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MEASUREMENT REPORT
FCC Part 24 & 27

Applicant Name:
LG Electronics MobileComm U.S.A
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:
09/07/2012-09/27/2012
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0Y1209241399.ZNF

FCC ID : **ZNFMS870**

APPLICANT: **LG ELECTRONICS MOBILECOMM U.S.A**

Application Type: Certification
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s): §2; §24; §27
EUT Type: Portable Handset
Model(s): MS870
Test Device Serial No.: *identical prototype* [S/N: RF2]

Mode	Tx Frequency (MHz)	Emission Designator	Modulation	ERP/EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE Band 4	1710.7 - 1754.3	1M09G7W	QPSK	0.193	22.850
LTE Band 4	1710.7 - 1754.3	1M10W7W	16QAM	0.156	21.940
LTE Band 4	1711.5 - 1753.5	2M71G7W	QPSK	0.199	22.990
LTE Band 4	1711.5 - 1753.5	2M70W7W	16QAM	0.154	21.880
LTE Band 4	1712.5 - 1752.5	4M50G7W	QPSK	0.178	22.510
LTE Band 4	1712.5 - 1752.5	4M50W7W	16QAM	0.146	21.650
LTE Band 4	1715 - 1750	9M01G7W	QPSK	0.171	22.340
LTE Band 4	1715 - 1750	8M99W7W	16QAM	0.135	21.290
LTE Band 2	1850.7 - 1909.3	1M09G7W	QPSK	0.101	20.050
LTE Band 2	1850.7 - 1909.3	1M10W7W	16QAM	0.088	19.430
LTE Band 2	1851.5 - 1908.5	2M71G7W	QPSK	0.083	19.200
LTE Band 2	1851.5 - 1908.5	2M70W7W	16QAM	0.066	18.220
LTE Band 2	1852.5 - 1907.5	4M49G7W	QPSK	0.102	20.100
LTE Band 2	1852.5 - 1907.5	4M51W7W	16QAM	0.087	19.410
LTE Band 2	1855 - 1905	8M98G7W	QPSK	0.103	20.140
LTE Band 2	1855 - 1905	8M98W7W	16QAM	0.080	19.050
LTE Band 25	1852.5 - 1912.5	4M49G7W	QPSK	0.091	19.610
LTE Band 25	1852.5 - 1912.5	4M50W7W	16QAM	0.077	18.890
LTE Band 25	1855 - 1910	8M98G7W	QPSK	0.091	19.580
LTE Band 25	1855 - 1910	8M98W7W	16QAM	0.071	18.490

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. 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.

PCTEST certifies that no party to this application has been subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

Randy Ortanez
President

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13.0 BAND 2 – 5 MHZ BW 73
14.0 BAND 2 – 10 MHZ BW 80
15.0 BAND 25 – 5 MHZ BW 87
16.0 BAND 25 – 10 MHZ BW 94
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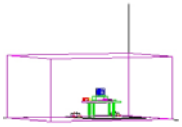


MEASUREMENT REPORT
FCC Part 24 & 27

§2.1033 General Information

APPLICANT:	LG Electronics MobileComm U.S.A
APPLICANT ADDRESS:	1000 Sylvan Avenue
	Englewood Cliffs, NJ 07632, United States
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S):	§2; §24; §27
BASE MODEL:	MS870
FCC ID:	ZNFMS870
FCC CLASSIFICATION:	PCS Licensed Transmitter Held to Ear (PCE)
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm) for Band 5, within frequency block for Bands 2, 5 and 25
Test Device Serial No.:	RF2 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST:	09/07/2012-09/27/2012
TEST REPORT S/N:	0Y1209241399.ZNF

Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab. located in Columbia, MD 21045, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) 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 (2451A-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 (2451A-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.

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.

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 C63.4-2009 on February 15, 2012.

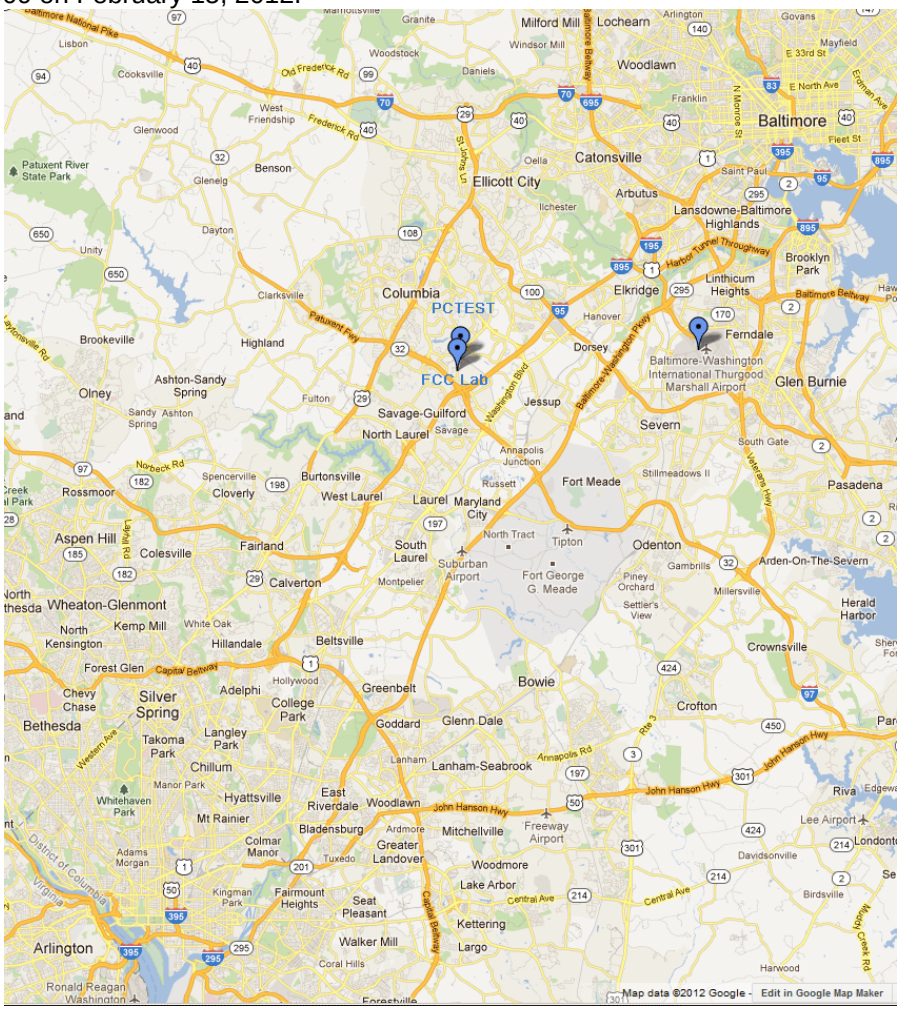


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFMS870**. 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:

850/1700/1900 CDMA/EvDO Rev0/A (BC0, BC15, BC1), Band 2 (1.4, 3, 5, 10 Mhz), 4 (1.4, 3, 5, 10 Mhz), 25 (5, 10 Mhz) LTE, 802.11b/g/n WLAN, Bluetooth (1x,EDR)

2.3 EMI Suppression Device(s)/Modifications

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

2.4 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..

Per 15.19; Docket 95-19

In addition to this requirement, a device subject to certification shall be labeled as follows:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the trade name and FCC ID must be displayed on the device per Section 15.19(b)(2).

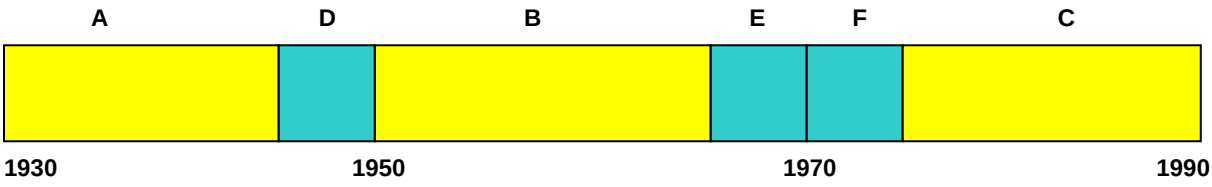
Please see attachment for FCC ID label and label location.

3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

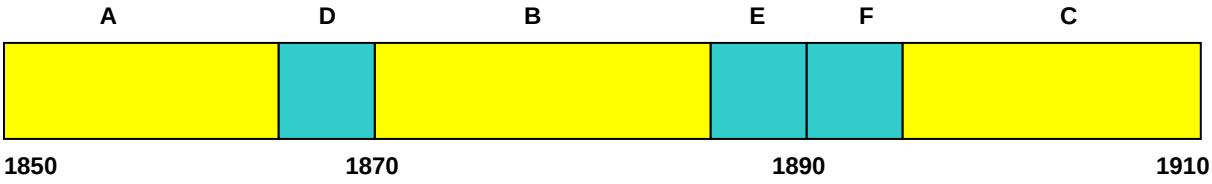
The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-C-2004) was used in the measurement of the **LG Portable Handset FCC ID: ZNFMS870**.

3.2 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)

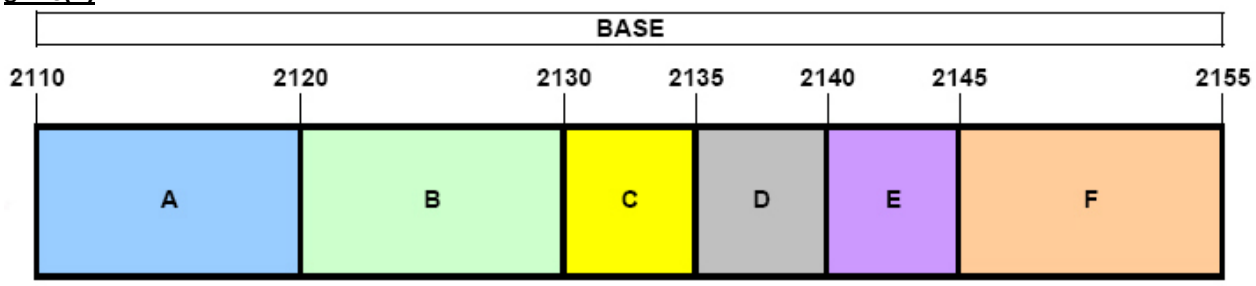
3.3 PCS - Mobile Frequency Blocks



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)

3.4 AWS - Base Frequency Blocks

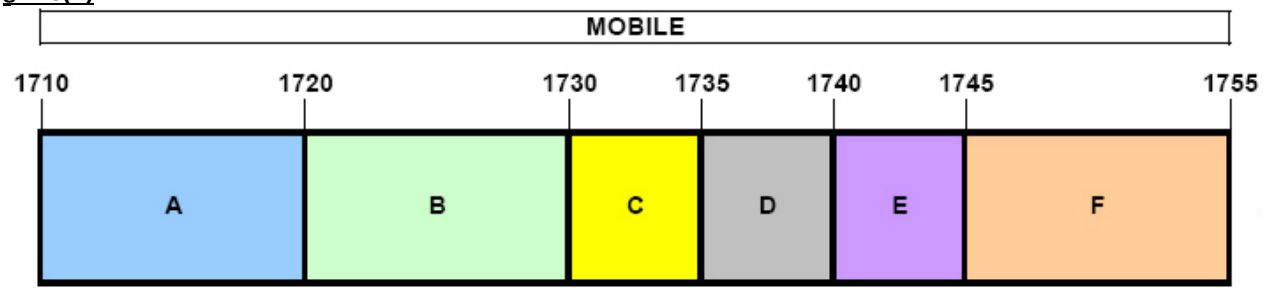
§27.5(h)



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)

3.5 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)

3.6 Occupied Bandwidth

§2.1049, RSS-Gen (4.6.1)

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.

3.7 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051, 24.238(a), §27.53(g), §27.53(h); RSS-133 (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. For Bands 5 and 12, Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. For Bands 2, 4, and 25 compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

3.8 Radiated Power and Radiated Spurious Emissions

§2.1053, §24.232(c), §24.238(a), §27.50(d)(4), §27.53(h), §27.50(c)(10), §27.53(g); RSS-RSS-133 (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 + $10\log_{10}$(Power $_{[Watts]}$) specified in 24.238(a), 27.53(g) and 27.53(h).

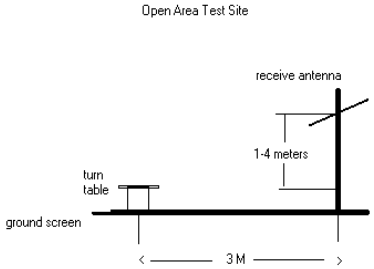


Figure 3-1. Diagram of 3-meter test range

3.9 Peak-Average Ratio

§24.232(d), §27.50(d)(5), RSS-133 (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.

3.10 SVLTE

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

No.	Capable TX Configration	Head SAR	Body SAR	Hotspot SAR	Power Reduction (LTE)	Note
1	CDMA BC0 Voice + WiFi data	O	O	X	X	
2	CDMA BC1 Voice + WiFi data	O	O	X	X	
3	CDMA BC15 Voice + WiFi data	O	O	X	X	
4	CDMA BC0 1X DATA + WiFi data	X	O	O	X	CDMA Hotspot
5	CDMA BC1 1X Data/EVDO + WiFi data	X	O	O	X	CDMA Hotspot
6	CDMA BC15 1X Data/EVDO+ WiFi data	X	O	O	X	CDMA Hotspot
7	LTE B2 + WiFi data	X	O	O	X	LTE Hotspot
8	LTE B4 + WiFi data	X	O	O	X	LTE Hotspot
9	LTE B25 + WiFi data	X	O	O	X	LTE Hotspot
10	CDMA BC0 Voice + LTE B2	O	O	X	O	SVLTE
11	CDMA BC0 Voice + LTE B4	O	O	X	O	SVLTE
12	CDMA BC0 Voice + LTE B25	O	O	X	O	SVLTE
13	CDMA BC1 Voice + LTE B2	O	O	X	O	SVLTE
14	CDMA BC1 Voice + LTE B4	O	O	X	O	SVLTE
15	CDMA BC1 Voice + LTE B25	O	O	X	O	SVLTE
16	CDMA BC15 Voice + LTE B2	O	O	X	O	SVLTE
17	CDMA BC15 Voice + LTE B4	O	O	X	O	SVLTE
18	CDMA BC15 Voice + LTE B25	O	O	X	O	SVLTE
19	CDMA BC0 Voice + LTE B2 + WLAN	O	O	O	O	WIFI Hotspot (SVLTE)
20	CDMA BC0 Voice + LTE B4 + WLAN	O	O	O	O	WIFI Hotspot (SVLTE)
21	CDMA BC0 Voice + LTE B25 + WLAN	O	O	O	O	WIFI Hotspot (SVLTE)
22	CDMA BC1 Voice + LTE B2+ WLAN	O	O	O	O	WIFI Hotspot (SVLTE)
23	CDMA BC1 Voice + LTE B4+ WLAN	O	O	O	O	WIFI Hotspot (SVLTE)
24	CDMA BC1 Voice + LTE B25+ WLAN	O	O	O	O	WIFI Hotspot (SVLTE)
25	CDMA BC15 Voice + LTE B2 + WLAN	O	O	O	O	WIFI Hotspot (SVLTE)
26	CDMA BC15 Voice + LTE B4 + WLAN	O	O	O	O	WIFI Hotspot (SVLTE)
27	CDMA BC15 Voice + LTE B25 + WLAN	O	O	O	O	WIFI Hotspot (SVLTE)

* BT and WLAN are not simultaneous transmission.
* CDMA EVDO and LTE are not simultaneous transmission.
* CDMA BC0 EVDO is not supported.
* VoLTE is supported.
* SVLTE is supported.
* Power reduction for SVLTE mode is supported.
* 1X Advanced capability for CDMA BC0/BC1/BC15 is supported.
* EVDO VoIP is supported.

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.

3.11 Frequency Stability / Temperature Variation

§2.1055, §24.235, §27.54, RSS-133 (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 – For Band 5, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Bands 2, 4, and 25 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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.

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	1/25/2012	Annual	1/25/2013	N/A
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/10/2012	Annual	7/10/2013	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	2/13/2012	Annual	2/13/2013	N/A
Agilent	8447D	Broadband Amplifier	5/8/2012	Annual	5/8/2013	1937A03348
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/5/2012	Annual	4/5/2013	MY45470194
Agilent	N9020A	MXA Signal Analyzer	10/10/2011	Annual	10/10/2012	US46470561
Agilent	N9030A	PXA Signal Analyzer	2/23/2012	Annual	2/23/2013	MY49432391
Espec	ESX-2CA	Environmental Chamber	4/4/2012	Annual	4/4/2013	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/22/2011	Biennial	7/22/2013	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	10/1/2010	Biennial	10/1/2012	128337
Mini-Circuits	VHF-1200+	High Pass Filter	1/15/2012	Annual	1/15/2013	30923
Mini-Circuits	VHF-3100+	High Pass Filter	1/15/2012	Annual	1/15/2013	30841
Rohde & Schwarz	CMU200	Base Station Simulator	N/A		N/A	836536/0005
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Annual	10/7/2012	103962
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	6/26/2012	Annual	6/26/2013	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/30/2012	Annual	5/30/2013	100040
Rohde & Schwarz	ESU26	EMI Test Receiver	12/15/2011	Annual	12/15/2012	100342
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/14/2011	Biennial	11/14/2013	9105-2404
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/26/2012	Biennial	1/26/2014	A051107

Table 4-1. Test Equipment

Note: Rohde & Schwarz Model: CMW500 and CMU200 were used for signaling purposes only and not for calibrated measurements. Care was taken to ensure that testing occurred while test equipment was in calibration.

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 receive power meter 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 power meter. 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).

6.0 TEST RESULTS

6.1 Summary

Company Name: LG Electronics MobileComm U.S.A

FCC ID: ZNFMS870

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)

Mode(s): LTE

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)						
2.1049	RSS-Gen (4.6.1) RSS-133 (2.3)	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0
2.1051, 24.238(a), 27.53(g), 27.53(h)	RSS-133 (6.5.1)	Band Edge / Conducted Spurious Emissions	< 43 + 10log$_{10}$ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Section 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0
24.232(d), 27.50(d)(5)	RSS-133 (6.4)	Peak-Average Ratio	< 13 dB		PASS	Section 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0
2.1046	RSS-133 (4.1)	Transmitter Conducted Output Power	N/A		PASS	SAR Report
24.232(c)	[SRSP-510 (5.1.2)]	Equivalent Isotropic Radiated Power (Band 2, 25)	< 2 Watts max. EIRP	RADIATED	PASS	Section 6.2
27.50(d)(4)		Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. EIRP		PASS	Section 6.2
2.1053, 24.238(a), 27.53(g), 27.53(h)	RSS-133 (6.5.1)	Undesirable Emissions	< 43 + 10log$_{10}$ (P[Watts]) for all out-of-band emissions		PASS	Section 6.3, 6.4, 6.5
2.1055, 27.54, 24.235	RSS-133 (6.3)	Frequency Stability	< 2.5 ppm		PASS	Section 6.6, 6.7, 6.8

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 Sections 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0 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.

6.2 Equivalent Isotropic Radiated Power Output Data

§24.232(c); §27.50(d)(4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1710.70	1.4	QPSK	Standard	1 / 0	13.95	8.47	H	22.42	0.175	-7.58
1732.50	1.4	QPSK	Standard	1 / 0	14.31	8.54	H	22.85	0.193	-7.15
1754.30	1.4	QPSK	Standard	1 / 0	13.46	8.60	H	22.06	0.161	-7.94
1710.70	1.4	16-QAM	Standard	1 / 0	13.15	8.47	H	21.62	0.145	-8.38
1732.50	1.4	16-QAM	Standard	1 / 0	13.40	8.54	H	21.94	0.156	-8.06
1754.30	1.4	16-QAM	Standard	1 / 0	12.54	8.60	H	21.14	0.130	-8.86
1711.50	3	QPSK	Standard	1 / 0	13.64	8.47	H	22.11	0.163	-7.89
1732.50	3	QPSK	Standard	1 / 0	14.45	8.54	H	22.99	0.199	-7.01
1753.50	3	QPSK	Standard	1 / 14	12.69	8.60	H	21.29	0.135	-8.71
1711.50	3	16-QAM	Standard	1 / 0	12.43	8.47	H	20.90	0.123	-9.10
1732.50	3	16-QAM	Standard	1 / 0	13.34	8.54	H	21.88	0.154	-8.12
1753.50	3	16-QAM	Standard	1 / 14	11.74	8.60	H	20.34	0.108	-9.66
1712.50	5	QPSK	Standard	1 / 0	13.38	8.47	H	21.85	0.153	-8.15
1732.50	5	QPSK	Standard	1 / 0	13.97	8.54	H	22.51	0.178	-7.49
1752.50	5	QPSK	Standard	1 / 24	13.04	8.60	H	21.64	0.146	-8.36
1712.50	5	16-QAM	Standard	1 / 0	12.46	8.47	H	20.93	0.124	-9.07
1732.50	5	16-QAM	Standard	1 / 0	13.11	8.54	H	21.65	0.146	-8.35
1752.50	5	16-QAM	Standard	1 / 24	12.10	8.60	H	20.70	0.117	-9.30
1715.00	10	QPSK	Standard	1 / 49	13.87	8.47	H	22.34	0.171	-7.66
1732.50	10	QPSK	Standard	1 / 49	13.52	8.54	H	22.06	0.161	-7.94
1750.00	10	QPSK	Standard	1 / 49	13.27	8.60	H	21.87	0.154	-8.13
1715.00	10	16-QAM	Standard	1 / 49	12.82	8.47	H	21.29	0.135	-8.71
1732.50	10	16-QAM	Standard	1 / 49	12.23	8.54	H	20.77	0.119	-9.23
1750.00	10	16-QAM	Standard	1 / 49	12.33	8.60	H	20.93	0.124	-9.07

Table 6-2. Equivalent Isotropic Radiated Power Output Data (Band 4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	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	8.91	8.56	H	17.47	0.056	-15.54
1882.50	5	QPSK	Standard	1 / 24	10.17	8.55	H	18.72	0.074	-14.29
1912.50	5	QPSK	Standard	1 / 0	11.08	8.53	H	19.61	0.091	-13.40
1852.50	5	16-QAM	Standard	1 / 24	8.24	8.56	H	16.80	0.048	-16.21
1882.50	5	16-QAM	Standard	1 / 24	9.48	8.55	H	18.03	0.064	-14.98
1912.50	5	16-QAM	Standard	1 / 0	10.36	8.53	H	18.89	0.077	-14.12
1855.00	10	QPSK	Standard	1 / 0	9.22	8.56	H	17.78	0.060	-15.23
1882.50	10	QPSK	Standard	1 / 49	10.00	8.55	H	18.55	0.072	-14.46
1910.00	10	QPSK	Standard	1 / 0	11.05	8.53	H	19.58	0.091	-13.43
1855.00	10	16-QAM	Standard	1 / 0	8.16	8.56	H	16.72	0.047	-16.29
1882.50	10	16-QAM	Standard	1 / 49	8.93	8.55	H	17.48	0.056	-15.53
1910.00	10	16-QAM	Standard	1 / 0	9.96	8.53	H	18.49	0.071	-14.52

Table 6-3. Equivalent Isotropic Radiated Power Output Data (Band 25)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1850.70	1.4	QPSK	Standard	3 / 1	9.57	8.56	H	18.13	0.065	-14.88
1880.00	1.4	QPSK	Standard	3 / 1	10.18	8.55	H	18.73	0.075	-14.28
1909.30	1.4	QPSK	Standard	3 / 1	11.51	8.54	H	20.05	0.101	-12.96
1850.70	1.4	16-QAM	Standard	3 / 1	8.82	8.56	H	17.38	0.055	-15.63
1880.00	1.4	16-QAM	Standard	3 / 1	9.56	8.55	H	18.11	0.065	-14.90
1909.30	1.4	16-QAM	Standard	3 / 1	10.89	8.54	H	19.43	0.088	-13.58
1851.50	3	QPSK	Standard	1 / 14	9.56	8.56	H	18.12	0.065	-14.89
1880.00	3	QPSK	Standard	1 / 14	10.37	8.55	H	18.92	0.078	-14.09
1908.50	3	QPSK	Standard	1 / 14	10.66	8.54	H	19.20	0.083	-13.81
1851.50	3	16-QAM	Standard	1 / 14	8.44	8.56	H	17.00	0.050	-16.01
1880.00	3	16-QAM	Standard	1 / 14	9.27	8.55	H	17.82	0.061	-15.19
1908.50	3	16-QAM	Standard	1 / 14	9.68	8.54	H	18.22	0.066	-14.79
1852.50	5	QPSK	Standard	1 / 24	8.83	8.56	H	17.39	0.055	-15.62
1880.00	5	QPSK	Standard	1 / 24	9.86	8.55	H	18.41	0.069	-14.60
1907.50	5	QPSK	Standard	1 / 24	11.56	8.54	H	20.10	0.102	-12.91
1852.50	5	16-QAM	Standard	1 / 24	8.16	8.56	H	16.72	0.047	-16.29
1880.00	5	16-QAM	Standard	1 / 24	9.08	8.55	H	17.63	0.058	-15.38
1907.50	5	16-QAM	Standard	1 / 24	10.87	8.54	H	19.41	0.087	-13.60
1855.00	10	QPSK	Standard	1 / 49	9.86	8.56	H	18.42	0.070	-14.59
1880.00	10	QPSK	Standard	1 / 49	10.20	8.55	H	18.75	0.075	-14.26
1905.00	10	QPSK	Standard	1 / 49	11.60	8.54	H	20.14	0.103	-12.87
1855.00	10	16-QAM	Standard	1 / 49	8.81	8.56	H	17.37	0.055	-15.64
1880.00	10	16-QAM	Standard	1 / 49	9.10	8.55	H	17.65	0.058	-15.36
1905.00	10	16-QAM	Standard	1 / 49	10.51	8.54	H	19.05	0.080	-13.96

Table 6-4. Equivalent Isotropic Radiated Power Output Data (Band 2)

NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This level is recorded using the power meter. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

This device was tested under all modulations and channel bandwidth configurations and the worst case emissions are reported at the maximum channel BW and respective settings for QPSK for all bands. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

6.3 Band 4 Radiated Measurements

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1710.70	MHz		
CHANNEL:	19957			
MEASURED OUTPUT POWER:	22.42	dBm	=	0.175 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	1.4 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.42	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3421.40	-52.66	8.09	-44.56	H	66.98
5132.10	-57.16	10.21	-46.95	H	69.37
6842.80	-55.43	11.31	-44.12	H	66.54
8553.50	-56.40	13.02	-43.38	H	65.80
10264.20	-50.14	13.01	-37.13	H	59.55
11974.90	-86.91	13.21	-73.70	H	96.12

Table 6-5. Radiated Spurious Data (Ch. 19975)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations and channel bandwidth configurations and the worst case emissions are reported at the maximum channel BW and respective settings for QPSK for all bands. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

Band 4 Radiated Measurements (cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1732.50	MHz		
CHANNEL:	20175			
MEASURED OUTPUT POWER:	22.85	dBm	= 0.193	W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	1.4 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.85	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3465.00	-48.36	8.26	-40.10	H	62.95
5197.50	-56.71	10.26	-46.45	H	69.30
6930.00	-52.82	11.42	-41.40	H	64.25
8662.50	-43.86	13.07	-30.79	H	53.64
10395.00	-46.35	13.12	-33.23	H	56.08
12127.50	-50.13	13.25	-36.87	H	59.72

Table 6-6. Radiated Spurious Data (Ch. 20175)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations and channel bandwidth configurations and the worst case emissions are reported at the maximum channel BW and respective settings for QPSK for all bands. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

Band 4 Radiated Measurements (cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1754.30	MHz		
CHANNEL:	20393			
MEASURED OUTPUT POWER:	22.06	dBm	=	0.161 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	1.4 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.06	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3508.60	-52.86	8.40	-44.46	H	66.52
5262.90	-54.13	10.32	-43.82	H	65.88
7017.20	-54.53	11.51	-43.01	H	65.07
8771.50	-54.28	13.11	-41.17	H	63.23
10525.80	-89.67	13.20	-76.47	H	98.53
12280.10	-85.91	13.31	-72.60	H	94.66

Table 6-7. Radiated Spurious Data (Ch. 20375)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations and channel bandwidth configurations and the worst case emissions are reported at the maximum channel BW and respective settings for QPSK for all bands. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

6.4 Band 2 Radiated Measurements

§2.1053, §24.238(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1850.70	MHz		
CHANNEL:	18607			
MEASURED OUTPUT POWER:	18.13	dBm	=	0.065 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	1.4 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	31.13	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3701.40	-51.86	8.40	-43.46	H	61.59
5552.10	-55.38	10.63	-44.76	H	62.89
7402.80	-56.69	11.84	-44.86	H	62.99
9253.50	-55.59	13.29	-42.30	H	60.43
11104.20	-47.21	13.50	-33.71	H	51.84
12954.90	-84.83	13.68	-71.15	H	89.28

Table 6-8. Radiated Spurious Data (Ch. 18625)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations and channel bandwidth configurations and the worst case emissions are reported at the maximum channel BW and respective settings for QPSK for all bands. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

Band 2 Radiated Measurements (cont'd)

§2.1053, §24.238(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1880.00	MHz		
CHANNEL:	18900			
MEASURED OUTPUT POWER:	18.73	dBm	=	0.075 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	1.4 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	31.73	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-49.48	8.42	-41.06	H	59.79
5640.00	-55.62	10.66	-44.96	H	63.69
7520.00	-57.83	11.92	-45.91	H	64.64
9400.00	-56.70	13.24	-43.46	H	62.19
11280.00	-50.52	13.49	-37.03	H	55.76
13160.00	-84.53	13.83	-70.70	H	89.43

Table 6-9. Radiated Spurious Data (Ch. 18900)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations and channel bandwidth configurations and the worst case emissions are reported at the maximum channel BW and respective settings for QPSK for all bands. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

Band 2 Radiated Measurements (cont'd)

§2.1053, §24.238(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1909.30	MHz		
CHANNEL:	19193			
MEASURED OUTPUT POWER:	20.05	dBm	=	0.101 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	1.4 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.05	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3818.60	-43.29	8.55	-34.75	H	54.80
5727.90	-52.57	10.69	-41.89	H	61.94
7637.20	-54.54	12.05	-42.50	H	62.55
9546.50	-54.32	13.20	-41.12	H	61.17
11455.80	-50.92	13.43	-37.49	H	57.54
13365.10	-84.25	14.00	-70.25	H	90.30

Table 6-10. Radiated Spurious Data (Ch. 19175)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations and channel bandwidth configurations and the worst case emissions are reported at the maximum channel BW and respective settings for QPSK for all bands. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

6.5 Band 25 Radiated Measurements

§2.1053, §24.238(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1852.50	MHz		
CHANNEL:	26065			
MEASURED OUTPUT POWER:	17.47	dBm	=	0.056 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	30.47	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3705.00	-53.97	8.40	-45.57	H	63.04
5557.50	-55.00	10.63	-44.38	H	61.85
7410.00	-92.54	11.84	-80.70	H	98.17
9262.50	-92.05	13.29	-78.76	H	96.23
11115.00	-85.28	13.50	-71.78	H	89.25
12967.50	-84.83	13.68	-71.15	H	88.62

Table 6-11. Radiated Spurious Data (Ch. 26065)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations and channel bandwidth configurations and the worst case emissions are reported at the maximum channel BW and respective settings for QPSK for all bands. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

Band 25 Radiated Measurements (cont'd)

§2.1053, §24.238(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1882.50	MHz		
CHANNEL:	26365			
MEASURED OUTPUT POWER:	18.72	dBm	=	0.074 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	31.72	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3765.00	-51.34	8.44	-42.91	H	61.63
5647.50	-55.49	10.66	-44.83	H	63.55
7530.00	-92.49	11.94	-80.56	H	99.28
9412.50	-91.86	13.23	-78.63	H	97.35
11295.00	-87.71	13.48	-74.23	H	92.95
13177.50	-84.49	13.84	-70.65	H	89.37

Table 6-12. Radiated Spurious Data (Ch. 26365)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations and channel bandwidth configurations and the worst case emissions are reported at the maximum channel BW and respective settings for QPSK for all bands. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

Band 25 Radiated Measurements (cont'd)

§2.1053, §24.238(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1912.50	MHz		
CHANNEL:	26665			
MEASURED OUTPUT POWER:	19.61	dBm	=	0.091 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	32.61	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3825.00	-43.78	8.57	-35.21	H	54.82
5737.50	-55.54	10.69	-44.85	H	64.46
7650.00	-92.56	12.07	-80.49	H	100.10
9562.50	-91.55	13.20	-78.35	H	97.96
11475.00	-88.21	13.42	-74.79	H	94.40
13387.50	-84.21	14.04	-70.17	H	89.78

Table 6-13. Radiated Spurious Data (Ch. 26665)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations and channel bandwidth configurations and the worst case emissions are reported at the maximum channel BW and respective settings for QPSK for all bands. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

6.6 Band 4 Frequency Stability Measurements

§2.1055, §27.54, RSS-133 (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)	1,732,499,994	-6	-0.0000003
100 %		- 30	1,732,500,002	2	0.0000001
100 %		- 20	1,732,500,009	9	0.0000005
100 %		- 10	1,732,499,981	-19	-0.0000011
100 %		0	1,732,500,015	15	0.0000009
100 %		+ 10	1,732,500,003	3	0.0000002
100 %		+ 20	1,732,500,006	6	0.0000003
100 %		+ 30	1,732,500,018	18	0.0000010
100 %		+ 40	1,732,499,997	-3	-0.0000002
100 %		+ 50	1,732,500,001	1	0.0000001
115 %	4.37	+ 20	1,732,500,012	12	0.0000007
85 %	3.23	+ 20	1,732,499,980	-20	-0.0000012

Table 6-14. Frequency Stability Data (Band 4)

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Note: Carrier Frequency Stability Measurements performed according to ANSI/TI/EIA-603-C-2004, Aug. 17, 2004

Band 4 Frequency Stability Measurements (Cont'd)

§2.1055, §27.54; RSS-133 (6.3)

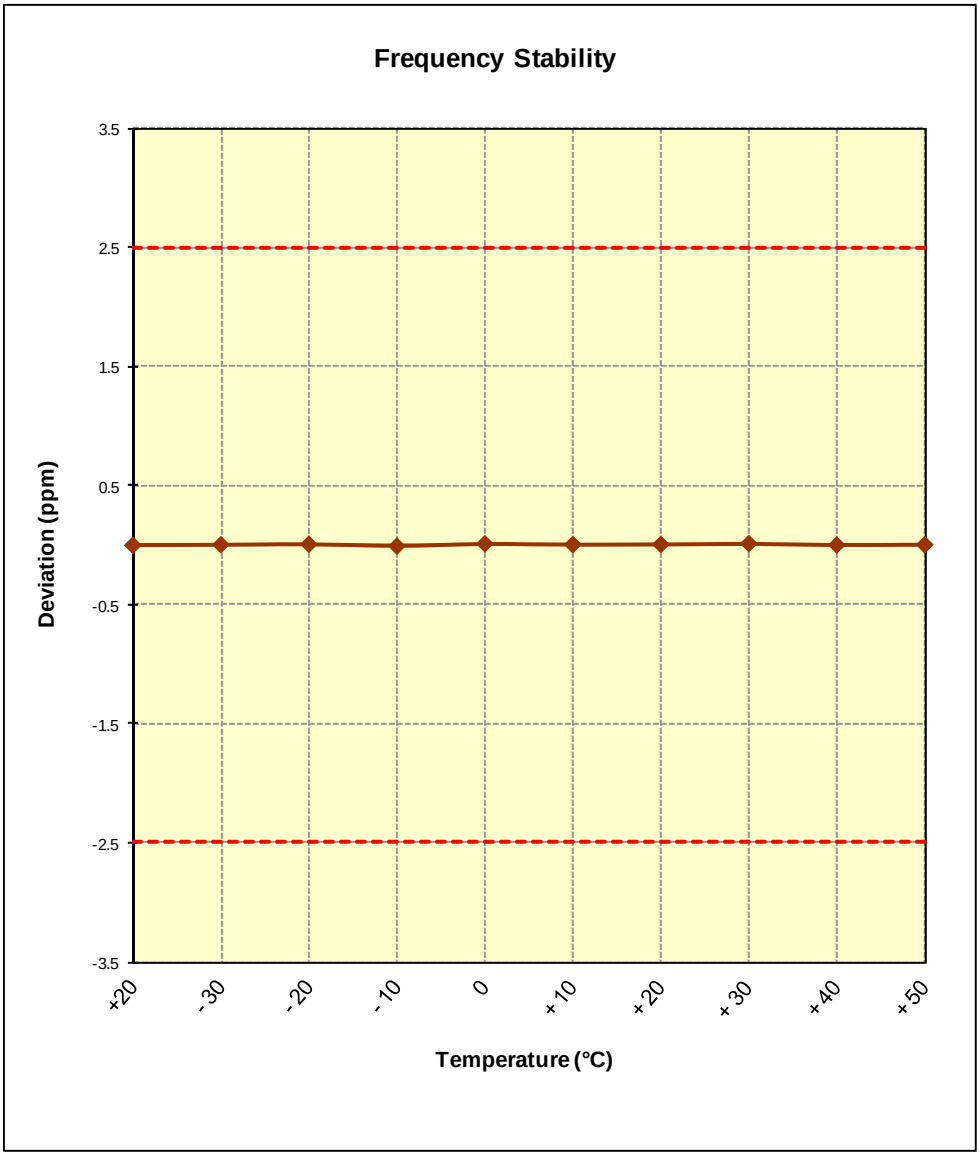


Figure 6-1. Frequency Stability Graph (Band 4)

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Note: Carrier Frequency Stability Measurements performed according to ANSI/TI/EIA-603-C-2004, Aug. 17, 2004

6.7 Band 2 Frequency Stability Measurements

§2.1055, §24.235

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)	1,880,000,016	16	0.0000009
100 %		- 30	1,880,000,000	0	0.0000000
100 %		- 20	1,880,000,018	18	0.0000010
100 %		- 10	1,880,000,007	7	0.0000004
100 %		0	1,880,000,000	0	0.0000000
100 %		+ 10	1,880,000,000	0	0.0000000
100 %		+ 20	1,879,999,998	-2	-0.0000001
100 %		+ 30	1,879,999,998	-2	-0.0000001
100 %		+ 40	1,879,999,993	-7	-0.0000004
100 %		+ 50	1,879,999,998	-2	-0.0000001
115 %	4.37	+ 20	1,879,999,981	-19	-0.0000010
85 %	3.23	+ 20	1,879,999,996	-4	-0.0000002

Table 6-15. Frequency Stability Data (Band 2)

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Note: Carrier Frequency Stability Measurements performed according to ANSI/TI/EIA-603-C-2004, Aug. 17, 2004

Band 2 Frequency Stability Measurements (Cont'd)

§2.1055, §24.235

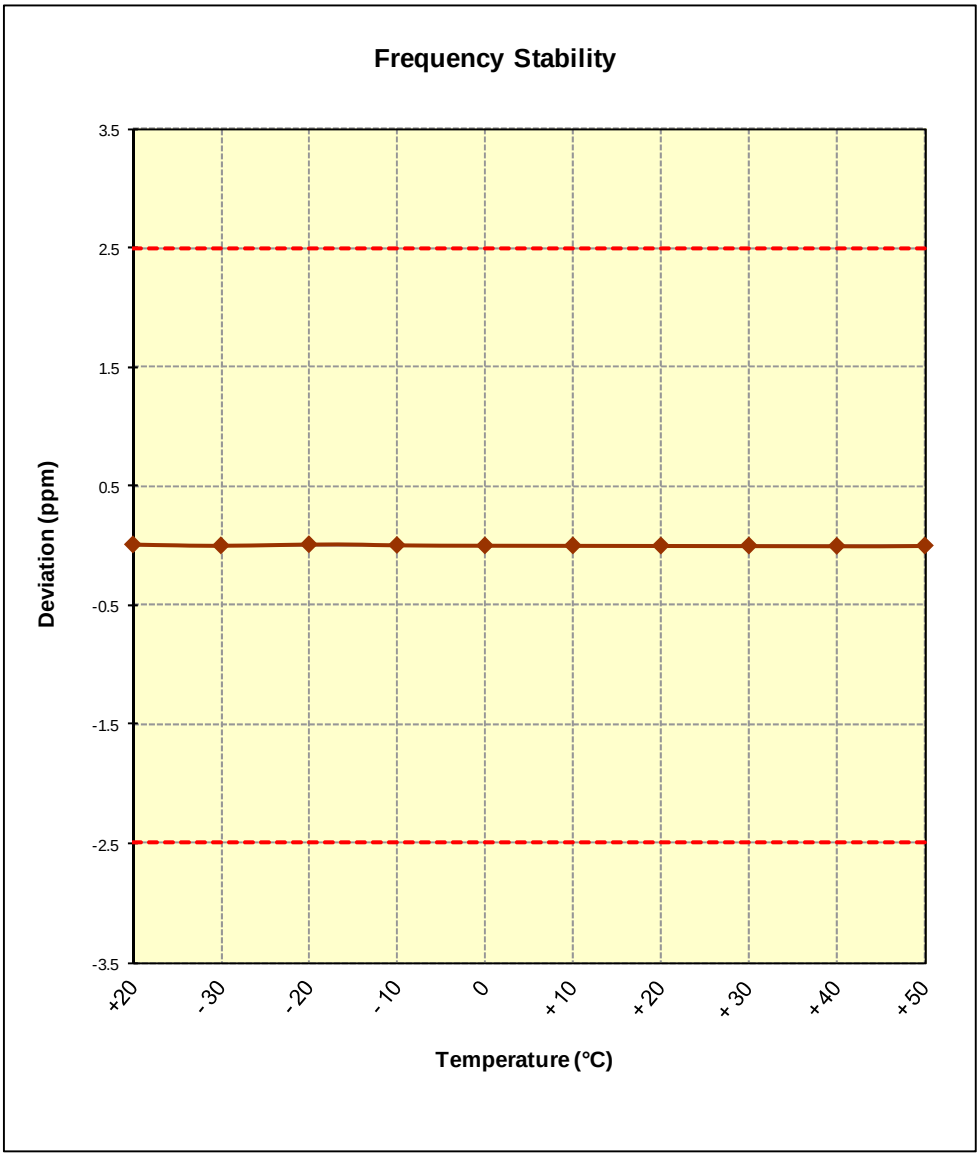


Figure 6-2. Frequency Stability Graph (Band 2)

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Note: Carrier Frequency Stability Measurements performed according to ANSI/TI/EIA-603-C-2004, Aug. 17, 2004

6.8 Band 25 Frequency Stability Measurements

§2.1055, §24.235

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)	1,882,499,983	-17	-0.0000009
100 %		- 30	1,882,500,003	3	0.0000002
100 %		- 20	1,882,499,990	-10	-0.0000005
100 %		- 10	1,882,500,019	19	0.0000010
100 %		0	1,882,499,981	-19	-0.0000010
100 %		+ 10	1,882,499,986	-14	-0.0000007
100 %		+ 20	1,882,500,011	11	0.0000006
100 %		+ 30	1,882,499,985	-15	-0.0000008
100 %		+ 40	1,882,500,013	13	0.0000007
100 %		+ 50	1,882,499,989	-11	-0.0000006
115 %	4.37	+ 20	1,882,500,013	13	0.0000007
85 %	3.23	+ 20	1,882,500,013	13	0.0000007

Table 6-16. Frequency Stability Data (Band 25)

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Note: Carrier Frequency Stability Measurements performed according to ANSI/TI/EIA-603-C-2004, Aug. 17, 2004

Band 25 Frequency Stability Measurements (Cont'd)

§2.1055, §24.235

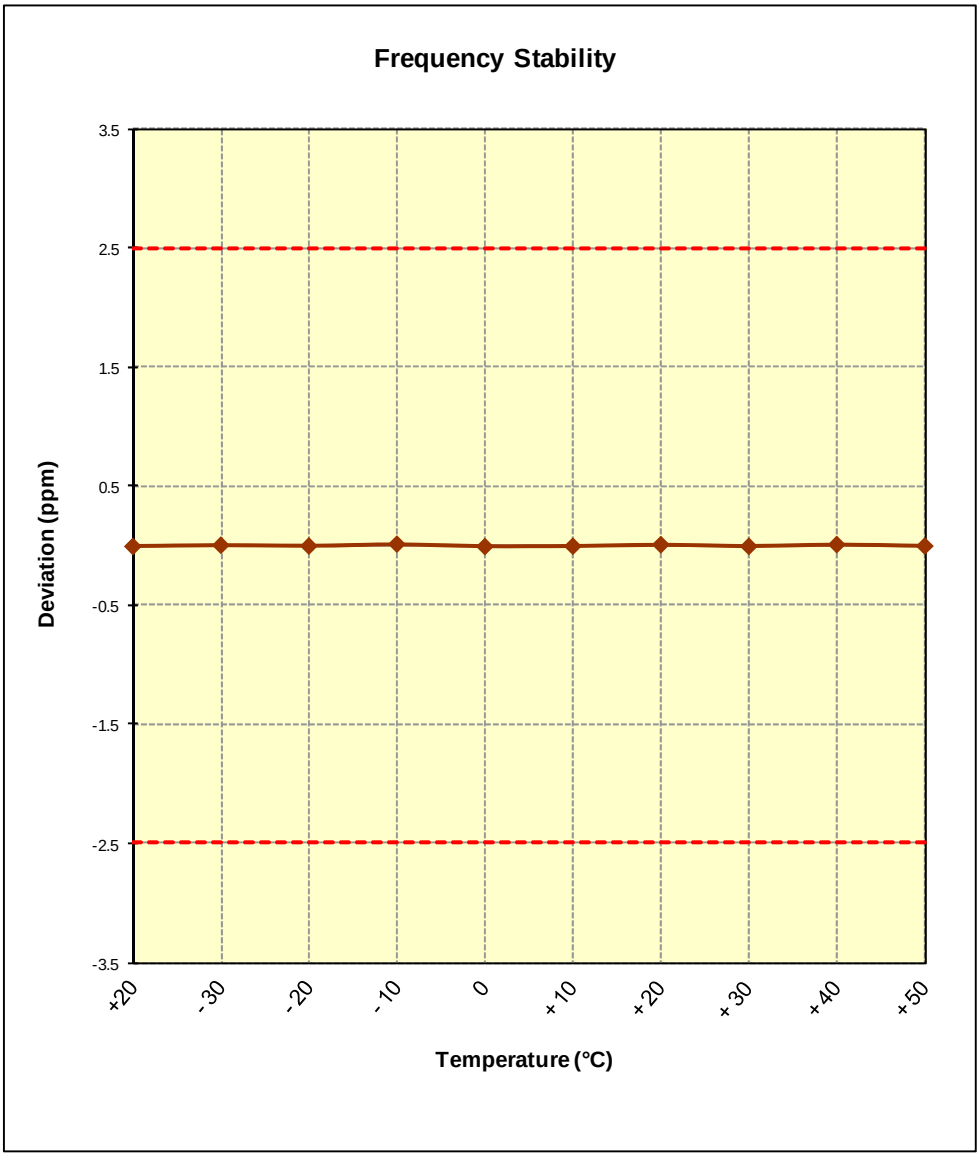
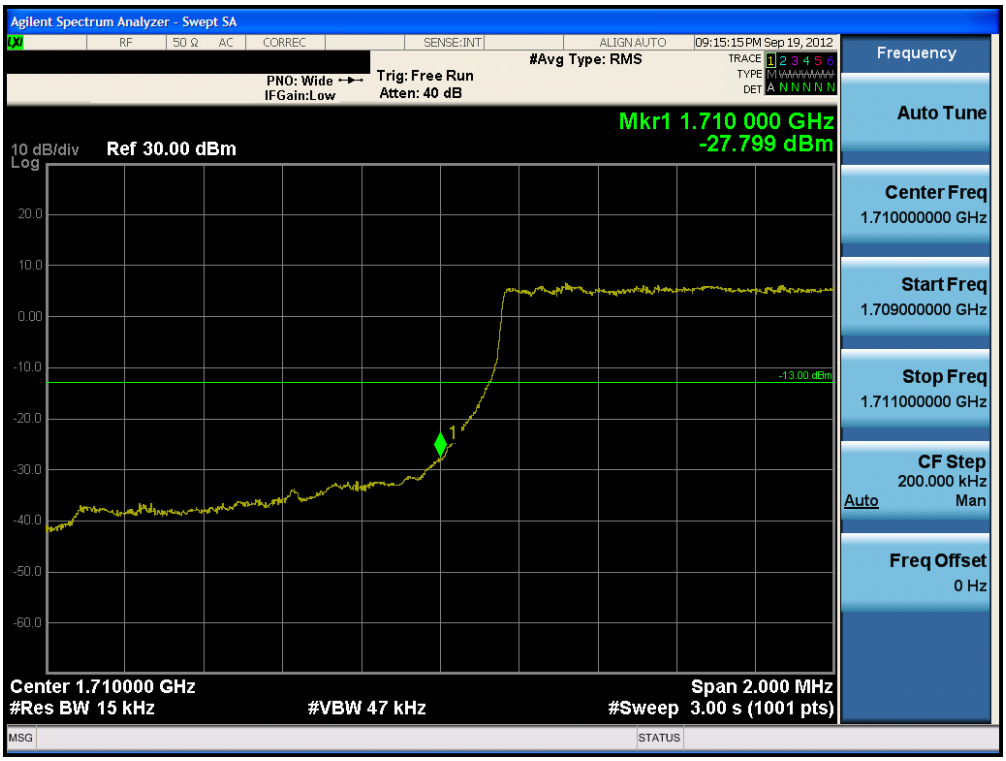


Figure 6-3. Frequency Stability Graph (Band 25)

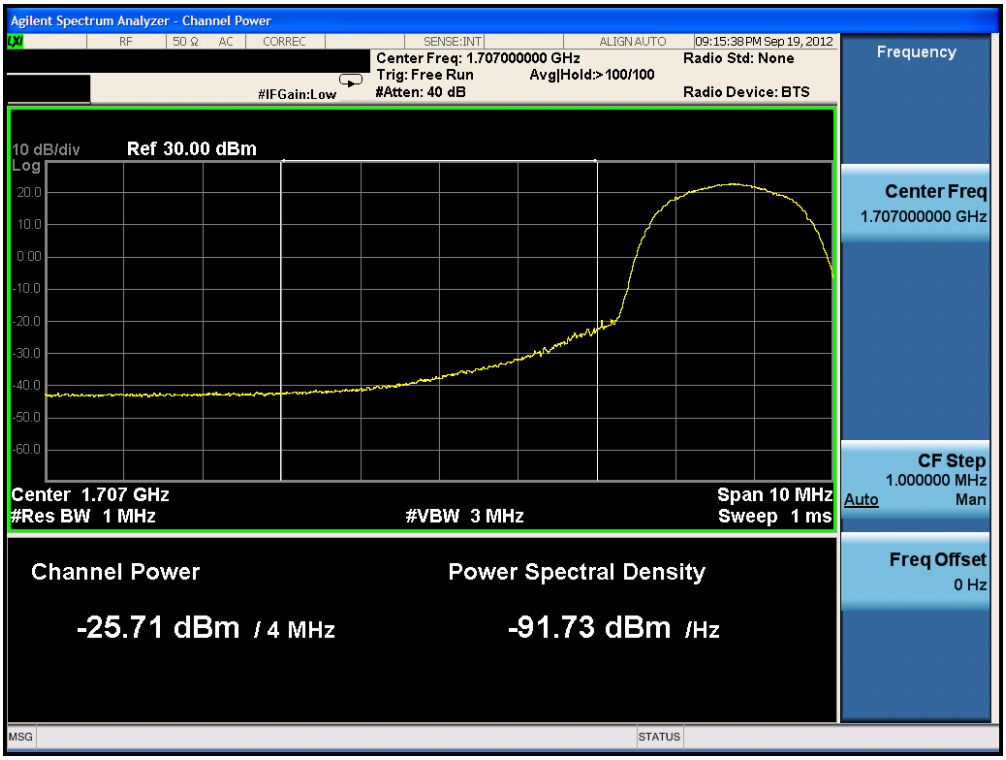
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Note: Carrier Frequency Stability Measurements performed according to ANSI/TI/EIA-603-C-2004, Aug. 17, 2004

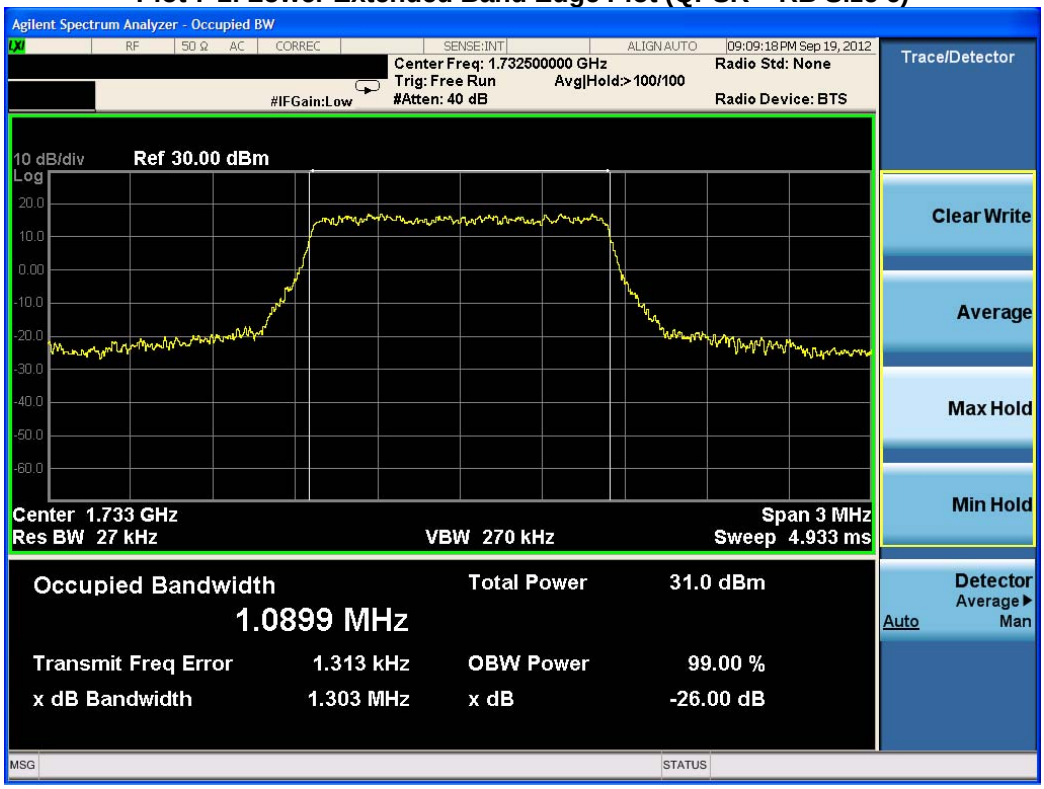
7.0 BAND 4 – 1.4 MHZ BW



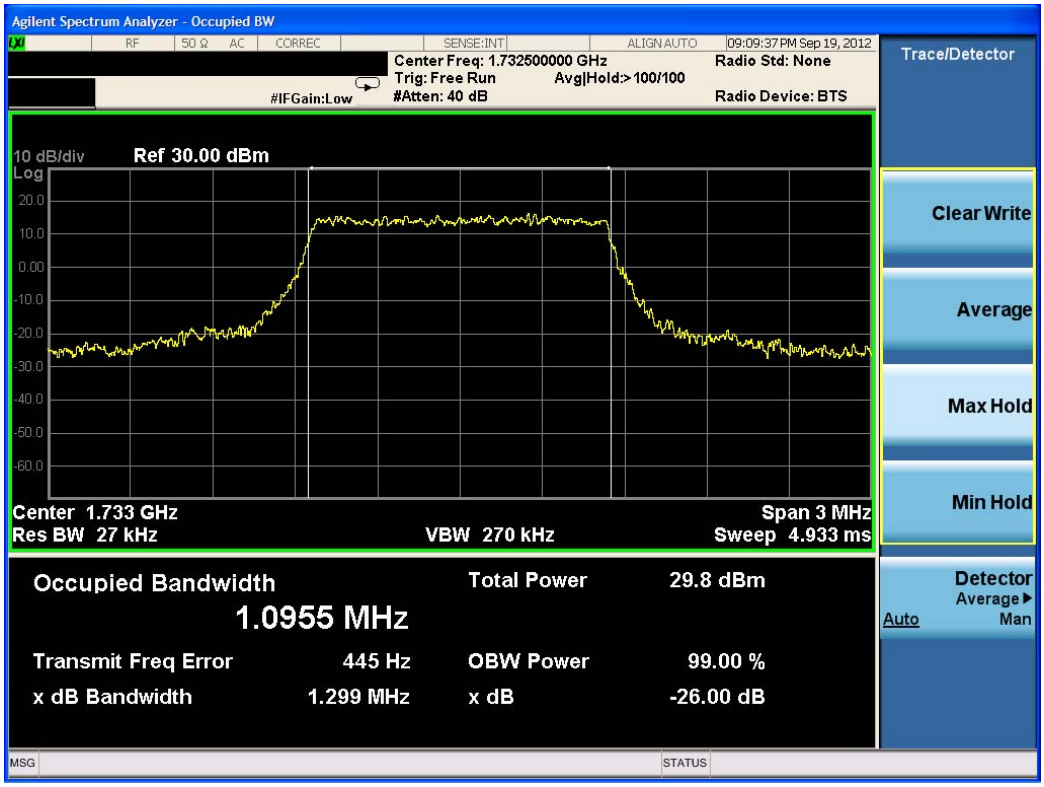
Plot 7-1. Lower Band Edge Plot (QPSK – RB Size 6)



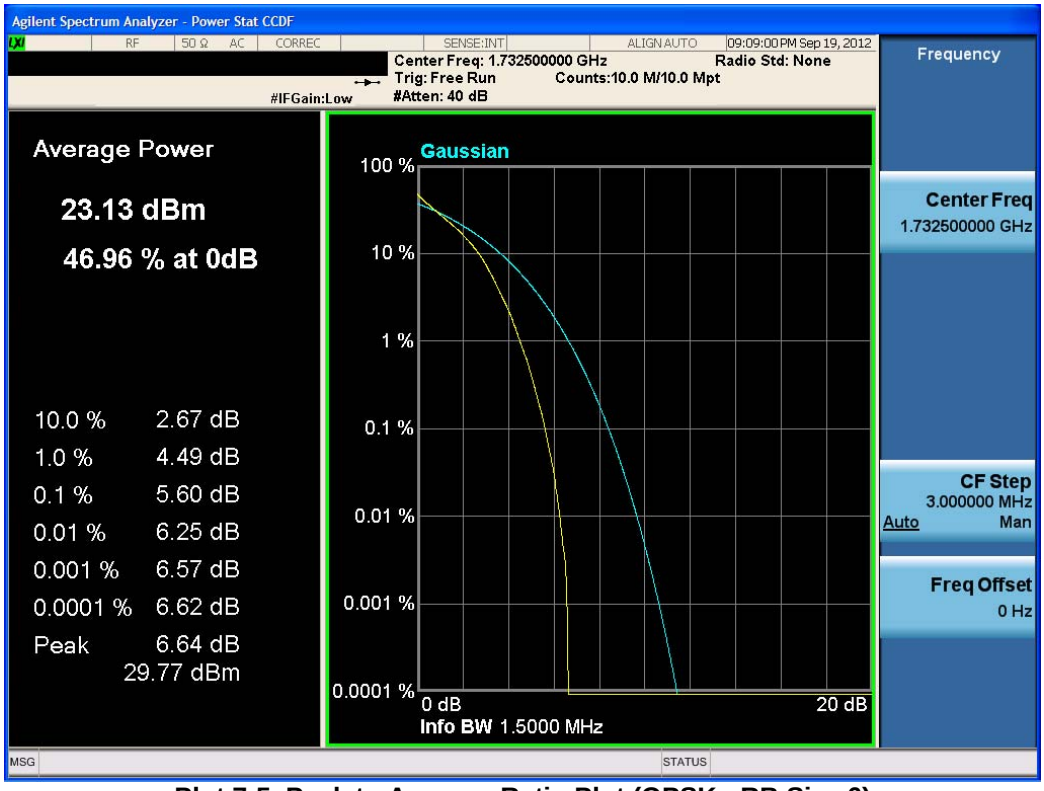
Plot 7-2. Lower Extended Band Edge Plot (QPSK – RB Size 6)



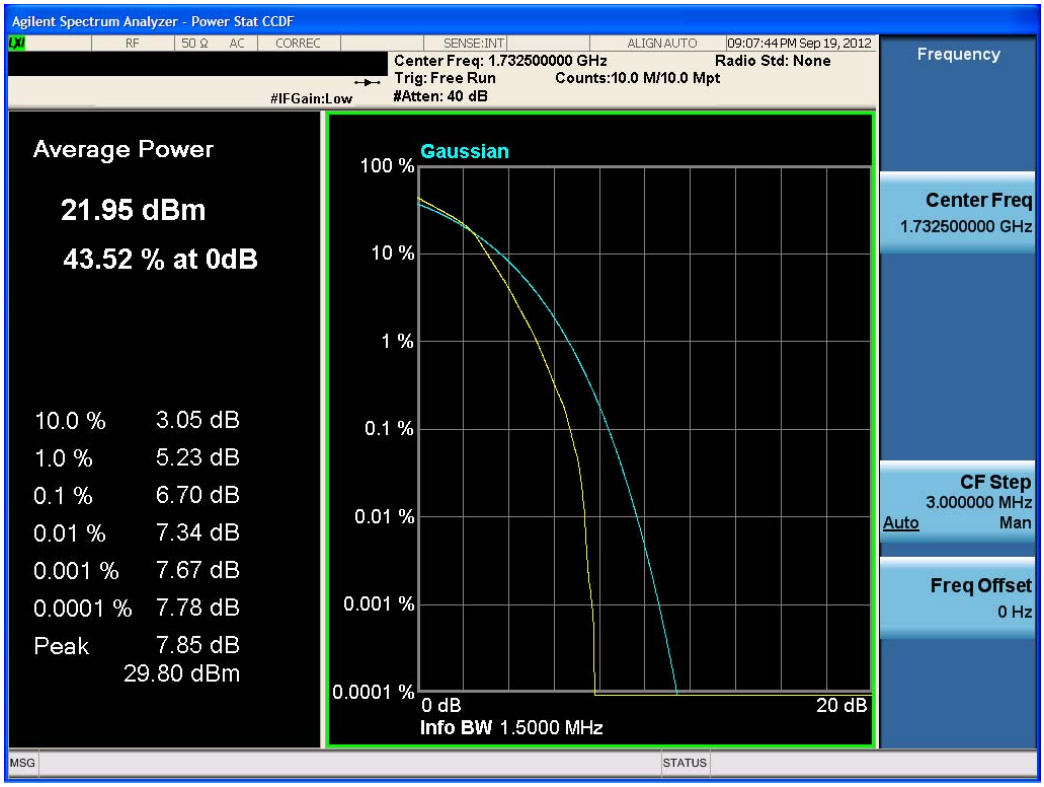
Plot 7-3. Occupied Bandwidth Plot (QPSK – RB Size 6)



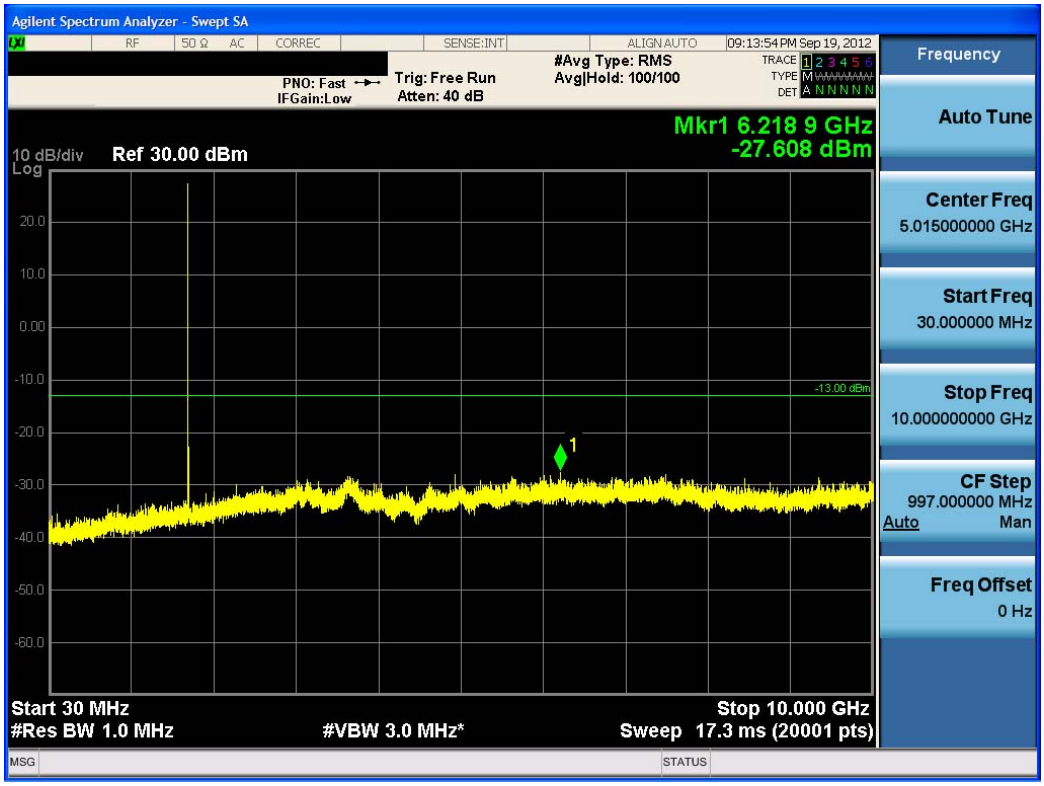
Plot 7-4. Occupied Bandwidth Plot (16-QAM – RB Size 6)



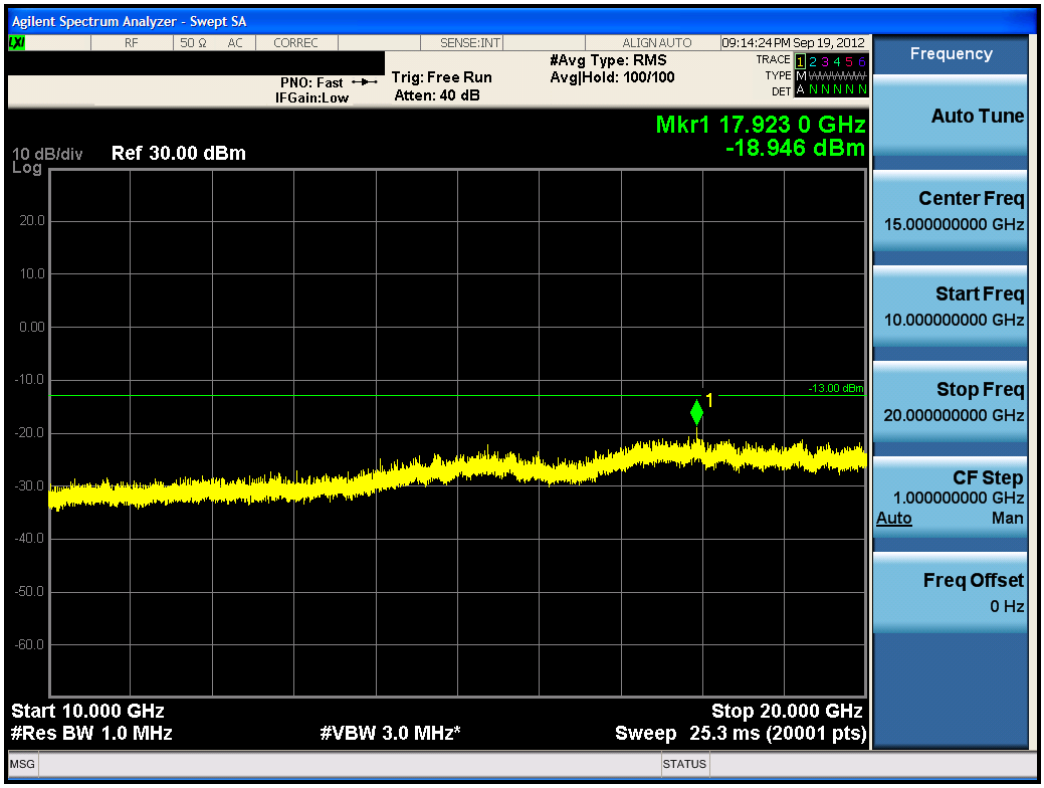
Plot 7-5. Peak to Average Ratio Plot (QPSK - RB Size 6)



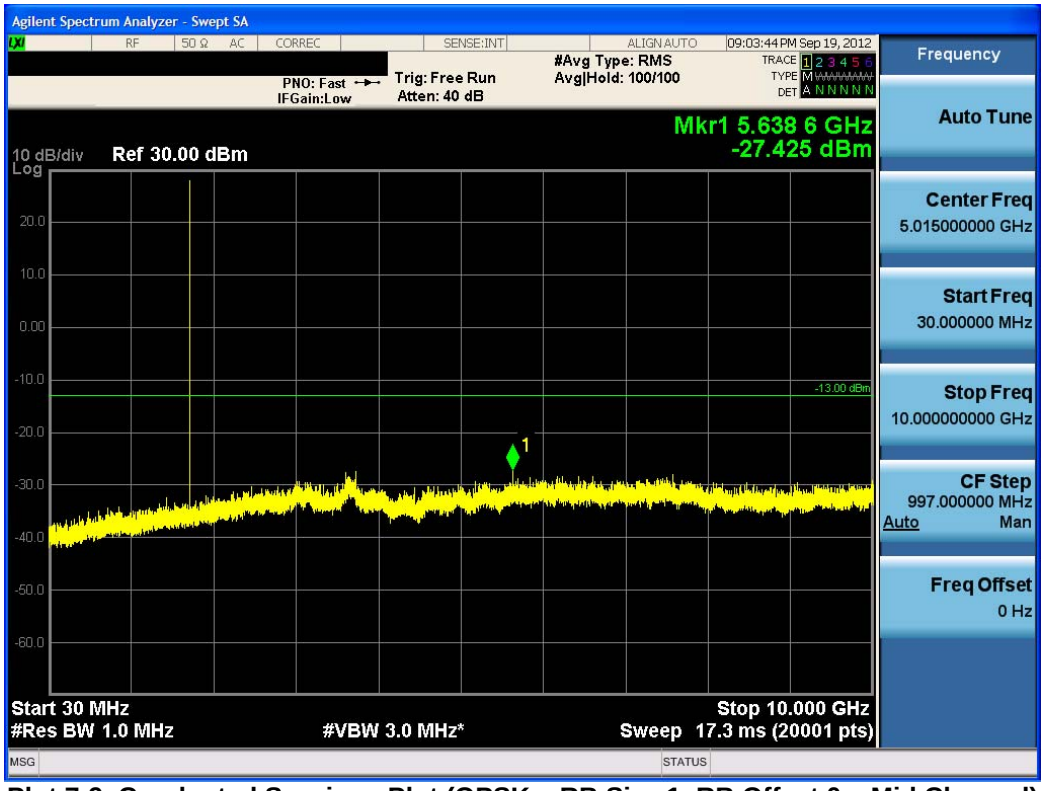
Plot 7-6. Peak to Average Ratio Plot (16QAM - RB Size 6)



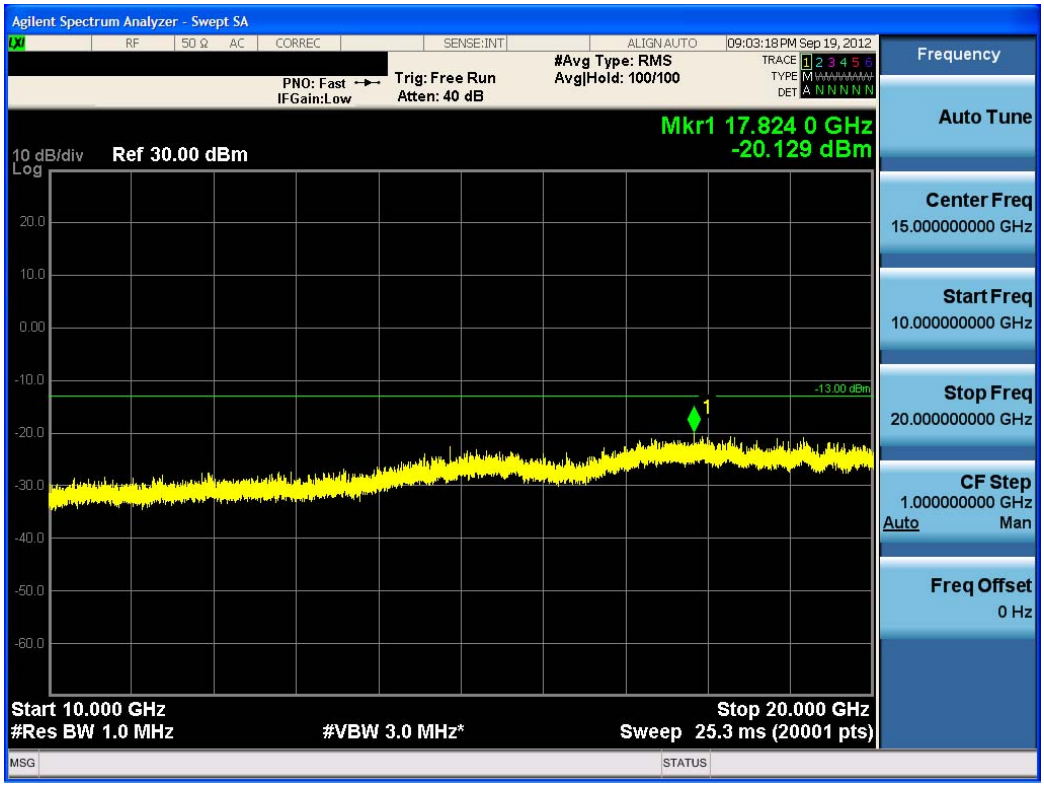
Plot 7-7. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)



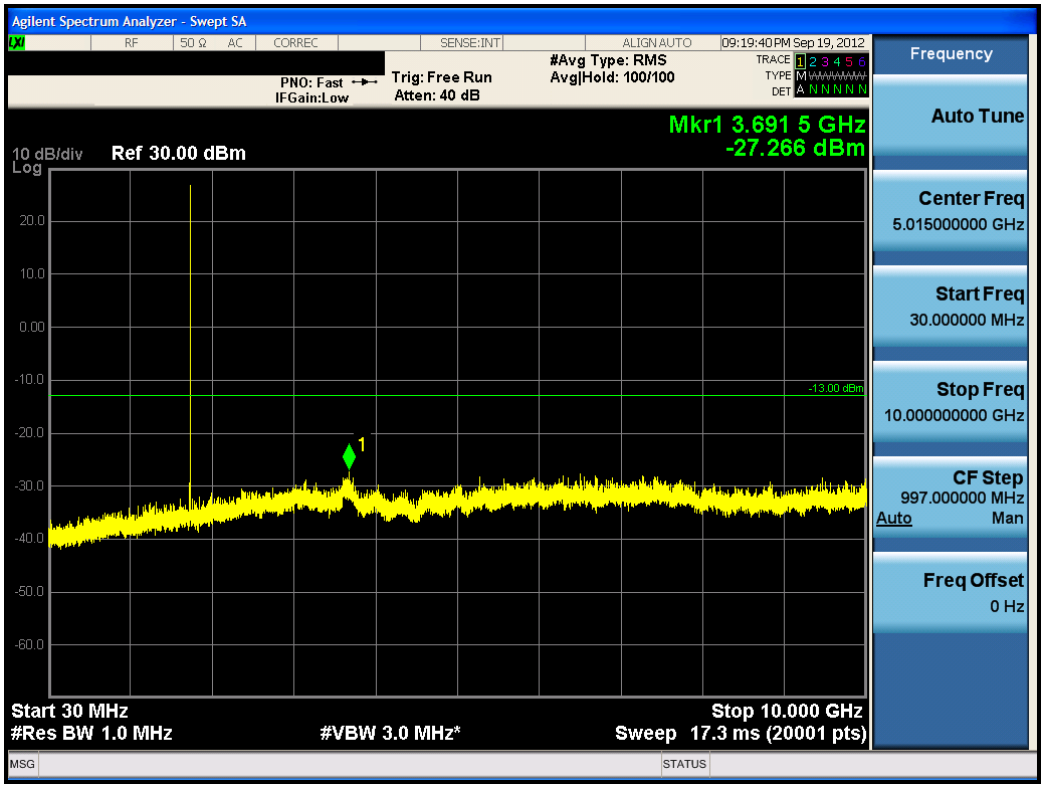
Plot 7-8. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)



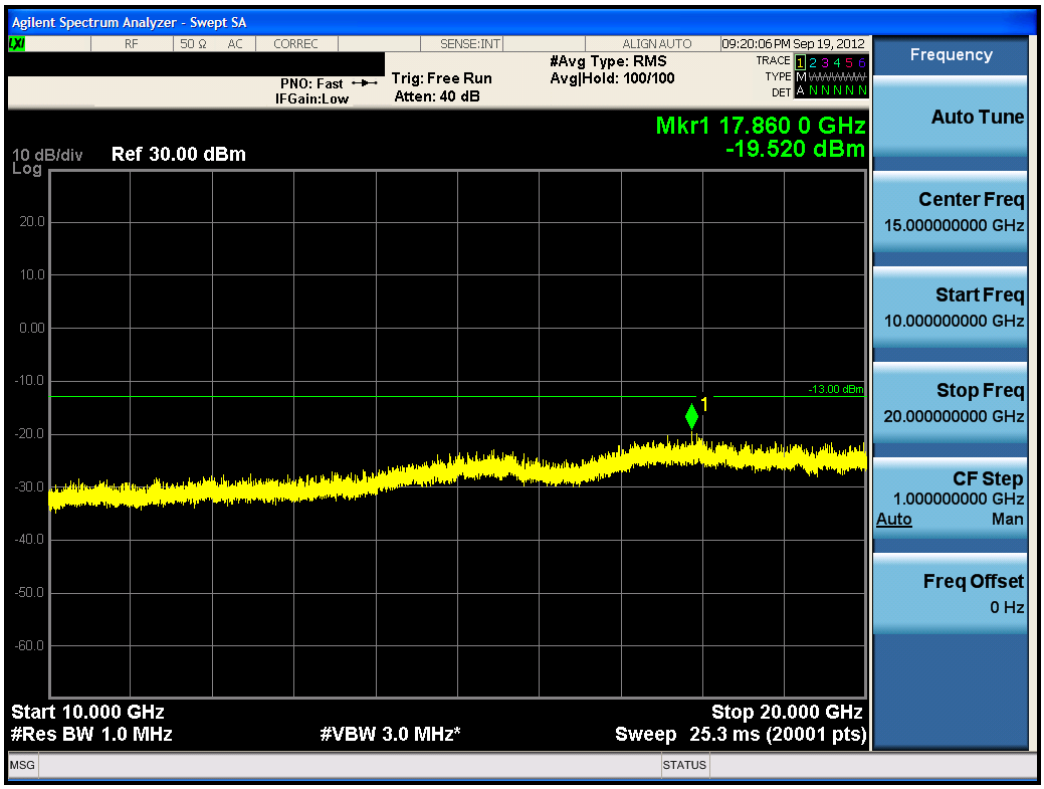
Plot 7-9. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)



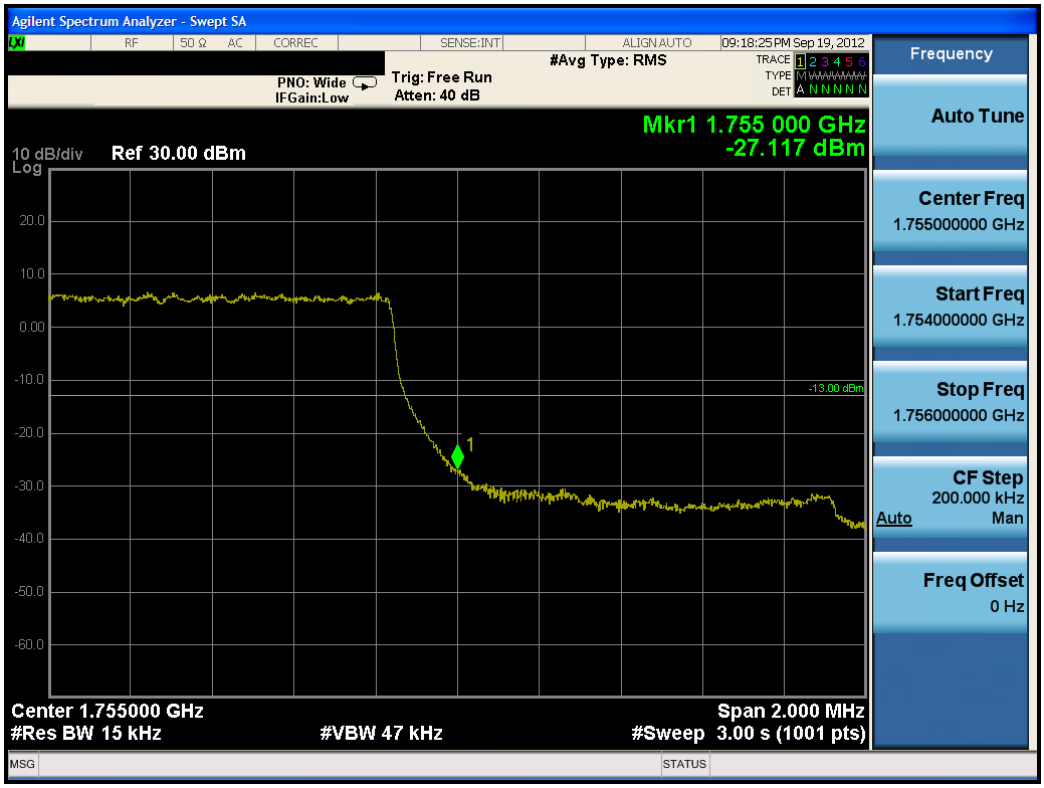
Plot 7-10. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)



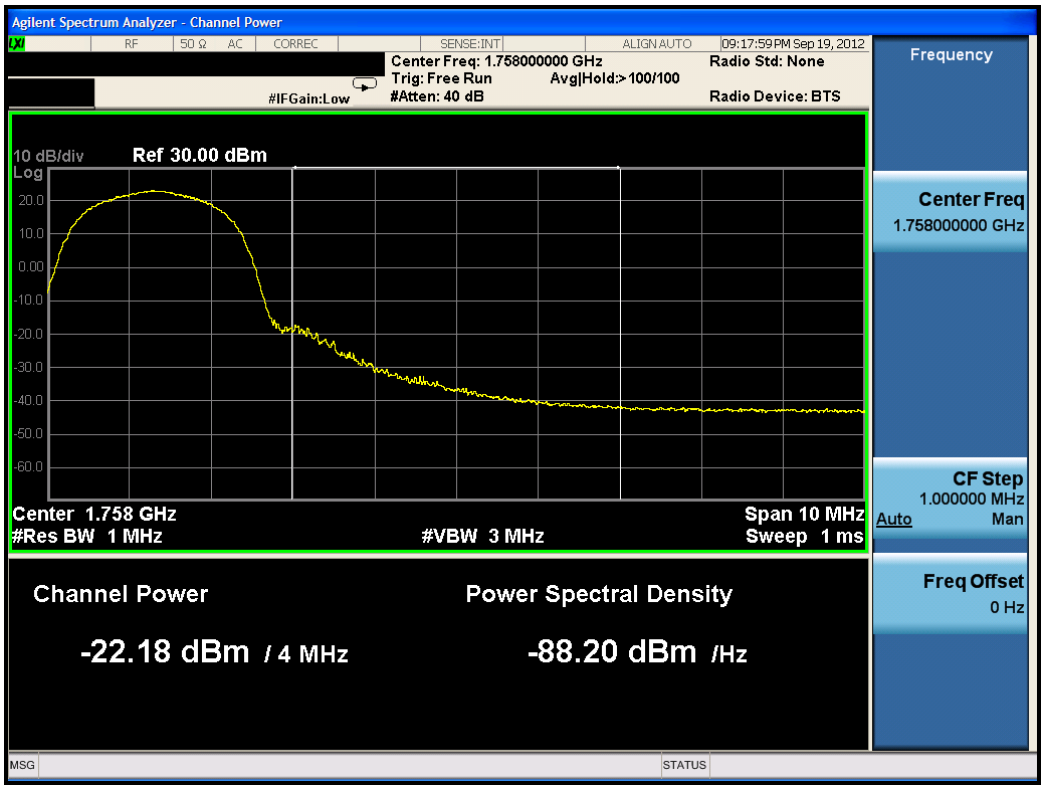
Plot 7-11. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)



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



Plot 7-13. Upper Band Edge Plot (QPSK – RB Size 6)



Plot 7-14. Upper Extended Band Edge Plot (QPSK – RB Size 6)

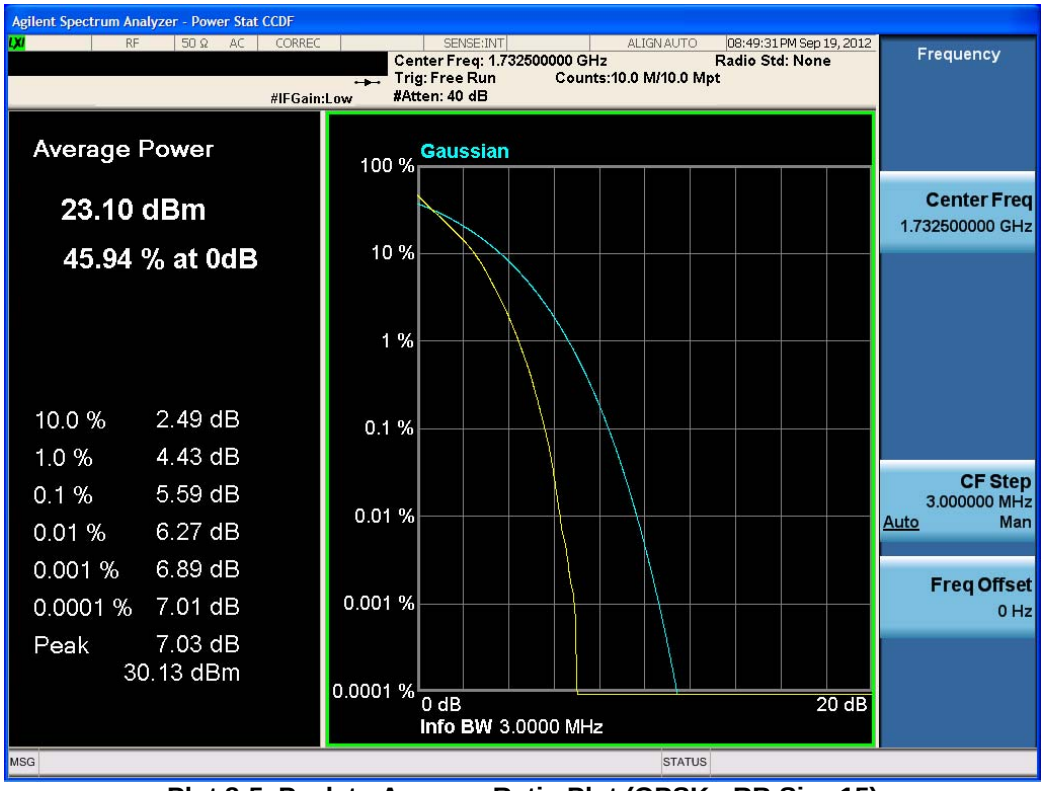
8.0 BAND 4 – 3 MHZ BW

Plot 8-1. Lower Band Edge Plot (QPSK – RB Size 15)

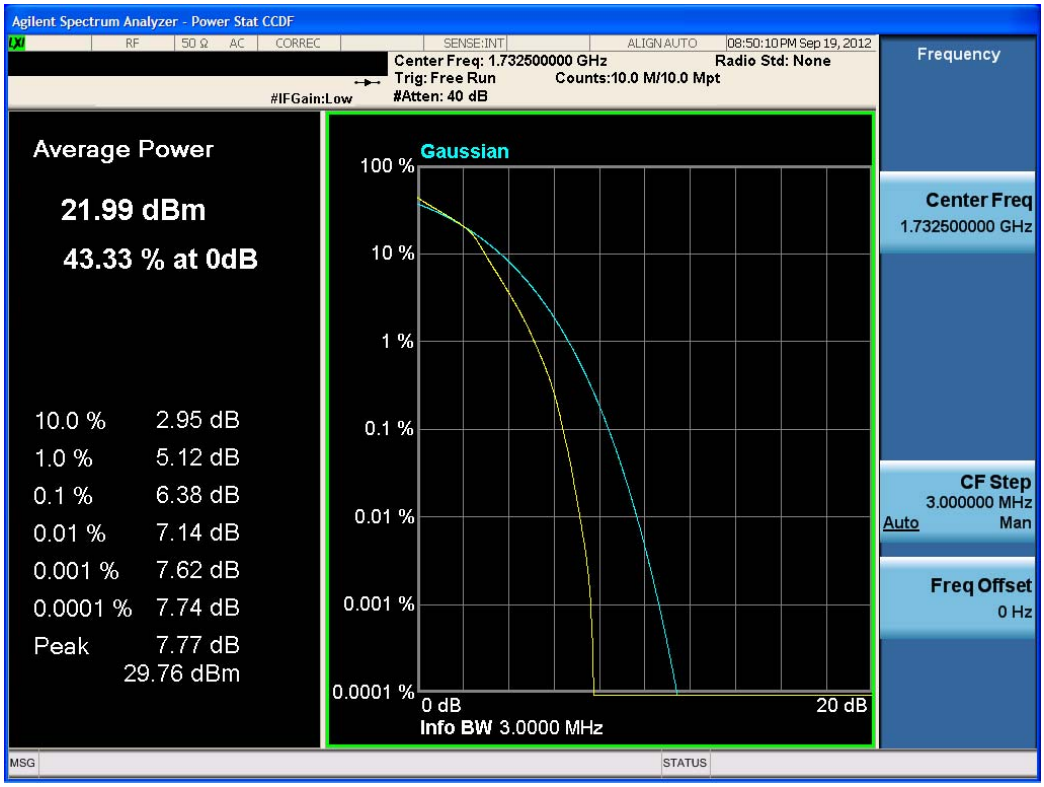
Plot 8-2. Lower Extended Band Edge Plot (QPSK – RB Size 15)

Plot 8-3. Occupied Bandwidth Plot (QPSK – RB Size 15)

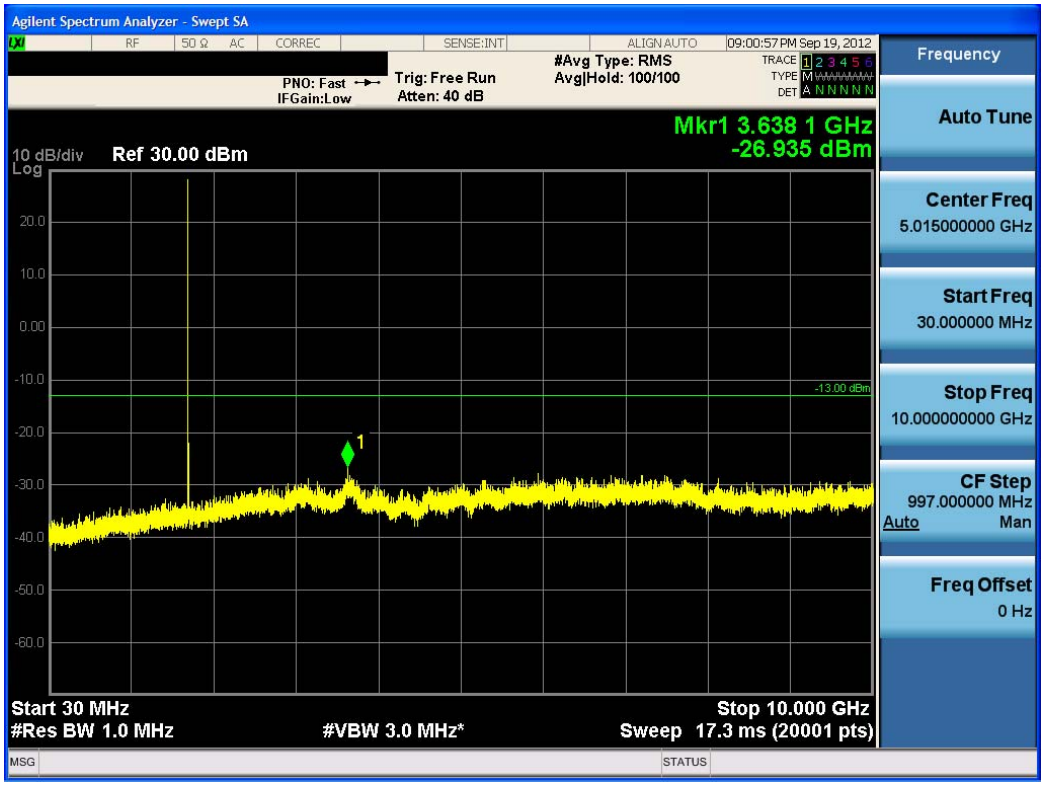
Plot 8-4. Occupied Bandwidth Plot (16-QAM – RB Size 15)



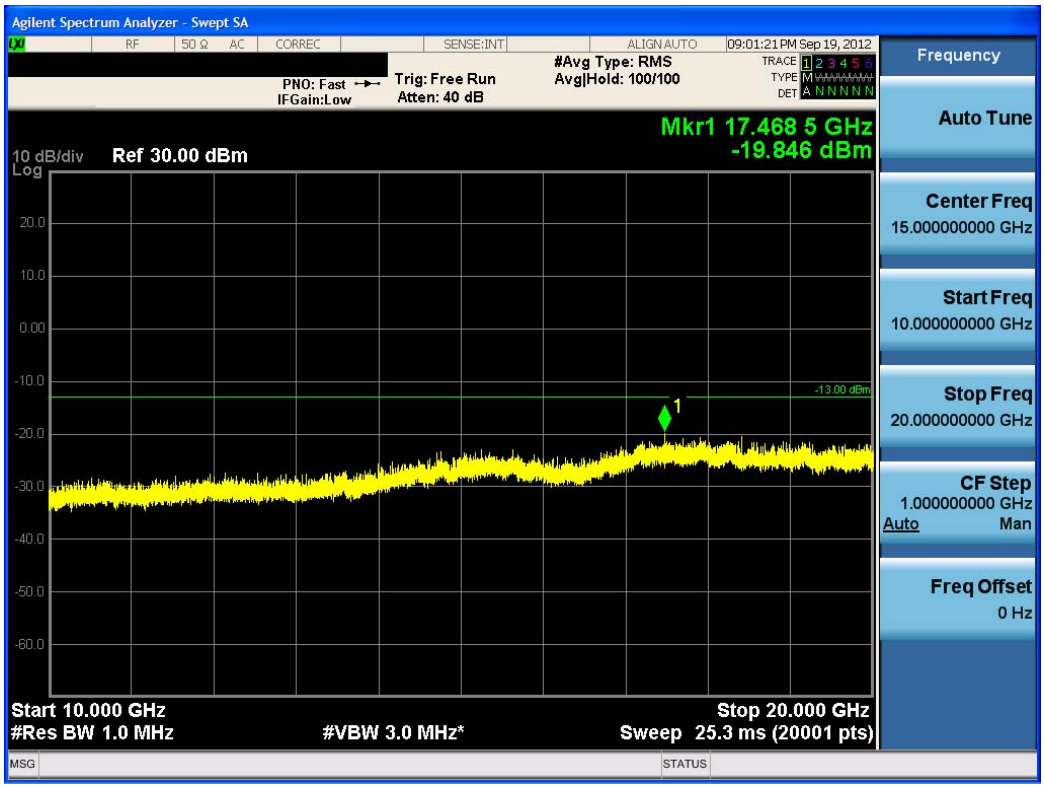
Plot 8-5. Peak to Average Ratio Plot (QPSK - RB Size 15)



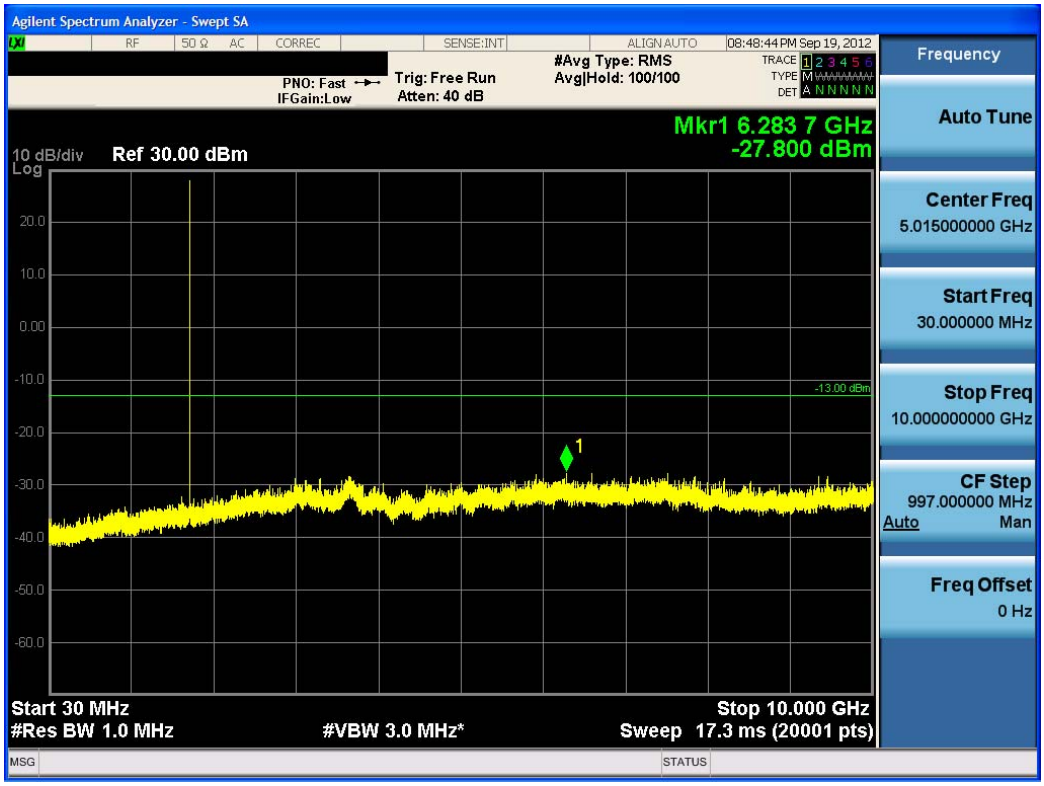
Plot 8-6. Peak to Average Ratio Plot (16QAM - RB Size 15)



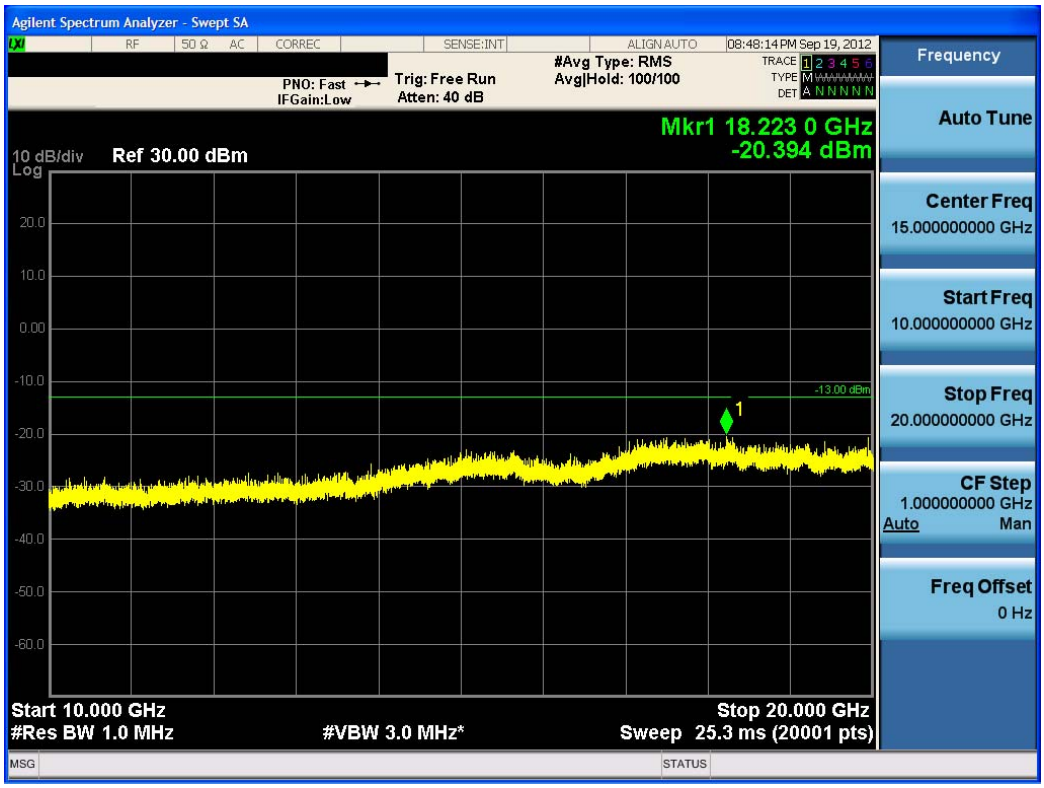
Plot 8-7. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)



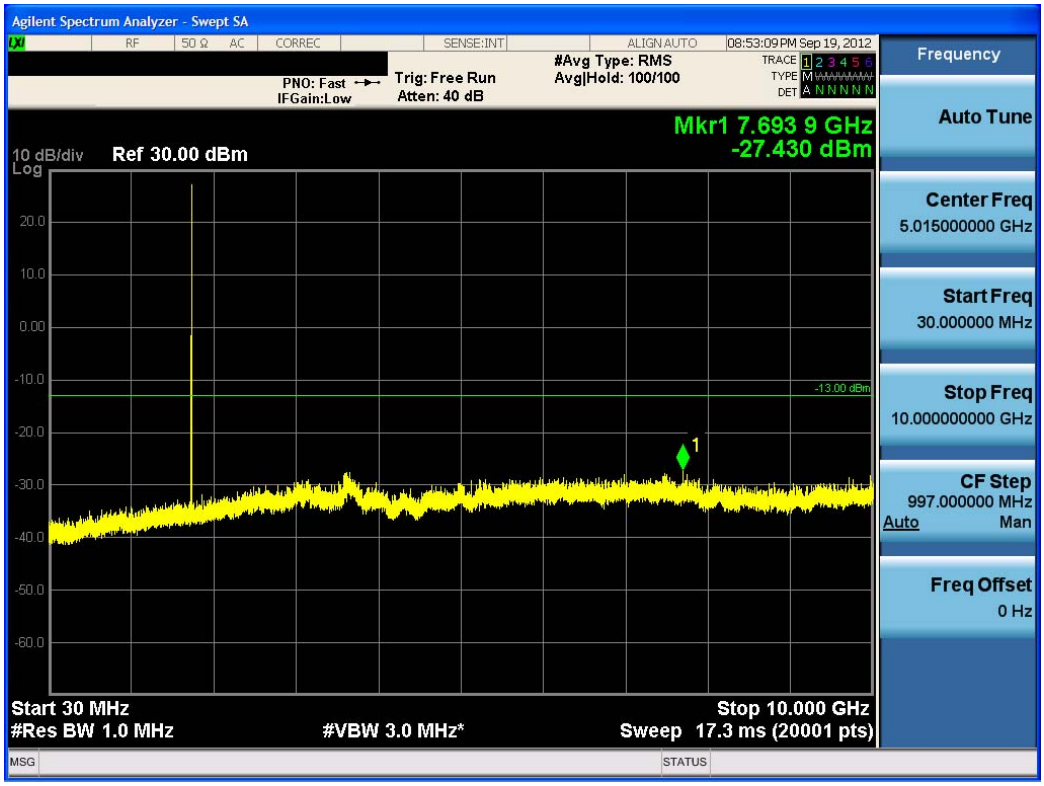
Plot 8-8. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)



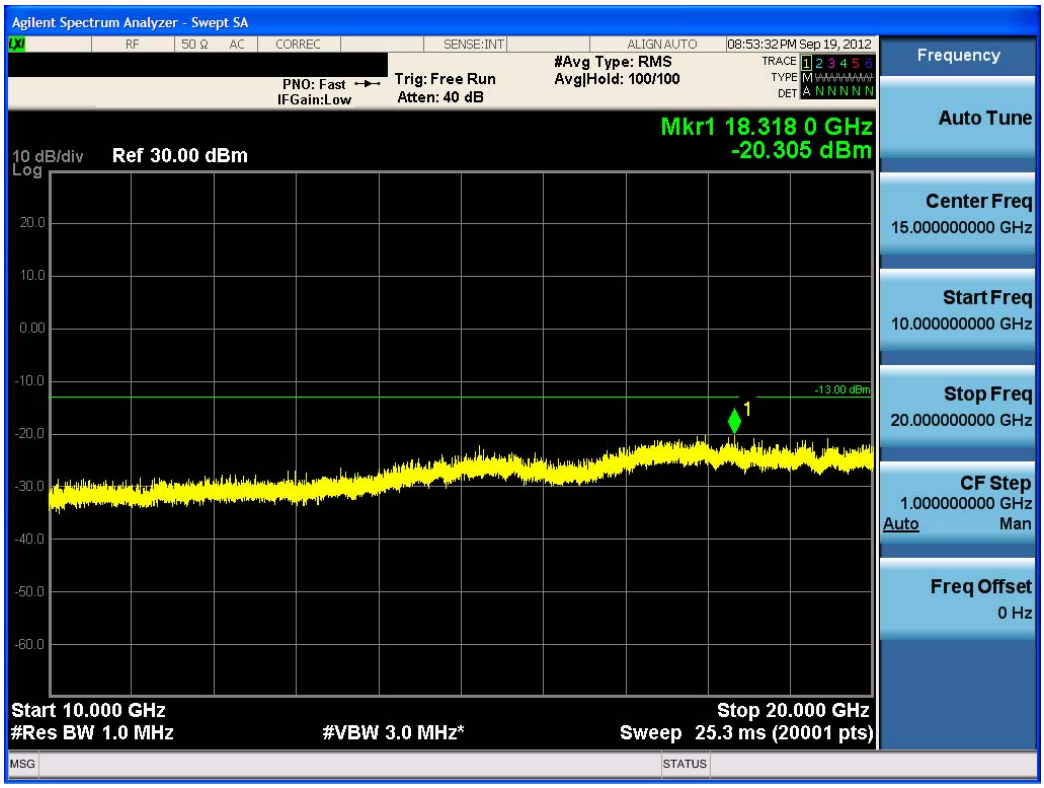
Plot 8-9. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 8-10. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 8-11. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 8-12. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)

Plot 8-13. Upper Band Edge Plot (QPSK – RB Size 15)

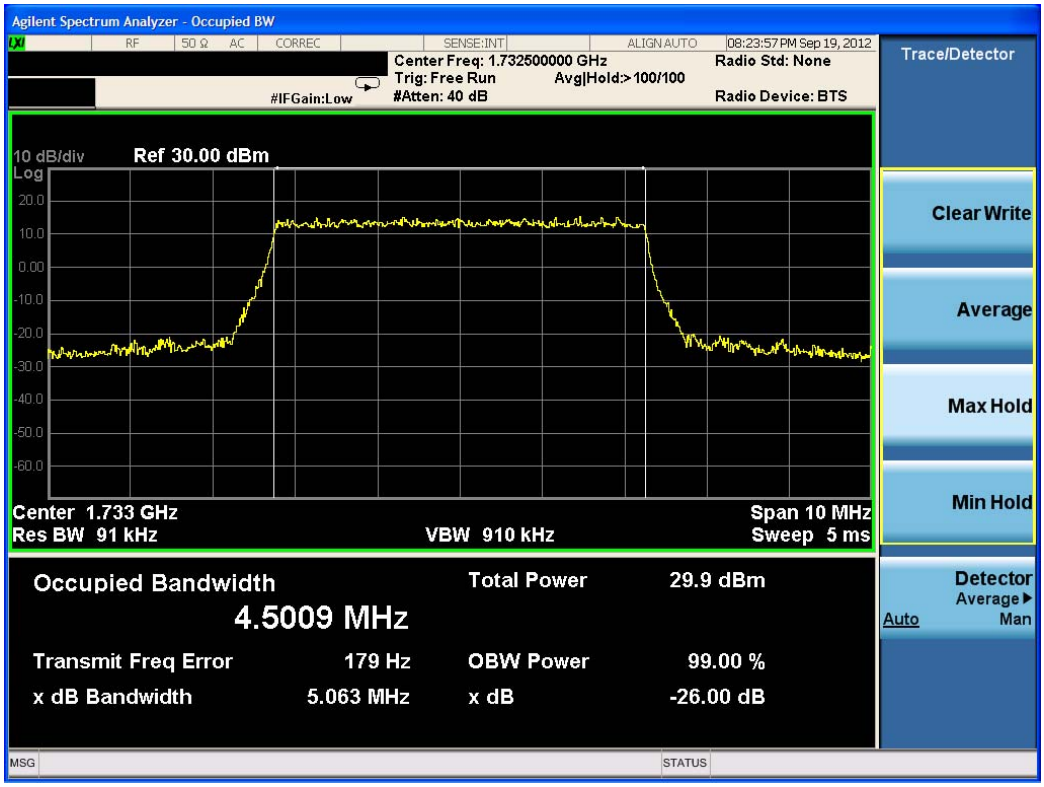
Plot 8-14. Upper Extended Band Edge Plot (QPSK – RB Size 15)

9.0 BAND 4 – 5 MHZ BW

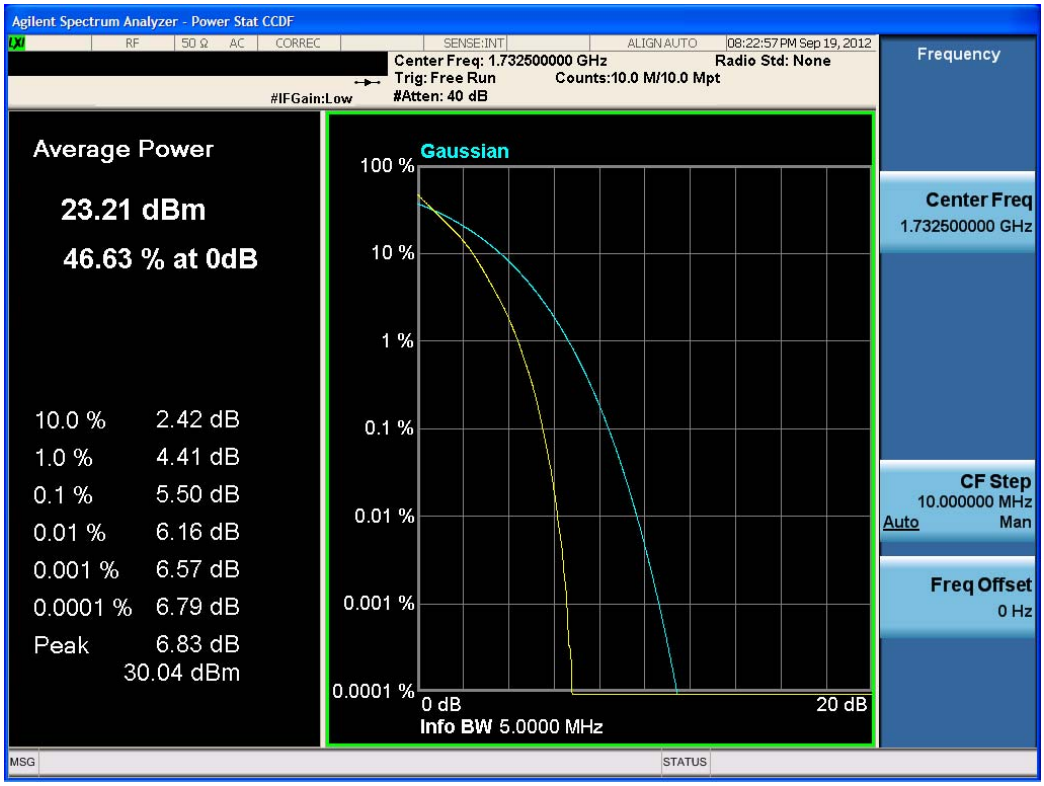
Plot 9-1. Lower Band Edge Plot (QPSK – RB Size 25)

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

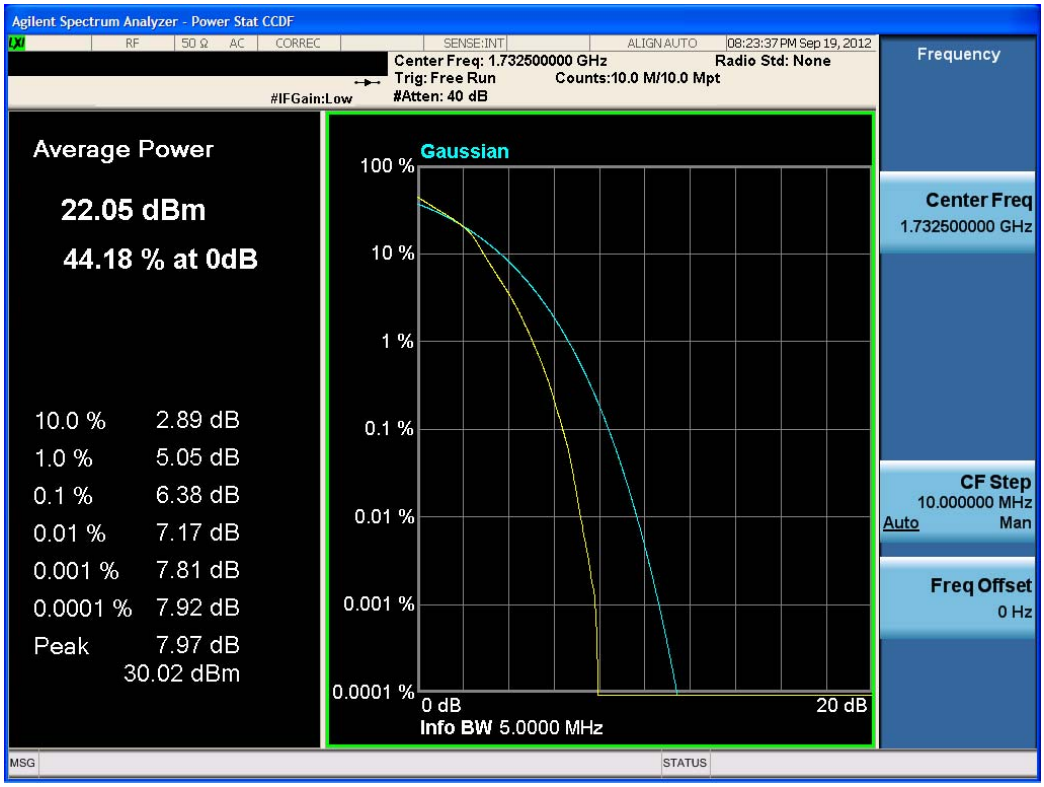
Plot 9-3. Occupied Bandwidth Plot (QPSK – RB Size 25)



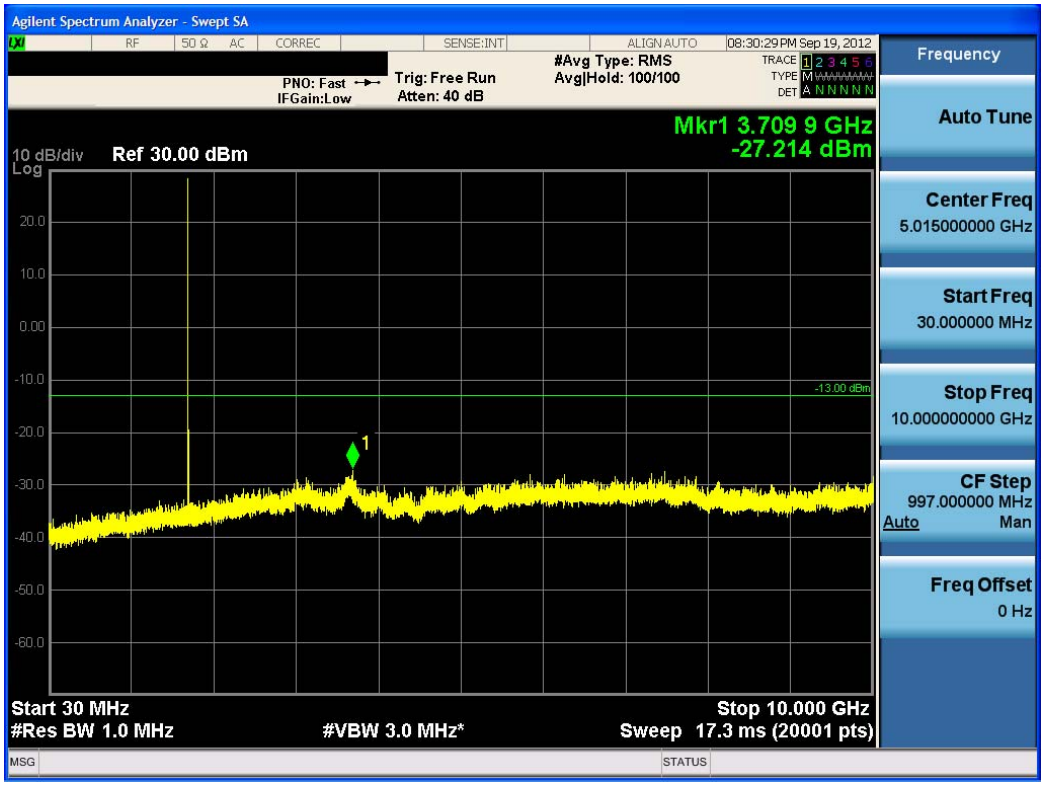
Plot 9-4. Occupied Bandwidth Plot (16-QAM – RB Size 25)



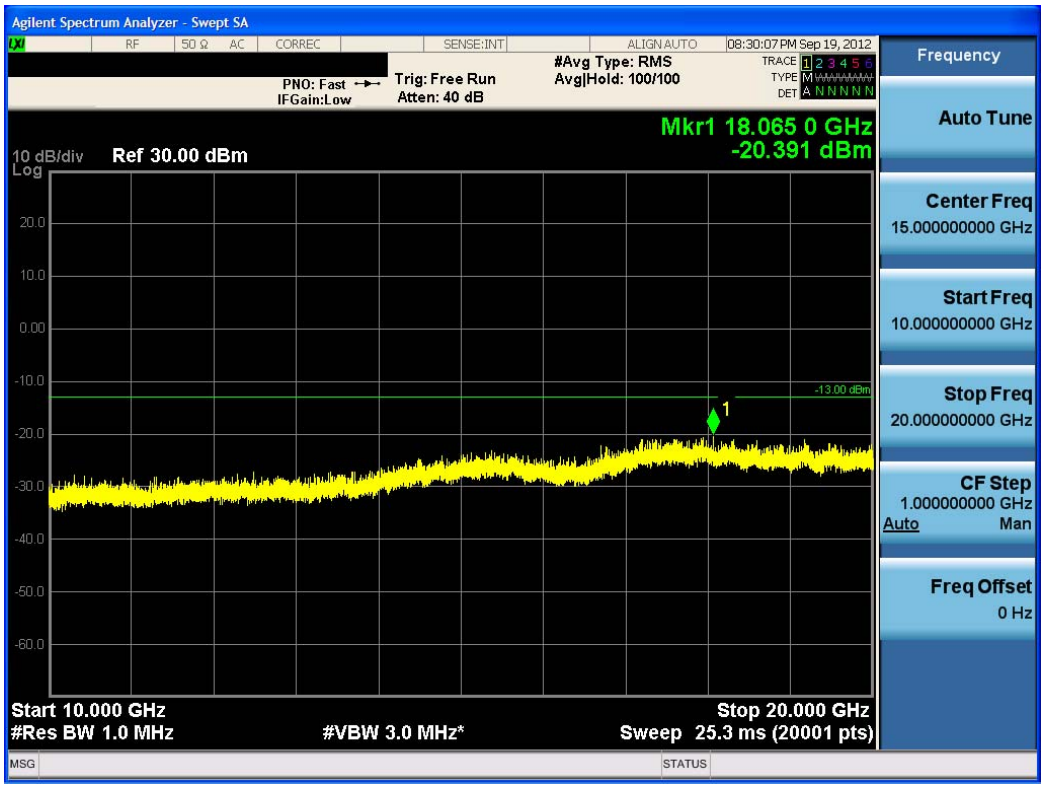
Plot 9-5. Peak to Average Ratio Plot (QPSK - RB Size 25)



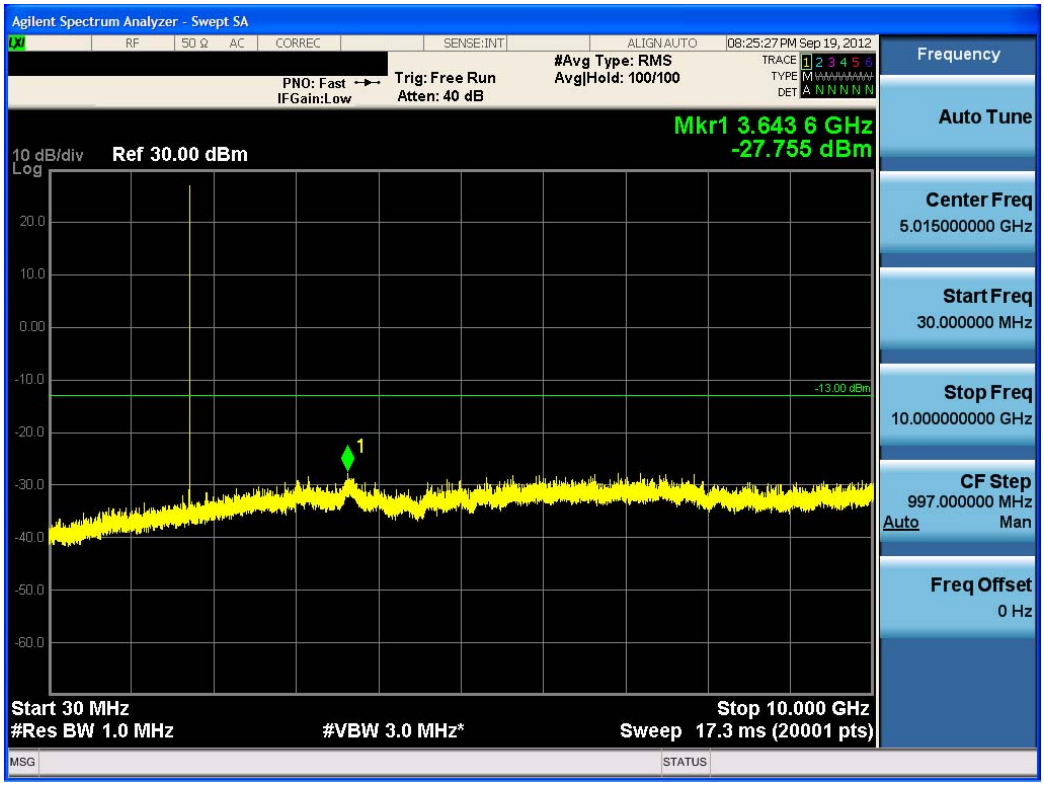
Plot 9-6. Peak to Average Ratio Plot (16QAM - RB Size 25)



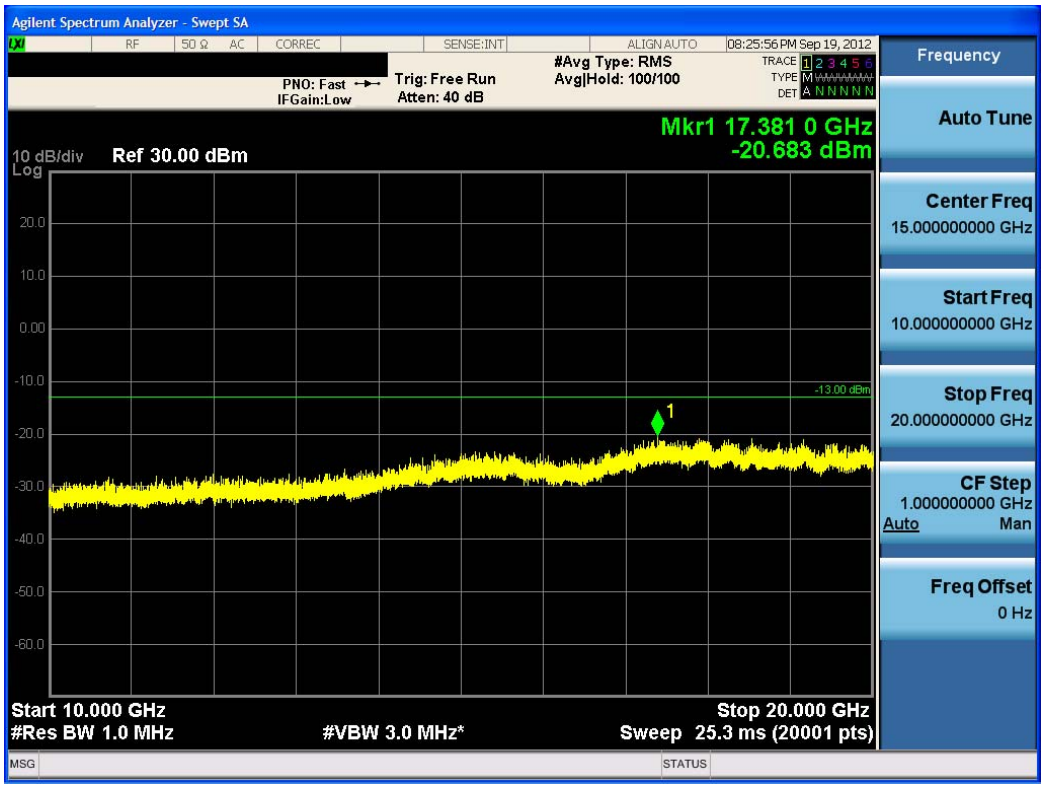
Plot 9-7. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)



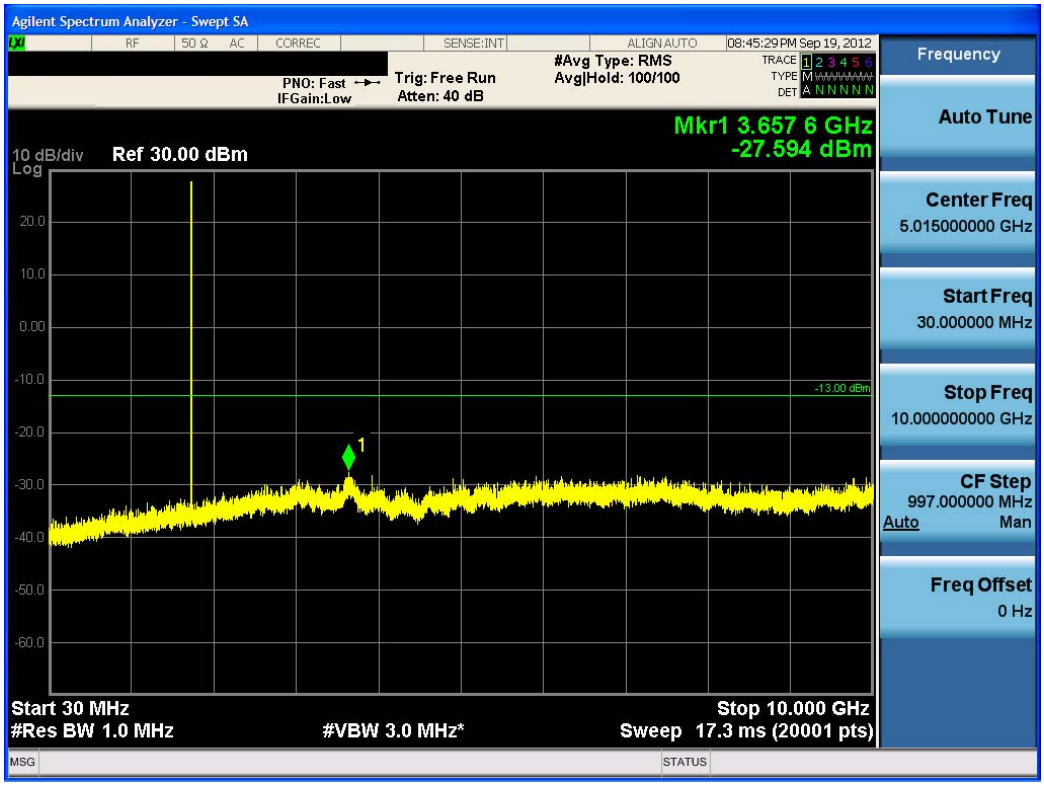
Plot 9-8. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)



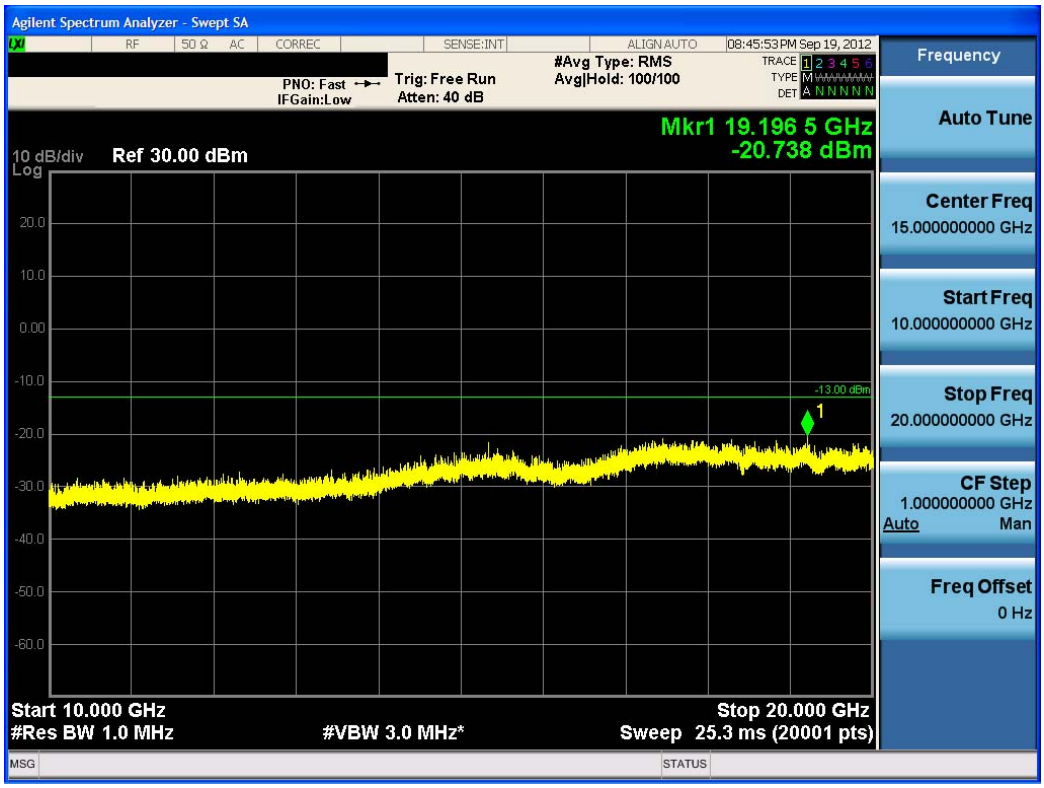
Plot 9-9. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 9-10. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 9-11. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 9-12. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)

Plot 9-13. Upper Band Edge Plot (QPSK – RB Size 25)

Plot 9-14. Upper Extended Band Edge Plot (QPSK – RB Size 25)

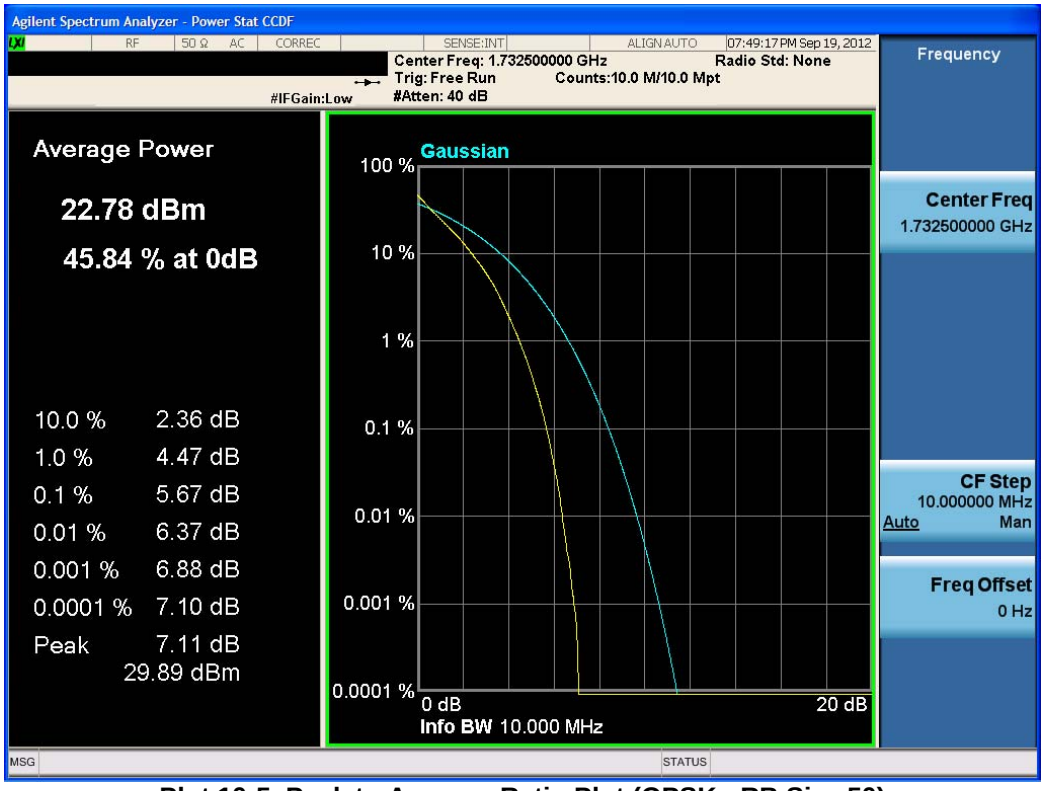
10.0 BAND 4 – 10 MHZ BW

Plot 10-1. Lower Band Edge Plot (QPSK – RB Size 50)

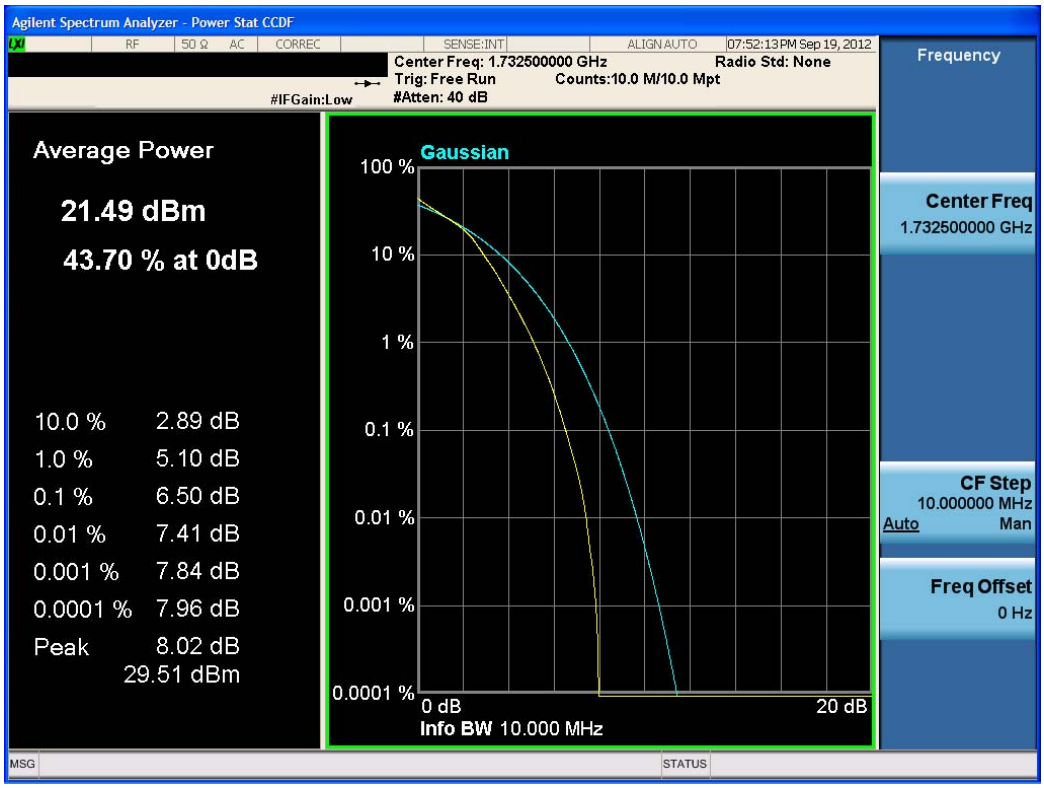
Plot 10-2. Lower Extended Band Edge Plot (QPSK – RB Size 50)

Plot 10-3. Occupied Bandwidth Plot (QPSK – RB Size 50)

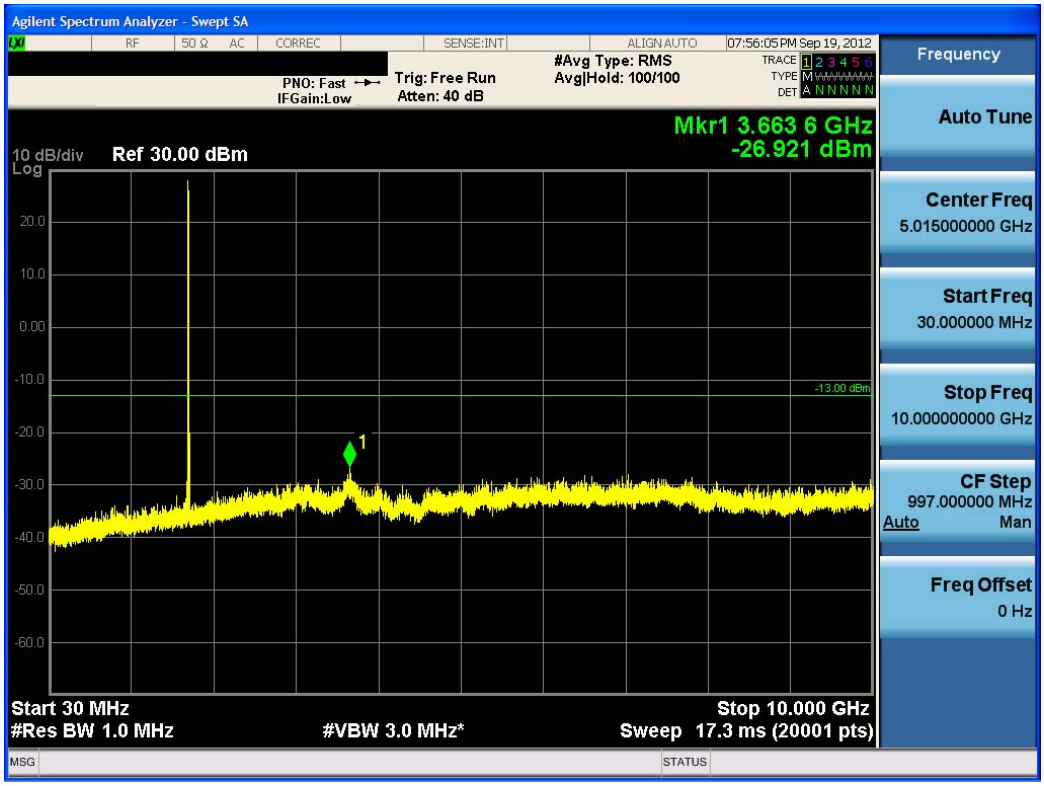
Plot 10-4. Occupied Bandwidth Plot (16-QAM – RB Size 50)



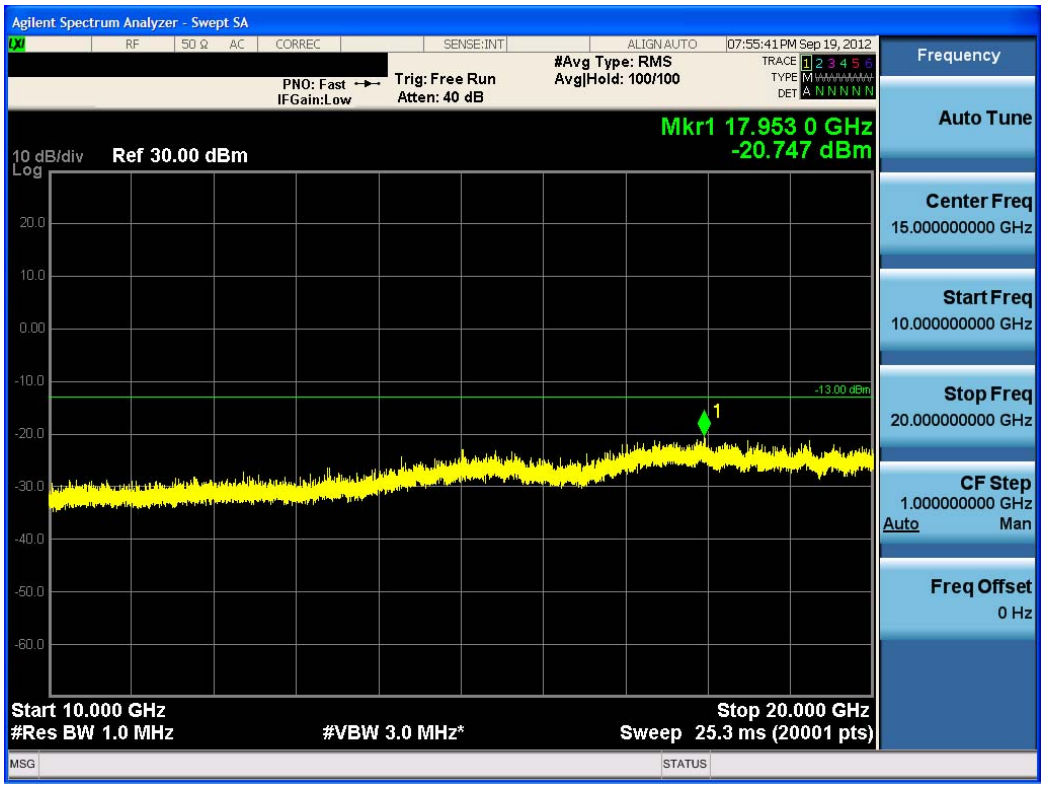
Plot 10-5. Peak to Average Ratio Plot (QPSK - RB Size 50)



Plot 10-6. Peak to Average Ratio Plot (16QAM - RB Size 50)



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



Plot 10-8. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)