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MEASUREMENT REPORT
FCC Part 24 & 27 LTE

Applicant Name:
Samsung Electronics, Co. Ltd.
129, Samsung-ro, Maetan dong,
Yeongtong-gu, Suwon-si
Gyeonggi-do 443-742, Korea

Date of Testing:
2/3 - 3/26/2014
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0Y1403190580.A3L

FCC ID : A3LSMG900R7

APPLICANT: SAMSUNG ELECTRONICS, CO. LTD.

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s): §2; §24; §27
EUT Type: Portable Handset
Model(s): SM-G900R7
Test Device Serial No.: *identical prototype* [S/N: 32F0A, K ACG #2]
Test Procedure(s): ANSI/TIA-603-C-2004, KDB 971168 v02r01

Mode	Tx Frequency (MHz)	Emission Designator	Modulation	ERP/EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE Band 12	701.5 - 713.5	4M49G7W	QPSK	0.043	16.30
LTE Band 12	701.5 - 713.5	4M51W7W	16QAM	0.034	15.27
LTE Band 12	704 - 711	8M98G7W	QPSK	0.049	16.91
LTE Band 12	704 - 711	8M97W7W	16QAM	0.039	15.87
LTE Band 4	1712.5 - 1752.5	4M50G7W	QPSK	0.127	21.05
LTE Band 4	1712.5 - 1752.5	4M52W7W	16QAM	0.097	19.89
LTE Band 4	1715 - 1750	8M98G7W	QPSK	0.139	21.44
LTE Band 4	1715 - 1750	8M96W7W	16QAM	0.102	20.08
LTE Band 2	1852.5 - 1907.5	4M49G7W	QPSK	0.153	21.86
LTE Band 2	1852.5 - 1907.5	4M50W7W	16QAM	0.130	21.15
LTE Band 2	1855 - 1905	8M99G7W	QPSK	0.157	21.95
LTE Band 2	1855 - 1905	8M97W7W	16QAM	0.116	20.66
LTE Band 25	1852.5 - 1912.5	4M50G7D	QPSK	0.110	20.40
LTE Band 25	1852.5 - 1912.5	4M52W7D	16QAM	0.088	19.42
LTE Band 25	1855 - 1910	9M00G7D	QPSK	0.103	20.13
LTE Band 25	1855 - 1910	9M00W7D	16QAM	0.083	19.19

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

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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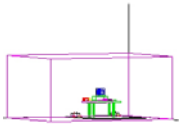

MEASUREMENT REPORT
FCC Part 24 & 27

§2.1033 General Information

APPLICANT:	Samsung Electronics, Co. Ltd.
APPLICANT ADDRESS:	129, Samsung-ro, Maetan dong, Yeongtong-gu, Suwon-si, Gyeonggi-do 443-742, Korea
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21045 USA
FCC RULE PART(S):	§2; §24; §27
BASE MODEL:	SM-G900R7
FCC ID:	A3LSMG900R7
FCC CLASSIFICATION:	PCS Licensed Transmitter Held to Ear (PCE)
Test Device Serial No.:	32F0A, K ACG #2 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST:	2/3 - 3/26/2014
TEST REPORT S/N:	0Y1403190580.A3L

Test Facility / Accreditations

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

- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EME) 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 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Internt'l (BWI) airport, the city of Baltimore and the Washington, DC area. (*See Figure 1-1*).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2003 on February 15, 2012.

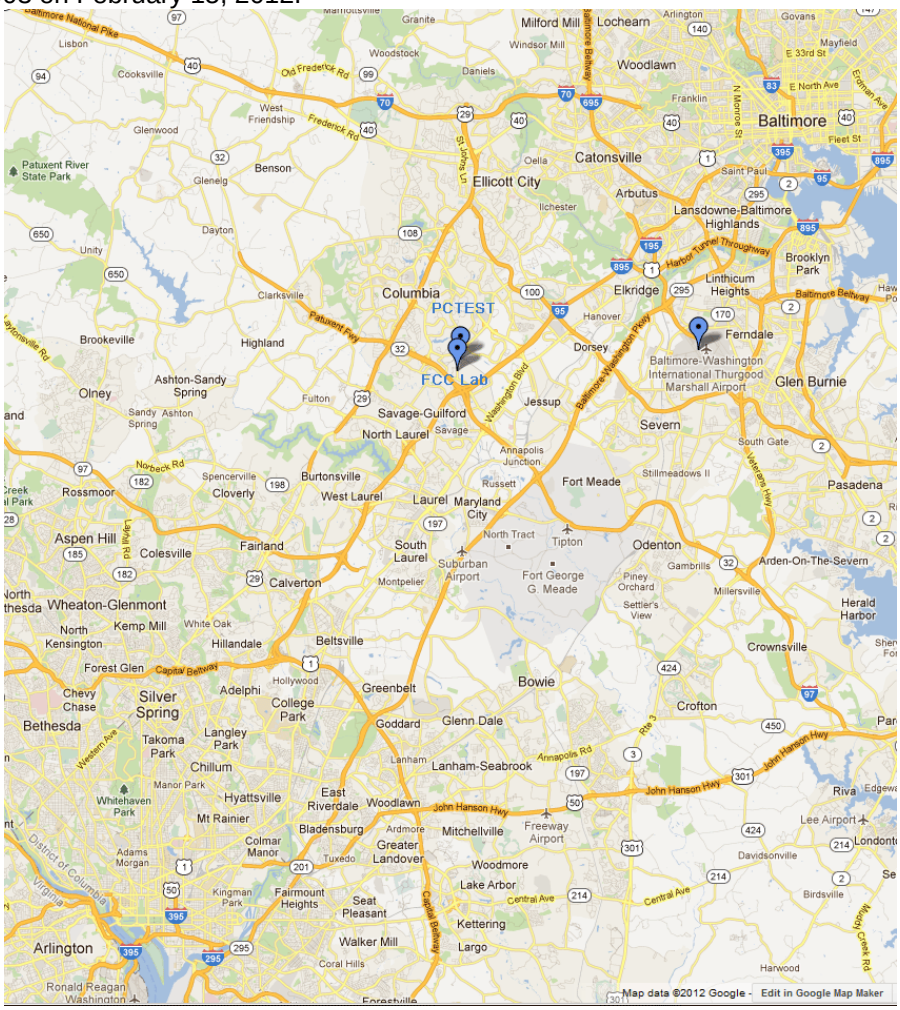

Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMG900R7**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A (BC0, BC1), Band 2, 4, 12, 25 (5/10MHz) LTE, 802.11a/b/g/n/ac WLAN (DTS/NII), Bluetooth (1x,EDR, LE), NFC, ANT+

2.3 Test Configuration

The Samsung Portable Handset FCC ID: A3LSMG900R7 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 v02r01. See Section 6.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

Per KDB 648474 D03 v01r02, spurious emissions measurement data was also investigated with the wireless charging battery cover (WCC). The handset was placed on the representative charging pad under normal conditions and in a simulated call configuration. Only worst case emissions are 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.

2.5 Labeling Requirements

Per 2.925

The FCC identifier shall be permanently affixed to the equipment and shall be readily visible to the purchaser at the time of purchase.

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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-C-2004) 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 **Samsung Portable Handset FCC ID: A3LSMG900R7.**

3.2 Block A Frequency Range

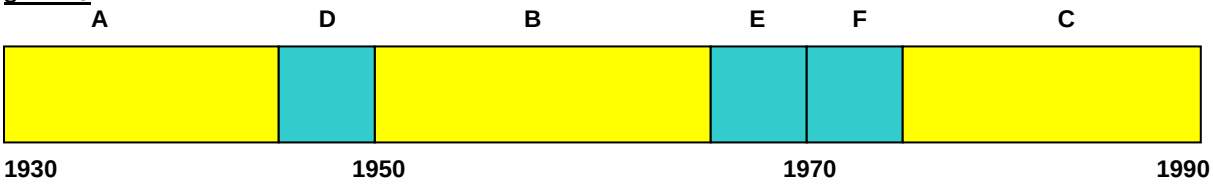
§27.5(c)

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.

3.3 PCS - Base Frequency Blocks

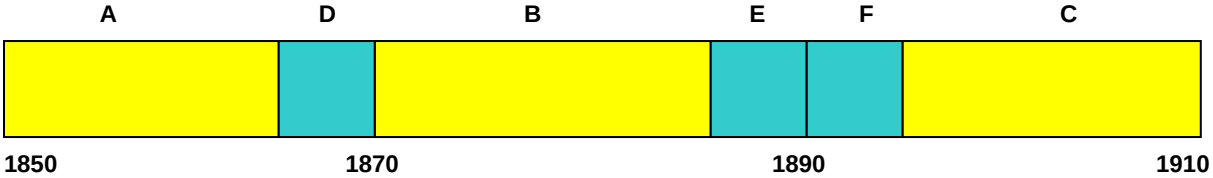
§24.229



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)

3.4 PCS - Mobile Frequency Blocks

§24.229



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)

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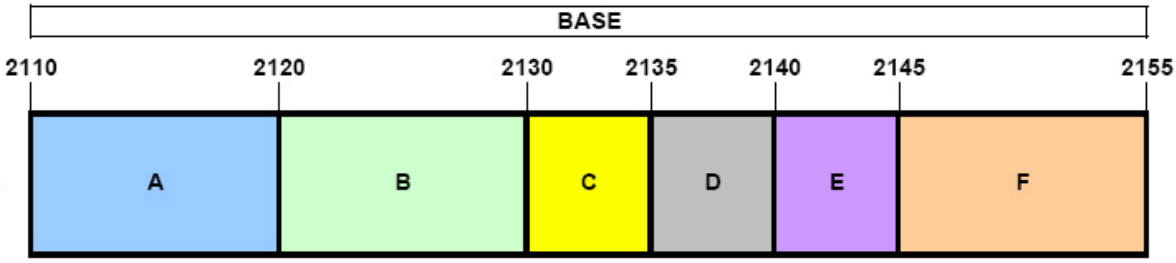
3.5 AWS - Base Frequency Blocks

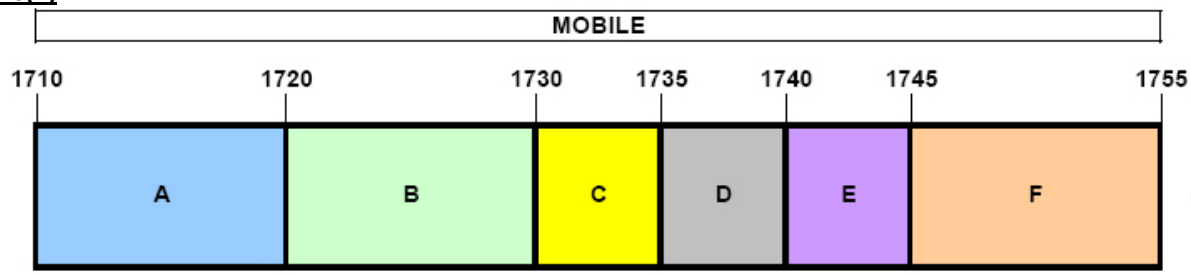
§27.5(h)



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 (E)

3.6 AWS - Mobile Frequency Blocks

§27.5(h)



BLOCK 1: 1710 – 1720 MHz (A)
BLOCK 2: 1720 – 1730 MHz (B)
BLOCK 3: 1730 – 1735 MHz (C)
BLOCK 4: 1735 – 1740 MHz (D)
BLOCK 5: 1740 – 1745 MHz (E)
BLOCK 6: 1745 – 1755 MHz (F)

3.7 Occupied Bandwidth

§2.1049 RSS-Gen(4.6.1) RSS-133(2.3) RSS-139(2.3)

The implementation of this test is performed by the spectrum analyzer's occupied bandwidth function. 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.

3.8 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §24.238(a)(b) §27.53(g) §27.53(h) RSS-133(6.5.1) RSS-139(6.5.1)

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 10th 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 Cell band, 698–746 MHz band, or 1 MHz or greater for PCS band, AWS band. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed for PCS band, AWS band. 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.

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3.9 Peak-Average Ratio

§24.232(d) §27.50(d.5) RSS-133(6.4) RSS-139(6.4)

A peak to average ratio measurement is performed at the conducted port of the EUT. For LTE signals, 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.

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3.10 SVLTE

§2.1053 §24.238(a) §27.53(g) §27.53(h) RSS-133(6.5.1) RSS-139(6.5.1)

This device is capable of operating in SVLTE mode in the following cases:

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Notes
1	1x CDMA voice + 2.4 GHz WI-FI	Yes	Yes	N/A	
2	1x CDMA voice + 5 GHz WI-FI	Yes	Yes	N/A	
3	1x CDMA voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	
4	LTE + 2.4 GHz WI-FI	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
5	LTE + 5 GHz WI-FI	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
6	LTE + 2.4 GHz Bluetooth	N/A	Yes*	N/A	*-Pre-installed VOIP applications are considered.
7	CDMA/EVDO data + 2.4 GHz WI-FI	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
8	CDMA/EVDO data + 5 GHz WI-FI	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
9	CDMA/EVDO data + 2.4 GHz Bluetooth	N/A	Yes*	N/A	*-Pre-installed VOIP applications are considered.
10	1x CDMA voice + LTE	Yes	Yes	N/A	
11	1x CDMA voice + LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	
12	1x CDMA voice + LTE + 5 GHz WI-FI	Yes	Yes	Yes	
13	1x CDMA voice + LTE + 2.4 GHz Bluetooth	N/A	Yes	N/A	
14	1x CDMA voice + CDMA/EVDO data	N/A	N/A	N/A	Not supported by HW
15	CDMA/EVDO data + LTE	N/A	N/A	N/A	Not supported by SW

Table 3-1. SVLTE Transmit Configurations

All modes of SVLTE operation were investigated. It was determined that this device did not produce any intermodulation products that were within 25dB of the spurious emission limit so the emissions are not reported herein.

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3.11 Radiated Power and Radiated Spurious Emissions

§2.1053 §24.232(c) §24.238(a) §27.50(c.10) §27.50(d.4) §27.53(g) RSS-133(6.4) RSS-133(6.5.1) RSS-139(6.5.1)

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. 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. An ETS Lindgren Model 2188 raised 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 78cm high PVC support structure is placed on top of the turntable. A ¾" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

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-C-2004, 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 $P_{g\,[dBm]}$ – 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 $43 + 10\log_{10}(\text{Power}_{\,[Watts]})$.

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3.12 Frequency Stability / Temperature Variation

§2.1055 §24.229 §24.235 §27.5(c) §27.5(h) §27.54 RSS-133(6.3) RSS-139(6.3)

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 85% 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 – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block for Part 24 and 27.

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 one minute 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 sufficient stabilization period at each temperature shall be used prior to each frequency requirement.

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4.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx1	Licensed Transmitter Cable Set	1/29/2014	Annual	1/29/2015	N/A
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
Agilent	8447D	Broadband Amplifier	5/31/2013	Annual	5/31/2014	1937A03348
Agilent	N9020A	MXA Signal Analyzer	10/29/2013	Annual	10/29/2014	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	1/17/2014	Annual	1/17/2015	MY52350166
Anritsu	MA2411B	Pulse Sensor	11/13/2013	Annual	11/13/2014	1027293
Anritsu	ML2495A	Power Meter	10/31/2013	Annual	10/31/2014	1039008
Espec	ESX-2CA	Environmental Chamber	4/16/2013	Annual	4/16/2014	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/24/2013	Biennial	7/24/2015	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/30/2012	Biennial	5/30/2014	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	11/7/2012	Biennial	11/7/2014	128338
Mini-Circuits	SSG-4000HP	USB Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	TVA-11-422	RF Power Amp	N/A			QA1303002
Mini-Circuits	VHF-1200+	High Pass Filter	1/27/2014	Annual	1/27/2015	30923
Mini-Circuits	VHF-3100+	High Pass Filter	1/27/2014	Annual	1/27/2015	30841
Mini-Circuits	VHF-3100+	High Pass Filter	1/29/2014	Annual	1/29/2015	31144
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	N/A			100976
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	1/24/2014	Annual	1/24/2015	100348
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100040
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/21/2013	Biennial	11/21/2015	9105-2404
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	6/19/2013	Biennial	6/19/2015	A050307

Table 4-1. Test Equipment

Notes:

1. Equipment used for signaling with a calibration date of "N/A" shown in this list was only used for maintaining a link between the piece of equipment and the EUT. This equipment was not used to make direct calibrated measurements.

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5.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Amplitude/Angle Modulated

16QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Combination (Audio/Data)

Spurious Radiated Emission – LTE Band

Example: Middle Channel LTE Mode 2nd 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 analzyer. 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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6.0 TEST RESULTS

6.1 Summary

Company Name: Samsung Electronics, Co. Ltd.
FCC ID: A3LSMG900R7
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
TRANSMITTER MODE (TX)					
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0, **Error! Reference source not found.**, 8.0, 9.0, 10.0
2.1051, 24.238(a) 27.53(g), 27.53(h)	Band Edge / Conducted Spurious Emissions	> 43 + 10log$_{10}$ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Section 7.0, **Error! Reference source not found.**, 8.0, 9.0, 10.0
24.232(d) 27.50(d.5)	Peak-Average Ratio	< 13 dB		PASS	Section 8.0, 9.0, 10.0
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
27.50(c.10)	Effective Radiated Power (Band 12)	< 3 Watts max. ERP		PASS	Section 6.2
24.232(c)	Equivalent Isotropic Radiated Power (Band 2, 25)	< 2 Watts max. EIRP		PASS	Section 6.3
27.50(d.4)	Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. EIRP		PASS	Section 6.3
2.1053, 24.238(a) 27.53(g), 27.53(h)	Undesirable Emissions	> 43 + 10log$_{10}$ (P[Watts]) for all out-of-band emissions		PASS	Section 6.4, **Error! Reference source not found.**, 6.5, 6.6, 6.7
2.1055, 24.235 27.54	Frequency Stability	Fundamental emissions stay within authorized frequency block (Part 24, 27)		PASS	Section 6.8, **Error! Reference source not found.**, 6.9, 6.10, 6.11

Table 6-1. Summary of 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 shown in Section 7.0 **Error! Reference source not found.** 8.0 9.0 10.0 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.

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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 1.5.

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6.2 Effective Radiated Power (ERP)

§22.913(a.2) §27.50(c.10) RSS-132(4.4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Back Cover	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	Margin [dB]
701.50	5	QPSK	Standard	1/0	14.00	2.30	V	16.30	0.043	-18.47
707.50	5	QPSK	Standard	1/0	13.39	2.37	V	15.76	0.038	-19.01
713.50	5	QPSK	Standard	1/0	12.45	2.44	V	14.89	0.031	-19.88
701.50	5	16-QAM	Standard	1/0	12.97	2.30	V	15.27	0.034	-19.50
707.50	5	16-QAM	Standard	1/0	12.35	2.37	V	14.72	0.030	-20.05
713.50	5	16-QAM	Standard	1/0	11.63	2.44	V	14.07	0.026	-20.70
704.00	10	QPSK	Standard	1/0	14.61	2.30	V	**16.91**	0.049	-17.86
707.50	10	QPSK	Standard	1/0	14.23	2.37	V	16.60	0.046	-18.17
711.00	10	QPSK	Standard	1/0	13.45	2.44	V	15.89	0.039	-18.88
704.00	10	16-QAM	Standard	1/0	13.57	2.30	V	15.87	0.039	-18.90
707.50	10	16-QAM	Standard	1/0	13.08	2.37	V	15.45	0.035	-19.32
711.00	10	16-QAM	Standard	1/0	12.47	2.44	V	14.91	0.031	-19.86
704.00	10	QPSK	WCC	1/0	10.30	2.30	H	12.60	0.018	-22.17

Table 6-2. ERP Data (Band 12)

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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6.3 Equivalent Isotropic Radiated Power (EIRP)

§24.232(c) §27.50(d.4) RSS-133(6.4) RSS-139(6.4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Back Cover	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1712.50	5	QPSK	Standard	1/0	10.34	9.89	V	20.23	0.105	-9.77
1732.50	5	QPSK	Standard	1/0	11.20	9.85	V	21.05	0.127	-8.95
1752.50	5	QPSK	Standard	1/0	11.09	9.80	V	20.89	0.123	-9.11
1712.50	5	16-QAM	Standard	1/0	9.54	9.89	V	19.43	0.088	-10.57
1732.50	5	16-QAM	Standard	1/0	10.04	9.85	V	19.89	0.097	-10.11
1752.50	5	16-QAM	Standard	1/0	9.72	9.80	V	19.52	0.090	-10.48
1715.00	10	QPSK	Standard	1/0	10.86	9.89	V	20.75	0.119	-9.25
1732.50	10	QPSK	Standard	1/0	11.26	9.85	V	21.11	0.129	-8.89
1750.00	10	QPSK	Standard	1/0	11.64	9.80	V	**21.44**	0.139	-8.56
1715.00	10	16-QAM	Standard	1/0	9.99	9.89	V	19.88	0.097	-10.12
1732.50	10	16-QAM	Standard	1/0	10.04	9.85	V	19.89	0.097	-10.11
1750.00	10	16-QAM	Standard	1/0	10.28	9.80	V	20.08	0.102	-9.92
1750.00	10	QPSK	WCC	1/0	7.75	9.80	H	17.55	0.057	-12.45

Table 6-3. EIRP Data (Band 4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Back Cover	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1852.50	5	QPSK	Standard	1/24	12.27	9.59	H2	21.86	0.153	-11.15
1880.00	5	QPSK	Standard	1/24	12.13	9.53	H2	21.66	0.147	-11.35
1907.50	5	QPSK	Standard	1/0	11.28	9.48	H2	20.76	0.119	-12.25
1852.50	5	16-QAM	Standard	1/24	11.56	9.59	H2	21.15	0.130	-11.86
1880.00	5	16-QAM	Standard	1/24	10.73	9.53	H2	20.26	0.106	-12.75
1907.50	5	16-QAM	Standard	1/0	10.11	9.48	H2	19.59	0.091	-13.42
1855.00	10	QPSK	Standard	1/49	12.16	9.59	H2	21.75	0.150	-11.26
1880.00	10	QPSK	Standard	1/49	12.29	9.53	H2	21.82	0.152	-11.19
1905.00	10	QPSK	Standard	1/0	12.47	9.48	H2	**21.95**	0.157	-11.06
1855.00	10	16-QAM	Standard	1/49	11.01	9.59	H2	20.60	0.115	-12.41
1880.00	10	16-QAM	Standard	1/49	10.96	9.53	H2	20.49	0.112	-12.52
1905.00	10	16-QAM	Standard	1/0	11.18	9.48	H2	20.66	0.116	-12.35
1905.00	10	QPSK	WCC	1/0	10.54	9.48	H	20.02	0.100	-12.99

Table 6-4. EIRP Data (Band 2)

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Back Cover	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1852.50	5	QPSK	Standard	1/0	10.58	9.59	H2	20.17	0.104	-12.84
1882.50	5	QPSK	Standard	1/0	10.72	9.53	H2	20.25	0.106	-12.76
1912.50	5	QPSK	Standard	1/0	10.93	9.47	H2	**20.40**	0.110	-12.61
1852.50	5	16-QAM	Standard	1/0	9.79	9.59	H2	19.38	0.087	-13.63
1882.50	5	16-QAM	Standard	1/0	9.87	9.53	H2	19.40	0.087	-13.61
1912.50	5	16-QAM	Standard	1/0	9.95	9.47	H2	19.42	0.088	-13.59
1855.00	10	QPSK	Standard	1/0	10.32	9.59	H2	19.91	0.098	-13.10
1882.50	10	QPSK	Standard	1/0	10.46	9.53	H2	19.99	0.100	-13.02
1910.00	10	QPSK	Standard	1/0	10.66	9.47	H2	20.13	0.103	-12.88
1855.00	10	16-QAM	Standard	1/0	9.35	9.59	H2	18.94	0.078	-14.07
1882.50	10	16-QAM	Standard	1/0	9.66	9.53	H2	19.19	0.083	-13.82
1910.00	10	16-QAM	Standard	1/0	9.67	9.47	H2	19.14	0.082	-13.87
1912.50	5	QPSK	WCC	1/0	5.47	9.47	H2	14.94	0.031	-18.07

Table 6-5. EIRP Data (Band 25)

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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6.4 Band 12 Radiated Spurious Emissions

§2.1053 §27.53(g)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	704.00	MHz		
MEASURED OUTPUT POWER:	16.91	dBm	=	0.049 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	29.91	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1408.00	-36.92	2.35	-34.57	V	51.48
2112.00	-81.03	3.21	-77.82	V	94.73
2816.00	-81.01	4.59	-76.43	V	93.34
3520.00	-81.56	6.15	-75.41	V	92.32
4224.00	-81.30	7.12	-74.18	V	91.10
4928.00	-79.92	7.74	-72.17	V	89.09

Table 6-6. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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Band 12 Radiated Spurious Measurements (continued)

§2.1053 §27.53(g)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	707.50	MHz		
MEASURED OUTPUT POWER:	16.60	dBm	=	0.046 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	29.60	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1415.00	-34.40	2.43	-31.97	V	48.57
2122.50	-81.08	3.25	-77.82	V	94.43
2830.00	-81.00	4.61	-76.39	V	93.00
3537.50	-81.42	6.13	-75.29	V	91.89
4245.00	-81.31	7.16	-74.15	V	90.75
4952.50	-79.91	7.79	-72.11	V	88.72

Table 6-7. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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Band 12 Radiated Spurious Measurements (continued)

§2.1053 §27.53(g)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	711.00	MHz		
MEASURED OUTPUT POWER:	15.89	dBm	=	0.039 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	28.89	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1422.00	-33.41	2.51	-30.91	V	46.80
2133.00	-81.12	3.30	-77.83	V	93.72
2844.00	-80.99	4.63	-76.36	V	92.26
3555.00	-81.28	6.11	-75.17	V	91.06
4266.00	-81.28	7.19	-74.09	V	89.98
4977.00	-79.90	7.84	-72.06	V	87.95

Table 6-8. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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6.5 Band 4 Radiated Spurious Emissions

§2.1053 §27.53(h) RSS-139(6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1715.00	MHz		
MEASURED OUTPUT POWER:	20.75	dBm	=	0.119 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.75	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3430.00	-45.99	8.11	-37.88	H2	58.63
5145.00	-57.94	10.13	-47.81	H2	68.56
6860.00	-82.15	11.31	-70.84	H2	91.59
8575.00	-81.81	12.98	-68.83	H2	89.58
10290.00	-79.80	13.22	-66.59	H2	87.34
12005.00	-75.68	13.01	-62.67	H2	83.42

Table 6-9. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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Band 4 Radiated Spurious Measurements (continued)

§2.1053 §27.53(h) RSS-139(6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1732.50	MHz		
MEASURED OUTPUT POWER:	21.11	dBm	=	0.129 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.11	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3465.00	-47.45	8.23	-39.22	H2	60.33
5197.50	-58.02	10.18	-47.83	H2	68.94
6930.00	-82.14	11.41	-70.72	H2	91.83
8662.50	-81.92	13.00	-68.92	H2	90.03
10395.00	-79.26	13.15	-66.11	H2	87.22
12127.50	-74.75	13.00	-61.76	H2	82.86

Table 6-10. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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Band 4 Radiated Spurious Measurements (continued)

§2.1053 §27.53(h) RSS-139(6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1750.00	MHz		
MEASURED OUTPUT POWER:	21.44	dBm	=	0.139 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.44	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3500.00	-44.63	8.32	-36.31	H2	57.75
5250.00	-55.44	10.20	-45.24	H2	66.68
7000.00	-82.09	11.48	-70.61	H2	92.06
8750.00	-81.72	12.97	-68.75	H2	90.20
10500.00	-79.05	13.04	-66.01	H2	87.46
12250.00	-73.70	13.03	-60.67	H2	82.12

Table 6-11. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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6.6 Band 2 Radiated Spurious Emissions

§2.1053 §24.238(a) RSS-133(6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1855.00	MHz		
MEASURED OUTPUT POWER:	21.75	dBm	=	0.150 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.75	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3710.00	-58.17	8.30	-49.87	H2	71.62
5565.00	-82.98	10.59	-72.40	H2	94.15
7420.00	-82.20	11.96	-70.24	H2	91.99
9275.00	-80.91	13.16	-67.75	H2	89.49
11130.00	-78.34	13.25	-65.09	H2	86.84
12985.00	-62.47	13.29	-49.18	H2	70.93

Table 6-12. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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Band 2 Radiated Spurious Measurements (continued)

§2.1053 §24.238(a) RSS-133(6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1880.00	MHz		
MEASURED OUTPUT POWER:	21.82	dBm	=	0.152 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.82	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-56.47	8.32	-48.15	H2	69.97
5640.00	-82.97	10.67	-72.30	H2	94.12
7520.00	-82.14	12.05	-70.09	H2	91.91
9400.00	-80.73	13.16	-67.58	H2	89.40
11280.00	-78.10	13.32	-64.77	H2	86.60
13160.00	-57.12	13.47	-43.65	H2	65.47

Table 6-13. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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Band 2 Radiated Spurious Measurements (continued)

§2.1053 §24.238(a) RSS-133(6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1905.00	MHz		
MEASURED OUTPUT POWER:	21.95	dBm	=	0.157 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.95	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3810.00	-58.16	8.36	-49.80	H2	71.75
5715.00	-82.92	10.73	-72.19	H2	94.13
7620.00	-82.03	12.12	-69.91	H2	91.86
9525.00	-80.49	13.14	-67.35	H2	89.30
11430.00	-77.97	13.36	-64.62	H2	86.57
13335.00	-55.32	13.47	-41.85	H2	63.80

Table 6-14. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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6.7 Band 25 Radiated Spurious Emissions

§2.1053 §24.238(a) RSS-133(6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1852.50	MHz		
MEASURED OUTPUT POWER:	20.17	dBm	=	0.104 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.17	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3705.00	-59.09	9.43	-49.66	H2	69.82
5557.50	-83.42	10.84	-72.58	H2	92.75
7410.00	-79.95	10.72	-69.23	H2	89.40
9262.50	-78.12	11.59	-66.53	H2	86.70
11115.00	-77.87	12.79	-65.08	H2	85.25
12967.50	-62.31	13.22	-49.08	H2	69.25

Table 6-15. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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Band 25 Radiated Spurious Measurements (continued)

§2.1053 §24.238(a) RSS-133(6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1882.50	MHz		
MEASURED OUTPUT POWER:	20.25	dBm	=	0.106 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.25	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3765.00	-58.49	9.27	-49.22	H2	69.46
5647.50	-83.69	11.08	-72.61	H2	92.86
7530.00	-80.37	10.99	-69.38	H2	89.63
9412.50	-77.72	11.57	-66.15	H2	86.40
11295.00	-77.15	12.71	-64.43	H2	84.68
13177.50	-55.54	12.80	-42.74	H2	62.99

Table 6-16. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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Band 25 Radiated Spurious Measurements (continued)

§2.1053 §24.238(a) RSS-133(6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1912.50	MHz		
MEASURED OUTPUT POWER:	20.4026958	dBm	=	0.110 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.40	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3825.00	-60.61	9.20	-51.42	H2	71.82
5737.50	-83.93	11.30	-72.63	H2	93.03
7650.00	-80.53	11.17	-69.37	H2	89.77
9562.50	-78.07	11.84	-66.23	H2	86.63
11475.00	-76.51	12.72	-63.80	H2	84.20
13387.50	-54.14	12.51	-41.63	H2	62.03

Table 6-17. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the ERP/EIRP tables above.

2. This unit was tested with its standard battery.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

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6.8 Band 12 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY: 707,500,000 Hz

CHANNEL: 23790

REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	707,499,997	-3	-0.0000004
100 %		- 30	707,499,980	-20	-0.0000028
100 %		- 20	707,499,991	-9	-0.0000013
100 %		- 10	707,499,990	-10	-0.0000014
100 %		0	707,499,996	-4	-0.0000005
100 %		+ 10	707,499,981	-19	-0.0000027
100 %		+ 20	707,499,983	-17	-0.0000024
100 %		+ 30	707,499,986	-14	-0.0000019
100 %		+ 40	707,499,986	-14	-0.0000019
100 %		+ 50	707,499,982	-18	-0.0000025
115 %	4.37	+ 20	707,499,983	-17	-0.0000024
BATT. ENDPOINT	3.40	+ 20	707,499,982	-18	-0.0000026

Table 6-18. Frequency Stability Data (Band 12)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 12 Frequency Stability Measurements (Cont'd)

§2.1055 §27.54

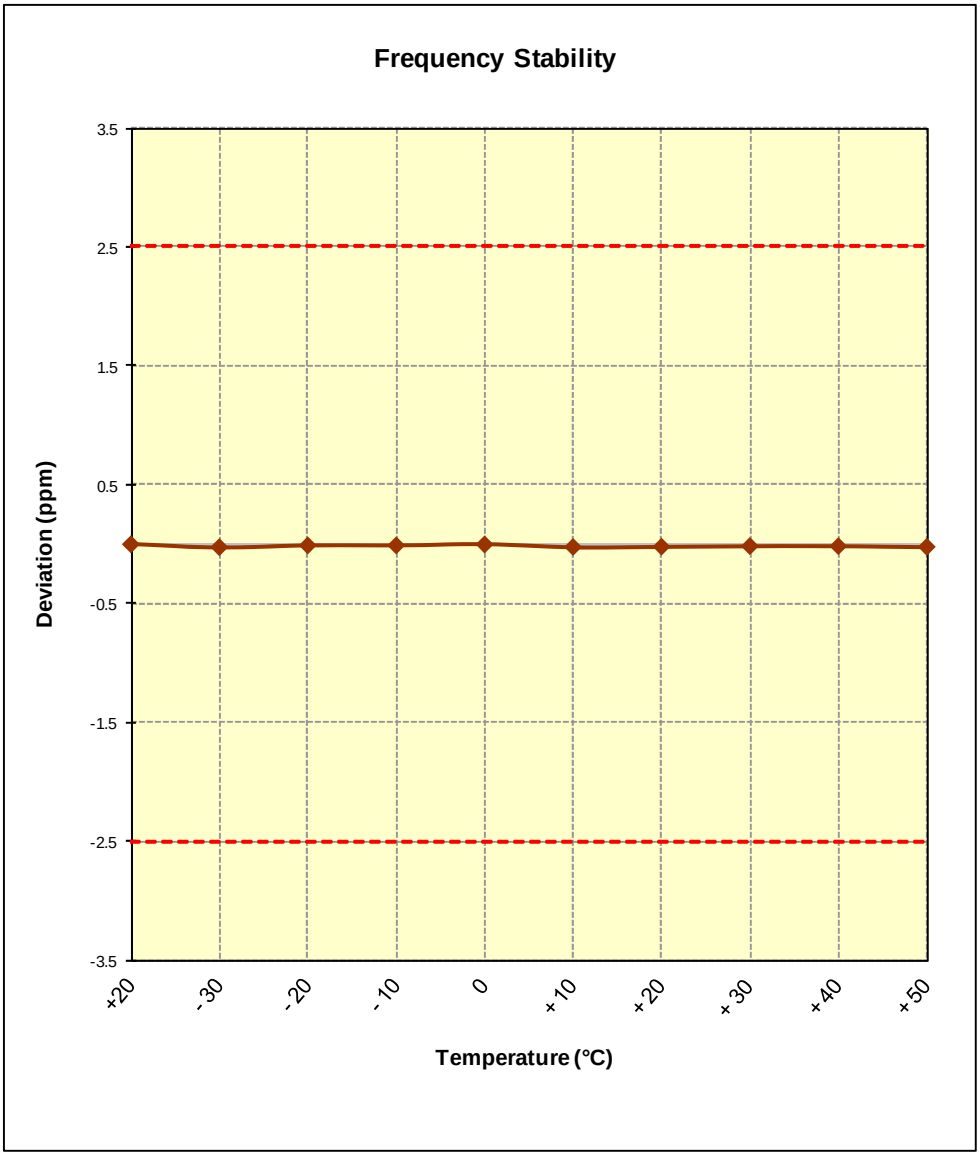

Figure 6-1. Frequency Stability Graph (Band 12)

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6.9 Band 4 Frequency Stability Measurements

§2.1055 §27.54 RSS-139(6.3)

OPERATING FREQUENCY: 1,732,500,000 Hz

CHANNEL: 20175

REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,499,984	-16	-0.0000009
100 %		- 30	1,732,499,987	-13	-0.0000007
100 %		- 20	1,732,499,987	-13	-0.0000008
100 %		- 10	1,732,499,992	-8	-0.0000005
100 %		0	1,732,499,988	-12	-0.0000007
100 %		+ 10	1,732,499,987	-13	-0.0000007
100 %		+ 20	1,732,499,996	-4	-0.0000002
100 %		+ 30	1,732,499,987	-13	-0.0000008
100 %		+ 40	1,732,499,980	-20	-0.0000012
100 %		+ 50	1,732,499,997	-3	-0.0000002
115 %	4.37	+ 20	1,732,499,994	-6	-0.0000004
BATT. ENDPOINT	3.40	+ 20	1,732,499,983	-17	-0.0000010

Table 6-19. Frequency Stability Data (Band 4)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 4 Frequency Stability Measurements (Cont'd)

§2.1055 §27.54 RSS-139(6.3)

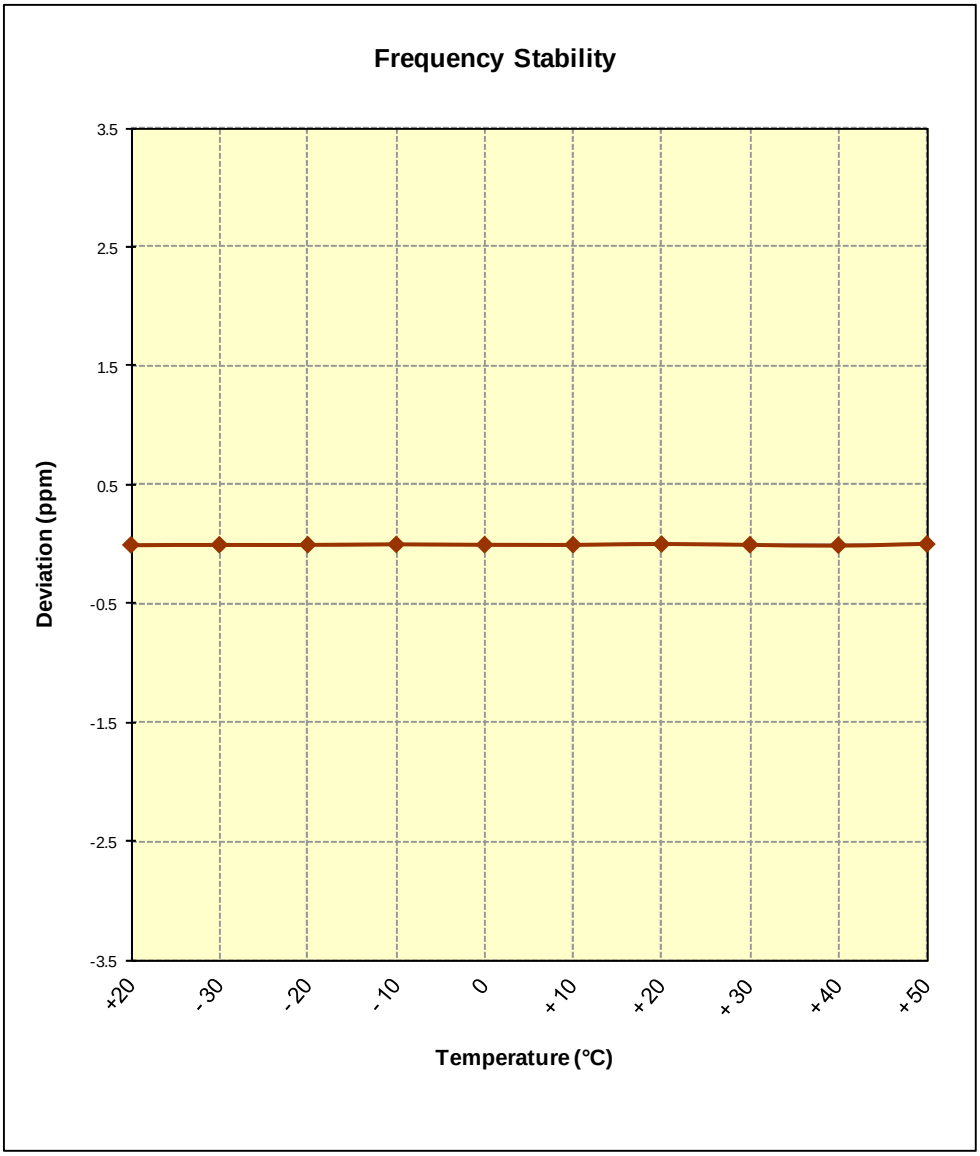

Figure 6-2. Frequency Stability Graph (Band 4)

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6.10 Band 2 Frequency Stability Measurements

§2.1055 §24.235 RSS-133(6.3)

OPERATING FREQUENCY: 1,880,000,000 Hz

CHANNEL: 18900

REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,997	-3	-0.0000002
100 %		- 30	1,879,999,994	-6	-0.0000003
100 %		- 20	1,879,999,990	-10	-0.0000005
100 %		- 10	1,879,999,997	-3	-0.0000002
100 %		0	1,879,999,997	-3	-0.0000002
100 %		+ 10	1,879,999,995	-5	-0.0000003
100 %		+ 20	1,879,999,988	-12	-0.0000006
100 %		+ 30	1,879,999,981	-19	-0.0000010
100 %		+ 40	1,879,999,990	-10	-0.0000005
100 %		+ 50	1,879,999,996	-4	-0.0000002
115 %	4.37	+ 20	1,879,999,984	-16	-0.0000008
BATT. ENDPOINT	3.40	+ 20	1,879,999,986	-14	-0.0000007

Table 6-20. Frequency Stability Data (Band 2)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 2 Frequency Stability Measurements (Cont'd)

§2.1055 §24.235 RSS-133(6.3)

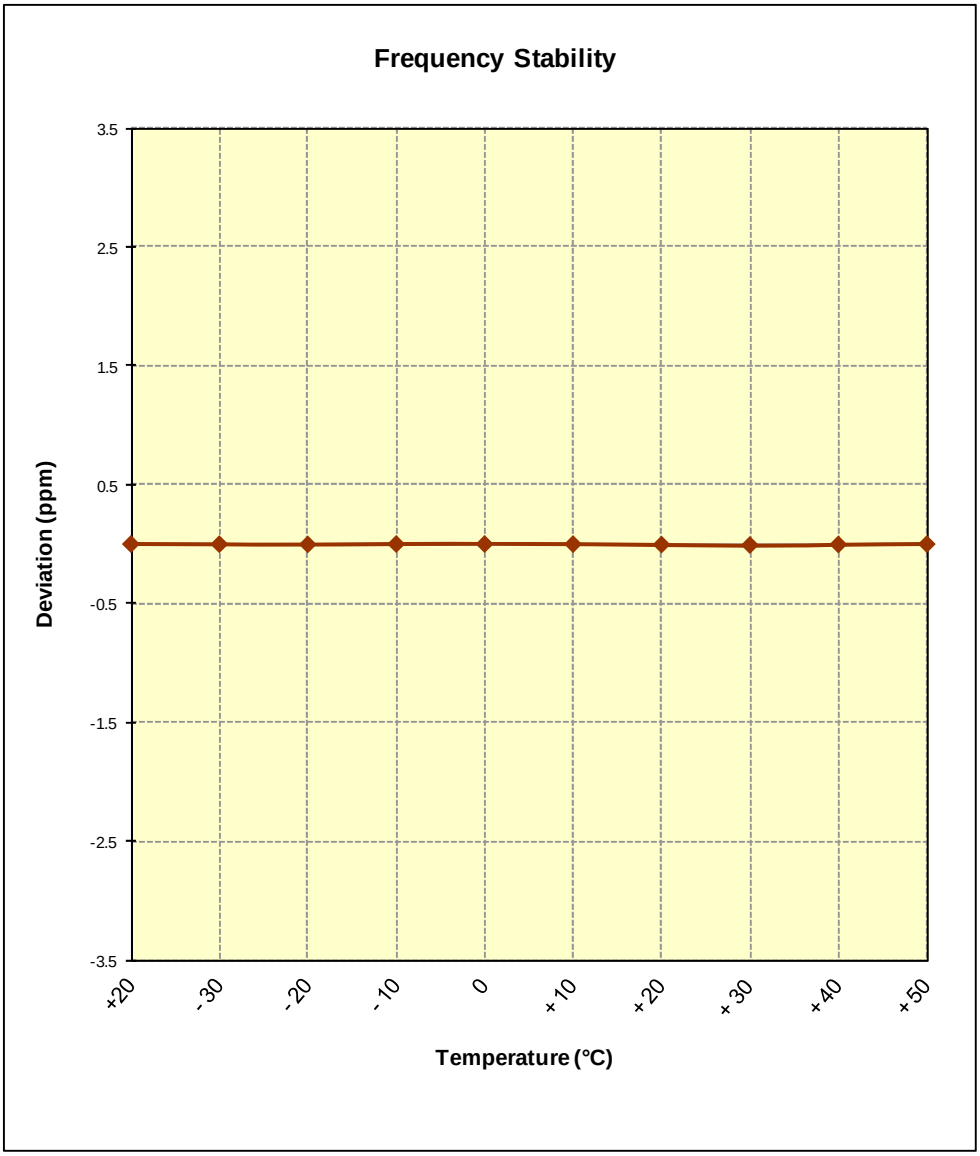

Figure 6-3. Frequency Stability Graph (Band 2)

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6.11 Band 25 Frequency Stability Measurements

§2.1055 §24.235 RSS-133(6.3)

OPERATING FREQUENCY: 1,882,500,000 Hz

CHANNEL: 26365

REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,882,499,991	-9	-0.0000005
100 %		- 30	1,882,499,997	-3	-0.0000002
100 %		- 20	1,882,499,997	-3	-0.0000001
100 %		- 10	1,882,499,997	-3	-0.0000002
100 %		0	1,882,499,992	-8	-0.0000004
100 %		+ 10	1,882,499,986	-14	-0.0000008
100 %		+ 20	1,882,499,984	-16	-0.0000009
100 %		+ 30	1,882,499,990	-10	-0.0000005
100 %		+ 40	1,882,499,986	-14	-0.0000007
100 %		+ 50	1,882,499,984	-16	-0.0000008
115 %	4.37	+ 20	1,882,499,994	-6	-0.0000003
BATT. ENDPOINT	3.40	+ 20	1,882,499,997	-3	-0.0000002

Table 6-21. Frequency Stability Data (Band 25)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 25 Frequency Stability Measurements (Cont'd)

§2.1055 §24.235 RSS-133(6.3)

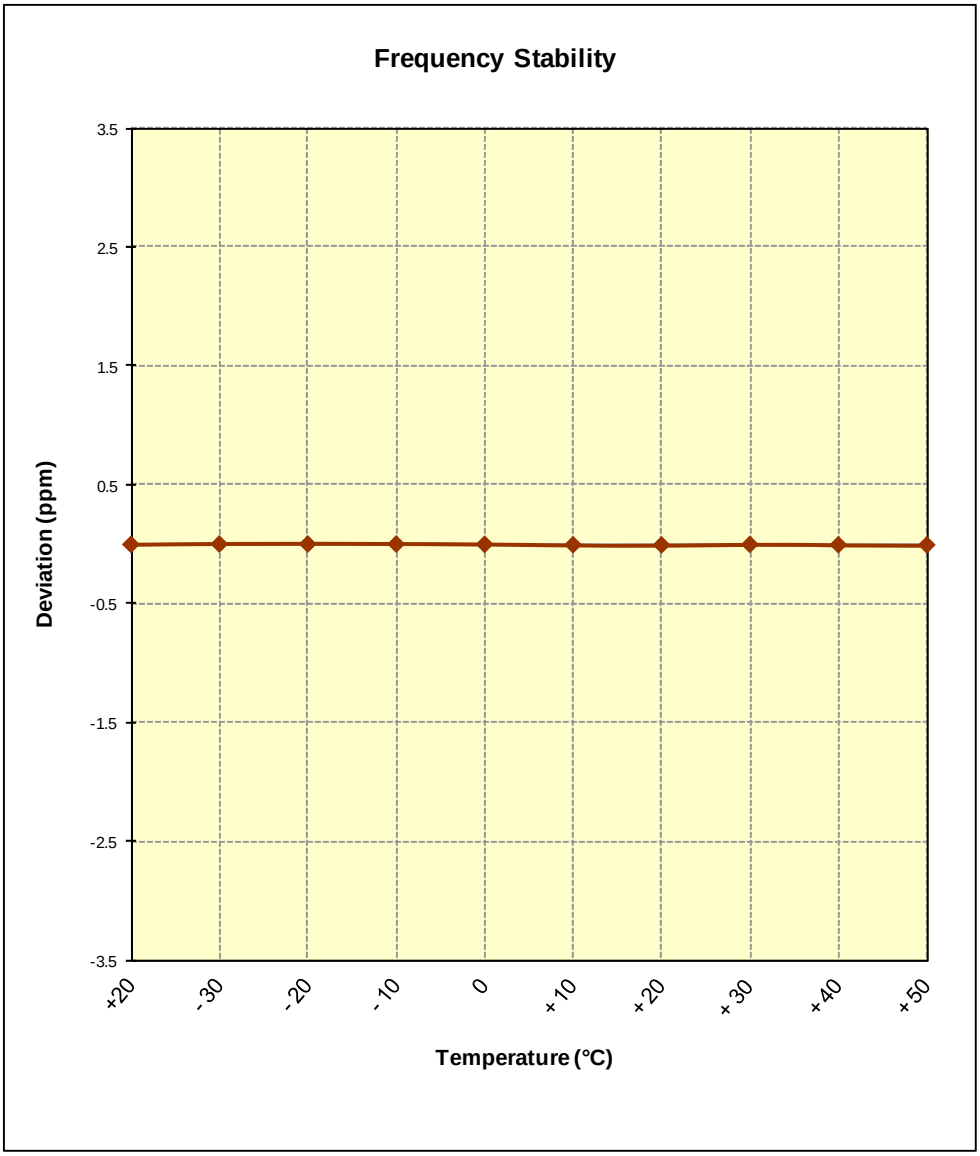

Figure 6-4. Frequency Stability Graph (Band 25)

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7.0 BAND 12 PLOTS OF EMISSIONS

Note: All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.

Plot 7-1. Lower Band Edge Plot (5.0MHz QPSK – RB Size 25)

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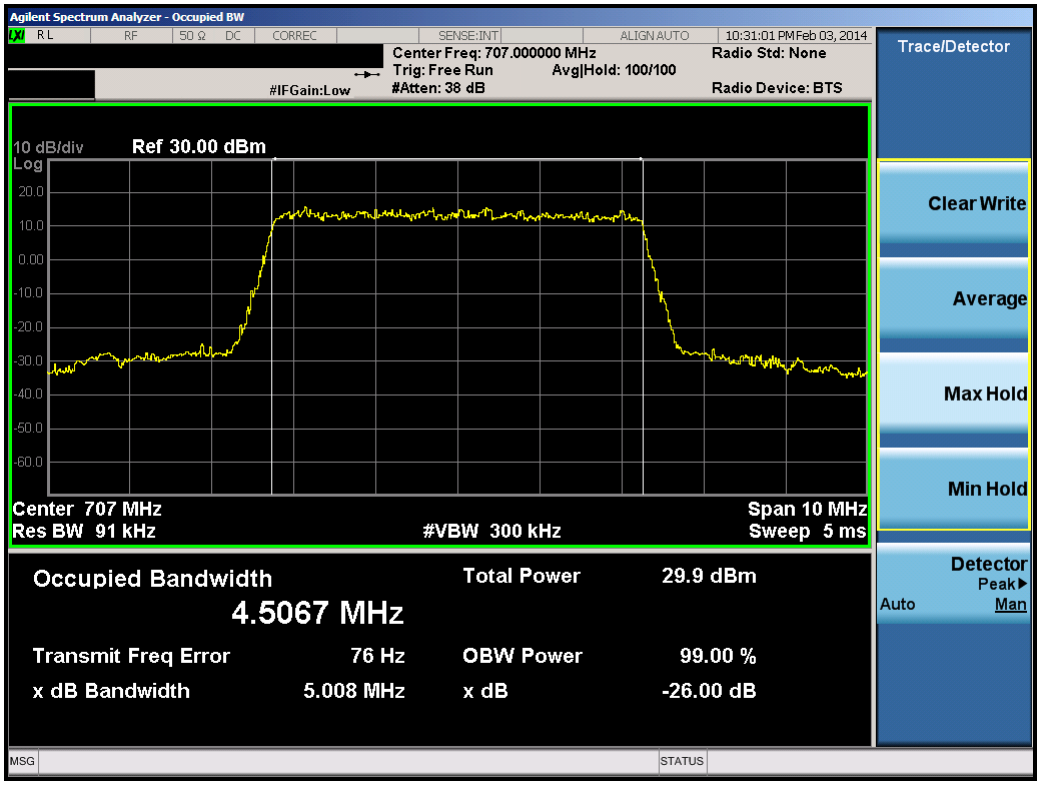
Plot 7-2. Occupied Bandwidth Plot (5.0MHz QPSK – RB Size 25)



Plot 7-3. Occupied Bandwidth Plot (5.0MHz 16-QAM – RB Size 25)

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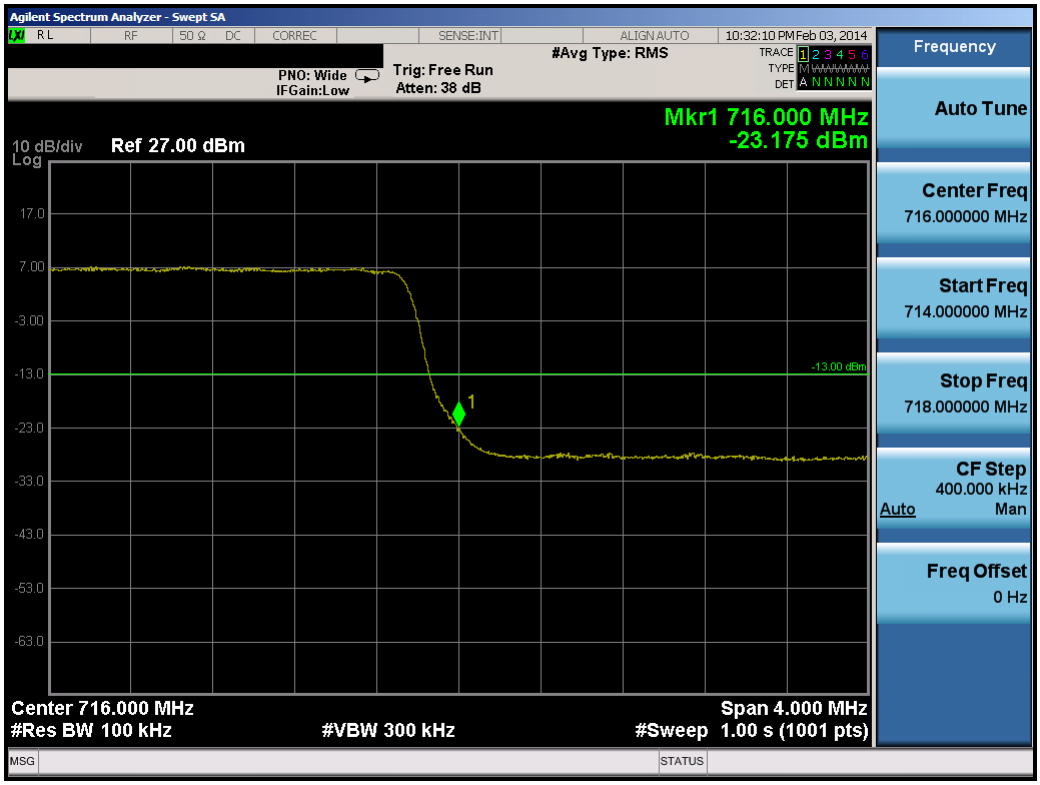
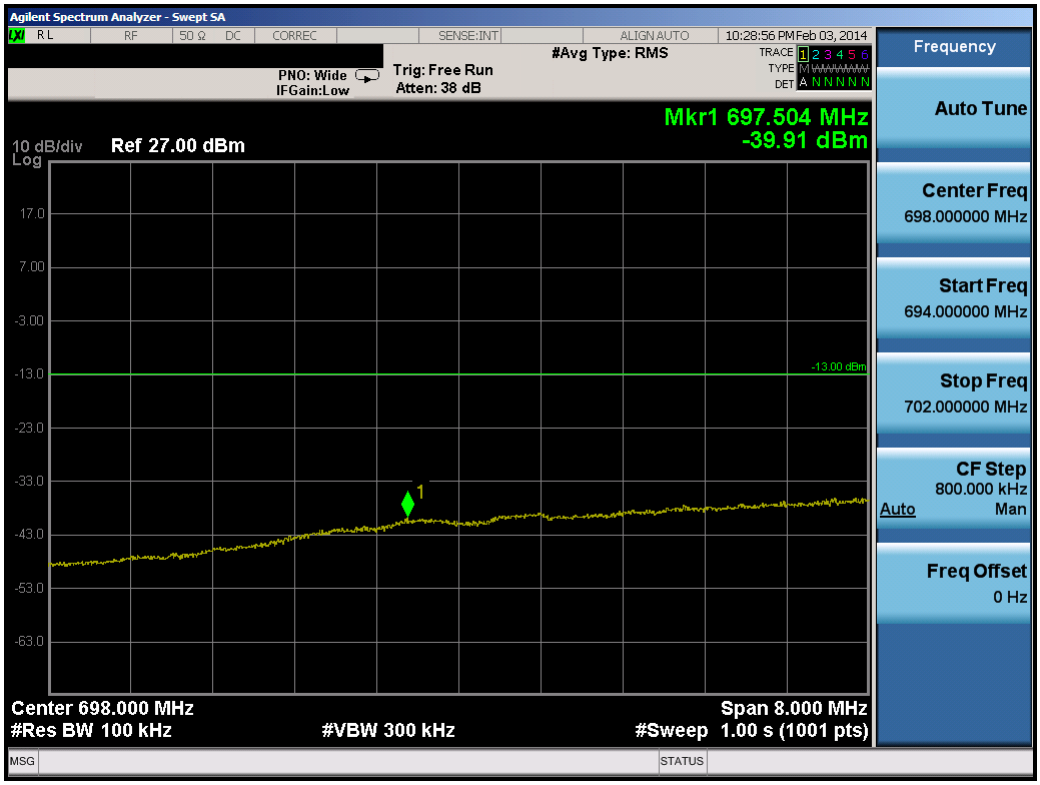


Plot 7-4. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)



Plot 7-5. Lower Band Edge Plot (10.0MHz QPSK – RB Size 50)

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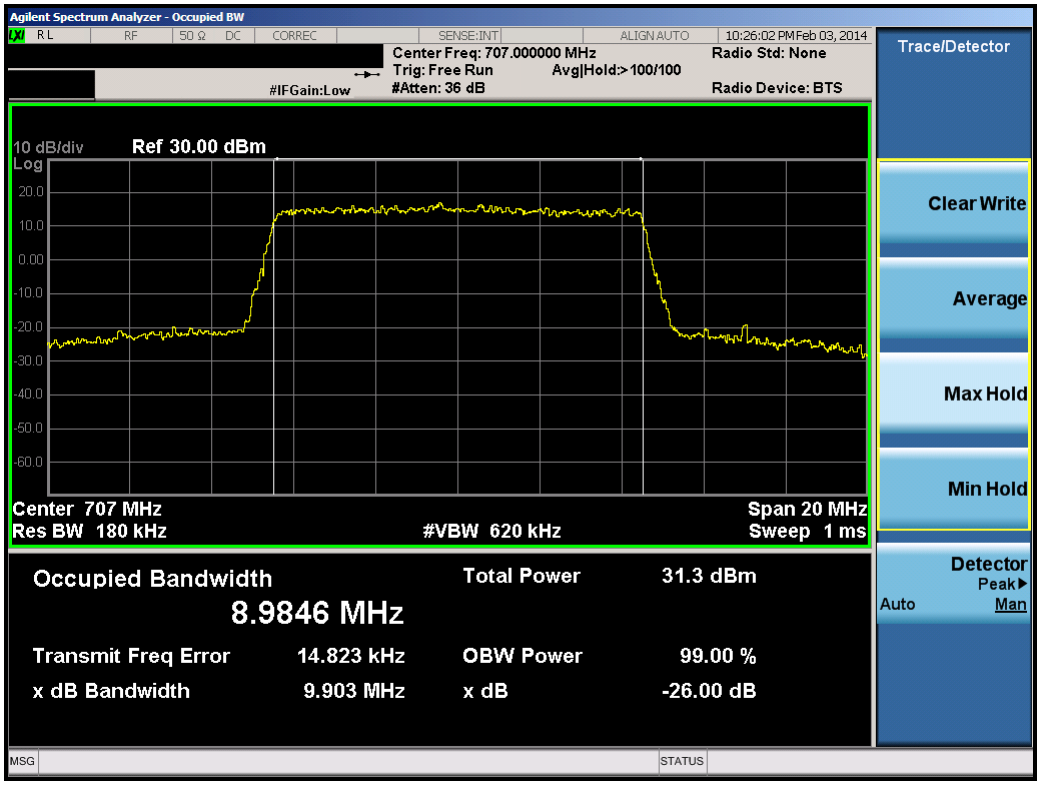
Plot 7-6. Lower Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 7-7. Occupied Bandwidth Plot (10.0MHz QPSK – RB Size 50)

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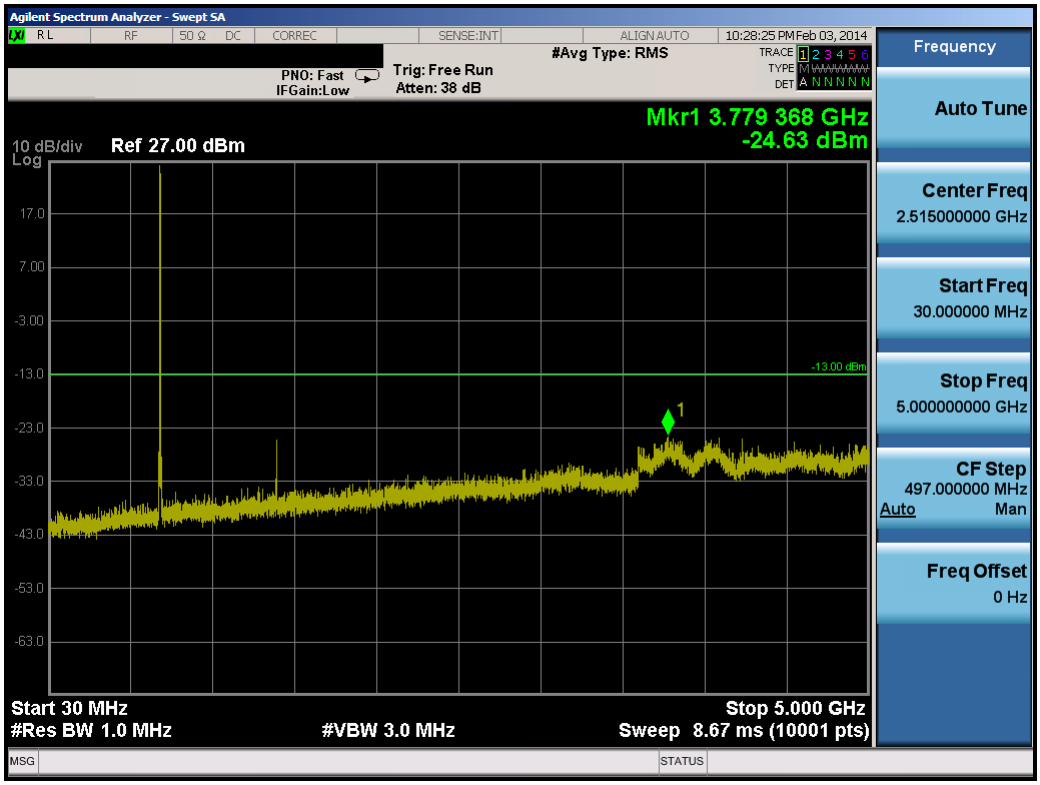
Plot 7-8. Occupied Bandwidth Plot (10.0MHz 16-QAM – RB Size 50)



Plot 7-9. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

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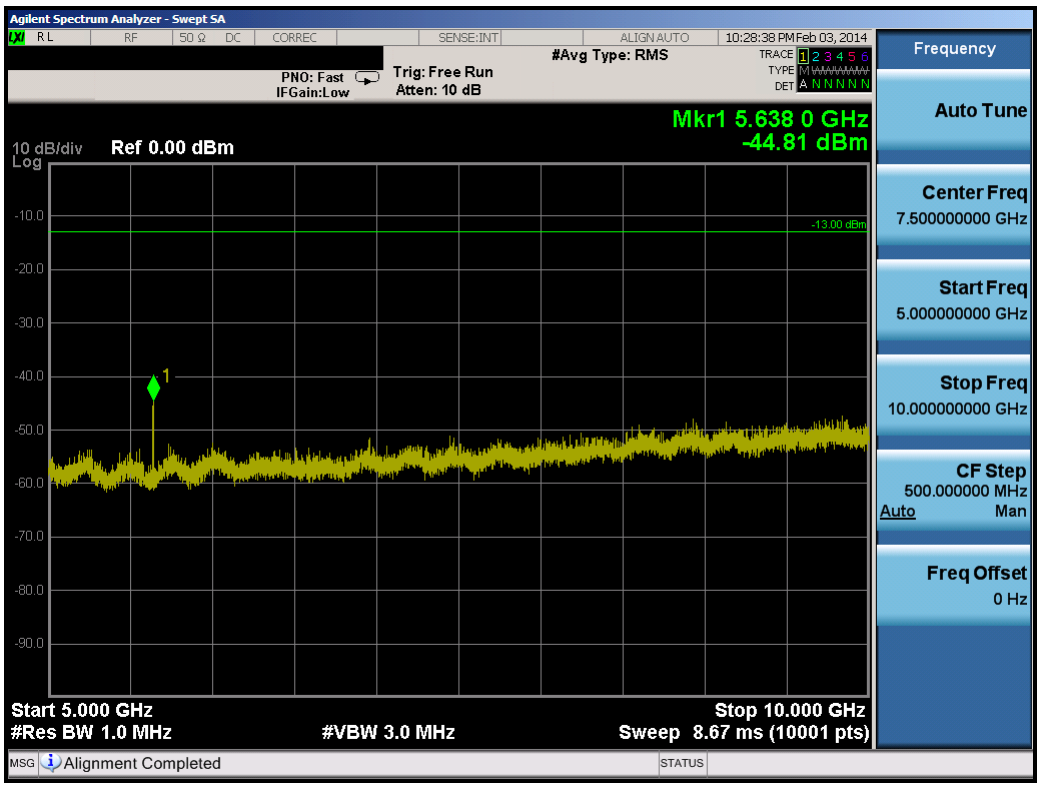
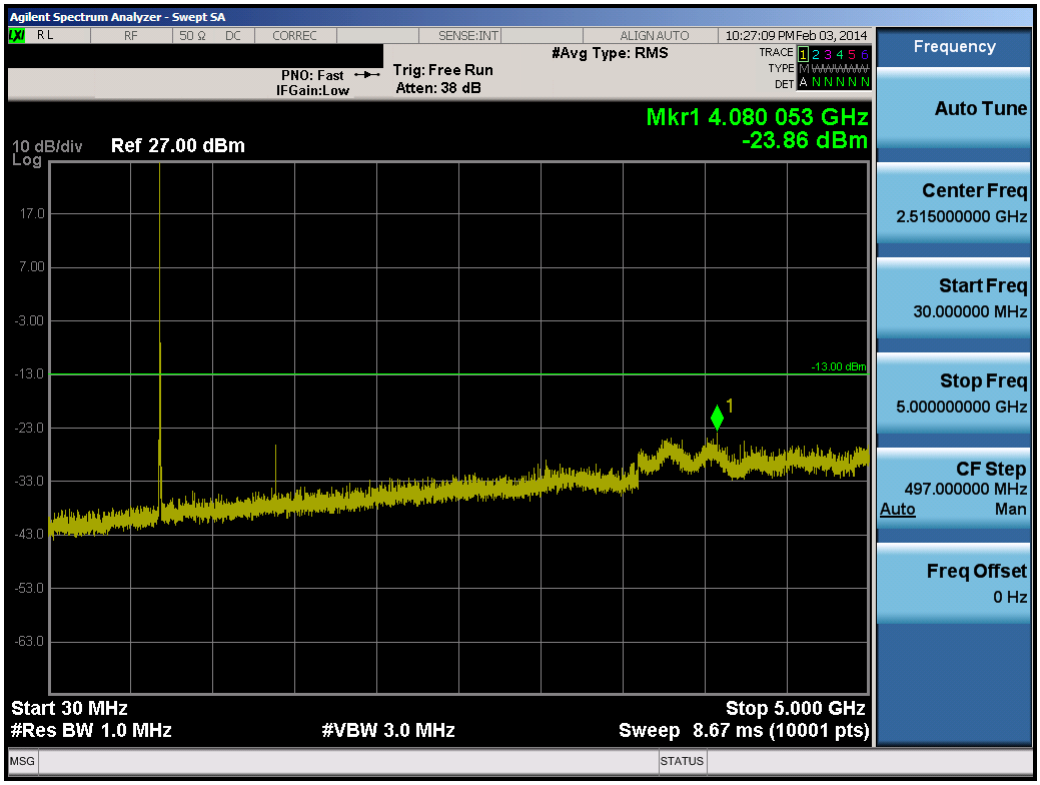


Plot 7-10. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 7-11. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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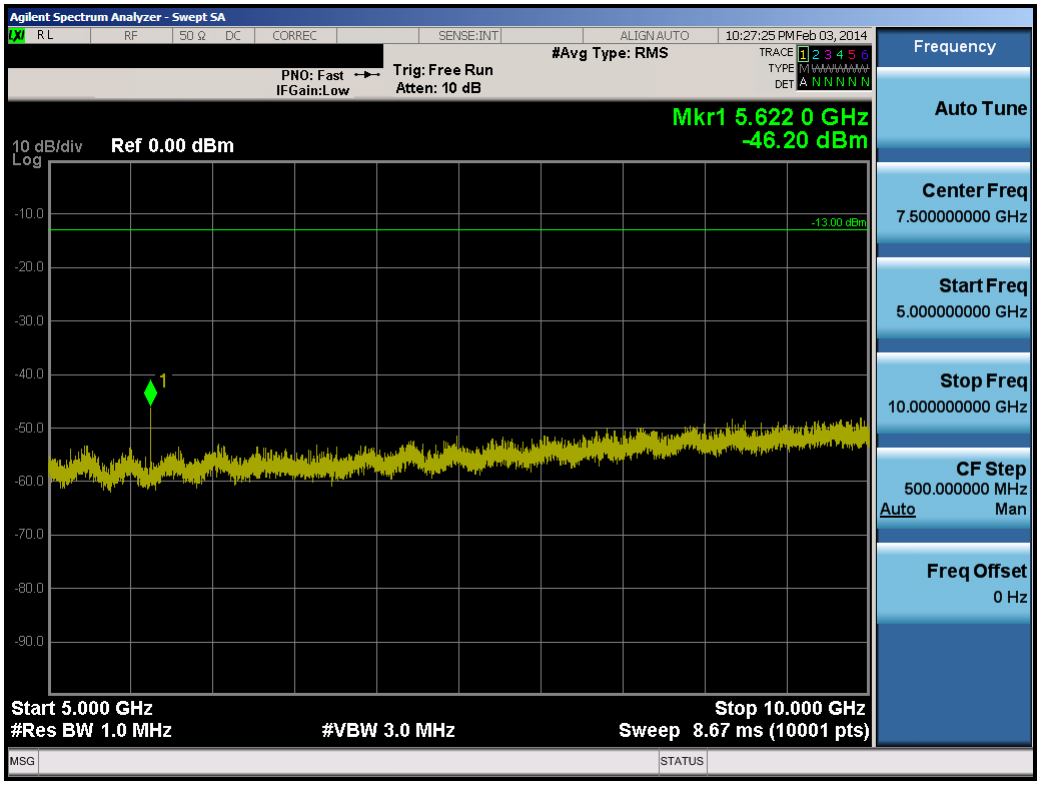
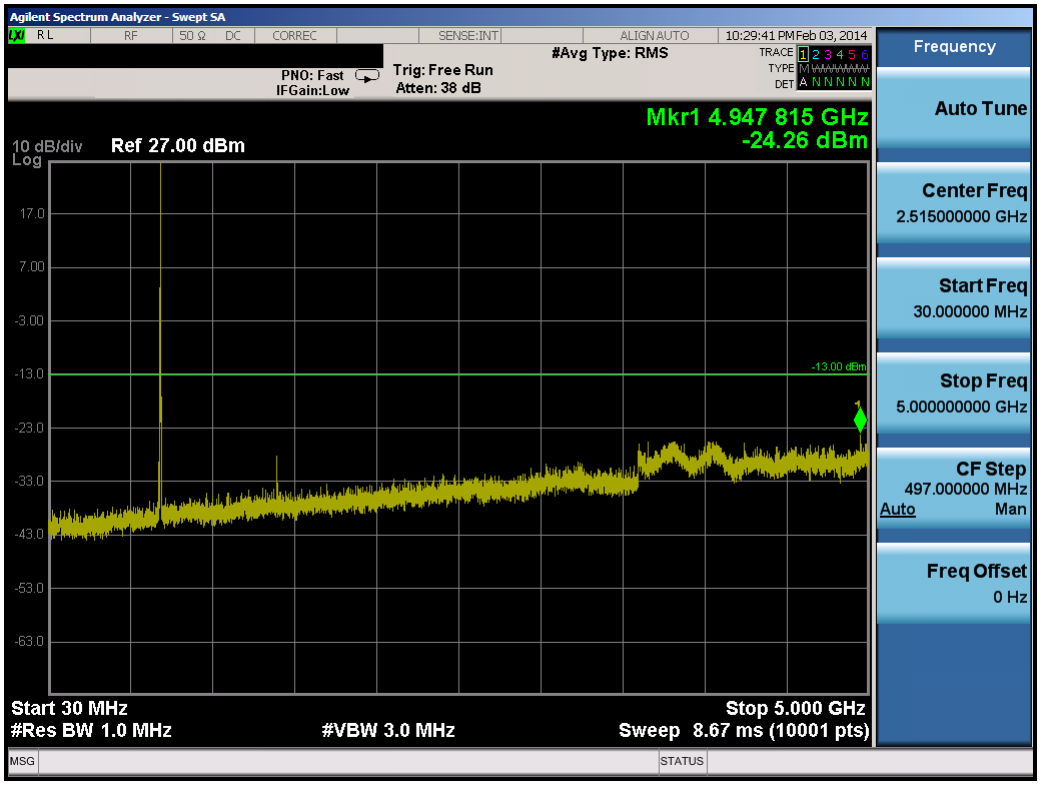


Plot 7-12. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-13. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

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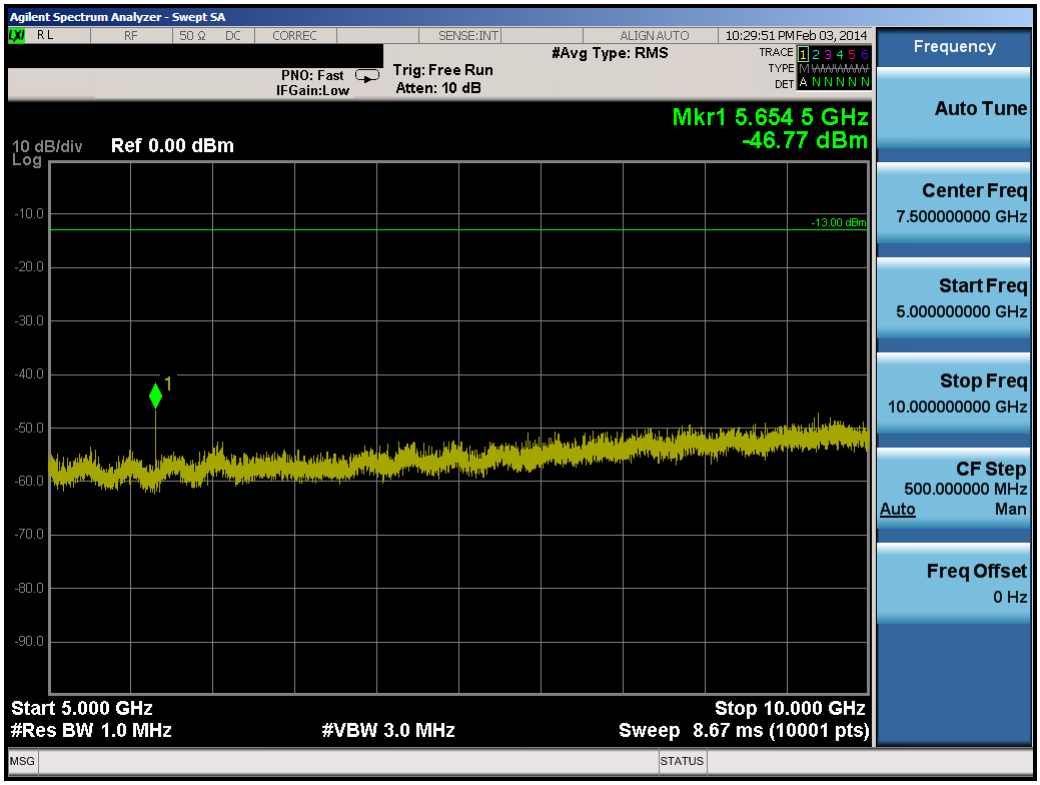
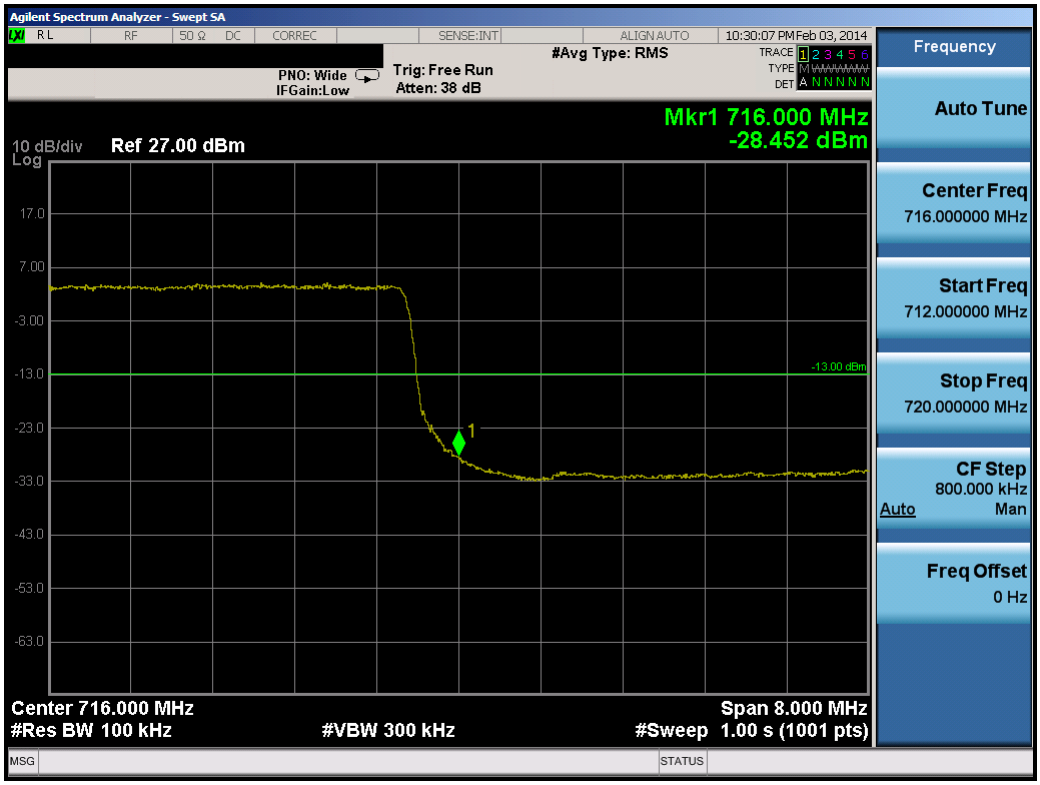


Plot 7-14. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-15. Upper Band Edge Plot (10.0MHz QPSK – RB Size 50)

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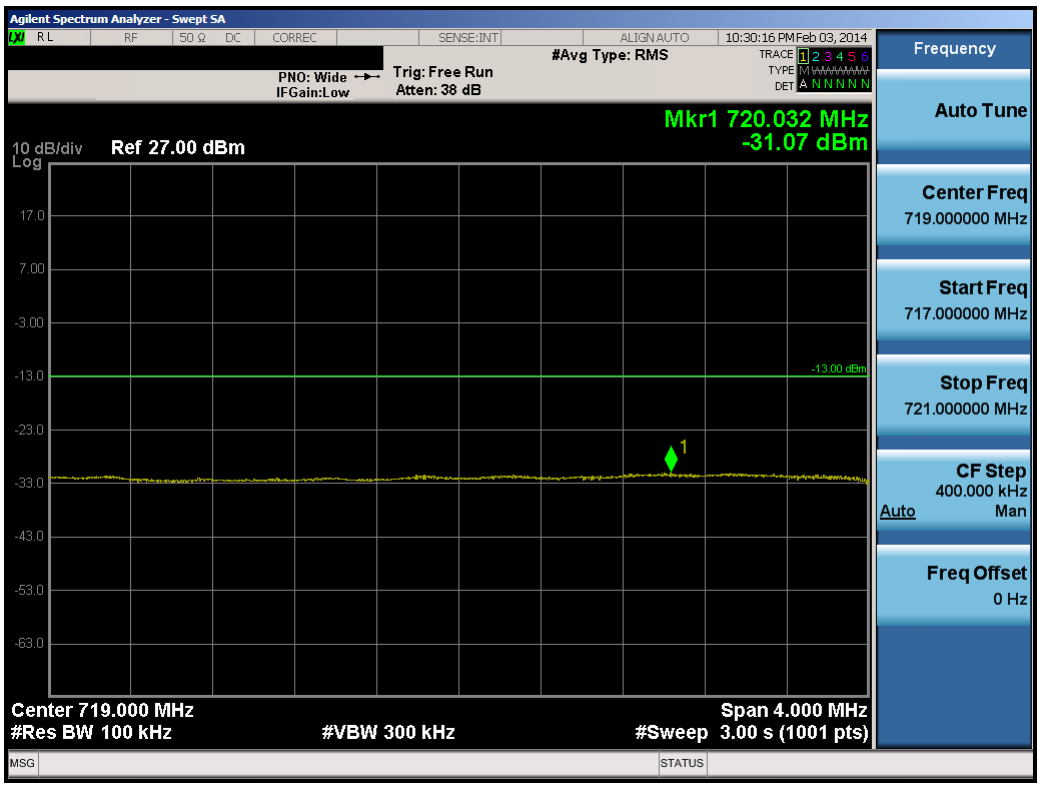

Plot 7-16. Upper Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)

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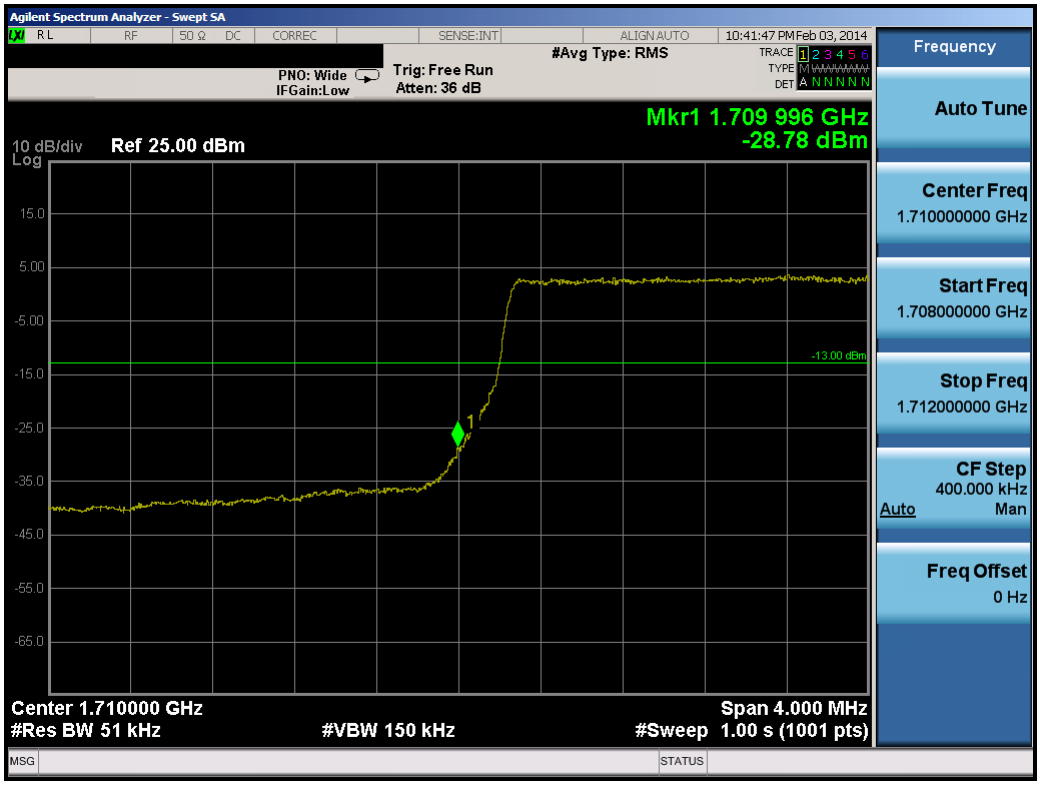
8.0 BAND 4 PLOTS OF EMISSIONS

Note: All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.



Plot 8-1. Lower Band Edge Plot (5.0MHz QPSK – RB Size 25)

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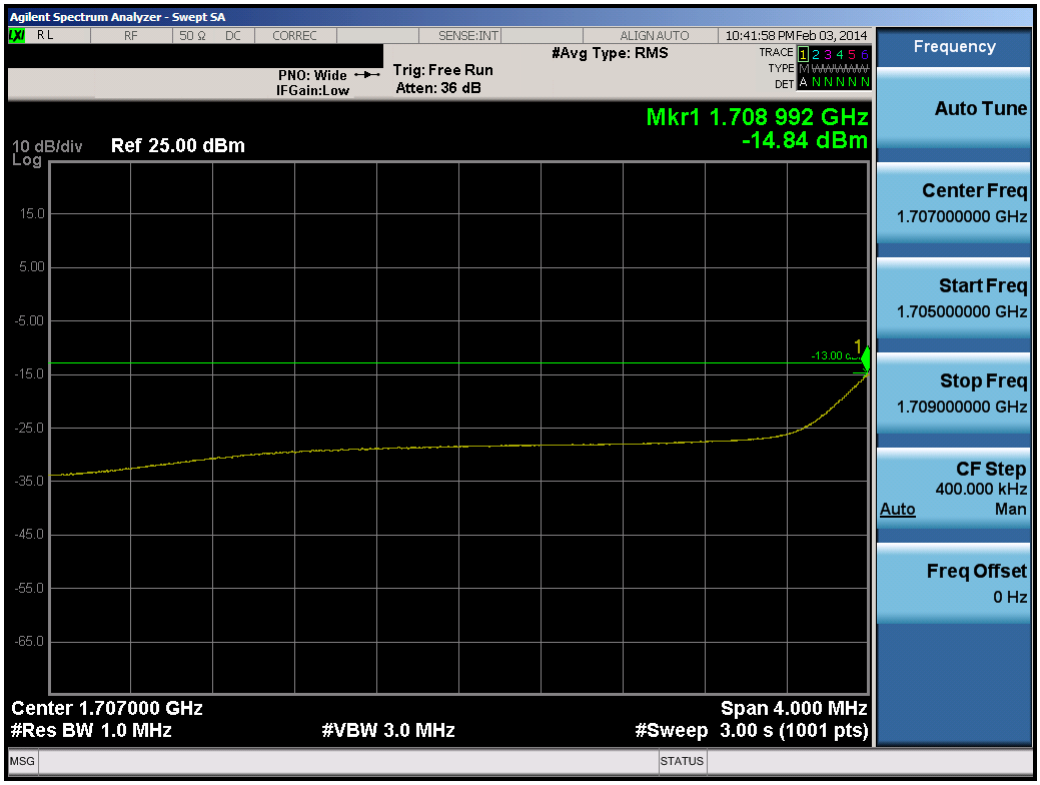

Plot 8-2. Lower Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

Plot 8-3. Occupied Bandwidth Plot (5.0MHz QPSK – RB Size 25)

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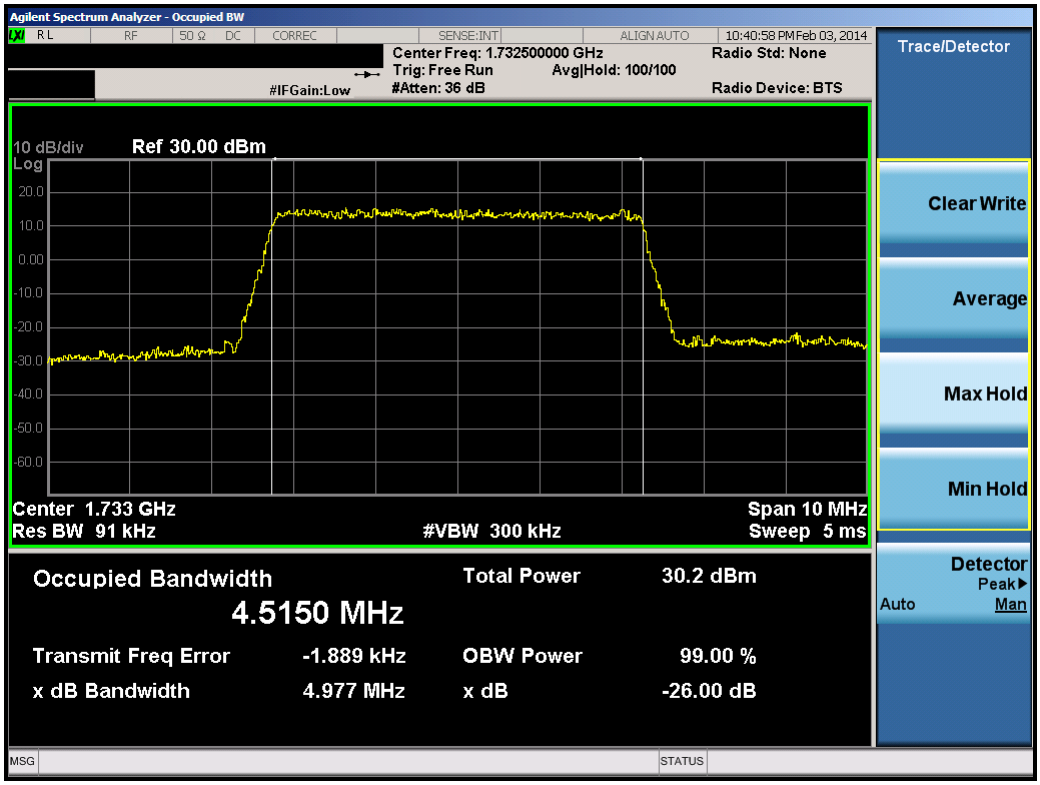
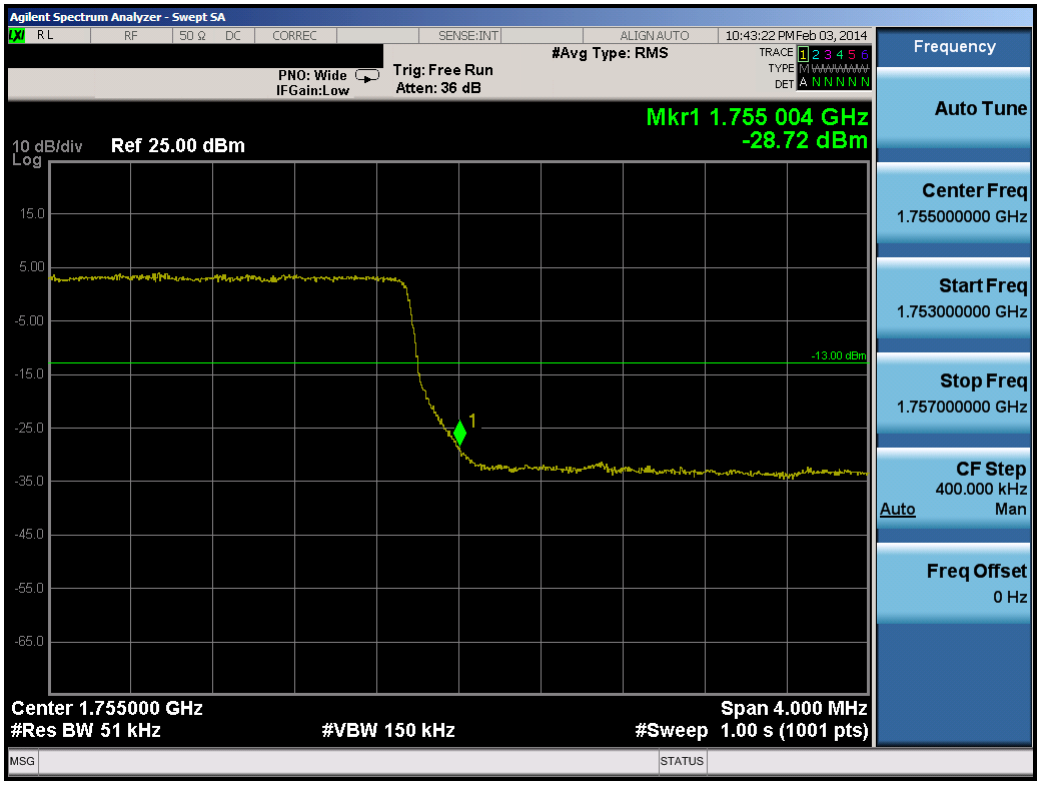


Plot 8-4. Occupied Bandwidth Plot (5.0MHz 16-QAM – RB Size 25)



Plot 8-5. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)

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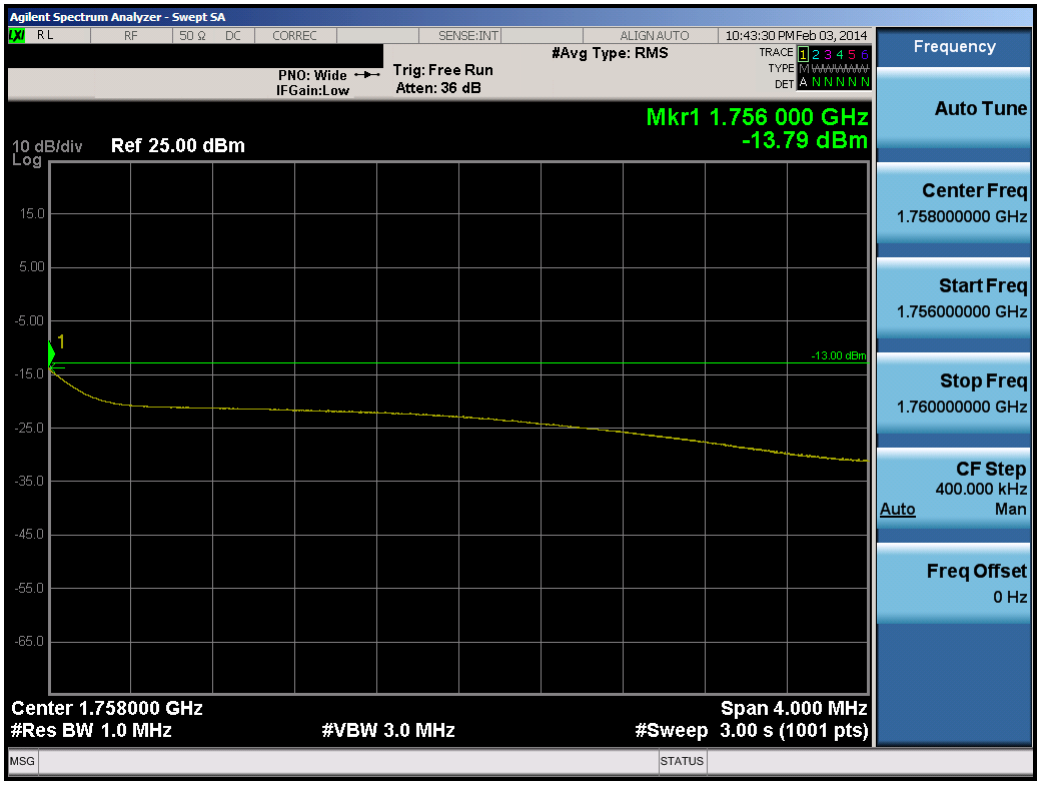
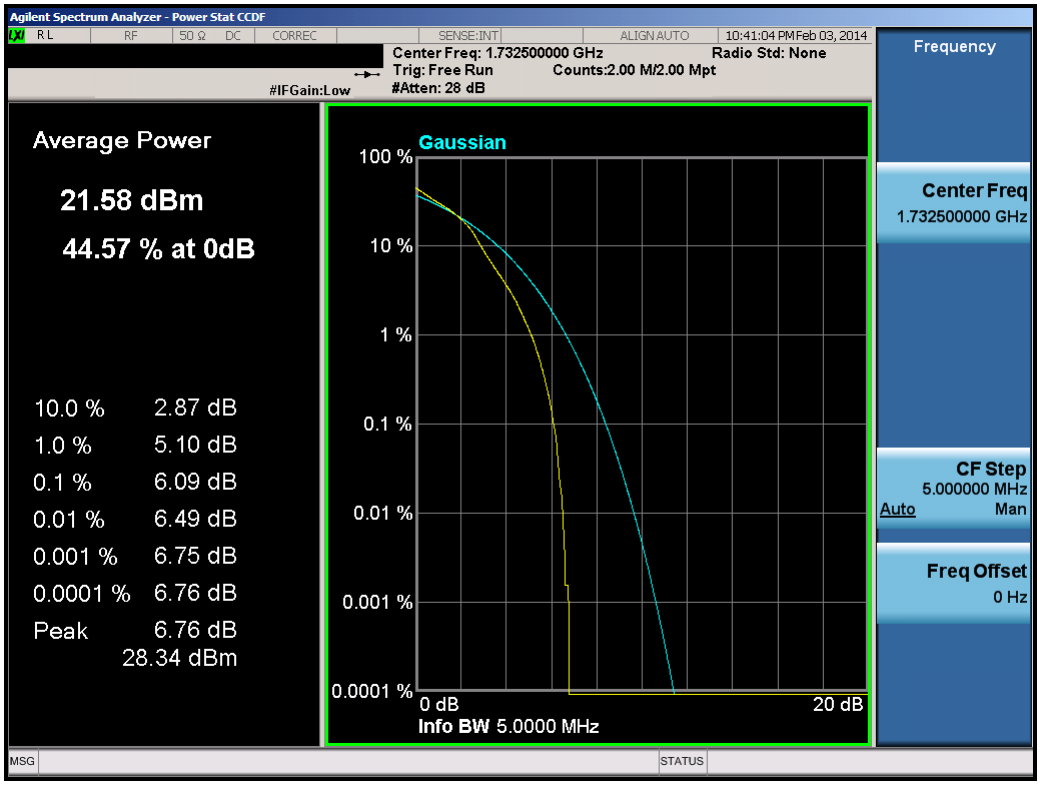


Plot 8-6. Upper Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)



Plot 8-7. PAR Plot (5.0MHz QPSK – RB Size 25)

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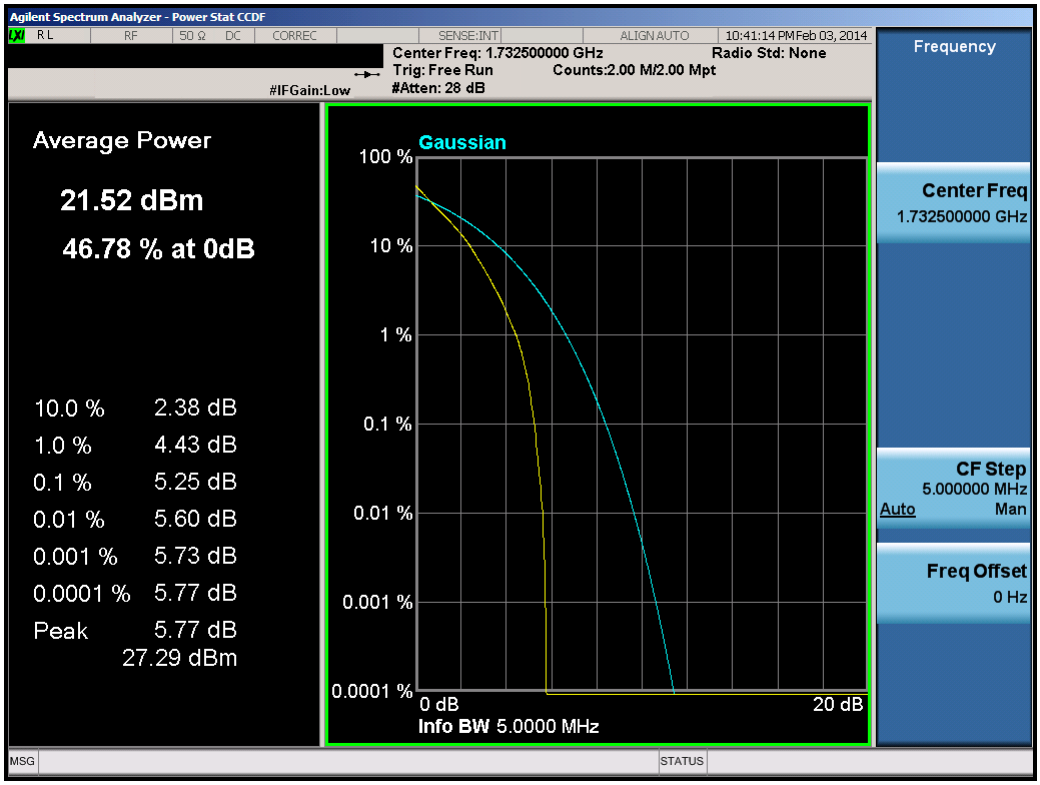
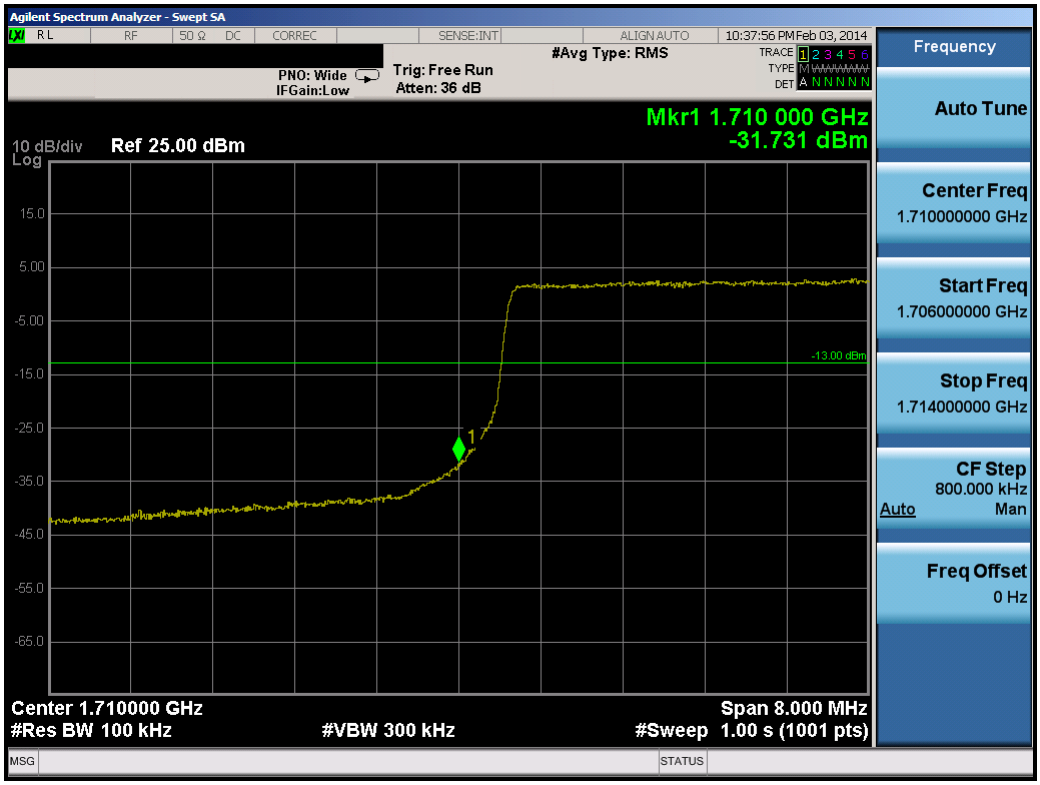


Plot 8-8. PAR Plot (5.0MHz 16-QAM – RB Size 25)



Plot 8-9. Lower Band Edge Plot (10.0MHz QPSK – RB Size 50)

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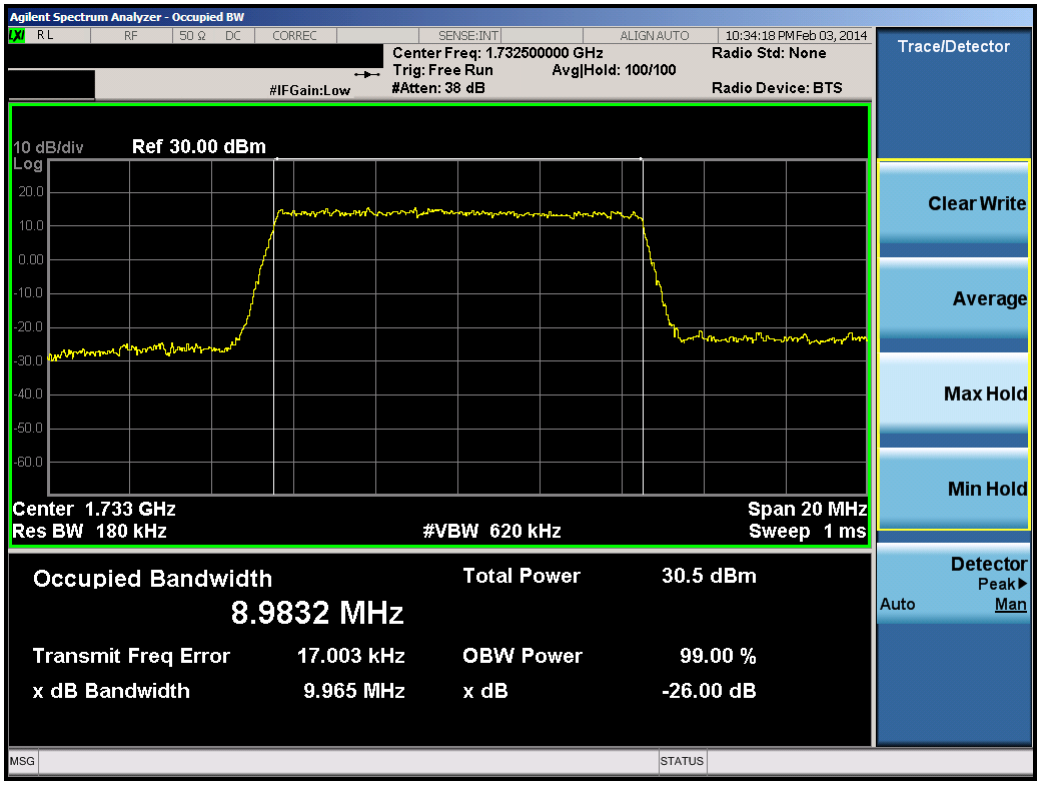
Plot 8-10. Lower Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 8-11. Occupied Bandwidth Plot (10.0MHz QPSK – RB Size 50)

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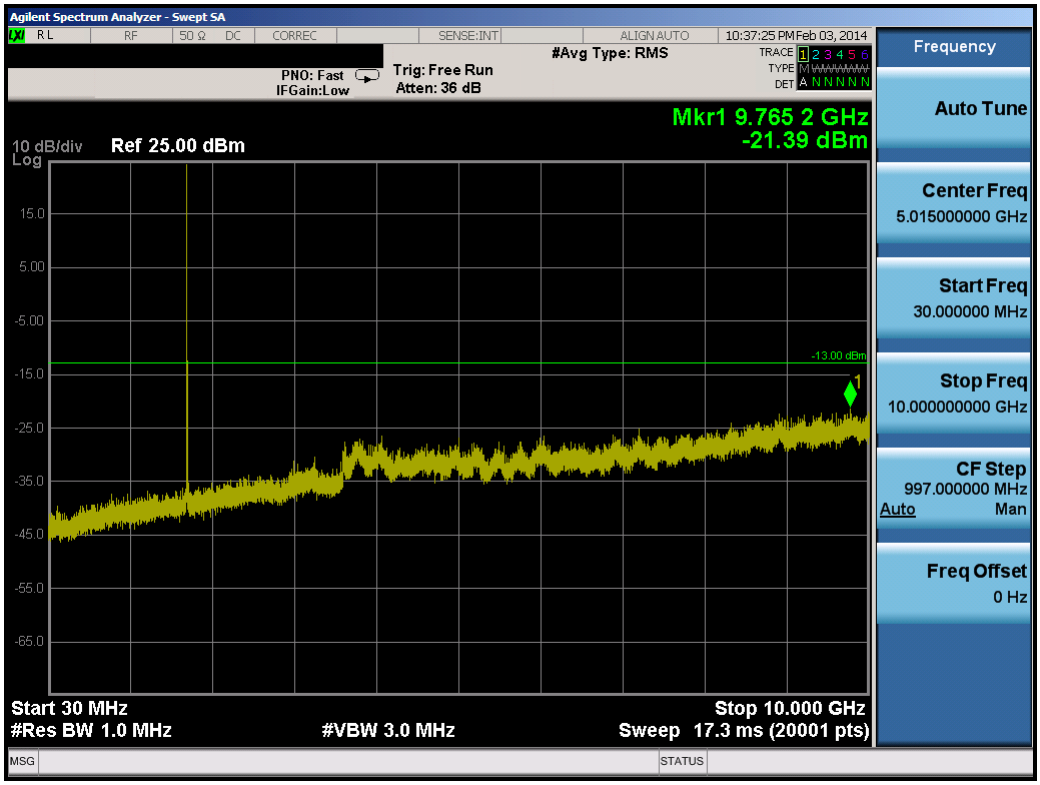
Plot 8-12. Occupied Bandwidth Plot (10.0MHz 16-QAM – RB Size 50)



Plot 8-13. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

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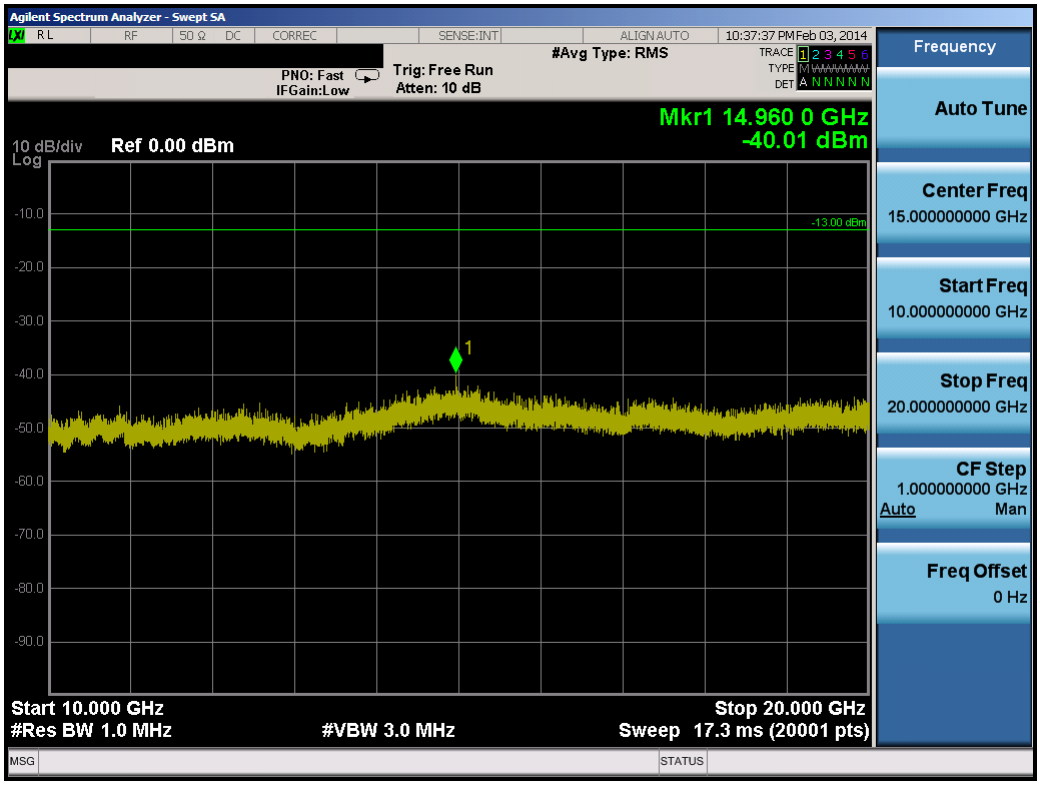
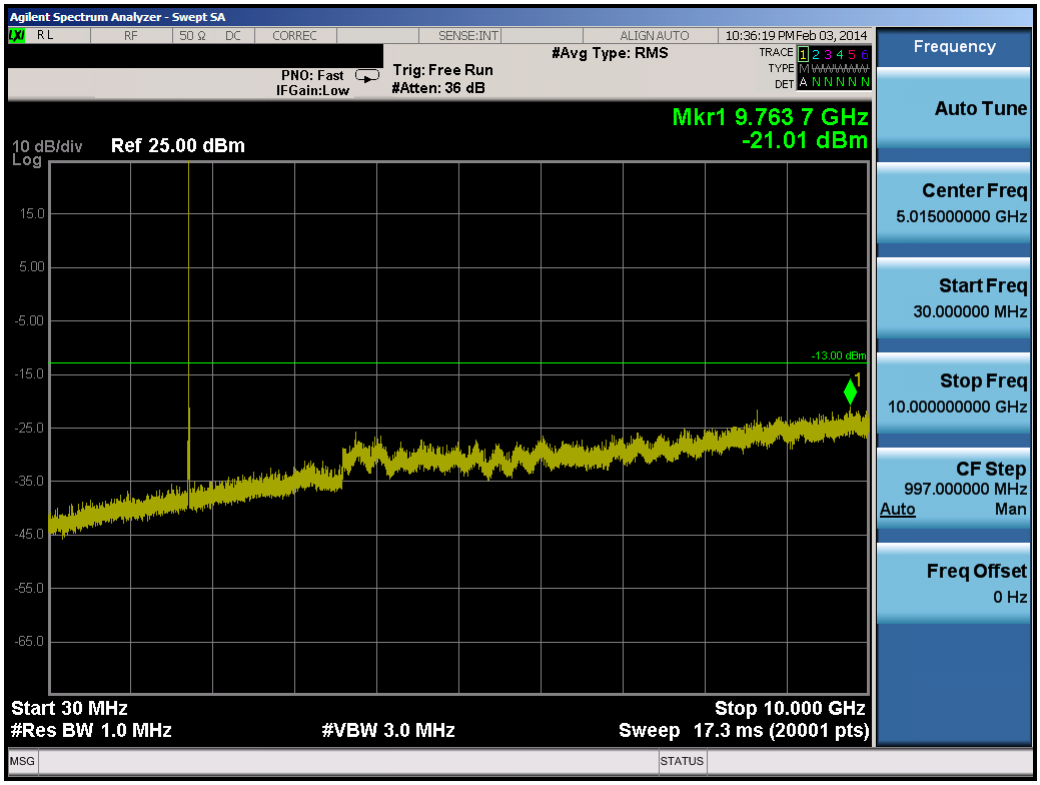


Plot 8-14. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 8-15. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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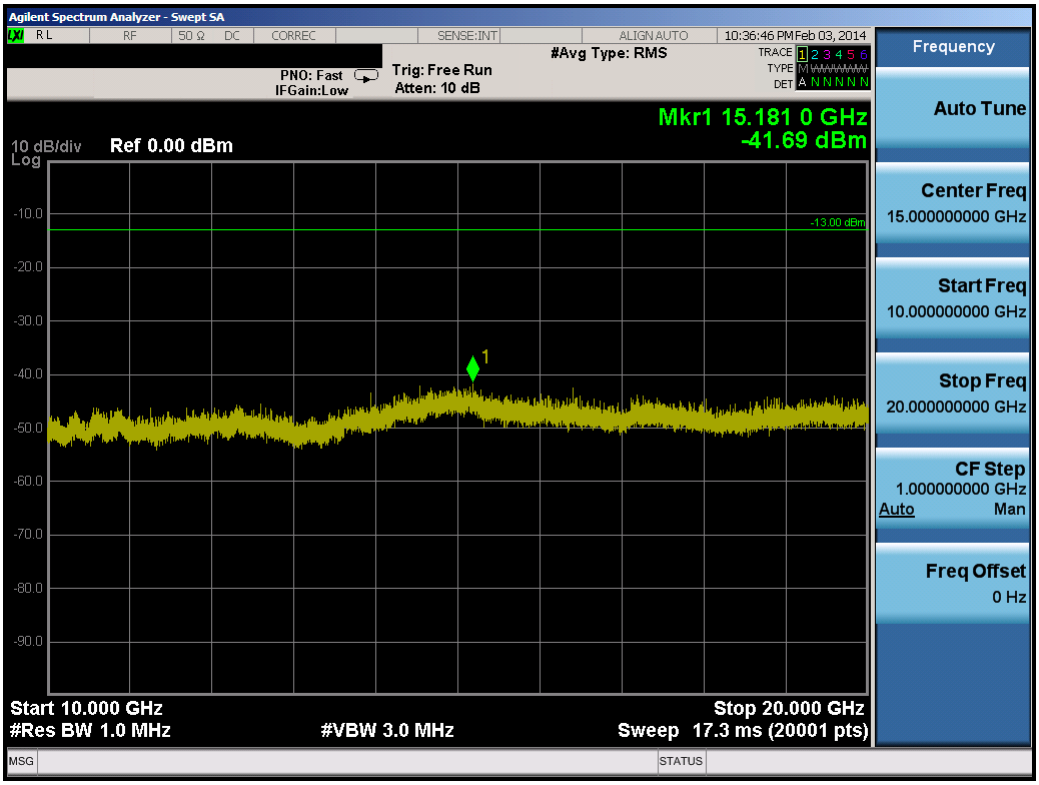
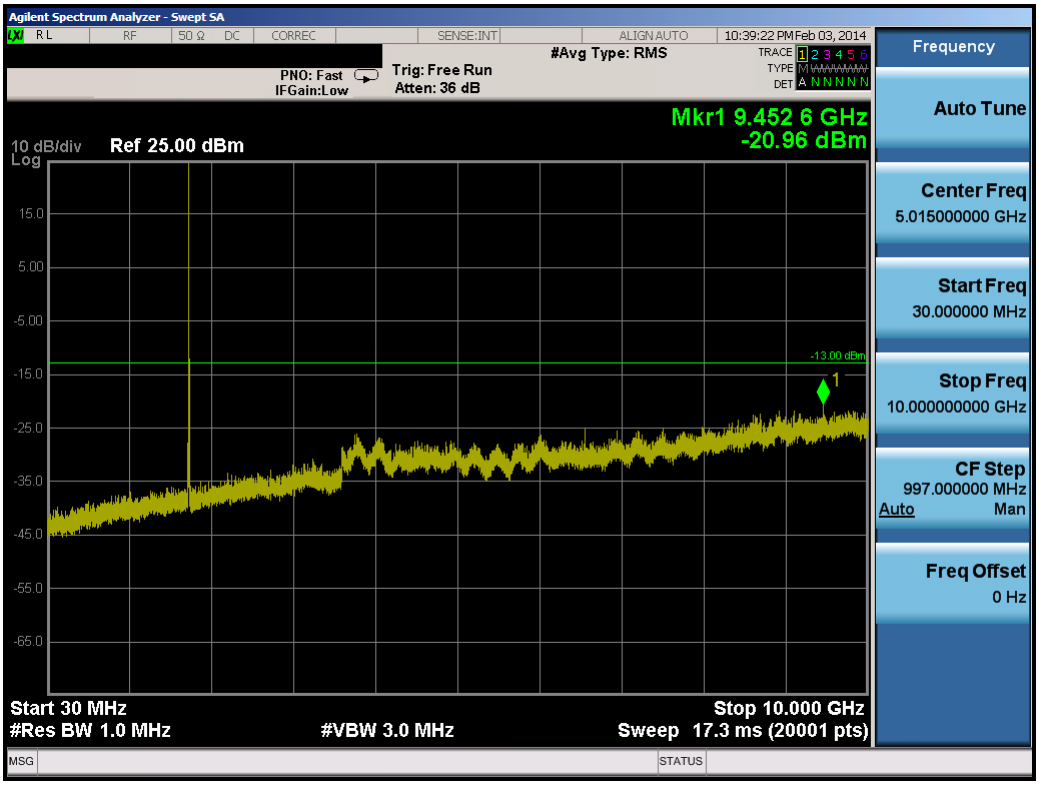
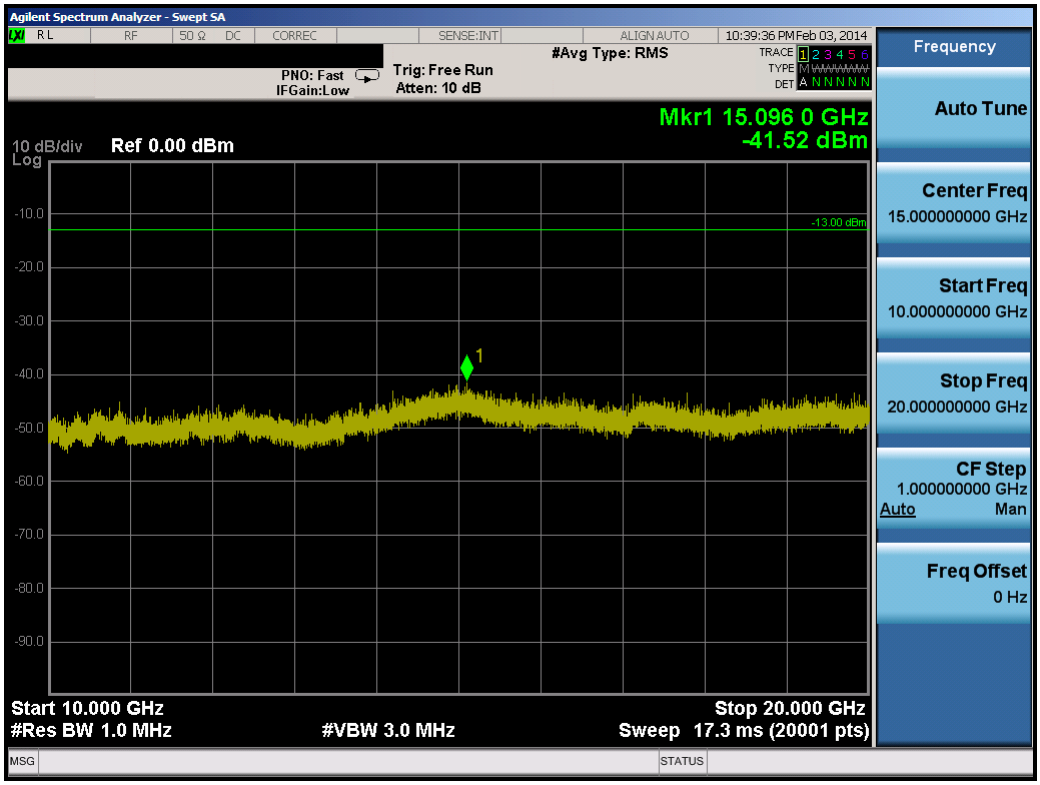


Plot 8-16. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

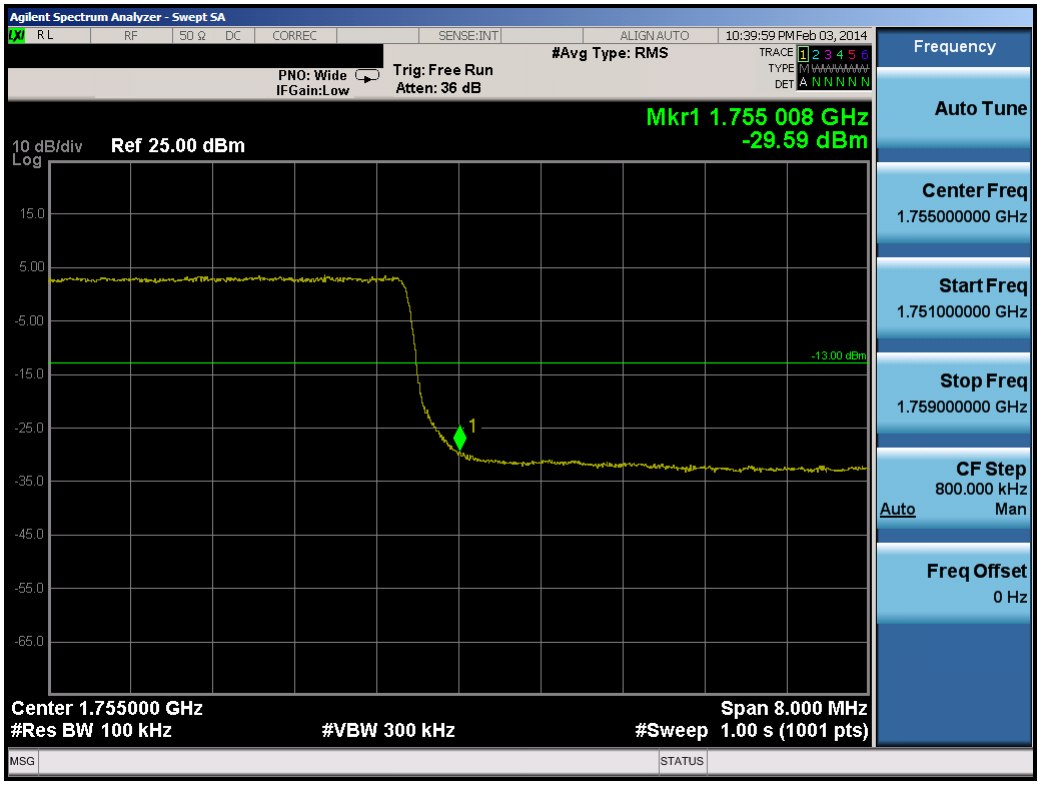


Plot 8-17. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

© 2014 PCTEST Engineering Laboratory, Inc.



Plot 8-18. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 8-19. Upper Band Edge Plot (10.0MHz QPSK – RB Size 50)

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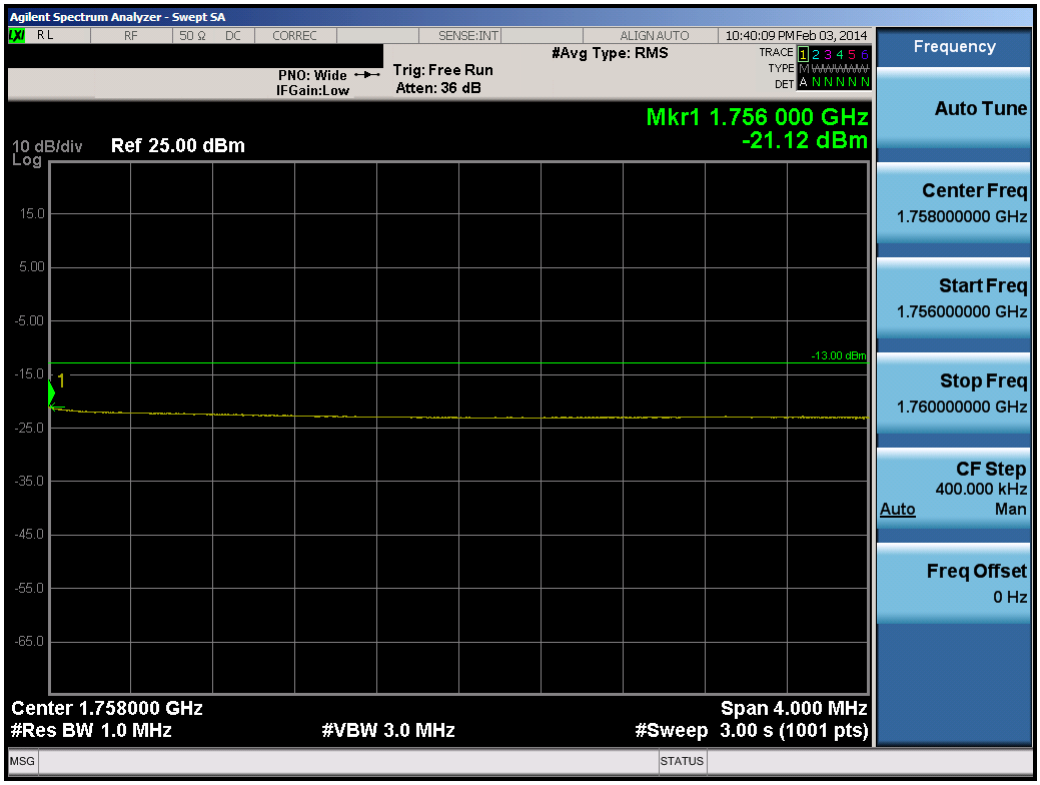
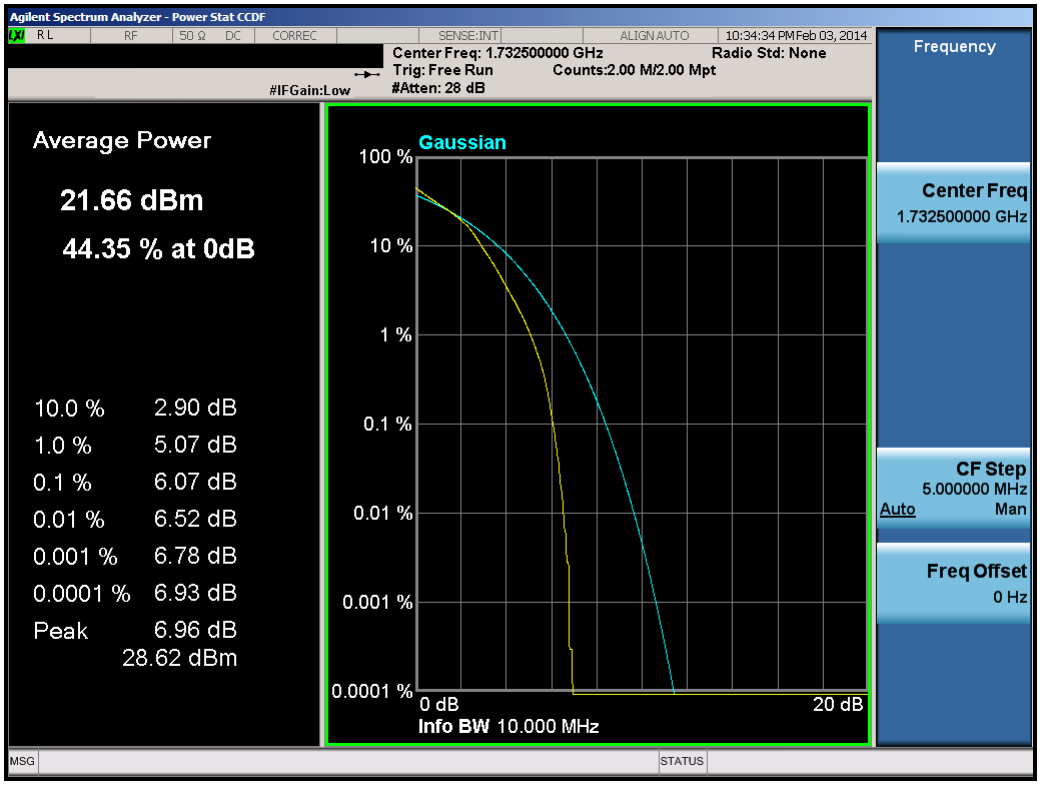


Plot 8-20. Upper Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 8-21. PAR Plot (10.0MHz QPSK – RB Size 50)

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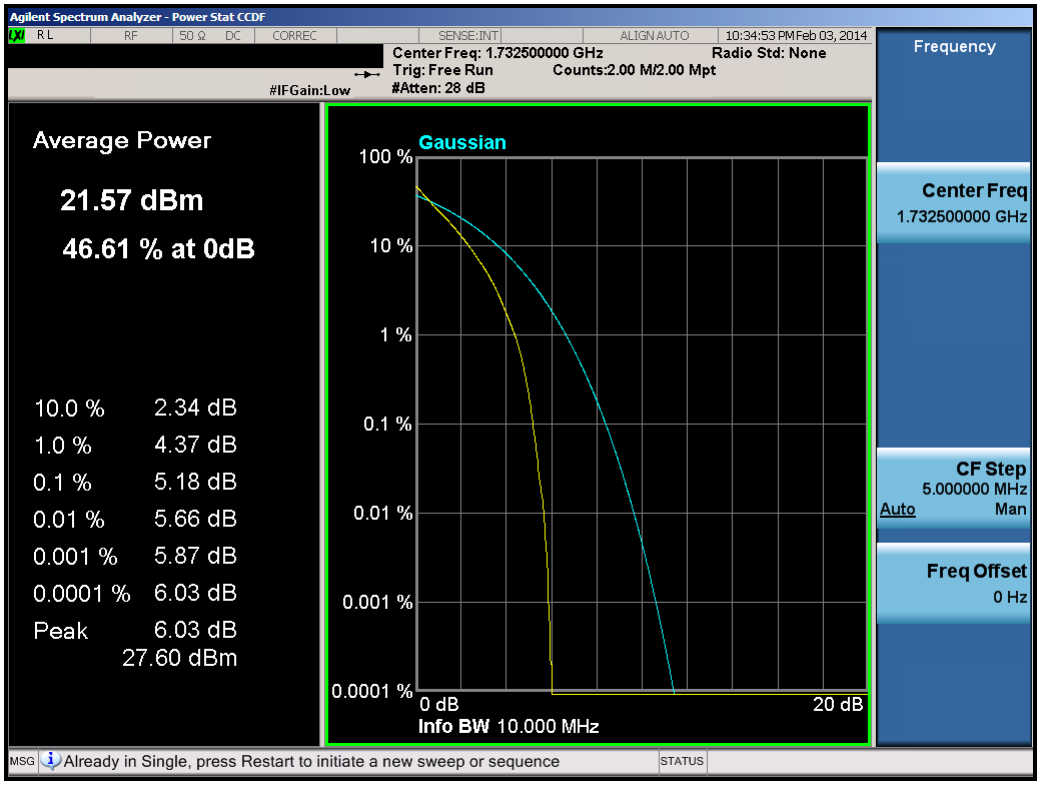

Plot 8-22. PAR Plot (10.0MHz 16-QAM – RB Size 50)

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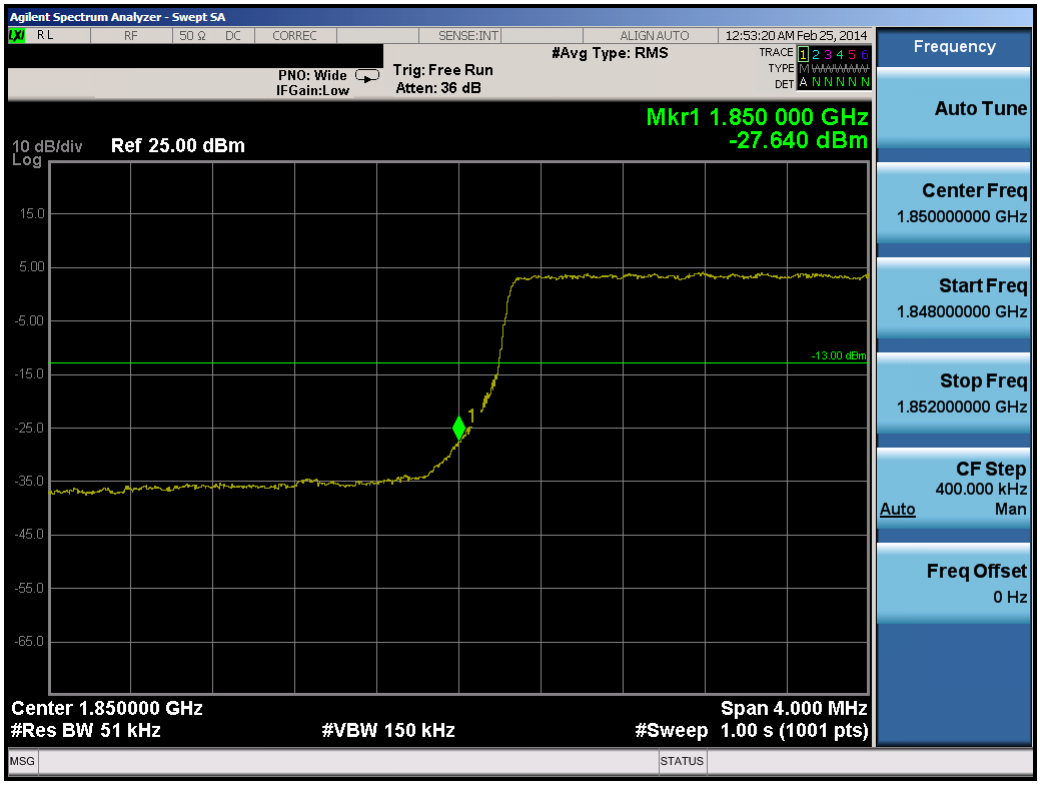
9.0 BAND 2 PLOTS OF EMISSIONS

Note: All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.



Plot 9-1. Lower Band Edge Plot (5.0MHz QPSK – RB Size 25)

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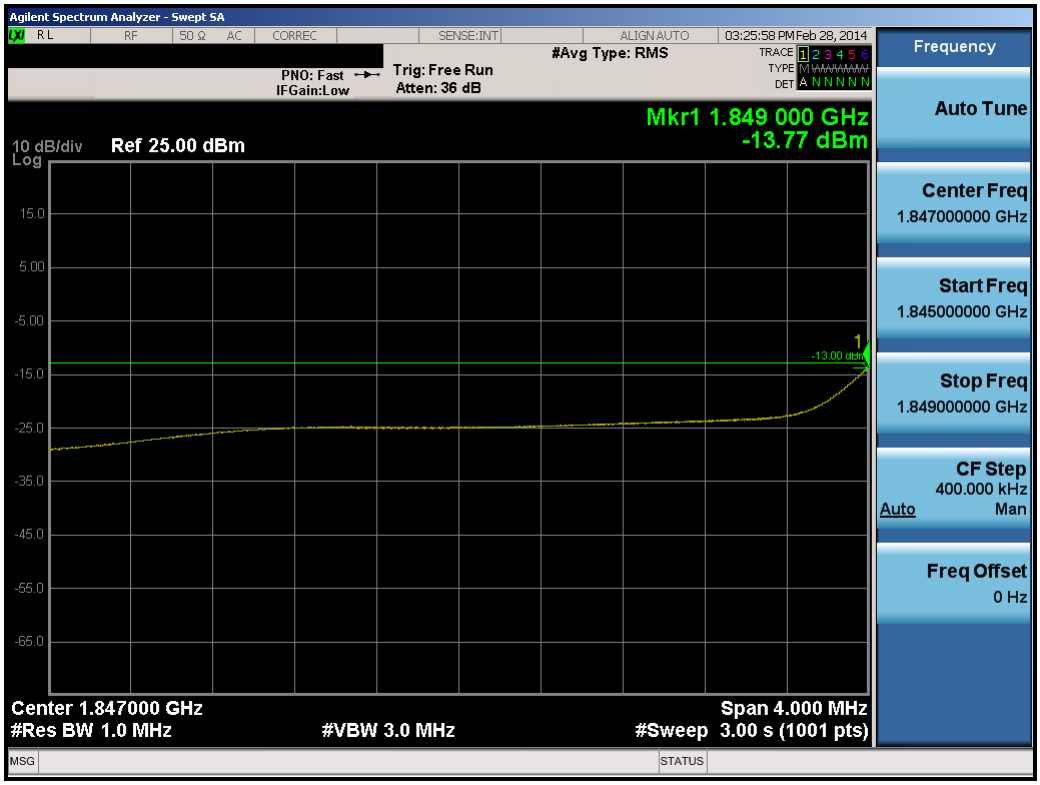

Plot 9-2. Lower Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

Plot 9-3. Occupied Bandwidth Plot (5.0MHz QPSK – RB Size 25)

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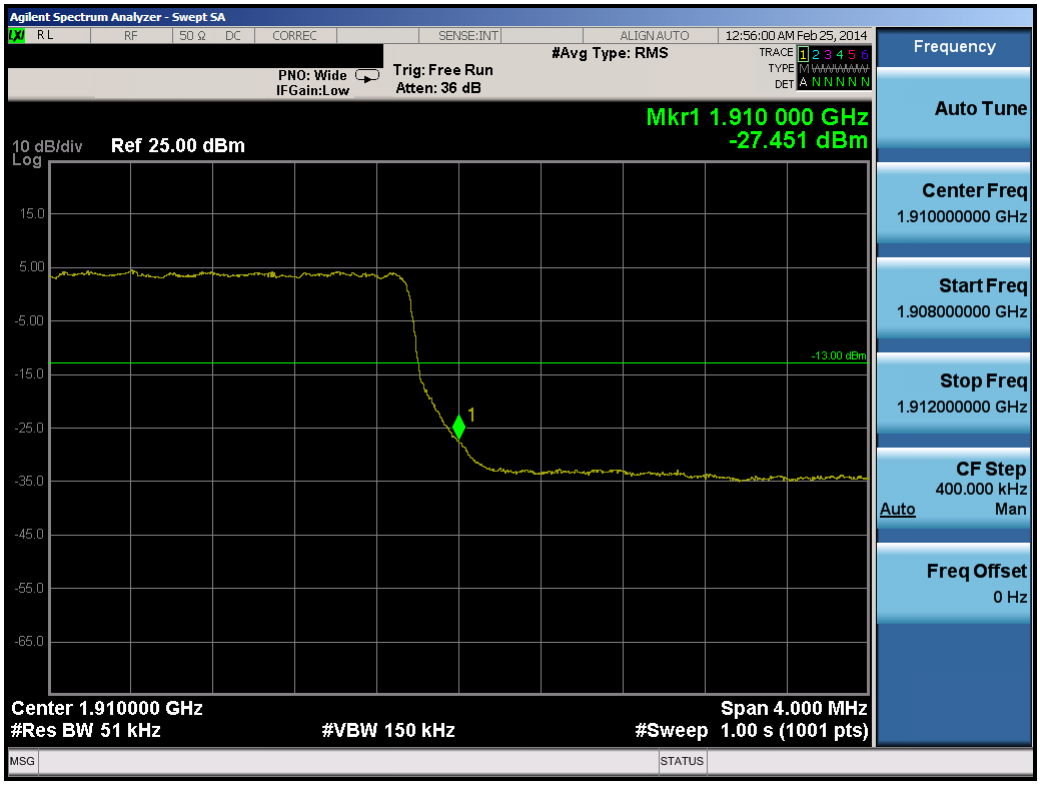
Plot 9-4. Occupied Bandwidth Plot (5.0MHz 16-QAM – RB Size 25)



Plot 9-5. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)

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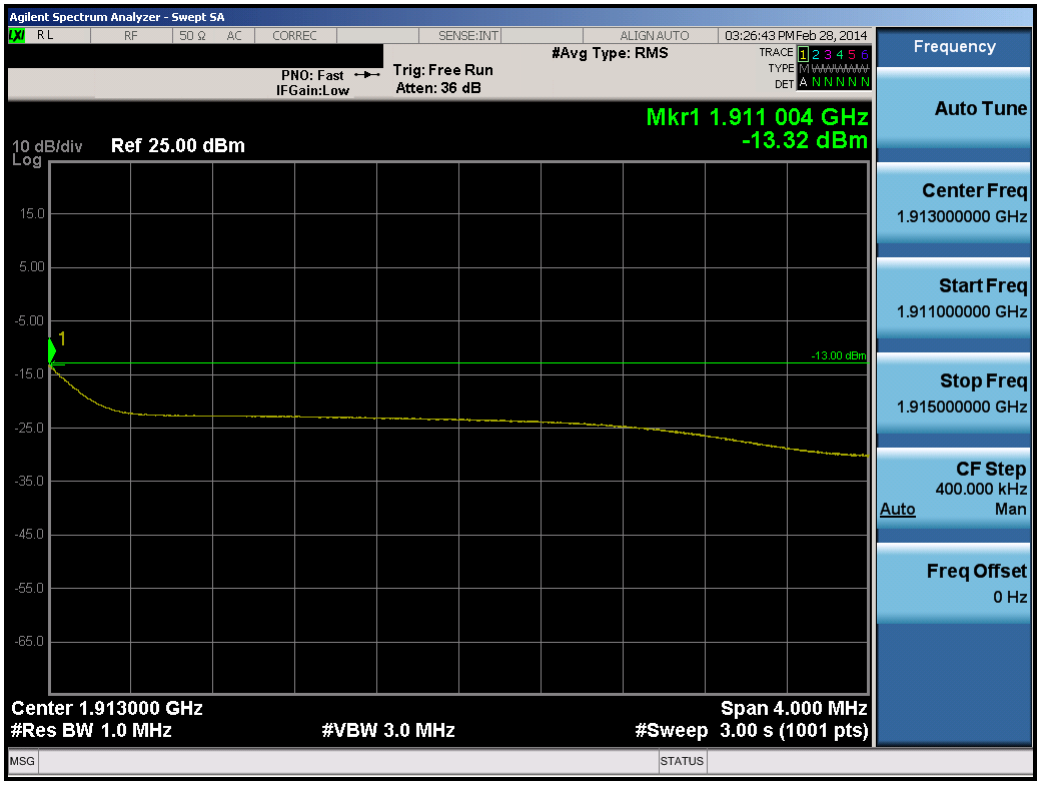
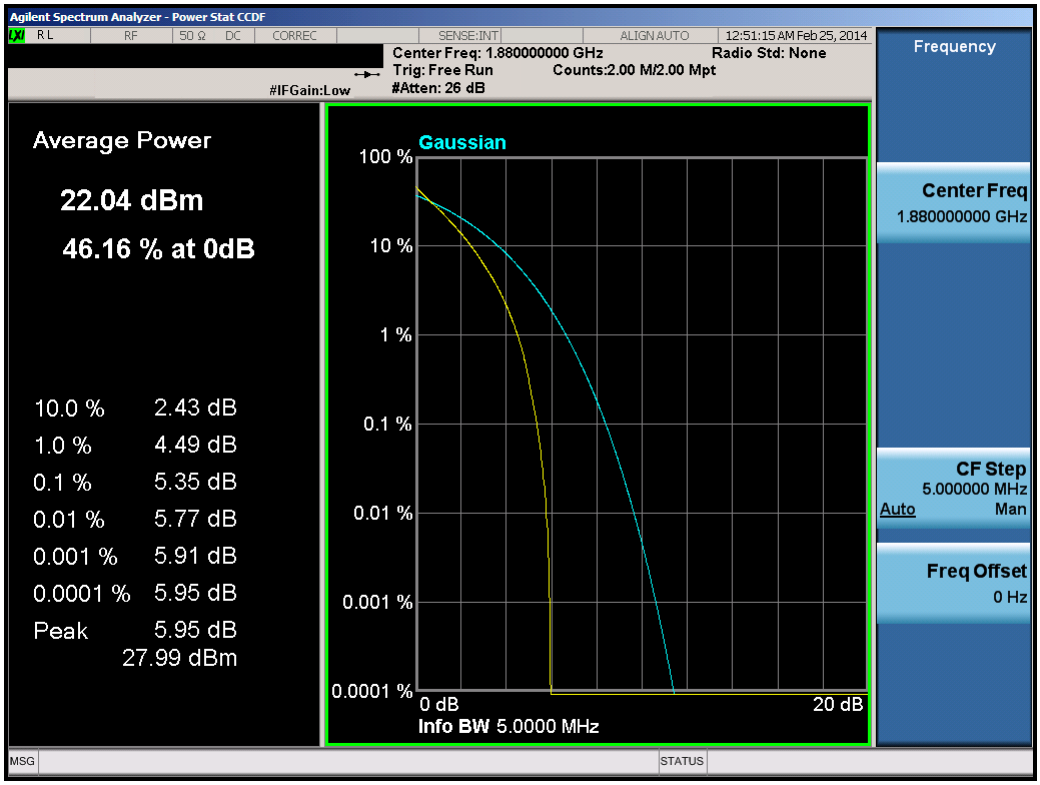


Plot 9-6. Upper Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)



Plot 9-7. PAR Plot (5.0MHz QPSK – RB Size 25)

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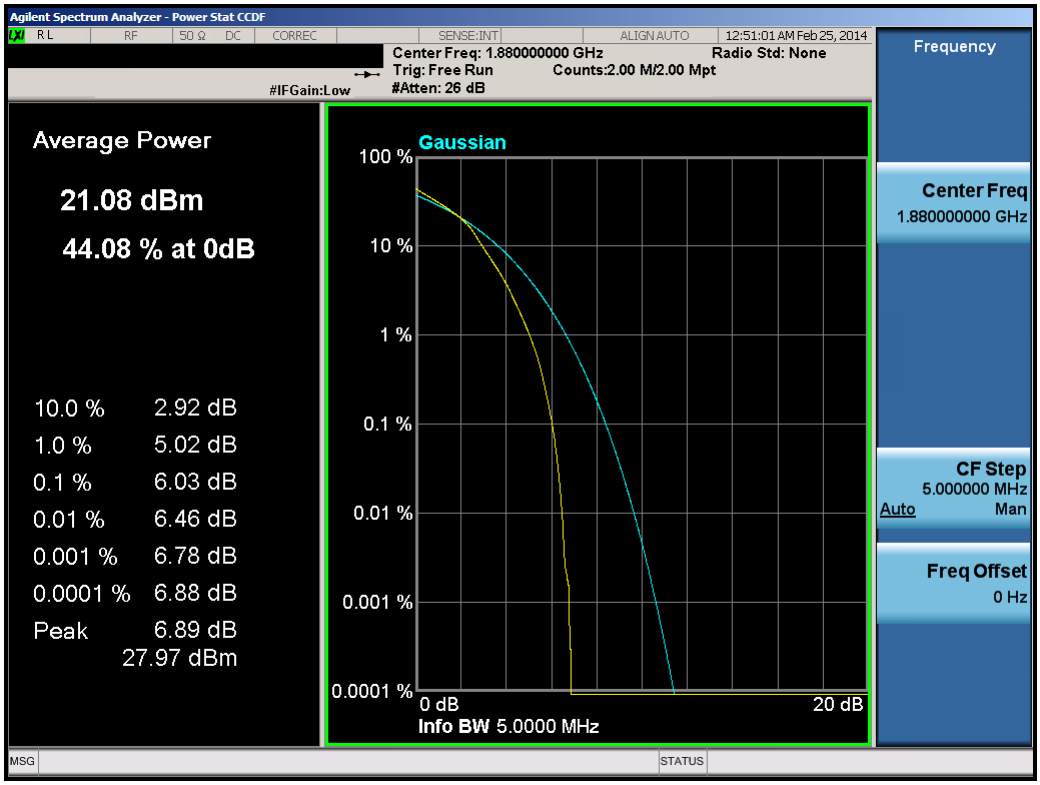
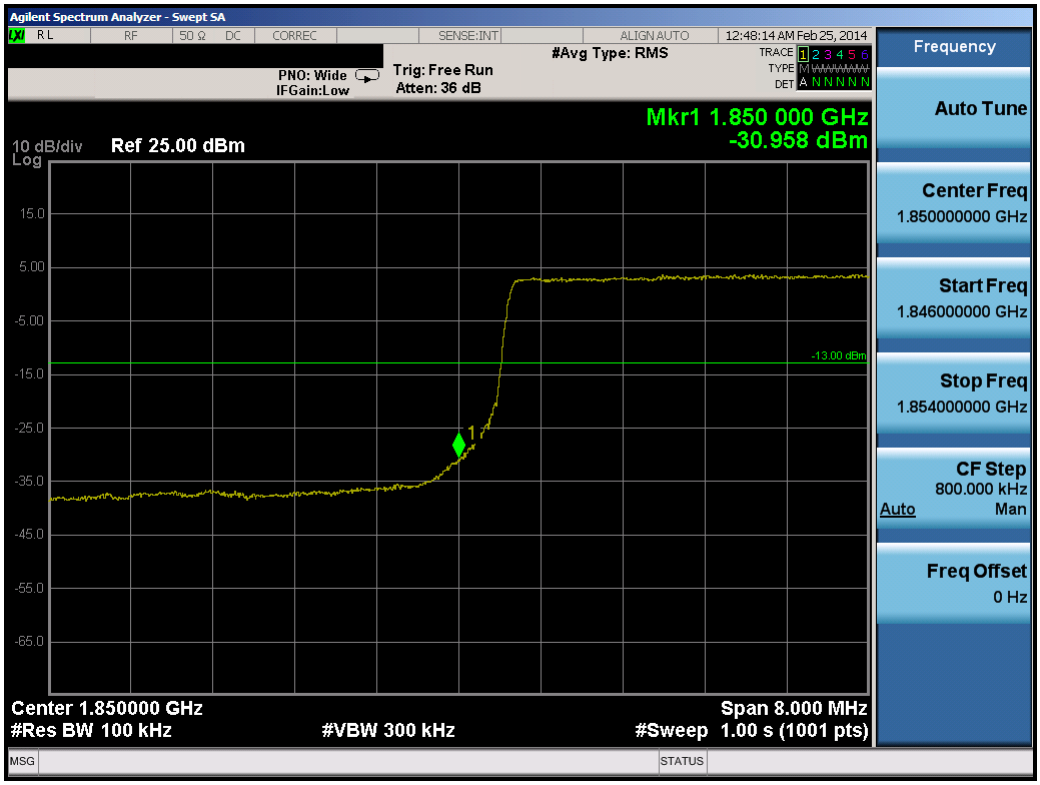


Plot 9-8. PAR Plot (5.0MHz 16-QAM – RB Size 25)



Plot 9-9. Lower Band Edge Plot (10.0MHz QPSK – RB Size 50)

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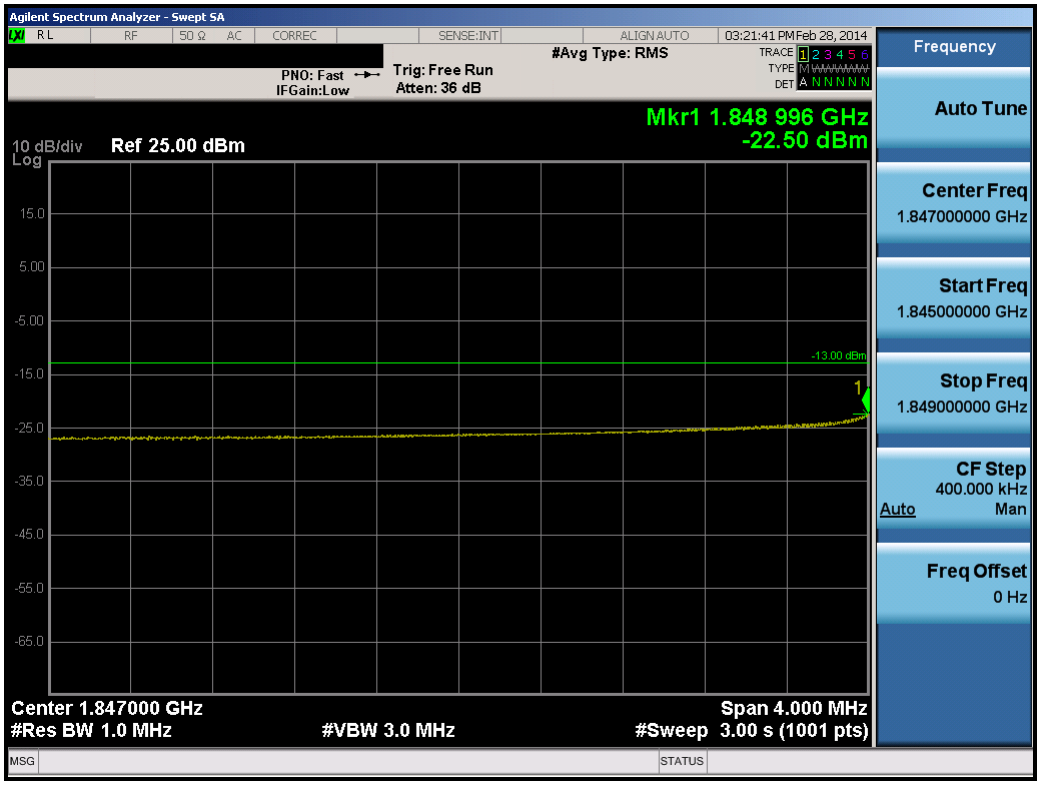
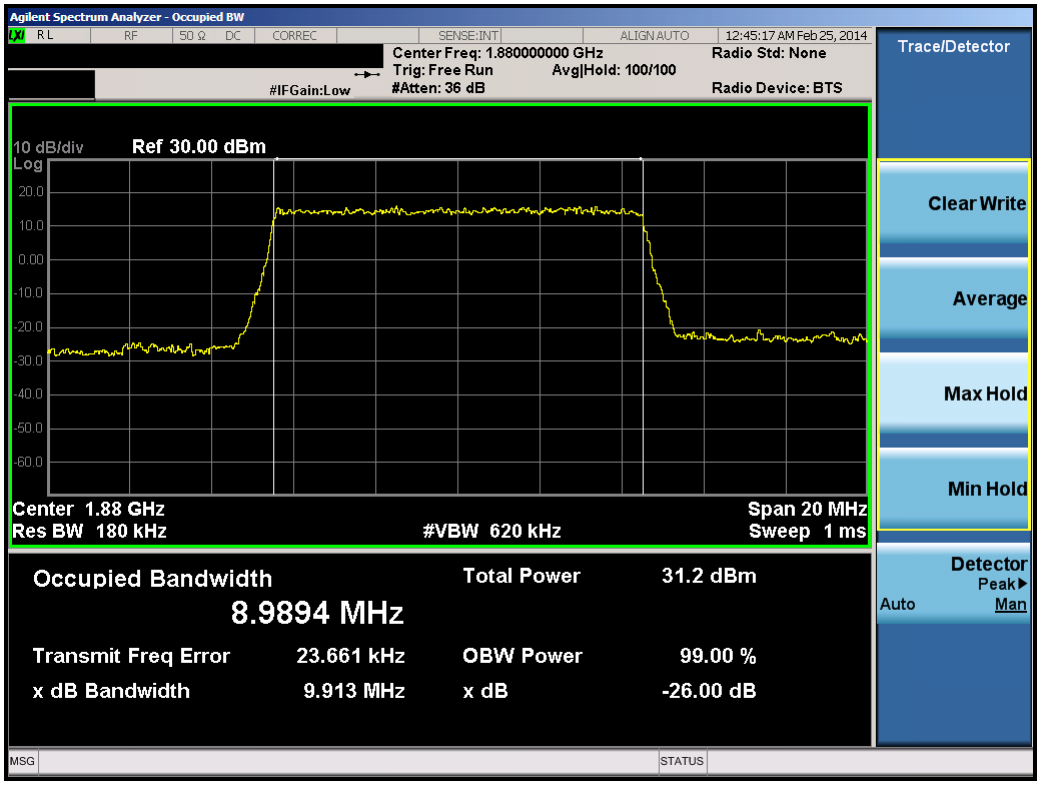


Plot 9-10. Lower Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 9-11. Occupied Bandwidth Plot (10.0MHz QPSK – RB Size 50)

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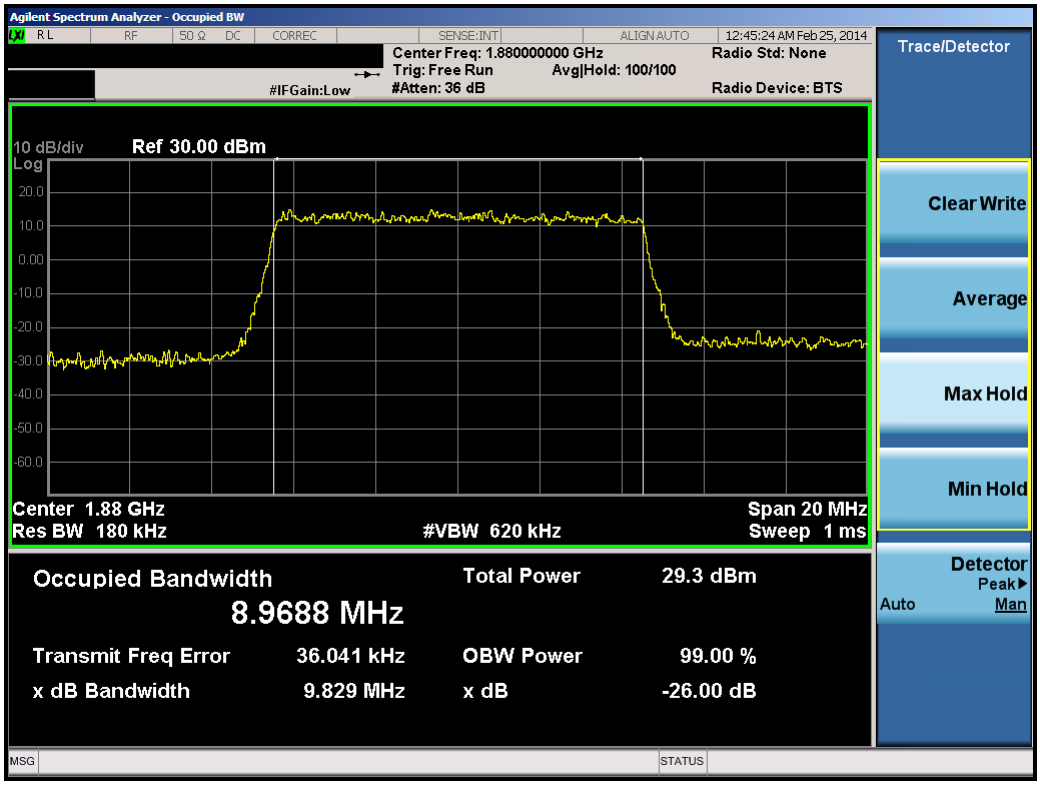
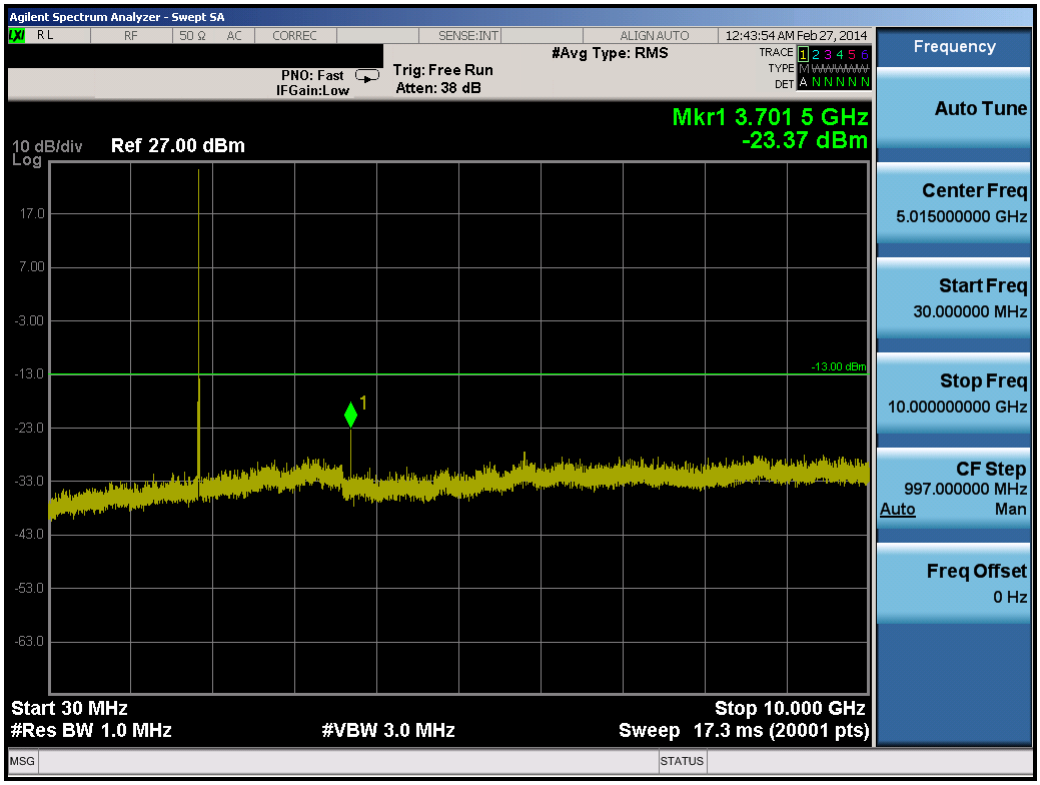


Plot 9-12. Occupied Bandwidth Plot (10.0MHz 16-QAM – RB Size 50)



Plot 9-13. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

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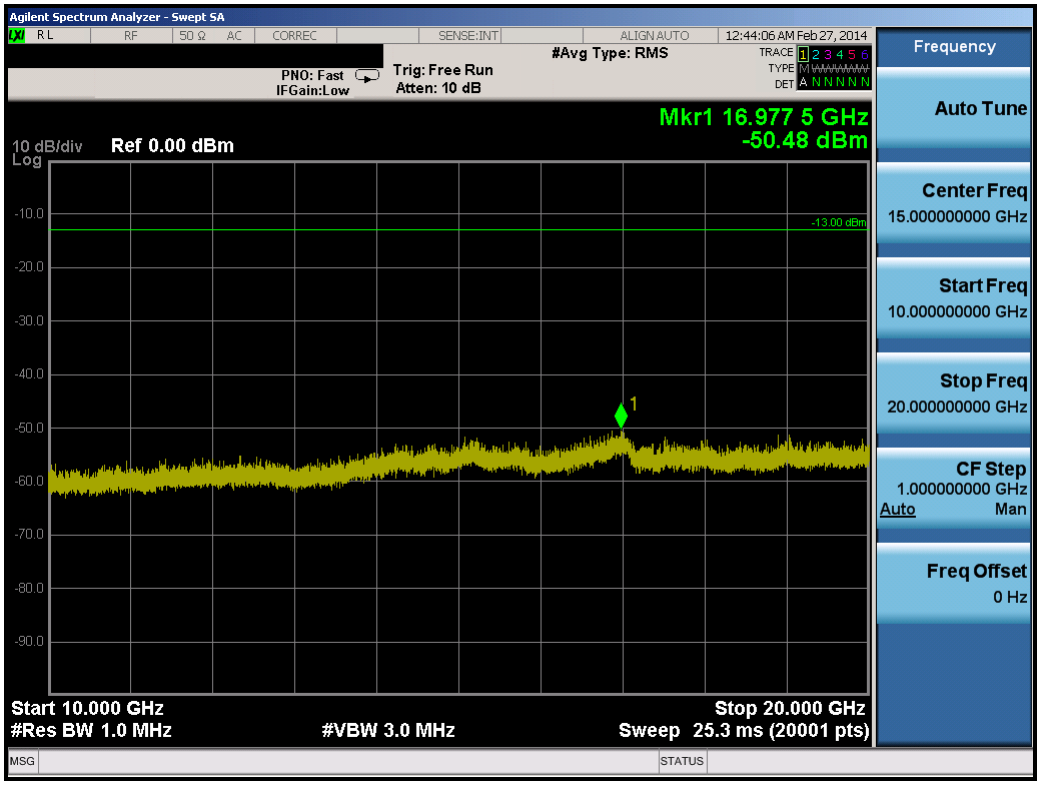
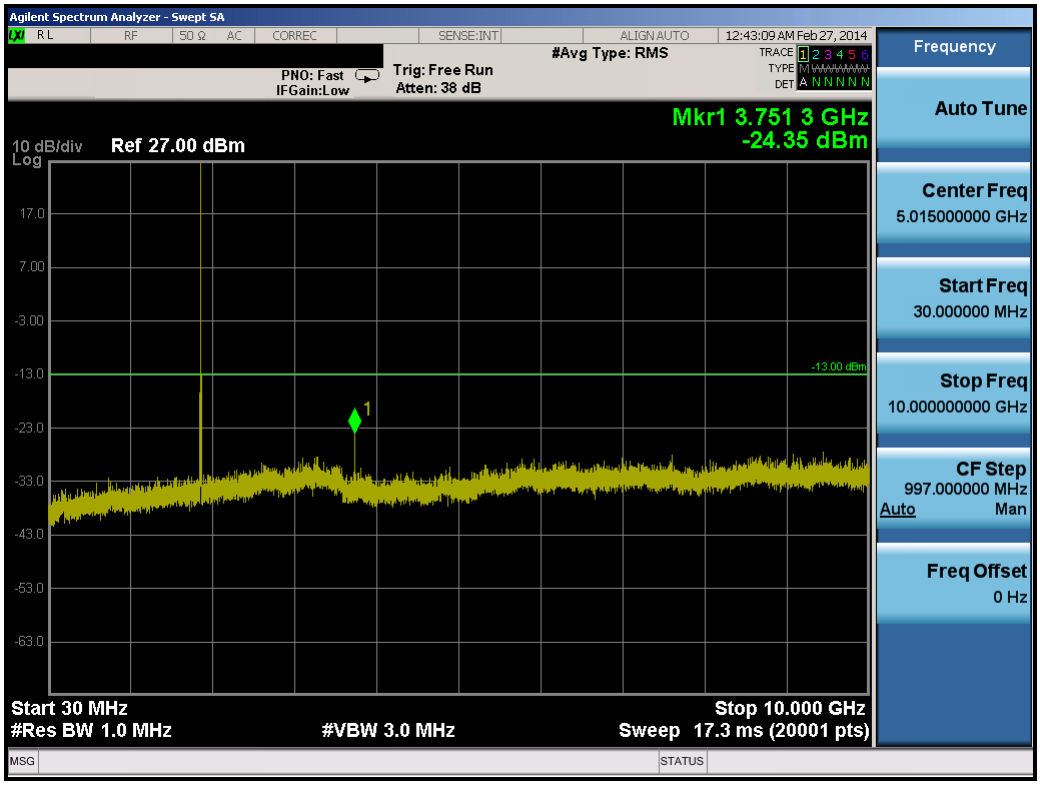


Plot 9-14. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 9-15. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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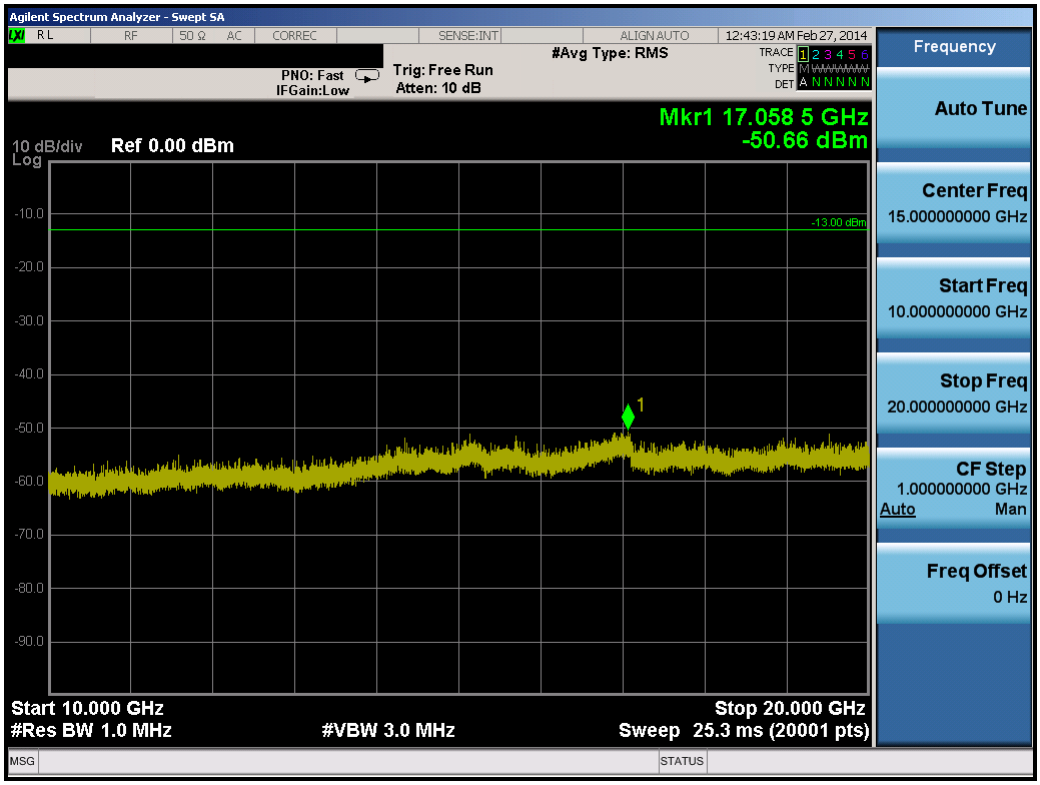
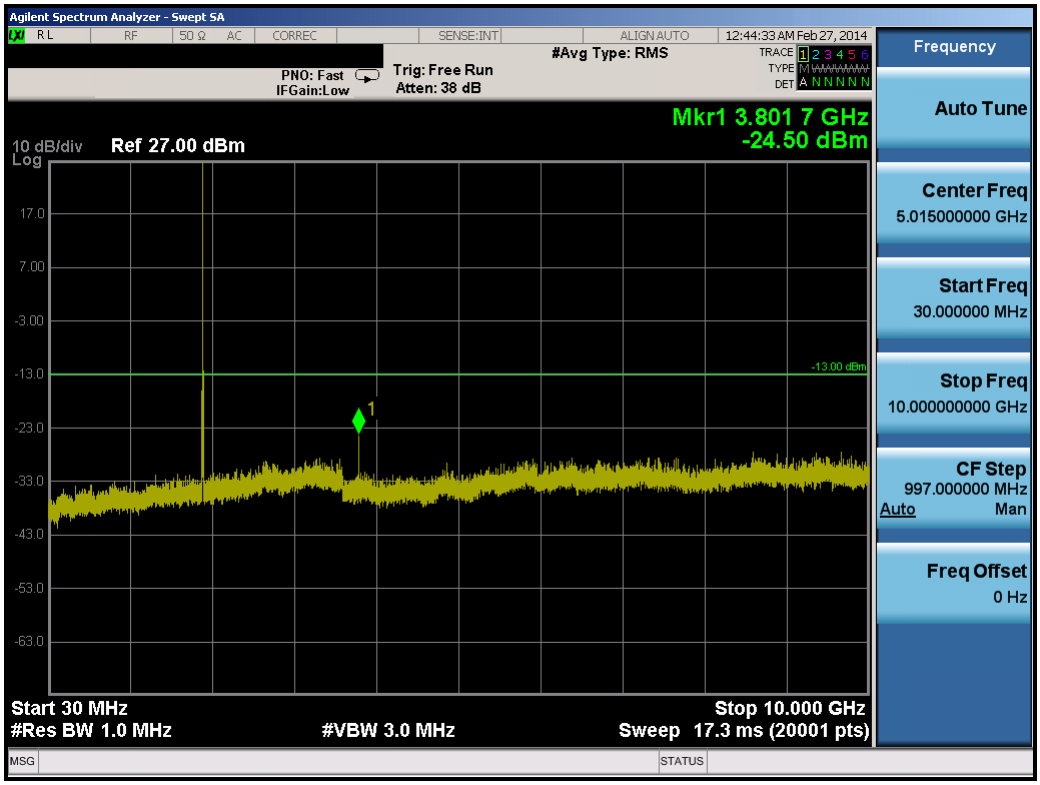


Plot 9-16. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 9-17. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

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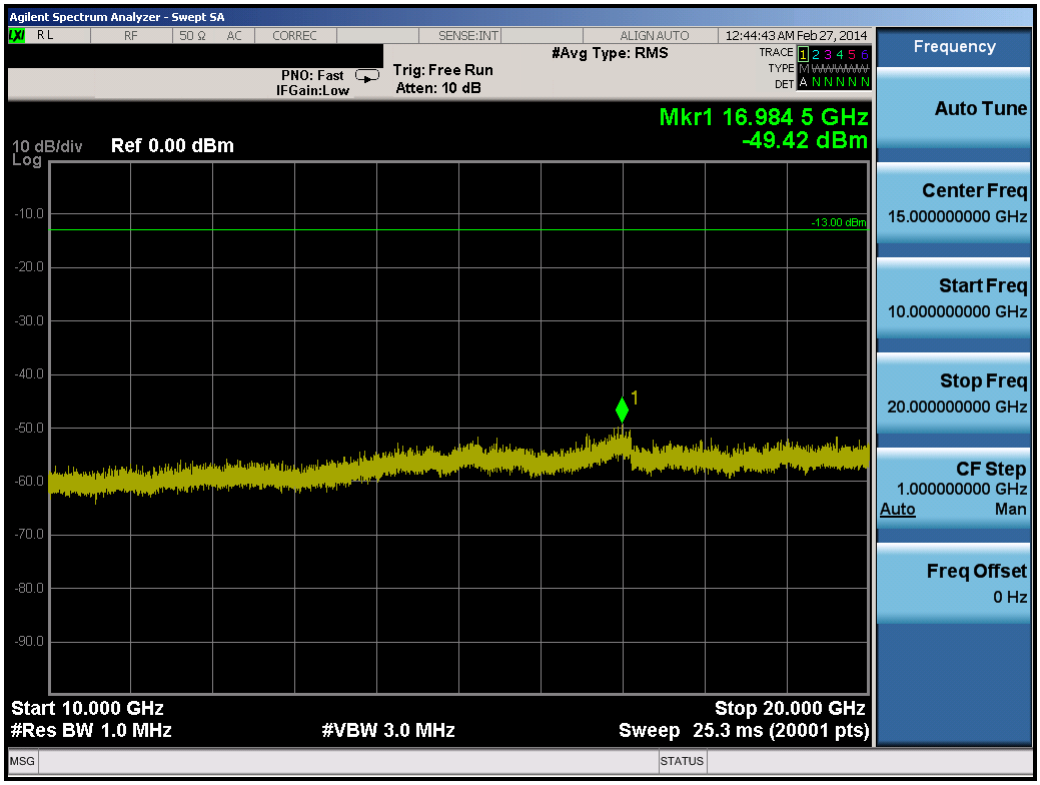
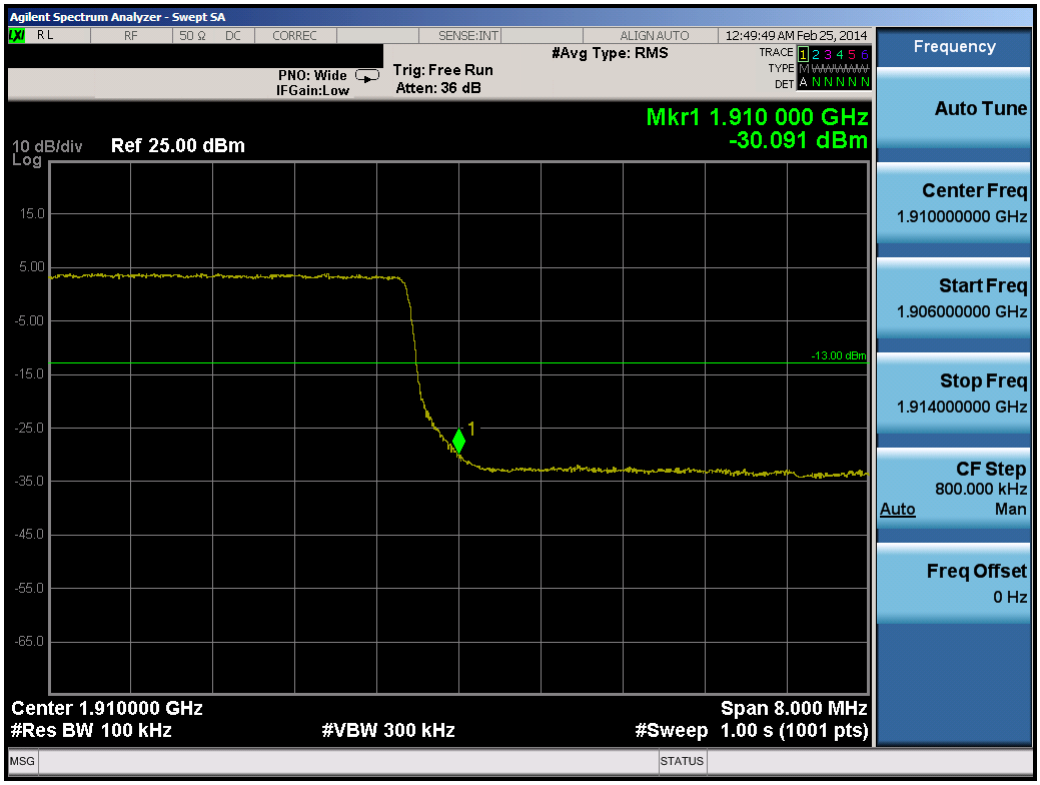


Plot 9-18. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 9-19. Upper Band Edge Plot (10.0MHz QPSK – RB Size 50)

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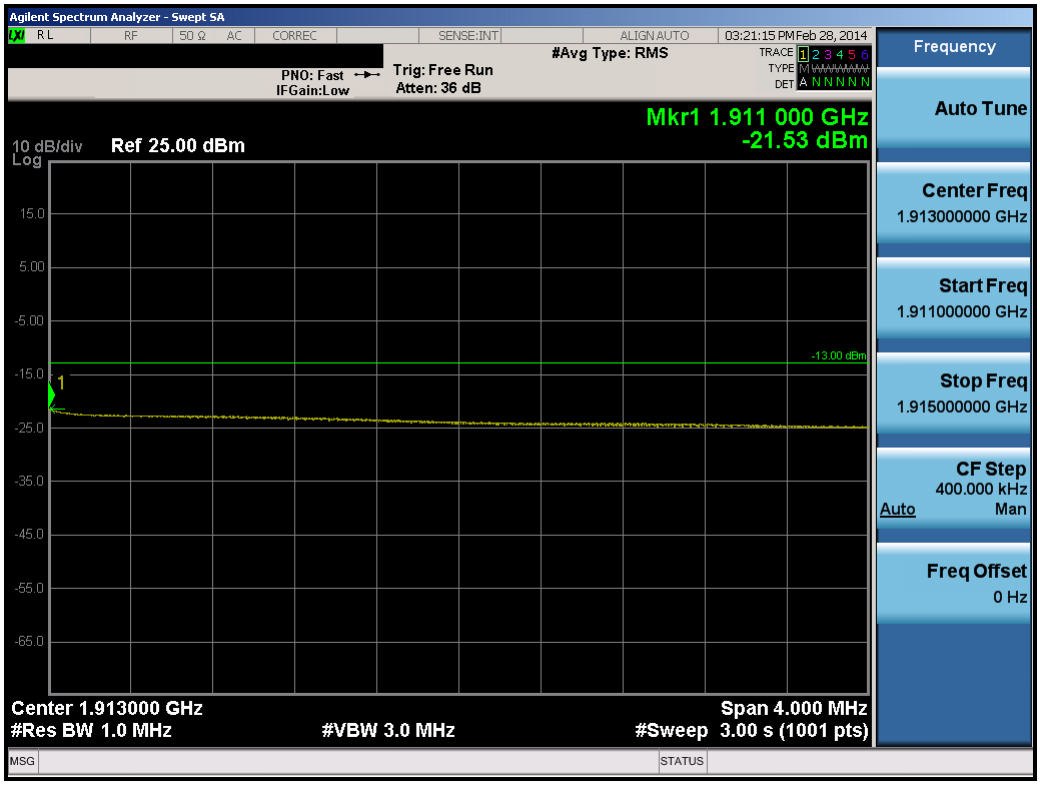
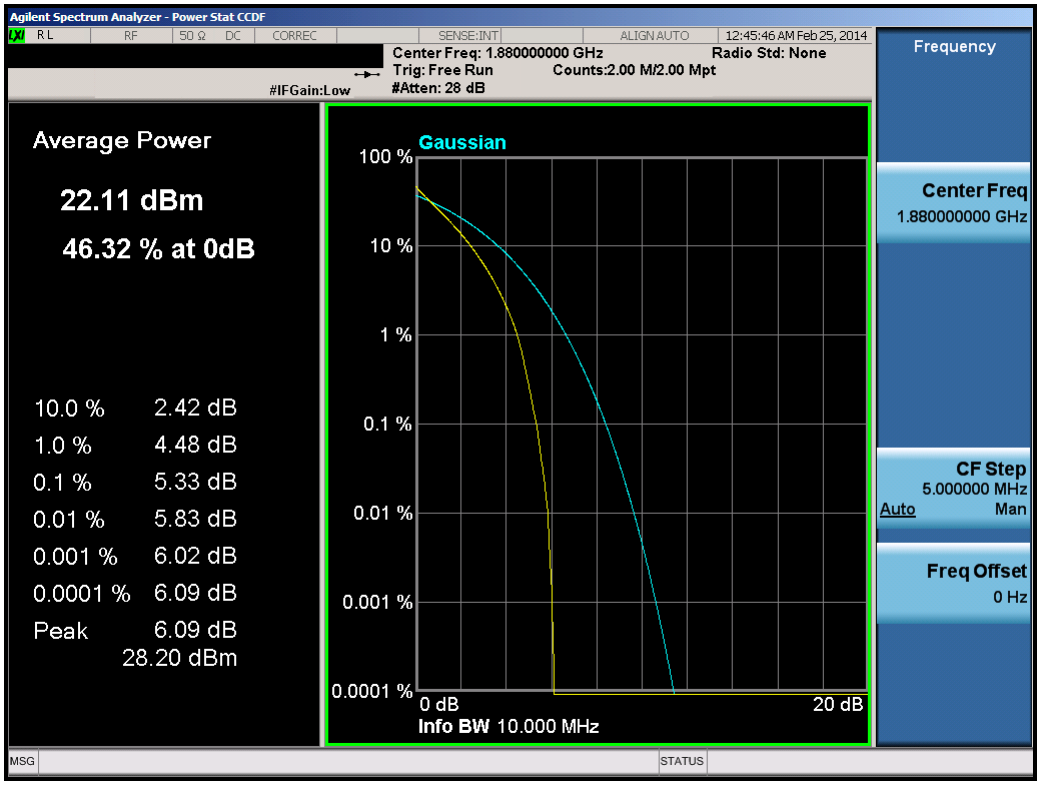


Plot 9-20. Upper Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 9-21. PAR Plot (10.0MHz QPSK – RB Size 50)

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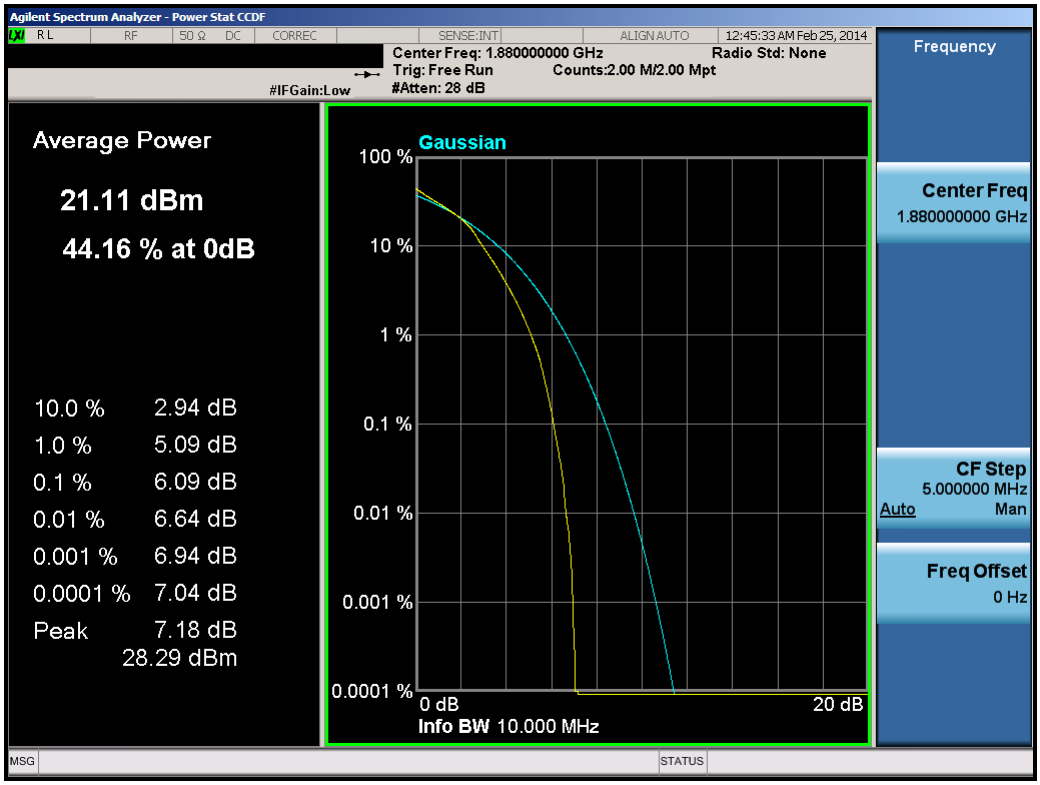

Plot 9-22. PAR Plot (10.0MHz 16-QAM – RB Size 50)

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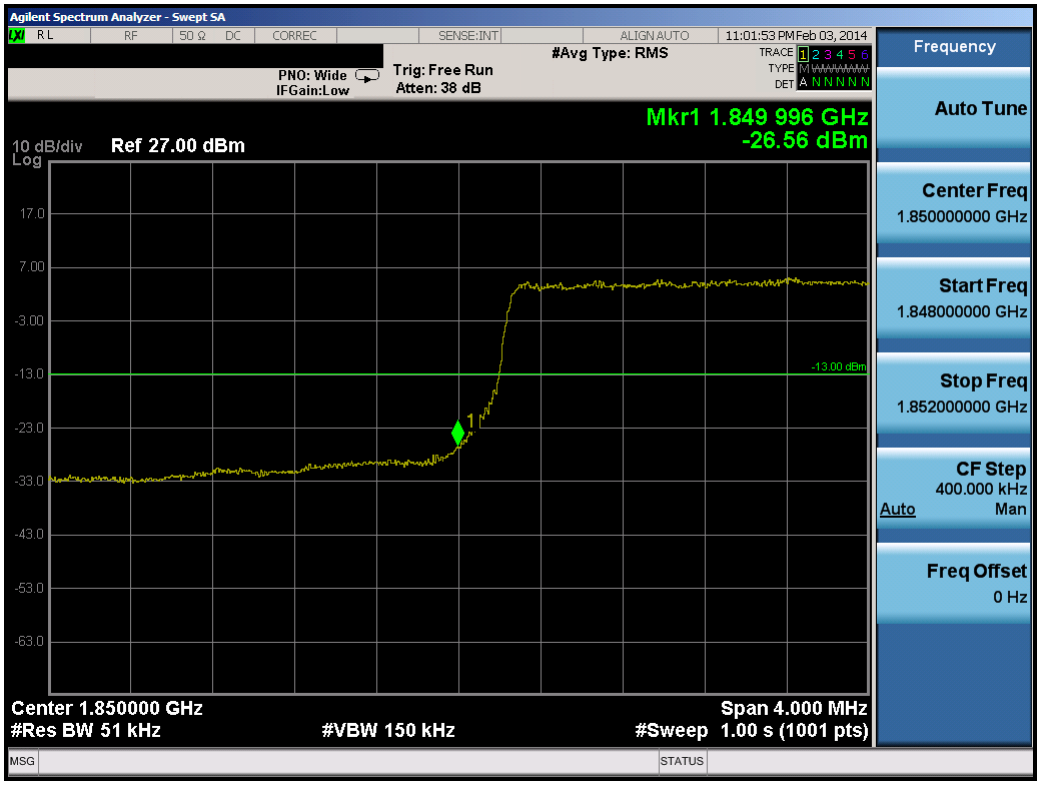
10.0 BAND 25 PLOTS OF EMISSIONS

Note: All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.



Plot 10-1. Lower Band Edge Plot (5.0MHz QPSK – RB Size 25)

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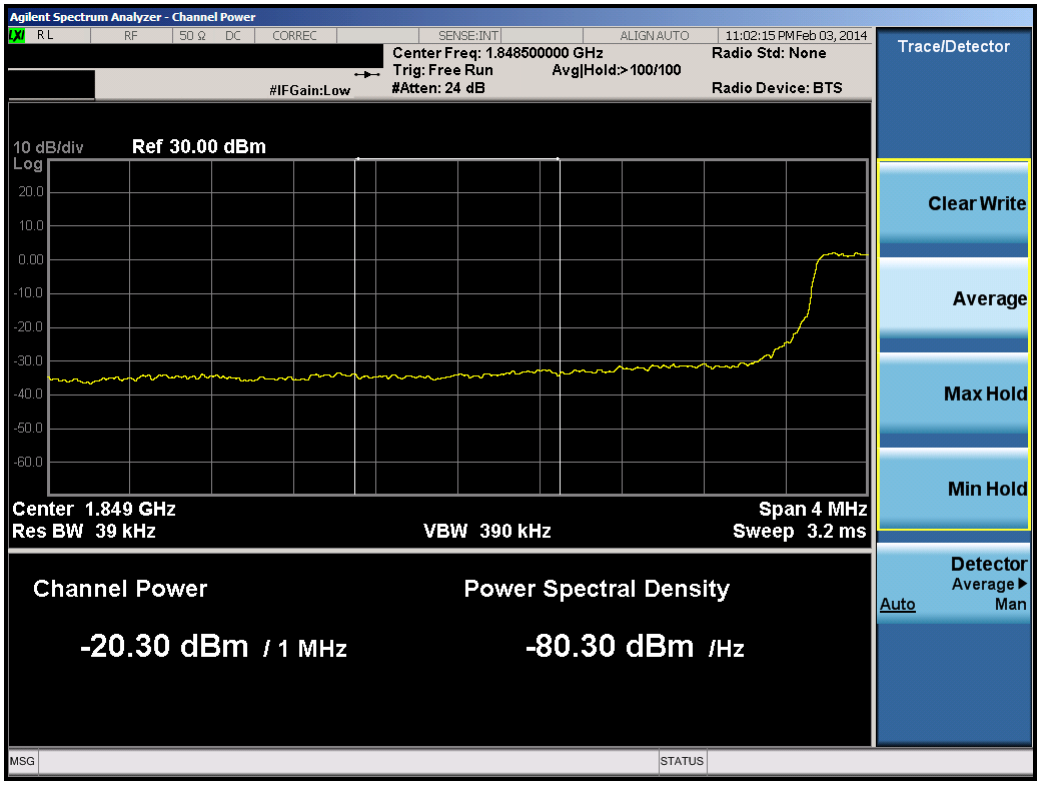
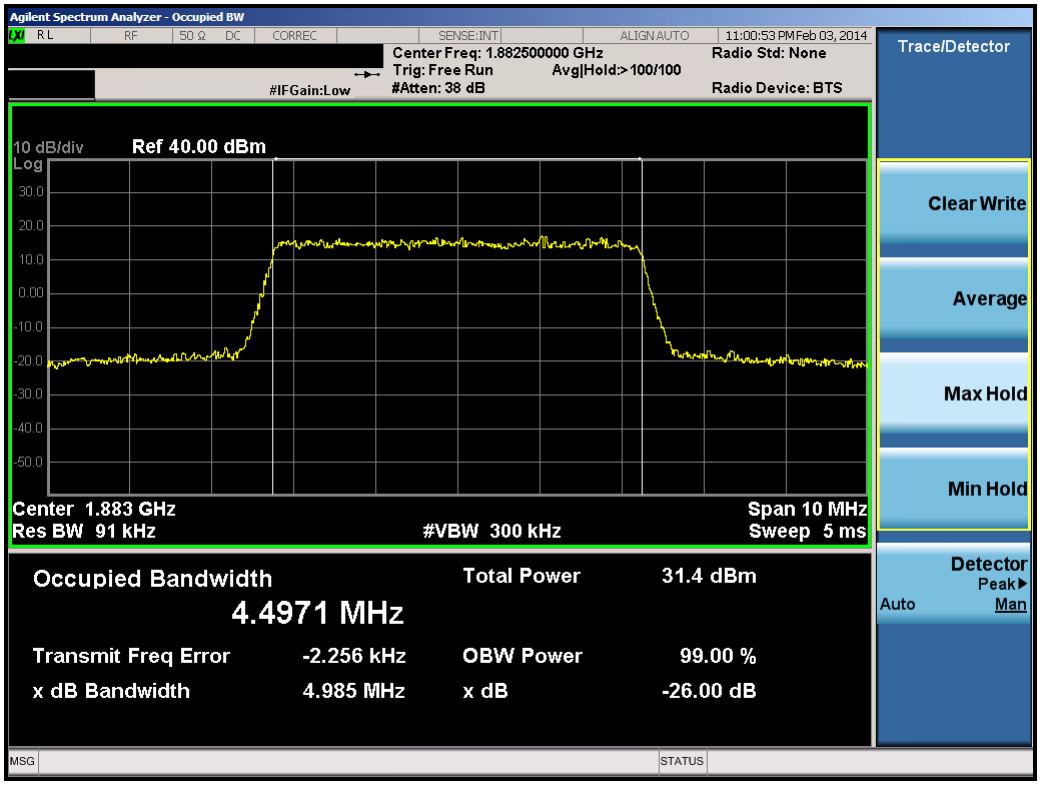


Plot 10-2. Lower Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)



Plot 10-3. Occupied Bandwidth Plot (5.0MHz QPSK – RB Size 25)

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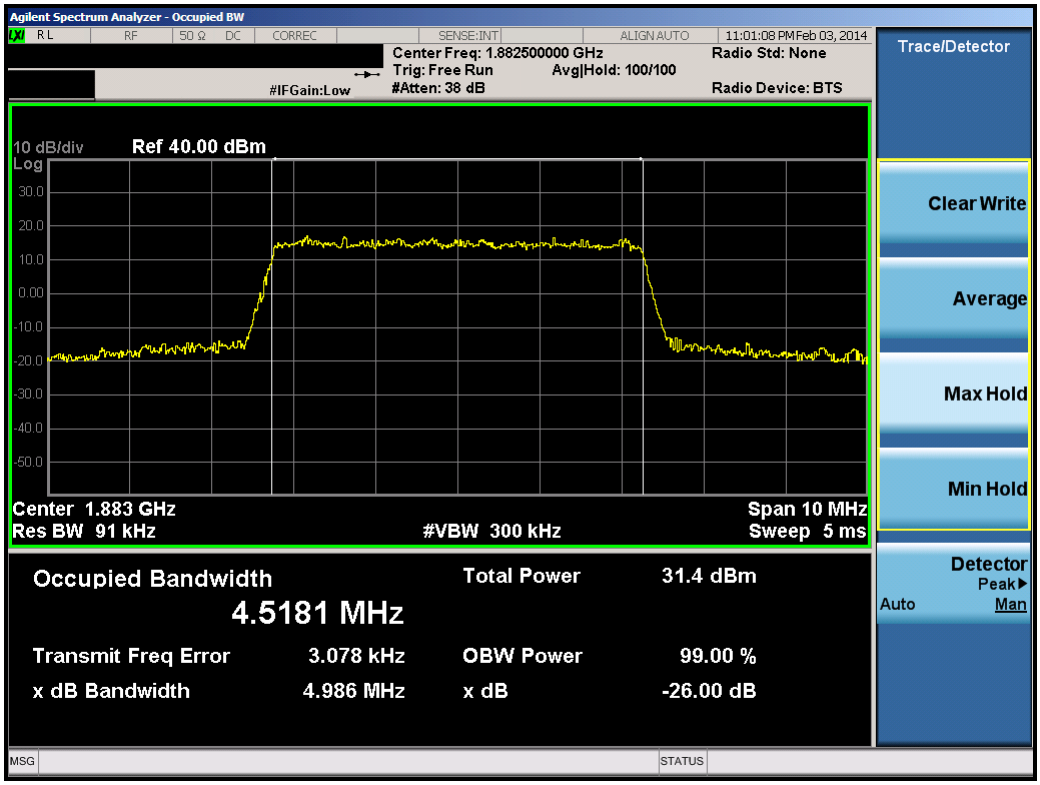
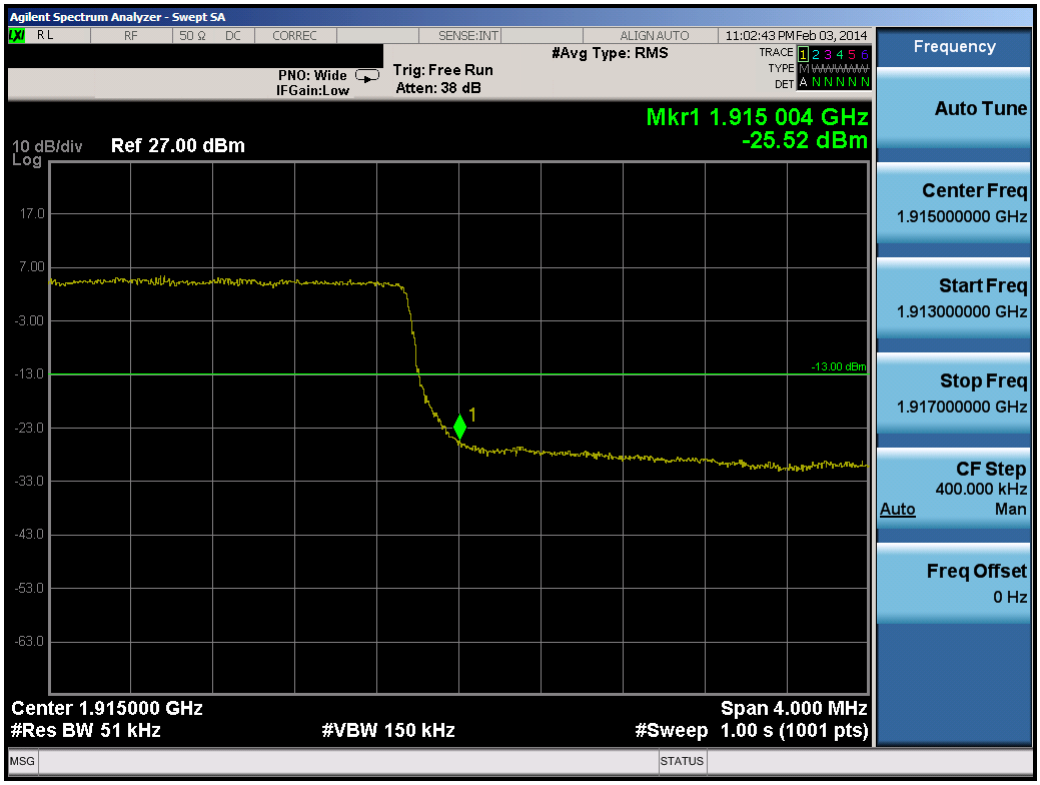


Plot 10-4. Occupied Bandwidth Plot (5.0MHz 16-QAM – RB Size 25)



Plot 10-5. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)

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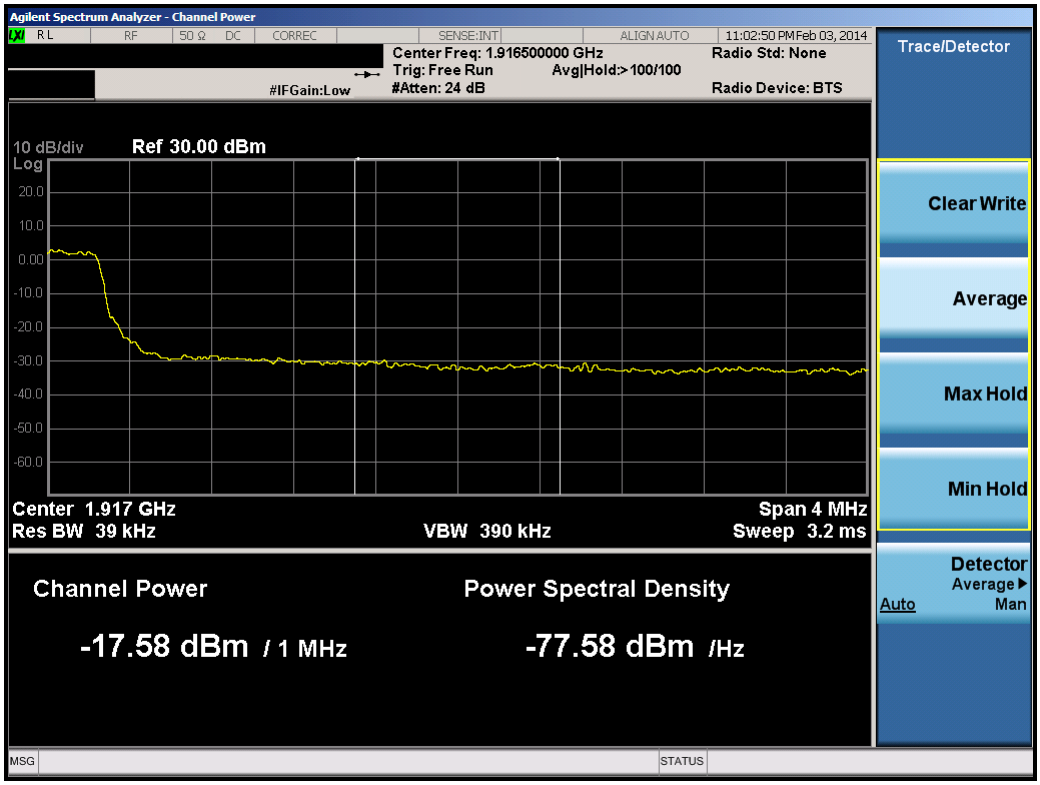
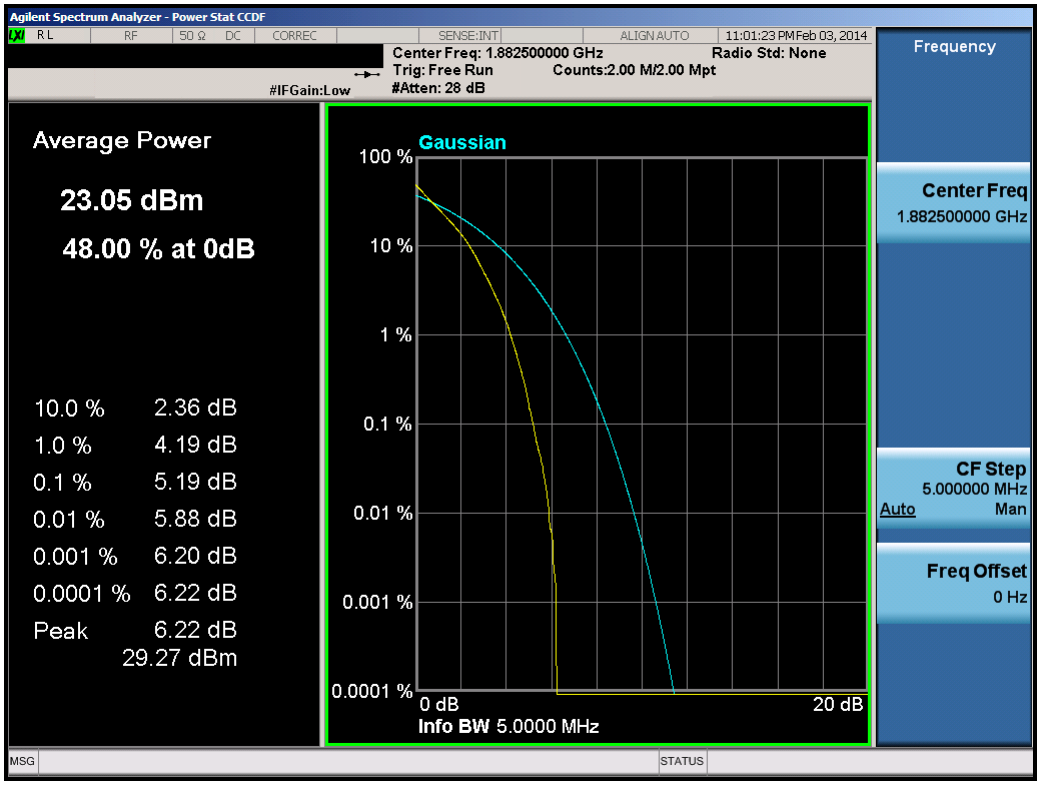


Plot 10-6. Upper Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)



Plot 10-7. PAR Plot (5.0MHz QPSK – RB Size 25)

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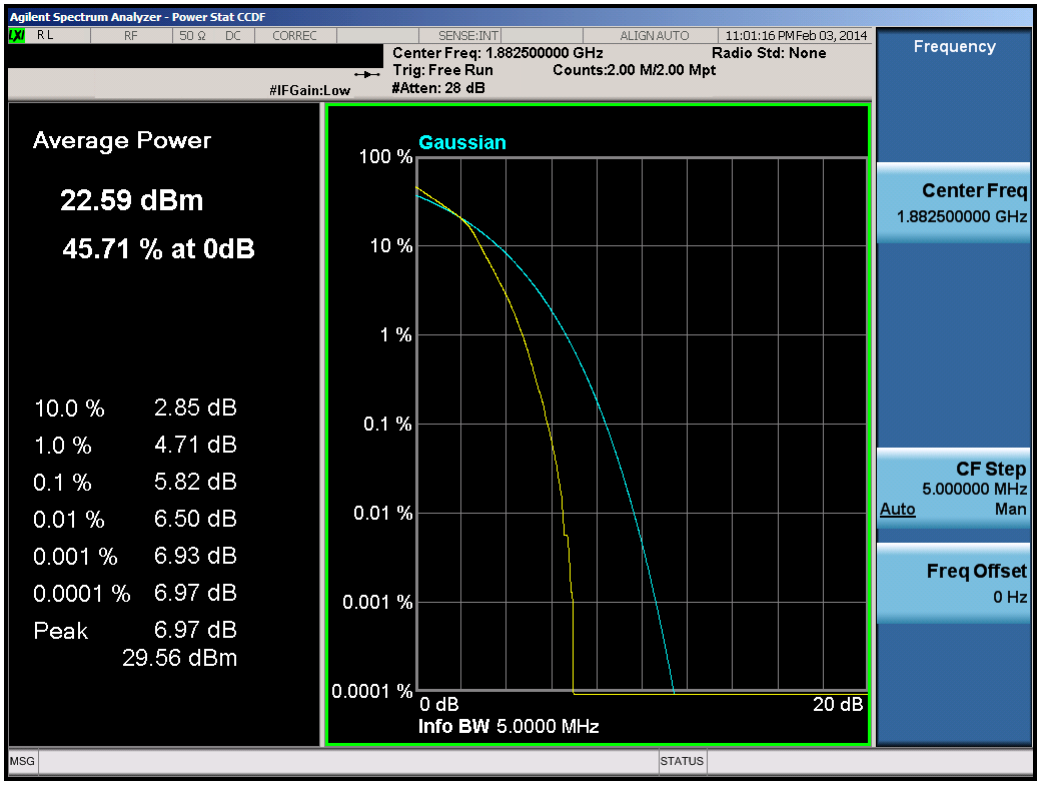
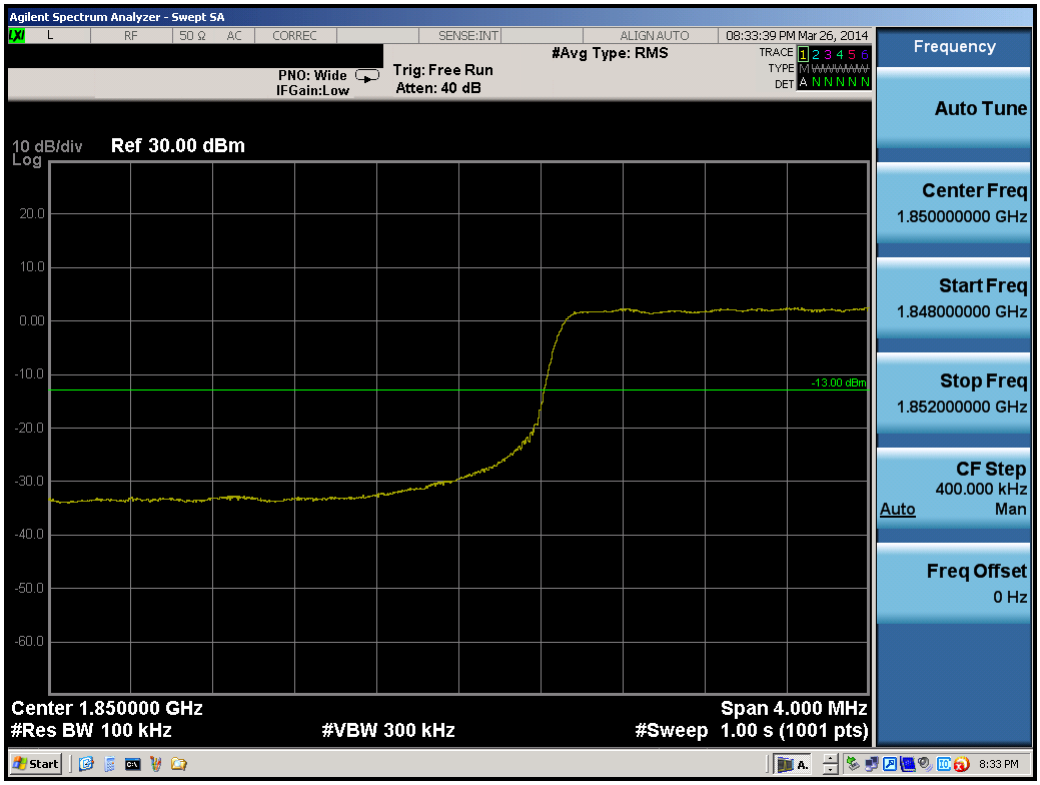


Plot 10-8. PAR Plot (5.0MHz 16-QAM – RB Size 25)



Plot 10-9. Lower Band Edge Plot (10.0MHz QPSK – RB Size 50)

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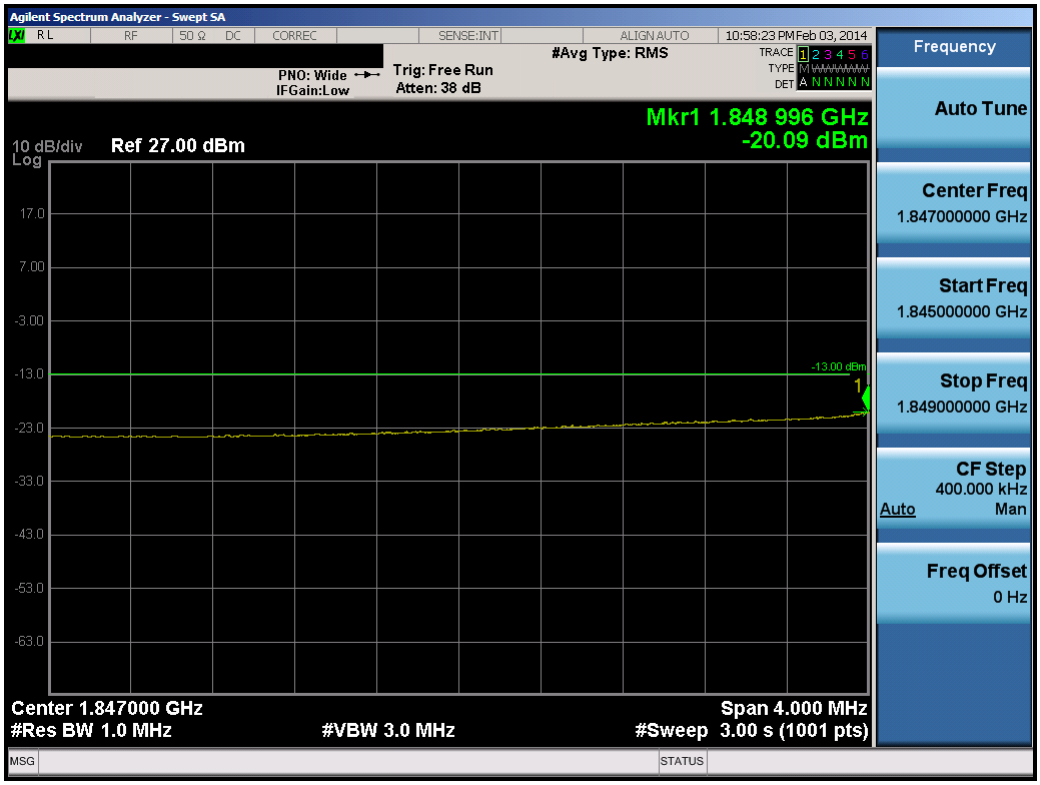
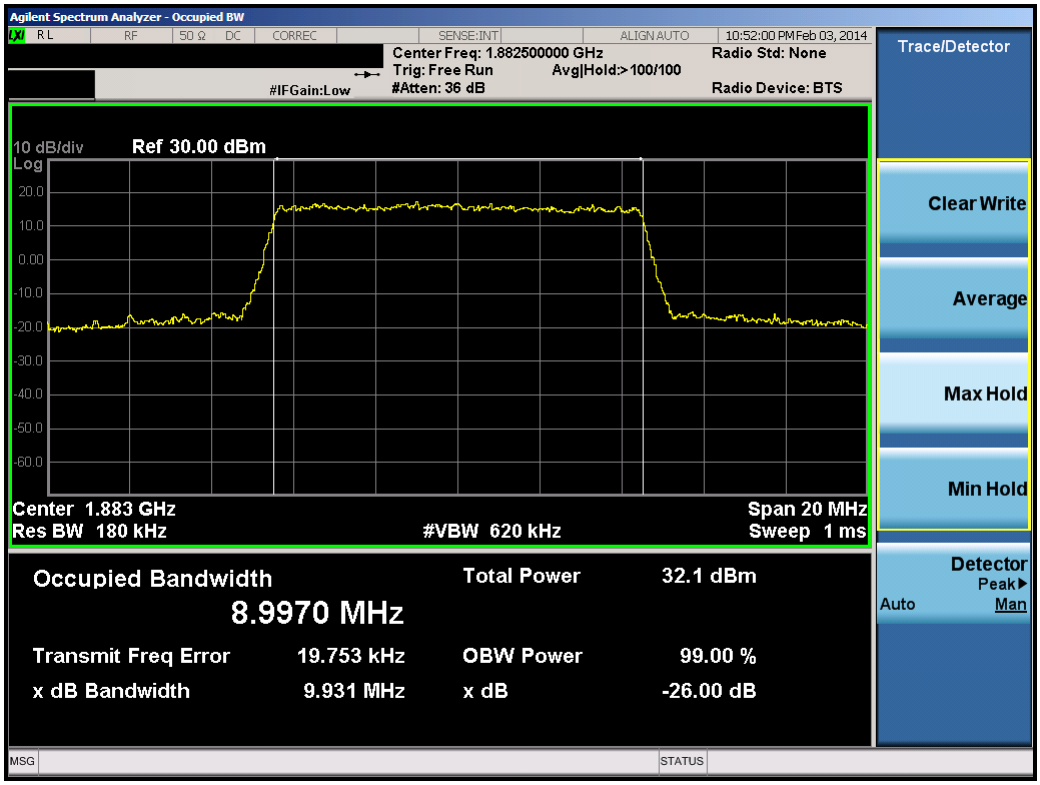


Plot 10-10. Lower Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 10-11. Occupied Bandwidth Plot (10.0MHz QPSK – RB Size 50)

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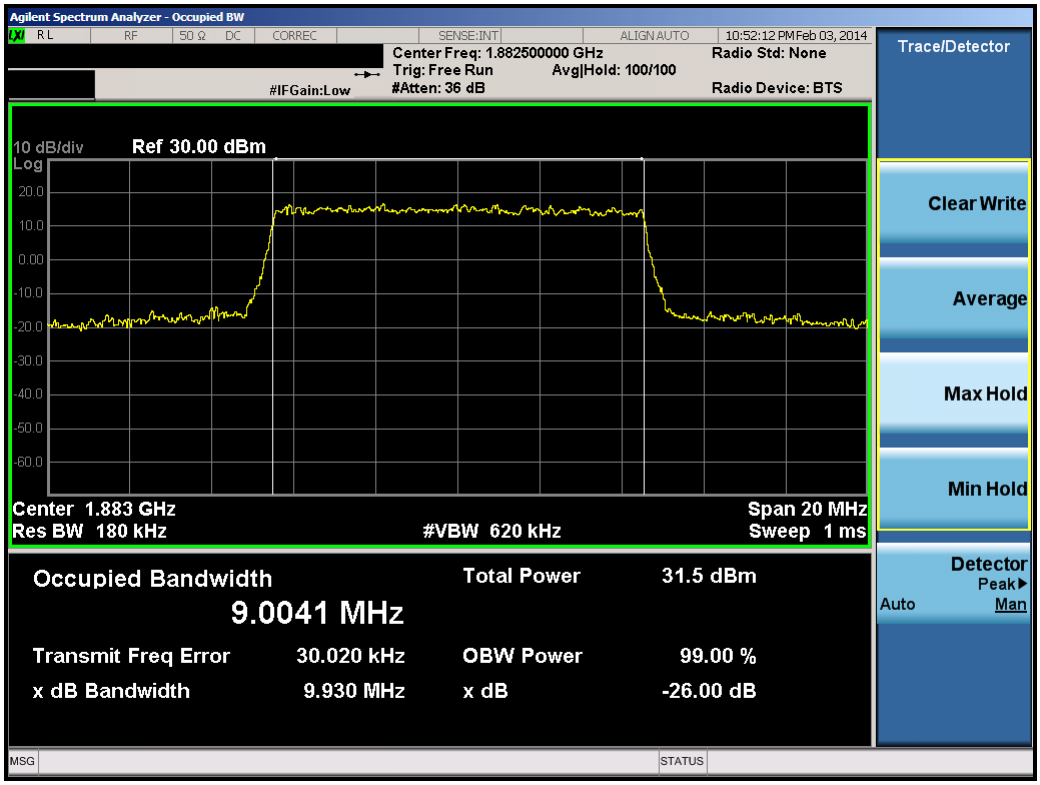
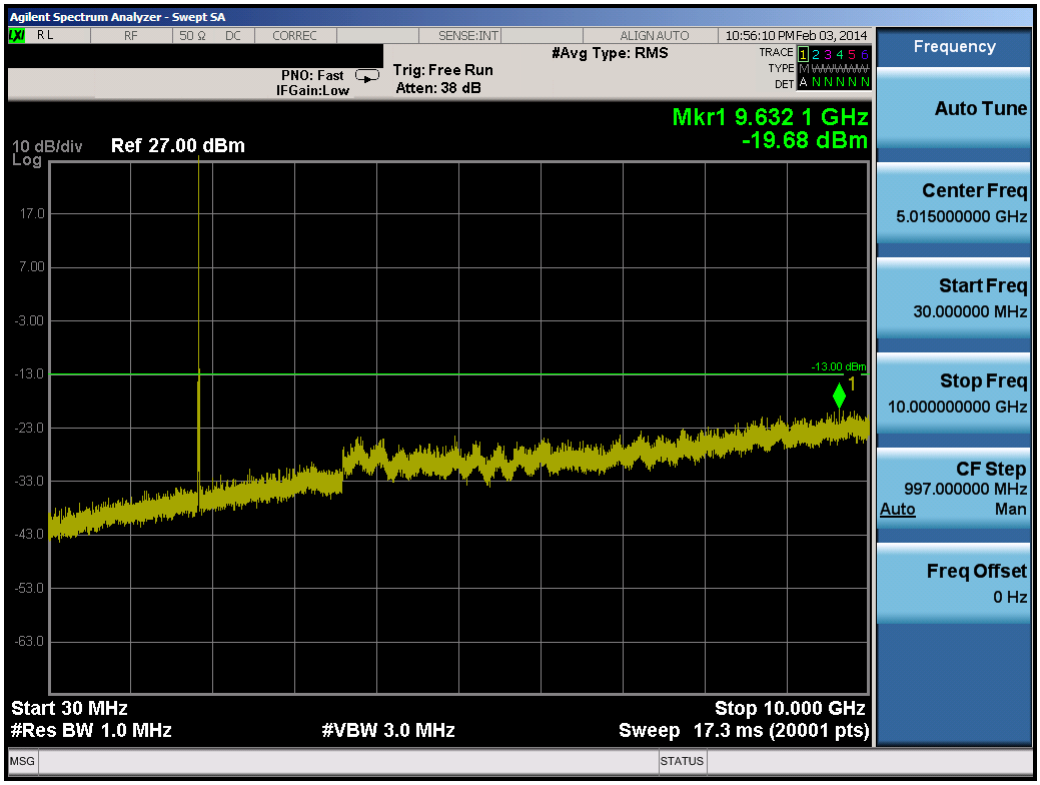


Plot 10-12. Occupied Bandwidth Plot (10.0MHz 16-QAM – RB Size 50)



Plot 10-13. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

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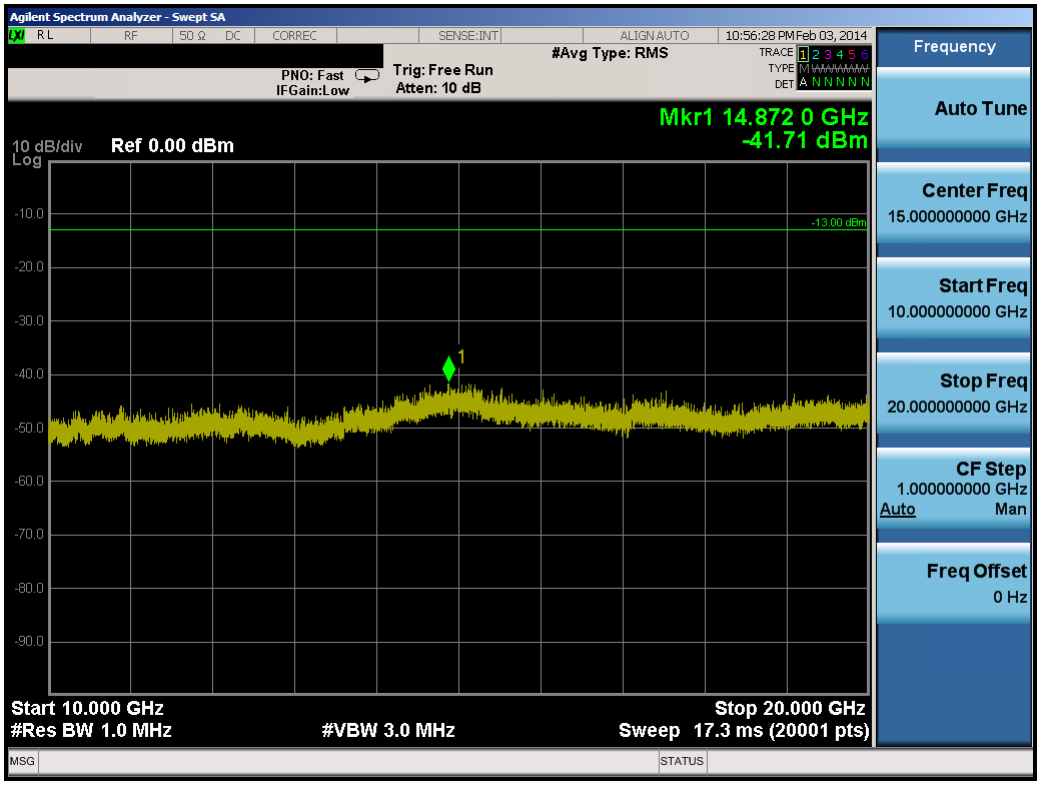
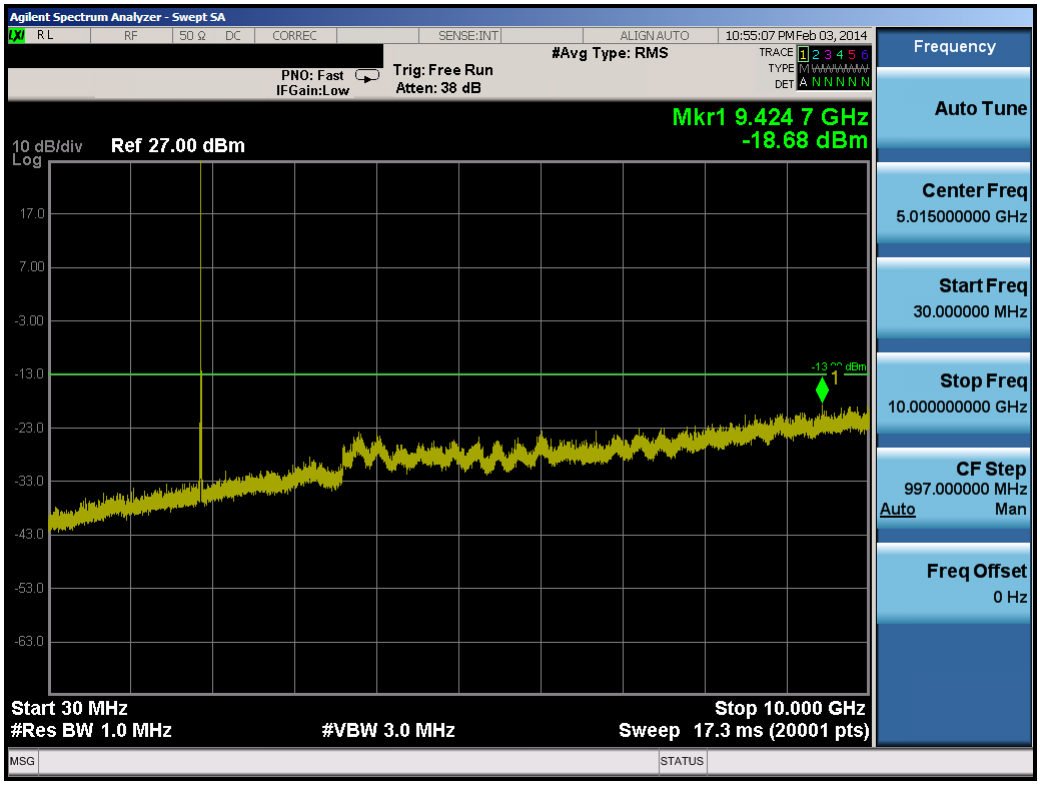


Plot 10-14. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 10-15. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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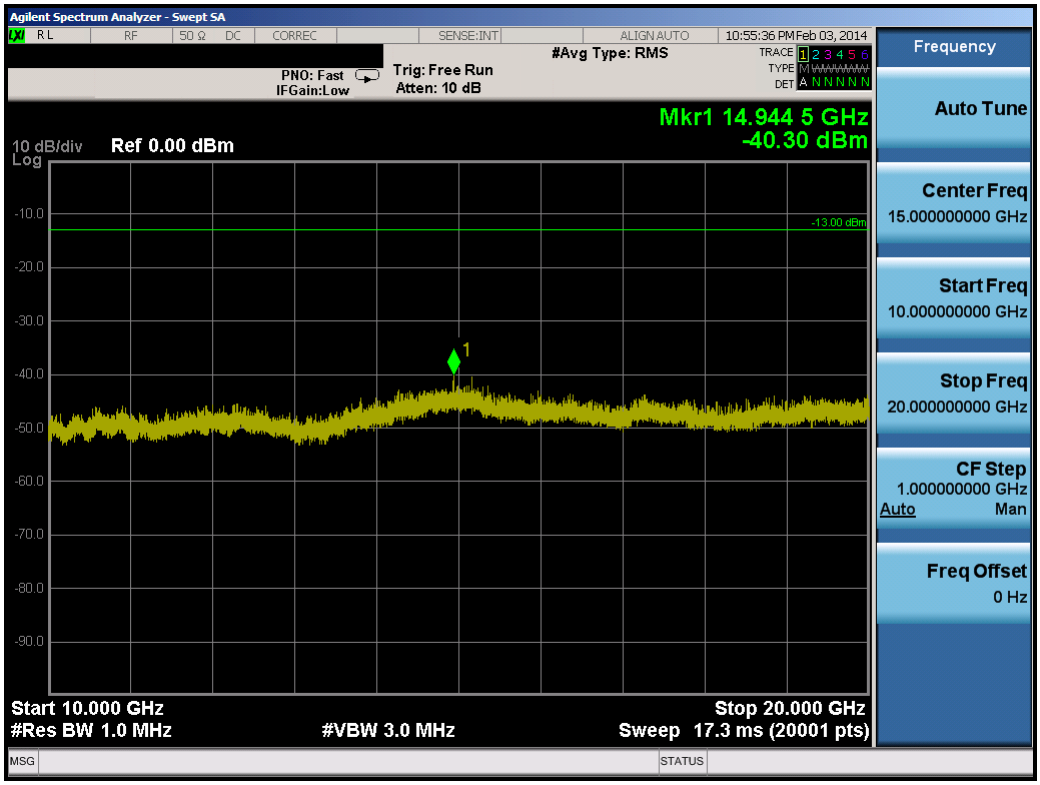
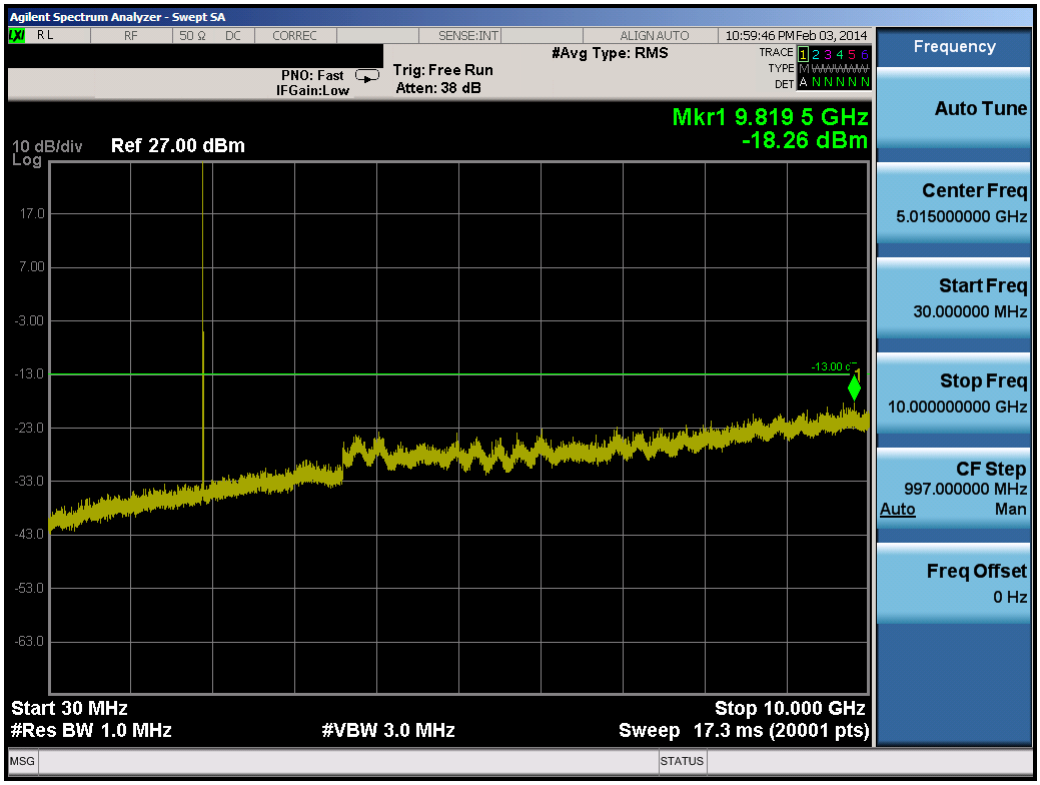


Plot 10-16. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 10-17. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

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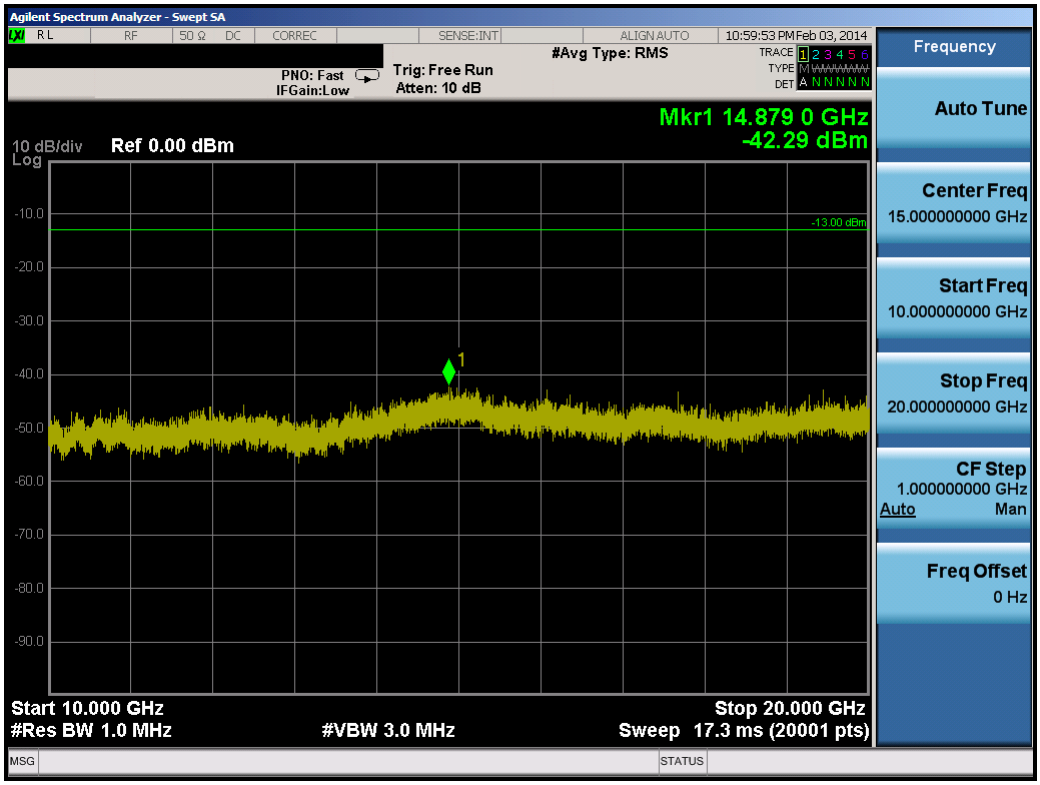
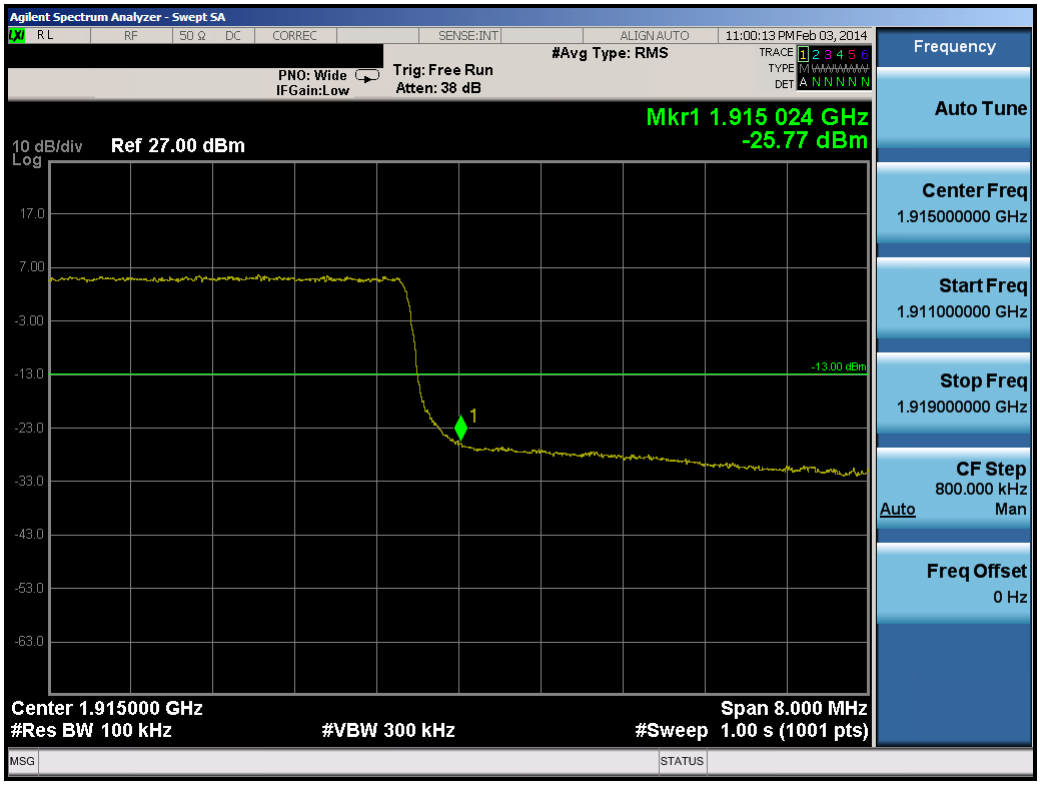


Plot 10-18. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 10-19. Upper Band Edge Plot (10.0MHz QPSK – RB Size 50)

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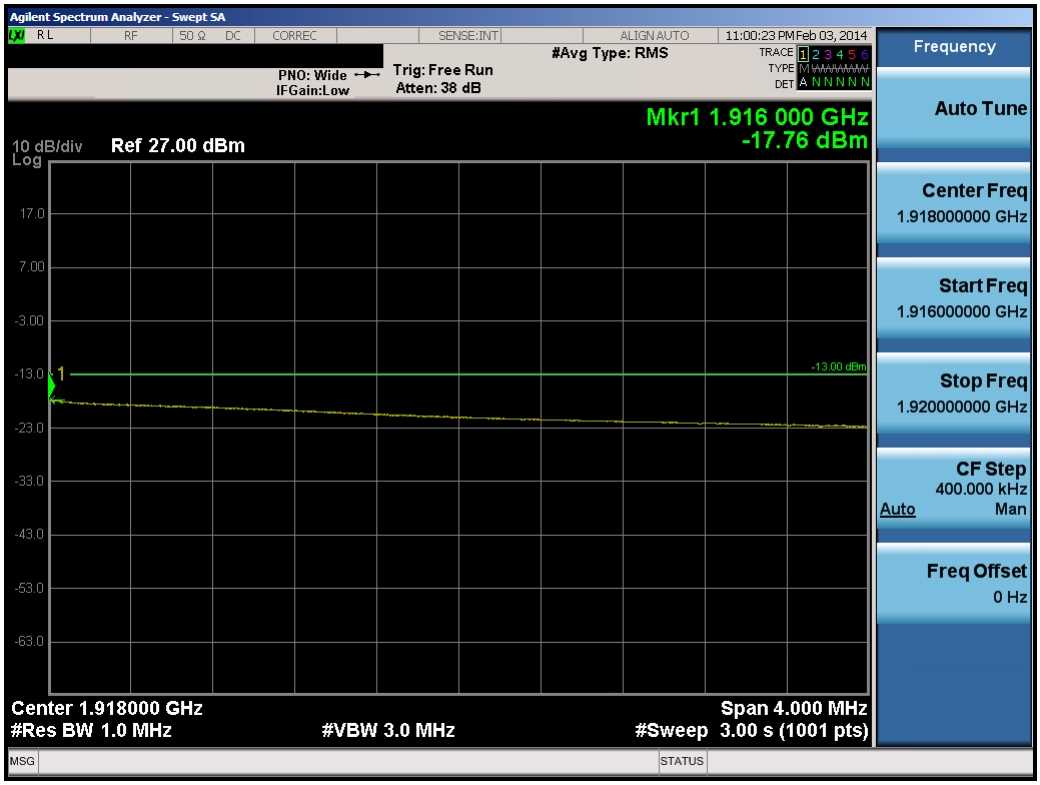
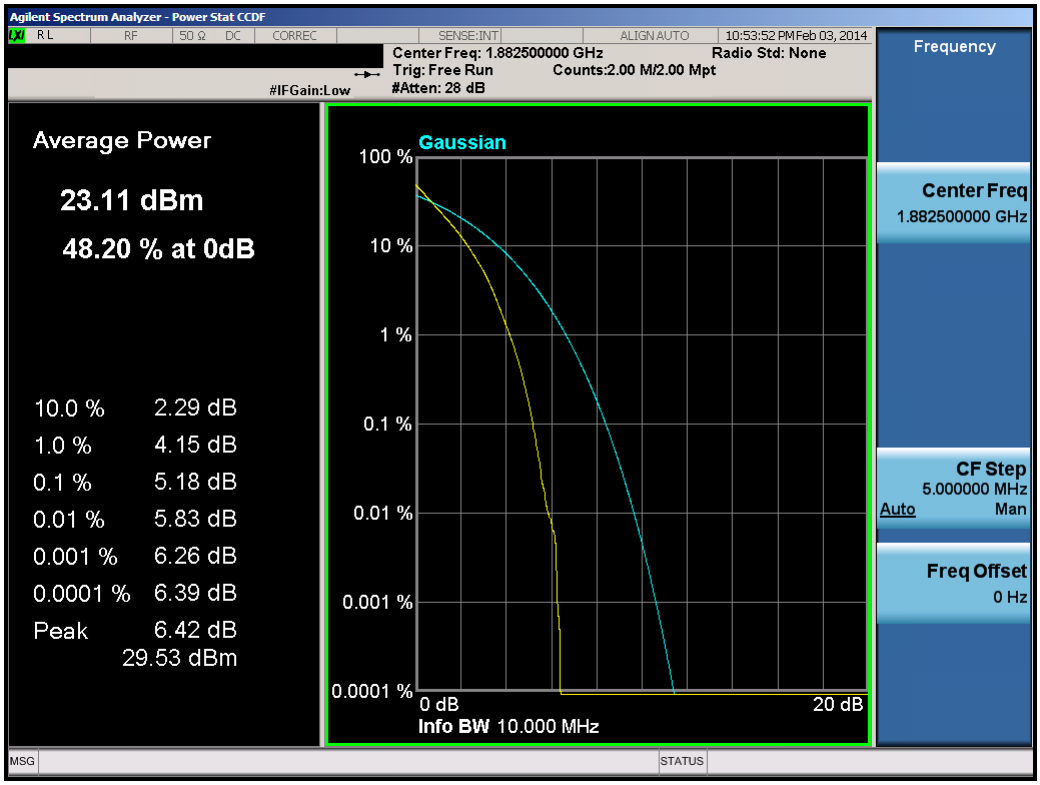


Plot 10-20. Upper Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 10-21. PAR Plot (10.0MHz QPSK – RB Size 50)

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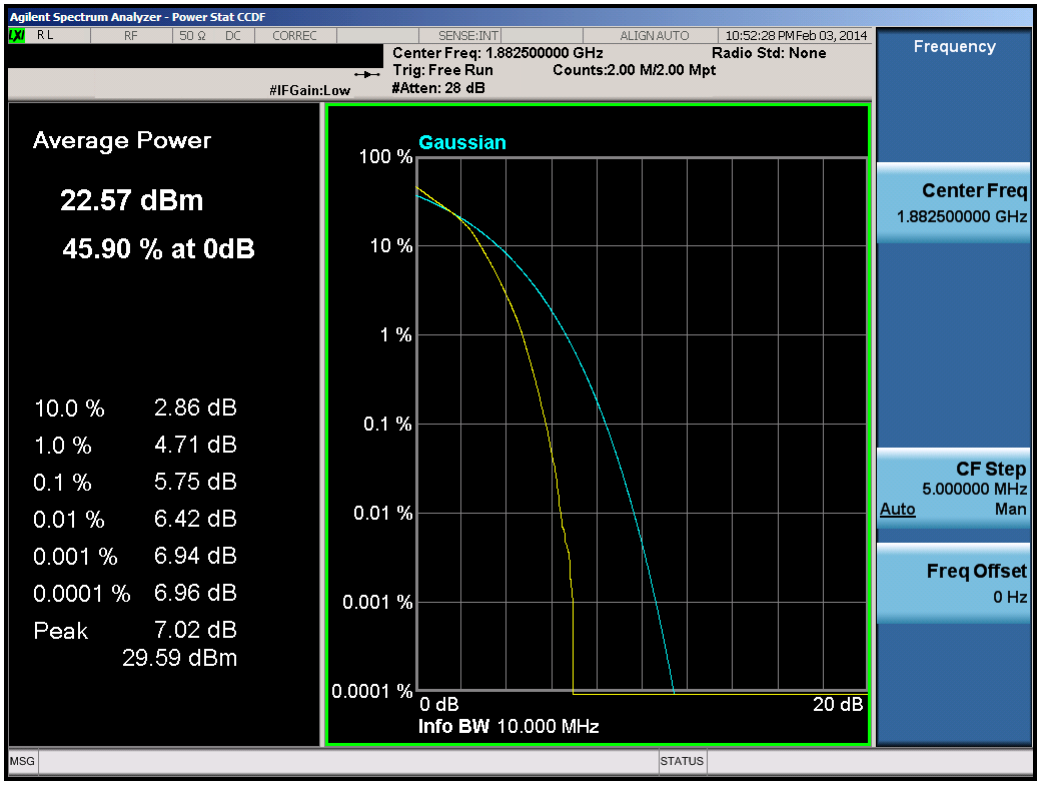

Plot 10-22. PAR Plot (10.0MHz 16-QAM – RB Size 50)

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11.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG900R7** complies with all the requirements of Parts 2, 24, 27 of the FCC rules for LTE operation only.

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