



## MEASUREMENT REPORT

### FCC PART 22,24,27

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**FCC ID:** YY3-14249-RF2

**APPLICANT:** HANDHELD GROUP AB

**Application Type:** Certification

**Product:** Nautiz X9

**Model No.:** 14249-RF2-B

**Trade Mark:** **handheld**

**FCC Classification:** (PCE) PCS Licensed Transmitter held to ear

**FCC Rule Part(s):** Part 22H, Part 24E, Part 27

**Test Procedure(s):** TIA 603-E 2016, KDB 971168 D01v03

**Test Date:** October 09, 2016 ~ January 25, 2018

Tested By : *Kevin Ker*

( Kevin Ker )

Reviewed By : *Paddy Chen*

( Paddy Chen )

Approved By : *Chenz Ker*

( Chenz Ker )



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.

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## Revision History

| Report No.    | Version | Description     | Issue Date | Note |
|---------------|---------|-----------------|------------|------|
| 1801TW1902-U8 | 1.0     | Original Report | 2018-02-06 |      |

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## §2.1033 General Information

|                                 |                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>                | HANDHELD GROUP AB                                                                                                               |
| <b>Applicant Address</b>        | Kinnegatan 17 A ,531 33 Lidköping, Sweden                                                                                       |
| <b>Manufacturer</b>             | HANDHELD GROUP AB                                                                                                               |
| <b>Manufacturer Address</b>     | Kinnegatan 17 A ,531 33 Lidköping, Sweden                                                                                       |
| <b>Test Site</b>                | MRT Technology (Taiwan) Co., Ltd                                                                                                |
| <b>Test Site Address</b>        | No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)                                                      |
| <b>MRT FCC Registration No.</b> | 153292                                                                                                                          |
| <b>FCC Rule Part(s)</b>         | Part 22H,Part 24E,Part 27                                                                                                       |
| <b>Test Device Serial No.</b>   | N/A <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering |

### Test Facility / Accreditations

1. MRT facility is a FCC registered ( Reg. No. 153292) test facility with the site description report on file and is designated by the FCC as an Accredited Test Film.
2. MRT facility is an IC registered (MRT Reg. No. 21723-1) test laboratory with the site description on file at Industry Canada.
3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC, Industry Taiwan, EU and TELEC Rules.

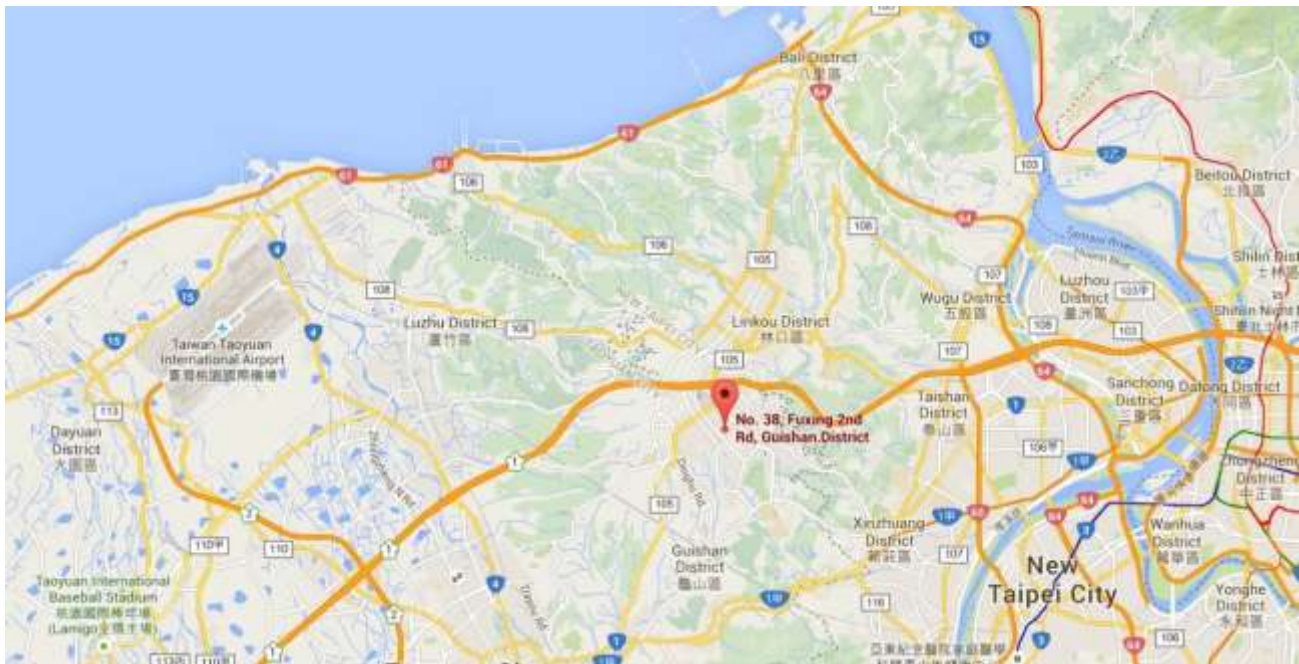
## 1. INTRODUCTION

### 1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

### 1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



## 2. PRODUCT INFORMATION

### 2.1. Feature of Equipment under Test

|                       |                                                                                                                                                                                             |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name          | Nautiz X9                                                                                                                                                                                   |
| Model No.             | 14249-RF2-B                                                                                                                                                                                 |
| Trade Mark            | <b>handheld</b>                                                                                                                                                                             |
| Supports Radios Spec. | WWAN : GSM/GPRS/EGPRS/WCDMA/HSPA/CDMA/EVDO/LTE<br>WLAN : 2.4G : 802.11b/g/n-20/n-40; 5G : 802.11a/n-20/n-40<br>WPAN : Bluetooth/NFC                                                         |
| WWAN Specification    | 2G(GSM/GPRS/EDGE): 850/1900<br>3G(WCDMA): Band 2/5<br>3G(CDMA2000):BC0/BC1<br>4G(FDD/TDD): Band 2/4/5/7/12/13/17                                                                            |
| Frequency Range       | LTE Band 2: 1850~1910MHz<br>LTE Band 4: 1710~1755MHz<br>LTE Band 5: 824~849MHz<br>LTE Band 7: 2500~2570MHz<br>LTE Band 12: 699~716MHz<br>LTE Band 13: 777~787MHz<br>LTE Band 17: 704~716MHz |

### 2.2. Antenna Description

|                    |                                                                                                                                                                                                                                                                        |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Antenna Type       | FPC                                                                                                                                                                                                                                                                    |
| Antenna M/N        | AP316-LTE-MAIN_V1                                                                                                                                                                                                                                                      |
| Antenna Gain       | LTE Band 2: 1850~1910MHz : 3.31dBi<br>LTE Band 4: 1710~1755MHz : -7.78dBi<br>LTE Band 5: 824~849MHz : -3.94dBi<br>LTE Band 7: 2500~2570MHz : 0.93dBi<br>LTE Band 12: 699~716MHz : -3.26dBi<br>LTE Band 13: 777~787MHz : -3.94dBi<br>LTE Band 17: 704~716MHz : -3.26dBi |
| Type of Modulation | QPSK/16QAM                                                                                                                                                                                                                                                             |

Note: The test report has showed the worst test mode.

### **2.3. Test Configuration**

The **Nautiz X9** was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01v03. See section 7.0 of this report for a description of the radiated and antenna port conducted emissions tests.

### **2.4. EMI Suppression Device(s)/Modifications**

No EMI suppression device(s) were added and no modifications were made during testing.



### 3. DESCRIPTION OF TEST

#### 3.1. Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-E-2016) and “Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems” (KDB 971168) were used in the measurement of the **Nautiz X9**

Deviation from measurement procedure.....None

#### 3.2. Occupied Bandwidth

##### §2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The spectrum analyzers’ “occupied bandwidth” measurement function was used to record the occupied bandwidth in accordance with KDB 971168.

#### 3.3. Spurious and Harmonic Emissions at Antenna Terminal

##### §2.1051 §22.917(a) §24.238(a) §27.53(c)(h)(m)

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. On any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

### 3.4. Power and Radiated Spurious Emissions

#### §2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) §27.50(b)(d)(h) §27.53(c)(h)(m)

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurement and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 80cm high PVC support structure is placed on top of the turntable.

The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer “Channel Power” function with the integration band set to the emissions’ occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168.

Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_d \text{ [dBm]} = P_g \text{ [dBm]} - \text{cable loss [dB]} + \text{antenna gain [dBd/dBi]}$$

Where,  $P_d$  is the dipole equivalent power,  $P_g$  is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to  $P_g \text{ [dBm]} - \text{cable loss [dB]}$ .

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13/-25dBm which is equivalent to the required minimum attenuation of  $43 + 10 \cdot \log_{10}(\text{Power [Watts]}) / 55 + 10 \cdot \log_{10}(\text{Power [Watts]})$  specified in 22.917(a)/27.53(m).

### 3.5. Peak-Average Ratio

#### §24.232(d) §27.50(B)

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

For pulsed signals, the spectrum analyzer is set to use an internal “RF Burst” trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the “on time” of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power. For continuous signals, the trigger is set to “free run” in the CCDF measurement mode.

### 3.6. Frequency Stability / Temperature Variation

#### §2.1055 §22.355 §22.863 §22.905 §24.235 §27.54

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

- a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) Primary Supply Voltage: The primary supply voltage is varied from End point to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification – For Part 22, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

#### 4. TEST EQUIPMENT CALIBRATION DATE

##### Conducted Emissions – SR2

| Instrument         | Manufacturer | Type No.                    | Asset No.   | Cali. Interval | Cali. Due Date |
|--------------------|--------------|-----------------------------|-------------|----------------|----------------|
| Two-Line V-Network | R&S          | ENV216                      | MRTTWA00019 | 1 year         | 2018.03.15     |
| Cable              | Rosnol       | N1C50-RG400-<br>B1C50-500CM | MRTTWE00013 | 1 year         | 2018.05.19     |
| EMI Test Receiver  | R&S          | ESR3                        | MRTTWA00009 | 1 year         | 2018.03.16     |

##### Radiated Emissions – AC1

| Instrument               | Manufacturer | Type No.                  | Asset No.   | Cali. Interval | Cali. Due Date |
|--------------------------|--------------|---------------------------|-------------|----------------|----------------|
| Broadband TRILOG Antenna | SCHWARZBECK  | VULB 9162                 | MRTTWA00001 | 1 year         | 2018.05.14     |
| EMI Test Receiver        | R&S          | ESR3                      | MRTTWA00009 | 1 year         | 2018.03.16     |
| Active Loop Antenna      | Schwarzbeck  | FMZB 1519B                | MRTTWA00002 | 1 year         | 2018.04.13     |
| Broadband Horn antenna   | SCHWARZBECK  | BBHA 9120D                | MRTTWA00003 | 1 year         | 2018.04.17     |
| Breitband Hornantenna    | Schwarzbeck  | BBHA 9170                 | MRTTWA00004 | 1 year         | 2018.04.24     |
| Broadband Amplifier      | Schwarzbeck  | BBV 9721                  | MRTTWA00006 | 1 year         | 2018.04.24     |
| Broadband Preamplifier   | SCHWARZBECK  | BBV 9718                  | MRTTWA00005 | 1 year         | 2018.04.19     |
| Cable                    | HUBERSUHNER  | SF106                     | MRTTWA00010 | 1 year         | 2018.05.19     |
| Cable                    | Rosnol       | K1K50-UP0264-<br>K1K50-4M | MRTTWA00012 | 1 year         | 2018.05.19     |

##### Conducted Test Equipment – SR2

| Instrument                | Manufacturer | Type No. | Asset No.   | Cali. Interval | Cali. Due Date |
|---------------------------|--------------|----------|-------------|----------------|----------------|
| Spectrum Analyzer         | KEYSIGHT     | N9010A   | MRTTWA00012 | 1 year         | 2018.07.24     |
| USB Wideband Power Sensor | KEYSIGHT     | U2021XA  | MRTTWA00015 | 1 year         | 2018.03.19     |

##### Test Software

| Software | Version   | Function          |
|----------|-----------|-------------------|
| e3       | 9.160520a | EMI Test Software |
| EMI      | V3        | EMI Test Software |

## 5. SAMPLE CALCULATIONS

### **GSM Emission Designator**

Emission Designator = 250KGXW

GSM BW = 250 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

### **EGPRS Emission Designator**

Emission Designator = 250KG7W

GSM BW = 250 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

### **WCDMA / CDMA Emission Designator**

Emission Designator = 1M25F9W

WCDMA BW = 1.25 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

### **LTE Emission Designator**

Emission Designator = QPSK 5M00G7D / 16QAM 5M00W7D

LTE BW = 1.4/3/5/10/15/20 MHz

QPSK G = Phase Modulation /

16QAM W= in a combination of two or more of the following modes: amplitude, angle, pulse

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

### **Spurious Radiated Emission**

Example: Spurious emission at 1688.10 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was -65.0dBm. The gain of the substituted antenna is 6.5dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -65.0dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 4.5 dB at 1688.1MHz. So 2 dB is added to the signal generator reading of -25dBm yielding -23dBm. The fundamental EIRP was 24.0dBm so this harmonic was 24.0dBm - (-23) = 47dBc.

## 6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .

|                                                                                                 |
|-------------------------------------------------------------------------------------------------|
| AC Conducted Emission Measurement – SR2                                                         |
| Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ):<br>150kHz~30MHz: 2.42dB |
| Conducted Measurement– SR1                                                                      |
| Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ): 1.3dB                   |
| Radiated Emission Measurement – AC1                                                             |
| Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ): 4.22dB                  |

## 7. TEST RESULT

### 7.1. Summary

**Company Name:** Nautiz X9

**FCC Classification:** (PCE) PCS Licensed Transmitter held to ear

| FCC Part Section(s)                                      | Test Description             | Test Limit                                                                                         | Test Condition | Test Result | Reference   |
|----------------------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------|----------------|-------------|-------------|
| <b><u>Transmitter Mode(TX)</u></b>                       |                              |                                                                                                    |                |             |             |
| 2.1049                                                   | Occupied bandwidth           | N/A                                                                                                | Conducted      | Pass        | Section 7.2 |
| 2.1051<br>22.917(a)<br>24.238(a)<br>27.53(c)<br>27.52(h) | Conducted Spurious Emissions | > 43 + 10log <sub>10</sub> (P[Watts]) at<br>for all out-of-band emissions<br>(Band 2,4,5,12,13,17) |                | Pass        | Section 7.3 |
| 2.1051<br>27.53(m)                                       |                              | > 55 + 10log <sub>10</sub> (P[Watts]) at<br>for all out-of-band emissions<br>(Band 7)              |                |             |             |
| 2.1051<br>22.917(a)<br>24.238(a)<br>27.53(c)<br>27.52(h) | Band Edge                    | > 43 + 10log <sub>10</sub> (P[Watts]) at<br>for all out-of-band emissions                          |                | Pass        | Section 7.4 |
| 27.53(m)                                                 |                              | 27.53(m)(4)                                                                                        |                |             |             |
| 2.1046                                                   | Conducted Output Power       | N/A                                                                                                |                | Pass        | Section 7.5 |
| 22.913(a)                                                | Radiated Output Power        | < 7 Watts max. ERP<br>(Band 5)                                                                     | Radiated       | Pass        | Section 7.5 |
| 24.232(c)<br>27.50(h)                                    |                              | < 2 Watts max. EIRP<br>(Band 2, 7)                                                                 |                | Pass        |             |
| 27.50(b)                                                 |                              | < 3 Watts max. ERP<br>(Band 12,13)                                                                 |                | Pass        |             |
| 27.50(d)                                                 |                              | < 1 Watts max. EIRP<br>(Band 4)                                                                    |                | Pass        |             |

|                                                          |                             |                                                                                   |           |      |             |
|----------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------|-----------|------|-------------|
| 2.1053<br>22.917(a)<br>24.238(a)<br>27.53(c)<br>27.53(h) | Radiated Spurious Emissions | > 43 + $\log_{10}$ (P[Watts]) for all out-of-band emissions (Band 2,4,5,12,13,17) | Radiated  | Pass | Section 7.5 |
| 2.1053<br>27.53(m)                                       |                             | > 55 + $10\log_{10}$ (P[Watts]) for all out-of-band emissions (Band 7)            |           |      |             |
| 24.232(d)<br>27.50(B)                                    | Peak-Average Ratio          | <13dB                                                                             | Conducted | Pass | Section 7.6 |
| 2.1055<br>22.355                                         | Frequency Stability         | < 2.5 ppm                                                                         |           | Pass | Section 7.7 |
| 2.1055<br>24.235<br>27.54                                |                             | Within Authorized Band                                                            |           |      |             |

**Notes:**

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.



## 7.2. Occupied Bandwidth

### 7.2.1. Test Limit

N/A

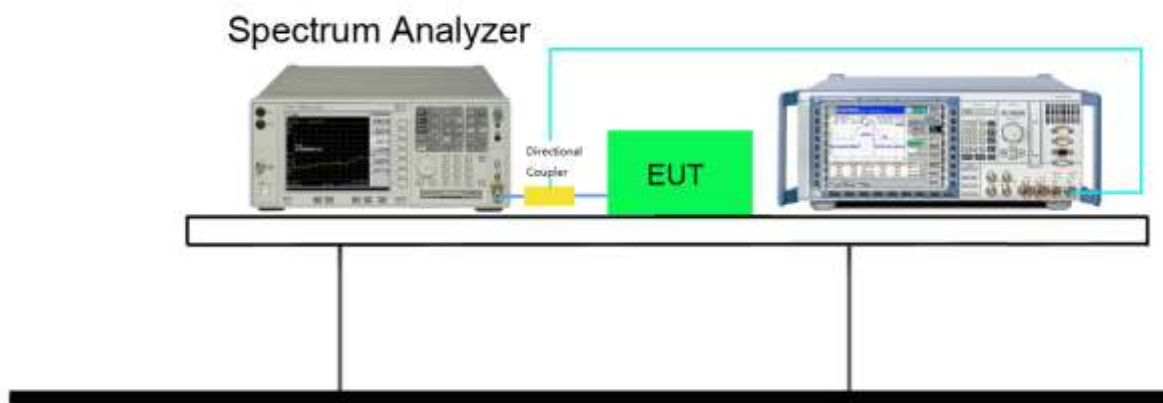
### 7.2.2. Test Procedure used

KDB 971168 D01v03 – Section 4 & ANSI/TIA-603-E-2016

### 7.2.3. Test Setting

1. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency.  
The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
2. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW. (RBW = approximately 1% of the emission bandwidth).
3. Set the detection mode to peak, and the trace mode to max hold.
4. Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

### 7.2.4. Test Setup



### 7.2.5. Test Result

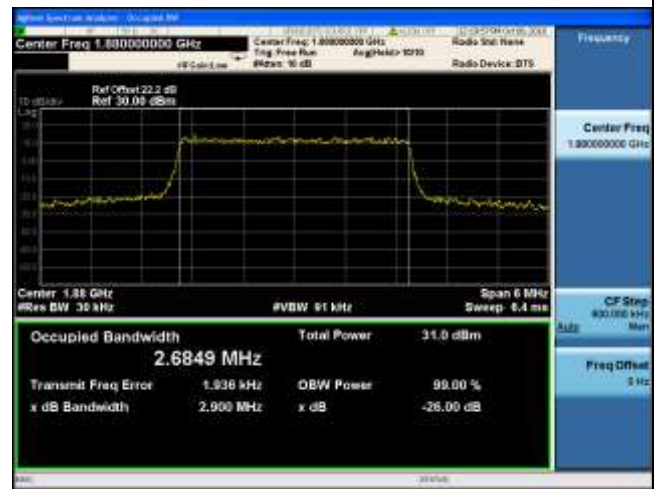
| Test Mode                      | Channel/<br>Frequency<br>(MHz) | Modulation | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | 99%<br>Occupied<br>Bandwidth<br>(MHz) | -26dB<br>Occupied<br>Bandwidth<br>(MHz) |
|--------------------------------|--------------------------------|------------|--------------------|------------|--------------|---------------------------------------|-----------------------------------------|
| LET Band 2<br>(Middle Channel) | 18900<br>(1880MHz)             | QPSK       | 1.4                | 6          | 0            | 1.084                                 | 1.258                                   |
|                                |                                |            | 3                  | 15         | 0            | 2.6849                                | 2.9                                     |
|                                |                                |            | 5                  | 25         | 0            | 4.5049                                | 5.003                                   |
|                                |                                |            | 10                 | 50         | 0            | 8.9675                                | 9.764                                   |
|                                |                                |            | 15                 | 75         | 0            | 13.437                                | 14.73                                   |
|                                |                                |            | 20                 | 100        | 0            | 17.931                                | 19.39                                   |
|                                |                                | 16QAM      | 1.4                | 6          | 0            | 1.0891                                | 1.262                                   |
|                                |                                |            | 3                  | 15         | 0            | 2.6857                                | 2.943                                   |
|                                |                                |            | 5                  | 25         | 0            | 4.4855                                | 4.909                                   |
|                                |                                |            | 10                 | 50         | 0            | 8.9615                                | 9.787                                   |
|                                |                                |            | 15                 | 75         | 0            | 13.463                                | 14.62                                   |
|                                |                                |            | 20                 | 100        | 0            | 17.905                                | 19.19                                   |
| LET Band 4<br>(Middle Channel) | 20175<br>(1732.5MHz)           | QPSK       | 1.4                | 6          | 0            | 1.0786                                | 1.226                                   |
|                                |                                |            | 3                  | 15         | 0            | 2.6845                                | 2.923                                   |
|                                |                                |            | 5                  | 25         | 0            | 4.5067                                | 5.016                                   |
|                                |                                |            | 10                 | 50         | 0            | 8.9545                                | 9.768                                   |
|                                |                                |            | 15                 | 75         | 0            | 13.450                                | 14.7                                    |
|                                |                                |            | 20                 | 100        | 0            | 17.918                                | 19.36                                   |
|                                |                                | 16QAM      | 1.4                | 6          | 0            | 1.0818                                | 1.246                                   |
|                                |                                |            | 3                  | 15         | 0            | 2.6874                                | 2.905                                   |
|                                |                                |            | 5                  | 25         | 0            | 4.4856                                | 4.948                                   |
|                                |                                |            | 10                 | 50         | 0            | 8.9392                                | 9.769                                   |
|                                |                                |            | 15                 | 75         | 0            | 13.421                                | 14.53                                   |
|                                |                                |            | 20                 | 100        | 0            | 17.898                                | 19.12                                   |

| Test Mode                       | Channel/<br>Frequency<br>(MHz) | Modulation | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | 99%<br>Occupied<br>Bandwidth<br>(MHz) | -26dB<br>Occupied<br>Bandwidth<br>(MHz) |
|---------------------------------|--------------------------------|------------|--------------------|------------|--------------|---------------------------------------|-----------------------------------------|
| LET Band 5<br>(Middle Channel)  | 20525<br>(836.5MHz)            | QPSK       | 1.4                | 6          | 0            | 1.0836                                | 1.24                                    |
|                                 |                                |            | 3                  | 15         | 0            | 2.6789                                | 2.905                                   |
|                                 |                                |            | 5                  | 25         | 0            | 4.5058                                | 4.989                                   |
|                                 |                                |            | 10                 | 50         | 0            | 8.9681                                | 9.748                                   |
|                                 |                                | 16QAM      | 1.4                | 6          | 0            | 1.0838                                | 1.262                                   |
|                                 |                                |            | 3                  | 15         | 0            | 2.6906                                | 2.903                                   |
|                                 |                                |            | 5                  | 25         | 0            | 4.4927                                | 4.932                                   |
|                                 |                                |            | 10                 | 50         | 0            | 8.9622                                | 9.759                                   |
| LET Band 7<br>(Middle Channel)  | 21100<br>(2535MHz)             | QPSK       | 5                  | 25         | 0            | 4.5067                                | 4.982                                   |
|                                 |                                |            | 10                 | 50         | 0            | 8.9594                                | 9.751                                   |
|                                 |                                |            | 15                 | 75         | 0            | 13.447                                | 14.55                                   |
|                                 |                                |            | 20                 | 100        | 0            | 17.916                                | 19.35                                   |
|                                 |                                | 16QAM      | 5                  | 25         | 0            | 4.4837                                | 4.913                                   |
|                                 |                                |            | 10                 | 50         | 0            | 8.9717                                | 9.771                                   |
|                                 |                                |            | 15                 | 75         | 0            | 13.442                                | 14.5                                    |
|                                 |                                |            | 20                 | 100        | 0            | 17.918                                | 19.11                                   |
| LET Band 12<br>(Middle Channel) | 23095<br>(707.5MHz)            | QPSK       | 1.4                | 6          | 0            | 1.0783                                | 1.237                                   |
|                                 |                                |            | 3                  | 15         | 0            | 2.6844                                | 2.915                                   |
|                                 |                                |            | 5                  | 25         | 0            | 4.4781                                | 4.964                                   |
|                                 |                                |            | 10                 | 50         | 0            | 8.9532                                | 9.717                                   |
|                                 |                                | 16QAM      | 1.4                | 6          | 0            | 1.0861                                | 1.245                                   |
|                                 |                                |            | 3                  | 15         | 0            | 2.6885                                | 2.904                                   |
|                                 |                                |            | 5                  | 25         | 0            | 4.4799                                | 4.982                                   |
|                                 |                                |            | 10                 | 50         | 0            | 8.9634                                | 9.646                                   |
| LET Band 13<br>(Middle Channel) | 23230<br>(782MHz)              | QPSK       | 5                  | 25         | 0            | 4.475                                 | 4.905                                   |
|                                 |                                |            | 10                 | 50         | 0            | 8.9682                                | 9.856                                   |
|                                 |                                | 16QAM      | 5                  | 25         | 0            | 4.4922                                | 4.957                                   |
|                                 |                                |            | 10                 | 50         | 0            | 8.9787                                | 9.779                                   |
| LET Band 17<br>(Middle Channel) | 23790<br>(710MHz)              | QPSK       | 5                  | 25         | 0            | 4.487                                 | 4.932                                   |
|                                 |                                |            | 10                 | 50         | 0            | 8.96                                  | 9.684                                   |
|                                 |                                | 16QAM      | 5                  | 25         | 0            | 4.4689                                | 4.949                                   |
|                                 |                                |            | 10                 | 50         | 0            | 8.949                                 | 9.649                                   |

### Band 2 CH18900(1880MHz) QPSK-1.4MHz



### Band 2 CH18900(1880MHz) QPSK-3MHz



### Band 2 CH18900(1880MHz) QPSK-5MHz



### Band 2 CH18900(1880MHz) QPSK-10MHz



### Band 2 CH18900(1880MHz) QPSK-15MHz



### Band 2 CH18900(1880MHz) QPSK-20MHz



### Band 2 CH18900(1880MHz) 16QAM-1.4MHz



### Band 2 CH18900(1880MHz) 16QAM -3MHz



### Band 2 CH18900(1880MHz) 16QAM -5MHz



### Band 2 CH18900(1880MHz) 16QAM -10MHz



### Band 2 CH18900(1880MHz) 16QAM -15MHz



### Band 2 CH18900(1880MHz) 16QAM -20MHz



### Band 4 CH20175(1732.5MHz) QPSK-1.4MHz



### Band 4 CH20175(1732.5MHz) QPSK-3MHz



### Band 4 CH20175(1732.5MHz) QPSK-5MHz



### Band 4 CH20175(1732.5MHz) QPSK-10MHz



### Band 4 CH20175(1732.5MHz) QPSK-15MHz



### Band 4 CH20175(1732.5MHz) QPSK-20MHz

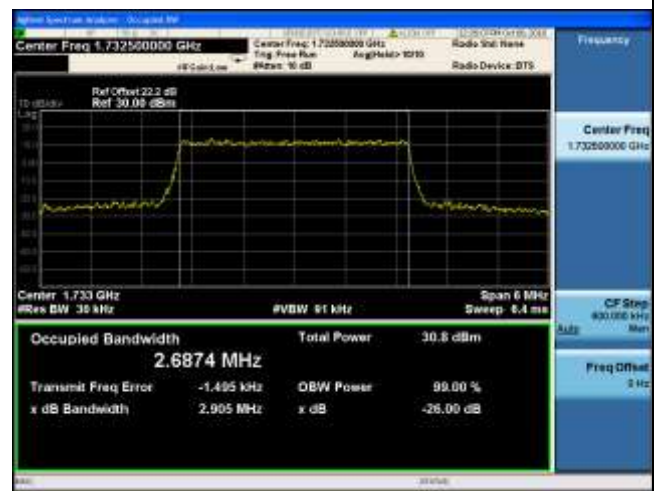




### Band 4 CH20175(1732.5MHz) 16QAM-1.4MHz



### Band 4 CH20175(1732.5MHz) 16QAM -3MHz



### Band 4 CH20175(1732.5MHz) 16QAM -5MHz



### Band 4 CH20175(1732.5MHz) 16QAM -10MHz



### Band 4 CH20175(1732.5MHz) 16QAM -15MHz



### Band 4 CH20175(1732.5MHz) 16QAM -20MHz



### Band 5 CH20525(836.5MHz) QPSK-1.4MHz



### Band 5 CH20525(836.5MHz) QPSK-3MHz



### Band 5 CH20525(836.5MHz) QPSK-5MHz



### Band 5 CH20525(836.5MHz) QPSK-10MHz



### Band 5 CH20525(836.5MHz) 16QAM-1.4MHz



### Band 5 CH20525(836.5MHz) 16QAM-3MHz





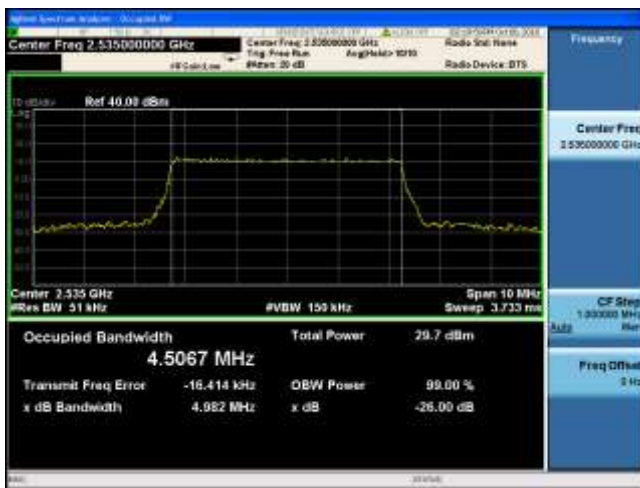
### Band 5 CH20525(836.5MHz) 16QAM-5MHz



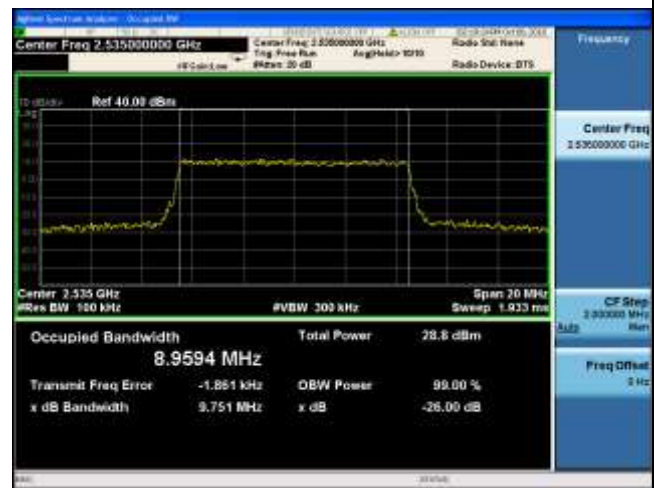
### Band 5 CH20525(836.5MHz) 16QAM-10MHz



### Band 7 CH21100(2535MHz) QPSK-5MHz



### Band 7 CH21100(2535MHz) QPSK-10MHz



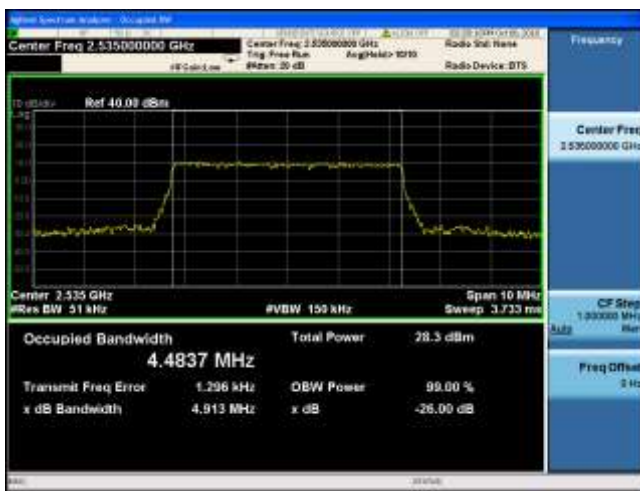
### Band 7 CH21100(2535MHz) QPSK-15MHz



### Band 7 CH21100(2535MHz) QPSK-20MHz



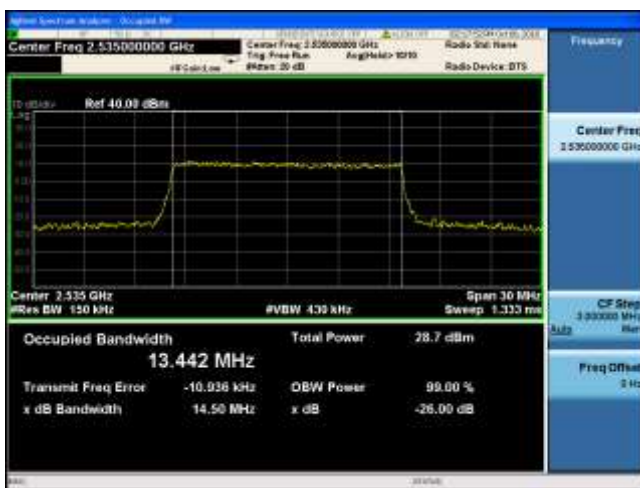
### Band 7 CH21100(2535MHz) 16QAM-5MHz



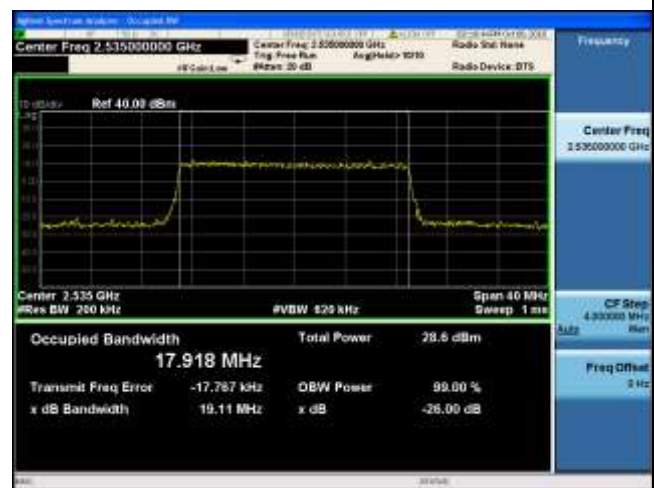
### Band 7 CH21100(2535MHz) 16QAM-10MHz



### Band 7 CH21100(2535MHz) 16QAM-15MHz



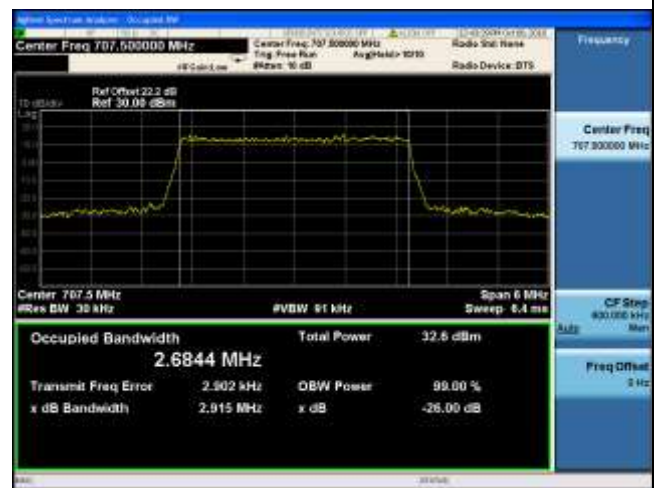
### Band 7 CH21100(2535MHz) 16QAM-20MHz



### Band 12 CH23095(707.5MHz) QPSK-1.4MHz



### Band 12 CH23095(707.5MHz) QPSK-3MHz



### Band 12 CH23095(707.5MHz) QPSK-5MHz



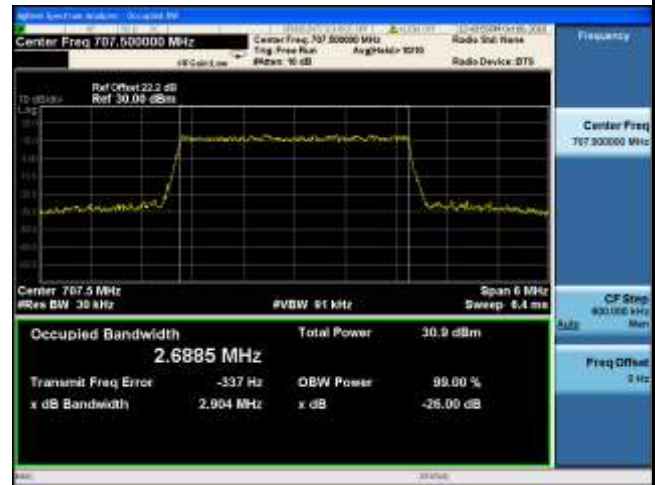
### Band 12 CH23095(707.5MHz) QPSK-10MHz



### Band 12 CH23095(707.5MHz) 16QAM-1.4MHz



### Band 12 CH23095(707.5MHz) 16QAM -3MHz



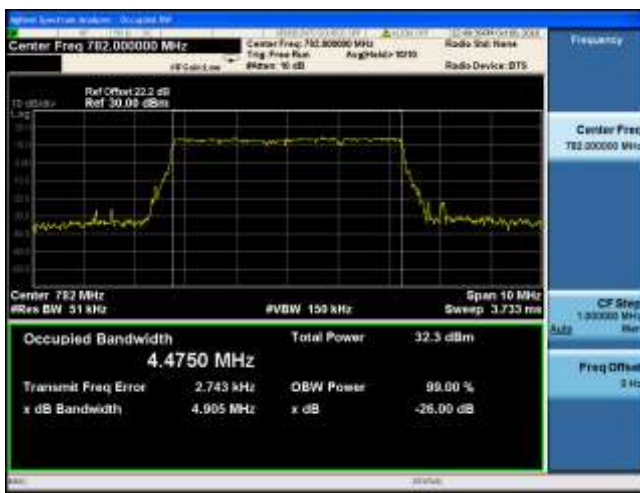
### Band 12 CH23095(707.5MHz) 16QAM-5MHz



### Band 12 CH23095(707.5MHz) 16QAM -10MHz



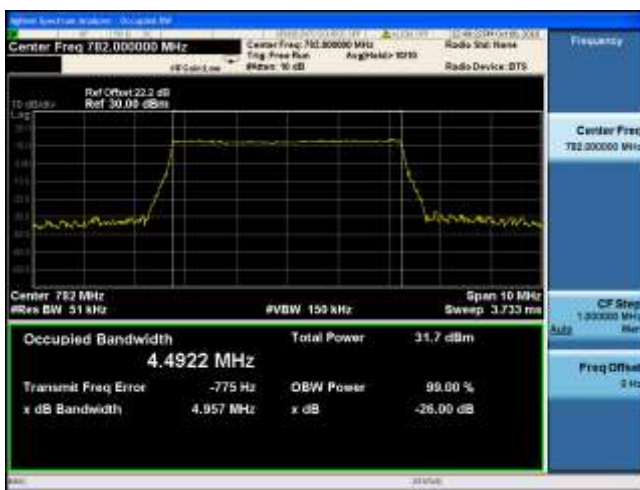
### Band 13 CH23230(782MHz) QPSK-5MHz



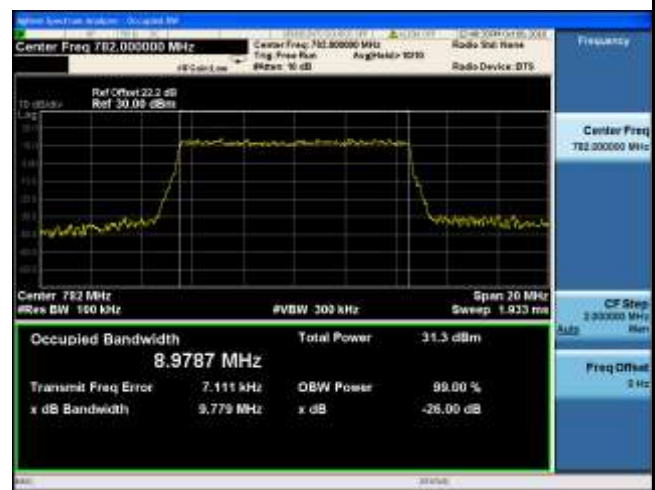
### Band 13 CH23230(782MHz) QPSK-10MHz



### Band 13 CH23230(782MHz) 16QAM-5MHz



### Band 13 CH23230(782MHz) 16QAM-10MHz



### Band 17 CH23790(710MHz) QPSK-5MHz



### Band 17 CH23790(710MHz) QPSK-10MHz





### Band 17 CH23790(710MHz) 16QAM-5MHz



### Band 17 CH23790(710MHz) 16QAM-10MHz



### 7.3. Conducted Spurious Emissions

#### 7.3.1. Test Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10\log_{10}(P)$  dB for Band 2,4,5,12,13,17/  $55 + 10\log_{10}(P)$  dB for Band7.

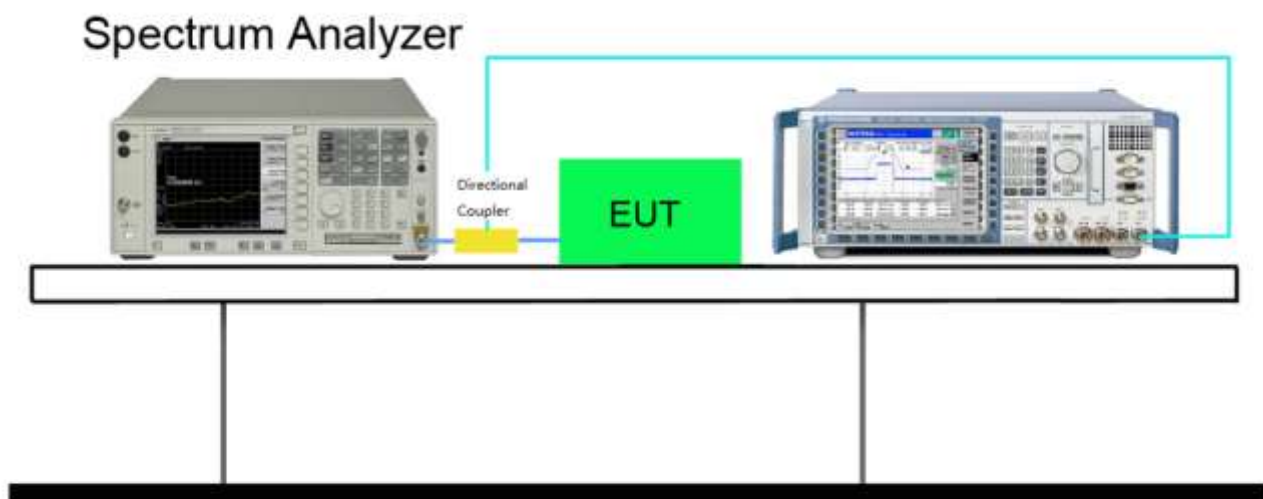
#### 7.3.2. Test Procedure Used

KDB 971168 D01v03 – Section 6 & ANSI/TIA-603-E-2016

#### 7.3.3. Test Setting

Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz is at or below 1GHz and 1MHz is above 1GHz, If any, up to 10<sup>th</sup> harmonic.

#### 7.3.4. Test Setup



### 7.3.5. Test Result

| Test Mode                      | Modulation | Channel/<br>Frequency<br>(MHz) | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | Limit<br>(dBm) | Result |
|--------------------------------|------------|--------------------------------|--------------------|------------|--------------|----------------|--------|
| LTE Band 2<br>(Low Channel)    | QPSK       | 18607/1850.7                   | 1.4                | 1          | 2            | -13            | PASS   |
|                                |            | 18615/1851.5                   | 3                  | 1          | 7            | -13            | PASS   |
|                                |            | 18625/1852.5                   | 5                  | 1          | 12           | -13            | PASS   |
|                                |            | 18650/1855                     | 10                 | 1          | 25           | -13            | PASS   |
|                                |            | 18675/1857.5                   | 15                 | 1          | 36           | -13            | PASS   |
|                                |            | 18700/1860                     | 20                 | 1          | 49           | -13            | PASS   |
|                                | 16QAM      | 18607/1850.7                   | 1.4                | 1          | 2            | -13            | PASS   |
|                                |            | 18615/1851.5                   | 3                  | 1          | 7            | -13            | PASS   |
|                                |            | 18625/1852.5                   | 5                  | 1          | 12           | -13            | PASS   |
|                                |            | 18650/1855                     | 10                 | 1          | 25           | -13            | PASS   |
|                                |            | 18675/1857.5                   | 15                 | 1          | 36           | -13            | PASS   |
|                                |            | 18700/1860                     | 20                 | 1          | 49           | -13            | PASS   |
| LTE Band 2<br>(Middle Channel) | QPSK       | 18900/1880                     | 1.4                | 1          | 2            | -13            | PASS   |
|                                |            |                                | 3                  | 1          | 7            | -13            | PASS   |
|                                |            |                                | 5                  | 1          | 12           | -13            | PASS   |
|                                |            |                                | 10                 | 1          | 25           | -13            | PASS   |
|                                |            |                                | 15                 | 1          | 36           | -13            | PASS   |
|                                |            |                                | 20                 | 1          | 49           | -13            | PASS   |
|                                | 16QAM      |                                | 1.4                | 1          | 2            | -13            | PASS   |
|                                |            |                                | 3                  | 1          | 7            | -13            | PASS   |
|                                |            |                                | 5                  | 1          | 12           | -13            | PASS   |
|                                |            |                                | 10                 | 1          | 25           | -13            | PASS   |
|                                |            |                                | 15                 | 1          | 36           | -13            | PASS   |
|                                |            |                                | 20                 | 1          | 49           | -13            | PASS   |



|                              |       |              |     |   |    |     |      |
|------------------------------|-------|--------------|-----|---|----|-----|------|
| LTE Band 2<br>(High Channel) | QPSK  | 19193/1909.3 | 1.4 | 1 | 2  | -13 | PASS |
|                              |       | 19185/1908.5 | 3   | 1 | 7  | -13 | PASS |
|                              |       | 19175/1907.5 | 5   | 1 | 12 | -13 | PASS |
|                              |       | 19150/1905   | 10  | 1 | 25 | -13 | PASS |
|                              |       | 19125/1902.5 | 15  | 1 | 36 | -13 | PASS |
|                              |       | 19100/1900   | 20  | 1 | 49 | -13 | PASS |
|                              | 16QAM | 19193/1909.3 | 1.4 | 1 | 2  | -13 | PASS |
|                              |       | 19185/1908.5 | 3   | 1 | 7  | -13 | PASS |
|                              |       | 19175/1907.5 | 5   | 1 | 12 | -13 | PASS |
|                              |       | 19150/1905   | 10  | 1 | 25 | -13 | PASS |
|                              |       | 19125/1902.5 | 15  | 1 | 36 | -13 | PASS |
|                              |       | 19100 /1900  | 20  | 1 | 49 | -13 | PASS |

| Test Mode                   | Modulation | Channel/<br>Frequency<br>(MHz) | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | Limit<br>(dBm) | Result |
|-----------------------------|------------|--------------------------------|--------------------|------------|--------------|----------------|--------|
| LTE Band 4<br>(Low Channel) | QPSK       | 19957/1710.7                   | 1.4                | 1          | 2            | -13            | PASS   |
|                             |            | 19965/1711.5                   | 3                  | 1          | 7            | -13            | PASS   |
|                             |            | 19975/1712.5                   | 5                  | 1          | 12           | -13            | PASS   |
|                             |            | 20000/1715                     | 10                 | 1          | 25           | -13            | PASS   |
|                             |            | 20025/1717.5                   | 15                 | 1          | 36           | -13            | PASS   |
|                             |            | 20050/1720                     | 20                 | 1          | 49           | -13            | PASS   |
|                             | 16QAM      | 19957/1710.7                   | 1.4                | 1          | 2            | -13            | PASS   |
|                             |            | 19965/1711.5                   | 3                  | 1          | 7            | -13            | PASS   |
|                             |            | 19975/1712.5                   | 5                  | 1          | 12           | -13            | PASS   |
|                             |            | 20000/1715                     | 10                 | 1          | 25           | -13            | PASS   |
|                             |            | 20025/1717.5                   | 15                 | 1          | 36           | -13            | PASS   |
|                             |            | 20050/1720                     | 20                 | 1          | 49           | -13            | PASS   |

|                                |       |                  |     |   |    |     |      |
|--------------------------------|-------|------------------|-----|---|----|-----|------|
| LTE Band 4<br>(Middle Channel) | QPSK  | 20175<br>/1732.5 | 1.4 | 1 | 2  | -13 | PASS |
|                                |       |                  | 3   | 1 | 7  | -13 | PASS |
|                                |       |                  | 5   | 1 | 12 | -13 | PASS |
|                                |       |                  | 10  | 1 | 25 | -13 | PASS |
|                                |       |                  | 15  | 1 | 36 | -13 | PASS |
|                                |       |                  | 20  | 1 | 49 | -13 | PASS |
|                                | 16QAM |                  | 1.4 | 1 | 2  | -13 | PASS |
|                                |       |                  | 3   | 1 | 7  | -13 | PASS |
|                                |       |                  | 5   | 1 | 12 | -13 | PASS |
|                                |       |                  | 10  | 1 | 25 | -13 | PASS |
|                                |       |                  | 15  | 1 | 36 | -13 | PASS |
|                                |       |                  | 20  | 1 | 49 | -13 | PASS |

|                              |       |              |     |   |    |     |      |
|------------------------------|-------|--------------|-----|---|----|-----|------|
| LTE Band 4<br>(High Channel) | QPSK  | 20393/1754.3 | 1.4 | 1 | 2  | -13 | PASS |
|                              |       | 20385/1753.5 | 3   | 1 | 7  | -13 | PASS |
|                              |       | 20375/1752.5 | 5   | 1 | 12 | -13 | PASS |
|                              |       | 20350/1750   | 10  | 1 | 25 | -13 | PASS |
|                              |       | 20325/1747.5 | 15  | 1 | 36 | -13 | PASS |
|                              |       | 20300/1745   | 20  | 1 | 49 | -13 | PASS |
|                              | 16QAM | 20393/1754.3 | 1.4 | 1 | 2  | -13 | PASS |
|                              |       | 20385/1753.5 | 3   | 1 | 7  | -13 | PASS |
|                              |       | 20375/1752.5 | 5   | 1 | 12 | -13 | PASS |
|                              |       | 20350/1750   | 10  | 1 | 25 | -13 | PASS |
|                              |       | 20325/1747.5 | 15  | 1 | 36 | -13 | PASS |
|                              |       | 20300/1745   | 20  | 1 | 49 | -13 | PASS |

| Test Mode                      | Modulation | Channel/<br>Frequency<br>(MHz) | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | Limit<br>(dBm) | Result |
|--------------------------------|------------|--------------------------------|--------------------|------------|--------------|----------------|--------|
| LTE Band 5<br>(Low Channel)    | QPSK       | 20407/824.7                    | 1.4                | 1          | 2            | -13            | PASS   |
|                                |            | 20415/825.5                    | 3                  | 1          | 7            | -13            | PASS   |
|                                |            | 20425/826.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                |            | 20450/829                      | 10                 | 1          | 25           | -13            | PASS   |
|                                | 16QAM      | 20407/824.7                    | 1.4                | 1          | 2            | -13            | PASS   |
|                                |            | 20415/825.5                    | 3                  | 1          | 7            | -13            | PASS   |
|                                |            | 20425/826.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                |            | 20450/829                      | 10                 | 1          | 25           | -13            | PASS   |
| LTE Band 5<br>(Middle Channel) | QPSK       | 20525/836.5                    | 1.4                | 1          | 2            | -13            | PASS   |
|                                |            |                                | 3                  | 1          | 7            | -13            | PASS   |
|                                |            |                                | 5                  | 1          | 12           | -13            | PASS   |
|                                |            |                                | 10                 | 1          | 25           | -13            | PASS   |
|                                | 16QAM      |                                | 1.4                | 1          | 2            | -13            | PASS   |
|                                |            |                                | 3                  | 1          | 7            | -13            | PASS   |
|                                |            |                                | 5                  | 1          | 12           | -13            | PASS   |
|                                |            |                                | 10                 | 1          | 25           | -13            | PASS   |
| LTE Band 5<br>(High Channel)   | QPSK       | 20643/848.3                    | 1.4                | 1          | 2            | -13            | PASS   |
|                                |            | 20635/847.5                    | 3                  | 1          | 7            | -13            | PASS   |
|                                |            | 20625/846.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                |            | 20600/844                      | 10                 | 1          | 25           | -13            | PASS   |
|                                | 16QAM      | 20643/848.3                    | 1.4                | 1          | 2            | -13            | PASS   |
|                                |            | 20635/847.5                    | 3                  | 1          | 7            | -13            | PASS   |
|                                |            | 20625/846.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                |            | 20600/844                      | 10                 | 1          | 25           | -13            | PASS   |

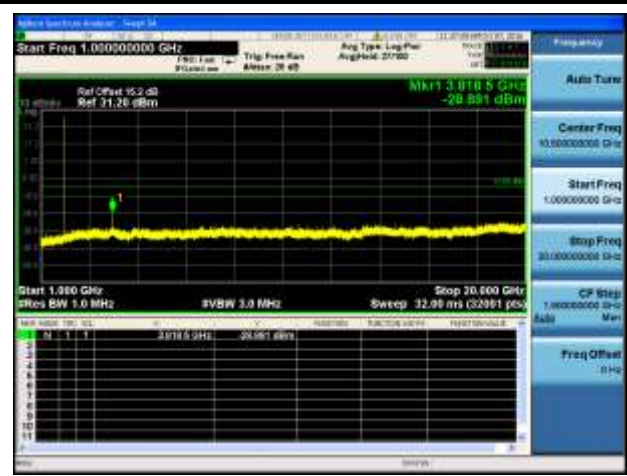
| Test Mode                      | Modulation | Channel/<br>Frequency<br>(MHz) | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | Limit<br>(dBm) | Result |
|--------------------------------|------------|--------------------------------|--------------------|------------|--------------|----------------|--------|
| LTE Band 7<br>(Low Channel)    | QPSK       | 20775/2502.5                   | 5                  | 1          | 12           | -25            | PASS   |
|                                |            | 20800/2505                     | 10                 | 1          | 25           | -25            | PASS   |
|                                |            | 20825/2507.5                   | 15                 | 1          | 36           | -25            | PASS   |
|                                |            | 20850/2510                     | 20                 | 1          | 49           | -25            | PASS   |
|                                | 16QAM      | 20775/2502.5                   | 5                  | 1          | 12           | -25            | PASS   |
|                                |            | 20800/2505                     | 10                 | 1          | 25           | -25            | PASS   |
|                                |            | 20825/2507.5                   | 15                 | 1          | 36           | -25            | PASS   |
|                                |            | 20850/2510                     | 20                 | 1          | 49           | -25            | PASS   |
| LTE Band 7<br>(Middle Channel) | QPSK       | 21100/2535                     | 5                  | 1          | 12           | -25            | PASS   |
|                                |            |                                | 10                 | 1          | 25           | -25            | PASS   |
|                                |            |                                | 15                 | 1          | 36           | -25            | PASS   |
|                                |            |                                | 20                 | 1          | 49           | -25            | PASS   |
|                                | 16QAM      |                                | 5                  | 1          | 12           | -25            | PASS   |
|                                |            |                                | 10                 | 1          | 25           | -25            | PASS   |
|                                |            |                                | 15                 | 1          | 36           | -25            | PASS   |
|                                |            |                                | 20                 | 1          | 49           | -25            | PASS   |
| LTE Band 7<br>(High Channel)   | QPSK       | 21425/2567.5                   | 5                  | 1          | 12           | -25            | PASS   |
|                                |            | 21400/2565                     | 10                 | 1          | 25           | -25            | PASS   |
|                                |            | 21375/2562.5                   | 15                 | 1          | 36           | -25            | PASS   |
|                                |            | 21350/2560                     | 20                 | 1          | 49           | -25            | PASS   |
|                                | 16QAM      | 21425/2567.5                   | 5                  | 1          | 12           | -25            | PASS   |
|                                |            | 21400/2565                     | 10                 | 1          | 25           | -25            | PASS   |
|                                |            | 21375/2562.5                   | 15                 | 1          | 36           | -25            | PASS   |
|                                |            | 21350/2560                     | 20                 | 1          | 49           | -25            | PASS   |

| Test Mode                       | Modulation | Channel/<br>Frequency<br>(MHz) | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | Limit<br>(dBm) | Result |
|---------------------------------|------------|--------------------------------|--------------------|------------|--------------|----------------|--------|
| LTE Band 12<br>(Low Channel)    | QPSK       | 23017/699.7                    | 1.4                | 1          | 2            | -13            | PASS   |
|                                 |            | 23025/700.5                    | 3                  | 1          | 7            | -13            | PASS   |
|                                 |            | 23035/701.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            | 23060/704                      | 10                 | 1          | 25           | -13            | PASS   |
|                                 | 16QAM      | 23017/699.7                    | 1.4                | 1          | 2            | -13            | PASS   |
|                                 |            | 23025/700.5                    | 3                  | 1          | 7            | -13            | PASS   |
|                                 |            | 23035/701.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            | 23060/704                      | 10                 | 1          | 25           | -13            | PASS   |
| LTE Band 12<br>(Middle Channel) | QPSK       | 23095/707.5                    | 1.4                | 1          | 2            | -13            | PASS   |
|                                 |            |                                | 3                  | 1          | 7            | -13            | PASS   |
|                                 |            |                                | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            |                                | 10                 | 1          | 25           | -13            | PASS   |
|                                 | 16QAM      |                                | 1.4                | 1          | 2            | -13            | PASS   |
|                                 |            |                                | 3                  | 1          | 7            | -13            | PASS   |
|                                 |            |                                | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            |                                | 10                 | 1          | 25           | -13            | PASS   |
| LTE Band 12<br>(High Channel)   | QPSK       | 23173/715.3                    | 1.4                | 1          | 2            | -13            | PASS   |
|                                 |            | 23165/714.5                    | 3                  | 1          | 7            | -13            | PASS   |
|                                 |            | 23155/713.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            | 23130/711                      | 10                 | 1          | 25           | -13            | PASS   |
|                                 | 16QAM      | 23173/715.3                    | 1.4                | 1          | 2            | -13            | PASS   |
|                                 |            | 23165/714.5                    | 3                  | 1          | 7            | -13            | PASS   |
|                                 |            | 23155/713.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            | 23130/711                      | 10                 | 1          | 25           | -13            | PASS   |

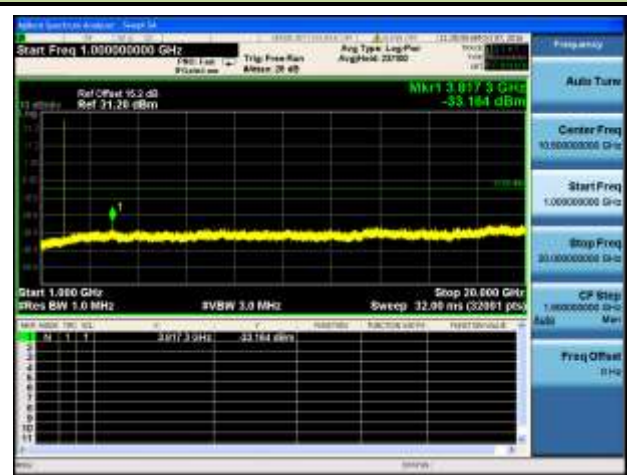
| Test Mode                       | Modulation | Channel/<br>Frequency<br>(MHz) | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | Limit<br>(dBm) | Result |
|---------------------------------|------------|--------------------------------|--------------------|------------|--------------|----------------|--------|
| LTE Band 13<br>(Low Channel)    | QPSK       | 23205/779.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                 | 16QAM      | 23205/779.5                    | 5                  | 1          | 12           | -13            | PASS   |
| LTE Band 13<br>(Middle Channel) | QPSK       | 23230/782                      | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            |                                | 10                 | 1          | 25           | -13            | PASS   |
|                                 | 16QAM      |                                | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            |                                | 10                 | 1          | 25           | -13            | PASS   |
| LTE Band 13<br>(High Channel)   | QPSK       | 23255/784.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                 | 16QAM      | 23255/784.5                    | 5                  | 1          | 12           | -13            | PASS   |

| Test Mode                       | Modulation | Channel/<br>Frequency<br>(MHz) | Bandwidth<br>(MHz) | RB<br>Size | RB<br>Offset | Limit<br>(dBm) | Result |
|---------------------------------|------------|--------------------------------|--------------------|------------|--------------|----------------|--------|
| LTE Band 17<br>(Low Channel)    | QPSK       | 23755/706.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            | 23780/709                      | 10                 | 1          | 25           | -13            | PASS   |
|                                 | 16QAM      | 23755/706.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            | 23780/709                      | 10                 | 1          | 25           | -13            | PASS   |
| LTE Band 17<br>(Middle Channel) | QPSK       | 23790/710                      | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            |                                | 10                 | 1          | 25           | -13            | PASS   |
|                                 | 16QAM      |                                | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            |                                | 10                 | 1          | 25           | -13            | PASS   |
| LTE Band 17<br>(High Channel)   | QPSK       | 23825/713.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            | 23800/711                      | 10                 | 1          | 25           | -13            | PASS   |
|                                 | 16QAM      | 23825/713.5                    | 5                  | 1          | 12           | -13            | PASS   |
|                                 |            | 23800/711                      | 10                 | 1          | 25           | -13            | PASS   |

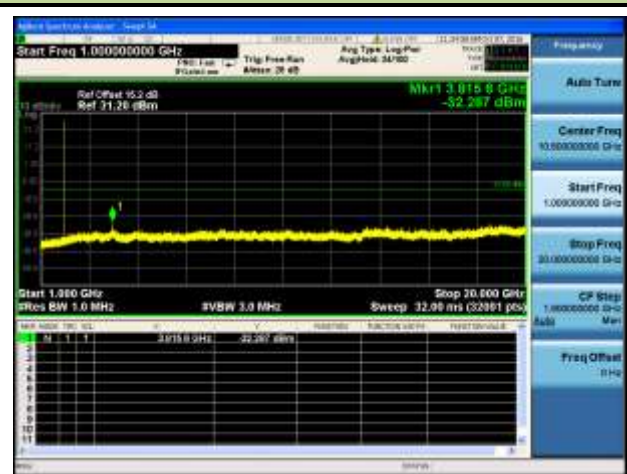
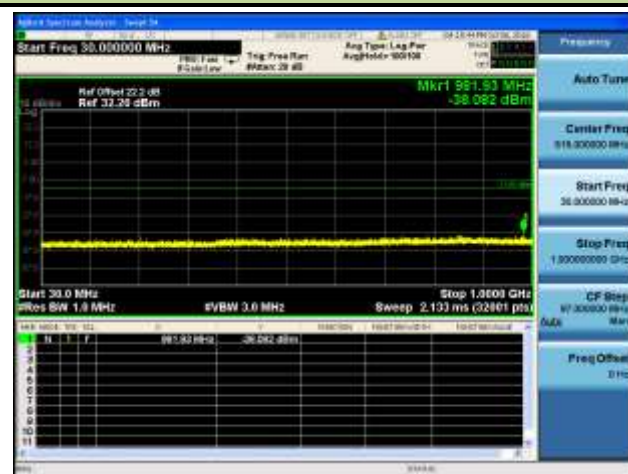
### LTE Band 2 (Low Channel) 18607 (1850.7MHz) QPSK Bandwidth 1.4MHz



### LTE Band 2 (Low Channel) 18615 (1851.5MHz) QPSK Bandwidth 3MHz

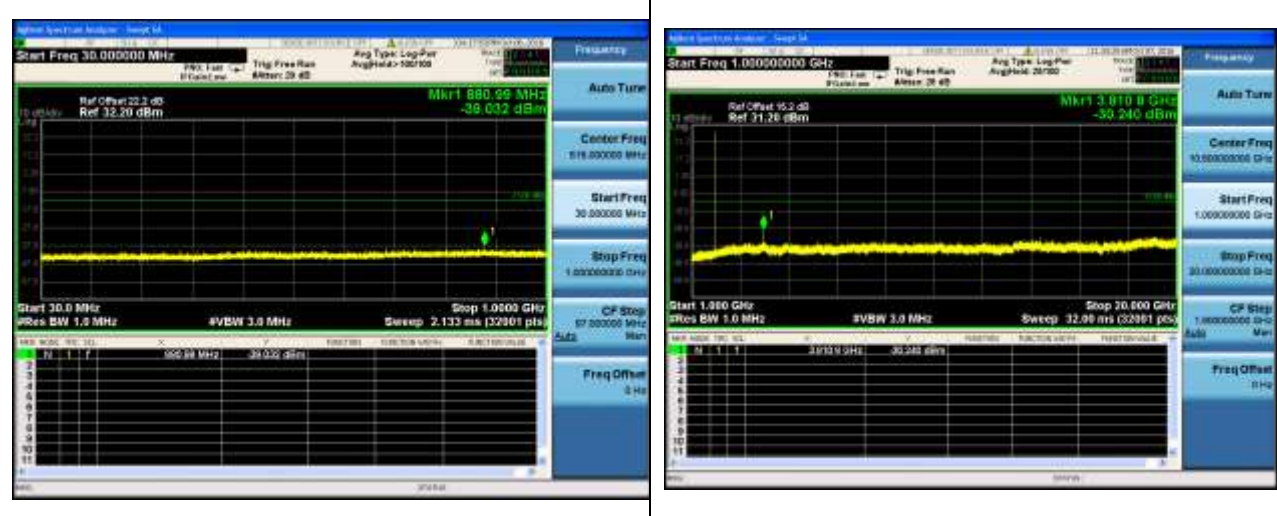


### LTE Band 2 (Low Channel) 18625 (1852.5MHz) QPSK Bandwidth 5MHz

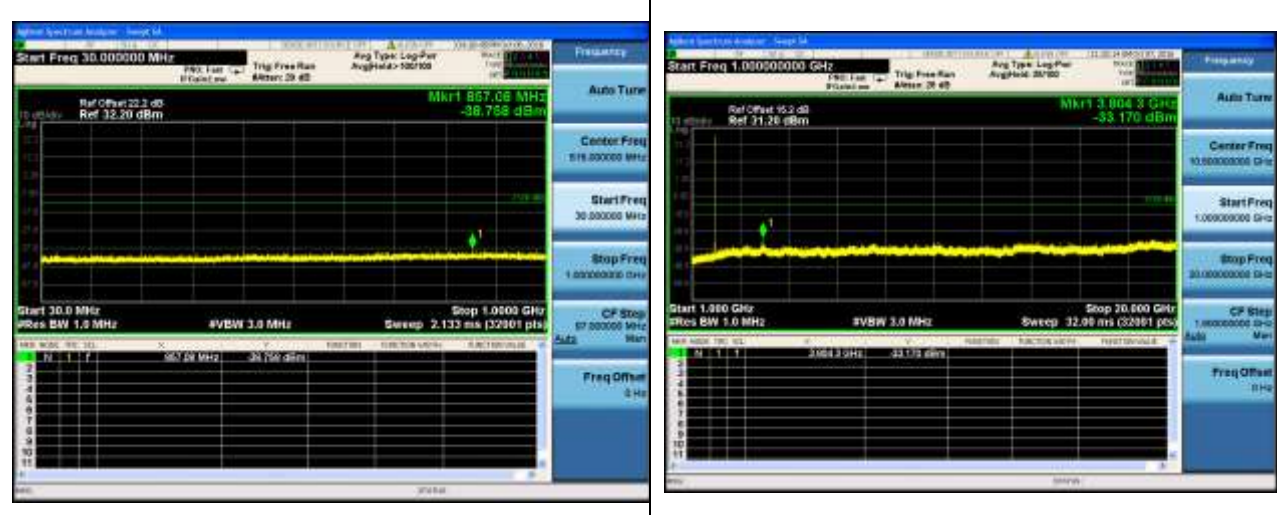




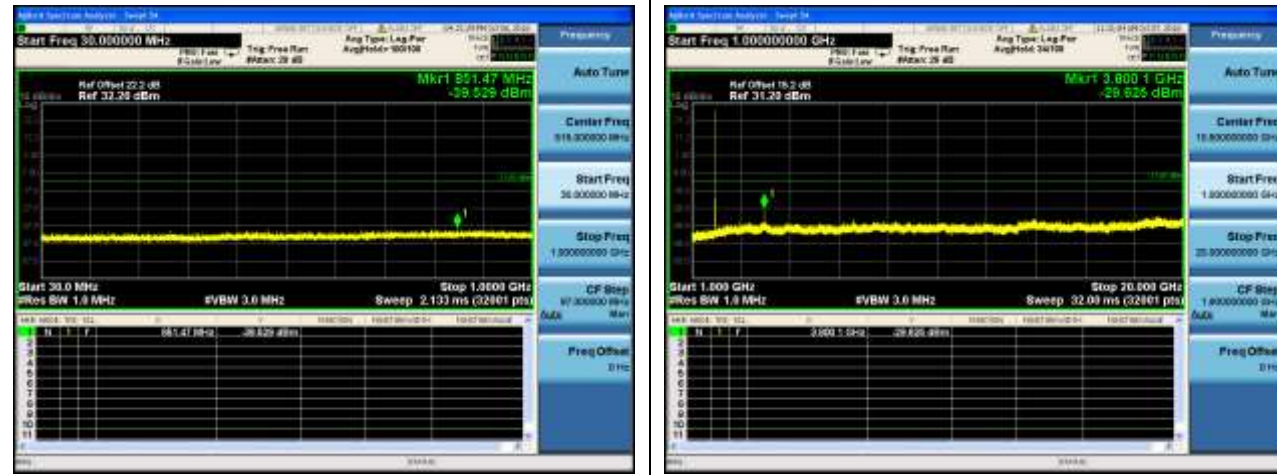
### LTE Band 2 (Low Channel) 18650 (1855MHz) QPSK Bandwidth 10MHz



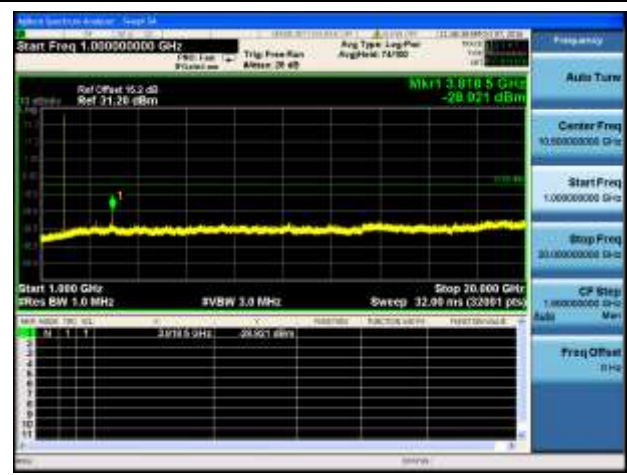
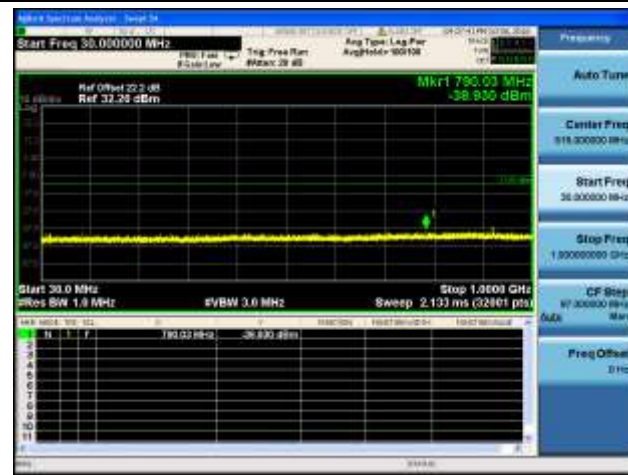
### LTE Band 2 (Low Channel) 18675 (1857.5MHz) QPSK Bandwidth 15MHz



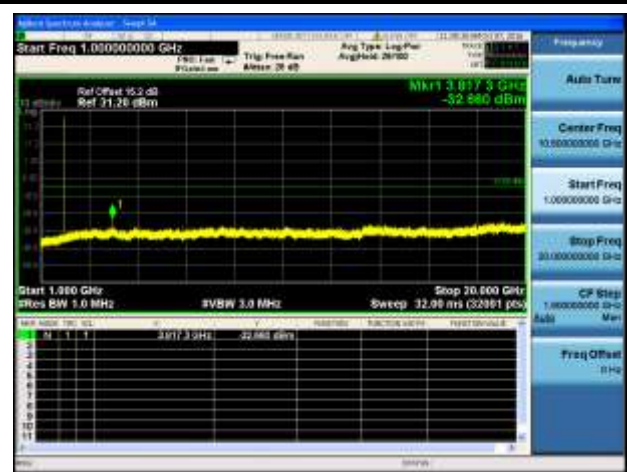
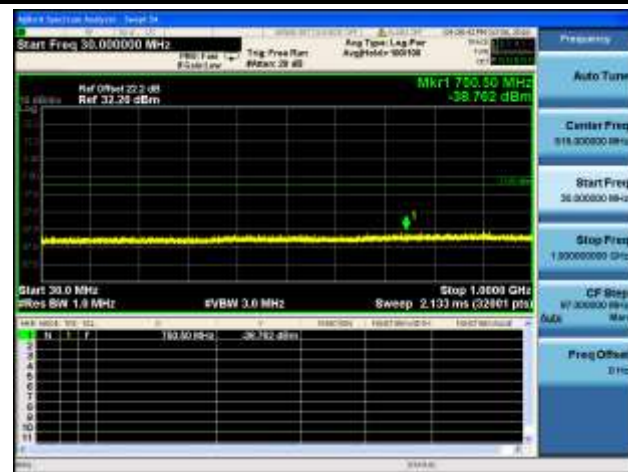
### LTE Band 2 (Low Channel) 18700 (1860MHz) QPSK Bandwidth 20MHz



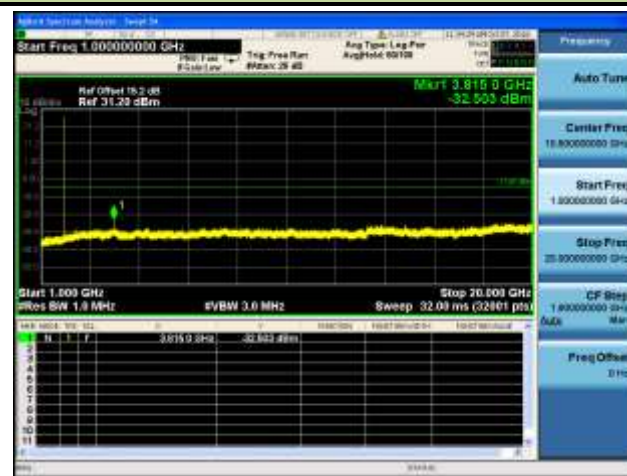
### LTE Band 2 (Low Channel) 18607 (1850.7MHz) 16QAM Bandwidth 1.4MHz



### LTE Band 2 (Low Channel) 18615 (1851.5MHz) 16QAM Bandwidth 3MHz

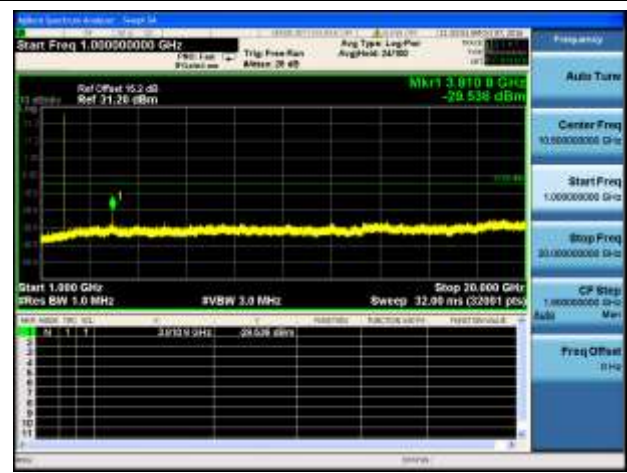
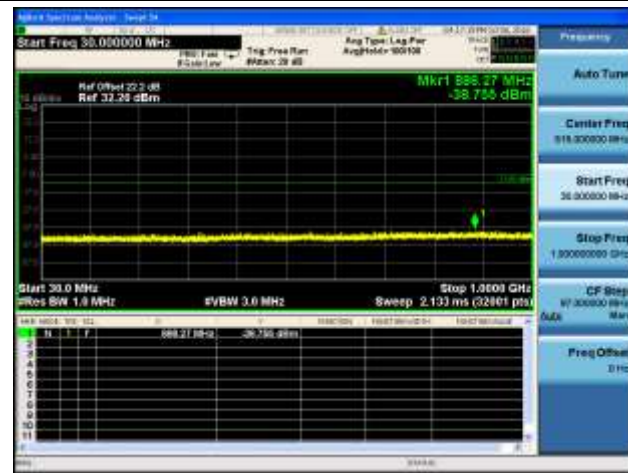


### LTE Band 2 (Low Channel) 18625 (1852.5MHz) 16QAM Bandwidth 5MHz

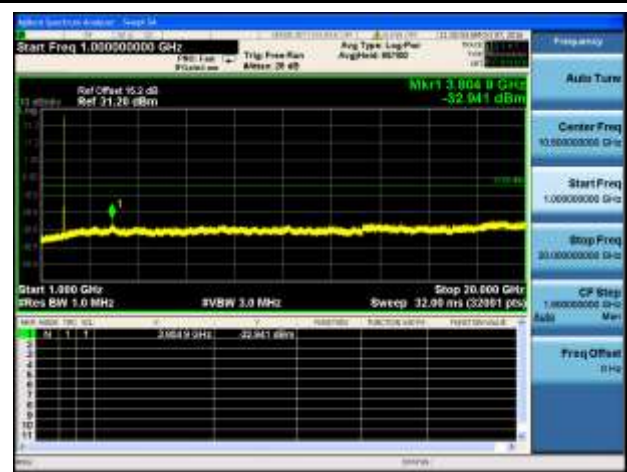




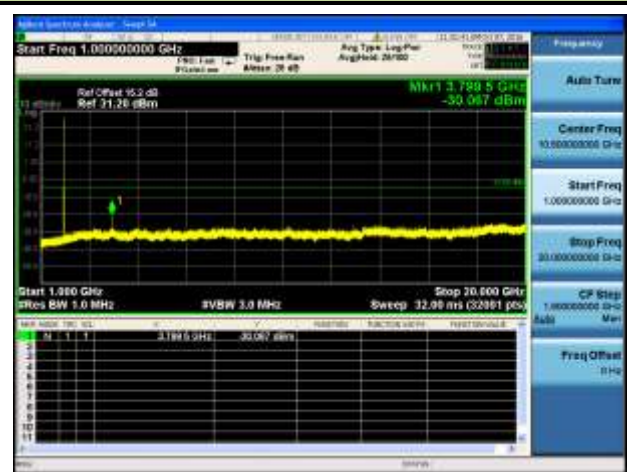
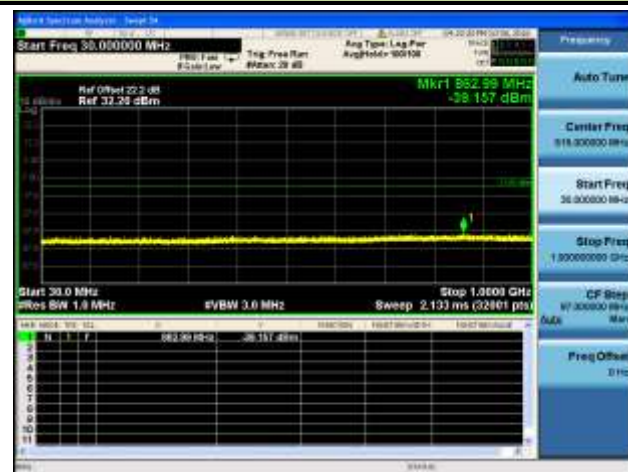
### LTE Band 2 (Low Channel) 18650 (1855MHz) 16QAM Bandwidth 10MHz



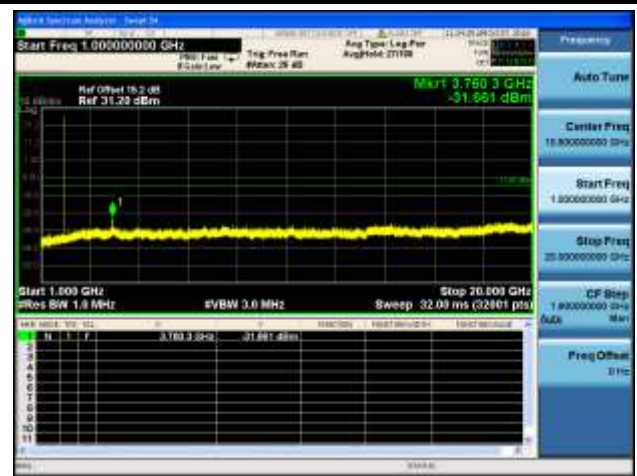
### LTE Band 2 (Low Channel) 18675 (1857.5MHz) 16QAM Bandwidth 15MHz



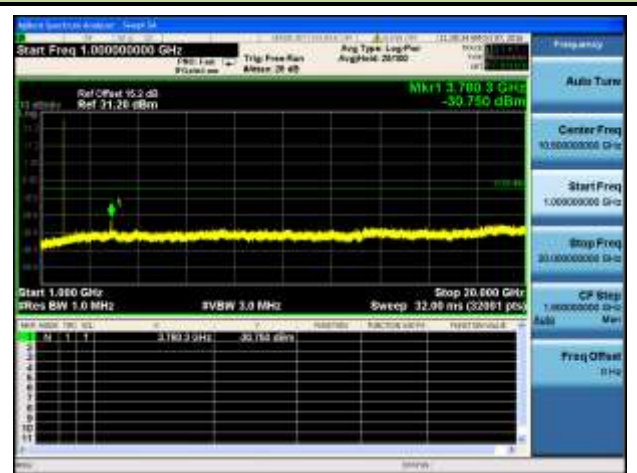
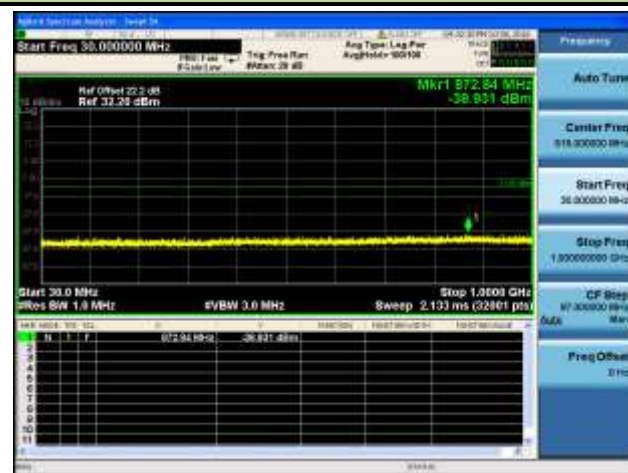
### LTE Band 2 (Low Channel) 18700 (1860MHz) 16QAM Bandwidth 20MHz



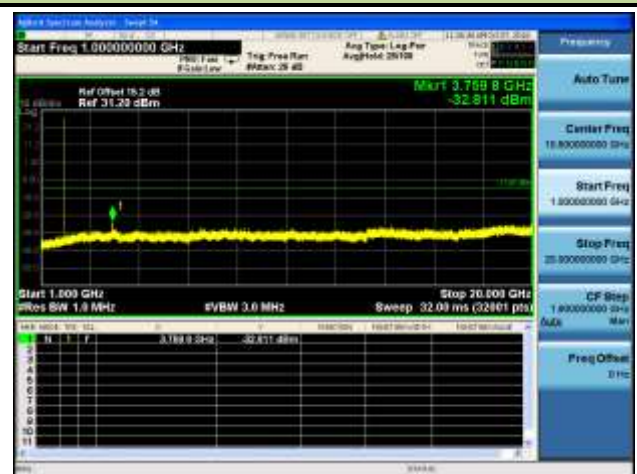
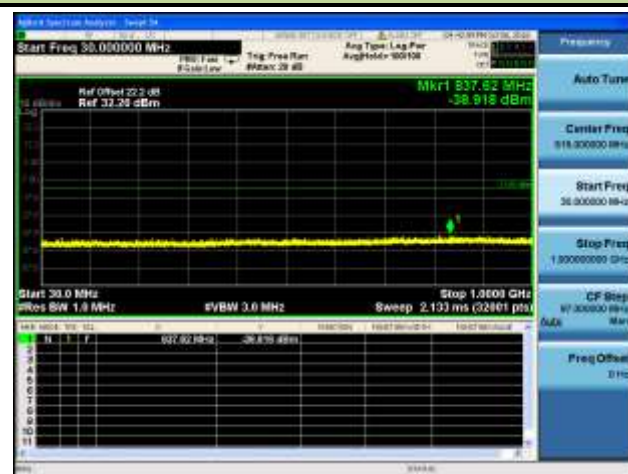
### LTE Band 2 (Mid Channel) 18900 (1880MHz) QPSK Bandwidth 1.4MHz



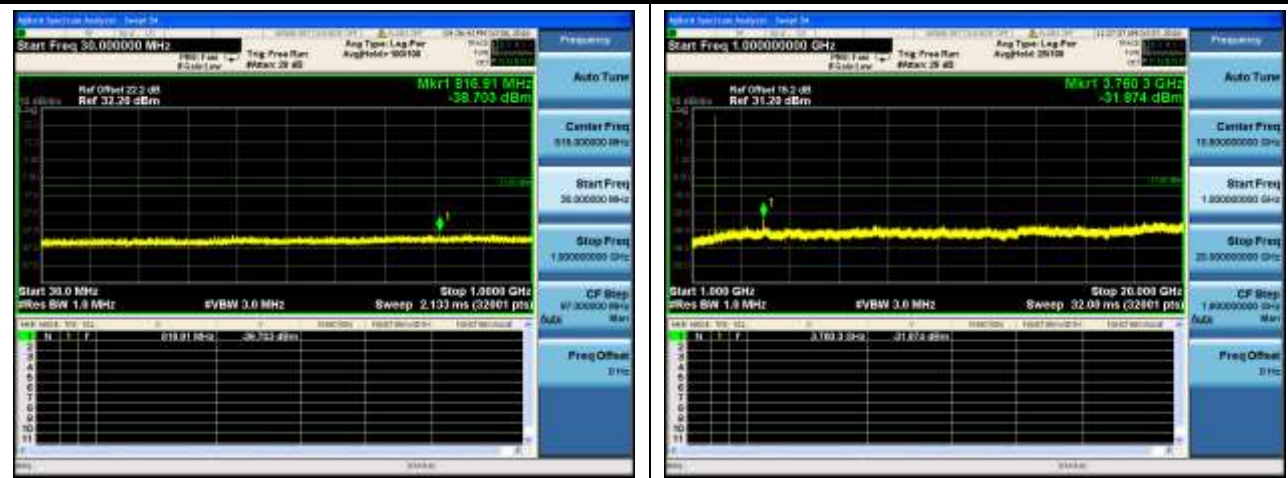
### LTE Band 2 (Mid Channel) 18900 (1880MHz) QPSK Bandwidth 3MHz



### LTE Band 2 (Mid Channel) 18900 (1880MHz) QPSK Bandwidth 5MHz



### LTE Band 2 (Mid Channel) 18900 (1880MHz) QPSK Bandwidth 10MHz



### LTE Band 2 (Mid Channel) 18900 (1880MHz) QPSK Bandwidth 15MHz

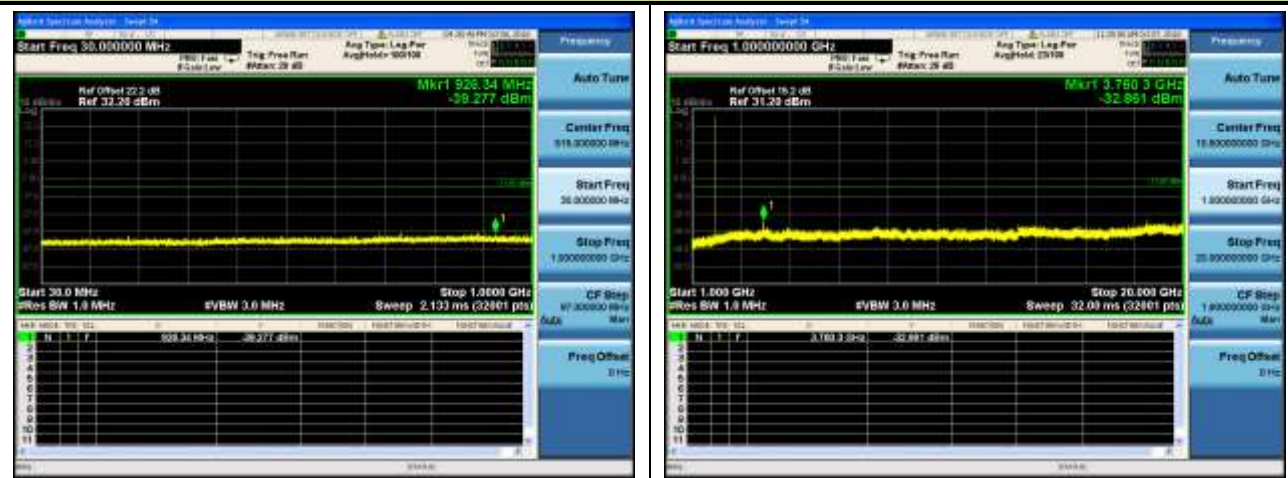


### LTE Band 2 (Mid Channel) 18900 (1880MHz) QPSK Bandwidth 20MHz

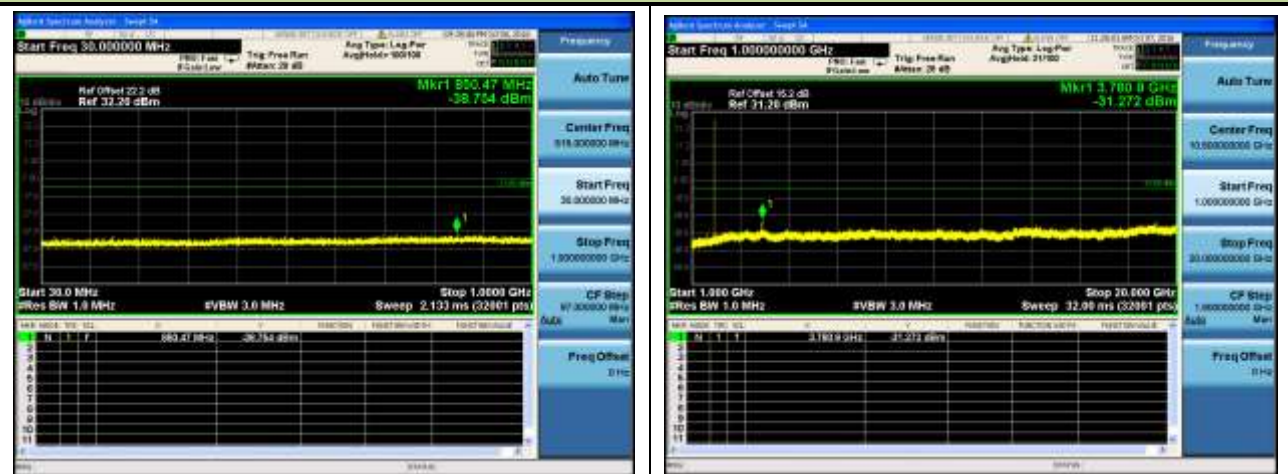




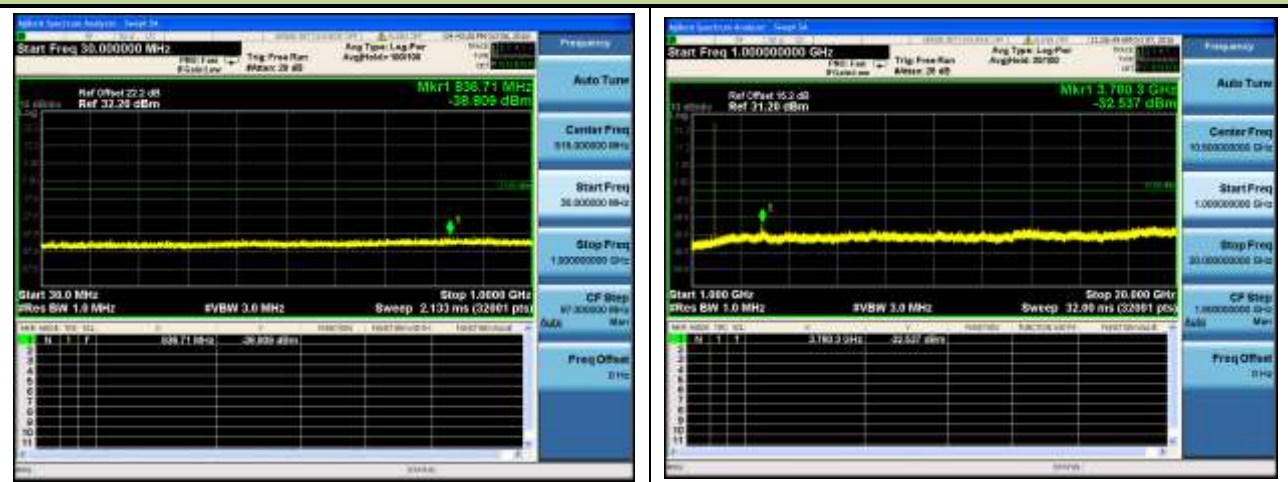
### LTE Band 2 (Mid Channel) 18900 (1880MHz) 16QAM Bandwidth 1.4MHz



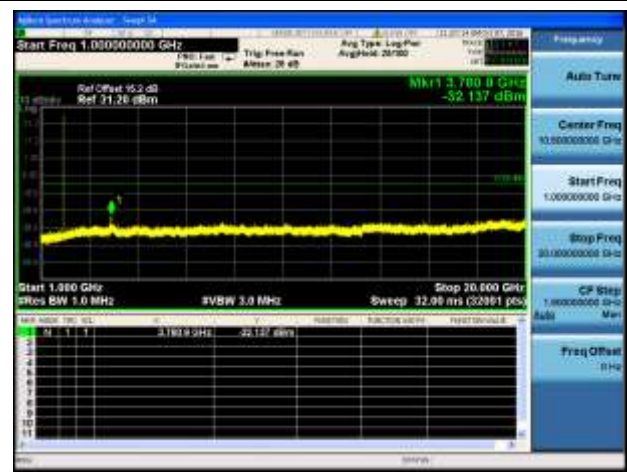
### LTE Band 2 (Mid Channel) 18900 (1880MHz) 16QAM Bandwidth 3MHz



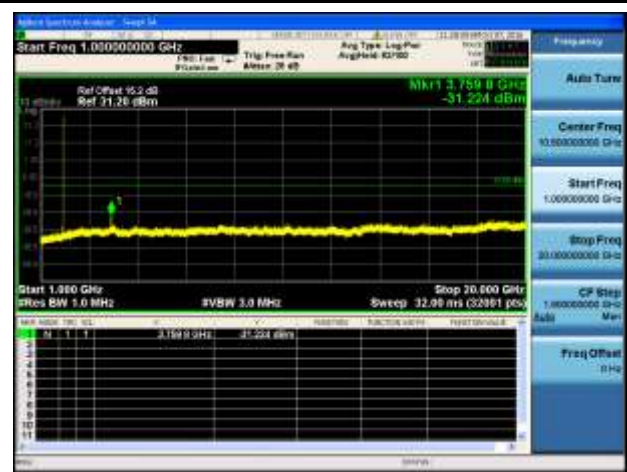
### LTE Band 2 (Mid Channel) 18900 (1880MHz) 16QAM Bandwidth 5MHz



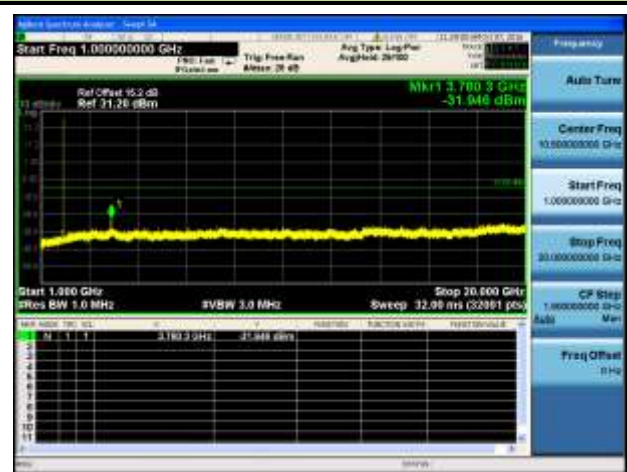
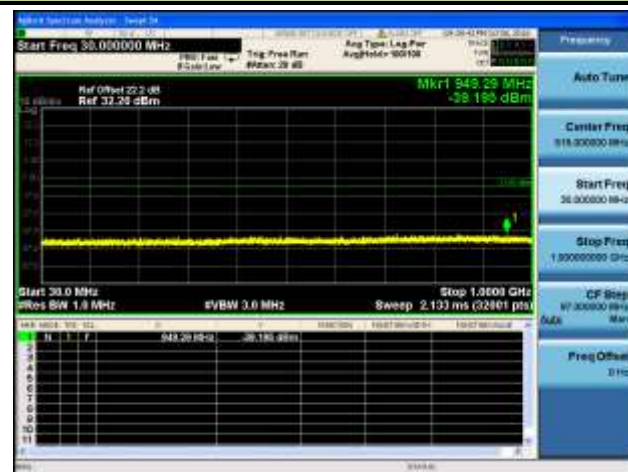
### LTE Band 2 (Mid Channel) 18900 (1880MHz) 16QAM Bandwidth 10MHz



### LTE Band 2 (Mid Channel) 18900 (1880MHz) 16QAM Bandwidth 15MHz

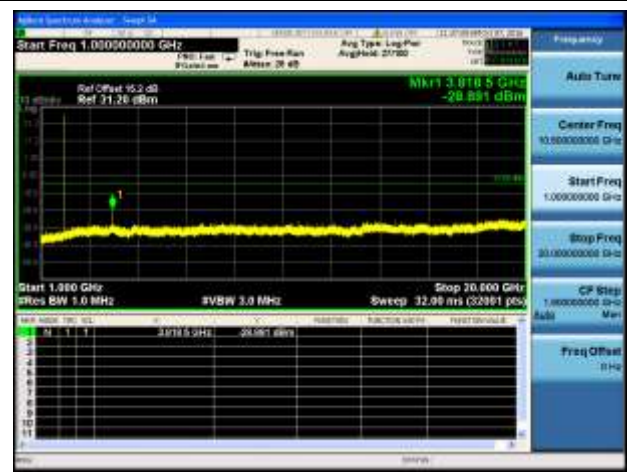
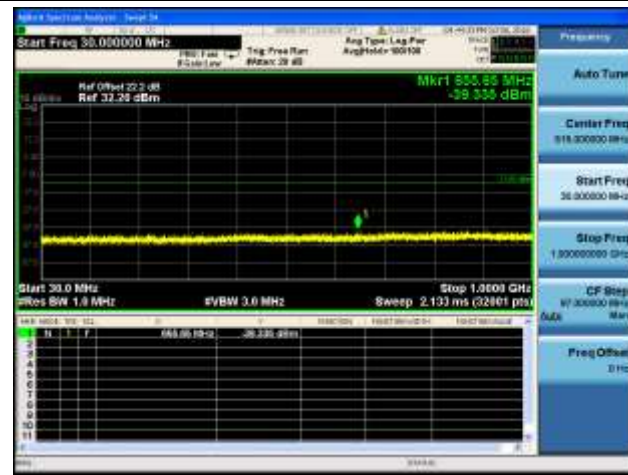


### LTE Band 2 (Mid Channel) 18900 (1880MHz) 16QAM Bandwidth 20MHz

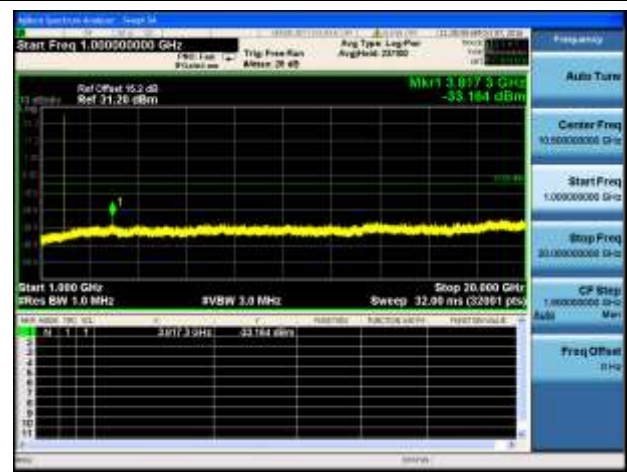




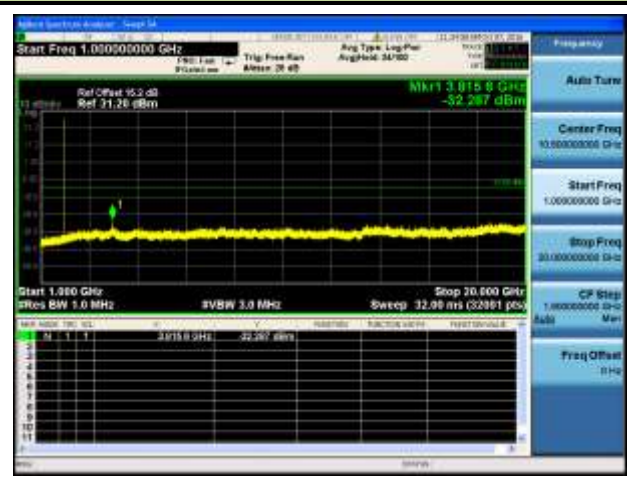
### LTE Band 2 (High Channel) 19193 (1909.3MHz) QPSK Bandwidth 1.4MHz



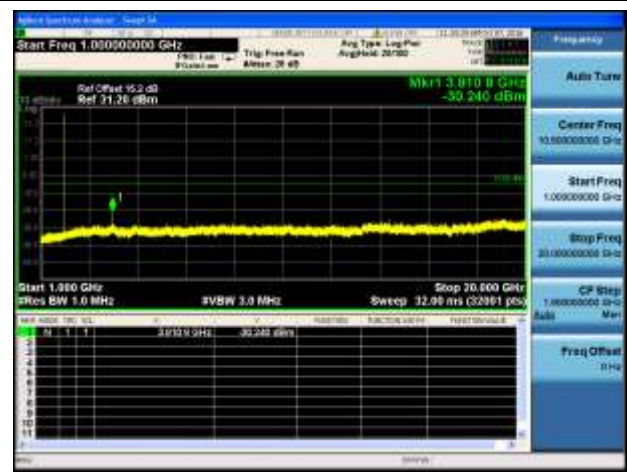
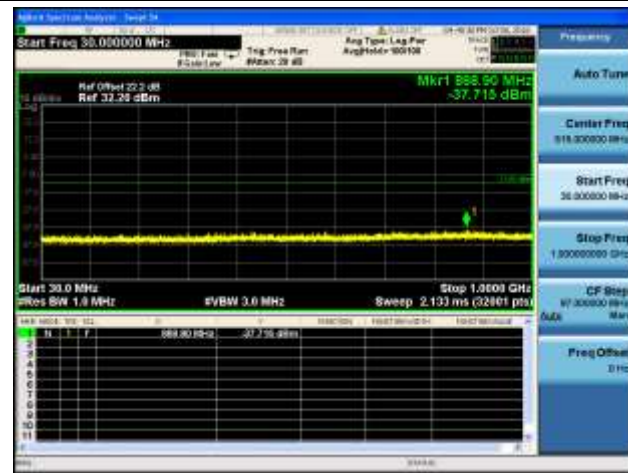
### LTE Band 2 (High Channel) 19185 (1908.5MHz) QPSK Bandwidth 3MHz



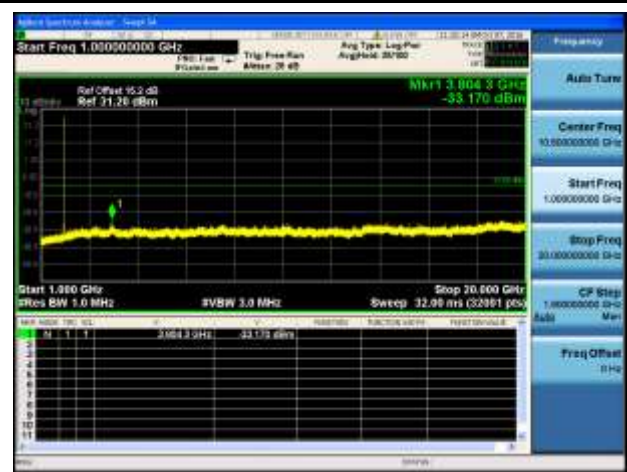
### LTE Band 2 (High Channel) 19175 (1907.5MHz) QPSK Bandwidth 5MHz



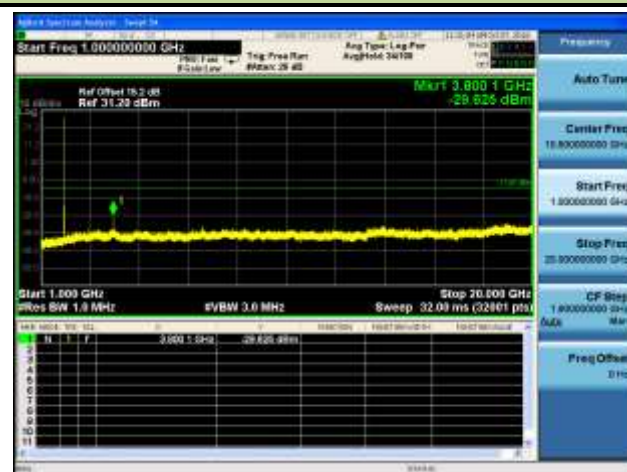
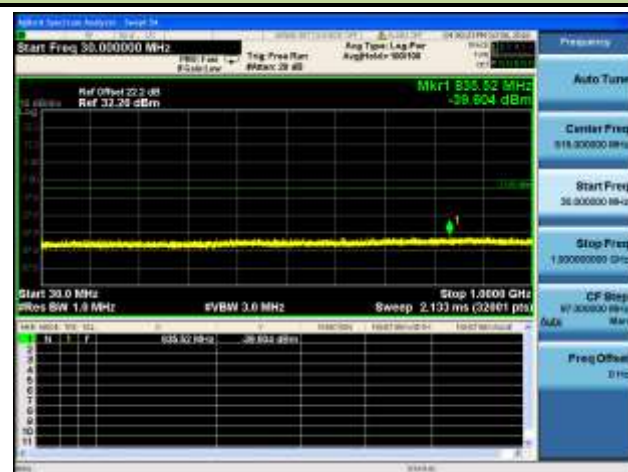
### LTE Band 2 (High Channel) 19150 (1905MHz) QPSK Bandwidth 10MHz



### LTE Band 2 (High Channel) 19125 (1902.5MHz) QPSK Bandwidth 15MHz

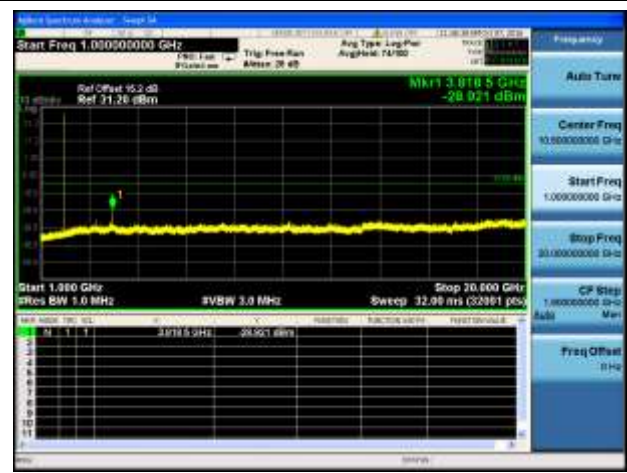
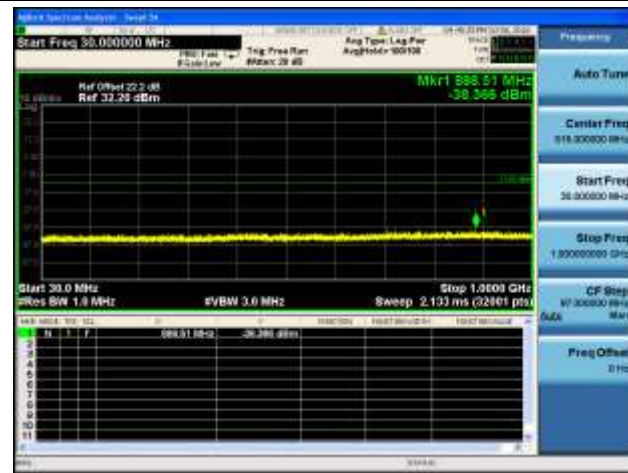


### LTE Band 2 (High Channel) 19100 (1900MHz) QPSK Bandwidth 20MHz

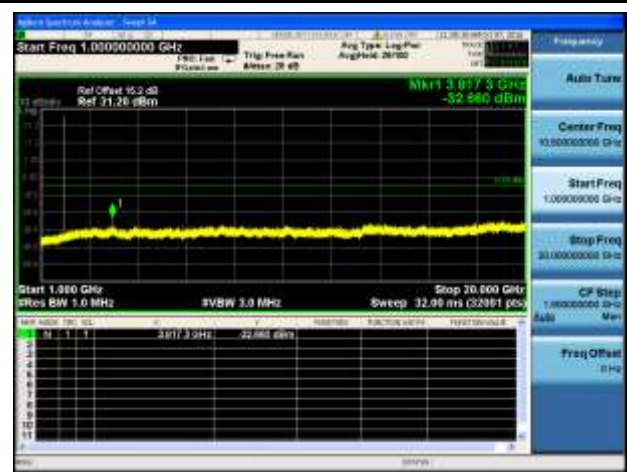




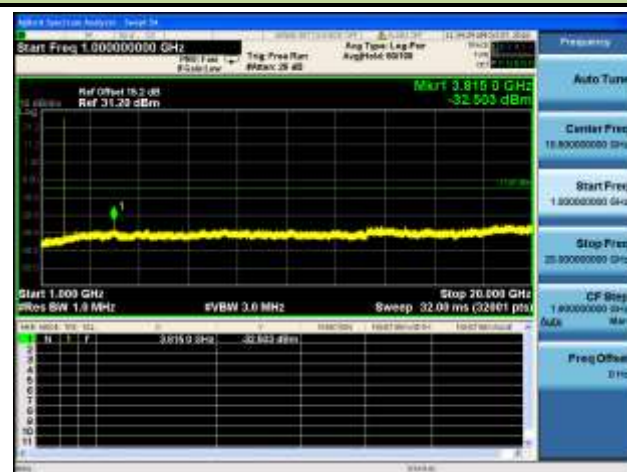
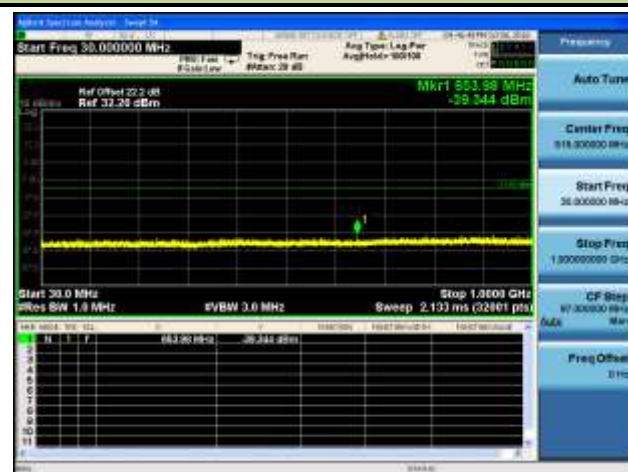
### LTE Band 2 (High Channel) 19193 (1909.3MHz) 16QAM Bandwidth 1.4MHz



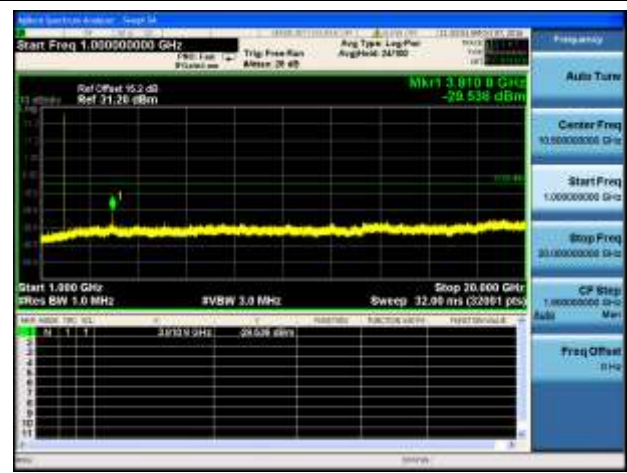
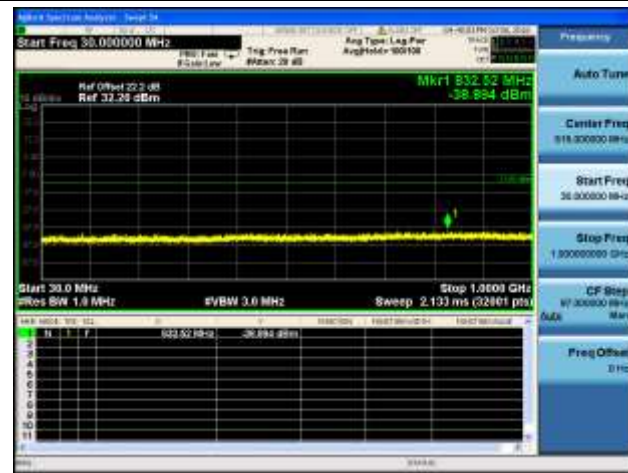
### LTE Band 2 (High Channel) 19185 (1908.5MHz) 16QAM Bandwidth 3MHz



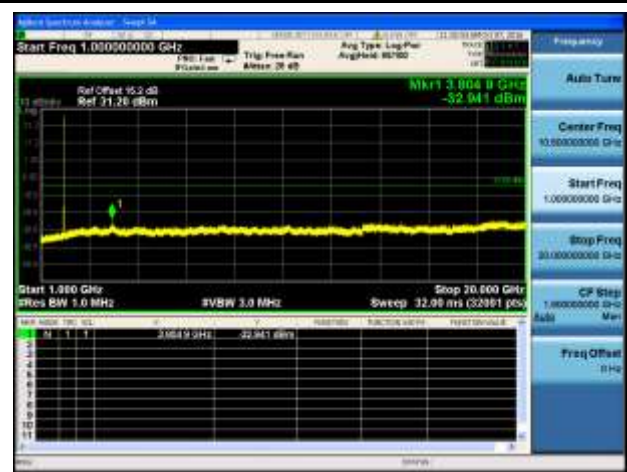
### LTE Band 2 (High Channel) 19175 (1907.5MHz) 16QAM Bandwidth 5MHz



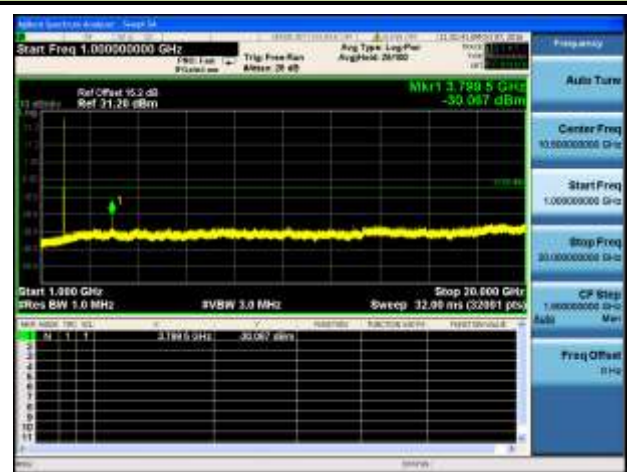
### LTE Band 2 (High Channel) 19150 (1905MHz) 16QAM Bandwidth 10MHz



### LTE Band 2 (High Channel) 19125 (1902.5MHz) 16QAM Bandwidth 15MHz

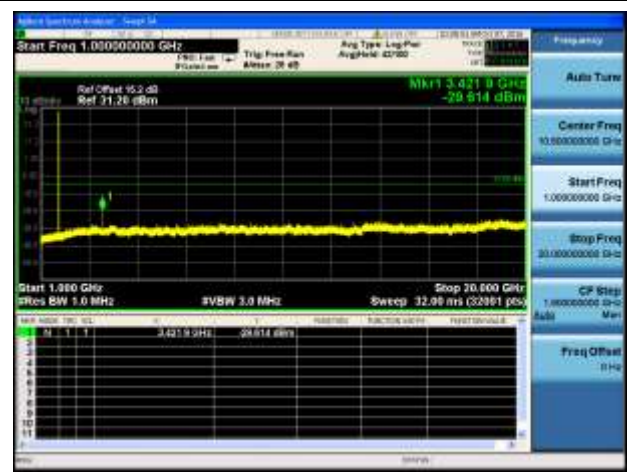
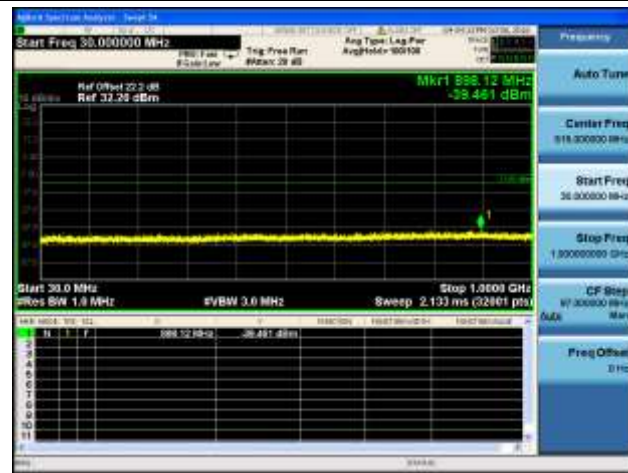


### LTE Band 2 (High Channel) 19100 (1900MHz) 16QAM Bandwidth 20MHz

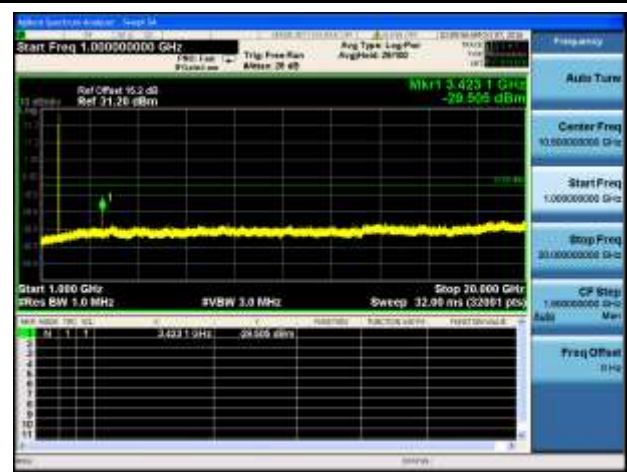




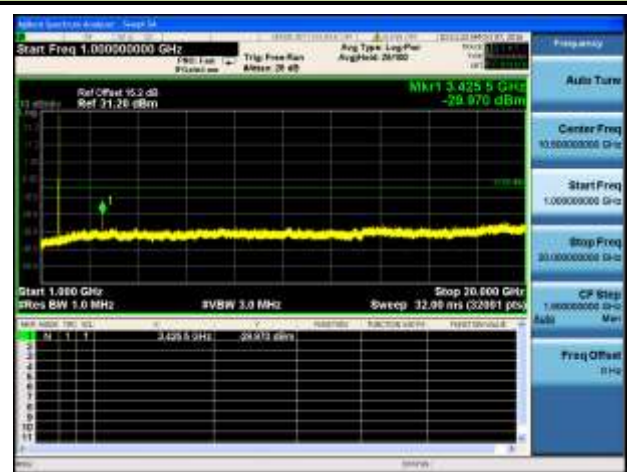
### LTE Band 4 (Low Channel) 19957 (1710.7MHz) QPSK Bandwidth 1.4MHz



### LTE Band 4 (Low Channel) 19965 (1711.5MHz) QPSK Bandwidth 3MHz

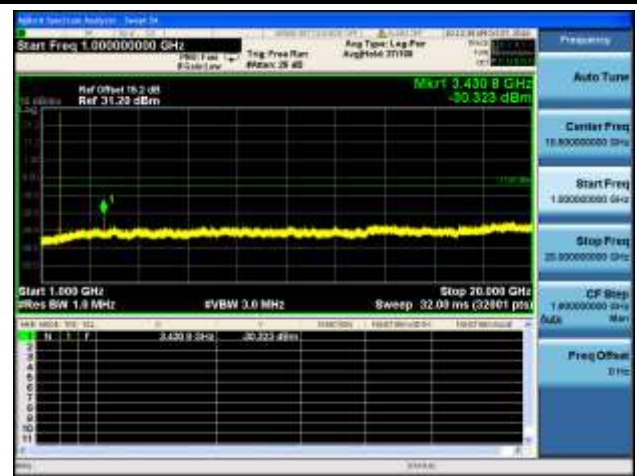
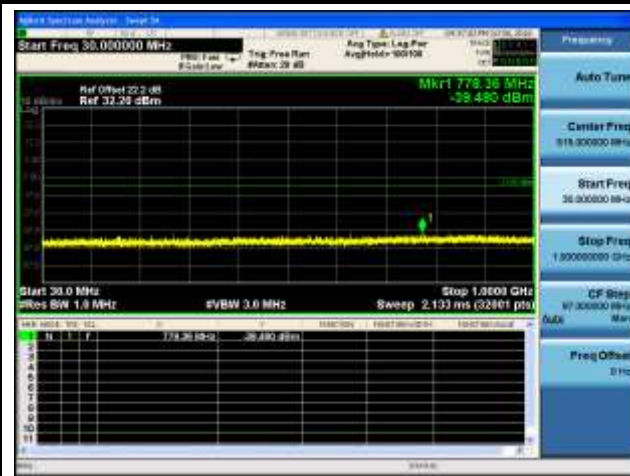


### LTE Band 4 (Low Channel) 19975 (1712.5MHz) QPSK Bandwidth 5MHz





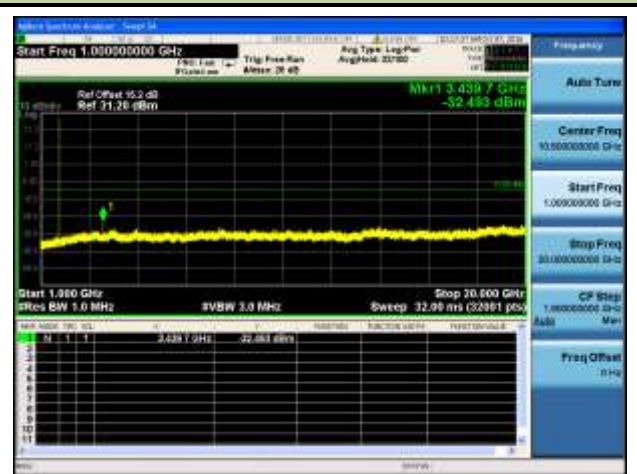
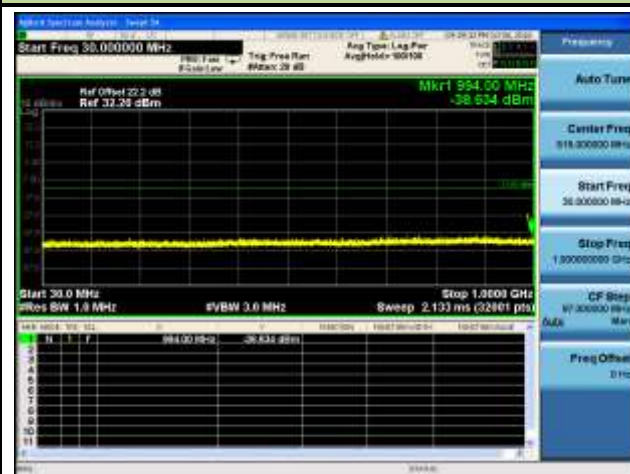
### LTE Band 4 (Low Channel) 20000 (1715MHz) QPSK Bandwidth 10MHz



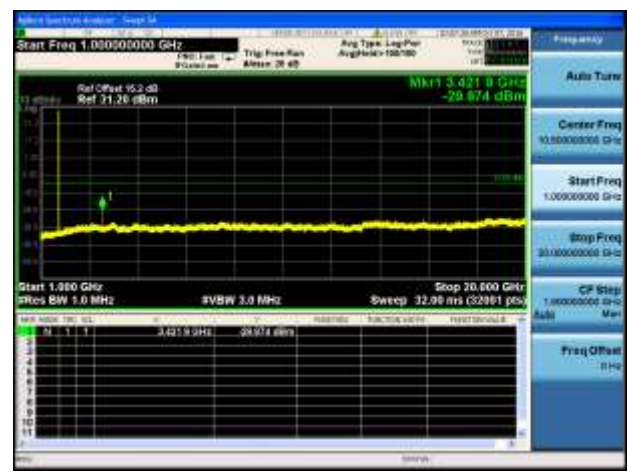
### LTE Band 4 (Low Channel) 20025 (1720MHz) QPSK Bandwidth 15MHz



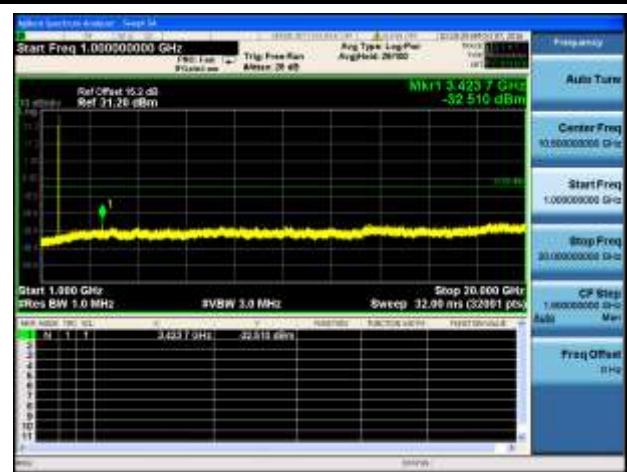
### LTE Band 4 (Low Channel) 20050 (1720MHz) QPSK Bandwidth 20MHz



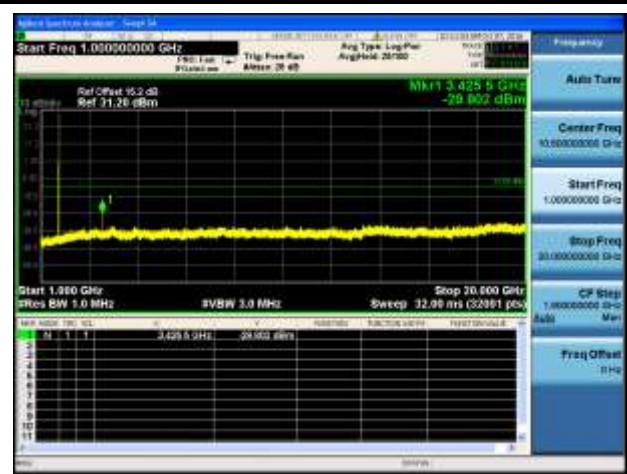
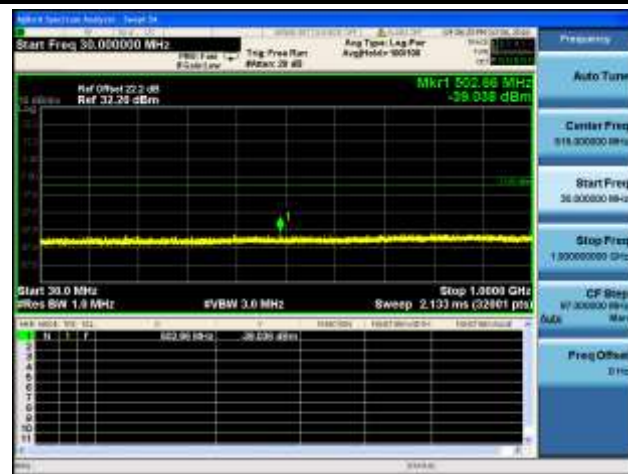
### LTE Band 4 (Low Channel) 19957 (1710.7MHz) 16QAM Bandwidth 1.4MHz



### LTE Band 4 (Low Channel) 19965 (1711.5MHz) 16QAM Bandwidth 3MHz

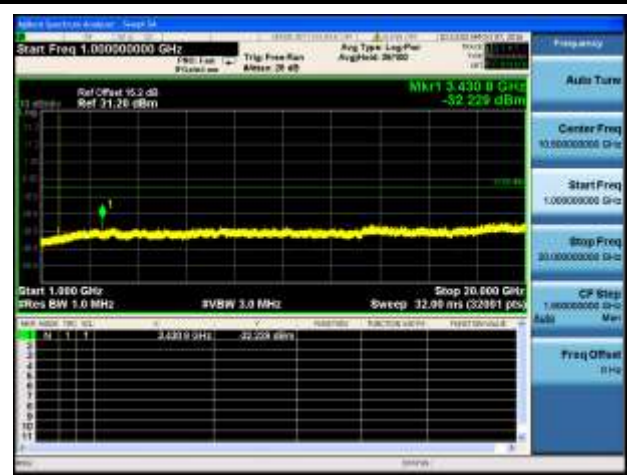


### LTE Band 4 (Low Channel) 19975 (1712.5MHz) 16QAM Bandwidth 5MHz

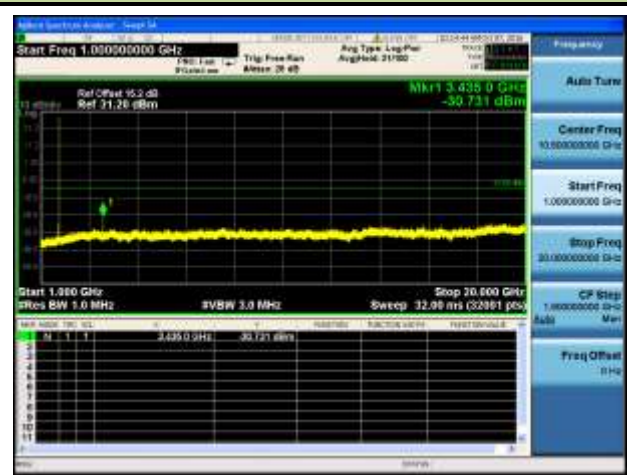




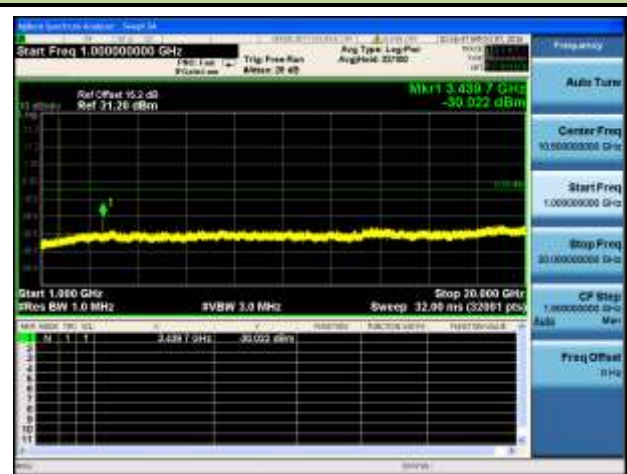
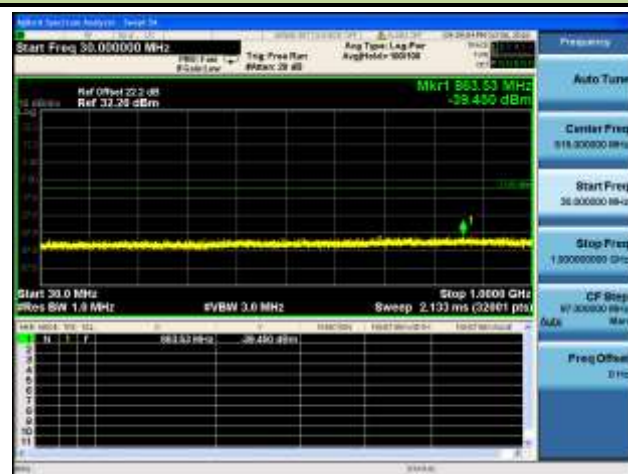
### LTE Band 4 (Low Channel) 20000 (1715MHz) 16QAM Bandwidth 10MHz



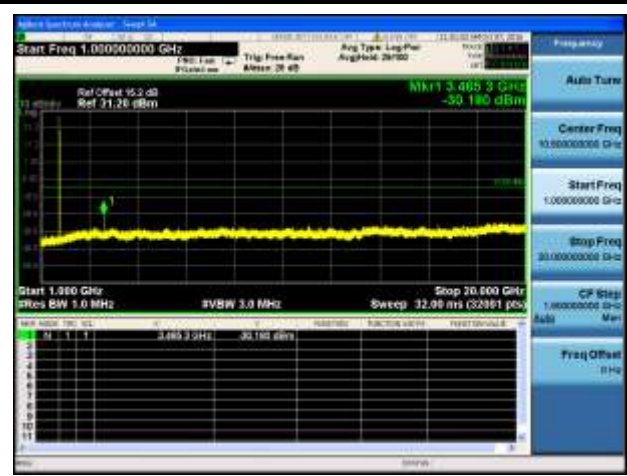
### LTE Band 4 (Low Channel) 20025 (1717.5MHz) 16QAM Bandwidth 15MHz



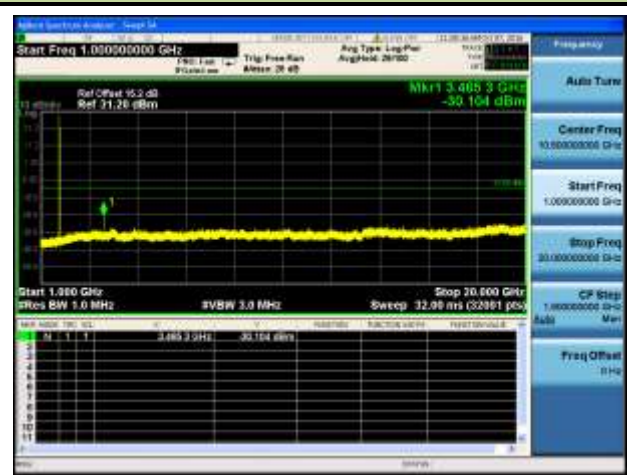
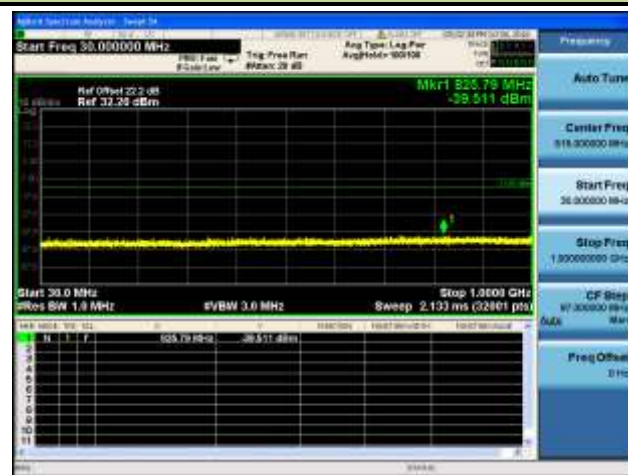
### LTE Band 4 (Low Channel) 20050 (1720MHz) 16QAM Bandwidth 20MHz



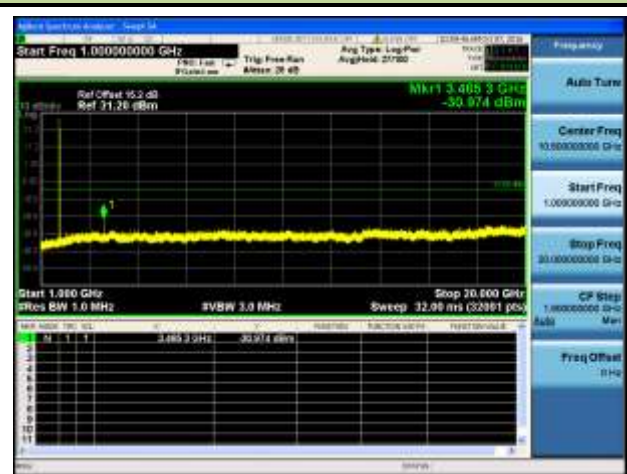
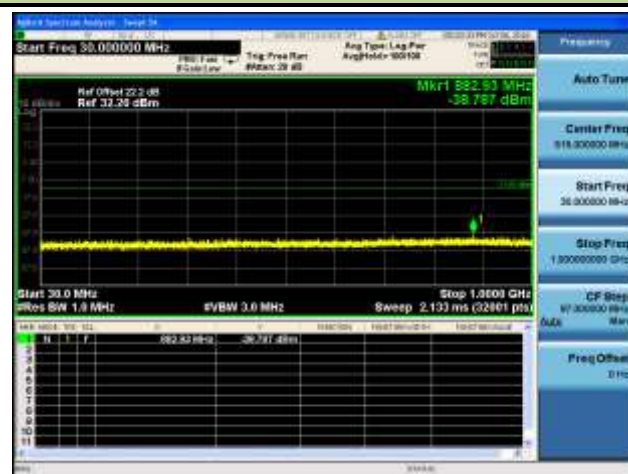
### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) QPSK Bandwidth 1.4MHz



### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) QPSK Bandwidth 3MHz

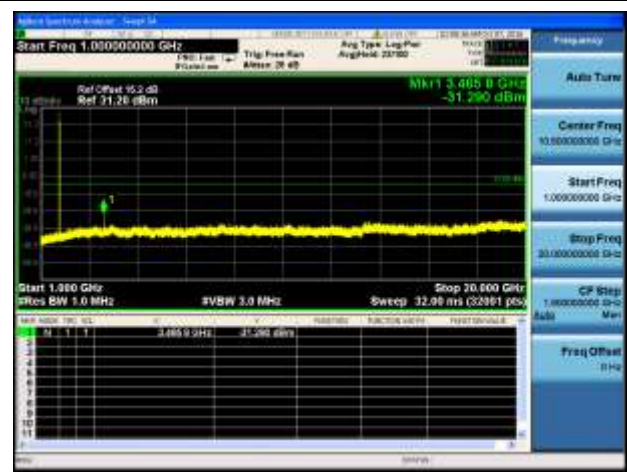
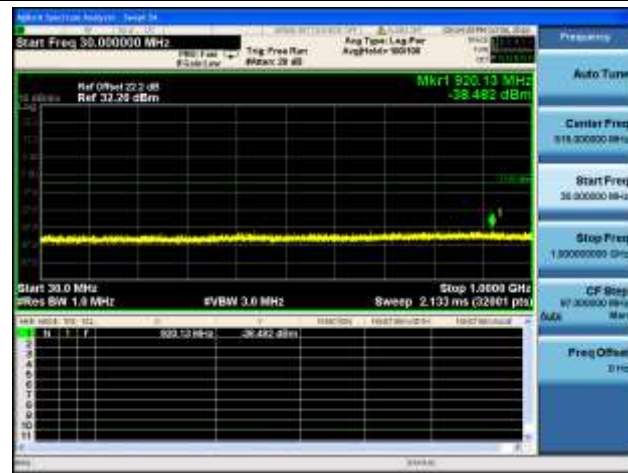


### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) QPSK Bandwidth 5MHz

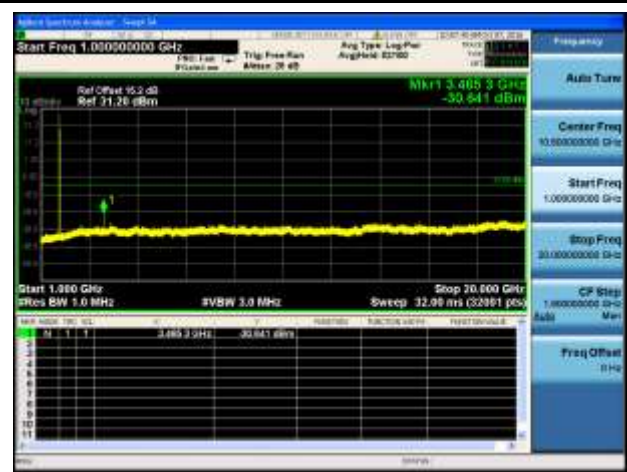
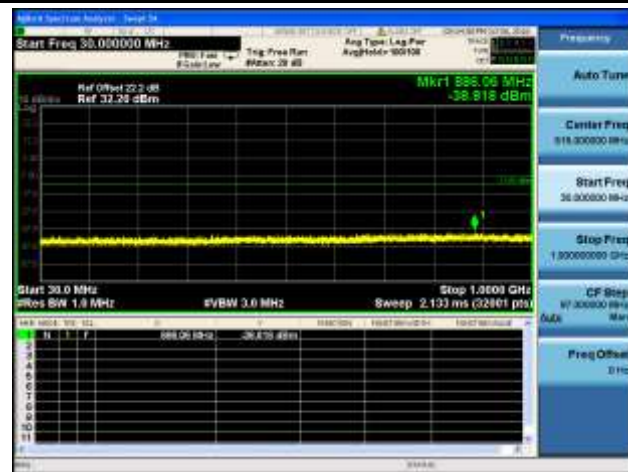




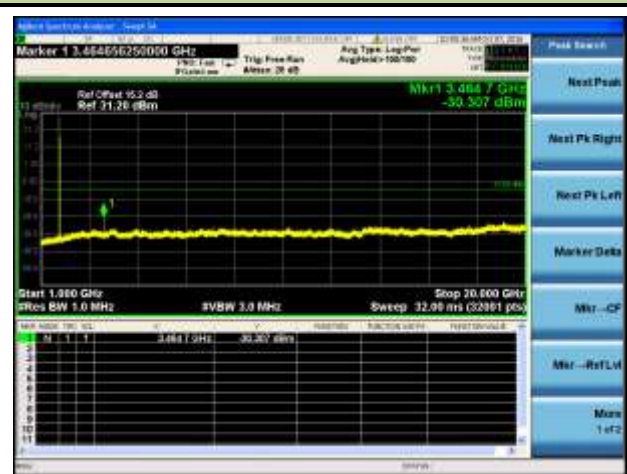
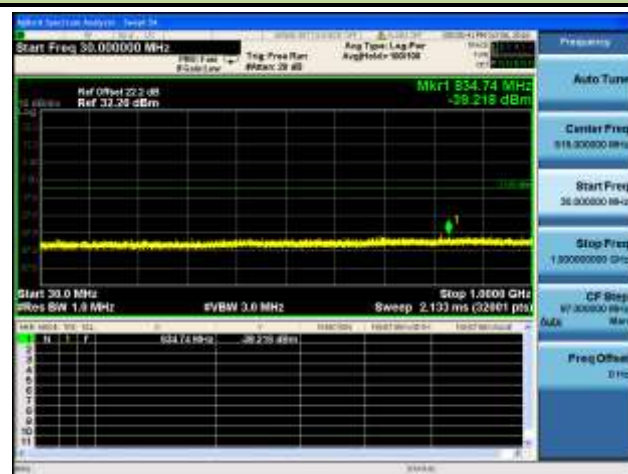
### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) QPSK Bandwidth 10MHz



### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) QPSK Bandwidth 15MHz

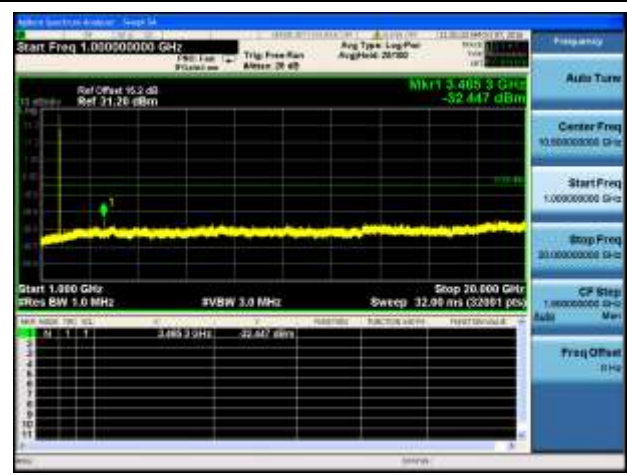
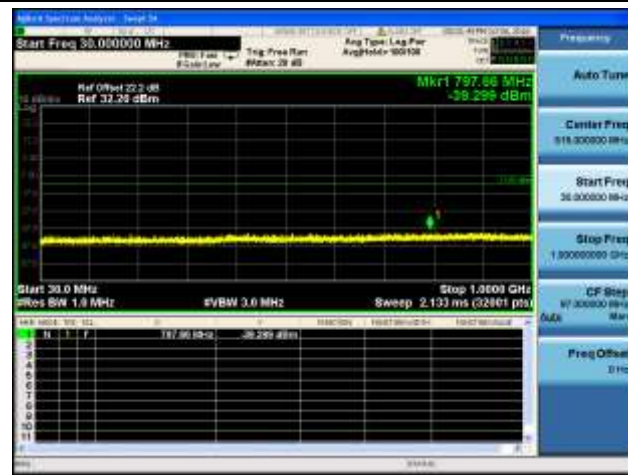


### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) QPSK Bandwidth 20MHz

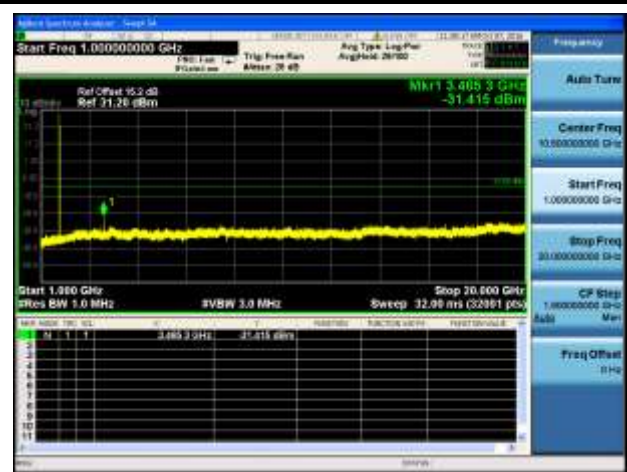




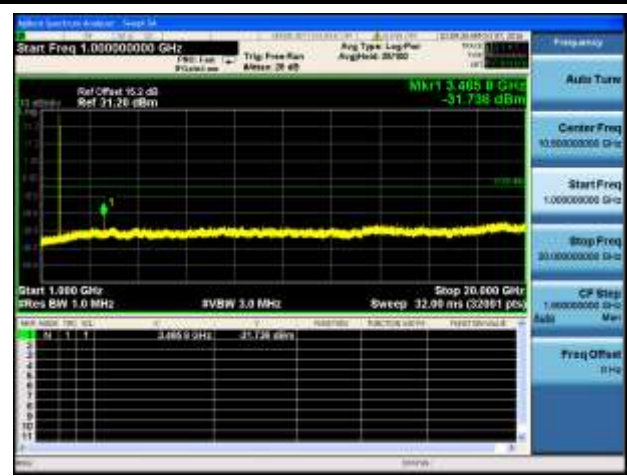
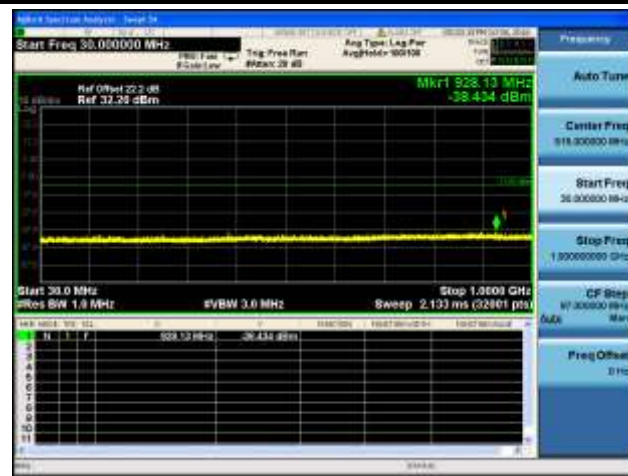
### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) 16QAM Bandwidth 1.4MHz



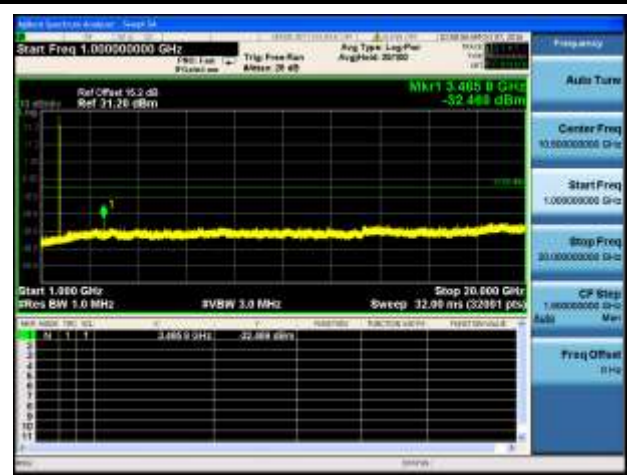
### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) 16QAM Bandwidth 3MHz



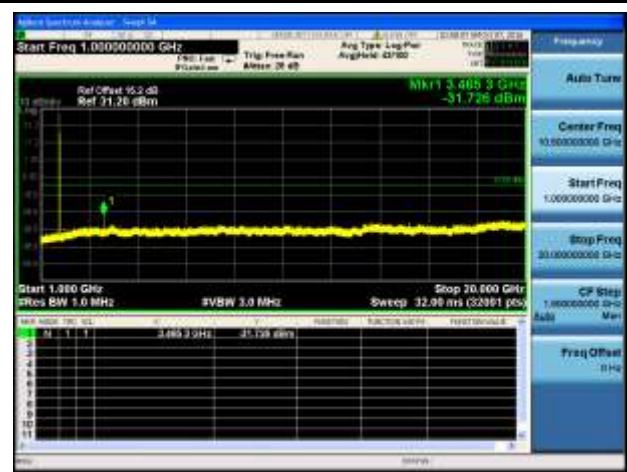
### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) 16QAM Bandwidth 5MHz



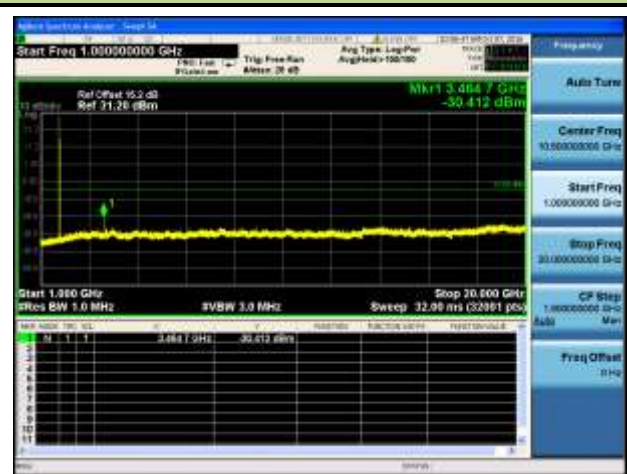
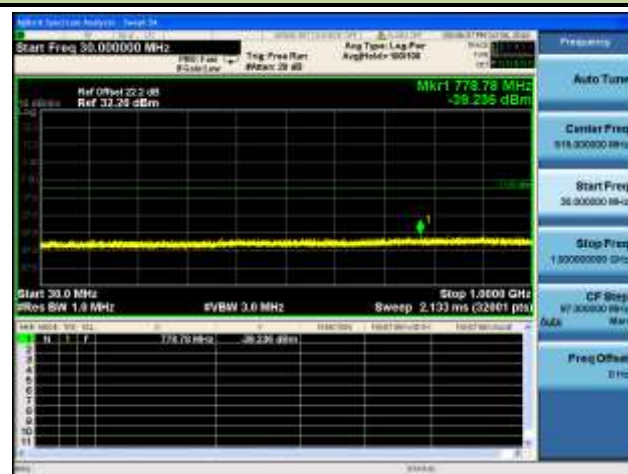
### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) 16QAM Bandwidth 10MHz



### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) 16QAM Bandwidth 15MHz

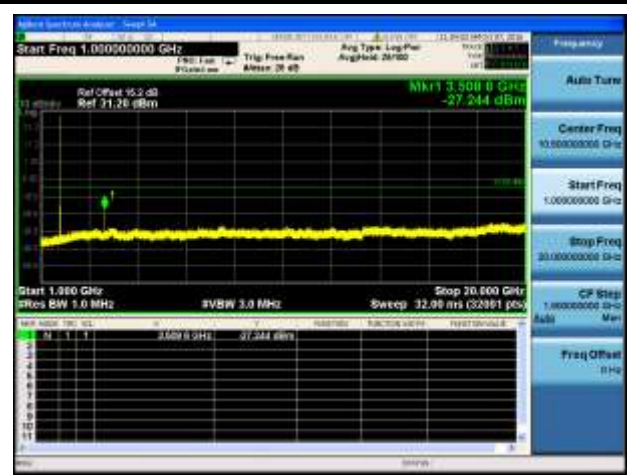


### LTE Band 4 (Mid Channel) 20175 (1732.5MHz) 16QAM Bandwidth 20MHz

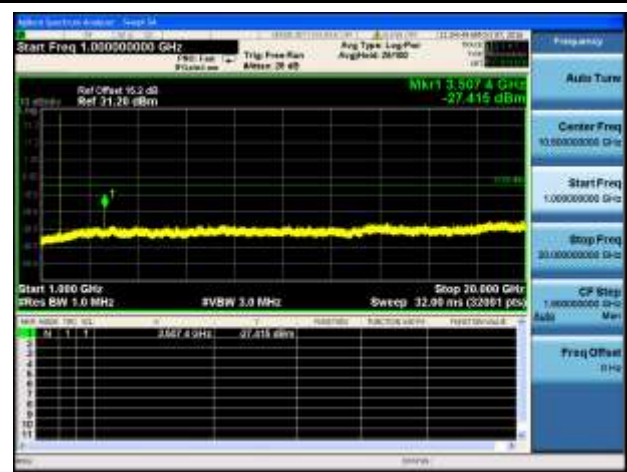




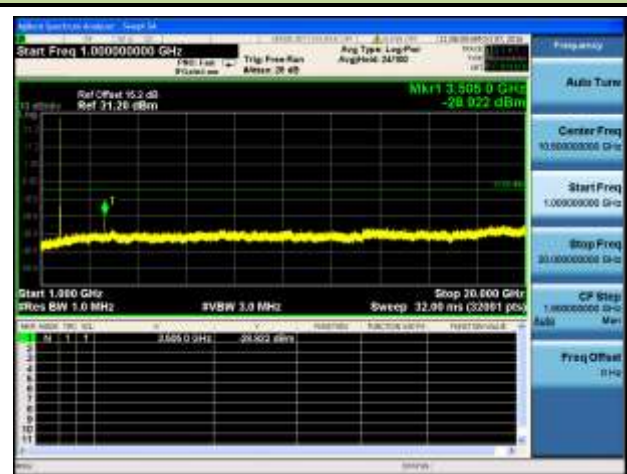
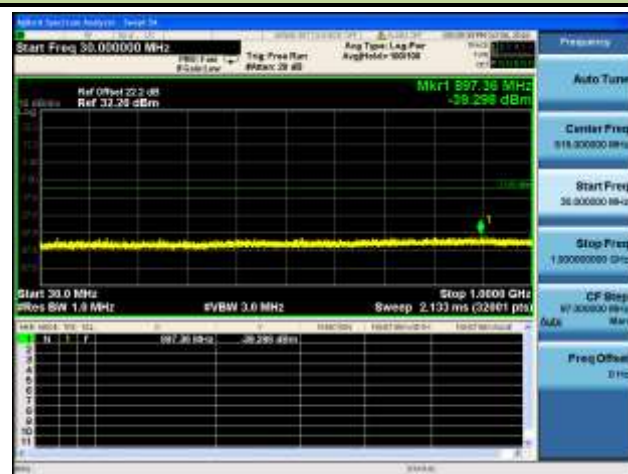
### LTE Band 4 (High Channel) 20393 (1754.3MHz) QPSK Bandwidth 1.4MHz



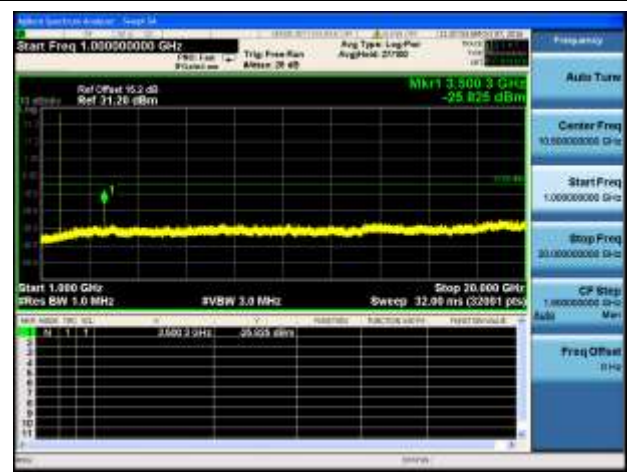
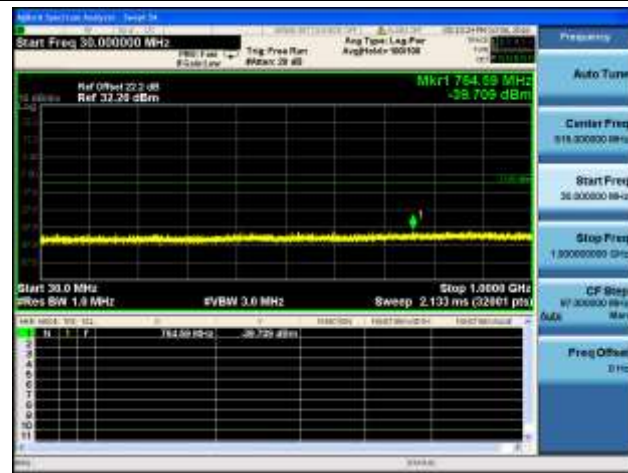
### LTE Band 4 (High Channel) 20385 (1753.5MHz) QPSK Bandwidth 3MHz



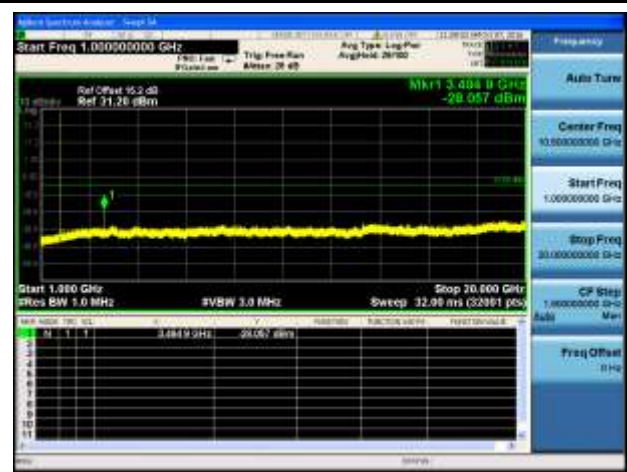
### LTE Band 4 (High Channel) 20375 (1752.5MHz) QPSK Bandwidth 5MHz



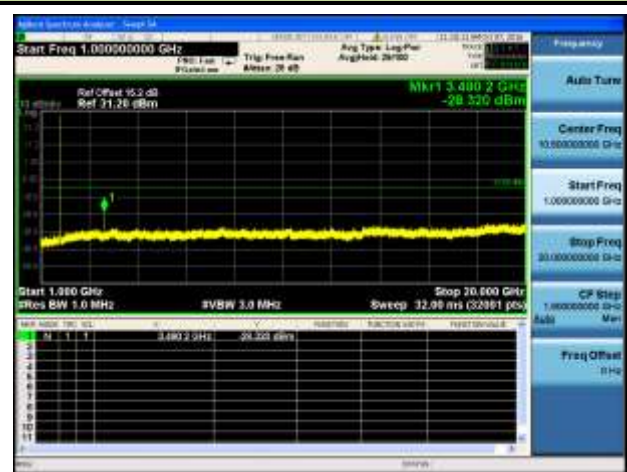
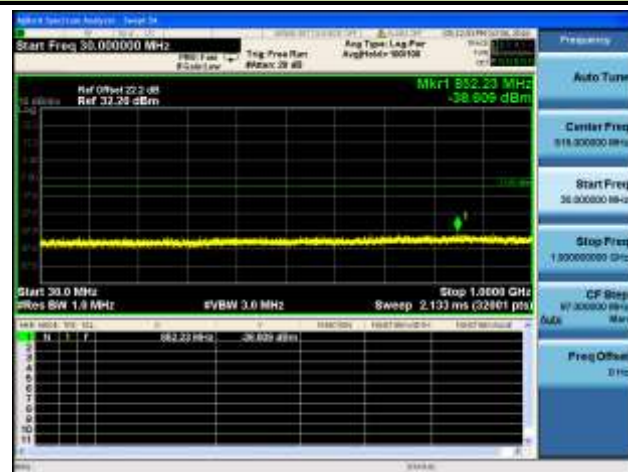
### LTE Band 4 (High Channel) 20350 (1750MHz) QPSK Bandwidth 10MHz



### LTE Band 4 (High Channel) 20325 (1747.5MHz) QPSK Bandwidth 15MHz

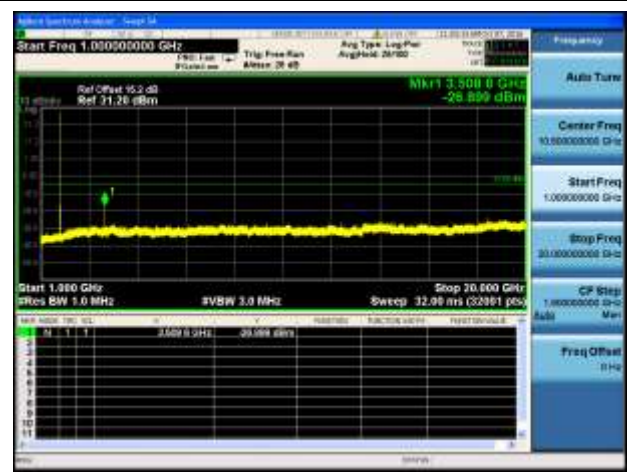
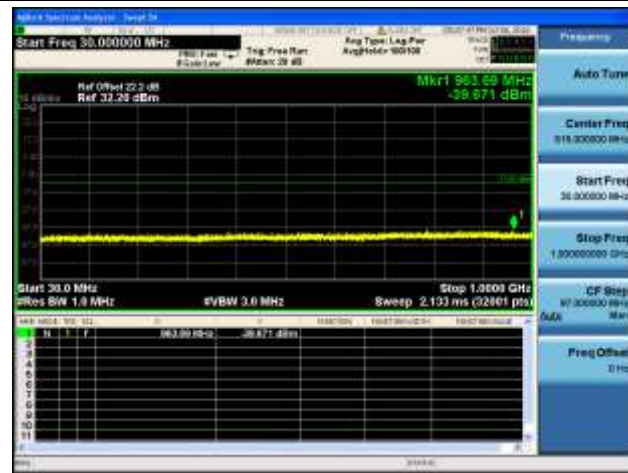


### LTE Band 4 (High Channel) 20300 (1745MHz) QPSK Bandwidth 20MHz

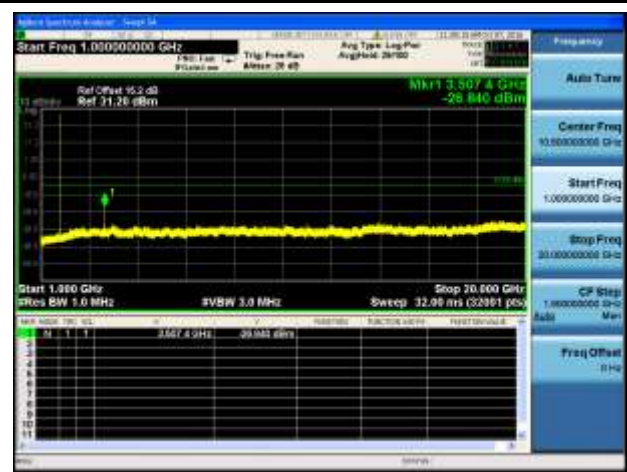




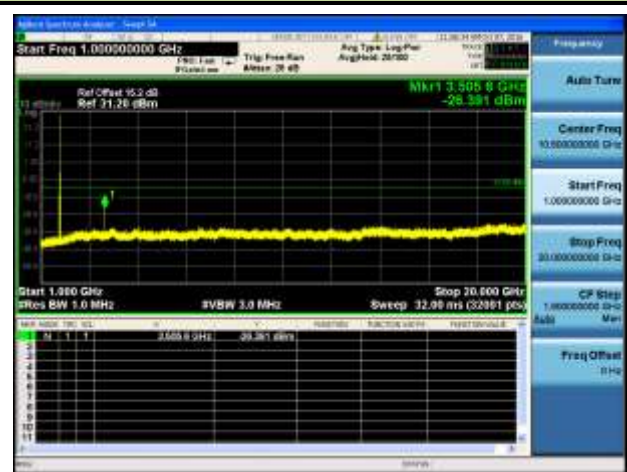
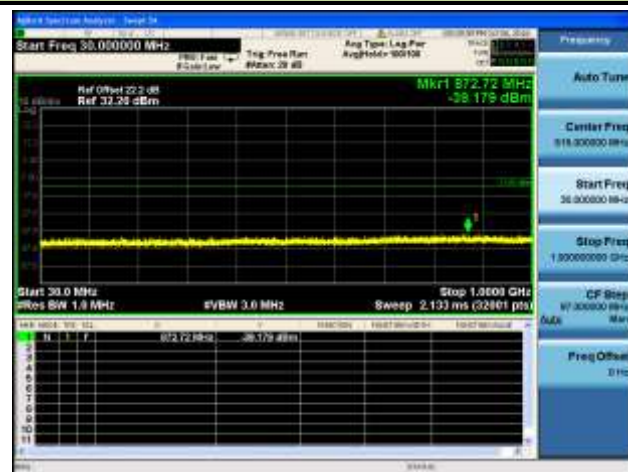
### LTE Band 4 (High Channel) 20393 (1754.3MHz) 16QAM Bandwidth 1.4MHz



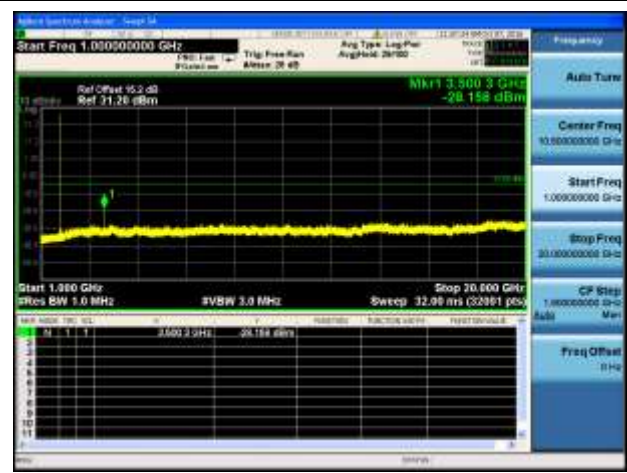
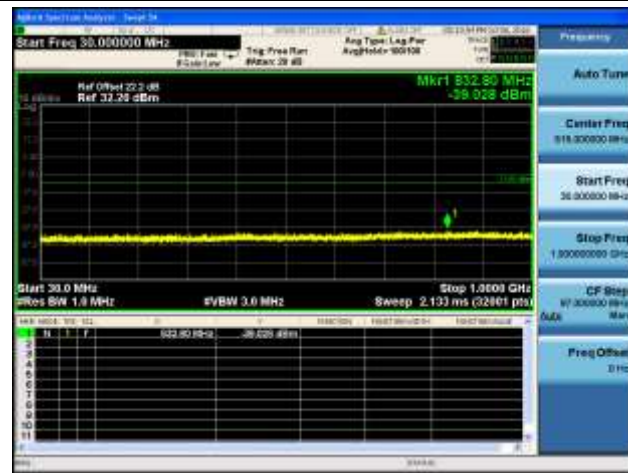
### LTE Band 4 (High Channel) 20385 (1753.5MHz) 16QAM Bandwidth 3MHz



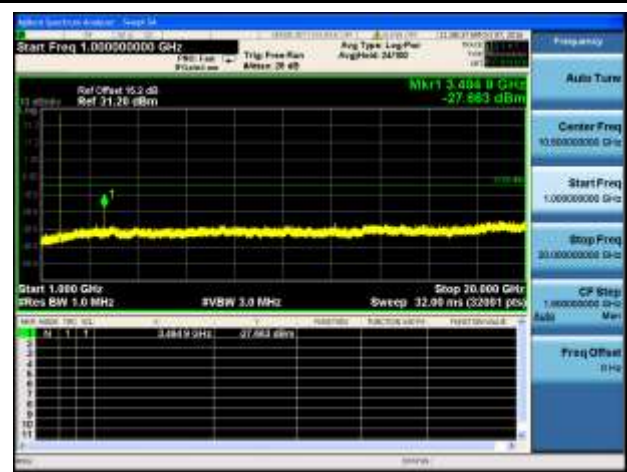
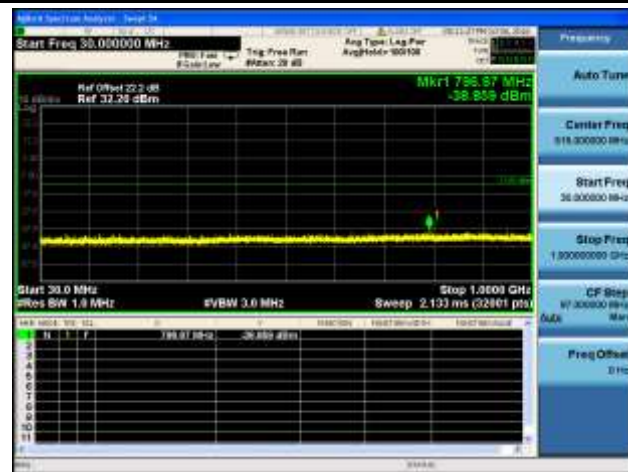
### LTE Band 4 (High Channel) 20375 (1752.5MHz) 16QAM Bandwidth 5MHz



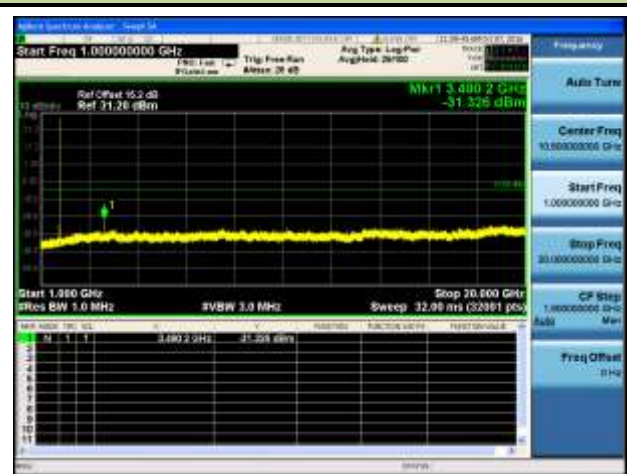
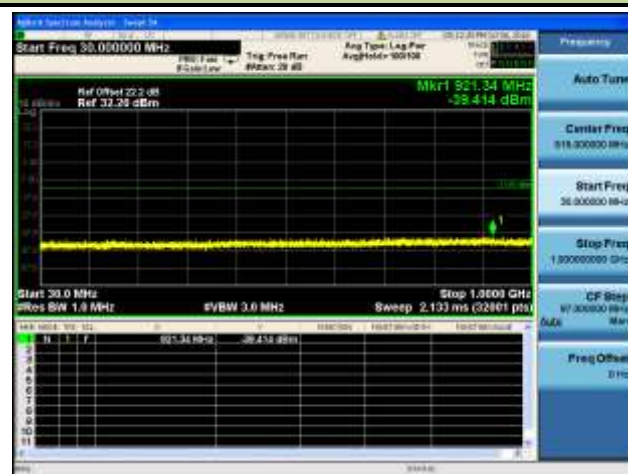
### LTE Band 4 (High Channel) 20350 (1750MHz) 16QAM Bandwidth 10MHz



### LTE Band 4 (High Channel) 20325 (1747.5MHz) 16QAM Bandwidth 15MHz

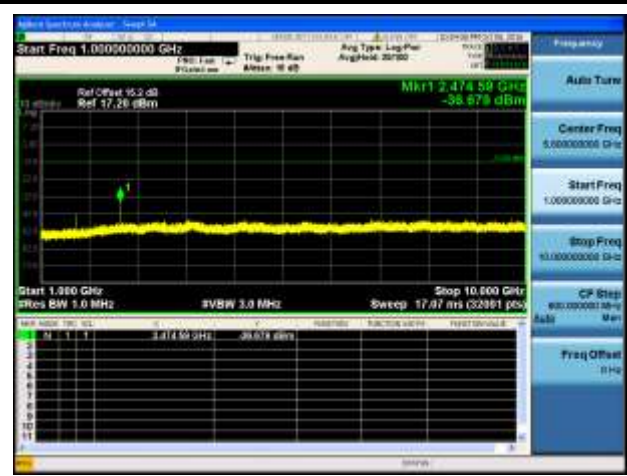


### LTE Band 4 (High Channel) 20300(1745MHz) 16QAM Bandwidth 20MHz

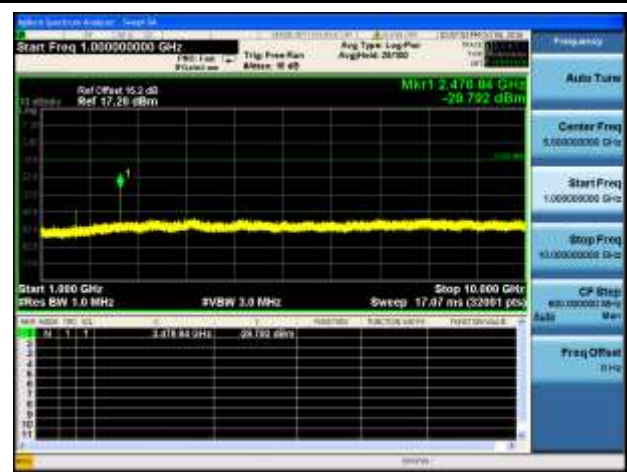
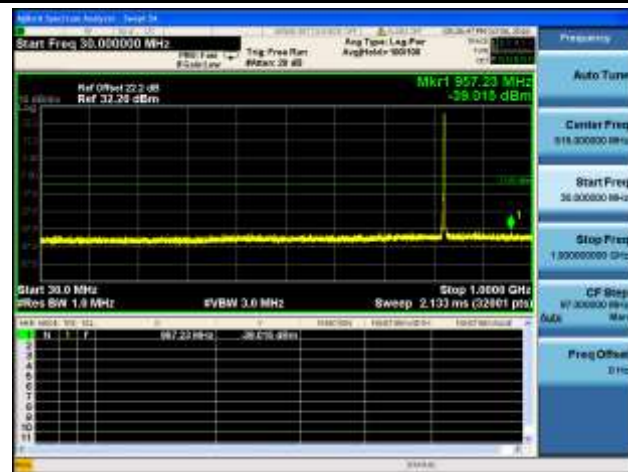




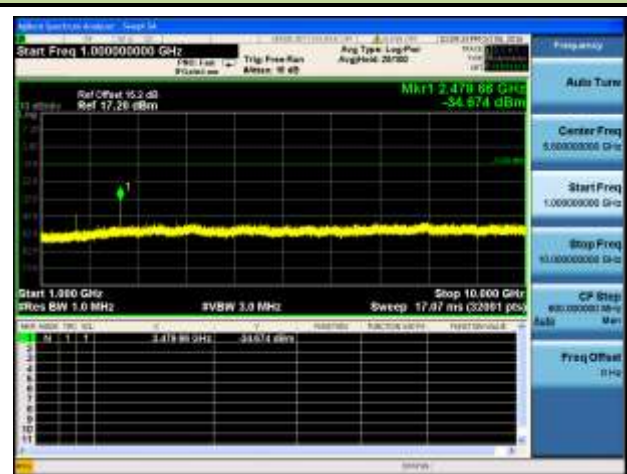
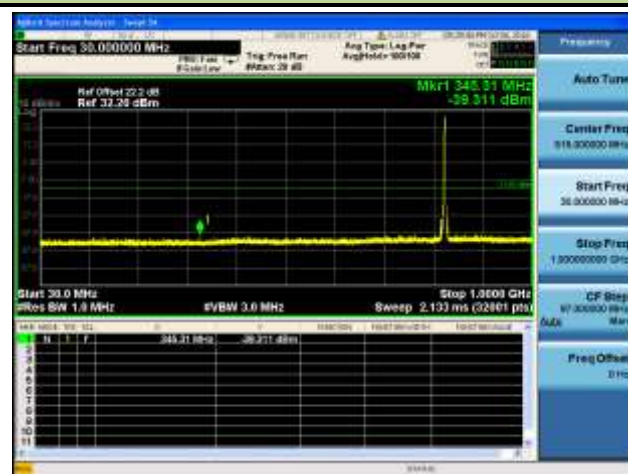
### LTE Band 5 (Low Channel) 20407 (824.7MHz) QPSK Bandwidth 1.4MHz



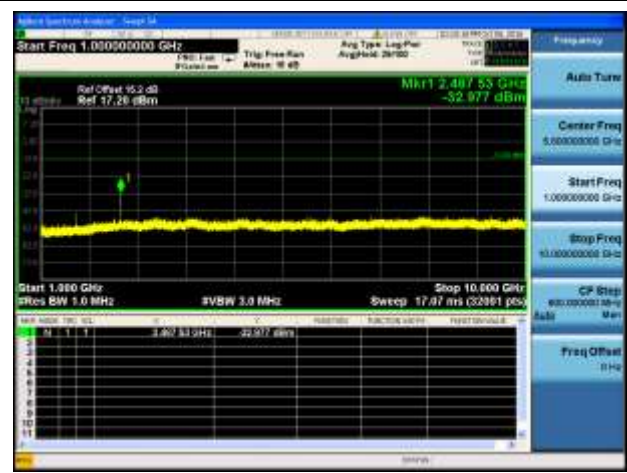
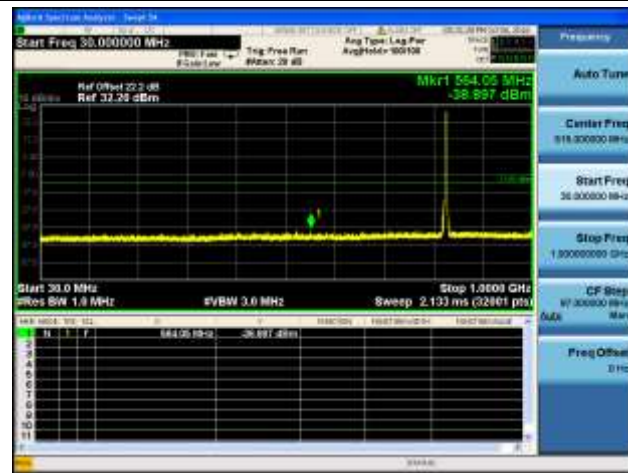
### LTE Band 5 (Low Channel) 20415 (825.5MHz) QPSK Bandwidth 3MHz



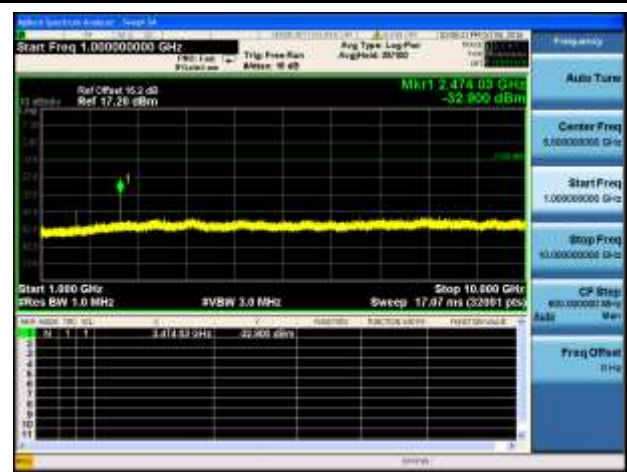
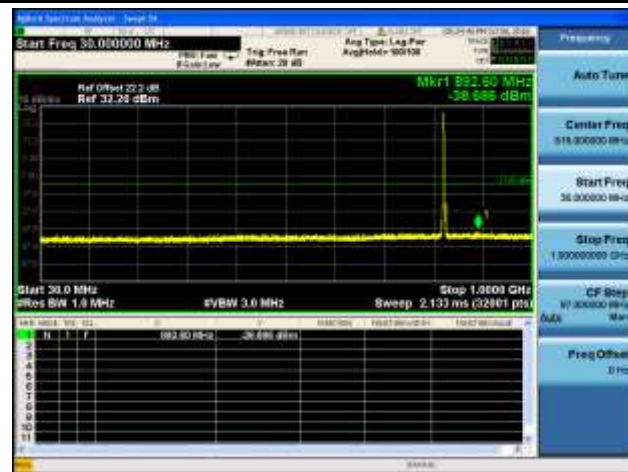
### LTE Band 5 (Low Channel) 20425 (826.5MHz) QPSK Bandwidth 5MHz



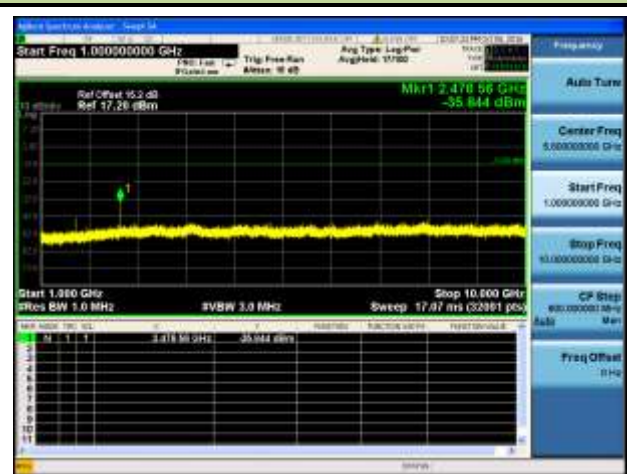
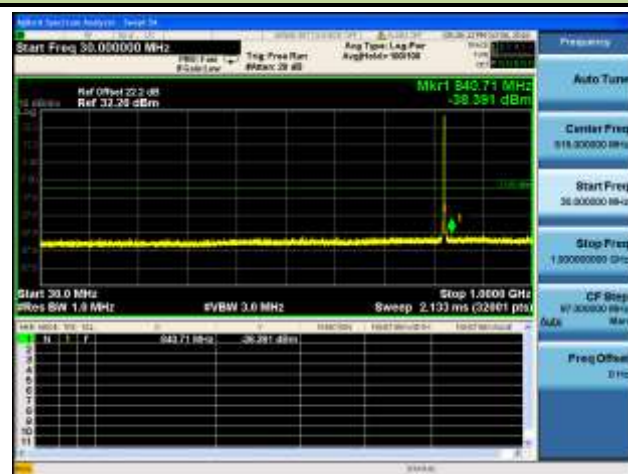
### LTE Band 5 (Low Channel) 20450 (829MHz) QPSK Bandwidth 10MHz



### LTE Band 5 (Low Channel) 20407 (824.7MHz) 16QAM Bandwidth 1.4MHz

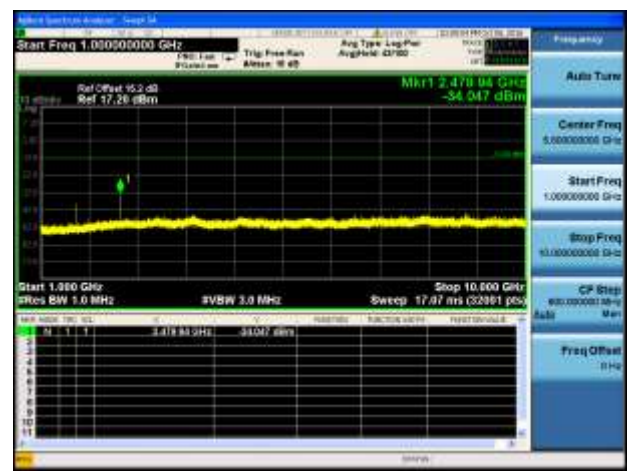


### LTE Band 5 (Low Channel) 20415 (825.5MHz) 16QAM Bandwidth 3MHz

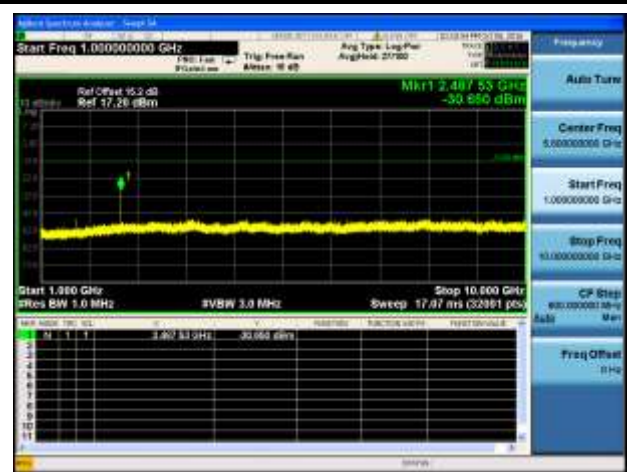
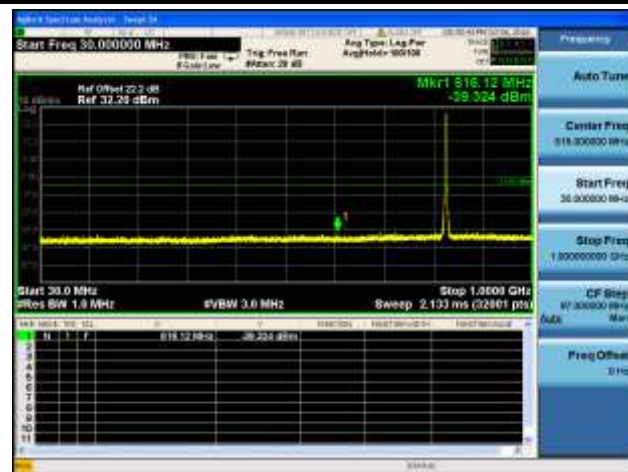




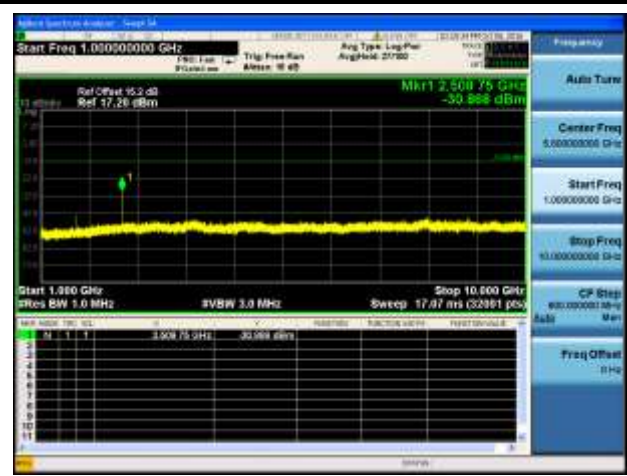
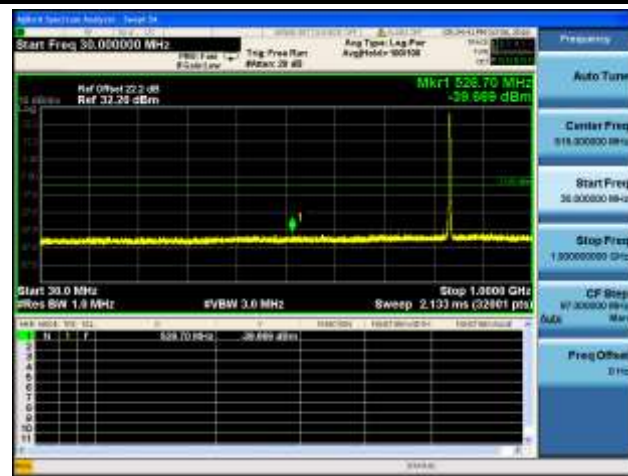
### LTE Band 5 (Low Channel) 20425 (826.5MHz) 16QAM Bandwidth 5MHz



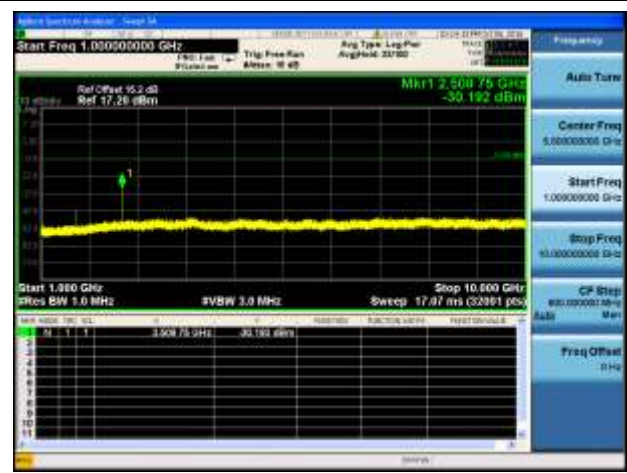
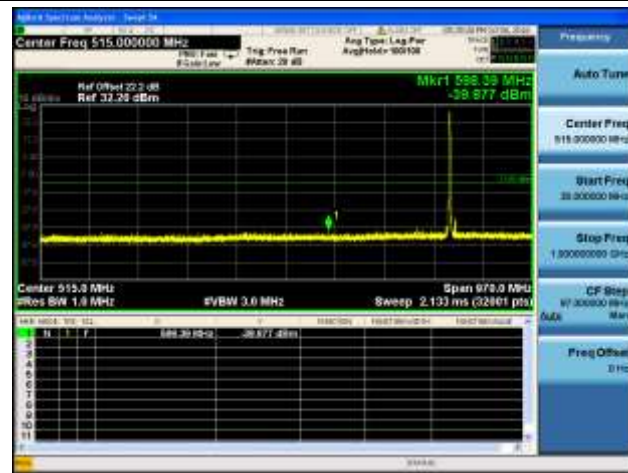
### LTE Band 5 (Low Channel) 20450 (829MHz) 16QAM Bandwidth 10MHz



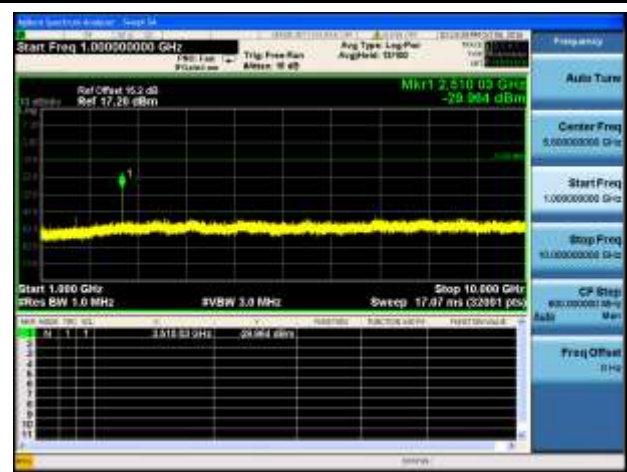
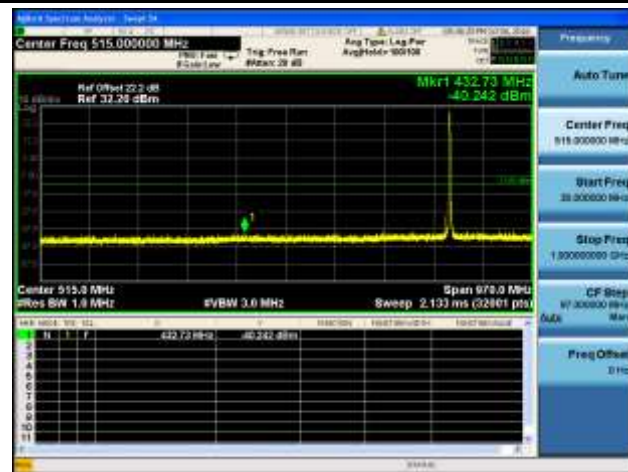
### LTE Band 5 (Mid Channel) 20525 (836.5MHz) QPSK Bandwidth 1.4MHz



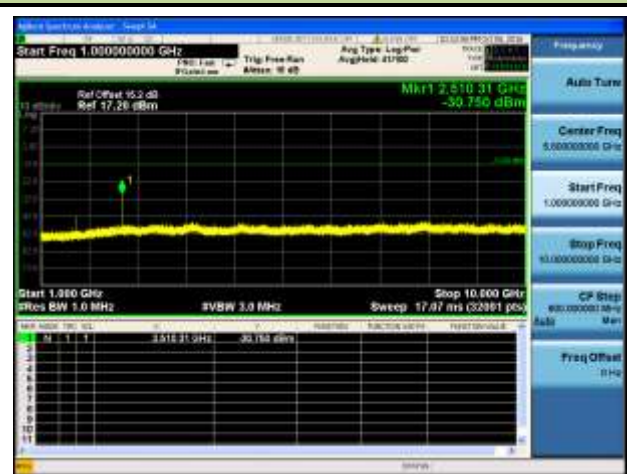
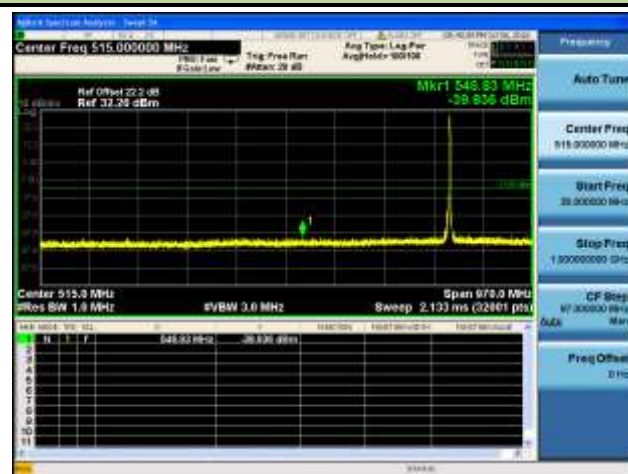
### LTE Band 5 (Mid Channel) 20525 (836.5MHz) QPSK Bandwidth 3MHz



### LTE Band 5 (Mid Channel) 20525 (836.5MHz) QPSK Bandwidth 5MHz

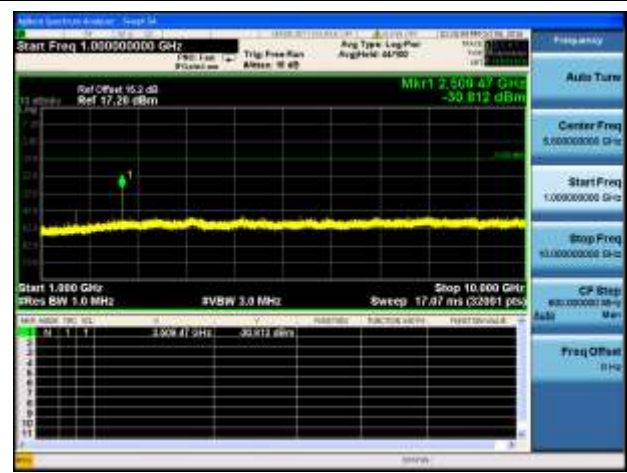
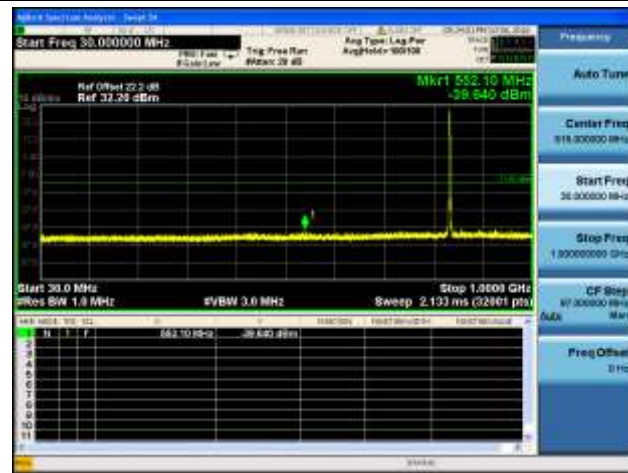


### LTE Band 5 (Mid Channel) 20525 (836.5MHz) QPSK Bandwidth 10MHz

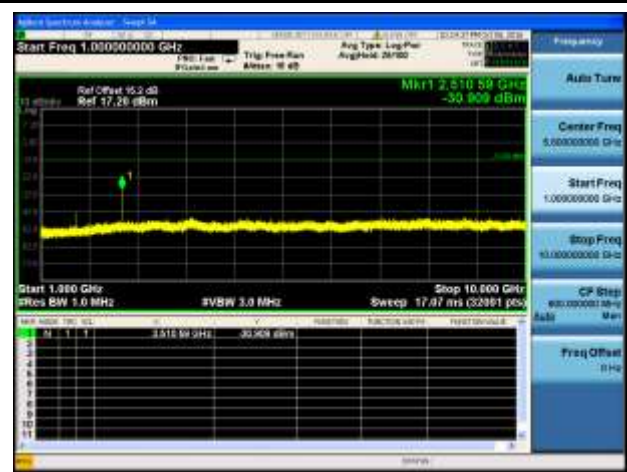
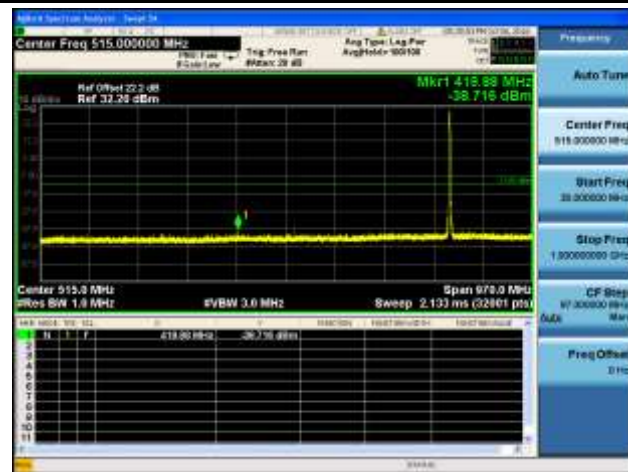




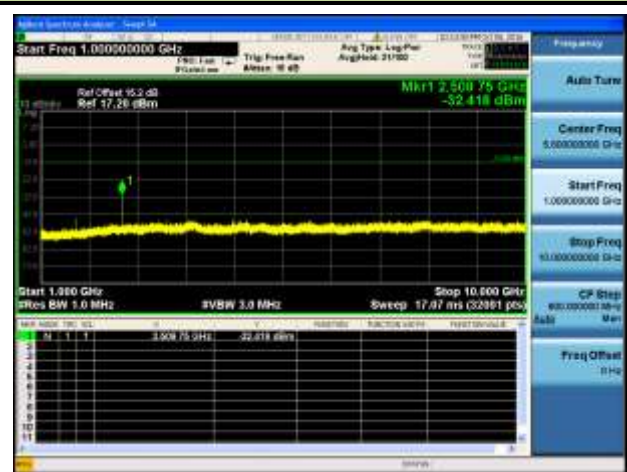
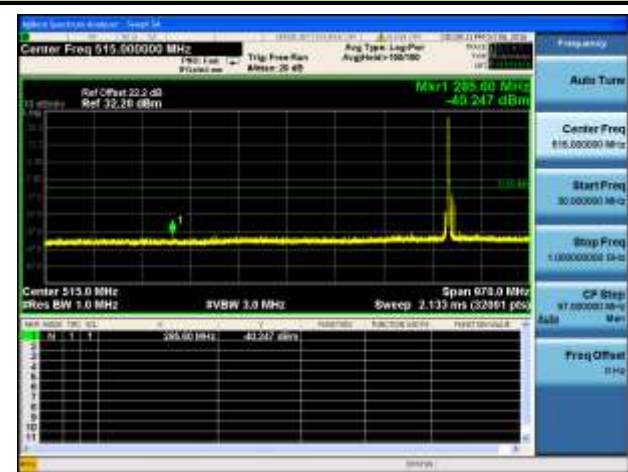
### LTE Band 5 (Mid Channel) 20525 (836.5MHz) 16QAM Bandwidth 1.4MHz



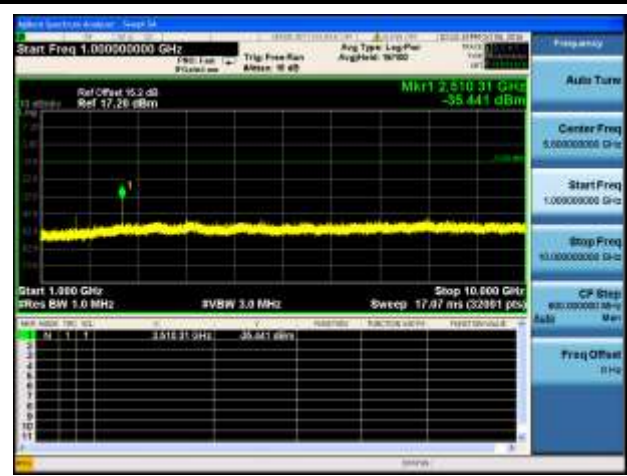
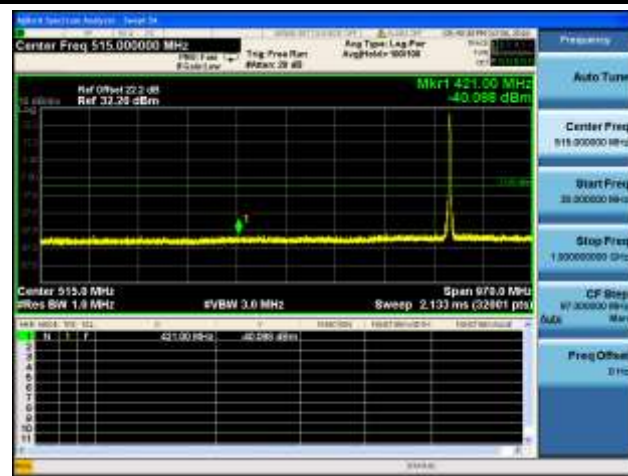
### LTE Band 5 (Mid Channel) 20525 (836.5MHz) 16QAM Bandwidth 3MHz



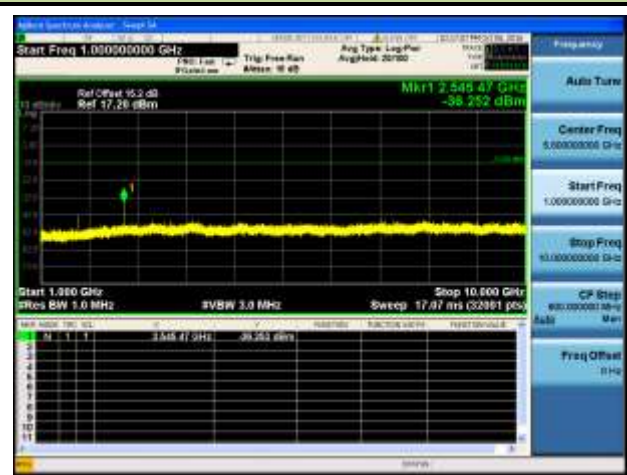
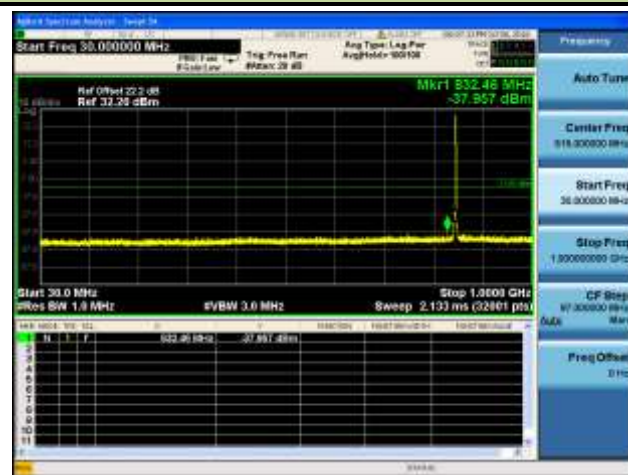
### LTE Band 5 (Mid Channel) 20525 (836.5MHz) 16QAM Bandwidth 5MHz



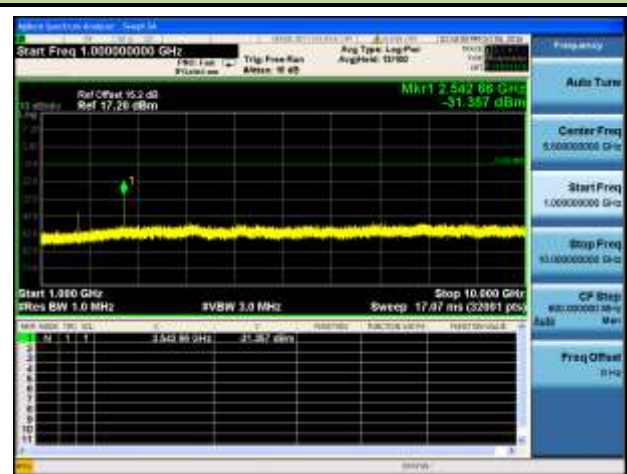
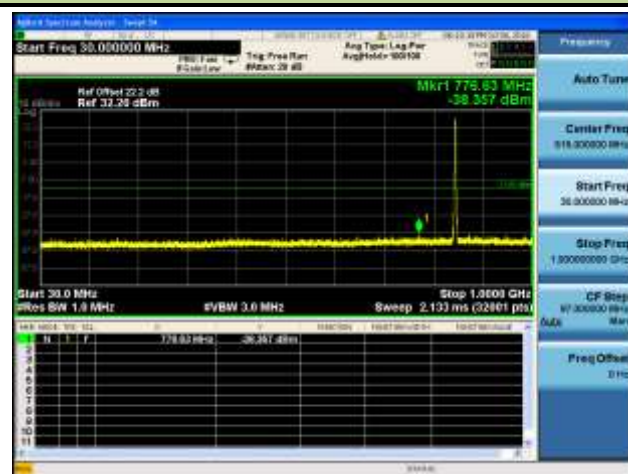
### LTE Band 5 (Mid Channel) 20525 (836.5MHz) 16QAM Bandwidth 10MHz



### LTE Band 5 (High Channel) 20643 (848.3MHz) QPSK Bandwidth 1.4MHz

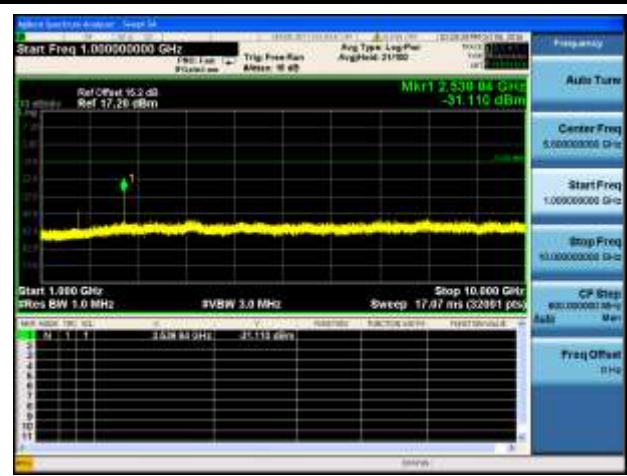
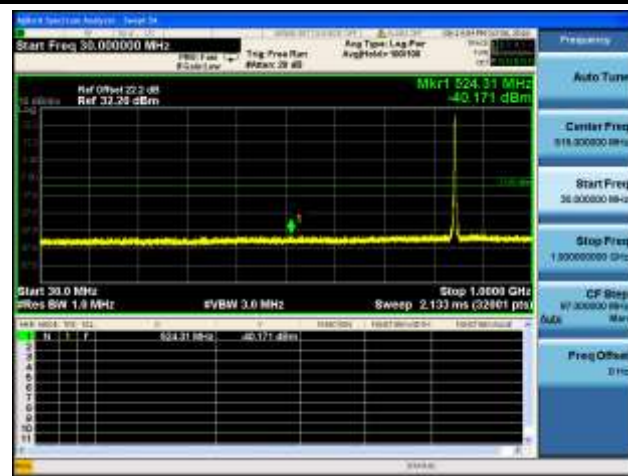


### LTE Band 5 (High Channel) 20635 (847.5MHz) QPSK Bandwidth 3MHz

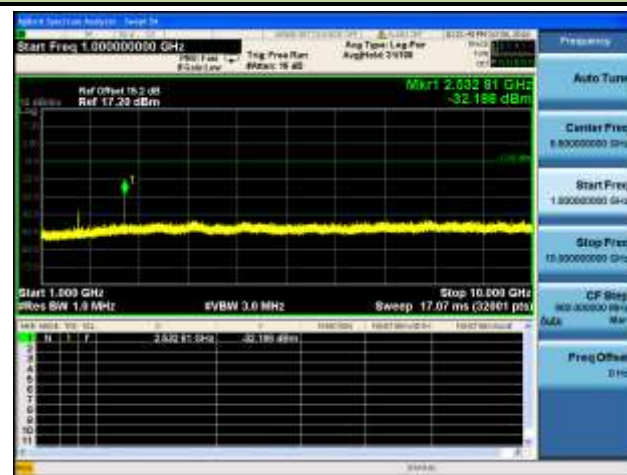
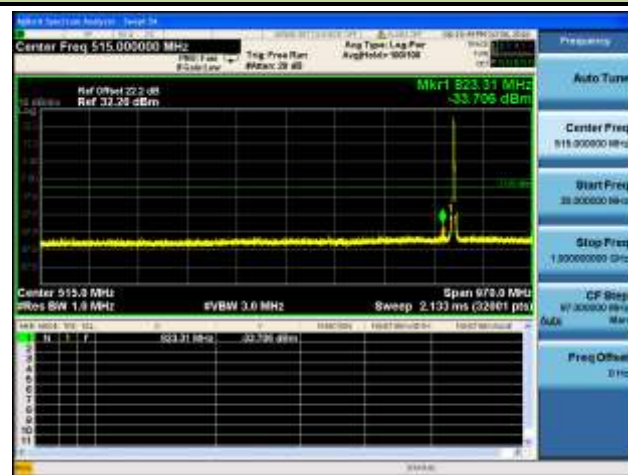




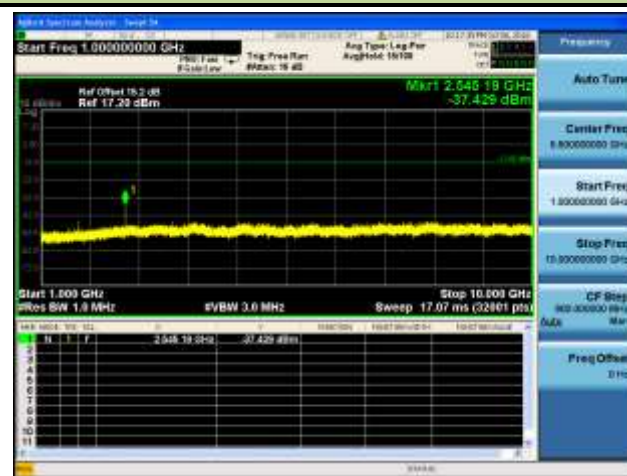
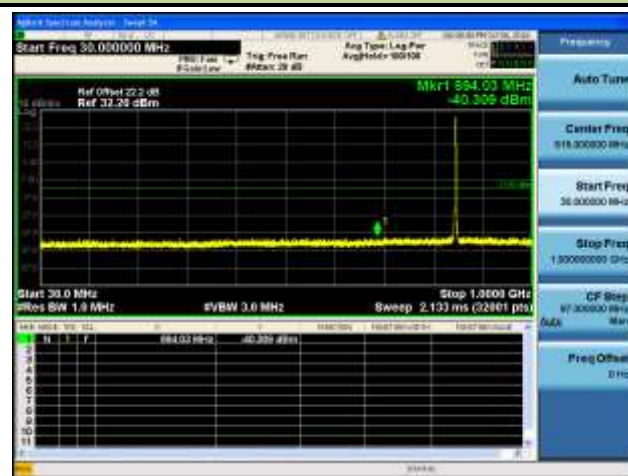
### LTE Band 5 (High Channel) 20625 (846.5MHz) QPSK Bandwidth 5MHz



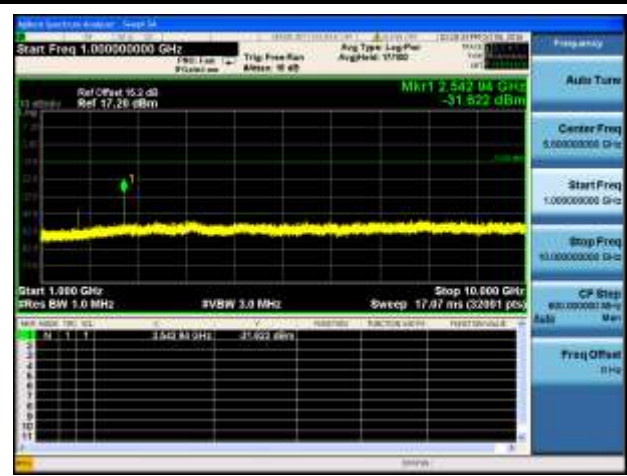
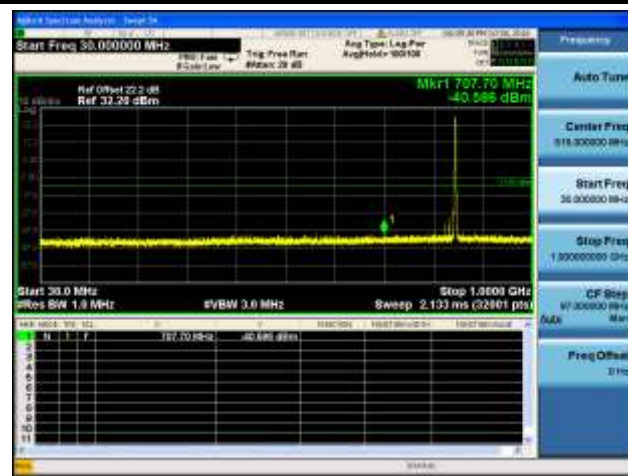
### LTE Band 5 (High Channel) 20600 (844MHz) QPSK Bandwidth 10MHz



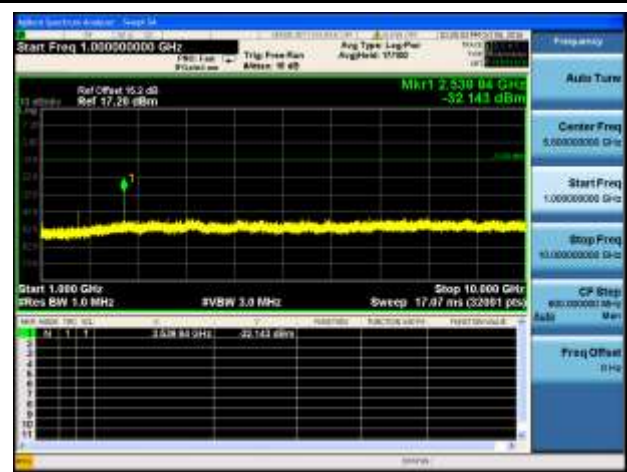
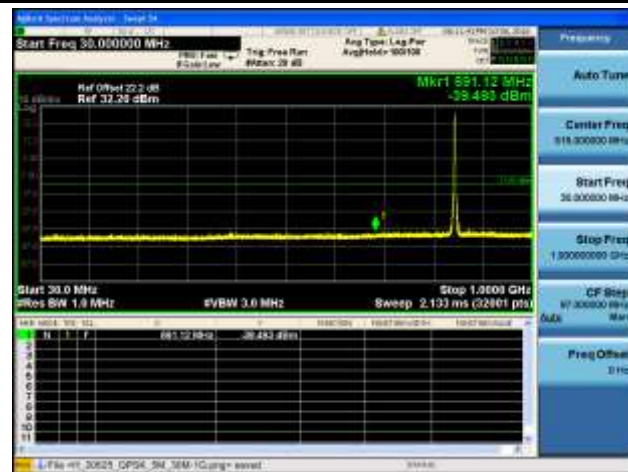
### LTE Band 5 (High Channel) 20643 (848.3MHz) 16QAM Bandwidth 1.4MHz



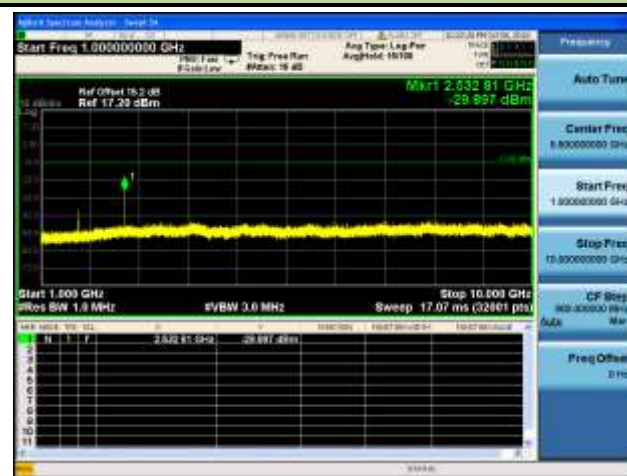
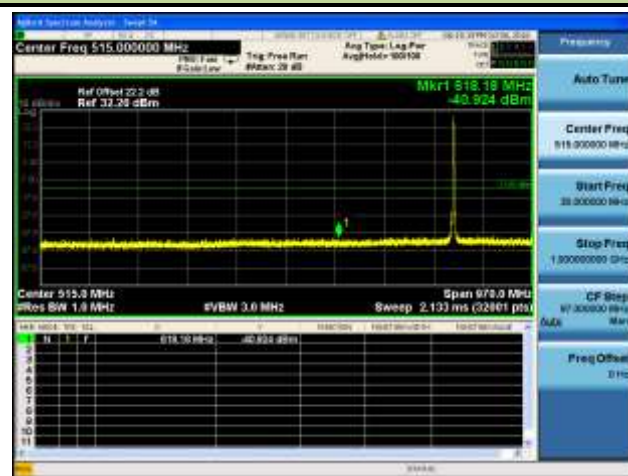
### LTE Band 5 (High Channel) 20635 (847.5MHz) 16QAM Bandwidth 3MHz



### LTE Band 5 (High Channel) 20625 (846.5MHz) 16QAM Bandwidth 5MHz

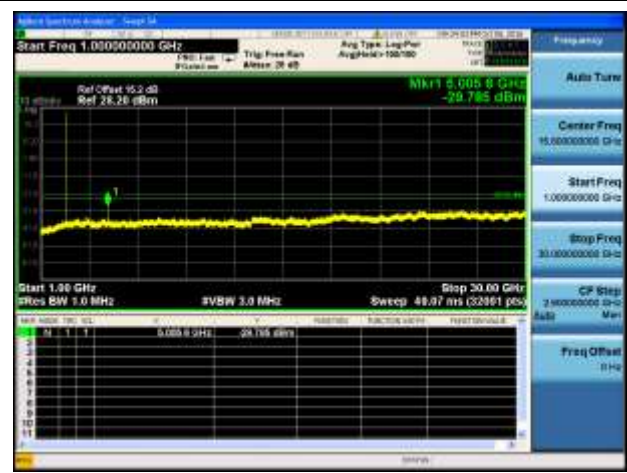
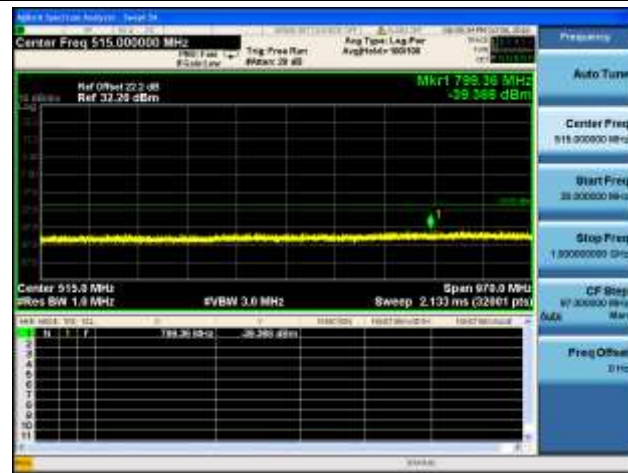


### LTE Band 5 (High Channel) 20600 (844MHz) 16QAM Bandwidth 10MHz

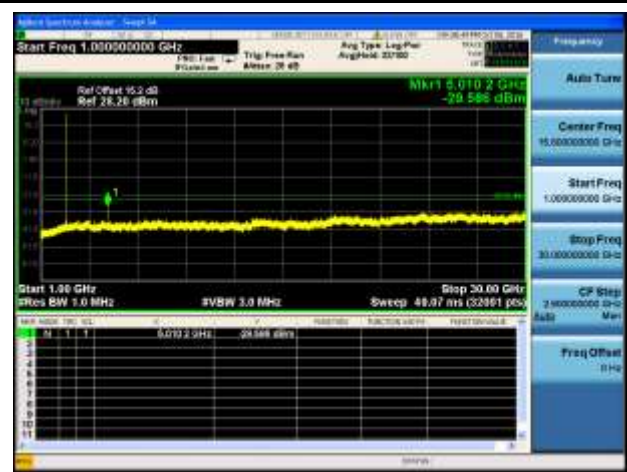
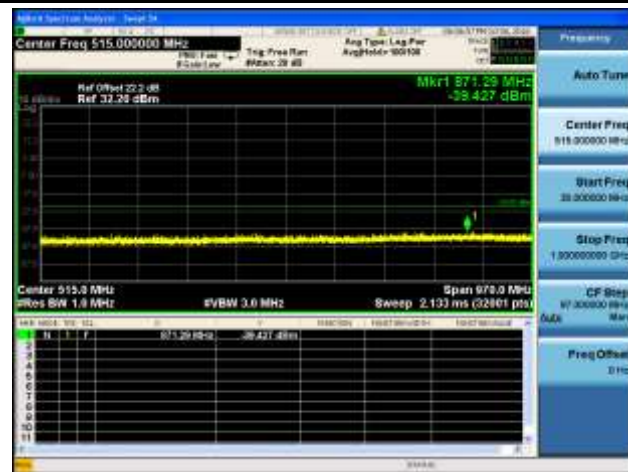




### LTE Band 7 (Low Channel) 20775 (2502.5MHz) QPSK Bandwidth 5MHz



### LTE Band 7 (Low Channel) 20800 (2505MHz) QPSK Bandwidth 10MHz



### LTE Band 7 (Low Channel) 20825 (2507.5MHz) QPSK Bandwidth 15MHz

