



TEST REPORT

<p>Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr</p>	<p>Report No.: KR23-SRF0260-A Page (1) of (68)</p>	
--	--	--

1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2023-09-05

2. Use of Report : Certification

3. Name of Product / Model : Tablet PC / SM-X308U

4. Manufacturer / Country of Origin : Samsung Electronics Co., Ltd. / Vietnam

5. FCC ID : A3LSMX308U

6. Date of Test : 2023-09-20 to 2023-11-22

7. Location of Test : Permanent Testing Lab On Site Testing
 (Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

8. Test method used : FCC Part 2
 FCC Part 90 subpart S
 FCC Part 90 subpart R

9. Test Result : Refer to the test result in the test report

Affirmation	Tested by	Technical Manager
	Name : Kwonse Kim (Signature)	Name : Seungyong Kim (Signature)

2023-12-20

Eurofins KCTL Co.,Ltd.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by Eurofins KCTL Co.,Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2023-11-22	Originally issued	-
2023-12-20	Removed the ISED information and change the band-edge plot for LTE B26	1, 6, 7, 11, 34, 37, 39, 48, 52, 54, 56, 59, 65

This report shall not be reproduced except in full, without the written approval of Eurofins KCTL Co.,Ltd. This document may be altered or revised by Eurofins KCTL Co.,Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by Eurofins KCTL Co.,Ltd. will constitute fraud and shall nullify the document. This test report is a general report that does not use the KOLAS accreditation mark and is not related to KS Q ISO/IEC 17025 and KOLAS accreditation

Note. The report No. KR23-SRF0260 is superseded by the report No. KR23-SRF0260-A.

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

Statement not required by the standard or client used for type testing

CONTENTS

1.	General information.....	4
2.	Device information.....	4
2.1.	Frequency/channel operations.....	5
3.	Maximum output power	6
4.	Summary of tests.....	7
4.1.	Worst case orientation	8
5.	Measurement uncertainty	9
6.	Measurement results explanation example	10
7.	Test results	11
7.1.	Conducted output power.....	11
7.2.	99% Occupied Bandwidth & 26 dB Bandwidth.....	19
7.3.	Band Edge Emissions at Antenna Terminal	33
7.4.	Spurious Emissions at Antenna Terminal.....	47
7.6.	Peak to Average Power Ratio (PAPR)	52
7.5.	Frequency stability.....	54
7.6.	Radiated Power (ERP/EIRP)	58
7.7.	Radiated Spurious Emissions.....	63
8.	Measurement equipment.....	68

1. General information

Client : Samsung Electronics Co., Ltd.
 Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
 Manufacturer : Samsung Electronics Co., Ltd.
 Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
 Factory : Samsung Electronics Vietnam Thai Nguyen Co., Ltd
 Address : Yen Binh Industrial Park, Dong Tien Ward, Pho Yen Town, Thai Nguyen Province, Vietnam
 Laboratory : Eurofins KCTL Co.,Ltd.
 Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
 Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132
 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056
 CAB Identifier: KR0040
 ISED Number: 8035A
 KOLAS No.: KT231

2. Device information

Equipment under test : Tablet PC
 Model : SM-X308U
 Modulation technique : QPSK, 16QAM, 64QAM, 256QAM
 Power source : DC 3.85 V
 Antenna specification : Main Antenna 1 : LDS Antenna
 Frequency range : LTE Band 14 : 790.5 MHz ~ 795.5 MHz
 : LTE Band 26 : 814.7 MHz ~ 848.3 MHz
 Bandwidth : LTE Band 14 : 5 MHz , 10 MHz
 : LTE Band 26 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz
 Software version : X308U.001
 Hardware version : REV1.0
 Test device serial No. : Conducted : R32WA0000FY
 : Radiated : R32W900200M
 Operation temperature : 0 °C ~ 35 °C

2.1. Frequency/channel operations

This device contains the following capabilities:

WLAN (11a/b/g/n/ac/ax), Bluetooth (BDR/EDR/BLE), NFC, Digitizer, WCDMA 850/1700/1900,

LTE B2/4/5/7/12/13/14/25/26/30/40/41(PC2/PC3)/48/66/71, ULCA 41C(PC2/PC3)/48C

NR n2/5/12/25/30/41(PC2/PC3)/48/66/71/77(PC2/PC3)/78(PC3), SRS n48/n77(PC2/PC3)/n78(PC3)

LTE Band 14

Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
23305	790.5	-	-
23330	793.0	23330	793.0
23355	795.5	-	-

Table 2.1-1. 5M BW

Table 2.1-2. 10M BW

LTE Band 26

Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
26697	814.7	26705	815.5	26715	816.5
26783	823.3	26775	822.5	26765	821.5

Table 2.1-3. 1.4M BW

Table 2.1-4. 3M BW

Table 2.1-5. 5M BW

Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
26740	819.0	26765	821.5

Table 2.1-6. 10M BW

Table 2.1-7. 15M BW

3. Maximum output power

LTE Band 14

Mode	Tx frequency (MHz)	Emission designator	ERP	
			Max. power (dBm)	Max. power (W)
LTE Band 14	790.5 ~ 795.5	4M53G7D	23.12	0.205
		4M53W7D	22.21	0.166
	793.0	9M04G7D	23.35	0.216
		9M04W7D	21.92	0.156

LTE Band 26

Mode	Tx frequency (MHz)	Emission designator	Conducted	
			Max. power (dBm)	Max. power (W)
LTE Band 26	814.7 ~ 823.3	1M10G7D	23.77	0.238
		1M10W7D	23.01	0.200
	815.5 ~ 822.5	2M70G7D	23.67	0.233
		2M70W7D	23.02	0.200
	816.5 ~ 821.5	4M53G7D	23.67	0.233
		4M53W7D	22.90	0.195
	819.0	9M04G7D	23.81	0.240
		9M02W7D	22.95	0.197
	821.5	13M5G7D	23.70	0.234
		13M5W7D	23.03	0.201
Straddle channel	824.0	1M10G7D	23.70	0.234
		1M11W7D	22.92	0.196
		2M71G7D	23.70	0.234
		2M71W7D	22.97	0.198
		4M55G7D	23.66	0.232
		4M57W7D	22.86	0.193
		9M04G7D	23.72	0.236
		9M02W7D	22.93	0.196
		13M5G7D	23.69	0.234
		13M5W7D	22.99	0.199

4. Summary of tests

FCC Part section(s)	Parameter	Test Limit	Test Condition	Test results
2.1046 90.635	Conducted Output Power	<100 Watts	Conducted	Pass
2.1049	Occupied Bandwidth & 26 dB Bandwidth	N/A		Pass
2.1051 90.543(e) 90.691(a)	Band Edge Emissions at Antenna Terminal	<65+10Log ₁₀ (P) dB between 769-775 MHz and 799-805 MHz (FCC), <65+10Log ₁₀ (P) dB between 769-775 MHz and 799-806 MHz (IC),		Pass
	Spurious Emissions at Antenna Terminal	<43 + 10Log ₁₀ (P) dB, <50 + 10Log ₁₀ (P) dB at Band Edge and for all out-of-band emissions within 37.5kHz of Block Edge		Pass
-	Peak to Average Power Ratio	<13 dB		Pass
2.1055 90.539(e) 90.213	Frequency stability	<1.25 ppm, < 2.5 ppm (FCC), Emission must remain in band (IC)		Pass
22.913(a)(5)	Effective Radiated Power	<7 Watts max. ERP	Radiated	Pass
90.542(a)(7)		<3 Watts max. ERP		Pass
2.1053 90.691(a) 90.543(e)(f)	Radiated Spurious Emissions	<43 + 10Log ₁₀ (P) dB, <-70dBW/MHz EIRP (Wideband), <-80dBW/MHz EIRP (Narrowband) In the 1559 – 1610 MHz band.		Pass

Notes:

- The test procedure(s) in this report were performed in accordance as following.
 - ◆ ANSI C63.26-2015
 - ◆ ANSI/TIA-603-E-2016
 - ◆ KDB 971168 D01 v03r01
 - ◆ KDB 971168 D02 v02r02

4.1. Worst case orientation

- All modes of operation were investigated and the worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations in the test data.
- Output power measurements were measured on QPSK, 16QAM, 64QAM and 256QAM modulation. All tests except output power was performed with QPSK and 16QAM modulation.
- In the case of radiated spurious emissions, only the worst case bandwidth results were reported.
- All configurations have been performed (Stand-alone, Stand-alone with TA, With accessories).
- The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z and all of the radiated tests have been performed with the accessories as below. It was determined that below orientation was worst case orientation for each band.

Band	Stand-alone			Stand-alone with TA			With accessories		
	X-axis	Y-axis	Z-axis	X-axis	Y-axis	Z-axis	X-axis	Y-axis	Z-axis
LTE B14	O	-	-	-	-	-	-	-	-
LTE B26(Part 90)	O	-	-	-	-	-	-	-	-

6. Test Condition

- The measurement was performed with various configurations then worst results are reported.

1) Radiated measurement

Test Description	Modulation	RB size	Test Channel
Effective Radiated Power	QPSK, 16QAM	1	Low, Mid, High
Radiated Spurious Emissions	QPSK		

LTE Band	Bandwidth (MHz)	RB size	RB offset
B14	5, 10	1	Low, Mid, High
B26 (Part 90)	1.4, 3, 5, 10, 15		

2) Conducted measurement

Test Description	Modulation	RB size	Test Channel
OBW & 26 dB BW	QPSK, 16QAM	Full	Low, Mid, High
PAPR	QPSK, 16QAM	Full	Mid
Band Edge	QPSK	1	Low, High
		Full	
Spurious Emissions	QPSK	1	Low, Mid, High

LTE Band	Bandwidth (MHz)	RB size	RB offset
B14	5, 10	1	0, 24, 49
		Full	0
B26 (Part 90)	1.4, 3, 5, 10, 15	1	0, 5, 14, 24, 49, 74
		Full	0

5. 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 data shown herein 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.

Parameter	Expanded uncertainty (\pm)	
Conducted RF power	0.9 dB	
Conducted spurious emissions	1.3 dB	
Radiated spurious emissions	Below 1 000 MHz	2.4 dB
	1 000 MHz ~ 18 000 MHz	2.4 dB
	Above 1 8000 MHz	2.6 dB



6. Measurement results explanation example

Frequency (MHz)	Factor(dB)	Frequency (MHz)	Factor(dB)
30	6.10	9 000	8.31
50	6.25	10 000	7.98
100	6.32	11 000	8.53
200	6.33	12 000	8.45
300	6.45	13 000	9.45
400	6.61	14 000	9.41
500	6.99	15 000	9.79
600	7.08	16 000	10.13
700	7.04	17 000	9.56
800	7.03	18 000	9.97
900	6.95	19 000	9.66
1 000	7.01	20 000	10.20
2 000	7.39	21 000	10.56
3 000	7.55	22 000	9.90
4 000	7.94	23 000	11.16
5 000	8.38	24 000	10.48
6 000	8.61	25 000	11.89
7 000	7.88	26 000	11.17
8 000	8.06	26 500	11.29

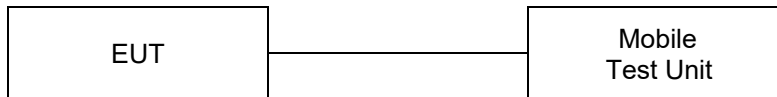
Note.

Offset(dB) = RF cable loss(dB) + Divider (dB)

7. Test results

7.1. Conducted output power

Test setup



Limit

According to §90.635(b),

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

Test procedure

971168 D01 v03r01 – Section 5.2
ANSI C63.26-2015 – Section 5.2.4.2
CFR 47, - Section §2.1046

Test settings

When an average power meter is used to perform RF output power measurements, the fundamental condition that measurement be performed only over durations of active transmissions at maximum output power level applies. Thus, an average power meter can always be used to perform the measurement when the EUT can be configured to transmit continuously.

If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle < 98%), then the following options can be implemented to facilitate measurement of the average power with an average power meter:

- a) A gated average power meter can be used to perform the measurement if the gating parameters can be adjusted such that the power is measured only during active transmission bursts at maximum output power levels.
- b) A conventional average power meter with no signal gating capability can also be used if the measured burst duty cycle is constant (i.e., duty cycle variations are less than or equal to $\pm 2\%$) by performing the measurement over the on/off burst cycles and then correcting (increasing) the measured level by a factor equal to $[10\log(1/\text{duty cycle})]$. See 5.2.4.3.4 for guidance with respect to measuring the transmitter duty cycle.

See item r) of 4.1 for more information regarding power meter functional requirements and limitations, and consult the instrumentation-specific application literature for proper set-up and use.

Notes:

Offset(dB) = RF cable loss(dB)

Test results

Test Band	Bandwidth (MHz)	Test mode	RB size	RB offset	Maximum power		
					Frequency (MHz)		
					Low	Middle	High
LTE Band 14	5	QPSK	1	0	24.64	24.48	24.51
			1	12	24.63	24.59	24.51
			1	24	24.57	24.50	24.53
			12	0	23.64	23.62	23.61
			12	7	23.60	23.63	23.53
			12	13	23.62	23.58	23.56
		25	0	23.72	23.63	23.57	
		16QAM	1	0	23.78	23.61	23.82
			1	12	23.66	23.59	23.61
			1	24	23.76	23.63	23.61
			12	0	22.72	22.60	22.61
			12	7	22.68	22.66	22.58
			12	13	22.69	22.54	22.59
		25	0	22.67	22.58	22.58	
		64QAM	1	0	22.83	22.71	22.81
			1	12	22.79	22.65	22.79
			1	24	22.79	22.68	22.60
			12	0	21.67	21.68	21.62
			12	7	21.67	21.57	21.53
			12	13	21.64	21.59	21.56
		25	0	21.68	21.61	21.57	
		256QAM	1	0	19.73	19.68	19.76
			1	12	19.70	19.54	19.61
			1	24	19.77	19.59	19.57
	12		0	19.67	19.58	19.52	
	12		7	19.56	19.53	19.56	
	12		13	19.60	19.58	19.51	
	25	0	19.63	19.60	19.53		
	10	QPSK	1	0	-	24.55	-
			1	25	-	24.32	-
			1	49	-	24.46	-
			25	0	-	23.66	-
			25	12	-	23.62	-
			25	25	-	23.57	-
		50	0	-	23.64	-	
		16QAM	1	0	-	23.72	-
			1	25	-	23.73	-
			1	49	-	23.67	-
			25	0	-	22.68	-
			25	12	-	22.63	-
			25	25	-	22.54	-
		50	0	-	22.66	-	
		64QAM	1	0	-	22.78	-
			1	25	-	22.62	-
			1	49	-	22.69	-
			25	0	-	21.62	-
			25	12	-	21.66	-
			25	25	-	21.59	-
50		0	-	21.67	-		
256QAM		1	0	-	19.79	-	
		1	25	-	19.66	-	
		1	49	-	19.65	-	
	25	0	-	19.63	-		
	25	12	-	19.62	-		
	25	25	-	19.55	-		
50	0	-	19.64	-			

Test Band	Bandwidth (MHz)	Test mode	RB size	RB offset	Maximum power			
					Frequency (MHz)			
					Low	Middle	High	
LTE Band 26	1.4	QPSK	1	0	23.66	-	23.59	
			1	3	23.67	-	23.51	
			1	5	23.71	-	23.55	
			3	0	23.77	-	23.67	
			3	1	23.61	-	23.58	
			3	3	23.70	-	23.56	
		6	0	22.80	-	22.79		
		16QAM	1	0	23.01	-	22.88	
			1	3	22.93	-	22.69	
			1	5	22.91	-	22.90	
			3	0	22.76	-	22.82	
			3	1	22.87	-	22.81	
			3	3	22.82	-	22.60	
		6	0	21.86	-	21.80		
		64QAM	1	0	21.90	-	21.78	
			1	3	21.80	-	21.85	
			1	5	22.07	-	21.85	
			3	0	21.86	-	21.73	
			3	1	21.94	-	21.69	
			3	3	21.76	-	21.81	
		6	0	20.85	-	20.71		
		256QAM	1	0	18.85	-	18.84	
			1	3	18.82	-	18.73	
			1	5	18.84	-	18.88	
	3		0	18.84	-	18.73		
	3		1	18.84	-	18.71		
	3		3	18.80	-	18.74		
	6	0	18.82	-	18.60			
	3	QPSK	1	0	23.67	-	23.63	
			1	8	23.61	-	23.48	
			1	14	23.59	-	23.67	
			8	0	22.73	-	22.69	
			8	4	22.75	-	22.76	
			8	7	22.76	-	22.76	
			15	0	22.82	-	22.91	
			16QAM	1	0	22.99	-	22.90
				1	8	22.87	-	22.69
				1	14	23.02	-	22.87
				8	0	21.81	-	21.73
				8	4	21.80	-	21.74
		8		7	21.85	-	21.76	
		15	0	21.82	-	21.74		
		64QAM	1	0	21.86	-	21.80	
			1	8	21.80	-	21.97	
			1	14	21.96	-	21.94	
			8	0	20.81	-	20.70	
			8	4	20.78	-	20.72	
			8	7	20.84	-	20.77	
15		0	20.87	-	20.71			
256QAM		1	0	19.01	-	18.82		
		1	8	18.82	-	18.70		
		1	14	18.79	-	18.73		
	8	0	18.84	-	18.83			
	8	4	18.83	-	18.76			
	8	7	18.82	-	18.71			
15	0	18.79	-	18.81				

Test Band	Bandwidth (MHz)	Test mode	RB size	RB offset	Maximum power		
					Frequency (MHz)		
					Low	Middle	High
LTE Band 26	5	QPSK	1	0	23.64	-	23.67
			1	12	23.62	-	23.57
			1	24	23.62	-	23.49
			12	0	22.75	-	22.80
			12	7	22.84	-	22.73
			12	13	22.73	-	22.75
		25	0	22.80	-	22.77	
		16QAM	1	0	22.89	-	22.82
			1	12	22.90	-	22.63
			1	24	22.79	-	22.67
			12	0	21.86	-	21.78
			12	7	21.85	-	21.80
			12	13	21.85	-	21.75
		25	0	21.73	-	21.78	
		64QAM	1	0	22.05	-	21.92
			1	12	21.99	-	21.86
			1	24	21.78	-	21.74
			12	0	20.82	-	20.70
			12	7	20.80	-	20.77
			12	13	20.78	-	20.70
		25	0	20.74	-	20.69	
		256QAM	1	0	18.85	-	18.92
			1	12	18.86	-	18.90
			1	24	18.78	-	18.91
	12		0	18.85	-	18.78	
	12		7	18.79	-	18.76	
	12		13	18.78	-	18.75	
	25	0	18.80	-	18.84		
	10	QPSK	1	0	-	23.81	-
			1	25	-	23.61	-
			1	49	-	23.71	-
			25	0	-	22.89	-
			25	12	-	22.86	-
			25	25	-	22.83	-
		50	0	-	22.91	-	
		16QAM	1	0	-	22.95	-
			1	25	-	22.81	-
			1	49	-	22.86	-
			25	0	-	21.79	-
			25	12	-	21.78	-
			25	25	-	21.76	-
		50	0	-	21.90	-	
		64QAM	1	0	-	21.94	-
			1	25	-	21.87	-
			1	49	-	21.79	-
			25	0	-	20.88	-
			25	12	-	20.83	-
			25	25	-	20.80	-
50		0	-	20.87	-		
256QAM		1	0	-	18.94	-	
		1	25	-	18.81	-	
		1	49	-	18.83	-	
	25	0	-	18.84	-		
	25	12	-	18.83	-		
	25	25	-	18.78	-		
50	0	-	18.79	-			

Test Band	Bandwidth (MHz)	Test mode	RB size	RB offset	Maximum power		
					Frequency (MHz)		
					Low	Middle	High
LTE Band 26	15	QPSK	1	0	-	23.70	-
			1	36	-	23.53	-
			1	74	-	23.66	-
			36	0	-	22.84	-
			36	18	-	22.80	-
			36	37	-	22.76	-
		16QAM	75	0	-	22.81	-
			1	0	-	22.96	-
			1	36	-	23.03	-
			1	74	-	22.97	-
			36	0	-	21.89	-
			36	18	-	21.80	-
		64QAM	36	37	-	21.77	-
			75	0	-	21.78	-
			1	0	-	21.98	-
			1	36	-	21.93	-
			1	74	-	21.90	-
			36	0	-	20.85	-
		256QAM	36	18	-	20.80	-
			36	37	-	20.79	-
			75	0	-	20.83	-
			1	0	-	18.91	-
			1	36	-	18.68	-
			1	74	-	18.73	-
			36	0	-	18.82	-
			36	18	-	18.78	-
			36	37	-	18.74	-
			75	0	-	18.79	-

Straddle channel

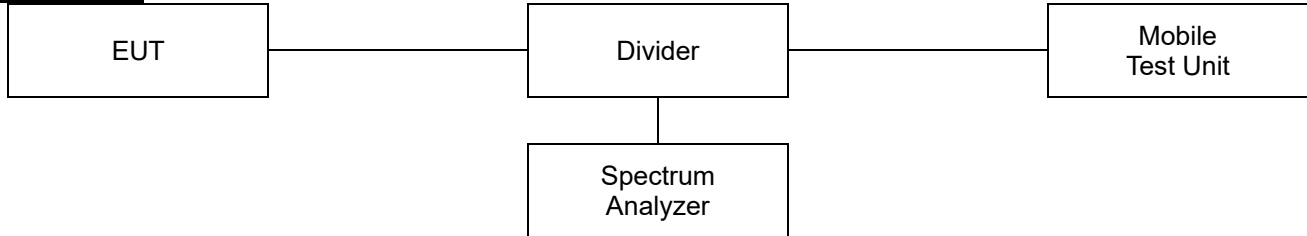
Test Band	Bandwidth (MHz)	Test mode	RB size	RB offset	Maximum power
LTE Band 26	1.4	QPSK	1	0	23.52
			1	3	23.48
			1	5	23.58
			3	0	23.70
			3	1	23.52
			3	3	23.46
		16QAM	6	0	22.59
			1	0	22.92
			1	3	22.69
			1	5	22.90
			3	0	22.77
			3	1	22.81
		64QAM	3	3	22.58
			6	0	21.85
			1	0	21.86
			1	3	21.83
			1	5	21.81
			3	0	21.64
		256QAM	3	1	21.77
			3	3	21.79
			6	0	20.61
			1	0	18.77
			1	3	18.72
			1	5	18.65
	3	QPSK	3	0	18.70
			3	1	18.84
			3	3	18.81
			6	0	18.72
			1	0	23.70
			1	8	23.47
		16QAM	1	14	23.55
			8	0	22.74
			8	4	22.66
			8	7	22.69
			15	0	22.76
			1	0	22.97
		64QAM	1	8	22.64
			1	14	22.97
			8	0	21.69
			8	4	21.71
			8	7	21.82
			15	0	21.70
		256QAM	1	0	21.78
			1	8	21.96
			1	14	21.89
			8	0	20.82
			8	4	20.85
			8	7	20.66
QPSK	15	0	20.76		
	1	0	18.77		
	1	8	18.81		
	1	14	18.76		
	8	0	18.74		
	8	4	18.71		
16QAM	8	7	18.69		
	15	0	18.81		

Test Band	Bandwidth (MHz)	Test mode	RB size	RB offset	Maximum power
LTE Band 26	5	QPSK	1	0	23.66
			1	12	23.66
			1	24	23.54
			12	0	22.79
			12	7	22.73
			12	13	22.83
		16QAM	25	0	22.78
			1	0	22.86
			1	12	22.57
			1	24	22.75
			12	0	21.69
			12	7	21.76
		64QAM	12	13	21.72
			25	0	21.84
			1	0	21.93
			1	12	21.90
			1	24	21.66
			12	0	20.72
		256QAM	12	7	20.81
			12	13	20.73
			25	0	20.83
			1	0	18.85
			1	12	18.81
			1	24	18.79
	10	QPSK	12	0	18.69
			12	7	18.77
			12	13	18.77
			25	0	18.67
			1	0	23.72
			1	25	23.61
		16QAM	1	49	23.52
			25	0	22.86
			25	12	22.88
			25	25	22.79
			50	0	22.91
			1	0	22.93
		64QAM	1	25	22.73
			1	49	22.80
			25	0	21.82
			25	12	21.82
			25	25	21.78
			50	0	21.87
		256QAM	1	0	21.94
			1	25	21.69
			1	49	21.92
			25	0	20.88
			25	12	20.78
			25	25	20.74
QPSK	50	0	20.86		
	1	0	18.84		
	1	25	18.86		
	1	49	18.93		
	25	0	18.81		
	25	12	18.81		
QPSK	25	25	18.75		
	50	0	18.71		

Test Band	Bandwidth (MHz)	Test mode	RB size	RB offset	Maximum power
LTE Band 26	15	QPSK	1	0	23.69
			1	36	23.61
			1	74	23.64
			36	0	22.94
			36	18	22.81
			36	37	22.63
			75	0	22.84
		16QAM	1	0	22.99
			1	36	22.92
			1	74	22.78
			36	0	21.89
			36	18	21.73
			36	37	21.78
			75	0	21.69
		64QAM	1	0	22.06
			1	36	21.78
			1	74	21.81
			36	0	20.76
			36	18	20.91
			36	37	20.87
			75	0	20.81
		256QAM	1	0	19.07
			1	36	18.76
			1	74	18.83
36	0		18.79		
36	18		18.71		
36	37		18.80		
75	0		18.83		

7.2. 99% Occupied Bandwidth & 26 dB Bandwidth

Test setup



Limit

According to §2.1049,

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.



Test procedure

971168 D01 v03r01 – Section 4.2 and 4.3
ANSI C63.26-2015 – Section 5.4.3 and 5.4.4

Test settings

◆ 26 dB Bandwidth

- c) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- d) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- e) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- f) Determine the reference value by either of the following:
 - 1) Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
 - 2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.
- g) Determine the “-X dB amplitude” as equal to (Reference Value - X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
- h) If the reference value was determined using an unmodulated carrier, turn the EUT modulation on, then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used

<p>Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr</p>	<p>Report No.: KR23-SRF0260-A Page (20) of (68)</p>	 
--	---	---

for step i).

- i) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB amplitude” determined in step f). If a marker is below this “-X dB amplitude” value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
- j) The spectral envelope can cross the “-X dB amplitude” at multiple points. The lowest or highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the “-X dB amplitude.”
- j) The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

◆ 99% Occupied Bandwidth

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of $1.5 \times \text{OBW}$ is sufficient).
- b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- d) Set the detection mode to peak, and the trace mode to max-hold.
- e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.
- f) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

Notes:

1. The EUT was setup to maximum output power as its lowest and highest channel with all bandwidth, Modulation.

Test results

Test Band	Bandwidth (MHz)	Frequency (MHz)	Test mode	26 dB bandwidth (MHz)	99 % bandwidth (MHz)
LTE Band 14	5	790.5	QPSK	5.28	4.53
			16QAM	5.40	4.53
		793.0	QPSK	5.37	4.53
			16QAM	5.36	4.52
		795.5	QPSK	5.43	4.52
			16QAM	5.36	4.53
	10	793.0	QPSK	10.47	9.04
			16QAM	10.49	9.04

Test Band	Bandwidth (MHz)	Frequency (MHz)	Test mode	26 dB bandwidth (MHz)	99 % bandwidth (MHz)
LTE Band 26	1.4	814.7	QPSK	1.36	1.10
			16QAM	1.34	1.10
		823.3	QPSK	1.35	1.10
			16QAM	1.32	1.09
	3	815.5	QPSK	3.14	2.70
			16QAM	3.09	2.70
		822.5	QPSK	3.12	2.70
			16QAM	3.09	2.70
	5	816.5	QPSK	5.40	4.53
			16QAM	5.40	4.53
		821.5	QPSK	5.41	4.53
			16QAM	5.32	4.52
	10	819.0	QPSK	10.37	9.04
			16QAM	10.32	9.02
	15	821.5	QPSK	15.06	13.45
			16QAM	15.10	13.45

Straddle channel

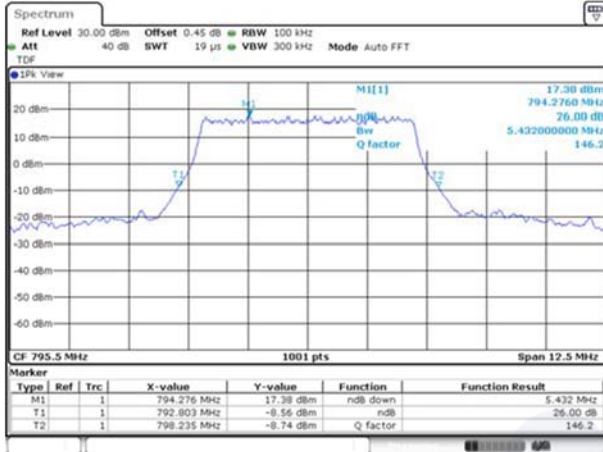
Test Band	Bandwidth (MHz)	Frequency (MHz)	Test mode	26 dB bandwidth (MHz)	99 % bandwidth (MHz)
LTE Band 26	1.4	824	QPSK	1.32	1.10
			16QAM	1.34	1.11
	3	824	QPSK	3.12	2.71
			16QAM	3.11	2.71
	5	824	QPSK	5.38	4.55
			16QAM	5.53	4.57
	10	824	QPSK	10.32	9.04
			16QAM	10.39	9.02
	15	824	QPSK	15.40	13.45
			16QAM	15.21	13.52



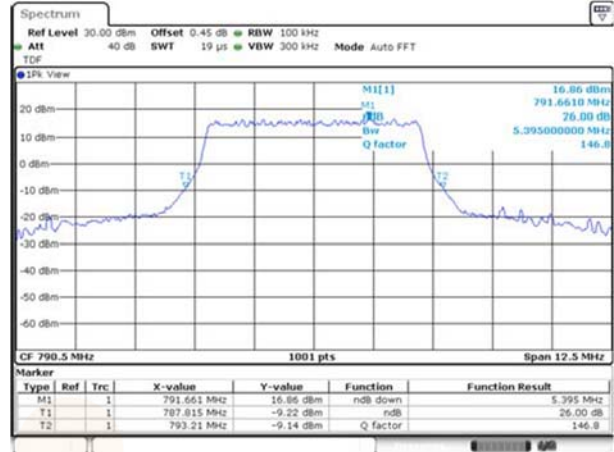
26 dB Bandwidth

Test mode: LTE Band 14

5M BW QPSK High ch.



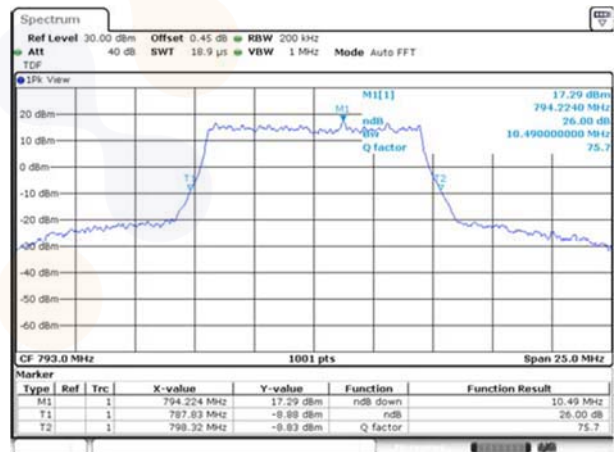
5M BW 16QAM Low ch.



10M BW QPSK Mid ch.

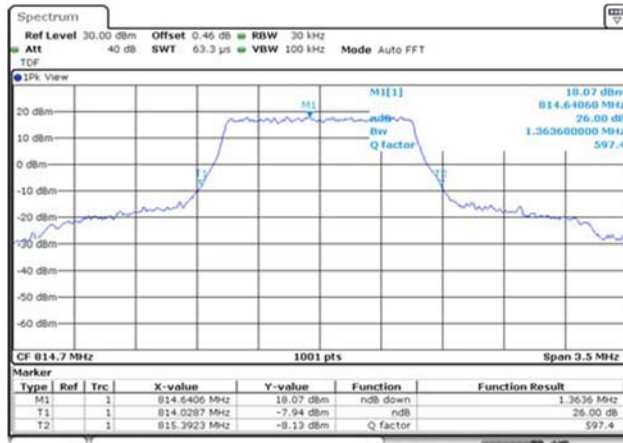


10M BW 16QAM Mid ch.

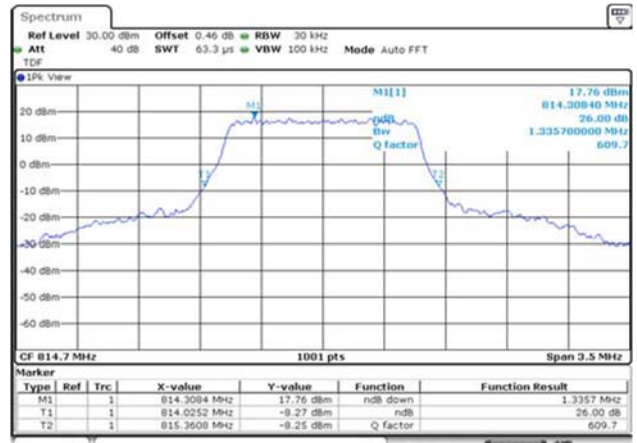


Test mode: LTE Band 26

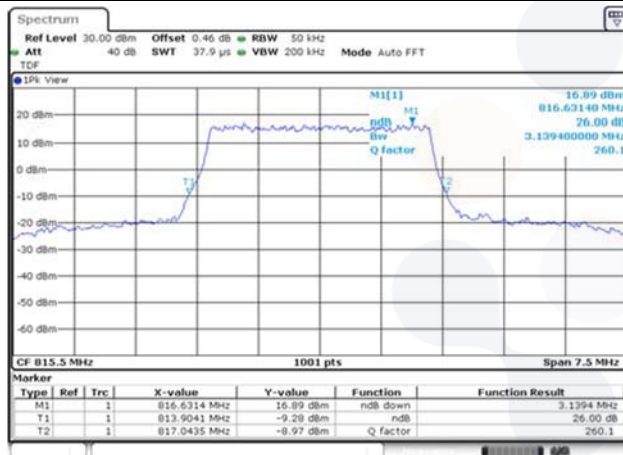
1.4M BW QPSK Low ch.



1.4M BW 16QAM Low ch.



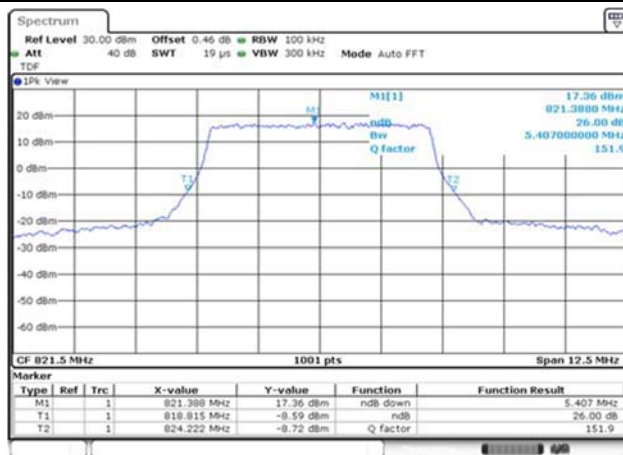
3M BW QPSK Low ch.



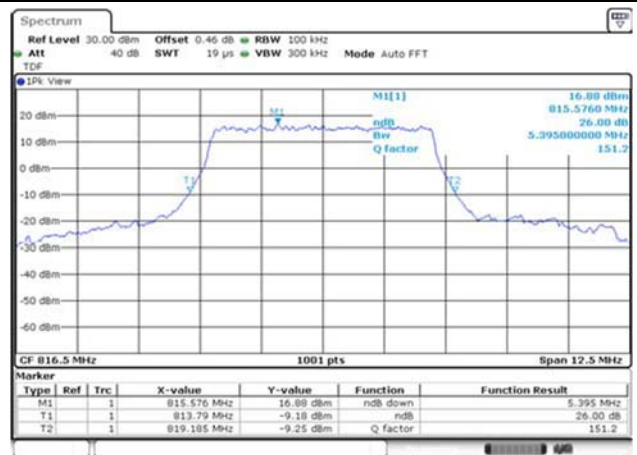
3M BW 16QAM Low ch.



5M BW QPSK High ch.



5M BW 16QAM Low ch.



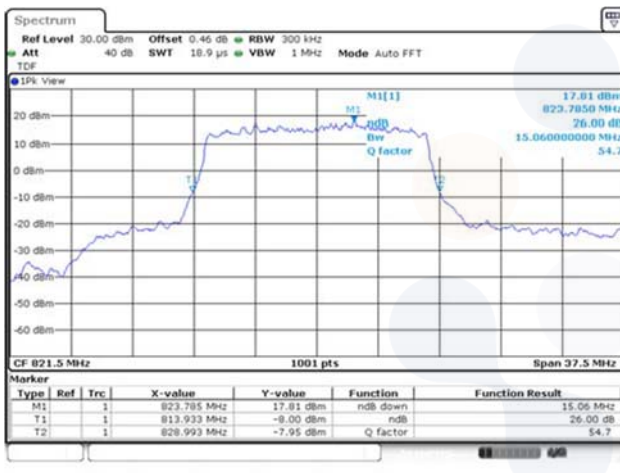
10M BW QPSK Mid ch.



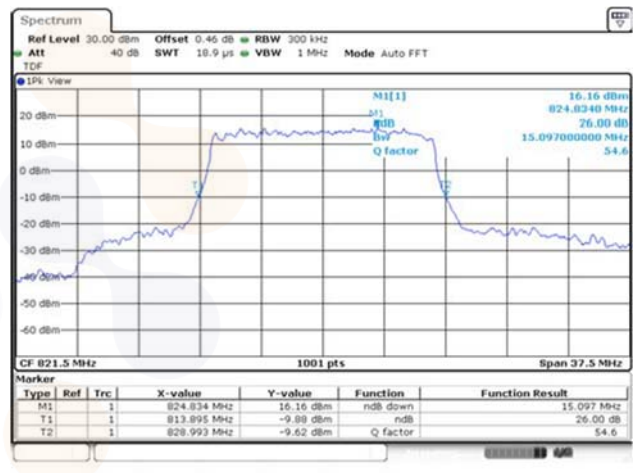
10M BW 16QAM Mid ch.



15M BW QPSK Mid ch.

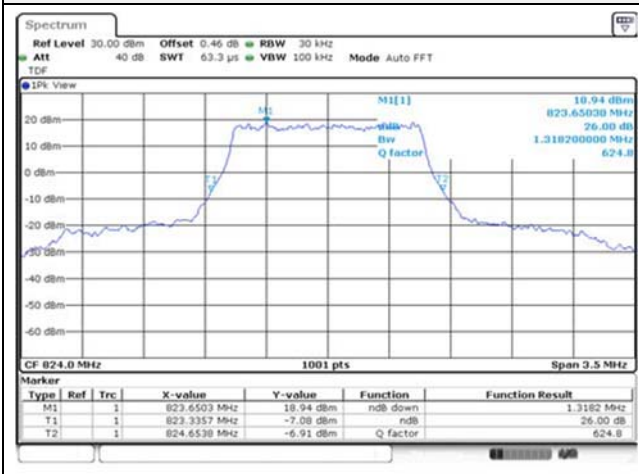


15M BW 16QAM Mid ch.

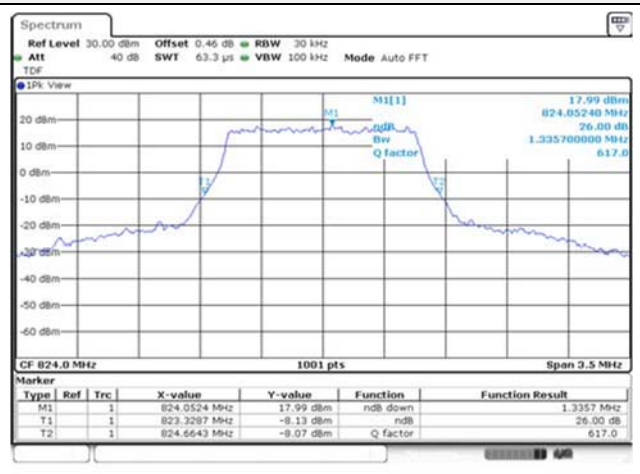


Straddle channel

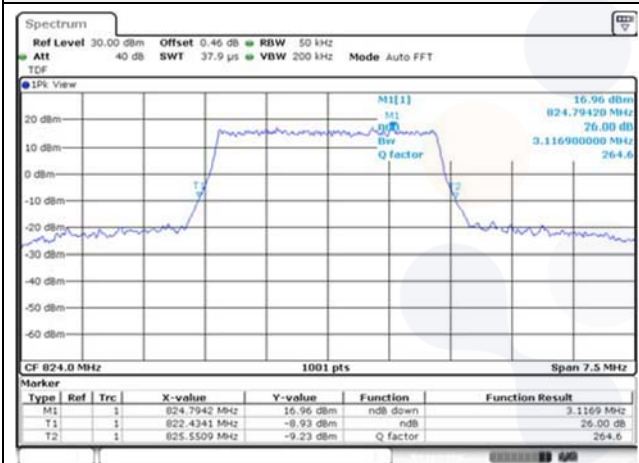
1.4M BW QPSK



1.4M BW 16QAM



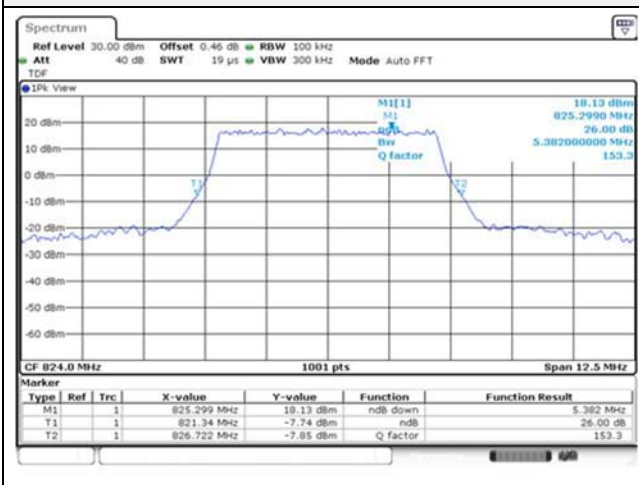
3M BW QPSK



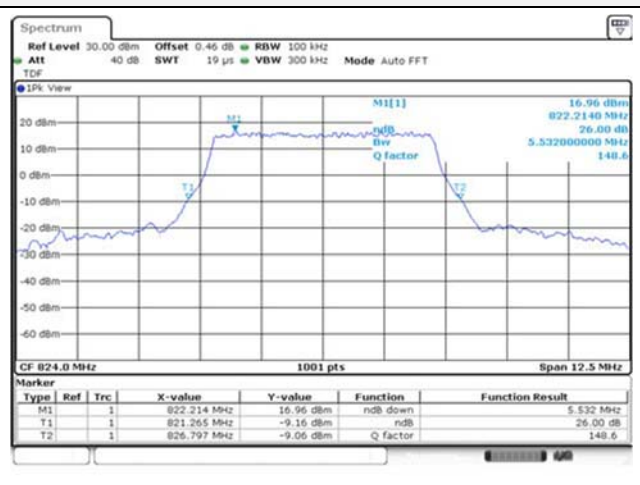
3M BW 16QAM



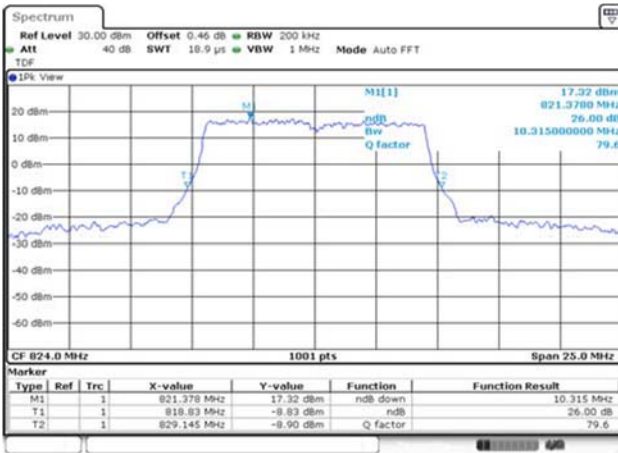
5M BW QPSK



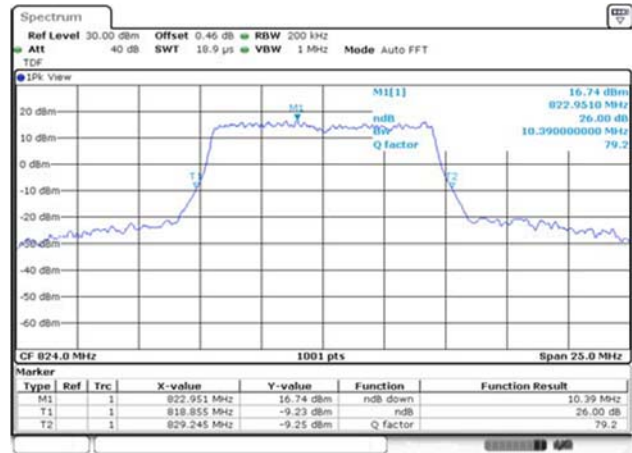
5M BW 16QAM



10M BW QPSK



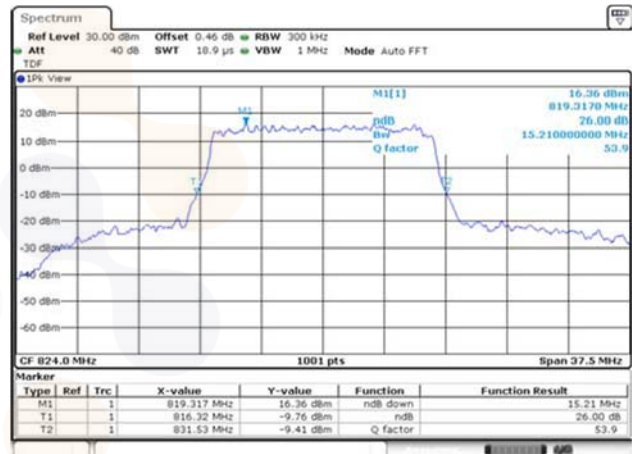
10M BW 16QAM



15M BW QPSK

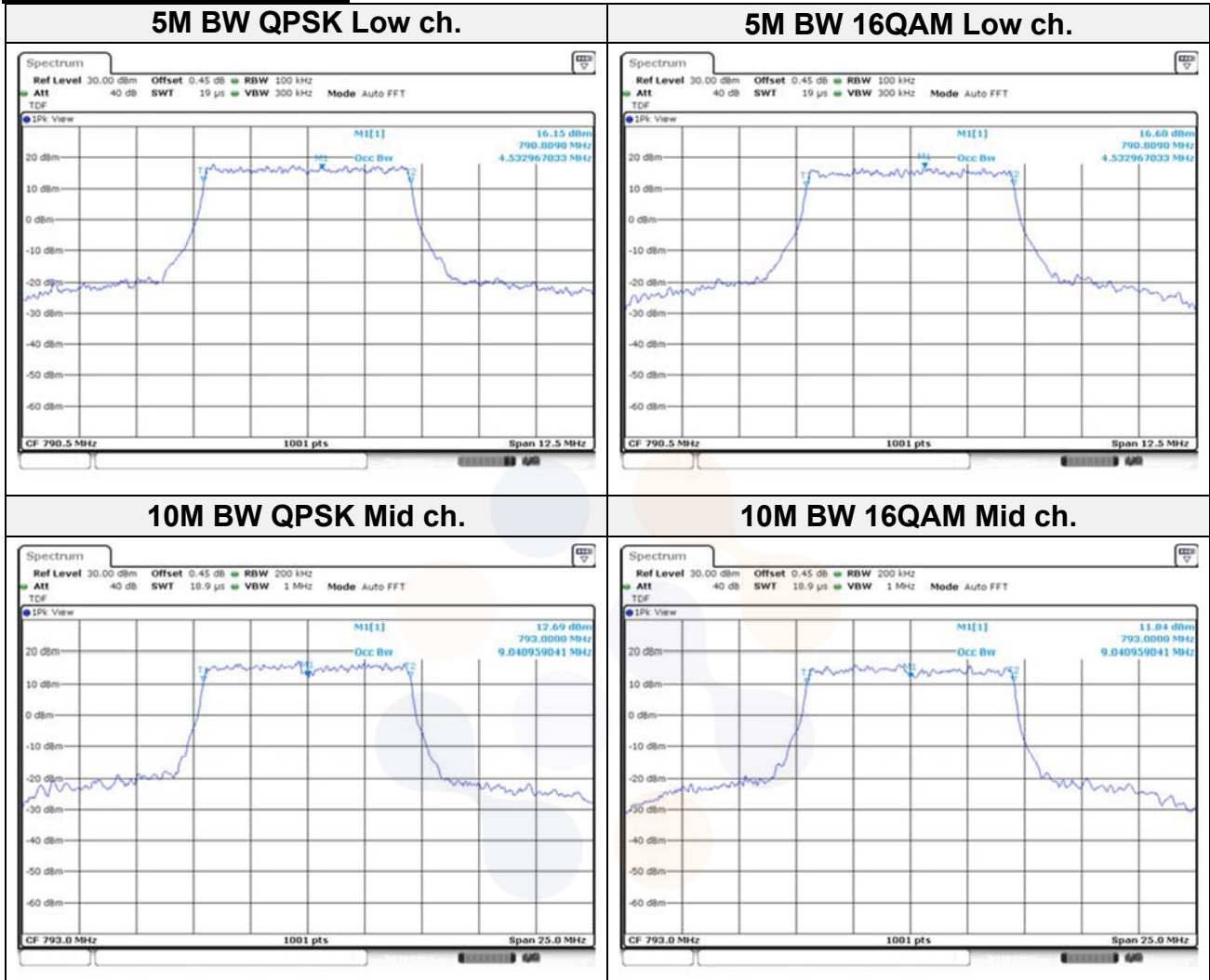


15M BW 16QAM



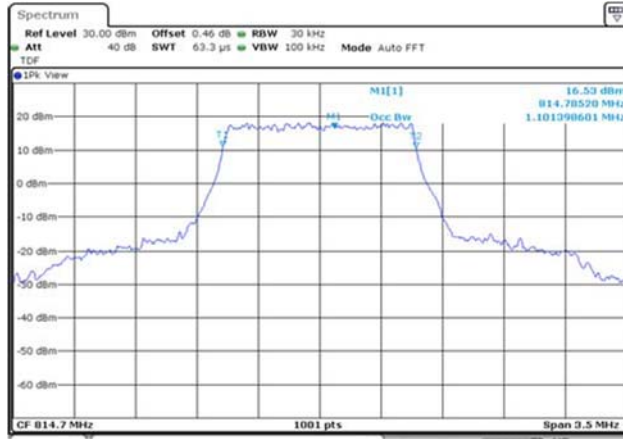
99% Occupied Bandwidth

Test mode: LTE Band 14

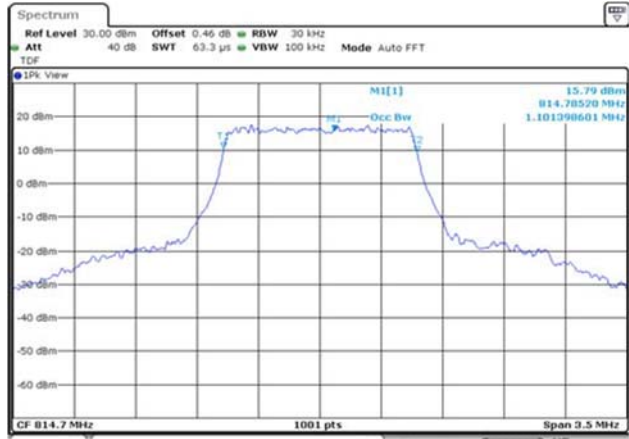


Test mode: LTE Band 26

1.4M BW QPSK Low ch.



1.4M BW 16QAM Low ch.



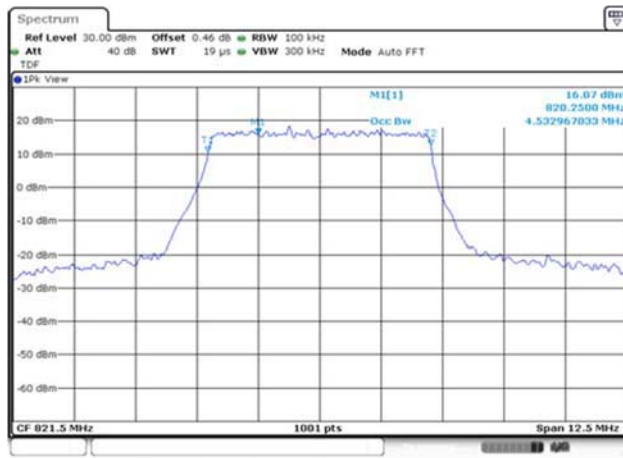
3M BW QPSK Low ch.



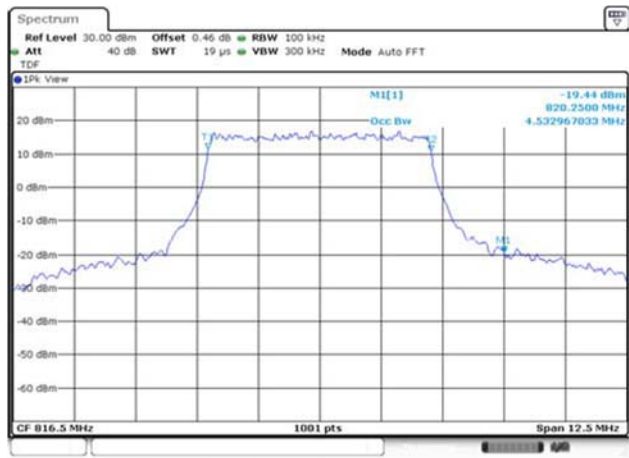
3M BW 16QAM Low ch.



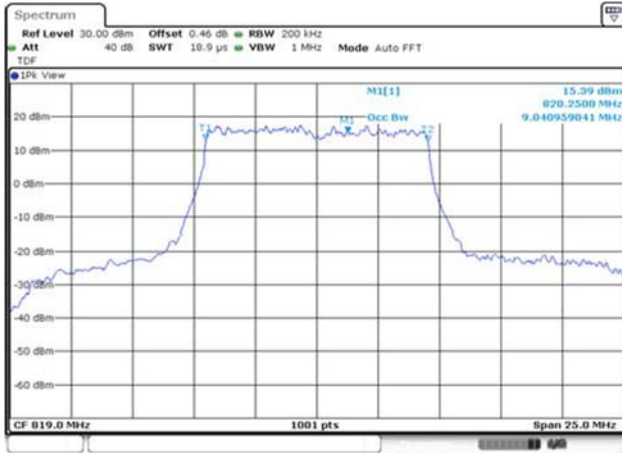
5M BW QPSK High ch.



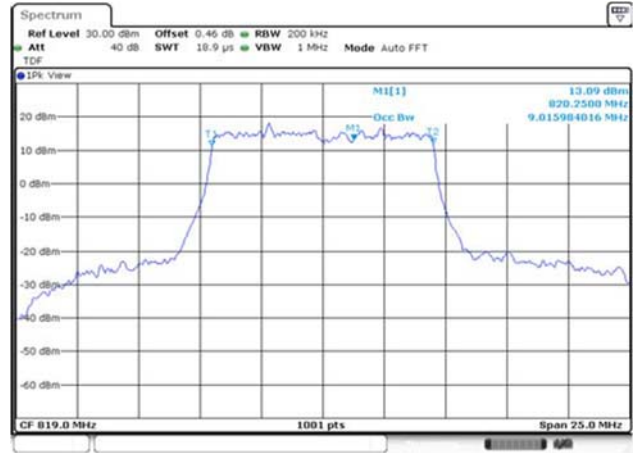
5M BW 16QAM Low ch.



10M BW QPSK Mid ch.



10M BW 16QAM Mid ch.



15M BW QPSK Mid ch.



15M BW 16QAM Mid ch.

