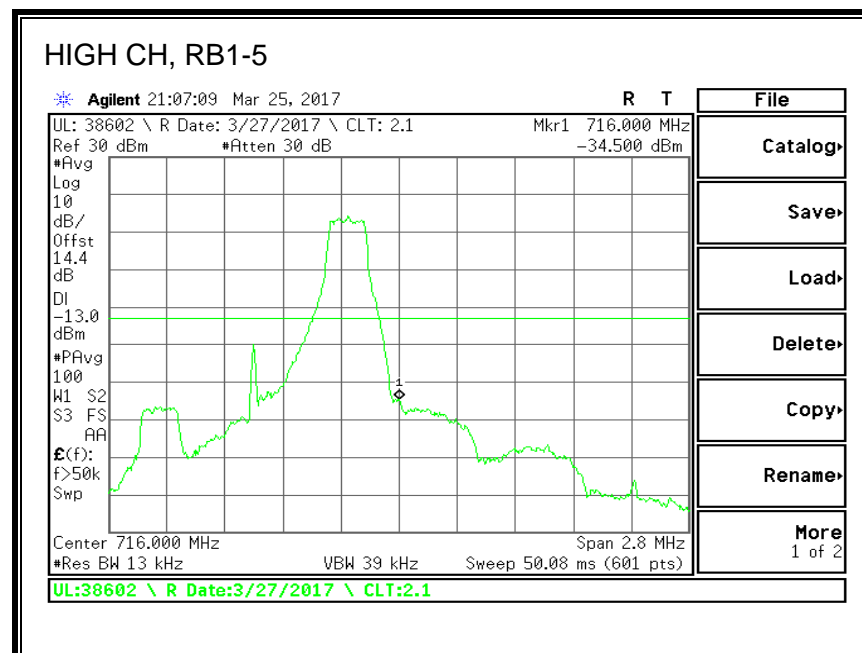
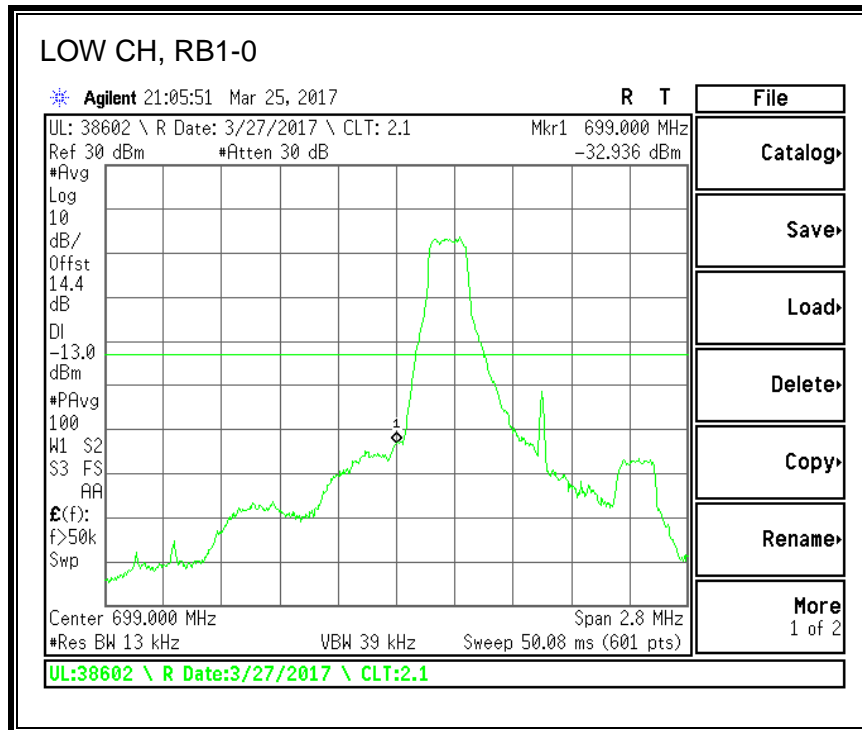


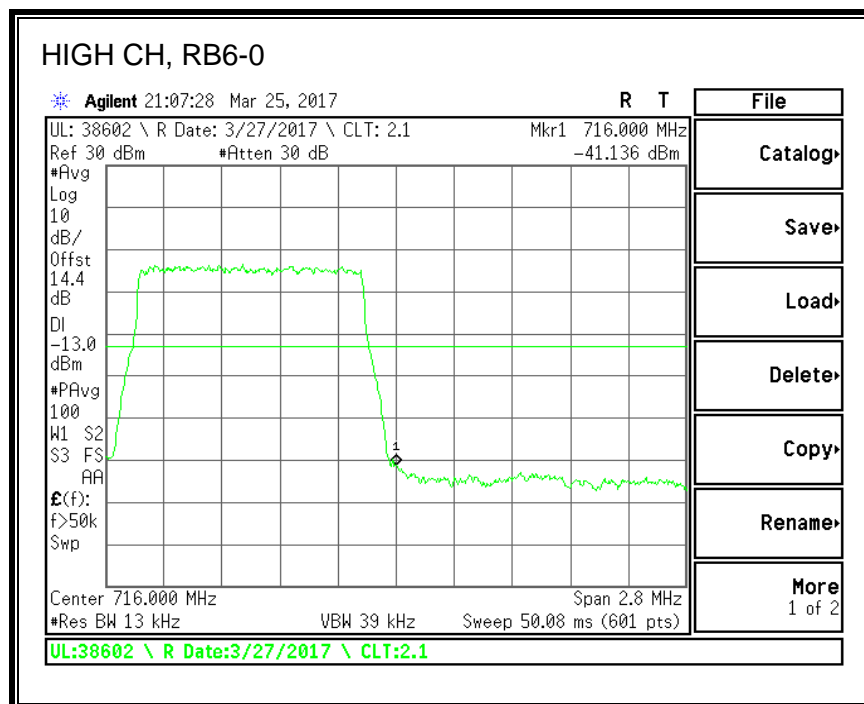
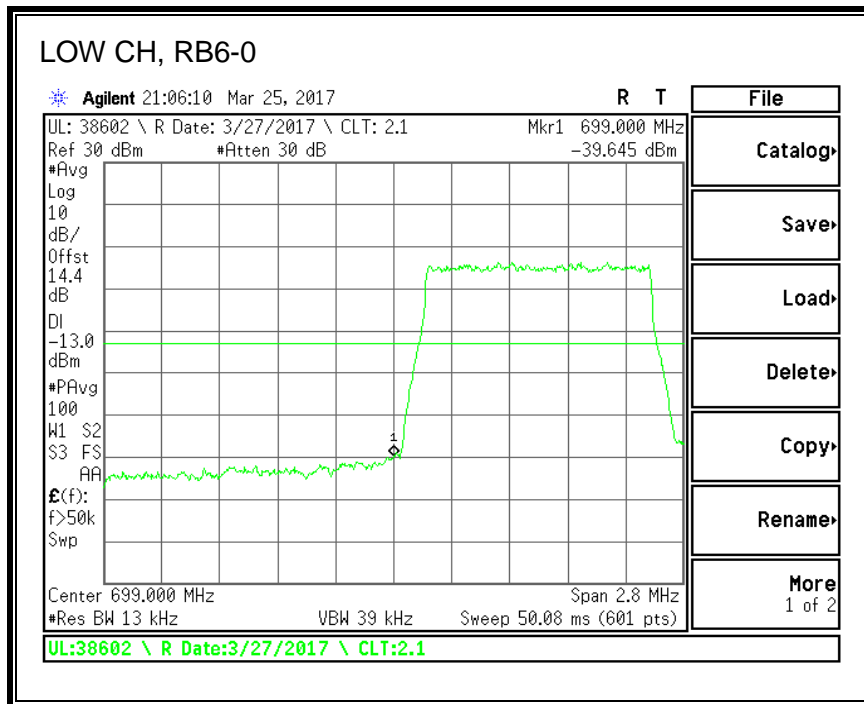




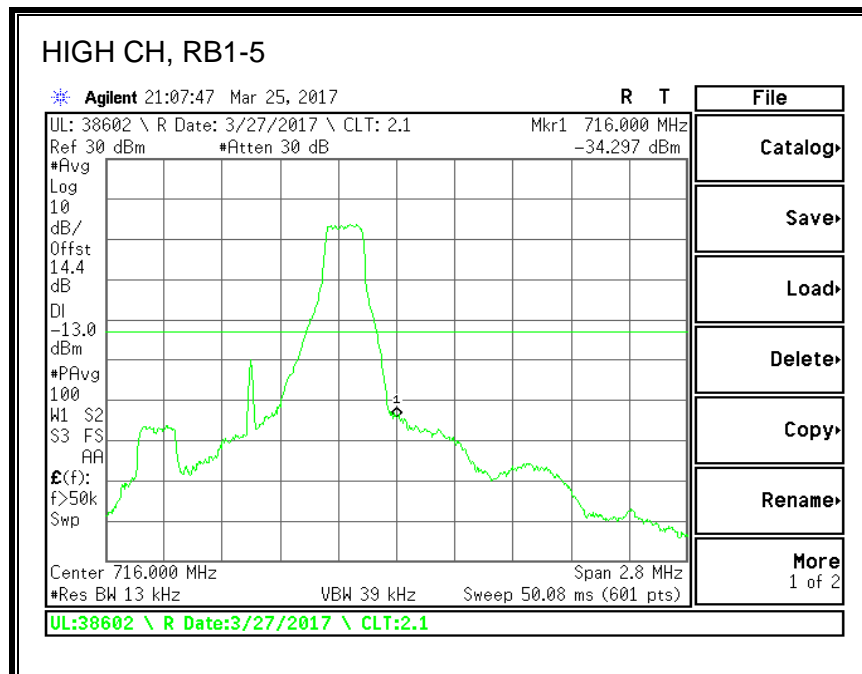
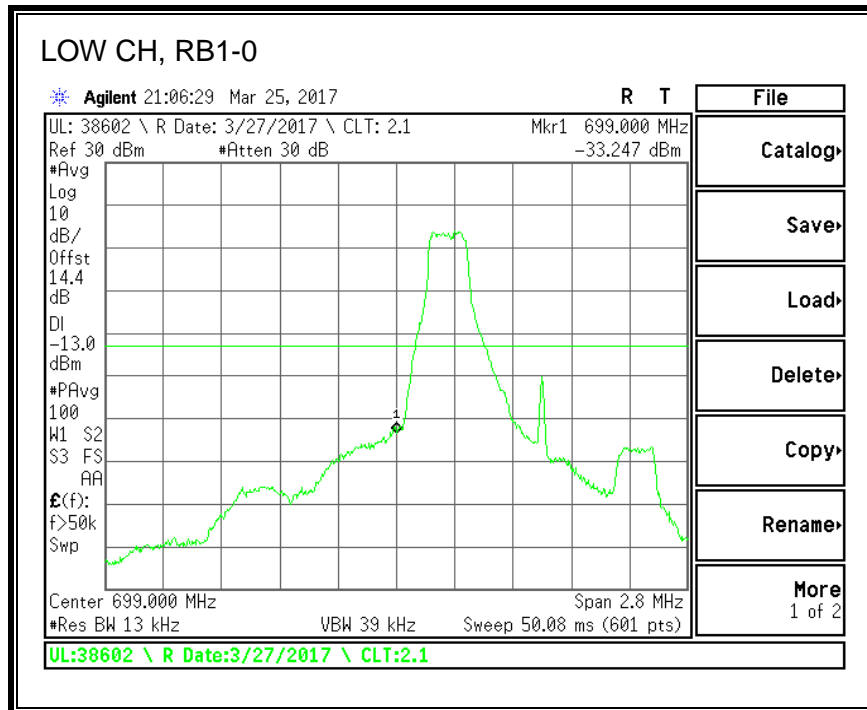
8.2.5. LTE BAND 12 BANDEDGE

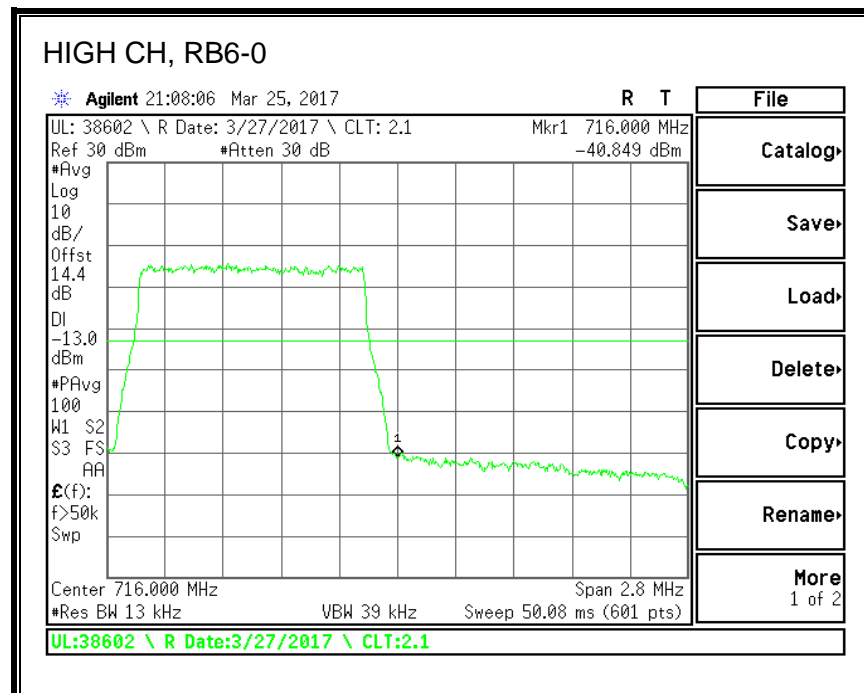
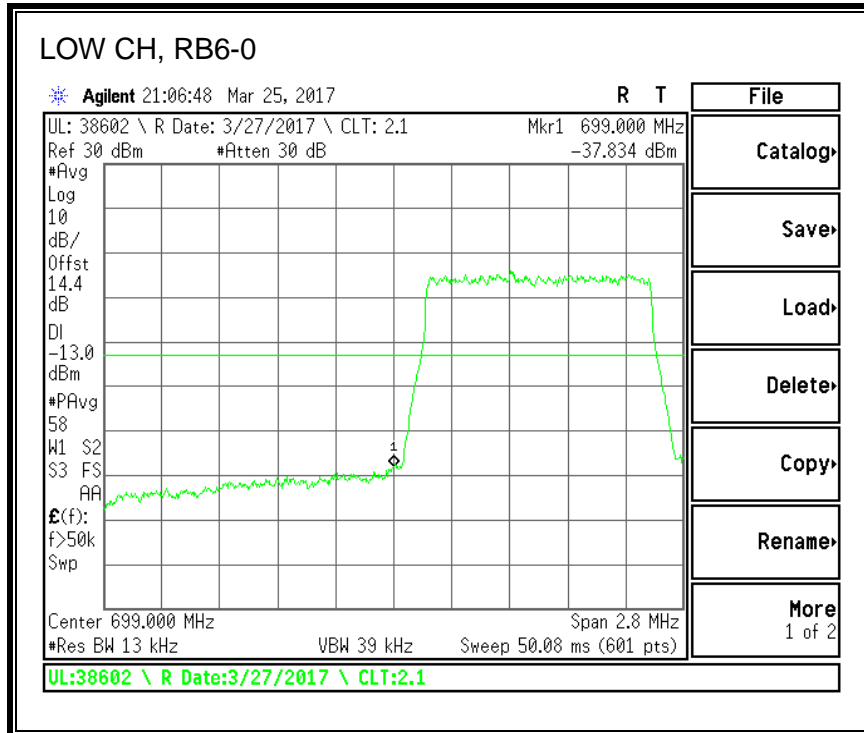
QPSK, (1.4 MHz BAND WIDTH)



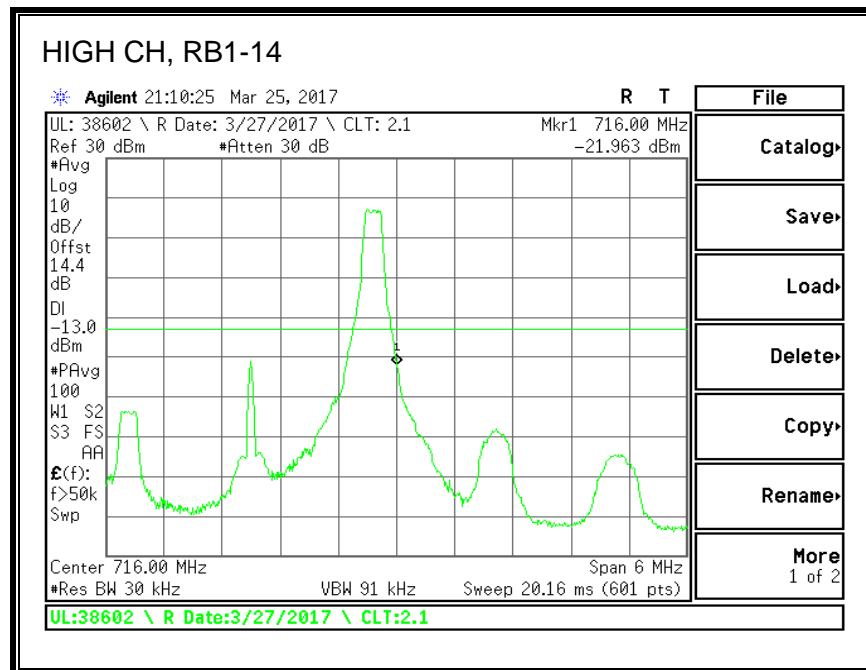
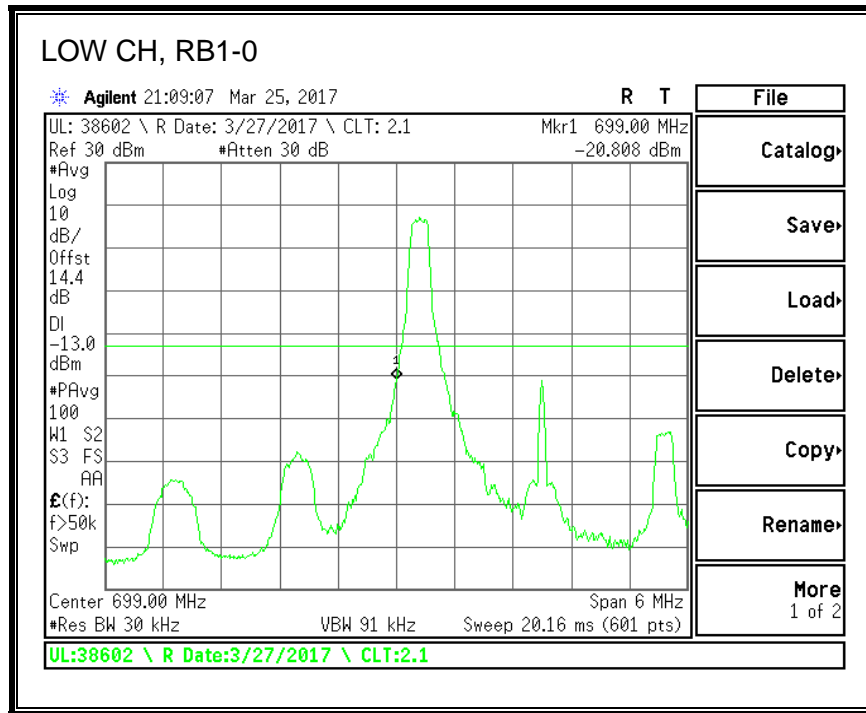


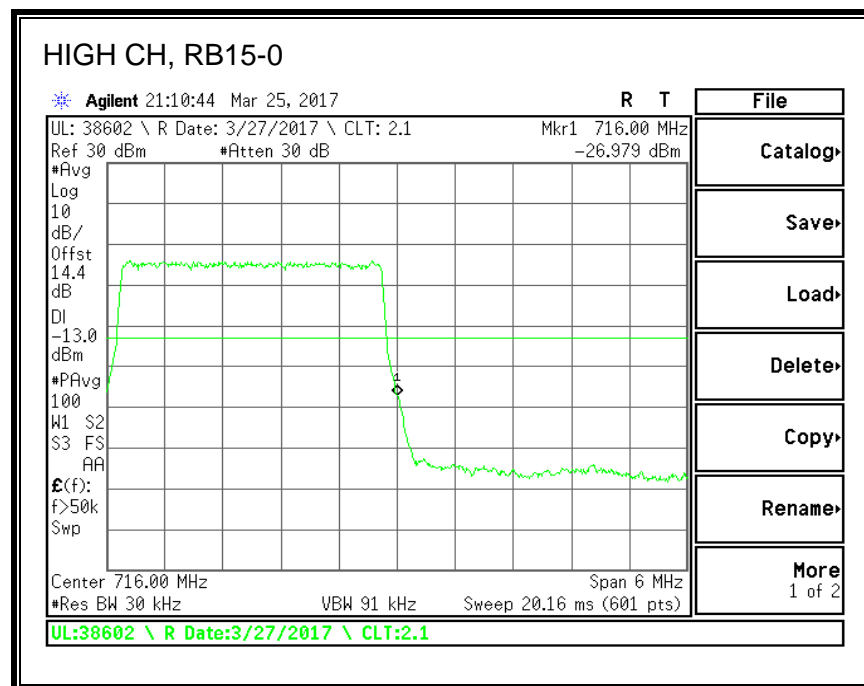
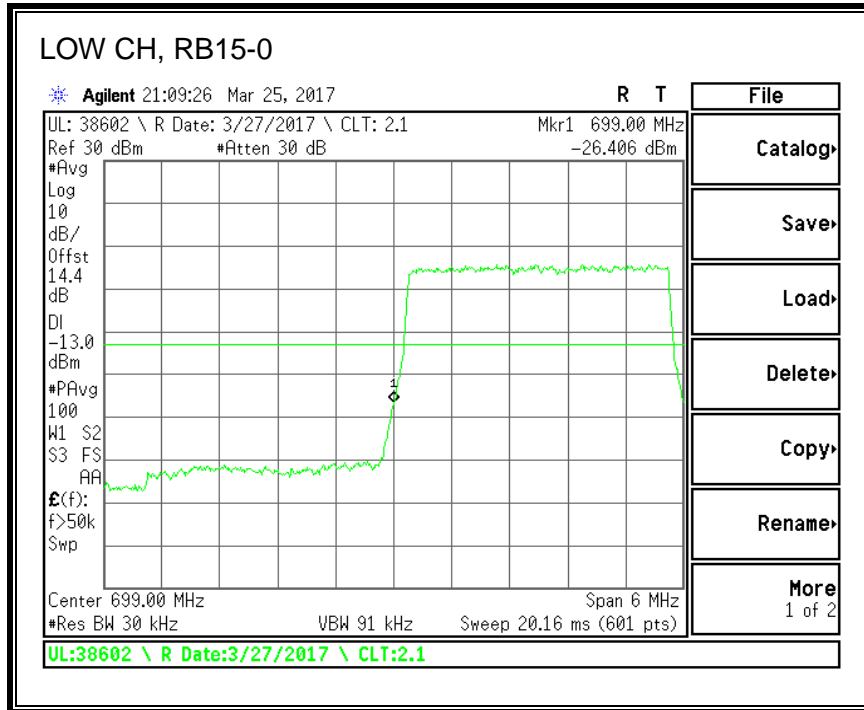
16QAM, (1.4 MHz BAND WIDTH)



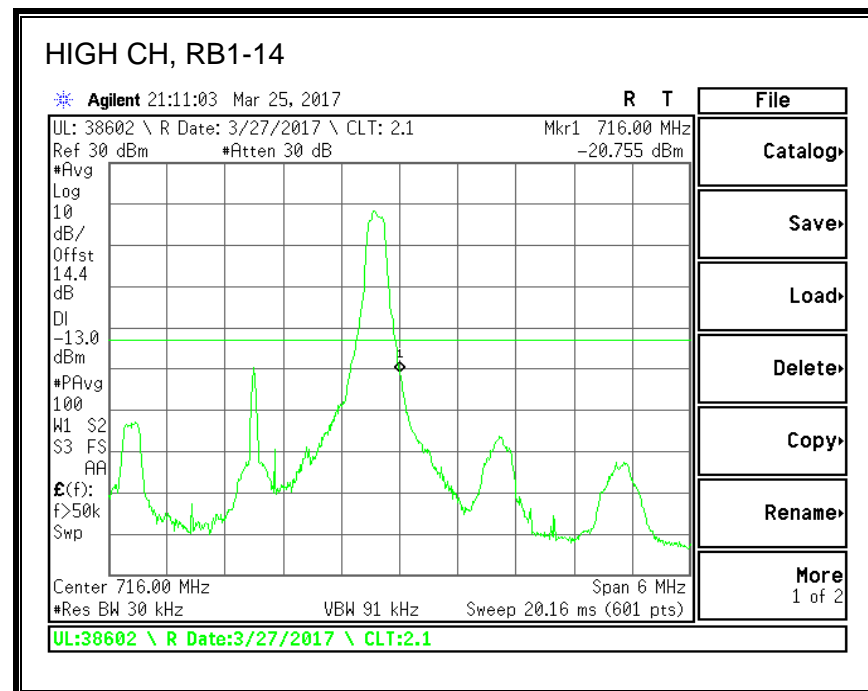
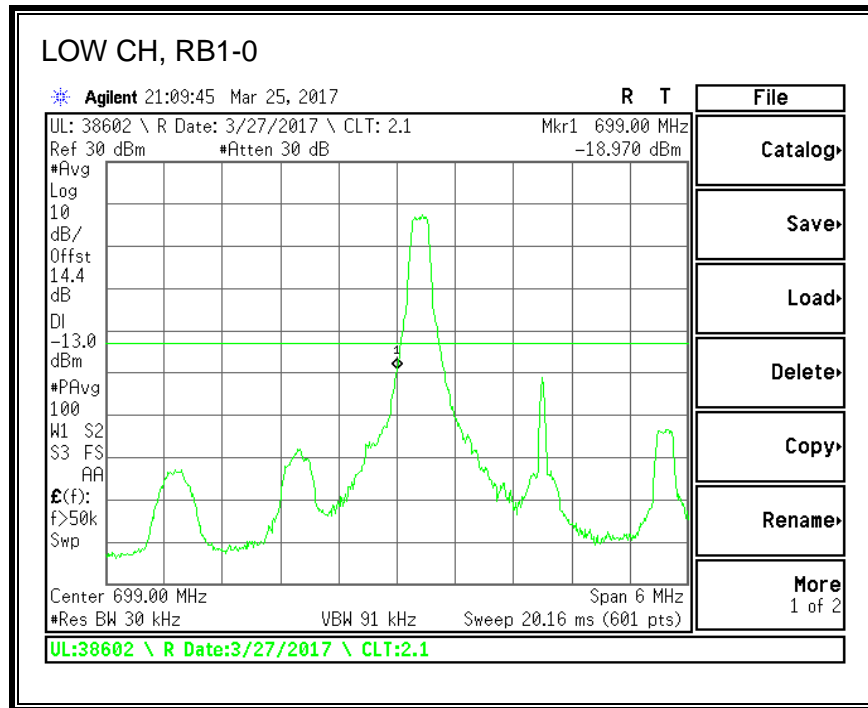


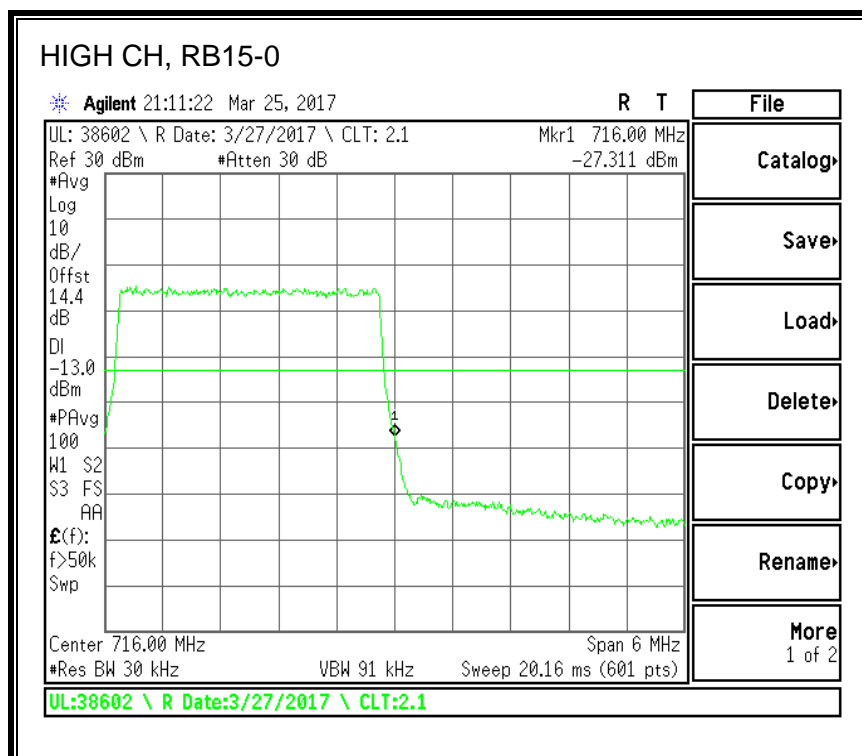
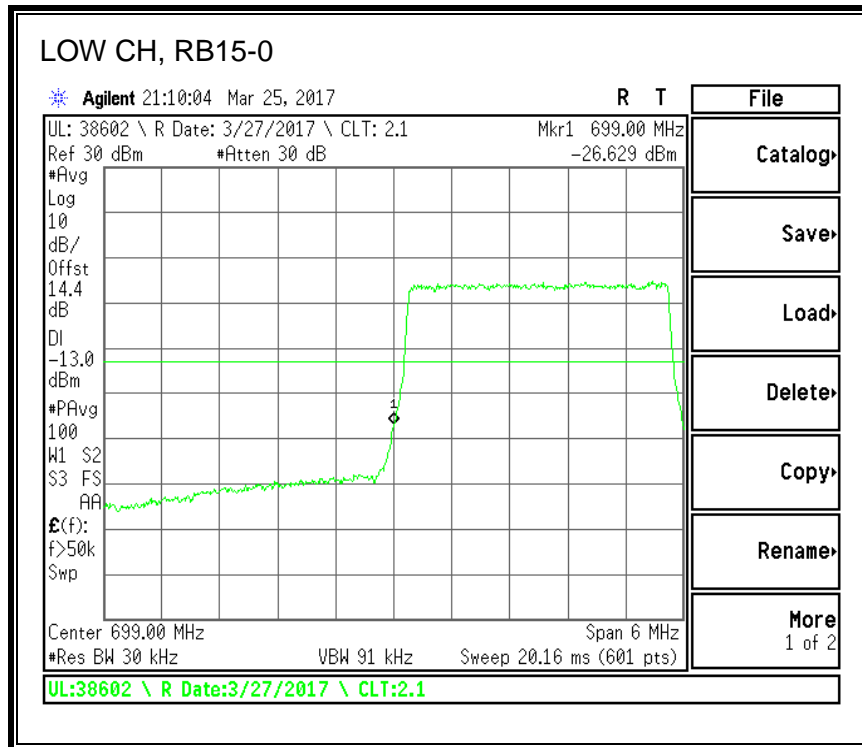
QPSK, (3.0 MHz BAND WIDTH)



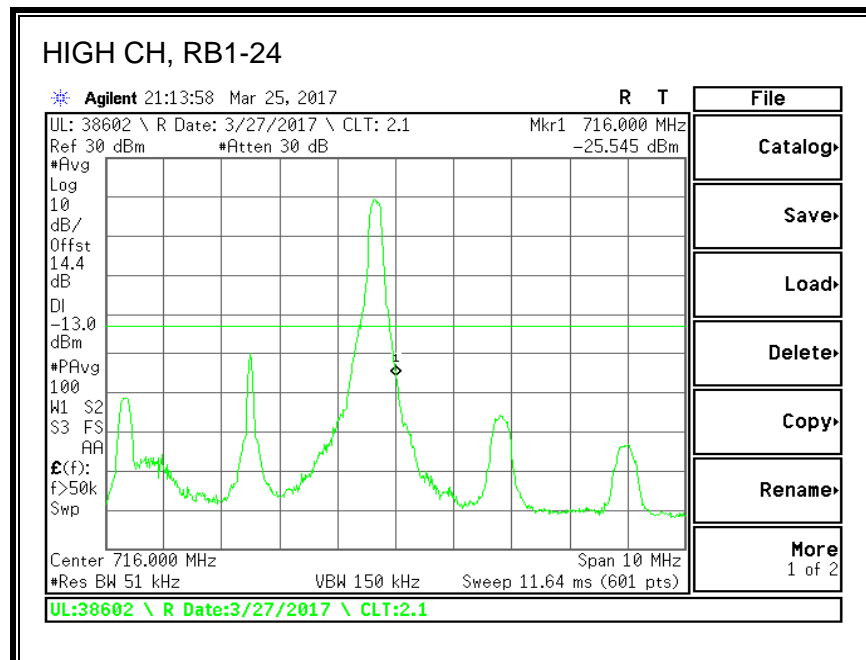
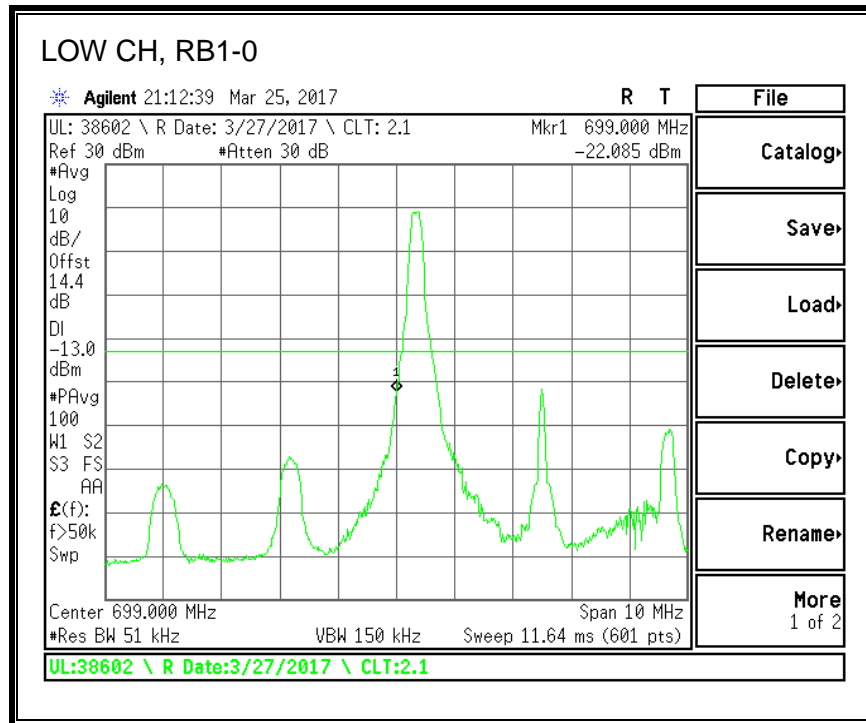


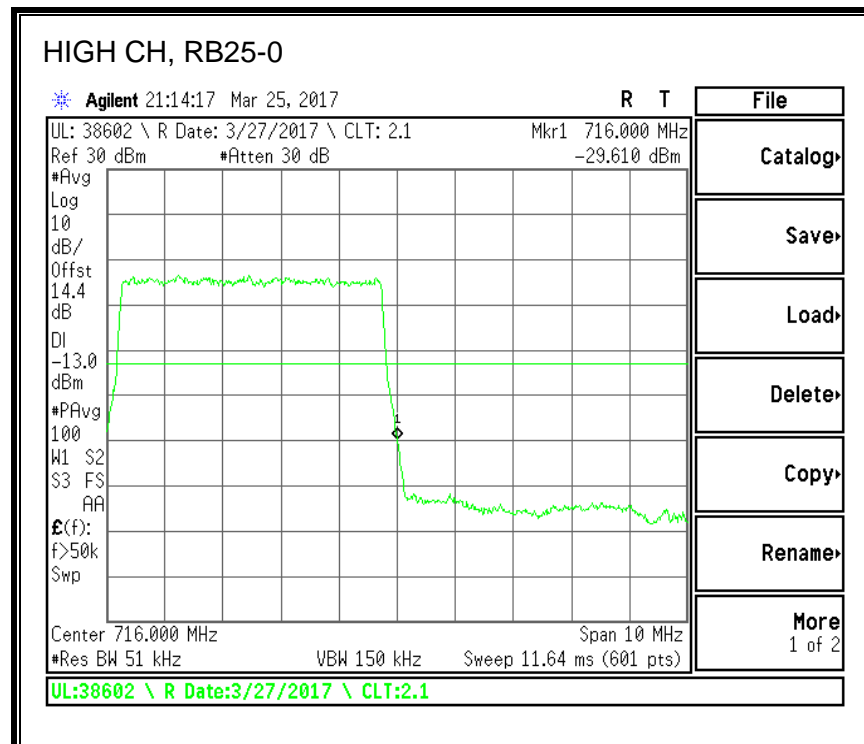
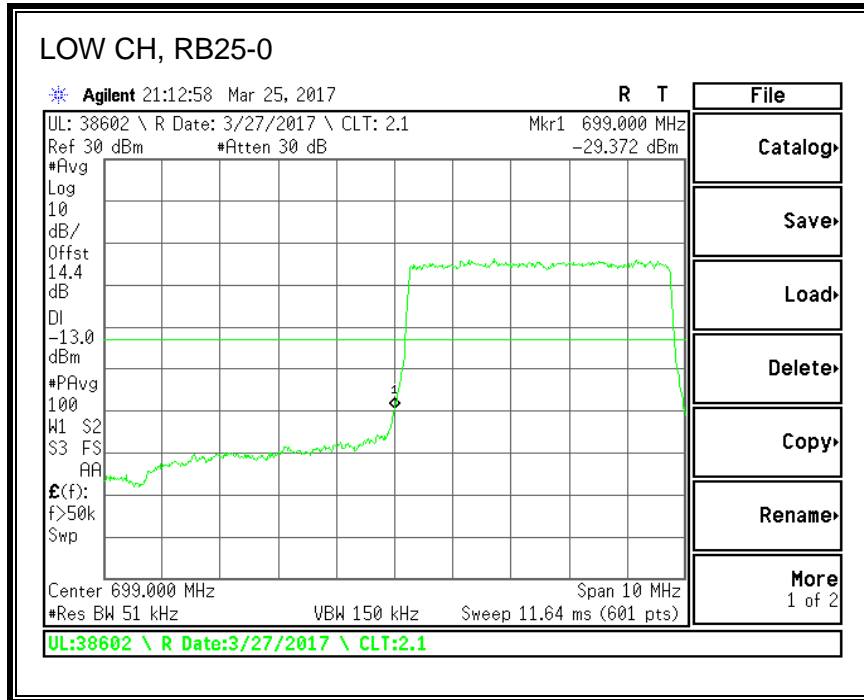
16QAM, (3.0 MHz BAND WIDTH)



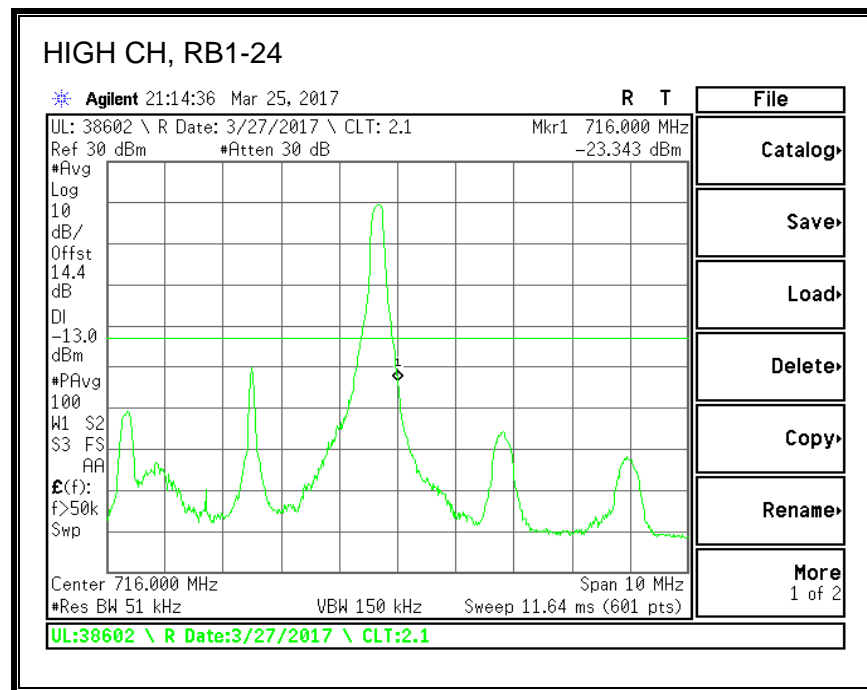
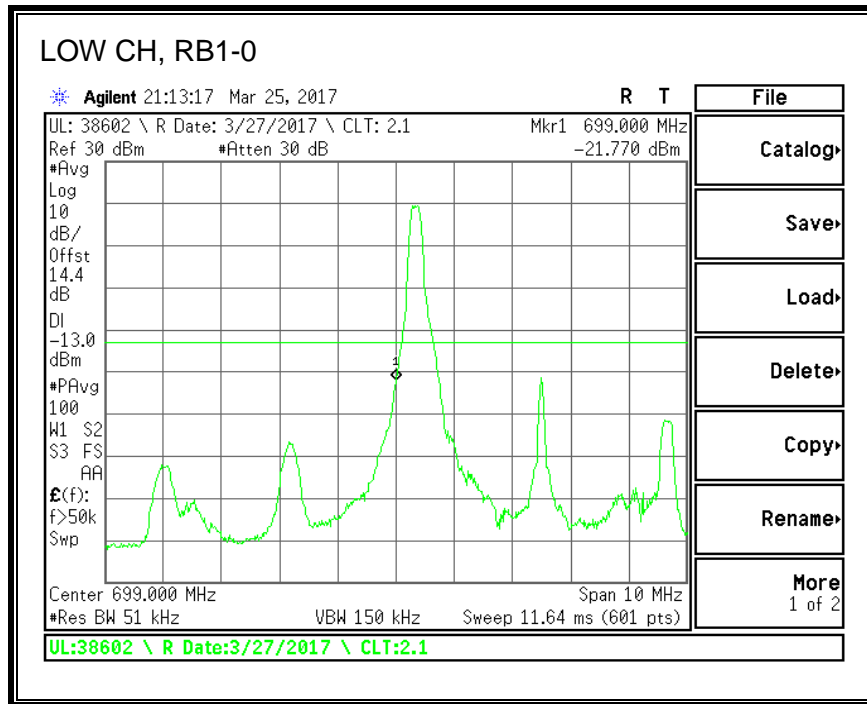


QPSK, (5.0 MHz BAND WIDTH)





16QAM, (5.0 MHz BAND WIDTH)



LOW CH, RB25-0

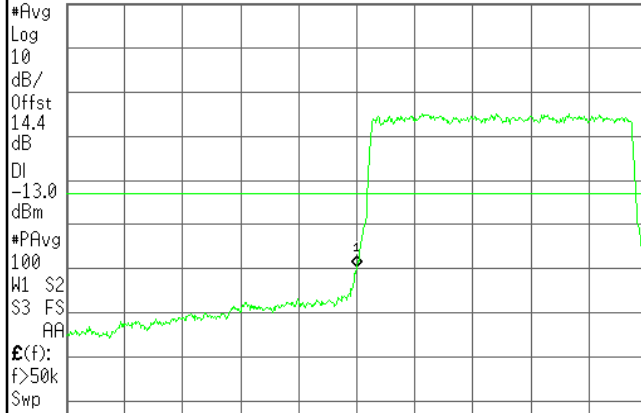
Agilent 21:13:36 Mar 25, 2017

R T

File

UL: 38602 \ R Date: 3/27/2017 \ CLT: 2.1
Ref 30 dBm *Atten 30 dB

Mkr1 699.000 MHz
-29.689 dBm



Catalog>

Save>

Load>

Delete>

Copy>

Rename>

More
1 of 2

Center 699.000 MHz Span 10 MHz
#Res BW 51 kHz VBW 150 kHz Sweep 11.64 ms (601 pts)

UL:38602 \ R Date:3/27/2017 \ CLT:2.1

HIGH CH, RB25-0

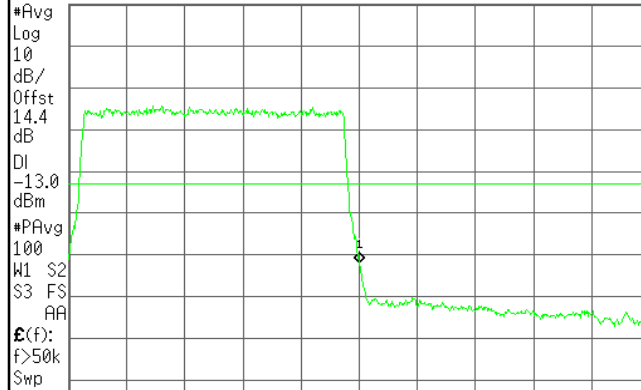
Agilent 21:14:55 Mar 25, 2017

R T

File

UL: 38602 \ R Date: 3/27/2017 \ CLT: 2.1
Ref 30 dBm *Atten 30 dB

Mkr1 716.000 MHz
-31.943 dBm



Catalog>

Save>

Load>

Delete>

Copy>

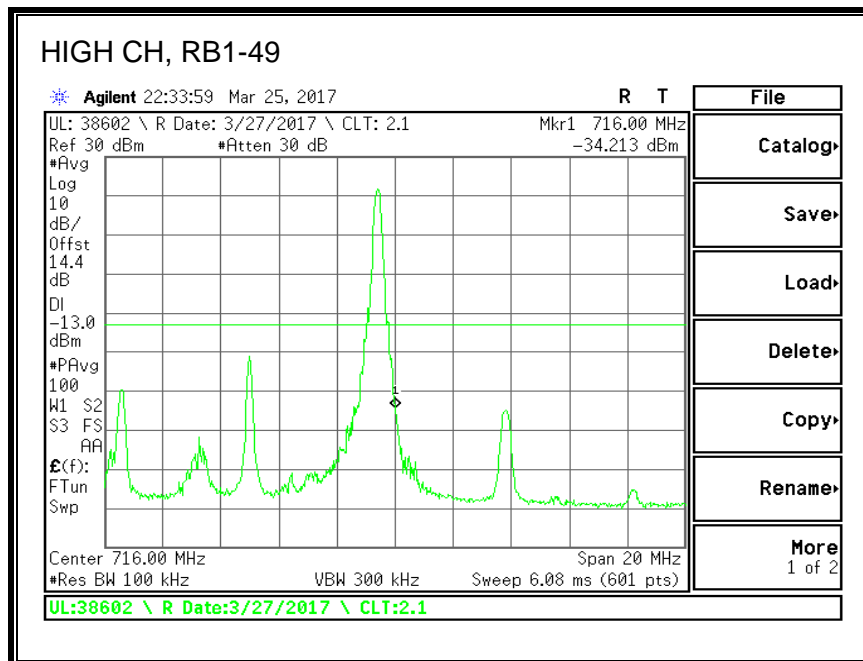
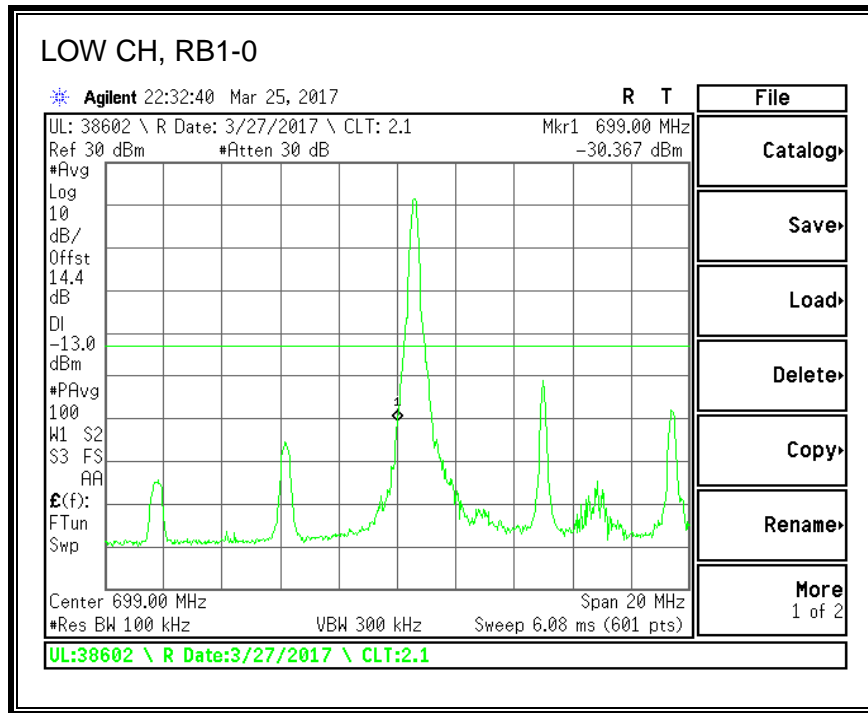
Rename>

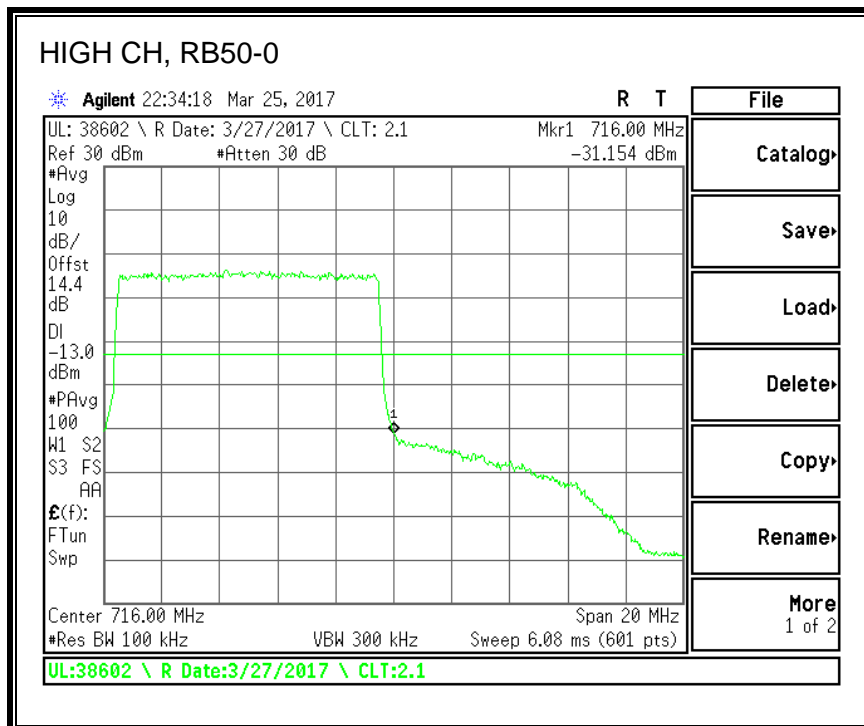
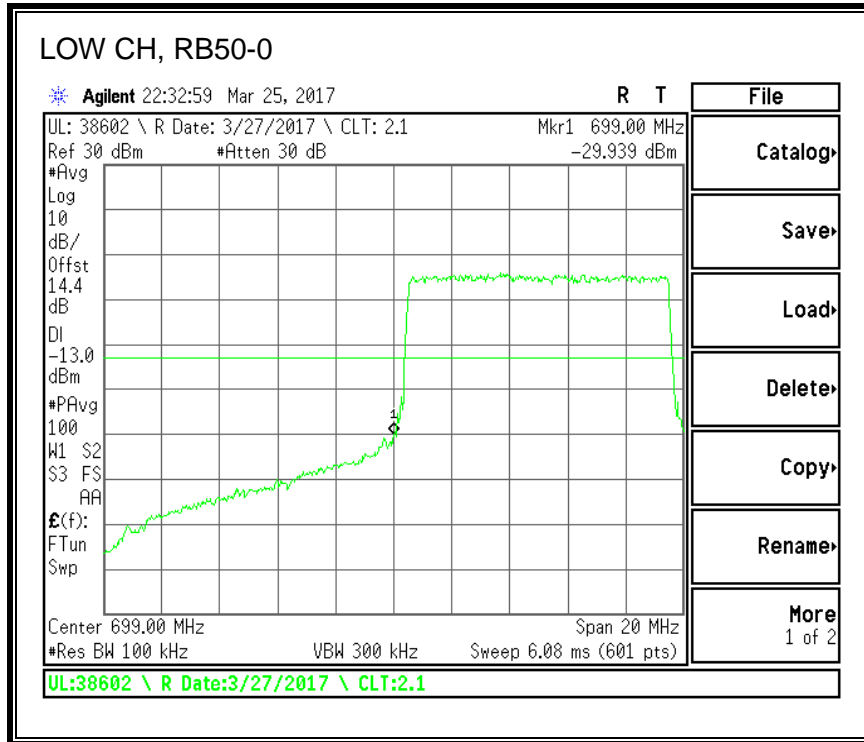
More
1 of 2

Center 716.000 MHz Span 10 MHz
#Res BW 51 kHz VBW 150 kHz Sweep 11.64 ms (601 pts)

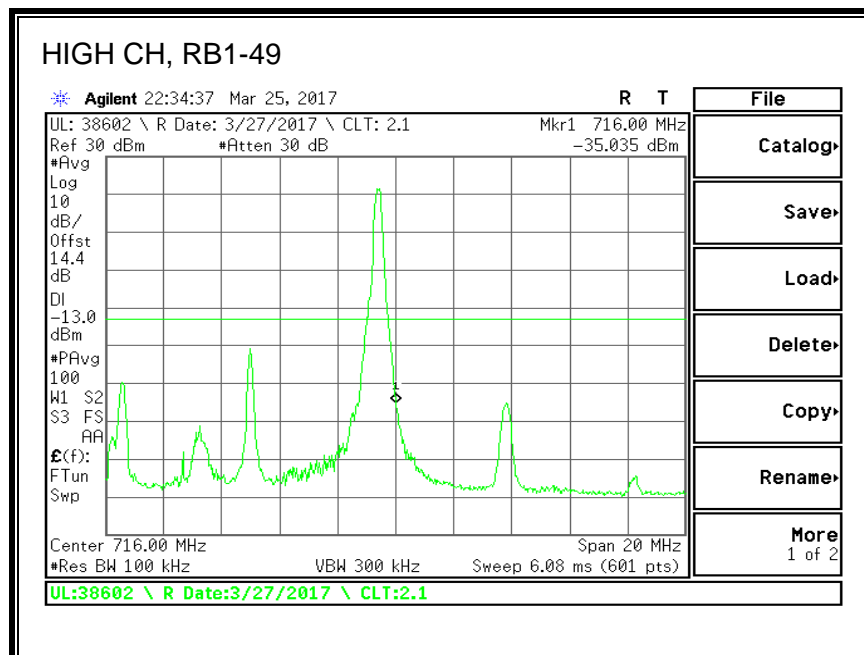
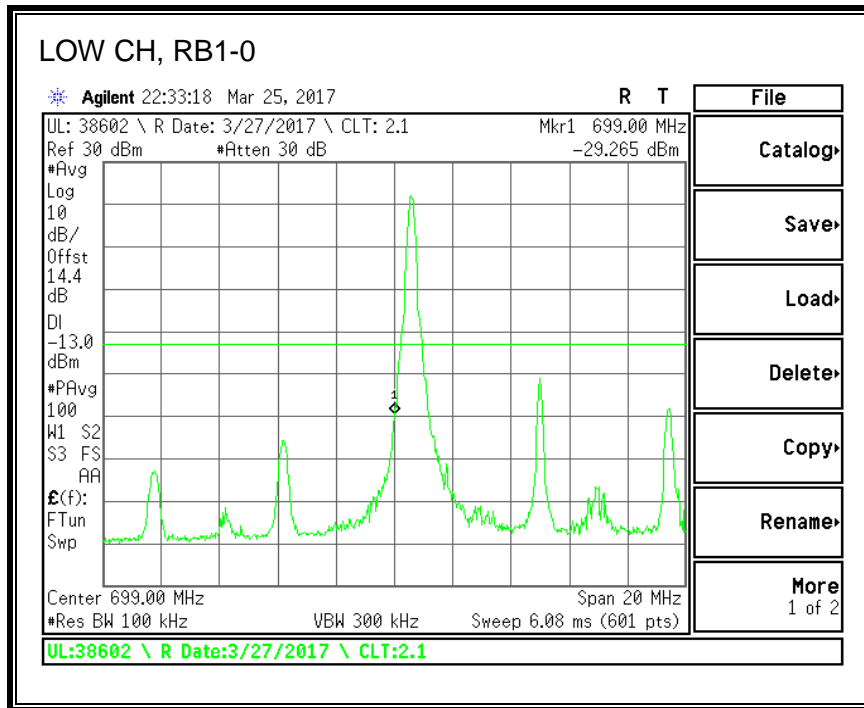
UL:38602 \ R Date:3/27/2017 \ CLT:2.1

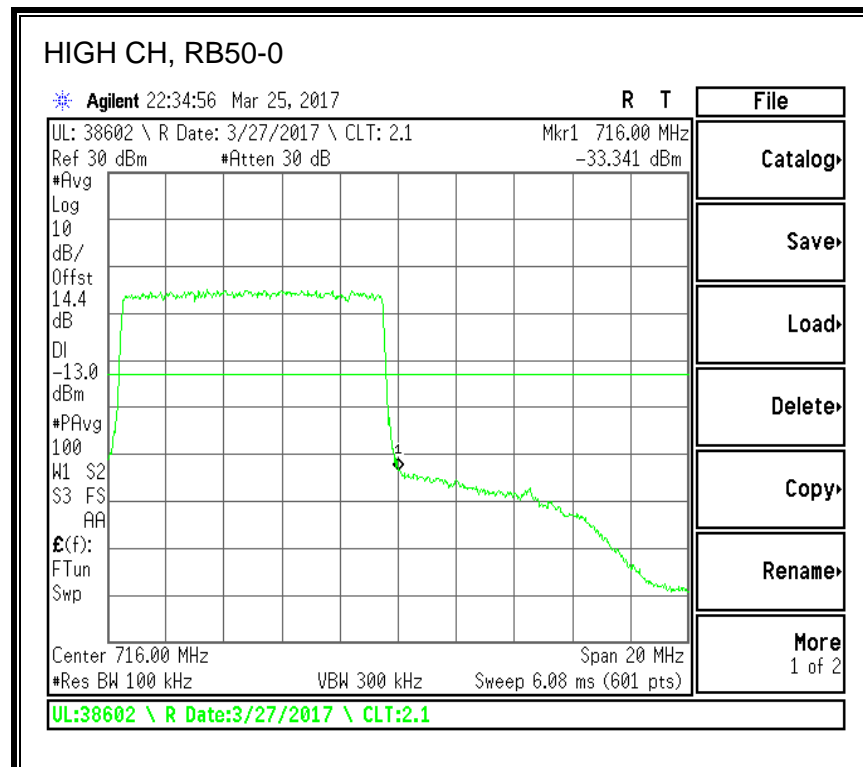
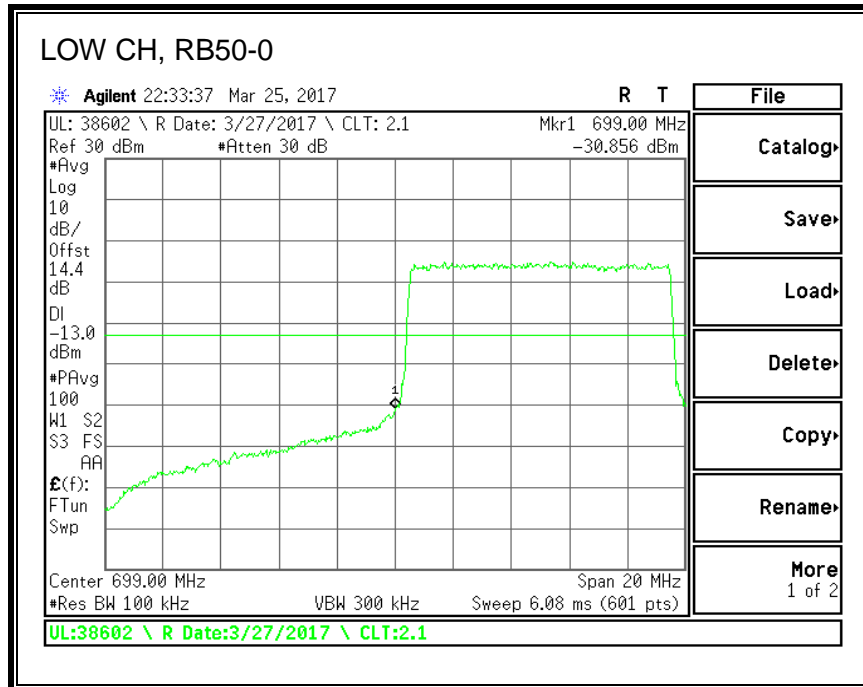
QPSK, (10.0 MHz BAND WIDTH)





16QAM, (10.0 MHz BAND WIDTH)

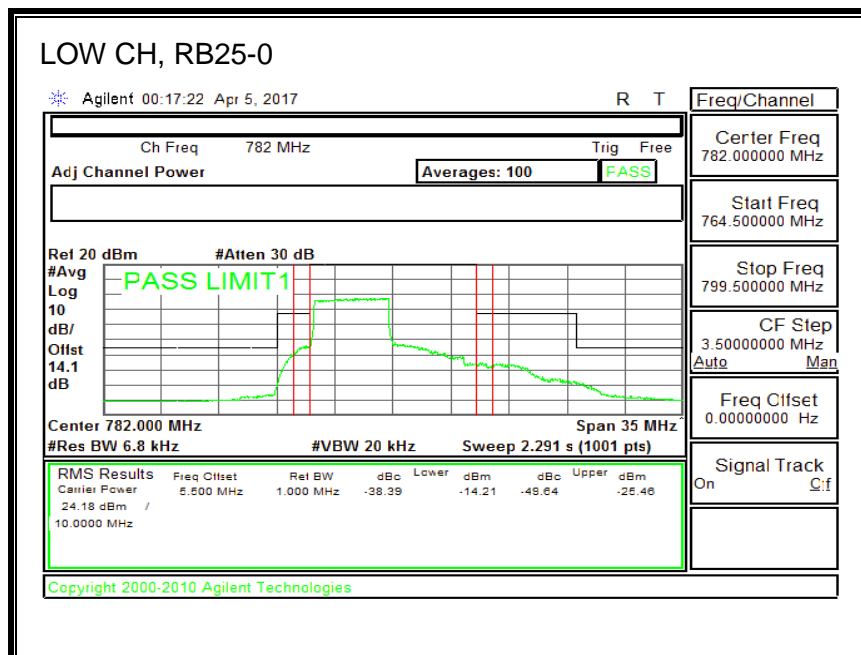
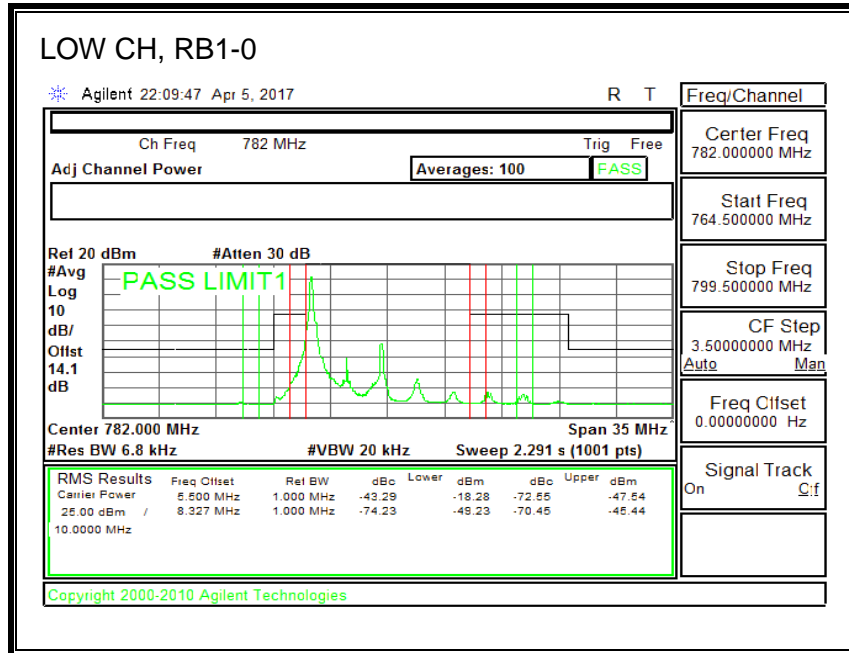


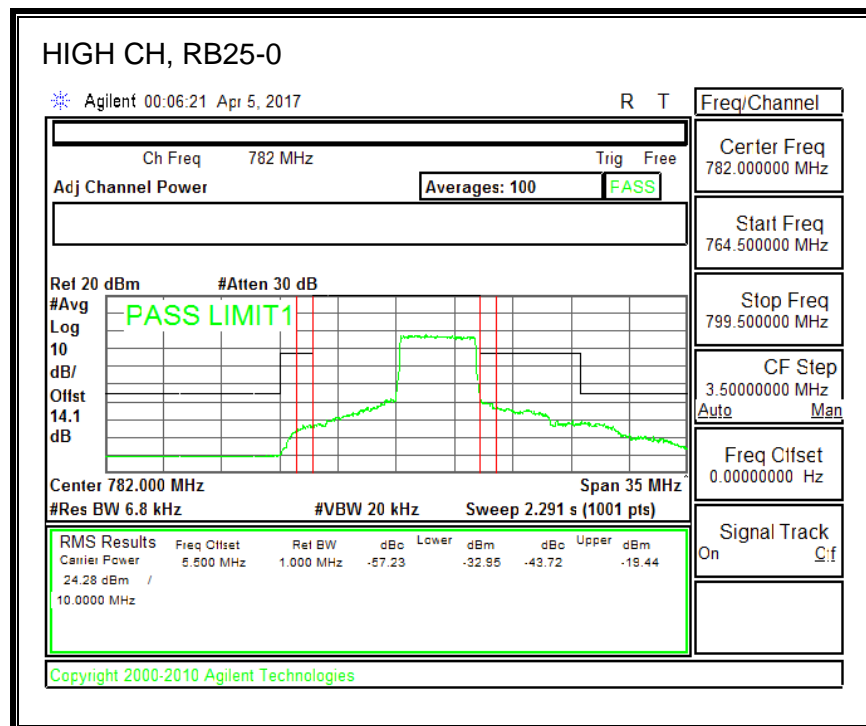
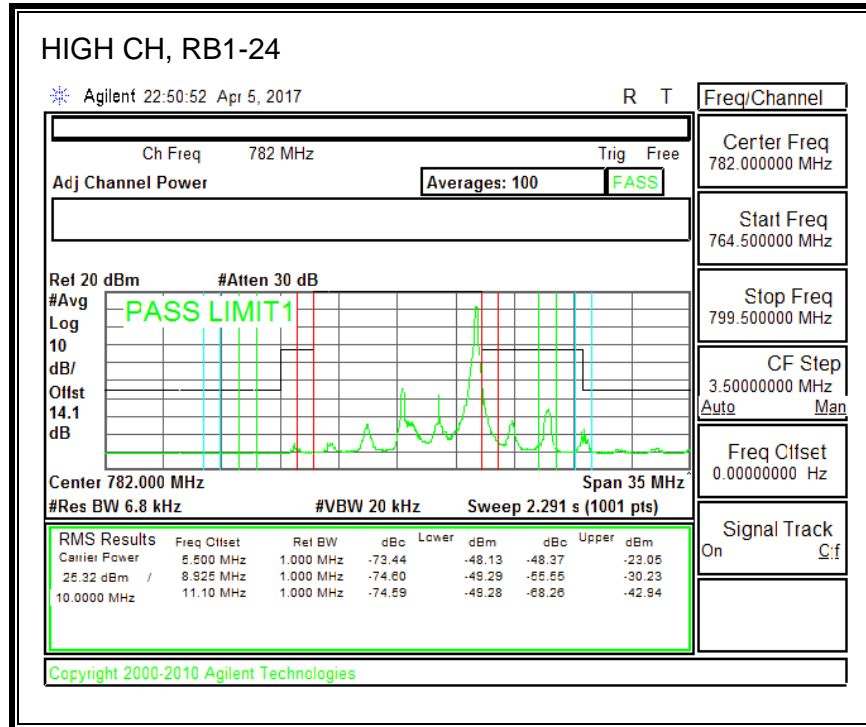


8.2.6. LTE BAND 13 ADJACENT CHANNEL POWER

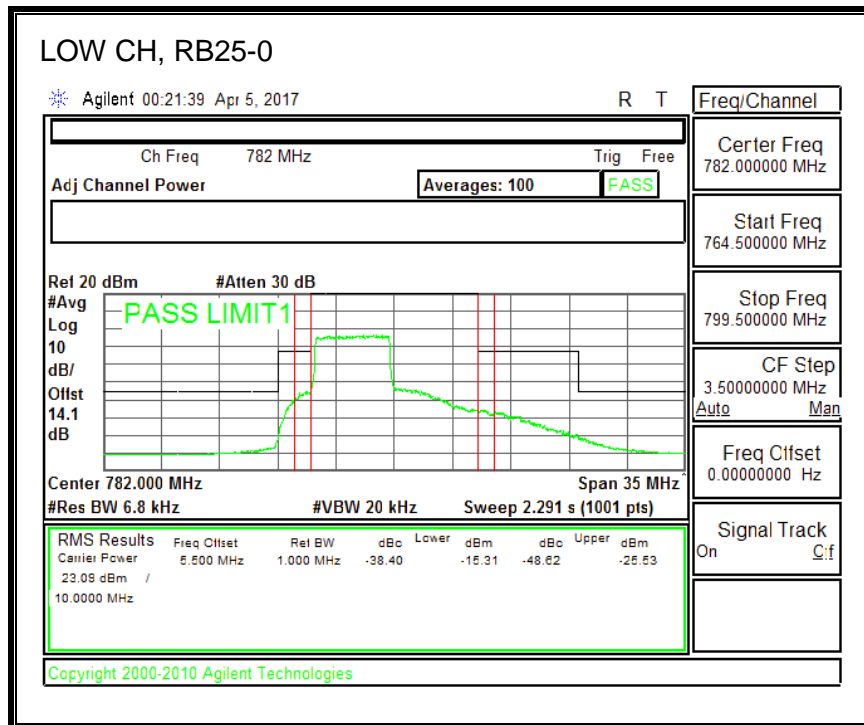
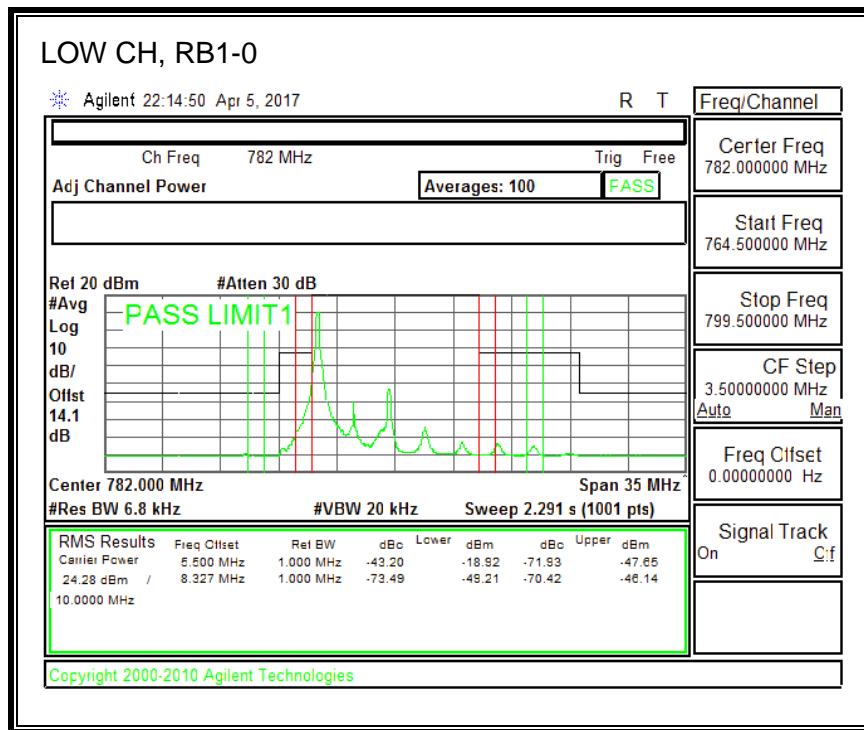
ID:	29439	Date:	4/5/17
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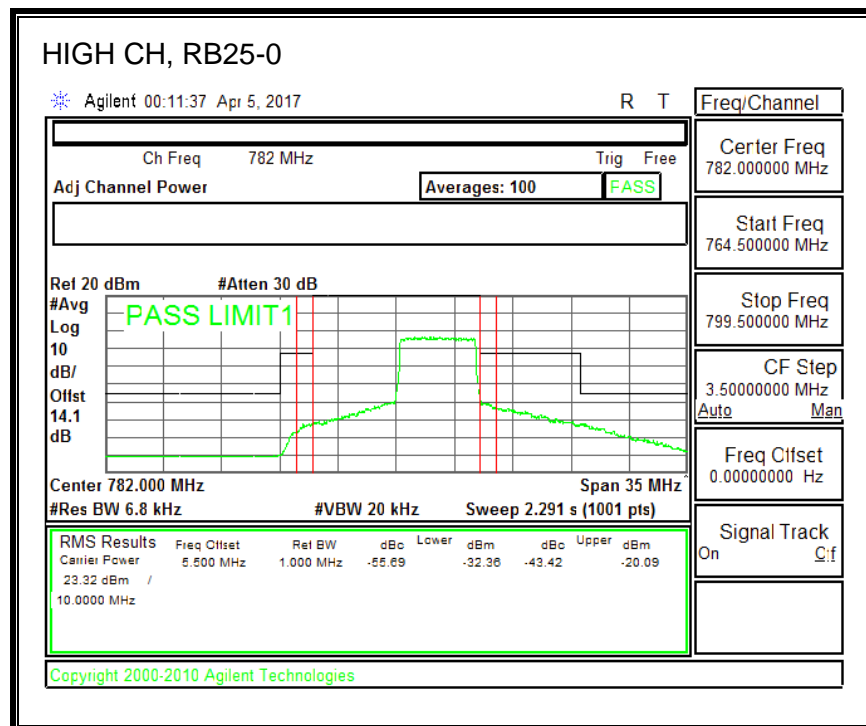
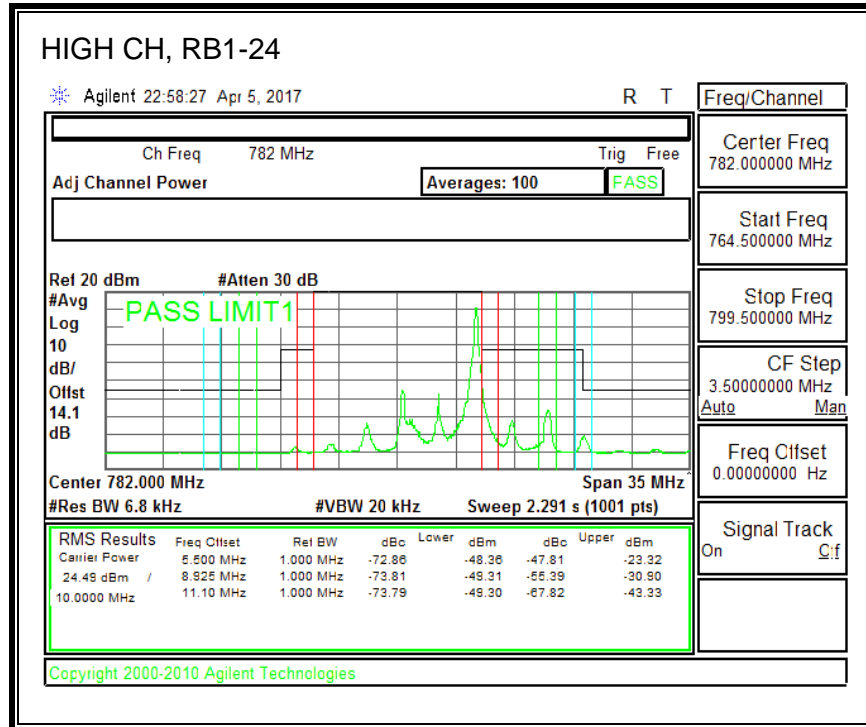
QPSK, (5.0 MHz BAND WIDTH)



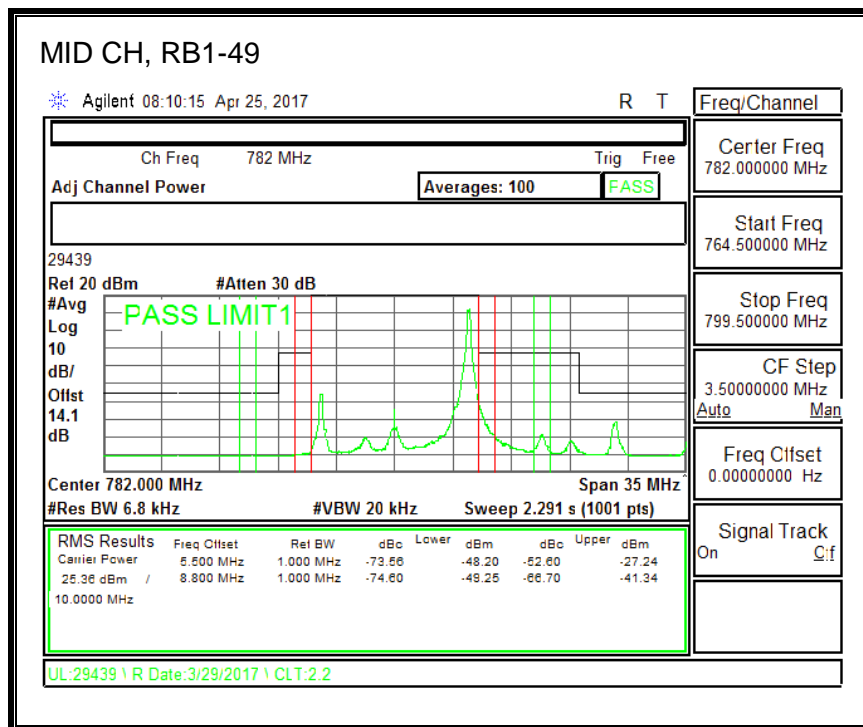
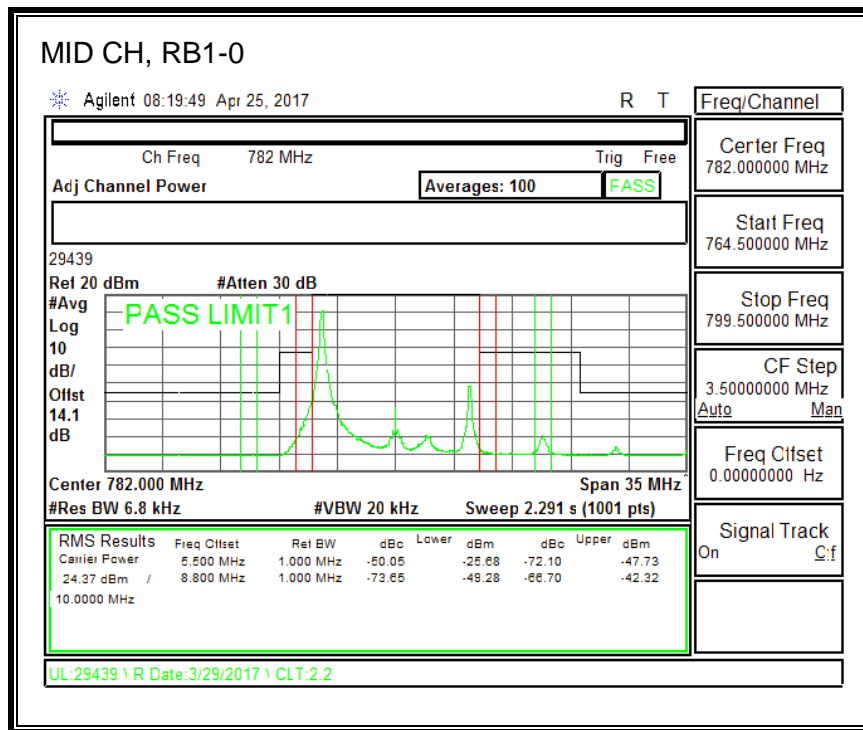


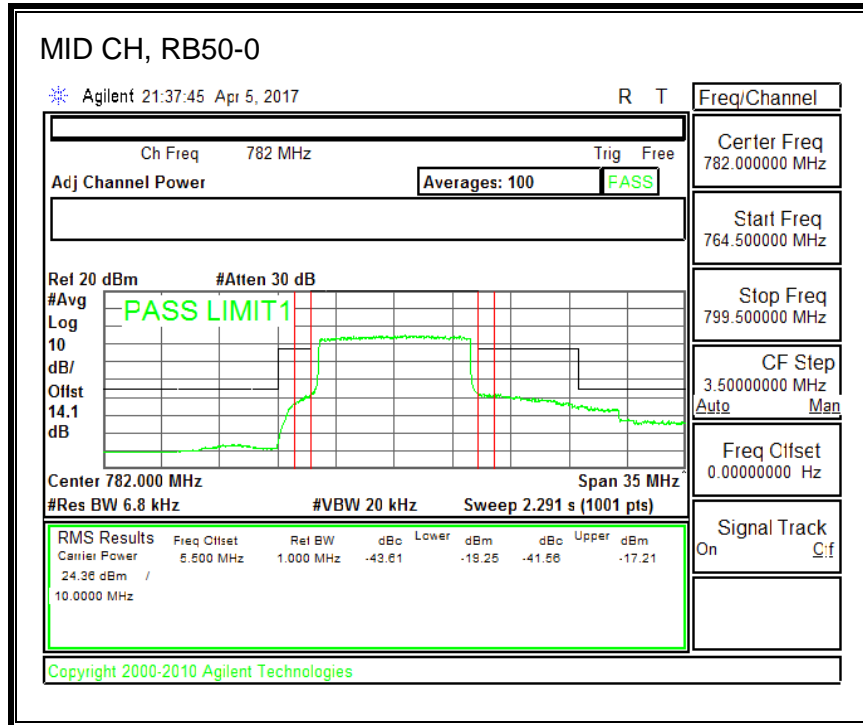
16QAM, (5.0 MHz BAND WIDTH)



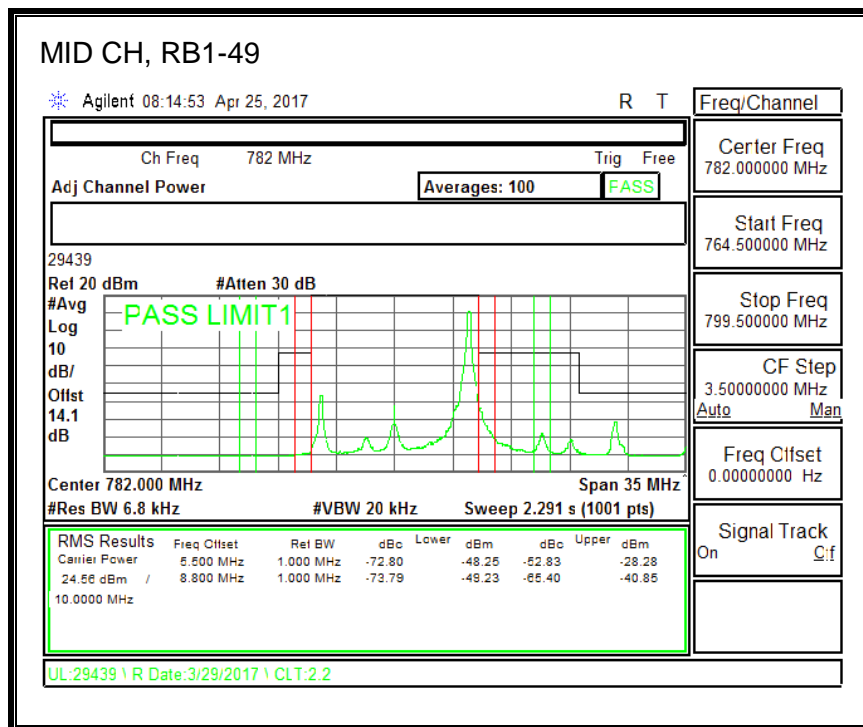
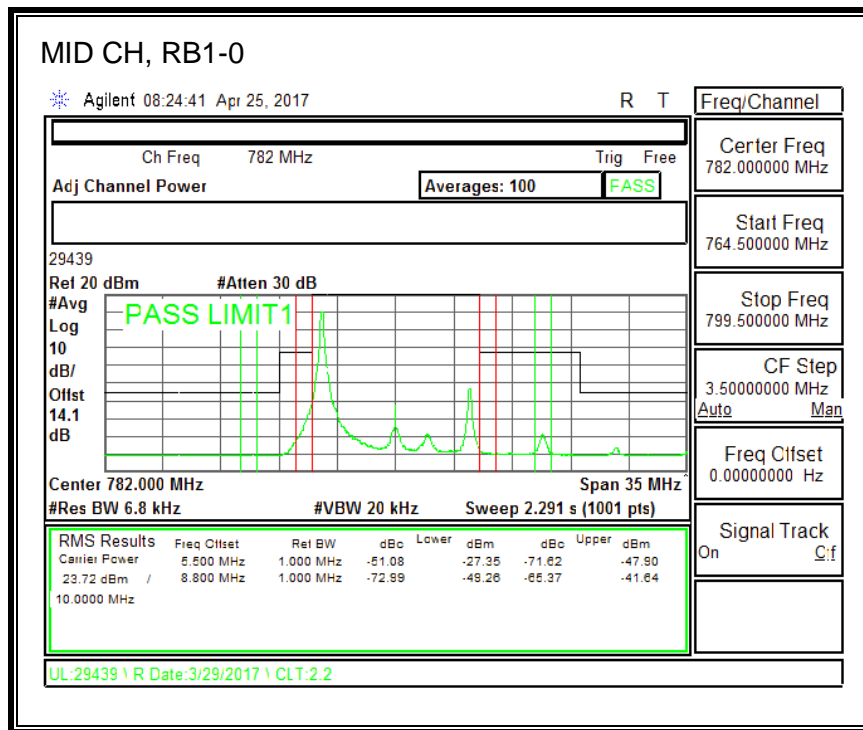


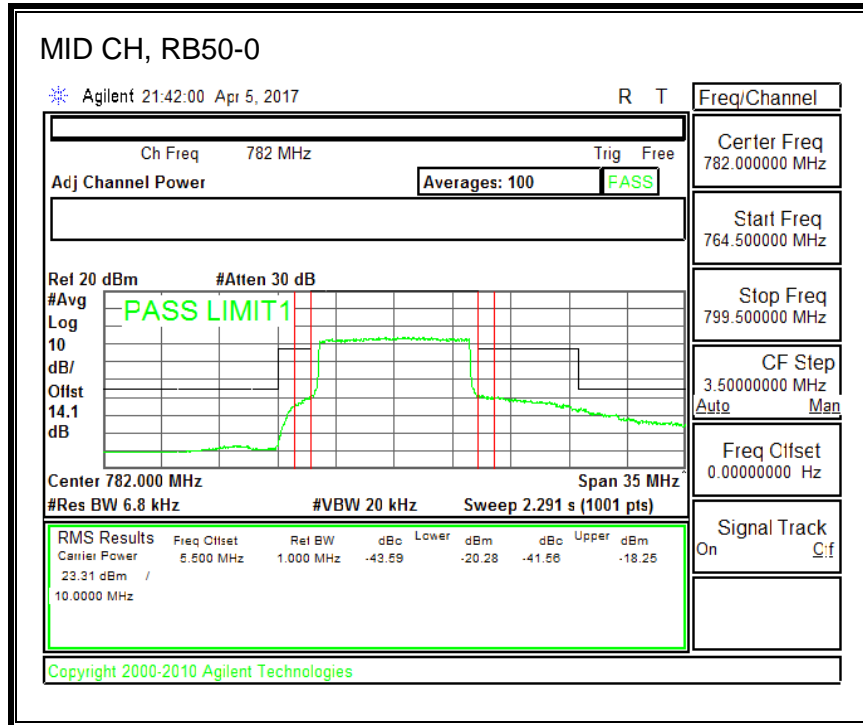
QPSK, (10.0 MHz BAND WIDTH)





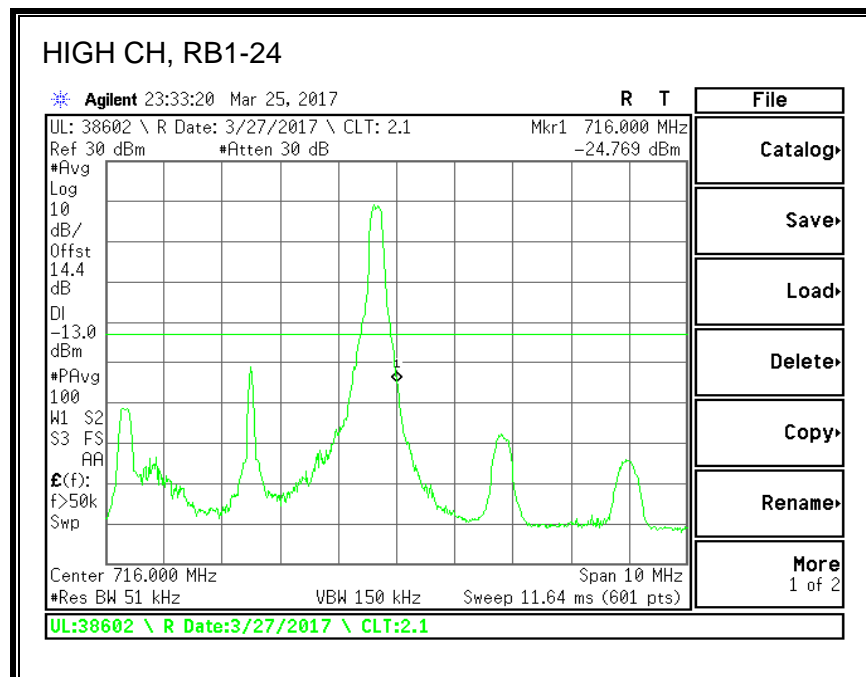
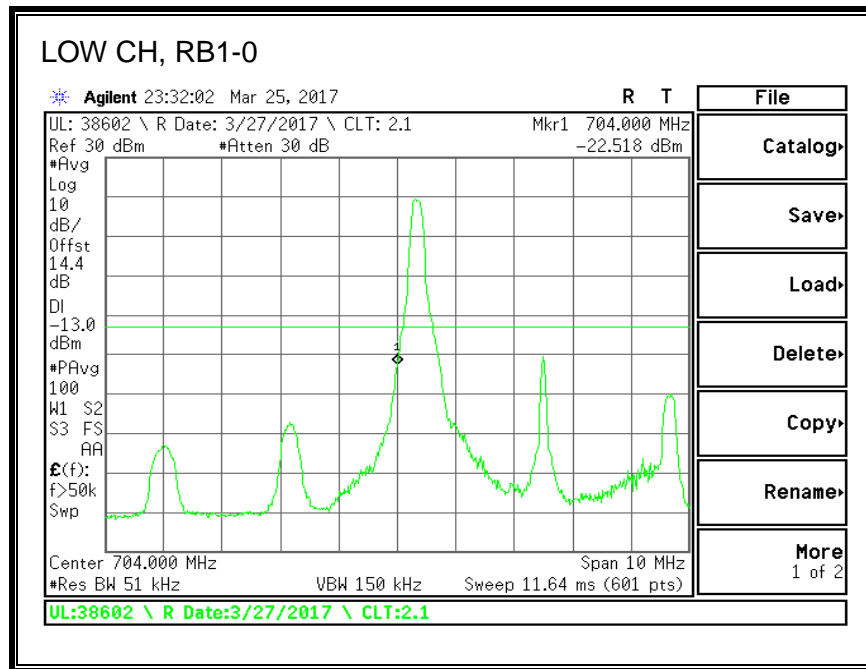
16QAM, (10.0 MHz BAND WIDTH)

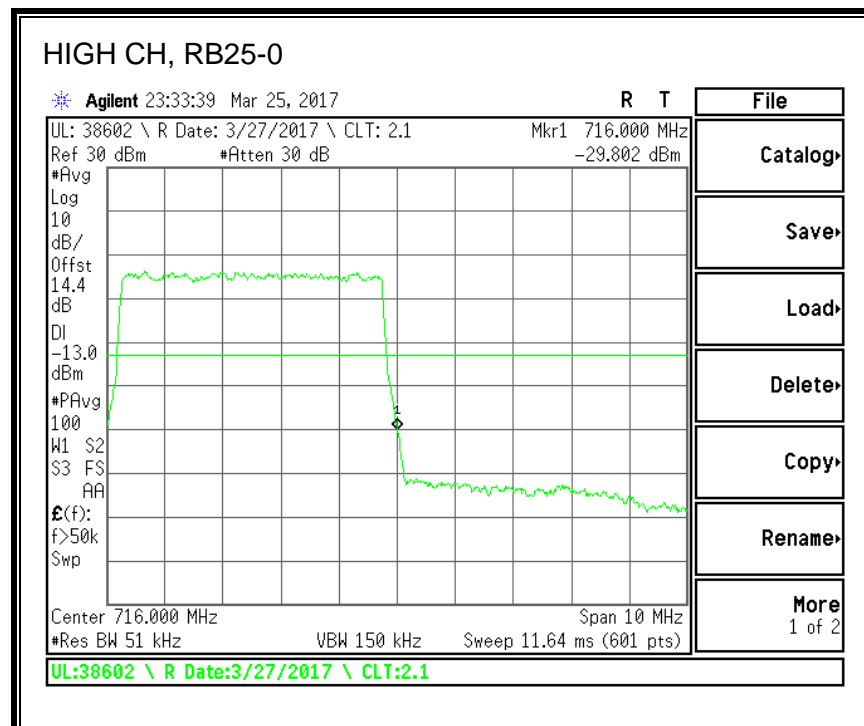
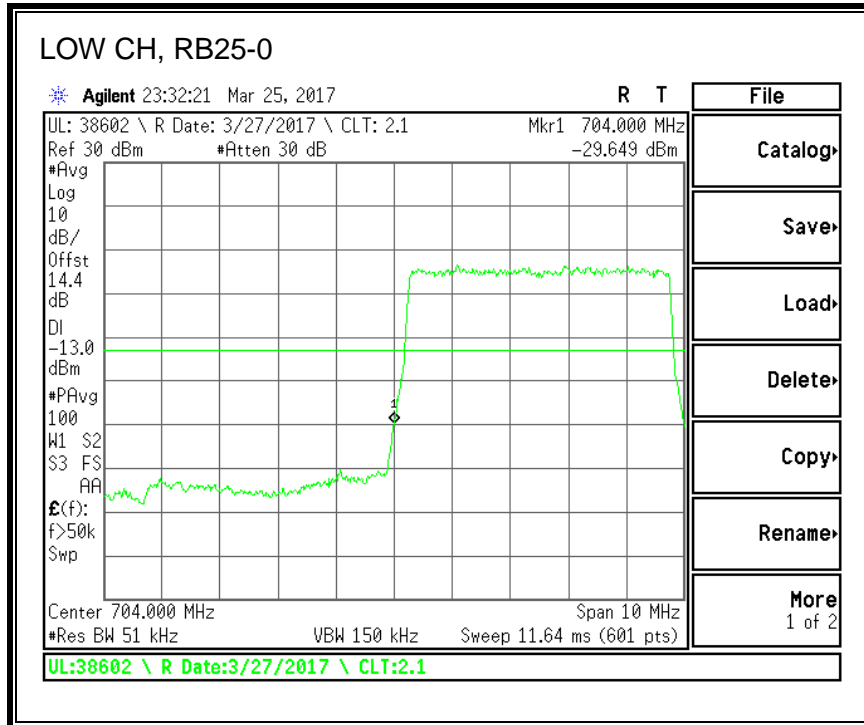




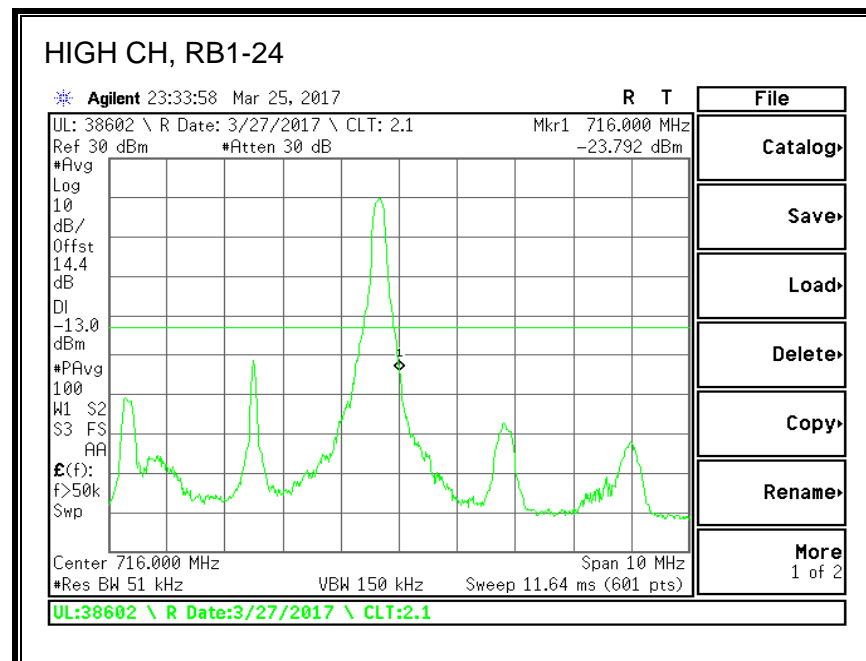
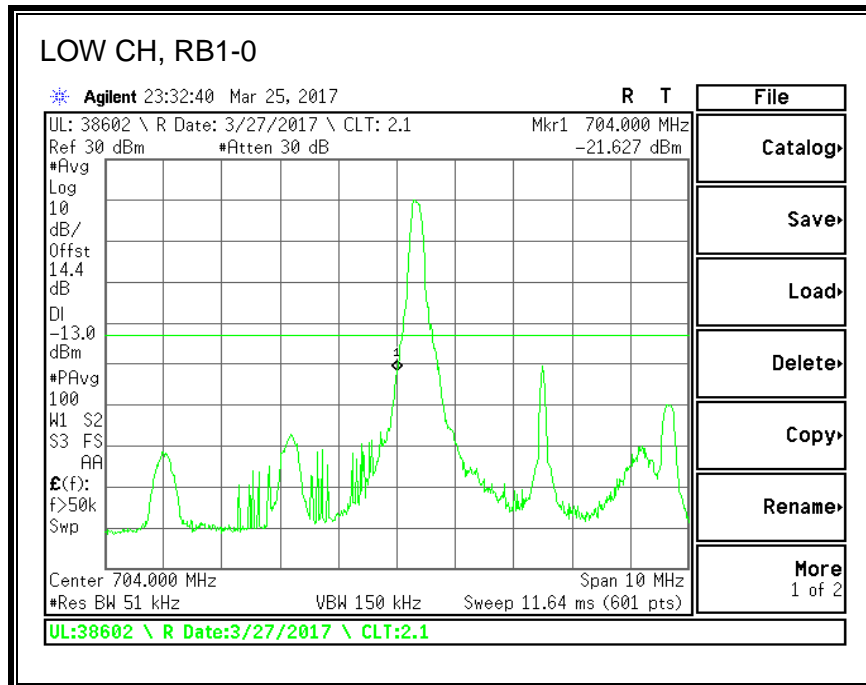
8.2.7. LTE BAND 17 BANDEDGE

QPSK, (5.0 MHz BAND WIDTH)





16QAM, (5.0 MHz BAND WIDTH)



LOW CH, RB25-0

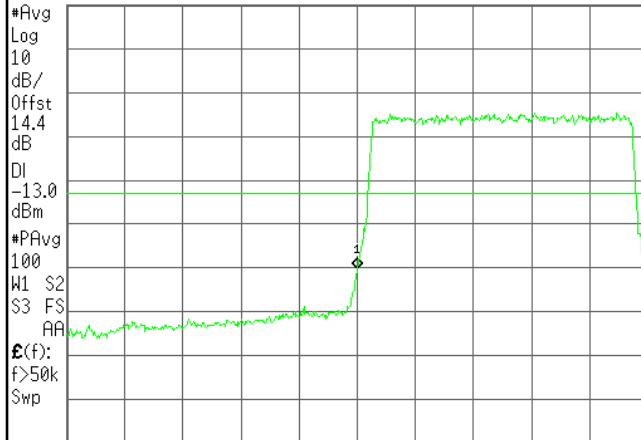
Agilent 23:32:59 Mar 25, 2017

R T

File

UL: 38602 \ R Date: 3/27/2017 \ CLT: 2.1
Ref 30 dBm *Atten 30 dB

Mkr1 704.000 MHz
-30.276 dBm



Catalog>

Save>

Load>

Delete>

Copy>

Rename>

More
1 of 2

Center 704.000 MHz Span 10 MHz
#Res BW 51 kHz VBW 150 kHz Sweep 11.64 ms (601 pts)

UL:38602 \ R Date:3/27/2017 \ CLT:2.1

HIGH CH, RB25-0

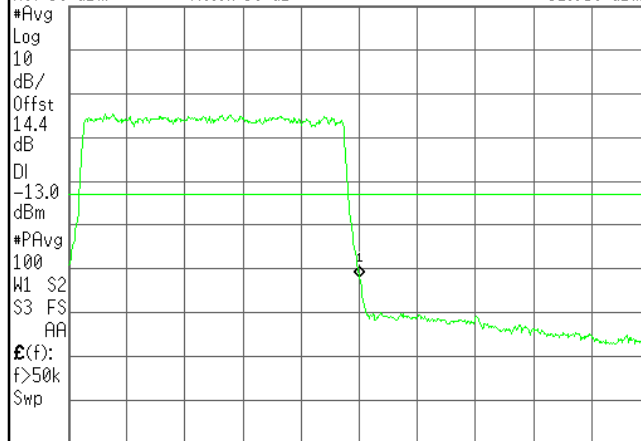
Agilent 23:34:17 Mar 25, 2017

R T

File

UL: 38602 \ R Date: 3/27/2017 \ CLT: 2.1
Ref 30 dBm *Atten 30 dB

Mkr1 716.000 MHz
-31.950 dBm



Catalog>

Save>

Load>

Delete>

Copy>

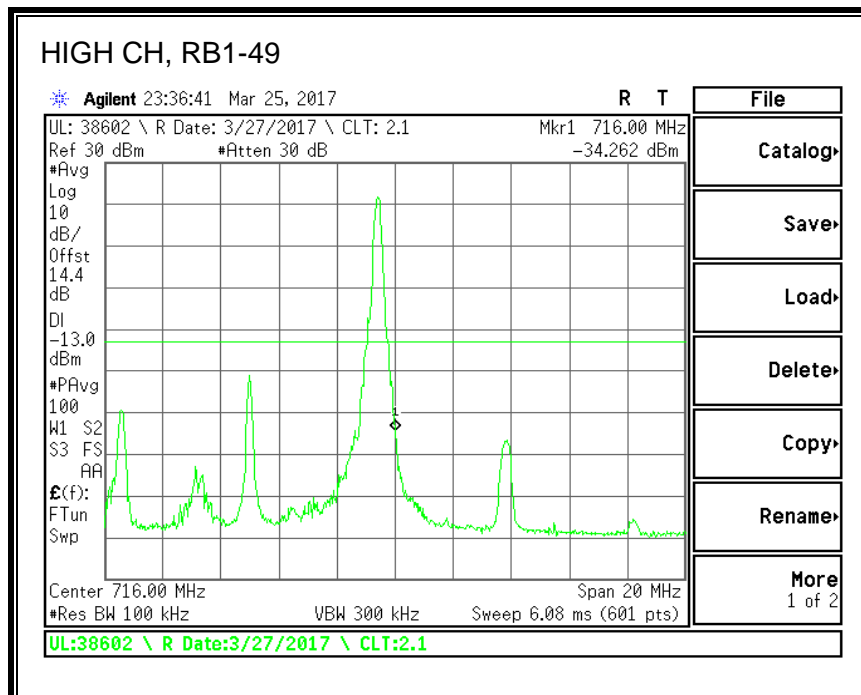
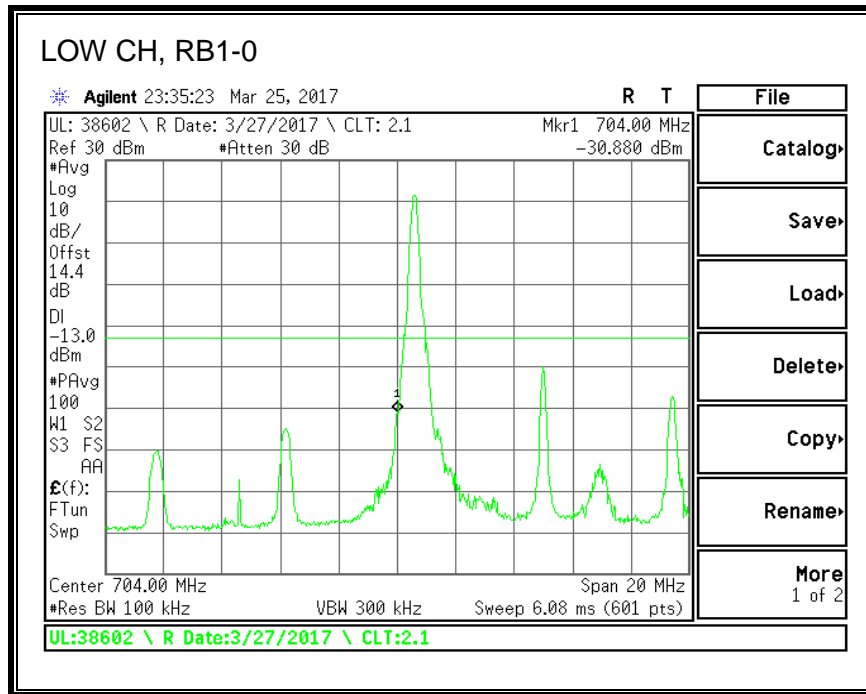
Rename>

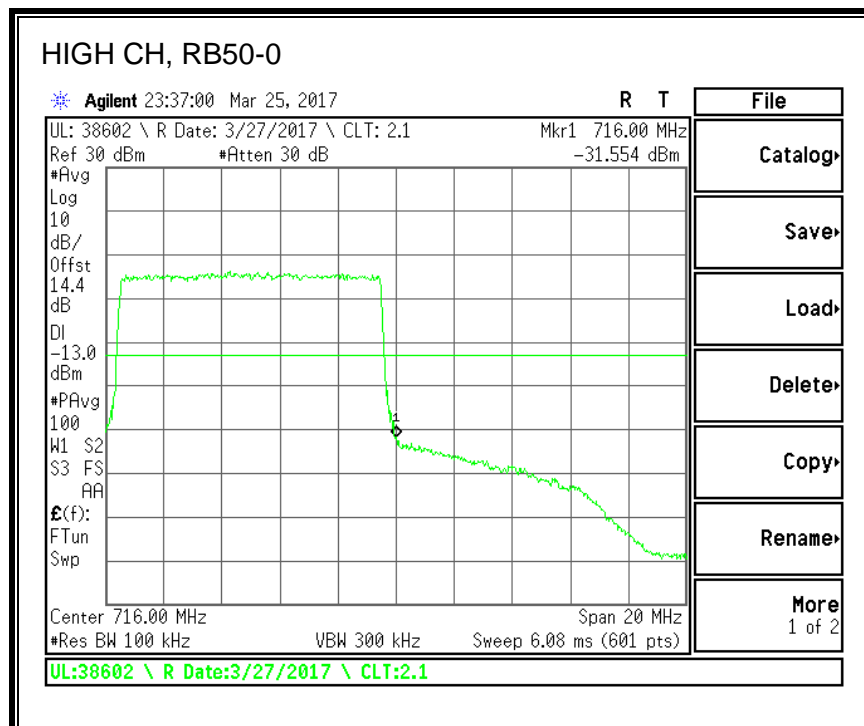
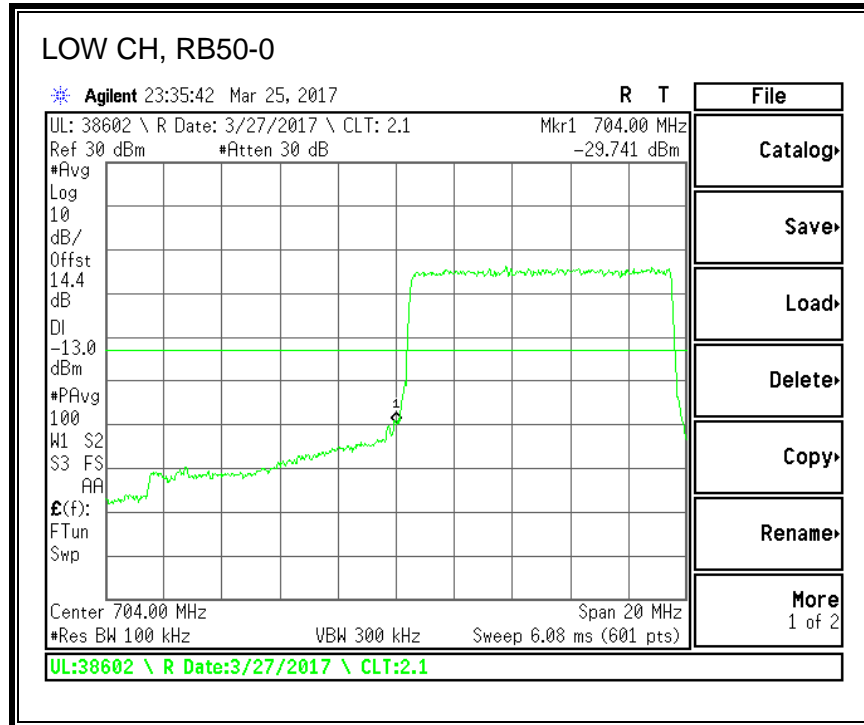
More
1 of 2

Center 716.000 MHz Span 10 MHz
#Res BW 51 kHz VBW 150 kHz Sweep 11.64 ms (601 pts)

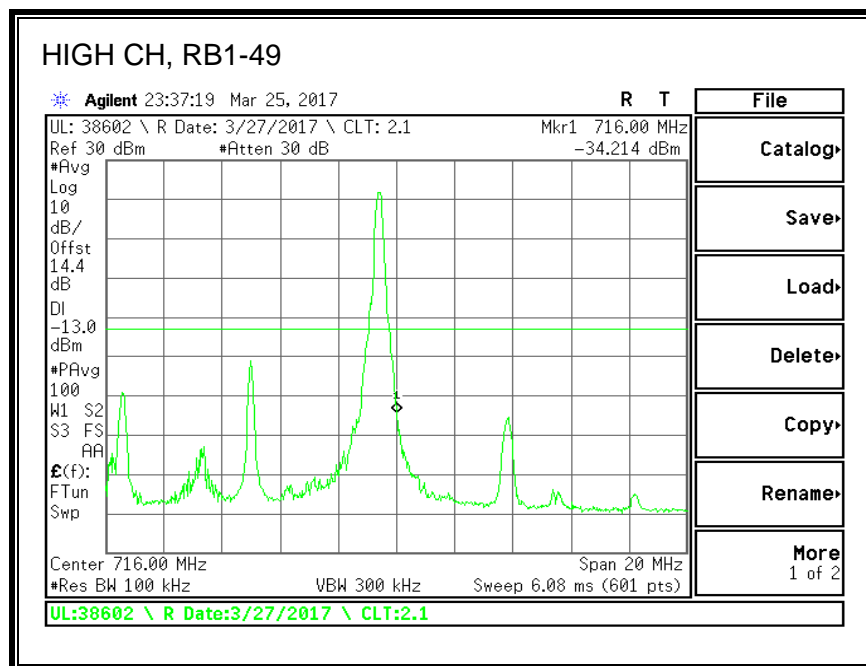
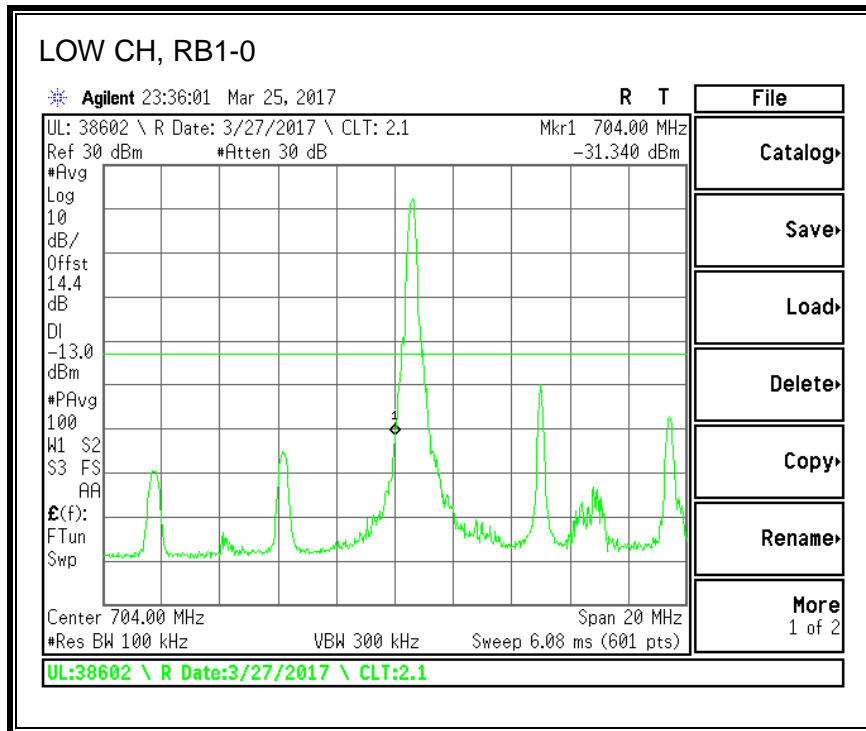
UL:38602 \ R Date:3/27/2017 \ CLT:2.1

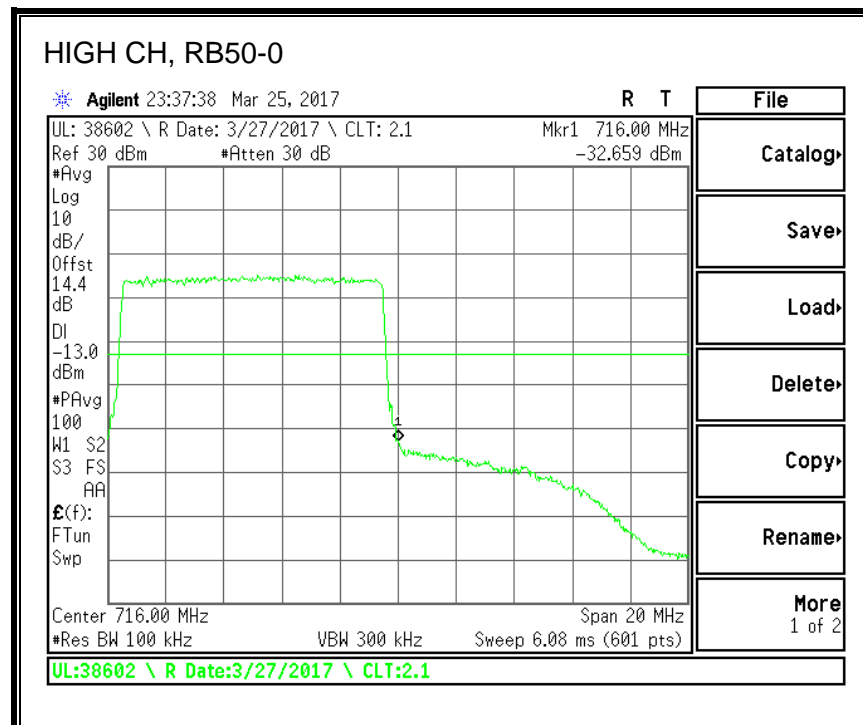
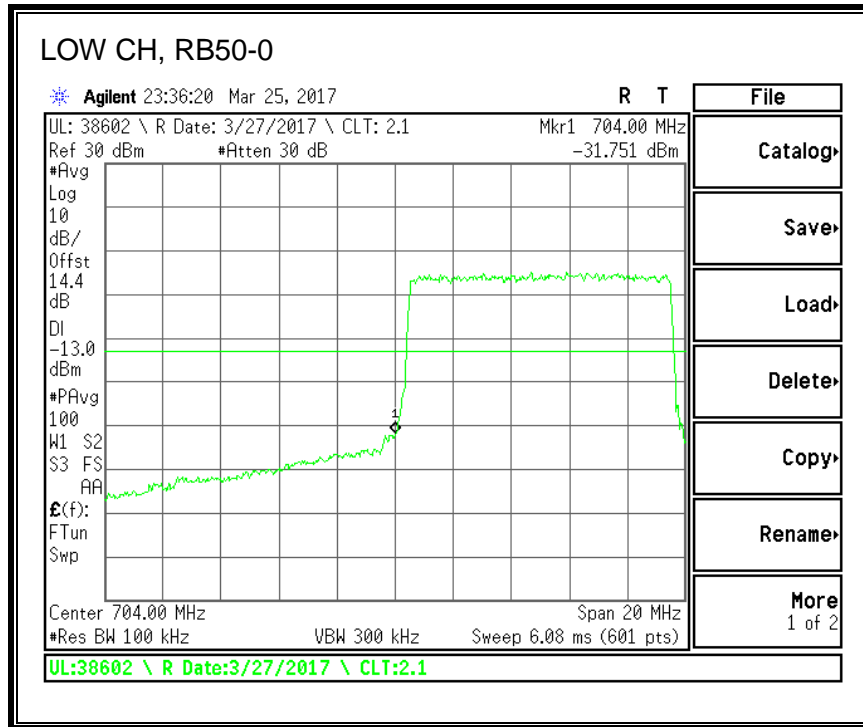
QPSK, (10.0 MHz BAND WIDTH)





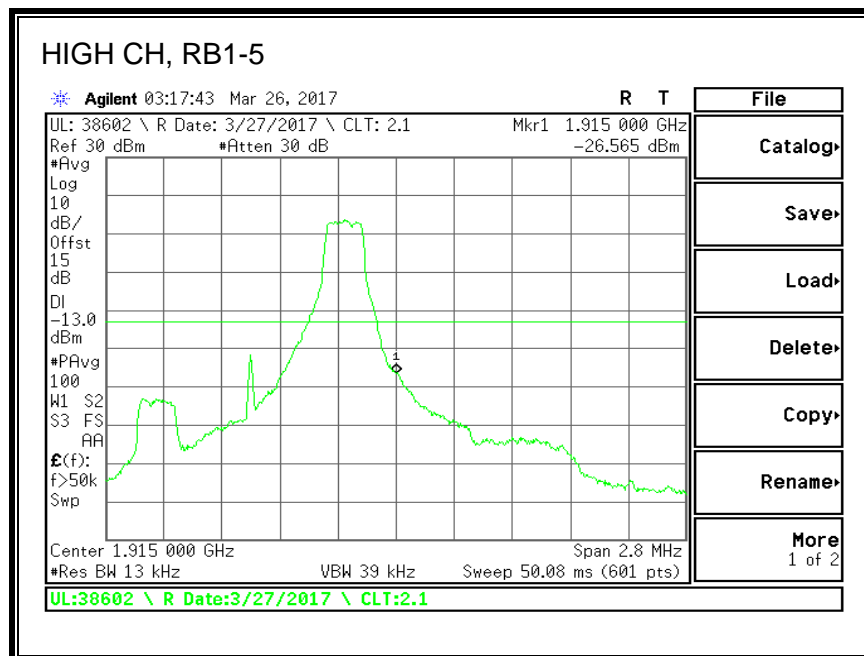
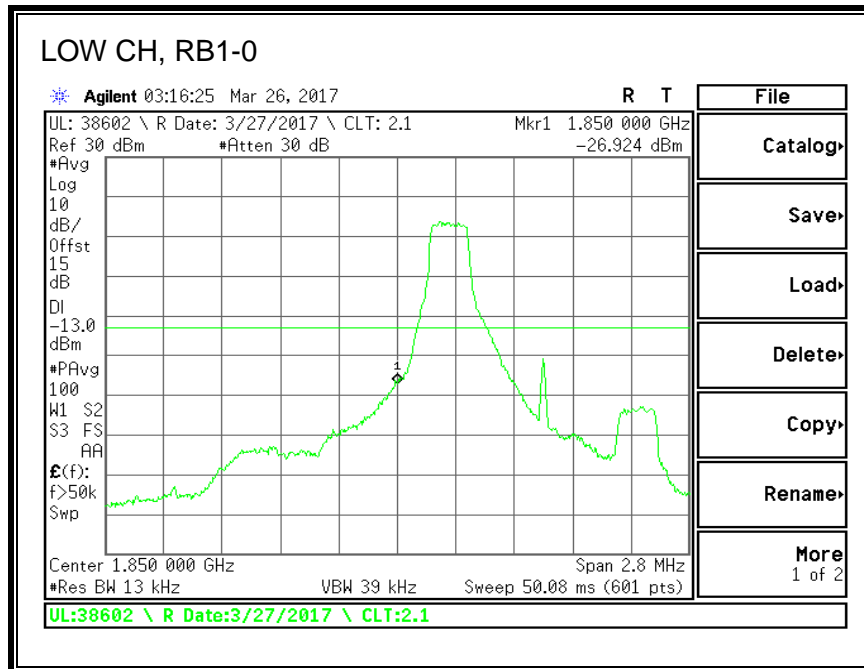
16QAM, (10.0 MHz BAND WIDTH)

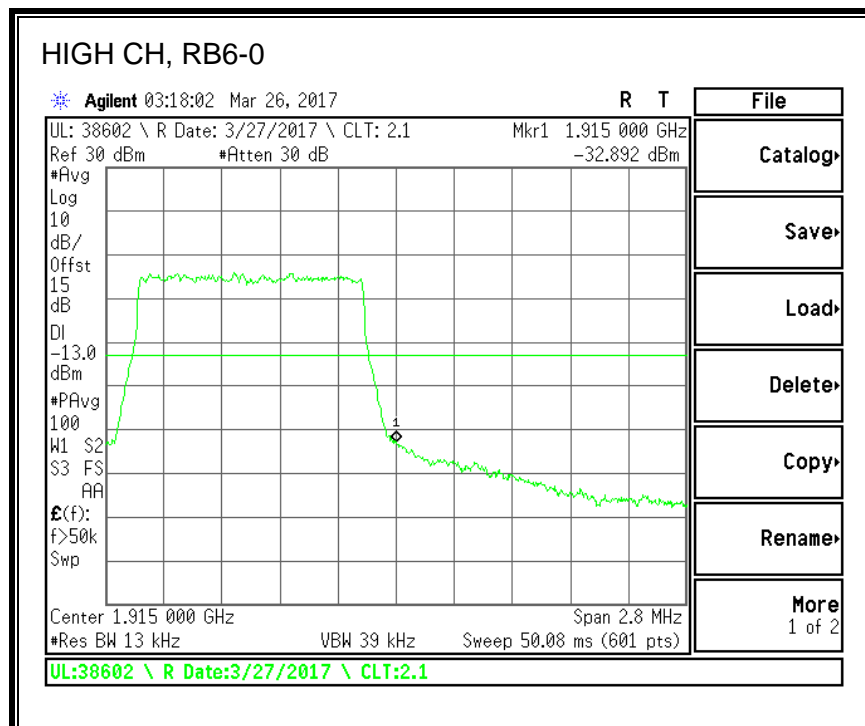
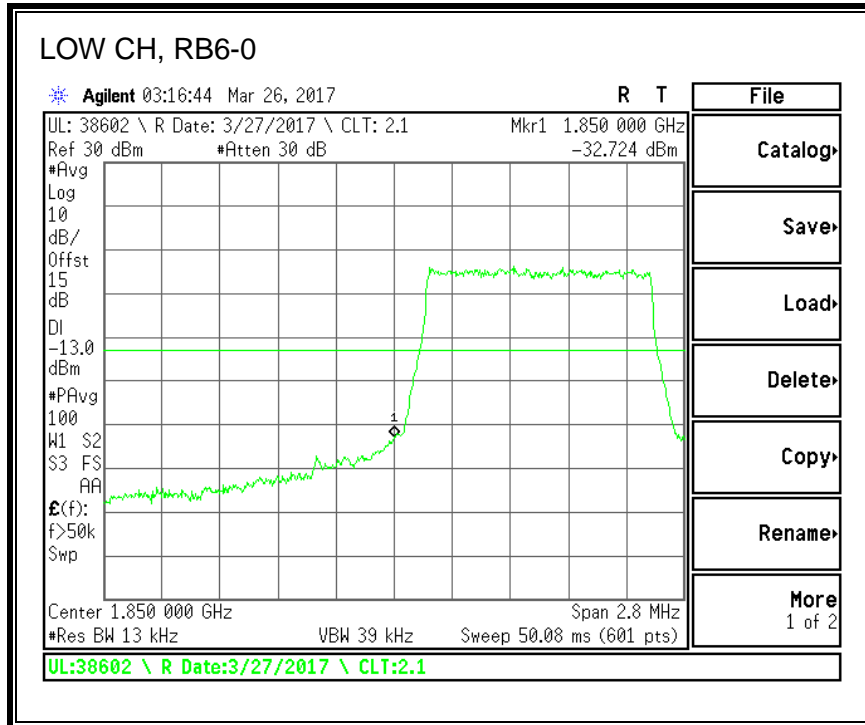




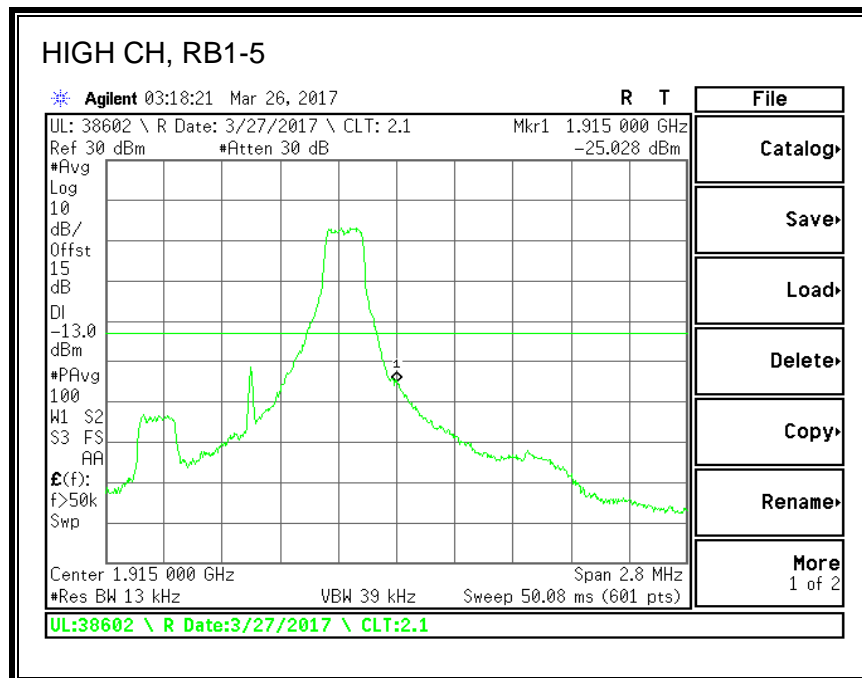
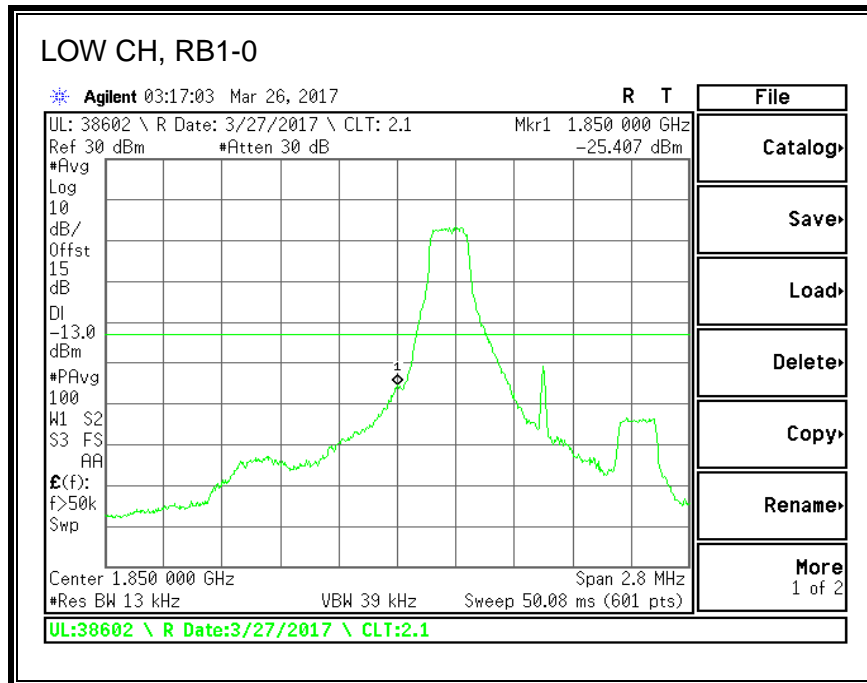
8.2.8. LTE BAND 25 BANDEDGE

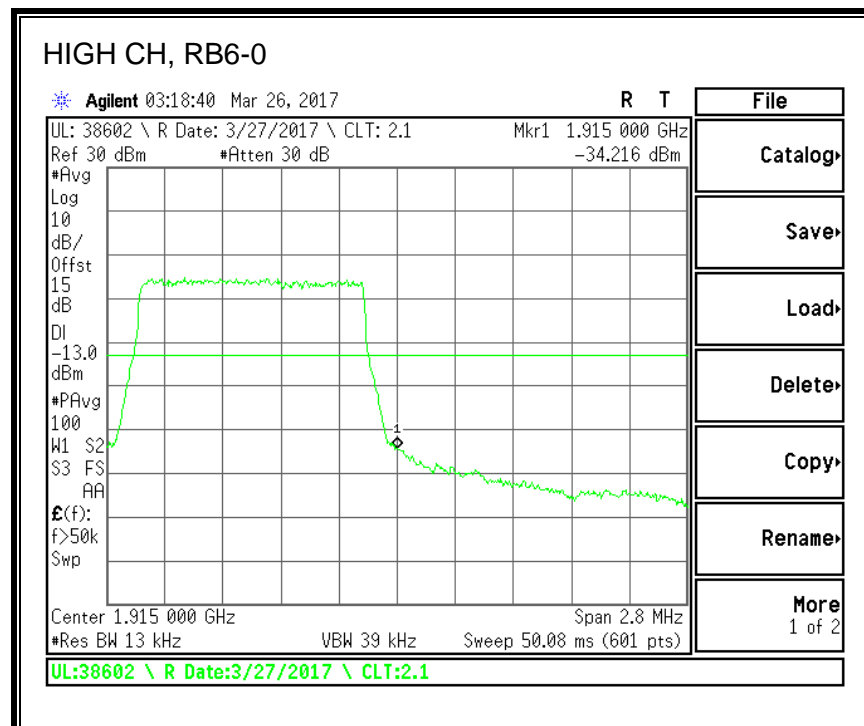
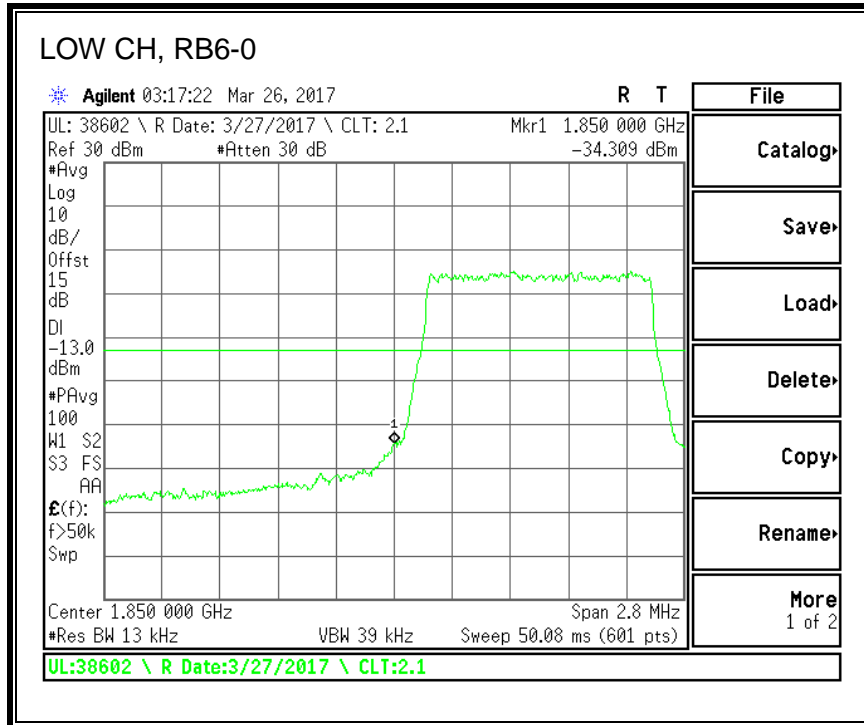
QPSK, (1.4 MHz BAND WIDTH)



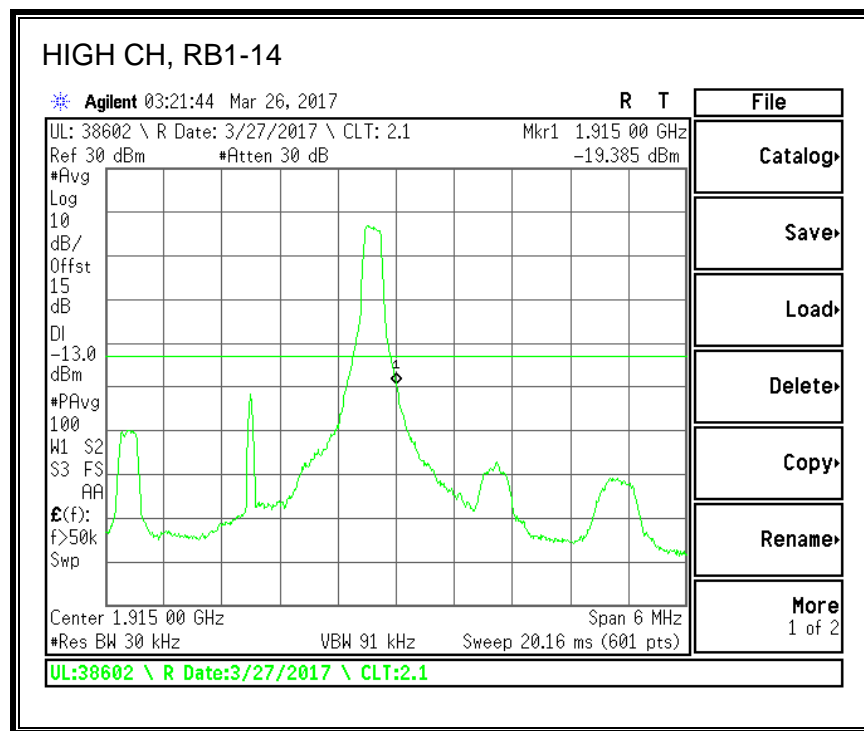
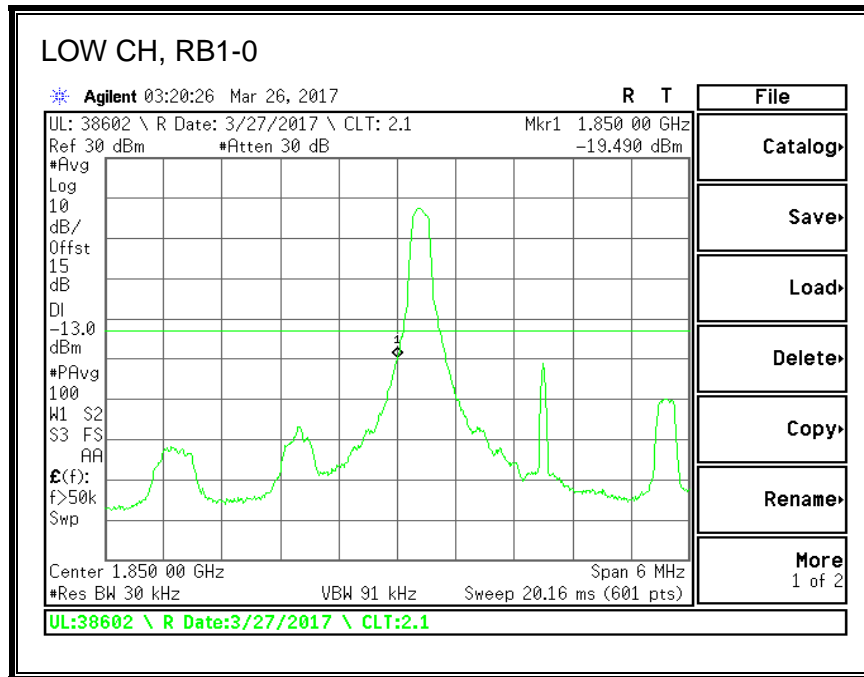


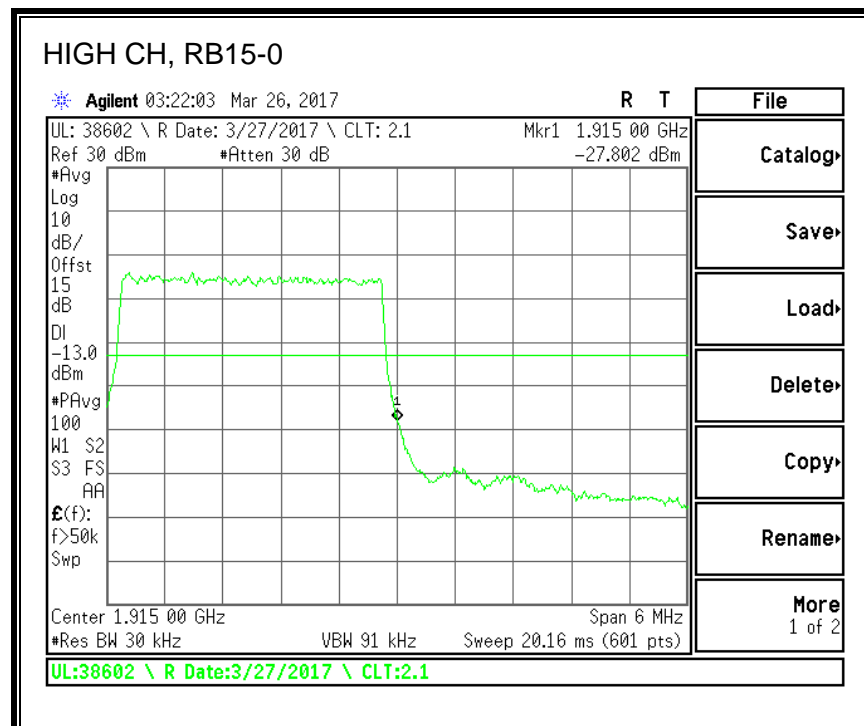
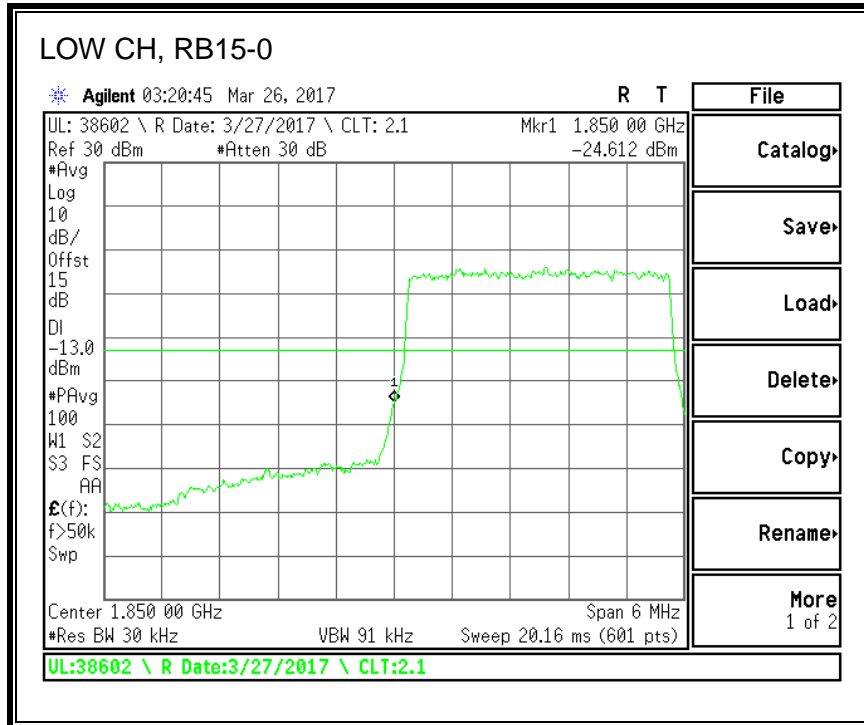
16QAM, (1.4 MHz BAND WIDTH)



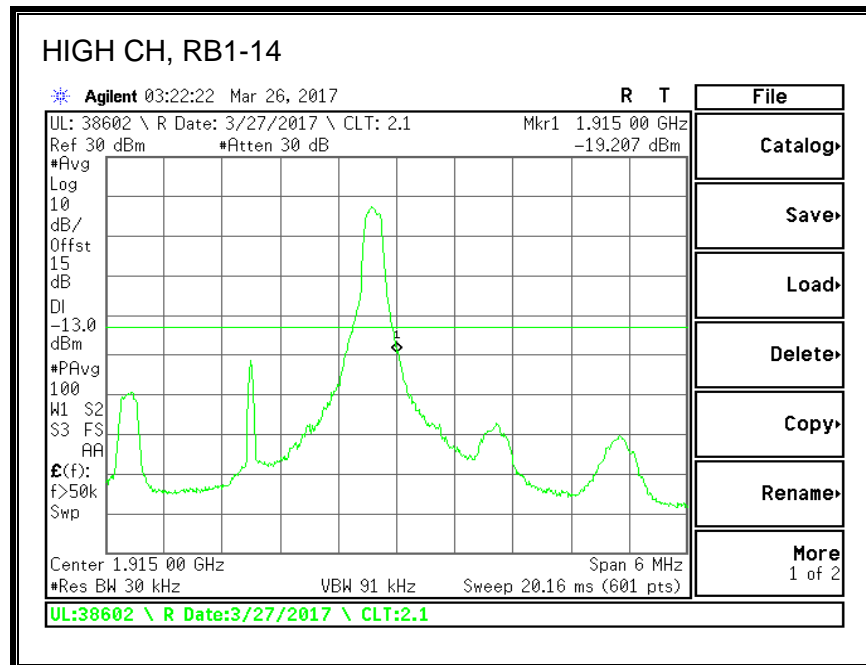
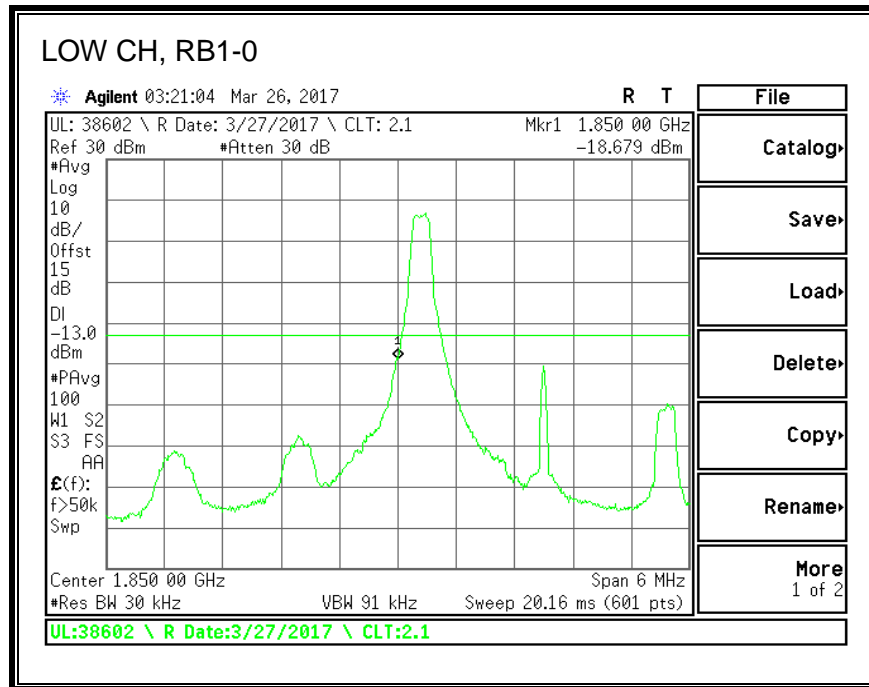


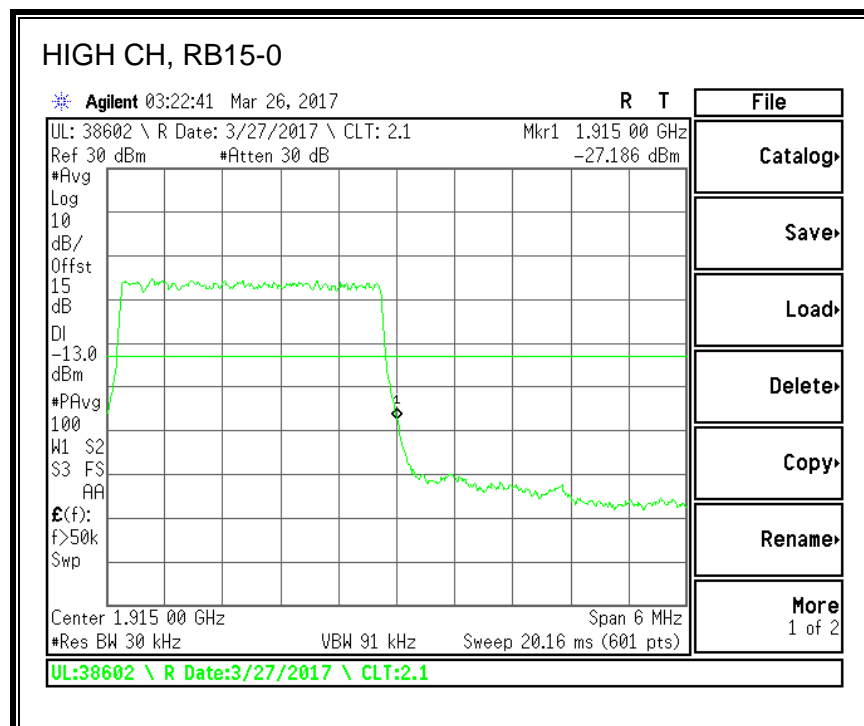
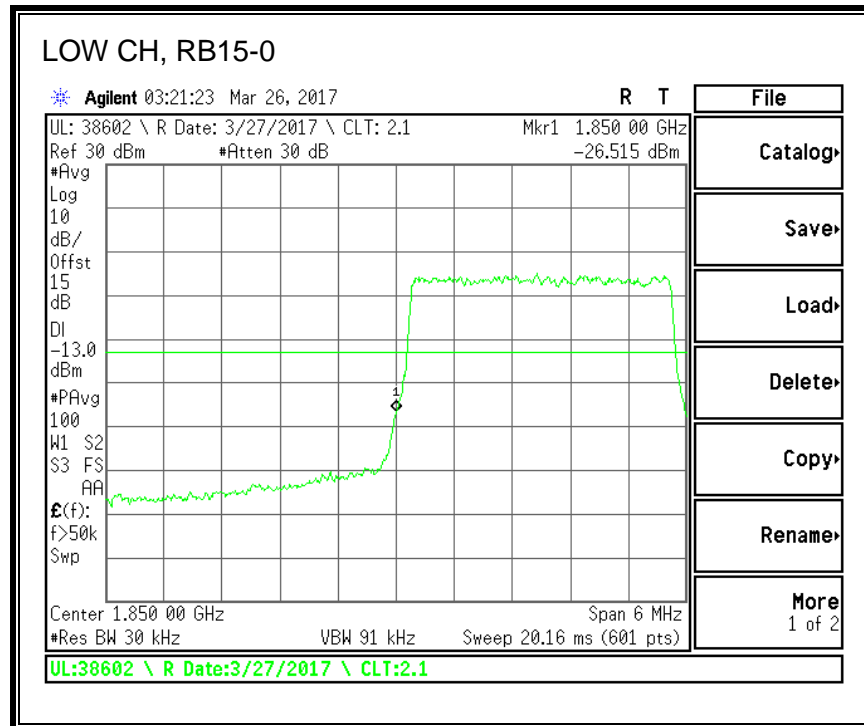
QPSK, (3.0 MHz BAND WIDTH)



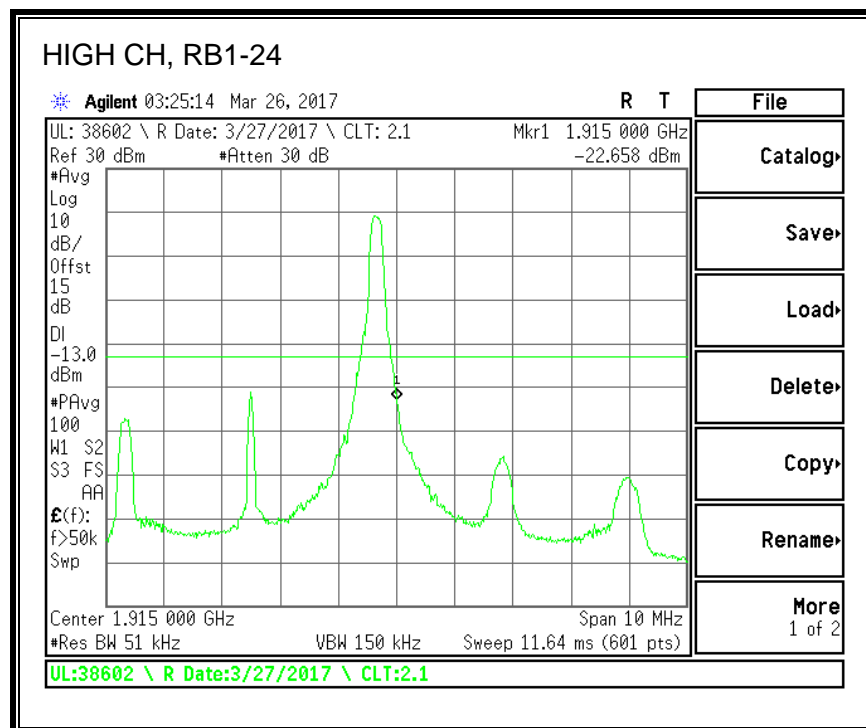
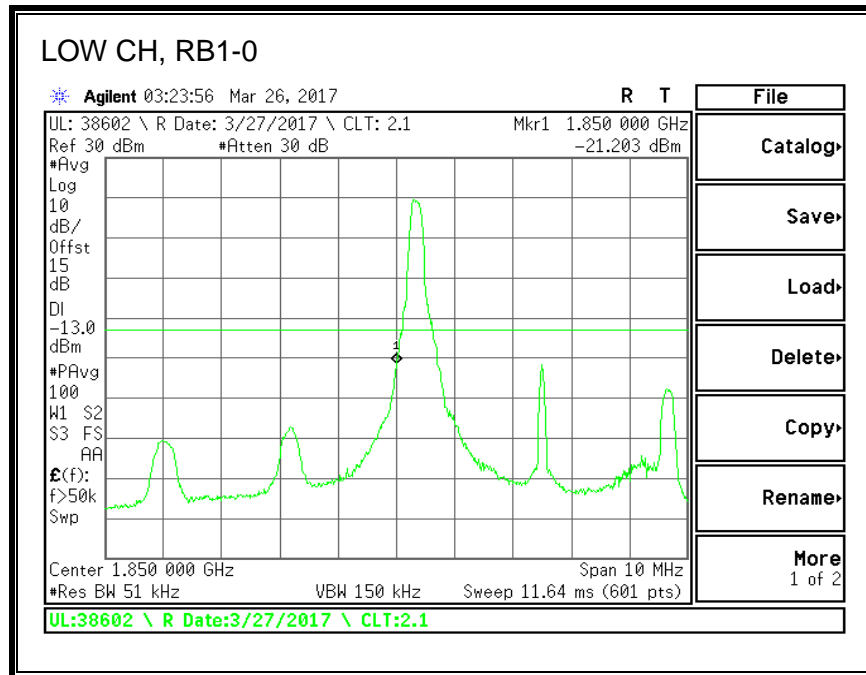


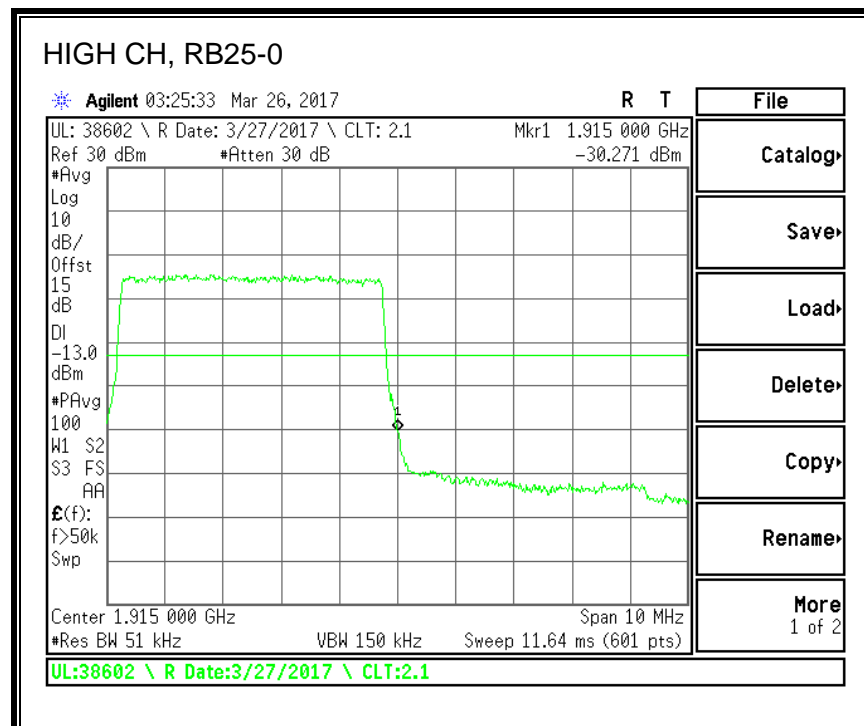
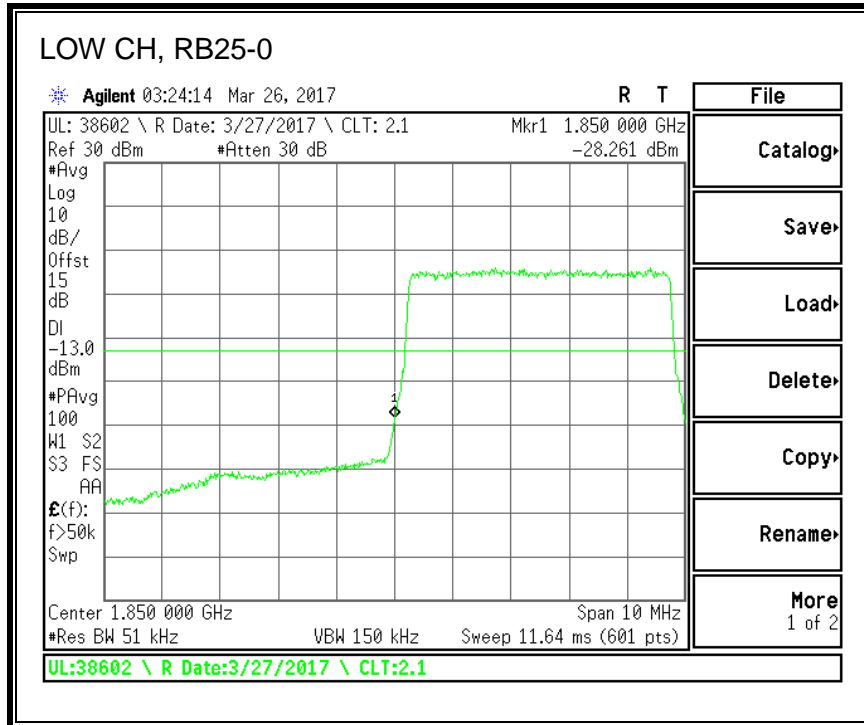
16QAM, (3.0 MHz BAND WIDTH)



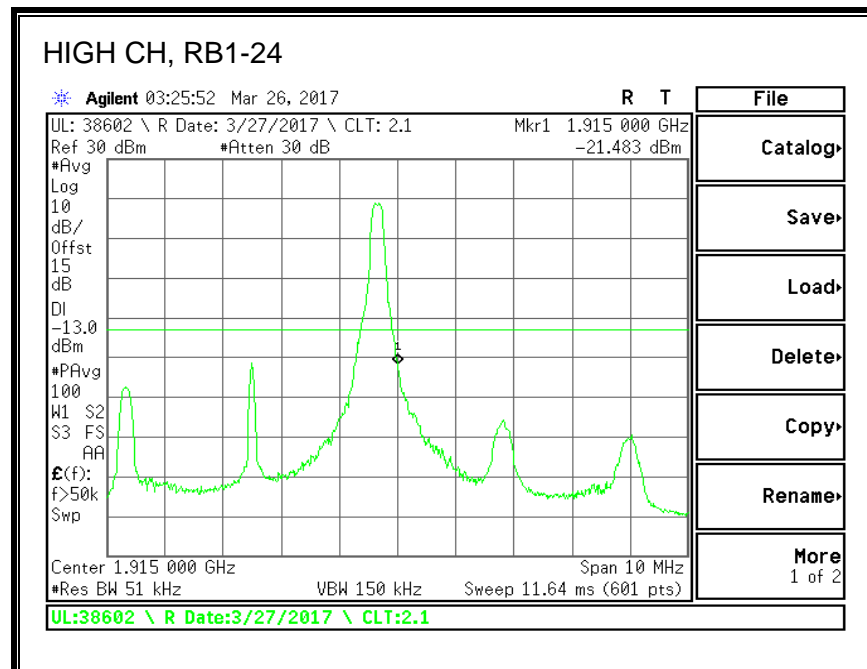
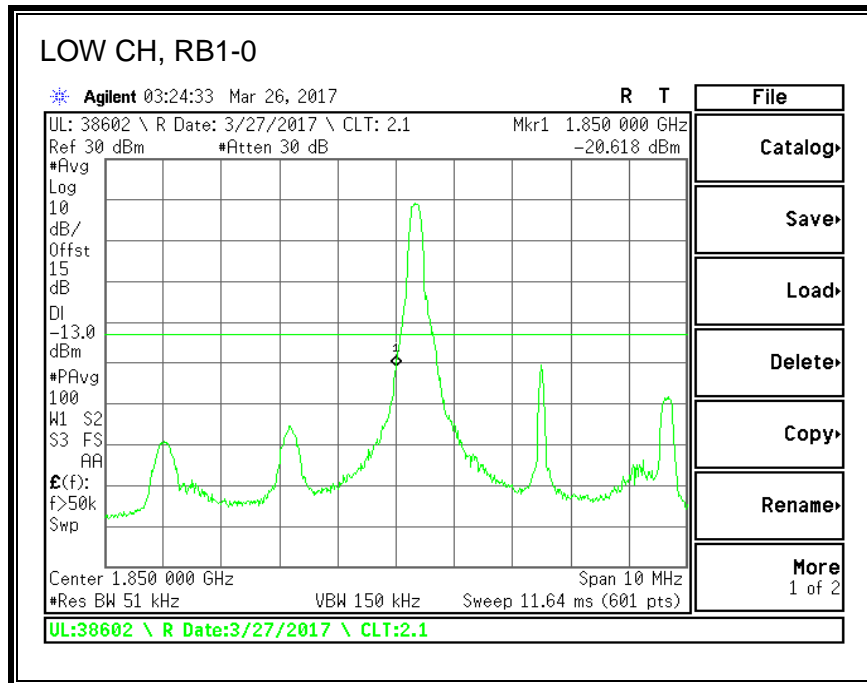


QPSK, (5.0 MHz BAND WIDTH)





16QAM, (5.0 MHz BAND WIDTH)



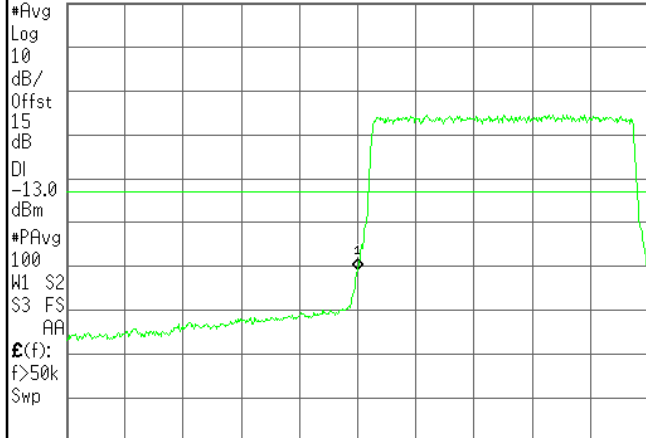
LOW CH, RB25-0

Agilent 03:24:52 Mar 26, 2017

R T

File

UL: 38602 \ R Date: 3/27/2017 \ CLT: 2.1 Mkr1 1.850 000 GHz
Ref 30 dBm *Atten 30 dB -30.676 dBm



Catalog>

Save>

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Rename>

More
1 of 2

Center 1.850 000 GHz Span 10 MHz
*Res BW 51 kHz VBW 150 kHz Sweep 11.64 ms (601 pts)

UL:38602 \ R Date:3/27/2017 \ CLT:2.1

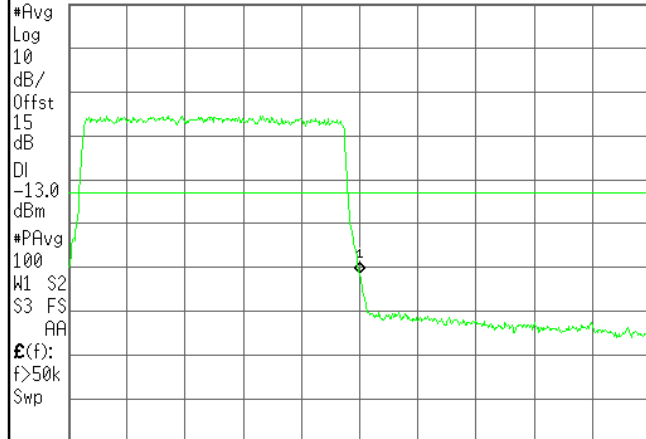
HIGH CH, RB25-0

Agilent 03:26:11 Mar 26, 2017

R T

File

UL: 38602 \ R Date: 3/27/2017 \ CLT: 2.1 Mkr1 1.915 000 GHz
Ref 30 dBm *Atten 30 dB -31.287 dBm



Catalog>

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Load>

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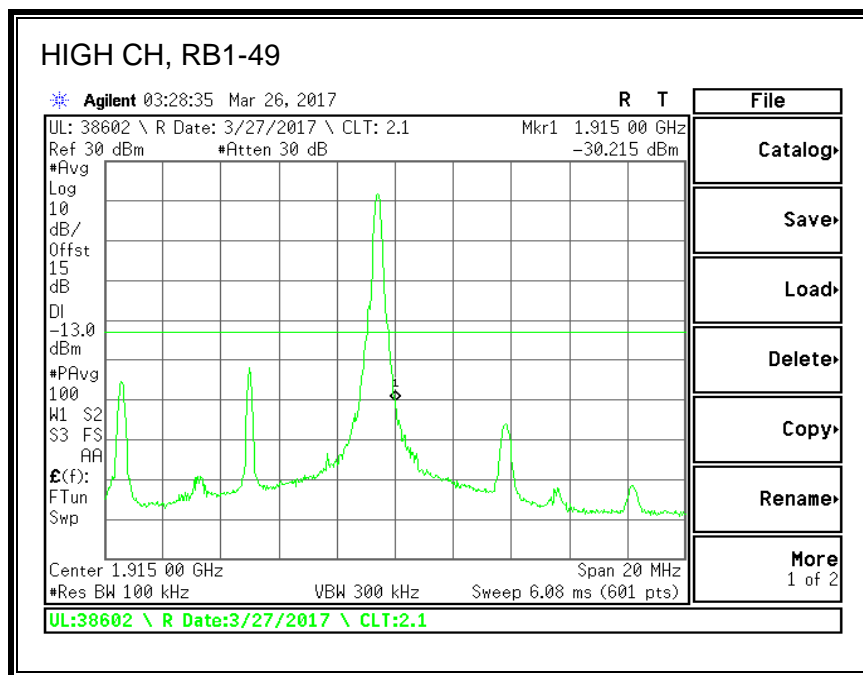
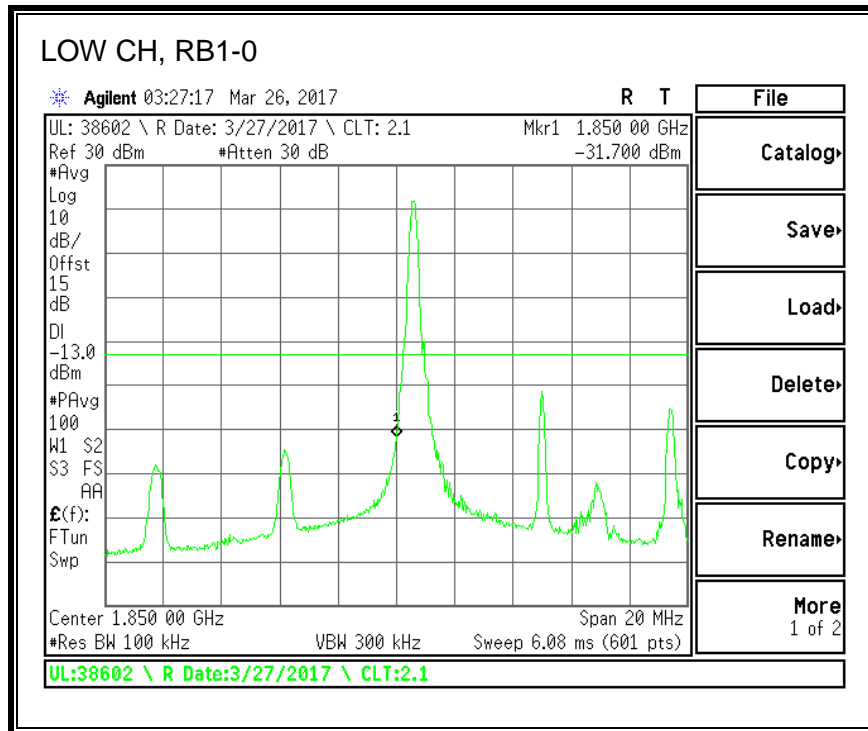
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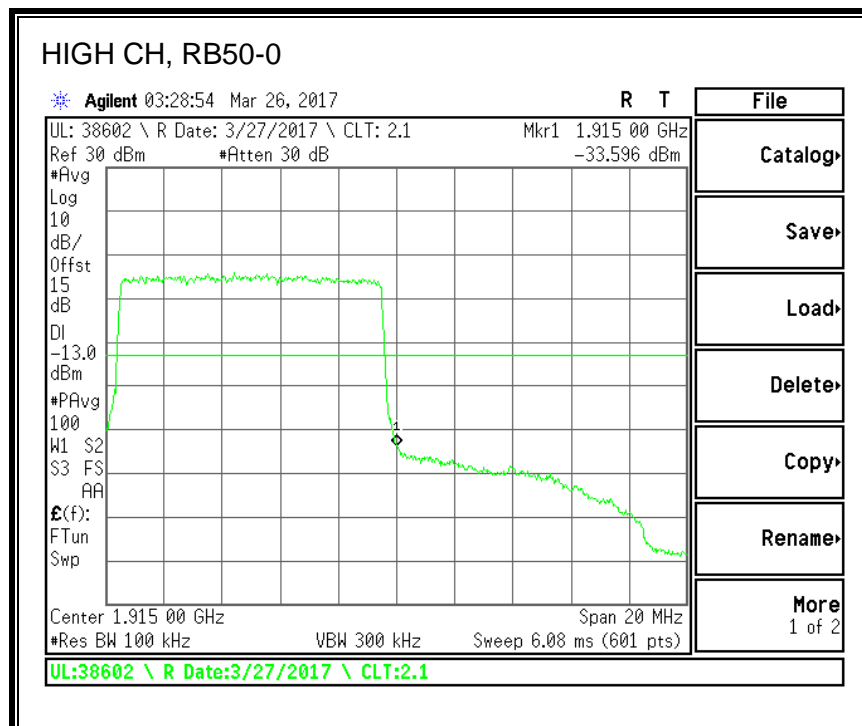
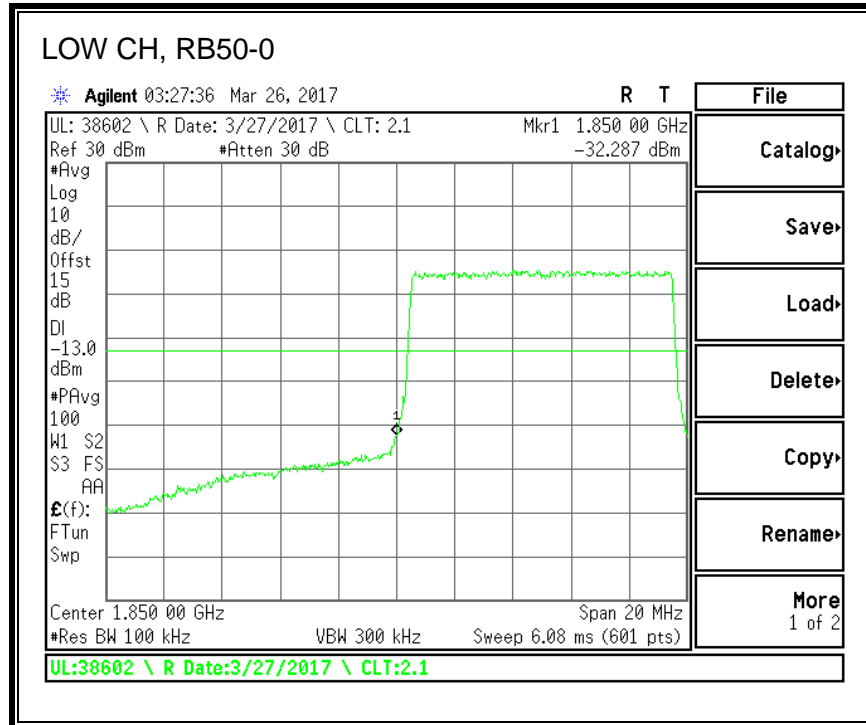
More
1 of 2

Center 1.915 000 GHz Span 10 MHz
*Res BW 51 kHz VBW 150 kHz Sweep 11.64 ms (601 pts)

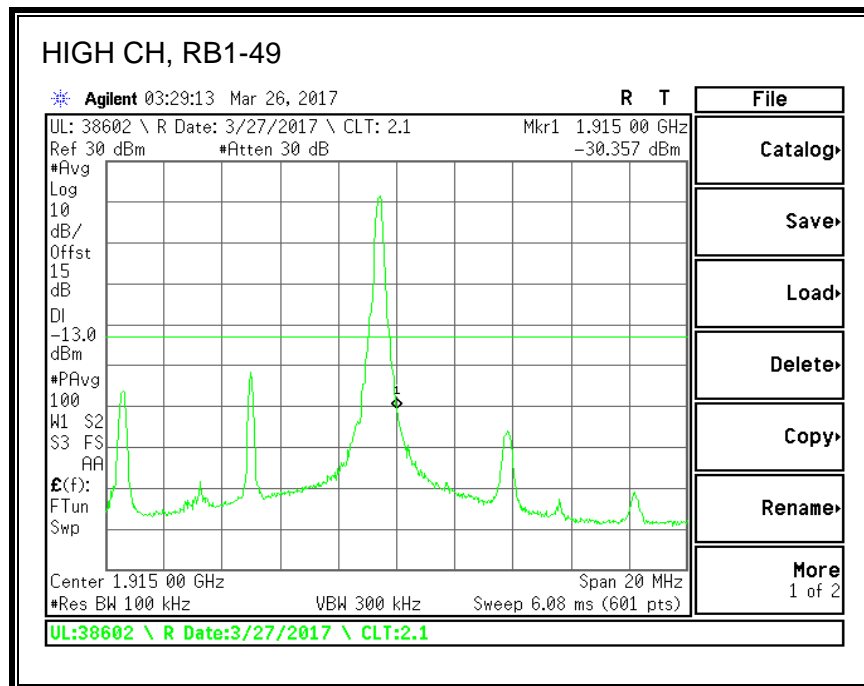
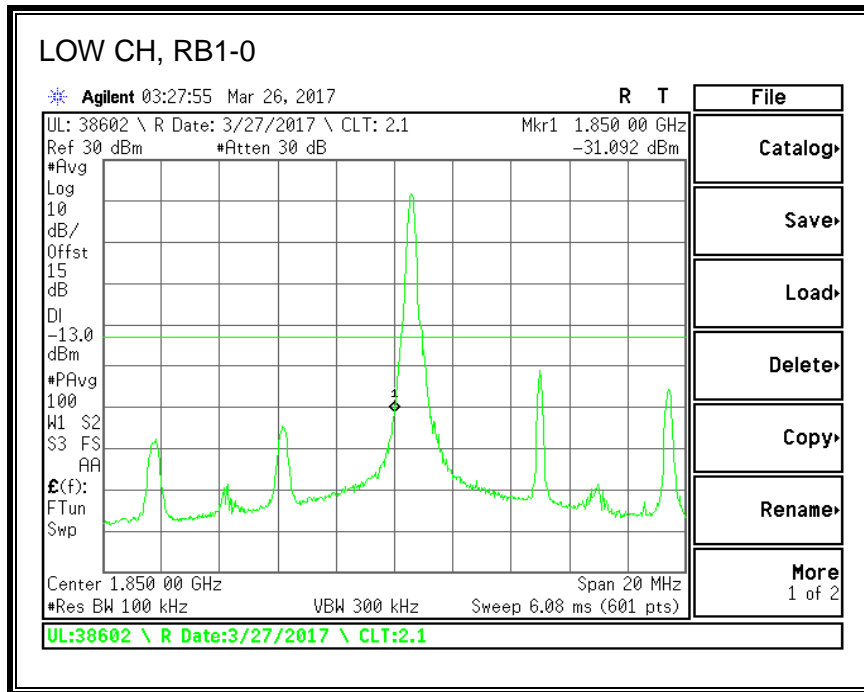
UL:38602 \ R Date:3/27/2017 \ CLT:2.1

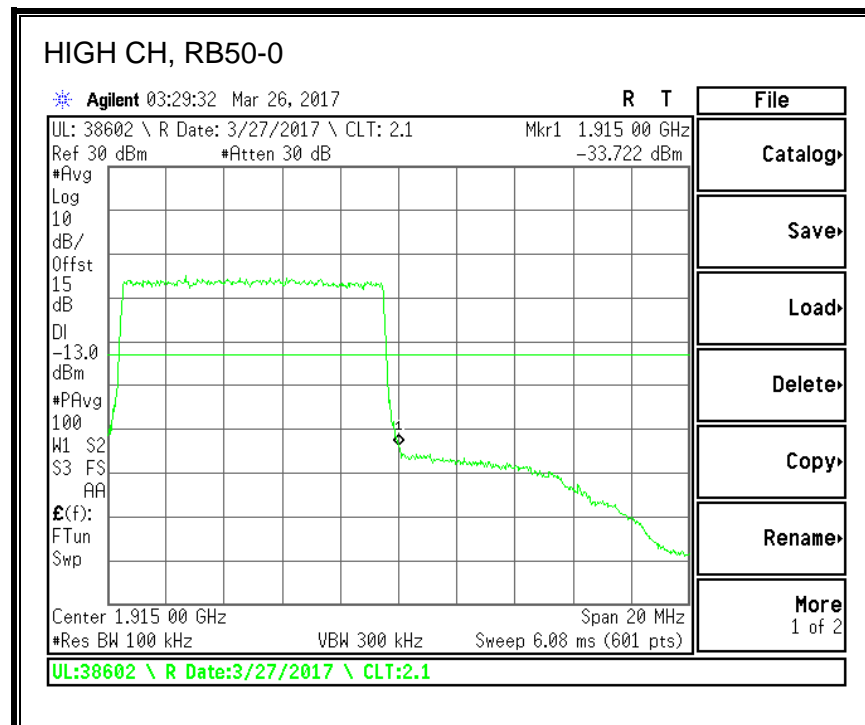
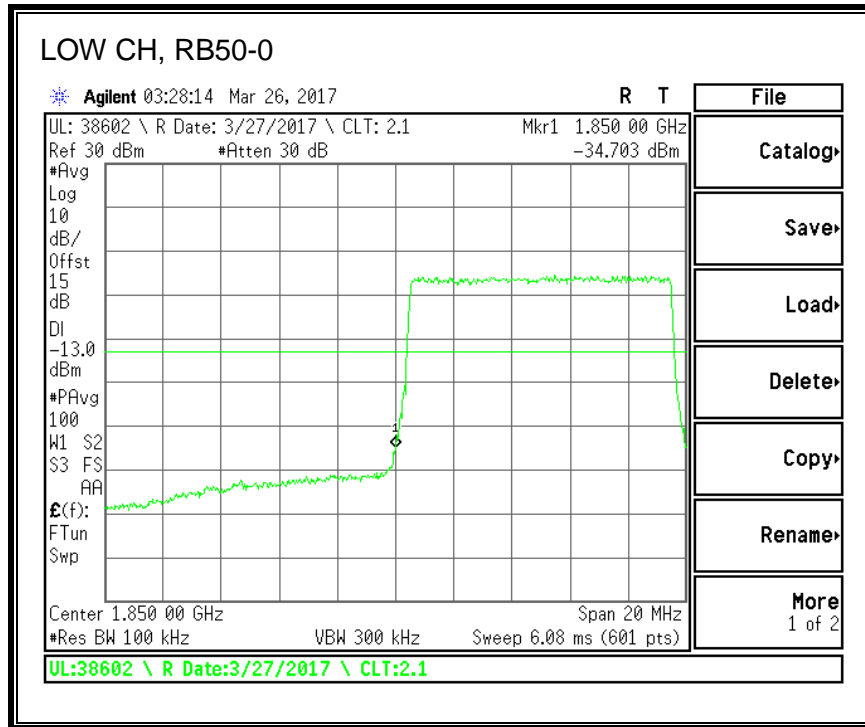
QPSK, (10.0 MHz BAND WIDTH)



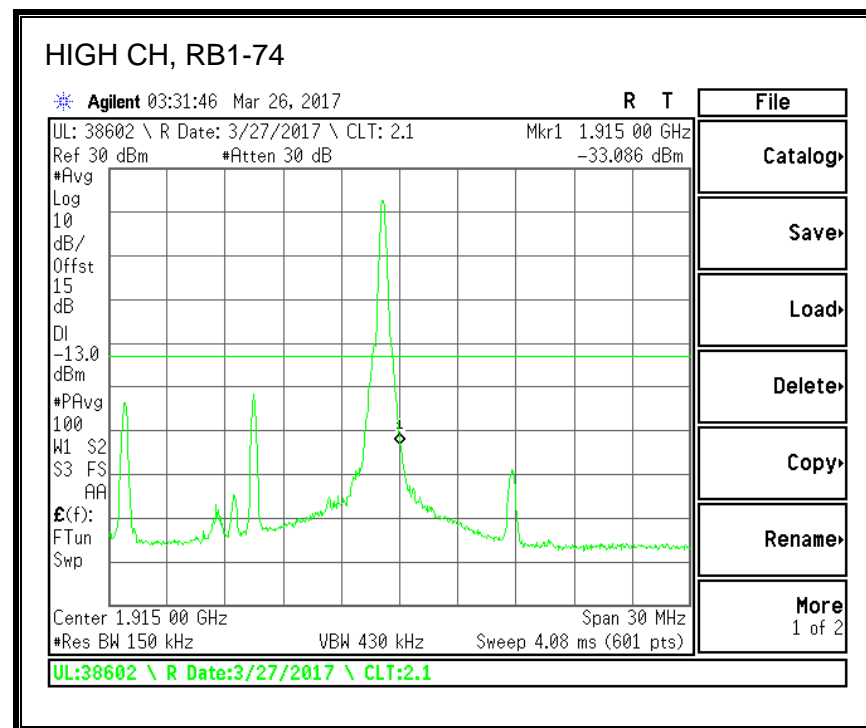
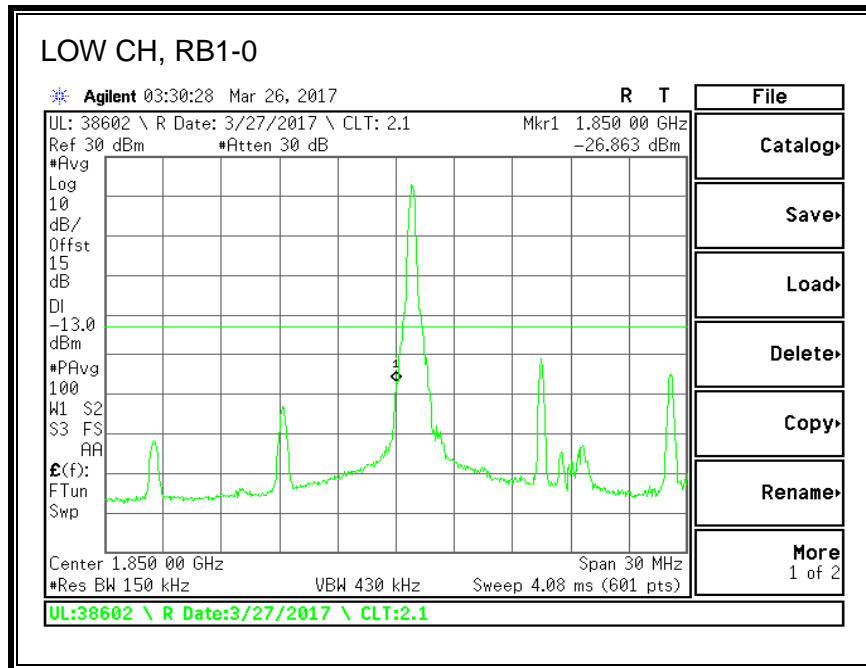


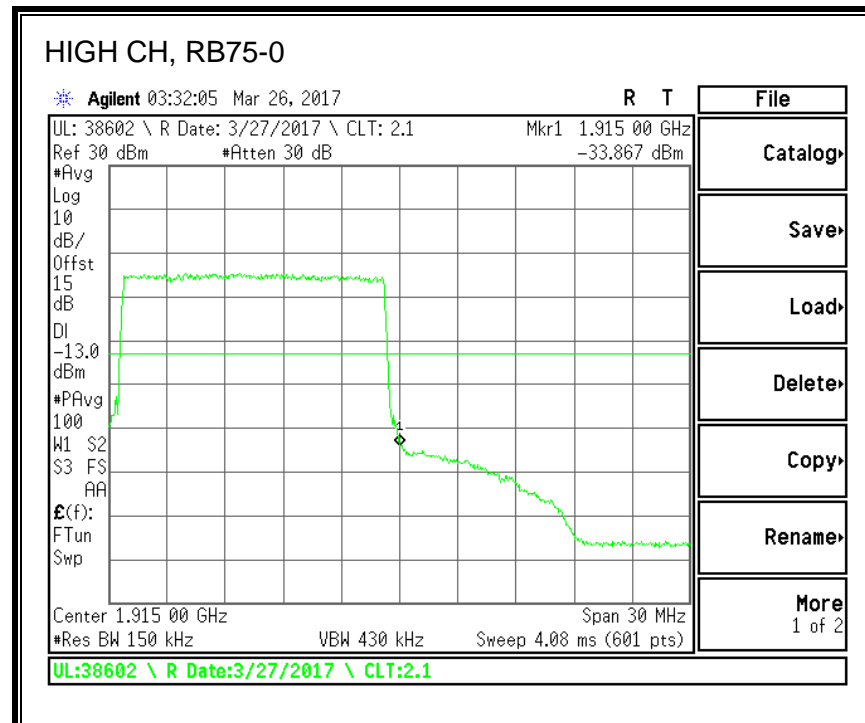
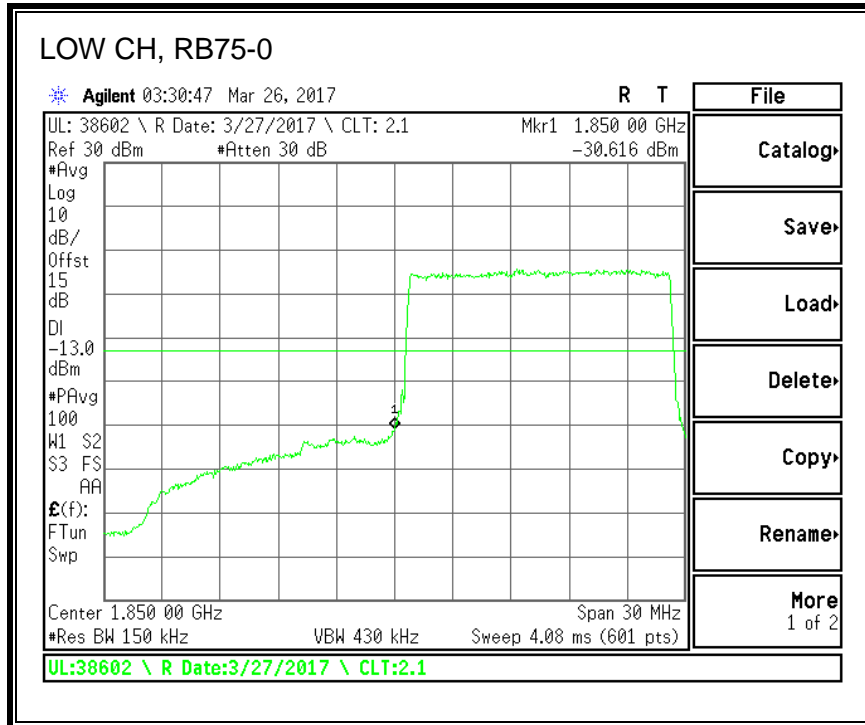
16QAM, (10.0 MHz BAND WIDTH)



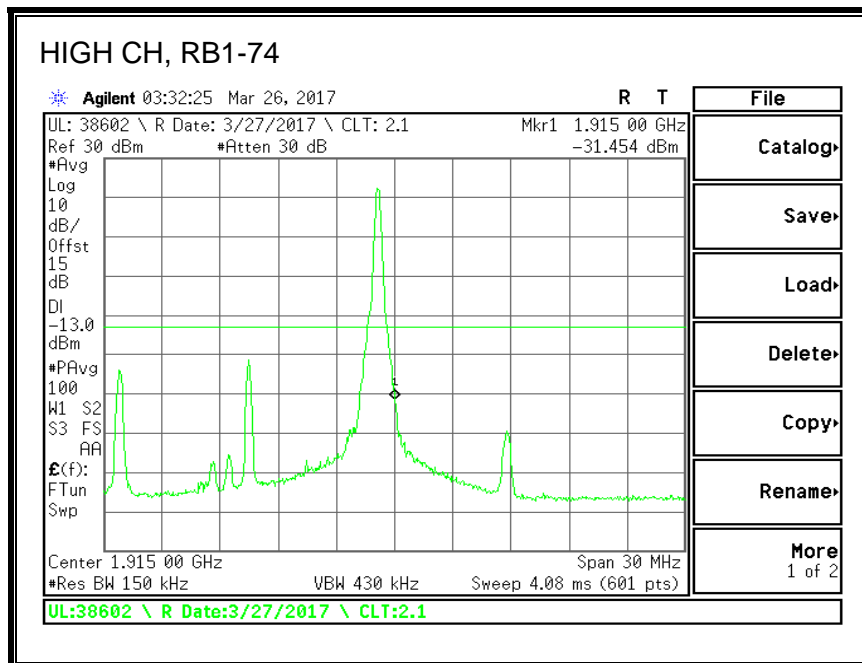
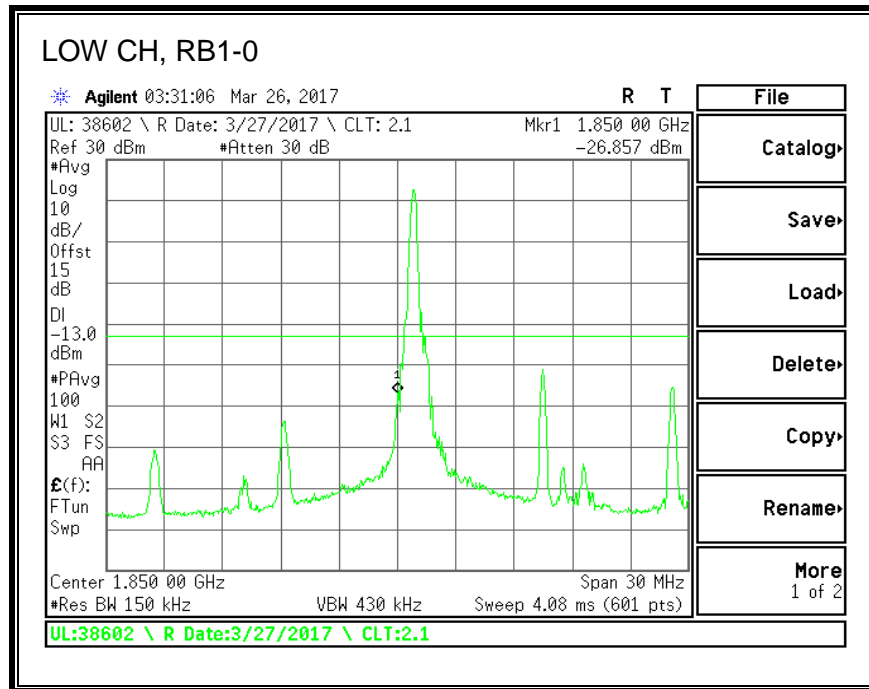


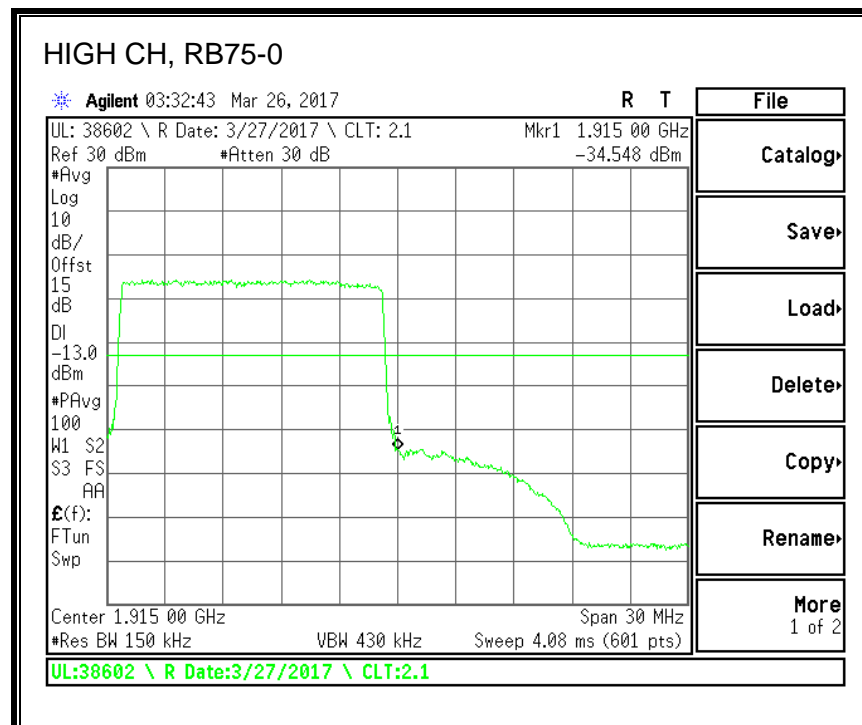
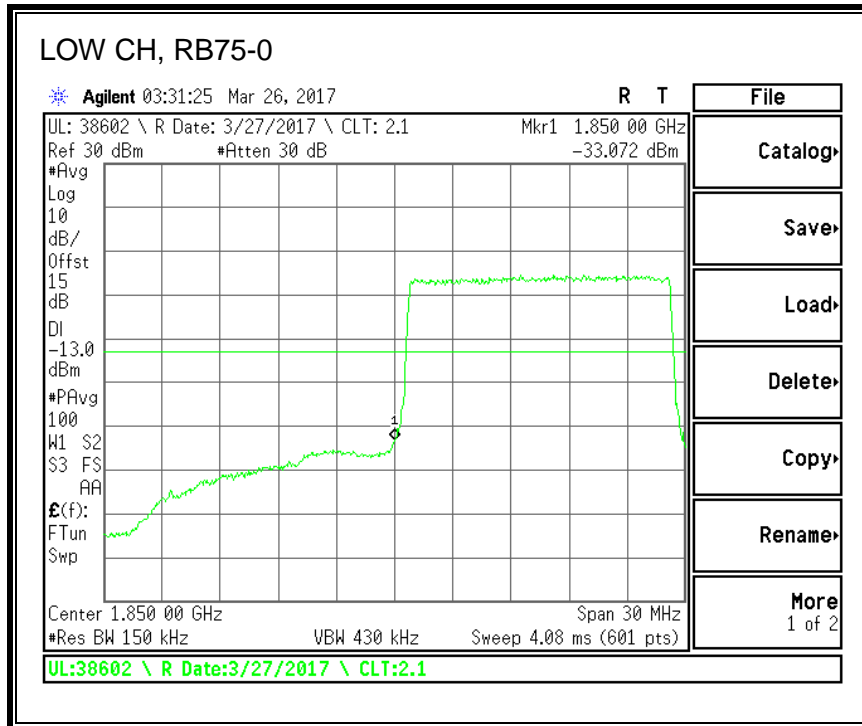
QPSK, (15.0 MHz BAND WIDTH)



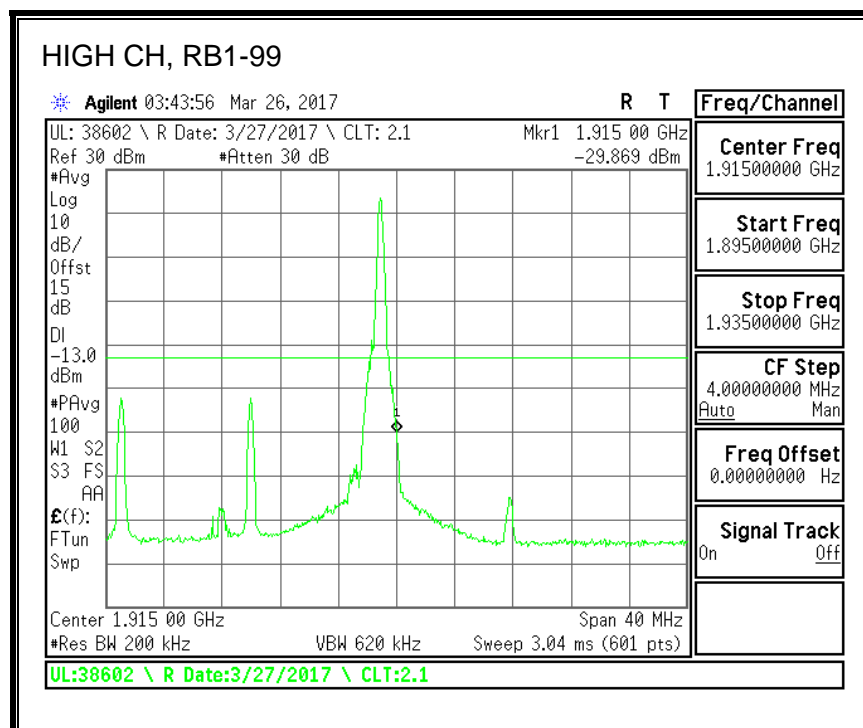
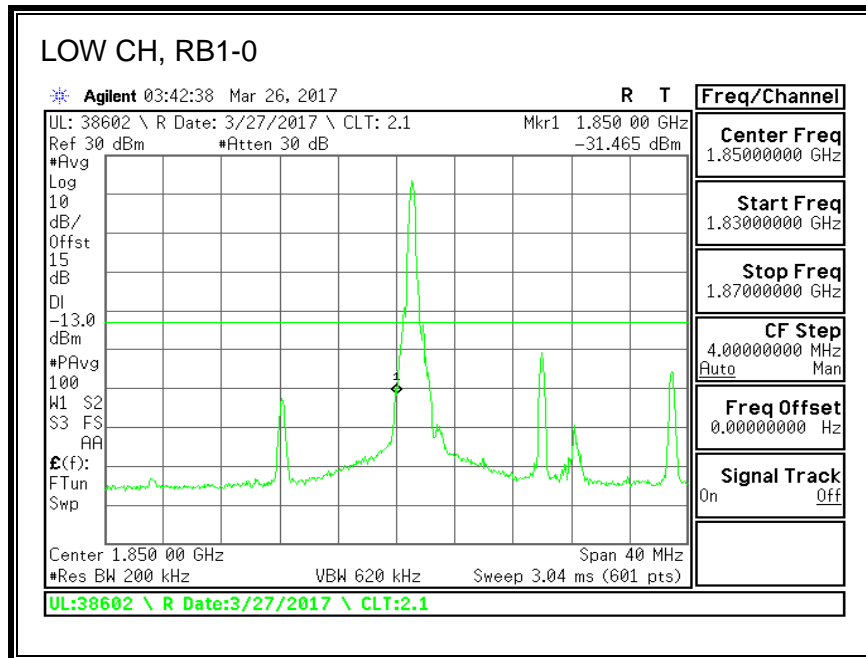


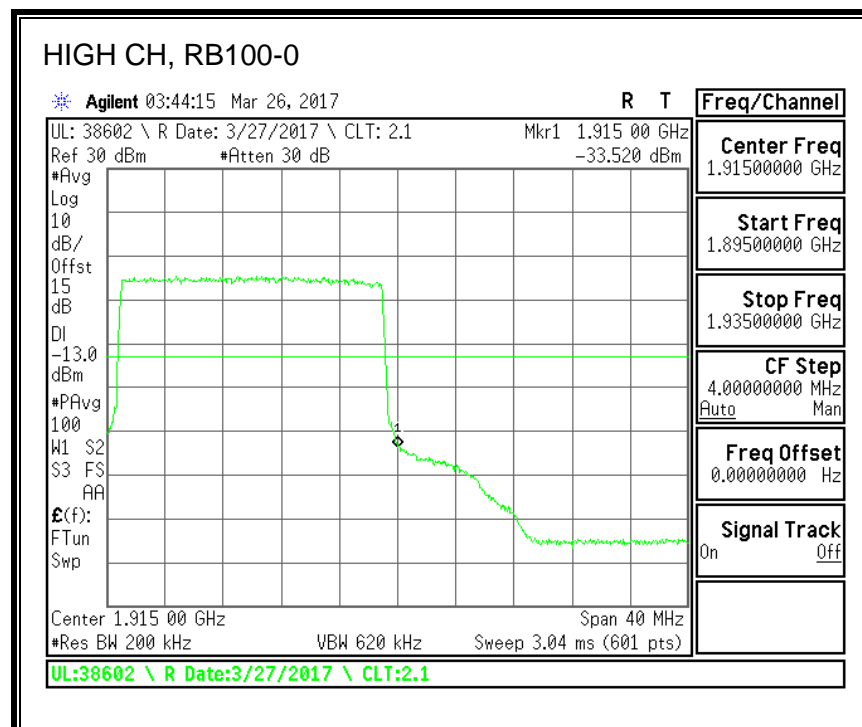
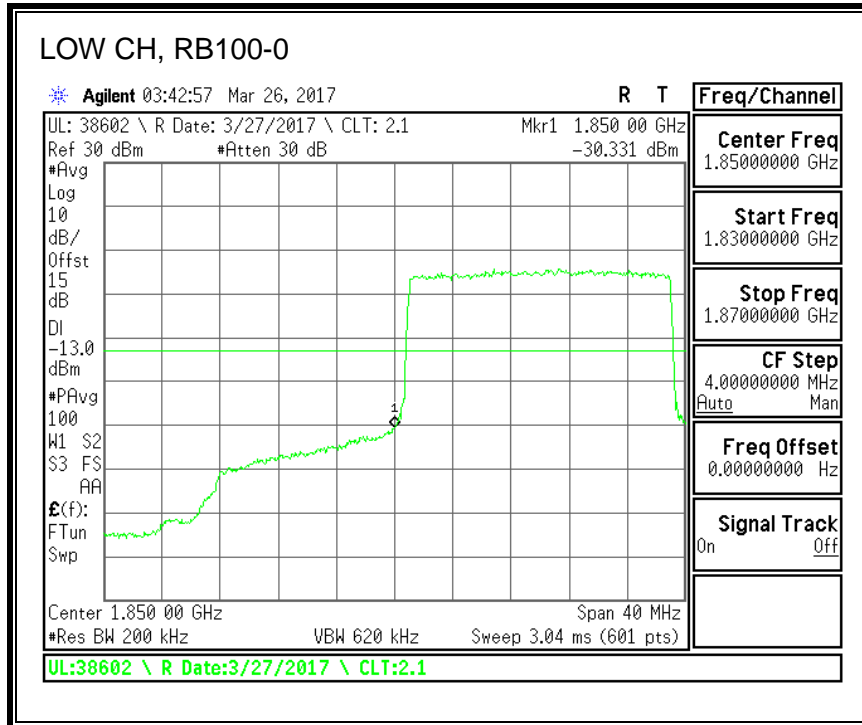
16QAM, (15.0 MHz BAND WIDTH)





QPSK, (20.0 MHz BAND WIDTH)





16QAM, (20.0 MHz BAND WIDTH)

