PCTEST ENGINEERING LABORATORY, INC.
7185 Oakland Mills Road, Columbia, MD 21045 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctestlab.com

MEASUREMENT REPORT
FCC Part 90

Applicant:
Harris Corporation
221 Jefferson Ridge Parkway
Lynchburg, VA 24501
United States

Date of Testing:
8/11 - 8/19/15
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0Y1508111547-R1.BV8

FCC ID:	**BV8BBPBM214**
APPLICANT:	**HARRIS CORPORATION**

Applicant Type:	Certification
FCC Classification:	Licensed Non-Broadcast Transmitter (TNB)
FCC Rule Part:	§90 Subpart R
EUT Type:	Wireless Module
Model(s):	PBM-214
Test Device Serial No.:	*identical prototype* [S/N: 355389060001284]

Mode	Tx Frequency (MHz)	Emission Designator	Cond. PWR	
			Max. Power (W)	Max. Power (dBm)
LTE Band 14	790.5-795.5	4M51G7D	0.281	24.49
LTE Band 14	790.5-795.5	4M48W7D	0.243	23.86
LTE Band 14	793	8M94G7D	0.262	24.19
LTE Band 14	793	8M95W7D	0.235	23.71

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.

This revised Test Report (S/N: 0Y1508111547-R1.BV8) supersedes and replaces the previously issued test report (S/N: 0Y1508111547.BV8) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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 CERT#2041.01

© 2016 PCTEST Engineering Laboratory, Inc.

TABLE OF CONTENTS

FCC PART 90 MEASUREMENT REPORT 3

1.0 INTRODUCTION 4

1.1 SCOPE 4

1.2 TESTING FACILITY 4

2.0 PRODUCT INFORMATION 5

2.1 EQUIPMENT DESCRIPTION 5

2.2 DEVICE CAPABILITIES 5

2.3 TEST CONFIGURATION 5

2.4 EMI SUPPRESSION DEVICE(S)/MODIFICATIONS 5

3.0 DESCRIPTION OF TESTS 6

3.1 EVALUATION PROCEDURE 6

3.2 OCCUPIED BANDWIDTH 6

3.3 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL 6

3.4 RADIATED POWER AND RADIATED SPURIOUS EMISSIONS 7

3.5 FREQUENCY STABILITY / TEMPERATURE VARIATION 8

4.0 TEST EQUIPMENT CALIBRATION DATA 9

5.0 SAMPLE CALCULATIONS 10

6.0 TEST RESULTS 11

6.1 SUMMARY 11

6.2 CONDUCTED POWER OUTPUT DATA 12

6.3 RADIATED SPURIOUS EMISSIONS 14

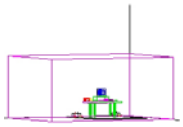
6.4 FREQUENCY STABILITY MEASUREMENTS 16

7.0 5MHZ BANDWIDTH - PLOT(S) OF EMISSIONS 18

8.0 10MHZ BANDWIDTH - PLOT(S) OF EMISSIONS 25

9.0 CONCLUSION 30

© 2016 PCTEST Engineering Laboratory, Inc.



MEASUREMENT REPORT
FCC Part 90

§2.1033 General Information

APPLICANT:	Harris Corporation
APPLICANT ADDRESS:	221 Jefferson Ridge Parkway Lynchburg, VA 24501, United States
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21045 USA
BASE MODEL:	PBM-214
FCC CLASSIFICATION:	Licensed Non-Broadcast Transmitter (TNB)
MODE:	LTE
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm)
Test Device Serial No.:	355389060001284 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST:	8/11 - 8/19/15
TEST REPORT S/N:	0Y1508111547-R1.BV8

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. 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.
- 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.

- 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.
- 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.

© 2016 PCTEST Engineering Laboratory, Inc.

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. (S*ee* **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 39o 10'23" N latitude and 76o 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.

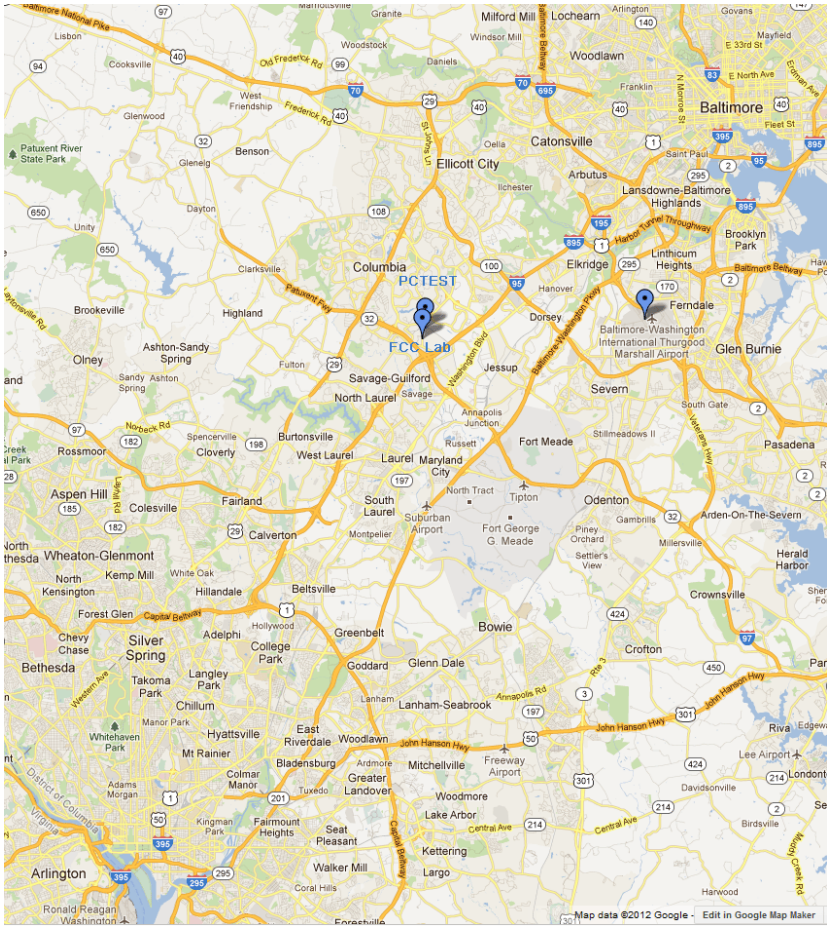


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

© 2016 PCTEST Engineering Laboratory, Inc.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Harris Wireless Module FCC ID: BV8BBPBM214**. For the purpose of equipment authorization, the transmitter was tested with an antenna that is representative of the type that will be used with the equipment in normal operation. The EUT consisted of the following component(s):

Trade Name / Base Model	FCC ID	Description
Harris / Model: PBM-214	BV8BBPBM214	Wireless Module

Table 2-1. EUT Equipment Description

Note: All data contained in this report is applicable for the device operation in the LTE Band 14 (790.5 – 795.5 MHz). Test data shown supports the devices compliance with §90.543 of the FCC Rules and Regulation.

2.2 Device Capabilities

This device contains the following capabilities:

Multi-band LTE

2.3 Test Configuration

The Harris Wireless Module FCC ID: BV8BBPBM214 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 v02r02. See Section 6.0 of this test report for a description of the radiated emissions tests.

2.4 EMI Suppression Device(s)/Modifications

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

© 2016 PCTEST Engineering Laboratory, Inc.

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment Measurements and Performance Standards" (ANSI/TIA-603-C-2004) was used in the measurement of the measurement of the **Harris Wireless Module FCC ID: BV8BBPBM214.**

3.2 Occupied Bandwidth

§2.1049

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

3.3 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051, §90.543(e)

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.

(e) For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

© 2016 PCTEST Engineering Laboratory, Inc.

3.4 Radiated Power and Radiated Spurious Emissions

§2.1053, §90.543(e)(f)

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Clause 5, Figure 5.7 of ANSI C63.4-2009. 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 90.543.

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

© 2016 PCTEST Engineering Laboratory, Inc.

3.5 Frequency Stability / Temperature Variation

§2.1055, 90.539(e)

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. 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 Part 90.539, the frequency stability of the transmitter shall be maintained within ±0.000125% (±1.25 ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).

2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A sufficient stabilization period at each temperature shall be used prior to each frequency requirement.

© 2016 PCTEST Engineering Laboratory, Inc.

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	4/16/2015	Annual	4/16/2016	N/A
-	RE3	Radiated Emissions Cable Set	4/29/2015	Annual	4/29/2016	N/A
Agilent	8447D	Broadband Amplifier	6/12/2015	Annual	6/12/2016	2443A01900
Agilent	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	3/19/2015	Annual	3/19/2016	US42510244
Agilent	N9020A	MXA Signal Analyzer	10/27/2014	Annual	10/27/2015	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/24/2015	Annual	3/24/2016	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	7/30/2015	Biennial	7/30/2017	121034
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/8/2014	Biennial	4/8/2016	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	10/22/2014	Biennial	10/22/2016	128338
K & L	13SH10-1000/U1000	N Type High Pass Filter	12/1/2014	Annual	12/1/2015	2
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	2
Rhode & Schwarz	TS-PR18	Pre-Amplifier	3/5/2015	Annual	3/5/2016	101622
Rohde & Schwarz	CMW500	Radio Communication Tester	10/3/2014	Annual	10/3/2015	100976
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/3/2015	Annual	3/3/2016	100040
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/17/2015	Annual	7/17/2016	100348
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/1/2013	Biennial	11/1/2015	91052523RX
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/18/2014	Biennial	3/18/2016	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/28/2014	Biennial	1/28/2016	A051107
VWR	62344-734	Thermometer with Clock	2/20/2014	Biennial	2/20/2016	140140336

Table 4-1. Test Equipment

Notes:

For equipment listed above that has a calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

© 2016 PCTEST Engineering Laboratory, Inc.

5.0 SAMPLE CALCULATIONS

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

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The 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 terminal is adjusted to produce a reading of –81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1402.0 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) = 50.3 dBc.

© 2016 PCTEST Engineering Laboratory, Inc.

6.0 TEST RESULTS

6.1 Summary

Company Name: Harris Corporation

FCC ID: BV8BBPBM214

FCC Classification: Licensed Non-Broadcast Transmitter (TNB)

Mode(s): LTE Band 14

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)					
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Sections 7.0, 8.0
2.1051, 90.543(e)	Band Edge / Conducted Spurious Emissions	> 43 + 10log$_{10}$ (P[Watts]) at Band Edge and for all out-of-band emissions <65 + 10 log (P[Watts]) in a 6.25kHz bandwidth for emissions in the 769–775 MHz and 799-805 MHz bands		PASS	Sections 7.0, 8.0
2.1046	Transmitter Conducted Output Power	N/A		PASS	Section 6.2
2.1053, 90.543(e)	Undesirable Emissions	< 43 + 10log$_{10}$ (P[Watts]) for all out-of-band emissions	RADIATED	PASS	Section 6.3
2.1053, 90.543(f)	Undesirable Emissions in the 1559-1610MHz band	< -40dBm/MHz EIRP (wideband) < -50dBm EIRP (narrowband)		PASS	Section 6.4
2.1055, 90.539(e)	Frequency Stability	< 1.25 ppm		PASS	Section 6.5

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 were 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.

© 2016 PCTEST Engineering Laboratory, Inc.

6.2 Conducted Power Output Data

§2.1046

The **Harris Wireless Module FCC ID: BV8BBPBM214** was powered by a DC Power supply through a test PCB. Via RF Cable, the Main Antenna port of the EUT was connected to a spectrum analyzer while the CMW500 LTE Callbox was used only to establish a connection. Transmit power readings were taken from the spectrum analyzer per Section 5.2.1 of KDB 971168v02r02.

Instrument settings:

a.) Span set to > 1.5 times the OBW.
b.) RBW set to 1 – 5% of OBW (not more than 1MHz)
c.) VBW set to 3MHz.
d.) Number of sweep points set to 5000 (>2*span/RBW)
e.) Sweep time set to auto couple
f.) Detector set to RMS
g.) Trace averaged at least 100 traces in RMS power averaging mode.
h.) Since duty cycle of >98% (measured using zero span on spectrum analyzer with sufficient response time and spacing between bins to permit accurate measurement of burst on/off time per Section 5.2.2 of KDB971168) cannot be achieved, signal gating was implemented by the spectrum analyzer to ensure that power was measured only when the EUT is actively transmitting at full power.
i.) Channel Power Function utilized to integrate power across the OBW

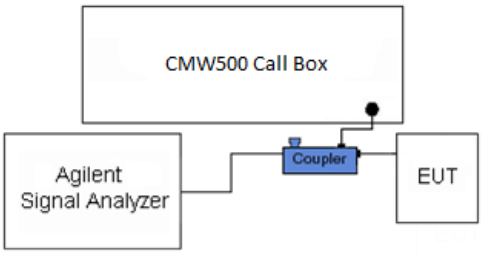


Figure 6-1. Conducted Output Power Test Setup Diagram

© 2016 PCTEST Engineering Laboratory, Inc.

Freq. [MHz]	MCS Level	Mod.	BW	RB Size	RB Offset	Maximum Average Power [dBm]
790.5	0	QPSK	5MHz	1	0	24.28
790.5	0	QPSK	5MHz	1	24	24.40
790.5	0	QPSK	5MHz	12	6	23.55
790.5	0	QPSK	5MHz	25	0	23.24
795.5	0	QPSK	5MHz	1	0	24.31
795.5	0	QPSK	5MHz	1	24	24.49
795.5	0	QPSK	5MHz	12	6	23.14
795.5	0	QPSK	5MHz	25	0	23.19
790.5	11	16QAM	5MHz	1	0	23.86
790.5	11	16QAM	5MHz	1	24	23.83
790.5	11	16QAM	5MHz	12	6	22.48
790.5	11	16QAM	5MHz	25	0	22.30
795.5	11	16QAM	5MHz	1	0	23.80
795.5	11	16QAM	5MHz	1	24	23.82
795.5	11	16QAM	5MHz	12	6	22.26
795.5	11	16QAM	5MHz	25	0	22.27
793	0	QPSK	10MHz	1	0	24.15
793	0	QPSK	10MHz	1	49	24.19
793	0	QPSK	10MHz	25	12	23.53
793	0	QPSK	10MHz	50	0	23.50
793	11	16QAM	10MHz	1	0	23.62
793	11	16QAM	10MHz	1	49	23.71
793	11	16QAM	10MHz	25	12	22.61
793	11	16QAM	10MHz	50	0	22.44

Table 6-2. Maximum Average Conducted Output Power

© 2016 PCTEST Engineering Laboratory, Inc.

6.3 Radiated Spurious Emissions

§2.1053, §90.543(e)

OPERATING FREQUENCY:	790.50	MHz
CHANNEL:	23780	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13.00	dBm

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	Margin [dB]
2371.50	-28.15	3.65	-24.50	V	-11.5
3162.00	-57.68	5.31	-52.37	V	-39.4

Table 6-3. Radiated Spurious Data (5MHz)

OPERATING FREQUENCY:	793.00	MHz
CHANNEL:	23790	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13.00	dBm

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	Margin [dB]
2379.00	-29.88	3.65	-26.23	V	-13.2
3172.00	-57.10	5.35	-51.76	V	-38.8

Table 6-4. Radiated Spurious Data (10MHz BW)

© 2016 PCTEST Engineering Laboratory, Inc.

Radiated Spurious Emissions (Cont'd)

§2.1053, §90.543(e)(f)

OPERATING FREQUENCY:	795.50	MHz
CHANNEL:	23800	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13.00	dBm

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	Margin [dB]
2386.50	-31.01	3.64	-27.36	V	-14.4
3182.00	-57.61	5.38	-52.23	V	-39.2

Table 6-5. Radiated Spurious Data (5MHz BW)

All spurious emissions found in the 1559-1610 MHz band were wideband emissions and the limit of -70dBW/MHz (-40dBm/MHz) was applied. Measurements in table below utilized resolution bandwidth of 1MHz.

OPERATING FREQUENCY:	795.50	MHz
CHANNEL:	23800	
MODULATION SIGNAL:	QPSK	
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	Margin [dB]
1564.00	-55.99	3.77	-52.22	V	-12.2

Table 6-6. Radiated Spurious Data (5MHz)

© 2016 PCTEST Engineering Laboratory, Inc.

6.4 Frequency Stability Measurements

§2.1055, §90.539(e)

OPERATING FREQUENCY: 790,500,000 Hz

CHANNEL: 23780

REFERENCE VOLTAGE: 3.30 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.30	+ 20 (Ref)	790,499,558	-442	-0.0000559
100 %		- 30	790,500,474	474	0.0000600
100 %		- 20	790,499,858	-142	-0.0000180
100 %		- 10	790,500,090	90	0.0000114
100 %		0	790,500,444	444	0.0000562
100 %		+ 10	790,500,270	270	0.0000342
100 %		+ 20	790,500,103	103	0.0000130
100 %		+ 30	790,499,614	-386	-0.0000488
100 %		+ 40	790,499,877	-123	-0.0000156
100 %		+ 50	790,499,574	-426	-0.0000539
85 %	2.81	+ 20	790,500,312	312	0.0000395
115 %	3.80	+ 20	790,499,922	-78	-0.0000099

Table 6-7. Frequency Stability Data

© 2016 PCTEST Engineering Laboratory, Inc.

Frequency Stability Measurements (Cont'd)
§2.1055, §90.539(e)

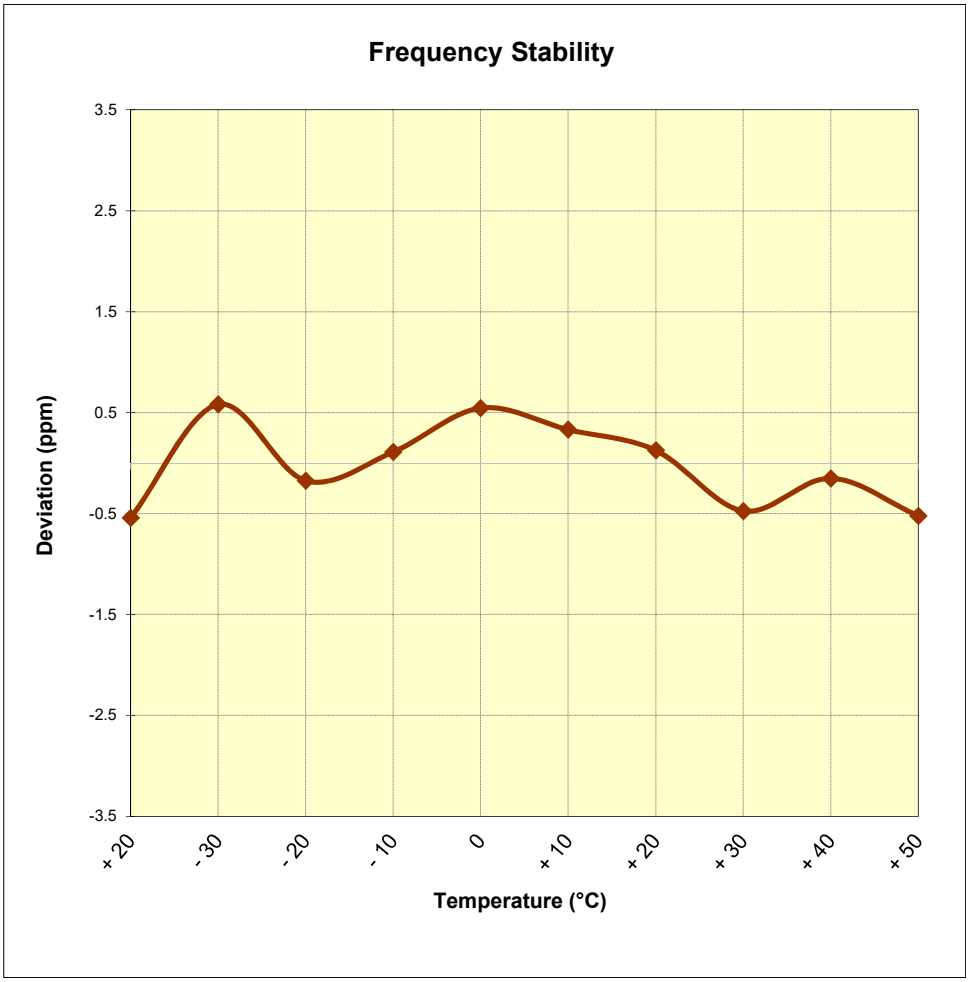
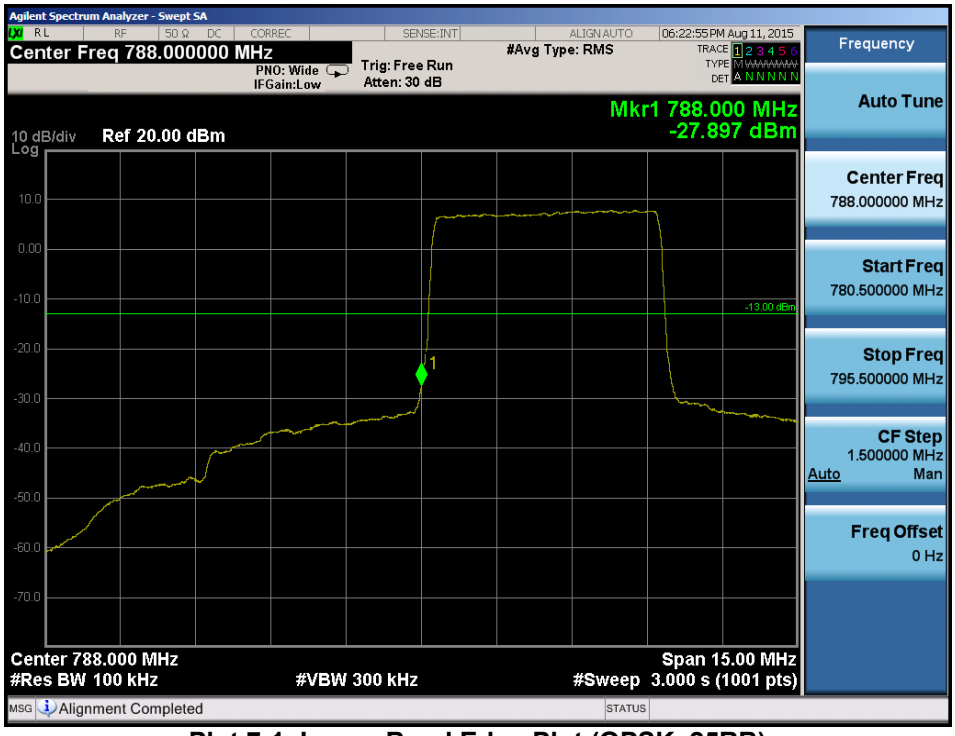


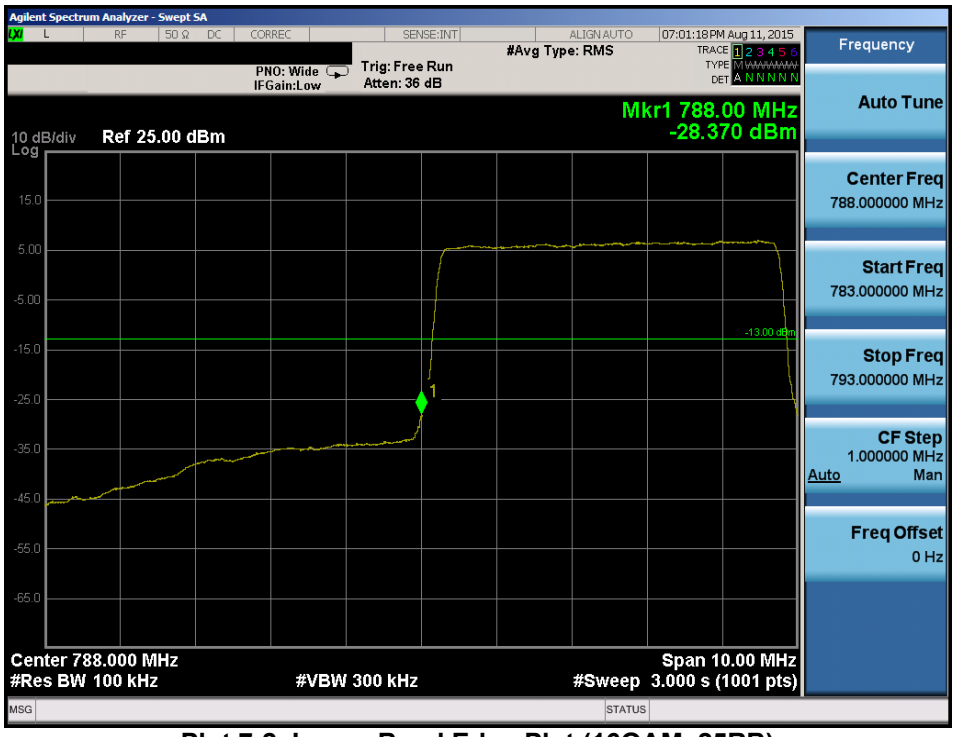
Figure 6-2. Frequency Stability Graph

© 2016 PCTEST Engineering Laboratory, Inc.

7.0 5MHZ BANDWIDTH - PLOT(S) OF EMISSIONS



Plot 7-1. Lower Band Edge Plot (QPSK, 25RB)



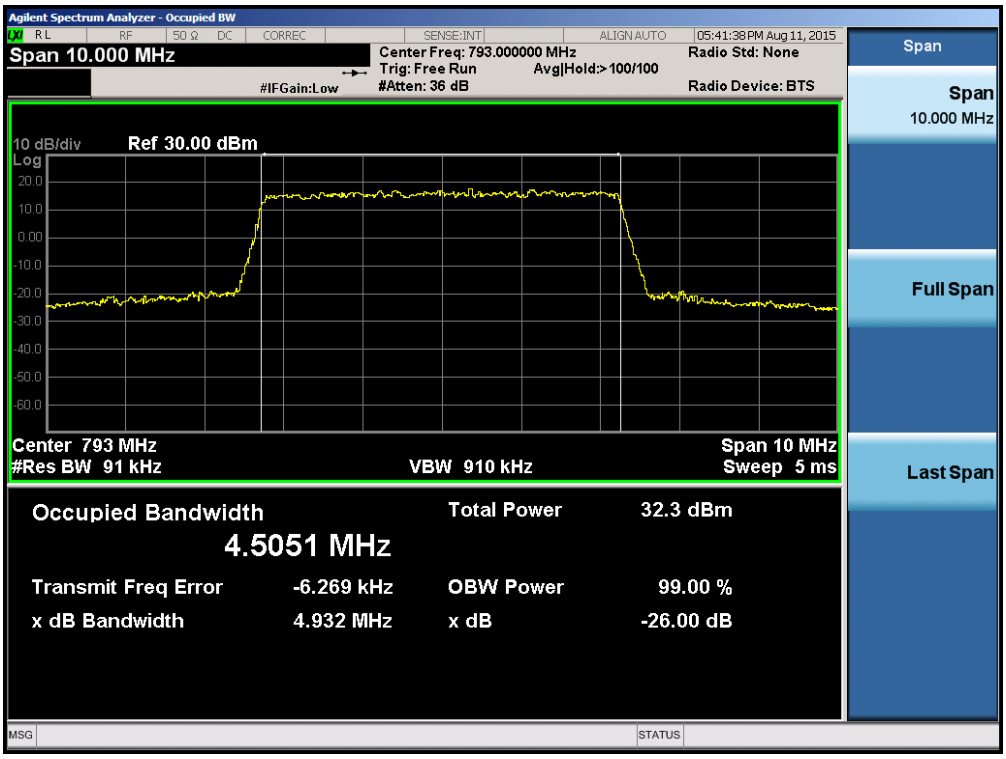
Plot 7-2. Lower Band Edge Plot (16QAM, 25RB)

© 2016 PCTEST Engineering Laboratory, Inc.

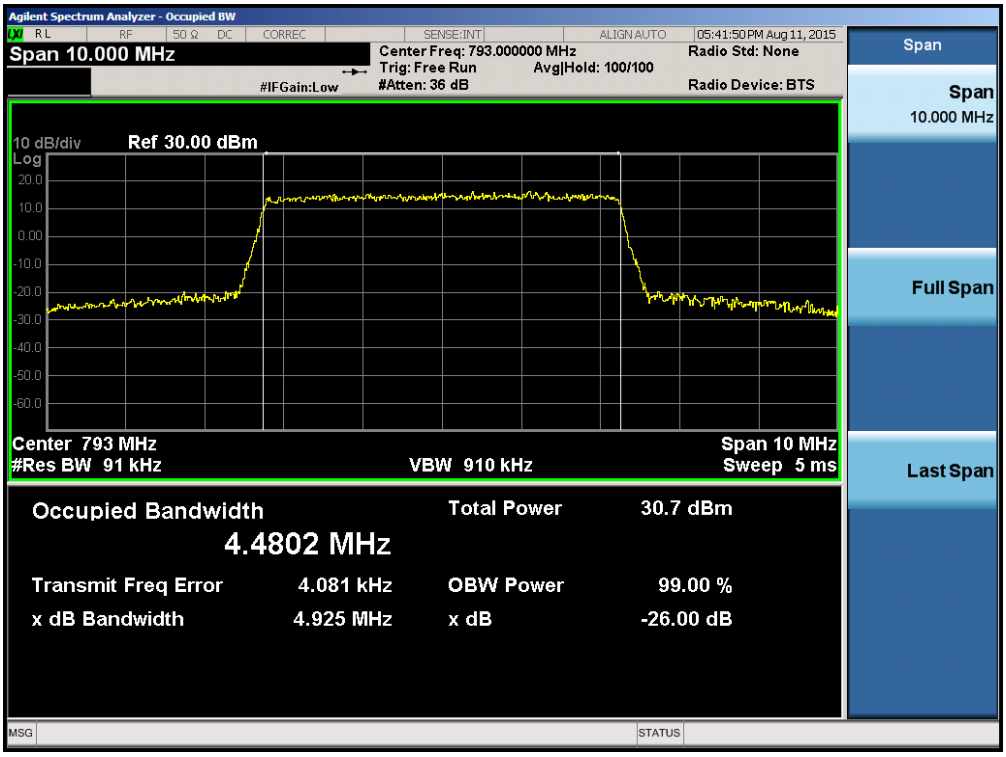
Plot 7-3. Upper Band Edge Plot (QPSK, 25RB)

Plot 7-4. Upper Band Edge Plot (16QAM, 25RB)

© 2016 PCTEST Engineering Laboratory, Inc.

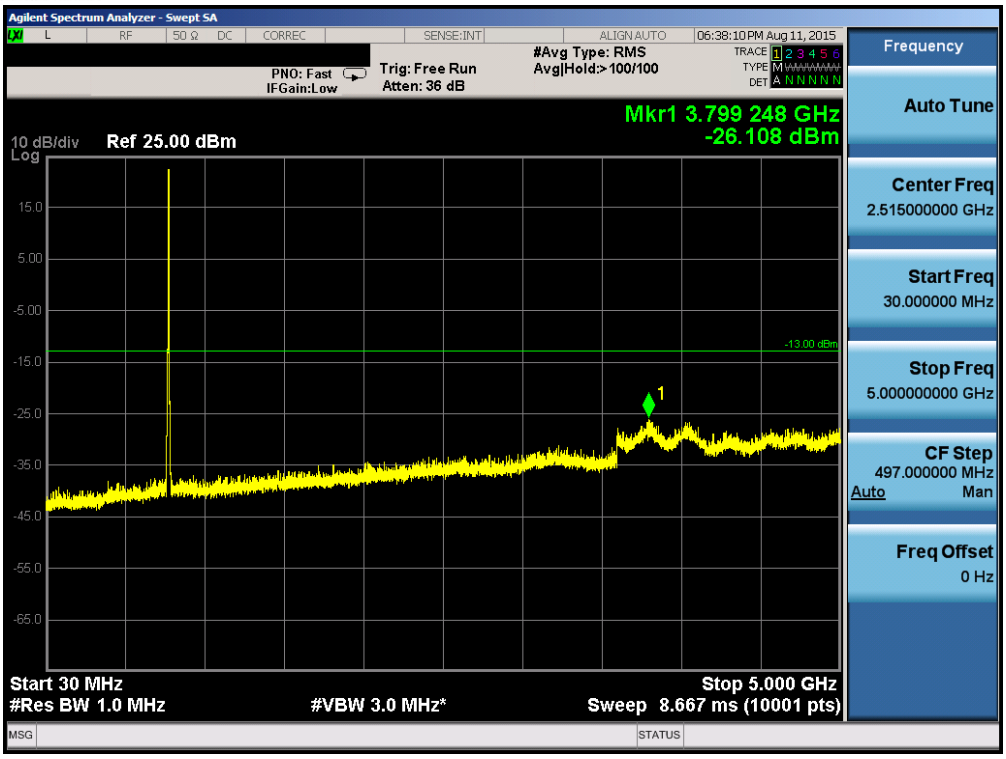


Plot 7-5. Occupied Bandwidth Plot (QPSK, 25RB)

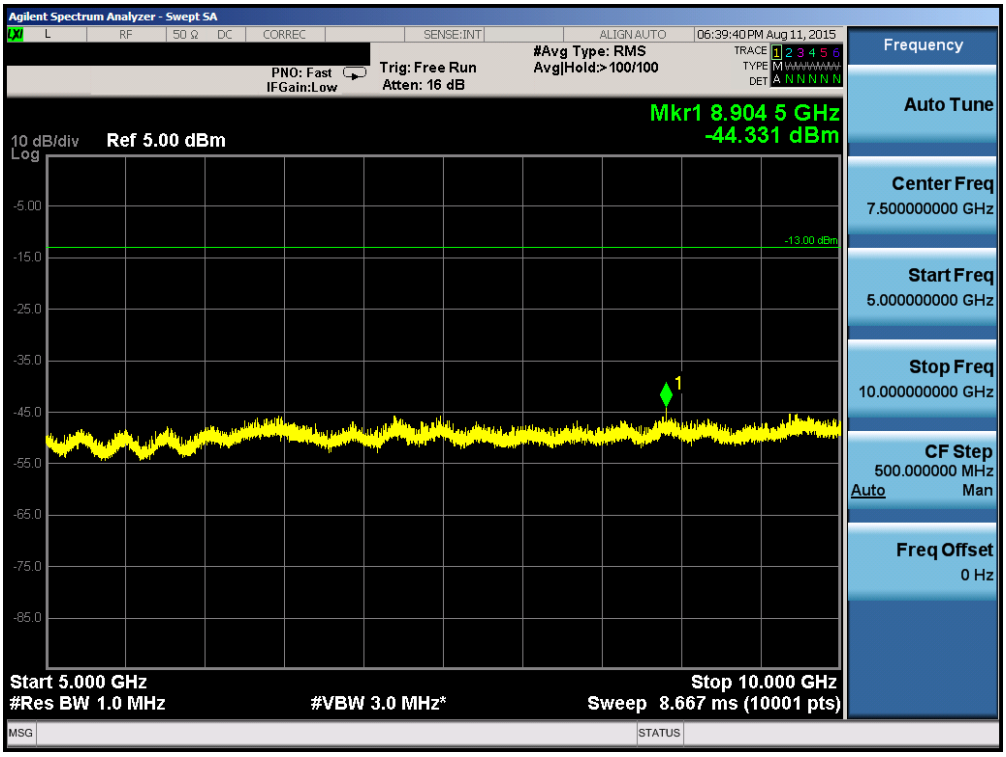


Plot 7-6. Occupied Bandwidth Plot (16QAM, 25RB)

© 2016 PCTEST Engineering Laboratory, Inc.



Plot 7-7. Conducted Spurious Plot



Plot 7-8. Conducted Spurious Plot

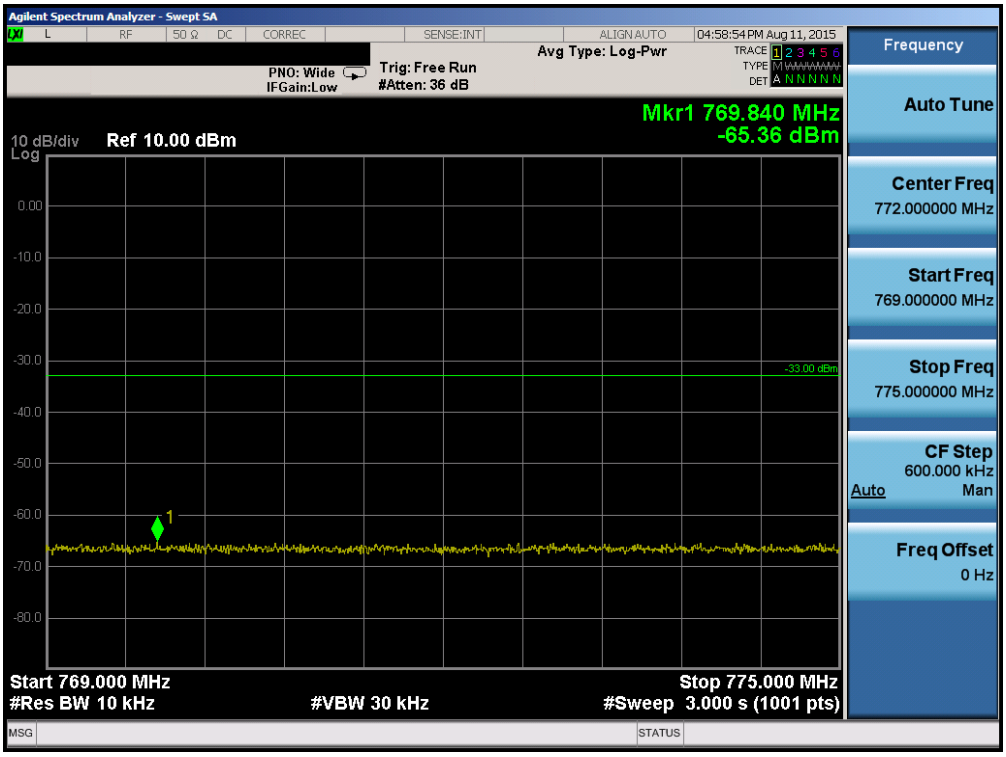
© 2016 PCTEST Engineering Laboratory, Inc.

Emissions Mask Note: For the following conducted emissions plots in the 769-775MHz and the 799 – 805MHz band, the FCC limit is 65 + $10\log_{10}(P_{[Watts]})$ = -35dBm in a 6.25kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25kHz with the available equipment, a bandwidth of 10kHz was used instead to show compliance. By using a 10kHz bandwidth, the limit was adjusted by $10\log_{10}(10kHz/6.25kHz)$ = 2.04dB. Thus, the limit shown in all plots in the 799 – 805MHz band for all available modulation types was -35dBm + 2.04dB = -32.96dBm.

Plot 7-9. Conducted Emissions Mask (799-805 MHz) Plot (QPSK, 25RB, High Channel)

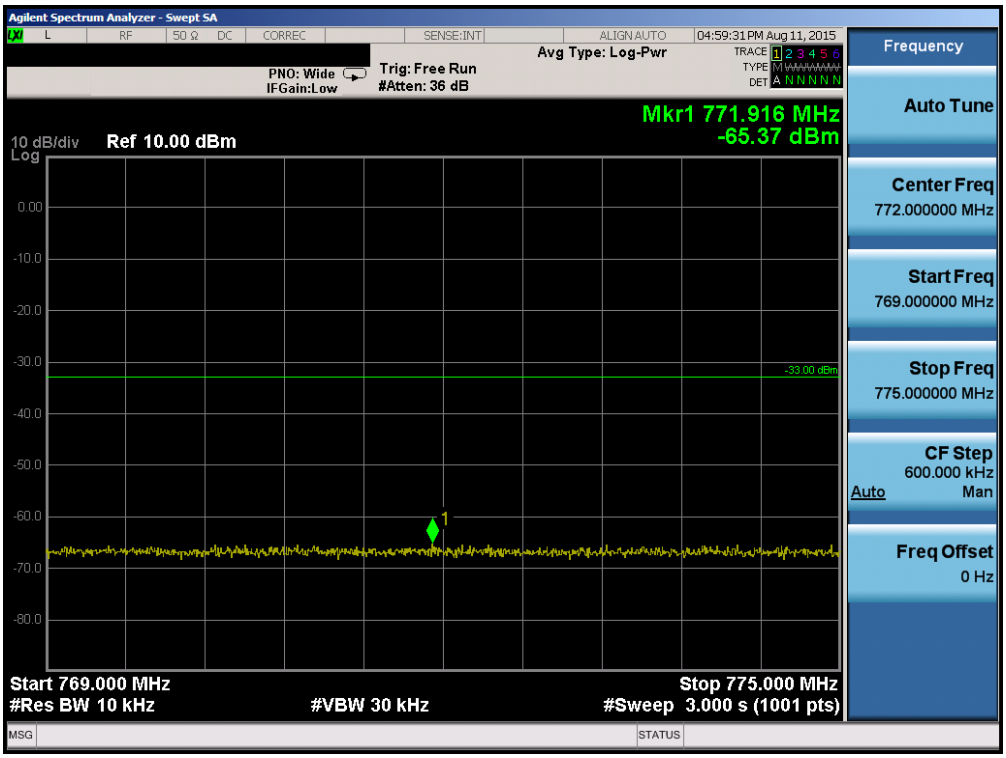
© 2016 PCTEST Engineering Laboratory, Inc.

Plot 7-10. Conducted Emissions Mask (799-805 MHz) Plot (16QAM, 25RB, High Channel)



Plot 7-11. Conducted Emissions Mask (769-775 MHz) Plot (QPSK, 25RB, Low Channel)

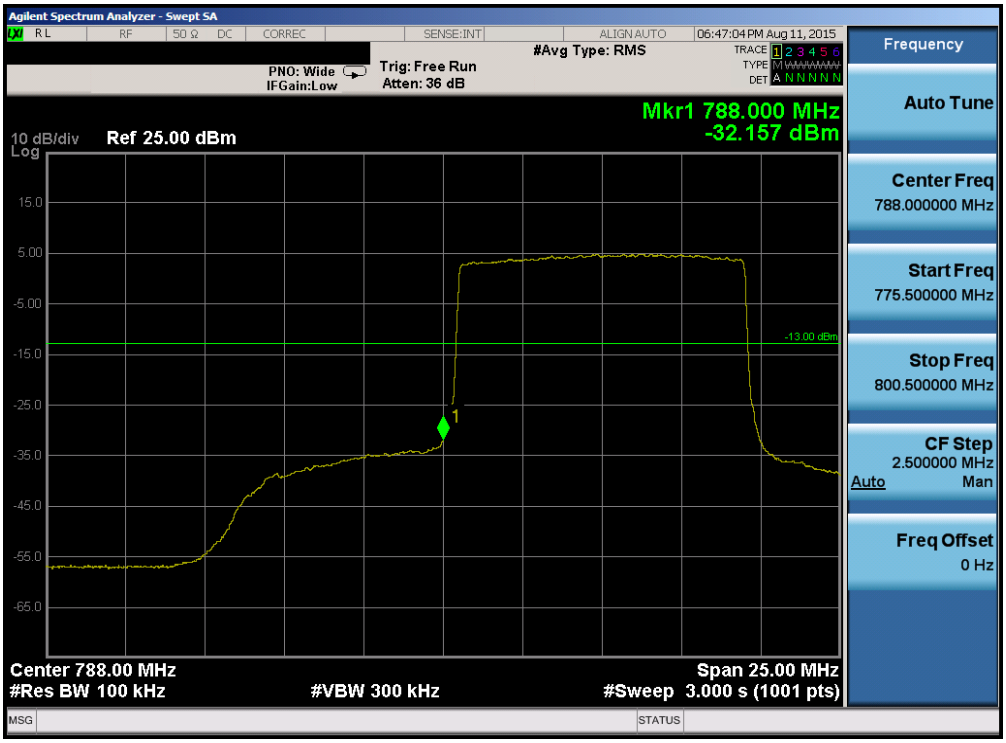
© 2016 PCTEST Engineering Laboratory, Inc.



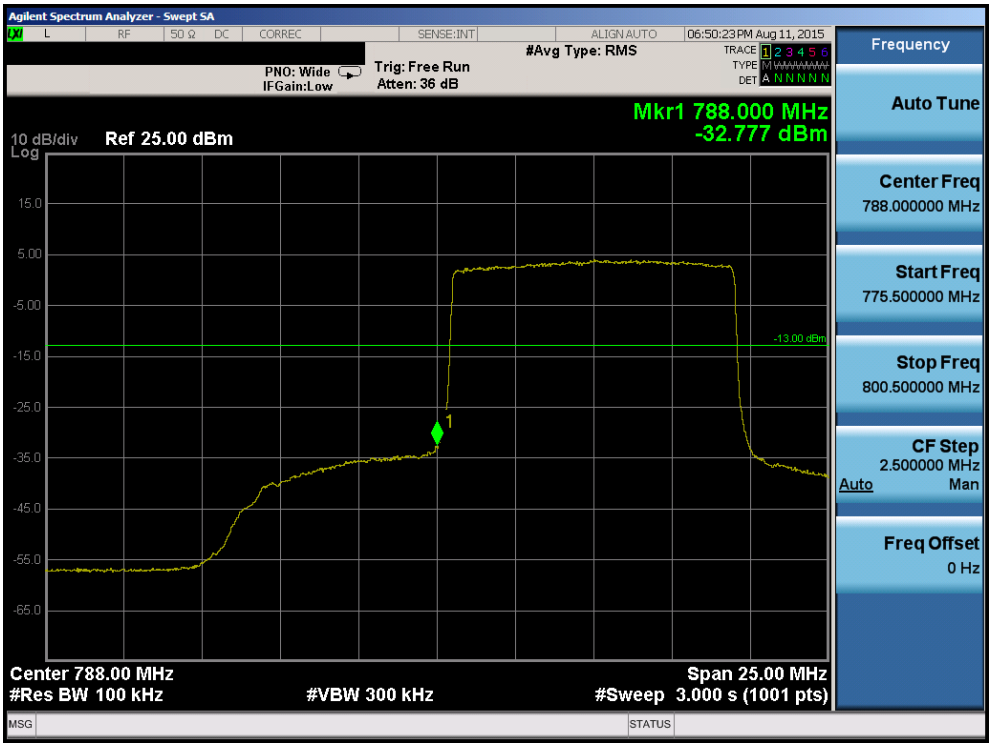
Plot 7-12. Conducted Emissions Mask (769-775 MHz) Plot (16QAM, 25RB, Low Channel)

© 2016 PCTEST Engineering Laboratory, Inc.

8.0 10MHZ BANDWIDTH - PLOT(S) OF EMISSIONS

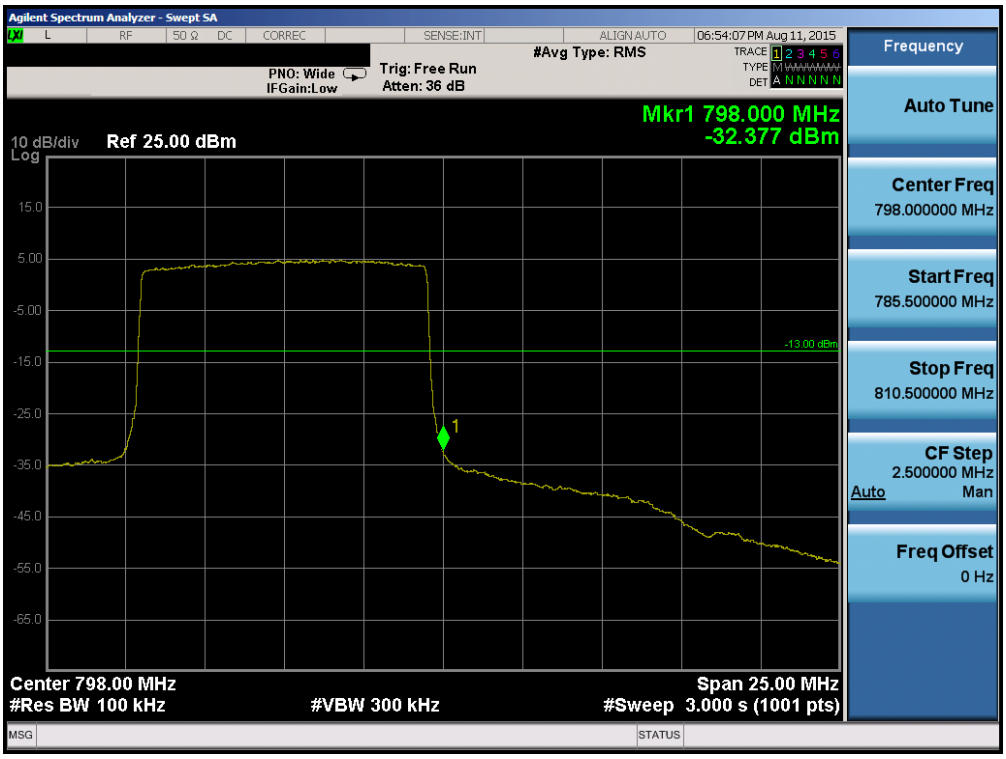


Plot 8-1. Lower Band Edge Plot (QPSK, 50RB)



Plot 8-2. Lower Band Edge Plot (16QAM, 50RB)

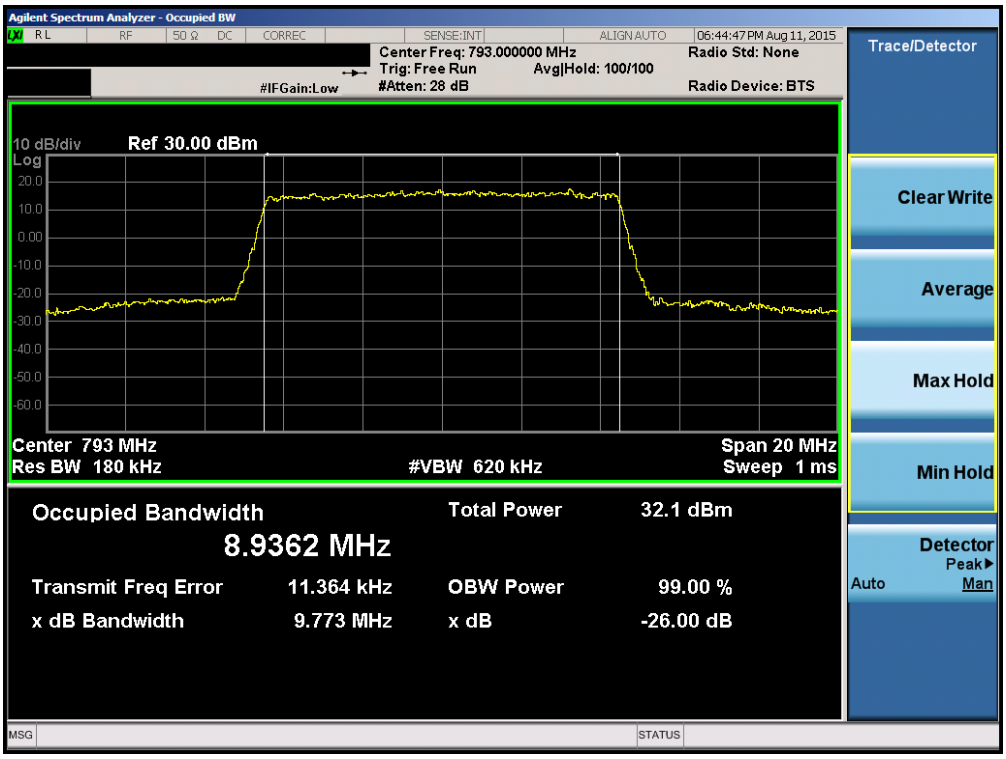
© 2016 PCTEST Engineering Laboratory, Inc.



Plot 8-3. Upper Band Edge Plot (QPSK, 50RB)

Plot 8-4. Upper Band Edge Plot (16QAM, 50RB)

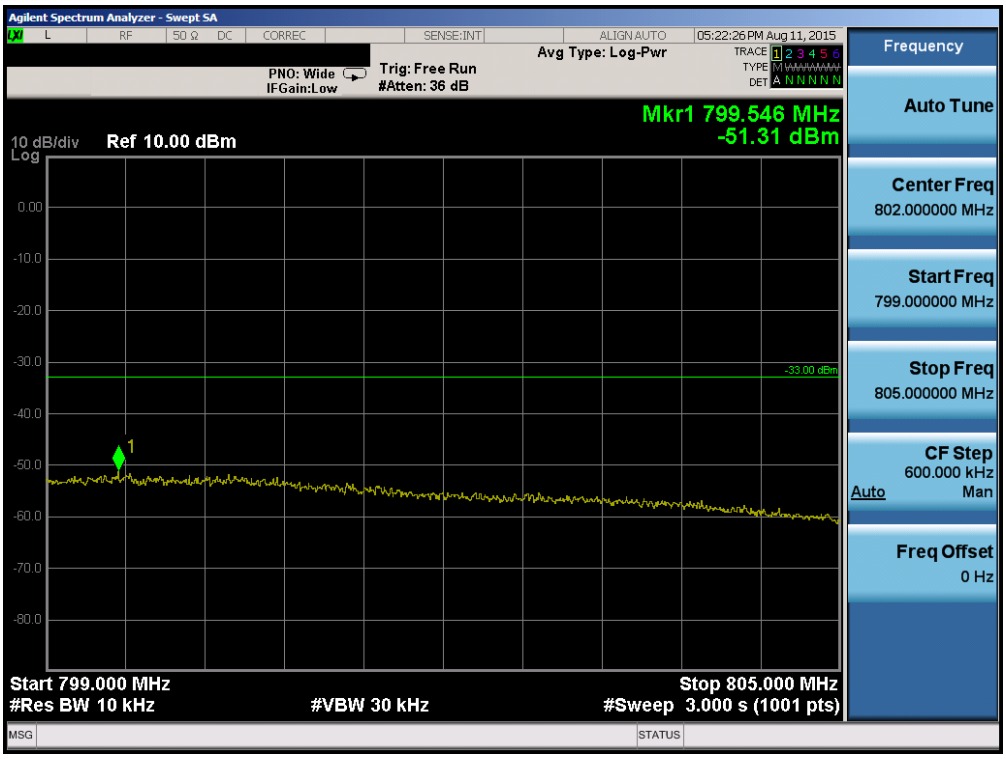
© 2016 PCTEST Engineering Laboratory, Inc.



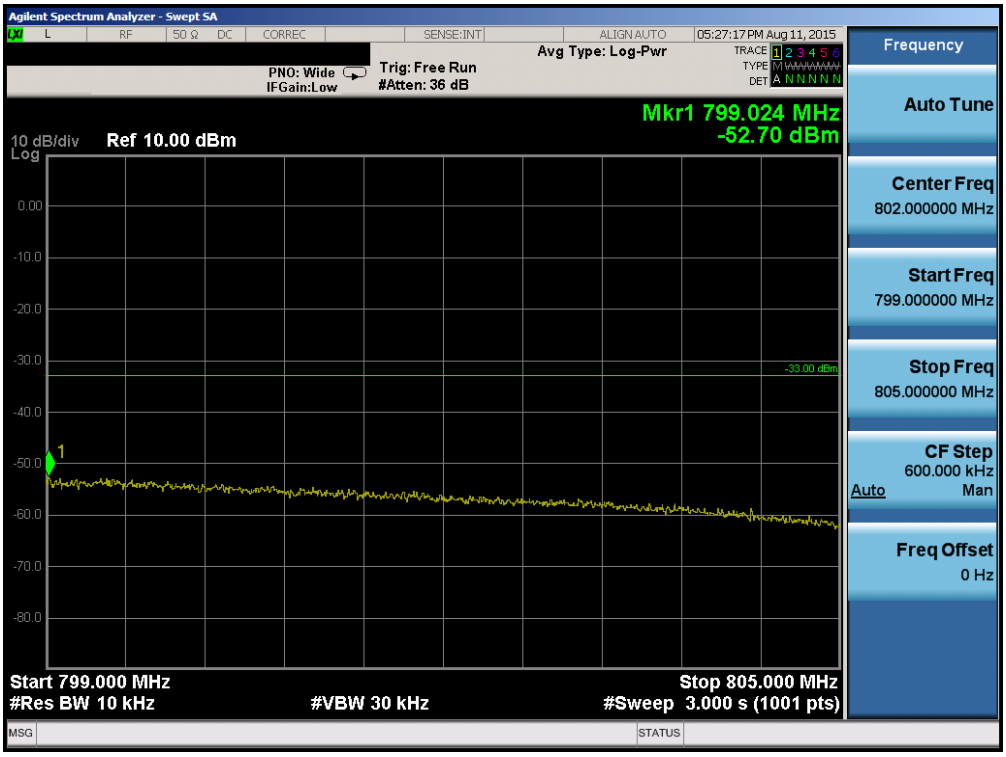
Plot 8-5. Occupied Bandwidth Plot (QPSK, 50RB)

Plot 8-6. Occupied Bandwidth Plot (16QAM, 50RB)

© 2016 PCTEST Engineering Laboratory, Inc.

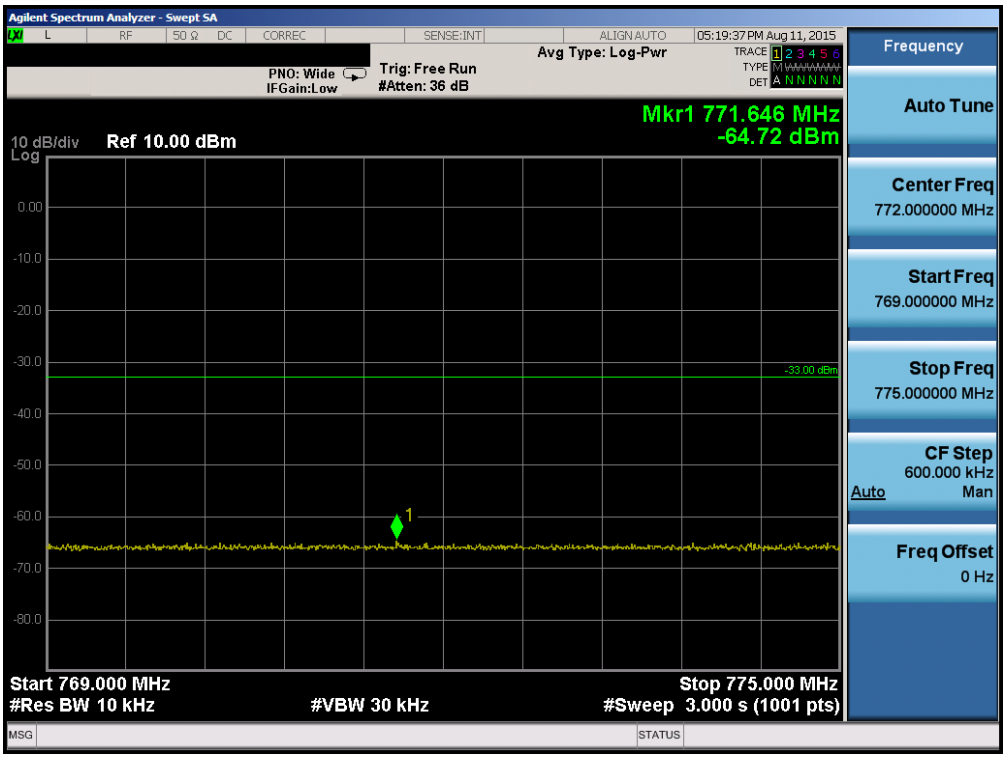


Plot 8-7. Upper Conducted Emissions Mask (799-805 MHz) Plot (QPSK, 50RB)

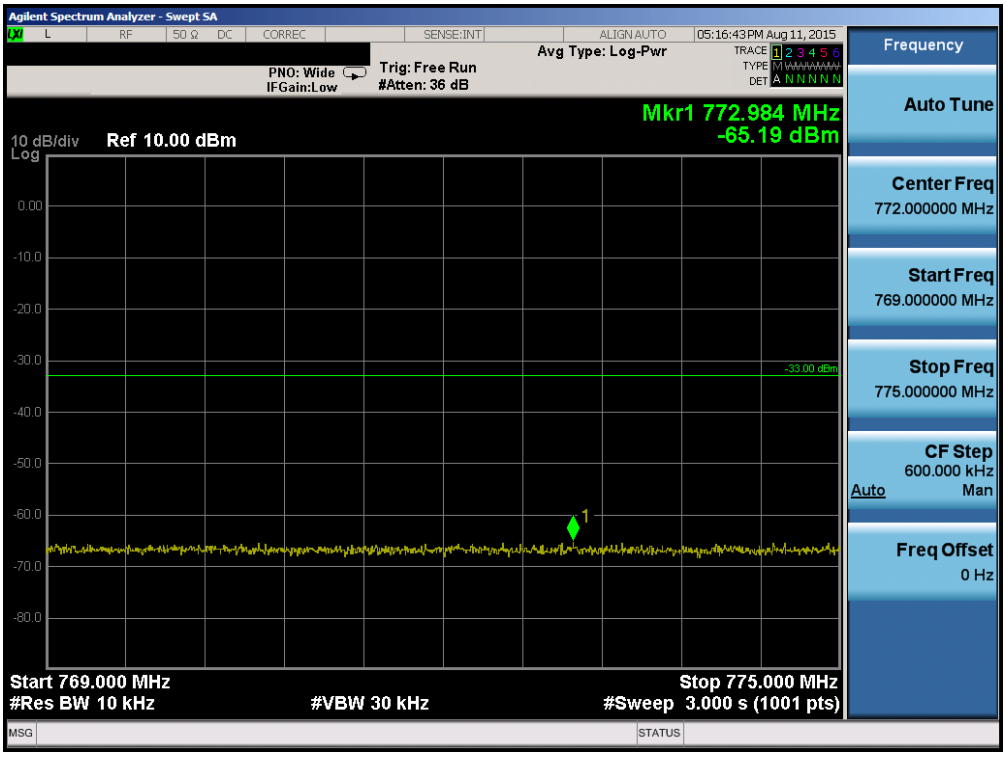


Plot 8-8. Upper Conducted Emissions Mask (799-805 MHz) Plot (16QAM, 50RB)

© 2016 PCTEST Engineering Laboratory, Inc.



Plot 8-9. Lower Conducted Emissions Mask (769-775 MHz) Plot (QPSK, 50RB)



Plot 8-10. Lower Conducted Emissions Mask (769-775 MHz) Plot (16QAM, 50RB)

© 2016 PCTEST Engineering Laboratory, Inc.

9.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Harris Wireless Module FCC ID: BV8BBPBM214** complies with all the requirements of Part 90 Subpart R of the FCC rules.

© 2016 PCTEST Engineering Laboratory, Inc.