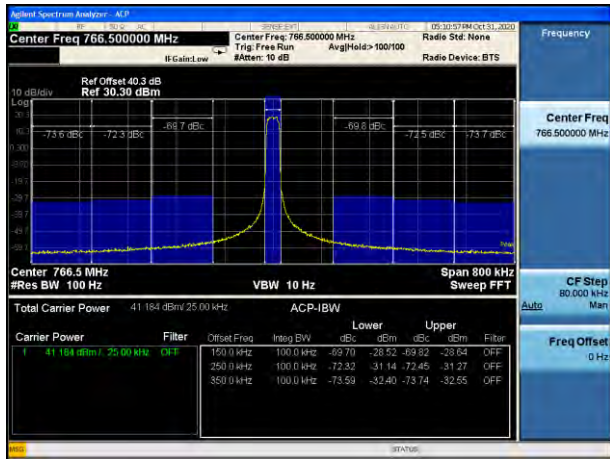
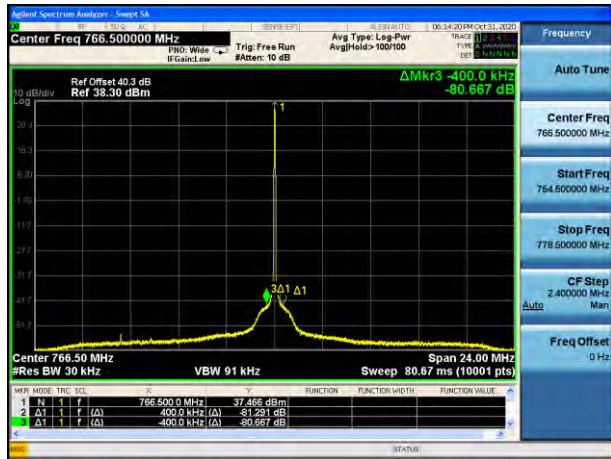




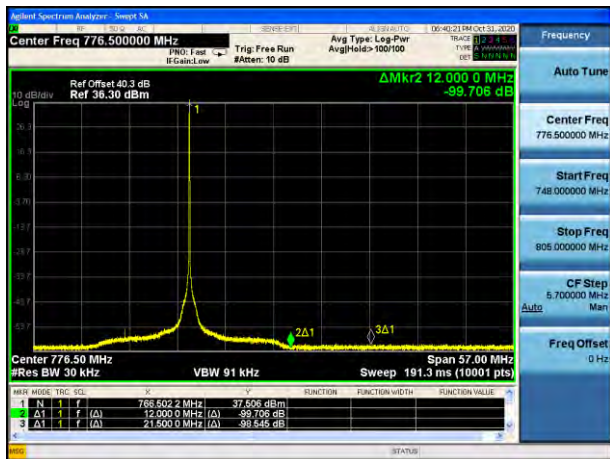
Output



Output



Output



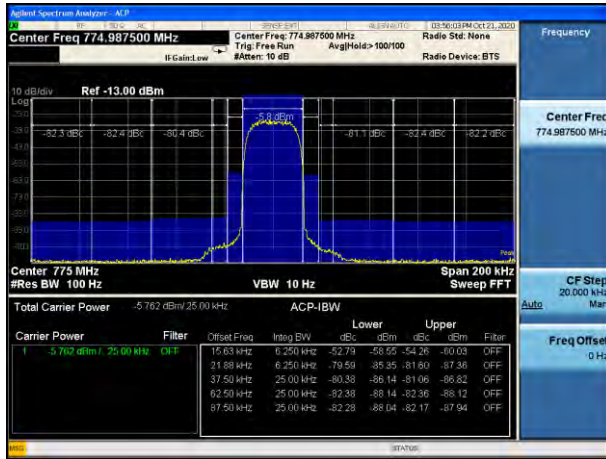
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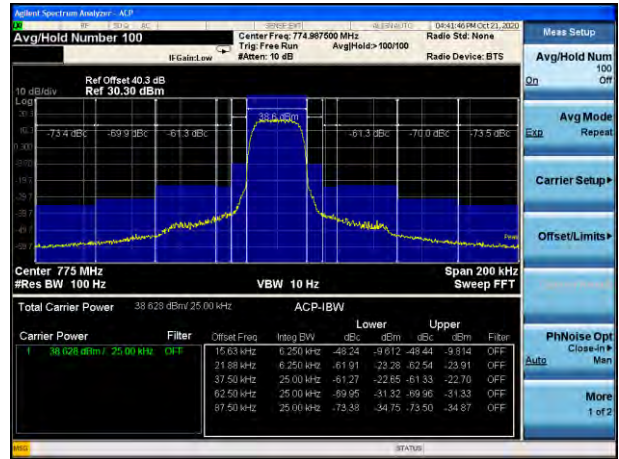
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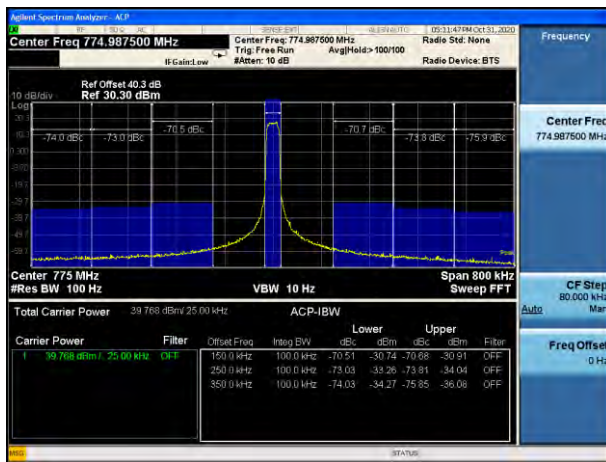
1.3.5 Pre-AGC_Highest frequency
Input



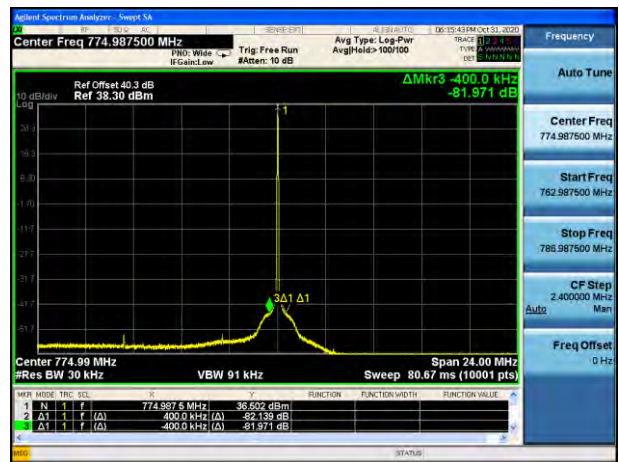
Output



Output



Output

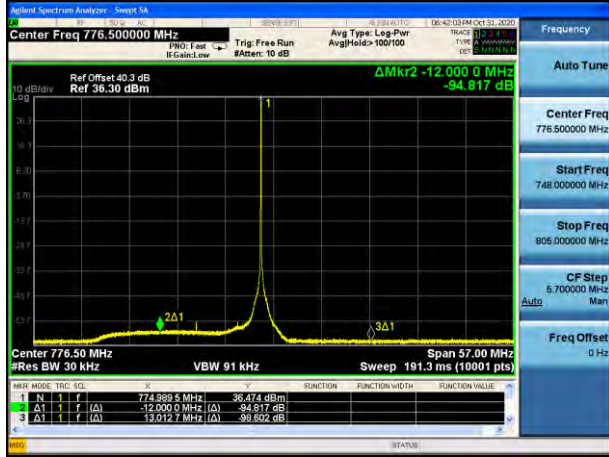


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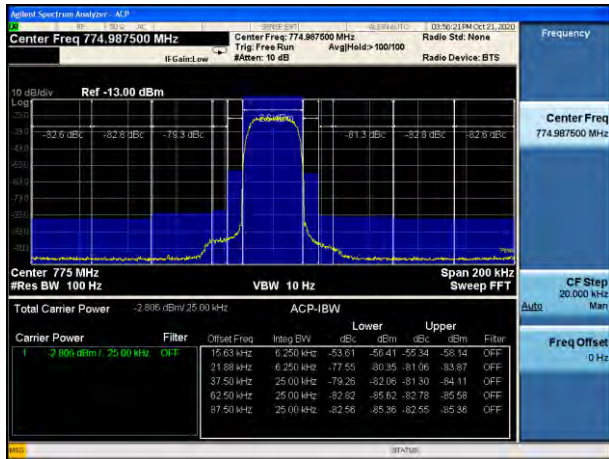
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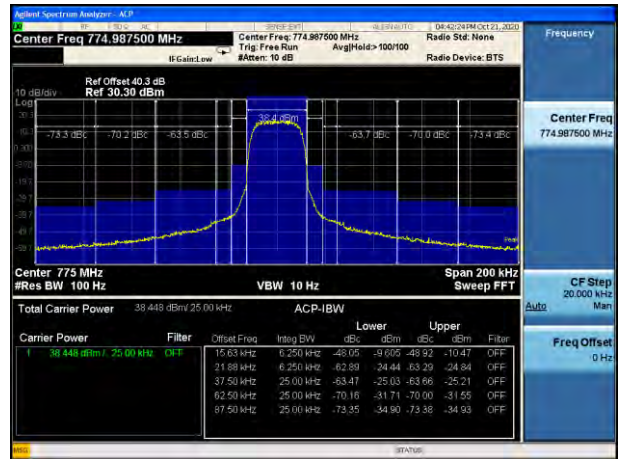
Output



1.3.6 3dB above AGC_ Highest frequency
 Input



Output



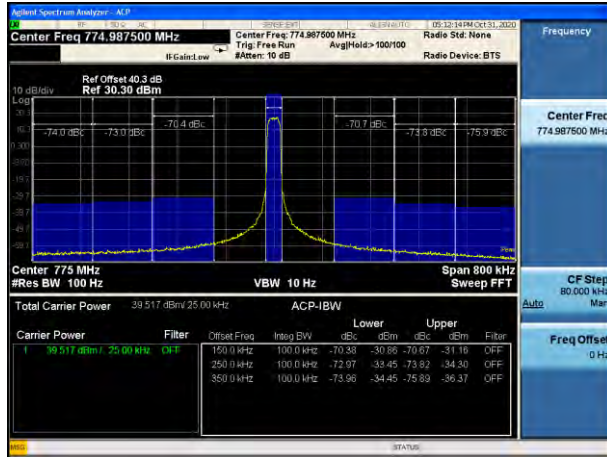
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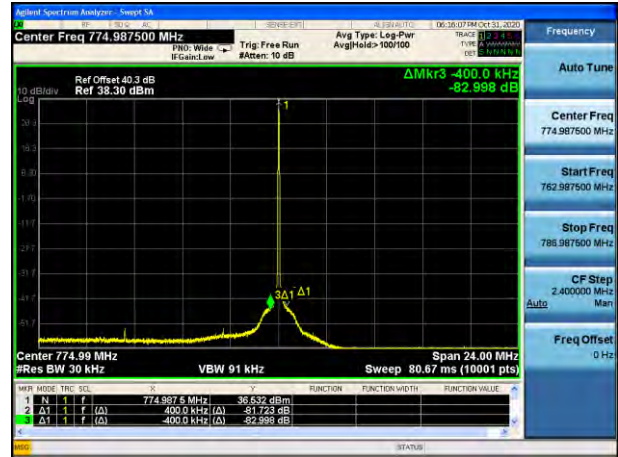
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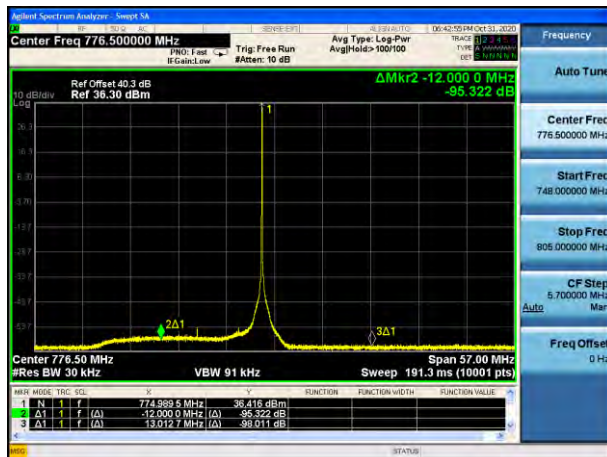
Output



Output



Output



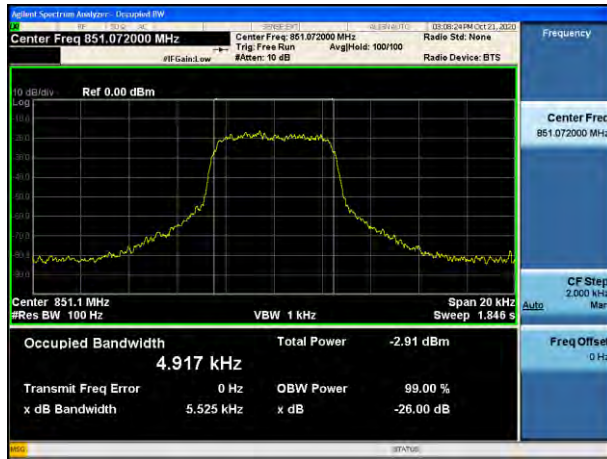
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2. Downlink: 851MHz to 869MHz

2.1 Occupied Bandwidth

2.1.1 6.25kHz CQPSK Pre-AGC

Input



Output

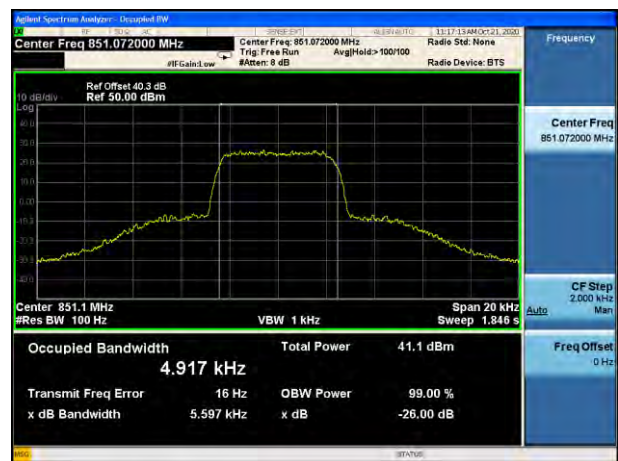


2.1.2 6.25kHz CQPSK 3dB above AGC

Input



Output



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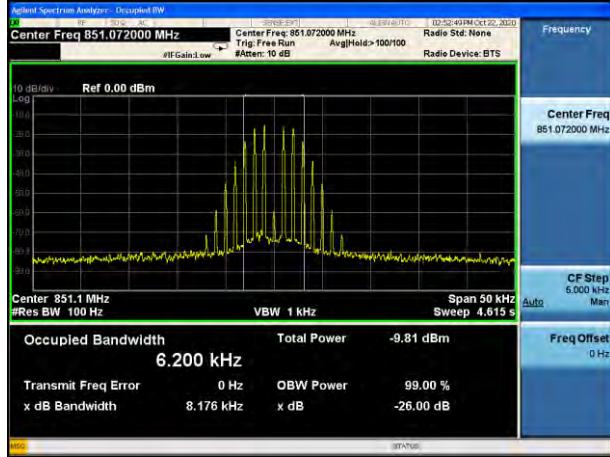
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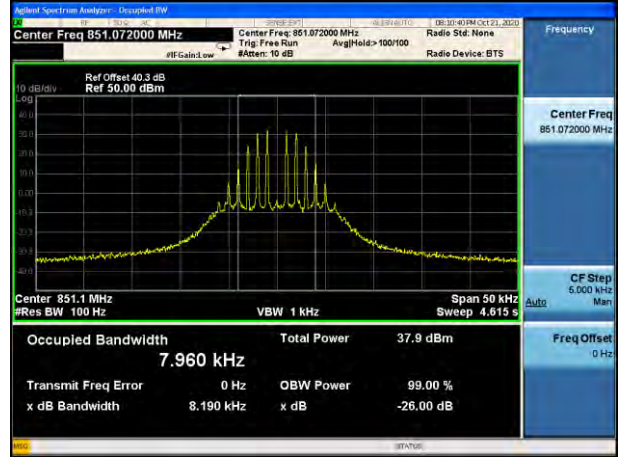


2.1.2 12.5kHz FM Pre-AGC

Input

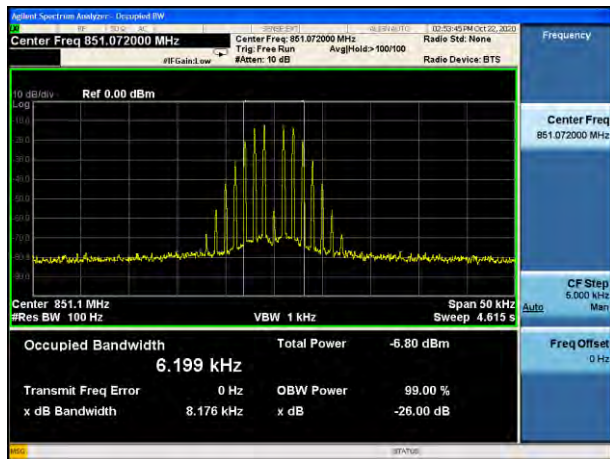


Output

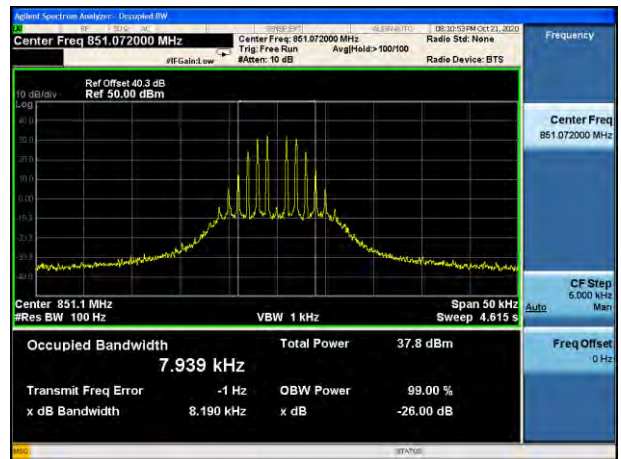


2.1.2 12.5kHz FM 3dB above AGC

Input



Output

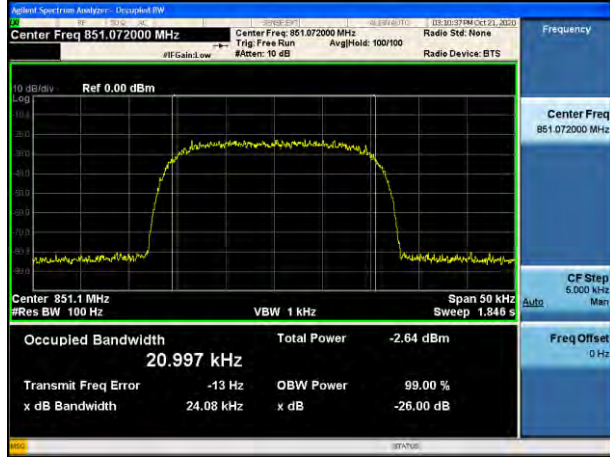


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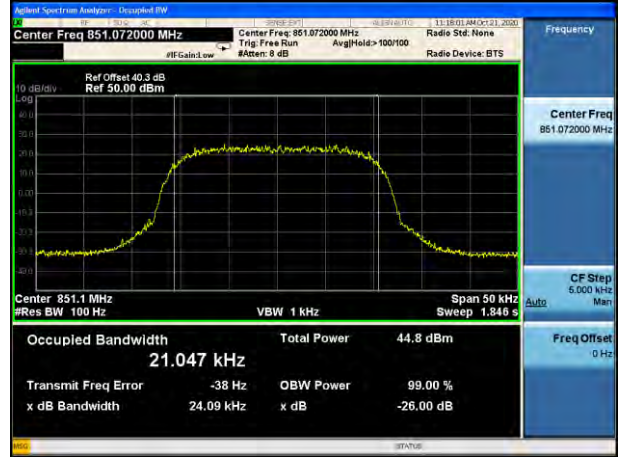


2.1.3 25kHz TETRA Pre-AGC

Input

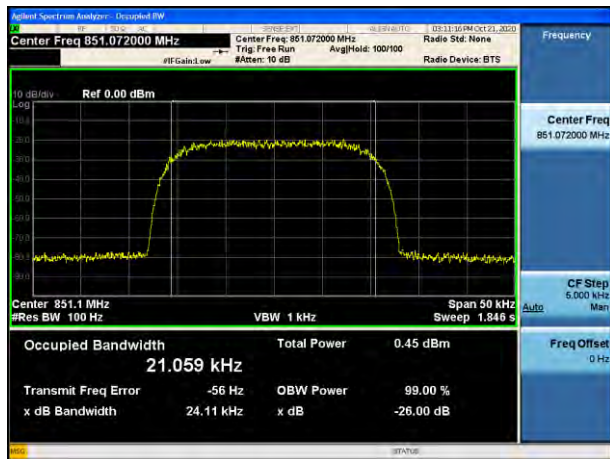


Output

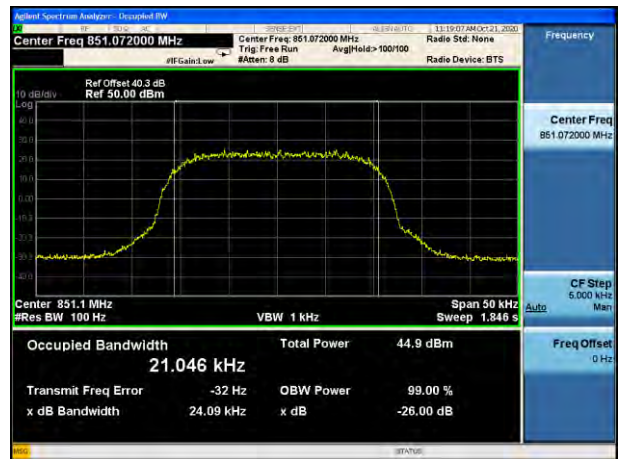


2.1.3 25kHz TETRA 3dB above AGC

Input



Output



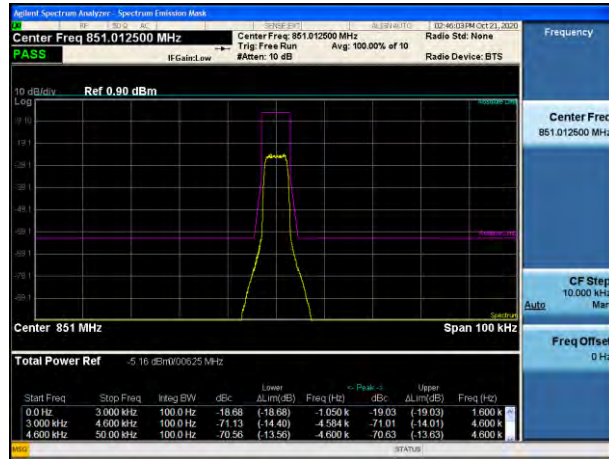
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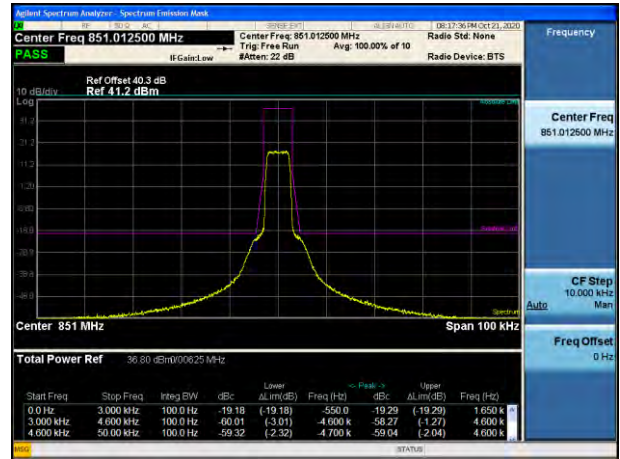
2.2 Emission masks (6.25kHz CQPSK MASK E)

2.2.1 Pre-AGC_ Lowest frequency

Input



Output

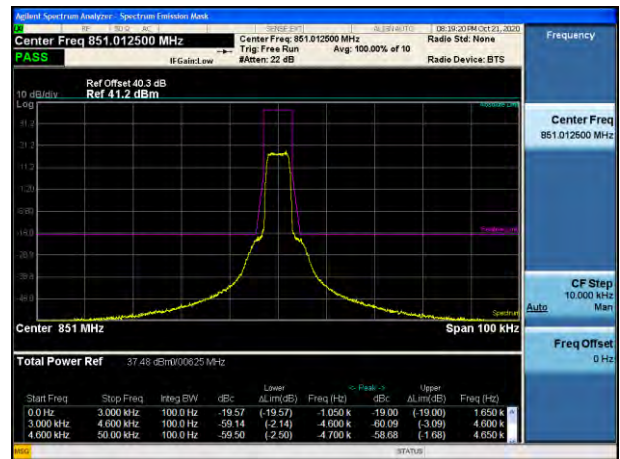


2.2.2 3dB above AGC_ Lowest frequency

Input



Output



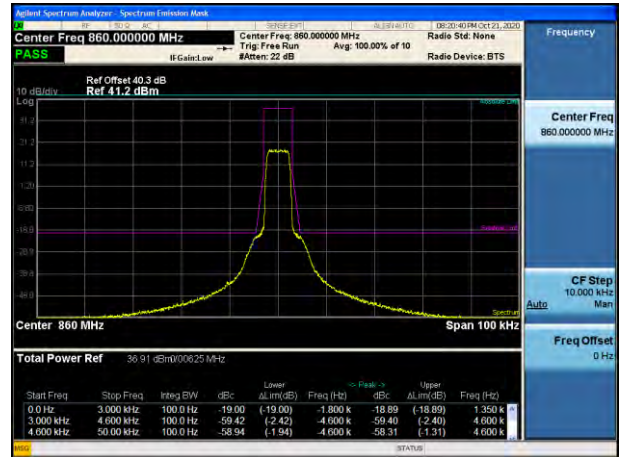
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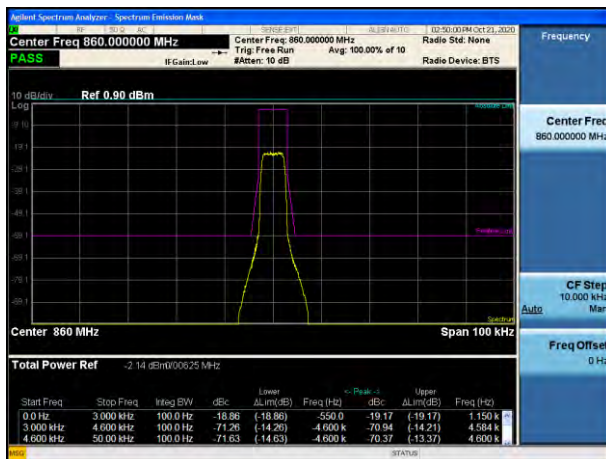
2.2.3 Pre-AGC_ Middle frequency
 Input



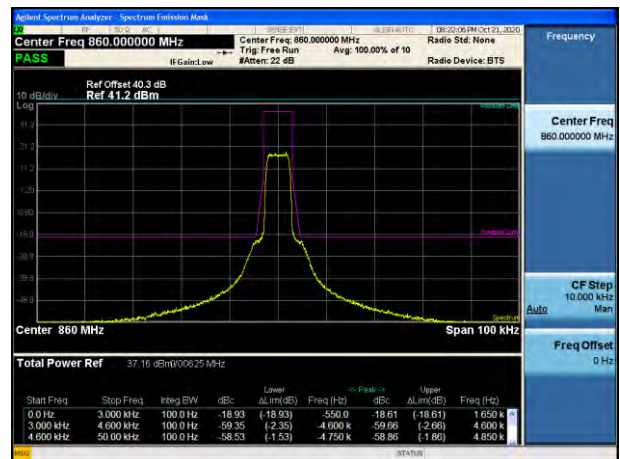
Output



2.2.4 3dB above AGC_ Middle frequency
 Input



Output

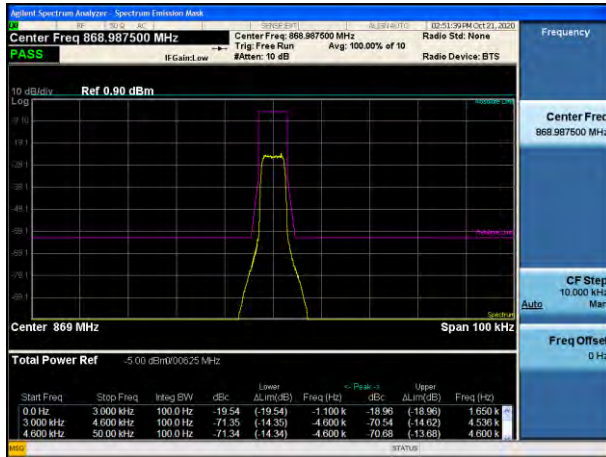


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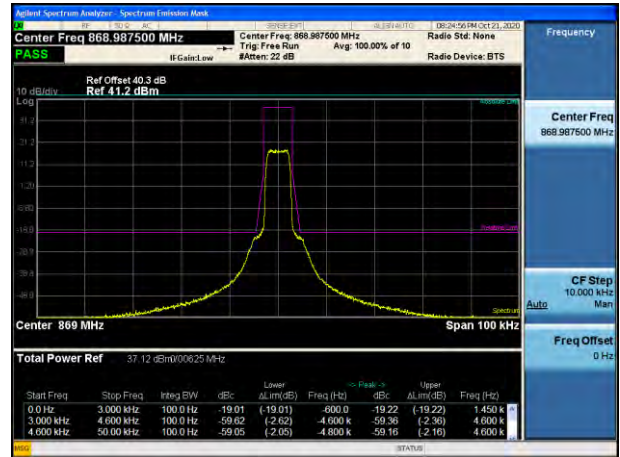
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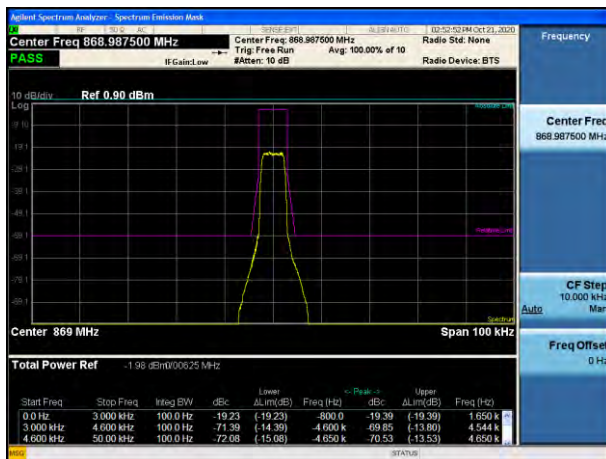
2.2.5 Pre-AGC_ Highest frequency
 Input



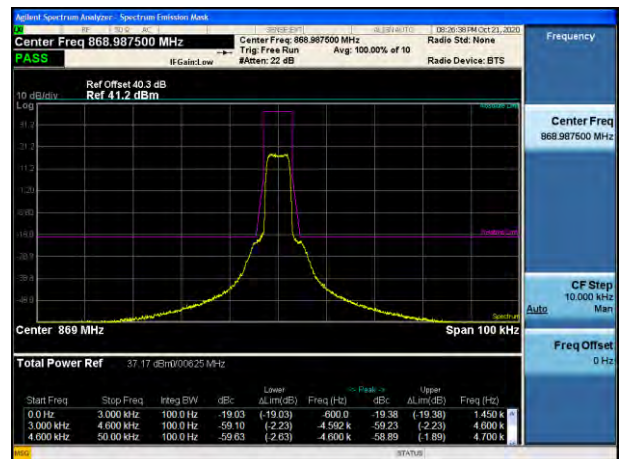
Output



2.2.6 3dB above AGC_ Highest frequency
 Input



Output



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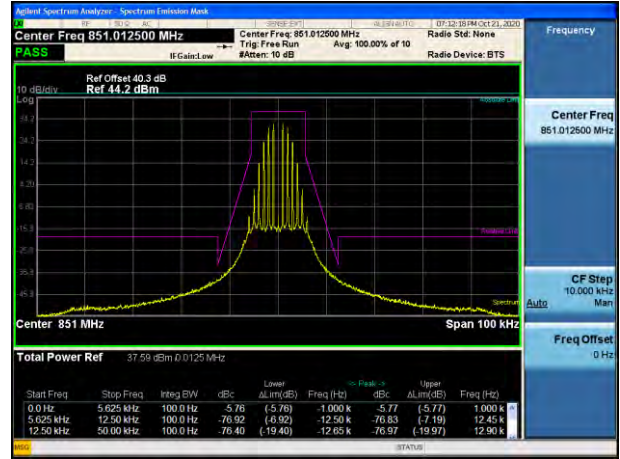
2.3 Emission masks (12.5kHz FM MASK D)

2.3.1 Pre-AGC_ Lowest frequency

Input



Output

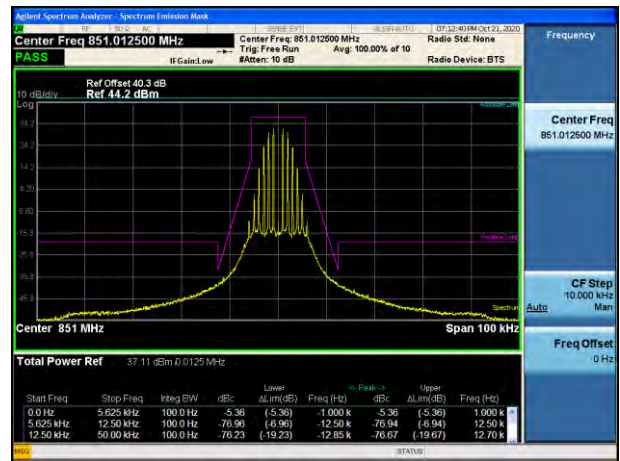


2.3.2 3dB above AGC_ Lowest frequency

Input



Output



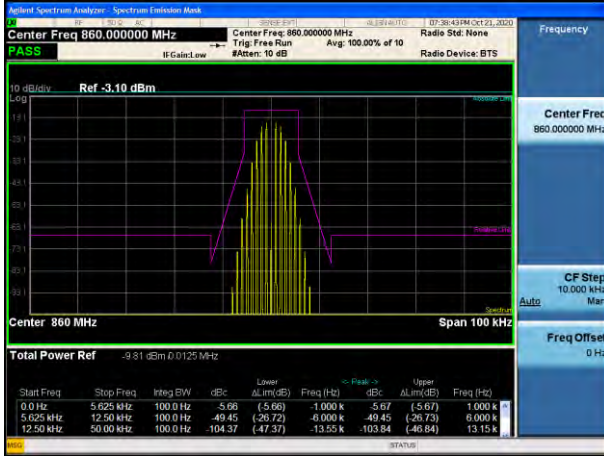
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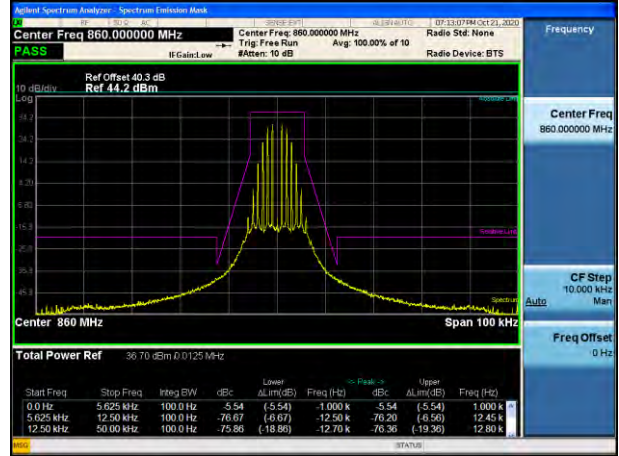
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2.3.3 Pre-AGC_ Middle frequency
Input



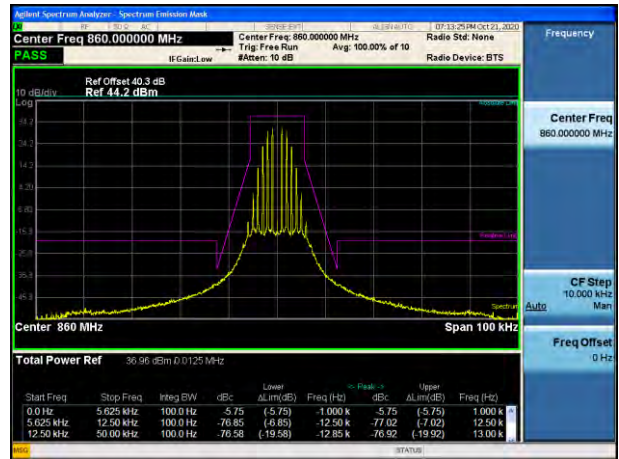
Output



2.3.4 3dB above AGC_ Middle frequency
Input



Output



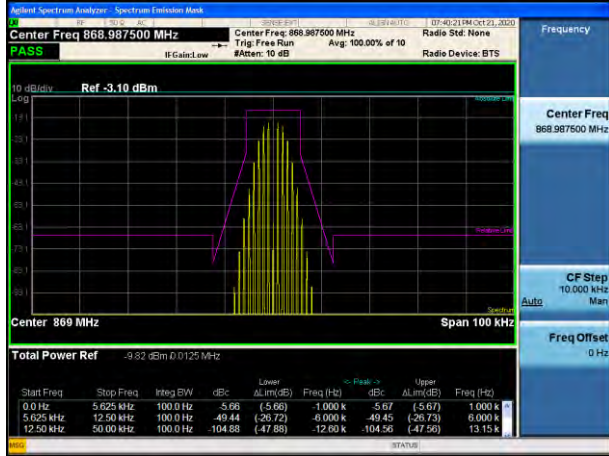
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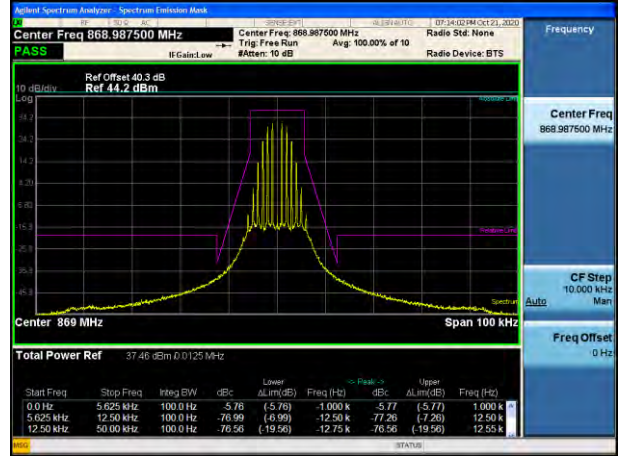
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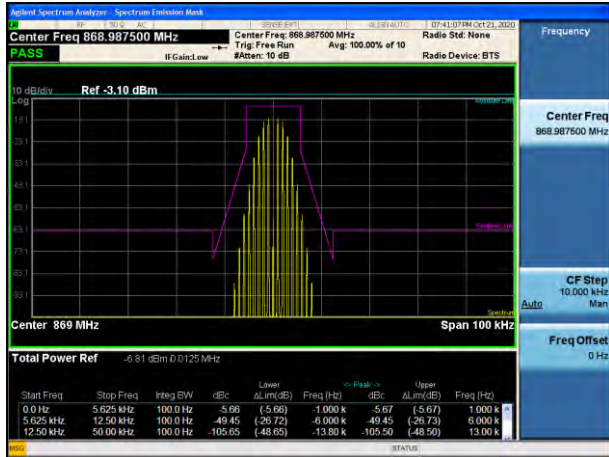
2.3.5 Pre-AGC_ Highest frequency
Input



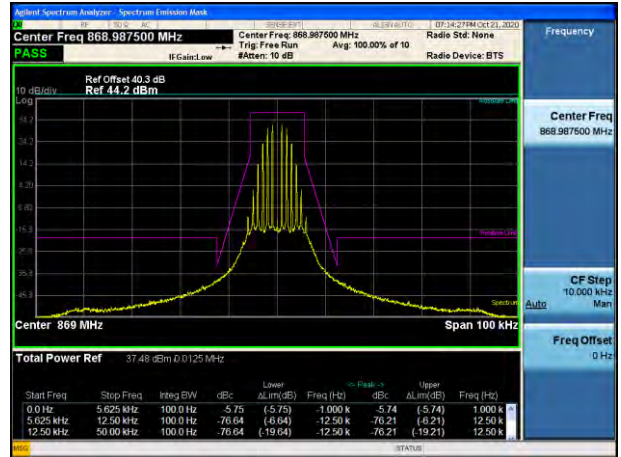
Output



2.3.6 3dB above AGC_ Highest frequency
Input



Output



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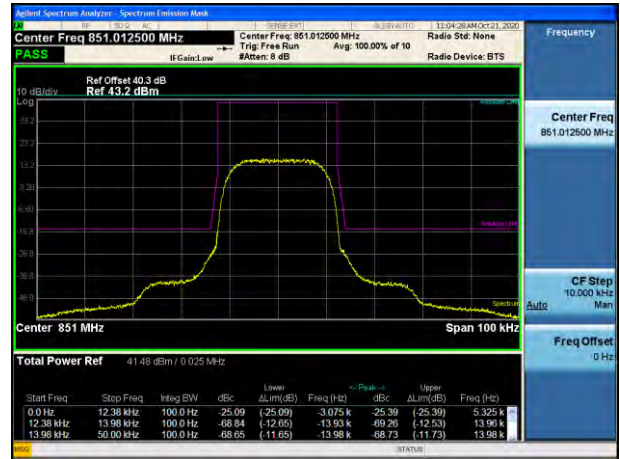
2.3 Emission masks (25kHz TETRA MASK Y)

2.3.1 Pre-AGC_ Lowest frequency

Input

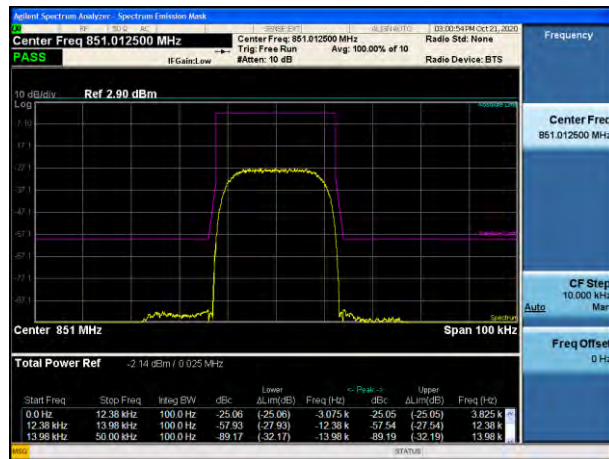


Output

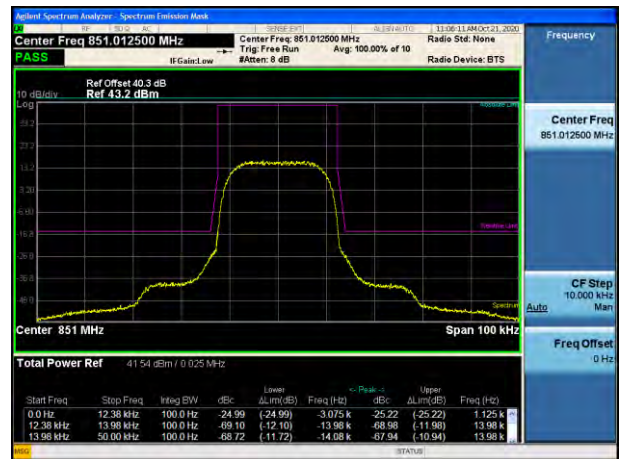


2.3.2 3dB above AGC_ Lowest frequency

Input



Output



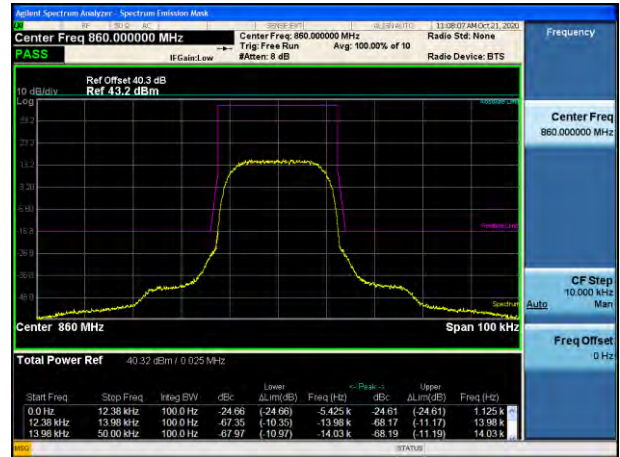
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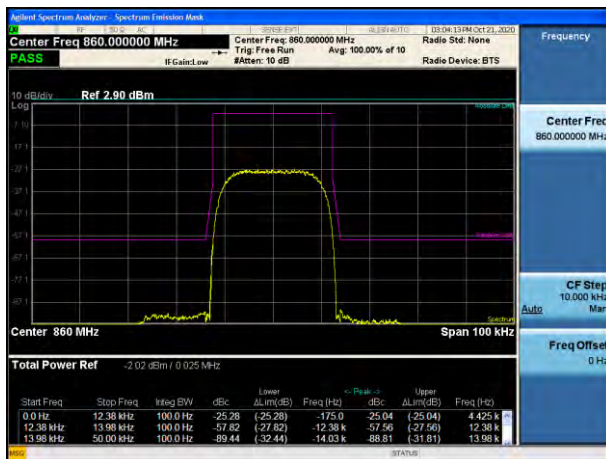
2.3.3 Pre-AGC_ Middle frequency
 Input



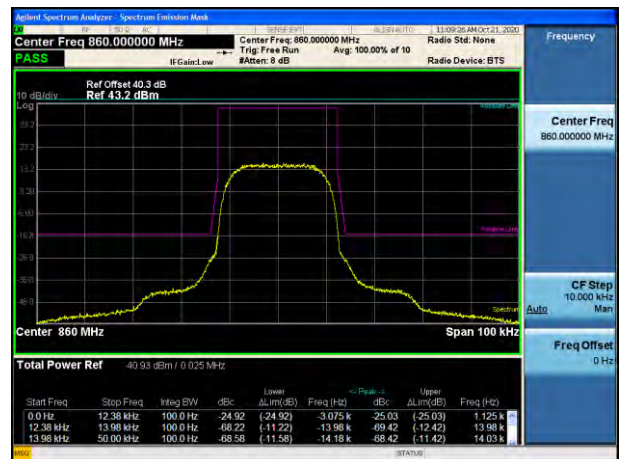
Output



2.3.4 3dB above AGC_ Middle frequency
 Input



Output



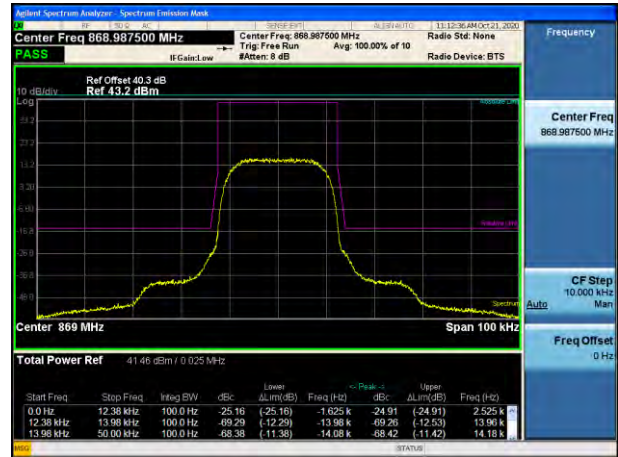
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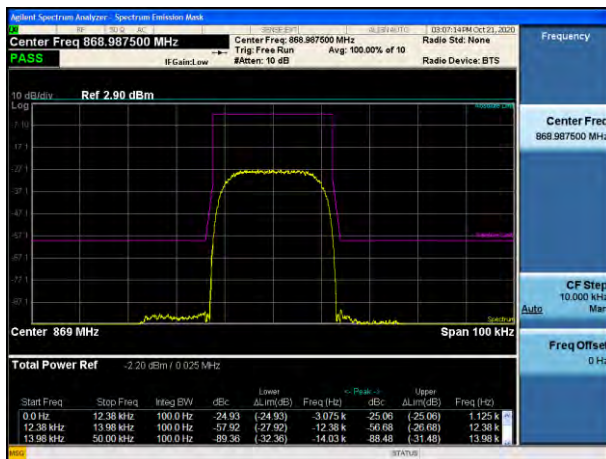
2.3.5 Pre-AGC_ Highest frequency
 Input



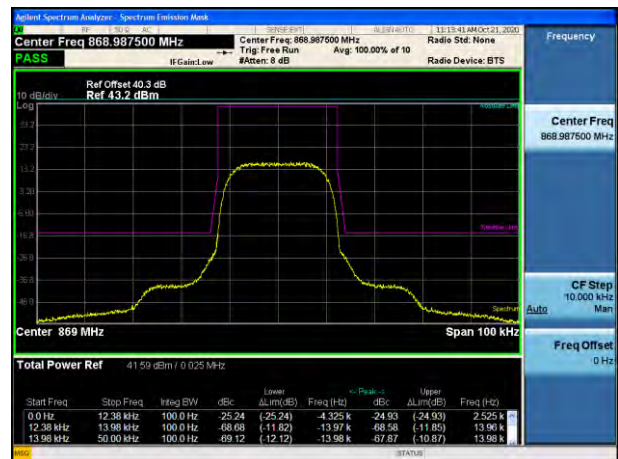
Output



2.3.6 3dB above AGC_ Highest frequency
 Input



Output



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7.2.6 Out of Band Rejection

Test Requirement: /
Test Method: KDB 935210 D05 Indus Booster Basic Meas v01r04
Limit: Shall within the passband
EUT Operation:
Status: Drive the EUT to maximum output power. .
Conditions: Normal conditions
Application: RF output ports
Test Configuration:

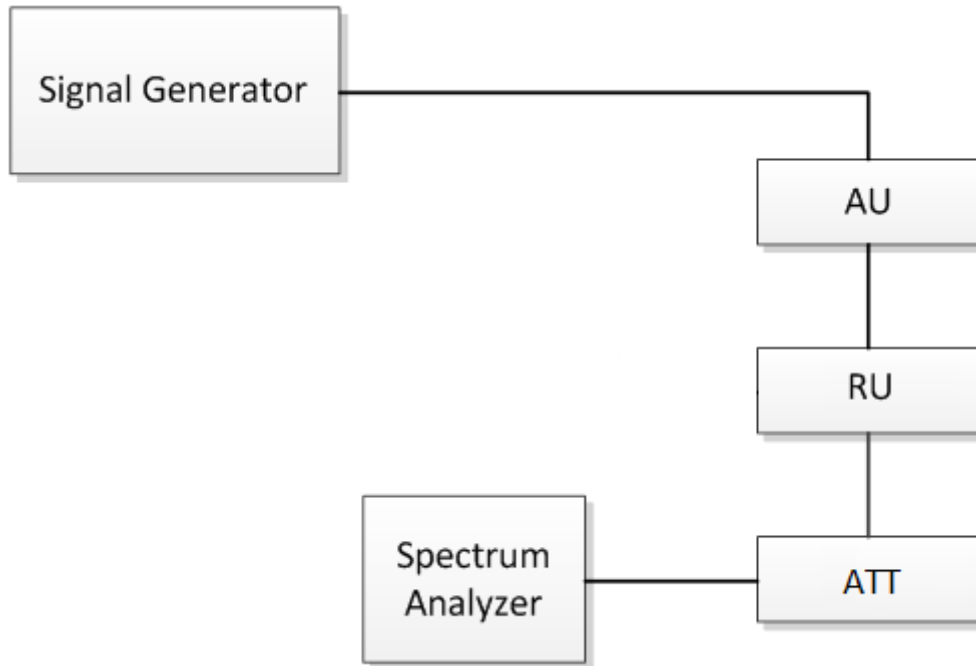


Fig.5. Out of Band rejection test configuration

- Test Procedure:
- a) Connect a signal generator to the input of the EUT.
 - b) Configure a swept CW signal with the following parameters:
 - 1) Frequency range = $\pm 250\%$ of the manufacturer's specified pass band.
 - 2) The CW amplitude shall be 3 dB below the AGC threshold (see 4.2), and shall not activate the AGC threshold throughout the test.
 - 3) Dwell time = approximately 10 ms.
 - 4) Frequency step = 50 kHz.
 - c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
 - d) Set the RBW of the spectrum analyzer to between 1 % and 5 % of the manufacturer's rated passband, and $VBW = 3 \times RBW$.



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- e) Set the detector to Peak and the trace to Max-Hold.
- f) After the trace is completely filled, place a marker at the peak amplitude, which is designated as f_0 , and with two additional markers (use the marker-delta method) at the 20 dB bandwidth (i.e., at the points where the level has fallen by 20 dB).
- g) Capture the frequency response plot for inclusion in the test report.



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Shenzhen Branch (Shenzhen) Laboratory

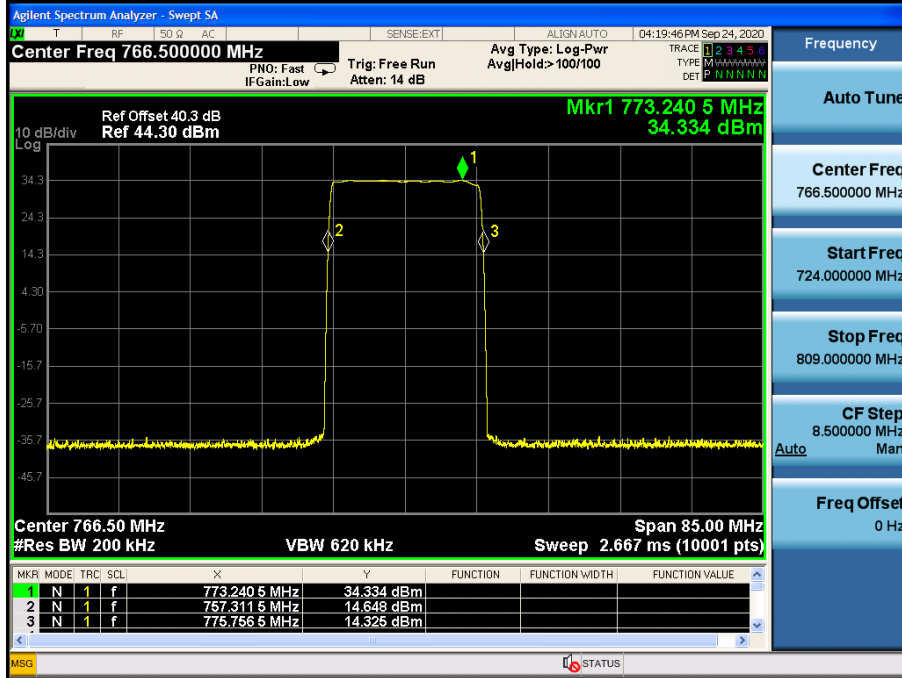
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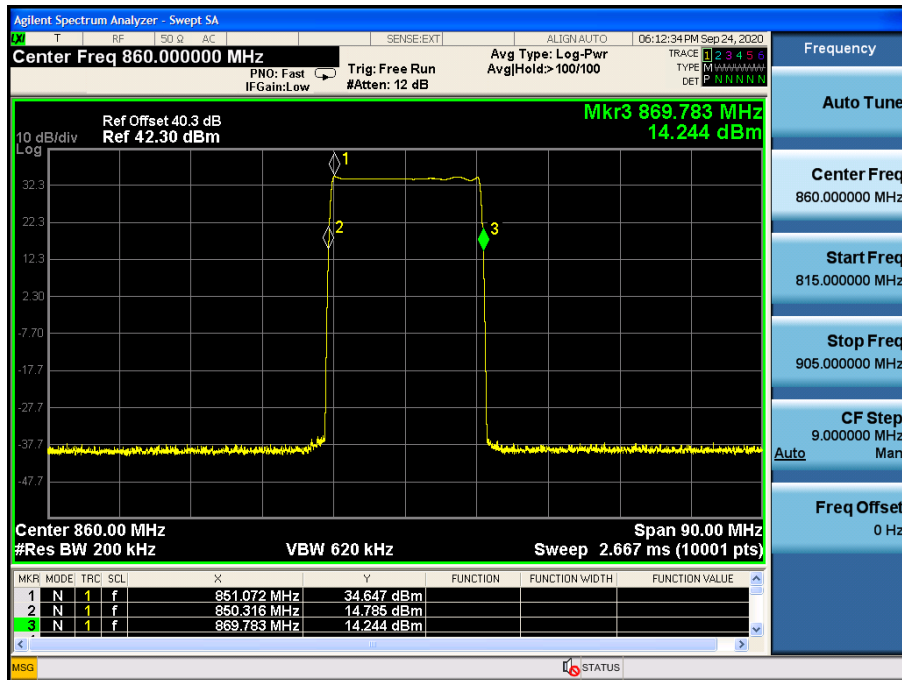


7.2.6.1 Measurement Record:

1. Downlink: 758MHz to 775MHz



2. Downlink: 851MHz to 869MHz



7.2.7 Frequency Stability

- Test Requirement: For 758-775MHz: 47 CFR Part 90.539
For 851-869MHz: 47 CFR Part 90.213
- Test Method: KDB 935210 D05 Indus Booster Basic Meas v01r04
- Limit: For band 700M BW=6.25kHz/12.5kHz/25kHz: +/- 0.1ppm
For band 800M BW=6.25kHz: +/- 0.1ppm
BW=12.5kHz: +/- 1.0ppm
BW=25kHz: +/- 1.5ppm
- Status: Drive the EUT to maximum output power.
- Conditions: Temperature conditions, voltage conditions
- Application: Cellular Band RF output ports
- Test Procedure:
1. Temperature conditions:
 - a) The RF output port of the EUT was connected to Frequency Meter;
 - b) Set the working Frequency in the middle channel;
 - c) record the 20°C and nominal voltage frequency value as reference point;
 - d) vary the temperature from -40°C to 50°C with step 10°C
 - e) when reach a temperature point, keep the temperature balance at least 1 hour to make the product working in this status;
 - f) read the frequency at the relative temperature.
 2. Voltage conditions:
 - a) record the 20°C and nominal voltage frequency value as reference point;
 - b) vary the voltage from -15% nominal voltage to +15% voltage;
 - c) read the frequency at the relative voltage.



7.2.7.1 Measurement Record:

Frequency Stability vs temperature:

1. Test for Downlink: 758MHz to 775MHz (middle channel=766.5MHz)

| Channel Bandwidth (kHz) | Temperature(°C) | Frequency Error (Hz) | Limit(ppm) | Results(ppm) |
|-------------------------|-----------------|----------------------|------------|--------------|
| 6.25kHz | 50 | 1.3 | 0.1 | 0.002 |
| | 40 | 1.3 | 0.1 | 0.002 |
| | 30 | 1.3 | 0.1 | 0.002 |
| | 20 | 1.3 | 0.1 | 0.002 |
| | 10 | 1.3 | 0.1 | 0.002 |
| | 0 | 1.3 | 0.1 | 0.002 |
| | -10 | 1.3 | 0.1 | 0.002 |
| | -20 | 1.3 | 0.1 | 0.002 |
| | -30 | 1.3 | 0.1 | 0.002 |
| 12.5kHz | 50 | 1.3 | 0.1 | 0.002 |
| | 40 | 1.3 | 0.1 | 0.002 |
| | 30 | 1.3 | 0.1 | 0.002 |
| | 20 | 1.3 | 0.1 | 0.002 |
| | 10 | 1.3 | 0.1 | 0.002 |
| | 0 | 1.3 | 0.1 | 0.002 |
| | -10 | 1.3 | 0.1 | 0.002 |
| | -20 | 1.3 | 0.1 | 0.002 |
| | -30 | 1.3 | 0.1 | 0.002 |
| 25kHz | 50 | 1.3 | 0.1 | 0.002 |
| | 40 | 1.3 | 0.1 | 0.002 |
| | 30 | 1.3 | 0.1 | 0.002 |
| | 20 | 1.3 | 0.1 | 0.002 |
| | 10 | 1.3 | 0.1 | 0.002 |
| | 0 | 1.3 | 0.1 | 0.002 |
| | -10 | 1.3 | 0.1 | 0.002 |
| | -20 | 1.3 | 0.1 | 0.002 |
| | -30 | 1.3 | 0.1 | 0.002 |
| -40 | 1.3 | 0.1 | 0.002 | |



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2. Test for Downlink: 851MHz to 869MHz (middle channel=860MHz)

| Channel Bandwidth (kHz) | Temperature(°C) | Frequency Error (Hz) | Limit(ppm) | Results(ppm) |
|-------------------------|-----------------|----------------------|------------|--------------|
| 6.25kHz | 50 | 1.1 | 0.1 | 0.001 |
| | 40 | 1.1 | 0.1 | 0.001 |
| | 30 | 1.1 | 0.1 | 0.001 |
| | 20 | 1.1 | 0.1 | 0.001 |
| | 10 | 1.1 | 0.1 | 0.001 |
| | 0 | 1.1 | 0.1 | 0.001 |
| | -10 | 1.1 | 0.1 | 0.001 |
| | -20 | 1.1 | 0.1 | 0.001 |
| | -30 | 1.1 | 0.1 | 0.001 |
| 12.5kHz | 50 | 1.1 | 1.0 | 0.001 |
| | 40 | 1.1 | 1.0 | 0.001 |
| | 30 | 1.1 | 1.0 | 0.001 |
| | 20 | 1.1 | 1.0 | 0.001 |
| | 10 | 1.1 | 1.0 | 0.001 |
| | 0 | 1.1 | 1.0 | 0.001 |
| | -10 | 1.1 | 1.0 | 0.001 |
| | -20 | 1.1 | 1.0 | 0.001 |
| | -30 | 1.1 | 1.0 | 0.001 |
| 25kHz | 50 | 1.1 | 1.5 | 0.001 |
| | 40 | 1.1 | 1.5 | 0.001 |
| | 30 | 1.1 | 1.5 | 0.001 |
| | 20 | 1.1 | 1.5 | 0.001 |
| | 10 | 1.1 | 1.5 | 0.001 |
| | 0 | 1.1 | 1.5 | 0.001 |
| | -10 | 1.1 | 1.5 | 0.001 |
| | -20 | 1.1 | 1.5 | 0.001 |
| | -30 | 1.1 | 1.5 | 0.001 |



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Frequency Stability vs voltage:

1. Test for Downlink: 758MHz to 775MHz (middle channel=766.5MHz)

| Channel Bandwidth (kHz) | Voltage(V ac) | Frequency Error (Hz) | Limit(ppm) | Results(ppm) |
|-------------------------|---------------|----------------------|------------|--------------|
| 6.25kHz | 102 | 1.1 | 0.1 | 0.001 |
| | 120 | 1.1 | 0.1 | 0.001 |
| | 138 | 1.1 | 0.1 | 0.001 |
| 12.5kHz | 102 | 1.1 | 0.1 | 0.001 |
| | 120 | 1.1 | 0.1 | 0.001 |
| | 138 | 1.1 | 0.1 | 0.001 |
| 25kHz | 102 | 1.1 | 0.1 | 0.001 |
| | 120 | 1.1 | 0.1 | 0.001 |
| | 138 | 1.1 | 0.1 | 0.001 |

2. Test for Downlink: 851MHz to 869MHz (middle channel=860MHz)

| Channel Bandwidth (kHz) | Voltage(V ac) | Frequency Error (Hz) | Limit(ppm) | Results(ppm) |
|-------------------------|---------------|----------------------|------------|--------------|
| 6.25kHz | 102 | 0.9 | 0.1 | 0.001 |
| | 120 | 0.9 | 0.1 | 0.001 |
| | 138 | 0.9 | 0.1 | 0.001 |
| 12.5kHz | 102 | 0.9 | 1.0 | 0.001 |
| | 120 | 0.9 | 1.0 | 0.001 |
| | 138 | 0.9 | 1.0 | 0.001 |
| 25kHz | 102 | 0.9 | 1.5 | 0.001 |
| | 120 | 0.9 | 1.5 | 0.001 |
| | 138 | 0.9 | 1.5 | 0.001 |



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7.2.8 Noise

Test Requirement: For 758-775MHz: 47 CFR Part 2.1051, 47 CFR Part 90.219(d)(6)
 For 851-869MHz: /

Test Method: KDB 935210 D05 Indus Booster Basic Meas v01r04

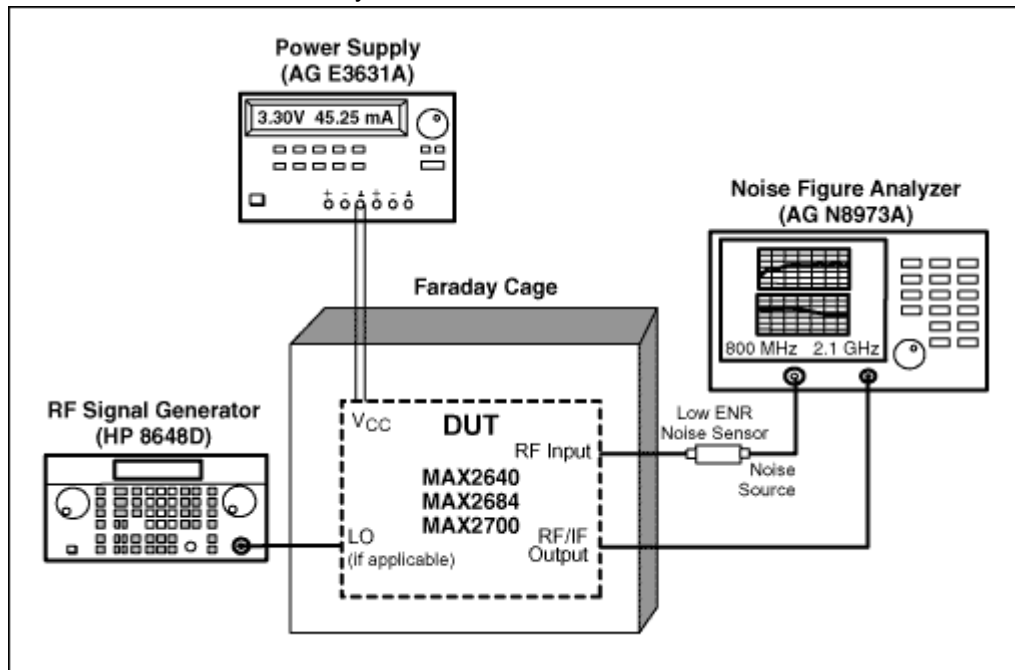
Limit: The ERP of noise within the passband should not exceed -43 dBm in a 10 kHz measurement bandwidth.
 The ERP of noise in spectrum more than 1 MHz outside of the passband should not exceed -70 dBm in a 10 kHz measurement bandwidth.
 The noise figure of a zone enhancer shall not exceed 9 dB in either direction.

Status: Drive the EUT to maximum output power.

Conditions: Temperature conditions, voltage conditions

Application: RF output ports

Test Procedure: Several widely recognized methods for performing noise figure measurements are available. Some require the use of specialized equipment, such as a noise figure analyzer and/or an excess noise ratio (ENR) calibrated noise source, while others involve the use of conventional measurement instrumentation such as a spectrum analyzer. Methods that require use of a noise figure analyzer are generally accepted as producing the most accurate results, and are considered to be the reference method within this document, while others are considered to be acceptable alternative methods. Consult the relevant instrumentation application notes for detailed guidance regarding the selection and application of an appropriate methodology for performing noise figure measurements. Note also that noise figure measurements require that any AGC circuitry be disabled over the duration of the measurement.



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7.2.8.1 Measurement Record:

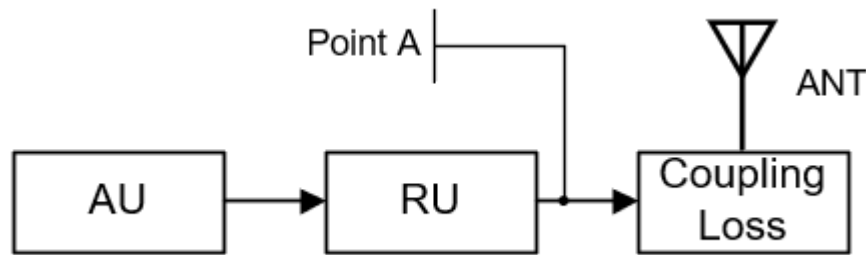
1. Noise

| Frequency range(MHz) | ERP noise in passband | The ERP noise more than 1MHz outside of passband |
|----------------------|-----------------------|--|
| 758MHz to 775MHz | -45.78dBm | -72.94dBm |
| 851MHz to 869MHz | -43.22dBm | -70.54dBm |

ERP noise = Test results at point A + Coupling Loss + Antenna Gain

Remark:

The noise test results in the table are measured from point A. The test results plus the coupling loss and antenna gain will meet the noise radiation requirements of the signal booster, which is that the ERP of noise should not exceed -43 dBm in 10 kHz within passband and -70 dBm in 10 kHz more than 1 MHz outside of passband. Therefore, the coupling loss in engineering practice must be greater than 20dB to eliminate the interference.



Setting details were declared by manufacture and stated in the user manual.
The test screenshots below are only to record the case without engineering practice for reference.





2.Noise Figure:
 788MHz to 805MHz



806MHz to 824MHz





8 Photographs

8.1.1 Test Setup

Please refer to setup photos.

8.1.2 EUT Constructional Details

Please Refer to external and internal photos for details.

--The End of Report--

