

# TEST REPORT

Reference No..... : WTS17S0989524-1E V10  
FCC ID ..... : 2AG32PBS2120  
IC No..... : 20982-PBS2120  
Applicant..... : Baicells Technologies Co., Ltd.  
Address..... : 3F, Hui Yuan Development Building, No.1 Shangdi Information  
Industry Base, Haidian Dist., Beijing, China  
Manufacturer ..... : The same as above  
Address..... : The same as above  
Product..... : LTE-TDD Base Station  
Model(s). .... : pBS2120  
Brand Name ..... : BaiCells  
Standards..... : FCC CFR Title 47 Part 2  
FCC CFR Title 47 Part 90 Subpart Z  
RSS-Gen Issue 4, November 2014  
RSS-197 Issue 1, February 2010  
Date of Receipt sample .... : 2017-09-06  
Date of Test ..... : 2017-09-06 to 2017-11-15  
Date of Issue..... : 2017-11-15  
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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## 2 Laboratories Introduction

**Waltek Services Test Group Ltd.** is one of the largest and the most comprehensive third party testing organizations in China, our headquarter located in Shenzhen (CNAS Registration No. L3110, A2LA Certificate Number: 4243.01) and have branches in Foshan (CNAS Registration No. L6478), Dongguan (CNAS Registration No. L9950), Zhongshan, Suzhou (CNAS Registration No. L7754), Ningbo and Hong Kong, Our test capability covered four large fields: safety test. Electronic Magnetic Compatibility(EMC), reliability and energy performance, Chemical test. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CPSC(Consumer Product Safety Commission), CEC(California energy efficiency), IC(Industry Canada) and ELI(Efficient Lighting Initiative). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as UL, Intertek(ETL-SEMKO), CSA, TÜV Rheinland, TÜV SÜD, etc. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

### Waltek Services (Shenzhen) Co., Ltd.

#### A. Accreditations for Conformity Assessment (International)

| Country/Region                                                      | Accreditation Body                                                                                  | Scope                         | Note |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------|------|
| USA                                                                 | <b>CNAS</b><br><b>(Registration No.: L3110)</b><br><b>A2LA</b><br><b>(Certificate No.: 4243.01)</b> | FCC ID \ DOC \ VOC            | 1    |
| Canada                                                              |                                                                                                     | IC ID \ VOC                   | 2    |
| Japan                                                               |                                                                                                     | MIC-T \ MIC-R                 | -    |
| Europe                                                              |                                                                                                     | EMCD \ RED                    | -    |
| Taiwan                                                              |                                                                                                     | NCC                           | -    |
| Hong Kong                                                           |                                                                                                     | OFCA                          | -    |
| Australia                                                           |                                                                                                     | RCM                           | -    |
| India                                                               |                                                                                                     | <b>International Services</b> | WPC  |
| Thailand                                                            | NTC                                                                                                 |                               | -    |
| Singapore                                                           | IDA                                                                                                 |                               | -    |
| Note:                                                               |                                                                                                     |                               |      |
| 1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476. |                                                                                                     |                               |      |
| 2. IC Canada Registration No.: 7760A                                |                                                                                                     |                               |      |

**B. TCBs and Notify Bodies Recognized Testing Laboratory.**

| Recognized Testing Laboratory of ...     | Notify body number |
|------------------------------------------|--------------------|
| TUV Rheinland                            | Optional.          |
| Intertek                                 |                    |
| TUV SUD                                  |                    |
| SGS                                      |                    |
| Phoenix Testlab GmbH                     | 0700               |
| Element Materials Technology Warwick Ltd | 0891               |
| Timco Engineering, Inc.                  | 1177               |
| Eurofins Product Service GmbH            | 0681               |

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## 4 Revision History

| Test report No.          | Date of Receipt sample | Date of Test                | Date of Issue | Purpose       | Comment | Approved |
|--------------------------|------------------------|-----------------------------|---------------|---------------|---------|----------|
| WTS17S09895<br>24-1E     | 2017-09-06             | 2017-09-06 to<br>2017-09-11 | 2017-09-12    | original      | -       | Replaced |
| WTS17S09895<br>24-1E V1  | -                      | 2017-09-06 to<br>2017-09-11 | 2017-09-27    | Version 1     | Updated | Replaced |
| WTS17S09895<br>24-1E V2  | -                      | 2017-09-06 to<br>2017-09-29 | 2017-09-29    | Version 2     | Updated | Replaced |
| WTS17S09895<br>24-1E V3  | -                      | 2017-09-06 to<br>2017-10-10 | 2017-10-10    | Version 3     | Updated | Replaced |
| WTS17S09895<br>24-1E V4  | -                      | 2017-09-06 to<br>2017-10-10 | 2017-10-12    | Version 4     | Updated | Replaced |
| WTS17S09895<br>24-1E V5  | -                      | 2017-09-06 to<br>2017-10-10 | 2017-10-18    | Version 5     | Updated | Replaced |
| WTS17S09895<br>24-1E V6  | -                      | 2017-09-06 to<br>2017-10-10 | 2017-10-21    | Version 6     | Updated | Replaced |
| WTS17S09895<br>24-1E V7  | -                      | 2017-09-06 to<br>2017-10-10 | 2017-10-30    | Version 7     | Updated | Replaced |
| WTS17S09895<br>24-1E V8  | -                      | 2017-09-06 to<br>2017-10-31 | 2017-10-31    | Version 8     | Updated | Replaced |
| WTS17S09895<br>24-1E V9  | -                      | 2017-09-06 to<br>2017-10-31 | 2017-11-07    | Version 9     | Updated | Replaced |
| WTS17S09895<br>24-1E V10 | -                      | 2017-09-06 to<br>2017-11-15 | 2017-11-15    | Version<br>10 | Updated | Valid    |

## 5 General Information

### 5.1 General Description of E.U.T.

|                    |                      |
|--------------------|----------------------|
| Product:           | LTE-TDD Base Station |
| Model(s):          | pBS2120              |
| Model Description: | N/A                  |
| Storage Location:  | Internal Storage     |
| Note:              | N/A                  |

### 5.2 Details of E.U.T.

|                               |                    |
|-------------------------------|--------------------|
| Operation Frequency:          | 3655MHz~3695MHz    |
| Type of Modulation:           | QPSK, 16QAM, 64QAM |
| Antenna installation:         | Internal antenna   |
| Antenna Gain:                 | 9.0dBi             |
| Ratings:                      | AC 120V/60Hz       |
| Number of transmitter chains: | 2*2 (MIMO)         |

The device supports MIMO 2\*2, and the MIMO works with STBC(Space-Time Block Coding).The antenna is omnidirectional, does not support any directional gain in any modes.

MIMO rate, antennas use two different streams, from this side, if RX side need to decode MIMO, data between the two stream should be correlated. The device transmits simultaneously in multiple channels in single frequency bands and uses carrier aggregation techniques.

Directional gain = GANT + 10 log (NANT) dBi

### 5.3 Channel List

Normal

| 10MHz   |                 | 20MHz   |                 |
|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| Low     | 3655            | Low     | 3660            |
| Middle  | 3675            | Middle  | 3675            |
| High    | 3695            | High    | 3690            |

### 5.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

| Test Mode        | Description                                                       |
|------------------|-------------------------------------------------------------------|
| Data Mode (QPSK) | Keep the EUT in data communicating mode (QPSK).<br>(10MHz, 20MHz) |

|                   |                                                                    |
|-------------------|--------------------------------------------------------------------|
| Data Mode (64QAM) | Keep the EUT in data communicating mode (64QAM).<br>(10MHz, 20MHz) |
|-------------------|--------------------------------------------------------------------|

### 5.5 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☒ Yes      ☐ No

If Yes, list the related test items and lab information:

Test Lab: Shenzhen BALUN Technology Co.,Ltd.

Lab address: Block B,1<sup>st</sup> FL,Baisha Science and Technology Park ,Shahe Xi Road,, Nanshan District, Shenzhen, Guangdong Province, China. 518055

Test items: Radiation Spurious Emissions(18-40GHz) and Conducted Spurious Emissions(18-40GHz).

Designation Number: CN1196

## 6 Test Summary

| Test Items                             | Test Requirement                       |                                             | Result |
|----------------------------------------|----------------------------------------|---------------------------------------------|--------|
|                                        | FCC                                    | IC                                          |        |
| RF Output Power                        | Part 2.1046<br>Part 90.1321            | RSS Gen Section 6.12<br>RSS 197 section 5.6 | PASS   |
| Modulation Characteristics             | Part 2.1047                            | RSS 197 section 5.1                         | PASS   |
| 99% & -26 dB Occupied Bandwidth        | Part 2.1049<br>Part 90.209             | RSS Gen section 6.6                         | PASS   |
| Emission Mask                          | Part 90.210(b)                         | Not applicable                              | PASS   |
| Spurious Emissions at Antenna Terminal | Part 2.1051<br>Part 90.1323            | RSS Gen Section 6.13<br>RSS 197 section 5.7 | PASS   |
| Field Strength of Spurious Radiation   | Part 2.1053<br>Part 90.1323            | RSS Gen Section 6.13<br>RSS 197 section 5.7 | PASS   |
| Frequency stability vs. temperature    | Part 2.1055(a)(1)(b)<br>Part 90.213(a) | RSS Gen section 6.11<br>RSS 197 section 5.3 | PASS   |
| Frequency stability vs. voltage        | Part 2.1055(d)(1)(2)<br>Part 90.213(a) | RSS Gen section 6.11<br>RSS 197 section 5.3 | PASS   |

Pass: The EUT complies with the essential requirements in the standard.

Note 1: According to FCC KDB 662911 D01 Multiple Transmitter Output v02r01 & KDB 971168 D01 Power Means License Digital Systems v02r02.

Note 2: EUT was on continue transmit mode, the duty cycle was 100%.

## 7 Equipment Used during Test

### 7.1 Equipments List

| Conducted Emissions Test Site 1#                              |                                      |                      |              |                 |                       |                      |
|---------------------------------------------------------------|--------------------------------------|----------------------|--------------|-----------------|-----------------------|----------------------|
| Item                                                          | Equipment                            | Manufacturer         | Model No.    | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1.                                                            | EMI Test Receiver                    | R&S                  | ESCI         | 100947          | 2017-09-12            | 2018-09-11           |
| 2.                                                            | LISN                                 | R&S                  | ENV216       | 101215          | 2017-09-12            | 2018-09-11           |
| 3.                                                            | Cable                                | Top                  | TYPE16(3.5M) | -               | 2017-09-12            | 2018-09-11           |
| Conducted Emissions Test Site 2#                              |                                      |                      |              |                 |                       |                      |
| Item                                                          | Equipment                            | Manufacturer         | Model No.    | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1.                                                            | EMI Test Receiver                    | R&S                  | ESCI         | 101155          | 2017-09-12            | 2018-09-11           |
| 2.                                                            | LISN                                 | SCHWARZBECK          | NSLK 8128    | 8128-289        | 2017-09-12            | 2018-09-11           |
| 3.                                                            | Limiter                              | York                 | MTS-IMP-136  | 261115-001-0024 | 2017-09-12            | 2018-09-11           |
| 4.                                                            | Cable                                | LARGE                | RF300        | -               | 2017-09-12            | 2018-09-11           |
| 3m Semi-anechoic Chamber for Radiation Emissions Test site 1# |                                      |                      |              |                 |                       |                      |
| Item                                                          | Equipment                            | Manufacturer         | Model No.    | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1                                                             | Spectrum Analyzer                    | R&S                  | FSP          | 100091          | 2017-04-29            | 2018-04-28           |
| 2                                                             | Active Loop Antenna                  | Beijing Dazhi        | ZN30900A     | -               | 2017-04-09            | 2018-04-08           |
| 3                                                             | Trilog Broadband Antenna             | SCHWARZBECK          | VULB9163     | 336             | 2017-04-09            | 2018-04-08           |
| 4                                                             | Coaxial Cable (below 1GHz)           | Top                  | TYPE16(13M)  | -               | 2017-09-12            | 2018-09-11           |
| 5                                                             | Broad-band Horn Antenna              | SCHWARZBECK          | BBHA 9120 D  | 667             | 2017-04-09            | 2018-04-08           |
| 6                                                             | Broad-band Horn Antenna              | SCHWARZBECK          | BBHA 9170    | 335             | 2017-04-09            | 2018-04-08           |
| 7                                                             | Broadband Preamplifier               | COMPLIANCE DIRECTION | PAP-1G18     | 2004            | 2017-04-13            | 2018-04-12           |
| 8                                                             | Coaxial Cable (above 1GHz)           | Top                  | 1GHz-25GHz   | EW02014-7       | 2017-04-13            | 2018-04-12           |
| 9                                                             | Universal Radio Communication Tester | R&S                  | CMU 200      | 112461          | 2017-04-13            | 2018-04-12           |
| 10                                                            | Signal Generator                     | R&S                  | SMR20        | 100046          | 2017-09-12            | 2018-09-11           |
| 11                                                            | Smart Antenna                        | SCHWARZBECK          | HA08         | -               | 2017-04-09            | 2018-04-08           |
| 3m Semi-anechoic Chamber for Radiation Emissions Test site 2# |                                      |                      |              |                 |                       |                      |
| Item                                                          | Equipment                            | Manufacturer         | Model No.    | Serial No       | Last Calibration Date | Calibration Due Date |

| 1                           | Test Receiver                              | R&S                                    | ESCI      | 101296     | 2017-04-13            | 2018-04-12           |
|-----------------------------|--------------------------------------------|----------------------------------------|-----------|------------|-----------------------|----------------------|
| 2                           | Trilog Broadband Antenna                   | SCHWARZBECK                            | VULB9160  | 9160-3325  | 2017-04-09            | 2018-04-08           |
| 3                           | Amplifier                                  | Compliance<br>pirection<br>systems inc | PAP-0203  | 22024      | 2017-04-13            | 2018-04-12           |
| 4                           | Cable                                      | HUBER+SUHNER                           | CBL2      | 525178     | 2017-04-13            | 2018-04-12           |
| <b>RF Conducted Testing</b> |                                            |                                        |           |            |                       |                      |
| Item                        | Equipment                                  | Manufacturer                           | Model No. | Serial No. | Last Calibration Date | Calibration Due Date |
| 1.                          | EMC Analyzer<br>(9k~26.5GHz)               | Agilent                                | E7405A    | MY45114943 | 2017-09-12            | 2018-09-11           |
| 2.                          | Spectrum Analyzer<br>(9k-6GHz)             | R&S                                    | FSL6      | 100959     | 2017-09-12            | 2018-09-11           |
| 3.                          | Universal Radio<br>Communication<br>Tester | R&S                                    | CMU 200   | 112461     | 2017-04-13            | 2018-04-12           |
| 4                           | Signal Analyzer<br>(9k~26.5GHz)            | Agilent                                | N9010A    | MY50520207 | 2017-09-12            | 2018-09-11           |

## 7.2 Measurement Uncertainty

| Parameter                                       | Uncertainty                             |
|-------------------------------------------------|-----------------------------------------|
| Conducted Emission                              | ± 3.64 dB(AC mains 150KHz~30MHz)        |
| Radiated Spurious Emissions                     | ± 5.08 dB (Bilog antenna 30M~1000MHz)   |
|                                                 | ± 5.47 dB (Horn antenna 1000M~25000MHz) |
| Radio Frequency                                 | ± 1 x 10 <sup>-7</sup> Hz               |
| RF Power                                        | ± 0.42 dB                               |
| RF Power Density                                | ± 0.7dB                                 |
| Conducted Spurious Emissions                    | ± 2.76 dB (9kHz~26500MHz)               |
| Confidence interval: 95%. Confidence factor:k=2 |                                         |

## 7.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

## 8 Transmit Output Power and PSD

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC part90.1321(a) and RSS-197 Clause 5.6.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test Method:      | FCC part2.1046 and RSS Gen section 6.12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Test Mode:        | Data communicating mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Limit:            | <p>FCC:</p> <ul style="list-style-type: none"> <li>(a) Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP powerdensity shall not exceed 1 Watt in any one-megahertz slice of spectrum.</li> <li>(b) In addition to the provisions in paragraph (a) of this section, transmitters operating in the 3650-3700 MHz band that emit multipledirectional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided theemissions comply with the following: <ul style="list-style-type: none"> <li>(1) Different information must be transmitted to each receiver.</li> <li>(2) If the transmitter employs an antenna system that emits multiple directional beams but does not emit multiple directional beamssimultaneously, the total output power conducted to the array or arrays that comprise the device, <i>i.e.</i>, the sum of the power supplied to allantennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph(a) of this section, as applicable. The directional antenna gain shall be computed as follows: <ul style="list-style-type: none"> <li>(i) The directional gain, in dBi, shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain, in dBi,of the individual element or stave having the highest gain.</li> <li>(ii) A lower value for the directional gain than that calculated in paragraph (b)(2)(i) of this section will be accepted if sufficient evidence ispresented, <i>e.g.</i>, due to shading of the array or coherence loss in the beam-forming.</li> </ul> </li> <li>(3) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequencychannels and if transmitted beams overlap, the power shall be reduced to ensure that the aggregate power from the overlapping beams does notexceed the limit specified in paragraph (b)(2) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall notexceed the limit specified in paragraph (b)(2) of this section by more than 8 dB.</li> <li>(4) Transmitters that emit a single directional beam shall operate under the provisions of paragraph (b)(2) of this section.</li> </ul> </li> </ul> <p>IC:</p> <ul style="list-style-type: none"> <li>5.6.2 The maximum transmitter output power density of equipment, other than mobile and portaleequipment, shall not exceed 1W in any 1 MHz bandwidth.</li> <li>5.6.3 In addition, equipment, other than mobile and portable equipment, employing antenna systemsthat emit multiple directional beams, simultaneously or sequentially, for the purpose ofdirecting signals to individual receivers or to groups of receivers, shall comply with therequirements in SRSP-303.65.</li> </ul> |

### 8.1 EUT Operation

Operating Environment :

|                       |           |
|-----------------------|-----------|
| Temperature:          | 22.5 °C   |
| Humidity:             | 52.1 % RH |
| Atmospheric Pressure: | 101.2kPa  |

### 8.2 Test Procedure

RBW=1MHz, VBW=3MHz, Detector mode= RMS ,

Trace mode: Power averaging over 100 sweeps

### 8.3 Test Result

| Transmit Output Power |            |              |                                  |                                  |                         |                    |                  |                        |
|-----------------------|------------|--------------|----------------------------------|----------------------------------|-------------------------|--------------------|------------------|------------------------|
| Bandwidth (MHz)       | Modulation | Test Channel | Chain 0 Output Power (dBm/10MHz) | Chain 1 Output Power (dBm/10MHz) | Total Power (dBm/10MHz) | Antenna Gain (dBi) | EIRP (dBm/10MHz) | EIRP Limit (dBm/10MHz) |
| 10                    | QPSK       | Low          | 23.24                            | 23.86                            | 26.57                   | 12                 | 38.57            | 40.0                   |
|                       |            | Middle       | 23.25                            | 23.85                            | 26.57                   | 12                 | 38.57            |                        |
|                       |            | High         | 23.04                            | 23.58                            | 26.33                   | 12                 | 38.33            |                        |
|                       | 64QAM      | Low          | 22.88                            | 23.85                            | 26.40                   | 12                 | 38.40            |                        |
|                       |            | Middle       | 22.85                            | 23.90                            | 26.42                   | 12                 | 38.42            |                        |
|                       |            | High         | 22.63                            | 23.64                            | 26.17                   | 12                 | 38.17            |                        |
| Bandwidth (MHz)       | Modulation | Test Channel | Chain 0 Output Power (dBm/20MHz) | Chain 1 Output Power (dBm/20MHz) | Total Power (dBm/20MHz) | Antenna Gain (dBi) | EIRP (dBm/20MHz) | EIRP Limit (dBm/20MHz) |
| 20                    | QPSK       | Low          | 22.75                            | 23.56                            | 26.18                   | 12                 | 38.18            | 40.0                   |
|                       |            | Middle       | 22.88                            | 23.68                            | 26.31                   | 12                 | 38.31            |                        |
|                       |            | High         | 22.60                            | 23.44                            | 26.05                   | 12                 | 38.05            |                        |
|                       | 64QAM      | Low          | 22.69                            | 23.70                            | 26.23                   | 12                 | 38.23            |                        |
|                       |            | Middle       | 22.66                            | 23.65                            | 26.19                   | 12                 | 38.19            |                        |
|                       |            | High         | 22.55                            | 23.58                            | 26.11                   | 12                 | 38.11            |                        |

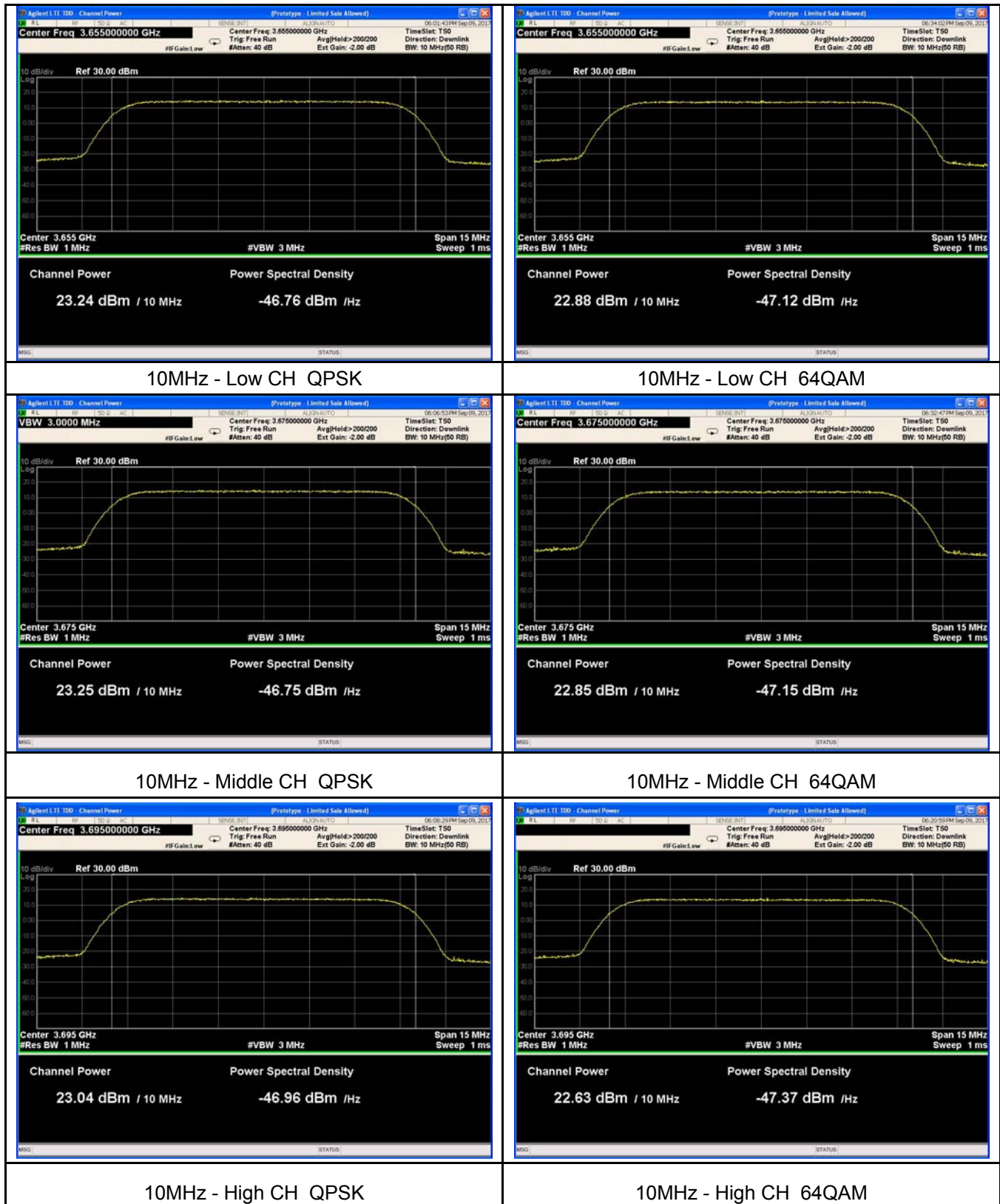
| PSD             |            |              |                       |                       |                     |                    |                        |                              |
|-----------------|------------|--------------|-----------------------|-----------------------|---------------------|--------------------|------------------------|------------------------------|
| Bandwidth (MHz) | Modulation | Test Channel | Chain 0 PSD (dBm/MHz) | Chain 1 PSD (dBm/MHz) | Total PSD (dBm/MHz) | Antenna Gain (dBi) | EIRP density (dBm/MHz) | EIRP density Limit (dBm/MHz) |
| 10              | QPSK       | Low          | 14.53                 | 14.24                 | 17.40               | 12                 | 29.40                  | 30.0                         |
|                 |            | Middle       | 14.54                 | 14.66                 | 17.61               | 12                 | 29.61                  |                              |
|                 |            | High         | 14.27                 | 14.72                 | 17.51               | 12                 | 29.51                  |                              |
|                 | 64QAM      | Low          | 14.35                 | 14.65                 | 17.51               | 12                 | 29.51                  |                              |
|                 |            | Middle       | 14.40                 | 14.82                 | 17.63               | 12                 | 29.63                  |                              |
|                 |            | High         | 14.59                 | 14.55                 | 17.58               | 12                 | 29.58                  |                              |
| Bandwidth (MHz) | Modulation | Test Channel | Chain 0 PSD (dBm/MHz) | Chain 1 PSD (dBm/MHz) | Total PSD (dBm/MHz) | Antenna Gain (dBi) | EIRP density (dBm/MHz) | EIRP density Limit (dBm/MHz) |
| 20              | QPSK       | Low          | 11.71                 | 12.24                 | 14.99               | 12                 | 26.99                  | 30.0                         |
|                 |            | Middle       | 11.58                 | 12.69                 | 14.93               | 12                 | 26.93                  |                              |
|                 |            | High         | 11.11                 | 12.56                 | 14.91               | 12                 | 26.91                  |                              |
|                 | 64QAM      | Low          | 11.34                 | 12.53                 | 14.99               | 12                 | 26.99                  |                              |
|                 |            | Middle       | 11.64                 | 12.45                 | 15.07               | 12                 | 27.07                  |                              |
|                 |            | High         | 11.15                 | 12.80                 | 15.06               | 12                 | 27.06                  |                              |

Remark: Directional antenna Gain = Antenna Gain + 10 lg (ANT<sub>N</sub>) = 9+10 lg (2)=12dBi

### Test Plots

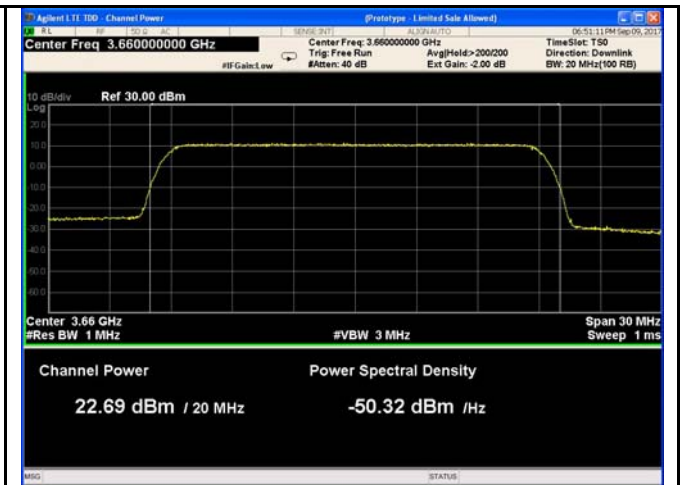
#### Output Power at antenna terminal

#### Chain 0

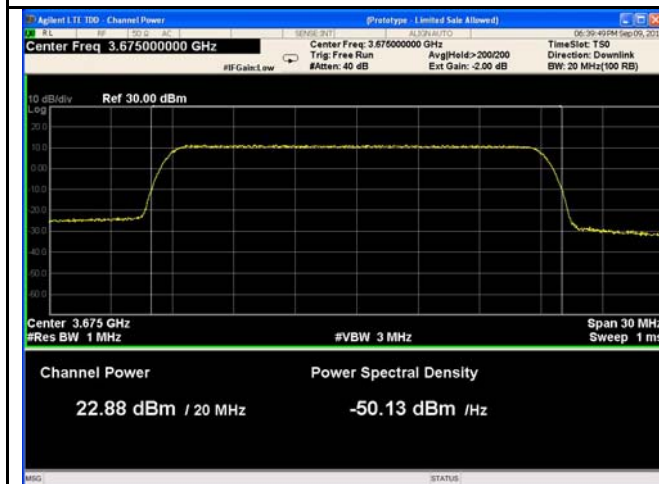




20MHz - Low CH QPSK



20MHz - Low CH 64QAM



20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

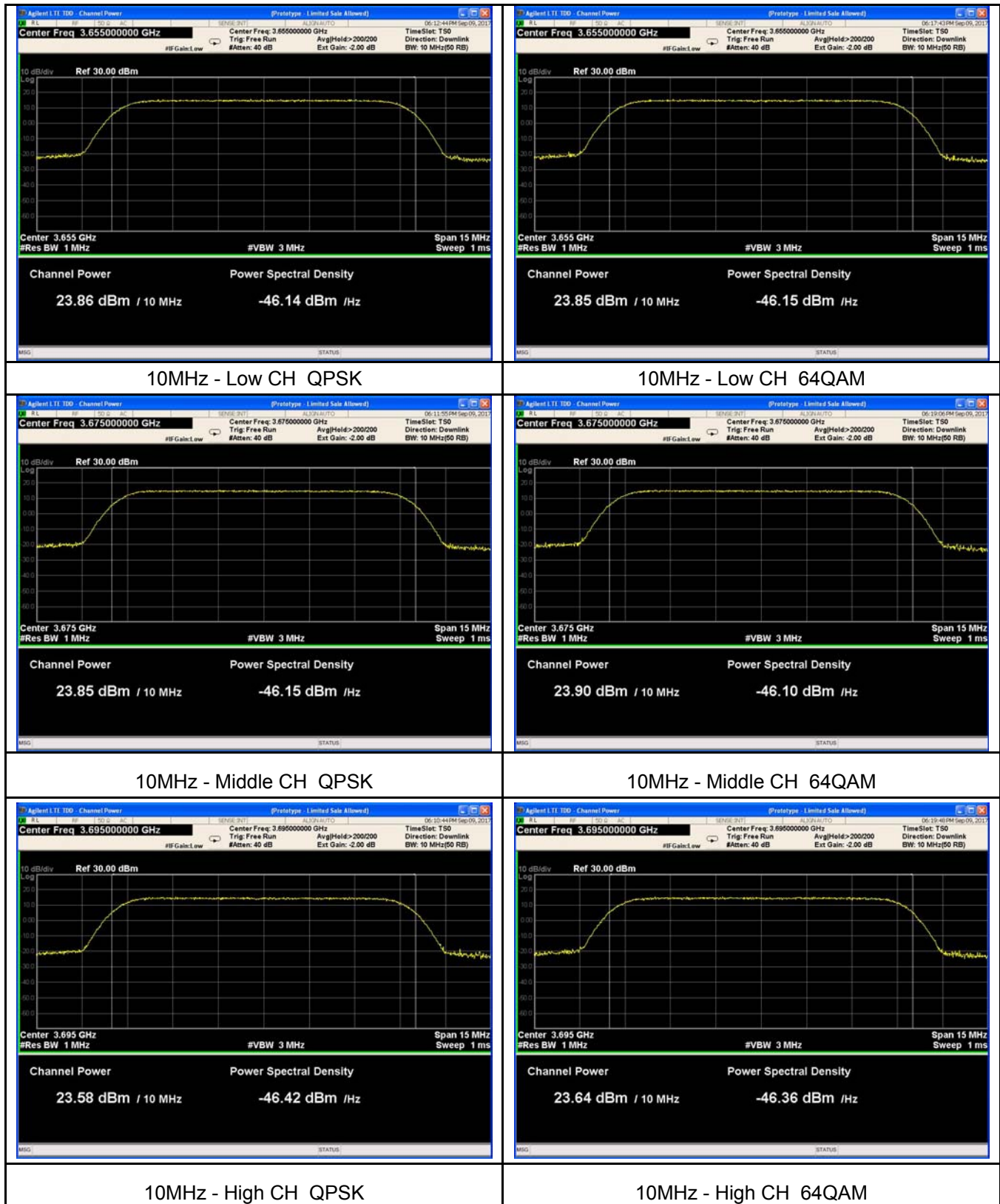


20MHz - High CH QPSK



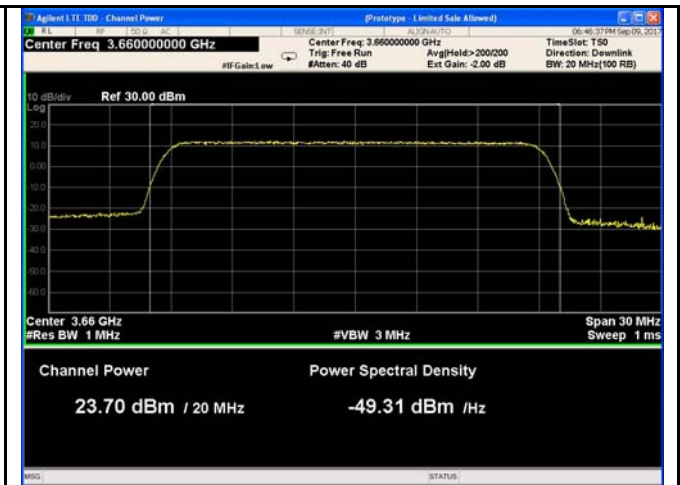
20MHz - High CH 64QAM

## Chain 1





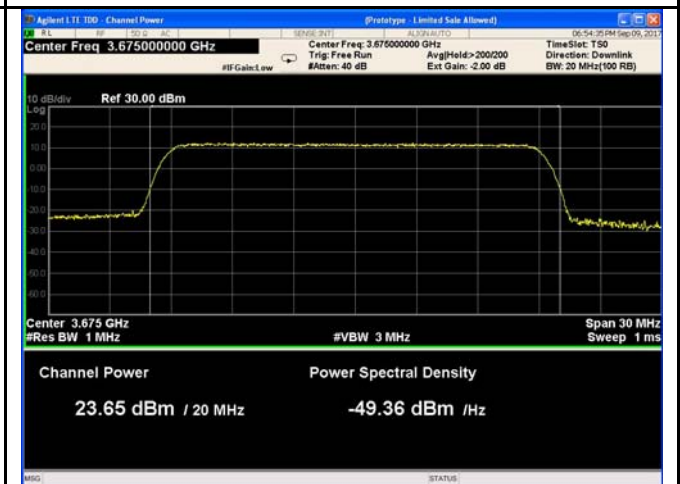
20MHz - Low CH QPSK



20MHz - Low CH 64QAM



20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

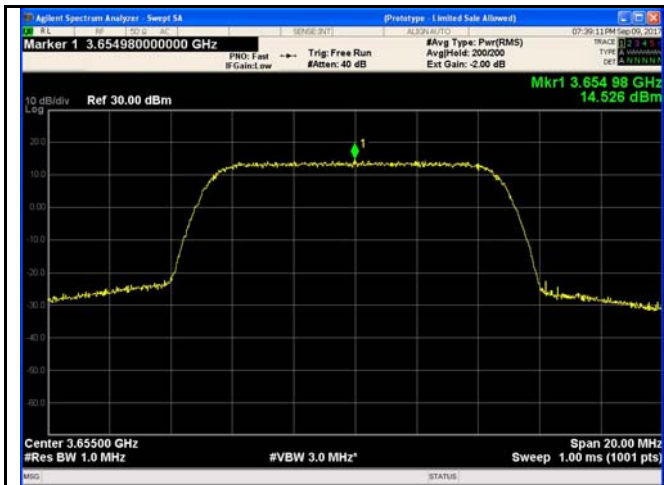


20MHz - High CH QPSK

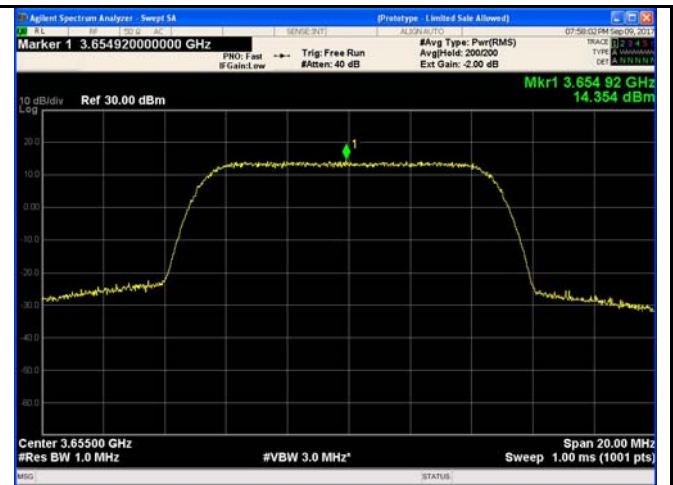


20MHz - High CH 64QAM

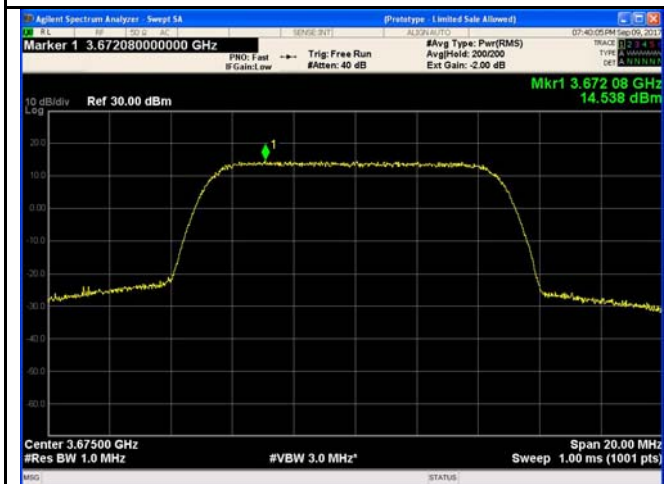
# PSD Chain 0



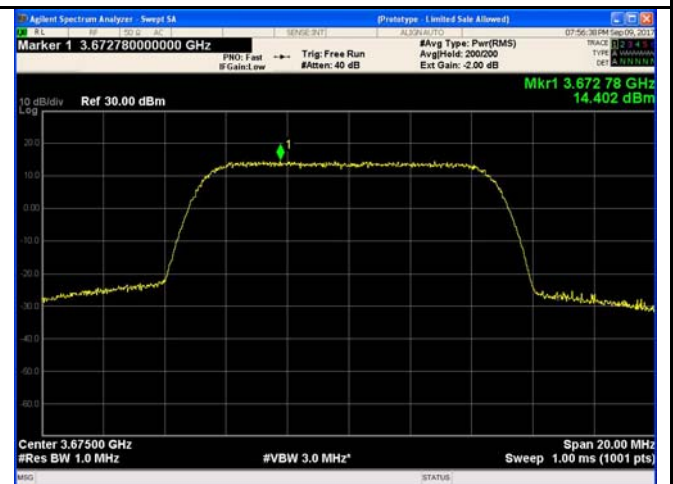
10MHz - Low CH QPSK



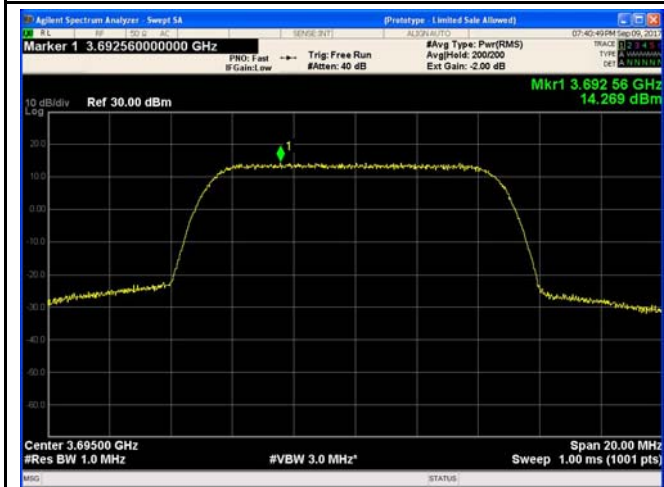
10MHz - Low CH 64QAM



10MHz - Middle CH QPSK



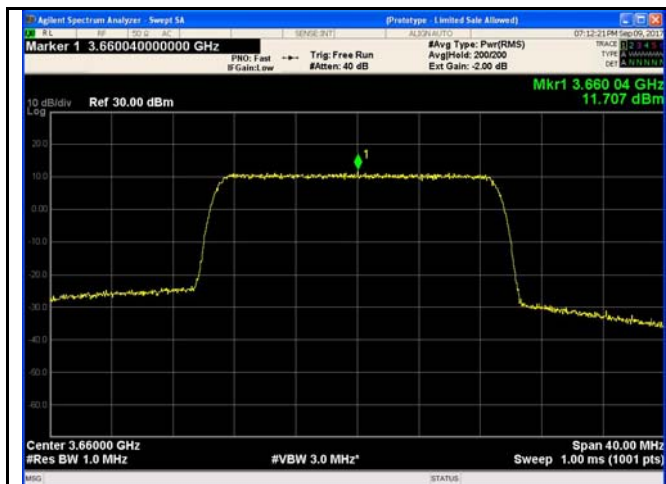
10MHz - Middle CH 64QAM



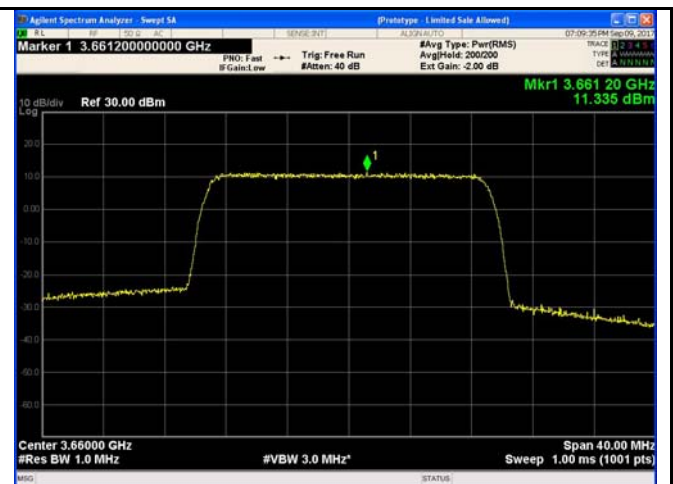
10MHz - High CH QPSK



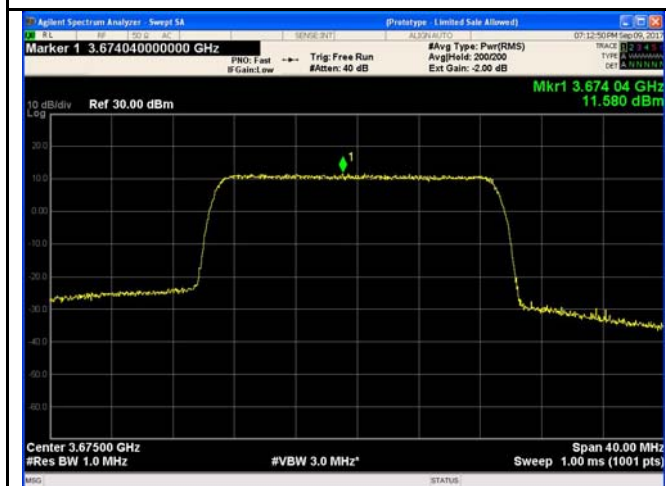
10MHz - High CH 64QAM



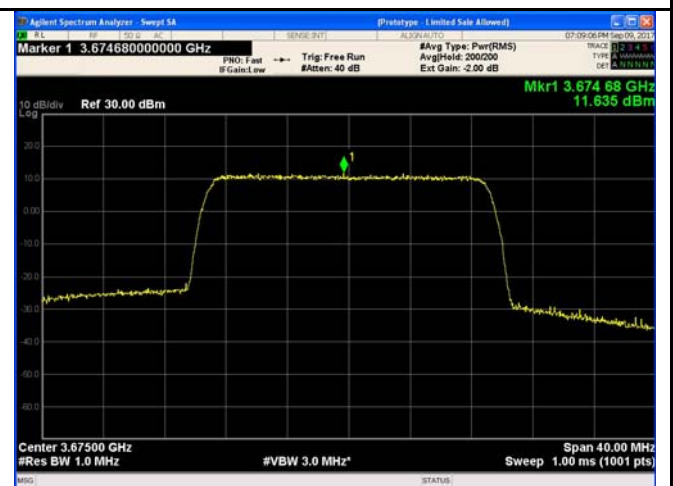
20MHz - Low CH QPSK



20MHz - Low CH 64QAM



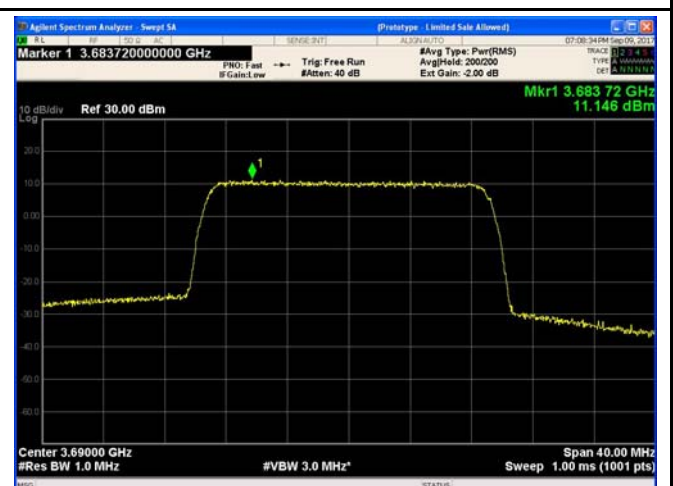
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

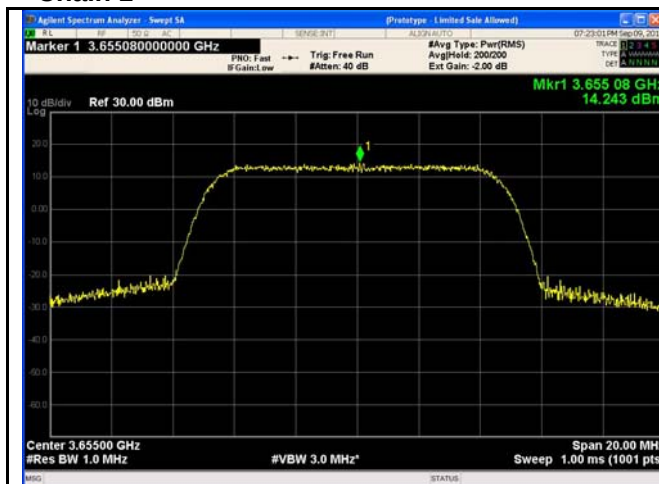


20MHz - High CH QPSK

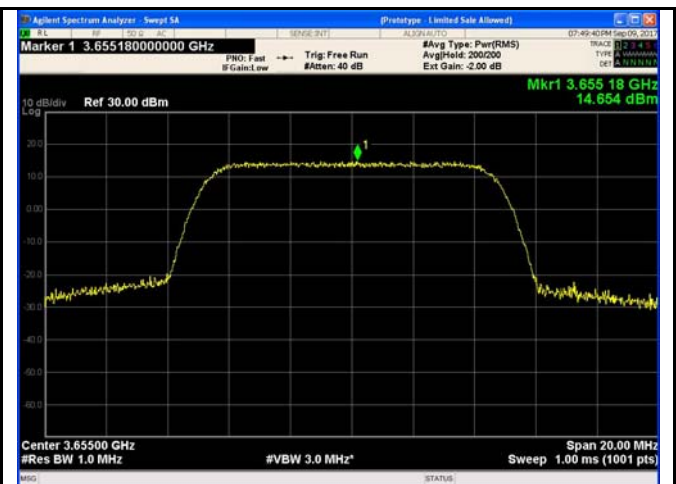


20MHz - High CH 64QAM

## Chain 1



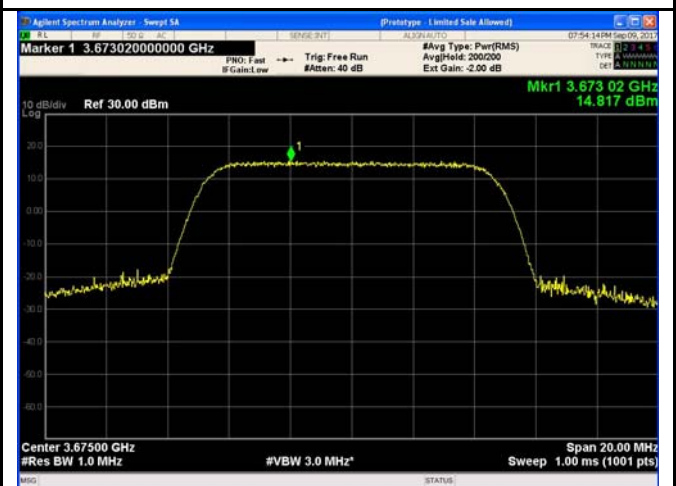
10MHz - Low CH QPSK



10MHz - Low CH 64QAM



10MHz - Middle CH QPSK



10MHz - Middle CH 64QAM



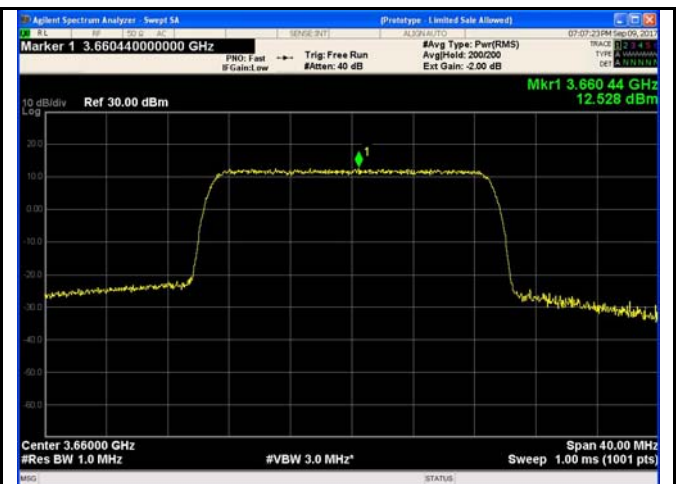
10MHz - High CH QPSK



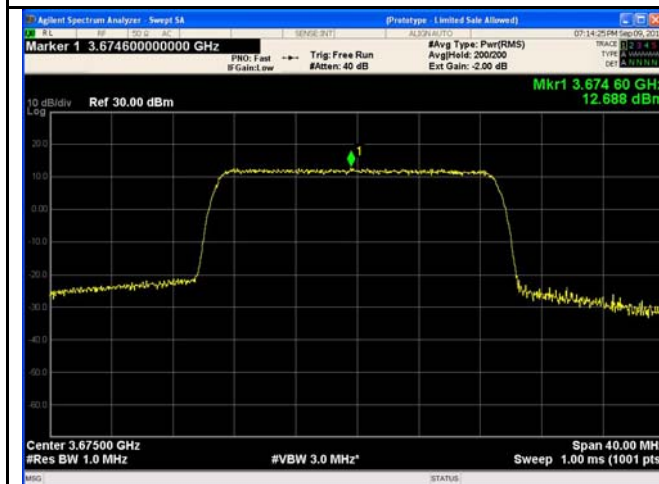
10MHz - High CH 64QAM



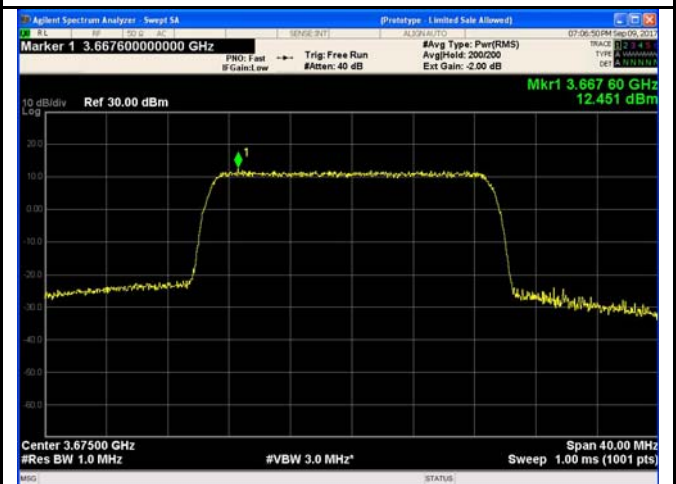
20MHz - Low CH QPSK



20MHz - Low CH 64QAM



20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM



20MHz - High CH QPSK



20MHz - High CH 64QAM

## 9 Occupy Bandwidth

|                   |                                 |
|-------------------|---------------------------------|
| Test Requirement: | FCC part 90.209 and RSS-Gen 6.6 |
| Test Method:      | FCC part 2.1049 and RSS-Gen 6.6 |
| Test Mode:        | Data communicating mode         |

### 9.1 EUT Operation

Operating Environment :

|                       |          |
|-----------------------|----------|
| Temperature:          | 22.5 °C  |
| Humidity:             | 52.3% RH |
| Atmospheric Pressure: | 101.2kPa |

### 9.2 Test Procedure

1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer.
2. The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
3. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
4. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

### 9.3 Test Result

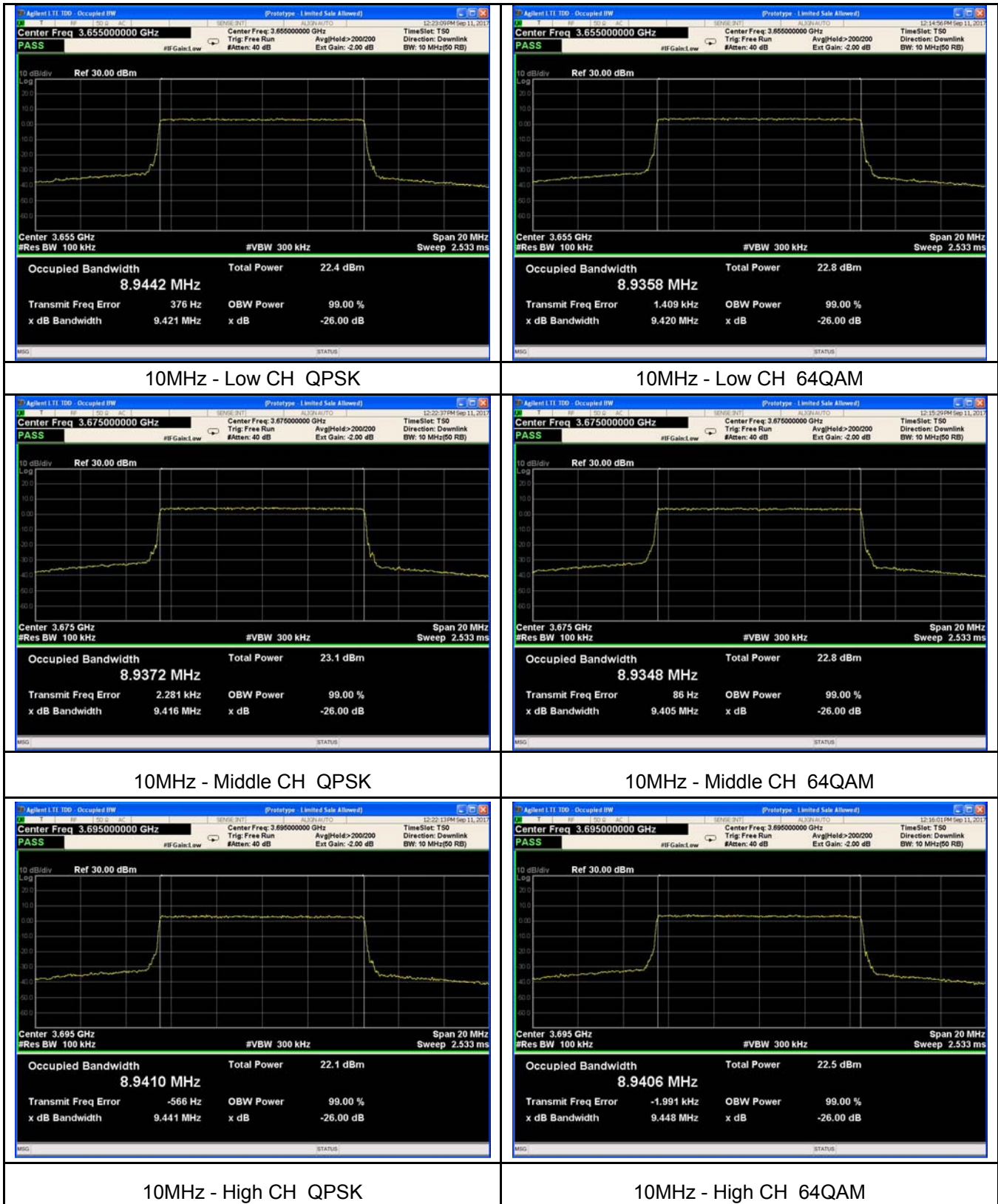
#### Chain 0

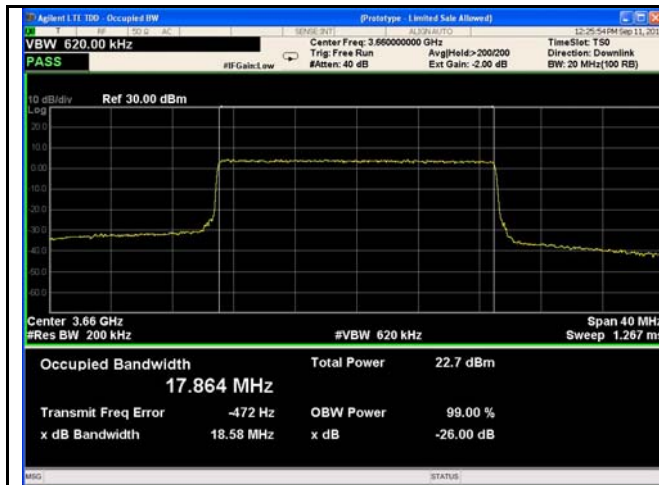
| Bandwidth (MHz) | Modulation | Test Channel | 26dB Occupy bandwidth (MHz) | 99% Occupy bandwidth (MHz) |
|-----------------|------------|--------------|-----------------------------|----------------------------|
| 10              | QPSK       | Low          | 9.42                        | 8.94                       |
|                 |            | Middle       | 9.42                        | 8.94                       |
|                 |            | High         | 9.44                        | 8.94                       |
|                 | 64QAM      | Low          | 9.42                        | 8.94                       |
|                 |            | Middle       | 9.41                        | 8.93                       |
|                 |            | High         | 9.45                        | 8.94                       |
| Bandwidth (MHz) | Modulation | Test Channel | 26dB Occupy bandwidth (MHz) | 99% Occupy bandwidth (MHz) |
| 20              | QPSK       | Low          | 18.58                       | 17.86                      |
|                 |            | Middle       | 18.59                       | 17.86                      |
|                 |            | High         | 18.57                       | 17.84                      |
|                 | 64QAM      | Low          | 18.56                       | 17.85                      |
|                 |            | Middle       | 18.82                       | 17.86                      |
|                 |            | High         | 18.58                       | 17.86                      |

#### Chain 1

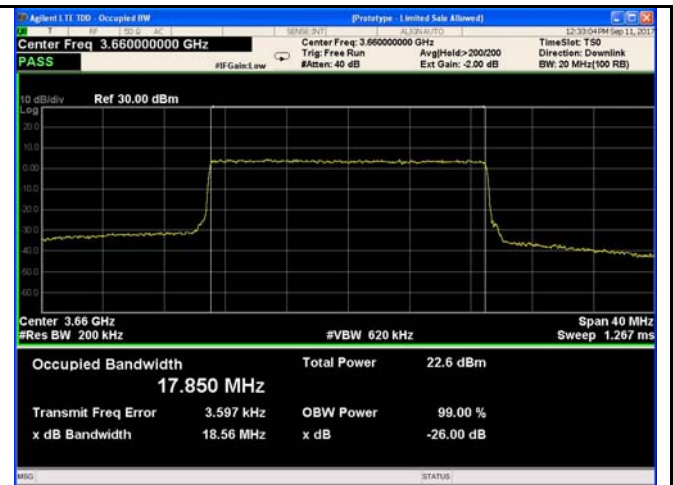
| Bandwidth (MHz) | Modulation | Test Channel | 26dB Occupy bandwidth (MHz) | 99% Occupy bandwidth (MHz) |
|-----------------|------------|--------------|-----------------------------|----------------------------|
| 10              | QPSK       | Low          | 9.50                        | 8.94                       |
|                 |            | Middle       | 9.38                        | 8.93                       |
|                 |            | High         | 9.38                        | 8.94                       |
|                 | 64QAM      | Low          | 9.42                        | 8.94                       |
|                 |            | Middle       | 9.42                        | 8.94                       |
|                 |            | High         | 9.41                        | 8.94                       |
| Bandwidth (MHz) | Modulation | Test Channel | 26dB Occupy bandwidth (MHz) | 99% Occupy bandwidth (MHz) |
| 20              | QPSK       | Low          | 18.61                       | 17.86                      |
|                 |            | Middle       | 18.56                       | 17.85                      |
|                 |            | High         | 18.59                       | 17.84                      |
|                 | 64QAM      | Low          | 18.68                       | 17.85                      |
|                 |            | Middle       | 18.59                       | 17.84                      |
|                 |            | High         | 18.55                       | 17.86                      |

### Test Plots Chain 0

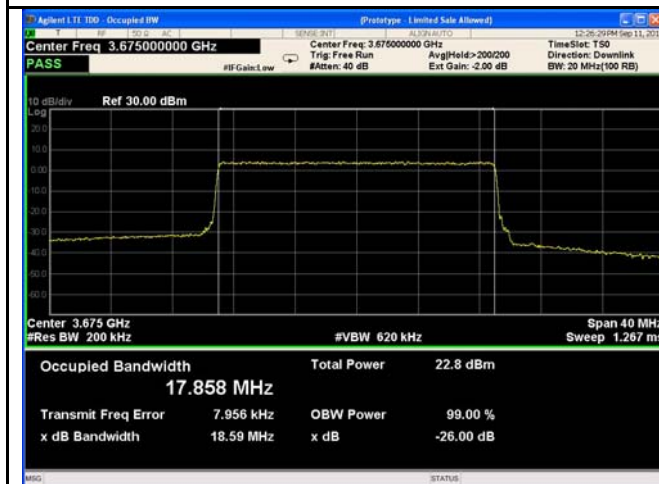




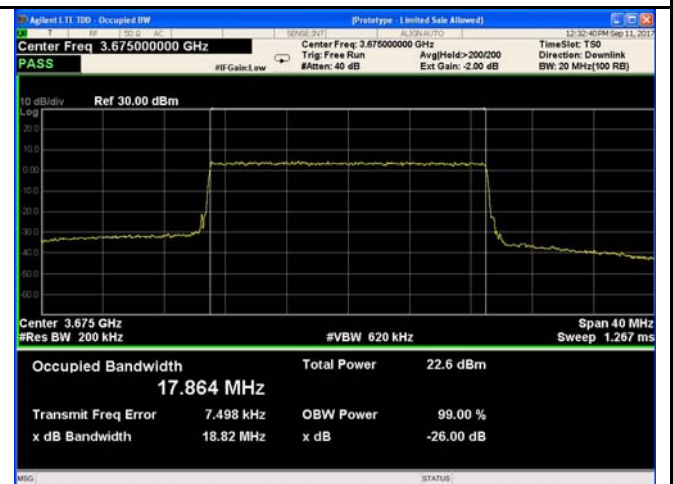
20MHz - Low CH QPSK



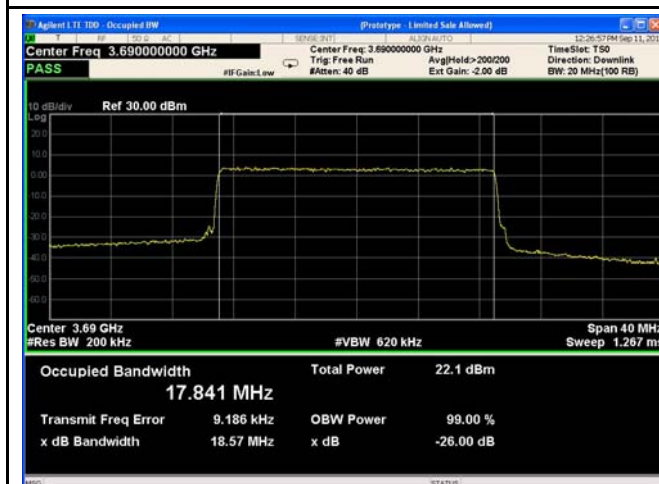
20MHz - Low CH 64QAM



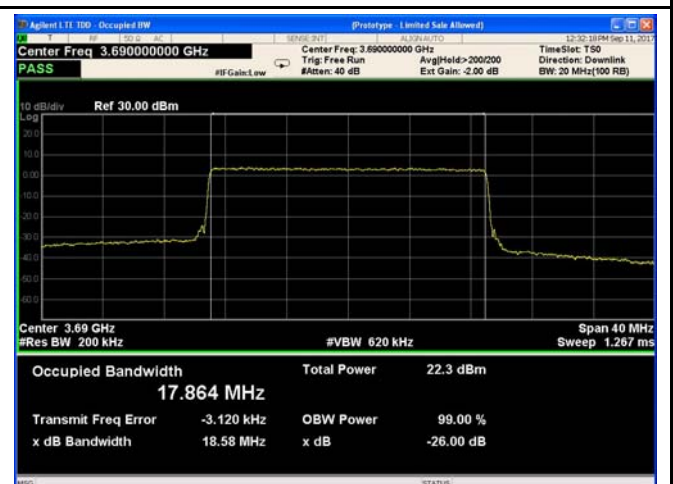
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

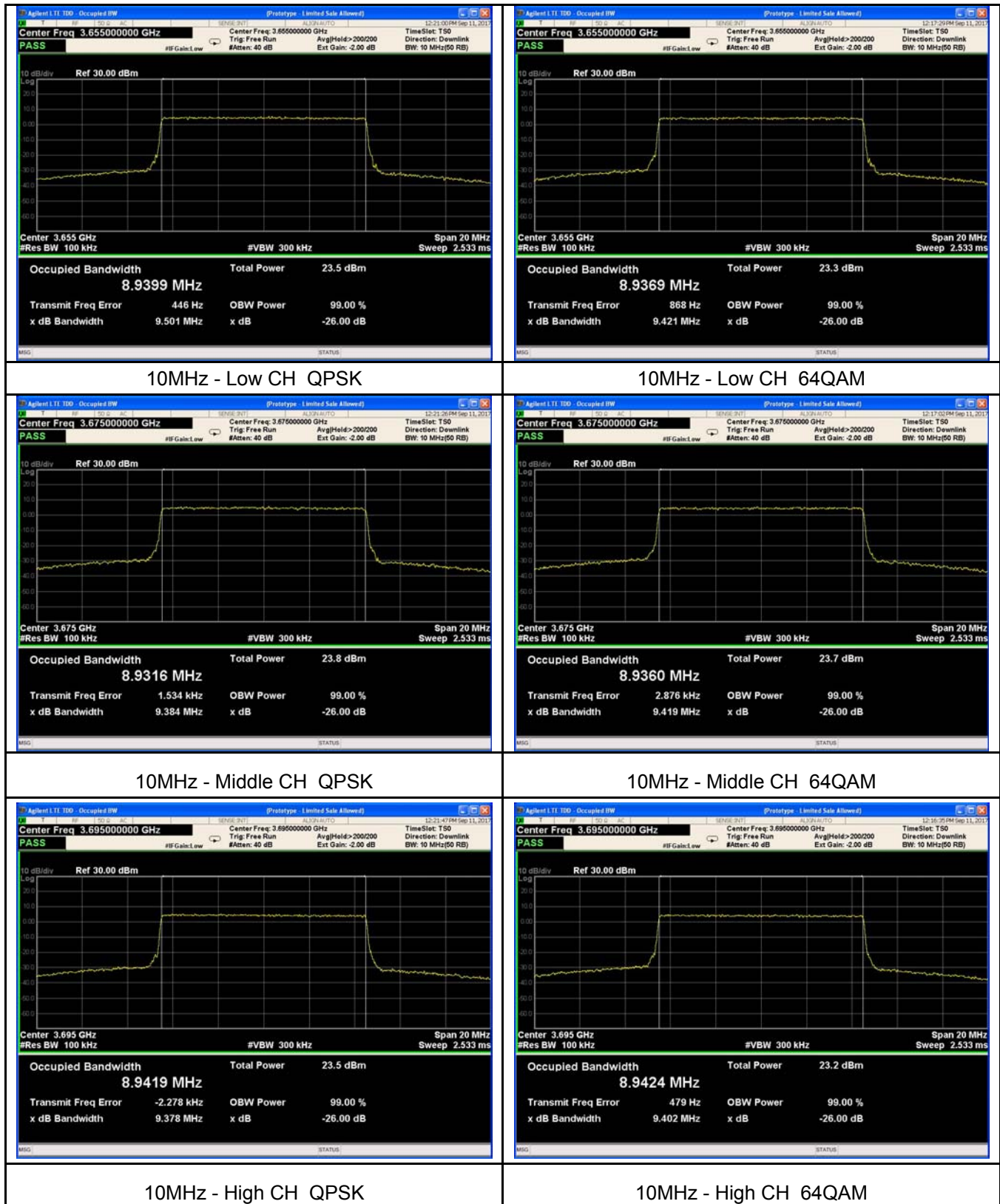


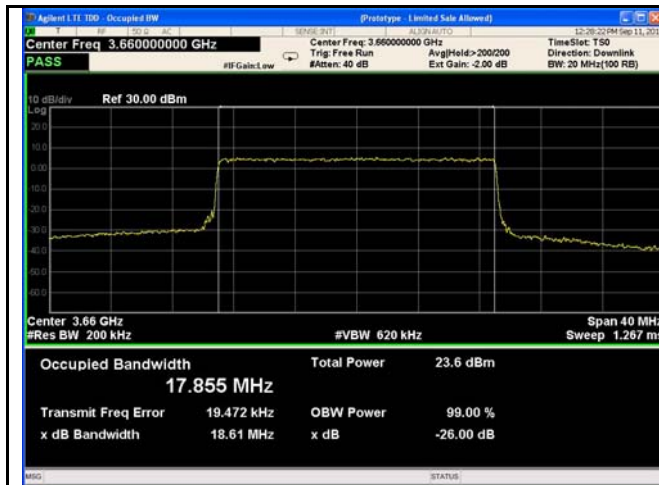
20MHz - High CH QPSK



20MHz - High CH 64QAM

## Chain 1

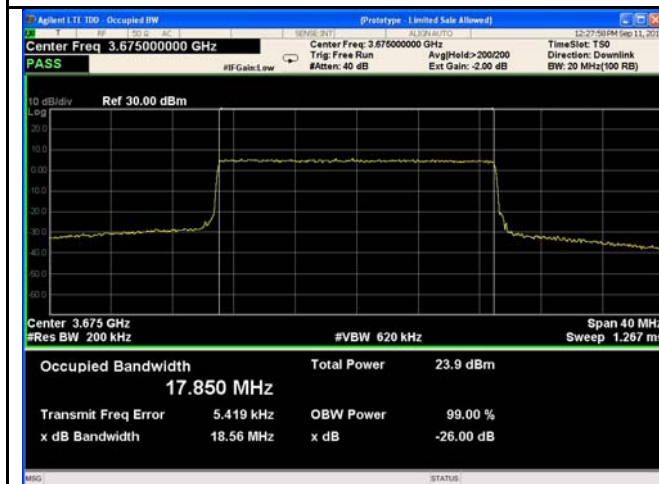




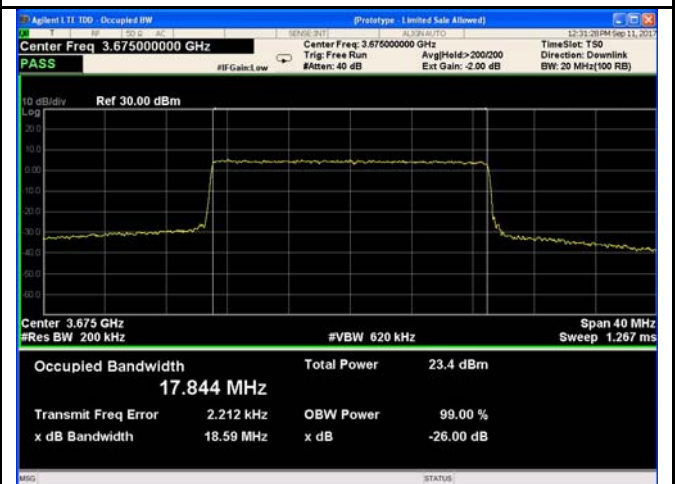
20MHz - Low CH QPSK



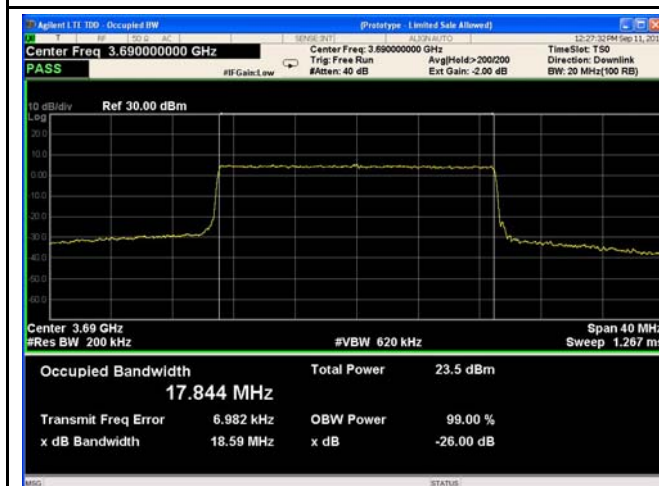
20MHz - Low CH 64QAM



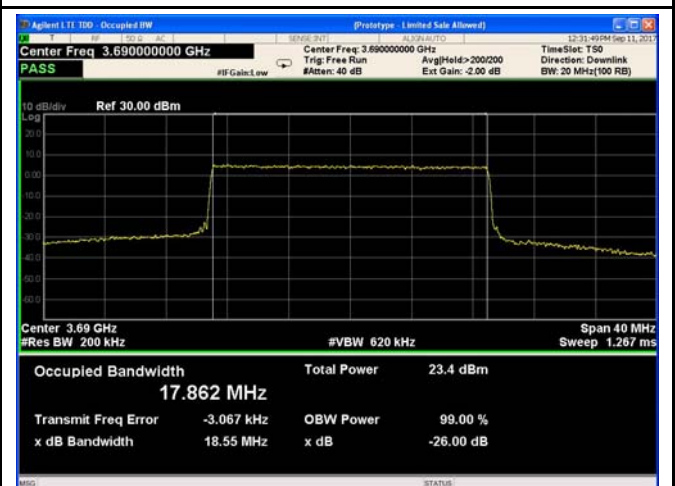
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM



20MHz - High CH QPSK



20MHz - High CH 64QAM

## 10 Emission Mask

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC part 90.210(b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Test Mode:        | Data communicating mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Limit:            | Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:<br>(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.<br>(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.<br>(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB |

### 10.1 EUT Operation

|                         |          |
|-------------------------|----------|
| Operating Environment : |          |
| Temperature:            | 22.5 °C  |
| Humidity:               | 52.3% RH |
| Atmospheric Pressure:   | 101.2kPa |

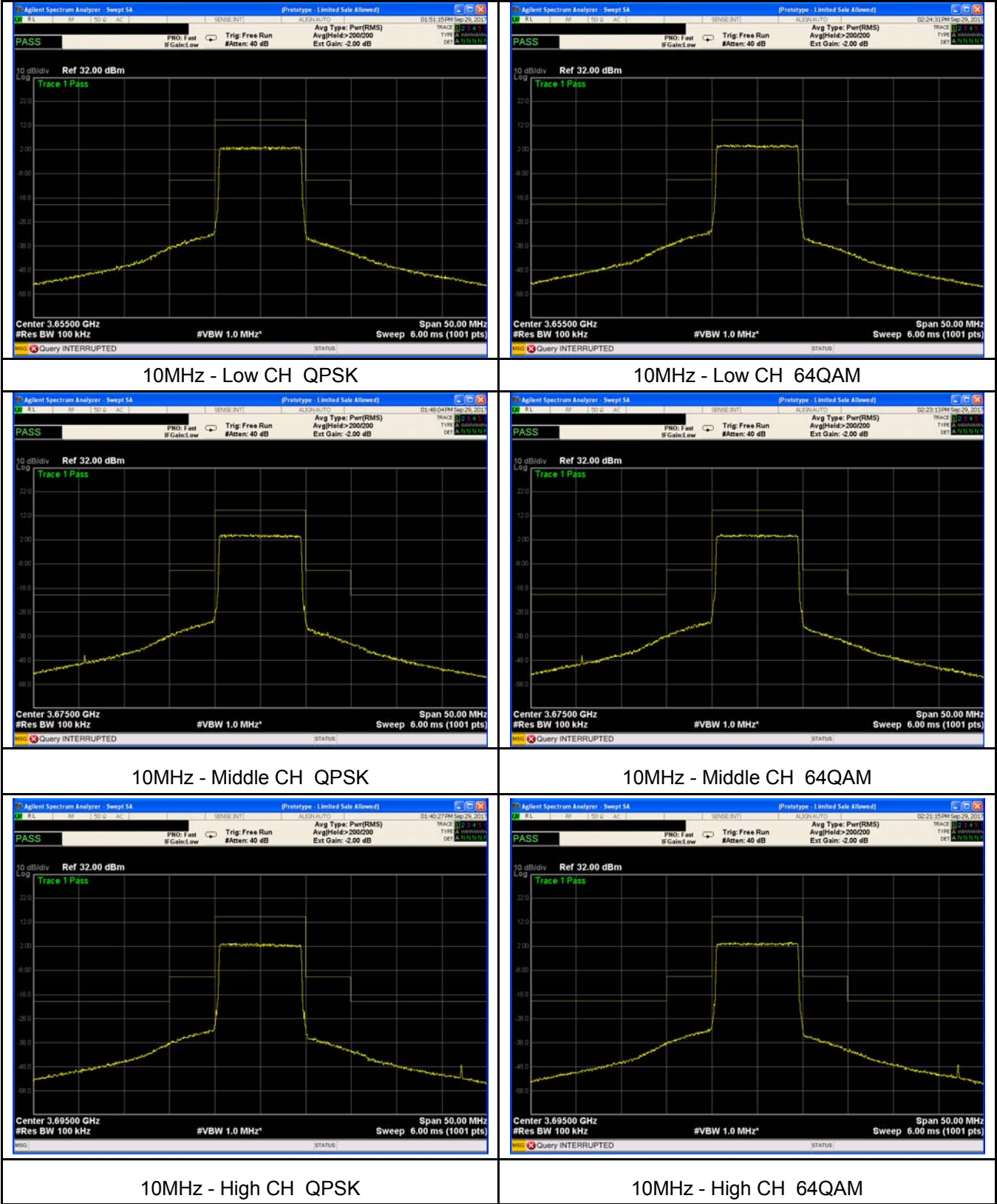
### 10.2 Test Procedure

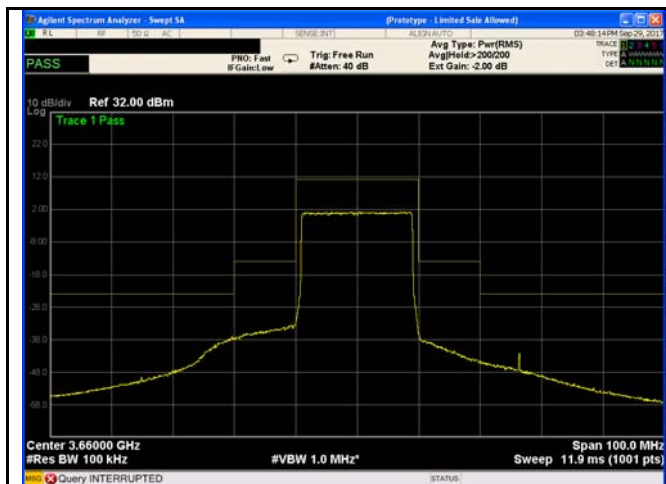
1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. RBW=100kHz, VBW=1MHz, Detector mode= RMS,  
Trace mode: Power averaging over 100 sweeps

Note: For FCC part 90.210(b) 3, more than 250 percent emission was considered in radiated emission test items.

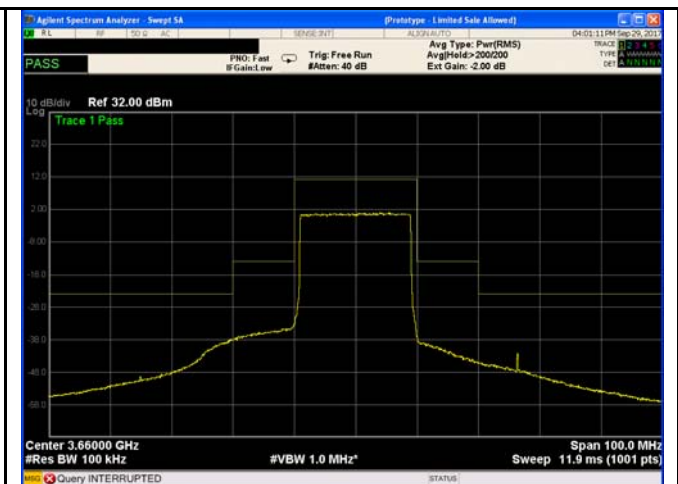
10.3 Test Result

Test Plots  
Chain 0

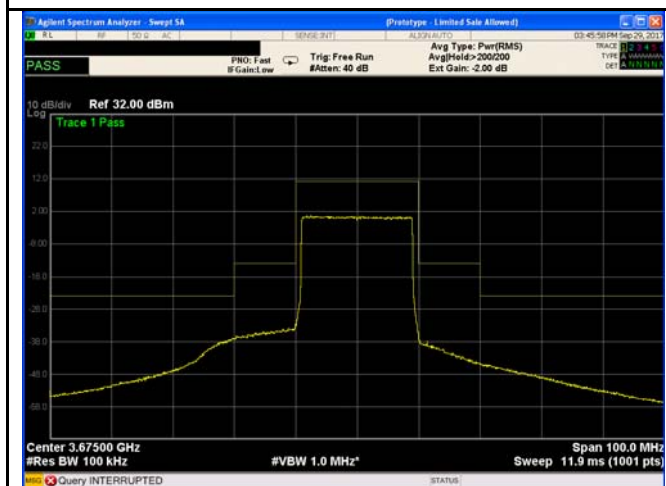




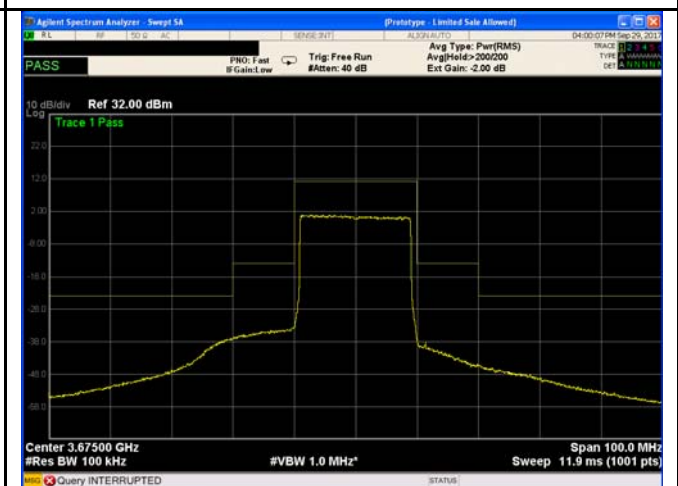
20MHz - Low CH QPSK



20MHz - Low CH 64QAM



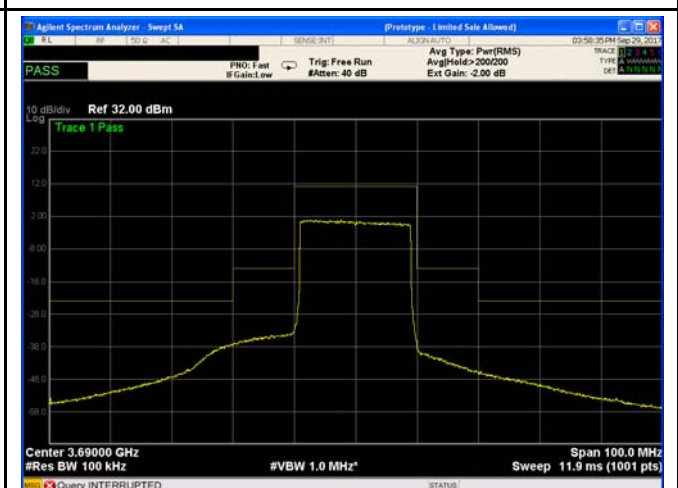
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

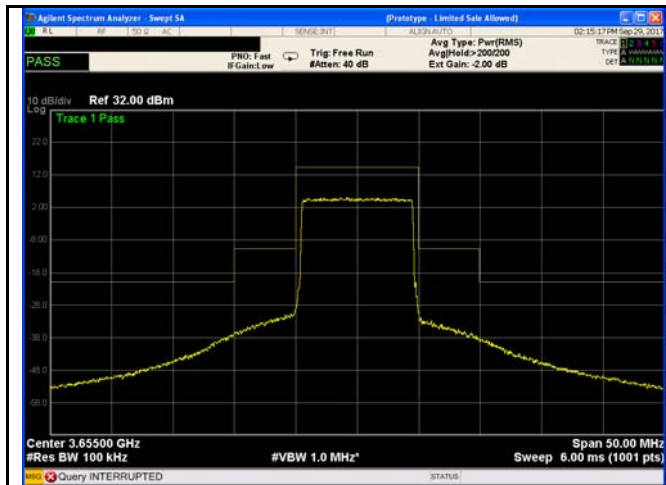


20MHz - High CH QPSK

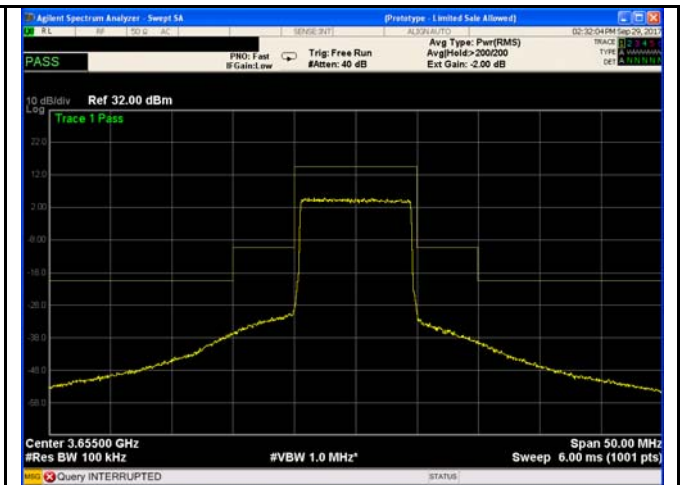


20MHz - High CH 64QAM

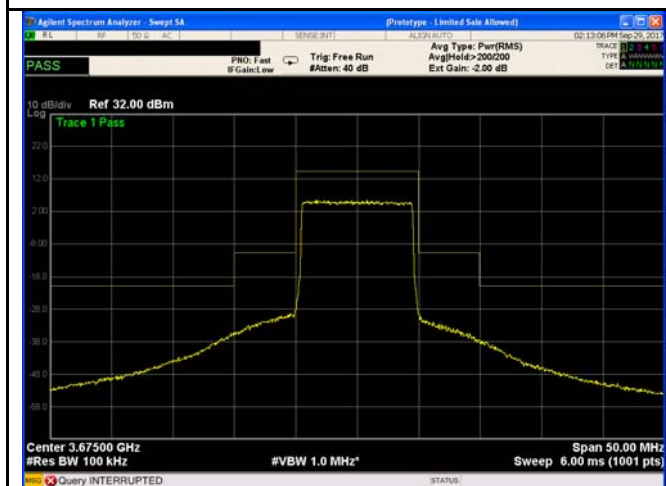
## Chain 1



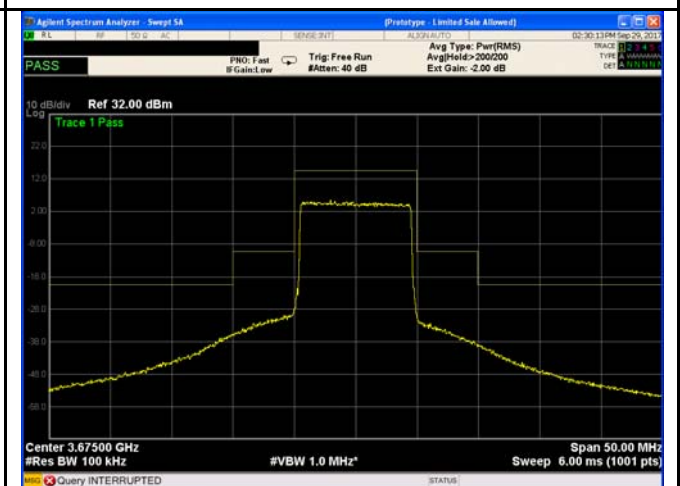
10MHz - Low CH QPSK



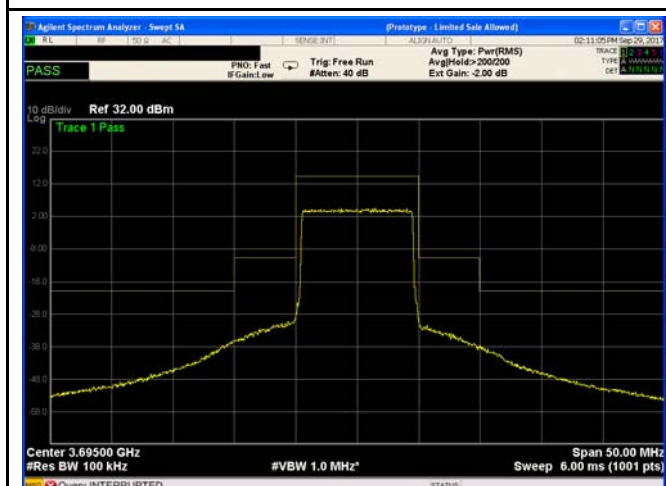
10MHz - Low CH 64QAM



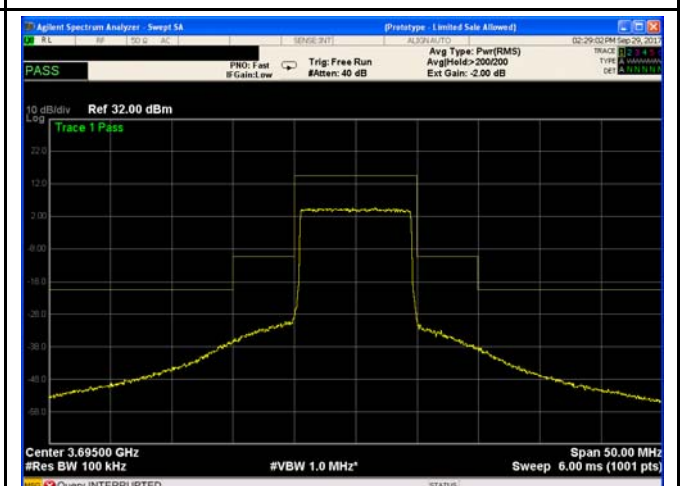
10MHz - Middle CH QPSK



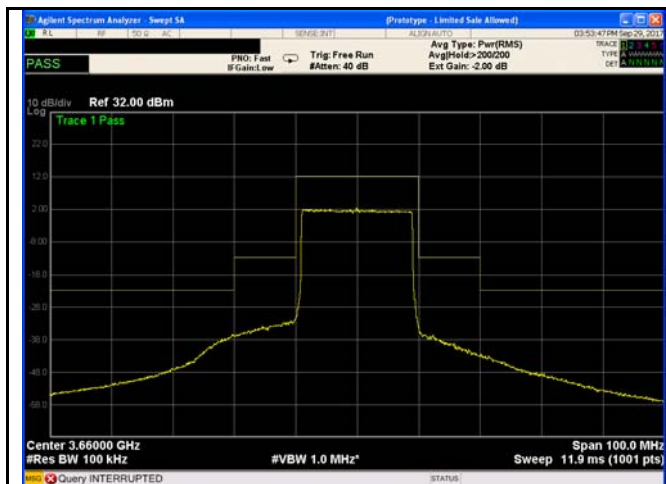
10MHz - Middle CH 64QAM



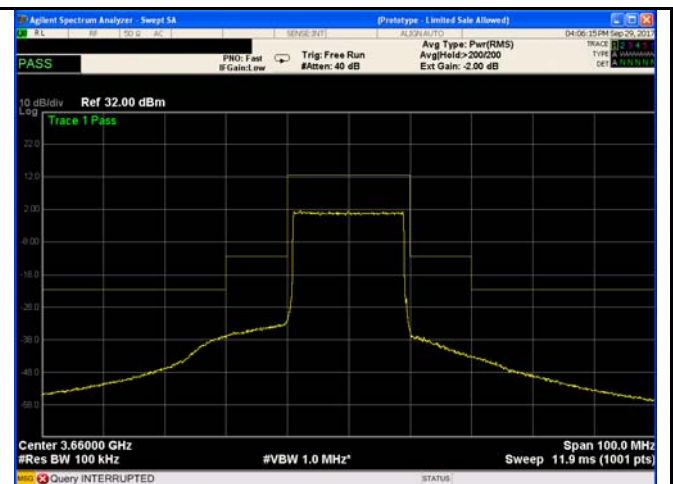
10MHz - High CH QPSK



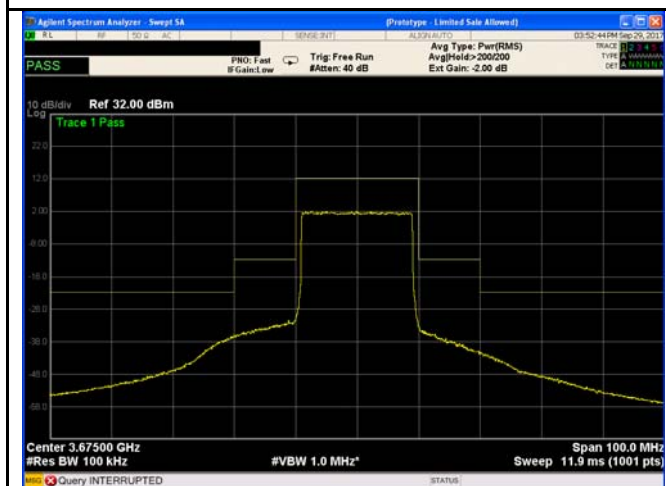
10MHz - High CH 64QAM



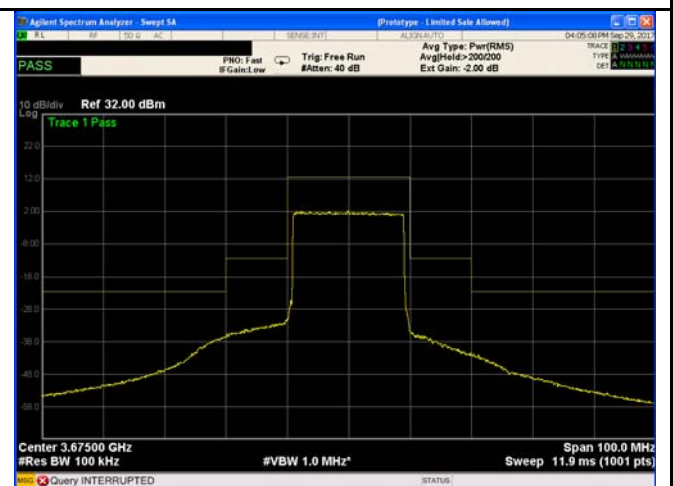
20MHz - Low CH QPSK



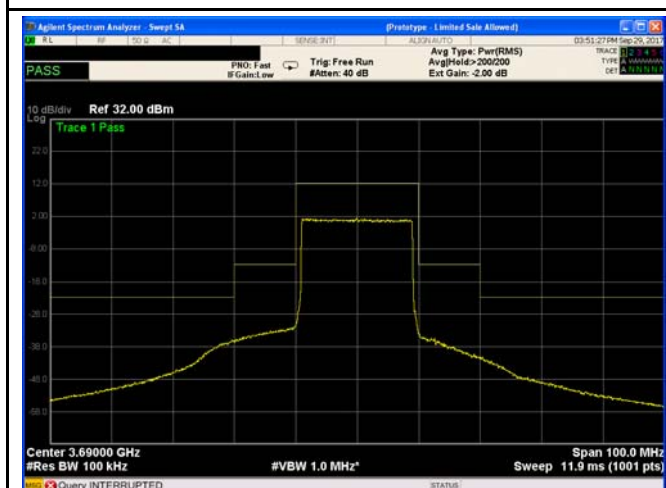
20MHz - Low CH 64QAM



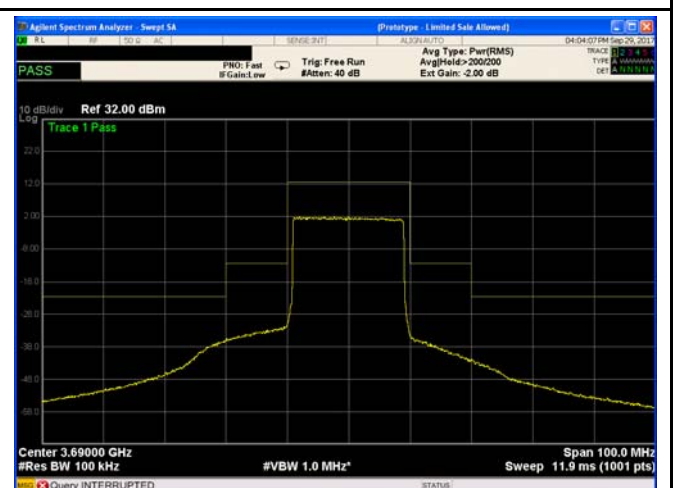
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM



20MHz - High CH QPSK



20MHz - High CH 64QAM

## 11 Out of band emission at antenna terminals

|                   |                                         |
|-------------------|-----------------------------------------|
| Test Requirement: | FCC part90.1323 and RSS-197 Clause 5.7  |
| Test Method:      | FCC part2.1051 and RSS Gen Section 6.13 |
| Test Mode:        | Data communicating mode                 |
| Limit:            | -13dBm                                  |

### 11.1 EUT Operation

Operating Environment :

|                       |           |
|-----------------------|-----------|
| Temperature:          | 23.5 °C   |
| Humidity:             | 52.1 % RH |
| Atmospheric Pressure: | 101.3kPa  |

### 11.2 Test Procedure

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
3. For the out of band: Set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic.
4. Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

### 11.3 Test Result

Remark: During the test, pre-scan the QPSK, 64QAM modulation, and found the QPSK modulation(10MHz/20MHz middle channel) is the worst case.

The permit frequency range of Part 90Z is from 3650-3700MHz. according the frequency table of the device on page 7. Notes as below:

1. The frequency star and stop for band edge test instruction as below:

| bandwidth | Left<br>> 1MHz | Left 1MHz<br>immediately | Low channel | Middle Channel | High channel | Right 1MHz<br>immediately | Right<br>> 1MHz |
|-----------|----------------|--------------------------|-------------|----------------|--------------|---------------------------|-----------------|
| 10MHz     | 3644-3649      | 3649-3650                | 3655        | 3675           | 3695         | 3700-3701                 | 3701-3706       |
| 20MHz     | 3639-3649      | 3649-3650                | 3660        | 3675           | 3690         | 3700-3701                 | 3701-3711       |

Note 1:

For **low** channel, we test left 1 MHz immediately and more than 1MHz away (5 MHz for 10 MHz bandwidth & 10MHz for 20MHz bandwidth) from the permit left band 3650 MHz; the emission above right of 3700MHz has no intentional.

For **high** channel, we test right 1 MHz immediately and more than 1MHz away (5 MHz for 10 MHz bandwidth & 10MHz for 20MHz bandwidth) from the permit right band 3700 MHz; the emission below left of 3650MHz has no intentional.

For **middle** channel, we both test left and right 1 MHz immediately and more than 1MHz away (5 MHz for 10 MHz bandwidth & 10MHz for 20MHz bandwidth) from the permit band 3650 MHz to 3700 MHz; see above table.

2. The RBW and the limit instruction as below: (The general limit = -13dBm)

1. For 2x2 MIMO, the limit=-13dBm -10 log 2=-16dBm.
2. For RBW=100kHz, the limit = -16dBm – 10log(1MHz/100kHz)= -26dBm
3. For RBW=50kHz, the limit= -16dBm – 10log(1MHz/50kHz)= -29dBm  
(The spectrum of N9020A only display the RBW=51kHz, and RBW=50kHz limit is lower than RBW=51kHz.)
4. For RBW=200kHz, the limit= -16dBm - 10log(1MHz/200kHz)= -23dBm

Test Plots

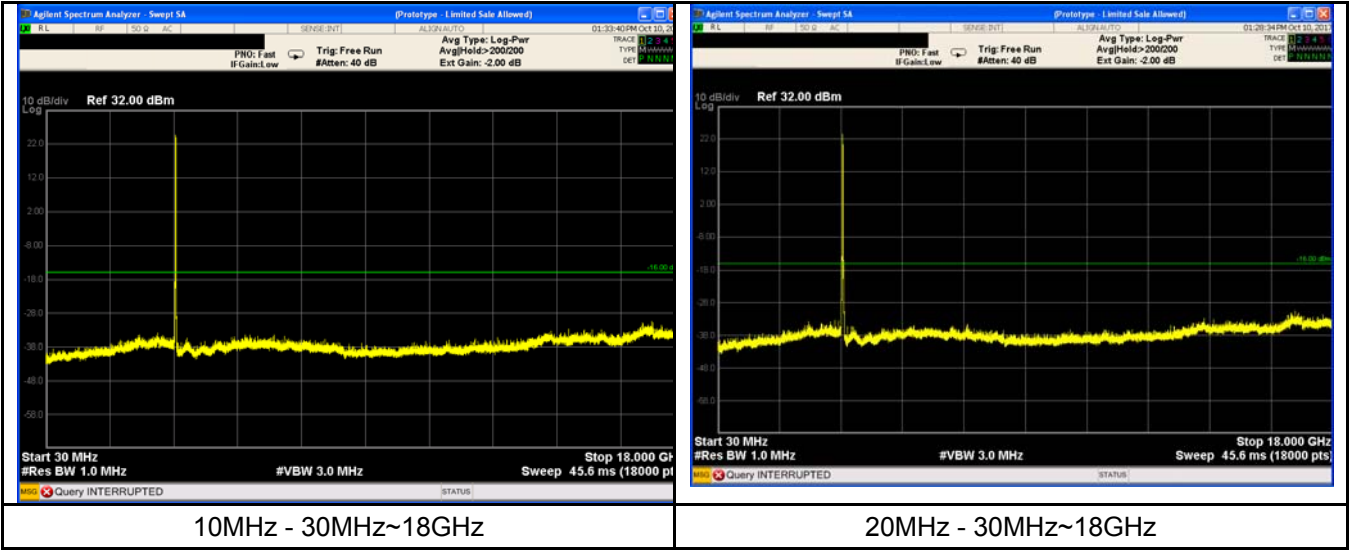
Spurious emission  
Chain 0



Remark:

The emission levels of above 18 GHz have been tested Shenzhen BALUN Technology Co.,Ltd. Refer to report: BL-SZ17A0379-501.

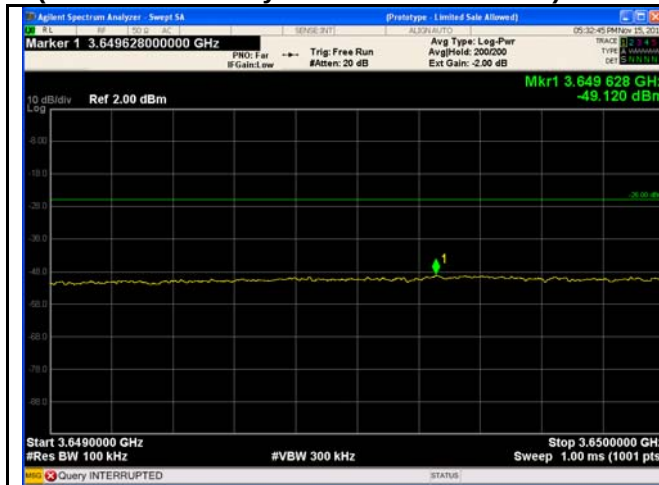
Chain 1



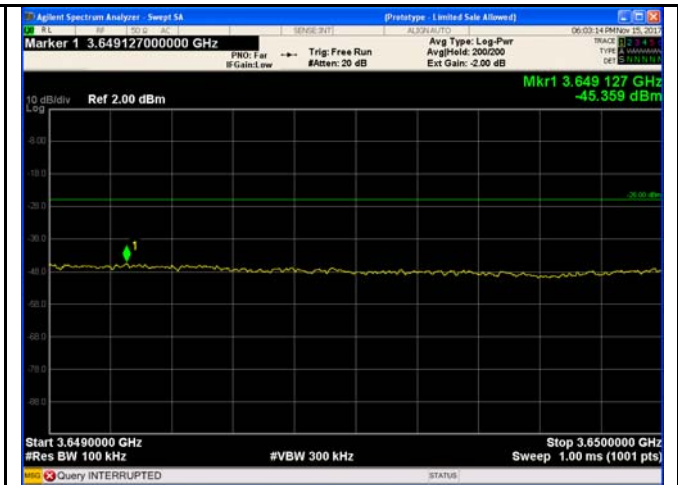
Remark:

The emission levels of above 18 GHz have been tested Shenzhen BALUN Technology Co.,Ltd. Refer to report: BL-SZ17A0379-501.

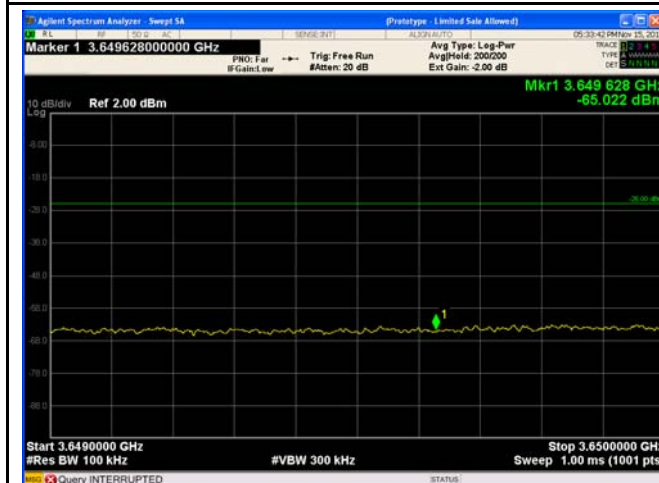
**Band edge emission**  
**Chain 0**  
**(1MHz immediately for 10MHz bandwidth)**



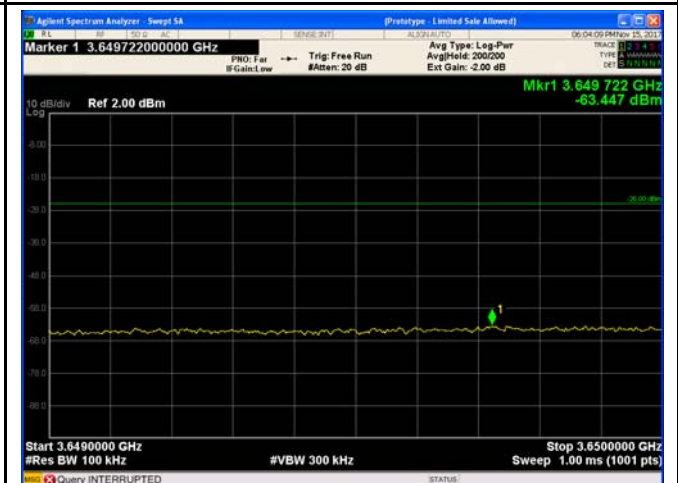
10MHz – 3649MHz-3650MHz Low CH QPSK



10MHz –3649MHz-3650MHz Low CH 64QAM



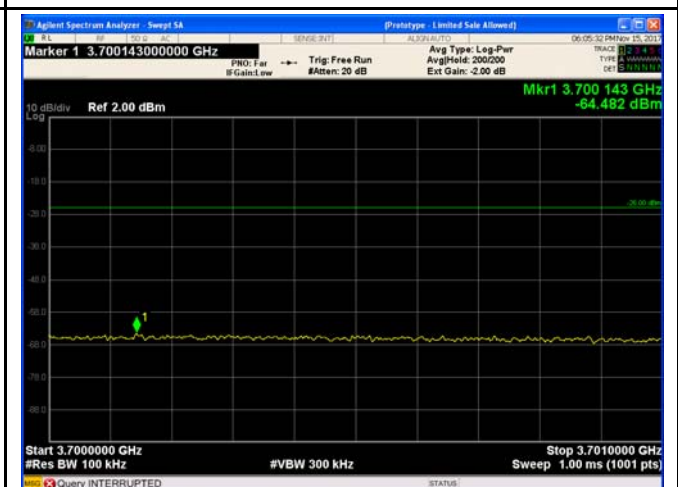
10MHz - 3649MHz -3650MHz Mid CH QPSK



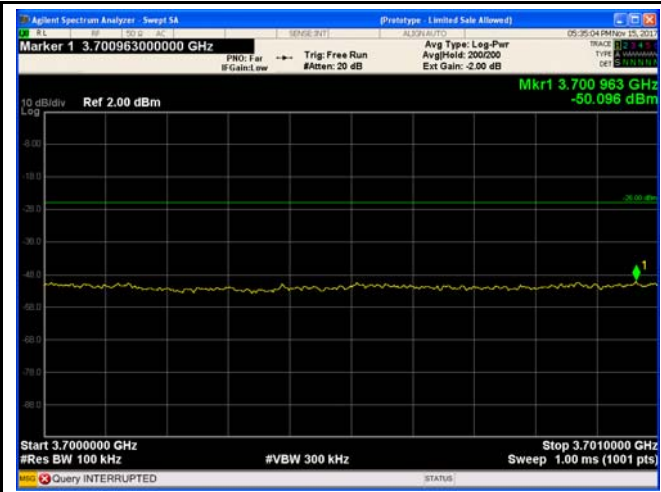
10MHz - 3649MHz -3650MHz Mid CH 64QAM



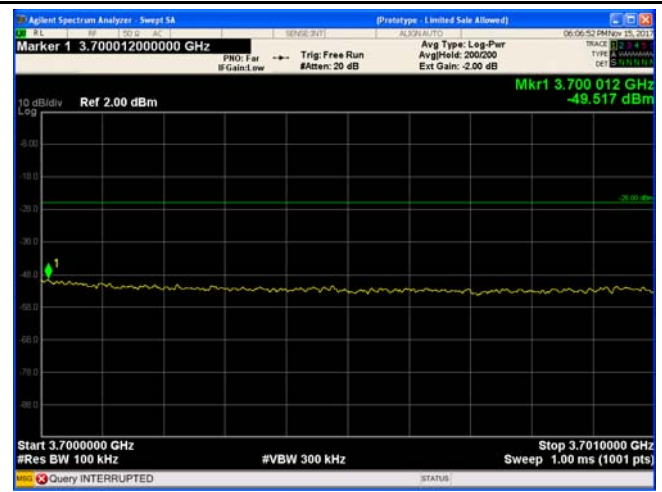
10MHz - 3700MHz -3701MHz Mid CH QPSK



10MHz - 3700MHz -3701MHz Mid CH 64QAM

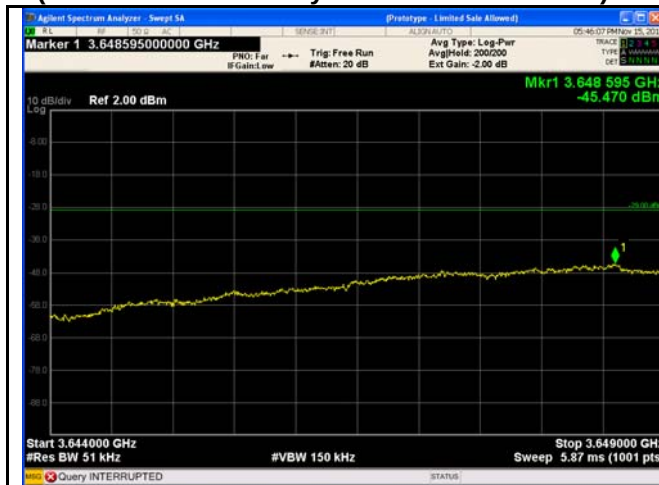


10MHz - 3700MHz -3701MHz High CH QPSK

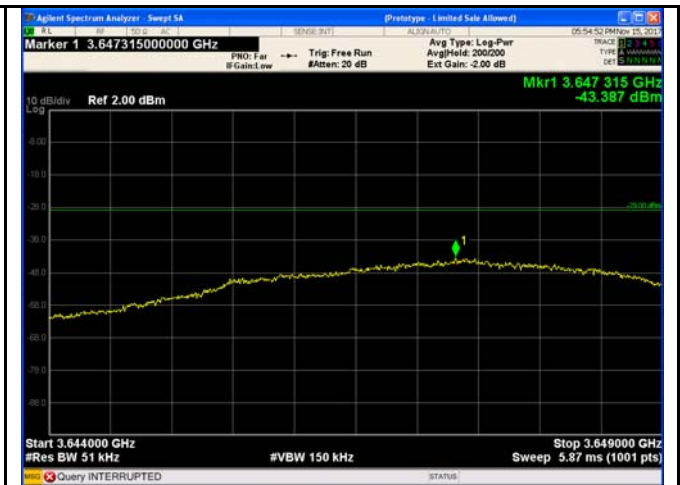


10MHz - 3700MHz -3701MHz High CH 64QAM

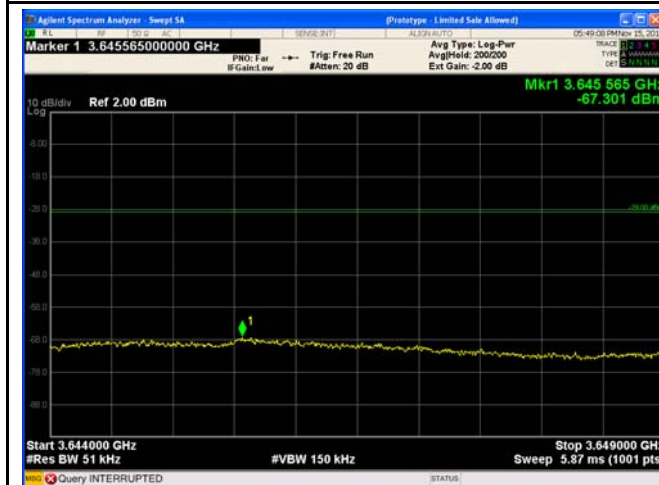
(more than 1MHz away for 10MHz bandwidth)



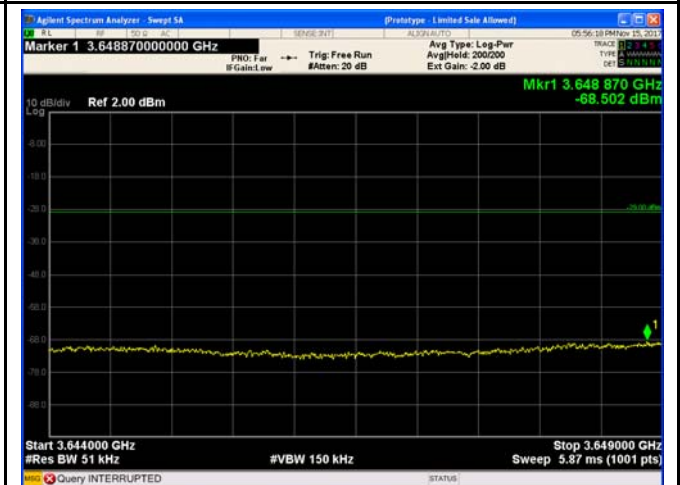
10MHz – 3644M-3649M Low CH QPSK



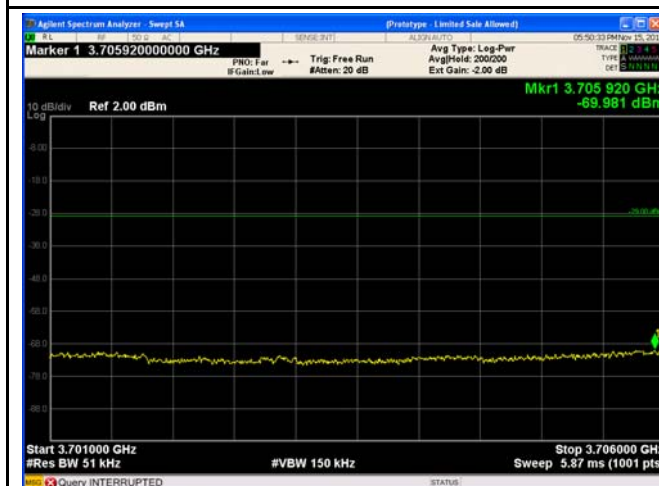
10MHz – 3644M-3649M Low CH 64QAM



10MHz – 3644M-3649M Mid CH QPSK



10MHz – 3644M-3649M Mid CH 64QAM



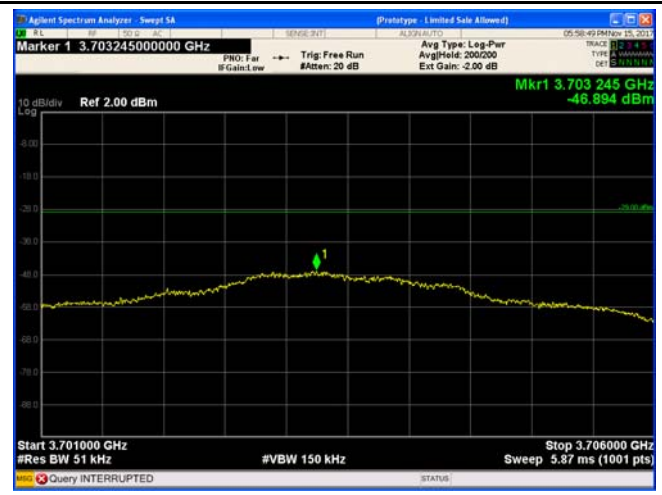
10MHz - 3701M-3706M Mid CH QPSK



10MHz - 3701M-3706M Mid CH 64QAM

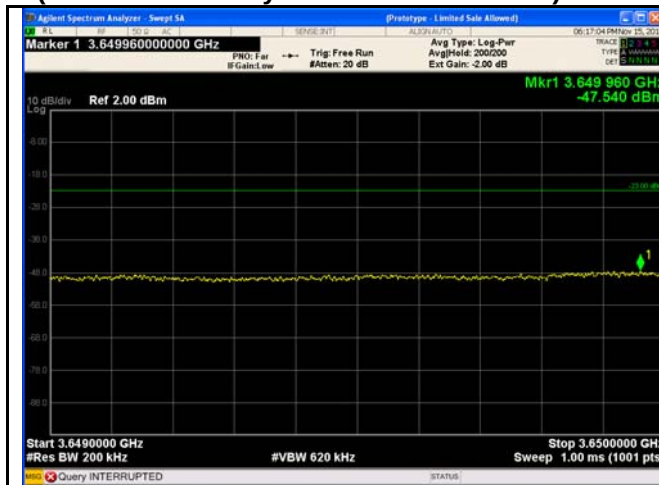


10MHz - 3701M-3706M High CH QPSK

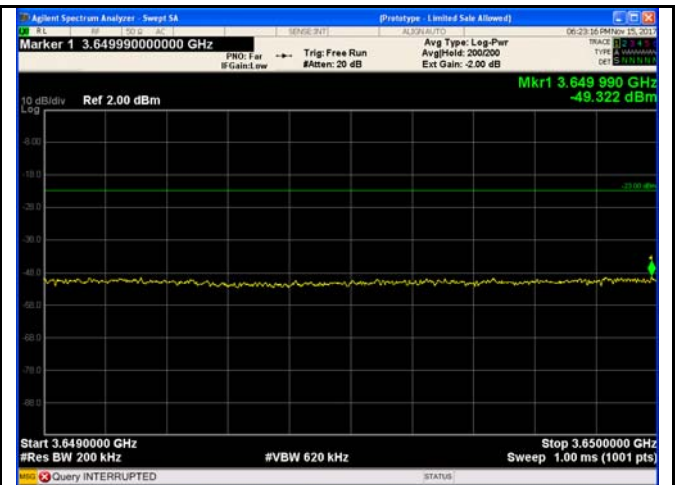


10MHz - 3701M-3706M High CH 64QAM

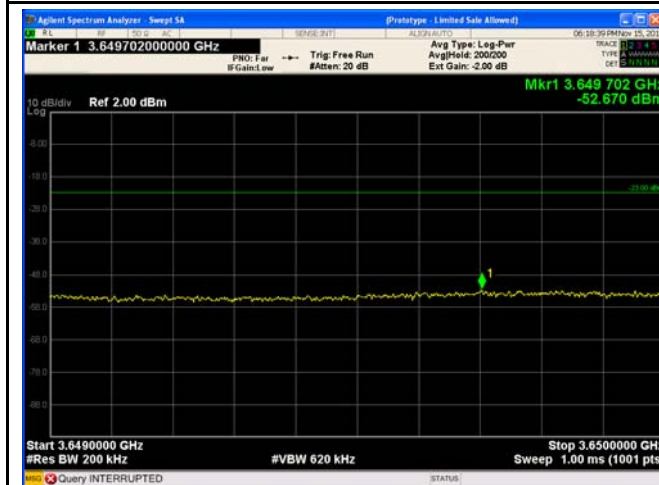
(1MHz immediately for 20MHz bandwidth)



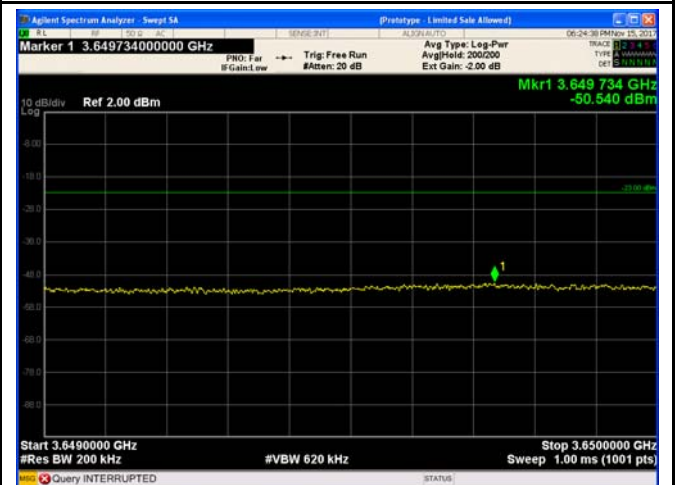
20MHz – 3649MHz-3650MHz Low CH QPSK



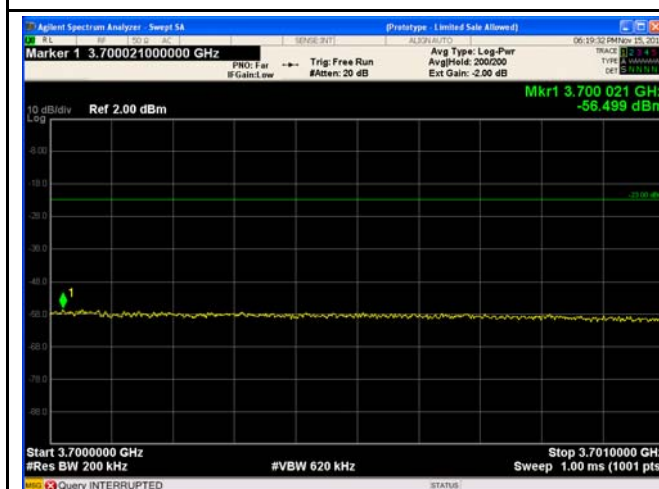
20MHz – 3649MHz-3650MHz Low CH 64QAM



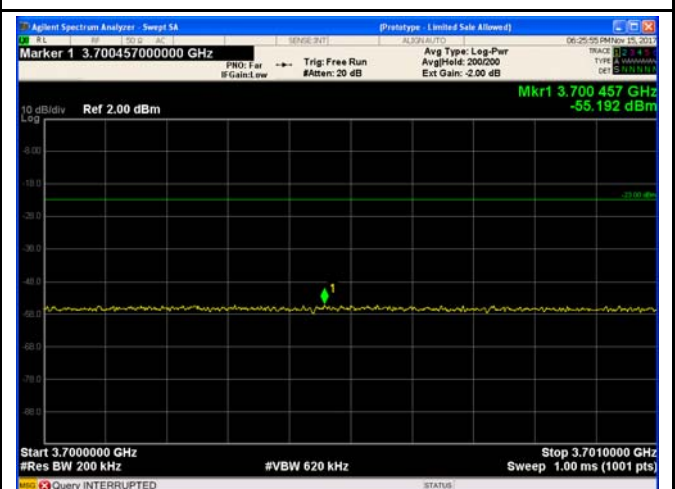
20MHz – 3649MHz-3650MHz Mid CH QPSK



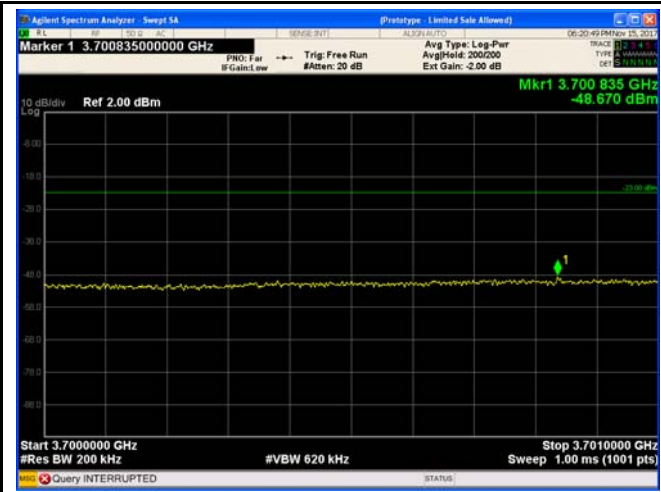
20MHz – 3649MHz-3650MHz Mid CH 64QAM



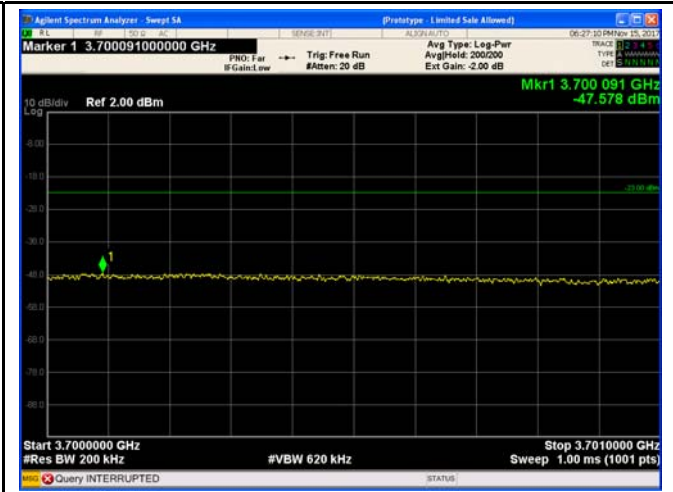
20MHz - 3700MHz -3701MHz Mid CH QPSK



20MHz - 3700MHz -3701MHz Mid CH 64QAM

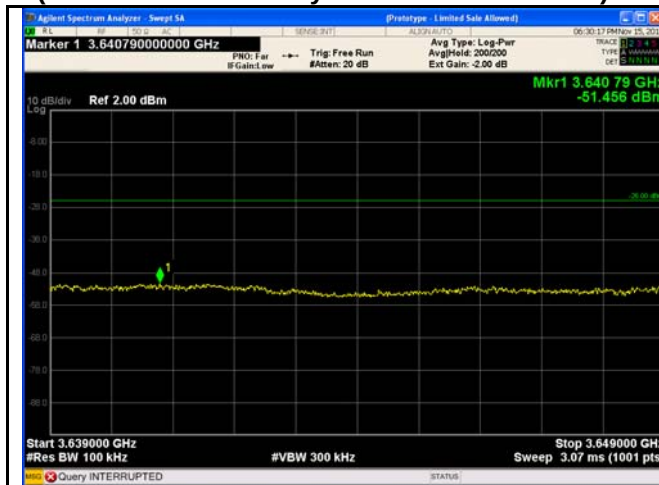


20MHz - 3700MHz -3701MHz High CH QPSK

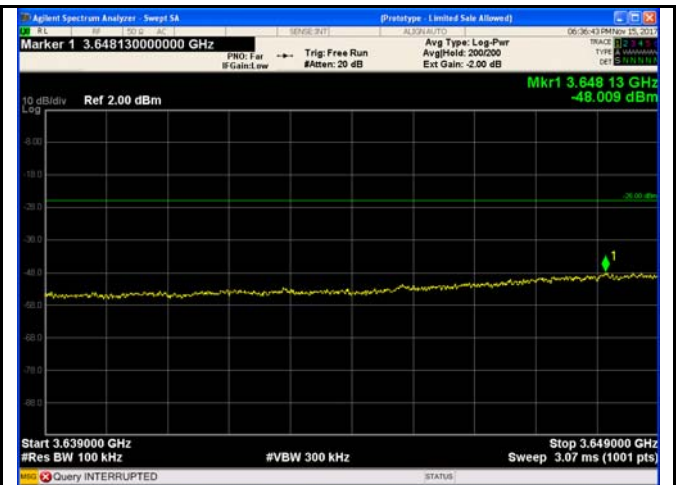


20MHz - 3700MHz -3701MHz High CH 64QAM

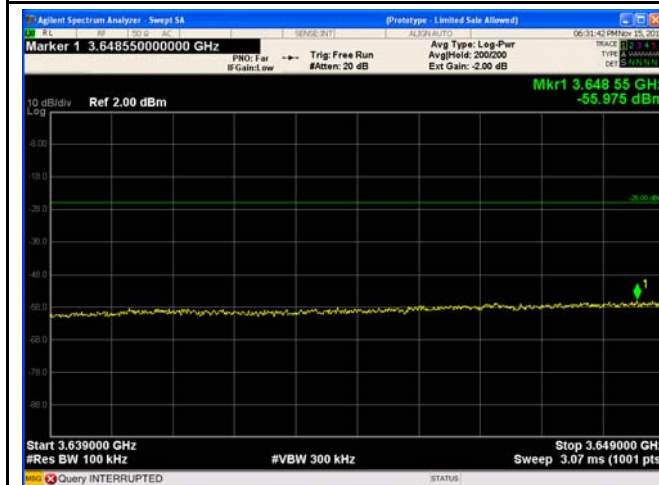
(more than 1MHz away for 20MHz bandwidth)



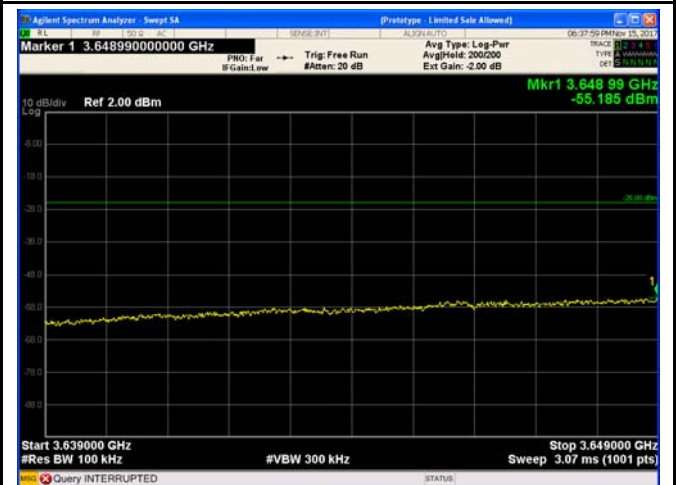
20MHz -3639M-3649M Low CH QPSK



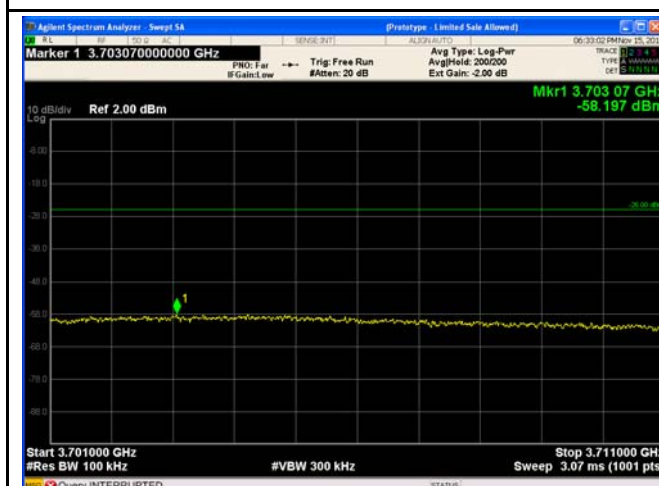
20MHz -3639M-3649M Low CH 64QAM



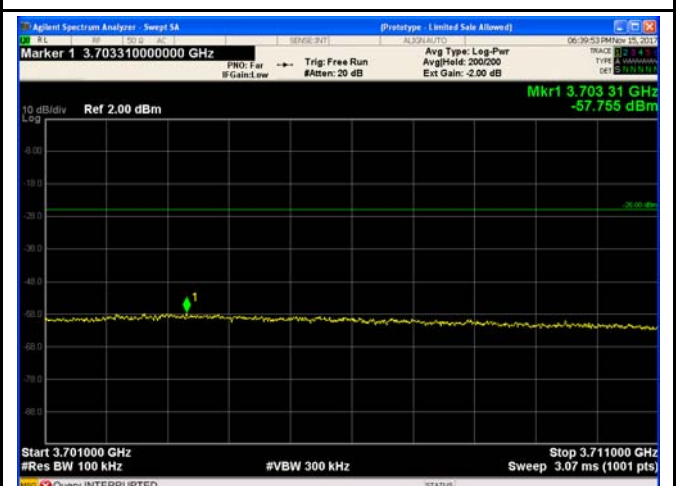
20MHz -3639M-3649M Mid CH QPSK



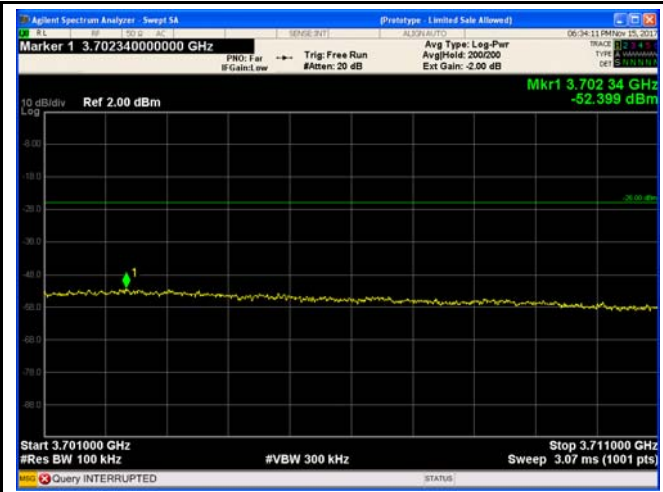
20MHz -3639M-3649M Mid CH 64QAM



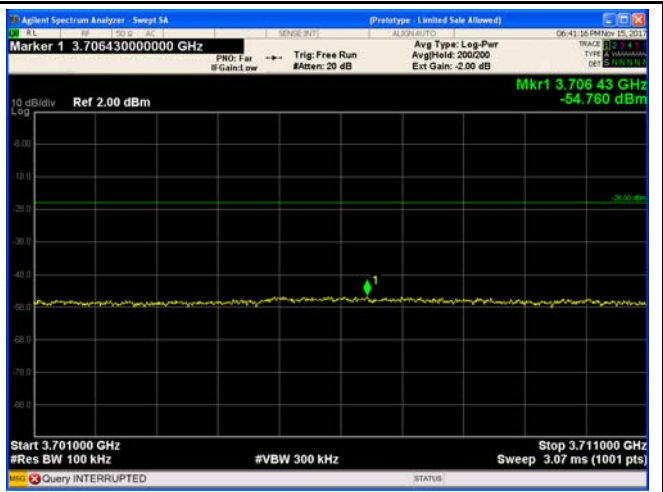
20MHz - 3701M-3711M Mid CH QPSK



20MHz - 3701M-3711M Mid CH 64QAM

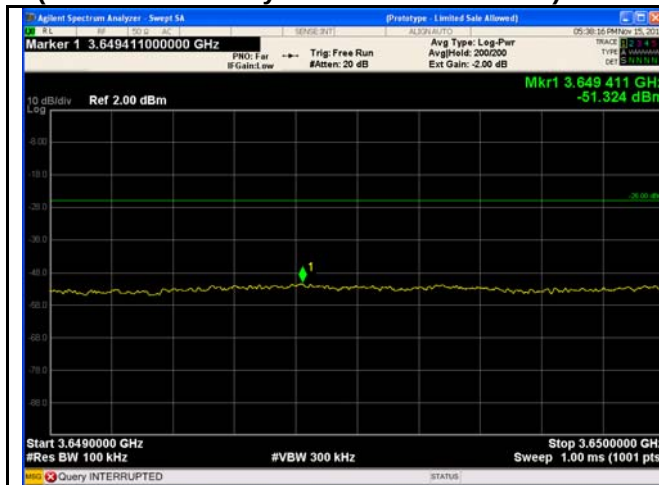


20MHz - 3701M-3711M High CH QPSK

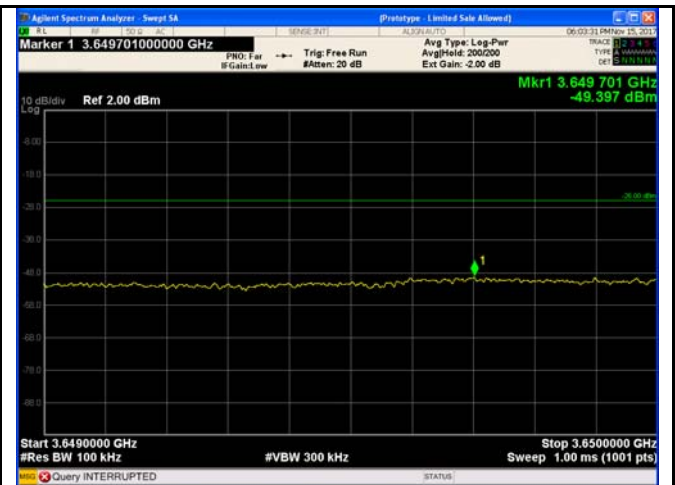


20MHz - 3701M-3711M High CH 64QAM

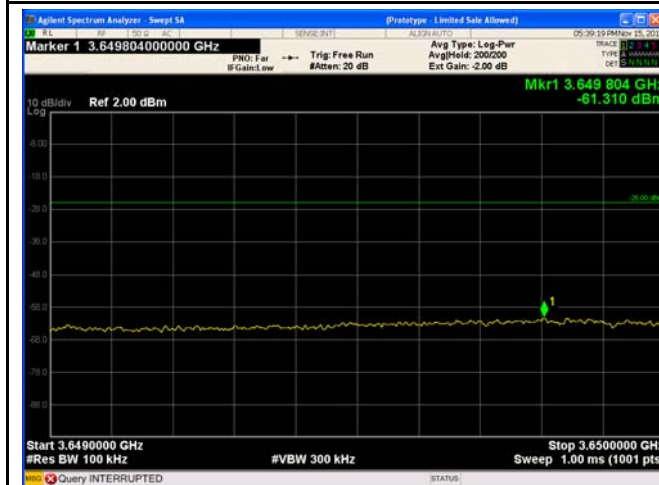
### Chain 1 (1MHz immediately for 10MHz bandwidth)



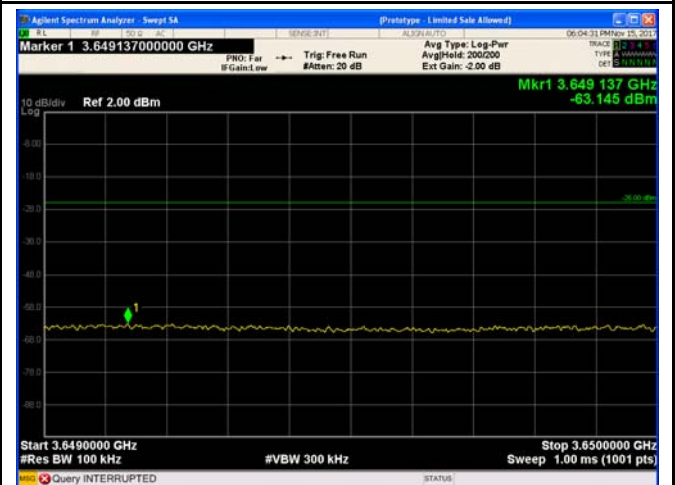
10MHz – 3649MHz-3650MHz Low CH QPSK



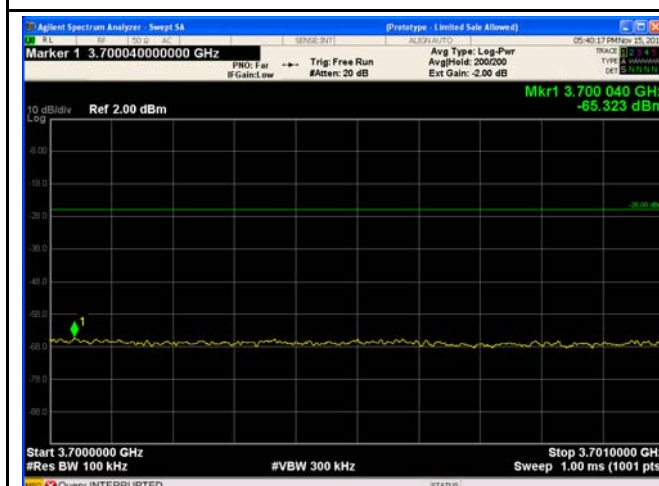
10MHz – 3649MHz-3650MHz Low CH 64QAM



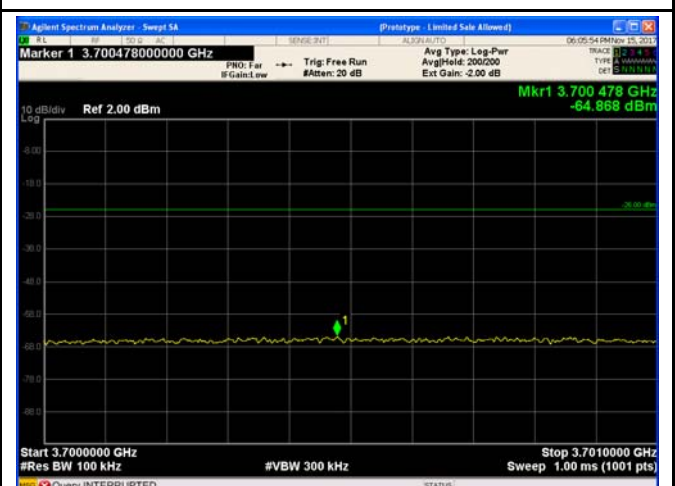
10MHz - 3649MHz -3650MHz Mid CH QPSK



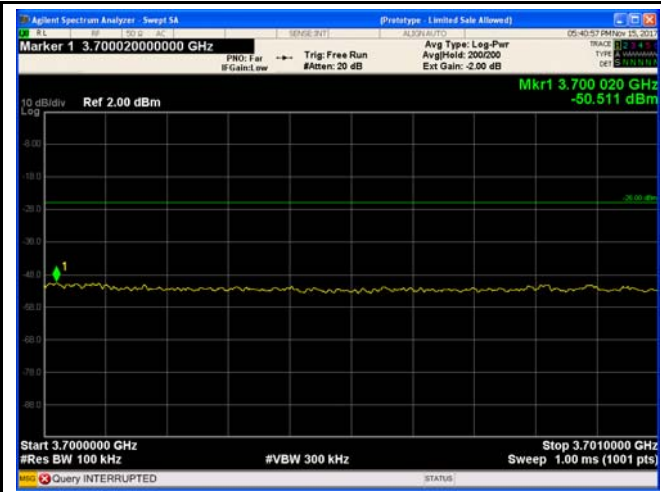
10MHz - 3649MHz -3650MHz Mid CH 64QAM



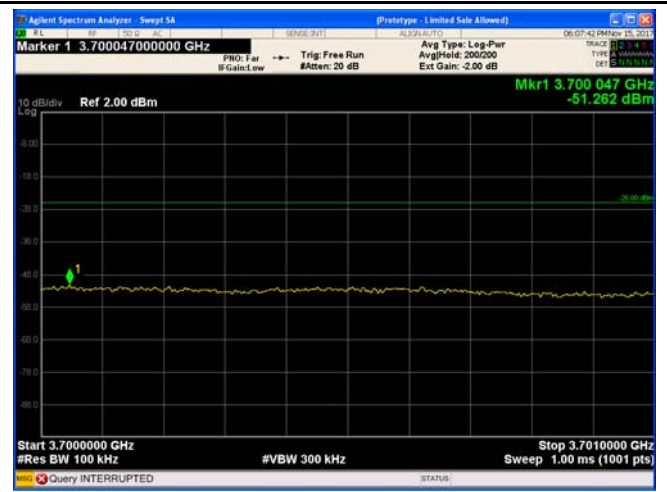
10MHz - 3700MHz -3701MHz Mid CH QPSK



10MHz - 3700MHz -3701MHz Mid CH 64QAM

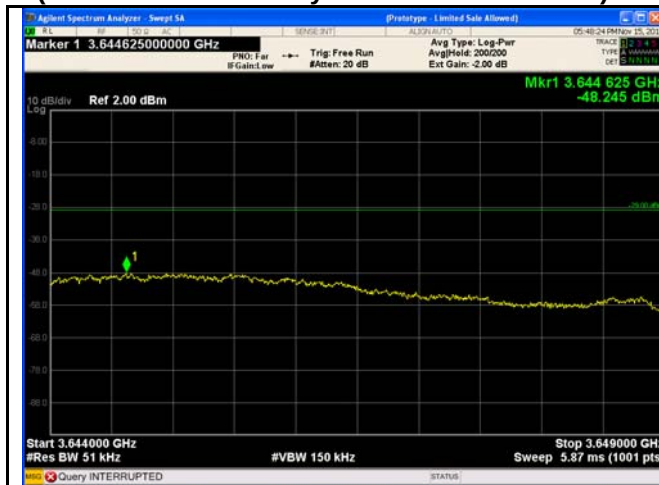


10MHz - 3700MHz -3701MHz High CH QPSK

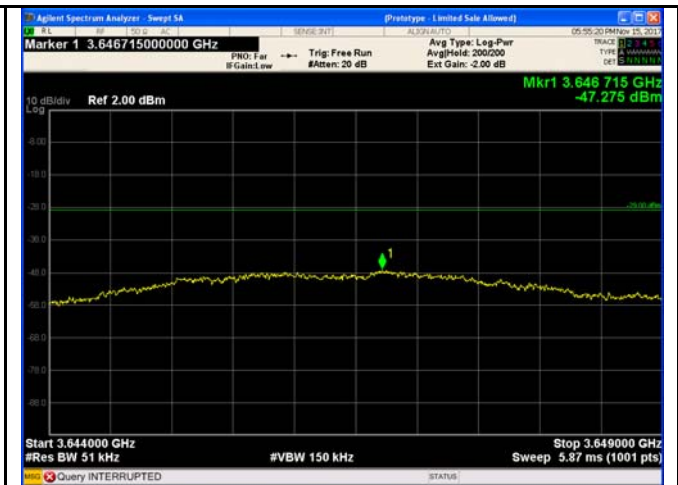


10MHz - 3700MHz -3701MHz High CH 64QAM

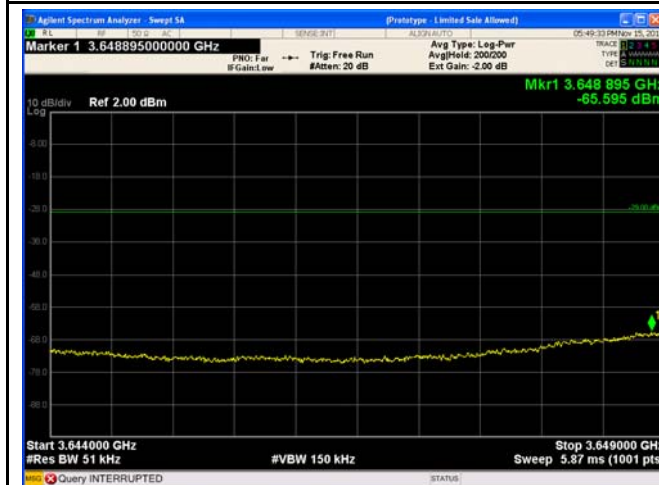
(more than 1MHz away for 10MHz bandwidth)



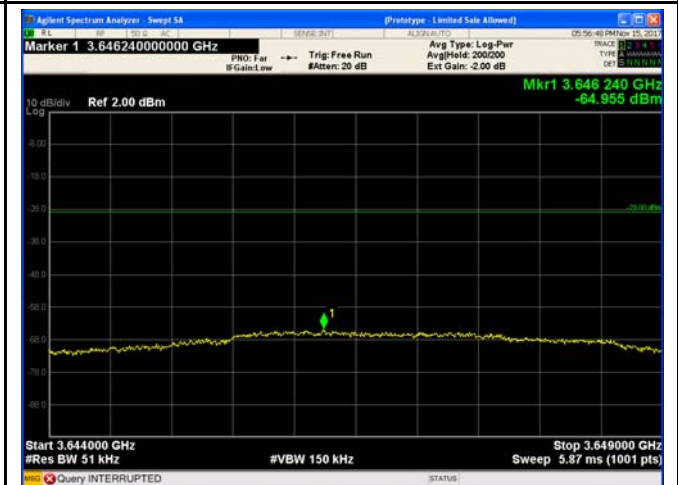
10MHz – 3644M-3649M Low CH QPSK



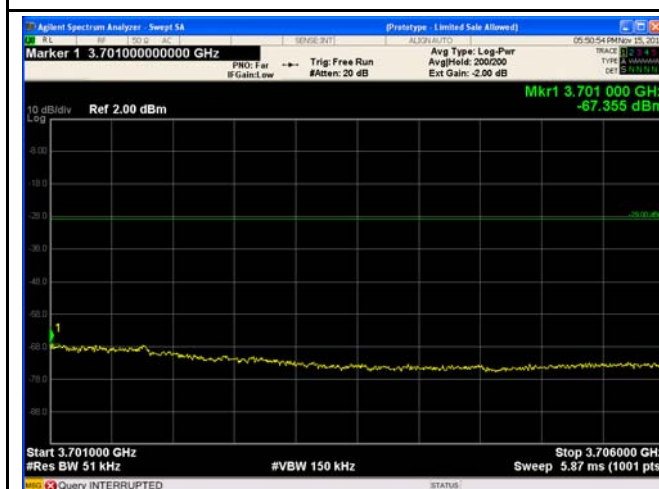
10MHz – 3644M-3649M Low CH 64QAM



10MHz – 3644M-3649M Mid CH QPSK



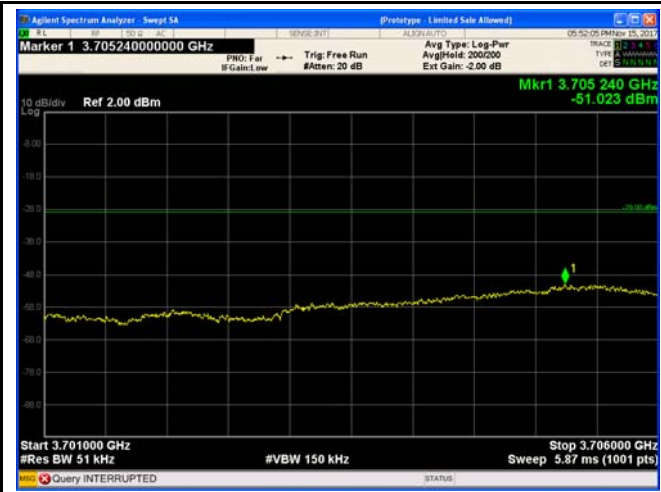
10MHz – 3644M-3649M Mid CH 64QAM



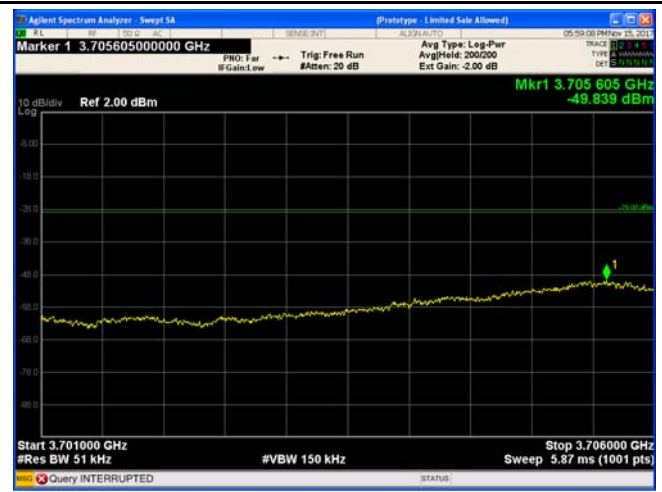
10MHz - 3701M-3706M Mid CH QPSK



10MHz - 3701M-3706M Mid CH 64QAM

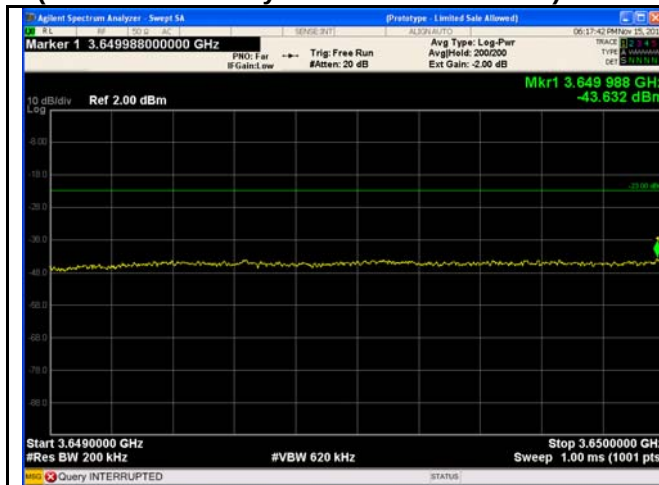


10MHz - 3701M-3706M High CH QPSK

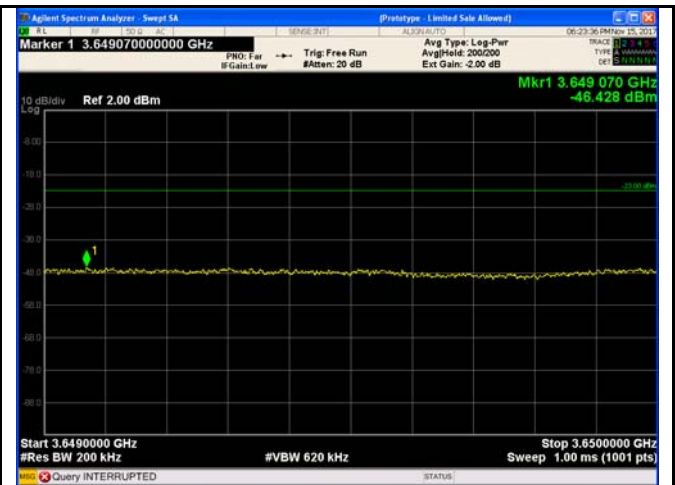


10MHz - 3701M-3706M High CH 64QAM

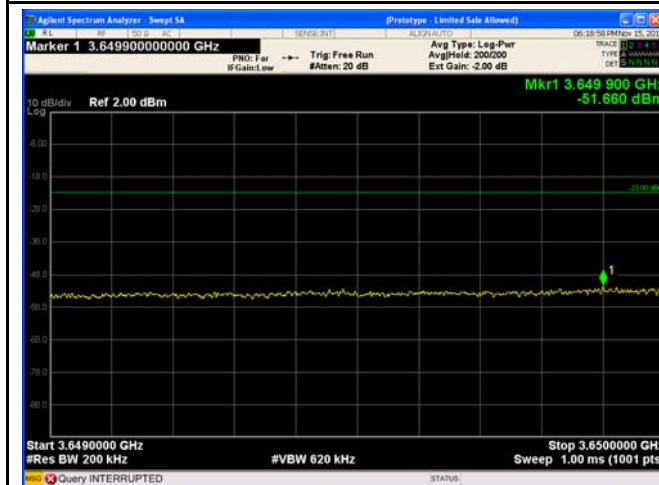
(1MHz immediately for 20MHz bandwidth)



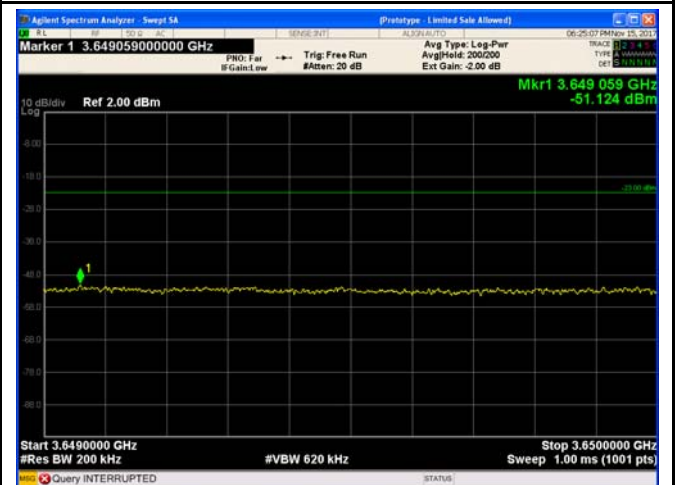
20MHz – 3649MHz-3650MHz Low CH QPSK



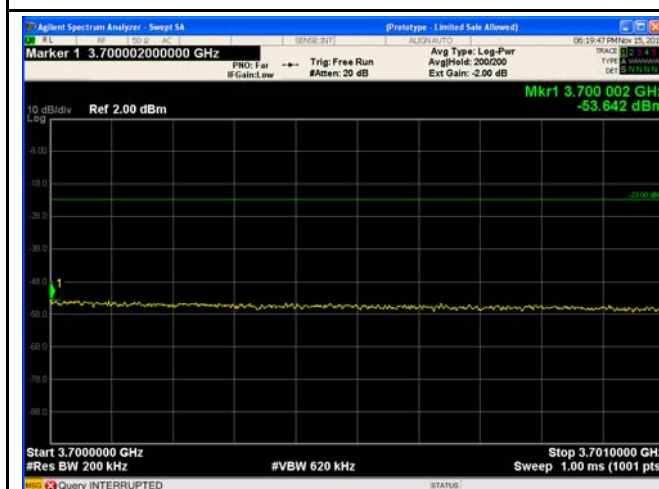
20MHz – 3649MHz-3650MHz Low CH 64QAM



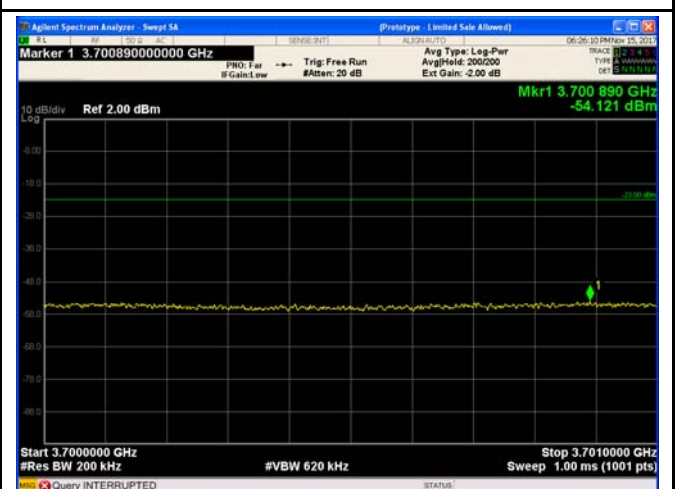
20MHz – 3649MHz-3650MHz Mid CH QPSK



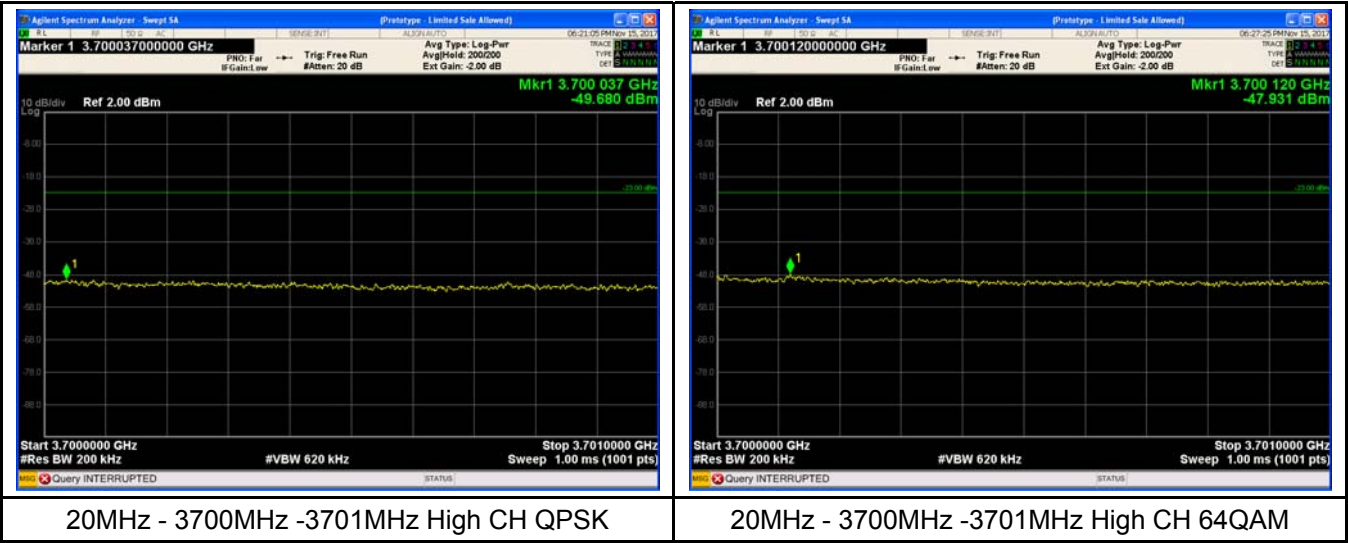
20MHz – 3649MHz-3650MHz Mid CH 64QAM



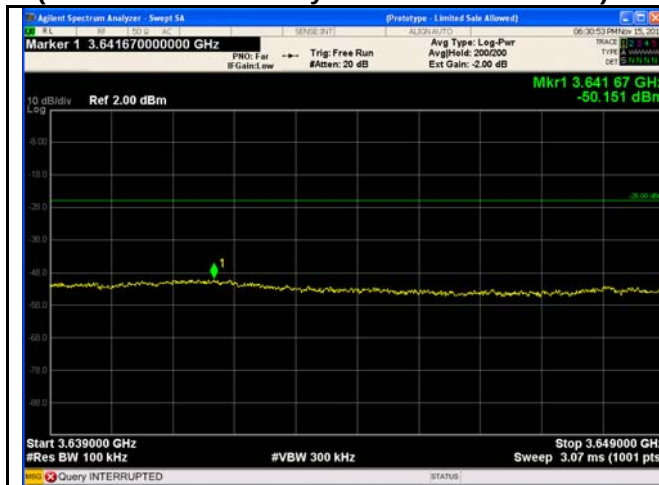
20MHz - 3700MHz -3701MHz Mid CH QPSK



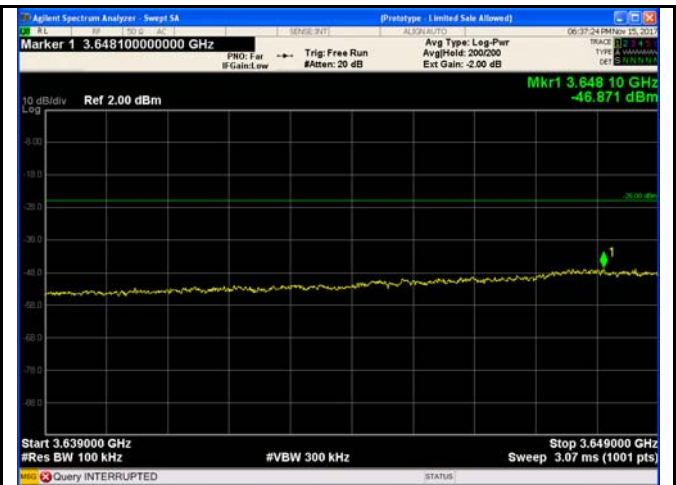
20MHz - 3700MHz -3701MHz Mid CH 64QAM



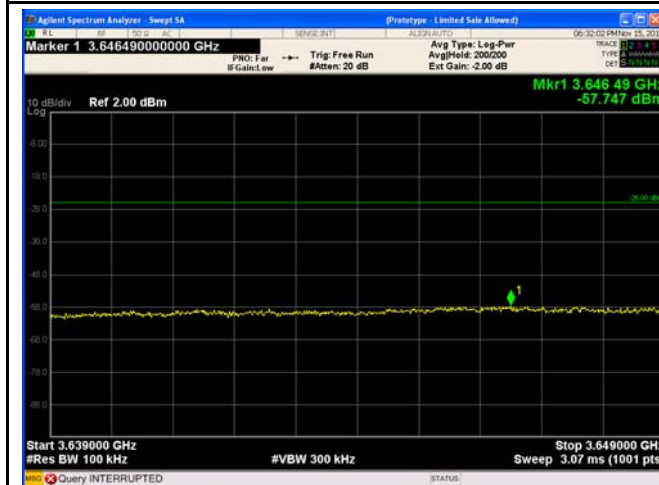
(more than 1MHz away for 20MHz bandwidth)



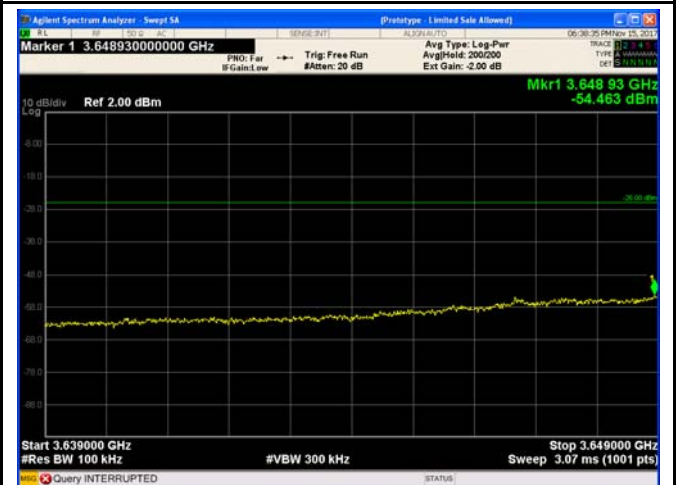
20MHz -3639M-3649M Low CH QPSK



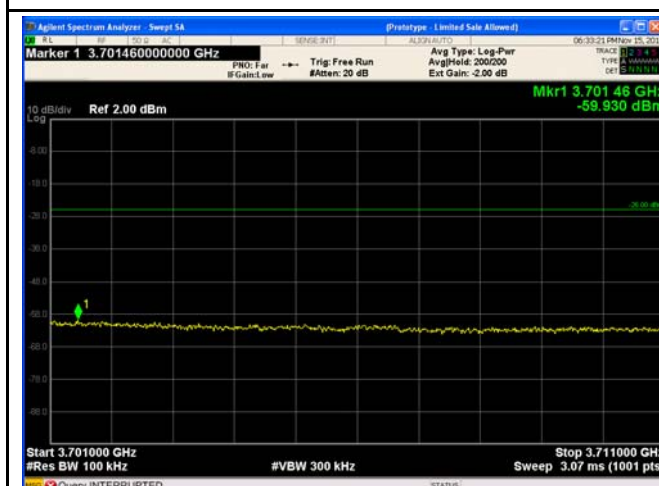
20MHz -3639M-3649M Low CH 64QAM



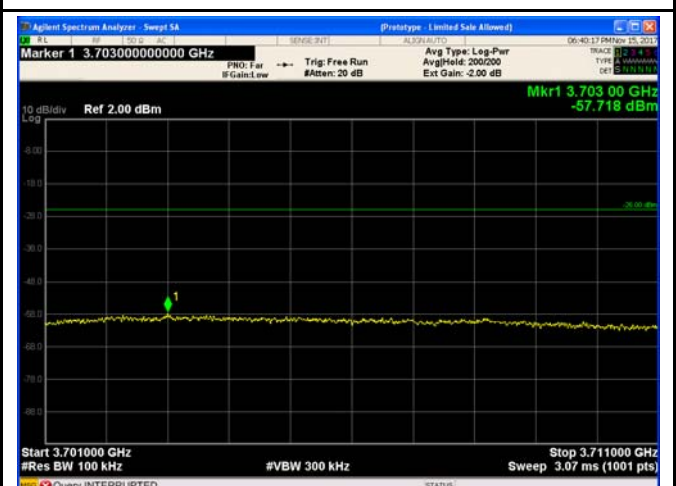
20MHz -3639M-3649M Mid CH QPSK



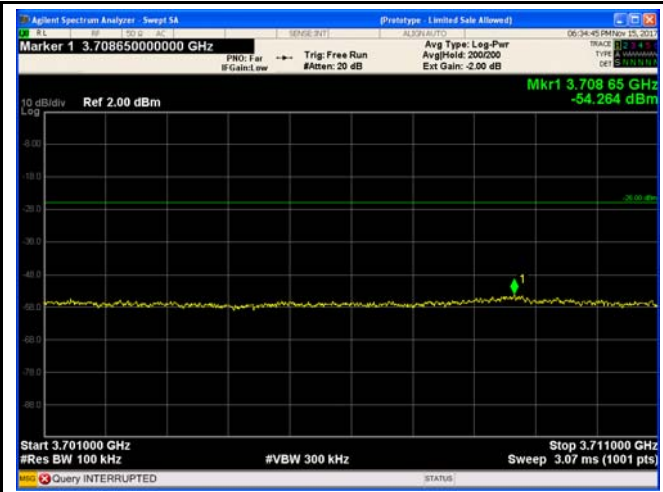
20MHz -3639M-3649M Mid CH 64QAM



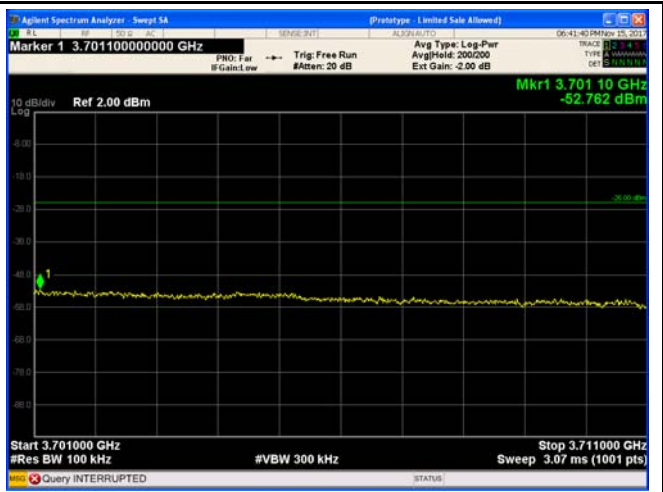
20MHz - 3701M-3711M Mid CH QPSK



20MHz - 3701M-3711M Mid CH 64QAM



20MHz - 3701M-3711M High CH QPSK



20MHz - 3701M-3711M High CH 64QAM

## 12 Field strength of spurious radiation measurement

|                   |                                         |
|-------------------|-----------------------------------------|
| Test Requirement: | FCC part90.1323 and RSS-197 Clause 5.7  |
| Test Method:      | FCC part2.1051 and RSS Gen Section 6.13 |
| Test Mode:        | Data communicating mode                 |
| Limit:            | -13dBm                                  |

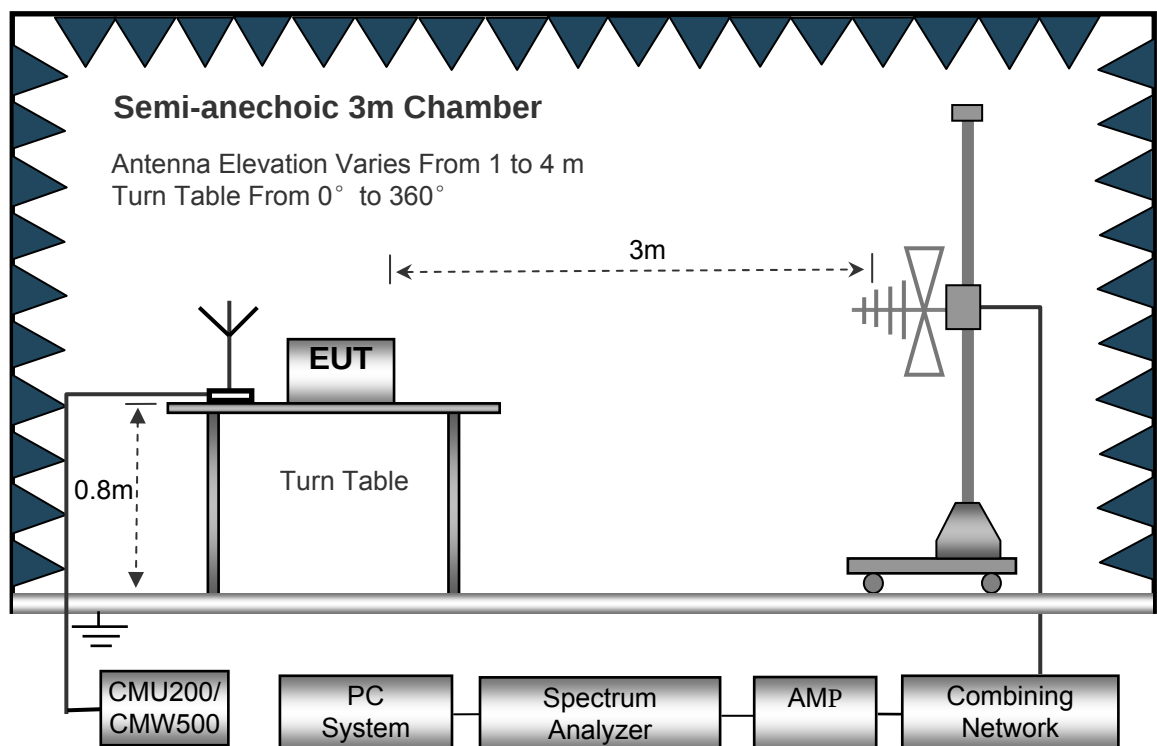
### 12.1 EUT Operation

Operating Environment :

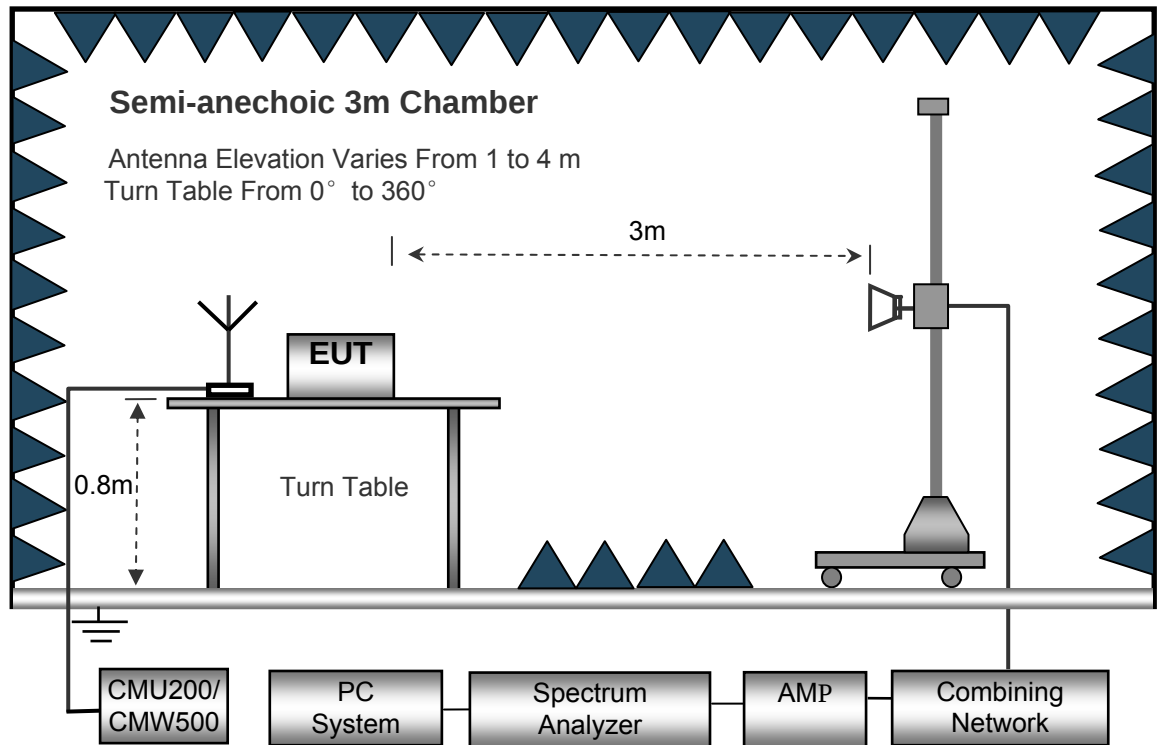
|                       |           |
|-----------------------|-----------|
| Temperature:          | 23.5 °C   |
| Humidity:             | 52.1 % RH |
| Atmospheric Pressure: | 101.2kPa  |

### 12.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site.  
The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



### 12.3 Spectrum Analyzer Setup

30MHz ~ 1GHz

Sweep Speed ..... Auto  
 Detector ..... PK  
 Resolution Bandwidth..... 100kHz  
 Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed ..... Auto  
 Detector ..... PK  
 Resolution Bandwidth..... 1MHz  
 Video Bandwidth..... 3MHz  
 Detector ..... Ave.  
 Resolution Bandwidth..... 1MHz  
 Video Bandwidth..... 10Hz

## 12.4 Test Procedure

1. The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.
3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.
4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$$\text{ERP / EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}$$

## 12.5 Test Result

30MHz-18GHz

Remark: During the test, pre-scan the QPSK, 64QAM modulation, and found the QPSK modulation and 10MHz bandwidth is the worst case.

| Frequency      | Receiver Reading | Turn table Angle | RX Antenna |       | Substituted |       |              | Absolute Level | Result |        |
|----------------|------------------|------------------|------------|-------|-------------|-------|--------------|----------------|--------|--------|
|                |                  |                  | Height     | Polar | SG Level    | Cable | Antenna Gain |                | Limit  | Margin |
| (MHz)          | (dBμV)           | Degree           | (m)        | (H/V) | (dBm)       | (dB)  | (dB)         | (dBm)          | (dBm)  | (dB)   |
| Low channel    |                  |                  |            |       |             |       |              |                |        |        |
| 199.38         | 40.60            | 189              | 1.4        | H     | -69.91      | 0.15  | 0.00         | -70.06         | -13.00 | -57.06 |
| 199.38         | 30.55            | 157              | 1.4        | V     | -77.04      | 0.15  | 0.00         | -77.19         | -13.00 | -64.19 |
| 7310.00        | 65.95            | 226              | 1.5        | H     | -47.10      | 2.79  | 12.70        | -37.19         | -13.00 | -24.19 |
| 7310.00        | 59.98            | 227              | 1.8        | V     | -51.17      | 2.79  | 12.70        | -41.26         | -13.00 | -28.26 |
| 10965.00       | 53.58            | 197              | 1.3        | H     | -55.83      | 3.25  | 13.13        | -45.95         | -13.00 | -32.95 |
| 10965.00       | 44.73            | 345              | 1.5        | V     | -64.04      | 3.25  | 13.13        | -54.16         | -13.00 | -41.16 |
| Middle channel |                  |                  |            |       |             |       |              |                |        |        |
| 199.38         | 39.96            | 17               | 1.6        | H     | -70.55      | 0.15  | 0.00         | -70.70         | -13.00 | -57.70 |
| 199.38         | 31.40            | 134              | 1.6        | V     | -76.19      | 0.15  | 0.00         | -76.34         | -13.00 | -63.34 |
| 7350.00        | 58.70            | 65               | 1.3        | H     | -54.35      | 2.37  | 12.50        | -44.22         | -13.00 | -31.22 |
| 7350.00        | 53.54            | 42               | 1.7        | V     | -57.61      | 2.37  | 12.50        | -47.48         | -13.00 | -34.48 |
| 11025.00       | 46.69            | 133              | 1.1        | H     | -62.72      | 2.79  | 12.70        | -52.81         | -13.00 | -39.81 |
| 11025.00       | 37.43            | 107              | 2.2        | V     | -71.34      | 2.79  | 12.70        | -61.43         | -13.00 | -48.43 |
| High channel   |                  |                  |            |       |             |       |              |                |        |        |
| 199.38         | 39.06            | 198              | 1.8        | H     | -71.45      | 0.15  | 0.00         | -71.60         | -13.00 | -58.60 |
| 199.38         | 31.42            | 11               | 1.1        | V     | -76.17      | 0.15  | 0.00         | -76.32         | -13.00 | -63.32 |
| 7390.00        | 50.90            | 41               | 1.2        | H     | -61.74      | 2.37  | 12.50        | -51.61         | -13.00 | -38.61 |
| 7390.00        | 46.66            | 187              | 1.6        | V     | -64.07      | 2.37  | 12.50        | -53.94         | -13.00 | -40.94 |
| 11085.00       | 39.52            | 123              | 1.8        | H     | -70.06      | 2.81  | 12.80        | -60.07         | -13.00 | -47.07 |
| 11085.00       | 31.01            | 75               | 2.1        | V     | -77.79      | 2.81  | 12.80        | -67.80         | -13.00 | -54.80 |

Remark:

The emission levels of above 18 GHz have been tested Shenzhen BALUN Technology Co.,Ltd.Refer to report: BL-SZ17A0379-501.

### 13 Frequency stability V.S. Temperature measurement

Test Requirement: FCC Part90.213(a) and RSS 197 section 5.3  
 Test Method: FCC Part2.1055(a)(1)(b) and RSS Gen section 6.1.1  
 Test Mode: Data communicating mode  
 Limit: FCC:

| Frequency range (MHz) | Fixed and base stations (±ppm) | Mobile stations (±ppm)    |                              |
|-----------------------|--------------------------------|---------------------------|------------------------------|
|                       |                                | Over 2 watts output power | 2 watts or less output power |
| Below 25              | 100                            | 100                       | 200                          |
| 25-50                 | 20                             | 20                        | 50                           |
| 72-76                 | 5                              |                           | 50                           |
| 150-174               | 5                              | 5                         | 50                           |
| 216-220               | 1.0                            |                           | 1.0                          |
| 220-222               | 0.1                            | 1.5                       | 1.5                          |
| 421-512               | 2.5                            | 5                         | 5                            |
| 806-809               | 1.0                            | 1.5                       | 1.5                          |
| 809-824               | 1.5                            | 2.5                       | 2.5                          |
| 851-854               | 1.0                            | 1.5                       | 1.5                          |
| 854-869               | 1.5                            | 2.5                       | 2.5                          |
| 896-901               | 0.1                            | 1.5                       | 1.5                          |
| 902-928               | 2.5                            | 2.5                       | 2.5                          |
| 902-928               | 2.5                            | 2.5                       | 2.5                          |
| 929-930               | 1.5                            |                           |                              |
| 935-940               | 0.1                            | 1.5                       | 1.5                          |
| 1427-1435             | 300                            | 300                       | 300                          |
| Above 2450            |                                |                           |                              |

IC:

The transmitter frequency stability limit shall be determined as follows:

- The frequency offset shall be measured according to the procedure described in RSS-Gen and recorded;
- Using a resolution bandwidth of 1% of the occupied bandwidth, a reference point at the unwanted emission level specified in Section 5.7 on the emission mask of the lowest and highest channel shall be selected, and the frequency at these points shall be recorded as fL and fH respectively.

The applicant shall ensure frequency stability by showing that fL minus the frequency offset and fH plus the frequency offset shall be within the 3650-3700 MHz band.

#### 13.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C  
 Humidity: 52.3 % RH  
 Atmospheric Pressure: 101.3kPa

#### 13.2 Test Procedure

- The equipment under test was connected to an external DC power supply and input rated voltage.
- RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
- The EUT was placed inside the temperature chamber.
- Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
- Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
- Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.