

## **PCTEST**

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# PART 27 MEASUREMENT REPORT

#### **Applicant Name:**

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

## Date of Testing:

10/14/2021 - 11/10/2021 **Test Report Issue Date:** 12/17/2021 **Test Site/Location:** PCTEST Lab. Yongin-Si, Gyeonggi-do, South Korea **Test Report Serial No.:** 1M2109290114-28.A3L

# FCC ID: APPLICANT:

## A3LSMS901E

Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part: Test Procedure(s): Certification SM-S901E/DS SM-S901E Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 27 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01, KDB 648474 D03 v01r04

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.

Prepared by

W

Reviewed by

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# MEASUREMENT REPORT FCC Part 27



	1			E	ERP		RP	
Mode	Bandwidth		Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	Emission Designator
	10 14	QPSK	704.0 - 711.0	0.035	15.41	0.057	17.56	9M02G7D
TE Dond 10/17	10 MHz	16QAM	704.0 - 711.0	0.028	14.45	0.046	16.60	9M05W7D
LTE Band 12/17 5 MHz	E MILLE	QPSK	701.5 - 713.5	0.032	15.09	0.053	17.24	4M55G7D
	5 WHZ	16QAM	701.5 - 713.5	0.027	14.30	0.044	16.45	4M56W7D
	3 MHz	QPSK	700.5 - 714.5	0.033	15.14	0.054	17.29	2M72G7D
ITE Dead 40		16QAM	700.5 - 714.5	0.027	14.26	0.044	16.41	2M72W7D
LTE Band 12	4.4.441	QPSK	699.7 - 715.3	0.032	15.09	0.053	17.24	1M11G7D
	1.4 MHz	16QAM	699.7 - 715.3	0.027	14.26	0.044	16.41	1M11W7D
	10.141	QPSK	782.0	0.064	18.03	0.104	20.18	9M00G7D
ITE David 40	10 MHz	16QAM	782.0	0.052	17.19	0.086	19.34	9M01W7D
LTE Band 13	E MUIS	QPSK	779.5 - 784.5	0.063	18.00	0.104	20.15	4M55G7D
1	5 MHz	16QAM	779.5 - 784.5	0.052	17.13	0.085	19.28	4M54W7D

**Overview Table (<1GHz Bands)** 

			L.S. CT. T	El	RP	Emission Designator
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	
WCDMA1700	N/A	Spread Spectrum	1712.4 - 1752.6	0.184	22.66	4M18F9W
	20 MU	QPSK	1720.0 - 1770.0	0.178	22.51	18M1G7D
	20 MHz	16QAM	1720.0 - 1770.0	0.132	21.20	18M0W7D
	15 MHz	QPSK	1717.5 - 1772.5	0.179	22.54	13M5G7D
		16QAM	1717.5 - 1772.5	0.139	21.42	13M6W7D
	10 MHz	QPSK	1715.0 - 1775.0	0.200	23.01	9M06G7D
TE David COM		16QAM	1715.0 - 1775.0	0.144	21.59	9M06W7D
LTE Band 66/4	5 MHz	QPSK	1712.5 - 1777.5	0.176	22.45	4M54G7D
		16QAM	1712.5 - 1777.5	0.135	21.31	4M55W7D
	2 MIL	QPSK	1711.5 - 1778.5	0.163	22.12	2M72G7D
	3 MHz	16QAM	1711.5 - 1778.5	0.126	21.01	2M74W7D
	4.4.641	QPSK	1710.7 - 1779.3	0.156	21.94	1M11G7D
	1.4 MHz	16QAM	1710.7 - 1779.3	0.128	21.06	1M12W7D

**Overview Table (>1GHz Bands)** 

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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 facility located at 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954, South Korea. 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 located in Yongin-si, Gyeonggi-do, 16954, South Korea.

- PCTEST is an ISO 17025-2017 accredited test facility under the National Voluntary Laboratory Accreditation Program (NVLAP) with Certificate number 600143-0 for Specific Absorption Rate (SAR), 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 (26168) 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: A3LSMS901E**. 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 27.

Test Device Serial No.: 0403M, 0419M, 0842M

## 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (FR1), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer

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

## 2.3 Test Configuration

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

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) Model: EP-N5100 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

## 2.4 EMI Suppression Device(s)/Modifications

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

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# 3.0 DESCRIPTION OF TESTS

## 3.1 Evaluation Procedure

The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

## 3.2 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 wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.

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

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

For fundamental radiated power measurements, the guidance of KDB 971168 D01 v03r01 is used to record the EUT power level that is subsequently matched via the aforementioned substitution method given in ANSI/TIA-603-E-2016.

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 414788 D01.

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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	1.20
Radiated Disturbance (<1GHz)	3.01
Radiated Disturbance (>1GHz)	5.56
Radiated Disturbance (>18GHz)	3.16

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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
Agilent	E5515C	WIRELESS COMMUNICATION TEST SET	2/19/2021	Annual	2/18/2022	MY50262130
Agilent	N9030A	PXA Signal Analyzer		Annual	7/5/2022	MY49432391
Anritsu	S820E	Cable and Antenna Analyzer	7/7/2021	Annual	7/6/2022	6201300731
Anritsu	MA24106A	USB Power Sensor	7/7/2021	Annual	7/6/2022	1244512
Espec	SH-242	Environmental Chamber	9/15/2021	Annual	9/14/2022	93011064
ETS Lindgren	3110C	Biconical Antenna	7/9/2020	Biennial	7/8/2022	00211248
ETS Lindgren	3110C	Biconical Antenna	7/9/2020	Biennial	7/8/2022	00211250
Fairview Microwave	FM2CP1122-10	Coupler	7/7/2021	Annual	7/6/2022	1946
Keysight Technologies	N9030B	MXA Signal Analyzer	5/11/2021	Annual	5/10/2022	MY57142018
Mini Circuits	ZUDC10-83-S+	Coupler	9/15/2021	Annual	9/14/2022	2111
Mini-Circuits	BW-N10W5+	Attenuator	7/6/2021	Annual	7/5/2022	1607
Mini-Circuits	BW-N10W5+	Attenuator	7/6/2021	Annual	7/5/2022	1607
Rohde & Schwarz	TS-PR18	Preamplifier	7/8/2021	Annual	7/7/2022	102141
Rohde & Schwarz	SMBV100B	Signal Generator	11/4/2021	Annual	11/3/2022	101568
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	7/6/2021	Annual	7/5/2022	116851
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2/19/2021	Annual	2/18/2022	131453
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2/19/2021	Annual	2/18/2022	131454
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2/19/2021	Annual	2/18/2022	150117
Rohde & Schwarz	ESW	EMI Test Receiver	7/6/2021	Annual	7/5/2022	101761
Rohde & Schwarz	FSW43	Signal & Spectrum Analyzer	9/15/2021	Annual	9/14/2022	101250
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/19/2021	Annual	2/18/2022	102131
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	3/29/2021	Annual	3/28/2022	102151
Schwarzbeck	UHA9105	Dipole Antenna	7/9/2020	Biennial	7/8/2022	91052522
Sunol	DRH-118	Horn Antenna	7/14/2021	Biennial	7/13/2023	A102416-1
Sunol	DRH-118	Horn Antenna	1/12/2021	Biennial	1/11/2023	A060215

Table 5-1. Test Equipment

#### Notes:

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

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# 6.0 SAMPLE CALCULATIONS

## **Emission Designator**

## **QPSK Modulation**

#### Emission Designator = 8M62G7D

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

## **QAM Modulation**

#### Emission Designator = 8M45W7D

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

## Spurious Radiated Emission – LTE Band

## Example: Middle Channel LTE Mode 2<sup>nd</sup> Harmonic (1564 MHz)

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

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# 7.0 TEST RESULTS

# 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMS901E
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	WCDMA/LTE

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
	Occupied Bandwidth	2,1049(h)	N/A	PASS	Section 7,2
	Conducted Band Edge / Spurious Emissions (LTE Band 13)	2.1051, 27.53(c), 27.53(f)	Undesirable emissions must meet the limits detailed in sections 27.53(c) and 27.53(f)	PASS	Sections 7.3, 7.4
ucted	Conducted Band Edge / Spurious Emissions (LTE Band 12, 17)	2.1051_27.53(g)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Sections 7.3, 7.4
Conducted	Conducted Band Edge / Spurious Emissions (WCDMA AWS; LTE Band 4, 86)	2.1051, 27.53(h)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Sections 7.3, 7.4
	Peak-to-Average Ratio (WCDMA AWS; LTE Band 4, 66)	27.50(d)(5)	≤ 13 dB	PASS	Section 7.5
	Frequency Stability	2 1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
	Effective Radiated Power (LTE Band 13)	27.50(b)(10)	≤ 3 Watts max. ERP	PASS	Section 7,6
	Effective Radiated Power (LTE Band 12_17)	27.50(c)(10)	≤ 3 Walts max. ERP	PASS	Section 7.6
ATED	Equivalent Isotropic Radiated Power (WCDMA AWS; LTE Band 4, 66)	27.50(d)(10)	≤1 Watt max. EIRP	PASS	Section 7.6
RADIATED	Radiated Spurious Emissions (LTE Band 13)	2.1053, 27.53(c), 27.53(f)	Undesirable emissions must meet the limits detailed in sections 27 53(c) and 27 53(f)	PASS	Section 7.7
	Radiated Spunous Emissions (LTE Band 12, 17)	2.1053, 27.53(g)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Section 7.7
	Radiated Spunous Emissions (WCDMA AWS, LTE Band 4, 66)	2.1053, 27.53(h)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Section 7.7

## Table 7-1. Summary of Test Results

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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 shown in Section 7.0 were taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST EMC Software Tool v1.0.

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# 7.2 Occupied Bandwidth

## **Test Overview**

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

## Test Procedure Used

KDB 971168 D01 v03r01 - Section 4.2

#### **Test Settings**

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

#### Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

#### Test Notes

None.

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# LTE Band 12/17



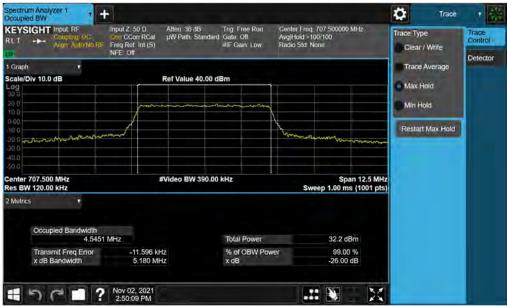
Plot 7-1. Occupied Bandwidth Plot (LTE Band 12/17 - 10MHz QPSK - Full RB)



Plot 7-2. Occupied Bandwidth Plot (LTE Band 12/17 - 10MHz 16-QAM - Full RB)

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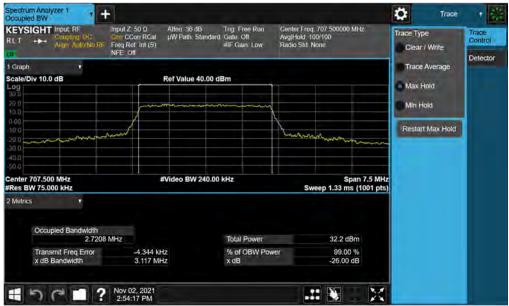
Plot 7-3. Occupied Bandwidth Plot (LTE Band 12/17 - 5MHz QPSK - Full RB)

CEYSIGHT Input R Couplin Augn A	RF Input Z Ig DC Con CC WIO/No RF Freq Re NFE O	orr RCal µW Path: S f: Int (S)	B Trig: Free Run Itandard Gate: Off #IF Gain: Low	Center Freq. 7 AvgiHold 100 Radio Std: No		Trace Type Clear / Write	Trace Control
Graph	*	-				Trace Average	Denoutor
cale/Div 10.0 dB		Ref Value 4	10.00 dBm			Max Hold	
30.0 20 0		Amontonio				Min Hold	
10.0		A second		1			
0 00 10 0	/			1		Restart Max Hold	
0.02				- Charles	mone	~	
40.0							
enter 707.500 MHz tes BW 120.00 kHz		#Video BW	390.00 kHz	Swe	Span 12.5 M		
Metrics	*						
Occupied Bar	ndwidth 4.5554 MHz		Total Power		31.2 dBm		
Transmit Free		-9.520 kHz	% of OBW Pow	ver	99.00 %		
x dB Bandwid	ith	5.185 MHz	x dB		-26.00 dB		Loc

Plot 7-4. Occupied Bandwidth Plot (LTE Band 12/17 - 5MHz 16-QAM - Full RB)

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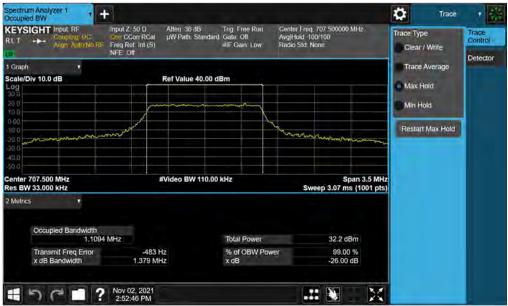
Plot 7-5. Occupied Bandwidth Plot (LTE Band 12 - 3MHz QPSK - Full RB)

LT	Input RF Coupling DC Align Auto/No RF	Input Z 50 Ω Gen CCorr RCal Freq Ref: Int (S) NFE: Off	Alten 36 dB pW Path: Standard	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq Avg Hold 10 Radio Std N			Trace Type Clear / Write	Trace Control Detector
Graph								Trace Average	Constant
cale/Div 10.0	dB		Ref Value 40.00 d	Bm				Max Hold	
10.0 10 0								Min Hold	
0.0					X				
		and we have			homeson			Restart Max Hold	
20.0 mmmm	mannie					mont	m		
0.0									
enter 707.500	MHz		#Video BW 240.00	kH4		Snan	7.5 MHz		
Res BW 75.00			FVIGEO BVI 240.00	1116	Sw	eep 1.33 ms (10			
Metrics Occup	+ ied Bandwidth 2.7217	Mir		Total Power		31.0 dBm			
Trape	mit Freg Error	-4.222 kł	17	% of OBW Po	AUGAR	99.00 %			
	Sandwidth	3.116 M		x dB		-26.00 dB			Loc

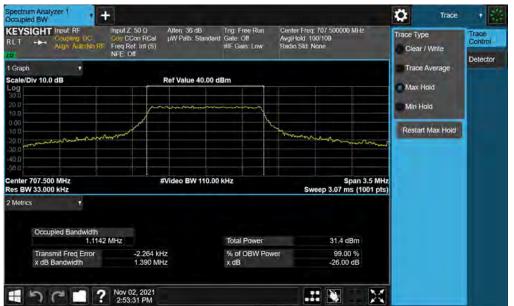
Plot 7-6. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 16-QAM - Full RB)

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Plot 7-7. Occupied Bandwidth Plot (LTE Band 12 - 1.4MHz QPSK - Full RB)



Plot 7-8. Occupied Bandwidth Plot (LTE Band 12 - 1.4MHz 16-QAM - Full RB)

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# LTE Band 13



Plot 7-9. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB)



Plot 7-10. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 16-QAM - Full RB)

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LT +++ Coupling DC C	nput Z 50 0 Atten 36 dt on CCorr RCal µW Path: Si req Ret Int (S) IFE Off	3 Tng: Free Run landard: Gate: Off #IF Gain: Low	Center Freq: 782.000000 MH; Avg Hold: 100/100 Radio Std: None	Trace Type Clear / Write	Trace Control
Graph v cale/Div 10.0 dB	Ref Value 4	0.00 dBm		Trace Average	
<b>og</b> 000 000				Max Hold	
00 00 00 00 00 00	~		Lannan	Restart Max Hold	
o o enter 782.000 MHz es BW 120.00 KHz	#Video BW 3	390.00 kHz	Span 1 Sweep 1.00 ms (1	2.5 MHz 001 pts)	
Metrics • Occupied Bandwidth 4.5468 M	Hz	Total Power	32.5 dBm		
Transmit Freq Error x dB Bandwidth	-11.094 kHz 5.218 MHz	% of OBW Paw x dB	ver 99.00 % -26.00 dB		

Plot 7-11. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB)

	Coupling DC Augn Auto/No RF	Input Z 50 Ω Corr CCorr RCal Freq Ref: Int (S) NFE: Off	Atten 36 dB µW Path: Standa	Trig: Free Run rd: Gate: Off #IF Gain: Low	Center Free Avg Hold_1 Radio Std:1		Trace Type Clear / Write	Trace Control
l Graph				ana.			Trace Average	Denout
cale/Div 10.0	dB		Ref Value 40.00	dBm	1		Max Hold	
30.0 20.0			man				Min Hold	
0.00	man and a start man	most			hown	mannan	Restart Max Hold	
30.0	and and a start of					- man man		
40.0								
Center 782.00		#	Video BW 390.0	0 kHz	Sv	Span 12.5 M veep 1.00 ms (1001 p		
2 Metrics								
Occuj	pied Bandwidth					21.2		
	4.5396 N	-8.767 kH		Total Power % of OBW Po		31.8 dBm 99.00 %		
	mit Freq Error Bandwidth	-6.767 KH		x dB	wer	-26.00 dB		

Plot 7-12. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB)

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# WCDMA AWS

T +++ Align Auto	Input Z 50 Ω Con CCorr RCel Freq Ref Int (S) NFE: Off	Atten 36 dB pW Path Standa	Trig. Free Ru rd Gate Off #IF Gain Lov	Avg(Ho	Freg. 1.73260000 kld > 100/100 Std. None	0 GHz	Trace Type Clear / Write	Trace Contro
raph ▼ ale/Div 10.0 dB		Ref Value 40.00	dBm				Trace Average	
9 0		Ref Value 40.00	asm				Max Hold	
0							Min Hold	
0							Restart Max Hold	
0 m m	mand			from	man wind	mann		
0 0								
0 nter 1.732600 GHz 5 BW 150.00 kHz		Video BW 1.5000	) MHz		S Sweep 1.00 m	pan 15 MHz s (1001 pts)		
etrics •								
	58 MHz		Total Powe		32.2 d			
Transmit Freq Error x dB Bandwidth	3.697 kH 4.800 MH		% of OBW x dB	Power	99.00 -26.00			

Plot 7-13. Occupied Bandwidth Plot (WCDMA, Ch. 1413)

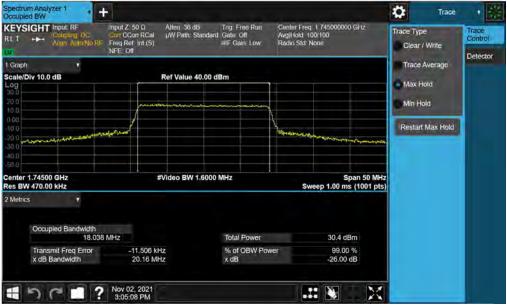
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## LTE Band 66/4



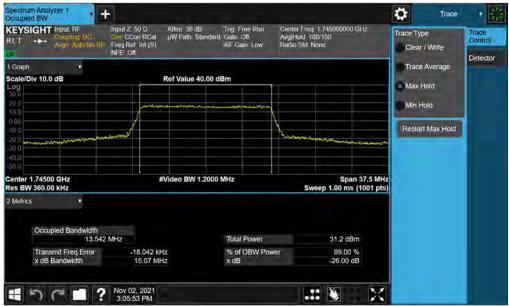
Plot 7-14. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz QPSK - Full RB)



Plot 7-15. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB)

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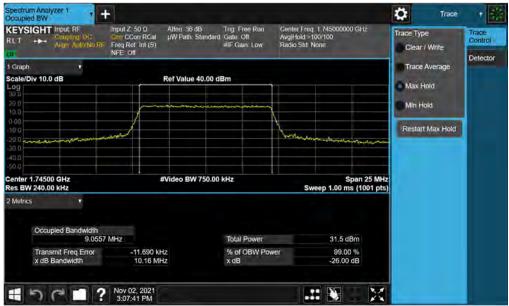
Plot 7-16. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz QPSK - Full RB)

Trace Control Detecto	ice Type Clear / Write	T		nter Freg. 1 g Hold. 100 dio Std: Noi		Trig: Fre Gate: Ol #IF Gair	36 dB Ih: Standard	Cal µWP	Input Z 50 Gen CCon Freq Ref 1 NFE Off	ut: RF ipling: DC in: Aulo/No R	
	Trace Average					100	ue 40.00 d	Bof V			ph /Div 10.0 d
	Max Hold					201	10 40.00 U	Rei Ve			2014 10.0 U
	Min Hold				nui	-	mina				
					A				- A		
	Restart Max Hold		minution	homeningo					imedi	mannes	
		and the second									ALL AND AND A
			Span 37.	Curro		MHz	W 1.2000	#Video			er 1.74500 G
		or pray	1.00 ma (100	51166						1	rics
			30.5 dBm		er	Total P			MHz	Bandwidth 13.57	Occupie
			99.00 % -26.00 dB		Powe	% of C x dB		25 kHz 12 MHz		Freq Error twidth	Transmi x dB Ba

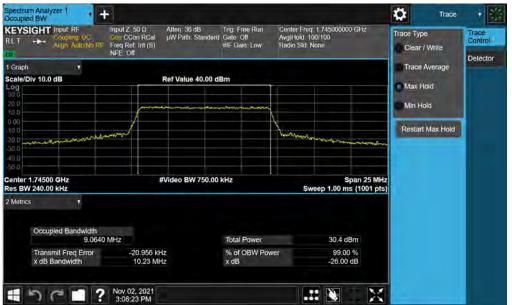
Plot 7-17. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB)

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Plot 7-18. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz QPSK - Full RB)



Plot 7-19. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB)

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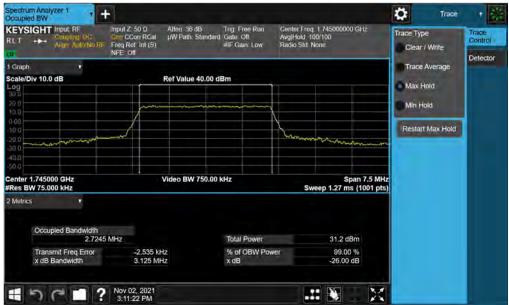
Plot 7-20. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz QPSK - Full RB)

1	INFE Off	nt (S)	andard Gate Off #IF Gain: Low	Avg Hold 10 Radio Std: N		Clear / Write	Contro
Graph v						Trace Average	
cale/Div 10.0 dB		Ref Value 4	0.00 dBm	1		Max Hold	
0.0						Min Hold	
	/	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	and the second s			Min Hold	
00	/			X		Restart Max Hold	
0.0	minin			Vormen	mannew		
10.0							
enter 1.745000 GHz es BW 120.00 kHz		Video BW 1.	2000 MHz	Sw	Span 12.5 MH eep 1.00 ms (1001 pt		
Metrics T						2	
Occupied Bandwk	dth 5545 MHz		Total Power		30.4 dBm		
Transmit Freq Em		.024 kHz	% of OBW Po	WAT	99.00 %		
x dB Bandwidth		250 MHz	x dB	inc.	-26.00 dB		

Plot 7-21. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 16-QAM - Full RB)

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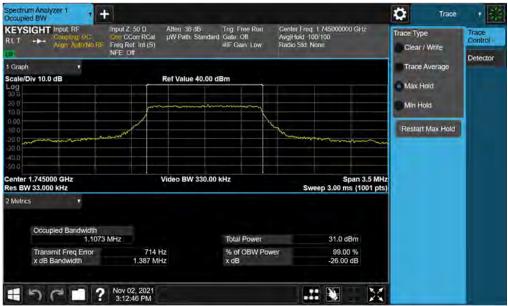
Plot 7-22. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz QPSK - Full RB)

1 Graph Scale/Div 10.0 dB Ref Value 40.00 dBm Comment 200 200 200 200 200 200 200 20	Trace Average Max Hold Min Hold	Detecto
09 00 00 000 000 000 000 000 000 000 000		
200 200 200 200 200 200 200 200	Min Hold	
10 0 10 0	Min Hold	
10 0 20 0 20 0 20 0 20 0 20 0 20 0 50 0		
20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Restart Max Hold	
enter 1.745000 GHz Video BW 750.00 kHz Span 7.5 MHz Res BW 75.000 kHz Sveep 1.27 ms (1001 pts)	Restart Wax Hold	
29.0 Center 1.745000 GHz Video BW 750.00 kHz Span 7.5 MHz Res BW 75.000 kHz Sweep 1.27 ms (1001 pts)		
Center 1.745000 GHz Video BW 750.00 kHz Span 7.5 MHz Res BW 75.000 kHz Sweep 1.27 ms (1001 pts)		
Res BW 75.000 kHz Sweep 1.27 ms (1001 pts)		
? Metrics Y		
Occupied Bandwidth		
2.7405 MHz Total Power 30.3 dBm		
Transmit Freq Error     -2.625 kHz     % of OBW Power     99.00 %       x dB Bandwidth     3.106 MHz     x dB     -26.00 dB		

Plot 7-23. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 16-QAM - Full RB)

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Plot 7-24. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB)

Col	ut RF upling DC gr. AutorNo RF	Input Z 50 (Con CCon Freq Ret NFE Off	RCal µ	utten 36 dB W Path Star	ndard Gate ( #IF Ga			Center Freq Avg Hold 10 Radio Std N	0/100	0 612	Trace Typ Clear /		Trace Control Detecto
Graph cale/Div 10.0 dB			Re	f Value 40.	00 dBm						Trace.	Average	
000 000 000											Max H		
	atoma and the						~~	mar	n	m	Restart	Max Hold	
o o enter 1.745000 G es BW 33.000 kH			Vic	deo BW 330	0.00 kHz			Sw		pan 3.5 MHz Is (1001 pts)			
Metrics	• Bandwidth												
Occopicu	1.1183	MHz			Total	Power			30.4 d	Bm			
Transmit x dB Ban	Freq Error dwidth		.304 kHz 438 MHz		% of x dB	OBW P	owe	r	99.00 -26.00				

Plot 7-25. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 16-QAM - Full RB)

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# 7.3 Spurious and Harmonic Emissions at Antenna Terminal

#### **Test Overview**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 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 18GHz (separated into at least two plots per channel)
- 2. RBW ≥ 100kHz
- 3. VBW  $\geq$  3 x RBW
- 4. Detector = RMS
- 5. Trace mode = max hold
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

#### Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

Per Part 27 and RSS-139, 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 emission are attenuated at least 26 dB below the transmitter power.

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# LTE Band 12/17

LT Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref: Int (S) NFE: Off	Atten 30 dB µW Path: Standard	PNO Fast Gate Off IF Gain: Low Sig Track: Off	#Avg Type: Power Trig Free Run	(RMS 1 2 3 4 5 0 A WW WW W A N N N N N	Center Frequency 363.950000 MHz	Setting
Spectrum v cale/Div 10 dB		Ref Level 20.00 dl	Bm		697.80 MHz -60.372 dBm	Span 667.900000 MHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
0.0						Start Freq 30.000000 MHz	
20,0						Stop Freq 697.900000 MHz	
						AUTO TUNE	
						CF Step 66.790000 MHz	
50.0					1	Auto Man	
/0.0			******			Freq Offset 0 Hz	
art 30.0 MHz Res BW 100 kHz		#Video BW 300 k	Hz	Sweep 32	Stop 697.9 MHz .1 ms (13361 pts)	X Axis Scale Log Lin	

Plot 7-26. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - 1 RB - Low Channel)

PASS NFE	CCorrRCal µW Path: Standard Gate Off g Ref: Int (S) IF Gain: Low E Off Sig Track: Off	#Avg Type: Power (RMS 1 2 3 4 3 10 Trig: Free Run A N N N N N	Center Frequency 858.000000 MHz Span
spectrum v sale/Div 10 dB	Ref Level 20.00 dBm	Mkr1 882.35 MHz -61.098 dBm	284.000000 MHz Swept Span Zero Span
00			Full Span
00			Start Freq 716.000000 MHz
0.0			Stop Freq 1.000000000 GHz
			AUTO TUNE
			CF Step 28.400000 MHz
0,0	<b>1</b>		Auto Man
0.0			Freq Offsel 0 Hz
art 0.7160 GHz Res BW 100 kHz	#Video BW 300 kHz	Stop 1.0000 GHz Sweep 13.6 ms (5681 pts)	X Axis Scale

Plot 7-27. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - 1 RB - Low Channel)

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Plot 7-28. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - 1 RB - Low Channel)

EYSIGHT Input RF Coupling DC Align: Auto	Input Z: 50 Ω Gen CCorr RCal Freq Ref: Int (S) NFE: Off	Atten: 30 dB µW Path: Standard	PNO Fast Gate: Off IF Gam Low Sig Track Off	#Avg Type: Pov Trig: Free Run	AW	3430 WWWW NNNN	Center Frequency 364.000000 MHz	
Spectrum v cale/Div 10 dB		Ref Level 20.00 dl		Mk	r1 695.7 -61.28		Span 668.000000 MHz Swept Span	
0.0 Trace 1 Pass							Zero Span Full Span	
							Start Freq 30.000000 MHz	
0.0							Stop Freq 698.000000 MHz	
							AUTO TUNE	
							CF Step 66.800000 MHz	
						1	Auto Man	
0,0							Freq Offset 0 Hz	
art 30.0 MHz Res BW 100 kHz		#Video BW 300 k	Hz	Sweep	Stop 6	98.0 MHz 3361 pts)	X Axis Scale Log Lin	Lo

Plot 7-29. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - 1 RB - Mid Channel)

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T Align: Auto	Input Z 50 0 Gorr CCorr RCal Freq Ref Int (S) NFE Off	Atten: 30 dB µW Path: Standard	PNO Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Pow Tng Free Run	er (RMS <mark>123430) A WW WWW A N N N N N</mark>	Center Frequency 858.000000 MHz	Settings
pectrum v ale/Div 10 dB		Ref Level 20.00 dB	Bm	Mkr	1 882.35 MHz -61.098 dBm	Span 284.000000 MHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
						Start Freq 716.000000 MHz	
0						Stop Freq 1.000000000 GHz	
						AUTO TUNE	
						CF Step 28.400000 MHz Auto	
0			1	-		Man	
						Freq Offset 0 Hz	
rt 0.7160 GHz es BW 100 kHz		#Video BW 300 ki	Hz	Sweep	Stop 1.0000 GHz 13.6 ms (5681 pts)	X Axis Scale Log Lin	Lo

Plot 7-30. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - 1 RB - Mid Channel)



Plot 7-31. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - 1 RB - Mid Channel)

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EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 0 Gorr CCorr RCal Freq Ref: Int (S) NFE: Off	Atten: 30 dB µW Path: Standard	PNO Fast Gate Off IF Gain: Low Sig Track Off	#Avg Type: Po Trig Free Run	wer (RMS123436 A WW WW W A N N N N N	304.000000 MHZ	Settings
Spectrum v cale/Div 10 dB		Ref Level 20.00 dl	Bm	Mk	r1 696.50 MHz -61.569 dBm	000.0000000000	
Trace 1 Pass						Full Span	
						Start Freq 30.000000 MHz	1
0.0						Stop Freq 698.000000 MHz	
						AUTO TUNE	
						CF Step 66.800000 MHz	
0,0					1,	Auto Man	
0.0	4					Freq Offset 0 Hz	
art 30.0 MHz tes BW 100 kHz		#Video BW 300 k	Hz	Sweep	Stop 698.0 MHz 32.1 ms (13361 pts)		Lo

Plot 7-32. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - 1 RB - High Channel)

EYSIGHT Input RF Coupling DC Align: Auto	Input Z: 50 Ω Alten: 30 dB Corr CCorr RCal μW Path: Standa Freq Ref. Int (S) NFE: Off	PNO Fast and Gate:Off IF Gam Low Sig Track:Off	#Avg Type: Power (RI Trig Free Run	MS123430 A WW WW W A N N N N N	Center Frequency 858.050000 MHz	Settings
Spectrum v cale/Div 10 dB	Ref Level 20.00	dBm		16.10 MHz 9.209 dBm	Span 283.900000 MHz Swept Span Zero Span	
0.0 Trace 1 Pass				_	Full Span	
0.0					Start Freq 716.100000 MHz	
10,0					Stop Freq 1.000000000 GHz	
					AUTO TUNE	
					CF Step 28.390000 MHz	
0.0					Auto Man	
0.0			1997		Freq Offset 0 Hz	
tart 0.7161 GHz Res BW 100 kHz	#Video BW 300	kHz		top 1.0000 GHz 5 ms (5681 pts)		Lo

Plot 7-33. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - 1 RB - High Channel)

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KEYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 0 Corr CCorr RCal Freq Ref: Int (S) NFE: Off	#Atten: 30 dB µW Path: Standard	PNO Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Po Tng Free Run	wer (RMS123430 A WW WW W A N N N N N	Center Frequency 5.500000000 GHz Span	Setting
Spectrum v scale/Div 10 dB		Ref Level 0.00 dE	3m	Mk	1 9.981 0 GHz -41.227 dBm	9.00000000 GHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
20.0						Start Freq 1.000000000 GHz	
40.0			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		1	Stop Freq 10.000000000 GHz	
50 0						AUTO TUNE	
						CF Step 900.000000 MHz	
80.0						Auto Man	
50.0						Freq Offset 0 Hz	
tart 1.000 GHz Res BW 1.0 MHz		#Video BW 3.0 M	Hz	Sweep	Stop 10.000 GHz 16.5 ms (18001 pts)	X Axis Scale Log Lin	
501	Oct 19, 2021 2:13:33 PM					The The	

Plot 7-34. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - 1 RB - High Channel)

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# LTE Band 13

T Coupling DC Align: Auto	Input 2:50 Ω Atten: 3 ComCComRCal µW Pat Freq Ret: Int (S) NFE: Off	0 dB PNO Fast h Standard Gate Off IF Gain Low Sig Track: Off		3 4 5 6 Center Frequency 403.500000 MHz N N N N Span	
Spectrum v ale/Div 10 dB	Ref Lev	el 20.00 dBm	Mkr1 771.9 -61.51	5 MHZ 747.000000 MHz	
Trace 1 Pass				Full Span	
				Start Freq 30.000000 MHz	
0.0				Stop Freq 777.000000 MHz	
				AUTO TUNE	
0.0 				CF Step 74.700000 MHz Auto Man	
2.0			Alexandry & Construction of Co	Freq Offset 0 Hz	
art 30.0 MHz es BW 100 kHz	#Video	BW 300 kHz	Stop 77 Sweep 35.9 ms (14	77.0 MHz X Axis Scale Log	Lo

Plot 7-35. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)

EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 D Gorr CCorr RCal Freq Ref. Int (S) NFE: Off	Atten 30 dB µW Path Standan	PNO Fast d Gate Off IF Gain Low Sig Track: Off	#Avg Type. F Trig Free Ru	ower (RMS <mark>123456</mark> n A WWWWW A N N N N N	Center Frequency 893.500000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 20.00 d	IBm	м	kr1 787.00 MHz -57.933 dBm	213.000000 MHz Swept Span Zero Span	
Trace 1 Pass						Full Span	1
						Start Freq 787.000000 MHz	
0.0						Stop Freq 1.000000000 GHz	
0.0						AUTO TUNE	
						CF Step 21.300000 MHz	
0.0						Auto Man	
0.0	f an That 's sport have the "satisfies which in the		ana di ang manana di kalanga	**************************************		Freq Offset 0 Hz	
art 0.7870 GHz Res BW 100 kHz		#Video BW 300 I	(Hz	Swa	Stop 1.0000 GHz sep 10.2 ms (4621 pts)	X Axis Scale Log	Lor

Plot 7-36. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)

FCC ID: A3LSMS901E	PCTEST	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
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COUPING DC Align: Auto Align: Auto	Input Z 50 Ω Gorr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten: 28 dB µW Path Standard	PNO Fast Gate Off IF Gain Low Sig Track: Off	#Avg Type. P Trig: Free Ru	Power (RMS123456 IN A WWWWW A N N N N N	Center Frequency 5.500000000 GHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 0.00 dE	lm	MI	kr1 1.564 0 GHz -47.832 dBm	9.00000000 GHz Swept Span Zero Span	
Trace 1 Pass						Fuil Span	
20.0						Start Freq 1.000000000 GHz	
40.0						Stop Freq 10.000000000 GHz	
50.0	m		~~~~~	~~~~~		AUTO TUNE	
60.0						CF Step 900.000000 MHz	
80.0						Auto Man	
						Freq Offset 0 Hz	
tart 1.000 GHz Res BW 1.0 MHz		#Video BW 3.0 M	Hz	Sweet	Stop 10.000 GHz >~16.5 ms (18001 pts)	X Axis Scale Log	

Plot 7-37. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)

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# WCDMA AWS

Spant         Mkr1 1.705 0 GHz         Spant           1 Spectrum         Mkr1 1.705 0 GHz         1.67500000 GHz           209         Trace 1 Pass         -31.177 dBm           100         Start Freq         30.000 MHz           200         -1         Start Freq           200         -1         -100 MHz           200         -1         -100 MHz           200         -100 MHz         -100 MHz           30.00000 MHz         -100 MHz         -100 MHz           400         -100 MHz         -100 MHz	CEYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Con CCon RCal Freq Ref. Int (S) NFE: Off	Atten 30 dB PNO Fast µW Path Standard Gate Off IF Gain Lo Sig Track:	A N N N N N	Center Frequency 867.500000 MHz	Settings
100         Full Span           100         Start Freq           100         30.000000 MHz           100         1	cale/Div 10 dB		Ref Level 20.00 dBm		1.67500000 GHz Swept Span	
100     30.00000 MHz       200     1       300     1       <				_	Fuil Span	
10.0       1         10.0       1 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td></td<>						
CF Step 167.50000 MHz Auto Man Freq Offset						
50 0 167.500000 MHz Auto Man Freq Offset				1	AUTO TUNE	
Freq Offset	50.0	na na ina kata na mana na kata na ma			167.500000 MHz	
0.0	70.0				Freq Offset 0 Hz	
art 0.0300 GHz #Video BW 3.0 MHz Stop 1.7050 GHz Log			#Video BW 3.0 MHz		Log	Lo

Plot 7-38. Conducted Spurious Plot (WCDMA Ch. 1312- Low Channel)



Plot 7-39. Conducted Spurious Plot (WCDMA Ch. 1312- Low Channel)

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EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	Atten, 10 dB µW Path Standar	PNO Fast I Gate Off IF Gain Low Sig Track: Off	#Avg Type. P Trig: Free Ru	Power (RMS123) In A WW A N N	ww.w	Center Frequency 15.000000000 GHz Span	Settings
Spectrum V cale/Div 10 dB		Ref Level 0.00 d	Bm	Mkr	1 19.941 5 -55.297 d		10.0000000 GHz Swept Span Zero Span	
Trace 1 Pass							Full Span	
							Start Freq 10.000000000 GHz	
							Stop Freq 20.000000000 GHz	
						1	AUTO TUNE	
0.0	and the second	land the second of the second seco					CF Step 1.000000000 GHz Auto Man	
							Freq Offset 0 Hz	
art 10.000 GHz es BW 1.0 MHz		#Video BW 3.0 N	IHz	Sweed	Stop 20.00		X Axis Scale Log	Loc
501?	Oct 19, 2021 10:37:12 AM					X	Signal Task	

Plot 7-40. Conducted Spurious Plot (WCDMA Ch. 1312- Low Channel)

EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Gorr CCorr RCal Freq Ref. Int (S) NFE: Off	Atten 30 dB PNO: Fast µW Path Standard Gate Off IF Gain: Low Sig Track: Off	#Avg Type. Power (RMS123456 Trig Free Run A WWWWW A N N N N N	Center Frequency 870.000000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 20.00 dBm	Mkr1 1.692 0 GHz -49.282 dBm	1.68000000 GHz Swept Span Zero Span	
Trace 1 Pass				Fuil Span	
				Start Freq 30.000000 MHz	
0.0				Stop Freq 1.710000000 GHz	
				AUTO TUNE	
0.0		and and an an array of the state of the stat		CF Step 168.000000 MHz Auto Man	
				Freq Offset 0 Hz	
tart 0.0300 GHz Res BW 1.0 MHz			Stop 1.7100 GHz Sweep 2.24 ms (3361 pts)	X Axis Scale Log	Loc
501	? Oct 19, 2021 10:39:26 AM			Sin of Television	

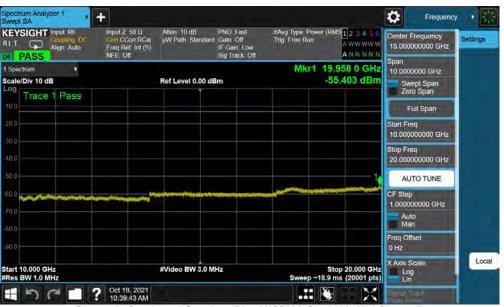
Plot 7-41. Conducted Spurious Plot (WCDMA Ch. 1413- Mid Channel)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	LAMSUNG	Approved by: Technical Manager	
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Plot 7-42. Conducted Spurious Plot (WCDMA Ch. 1413- Mid Channel)



Plot 7-43. Conducted Spurious Plot (WCDMA Ch. 1413- Mid Channel)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	AND	Approved by: Technical Manager	
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KEYSIGHT Input RF Cauping DC Align: Auto	Input 2:50 Ω Com CCon RCal Freq Ref. Int (S) NFE: Off	Atten 30 dB µW Path Standard	PNO Fast Gate Off IF Gain Low Sig Track: Off	#Avg Type. Pov Trig Free Run	AW	3456 WWWW NNNN	Center Frequency 870.000000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 20.00 d	Bm	Mkr	1 1.642 4		1.68000000 GHz Swept Span Zero Span	
Trace 1 Pass						_	Full Span	
							Start Freq 30.000000 MHz	
20.0							Stop Freq 1.710000000 GHz	
						_	AUTO TUNE	
40.0 50.0	an manager and the second second	and the second		yester of the second		<b>▲</b> 1	CF Step 168.000000 MHz Auto Man	
70.0							Freq Offset 0 Hz	
tart 0.0300 GHz Res BW 1.0 MHz		#Video BW 3.0 M	IHz	Swee	Stop 1.71 p 2.24 ms (3		X Axis Scale Log	Loc
1701	Oct 19, 2021 10:41:40 AM					X	Signal Teach	

Plot 7-44. Conducted Spurious Plot (WCDMA Ch. 1513- High Channel)



Plot 7-45. Conducted Spurious Plot (WCDMA Ch. 1513- High Channel)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	SAMEUND.	Approved by: Technical Manager
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	Corr RCal µW Path Sta et Int (S)	PNO Fast ndard Gate Off IFGain Low Sig Track: Off	#Avg Type. P Trig: Free Ru	ower (RMS <mark>123456</mark> A WWWWW A N N N N N	Center Frequency 15.000000000 GHz Span	Settings
Spectrum v icale/Div 10 dB	Ref Level 0.	00 dBm	Mkr	1 19.962 5 GHz -55.058 dBm	10.0000000 GHz	
					Fuil Span	
					Start Freq 10.000000000 GHz	
10.0					Stop Freq 20.000000000 GHz	
					AUTO TUNE	
50.0	historician and the second	e tati in gate da partico	Same and the same of the same		CF Step 1.000000000 GHz	
70.0					Auto Man	
					Freq Offset 0 Hz	
tart 10.000 GHz Res BW 1.0 MHz	#Video BW	3.0 MHz	Sween	Stop 20.000 GHz ~18.9 ms (20001 pts)		

Plot 7-46. Conducted Spurious Plot (WCDMA Ch. 1513- High Channel)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	STANSON P	Approved by: Technical Manager
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# LTE Band 66/4

KEYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	Atten 30 dB PNO: Fast µW Path Standard Gate Off IF Gain: Low Sig Track: Off	#Avg Type. Power (RMS123456 Trig Free Run A WWWW A N N N N N	Center Frequency 869.500000 MHz
Spectrum v cale/Div 10 dB		Ref Level 20.00 dBm	Mkr1 1.707 5 GHz -49.478 dBm	1.67900000 GHz
Trace 1 Pass				Full Span
				Start Freq 30.000000 MHz
20.0				Stop Freq 1.709000000 GHz
				AUTO TUNE
10.0				CF Step 167.900000 MHz Auto Man
				Freq Offset 0 Hz
tart 0.0300 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz	Stop 1.7090 GHz Sweep 2.24 ms (3361 pts)	
501	Oct 20, 2021 1:07:41 PM		X - X	Se el Tata

Plot 7-47. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Low Channel)



Plot 7-48. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Low Channel)

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Plot 7-49. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Low Channel)

KEYSIGHT Input RF Cauping DC Align: Auto	Input Z 50 Ω Con CCon RCal Freq Ref. Int (S) NFE: Off	Atten 30 dB PNO. Fast µW Path Standard Gate Off IF Gain Low Sig Track: Off	#Avg Type: Power (RMS123456 Trig Free Run A WWWWW A N N N N N	Center Frequency 870.000000 MHz Span	Settings
Spectrum v icale/Div 10 dB		Ref Level 20.00 dBm	Mkr1 1.664 0 GHz -49.555 dBm	1.68000000 GHz Swept Span Zero Span	
Trace 1 Pass				Full Span	
				Start Freq 30.000000 MHz	
20.0				Stop Freq 1.710000000 GHz	
				AUTO TUNE	
40.0 50.0	ang panamana pang manakan dalam da	and the second secon	<b>↓</b> 1	CF Step 168.000000 MHz Auto Man	
				Freq Offset 0 Hz	
art 0.0300 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz	Stop 1.7100 GHz Sweep 2.24 ms (3361 pts)	X Axis Scale Log	Los
501	Oct 20, 2021 1:09:21 PM		.:: 💦 – 🗙	Signal Test	

Plot 7-50. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Mid Channel)

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LT Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	Atten: 30 dB µW Path: Standard	PNO: Fast Gate Off IF Gain: Low Sig Track: Off	#Avg Type. P Trig: Free Ru	Power (RMS 1 2 3 4 5 6 In A WWWWW A N N N N N	Center Frequency 5.890000000 GHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 20.00 di	Bm	M	kr1 9.984 5 GHz -41.321 dBm	8.22000000 GHz	
Trace 1 Pass						Full Span	
00						Start Freq 1.780000000 GHz	
0.0						Stop Freq 10.000000000 GHz	
					1/	AUTO TUNE	
0.0	~~~~			~~~~		CF Step 822.000000 MHz	
						Man Freq Offset 0 Hz	
art 1.780 GHz tes BW 1.0 MHz		#Video BW 3.0 M	Hz	Sweer	Stop 10.000 GHz ~15.1 ms (16441 pts)		
	Oct 20, 2021 1:13:35 PM	)-		Sweep		Statut Tauk	

Plot 7-51. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Mid Channel)

EYSIGHT Input: RF Coupling DC Align: Auto	Input Z 50 Ω Gon CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten: 20 dB PNO Fast µW Path Standard Gate Off IF Gain: Low Sig Track: Off	#Avg Type. Power (RMS123456 Trig Free Run A WWWW A N N N N N	Center Frequency 15.000000000 GHz	Settings
Spectrum v cale/Div 10 dB		Ref Level 0.00 dBm	Mkr1 19.481 0 GHz -44.335 dBm	Span 10.0000000 GHz	
Trace 1 Pass				Zero Span Fuil Span	
				Start Freq 10.000000000 GHz	
			<u>+</u> 1	Stop Freq 20.000000000 GHz	
0.0				AUTO TUNE	
0.0				CF Step 1.000000000 GHz Auto Man	
				Freq Offset 0 Hz	
art 10.000 GHz tes BW 1.0 MHz		#Video BW 3.0 MHz	Stop 20.000 GHz Sweep ~18.9 ms (20001 pts)	X Axis Scale Log	Loc
501	Oct 20, 2021 1:14:27 PM			Signal Track	

Plot 7-52. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Mid Channel)

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	645 0 GHz 133 dBm	Span 1.6800000 GHz Swept Span Zero Span Full Span Start Freq 30.000000 MHz Stop Freq	
		Fuil Span Start Freq 30.000000 MHz Stop Freq	
20.0		30.000000 MHz Stop Freq	
		1.710000000 GHz	
		AUTO TUNE	
10.0		CF Step 168.000000 MHz	
		Auto Man	
		Freq Offset 0 Hz	
	op 1.7100 GHz ms (3361 pts)	X Axis Scale Log	

Plot 7-53. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - High Channel)

EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	Atten 30 dB PNO. Fast µW Path Standard Gate Off IF Gain: Low Sig Track: Off	#Avg Type Power (RMS123456 Trig Free Run A WWWWW A N N N N N	Center Frequency 5.890500000 GHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 20.00 dBm	Mkr1 9.999 0 GHz -41.209 dBm	8.21900000 GHz Swept Span Zero Span	
Trace 1 Pass				Full Span	
00				Start Freq 1.781000000 GHz	
0.0				Stop Freq 10.000000000 GHz	
			1	AUTO TUNE	
0.0	m			CF Step 821.900000 MHz	
0.0				Auto Man	
				Freq Offset 0 Hz	
art 1.781 GHz tes BW 1.0 MHz		#Video BW 3.0 MHz	Stop 10.000 GHz Sweep ~15.1 ms (16441 pts)	X Axis Scale Log	Lo
501	Oct 20, 2021 1:15:21 PM		🕥 – 🔀	Signal Tati	

Plot 7-54. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - High Channel)

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Plot 7-55. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - High Channel)

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## 7.4 Band Edge Emissions at Antenna Terminal

## **Test Overview**

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

# The minimum permissible attenuation level of any spurious emission is $43 + 10 \log_{10}(P_{[Watts]})$ , 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 <u>></u> 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

#### Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

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## Test Notes

Per 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Per 27.53(g) for operations in the 663 - 698 MHz and 698 – 746MHz bands, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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

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

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# LTE Band 12/17



Plot 7-56. Lower Band Edge Plot (LTE Band 12 - 10MHz QPSK – Full RB)

KEYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten: 36 dB µW Path Standard	PNO Balanced Gate Off IF Gain Low Sig Track: Off	#Avg Type. Powe Trig Free Run	(RMS <mark>123456</mark> A WWWWW A N N N N N	Center Frequency 704.000000 MHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 25.00 di	3m	Mkr1	703.992 MHz -31.285 dBm	4.00000000 MHz Swept Span Zero Span	
Trace 1 Pass						Fuil Span	
.00						Start Freq 702.000000 MHz	
5.0						Stop Freq 706.000000 MHz	
5.0		1,1	m.			AUTO TUNE	
		N				CF Step 400.000 kHz	
5.0						Auto Man	
						Freq Offset 0 Hz	
enter 704.000 MHz Res BW 100 kHz		#Video BW 300 k	Hz	Sweep	Span 4.000 MHz 1.00 ms (1001 pts)	X Axis Scale Log Lin	Lo
500?	Oct 19, 2021 2:21:18 PM	1-			XX	Sin of Test	

Plot 7-57. Lower Band Edge Plot (LTE Band 17 - 10MHz QPSK - Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	BNS	Approved by: Technical Manager	
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Caupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Balanced d Gate Off IF Gain Low Sig Track: Off	#Avg Type. F Trig: Free Ru	un A	23456 WWWWW NNNNN	Center Frequency 716.000000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 d	IBm	Mk	r1 716.0 -30.8	04 MHz 70 dBm	4.00000000 MHz Swept Span Zero Span	
15.0 Trace 1 Pass							Full Span	
5.00	mund	1					Start Freq 714.000000 MHz	
15.0							Stop Freq 718.000000 MHz	
25.0		WWW 1		-			AUTO TUNE	
			man		~~~~~	~~~~	CF Step 400.000 kHz Auto Man	
							Freq Offset 0 Hz	
enter 716.000 MHz Res BW 100 kHz		#Video BW 300 P	(Hz	Sw	Span eep 1.00 ms	4.000 MHz (1001 pts)	X Axis Scale Log	Lo
501?	Oct 19, 2021 2:22:58 PM	0			-	X	Signal Tax	

Plot 7-58. Upper Band Edge Plot (LTE Band 12/17 - 10MHz QPSK – Full RB)



Plot 7-59. Lower Band Edge Plot (LTE Band 12 - 5MHz QPSK – Full RB)

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EYSIGHT Input RF LT Align Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Balanced Gate Off IF Gain Low Sig Track: Off	#Avg Type. Powe Trig Free Run	r (RMS <mark>123456</mark> A WWWWW A N N N N N	Center Frequency 704.000000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 di	Bm	Mkr1	703.972 MHz -22.503 dBm	4.00000000 MHz Swept Span Zero Span	
5 0 Trace 1 Pass						Full Span	
			1			Start Freq 702.000000 MHz	
5.0		1/				Stop Freq 706.000000 MHz	
5.0		manip				AUTO TUNE	
5.0						CF Step 400.000 kHz	
5,0						Auto Man	
						Freq Offset 0 Hz	
enter 704.000 MHz Res BW 100 kHz		#Video BW 300 k	Hz	Sweep	Span 4.000 MHz 1.00 ms (1001 pts)	X Axis Scale Log	
501	? Oct 19, 2021 2:26:41 PM					Seriel Tank	

Plot 7-60. Lower Band Edge Plot (LTE Band 17 - 5MHz QPSK - Full RB)



Plot 7-61. Upper Band Edge Plot (LTE Band 12/17 - 5MHz QPSK - Full RB)

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EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Com CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO: Balanced Gate Off IF Gain: Low Sig Track: Off	#Avg Type. Power (RM Trig: Free Run	S123456 AWWWWW ANNNNN	Center Frequency 699.000000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 dl	Bm		3.996 MHz .298 dBm	4.00000000 MHz Swept Span Zero Span	
5 0 Trace 1 Pass						Full Span	
		1				Start Freq 697.000000 MHz	
5.0		1				Stop Freq 701.000000 MHz	
5.0						AUTO TUNE	
5.0	mann	~~~~v				CF Step 400.000 kHz	
5.0						Auto Man	
						Freq Offset 0 Hz	
enter 699.000 MHz tes BW 100 kHz		#Video BW 300 k	Hz		an 4.000 MHz ms (1001 pts)	X Axis Scale Log	
501	Oct 19, 2021 2:29:59 PM	15-			X	Second Second	

Plot 7-62. Lower Band Edge Plot (LTE Band 12 - 3MHz QPSK - Full RB)



Plot 7-63. Upper Band Edge Plot (LTE Band 12 - 3MHz QPSK – Full RB)

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EYSIGHT Input RF L T +++ Coupling, DC Alige Auto/No RF	Input Z 50 Ω Gorr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Balanced Gate Off IF Gain Low Sig Track: Off	#Avg Type. P Trig: Free Ru	n j	1 2 3 4 5 6 A WWWWW A N N N N N	Center Frequency 699.000000 MHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 25.00 di	Bm	Mk		996 MHz 003 dBm	4.00000000 MHz Swept Span Zero Span	
50 Trace 1 Pass				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			Full Span	
							Start Freq 697.000000 MHz	
5.0		•1			L		Stop Freq 701.000000 MHz	
5.0	m				5	mann	AUTO TUNE	
man							CF Step 400.000 kHz	
5.0							Auto Man	
							Freq Offset 0 Hz	
enter 699.000 MHz Res BW 100 kHz		#Video BW 300 k	Hz	Swe		n 4.000 MHz s (1001 pts)	X Axis Scale Log	
501?	Nov 02, 2021 2:58:52 PM					X	Signal Tests	

Plot 7-64. Lower Band Edge Plot (LTE Band 12 – 1.4MHz QPSK – Full RB)

	it RF pling DC n Auto/No RF	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Sta	PNO: Balanced indard: Gate: Off IF Gain: Low Sig Track: Off	#Avg Type. P Trig: Free Ru	ower (RMS123456 n AWWWWW ANNNNN	Center Frequency 716.000000 MHz Span	Settings
Spectrum cale/Div 10 dB	×.		Ref Level 25	.00 dBm	Mk	r1 716.032 MHz -16.363 dBm	4.00000000 MHz	
5.0 Trace 1 F	Pass						Fuil Span	
							Start Freq 714.000000 MHz	
				<b>1</b>			Stop Freq 718.000000 MHz	
5.0	r l			pourter	m		AUTO TUNE	
5.0						- min	CF Step 400.000 kHz	
5.0							Auto Man	
							Freq Offset 0 Hz	
enter 716.000 MH Res BW 100 kHz	z		#Video BW 3	300 kHz	Swe	Span 4.000 MHz ep 1.00 ms (1001 pts)		

Plot 7-65. Upper Band Edge Plot (LTE Band 12 – 1.4MHz QPSK – Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	JAMSUND?	Approved by: Technical Manager
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# LTE Band 13



Plot 7-66. Lower Band Edge Plot (LTE Band 13 - 10MHz QPSK – Full RB)

KEYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Best Wide I Gate Off IF Gain Low Sig Track: Off	#Avg Type. Pow Trig Free Run	Mer (RMS123456 A WWWWW A N N N N N	Center Frequency 769.000000 MHz Span	Settings
Spectrum v Scale/Div 10 dB		Ref Level 15.00 d	IBm	Mkr1	1 769.000 MHz -68.654 dBm	12.0000000 MHz Swept Span Zero Span	
5 00 Trace 1 Pass						Full Span	
						Start Freq 763.000000 MHz	
						Stop Freq 775.000000 MHz	
35.0						AUTO TUNE	
						CF Step 1.200000 MHz	
55.0		1				Auto Man	
75.0		ge der bei eine generende geben der anderender	9999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	in an	and the second second of	Freq Offset 0 Hz	
enter 769.000 MHz Res BW 6.8 kHz		#Video BW 30 kl	Hz	Sweet	Span 12.00 MHz p 81.9 ms (4001 pts)	X Axis Scale	Lor
	Oct 20, 2021 10:10:57 AM	12		Swee		Signer To S	-

Plot 7-67. Lower Emission Mask Plot (LTE Band 13 - 10MHz QPSK – Full RB)

FCC ID: A3LSMS901E	PCTEST	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
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EYSIGHT Input RF Cauping DC Align: Auto	Input Z 50 Ω ComCCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Balanced Gate Off IF Gain Low Sig Track: Off	#Avg Type. Powe Trig Free Run	er (RMS <mark>123456</mark> A <del>WWWWW</del> A N N N N N	Center Frequency 787.000000 MHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 25.00 d	Bm	Mkr1	787.040 MHz -28.930 dBm	4.00000000 MHz Swept Span Zero Span	
5 0 Trace 1 Pass						Full Span	
.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1				Start Freq 785.000000 MHz	
5.0						Stop Freq 789.000000 MHz	
5.0		man 1				AUTO TUNE	
						CF Step 400.000 kHz	
						Auto Man	
						Freq Offset 0 Hz	
enter 787.000 MHz Res BW 100 kHz		#Video BW 300 k	Hz	Sweep	Span 4.000 MHz 1.00 ms (1001 pts)	X Axis Scale Log	
501	Oct 20, 2021 10:13:47 AM				X X	Signal Tatik	

Plot 7-68. Upper Band Edge Plot (LTE Band 13 - 10MHz QPSK – Full RB)



Plot 7-69. Upper Emission Mask Plot (LTE Band 13 - 10MHz QPSK - Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	SAMSUND	Approved by: Technical Manager
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EYSIGHT Input RF L T + Align: Auto	Input 2 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Balanced Gate Off IF Gain: Low Sig Track: Off	#Avg Type. Power Trig: Free Run	(RMS123456 A WWWWW A N N N N N	Center Frequency 777.000000 MHz Span	Settings
Spectrum T cale/Div 10 dB		Ref Level 25.00 dl	Bm		777.000 MHz -21.636 dBm	4.00000000 MHz Swept Span Zero Span	
Trace 1 Pass						Fuil Span	
			/	and a second	~~~~~	Start Freq 775.000000 MHz	
5.0		1/				Stop Freq 779.000000 MHz	
5.0	m	man				AUTO TUNE	
5.0						CF Step 400.000 kHz	
5.0						Auto Man	
						Freq Offset 0 Hz	
nter 777.000 MHz es BW 100 kHz		#Video BW 300 k	Hz	Sweep 1	Span 4.000 MHz .00 ms (1001 pts)	X Axis Scale Log	
501	Oct 20, 2021 10:15:59 AM					Sin of Tells	

Plot 7-70. Lower Band Edge Plot (LTE Band 13 - 5MHz QPSK - Full RB)

RLT	Input Z 50 Ω CorrCCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB PNO Best Wide µW Path Standard Gate Off IF Gain: Low Sig Track: Off	#Avg Type. Power (RMS123456 Trig Free Run A WWWW A N N N N N	Center Frequency 769.000000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 15.00 dBm	Mkr1 774.997 MHz -54.060 dBm	12.0000000 MHz Swept Span	
Trace 1 Pass				Zero Span Fuil Span	
15.0				Start Freq 763.000000 MHz	
25.0				Stop Freq 775.000000 MHz	
35.0				AUTO TUNE	
55.0			1	CF Step 1.200000 MHz	
35.0			1	Auto Man	
75.0	Lander and the second secon	สารได้เหมือสารเหมือน ความสารางการการการการการการการการการการการการการก	and a second of the desired of the second	Freq Offset 0 Hz	
enter 769.000 MHz Res BW 6.8 kHz		#Video BW 30 kHz	Span 12.00 MHz Sweep 81.9 ms (4001 pts)	X Axis Scale Log Lin	Loc
1501	? Oct 20, 2021 10:16:13 AM		X = 8 =	Select Table	

Plot 7-71. Lower Emission Mask Plot (LTE Band 13 - 5MHz QPSK – Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	SAMSUND	Approved by: Technical Manager
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RLT +++ Coupling DC Align Auto	input Z 50 Ω #Atten: 36 dB Con CCon RCal µW Path Standar Freq Ref. Int (S) NFE: Off	PNO Balanced d Gate Off IF Gain: Low Sig Track: Off	#Avg Type. Power (RMS Trig Free Run	1 2 3 4 5 6 A WWWWW A N N N N N	Center Frequency 787.000000 MHz	Settings
Spectrum v cale/Div 10 dB	Ref Level 25.00 d	IBm	Mkr1 787 -21.	020 MHz 134 dBm	Span 4.00000000 MHz Swept Span Zero Span	
50 Trace 1 Pass					Full Span	
5.00					Start Freq 785.000000 MHz	
5.0					Stop Freq 789.000000 MHz	
25.0	- M	han			AUTO TUNE	
					CF Step 400.000 kHz	
55.0					Auto Man	
					Freq Offset 0 Hz	
enter 787.000 MHz Res BW 100 kHz	#Video BW 300 I	(Hz	Spa Sweep 1.00 m	n 4.000 MHz is (1001 pts)	X Axis Scale Log	Lor
	Oct 20, 2021 10:17:40 AM			X	Series Table	

Plot 7-72. Upper Band Edge Plot (LTE Band 13 - 5MHz QPSK - Full RB)

EYSIGHT Input RF Couping DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Stand	PNO Best Wide ard Gate Off IF Gain: Low Sig Track: Off	#Avg Type F Trig Free Ru	2000er (RMS 1 2 3 4 5 6 In A WWWWW A N N N N N	Center Frequency 799,500000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 20.00	) dBm	Mkr1	799.500 00 MHz -66.206 dBm	13.0000000 MHz Swept Span Zero Span	
Trace 1 Pass						Fuil Span	
						Start Freq 793.000000 MHz	
0.0						Stop Freq 806.000000 MHz	
0.0						AUTO TUNE	
0.0						CF Step 1.300000 MHz	
0.0						Auto Man	
0.0	when a second and a	service in the	and the second second second			Freq Offset 0 Hz	
enter 799.500 MHz Res BW 6.8 kHz		#Video BW 30	kHz	Sw	Span 13.00 MHz eep 88.5 ms (4001 pts)	X Axis Scale Log	Loc

Plot 7-73. Upper Emission Mask Plot (LTE Band 13 - 5MHz QPSK – Full RB)

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# WCDMA AWS



Plot 7-74. Lower Band Edge Plot (WCDMA AWS – Ch. 1312)

Align Auto Free	ut Z 50 Ω #Atten, 36 dB ICCom RCal µW Path Sta q Ref. Int (S) E: Off	PNO Fast ndard Gate Off IF Gain Low Sig Track: Off	#Avg Type. Power (RMS Trig Free Run	A WW WW W A N N N N N	Center Frequency 1.707000000 GHz	Settings
Spectrum v cale/Div 10 dB	Ref Level 25	00 dBm	Mkr1 1.709 -15.	000 GHz 452 dBm	Span 4.00000000 MHz Swept Span Zero Span	
Trace 1 Pass					Fuil Span	
.00					Start Freq 1.705000000 GHz	
				1	Stop Freq 1.709000000 GHz	
5.0	No the spectrum and the descent of the state	الم المان بالم المان الم الم المان الم			AUTO TUNE	
5.0					CF Step 400.000 kHz	
5.0					Auto Man	
					Freq Offset 0 Hz	
enter 1.707000 GHz Res BW 1.0 MHz	#Video BW 3	3.0 MHz	Spa Sweep 1.00 n	an 4.000 MHz	X Axis Scale Log Lin	Loc

Plot 7-75. Lower Extended Band Edge Plot (WCDMA AWS - Ch. 1312)

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EYSIGHT Input RF Coupling DC Align Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Best Wide Gate Off IF Gain Low Sig Track: Off	#Avg Type. Po Trig Free Run	wer (RMS 1 2 3 4 5 6 A WW WW W A N N N N N	Center Frequency 1.755000000 GHz Span	Setling
Spectrum Y cale/Div 10 dB		Ref Level 25.00 d	Bm	Mkr1	1.755 000 GHz -20.116 dBm	15.0000000 MHz Swept Span Zero Span	
50 Trace 1 Pass						Full Span	
.00						Start Freq 1.747500000 GHz	
5.0						Stop Freq 1.762500000 GHz	
5.0		ha				AUTO TUNE	
5.0		V			m	CF Step 1.500000 MHz	
5.0					and the second	Auto Man	
						Freq Offset 0 Hz	
enter 1.755000 GHz Res BW 100 kHz		#Video BW 300 k	Hz	Swee	Span 15.00 MHz ep 1.00 ms (1001 pts)	X Axis Scale Log	
501	Oct 19, 2021 10:48:02 AM	-)			the second second second second	Status) Tatok	

Plot 7-76. Upper Band Edge Plot (WCDMA AWS - Ch. 1513)

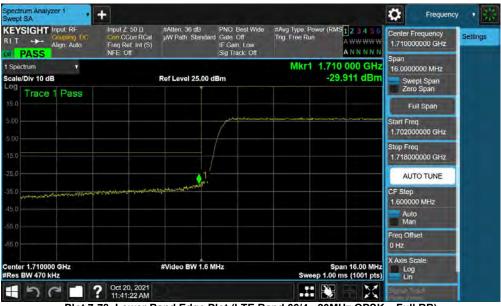
CEYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten: 36 dB PNO: Fast µW Path Standard Gate Off IF Gain: Low Sig Track: Off	#Avg Type: Power (RMS123456 Trig: Free Run A WW WWW A N N N N N	Center Frequency 1.758000000 GHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 25.00 dBm	Mkr1 1.756 000 GHz -16.277 dBm	4.00000000 MHz Swept Span	
5 Trace 1 Pass				Zero Span Full Span	
				Start Freq 1.756000000 GHz	
5.0 1				Stop Freq 1.760000000 GHz	
5.0	and the street services and the street	and a fear and the second of the		AUTO TUNE	
				CF Step 400.000 kHz	
55.0				Auto Man	
				Freq Offset 0 Hz	
enter 1.758000 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz	Span 4.000 MHz Sweep 1.00 ms (1001 pts)	X Axis Scale Log Lin	
50	? Oct 19, 2021 10:48:11 AM		💥 🕂 🔀	Secol Track	

Plot 7-77. Upper Extended Band Edge Plot (WCDMA AWS – Ch. 1513)

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# LTE Band 66/4



Plot 7-78. Lower Band Edge Plot (LTE Band 66/4 - 20MHz QPSK - Full RB)

LT Coupling DC Go Align Auto Fra	out Z 50 Ω #Alten, 36 d mCCorr RCai µW Path St eq Ref. Int (S) E: Off	B PNO Fast andard Gate Off IF Gain Low Sig Track: Off	#Avg Type. Power (RM Trig Free Run	18 1 2 3 4 5 6 A WWWWW A N N N N N	Center Frequency 1.707000000 GHz	Setting
Spectrum v cale/Div 10 dB	Ref Level 2	5.00 dBm	Mkr1 1.70 -21	8 996 GHz 3.415 dBm	Span 4.00000000 MHz Swept Span Zero Span	
Trace 1 Pass				_	Fuil Span	
00					Start Freq 1.705000000 GHz	
5.0					Stop Freq 1.709000000 GHz	
5.0				1	AUTO TUNE	
5.0 Lubbanizony drively on both and a strategy of	&	45 <sub>46776</sub> 88973678364765867898787878	an in the second second	en Jelonal a charter	CF Step 400.000 kHz	
5.0					Auto Man	
					Freq Offset 0 Hz	
enter 1.707000 GHz Res BW 1.0 MHz	#Video BW	3.0 MHz		oan 4.000 MHz ms (1001 pts)	X Axis Scale Log Lin	Lo

Plot 7-79. Lower Extended Band Edge Plot (LTE Band 66/4 - 20MHz QPSK - Full RB)

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EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Gorr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO: Best Wide Gate Off IF Gain: Low Sig Track: Off	#Avg Type. Po Trig Free Run	wer (RMS123456 A WWWWW A N N N N N	Center Frequency 1.755000000 GHz	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 d	Bm	Mkr1	1.755 064 GHz -29.362 dBm	Span 16.0000000 MHz Swept Span Zero Span	
5 Trace 1 Pass						Fuil Span	
.00	and the second					Start Freq 1.747000000 GHz	
5.0						Stop Freq 1.763000000 GHz	
5.0		1	Land a Natural and			AUTO TUNE	
15.0			an and a second state of the second	and and and and a faith of the	anter anna anna anna anna anna anna anna an	CF Step 1.600000 MHz	
i5.0						Auto Man	
						Freq Offset 0 Hz	
enter 1.755000 GHz Res BW 470 kHz		#Video BW 1.6 M	Hz	Swee	Span 16.00 MHz p 1.00 ms (1001 pts)	X Axis Scale Log Lin	Lo
501	Oct 20, 2021 11:42:49 AM					Sin of Test	

Plot 7-80. Upper Band Edge Plot (LTE Band 4 - 20MHz QPSK - Full RB)

KEYSIGHT Input RF L +++ Coupling DC Align: Auto	Input Z 50 Ω Gorr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten: 36 dB PNO: Fast µW Path Standard Gate Off IF Gain: Lo Sig Track: 0		Center Frequency 1.758000000 GHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 dBm	Mkr1 1.756 000 GHz -29.405 dBm	4.00000000 MHz Swept Span	
Trace 1 Pass				Zero Span Fuil Span	
5.00				Start Freq 1.756000000 GHz	
				Stop Freq 1.760000000 GHz	
25.0 1		المراجع المراجع المحالمين المحاجم ومحاصر المحاجب المراجع المداح ومراجع	604444, julya, 19240, 1974, 1994, 1994, 1994, 1994, 1994, 1994, 1994, 1994, 1994, 1994, 1994, 1994, 1994, 1994	AUTO TUNE	
15.0				CF Step 400.000 kHz	
				Auto Man	
				Freq Offset 0 Hz	
enter 1.758000 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz	Span 4.000 MHz Sweep 1.00 ms (1001 pts)		
501?	Oct 20, 2021 11:43:00 AM		💓 – 🗙	Signal Track	

Plot 7-81. Upper Extended Band Edge Plot (LTE Band 4 - 20MHz QPSK – Full RB)

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ELT + Auto	Input Z 50 Ω Com CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Best Wide Gate Off IF Gain Low Sig Track: Off	#Avg Type. Pov Trig: Free Run	wer (RMS123456 A WWWWW A N N N N N	Center Frequency 1.780000000 GHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 25.00 di	Bm	Mkr1	1.780 592 GHz -30.020 dBm	16.0000000 MHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
5.00	tini i ta sta de la serie d	and the				Start Freq 1.772000000 GHz	
5.0						Stop Freq 1.788000000 GHz	
5.0		Wing	1			AUTO TUNE	
			all and the second s		- Antoning and the second s	CF Step 1.600000 MHz	
55.0						Auto Man	
						Freq Offset 0 Hz	
enter 1.780000 GHz Res BW 470 kHz		#Video BW 1.6 M	Hz	Swee	Span 16.00 MHz p 1.00 ms (1001 pts)	X Axis Scale Log	
501	Oct 20, 2021 11:44:40 AM				N X	Station Track	

Plot 7-82. Upper Band Edge Plot (LTE Band 66 - 20MHz QPSK – Full RB)

Ispectrum         Mkr1         1.781         000         GHZ           Scale/Div 10 dB         Ref Lavel 25.00 dBm         -29.712 dBm	Center Frequency 1.783000000 GHz Span		#Avg Type. Power ( Trig Free Run	Gate Off IF Gain Low Sig Track: Off	µW Path Standard	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	ign: Auto	
Trace 1 Pass       Full Span         50       Full Span         50       Start Freq         51       Start Freq         52       Start Freq         53       Start Freq         54       Start Freq         55       Start Freq         56       Start Freq         57       Start Freq         58       Start Freq         59       Start Freq         50       Start Freq         51       Start Freq         52       Start Freq         53       Start Freq         54       Start Freq         55       Start Freq	4.00000000 MHz Swept Span	.781 000 GHz		3m	Ref Level 25.00 dl		Y	/Div 10 dB
1.781000000 GHz           1.781000000 GHz           150           1           1450           1           150           1           100000 GHz           1.781000000 GHz           1.785000000 GHz           1.78500000 GHz							Pass	Trace 1
15 0 1 0 15 0 1								
Although a share the second of the seco	and the second							
15.0 CF Step 400.000 kHz Alto Man	AUTO TUNE		and the second		mathewanter	and and the loss of marine starting	allow second	
	400.000 kHz Auto							
is 0 Freq Offset 0 Hz	Freq Offset							
enter 1.783000 GHz #Video BW 3.0 MHz \$pan 4.000 MHz Log Res BW 1.0 MHz \$weep 1.00 ms (1001 pts)	Log	Span 4.000 MHz	Sweep 1.	Hz	#Video BW 3.0 M			

Plot 7-83. Channel Edge Plot (LTE Band 66 - 20MHz QPSK - Full RB)

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EYSIGHT Input RF Cauping DC Align: Auto	Input Z 50 Ω CorrCCorrRCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Best Wide Gate Off IF Gain Low Sig Track: Off	#Avg Type. Power (F Trig: Free Run	A N N N N N N	Center Frequency 1.710000000 GHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 25.00 di	Bm		09 988 GHz 27.786 dBm	12.0000000 MHz Swept Span Zero Span	
5 0 Trace 1 Pass						Fuil Span	
00			1		and an and a state of the state	Start Freq 1.704000000 GHz	
5.0		/				Stop Freq 1.716000000 GHz	
5.0		1-				AUTO TUNE	
5.0 ochon months						CF Step 1.200000 MHz	
5.0						Auto Man	
5.0						Freq Offset 0 Hz	
enter 1.710000 GHz Res BW 360 kHz		#Video BW 1.2 M	Hz		Span 12.00 MHz 00 ms (1001 pts)	X Axis Scale Log	
501	? Oct 20, 2021 11:51:16 AM					Server T = 2	

Plot 7-84. Lower Band Edge Plot (LTE Band 66/4 - 15MHz QPSK - Full RB)

LT + Align: Auto	Input Z 50 Ω Gorr CCorr RCal Freq Ret Int (S) NFE: Off	#Atten: 36 dB PNO: Fast µW Path Standard Gate Off IF Gain: Low Sig Track: Off	#Awg Type: Power (RMS 1 2 3 4 5 6 Trig Free Run A WWWW A N N N N N	Center Frequency 1.707000000 GHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 dBm	Mkr1 1.708 820 GHz -24.789 dBm	4.00000000 MHz Swept Span Zero Span	
Trace 1 Pass				Fuil Span	
				Start Freq 1.705000000 GHz	
				Stop Freq 1.709000000 GHz	
15.0	war the grant water that it	and a state and the state of th	and and a state of the state of	AUTO TUNE	
				CF Step 400.000 kHz	
5.0				Auto Man	
				Freq Offset 0 Hz	
enter 1.707000 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz	Span 4.000 MHz Sweep 1.00 ms (1001 pts)	X Axis Scale Log	Loc
501	Oct 20, 2021 11:51:48 AM			Sprail Task	

Plot 7-85. Lower Extended Band Edge Plot (LTE Band 66/4 - 15MHz QPSK - Full RB)

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LT +++ Coupling DC C Align Auto Fr	iput Z 50 Ω #Atten, 36 d orr CCorr RCal µW Path Si req Ref. Int (S) FE: Off	B PNO Best Wide andard Gate Off IF Gain Low Sig Track: Off	#Avg Type. Power (RMS Trig: Free Run	1 2 3 4 5 6 A WWWWW A N N N N N	Center Frequency 1.755000000 GHz Span	Settings
Spectrum v cale/Div 10 dB	Ref Level 2	5.00 dBm	Mkr1 1.755 -27.	096 GHz 636 dBm	12.0000000 MHz Swept Span Zero Span	
5 0 Trace 1 Pass					Fuil Span	
.00	the second s				Start Freq 1.749000000 GHz	
5.0					Stop Freq 1.761000000 GHz	
5.0	4	T.	hand and proper services		AUTO TUNE	
			and the second se	Sand and a strate of the state	CF Step 1.200000 MHz	
5.0					Auto Man	
					Freq Offset 0 Hz	
enter 1.755000 GHz Res BW 360 kHz	#Video BW	1.2 MHz	Spa Sweep 1.00 n	n 12.00 MHz	X Axis Scale Log	Lor

Plot 7-86. Upper Band Edge Plot (LTE Band 4 - 15MHz QPSK - Full RB)

It spectrum         Mkr1 1.756 028 GHz         and and cooperation           Scale/Div 10 dB         Ref Level 25.00 dBm         -24.580 dBm         State 200         State 100         Full Span           500         Image: Span         Image: Span	Standard Gale Off IF Gain: Low Sig Track: Off Sig Track: Of	A WW WW W 1.7	Tri	IF Gain Los		#Atten, 36 µW Path	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	aupling DC lign: Auto		RLT
Trace 1 Pass       Full Span         50       Full Span         500       Start Freq         7.76000000 GHz       AUTO TUNE         CF Step       400.000 Hz         400.000 Hz       Auto         500       Auto         500       Start Freq         500       Start Freq         500       Start Freq         510       Start Freq         520       Start Freq         530       Start Freq         540       Start Freq         550       Freq Offset	Mkr1 1.756 028 GHz 4.0000000 MHz 125.00 dBm -24.580 dBm swept Span	Mkr1 1.756 028 GHz 4.0		3m	25.00 de	Ref Level		4		cale/
1.798000000 GHz       15.0       15.0       1       15.0       1								Pass	Trace 1	
150     1       250     1       350     1       350     1       350     1       350     1       350     1       350     1       350     1       350     1       350     1       350     1       350     1       350     1       360     1       370     1       370     1       370										
45.0 CF Step 400.000 kHz 55.0 Man Freq Offset									1	
45.0 400.000 kHz 55.0 Man Freq Offset		and the second state of th	meeninge	ماد مراجع المراجع المراجعة	and the second states	nyanana	ates, mare level and a level	- mouse	and interest of the	25.0
55 0 Auto Man Freq Offset										
enter 1.758000 GHz #Video BW 3.0 MHz Span 4.000 MHz Log Res BW 1.0 MHz Sweep 1.00 ms (1001 pts)	3W 3.0 MHz Span 4.000 MHz Log	Span 4.000 MHz		łz	W 3.0 MI	#Video B				

Plot 7-87. Upper Extended Band Edge Plot (LTE Band 4 - 15MHz QPSK – Full RB)

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EYSIGHT Input RF Cauping DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten: 36 dB µW Path Standard	PNO Best Wide Gate Off IF Gain Low Sig Track: Off	#Avg Type. Po Trig Free Run	Mer (RMS123456 A WWWWW A N N N N N	Center Frequency 1.780000000 GHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 25.00 d	Bm	Mkr1	1.780 060 GHz -27.261 dBm	12.0000000 MHz Swept Span Zero Span	
5 0 Trace 1 Pass						Full Span	
.00	-	-				Start Freq 1.774000000 GHz	
						Stop Freq 1.786000000 GHz	
5.0		MA 1	-			AUTO TUNE	
					adore a contraction of the star	CF Step 1.200000 MHz	
						Auto Man	
						Freq Offset 0 Hz	
enter 1.780000 GHz Res BW 360 kHz		#Video BW 1.2 M	Hz	Swee	Span 12.00 MHz p 1.00 ms (1001 pts)	X Axis Scale Log	
501	Nov 05, 2021 2:41:07 PM					Sin of Test	

Plot 7-88. Upper Band Edge Plot (LTE Band 66 - 15MHz QPSK – Full RB)

EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	µW Path Standard Ge	NO: Fast ate: Off Gain: Low g Track: Off	#Avg Type. Power (RM: Trig. Free Run	AWWWWW	Center Frequency 1.783000000 GHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 dBm		Mkr1 1.781 -24	1 140 GHz .327 dBm	4.00000000 MHz Swept Span	
<sup>50</sup> Trace 1 Pass						Zero Span Fuil Span	
00						Start Freq 1.781000000 GHz	
5.0						Stop Freq 1.785000000 GHz	
5.0 minute provide the second statements	-htmplannesin nerathan	an a construction of the second	man the second	and the construction of the second	ministra	AUTO TUNE	
						CF Step 400.000 kHz	
5.0						Auto Man	
						Freq Offset 0 Hz	
enter 1.783000 GHz		#Video BW 3.0 MHz			an 4.000 MHz ms (1001 pts)	X Axis Scale Log	

Plot 7-89. Upper Extended Band Edge Plot (LTE Band 66 - 15MHz QPSK – Full RB)

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EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Gorr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Best Wide Gate Off IF Gain Low Sig Track: Off	#Avg Type. Power (F Trig: Free Run	A WWWWW A N N N N N	Center Frequency 1.710000000 GHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 dl	Bm		09 992 GHz 25.991 dBm	8.00000000 MHz Swept Span Zero Span	
Trace 1 Pass						Fuil Span	
				minnen and		Start Freq 1.706000000 GHz	
5.0		/				Stop Freq 1.714000000 GHz	
5.0		and				AUTO TUNE	
5.0 p-manager	and a state of the	In market				CF Step 800.000 kHz	
5.0						Auto Man	
						Freq Offset 0 Hz	
enter 1.710000 GHz tes BW 240 kHz		#Video BW 750 ki	Hz		Span 8.000 MHz 00 ms (1001 pts)	X Axis Scale Log	

Plot 7-90. Lower Band Edge Plot (LTE Band 66/4 - 10MHz QPSK - Full RB)

RLT +++ Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	µW Path Standard Ge	NO: Fast ate: Off Gain: Low g Track: Off	#Avg Type. Power (RM Trig Free Run	A WW WW W A N N N N N	Center Frequency 1.707000000 GHz Span	Setting
Spectrum v cale/Div 10 dB	4	Ref Level 25.00 dBm		Mkr1 1.70 -24	8 980 GHz 1.295 dBm	4.00000000 MHz Swept Span Zero Span	
50 Trace 1 Pass						Fuil Span	
						Start Freq 1.705000000 GHz	
					1.	Stop Freq 1.709000000 GHz	
15.0 Anaroman provide to the second	مرود الإسرومين المراجم المراجم المراجم الم	Antonalistant	www.	please presidential theostoperate felling	Mary Westerner	AUTO TUNE	
5.0						CF Step 400.000 kHz	
5.0						Auto Man	
i5.0						Freq Offset 0 Hz	1
enter 1.707000 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz			oan 4.000 MHz ms (1001 pts)	X Axis Scale Log	
501?	Oct 20, 2021 11:59:16 AM				X	Status Tatis	

Plot 7-91. Lower Extended Band Edge Plot (LTE Band 66/4 - 10MHz QPSK – Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	<b>pproved by:</b> echnical Manager
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I Spectrum Mkr1 1.755 000 GHz Scale/Div 10 dB Ref Level 25.00 dBm -28.246 dBm -28.246 dBm Full Span 2ero Span Full Span Start Freq 1.751000000 GHz Stop Freq 1.759000000 GHz Stop Freq 1.75900000 GHz CF Step 80.000000 GHz CF Step	Settings	Center Frequency 1.755000000 GHz	AWWWWW	PNO: Best Wide Gate Off IF Gain: Low Sig Track: Off	#Atten, 36 dB µW Path Standard	Input Z 50 Ω Gorr CCorr RCal Freq Ref. Int (S) NFE: Off	Coupling DC Align: Auto	T PASS
Trace 1 Pass Trace 1 Pass Tr		8.00000000 MHz Swept Span	000 GHz	łm	Ref Level 25.00 de			Spectrum ale/Div 10 d
1         1.751000000 GHz           5.0         1.75900000 GHz           5.0         1.75900000 GHz           6.0         0.00000 GHz           5.0         0.00000 GHz           6.0         0.0000 GHz           6.0         0.000 GHz								Trace
S.0         Stop Freq         1.759000000 GHz           5.0         1         AUTO TUNE           5.0         CF Step         800.000 KHz           5.0         Auto TUNE         CF Step           5.0         Auto TUNE         CF Step           5.0         Auto TUNE         CF Step           5.0         Freq Offset         Man								
5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0								
5.0 5.0 5.0 5.0 5.0 Freq Offset		AND NO. DELLER		(multis in Arts	4 T			
5 0 Auto Man Freq Offset			Serence and the second					
		Freq Offset 0 Hz						
enter 1.755000 GHz #Video BW 750 kHz Span 8.000 MHz Log tes BW 240 kHz Sweep 1.00 ms (1001 pts) Un	Lo	Log	n 8.000 MHz	łz	#Video BW 750 kl			

Plot 7-92. Upper Band Edge Plot (LTE Band 4 - 10MHz QPSK – Full RB)

LT + Align: Auto	Input Z 50 D Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten: 36 dB PNO: Fast µW Path: Standard: Gate: Off IF Gain: Low Sig Track: Off	#Avg Type. Power (RMS123456 Trig. Free Run A W W W W A N N N N N	Center Frequency 1.758000000 GHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 dBm	Mkr1 1.756 036 GHz -22.728 dBm	4.00000000 MHz Swept Span Zero Span	
Trace 1 Pass				Fuil Span	
				Start Freq 1.756000000 GHz	
5.0				Stop Freq 1.760000000 GHz	
5.0 Harring with a second to the second	๛ฃฑมสระรู้อย่างสะการจะบุในส	and for a state of the formal and plant here for a formation of	have been that the product of the second s	AUTO TUNE	
				CF Step 400.000 kHz	
5.0				Auto Man	
				Freq Offset 0 Hz	
enter 1.758000 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz	Span 4.000 MHz Sweep 1.00 ms (1001 pts)	X Axis Scale Log	Loc
501?	Oct 20, 2021 11:59:54 AM			Signal Test	

Plot 7-93. Upper Extended Band Edge Plot (LTE Band 4 - 10MHz QPSK – Full RB)

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EYSIGHT Input RF Cauping DC Align: Auto	Input 2:50 Ω Gorr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Best Wide Gate Off IF Gain Low Sig Track: Off	#Avg Type. Po Trig: Free Run	wer (RMS123456 A WWWWW A N N N N N	Center Frequency 1.780000000 GHz Span	Setlings
Spectrum v cale/Div 10 dB		Ref Level 25.00 d	Bm	Mkr1	1.780 056 GHz -26.957 dBm	8.00000000 MHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
5.00	an a	m				Start Freq 1.776000000 GHz	
5.0						Stop Freq 1.784000000 GHz	
5.0		The T				AUTO TUNE	
			and and a state of the second s		and the second sec	CF Step 800.000 kHz	
						Auto Man	
						Freq Offset 0 Hz	
enter 1.780000 GHz Res BW 240 kHz		#Video BW 750 k	Hz	Swee	Span 8.000 MHz pp 1.00 ms (1001 pts)	X Axis Scale Log	
501	Nov 05, 2021 2:42:15 PM				Lange and the second second	Signal Test	

Plot 7-94. Upper Band Edge Plot (LTE Band 66 - 10MHz QPSK – Full RB)

Coupling DC ;Corr	IZ 50 Ω         #Atten. 36 dB         PNO. Fast           CCorn RCai         μW Path         Standard         Gete Off           Ref. Int (S)         IF Gain: Low         Off         Sig Track: Off	#Avg Type. Power (RMS123456 Trig Free Run A WWWWW A N N N N N	Center Frequency 1.783000000 GHz Span	Settings
Spectrum v cale/Div 10 dB	Ref Level 25,00 dBm	Mkr1 1.781 004 GHz -24.342 dBm	4.00000000 MHz Swept Span	
Trace 1 Pass			Zero Span Full Span	
5.00			Start Freq 1.781000000 GHz	
15.0			Stop Freq 1.785000000 GHz	
25.0 manual and tentral barrenarisment	ารระที่สารรถเหลือเป็นเป็นก็การจากสุดภูณฑาสุดภูณฑาสะสาราชาวารระการระ	water and marked and and and and and and and and and an	AUTO TUNE	
35.0			CF Step 400.000 kHz	
55.0			Auto Man	
			Freq Offset 0 Hz	
enter 1.783000 GHz Res BW 1.0 MHz	#Video BW 3.0 MHz	Span 4.000 MHz Sweep 1.00 ms (1001 pts)	X Axis Scale Log	
	/ 05, 2021 12:53 PM		Signal Test	

Plot 7-95. Upper Extended Band Edge Plot (LTE Band 66 - 10MHz QPSK – Full RB)

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req Ref. Int (S) IFE: Off		PNO Balanced Gate Off IF Gain Low Sig Track: Off	Trig Free Run	wer (RMS123456 A WWWWW A N N N N N	Center Frequency 1.710000000 GHz	Settings
Ret	Level 25.00 dE	Bm	Mkr1	1.709 984 GHz -26.743 dBm	4.00000000 MHz Swept Span	
					Full Span	
		man	in an	~	Start Freq 1.708000000 GHz	
	/				Stop Freq 1.712000000 GHz	
	1				AUTO TUNE	
	- And				CF Step 400.000 kHz	
					Auto Man	
					Freq Offset 0 Hz	
#V	ideo BW 390 kł	łz	Swee	Span 4.000 MHz	X Axis Scale	
	Ref	Ref Level 25.00 dE		FE Off Sig Track: Off Mkr1 Ref Level 25:00 dBm	FE Off Sig Track: Off ANN NNN Mkr1 1.709 984 GHz Ref Level 25.00 dBm -26.743 dBm	EE Off         Sig Track: Off         A N N N N         Span           Mkr1 1.709 984 GHz         4.0000000 MHz         \$swept Span         4.0000000 MHz           Ref Level 25.00 dBm         -26.743 dBm         Swept Span         Zero Span           Fill Span         Start Freq         1.708000000 GHz         Start Freq           1.708000000 GHz         Start Freq         1.708000000 GHz         Start Freq           1.708000000 GHz         Good KHz         Start Freq         1.712000000 GHz           1.712000000 GHz         Good KHz         AUTO TUNE         CF Step           4.000 MHz         Span 4.000 MHz         Auto         Man

Plot 7-96. Lower Band Edge Plot (LTE Band 66/4 - 5MHz QPSK - Full RB)



Plot 7-97. Lower Extended Band Edge Plot (LTE Band 66/4 - 5MHz QPSK – Full RB)

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KEYSIGHT Input RF Cauping DC Align Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Balanced Gate Off IF Gain: Low Sig Track: Off	#Avg Type. Po Trig: Free Run	wer (RMS123456 A WWWWW A N N N N N	Center Frequency 1.755000000 GHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 25.00 di	Bm	Mkr1	1.755 000 GHz -21.239 dBm	4.00000000 MHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
5.00	minimu	m				Start Freq 1.753000000 GHz	
						Stop Freq 1.757000000 GHz	
5.0		ard were	han			AUTO TUNE	
			4 hours	mmm	mania	CF Step 400.000 kHz	
55.0						Auto Man	
						Freq Offset 0 Hz	
enter 1.755000 GHz Res BW 120 kHz		#Video BW 390 k	Hz	Swee	Span 4.000 MHz pp 1.00 ms (1001 pts)	X Axis Scale Log	
500	? Oct 20, 2021 12:03:14 PM					Seriel Table	

Plot 7-98. Upper Band Edge Plot (LTE Band 4 - 5MHz QPSK - Full RB)

KEYSIGHT         Input. RF         Input. 2 50 5           RLT         Coupling DC         Corr CCorr F           Algo: AutoNo RF         Freq Ref In           NFE: Off         NFE: Off	Cal µW Path Standard	Trig. Free Run 9 Gate Off #IF Gain Low	Center Freg. 1.7565000 Avg Hold: 100/100 Radio Std: None	00 GHz	Trace Type Clear / Write	Trace Control Detector
Graph v cale/Div 10.0 dB	Ref Value 30.00 d	IBm			Max Hold	
10.0 0.00					Min Hold Restart Averaging	
0.0	mar marine		Macynun unan			
50 0 enter 1.756500 GHz	Video BW 390.00	kH7"		Span 4 MHz		
es BW 39.000 kHz Metrics T			Sweep 3.20 n			
Total Channel Power -25.49 dBm	1.00 MHz					
Total Power Spectral Density -85.	l9 dBm/Hz					
1 う C I ? Nov 02, 20 3:15:20 F	21 M			X		

Plot 7-99. Upper Extended Band Edge Plot (LTE Band 4 - 5MHz QPSK – Full RB)

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T +++ Coupling DC Co Align Auto Fre	out Z 50 Ω #Atten, 36 dB mCCom RCal µW Path Sta eq Ref. Int (S) E: Off	PNO Balanced ndard Gate Off IF Gain Low Sig Track: Off	#Avg Type. Power (RM: Trig: Free Run	A NN NN N	Center Frequency 1.780000000 GHz	Settings
Spectrum v ale/Div 10 dB	Ref Level 25.	00 dBm	Mkr1 1.780 -23	012 GHz .374 dBm	Span 4.00000000 MHz Swept Span Zero Span	
Trace 1 Pass					Fuil Span	
00	minning				Start Freq 1.778000000 GHz	
5.0	4	4			Stop Freq 1.782000000 GHz	
5.0	- 1	min			AUTO TUNE	
		- Marine Contraction	minnen	maria	CF Step 400.000 kHz	
5.0					Auto Man	
					Freq Offset 0 Hz	
nter 1.780000 GHz es BW 120 kHz	#Video BW 3	90 kHz		an 4.000 MHz ms (1001 pts)	X Axis Scale Log	Los

Plot 7-100. Upper Band Edge Plot (LTE Band 66 - 5MHz QPSK - Full RB)

KEYSIGHT         Input: RF         Input: 2 50           R1 T         +++         Coupling: DC         Corr CCorr           Align: Auto/No RF         Freq Ref         NFE: Off	RCal µW Path Standa	Trig. Free Run rd Gate Off #IF Gain: Low	Center Freg. 1.781500000 G Avg(Hold: 100/100 Radio Std: None	Hz Trace Type Clear / Write	Trace Control Detector
Graph Y				Trace Average	
cale/Div 10.0 dB	Ref Value 30.00	dBm		Max Hold	
0.0				Min Hold	
0.0				Restart Averaging	
0.0					
0.0		man	······································	~~~~	
50.0					
center 1.781500 GHz ces BW 39.000 kHz	Video BW 390.00	kHz*	Sp: Sweep 3.20 ms (	an 4 MHz	
Metrics			Sweep 5.20 ms (	loor pis)	
Total Channel Power -25.02 dB	m / 1.00 MHz				
	5.02 dBm/Hz				
1 6 0 - 0 Nov 02,	2021			NA	

Plot 7-101. Upper Extended Band Edge Plot (LTE Band 66 - 5MHz QPSK – Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	SAMSBHD.	Approved by: Technical Manager
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EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten: 36 dB µW Path Standard	PNO Balanced Gate Off IF Gain: Low Sig Track: Off	#Avg Type. Po Trig: Free Run	wer (RMS 1 2 3 4 5 6 A WW WW W A N N N N N	Center Frequency 1.710000000 GHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 dl	Bm	Mkr1	1.709 996 GHz -23.324 dBm	4.00000000 MHz Swept Span Zero Span	
5 0 Trace 1 Pass						Full Span	
						Start Freq 1.708000000 GHz	
5.0						Stop Freq 1.712000000 GHz	
5.0						AUTO TUNE	
5.0						CF Step 400.000 kHz	
5.0						Auto Man	
						Freq Offset 0 Hz	
enter 1.710000 GHz les BW 75 kHz		#Video BW 240 k	Hz	Swee	Span 4.000 MHz ep 1.00 ms (1001 pts)	X Axis Scale Log	
501	Oct 20, 2021 12:08:39 PM	0.5			the second se	Status Tersk	

Plot 7-102. Lower Band Edge Plot (LTE Band 66/4 - 3MHz QPSK - Full RB)

	ut RF uping DC gr Auto/No RF	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	Atten 36 dB µW Path Standar #PNO Fast	Trig. Free Run d Gate Off #IF Gain: Low	Center Freg. 1.7085 Avg Hold 100/100 Radio Std: None	00000 GHz	Trace Type Clear / Write	Trace Control Detector
l Graph Scale/Div 10.0 dB	1						Trace Average	
2000 10.0 dB 10.0 20.0 30.0 40.0 50.0			Ref Value 0.00 d				Max Hold Min Hold Restart Averaging	
60.0 70.0 80.0 90.0 Center 1.708500 C						Span 4 MHz		
Res BW 22.000 k			Video BW 220.00	KHZ	Sweep 9.8	37 ms (1001 pts)		
2 Metrics	-							
Total Channel P Total Power Spe		-25.76 dBm / 1.0 -85.76 dl						
160	2	Nov 02, 2021 3:17:10 PM						

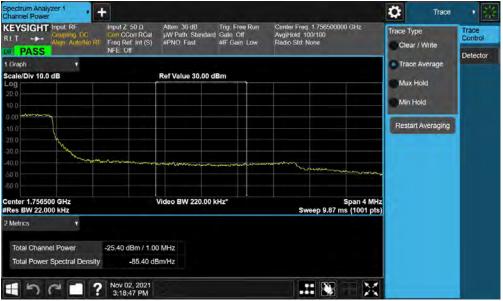
Plot 7-103. Lower Extended Band Edge Plot (LTE Band 66/4 - 3MHz QPSK – Full RB)

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L T Align: Auto	Input Z 50 Ω Gom CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten, 36 dB µW Path Standard	PNO Balanced Gate Off IF Gain Low Sig Track: Off	#Avg Type. Power Trig Free Run	(RMS123456 A WWWW A N N N N N	Center Frequency 1.755000000 GHz	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 d	Bm		755 004 GHz -22.998 dBm	Span 4.00000000 MHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
00	m					Start Freq 1.753000000 GHz	
5.0						Stop Freq 1.757000000 GHz	
5.0						AUTO TUNE	
					~~~~~	CF Step 400.000 kHz Auto Man	
						Freq Offset 0 Hz	
enter 1.755000 GHz Res BW 75 kHz		#Video BW 240 k	Hz	Sweep 1	Span 4.000 MHz .00 ms (1001 pts)	X Axis Scale Log	Lo
501	Oct 20, 2021 12:09:36 PM					Station T = St	

Plot 7-104. Upper Band Edge Plot (LTE Band 4 - 3MHz QPSK - Full RB)



Plot 7-105. Upper Extended Band Edge Plot (LTE Band 4 - 3MHz QPSK – Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	SAMSOND.	Approved by: Technical Manager
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L ++ Coupling DC (Gor Align: Auto Fre	ut Z 50 Ω #Atten, 36 dB mCCon RCal μW Path Standa aq Ref. Int (S) E: Off	PNO Balanced #Avg Ty rd Gate Off Trig Fr IF Gain Low Sig Track: Off	npe. Power (RMS <mark>1</mark> 2345 De Run A WW WW A N N N N	1.780000000 GHz	Settings
Spectrum v cale/Div 10 dB	Ref Level 25.00		lkr1 1.780 004 GH -22.116 dBr		
5 0 Trace 1 Pass				Full Span	1
.00				Start Freq 1.778000000 GHz	
5.0				Stop Freq 1.782000000 GHz	
5.0				AUTO TUNE	
		min	ware ware ware	CF Step 400.000 kHz	
5.0				Auto Man	
				Freq Offset 0 Hz	
enter 1.780000 GHz Res BW 75 kHz	#Video BW 240	kHz	Span 4.000 MH Sweep 1.00 ms (1001 pt		Lo

Plot 7-106. Upper Band Edge Plot (LTE Band 66 - 3MHz QPSK - Full RB)



Plot 7-107. Upper Extended Band Edge Plot (LTE Band 66 - 3MHz QPSK – Full RB)

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T Coupling DC Align Auto	input Z 50 Ω #Atten. 3 Con CCon RCal µW Path Freq Ref. Int (S) NFE: Off	6 dB PNO Balanced Standard Gate Off IF Gain Low Sig Track: Off	#Avg Type. Power (RMS12345) Trig. Free Run A WWWWA	1.710000000 GHz	Settings
pectrum V ale/Div 10 dB	Ref Leve	l 25.00 dBm	Mkr1 1.709 996 GH -22.732 dBr	4.00000000 mm 12	
Trace 1 Pass				Fuil Span	
				Start Freq 1.708000000 GHz	
.0				Stop Freq 1.712000000 GHz	
		<u> </u>		AUTO TUNE	
0				CF Step 400.000 kHz	
0				Auto Man	
				Freq Offset 0 Hz	
ter 1.710000 GHz #Video BW 110 kHz BW 33 kHz			Span 4.000 MH Sweep 1.40 ms (1001 pt		Lo

Plot 7-108. Lower Band Edge Plot (LTE Band 66/4 – 1.4MHz QPSK – Full RB)



Plot 7-109. Lower Extended Band Edge Plot (LTE Band 66/4 – 1.4MHz QPSK – Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	LAMSDAD	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dama 72 of 102		
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	Corr RCal µW Path Standard Gate Off at Int (S) IF Gain Low	d #Avg Type. Power (RMS <mark>123456</mark> Trig Free Run A WWWW A N N N N N	Center Frequency 1.755000000 GHz	Settings
Spectrum v cale/Div 10 dB	Ref Level 25.00 dBm	Mkr1 1.755 000 GHz -23,697 dBm	Span 4.00000000 MHz Swept Span Zero Span	
5 0 Trace 1 Pass			Full Span	
.00			Start Freq 1.753000000 GHz	
5.0			Stop Freq 1.757000000 GHz	
5.0			AUTO TUNE	
5.0			CF Step 400.000 kHz	
5.0		- marine	Auto Man	
			Freq Offset 0 Hz	
enter 1.755000 GHz Res BW 33 kHz	#Video BW 110 kHz	Span 4.000 MHz Sweep 1.40 ms (1001 pts)	X Axis Scale Log	Lo

Plot 7-110. Upper Band Edge Plot (LTE Band 4 – 1.4MHz QPSK – Full RB)



Plot 7-111. Upper Extended Band Edge Plot (LTE Band 4 – 1.4MHz QPSK – Full RB)

FCC ID: A3LSMS901E	PCTEST Had tude particip	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
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KEYSIGHT Input. RF Coupling DC Align: Auto		n, 36 dB PNO: Balance Path Standard Gate Off IF Gain Low Sig Track: Off	Trig Free Run A WW	1.780000000 GHz
Spectrum v cale/Div 10 dB	Ref L	evel 25.00 dBm	Mkr1 1.780 004 -23.870	GHz 4.0000000 MHz
Trace 1 Pass				Full Span
.00				Start Freq 1.778000000 GHz
15.0		1		Stop Freq 1.782000000 GHz
25.0				AUTO TUNE
35.0				CF Step 400.000 kHz
55.0				Auto Man
				Freq Offset 0 Hz
enter 1.780000 GHz Res BW 33 kHz	#Vide	eo BW 110 kHz	Span 4.00 Sweep 1.40 ms (100	
501?	Oct 20, 2021 1:04:12 PM			

Plot 7-112. Upper Band Edge Plot (LTE Band 66 – 1.4MHz QPSK – Full RB)



Plot 7-113. Upper Extended Band Edge Plot (LTE Band 66 – 1.4MHz QPSK – Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	2	Approved by: Technical Manager
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## 7.5 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 7-4. Test Instrument & Measurement Setup

#### Test Notes

None.

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## WCDMA AWS

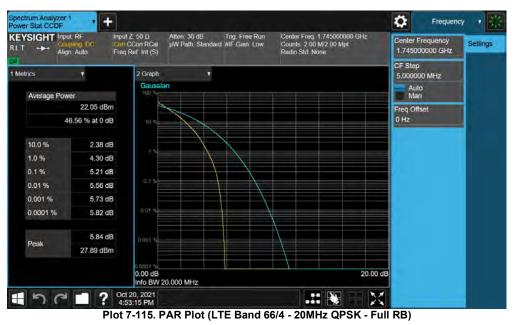


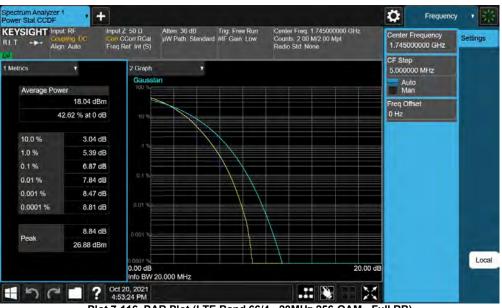
Plot 7-114. PAR Plot (WCDMA, Ch. 1413)

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# LTE Band 66/4





Plot 7-116. PAR Plot (LTE Band 66/4 - 20MHz 256-QAM - Full RB)

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Plot 7-117. PAR Plot (LTE Band 66/4 - 15MHz QPSK - Full RB)



Plot 7-118. PAR Plot (LTE Band 66/4 - 15MHz 256-QAM - Full RB)

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Plot 7-119. PAR Plot (LTE Band 66/4 - 10MHz QPSK - Full RB)



Plot 7-120. PAR Plot (LTE Band 66/4 - 10MHz 256-QAM - Full RB)

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Plot 7-121. PAR Plot (LTE Band 66/4 - 5MHz QPSK - Full RB)



Plot 7-122. PAR Plot (LTE Band 66/4 - 5MHz 256-QAM - Full RB)

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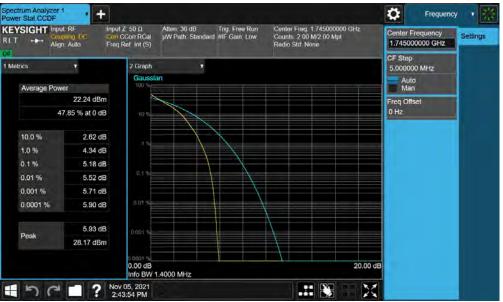
Plot 7-123. PAR Plot (LTE Band 66/4 - 3MHz QPSK - Full RB)



Plot 7-124. PAR Plot (LTE Band 66/4 - 3MHz 256-QAM - Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	SAMSUND	Approved by: Technical Manager
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Plot 7-125. PAR Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB)



Plot 7-126. PAR Plot (LTE Band 66/4 - 1.4MHz 256-QAM - Full RB)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	MSBNG	Approved by: Technical Manager
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## 7.6 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 polarized tuned 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

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW  $\geq$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points  $\geq$  2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

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## Test Setup

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

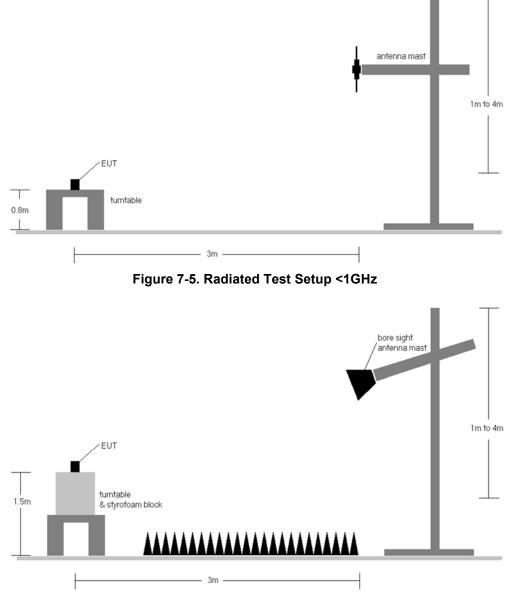


Figure 7-6. Radiated Test Setup >1GHz

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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.

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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIR.P [dBm]	EIRP [Watts]	EIRP Limit (dBm)	Margin [dB]	ERP (dBm)	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
N	OPSK	704.0	V	170	337	1.34	1/49	15.45	16.79	0.048	36.99	-20.20	14.64	0.029	34.77	-20.13
MHz	OPSK	707.5	v	149	307	1.33	1/49	16.23	17.56	0.057	36.99	-19.43	15.41	0.035	34.77	-19.36
5	OPSK	711.0	V	176	228	1.33	1/25	15.98	17.31	0.054	36.99	-19.68	15,16	0.033	34.77	-19.62
-	16-QAM	707.5	V	149	307	1.33	1/49	15.27	16.60	0.046	36.99	-20.39	14.45	0.028	34.77	-20.32
A	OPSK	701.5	V	170	337	1.35	1/24	15.35	16.70	0.047	36.99	-20.29	14.55	0.028	34.77	-20.22
Ŧ	QPSK	707.5	V	149	307	1.33	1/24	15.91	17.24	0.053	36.99	-19.75	15.09	0.032	34.77	-19.68
5 MHz	OPSK	713.5	V	176	228	1.32	1/0	15.88	17.20	0.052	36.99	-19.79	15.05	0.032	34.77	-19.72
	16-QAM	707.5	V	149	307	1.33	1/24	15.12	16.45	0.044	36.99	-20.54	14.30	0.027	34.77	-20.47
	OPSK	700.5	V	170	337	1.35	1/7	15.23	16.58	0.045	36.99	-20.41	14.43	0.028	34.77	-20.34
MHz	OPSK	707.5	V	149	307	1.33	1/14	15.96	17.29	0.054	36.99	-19.70	15.14	0.033	34.77	-19.63
2 2	OPSK	714.5	V	176	228	1.32	1/0	15.89	17.21	0.053	36.99	-19.78	15.06	0.032	34.77	-19.71
	16-QAM	707.5	V	149	307	1.33	1/14	15.08	16.41	0.044	36.99	-20.58	14.26	0.027	34.77	-20.51
N	OPSK	699.7	V	170	337	1.35	1/5	15.15	16.50	0.045	36.99	-20.49	14.35	0.027	34.77	-20.42
MHz	OPSK	707.5	V	149	307	1.33	1/5	15.91	17.24	0.053	36.99	-19.75	15.09	0.032	34.77	-19.68
-	QPSK	715.3	V	176	228	1.32	1/3	15.91	17.23	0.053	36.99	-19.76	15.08	0.032	34.77	-19.70
÷	16-QAM	707.5	V	149	307	1.33	1/5	15.0B	16.41	0.044	36.99	-20.58	14.28	0.027	34.77	-20.51
10 MHz	Opposite Pol.	707.5	H	112	275	1.33	1/5	15.94	17.27	0.053	36.99	-19.72	15.12	0.033	34.77	-19.65
10 Minz	WCP	707.5	V	177	218	1.33	1/5	10.60	11.93	0.016	36.99	-25.06	9.78	0.010	34.77	-24.99

Table 7-2. ERP Data (LTE Band 12/17)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin (dB)	ERP (dBm)	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
10 MHz	OPSK	782.0	н	252	260	1.17	1/49	19.01	20.18	0.104	36.99	-16.81	18.03	0.064	34.77	-16.74
10 1012	16-QAM	782.0	н	252	260	1.17	1/49	18.17	19.34	0.086	36.99	-17.65	17.19	0.052	34.77	-17.58
	OPSK	779.5	н	246	268	1.17	1/12	18.60	19.77	0.095	36.99	-17.22	17.62	0.058	34.77	-17 15
MHz	QPSK	782.0	н	252	260	1.17	1/24	18.70	19.87	0.097	36.99	-17.12	17.72	0.059	34.77	-17.05
2 2	OPSK	784.5	н	252	270	1.16	1/24	18.99	20.15	0.104	36.99	-16.84	18.00	0.063	34.77	-16.77
	16-QAM	784.5	н	252	270	1.16	1/24	18.12	19.28	0.085	36.99	-17.71	17.13	0.052	34.77	-17.64
10.0016	Opposite Pol.	782.0	V	139	286	1.17	1/24	18.43	19.60	0.091	36.99	-17.39	17.45	0.056	34.77	-17.32
10 MHz	WCP	782.0	н	236	265	1.17	1/24	14.68	15.85	0.038	36.99	-21.14	13.70	0.023	34.77	-21.07

Table 7-3. ERP Data (LTE Band 13)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1712.40	WCDMA1700	V	111	299	13.96	8.70	22.66	0.184	30.00	-7.34
1732.60	WCDMA1700	V	108	296	12.24	8.70	20.94	0.124	30.00	-9.06
1752.60	WCDMA1700	V	100	311	12.61	8.70	21.31	0.135	30.00	-8.69
1712.40	WCDMA1700	Н	186	161	13.88	8.70	22.58	0.181	30.00	-7.42
1712.40	WCDMA1700 (WCP)	V	169	119	10.59	8.70	19.29	0.085	30.00	-10.71

Table 7-4. EIRP Data (WCDMA AWS)

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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
N	QPSK	1720.0	V	104	317	8.70	1/50	13.81	22.51	0.178	30.00	-7.49
20 MHz	QPSK	1745.0	V	101	297	8.70	1/50	13.06	21.76	0.150	30.00	-8.24
0	QPSK	1770.0	V	133	309	8.71	1/50	13.14	21.85	0.153	30.00	-8.15
2	16-QAM	1720.0	V	104	317	8.70	1/50	12.50	21.20	0.132	30.00	-8.80
N	QPSK	1717.5	V	104	317	8.70	1/0	13.84	22.54	0.179	30.00	-7.46
MHz	QPSK	1745.0	V	101	297	8.70	1/37	13.27	21.97	0.158	30.00	-8.03
15 N	QPSK	1772.5	V	133	309	8.71	1/37	13.40	22.11	0.162	30.00	-7.89
-	16-QAM	1717.5	V	104	317	8.70	1/0	12.72	21.42	0,139	30.00	-8.58
N	QPSK	1715.0	V	104	317	8.70	1/25	14.31	23.01	0.200	30.00	-6.99
10 MHz	QPSK	1745.0	V	101	297	8.70	1/25	13.44	22.14	0.164	30.00	-7.86
-	QPSK	1775.0	V	133	309	8.71	1/25	13.62	22.33	0.171	30.00	-7.67
-	16-QAM	1715.0	V	104	317	8.70	1/25	12.89	21.59	0.144	30.00	-8.41
	QPSK	1712.5	V	104	317	8.70	1/12	13.75	22.45	0.176	30.00	-7.55
5 MHz	QPSK	1745.0	V	101	297	8.70	1/12	12.95	21.65	0.146	30.00	-8.35
2	QPSK	1777.5	V	133	309	8.71	1/0	13.10	21.81	0.152	30.00	-8.19
-0	16-QAM	1712.5	V	104	317	8.70	1/12	12.61	21.31	0.135	30.00	-8.69
	QPSK	1711.5	V	104	317	8.70	1/7	13.42	22.12	0.163	30.00	-7.88
3 MHz	QPSK	1745.0	V	101	297	8.70	1/7	12.37	21.07	0.128	30.00	-8.93
2	QPSK	1778.5	V	133	309	8.71	1/7	12.41	21.12	0.129	30.00	-8.88
en la	16-QAM	1711.5	V	104	317	8.70	1/7	12.31	21.01	0.126	30.00	-8.99
N	QPSK	1710.7	V	104	317	8.70	1/5	13.24	21.94	0.156	30.00	-8.06
1.4 MHz	QPSK	1745.0	V	101	297	8.70	1/0	12.27	20.97	0.125	30.00	-9.03
4	QPSK	1779.3	V	133	309	8.71	1/0	12.45	21.16	0.131	30.00	-8.84
÷	16-QAM	1710.7	V	104	317	8.70	1/5	12.36	21.06	0.128	30.00	-8.94
10.101	Opposite Pol.	1715.0	н	101	159	8.70	1/3	14.07	22.77	0.189	30.00	-7.23
10 MHz	WCP	1715.0	V	105	248	8.70	1/3	11.15	19.85	0.097	30.00	-10.15

Table 7-5. EIRP Data (LTE Band 66/4)

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## 7.7 Radiated Spurious Emissions Measurements

### **Test Overview**

Radiated spurious emissions 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 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

ANSI/TIA-603-E-2016 - Section 2.2.12

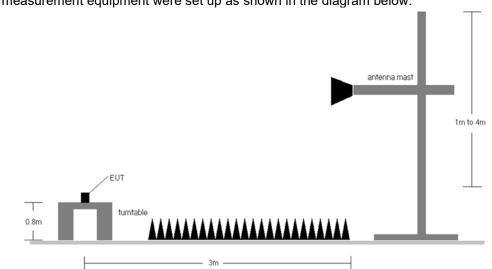
### Test Settings

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\ge$  3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points  $\geq$  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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#### Test Setup



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

Figure 7-7. Test Instrument & Measurement Setup

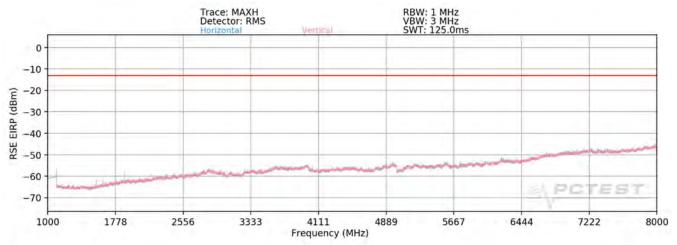
### Test Notes

- 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) 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.
- 3) This unit was tested with its standard battery.
- 4) 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.
- 5) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 6) 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.
- 7) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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# LTE Band 12/17





Bandwidth (MHz):	10
Frequency (MHz):	704
RB / Offset:	1/25

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]
1408.00	н	169	25	-74.63	-8.56	23.81	-71.45	-13.00	-58.45
2112.00	н	1000		-75.70	-5.67	25.63	-69.62	-13.00	-56.62
2816.00	H	1.1.1		-76.32	-3.53	27.15	-68.11	-13.00	-55.11
3520.00	н		· · · ·	-77.02	-1.00	28,98	-66.28	-13.00	-53.28
4224.00	н	1.9.1		-77.44	0.45	30.01	-65.25	-13.00	-52.25

Table 7-6. Radiated Spurious Data (LTE Band 12/17 – Low Channel)

Bandwidth (MHz):	10	
Frequency (MHz):	707.5	
RB / Offset:	1/25	

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]
1415.00	н	170	19	-74.61	-8.55	23.84	-71.42	-13.00	-58.42
2122.50	н			-75.65	-5.65	25.70	-69.56	-13.00	-56.56
2830.00	н	10 mil 10 mil 1	1 <u>1</u>	-76.28	-3.32	27.40	-67.85	-13.00	-54.85
3537.50	H			-76.93	-0,81	29.26	-66.00	-13.00	-53.00
4245.00	н	1.1.9.1.1		-77.20	0.41	30.21	-65.05	-13.00	-52.05

Table 7-7. Radiated Spurious Data (LTE Band 12/17 – Mid Channel)

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Bandwidth (MHz):	10	
Frequency (MHz):	711	
RB / Offset:	1/25	

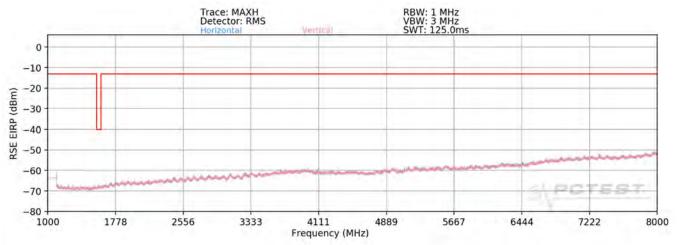
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1422.00	н	161	30	-74.76	-8.54	23.70	-71.56	-13.00	-58.56
2133.00	н		-	-75.77	-5.67	25.56	-69.70	-13.00	-56.70
2844.00	н	1.1.1.1		-76.40	-3.05	27.55	-67.70	-13.00	-54.70
3555.00	н			-76.95	-0.62	29.43	-65.82	-13.00	-52.82
4266.00	н		-	-77.20	0.52	30.32	-64.94	-13.00	-51.94

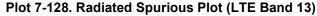
Table 7-8. Radiated Spurious Data (LTE Band 12/17 – High Channel)

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# LTE Band 13





2	Frequency [MHz]	Ant. Pol.	Antenna Height [cm]	Turntable Azimuth	Analyzer Level	AFCL	Field Strength	EIRP Spi Emission
	RB / Offset:		1/25					
	Frequency (MHz):		782					
	Bandwidth (MHz):		10					

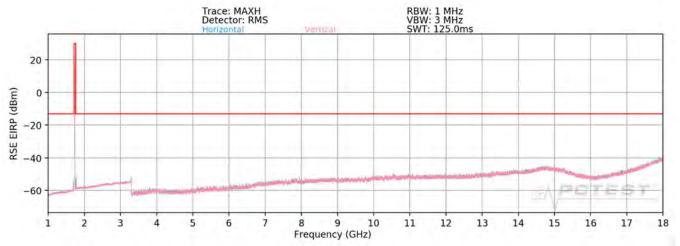
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Azimuth [degree]	Level [dBm]	AFCL [dB/m]	Strength	Emission Level [dBm]	Limit [dBm]	Margin [dB]
1564.00	н			-75.55	-8.09	23.36	-71.90	-40.00	-31.90
2346.00	н			-75.51	-4.64	26.85	-68.40	-13.00	-55.40
3128.00	н			-76.00	-1.60	29.40	-65.86	-13.00	-52.86
3910.00	н	· ·		-76.55	1.01	31.46	-63.80	-13.00	-50.80

Table 7-9. Radiated Spurious Data (LTE Band 13 – Mid Channel)

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# WCDMA AWS





Mode:	WCDMA RMC	
Channel:	1312	
Frequency (MHz):	1712.4	

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]
3424.80	v			-68.62	-0.33	38.05	-57.21	-13.00	-44.21
5137.20	V		*	-69.35	3.05	40.70	-54.56	-13.00	-41.56
6849.60	V		•	-70.85	7.17	43.32	-51.93	-13.00	-38.93
8562.00	V	•		-72.56	10.46	44.90	-50.36	-13.00	-37.36

7-10. Radiated Spurious Data (WCDMA AWS - Low Channel)

Mode:	WCDMA RMC
Channel:	1413
Frequency (MHz):	1732.6

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]
3465.20	V		· · · ·	-69.22	-0.13	37.65	-57.61	-13.00	-44.61
5197.80	V	-	-	-68.79	2.58	40.79	-54.47	-13.00	-41.47
6930.40	V		-	-70.16	7.02	43.86	-51.40	-13.00	-38.40
8663.00	V	•	•	-72.08	10.58	45.50	-49.75	-13.00	-36.75

Table 7-11. Radiated Spurious Data (WCDMA AWS – Mid Channel)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	SAMSUND?	Approved by: Technical Manager	
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Mode:	WCDMA RMC
Channel:	1513
Frequency (MHz):	1752.6

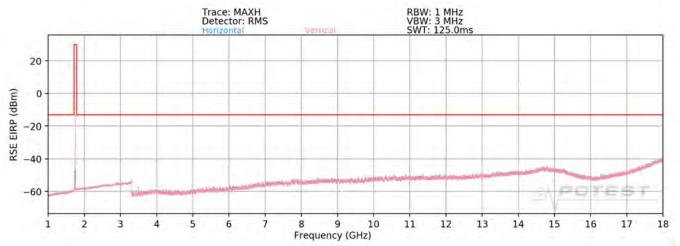
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3505.20	V			-68.03	-0.06	38.91	-56.35	-13.00	-43.35
5257.80	V			-69.00	2.52	40.52	-54.73	-13.00	-41.73
7010.40	V	1.2.1.1	÷	-71.18	7.69	43.51	-51.75	-13.00	-38.75
8763.00	V		÷	-72.33	10.70	45.37	-49.89	-13.00	-36.89

Table 7-12. Radiated Spurious Data (WCDMA AWS – High Channel)

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# LTE Band 66/4





Bandwidth (MHz):	10
Frequency (MHz):	1715
RB / Offset:	1/25

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]
3430.00	н	160	46	-74.27	-0.84	31.89	-63.37	-13.00	-50.37
5145.00	H	11.049.11	1.1.1	-77.53	2.38	31.85	-63.41	-13.00	-50.41
6860.00	н			-79.17	7.20	35.03	-60.23	-13.00	-47.23
8575.00	н	•		-80.10	10.65	37.55	-57.71	-13.00	-44.71
10290.00	н	1.1.2.1.1	-	-81.95	12.03	37.08	-58.18	-13.00	-45.18

Table 7-13. Radiated Spurious Data (LTE Band 66/4 – Low Channel)

Bandwidth (MHz):	10	_
Frequency (MHz):	1745	
RB / Offset:	1/25	

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]
3490.00	н	131	44	-73.18	-0.86	32.96	-62.30	-13.00	-49.30
5235.00	н	1.00	-	-77.35	2.33	31.98	-63.28	-13.00	-50.28
6980,00	н	1000	1.00	-79.12	7.58	35.46	-59.80	-13.00	-46.80
8725.00	н	-		-80.45	11.08	37.63	-57.63	-13.00	-44.63
10470.00	н	1.1.9.1		-81.57	12.67	38.10	-57.15	-13.00	-44.15
					and the second se				

Table 7-14. Radiated Spurious Data (LTE Band 66/4 - Mid Channel)

FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	SAMSOND	Approved by: Technical Manager	
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Bandwidth (MHz):	10	]
Frequency (MHz):	1775	
RB / Offset:	1/25	

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]
3550.00	н	142	40	-75.79	-0.35	30.86	-64.39	-13.00	-51.39
5325.00	н		-	-78.28	3.09	31.81	-63.45	-13.00	-50.45
7100.00	н			-79.36	7.58	35.22	-60.04	-13.00	-47.04
8875.00	н			-80.71	11.04	37.33	-57.93	-13.00	-44.93
10650.00	н			-81.56	13.35	38.79	-56.47	-13.00	-43.47

Table 7-15. Radiated Spurious Data (LTE Band 66/4 – High Channel)

FCC ID: A3LSMS901E	PCTEST Practicity control of	PART 27 MEASUREMENT REPORT	SAMSUND	Approved by: Technical Manager
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## 7.8 Frequency Stability / Temperature Variation

#### **Test Overview and Limit**

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

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

For Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### Test Procedure Used

ANSI/TIA-603-E-2016

#### **Test Settings**

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

#### Test Setup

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

#### Test Notes

None

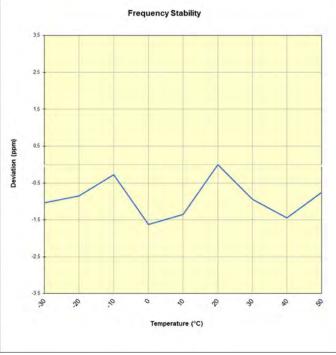
FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	SAMSONO	Approved by: Technical Manager
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# LTE Band 12/17

	Operating F	requency (Hz):	707,50	00,000	
1	Ref. Voltage (VDC):		4.:	4.39	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
		- 30	707,490,301	-733	-0.0001036
		- 20	707,490,431	-603	-0.0000852
		- 10	707,490,838	-196	-0.0000277
		0	707,489,886	-1,148	-0.0001623
100 %	4.39	+ 10	707,490,078	-956	-0.0001351
		+ 20 (Ref)	707,491,034	0	0.0000000
		+ 30	707,490,367	-667	-0.0000943
		+ 40	707,490,012	-1,022	-0.0001445
		+ 50	707,490,499	-536	-0.0000757
Battery Endpoint	3.85	+ 20	707,490,227	-807	-0.0001141

Table 7-16. LTE Band 12/17 Frequency Stability Data



Plot 7-131. LTE Band 12/17 Frequency Stability Chart

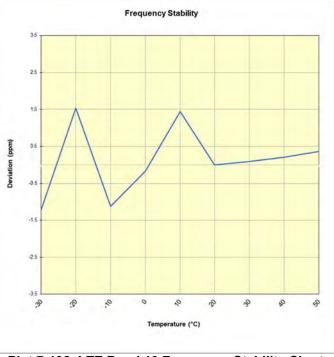
FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	JAMSOND	Approved by: Technical Manager
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# LTE Band 13

	Operating F	requency (Hz):	782,00	00,000	
1	Ref. Voltage (VDC):		4.:	4.39	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
	4.39	- 30	781,998,992	-956	-0.0001222
		- 20	782,001,150	1,203	0.0001538
		- 10	781,999,068	-879	-0.0001124
		0	781,999,816	-131	-0.0000168
100 %		+ 10	782,001,078	1,131	0.0001446
		+ 20 (Ref)	781,999,947	0	0.0000000
	-	+ 30	782,000,015	68	0.0000087
		+ 40	782,000,112	165	0.0000211
		+ 50	782,000,233	286	0.0000365
Battery Endpoint	3.85	+ 20	782,001,039	1,092	0.0001396

Table 7-17. LTE Band 13 Frequency Stability Data



Plot 7-132. LTE Band 13 Frequency Stability Chart

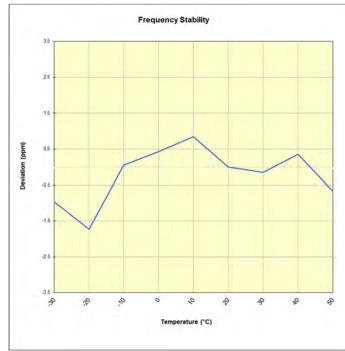
FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
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# WCDMA AWS

WCDMA /	AWS				
	Operating F	requency (Hz):	1,732,6	00,000	1
Į.	Ref. Voltage (VDC):		4.39		]
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
	4.39	- 30	1,732,600,711	-1,681	-0.0000970
		- 20	1,732,599,399	-2,993	-0.0001727
		- 10	1,732,602,471	79	0.0000046
		0	1,732,603,124	732	0.0000422
100 %		+ 10	1,732,603,858	1,466	0.0000846
		+ 20 (Ref)	1,732,602,392	0	0.0000000
		+ 30	1,732,602,137	-255	-0.0000147
		+ 40	1,732,602,997	605	0.0000349
	1	+ 50	1,732,601,233	-1,159	-0.0000669
Battery Endpoint	3.85	+ 20	1,732,599,678	-2,714	-0.0001566

Table 7-18. WCDMA AWS Frequency Stability Data



Plot 7-133. WCDMA AWS Frequency Stability Chart

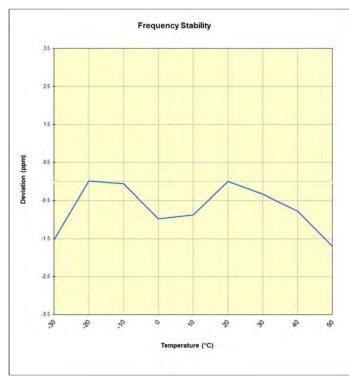
FCC ID: A3LSMS901E		PART 27 MEASUREMENT REPORT	SAMESDAG	Approved by: Technical Manager
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# LTE Band 66/4

	Operating F	requency (Hz):	1,745,0	00,000	
U.	Ref.	Voltage (VDC):	4.3	4.39	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
	4.39	- 30	1,744,998,924	-2,666	-0.0001528
		- 20	1,745,001,612	22	0.0000013
		- 10	1,745,001,480	-110	-0.0000063
		0	1,744,999,881	-1,709	-0.0000979
100 %		+ 10	1,745,000,057	-1,533	-0.0000879
		+ 20 (Ref)	1,745,001,590	0	0.0000000
		+ 30	1,745,001,009	-581	-0.0000333
		+ 40	1,745,000,237	-1,353	-0.0000775
		+ 50	1,744,998,626	-2,964	-0.0001699
Battery Endpoint	3.85	+ 20	1,745,002,789	1,199	0.0000687

Table 7-19. LTE Band 66/4 Frequency Stability Data





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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: A3LSMS901E** complies with all the requirements of Part 27 of the FCC rules.

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