



PCTEST ENGINEERING LABORATORY, INC.

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<http://www.pctestlab.com>



MEASUREMENT REPORT

FCC Part 27 LTE

Applicant Name:

Samsung Electronics, Co. Ltd.
18600 Broadwick St.
Rancho Dominguez, CA 90220
United States

Date of Testing:

Jan. 9-13, 2012

Test Site/Location:

PCTEST Lab., Columbia, MD, USA

Test Report Serial No.:

0Y1201030007-R1.A3L

FCC ID:

A3LSGHI577

APPLICANT:

SAMSUNG ELECTRONICS, CO. LTD.

Application Type:

Certification

FCC Classification:

PCS Licensed Transmitter (PCE)

FCC Rule Part(s):

§2; §27

EUT Type:

Portable Handset

Model(s):

SGH-I577

Tx Frequency Range:

704 - 716MHz (LTE Band 17), 1710 - 1755 MHz (LTE Band 4)

Max. RF Output Power:

Band 17, 10MHz: 0.055 W ERP (QPSK) (17.4dBm)
0.046 W ERP (16QAM) (16.6dBm)

Band 17, 5MHz: 0.06 W ERP (QPSK) (17.8dBm)
0.045 W ERP (16QAM) (16.5dBm)

Band 4, 10MHz: 0.234 W EIRP (QPSK) (23.7dBm)
0.182 W EIRP (16QAM) (22.6dBm)

Band 4, 5MHz: 0.234 W EIRP (QPSK) (23.7dBm)
0.174 W EIRP (16QAM) (22.4dBm)

Emission Designator(s):

Band 17, 10MHz: 8M92G7D (QPSK) / 8M96W7D (16QAM)

Band 17, 5MHz: 4M57G7D (QPSK) / 4M60W7D (16QAM)

Band 4, 10MHz: 9M00G7D (QPSK) / 9M00W7D (16QAM)

Band 4, 5MHz: 4M60G7D (QPSK) / 4M60W7D (16QAM)

Test Device Serial No.:

identical prototype [S/N: FI-343-E]

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.

***This revised Test Report (S/N: 0Y1201030007-R1.A3L) supersedes and replaces the previously issued test report on the same subject EUT for the same type of testing as indicated. Please discard and destroy the previously issued test report (S/N: 0Y1201030007.A3L) and dispose of it accordingly.**

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

Randy Ortañez
President

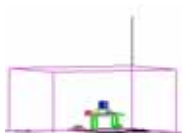


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Test Report S/N: 0Y1201030007-R1.A3L	Test Dates: Jan. 9-13, 2012	EUT Type: Portable Handset		Page 1 of 54

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MEASUREMENT REPORT

FCC Part 27



§2.1033 General Information

APPLICANT: Samsung Electronics, Co. Ltd.
APPLICANT ADDRESS: 18600 Broadwick St.
 Rancho Dominguez, CA 90220, United States
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 6660-B Dobbin Road, Columbia, MD 21045 USA
FCC RULE PART(S): §2, §27
BASE MODEL: SGH-I577
FCC ID: A3LSGHI577
FCC CLASSIFICATION: PCS Licensed Transmitter (PCB)
EMISSION DESIGNATORS: Band 17, 10MHz: 8M92G7D (QPSK) / 8M96W7D (16QAM)
 Band 17, 5MHz: 4M57G7D (QPSK) / 4M60W7D (16QAM)
 Band 4, 10MHz: 9M00G7D (QPSK) / 9M00W7D (16QAM)
 Band 4, 5MHz: 4M60G7D (QPSK) / 4M60W7D (16QAM)
Test Device Serial No.: FI-343-E ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST: Jan. 9-13, 2012
TEST REPORT S/N: 0Y1201030007-R1.A3L

Test Facility / Accreditations

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



- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451A-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451A-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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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.

1.2 Testing Facility

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

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2003 on January 28, 2009.

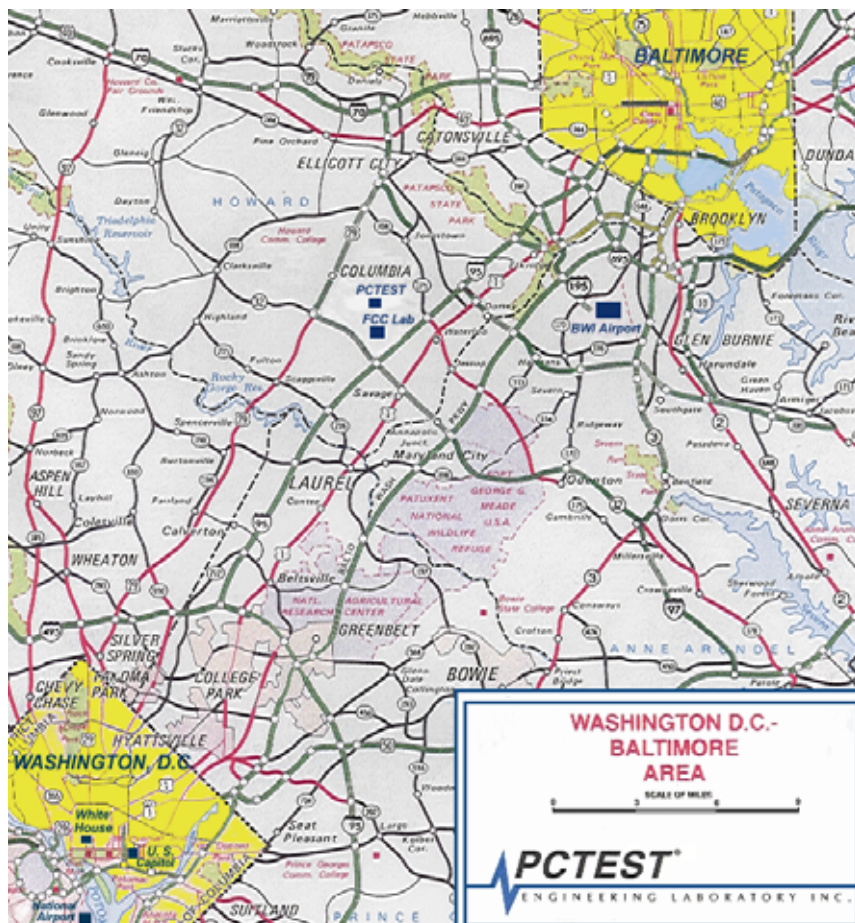


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSGHI577**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function. The EUT consisted of the following component(s):

Trade Name / Base Model	FCC ID	Description
Samsung / Model: SGH-I577	A3LSGHI577	Portable Handset

Table 2-1. EUT Equipment Description

2.2 EUT Capabilities

The EUT has the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Band 4, 17 LTE, 802.11b/g/n WLAN, Bluetooth, NFC

2.3 EMI Suppression Device(s)/Modifications

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

2.4 Labeling Requirements

Per 2.925

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

Per 15.19; Docket 95-19

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

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

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

Please see attachment for FCC ID label and label location.

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

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

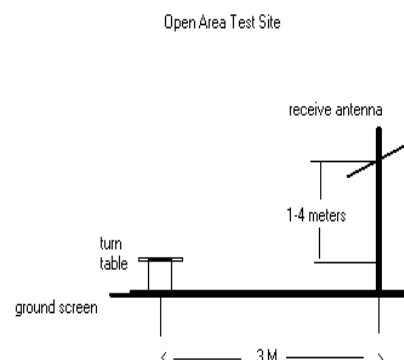


Figure 3-1. Diagram of 3-meter outdoor test range

Deviation from Measurement Procedure.....None

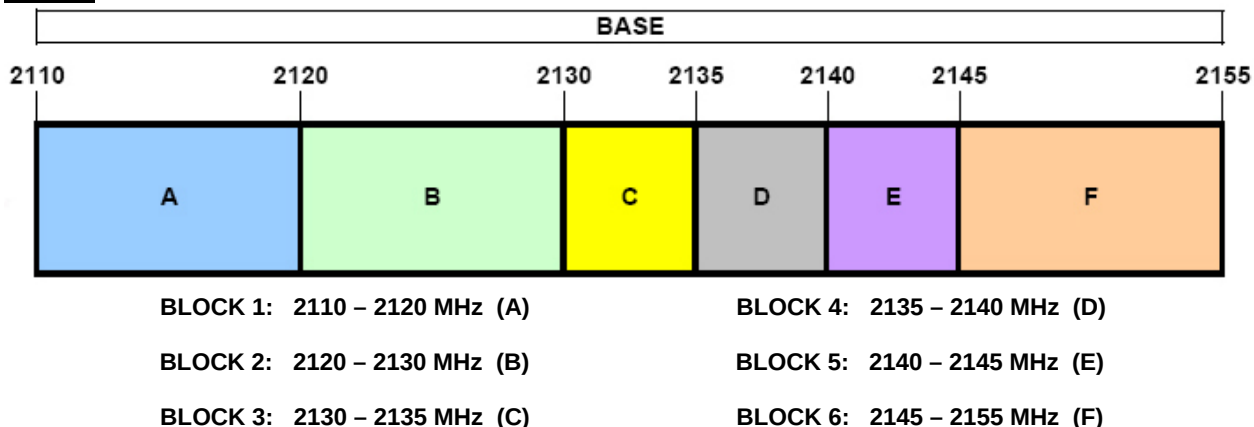
3.2 Occupied Bandwidth Emission Limits

§2.1049, §27.53(h)(1)

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

3.3 AWS - Base Frequency Blocks

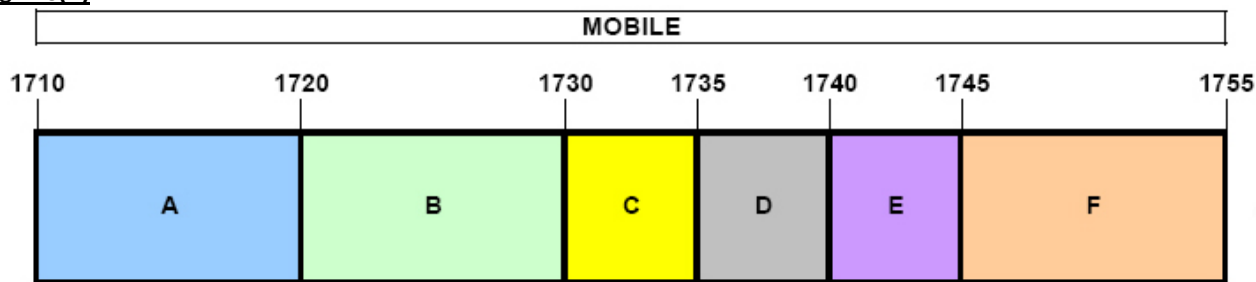
§27.5(h)



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3.4 AWS - Mobile Frequency Blocks

§27.5(h)



BLOCK 1: 1710 – 1720 MHz (A)

BLOCK 4: 1735 – 1740 MHz (D)

BLOCK 2: 1720 – 1730 MHz (B)

BLOCK 5: 1740 – 1745 MHz (E)

BLOCK 3: 1730 – 1735 MHz (C)

BLOCK 6: 1745 – 1755 MHz (F)

3.5 Block B and C Frequency Range (704–710 and 710–716 MHz)

§27.5(c)

Three paired channel blocks of 12 MHz 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. Two unpaired channel blocks of 6 MHz each are available for assignment as follows: Block D: 716-722 MHz; and Block E: 722-728 MHz.

3.6 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051, §27.53(h)

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

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3.7 Radiated Power and Radiated Spurious Emissions §2.1053, §27.53(h)

Radiated power and radiated spurious emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. This level is then measured with a broadband average power meter. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive average power meter reading. This spurious level is recorded with the power meter. For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration. This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation and RB size = 1. The worst case RB offset varied depending on the test configuration. Please see section 6 for more details.

3.8 Peak-Average Ratio §27.50(d)(5)

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

3.9 Frequency Stability / Temperature Variation §2.1055, §27.54

The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

Time Period and Procedure:

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

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4.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	263-10dB	(DC-18GHz) 10 dB Attenuator	N/A		N/A	N/A
-	No.166	(1000-26500MHz) Microwave RF Cable	N/A		N/A	N/A
-	No.167	(100kHz - 100MHz) RG58 Coax Cable	N/A		N/A	N/A
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	2/8/2011	Annual	2/8/2012	3008A00985
Agilent	85650A	Quasi-Peak Adapter	4/7/2011	Annual	4/7/2012	3303A01872
Agilent	85650A	Quasi-Peak Adapter	4/7/2011	Annual	4/7/2012	2043A00301
Agilent	8566B	(100Hz-22GHz) Spectrum Analyzer	4/7/2011	Annual	4/7/2012	3638A08713
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2011	Annual	10/10/2012	3613A00315
Agilent	E4407B	ESA Spectrum Analyzer	4/5/2011	Annual	4/5/2012	US39210313
Agilent	E5515C	Wireless Communications Test Set	10/10/2011	Annual	10/10/2012	GB46110872
Agilent	E5515C	Wireless Communications Test Set	7/6/2011	Annual	7/6/2012	GB41450275
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2011	Annual	4/8/2012	MY45470194
Agilent	E8267C	Vector Signal Generator	10/10/2011	Annual	10/10/2012	US42340152
Agilent	N9020A	MXA Signal Analyzer	10/10/2011	Annual	10/10/2012	US46470561
Agilent	E5515C	Wireless Communications Test Set	2/8/2011	Annual	2/8/2012	GB45360985
Agilent	N9038A	MXE EMI Receiver	8/5/2011	Annual	8/5/2012	MY51210133
Anritsu	MA2411B	Pulse Sensor	10/13/2011	Annual	10/13/2012	1027293
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
Compliance Design	Roberts	Dipole Set	4/7/2010	Biennial	4/7/2012	146
Compliance Design	Roberts	Dipole Set	4/7/2010	Biennial	4/7/2012	147
Emco	3115	Horn Antenna (1-18GHz)	4/8/2010	Biennial	4/8/2012	9205-3874
Espec	ESX-2CA	Environmental Chamber	4/21/2011	Annual	4/21/2012	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/22/2011	Annual	7/22/2012	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/31/2011	Annual	5/31/2012	135427
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/12/2011	Annual	10/12/2012	1833460
Gigatronics	8651A	Universal Power Meter	10/12/2011	Annual	10/12/2012	8650319
K & L	11SH10	Band Pass Filter	N/A		N/A	1300/4000
K & L	11SH10	Band Pass Filter	N/A		N/A	4000/12000
MiniCircuits	VHF-1300+	High Pass Filter	N/A		N/A	30716
MiniCircuits	VHF-3100+	High Pass Filter	N/A		N/A	30721
Pasternack	PE2208-6	Bidirectional Coupler	N/A		N/A	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	6/1/2011	Annual	6/1/2012	833855/0010
Rohde & Schwarz	CMU200	Base Station Simulator	4/19/2011	Annual	4/19/2012	107826
Rohde & Schwarz	CMU200	Base Station Simulator	N/A		N/A	836536/0005
Rohde & Schwarz	RS-PR18	1-18 GHz Pre-Amplifier	6/9/2011	Annual	6/9/2012	100071
Rohde & Schwarz	RS-PR26	18-26.5 GHz Pre-Amplifier	6/9/2011	Annual	6/9/2012	100040
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	10/3/2011	Biennial	10/3/2013	91052522TX
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	10/3/2011	Biennial	10/3/2013	91052523RX
Schwarzbeck	VULB-9161SE	Trilog Super Broadband Test Antenna	11/8/2011	Biennial	11/8/2013	9161-4075
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	7/5/2011	Biennial	7/5/2013	A050307
Sunol	DRH-118	Horn Antenna (1-18 GHz)	6/17/2011	Biennial	6/17/2013	A042511

Table 4-1. Test Equipment

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5.0 SAMPLE CALCULATIONS

Emission Designator

Emission Designator = 4M25G7D

QPSK BW = 4.25 MHz

G = Phase Modulation

7 = Two or more channels containing quantized or digital information

D = Data transmission, telemetry, telecommand

Emission Designator = 3M35W7D

16-QAM BW = 3.35 MHz

W = Quadrature Amplitude Modulation

7 = Two or more channels containing quantized or digital information

D = Data transmission, telemetry, telecommand

Spurious Radiated Emission – AWS Band

Example: Channel 20150 AWS Mode 2nd Harmonic (3460.0 MHz)

The spectrum analyzer reading at 3 meters with the EUT on the turntable was –81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminal is adjusted to produce a reading of –81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3460.0 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80) = 50.3 dBc.

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6.0 TEST RESULTS

6.1 Summary

Company Name: Samsung Electronics, Co. Ltd.
 FCC ID: A3LSGHI577
 FCC Classification: PCS Licensed Transmitter (PCE)
 Mode(s): LTE
 Band(s): 4 and 17
 Modulation(s): QPSK and 16-QAM

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)					
2.1049, 27.53(h)(1)	Occupied Bandwidth	N/A	CONDUCTED	PASS	Sections 7.0, 8.0
2.1051, 27.53(h), 27.53(g)	Band Edge / Conducted Spurious Emissions	$< 43 + 10\log_{10}(P[\text{Watts}])$ at Band Edge and for all out-of-band emissions		PASS	Sections 7.0, 8.0
27.50(d)(5)	Peak-Average Ratio	$< 13 \text{ dB}$		PASS	Sections 7.0, 8.0
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
27.50(c)(10)	Effective Radiated Power (Band17)	$< 3 \text{ Watts max. ERP}$	RADIATED	PASS	Section 6.2
27.50(d)(4)	Equivalent Isotropic Radiated Power (AWS)	$< 1 \text{ Watts max. EIRP}$		PASS	Section 6.3
2.1053, 27.53(h), 27.53(g)	Undesirable Emissions	$< 43 + 10\log_{10}(P[\text{Watts}])$ for all out-of-band emissions		PASS	Section 6.4, 6.5
2.1055, 27.54	Frequency Stability	$< 2.5 \text{ ppm}$		PASS	Section 6.6, 6.7

Table 6-1. Summary of Test Results

Note:

This unit was tested with its standard battery (Model: ICP565154M). The NFC antenna is integrated into the standard battery and is the only battery available from the manufacturer for this device. All spurious emissions were investigated and the worst case emissions were found with the EUT powered by this battery.

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6.2 Effective Radiated Power Data

§27.50(c)(10)

Frequency [MHz]	Bandwidth	Modulation	RB Size / Offset	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	ERP [dBm]	ERP [Watts]	Power Source
709.00	10 MHz	QPSK	1 / 49	-20.40	17.20	0.00	H	17.20	0.052	Battery
710.00	10 MHz	QPSK	1 / 49	-20.20	17.40	0.00	H	17.40	0.055	Battery
711.00	10 MHz	QPSK	1 / 49	-20.50	17.10	0.00	H	17.10	0.051	Battery
710.00	10 MHz	16QAM	1 / 49	-21.00	16.60	0.00	H	16.60	0.046	Battery

Table 6-2. Effective Radiated Power Data (Band 17 – 10MHz)

Frequency [MHz]	Bandwidth	Modulation	RB Size / Offset	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	ERP [dBm]	ERP [Watts]	Power Source
706.50	5 MHz	QPSK	1 / 0	-20.40	17.20	0.00	H	17.20	0.052	Battery
710.00	5 MHz	QPSK	1 / 0	-20.10	17.50	0.00	H	17.50	0.056	Battery
713.50	5 MHz	QPSK	1 / 0	-19.80	17.80	0.00	H	17.80	0.060	Battery
713.50	5 MHz	16QAM	1 / 0	-21.10	16.50	0.00	H	16.50	0.045	Battery

Table 6-3. Effective Radiated Power Data – Low Channel (Band 17 – 5MHz)

NOTES:

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

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This level is recorded using the power meter. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

This device was tested under all configurations and modulations and the highest power is reported with QPSK modulation and RB size = 1. RB offset that produced the highest power was 49 for 10MHz BW and 0 for 5MHz BW. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The highest power test configuration was found in the horizontal setup for Band 17. The data reported in the table above was measured in this test setup.

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6.3 Equivalent Isotropic Radiated Power Data §27.50(d)(2)

Frequency [MHz]	Bandwidth	Modulation	RB Size / Offset	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Power Source
1715.00	10 MHz	QPSK	1 / 25	-17.10	15.60	8.00	V	23.60	0.229	Battery
1732.50	10 MHz	QPSK	1 / 25	-17.00	15.70	8.00	V	23.70	0.234	Battery
1750.00	10 MHz	QPSK	1 / 25	-17.00	15.70	8.00	V	23.70	0.234	Battery
1732.50	10 MHz	16QAM	1 / 25	-18.10	14.60	8.00	V	22.60	0.182	Battery

Table 6-4. Equivalent Isotropic Radiated Power Output Data (Band 4 – 10MHz)

Frequency [MHz]	Bandwidth	Modulation	RB Size / Offset	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Power Source
1712.50	5 MHz	QPSK	1 / 0	-18.30	14.40	8.00	V	22.40	0.174	Battery
1732.50	5 MHz	QPSK	1 / 0	-17.00	15.70	8.00	V	23.70	0.234	Battery
1752.50	5 MHz	QPSK	1 / 0	-18.20	14.50	8.00	V	22.50	0.178	Battery
1732.50	5 MHz	16QAM	1 / 0	-18.30	14.40	8.00	V	22.40	0.174	Battery

Table 6-5. Equivalent Isotropic Radiated Power Output Data (Band 4 – 5MHz)

NOTES:

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

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

This device was tested under all configurations and modulations and the highest power is reported with QPSK modulation and RB size = 1. RB offset that produced the highest power was 25 for 10MHz BW and 0 for 5Mhz BW. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The highest power test configuration was found in the vertical setup for Band 4. The data reported in the table above was measured in this test setup.

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6.4 Band 17 LTE Radiated Spurious Measurements

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 709.000 MHz
 MEASURED OUTPUT POWER: 17.200 dBm = 0.052 W
 BW / MODULATION SIGNAL: 10MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.20 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1418.00	-50.39	5.84	-44.55	H	61.8
2127.00	-32.55	6.48	-26.07	H	43.3
2836.00	-49.97	7.69	-42.28	H	59.5
3545.00	-44.23	7.50	-36.73	H	53.9
4254.00	-51.25	8.17	-43.08	H	60.3

Table 6-6. Radiated Spurious Data (10MHz BW, QPSK, Band 17)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 17. The data reported in the table above was measured in this test setup.

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Band 17 LTE Radiated Spurious Measurements (Cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 710.000 MHz
 MEASURED OUTPUT POWER: 17.400 dBm = 0.055 W
 BW / MODULATION SIGNAL: 10MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.40 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1420.00	-49.49	5.84	-43.65	H	60.9
2130.00	-31.55	6.48	-25.07	H	42.3
2840.00	-49.27	7.69	-41.58	H	58.8
3550.00	-44.43	7.50	-36.93	H	54.1
4260.00	-51.05	8.17	-42.88	H	60.1

Table 6-7. Radiated Spurious Data (10MHz BW, QPSK, Band 17)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 17. The data reported in the table above was measured in this test setup.

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Band 17 LTE Radiated Spurious Measurements (Cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 711.000 MHz
 MEASURED OUTPUT POWER: 17.100 dBm = 0.051 W
 BW / MODULATION SIGNAL: 10MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.10 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1422.00	-49.89	5.84	-44.05	H	61.3
2133.00	-29.25	6.48	-22.77	H	40.0
2844.00	-46.47	7.69	-38.78	H	56.0
3555.00	-42.53	7.50	-35.03	H	52.2
4266.00	-50.35	8.17	-42.18	H	59.4

Table 6-8. Radiated Spurious Data (10MHz BW, QPSK, Band 17)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 17. The data reported in the table above was measured in this test setup.

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Band 17 LTE Radiated Spurious Measurements (Cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 706.50 MHz
 MEASURED OUTPUT POWER: 17.200 dBm = 0.052 W
 BW / MODULATION SIGNAL: 5MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.20 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1413.00	-47.29	6.08	-41.21	H	58.4
2119.50	-24.17	6.61	-17.56	H	34.8
2826.00	-48.93	7.31	-41.62	H	58.8
3532.50	-36.70	7.50	-29.20	H	46.4
4239.00	-51.89	8.09	-43.80	H	61.0

Table 6-9. Radiated Spurious Data (5MHz BW, QPSK, Band 17 – Low Channel)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 17. The data reported in the table above was measured in this test setup.

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Band 17 LTE Radiated Spurious Measurements (Cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 710.00 MHz
 MEASURED OUTPUT POWER: 17.500 dBm = 0.056 W
 MODULATION SIGNAL: 5MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.50 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1420.00	-52.85	5.84	-47.02	H	64.5
2130.00	-29.87	6.48	-23.40	H	40.9
2840.00	-42.09	7.69	-34.40	H	51.9
3550.00	-39.46	7.50	-31.96	H	49.5
4260.00	-51.90	8.17	-43.73	H	61.2

Table 6-10. Radiated Spurious Data (5MHz BW, QPSK, Band 17 – Mid Channel)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 17. The data reported in the table above was measured in this test setup.

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Band 17 LTE Radiated Spurious Measurements (Cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 713.50 MHz
 MEASURED OUTPUT POWER: 17.800 dBm = 0.060 W
 BW / MODULATION SIGNAL: 5MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W)$ 30.80 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1427.00	-52.53	6.13	-46.40	H	64.2
2140.50	-36.14	6.61	-29.53	H	47.3
3870.50	-41.46	7.17	-34.29	H	52.1
5600.50	-46.78	8.16	-38.62	H	56.4
7330.50	-52.27	8.92	-43.35	H	61.2

Table 6-11. Radiated Spurious Data (5MHz BW, QPSK, Band 17 – High Channel)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 17. The data reported in the table above was measured in this test setup.

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6.5 Band 4 LTE Radiated Spurious Measurements

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1715.000 MHz
 MEASURED OUTPUT POWER: 23.600 dBm = 0.229 W
 BW / MODULATION SIGNAL: 10MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.60 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3430.00	-45.99	9.70	-36.29	H	59.9
5145.00	-53.80	11.00	-42.80	H	66.4
6860.00	-86.04	11.18	-74.87	H	98.5
8575.00	-82.98	11.63	-71.35	H	94.9
10290.00	-82.20	12.74	-69.45	H	93.1

Table 6-12. Radiated Spurious Data (10MHz BW, QPSK, Band 4 - Low Channel)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 4. The data reported in the table above was measured in this test setup.

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Band 4 LTE Radiated Spurious Measurements (Cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1732.50 MHz
 MEASURED OUTPUT POWER: 23.700 dBm = 0.234 W
 BW / MODULATION SIGNAL: 10MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.70 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3465.00	-48.19	9.70	-38.49	H	62.2
5232.50	-49.95	10.93	-39.02	H	62.7
6965.00	-86.03	11.09	-74.94	H	98.6
8697.50	-82.78	11.74	-71.04	H	94.7
10430.00	-82.10	12.82	-69.29	H	93.0

Table 6-13. Radiated Spurious Data (10MHz BW, QPSK, Band 4 - Mid Channel)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 4. The data reported in the table above was measured in this test setup.

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Band 4 LTE Radiated Spurious Measurements (Cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1750.00 MHz
 MEASURED OUTPUT POWER: 23.700 dBm = 0.234 W
 BW / MODULATION SIGNAL: 10MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W)$ 36.70 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3500.00	-47.69	9.70	-37.99	H	61.7
5250.00	-49.72	10.84	-38.87	H	62.6
6980.00	-86.03	11.00	-75.03	H	98.7
8710.00	-83.00	11.86	-71.13	H	94.8
10440.00	-82.10	12.90	-69.20	H	92.9

Table 6-14. Radiated Spurious Data (10MHz BW, QPSK, Band 4 - High Channel)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 4. The data reported in the table above was measured in this test setup.

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Band 4 LTE Radiated Spurious Measurements (Cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1712.50 MHz
 MEASURED OUTPUT POWER: 22.400 dBm = 0.174 W
 BW / MODULATION SIGNAL: 5MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.40 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3425.00	-46.57	9.70	-36.87	H	59.3
5137.50	-49.94	11.00	-38.93	H	61.3
6850.00	-48.38	11.18	-37.20	H	59.6
8562.50	-83.03	11.63	-71.39	H	93.8
10275.00	-82.22	12.74	-69.47	H	91.9

Table 6-15. Radiated Spurious Data (5MHz BW, QPSK, Band 4 - Low Channel)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 4. The data reported in the table above was measured in this test setup.

FCC ID: A3LSGHI577		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 4 LTE Radiated Spurious Measurements (Cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1732.50 MHz
 MEASURED OUTPUT POWER: 23.700 dBm = 0.234 W
 BW / MODULATION SIGNAL: 5MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.70 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3465.00	-48.39	9.70	-38.69	H	62.4
5237.50	-49.84	10.93	-38.92	H	62.6
6970.00	-48.15	11.09	-37.05	H	60.8
8702.50	-82.77	11.74	-71.02	H	94.7
10435.00	-82.10	12.82	-69.28	H	93.0

Table 6-16. Radiated Spurious Data (5MHz BW, QPSK, Band 4 - Mid Channel)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 4. The data reported in the table above was measured in this test setup.

FCC ID: A3LSGHI577		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 4 LTE Radiated Spurious Measurements (Cont'd)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1752.50 MHz
 MEASURED OUTPUT POWER: 22.500 dBm = 0.178 W
 BW / MODULATION SIGNAL: 5MHz QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W)$ 35.50 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3505.00	-48.08	9.70	-38.38	H	60.9
5257.50	-51.16	10.84	-40.32	H	62.8
6987.50	-48.49	11.00	-37.49	H	60.0
8717.50	-82.99	11.86	-71.13	H	93.6
10447.50	-82.10	12.90	-69.20	H	91.7

Table 6-17. Radiated Spurious Data (5MHz BW, QPSK, Band 4 - High Channel)

NOTES:

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

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

This device was tested under all configurations and modulations and the worst case is reported in the horizontal polarity with QPSK modulation with RB size = 1 and RB Offset = 0. The data reported in the table above was measured in this test setup. The EUT was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup for Band 4. The data reported in the table above was measured in this test setup.

FCC ID: A3LSGHI577		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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6.6 Band 17 LTE Frequency Stability Measurements

§2.1055, §27.54

OPERATING FREQUENCY: 710,000,000 Hz

REFERENCE VOLTAGE: 3.7 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	710,000,005	5	0.000001
100 %		- 30	710,000,002	2	0.000000
100 %		- 20	710,000,003	3	0.000000
100 %		- 10	710,000,005	5	0.000001
100 %		0	710,000,001	1	0.000000
100 %		+ 10	710,000,002	2	0.000000
100 %		+ 20	710,000,003	3	0.000000
100 %		+ 30	710,000,005	5	0.000001
100 %		+ 40	710,000,012	12	0.000002
100 %		+ 50	710,000,003	3	0.000000
115 %	4.26	+ 20	710,000,003	3	0.000000
BATT. ENDPOINT	3.40	+ 20	710,000,001	1	0.000000

Table 6-18. Frequency Stability Data (10MHz BW, QPSK, Band 17)

Note:

The frequency deviation was measured to ensure that the channel emissions remained within the authorized band with varying temperature and voltage.

FCC ID: A3LSGHI577		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 17 LTE Frequency Stability Measurements (Cont'd)

§2.1055, §27.54

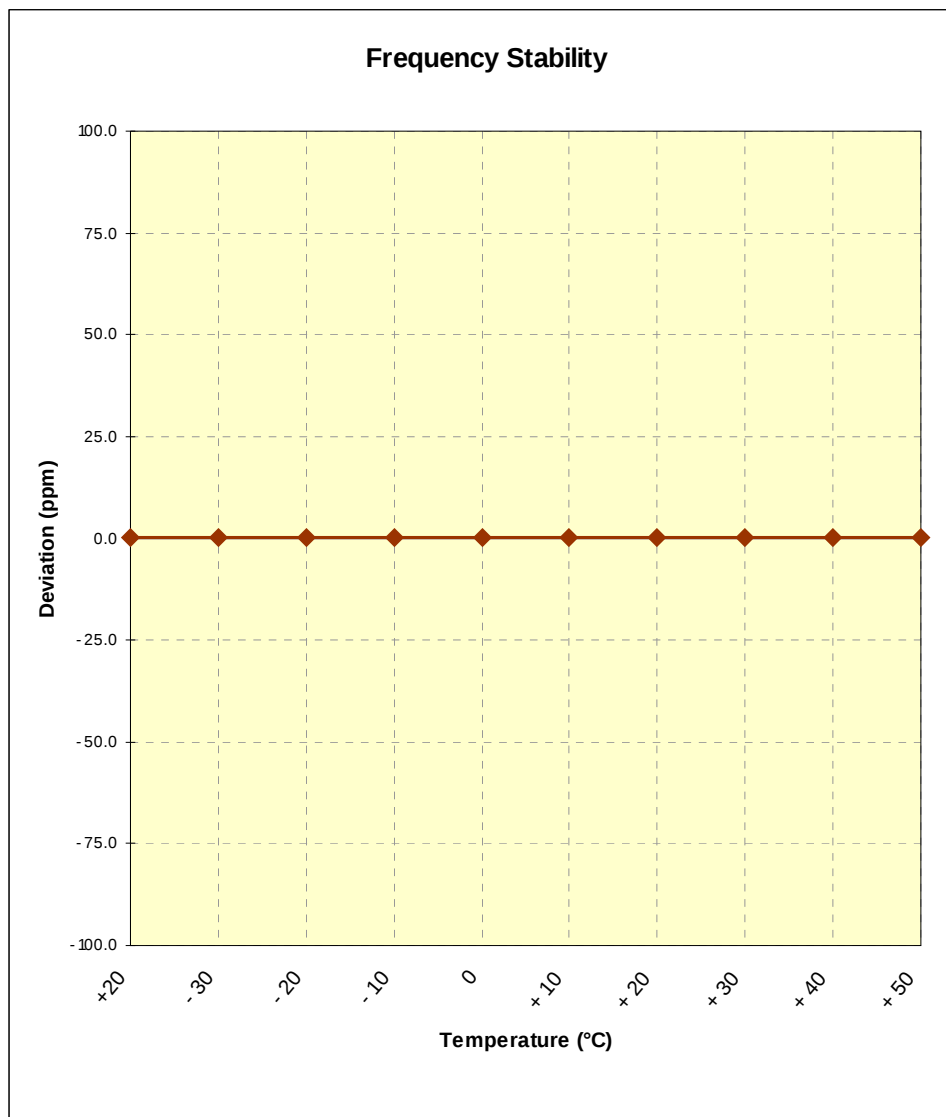


Figure 6-1. Frequency Stability Graph (10MHz BW, QPSK, Band 17)

FCC ID: A3LSGHI577		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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6.7 Band 4 LTE Frequency Stability Measurements

\$2.1055, \$27.54

OPERATING FREQUENCY: 1,732,500,000 Hz

REFERENCE VOLTAGE: 3.7 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	1,732,500,002	2	0.000000
100 %		- 30	1,732,500,003	3	0.000000
100 %		- 20	1,732,500,006	6	0.000000
100 %		- 10	1,732,500,003	3	0.000000
100 %		0	1,732,500,002	2	0.000000
100 %		+ 10	1,732,500,001	1	0.000000
100 %		+ 20	1,732,500,008	8	0.000000
100 %		+ 30	1,732,500,005	5	0.000000
100 %		+ 40	1,732,500,003	3	0.000000
100 %		+ 50	1,732,500,006	6	0.000000
115 %	4.26	+ 20	1,732,500,004	4	0.000000
BATT. ENDPOINT	3.40	+ 20	1,732,500,007	7	0.000000

Table 6-19. Frequency Stability Data (10MHz BW, QPSK, Band 4)

Note:

The frequency deviation was measured to ensure that the channel emissions remained within the authorized band with varying temperature and voltage.

FCC ID: A3LSGHI577		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
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Band 4 LTE Frequency Stability Measurements (Cont'd)

§2.1055, §27.54

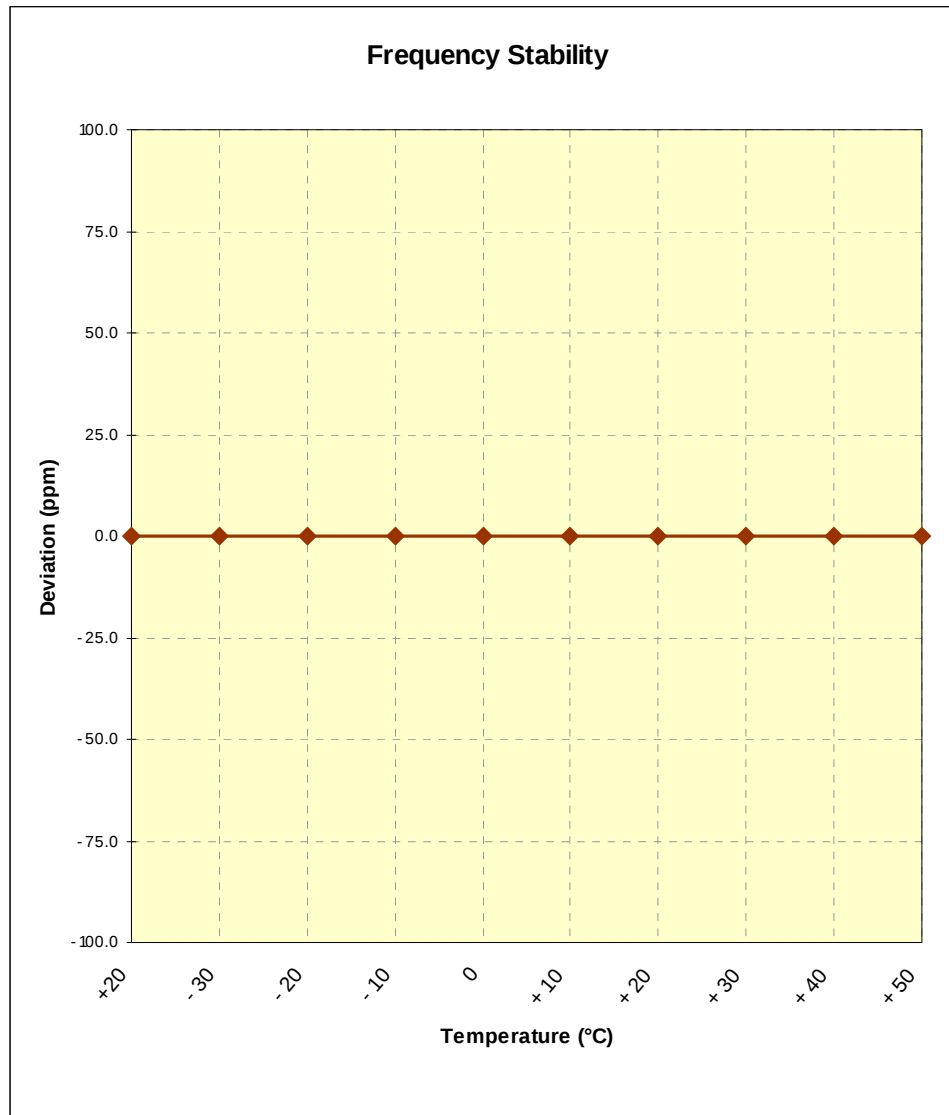
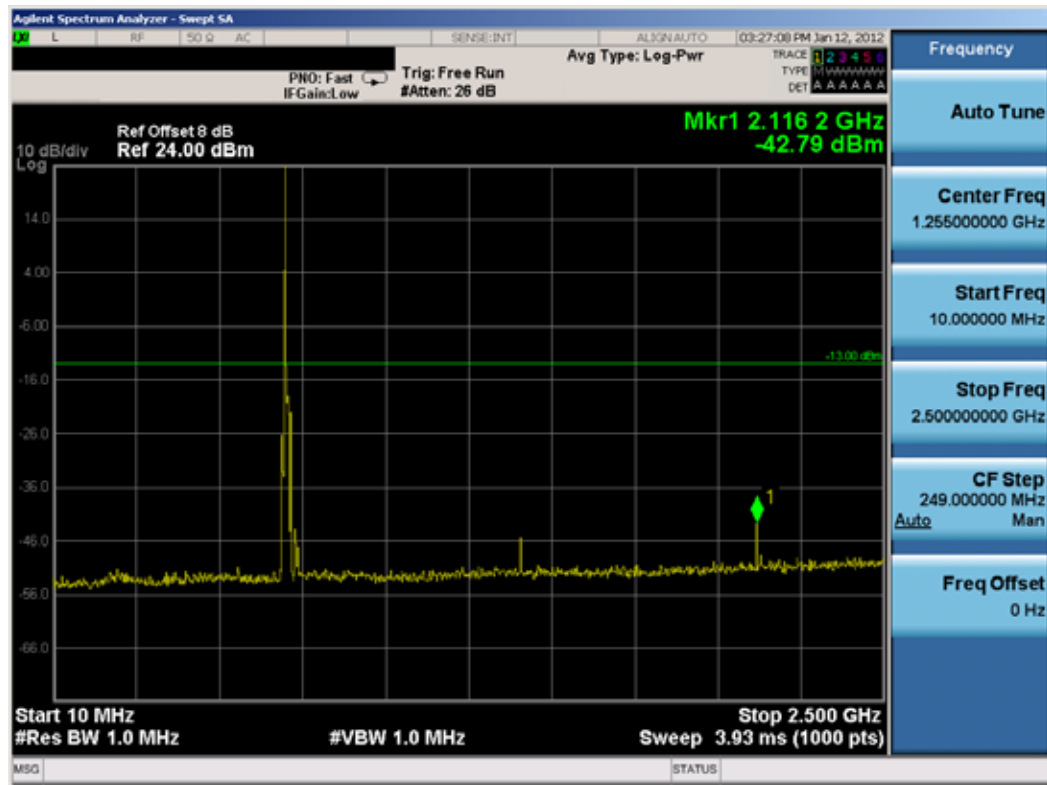


Figure 6-2. Frequency Stability Graph (10 MHz BW, QPSK, Band 4)

FCC ID: A3LSGHI577		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1201030007-R1.A3L	Test Dates: Jan. 9-13, 2012	EUT Type: Portable Handset		Page 29 of 54

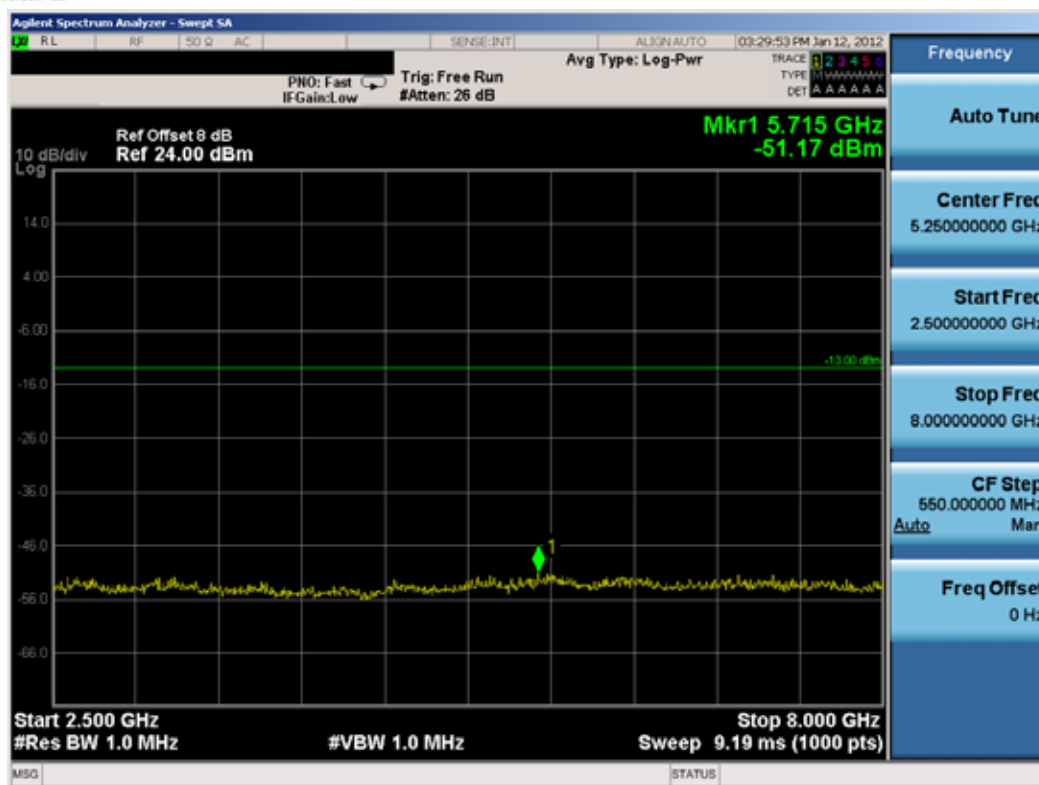
7.0 PLOTS OF EMISSIONS – BAND 17 LTE

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

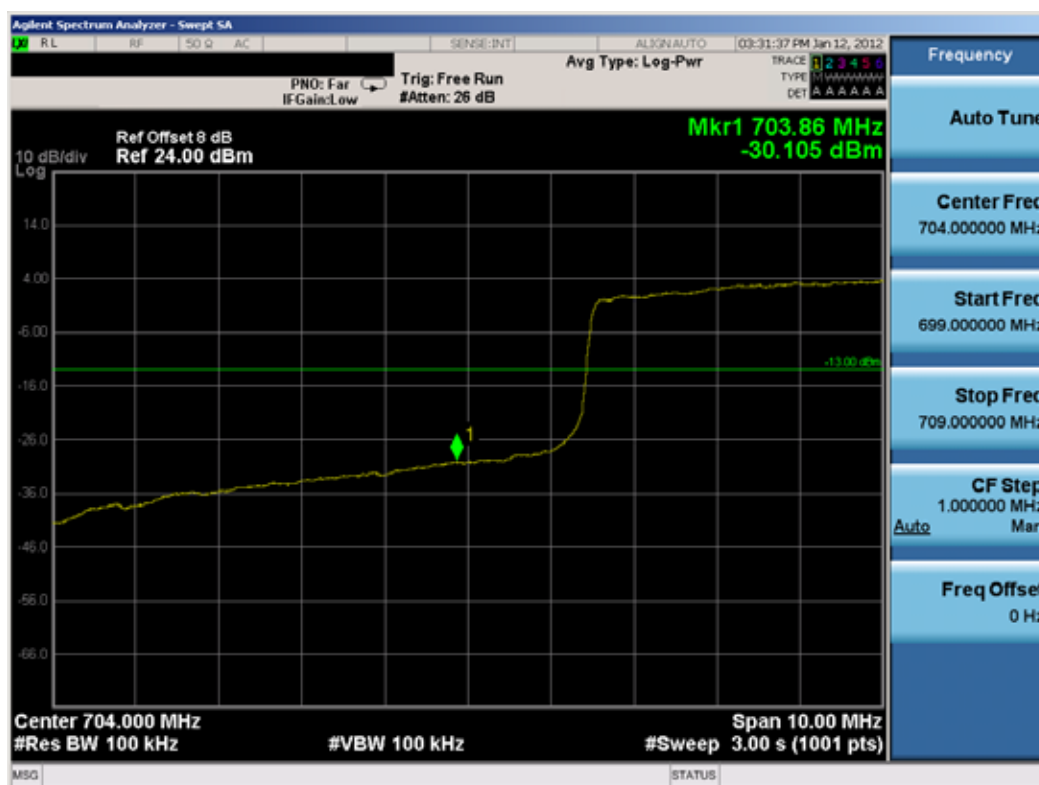


Plot 7-1. Conducted Spurious Plot (10MHz BW, QPSK RB Size = 1, Offset = 0)

FCC ID: A3LSGHI577		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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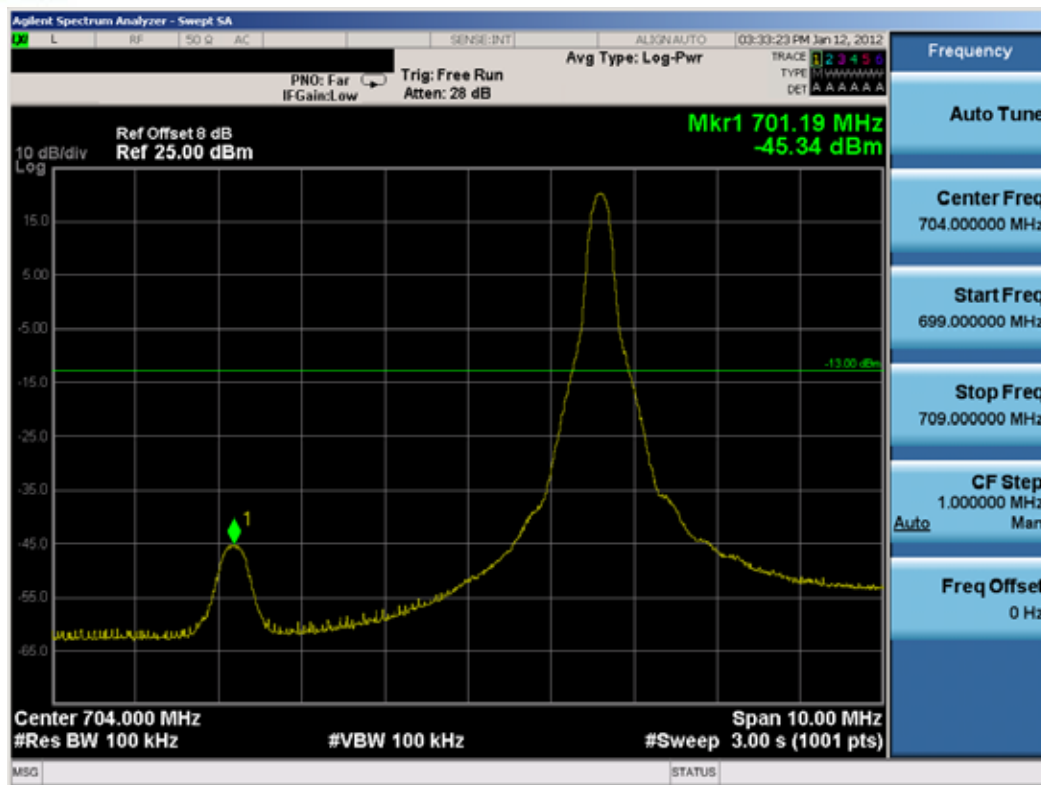


Plot 7-2. Conducted Spurious Plot (10MHz BW, QPSK RB Size = 1, Offset = 0)

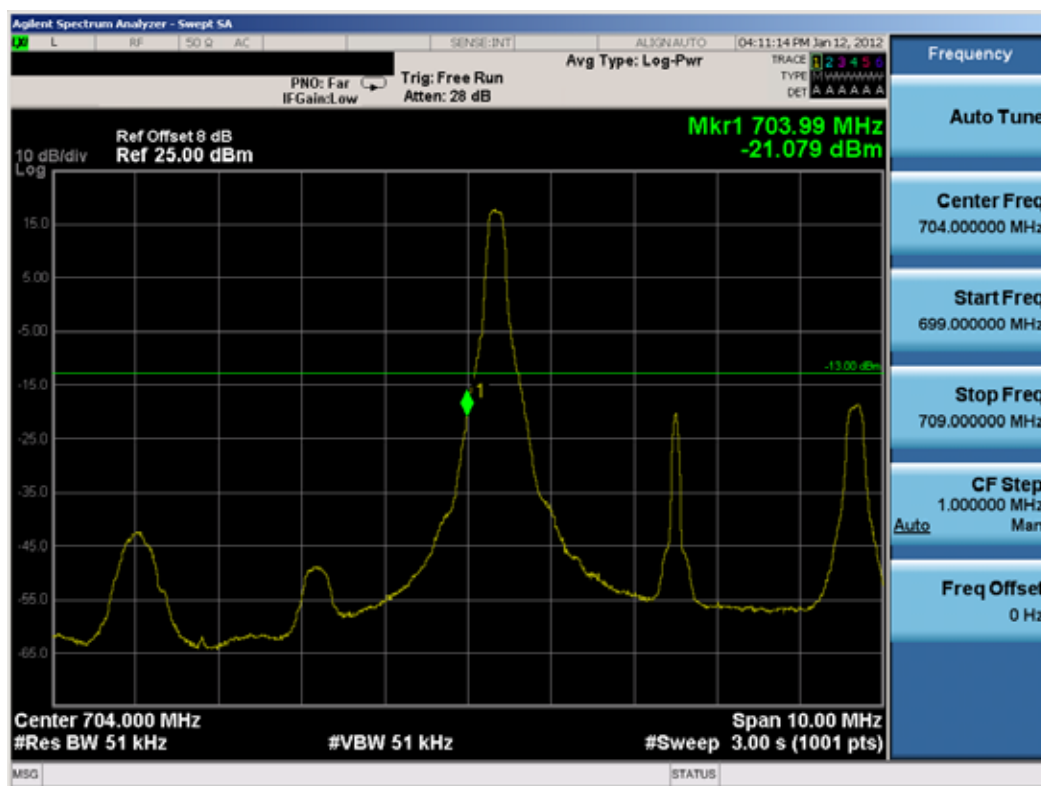


Plot 7-3. Lower Band Edge Plot (10MHz BW, QPSK RB Size = 50, Offset = 0)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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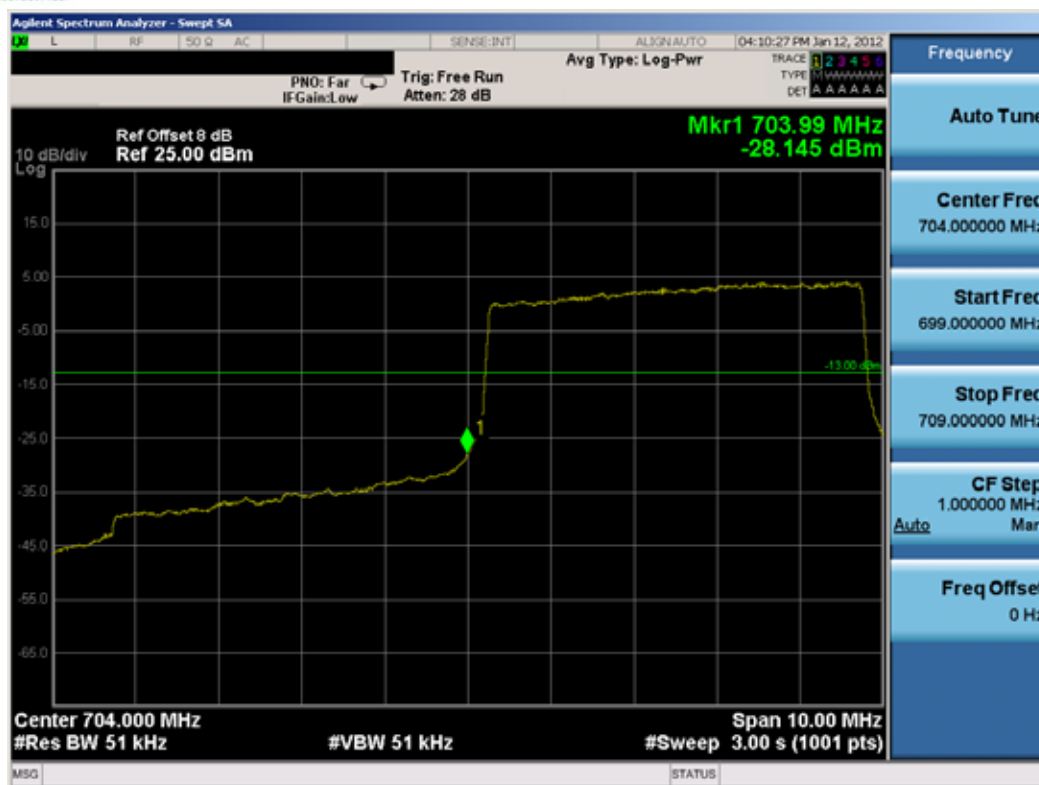


Plot 7-4. Lower Band Edge Plot (10MHz BW, QPSK RB Size = 1, Offset = 0)

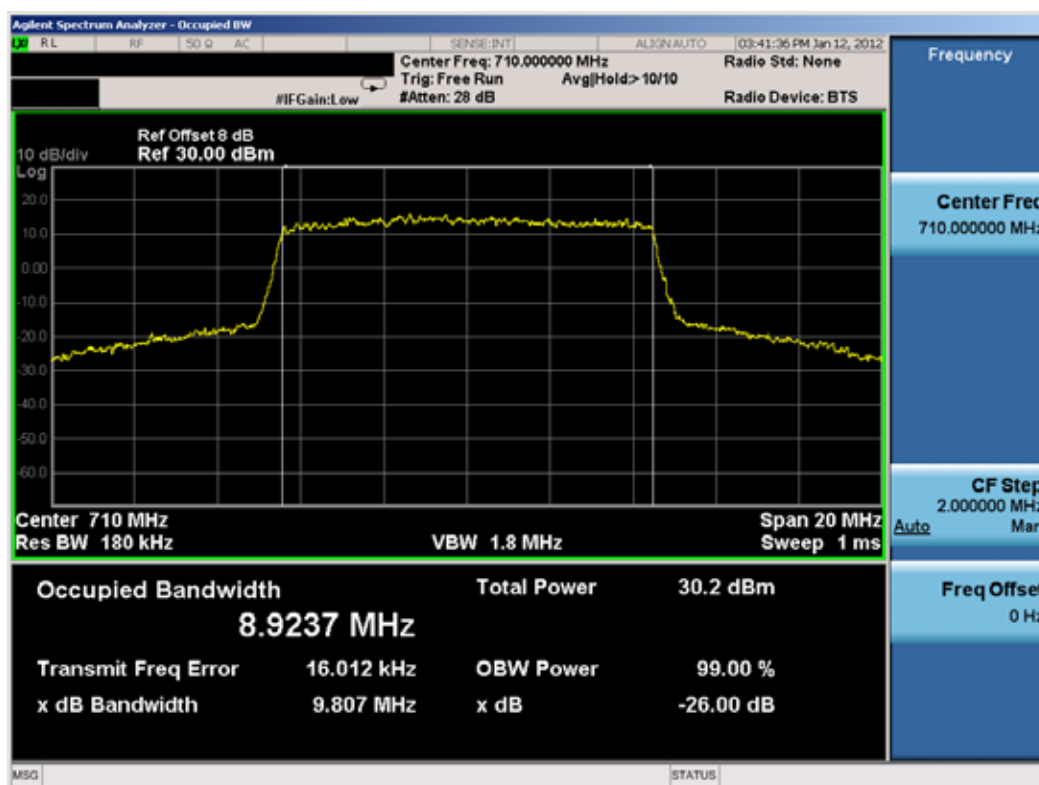


Plot 7-5. Lower Band Edge Plot (5MHz BW, QPSK RB Size = 1, Offset = 0)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1201030007-R1.A3L	Test Dates: Jan. 9-13, 2012	EUT Type: Portable Handset		Page 32 of 54

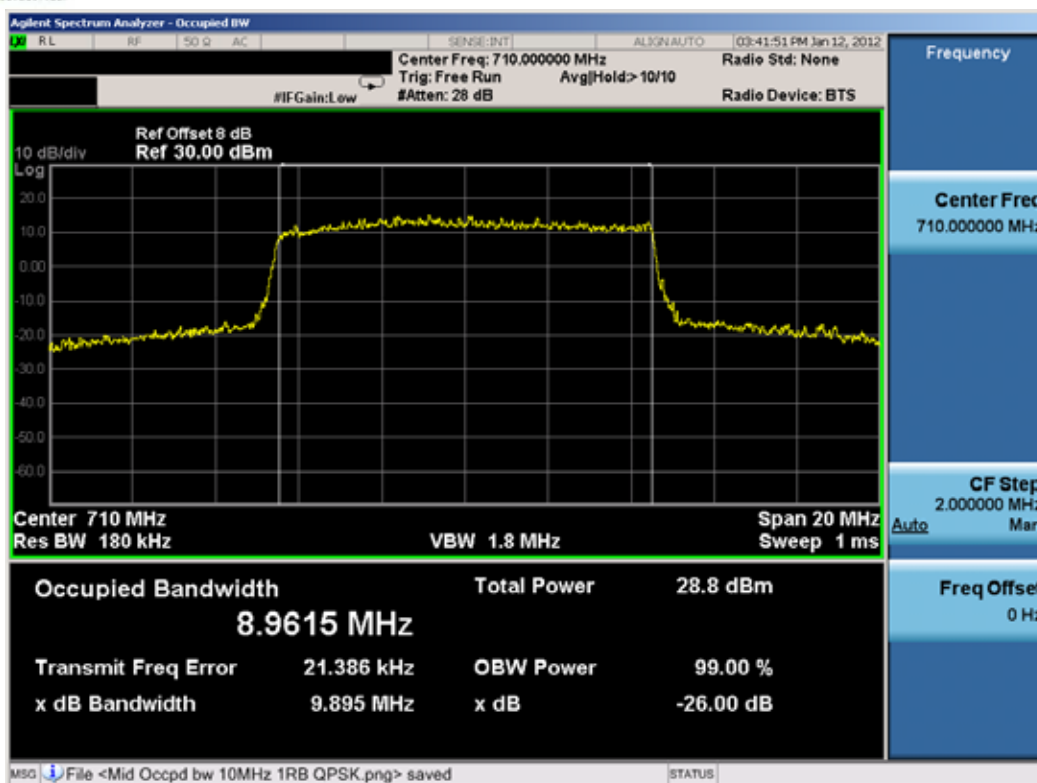


Plot 7-6. Lower Band Edge Plot (5MHz BW, QPSK RB Size = 25, Offset = 0)

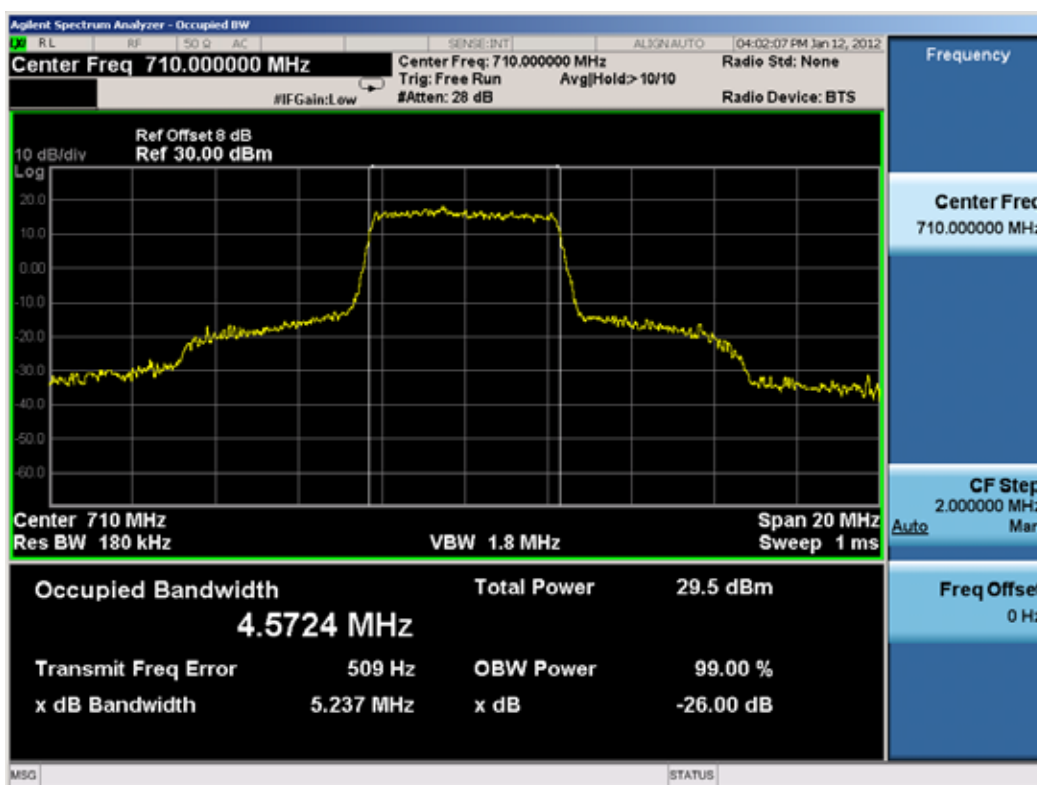


Plot 7-7. Occupied Bandwidth Plot (10MHz BW, QPSK RB Size = 50, Offset = 0)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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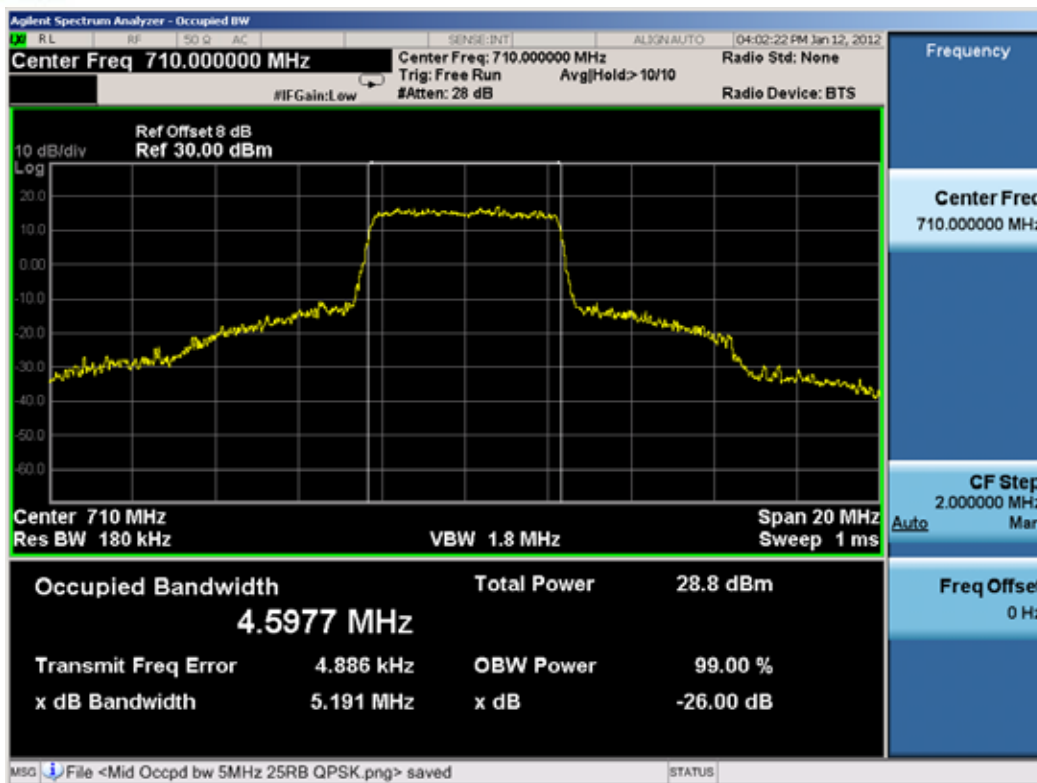


Plot 7-8. Occupied Bandwidth Plot (10MHz BW, 16-QAM, RB Size = 50, Offset = 0)

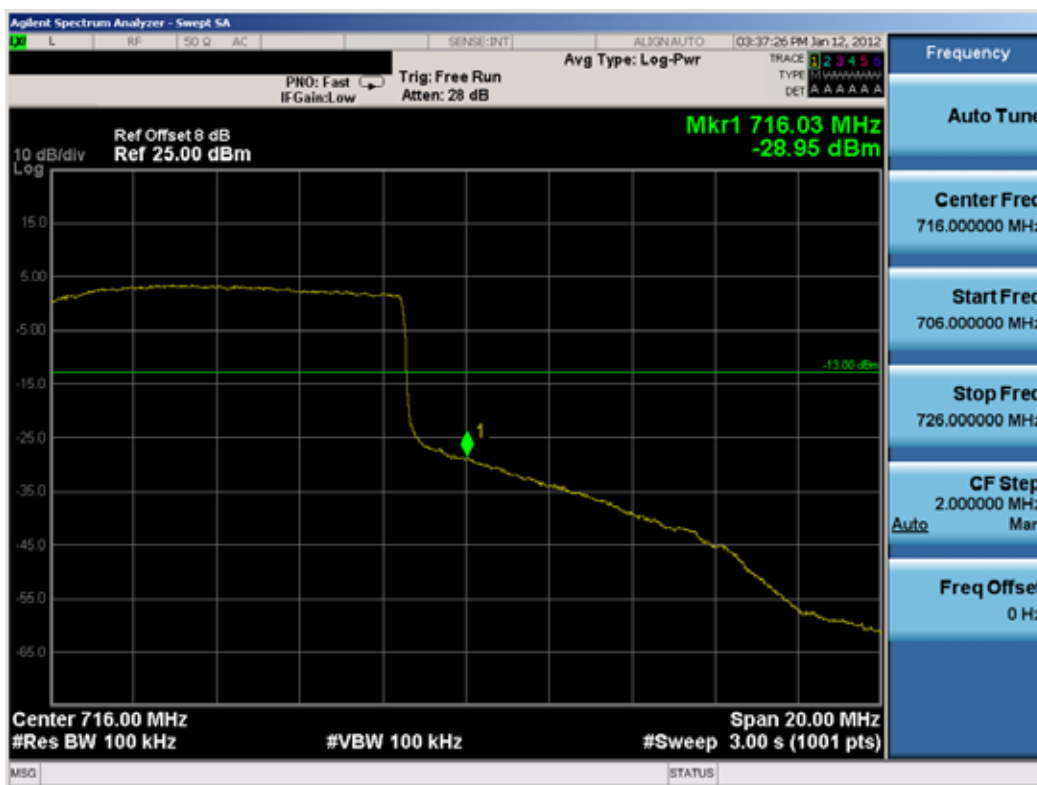


Plot 7-9. Occupied Bandwidth Plot (5MHz BW, QPSK RB Size = 25, Offset = 0)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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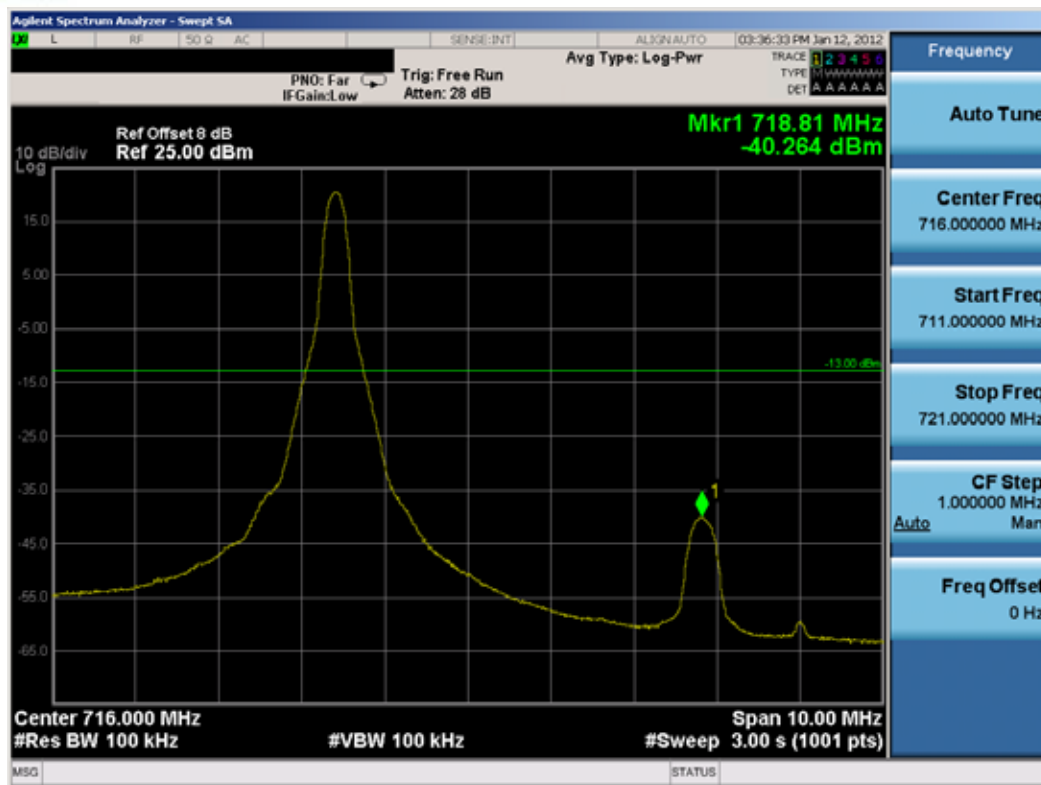


Plot 7-10. Occupied Bandwidth Plot (5MHz BW, 16-QAM RB Size = 25, Offset = 0)

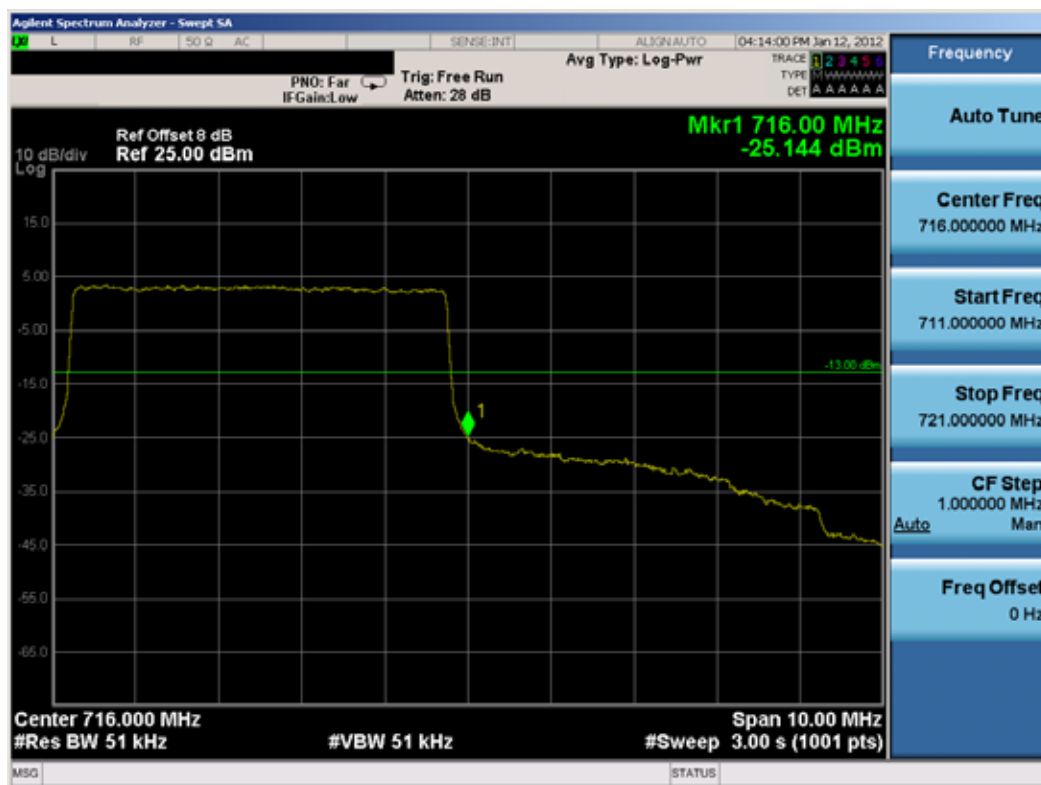


Plot 7-11. Upper Band Edge Plot (10 MHz BW, QPSK RB Size = 50, Offset = 0)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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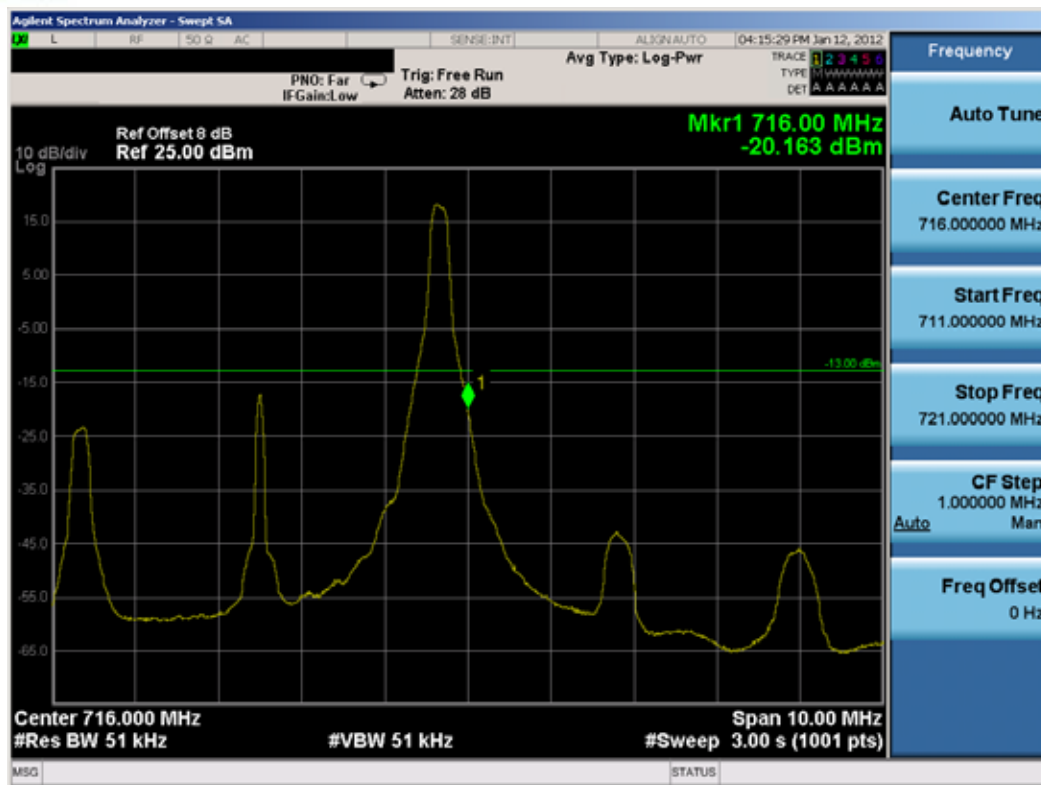


Plot 7-12. Upper Band Edge Plot (10MHz BW, QPSK RB Size = 1, Offset = 49)



Plot 7-13. Upper Band Edge Plot (5MHz BW, QPSK RB Size = 25, Offset = 0)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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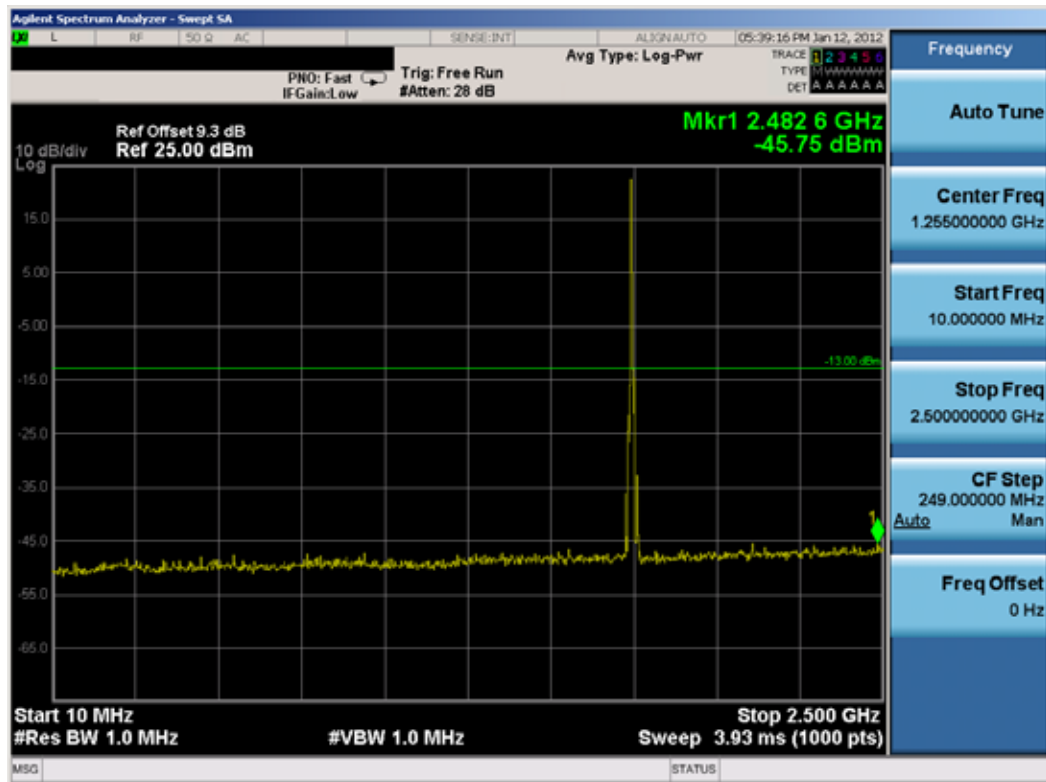


Plot 7-14. Upper Band Edge Plot (5MHz BW, QPSK RB Size = 1, Offset = 24)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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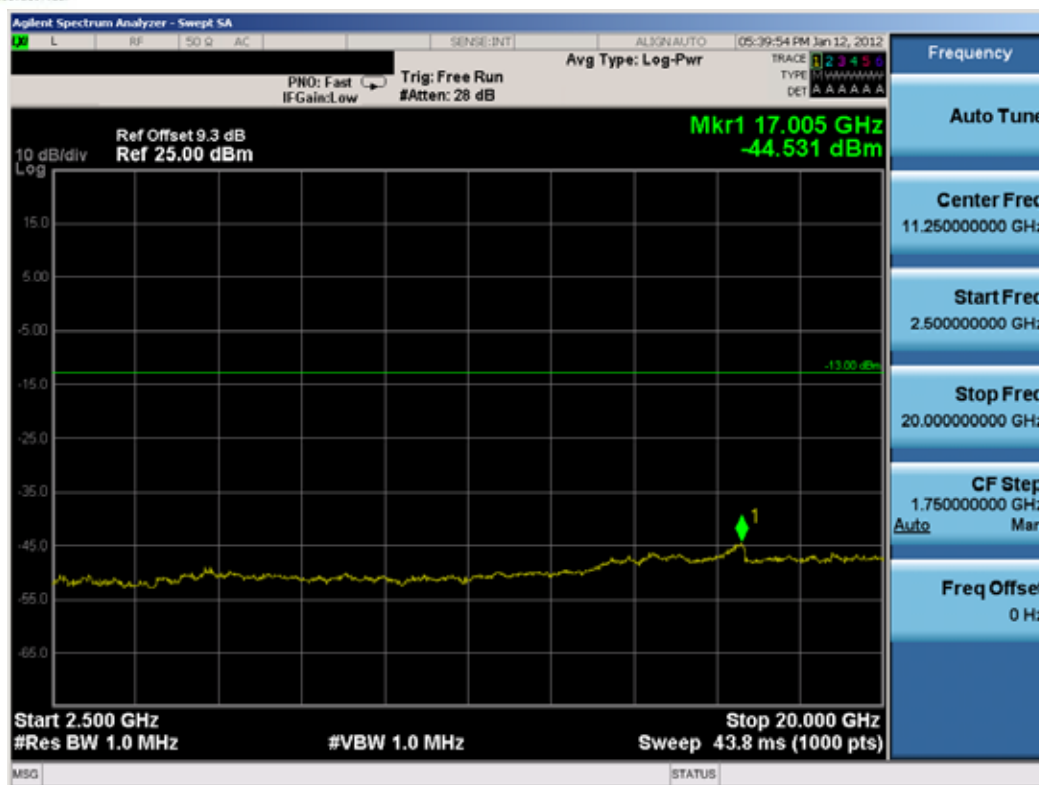
8.0 PLOTS OF EMISSIONS –BAND 4 LTE

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

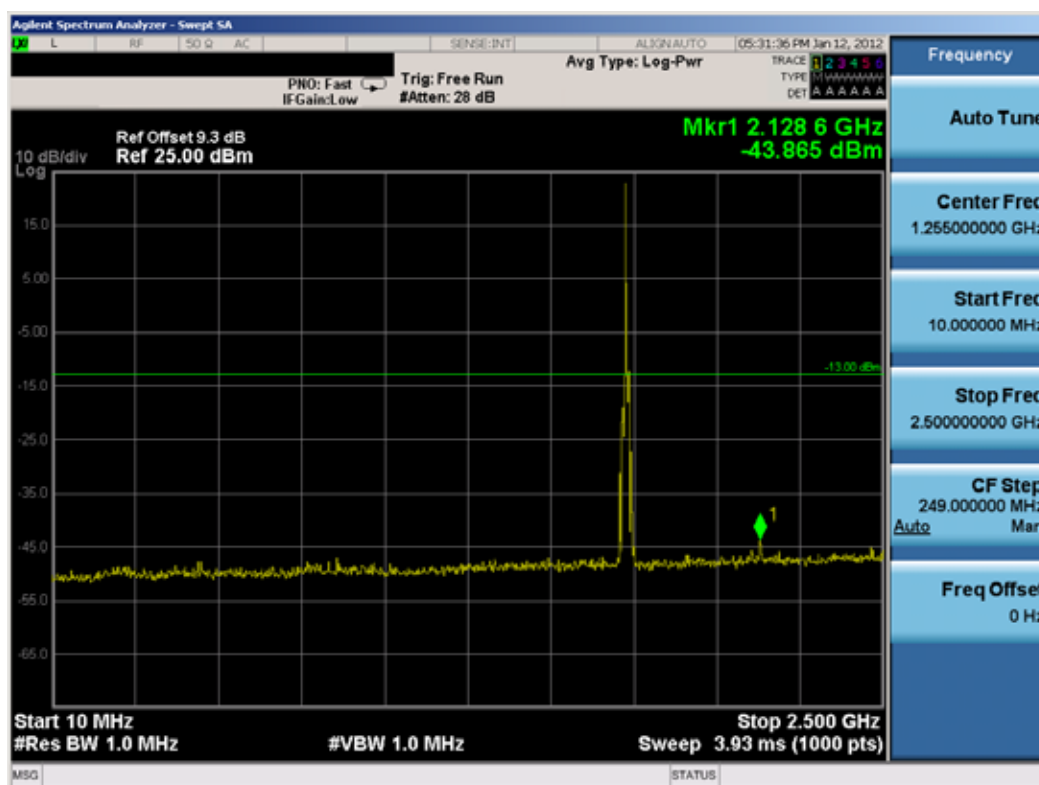


Plot 8-1. Conducted Spurious Plot (10MHz BW, QPSK, RB Size = 1 Offset = 0, Low Channel)

FCC ID: A3LSGHI577		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1201030007-R1.A3L	Test Dates: Jan. 9-13, 2012	EUT Type: Portable Handset		Page 38 of 54

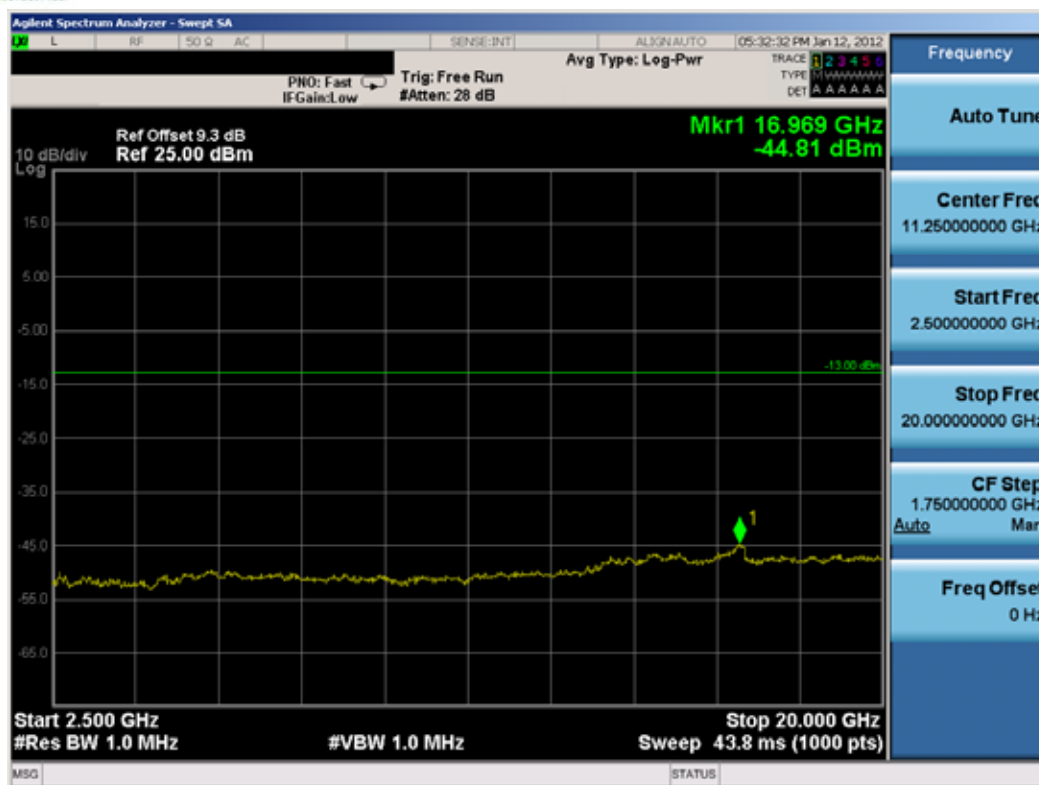


Plot 8-2. Conducted Spurious Plot (10MHz BW, QPSK, RB Size = 1 Offset = 0, Low Channel)

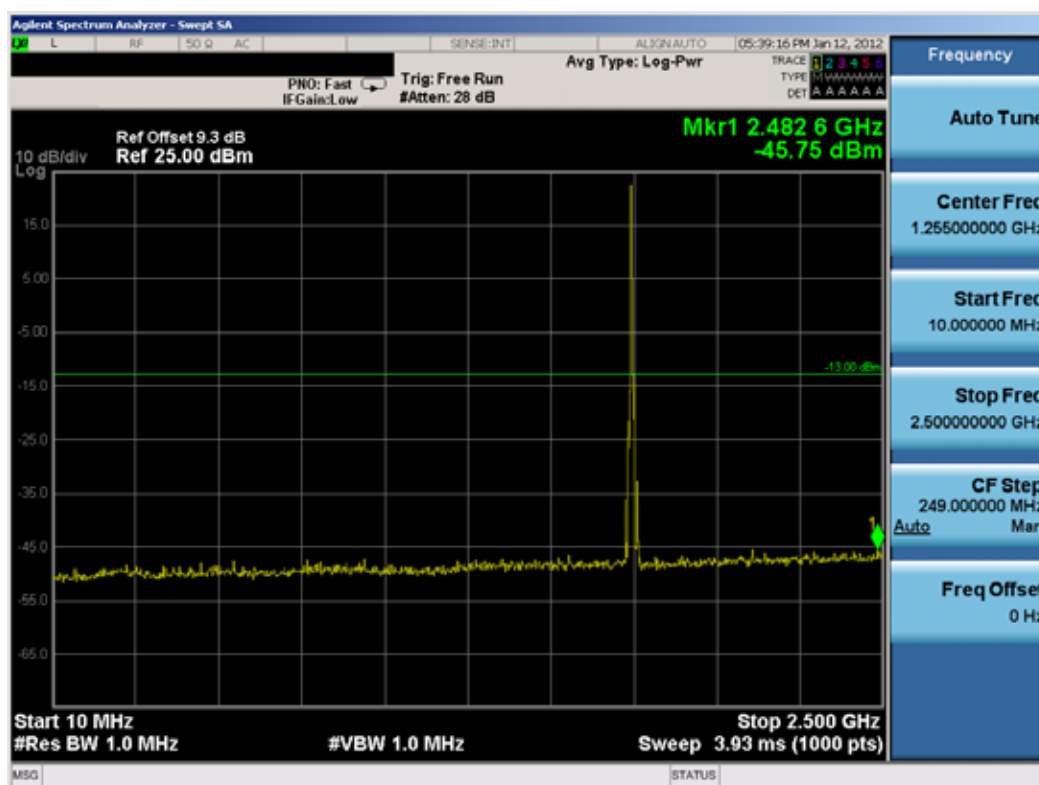


Plot 8-3. Conducted Spurious Plot (10MHz BW, QPSK, RB Size = 1 Offset = 0, Mid Channel)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1201030007-R1.A3L	Test Dates: Jan. 9-13, 2012	EUT Type: Portable Handset		Page 39 of 54

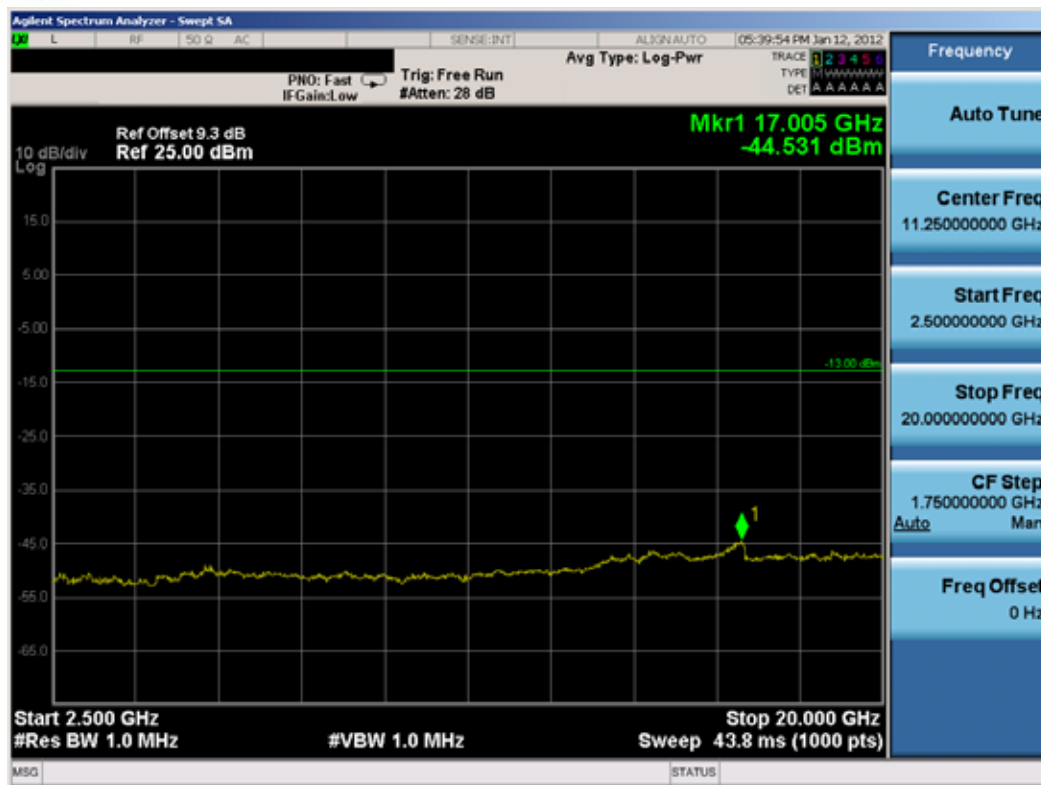


Plot 8-4. Conducted Spurious Plot (10MHz BW, QPSK, RB Size = 1 Offset = 0, Mid Channel)

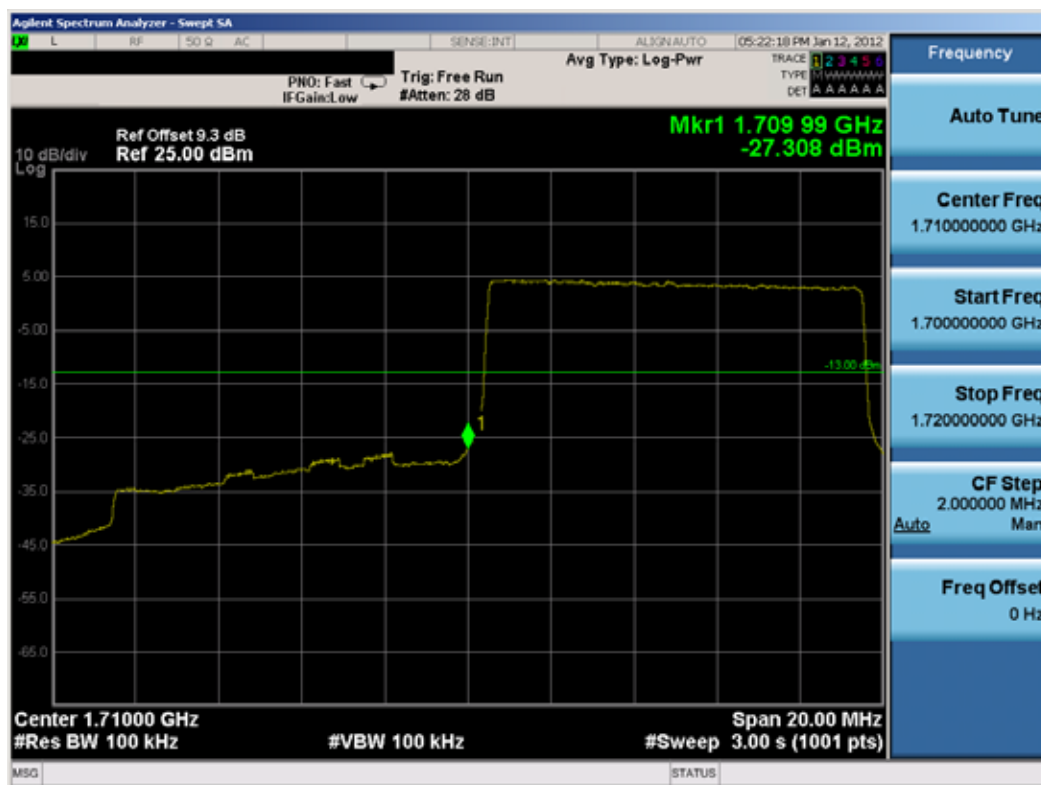


Plot 8-5. Conducted Spurious Plot (10MHz BW, QPSK, RB Size = 1 Offset = 0, High Channel)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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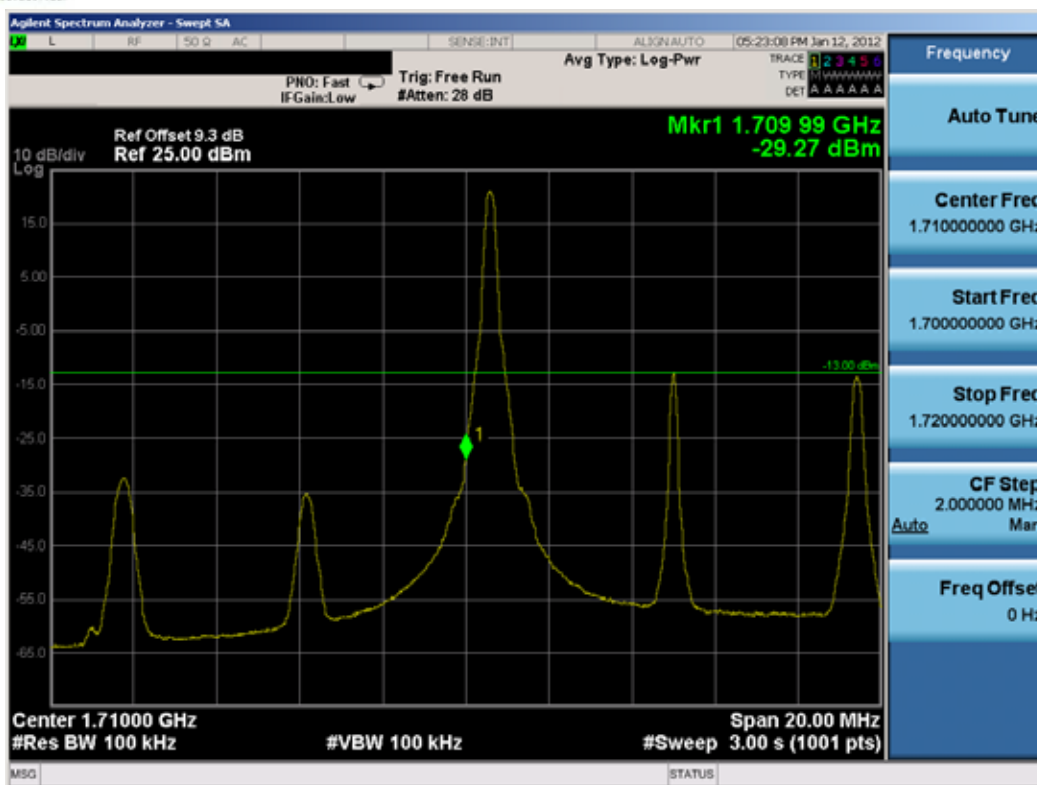


Plot 8-6. Conducted Spurious Plot (10MHz BW, QPSK, RB Size = 1 Offset = 0, High Channel)

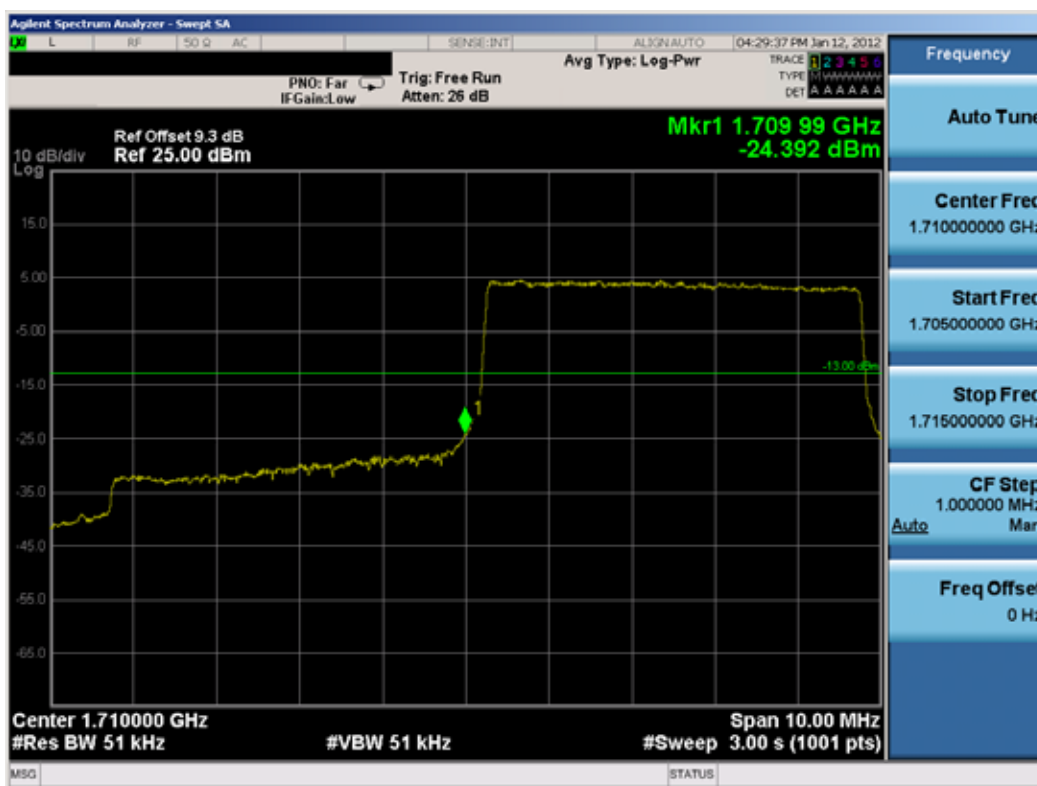


Plot 8-7. Band Edge Plot (10MHz BW, QPSK RB Size = 50 Offset = 0, Low Channel)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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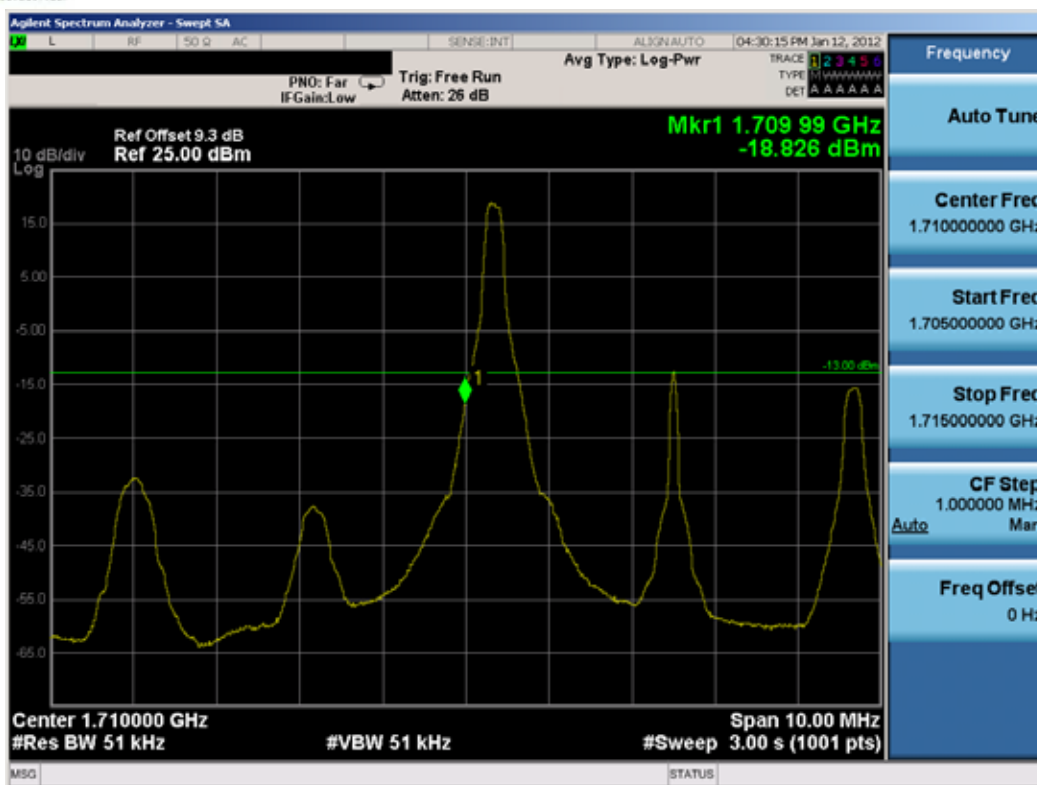


Plot 8-8. Band Edge Plot (10MHz BW, QPSK RB Size = 1 Offset = 0, Low Channel)

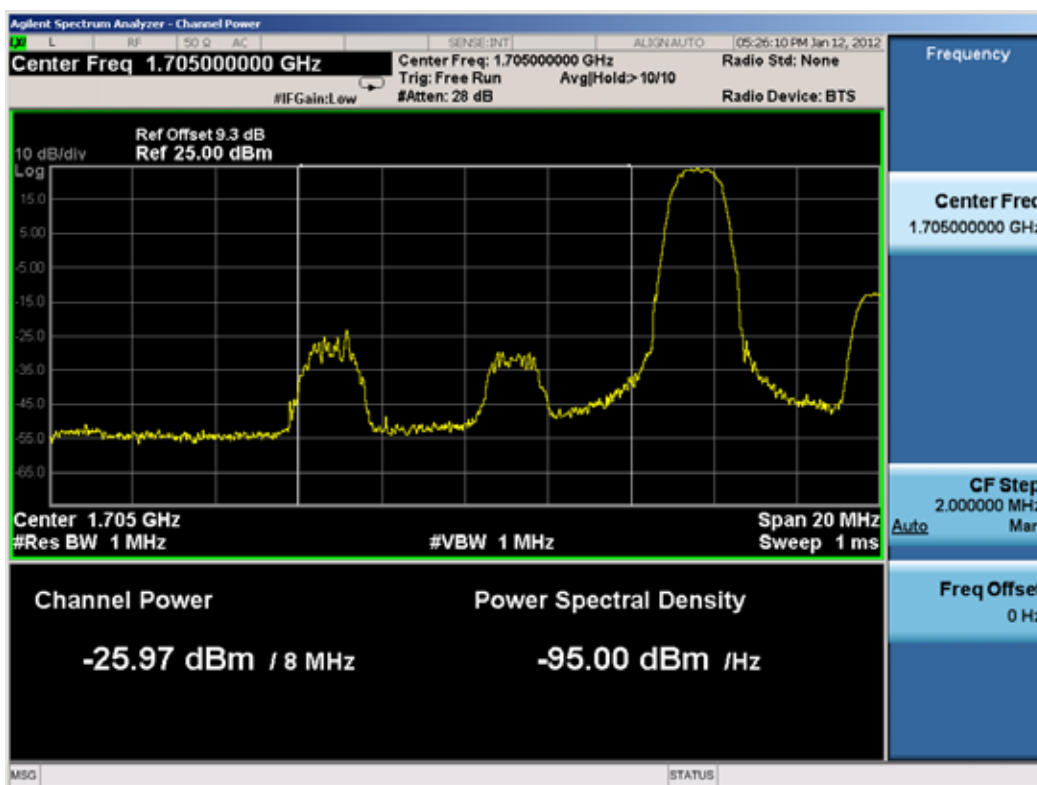


Plot 8-9. Band Edge Plot (5MHz BW, QPSK RB Size = 25 Offset = 0, Low Channel)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 8-10. Band Edge Plot (5MHz BW, QPSK RB Size = 1 Offset = 0, Low Channel)



Plot 8-11. Extended Band Edge Plot (10MHz BW, QPSK RB Size = 1 Offset = 0, Low Channel)

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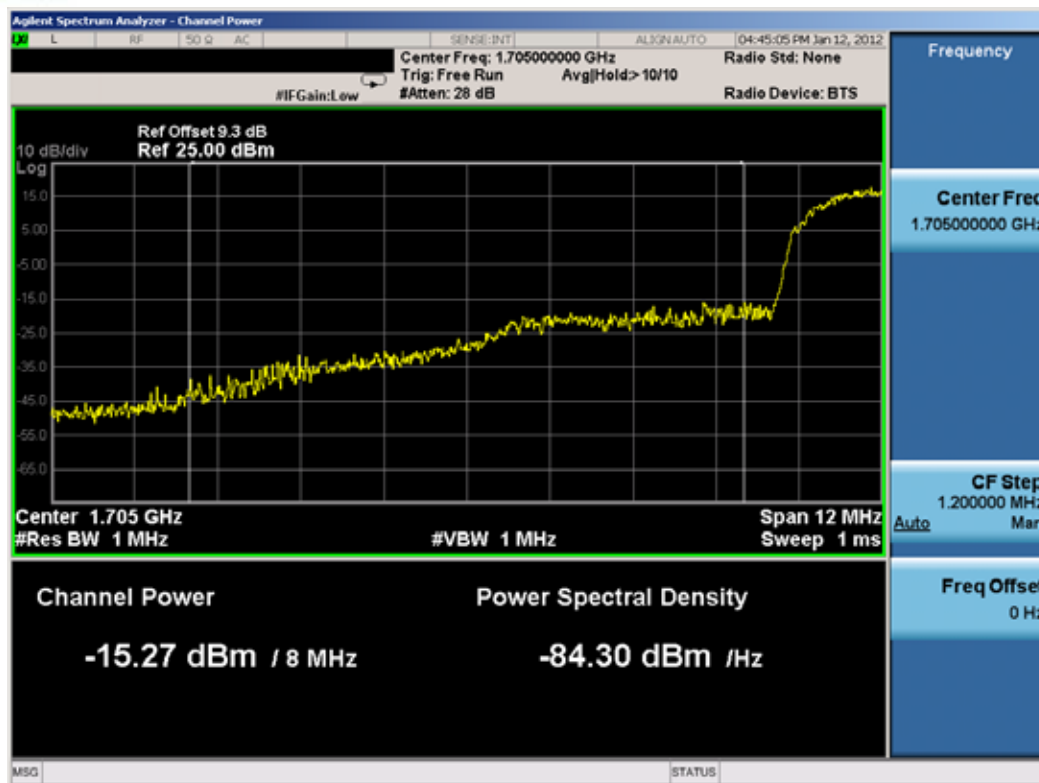


Plot 8-12. Extended Band Edge Plot (10MHz BW, QPSK RB Size = 50 Offset = 0)

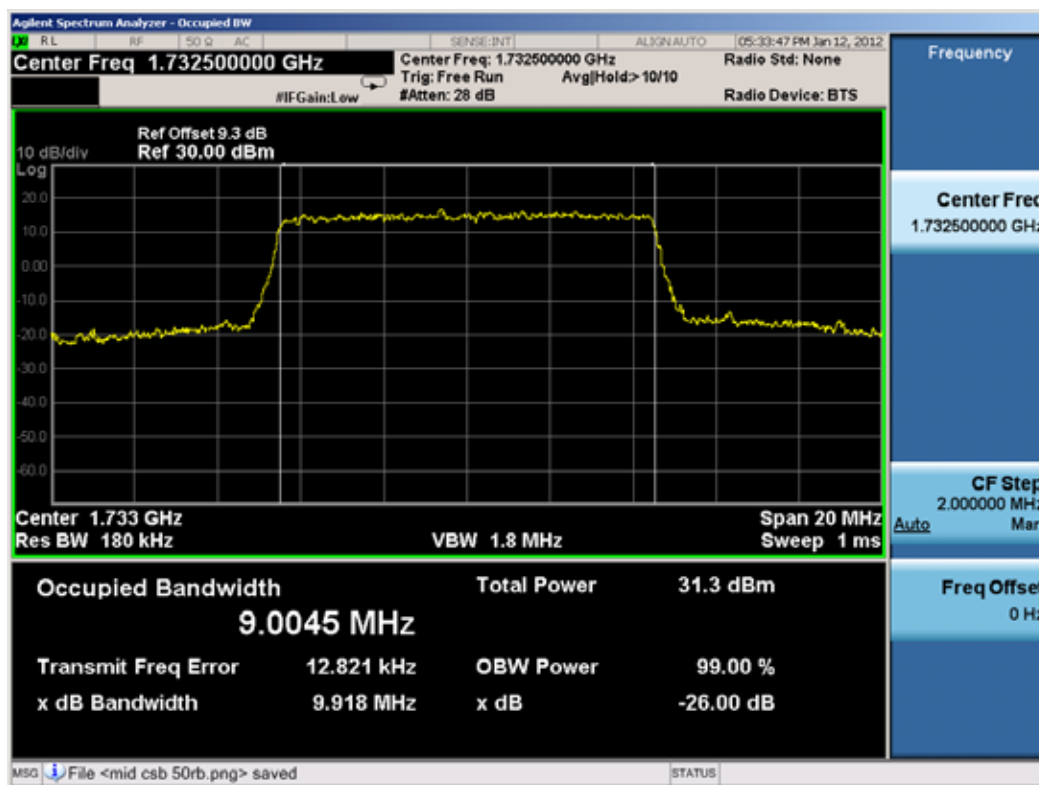


Plot 8-13. Extended Band Edge Plot (5MHz BW, QPSK RB Size = 1 Offset = 0)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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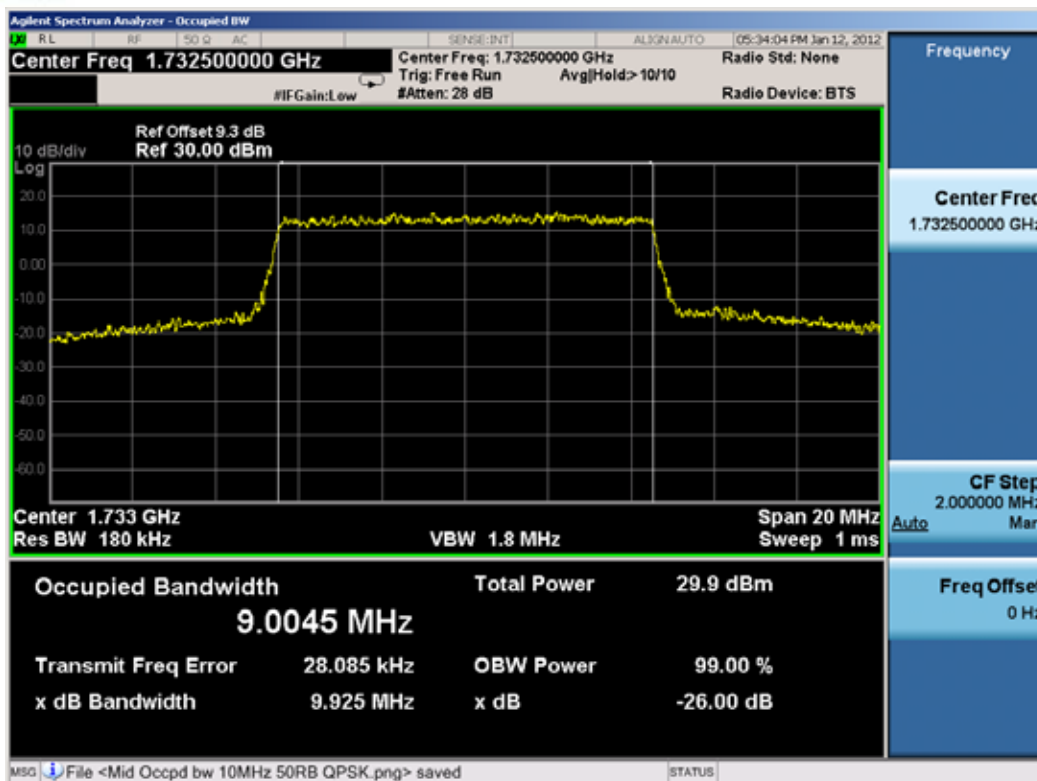


Plot 8-14. Extended Band Edge Plot (5MHz BW, QPSK RB Size = 25 Offset = 0)

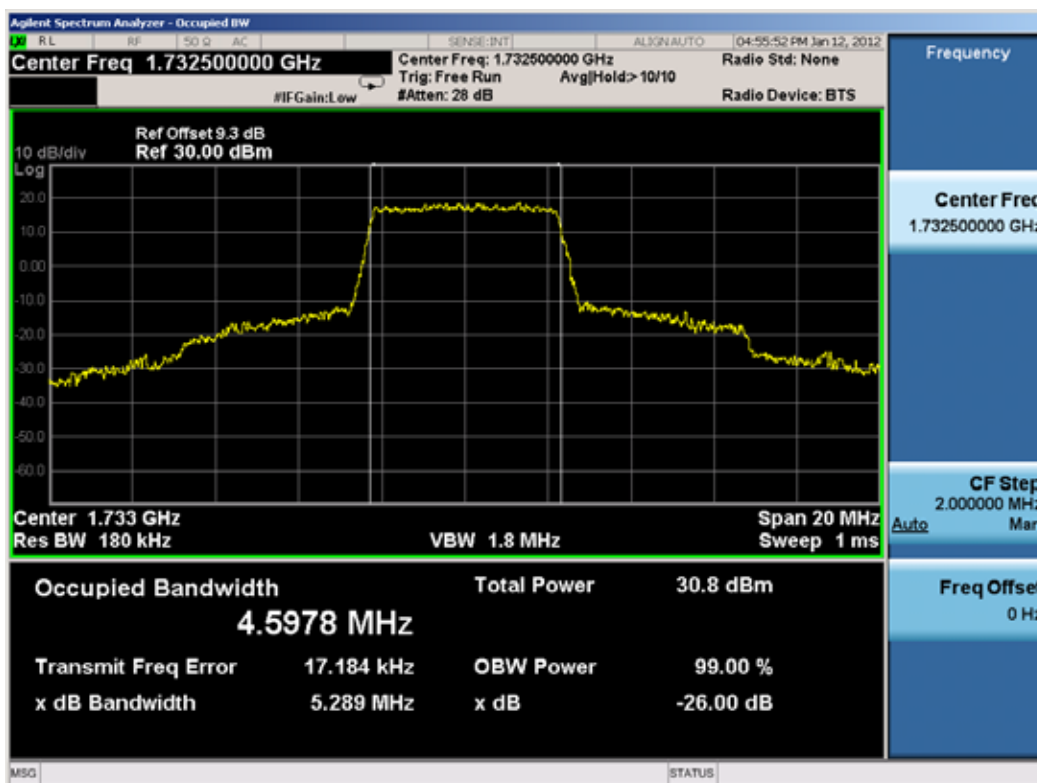


Plot 8-15. Occupied Bandwidth Plot (10MHz BW, QPSK RB Size = 50 Offset = 0)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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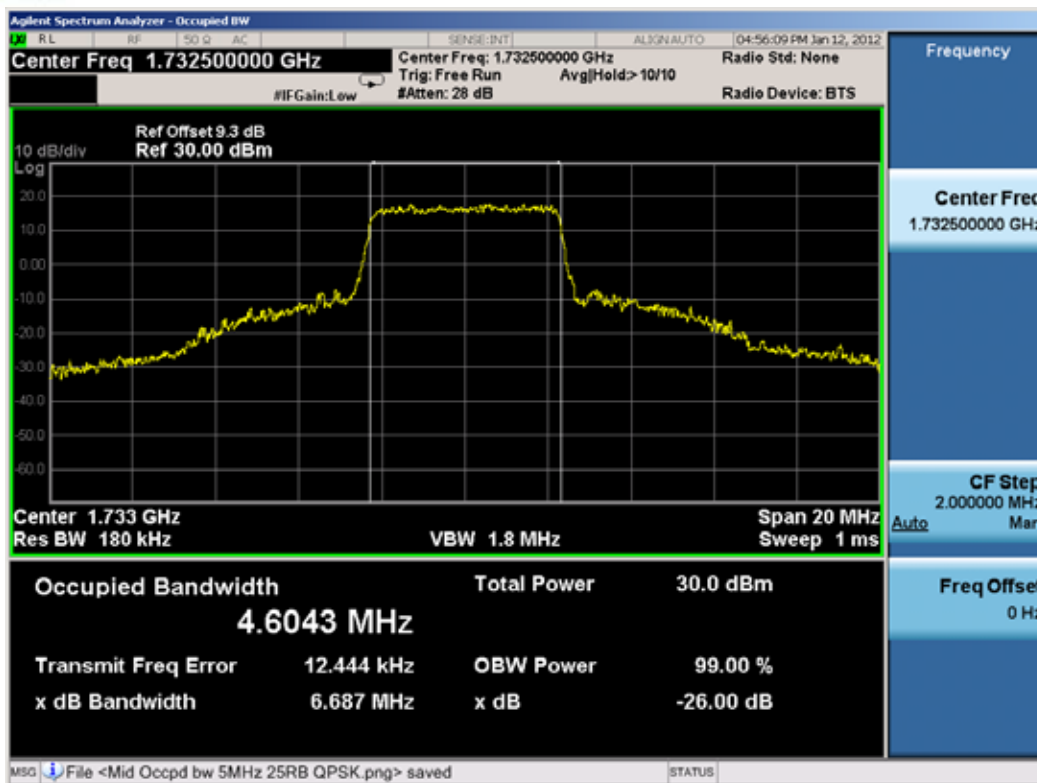


Plot 8-16. Occupied Bandwidth Plot (10MHz BW, 16QAM RB Size = 50 Offset = 0)

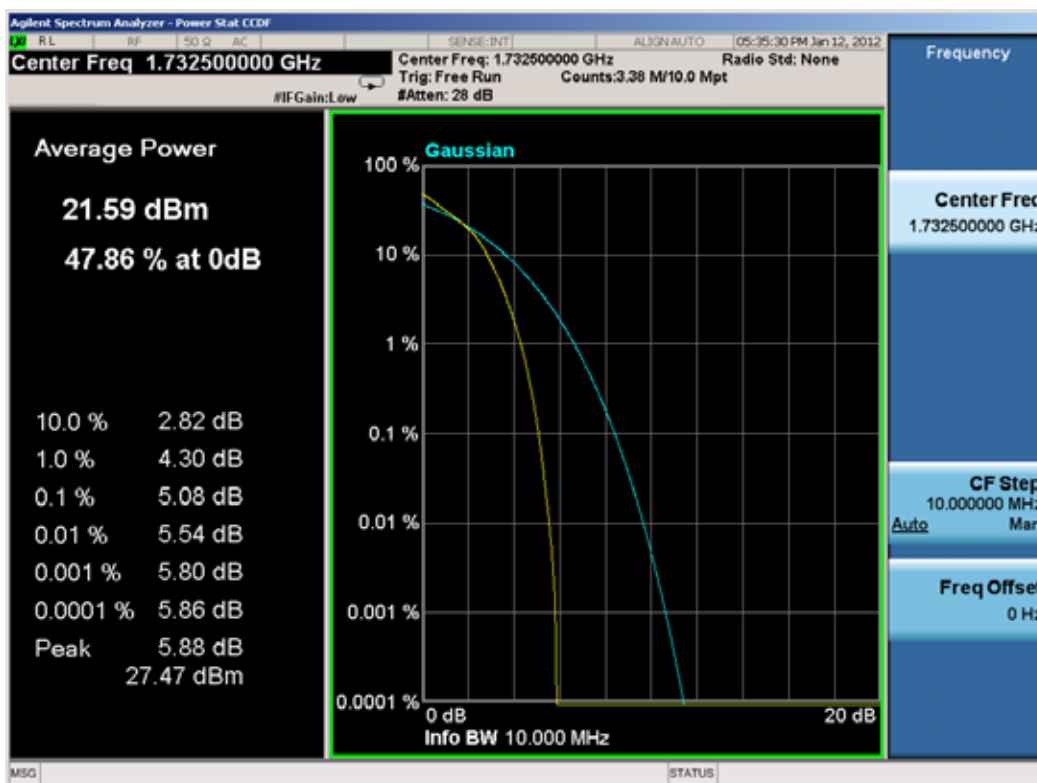


Plot 8-17. Occupied Bandwidth Plot (5MHz BW, QPSK RB Size = 25 Offset = 0)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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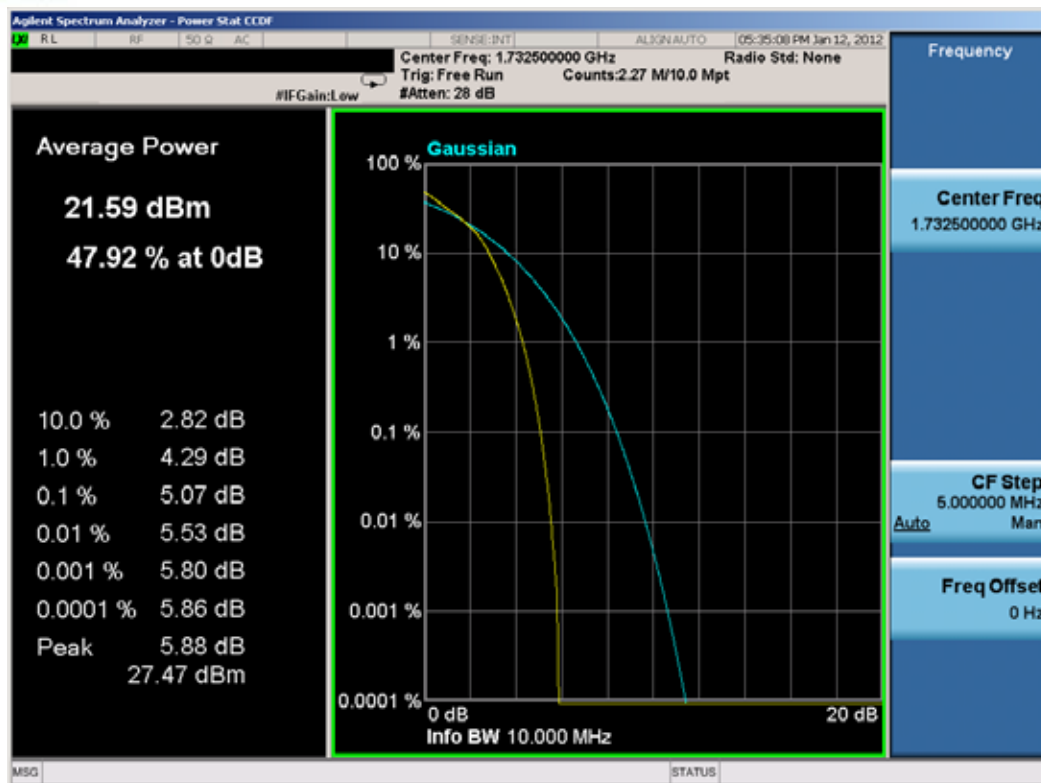


Plot 8-18. Occupied Bandwidth Plot (5MHz BW, 16QAM RB Size = 25 Offset = 0)

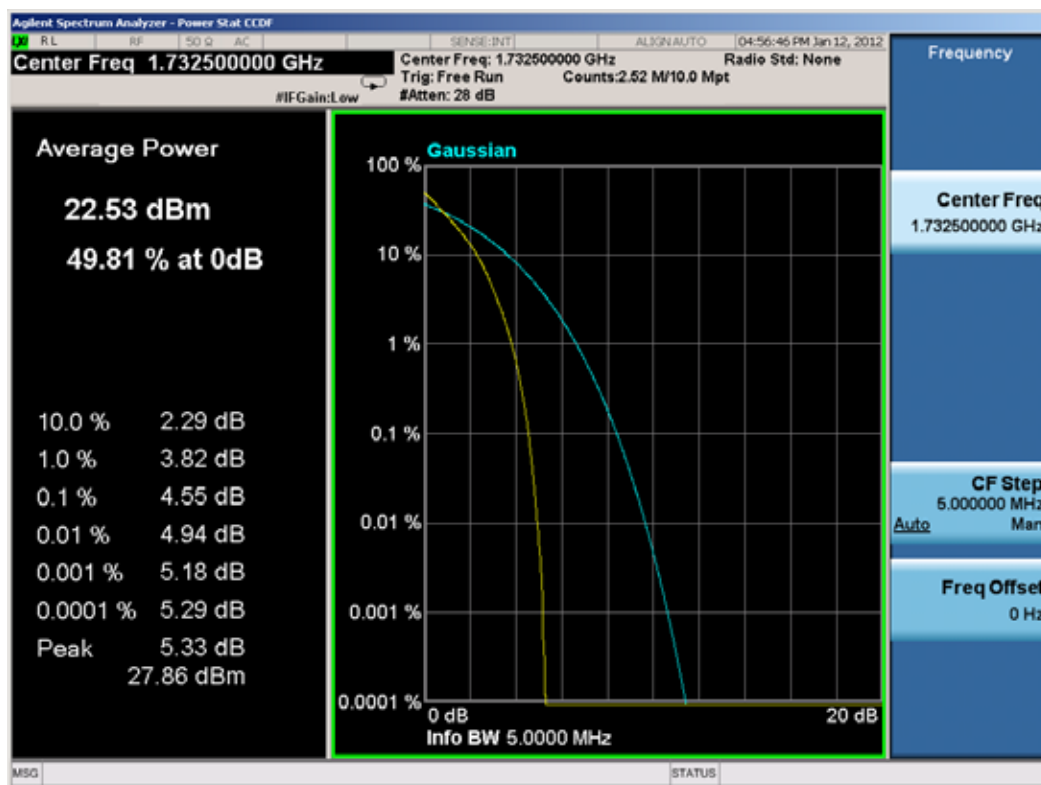


Plot 8-19. Peak-Average Ratio Plot (10MHz BW, QPSK RB Size = 50 RB Offset = 0)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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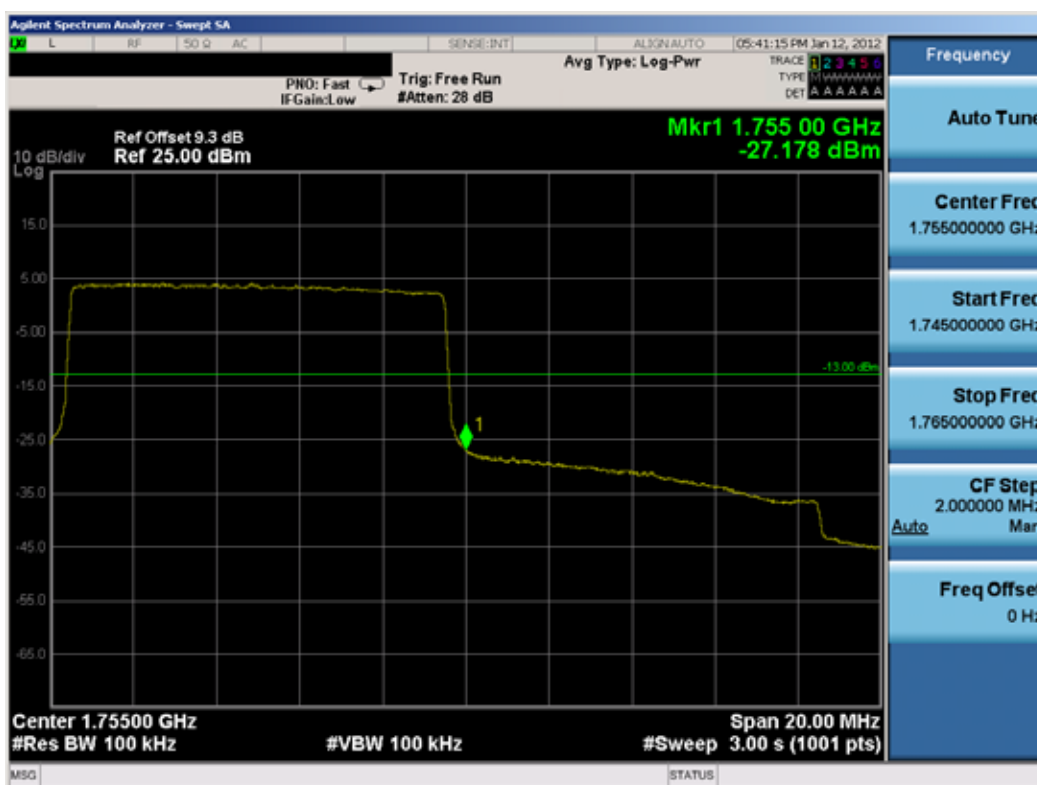
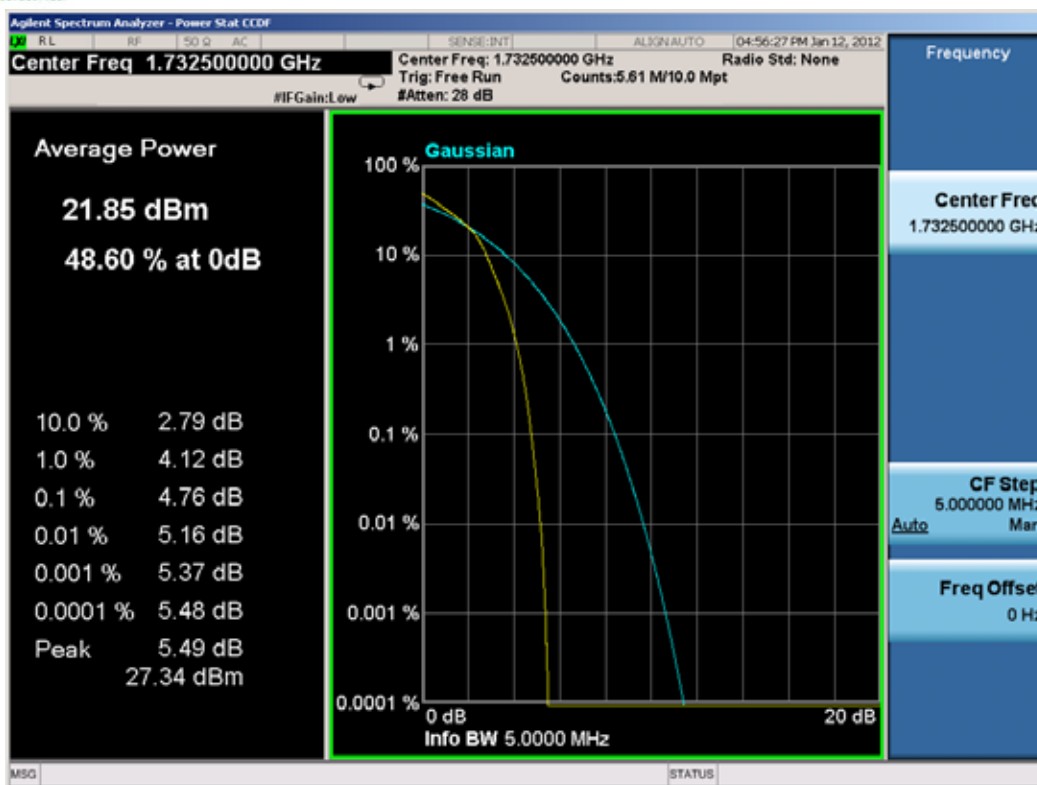


Plot 8-20. Peak-Average Ratio Plot (10MHz BW, 16QAM RB Size = 50 RB Offset = 0)

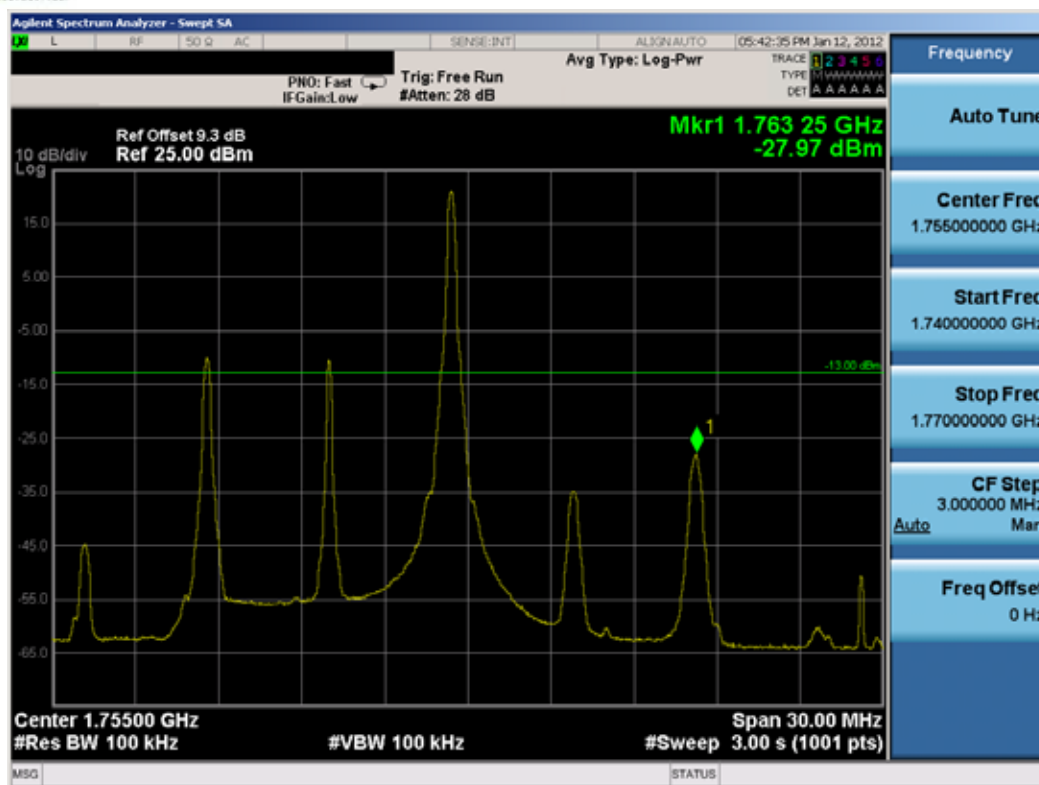


Plot 8-21. Peak-Average Ratio Plot (5MHz BW, QPSK RB Size = 25 RB Offset = 0)

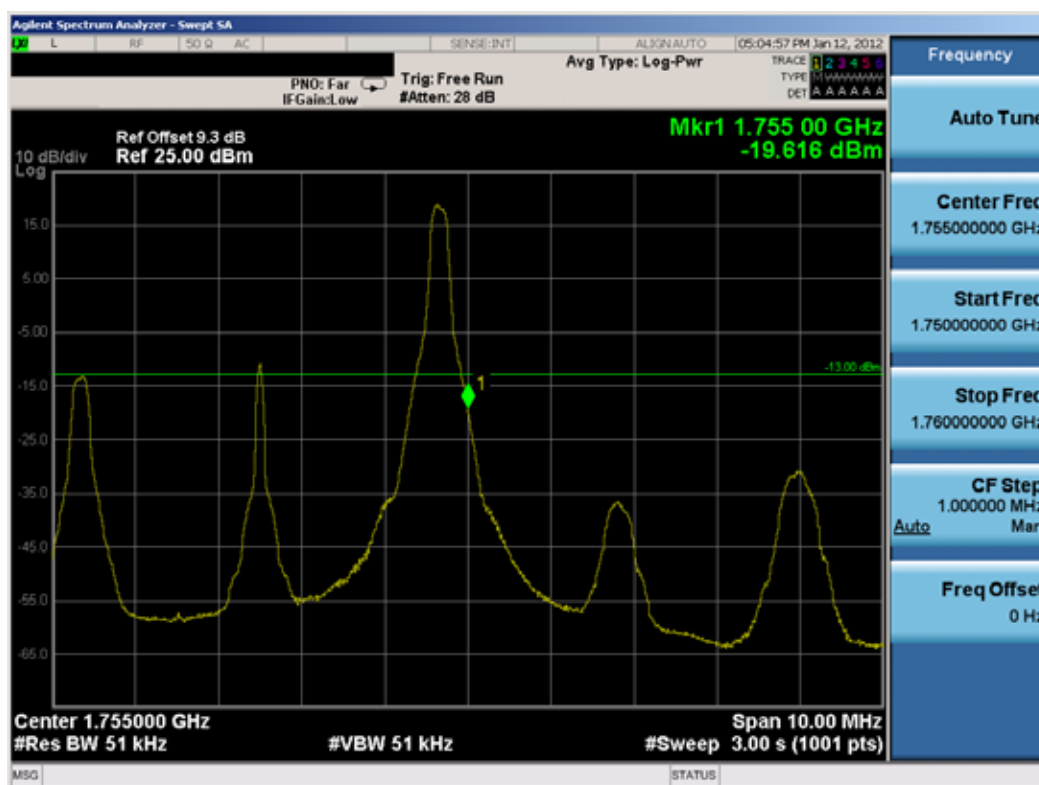
FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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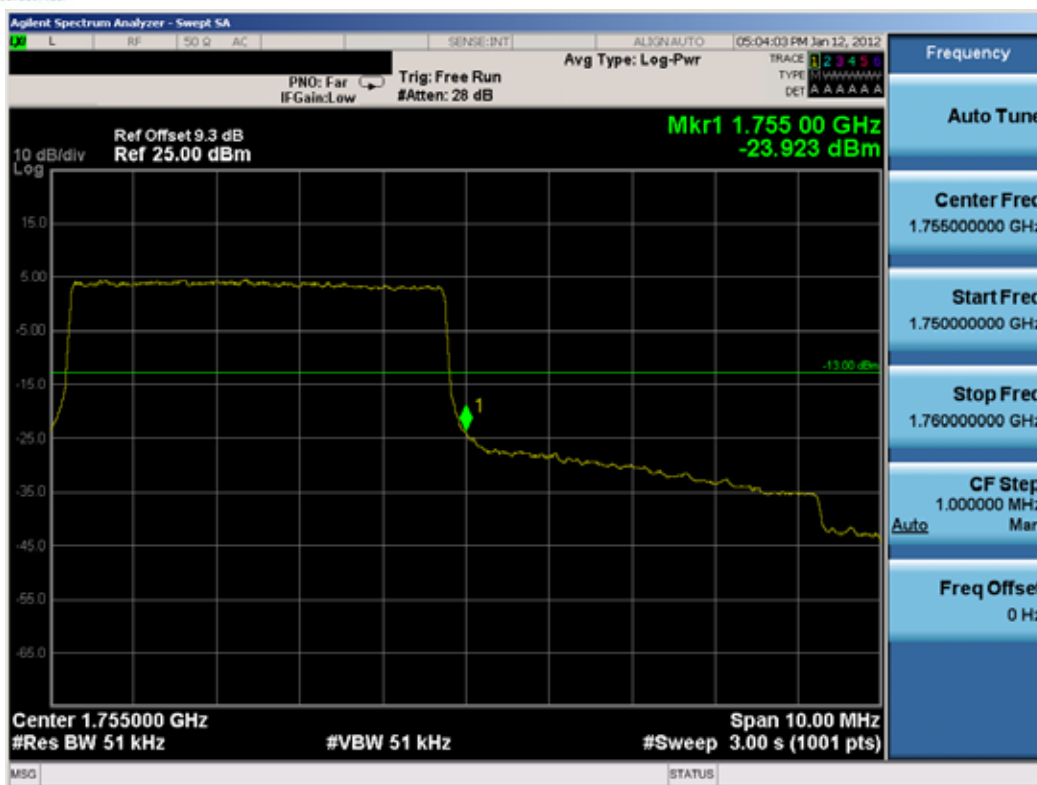


Plot 8-24. Band Edge Plot (10MHz BW, QPSK RB Size = 1 Offset = 49, High Channel)

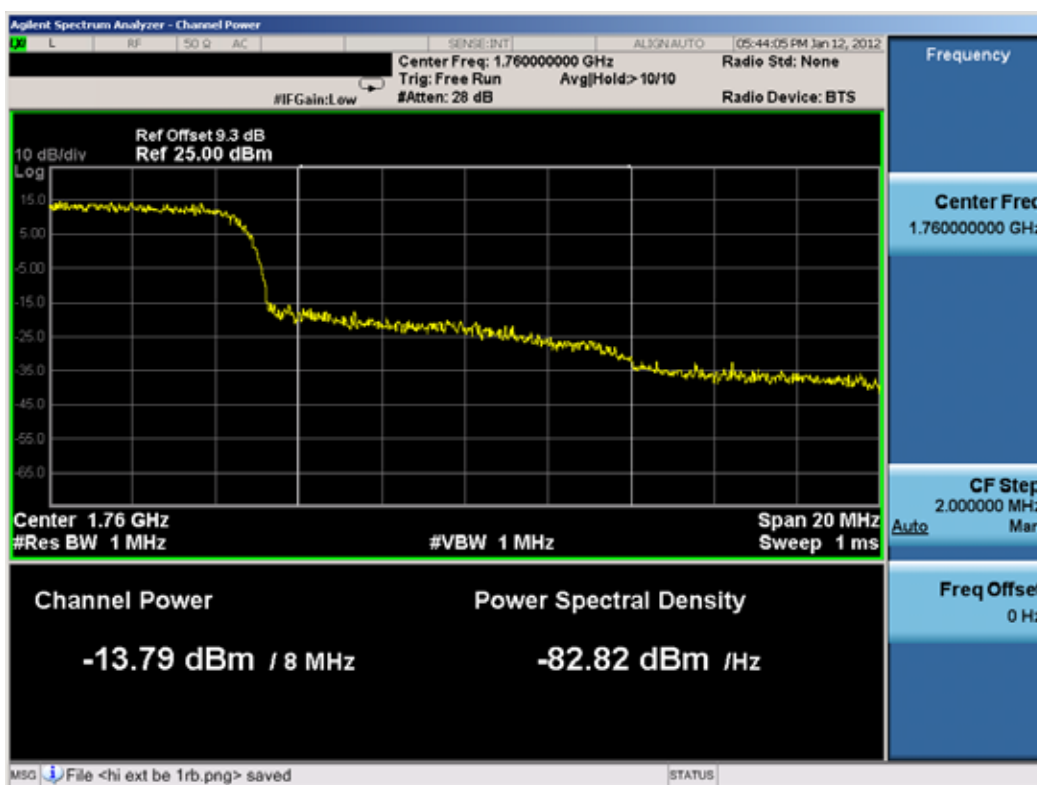


Plot 8-25. Band Edge Plot (5MHz BW, QPSK RB Size = 1 Offset = 24, High Channel)

FCC ID: A3LSGHI577	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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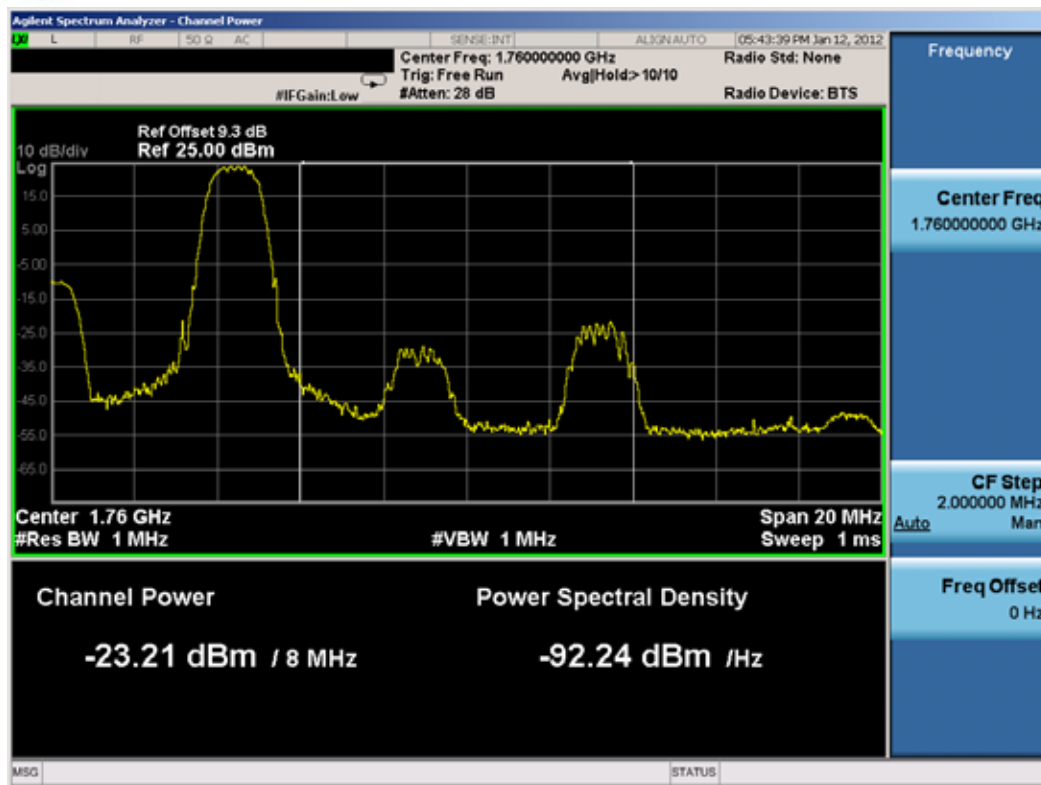


Plot 8-26. Band Edge Plot (5MHz BW, QPSK RB Size = 25 Offset = 0, High Channel)

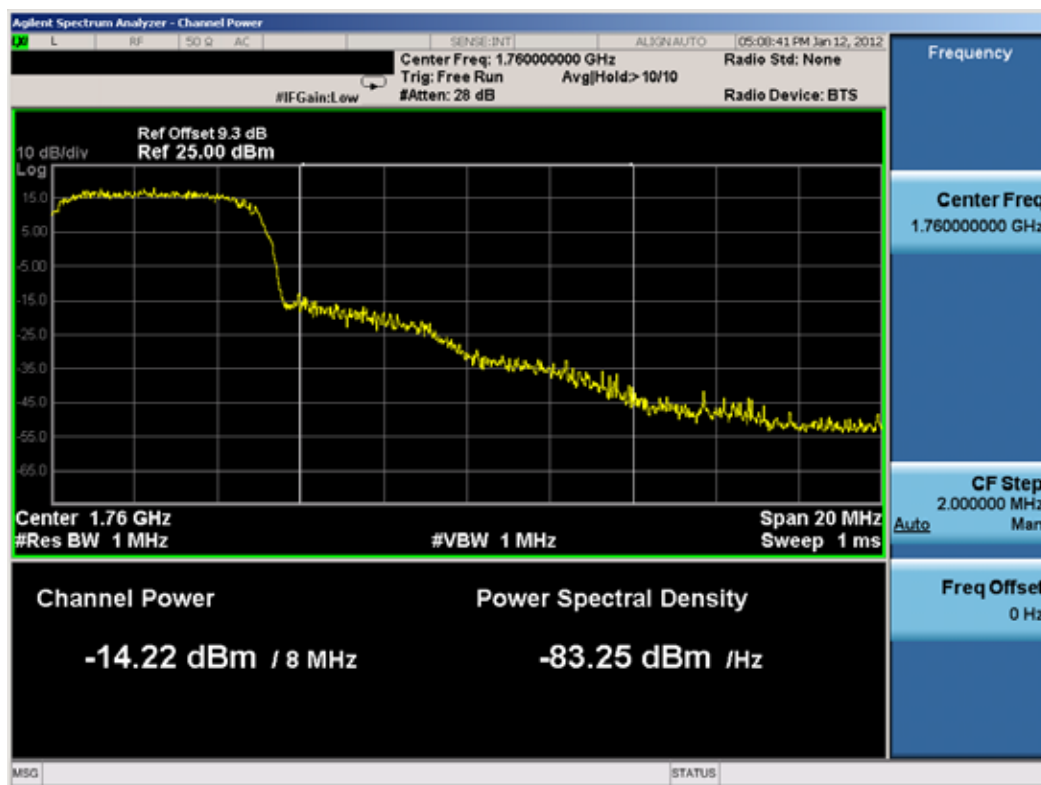


Plot 8-27. Extended Band Edge Plot (10MHz BW, QPSK RB Size = 50 Offset = 0, High Channel)

FCC ID: A3LSGHI577		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 8-28. Extended Band Edge Plot (10MHz BW, QPSK RB Size = 1 Offset = 49, High Channel)



Plot 8-29. Extended Band Edge Plot (5MHz BW, QPSK RB Size = 25 Offset = 0, High Channel)

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Plot 8-30. Extended Band Edge Plot (5MHz BW, QPSK RB Size = 1 Offset = 24, High Channel)

Note: All of the Extended Band Edge Plots above are the worst case emissions 1MHz removed from the band edge. All signal bandwidths, RB sizes, RB offsets, and modulations have been investigated and did not produce significant emissions greater than what is reported above.

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9.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSGHI577** complies with all the requirements of Parts 2, and 27 of the FCC rules.

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