



PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA

Tel. 410.290.6652 / Fax 410.290.6654

<http://www.pctestlab.com>



MEASUREMENT REPORT FCC Part 22 & 27 LTE

Applicant Name:

Samsung Electronics Co., Ltd.

129, Samsung-ro,

Yeongtong-gu, Suwon-si

Gyeonggi-do, 16677, Korea

Date of Testing:

3/5-3/24/2017

Test Site/Location:

PCTEST Lab., Columbia, MD, USA

Test Report Serial No.:

1M1703080090-03.A3L

FCC ID : A3LSCV35

APPLICANT: SAMSUNG ELECTRONICS CO., LTD.

Application Type:

Certification

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part(s):

§2; §22; §27

Test Procedure(s):

ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02, KDB 648474 D03 v01r04

EUT Type:

Portable Handset

Model:

SCV35

Test Device Serial No.:

identical prototype [S/N: D6A2B, JEUX]

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



FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset	Page 1 of 103	

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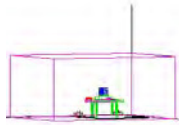
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T A B L E O F C O N T E N T S

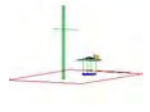
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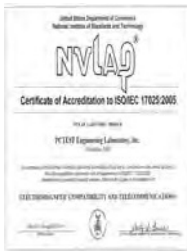
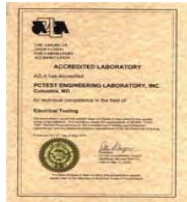


§2.1033 General Information

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; §27
BASE MODEL: SCV35
FCC ID: A3LSCV35
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
FREQUENCY TOLERANCE: $\pm 0.00025\%$ (2.5 ppm)
Test Device Serial No.: D6A2B, JEUX ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST: 3/5-3/24/2017
TEST REPORT S/N: 1M1703080090-03.A3L

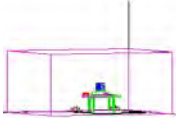
Test Facility / Accreditations

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



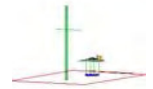
- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards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

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Mode	FCC Rule Part	Tx Frequency (MHz)	ERP/EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
LTE Band 17	27	706.5 - 713.5	0.068	18.33	4M48G7D	QPSK
LTE Band 17	27	706.5 - 713.5	0.055	17.43	4M49W7D	16QAM
LTE Band 17	27	706.5 - 713.5	0.044	16.47	4M50W7D	64QAM
LTE Band 17	27	709 - 711	0.066	18.23	8M98G7D	QPSK
LTE Band 17	27	709 - 711	0.053	17.27	8M95W7D	16QAM
LTE Band 17	27	709 - 711	0.043	16.32	8M97W7D	64QAM
LTE Band 13	27	779.5 - 784.5	0.042	16.27	4M51G7D	QPSK
LTE Band 13	27	779.5 - 784.5	0.036	15.58	4M50W7D	16QAM
LTE Band 13	27	779.5 - 784.5	0.028	14.49	4M50W7D	64QAM
LTE Band 13	27	782	0.043	16.34	9M00G7D	QPSK
LTE Band 13	27	782	0.035	15.42	8M95W7D	16QAM
LTE Band 13	27	782	0.028	14.54	8M95W7D	64QAM
LTE Band 5/26	22H	824.7 - 848.3	0.054	17.33	1M11G7D	QPSK
LTE Band 5/26	22H	824.7 - 848.3	0.043	16.34	1M11W7D	16QAM
LTE Band 5/26	22H	824.7 - 848.3	0.035	15.47	1M11W7D	64QAM
LTE Band 5/26	22H	825.5 - 847.5	0.055	17.40	2M71G7D	QPSK
LTE Band 5/26	22H	825.5 - 847.5	0.044	16.42	2M71W7D	16QAM
LTE Band 5/26	22H	825.5 - 847.5	0.034	15.35	2M71W7D	64QAM
LTE Band 5/26	22H	826.5 - 846.5	0.058	17.67	4M49G7D	QPSK
LTE Band 5/26	22H	826.5 - 846.5	0.047	16.74	4M49W7D	16QAM
LTE Band 5/26	22H	826.5 - 846.5	0.039	15.88	4M50W7D	64QAM
LTE Band 5/26	22H	829 - 844	0.062	17.92	8M97G7D	QPSK
LTE Band 5/26	22H	829 - 844	0.050	16.99	8M96W7D	16QAM
LTE Band 5/26	22H	829 - 844	0.038	15.77	8M96W7D	64QAM
LTE Band 26	22H	831.5 - 841.5	0.057	17.59	13M5G7D	QPSK
LTE Band 26	22H	831.5 - 841.5	0.046	16.64	13M4W7D	16QAM
LTE Band 26	22H	831.5 - 841.5	0.037	15.68	13M4W7D	64QAM
LTE Band 41	27	2498.5 - 2687.5	0.146	21.63	4M49G7D	QPSK
LTE Band 41	27	2498.5 - 2687.5	0.115	20.61	4M50W7D	16QAM
LTE Band 41	27	2498.5 - 2687.5	0.063	18.01	4M49W7D	64QAM
LTE Band 41	27	2501 - 2685	0.153	21.85	8M97G7D	QPSK
LTE Band 41	27	2501 - 2685	0.119	20.76	8M99W7D	16QAM
LTE Band 41	27	2501 - 2685	0.074	18.67	8M95W7D	64QAM
LTE Band 41	27	2503.5 - 2682.5	0.153	21.83	13M4G7D	QPSK
LTE Band 41	27	2503.5 - 2682.5	0.121	20.84	13M5W7D	16QAM
LTE Band 41	27	2503.5 - 2682.5	0.066	18.20	13M4W7D	64QAM
LTE Band 41	27	2506 - 2680	0.149	21.74	18M0G7D	QPSK
LTE Band 41	27	2506 - 2680	0.118	20.73	17M9W7D	16QAM
LTE Band 41	27	2506 - 2680	0.070	18.45	17M9W7D	64QAM

EUT Overview

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Intern't'l (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2014 on January 22, 2015.

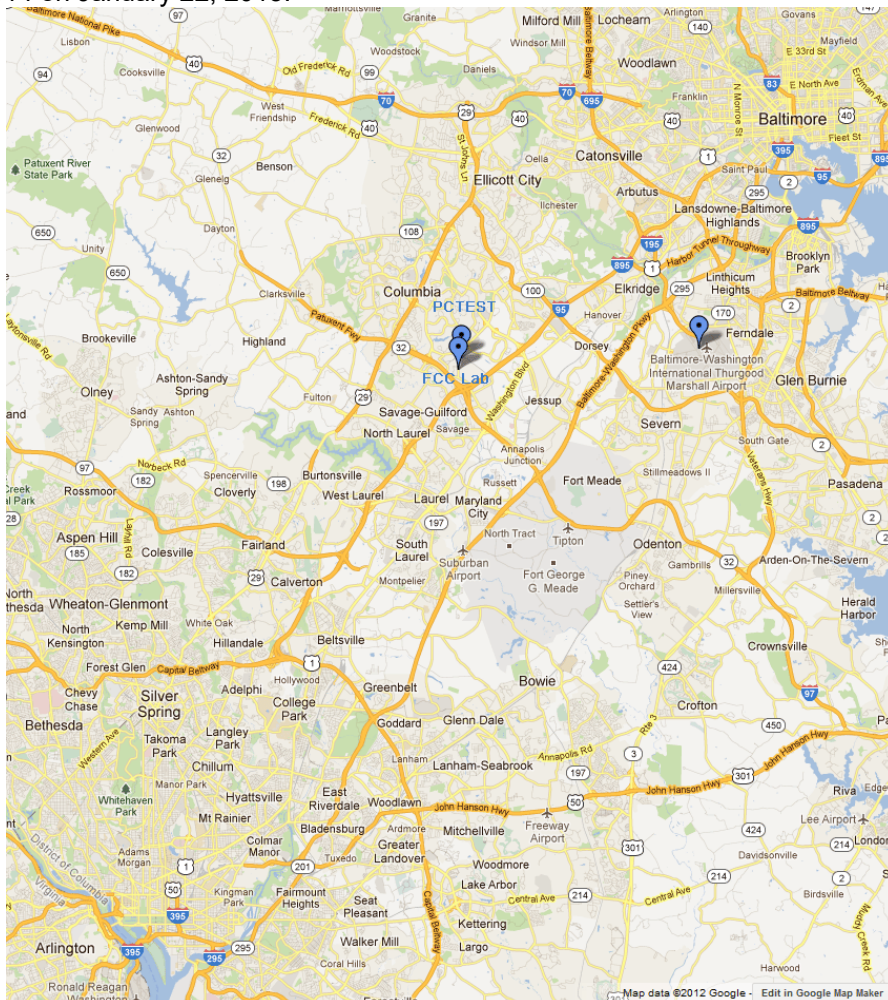


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSCV35**. 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 GSM/GPRS/EDGE, 850 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac
UNII, Bluetooth (1x, EDR, LE), NFC, ANT+

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

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

2.3 Test Configuration

The EUT 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.

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

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The measurement procedures described in the document titled “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-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 EUT.

3.1 Block C Frequency Range

§27.5(b)(3)

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

3.2 Block A Frequency Range

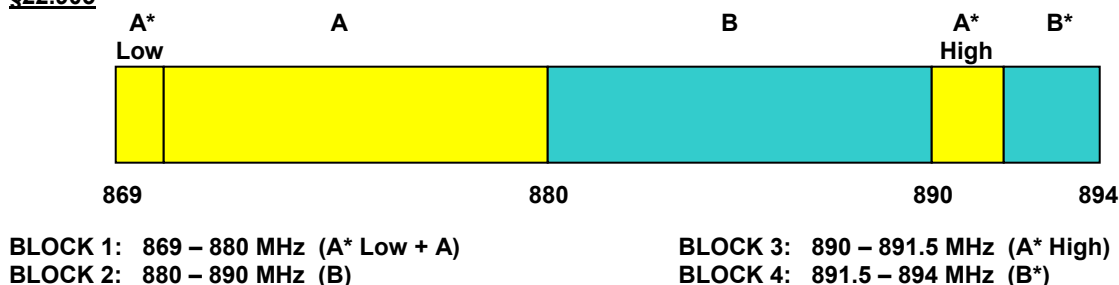
§27.5(c)

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

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

3.3 Cellular - Base Frequency Blocks

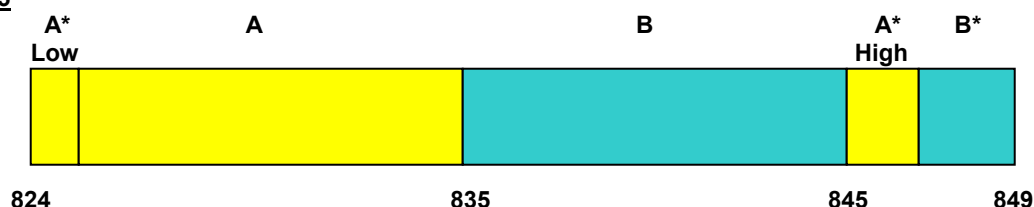
§22.905



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3.4 Cellular - Mobile Frequency Blocks

§22.905



BLOCK 1: 824 – 835 MHz (A* Low + A)

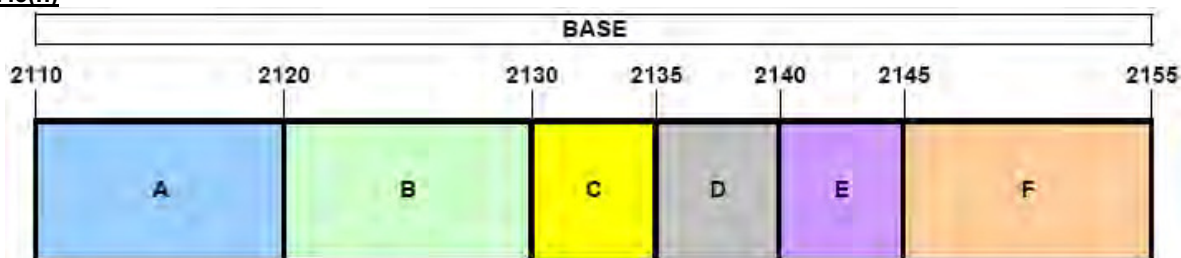
BLOCK 2: 835 – 845 MHz (B)

BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 4: 846.5 – 849 MHz (B*)

3.5 AWS - Base Frequency Blocks

§27.5(h)



BLOCK 1: 2110 – 2120 MHz (A)

BLOCK 2: 2120 – 2130 MHz (B)

BLOCK 3: 2130 – 2135 MHz (C)

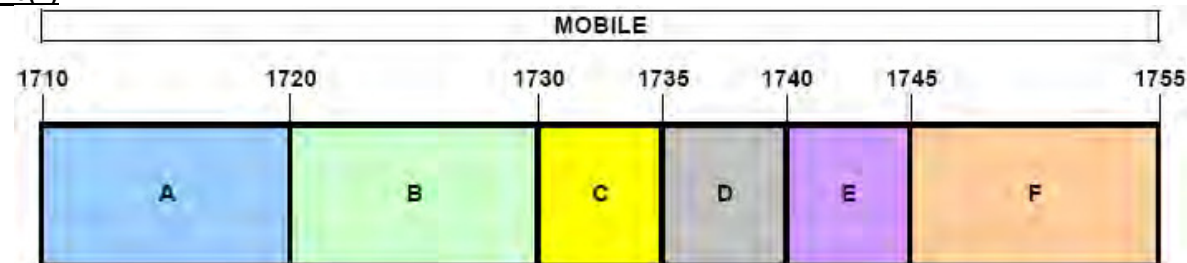
BLOCK 4: 2135 – 2140 MHz (D)

BLOCK 5: 2140 – 2145 MHz (E)

BLOCK 6: 2145 – 2155 MHz (F)

3.6 AWS - Mobile Frequency Blocks

§27.5(h)



BLOCK 1: 1710 – 1720 MHz (A)

BLOCK 2: 1720 – 1730 MHz (B)

BLOCK 3: 1730 – 1735 MHz (C)

BLOCK 4: 1735 – 1740 MHz (D)

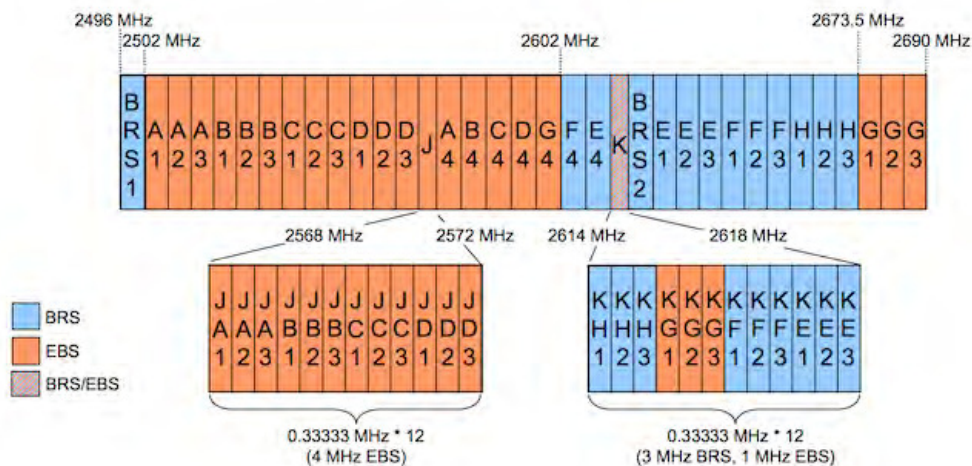
BLOCK 5: 1740 – 1745 MHz (E)

BLOCK 6: 1745 – 1755 MHz (F)

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3.7 BRS/EBS Frequency Block

§27.5



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3.8 Radiated Power and Radiated Spurious Emissions

§2.1053 §22.913(a.2) §22.917(a) §27.50(b.10) §27.50(c.10) §27.50(d.4) §27.53(f) §27.53(g) §27.53(h) §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:

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

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

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

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2006.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx3	Licensed Transmitter Cable Set	7/12/2016	Annual	7/12/2017	N/A
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/11/2016	Annual	7/11/2017	RE1
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/27/2016	Annual	3/27/2017	MY52350166
Anritsu	MT8820C	Radio Communication Analyzer	4/14/2016	Annual	4/14/2017	6201240328
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	7/6/2016	Annual	7/6/2017	441119
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
Espec	ESX-2CA	Environmental Chamber	4/4/2016	Annual	4/4/2017	17620
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	8/28/2016	Biennial	8/28/2018	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128338
K & L	11SH10-3075/U18000	High Pass Filter	7/11/2016	Annual	7/11/2017	11SH10-3075/U18000-2
K & L	13SH10-1000/U1000	N Type High Pass Filter	7/6/2016	Annual	7/6/2017	13SH10-1000/U1000-1
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	4/4/2016	Annual	4/4/2017	11210140001
Mini-Circuits	SSG-4000HP	USB Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	TVA-11-422	RF Power Amp	N/A			QA1303002
PCTEST	-	EMC Switch System	7/11/2016	Annual	7/11/2017	NM1
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rohde & Schwarz	CMW500	Radio Communication Tester	10/20/2016	Annual	10/20/2017	100976
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
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	4/7/2016	Annual	4/7/2017	100040
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	3/30/2016	Biennial	3/30/2018	9105-2404
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:

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

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6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

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 analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

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7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSCV35
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.2
2.1051 22.917(a) 27.53(c) 27.53(g) 27.53(h)	Out of Band Emissions	$> 43 + 10\log_{10} (P[\text{Watts}])$ at Band Edge and for all out-of-band emissions		PASS	Section 7.3, 7.4
27.53(m)	Out of Band Emissions	$> 43 + 10\log_{10} (P[\text{Watts}])$ at channel edges and $> 55 + 10\log_{10} (P[\text{Watts}])$ at 5.5MHz away and beyond channel edges		PASS	Section 7.3, 7.4
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
2.1055. 22.355 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)		PASS	Section 7.9
22.913(a.2)	Effective Radiated Power (Band 5, 26)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.6
27.50(b.10) 27.50(c.10)	Effective Radiated Power (Band 13, 17)	< 3 Watts max. ERP		PASS	Section 7.6
27.50(h.2)	Equivalent Isotropic Radiated Power (Band 41)	< 2 Watts max. EIRP		PASS	Section 7.6
2.1053 22.917(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions (Band 5, 17, 26)	$> 43 + 10\log_{10} (P[\text{Watts}])$ for all out-of-band emissions		PASS	Section 7.7
27.53(f)	Undesirable Emissions (Band 13)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 – 1610 MHz		PASS	Section 7.7
27.53(m)	Undesirable Emissions (Band 41)	$> 43 + 10\log_{10} (P[\text{Watts}])$ at channel edges $> 55 + 10\log_{10} (P[\text{Watts}])$ 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) 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 4.5.

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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 $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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

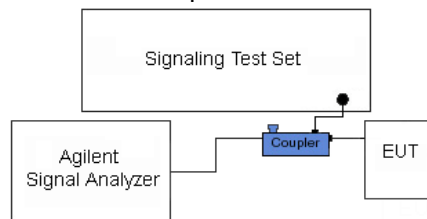
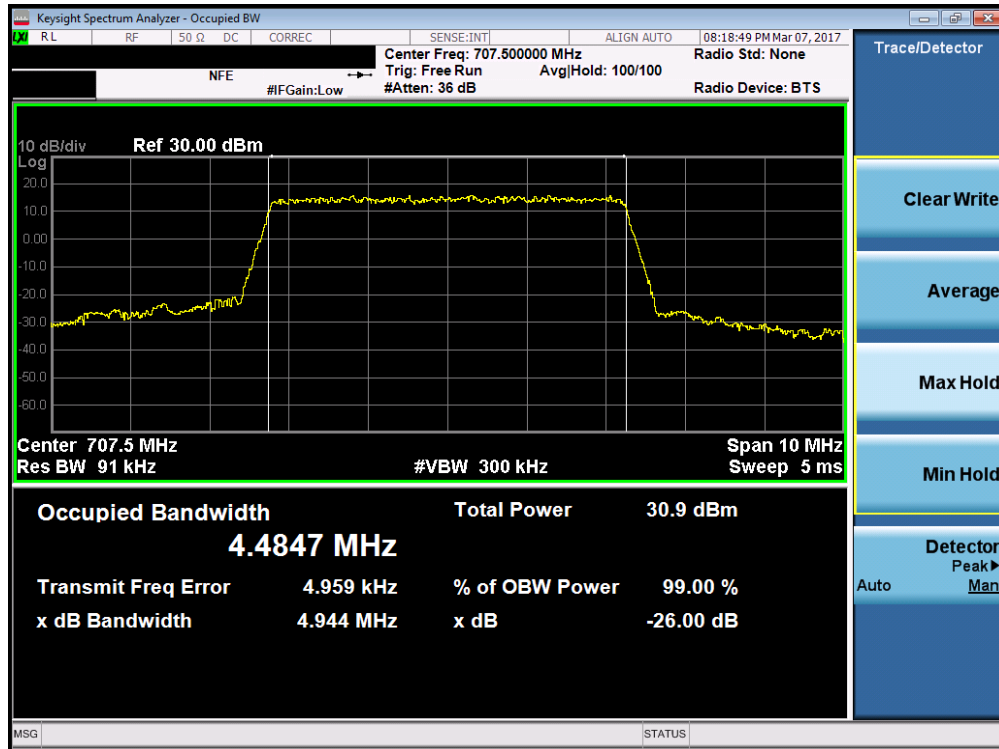


Figure 7-1. Test Instrument & Measurement Setup

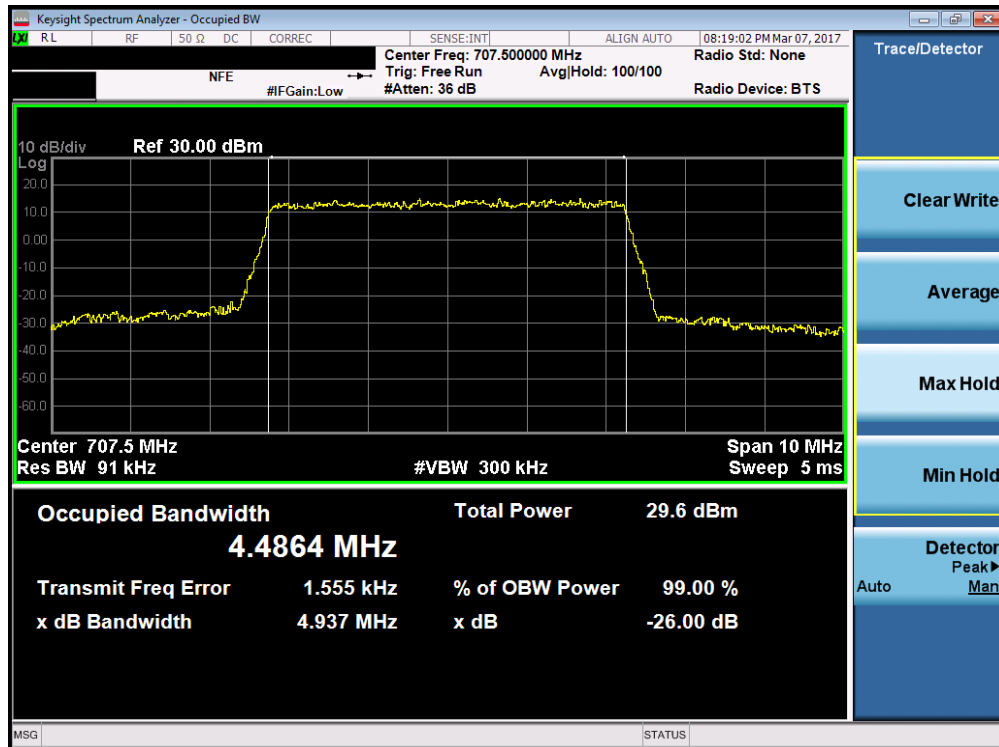
Test Notes

None.

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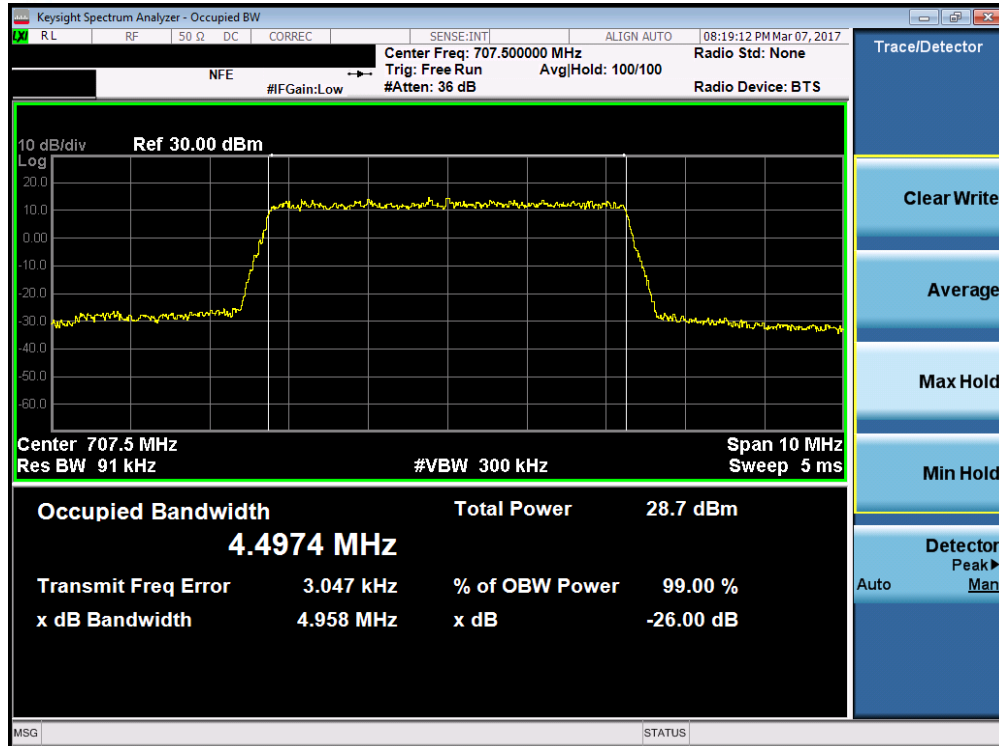


Plot 7-1. Occupied Bandwidth Plot (Band 17 – 5.0MHz QPSK – RB Size 25)

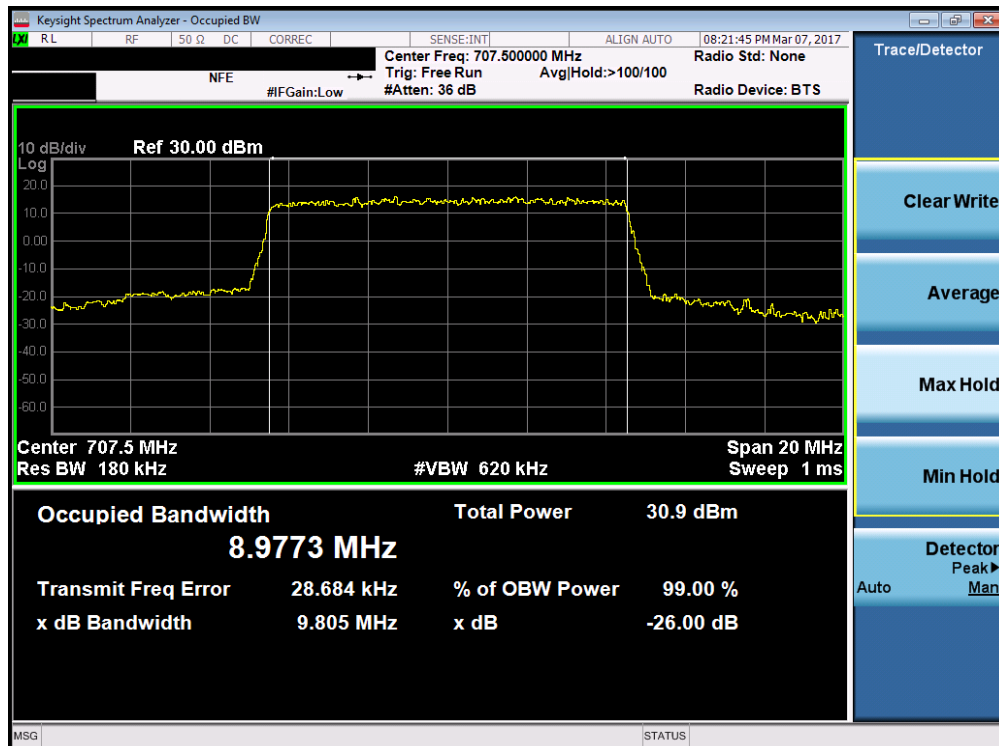


Plot 7-2. Occupied Bandwidth Plot (Band 17 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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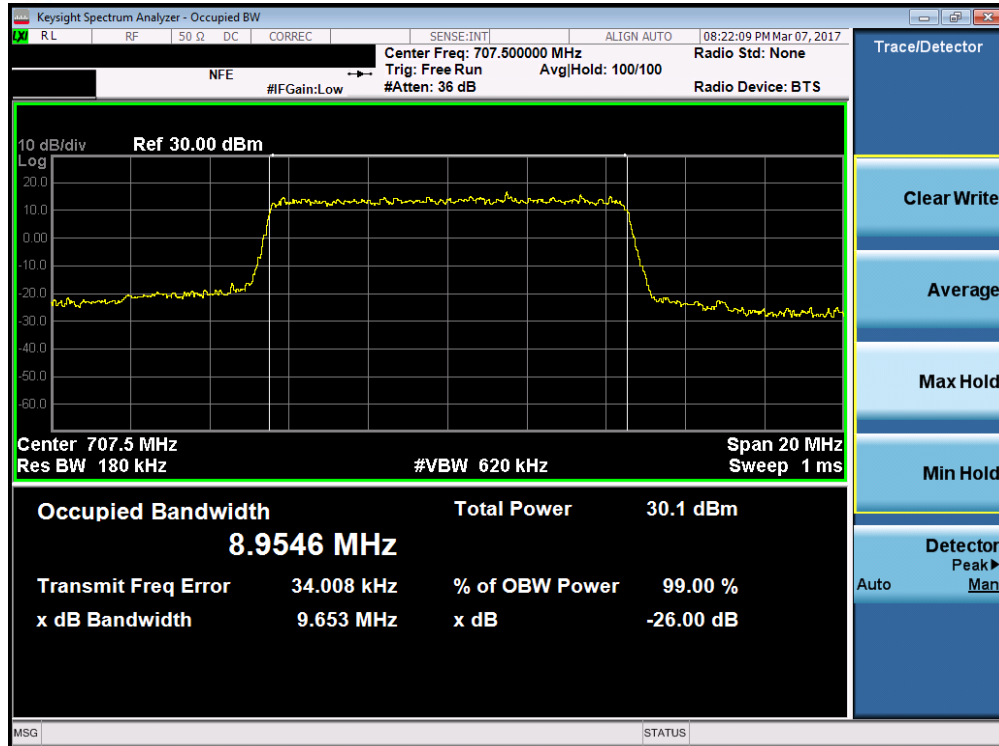


Plot 7-3. Occupied Bandwidth Plot (Band 17 – 5.0MHz 64-QAM – RB Size 25)

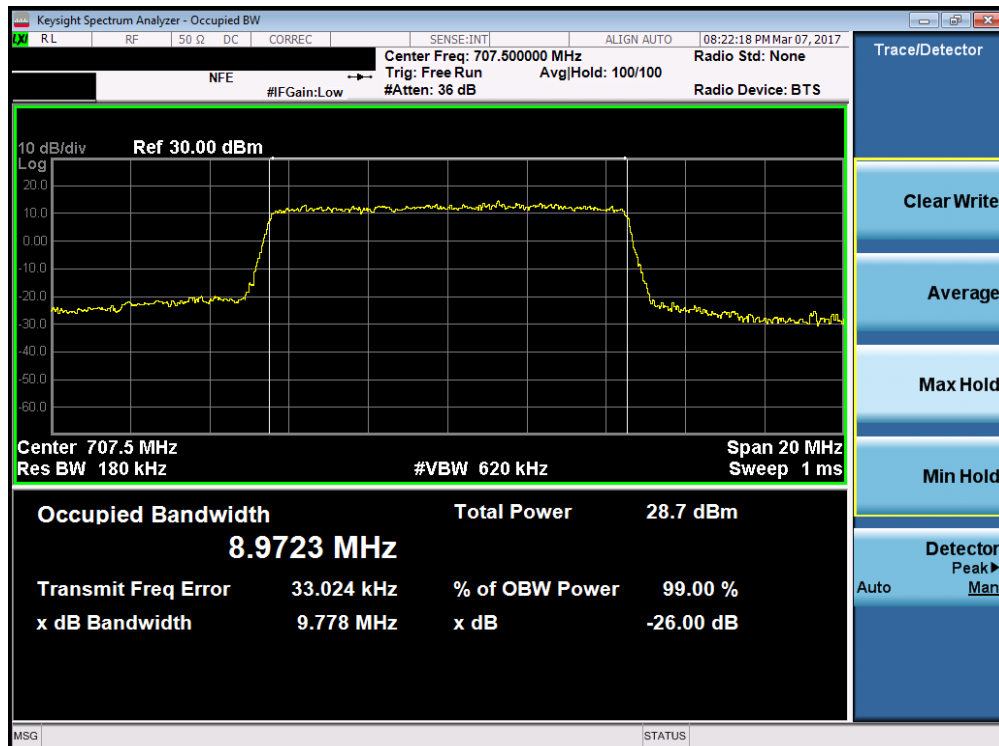


Plot 7-4. Occupied Bandwidth Plot (Band 17 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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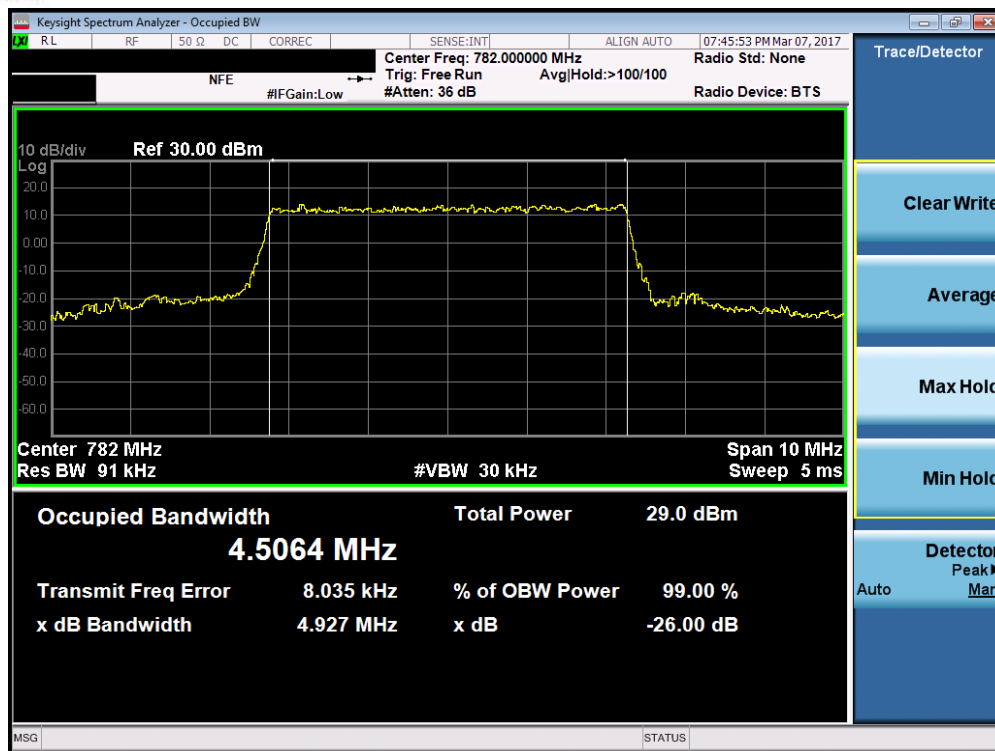


Plot 7-5. Occupied Bandwidth Plot (Band 17 – 10.0MHz 16-QAM – RB Size 50)

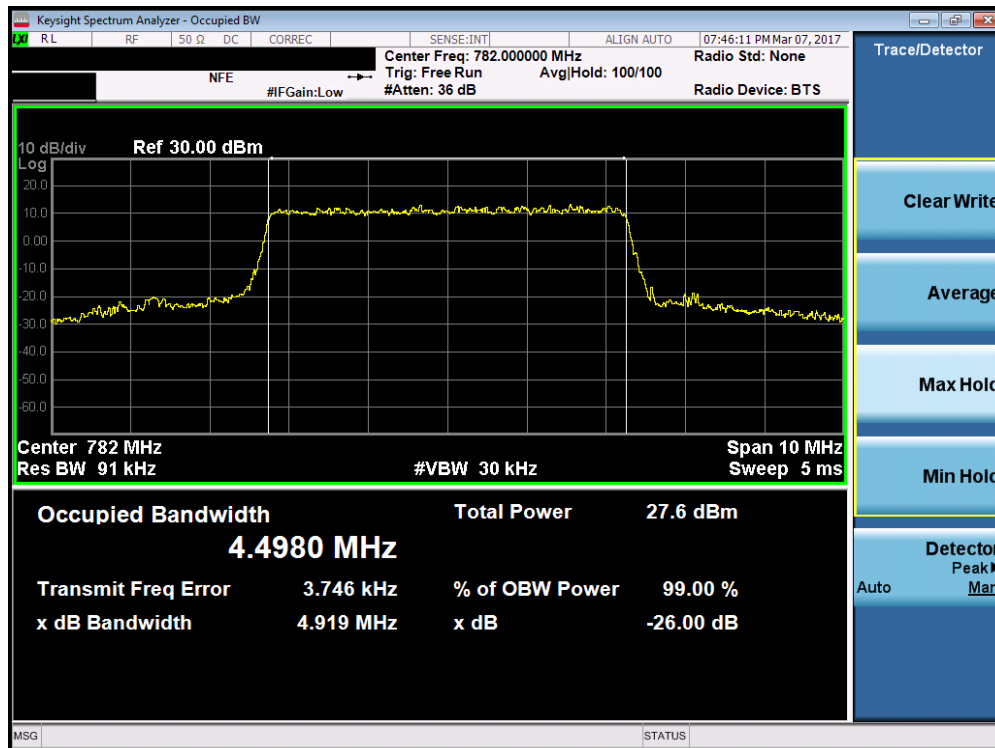


Plot 7-6. Occupied Bandwidth Plot (Band 17 – 10.0MHz 64-QAM – RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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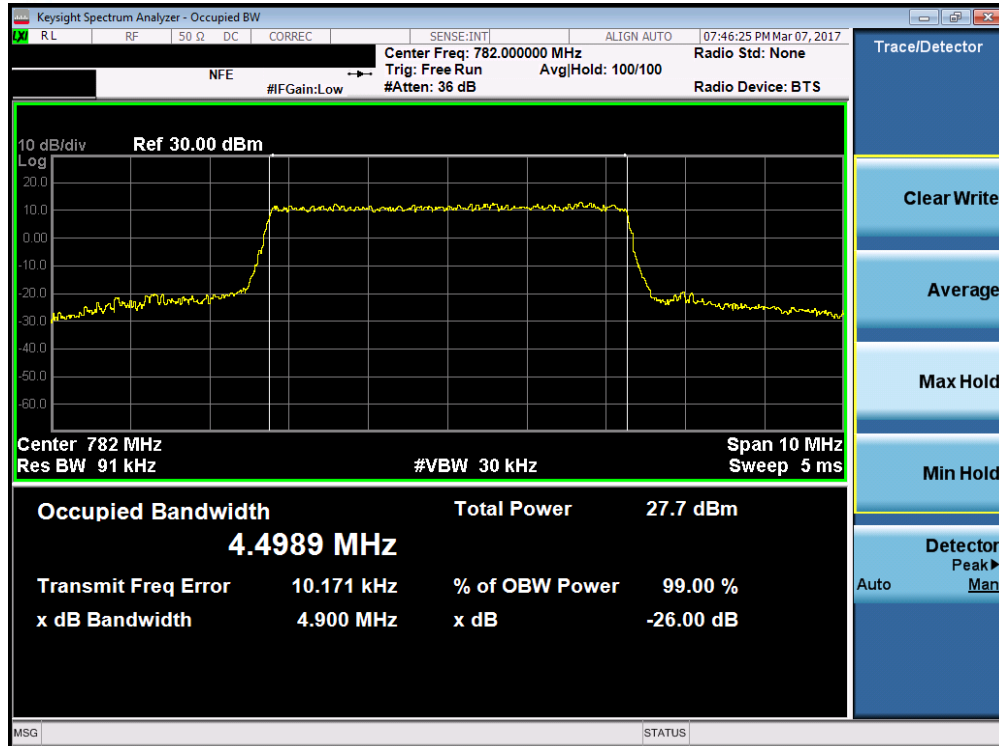


Plot 7-7. Occupied Bandwidth Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

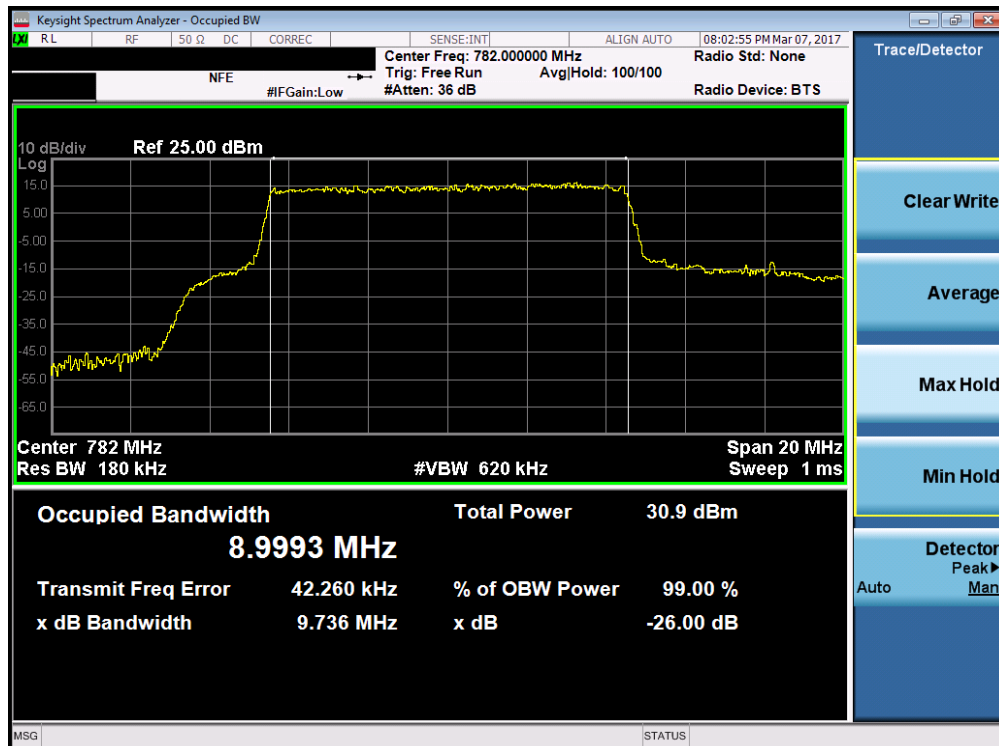


Plot 7-8. Occupied Bandwidth Plot (Band 13 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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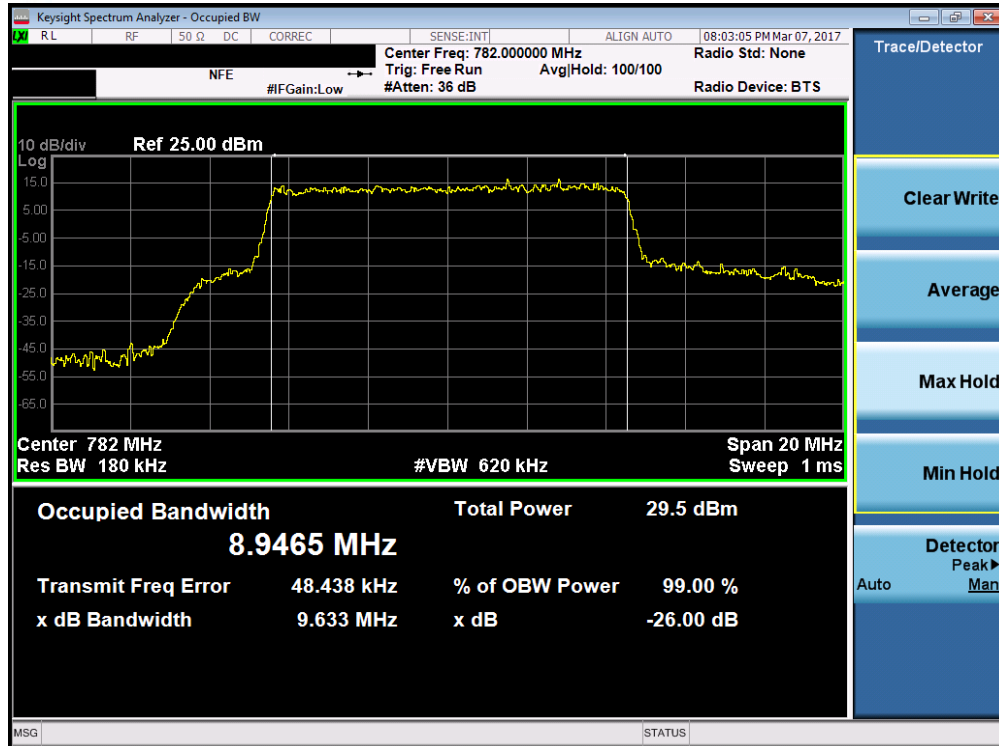


Plot 7-9. Occupied Bandwidth Plot (Band 13 – 5.0MHz 64-QAM – RB Size 25)

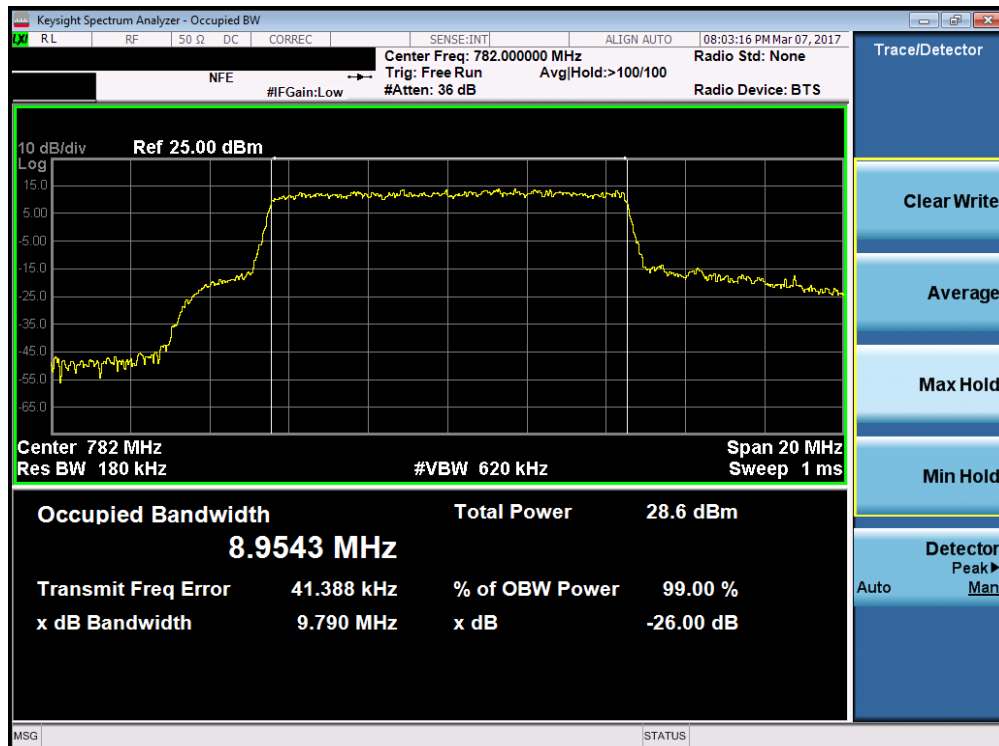


Plot 7-10. Occupied Bandwidth Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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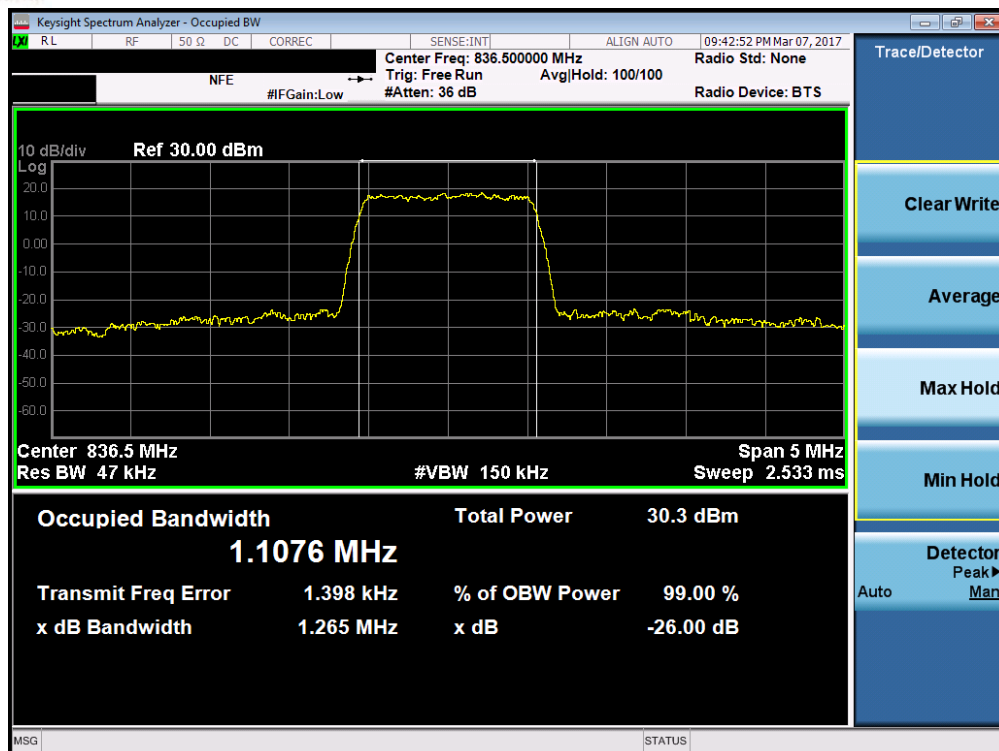


Plot 7-11. Occupied Bandwidth Plot (Band 13 – 10.0MHz 16-QAM – RB Size 50)

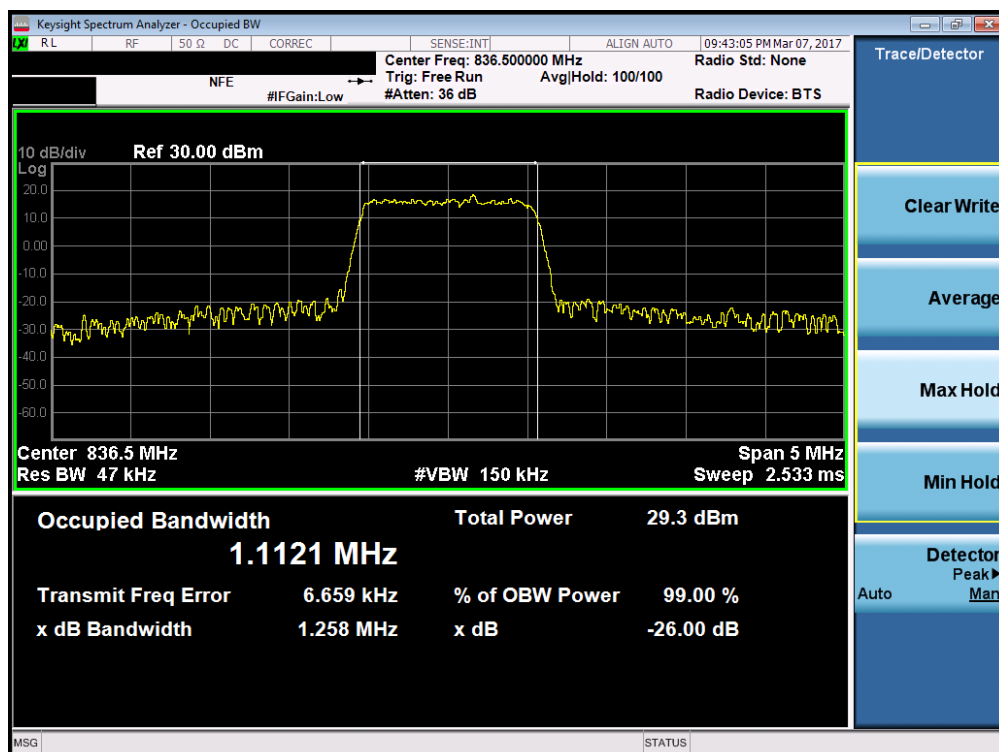


Plot 7-12. Occupied Bandwidth Plot (Band 13 – 10.0MHz 64-QAM – RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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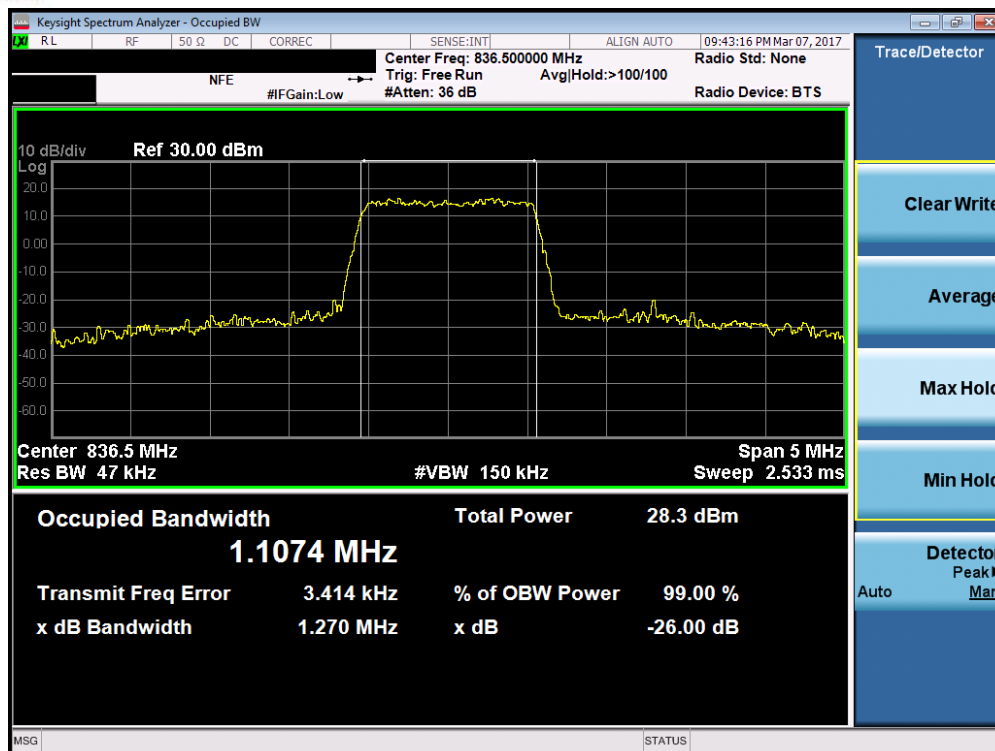


Plot 7-13. Occupied Bandwidth Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)

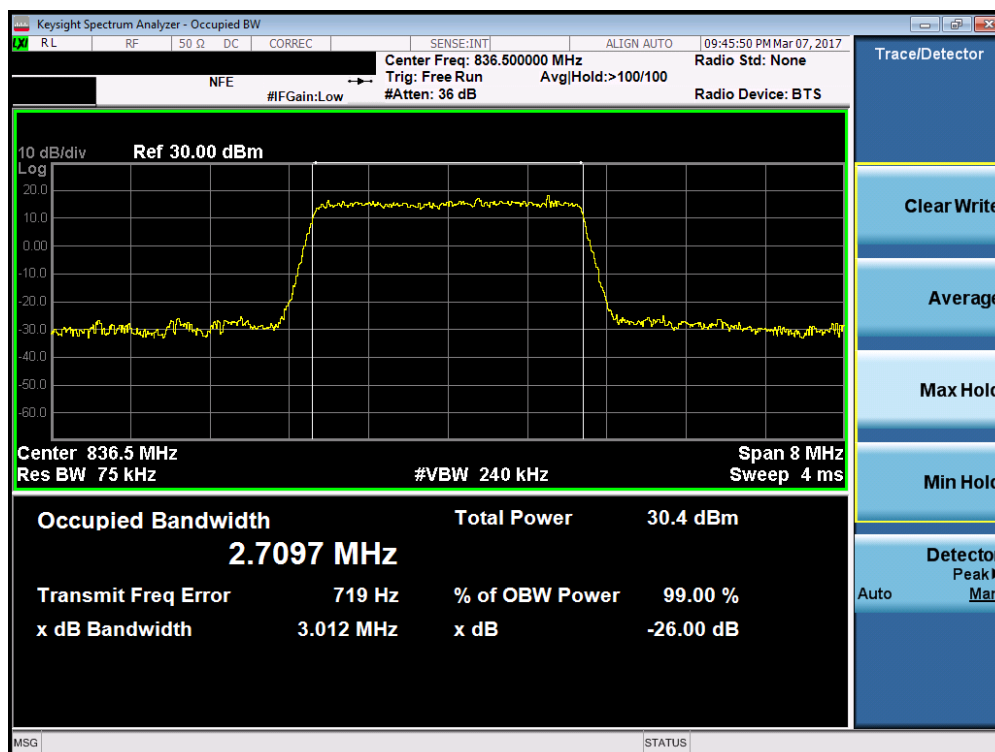


Plot 7-14. Occupied Bandwidth Plot (Band 5/26 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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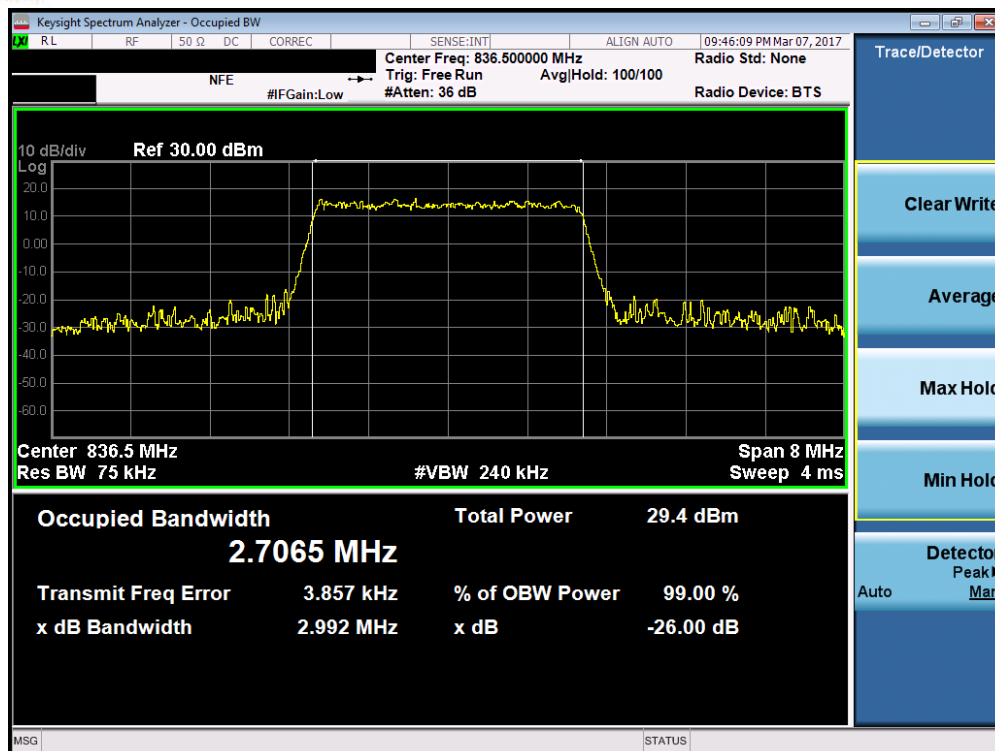


Plot 7-15. Occupied Bandwidth Plot (Band 5/26 – 1.4MHz 64-QAM – RB Size 6)

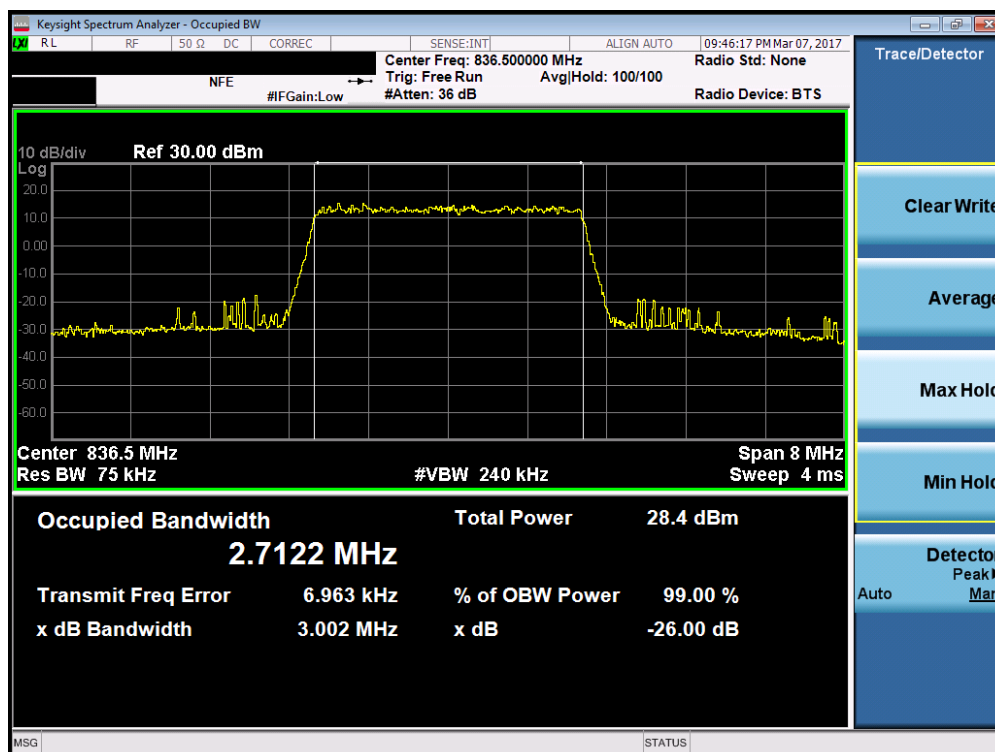


Plot 7-16. Occupied Bandwidth Plot (Band 5/26 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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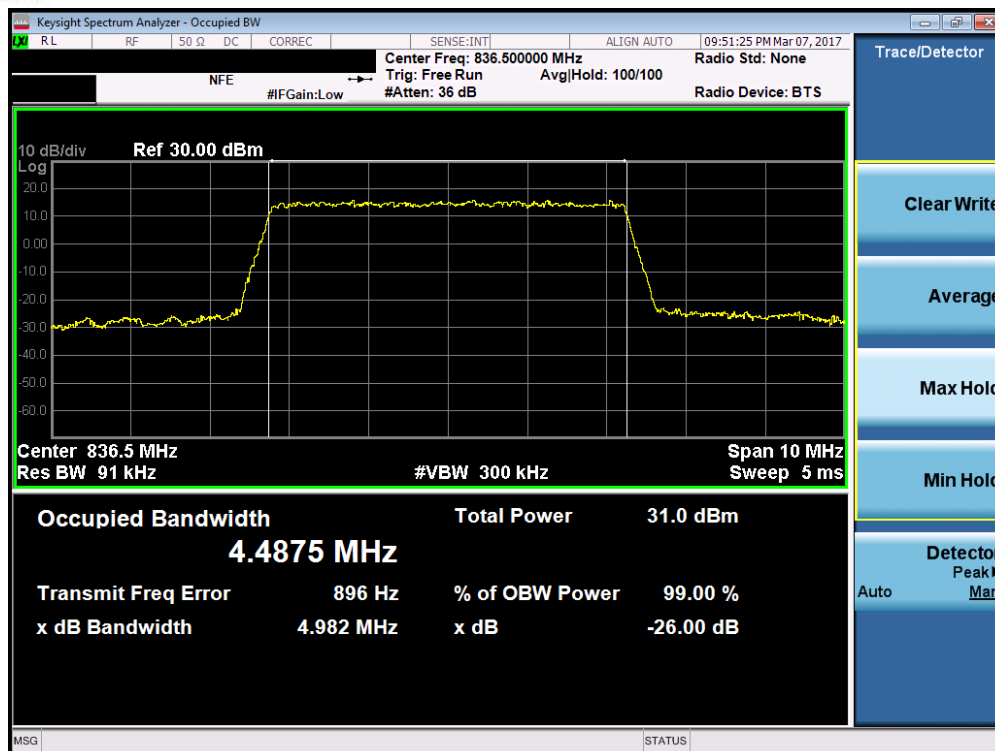


Plot 7-17. Occupied Bandwidth Plot (Band 5/26 – 3.0MHz 16-QAM – RB Size 15)

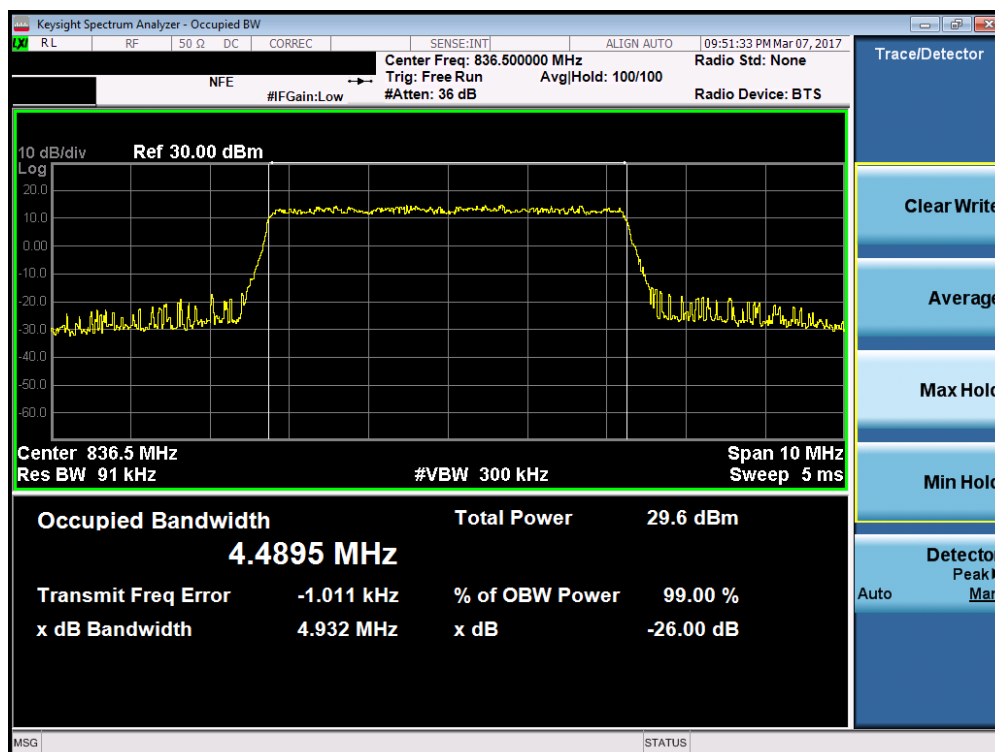


Plot 7-18. Occupied Bandwidth Plot (Band 5/26 – 3.0MHz 64-QAM – RB Size 15)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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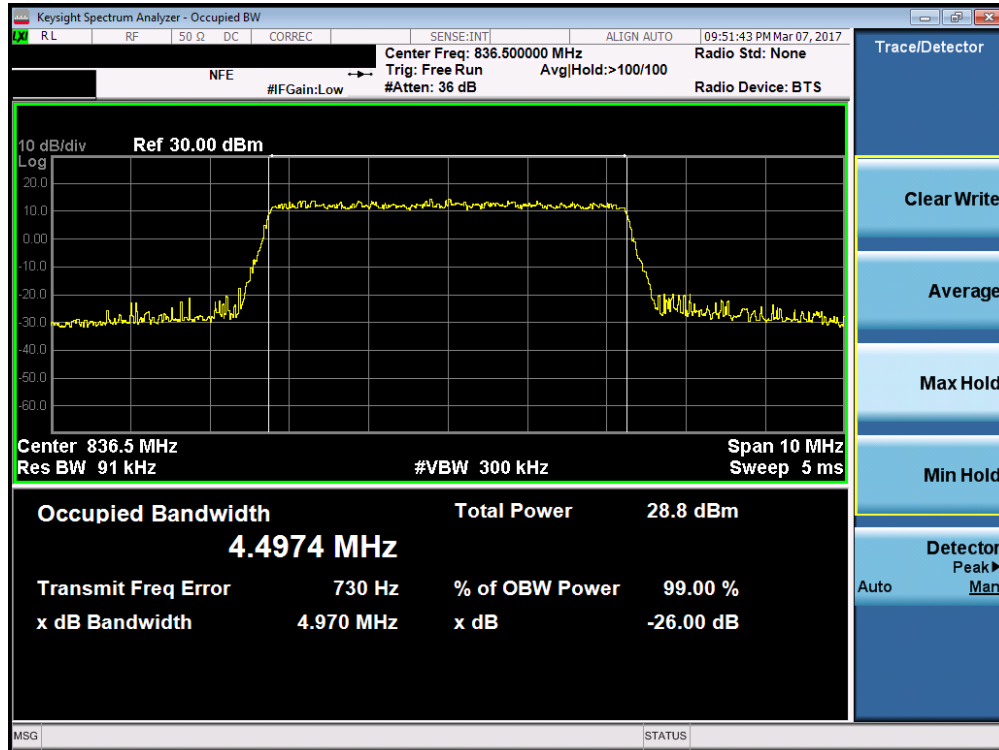


Plot 7-19. Occupied Bandwidth Plot (Band 5/26 - 5.0MHz QPSK - RB Size 25)



Plot 7-20. Occupied Bandwidth Plot (Band 5/26 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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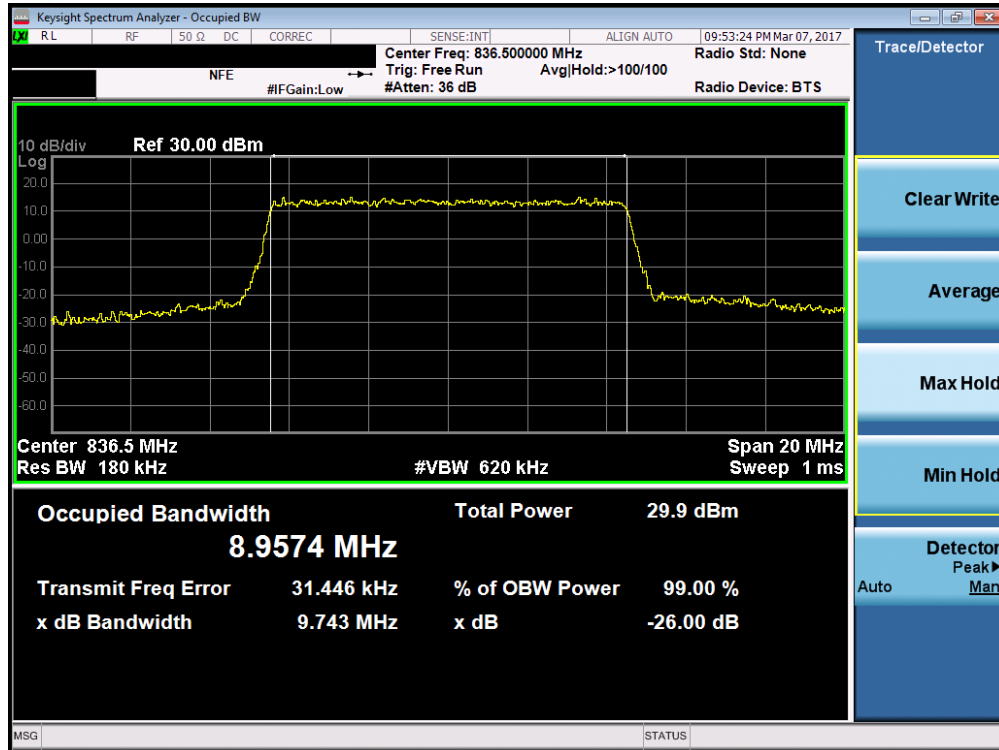


Plot 7-21. Occupied Bandwidth Plot (Band 5/26 - 5.0MHz 64-QAM - RB Size 25)

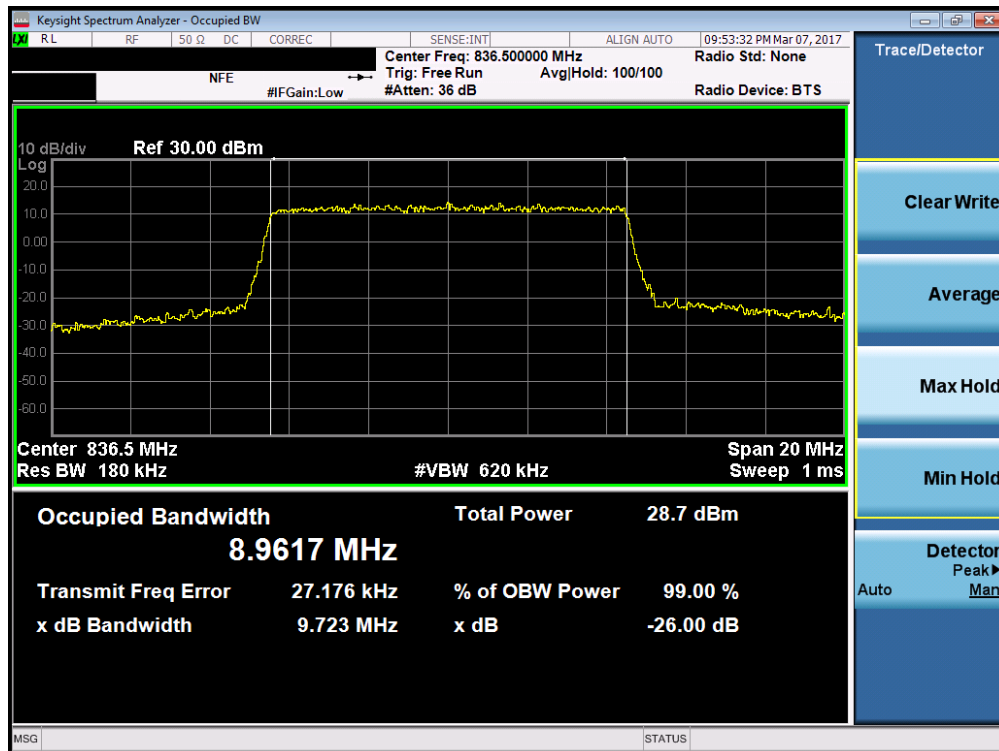


Plot 7-22. Occupied Bandwidth Plot (Band 5/26 - 10.0MHz QPSK - RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 26 of 103

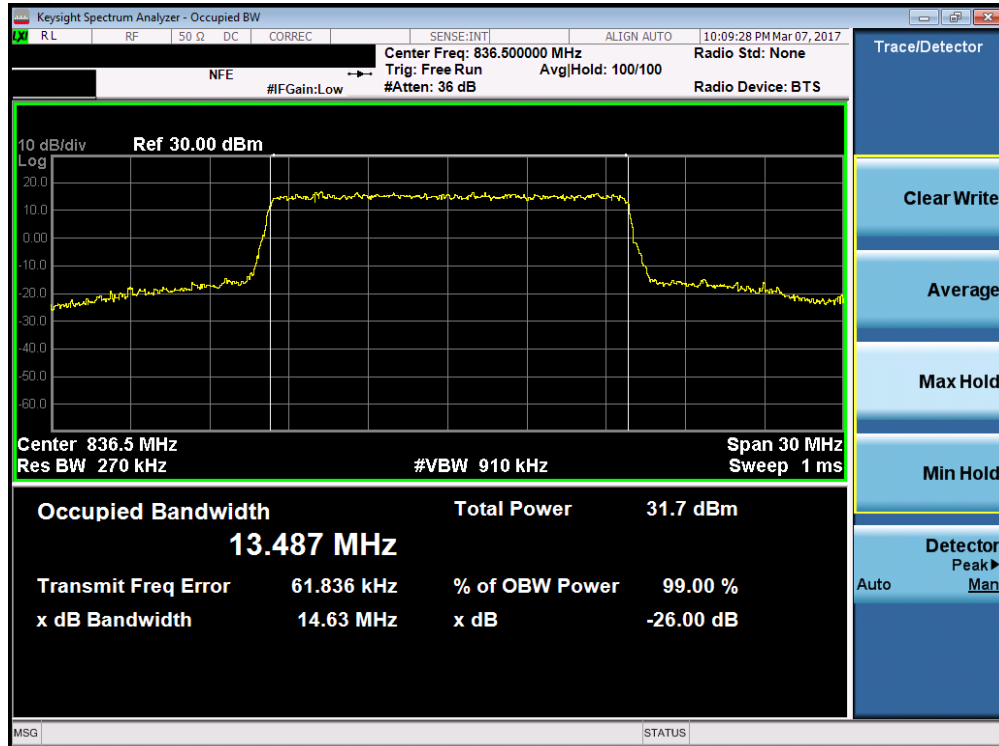


Plot 7-23. Occupied Bandwidth Plot (Band 5/26 – 10.0MHz 16-QAM – RB Size 50)

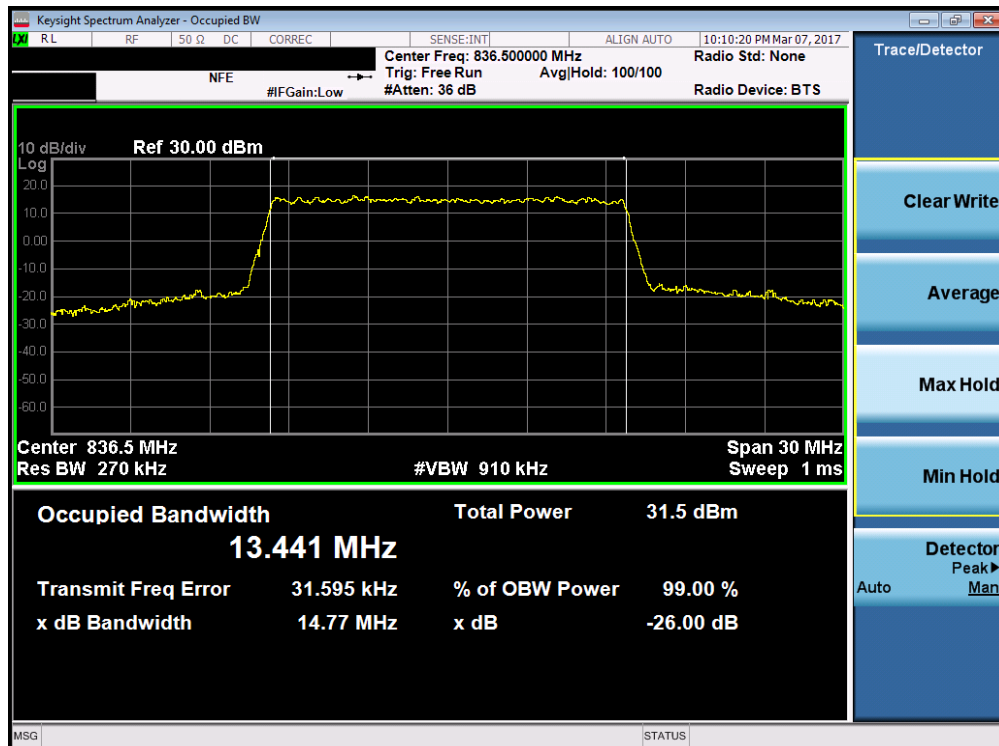


Plot 7-24. Occupied Bandwidth Plot (Band 5/26 – 10.0MHz 64-QAM – RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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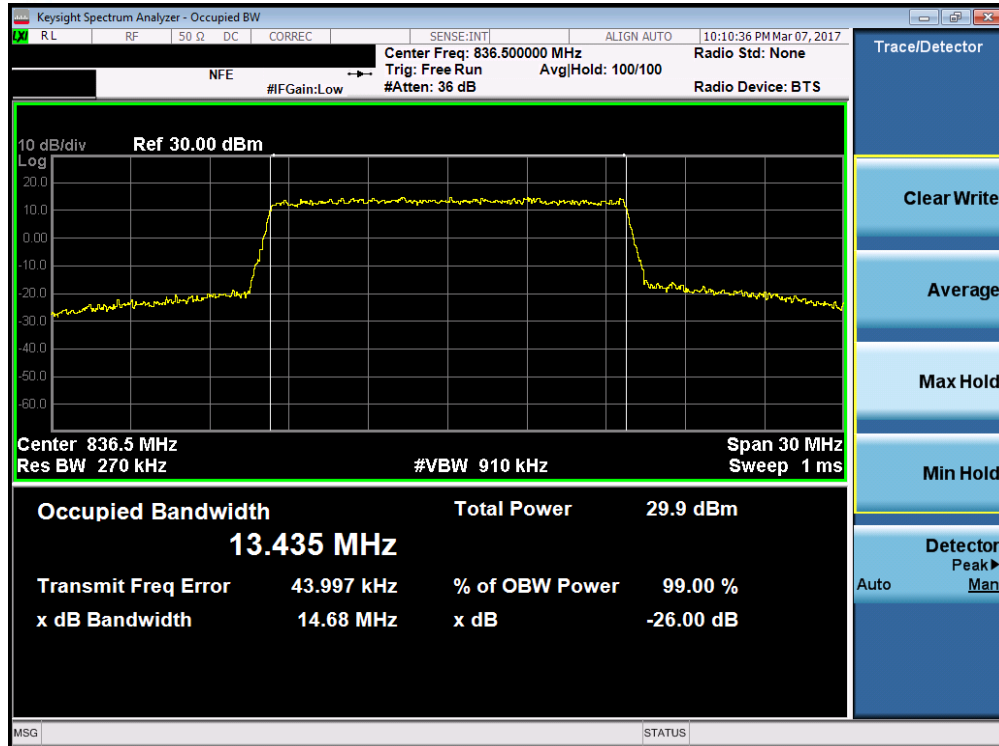


Plot 7-25. Occupied Bandwidth Plot (Band 26 – 15.0MHz QPSK – RB Size 75)

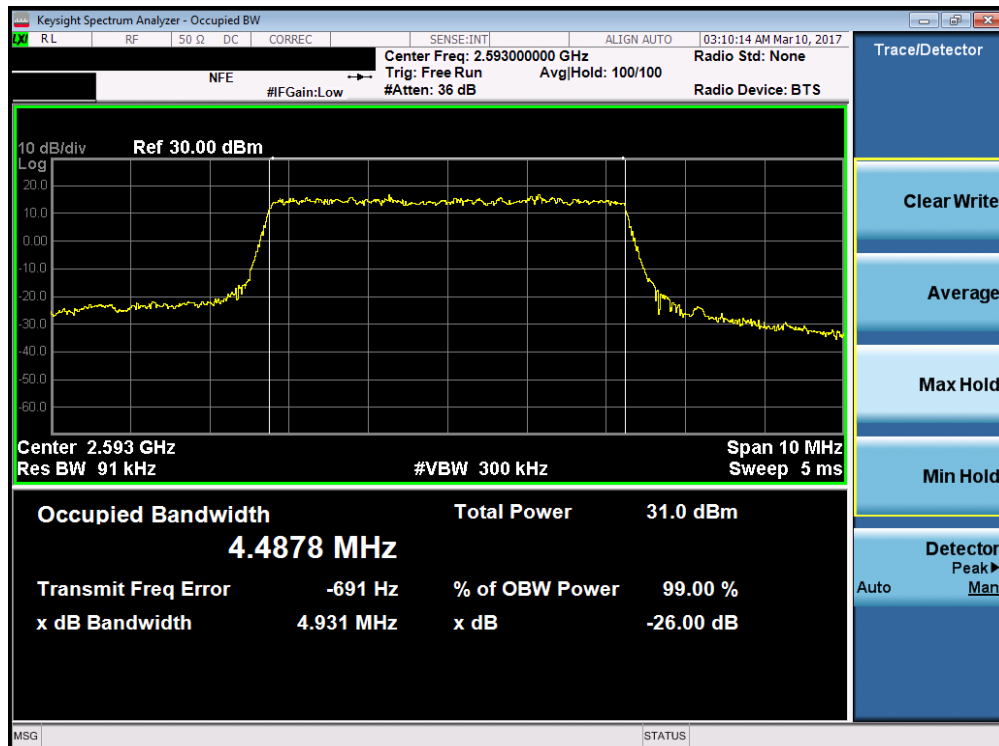


Plot 7-26. Occupied Bandwidth Plot (Band 26 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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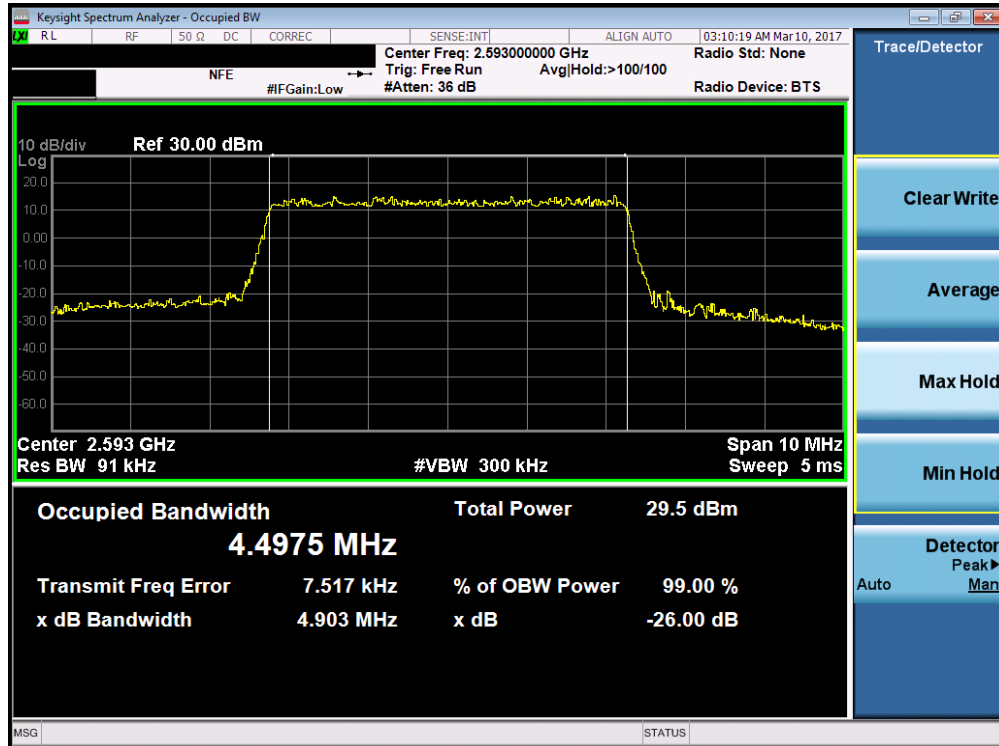


Plot 7-27. Occupied Bandwidth Plot (Band 26 – 15.0MHz 64-QAM – RB Size 75)

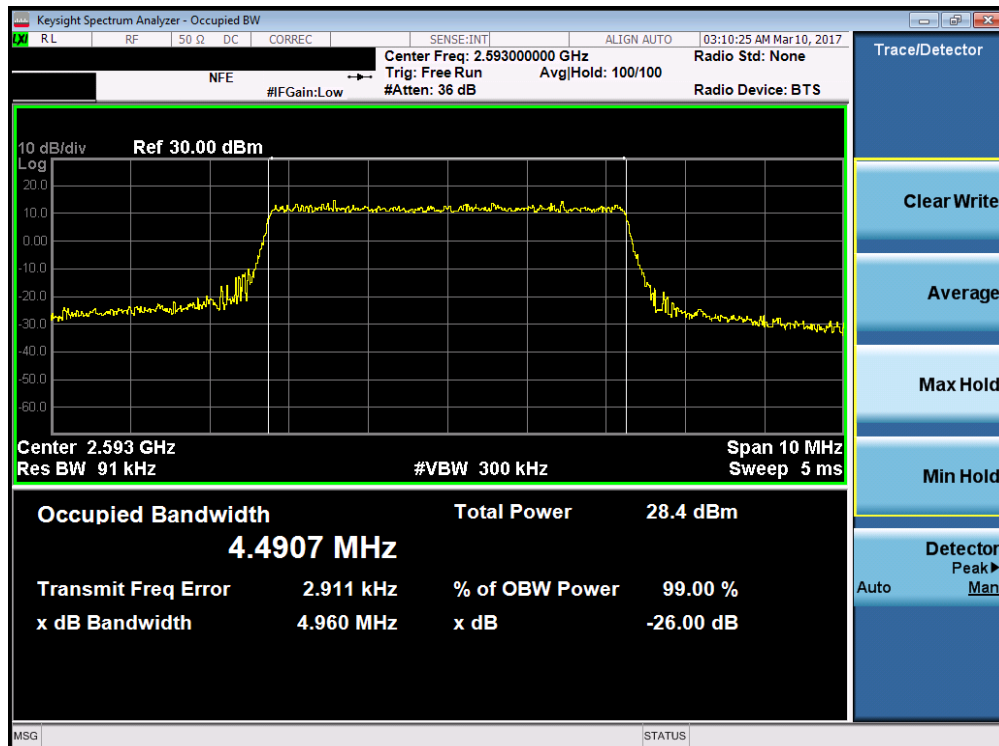


Plot 7-28. Occupied Bandwidth Plot (Band 41 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 29 of 103

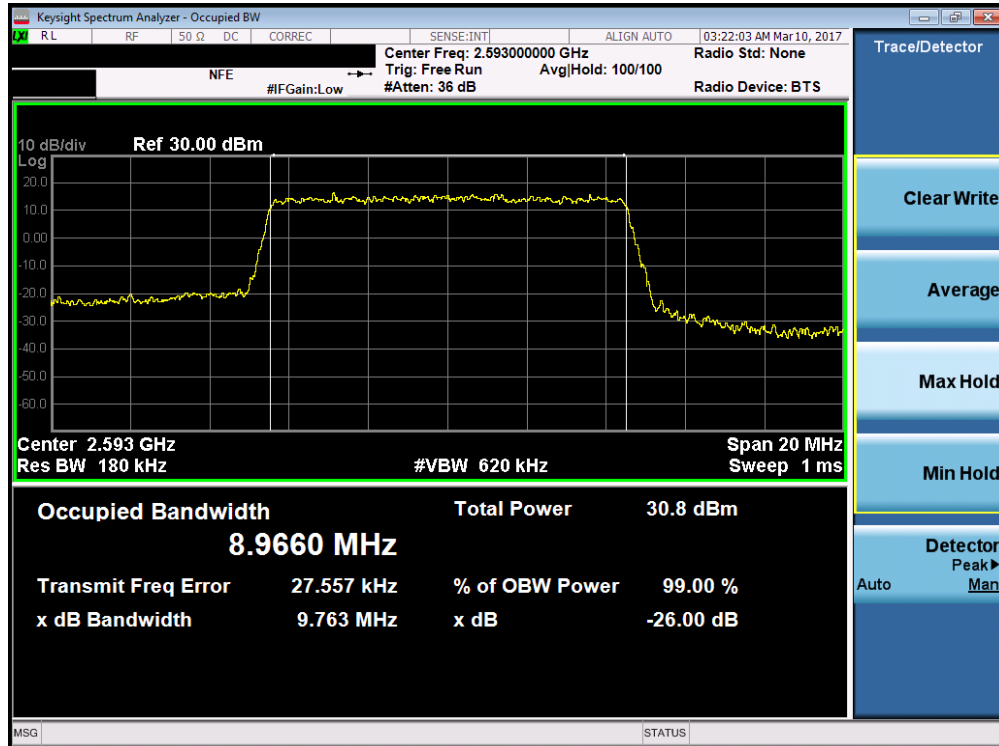


Plot 7-29. Occupied Bandwidth Plot (Band 41 – 5.0MHz 16-QAM – RB Size 25)

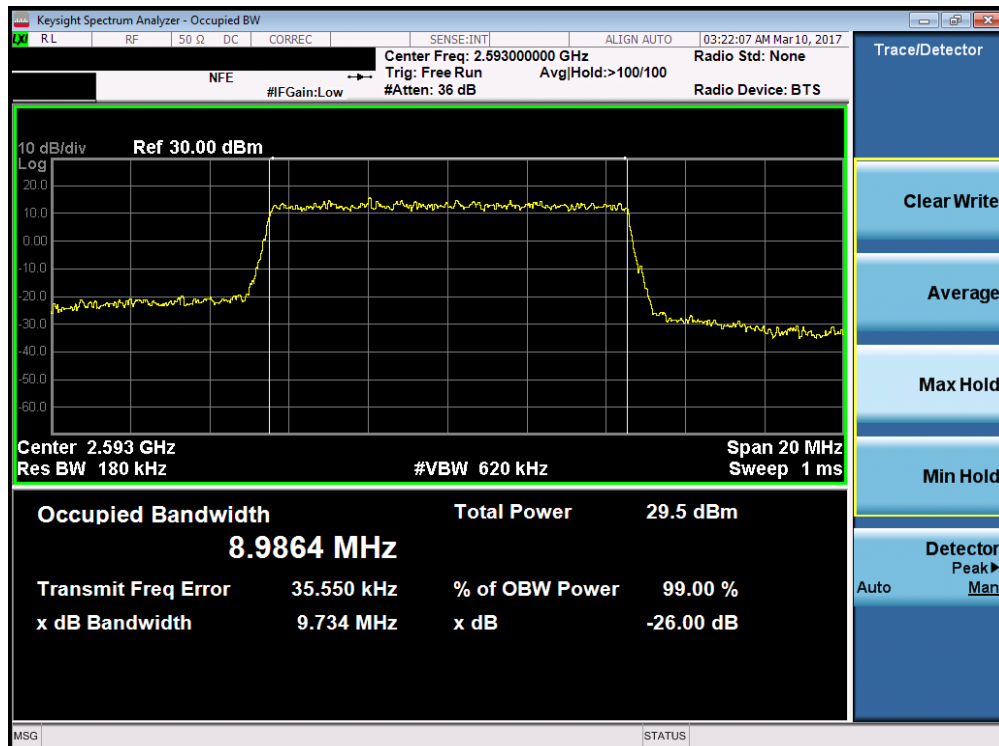


Plot 7-30. Occupied Bandwidth Plot (Band 41 – 5.0MHz 64-QAM – RB Size 25)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 30 of 103

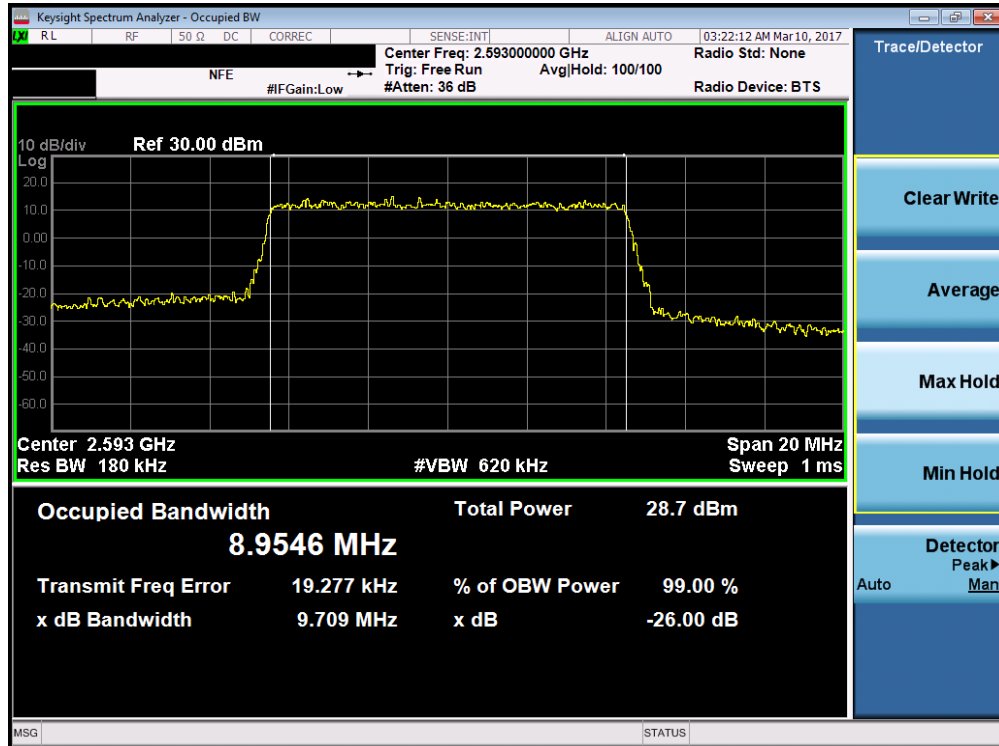


Plot 7-31. Occupied Bandwidth Plot (Band 41 – 10.0MHz QPSK – RB Size 50)

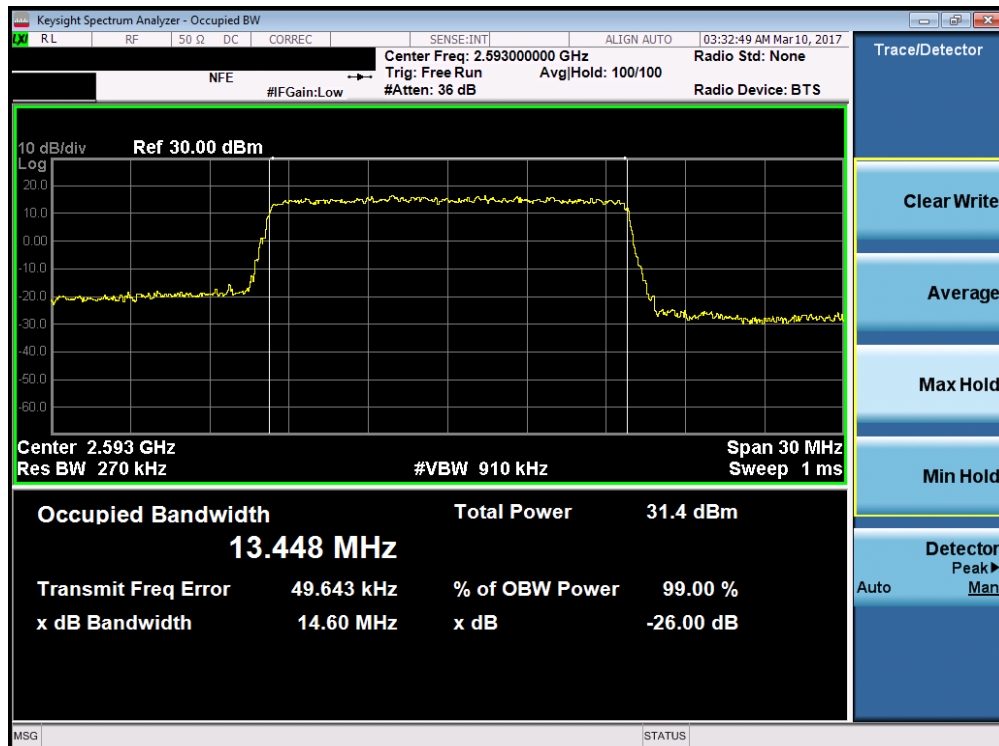


Plot 7-32. Occupied Bandwidth Plot (Band 41 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 31 of 103

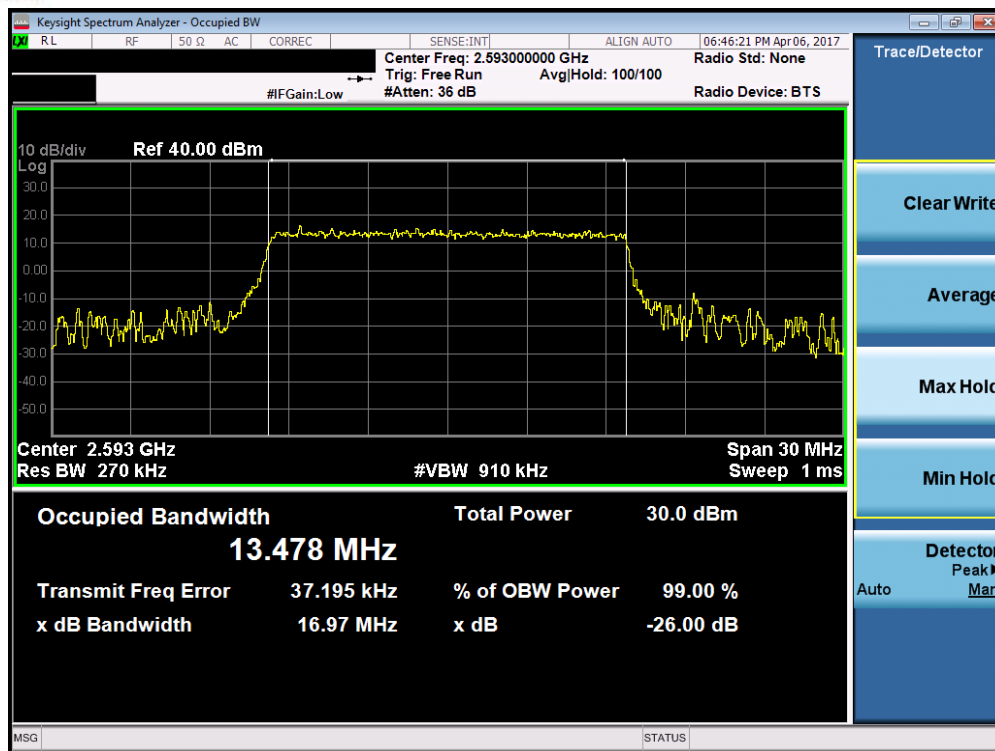


Plot 7-33. Occupied Bandwidth Plot (Band 41 – 10.0MHz 64-QAM – RB Size 50)

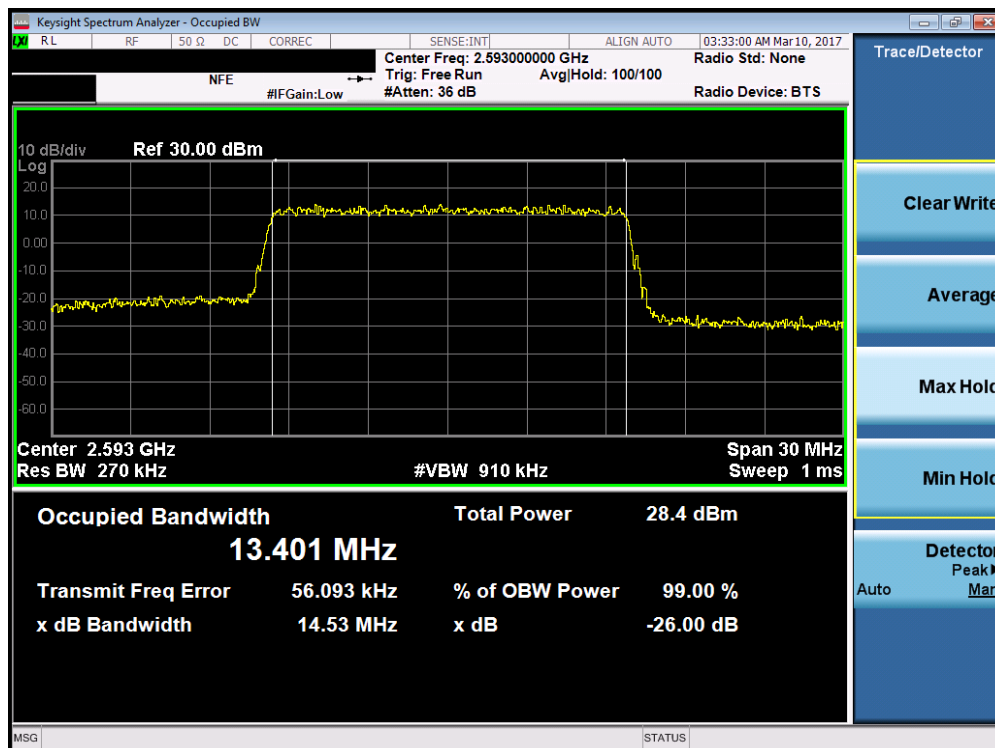


Plot 7-34. Occupied Bandwidth Plot (Band 41 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 32 of 103

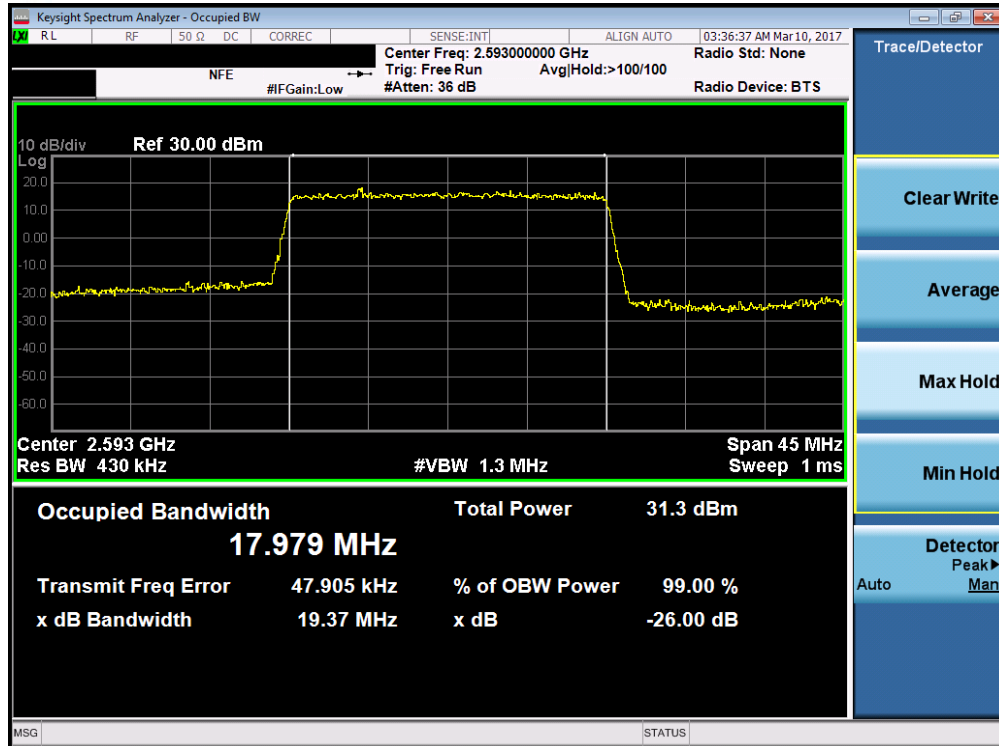


Plot 7-35. Occupied Bandwidth Plot (Band 41 – 15.0MHz 16-QAM – RB Size 75)

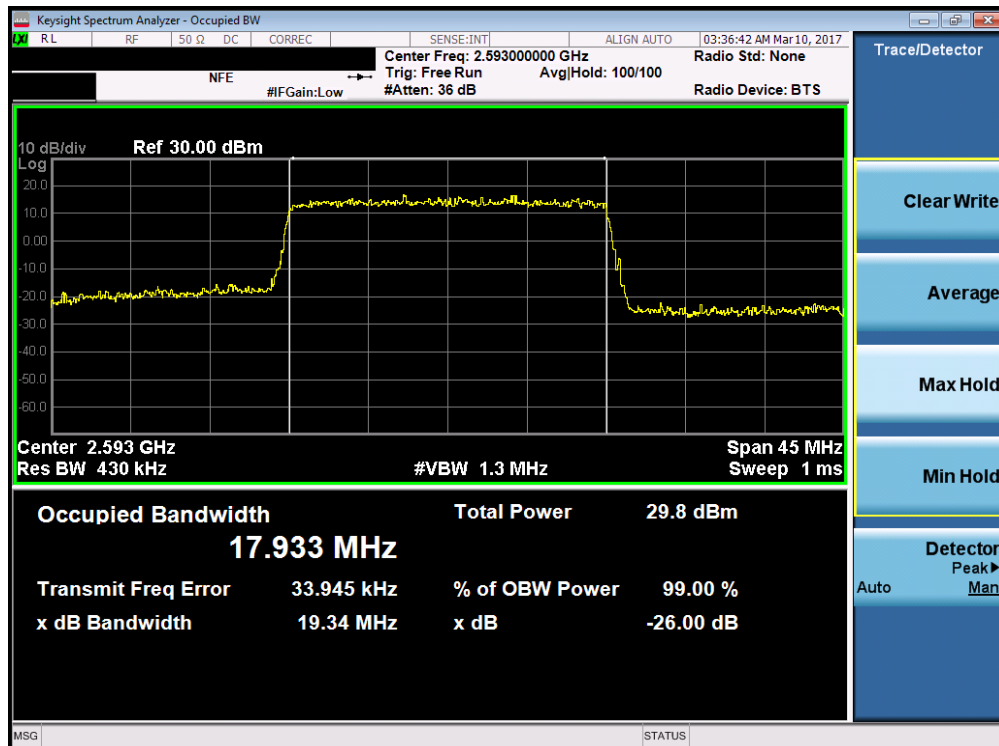


Plot 7-36. Occupied Bandwidth Plot (Band 41 – 15.0MHz 64-QAM – RB Size 75)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 33 of 103

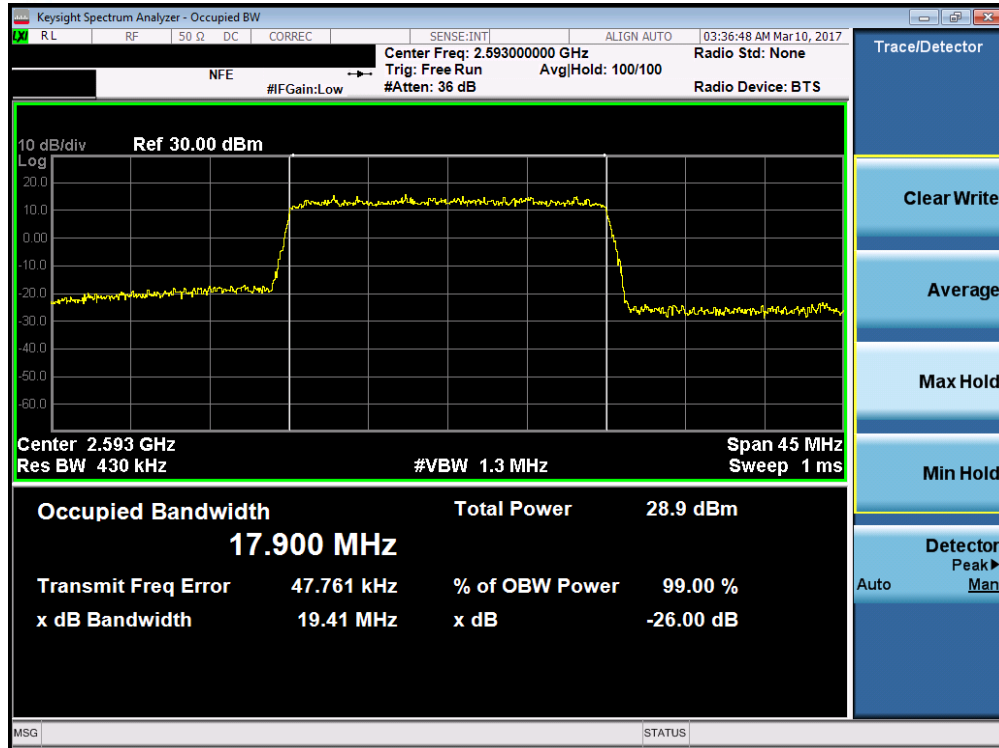


Plot 7-37. Occupied Bandwidth Plot (Band 41 – 20.0MHz QPSK – RB Size 100)



Plot 7-38. Occupied Bandwidth Plot (Band 41 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 34 of 103



Plot 7-39. Occupied Bandwidth Plot (Band 41 – 20.0MHz 64-QAM – RB Size 100)

FCC ID: A3LSCV35	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset	Page 35 of 103

7.3 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §22.917(a) §27.53(c.2) §27.53(g) §27.53(h) §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.

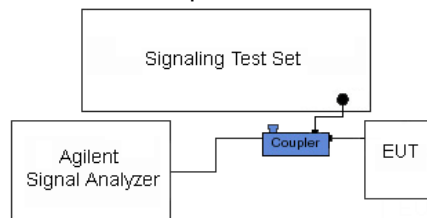
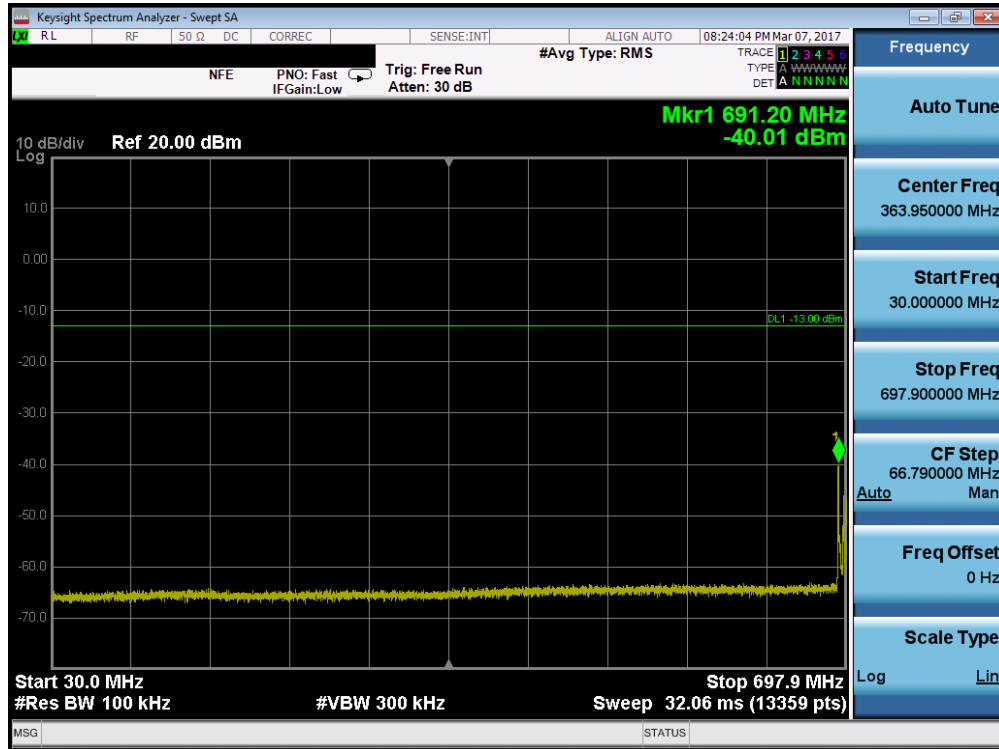


Figure 7-2. Test Instrument & Measurement Setup

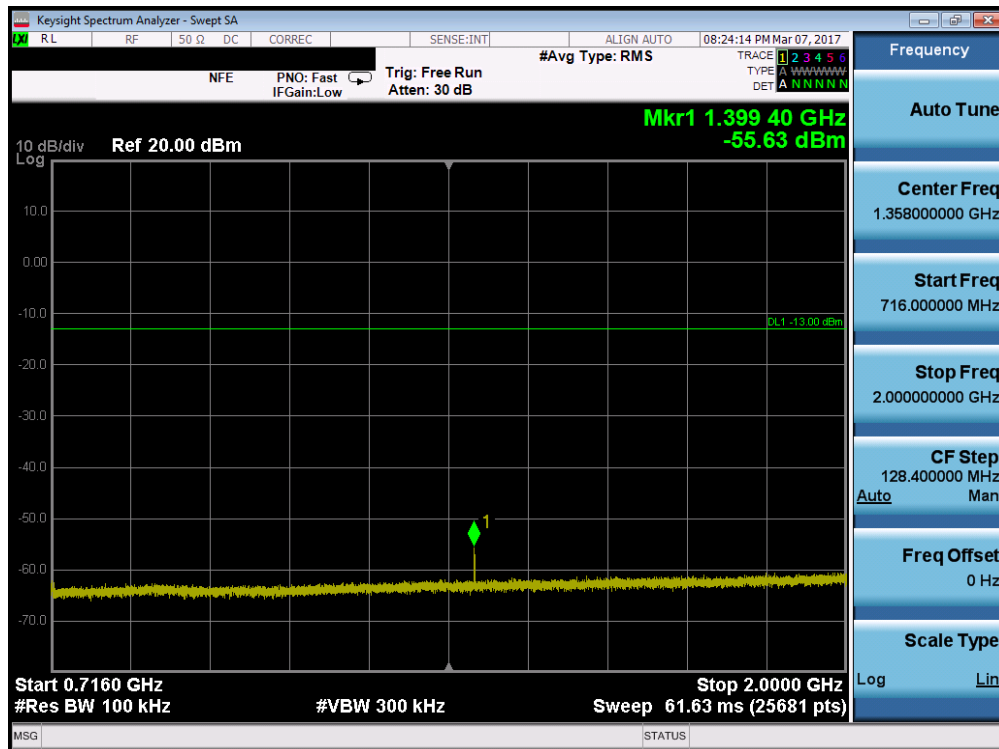
Test Notes

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.

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset	Page 36 of 103	

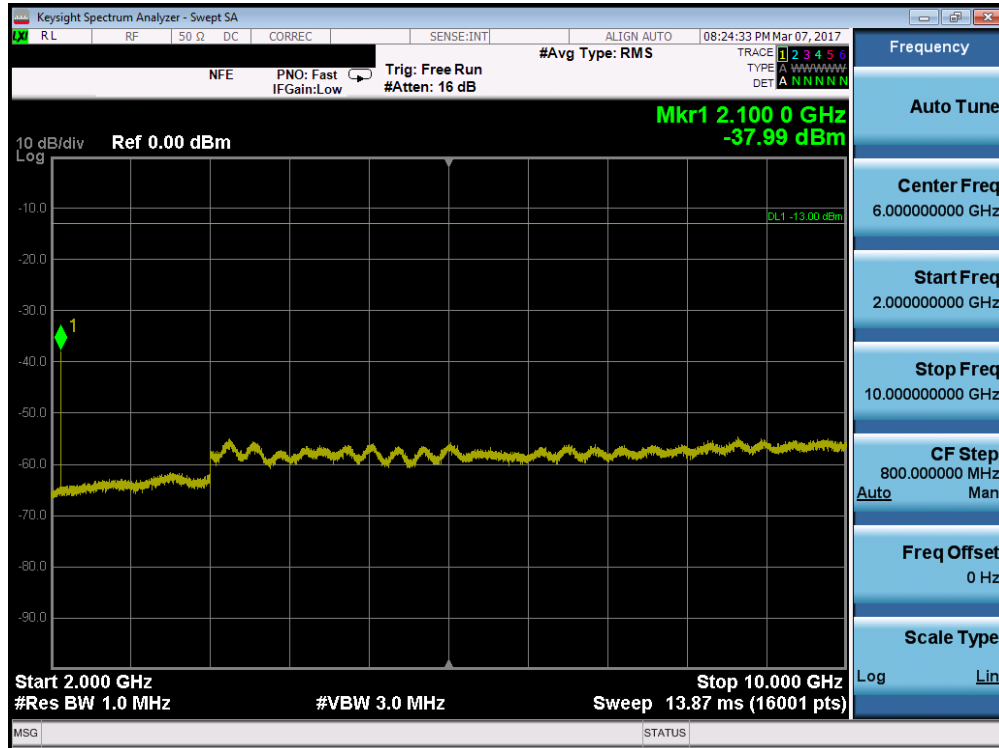


Plot 7-40. Conducted Spurious Plot (Band 17 – 10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

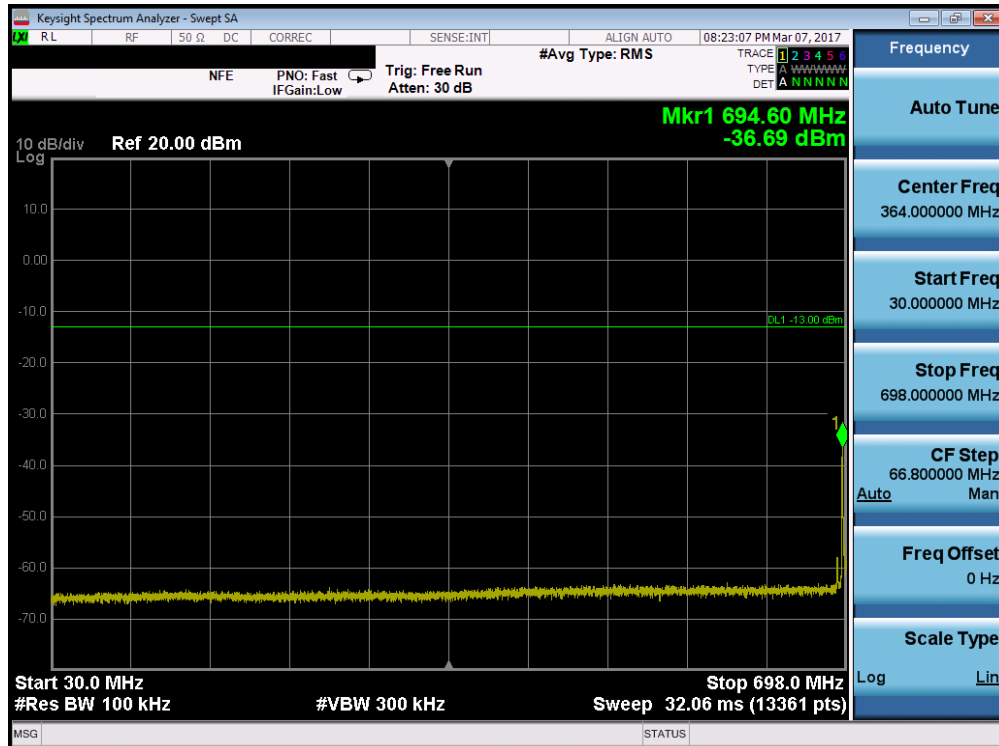


Plot 7-41. Conducted Spurious Plot (Band 17 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 37 of 103

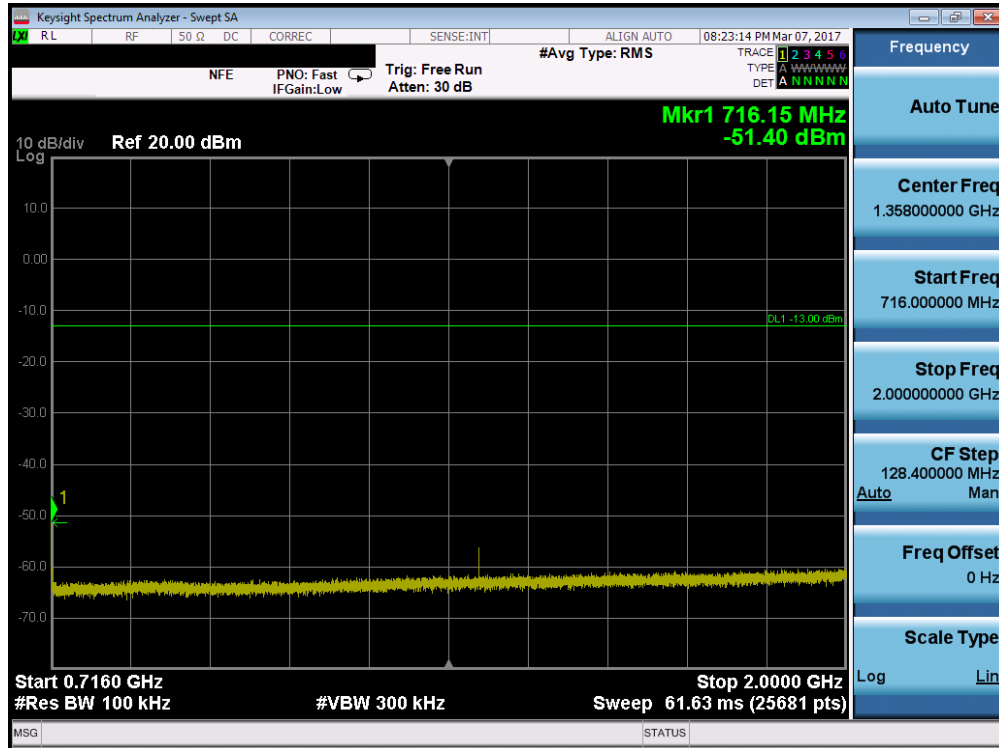


Plot 7-42. Conducted Spurious Plot (Band 17 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

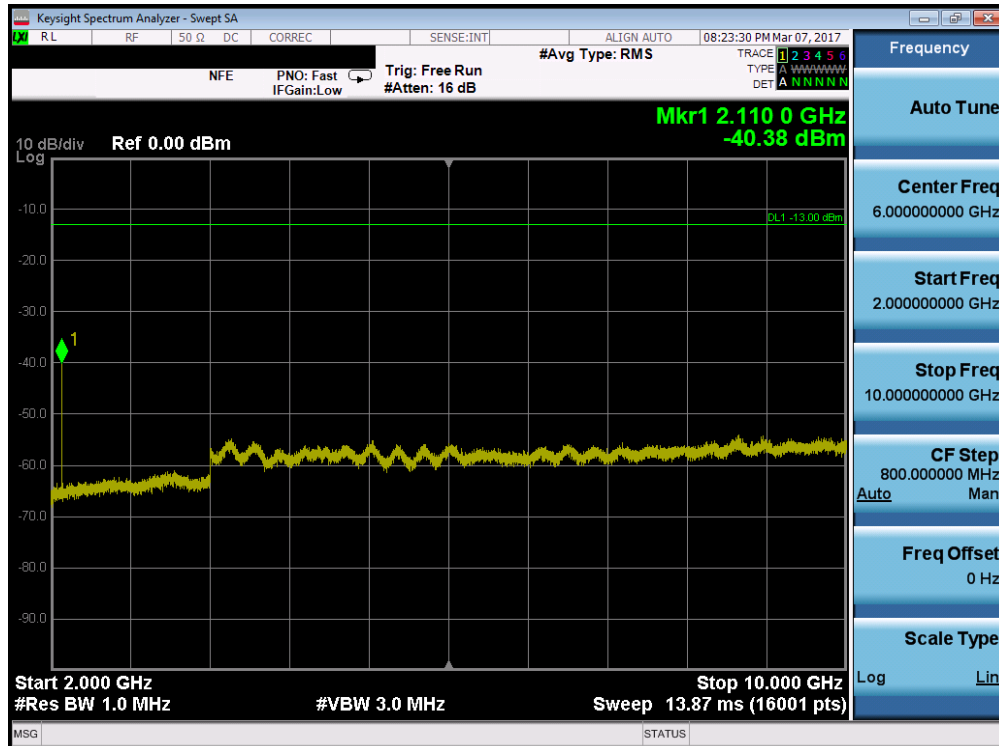


Plot 7-43. Conducted Spurious Plot (Band 17 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 38 of 103

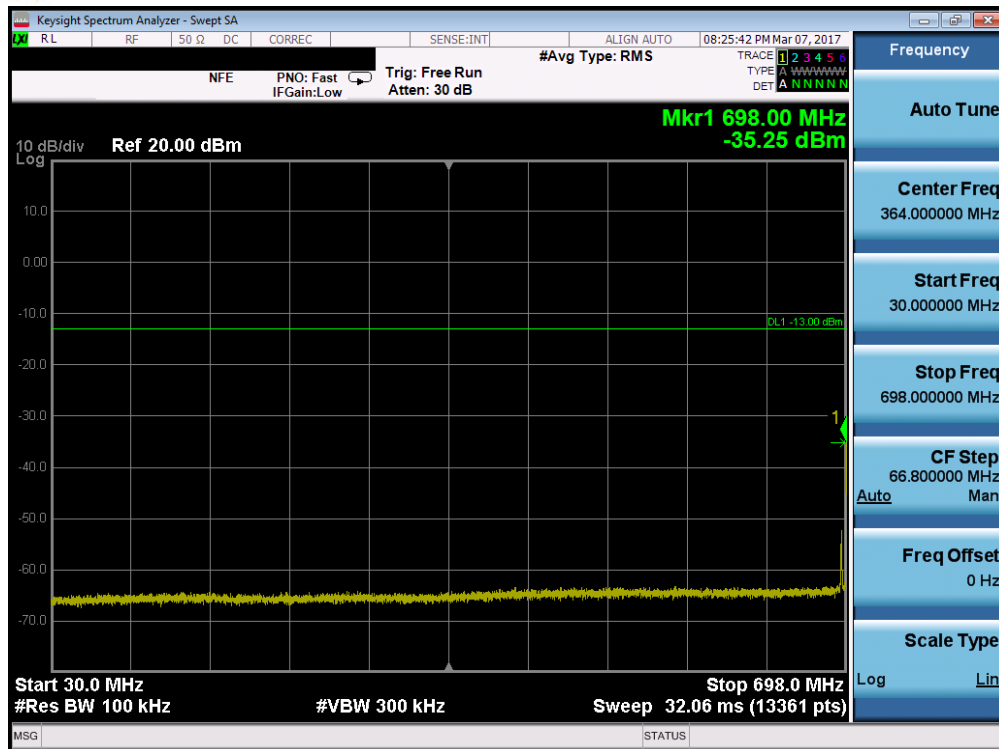


Plot 7-44. Conducted Spurious Plot (Band 17 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

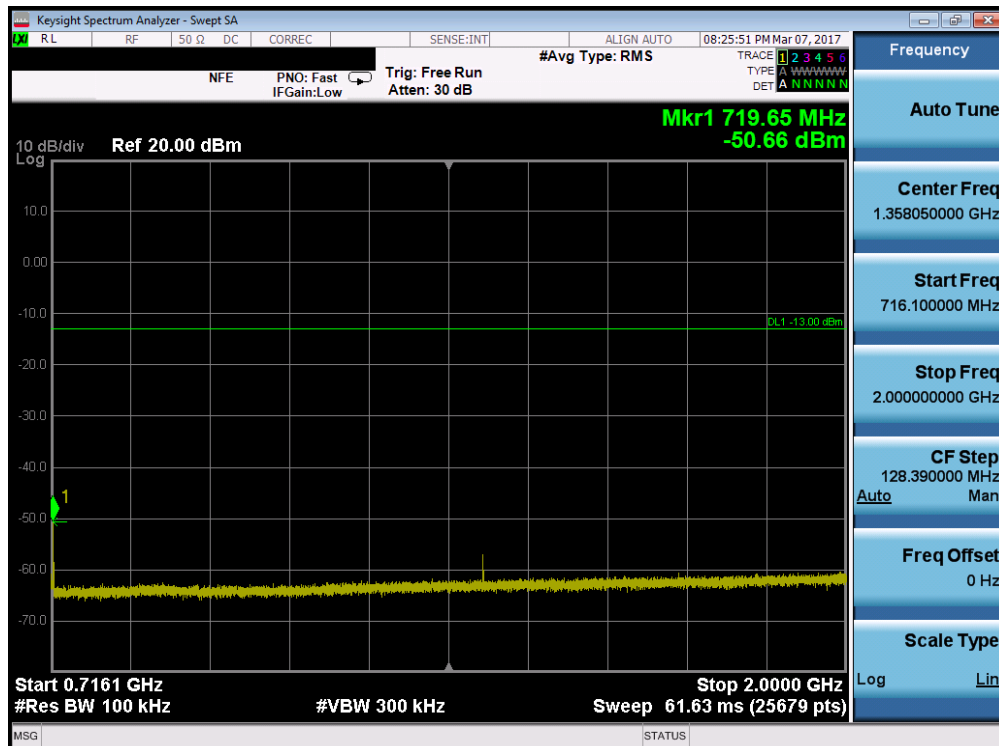


Plot 7-45. Conducted Spurious Plot (Band 17 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 39 of 103

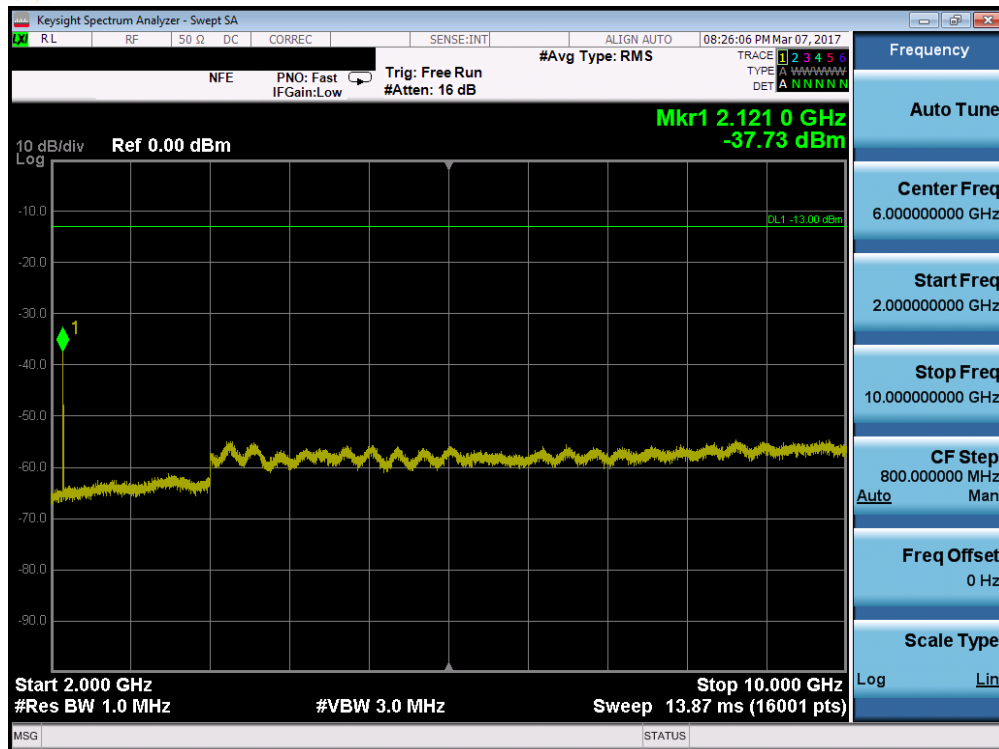


Plot 7-46. Conducted Spurious Plot (Band 17 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

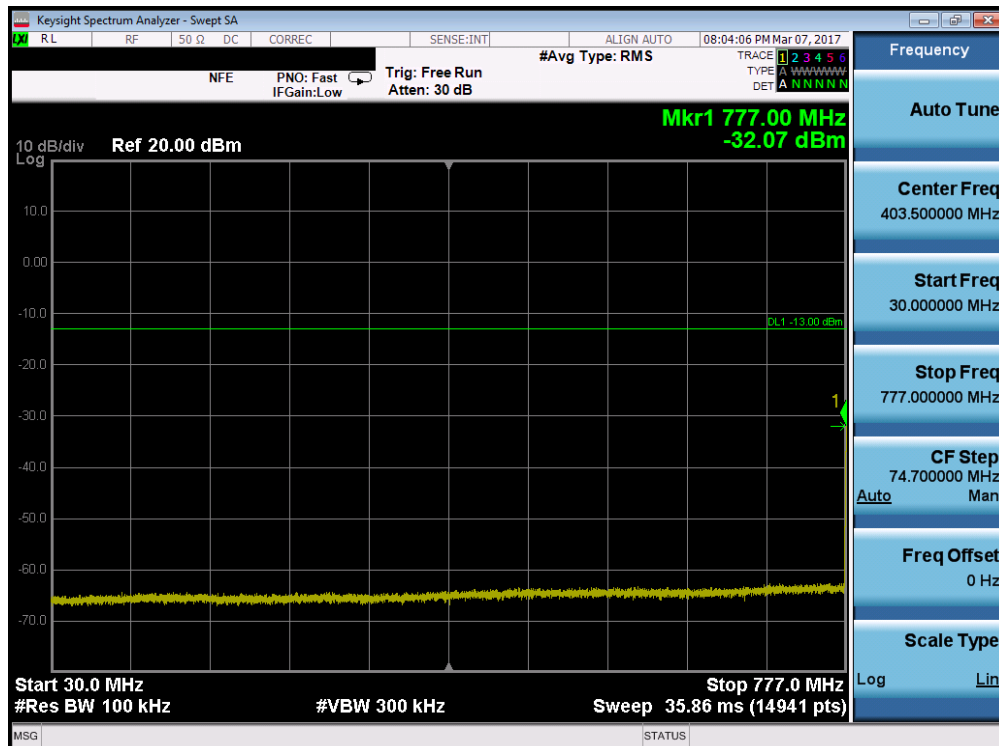


Plot 7-47. Conducted Spurious Plot (Band 17 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 40 of 103

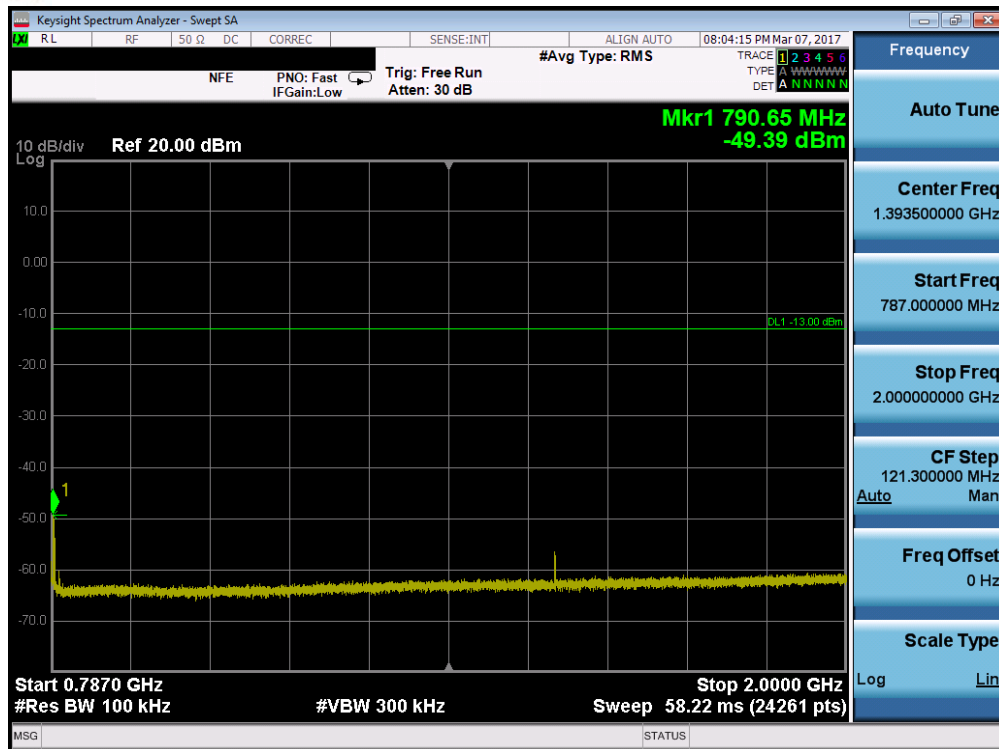


Plot 7-48. Conducted Spurious Plot (Band 17 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

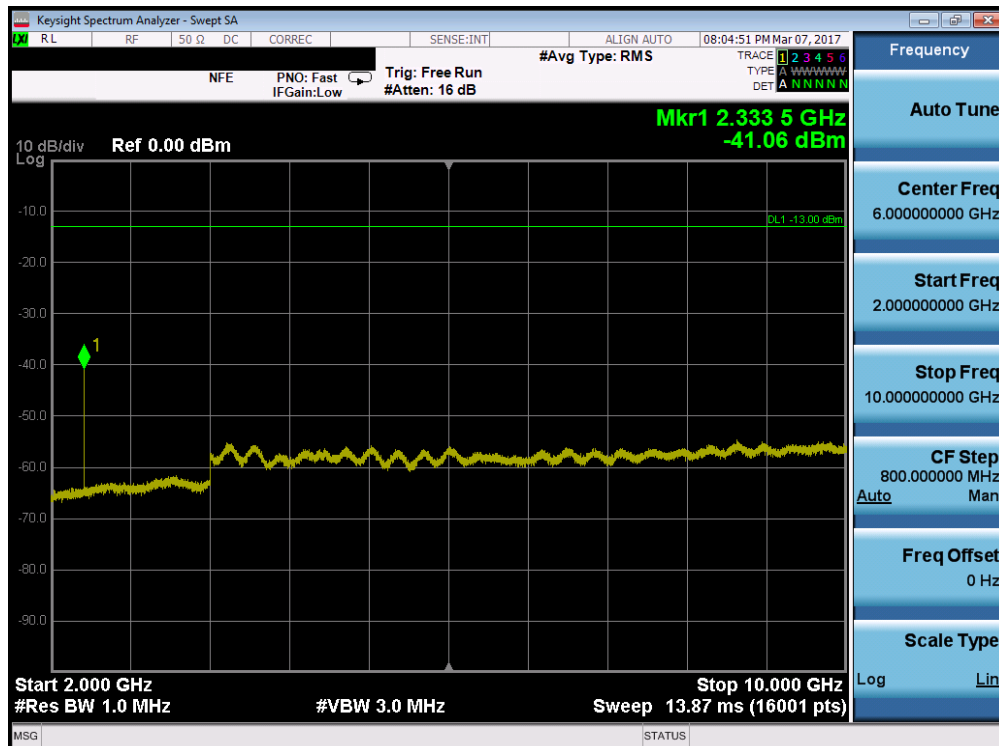


Plot 7-49. Conducted Spurious Plot (Band 13 – 10.0MHz QPSK – RB Size 1, RB Offset 0)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 41 of 103

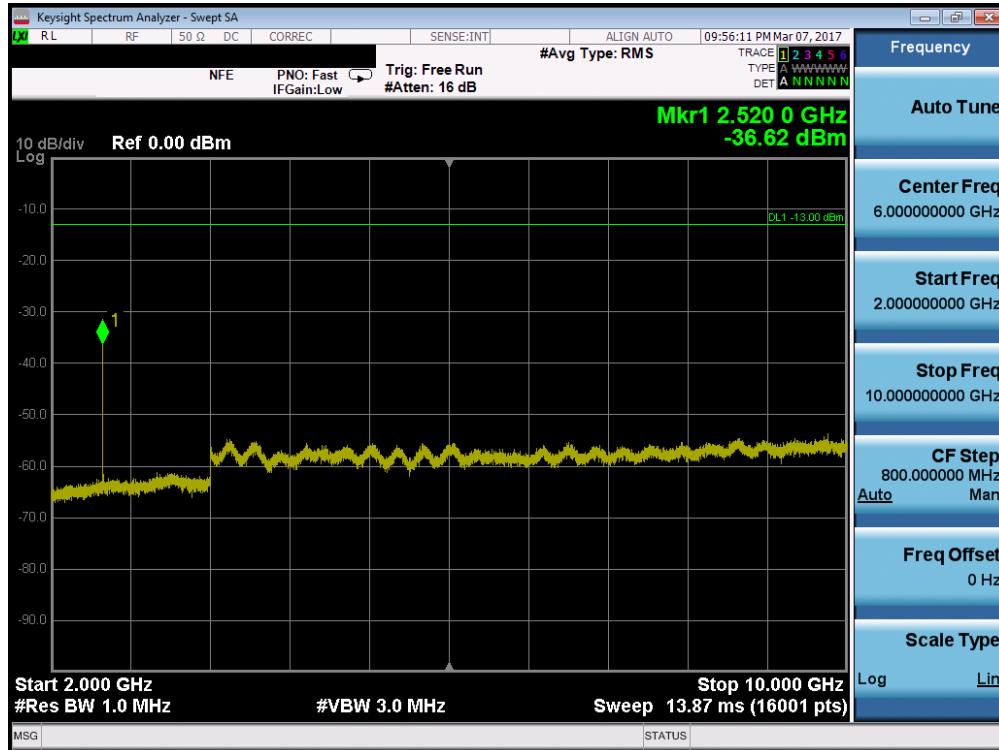


Plot 7-50. Conducted Spurious Plot (Band 13 – 10.0MHz QPSK – RB Size 1, RB Offset 0)

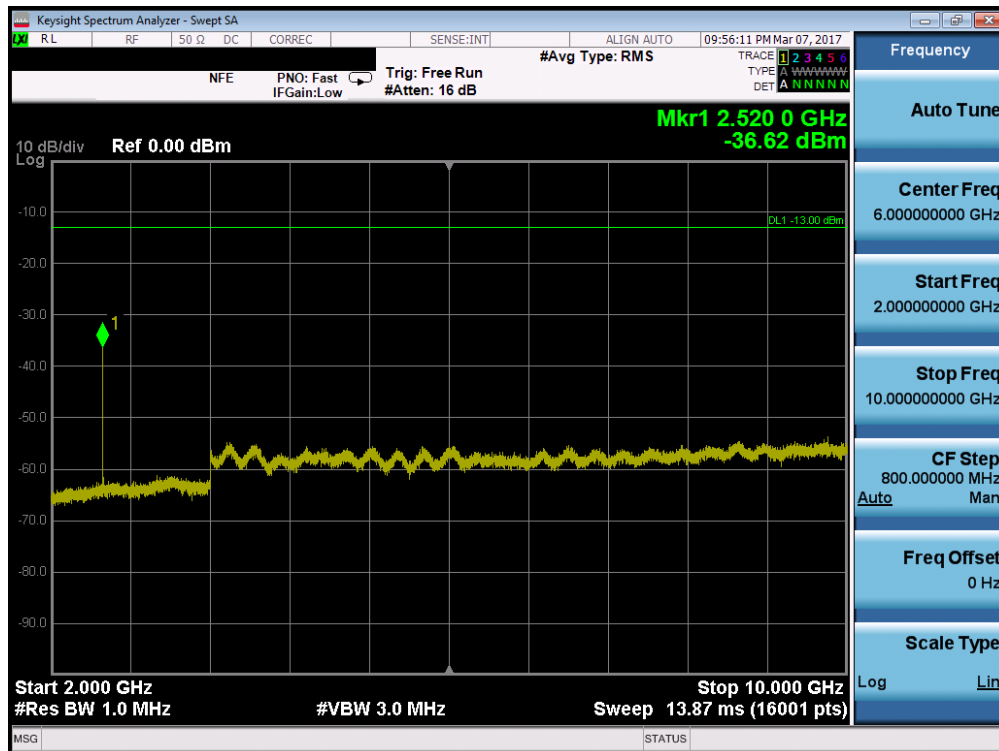


Plot 7-51. Conducted Spurious Plot (Band 13 – 10.0MHz QPSK – RB Size 1, RB Offset 0)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 42 of 103

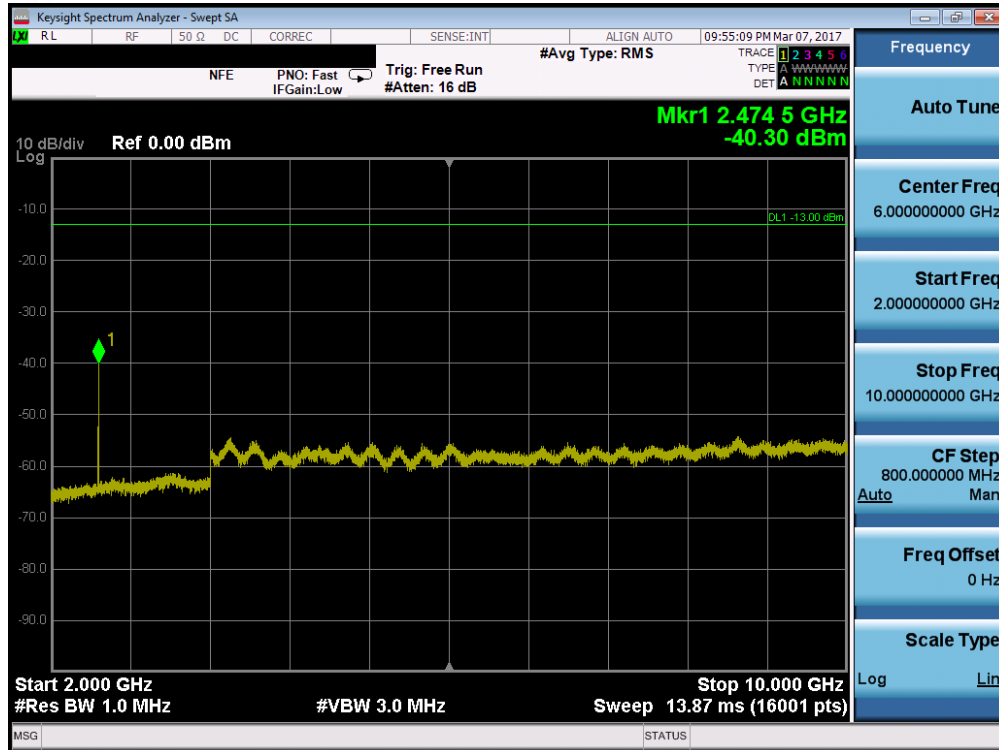


Plot 7-52. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

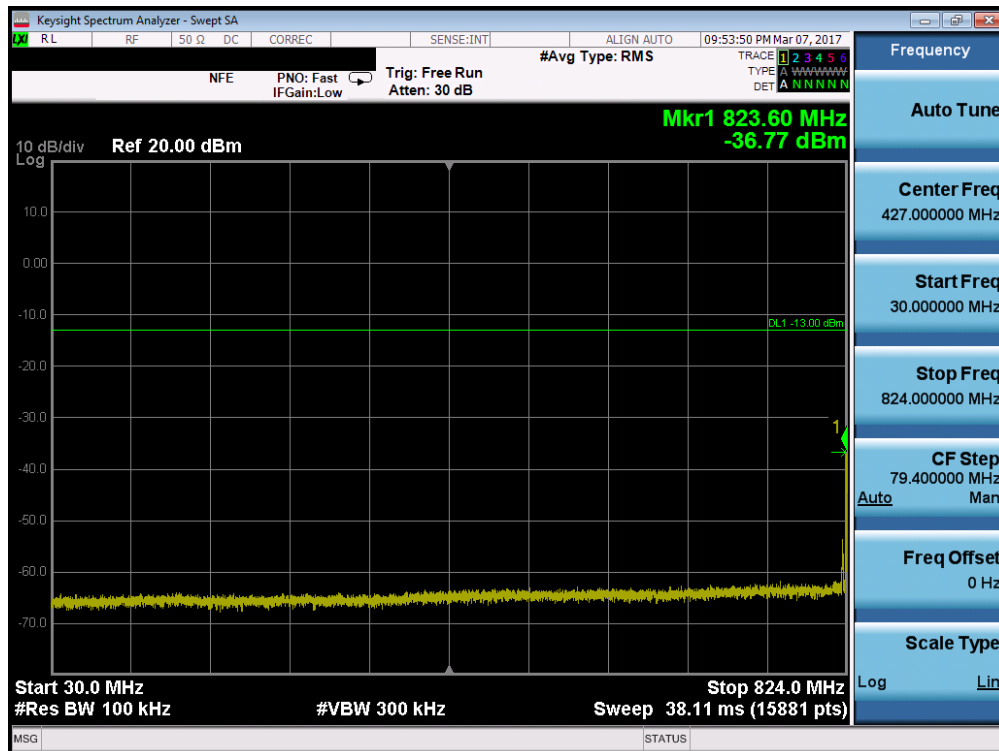


Plot 7-53. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 43 of 103

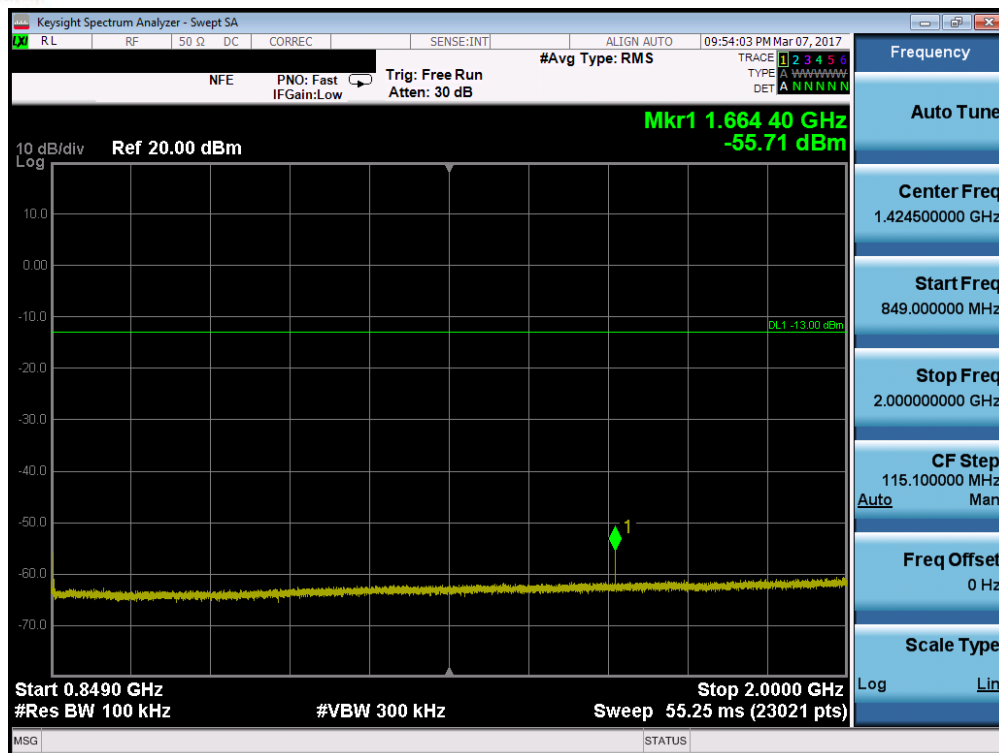


Plot 7-54. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

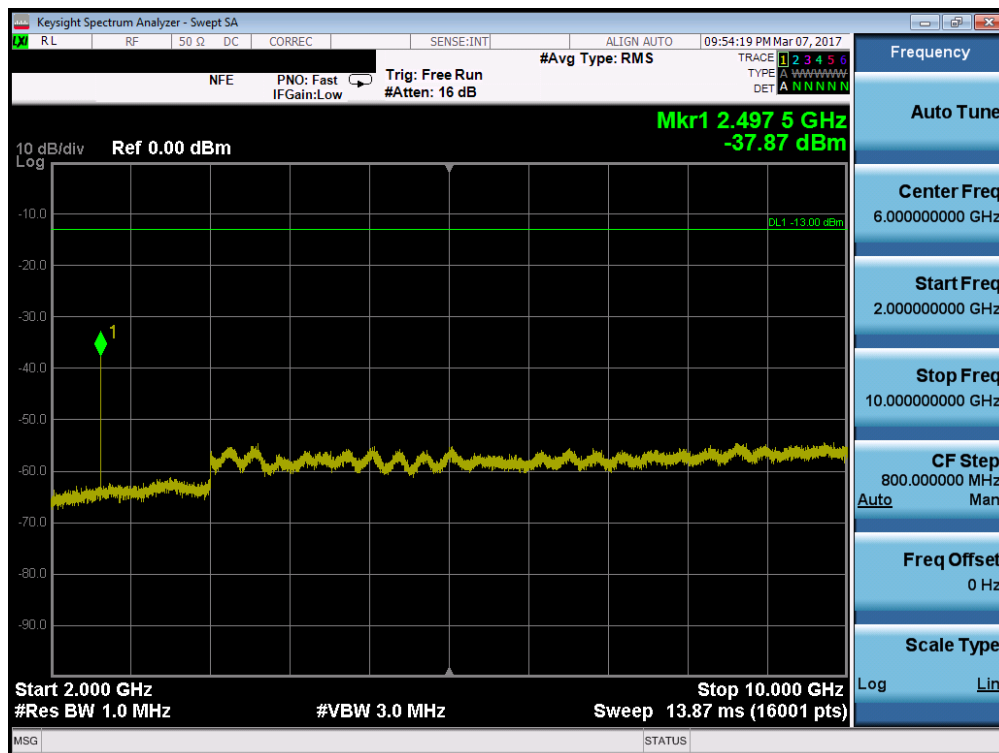


Plot 7-55. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 44 of 103

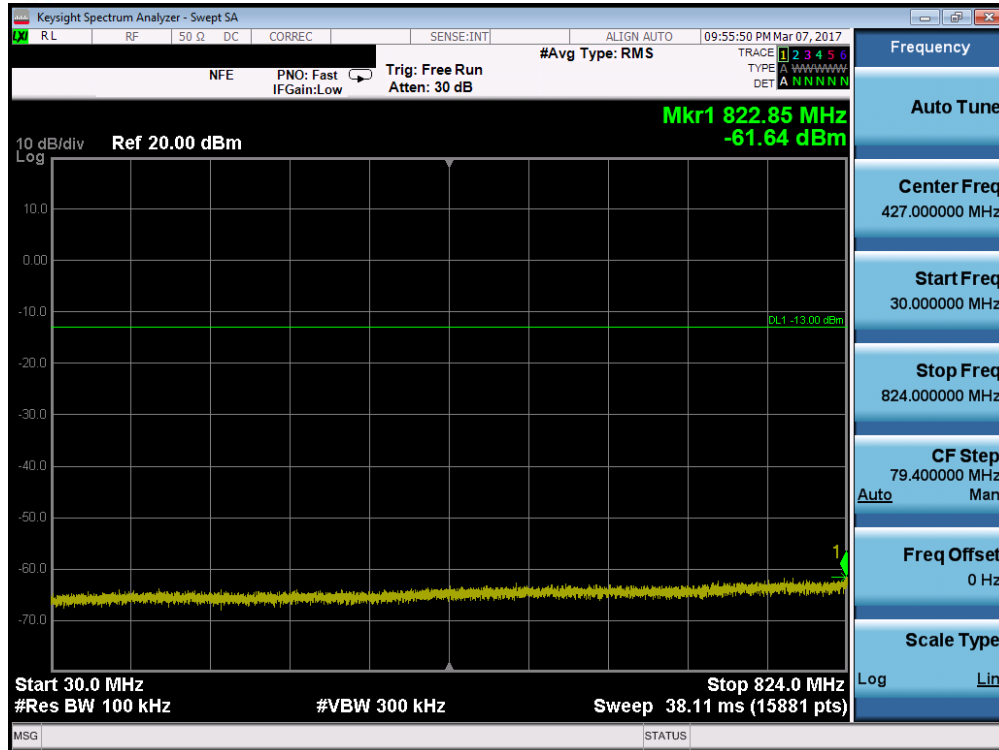


Plot 7-56. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

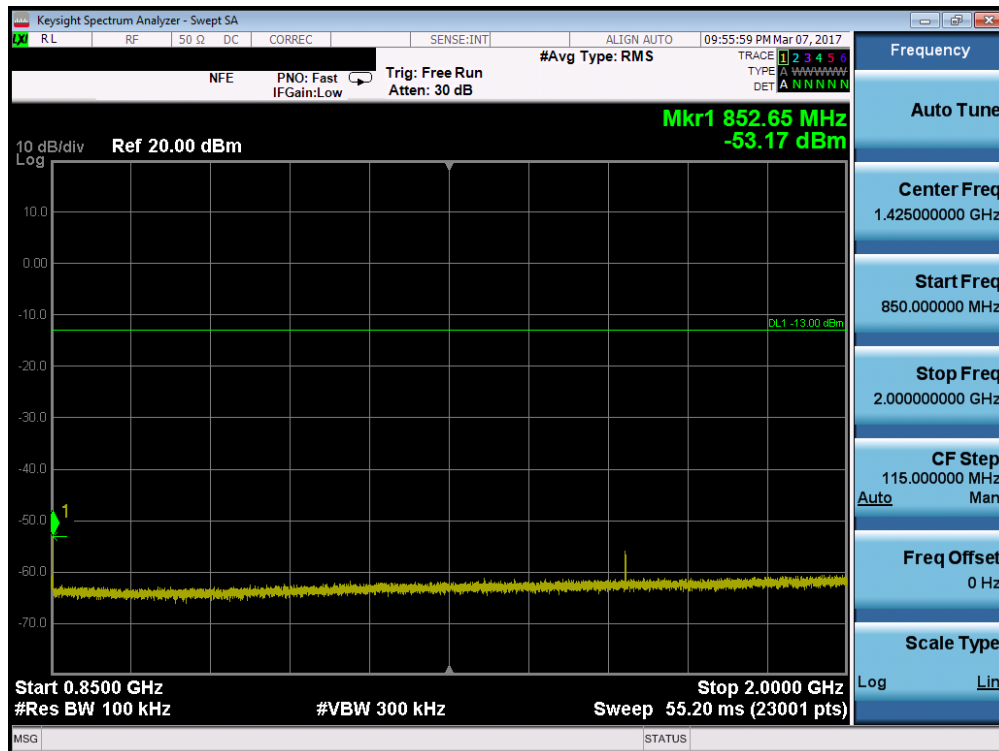


Plot 7-57. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 45 of 103

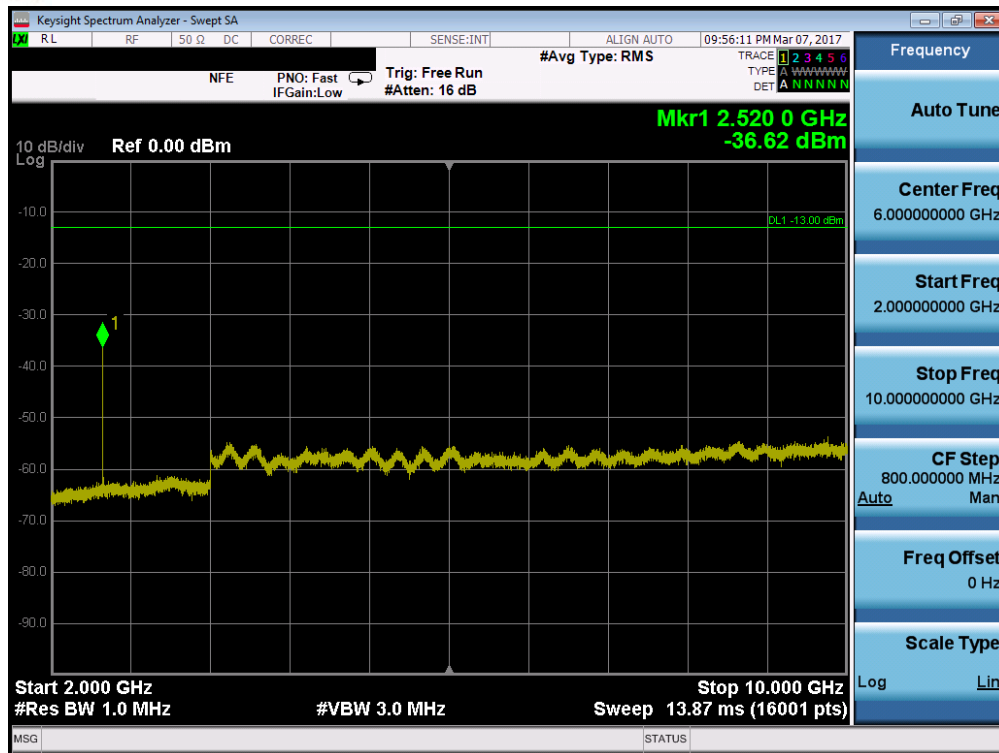


Plot 7-58. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

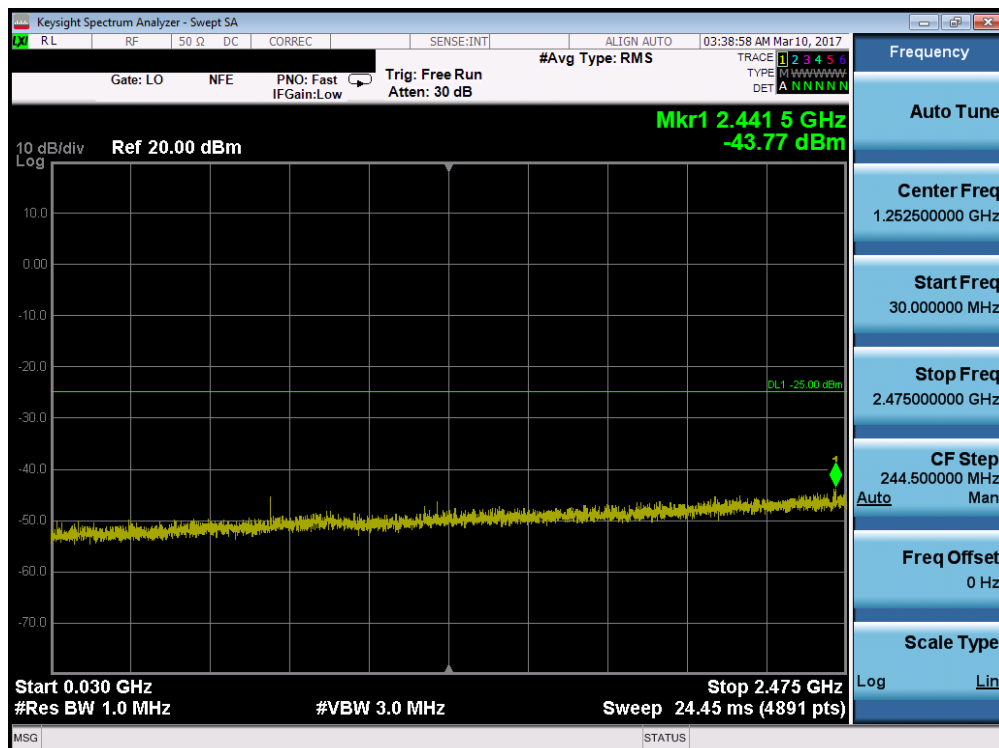


Plot 7-59. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 46 of 103

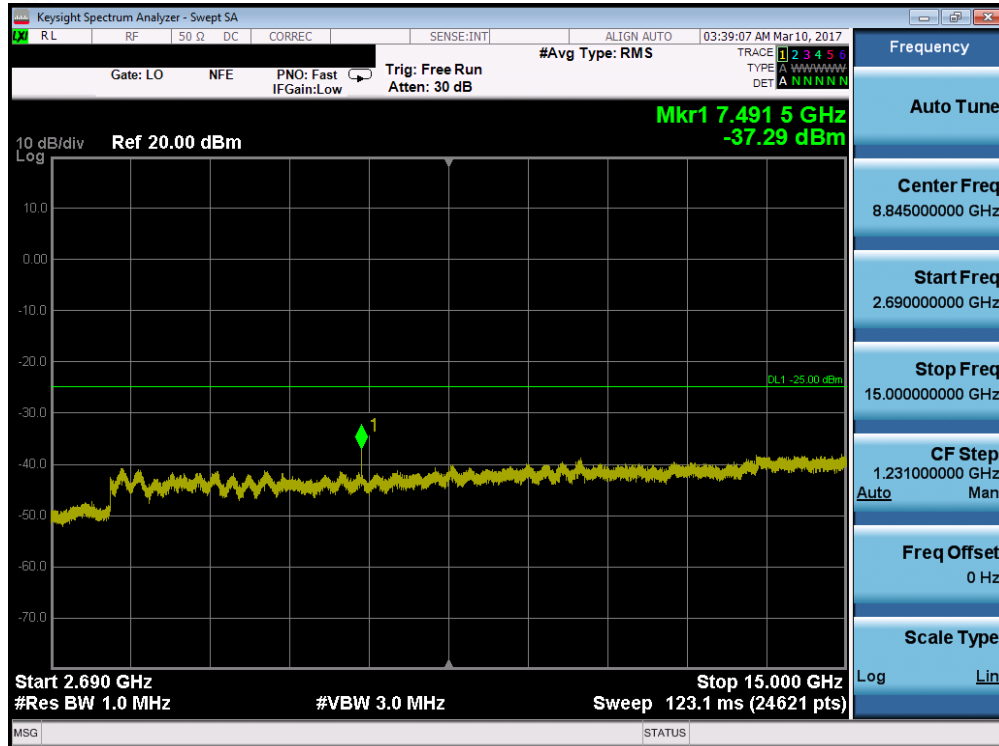


Plot 7-60. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

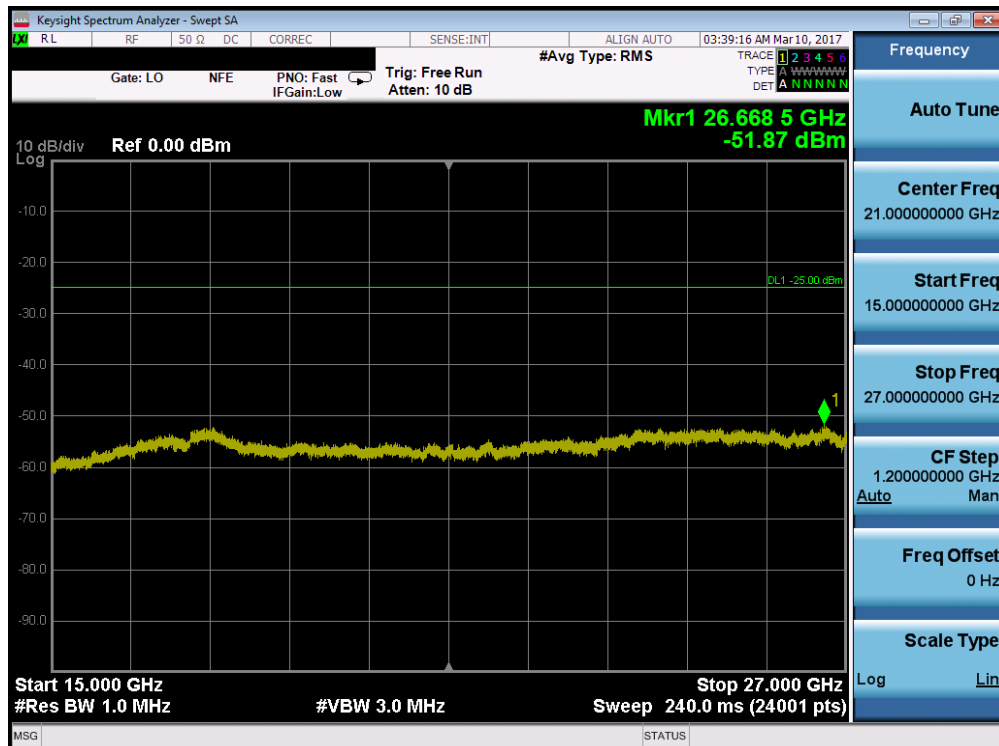


Plot 7-61. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 47 of 103

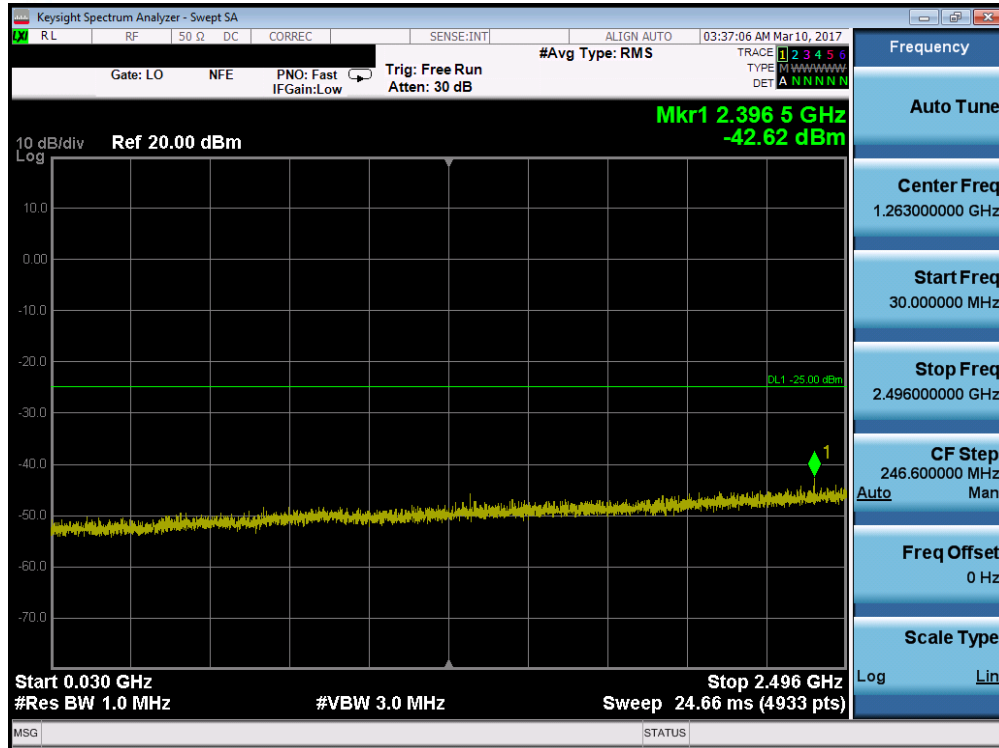


Plot 7-62. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

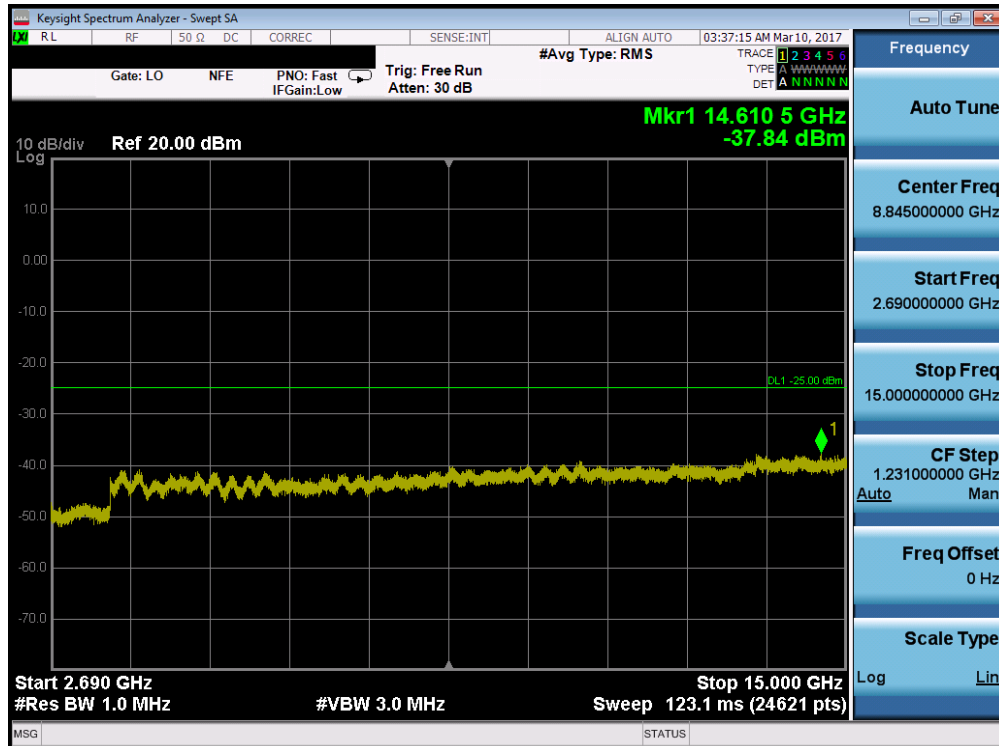


Plot 7-63. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 48 of 103

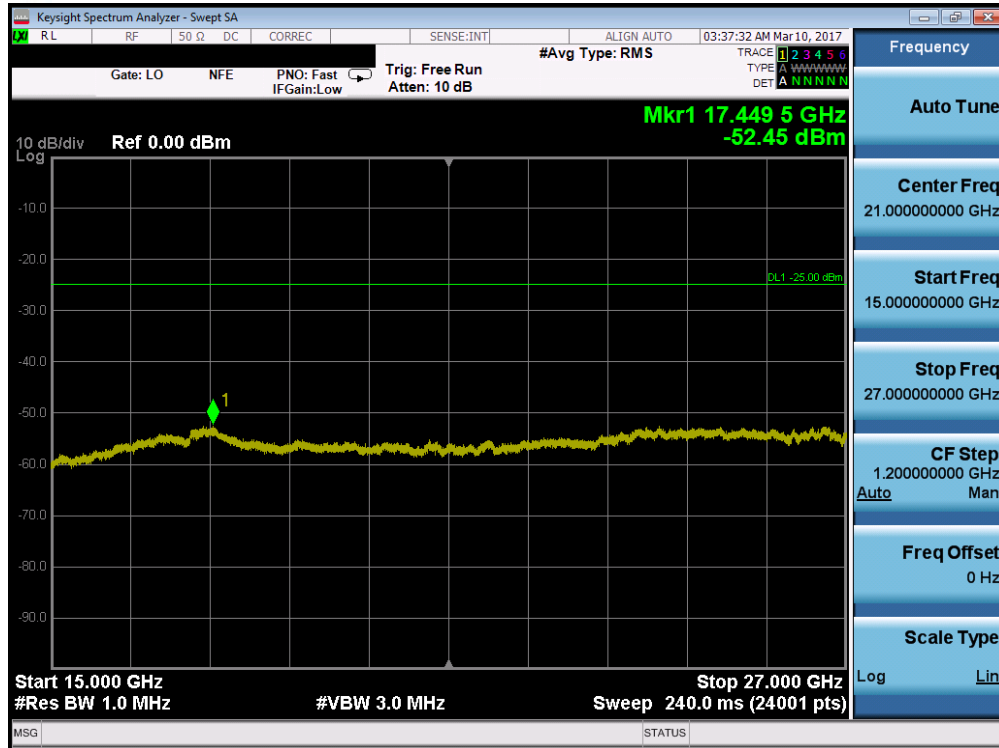


Plot 7-64. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

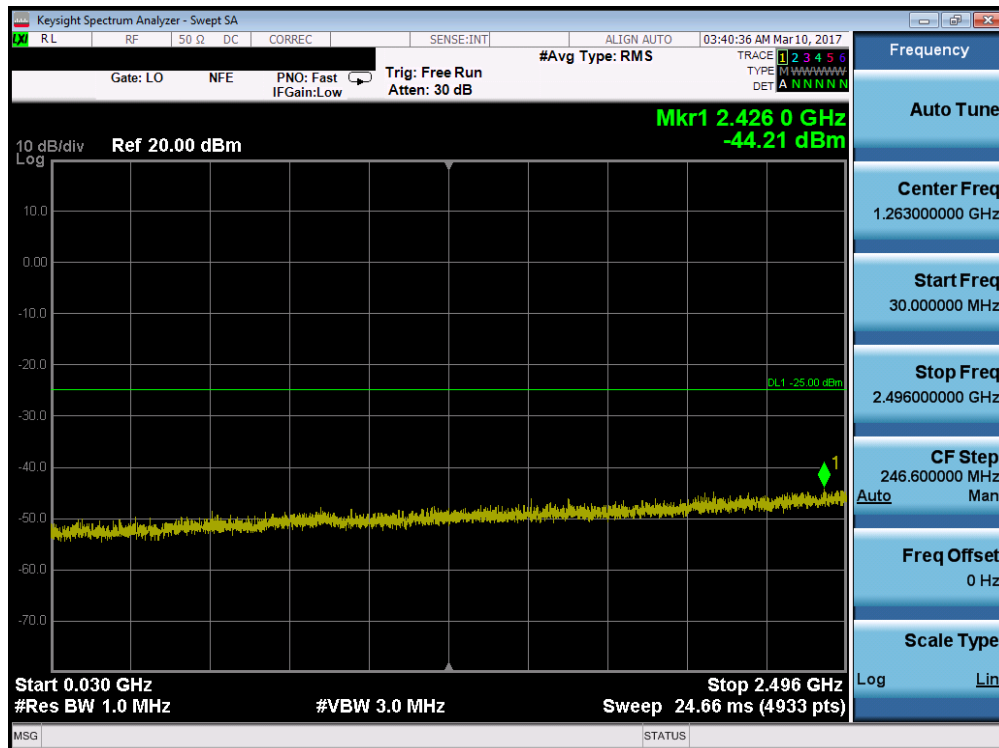


Plot 7-65. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 49 of 103

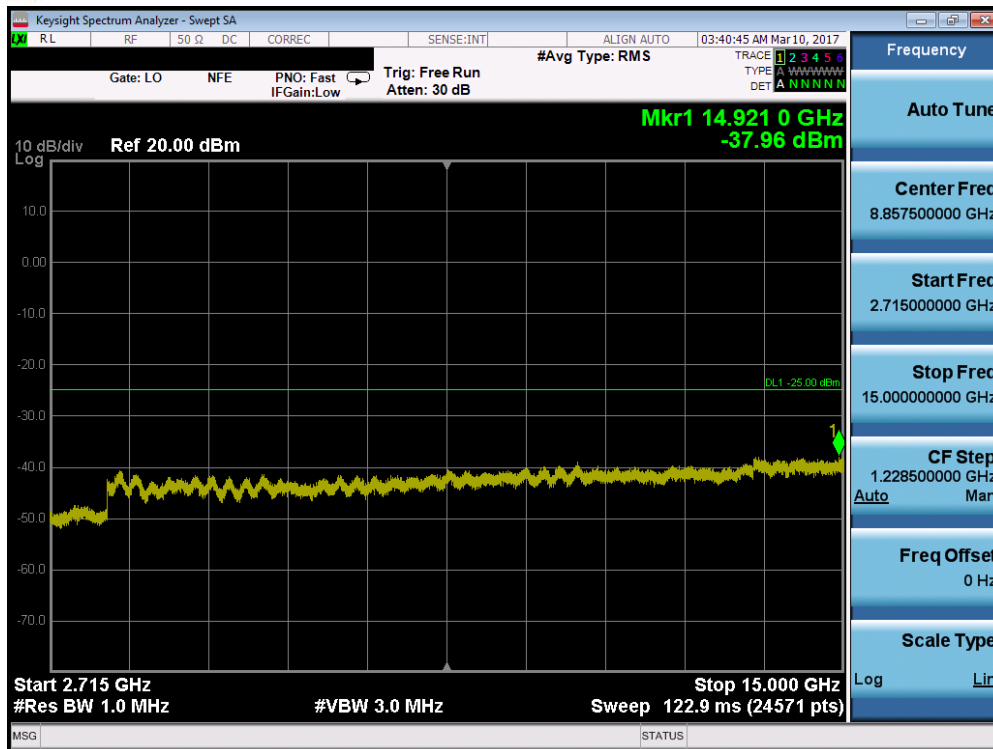


Plot 7-66. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

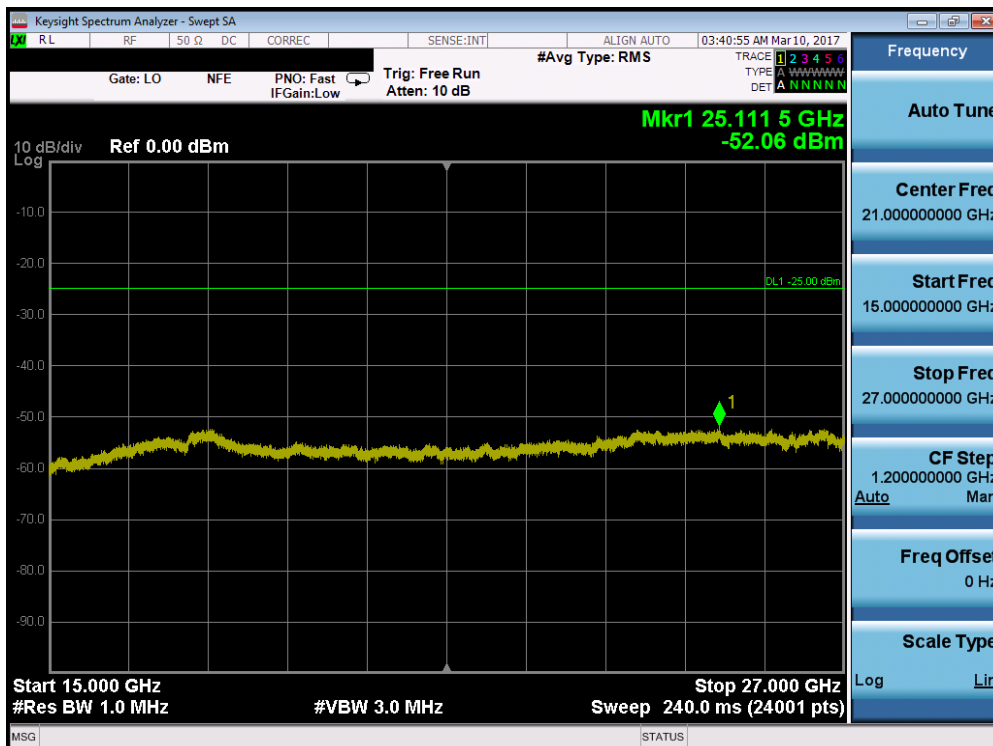


Plot 7-67. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 50 of 103



Plot 7-68. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-69. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 51 of 103

7.4 Band Edge Emissions at Antenna Terminal

§2.1051 §22.917(a) §27.53(c) §27.53(g) §27.53(h) §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 $\geq 1\%$ of the emission bandwidth
4. VBW $\geq 3 \times$ RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times$ 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.

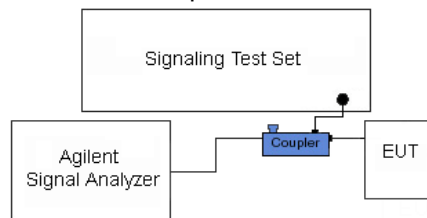


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

Per 22.917(b) 27.53(h) 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.

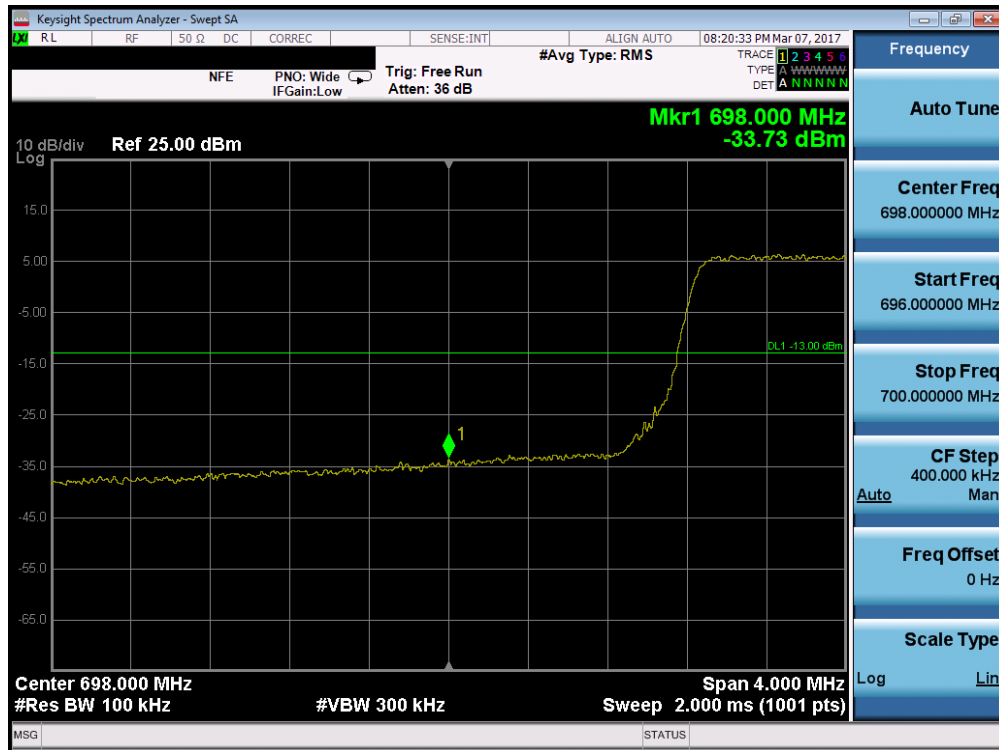
FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset	Page 52 of 103	

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is $65 + 10\log_{10}(P) = -35\text{dBm}$ in a 6.25kHz bandwidth.

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.

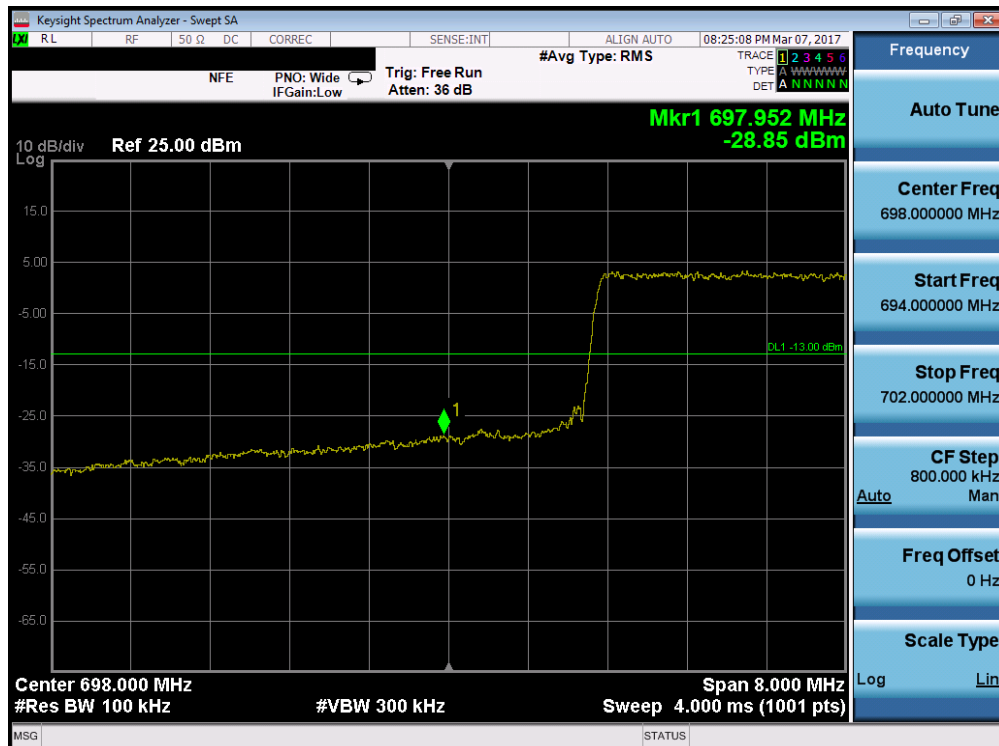


Plot 7-70. Lower Band Edge Plot (Band 17 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-71. Upper Band Edge Plot (Band 17 – 5.0MHz QPSK – RB Size 25)

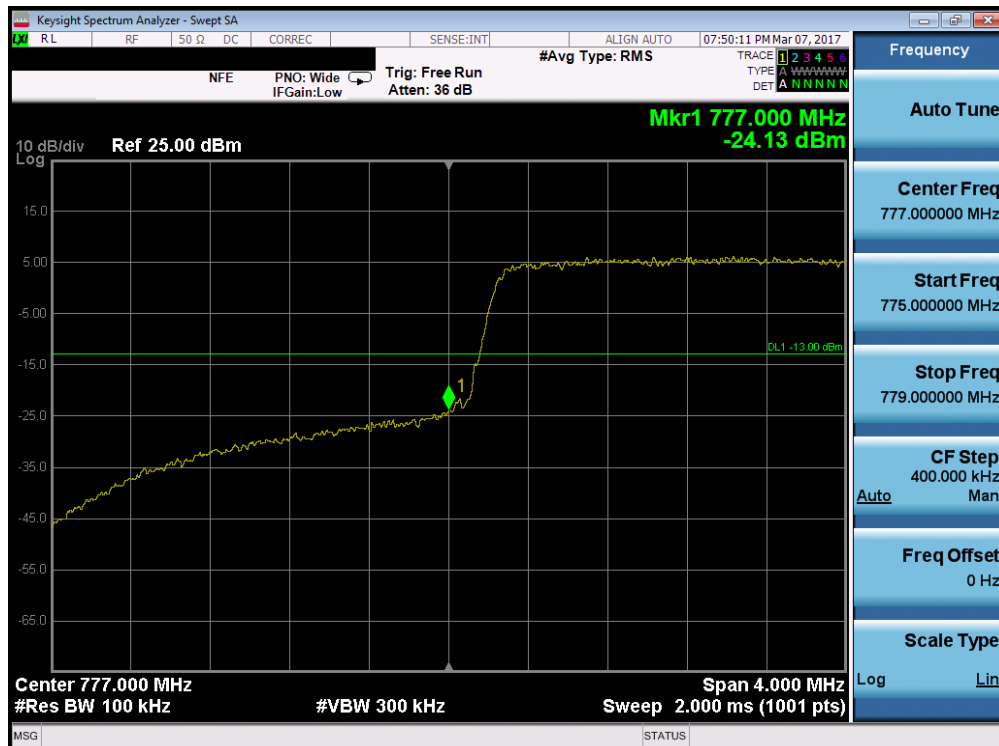


Plot 7-72. Lower Band Edge Plot (Band 17 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 54 of 103

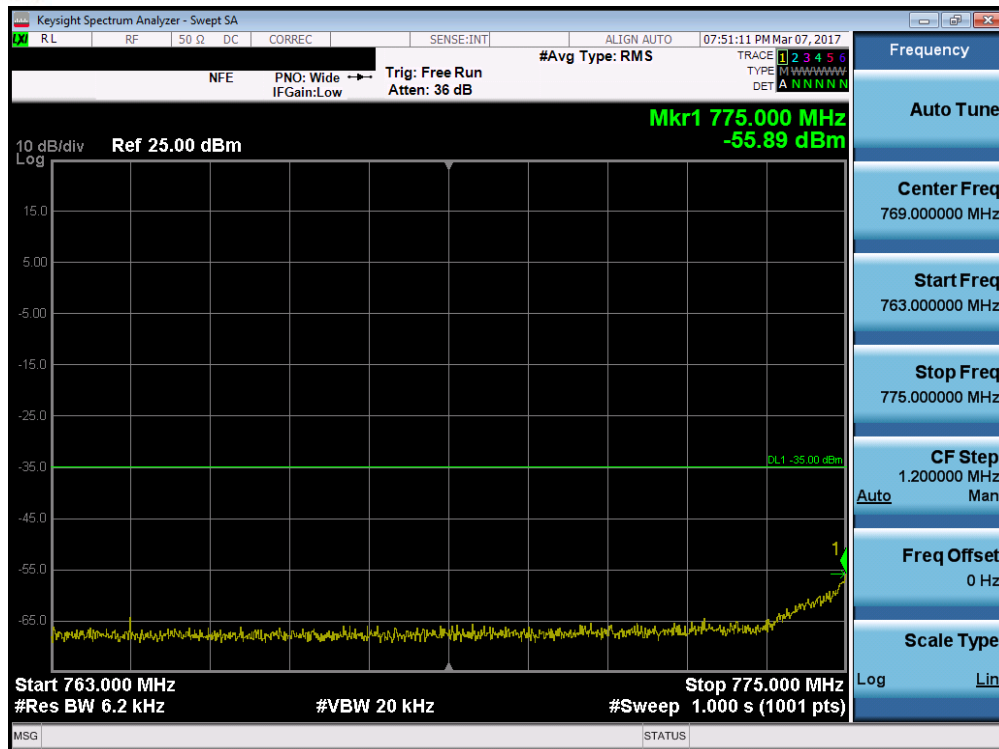


Plot 7-73. Upper Band Edge Plot (Band 17 – 10.0MHz QPSK – RB Size 50)



Plot 7-74. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 55 of 103

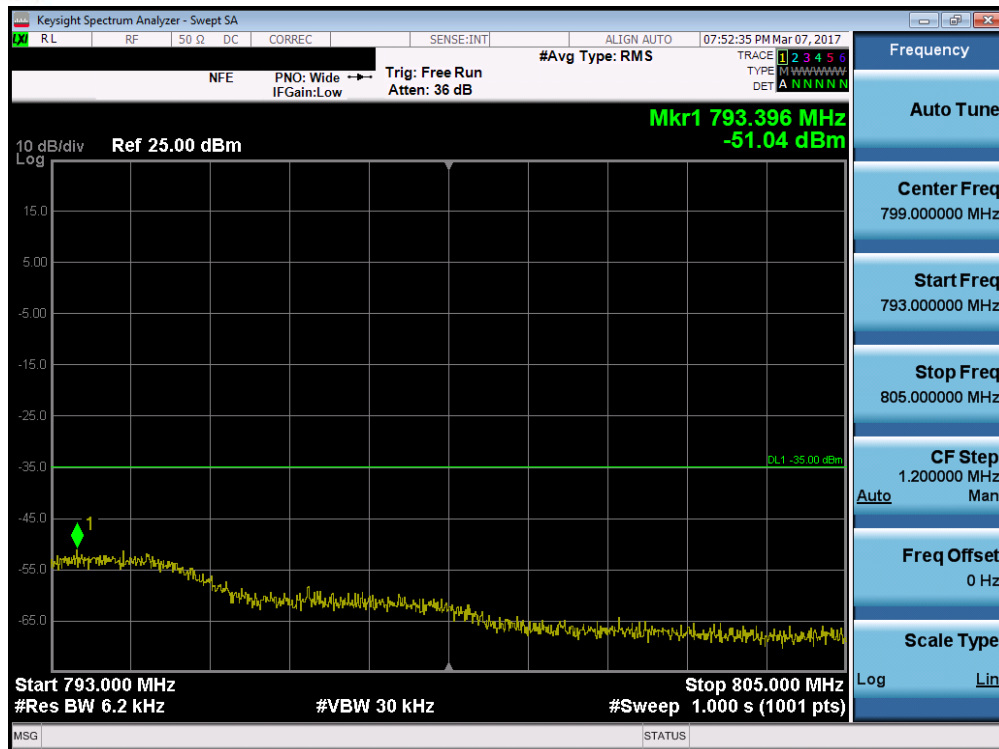


Plot 7-75. Lower Emission Mask Edge Plot (Band 13 - 5.0MHz QPSK - RB Size 25)

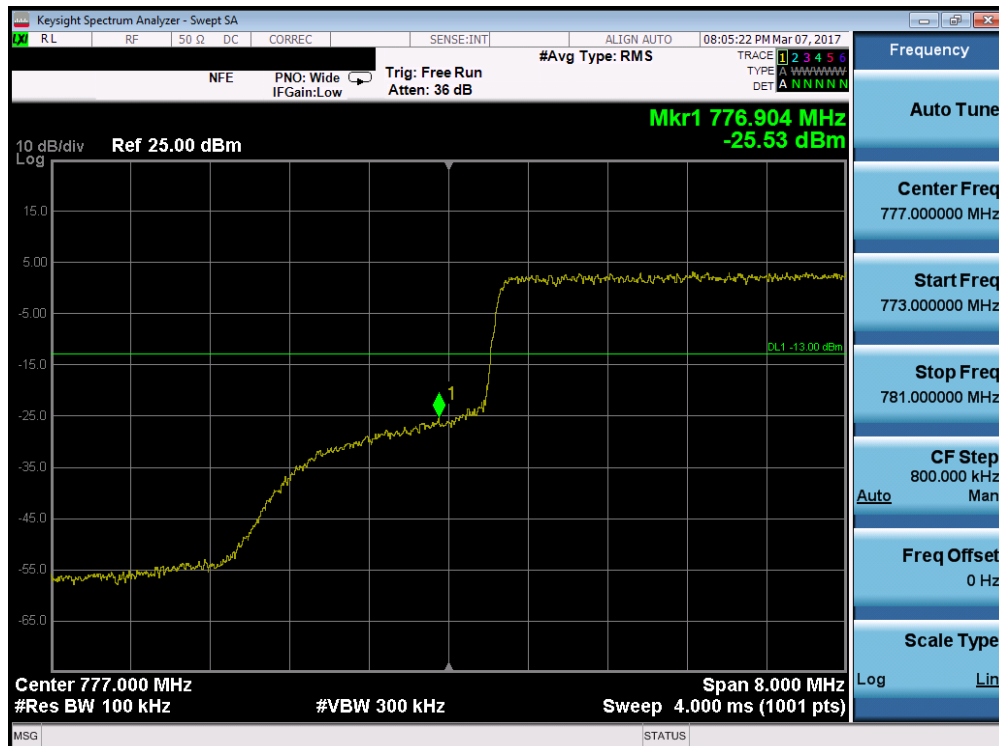


Plot 7-76. Upper Band Edge Plot (Band 13 - 5.0MHz QPSK - RB Size 25)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 56 of 103

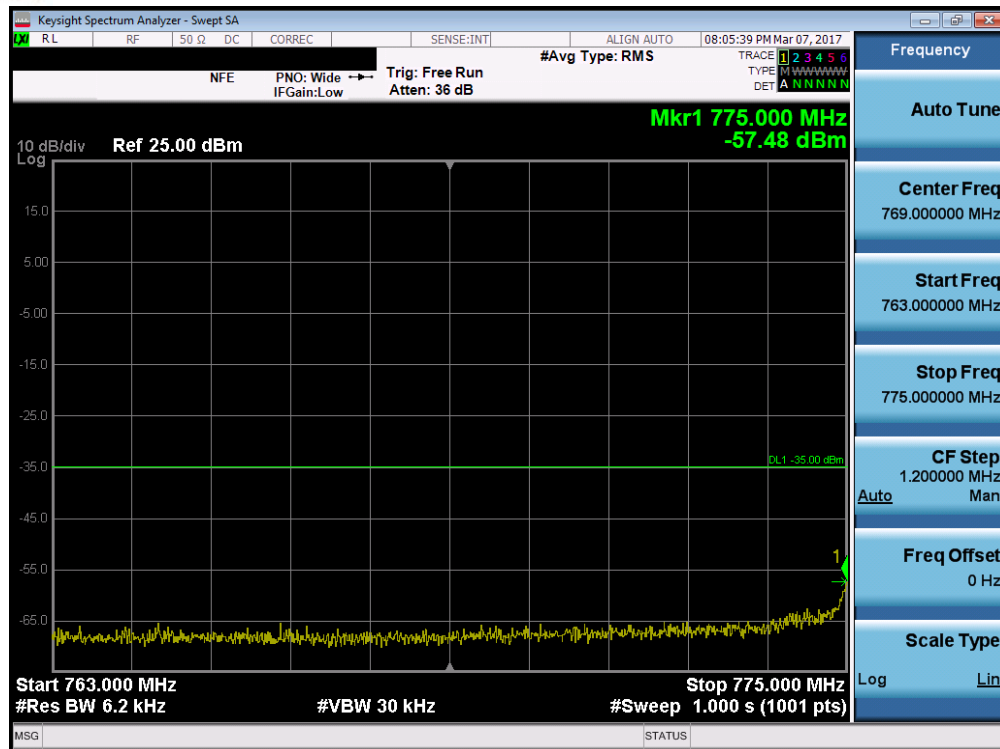


Plot 7-77. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-78. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 57 of 103

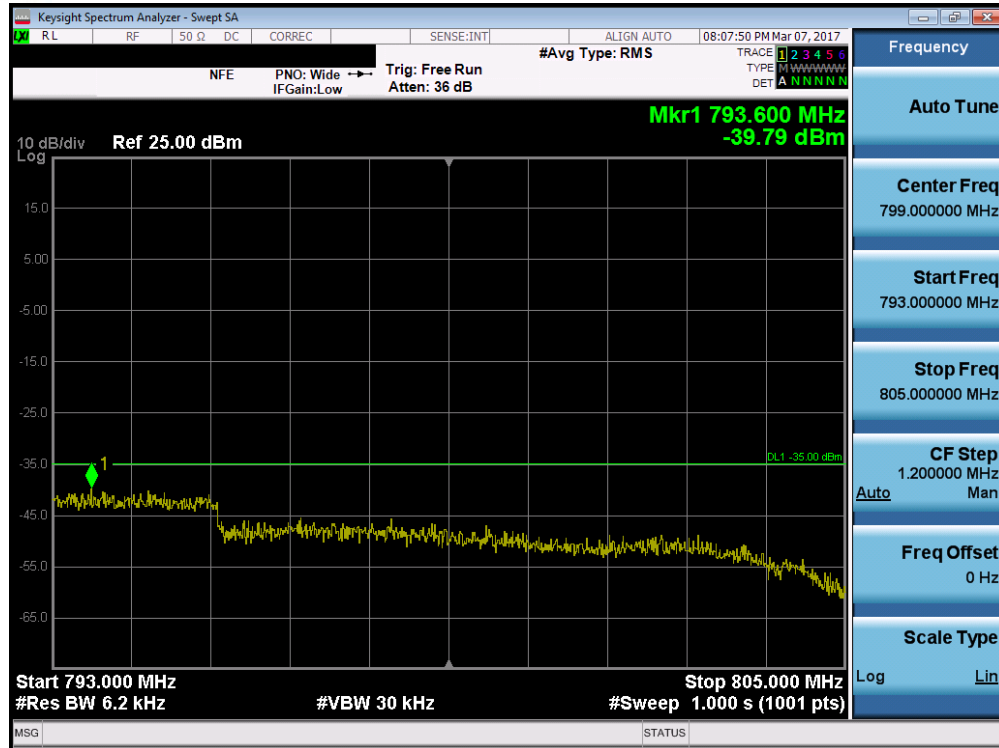


Plot 7-79. Lower Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

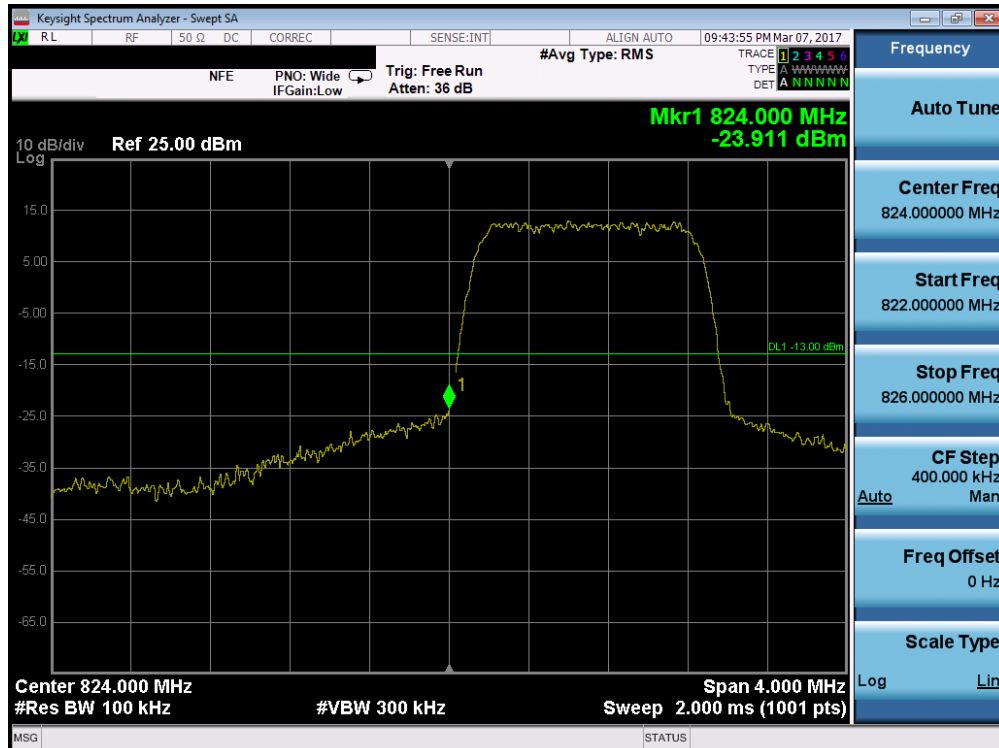


Plot 7-80. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSCV35	 FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset	Page 58 of 103

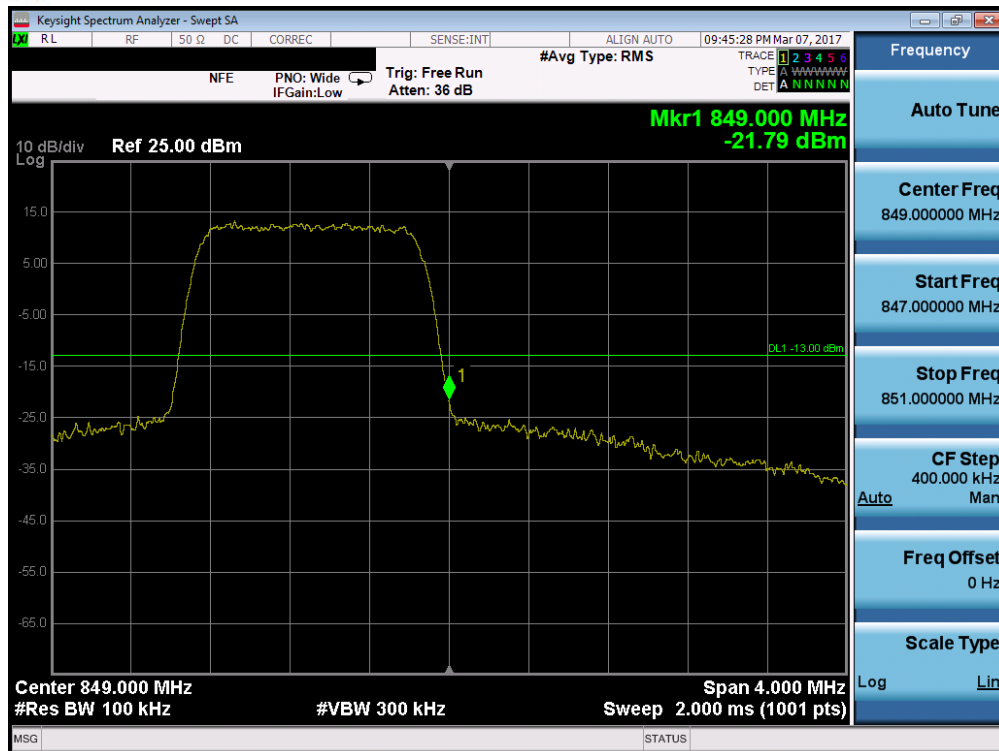


Plot 7-81. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

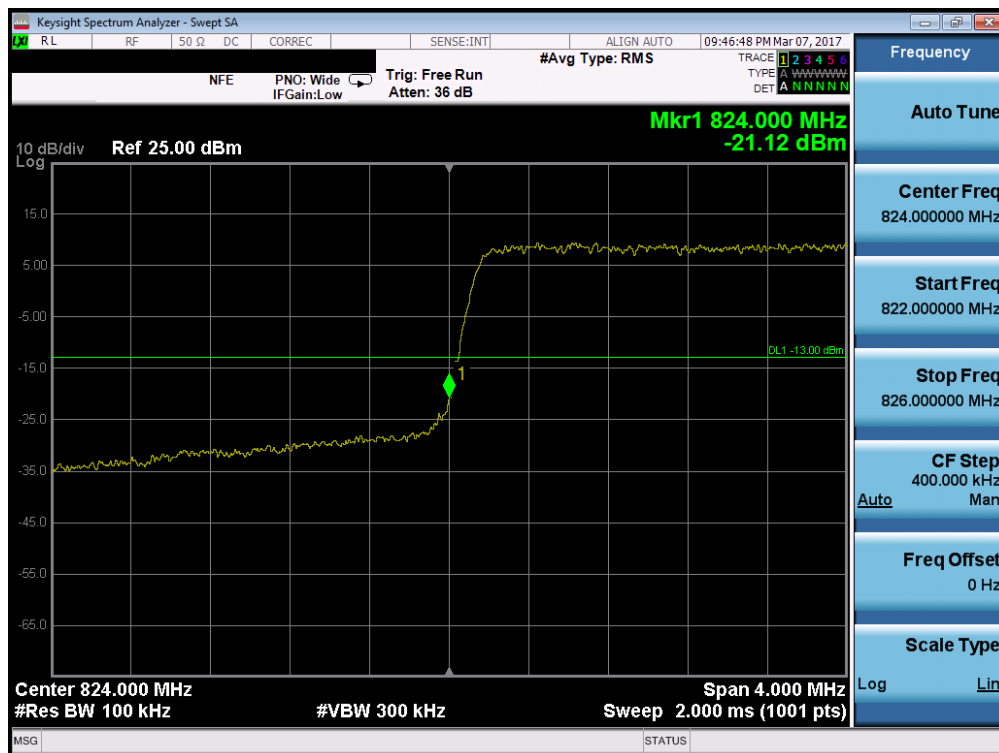


Plot 7-82. Lower Band Edge Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 59 of 103



Plot 7-83. Upper Band Edge Plot (Band 5/26 - 1.4MHz QPSK - RB Size 6)

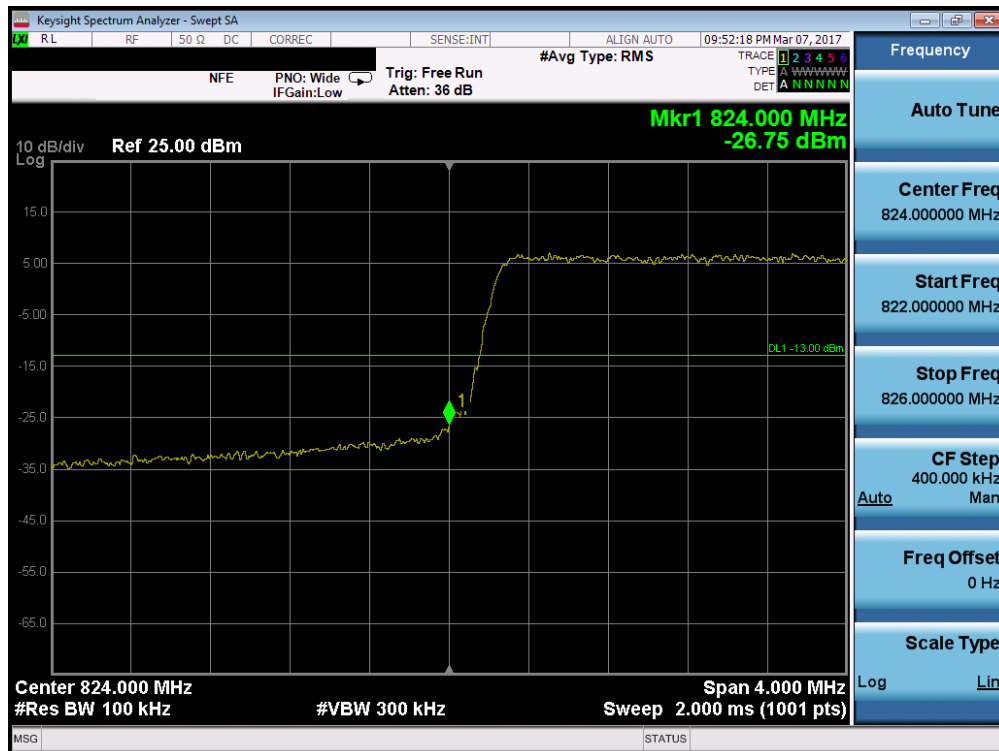


Plot 7-84. Lower Band Edge Plot (Band 5/26 - 3.0MHz QPSK - RB Size 15)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 60 of 103



Plot 7-85. Upper Band Edge Plot (Band 5/26 – 3.0MHz QPSK – RB Size 15)

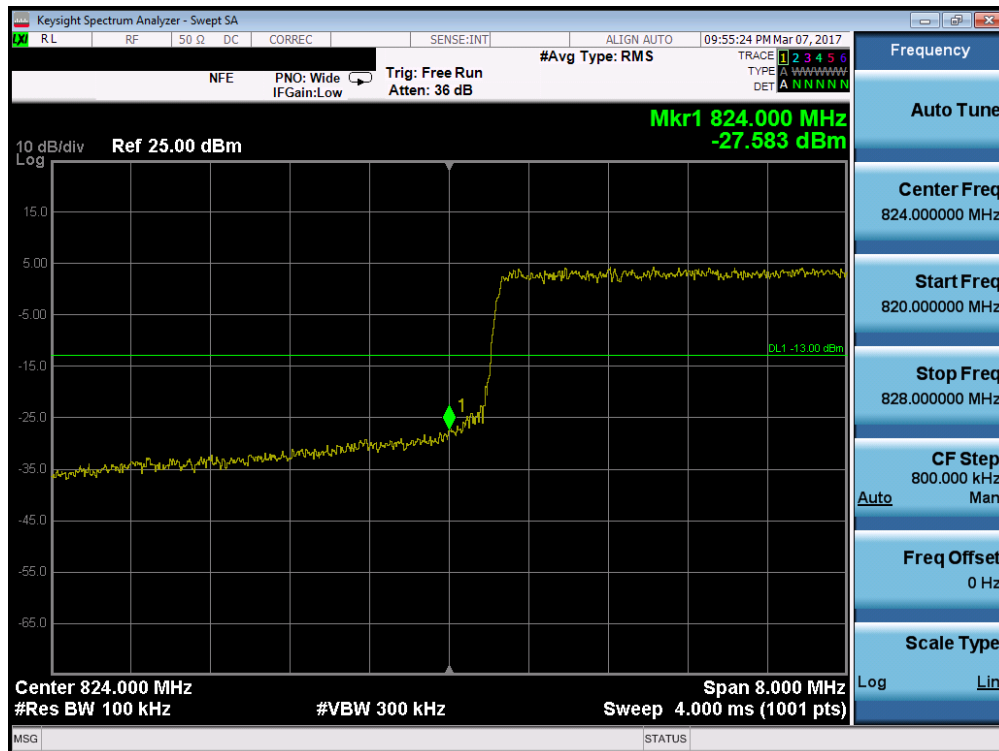


Plot 7-86. Lower Band Edge Plot (Band 5/26 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 61 of 103



Plot 7-87. Upper Band Edge Plot (Band 5/26 - 5.0MHz QPSK - RB Size 25)

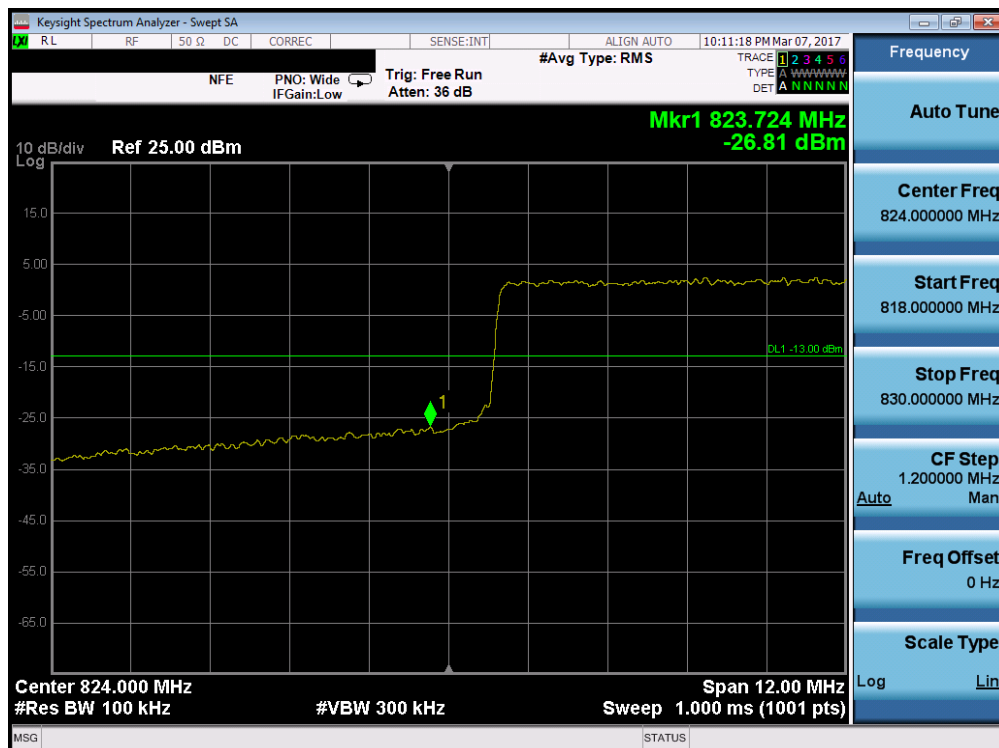


Plot 7-88. Lower Band Edge Plot (Band 5/26 - 10.0MHz QPSK - RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 62 of 103

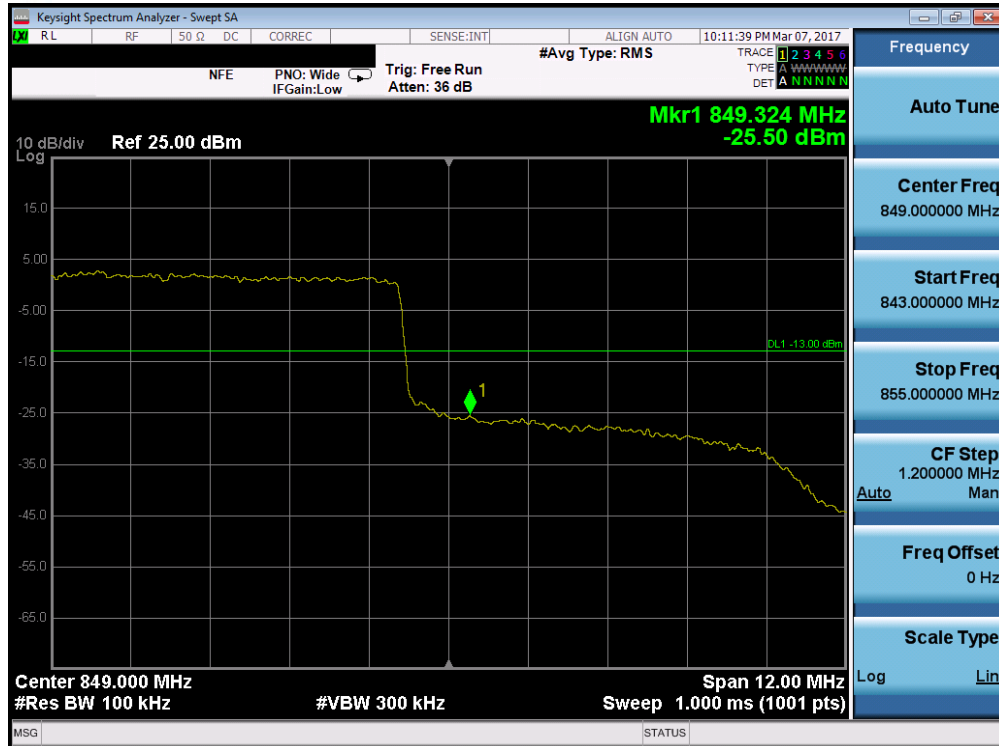


Plot 7-89. Upper Band Edge Plot (Band 5/26 – 10.0MHz QPSK – RB Size 50)

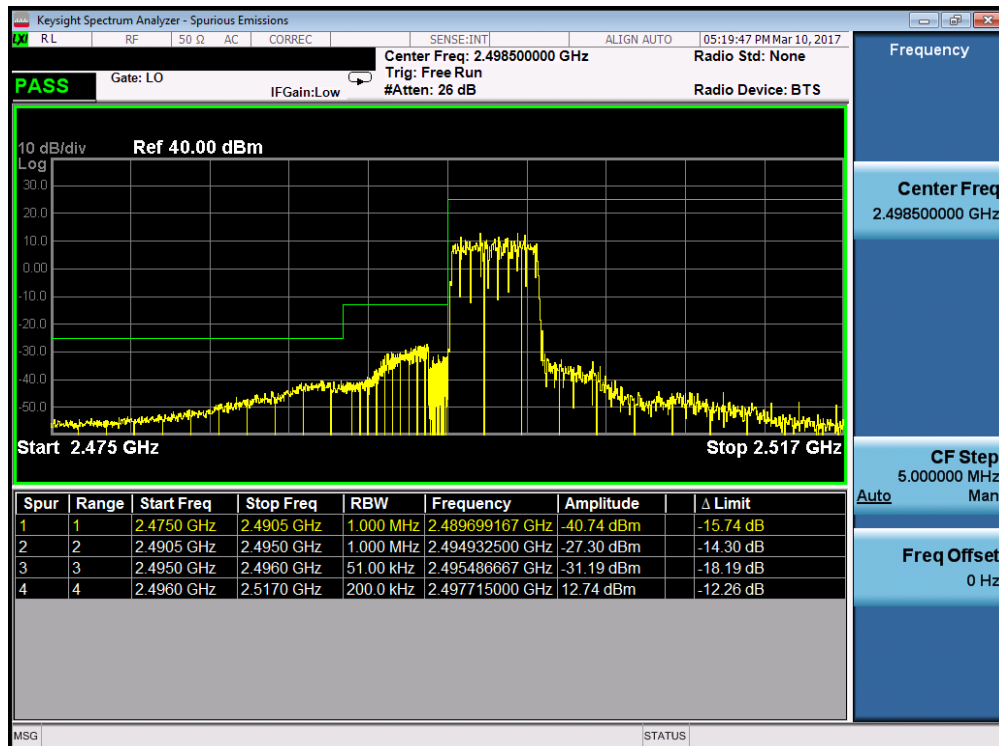


Plot 7-90. Lower Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 63 of 103

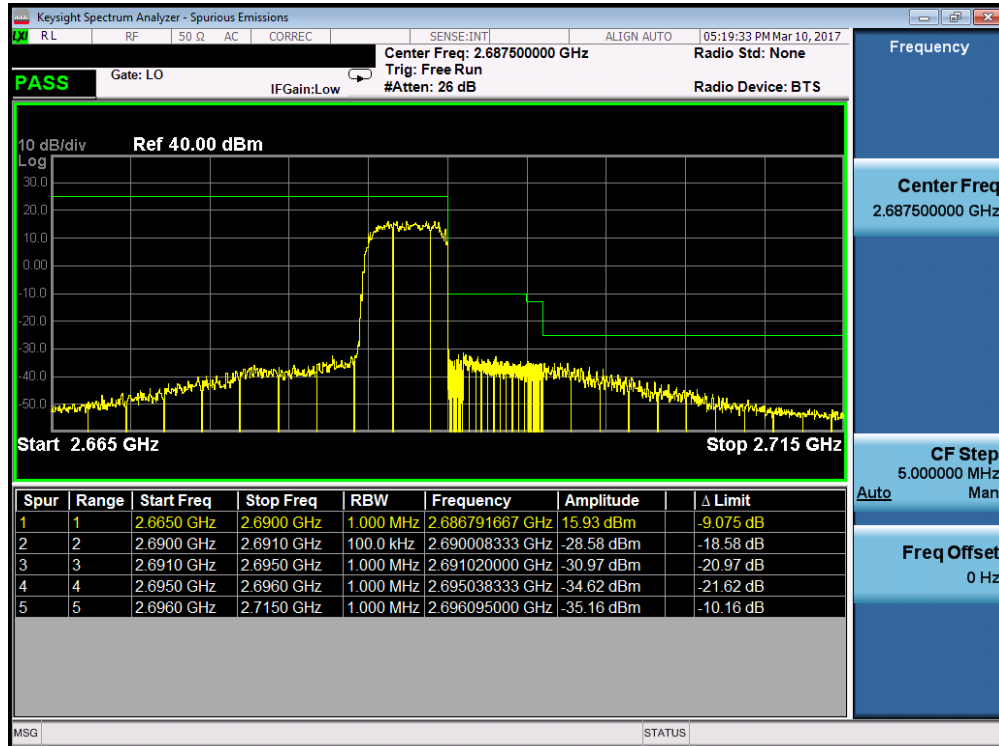


Plot 7-91. Upper Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)

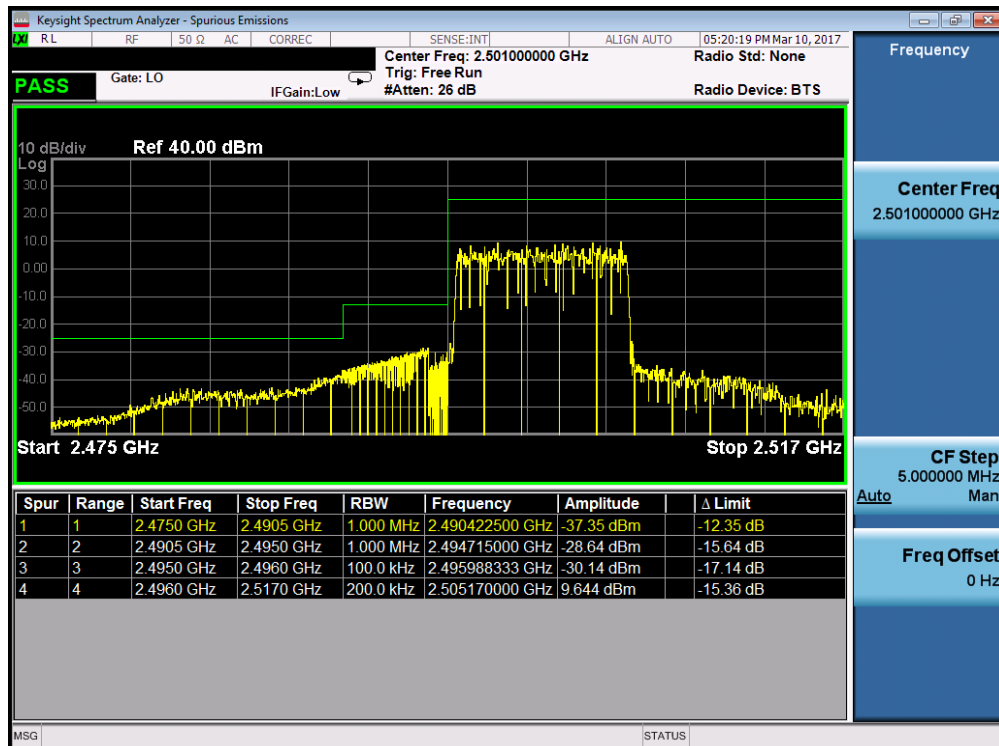


Plot 7-92. Lower ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset			Page 64 of 103

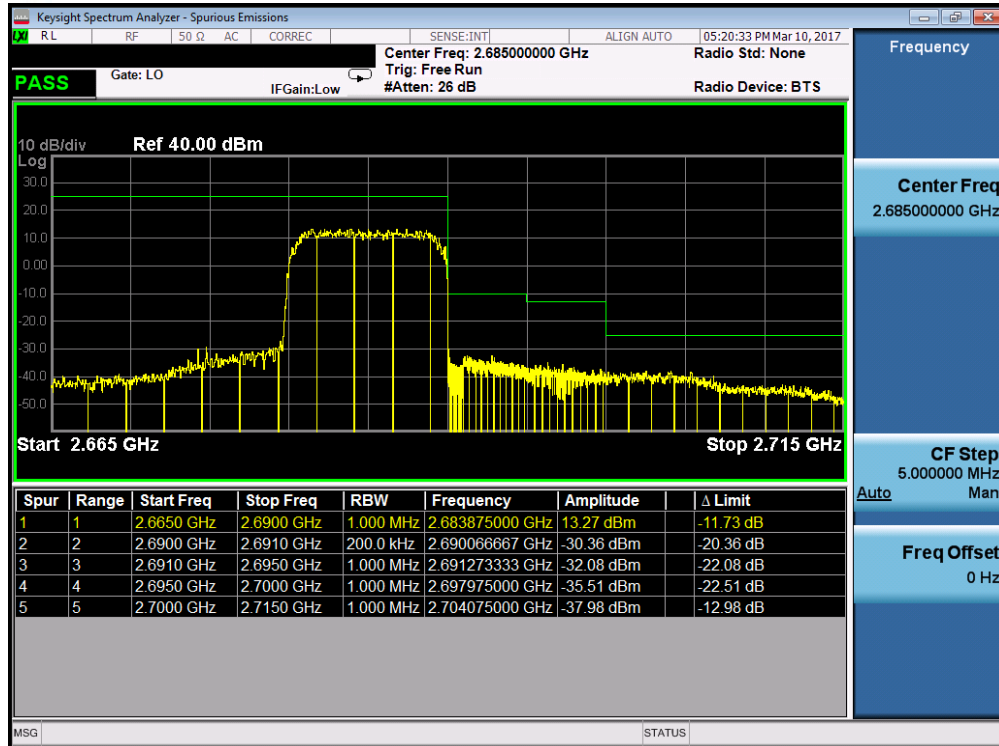


Plot 7-93. Upper ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)

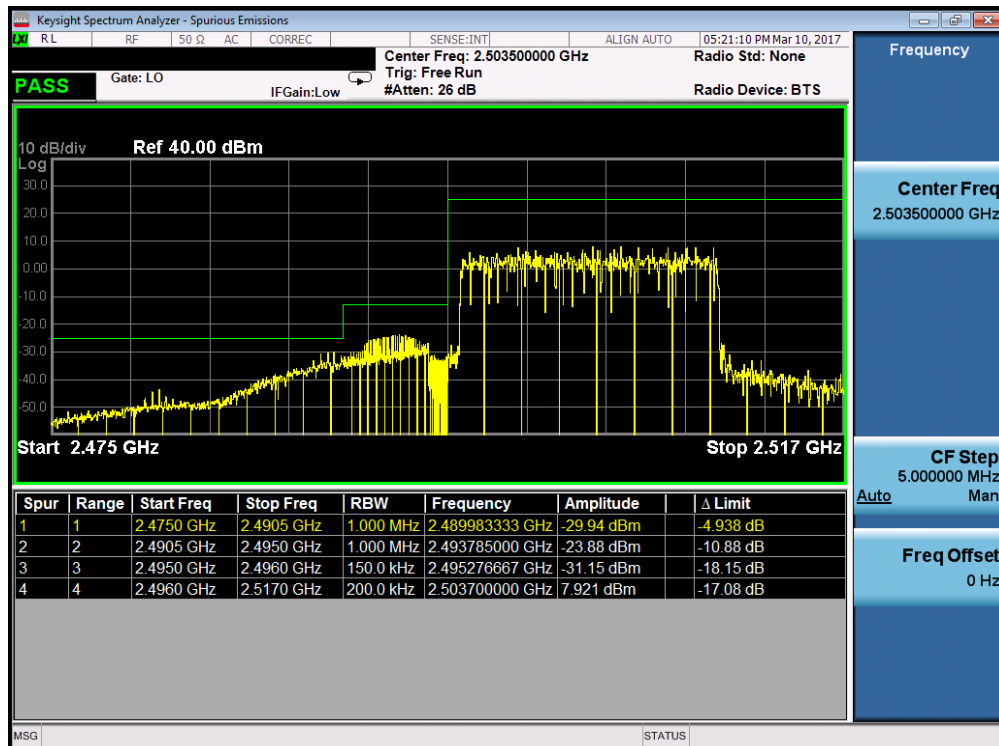


Plot 7-94. Lower ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset			Page 65 of 103

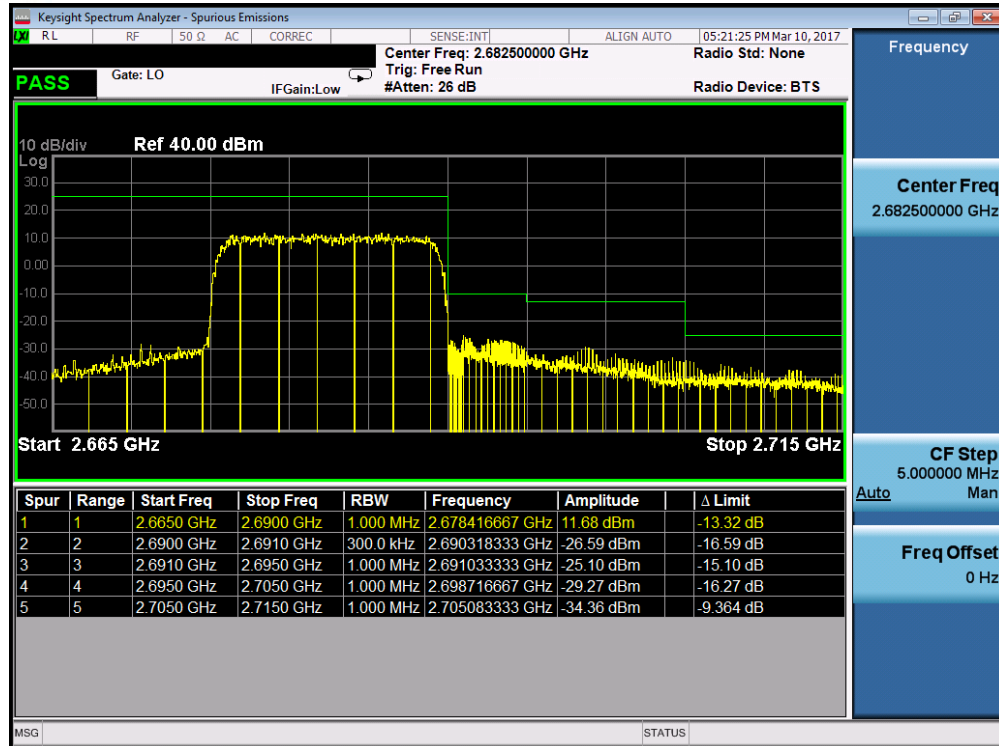


Plot 7-95. Upper ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)

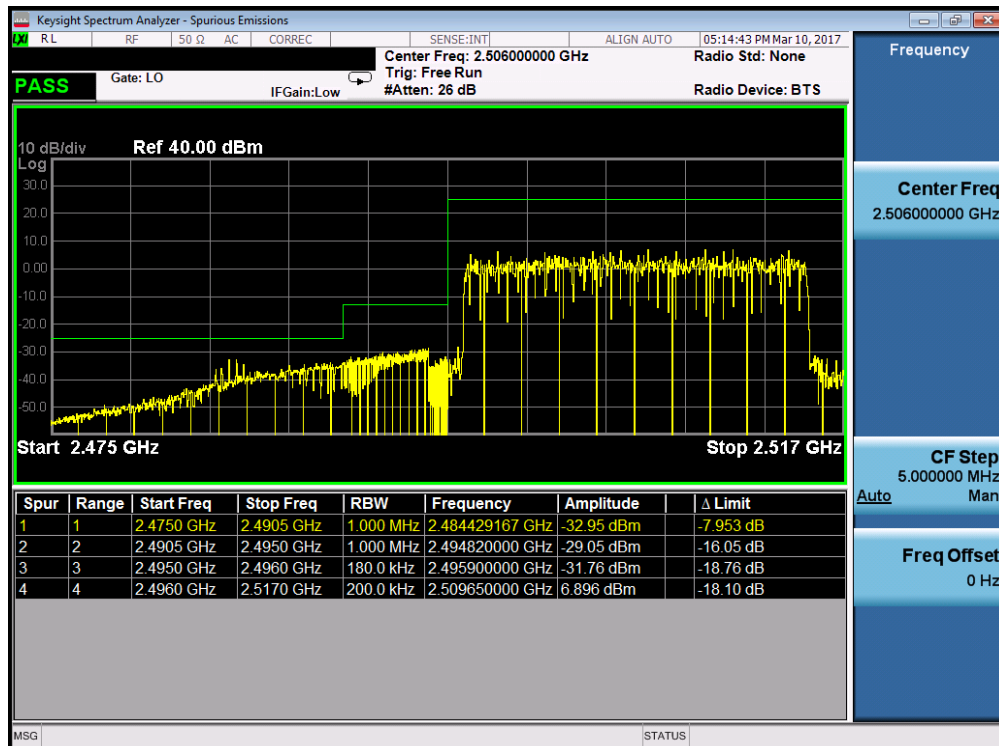


Plot 7-96. Lower ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset			Page 66 of 103

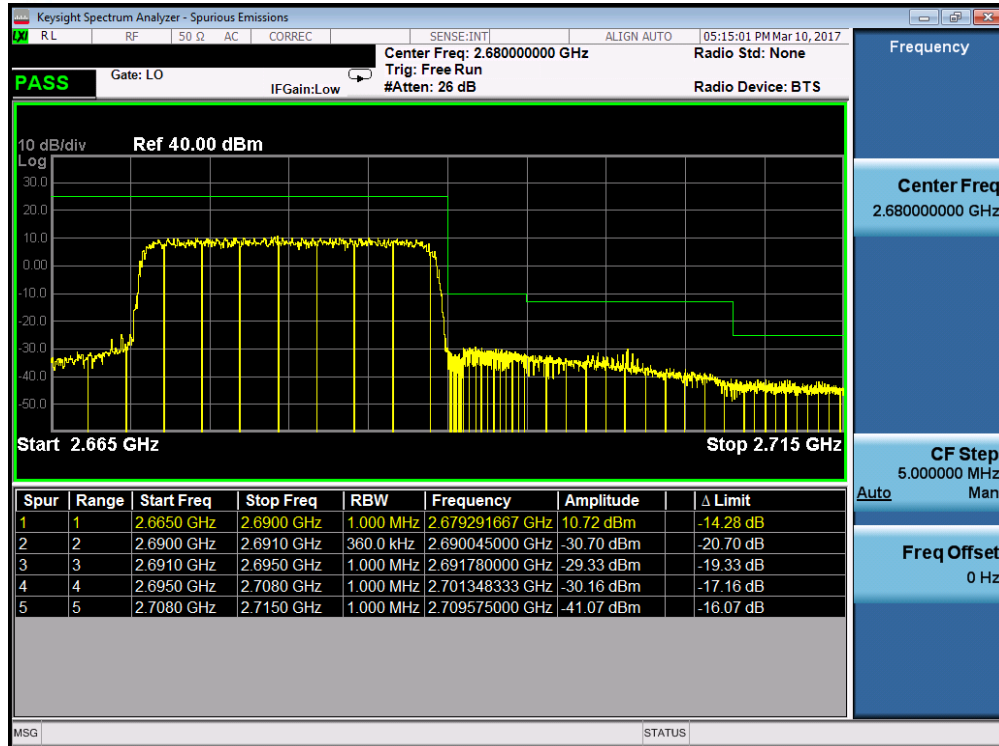


Plot 7-97. Upper ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



Plot 7-98. Lower ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 67 of 103	



Plot 7-99. Upper ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSCV35			FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset			Page 68 of 103

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7.5 Uplink Carrier Aggregation

§27.53(m)

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers 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 $55 + \log_{10}(P_{\text{Watts}})$.

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.

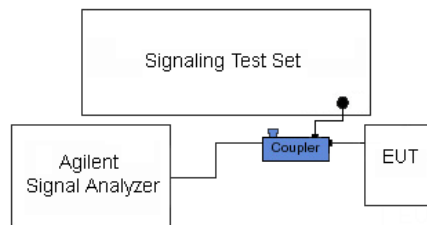


Figure 7-4. Test Instrument & Measurement Setup

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 69 of 103

Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.
2. Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation, as shown in Table 7-3 below, with both carriers set to transmit using 1RB.
3. 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.

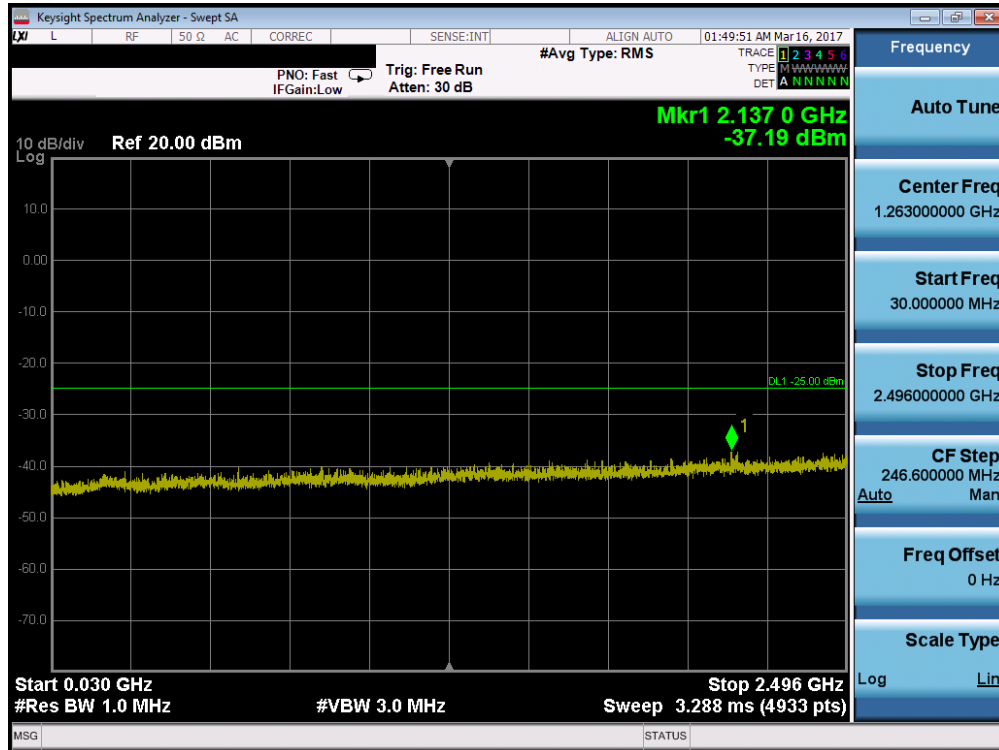
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	
Max	LTE B41	10	40620	2593	QPSK	1	49	LTE B41	15	40740	2605	QPSK	1	0	23.98
Max	LTE B41	10	40620	2593	QPSK	1	49	LTE B41	20	40764	2607.4	QPSK	1	0	23.33
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	15	40770	2608	QPSK	1	0	23.18
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	20	40791	2610.1	QPSK	1	0	23.15
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	10	40764	2607.4	QPSK	1	0	23.23
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	15	40791	2610.1	QPSK	1	0	23.11
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	23.14

Table 7-2. Conducted Powers (B41 – PCC: RB Size 1, Offset Max and SCC: RB Size 1, Offset 0)

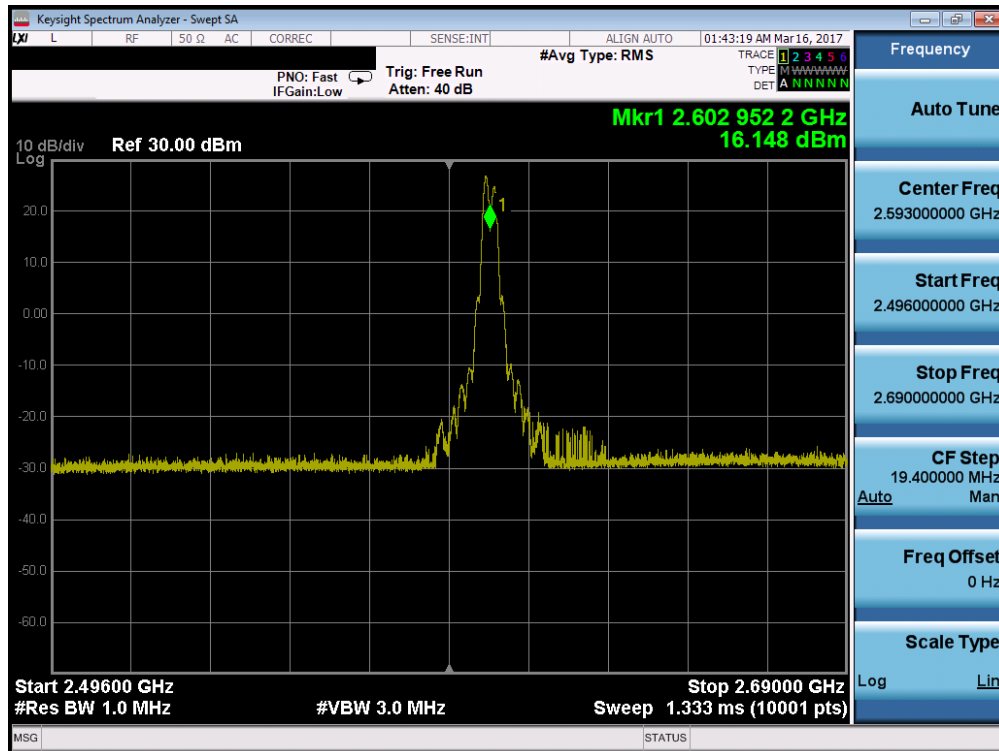
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	
Max	LTE B41	20	39750	2506	QPSK	1	0	LTE B41	20	39948	2525.8	QPSK	1	0	20.25
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	99	20.05
Max	LTE B41	20	39750	2506	QPSK	1	0	LTE B41	20	39948	2525.8	QPSK	1	99	16.25
Max	LTE B41	20	39750	2506	QPSK	1	50	LTE B41	20	39948	2525.8	QPSK	1	50	20.14
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	23.54
Max	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	QPSK	100	0	21.34
Max	LTE B41	20	39750	2506	16-QAM	100	0	LTE B41	20	39948	2525.8	16-QAM	100	0	20.36
Max	LTE B41	20	39750	2506	64-QAM	100	0	LTE B41	20	39948	2525.8	64-QAM	100	0	20.04

Table 7-3. Conducted Powers (B41 with Various Combinations for 20MHz Channel Bandwidth)

FCC ID: A3LSCV35			FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset			Page 70 of 103

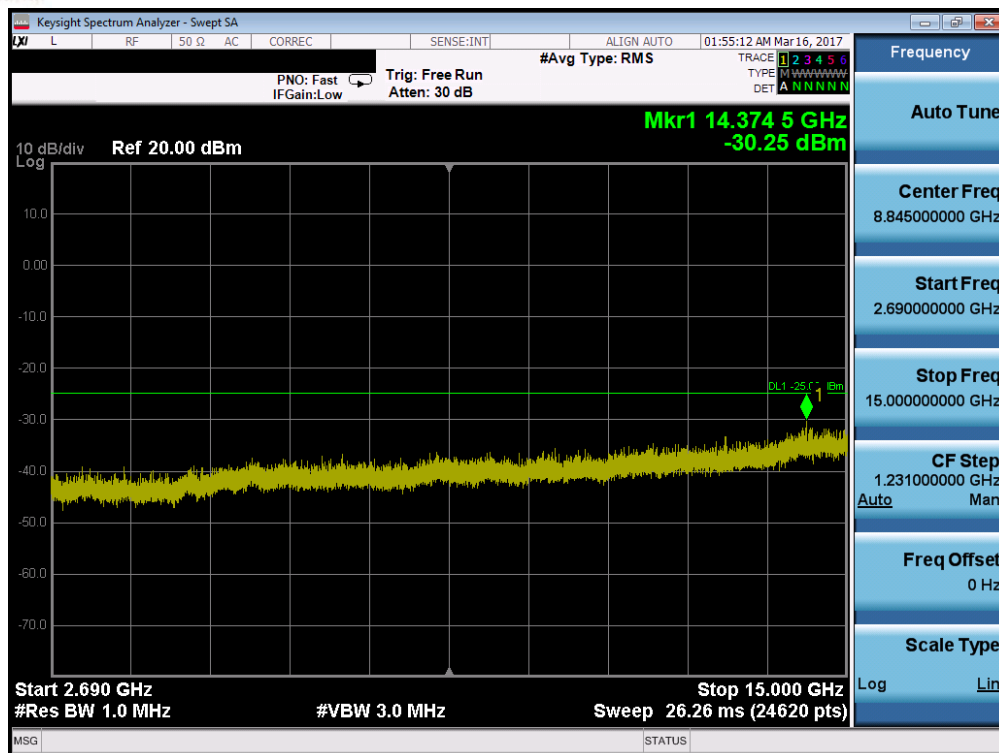


Plot 7-100. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

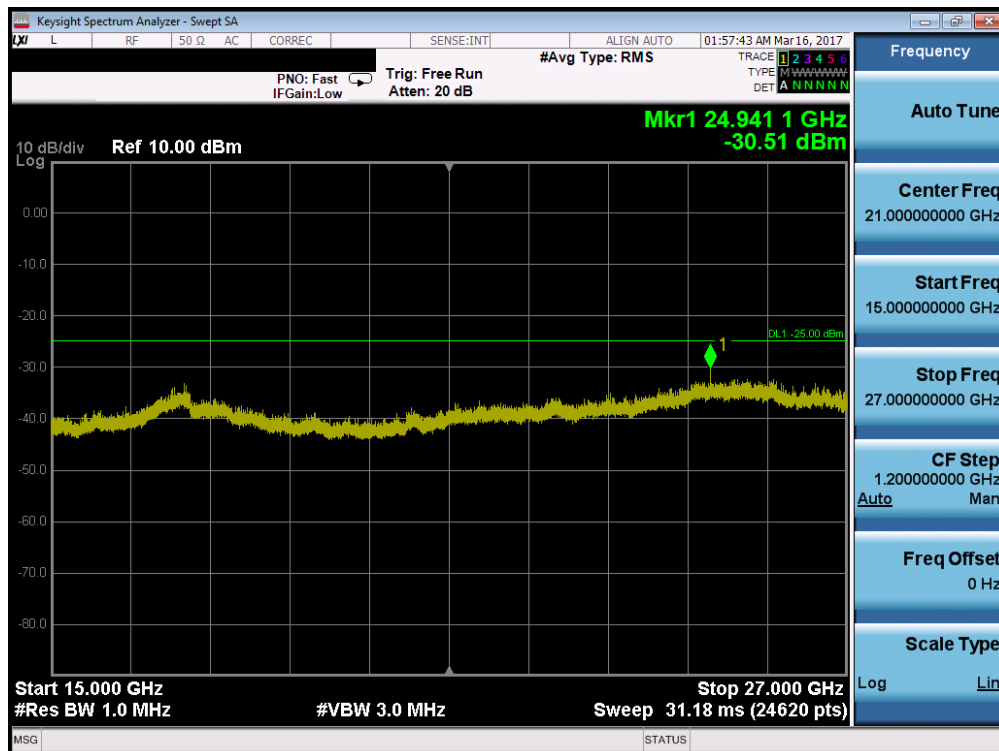


Plot 7-101. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 71 of 103

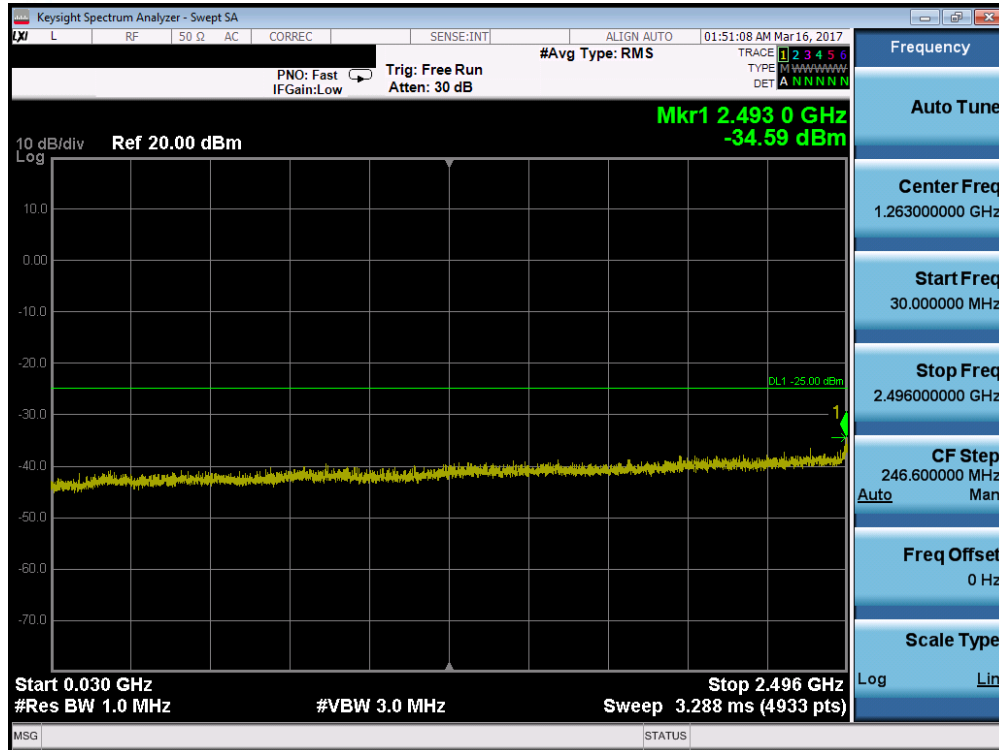


Plot 7-102. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 ,SCC 1/0 – Mid Channel)

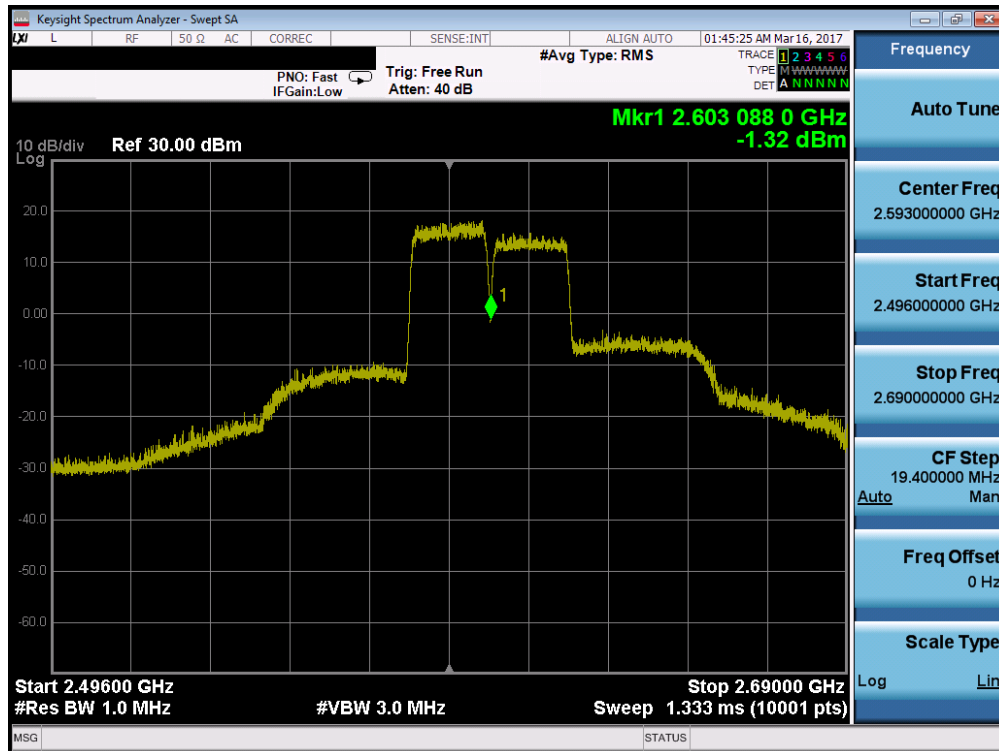


Plot 7-103. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99, SCC 1/0 – Mid Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 72 of 103

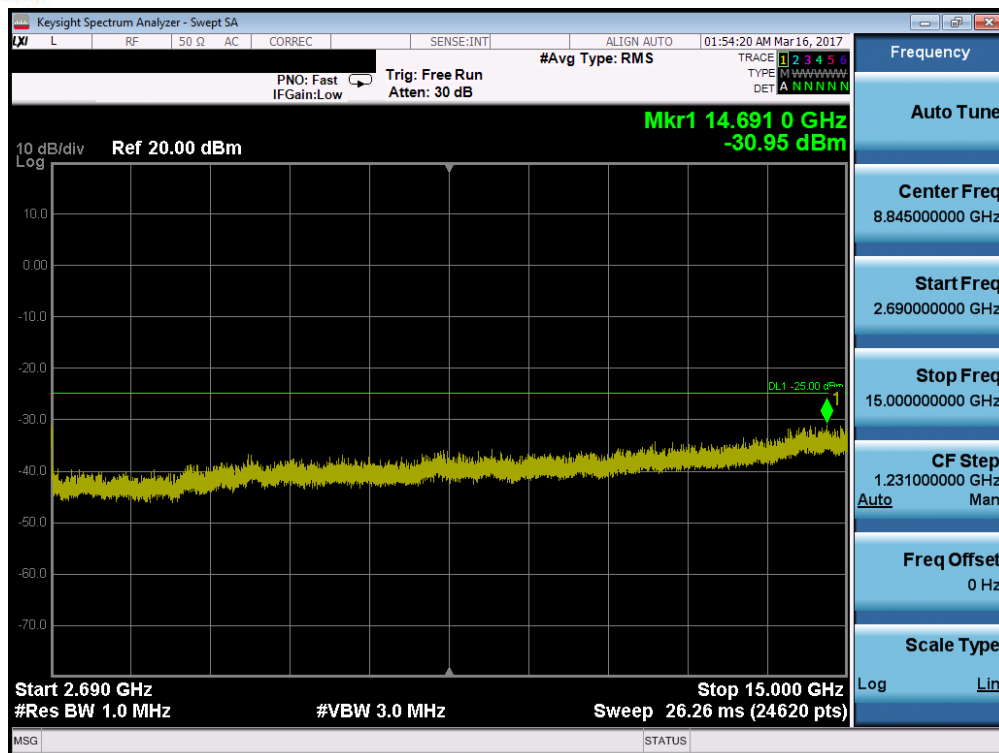


Plot 7-104. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0, SCC 100/0 – Mid Channel)

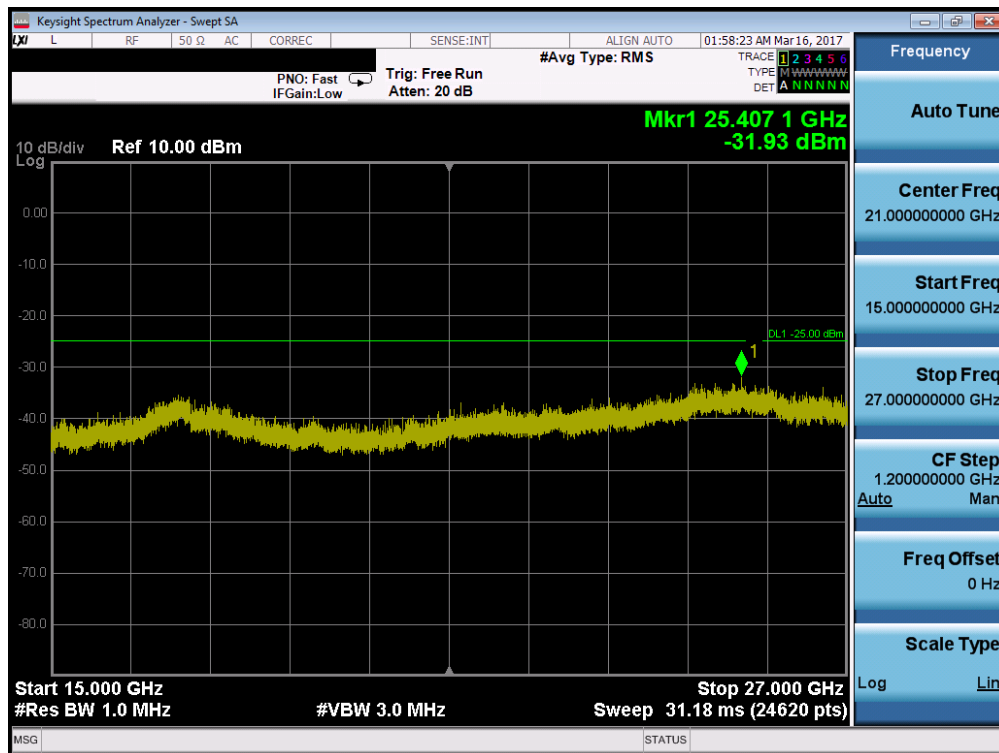


Plot 7-105. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0, SCC 100/0 – Mid Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-106. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0, SCC 100/0 – Mid Channel)



Plot 7-107. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0, SCC 100/0 – Mid Channel)

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 74 of 103

7.6 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.2) §27.50(h.2) §27.50(b.10) §27.50(c.10)

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 $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ 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

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Test Setup

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

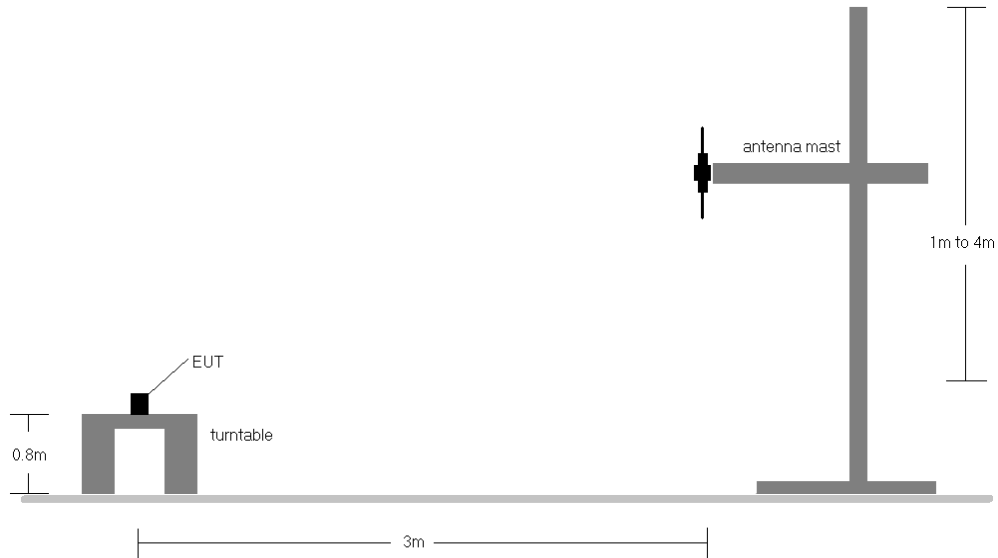


Figure 7-5. Radiated Test Setup <1GHz

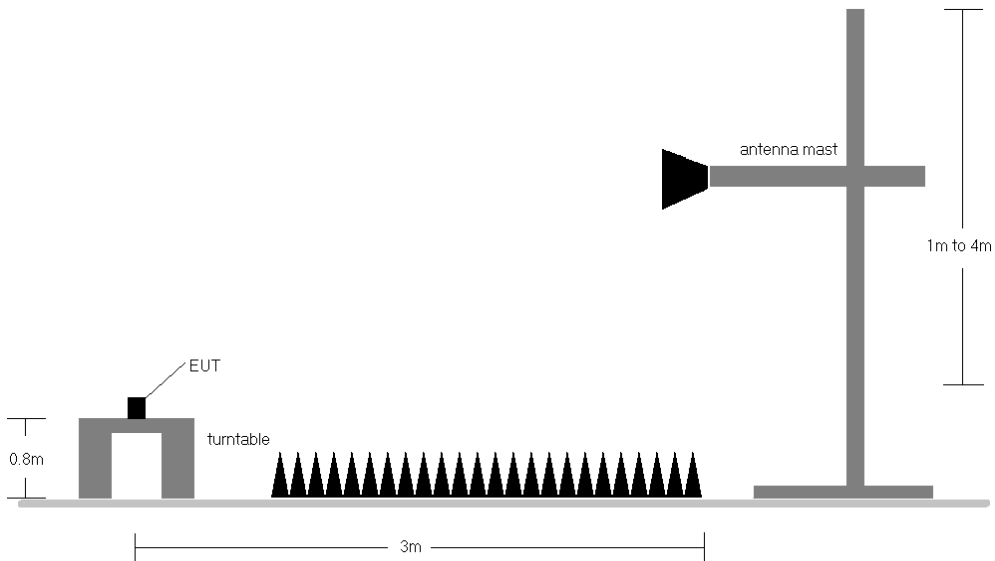


Figure 7-6. Radiated Test Setup >1GHz

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.

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1703080090-03.A3L	Test Dates: 3/5-3/24/2017	EUT Type: Portable Handset		Page 76 of 103

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]
706.50	5	QPSK	H	190	251	1 / 24	18.02	-0.26	17.76	34.77	-17.01
710.00	5	QPSK	H	189	259	1 / 0	18.44	-0.28	18.16	34.77	-16.61
713.50	5	QPSK	H	189	255	1 / 0	18.63	-0.30	18.33	34.77	-16.45
713.50	5	16-QAM	H	189	255	1 / 0	17.73	-0.30	17.43	34.77	-17.35
713.50	5	64-QAM	H	189	255	1 / 0	16.77	-0.30	16.47	34.77	-18.31
709.00	10	QPSK	H	183	247	1 / 49	18.22	-0.27	17.95	34.77	-16.82
710.00	10	QPSK	H	180	251	1 / 49	18.32	-0.28	18.04	34.77	-16.73
711.00	10	QPSK	H	186	254	1 / 0	18.52	-0.29	18.23	34.77	-16.55
711.00	10	16-QAM	H	186	254	1 / 0	17.56	-0.29	17.27	34.77	-17.51
711.00	10	64-QAM	H	186	254	1 / 0	16.61	-0.29	16.32	34.77	-18.46
713.50	5	QPSK	V	21	201	1 / 74	18.88	-1.20	17.68	34.77	-17.09
713.50	5 (WCP)	QPSK	H	185	264	1 / 0	18.17	-0.30	17.87	34.77	-16.91

Table 7-4. ERP Data (Band 17)

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]
779.50	5	QPSK	H	0	237	1 / 0	16.84	-0.57	16.27	34.77	-18.50
782.00	5	QPSK	H	0	256	1 / 0	16.70	-0.58	16.12	34.77	-18.65
784.50	5	QPSK	H	0	235	1 / 0	16.46	-0.59	15.87	34.77	-18.90
779.50	5	16-QAM	H	0	237	1 / 0	16.15	-0.57	15.58	34.77	-19.19
779.50	5	64-QAM	H	0	237	1 / 0	15.06	-0.57	14.49	34.77	-20.28
782.00	10	QPSK	H	0	255	1 / 0	16.92	-0.58	16.34	34.77	-18.43
782.00	10	QPSK	V	0	134	1 / 0	16.17	-0.58	15.59	34.77	-19.18
782.00	10 (WCP)	QPSK	H	0	249	1 / 0	16.19	-0.58	15.61	34.77	-19.16

Table 7-5. ERP Data (Band 13)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Positioner Azimuth [degree]	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	356	272	3 / 2	17.85	-0.75	17.10	38.45	-21.35
836.50	1.4	QPSK	H	0	265	3 / 2	18.17	-0.84	17.33	38.45	-21.12
848.30	1.4	QPSK	H	358	261	3 / 2	18.23	-0.94	17.29	38.45	-21.16
836.50	1.4	16-QAM	H	0	265	3 / 2	17.18	-0.84	16.34	38.45	-22.11
836.50	1.4	64-QAM	H	0	265	3 / 2	16.31	-0.84	15.47	38.45	-22.98
825.50	3	QPSK	H	358	271	1 / 14	17.96	-0.75	17.21	38.45	-21.25
836.50	3	QPSK	H	350	269	1 / 14	17.96	-0.84	17.12	38.45	-21.33
847.50	3	QPSK	H	355	273	1 / 0	18.33	-0.93	17.40	38.45	-21.05
847.50	3	16-QAM	H	355	273	1 / 0	17.35	-0.93	16.42	38.45	-22.03
847.50	3	64-QAM	H	355	273	1 / 0	16.28	-0.93	15.35	38.45	-23.10
826.50	5	QPSK	H	0	275	1 / 24	18.20	-0.76	17.44	38.45	-21.01
836.50	5	QPSK	H	0	269	1 / 24	18.35	-0.84	17.51	38.45	-20.94
846.50	5	QPSK	H	354	264	1 / 0	18.59	-0.92	17.67	38.45	-20.78
846.50	5	16-QAM	H	354	264	1 / 0	17.66	-0.92	16.74	38.45	-21.71
846.50	5	64-QAM	H	354	264	1 / 0	16.80	-0.92	15.88	38.45	-22.57
829.00	10	QPSK	H	355	275	1 / 49	18.29	-0.78	17.51	38.45	-20.94
836.50	10	QPSK	H	359	271	1 / 49	18.54	-0.84	17.70	38.45	-20.75
844.00	10	QPSK	H	0	267	1 / 49	18.82	-0.90	17.92	38.45	-20.53
844.00	10	16-QAM	H	0	267	1 / 49	17.89	-0.90	16.99	38.45	-21.46
844.00	10	64-QAM	H	0	267	1 / 49	16.67	-0.90	15.77	38.45	-22.68

Table 7-6. ERP Data (Band 5/26)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
831.50	15	QPSK	H	0	266	1 / 74	18.01	-0.80	17.21	38.45	-21.24
836.50	15	QPSK	H	0	249	1 / 74	18.24	-0.84	17.40	38.45	-21.05
841.50	15	QPSK	H	351	257	1 / 74	18.47	-0.88	17.59	38.45	-20.86
841.50	15	16-QAM	H	351	257	1 / 74	17.52	-0.88	16.64	38.45	-21.81
841.50	15	64-QAM	H	351	257	1 / 74	16.56	-0.88	15.68	38.45	-22.77

Table 7-7. ERP Data (Band 26)

FCC ID: A3LSCV35	 PCTEST[®] TESTING ENGINEERING LABORATORY, INC.		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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	0	192	1 / 0	15.26	5.73	20.99	33.01	-12.02
2593.00	5	QPSK	H	0	213	1 / 0	15.51	6.07	21.58	33.01	-11.43
2687.50	5	QPSK	H	0	197	1 / 0	15.15	6.48	21.63	33.01	-11.38
2687.50	5	16-QAM	H	0	197	1 / 0	14.13	6.48	20.61	33.01	-12.40
2687.50	5	64-QAM	H	0	197	1 / 0	11.17	6.48	17.65	33.01	-15.36
2501.00	10	QPSK	H	0	200	1 / 49	15.96	5.73	21.69	33.01	-11.32
2593.00	10	QPSK	H	0	193	1 / 0	15.78	6.07	21.85	33.01	-11.16
2685.00	10	QPSK	H	0	197	1 / 0	15.15	6.47	21.62	33.01	-11.39
2593.00	10	16-QAM	H	0	193	1 / 0	14.69	6.07	20.76	33.01	-12.25
2593.00	10	64-QAM	H	0	193	1 / 0	12.30	6.07	18.37	33.01	-14.64
2503.50	15	QPSK	H	0	194	1 / 74	15.57	5.74	21.31	33.01	-11.70
2593.00	15	QPSK	H	0	191	1 / 0	15.76	6.07	21.83	33.01	-11.18
2682.50	15	QPSK	H	0	195	1 / 0	15.05	6.46	21.51	33.01	-11.50
2593.00	15	16-QAM	H	0	191	1 / 0	14.77	6.07	20.84	33.01	-12.17
2593.00	15	64-QAM	H	0	191	1 / 0	11.93	6.07	18.00	33.01	-15.01
2506.00	20	QPSK	H	0	203	1 / 0	15.59	5.75	21.34	33.01	-11.67
2593.00	20	QPSK	H	0	197	1 / 0	15.67	6.07	21.74	33.01	-11.27
2680.00	20	QPSK	H	0	190	1 / 0	15.01	6.45	21.46	33.01	-11.55
2593.00	20	16-QAM	H	0	197	1 / 0	14.66	6.07	20.73	33.01	-12.28
2593.00	20	64-QAM	H	0	197	1 / 0	12.26	6.07	18.33	33.01	-14.68
2593.00	10	QPSK	V	42	161	1 / 0	14.51	6.07	20.58	33.01	-12.43
2593.00	10 (WCP)	QPSK	H	0	201	1 / 0	15.09	6.07	21.16	33.01	-11.85

Table 7-8. EIRP Data (Band 41)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.7 Radiated Spurious Emissions Measurements

\$2.1053 \$22.917(a) \$27.53(c) \$27.53(f) \$27.53(g) \$27.53(h) \$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 $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $\geq 2 \times$ span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Test Setup

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

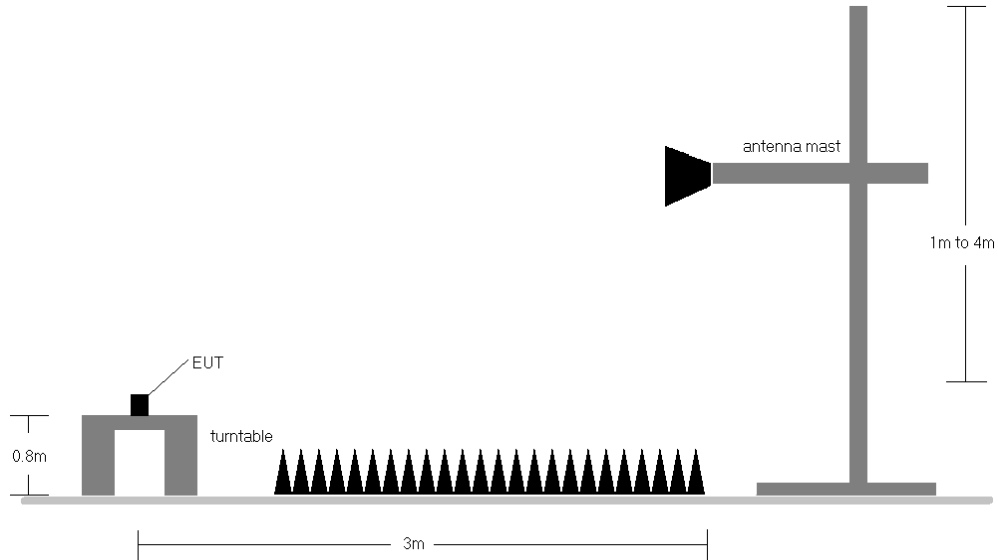


Figure 7-7. Test Instrument & Measurement Setup

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.

FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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OPERATING FREQUENCY: 706.50 MHz
 CHANNEL: 23755
 MEASURED OUTPUT POWER: 17.76 dBm = 0.060 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.76 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]
1413.00	H	149	194	-69.82	5.92	-63.90	81.7
2119.50	H	128	219	-65.37	6.80	-58.57	76.3
2826.00	H	-	-	-66.94	8.12	-58.82	76.6

Table 7-9. Radiated Spurious Data (Band 17 – Low Channel)

OPERATING FREQUENCY: 710.00 MHz
 CHANNEL: 23790
 MEASURED OUTPUT POWER: 18.16 dBm = 0.065 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 31.16 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]
1420.00	H	-	-	-75.59	5.96	-69.62	87.8
2130.00	H	123	11	-66.18	6.84	-59.33	77.5
2840.00	H	-	-	-66.68	8.13	-58.55	76.7

Table 7-10. Radiated Spurious Data (Band 17 – Mid Channel)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 713.50 MHz
 CHANNEL: 23825
 MEASURED OUTPUT POWER: 18.33 dBm = 0.068 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 31.33 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]
1427.00	H	136	172	-68.72	6.01	-62.71	81.0
2140.50	H	121	175	-65.42	6.89	-58.53	76.9
2854.00	H	-	-	-66.77	8.15	-58.62	76.9

Table 7-11. Radiated Spurious Data (Band 17 – High Channel)

OPERATING FREQUENCY: 713.50 MHz
 CHANNEL: 23825
 MEASURED OUTPUT POWER: 17.87 dBm = 0.061 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.87 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]
1427.00	H	100	6	-70.25	6.01	-64.24	82.1
2140.50	H	106	171	-69.23	6.89	-62.34	80.2
2854.00	H	-	-	-68.84	8.15	-60.69	78.6

Table 7-12. Radiated Spurious Data with WCP (Band 17 – High Channel)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 MEASURED OUTPUT POWER: 16.34 dBm = 0.043 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 29.34 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]
2346.00	H	-	-	-67.25	7.00	-60.25	76.6
3128.00	H	-	-	-63.90	7.21	-56.69	73.0

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

MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.00 MHz
 DISTANCE: 3 meters
 NARROWBAND EMISSION LIMIT: -50 dBm
 WIDEBAND EMISSION LIMIT: -40 dBm/MHz

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]	Margin [dB]
1564.00	H	143	150	-68.59	6.41	-62.18	-22.2

Table 7-14. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 MEASURED OUTPUT POWER: 15.61 dBm = 0.036 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 28.61 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]
2346.00	H	-	-	-67.17	7.00	-60.17	75.8
3128.00	H	-	-	-63.88	7.21	-56.67	72.3

Table 7-15. Radiated Spurious Data with WCP (Band 13 – Mid Channel)

MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.00 MHz
 DISTANCE: 3 meters
 NARROWBAND EMISSION LIMIT: -50 dBm
 WIDEBAND EMISSION LIMIT: -40 dBm/MHz

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]	Margin [dB]
1564.00	H	126	181	-67.95	6.41	-61.54	-21.5

Table 7-16. Radiated Spurious Data with WCP (Band 13 – 1559-1610MHz Band)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 829.00 MHz
 CHANNEL: 26840
 MEASURED OUTPUT POWER: 17.51 dBm = 0.056 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.51 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]
1658.00	H	-	-	-75.27	6.26	-69.00	86.5
2487.00	H	-	-	-72.32	6.84	-65.48	83.0

Table 7-17. Radiated Spurious Data (Band 26 – Low Channel)

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 26915
 MEASURED OUTPUT POWER: 17.70 dBm = 0.059 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.70 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	-	-	-75.31	6.21	-69.10	86.8
2509.50	H	-	-	-72.49	6.86	-65.63	83.3

Table 7-18. Radiated Spurious Data (Band 26 – Mid Channel)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 844.00 MHz
 CHANNEL: 26990
 MEASURED OUTPUT POWER: 17.92 dBm = 0.062 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.92 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]
1688.00	H	-	-	-76.01	6.15	-69.86	87.8
2532.00	H	-	-	-73.19	6.93	-66.27	84.2

Table 7-19. Radiated Spurious Data (Band 26 – High Channel)

OPERATING FREQUENCY: 844.00 MHz
 CHANNEL: 26990
 MEASURED OUTPUT POWER: 16.98 dBm = 0.050 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 29.98 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]
1688.00	H	-	-	-75.97	6.15	-69.82	86.8
2532.00	H	-	-	-73.33	6.93	-66.41	83.4

Table 7-20. Radiated Spurious Data with WCP (Band 26 – High Channel)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 2501.00 MHz
 CHANNEL: 39700
 MEASURED OUTPUT POWER: 21.69 dBm = 0.148 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 46.69 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	100	328	-56.58	11.16	-45.42	67.1
7503.00	H	-	-	-48.37	11.21	-37.16	58.9
10004.00	H	-	-	-47.96	12.57	-35.39	57.1
12505.00	H	-	-	-44.10	13.04	-31.06	52.8

Table 7-21. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY: 2593.00 MHz
 CHANNEL: 40620
 MEASURED OUTPUT POWER: 21.85 dBm = 0.153 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 46.85 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	123	48	-48.59	10.83	-37.76	59.6
7779.00	H	119	27	-44.85	11.60	-33.25	55.1
10372.00	H	-	-	-47.78	12.74	-35.04	56.9
12965.00	H	-	-	-41.82	12.83	-28.99	50.8
15558.00	H	-	-	-43.72	14.91	-28.81	50.7

Table 7-22. Radiated Spurious Data (Band 41 – Mid Channel)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 2685.00 MHz
 CHANNEL: 41540
 MEASURED OUTPUT POWER: 21.62 dBm = 0.145 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 46.62 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	-	-	-55.92	11.08	-44.84	66.5
8055.00	H	-	-	-47.64	11.54	-36.10	57.7
10740.00	H	-	-	-47.79	12.97	-34.82	56.4

Table 7-23. Radiated Spurious Data (Band 41 – High Channel)

OPERATING FREQUENCY: 2593.00 MHz
 CHANNEL: 40620
 MEASURED OUTPUT POWER: 21.16 dBm = 0.131 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 46.16 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	130	63	-48.76	10.83	-37.93	59.1
7779.00	H	126	81	-45.92	11.60	-34.32	55.5
10372.00	H	-	-	-47.01	12.74	-34.27	55.4
12965.00	H	-	-	-40.90	12.83	-28.07	49.2
15558.00	H	-	-	-44.08	14.91	-29.17	50.3

Table 7-24. Radiated Spurious Data with WCP (Band 41 – Mid Channel)

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7.8 Uplink Carrier Aggregation Radiated Measurements

\$2.1053, \$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 $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $\geq 2 \times$ span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

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Test Setup

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

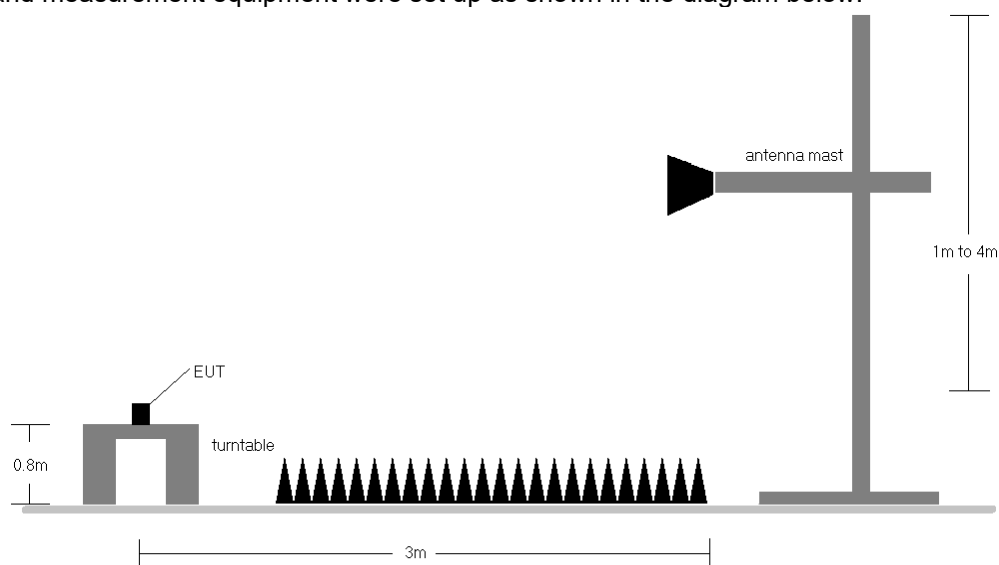
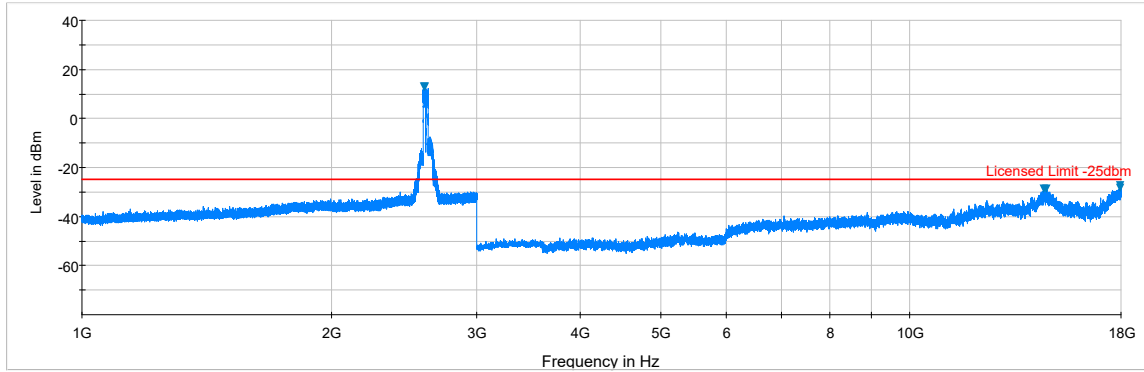


Figure 7-8. Test Instrument & Measurement Setup

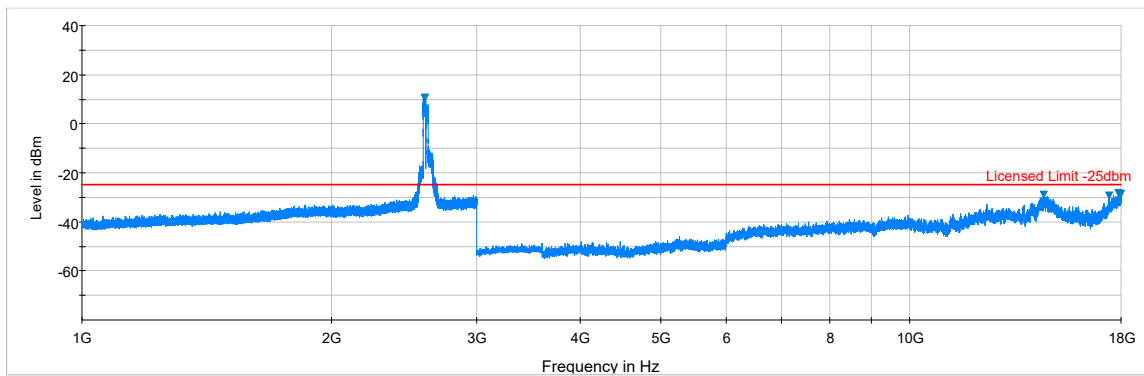
Test Notes

- 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) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
- 4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 5) 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.
- 6) No significant emissions were found as a result of two uplink carriers operating contiguously.

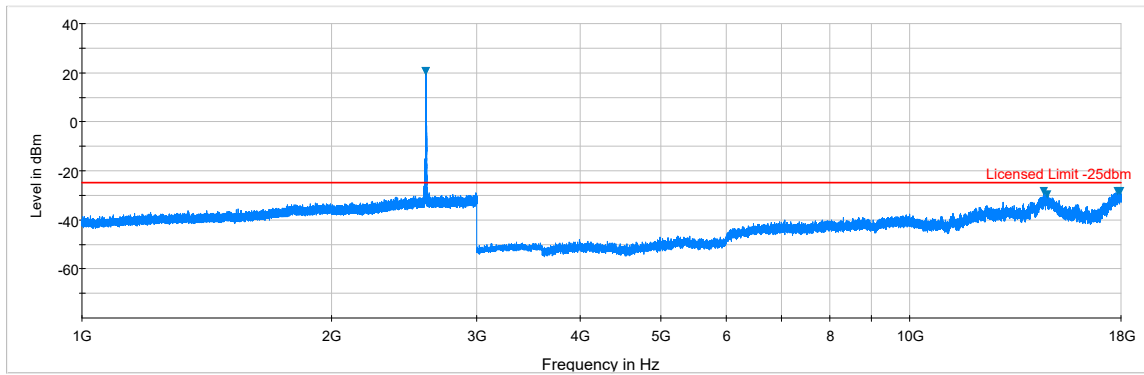
FCC ID: A3LSCV35	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-25. Radiated Spurious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0, Ant. Pol. H)

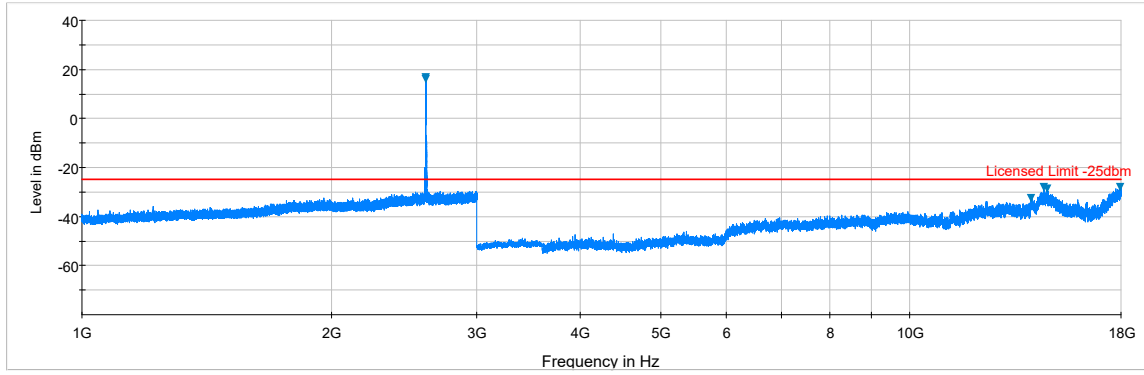


Plot 7-26. Radiated Spurious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0, Ant. Pol. V)



Plot 7-27. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0, Ant. Pol. H)

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Plot 7-28. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0, Ant. Pol. V)

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7.9 Frequency Stability / Temperature Variation

\$2.1055 \$22.355 \$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 $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For 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

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Band 17 Frequency Stability Measurements

\$2.1055 \$27.54

OPERATING FREQUENCY: 710,000,000 Hz
 CHANNEL: 23090
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	710,000,010	10	0.0000014
100 %		- 30	709,999,976	-24	-0.0000034
100 %		- 20	709,999,752	-248	-0.0000349
100 %		- 10	710,000,165	165	0.0000232
100 %		0	710,000,095	95	0.0000134
100 %		+ 10	709,999,791	-209	-0.0000294
100 %		+ 20	710,000,271	271	0.0000382
100 %		+ 30	709,999,795	-205	-0.0000289
100 %		+ 40	710,000,278	278	0.0000392
100 %		+ 50	710,000,011	11	0.0000015
BATT. ENDPOINT	3.45	+ 20	709,999,959	-41	-0.0000058

Table 7-29. Frequency Stability Data (Band 17)

Note:

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

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Band 17 Frequency Stability Measurements

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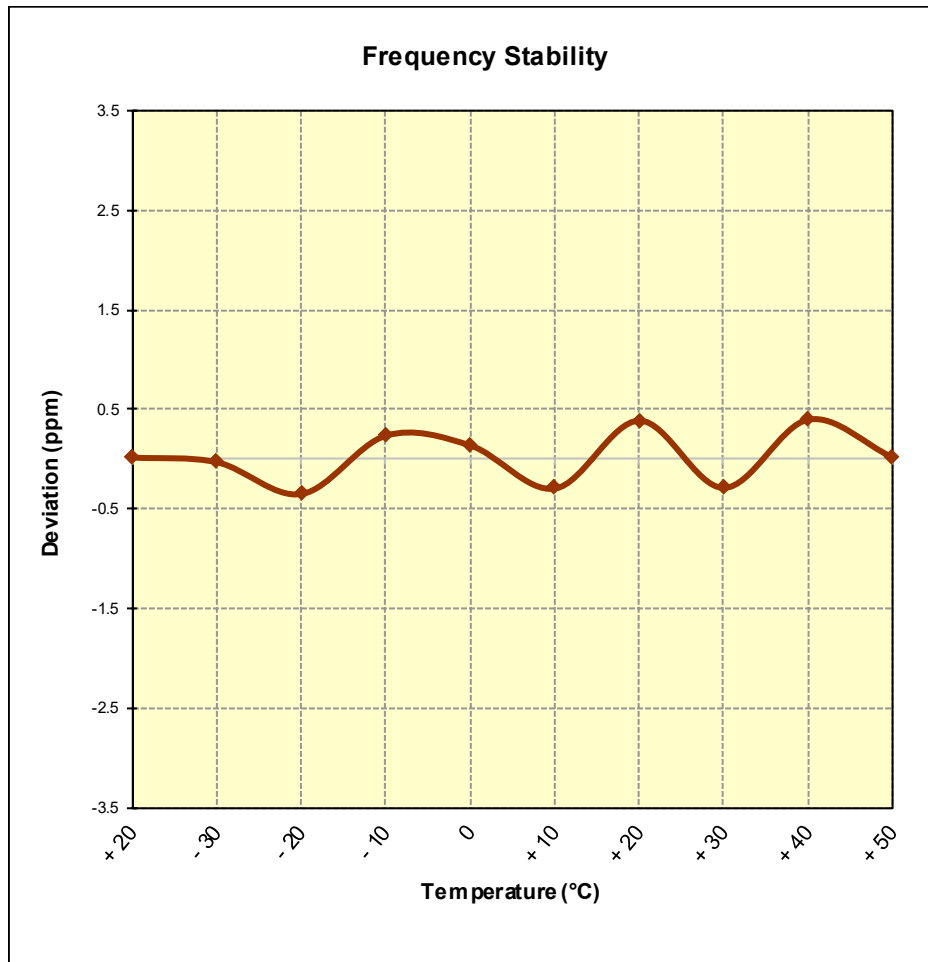


Figure 7-9. Frequency Stability Graph (Band 17)

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Band 13 Frequency Stability Measurements

\$2.1055 \$27.54

OPERATING FREQUENCY: 782,000,000 Hz
 CHANNEL: 23230
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	781,999,682	-318	-0.0000407
100 %		- 30	781,999,840	-160	-0.0000205
100 %		- 20	782,000,008	8	0.0000010
100 %		- 10	782,000,106	106	0.0000136
100 %		0	781,999,905	-95	-0.0000121
100 %		+ 10	781,999,696	-304	-0.0000389
100 %		+ 20	782,000,004	4	0.0000005
100 %		+ 30	781,999,825	-175	-0.0000224
100 %		+ 40	781,999,997	-3	-0.0000004
100 %		+ 50	781,999,953	-47	-0.0000060
BATT. ENDPOINT	3.45	+ 20	782,000,251	251	0.0000321

Table 7-30. Frequency Stability Data (Band 13)

Note:

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

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Band 13 Frequency Stability Measurements

§2.1055 §27.54

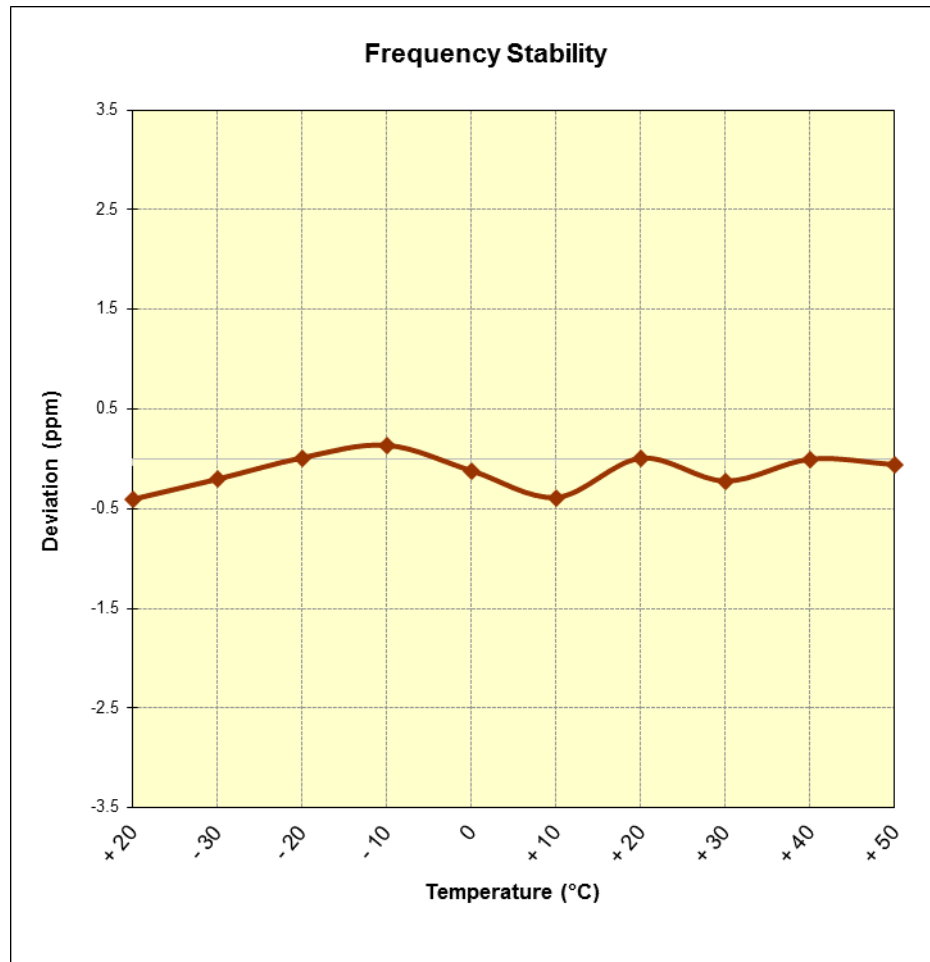


Figure 7-10. Frequency Stability Graph (Band 13)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 5/26 Frequency Stability Measurements

§2.1055 §22.355

OPERATING FREQUENCY: 831,500,000 Hz

CHANNEL: 26865

REFERENCE VOLTAGE: 3.85 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	831,500,281	281	0.0000338
100 %		- 30	831,499,841	-159	-0.0000191
100 %		- 20	831,500,381	381	0.0000458
100 %		- 10	831,499,944	-56	-0.0000067
100 %		0	831,499,851	-149	-0.0000179
100 %		+ 10	831,500,012	12	0.0000014
100 %		+ 20	831,500,115	115	0.0000138
100 %		+ 30	831,500,188	188	0.0000226
100 %		+ 40	831,499,760	-240	-0.0000289
100 %		+ 50	831,500,020	20	0.0000024
BATT. ENDPOINT	3.45	+ 20	831,500,072	72	0.0000087

Table 7-31. Frequency Stability Data (Band 26)

FCC ID: A3LSCV35		FCC Pt. 22 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 5/26 Frequency Stability Measurements
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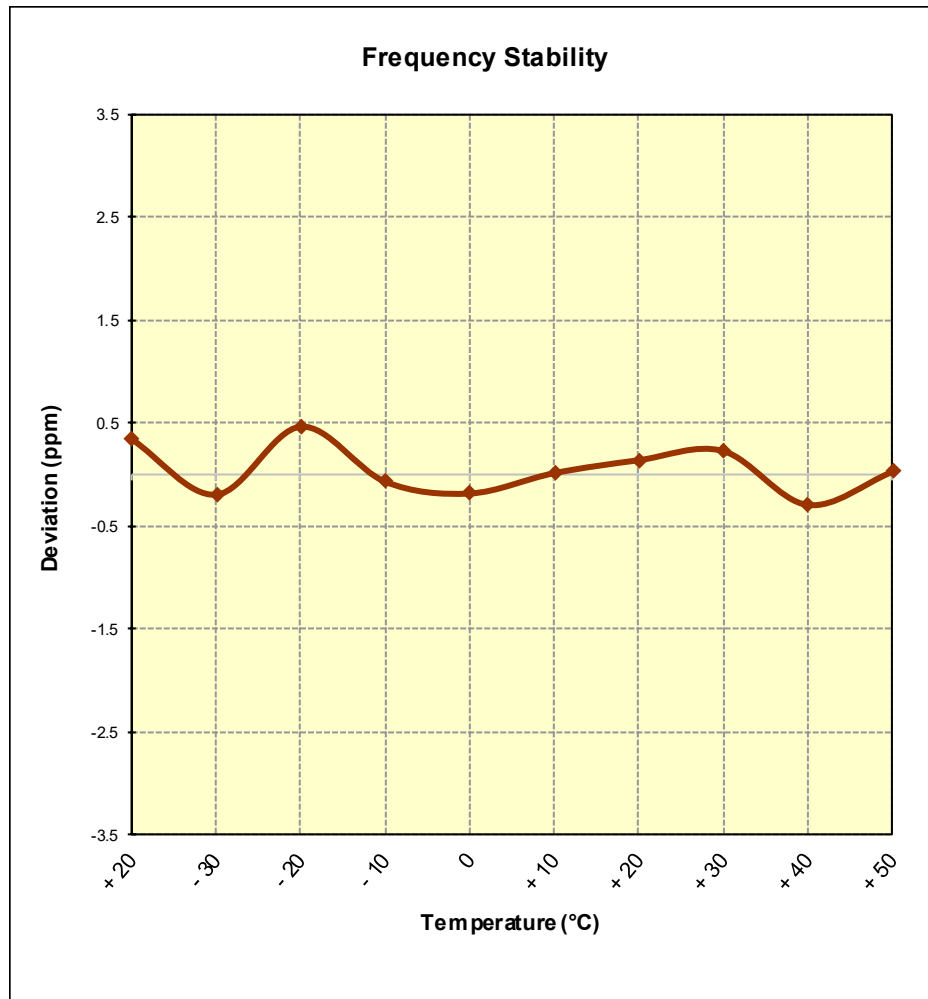


Figure 7-11. Frequency Stability Graph (Band 26)

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Band 41 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY: 2,593,000,000 Hz

CHANNEL: 40620

REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,592,999,977	-23	-0.0000009
100 %		- 30	2,592,999,917	-83	-0.0000032
100 %		- 20	2,592,999,594	-406	-0.0000157
100 %		- 10	2,593,000,307	307	0.0000118
100 %		0	2,593,000,056	56	0.0000022
100 %		+ 10	2,593,000,290	290	0.0000112
100 %		+ 20	2,592,999,966	-34	-0.0000013
100 %		+ 30	2,593,000,106	106	0.0000041
100 %		+ 40	2,593,000,114	114	0.0000044
100 %		+ 50	2,592,999,940	-60	-0.0000023
BATT. ENDPOINT	3.45	+ 20	2,592,999,647	-353	-0.0000136

Table 7-32. 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.

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Band 41 Frequency Stability Measurements

§2.1055 §27.54

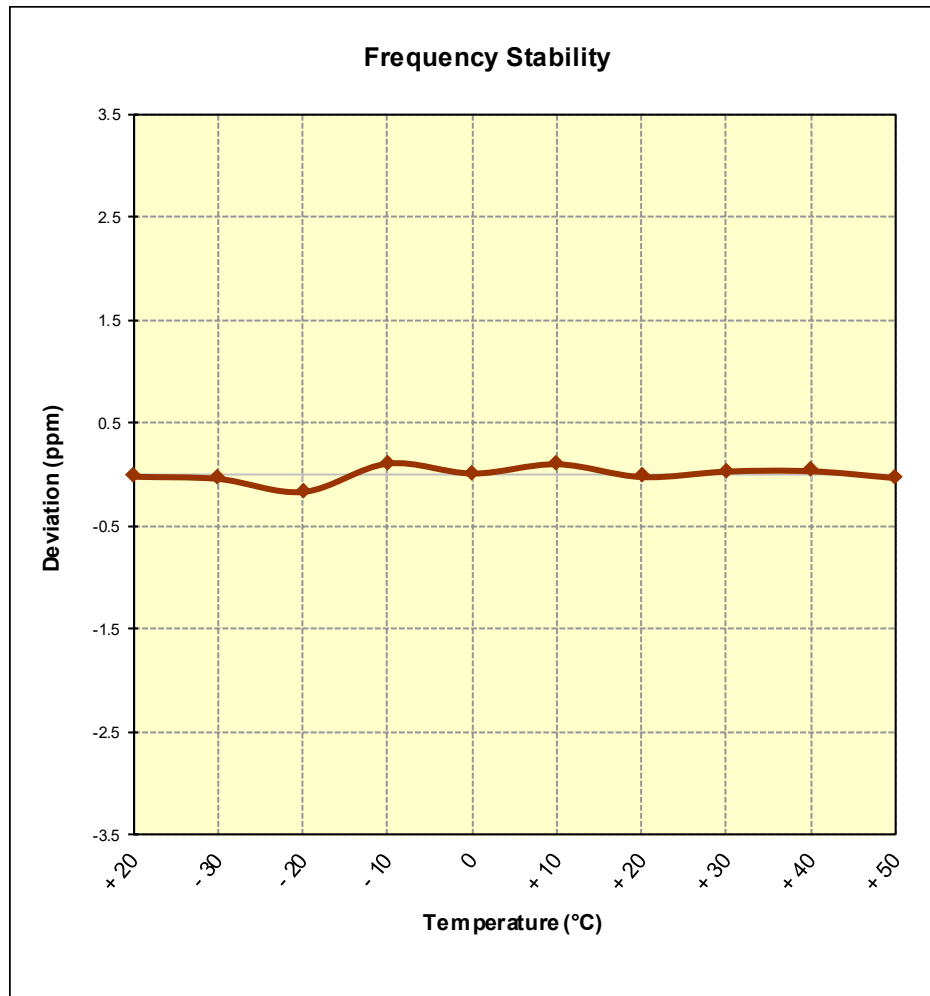


Figure 7-12. Frequency Stability Graph (Band 41)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSCV35** complies with all the requirements of Parts 22 & 27 of the FCC rules for LTE operation only.

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