



**MEASUREMENT REPORT  
 LTE**

**Applicant Name:**  
 Samsung Electronics Co., Ltd.  
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 Yeongtong-gu, Suwon-si  
 Gyeonggi-do, 16677, Korea


**Date of Testing:**  
 4/6/2018-6/19/2018  
**Test Site/Location:**  
 PCTEST Lab. Columbia, MD, USA  
**Test Report Serial No.:**  
 1M1804130071-03.A3L

<b>FCC ID:</b>	<b>A3LSMN960KOR</b>
<b>APPLICANT:</b>	<b>Samsung Electronics Co., Ltd.</b>

**Application Type:** Certification  
**Model:** SM-N960N  
**EUT Type:** Portable Handset  
**Classification:** PCS Licensed Transmitter Held to Ear (PCE)  
**FCC Rule Part(s):** 22, 24, & 27  
**Test Procedure(s):** ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01, KDB 648474 D03 v01r04

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.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



Randy Ortanez  
 President

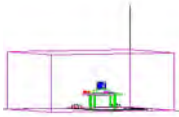


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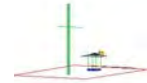
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## Part 22, 24, & 27



Mode	FCC Rule Part	Tx Frequency (MHz)	ERP		EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)		
LTE Band 12	27	699.7 - 715.3	0.055	17.41	0.090	19.56	1M11G7D	QPSK
LTE Band 12	27	699.7 - 715.3	0.048	16.81	0.079	18.96	1M11W7D	16QAM
LTE Band 12	27	699.7 - 715.3	0.039	15.88	0.064	18.03	1M10W7D	64QAM
LTE Band 12	27	700.5 - 714.5	0.058	17.64	0.095	19.79	2M72G7D	QPSK
LTE Band 12	27	700.5 - 714.5	0.048	16.77	0.078	18.92	2M72W7D	16QAM
LTE Band 12	27	700.5 - 714.5	0.035	15.41	0.057	17.56	2M71W7D	64QAM
LTE Band 12/17	27	701.5 - 713.5	0.055	17.38	0.090	19.53	4M54G7D	QPSK
LTE Band 12/17	27	701.5 - 713.5	0.044	16.40	0.072	18.55	4M55W7D	16QAM
LTE Band 12/17	27	701.5 - 713.5	0.037	15.68	0.061	17.83	4M54W7D	64QAM
LTE Band 12/17	27	704 - 711	0.058	17.67	0.096	19.82	9M06G7D	QPSK
LTE Band 12/17	27	704 - 711	0.046	16.66	0.076	18.81	9M02W7D	16QAM
LTE Band 12/17	27	704 - 711	0.033	15.20	0.054	17.35	9M02W7D	64QAM
LTE Band 13	27	779.5 - 784.5	0.028	14.44	0.046	16.59	4M53G7D	QPSK
LTE Band 13	27	779.5 - 784.5	0.023	13.53	0.037	15.68	4M55W7D	16QAM
LTE Band 13	27	779.5 - 784.5	0.019	12.76	0.031	14.91	4M54W7D	64QAM
LTE Band 13	27	782	0.028	14.53	0.047	16.68	8M98G7D	QPSK
LTE Band 13	27	782	0.023	13.53	0.037	15.68	8M99W7D	16QAM
LTE Band 13	27	782	0.016	12.12	0.027	14.27	9M00W7D	64QAM
LTE Band 5/26	22H	824.7 - 848.3	0.059	17.71	0.097	19.86	1M10G7D	QPSK
LTE Band 5/26	22H	824.7 - 848.3	0.048	16.77	0.078	18.92	1M10W7D	16QAM
LTE Band 5/26	22H	824.7 - 848.3	0.031	14.96	0.051	17.11	1M10W7D	64QAM
LTE Band 5/26	22H	825.5 - 847.5	0.061	17.87	0.100	20.02	2M73G7D	QPSK
LTE Band 5/26	22H	825.5 - 847.5	0.050	16.99	0.082	19.14	2M72W7D	16QAM
LTE Band 5/26	22H	825.5 - 847.5	0.032	15.06	0.053	17.21	2M71W7D	64QAM
LTE Band 5/26	22H	826.5 - 846.5	0.062	17.95	0.102	20.10	4M53G7D	QPSK
LTE Band 5/26	22H	826.5 - 846.5	0.052	17.12	0.085	19.27	4M53W7D	16QAM
LTE Band 5/26	22H	826.5 - 846.5	0.034	15.32	0.056	17.47	4M52W7D	64QAM
LTE Band 5/26	22H	829 - 844	0.055	17.42	0.091	19.57	9M02G7D	QPSK
LTE Band 5/26	22H	829 - 844	0.048	16.80	0.079	18.95	9M00W7D	16QAM
LTE Band 5/26	22H	829 - 844	0.035	15.43	0.057	17.58	9M01W7D	64QAM
LTE Band 26	22H	831.5 - 841.5	0.057	17.53	0.093	19.68	13M5G7D	QPSK
LTE Band 26	22H	831.5 - 841.5	0.046	16.61	0.075	18.76	13M5W7D	16QAM
LTE Band 26	22H	831.5 - 841.5	0.036	15.55	0.059	17.70	13M5W7D	64QAM

### EUT Overview (<1GHz)

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Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
LTE Band 4/66	27	1710.7 - 1779.3	0.230	23.62	1M10G7D	QPSK
LTE Band 4/66	27	1710.7 - 1779.3	0.183	22.62	1M10W7D	16QAM
LTE Band 4/66	27	1710.7 - 1779.3	0.147	21.68	1M10W7D	64QAM
LTE Band 4/66	27	1711.5 - 1778.5	0.246	23.91	2M72G7D	QPSK
LTE Band 4/66	27	1711.5 - 1778.5	0.206	23.14	2M72W7D	16QAM
LTE Band 4/66	27	1711.5 - 1778.5	0.163	22.13	2M71W7D	64QAM
LTE Band 4/66	27	1712.5 - 1777.5	0.237	23.75	4M56G7D	QPSK
LTE Band 4/66	27	1712.5 - 1777.5	0.197	22.94	4M54W7D	16QAM
LTE Band 4/66	27	1712.5 - 1777.5	0.154	21.88	4M55W7D	64QAM
LTE Band 4/66	27	1715 - 1775	0.244	23.88	9M09G7D	QPSK
LTE Band 4/66	27	1715 - 1775	0.201	23.04	9M04W7D	16QAM
LTE Band 4/66	27	1715 - 1775	0.163	22.11	9M06W7D	64QAM
LTE Band 4/66	27	1717.5 - 1772.5	0.243	23.85	13M5G7D	QPSK
LTE Band 4/66	27	1717.5 - 1772.5	0.204	23.10	13M5W7D	16QAM
LTE Band 4/66	27	1717.5 - 1772.5	0.159	22.03	13M5W7D	64QAM
LTE Band 4/66	27	1720 - 1770	0.235	23.70	18M1G7D	QPSK
LTE Band 4/66	27	1720 - 1770	0.191	22.81	18M1W7D	16QAM
LTE Band 4/66	27	1720 - 1770	0.151	21.78	18M0W7D	64QAM
LTE Band 2/25	24E	1850.7 - 1914.3	0.194	22.87	1M11G7D	QPSK
LTE Band 2/25	24E	1850.7 - 1914.3	0.134	21.28	1M10W7D	16QAM
LTE Band 2/25	24E	1850.7 - 1914.3	0.109	20.38	1M11W7D	64QAM
LTE Band 2/25	24E	1851.5 - 1913.5	0.189	22.76	2M71G7D	QPSK
LTE Band 2/25	24E	1851.5 - 1913.5	0.155	21.91	2M72W7D	16QAM
LTE Band 2/25	24E	1851.5 - 1913.5	0.125	20.98	2M72W7D	64QAM
LTE Band 2/25	24E	1852.5 - 1912.5	0.171	22.33	4M56G7D	QPSK
LTE Band 2/25	24E	1852.5 - 1912.5	0.140	21.47	4M56W7D	16QAM
LTE Band 2/25	24E	1852.5 - 1912.5	0.114	20.56	4M54W7D	64QAM
LTE Band 2/25	24E	1855 - 1910	0.189	22.76	9M08G7D	QPSK
LTE Band 2/25	24E	1855 - 1910	0.150	21.77	9M04W7D	16QAM
LTE Band 2/25	24E	1855 - 1910	0.120	20.78	9M06W7D	64QAM
LTE Band 2/25	24E	1857.5 - 1907.5	0.179	22.52	13M5G7D	QPSK
LTE Band 2/25	24E	1857.5 - 1907.5	0.148	21.70	13M6W7D	16QAM
LTE Band 2/25	24E	1857.5 - 1907.5	0.116	20.63	13M5W7D	64QAM
LTE Band 2/25	24E	1860 - 1905	0.176	22.44	18M0G7D	QPSK
LTE Band 2/25	24E	1860 - 1905	0.142	21.51	18M0W7D	16QAM
LTE Band 2/25	24E	1860 - 1905	0.113	20.54	18M0W7D	64QAM
LTE Band 41	27	2498.5 - 2687.5	0.187	22.71	4M54G7D	QPSK
LTE Band 41	27	2498.5 - 2687.5	0.150	21.76	4M54W7D	16QAM
LTE Band 41	27	2498.5 - 2687.5	0.114	20.57	4M51W7D	64QAM
LTE Band 41	27	2501 - 2685	0.172	22.35	8M97G7D	QPSK
LTE Band 41	27	2501 - 2685	0.133	21.24	9M01W7D	16QAM
LTE Band 41	27	2501 - 2685	0.107	20.28	9M05W7D	64QAM
LTE Band 41	27	2503.5 - 2682.5	0.247	23.93	13M5G7D	QPSK
LTE Band 41	27	2503.5 - 2682.5	0.196	22.93	13M5W7D	16QAM
LTE Band 41	27	2503.5 - 2682.5	0.157	21.95	13M5W7D	64QAM
LTE Band 41	27	2506 - 2680	0.239	23.78	18M0G7D	QPSK
LTE Band 41	27	2506 - 2680	0.209	23.19	18M0W7D	16QAM
LTE Band 41	27	2506 - 2680	0.185	22.66	18M0W7D	64QAM

**EUT Overview (>1GHz)**

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# 1.0 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 Innovation, Science and Economic Development Canada.

## 1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

## 1.3 Test Facility / Accreditations

**Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.**

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMN960KOR**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

**Test Device Serial No.:** T0776, T0758, 91789, T0775

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC, ANT+

LTE Band 12 (698 - 716 MHz) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz). Therefore, test data provided in this report covers Band 17 as well as Band 12.

LTE Band 26 (814.7 – 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 – 849 MHz). Therefore, test data provided in this report covers Band 5 and the portion of Band 26 subject to Part 22.

LTE Band 66 (1710 - 1780 MHz) overlaps the entire frequency range of LTE Band 4 (1710 - 1755 MHz). Therefore, test data provided in this report covers Band 4 as well as Band 66.

LTE Band 25 (1850 - 1915 MHz) overlaps the entire frequency range of LTE Band 2 (1850 - 1910 MHz). Therefore, test data provided in this report covers Band 2 as well as Band 25.

This device uses a tuner circuit that dynamically updates the antenna impedance parameters to optimize antenna performance for certain bands and modes of operation. The tuner for this device was set to simulate a "free space" condition where the transmit antenna is matched to the medium into which it is transmitting and, thus, the power is at its maximum level.

This device employs an antenna switching mechanism that allows for radiated transmission from one of two antennas at a time for LTE B5. LTE B5 RF tests were performed with a manufacturer SW test code that simulated the two transmit conditions, and it was verified that the test results in this report reflect the actual transmit conditions. Both antennas cannot transmit simultaneously so dual transmission conditions were not investigated. The main transmit antenna data is labeled as "Antenna A" and the secondary transmit antenna data is labeled as "Antenna B" in the radiated section of this report.

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### 2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

This device uses a stylus pen for several functions. The EUT can operate with the stylus pen inserted or removed and the emissions measurements for the EUT were performed with and without the stylus pen inserted into the EUT. There was no degradation found without the stylus pen removed so all emission measurements were performed with the pen inserted into the EUT

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) Model: EP-N5100 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

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

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

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## 3.0 DESCRIPTION OF TESTS

### 3.1 Measurement Procedure

The measurement procedures described in the document titled “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 D01 v03r01) were used in the measurement of the EUT.

### 3.2 Block C Frequency Range

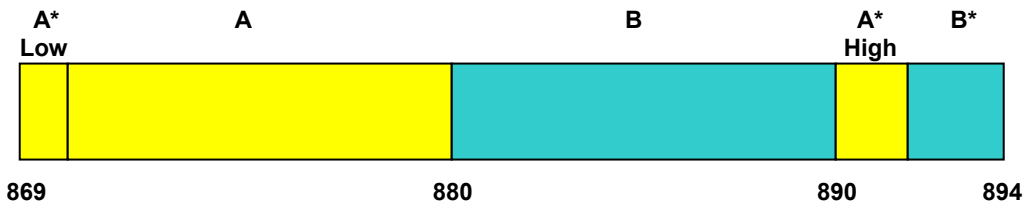
Two paired channels of 11 megahertz each are available for assignment in Block C in the 746-757 MHz and 776-787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results do not satisfy the applicable reserve price, the spectrum in the 746-757 MHz and 776-787 MHz bands will instead be made available for assignment at a subsequent auction as follows: (i) Two paired channels of 6 megahertz each available for assignment in Block C1 in the 746-752 MHz and 776-782 MHz bands. (ii) Two paired channels of 5 megahertz each available for assignment in Block C2 in the 752-757 MHz and 782-787 MHz bands.

### 3.3 Block A Frequency Range

698-746 MHz band. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

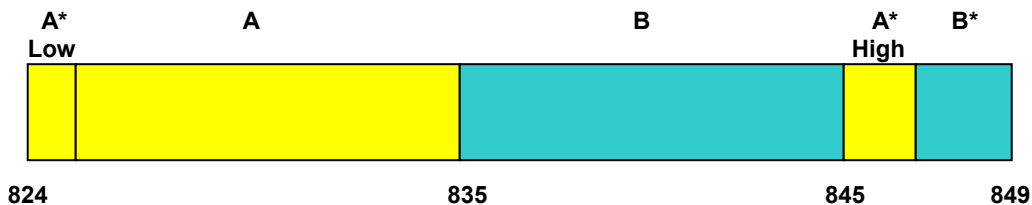
Block A: 698-704 MHz and 728-734 MHz;  
 Block B: 704-710 MHz and 734-740 MHz; and  
 Block C: 710-716 MHz and 740-746 MHz.

### 3.4 Cellular - Base Frequency Blocks



**BLOCK 1:** 869 – 880 MHz (A\* Low + A)                      **BLOCK 3:** 890 – 891.5 MHz (A\* High)  
**BLOCK 2:** 880 – 890 MHz (B)                                      **BLOCK 4:** 891.5 – 894 MHz (B\*)

### 3.5 Cellular - Mobile Frequency Blocks

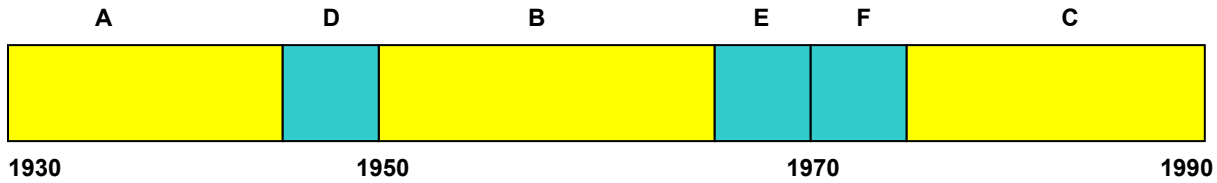


**BLOCK 1:** 824 – 835 MHz (A\* Low + A)                      **BLOCK 3:** 845 – 846.5 MHz (A\* High)  
**BLOCK 2:** 835 – 845 MHz (B)                                      **BLOCK 4:** 846.5 – 849 MHz (B\*)

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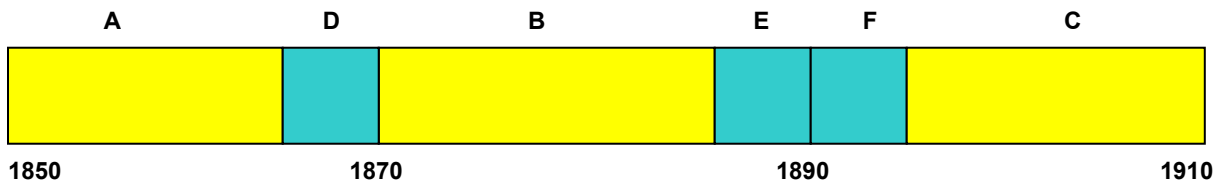


### 3.6 PCS - Base Frequency Blocks



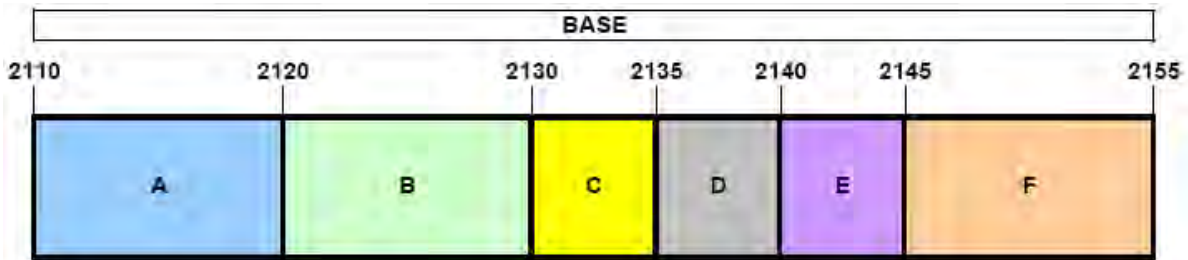
- BLOCK 1: 1930 – 1945 MHz (A)
- BLOCK 2: 1945 – 1950 MHz (D)
- BLOCK 3: 1950 – 1965 MHz (B)
- BLOCK 4: 1965 – 1970 MHz (E)
- BLOCK 5: 1970 – 1975 MHz (F)
- BLOCK 6: 1975 – 1990 MHz (C)

### 3.7 PCS - Mobile Frequency Blocks



- BLOCK 1: 1850 – 1865 MHz (A)
- BLOCK 2: 1865 – 1870 MHz (D)
- BLOCK 3: 1870 – 1885 MHz (B)
- BLOCK 4: 1885 – 1890 MHz (E)
- BLOCK 5: 1890 – 1895 MHz (F)
- BLOCK 6: 1895 – 1910 MHz (C)

### 3.8 AWS - Base Frequency Blocks



- BLOCK 1: 2110 – 2120 MHz (A)
- BLOCK 2: 2120 – 2130 MHz (B)
- BLOCK 3: 2130 – 2135 MHz (C)
- BLOCK 4: 2135 – 2140 MHz (D)
- BLOCK 5: 2140 – 2145 MHz (E)
- BLOCK 6: 2145 – 2155 MHz (F)

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### 3.11 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. 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 above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table 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. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 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 D01 v03r01.

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:

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

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  $P_g [dBm] - \text{cable loss} [dB]$ .

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of  $43 + 10\log_{10}(\text{Power} [Watts])$ . For Band 41, the calculated  $P_d$  levels are compared to the absolute spurious emission limit of -25dBm which is equivalent to the required minimum attenuation of  $55 + 10\log_{10}(\text{Power} [Watts])$ .

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## 4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the  $U_{CISPR}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty ( $\pm$ dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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## 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTX2	Licensed Transmitter Cable Set	8/10/2017	Annual	8/10/2018	LTX2
Agilent	N9020A	MXA Signal Analyzer	1/24/2018	Annual	1/24/2019	US46470561
Agilent	N9030A	PXA Signal Analyzer (26.5GHz)	8/28/2017	Annual	8/28/2018	MY49432391
COM-Power	AL-130R	Active Loop Antenna	6/5/2017	Annual	6/5/2018	121085
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	12/1/2016	Biennial	12/1/2018	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
Huber+Suhner	Sucoflex 102A	40GHz Radiated Cable	5/19/2017	Annual	5/19/2018	251425001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11401010036
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	10/13/2017	Annual	10/13/2018	102060
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/19/2017	Annual	5/19/2018	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/31/2017	Annual	7/31/2018	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/11/2017	Annual	8/11/2018	103200
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102133
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102135
Anritsu	MT8820C	Radio Communication Analyzer	10/25/2017	Annual	10/25/2018	6201144419
Rohde & Schwarz	TC-TA18	Cross-Pol Antenna 400MHz-18GHz	10/30/2017	Annual	10/30/2018	101058
Schwarzbeck	UHA 9105	Dipole Antenna	8/26/2016	Biennial	8/26/2018	2696
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/11/2017	Annual	5/11/2018	100040
Seekonk	NC-100	Torque Wrench	12/28/2017	Annual	12/28/2018	N/A
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307

**Table 5-1. Test Equipment**

**Notes:**

1. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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## 6.0 SAMPLE CALCULATIONS

### Emission Designator

#### QPSK Modulation

**Emission Designator = 8M62G7D**

LTE BW = 8.62 MHz  
 G = Phase Modulation  
 7 = Quantized/Digital Info  
 D = Data transmission, telemetry, telecommand

#### QAM Modulation

**Emission Designator = 8M45W7D**

LTE BW = 8.45 MHz  
 W = Amplitude/Angle Modulated  
 7 = Quantized/Digital Info  
 D = Data transmission, telemetry, telecommand

### Spurious Radiated Emission – LTE Band

#### **Example: Middle Channel LTE Mode 2<sup>nd</sup> Harmonic (1564 MHz)**

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was  $-81.0$  dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of  $-81.0$  dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of  $-30.9$  dBm yielding  $-24.80$  dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm  $- (-24.80)$ .

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## 7.0 TEST RESULTS

### 7.1 Summary

Company Name: Samsung Electronics Co., Ltd.  
 FCC ID: A3LSMN960KOR  
 Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): LTE

Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.2
2.1051 2.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Out of Band Emissions	> 43 + 10log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions			Section 7.3, 7.4
27.53(m)	Out of Band Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.3, 7.4
24.232(d)	Peak-Average Ratio	< 13 dB			Section 7.5
2.1046	Transmitter Conducted Output Power	N/A			See RF Exposure Report
2.1055 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)			Section 7.8

**Table 7-1. Summary of Conducted Test Results**

FCC ID: A3LSMN960KOR		<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
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Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a)(5)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 26/5)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.6
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 12/17,13)	< 3 Watts max. ERP			Section 7.6
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 25/2, 41)	< 2 Watts max. EIRP			Section 7.6
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4/66)	< 1 Watts max. EIRP			Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions	> 43 + 10log <sub>10</sub> (P[Watts]) for all out-of-band emissions			Section 7.7
27.53(f)	Undesirable Emissions (Band 13)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 – 1610 MHz			Section 7.7
27.53(m)	Undesirable Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.7

**Table 7-2. Summary of Radiated Test Results**

**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) The analyzer plots (Sections 7.2, 7.3, 7.4, 7.5) were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) 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.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 4.8.
- 5) For operation <1GHz, the EIRP limits in the table above are referenced to the specifications written in the relevant Radio Standards Specifications for Innovation, Science, and Economic Development Canada.

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## 7.2 Occupied Bandwidth

### Test Overview

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. All modes of operation were investigated and the worst case configuration results are reported in this section.

### Test Procedure Used

KDB 971168 D01 v03r01 – Section 4.2

### Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW  $\geq 3 \times$  RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

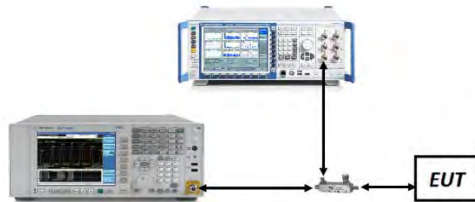
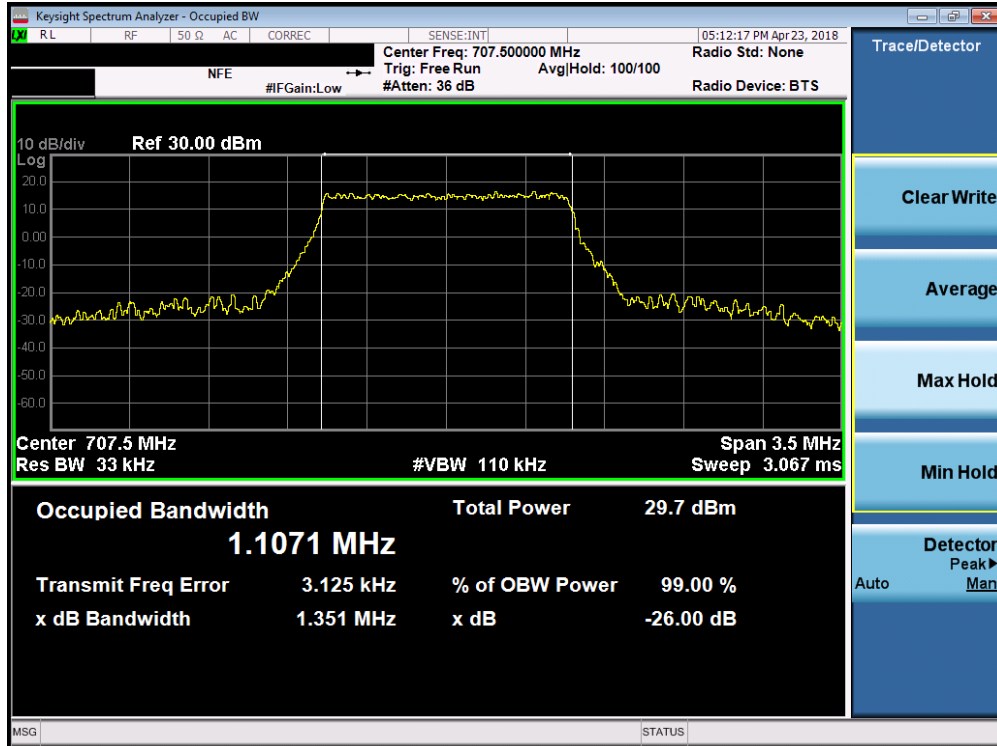


Figure 7-1. Test Instrument & Measurement Setup

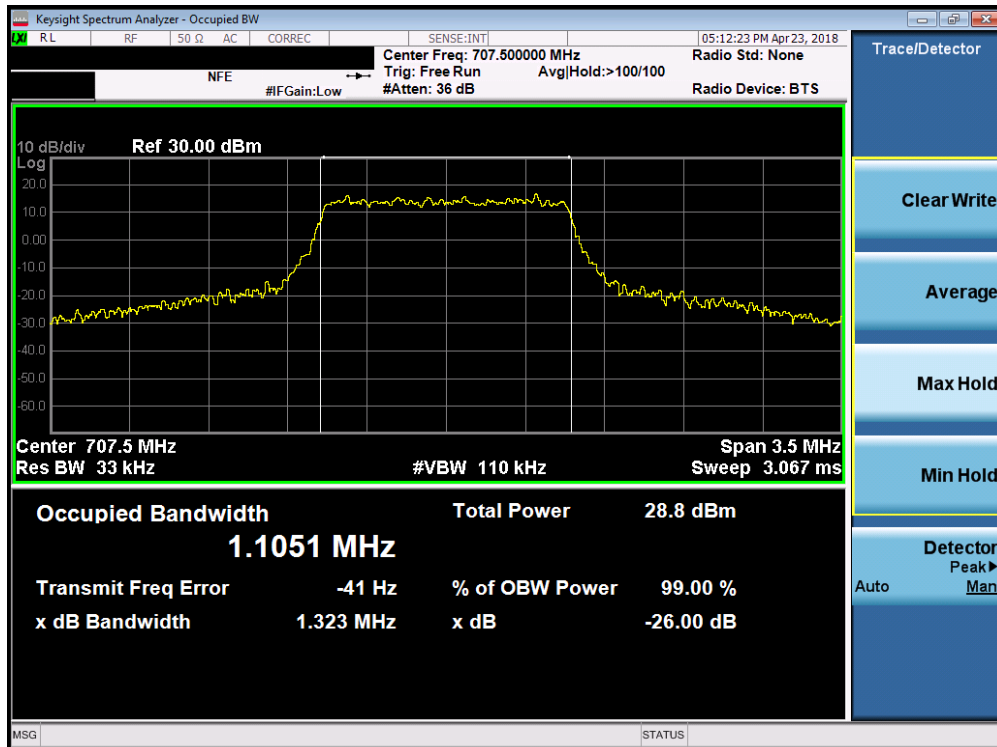
### Test Notes

None.

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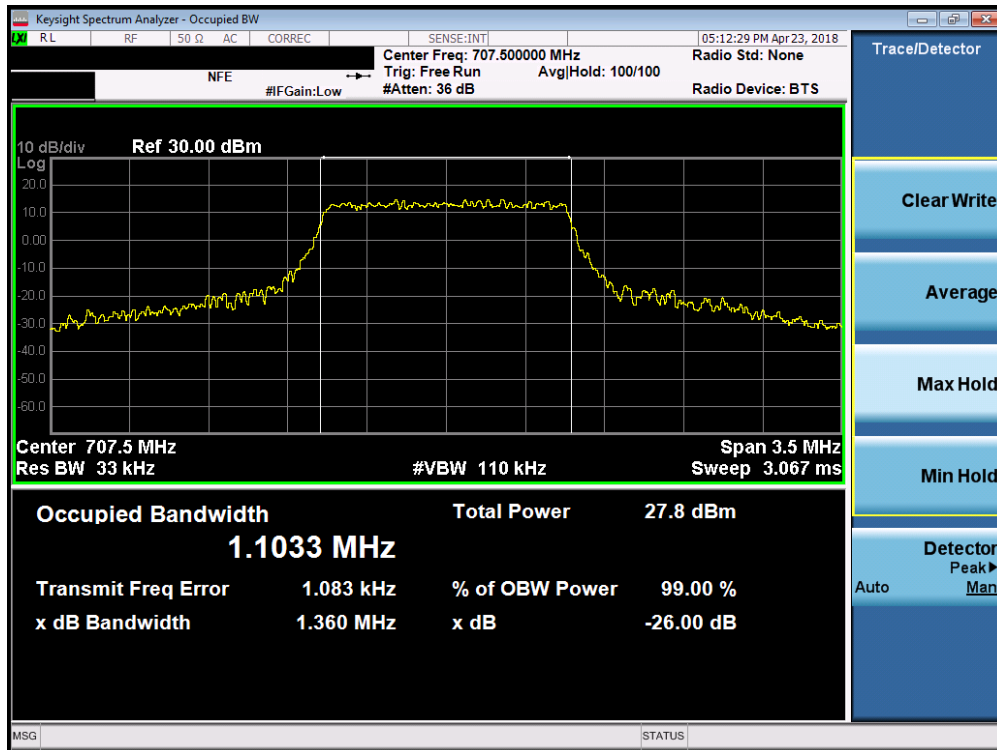


Plot 7-1. Occupied Bandwidth Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

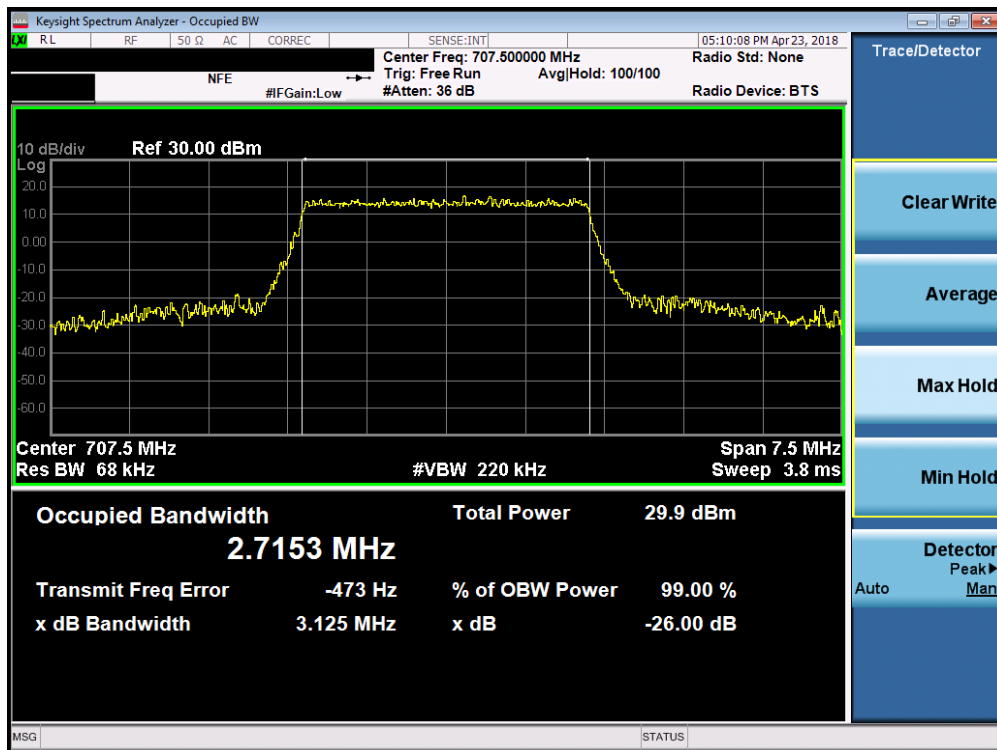


Plot 7-2. Occupied Bandwidth Plot (Band 12 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 18 of 198

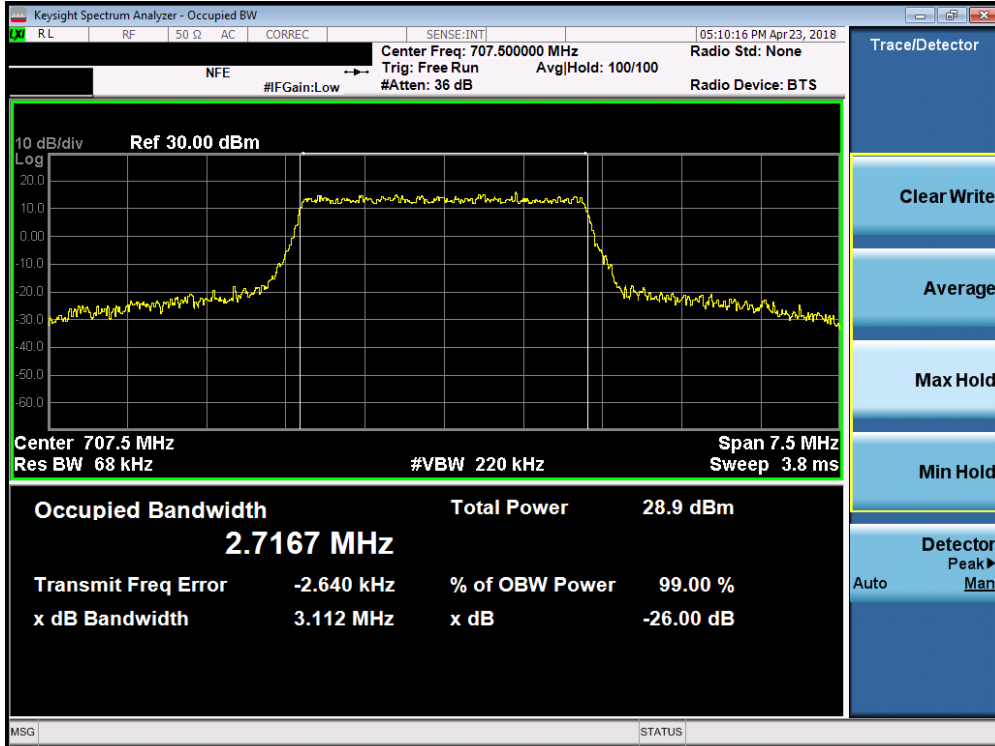


Plot 7-3. Occupied Bandwidth Plot (Band 12 - 1.4MHz 64-QAM - Full RB Configuration)

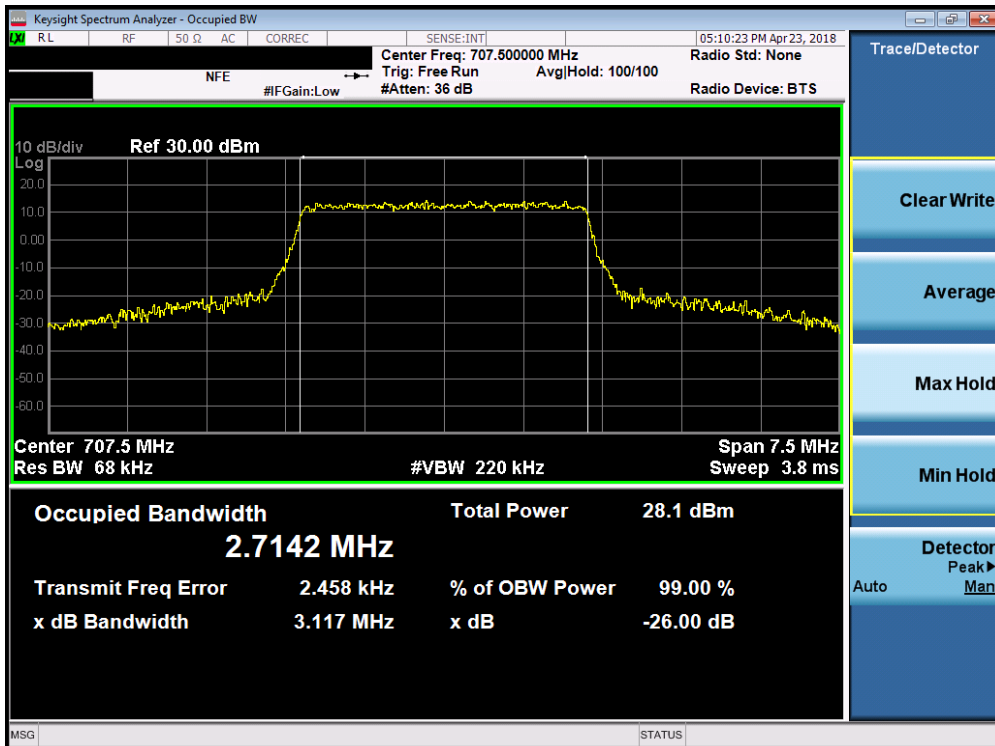


Plot 7-4. Occupied Bandwidth Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR			<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
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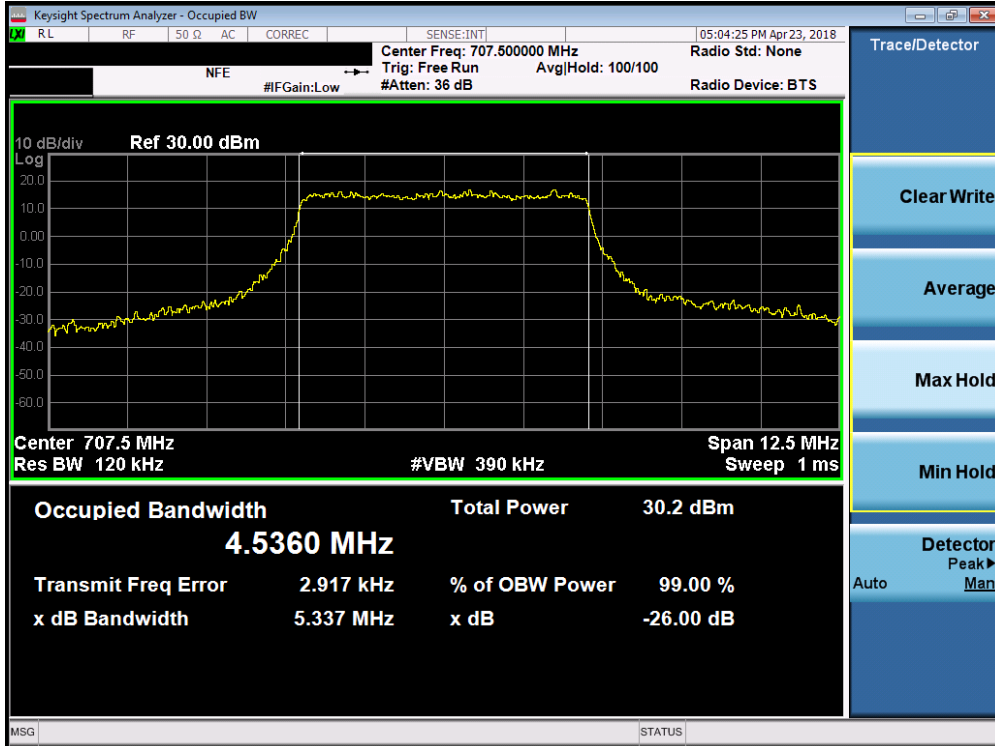


Plot 7-5. Occupied Bandwidth Plot (Band 12 - 3.0MHz 16-QAM - Full RB Configuration)

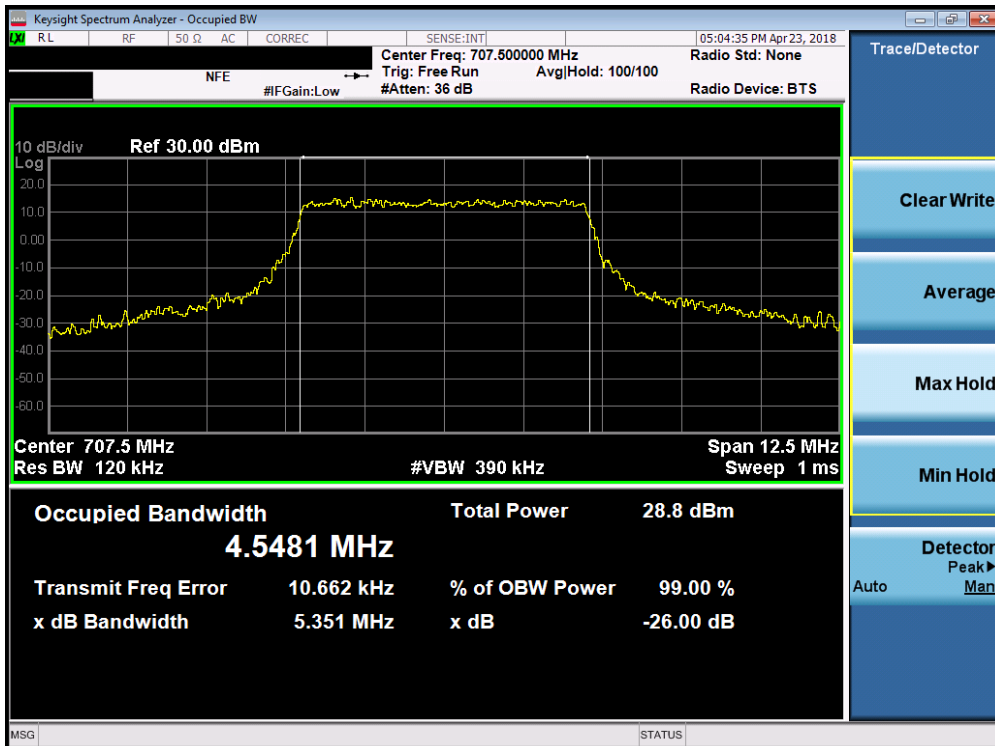


Plot 7-6. Occupied Bandwidth Plot (Band 12 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
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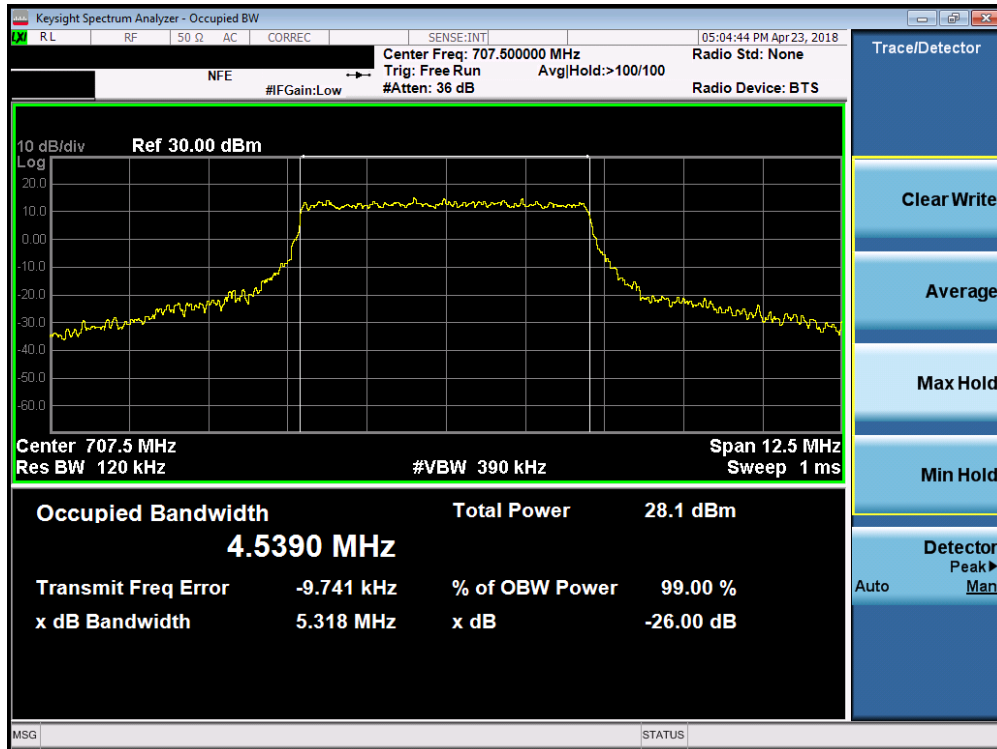


Plot 7-7. Occupied Bandwidth Plot (Band 12/17 - 5.0MHz QPSK - Full RB Configuration)

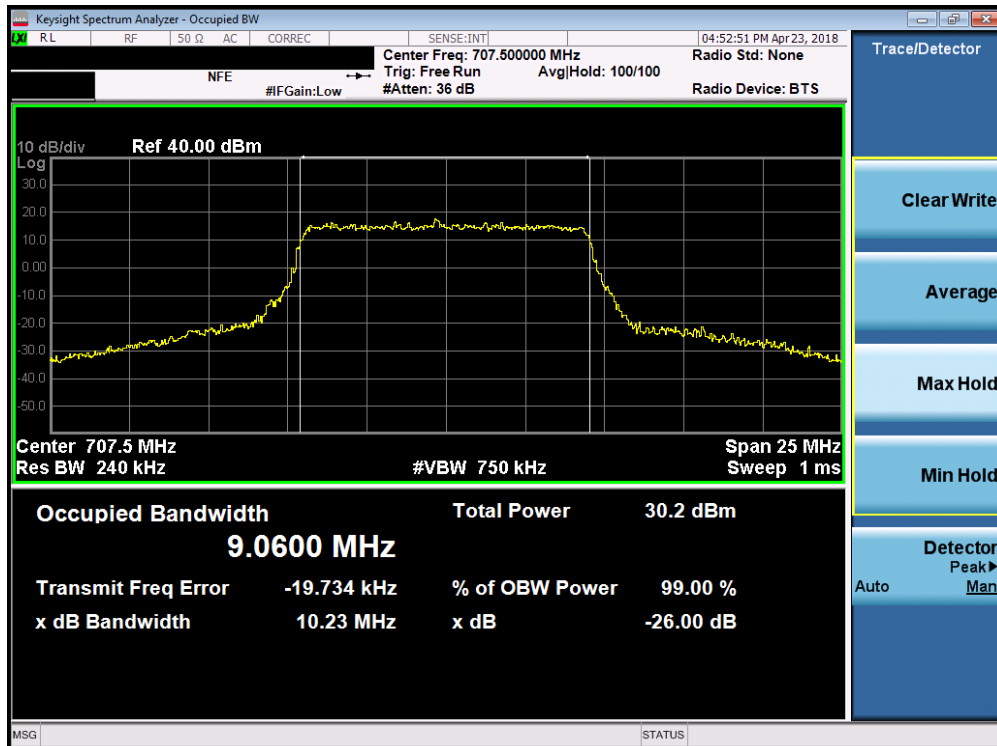


Plot 7-8. Occupied Bandwidth Plot (Band 12/17 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR			<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
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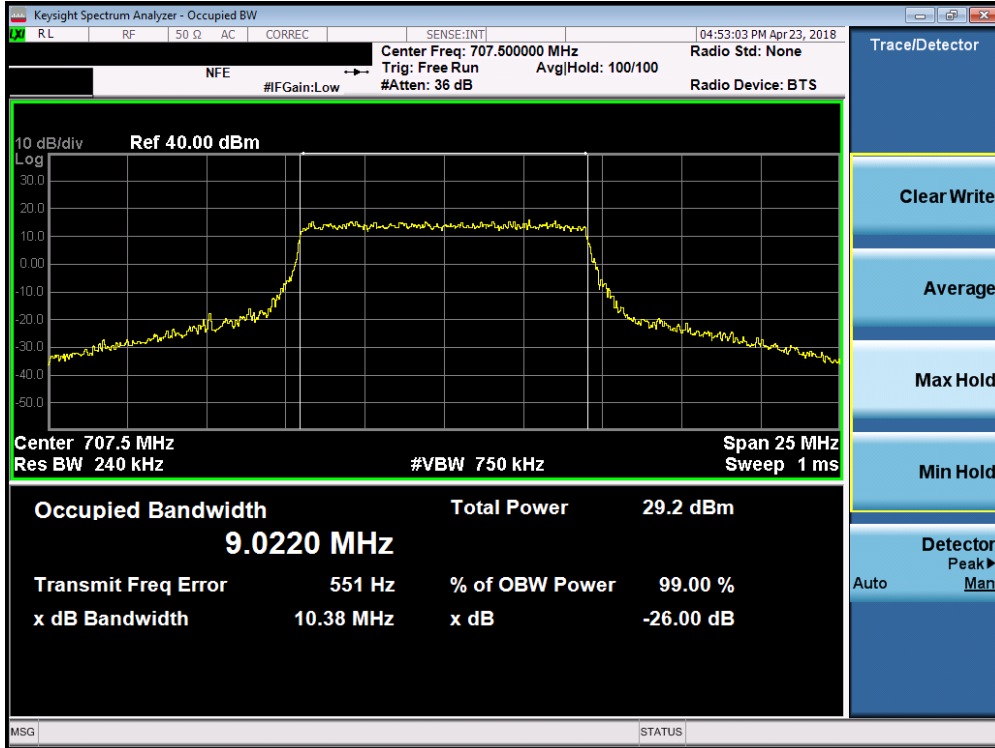


Plot 7-9. Occupied Bandwidth Plot (Band 12/17 - 5.0MHz 64-QAM - Full RB Configuration)

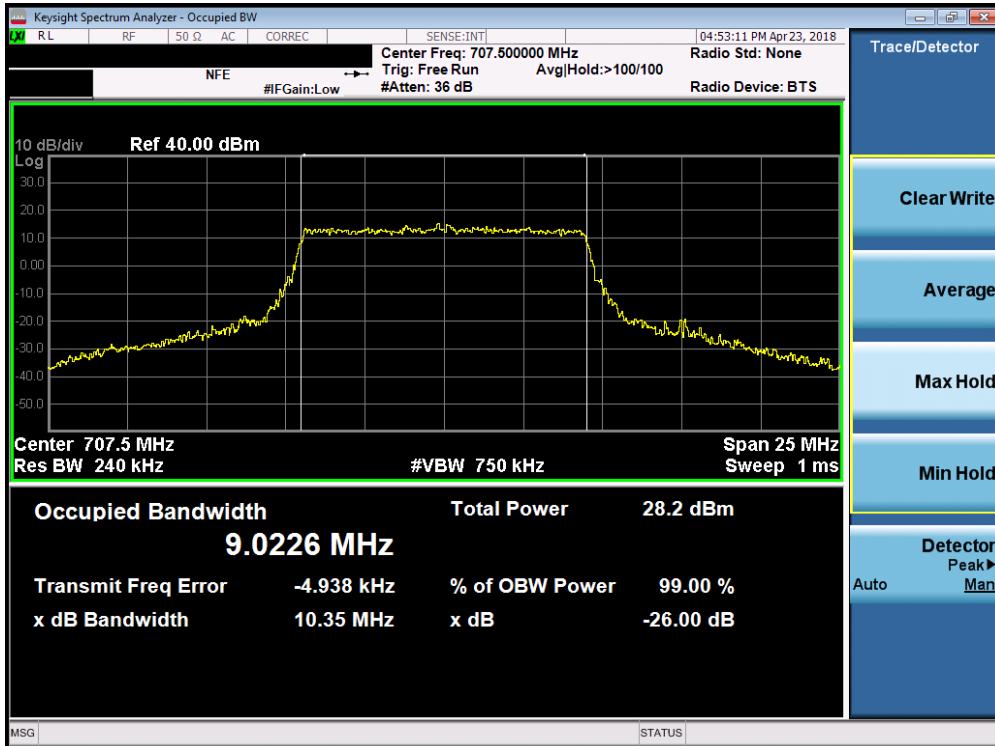


Plot 7-10. Occupied Bandwidth Plot (Band 12/17 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
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Plot 7-11. Occupied Bandwidth Plot (Band 12/17 - 10.0MHz 16-QAM - Full RB Configuration)



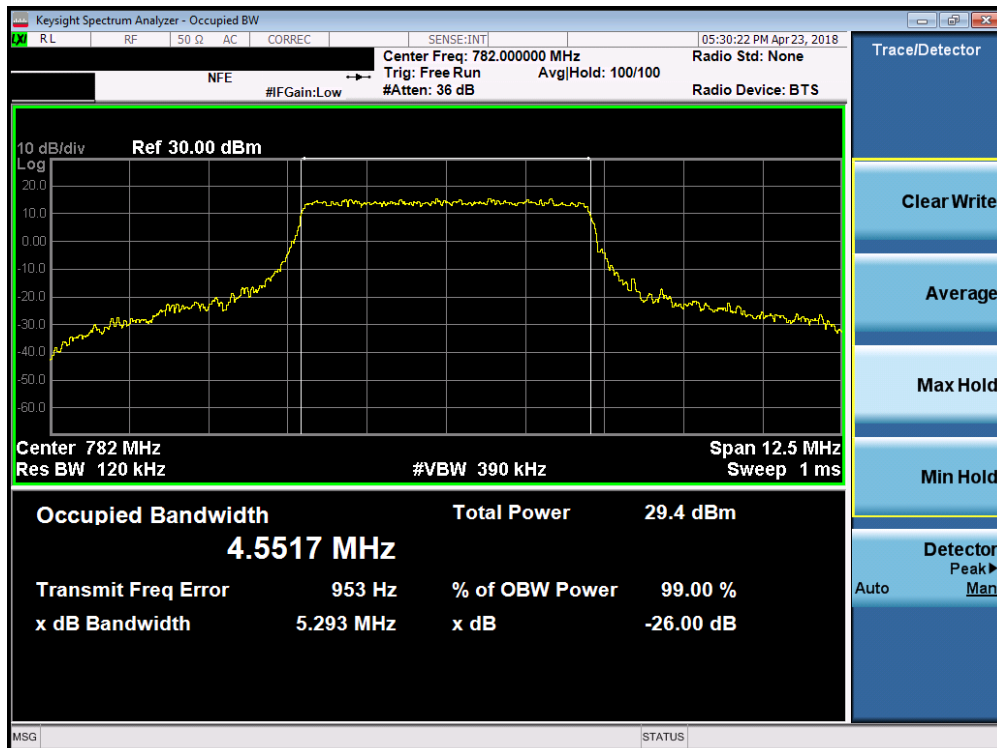
Plot 7-12. Occupied Bandwidth Plot (Band 12/17 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
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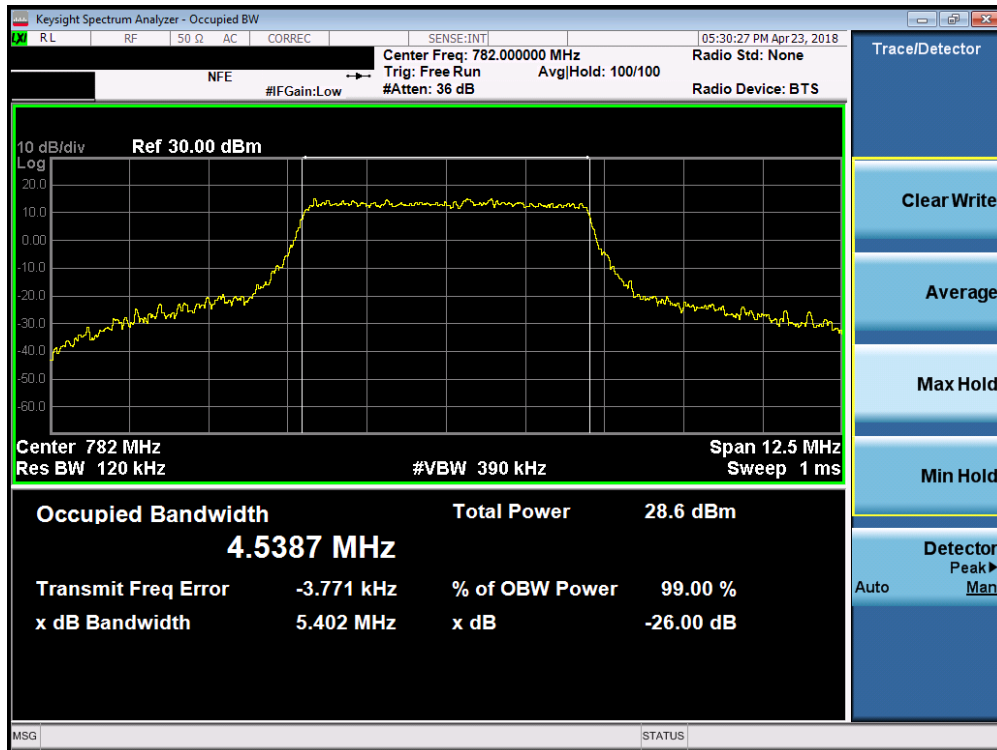
**Plot 7-13. Occupied Bandwidth Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)**



**Plot 7-14. Occupied Bandwidth Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)**

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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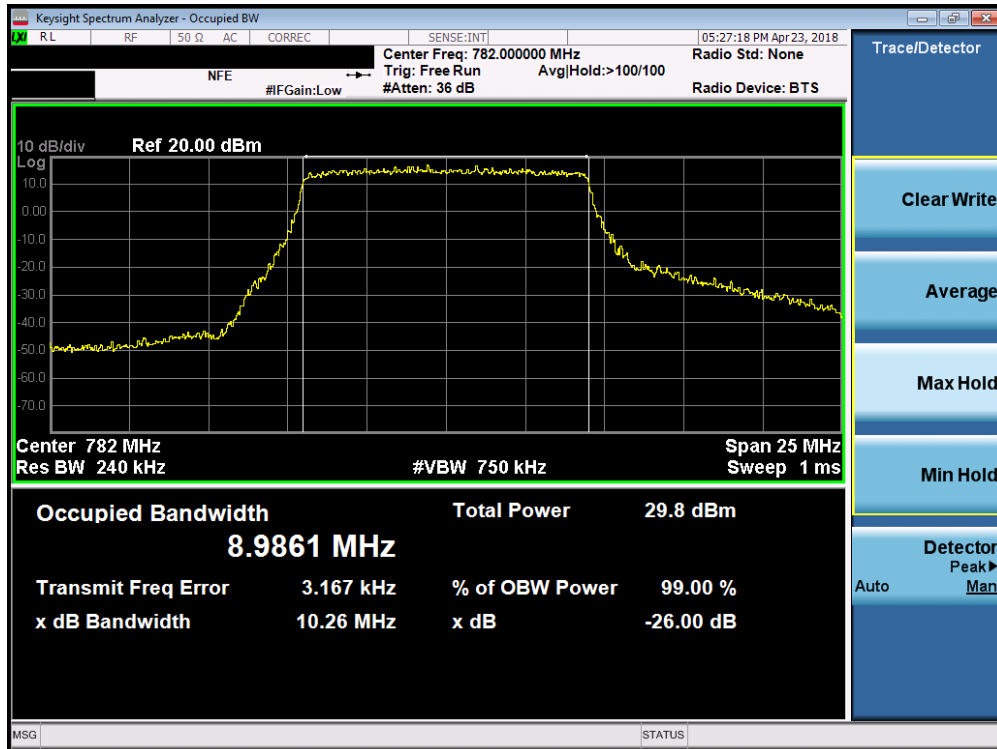


Plot 7-15. Occupied Bandwidth Plot (Band 13 - 5.0MHz 64-QAM - Full RB Configuration)

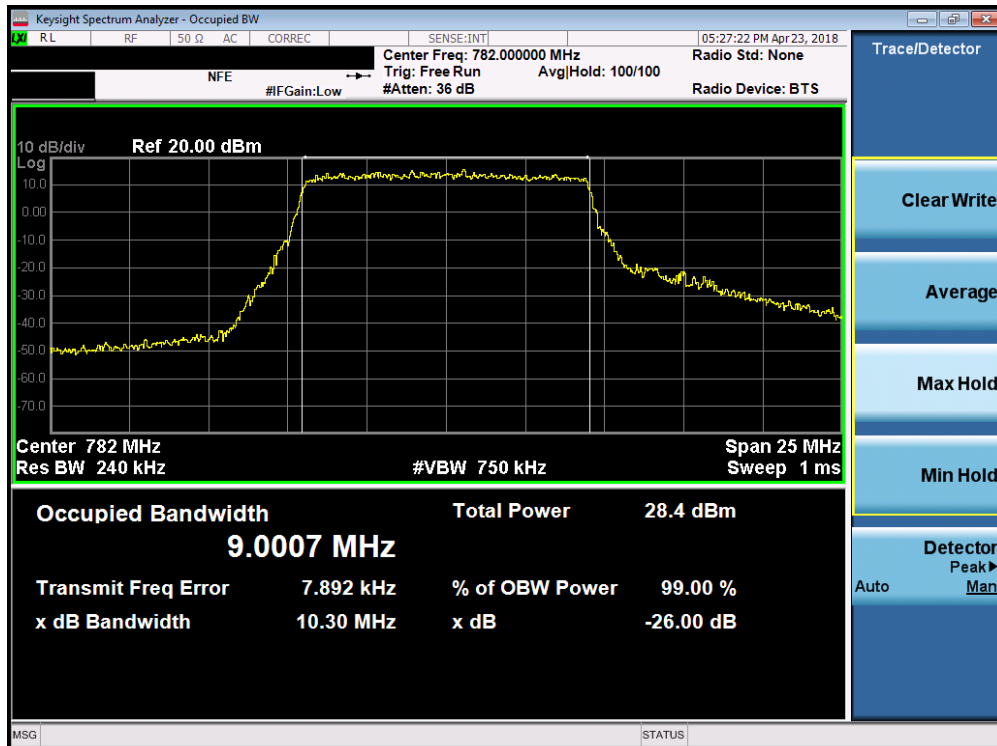


Plot 7-16. Occupied Bandwidth Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR			<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
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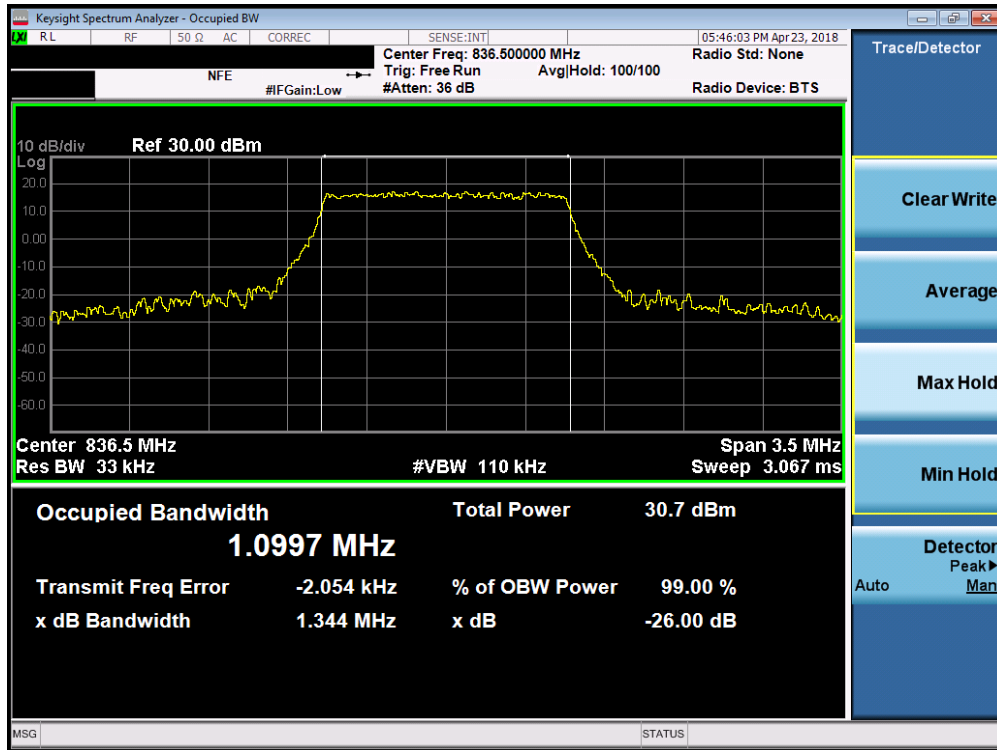


Plot 7-17. Occupied Bandwidth Plot (Band 13 - 10.0MHz 16-QAM - Full RB Configuration)

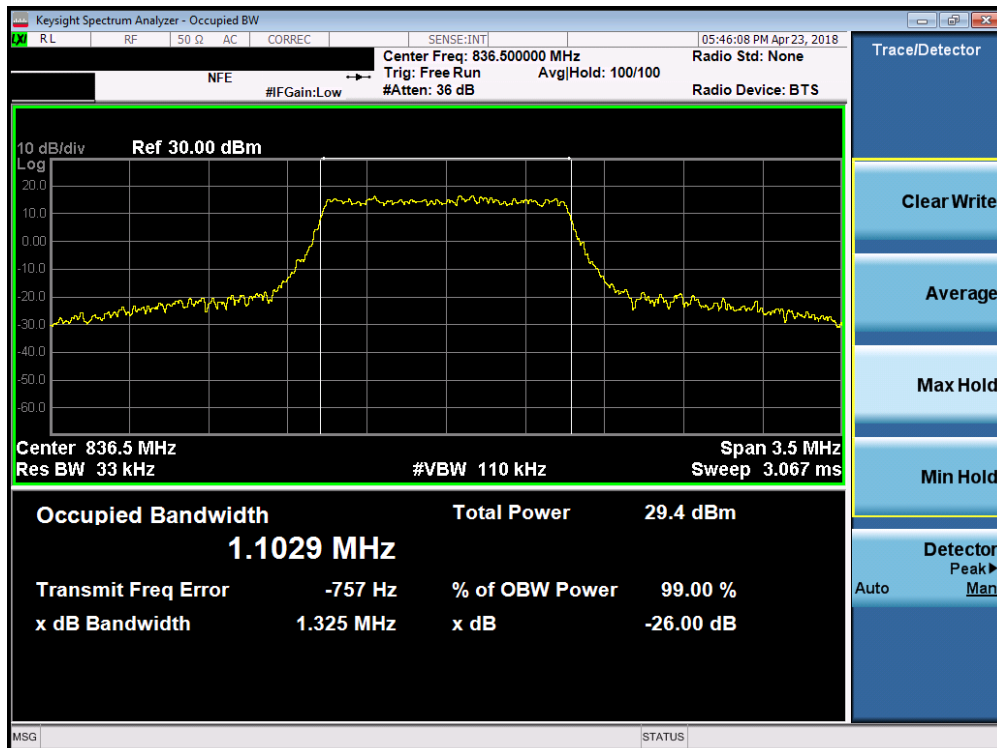


Plot 7-18. Occupied Bandwidth Plot (Band 13 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	<b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
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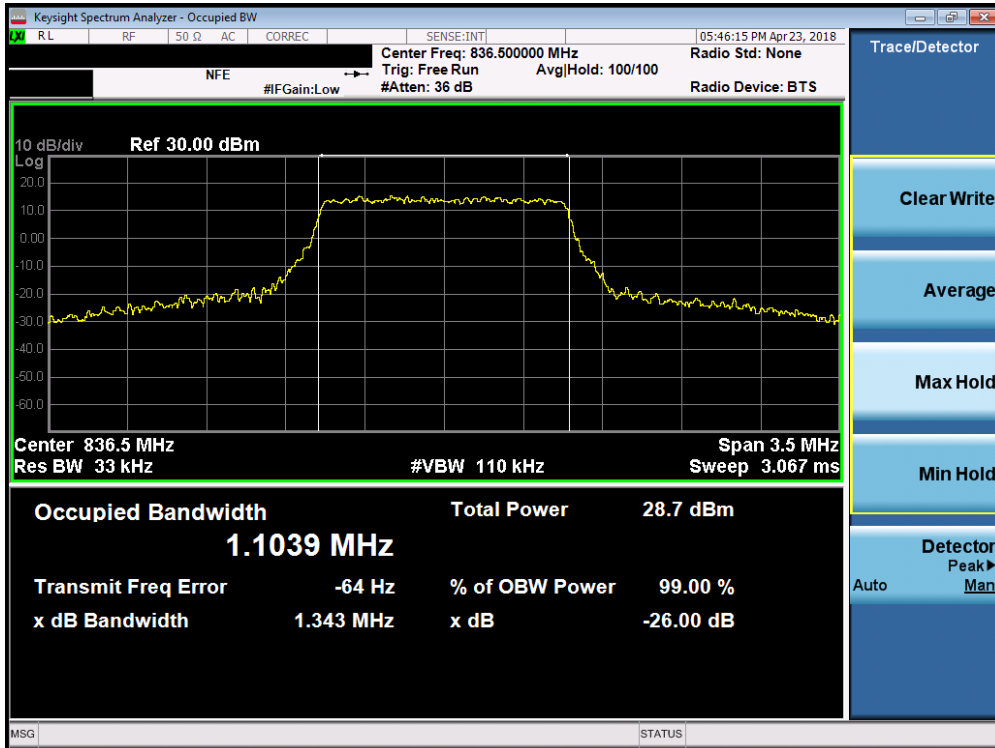


Plot 7-19. Occupied Bandwidth Plot (Band 26/5 - 1.4MHz QPSK - Full RB Configuration)

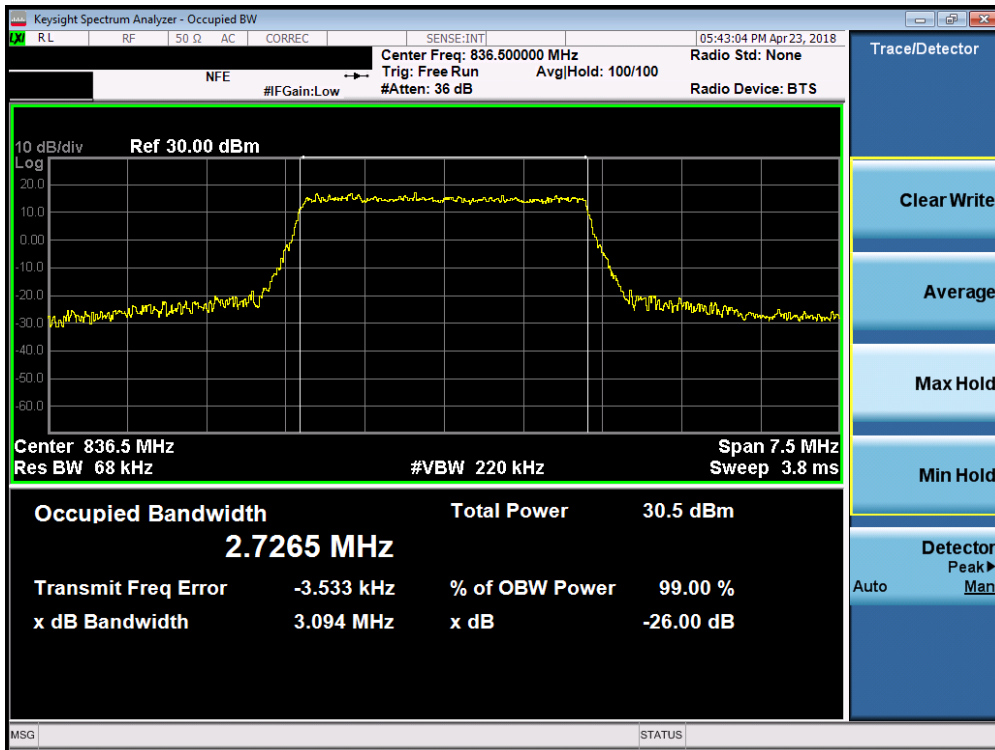


Plot 7-20. Occupied Bandwidth Plot (Band 26/5 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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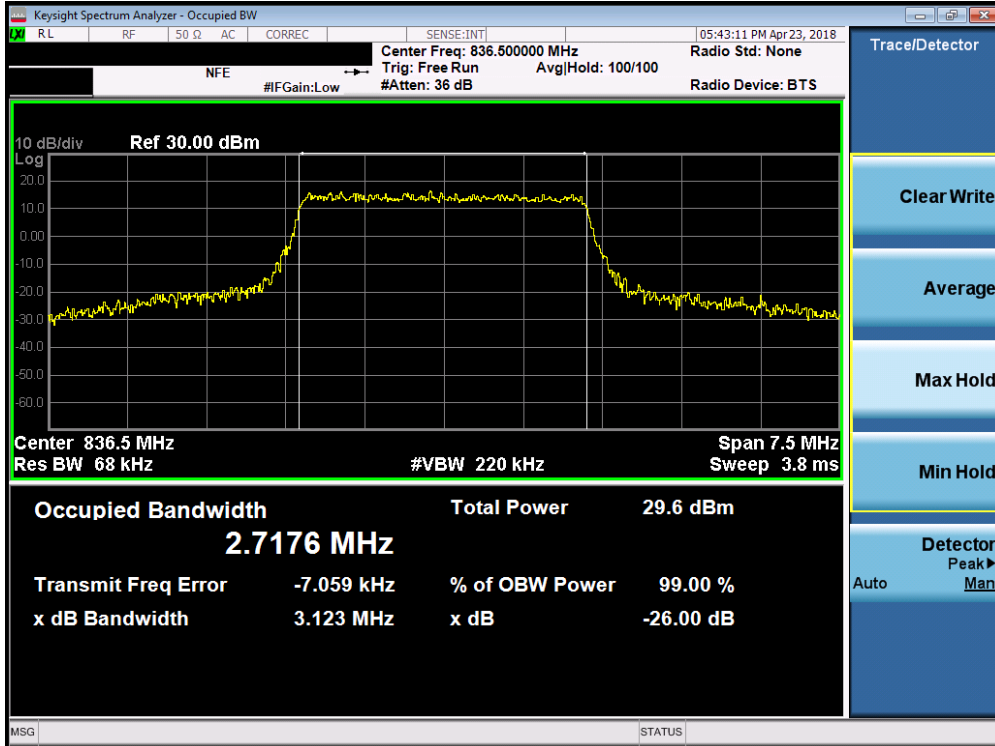


Plot 7-21. Occupied Bandwidth Plot (Band 26/5 - 1.4MHz 64-QAM - Full RB Configuration)

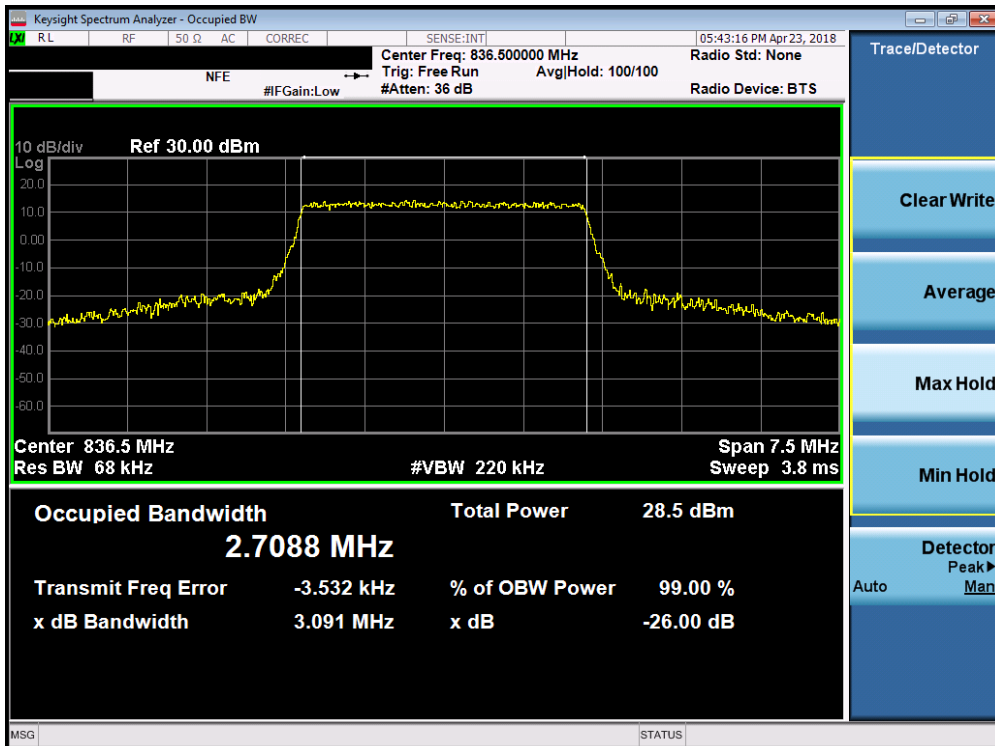


Plot 7-22. Occupied Bandwidth Plot (Band 26/5 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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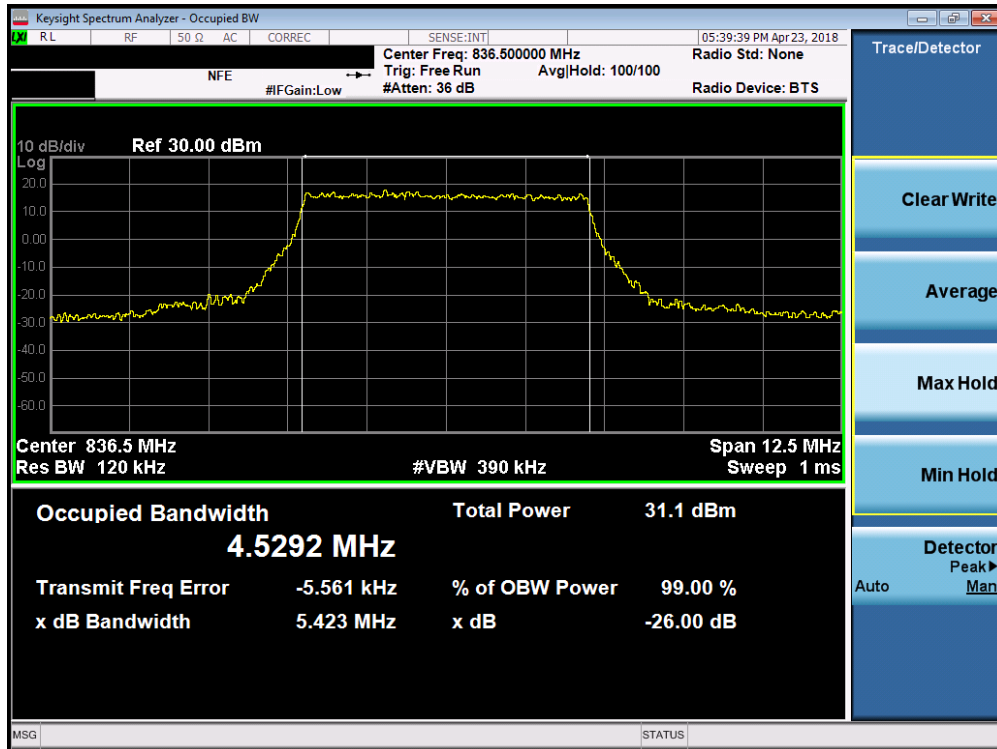


Plot 7-23. Occupied Bandwidth Plot (Band 26/5 - 3.0MHz 16-QAM - Full RB Configuration)

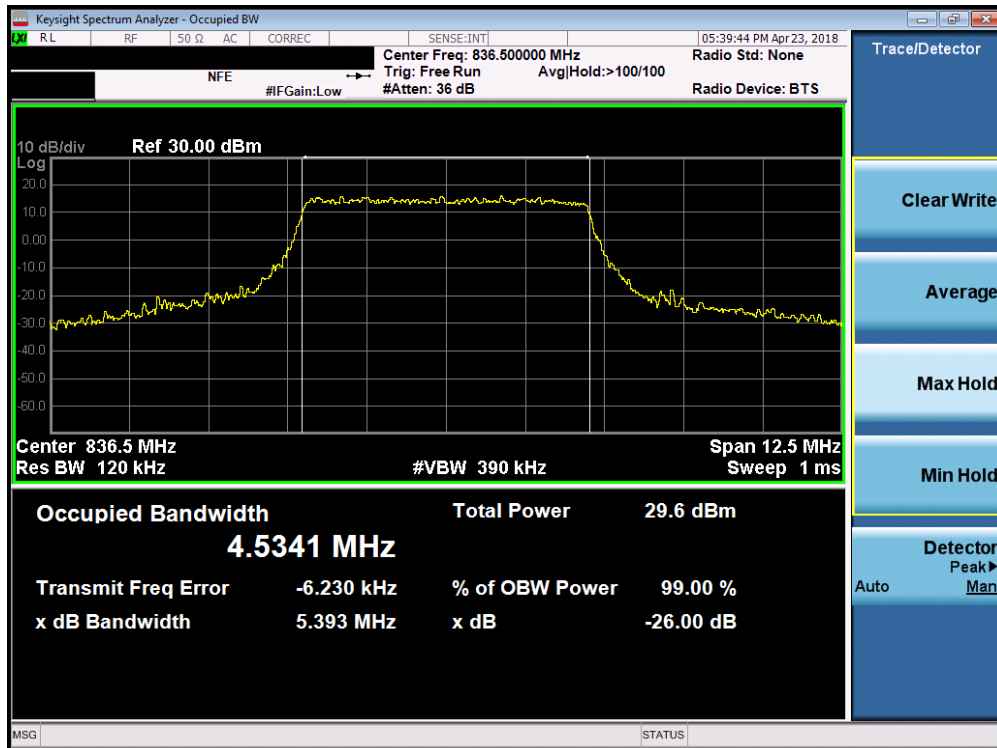


Plot 7-24. Occupied Bandwidth Plot (Band 26/5 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR			<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1804130071-03.A3L	<b>Test Dates:</b> 4/6/2018-6/19/2018	<b>EUT Type:</b> Portable Handset		Page 29 of 198	

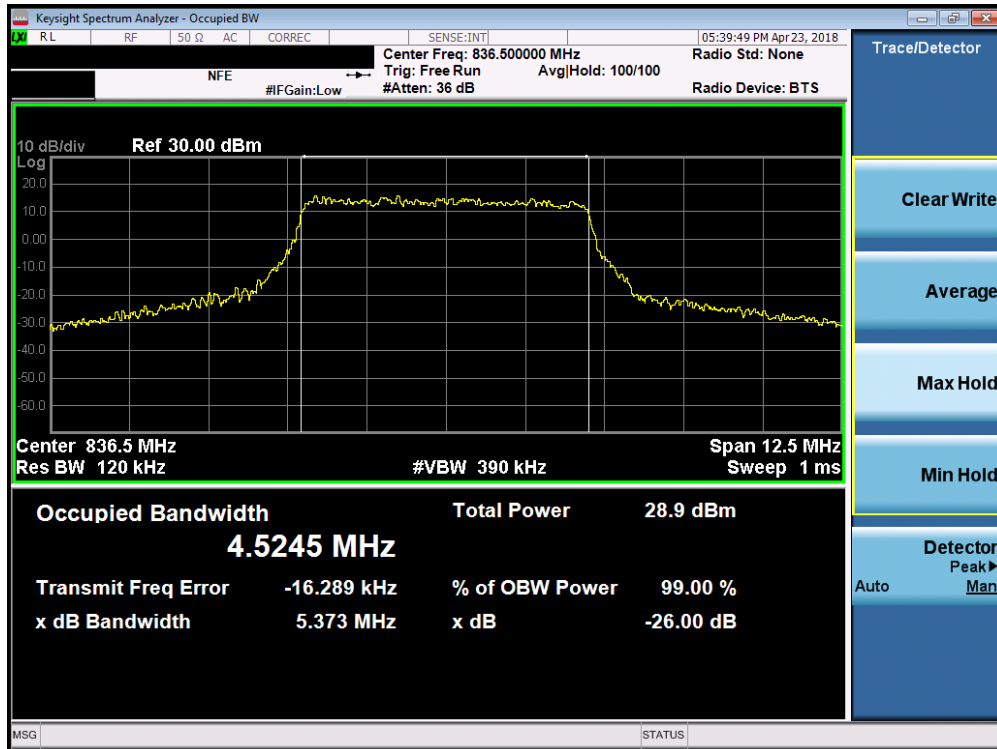


Plot 7-25. Occupied Bandwidth Plot (Band 26/5 - 5.0MHz QPSK - Full RB Configuration)

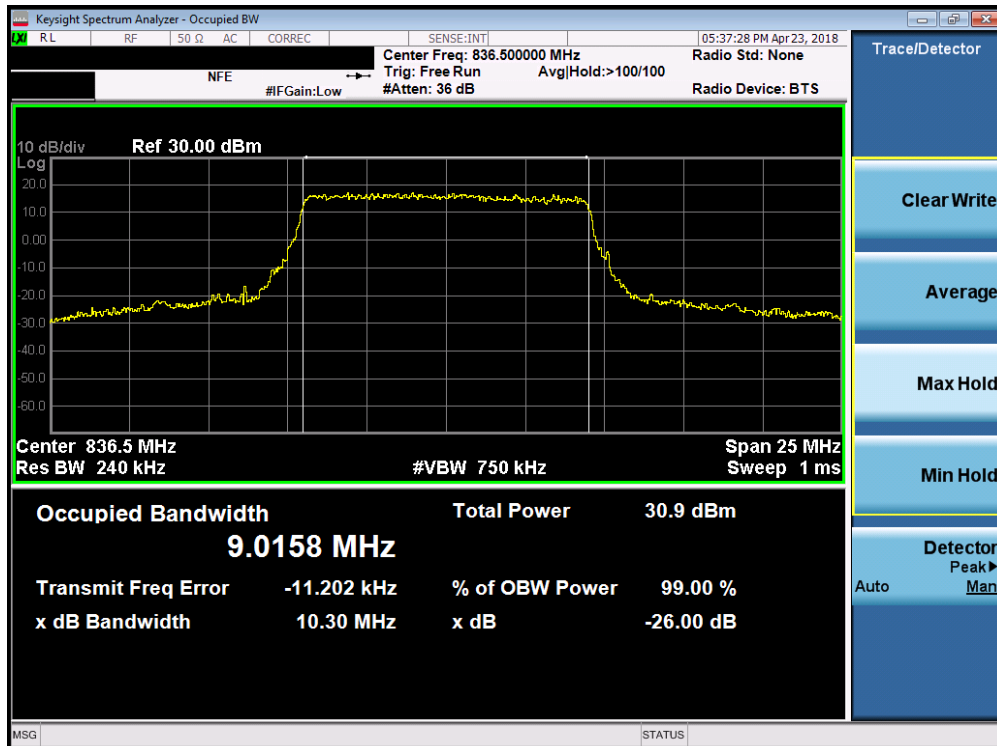


Plot 7-26. Occupied Bandwidth Plot (Band 26/5 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 30 of 198		



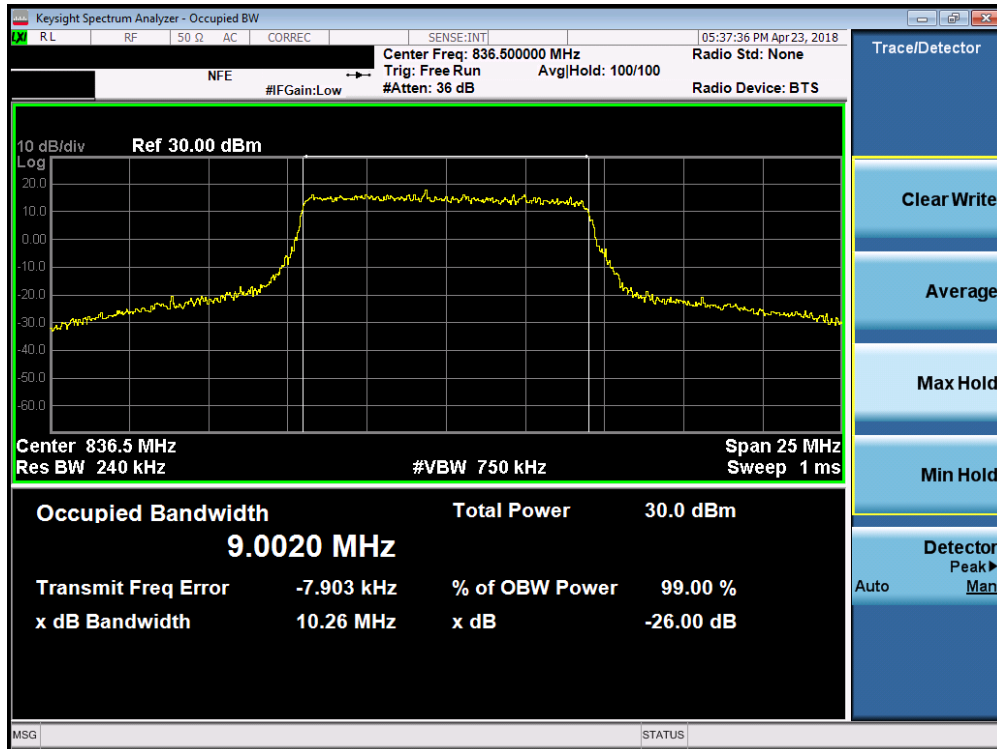
Plot 7-27. Occupied Bandwidth Plot (Band 26/5 - 5.0MHz 64-QAM - Full RB Configuration)



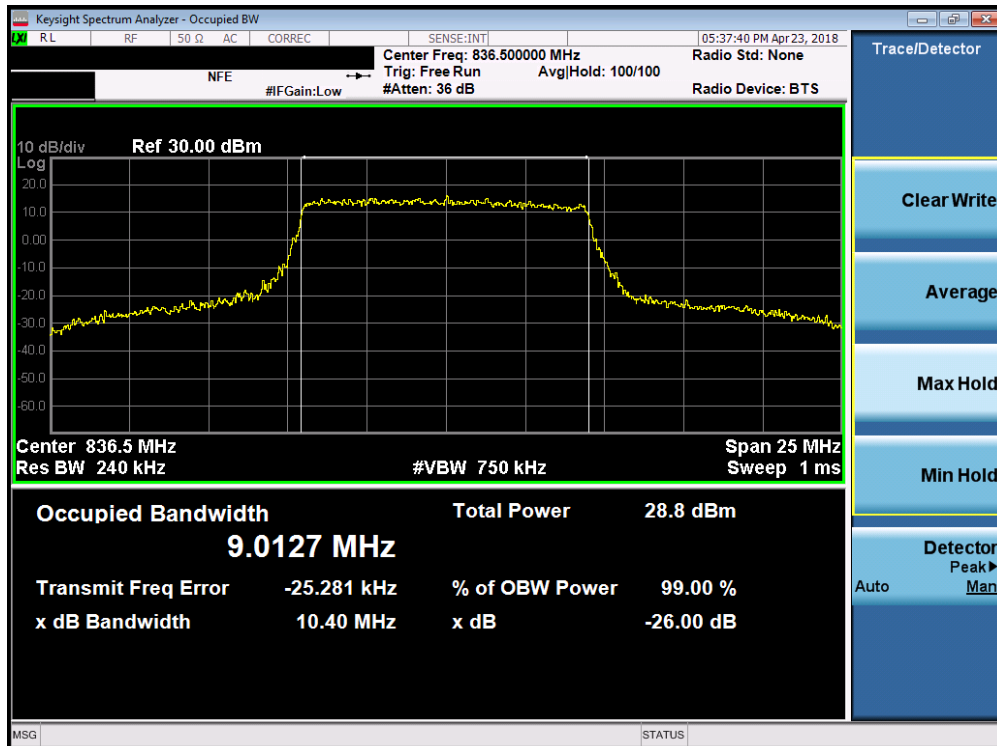
Plot 7-28. Occupied Bandwidth Plot (Band 26/5 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 31 of 198		





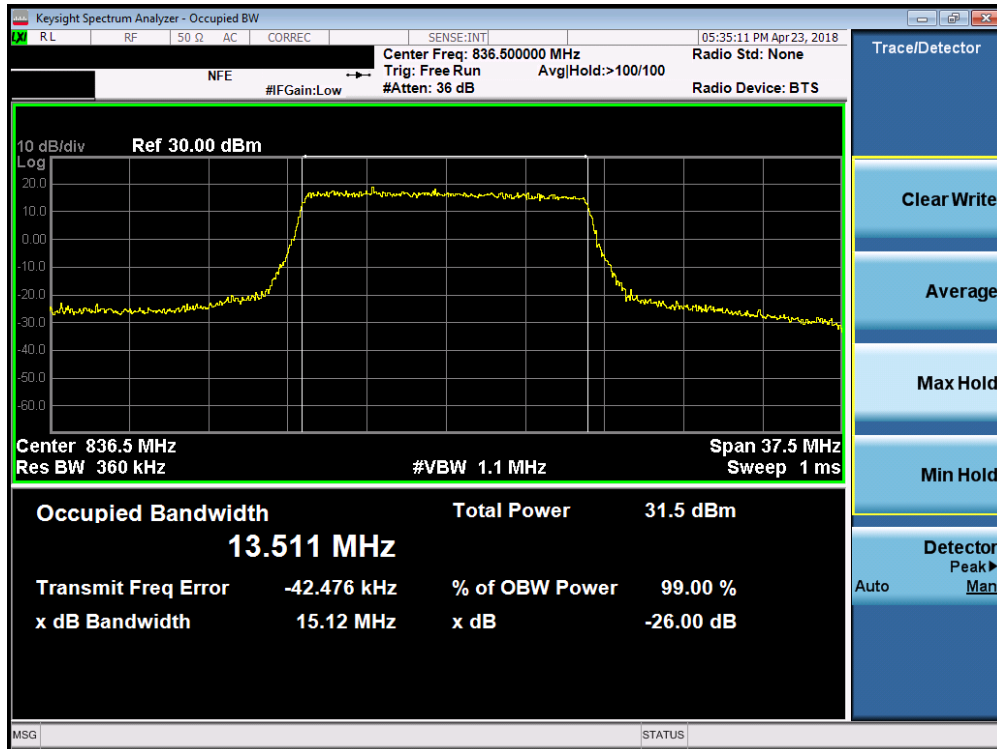
Plot 7-29. Occupied Bandwidth Plot (Band 26/5 - 10.0MHz 16-QAM - Full RB Configuration)



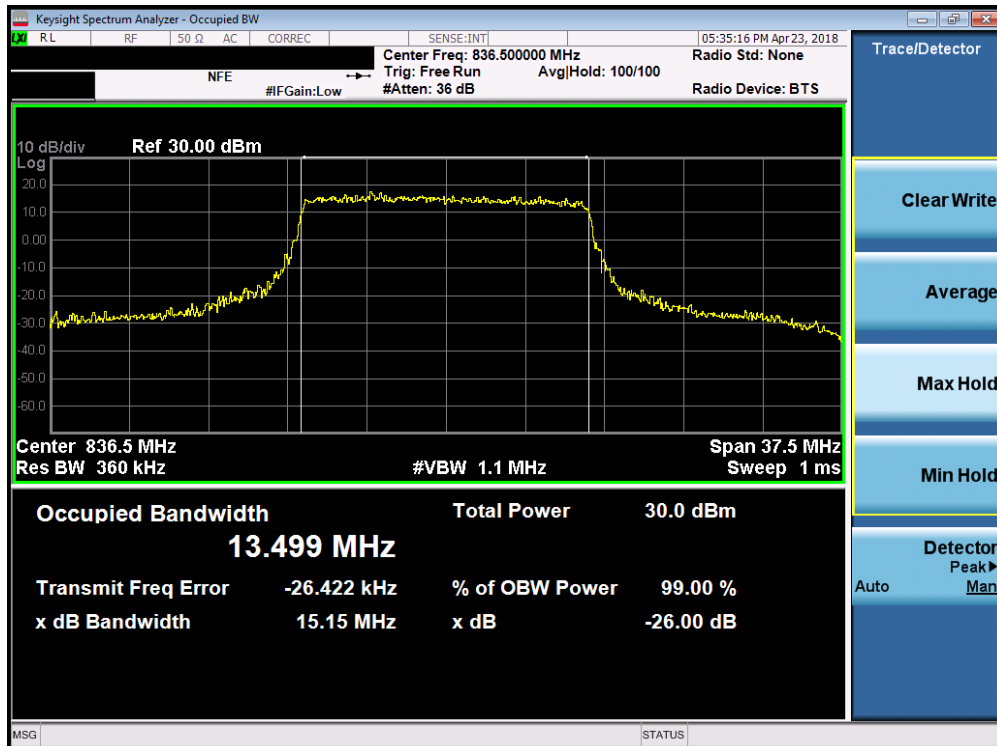
Plot 7-30. Occupied Bandwidth Plot (Band 26/5 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 32 of 198



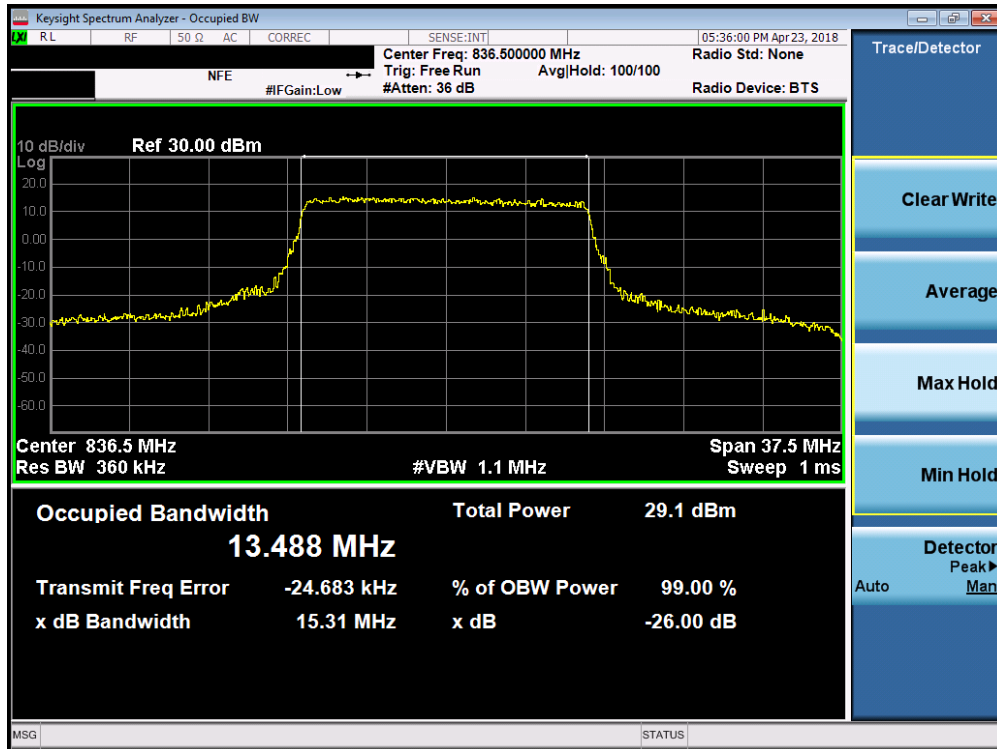


Plot 7-31. Occupied Bandwidth Plot (Band 26 - 15.0MHz QPSK - Full RB Configuration)



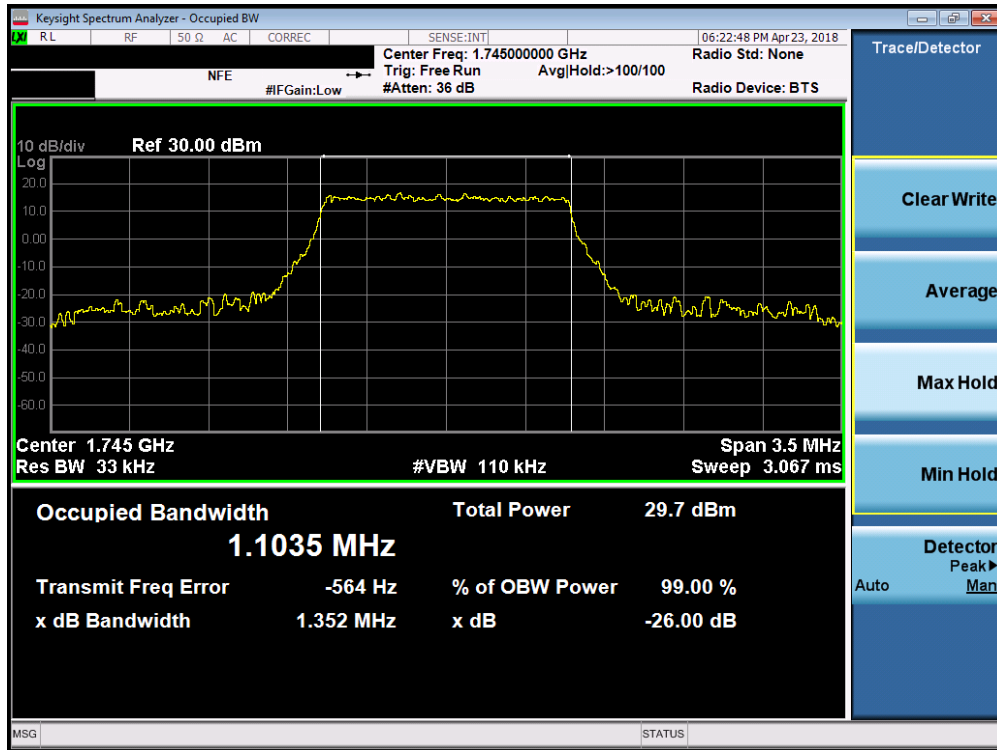
Plot 7-32. Occupied Bandwidth Plot (Band 26 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 33 of 198

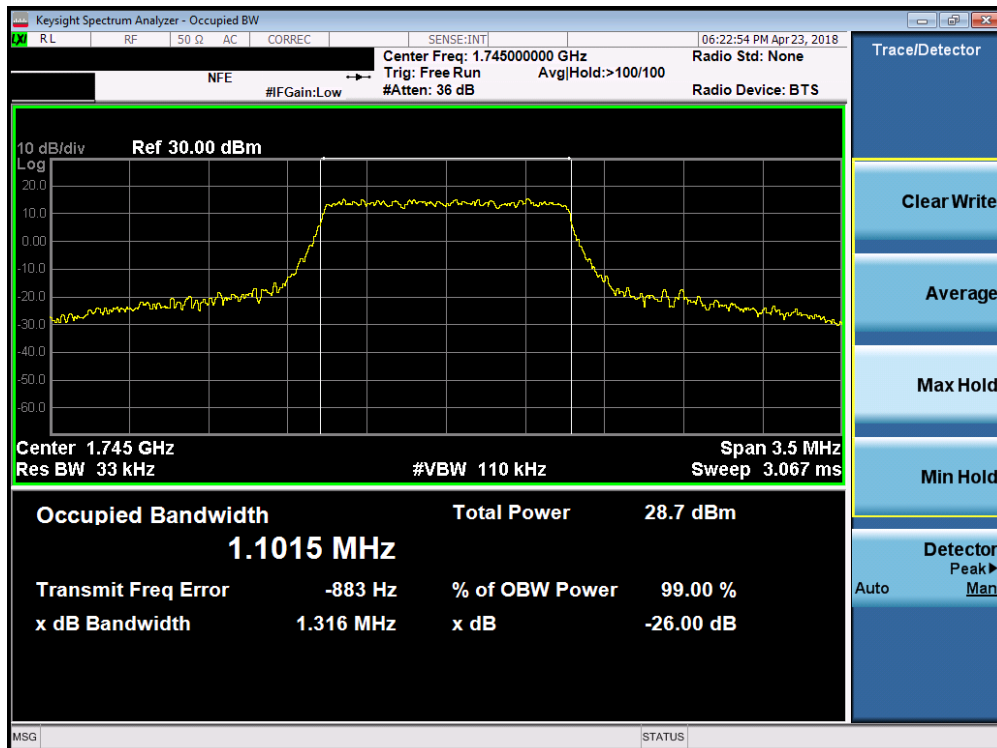


Plot 7-33. Occupied Bandwidth Plot (Band 26 - 15.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 34 of 198

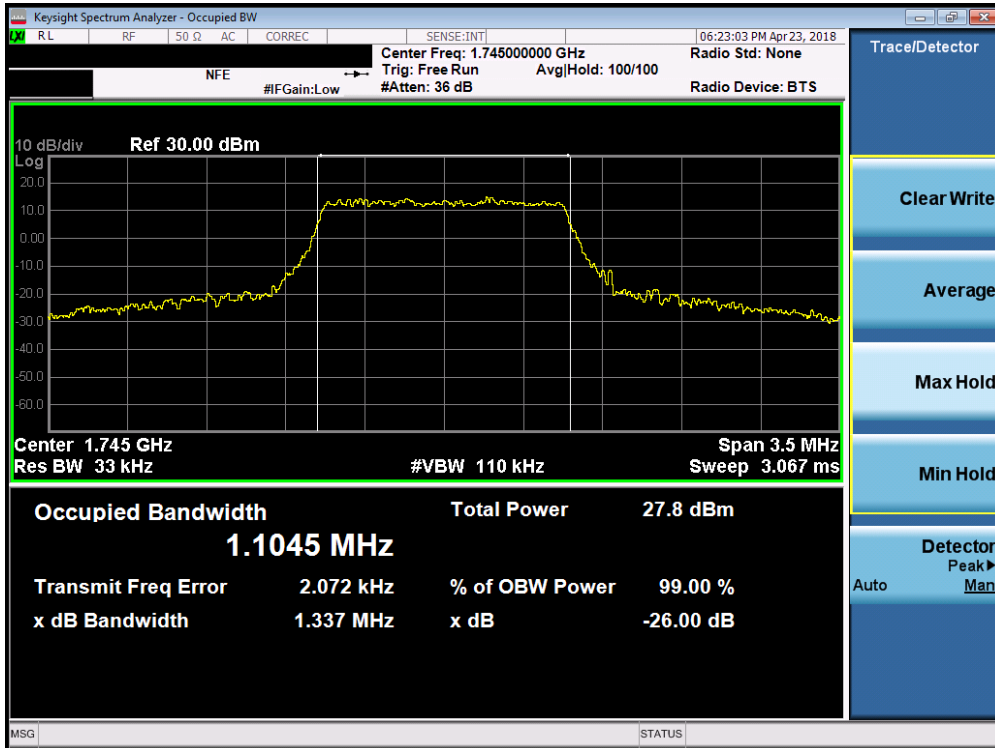


Plot 7-34. Occupied Bandwidth Plot (Band 4/66 - 1.4MHz QPSK - Full RB Configuration)

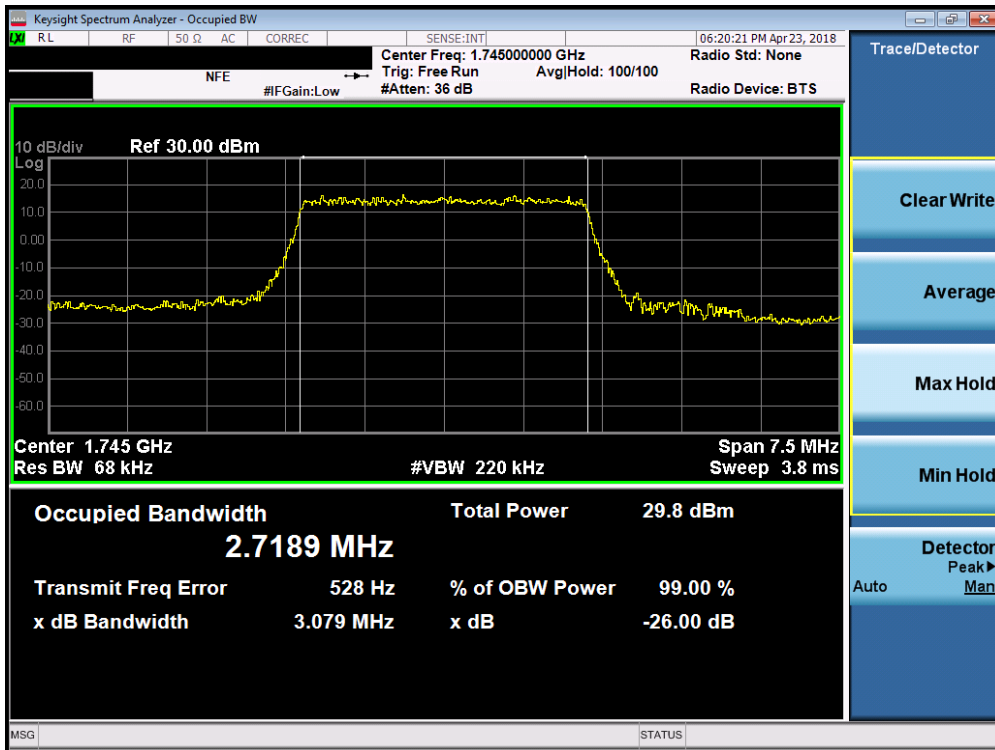


Plot 7-35. Occupied Bandwidth Plot (Band 4/66 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 35 of 198

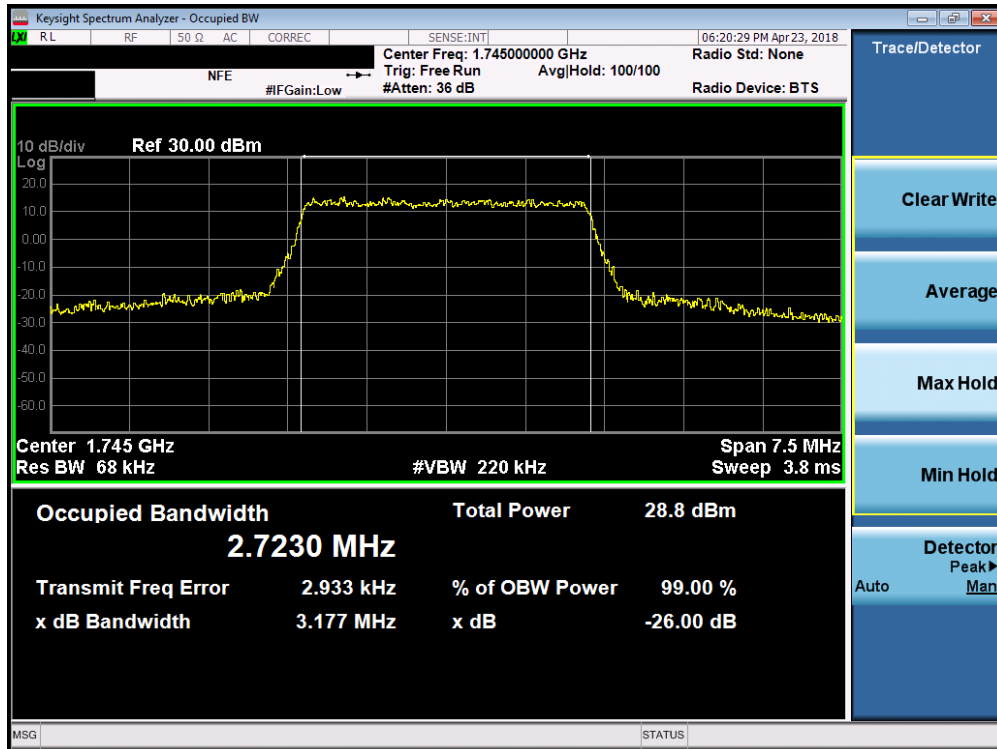


Plot 7-36. Occupied Bandwidth Plot (Band 4/66 - 1.4MHz 64-QAM - Full RB Configuration)

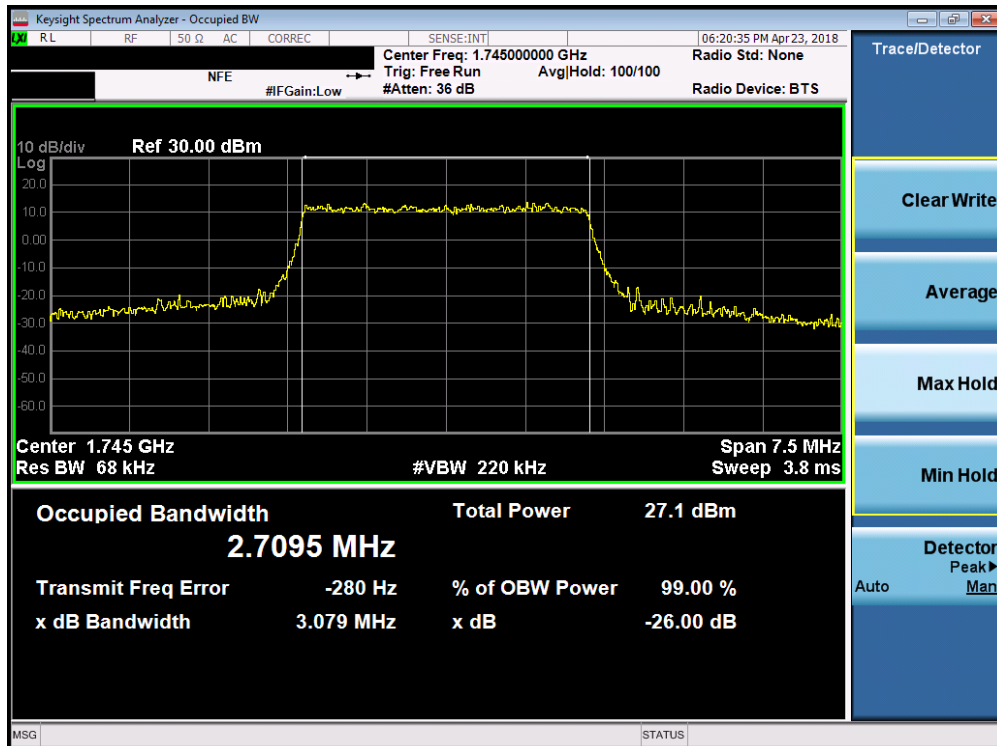


Plot 7-37. Occupied Bandwidth Plot (Band 4/66 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR			<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1804130071-03.A3L	<b>Test Dates:</b> 4/6/2018-6/19/2018	<b>EUT Type:</b> Portable Handset			Page 36 of 198

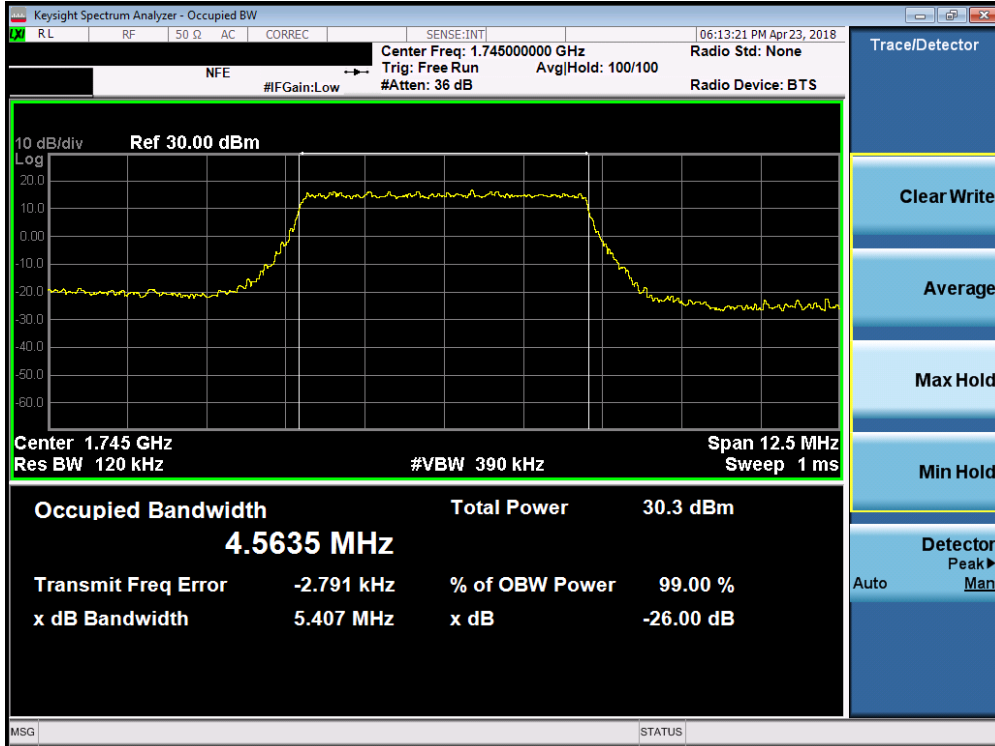


Plot 7-38. Occupied Bandwidth Plot (Band 4/66 - 3.0MHz 16-QAM - Full RB Configuration)

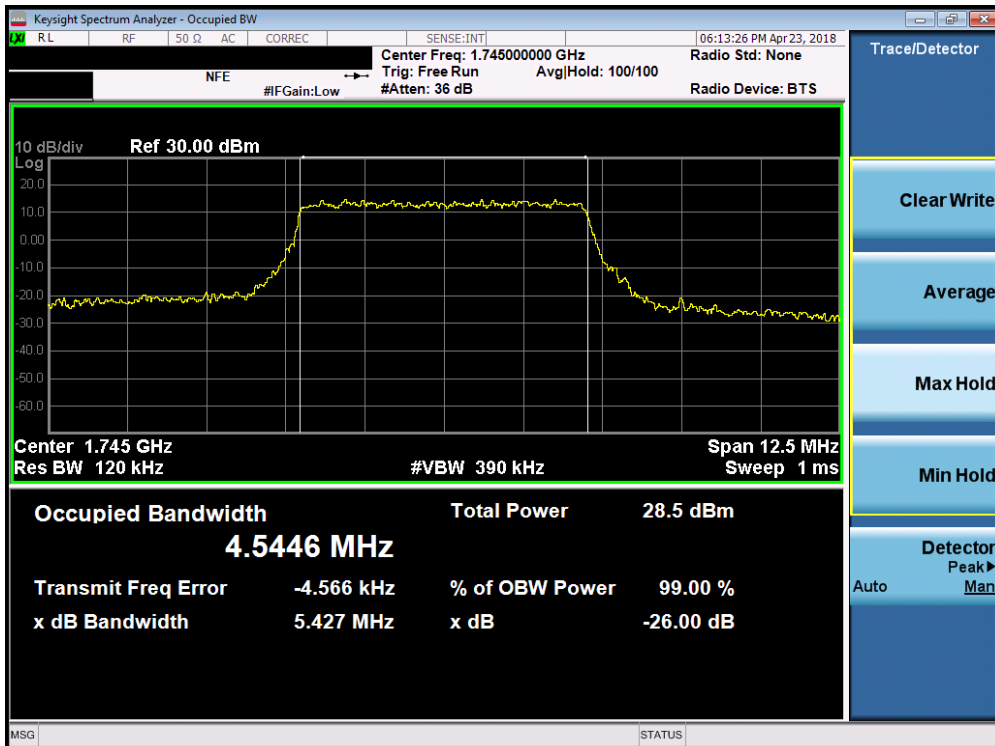


Plot 7-39. Occupied Bandwidth Plot (Band 4/66 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 37 of 198

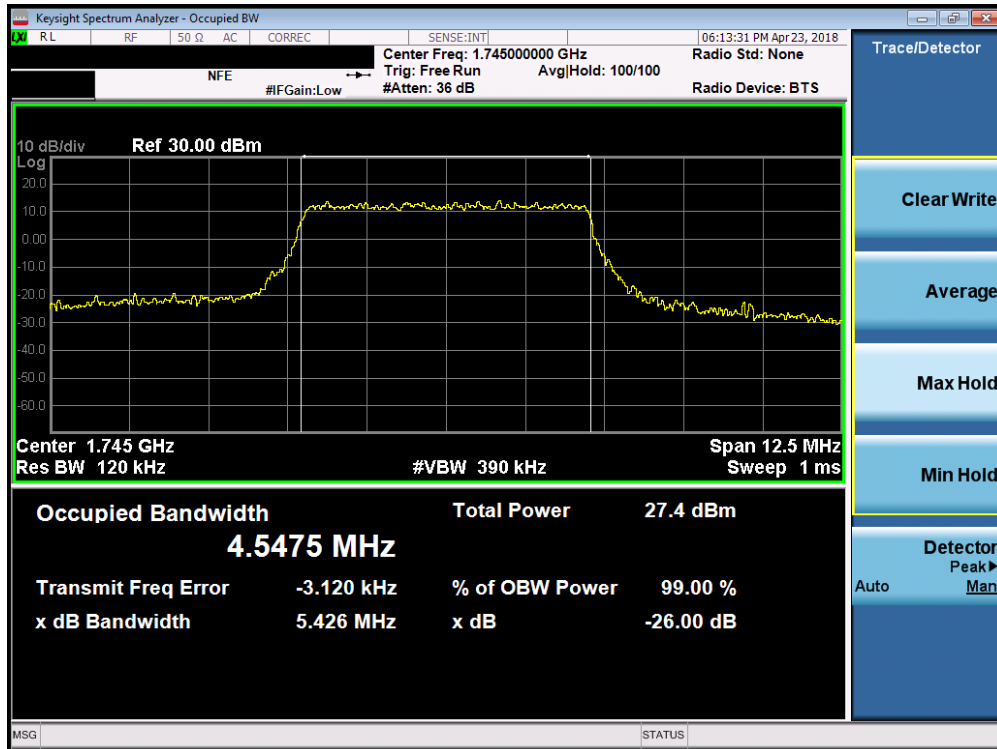


Plot 7-40. Occupied Bandwidth Plot (Band 4/66 - 5.0MHz QPSK - Full RB Configuration)

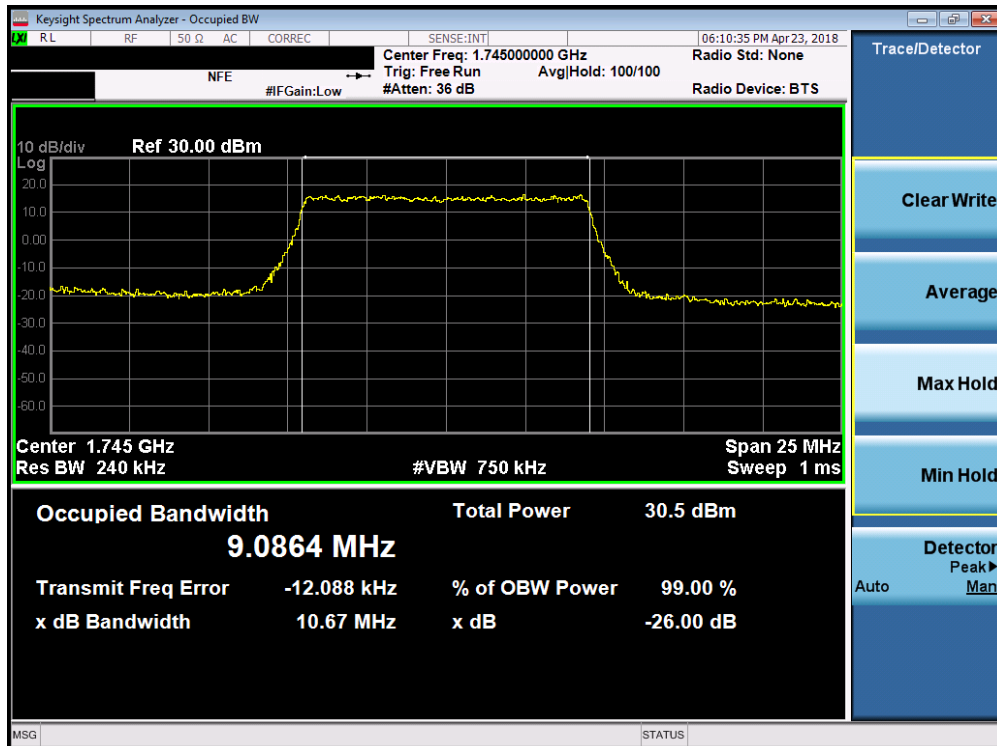


Plot 7-41. Occupied Bandwidth Plot (Band 4/66 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 38 of 198



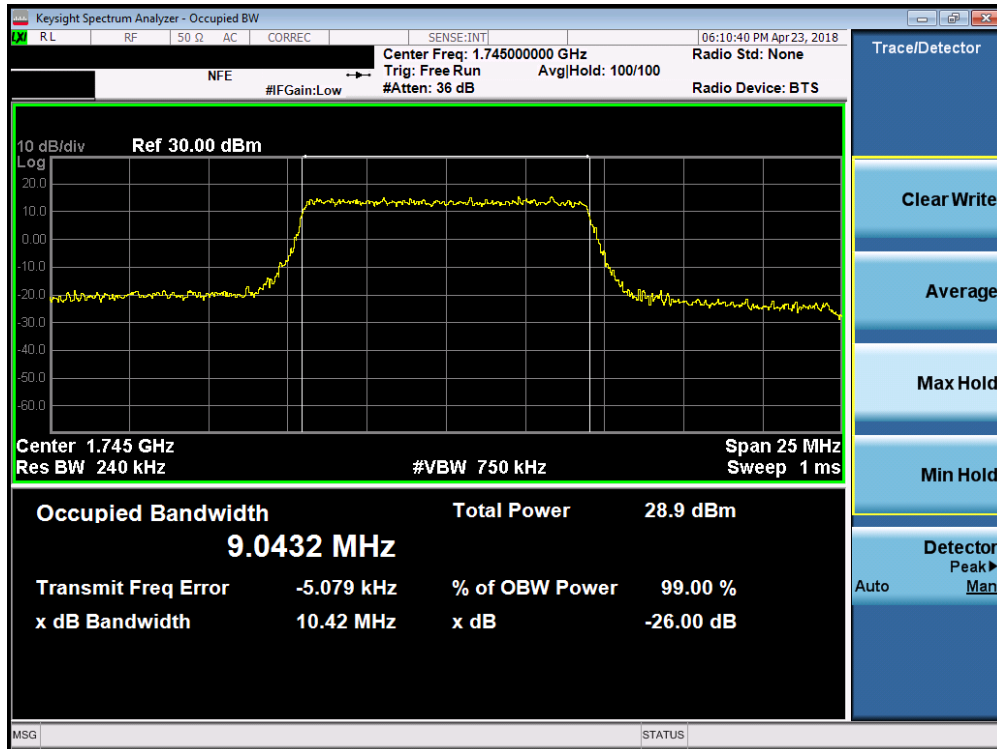
Plot 7-42. Occupied Bandwidth Plot (Band 4/66 - 5.0MHz 64-QAM - Full RB Configuration)



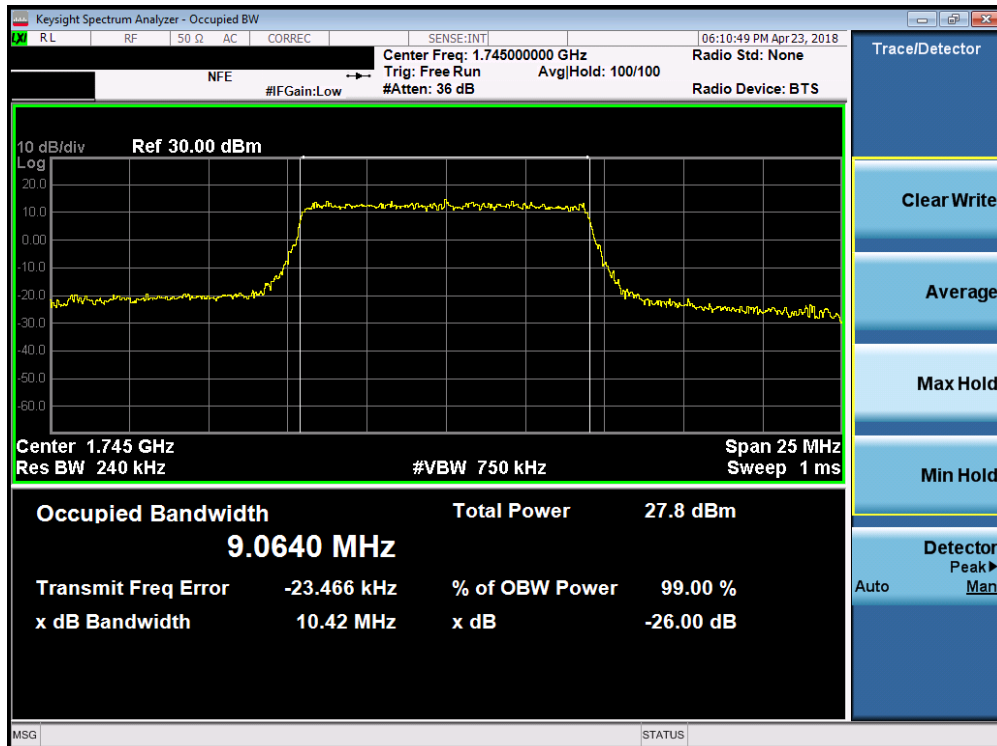
Plot 7-43. Occupied Bandwidth Plot (Band 4/66 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 39 of 198





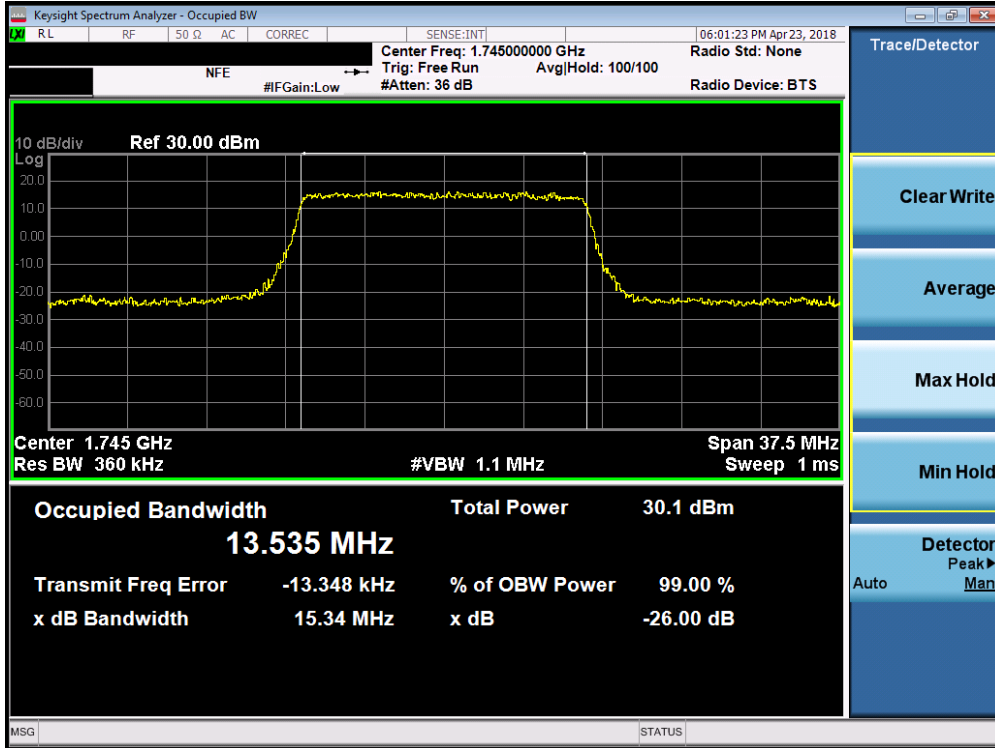
Plot 7-44. Occupied Bandwidth Plot (Band 4/66 - 10.0MHz 16-QAM - Full RB Configuration)



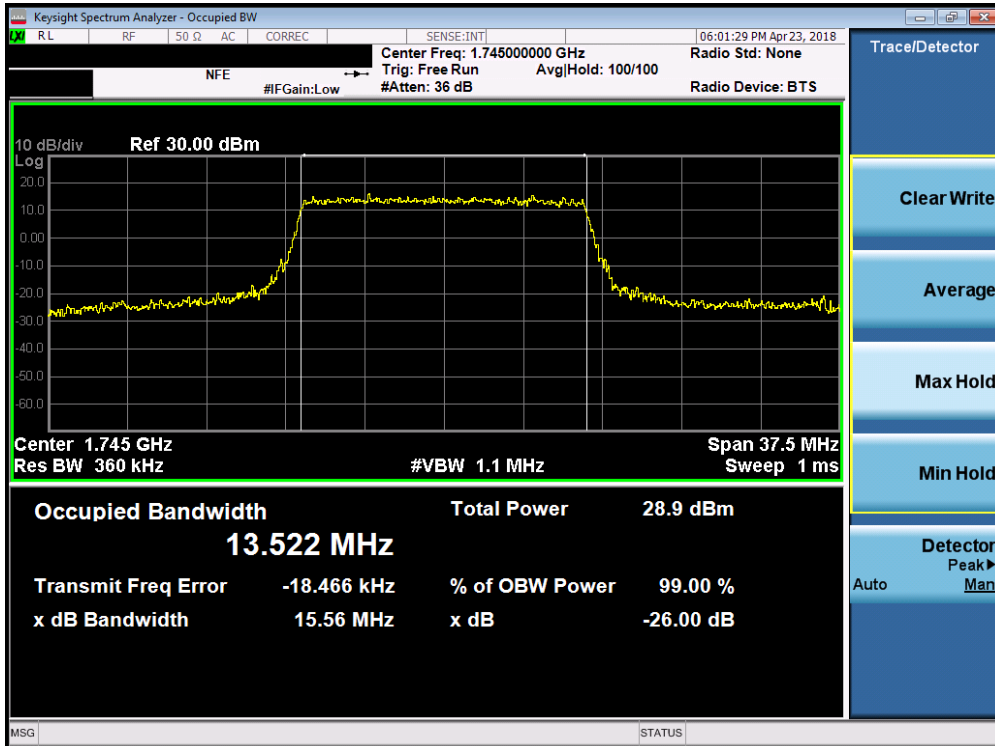
Plot 7-45. Occupied Bandwidth Plot (Band 4/66 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 40 of 198



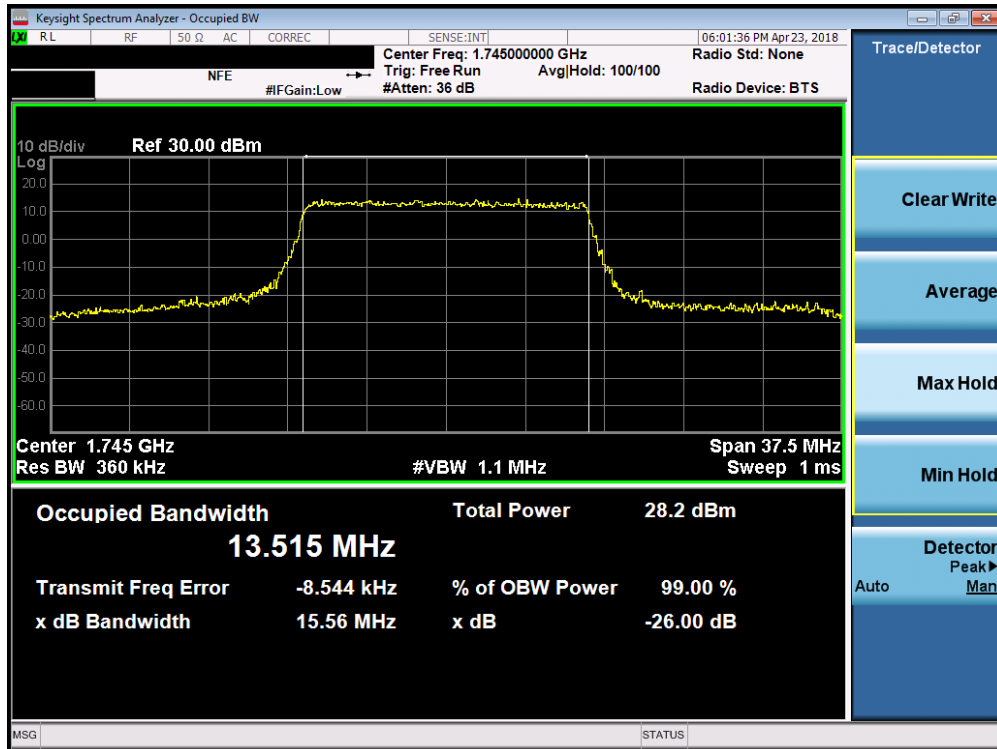


Plot 7-46. Occupied Bandwidth Plot (Band 4/66 - 15.0MHz QPSK - Full RB Configuration)

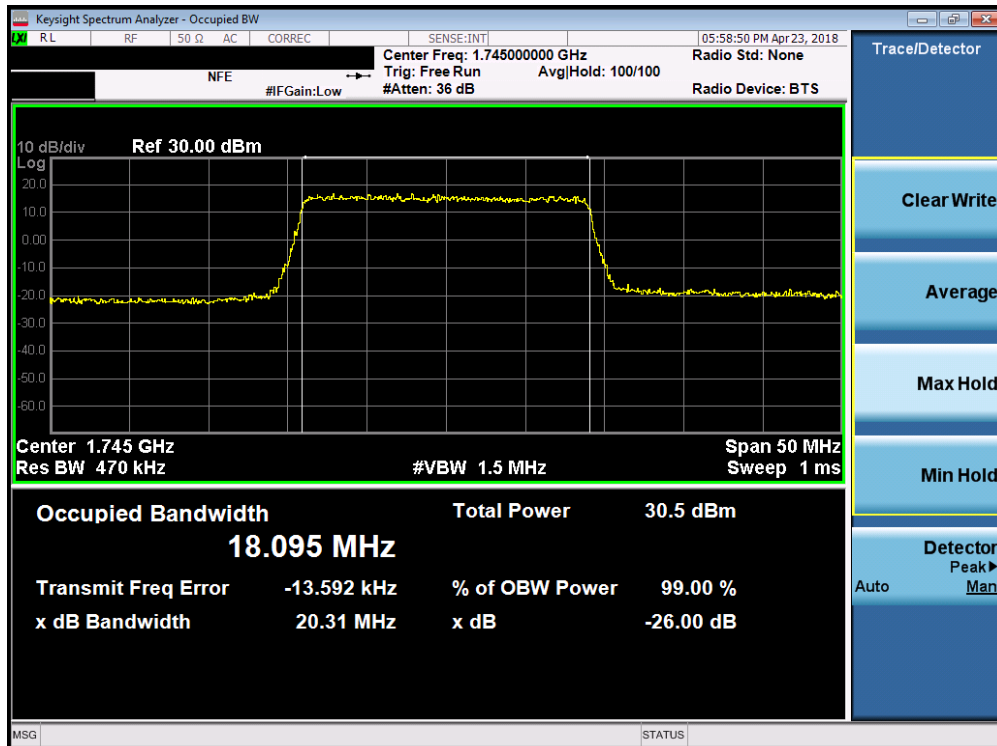


Plot 7-47. Occupied Bandwidth Plot (Band 4/66 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 41 of 198

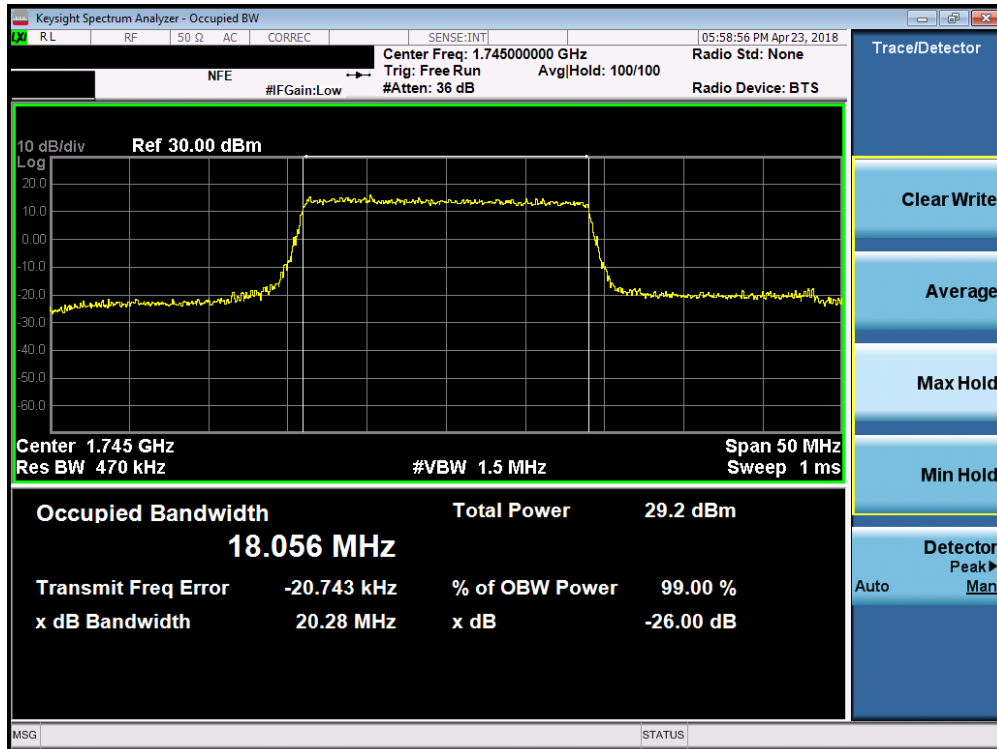


Plot 7-48. Occupied Bandwidth Plot (Band 4/66 - 15.0MHz 64-QAM - Full RB Configuration)

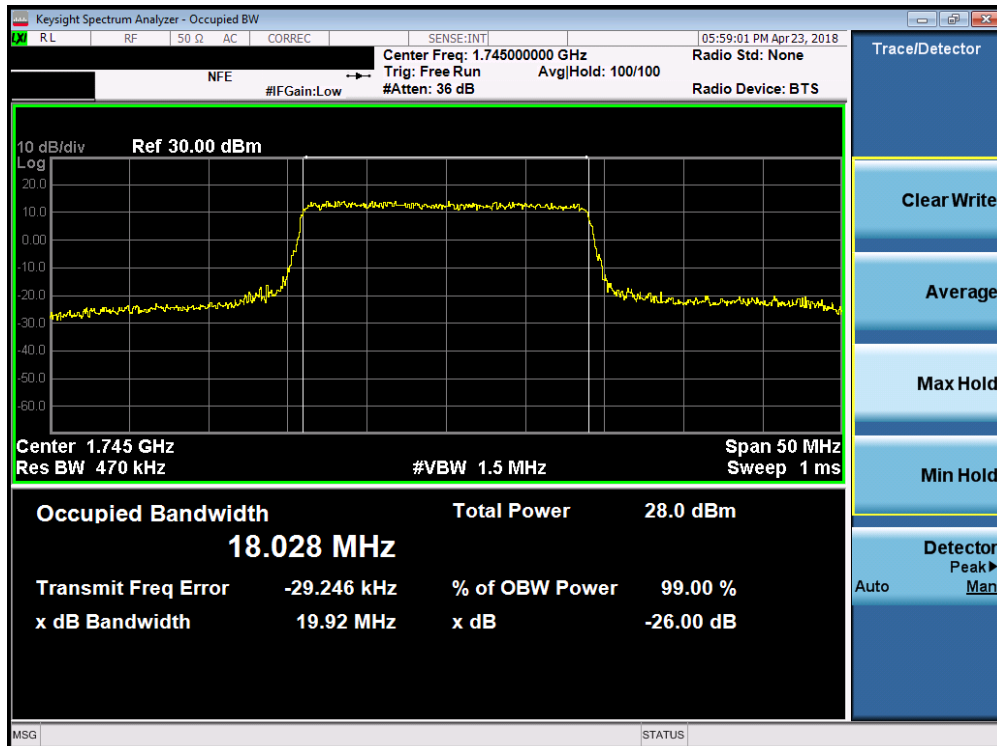


Plot 7-49. Occupied Bandwidth Plot (Band 4/66 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 42 of 198

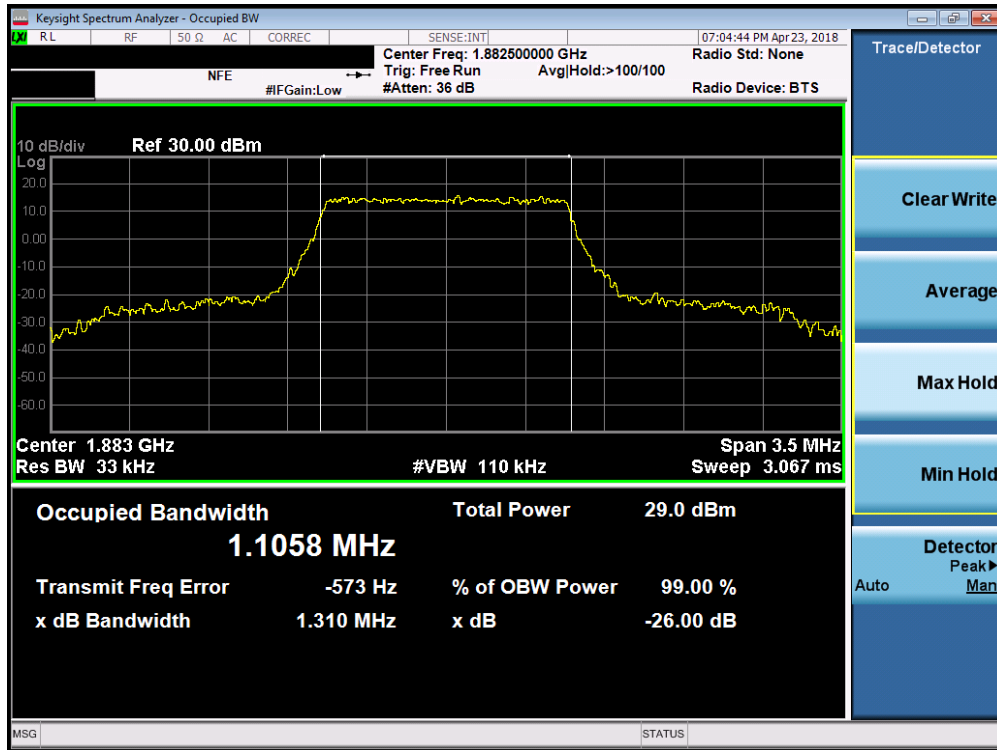


Plot 7-50. Occupied Bandwidth Plot (Band 4/66 - 20.0MHz 16-QAM - Full RB Configuration)

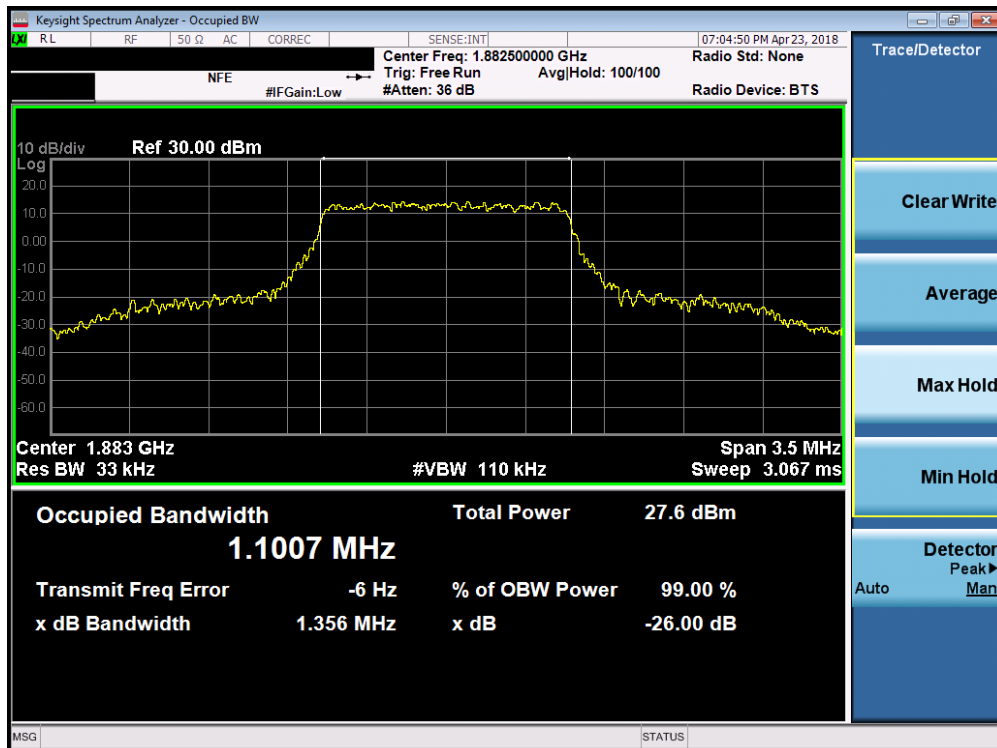


Plot 7-51. Occupied Bandwidth Plot (Band 4/66 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 43 of 198

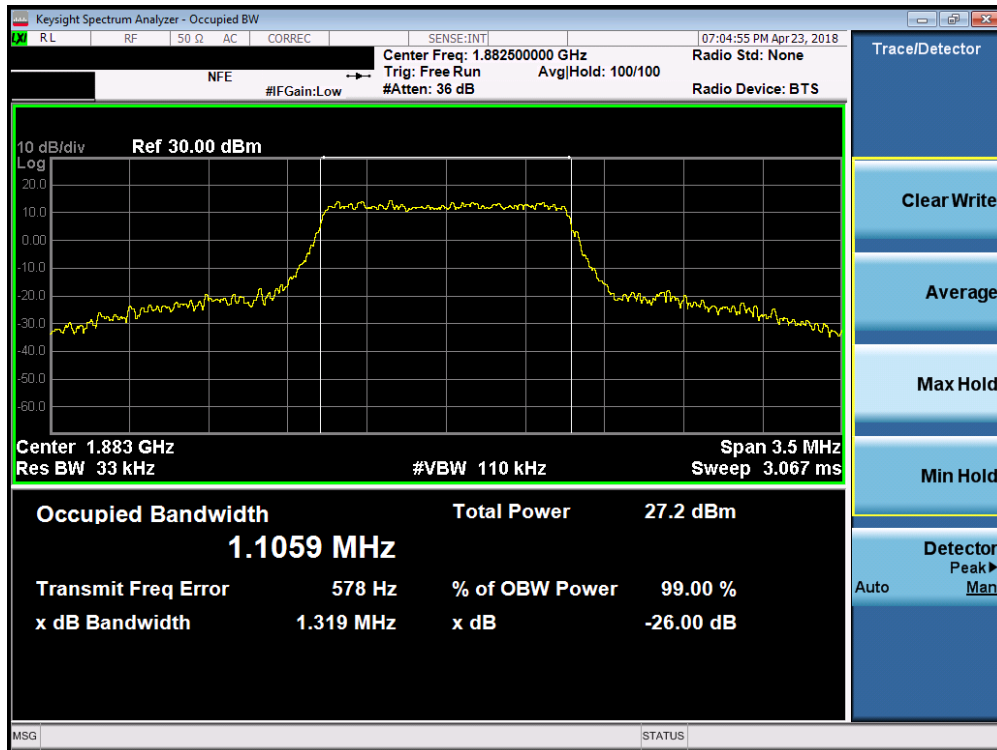


Plot 7-52. Occupied Bandwidth Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)

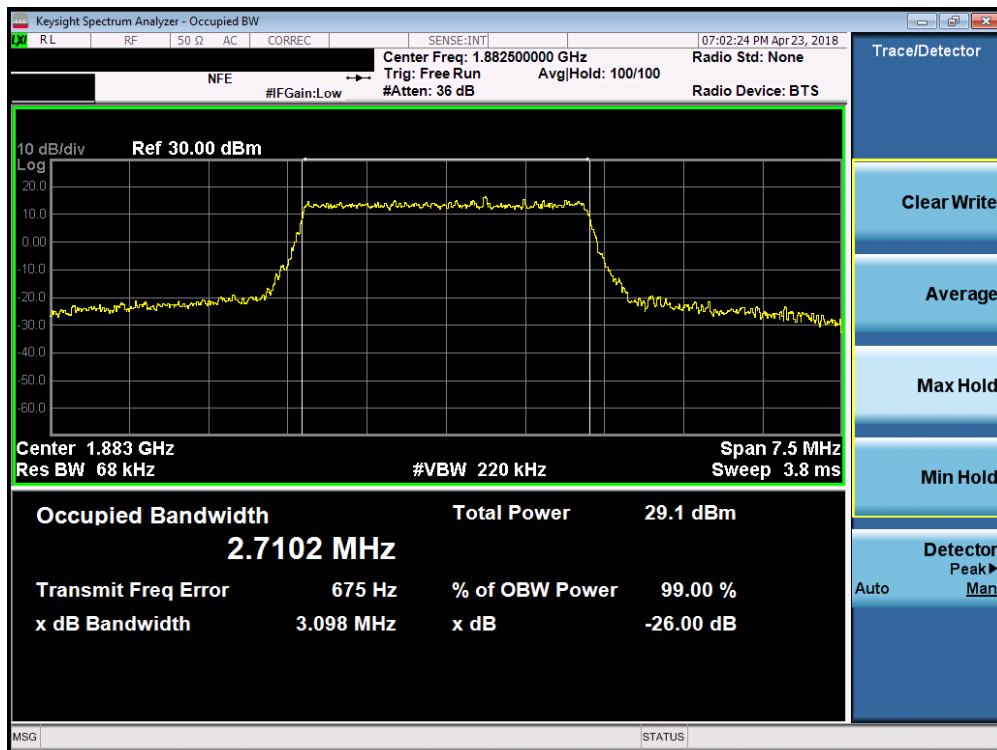


Plot 7-53. Occupied Bandwidth Plot (Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 44 of 198

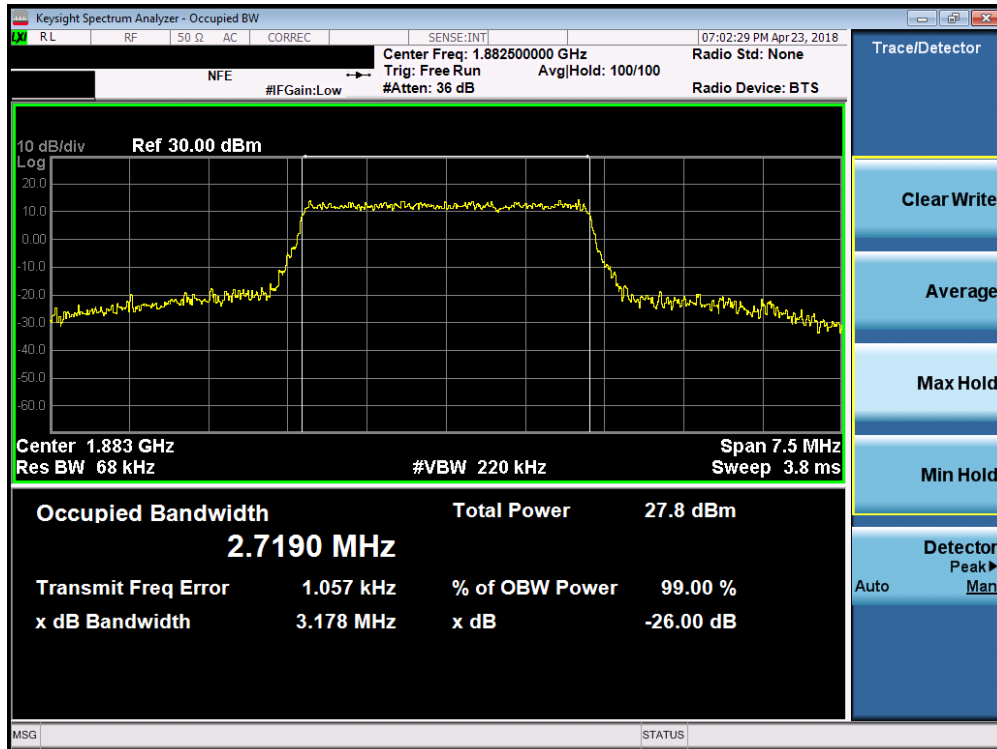


Plot 7-54. Occupied Bandwidth Plot (Band 25/2 - 1.4MHz 64-QAM - Full RB Configuration)

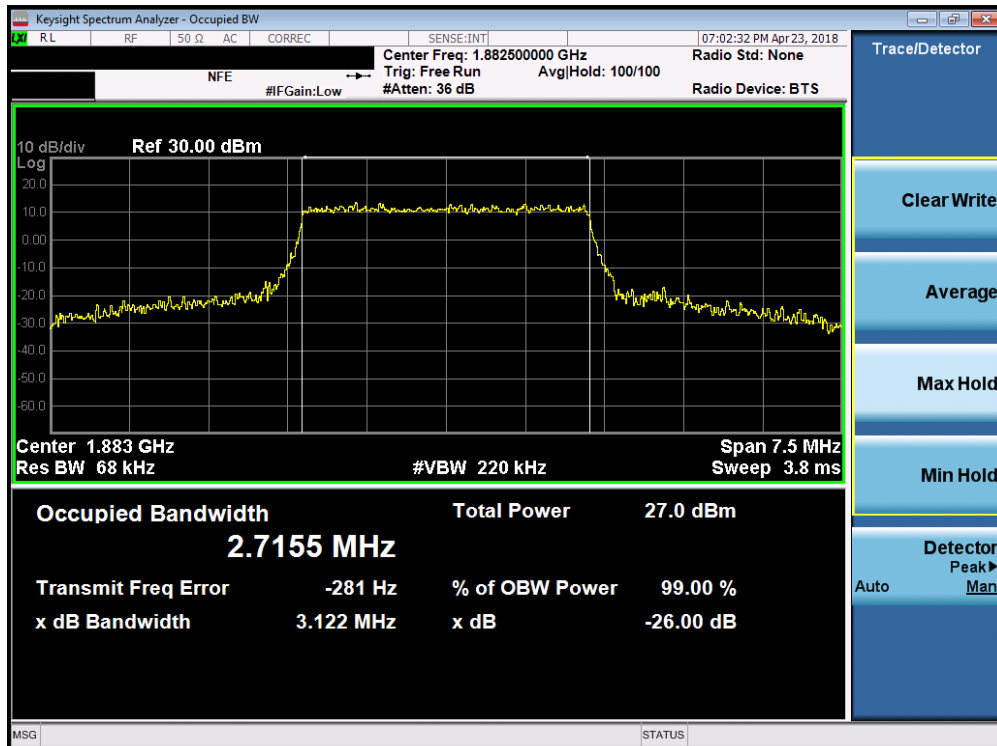


Plot 7-55. Occupied Bandwidth Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR				<b>MEASUREMENT REPORT</b> (CERTIFICATION)	<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1804130071-03-A3L	<b>Test Dates:</b> 4/6/2018-6/19/2018	<b>EUT Type:</b> Portable Handset	Page 45 of 198		

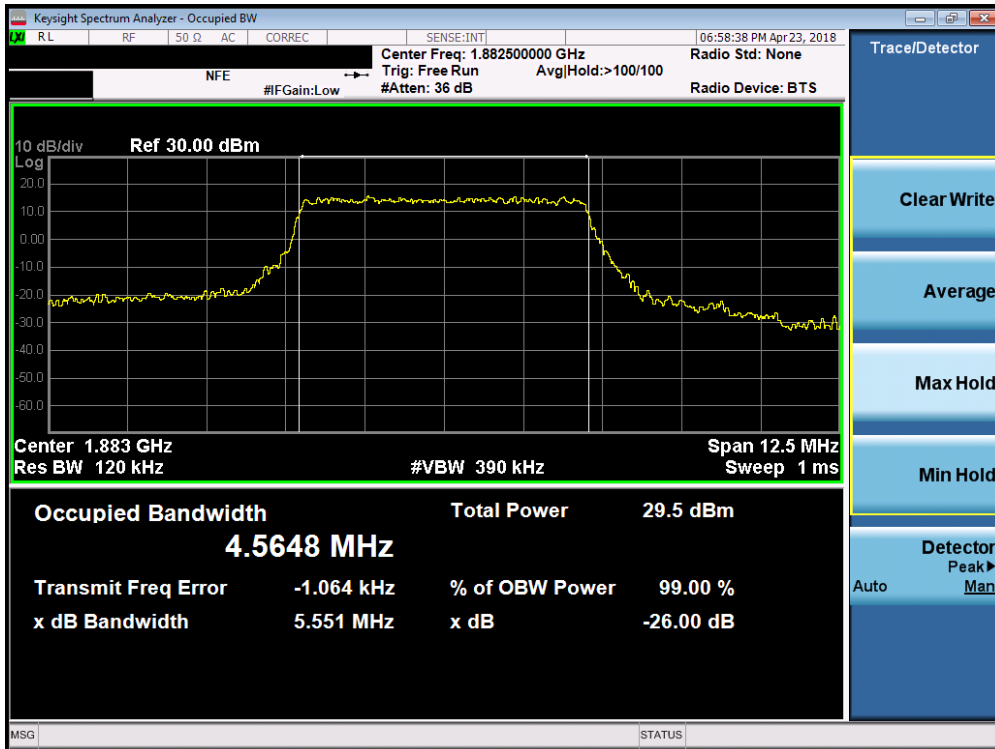


Plot 7-56. Occupied Bandwidth Plot (Band 25/2 - 3.0MHz 16-QAM - Full RB Configuration)

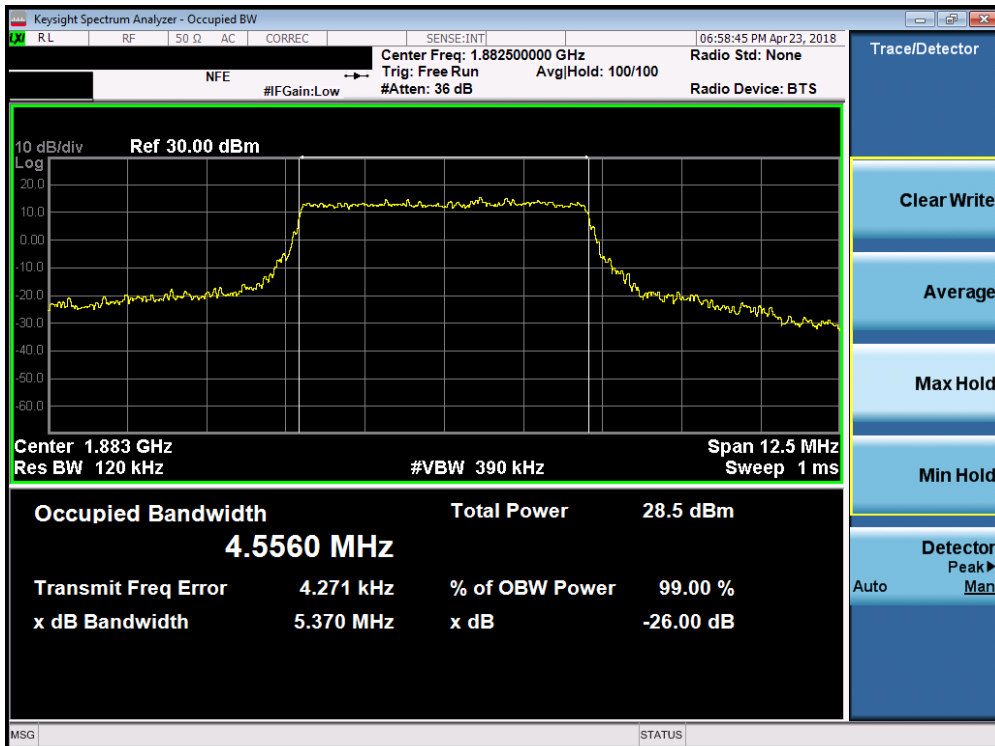


Plot 7-57. Occupied Bandwidth Plot (Band 25/2 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 46 of 198



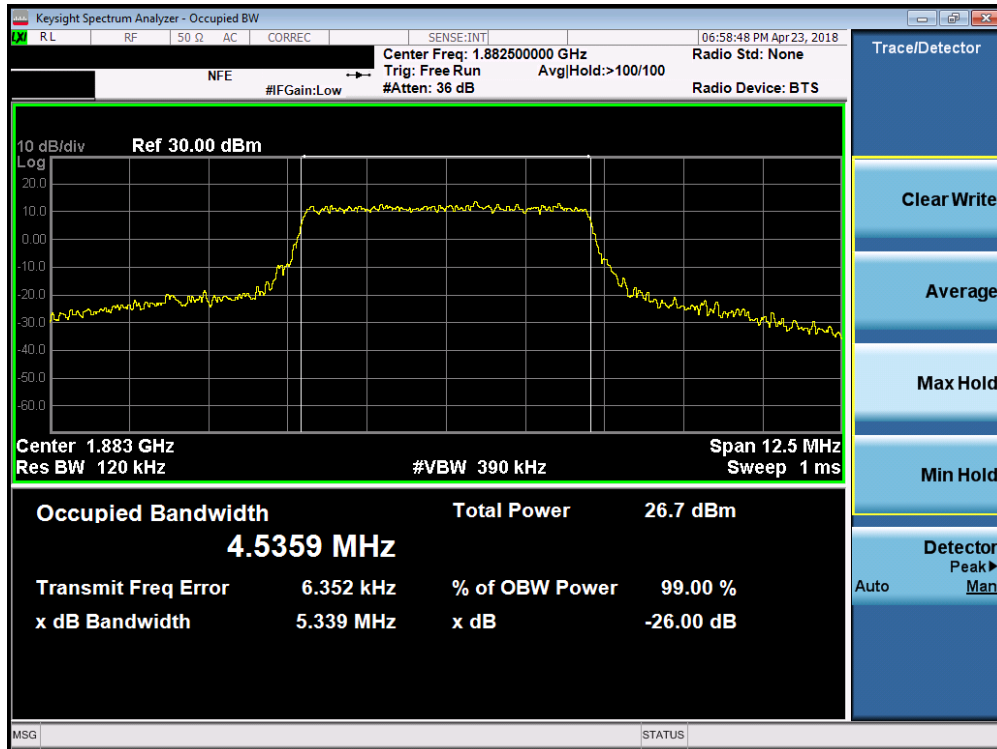
Plot 7-58. Occupied Bandwidth Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



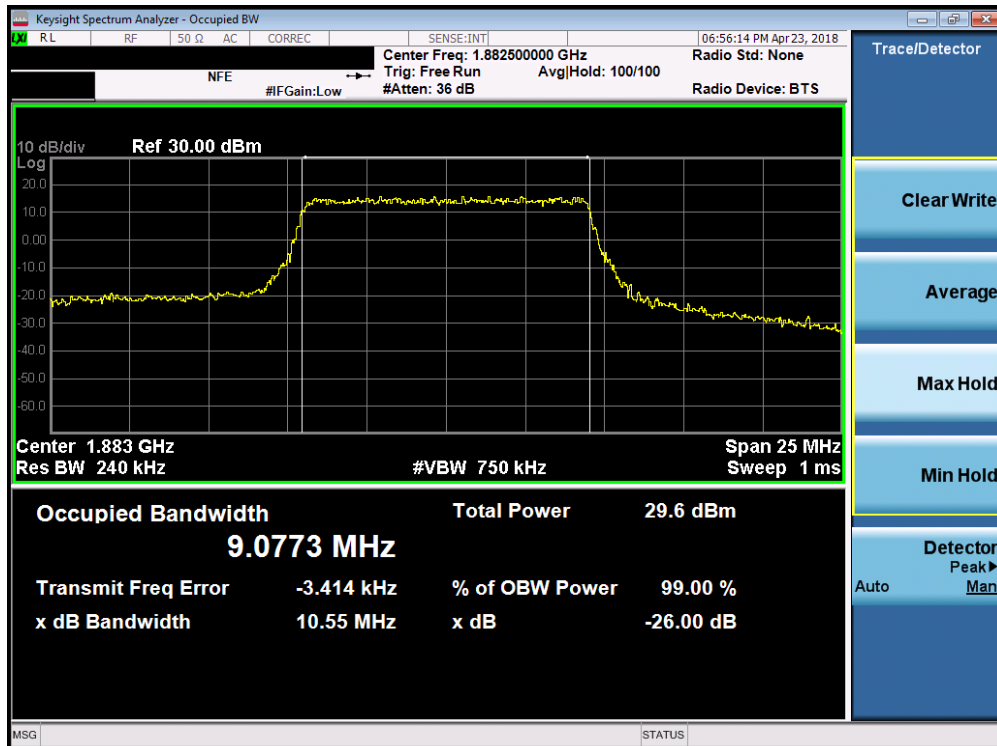
Plot 7-59. Occupied Bandwidth Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 47 of 198





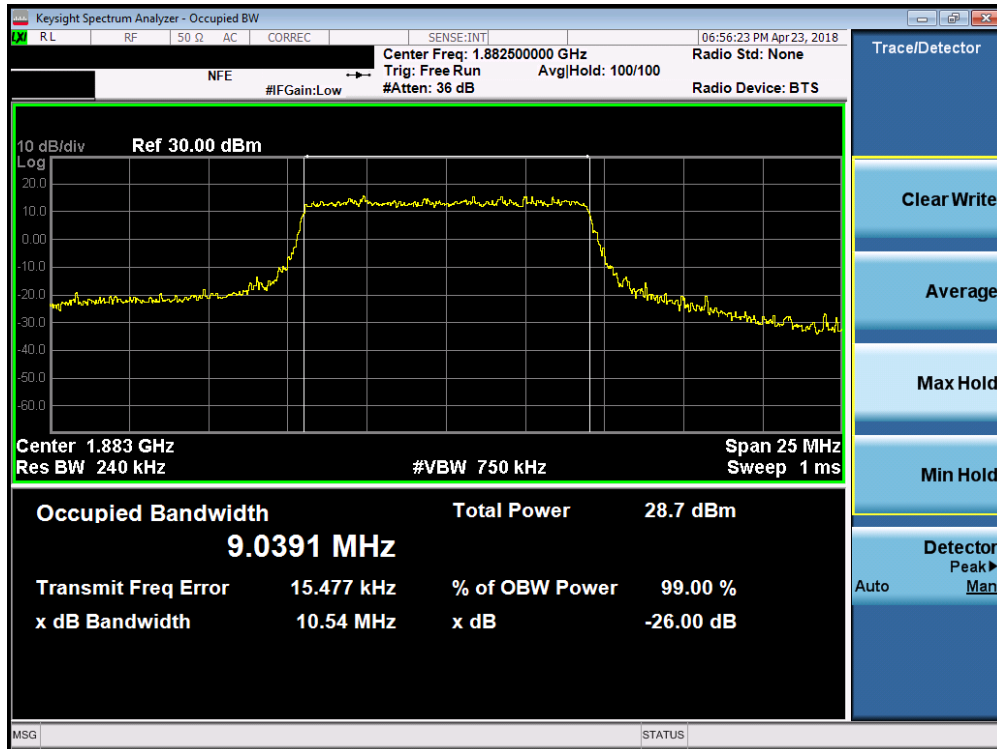
Plot 7-60. Occupied Bandwidth Plot (Band 25/2 - 5.0MHz 64-QAM - Full RB Configuration)



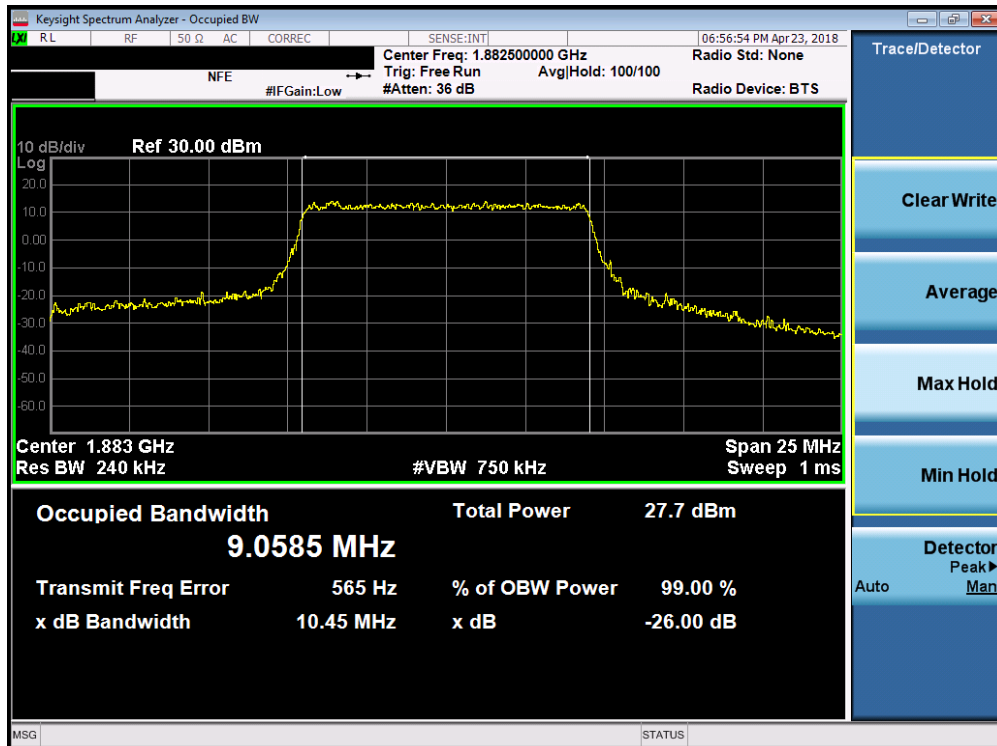
Plot 7-61. Occupied Bandwidth Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 48 of 198



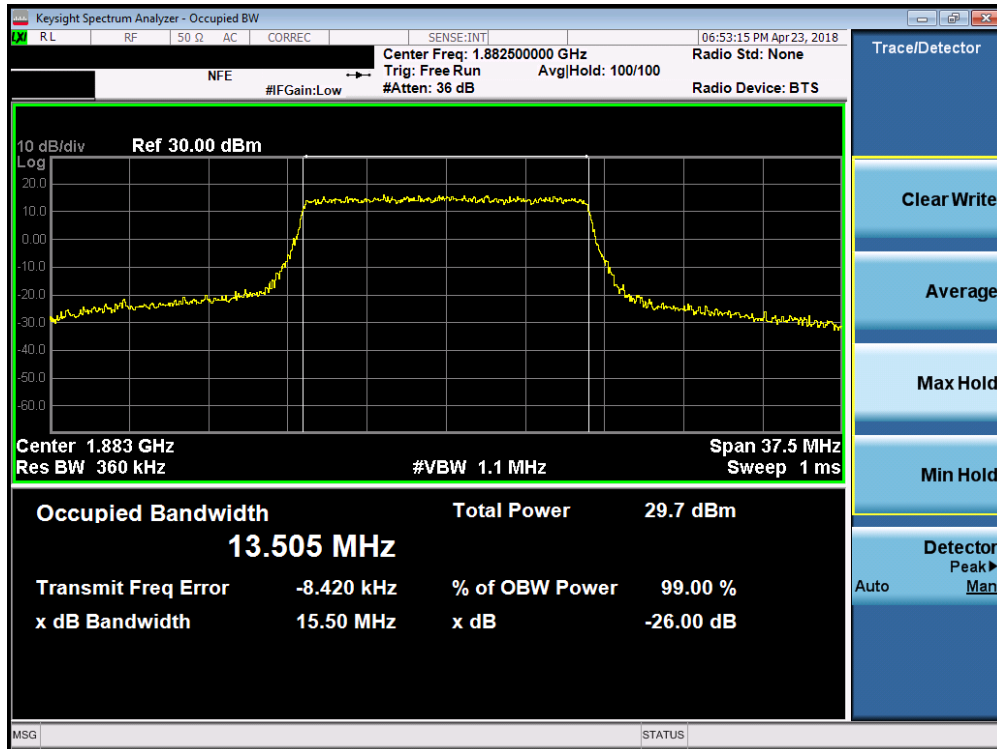


Plot 7-62. Occupied Bandwidth Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)

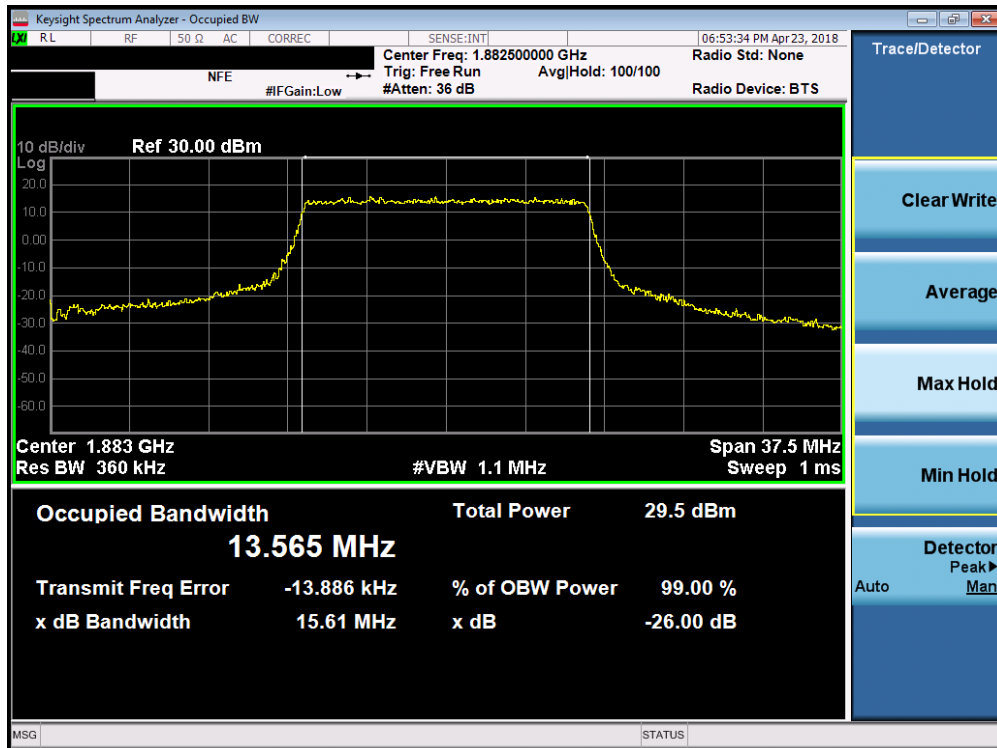


Plot 7-63. Occupied Bandwidth Plot (Band 25/2 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 49 of 198

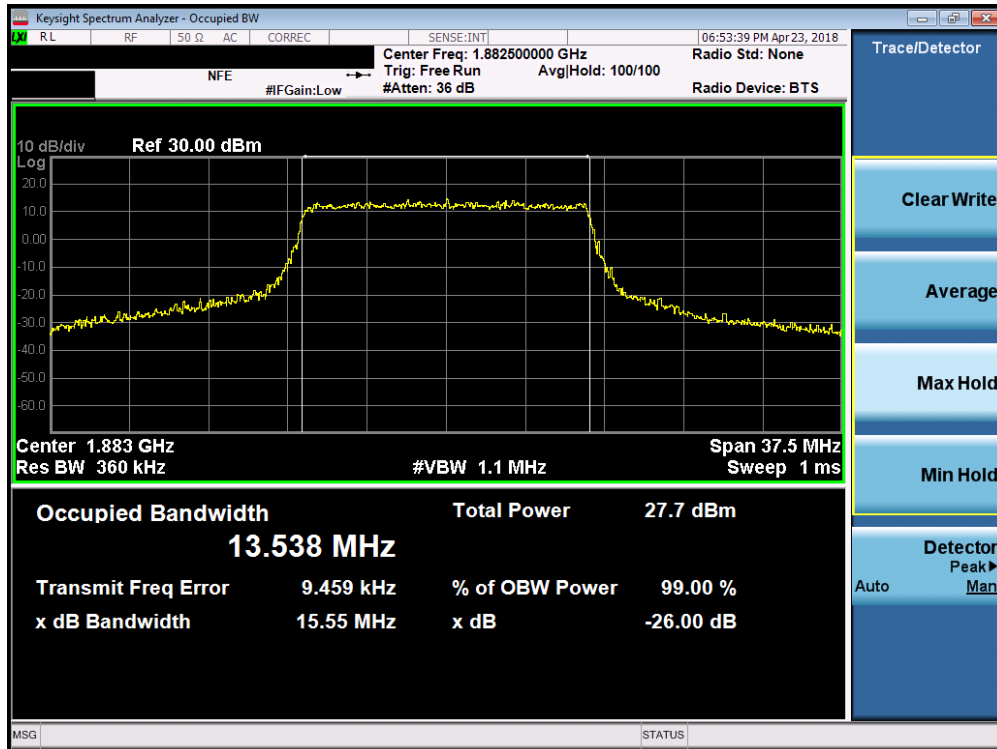


Plot 7-64. Occupied Bandwidth Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)

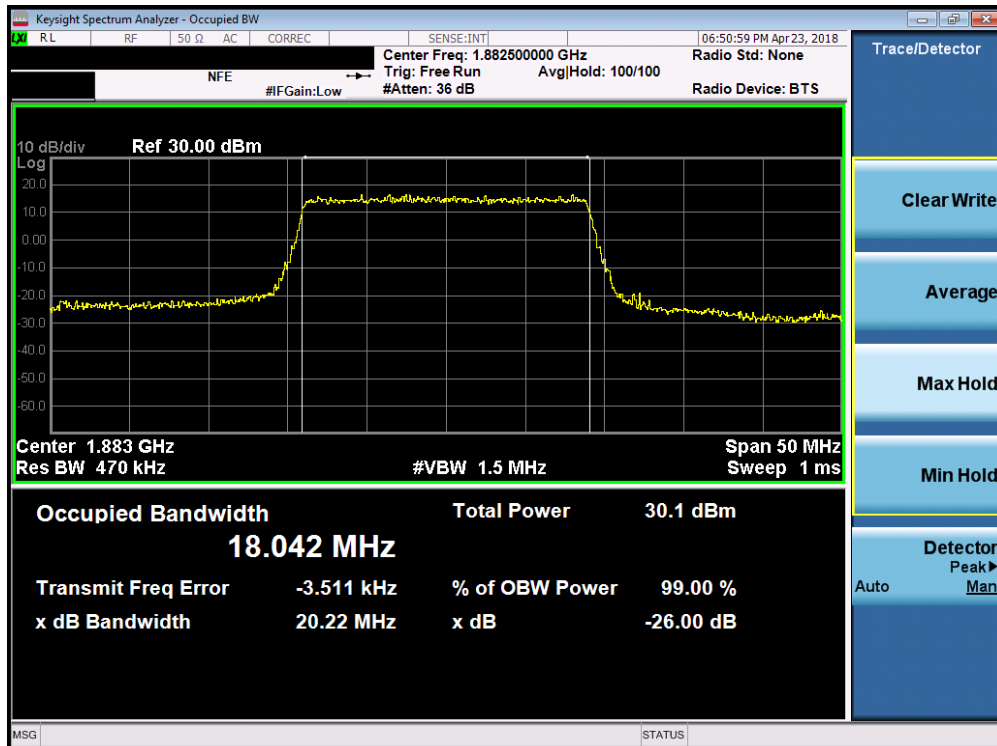


Plot 7-65. Occupied Bandwidth Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 50 of 198	

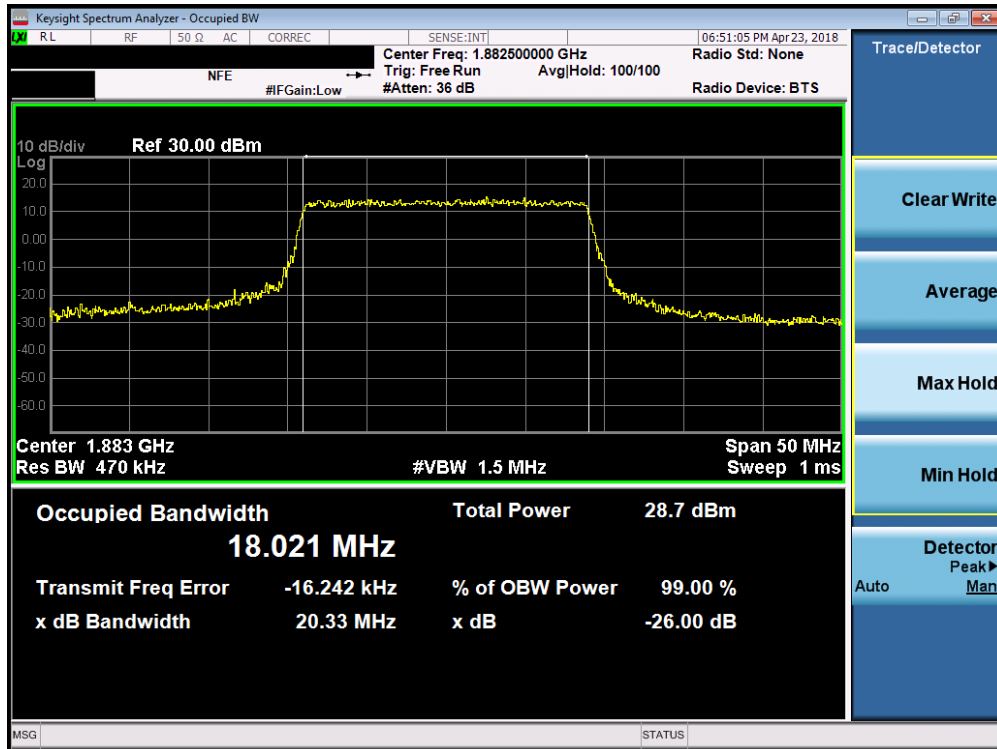


Plot 7-66. Occupied Bandwidth Plot (Band 25/2 - 15.0MHz 64-QAM - Full RB Configuration)

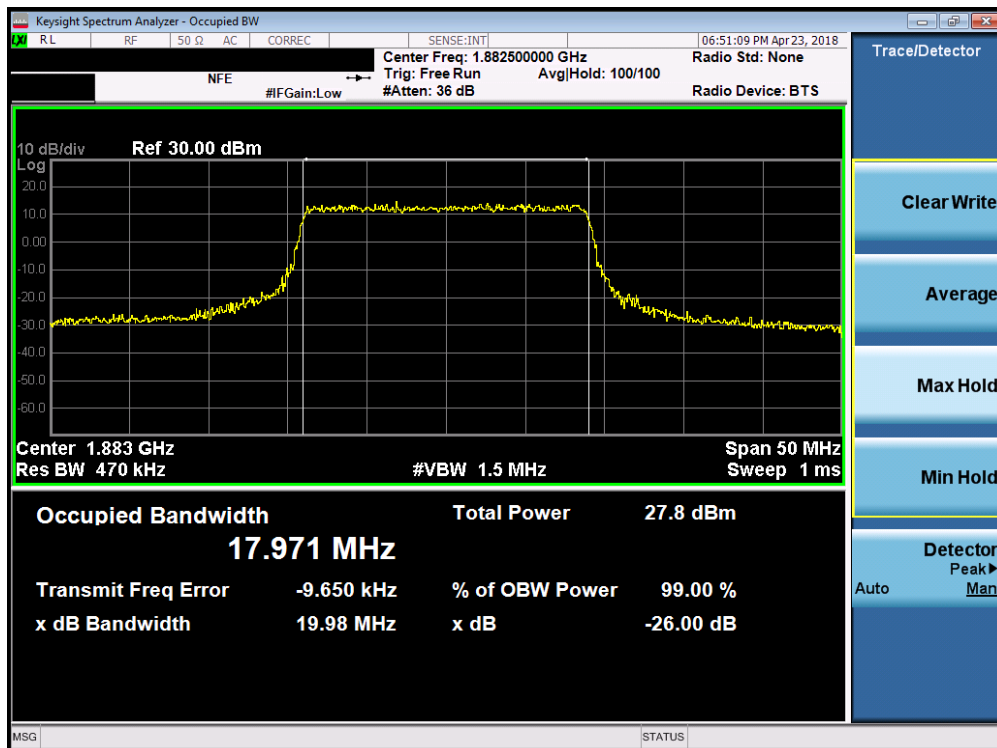


Plot 7-67. Occupied Bandwidth Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 51 of 198



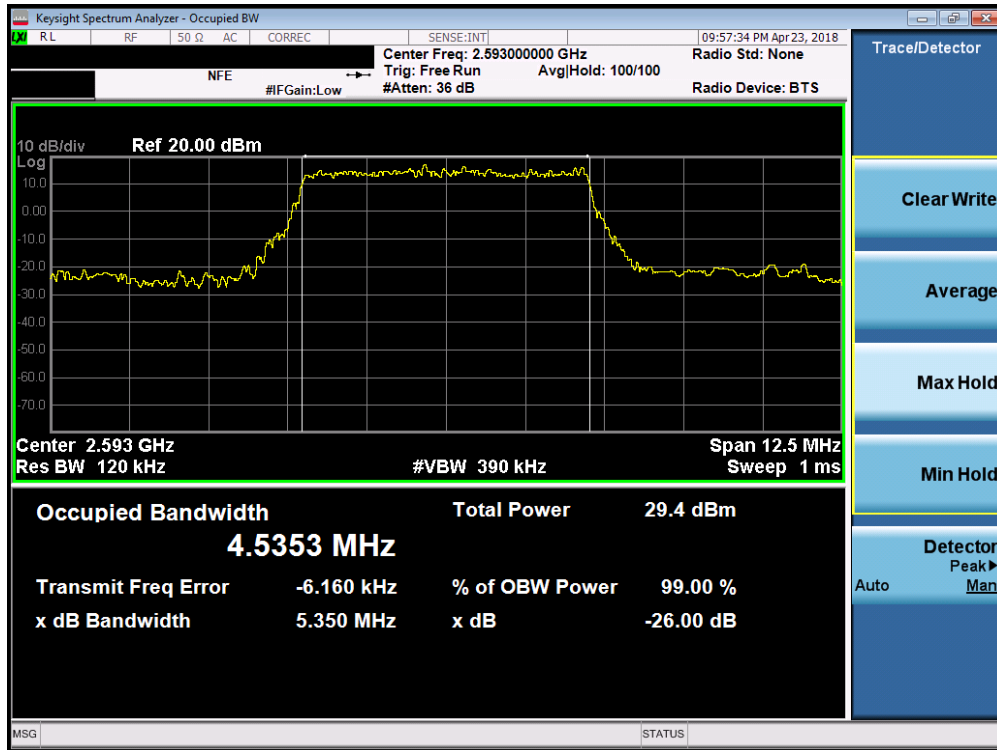
Plot 7-68. Occupied Bandwidth Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)



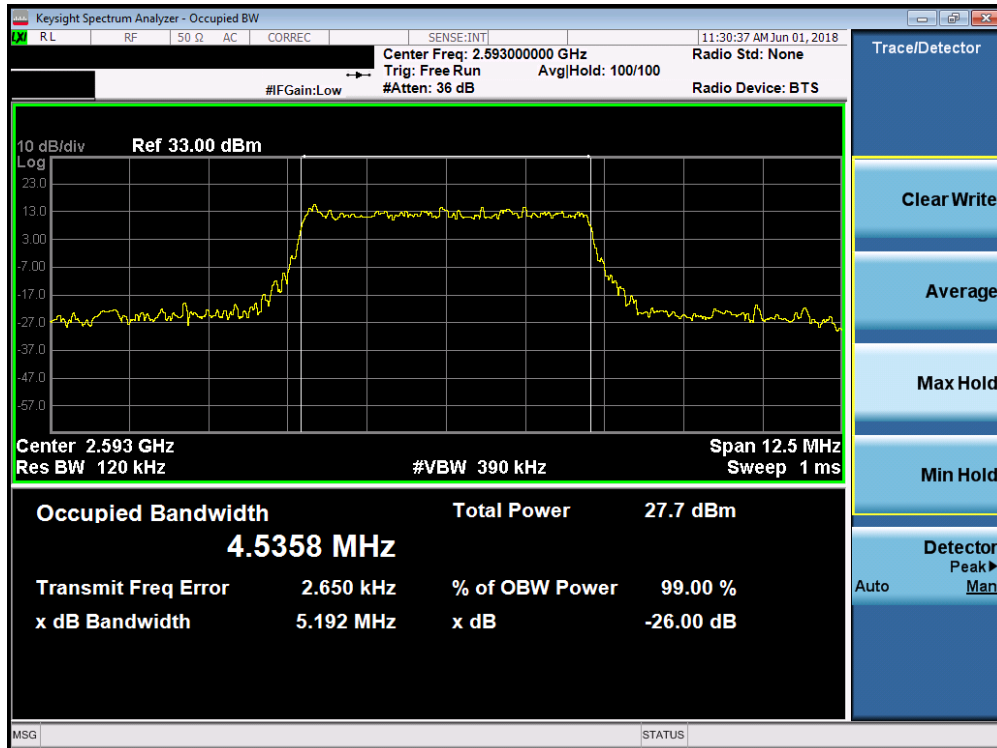
Plot 7-69. Occupied Bandwidth Plot (Band 25/2 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 52 of 198

**Band 41**

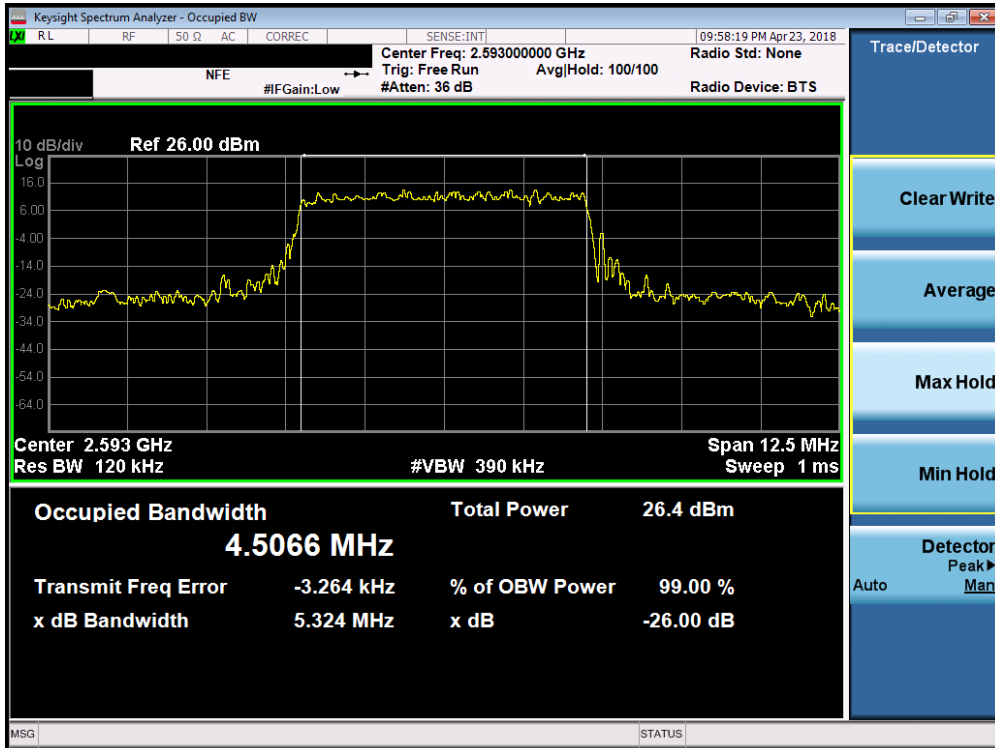


**Plot 7-70. Occupied Bandwidth Plot (Band 41 - 5.0MHz QPSK - Full RB Configuration)**

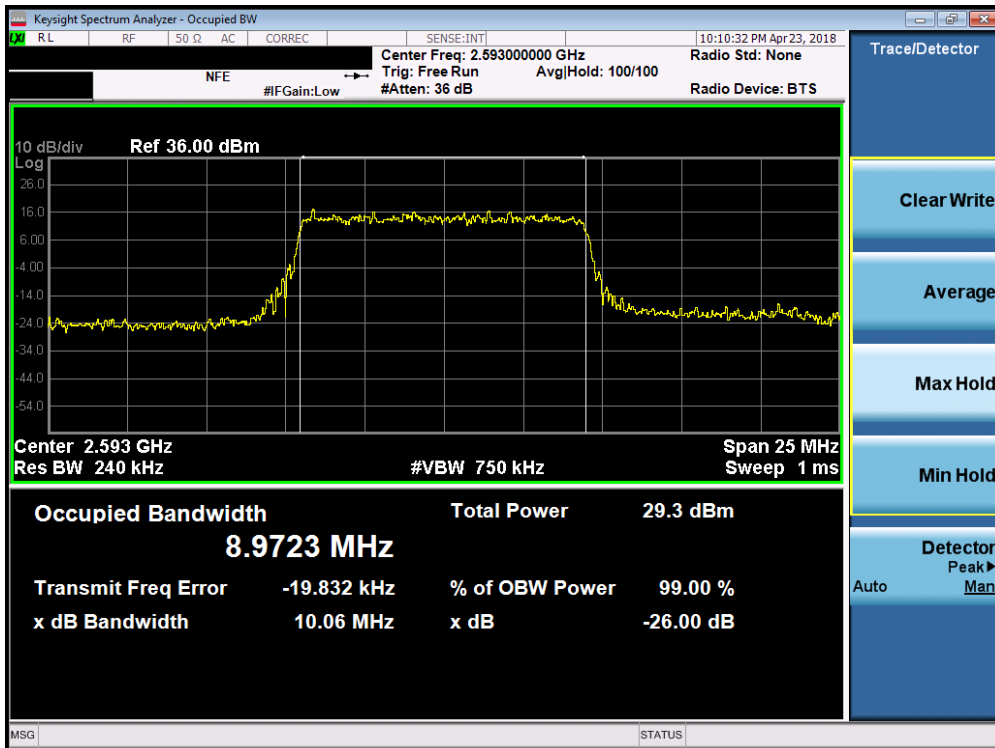


**Plot 7-71. Occupied Bandwidth Plot (Band 41 - 5.0MHz 16-QAM - Full RB Configuration)**

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1804130071-03.A3L	<b>Test Dates:</b> 4/6/2018-6/19/2018	<b>EUT Type:</b> Portable Handset	Page 53 of 198	

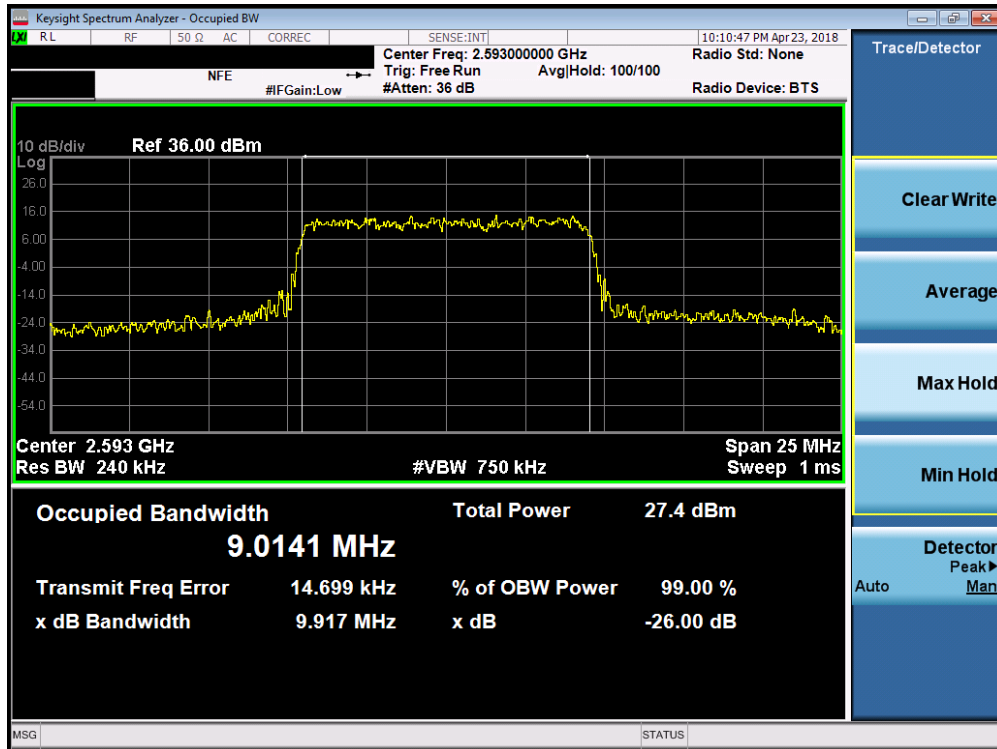


Plot 7-72. Occupied Bandwidth Plot (Band 41 - 5.0MHz 64-QAM - Full RB Configuration)

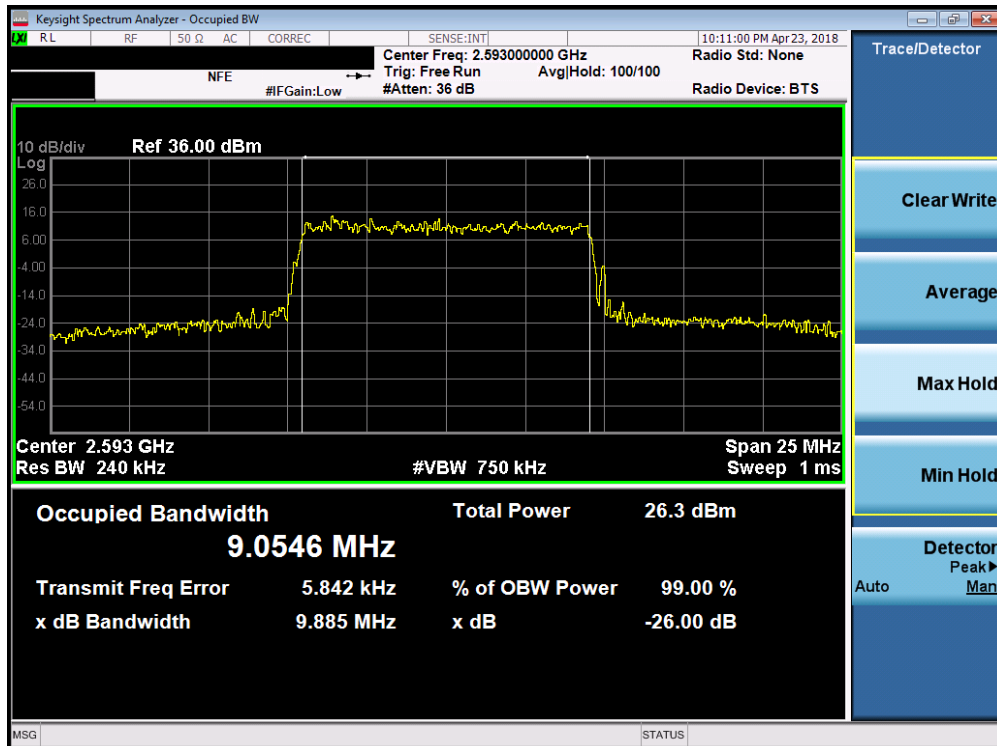


Plot 7-73. Occupied Bandwidth Plot (Band 41 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 54 of 198



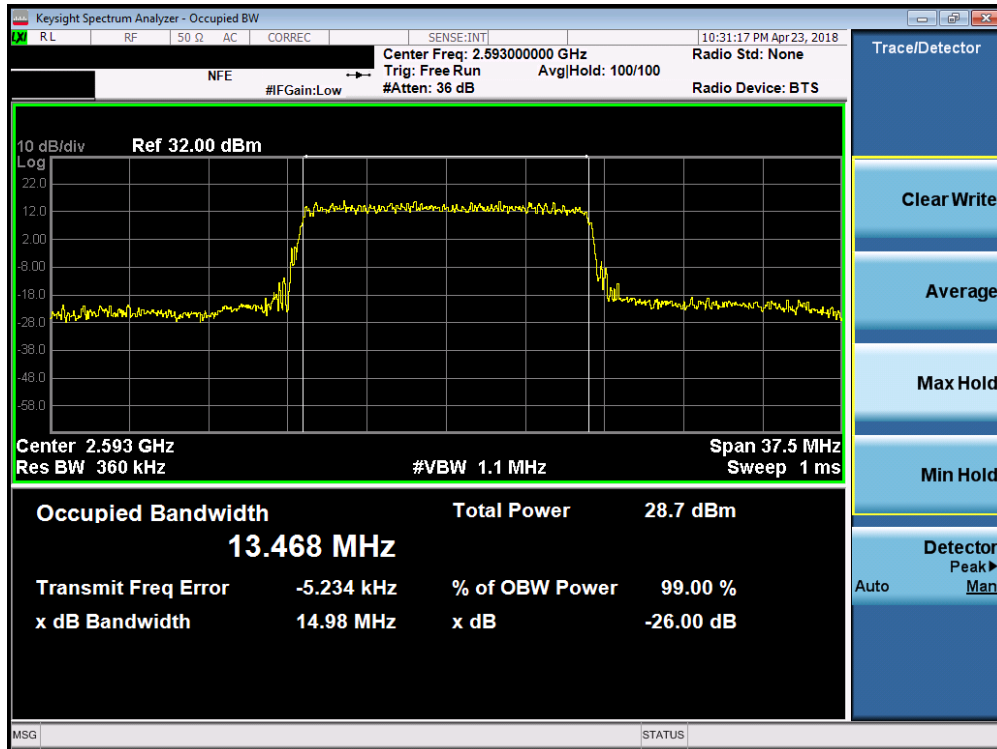
Plot 7-74. Occupied Bandwidth Plot (Band 41 - 10.0MHz 16-QAM - Full RB Configuration)



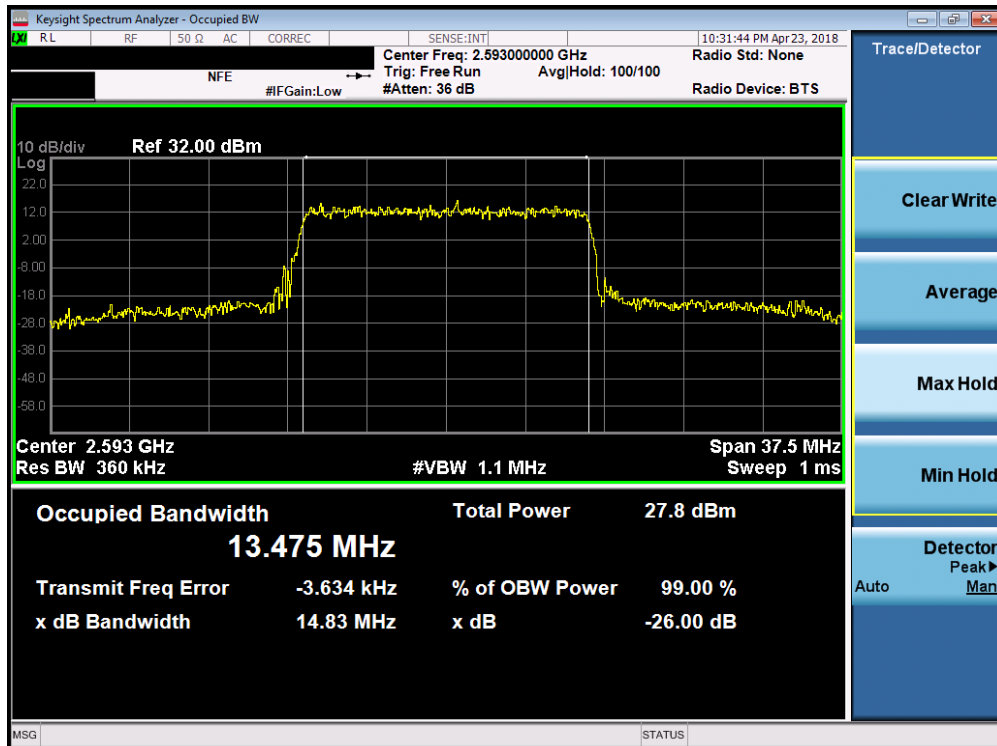
Plot 7-75. Occupied Bandwidth Plot (Band 41 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 55 of 198



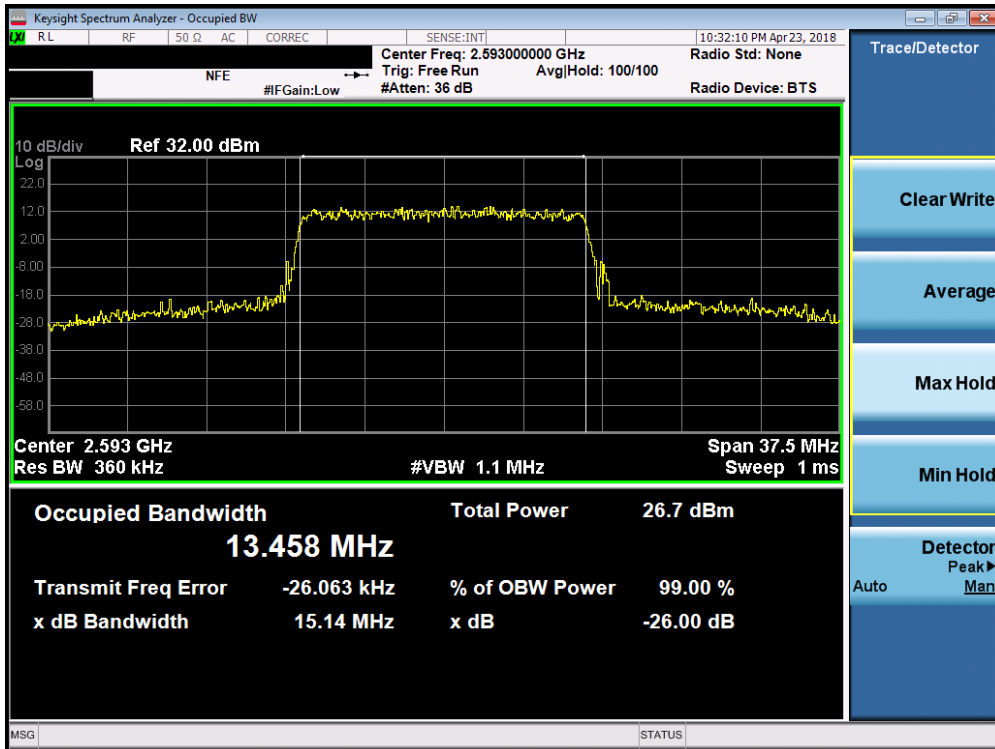


Plot 7-76. Occupied Bandwidth Plot (Band 41 - 15.0MHz QPSK - Full RB Configuration)

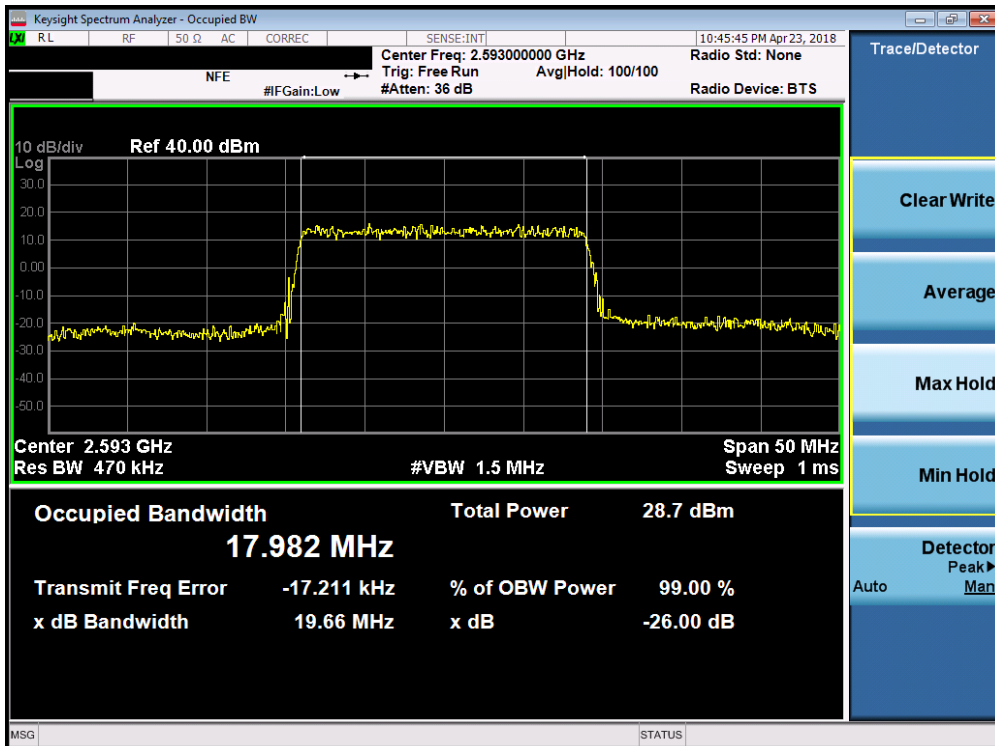


Plot 7-77. Occupied Bandwidth Plot (Band 41 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 56 of 198

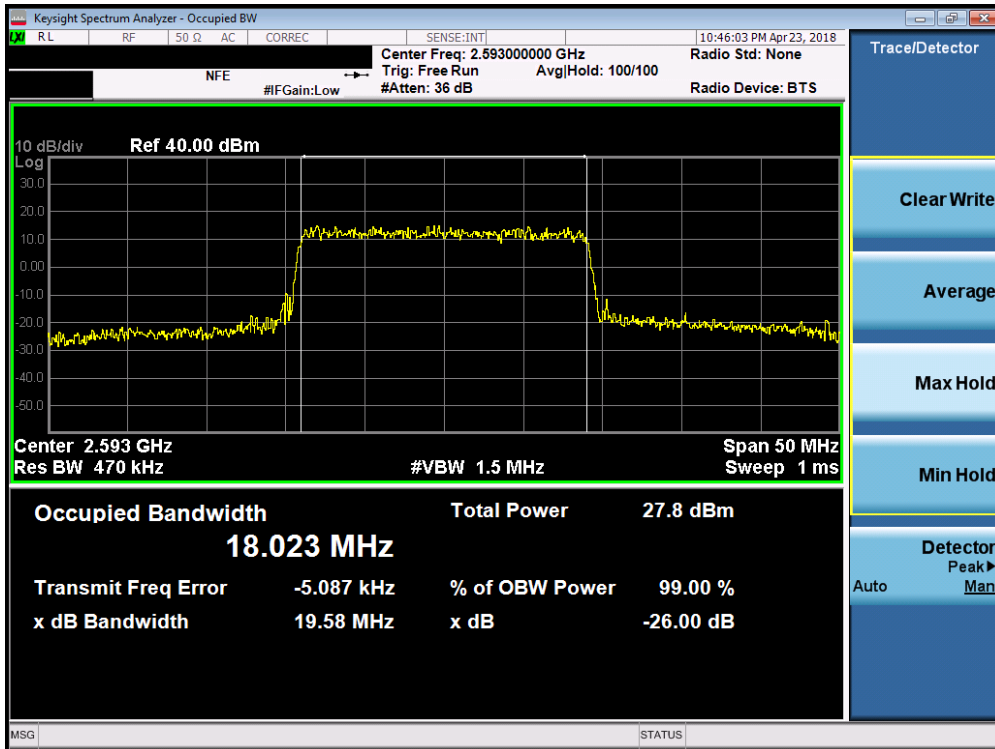


Plot 7-78. Occupied Bandwidth Plot (Band 41 - 15.0MHz 64-QAM - Full RB Configuration)

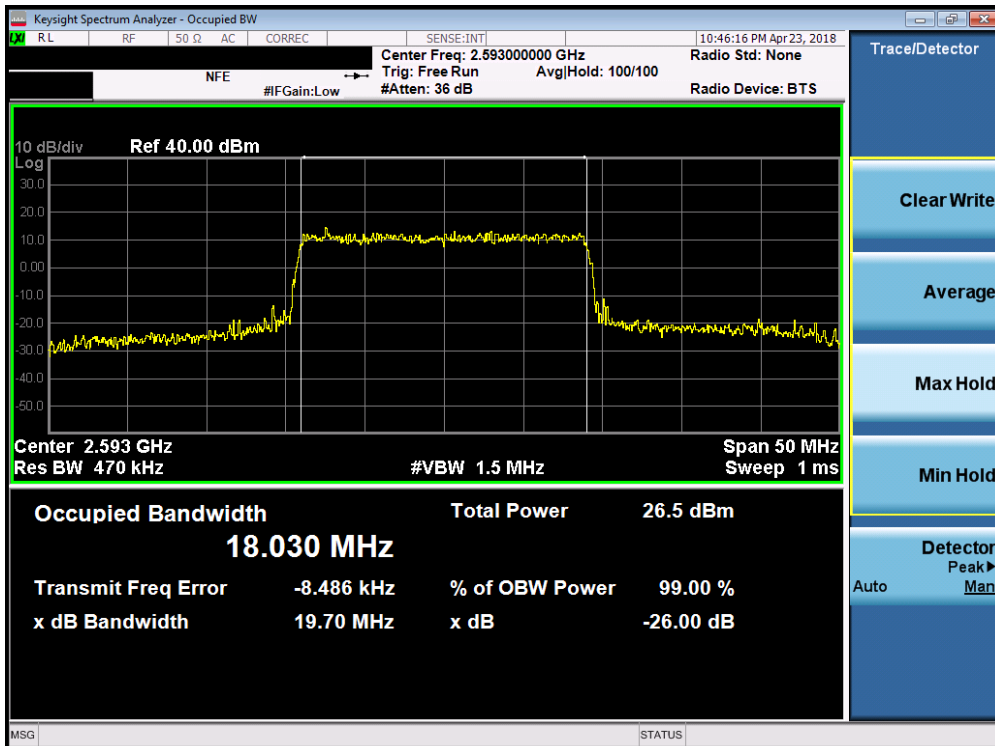


Plot 7-79. Occupied Bandwidth Plot (Band 41 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
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Plot 7-80. Occupied Bandwidth Plot (Band 41 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-81. Occupied Bandwidth Plot (Band 41 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
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### 7.3 Spurious and Harmonic Emissions at Antenna Terminal

#### Test Overview

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. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

**The minimum permissible attenuation level of any spurious emission is  $43 + \log_{10}(P_{[Watts]})$ , where  $P$  is the transmitter power in Watts.**

**For Band 41, the minimum permissible attenuation level of any spurious emission is  $55 + \log_{10}(P_{[Watts]})$ .**

#### Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

#### Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 \* the fundamental frequency (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

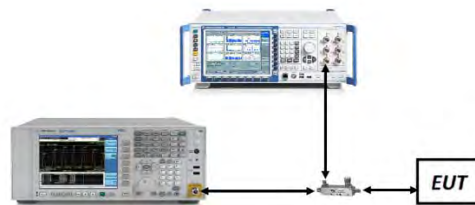
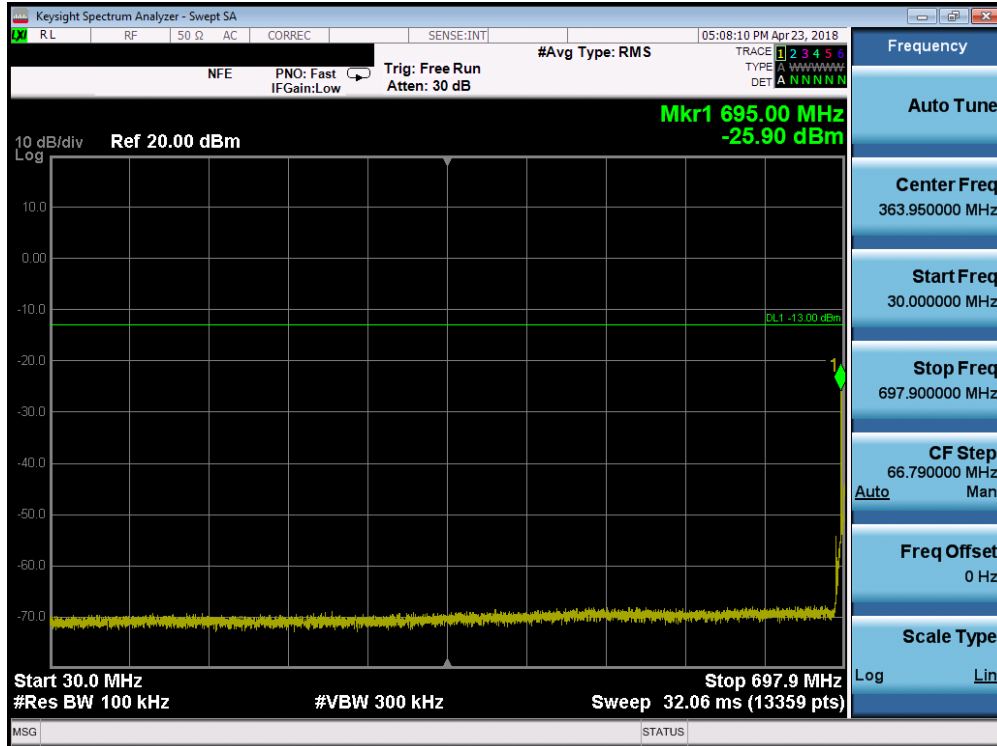


Figure 7-2. Test Instrument & Measurement Setup

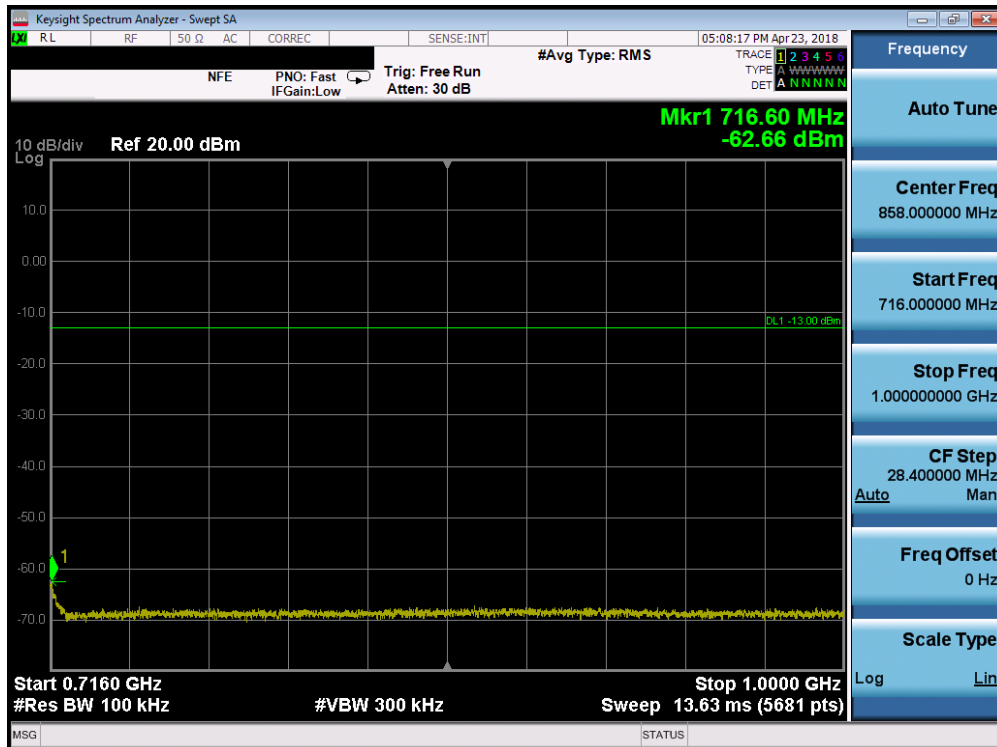
#### Test Notes

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. 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.

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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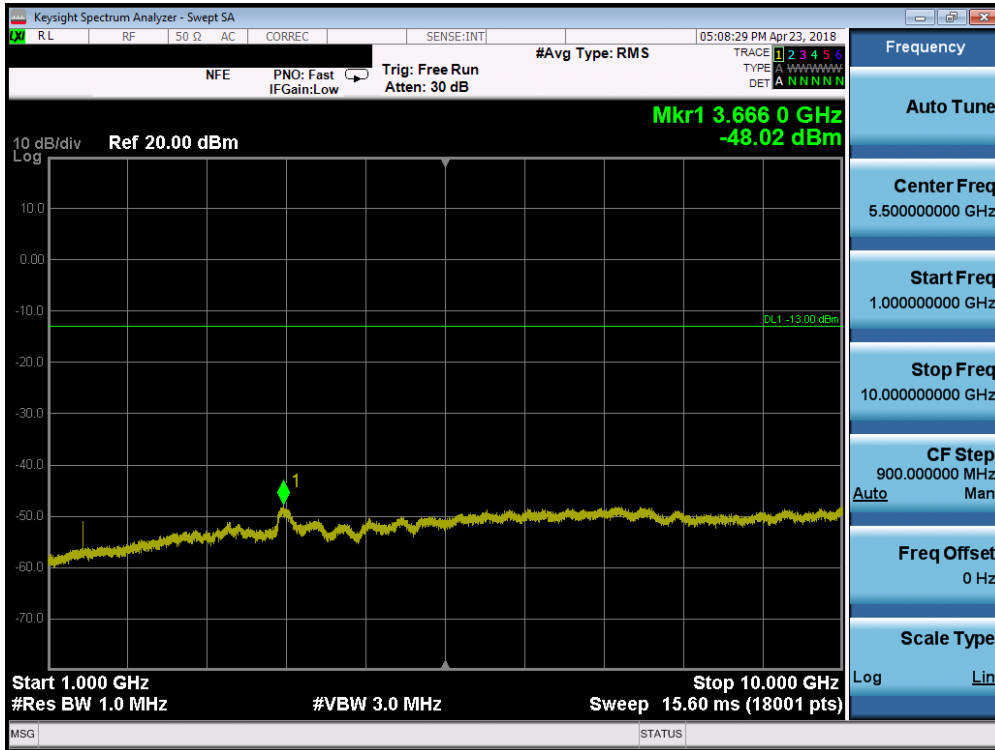


Plot 7-82. Conducted Spurious Plot (Band 12/17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

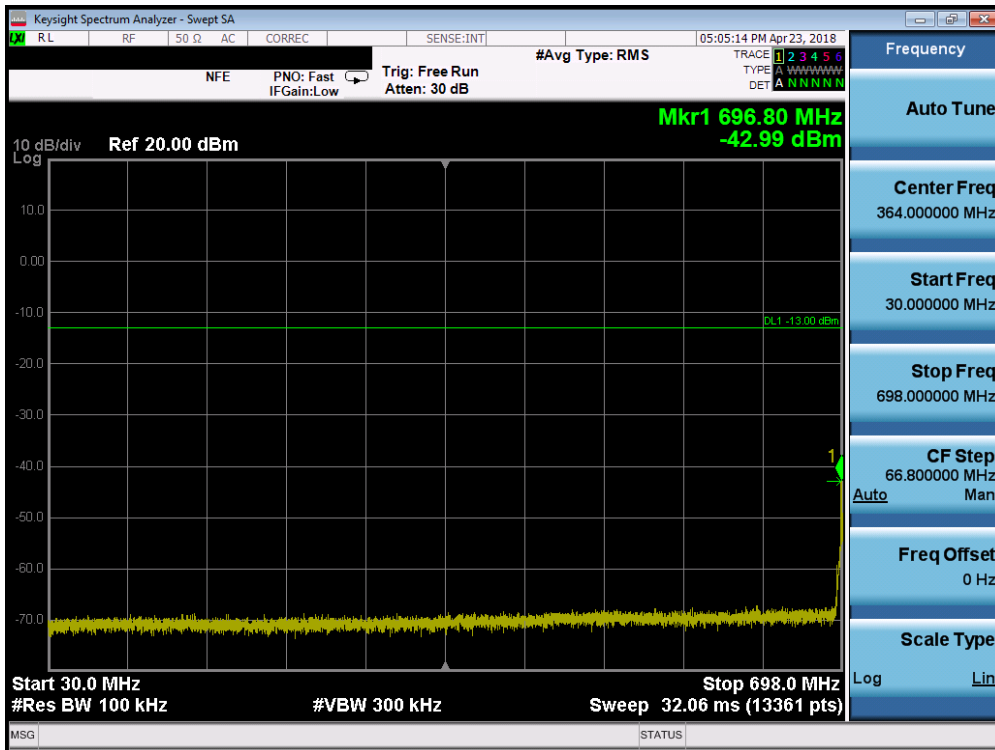


Plot 7-83. Conducted Spurious Plot (Band 12/17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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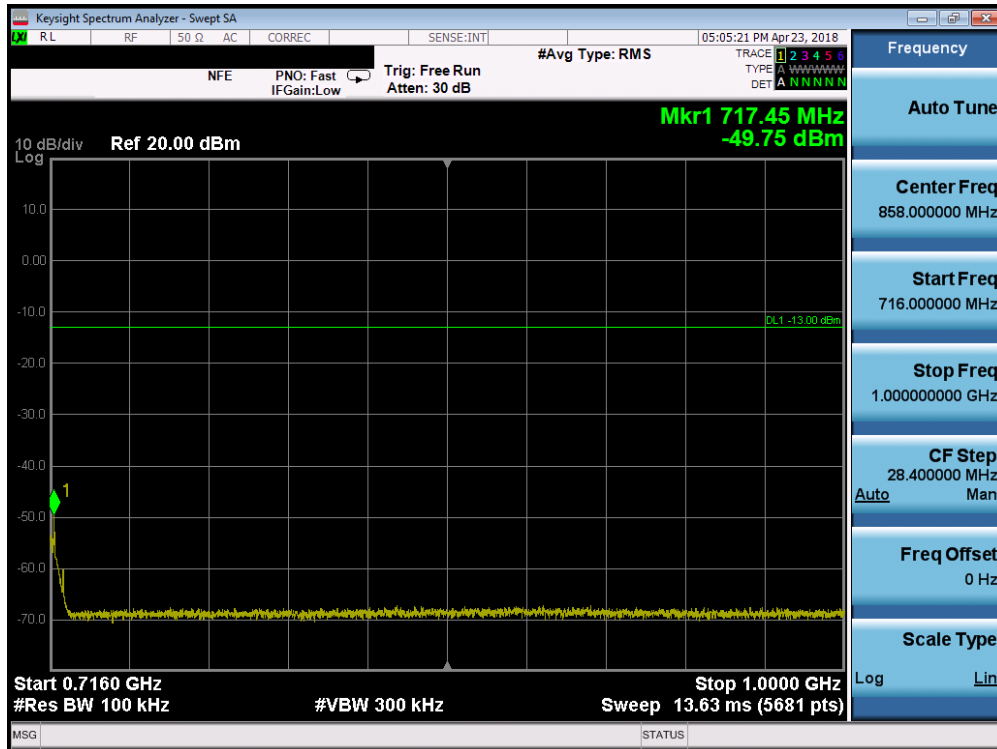


Plot 7-84. Conducted Spurious Plot (Band 12/17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

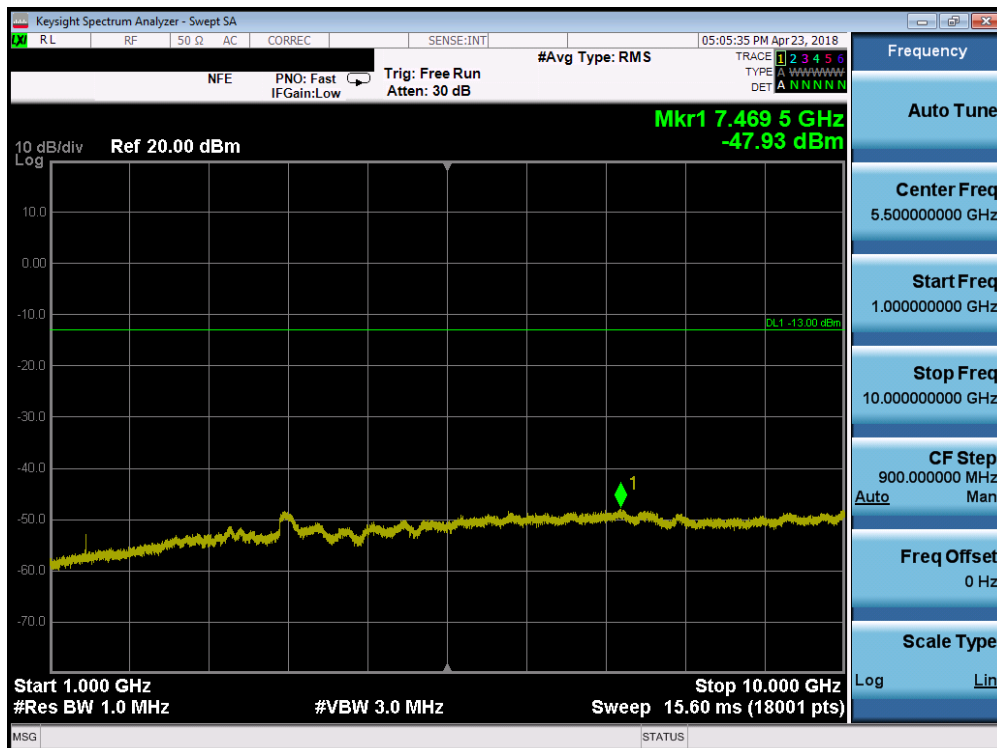


Plot 7-85. Conducted Spurious Plot (Band 12/17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 61 of 198



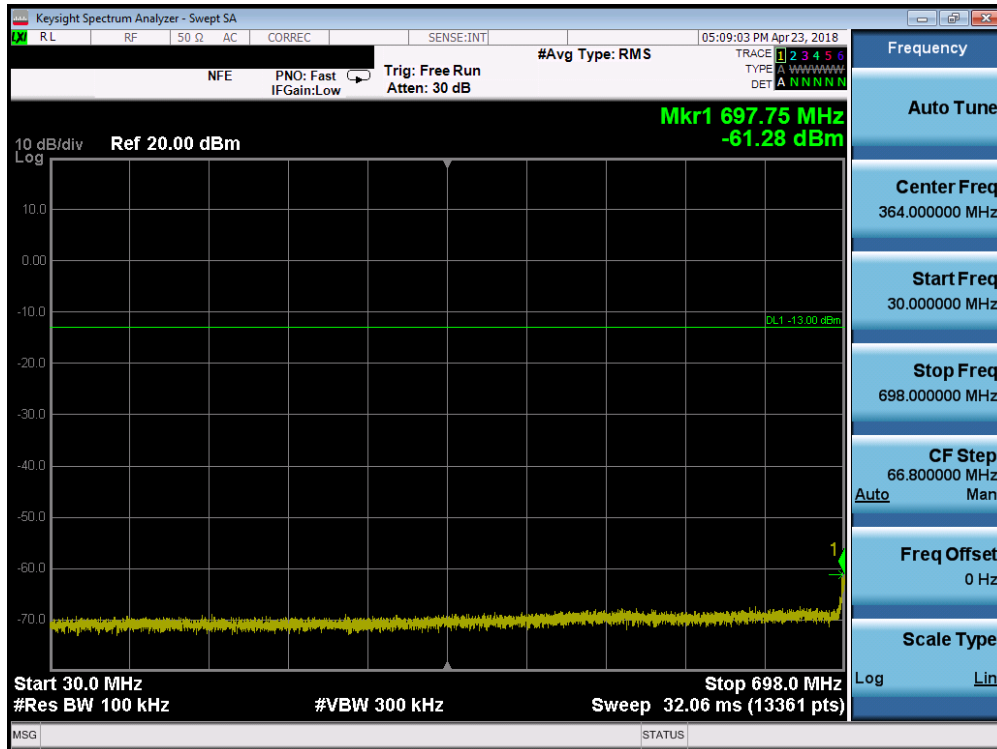
Plot 7-86. Conducted Spurious Plot (Band 12/17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



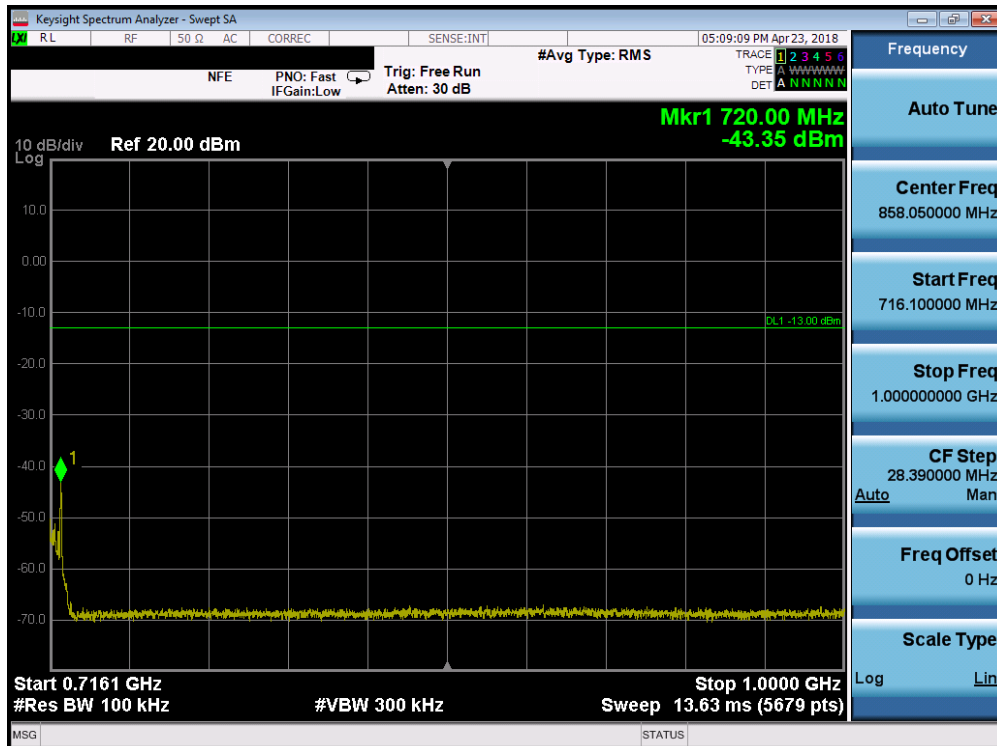
Plot 7-87. Conducted Spurious Plot (Band 12/17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 62 of 198	



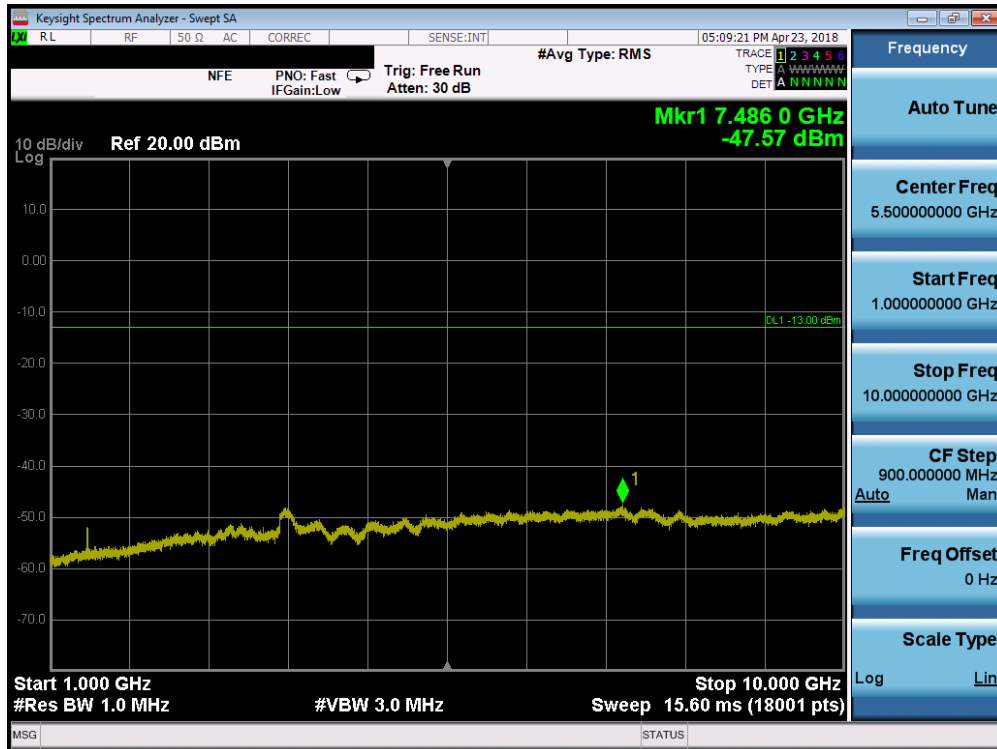


Plot 7-88. Conducted Spurious Plot (Band 12/17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-89. Conducted Spurious Plot (Band 12/17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

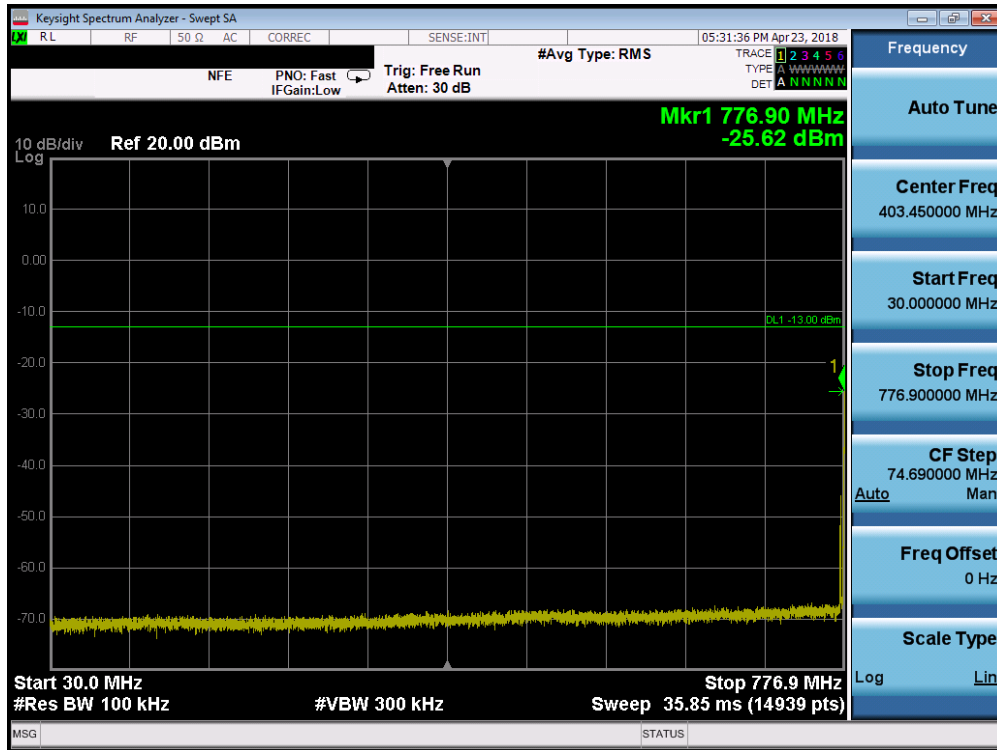
FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 63 of 198	



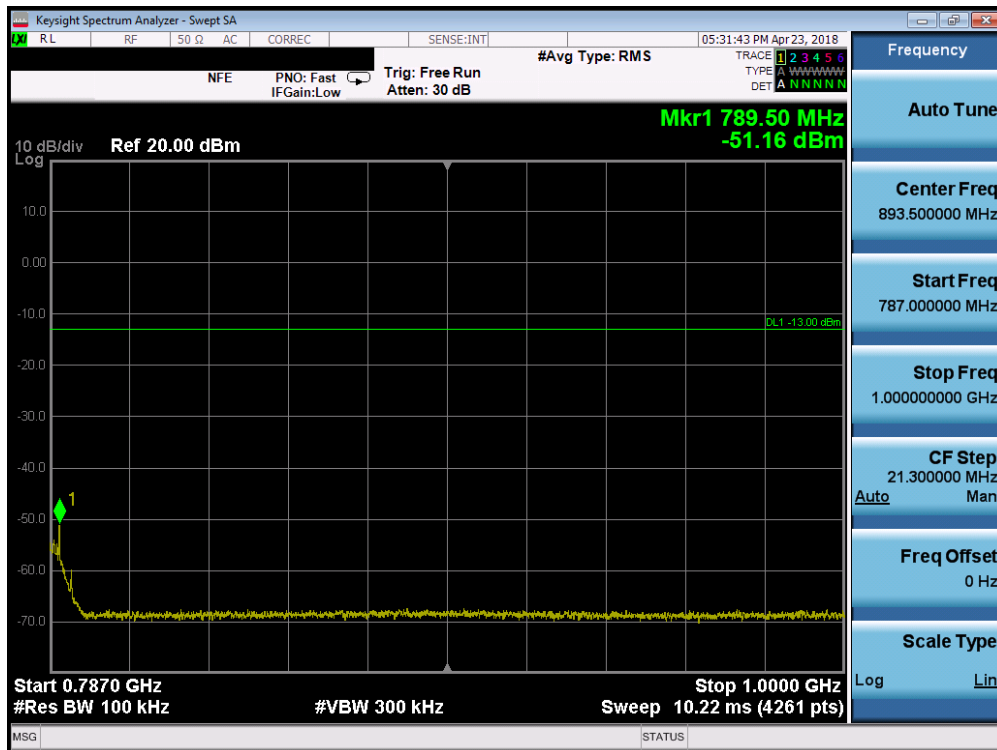
Plot 7-90. Conducted Spurious Plot (Band 12/17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 64 of 198

**Band 13**

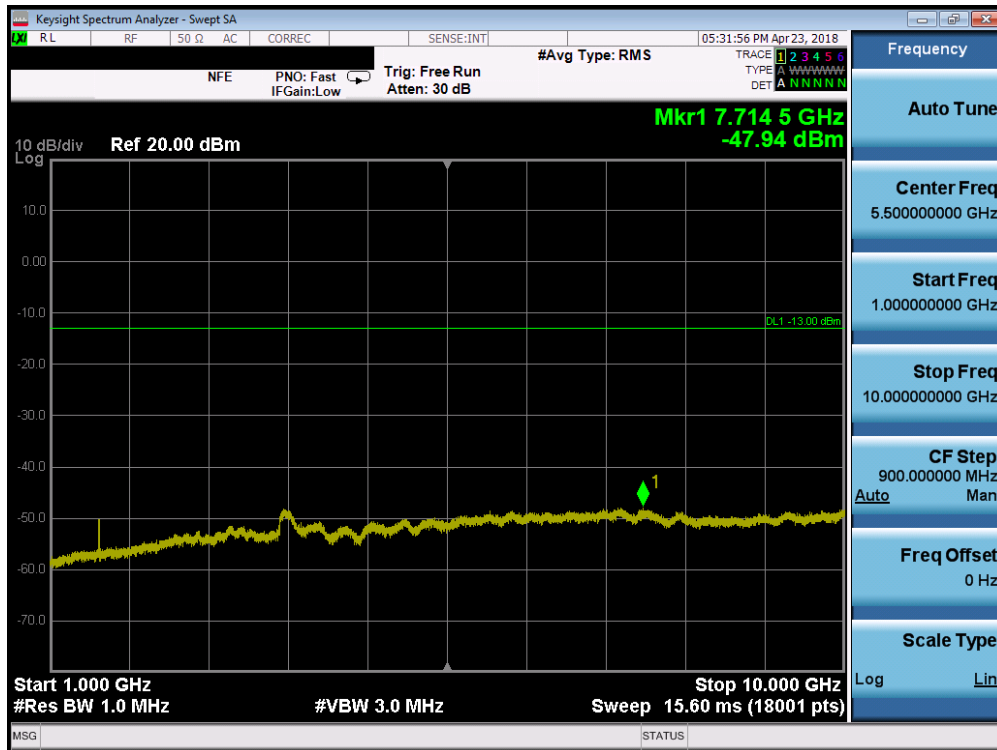


**Plot 7-91. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)**

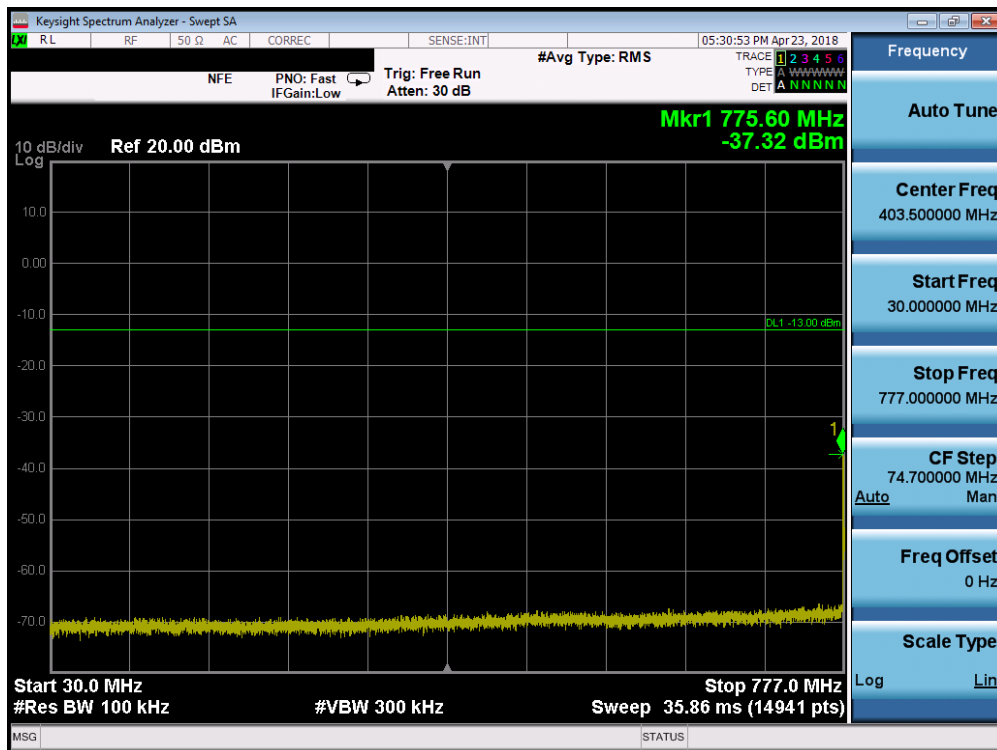


**Plot 7-92. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)**

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 65 of 198

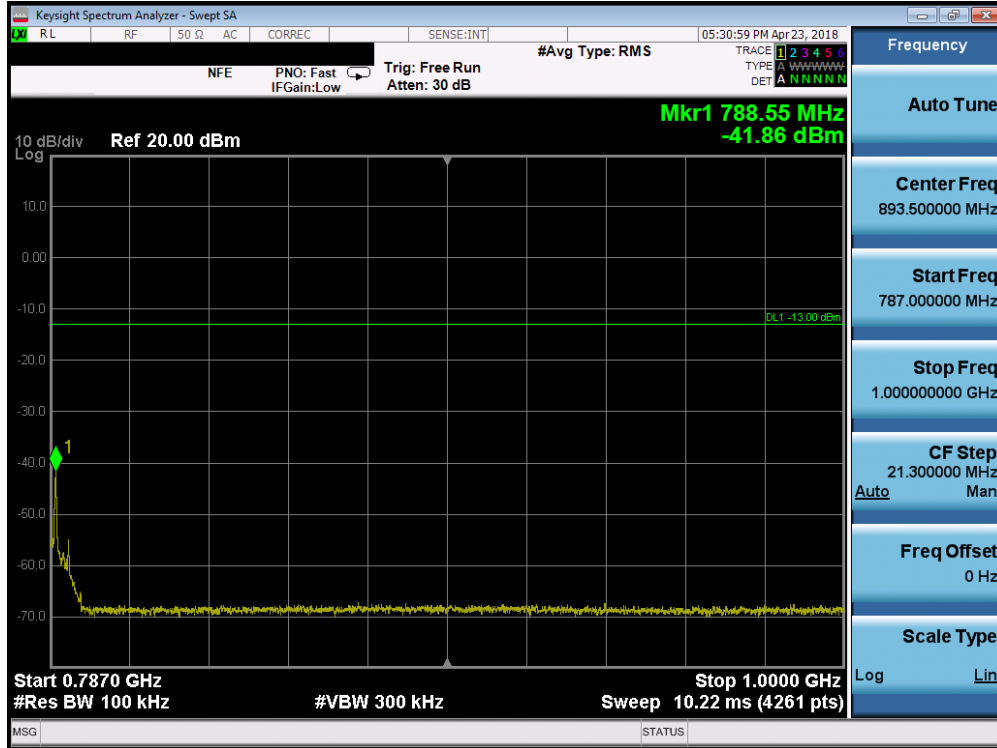


Plot 7-93. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

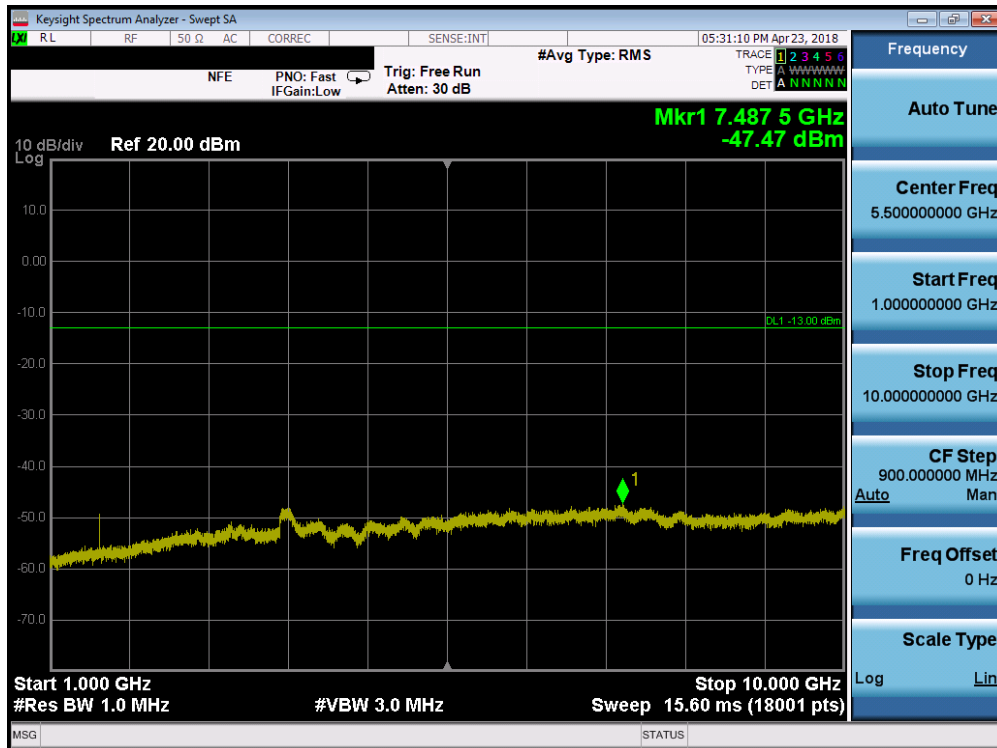


Plot 7-94. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMN960KOR			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 66 of 198		

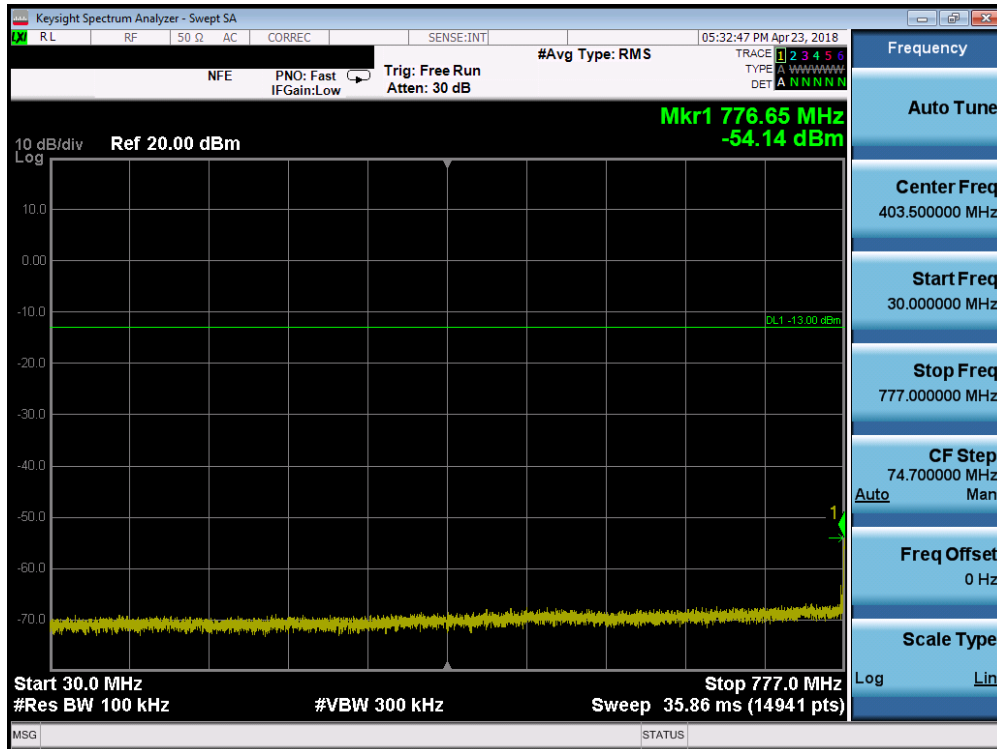


Plot 7-95. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

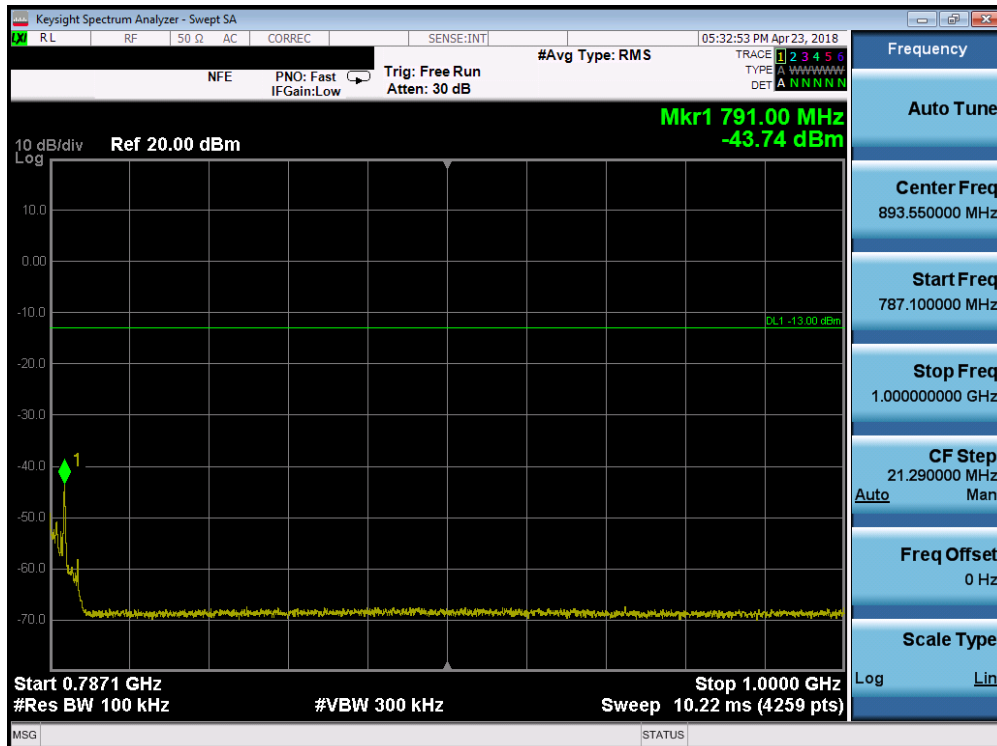


Plot 7-96. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 67 of 198	

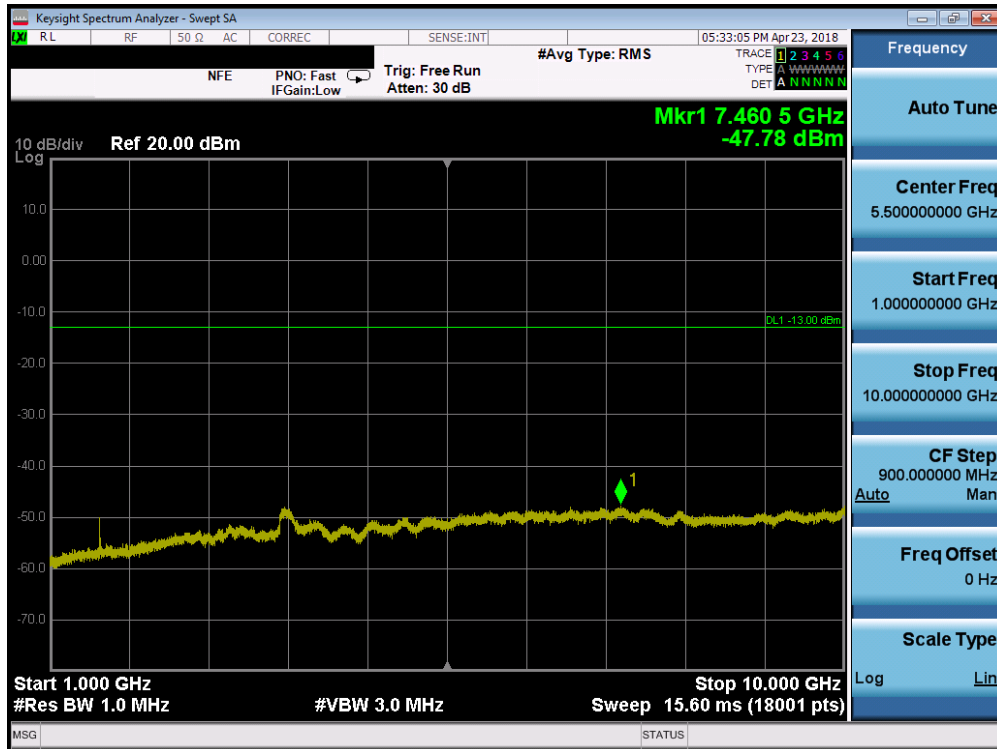


Plot 7-97. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-98. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

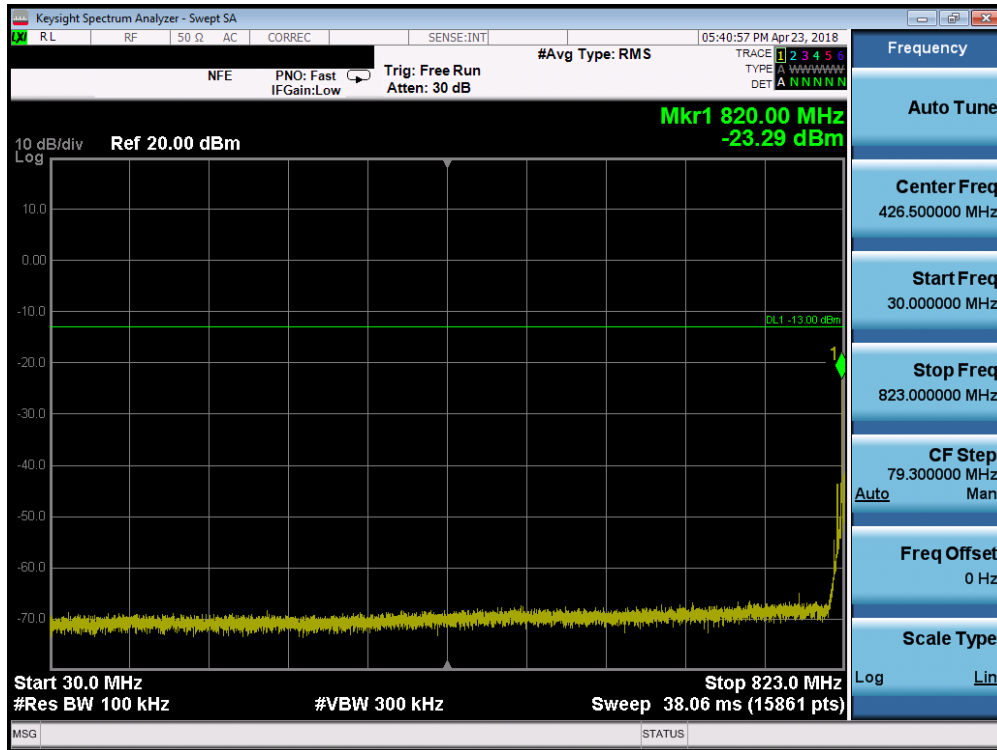
FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 68 of 198	



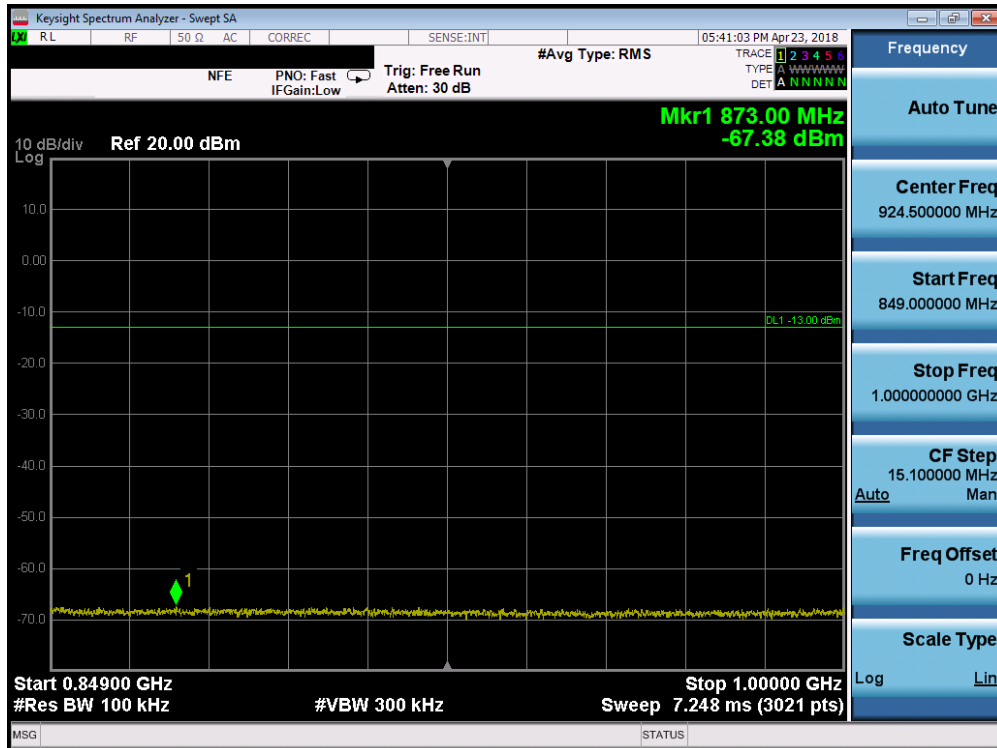
Plot 7-99. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
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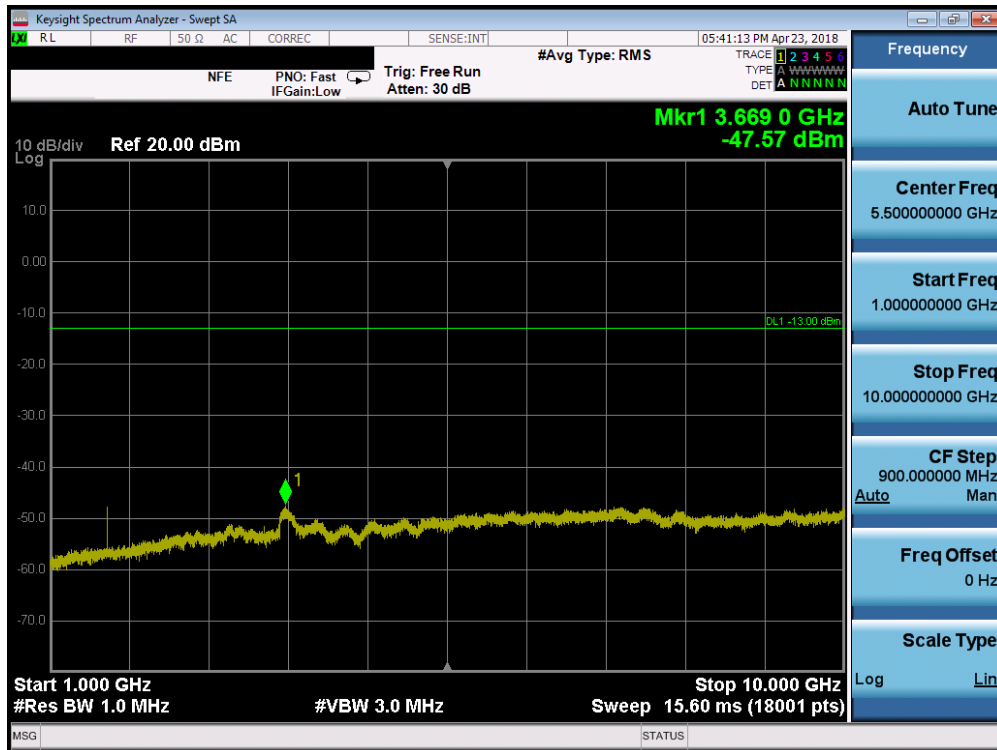


Plot 7-100. Conducted Spurious Plot (Band 26/5 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

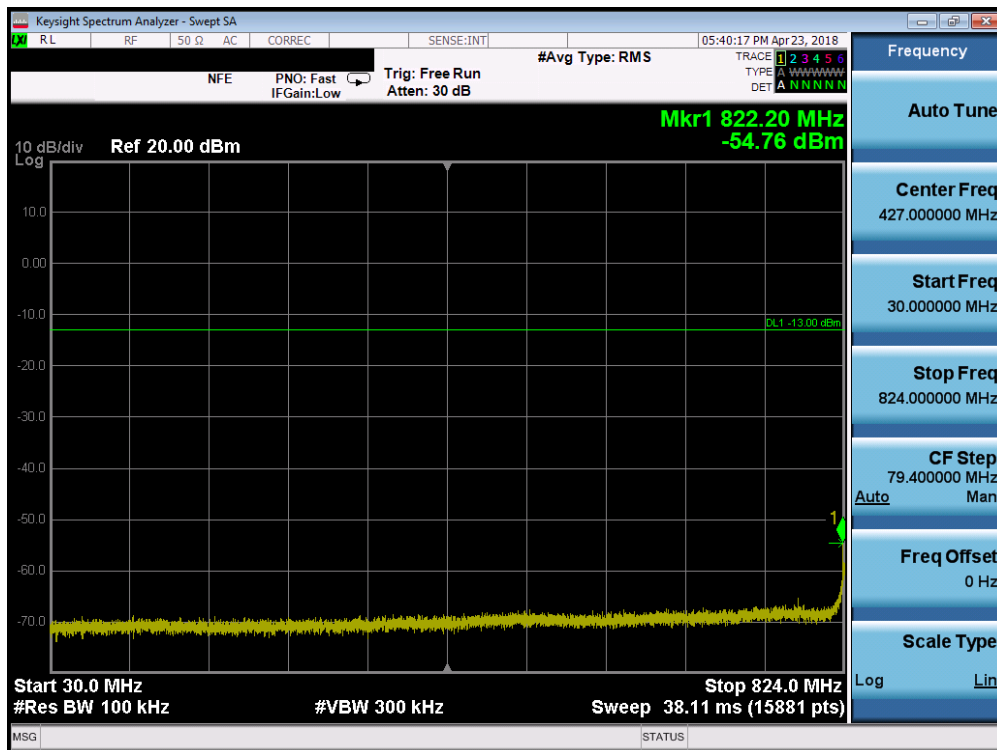


Plot 7-101. Conducted Spurious Plot (Band 26/5 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset		Page 70 of 198

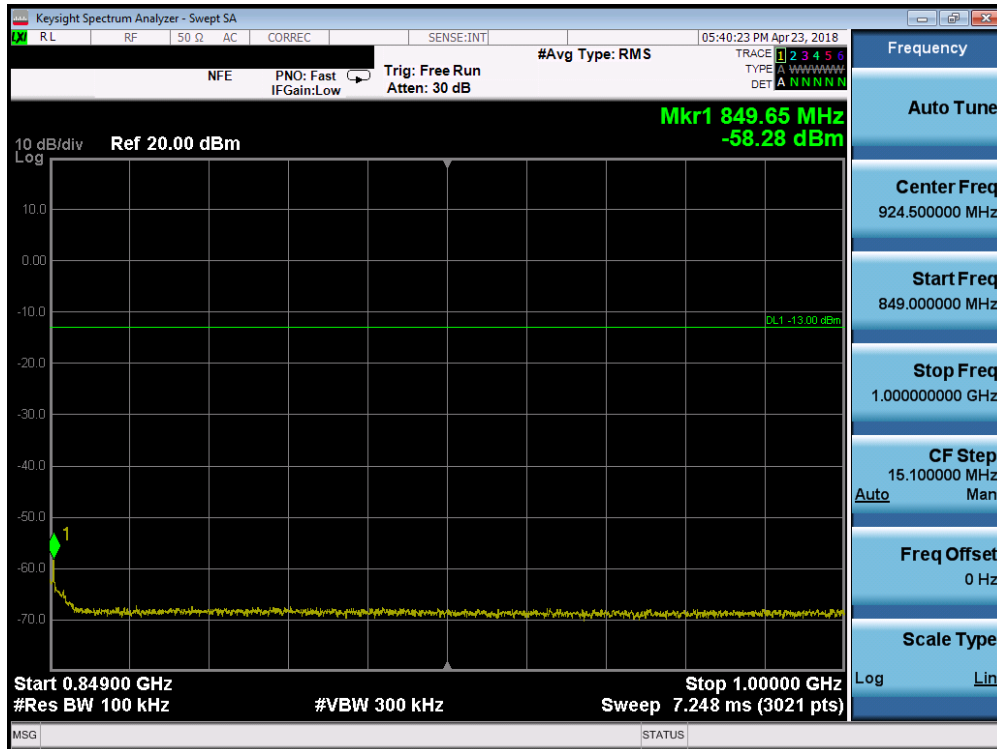


Plot 7-102. Conducted Spurious Plot (Band 26/5 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

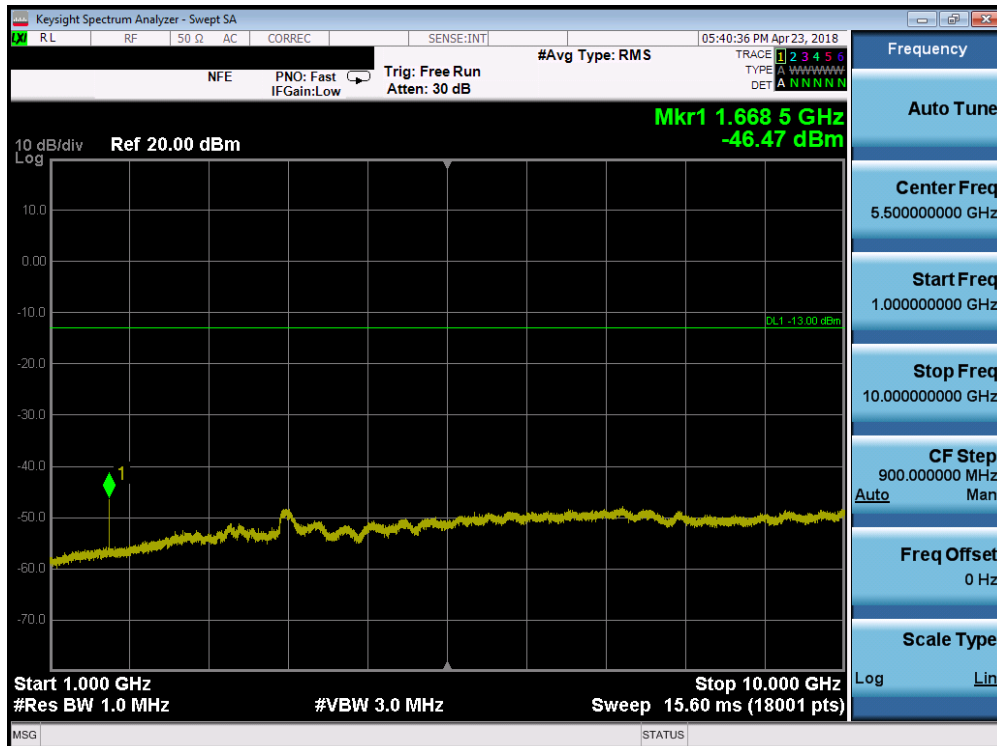


Plot 7-103. Conducted Spurious Plot (Band 26/5 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMN960KOR			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 71 of 198		

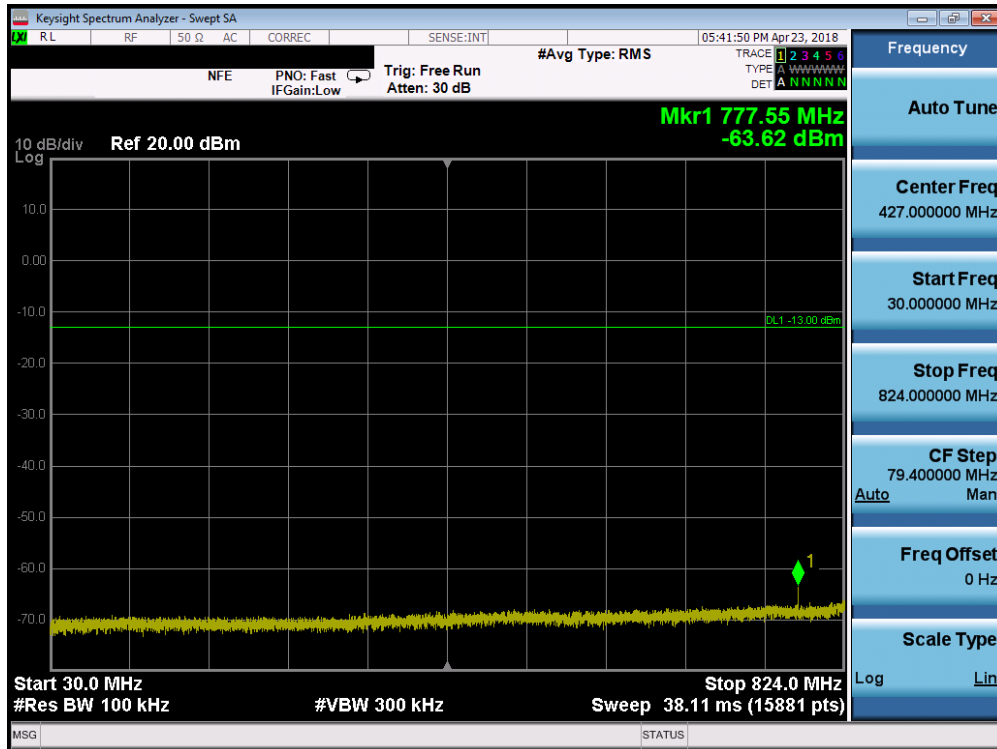


Plot 7-104. Conducted Spurious Plot (Band 26/5 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

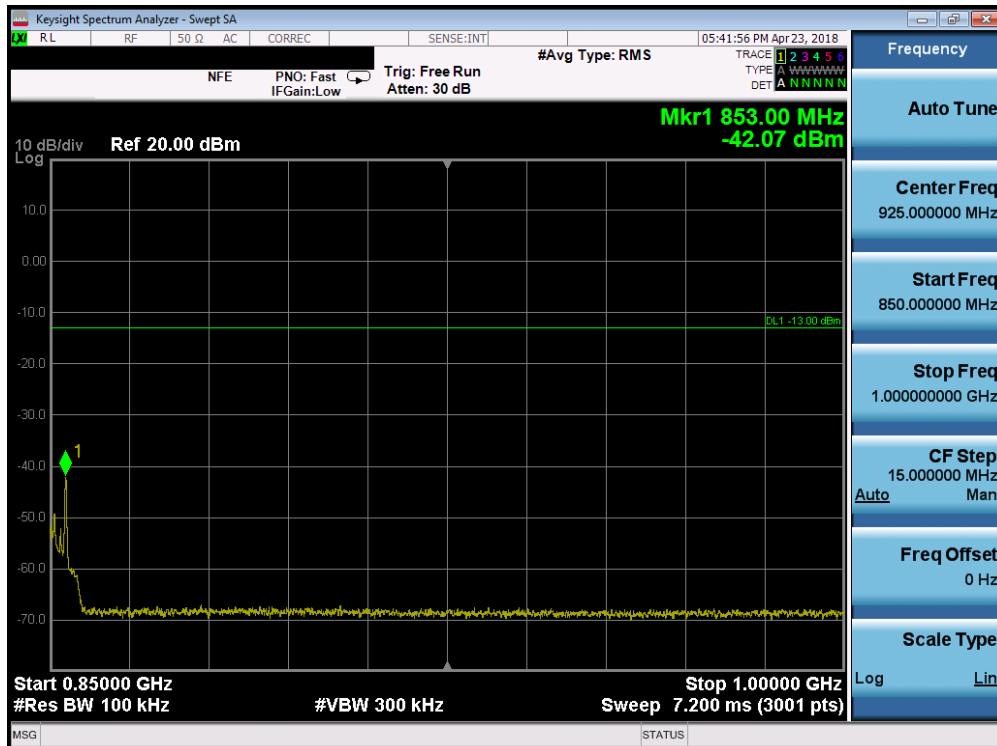


Plot 7-105. Conducted Spurious Plot (Band 26/5 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 72 of 198	



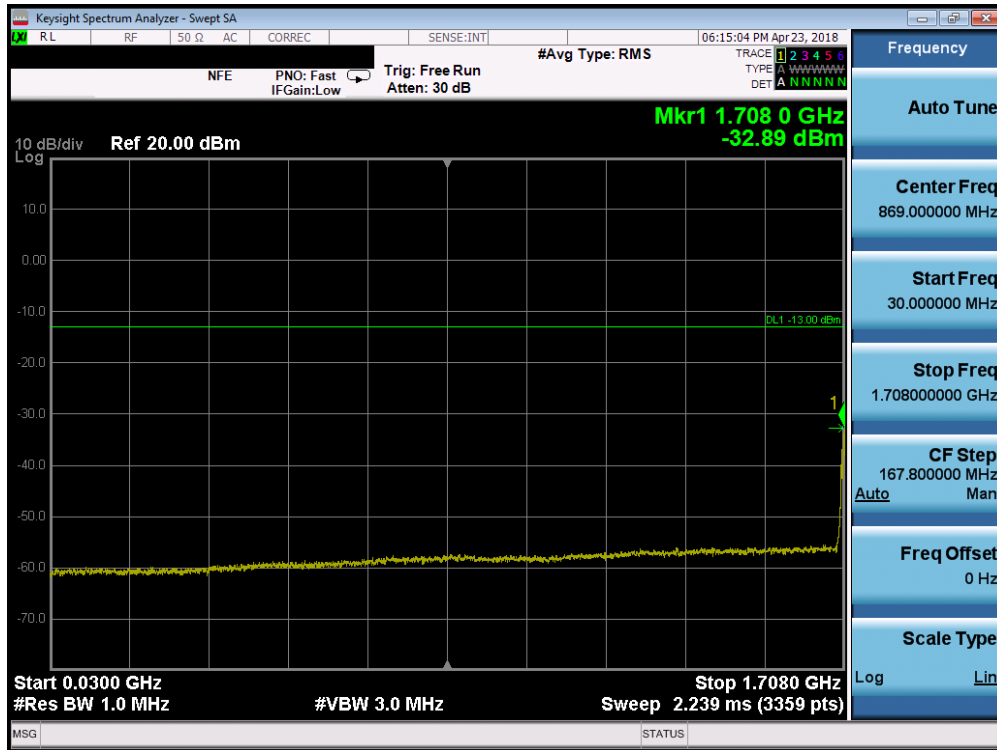
Plot 7-106. Conducted Spurious Plot (Band 26/5 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



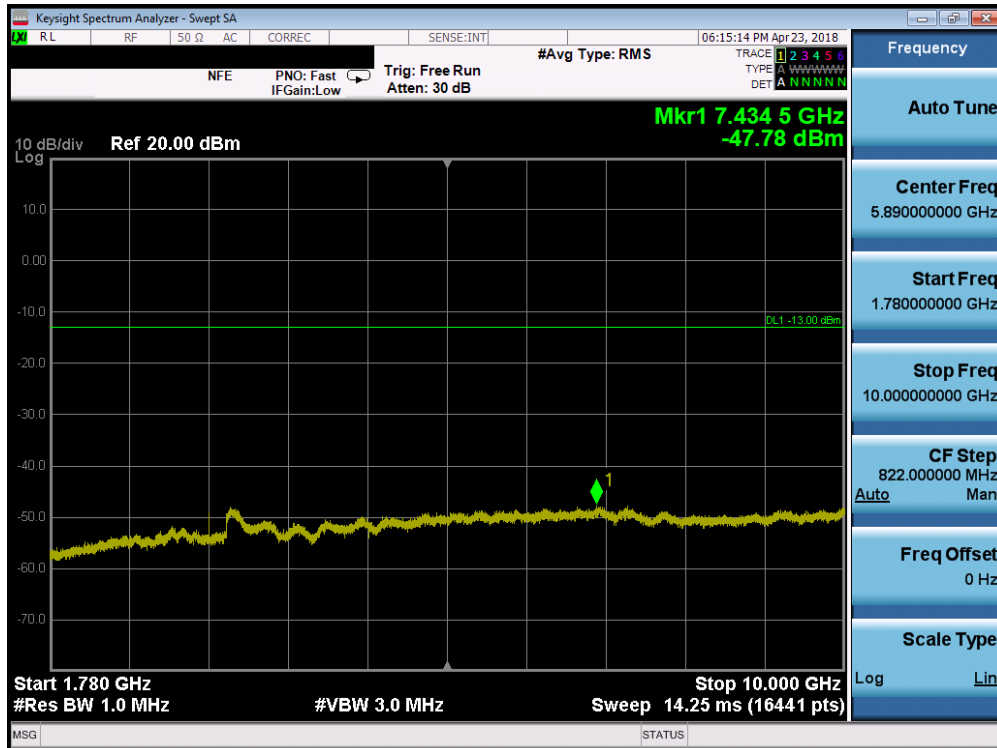
Plot 7-107. Conducted Spurious Plot (Band 26/5 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 73 of 198	



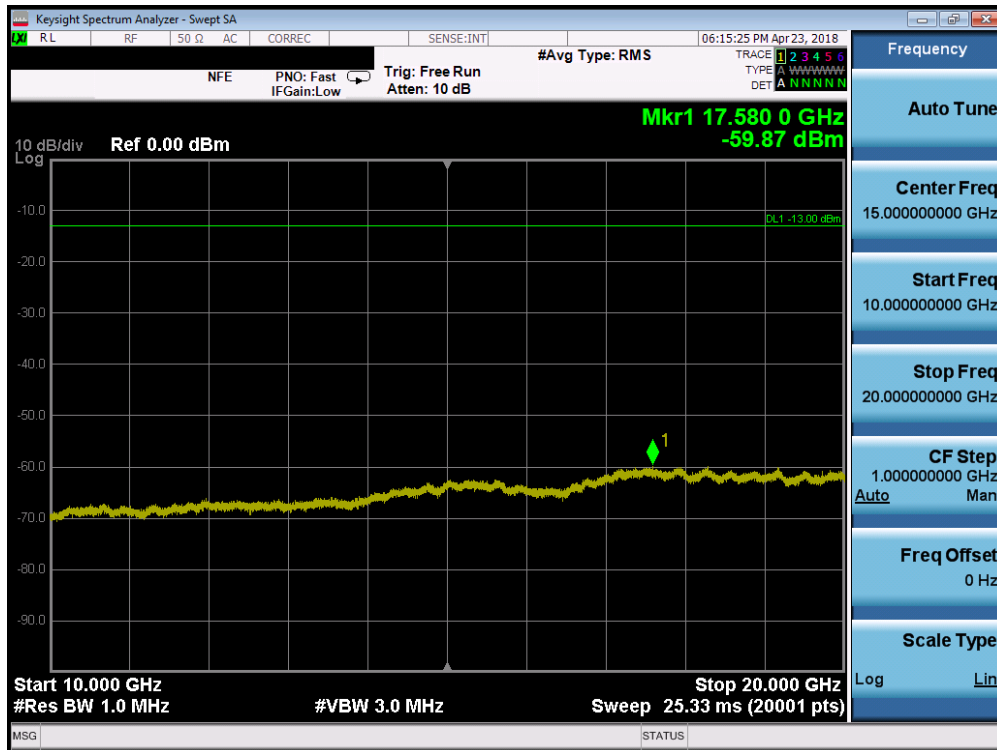


Plot 7-109. Conducted Spurious Plot (Band 4/66 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

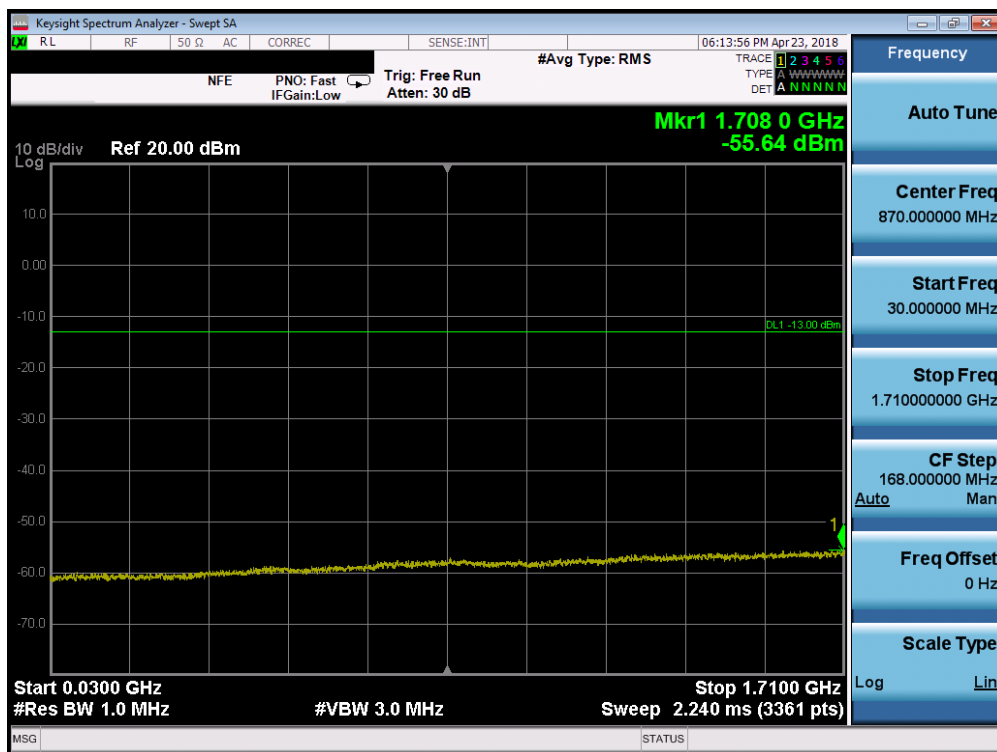


Plot 7-110. Conducted Spurious Plot (Band 4/66 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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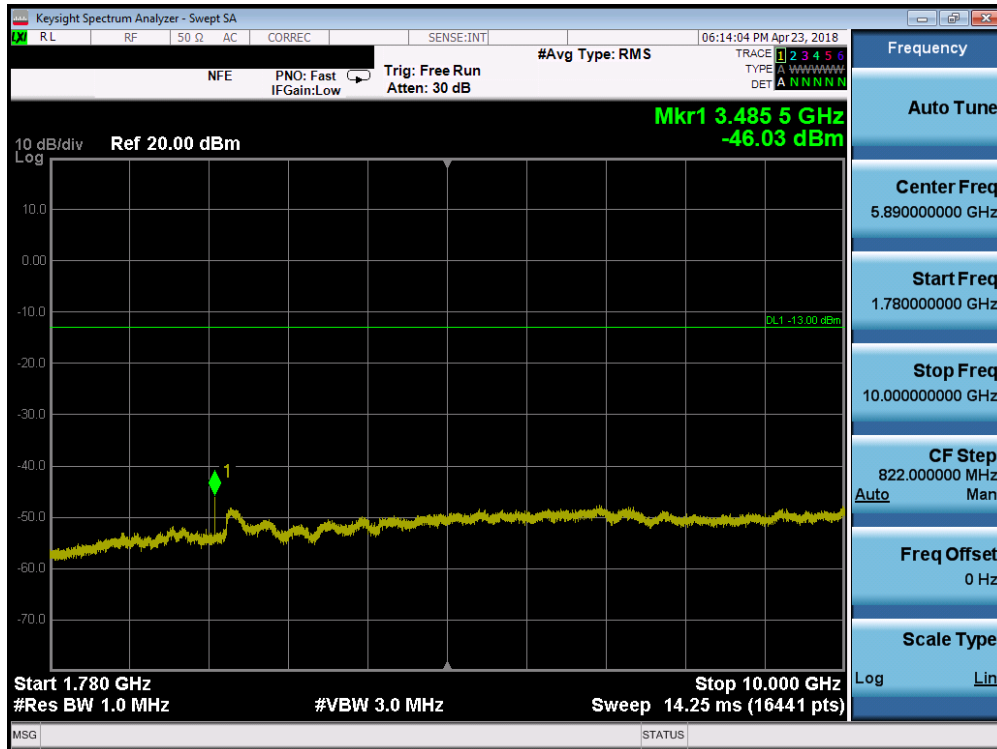
Plot 7-111. Conducted Spurious Plot (Band 4/66 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



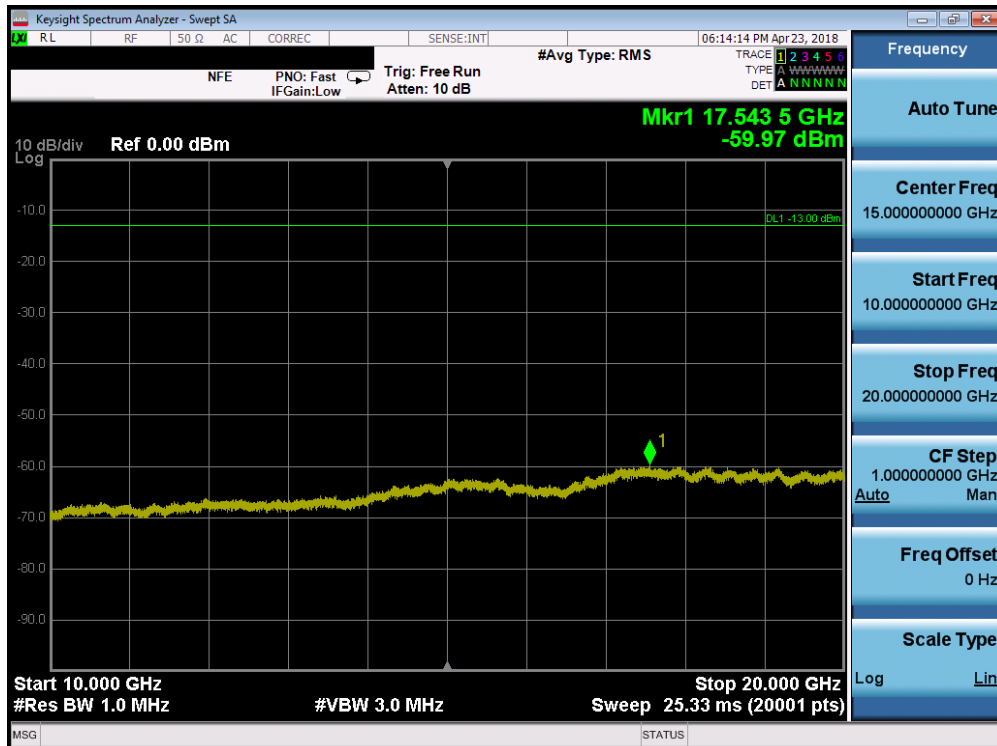
Plot 7-112. Conducted Spurious Plot (Band 4/66 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1804130071-03.A3L	<b>Test Dates:</b> 4/6/2018-6/19/2018	<b>EUT Type:</b> Portable Handset	Page 76 of 198	



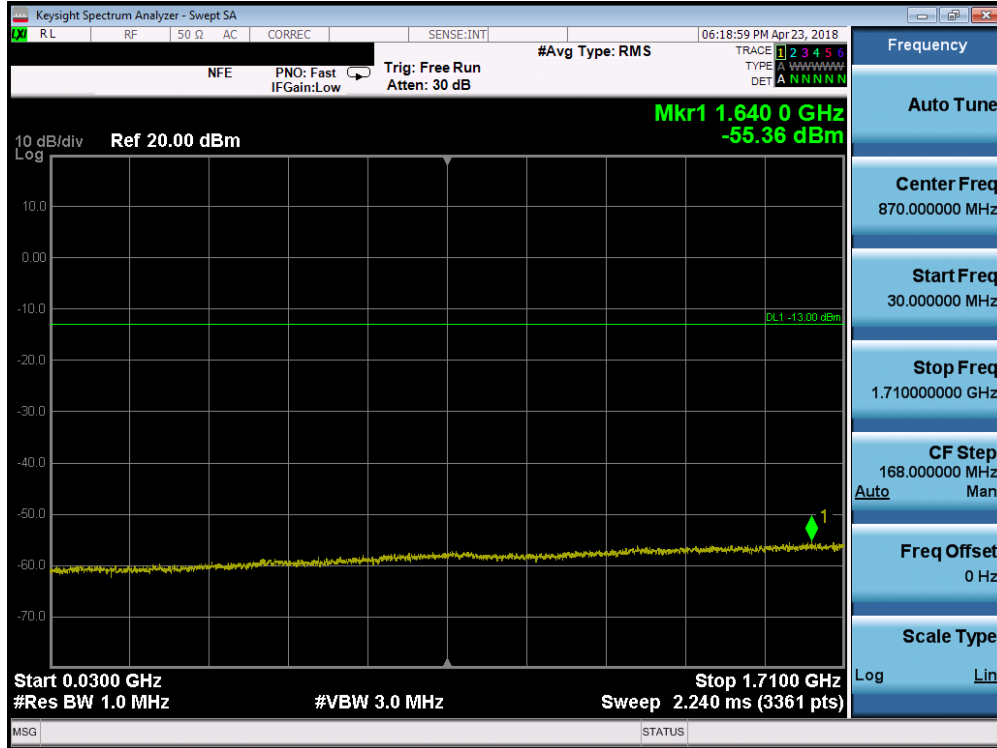


Plot 7-113. Conducted Spurious Plot (Band 4/66 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

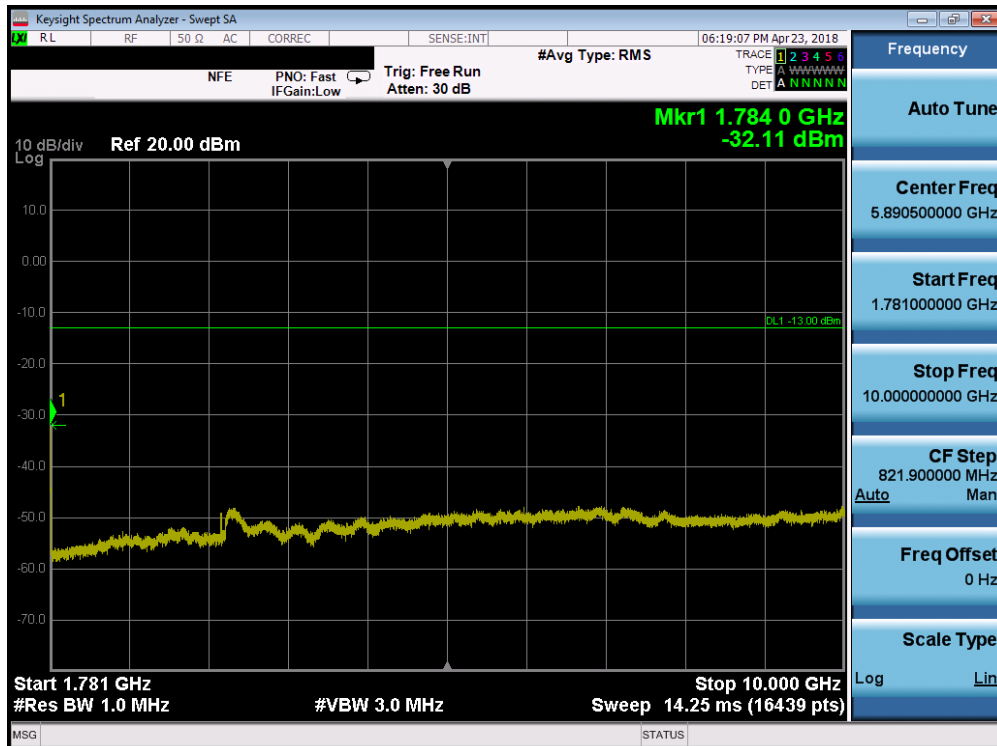


Plot 7-114. Conducted Spurious Plot (Band 4/66 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1804130071-03.A3L	Test Dates: 4/6/2018-6/19/2018	EUT Type: Portable Handset	Page 77 of 198	

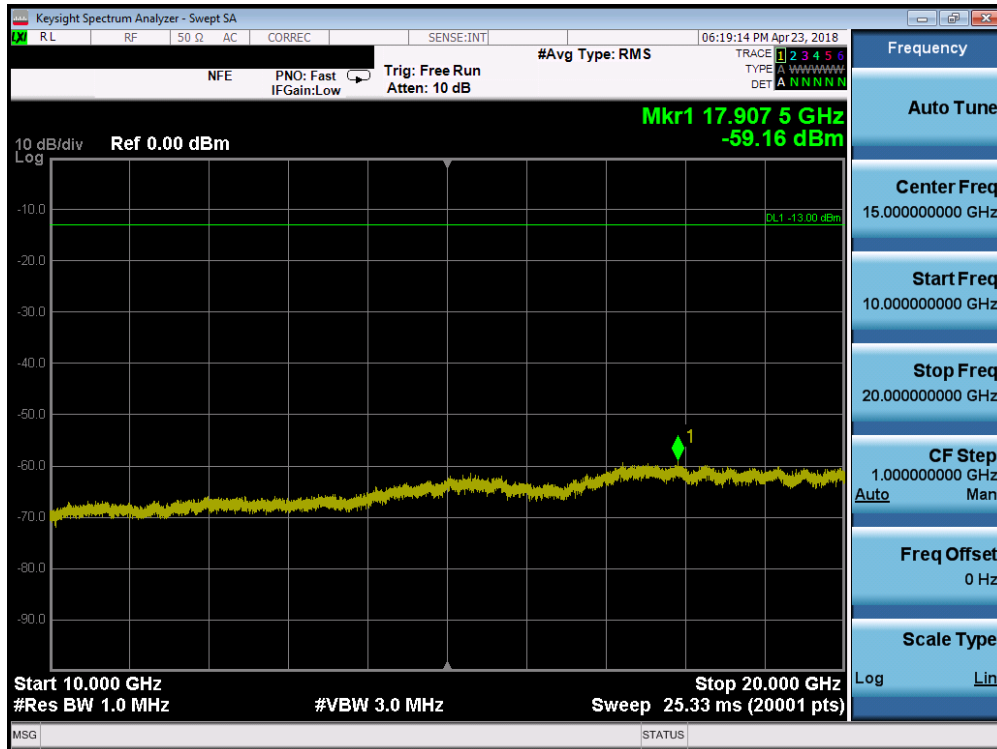


Plot 7-115. Conducted Spurious Plot (Band 4/66 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-116. Conducted Spurious Plot (Band 4/66 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: A3LSMN960KOR	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
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Plot 7-117. Conducted Spurious Plot (Band 4/66 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: A3LSMN960KOR		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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