

# PCTEST

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# PART 24 MEASUREMENT REPORT

#### **Applicant Name:**

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

## Date of Testing:

2/9/2021 - 2/11/2021 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2102050006-05.A3L

# FCC ID:

Applicant Name:

# A3LSMG998U

## Samsung Electronics Co., Ltd.

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

Class II Permissive Change: Original Grant Date: Class II Permissive Change SM-G998U SM-G998U1 Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 24 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01 Please see FCC change document 12/22/2020

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

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

Randy Ortanez President



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			Ty Freemannes	Ell	RP	Emission
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Emission Designator
		QPSK	1860 - 1905	0.170	22.31	17M9G7D
	20 MHz	16QAM	1860 - 1905	0.145	21.62	17M9W7D
		64QAM	1860 - 1905	0.115	20.59	18M0W7D
		256QAM	1860 - 1905	0.061	17.85	18M0W7D
		QPSK	1857.5 - 1907.5	0.177	22.49	13M5G7D
	15 MHz	16QAM	1857.5 - 1907.5	0.144	21.58	13M5W7D
		64QAM	1857.5 - 1907.5	0.127	21.05	13M5W7D
		256QAM	1857.5 - 1907.5	0.064	18.07	13M5W7D
	10 MHz	QPSK	1855 - 1910	0.172	22.36	9M02G7D
		16QAM	1855 - 1910	0.141	21.49	8M95W7D
		64QAM	1855 - 1910	0.126	21.00	9M01W7D
LTE Band 25		256QAM	1855 - 1910	0.064	18.07	9M00W7D
LTE Danu 25	5 MHz	QPSK	1852.5 - 1912.5	0.150	21.75	4M50G7D
		16QAM	1852.5 - 1912.5	0.125	20.98	4M51W7D
		64QAM	1852.5 - 1912.5	0.115	20.62	4M49W7D
		256QAM	1852.5 - 1912.5	0.061	17.87	4M51W7D
		QPSK	1851.5 - 1913.5	0.146	21.63	2M71G7D
	3 MHz	16QAM	1851.5 - 1913.5	0.129	21.10	2M72W7D
		64QAM	1851.5 - 1913.5	0.112	20.47	2M70W7D
		256QAM	1851.5 - 1913.5	0.065	18.12	2M71W7D
		QPSK	1850.7 - 1914.3	0.179	22.52	1M09G7D
	1.4 MHz	16QAM	1850.7 - 1914.3	0.141	21.48	1M10W7D
		64QAM	1850.7 - 1914.3	0.109	20.38	1M10W7D
		256QAM	1850.7 - 1914.3	0.058	17.66	1M09W7D

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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 17025-2017 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 FCC 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 FCC 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:A3LSMG998U**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 24.

Test Device Serial No.: 32609, 01279

## 2.2 Device Capabilities

This device contains the following capabilities:

800/850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (n5, n71, n41, n66, n2, n12, n25, n30, n77, n260, n261), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer, UWB

LTE Band 25 (1850 - 1915 MHz) overlaps the entire frequency range of LTE Band 2 (1850 - 1910 MHz). Therefore, test data provided in this report covers Band 2 as well as Band 25.

This EUT supports 2 antennas (Antenna A and Antenna E) for band 2/25 operations. This report includes supplemental conducted and radiated data to ensure compliance for Antenna E, which was not covered in the original filing.

## 2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 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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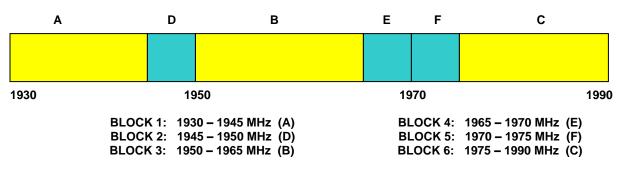
# 3.0 DESCRIPTION OF TESTS

## 3.1 Evaluation Procedure

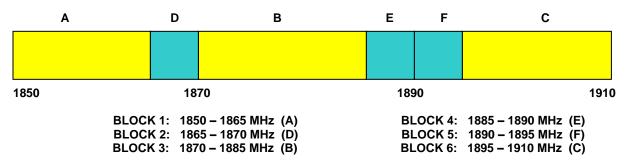
The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

# 3.2 PCS - Base Frequency Blocks



# 3.3 PCS - Mobile Frequency Blocks



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# 3.4 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.

For radiated power measurements, substitution method is used per the guidance of ANSI/TIA-603-E-2016. A halfwave dipole is substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

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

For radiated spurious emissions measurements and calculations, conversion method is used per the formulas in KDB 971168 Section 5.8.4. Field Strength (EIRP) is calculated using the following formulas:

$$\begin{split} E_{[dB\mu V/m]} &= Measured \ amplitude \ level_{[dBm]} + 107 + Cable \ Loss_{[dB]} + Antenna \ Factor_{[dB/m]} \\ And \\ EIRP_{[dBm]} &= E_{[dB\mu V/m]} + 20logD - 104.8; \ where \ D \ is the measurement \ distance \ in \ meters. \end{split}$$

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-E-2016.

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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	8/28/2020	Annual	8/28/2021	LTx3
Agilent	E5515C	Wireless Communications Test Set		N/A		GB45360985
Anritsu	MT8821C	Radio Communication Analyzer		N/A		6200901190
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Annual	8/27/2022	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	2/22/2019	Biennial	2/22/2021	128338
Keysight Technologies	N9020A	MXA Signal Analyzer	9/22/2020	Annual	9/22/2021	MY54500644
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		100976
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		112347
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	7/15/2020	Annual	7/15/2021	100342
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/21/2020	Annual	2/21/2021	102133
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Test Equipment

## Notes:

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

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# 6.0 SAMPLE CALCULATIONS

# **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

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## **Spurious Radiated Emission**

#### Example: Spurious emission at 3700.40 MHz

The receive 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 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm -(-24.80) = 50.3 dBc.

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# 7.0 TEST RESULTS

## 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMG998U
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>LTE</u>

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
ED	Transmitter Conducted Output Pow er	2.1046	N/A	PASS	Section 7.2
CONDUCTED	Occupied Bandw idth	2.1049	N⁄A	PASS	Section 7.3
O S	Conducted Band Edge / Spurious Emissions	2.1051, 24.238(a)	> 43 + 10log10(P[Watts]) at Band Edge and for all out- of-band emissions	PASS	Sections 7.4, 7.5
RADIATED	Equivalent Isotropic Radiated Pow er	24.232(c)	< 2 Watts max. EIRP	PASS	Section 7.7
RADI	Radiated Spurious Emissions	2.1053, 24.238(a)	> 43 + 10 log10 (P[Watts]) for all out-of-band emissions	PASS	Section 7.8

Table 7-1. Summary of Test Results

## Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots 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) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST EMC Software Tool Beta 8.
- 5) For radiated spurious emissions, automated test software was used to maximize emissions. The measurement software utilized is Chamber Control v1.3.1.

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# 7.2 Conducted Power Output Data

## **Test Overview**

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers is measured by means of a calibrated spectrum analyzer. All 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.

#### Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

## Test Settings

- 1. Span =  $2 \times OBW$  to  $3 \times OBW$
- 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 7-1. Test Instrument & Measurement Setup

#### Test Notes

None.

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
		26140	1860.0	1/99	23.48
20 MHz	QPSK	26365	1882.5	1/99	23.26
		26590	1905.0	1/99	23.64
0	16-QAM	26590	1905.0	1/99	22.90
20	64-QAM	26590	1905.0	1/50	21.76
	256-QAM	26590	1905.0	1/50	18.86
		26115	1857.5	1/36	23.53
N	QPSK	26365	1882.5	1/74	23.44
15 MHz		26615	1907.5	1/74	23.49
51	16-QAM	26615	1907.5	1/74	22.86
	64-QAM	26615	1907.5	1/74	22.22
	256-QAM	26615	1907.5	1/36	19.08
		26090	1855.0	1/25	23.28
<u>N</u>	QPSK	26365	1882.5	1/25	23.31
H		26640	1910.0	1/49	23.48
10 MHz	16-QAM	26640	1910.0	1/49	22.77
	64-QAM	26640	1910.0	1/49	22.17
	256-QAM	26640	1910.0	1/25	19.08
		26065	1852.5	1/24	23.46
N	QPSK	26365	1882.5	1/12	21.46
H		26665	1912.5	1/24	21.79
5 MHz	16-QAM	26065	1852.5	1/24	22.52
	64-QAM	26665	1912.5	1/24	21.79
	256-QAM	26665	1912.5	1/12	18.88
		26055	1851.5	1/14	23.34
N	QPSK	26365	1882.5	1/14	21.52
H		26675	1913.5	1/14	21.64
3 V	16-QAM	26055	1851.5	1/14	22.64
	64-QAM	26675	1913.5	1/14	21.64
	256-QAM	26675	1913.5	1/14	19.13
		26047	1850.7	1/5	21.79
P	QPSK	26365	1882.5	1/5	23.47
1.4 MHz		26683	1914.3	1/2	23.39
4	16-QAM	26365	1882.5	1/5	22.52
	64-QAM	26683	1914.3	1/2	21.55
	256-QAM	26683	1914.3	1/2	18.67

Table 7-2. Conducted Power Band 25/2

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# 7.3 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 7-2. Test Instrument & Measurement Setup

#### **Test Notes**

None.

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## LTE Band 2<u>5/2</u>



Plot 7-1. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz QPSK - Full RB Configuration)



Plot 7-2. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of @witercent	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Keysight Spectrum Analyzer - Occupied BW	/				
💢 RLT RF 50Ω DC	CORREC	SENSE:INT Center Freq: 1.882500		10:53:00 PM Feb 11, 202 Radio Std: None	Trace/Detector
	#IFGain:Low	Trig: Free Run #Atten: 36 dB	Avg Hold: 100/100	Radio Device: BTS	
10 dB/div Ref 30.00 dBn					
20.0					Clear Write
10.0	Jepannen	on and the lay and a feature of the second	nummen		
-10.0					
-20.0					Average
-30.0 Manakantan Maryanan Andr	/ <b>\/</b> W			all martany has did and in base of	J
-40.0					
-50.0					Max Hold
-60.0					
Center 1.88250 GHz			-	Span 50.00 MH	
Res BW 470 kHz		#VBW 1.5 MH	IZ	Sweep 1 m	s Min Hold
Occupied Bandwidt	h	Total Po	ower 28.6	6 dBm	
17	.962 M⊦	z			Detector
Transmit Freq Error	-1.010 k	Hz % of OB	W Power 99	9.00 %	Peak▶ Auto <u>Man</u>
x dB Bandwidth	19.52 M		-26	00 dB	
	10102				
MSG			STATU	S	

Plot 7-3. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz 64-QAM - Full RB Configuration)



Plot 7-4. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST: Proud to be part of @ element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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🔤 Keysight Spectrum Analyzer - Occu	upied BW						- • •
<b>LX/</b> RLT RF 50Ω	DC CORREC	SENSE:INT Center Freg: 1.88			0:56:46 PM Feb 11, 2021 dio Std: None	Trac	e/Detector
		🛶 Trig: Free Run	Avg Hold:	100/100			
	#IFGain:Low	#Atten: 36 dB		Ra	dio Device: BTS		
10 dB/div Ref 40.00	dBm						
30.0							
20.0						(	Clear Write
10.0	mhun	mmune	handerstand				
0.00			\				
-10.0							Average
-20.0							
20.0	A martine Cal			The lot a free free at a			
-30.0				THE THE COM	ether wormer of the second of		
							Max Hold
-50.0							
Center 1.88250 GHz				s	pan 37.50 MHz		
Res BW 360 kHz		#VBW 1.1	MHz		Sweep 1 ms		Min Hold
		Total	Power	30.4 dE	2m		
Occupied Bandy			Fower	30.4 UE	5111		
	13.469 N	<b>NHZ</b>					Detector
Transmit Freq Erro	or 7.37	8 kHz % of	OBW Powe	r 99.00	%	Auto	Peak▶ <u>Man</u>
x dB Bandwidth	14.45	MHz x dB		-26.00	dB		
				Loioo			
MSG				STATUS			
MSG				STATUS			

Plot 7-5. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz QPSK - Full RB Configuration)



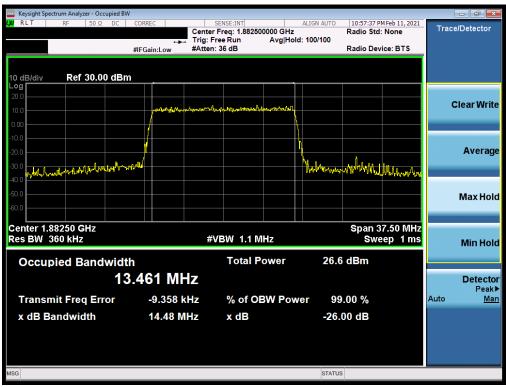
Plot 7-6. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Keysight Spectrum Analyzer - Occupied BW						
LXIRLT RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO	10:57:25 PM Fe Radio Std: No		Trace/Detector
	T		g Hold: 100/100	Radio Device		
	#IFGain:Low #	Atten: 36 dB		Radio Device	: 615	
10 dB/div Ref 30.00 dBm						
20.0						
	mandmerton	many and apply many have been a	runa.			Clear Write
10.0						
0.00	/					
-10.0						Average
-20.0			<b>1</b>			Average
-30.0 Allower programmer and			States States	ᠬᠬᢁ᠂ᡎᡟᡟᡁᢄᡰᡰᠬ᠕ᡃᠬ	Martillaria	
-40.0						
-50.0						Max Hold
-60.0						
Center 1.88250 GHz				Span 37.5	50 MHz	
Res BW 360 kHz		#VBW 1.1 MHz		Sweep	)1ms	Min Hold
Occupied Bandwidth	1	Total Pow	er 28.5	dBm		
	.459 MHz					Detector
15	.455 1011 12	4				Peak►
Transmit Freq Error	-4.381 kH	z % of OBW	Power 99	.00 %		Auto <u>Man</u>
x dB Bandwidth	14.50 MH	z xdB	-26.0	00 dB		
MSG			STATUS			

Plot 7-7. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz 64-QAM - Full RB Configuration)



Plot 7-8. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	Proud to be part of & element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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🔤 Keysight Spectrum Analyzer - Occ	upied BW									
LXI RLT RF 50Ω	DC COR	REC	Center Fr	NSE:INT req: 1.88250 e Run		ALIGN AUTO	10:59:14 P Radio Std	M Feb 11, 2021 None	Trac	e/Detector
	#IFG	Gain:Low	#Atten: 3				Radio Dev	ice: BTS		
10 dB/div Ref 40.00	0 dBm									
30.0										
20.0		. Audi da	e-U-Je-Mparyl	da a Dada	ه من ا				C	Clear Write
10.0		Murel	ar Calera Land	C Alfred Sector of the Sector	North Market	1				
0.00		/				<u>n</u>				
-10.0						<b>I</b>				Average
-20.0	a water mayor					ha an				
-30.0						- Williams	Mary Mary	monaho		
-40.0										Max Hold
Center 1.88250 GHz Res BW 240 kHz			#\/E	3W 750 k	LI-7			5.00 MHz ep 1 ms		
Res BW 240 KHZ			#VE	SVV 7JUK	ΠZ		SWC	ep Tills		Min Hold
Occupied Band	width			Total P	ower	30.4	l dBm			
	9.02	44 MI	Hz							Detector Peak▶
Transmit Freq Err	or	19.803	kHz	% of OE	<b>SW Pow</b>	ver 99	0.00 %		Auto	<u>Man</u>
x dB Bandwidth		9.798 N	lHz	x dB		-26.	00 dB			
MSG						STATU	5			

Plot 7-9. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz QPSK - Full RB Configuration)



Plot 7-10. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST. Prout to be part of @ element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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🔤 Keysight Spectrum Analyzer - Occupied BW	
X         RLT         RF         50 Ω         DC         CORREC         SENSE:INT         ALIGN AUTO         10:59:39 PM Feb 11, 2021           Center Freg: 1.882500000 GHz         Radio Std: None	e/Detector
Trig: Free Run Avg Hold: 100/100	
#IFGain:Low #Atten: 36 dB Radio Device: BTS	
10 dB/diy Ref 30.00 dBm	
10.0 month the hour of the second sec	Clear Write
-20.0	Average
30.0 million and a second seco	
-50.0	
-0.0	Max Hold
Center 1.88250 GHz Span 25.00 MHz	
Res BW 240 kHz #VBW 750 kHz Sweep 1 ms	Min Hold
Occupied Bandwidth Total Power 28.2 dBm	
9.0084 MHz	Detector Peak▶
Transmit Freq Error 3.999 kHz % of OBW Power 99.00 % Auto	<u>Man</u>
x dB Bandwidth 9.794 MHz x dB -26.00 dB	
MSG STATUS	

Plot 7-11. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz 64-QAM - Full RB Configuration)



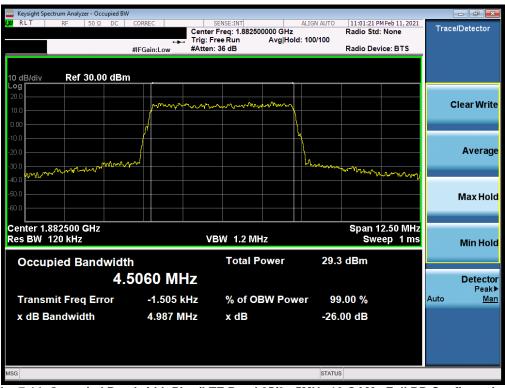
Plot 7-12. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-13. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz QPSK - Full RB Configuration)



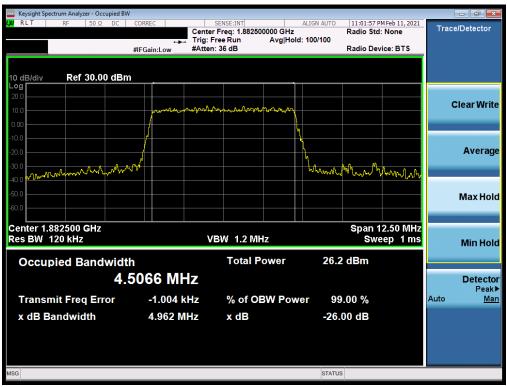
Plot 7-14. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	Proved to be part of & element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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	- 6 - 🔀
μ         RLT         RF         50 Ω         DC         CORREC         SENSE:INT         ALIGN AUTO         11:01:40 PM Feb 11, 2021           Center Freq:         1.882500000 GHz         Radio Std: None         Trace/I	Detector
Trig: Free Run Avg Hold: 100/100	
#IFGain:Low #Atten: 36 dB Radio Device: BTS	
10 dB/div Ref 30.00 dBm	
20.0	
10.0 Manhaman CI	ear Write
	Average
	5
30.0 mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	
-0.0	Max Hold
Center 1.882500 GHz Span 12.50 MHz	
Res BW 120 kHz VBW 1.2 MHz Sweep 1 ms	Min Hold
Occupied Bandwidth Total Power 28.2 dBm	
4.4901 MHz	Detector Peak►
Transmit Freq Error -1.579 kHz % of OBW Power 99.00 %	Man
x dB Bandwidth 4.914 MHz x dB -26.00 dB	
MSG STATUS	

Plot 7-15. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz 64-QAM - Full RB Configuration)



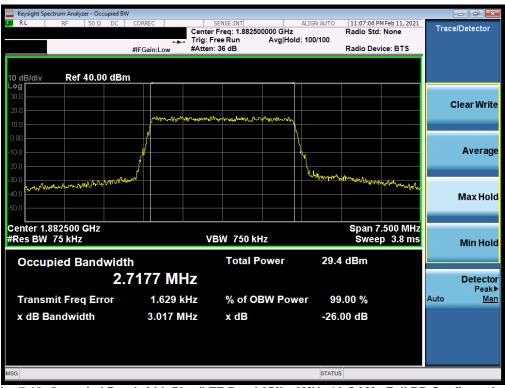
Plot 7-16. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Keysight Spectrum Analyzer - Occupied B	W				
<b>LX/</b> RL RF 50Ω DC	CORREC	SENSE:INT Center Freg: 1.882500	ALIGN AUTO	11:05:43 PM Feb 11, 2021 Radio Std: None	Trace/Detector
	↔ #IFGain:Low	Trig: Free Run #Atten: 36 dB	Avg Hold: 100/100	Radio Device: BTS	
	#IFGaIn:Low	#Atten: 00 dB		Radio Bevice: B13	
10 dB/div Ref 40.00 dB	m				
Log					
30.0					Clear Write
20.0	- Marganeza	᠂ᡁᢣᢦᡐᡎᡨᡯᡵᠬᡎ᠕ᢧᢇᢩ᠕ᡢᡎ᠆᠘᠒᠘ᠰᢋ	Aurouner		Cical Miles
10.0					
0.00					A
-10.0	1				Average
-20.0	N M		Pr-Colling and a second	Vinamen and a strate	
30.0 My / Long Automation				and the first of the second second	
-40.0					Max Hold
-50.0					
Center 1.882500 GHz				Span 7.500 MHz	
#Res BW 75 kHz		VBW 750 kH	Z	Sweep 3.8 ms	Min Hold
Occupied Bandwid	th	Total Po	ower 30.4	dBm	
2.	.7050 M⊦	12			Detector Peak►
Transmit Freq Error	-1.486 k	Hz % of OE	W Power 99	.00 %	Auto <u>Man</u>
x dB Bandwidth	2.986 M	Hz xdB	-26.	00 dB	
MSG			STATUS	5	

Plot 7-17. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz QPSK - Full RB Configuration)



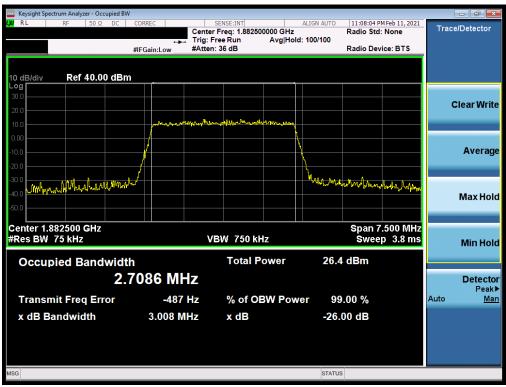
Plot 7-18. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	Pout to be part of @ element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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🔤 Keysight Spectrum Analyzer - Occupie	ed BW				
<b>LXU RL</b> RF 50 Ω D	DC CORREC	SENSE:INT Center Freq: 1.882500000 Trig: Free Run Av	ALIGN AUTO GHz rg Hold: 100/100	11:07:39 PM Feb 11, 2021 Radio Std: None	Trace/Detector
	#IFGain:Low	#Atten: 36 dB		Radio Device: BTS	
10 dB/div Ref 40.00 d	lBm				
30.0					
20.0					Clear Write
10.0	phone min	Janayalana and Janan Many In Andrew			
0.00					
-10.0	/				Average
-20.0			- h.		
-30.0	millet a		14 march 190	he have have about a my	
-40.0					Max Hold
-30.0					
Center 1.882500 GHz #Res BW 75 kHz		VBW 750 kHz		Span 7.500 MHz	
#Res DW 75 KHZ				Sweep 3.8 ms	Min Hold
Occupied Bandwi	idth	Total Powe	er 28.5	dBm	
	2.7038 MH	Z			Detector Peak▶
Transmit Freq Error	3.350 kl	Iz % of OBW	Power 99.	00 %	Auto <u>Man</u>
x dB Bandwidth	2.991 MI	Hz xdB	-26.0	0 dB	
MSG			STATUS		

Plot 7-19. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz 64-QAM - Full RB Configuration)



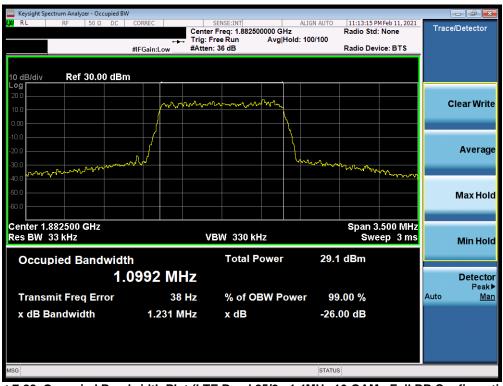
Plot 7-20. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	POLTEST. Proud to be part of @ element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-21. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-22. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of @ element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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🔤 Keysight Spectrum An														
LXI RL RF	50 Ω D	C COI	RREC			SENSE:INT	82500	000 GI		ALIGN AUTO	11:13:29 P Radio Std	M Feb 11, 2021	Trac	e/Detector
					Trig: F	ree Run				100/100				
		#IF	Gain:Lo	DW	#Atten	: 36 dB					Radio Dev	/ice: BTS		
	ef 30.00 d	Bm												
Log 20.0														
10.0			, I	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-landora	mono	- المريد	m						Clear Write
			ſ						5					
0.00			4						Ì					
-10.0									1					
-20.0			$\top$						1					Average
-30.0 -40.0	Jun Mary	m <sup>orn</sup> allar	**						[r	man from the	m	00.00 0 of		
-40.0												and an and the		
-50.0														Max Hold
-60.0														
Center 1.88250											Onen 1	500 BALL-		
Res BW 33 kH					V	BW 33	0 kH	7				1.500 MHz eep 3 ms		
Res BH Solin	-						e kiri	2			0	ceb o mo		Min Hold
Occupied	Bandwi	dth				Tota	al Po	ower		28.3	3 dBm			
		1.09	07	ML	-									Detector
		1.00	01	IVII	12									Peak ►
Transmit Fr	eq Error			744	Hz	% o	f OB	W P	owe	er 99	9.00 %		Auto	Man
x dB Bandw	vidth		12	36 M	Hz	x dE	2			-26	.00 dB			
			1.2	00 10		A UL				-20				
MSG										STATU	s			

Plot 7-23. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-24. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz 256-QAM - Full RB Configuration

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# 7.4 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 10<sup>th</sup> 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 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 $43 + 10 \log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.

## Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

## Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 20GHz (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 7-3. Test Instrument & Measurement Setup

#### **Test Notes**

Per Part 24, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. 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 emissions are attenuated at least 26 dB below the transmitter power.

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# LTE Band 25/2

Keysight Spectrum Analyzer - Swep	t SA				
🗶 RLT RF 50Ω	DC CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	11:44:33 PM Feb 11, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS 10 dB/div Ref 20.00 dE	PNO: Fast IFGain:Low	Trig: Free Run Atten: 30 dB	Mł	type A WWWW Det A NNNNN (r1 1.849 0 GHz -32.238 dBm	Auto Tune
Log Trace 1 Pass					Center Free 939.500000 MH:
-10.0					Start Free 30.000000 MH
-20.0				<u>1</u>	<b>Stop Fre</b> 1.849000000 GH
-40.0					<b>CF Ste</b> j 181.900000 MH <u>Auto</u> Ma
-60.0	an a	n na	en myndeste a Brenedar y sternigt ar yn ar an gerste ganet		Freq Offse 0 H
-70.0 Start 0.0300 GHz				Stop 1.8490 GHz	Scale Type
#Res BW 1.0 MHz	#VBW 3	3.0 MHz	Sweep 2	.427 ms (3641 pts)	

Plot 7-25. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-26. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: A3LSMG998U	PCTEST* Proud to be pert of @ element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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	um Analyzer - Sw	/ept SA								×
IXI RLT	RF 50 Ω		PNO: Fast		#Avg Typ	ALIGN AUTO e: RMS	TRAC	Feb 11, 2021	Frequency	y
10 dB/div	Ref 20.00 (		IFGain:Low	Atten: 30		Mkr	1 19.595	5 5 GHz 51 dBm	Auto T	une
10.0	1 Pass								Center 1 15.000000000	
-10.0									<b>Start F</b> 10.000000000	
-20.0								1-	Stop F 20.000000000	
-40.0									CF \$ 1.000000000 <u>Auto</u>	
-60.0									Freq Of	f <b>fset</b> 0 Hz
-70.0									Scale T	
Start 10.000 #Res BW 1.			#VBW	/ 3.0 MHz	S	weep 17	.Stop 20 33 ms (2	.000 GHz 0001 pts)	-	Lin
MSG						STATUS	6			

Plot 7-27. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-28. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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	ctrum Analyzer -	Swept SA								- 6 -
XI RLT	RF 50	Ω DC	CORREC	SEI	NSE:INT	#Avg Typ	ALIGN AUTO		M Feb 11, 2021	Frequency
PASS			PNO: Fast ++ IFGain:Low	, Trig: Free Atten: 30		#Avg Typ	e:RMS	TY	CE 1 2 3 4 5 6 PE A WWWW ET A NNNN	
10 dB/div	Ref 20.00	) dBm					N	lkr1 9.71 -40.5	0 2 GHz 07 dBm	Auto Tun
10.0	e 1 Pass									<b>Center Fre</b> 5.957500000 GH
10.00										Start Fre 1.915000000 GH
30.0										<b>Stop Fre</b> 10.000000000 Gi
40.0		~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~	<b>~_</b> ~~~			antina <u>ana</u> ang	¢1	CF Ste 808.500000 Mi <u>Auto</u> Ma
60.0										Freq Offs
70.0										Scale Ty
Start 1.91 #Res BW			#VBW	/ 3.0 MHz		s	weep 1	Stop 10 14.02 ms (1	JUDU GHZ	Log <u>L</u>
SG	1.0 191112		<b>77 V D V</b>	7 3.0 191112			STAT		0101 pts)	

Plot 7-29. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-30. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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Keysight Spectrum Analyzer - Swept SA					
LX/RLT RF 50Ω DC		SENSE:INT	ALIGN A #Avg Type: RMS	TRACE 1 2 3 4 5 0	Frequency
PASS	PNO: Fast Irig: F IFGain:Low Atten:	ree Run 30 dB		TYPE A WWWW DET A NNNN	
10 dB/div Ref 20.00 dBm				Mkr1 1.848 0 GHz -49.792 dBm	Auto Tune
Trace 1 Pass					Center Freq
10.0					940.000000 MHz
0.00					Start Freq
-10.0					30.000000 MHz
-20.0					Stop Freq
-30.0					1.850000000 GHz
-40.0					CF Step
				1	182.000000 MHz <u>Auto</u> Mar
-50.0		ann a tha tha tha tha tha tha tha tha tha t	the second s		
-60.0					Freq Offset 0 Hz
-70.0					
					Scale Type
Start 0.0300 GHz #Res BW 1.0 MHz	#VBW 3.0 MH	z	Swee	Stop 1.8500 GHz p 2.427 ms (3641 pts)	Log <u>Lin</u>
MSG				STATUS	

Plot 7-31. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-32. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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	ectrum Analyz		А										
(XV) RLT	RF	50Ω D	C CO	RREC			SENSE:INT	#Avg Typ	ALIGN AUTO		HFeb 11, 2021	Fre	equency
PASS				'NO: Fa Gain:Lo	st ↔ ow	Trig: F Atten:	ree Run 30 dB			TYP De			
10 dB/div Log	Ref 20.	.00 dBr	n						Mkr	1 19.57 -35.2	6 0 GHz 51 dBm		Auto Tune
10.0 Trac	e 1 Pass												e <b>nter Freq</b> 0000000 GHz
-10.0												10.000	Start Freq
-20.0											1-	20.000	<b>Stop Freq</b> 0000000 GHz
-40.0	~~~											1.000 <u>Auto</u>	<b>CF Step</b> 0000000 GHz Man
-60.0												F	F <b>req Offset</b> 0 Hz
-70.0													Scale Type
Start 10.0 #Res BW				#	VBW	3.0 MF	z	ş	weep <u>17</u>	Stop 20 33 ms <u>(2</u>	.000 GHz 0001 pts)	Log	Lin
MSG									STATUS				

Plot 7-33. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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# 7.5 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 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 $43 + 10 \log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.

#### 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  $\geq$  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 7-4. Test Instrument & Measurement Setup

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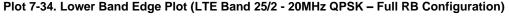
Per 24.238(a), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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# LTE Band 25/2

Keysight Spectrum Analyzer - Swept SA				
<u>4</u> RLT   RF   50 Ω DC	CORREC SENSI	#Avg Type: R	N AUTO 11:35:58 PM Feb 11, 2021 MS TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
PASS         Ref 25.00 dBm	PNO: Wide Trig: Free F IFGain:Low #Atten: 36 d	dB	Mkr1 1.850 000 GHz -29.99 dBm	Auto Tur
15.0 Trace 1 Pass				Center Fre 1.85000000 GH
5.00			and a second and a s	<b>Start Fr</b> 1.842000000 G
25.0				<b>Stop Fro</b> 1.858000000 GI
5.0	and the second			CF Ste 1.600000 M <u>Auto</u> M
5.0				Freq Offs 0
5.0				Scale Ty
enter 1.850000 GHz Res BW 240 kHz	#VBW 820 kHz	Sw	Span 16.00 MHz eep   1.000 ms (1001 pts)	
6G			STATUS	



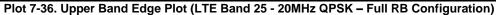


Plot 7-35. Extended Lower Band Edge Plot (LTE Band 25/2 - 20MHz QPSK – Full RB Configuration)

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Keysight Spectrum Analyzer - Swept SA					
XIRLT RF 50Ω DC		SENSE:INT	#Avg Type: RMS	11:36:48 PM Feb 11, 2021 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
PASS 10 dB/div Ref 25.00 dBm	PNO: Wide ↔ IFGain:Low	#Atten: 36 dB	Mkr1	1.915 000 GHz -30.98 dBm	Auto Tun
15.0 Trace 1 Pass					Center Fre 1.915000000 GF
5.00	and a second s				Start Fre 1.907000000 GF
26.0					<b>Stop Fre</b> 1.923000000 GH
15.0			- man - man	menne	CF Ste 1.600000 MH <u>Auto</u> Ma
56.0					Freq Offs 0 I
65.0				Span 16.00 MHz	Scale Typ
Res BW 240 kHz	#VBW	820 kHz		.000 ms (1001 pts)	
SG			STATUS	3	



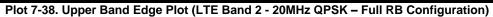


Plot 7-37. Extended Upper Band Edge Plot (LTE Band 25 - 20MHz QPSK – Full RB Configuration)

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🔤 Keysight Spectrum Analyzer - Swept SA 🚽					
LXX RLT RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	11:52:35 PM Feb 11, 2021 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
PASS		Atten: 36 dB		DET A P N N N N	Auto Tune
10 dB/div Ref 25.00 dBm			Mkr1	1.910 224 GHz -34.26 dBm	Auto Tune
Log Trace 1 Pass		Ĭ			Center Freq
15.0					1.910000000 GHz
5.00 manna	monormany	\ \			Start Freq
-5.00					1.902000000 GHz
-15.0					Stop Freq
-25.0		\			1.918000000 GHz
		<sup>%</sup> √ <sub>%</sub> ↓			CF Step
-35.0			an and the second	· · · · · · · · · · · · · · · · · · ·	1.600000 MHz <u>Auto</u> Man
-43.0					Freq Offset
-55.0					0 Hz
-65.0					Scale Type
				0	Log Lin
Center 1.910000 GHz #Res BW 240 kHz	#VBW 82	0 kHz	Sweep 1	Span 16.00 MHz .000 ms (1001 pts)	
MSG			STATUS	6	



Keysight Spectrum Analyzer - Swept SA					
RLT RF 50Ω DC	PNO: Wide ↔	SENSE:INT Trig: Free Run #Atten: 36 dB	ALIGN AUTO #Avg Type: RMS	11:52:53 PM Feb 11, 2021 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A P N N N N	Frequency
0 dB/div Ref 25.00 dBm	II GUILLOW	#Atten: 36 dB	Mkr1	1.911 016 GHz -29.11 dBm	Auto Tun
og Trace 1 Pass					Center Fre 1.913000000 G⊦
.00					Start Fre 1.911000000 GF
5.0 1					<b>Stop Fre</b> 1.915000000 GH
5.0				n ferfen an de felfetissen og en felfetige en andere strange	<b>CF Ste</b> 400.000 kl <u>Auto</u> Ma
5.0					Freq Offs 0 H
5.0					Scale Tyr
enter 1.913000 GHz Res BW 1.0 MHz	#VBW 3	.0 MHz	Sweep 2	Span 4.000 MHz .000 ms (1001 pts)	Log <u>L</u>
G			STATUS		

Plot 7-39. Extended Upper Band Edge Plot (LTE Band 2 - 20MHz QPSK – Full RB Configuration)

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🔤 Keysight Spe	ectrum Analyz	zer - Swep	ot SA										
(XI RLT	RF	50 Ω	DC	CORREC		SEI	ISE:INT	#Avg Typ	ALIGN AUTO		M Feb 11, 2021	F	requency
PASS				PNO: W		Trig: Free				TY			
FA35				IFGain:L	ow	#Atten: 3	6 dB						Auto Tune
									Mkr1	1.850 (	000 GHz 97 dBm		Auto Tune
10 dB/div Log	Ref 25		Вm				_			-30.6	97 ubm		
Trac	e 1 Pass												Center Freq
15.0													50000000 GHz
5.00								er-land	h	mar and a marked and a marked a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
							$\int$						Start Freq
-5.00												1.84	44000000 GHz
-15.0													Stop Freq
												1.8	56000000 GHz
-25.0							1 7						
					han	man	2 <sup>-2</sup>						CF Step
-35.0	mm	www.	<u>~^~~~</u>	mm									1.200000 MHz
,												<u>Auto</u>	Man
-45.0													
													<b>Freq Offset</b>
-55.0													0 Hz
er 0													
-65.0													Scale Type
													could type
Center 1.										Span 1	2.00 MHz	Log	<u>Lin</u>
#Res BW	180 kHz	4		#	VBW	620 kHz			Sweep 1	.000 ms	(1001 pts)		
MSG									STATUS	3			

Plot 7-40. Lower Band Edge Plot (LTE Band 25/2 - 15MHz QPSK – Full RB Configuration)

Interview         Mikr1 1.849 000 GHz -24.65 dBm         Auto Tu Center Fr           09         Trace 1 Pass         Center Fr           500         Start Fr         1.84700000 G           500         Start Fr           500         Start Fr           500         Center Fr           500         Freq Offs           500         Freq Offs           500         Freq Offs	Center 1.84 Res BW 1.		/ 3.0 MHz		Sweep 2		200 1911 12	Log	L
ASS PNO: Wide ++ Trig: Free Run HAtten: 36 dB Mkr1 1.849 0000 GHz -24.65 dBm Center Fr 1.84700000 G 500 500 500 500 500 500 500 50	65.0								Scale Ty
ASS       PNO: Wide ++       Trig: Free Run       Wrig Type: Kind of the point of the poin	55.0								o o
ASS         PNO: Wide         Trig: Free Run #Atten: 36 dB         Trig: Free Run #Atten: 36 dB         Trig: Free Run Der APNNNN         Auto Tu           0 dB/div         Ref 25.00 dBm         -24.65 dBm         -24	45.0							_	
ASS       PNO: Wide       Trig: Free Run #Atten: 36 dB       Trig: Free Run #Atten: 36 dB       Trig: Free Run Der APNNNN       Auto Tu         0 dB/div       Ref 25.00 dBm       -24.65 dBm       -24.65 dBm       -24.65 dBm         0 dB/div       Ref 25.00 dBm       -24.65 dBm       -24.65 dBm       -24.65 dBm         50	35.0							Auto	CF St 400.000 k
ASS PNO: Wide +++ Trig: Free Run IFGain:Low #Atten: 36 dB Mkr1 1.849 000 GHz -24.65 dBm Center Fr 1.84700000 G Start Fr 1.84500000 G	25.0	 a for for the second	 	 مىرىيىيىر بىرىي	na traduction and the second	an an Anger - Market and -	<b>\</b>	1.84	19000000 G
ASS PNO: Wide Trig: Free Run IFGain:Low Trig: Free Run Mkr1 1.849 000 GHz OdB/div Ref 25.00 dBm -24.65 dBm Center Fr 1.84700000 G Start Fr 1.84700000 G	5.0								Stop Fr
ASS PNO: Wide FFT Trig: Free Run FGain:Low #Atten: 36 dB Mkr1 1.849 000 GHz 0 dB/div Ref 25.00 dBm 24.65 dBm 50 50 50 50 50 50 50 50 50 50	i.00							1.84	
ASS PNO: Wide +++ IFGain:Low #Atten: 36 dB OdB/div Ref 25.00 dBm -24.65 dBm PG Trace 1 Pass Center Fi	5.00								Start Er
ASS PNO: Wide +++ IFGain:Low #Atten: 36 dB 0 dB/div Ref 25.00 dBm -24.65 dBm Auto Tu	15.0								
ASS IFGain:Low #Atten: 36 dB DET A PNNNN	og	lBm			Mkr1				AutoTu
	ASS					TYF DE			Auto Tu

Plot 7-41. Extended Lower Band Edge Plot (LTE Band 25/2 - 15MHz QPSK – Full RB Configuration)

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	ctrum Analyz												
L <mark>XI</mark> RLT	RF	50 Ω DO	C COF	REC		SENSE	:INT	#Avg Typ	ALIGN AUTO		M Feb 11, 2021	F	requency
PASS			PN	IO: Wide ↔ Gain:Low		Free R en: 36 d		•		TY	PE A WWWWW ET A P N N N N		
			IF	Sam.Low	***				Mkr1	1 915 (	000 GHz		Auto Tune
10 dB/div Log	Ref 25	.00 dBn	n							-31.	30 dBm		
Trace	e 1 Pass												Center Freq
15.0						-+							5000000 GHz
5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ward and the second	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	*****	man 1								Start Freq
-5.00												1.90	9000000 GHz
-15.0					+								Stop Freq
-25.0						u						1.92	1000000 GHz
-23.0						<sup>1</sup> . 1							
-35.0							~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	an mark			CF Step 1.200000 MHz
											- m	<u>Auto</u>	Man
-45.0													
-55.0													Freq Offset
													0 Hz
-65.0													
													Scale Type
Center 1.9									_	Span 1	2.00 MHz	Log	<u>Lin</u>
#Res BW	180 KHZ			#VBV	V 620	KHZ					(1001 pts)		
MSG									STATU	5			

Plot 7-42. Upper Band Edge Plot (LTE Band 25 - 15MHz QPSK – Full RB Configuration)

SG				# V	DVV 0.0 IVI	112		SWEEP Z		oor pis)	
	r 1.918 3W 1.0	3000 GH	Z	#\	'BW 3.0 M	Hz		Sween 2	.9 Span 4 1.000 ms		og <u>i</u>
											0.7
i5.0											Scale Ty
											Ű
i5.0											Freq Offs
5.0											
										A	uto N
5.0											CF St 400.000 k
5.0				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		and management			and the second second		
1											1.920000000 G
5.0 =											Stop Fr
.00											Start Fr 1.916000000 G
											Otest Fr
5.0											1.918000000 G
5.0											Center Fr
) dB/d <sup>og</sup> [ <del>-</del>	liv R	ef 25.00	dBm						-24.6	3 dBm	
								Mkr1	1.916 0	20 GHz	Auto Tu
ASS				PNO: Wide IFGain:Lov		Free Run n: 36 dB			TYPE DE1	A WWWWW A P N N N N	
RLT		RF 50	ΩDC	CORREC		SENSE:INT	#Avg Type	ALIGN AUTO e: RMS	11:32:10 PM TRACE	123456	Frequency
		•	Swept SA								

Plot 7-43. Extended Upper Band Edge Plot (LTE Band 25 - 15MHz QPSK - Full RB Configuration)

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Keysight Spectrum Analyzer - Swept SA					
LXX RLT RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	11:53:48 PM Feb 11, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS		rig: Free Run Atten: 36 dB	• //	TYPE A WWWWW DET A P N N N N	
10 dB/div Ref 25.00 dBm	1		Mkr1	1.910 012 GHz -33.85 dBm	Auto Tune
Trace 1 Pass		Ĭ			Center Freq
15.0					1.910000000 GHz
5.00	man providence				Start Freq
-5.00					1.904000000 GHz
-15.0					Stop Freq
-25.0		<u></u>			1.916000000 GHz
-35.0		<sup>™</sup> . • 1			CF Step
		how	montown	man white	1.200000 MHz <u>Auto</u> Man
-45.0				* * * * * * * * * * * * * * * *	Erog Offect
-55.0					Freq Offset 0 Hz
-65.0					Scale Type
					Log <u>Lin</u>
Center 1.910000 GHz #Res BW 180 kHz	#VBW 62	20 kHz	Sweep 1	Span 12.00 MHz .000 ms (1001 pts)	
MSG			STATUS		

Plot 7-44. Upper Band Edge Plot (LTE Band 2 - 15MHz QPSK – Full RB Configuration)

RLT	RF 50 Ω D	C CORREC	SENSE:INT	ALIGN AUTO	11:54:10 PM Feb 11, 2021	
PASS		PNO: Wide ↔ IFGain:Low	⊢ Trig: Free Run #Atten: 36 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WWWW DET A P N N N N	Frequency
0 dB/div	Ref 25.00 dBr	n		Mkr1	1.911 000 GHz -29.090 dBm	Auto Tu
og Trace	1 Pass					<b>Center Fr</b> 1.913000000 G
5.00						<b>Start Fr</b> 1.911000000 G
5.0						<b>Stop Fr</b> 1.915000000 G
5.0		derrinden die der schenden zur einen die die der schenden die der schenden die der schenden die der schende die	a general and a first state	Neuen Contemporation and a contemporation of the second system of the second system of the second system of the	laftagen house vale delegand <sup>all</sup> ando order naveg do vale de	CF St 400.000 k <u>Auto</u> N
15.0 <b></b> 15.0 <b></b>						Freq Offs 0
5.0						Scale Ty
enter 1.91 Res BW 1.	3000 GHz .0 MHz	#VB\	V 3.0 MHz	Sweep 2	Span 4.000 MHz 2.000 ms (1001 pts)	Log <u>I</u>

Plot 7-45. Extended Upper Band Edge Plot (LTE Band 2 - 15MHz QPSK – Full RB Configuration)

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Keysight S	Spectrum Analyze	er - Swept SA						
(XI) RLT	RF	50 Ω DC	CORREC	SENSE:IN	#Avg Typ	ALIGN AUTO e: RMS	11:29:38 PM Feb 11, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS			PNO: Wide ↔→	Trig: Free Rur #Atten: 36 dB			TYPE A WWWWW DET A P N N N N	
	-					Mkr1	1.849 992 GHz	Auto Tune
10 dB/div Log		00 dBm					-31.94 dBm	
Tra	ce 1 Pass			Ť				Center Freq
15.0								1.850000000 GHz
5.00					manyananan	waynandor	Made and a second and a second se	Start Freq
-5.00								1.846000000 GHz
-15.0								Stop Freq
-25.0					ł I			1.854000000 GHz
-25.0				1 <sup>[W</sup>				
-35.0			and the second second second	and the second				CF Step 800.000 kHz
	Mar Maranganes	and and a second second	werning -					Auto Man
-45.0								
-55.0								Freq Offset
								0 Hz
-65.0								
								Scale Type
	.850000 G	Hz					Span 8.000 MHz	Log <u>Lin</u>
	V 120 kHz		#VBW	430 kHz			000 ms (1001 pts)	
MSG						STATUS		

Plot 7-46. Lower Band Edge Plot (LTE Band 25/2 - 10MHz QPSK – Full RB Configuration)

RLT	RF 50 Ω	DC CORREC	Trig: Free	SE:INT Run	#Avg Type	LIGN AUTO : RMS	TYPE	1 2 3 4 5 6 A WWWW	Frequenc	су
O dB/div	Ref 25.00 dl	IFGain:Lo		dB		Mkr1	1.849 00	0 GHz 2 dBm	Auto <sup>-</sup>	Tur
.og	e 1 Pass								<b>Center</b> 1.84700000	
5.00									<b>Start</b> 1.84500000	
25.0							الم مر و الم الم الم الم	1.	<b>Stop</b> 1.84900000	
یمینیسید 15.0 اندر اندر 15.0	g terre and a second	and the second and a second and a second and a second a s	ξης η						CF 400.00 Auto	
5.0									Freq O	Offs 0
65.0									Scale	-
enter 1. Res BW	847000 GHz 1.0 MHz	#\	/BW 3.0 MHz		s	weep 2.	Span 4.0 000 ms (1	00 MHz 001 pts)	Log	L

Plot 7-47. Extended Lower Band Edge Plot (LTE Band 25/2 - 10MHz QPSK – Full RB Configuration)

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Keysight Spectrum Analyzer - Swept SA					
LXU RLT RF 50Ω DC	CORREC S	ENSE:INT #Avg Ty		7 PM Feb 11, 2021 RACE 1 2 3 4 5 6	Frequency
PASS	PNO: Wide ↔ Trig: Fr IFGain:Low #Atten:	ee Run			
10 dB/div Ref 25.00 dBm			Mkr1 1.915 -3	008 GHz 2.18 dBm	Auto Tune
15.0					Center Freq 1.915000000 GHz
5.00 <b>60-000 100 100 100 100 100 100 100 100 10</b>	ware and the second				<b>Start Freq</b> 1.911000000 GHz
-15.0		1			<b>Stop Freq</b> 1.919000000 GHz
-35.0			Martin - working the age of the		<b>CF Step</b> 800.000 kHz <u>Auto</u> Man
-55.0					Freq Offset 0 Hz
-65.0					Scale Type
Center 1.915000 GHz #Res BW 120 kHz	#VBW 430 kH	Z	Spar Sweep 4.000 m	0.000 1911 12	Log <u>Lin</u>
MSG			STATUS		

Plot 7-48. Upper Band Edge Plot (LTE Band 25 - 10MHz QPSK – Full RB Configuration)

RLT RF	50 Ω DC COF	REC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	11:30:39 PM Feb 11, 2021	Frequency
ASS			Frig: Free Run Atten: 36 dB		TRACE 1 2 3 4 5 6 TYPE A WWWW DET A P N N N N	
O dB/div Ref 25.	00 dBm			Mkr1	1.916 004 GHz -23.59 dBm	Auto Tui
5.0 Trace 1 Pass						<b>Center Fr</b> 1.918000000 G
.00						<b>Start Fr</b> 1.916000000 G
5.0	Analytic for the second s					<b>Stop Fr</b> 1.920000000 G
5.0						CF St 400.000 k <u>Auto</u> M
5.0						Freq Offs 0
5.0						Scale Ty
enter 1.918000 G Res BW 1.0 MHz	iHz	#VBW 3.	0 MHz	Sweep 2	Span 4.000 MHz 2.000 ms (1001 pts)	Log <u>l</u>

Plot 7-49. Extended Upper Band Edge Plot (LTE Band 25 - 10MHz QPSK – Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
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Keysight Spectrum Analyz						
LXI RLT RF	50 Ω DC CORREC	SEN	ISE:INT #Avg Ty		:54:58 PM Feb 11, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS	PNO: V IFGain:	Vide ↔ Trig: Free Low #Atten: 3	Run		DET A WWWWWW DET A P N N N N	
00	.00 dBm			Mkr1 1.9	010 000 GHz 30.985 dBm	Auto Tune
15.0 Trace 1 Pass						Center Freq 1.910000000 GHz
-5.00	09990000000000000000000000000000000000	the the second				<b>Start Freq</b> 1.906000000 GHz
-15.0			1			<b>Stop Freq</b> 1.914000000 GHz
-35.0			Marrieller marrieller	have the state of the second	Constant marking work way	CF Step 800.000 kHz <u>Auto</u> Man
-55.0						<b>Freq Offset</b> 0 Hz
-65.0						Scale Type
Center 1.910000 C #Res BW 120 kHz		#VBW 430 kHz		Sweep 4.000	pan 8.000 MHz ) ms (1001 pts)	Log <u>Lin</u>
MSG				STATUS		

Plot 7-50. Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB Configuration)

Keysight Spectrum Analyzer           RLT         RF         5	0 Ω DC CORREC	SENSE:INT	ALIGN AUTO	11:55:25 PM Feb 11, 2021	Frequency
ASS	PNO: Wide IFGain:Low	Trig: Free Run #Atten: 36 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A P N N N N	
dB/div Ref 25.0	0 dBm		Mkr1	1.911 000 GHz -23.251 dBm	Auto Tu
Trace 1 Pass		The second secon			Center Fr
5.0					1.913000000 G
.00					Start Fr
.00					1.911000000 G
5.0					<b>Stop Fr</b> 1.915000000 G
5.0		A	and not provide the state of th		
5.0					CF St 400.000 k Auto M
5.0					
5.0					Freq Offs 0
5.0					Scale Ty
enter 1.913000 GH Res BW 1.0 MHz		SW 3.0 MHz	Sweep 2	Span 4.000 MHz .000 ms (1001 pts)	Log <u>i</u>
G	~~VL	5.5-14112	STATUS	-	

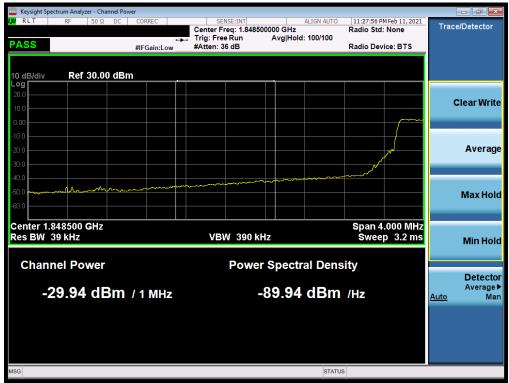
Plot 7-51. Extended Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	<b>SAMSUNG</b>	Approved by: Technical Manager
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🔤 Keysight Spectrum A						
<b>LXI</b> RLT RF	50 Ω DC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	TRACE 1 2 3 4 5 6	Frequency
PASS		PNO: Wide ↔ IFGain:Low	Trig: Free Run #Atten: 36 dB		DET A PNNN	
10 dB/div Ref	25.00 dBm			Mkı	1 1.849 996 GHz -30.88 dBm	Auto Tune
15.0	ass					Center Freq 1.85000000 GHz
-5.00						<b>Start Freq</b> 1.848000000 GHz
-15.0						<b>Stop Freq</b> 1.852000000 GHz
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m	~~~~			CF Step 400.000 kHz <u>Auto</u> Man
-55.0						Freq Offset 0 Hz
-65.0						Scale Type
Center 1.85000 #Res BW 62 kH		#VBW	220 kHz	Sweep	Span 4.000 MHz 2.000 ms (1001 pts)	Log <u>Lin</u>
MSG				STAT	rus	

Plot 7-52. Lower Band Edge Plot (LTE Band 25/2 - 5MHz QPSK – Full RB Configuration)



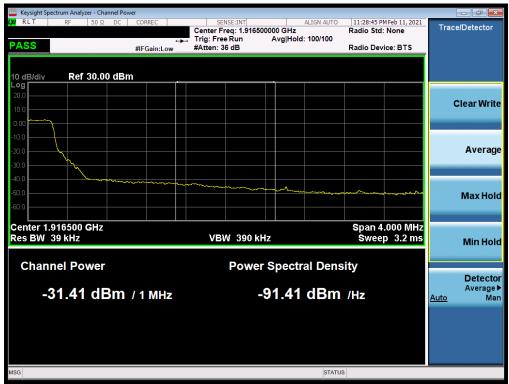
Plot 7-53. Extended Lower Band Edge Plot (LTE Band 25/2 - 5MHz QPSK – Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST* Proud to be part of @ element	PART 24 MEASUREMENT REPORT	Sлмsung	Approved by: Technical Manager
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Keysight Spectr	rum Analyzer - Swe										
IXI RLT	RF 50 Ω	DC	CORREC	SENS	E:INT	#Avg Typ	ALIGN AUTO	TRAC	4 Feb 11, 2021 E <b>1 2 3 4 5 6</b>	F	requency
PASS			PNO: Wide IFGain:Low	Trig: Free #Atten: 36				TYF De	A WWWWWW A P N N N N		
Log	Ref 25.00 d	Bm					Mkr1	1.915 0 -30.	24 GHz 55 dBm		Auto Tune
15.0	1 Pass										<b>Center Freq</b> 5000000 GHz
-5.00										1.91	Start Freq 3000000 GHz
-15.0					1					1.91	<b>Stop Freq</b> 7000000 GHz
-35.0					how	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	······	mmmm	when and the second	<u>Auto</u>	CF Step 400.000 kHz Man
-55.0											<b>Freq Offset</b> 0 Hz
-65.0											Scale Type
Center 1.91 #Res BW 6			#VBW	220 kHz			Sweep 2	Span 4 .000 ms (	.000 MHz 1001 pts)	Log	<u>Lin</u>
MSG							STATUS				

Plot 7-54. Upper Band Edge Plot (LTE Band 25 - 5MHz QPSK – Full RB Configuration)



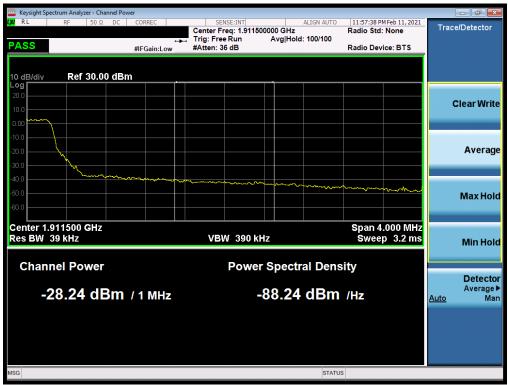
Plot 7-55. Extended Upper Band Edge Plot (LTE Band 25 - 5MHz QPSK – Full RB Configuration)

FCC ID: A3LSMG998U	Pcutest of the element	PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
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	ım Analyzer - Swe						- 6 -
LX/ RL	RF 50 Ω	DC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	11:56:53 PM Feb 11, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS			PNO: Wide	Trig: Free Run #Atten: 36 dB		TYPE A WWWWW DET A P N N N N	Auto Tuno
10 dB/div	tef 25.00 d	Bm			Mkr1	1.910 000 GHz -28.161 dBm	Auto Tune
15.0 Trace 1	Pass						Center Freq 1.910000000 GHz
-5.00	v who can a man a first a man a m I man a ma	vywa	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				Start Freq 1.908000000 GHz
-15.0							<b>Stop Freq</b> 1.912000000 GHz
-35.0				 	man and a second	mmmmm	CF Step 400.000 kHz <u>Auto</u> Man
-55.0							Freq Offset 0 Hz
-65.0							Scale Type
Center 1.910 #Res BW 62			#VBW	220 kHz	Sweep 2	Span 4.000 MHz 2.000 ms (1001 pts)	Log <u>Lin</u>
MSG					STATUS		

Plot 7-56. Upper Band Edge Plot (LTE Band 2 - 5MHz QPSK – Full RB Configuration)



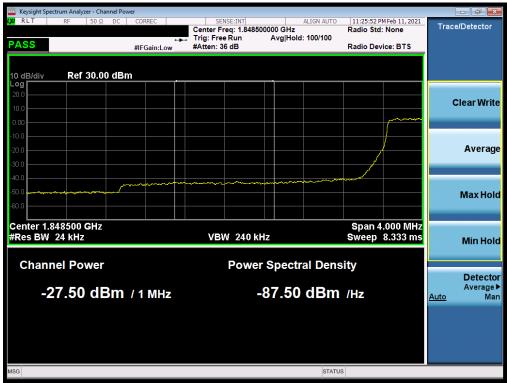
Plot 7-57. Extended Upper Band Edge Plot (LTE Band 2 - 5MHz QPSK - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of @ element	PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
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Keysight Spectr	um Analyzer - Swe										
LXI RLT	RF 50 Ω	DC	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	11:25:34 PM TRACE	Feb 11, 2021	F	requency
PASS			PNO: Wide	Trig: Free #Atten: 3		0 71		TYPE DET	A WWWWW A P N N N N		
10 dB/div	Ref 25.00 d	IBm					Mkr1	1.850 00 -27.2	00 GHz 6 dBm		Auto Tune
15.0 <b>Trace</b>	1 Pass										Center Freq 50000000 GHz
-5.00						han the second s				1.84	Start Freq 48000000 GHz
-15.0					1					1.8	Stop Freq 52000000 GHz
-35.0				~~~						<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-55.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 1.85 #Res BW 30		·	#VBW	120 kHz			Sweep 2	Span 4.0 .000 ms (1	000 MHz 001 pts)	Log	<u>Lin</u>
MSG							STATUS				

Plot 7-58. Lower Band Edge Plot (LTE Band 25/2 - 3MHz QPSK – Full RB Configuration)



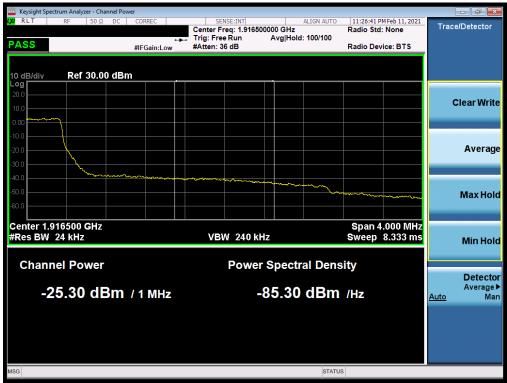
Plot 7-59. Extended Lower Band Edge Plot (LTE Band 25/2 - 3MHz QPSK – Full RB Configuration)

FCC ID: A3LSMG998U	Pcutest of the element	PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
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🔤 Keysight Spectrum		SA				
LXI RLT R	F 50Ω [	DC CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	11:26:24 PM Feb 11, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS		PNO: Wide ↔ IFGain:Low	<ul> <li>Trig: Free Run #Atten: 36 dB</li> </ul>		DET A P N N N N	
10 dB/div Re	ef 25.00 dB	m		Mkr1	1.915 000 GHz -26.02 dBm	Auto Tune
15.0	Pass					Center Freq 1.915000000 GHz
-5.00						<b>Start Freq</b> 1.913000000 GHz
-15.0			1			<b>Stop Freq</b> 1.917000000 GHz
-35.0						<b>CF Step</b> 400.000 kHz <u>Auto</u> Man
-45.0						<b>Freq Offset</b> 0 Hz
-65.0						Scale Type
Center 1.9150 #Res BW 36 I		#VBW	120 kHz	Sweep 2	Span 4.000 MHz .000 ms (1001 pts)	Log <u>Lin</u>
MSG				STATUS		

Plot 7-60. Upper Band Edge Plot (LTE Band 25 - 3MHz QPSK – Full RB Configuration)



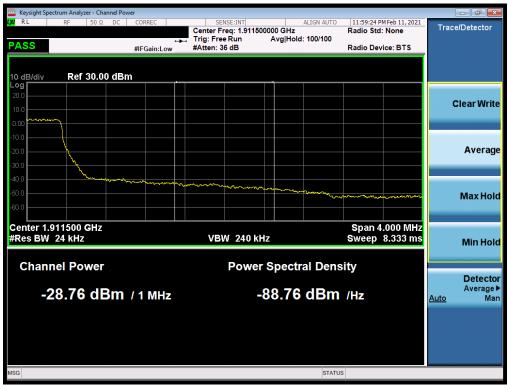
Plot 7-61. Extended Upper Band Edge Plot (LTE Band 25 - 3MHz QPSK – Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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🔤 Keysight Spectrum Analyzer - Swept SA 👘					
LX RL RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	11:58:39 PM Feb 11, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS	PNO: Wide ↔ IFGain:Low	Trig: Free Run #Atten: 36 dB		DET A PNNN	Auto Toma
10 dB/div Ref 25.00 dBm			Mkr1	1.910 000 GHz -26.20 dBm	Auto Tune
15.0					Center Freq 1.910000000 GHz
5.00	~~~~~~~				<b>Start Freq</b> 1.908000000 GHz
-15.0		1			<b>Stop Freq</b> 1.912000000 GHz
-35.0			·····		CF Step 400.000 kHz <u>Auto</u> Man
-56.0					<b>Freq Offset</b> 0 Hz
-65.0					Scale Type
Center 1.910000 GHz #Res BW 36 kHz	#VBW	120 kHz	Sweep 2	Span 4.000 MHz .000 ms (1001 pts)	Log <u>Lin</u>
MSG			STATUS		

Plot 7-62. Upper Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB Configuration)



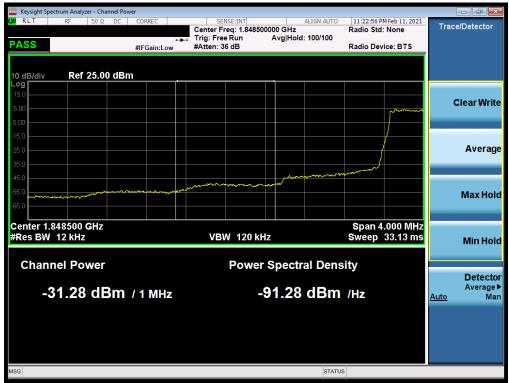
Plot 7-63. Extended Upper Band Edge Plot (LTE Band 2 - 3MHz QPSK - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of @ element	PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
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PASS       PNO: Wide       Trig: Free Run #Atten: 36 dB       Trig: Free Run #Atten: 36 dB       Mkr1 1.849 996 GHz -36.06 dBm       Auto Tune         10 dB/div       Ref 25.00 dBm       -36.06 dBm       -36.06 dBm       Center Freq 1.85000000 GHz       Image: Ref 25.00 dBm       Center Freq 1.85000000 GHz       Center Freq 1.85000000 GHz         500	🔤 Keysight Spectrum Analyzer - Swept SA 👘					
PASS       PNO: Wide       Trig: Free Run #Atten: 36 dB       PMO: Wide       Auto Tune         10 dB/div       Ref 25.00 dBm       -36.06 dBm       -36.06 dBm       Center Freq         150       160       150       160       150       160       160       150       160       160       160       160       160	LX/RLT RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO	11:22:24 PM Feb 11, 2021 TRACE 12 3 4 5 6	Frequency
Center 1.8500000 GHz Trace 1 Pass Trace 1 Pass Center Freq 1.85000000 GHz Start Freq 1.8500000 GHz Treq Offset Center 1.8500000 GHz Treq Offset Center 1.850000 GHz Treq Offset Center 1.85000 GHZ Treq Offset C	PASS			• /	DET A PNNN	
Trace 1 Pass       Center Freq         150       Start Freq         500       Start Freq         500       Start Freq         150       Stop Freq         185200000 GHz       Stop Freq         185200000 GHz       Stop Freq         185200000 GHz       Stop Freq         450       Stop Freq         450       Stop Freq         450       Stop Freq         185200000 GHz       Span 4.000 MHz         400.00 GHz       Span 4.000 MHz         Certer 1.850000 GHz       Span 4.000 MHz         Log       Lin         Sweep 4.800 ms (1001 pts)       Sweep 4.800 ms (1001 pts)				Mkr1	1.849 996 GHz -36.06 dBm	Auto Tune
Start Freq Start Freq Start Freq 1.84800000 GHz 450 450 450 450 450 450 450 450	15.0					-
2250 360 360 460 460 460 460 460 460 460 4	-5.00			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
400.000 kHz 400.000 kHz 400.000 kHz 400.000 kHz 400.000 kHz 400.000 kHz Auto Man Freq Offset 0 Hz Scale Type Center 1.850000 GHz #Res BW 18 kHz #VBW 56 kHz Sweep 4.800 ms (1001 pts)	-15.0					
550     Freq Offset       650     Image: Constraint of the second secon	-35.0	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	~~~~			400.000 kHz
Center 1.850000 GHz Span 4.000 MHz Log Lin #Res BW 18 kHz #VBW 56 kHz Sweep 4.800 ms (1001 pts)	-55.0					
#Res BW 18 kHz         #VBW 56 kHz         Sweep 4.800 ms (1001 pts)	-65.0					Scale Type
AND STATUS	Center 1.850000 GHz #Res BW 18 kHz	#VBW 56	kHz	Sweep 4.	Span 4.000 MHz 800 ms (1001 pts)	Log <u>Lin</u>
	MSG			-		

Plot 7-64. Lower Band Edge Plot (LTE Band 25/2 – 1.4MHz QPSK – Full RB Configuration)



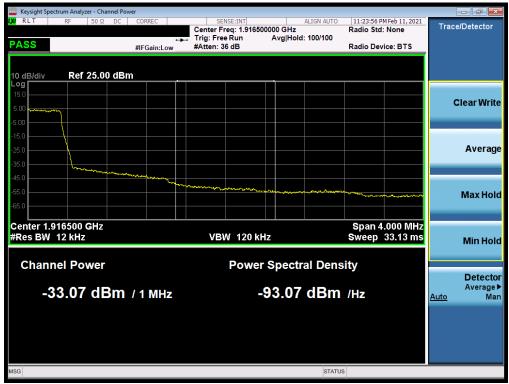
Plot 7-65. Extended Lower Band Edge Plot (LTE Band 25/2 – 1.4MHz QPSK – Full RB Configuration)

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🔤 Keysight Spectrum Analyzer - Swept SA 👘					
🗱 RLT RF 50Ω DC			ALIGN AUTO	11:23:35 PM Feb 11, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS	PNO: Wide ↔ Trig: Fre IFGain:Low #Atten:			TYPE A WWWW DET A P N N N N	
10 dB/div Ref 25.00 dBm			Mkr1	1.915 024 GHz -35.50 dBm	Auto Tune
15.0					Center Freq 1.915000000 GHz
-5.00					<b>Start Freq</b> 1.913000000 GHz
-15.0					<b>Stop Freq</b> 1.917000000 GHz
-35.0		1	m		CF Step 400.000 kHz <u>Auto</u> Man
-56.0			- hom	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<b>Freq Offset</b> 0 Hz
-65.0					Scale Type
Center 1.915000 GHz #Res BW 18 kHz	#VBW 56 kHz		Sweep 4	Span 4.000 MHz 800 ms (1001 pts)	Log <u>Lin</u>
MSG			STATUS		

Plot 7-66. Upper Band Edge Plot (LTE Band 25 – 1.4MHz QPSK – Full RB Configuration)



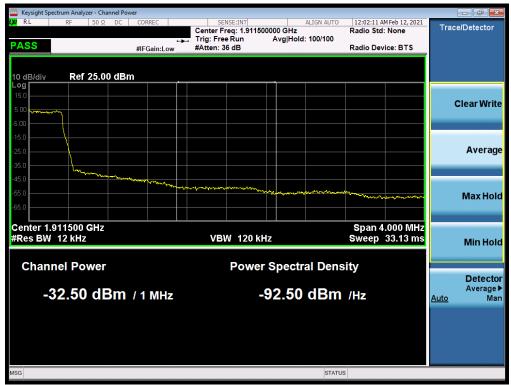
Plot 7-67. Extended Upper Band Edge Plot (LTE Band 25 – 1.4MHz QPSK – Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST* Proud to be part of @ element	PART 24 MEASUREMENT REPORT	Sлмsung	Approved by: Technical Manager
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Keysight Spectrum Analyzer - Swept SA					
XIRL RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	12:01:30 AM Feb 12, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS		rig: Free Run Atten: 36 dB		TYPE A WWWWW DET A P N N N N	Auto Tune
10 dB/div Ref 25.00 dBm			Mkr1	1.910 004 GHz -36.29 dBm	Auto Tune
15.0 Trace 1 Pass					Center Freq 1.910000000 GHz
5.00	<u>~~~~~~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				Start Freq 1.908000000 GHz
-15.0					<b>Stop Freq</b> 1.912000000 GHz
-35.0		1	mm		CF Step 400.000 kHz <u>Auto</u> Man
-55.0				mmmmm	Freq Offset 0 Hz
-65.0					Scale Type
Center 1.910000 GHz #Res BW 18 kHz	#VBW 56	kHz	Sweep 4	Span 4.000 MHz .800 ms (1001 pts)	Log <u>Lin</u>
MSG			STATUS		

Plot 7-68. Upper Band Edge Plot (LTE Band 2 – 1.4MHz QPSK – Full RB Configuration)



Plot 7-69. Extended Upper Band Edge Plot (LTE Band 2 – 1.4MHz QPSK – Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST* Proud to be part of @ element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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## 7.6 Peak-Average Ratio

## **Test Overview**

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

### Test Procedure Used

KDB 971168 D01 v03r01 - Section 5.7.1

## **Test Settings**

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

### Test Setup

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



Figure 7-5. Test Instrument & Measurement Setup

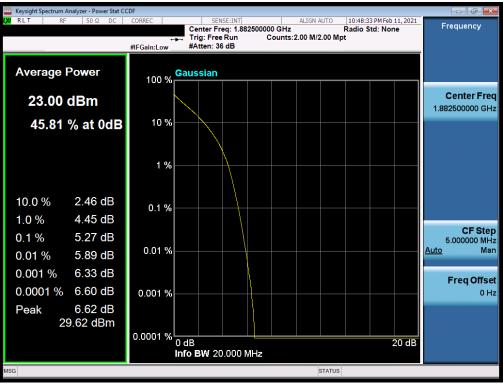
## Test Notes

None.

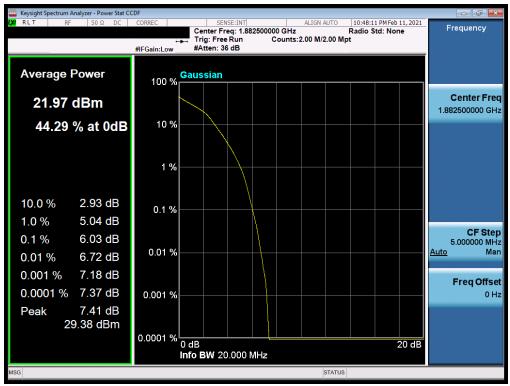
FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 54 of 76
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## LTE Band 25/2



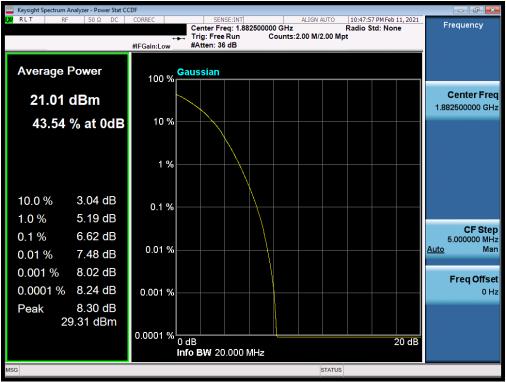
Plot 7-70. PAR Plot (LTE Band 25/2 - 20MHz QPSK - Full RB Configuration)



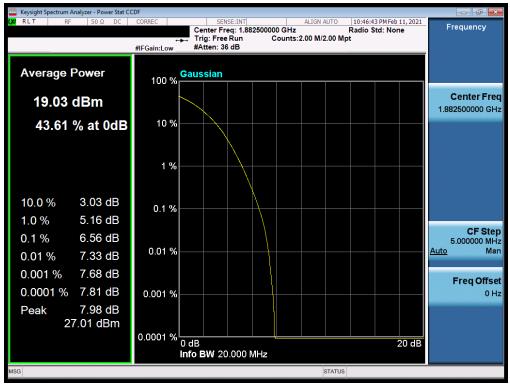
#### Plot 7-71. PAR Plot (LTE Band 25/2 - 20MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
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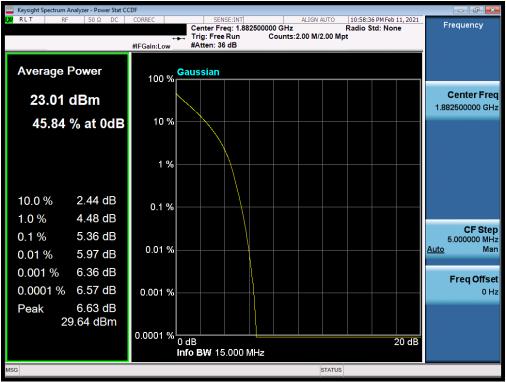




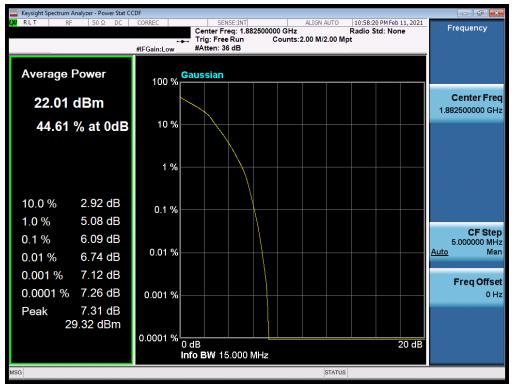
#### Plot 7-73. PAR Plot (LTE Band 25/2 - 20MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage EC of 70	
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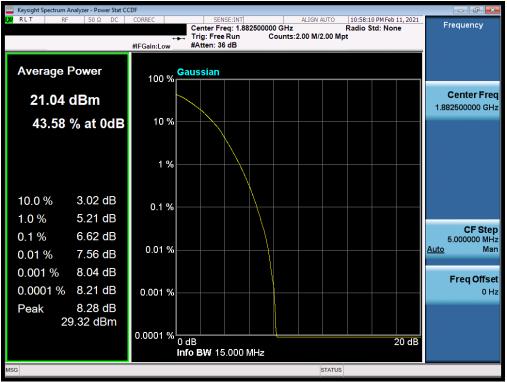


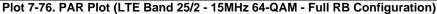
#### Plot 7-75. PAR Plot (LTE Band 25/2 - 15MHz 16-QAM - Full RB Configuration)

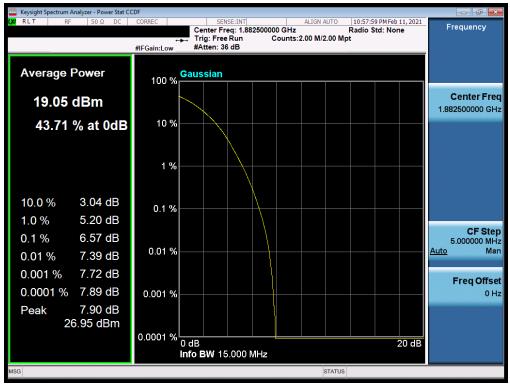
FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 57 of 76	
1M2102050006-05.A3L	2/9/2021 - 2/11/2021	Portable Handset	Page 57 of 76	
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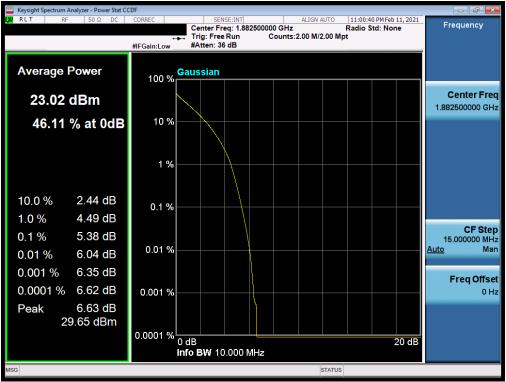




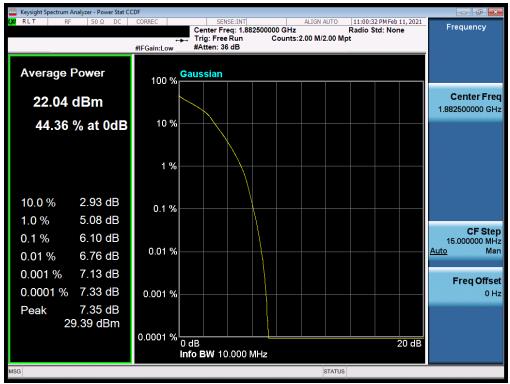
#### Plot 7-77. PAR Plot (LTE Band 25/2 - 15MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage E9 of 70	
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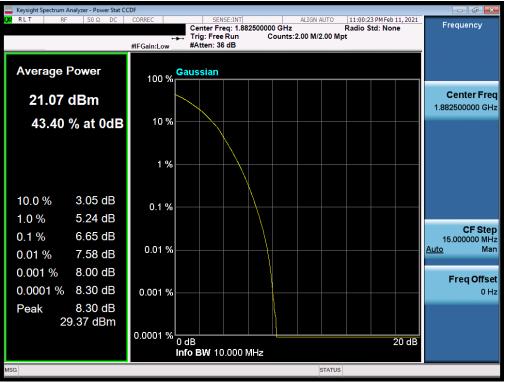
Plot 7-78. PAR Plot (LTE Band 25/2 - 10MHz QPSK - Full RB Configuration)

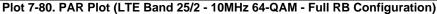


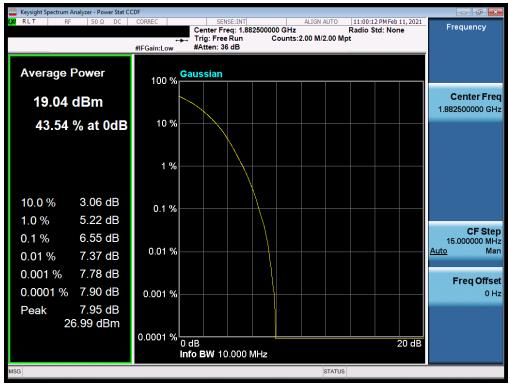
#### Plot 7-79. PAR Plot (LTE Band 25/2 - 10MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	Sлмsung	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 50 of 70	
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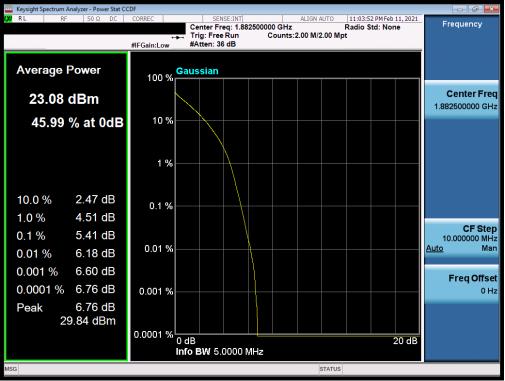


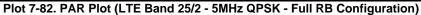


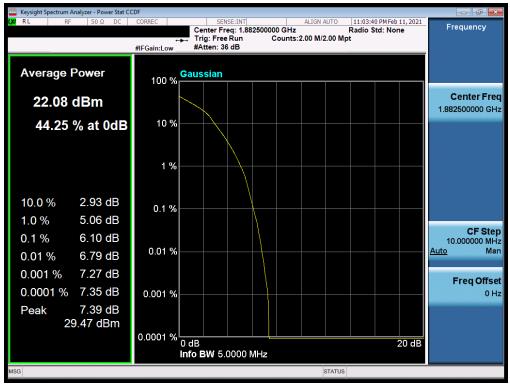
#### Plot 7-81. PAR Plot (LTE Band 25/2 - 10MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 60 of 76	
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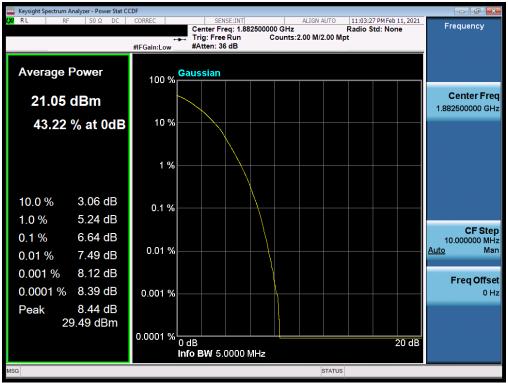


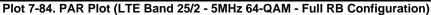


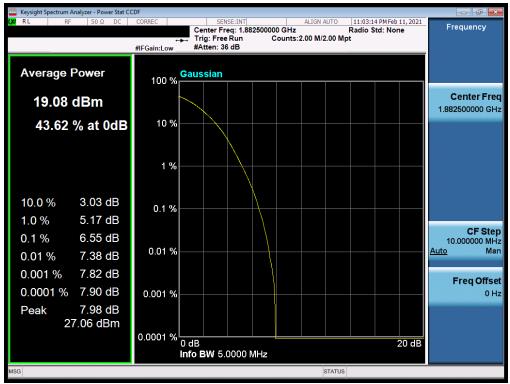
#### Plot 7-83. PAR Plot (LTE Band 25/2 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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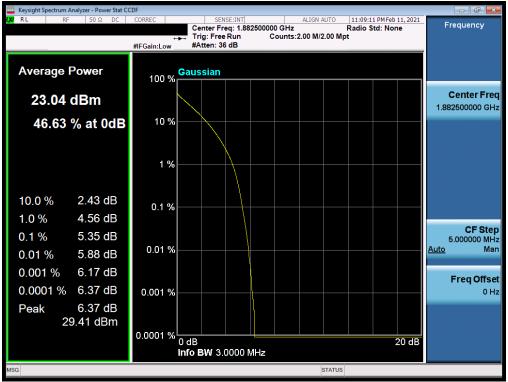


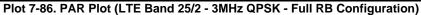


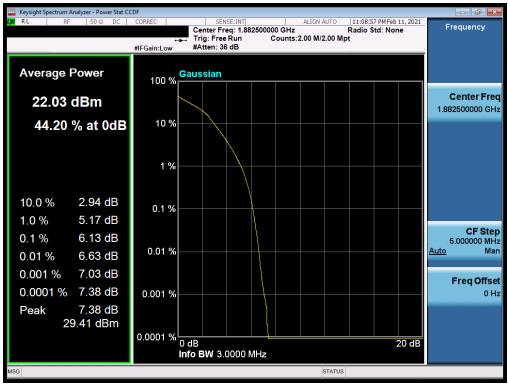
#### Plot 7-85. PAR Plot (LTE Band 25/2 - 5MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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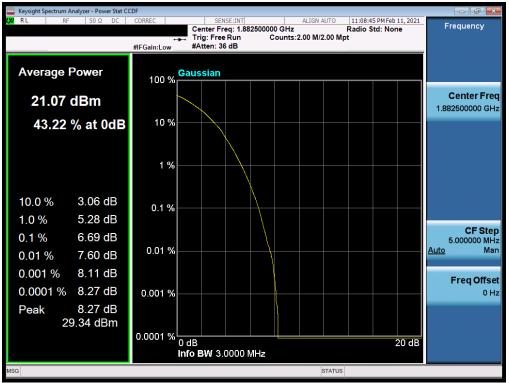


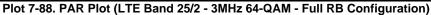


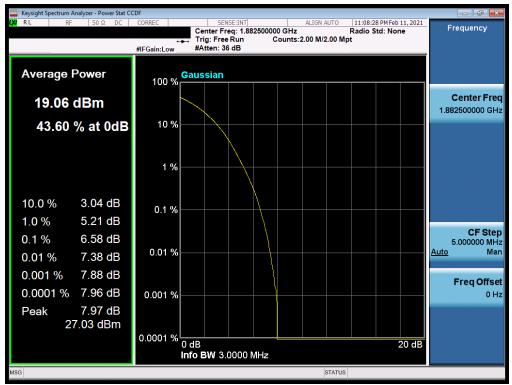
#### Plot 7-87. PAR Plot (LTE Band 25/2 - 3MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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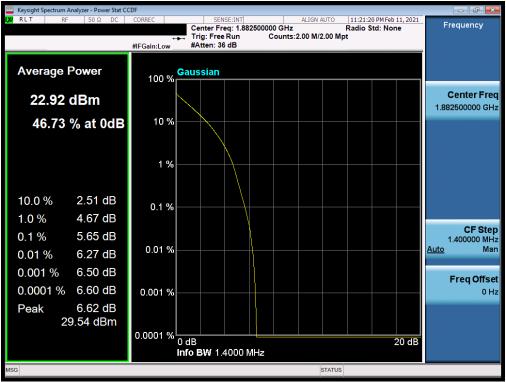


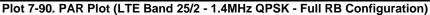
#### Plot 7-89. PAR Plot (LTE Band 25/2 - 3MHz 256-QAM - Full RB Configuration)

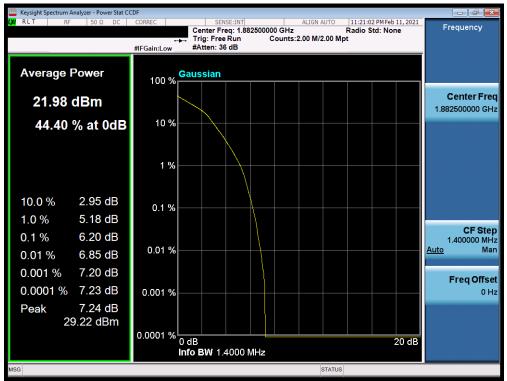
FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 64 of 76	
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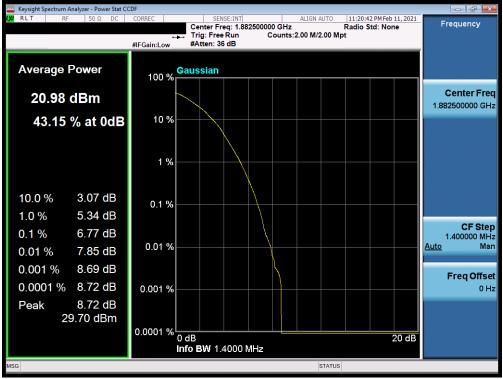




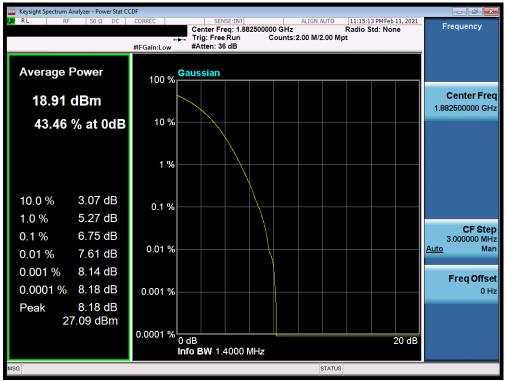
Plot 7-91. PAR Plot (LTE Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST* Proud to be part of @ element	PART 24 MEASUREMENT REPORT	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage CE of 70
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Plot 7-92. PAR Plot (LTE Band 25/2 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-93. PAR Plot (LTE Band 25/2 - 1.4MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U		PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega CC of 70
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## 7.7 Radiated Power (ERP/EIRP)

## **Test Overview**

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

## Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.2.1

ANSI/TIA-603-E-2016 - Section 2.2.17

## Test Settings

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

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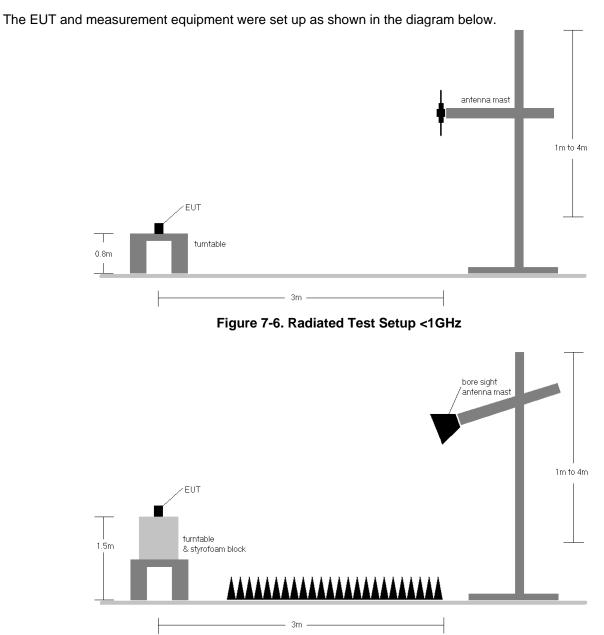


Figure 7-7. Radiated Test Setup >1GHz

FCC ID: A3LSMG998U	Portest Proud to be part of @ element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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## Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

FCC ID: A3LSMG998U	PCTEST* Prod to be part of @ element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 60 of 76
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PTO         1882.5         V         Y         121.0         237.0         10.15         1/.99         12.16         22.31         0.1           16-0AM         1905.0         V         Y         136.0         240.0         10.31         1/.0         11.90         12.16         22.31         0.1           64-0AM         1905.0         V         Y         136.0         240.0         10.31         1/.50         10.28         20.59         0.1           256-0AM         1905.0         V         Y         136.0         240.0         10.31         1/.50         7.54         17.85         0.0           256-0AM         1905.0         V         Y         136.0         240.0         10.31         1/.50         7.54         17.85         0.0           16-0AM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.49         0.1           16-0AM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.66         0.1           16-0AM         1907.5         V         Y         136.0         240.0         10.33         1/7	Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
Provide         1905.0         V         Y         136.0         240.0         10.31         1/0         11.90         22.21         0.1           16-QAM         1905.0         V         Y         136.0         240.0         10.31         1/0         11.90         12.21         0.1           64-QAM         1905.0         V         Y         136.0         240.0         10.31         1/0         11.31         21.62         0.1           256-QAM         1905.0         V         Y         136.0         240.0         10.31         1/0         11.86         21.82         0.0           256-QAM         1905.0         V         Y         136.0         240.0         10.33         1/74         11.74         22.49         0.1           16-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.66         0.1           16-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         10.73         21.65         0.1           256-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         10.73			1860.0	V	Y	140.0	244.0	9.98	1 / 50	11.79	21.77	0.150	33.01	-11.24
PHY         Disc, 1         1         130.0         240.0         10.31         1/150         15.40         17.35         0.1           256-0AM         1905.0         V         Y         136.0         240.0         10.31         1/150         7.54         17.35         0.1           187.5         V         Y         140.0         244.0         9.96         1/36         11.86         21.82         0.1           1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.66         0.1           16-0AM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.66         0.1           64-0AM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         2.06         0.1           226-0AM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.26         21.57         0.1           190.0         V         Y         136.0         240.0         10.34         1/49         11.71         22.05         0.1           16-0AM	N	QPSK	1882.5	V	Y	121.0	237.0	10.15	1 / 99	12.16	22.31	0.170	33.01	-10.70
PY         Drawn         1905.0         V         Y         130.0         240.0         10.31         1/1.50         7.54         17.85         0.1           256-QAM         1905.0         V         Y         130.0         240.0         10.31         1/1.50         7.54         17.85         0.1           187.5         V         Y         121.0         237.0         10.15         1/74         11.234         22.49         0.1           1807.5         V         Y         136.0         240.0         10.33         1/74         11.74         2.26         0.1           16-0AM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         2.26         0.1           256-0AM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         2.26         0.1           190.0         V         Y         136.0         240.0         10.34         1/49         11.71         22.05         0.1           16-QAM         191.0         V         Y         136.0         240.0         10.34         1/49         11.71         12.05         0.1	Ŧ		1905.0	V	Y	136.0	240.0	10.31	1/0	11.90	22.21	0.166	33.01	-10.80
PHY         Disc, 1         1         130.0         240.0         10.31         1/150         15.40         17.35         0.1           256-0AM         1905.0         V         Y         136.0         240.0         10.31         1/150         7.54         17.35         0.1           187.5         V         Y         140.0         244.0         9.96         1/36         11.86         21.82         0.1           1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.66         0.1           16-0AM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.66         0.1           64-0AM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         2.06         0.1           226-0AM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.26         21.57         0.1           190.0         V         Y         136.0         240.0         10.34         1/49         11.71         22.05         0.1           16-0AM	0	16-QAM	1905.0	V	Y	136.0	240.0	10.31	1/0	11.31	21.62	0.145	33.01	-11.39
PTOP         1857.5         V         Y         140.0         244.0         9.96         1/36         11.86         21.82         0.1           1882.5         V         Y         121.0         237.0         10.15         1/74         11.234         22.49         0.1           16-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.06         0.1           64-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.06         0.1           256-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.73         22.06         0.0           256-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.73         22.05         0.0           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.07         0.0           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.6         21.00<	7	64-QAM	1905.0	V	Y	136.0	240.0	10.31	1 / 50	10.28	20.59	0.115	33.01	-12.42
PY         QPSK         1882.5         V         Y         121.0         237.0         10.15         1/74         12.34         22.49         0.1           1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.66         0.1           16-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.66         0.1           266-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.73         22.66         0.1           256-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.73         22.05         0.1           256-QAM         1907.5         V         Y         121.0         237.0         10.15         1/25         11.63         21.57         0.1           16-QAM         190.0         V         Y         136.0         240.0         10.34         1/49         11.71         22.05         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.25 <td></td> <td>256-QAM</td> <td>1905.0</td> <td>V</td> <td>Y</td> <td>136.0</td> <td>240.0</td> <td>10.31</td> <td>1 / 50</td> <td>7.54</td> <td>17.85</td> <td>0.061</td> <td>33.01</td> <td>-15.16</td>		256-QAM	1905.0	V	Y	136.0	240.0	10.31	1 / 50	7.54	17.85	0.061	33.01	-15.16
PION         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.06         0.1           16-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         22.06         0.1           64-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         10.73         21.05         0.1           266-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         10.73         21.05         0.1           266-QAM         1907.5         V         Y         136.0         240.0         10.33         1/74         11.74         12.05         0.1           1165.0         V         Y         136.0         240.0         10.34         1/49         11.71         22.05         0.1           1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           64-QAM         1910.0         V         Y         136.0         240.0         10.34         1/25         1.0.0         1.0         1.0.6 <td></td> <td></td> <td>1857.5</td> <td>V</td> <td>Y</td> <td>140.0</td> <td>244.0</td> <td>9.96</td> <td>1/36</td> <td>11.86</td> <td>21.82</td> <td>0.152</td> <td>33.01</td> <td>-11.19</td>			1857.5	V	Y	140.0	244.0	9.96	1/36	11.86	21.82	0.152	33.01	-11.19
PERF         180.7.5         V         Y         136.0         240.0         10.33         1/14         10.7.3         21.03         0.1.3           PERF         1855.0         V         Y         136.0         240.0         10.33         1/14         10.7.5         11.63         21.07         0.1.33           QPSK         1855.0         V         Y         140.0         244.0         9.94         1/25         11.63         21.57         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.0           1852.5         V         Y         140.0         244.0         9.92         1/24         11.01	N	QPSK	1882.5	V	Y	121.0	237.0	10.15	1/74	12.34	22.49	0.178	33.01	-10.52
PERF         180.7.5         V         Y         136.0         240.0         10.33         1/14         10.7.3         21.03         0.1.3           PERF         1855.0         V         Y         136.0         240.0         10.33         1/14         10.7.5         11.63         21.07         0.1.33           QPSK         1855.0         V         Y         140.0         244.0         9.94         1/25         11.63         21.57         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.0           1852.5         V         Y         140.0         244.0         9.92         1/24         11.01	H		1907.5	V	Y	136.0	240.0	10.33	1/74	11.74	22.06	0.161	33.01	-10.95
PERF         180.7.5         V         Y         136.0         240.0         10.33         1/14         10.7.3         21.03         0.1.3           PERF         1855.0         V         Y         136.0         240.0         10.33         1/14         10.7.5         11.63         21.07         0.1.33           QPSK         1855.0         V         Y         140.0         244.0         9.94         1/25         11.63         21.57         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.0           1852.5         V         Y         140.0         244.0         9.92         1/24         11.01	5 1	16-QAM	1907.5	V	Y	136.0	240.0	10.33	1/74	11.26	21.58	0.144	33.01	-11.43
PHOP         1855.0         V         Y         140.0         244.0         9.94         1/25         11.63         21.57         0.1           1882.5         V         Y         121.0         237.0         10.15         1/25         12.21         22.36         0.1           1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           64-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.66         21.00         0.1           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.0           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         20.61         0.0           1912.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1	<u> </u>	64-QAM	1907.5	V	Y	136.0	240.0	10.33	1/74	10.73	21.05	0.127	33.01	-11.96
PR         QPSK         1882.5         V         Y         121.0         237.0         10.15         1/25         12.21         22.36         0.1           1910.0         V         Y         136.0         240.0         10.34         1/49         11.71         22.05         0.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           64-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.1           64-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.1           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/25         7.73         18.07         0.0           QPSK         1852.5         V         Y         121.0         237.0         10.15         1/12         10.36         20.51         0.1           1912.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.8		256-QAM	1907.5	V	Y	136.0	240.0	10.33	1/36	7.75	18.07	0.064	33.01	-14.94
Prop         1910.0         V         Y         136.0         240.0         10.3         140.4         11.7.1         22.05         0.1.1           16-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.7.1         22.05         0.1.1           64-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         11.15         21.49         0.1           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.1           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/25         7.73         18.07         0.0           QPSK         1882.5         V         Y         140.0         244.0         9.92         1/24         11.83         20.75         0.1           1912.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1           16-QAM         1912.5         V         Y         136.0         240.0         10.36         1/14         10.27         20.6			1855.0	V	Y	140.0	244.0	9.94	1/25	11.63	21.57	0.144	33.01	-11.44
Production         Data CANN         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.1           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.1           QPSK         1852.5         V         Y         136.0         240.0         10.34         1/25         7.73         18.07         0.0           1852.5         V         Y         140.0         244.0         9.92         1/24         11.83         21.75         0.1           116-QAM         1852.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1           16-QAM         1852.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1           64-QAM         1912.5         V         Y         136.0         240.0         10.36         1/12         7.52         17.87         0.0           20PSK         1851.5         V         Y         136.0         240.0         10.36         1/14         10	N	QPSK	1882.5	V	Y	121.0	237.0	10.15	1/25	12.21	22.36	0.172	33.01	-10.65
Product         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.1           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.1           QPSK         1852.5         V         Y         136.0         240.0         10.34         1/25         7.73         18.07         0.0           QPSK         1882.5         V         Y         140.0         244.0         9.92         1/24         11.83         21.75         0.1           1912.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1           16-QAM         1852.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1           64-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           256-QAM         1912.5         V         Y         136.0         240.0         10.36         1/14         10.12         20.62 <td>H</td> <td></td> <td>1910.0</td> <td>V</td> <td>Y</td> <td>136.0</td> <td>240.0</td> <td>10.34</td> <td>1/49</td> <td>11.71</td> <td>22.05</td> <td>0.160</td> <td>33.01</td> <td>-10.96</td>	H		1910.0	V	Y	136.0	240.0	10.34	1/49	11.71	22.05	0.160	33.01	-10.96
Product         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.1           256-QAM         1910.0         V         Y         136.0         240.0         10.34         1/49         10.66         21.00         0.1           QPSK         1852.5         V         Y         136.0         240.0         10.34         1/25         7.73         18.07         0.0           QPSK         1882.5         V         Y         140.0         244.0         9.92         1/24         11.83         21.75         0.1           1912.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1           16-QAM         1852.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1           64-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           256-QAM         1912.5         V         Y         136.0         240.0         10.36         1/14         10.12         20.62 <td>4 O</td> <td>16-QAM</td> <td>1910.0</td> <td>V</td> <td>Y</td> <td>136.0</td> <td>240.0</td> <td>10.34</td> <td>1/49</td> <td>11.15</td> <td>21.49</td> <td>0.141</td> <td>33.01</td> <td>-11.52</td>	4 O	16-QAM	1910.0	V	Y	136.0	240.0	10.34	1/49	11.15	21.49	0.141	33.01	-11.52
Product         1000         1         1000 <th< td=""><td>÷</td><td>64-QAM</td><td>1910.0</td><td>V</td><td>Y</td><td>136.0</td><td>240.0</td><td>10.34</td><td>1/49</td><td>10.66</td><td>21.00</td><td>0.126</td><td>33.01</td><td>-12.01</td></th<>	÷	64-QAM	1910.0	V	Y	136.0	240.0	10.34	1/49	10.66	21.00	0.126	33.01	-12.01
P         QPSK         1882.5         V         Y         121.0         237.0         10.15         1/12         10.36         20.51         0.1           1912.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1           16-QAM         1852.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1           64-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           256-QAM         1912.5         V         Y         136.0         240.0         10.36         1/12         7.52         17.87         0.0           QPSK         1851.5         V         Y         136.0         240.0         10.36         1/14         10.42         20.57         0.1           1913.5         V         Y         136.0         240.0         10.36         1/14         10.42         20.57         0.1           16-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47		256-QAM	1910.0	V	Y	136.0	240.0	10.34	1/25	7.73	18.07	0.064	33.01	-14.94
Provide         1912.5         V         Y         136.0         240.0         10.36         1/24         10.01         20.36         0.1           16-QAM         1852.5         V         Y         140.0         244.0         9.92         1/24         11.06         20.98         0.1           64-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           256-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           256-QAM         1912.5         V         Y         136.0         240.0         10.36         1/12         7.52         17.87         0.0           QPSK         1881.5         V         Y         140.0         244.0         9.91         1/14         10.42         20.57         0.1           1913.5         V         Y         136.0         240.0         10.36         1/14         9.85         20.21         0.1           16-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         1.11         20.47			1852.5	V	Y	140.0	244.0	9.92	1/24	11.83	21.75	0.150	33.01	-11.26
64-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           256-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           QPSK         1851.5         V         Y         136.0         240.0         10.36         1/12         7.52         17.87         0.0           QPSK         1851.5         V         Y         140.0         244.0         9.91         1/14         11.72         21.63         0.1           1913.5         V         Y         136.0         240.0         10.36         1/14         9.45         20.21         0.1           16-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         9.85         20.21         0.1           16-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.17         20.08	N	QPSK	1882.5	V	Y	121.0	237.0	10.15	1/12	10.36	20.51	0.113	33.01	-12.50
64-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           256-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           QPSK         1851.5         V         Y         136.0         240.0         10.36         1/12         7.52         17.87         0.0           QPSK         1851.5         V         Y         140.0         244.0         9.91         1/14         11.72         21.63         0.1           1913.5         V         Y         136.0         240.0         10.36         1/14         9.45         20.21         0.1           16-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         9.85         20.21         0.1           16-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.17         20.08	H		1912.5	V	Y	136.0	240.0	10.36	1/24	10.01	20.36	0.109	33.01	-12.65
64-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           256-QAM         1912.5         V         Y         136.0         240.0         10.36         1/24         10.27         20.62         0.1           QPSK         1851.5         V         Y         136.0         240.0         10.36         1/12         7.52         17.87         0.0           QPSK         1851.5         V         Y         140.0         244.0         9.91         1/14         11.72         21.63         0.1           1913.5         V         Y         136.0         240.0         10.36         1/14         9.45         20.21         0.1           16-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         9.85         20.21         0.1           16-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.17         20.08	2	16-QAM	1852.5	V	Y	140.0	244.0	9.92	1/24	11.06	20.98	0.125	33.01	-12.03
N         1851.5         V         Y         140.0         244.0         9.91         1/14         11.72         21.63         0.1           1982.5         V         Y         121.0         237.0         10.15         1/14         10.42         20.57         0.1           1913.5         V         Y         136.0         240.0         10.36         1/14         9.85         20.21         0.1           16-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         10.12         20.57         0.1           64-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           126-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         7.76         18.12         0.0		64-QAM	1912.5	V	Y	136.0	240.0	10.36	1/24	10.27	20.62	0.115	33.01	-12.39
PER         QPSK         1882.5         V         Y         121.0         237.0         10.15         1/14         10.42         20.57         0.1           1913.5         V         Y         136.0         240.0         10.36         1/14         9.85         20.21         0.1           16-QAM         1851.5         V         Y         136.0         240.0         10.36         1/14         9.85         20.21         0.1           64-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         7.76         18.12         0.0           QPSK         1882.5         V         Y         136.0         240.0         10.37         1/5         10.17         20.08         0.1           1914.3         V         Y         136.0         240.0         10.37         1/2         11.60         21.96		256-QAM	1912.5	V	Y	136.0	240.0	10.36	1/12	7.52	17.87	0.061	33.01	-15.14
Provide         1913.5         V         Y         136.0         240.0         10.36         1/14         9.85         20.21         0.1           16-QAM         1851.5         V         Y         140.0         244.0         9.91         1/14         11.19         21.10         0.1           64-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         7.76         18.12         0.0           QPSK         1850.7         V         Y         136.0         240.0         10.36         1/14         7.76         18.12         0.0           QPSK         1882.5         V         Y         121.0         237.0         10.15         1/5         12.37         22.52         0.1           16-QAM         1882.5         V         Y         136.0         240.0         10.37         1/2         11.60			1851.5	V	Y	140.0	244.0	9.91	1/14	11.72	21.63	0.146	33.01	-11.38
64-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         7.76         18.12         0.0           QPSK         1850.7         V         Y         140.0         244.0         9.91         1/5         10.17         20.08         0.1           QPSK         1882.5         V         Y         121.0         237.0         10.15         1/5         12.37         22.52         0.1           1914.3         V         Y         136.0         240.0         10.37         1/2         11.60         21.96         0.1           16-QAM         1882.5         V         Y         121.0         237.0         10.15         1/5         11.33         21.48         0.1           64-QAM         1914.3         V         Y         136.0         240.0         10.37         1/2         10.02         20.38	N	QPSK	1882.5	V	Y	121.0	237.0	10.15	1/14	10.42	20.57	0.114	33.01	-12.44
64-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         7.76         18.12         0.0           QPSK         1850.7         V         Y         140.0         244.0         9.91         1/5         10.17         20.08         0.1           QPSK         1882.5         V         Y         121.0         237.0         10.15         1/5         12.37         22.52         0.1           1914.3         V         Y         136.0         240.0         10.37         1/2         11.60         21.96         0.1           16-QAM         1882.5         V         Y         121.0         237.0         10.15         1/5         11.33         21.48         0.1           64-QAM         1914.3         V         Y         136.0         240.0         10.37         1/2         10.02         20.38	H		1913.5	V	Y	136.0	240.0	10.36	1/14	9.85	20.21	0.105	33.01	-12.80
64-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         10.11         20.47         0.1           256-QAM         1913.5         V         Y         136.0         240.0         10.36         1/14         7.76         18.12         0.0           QPSK         1850.7         V         Y         140.0         244.0         9.91         1/5         10.17         20.08         0.1           QPSK         1882.5         V         Y         121.0         237.0         10.15         1/5         12.37         22.52         0.1           1914.3         V         Y         136.0         240.0         10.37         1/2         11.60         21.96         0.1           16-QAM         1882.5         V         Y         121.0         237.0         10.15         1/5         11.33         21.48         0.1           64-QAM         1914.3         V         Y         136.0         240.0         10.37         1/2         10.02         20.38	N N N N N N N N N N N N N N N N N N N	16-QAM	1851.5	V	Y	140.0	244.0	9.91	1/14	11.19	21.10	0.129	33.01	-11.91
N         1850.7         V         Y         140.0         244.0         9.91         1/5         10.17         20.08         0.1           1850.7         V         Y         140.0         244.0         9.91         1/5         10.17         20.08         0.1           1882.5         V         Y         121.0         237.0         10.15         1/5         12.37         22.52         0.1           1914.3         V         Y         136.0         240.0         10.37         1/2         11.60         21.96         0.1           16-QAM         1882.5         V         Y         121.0         237.0         10.15         1/5         11.33         21.48         0.1           64-QAM         1914.3         V         Y         136.0         240.0         10.37         1/2         10.02         20.38         0.1		64-QAM	1913.5	V	Y	136.0	240.0	10.36	1/14	10.11	20.47	0.112	33.01	-12.54
V         V         Y         121.0         237.0         10.15         1/5         12.37         22.52         0.1           1914.3         V         Y         136.0         240.0         10.37         1/2         11.60         21.96         0.1           16-QAM         1882.5         V         Y         121.0         237.0         10.15         1/5         11.33         21.48         0.1           64-QAM         1914.3         V         Y         136.0         240.0         10.37         1/2         10.02         20.38         0.1		256-QAM	1913.5	V	Y	136.0	240.0	10.36	1/14	7.76	18.12	0.065	33.01	-14.89
Here         1914.3         V         Y         136.0         240.0         10.37         1/2         11.60         21.96         0.1           16-QAM         1882.5         V         Y         121.0         237.0         10.15         1/5         11.33         21.48         0.1           64-QAM         1914.3         V         Y         136.0         240.0         10.37         1/2         10.02         20.38         0.1			1850.7	V	Y	140.0	244.0	9.91	1/5	10.17	20.08	0.102	33.01	-12.93
04-QAIVI 1914.5 V 1 130.0 Z40.0 10.37 17Z 10.0Z 20.30 0.1	N	QPSK	1882.5	V	Y	121.0	237.0	10.15	1/5	12.37	22.52	0.179	33.01	-10.49
04-QAIVI 1514.5 V 1 150.0 240.0 10.57 172 10.02 20.56 0.1	H		1914.3	V	Y	136.0	240.0	10.37	1/2	11.60	21.96	0.157	33.01	-11.05
04-QAIVI 1514.5 V 1 150.0 240.0 10.57 172 10.02 20.56 0.1	4 1	16-QAM	1882.5	V	Y	121.0	237.0	10.15	1/5	11.33	21.48	0.141	33.01	-11.53
	<del>,</del>	64-QAM	1914.3	V	Y	136.0	240.0	10.37	1/2	10.02	20.38	0.109	33.01	-12.63
256-QAM 1914.3 V Y 136.0 240.0 10.37 1/2 7.30 17.66 0.0		256-QAM	1914.3	V	Y	136.0	240.0	10.37	1/2	7.30	17.66	0.058	33.01	-15.35
20 MHz Opposite Pol. 1882.5 H X 124.0 177.0 9.96 1/99 11.37 21.33 0.1	20 MHz	Opposite Pol.	1882.5	Н	Х	124.0	177.0	9.96	1 / 99	11.37	21.33	0.136	33.01	-11.68

Table 7-3. EIRP Data (LTE Band 25/2)

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## 7.8 Radiated Spurious Emissions Measurements

## **Test Overview**

Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

### **Test Procedures Used**

KDB 971168 D01 v03r01 - Section 5.8

### **Test Settings**

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\geq$  3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points > 2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

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

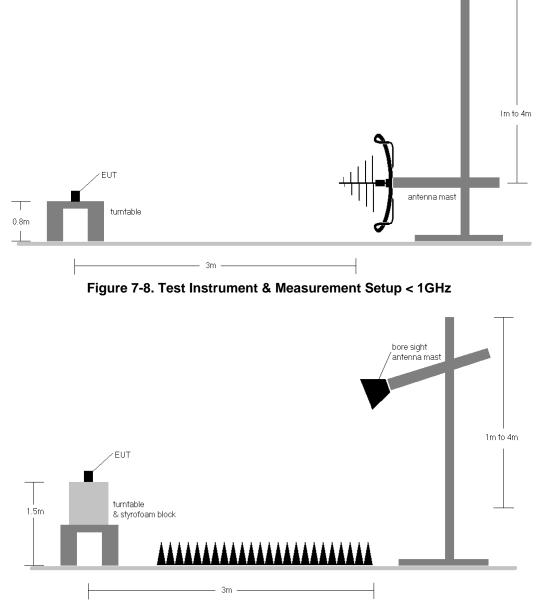


Figure 7-9. Test Instrument & Measurement Setup >1 GHz

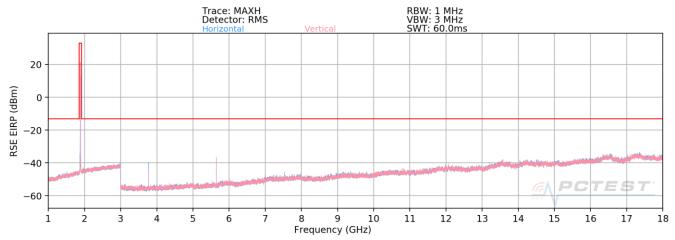
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- Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
   b) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   d) EIRP (dBm) = E(dBµV/m) + 20logD 104.8; where D is the measurement distance in meters.
- 2) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers is reported in GPRS mode while transmitting with one slot active.
- 3) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".
- 4) For CDMA, this device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 6) This unit was tested with its standard battery.
- 7) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 8) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 9) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 10) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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Bandwidth (MHz):	2	20							
Frequency (MHz):	180	60.0							
RB / Offset:	1/	50							
Detector / Trace Mode:	RMS / /	Average							
RBW / VBW:	1MHz	/ 3MHz							
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3720.0	V	391	157	-70.32	7.82	44.50	-50.76	-13.00	-37.76
5580.0	V	103	132	-61.80	11.90	57.10	-38.16	-13.00	-25.16
7440.0	V	-	-	-80.14	16.00	42.86	-52.40	-13.00	-39.40
9300.0	V	-	-	-80.30	18.79	45.49	-49.77	-13.00	-36.77

Table 7-4. Radiated Spurious Data (LTE Band 25/2 – Low Channel)

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Bandwidth (MHz):	20
Frequency (MHz):	1882.5
RB / Offset:	1/50
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz/3MHz

RBM / VBW:	1 MHz	/ 3MHz	1		1	1	1	1	
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3765.0	V	380	158	-68.43	8.39	46.96	-48.30	-13.00	-35.30
5647.5	V	100	103	-60.65	11.24	57.59	-37.67	-13.00	-24.67
7530.0	V	340	126	-79.25	16.04	43.79	-51.47	-13.00	-38.47
9412.5	V	-	-	-80.93	18.81	44.88	-50.38	-13.00	-37.38
11295.0	V	-	-	-80.47	21.39	47.92	-47.33	-13.00	-34.33

Table 7-5. Radiated Spurious Data (LTE Band 25/2 – Mid Channel)

Bandwidth (MHz):	2	20							
Frequency (MHz):	190	05.0							
RB / Offset:	1/	/ 50							
Detector / Trace Mode:	RMS / /	Average							
RBW / VBW:	1MHz	/ 3MHz							
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Frequency [MHz] 3810.00			Azimuth	Level	-	Strength	Emission Level	Limit [dBm]	Margin [dB] -42.44
	[H/V]	Height [cm]	Azimuth [degree]	Level [dBm]	[dB/m]	Strength [dBµV/m]	Emission Level [dBm]		0.1.1
3810.00	<b>[H/V]</b>	Height [cm]	Azimuth [degree]	Level [dBm] -75.56	[dB/m] 8.37	Strength [dBµV/m] 39.81	Emission Level [dBm] -55.44	-13.00	

Table 7-6. Radiated Spurious Data (LTE Band 25/2 – High Channel)

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# 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the Samsung **Portable Handset FCC ID: A3LSMG998U** complies with all the requirements of Part 24 of the FCC rules.

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