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MEASUREMENT REPORT
FCC Part 22, 24, & 27 LTE

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

Date of Testing:
8/9 - 9/1/2016
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0Y1608101318.A3L

FCC ID :	**A3LSMT587P**
APPLICANT:	**SAMSUNG ELECTRONICS CO., LTD.**

Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§2; §22; §24; §27
Test Procedure(s):	ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02
EUT Type:	Portable Tablet
Model(s):	SM-T587P
Test Device Serial No.:	*identical prototype* [S/N: 04707]

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

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

Randy Ortanez
President

ACCREDITED
TESTING CERT#2041.01

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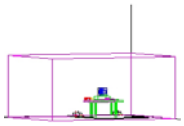

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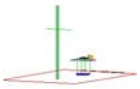


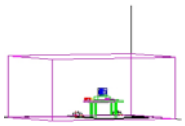
§2.1033 General Information

APPLICANT:	Samsung Electronics Co., Ltd.
APPLICANT ADDRESS:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21045 USA
FCC RULE PART(S):	§2; §22; §24; §27
BASE MODEL:	SM-T587P
FCC ID:	A3LSMT587P
FCC CLASSIFICATION:	PCS Licensed Transmitter (PCB)
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm)
Test Device Serial No.:	04707 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST:	8/9 - 9/1/2016
TEST REPORT S/N:	0Y1608101318.A3L

Test Facility / Accreditations

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

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



MEASUREMENT REPORT
FCC Part 22, 24, & 27

Mode	FCC Rule Part	Tx Frequency (MHz)	ERP/EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
LTE Band 26	22H	824.7 - 848.3	0.178	22.50	1M12G7D	QPSK
LTE Band 26	22H	824.7 - 848.3	0.143	21.55	1M12W7D	16QAM
LTE Band 26	22H	825.5 - 847.5	0.184	22.66	2M73G7D	QPSK
LTE Band 26	22H	825.5 - 847.5	0.153	21.84	2M73W7D	16QAM
LTE Band 26	22H	826.5 - 846.5	0.307	24.88	4M52G7D	QPSK
LTE Band 26	22H	826.5 - 846.5	0.194	22.88	4M51W7D	16QAM
LTE Band 26	22H	829 - 844	0.265	24.23	8M95G7D	QPSK
LTE Band 26	22H	829 - 844	0.220	23.43	8M98W7D	16QAM
LTE Band 26	22H	831.5 - 841.5	0.256	24.08	13M4G7D	QPSK
LTE Band 26	22H	831.5 - 841.5	0.214	23.31	13M4W7D	16QAM
LTE Band 25	24E	1850.7 - 1914.3	0.261	24.16	1M12G7D	QPSK
LTE Band 25	24E	1850.7 - 1914.3	0.210	23.22	1M12W7D	16QAM
LTE Band 25	24E	1851.5 - 1913.5	0.256	24.08	2M73G7D	QPSK
LTE Band 25	24E	1851.5 - 1913.5	0.213	23.29	2M73W7D	16QAM
LTE Band 25	24E	1852.5 - 1912.5	0.283	24.52	4M54G7D	QPSK
LTE Band 25	24E	1852.5 - 1912.5	0.199	22.99	4M51W7D	16QAM
LTE Band 25	24E	1855 - 1910	0.274	24.38	8M97G7D	QPSK
LTE Band 25	24E	1855 - 1910	0.186	22.70	8M98W7D	16QAM
LTE Band 25	24E	1857.5 - 1907.5	0.237	23.74	13M4G7D	QPSK
LTE Band 25	24E	1857.5 - 1907.5	0.177	22.49	13M4W7D	16QAM
LTE Band 25	24E	1860 - 1905	0.233	23.67	17M9G7D	QPSK
LTE Band 25	24E	1860 - 1905	0.177	22.48	17M9W7D	16QAM
LTE Band 41	27	2498.5 - 2687.5	0.242	23.83	4M50G7D	QPSK
LTE Band 41	27	2498.5 - 2687.5	0.171	22.32	4M50W7D	16QAM
LTE Band 41	27	2501 - 2685	0.314	24.97	8M97G7D	QPSK
LTE Band 41	27	2501 - 2685	0.294	24.69	8M99W7D	16QAM
LTE Band 41	27	2503.5 - 2682.5	0.305	24.84	13M5G7D	QPSK
LTE Band 41	27	2503.5 - 2682.5	0.291	24.64	13M5W7D	16QAM
LTE Band 41	27	2506 - 2680	0.305	24.84	18M0G7D	QPSK
LTE Band 41	27	2506 - 2680	0.291	24.64	17M9W7D	16QAM

EUT Overview

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 C63.4-2014 on January 22, 2015.

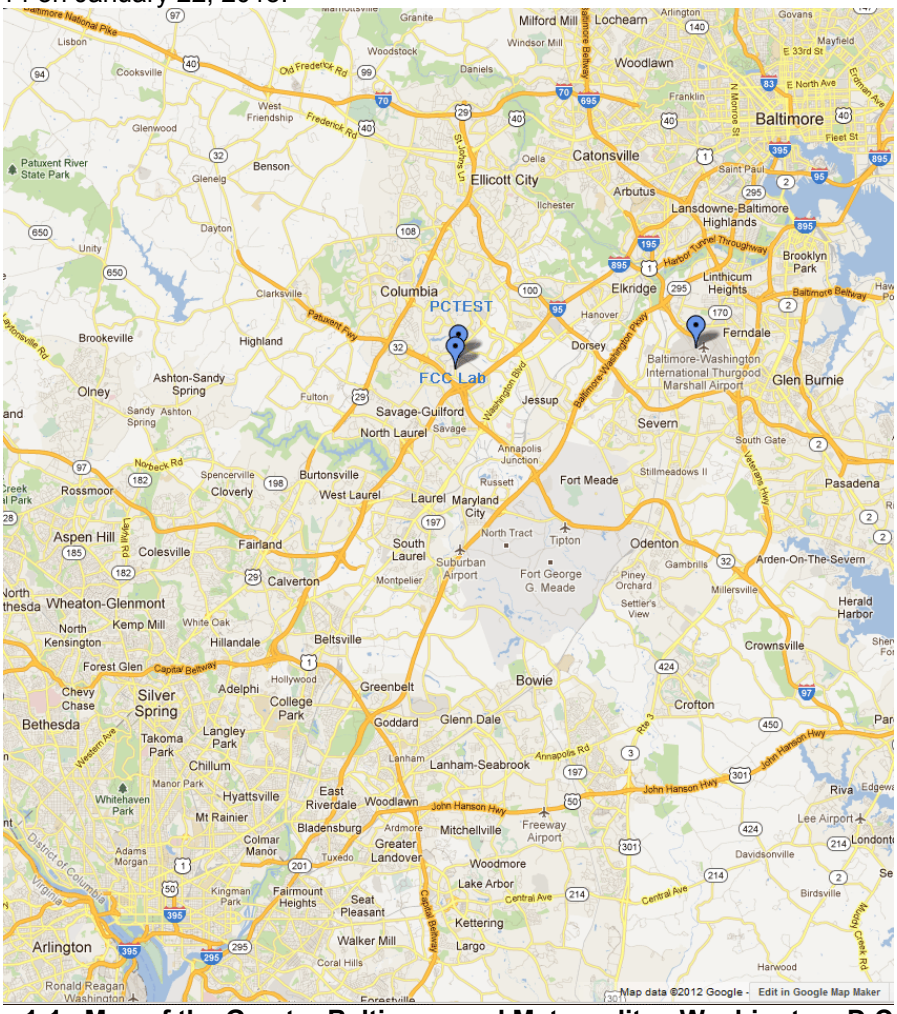


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Tablet FCC ID: A3LSMT587P**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A (BC0, BC1, BC10), Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), ANT+

2.3 Test Configuration

The Samsung Portable Tablet FCC ID: A3LSMT587P was tested per the guidance of ANSI/TIA-603-D-2010 and KDB 971168 D01 v02r02. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 EMI Suppression Device(s)/Modifications

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

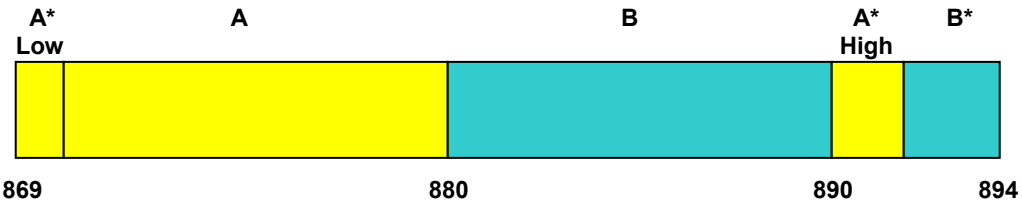
3.0 DESCRIPTION OF TESTS

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-D-2010) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v02r02) were used in the measurement of the **Samsung Portable Tablet FCC ID: A3LSMT587P.**

3.2 Cellular - Base Frequency Blocks

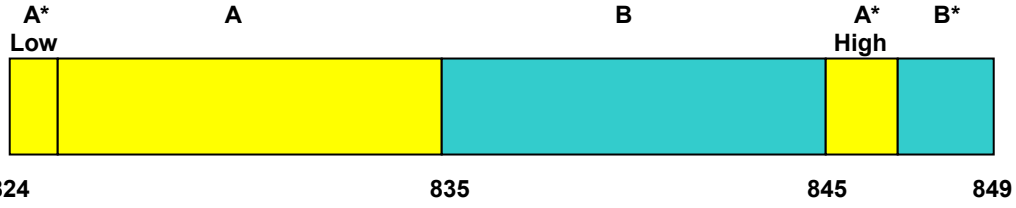
§22.905



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

3.3 Cellular - Mobile Frequency Blocks

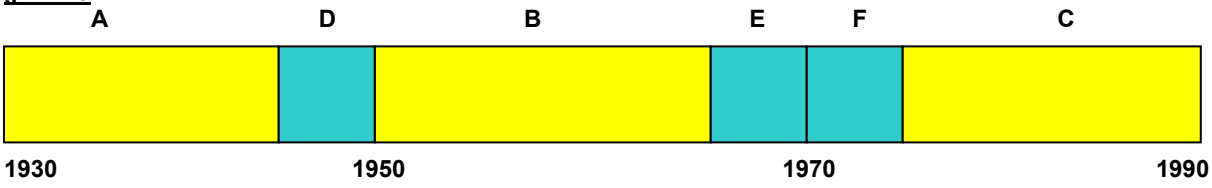
§22.905



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

3.4 PCS - Base Frequency Blocks

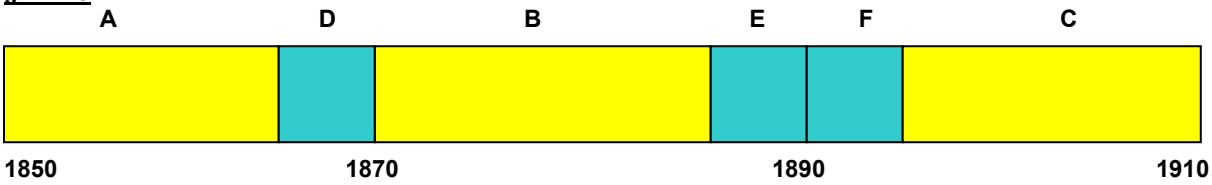
§24.229



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

3.5 PCS - Mobile Frequency Blocks

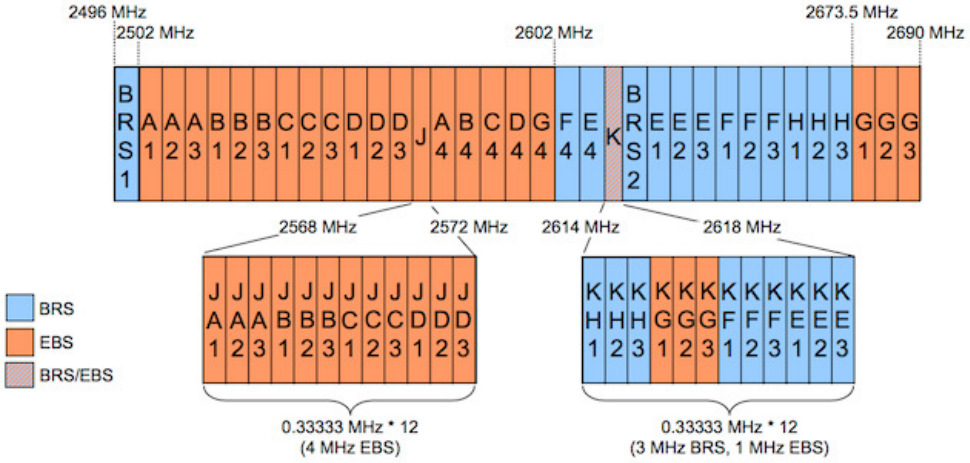
§24.229



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

3.6 BRS/EBS Frequency Block

§27.5



3.7 Radiated Power and Radiated Spurious Emissions

§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) §27.53(m)

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 72.4cm high PVC support structure is placed on top of the turntable. A 3" (~7.6cm) sheet of high density polystyrene 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 turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v02r02.

Per the guidance of ANSI/TIA-603-D-2010, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_{d\ [dBm]} = P_{g\ [dBm]} - \text{cable loss}_{\ [dB]} + \text{antenna gain}_{\ [dBd/dBi]}$$

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

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

4.0 MEASUREMENT UNCERTAINTY

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

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

5.0 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	4/11/2016	Annual	4/11/2017	LTx1
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/11/2016	Annual	7/11/2017	RE1
-	LTx3	LIcensed Transmitter Cable Set	7/12/2016	Annual	7/12/2017	LTx3
Agilent	N9020A	MXA Signal Analyzer	11/5/2015	Annual	11/5/2016	US46470561
Rohde & Schwarz	CMW500	Radio Communication Tester	10/13/2015	Annual	10/13/2016	100976
Agilent	N9038A	MXE EMI Receiver	4/21/2016	Annual	4/21/2017	MY51210133
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	7/30/2015	Biennial	7/30/2017	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	7/6/2016	Annual	7/6/2017	441119
Emco	3116	Horn Antenna (18 - 40GHz)	3/27/2015	Biennial	3/27/2017	9203-2178
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
Espec	ESX-2CA	Environmental Chamber	3/4/2016	Annual	3/4/2017	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/26/2016	Biennial	4/26/2018	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	7/6/2016	Annual	7/6/2017	13SH10-1000/U1000-1
K & L	13SH10-1000/U1000	N Type High Pass Filter	7/11/2016	Annual	7/11/2017	13SH10-1000/U1000-2
K & L	11SH10-3075/U18000	High Pass Filter	7/11/2016	Annual	7/11/2017	11SH10-3075/U18000-2
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	3/4/2016	Annual	3/4/2017	11210140001
Mini-Circuits	TVA-11-422	RF Power Amp	N/A			QA1303002
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
PCTEST	-	EMC Switch System	7/11/2016	Annual	7/11/2017	NM1
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rhode & Schwarz	TS-PR18	Pre-Amplifier	7/6/2016	Annual	7/6/2017	101622
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	7/11/2016	Annual	7/11/2017	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/7/2016	Annual	3/7/2017	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/16/2016	Annual	5/16/2017	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/18/2015	Biennial	11/18/2017	91052523RX
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or 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.

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

6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

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

16QAM Modulation

Emission Designator = 8M45W7D

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

Spurious Radiated Emission – LTE Band

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

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

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
FCC ID: A3LSMT587P
FCC Classification: PCS Licensed Transmitter (PCB)
Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
TRANSMITTER MODE (TX)					
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.2
2.1051 22.917(a) 24.238(a)	Out of Band Emissions	> 43 + 10log$_{10}$ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Section 7.3, 7.4
27.53(m)	Out of Band Emissions	> 43 + 10log$_{10}$ (P[Watts]) at channel edges and > 55 + 10log$_{10}$ (P[Watts]) at 5.5MHz away and beyond channel edges		PASS	Section 7.3, 7.4
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section 7.5
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
2.1055. 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)		PASS	Section 7.8
22.913(a.2)	Effective Radiated Power (Band 26)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.6
24.232(c) 27.50(h.2)	Equivalent Isotropic Radiated Power (Band 25 41)	< 2 Watts max. EIRP		PASS	Section 7.6
2.1053 22.917(a) 24.238(a)	Undesirable Emissions	> 43 + 10log$_{10}$ (P[Watts]) for all out-of-band emissions		PASS	Section 7.7
27.53(m)	Undesirable Emissions	> 43 + 10log$_{10}$ (P[Watts]) at channel edges > 55 + 10log$_{10}$ (P[Watts]) at 5.5MHz away and beyond channel edges		PASS	Section 7.7

Table 7-1. 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 (Sections 7.2, 7.3, 7.4, 7.5) were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 4.2.

7.2 Occupied Bandwidth

§2.1049

Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedure Used

KDB 971168 D01 v02r02 – Section 4.2

Test Settings

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

Test Setup

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

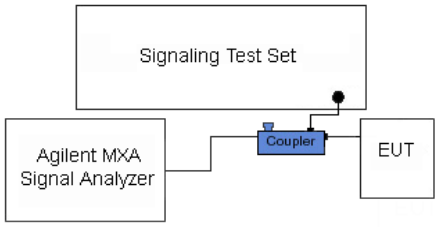
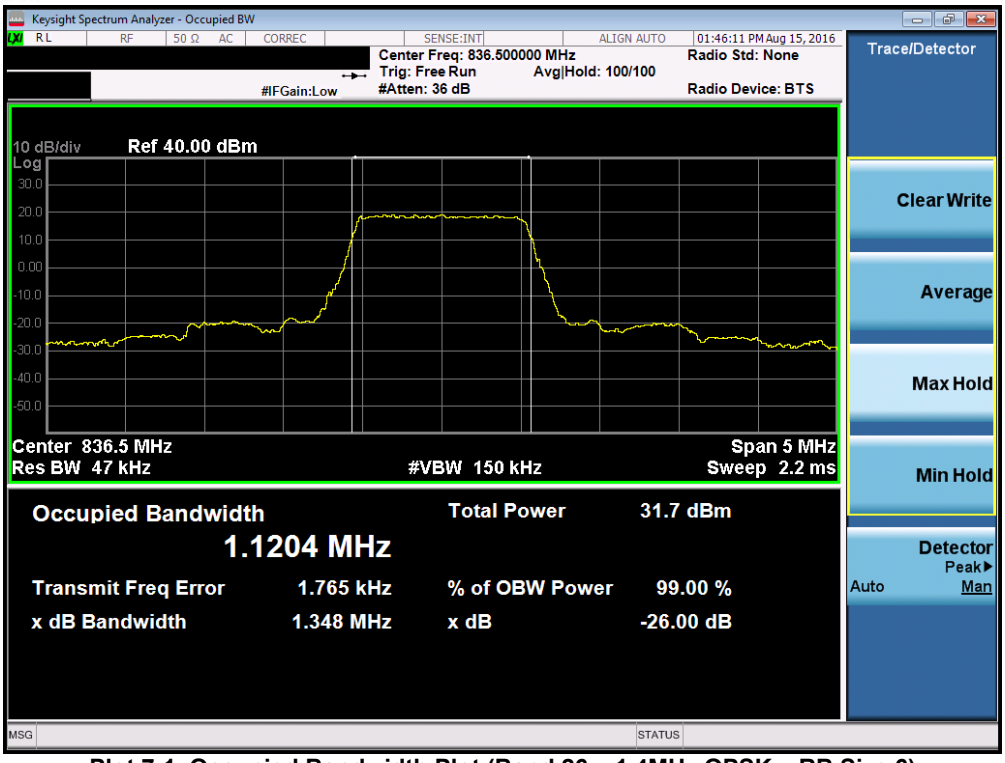


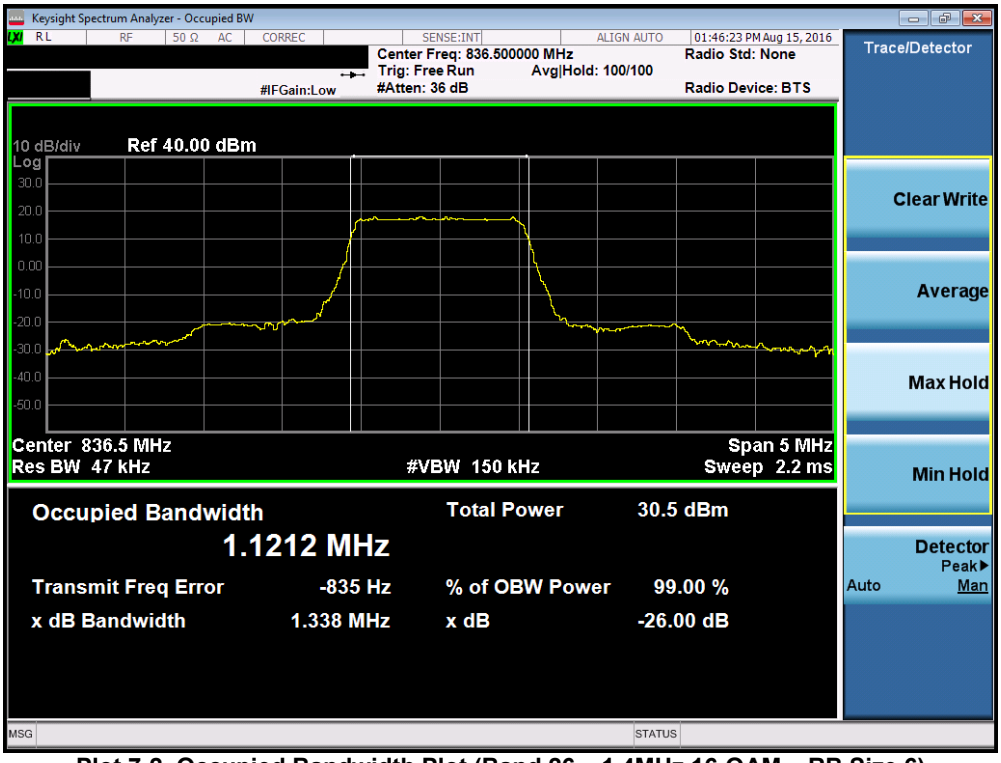
Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

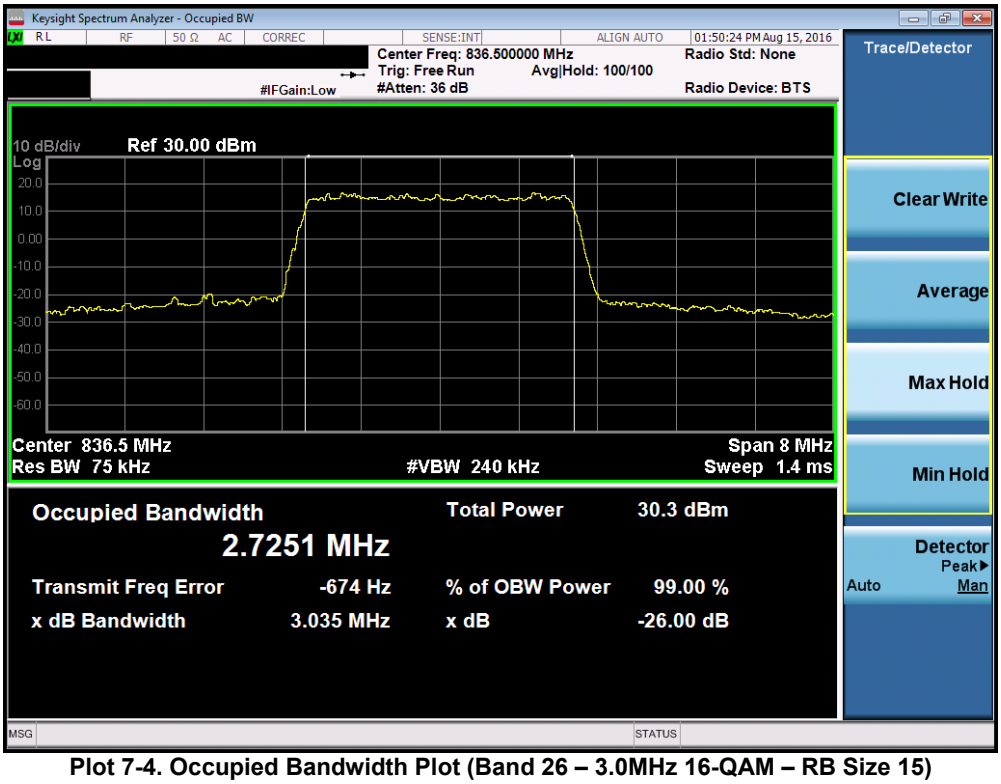


Plot 7-1. Occupied Bandwidth Plot (Band 26 – 1.4MHz QPSK – RB Size 6)

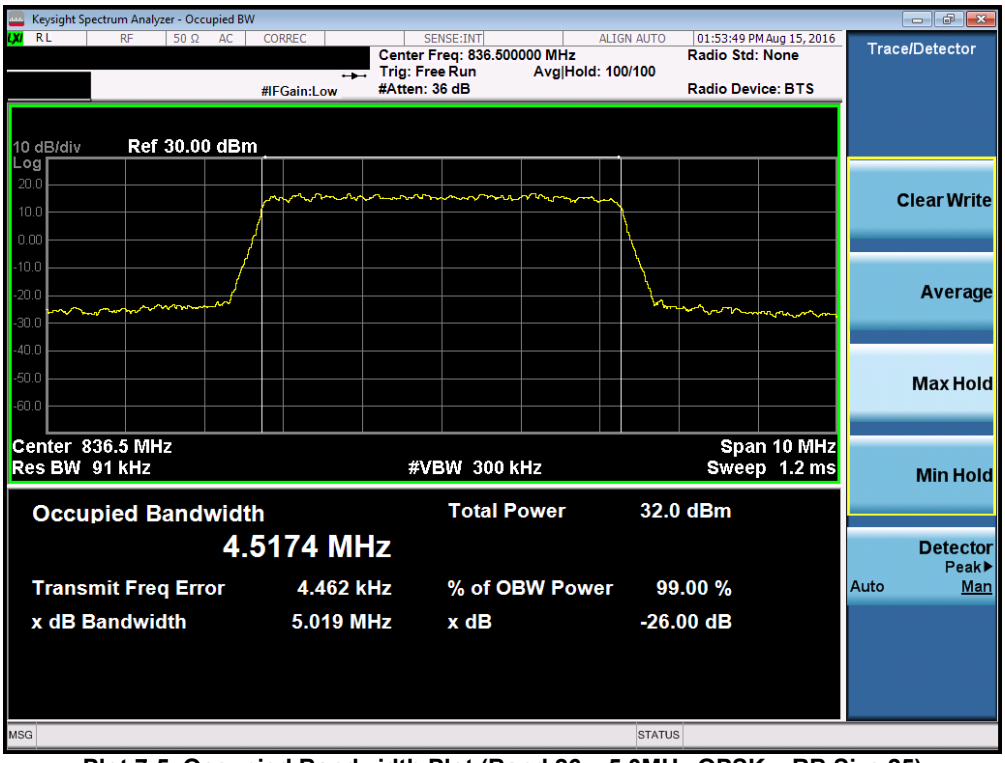


Plot 7-2. Occupied Bandwidth Plot (Band 26 – 1.4MHz 16-QAM – RB Size 6)

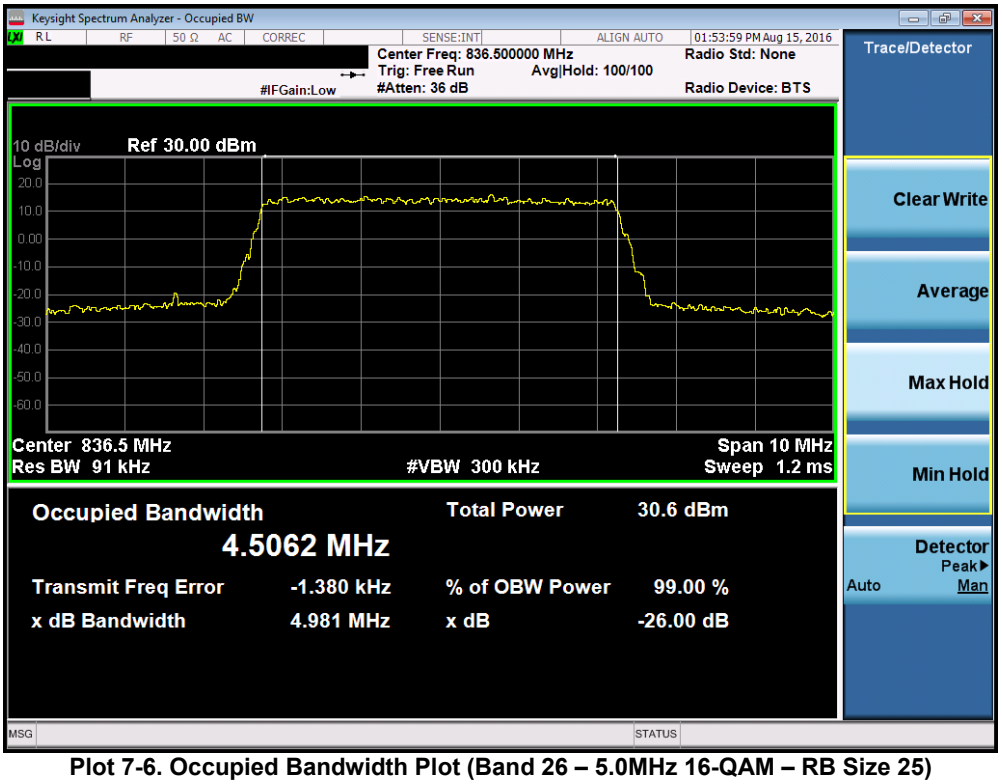
Plot 7-3. Occupied Bandwidth Plot (Band 26 – 3.0MHz QPSK – RB Size 15)



Plot 7-4. Occupied Bandwidth Plot (Band 26 – 3.0MHz 16-QAM – RB Size 15)



Plot 7-5. Occupied Bandwidth Plot (Band 26 – 5.0MHz QPSK – RB Size 25)

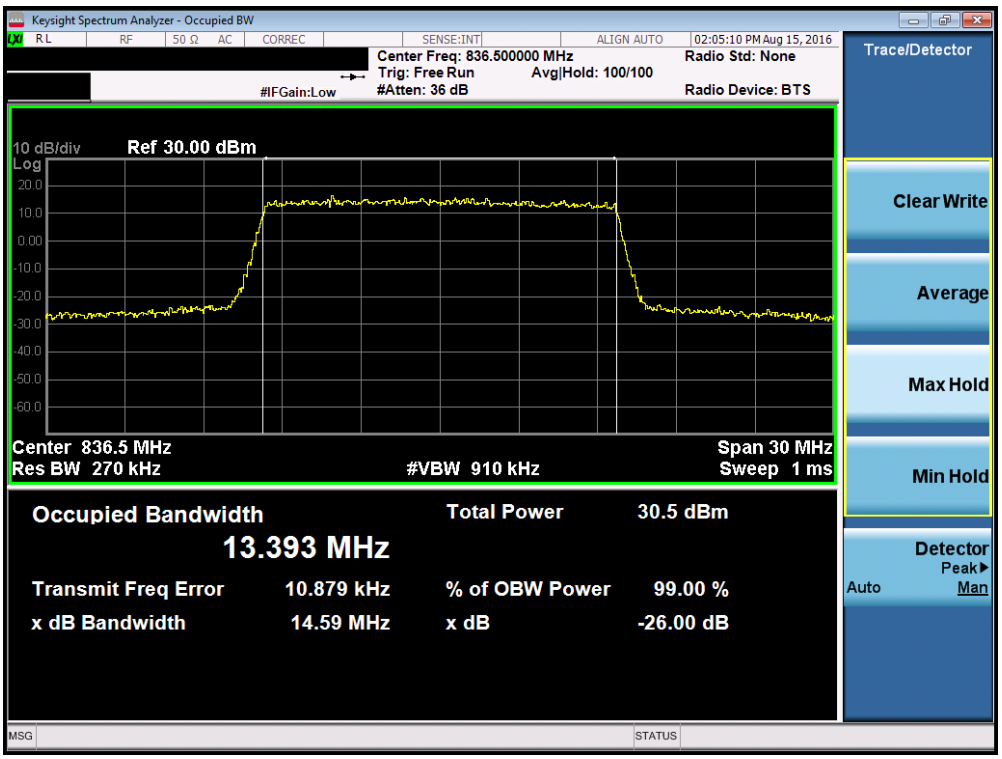


Plot 7-6. Occupied Bandwidth Plot (Band 26 – 5.0MHz 16-QAM – RB Size 25)

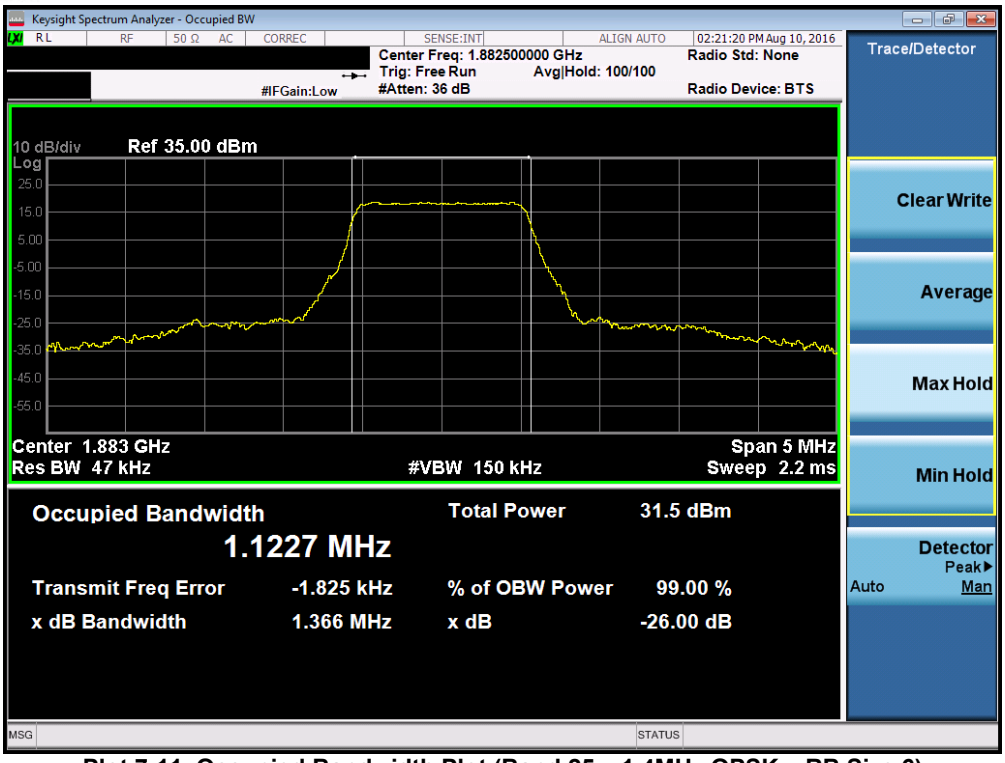
Plot 7-7. Occupied Bandwidth Plot (Band 26 – 10.0MHz QPSK – RB Size 50)

Plot 7-8. Occupied Bandwidth Plot (Band 26 – 10.0MHz 16-QAM – RB Size 50)

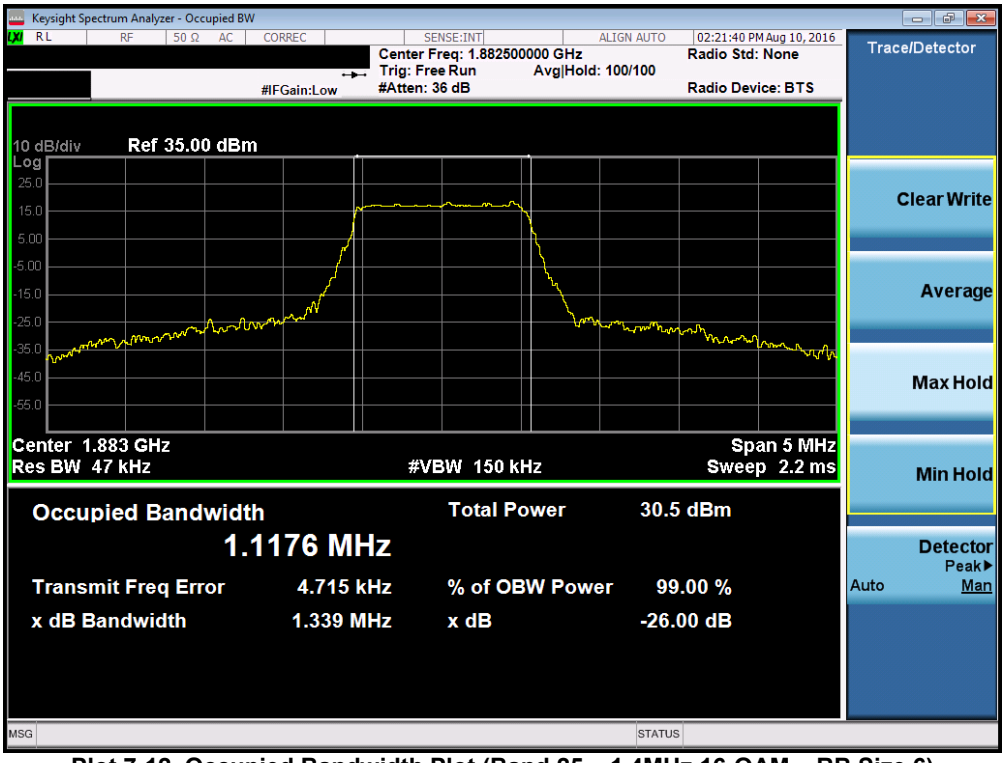
Plot 7-9. Occupied Bandwidth Plot (Band 26 – 15.0MHz QPSK – RB Size 75)



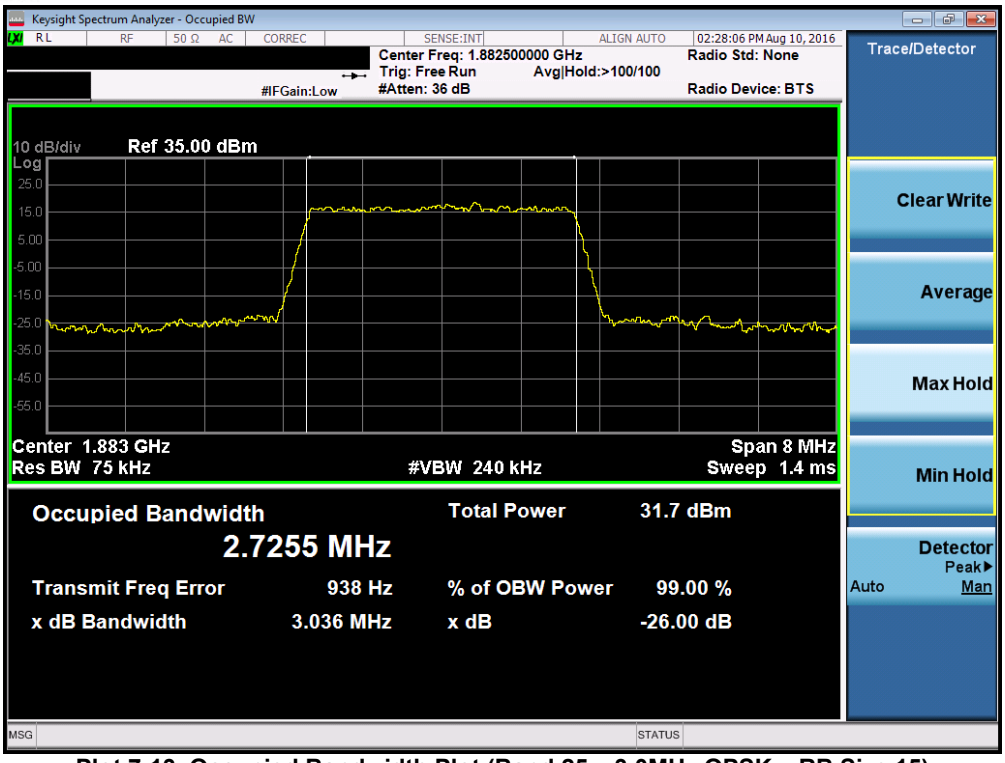
Plot 7-10. Occupied Bandwidth Plot (Band 26 – 15.0MHz 16-QAM – RB Size 75)



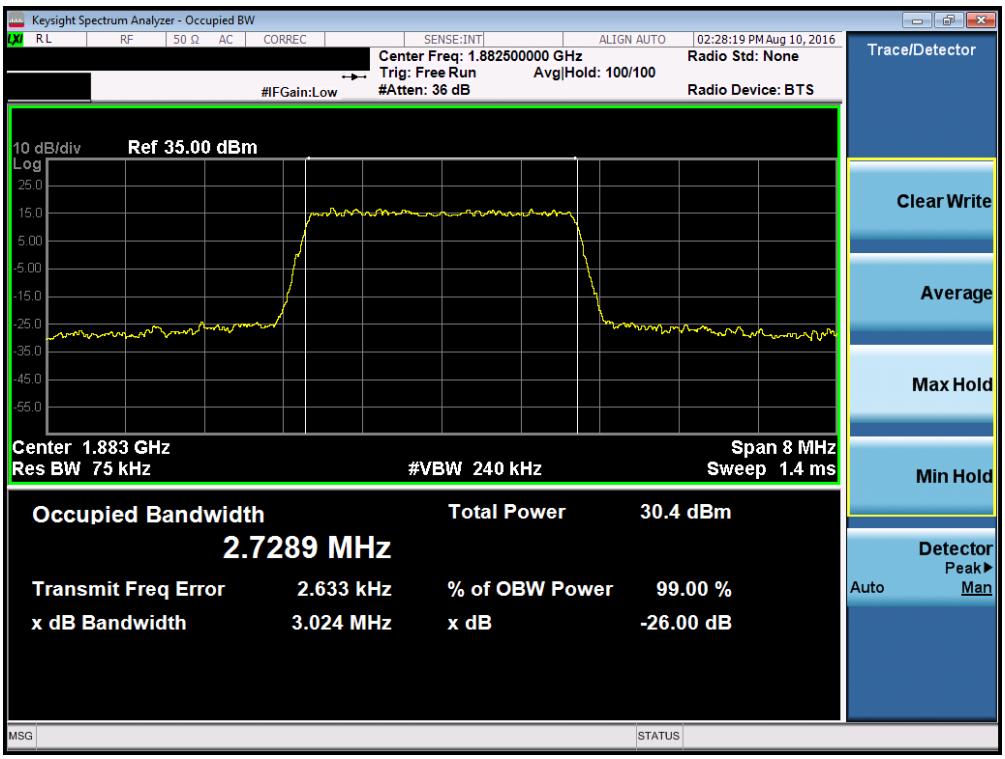
Plot 7-11. Occupied Bandwidth Plot (Band 25 – 1.4MHz QPSK – RB Size 6)



Plot 7-12. Occupied Bandwidth Plot (Band 25 – 1.4MHz 16-QAM – RB Size 6)



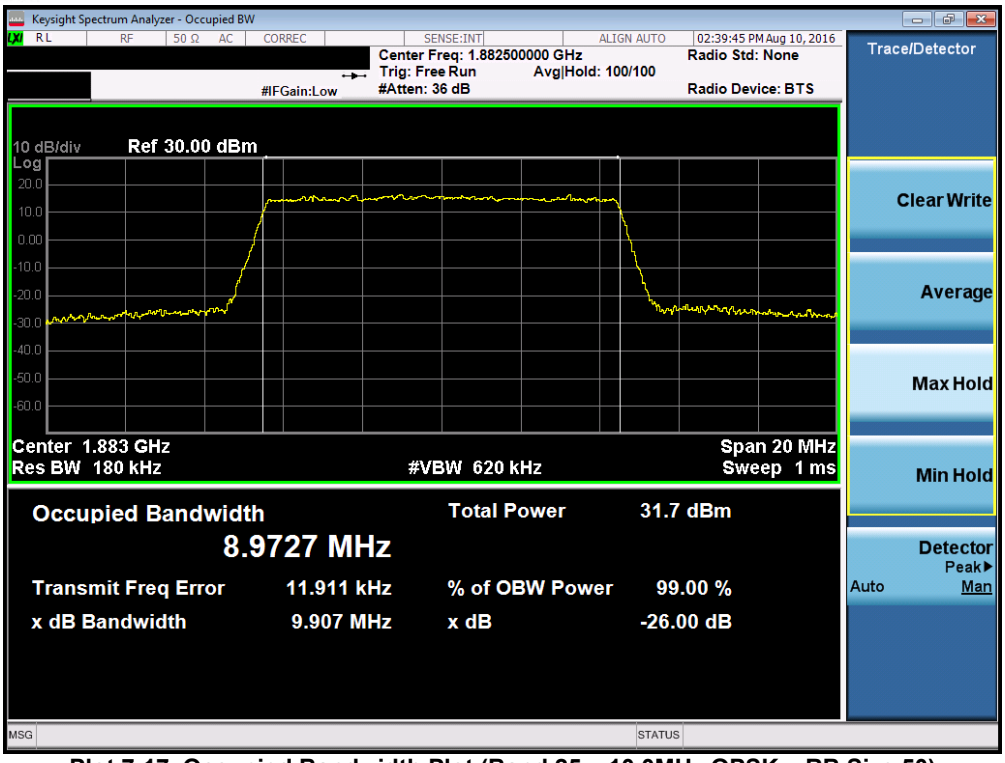
Plot 7-13. Occupied Bandwidth Plot (Band 25 – 3.0MHz QPSK – RB Size 15)



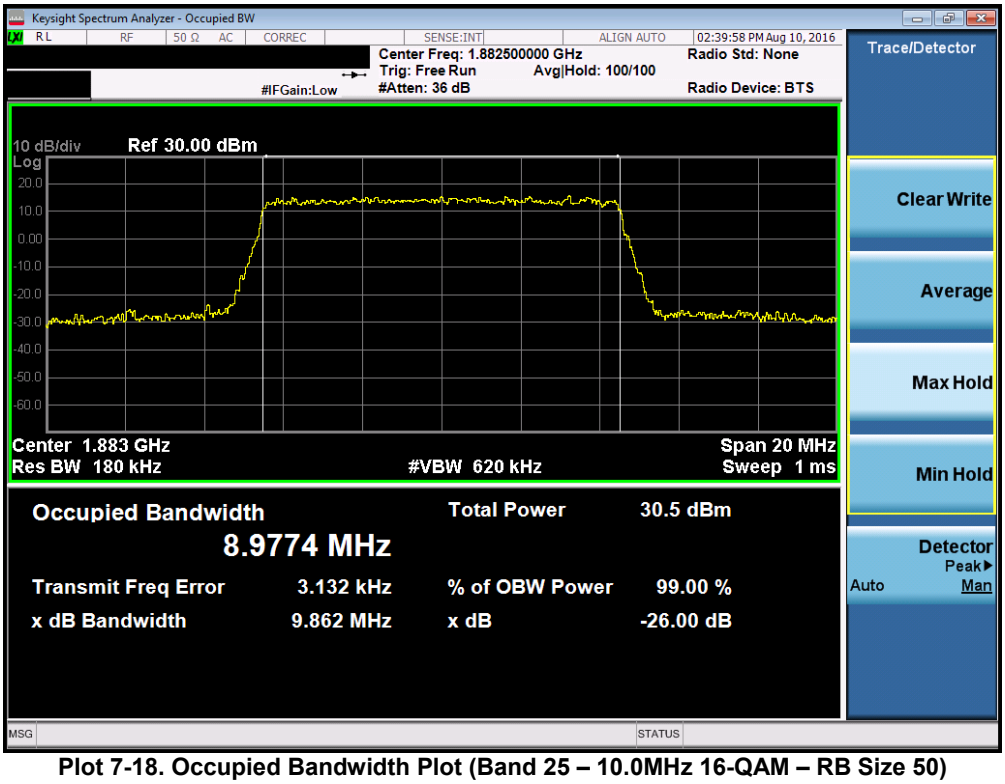
Plot 7-14. Occupied Bandwidth Plot (Band 25 – 3.0MHz 16-QAM – RB Size 15)

Plot 7-15. Occupied Bandwidth Plot (Band 25 – 5.0MHz QPSK – RB Size 25)

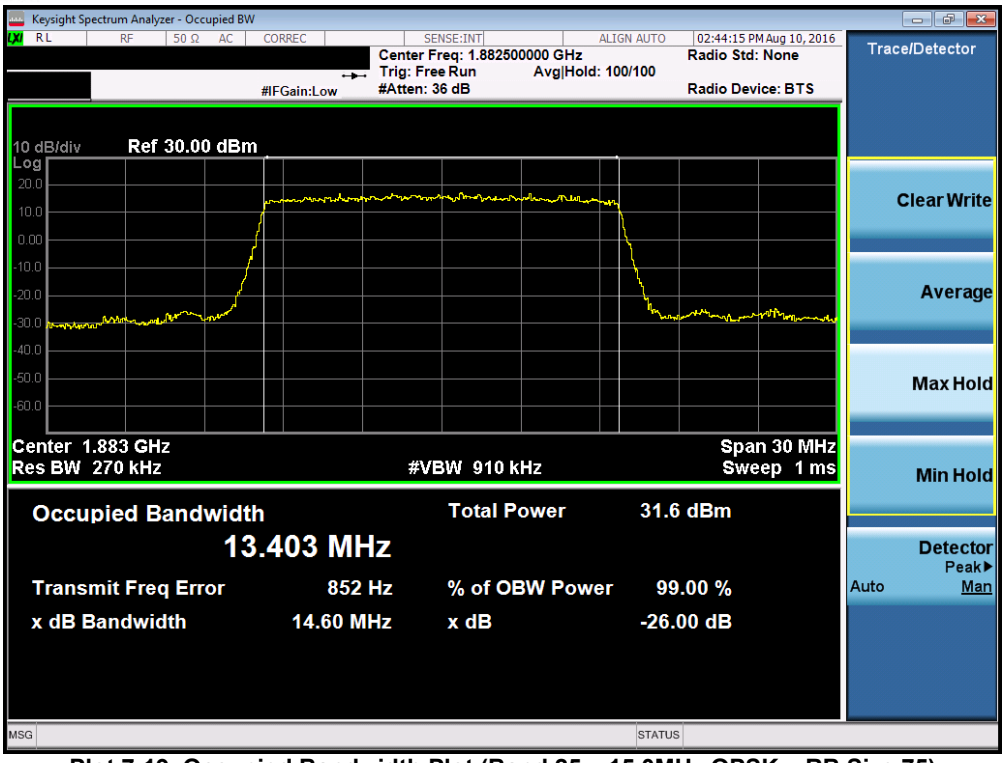
Plot 7-16. Occupied Bandwidth Plot (Band 25 – 5.0MHz 16-QAM – RB Size 25)



Plot 7-17. Occupied Bandwidth Plot (Band 25 – 10.0MHz QPSK – RB Size 50)

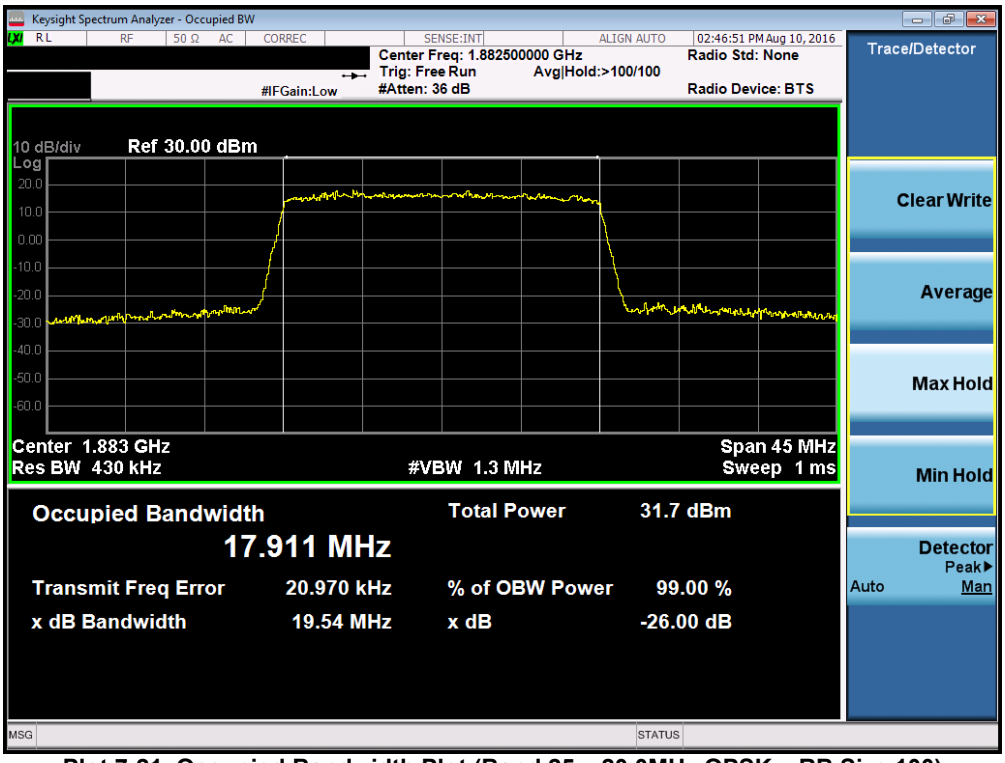


Plot 7-18. Occupied Bandwidth Plot (Band 25 – 10.0MHz 16-QAM – RB Size 50)

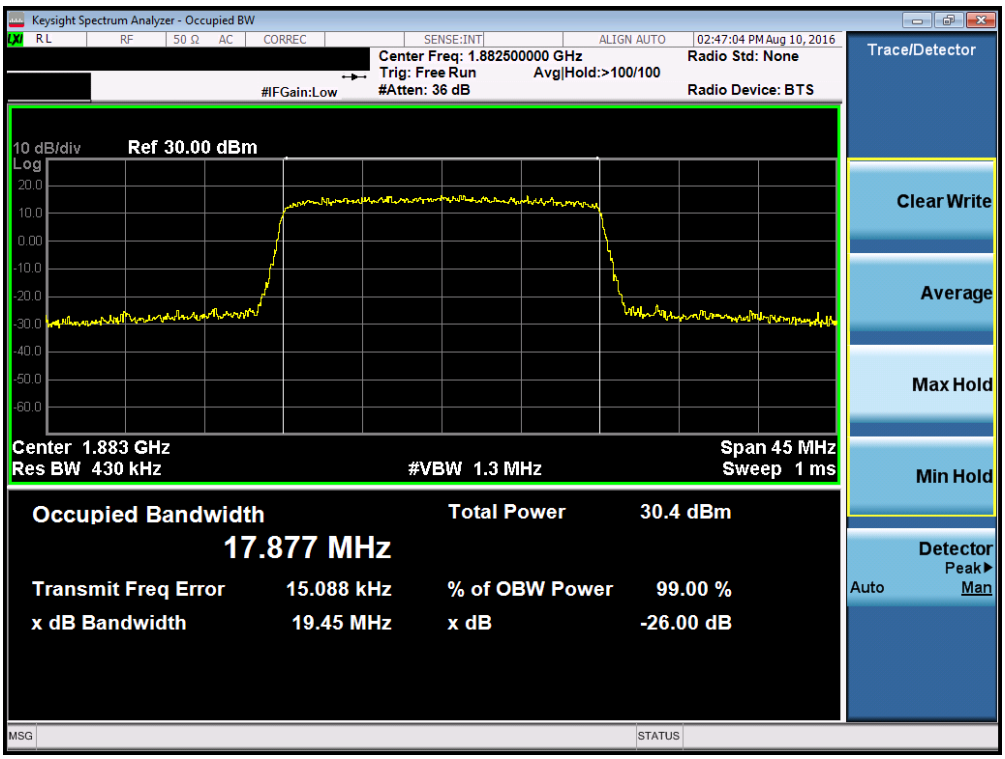


Plot 7-19. Occupied Bandwidth Plot (Band 25 – 15.0MHz QPSK – RB Size 75)

Plot 7-20. Occupied Bandwidth Plot (Band 25 – 15.0MHz 16-QAM – RB Size 75)

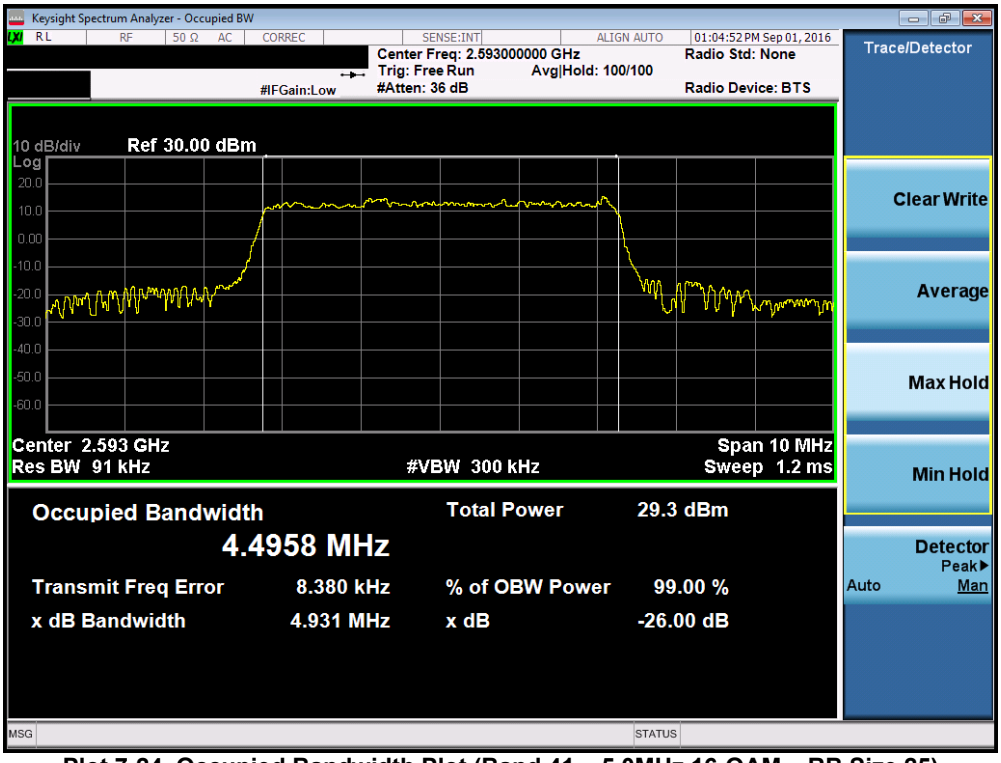


Plot 7-21. Occupied Bandwidth Plot (Band 25 – 20.0MHz QPSK – RB Size 100)



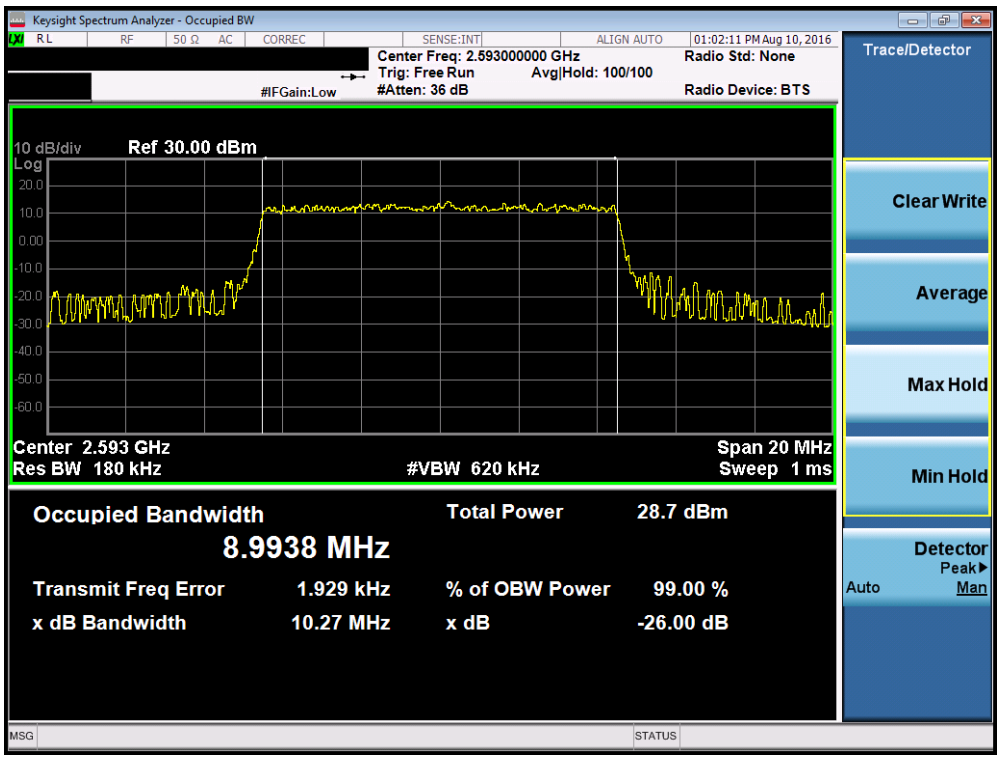
Plot 7-22. Occupied Bandwidth Plot (Band 25 – 20.0MHz 16-QAM – RB Size 100)

Plot 7-23. Occupied Bandwidth Plot (Band 41 – 5.0MHz QPSK – RB Size 25)

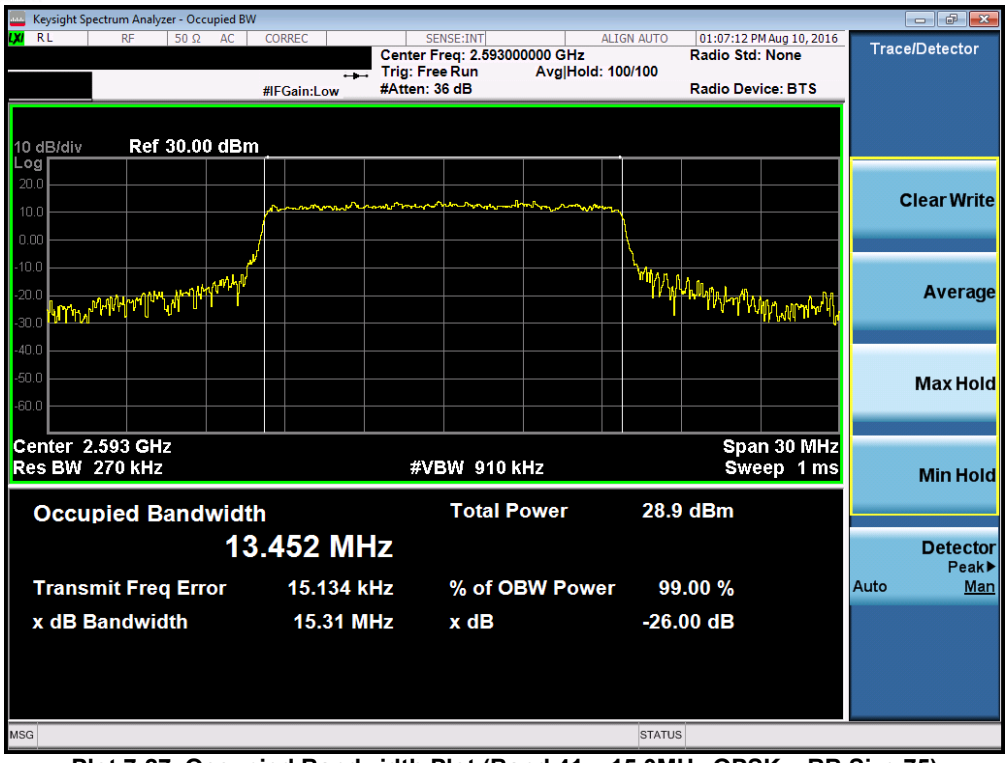


Plot 7-24. Occupied Bandwidth Plot (Band 41 – 5.0MHz 16-QAM – RB Size 25)

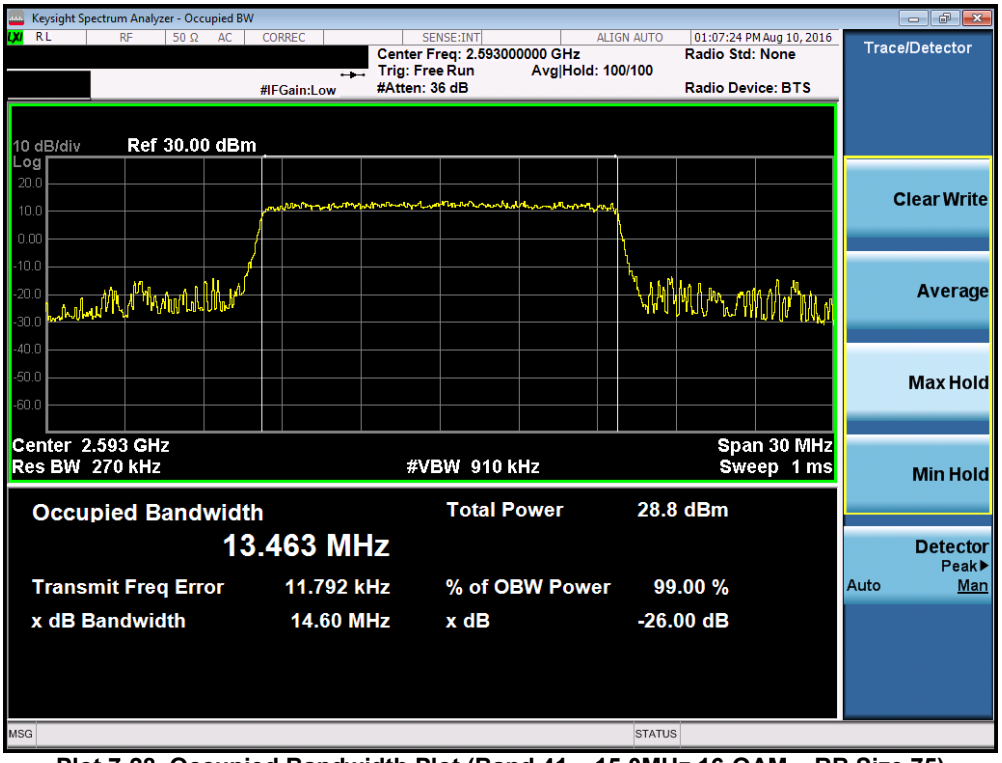
Plot 7-25. Occupied Bandwidth Plot (Band 41 – 10.0MHz QPSK – RB Size 50)



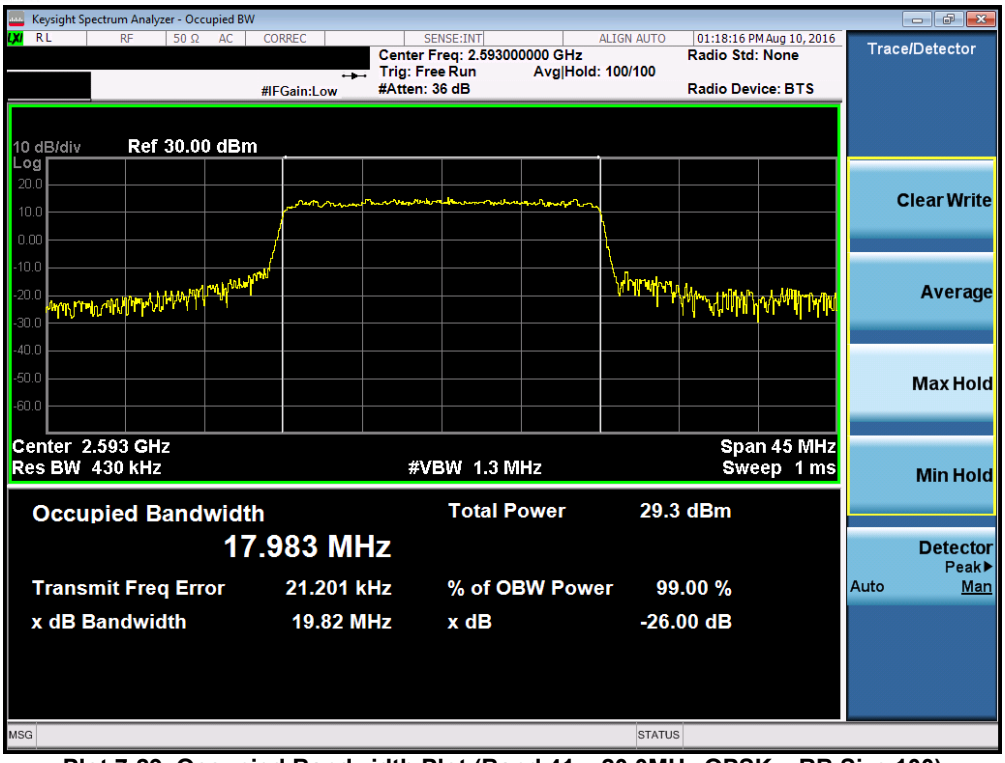
Plot 7-26. Occupied Bandwidth Plot (Band 41 – 10.0MHz 16-QAM – RB Size 50)



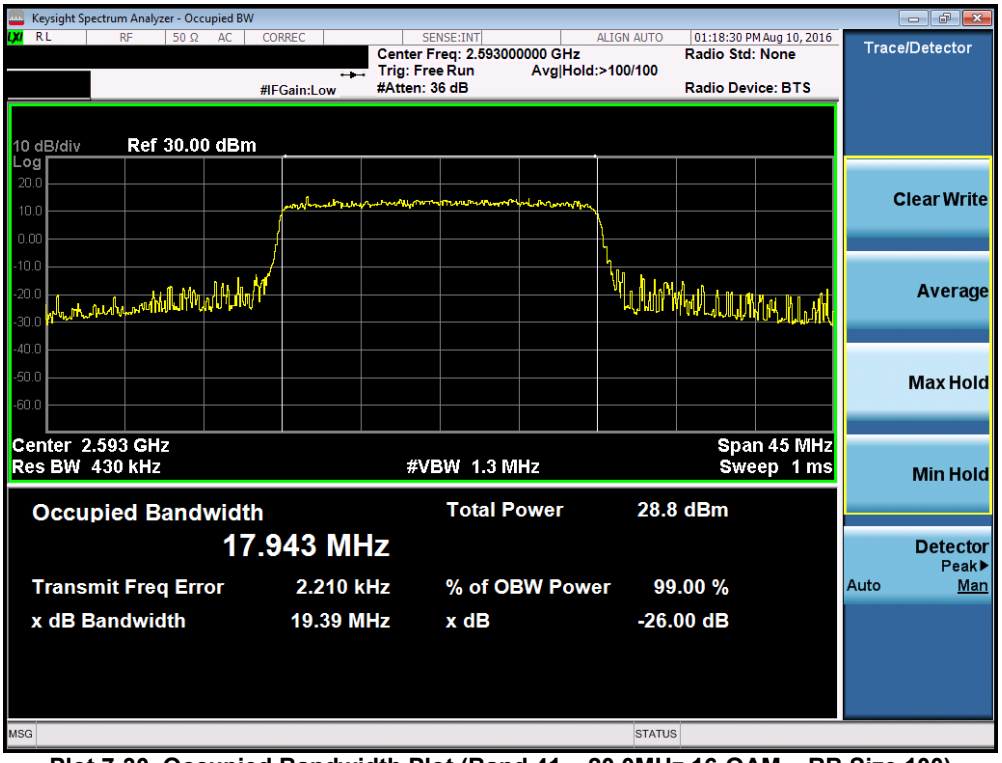
Plot 7-27. Occupied Bandwidth Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



Plot 7-28. Occupied Bandwidth Plot (Band 41 – 15.0MHz 16-QAM – RB Size 75)



Plot 7-29. Occupied Bandwidth Plot (Band 41 – 20.0MHz QPSK – RB Size 100)



Plot 7-30. Occupied Bandwidth Plot (Band 41 – 20.0MHz 16-QAM – RB Size 100)

7.3 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) §27.53(m)

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

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

Test Procedure Used

KDB 971168 D01 v02r02 – Section 6.0

Test Settings

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

Test Setup

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

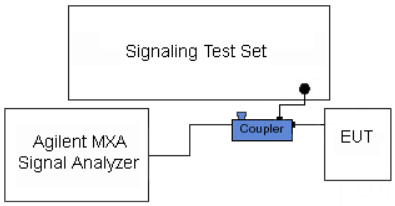
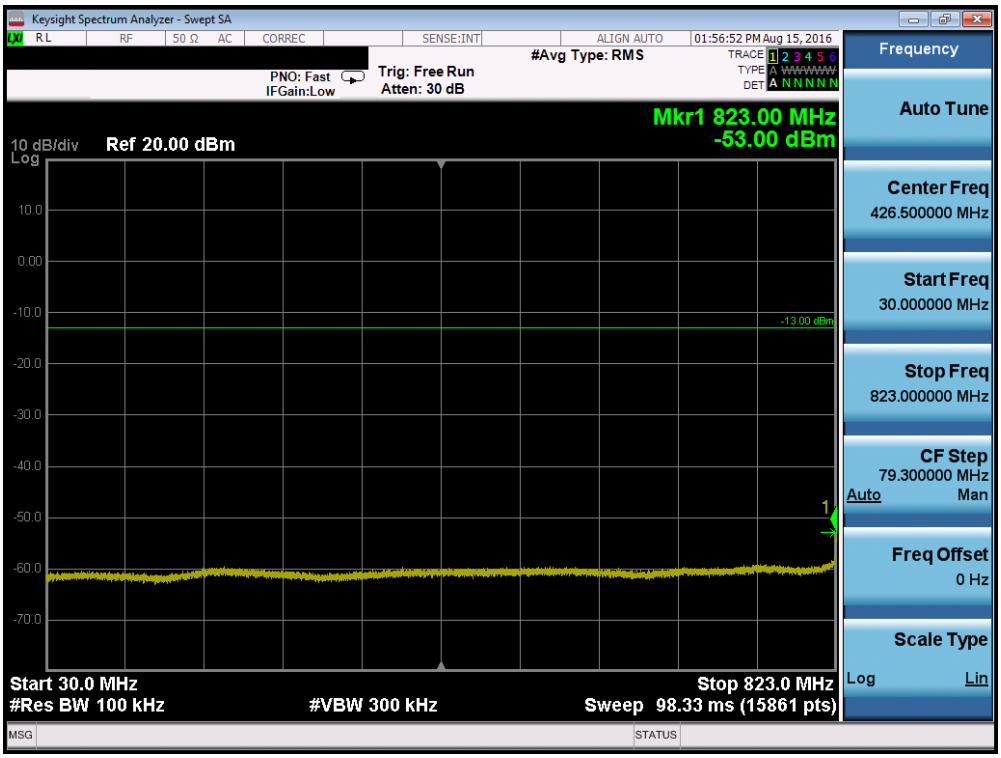


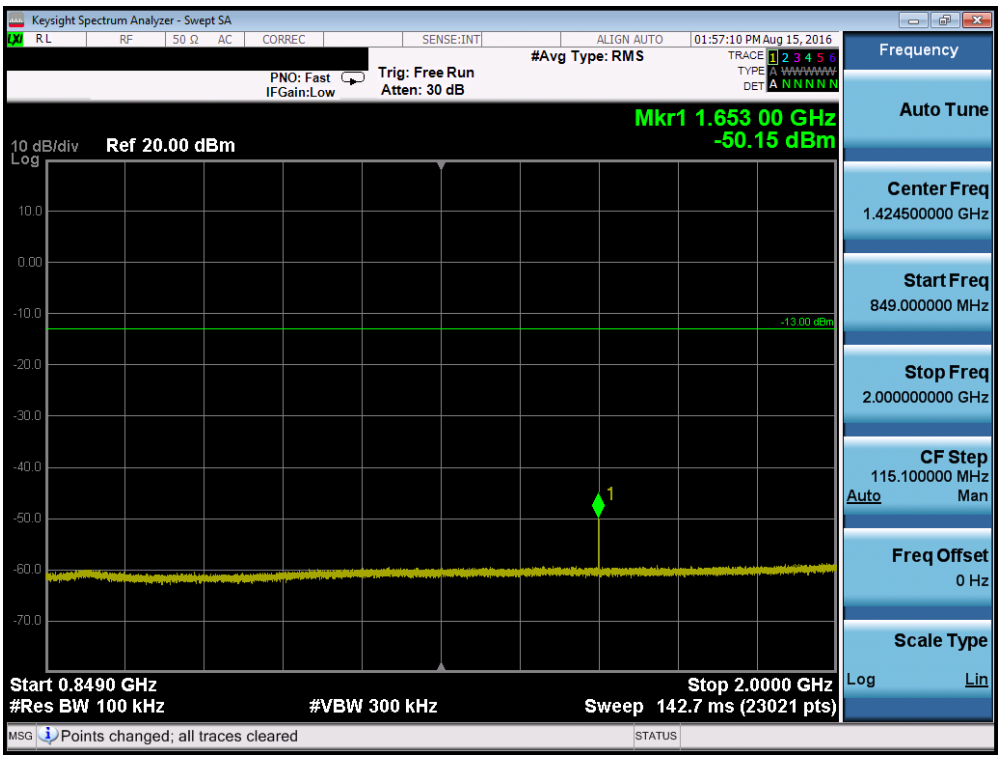
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

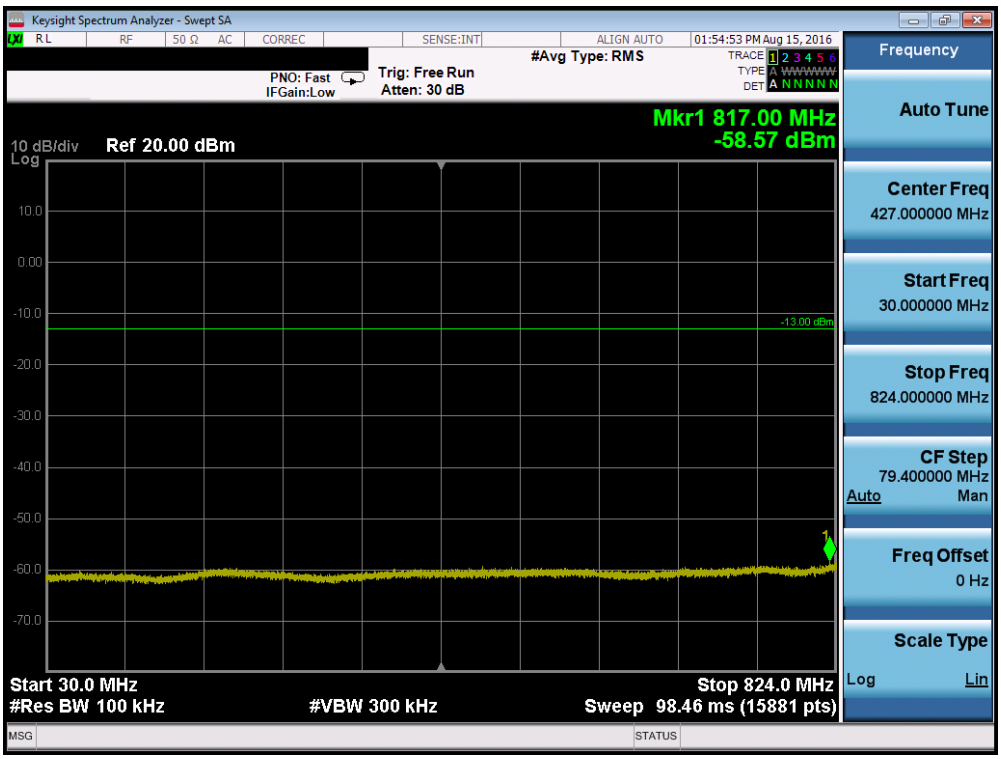


Plot 7-31. Conducted Spurious Plot (Band 26 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

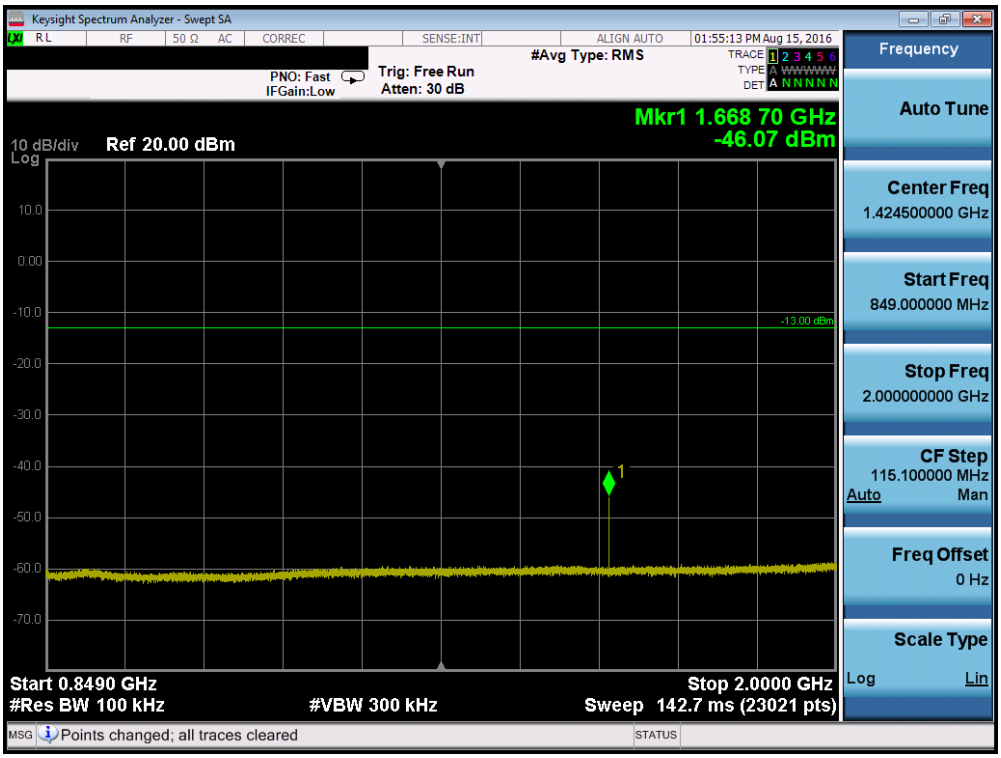


Plot 7-32. Conducted Spurious Plot (Band 26 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

Plot 7-33. Conducted Spurious Plot (Band 26 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

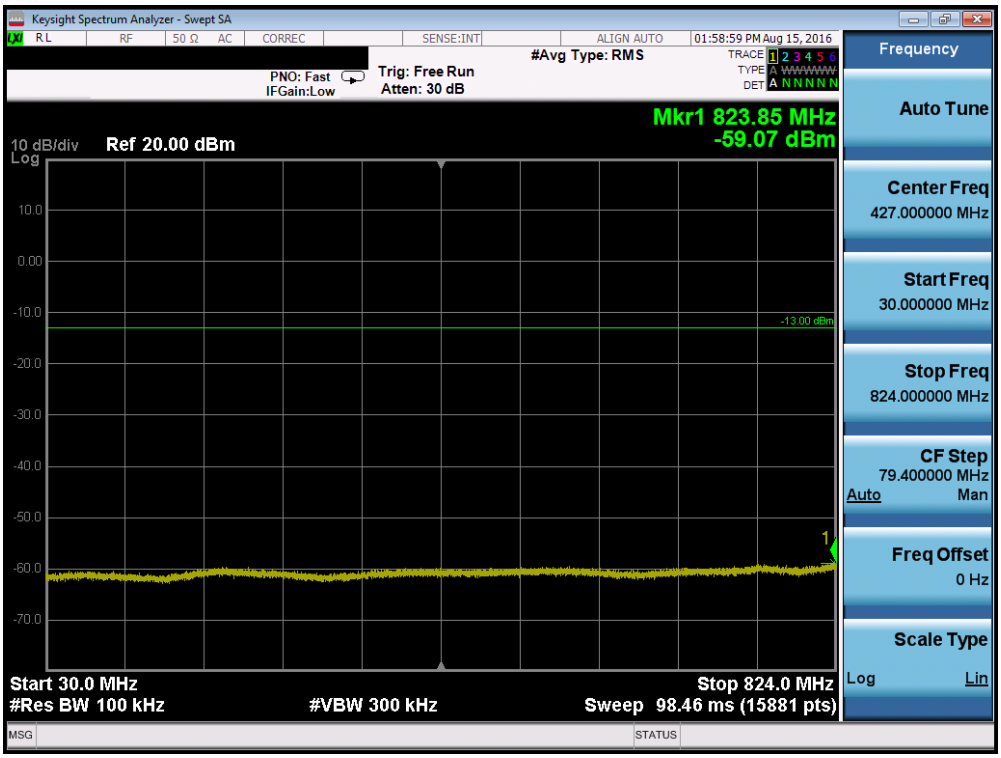


Plot 7-34. Conducted Spurious Plot (Band 26 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

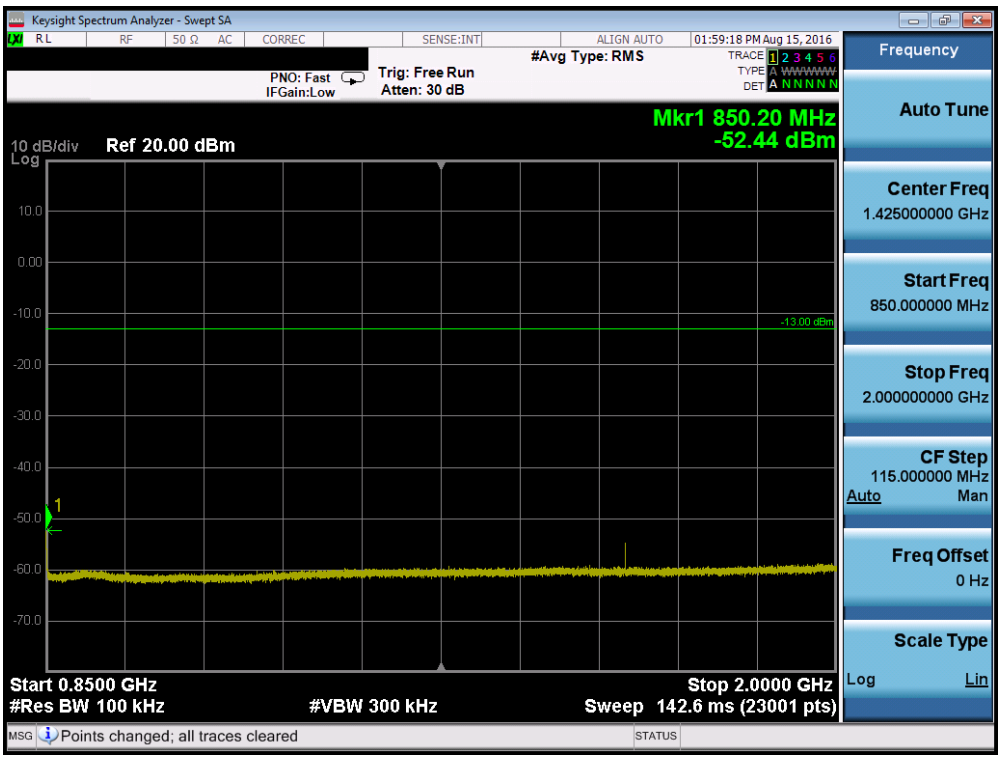


Plot 7-35. Conducted Spurious Plot (Band 26 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

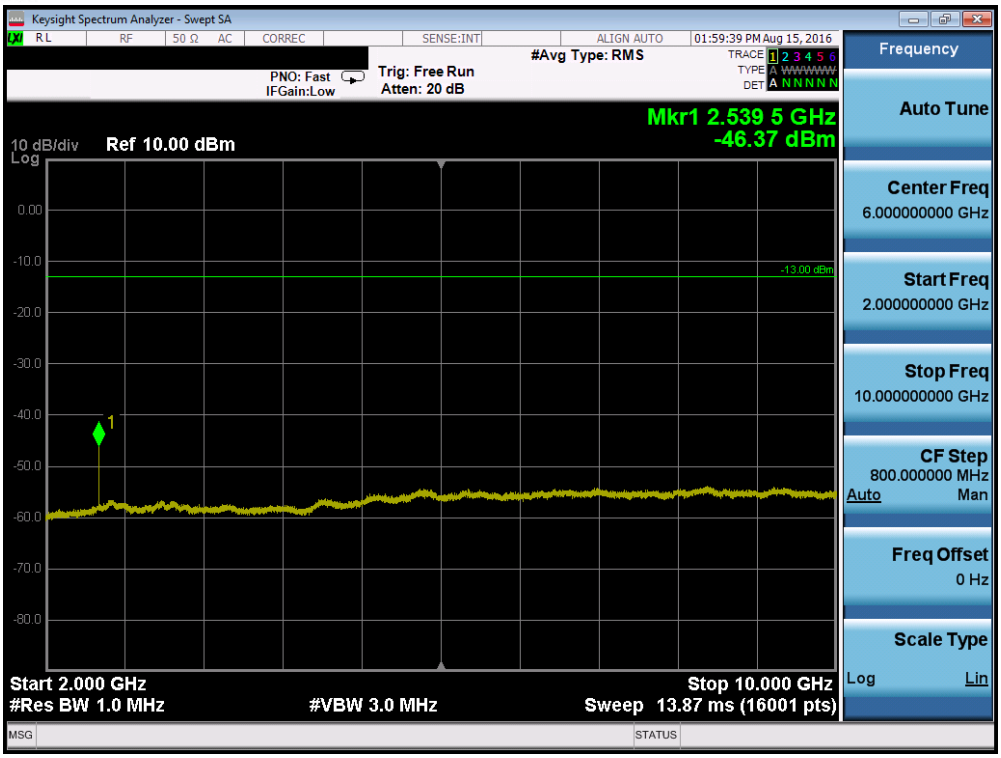
Plot 7-36. Conducted Spurious Plot (Band 26 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



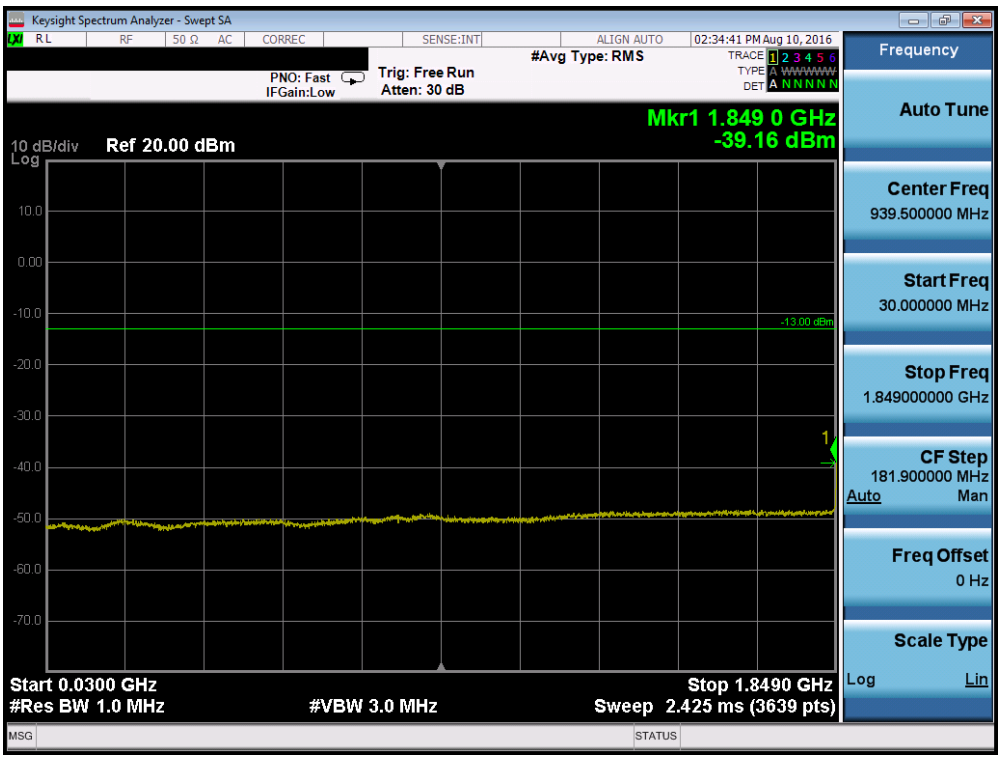
Plot 7-37. Conducted Spurious Plot (Band 26 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



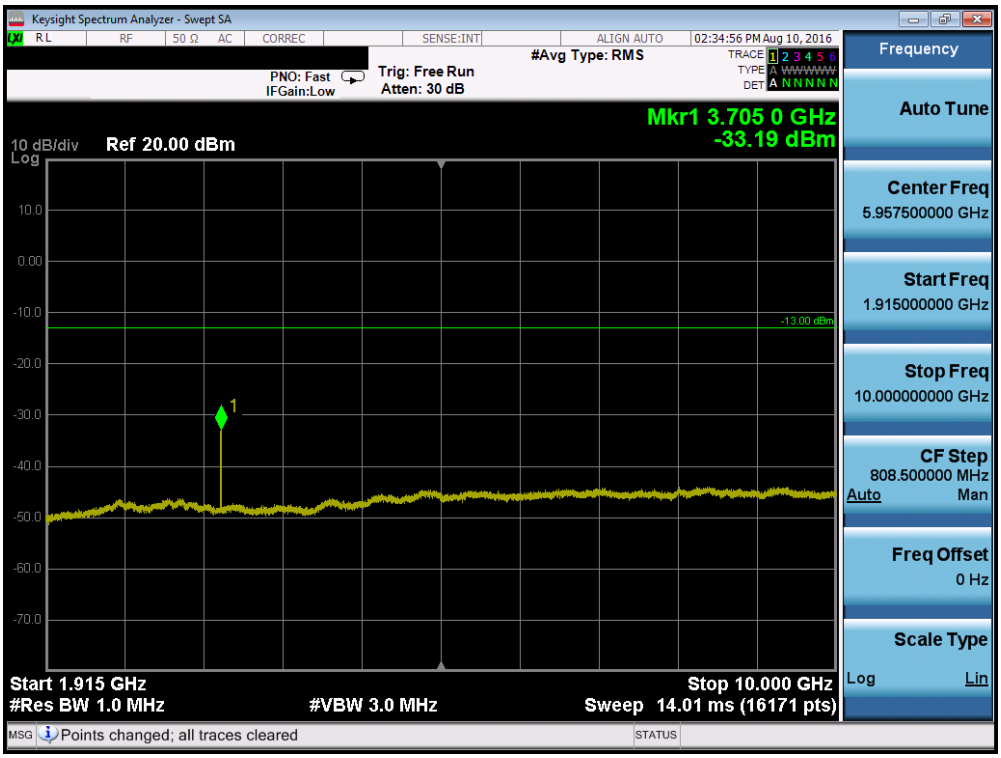
Plot 7-38. Conducted Spurious Plot (Band 26 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



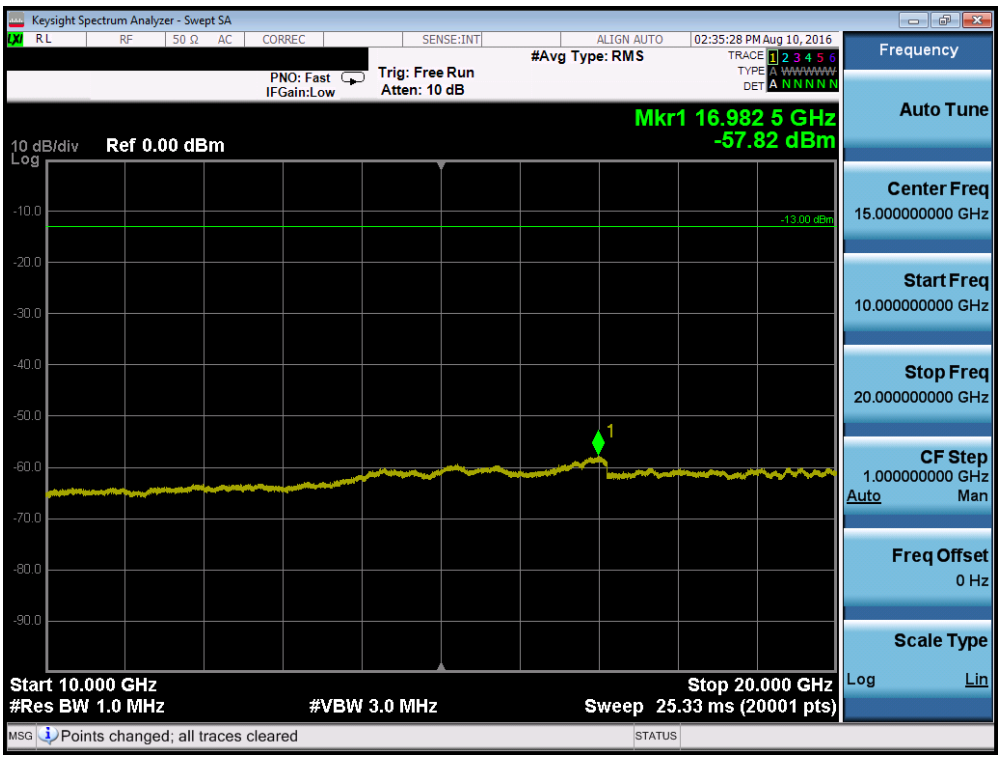
Plot 7-39. Conducted Spurious Plot (Band 26 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



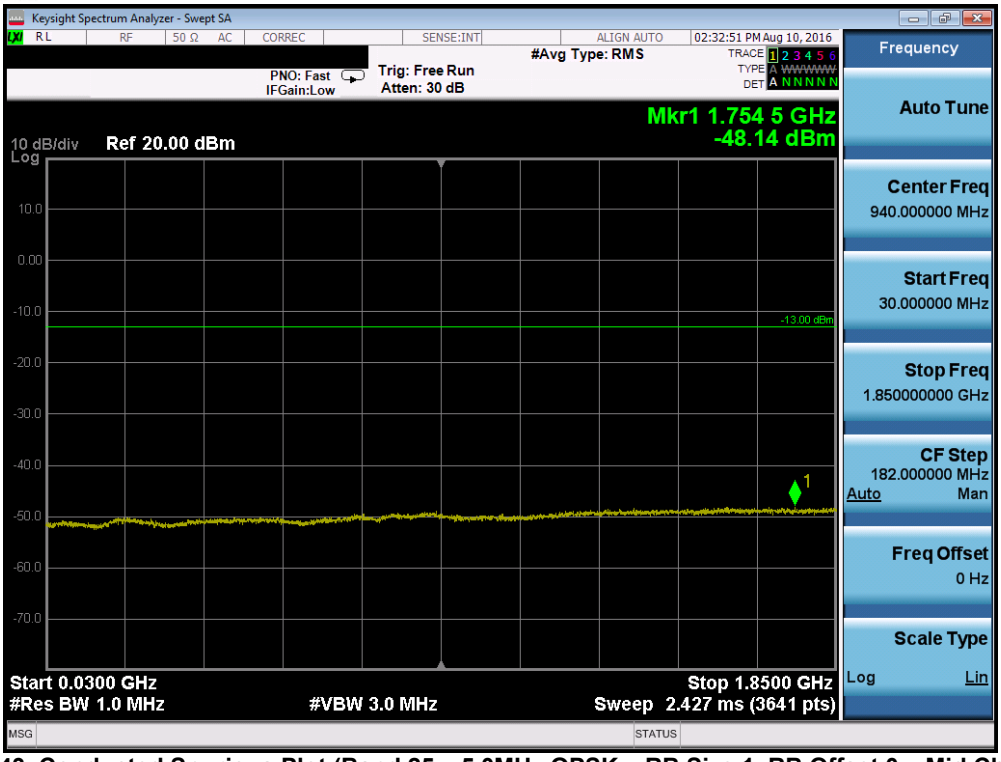
Plot 7-40. Conducted Spurious Plot (Band 25 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 7-41. Conducted Spurious Plot (Band 25 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

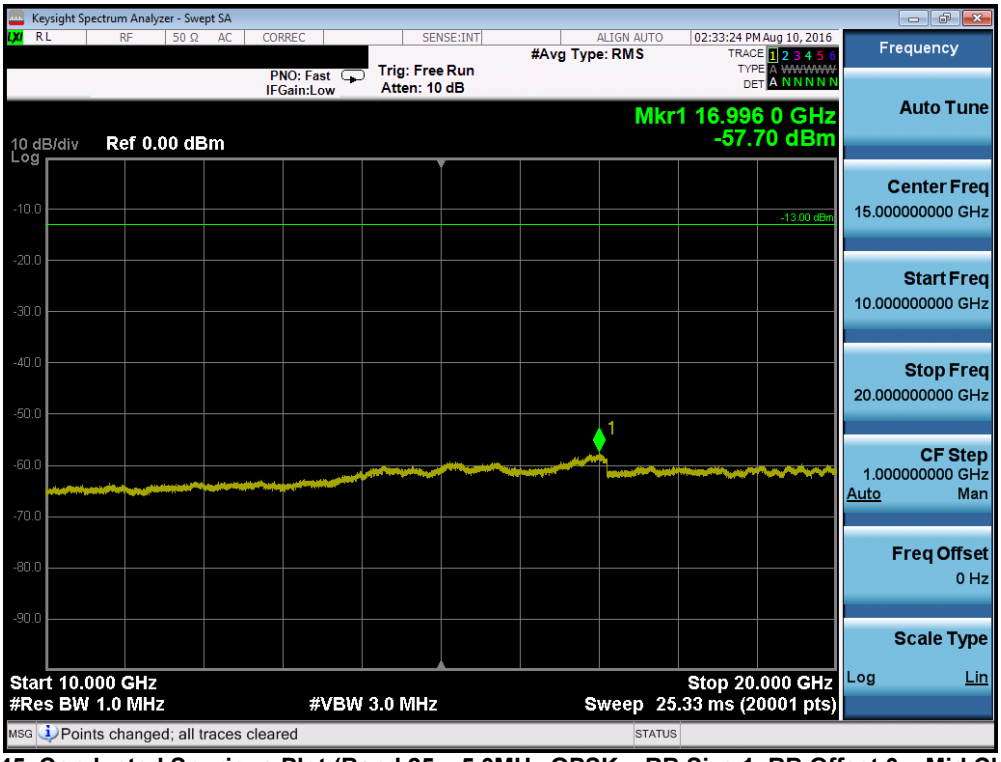


Plot 7-42. Conducted Spurious Plot (Band 25 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

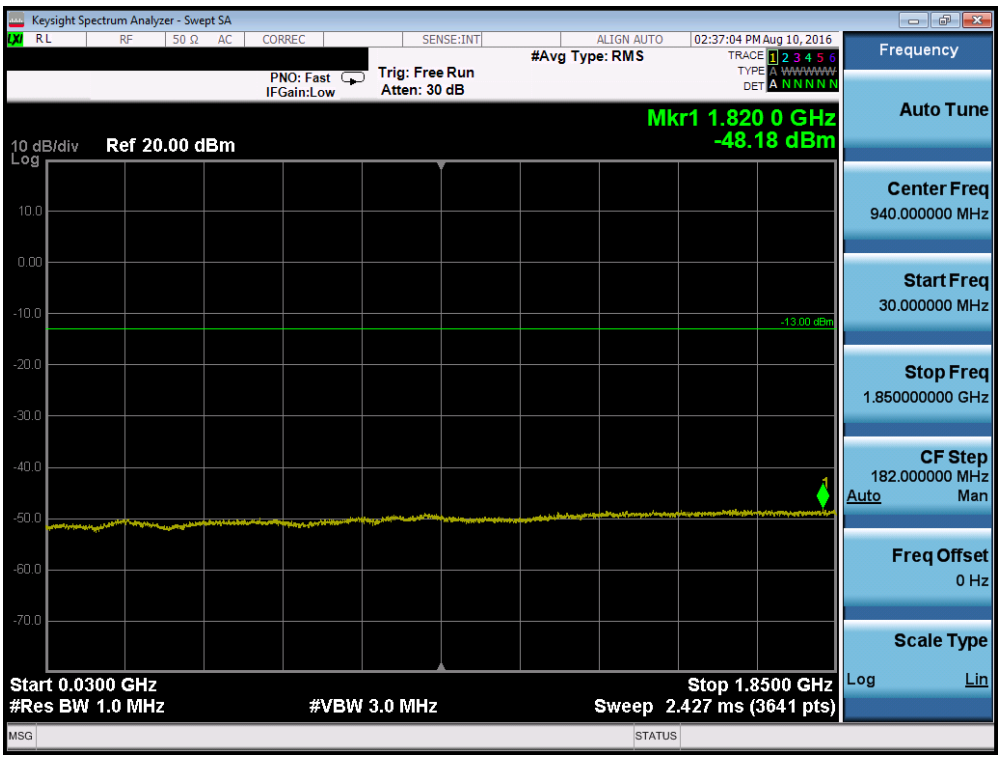


Plot 7-43. Conducted Spurious Plot (Band 25 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

Plot 7-44. Conducted Spurious Plot (Band 25 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

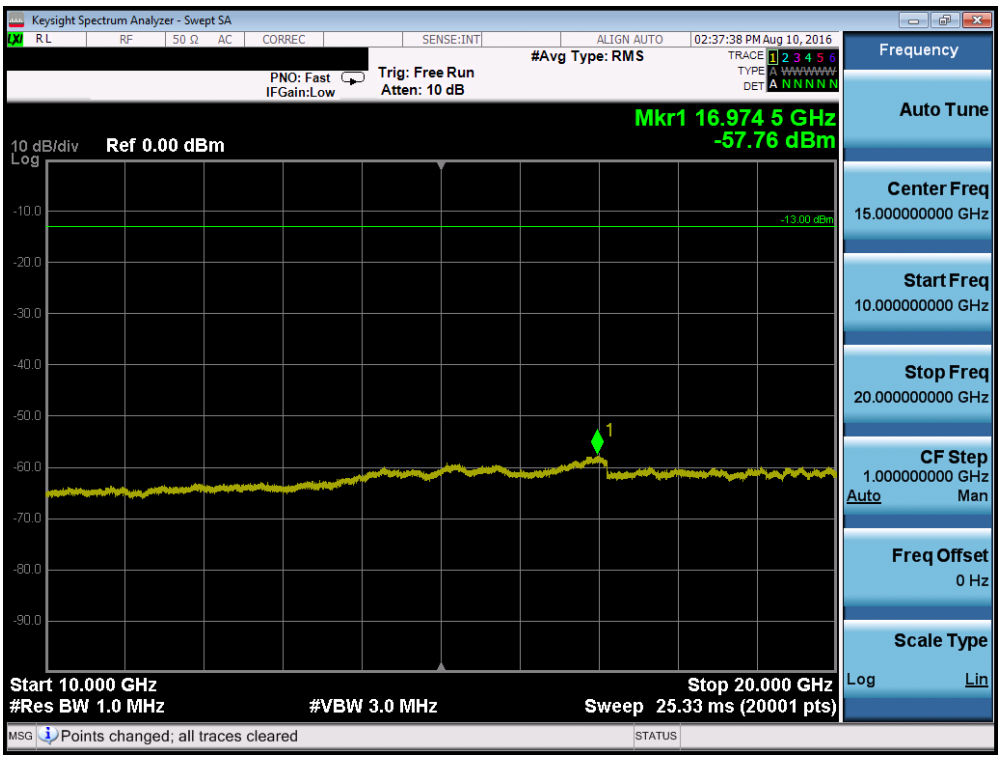


Plot 7-45. Conducted Spurious Plot (Band 25 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

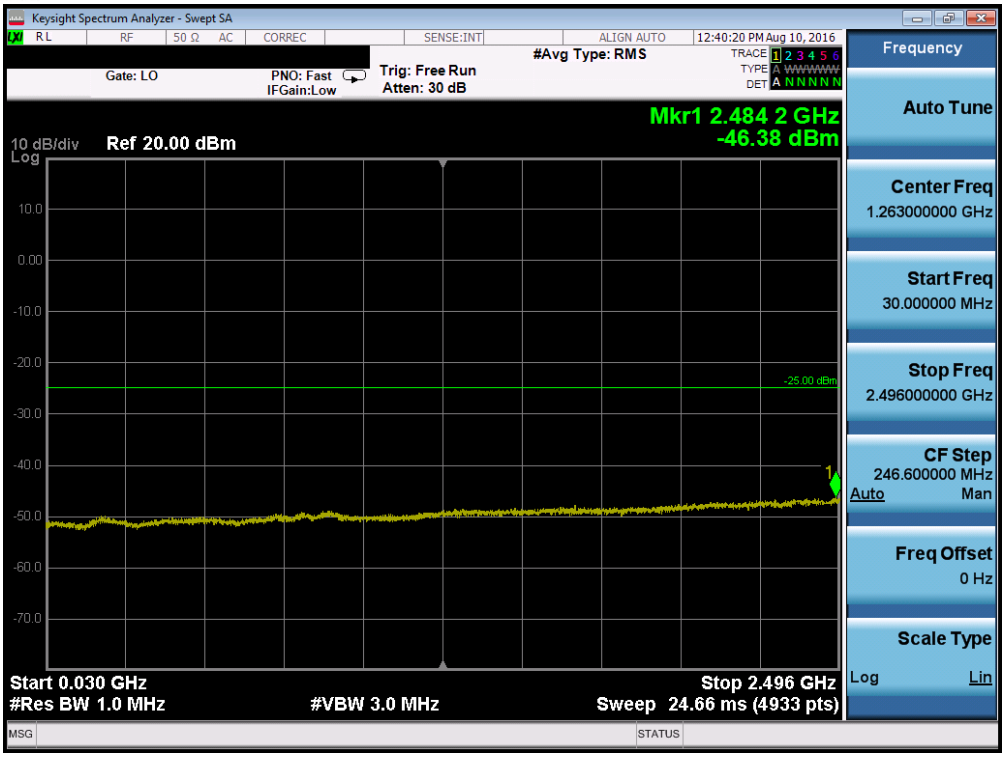


Plot 7-46. Conducted Spurious Plot (Band 25 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

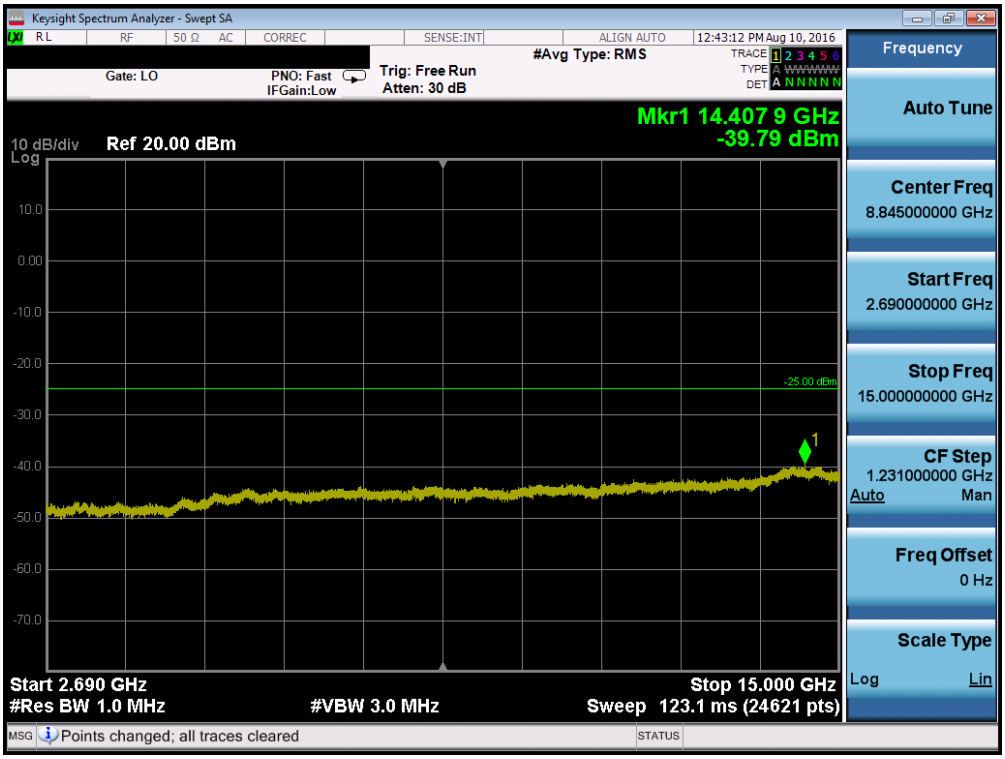
Plot 7-47. Conducted Spurious Plot (Band 25 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-48. Conducted Spurious Plot (Band 25 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

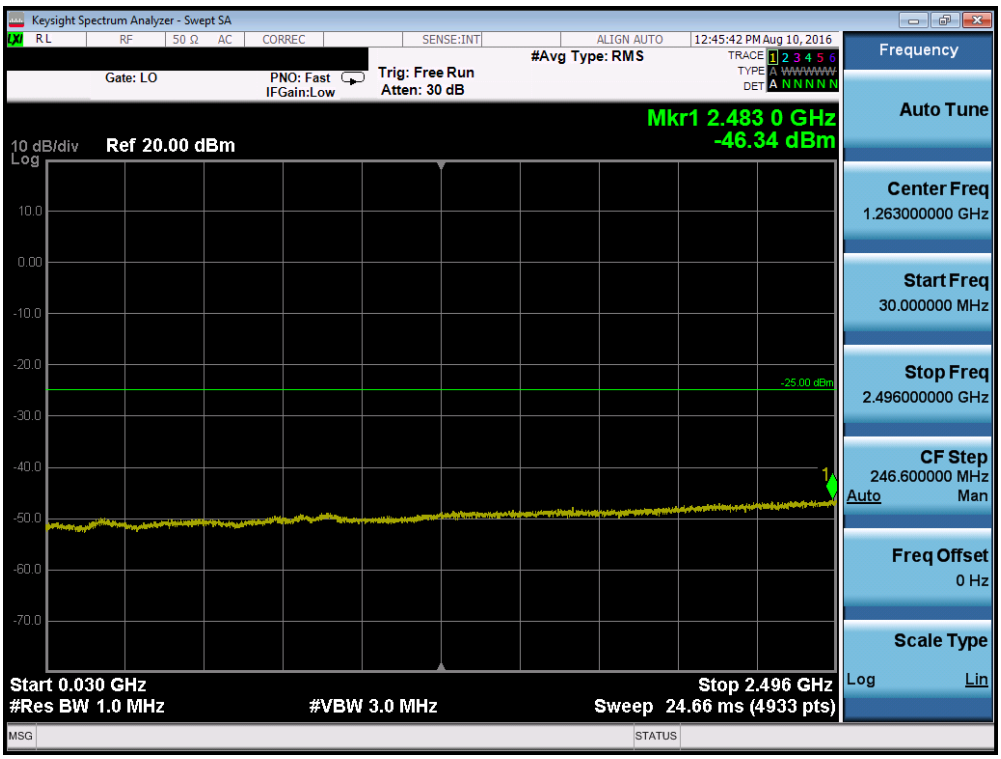


Plot 7-49. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

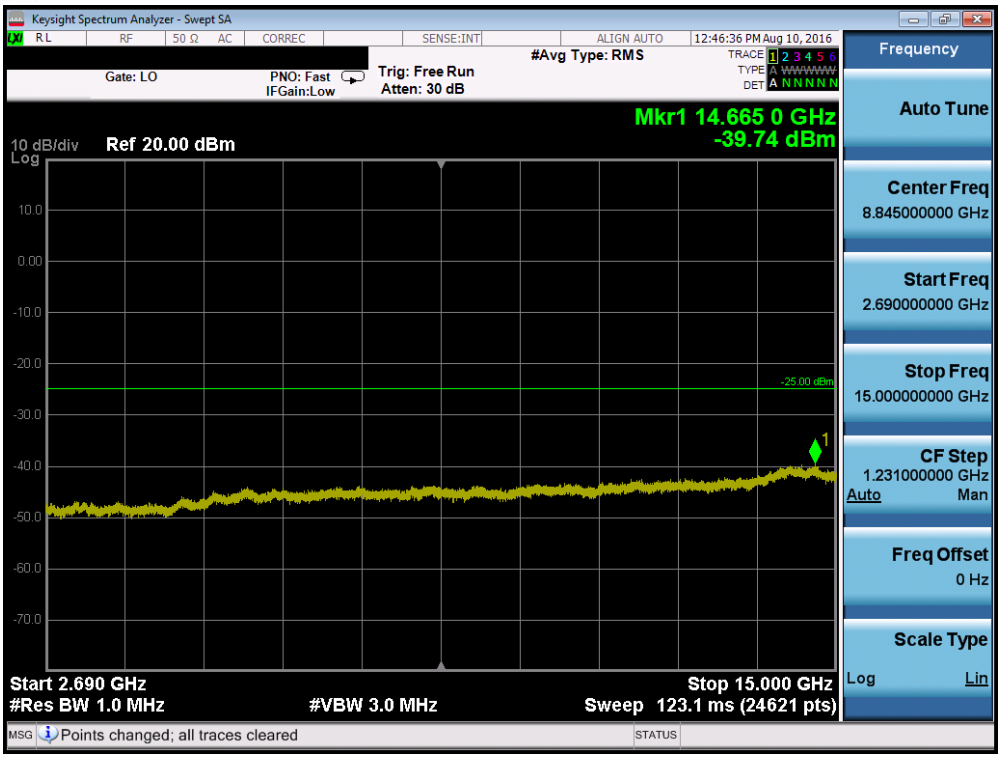


Plot 7-50. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

Plot 7-51. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

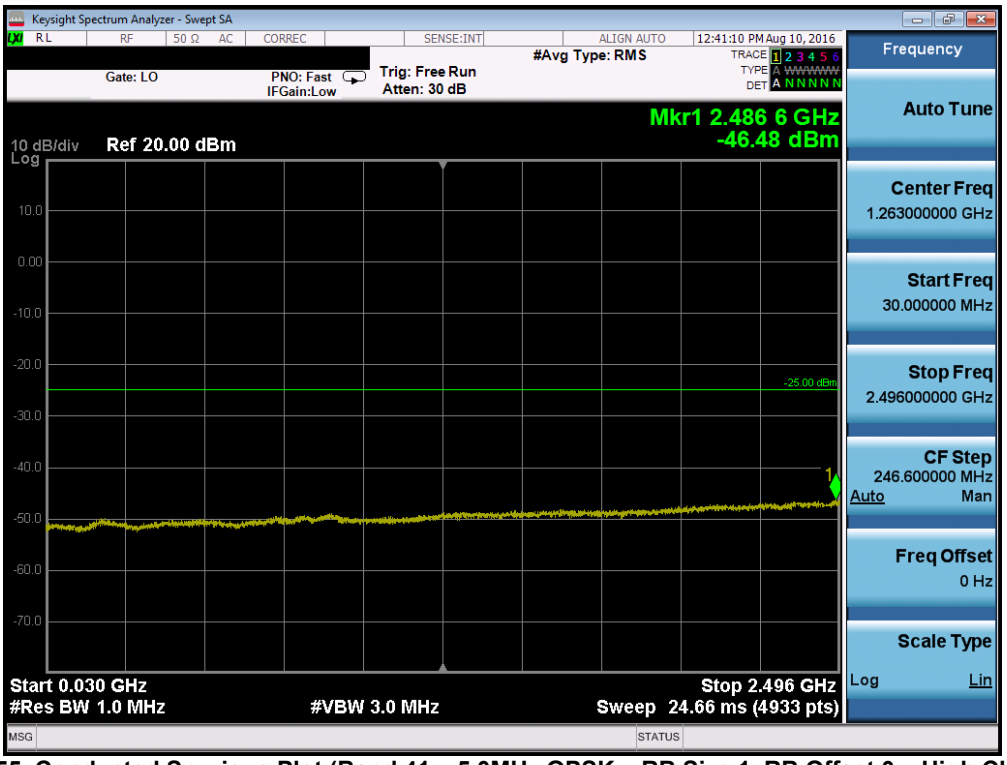


Plot 7-52. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

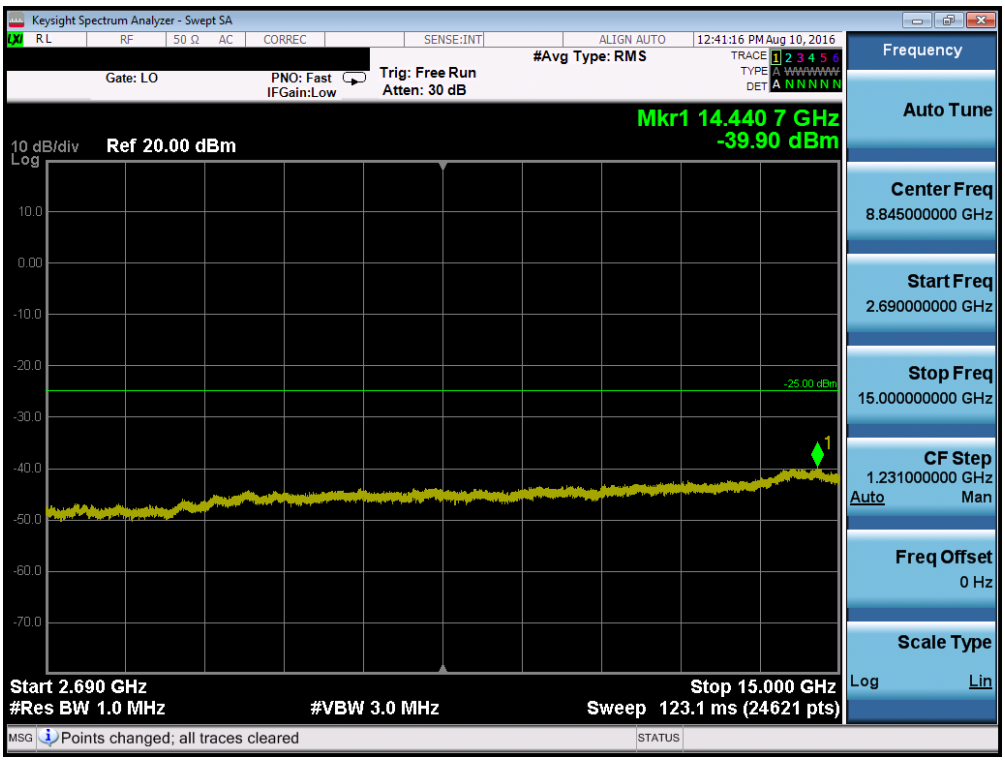


Plot 7-53. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

Plot 7-54. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-55. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-56. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

Plot 7-57. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

7.4 Band Edge Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) §27.53(m)

Test Overview

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

The minimum permissible attenuation level for Band 41 is as noted in the Test Notes on the following page.

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

Test Procedure Used

KDB 971168 D01 v02r02 – Section 6.0

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW ≥ 1% of the emission bandwidth
4. VBW ≥ 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Setup

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

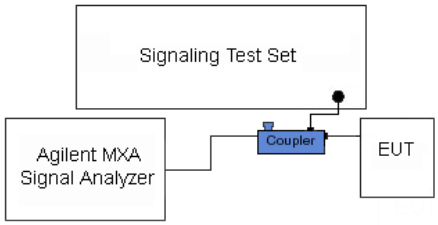
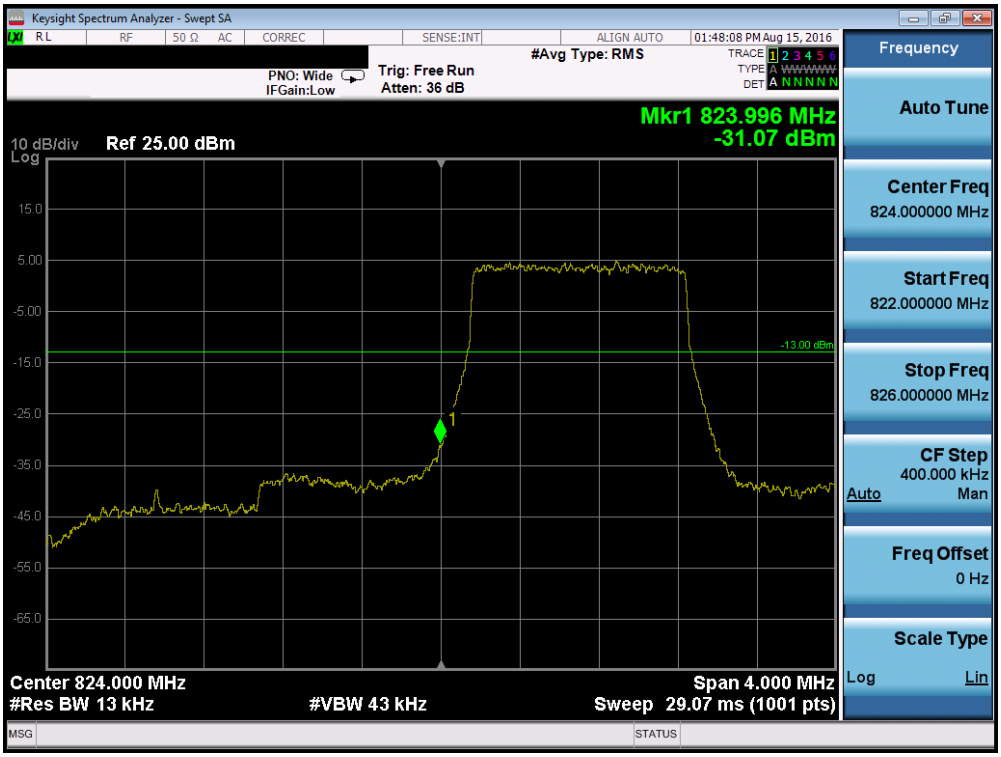


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

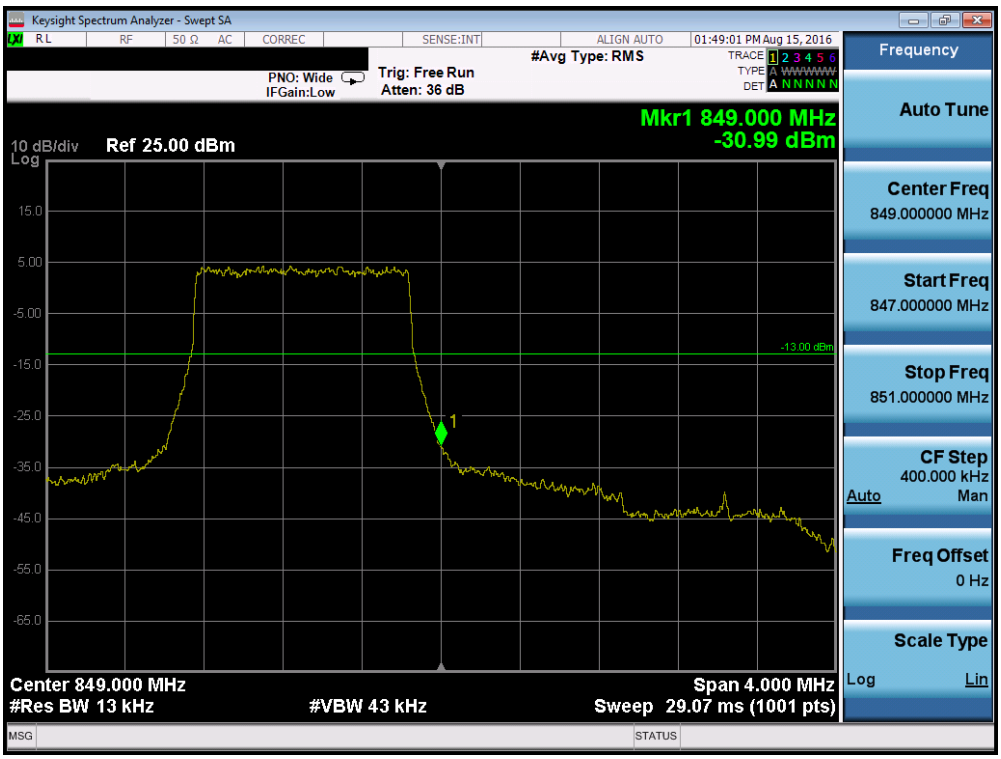
Per 22.917(b) 24.238(a) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The 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.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.



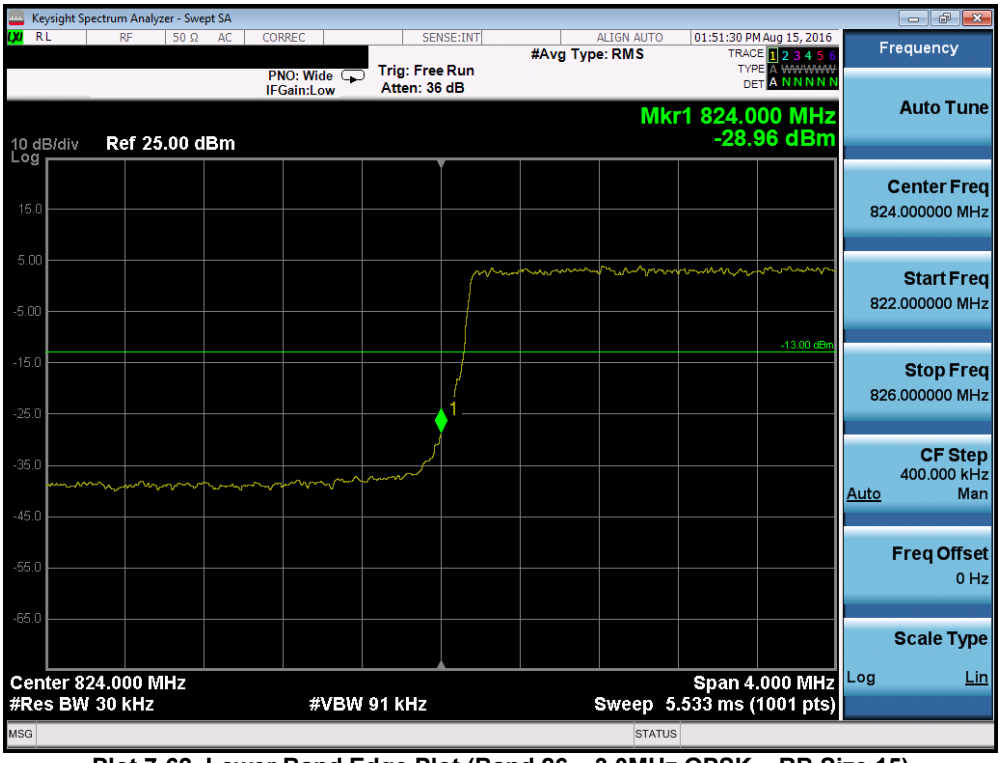
Plot 7-58. Lower Band Edge Plot (Band 26 – 1.4MHz QPSK – RB Size 6)

Plot 7-59. Lower Extended Band Edge Plot (Band 26 – 1.4MHz QPSK – RB Size 6)

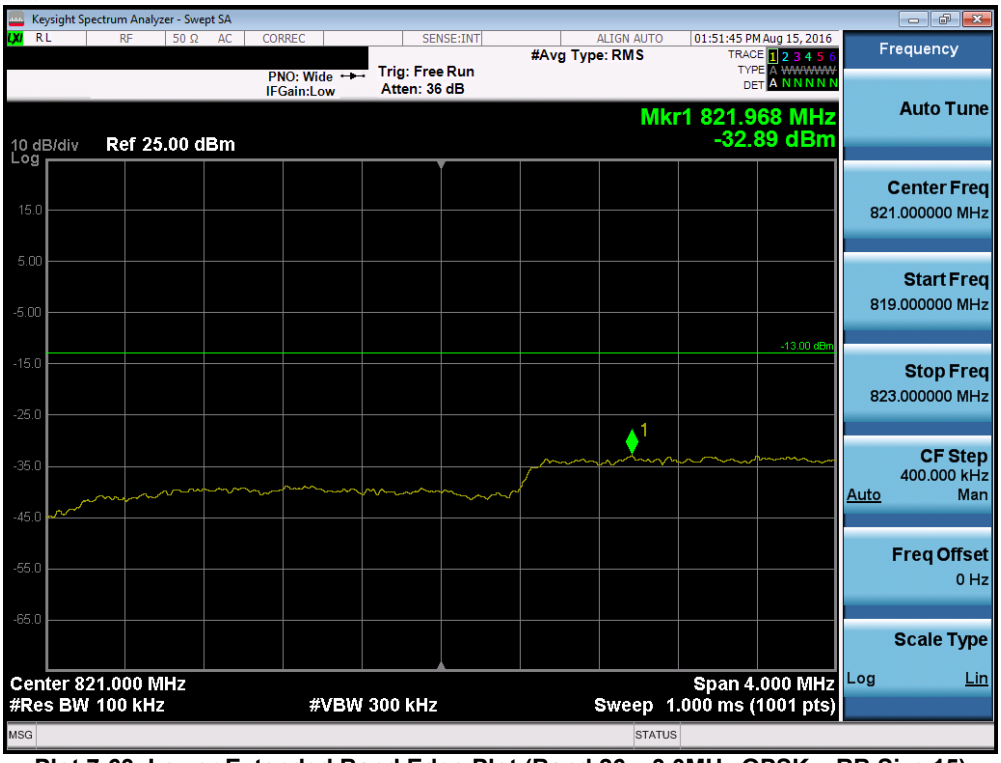


Plot 7-60. Upper Band Edge Plot (Band 26 – 1.4MHz QPSK – RB Size 6)

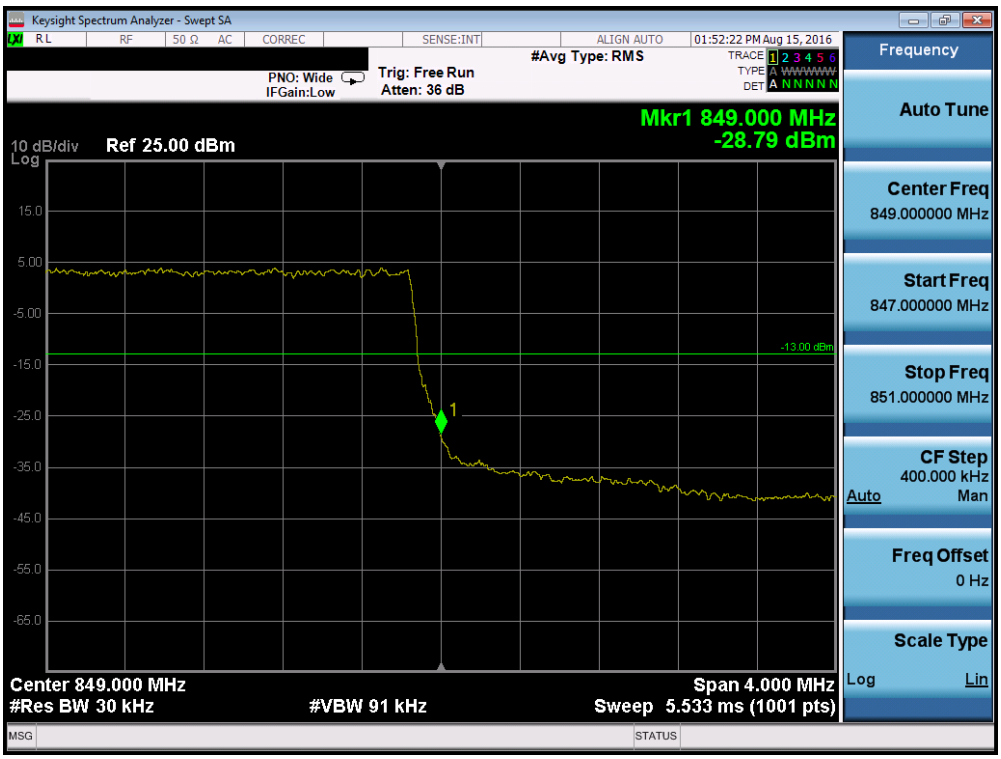
Plot 7-61. Upper Extended Band Edge Plot (Band 26 – 1.4MHz QPSK – RB Size 6)



Plot 7-62. Lower Band Edge Plot (Band 26 – 3.0MHz QPSK – RB Size 15)

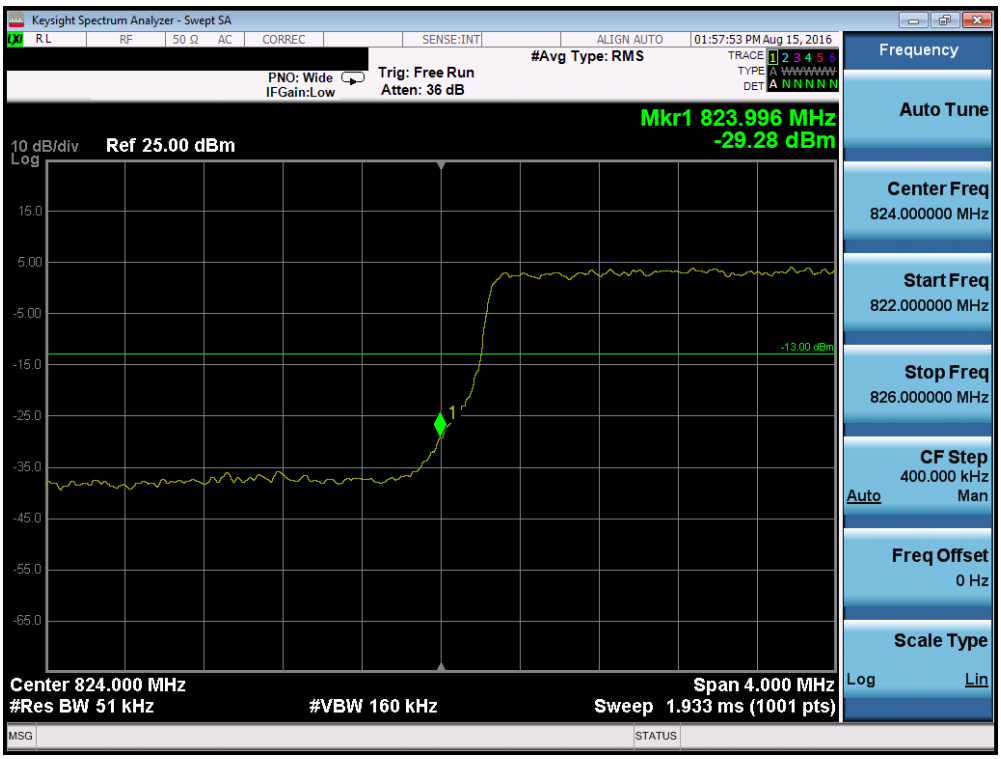


Plot 7-63. Lower Extended Band Edge Plot (Band 26 – 3.0MHz QPSK – RB Size 15)

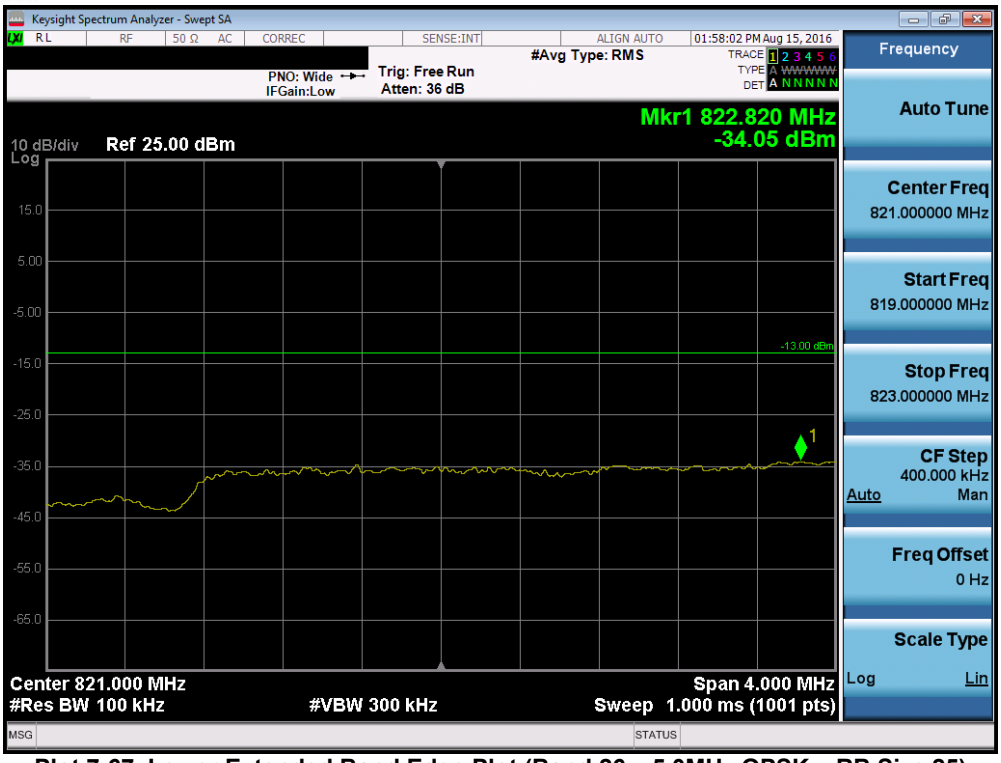


Plot 7-64. Upper Band Edge Plot (Band 26 – 3.0MHz QPSK – RB Size 15)

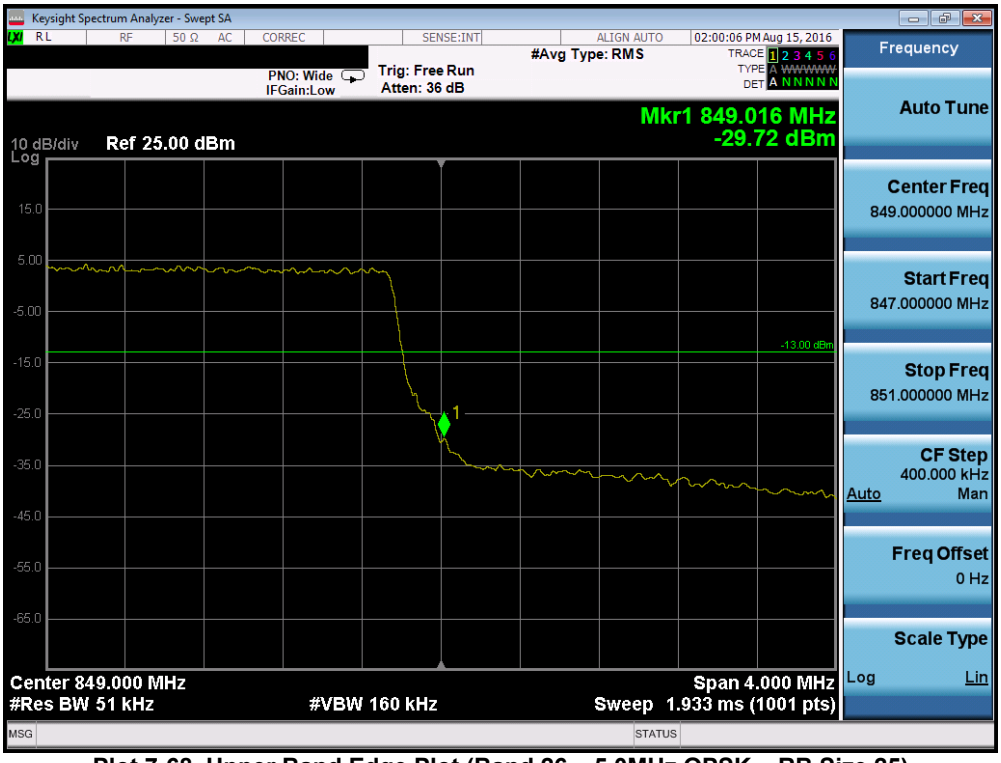
Plot 7-65. Upper Extended Band Edge Plot (Band 26 – Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-66. Lower Band Edge Plot (Band 26 – 5.0MHz QPSK – RB Size 25)

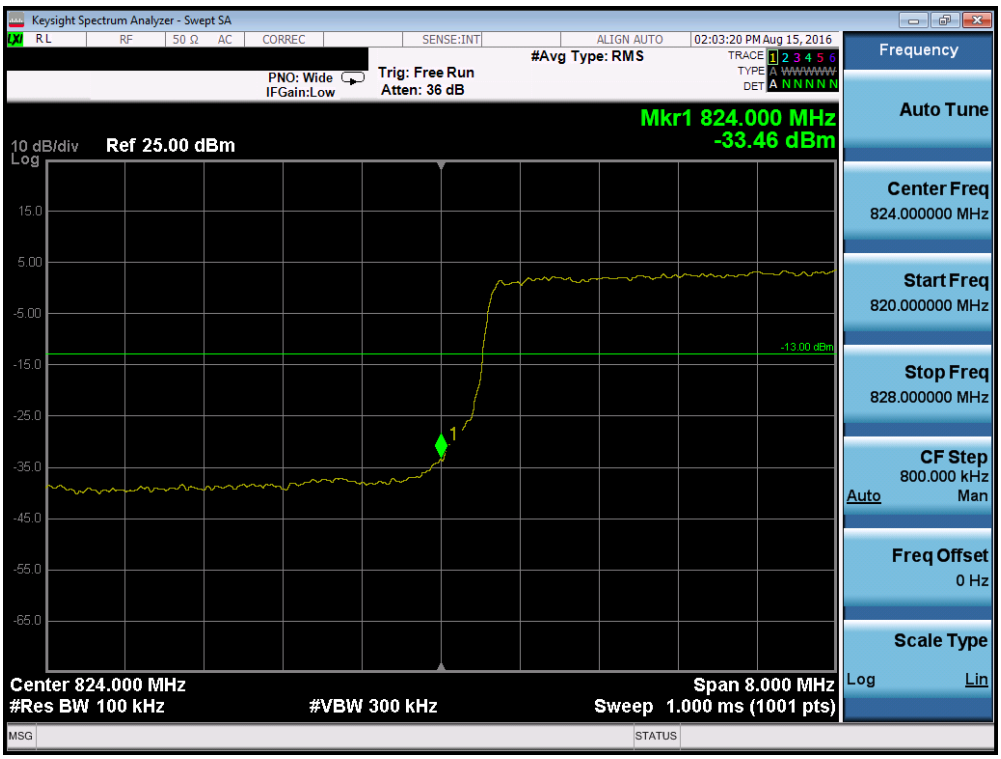


Plot 7-67. Lower Extended Band Edge Plot (Band 26 – 5.0MHz QPSK – RB Size 25)



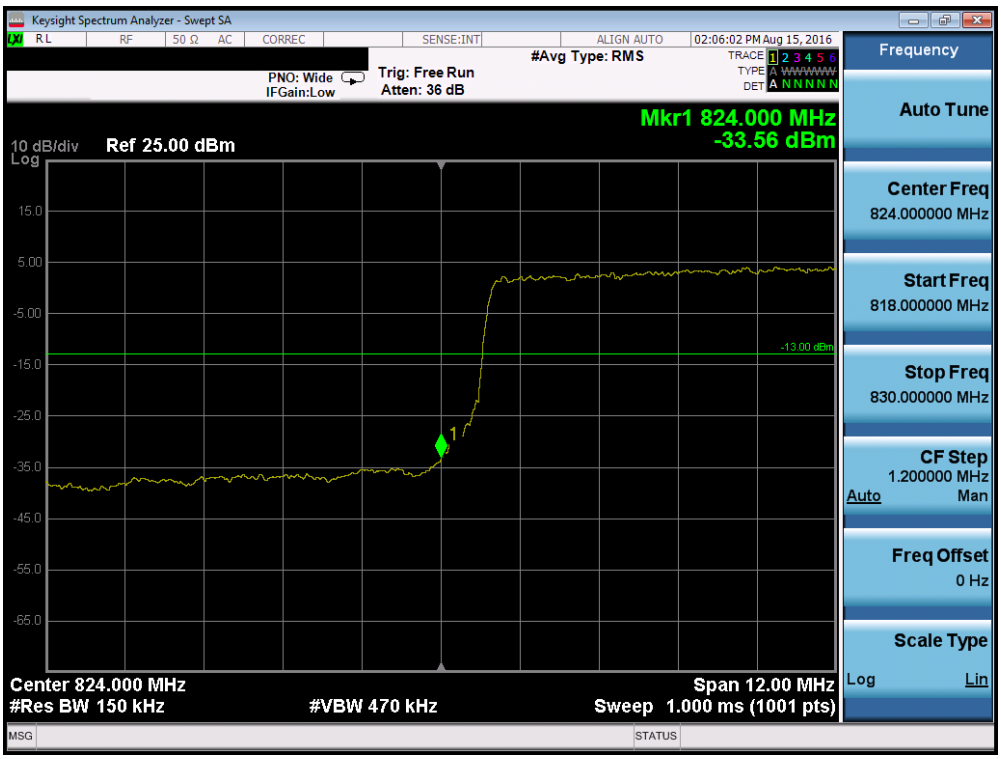
Plot 7-68. Upper Band Edge Plot (Band 26 – 5.0MHz QPSK – RB Size 25)

Plot 7-69. Upper Extended Band Edge Plot (Band 26 – 5.0MHz QPSK – RB Size 25)



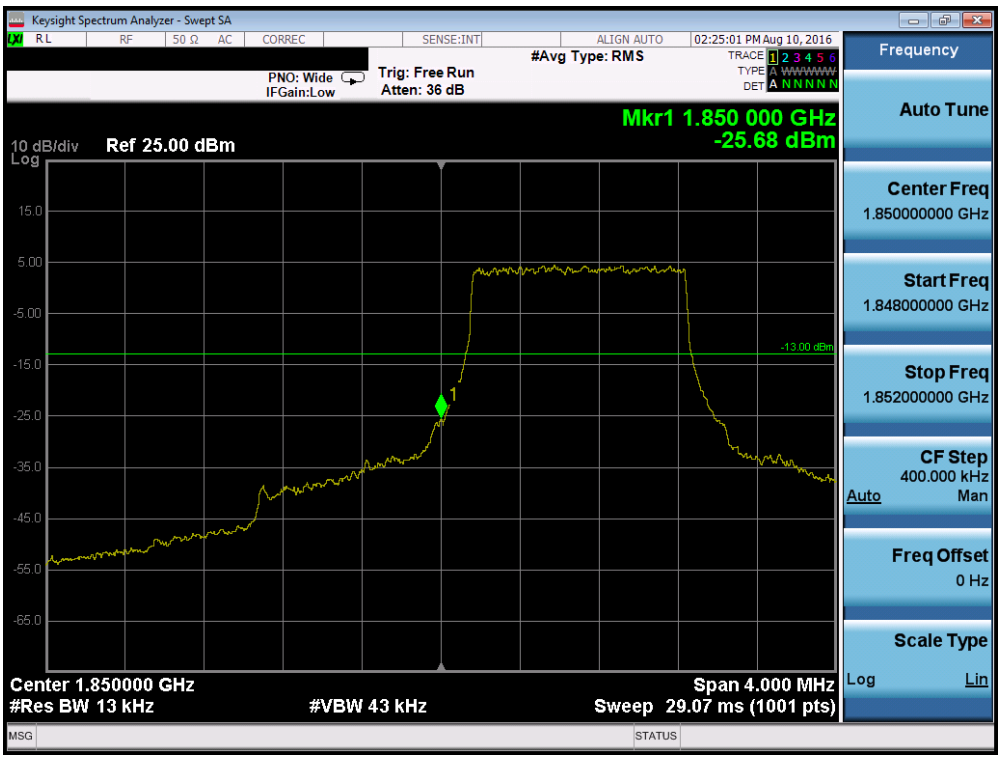
Plot 7-70. Lower Band Edge Plot (Band 26 – 10.0MHz QPSK – RB Size 50)

Plot 7-71. Upper Band Edge Plot (Band 26 – 10.0MHz QPSK – RB Size 50)

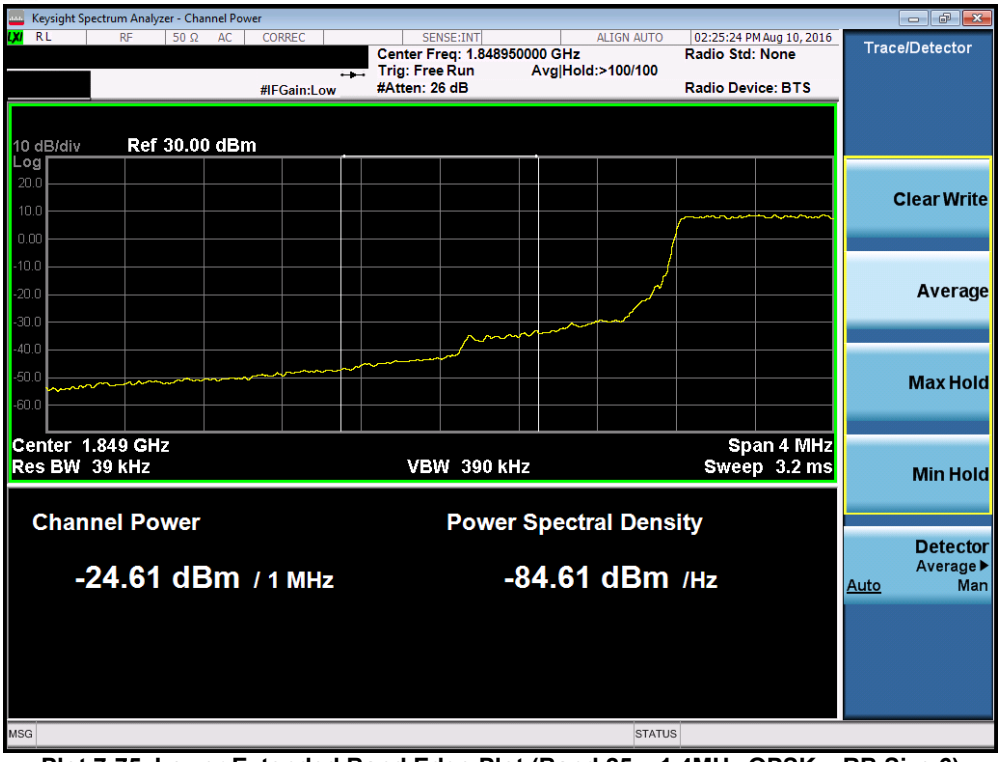


Plot 7-72. Lower Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)

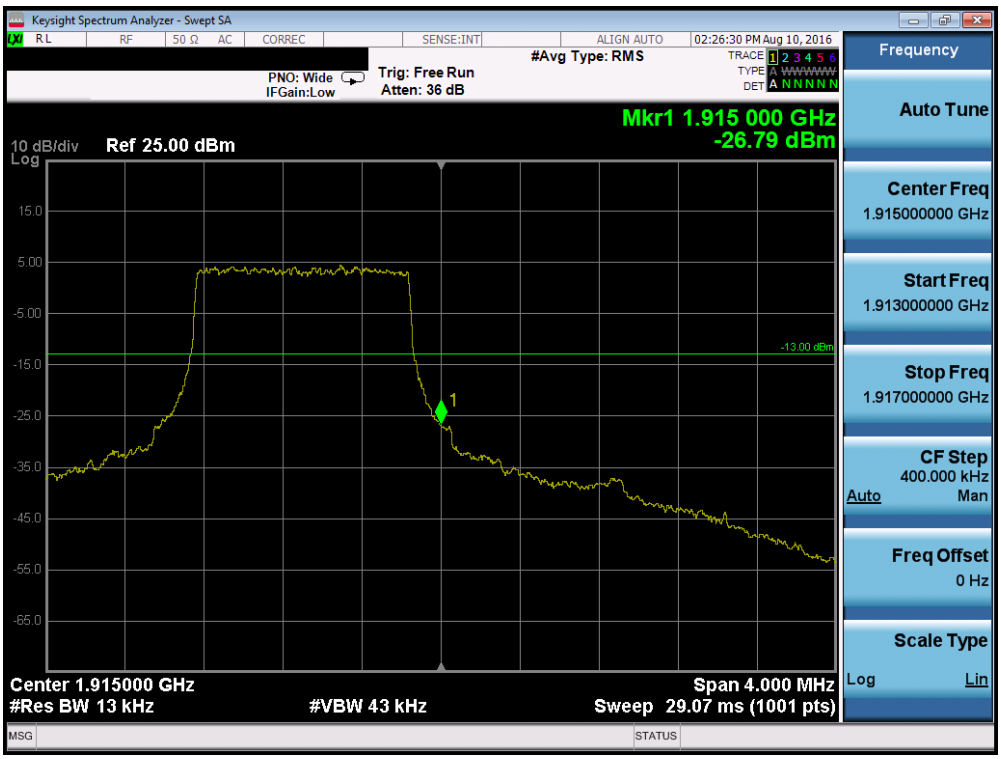
Plot 7-73. Upper Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)



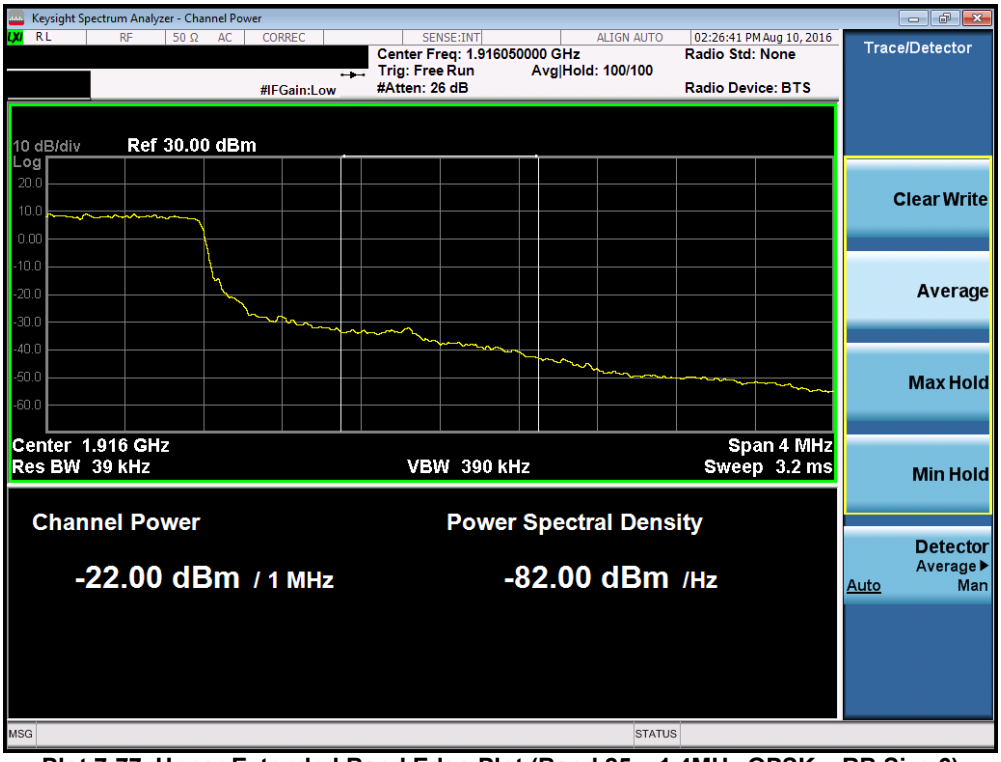
Plot 7-74. Lower Band Edge Plot (Band 25 – 1.4MHz QPSK – RB Size 6)



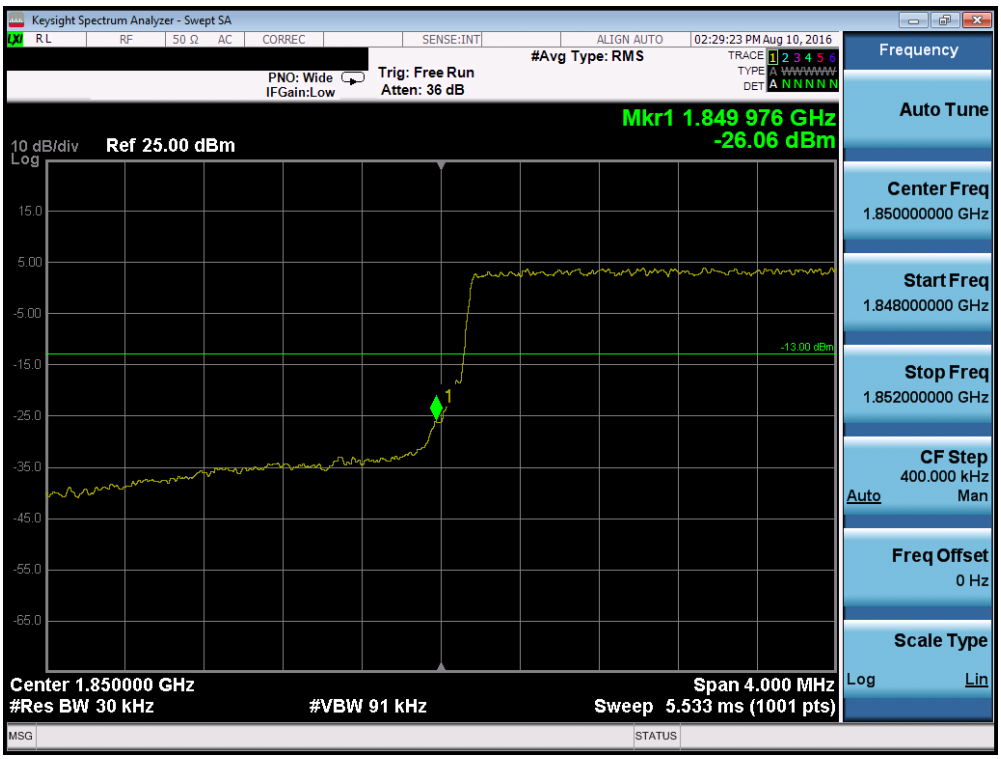
Plot 7-75. Lower Extended Band Edge Plot (Band 25 – 1.4MHz QPSK – RB Size 6)



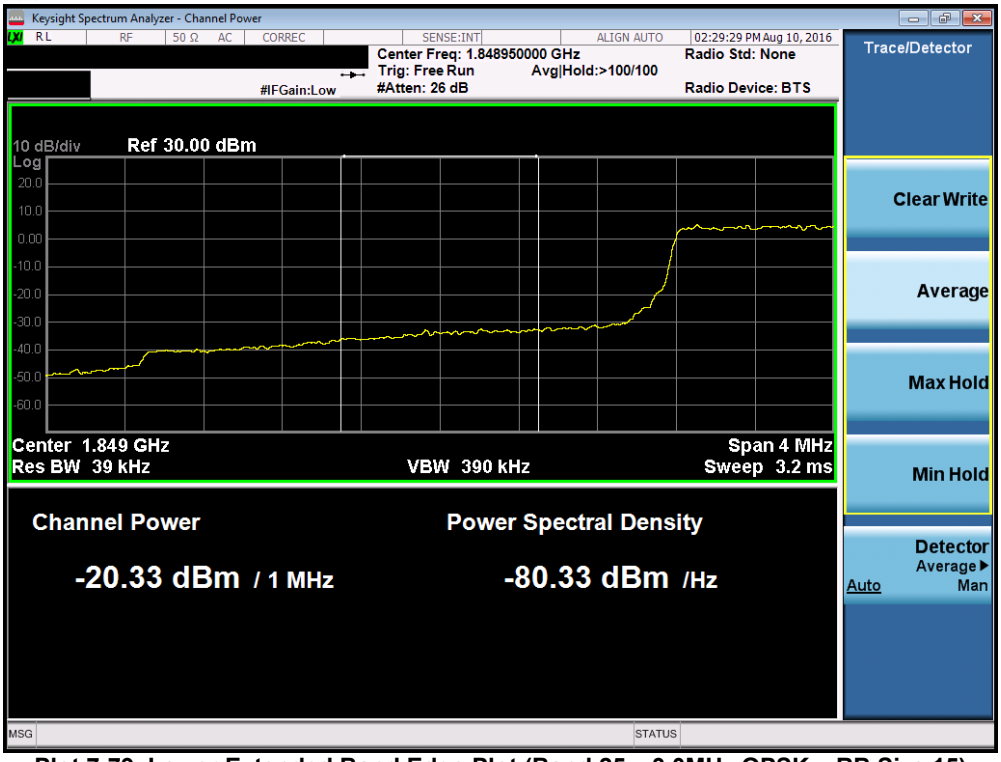
Plot 7-76. Upper Band Edge Plot (Band 25 – 1.4MHz QPSK – RB Size 6)



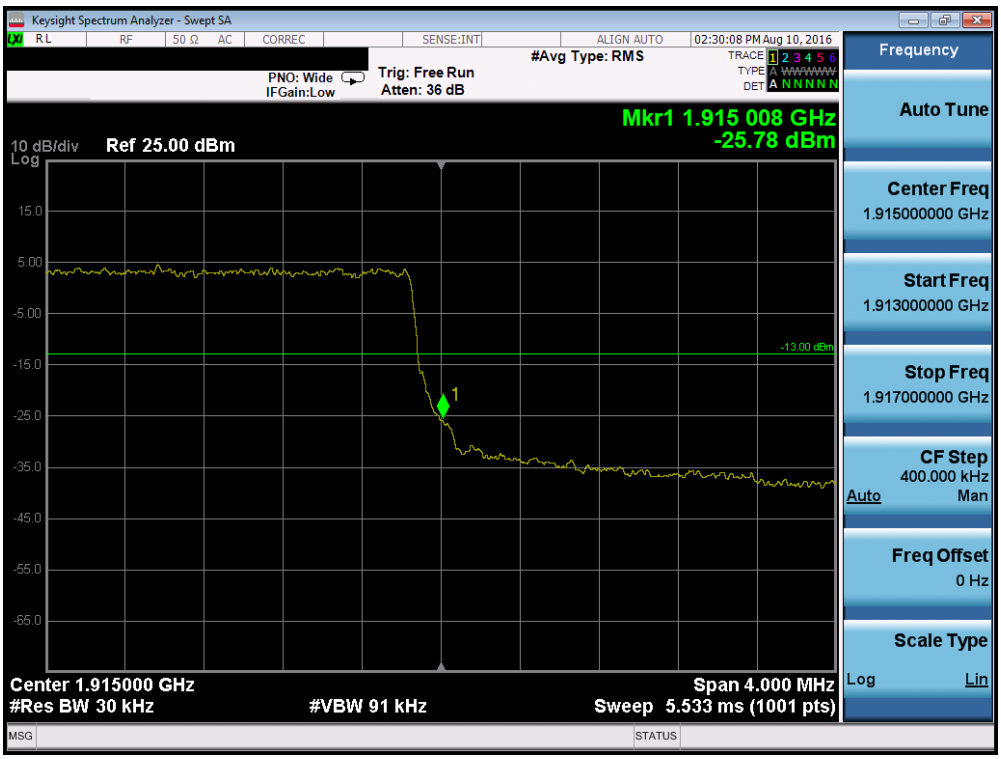
Plot 7-77. Upper Extended Band Edge Plot (Band 25 – 1.4MHz QPSK – RB Size 6)



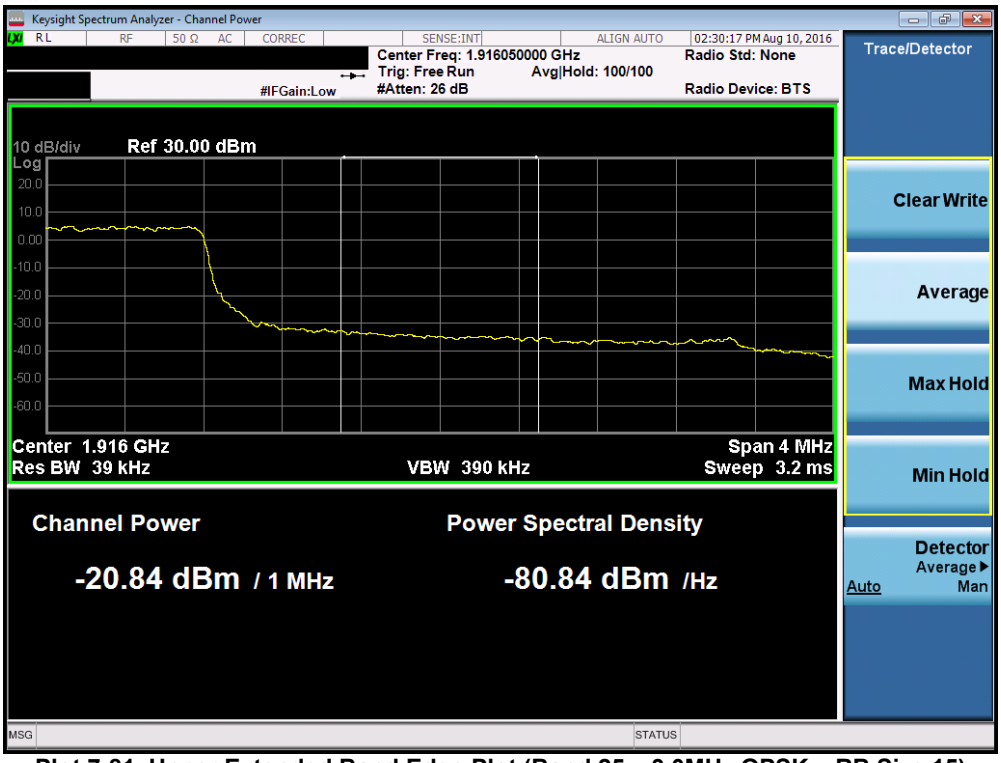
Plot 7-78. Lower Band Edge Plot (Band 25 – 3.0MHz QPSK – RB Size 15)



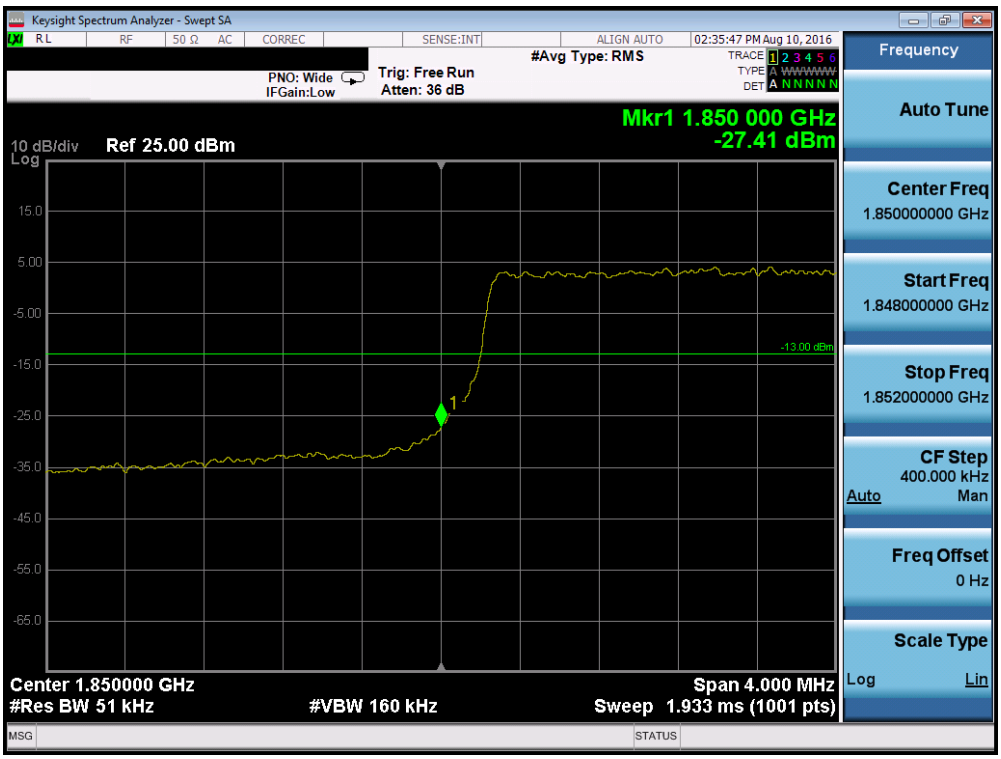
Plot 7-79. Lower Extended Band Edge Plot (Band 25 – 3.0MHz QPSK – RB Size 15)



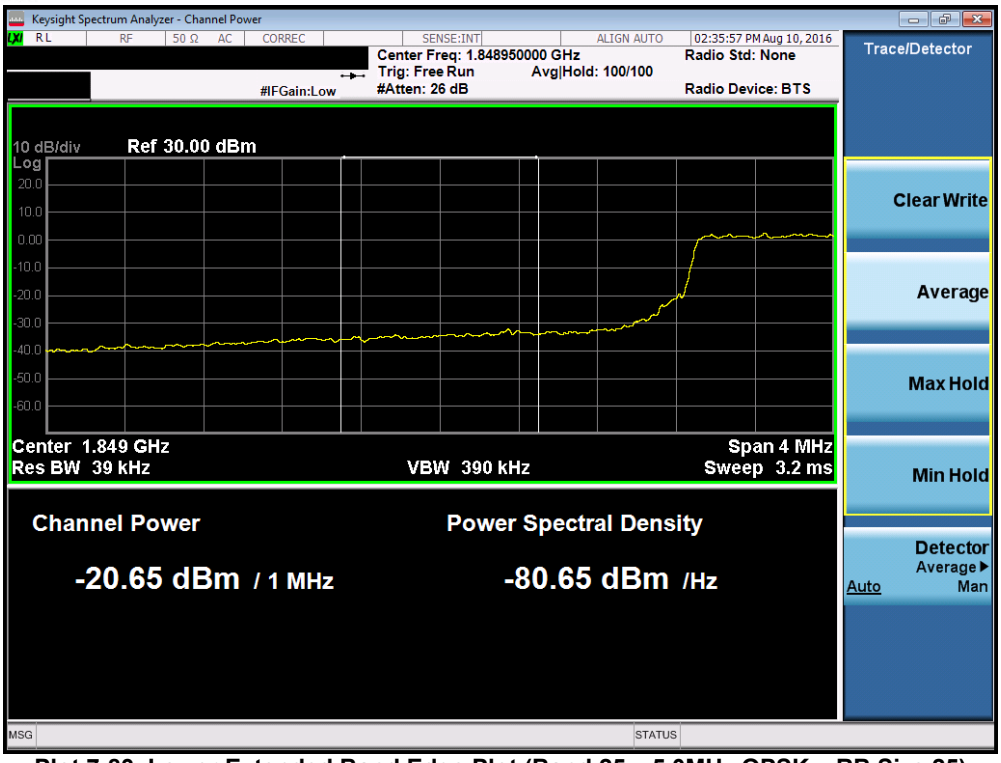
Plot 7-80. Upper Band Edge Plot (Band 25 – 3.0MHz QPSK – RB Size 15)



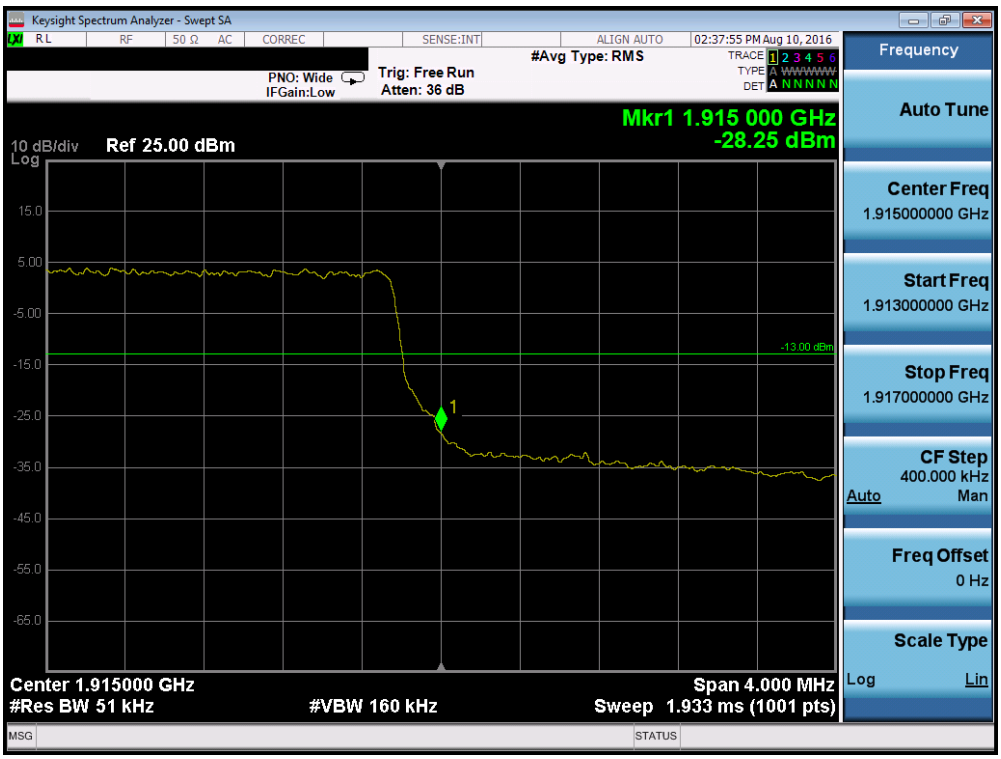
Plot 7-81. Upper Extended Band Edge Plot (Band 25 – 3.0MHz QPSK – RB Size 15)



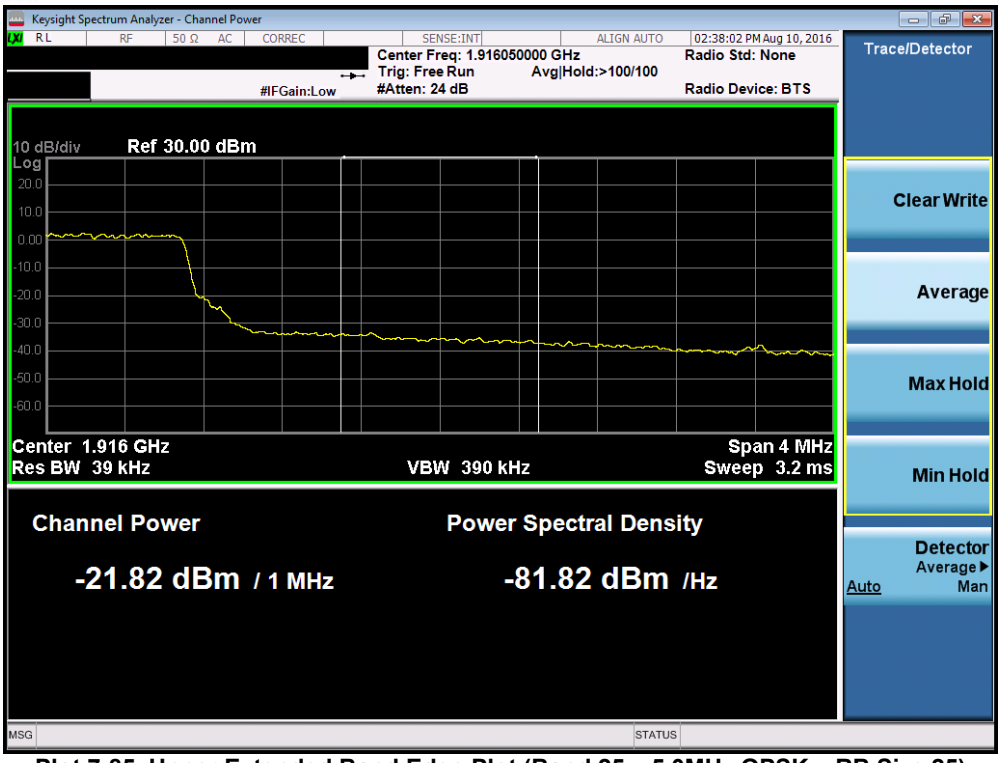
Plot 7-82. Lower Band Edge Plot (Band 25 – 5.0MHz QPSK – RB Size 25)



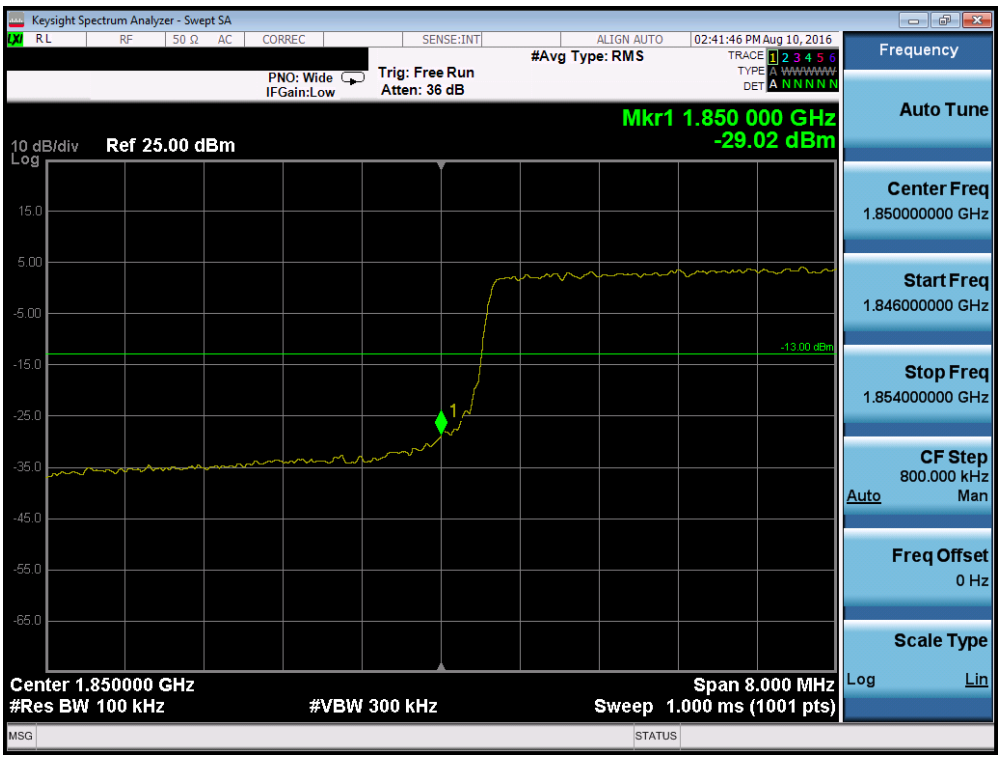
Plot 7-83. Lower Extended Band Edge Plot (Band 25 – 5.0MHz QPSK – RB Size 25)



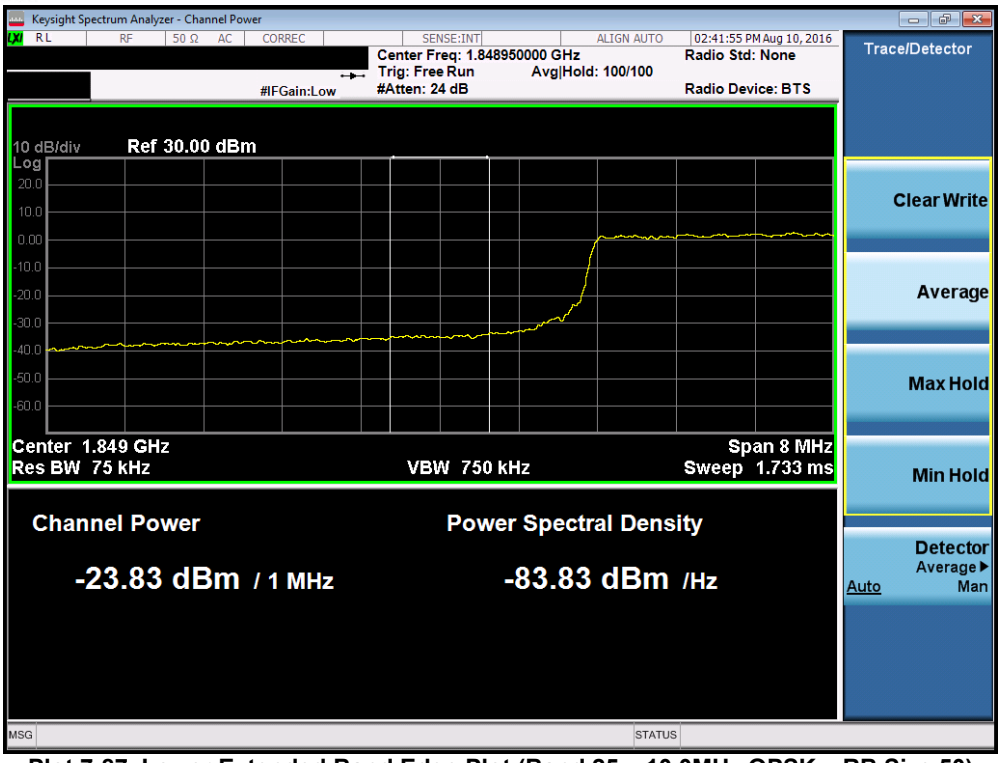
Plot 7-84. Upper Band Edge Plot (Band 25 – 5.0MHz QPSK – RB Size 25)



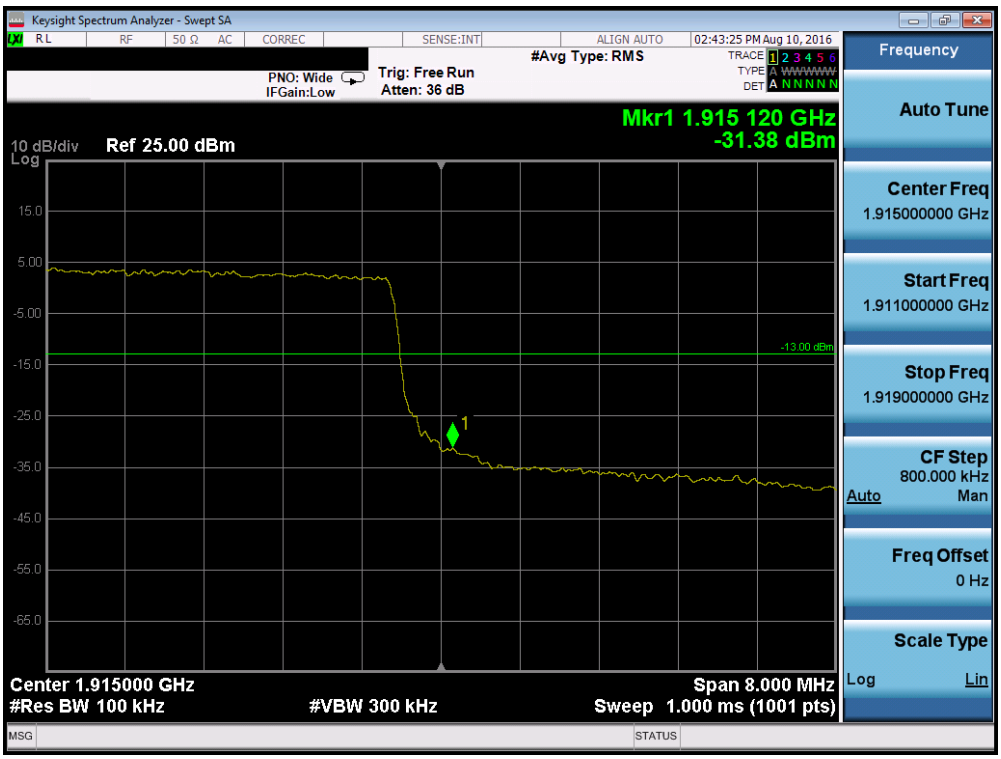
Plot 7-85. Upper Extended Band Edge Plot (Band 25 – 5.0MHz QPSK – RB Size 25)



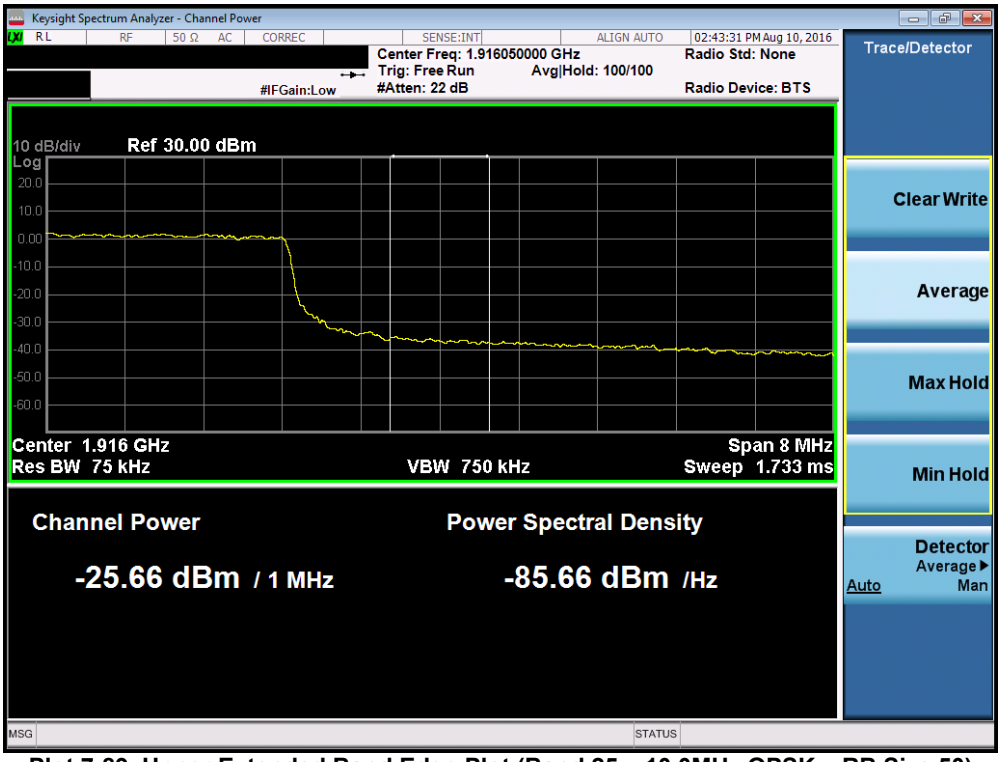
Plot 7-86. Lower Band Edge Plot (Band 25 – 10.0MHz QPSK – RB Size 50)



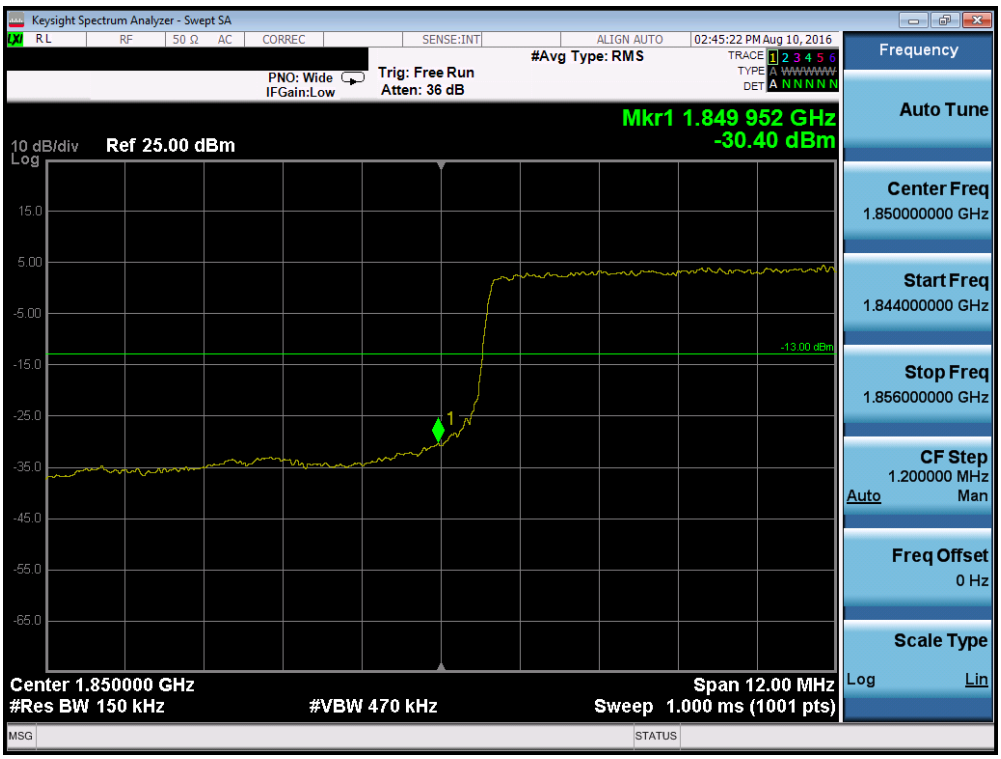
Plot 7-87. Lower Extended Band Edge Plot (Band 25 – 10.0MHz QPSK – RB Size 50)



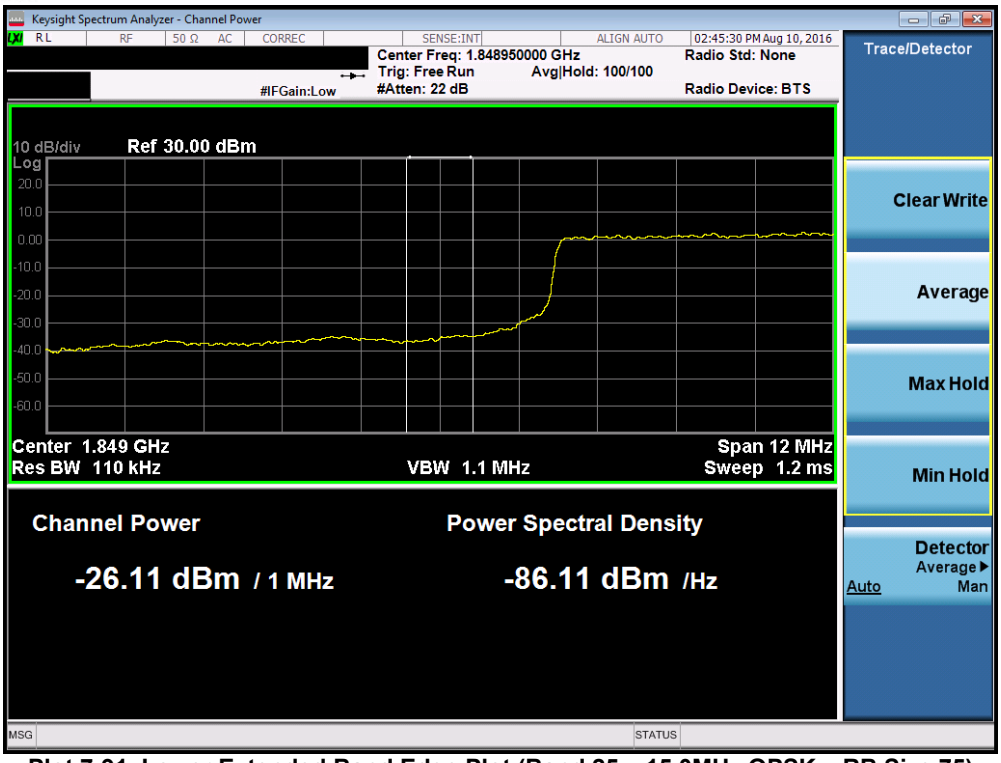
Plot 7-88. Upper Band Edge Plot (Band 25 – 10.0MHz QPSK – RB Size 50)



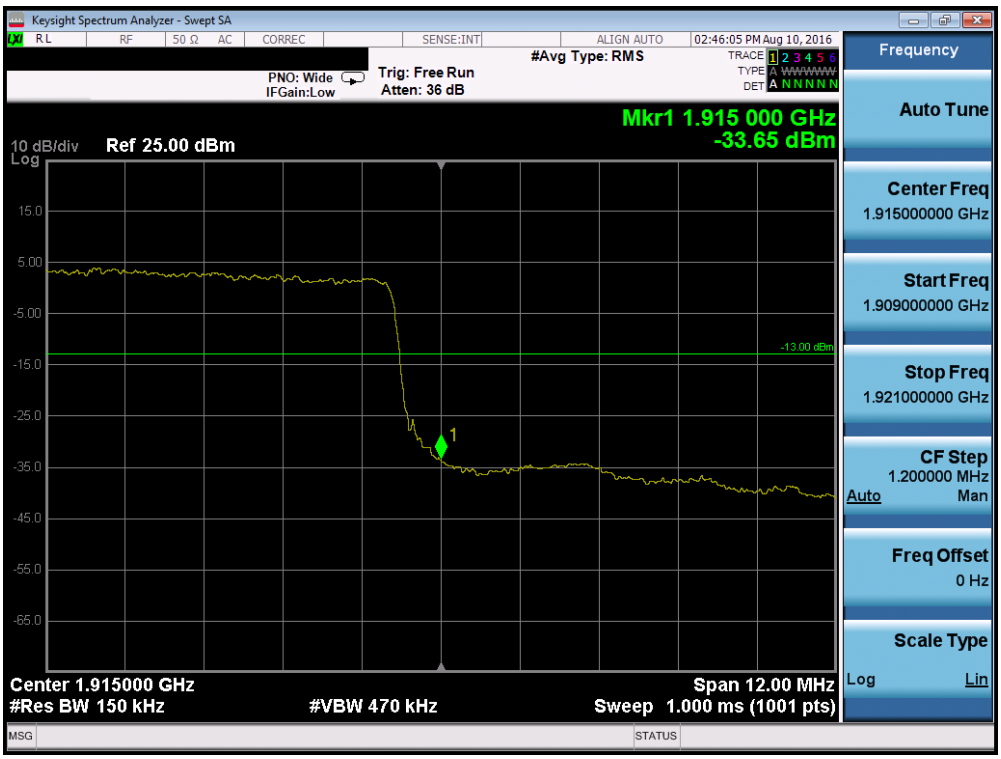
Plot 7-89. Upper Extended Band Edge Plot (Band 25 – 10.0MHz QPSK – RB Size 50)



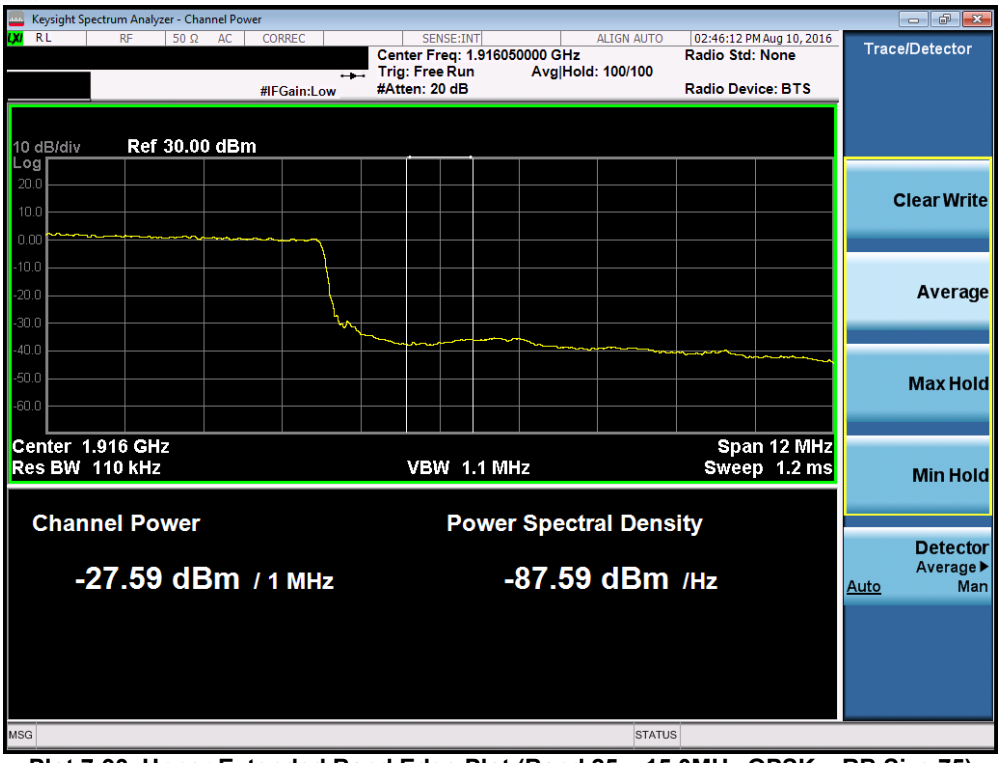
Plot 7-90. Lower Band Edge Plot (Band 25 – 15.0MHz QPSK – RB Size 75)



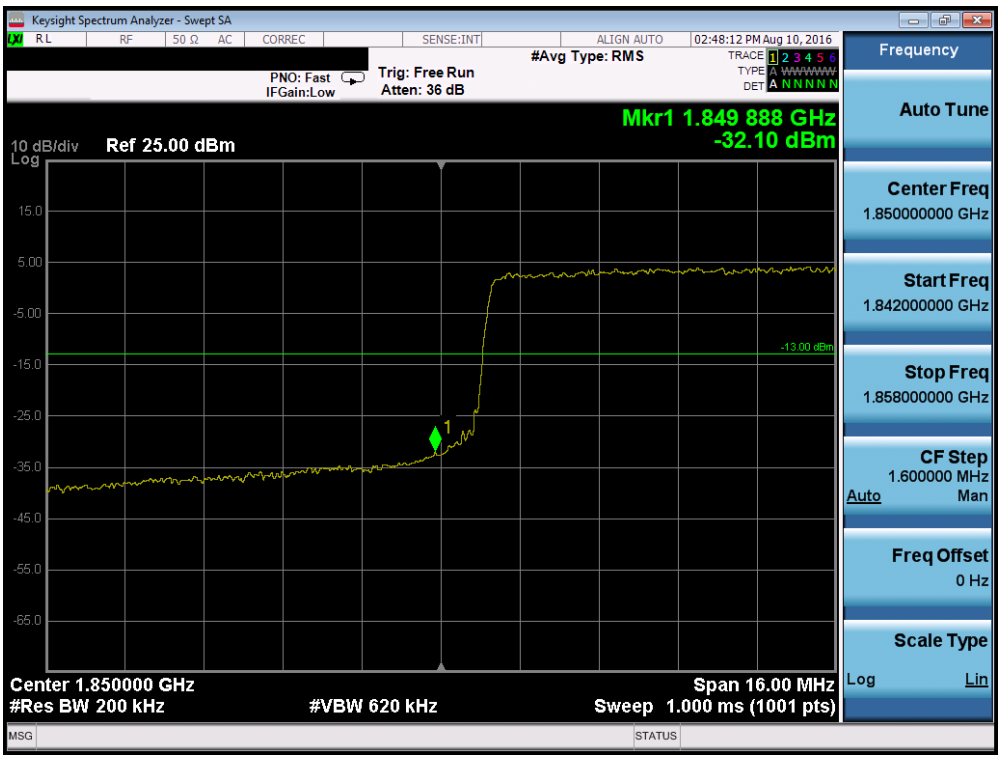
Plot 7-91. Lower Extended Band Edge Plot (Band 25 – 15.0MHz QPSK – RB Size 75)



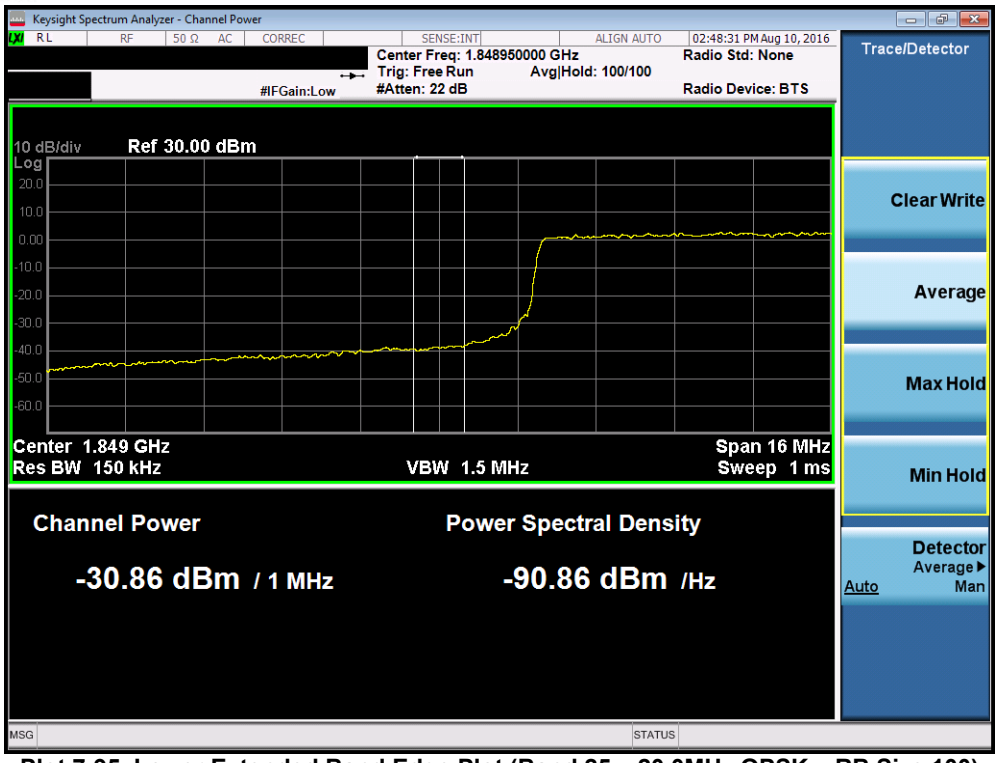
Plot 7-92. Upper Band Edge Plot (Band 25 – 15.0MHz QPSK – RB Size 75)



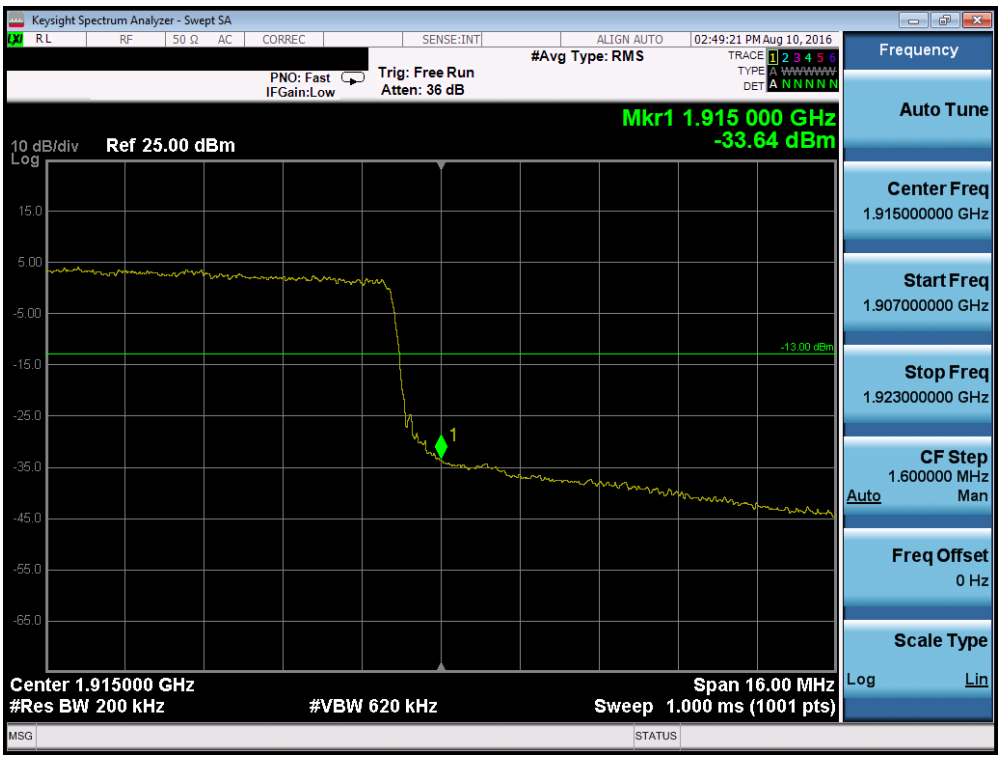
Plot 7-93. Upper Extended Band Edge Plot (Band 25 – 15.0MHz QPSK – RB Size 75)



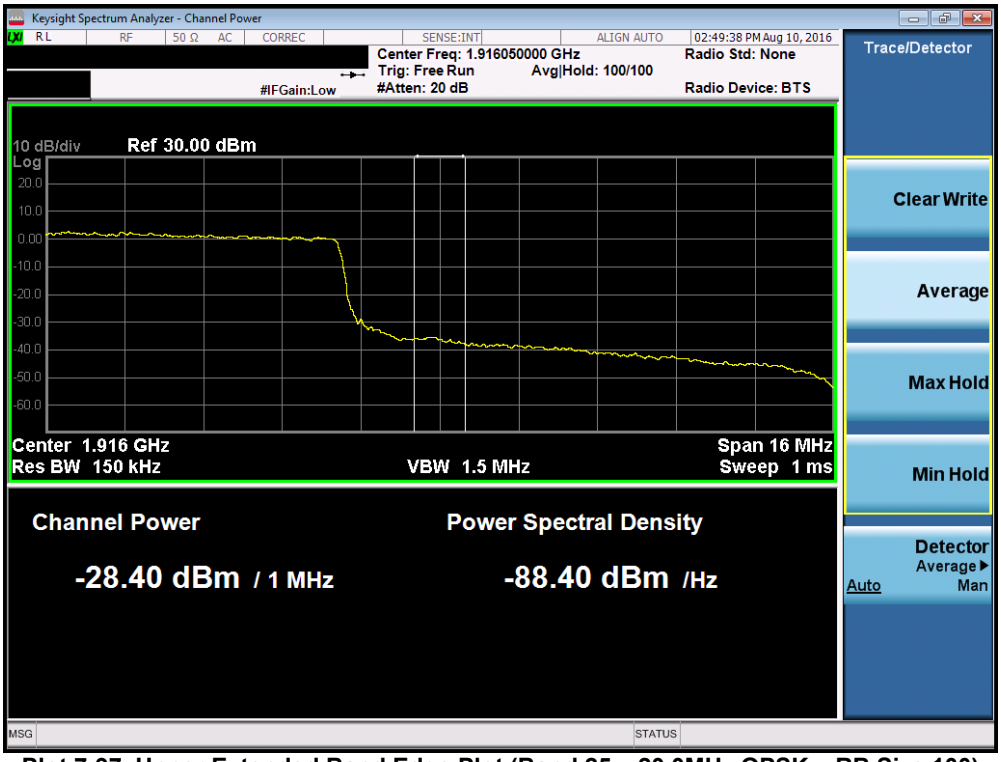
Plot 7-94. Lower Band Edge Plot (Band 25 – 20.0MHz QPSK – RB Size 100)



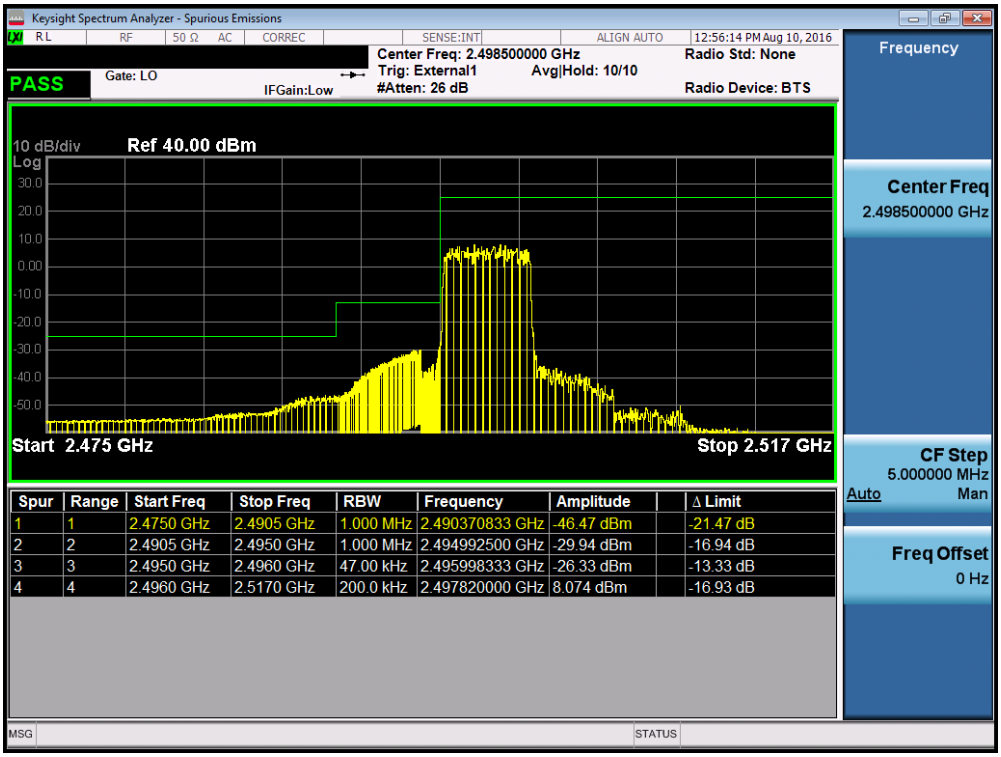
Plot 7-95. Lower Extended Band Edge Plot (Band 25 – 20.0MHz QPSK – RB Size 100)



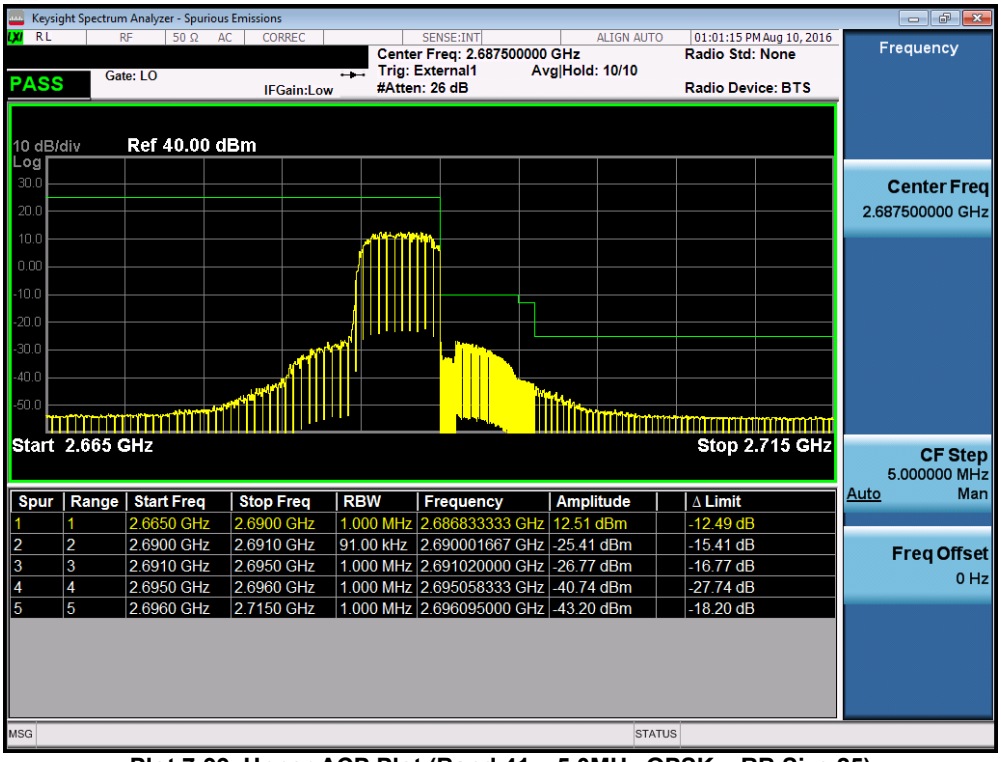
Plot 7-96. Upper Band Edge Plot (Band 25 – 20.0MHz QPSK – RB Size 100)



Plot 7-97. Upper Extended Band Edge Plot (Band 25 – 20.0MHz QPSK – RB Size 100)

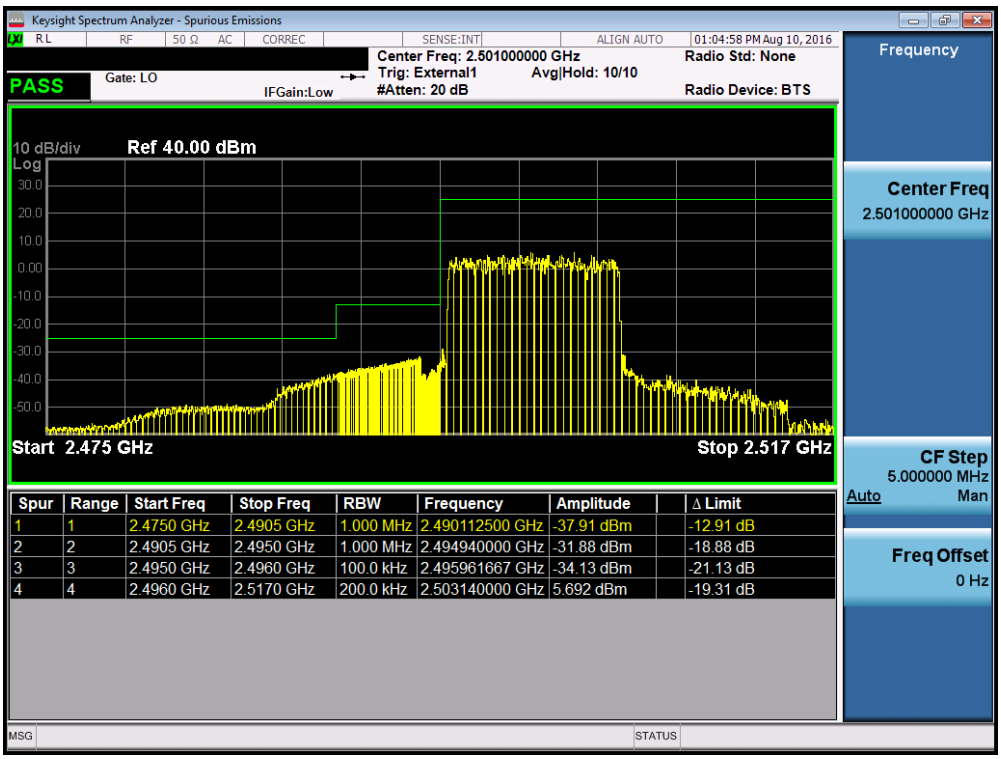


Plot 7-98. Lower ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)



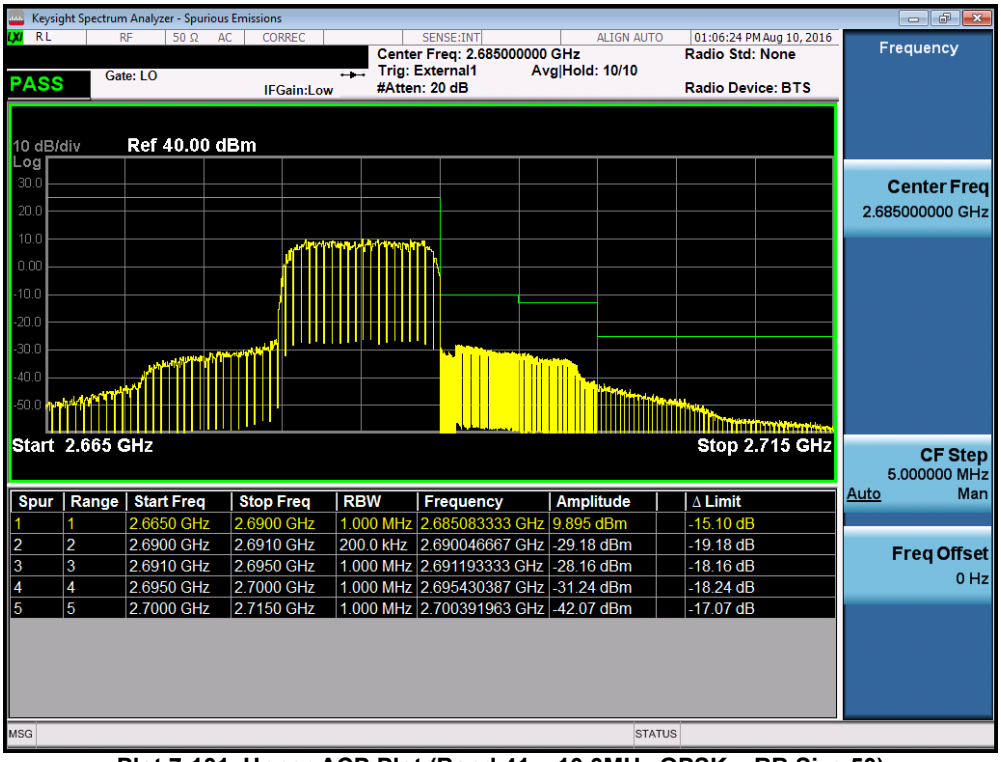
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.686833333 GHz	12.51 dBm	-12.49 dB
2	2	2.6900 GHz	2.6910 GHz	91.00 kHz	2.690001667 GHz	-25.41 dBm	-15.41 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691020000 GHz	-26.77 dBm	-16.77 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695058333 GHz	-40.74 dBm	-27.74 dB
5	5	2.6960 GHz	2.7150 GHz	1.000 MHz	2.696095000 GHz	-43.20 dBm	-18.20 dB

Plot 7-99. Upper ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)



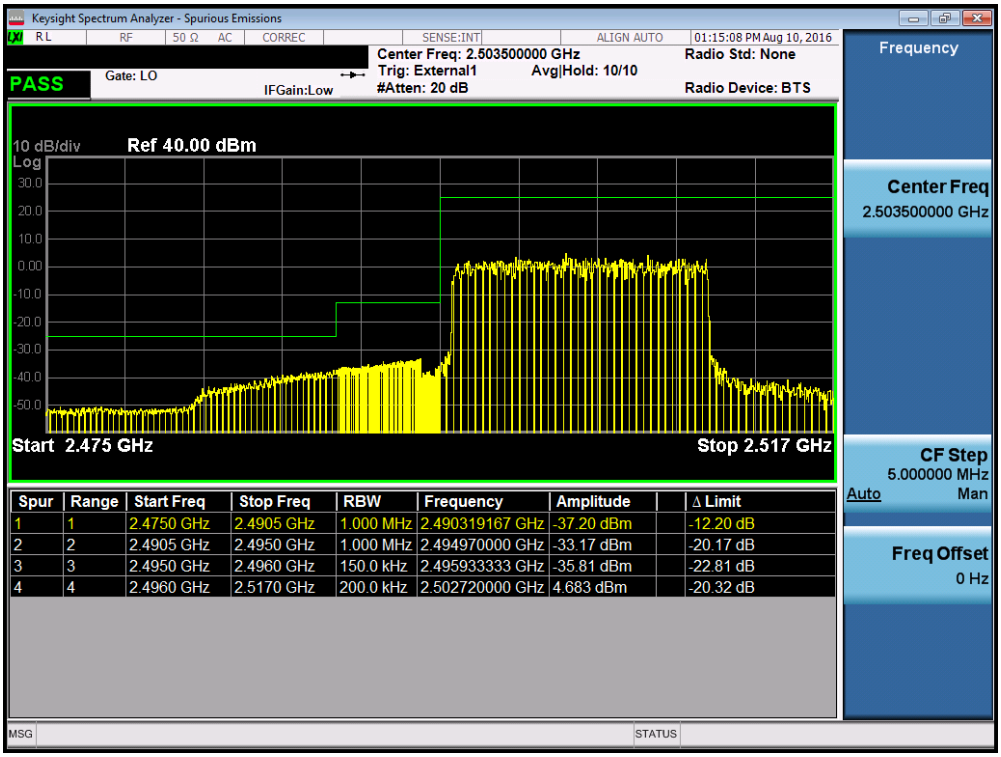
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490112500 GHz	-37.91 dBm	-12.91 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494940000 GHz	-31.88 dBm	-18.88 dB
3	3	2.4950 GHz	2.4960 GHz	100.0 kHz	2.495961667 GHz	-34.13 dBm	-21.13 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.503140000 GHz	5.692 dBm	-19.31 dB

Plot 7-100. Lower ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)



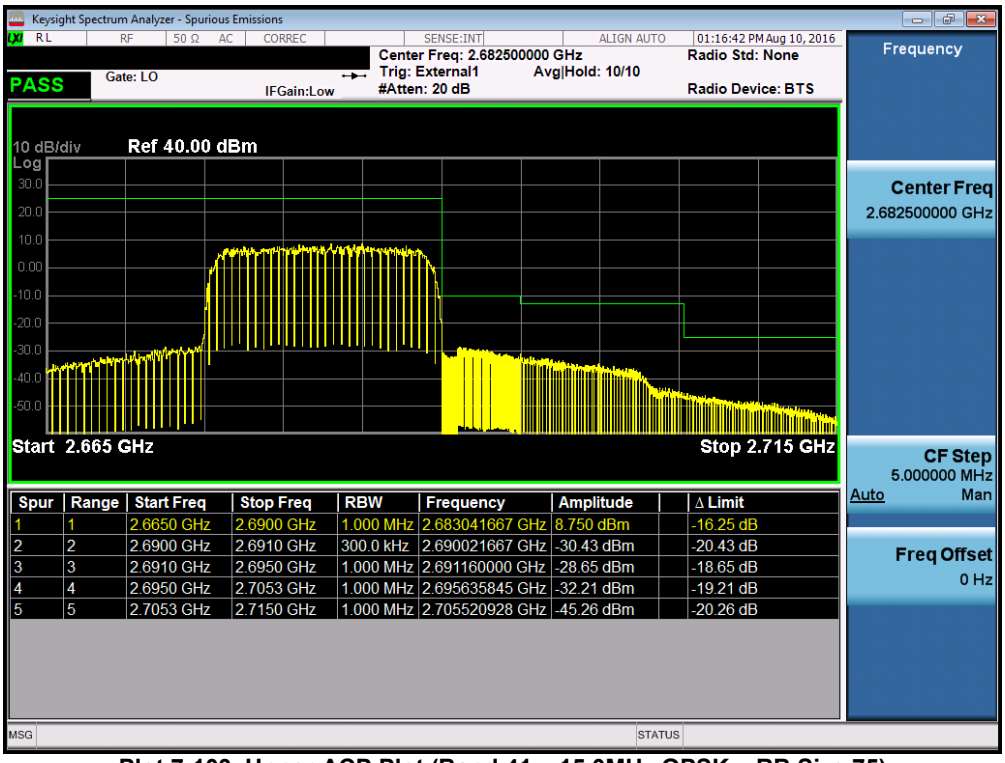
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.685083333 GHz	9.895 dBm	-15.10 dB
2	2	2.6900 GHz	2.6910 GHz	200.0 kHz	2.690046667 GHz	-29.18 dBm	-19.18 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691193333 GHz	-28.16 dBm	-18.16 dB
4	4	2.6950 GHz	2.7000 GHz	1.000 MHz	2.695430387 GHz	-31.24 dBm	-18.24 dB
5	5	2.7000 GHz	2.7150 GHz	1.000 MHz	2.700391963 GHz	-42.07 dBm	-17.07 dB

Plot 7-101. Upper ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)



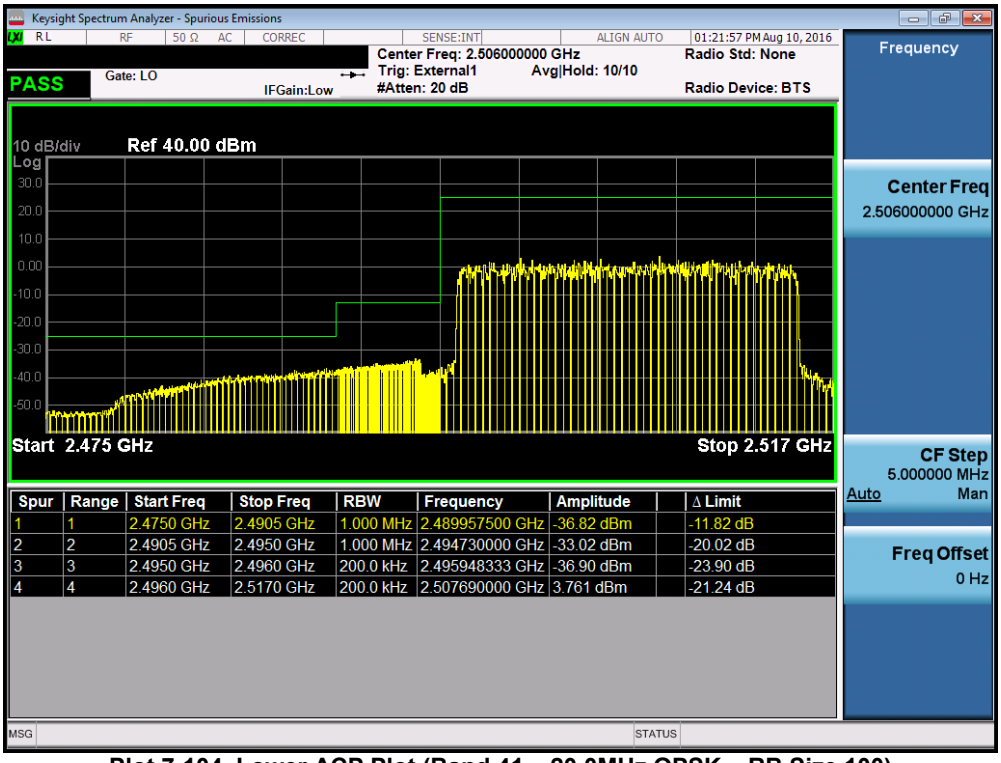
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490319167 GHz	-37.20 dBm	-12.20 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494970000 GHz	-33.17 dBm	-20.17 dB
3	3	2.4950 GHz	2.4960 GHz	150.0 kHz	2.495933333 GHz	-35.81 dBm	-22.81 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.502720000 GHz	4.683 dBm	-20.32 dB

Plot 7-102. Lower ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



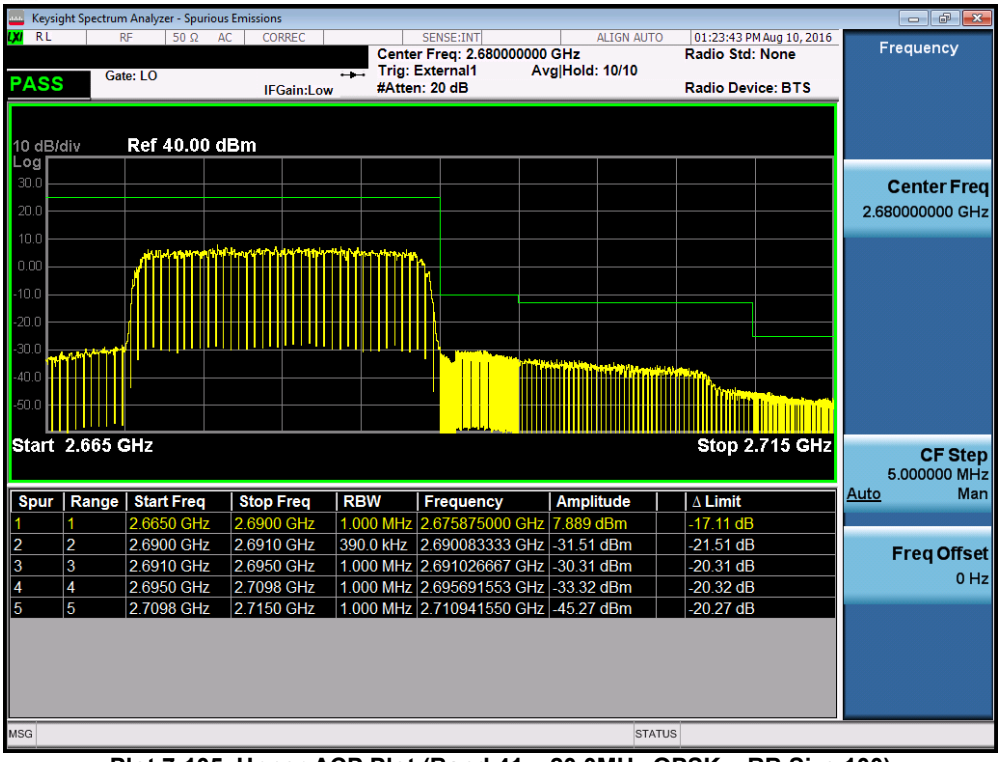
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.683041667 GHz	8.750 dBm	-16.25 dB
2	2	2.6900 GHz	2.6910 GHz	300.0 kHz	2.690021667 GHz	-30.43 dBm	-20.43 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691160000 GHz	-28.65 dBm	-18.65 dB
4	4	2.6950 GHz	2.7053 GHz	1.000 MHz	2.695635845 GHz	-32.21 dBm	-19.21 dB
5	5	2.7053 GHz	2.7150 GHz	1.000 MHz	2.705520928 GHz	-45.26 dBm	-20.26 dB

Plot 7-103. Upper ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489957500 GHz	-36.82 dBm	-11.82 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494730000 GHz	-33.02 dBm	-20.02 dB
3	3	2.4950 GHz	2.4960 GHz	200.0 kHz	2.495948333 GHz	-36.90 dBm	-23.90 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.507690000 GHz	3.761 dBm	-21.24 dB

Plot 7-104. Lower ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.675875000 GHz	7.889 dBm	-17.11 dB
2	2	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690083333 GHz	-31.51 dBm	-21.51 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691026667 GHz	-30.31 dBm	-20.31 dB
4	4	2.6950 GHz	2.7098 GHz	1.000 MHz	2.695691553 GHz	-33.32 dBm	-20.32 dB
5	5	2.7098 GHz	2.7150 GHz	1.000 MHz	2.710941550 GHz	-45.27 dBm	-20.27 dB

Plot 7-105. Upper ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)

7.5 Peak-Average Ratio

§24.232(d)

Test Overview

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

Test Procedure Used

KDB 971168 D01 v02r02 – Section 5.7.1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Setup

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

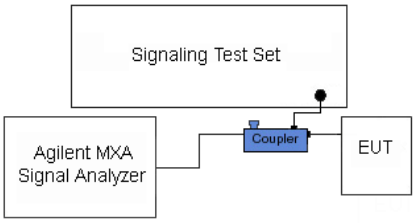
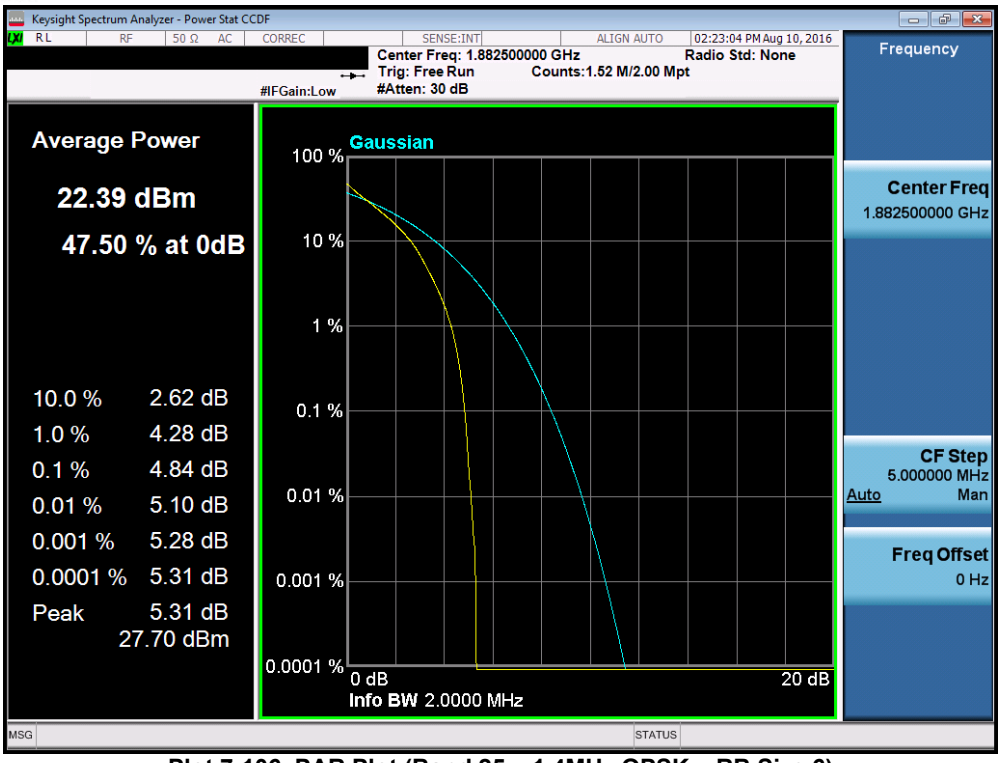


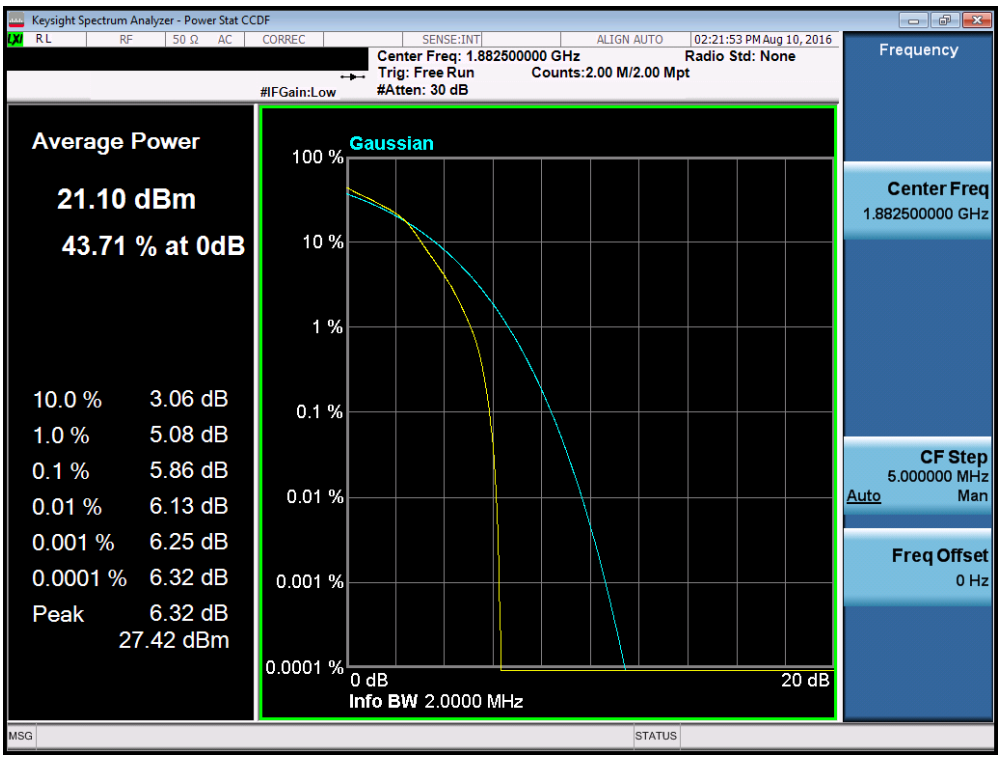
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

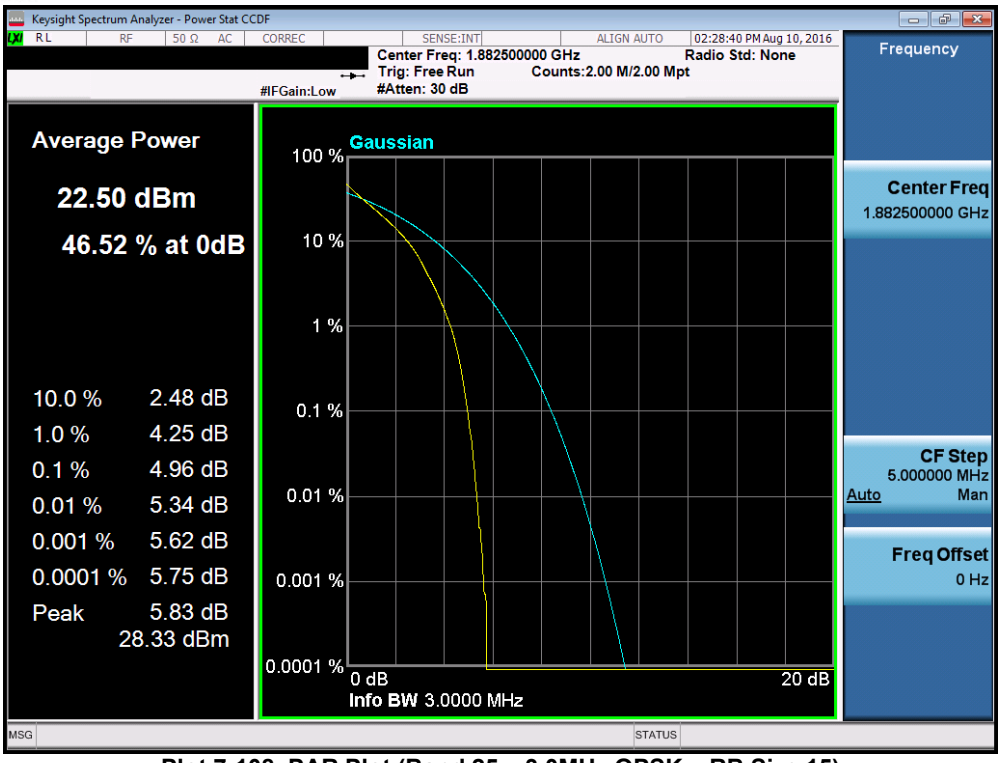
None.



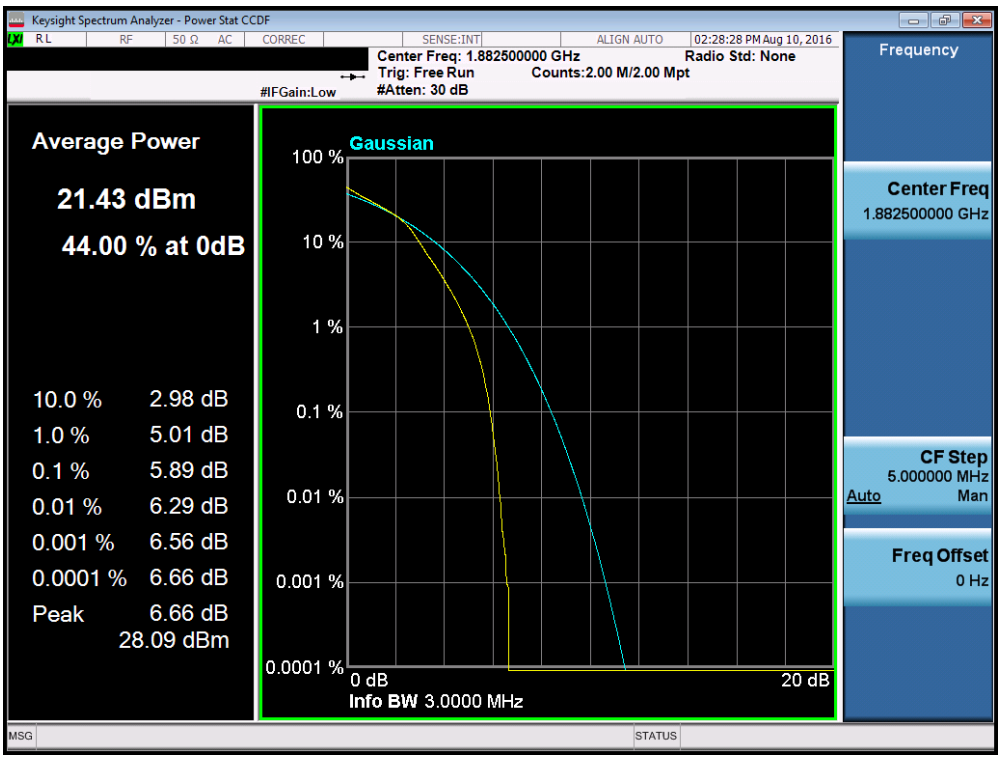
Plot 7-106. PAR Plot (Band 25 – 1.4MHz QPSK – RB Size 6)



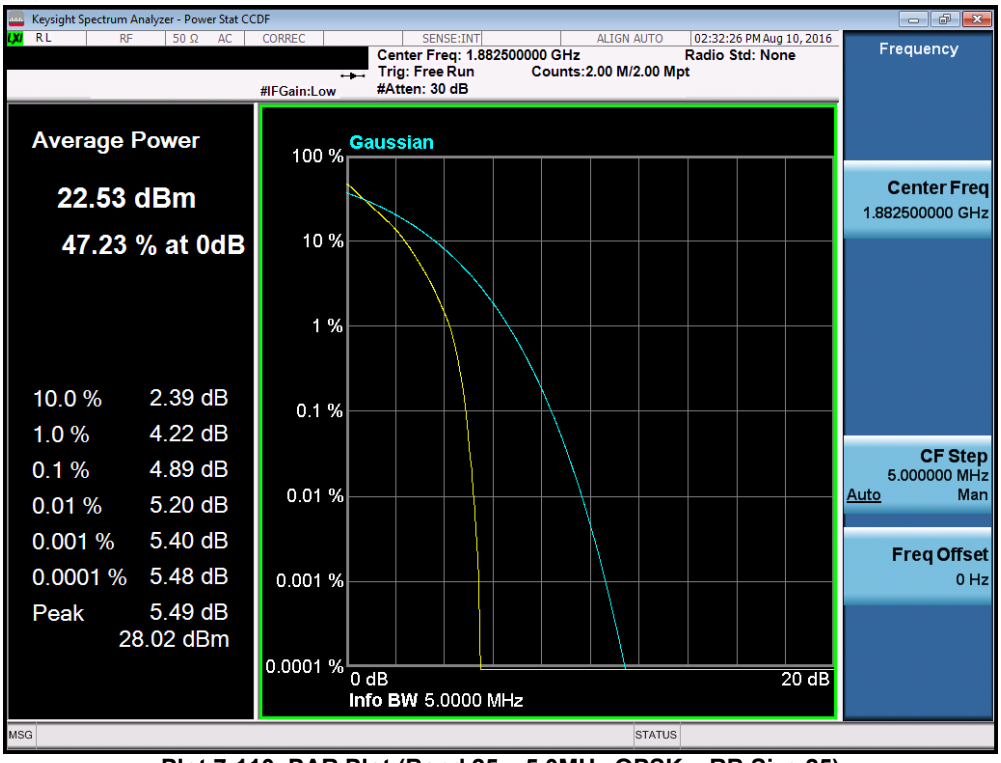
Plot 7-107. PAR Plot (Band 25 – 1.4MHz 16-QAM – RB Size 6)



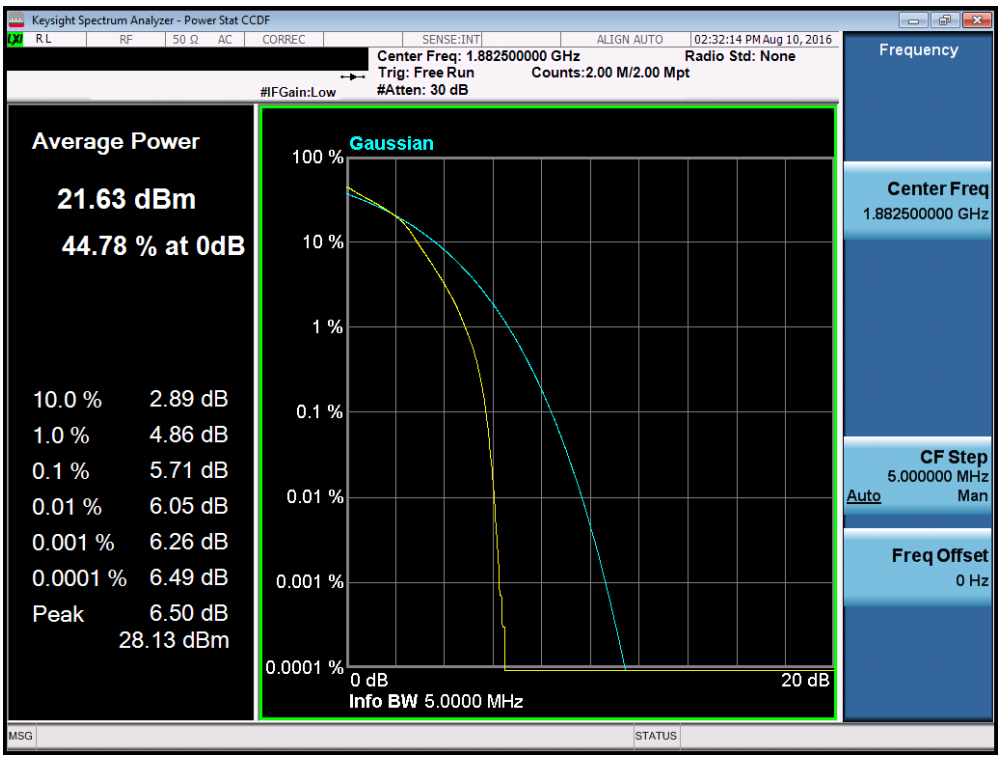
Plot 7-108. PAR Plot (Band 25 – 3.0MHz QPSK – RB Size 15)



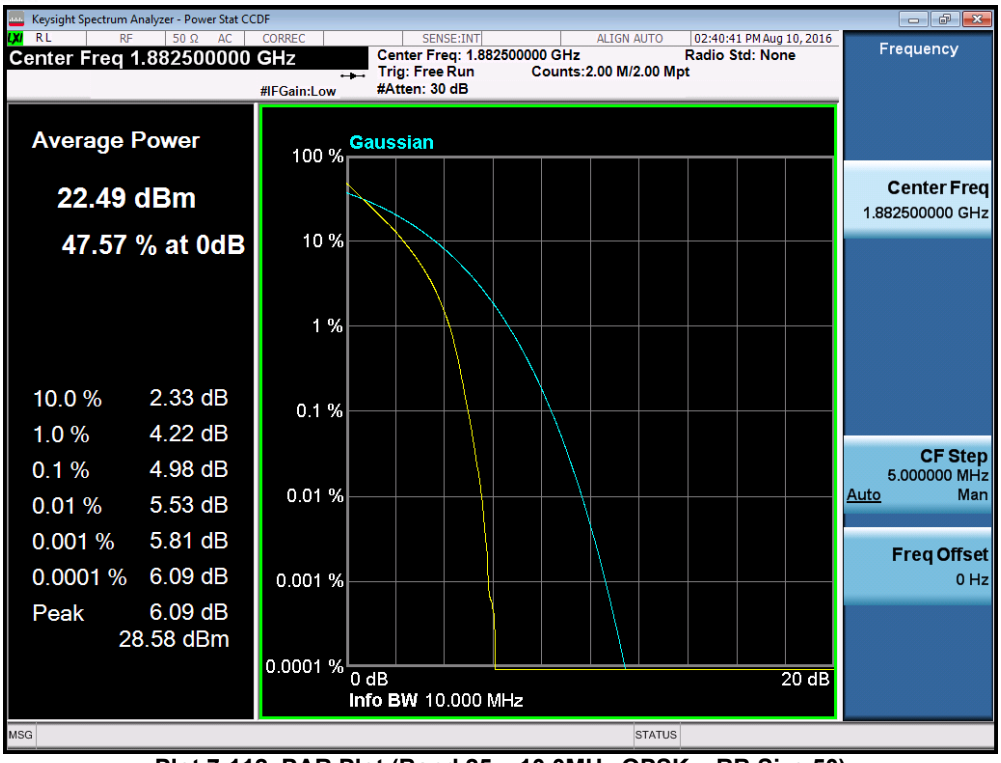
Plot 7-109. PAR Plot (Band 25 – 3.0MHz 16-QAM – RB Size 15)



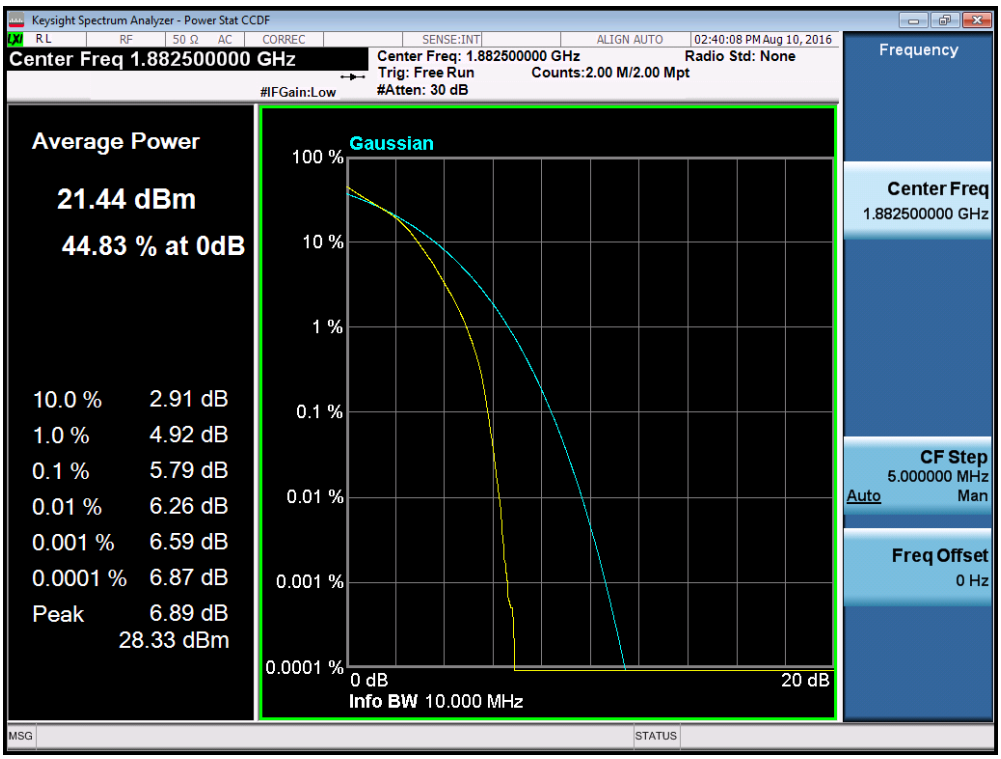
Plot 7-110. PAR Plot (Band 25 – 5.0MHz QPSK – RB Size 25)



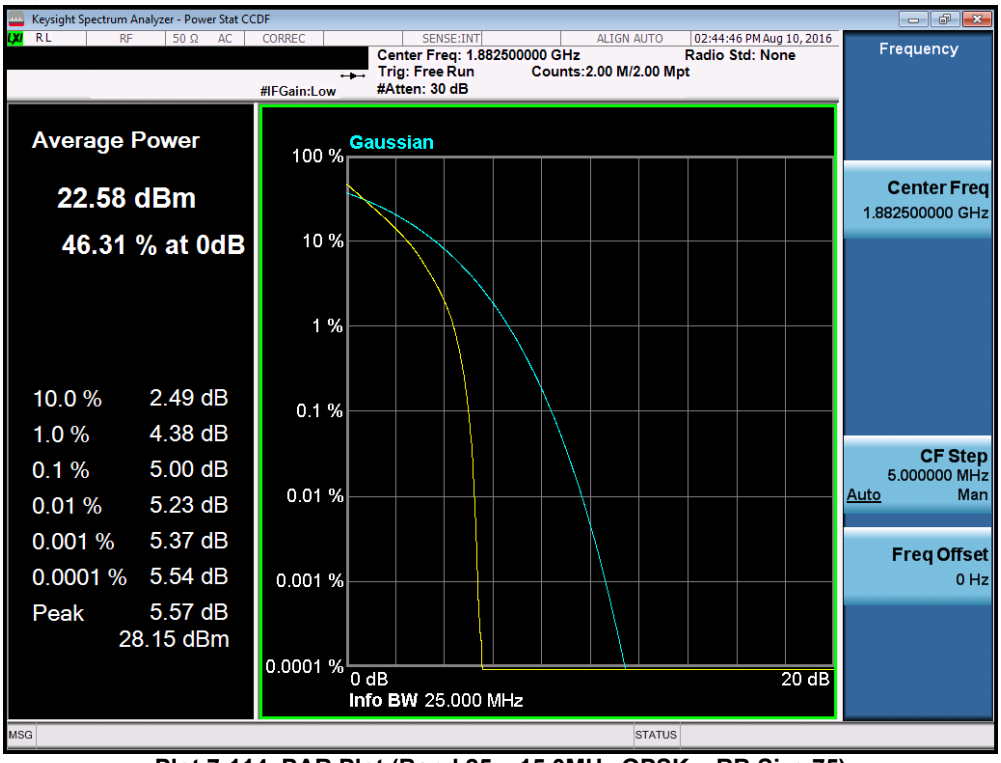
Plot 7-111. PAR Plot (Band 25 – 5.0MHz 16-QAM – RB Size 25)



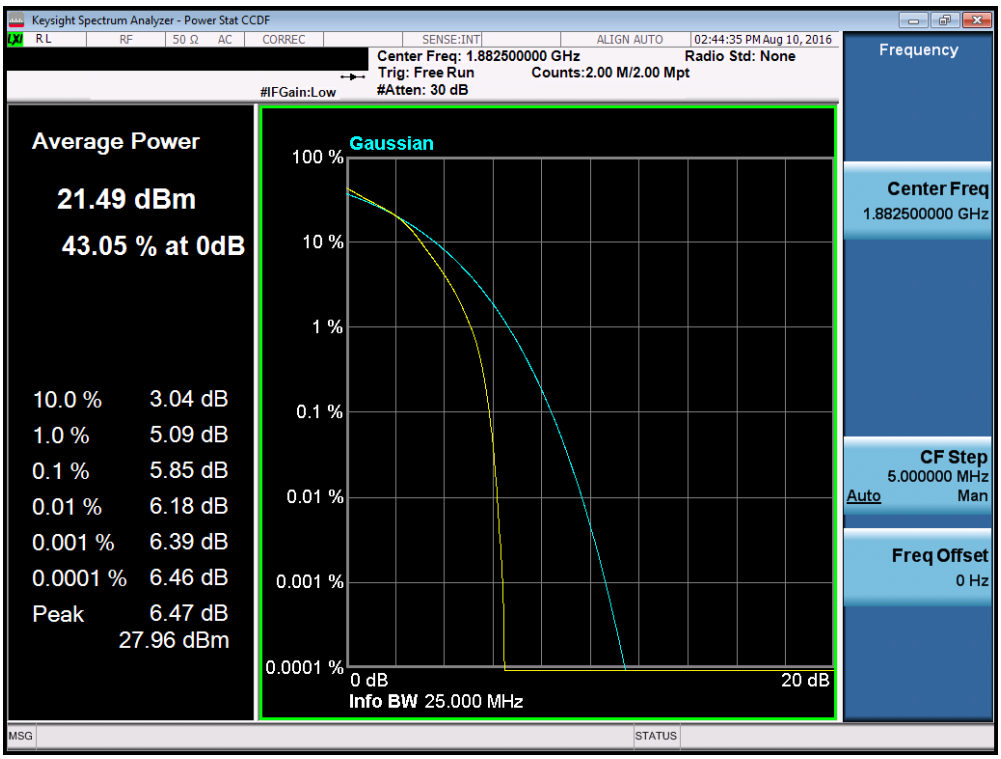
Plot 7-112. PAR Plot (Band 25 – 10.0MHz QPSK – RB Size 50)



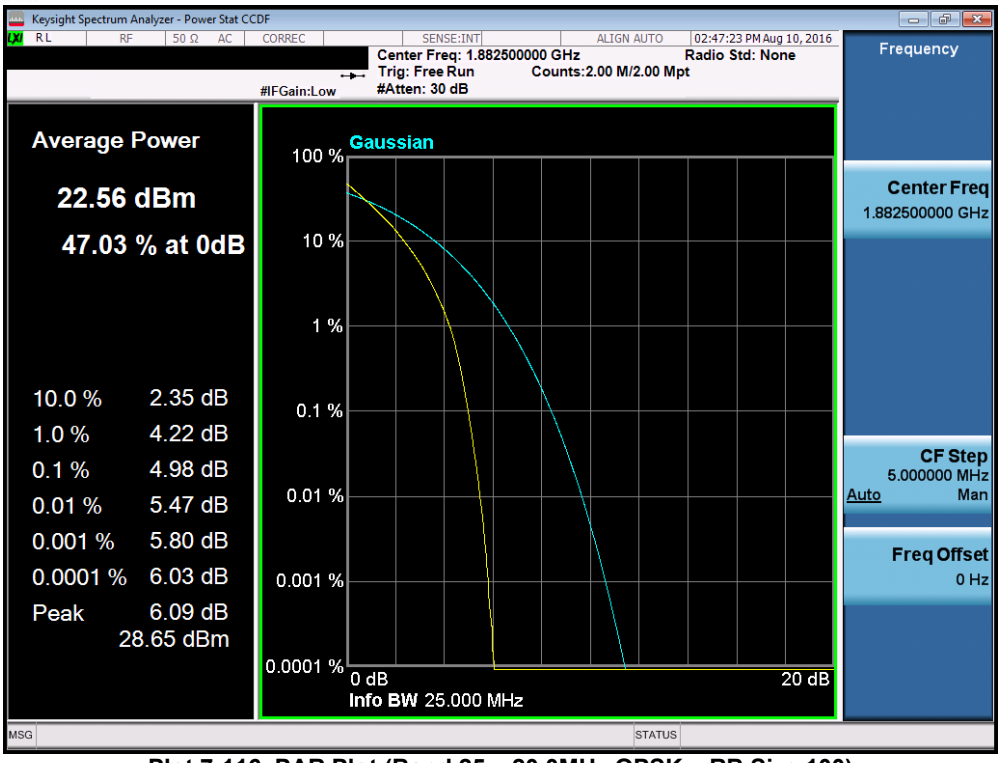
Plot 7-113. PAR Plot (Band 25 – 10.0MHz 16-QAM – RB Size 50)



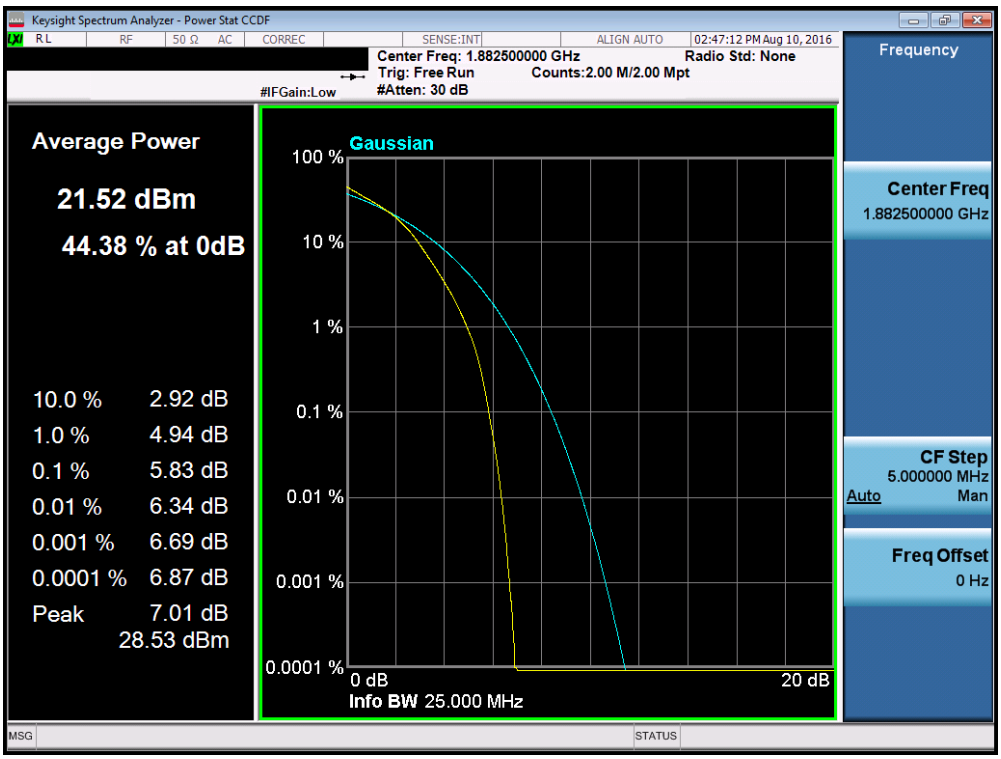
Plot 7-114. PAR Plot (Band 25 – 15.0MHz QPSK – RB Size 75)



Plot 7-115. PAR Plot (Band 25 – 15.0MHz 16-QAM – RB Size 75)



Plot 7-116. PAR Plot (Band 25 – 20.0MHz QPSK – RB Size 100)



Plot 7-117. PAR Plot (Band 25 – 20.0MHz 16-QAM – RB Size 100)

7.6 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.2) §27.50(h.2)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.2.1

ANSI/TIA-603-D-2010 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Setup

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

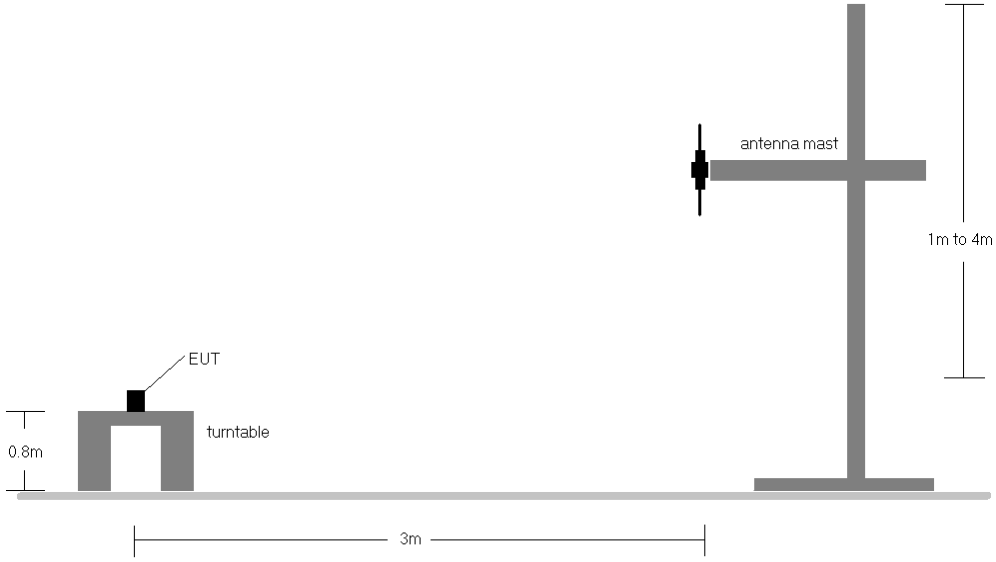


Figure 7-5. Radiated Test Setup <1GHz

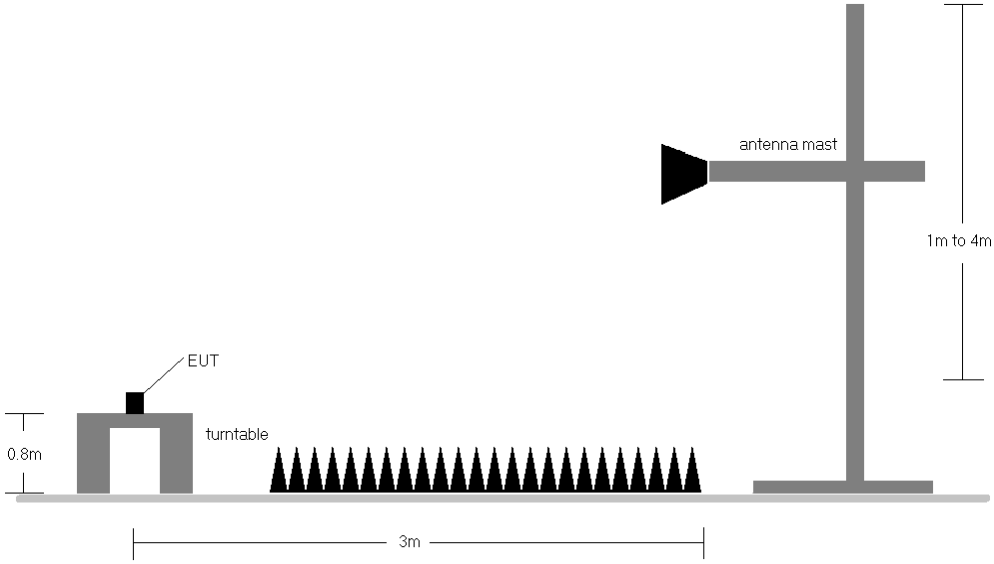


Figure 7-6. Radiated Test Setup >1GHz

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	219	154	1 / 0	16.68	5.01	21.69	38.45	-16.76
836.50	1.4	QPSK	H	223	167	1 / 0	17.34	5.16	22.50	38.45	-15.95
848.30	1.4	QPSK	H	234	167	1 / 0	16.60	5.30	21.90	38.45	-16.55
824.70	1.4	16-QAM	H	219	154	1 / 0	15.84	5.01	20.85	38.45	-17.60
836.50	1.4	16-QAM	H	223	167	1 / 0	16.39	5.16	21.55	38.45	-16.90
848.30	1.4	16-QAM	H	234	167	1 / 0	15.48	5.30	20.78	38.45	-17.67
825.50	3	QPSK	H	219	167	1 / 14	17.29	5.02	22.31	38.45	-16.14
836.50	3	QPSK	H	223	165	1 / 0	17.50	5.16	22.66	38.45	-15.79
847.50	3	QPSK	H	235	164	1 / 0	16.57	5.29	21.86	38.45	-16.59
825.50	3	16-QAM	H	219	167	1 / 14	16.48	5.02	21.50	38.45	-16.95
836.50	3	16-QAM	H	223	165	1 / 0	16.68	5.16	21.84	38.45	-16.61
847.50	3	16-QAM	H	235	164	1 / 0	15.59	5.29	20.88	38.45	-17.57
826.50	5	QPSK	H	223	166	1 / 0	18.89	5.03	23.92	38.45	-14.53
836.50	5	QPSK	H	221	167	1 / 0	19.72	5.16	24.88	38.45	-13.57
846.50	5	QPSK	H	230	169	1 / 0	18.06	5.28	23.34	38.45	-15.11
826.50	5	16-QAM	H	223	166	1 / 0	17.21	5.03	22.24	38.45	-16.21
836.50	5	16-QAM	H	221	167	1 / 0	17.72	5.16	22.88	38.45	-15.57
846.50	5	16-QAM	H	230	169	1 / 0	17.21	5.28	22.49	38.45	-15.96
829.00	10	QPSK	H	220	163	1 / 0	18.98	5.06	24.04	38.45	-14.41
836.50	10	QPSK	H	223	165	1 / 0	19.07	5.16	24.23	38.45	-14.22
844.00	10	QPSK	H	231	165	1 / 0	18.39	5.25	23.64	38.45	-14.81
829.00	10	16-QAM	H	220	163	1 / 0	17.04	5.06	22.10	38.45	-16.35
836.50	10	16-QAM	H	223	165	1 / 0	18.27	5.16	23.43	38.45	-15.02
844.00	10	16-QAM	H	231	165	1 / 0	17.26	5.25	22.51	38.45	-15.94
831.50	15	QPSK	H	220	163	1 / 0	18.67	5.10	23.77	38.45	-14.69
836.50	15	QPSK	H	223	165	1 / 0	18.92	5.16	24.08	38.45	-14.37
841.50	15	QPSK	H	231	165	1 / 0	18.30	5.22	23.52	38.45	-14.93
831.50	15	16-QAM	H	220	163	1 / 0	17.00	5.10	22.10	38.45	-16.36
836.50	15	16-QAM	H	223	165	1 / 0	18.15	5.16	23.31	38.45	-15.14
841.50	15	16-QAM	H	231	165	1 / 0	17.12	5.22	22.34	38.45	-16.11
836.50	5	QPSK	V	277	201	1 / 0	17.53	5.00	22.53	38.45	-15.92

Table 7-2. ERP Data (Band 26)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	H	110	301	1 / 0	14.81	9.35	24.16	33.01	-8.85
1882.50	1.4	QPSK	H	110	268	1 / 0	12.72	9.27	21.99	33.01	-11.02
1914.30	1.4	QPSK	H	110	305	1 / 0	12.93	9.26	22.19	33.01	-10.82
1850.70	1.4	16-QAM	H	110	301	1 / 0	13.87	9.35	23.22	33.01	-9.79
1882.50	1.4	16-QAM	H	110	268	1 / 0	11.52	9.27	20.79	33.01	-12.22
1914.30	1.4	16-QAM	H	110	305	1 / 0	11.81	9.26	21.07	33.01	-11.94
1851.50	3	QPSK	H	110	297	1 / 0	14.73	9.35	24.08	33.01	-8.93
1882.50	3	QPSK	H	110	275	1 / 0	12.61	9.27	21.88	33.01	-11.13
1913.50	3	QPSK	H	110	309	1 / 0	13.01	9.26	22.27	33.01	-10.74
1851.50	3	16-QAM	H	110	297	1 / 0	13.94	9.35	23.29	33.01	-9.72
1882.50	3	16-QAM	H	110	275	1 / 0	11.44	9.27	20.71	33.01	-12.30
1913.50	3	16-QAM	H	110	309	1 / 0	11.90	9.26	21.16	33.01	-11.85
1852.50	5	QPSK	H	110	301	1 / 0	15.18	9.34	24.52	33.01	-8.49
1882.50	5	QPSK	H	110	265	1 / 0	13.46	9.27	22.73	33.01	-10.28
1912.50	5	QPSK	H	110	300	1 / 0	13.13	9.26	22.39	33.01	-10.62
1852.50	5	16-QAM	H	110	301	1 / 0	13.65	9.34	22.99	33.01	-10.02
1882.50	5	16-QAM	H	110	265	1 / 0	11.70	9.27	20.97	33.01	-12.04
1912.50	5	16-QAM	H	110	300	1 / 0	11.82	9.26	21.08	33.01	-11.93
1855.00	10	QPSK	H	110	311	1 / 0	15.04	9.34	24.38	33.01	-8.63
1882.50	10	QPSK	H	110	254	1 / 0	13.40	9.27	22.67	33.01	-10.34
1910.00	10	QPSK	H	110	295	1 / 0	13.19	9.25	22.44	33.01	-10.57
1855.00	10	16-QAM	H	110	311	1 / 0	13.36	9.34	22.70	33.01	-10.31
1882.50	10	16-QAM	H	110	254	1 / 0	11.75	9.27	21.02	33.01	-11.99
1910.00	10	16-QAM	H	110	295	1 / 0	11.71	9.25	20.96	33.01	-12.05
1857.50	15	QPSK	H	110	299	1 / 74	14.41	9.33	23.74	33.01	-9.27
1882.50	15	QPSK	H	110	299	1 / 0	13.56	9.27	22.83	33.01	-10.18
1907.50	15	QPSK	H	110	301	1 / 0	12.72	9.24	21.96	33.01	-11.05
1857.50	15	16-QAM	H	110	299	1 / 74	13.16	9.33	22.49	33.01	-10.52
1882.50	15	16-QAM	H	110	299	1 / 0	12.55	9.27	21.82	33.01	-11.19
1907.50	15	16-QAM	H	110	301	1 / 0	11.93	9.24	21.17	33.01	-11.84
1860.00	20	QPSK	H	110	303	1 / 99	14.35	9.32	23.67	33.01	-9.34
1882.50	20	QPSK	H	110	289	1 / 0	13.48	9.27	22.75	33.01	-10.26
1905.00	20	QPSK	H	110	307	1 / 0	12.75	9.24	21.99	33.01	-11.02
1860.00	20	16-QAM	H	110	303	1 / 99	13.16	9.32	22.48	33.01	-10.53
1882.50	20	16-QAM	H	110	289	1 / 0	12.45	9.27	21.72	33.01	-11.29
1905.00	20	16-QAM	H	110	307	1 / 0	12.04	9.24	21.28	33.01	-11.73
1852.50	5	QPSK	V	214	274	1 / 0	12.48	9.22	21.70	33.01	-11.31

Table 7-3. EIRP Data (Band 25)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	H	257	339	1 / 0	15.23	8.60	23.83	33.01	-9.18
2593.00	5	QPSK	H	100	190	1 / 0	14.66	8.53	23.19	33.01	-9.82
2687.50	5	QPSK	H	127	346	1 / 0	14.06	8.79	22.85	33.01	-10.16
2498.50	5	16-QAM	H	257	339	1 / 0	13.72	8.60	22.32	33.01	-10.69
2593.00	5	16-QAM	H	100	190	1 / 0	12.91	8.53	21.44	33.01	-11.57
2687.50	5	16-QAM	H	127	346	1 / 0	12.59	8.79	21.38	33.01	-11.63
2501.00	10	QPSK	H	202	256	1 / 0	16.37	8.60	24.97	33.01	-8.04
2593.00	10	QPSK	H	232	357	1 / 0	15.01	8.53	23.54	33.01	-9.47
2685.00	10	QPSK	H	213	360	1 / 0	15.34	8.78	24.12	33.01	-8.89
2501.00	10	16-QAM	H	202	256	1 / 0	16.09	8.60	24.69	33.01	-8.32
2593.00	10	16-QAM	H	232	357	1 / 0	14.26	8.53	22.79	33.01	-10.22
2685.00	10	16-QAM	H	213	360	1 / 0	13.96	8.78	22.74	33.01	-10.27
2503.50	15	QPSK	H	200	261	1 / 0	16.25	8.59	24.84	33.01	-8.17
2593.00	15	QPSK	H	238	355	1 / 0	15.06	8.53	23.59	33.01	-9.42
2682.50	15	QPSK	H	205	368	1 / 0	15.31	8.77	24.08	33.01	-8.93
2503.50	15	16-QAM	H	200	261	1 / 0	16.05	8.59	24.64	33.01	-8.37
2593.00	15	16-QAM	H	238	355	1 / 0	13.93	8.53	22.46	33.01	-10.55
2682.50	15	16-QAM	H	205	368	1 / 0	13.90	8.77	22.67	33.01	-10.34
2506.00	20	QPSK	H	210	277	1 / 0	16.25	8.59	24.84	33.01	-8.17
2593.00	20	QPSK	H	245	358	1 / 0	15.06	8.53	23.59	33.01	-9.42
2680.00	20	QPSK	H	199	355	1 / 0	15.31	8.77	24.08	33.01	-8.93
2506.00	20	16-QAM	H	210	277	1 / 0	16.05	8.59	24.64	33.01	-8.37
2593.00	20	16-QAM	H	245	358	1 / 0	13.93	8.53	22.46	33.01	-10.55
2680.00	20	16-QAM	H	199	355	1 / 0	13.90	8.77	22.67	33.01	-10.34
2501.00	10	QPSK	V	266	321	1 / 0	12.69	8.60	21.29	33.01	-11.72

Table 7-4. EIRP Data (Band 41)

7.7 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(m)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

Test Setup

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

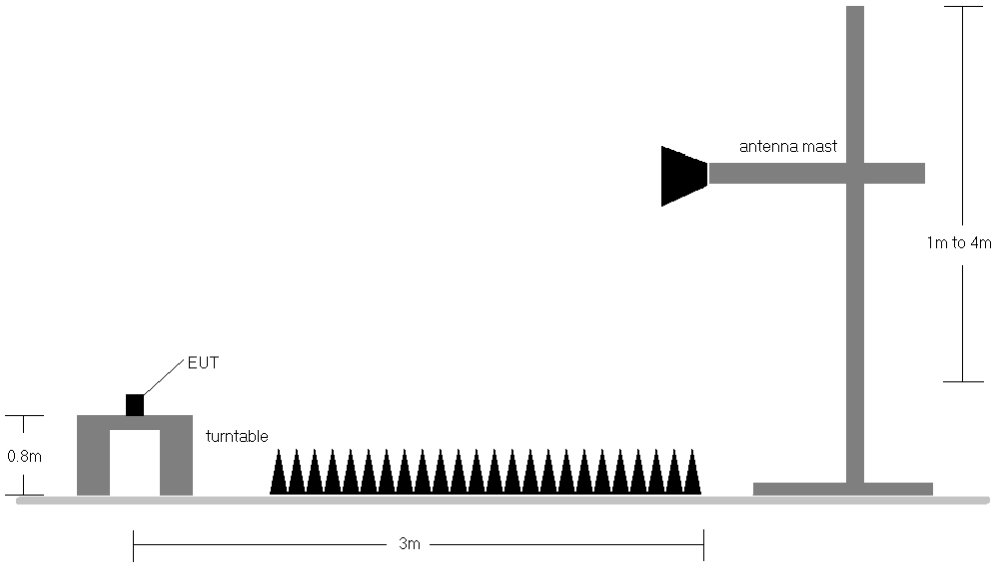


Figure 7-7. Test Instrument & Measurement Setup

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

OPERATING FREQUENCY:	826.50	MHz		
CHANNEL:	26815			
MEASURED OUTPUT POWER:	23.92	dBm	=	0.247 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	36.92	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
1653.00	H	110	10	-52.42	3.62	-48.80	72.7
2479.50	H	-	-	-52.59	3.56	-49.03	73.0
3306.00	H	-	-	-54.28	5.83	-48.45	72.4

Table 7-5. Radiated Spurious Data (Band 26 – Low Channel)

OPERATING FREQUENCY:	836.50	MHz		
CHANNEL:	26915			
MEASURED OUTPUT POWER:	24.88	dBm	=	0.307 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	37.88	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	H	110	15	-51.58	3.52	-48.06	72.9
2509.50	H	-	-	-52.45	3.59	-48.86	73.7
3346.00	H	-	-	-54.07	5.87	-48.20	73.1

Table 7-6. Radiated Spurious Data (Band 26 – Mid Channel)

OPERATING FREQUENCY:	846.50	MHz		
CHANNEL:	27015			
MEASURED OUTPUT POWER:	23.34	dBm	=	0.216 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	36.34	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.00	H	110	12	-52.96	3.42	-49.54	72.9
2539.50	H	-	-	-52.80	3.72	-49.08	72.4
3386.00	H	-	-	-54.07	5.91	-48.15	71.5

Table 7-7. Radiated Spurious Data (Band 26 – High Channel)

OPERATING FREQUENCY:	1852.50	MHz		
CHANNEL:	26065			
MEASURED OUTPUT POWER:	24.52	dBm	=	0.283 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	37.52	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3705.00	H	110	5	-40.75	8.42	-32.33	56.9
5557.50	H	-	-	-51.94	10.52	-41.42	65.9
7410.00	H	-	-	-48.10	12.01	-36.09	60.6

Table 7-8. Radiated Spurious Data (Band 25 – Low Channel)

OPERATING FREQUENCY:	1882.50	MHz		
CHANNEL:	26365			
MEASURED OUTPUT POWER:	22.73	dBm	=	0.187 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.73	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3765.00	H	110	6	-41.80	8.66	-33.14	55.9
5647.50	H	-	-	-52.30	10.62	-41.68	64.4
7530.00	H	-	-	-48.64	12.06	-36.58	59.3

Table 7-9. Radiated Spurious Data (Band 25 – Mid Channel)

OPERATING FREQUENCY:	1912.50	MHz		
CHANNEL:	26665			
MEASURED OUTPUT POWER:	22.39	dBm	=	0.173 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.39	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3825.00	H	110	358	-41.45	8.76	-32.69	55.1
5737.50	H	-	-	-52.40	10.72	-41.68	64.1
7650.00	H	-	-	-49.51	12.18	-37.34	59.7

Table 7-10. Radiated Spurious Data (Band 25 – High Channel)

OPERATING FREQUENCY:	2501.00	MHz			
CHANNEL:	39700				
MEASURED OUTPUT POWER:	24.97	dBm	=	0.314	W
MODULATION SIGNAL:	QPSK				
BANDWIDTH:	10.0	MHz			
DISTANCE:	3	meters			
LIMIT:	55 + 10 log10 (W)	49.97	dBc		

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5002.00	H	115	0	-61.84	10.14	-51.70	76.7
7503.00	H	154	0	-53.13	12.02	-41.11	66.1
10004.00	H	-	-	-61.70	13.00	-48.70	73.7

Table 7-11. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY:	2593.00	MHz			
CHANNEL:	40620				
MEASURED OUTPUT POWER:	23.54	dBm	=	0.226	W
MODULATION SIGNAL:	QPSK				
BANDWIDTH:	10.0	MHz			
DISTANCE:	3	meters			
LIMIT:	55 + 10 log10 (W)	48.54	dBc		

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5186.00	H	120	10	-49.66	10.40	-39.25	62.8
7779.00	H	129	112	-48.85	12.24	-36.61	60.2
10372.00	H	-	-	-60.49	13.13	-47.36	70.9

Table 7-12. Radiated Spurious Data (Band 41 – Mid Channel)

OPERATING FREQUENCY:	2685.00	MHz		
CHANNEL:	41540			
MEASURED OUTPUT POWER:	24.12	dBm	=	0.258 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	49.12	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5370.00	H	106	14	-66.56	10.37	-56.19	80.3
8055.00	H	104	269	-56.93	12.54	-44.39	68.5
10740.00	H	-	-	-59.65	13.00	-46.65	70.8

Table 7-13. Radiated Spurious Data (Band 41 – High Channel)

7.8 Frequency Stability / Temperature Variation

§2.1055 §22.355 §24.235 §27.54

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-D-2010. 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.

For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-D-2010

Test Settings

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

Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

Test Notes

None

Band 26 Frequency Stability Measurements

§2.1055 §22.355

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	831,499,714	-286	-0.0000344
100 %		- 30	831,500,008	8	0.0000010
100 %		- 20	831,499,851	-149	-0.0000179
100 %		- 10	831,499,915	-85	-0.0000102
100 %		0	831,500,135	135	0.0000162
100 %		+ 10	831,500,250	250	0.0000301
100 %		+ 20	831,499,723	-277	-0.0000333
100 %		+ 30	831,500,202	202	0.0000243
100 %		+ 40	831,500,321	321	0.0000386
100 %		+ 50	831,500,291	291	0.0000350
BATT. ENDPOINT	3.40	+ 20	831,500,179	179	0.0000215

Table 7-14. Frequency Stability Data (Band 26)

Band 26 Frequency Stability Measurements

§2.1055 §22.355

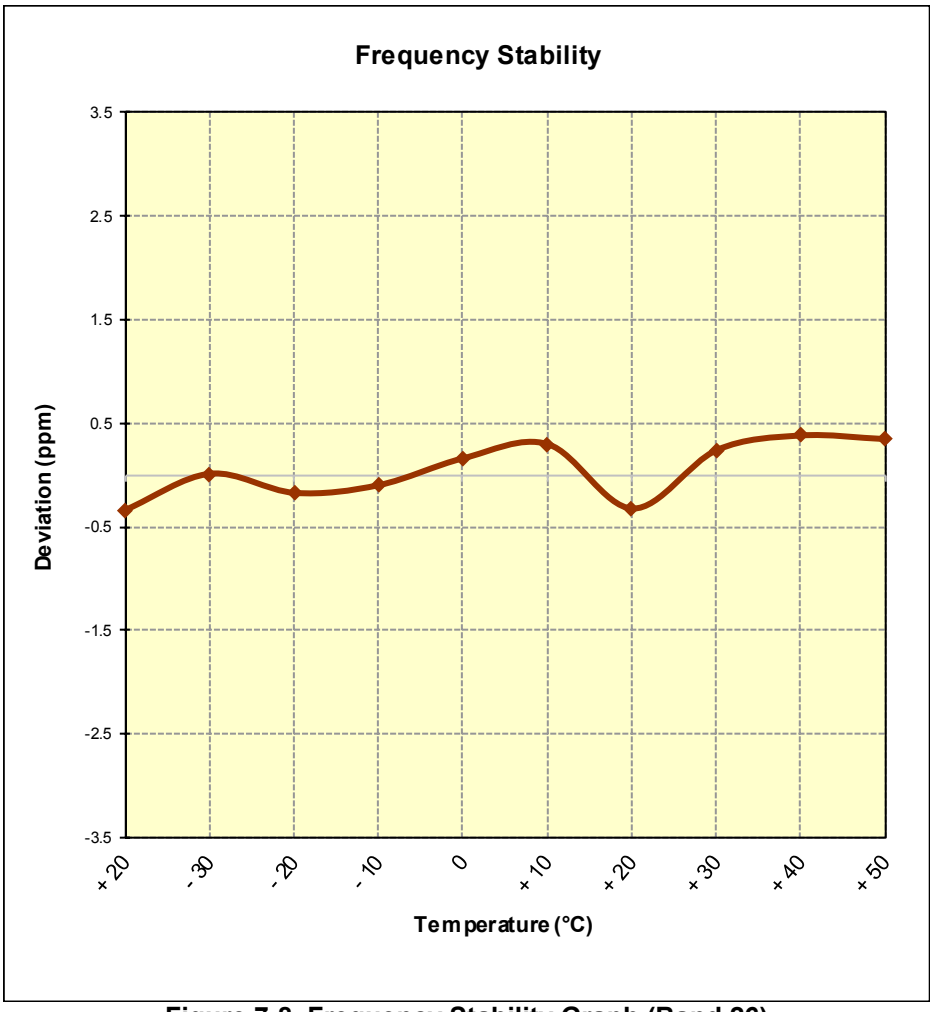


Figure 7-8. Frequency Stability Graph (Band 26)

Band 25 Frequency Stability Measurements

§2.1055 §24.235

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,882,499,944	-56	-0.0000030
100 %		- 30	1,882,500,242	242	0.0000129
100 %		- 20	1,882,499,876	-124	-0.0000066
100 %		- 10	1,882,499,922	-78	-0.0000041
100 %		0	1,882,499,935	-65	-0.0000035
100 %		+ 10	1,882,500,235	235	0.0000125
100 %		+ 20	1,882,500,278	278	0.0000148
100 %		+ 30	1,882,500,007	7	0.0000004
100 %		+ 40	1,882,500,001	1	0.0000001
100 %		+ 50	1,882,499,763	-237	-0.0000126
BATT. ENDPOINT	3.40	+ 20	1,882,499,952	-48	-0.0000025

Table 7-15. Frequency Stability Data (Band 25)

Note:

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

Band 25 Frequency Stability Measurements

§2.1055 §24.235

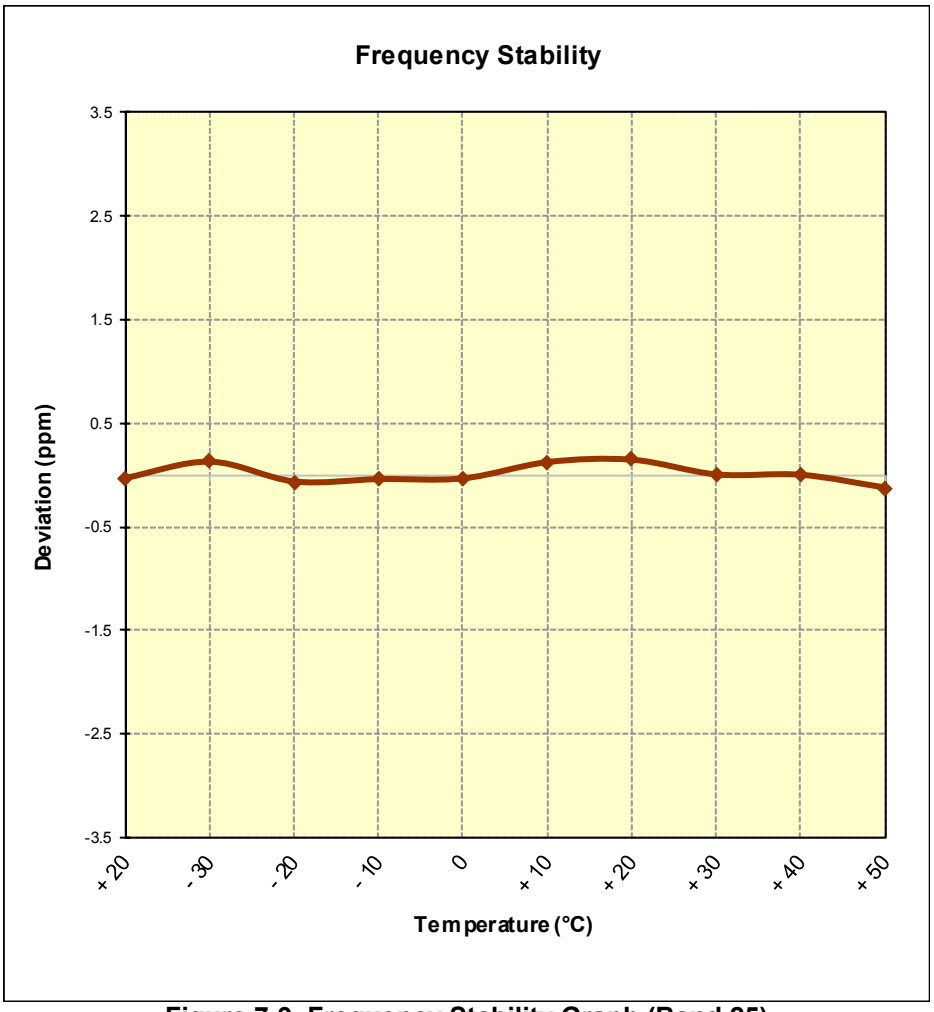


Figure 7-9. Frequency Stability Graph (Band 25)

Band 41 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	2,593,000,249	249	0.0000096
100 %		- 30	2,592,999,935	-65	-0.0000025
100 %		- 20	2,592,999,984	-16	-0.0000006
100 %		- 10	2,593,000,057	57	0.0000022
100 %		0	2,593,000,007	7	0.0000003
100 %		+ 10	2,592,999,942	-58	-0.0000022
100 %		+ 20	2,593,000,373	373	0.0000144
100 %		+ 30	2,593,000,235	235	0.0000091
100 %		+ 40	2,592,999,778	-222	-0.0000086
100 %		+ 50	2,593,000,019	19	0.0000007
BATT. ENDPOINT	3.40	+ 20	2,593,000,396	396	0.0000153

Table 7-16. Frequency Stability Data (Band 41)

Note:

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

Band 41 Frequency Stability Measurements

§2.1055 §27.54

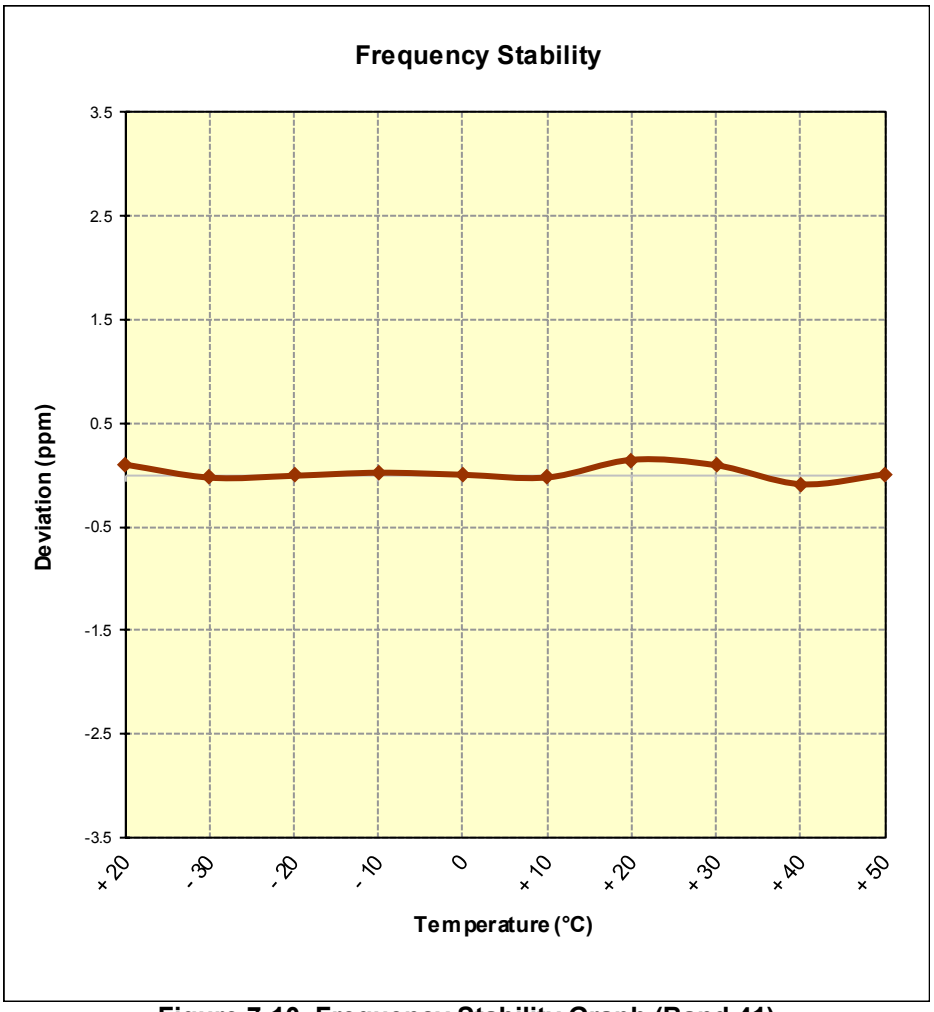


Figure 7-10. Frequency Stability Graph (Band 41)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Tablet FCC ID: A3LSMT587P** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.