

PCTEST ENGINEERING LABORATORY, INC.

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MEASUREMENT REPORT

LTE

Applicant Name:

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

Date of Testing: 3/19 - 4/27/2018 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1803190049-03-R1.A3L

FCC ID:

A3LSMJ337V

Certification

SM-J337V

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model(s): EUT Type: Classification: FCC Rule Part(s): Test Procedure(s):

SM-J337VPP Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 22, 24, & 27 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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

This revised Test Report (S/N: 1M1803190049-03-R1.A3L) supersedes and replaces the previously issued test report (S/N: 1M1803190049-03.A3L) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

Randy Ortanez President



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MEASUREMENT REPORT Part 22, 24, & 27



			EF	RP	El	RP		
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Pow er (W)	Max. Pow er (dBm)	Max. Pow er (W)	Max. Pow er (dBm)	Emission Designator	Modulation
LTE Band 13	27	779.5 - 784.5	0.059	17.71	0.097	19.86	4M54G7D	QPSK
LTE Band 13	27	779.5 - 784.5	0.052	17.12	0.084	19.27	4M53W7D	16QAM
LTE Band 13	27	782	0.060	17.79	0.099	19.94	9M01G7D	QPSK
LTE Band 13	27	782	0.051	17.09	0.084	19.24	8M98W7D	16QAM
LTE Band 5	22H	824.7 - 848.3	0.147	21.68	0.242	23.83	1M10G7D	QPSK
LTE Band 5	22H	824.7 - 848.3	0.124	20.94	0.204	23.09	1M11W7D	16QAM
LTE Band 5	22H	825.5 - 847.5	0.154	21.88	0.253	24.03	2M72G7D	QPSK
LTE Band 5	22H	825.5 - 847.5	0.137	21.36	0.224	23.51	2M73W7D	16QAM
LTE Band 5	22H	826.5 - 846.5	0.157	21.97	0.258	24.12	4M59G7D	QPSK
LTE Band 5	22H	826.5 - 846.5	0.134	21.27	0.220	23.42	4M57W7D	16QAM
LTE Band 5	22H	829 - 844	0.145	21.60	0.237	23.75	9M05G7D	QPSK
LTE Band 5	22H	829 - 844	0.122	20.85	0.200	23.00	9M03W7D	16QAM

EUT Overview (<1GHz)

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			EI	RP		
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Pow er (W)	Max. Pow er (dBm)	Emission Designator	Modulation
LTE Band 4	27	1710.7 - 1754.3	0.160	22.05	1M09G7D	QPSK
LTE Band 4	27	1710.7 - 1754.3	0.100	21.19	1M0907D	16QAM
LTE Band 4	27	1711.5 - 1753.5	0.161	22.06	2M72G7D	QPSK
LTE Band 4	27	1711.5 - 1753.5	0.129	21.10	2M72W7D	16QAM
LTE Band 4	27	1712.5 - 1752.5	0.120	21.10	4M54G7D	QPSK
LTE Band 4	27	1712.5 - 1752.5	0.126	21.00	4M55W7D	16QAM
LTE Band 4	27	1715 - 1750	0.120	21.00	9M02G7D	QPSK
LTE Band 4	27	1715 - 1750	0.136	21.34	9M07W7D	16QAM
LTE Band 4	27	1717.5 - 1747.5	0.163	22.11	13M6G7D	QPSK
LTE Band 4	27	1717.5 - 1747.5	0.133	21.24	13M5W7D	16QAM
LTE Band 4	27	1720 - 1745	0.159	22.01	18M0G7D	QPSK
LTE Band 4	27	1720 - 1745	0.131	21.19	18M0W7D	16QAM
LTE Band 2	24E	1850.7 - 1909.3	0.205	23.13	1M10G7D	QPSK
LTE Band 2	24E	1850.7 - 1909.3	0.183	22.62	1M10W7D	16QAM
LTE Band 2	24E	1851.5 - 1908.5	0.208	23.19	2M71G7D	QPSK
LTE Band 2	24E	1851.5 - 1908.5	0.171	22.34	2M72W7D	16QAM
LTE Band 2	24E	1852.5 - 1907.5	0.200	23.01	4M57G7D	QPSK
LTE Band 2	24E	1852.5 - 1907.5	0.157	21.96	4M54W7D	16QAM
LTE Band 2	24E	1855 - 1905	0.198	22.97	9M06G7D	QPSK
LTE Band 2	24E	1855 - 1905	0.164	22.14	9M05W7D	16QAM
LTE Band 2	24E	1857.5 - 1902.5	0.210	23.23	13M6G7D	QPSK
LTE Band 2	24E	1857.5 - 1902.5	0.168	22.26	13M6W7D	16QAM
LTE Band 2	24E	1860 - 1900	0.204	23.09	18M0G7D	QPSK
LTE Band 2	24E	1860 - 1900	0.165	22.16	18M0W7D	16QAM
LTE Band 7	27	2502.5 - 2567.5	0.304	24.83	4M55G7D	QPSK
LTE Band 7	27	2502.5 - 2567.5	0.256	24.08	4M54W7D	16QAM
LTE Band 7	27	2505 - 2565	0.282	24.50	9M02G7D	QPSK
LTE Band 7	27	2505 - 2565	0.250	23.98	9M05W7D	16QAM
LTE Band 7	27	2507.5 - 2562.5	0.283	24.51	13M5G7D	QPSK
LTE Band 7	27	2507.5 - 2562.5	0.247	23.93	13M5W7D	16QAM
LTE Band 7	27	2510 - 2560	0.246	23.91	18M0G7D	QPSK
LTE Band 7	27	2510 - 2560	0.212	23.27	18M0W7D	16QAM

EUT Overview (>1GHz)

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) 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 Innovation, Science and Economic Development Canada.

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMJ337V**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 18113, 18139, 18113, 21315

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ UNII, Bluetooth (1x, EDR, LE)

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 EMI Suppression Device(s)/Modifications

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

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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-E-2016) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

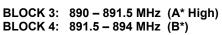
3.2 Block C Frequency Range

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.

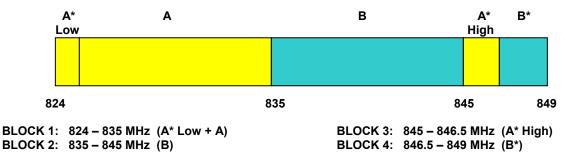
3.3 Cellular - Base Frequency Blocks



BLOCK 1: 869 - 880 MHz (A* Low + A) BLOCK 2: 880 - 890 MHz (B)



3.4 Cellular - Mobile Frequency Blocks



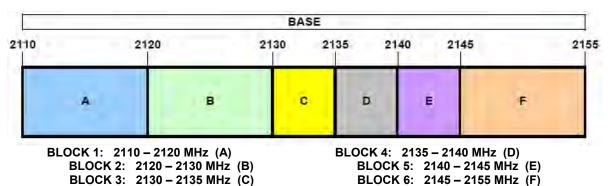
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3.5 **PCS - Base Frequency Blocks** Α D в Е F С 1930 1950 1970 1990 BLOCK 1: 1930 - 1945 MHz (A) BLOCK 4: 1965 - 1970 MHz (E) BLOCK 2: 1945 - 1950 MHz (D) BLOCK 5: 1970 - 1975 MHz (F) BLOCK 3: 1950 - 1965 MHz (B) BLOCK 6: 1975 – 1990 MHz (C) 3.6 **PCS - Mobile Frequency Blocks** Α D В Ε F С



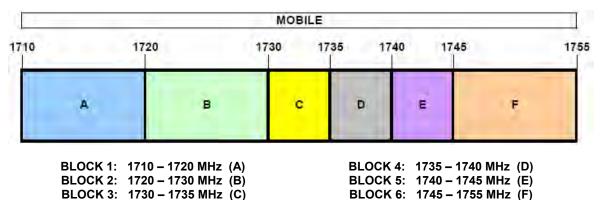
3.7 AWS - Base Frequency Blocks



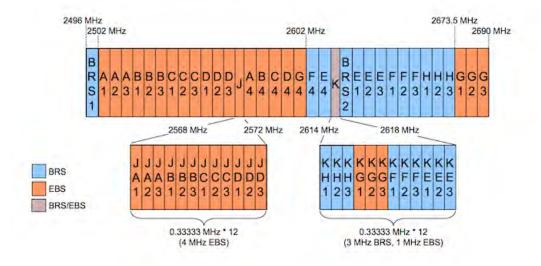
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3.8 AWS - Mobile Frequency Blocks



3.9 BRS/EBS Frequency Block



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3.10 Radiated Power and Radiated Spurious Emissions

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. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

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 v03r01.

Per the guidance of ANSI/TIA-603-E-2016, 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:

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

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10log₁₀(Power [Watts]). For Band 7, 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 + 10log₁₀(Power [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 (±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 C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx3	Licensed Transmitter Cable Set	8/10/2017	Annual	8/10/2018	LTx3
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	6/21/2017	Annual	6/21/2018	RE1
Anritsu	MT8820C	Radio Communication Analyzer	5/23/2017	Annual	5/23/2018	6201240328
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
Espec	ESX-2CA	Environmental Chamber	4/11/2017	Annual	4/11/2018	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128337
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	12/1/2016	Biennial	12/1/2018	125518
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A		11208010032	
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102135
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102133
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/11/2017	Annual	5/11/2018	100040
Rohde & Schwarz	CMW500	Radio Communication Tester	10/13/2017	Annual	10/13/2018	102060
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/31/2017	Annual	7/31/2018	100348
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	4/19/2017	Annual	4/19/2018	100342
Rohde & Schwarz	CMW500	Radio Communication Tester	5/4/2017	Annual	5/4/2018	112347
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102134
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB6	Bi-Log Antenna (30M - 6GHz)	9/27/2016	Biennial	9/27/2018	A082816

Table 5-1. Test Equipment

Notes:

- 1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- 2. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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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

QAM 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.
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Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	LTE

Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference	
2.1049	Occupied Bandwidth	N/A			PASS	Section 7.2
2.1051 2.917(a) 24.238(a) 27.53(c) 27.53(h)	Out of Band Emissions	> 43 + 10log ₁₀ (P[Watts]) at Band Edge and for all out-of- band emissions		PASS	Section 7.3, 7.4	
27.53(m)	Out of Band Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)		PASS	Section 7.3, 7.4	
24.232(d)	Peak-Average Ratio	< 13 dB	CONDUCTED	PASS	Section 7.5	
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report	
2.1055 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)		PASS	Section 7.8	

Table 7-1. Summary of Conducted Test Results

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 14 of 126
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Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a)(5)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 5)	< 7 Watts max. ERP		PASS	Section 7.6
27.50(b)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 13)	< 3 Watts max. ERP		PASS	Section 7.6
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2, 7)	< 2 Watts max. EIRP		PASS	Section 7.6
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. EIRP	RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(h)	Undesirable Emissions	> 43 + 10log ₁₀ (P[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	Undesirable emissions must meet the limits detailed in 27.53(m)		PASS	Section 7.7

Table 7-2. Summary of Radiated Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots (Sections 7.2, 7.3, 7.4, 7.5) were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 4.8.
- 5) For operation <1GHz, the EIRP limits in the table above are referenced to the specifications written in the relevant Radio Standards Specifications for Innovation, Science, and Economic Development Canada.

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7.2 Occupied Bandwidth

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 v03r01 - 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 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2 7 were repeated after changing the RBW such that it would be within
 - 1-5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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Plot 7-1. Occupied Bandwidth Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-2. Occupied Bandwidth Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)

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Plot 7-3. Occupied Bandwidth Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

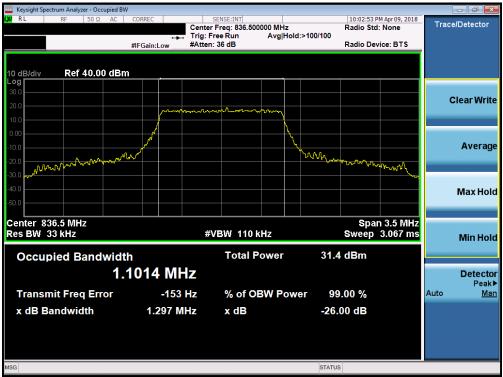


Plot 7-4. Occupied Bandwidth Plot (Band 13 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 5



Plot 7-5. Occupied Bandwidth Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-6. Occupied Bandwidth Plot (Band 5 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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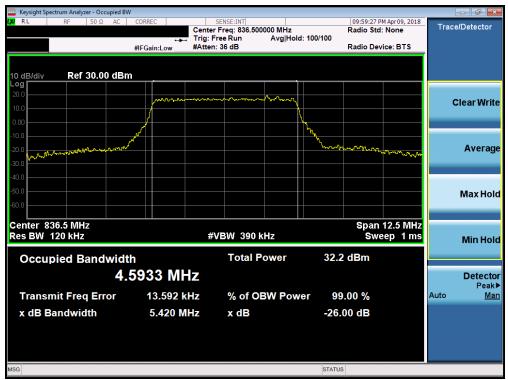
Plot 7-7. Occupied Bandwidth Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)



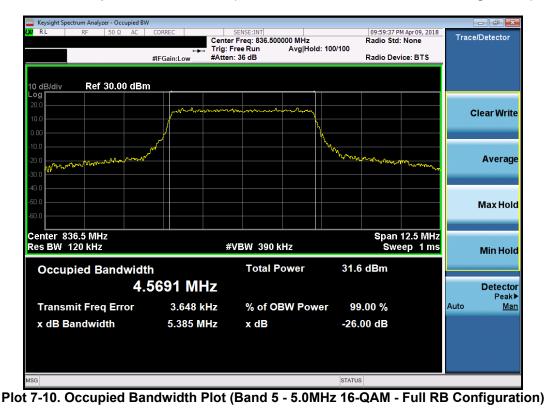
Plot 7-8. Occupied Bandwidth Plot (Band 5 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-9. Occupied Bandwidth Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

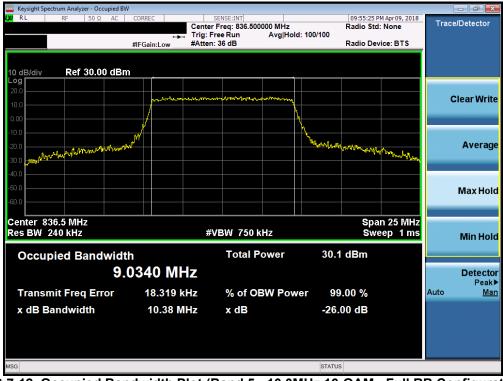


Approved by: PCTEST MEASUREMENT REPORT SAMSUNG FCC ID: A3LSMJ337V (CERTIFICATION) **Quality Manager** EUT Type: Test Report S/N: Test Dates: Page 21 of 136 1M1803190049-03-R1.A3L 3/19 - 4/27/2018 Portable Handset © 2018 PCTEST Engineering Laboratory, Inc. V 8.0 03/13/2018





Plot 7-11. Occupied Bandwidth Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-12. Occupied Bandwidth Plot (Band 5 - 10.0MHz 16-QAM - Full RB Configuration)

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Band 4



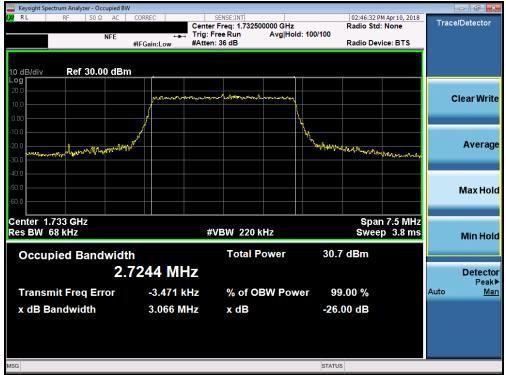
Plot 7-13. Occupied Bandwidth Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-14. Occupied Bandwidth Plot (Band 4 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-15. Occupied Bandwidth Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



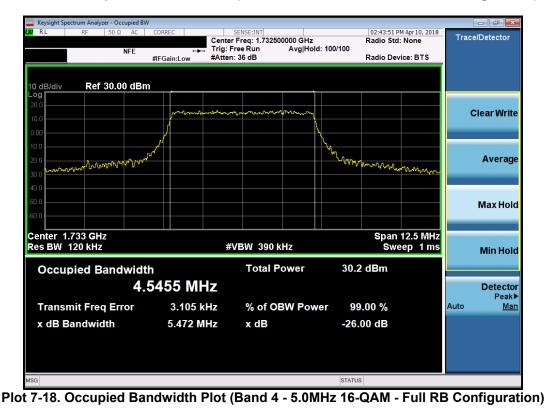
Plot 7-16. Occupied Bandwidth Plot (Band 4 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-17. Occupied Bandwidth Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



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Plot 7-19. Occupied Bandwidth Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



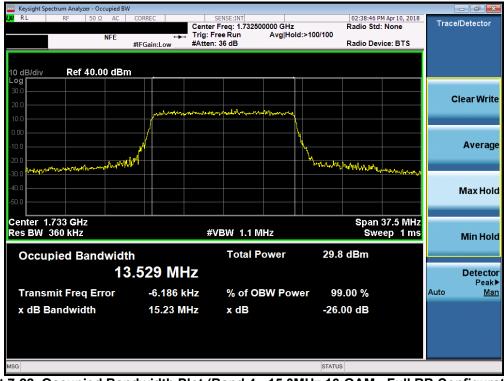
Plot 7-20. Occupied Bandwidth Plot (Band 4 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied I							
IX RL RF 50Ω AC	CORREC	SENSE:INT Center Freq: 1.732500 Trig: Free Run	000 GHz Avg Hold:>100/100	02:38:36 PM Radio Std:	Apr 10, 2018 None	Trace/[Detector
	#IFGain:Low	#Atten: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 40.00 dB	m						
30.0						Cle	ear Write
20.0	partermeter	ฟ [ุ] ทุกระสูงให้สูงสุดจัง <mark>ห</mark> ู้สุดสุดใหญ่จากเรื่องได	mary				
0.00	1		<u> </u>				
-10.0	_		<u>N</u>				Average
	hand .		- With Aug	a dia sec			
-20.0				n the work of the work	the when the m		
-40.0							Max Hold
-50.0							nux moru
Center 1.733 GHz				Enon 2	7.5 MHz		
Res BW 360 kHz		#VBW 1.1 MH	łz		ep 1 ms		Min Hold
Occupied Bandwid	lth	Total Po	ower 31.4	4 dBm			MITTIOIG
	3.590 M⊦	7					Detector
							Peak▶
Transmit Freq Error	30.731 k	Hz % of OB	W Power 99	9.00 %		Auto	Man
x dB Bandwidth	15.39 M	Hz xdB	-26.	.00 dB			
				-			
MSG			STATU	s			

Plot 7-21. Occupied Bandwidth Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



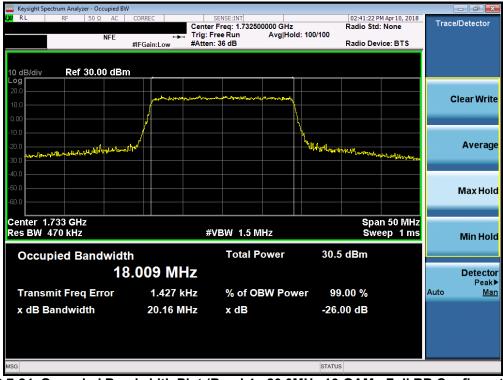
Plot 7-22. Occupied Bandwidth Plot (Band 4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-23. Occupied Bandwidth Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-24. Occupied Bandwidth Plot (Band 4 - 20.0MHz 16-QAM - Full RB Configuration)

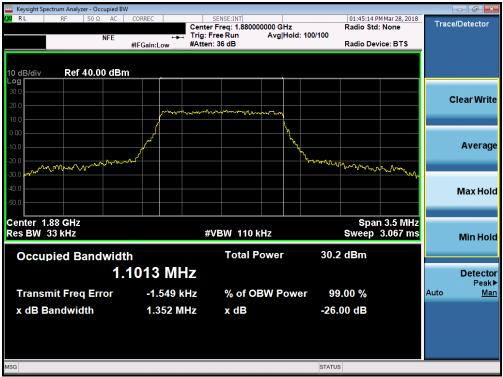
FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 29 of 126
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Band 2



Plot 7-25. Occupied Bandwidth Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-26. Occupied Bandwidth Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-27. Occupied Bandwidth Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



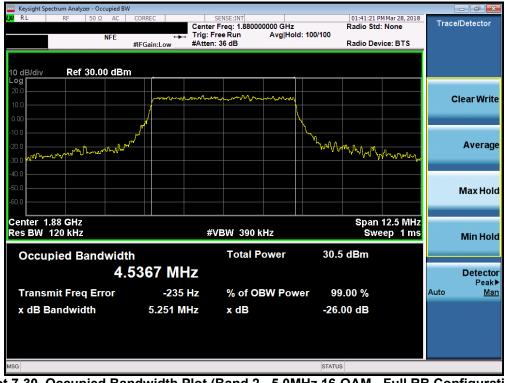
Plot 7-28. Occupied Bandwidth Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 126	
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Plot 7-29. Occupied Bandwidth Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



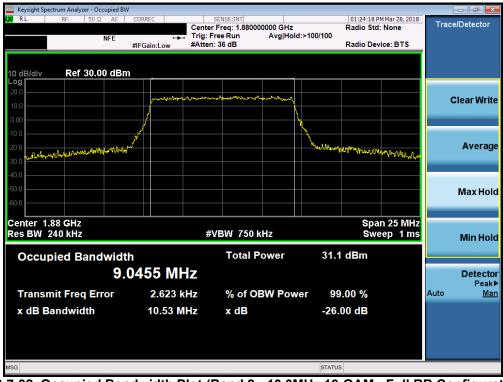
Plot 7-30. Occupied Bandwidth Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-31. Occupied Bandwidth Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



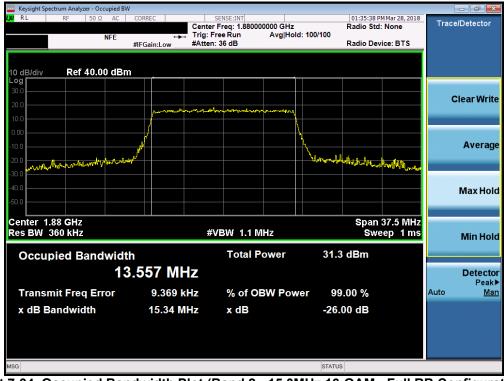
Plot 7-32. Occupied Bandwidth Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW	1						- • ×
LXIRL RF 50Ω AC	CORREC	SENSE:INT Center Freg: 1.8800	00000 GHz	01:35:25 PM Radio Std:	4 Mar 28, 2018 None	Trace	/Detector
NFE		Trig: Free Run	Avg Hold:>10	0/100			
	#IFGain:Low	#Atten: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 40.00 dBm Log	<u> </u>						
30.0							
20.0		- and a second				С	lear Write
10.0	howystorande	- We want of the second s					
0.00	/		\v				
-10.0			h.				Average
-20.0	<i>J</i> .		\``	Hereal and a start of the			
-30.0				waylow and way way	Amanna		
-40.0							Max Hold
-50.0							
Center 1.88 GHz Res BW 360 kHz		#VBW 1.1 M	al.i		37.5 MHz		
Res BW 300 KH2		#4044 1.11	лпz	Swe	ep 1 ms		Min Hold
Occupied Bandwidt	h	Total F	Power	32.0 dBm			
	.582 M⊦	17					Detector
		12					Peak►
Transmit Freq Error	10.207 k	Hz % of O	BW Power	99.00 %		Auto	<u>Man</u>
x dB Bandwidth	15.41 M	Hz x dB		-26.00 dB			
MSG				STATUS			

Plot 7-33. Occupied Bandwidth Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-34. Occupied Bandwidth Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							
XIRL RF 50Ω AC	CORREC	SENSE:INT Center Freg: 1.880000	000 GHz	01:38:53 P Radio Std	MMar 28, 2018	Trace	/Detector
NFE	- -	Trig: Free Run	Avg Hold: 100/100				
	#IFGain:Low	#Atten: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dBm							
Log 30.0							
20.0						C	lear Write
10.0	American		- and the second s				
0.00	/		N.				
-10.0	1						Average
			hallan-				Average
-20.0 murrantelisteringtoning			- Andrews	Augustan Aurologia	Marrifelture		
-30.0							
-40.0							Max Hold
-50.0							
Center 1.88 GHz				Spa	n 50 MHz	_	
Res BW 470 kHz		#VBW 1.5 M	Hz		ep 1 ms		Min Hold
							Millinoid
Occupied Bandwidth	1	Total Po	ower 33	.1 dBm			
18	.038 M⊦	z					Detector
							Peak▶
Transmit Freq Error	-6.513 k	Hz % of OE	W Power 9	9.00 %		Auto	<u>Man</u>
x dB Bandwidth	20.39 M	Hz xdB	-26	6.00 dB			
MSG			STAT	US			

Plot 7-35. Occupied Bandwidth Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-36. Occupied Bandwidth Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Band 7



Plot 7-37. Occupied Bandwidth Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-38. Occupied Bandwidth Plot (Band 7 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-39. Occupied Bandwidth Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)



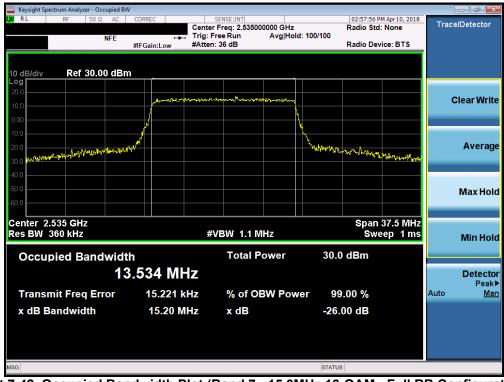
Plot 7-40. Occupied Bandwidth Plot (Band 7 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-41. Occupied Bandwidth Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)



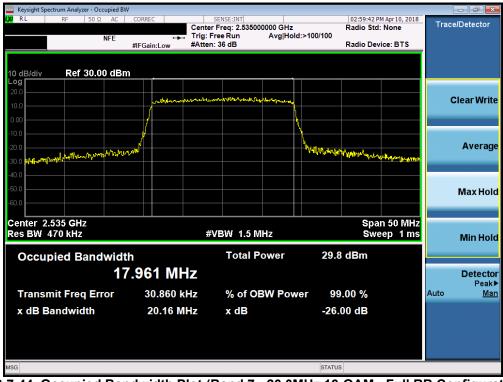
Plot 7-42. Occupied Bandwidth Plot (Band 7 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied B\	N				
(X) RL RF 50Ω AC	CORREC	SENSE:INT Center Freq: 2.535000 Trig: Free Run #Atten: 36 dB	000 GHz Avg Hold: 100/100	02:59:30 PM Apr 10 Radio Std: None Radio Device: B	Trace/Detector
10 dB/div Ref 30.00 dBr	n				
20.0	meenen	_จ])๛ _ั ๛๛๛๛๛๛ _๛ ๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛			Clear Write
0.00 -10.0 -20.0 -30.0 the start of the star	,			han halmiging for a start with the farmer	Average
-40.0					Max Hold
Center 2.535 GHz Res BW 470 kHz		#VBW 1.5 MI	Hz	Span 50 Sweep	
Occupied Bandwidt	th 7.967 MH	Total Po	ower 31	.0 dBm	Detector
Transmit Freq Error	-5.960 k	Hz % of OB	W Power 9	9.00 %	Peak▶ Auto <u>Man</u>
x dB Bandwidth	19.87 MI	Hz x dB	-20	5.00 dB	
MSG			STAT	US	

Plot 7-43. Occupied Bandwidth Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-44. Occupied Bandwidth Plot (Band 7 - 20.0MHz 16-QAM - Full RB Configuration)

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7.3 Spurious and Harmonic Emissions at Antenna Terminal

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.

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

For Band 7, the minimum permissible attenuation level of any spurious emission is 55 + log₁₀(P_[Watts]).

Test Procedure Used

KDB 971168 D01 v03r1 - 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

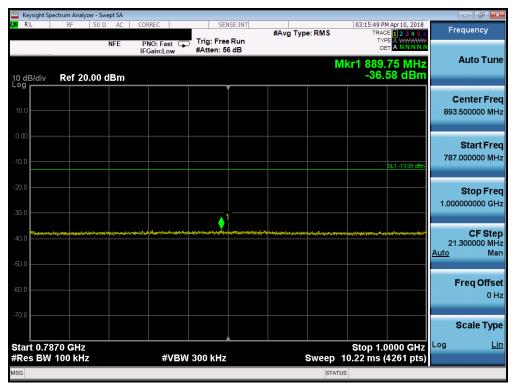
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the 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.

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RL	RF	50 Ω	AC	CORREC		SEN	SE:INT			03:15:36 P	M Apr 10, 2018		
			IFE		Fast 🖵		Run	#Avg Typ	e: RMS	TRAI TY	CE 1 2 3 4 5 6 PE A WWWWW ET A NNNNN	Fr	equency
0 dB/div	Ref 2	0.00 d	Bm						N		.00 MHz 44 dBm		Auto Tur
10.0													Center Fre
10.0											DL1 -13.00 dBm	30	Start Fr 0.000000 Mi
20.0 30.0												777	Stop Fr .000000 M
40.0 											1,	74 <u>Auto</u>	CF Ste .700000 M M
60.0		anagiantayana				e glasse sijner i som sigelige							Freq Offs 0
70.0													Scale Ty
tart 30.0 Res BW		z			#VBW	300 kHz		S	weep 3	Stop 7 5.86 ms (1	77.0 MHz 4941 pts)	Log	L

Plot 7-45. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

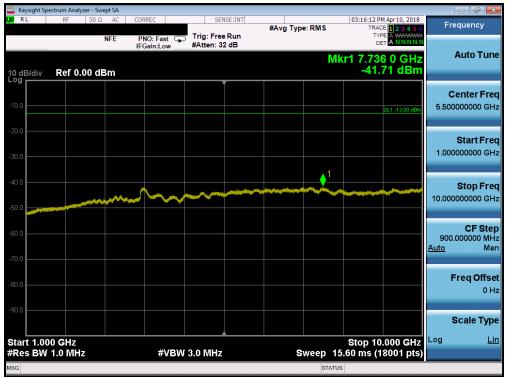


Plot 7-46. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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Plot 7-47. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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Band 5

	ectrum Analyze									
RL	RF	50 Ω AC	CORREC PNO: Fast			#Avg Type: I		0:57:14 PM Apr 09, 2 TRACE 1 2 3 4 TYPE A WWW DET A N N N	5 6	Frequency
10 dB/div Log	Ref 20.0	00 dBm					Mkr1	820.15 M -42.18 dE	Hz	Auto Tune
10.0									4	Center Freq 26.500000 MHz
-10.0								DL1 -13.00		Start Freq 30.000000 MHz
-20.0									8	Stop Fred 23.000000 MHz
-40.0					i tang mga Jawa pan Mari I.				1 Auto	CF Step 79.300000 MHz Mar
-60.0										Freq Offset 0 Hz
-70.0										Scale Type
Start 30.0 #Res BW			#VB	W 300 kHz		Sw	eep 98.33	8top 823.0 M ms (15861 p	Hz ^{Log} ts)	Lin
MSG							STATUS			

Plot 7-48. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-49. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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	ectrum Analyz										_	X
LXI RL	RF	50 Ω AC	C COR	REC	SEI	ISE:INT	#Avg Typ	e: RMS		M Apr 09, 2018 CE 1 2 3 4 5 6	Fr	equency
			IFG	O: Fast ⊊ ain:Low	Trig: Free #Atten: 3			M	۲۷ D Ikr1 1.64			Auto Tune
10 dB/div Log	Ref 0.0)0 dBm							-44.	10 dBm		
-10.0										DL1 -13.00 dBm		Center Freq
-20.0											1.00	Start Freq
-40.0	↓1		~~~,		and the second						10.00	Stop Freq
-60.0											900 <u>Auto</u>	CF Step .000000 MHz Man
-80.0											1	Freq Offset 0 Hz
-90.0												Scale Type
Start 1.00 #Res BW		:		#VBW	/ 3.0 MHz		s	weep 1	Stop 10 5.60 ms (1	.000 GHZ	Log	<u>Lin</u>
MSG								STATI	US			

Plot 7-50. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-51. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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	ectrum Analyzer - Sv										
LX/ RL	RF 50 Ω	2 AC	CORREC	SEN	ISE:INT	#Avg Typ	e: RMS		M Apr 09, 2018	Fre	equency
			PNO: Fast 📮 IFGain:Low	Trig: Free #Atten: 5				۳۲ ۵ 1kr1 849			Auto Tune
10 dB/div Log	Ref 20.00	dBm						-40.	64 dBm		
				,						С	enter Freq
10.0										924.	500000 MHz
0.00											
-10.0										849.	Start Freq
-10.0									DL1 -13.00 dBm		
-20.0											Stop Freq
-30.0										1.000	000000 GHz
1											CF Step
-40.0				addrew and the state	, lineijermenter, piere	aller dans series and all	-	وستهما وحروب والمالك	مىلىدى، مىلىدىنى بىلىدىر مەربىيە بىلىدىنى بىلىدىرىكى بىلىدىرىكى بىلىدىرىكى بىلىدىكى بىلىدىكى بىلىدىكى بىلىدىكى بىلىكى بىلىكى بىلىكى بىلى	15. <u>Auto</u>	100000 MHz. Man
-50.0											
-60.0										F	req Offset
											0 Hz
-70.0										ę	Scale Type
Start 0.84	900 GHz			<u> </u>				Stop 1.0	0000 GHz	Log	Lin
#Res BW			#VBW	/ 300 kHz			Sweep	18.72 ms			
MSG							STAT	US			

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



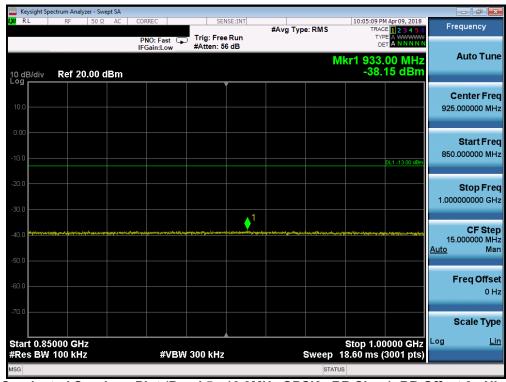
Plot 7-53. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	ectrum Analyzer											
LX/IRL	RF	50 Ω AC	CORF	REC	SEI	ISE:INT	#Avg Typ	e: RMS		M Apr 09, 2018	Fr	equency
			PN	0:Fast 🕞 ain:Low	Trig: Free Atten: 30				TYP			
			IFG		Atten. ot	ub .			Mkr1 823.	25 MHz		Auto Tune
10 dB/div	Ref 20.0)0 dBm							-61.5	95 dBm		
					Ì							Senter From
10.0												Center Freq
											421	.000000 10112
0.00												
												Start Freq
-10.0										DL1 -13.00 dBm	30	.000000 MHz
-20.0												Stop Freq
-30.0											824	.000000 MHz
-40.0											70	CF Step 400000 MHz
											Auto	Man
-50.0												
										1		Freq Offset
-60.0	والمتعادية والمتعادية	ويعواد والهدو	in a fall of particular	in the second second			a program and a second s	and the second second	and the second sec			0 Hz
-70.0	Statistics & page the statist	and the second sec		(Sahar Jarah & Dasa)	ومراطلة ويستقربني			المشتحدك الاشتار				
												Scale Type
Start 30.0	MUZ								Stop 9	24.0 MHz	Log	Lin
#Res BW				#VBW	/ 300 kHz		S	weep	ہ stop 1) 98.46 ms	5881 pts)		
MSG								STAT	_			

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



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

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		Analyzer - Swe	ept SA										
LXI RL	RF	50 Ω	AC	CORREC		SEN	ISE:INT	#Avg Typ	e: RMS		PM Apr 09, 2018 ACE 1 2 3 4 5 6	Fre	equency
				PNO: Fa IFGain:Lo		Trig: Free #Atten: 34				1			
10 dB/di Log	v Ref	0.00 dE	3m							Mkr1 8.3 -43	83 5 GHz 3.42 dBm		Auto Tune
													enter Freq
-10.0											DL1 -13.00 dBm	5.500	000000 GHz
-20.0													Start Freq
-30.0												1.000	000000 GHz
-40.0										1			Stop Freq
-50.0												10.000	000000 GHz
-60.0													CF Step
												900. <u>Auto</u>	.000000 MHz Man
-70.0													Freq Offset
-80.0													0 Hz
-90.0													
		_										Log	Scale Type Lin
Start 1. #Res B				#	VBW 3	.0 MHz		S	weep	Stop 1 15.60 ms	0.000 GHz (18001 pts)	Log	
MSG									STA	TUS			

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

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Band 4

Keysight Spectrum Anal							
XURL RF	50 Ω AC	PNO: Fast	SENSE:IN Trig: Free Run Atten: 30 dB	#Avg Typ	pe: RMS	02:35:31 PM Apr 10, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A NNNN	Frequency
10 dB/div Ref 2	0.00 dBm				М	kr1 1.707 5 GHz -36.06 dBm	Auto Tun
10.0							Center Free 869.000000 MH
10.0						DL1 -13.00 dBm	Start Fre 30.000000 MH
30.0						1	Stop Fre 1.708000000 GH
40.0							CF Ste 167.800000 M⊢ <u>Auto</u> Ma
60.0	******)an(l))/a 		n ya kana kana kana kana kana kana kana			Freq Offse 0 H
-70.0 Start 0.0300 GHz						Stop 1.7080 GHz	Scale Typ
Res BW 1.0 MH		#VBW	3.0 MHz		Sweep	2.239 ms (3359 pts)	
ISG					STATU	JS	

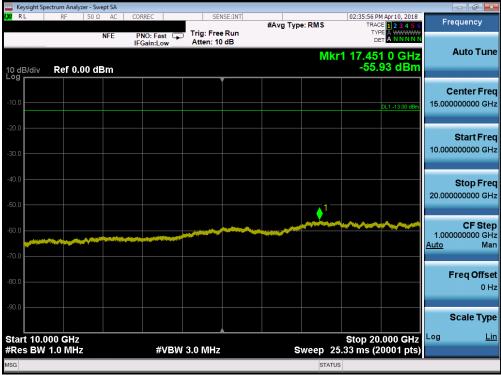
Plot 7-57. Conducted Spurious Plot (Band 4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-58. Conducted Spurious Plot (Band 4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-59. Conducted Spurious Plot (Band 4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-60. Conducted Spurious Plot (Band 4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dama 40 of 400		
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	ctrum Analyze								
LXI RL	RF	50 Ω AC	CORREC	SENSE:II	#Avg Typ	e: RMS	02:31:51 PM Apr 1 TRACE 12		Frequency
		NFE	PNO: Fast G	Trig: Free Run Atten: 30 dB			DET A		Auto Tune
10 dB/div Log	Ref 20.	00 dBm				Mł	(r1 7.424 0 -43.83	GHz dBm	AutoTune
10.0									Center Freq 5.877500000 GHz
-10.0							DL1 -1	3.00 dBm	Start Freq 1.755000000 GHz
-20.0									Stop Freq 10.00000000 GHz
-40.0	مىلىنى ئەرىمىيى مىلىنى ئەرىمىي	\sim	~~~			1			CF Step 824.500000 MHz <u>Auto</u> Man
-60.0									Freq Offset 0 Hz
-70.0									Scale Type
Start 1.75 #Res BW			#\/D\	V 3.0 MHz		woon 4	Stop 10.000 29 ms (1649.		Log <u>Lin</u>
#Res DW			#VDV	v 3.0 IVINZ	3	status		r pis)	
						STATUS			

Plot 7-61. Conducted Spurious Plot (Band 4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-62. Conducted Spurious Plot (Band 4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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	ectrum Analyzer - Sv										
LX/RL	RF 50 Ω	2 AC (CORREC	SEN	ISE:INT	#Avg Typ	e: RMS	TRAC	Apr 10, 2018	Fr	equency
10 dB/div	Ref 20.00		PNO: Fast 🖵 IFGain:Low	Trig: Free Atten: 30			MI	or 1.67	0 0 GHz 69 dBm		Auto Tune
											Center Freq 0.000000 MHz
-10.0									DL1 -13.00 dBm	30	Start Freq 0.000000 MHz
-20.0										1.71	Stop Freq 0000000 GHz
-40.0								يون و مرد و	1	168 <u>Auto</u>	CF Step 8.000000 MHz Man
-60.0	sef-mones Annual Maria and	and a second and a s		geryddiwdiwia wedd ynanwllyw	******						Freq Offset 0 Hz
Start 0.03			-#\/D\\/	2.0.884				Stop 1.7	00 012	Log	Scale Type <u>Lin</u>
#Res BW	T.U IVIHZ		# 4 BW	3.0 MHz			Sweep 2	2.240 ms (5501 pts)		

Plot 7-63. Conducted Spurious Plot (Band 4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-64. Conducted Spurious Plot (Band 4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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		Analyzer - Swe	ept SA									
l xi RL	RI	- 50 Ω	AC	CORREC		SEN	ISE:INT	#Avg Ty	e: RMS		38 PM Apr 10, 2018 TRACE 1 2 3 4 5 6	Frequency
			NFE	PNO: Fa		Frig: Free Atten: 10						
10 dB/d Log	liv Re	f 0.00 dE	3m						Μ	kr1 17. _{	617 5 GHz 56.22 dBm	Auto Tune
-10.0											DL1 -13.00 dBm	Center Freq 15.00000000 GHz
-20.0												Start Freq 10.00000000 GHz
-40.0												Stop Freq 20.000000000 GHz
-60.0	~~~										<u> </u>	CF Step 1.00000000 GHz <u>Auto</u> Man
-70.0												Freq Offset 0 Hz
-90.0												Scale Type
	10.000 C BW 1.0			#	VBW 3.	0 MHz		ę	Sweep	Stop 25.33 m	20.000 GHz s (20001 pts)	Log <u>Lin</u>
MSG										TUS		

Plot 7-65. Conducted Spurious Plot (Band 4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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Band 2

	ectrum Analyz							
L <mark>XI</mark> RL	RF	50 Ω AC	CORREC PNO: Fast	Trig: Free R #Atten: 40 d	#Avg un Avg H	Type: RMS Hold:>100/100	01:29:16 PM Mar 28, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N	
10 dB/div Log	Ref 20.	.00 dBm				М	kr1 1.846 5 GHz -37.173 dBm	Auto Tune
10.0								Center Freq 939.000000 MHz
-10.0							DL1 -13.00 dBm	Start Freq 30.000000 MHz
-20.0							1	Stop Freq 1.848000000 GHz
-40.0	-1-72-14-14-14-14-14-14-14-14-14-14-14-14-14-	وي ورون وي	and the second	an a	Mennenganangan anandah parta G	unoning the state of the state of the		CF Step 181.800000 MHz <u>Auto</u> Man
-60.0								Freq Offset 0 Hz
-70.0								Scale Type
Start 0.03 #Res BW			#VBV	V 3.0 MHz*			Stop 1.8480 GHz 2.425 ms (3639 pts)	
ISG						STATU	15	

Plot 7-66. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-67. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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Plot 7-68. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



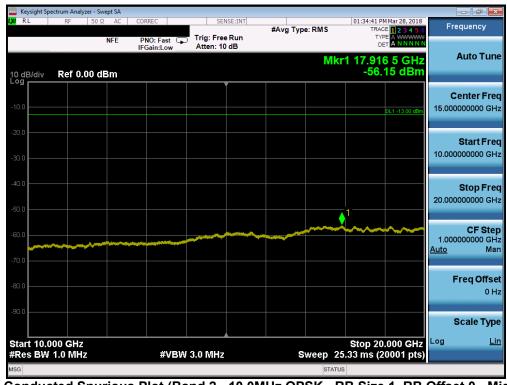
Plot 7-69. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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	ectrum Analyzei	- Swept SA						- 6
L <mark>XI</mark> RL	RF	50 Ω AC	CORREC	SENSE:INT	#Avg Type: RM	01:34:16 PM MS TRACE	Mar 28, 2018	Frequency
		NFE	PNO: Fast IFGain:Low	Trig: Free Run Atten: 30 dB		TYPE DE1	A WWWWW A N N N N N	Auto Tune
10 dB/div	Ref 20.0	00 dBm				Mkr1 7.476 -43.5	5 GHz 59 dBm	
10.0				Ĭ				Center Freq 5.95500000 GHz
0.00								
-10.0								Start Freq 1.910000000 GHz
-20.0							0L1 -13.00 dBm	Stop Freq
-30.0								10.000000000 GHz
-40.0					1			CF Step 809.000000 MHz
-50.0		\sim	\sim					Auto Man
-60.0								Freq Offset
-70.0								0 Hz
								Scale Type
Start 1.91 #Res BW			#VBW	3.0 MHz	Swee	Stop 10. p 14.02 ms (16	000 0112	Log <u>Lin</u>
MSG						STATUS		

Plot 7-70. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-71. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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	ectrum Analyzer - Swe										
LX/RL	RF 50 Ω	AC CC	RREC	SEN	SE:INT	#Avg Typ	e: RMS		Mar 28, 2018	Fr	equency
		IF	PNO: Fast 🕞 Gain:Low	Trig: Free Atten: 30		• *	M	TYF De	BOGHz 66 dBm		Auto Tune
10 dB/div Log	Ref 20.00 c	dBm						-50.	ье авт		
10.0											Center Freq 0.000000 MHz
-10.0									DL1 -13.00 dBm	30	Start Freq 0.000000 MHz
-20.0										1.85	Stop Freq 0000000 GHz
-40.0										182 <u>Auto</u>	CF Step 2.000000 MHz Man
-60.0	84,993,994,994,994,994,994,994,994,994,99	an de antigen agent de la desarra (en la desarra (e	***	in the second	anan (aka ku aka ku ak	hange girden all option of the second		an a	9,500,500) - 2020 - 2020 - 2020 - 2020 - 2020 - 2020 - 2020 - 2020 - 2020 - 2020 - 2020 - 2020 - 2020 - 2020 -		Freq Offset 0 Hz
-70.0											Scale Type
Start 0.03 #Res BW			#VBW	/ 3.0 MHz			Sweep 2	Stop 1.8 2.427 ms (Log	Lin
MSG							STATUS				

Plot 7-72. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-73. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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	ectrum Analyz	er - Swept SA									
LXU RL	RF	50 Ω AC	CORREC	SENS	E:INT	#Avg Type	e: RMS		M Mar 28, 2018 E 1 2 3 4 5 6	Fre	quency
		NFE	PNO: Fast 🕞	Trig: Free #Atten: 26				TYP			
10 dB/div Log	Ref 0.0	00 dBm					Mkr	1 17.46 -39.	6 0 GHz 63 dBm		Auto Tune
-10.0									DL1 -13.00 dBm		e nter Freq 000000 GHz
-20.0							<u>1</u>				Start Freq 000000 GHz
-40.0		A			~~~~				~~~~		Stop Freq 000000 GHz
-60.0										1.0000 <u>Auto</u>	CF Step 000000 GHz Man
-80.0										F	r eq Offset 0 Hz
-90.0											cale Type
Start 10.0 #Res BW			#VBW	3.0 MHz		S	weep 25	Stop 20 .33 ms (2	.000 GHz 20001 pts)	Log	Lin
MSG							STATUS				

Plot 7-74. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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Band 7

🔤 Keysight Spectrum Analyzer - Sw						
<mark>ΙΧΊ</mark> RL RF 50 Ω	NFE P	RREC NO: Fast 😱 Gain:Low	SENSE:INT	#Avg Type: RMS	02:55:42 PM Apr 10, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
10 dB/div Ref 20.00 d		Sam.Low	Attent of ab	Ν	/kr1 2.449 5 GHz -48.40 dBm	Auto Tune
10.0						Center Freq 1.252500000 GHz
-10.0						Start Free 30.000000 MH;
-20.0					DL1 -25.00 dBm	Stop Fred 2.475000000 GHz
-40.0						CF Stej 244.50000 MH <u>Auto</u> Mar
-60.0	Ya e e e e e e e e e e e e e e e e e e e		n dige and trading of the second s			Freq Offse 0 H
-70.0 Start 0.030 GHz					300p 2.473 3112	Scale Type
#Res BW 1.0 MHz		#VBW 3	3.0 MHz	Sweep	3.260 ms (4891 pts)	

Plot 7-75. Conducted Spurious Plot (Band 7 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-76. Conducted Spurious Plot (Band 7 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-77. Conducted Spurious Plot (Band 7 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-78. Conducted Spurious Plot (Band 7 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	ectrum Analyze	r - Swept SA						
LXI RL	RF	50 Ω AC	CORREC	SENSE:I	T #Avg Typ	e: RMS	02:54:59 PM Apr 10, 2018 TRACE 1 2 3 4 5	
		NFE	PNO: Fast G	Trig: Free Ru Atten: 30 dB			TYPE A WWWW DET A NNNN	N
						Mkr	1 14.758 5 GH	Auto Tune
10 dB/div Log	Ref 20.	00 dBm					-38.39 dBn	
				l İ				Center Freq
10.0								8.785000000 GHz
0.00								Start Freq
-10.0								2.570000000 GHz
-20.0								Stop Freq
							DL1 -25.00 dBr	15.00000000 GHz
-30.0							1	
-40.0								CF Step
40.0	A		والاستقلاب والمسار أولى والم		-	and institutely		1.243000000 GHz Auto Man
-50.0	<u> </u>							<u>/ (aro</u> man
								Freq Offset
-60.0								0 Hz
-70.0								
-70.0								Scale Type
								Log Lin
Start 2.57 #Res BW			#VBV	/ 3.0 MHz		weep 24	Stop 15.000 GHz 86 ms (24861 pts	
MSG						STATUS		

Plot 7-79. Conducted Spurious Plot (Band 7 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-80. Conducted Spurious Plot (Band 7 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	ectrum Analyz											_	
LXU RL	RF	50 Ω	AC	CORREC	Fast 🕞		SENSE:INT	#Avg Typ	e:RMS	TRAC	M Apr 26, 2018 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	F	requency
10 dB/div	Ref 20	.00 di	3m	IFGain	:Low	Atten	: 30 dB		M	kr1 2.49	8 5 GHz 73 dBm		Auto Tune
10.0													Center Fred 5000000 GHz
-10.0												3	Start Fred 0.000000 MH:
-20.0											DL1 -25.00 dBm	2.50	Stop Fred 00000000 GH2
-40.0					styling Stationary, og		ادر ور. با بادر بور.		4 201,019169,0240,0040,0040	add a Bridger findle of Starting Property and	1	24 ⁻ <u>Auto</u>	CF Step 7.000000 MH Mar
-60.0													Freq Offse 0 H
-70.0 Start 0.03 #Res BW					#\/B\A	/ 3.0 M			Sween	Stop 2	.500 GHz (4941 pts)	Log	Scale Type <u>Lir</u>
#Res DW	1.0 10112				#VDV	- 3. 0 WI	112		Sweep .		asar pis)		

Plot 7-81. Conducted Spurious Plot (Band 7 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-82. Conducted Spurious Plot (Band 7 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	ectrum Analyz	er - Swep	ot SA									
X/RL	RF	50 Ω	AC	CORREC		SEN	#Avg Typ	e: RMS	TRAC	M Apr 26, 2018 CE 1 2 3 4 5 6 DE 0 10000000000000000000000000000000000	Fr	equency
				PNO: Fa	ast 🖵 .ow	Atten: 10						
10 dB/div Log	Ref 0.0	0 dB	m					Mk	(r1 26.99 -52.	8 5 GHz 17 dBm		Auto Tune
											C	Center Freq
-10.0											21.00	0000000 GHz
-20.0										DL1 -25.00 dBm		Start Freq
-30.0											15.00	0000000 GHz
-40.0												Stop Freq
-50.0										1	27.00	0000000 GHz
												CF Step
-60.0						and the second					1.20 <u>Auto</u>	0000000 GHz Mar
-70.0												
-80.0											I	Freq Offset 0 Hz
-90.0												
												Scale Type
Start 15.0 #Res BW				;	≠vbw∶	3.0 MHz	s	weep 3	Stop 27 30.40 ms (2	.000 GHz 4001 pts)	Log	Lin
MSG								STAT				

Plot 7-83. Conducted Spurious Plot (Band 7 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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7.4 Band Edge Emissions at Antenna Terminal

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

The minimum permissible attenuation level for Band 7 is as noted in the Test Notes on the following page.

Test Procedure Used

KDB 971168 D01 v03r01 - 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 <u>></u> 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
- 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

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Test Notes

Per 22.917(b) 24.238(a) 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.

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 limit per 27.53(c)(4) is 65 + $10\log_{10}(P) = -35dBm$ in a 6.25kHz bandwidth.

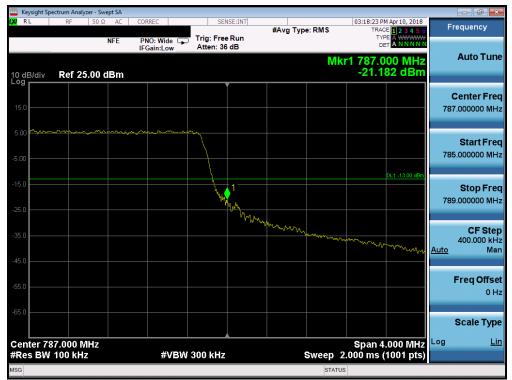
Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than $40 + 10 \log (P) dB$ on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P) dB$ on all frequencies between 5 megahertz and X megahertz from the channel edge, 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.

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Plot 7-84. Lower Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



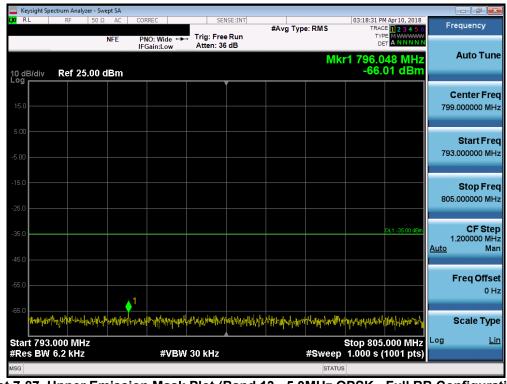
Plot 7-85. Upper Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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	Spectrum Analyz	er - Swept SA								_	
LX/I RL	RF	50 Ω AC	CORREC	Trig: Free		#Avg Typ	e: RMS	TRAC	Apr10, 2018 E 1 2 3 4 5 6 E M WWWW T A N N N N N	F	requency
10 dB/div	Ref 25.	.00 dBm	IFGain:Low	Atten: 36	6 dB		Mk	r1 765.7	12 MHz 49 dBm		Auto Tune
15.0											Center Free 9.000000 MH
-5.00										76	Start Fre 3.000000 MH
-15.0										77	Stop Fre 5.000000 MH
-35.0									DL1 -35.00 dBm	<u>Auto</u>	CF Ste 1.200000 M⊢ Ma
-55.0		1									Freq Offs 0 H
-65.0 Mundhy)	():1142.pg/d-+4yoyd	linnenenen	ph non-montality	handly yapan yang	Marceffethater	kurulur i letevi	htelen have	yrodanyn flafiddir al	NH149MMUNUMH		Scale Typ
	3.000 MHz N 6.2 kHz	2	#VBW	30 kHz					.000 MHz 1001 pts)	Log	Li
MSG							STATUS	3			

Plot 7-86. Lower Emission Mask Plot Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-87. Upper Emission Mask Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	pectrum Analyze										
LXU RL	RF	50 Ω AC	CORREC		E:INT	#Avg Typ	e: RMS	TRAC	M Apr 10, 2018	F	requency
		NFE	PNO: Wide 🖵 IFGain:Low	Trig: Free A Atten: 36 d				TYF			
							Mk		00 MHz		Auto Tune
10 dB/div Log	Ref 25.	00 dBm						-29.6	98 dBm		
				Ī							Center Fre
15.0										77	7.000000 MH
5.00											
3.00					ىلىرىم 1	monorally	Nor Malars	angraph your you	y whether wh		Start Fre
-5.00										77	3.000000 MH
									DL1 -13.00 dBm		
-15.0					Í						Stop Fre
-25.0					1 #					78	1.000000 MH
					ſľ'						CF Ste
-35.0				ALAYP I www.wymytri							800.000 kH
-45.0			N	at NV						<u>Auto</u>	Ма
			Mar and a second								
-55.0	and the states and the states and	ma man Mark	NAME JOS TO AND TO A								Freq Offse
-65.0	440 440										
-100.0											Scale Typ
Contor 7	77 000 841							On on 9		Log	Li
	77.000 MH V 100 kHz	12	#VBW	300 kHz			Sweep 4	span 8 .000 ms (.000 MHz 1001 pts)	9	<u> </u>
ISG							STATUS				

Plot 7-88. Lower Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



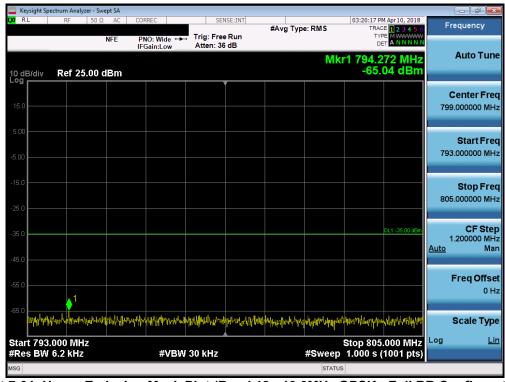
Plot 7-89. Upper Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Sp	pectrum Analyze	er - Swept SA									
XI RL	RF	50 Ω AC NFE	CORREC PNO: Wide ↔			#Avg Typ	e: RMS	TRAC	Apr 10, 2018 E 1 2 3 4 5 6 E M WWWWWW T A N N N N N	Fr	equency
10 dB/div Log	Ref 25.	00 dBm	IFGain:Low	Atten: 36	ав		Mk	r1 763.9			Auto Tun
15.0											Center Fre
5.00										763	Start Fre .000000 M⊦
25.0										775	Stop Fre .000000 M⊦
45.0									DL1 -35.00 dBm	1 <u>Auto</u>	CF Ste .200000 MH Ma
55.0	▲ ¹										F req Offs 0 F
			anthereaster the performance	harhabaritar	Ny Mand	W hith- Authority					Scale Typ
	3.000 MHz / 6.2 kHz		#VBW	30 kHz			#Sweep	Stop 775. 1.000 s (000 MHz 1001 pts)	Log	Li
ISG							STATUS	6			

Plot 7-90. Lower Emission Mask Plot Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

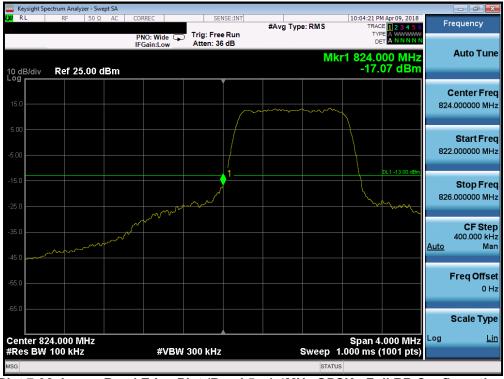


Plot 7-91. Upper Emission Mask Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

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Band 5



Plot 7-92. Lower Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-93. Upper Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)

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RL RL	Spectrum Analyz	zer - Swept 50 Ω		CORREC		SEI	NSE:INT			10:02:01	M Apr 09, 2018		
				PNO: Wid		Trig: Fre	Run	#Avg Typ	e:RMS	TRA	CE 1 2 3 4 5 6 PE A WWWWW ET A NNNN	F	requency
0 dB/div	Ref 25	.00 dB		IFGain:Lo	W	Atten: 36	o dB		M	(r1 824.(000 MHz 41 dBm		Auto Tur
og								~~~~~		·····	······		Center Fre 4.000000 Mi
5.00 												82	Start Fr 2.000000 M
5.0)' 				DL1 -13.00 dBm	82	Stop Fr 6.000000 M
5.0	~~~~~	~~~~	~~~~		~~~~							<u>Auto</u>	CF Sto 400.000 k M
5.0													Freq Offs 0
i5.0	24 000 5											Log	Scale Ty
	324.000 M N 100 kHz			#	VBW	300 kHz			Sweep	span ⁄ 1.000 ms	.000 MHz (1001 pts)	Log	L
G									STATU				

Plot 7-94. Lower Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-95. Upper Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

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	ctrum Analyzer - Swep										
LXI RL	RF 50 Ω	AC CORE	REC	SEI	ISE:INT	#Avg Typ	e: RMS		Apr 09, 2018	F	requency
		PN	O:Wide 🖵 ain:Low	Trig: Free Atten: 36				TYP			
		IFG	ain:Low	Atten. St	ub		Mk	1 923 0	52 MHz		Auto Tune
10 dB/div	Ref 25.00 dl	Bm					WIK	-22.	56 dBm		
				<u> </u>							
15.0											Center Freq
15.0										82	4.000000 MHz
5.00								······			
0.00					1						Start Freq
-5.00										82	2.000000 MHz
									DL1 -13.00 dBm		
-15.0									DET TO DO UDIN		Stop Freq
				•	W					82	6.000000 MHz
-25.0				m							
~~~~~		~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~							CF Step
-35.0											400.000 kHz
-45.0										<u>Auto</u>	Man
-45.0											
-55.0											Freq Offset
											0 Hz
-65.0											
											Scale Type
Center 824	1 000 MHz							Snan /	000 MHz	Log	Lin
#Res BW			#VBW	300 kHz			Sweep 1	.000 m <u>s (</u>	.000 MHz 1001 pts)		
MSG							STATUS				
							STATUS	<u> </u>			



Plot 7-96. Lower Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

Plot 7-97. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

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	ectrum Analyzer										
L <mark>XI</mark> RL	RF	50Ω AC	CORREC	SENS		#Avg Type	e: RMS		Apr 09, 2018	F	equency
	_		PNO: Wide IFGain:Low	Trig: Free Atten: 36 c				TYPI DE	A WWWWW A N N N N N		Auto Turo
10 dB/div Log	Ref 25.0	0 dBm					Mk	r1 823.9: -29.1	36 MHz I2 dBm		Auto Tune
				Ĭ						(	Center Free
15.0										824	4.000000 MH
5.00					~~~			······			Start Fre
-5.00										820	0.000000 MH
-15.0									0L1 -13.00 dBm		
-15.0										828	Stop Free 3.000000 MH
-25.0											
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m							CF Stej 800.000 kH
-45.0										<u>Auto</u>	Ma
-55.0											Freq Offse
											0 H
-65.0											Scale Type
	24.000 MH	z						Span 8.	000 MHz	Log	Lir
	100 kHz		#VBW	/ 300 kHz			Sweep 1	.000 ms (1	1001 pts)		
MSG							STATUS	3			

Plot 7-98. Lower Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)

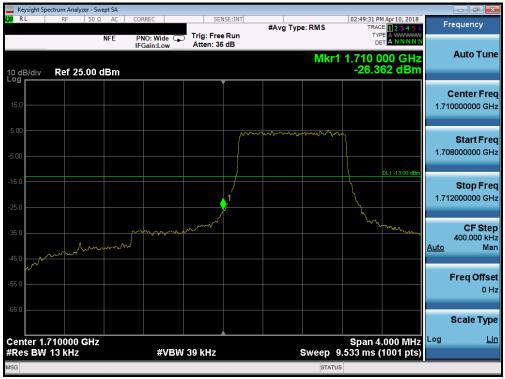


Plot 7-99. Upper Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)

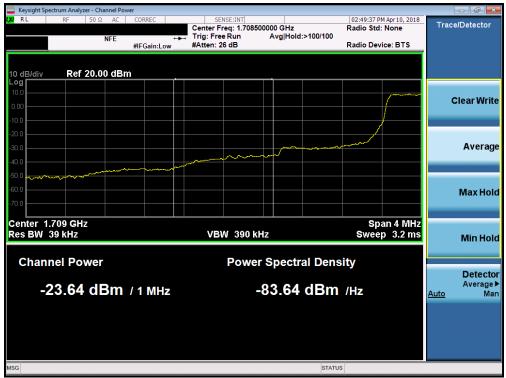
FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 71 of 126
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#### Band 4



Plot 7-100. Lower Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



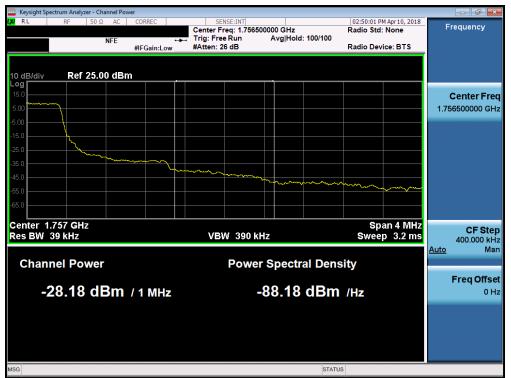
Plot 7-101. Lower Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Sj	pectrum Analyzer - Swept SA RF 50 Ω AC	CORREC	SENSE:INT		02:49:55 PM Apr 10, 2018	
KL	RF 50 Ω AC	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type: RMS	102:49:55 PM Apr 10, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A NNNNN	Frequency
0 dB/div	Ref 25.00 dBm			Mkr	1 1.755 008 GHz -27.45 dBm	Auto Tur
og 15.0						Center Fre 1.755000000 G⊦
i.00 i.00		Maren and a second	mm			<b>Start Fre</b> 1.753000000 GF
5.0			1		DL1 -13.00 dBm	<b>Stop Fre</b> 1.757000000 GF
5.0	ward and a start of the second start of the se			and the second s		<b>CF Ste</b> 400.000 kł <u>Auto</u> Ma
5.0					and the second s	Freq Offs 01
5.0						Scale Typ
	.755000 GHz / 13 kHz	#VBW	39 kHz	Sweep	Span 4.000 MHz 9.533 ms (1001 pts)	Log <u>L</u>
G				STAT	JS	

Plot 7-102. Upper Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



### Plot 7-103. Upper Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum /										- 6 <b>-</b> ×
<b>lxu</b> RL RF	50 Ω AC NFE	CORREC	Trig: Free		#Avg Type	e: RMS	TRAC	Apr 10, 2018 <b>1 2 3 4 5 6</b> E A WWWWWW T A N N N N N	Fre	equency
10 dB/div Rel	f 25.00 dBm	IFGain:Low	Atten: 30 G	10		Mkr1	1.709 9			Auto Tune
15.0										<b>enter Fre</b> 000000 GH
5.00					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~		DL1 -13.00 dBm	1.708	<b>Start Fre</b> 0000000 GH
-15.0				,					1.712	<b>Stop Fre</b> 0000000 GH
45.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~						<u>Auto</u>	<b>CF Ste</b> 400.000 k⊢ Ma
55.0									F	F <b>req Offs</b> 0 H
Center 1.7100							Span 4.	000 MHz	tog	Scale Typ <u>Li</u>
#Res BW 30 k	HZ	#VBW	91 KHZ			sweep 2	.000 ms (	1001 pts)		

Plot 7-104. Lower Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



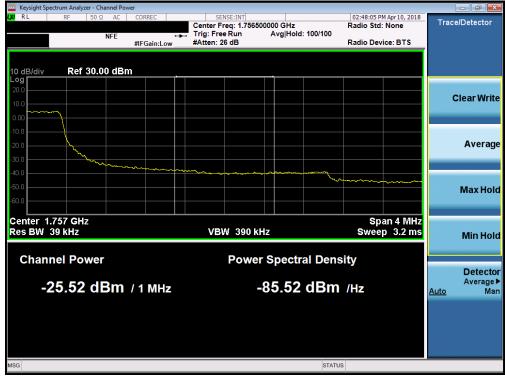
Plot 7-105. Lower Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dego 74 of 126
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		zer - Swept SA									
LXU RL	RF	50 Ω AC	CORREC	Trig: Fre		#Avg Typ	e: RMS	TRAC	Apr 10, 2018 E 1 2 3 4 5 6 E A WWWWW T A NNNN	Fr	equency
10 dB/div Log	Ref 25	5.00 dBm	IFGain:Lo	N Atten: 36	6 dB		Mkr	1 1.755 0			Auto Tune
15.0											Center Free
-5.00	~~~~		~~~~~						DL1 -13.00 dBm	1.753	Start Fre
-15.0					1					1.75	<b>Stop Fre</b> 7000000 GH
-35.0					hor	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m	~~~~~	····~	<u>Auto</u>	<b>CF Ste</b> 400.000 kH Ma
55.0										•	Freq Offso 0 ⊦
-65.0											Scale Typ
Center 1. #Res BW		GHz	#\	/BW 91 kHz			Sweep	Span 4 2.000 ms (		Log	Li
MSG							STAT	JS			

Plot 7-106. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



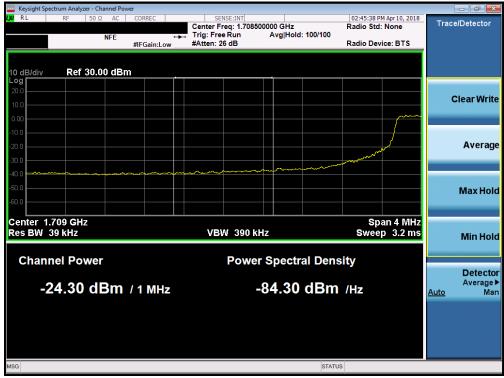
Plot 7-107. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	ectrum Analyz											
I,XI RL	RF	50 Ω AC	CORREC		SEN	ISE:INT	#Avg Typ	e: RMS		M Apr 10, 2018 CE 1 2 3 4 5 6	F	requency
		NFE	PNO: Wi IFGain:L	ide 🖵 .ow	Trig: Free Atten: 36				TY D			A
10 dB/div Log	Ref 25	.00 dBm						Mkr	1 1.709 9 -24	996 GHz 27 dBm		Auto Tune
15.0												Center Freq 10000000 GHz
-5.00							·····		······		1.70	Start Freq 08000000 GHz
-15.0					~	1,~				DL1 -13.00 dBm	1.7	Stop Freq 2000000 GHz
-35.0	~~~~	~~~~~	<del>~~~~</del>	~~~~	~~~						<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-55.0												Freq Offset 0 Hz
-65.0												Scale Type
Center 1.7 #Res BW		GHz	#	<b>VBW</b>	160 kHz			Sweep	Span 4 2.000 ms	.000 MHz (1001 pts)	Log	<u>Lin</u>
MSG								STAT				

Plot 7-108. Lower Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



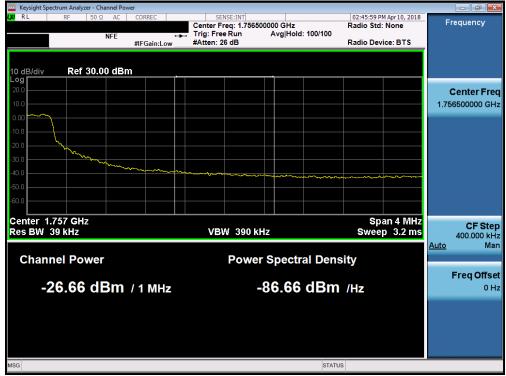
Plot 7-109. Lower Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	pectrum Analy	zer - Swept SA										
X/RL	RF	50 Ω AC	PNO: V		Trig: Free		#Avg Typ	e: RMS	TRAC	M Apr 10, 2018 CE 1 2 3 4 5 6 PE A WWWWW T A N N N N N	Fr	requency
10 dB/div Log	Ref 25	.00 dBm	IFGain:	Low	Atten: 36	dB		Mkr	1.755 (	000 GHz 10 dBm		Auto Tune
15.0												Center Free 5000000 GH
5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~							1.75	<b>Start Fre</b> 3000000 GH
25.0					h	1				DL1 -13.00 dBm	1.75	<b>Stop Fre</b> 7000000 G⊦
45.0						· ~~	the office	~~~~	m	~~~~~	<u>Auto</u>	CF Ste 400.000 kH Ma
55.0												F <b>req Offs</b> 0 F
65.0												Scale Typ
	.755000 V 51 kHz	GHz		#VBW 1	60 kHz			Sweep :	Span 4 2.000 ms (	.000 MHz (1001 pts)	Log	Li
ISG								STATU	IS			

Plot 7-110. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-111. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	AMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 77 of 126
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	pectrum Analyzer										
LXU RL	RF	50 Ω AC	CORREC		SE:INT	#Avg Typ	e: RMS	TRACE	Apr 10, 2018 1 2 3 4 5 6	Fr	equency
10 dB/div	Ref 25.0	NFE 10 dBm	PNO: Wide G	Trig: Free Atten: 36			Mkr1	DET	84 GHz 1 dBm		Auto Tune
15.0											Center Freq 0000000 GHz
-5.00					- July	www.www.	Ingendenserver der	₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	مەرىمەر بەرىمەر بەرمەر بەرمەر بەرمەر بەرمەر بەرمەر بەرمەر بەرمەر بەر بەر بەر بەر بەر بەر بەر بەر بەر ب	1.70	Start Freq 6000000 GHz
-15.0					1 1 1 1 1					1.71	Stop Freq 4000000 GHz
-35.0	i for an	www.	were the state of the							<u>Auto</u>	CF Step 800.000 kHz Man
-55.0											Freq Offsel 0 Hz
Center 1	.710000 G	Hz						Span 8.	000 MHz	Log	Scale Type <u>Lin</u>
#Res BW	/ 100 kHz		#VBW	300 kHz				.000 ms (1	1001 pts)		
nou							STATUS	1			

Plot 7-112. Lower Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-113. Lower Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	trum Analyzer - Sw										
LX/ RL	RF 50 Ω	AC C	ORREC	SEN	NSE:INT	#Avg Typ	e: RMS		Apr 10, 2018	Fr	equency
		NFE	PNO: Wide 😱 FGain:Low	Trig: Free Atten: 36				TYP			
10 dB/div Log	Ref 25.00 (	dBm					Mkr1	1.755 0 -28.	16 GHz 68 dBm		Auto Tune
15.0											<b>Center Freq</b> 5000000 GHz
-5.00	and the second second	a mar mary							DL1 -13.00 dBm	1.75	Start Fred 1000000 GH;
-15.0					1				021-13.00 dBm	1.75	<b>Stop Fred</b> 9000000 GH2
-35.0				<u>ъ</u>	hony york where the second	Mannorton Jacquero	when	Mar Carlon Marchard	www.m	<u>Auto</u>	CF Step 800.000 kH Mar
-55.0											Freq Offse 0 H
-65.0											Scale Type
Center 1.7 #Res BW 1	55000 GHz 100 kHz		#VBW	300 kHz			Sweep 4	Span 8 .000 ms (	.000 MHz 1001 pts)	Log	<u>Lir</u>
MSG							STATUS	5			

Plot 7-114. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



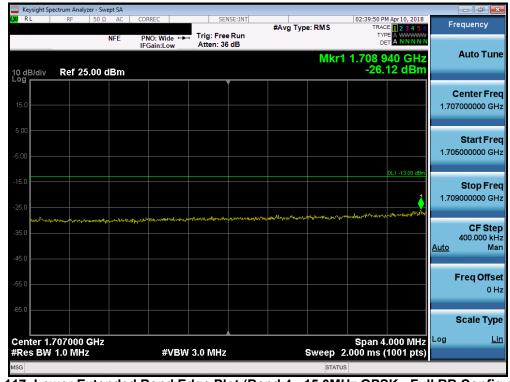
Plot 7-115. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	pectrum Analyz	er - Swept S	А								_	- 0
XI RL	RF	50 Ω Α NFE	E PNC	:Wide 🕟			#Avg Typ	e: RMS	TR/	PM Apr 10, 2018 ACE 1 2 3 4 5 6 APE A WWWWWW DET A NNNNN	Fred	quency
10 dB/div	Ref 25	.00 dBr		in:Low	Atten: 30	, ab		Mkr'	1 1.709	940 GHz .64 dBm	A	uto Tun
15.0												e <b>nter Fre</b> 000000 GH
5.00										DL1 -13.00 dBm		Start Fre 00000 GH
-15.0						1-1						Stop Fre 00000 G⊦
35.0	~~~~~	-h.~~~~	mm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m	0W-					1.2 <u>Auto</u>	CF Ste 00000 M⊦ Ma
55.0											Fr	r <b>eq Offs</b> 0 H
	.710000 (								Span	12.00 MHz	S Log	cale Typ <u>Li</u>
≉Res BW	/ 150 kHz			#VBW	470 kHz			Sweep	1.000 ms	(1001 pts)		

Plot 7-116. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-117. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMJ337V		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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