



TEST REPORT

Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-4904-0113 FAX: 82-505-299-8311 www.kctl.co.kr	Report No.: KR25-SRF0175 Page(1) of (68)	 KCTL
1. Client		
◦ Name : Samsung Electronics Co., Ltd. ◦ Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea ◦ Date of Receipt : 2025-08-06		
2. Use of Report : Certification		
3. Name of Product / Model : Tablet PC / SM-X236B		
4. Manufacturer / Country of Origin : Samsung Electronics Co., Ltd. / Vietnam		
5. FCC ID : A3LSMX236B		
6. Date of Test : 2025-08-08 to 2025-09-10		
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 24 Subpart E		
9. Test Result : Refer to the test result in the test report		
Affirmation	Tested by Name : Narae Kang  (Signature)	Technical Manager Name : Kwonse Kim  (Signature)
	2025-09-12	
Eurofins KCTL Co.,Ltd.		
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REPORT REVISION HISTORY

Date	Revision	Page No
2025-09-12	Originally issued	-

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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

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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
 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-X236B
 Modulation technique : GSM : GMSK
 : WCDMA : QPSK
 : LTE : QPSK, 16QAM, 64QAM, 256QAM
 Power source : DC 3.85 V
 Antenna specification : Main Antenna 1 : PIFA Antenna
 : (GSM 1900, WCDMA 1900, LTE B2)
 Antenna gain : Main Antenna 1 : -2.4 dBi
 Frequency range : GSM 1900 : 1 850.2 MHz ~ 1 909.8 MHz
 : WCDMA 1900 : 1 852.4 MHz ~ 1 907.6 MHz
 : LTE B2 : 1 850.7 MHz ~ 1 909.3 MHz
 Bandwidth : LTE B2 : 1.4/3/5/10/15/20 MHz
 Software version : X236B.001
 Hardware version : REV1.0
 Test device serial No. : Conducted : R32Y700QKJW, R32Y700QKRP
 : Radiated : R32Y700QLFF, R32Y700QKFY
 Operation Temperature : 0 °C ~ 35 °C

2.1. Frequency/channel operations

This device contains the following capabilities:

GSM 1900, WCDMA 1900, LTE B2

GSM 1900

Ch.	Frequency (MHz)
512	1 850.2
661	1 880.0
810	1 909.8

Table 2.1-1.
Voice/GPRS/EDGE

WCDMA 1900

Ch.	Frequency (MHz)
9262	1 852.4
9400	1 880.0
9538	1 907.6

Table 2.1-2.
RMC/HSDPA/HSUPA/
DC-HSDPA

LTE B2

Ch.	Frequency (MHz)
18607	1 850.7
18900	1 880.0
19193	1 909.3

Table 2.1-3. 1.4M BW

Ch.	Frequency (MHz)
18615	1 851.5
18900	1 880.0
19185	1 908.5

Table 2.1-4. 3M BW

Ch.	Frequency (MHz)
18625	1 852.5
18900	1 880.0
19175	1 907.5

Table 2.1-5. 5M BW

Ch.	Frequency (MHz)
18650	1 855.0
18900	1 880.0
19150	1 905.0

Table 2.1-6. 10M BW

Ch.	Frequency (MHz)
18675	1 857.5
18900	1 880.0
19125	1 902.5

Table 2.1-7. 15M BW

Ch.	Frequency (MHz)
18700	1 860.0
18900	1 880.0
19100	1 900.0

Table 2.1-8. 20M BW

3. Maximum EIRP power

GSM 1900

Mode	Tx frequency (MHz)	Emission designator	EIRP	
			Max. power (dBm)	Max. power (W)
GSM 1900 (Voice)	1 850.2 ~ 1 909.8	244KF9W	28.47	0.703
GSM 1900 (EDGE)	1 850.2 ~ 1 909.8	246KF9W	24.25	0.266

WCDMA 1900

Mode	Tx frequency (MHz)	Emission designator	EIRP	
			Max. power (dBm)	Max. power (W)
WCDMA 1900	1 852.4 ~ 1 907.6	4M17F9W	22.84	0.192

LTE B2

Mode	Tx frequency (MHz)	Emission designator	EIRP	
			Max. power (dBm)	Max. power (W)
LTE B2	1 850.7 ~ 1 909.3	1M10G7D	22.77	0.189
		1M10W7D	21.78	0.150
	1 851.5 ~ 1 908.5	2M71G7D	22.56	0.180
		2M70W7D	21.59	0.144
	1 852.5 ~ 1 907.5	4M51G7D	22.24	0.167
		4M51W7D	21.19	0.132
	1 855.0 ~ 1 905.0	8M97G7D	22.11	0.162
		8M99W7D	21.21	0.132
	1 857.5 ~ 1 902.5	13M4G7D	22.20	0.166
		13M4W7D	21.19	0.131
	1 860.0 ~ 1 900.0	18M0G7D	22.06	0.161
		18M1W7D	21.27	0.134

4. Summary of tests

FCC Part section(s)	Parameter	Test Limit	Test Condition	Test results
2.1046	Conducted Output Power	N/A	Conducted	Pass
2.1049	Occupied Bandwidth & 26 dB Bandwidth	N/A		Pass
2.1051 24.238(a)	Band Edge Emissions at Antenna Terminal	<43 + 10Log ₁₀ (P) dB at Band Edge and for all out of band emissions		Pass
	Spurious Emissions at Antenna Terminal			Pass
24.232(d)	Peak to Average Power Ratio	<13 dB		Pass
2.1055 24.355	Frequency stability	< 2.5 ppm		Pass
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. ERP	Radiated	Pass
2.1053 24.238(a)	Radiated Spurious Emissions	<43 + 10Log ₁₀ (P) dB for all out of band emissions		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

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.
- In the case of radiated spurious emissions, only the worst case bandwidth results were reported.
- Output power measurements were measured on all of modulation. All tests except output power was performed with below modulation with highest power.
 - GSM: Voice, Edge
 - WCDMA: RMC
 - LTE: QPSK, 16QAM
- However, the PAPR was evaluated for all wave forms and modulations during pre-test, then all bandwidth was performed for the modulations with the highest result.
 - LTE: QPSK, 16QAM
- All configurations have been performed (Stand-alone, Stand-alone with TA, With accessories).
 - Accessory type: DLC
- 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
GSM1900	O	-	-	-	-	-	-	-	-
WCDMA1900	O	-	-	-	-	-	-	-	-
LTE B2	O	-	-	-	-	-	-	-	-

7. Test Condition

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

1) Radiated measurement

Test Description	Mode	Condition		Test Channel
Radiated Power	GSM	Voice, EDGE (1 Tx)		Low, Middle, High
	WCDMA	RMC (12.2 kbps)		
	LTE	QPSK, 16QAM	RB Size: 1	
Radiated Spurious Emissions	GSM	Voice		Low, Middle, High
	WCDMA	RMC (12.2 kbps)		
	LTE	QPSK	RB Size: 1	

Band	Bandwidth (MHz)	RB size	RB offset
LTE B2	1.4, 3, 5, 10, 15, 20	1	Low, Middle, High

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2) Conducted measurement

Test Description	Mode	Condition		Test Channel
OBW & 26 dB BW	GSM	Voice, EDGE (1 Tx)		Low, Middle, High
	WCDMA	RMC (12.2 kbps)		
	LTE	QPSK, 16QAM	RB Size: Full	
PAPR	GSM	Voice, EDGE (1 Tx)		Middle
	WCDMA	RMC (12.2 kbps)		
	LTE	QPSK, 16QAM	RB Size: Full	
Stability	GSM	Voice (1 Tx)		Middle
	WCDMA	RMC (12.2 kbps)		
	LTE	QPSK	RB Size: Full	
Band Edge	GSM	Voice, EDGE (1 Tx)		Low, High
	WCDMA	RMC (12.2 kbps)		
	LTE	QPSK	RB Size: 1, Full	
Spurious Emissions	GSM	Voice, EDGE (1 Tx)		Low, Middle, High
	WCDMA	RMC (12.2 kbps)		
	LTE	QPSK	RB Size: 1	

Band	Bandwidth (MHz)	RB size	RB offset
LTE B2	1.4, 3, 5, 10, 15, 20	1	0, 5, 14, 24, 49, 74, 99
		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 indicated 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	2.0 dB	
Radiated spurious emissions	Below 1 000 MHz	2.5 dB
	1 000 MHz to 18 000 MHz	2.5 dB
	Above 18 000 MHz	2.6 dB

6. Measurement results explanation example

Frequency (MHz)	Factor(dB)	Frequency (MHz)	Factor(dB)
30	5.86	11 000	9.30
50	6.08	12 000	8.90
100	6.16	13 000	9.44
200	6.14	14 000	9.73
300	6.34	15 000	10.53
400	6.44	16 000	11.18
500	6.53	17 000	10.79
600	6.58	18 000	9.96
700	6.64	19 000	9.41
800	6.70	20 000	9.08
900	6.76	21 000	9.52
1 000	6.82	22 000	12.11
2 000	7.23	23 000	11.95
3 000	7.46	24 000	10.40
4 000	7.75	25 000	10.77
5 000	8.12	26 000	10.46
6 000	8.44	26 500	11.81
7 000	7.59	27 000	12.81
8 000	7.82	28 000	13.54
9 000	8.17	29 000	12.16
10 000	7.78	30 000	11.53

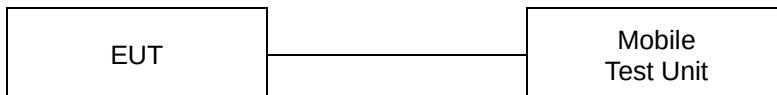
Note.

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

7. Test results

7.1. Conducted output power

Test setup



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 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.
- 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.

Note:

- Offset(dB) = RF cable loss(dB)

Test results

Maximum Average Power (dBm)										
Test Band	Channel	GSM	GPRS				EDGE			
		Voice	1Tx	2Tx	3Tx	4Tx	1Tx	2Tx	3Tx	4Tx
GSM1900	Low	29.15	29.18	28.37	26.34	25.07	24.67	23.85	21.28	19.79
	Middle	29.08	29.09	28.15	26.01	25.11	24.66	23.43	20.70	19.34
	High	29.01	29.03	28.59	26.41	25.06	24.41	23.08	20.31	19.01

Test Band	Test mode	Maximum Average Power (dBm)		
		Channel		
		Low	Middle	High
WCDMA 1900	RMC	23.30	23.33	22.98
	HSDPA-Subtest 1	22.39	22.38	22.05
	HSDPA-Subtest 2	22.39	22.36	22.02
	HSDPA-Subtest 3	21.93	21.92	21.58
	HSDPA-Subtest 4	21.91	21.89	21.54
	HSUPA-Subtest 1	22.16	22.16	21.80
	HSUPA-Subtest 2	20.25	20.21	20.02
	HSUPA-Subtest 3	20.78	20.66	20.30
	HSUPA-Subtest 4	20.19	20.11	19.79
	HSUPA-Subtest 5	21.66	21.65	21.31
	DC-HSDPA-Subtest 1	22.36	22.39	22.07
	DC-HSDPA-Subtest 2	22.35	22.35	22.06
	DC-HSDPA-Subtest 3	21.90	21.92	21.62
	DC-HSDPA-Subtest 4	21.88	21.89	21.60

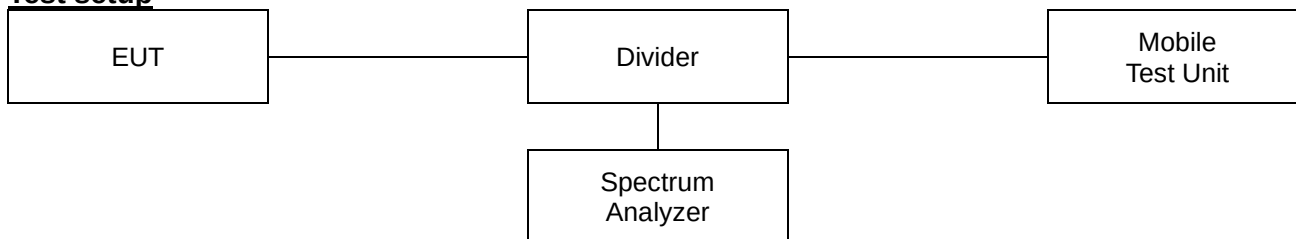
Test Band	Bandwidth (MHz)	Test mode	RB size	RB offset	Maximum Average Power (dBm)		
					Channel		
					Low	Middle	High
LTE B2	1.4	QPSK	1	0	23.44	23.77	23.45
			1	3	23.40	23.74	23.37
			1	5	23.45	23.77	23.36
			3	0	23.57	23.54	23.41
			3	1	23.58	23.57	23.39
			3	3	23.59	23.58	23.35
			6	0	22.49	22.65	22.39
		16QAM	1	0	22.55	22.70	22.61
			1	3	22.52	22.64	22.54
			1	5	22.57	22.70	22.54
			3	0	22.58	22.81	22.40
			3	1	22.57	22.83	22.45
			3	3	22.57	22.81	22.43
			6	0	21.43	21.65	21.44
		64QAM	1	0	22.01	22.05	21.33
			1	3	21.35	21.52	21.29
			1	5	21.84	21.61	21.26
			3	0	21.88	21.88	21.65
			3	1	21.79	21.91	21.67
			3	3	21.84	21.88	21.65
			6	0	20.74	20.86	20.59
		256QAM	1	0	18.89	18.97	18.72
			1	3	18.88	18.96	18.65
			1	5	18.78	19.00	18.59
			3	0	18.83	18.95	18.69
			3	1	18.80	18.95	18.64
			3	3	18.83	18.93	18.68
			6	0	18.74	18.82	18.57
	3	QPSK	1	0	23.49	23.62	23.44
			1	8	23.53	23.67	23.36
			1	14	23.42	23.68	23.31
			8	0	22.52	22.61	22.49
			8	4	22.55	22.65	22.44
			8	7	22.53	22.65	22.43
			15	0	22.55	22.65	22.48
			1	0	23.01	22.75	22.47
		16QAM	1	8	22.94	22.81	22.51
			1	14	22.92	22.71	22.45
			8	0	21.73	21.64	21.58
			8	4	21.66	21.66	21.49
			8	7	21.70	21.64	21.51
			15	0	21.54	21.72	21.50
		64QAM	1	0	21.93	21.60	21.38
			1	8	21.97	21.59	21.38
			1	14	21.96	21.58	21.30
			8	0	20.82	21.01	20.75
			8	4	20.85	20.95	20.68
			8	7	20.88	20.95	20.69
			15	0	20.88	20.97	20.72
		256QAM	1	0	18.85	19.06	18.77
			1	8	18.89	18.88	18.77
			1	14	18.90	18.99	18.84
			8	0	18.85	18.99	18.78
			8	4	18.80	18.92	18.69
			8	7	18.84	18.95	18.69
			15	0	18.79	18.93	18.67

Test Band	Bandwidth (MHz)	Test mode	RB size	RB offset	Maximum Average Power (dBm)			
					Channel			
					Low	Middle	High	
LTE B2	5	QPSK	1	0	23.65	23.60	23.72	
			1	12	23.65	23.71	23.56	
			1	24	23.60	23.65	23.47	
			12	0	22.55	22.68	22.59	
			12	7	22.54	22.69	22.54	
			12	13	22.54	22.67	22.47	
			25	0	22.60	22.69	22.58	
		16QAM	1	0	22.51	22.96	22.59	
			1	12	22.48	23.00	22.50	
			1	24	22.48	22.92	22.48	
			12	0	21.57	21.71	21.61	
			12	7	21.56	21.73	21.53	
			12	13	21.56	21.72	21.49	
			25	0	21.60	21.70	21.62	
		64QAM	1	0	22.01	21.60	21.39	
			1	12	21.50	21.60	21.48	
			1	24	21.45	21.63	21.38	
			12	0	20.82	20.92	20.82	
			12	7	20.83	20.95	20.74	
			12	13	20.88	20.95	20.76	
			25	0	20.83	20.91	20.72	
		256QAM	1	0	18.86	18.95	18.80	
			1	12	18.95	19.02	18.74	
			1	24	18.89	19.01	18.68	
			12	0	18.78	18.87	18.78	
			12	7	18.77	18.86	18.70	
			12	13	18.76	18.90	18.61	
			25	0	18.80	18.92	18.75	
		10	QPSK	1	0	23.52	23.62	23.66
				1	25	23.51	23.69	23.59
	1			49	23.47	23.74	23.46	
	25			0	22.59	22.69	22.70	
	25			12	22.61	22.70	22.66	
	25			25	22.59	22.72	22.55	
	50			0	22.58	22.68	22.61	
	16QAM		1	0	22.62	23.16	22.86	
			1	25	22.59	23.21	22.77	
			1	49	22.54	23.17	22.64	
			25	0	21.67	21.72	21.77	
			25	12	21.63	21.73	21.69	
			25	25	21.64	21.77	21.63	
			50	0	21.61	21.70	21.61	
	64QAM		1	0	21.99	21.53	21.53	
			1	25	21.30	21.56	21.35	
			1	49	21.49	21.52	21.27	
			25	0	20.73	20.86	20.81	
			25	12	20.75	20.84	20.74	
			25	25	20.78	20.87	20.66	
			50	0	20.79	20.87	20.72	
	256QAM		1	0	18.84	18.92	18.95	
			1	25	18.86	18.98	18.78	
			1	49	18.92	18.99	18.76	
			25	0	18.72	18.84	18.82	
			25	12	18.77	18.81	18.74	
			25	25	18.79	18.86	18.68	
			50	0	18.75	18.85	18.72	

Test Band	Bandwidth (MHz)	Test mode	RB size	RB offset	Maximum Average Power (dBm)		
					Channel		
					Low	Middle	High
LTE B2	15	QPSK	1	0	23.61	23.63	23.84
			1	36	23.56	23.74	23.65
			1	74	23.56	23.69	23.44
			36	0	22.57	22.66	22.72
			36	18	22.56	22.70	22.64
			36	37	22.53	22.69	22.55
			75	0	22.57	22.70	22.68
		16QAM	1	0	22.90	23.09	23.01
			1	36	22.84	23.21	22.83
			1	74	22.81	23.15	22.64
			36	0	21.58	21.70	21.76
			36	18	21.60	21.71	21.70
			36	37	21.57	21.72	21.62
			75	0	21.57	21.71	21.64
		64QAM	1	0	21.90	21.93	21.61
			1	36	21.92	22.07	21.41
			1	74	21.87	21.56	21.32
			36	0	20.76	20.90	20.86
			36	18	20.81	20.91	20.84
			36	37	20.80	20.91	20.77
			75	0	20.77	20.89	20.80
		256QAM	1	0	18.91	18.93	18.88
			1	36	18.91	19.02	18.87
			1	74	18.91	18.94	18.74
			36	0	18.75	18.87	18.85
			36	18	18.79	18.88	18.79
			36	37	18.82	18.86	18.72
			75	0	18.80	18.89	18.80
	20	QPSK	1	0	23.62	23.85	23.83
			1	49	23.59	23.75	23.69
			1	99	23.62	23.75	23.52
			50	0	22.57	22.78	22.71
			50	24	22.58	22.72	22.74
			50	50	22.55	22.72	22.58
			100	0	22.58	22.70	22.67
		16QAM	1	0	22.89	22.88	23.48
			1	49	22.77	23.01	23.21
			1	99	22.83	22.98	23.17
			50	0	21.57	21.70	21.75
			50	24	21.62	21.73	21.76
			50	50	21.56	21.74	21.61
			100	0	21.59	21.71	21.68
		64QAM	1	0	21.90	21.48	21.51
			1	49	21.91	21.61	21.52
			1	99	21.96	21.65	21.36
			50	0	20.76	20.90	20.90
			50	24	20.82	20.94	20.90
			50	50	20.87	20.96	20.79
			100	0	20.81	20.93	20.82
		256QAM	1	0	18.91	18.97	19.03
			1	49	18.87	19.08	19.03
			1	99	19.03	18.93	18.77
			50	0	18.77	18.88	18.86
			50	24	18.81	18.93	18.86
			50	50	18.83	18.92	18.75
			100	0	18.80	18.91	18.84

7.2. 99% Occupied Bandwidth & 26dB 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

◆ 26dB Bandwidth

- 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.
- The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- 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.
- 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.
- Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- Determine the reference value by either of the following:
 - 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).
 - Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.
- 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.
- 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 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.”
- k) 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 with all bandwidth and modulation.

Test results

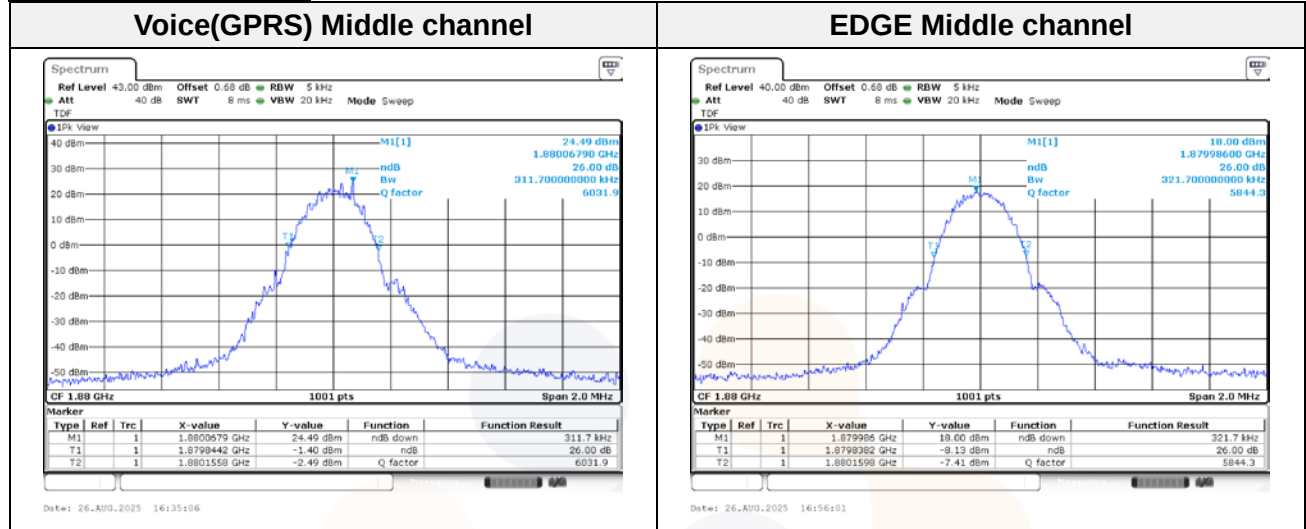
Test mode		Channel	26 dB Bandwidth (MHz)	99 % Bandwidth (MHz)
GSM 1900	Voice	Low	0.308	0.244
		Middle	0.312	0.242
		High	0.298	0.244
	EDGE	Low	0.316	0.246
		Middle	0.322	0.246
		High	0.316	0.246
WCDMA1900	RMC	Low	4.705	4.151
		Middle	4.720	4.151
		High	4.705	4.166

Test Band	Bandwidth (MHz)	Channel	Test mode	26dB Bandwidth (MHz)	99 % Bandwidth (MHz)
LTE B2	1.4	Low	QPSK	1.304	1.098
			16QAM	1.318	1.094
		Middle	QPSK	1.308	1.098
			16QAM	1.280	1.087
		High	QPSK	1.290	1.098
			16QAM	1.294	1.098
	3	Low	QPSK	2.952	2.705
			16QAM	2.945	2.697
		Middle	QPSK	2.930	2.705
			16QAM	2.937	2.690
		High	QPSK	2.952	2.697
			16QAM	2.952	2.690
	5	Low	QPSK	4.920	4.483
			16QAM	4.995	4.508
		Middle	QPSK	4.945	4.508
			16QAM	4.933	4.483
		High	QPSK	4.995	4.508
			16QAM	4.970	4.508
	10	Low	QPSK	9.765	8.966
			16QAM	9.765	8.991
		Middle	QPSK	9.740	8.941
			16QAM	9.790	8.991
		High	QPSK	9.815	8.941
			16QAM	9.840	8.991
	15	Low	QPSK	14.498	13.449
			16QAM	14.685	13.412
		Middle	QPSK	14.498	13.449
			16QAM	14.573	13.449
		High	QPSK	14.685	13.449
			16QAM	14.461	13.449
	20	Low	QPSK	19.281	17.982
			16QAM	19.181	17.932
		Middle	QPSK	19.231	17.982
			16QAM	19.331	18.132
		High	QPSK	19.580	17.932
			16QAM	19.131	17.932

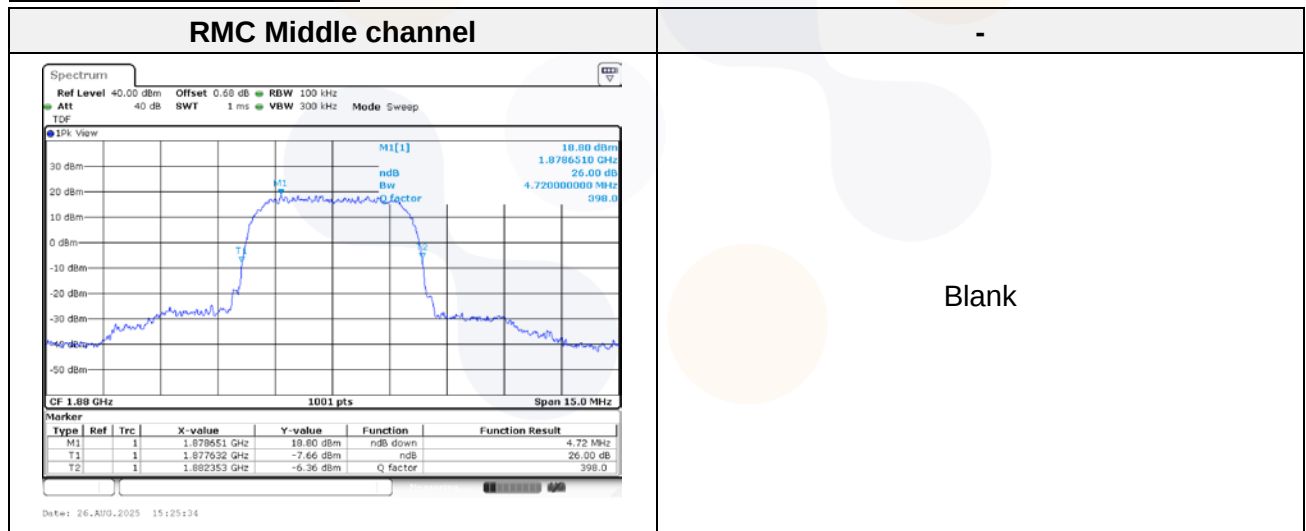
In order to simplify the report, only Middle channel test plots are attached

26dB Bandwidth

Test mode: GSM 1900

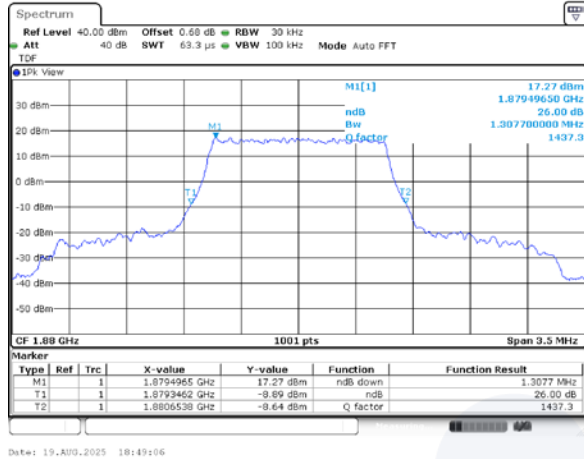


Test mode: WCDMA 1900

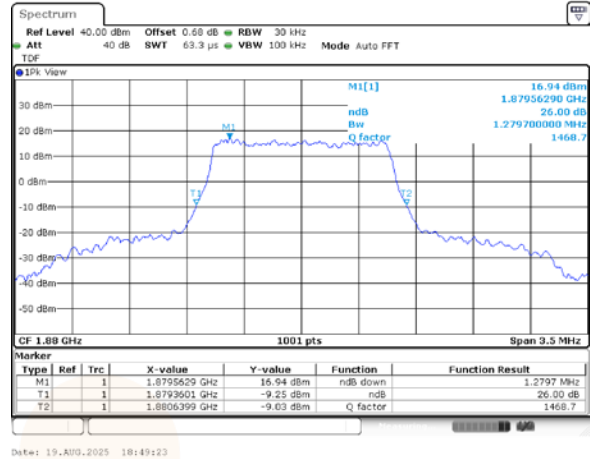


Test mode: LTE B2

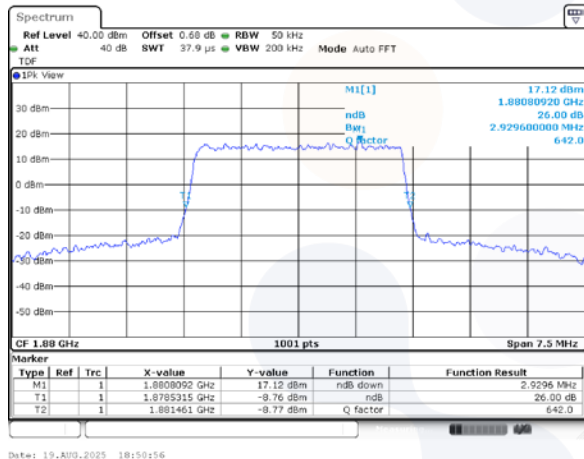
1.4M BW QPSK Middle channel



1.4M BW 16QAM Middle channel



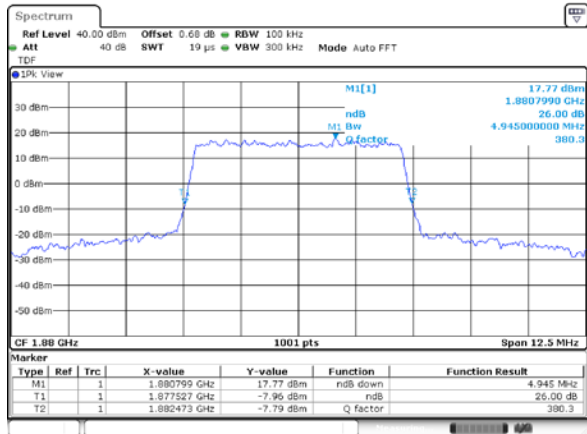
3M BW QPSK Middle channel



3M BW 16QAM Middle channel

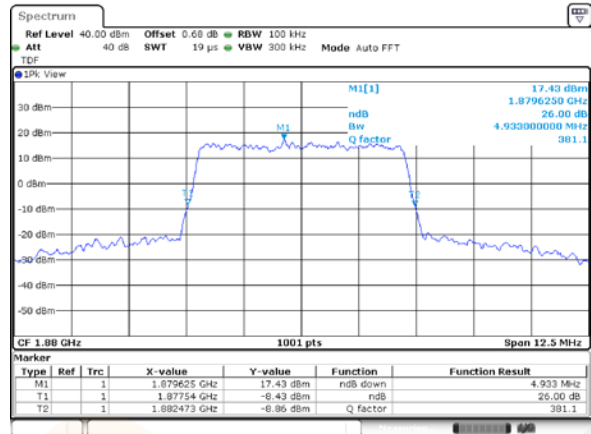


5M BW QPSK Middle channel



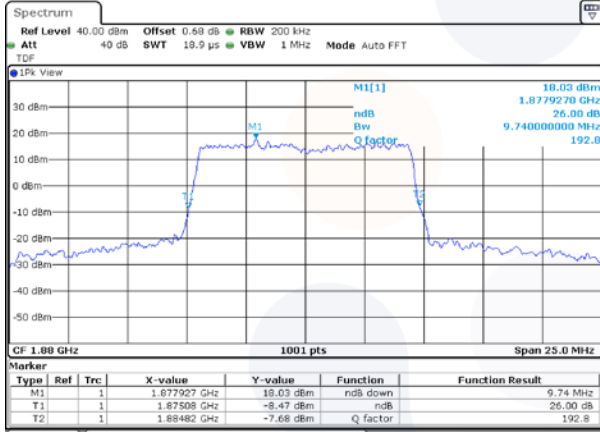
Date: 19.AUG.2025 18:52:51

5M BW 16QAM Middle channel



Date: 19.AUG.2025 18:53:08

10M BW QPSK Middle channel



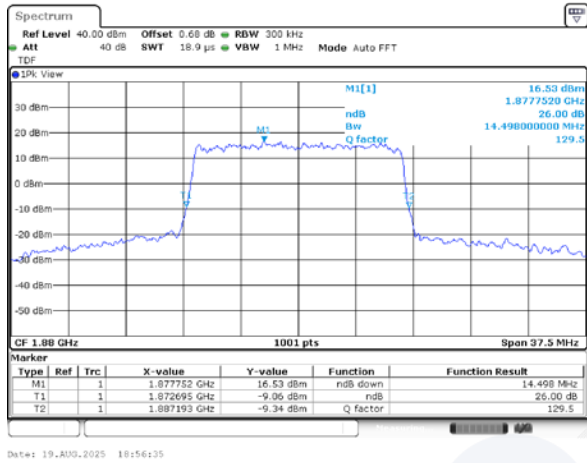
Date: 19.AUG.2025 18:54:46

10M BW 16QAM Middle channel

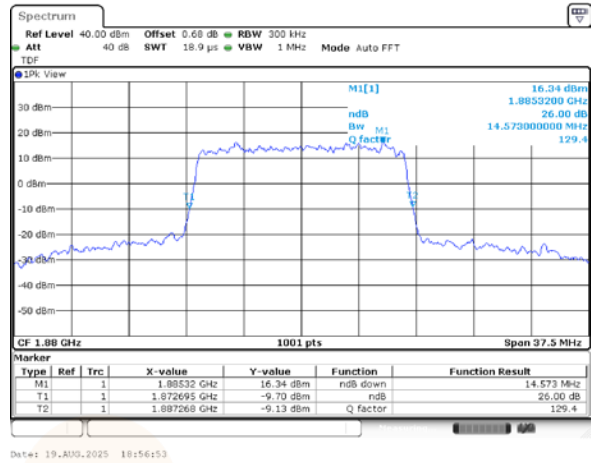


Date: 19.AUG.2025 18:55:03

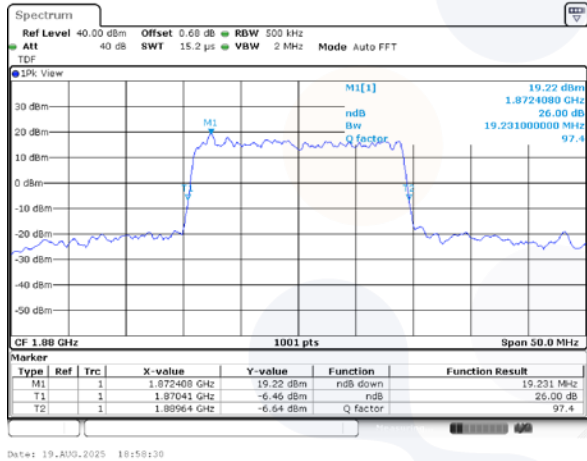
15M BW QPSK Middle channel



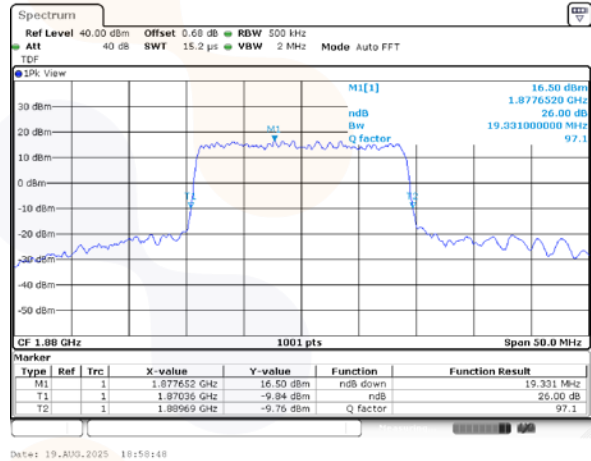
15M BW 16QAM Middle channel



20M BW QPSK Middle channel



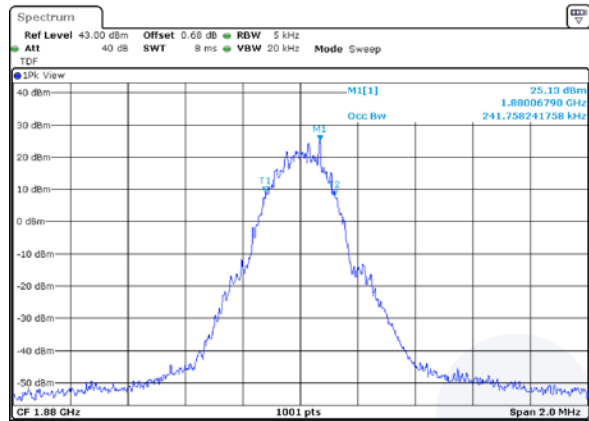
20M BW 16QAM Middle channel



99% Occupied Bandwidth

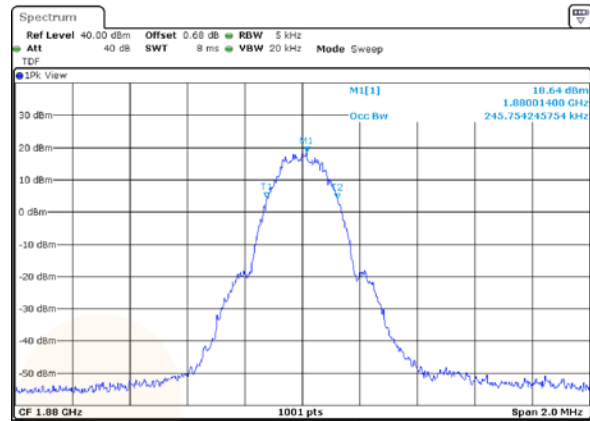
Test mode: GSM 1900

Voice(GPRS) Middle channel



Date: 26.AUG.2025 16:34:23

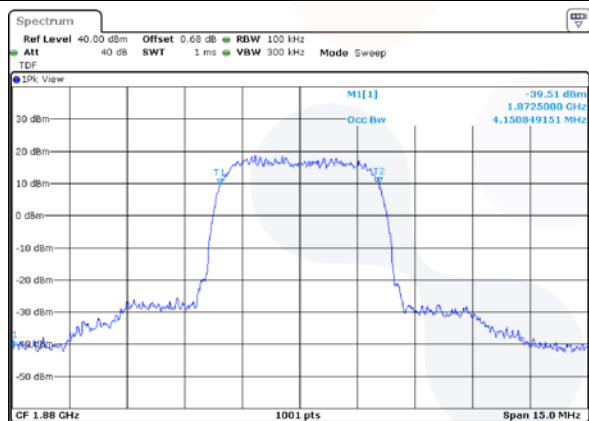
EDGE Middle channel



Date: 26.AUG.2025 16:54:48

Test mode: WCDMA 1900

RMC Middle channel



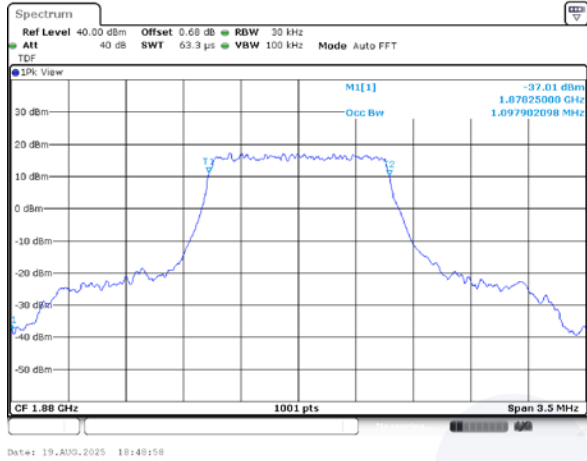
Date: 26.AUG.2025 15:24:54

-

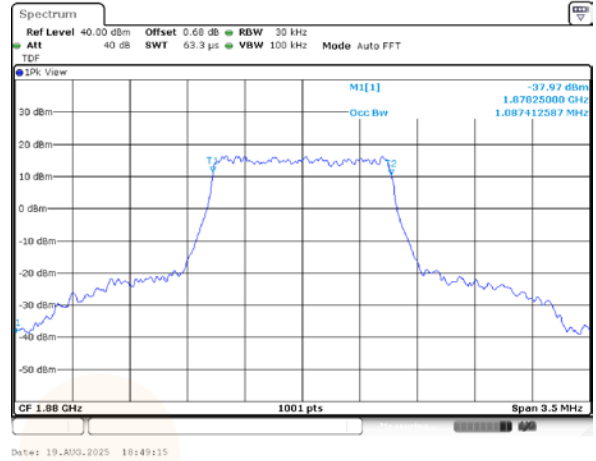
Blank

Test mode: LTE B2

1.4M BW QPSK Middle channel



1.4M BW 16QAM Middle channel



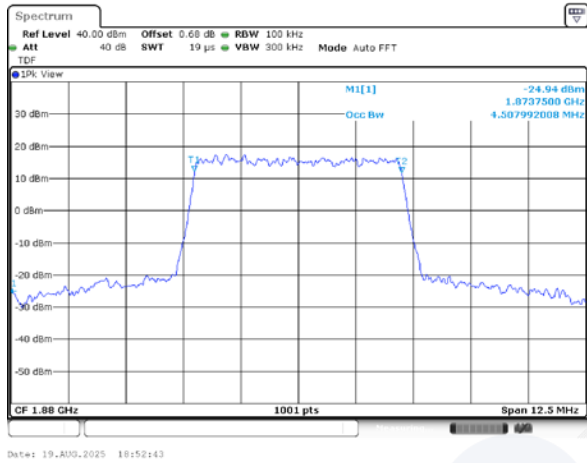
3M BW QPSK Middle channel



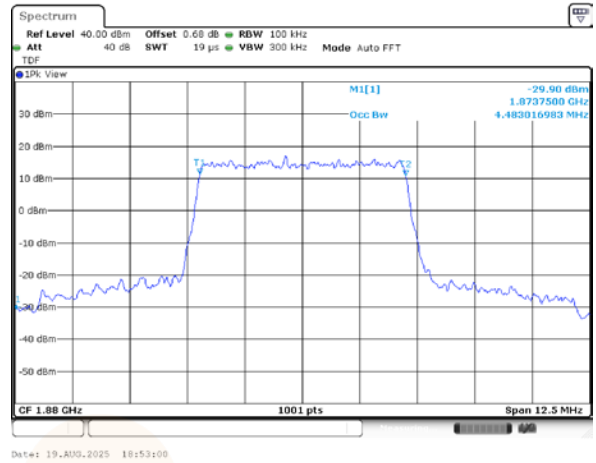
3M BW 16QAM Middle channel



5M BW QPSK Middle channel



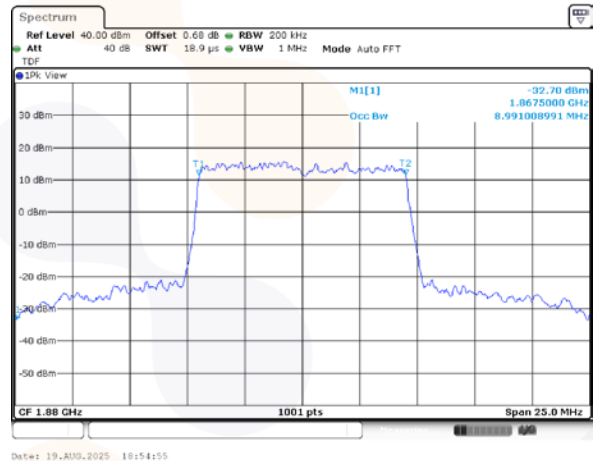
5M BW 16QAM Middle channel



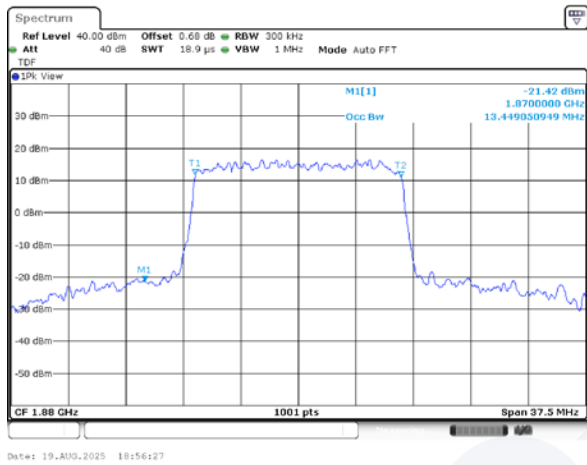
10M BW QPSK Middle channel



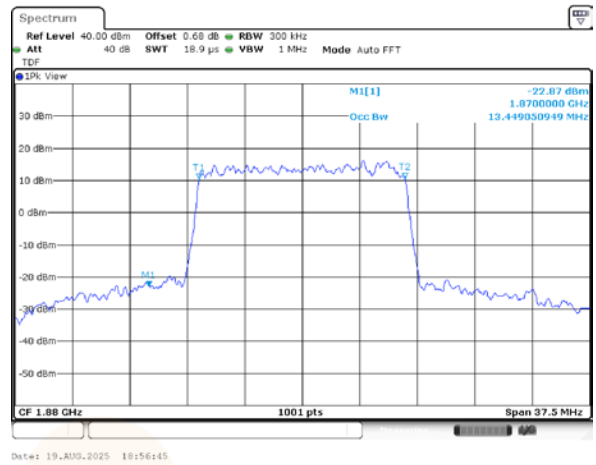
10M BW 16QAM Middle channel



15M BW QPSK Middle channel



15M BW 16QAM Middle channel



20M BW QPSK Middle channel

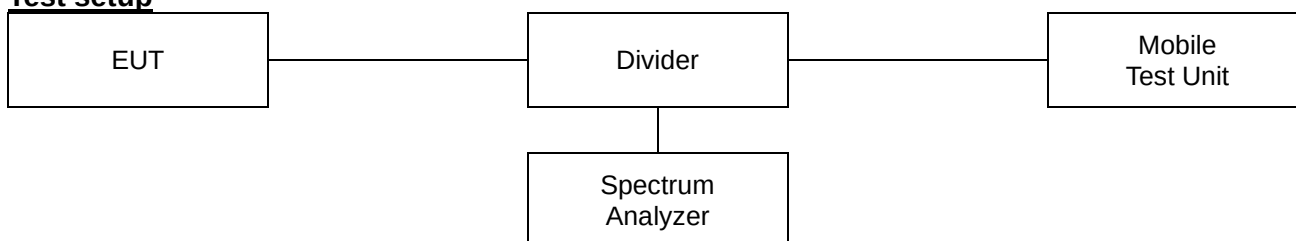


20M BW 16QAM Middle channel



7.3. Band Edge Emissions at Antenna Terminal

Test setup



Limit

According to §24.238(a),

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

Test procedure

971168 D01 v03r01 - Section 6

ANSI C63.26-2015 – Section 5.7

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) Set the RBW > 1% of the emission bandwidth.
- 4) Set the VBW $\geq 3 \times$ RBW.
- 5) Set the number of sweep points $\geq 2 \times$ Span/RBW
- 6) Detector = RMS
- 7) Trace mode = trace average
- 8) Sweep time should be auto for peak detection. For RMS detection the sweep time should be set as follows:
 - a) If the device can be configured to transmit continuously (duty cycle $\geq 98\%$), set the (sweep time) > (number of points in sweep) $\times$ (symbol period) (e.g., by a factor of $10 \times$ symbol period $\times$ number of points) Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols.
 - b) If the device cannot transmit continuously (duty cycle < 98%), a gated sweep shall be used when possible (i.e., gate triggered such that the analyzer only sweeps when the device is transmitting at full power), set the sweep time > (number of points in sweep) $\times$ (symbol period) but the sweep time shall always be maintained at a value that is less than or equal to the minimum transmission time
 - c) If the device cannot be configured to transmit continuously (duty cycle > 98%), and a free-running sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) $\times$ (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by $[10 \log (1/\text{duty cycle})]$. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation $\leq \pm 2\%$).
 - d) If the device cannot be configured to transmit continuously and a free-running

sweep must be used, and if the transmissions exhibit a non-constant duty cycle (duty cycle variations $> \pm 2\%$), set the sweep time so that the averaging is performed over the on-period by setting the sweep time $> (\text{symbol period}) \times (\text{number of points})$, while also maintaining the sweep time $< (\text{transmitter on-time})$. The trace mode shall be set to max hold, since not every display point will be averaged only over just the on-time. Thus, multiple sweeps (e.g., 100) in maximum hold are necessary to ensure that the maximum power is measured.

- 9) Allow trace to fully stabilize.

Notes:

- Per 24.238(b), compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
- For Band-Edge extended:

Channel BW (MHz)	RBW Used (kHz)	CF for emissions more than 100 kHz	CF for emissions more than 1 MHz
1.4	20	+6.99 dB	+16.99 dB
3	30	+5.23 dB	+15.23 dB
5	50	+3.01 dB	+13.01 dB
10	100	N/A	+10.00 dB
15	200	N/A	+6.99 dB
20	200	N/A	+6.99 dB

For emission levels measured with a resolution bandwidth of [RBW Used] at frequency offsets greater than 1 MHz from the band edge, even after applying a correction factor to represent the equivalent level in a 100 kHz or 1 MHz resolution bandwidth, the levels remain below -13 dBm.

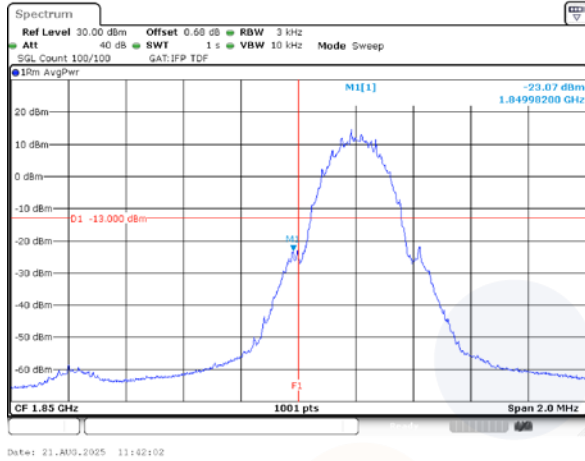
- The EUT was setup to maximum output power as its lowest and highest channel with all bandwidth, modulation and RB configurations.

Test results

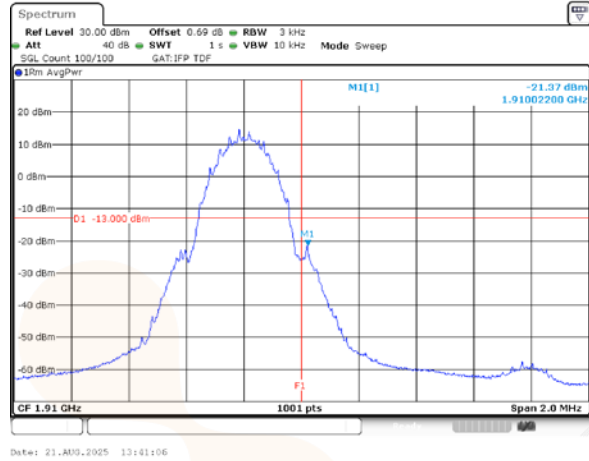
Test mode: GSM 1900

Voice(GPRS)

Low channel

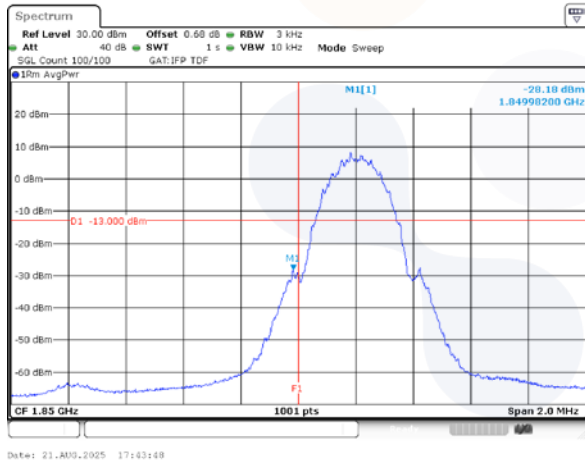


High channel

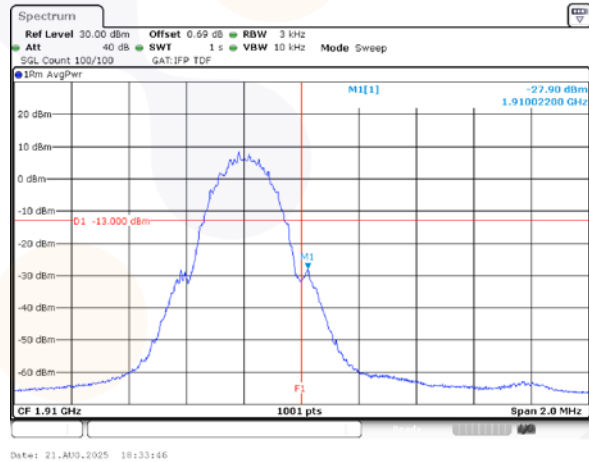


EDGE

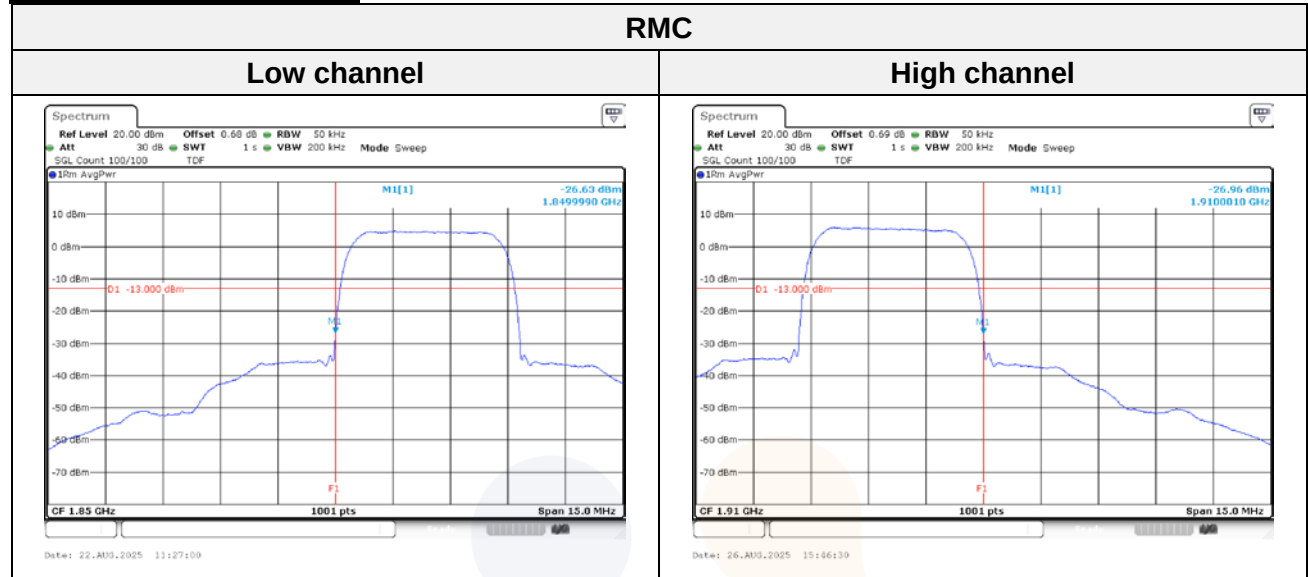
Low channel



High channel



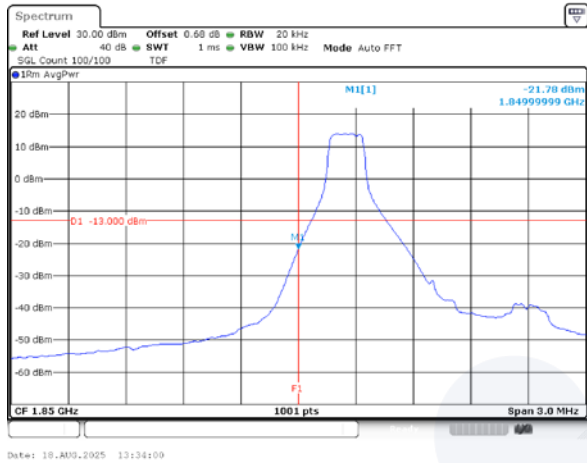
Test mode: WCDMA 1900



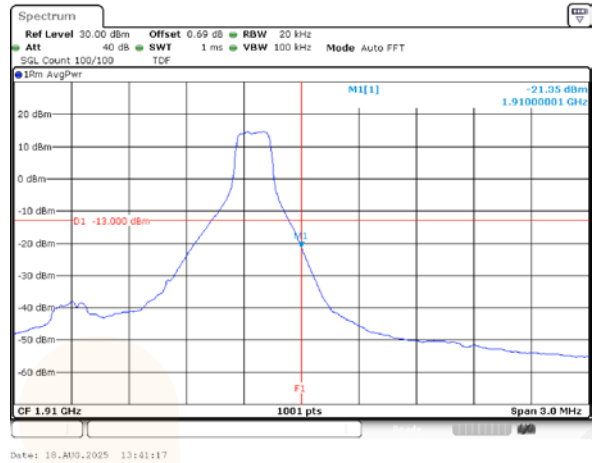
Test mode: LTE B2

1.4M BW QPSK

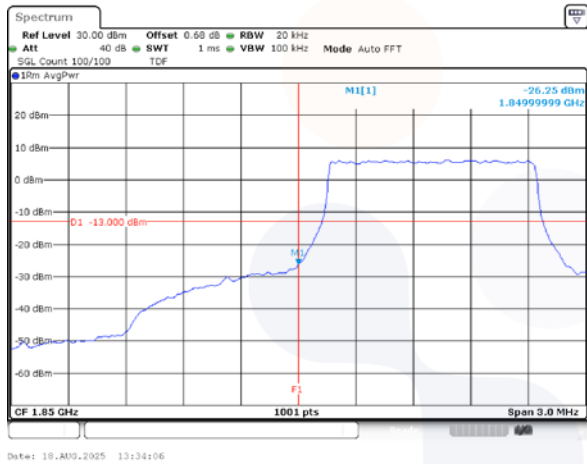
Low channel 1RB



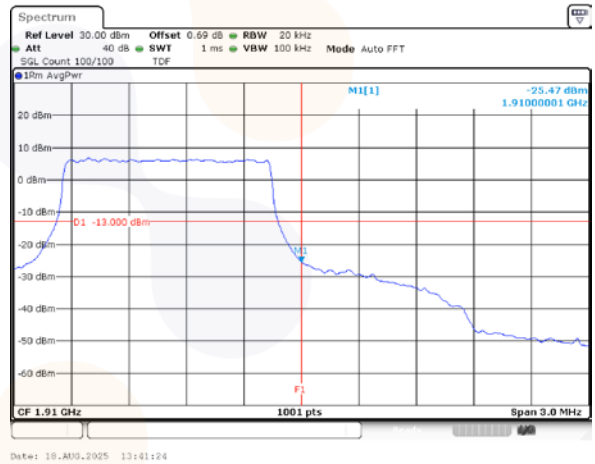
High channel 1RB



Low channel FRB

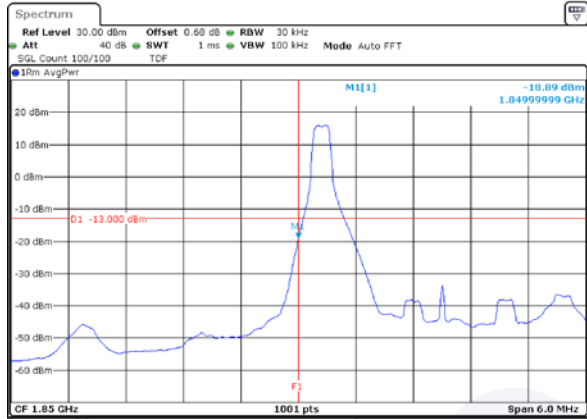


High channel FRB



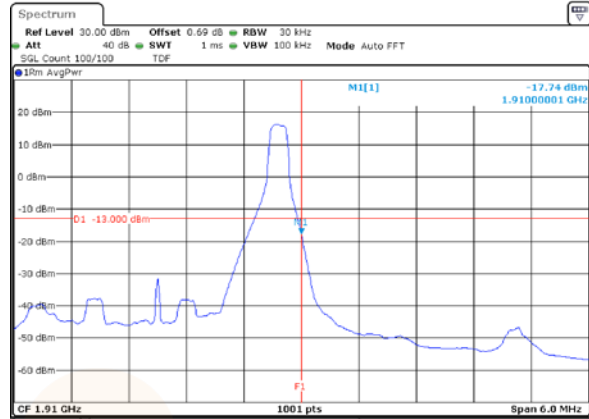
3M BW QPSK

Low channel 1RB



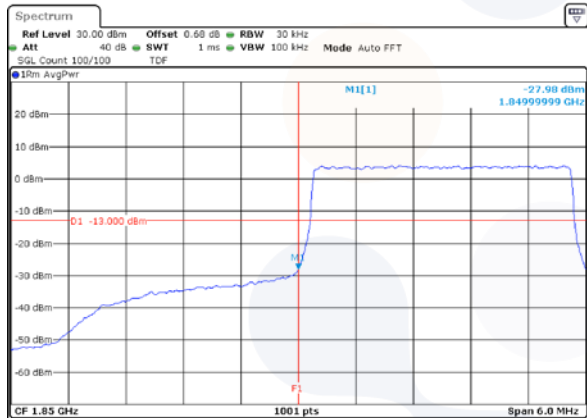
Date: 10.AUG.2025 13:51:59

High channel 1RB



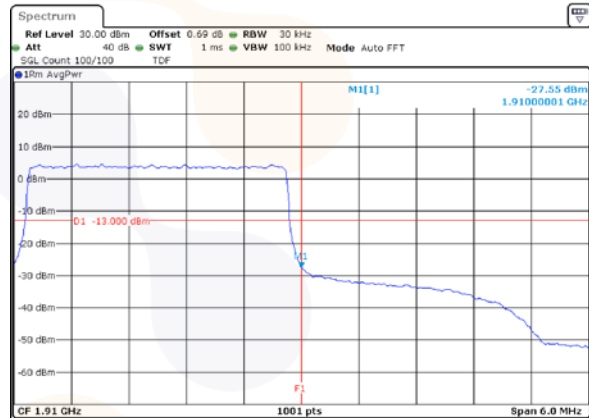
Date: 10.AUG.2025 13:59:11

Low channel FRB



Date: 10.AUG.2025 13:52:06

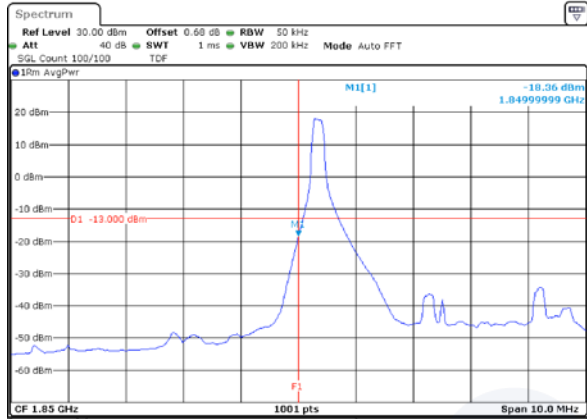
High channel FRB



Date: 10.AUG.2025 13:59:18

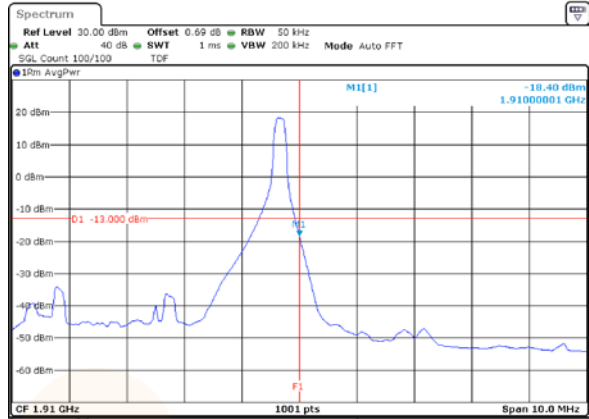
5M BW QPSK

Low channel 1RB



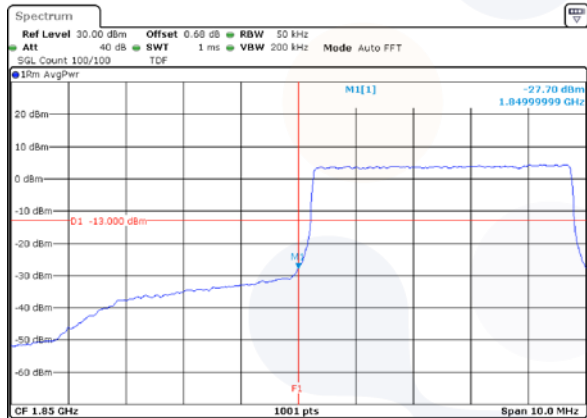
Date: 19.AUG.2025 14:03:07

High channel 1RB



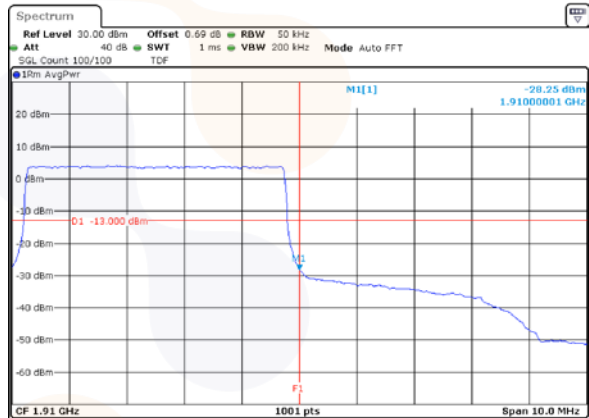
Date: 19.AUG.2025 14:10:21

Low channel FRB



Date: 19.AUG.2025 14:03:15

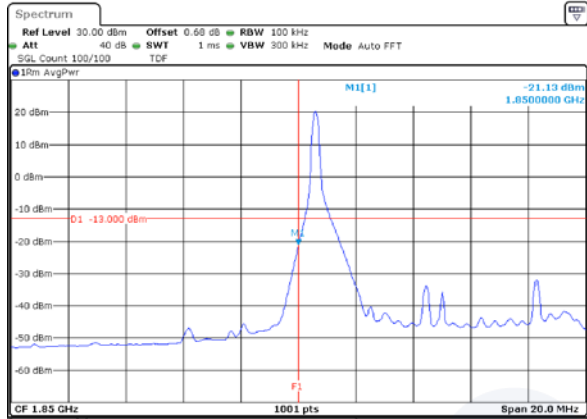
High channel FRB



Date: 19.AUG.2025 14:10:28

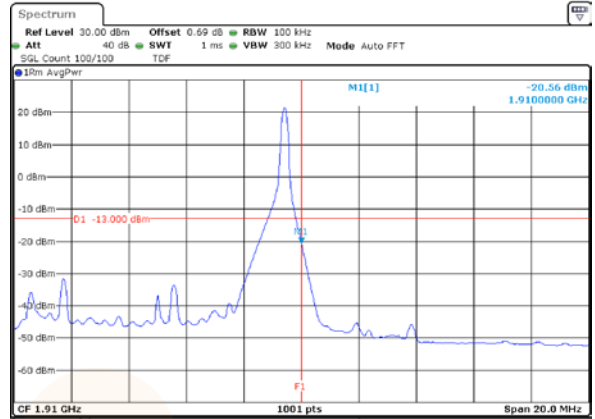
10M BW QPSK

Low channel 1RB



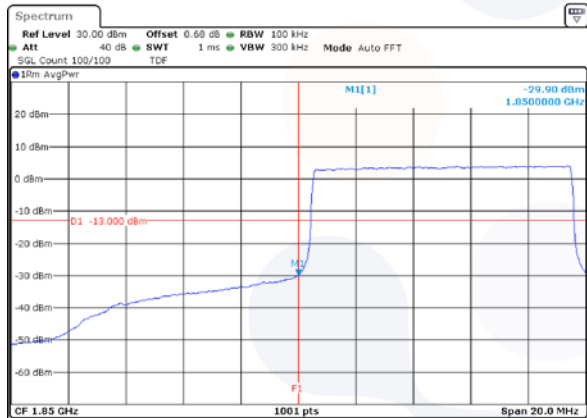
Date: 19.AUG.2025 14:14:18

High channel 1RB



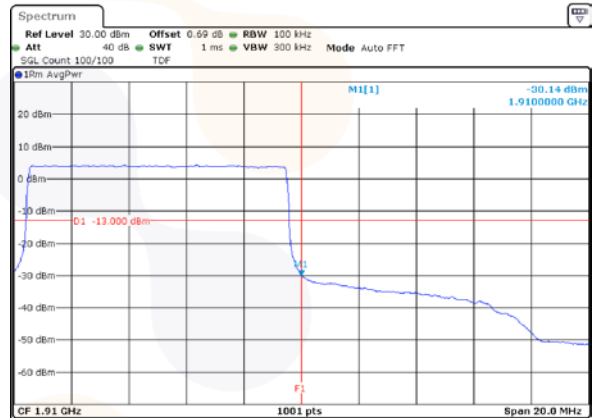
Date: 19.AUG.2025 14:21:31

Low channel FRB



Date: 19.AUG.2025 14:14:26

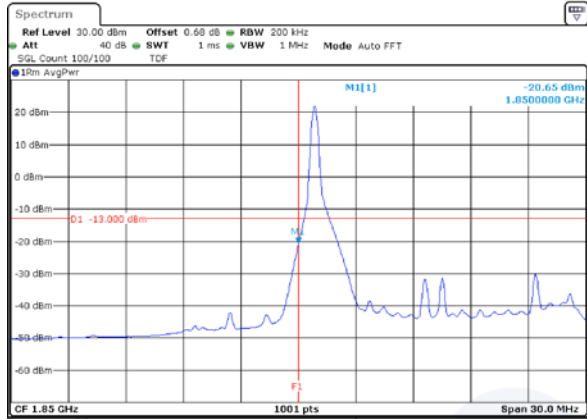
High channel FRB



Date: 19.AUG.2025 14:21:40

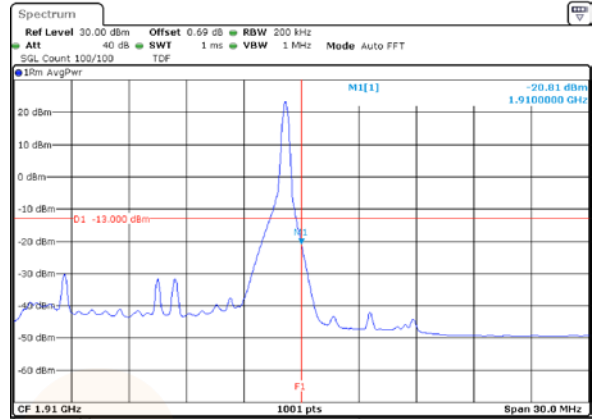
15M BW QPSK

Low channel 1RB



Date: 19.AUG.2025 14:25:26

High channel 1RB



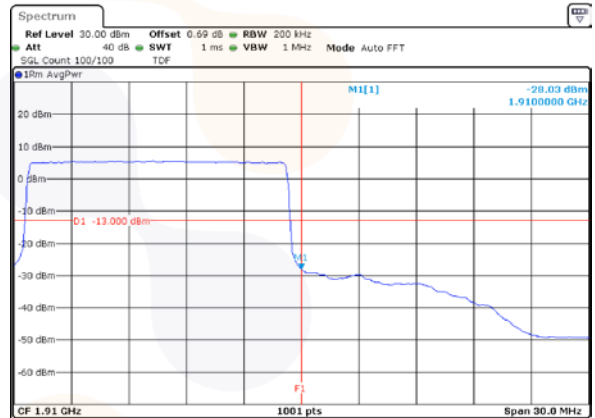
Date: 19.AUG.2025 14:32:39

Low channel FRB



Date: 19.AUG.2025 14:25:34

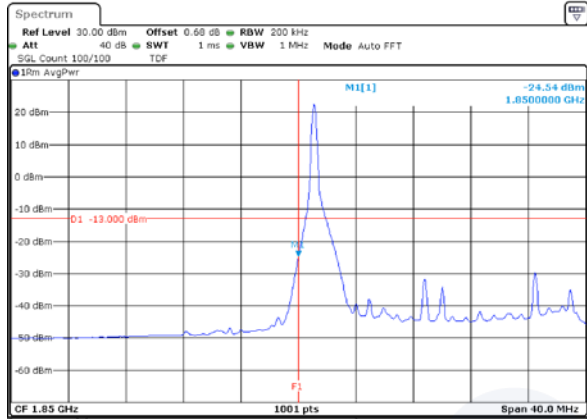
High channel FRB



Date: 19.AUG.2025 14:32:48

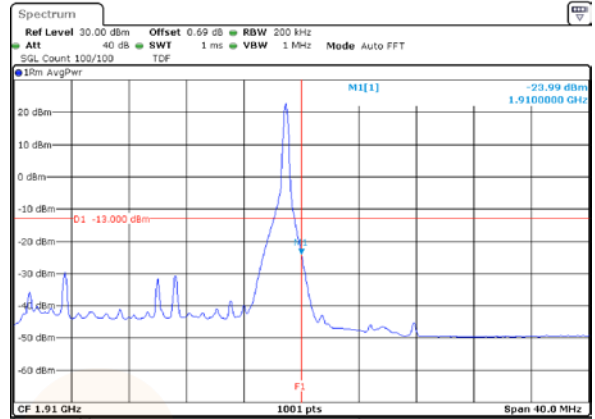
20M BW QPSK

Low channel 1RB



Date: 19.AUG.2025 14:36:33

High channel 1RB



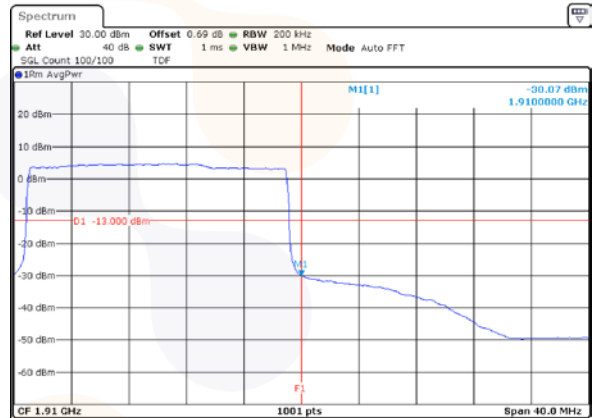
Date: 19.AUG.2025 14:43:39

Low channel FRB



Date: 19.AUG.2025 14:36:41

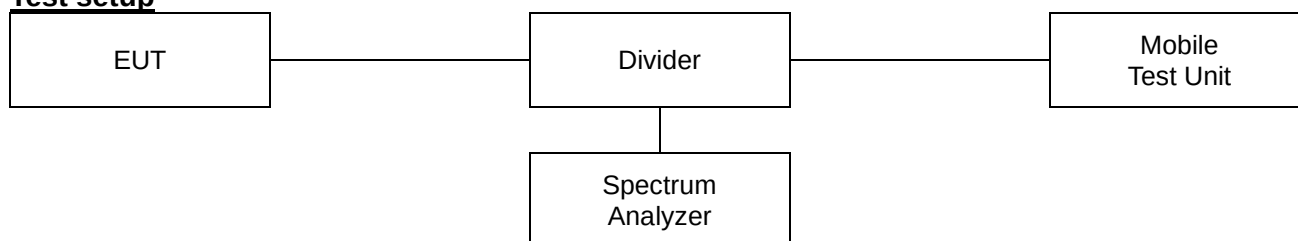
High channel FRB



Date: 19.AUG.2025 14:43:47

7.4. Spurious Emissions at Antenna Terminal

Test setup



Limit

According to §24.238(a),

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

Test procedure

971168 D01 v03r01 - Section 6
 ANSI 63.26-2015 – Section 5.7

Test settings

- 1) Start frequency was set to 30 MHz and stop frequency was set to at least 10th the fundamental frequency.
- 2) Detector = RMS
- 3) Sweep time = auto couple.
- 4) Trace mode = trace average
- 5) Allow trace to fully stabilize.
- 6) Please see test notes below RBW and VBW settings.

Notes:

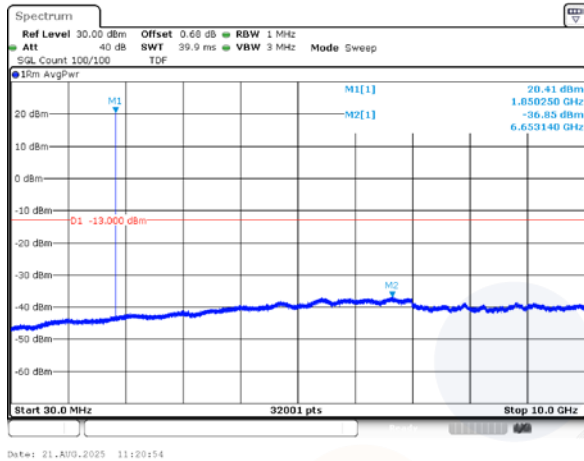
1. Per 24.238(b), compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
2. All modes of operation were investigated and the worst-case configuration results are reported.

Test results

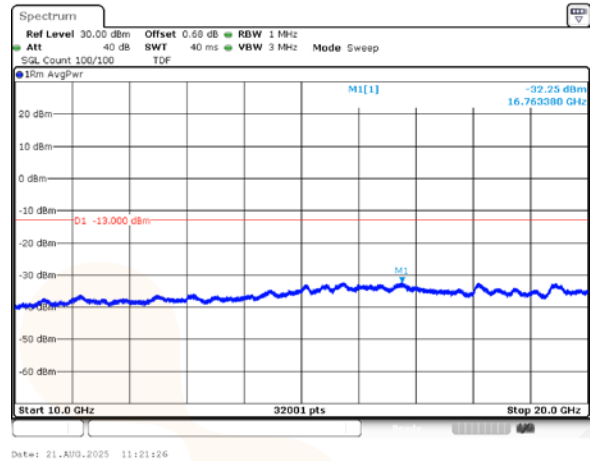
Test mode: GSM 1900

Voice(GPRS)

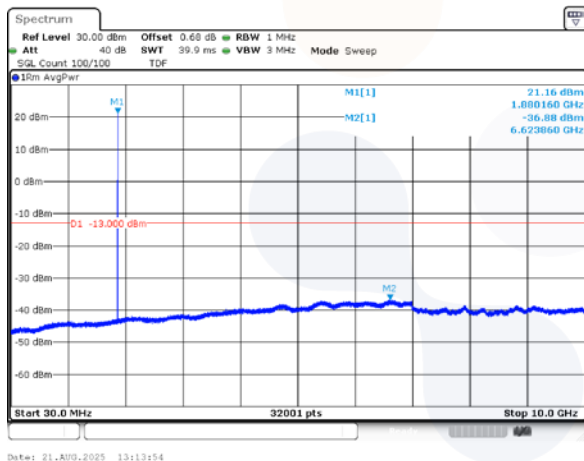
Low channel (30 MHz ~ 10 GHz)



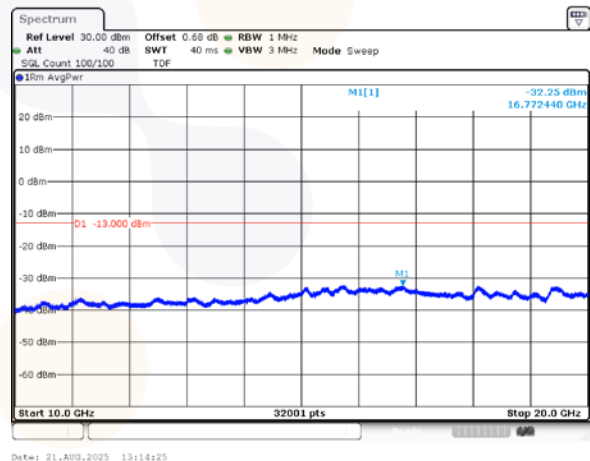
Low channel (10 GHz ~ 20 GHz)



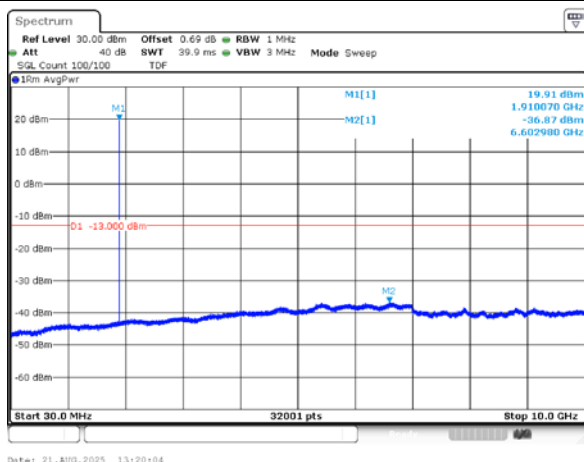
Middle channel (30 MHz ~ 10 GHz)



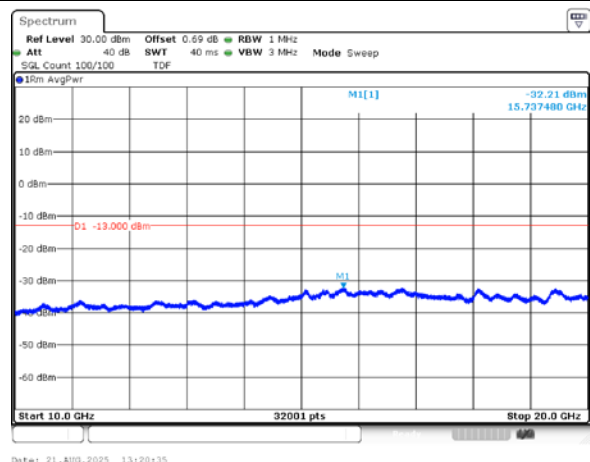
Middle channel (10 GHz ~ 20 GHz)



High channel (30 MHz ~ 10 GHz)



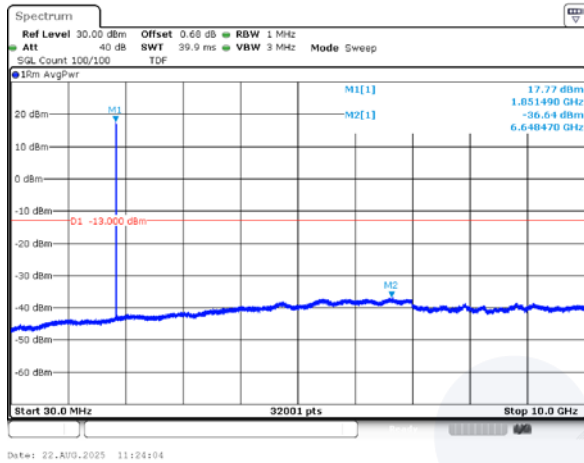
High channel (10 GHz ~ 20 GHz)



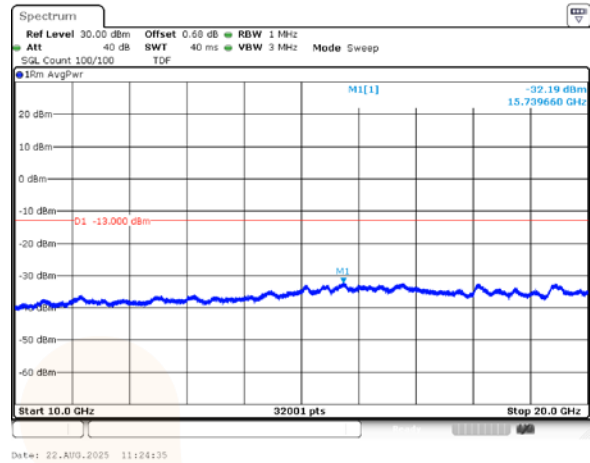
Test mode: WCDMA 1900

RMC

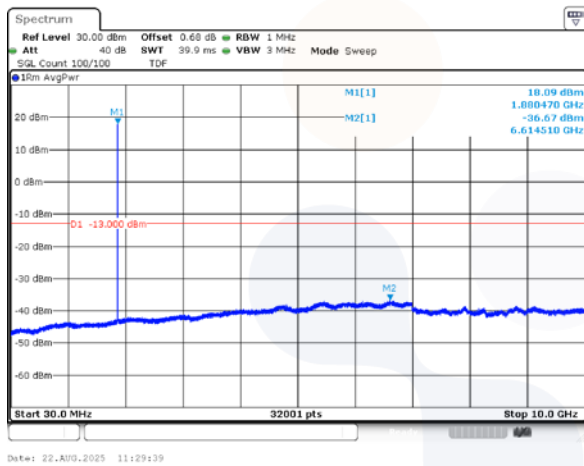
Low channel (30 MHz ~ 10 GHz)



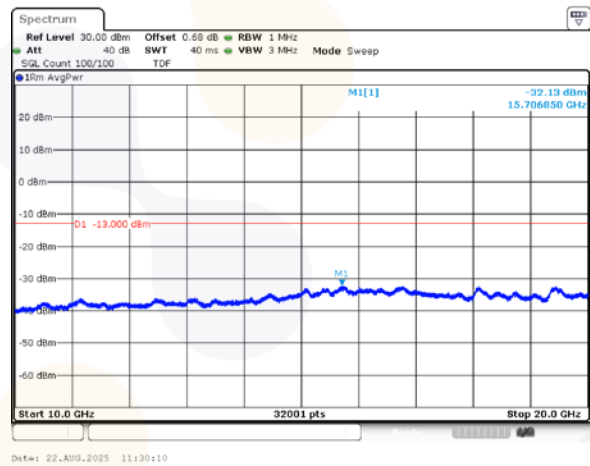
Low channel (10 GHz ~ 20 GHz)



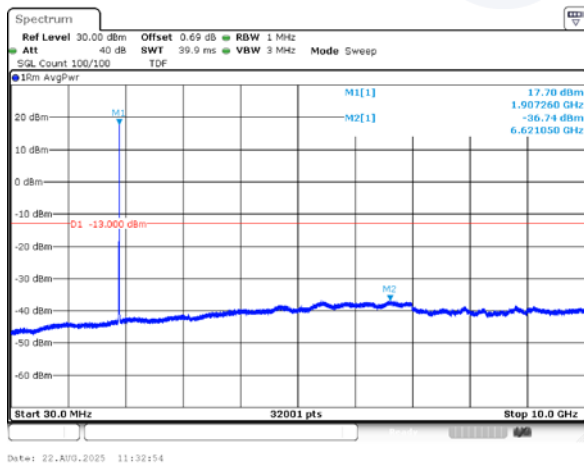
Middle channel (30 MHz ~ 10 GHz)



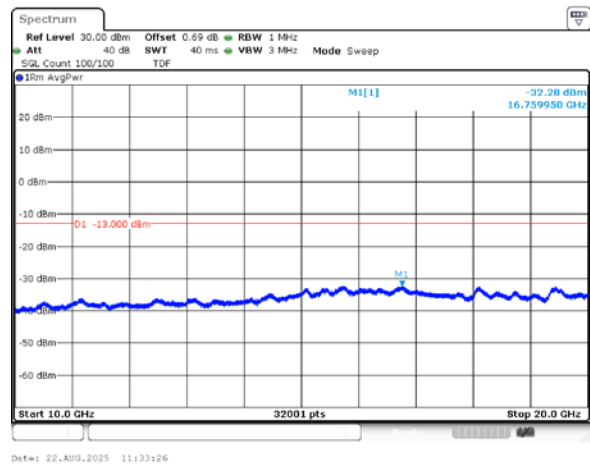
Middle channel (10 GHz ~ 20 GHz)



High channel (30 MHz ~ 10 GHz)



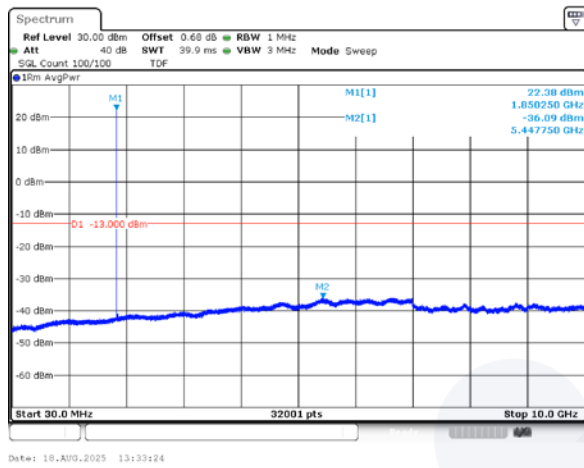
High channel (10 GHz ~ 20 GHz)



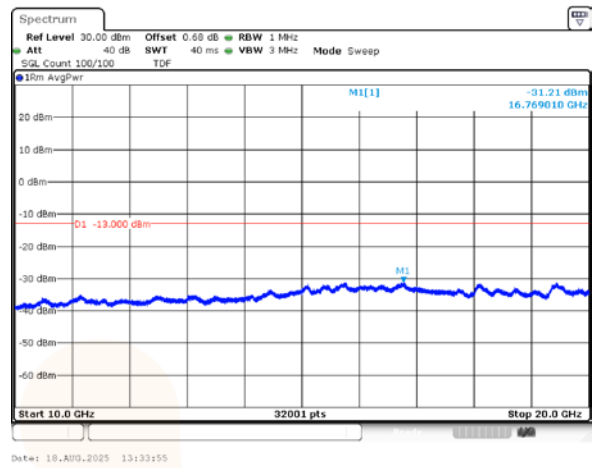
Test mode: LTE B2

1.4M BW QPSK

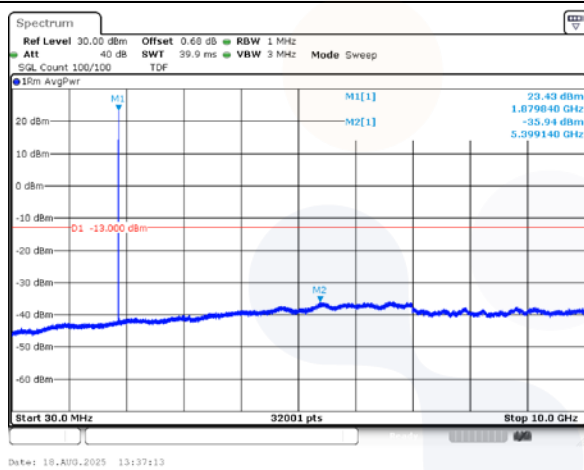
Low channel (30 MHz ~ 10 GHz)



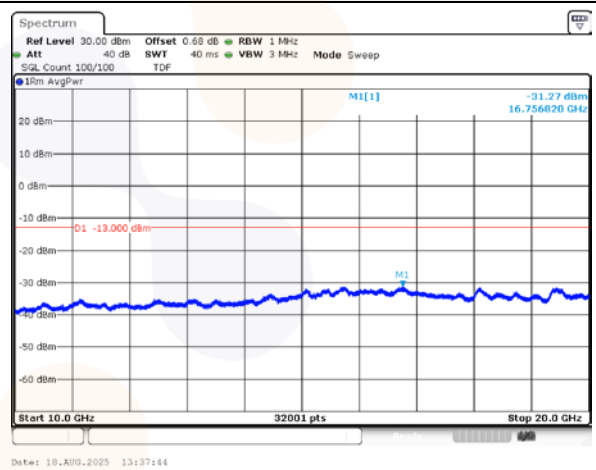
Low channel (10 GHz ~ 20 GHz)



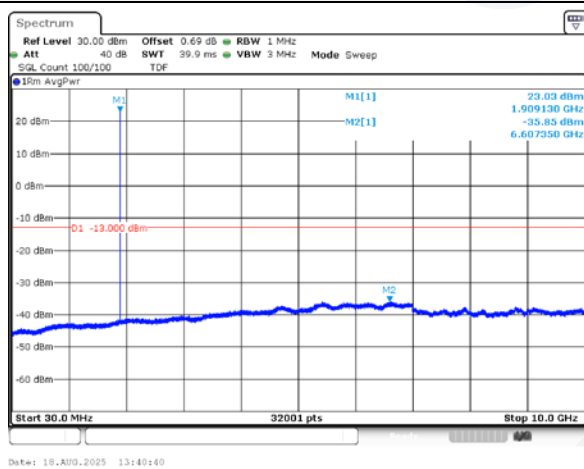
Middle channel (30 MHz ~ 10 GHz)



Middle channel (10 GHz ~ 20 GHz)



High channel (30 MHz ~ 10 GHz)



High channel (10 GHz ~ 20 GHz)

