

**ELEMENT WASHINGTON DC LLC** 

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## PART 24 MEASUREMENT REPORT

#### **Applicant Name:**

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

#### Date of Testing:

5/23/2024 - 7/31/2024 **Test Report Issue Date:** 8/2/2024 **Test Site/Location:** Element lab., Columbia, MD, USA **Test Report Serial No.:** 1M2405140039-19.A3L

## FCC ID:

## A3LSMX828U

Applicant Name:

## Samsung Electronics Co., Ltd.

Application Type: Model: EUT Type: FCC Classification: FCC Rule Part: Test Procedure(s): Certification SM-X828U Portable Tablet PCS Licensed Transmitter (PCB) 24 ANSI C63.26-2015

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.

RJ Ortanez Executive Vice President



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Antenna-1						
			T., F.,	EI	RP	Emission
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Designator
WCDMA	N/A	Spread Spectrum	1852.4 - 1907.6	0.192	22.83	4M17F9W
	20 MHz	QPSK	1860 - 1905	0.259	24.14	17M9G7D
		16QAM	1860 - 1905	0.219	23.41	18M0W7D
	15 MHz	QPSK	1857.5 - 1907.5	0.264	24.22	13M5G7D
		16QAM	1857.5 - 1907.5	0.221	23.44	13M5W7D
	10 MHz	QPSK	1855 - 1910	0.259	24.13	9M02G7D
LTE Band 25/2		16QAM	1855 - 1910	0.215	23.33	8M99W7D
LIE Band 20/2	5 MHz	QPSK	1852.5 - 1912.5	0.260	24.15	4M51G7D
		16QAM	1852.5 - 1912.5	0.235	23.71	4M52W7D
	3 MHz	QPSK	1851.5 - 1913.5	0.257	24.09	2M70G7D
	3 IVI⊓Z	16QAM	1851.5 - 1913.5	0.212	23.27	2M71W7D
	1.4 MHz	QPSK	1850.7 - 1914.3	0.256	24.08	1M09G7D
	1.4 IVI⊓Z	16QAM	1850.7 - 1914.3	0.216	23.35	1M10W7D
	40 MHz	π/2 BPSK	1870 - 1895	0.195	22.91	38M8G7D
		QPSK	1870 - 1895	0.194	22.88	38M8G7D
		16QAM	1870 - 1895	0.153	21.84	38M7W7D
		π/2 BPSK	1867.5 - 1897.5	0.210	23.23	32M4G7D
	35 MHz	QPSK	1867.5 - 1897.5	0.207	23.17	33M7G7D
		16QAM	1867.5 - 1897.5	0.168	22.26	33M7W7D
	30 MHz	Π/2 BPSK	1865 - 1900	0.199	22.99	28M7G7D
		QPSK	1865 - 1900	0.200	23.01	28M7G7D
		16QAM	1865 - 1900	0.157	21.96	28M7W7D
	25 MHz	π/2 BPSK	1862.5 - 1902.5	0.204	23.09	23M0G7D
		QPSK	1862.5 - 1902.5	0.202	23.04	23M8G7D
		16QAM	1862.5 - 1902.5	0.153	21.84	23M9W7D
NR Band n25/2	π/2 !	Π/2 BPSK	1860 - 1905	0.202	23.06	18M0G7D
	20 MHz	QPSK	1860 - 1905	0.204	23.10	19M0G7D
		16QAM	1860 - 1905	0.155	21.91	19M0W7D
		Π/2 BPSK	1857.5 - 1907.5	0.199	22.99	13M5G7D
	15 MHz	QPSK	1857.5 - 1907.5	0.200	23.02	14M1G7D
		16QAM	1857.5 - 1907.5	0.151	21.79	14M2W7D
		π/2 BPSK	1855 - 1910	0.199	23.00	9M00G7D
	10 MHz	QPSK	1855 - 1910	0.187	22.72	9M33G7D
		16QAM	1855 - 1910	0.145	21.62	9M35W7D
		π/2 BPSK	1852.5 - 1912.5	0.197	22.94	4M48G7D
	5 MHz	QPSK	1852.5 - 1912.5	0.200	23.01	4M50G7D
	_	16QAM	1852.5 - 1912.5	0.153	21.84	4M50W7D

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Antenna-2							
				Ell	Emission		
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Designator	
	20 MHz	QPSK	1860 - 1905	0.139	21.44	18M0G7D	
	20 1011 12	16QAM	1860 - 1905	0.120	20.78	18M0W7D	
	15 MHz - 10 MHz -	QPSK	1857.5 - 1907.5	0.141	21.50	13M5G7D	
		16QAM	1857.5 - 1907.5	0.121	20.84	13M5W7D	
		QPSK	1855 - 1910	0.145	21.62	9M01G7D	
LTE Band 25/2		16QAM	1855 - 1910	0.121	20.85	8M98W7D	
LIE Danu 20/2	5 MHz	QPSK	1852.5 - 1912.5	0.145	21.61	4M51G7D	
		16QAM	1852.5 - 1912.5	0.125	20.97	4M49W7D	
		QPSK	1851.5 - 1913.5	0.141	21.48	2M70G7D	
	3 MHz	16QAM	1851.5 - 1913.5	0.124	20.95	2M70W7D	
	1.4 MHz	QPSK	1850.7 - 1914.3	0.142	21.52	1M10G7D	
	1.4 MHZ	16QAM	1850.7 - 1914.3	0.127	21.05	1M10W7D	

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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 Element Test Location

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

### 1.3 Test Facility / Accreditations

#### Measurements were performed at Element lab located in Columbia, MD 21046, U.S.A.

- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Washington DC LLC 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).
- Element Washington DC LLC facility is a registered (2451B) test laboratory with the site description on file with ISED.
- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreement.

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## 2.0 PRODUCT INFORMATION

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Tablet FCC ID: A3LSMX828U**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 24.

Test Device Serial No.: 27174, 18223, 18066, 25343, 18074, 18207, 18231

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR (FR1 and FR2), 802.11b/g/n/ac/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), 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 C63.26-2015. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

### 2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version X828USQU0AXFE installed on the EUT.

## 2.5 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 "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services" (ANSI C63.26-2015) were used in the measurement of the EUT.

Deviation from Measurement Procedure......None

## 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 turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

For radiated power measurements, substitution method is used per the guidance of ANSI C63.26-2015. For emissions below 1GHz, a half-wave dipole is substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

P<sub>d [dBm]</sub> = P<sub>g [dBm]</sub> - cable loss [dB] + antenna gain [dBd/dBi];

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

For radiated spurious emissions measurements, the field strength conversion method is used per the formulas in Section 5.2.7 of ANSI C63.26-2015. Field Strength (EIRP) is calculated using the following formulas:

 $E_{[dB\mu V/m]}$  = Measured amplitude level<sub>[dBm]</sub> + 107 + Cable Loss<sub>[dB]</sub> + Antenna Factor<sub>[dB/m]</sub> And EIRP<sub>[dBm]</sub> =  $E_{[dB\mu V/m]}$  + 20logD – 104.8; where D is the measurement distance in meters.

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 v01r01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26-2015.

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## 4.0 MEASUREMENT UNCERTAINTY

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

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

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## 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AP2	EMC Cable and Switch System	4/2/2024	Annual	4/2/2025	AP2
-	LTx2	Licensed Transmitter Cable Set	4/2/2024	Annual	4/2/2025	LTx2
-	LTx3	LIcensed Transmitter Cable Set	4/2/2024	Annual	4/2/2025	LTx3
-	LTx5	LIcensed Transmitter Cable Set	4/2/2024	Annual	4/2/2025	LTx5
Agilent	N9030A	50GHz PXA Signal Analyzer	4/23/2024	Annual	4/23/2025	US51350301
Anritsu	MT8821C	Radio Communication Analyzer		N/A		6201381794
Com-Power	AL-130R	Active Loop Antenna	2/22/2024	Biennial	2/22/2026	121085
Emco	3115	Horn Antenna (1-18GHz)	8/8/2022	Biennial	8/8/2024	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	7/5/2023	Triennial	7/5/2025	9203-2178
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	2/22/2024	Biennial	2/22/2026	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/29/2023	Biennial	3/29/2025	128337
ETS Lindgren	3164-10	Quad Ridge Horn 400MHz - 10000MHz	7/13/2023	Biennial	7/13/2025	166283
ETS Lindgren	3816/2NM	LISN	8/11/2022	Biennial	8/11/2024	114451
Keysight Technologies	N9020A	MXA Signal Analyzer	4/11/2024	Annual	4/11/2025	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	8/29/2023	Annual	8/29/2024	MY49430494
Keysight Technologies	N9030A	PXA Signal Analyzer	8/7/2023	Annual	8/7/2024	MY54490576
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	9/25/2023	Annual	9/25/2024	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/11/2023	Annual	9/11/2024	100348
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer	3/8/2024	Annual	3/8/2025	103187
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	8/30/2022	Biennial	8/30/2024	A051107

Table 5-1. Test Equipment

#### Notes:

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

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## 6.0 SAMPLE CALCULATIONS

## WCDMA Emission Designator

#### Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz F = Frequency Modulation 9 = Composite Digital Info W = Combination (Audio/Data)

## **QPSK Modulation**

#### Emission Designator = 8M62G7D

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

## **QAM Modulation**

#### Emission Designator = 8M45W7D

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

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## **Spurious Radiated Emission**

#### Example: Spurious emission at 3700.40 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm -(-24.80) = 50.3 dBc.

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## 7.0 TEST RESULTS

## 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMX828U
FCC Classification:	PCS Licensed Transmitter (PCB)
Mode(s):	WCDMA/LTE/NR

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
	Transmitter Conducted Output Pow er*	2.1046(a), 2.1046(c)	N/A	PASS	See RF Exposure Report
Ð	Occupied Bandw idth	2.1049(h)	N/A	PASS	Section 7.2
CONDUCTED	Conducted Band Edge / Spurious Emissions	2.1051, 24.238(a)	> 43 + 10log10(P[Watts]) at Band Edge and for all out- of-band emissions	PASS	Sections 7.3, 7.4
CO	Peak-to-Average Ratio	24.232(d)	≤ 13 dB	PASS	Section 7.5
	Frequency Stability	2.1055, 24.235	Fundamental emissions stay within authorized frequency block **Carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm	PASS	Section 7.8
RADIATED	Equivalent Isotropic Radiated Pow er	24.232(c)	< 2 Watts max. EIRP	PASS	Section 7.6
RADI	Radiated Spurious Emissions	2.1053, 24.238(a)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter pow er **Spurious emissions from receivers shall not exceed the limit detailed in PSS-Cap(7.3)	PASS	Section 7.7

\* The only transmitter output conducted powers included in this report are those where the Pmax value, per the tune-up document, is higher than any of the DSI power levels. For the remaining conducted power measurements, see the **RF Exposure Report**.

#### Table 7-1. Summary of Test Results

#### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v2.3.0.

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## 7.2 Conducted Output Power Data

#### **Test Overview**

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

#### Test Procedure Used

ANSI C63.26-2015 – Section 5.2

#### **Test Settings**

- 1. Detector = RMS
- 2. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 3. Sweep time = auto couple
- 4. The trace was allowed to stabilize
- 5. Please see test notes below for RBW and VBW settings

#### Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

#### Test Notes

- 1. Conducted power measurements were evaluated using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.
- 2. All other conducted power measurements are contained in the RF exposure report for this filing.
- 3. Conducted power was found to reduce for the higher order QAM modulations when compared to 16QAM. Due to this trend, only the worst-case QAM (16QAM) powers are included in this section.

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz		26140	1860.0	1 / 0	24.25
	QPSK	26365	1882.5	1 / 0	24.19
		26590	1905.0	1 / 0	24.18
7	16-QAM	26365	1882.5	1 / 0	23.45
N		26115	1857.5	1 / 0	24.28
MHz	QPSK	26365	1882.5	1 / 0	24.26
15 N		26615	1907.5	1 / 0	24.21
~	16-QAM	26365	1882.5	1/0	23.48
z		26090	1855.0	1 / 0	24.29
10 MHz	QPSK	26365	1882.5	1 / 0	24.18
		26640	1910.0	1 / 0	24.14
-	16-QAM	26365	1882.5	1 / 0	23.37
N		26065	1852.5	1 / 0	24.30
H	QPSK	26365	1882.5	1 / 0	24.20
5 MHz		26665	1912.5	1 / 0	24.18
4,	16-QAM	26365	1882.5	1 / 0	23.75
N		26055	1851.5	1 / 14	24.33
H	QPSK	26365	1882.5	1 / 0	24.14
3 MHz		26675	1913.5	1 / 7	24.26
(-)	16-QAM	26365	1882.5	1 / 14	23.30
1.4 MHz		26047	1850.7	1/3	24.32
	QPSK	26365	1882.5	1 / 0	24.12
- <b>7</b>		26683	1914.3	1/3	24.13
	16-QAM	26365	1882.5	1 / 0	23.39

Table 7-2. Conducted	Powers – LTE –	Band 25/2 – Ant1
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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz		26140	1860.0	1 / 0	23.40
	QPSK	26365	1882.5	1 / 50	23.51
		26590	1905.0	1 / 50	23.74
7	16-QAM	26140	1860.0	1/0	22.59
N		26115	1857.5	1 / 37	23.45
MHz	QPSK	26365	1882.5	1 / 74	23.54
15 N		26615	1907.5	1 / 0	23.61
~	16-QAM	26115	1857.5	1 / 74	22.64
N		26090	1855.0	1 / 25	23.58
H	QPSK	26365	1882.5	1 / 49	23.65
10 MHz		26640	1910.0	1 / 25	23.71
Ę	16-QAM	26090	1855.0	1 / 25	22.65
N		26065	1852.5	1 / 12	23.56
MHz	QPSK	26365	1882.5	1 / 12	23.66
5 M		26665	1912.5	1/0	23.75
ц)	16-QAM	26065	1852.5	1 / 12	22.78
		26055	1851.5	1/0	23.43
MHz	QPSK	26365	1882.5	1/7	23.65
S S		26675	1913.5	1/0	23.66
.,	16-QAM	26055	1851.5	1 / 0	22.76
N		26047	1850.7	1/3	23.48
1.4 MHz	QPSK	26365	1882.5	1 / 5	23.58
4 N		26683	1914.3	1 / 0	23.58
	16-QAM	26047	1850.7	1/3	22.86

Table 7-3. Conducted	Powers – LTE -	- Band 25/2 – Ant2
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FCC ID: A3LSMX828U	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
		374000	1870.0	1 / 1	24.36
	π/2 BPSK	376500	1882.5	1 / 108	24.33
		379000	1895.0	1 / 108	24.41
40 MHz		374000	1870.0	1/1	24.26
	QPSK	376500	1882.5	1 / 108	24.25
		379000	1895.0	1 / 108	24.25
	16-QAM	374000	1870.0	1/1	23.20
		373500	1867.5	1 / 94	24.68
	π/2 BPSK	376500	1882.5	1 / 94	24.42
		379500	1897.5	1/1	24.29
35 MHz		373500	1867.5	1 / 94	24.57
	QPSK	376500	1882.5	1 / 94	24.49
		379500	1897.5	1 / 186	24.30
	16-QAM	373500	1867.5	1 / 94	23.63
	10 5 5 5 11	372000	1865.0	1/1	24.44
	π/2 BPSK	376500	1882.5	1 / 80	24.36
		381000	1900.0	1 / 80	24.49
30 MHz		372000	1865.0	1/1	24.41
	QPSK	376500	1882.5	1 / 80	24.31
		381000	1900.0	1 / 80	24.33
	16-QAM	372000	1865.0	1/1	23.32
		372000	1862.5	1/1	24.54
	π/2 BPSK	376500	1882.5	1 / 131	24.33
		381000	1902.5	1 / 131	24.30
25 MHz	QPSK	372000	1862.5	1/1	24.45
		376500	1882.5	1 / 131	24.38
	(0.0.1)	381000	1902.5	1 / 131	24.42
	16-QAM	372000	1862.5	1/1	23.20
		372000	1860.0	1 / 53	24.51
	π/2 BPSK	376500	1882.5	1/1	24.42
20 MHz	QPSK	381000	1905.0	1/1	24.48
		372000 376500	1860.0 1882.5	1 / 53	24.50
		381000	1905.0	1/1	24.24
	16-QAM			1/1	24.36
		372000 371500	1860.0 1857.5	1 / 53	23.27 24.45
	π/2 BPSK	376500	1882.5	1/39	24.45
		381500	1907.5		
15 MHz		371500	1857.5	1 / 77 1 / 77	24.29 24.34
	QPSK	376500	1882.5	1 / 39	24.34
	QION	381500	1907.5	1/77	24.33
	16-QAM	376500	1882.5	1/39	23.09
	10 30 101	371000	1855.0	1 / 26	24.36
	π/2 BPSK	376500	1882.5	1/1	24.44
		382000	1910.0	1 / 50	24.38
10 MHz		371000	1855.0	1 / 26	24.13
	QPSK	376500	1882.5	1/1	23.24
		382000	1910.0	1 / 50	24.40
	16-QAM	371000	1855.0	1 / 26	22.98
		370500	1852.5	1 / 23	24.35
	π/2 BPSK	376500	1882.5	1 / 12	24.38
		382500	1912.5	1 / 12	24.41
5 MHz		370500	1852.5	1 / 23	24.41
5 MHz	QPSK	376500	1882.5	1 / 12	24.17
	QION	382500	1912.5	1 / 12	24.38

Table 7-4. Conducted Powers – NR – Band n25/2

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## 7.3 Occupied Bandwidth

#### **Test Overview**

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

#### **Test Procedure Used**

ANSI C63.26-2015 - Section 5.4.4

#### **Test Settings**

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

1-5% of the 99% occupied bandwidth observed in Step 7

#### Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

None.

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Mode	Bandwidth	Modulation	OBW [MHz]
WCDMA-PCS	N/A	Spread Spectrum	4.165
	20MHz	QPSK	17.93
		16QAM	17.97
	15MHz	QPSK	13.48
		16QAM	13.50
	10MHz	QPSK	9.02
		16QAM	8.99
LTE-B25-2	5MHz	QPSK	4.51
		16QAM	4.52
		QPSK	2.70
	3MHz	16QAM	2.71
		QPSK	1.09
	1.4MHz	16QAM	1.10

Table 7-5. Occupied Bandwidth Summary – Antenna 1

Mode	Bandwidth	Modulation	OBW [MHz]
	20MHz	QPSK	17.99
	2010102	16QAM	17.98
	15MHz	QPSK	13.49
	TOIVINZ	16QAM	13.49
	10MHz	QPSK	9.01
LTE-B25-2		16QAM	8.98
LIE-DZJ-Z	5MHz	QPSK	4.51
		16QAM	4.49
	3MHz	QPSK	2.70
	SIVINZ	16QAM	2.70
	1.4MHz	QPSK	1.10
	I.4IVI⊓Z	16QAM	1.10

Table 7-6. Occupied Bandwidth Summary – Antenna 2

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Mode	Bandwidth	Modulation	OBW [MHz]
		BPSK	38.82
	40MHz	QPSK	38.78
		16QAM	38.73
		BPSK	32.40
	35MHz	QPSK	33.72
		16QAM	33.68
		BPSK	28.68
	30MHz	QPSK	28.65
		16QAM	28.71
	25MHz	BPSK	22.99
		QPSK	23.84
NR-n25-2		16QAM	23.91
1117-1120-2	20MHz	BPSK	17.97
		QPSK	19.05
		16QAM	18.99
	15MHz	BPSK	13.46
		QPSK	14.14
		16QAM	14.16
		BPSK	9.00
	10MHz	QPSK	9.33
		16QAM	9.35
		BPSK	4.48
	5MHz	QPSK	4.50
	Table 7.7 Occurried	16QAM	4.50

Table 7-7. Occupied Bandwidth Summary – Antenna 1

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## WCDMA PCS – Ant1

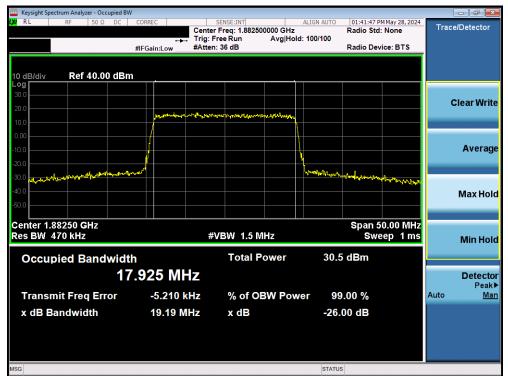


Plot 7-1. Occupied Bandwidth Plot (WCDMA, Ch. 9400 - Ant1)

FCC ID: A3LSMX828U	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
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## LTE Band 25/2 – Ant1



Plot 7-2. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz QPSK - Full RB - Ant1)



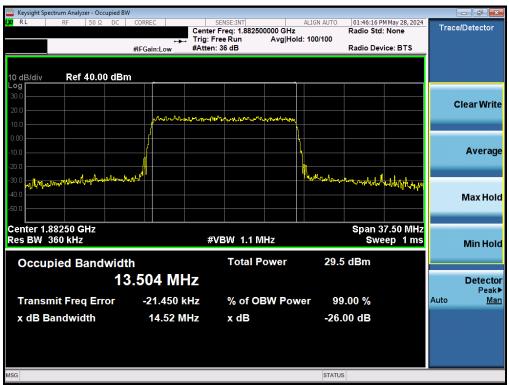
Plot 7-3. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz 16-QAM - Full RB - Ant1)

FCC ID: A3LSMX828U	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
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🧱 Keysight Spectrum Analyzer - Occupied BW						[	- 6 🗙
LXX RL RF 50Ω DC CORR		SENSE:INT Freq: 1.882500000 GH	ALIGN AUTO	01:46:11 P	M May 28, 2024	Trace	/Detector
	🛶 Trig: F	ree Run Avg l	Hold: 100/100				
#IFG	ain:Low #Atten	: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dBm	-						
Log 30.0							
20.0						c	lear Write
10.0	normanion	yport marine providence	M.				
0.00							
			)				Average
-10.0			N.				Average
-20.0			And first 1				
hite to We have been a subject of			TYTWY PULLING	www.	vwqlydyllynyr"		
-40.0							Max Hold
-50.0							
Center 1.88250 GHz				Span 3	7.50 MHz		
Res BW 360 kHz	#`	VBW 1.1 MHz			ep 1 ms		Min Hold
							Minitiona
Occupied Bandwidth		Total Power	30.4	l dBm			
13.47	78 MHz						Detector
				00.0/			Peak▶
Transmit Freq Error	3.024 kHz	% of OBW Po	ower 99	0.00 %		Auto	<u>Man</u>
x dB Bandwidth	14.56 MHz	x dB	-26.	00 dB			
MSG			STATU	5			

Plot 7-4. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz QPSK - Full RB - Ant1)



Plot 7-5. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz 16-QAM - Full RB - Ant1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
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🔤 Keysight Spectrum Analyzer - Occupied BW								- 7 💌
IX RL RF 50Ω DC CC	ORREC	SENSE:INT		ALIGN AUTO	01:47:42 P	May 28, 2024	Trace	e/Detector
	tr Tr	ig: Free Run	Avg Hold:	100/100				
#1	FGain:Low #A	tten: 36 dB			Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dBm								
Log 30.0								
20.0							(	Clear Write
10.0	mannan	Lagen rught months and	whenn					
0.00	1							
			\ \					Average
-10.0	/							Average
-20.0 -30.0 vmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	A			Windown	AN ALIN .			
-30.0 Uning the state of the st					r a vradafordford	Ward By Adam		
-40.0								Max Hold
-50.0								
Center 1.88250 GHz					Span 2	5.00 MHz		
Res BW 240 kHz		#VBW 750 k	Hz			ep 1 ms		Min Hold
		- / 1 -						IIIIIII
Occupied Bandwidth		Total P	ower	30.3	dBm			
9.01	170 MHz							Detector
Turu a suit Eus a Fanan	2 020 1-11-	0/ -f OI		- 00	00.0/		Auto	Peak►
Transmit Freq Error	2.829 kHz	% of OE	BW Powe		.00 %		Auto	<u>Man</u>
x dB Bandwidth	9.732 MHz	x dB		-26.0	)0 dB			
MSG				STATUS				

Plot 7-6. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz QPSK - Full RB - Ant1)



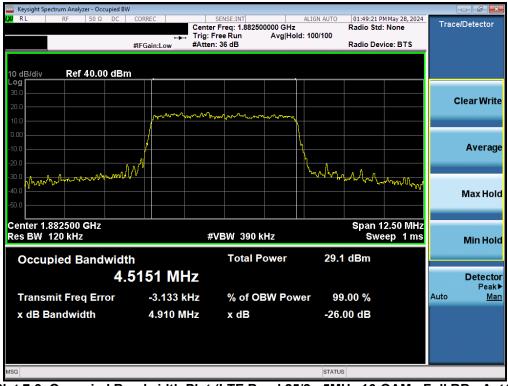
Plot 7-7. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz 16-QAM - Full RB - Ant1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
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🔤 Keysight Spectrum Analyzer - Occupie	ed BW				- đ <b>-</b>
<mark>LXI</mark> RL RF 50ΩD		SENSE:INT Freq: 1.882500000 GHz	ALIGN AUTO 01:49:15 P Radio Std	M May 28, 2024	Trace/Detector
	Trig:	Free Run Avg Hold	1: 100/100		
	#IFGain:Low #Atte	n: 36 dB	Radio Dev	rice: BTS	
10 dB/div Ref 40.00 d	JBm				
Log 30.0					
					Clear Write
20.0	man	m. m			
10.0					
0.00			N		
-10.0			<u>k</u>		Average
-20.0	N		<u> },</u>		
-30.0 may more more and	whan		James Jacob Antonio	Man - 1 - A	
-40.0			- 4 14	we with a	Max Hold
-50.0					ινιάχ ποια
30.0					
Center 1.882500 GHz				2.50 MHz	
Res BW 120 kHz	#	¢VBW 390 kHz	Swe	ep 1 ms	Min Hold
Occurried Develop	: -141-	Total Power	30.1 dBm		
Occupied Bandwi		Total Fower	30.1 UBIII		
	4.5061 MHz				Detector
Transmit Frag Error	-965 Hz	% of OBW Pow	er 99.00 %		Peak▶ Auto Man
Transmit Freq Error					Auto <u>Mari</u>
x dB Bandwidth	4.868 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-8. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz QPSK - Full RB - Ant1)



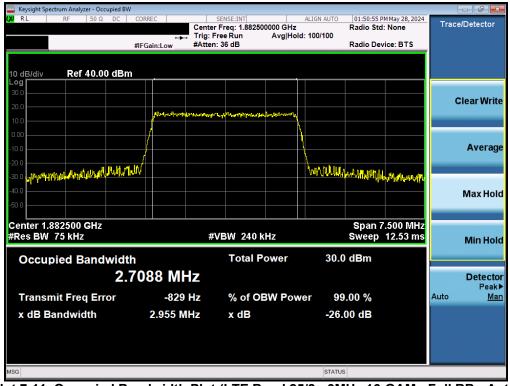
Plot 7-9. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz 16-QAM - Full RB - Ant1)

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	ght Spectrum Analyzer - Oo	cupied BW										- 6 🔀
L <mark>XI</mark> RL	RF 50 Ω	DC COF	RREC		NSE:INT req: 1.88250	0000 CH-	A	LIGN AUTO	01:50:49 P Radio Std	M May 28, 2024	Trac	e/Detector
			÷+			Avg Hold	d:	100/100	Raulo Stu	. None		
		#IF(	Gain:Low	#Atten: 3	6 dB				Radio Dev	ice: BTS		
10 dB/	div Ref 40.0	0 dBm										
Log							Т					
30.0												Clear Write
20.0			adural as units	1	مريد المعرفي مراجع المعرف	يد م مارا البيرمي						
10.0				and the first of the	al a second second second							
0.00 -			/				Ļ					
-10.0 —			/									Average
-20.0		1					l					<b>g</b> -
	waland wall wall wall	AN HUNGLAN WAY SH						with many	www.	And the second		
-30.0 <mark>.a</mark> .							Ť			and have been a		
-40.0 —												Max Hold
-50.0 —							╉					
	er 1.882500 GHz								On on 7			
	BW 75 kHz			#\/F	3W 240 k	H7				.500 MHz 12.53 ms		
mines	DW 75 KHZ			# ¥ L	598 240 K	112			өмсер	12.00 1119		Min Hold
0	cupied Band	lwidth			Total P	ower		30.8	dBm			
			04 M									
		2.70	24 MI	٦Z								Detector Peak▶
Tra	ansmit Freq Er	ror	-821	Hz	% of OE	BW Pow	/e	r 99	.00 %		Auto	Man
xd	B Bandwidth		2.948 N	Hz	x dB			-26.	00 dB			
MSG								STATUS	8			

Plot 7-10. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz QPSK - Full RB - Ant1)



Plot 7-11. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz 16-QAM - Full RB - Ant1)

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Plot 7-12. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz QPSK - Full RB - Ant1)



Plot 7-13. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz 16-QAM - Full RB - Ant1)

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## LTE Band 25/2 – Ant2

🔤 Keysight Spectrum Analyzer - Occupied B	W				- 7 ×
LX/RL RF 50Ω DC	CORREC Center	SENSE:INT r Freq: 1.882500000 GHz		4 AM May 31, 2024 td: None	Trace/Detector
	🛶 Trig: F	Free Run Avg Hold 1: 36 dB		evice: BTS	
	#IFGain:Low #Atten	1: 36 dB	Radio L	evice: D I S	
10 dB/div Ref 40.00 dB	-				
Log					
30.0					Clear Write
20.0	phan man phan the strength of	and the second and the second s			Clear write
10.0					
0.00					_
-10.0					Average
-20.0	white		magnoning		
-30:0				WWWWWWWWWWWW	
-40.0					Max Hold
-50.0					
Center 1.88250 GHz			Span	50.00 MHz	
Res BW 470 kHz	#	VBW 1.5 MHz	St	weep 1 ms	Min Hold
Occupied Bandwid	th	Total Power	31.1 dBm		
	 7.995 MHz				Detector
					Detector Peak▶
Transmit Freq Error	1.538 kHz	% of OBW Powe	er 99.00 %		Auto <u>Mar</u>
x dB Bandwidth	19.50 MHz	x dB	-26.00 dB		
MSG			STATUS		
	Davadu ulatika Diau				

Plot 7-14. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz QPSK - Full RB - Ant2)



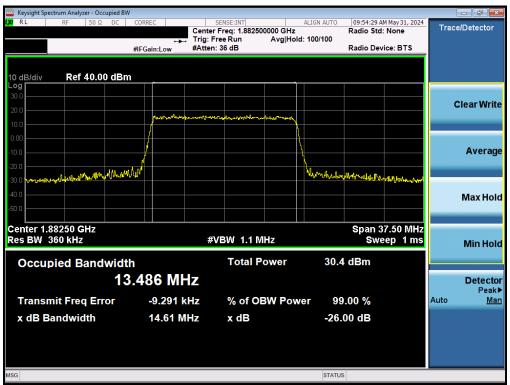
Plot 7-15. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates: EUT Type:		Dare 07 of 09
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www.www.www.analyzer - Occupied BW					
KM RL RF 50Ω DC	T	sense:INT enter Freq: 1.882500000 GHz rig: Free Run Avg Ho Atten: 36 dB	ALIGN AUTO	09:54:24 AM May 31, 2024 Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div Ref 40.00 dBm					
30.0	and the second second	ᡁᡊᡎᢣᠡᢤᢂᡔᡇᢩᢂᡣᠺ᠕᠁ᡔᡊᡗᡊᡍᡕᡆᢘᢆᠰ᠇ᡍᡁᡘᠬᠺ᠕ᢞᢇᠧᡁᡪ			Clear Write
10.0					Average
-2000				Monatur har and har and	Max Hold
Center 1.88250 GHz Res BW 360 kHz		#VBW 1.1 MHz		Span 37.50 MHz Sweep 1 ms	Min Hold
	.486 MHz			i dBm	Detector Peak
Transmit Freq Error x dB Bandwidth	12.420 kHz 14.74 MHz			0.00 % 00 dB	Auto <u>Mar</u>
MSG			STATUS		

Plot 7-16. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz QPSK - Full RB - Ant2)



Plot 7-17. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT			
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Keysight Spectrum Analyzer - Occupied BW					
LXM RL RF 50Ω DC	CORREC #IFGain:Low	SENSE:INT Center Freq: 1.882500000 G Trig: Free Run Avg #Atten: 36 dB	ALIGN AUTO Hz Hold: 100/100	09:57:07 AM May 31, 2024 Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div <b>Ref 40.00 dBm</b>					
20.0 10.0 0.00		๛ฬ๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛	umn		Clear Write
-10.0 -20.0	Nn (			with many and the second	Average
-30.0					Max Hold
Center 1.88250 GHz Res BW 240 kHz		#VBW 750 kHz Total Powe	24.1	Span 25.00 MHz Sweep 1 ms 2 dBm	Min Hold
Occupied Bandwidth 9.0	) 124 MH		51.2		Detector Peak▶
Transmit Freq Error x dB Bandwidth	10.341 kł 9.842 Mł			9.00 % 00 dB	Auto <u>Man</u>
NSG			STATU	s	

Plot 7-18. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz QPSK - Full RB - Ant2)



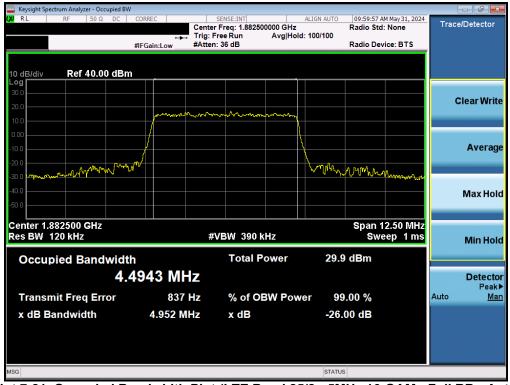
Plot 7-19. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT			
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Keysight Spectrum Analyze													- 6 ×
LXI RL RF	50 Ω	DC CC	ORREC			NSE:INT reg: 1.88250	0000 GHz	A	LIGN AUTO	09:59:52 A	M May 31, 2024	Trac	e/Detector
				- <b>-</b>	Trig: Fre #Atten: 3	e Run		ld:>	>100/100	Radio Dev			
		#1	-Gain:L	.ow	#Atten: 3	0 db				Radio Dev	ICE: DIS		
		al Dana											
10 dB/div Ref 4	40.00	aвт											
30.0													Clear Write
20.0				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~h~k~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mar						
10.0			+					+					
0.00			1					$\mathbb{R}$					
-10.0			/										Average
-20.0 -30.0 mm Ann - 2000	-	mound							hourson	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
										. when they	Construction of the second		
-40.0								+					Max Hold
-50.0													
Center 1.882500 C	GHz									Span 1	2.50 MHz		
Res BW 120 kHz					#VE	3W 390 k	Hz				ep 1 ms		Min Hold
Occupied Ba	andu	uidth				Total P	ower		30.9	dBm			
	andw					loturi			00.0	abiii			
		4.50	J51	MH	Ζ								Detector Peak►
Transmit Freq	Erro	r	-2.	788 kl	Ηz	% of O	3W Pov	ve	r 99	.00 %		Auto	Man
x dB Bandwid			4.9	51 MI	17	x dB			-26.0	00 dB			
									201				
MSG									STATUS				
	_							_					

Plot 7-20. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz QPSK - Full RB - Ant2)



Plot 7-21. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT			
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Keysight Spectrum Analyzer - Occupied BV							
LXXIRL RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO	10:01:36 A Radio Std	M May 31, 2024	Trace	Detector
			Hold:>100/100	Radio Dev	ice: BTS		
	#IFGain:Low#	Atten. 30 dB		Radio Dev	ICE. DT3		
10 dB/div Ref 40.00 dBn							
Log							
30.0						с	lear Write
20.0	جەربىيە مەرەبىلەر مەرەبىلەر مەرىپى	-	wn				
10.0							
0.00							Average
-10.0							Average
-20.0 -30.0 20-00-00-00-00-00-00-00-00-00-00-00-00-0	"wh		w.u.w.u.a.Abbay	Munh wyw.	Home Landson and		
-40.0							
-50.0							Max Hold
Center 1.882500 GHz #Res BW 75 kHz		#VBW 240 kHz			.500 MHz 12.53 ms		
		#VDVV 240 KHZ		Sweep	12.33 1115		Min Hold
Occupied Bandwidt	h	Total Power	30.	5 dBm			
2.	7018 MHz						Detector
	-1.092 kHz		ower 00	9.00 %		Auto	Peak▶ Man
Transmit Freq Error						Auto	Man
x dB Bandwidth	2.943 MHz	z x dB	-26.	00 dB			
MSG			STATU				
MBG			STATU	5			

Plot 7-22. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz QPSK - Full RB - Ant2)



Plot 7-23. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT			
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Plot 7-24. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz QPSK - Full RB - Ant2)



Plot 7-25. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT			
Test Report S/N:	Test Dates:	EUT Type:	Demo 22 of 09		
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## NR Band n25/2 – Ant1



Plot 7-26. Occupied Bandwidth Plot (NR Band n25/2 - 40.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)



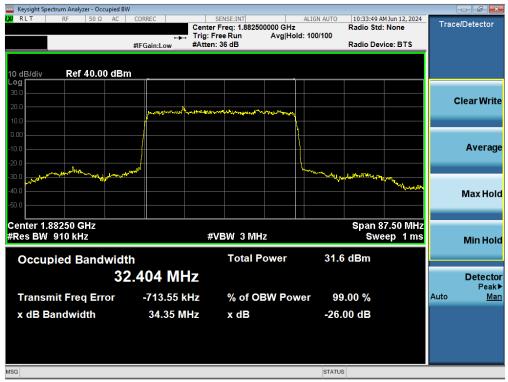
Plot 7-27. Occupied Bandwidth Plot (NR Band n25/2 - 40.0MHz CP-OFDM QPSK - Full RB - ANT1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT			
Test Report S/N:	Test Dates:	EUT Type:	Dere 22 of 09		
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🔤 Keysight Spectrum Analyzer - Occ							×
LXI RL RF 50 Ω	DC CORREC	SENSE:INT Center Freq: 1.8825	ALIGN AUTO	10:41:42 AM Radio Std: 1		Trace/Detecto	r
		Trig: Free Run #Atten: 36 dB	Avg Hold: 100/100	Radio Devic			
	#IFGain:Low	#Atten: 36 db		Radio Devid	e: b i s		
10 dB/div Ref 40.0	0 dBm						
Log							
30.0						Clear Wr	ite
20.0	mohan	-leng	rea .				
10.0							
0.00						Avera	
-10.0						Avera	ige
-20.0	h manufally and		งงใหญางหาง	manuthan			
-30.0				No.			
-40.0						Max He	bld
-50.0							
Center 1.88250 GHz				Span 10			
#Res BW 1 MHz		#VBW 3 MH	IZ	Swee	ep 1 ms	Min He	old
Occupied Band	width	Total F	Power 30.3	dBm			
	38.731 M					Detec	tor
	30.731 W	11 12				Pea	
Transmit Freq Err	ror -12.890	kHz % of O	BW Power 99	.00 %		Auto <u>N</u>	<u>lan</u>
x dB Bandwidth	41.05	MHz x dB	-26.	00 dB			
MSG			STATUS	3			

Plot 7-28. Occupied Bandwidth Plot (NR Band n25/2 - 40.0MHz CP-OFDM 16QAM - Full RB - ANT1)



Plot 7-29. Occupied Bandwidth Plot (NR Band n25/2 - 35.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT			
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Even Steven Strate - Steven Steven - St								
LXI RLT RF 50Ω AC	CORREC	SENSE:INT		IGN AUTO		M Jun 12, 2024	Trac	e/Detector
		Center Freq: 1.88250 Trig: Free Run	0000 GHz Avg Hold: 1	100/400	Radio Std	None	That	CIDELECTOR
	#IFGain:Low	#Atten: 36 dB	Avginoid. 1		Radio Dev	ice: BTS		
	In Guin.cow							
10 dB/div Ref 40.00 dBm								
Log								
30.0								Clear Write
20.0								
10.0	Ministrum	wither an an an and the	when the welly					
	1		l I					
0.00								
-10.0								Average
	w		l	da Mar and a				
-20.0 -30.0 phones in the second	· · · · · · · · · · · · · · · · · · ·		Ĭ	Mar Mark	T.MMANNA MA	Mr.		
						White		
-40.0								Max Hold
-50.0	_							
Center 1.88250 GHz					Span 8	7.50 MHz		
#Res BW 910 kHz		#VBW 3 MH	Z		Swe	ep 1 ms		Min Hold
								minner
Occupied Bandwidth		Total P	ower	29.4	dBm			
		-						
33.	.718 MH	Z						Detector
Tana a sa it Eas a Easa a	7 064 1	0/ -f OT	DIA/ D	- 00	00.0/		Auto	Peak▶
Transmit Freq Error	-7.961 kl	HZ % OT UE	3W Power	99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	35.79 MI	Hz xdB		-26.0	)0 dB			
MSG				STATUS			-	
mod				514103				

Plot 7-30. Occupied Bandwidth Plot (NR Band n25/2 - 35.0MHz CP-OFDM QPSK - Full RB - ANT1)



Plot 7-31. Occupied Bandwidth Plot (NR Band n25/2 - 35.0MHz CP-OFDM 16QAM - Full RB - ANT1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	
Test Report S/N:	Test Dates:	EUT Type:	Dage 25 of 09
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Keysight Spectrum Analyzer - Occupied BW	1					- d ×	
KI RE 50Ω DC	CORREC	SENSE:INT er Freg: 1.882500000 GHz		2:25 AM May 31, 2024 Std: None	Trace	/Detector	
	+++ Trig:	Free Run Avg Hol	d: 100/100	Stu. None			
,	#IFGain:Low #Atte	en: 36 dB	Radio	Device: BTS			
10 dB/div Ref 40.00 dBm	1						
Log							
30.0					c	lear Write	
20.0	mannam	when when the property of the second second				ioui mino	
10.0	— / — — —						
0.00	<mark> </mark>						
-10.0						Average	
-20.0							
-30.0			hanne				
-40.0			and work and	and a state of the			
						Max Hold	
-50.0							
Center 1.88250 GHz			Spa	an 75.00 MHz			
#Res BW 750 kHz				Sweep 1ms		Min Hold	
						Minitiona	
Occupied Bandwidt	h	Total Power	32.3 dBn	1			
28	28.682 MHz						
						Detector Peak▶	
Transmit Freq Error	-45.366 kHz	% of OBW Pow	ver 99.00 %	0	Auto	<u>Man</u>	
x dB Bandwidth	30.47 MHz	x dB	-26.00 dE	3			
MSG			STATUS				

Plot 7-32. Occupied Bandwidth Plot (NR Band n25/2 - 30.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)



Plot 7-33. Occupied Bandwidth Plot (NR Band n25/2 - 30.0MHz CP-OFDM QPSK - Full RB - ANT1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT		
Test Report S/N:	Test Dates:	EUT Type:	Dage 26 of 09	
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Keysight Spectrum Analyzer - Occupied BW					
XX RL RF 50Ω DC CO		SENSE:INT Freq: 1.882500000 GHz		:02:42 AM May 31, 2024 dio Std: None	Trace/Detector
	Trig: Fi	ree Run Avg Hold	i: 100/100		
#	FGain:Low #Atten:	: 36 dB	Rad	dio Device: BTS	
10 dB/div Ref 40.00 dBm					
Log 30.0					
20.0					Clear Write
10.0	Josephanes	m the shap and the server			
0.00					
-10.0					Average
20.0					, tronugo
-30.0			La harden and a second s	www.mpermanaller	
-40.0					
					Max Hold
-50.0					
Center 1.88250 GHz			S	pan 75.00 MHz	
#Res BW 750 kHz	#\	/BW 2.4 MHz		Sweep 1 ms	Min Hold
Occurried Dendwidth		Total Power	29.9 dE		
Occupied Bandwidth		Total Fower	29.9 UE		
28.7	708 MHz				Detector
Transmit Freq Error	-37.821 kHz	% of OBW Pow	er 99.00	%	Peak▶ Auto <u>Man</u>
x dB Bandwidth	30.52 MHz	x dB	-26.00 (	аB	
MSG			STATUS		

Plot 7-34. Occupied Bandwidth Plot (NR Band n25/2 - 30.0MHz CP-OFDM 16QAM - Full RB - ANT1)



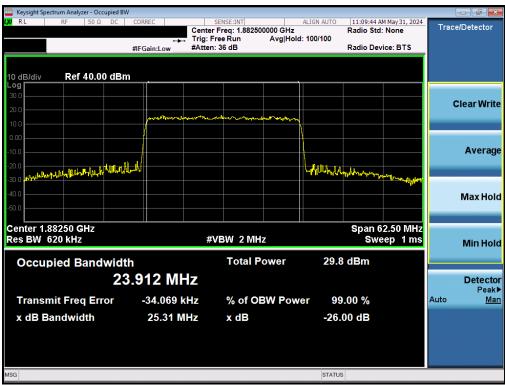
Plot 7-35. Occupied Bandwidth Plot (NR Band n25/2 - 25.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	
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🔤 Keysight Spectrum Analyzer - Occu	upied BW						d X
(X) RL RF 50 Ω	DC CORREC	SENSE:INT Center Freq: 1.882500 Trig: Free Run #Atten: 36 dB	ALIGN AUTO 0000 GHz Avg Hold: 100/100	11:09:30 AM Radio Std: Radio Devi		Trace/De	tector
10 dB/div Ref 40.00	dBm						
30.0 20.0						Clea	r Write
10.0	phinan and a	w.r.m.lasew.m.g.hashashlaw.go	mmmmm				
-10.0				1		A	verage
-20.0 -30.0 นะหญญญ <sup>51</sup> ปูลาได้การรู <b>ฟสโปนได้ได้ได้</b> -40.0	al di alta di di		Mill. A. Ib. Al	h <sup>alo</sup> nyi nyi <sub>Ny</sub> y	ᠰᠬᢇᠬᡁᡟᡊᡁᡟᡊᢧ	Ma	ax Hold
50.0 Center 1.88250 GHz Res BW 620 kHz		#VBW 2 MHz			2.50 MHz ep 1 ms		
Occupied Bandy	width	Total Po		dBm	ep 1 llis	М	in Hold
	23.837 MF	IZ				D	etector Peak▶
Transmit Freq Erre				.00 %		Auto	<u>Man</u>
x dB Bandwidth	25.28 M	Hz x dB	-26.	00 dB			
MSG			STATUS				

Plot 7-36. Occupied Bandwidth Plot (NR Band n25/2 - 25.0MHz CP-OFDM QPSK - Full RB - ANT1)



Plot 7-37. Occupied Bandwidth Plot (NR Band n25/2 - 25.0MHz CP-OFDM 16QAM - Full RB - ANT1)

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Plot 7-38. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)



Plot 7-39. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz CP-OFDM QPSK - Full RB - ANT1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	
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Keysight Spectrum Analyzer - Occupied BW							
IXI RL RF 50Ω DC COP	RREC	SENSE:INT r Freq: 1.882500000 GHz	ALIGN AUTO	11:16:07 Al Radio Std:	May 31, 2024	Trace	e/Detector
			d:>100/100	Raulo Stu.	None		
#IF	Gain:Low #Atter	n: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dBm							
Log							
30.0						(	lear Write
20.0		RATION CONTRACT					
10.0		the red of a state of the set					
0.00	f						
-10.0							Average
			White the second				
-20.0			helder of	ա( ԱԴԻՎ՝ խկելութ	h-THINA - CARAGERED		
-40.0							Max Hold
-50.0							Max Holu
30.0							
Center 1.88250 GHz					0.00 MHz		
Res BW 470 kHz	#	VBW 1.6 MHz		Swe	ep 1 ms		Min Hold
		Total Power	29.9	dBm			
Occupied Bandwidth		Total Fower	29.9	иып			
18.9	93 MHz						Detector
Transmit Freq Error	-22.727 kHz	% of OBW Pow		00 %		Auto	Peak▶ Man
						Auto	Intall
x dB Bandwidth	20.16 MHz	x dB	-26.0	0 dB			
MSG			STATUS				

Plot 7-40. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz CP-OFDM 16QAM - Full RB - ANT1)



Plot 7-41. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	
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Keysight Spectrum Analyzer - Occupied BW							- 6 💌
LX2 RL RF 50 Ω DC CORR		INSE:INT reg: 1.882500000 GHz	ALIGN AUTO	11:23:24 A Radio Std	M May 31, 2024	Trace	/Detector
	Trig: Fre	eRun Avg Ho	d: 100/100	Radio Dev			
#IFG	ain:Low#Atten: 3	36 GB		Radio Dev	ICE: BIS		
10 dB/div Ref 40.00 dBm Log							
30.0							lear Write
20.0							lear write
10.0	1. R. alter a strange of the	and a stand of the second s					
0.00							
-10.0							Average
-20.0			Mar Mine	مىلىرىيەلىيەك	ma attain an		
-30.0					. we have be		
-40.0							Max Hold
-50.0							
Center 1.88250 GHz				Snan 3	7.50 MHz		
Res BW 360 kHz	#VI	BW 1.2 MHz			ep 1 ms		Min Hold
		Total Power	20.0	dBm			
Occupied Bandwidth		Total Power	29.8	aBm			
14.13	39 MHz						Detector
Transmit Freq Error -	14.496 kHz	% of OBW Pov	wer 99	.00 %		Auto	Peak▶ <u>Man</u>
x dB Bandwidth	15.07 MHz	x dB	-26	00 dB			
		X GD	20.				
MSG			STATUS				

Plot 7-42. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz CP-OFDM QPSK - Full RB - ANT1)



Plot 7-43. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz CP-OFDM 16QAM - Full RB - ANT1)

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Plot 7-44. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)



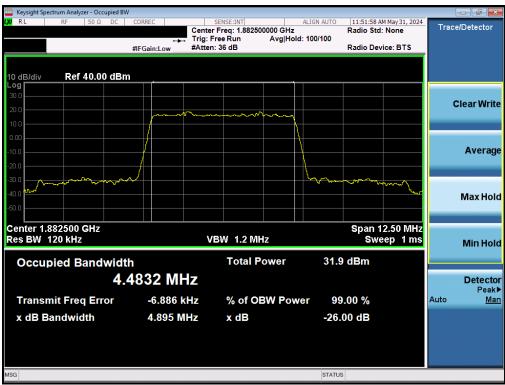
Plot 7-45. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz CP-OFDM QPSK - Full RB - ANT1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	
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🔤 Keysight Spectrum Analyzer - Occupie	ed BW				- đ <b>-</b>
<b>LXI</b> RL RF 50ΩD		SENSE:INT ter Freg: 1.882500000 GHz		AM May 31, 2024 : None	Trace/Detector
	Trig		d: 100/100 Radio De	vice: BTS	
	#IFGain:Low #Att	en. 30 dD	Radio De	vice. DTS	
10 dB/div Ref 40.00 d	IBm				
Log					
30.0					Clear Write
20.0	- markanne	www.ag./ <sup>ed</sup> .to			Cical Millo
10.0					
0.00					Average
-10.0					Average
-20.0 -30.0 pmpl/mmpl//mmpl/mmpl/	mand		Joursen and and	Whenman	
-40.0					
-50.0					Max Hold
Center 1.88250 GHz				25.00 MHz	
Res BW 240 kHz		#VBW 750 kHz	5W	eep 1ms	Min Hold
Occupied Bandwi	idth	Total Power	29.5 dBm		
	9.3520 MHz				Detector
					Peak▶
Transmit Freq Error		% of OBW Pov			Auto <u>Man</u>
x dB Bandwidth	9.971 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-46. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz CP-OFDM 16QAM - Full RB - ANT1)



Plot 7-47. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)

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Keysight Spectrum Analyzer - Occupied E	W						_	_ @ <u>X</u>
<b>(χ)</b> RL RF 50Ω DC		SENSE:INT Center Freq: 1.88250 Trig: Free Run #Atten: 36 dB		Rac 00/100	::52:10 AM M dio Std: No dio Device	one	Tracel	Detector
10 dB/div Ref 40.00 dB	m							
20.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					С	ear Write
10.0 0.00 -10.0								Average
-20.0 -30.0			\	man a front	<sup>vh</sup> Nya-marias	Marin ang may		Max Hold
Center 1.882500 GHz Res BW 120 kHz		VBW 1.2 MH	lz	s	pan 12. Sweep	50 MHz p 1 ms		Min Hold
Occupied Bandwid	<sup>th</sup> .5004 MHz	Total P	ower	28.8 dE	ßm		_	Detector
Transmit Freq Error x dB Bandwidth	-14.413 kH 4.973 MH	z % of OE	BW Power	99.00 -26.00 d			Auto	Peak▶ <u>Man</u>
MSG				STATUS				
mod				514105				

Plot 7-48. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz CP-OFDM QPSK - Full RB - ANT1)



Plot 7-49. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz CP-OFDM 16QAM - Full RB - ANT1)

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## 7.4 Spurious and Harmonic Emissions at Antenna Terminal

#### **Test Overview**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

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

#### **Test Procedure Used**

ANSI C63.26-2015 – Section 5.7.4

#### Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 20GHz (separated into at least two plots per channel)
- 2. Detector =  $\acute{R}MS$
- 3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

#### Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

#### Test Notes

- 1. Per Part 24, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz.
- 2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

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Mode	Bandwidth	Channel	Range [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]
		Low	30.0 - 1845.0	-45.07	-13	-32.07
		Low	1910.0 - 10000.0	-46.88	-13	-33.88
		Low	10000.0 - 20000.0	-62.27	-13	-49.27
		Mid	30.0 - 1850.0	-53.67	-13	[dB]           -32.07           -33.88           -49.27           -40.67           -33.69           -49.69           -40.50           -32.40           -49.50           -33.38           -33.72           -49.41           -40.04           -34.24           -49.51           -40.50
WCDMA-PCS	5MHz	Mid	1910.0 - 10000.0	-46.69	-13	-33.69
		Mid	10000.0 - 20000.0	-62.69	-13	-49.69
		High	30.0 - 1850.0	-53.50	-13	-13 -40.50 -13 -32.40
		High	1915.0 - 10000.0	-45.40	-13	-32.40
		High	10000.0 - 20000.0	-62.50	-13	-49.50
		Low	30.0 - 1849.0	-46.38	-13	-33.38
		Low	1915.0 - 10000.0	-46.72	-13	[dB]           -32.07           -33.88           -49.27           -40.67           -33.69           -49.69           -40.50           -32.40           -49.50           -33.38           -33.72           -49.41           -40.04           -34.24           -49.51           -40.50
		Low	10000.0 - 20000.0	-62.41	-13	-49.41
		Mid	30.0 - 1850.0	-53.04	-13	-40.04
LTE-B25-2	20MHz	Mid	1915.0 - 10000.0	-47.24	-13	-34.24
		Mid	10000.0 - 20000.0	-62.51	-13	-49.51
		High	30.0 - 1850.0	-53.50	-13	-40.50
		High	1916.0 - 10000.0	-46.94	-13	-32.07 -33.88 -49.27 -40.67 -33.69 -49.69 -40.50 -32.40 -49.50 -33.38 -33.72 -49.41 -40.04 -34.24 -49.51 -40.50 -33.94
		High	10000.0 - 20000.0	-62.60	-13	-49.60

Table 7-8. Spurious Emissions Test Summary – Antenna 1

Mode	Bandwidth	Channel	Range [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]
		Low	30.0 - 1849.0	-48.19	-13	-35.19
		Low	1915.0 - 10000.0	-47.17	-13	-34.17
		Low	10000.0 - 20000.0	-62.67	-13	-49.66
		Mid	30.0 - 1850.0	-53.70	-13	-40.70
LTE-B25-2	20MHz	Mid	1915.0 - 10000.0	-47.06	-13	-34.06
		Mid	10000.0 - 20000.0	-62.34	-13	-49.34
		High	30.0 - 1850.0	-53.69	-13	-40.69
		High	1916.0 - 10000.0	-46.20	-13	-33.20
		High	10000.0 - 20000.0	-61.86	-13	-48.86

Table 7-9. Spurious Emissions Test Summary – Antenna 2

Mode	Bandwidth	Channel	Range	Level	Limit	Margin
			[MHz]	[dBm]	[dBm]	[dB]
		Low	30.0 - 1849.0	-49.23	-13	-36.23
		Low	1915.0 - 10000.0	-46.57	-13	-33.57
		Low	10000.0 - 20000.0	-62.39	-13	-49.39
		Mid	30.0 - 1850.0	-51.42	-13	-38.42
NR-n25-2	40MHz	Mid	1915.0 - 10000.0	-46.29	-13	-33.29
		Mid	10000.0 - 20000.0	-62.04	-13	-49.04
		High	30.0 - 1850.0	-53.44	-13	-40.44
		High	1916.0 - 10000.0	-46.83	-13	-33.83
		High	10000.0 - 20000.0	-61.88	-13	-48.88

Table 7-10. Spurious Emissions Test Summary – Antenna 1

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## WCDMA PCS – Ant1

	ctrum Analyzer - Swept SA					
X/RL	RF 50 Ω DC	PNO: Fast	SENSE:INT	ALIGN AUTO #Avg Type: RMS	05:00:12 PM May 28, 2024 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
PASS	Ref 20.00 dBm	IFGain:Low	Atten: 30 dB	M	cr1 1.845 0 GHz -45.067 dBm	Auto Tuno
10.0 Trace	e 1 Pass					Center Fre 937.500000 MH
10.00						Start Fre 30.000000 M⊦
20.0 30.0						<b>Stop Fre</b> 1.845000000 GF
40.0					1,	CF Ste 181.50000 MH <u>Auto</u> Ma
60.0 <b>********</b> *	nethyainya yingan bank pi panina yi kasar kasar kasar ka	ytessen i fan fjirden sjon weter her <sup>te</sup> rnelli	qualupping land and an angle of the second	general name and a second table and a second s	ar a the analysis and the second s	Freq Offs 0 H
70.0						Scale Typ
tart 0.03 Res BW		#VBW	3.0 MHz	Sweep 2	Stop 1.8450 GHz .427 ms (3641 pts)	Log <u>L</u> i
ISG				STATUS	3	

Plot 7-50. Conducted Spurious Plot (WCDMA Ch. 9400 - Ant1)



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		n Analyzer - Sv									[	- # ×
LXI RL	F	RF 50 9	Ω DC	CORREC		NSE:INT	#Avg Typ	ALIGN AUTO	TRAC TY	M May 28, 2024 DE 1 2 3 4 5 6 PE A WWWWW	Fre	quency
10 dB/di	v Re	ef 0.00 d	IBm	IFGain:Low	Atten: 10	) dB		Mk	r1 19.57	7 0 GHz 73 dBm		Auto Tune
-10.0	race 1 I	Pass										enter Fred 000000 GHz
-20.0												Start Fred
-40.0												<b>Stop Fred</b> 000000 GH:
-60.0						and the second					1.000 <u>Auto</u>	CF Step 000000 GH: Mar
-80.0											F	r <b>eq Offse</b> 0 H
-90.0	0.000	GHz							Stop 20	.000 GHz	S Log	Scale Type <u>Lir</u>
#Res B				#VE	3W 3.0 MHz		s	weep 1	7.33 ms (2	20001 pts)		
50								STATC	15			

Plot 7-52. Conducted Spurious Plot (WCDMA Ch. 9400 - Ant1)

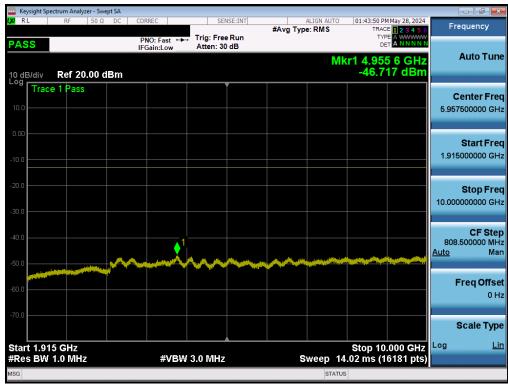
FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT				
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## LTE Band 25/2 - Ant1

<mark>(</mark> RL	RF	50 Ω	DC	CORREC	SE	NSE:INT	#Avg Typ	ALIGN AUTO		May 28, 2024	Freque	encv
PASS				PNO: Fast ↔ IFGain:Low	Trig: Free Atten: 30		#Avg iyp	e. RWS	TYP	E A WWWWW T A N N N N N		
0 dB/div	Ref 20	).00 dl	Bm					Mk	r1 1.849 -46.37	0 GHz 79 dBm	Aut	o Tui
og Tra	e 1 Pass					Ĭ					Cent	er Fr
10.0											939.500	000 M
).00											Sta	art Fr
0.0											30.000	000 M
0.0												op Fr
0.0											1.849000	000 G
0.0										1,	<b>0</b> 181.900	CF St
0.0											<u>Auto</u>	N
0.0	-	and the second	۹۰ <i>۹۰۱</i> ۲۰۰۰	Maning the grant of the state o			put for the faile		egii ( )gaathalgear jeto gainth <sup>jette</sup> vit	ta-trionyion for	Fred	Offs
0.0												0
											Sca	le Ty
	300 GHz 1.0 MHz			#VBV	V 3.0 MHz			Sweep 2	Stop 1.8	430 GHZ	Log	ļ
Start 0.0	300 GHz 1.0 MHz	2		#VBV	V 3.0 MHz			Sweep 2	.425 ms (3	430 GHZ		le

Plot 7-53. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Low Channel - Ant1)



Plot 7-54. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Low Channel - Ant1)

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	ctrum Analyzer	- Swept SA								
LXI RL	RF 5	50 Ω DC	CORREC	S	ENSE:INT	#Avg Typ	ALIGN AUTO		1 May 28, 2024 E <b>1 2 3 4 5</b> 6	Frequency
PASS			PNO: Fast IFGain:Lov			#/(18-)P		TYP DE		
10 dB/div	Ref 0.00	dBm					Mkr	1 19.53 -62.4	15 GHz 13 dBm	Auto Tur
-10.0	e 1 Pass									Center Fre 15.000000000 GH
-20.0										Start Fre 10.000000000 GF
-40.0										Stop Fre 20.000000000 GH
-60.0		l de la ferrar de la constitución d							1	CF Ste 1.00000000 GH <u>Auto</u> Ma
-80.0										Freq Offs 0 F
-90.0										Scale Typ
Start 10.0 #Res BW			#∖	'BW 3.0 MH	z	s	weep 17	Stop 20 .33 ms (2		Log <u>L</u>
MSG							STATUS			

Plot 7-55. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Low Channel - Ant1)

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## LTE Band 25/2 - Ant2







Plot 7-57. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - High Channel - Ant2)

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	Spectrum /	Analyzer - Sw	ept SA									- d ×
L <mark>XI</mark> RL	RF	50 Ω	DC	CORREC	SEI	NSE:INT	#Avg Typ	ALIGN AUTO		M May 30, 2024	Fre	quency
PASS				PNO: Fast ++ IFGain:Low	Trig: Free Atten: 10		#/(18.1)P		TY			
10 dB/div	Ref	0.00 di	Зm					Mkr	1 19.48 <sup>-1</sup> 61.8-	2 5 GHz 63 dBm		Auto Tune
Log Tra	ace 1 P	ass				Í					C.	enter Frea
-10.0												000000 GHz
-20.0												Start Freq
-30.0												000000 GHz
-30.0												
-40.0												Stop Freq
												000000 GHz
-50.0												
-60.0										<b>↓</b> 1		CF Step
		ulika ana anta a				(cond)) (cond)	n han stade by	-	a second a literative second second	la sporte la si la compare presentaria. La sia si	1.000 <u>Auto</u>	000000 GHz Man
-70.0 <sup>III</sup> III <sup>III</sup>	-	100. 100 100.	1		y on the Bayerhould	ta Muna da A	(1) with any print of the second second second	and the second				
-80.0											F	req Offset
-00.0												0 Hz
-90.0												
											S	cale Type
Start 10									Stop 20	.000 GHz	Log	Lin
#Res B\	N 1.0 M	ЛНz		#VBV	/ 3.0 MHz		S	weep 17	7.33 ms (2	20001 pts)		
MSG								STATU	5			

Plot 7-58. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - High Channel - Ant2)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
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## NR Band n25/2 – Ant1

Keysight Spectrum Analyzer - Swept S           RL         RF         50 Ω         D		CENCE INT		10-51-46 414 10-021-2024	
RL RF 50 Ω D	OC CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	10:51:46 AM May 31, 2024 TRACE 1 2 3 4 5 6	Frequency
ASS	PNO: Fast +++ IFGain:Low	Trig: Free Run Atten: 30 dB		TYPE A WWWWW DET A NNNNN	
dB/div Ref 20.00 dB	m		MI	r1 1.844 5 GHz -51.42 dBm	Auto Tun
Trace 1 Pass					Center Fre
0.0					940.000000 MH
00					Start Fre
).0					30.000000 MH
					Stop Fre
).0					1.850000000 GI
					CF Ste
0.0					182.000000 MI
).0				<u> </u>	Auto Ma
					Freq Offs
).0 <b></b>					01
).0					
					Scale Typ
art 0.0300 GHz				Stop 1.8500 GHz	Log <u>L</u>
Res BW 1.0 MHz	#VBW 3	3.0 MHz	Sweep 2	.427 ms (3641 pts)	

Plot 7-59. Conducted Spurious Plot (NR Band n25/2 - 40.0MHz - 1RB - Mid Channel - Ant1)



Plot 7-60. Conducted Spurious Plot (NR Band n25/2 - 40.0MHz - 1RB - Mid Channel - Ant1)

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	ectrum Analyzer - Sv								
ASS	RF 50 \$	ORREC			#Avg Typ	ALIGN AUTO e: RMS	TRAC	M May 31, 2024 DE <b>1 2 3 4 5</b> 6 DE A WWWWW T A N N N N N	Frequency
0 dB/div	Ref 0.00 d	FGain:Low	Atten: Tu	ι αΒ		Mkr	1 19.55	3 5 GHz 43 dBm	Auto Ti
og Trac	e 1 Pass								Center F 15.000000000
80.0									Start F 10.000000000
10.0 50.0									Stop F 20.000000000
	a star o a s		an an a the second s	l y sond by an indicated at the systematic large state in the systematic large state in the systematic large st	an a far an	and the second se			CF S 1.000000000 <u>Auto</u>
D.0									Freq Off
itart 10.0	00 GHz						Stop <u>20</u>	.000 GHZ	Scale Ty
Res BW	1.0 MHz	#VBW	/ 3.0 MHz		S	weep 17	.33 ms (2	0001 pts)	

Plot 7-61. Conducted Spurious Plot (NR Band n25/2 - 40.0MHz - 1RB - Mid Channel - Ant1)

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## 7.5 Band Edge Emissions at Antenna Terminal

#### **Test Overview**

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

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

#### Test Procedure Used

ANSI C63.26-2015 - Section 5.7.3

#### Test Settings

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW  $\geq$  1% of the emission bandwidth
- 4. VBW  $\geq$  3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

#### Test Setup

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



Figure 7-4. Test Instrument & Measurement Setup

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#### Test Notes

- Per 24.238(b)), 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.
- 2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

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Mode	Bandwidth	Channel	Test Case	Level	Limit	Margin
Widde	Banawiath	onanner	1631 0436	[dBm]	[dBm]	[dB]
		Low	Band Edge	-24.16	-13	-11.16
WCDMA-PCS	5MHz	Low	Extended	-15.21	-13	-2.21
		High	Band Edge	-24.89	-13	-11.89
		High	Extended	-16.36	-13	-3.36
		Low	Band Edge	-35.67	-13	-22.67
		Low	Extended	-29.39	-13	-16.39
	20MHz	High [B2]	Band Edge	-37.57	-13	-24.57
	20101112	High [B25]	Band Edge	-37.28	-13	-24.28
		High [B2]	Extended	-32.03	-13	-19.03
		High [B25]	Extended	-32.31	-13	-19.31
		Low	Band Edge	-33.67	-13	-20.67
		Low	Extended	-29.15	-13	-16.15
		High [B2]	Band Edge	-36.59	-13	-23.59
	15MHz	High [B25]	Band Edge	-35.65	-13	-22.65
		High [B2]	Extended	-30.27	-13	-17.27
		High [B25]	Extended	-30.66	-13	-17.66
		Low	Band Edge	-33.57	-13	-20.57
	10MHz	Low	Extended	-24.41	-13	-11.41
		High [B2]	Band Edge	-35.75	-13	-22.74
		High [B25]	Band Edge	-35.74	-13	-22.74
		High [B2]	Extended	-25.42	-13	-12.42
		High [B25]	Extended	-25.55	-13	-12.55
LTE-B25-2		Low	Band Edge	-29.51	-13	-16.51
		Low	Extended	-27.13	-13	-14.13
		High [B2]	Band Edge	-30.72	-13	-17.72
	5MHz	High [B25]	Band Edge	-32.39	-13	-19.39
		High [B2]	Extended	-28.70	-13	-15.70
		High [B25]	Extended	-28.41	-13	-15.41
		Low	Band Edge	-32.33	-13	-19.33
		Low	Extended	-25.94	-13	-12.94
		High [B2]	Band Edge	-31.90	-13	-18.90
	3MHz	High [B25]	Band Edge	-31.14	-13	-18.14
		High [B2]	Extended	-26.77	-13	-13.77
		High [B25]	Extended	-25.25	-13	-12.25
		Low	Band Edge	-29.51	-13	-16.51
		Low	Extended	-30.27	-13	-17.27
		High [B2]	Band Edge	-30.02	-13	-17.02
	1.4MHz	High [B25]	Band Edge	-30.26	-13	-17.26
		High [B2]	Extended	-30.08	-13	-17.08
		High [B25]	Extended	-29.76	-13	-16.76
	ļ.			-29.70	-15	-10.70

Table 7-11. Band Edge Summary – Antenna 1

FCC ID: A3LSMX828U	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
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Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
		Low	Band Edge	-37.68	-13	-24.68
		Low	Extended	-33.30	-13	-20.30
	20MHz	High [B2]	Band Edge	-38.35	-13	-25.35
		High [B25]	Band Edge	-38.39	-13	-25.39
		High [B2]	Extended	-34.06	-13	-21.06
		High [B25]	Extended	-33.46	-13	-20.46
		Low	Band Edge	-36.87	-13	-23.87
		Low	Extended	-31.24	-13	-18.24
	15MHz	High [B2]	Band Edge	-38.17	-13	-25.17
		High [B25]	Band Edge	-35.69	-13	-22.69
		High [B2]	Extended	-32.77	-13	-19.76
		High [B25]	Extended	-30.77	-13	-17.77 -22.29 -12.69 -22.98 -21.37 -13.71
		Low	Band Edge	-35.29	-13	-22.29
		Low	Extended	-25.69	-13	-12.69
	10MHz	High [B2]	Band Edge	-35.98	-13	-22.98
	TOIMINZ	High [B25]	Band Edge	-34.37	-13	-21.37
		High [B2]	Extended	-26.71	-13	-13.71
LTE-B25-2		High [B25]	Extended	-24.50	-13	-11.50
LIE-DZ0-Z		Low	Band Edge	-31.71	-13	-18.71
		Low	Extended	-28.71	-13	-15.71
	5MHz	High [B2]	Band Edge	-31.07	-13	-18.07
	SIMIFIZ	High [B25]	Band Edge	-26.83	-10	-17.18
		High [B2]	Extended	-27.71	-13	-14.71
		High [B25]	Extended	-16.49	-4	-12.38
		Low	Band Edge	-34.50	-13	-21.50
		Low	Extended	-26.70	-13	-13.70
	3MHz	High [B2]	Band Edge	-32.80	-13	-19.80
	SIVIFIZ	High [B25]	Band Edge	-30.34	-13	-17.34
		High [B2]	Extended	-25.64	-13	-12.64
		High [B25]	Extended	-23.75	-13	-10.75
		Low	Band Edge	-30.92	-13	-17.92
		Low	Extended	-31.43	-13	-18.43
	1.4MHz	High [B2]	Band Edge	-30.32	-13	-17.32
		High [B25]	Band Edge	-28.22	-13	-15.22
		High [B2]	Extended	-30.33	-13	-17.33
		High [B25]	Extended	-29.82	-13	-16.82

Table 7-12. Band Edge Summary – Antenna 2

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT			
Test Report S/N:	Test Dates:	EUT Type:	Daga 59 of 09		
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	<b>D</b>		- 10	Level	Limit	Margin
Mode	Bandwidth	Channel	Test Case	[dBm]	[dBm]	[dB]
		Low	Band Edge	-27.49	-13	-14.48
	40MHz	Low	Extended	-31.57	-13	-18.57
		High [n25]	Band Edge	-28.80	-13	-15.80
		High [n25]	Extended	-34.79	-13	-21.79
		Low	Band Edge	-31.03	-13	-18.03
	35MHz	Low	Extended	-29.36	-13	-16.36
	SOMIC	High [n25]	Band Edge	-33.54	-13	-20.54
		High [n25]	Extended	-31.68	-13	-18.68
		Low	Band Edge	-33.70	-13	-20.70
	30MHz	Low	Extended	-31.05	-13	-18.05
		High [n25]	Band Edge	-36.10	-13	-23.10
		High [n25]	Extended	-33.44	-13	-20.44
		Low	Band Edge	-35.60	-13	-22.60
		Low	Extended	-28.47	-13	-15.47
	25MHz	High [n25]	Band Edge	-38.14	-13	-25.14
		High [n25]	Extended	-31.45	-13	-18.45
		Low	Band Edge	-34.86	-13	-21.86
		Low	Extended	-25.70	-13	-12.70
	20MHz	High [n2]	Band Edge	-36.75	-13	-23.75
		High [n25]	Band Edge	-36.89	-13	-23.89
NR-n25-2		High [n2]	Extended	-29.10	-13	-16.10
		High [n25]	Extended	-28.95	-13	-15.95
		Low	Band Edge	-34.13	-13	-21.13
		Low	Extended	-21.43	-13	-8.42
		High [n2]	Band Edge	-36.19	-13	-23.19
	15MHz	High [n25]	Band Edge	-35.52	-13	-22.52
		High [n2]	Extended	-25.41	-13	-12.41
		High [n25]	Extended	-25.06	-13	-12.06
		Low	Band Edge	-25.05	-5	-20.01
		Low	Extended	-18.24	-14	-4.00
	10MHz	High [n2]	Band Edge	-28.68	-5	-24.13
		High [n25]	Band Edge	-25.03	-2	-22.77
		High [n2]	Extended	-19.74	-12	-8.18
		High [n25]	Extended	-21.25	-13	-8.25
		Low	Band Edge	-33.81	-13	-20.81
		Low	Extended	-29.17	-13	-16.17
	5M⊔→	High [n2]	Band Edge	-34.07	-13	-21.07
	5MHz	High [n25]	Band Edge	-34.25	-13	-21.25
		High [n2]	Extended	-29.34	-13	-16.34
		High [n25]	Extended	-30.43	-13	-17.43

Table 7-13. Band Edge Summary – Antenna 1

FCC ID: A3LSMX828U	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager		
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## WCDMA PCS – Ant1



Plot 7-62. Lower Band Edge Plot (WCDMA PCS - Ch. 9262 - Ant1)



Plot 7-63. Lower Extended Band Edge Plot (WCDMA PCS - Ch. 9262 - Ant1)

FCC ID: A3LSMX828U	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 60 of 00		
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Keysight Spectrum Analyzer - Swept SA							
RL RF 50Ω DC	CORREC PNO: Wide ↔→ IEGain:Low			#Avg Typ	ALIGN AUTO e: RMS	04:58:54 PM May 28, 2024 TRACE 1 2 3 4 5 TYPE A WWWW DET A N N N N	6 Frequency
dB/div Ref 25.00 dBm	II GUIILEOW				Mkr1	1.910 015 GHz -24.89 dBm	Auto Tun
Trace 1 Pass	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-0					Center Fre 1.910000000 GH
							<b>Start Fro</b> 1.902500000 Gi
5.0			1				<b>Stop Fr</b> 1.917500000 G
			h	~~~			CF Sto 1.500000 M <u>Auto</u> M
6.0					hum	Munder from the	Freq Offs
5.0						Span 15.00 MH	Scale Ty
Res BW 100 kHz	#VBW	300 kHz			Sweep 1	.000 ms (1001 pts	

Plot 7-64. Upper Band Edge Plot (WCDMA PCS - Ch. 9538 - Ant1)



Plot 7-65. Upper Extended Band Edge Plot (WCDMA PCS - Ch. 9538 - Ant1)

FCC ID: A3LSMX828U	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager		
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V(4.4.00/00/0000					



## LTE Band 25/2 – Ant1

🚾 Keysight Spectrum Analyzer - Swept SA			
XIRL RF 50Ω DC	C CORREC SENSE:INT	ALIGN AUTO 01:48:17 PM May 28, 2024 #Avg Type: RMS TRACE 2 3 4 5 6	Frequency
PASS	PNO: Wide +++ Trig: Free Run IFGain:Low #Atten: 36 dB	TYPE A WWWWW DET A NNNN	
10 dB/div Ref 25.00 dBm	1	Mkr1 1.849 975 GHz -33.57 dBm	Auto Tune
Log Trace 1 Pass			Center Free
15.0			1.850000000 GH
5.00		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Start Fre
-5.00			1.837500000 GH
-15.0			Stop Fre
-25.0			1.862500000 GH
35.0	<b>1</b>		CF Ste
	mmmmmm	man	2.500000 MH <u>Auto</u> Ma
-45.0			Freq Offse
55.0			0 H
65.0			Scale Typ
Center 1.85000 GHz		Span 25.00 MHz	
#Res BW 120 kHz	#VBW 430 kHz	Sweep 1.000 ms (1001 pts)	
ASG		STATUS	





Plot 7-67. Extended Lower Band Edge Plot (LTE Band 25/2 - 10MHz QPSK – Full RB - Ant1)

FCC ID: A3LSMX828U	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager		
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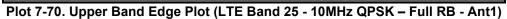
Keysight Spectrum Analyzer - Swe	·				
RL RF 50 Ω	DC CORREC PNO: Wide	SENSE:INT Trig: Free Run #Atten: 36 dB	ALIGN AUTO #Avg Type: RMS	01:49:03 PM May 28, 2024 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A NNNNN	Frequency
0 dB/div Ref 25.00 d	Bm		Mkr1	1.911 004 GHz -25.42 dBm	Auto Tur
Trace 1 Pass					Center Fre 1.913000000 GI
5.00					<b>Start Fr</b> 1.911000000 G
5.0					<b>Stop Fr</b> 1.915000000 G
5.0		and a second and a s		and adams to the construction of the construct	<b>CF St</b> 400.000 k <u>Auto</u> M
5.0					Freq Offs 0
enter 1.913000 GHz		2.0.544	Success	<b>3</b> 0an 4.000 minz	Scale Ty
Res BW 1.0 MHz	#VBW	3.0 MHz	sweep o	.667 ms (1001 pts)	

Plot 7-69. Extended Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	
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	pectrum Analyze										
L <mark>XI</mark> RL	RF	50 Ω DC	CORREC	SE	NSE:INT	#Avg Typ	ALIGN AUTO		May 28, 2024	Freque	ncy
PASS			PNO: Wide ↔ IFGain:Low	Trig: Fre #Atten: 3				TYP			
10 dB/div Log	Ref 25.	00 dBm					Mkr1	1.915 0 -35.	25 GHz 74 dBm	Aut	o Tune
15.0	e 1 Pass									Cent 1.915000	<b>er Freq</b> 000 GHz
-5.00				m						Sta 1.9025000	<b>nt Freq</b> 000 GHz
-15.0										<b>Sto</b> 1.927500	o <b>p Freq</b> 000 GHz
-35.0	~~/				1	m	hung			2.5000 Auto	<b>F Step</b> 000 MHz Man
-55.0							- Marken - Contraction - Contr	Ly www		Fred	<b>  Offset</b> 0 Hz
-65.0										Sca	Іе Туре
Center 1. #Res BW	.91500 GH 120 kHz	IZ	#VBW	430 kHz			Sweep 1	Span 2 .000 ms (	5.00 MHz 1001 pts)	Log	Lin
MSG							STATU	5			



NRKT 1.910 OTO GGR2         Odd/div       Ref 25.00 dBm       -25.55 dBm         Orac       -25.55 dBm         Trace 1 Pass       -25.55 dBm         150       -25.55 dBm         100       -25.55 dBm <t< th=""><th>Keysight Spectru</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>_</th><th></th></t<>	Keysight Spectru										_	
Mkr1 1.916 016 GHz         Auto T           0 dB/div         Ref 25.00 dBm         -25.55 dBm         1           0 dB/div         Ref 25.00 dBm         -25.55 dBm         1.91800000           150         Image: Start F         1.91800000         1.91800000           500         Image: Start F         1.91800000         1.91800000           500         Image: Start F         1.91800000         1.92000000           500         Image: Start F         1.91800000         Image: Start F           500         Image: Start F         Image: Start F         Image: Start F           500         Image: Start F         Image: Start F         Image: Start F           500         Image: Start F         Image: Start F         Image: Start F           500         Image: Start F         Image: Start F         Image: Start F		RF   50 Ω		PNO: Wide 🕶	. Trig: Free	Run	#Avg Ty		TRAC TY	CE 1 2 3 4 5 6 PE A WWWW	F	requency
Trace 1 Pass       Center F         1       1.91800000         500       Start F         1.918000000       Start F         1.918000000       Start F         1.918000000       Start F         500       Start F </th <th>0 dB/div R</th> <th>ef 25.00 c</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Mkr</th> <th></th> <th></th> <th></th> <th>Auto Tun</th>	0 dB/div R	ef 25.00 c						Mkr				Auto Tun
Start F Start F 1.91600000 Start F Start F 1.92000000 Start F 1.92000000 F Start F Start F	Trace 1	Pass										<b>Center Fre</b> 18000000 GH
1     Stop r       50     1       5											1.9 <sup>,</sup>	<b>Start Fr</b> 16000000 GI
CF S 400.000 Auto Freq Of 50 50 50 50 50 50 50 50 50 50 50 50 50	1										1.92	<b>Stop Fr</b> 20000000 G
enter 1.918000 GHz Span 4.000 MHz		hangto,,Magalan	lvuntrantinurg	alardajirayisyonghaqi	even with the second	al-matricefa	347-1-33424,11.024	ale folowers and	and - the second second	hrussian-plaindensalige	<u>Auto</u>	CF Sto 400.000 k M
enter 1.918000 GHz Span 4.000 MHz												Freq Offs 0
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 6.667 ms (1001 pts)	enter 1.918								Span 4	.000 10112	Log	Scale Tyj
	Res BW 1.0	) MHz		#VBW	3.0 MHz			Sweep	6.667 ms (	(1001 pts)		

Plot 7-71. Extended Upper Band Edge Plot (LTE Band 25 - 10MHz QPSK - Full RB - Ant1)

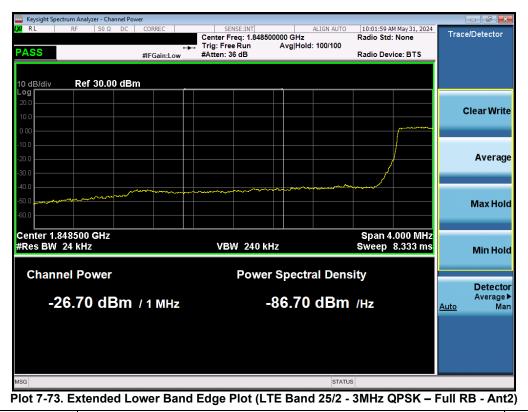
FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 64 of 09
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## LTE Band 25/2 - Ant2



Plot 7-72. Lower Band Edge Plot (LTE Band 25/2 - 3MHz QPSK - Full RB - Ant2)

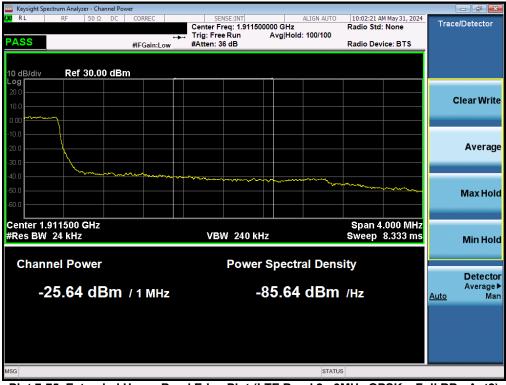


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	Analyzer - Swept SA									
L <mark>XI</mark> RL R	F 50 Ω DC	CORREC	SEI	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS		M May 31, 2024	F	requency
PASS		PNO: Wide +++ IFGain:Low	Trig: Free #Atten: 3				TY	PE A WWWWW ET A N N N N N		
						Mkr1 1	.910 00	0 0 GHz		Auto Tune
10 dB/div Re	f 25.00 dBm						-31.	77 dBm		
Log Trace 1	Pass									Center Freg
15.0										10000000 GHz
5.00	permanen march	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							Start Freq
5.00									1.90	)6250000 GHz
-5.00										
-15.0	ļ									Stop Freq
									1.91	13750000 GHz
-25.0	ļ			1						
-35.0			1	4						CF Step
when the set				Margar War	Munnow	um la second	1.Am		Auto	750.000 kHz Man
-45.0					, MA	LA MAUNAN	- Jawant	AM BURNING AND		
								. IN MUNICAL AND		Freq Offset
-55.0										0 Hz
-65.0										
										Scale Type
Center 1.9100							Snan 7	.500 MHz	Log	Lin
#Res BW 36		#VBW	120 kHz			Sweep 1	2.53 ms (	(1001 pts)		
MSG						STATUS	6			

Plot 7-74. Upper Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB - Ant2)



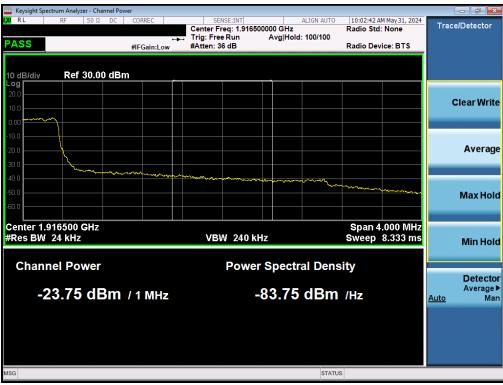
Plot 7-75. Extended Upper Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB - Ant2)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	Approved by: Technical Manager	
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Plot 7-76. Upper Band Edge Plot (LTE Band 25 - 3MHz QPSK - Full RB - Ant2)



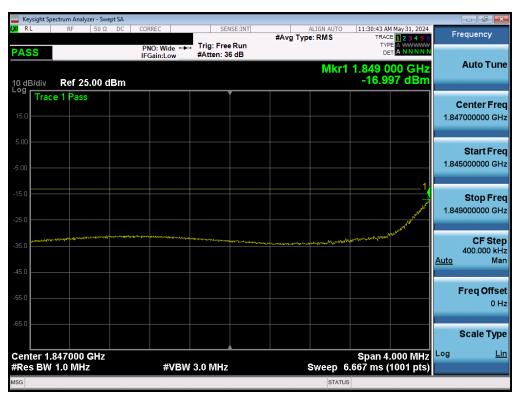
Plot 7-77. Extended Upper Band Edge Plot (LTE Band 25 - 3MHz QPSK – Full RB - Ant2)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
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## NR Band n25/2 – Ant1

SS       PNO: Wide → Trig: Free Run #Avg Type: RMS       TRACE 12.34.5 TYPE # WIDE TANNANT       Frequency         Mkr1 1.849 975 GHz       -33.01 dBm       -33.01 dBm       Auto Tu         IB/div       Ref 25.00 dBm       -33.01 dBm       -33.01 dBm       Center Fr         1.85000000 G       -33.01 dBm       -33.01 dBm       Start Fr       1.837500000 G         1       1       1       1       1.83750000 G       Start Fr	Keysight Spectrum Analyzer - Sv
SS PNO: Wide Trig: Free Run IFGain:Low #Atten: 36 dB Mkr1 1.849 975 GHz -33.01 dBm Center Fr 1.85000000 G Start Fr 1.837500000 G Stop Fr 1.86250000 G	XIRL RF 50 S
Trace 1 Pass         Center Fr           1.85000000 G         Start Fr           1.837500000 G         Start Fr           1.83250000 G         1.83250000 G	PASS
Trace 1 Pass         Center Fr           1.85000000 G         1.85000000 G           Start Fr         1.837500000 G           Start Fr         1.837500000 G           1.862500000 G         1.862500000 G	10 dB/div Ref 25.00
Start Fr           1.837500000 G           1.862500000 G           1	-og Trace 1 Pass
1.862500000 G	5.00
	-15.0
	-35.0
Freq Offs 0	-55.0 - Mr
Scale Ty	-65.0
	Center 1.85000 GHz #Res BW 120 kHz
STATUS	ISG



Plot 7-78. Lower Band Edge Plot (NR Band n25 - 10MHz QPSK - Full RB - Ant1)

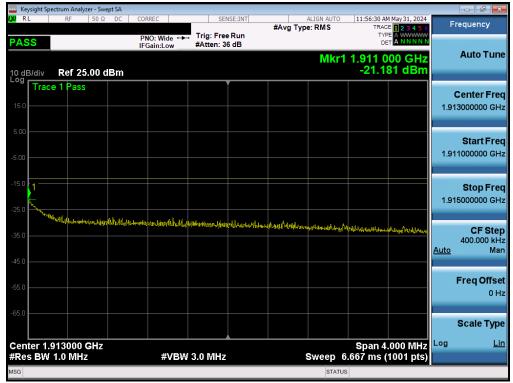
Plot 7-79. Extended Lower Band Edge Plot (NR Band n25 - 10MHz QPSK - Full RB - Ant1)

FCC ID: A3LSMX828U		PART 24 MEASUREMENT REPORT	Approved by: Technical Manager
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Keysight Spectrum Analyzer - Swept SA				
<b>Κ RL</b> RF 50Ω DC	CORREC SENSE:IN	#Avg Type: RMS	11:56:24 AM May 31, 2024 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
PASS Io dB/div Ref 25.00 dBm	PNO: Wide - Irig: Free Run IFGain:Low #Atten: 36 dB		оста NNNNN 1 1.910 025 GHz -37.13 dBm	Auto Tun
<sup>-og</sup> Trace 1 Pass				Center Fre 1.910000000 G⊦
5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			<b>Start Fre</b> 1.897500000 GF
25.0				<b>Stop Fro</b> 1.922500000 GI
95.0	1	man and a second	~~~	CF Ste 2.500000 MI <u>Auto</u> M
55.0			With the second	Freq Offs 01
65.0 Center 1.91000 GHz			Span 25.00 MHz	Scale Typ
Res BW 120 kHz	#VBW 430 kHz	Sweep	1.000 ms (1001 pts)	





Plot 7-81. Extended Upper Band Edge Plot (NR Band n2 - 10MHz QPSK - Full RB - Ant1)

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	sight Spect													a x
<b>lxi</b> Rl		RF	50 Ω	DC	CORRE	C	SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS		M May 31, 2024	Frequen	су
PAS	S				PNO: IFGai	Wide ↔	Trig: Fre #Atten: 3				TY	PE A WWWWW ET A N N N N N		
					IFGail	I.LOW	#rettern: e	o ub		Mkr1	1.915 4	50 GHz	Auto	Tune
10 dB	/div	Ref 25.	.00 d	Bm							-35.	77 dBm		
Log	Trace	1 Pass						Ĭ					Cente	r Erea
15.0													1.91500000	
5.00		~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~	~~~~	mme	m						Star	t Freq
-5.00													1.90250000	
-9.00														
-15.0													Stor	Freq
													1.92750000	
-25.0		-												
-35.0		ļ												Step
		~						Mun	mm				2.50000 <u>Auto</u>	00 MHz Man
-45.0										and the second second				
-55.0										<u> </u>	v.		Freq	
											some second	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		0 Hz
-65.0													0	<b>T</b>
													Scale	rype
	er 1.91										Span 2	5.00 MHz	Log	Lin
	BW 1	20 kHz				#VBW	430 kHz					(1001 pts)		
MSG										STATU	S			



Keysight Spectrum Analyzer - Sw	ept SA									
RL RF 50 Ω	P	REC IO: Wide ↔ Gain:Low			#Avg Typ	ALIGN AUTO e: RMS	TRAC TY	M May 31, 2024 DE <b>1 2 3 4 5</b> 6 PE A WWWWW ET A N N N N N	F	requency
0 dB/div Ref 25.00 d		Jam.Low				Mkr	1 1.916 ( -21.	00 GHz 25 dBm		Auto Tu
5.0 Trace 1 Pass										<b>Center Fr</b> 18000000 G
00									1.91	Start Fi 16000000 (
5.0 <b>1</b>									1.92	<b>Stop F</b> i 20000000 (
5.0	17Umithubaantha	å∙ <del>≈,</del> ₩™₽₩₽₽₩	neritari <mark>k di dinak d</mark> i	Hundhmennd	n forbenskansen	herione hierere	Ur Minera Montenna		<u>Auto</u>	CF St 400.000 I
5.0										Freq Off
enter 1.918000 GHz							Snan	.000 MHz	Log	Scale Ty
Res BW 1.0 MHz		#VBW	3.0 MHz			Sweep	6.667 ms (	.000 191112		

Plot 7-83. Extended Upper Band Edge Plot (NR Band n25 - 10MHz QPSK - Full RB - Ant1)

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## 7.6 Peak-Average Ratio

#### **Test Overview**

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

#### The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

### **Test Procedure Used**

ANSI C63.26-2015 - Section 5.2.3.4

#### **Test Settings**

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

#### Test Setup

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



Figure 7-5. Test Instrument & Measurement Setup

#### Test Notes

For the QAM modulations, 256QAM was found to have the worst-case peak-to-average ratio so it is the only QAM measurement included in this section.

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Mode	Bandwidth	Modulation	Average Power [dBm]	PAR at 0.1% [dB]	PAR Limit [dB]	Margin [dB]
WCDMA-PCS	N/A	Spread Spectrum	23.64	3.18	13	-9.82
	20MHz	QPSK	23.07	5.70	13	-7.30
		256QAM	19.33	6.80	13	-6.20
	15MHz	QPSK	23.02	5.76	13	-7.24
LTE-B25-2		256QAM	19.26	6.77	13	-6.23
	10MHz	QPSK	23.07	5.80	13	-7.20
		256QAM	19.31	6.71	13	-6.29
	5MHz	QPSK	23.04	5.75	13	-7.25
		256QAM	19.29	6.71	13	-6.29
	3MHz	QPSK	23.01	5.90	13	-7.10
	SIVIEZ	256QAM	19.30	6.75	13	-6.25
	1.4MHz	QPSK	23.02	5.82	13	-7.18
	1.411	256QAM	19.25	6.89	13	-6.11

Table 7-14	Peak-Average	Ratio	Summary	/ – Antenna 1
	i can-Average	Natio	Summary	

Mode	Bandwidth	Modulation	Average Power [dBm]	PAR at 0.1% [dB]	PAR Limit [dB]	Margin [dB]
	20MHz	QPSK	22.47	5.49	13	-7.51
	ZUIVIEZ	256QAM	18.39	6.84	13	-6.16
	15MHz	QPSK	22.52	5.55	13	-7.45
	TOIVINZ	256QAM	18.38	6.86	13	-6.14
	10MHz	QPSK	22.53	5.61	13	-7.39
LTE-B25-2	TOIVIEZ	256QAM	18.38	6.80	13	-6.20
LIE-DZJ-Z	5MHz	QPSK	22.53	5.59	13	-7.41
		256QAM	18.43	6.78	13	-6.22
	3MHz	QPSK	22.52	5.71	13	-7.29
	SIVITZ	256QAM	18.45	6.84	13	-6.16
	1.4MHz	QPSK	22.44	5.70	13	-7.30
	1.4IVI⊓Z	256QAM	18.42	6.99	13	-6.01

Table 7-15. Peak-Average Ratio Summary – Antenna 2

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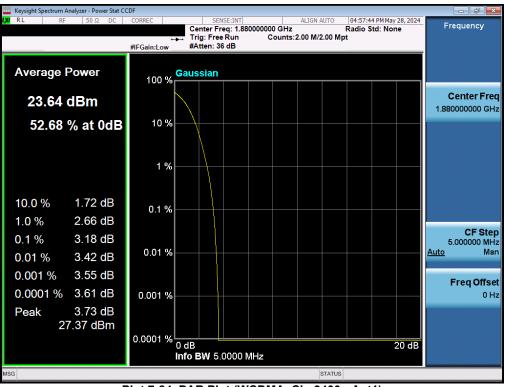
Mode	Bandwidth	Modulation	Average Power [dBm]	PAR at 0.1% [dB]	PAR Limit [dB]	Margin [dB]
		BPSK	23.65	4.94	13	-8.06
	40MHz	QPSK	21.14	8.33	13	-4.67
		256QAM	17.92	8.65	13	-4.35
		BPSK	23.97	4.52	13	-8.48
	35MHz	QPSK	21.39	8.33	13	-4.67
		256QAM	18.19	8.72	13	-4.28
		BPSK	23.68	4.47	13	-8.53
	30MHz	QPSK	21.13	8.28	13	-4.72
		256QAM	17.90	8.55	13	-4.45
		BPSK	23.61	4.70	13	-8.30
	25MHz	QPSK	21.03	8.33	13	-4.67
NR-n25-2		256QAM	17.88	8.74	13	-4.26
INR-H23-2		BPSK	23.83	4.54	13	-8.46
	20MHz	QPSK	21.25	8.27	13	-4.73
		256QAM	18.13	8.60	13	-4.40
		BPSK	23.79	4.56	13	-8.44
	15MHz	QPSK	21.24	8.48	13	-4.52
		256QAM	18.08	8.64	13	-4.36
		BPSK	23.76	4.51	13	-8.49
	10MHz	QPSK	21.19	8.29	13	-4.71
		256QAM	18.06	8.41	13	-4.59
		BPSK	23.74	4.72	13	-8.28
	5MHz	QPSK	21.15	8.37	13	-4.63
		256QAM	18.00	8.52	13	-4.48

Table 7-16. Peak-Average Ratio Summary – Antenna 1

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## WCDMA PCS – Ant1

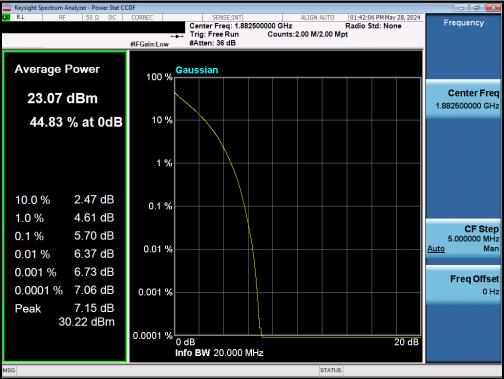


Plot 7-84. PAR Plot (WCDMA, Ch. 9400 - Ant1)

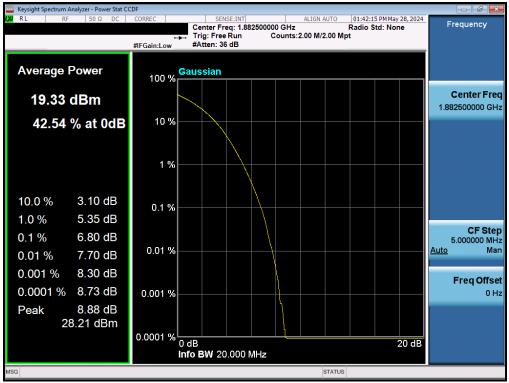
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### LTE Band 25/2 – Ant1



Plot 7-85. PAR Plot (LTE Band 25/2 - 20MHz QPSK - Full RB - Ant1)



Plot 7-86. PAR Plot (LTE Band 25/2 - 20MHz 256-QAM - Full RB - Ant1)

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