Test report 2023-0314-EMC-TR-23-0214-V01

Designation:	CAP M2 17E/19/23/25T [BRS] F-AC-F1
Manufacturer:	Commscope
Serial No(s):	FICMBA2338001
ID No.	7856326-1010 Rev: 00
FCC ID	XS5-CAPM217192325
Test Specification(s):	ANSI 63.26:2015 FCC Rules and Regulations as listed in 47 CFR, Part 20 and Part 27:2023-10-13
Test Plan:	"Infoblatt_für_CAP M2 17E_19_21_25T_ID7856326-1010 " from customer.
Test Result:	**Passed**

Date of issue:	2024-01-31		Signature:
Version:	01	Technical Reviewer:	Thomas Gerngroß Test Engineer Digitally signed by Thomas Gerngroß DN: cn=Thomas Gerngroß, o=Bureau Veritas CPS Germany GmbH, ou=ECL, email=thomas.gerngross@bureauveritas.com, c=DE Date: 2024.01.31 08:16:15 +01'00'
Date of delivery:	2023-10-13		
Performance date:	2023-10-26 to 2023-12-11	Report Reviewer:	Thomas Hufnagel Test Engineer Digitally signed by Thomas Hufnagel Date: 2024.01.31 08:30:49 +01'00'

Bundesnetzagentur

BNetzA-CAB-19/21-20

ilac-MRA

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	BNETZA-CAB-19/21-20
FCC Designation Number:	DE0023
FCC Test Firm Registration:	366481

Versions management:

V 01.00	Initial release

Table of Contents

1 APPLIED STANDARDS AND TEST SUMMARY

1.1 CFR APPLIED STANDARDS

Type of Authorization
Certification for an Industrial Signal Booster.

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 2 and 20, 27, (10/13/2023 Edition). The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

Part 20, Commercial Mobiles Services

§ 20.21 Signal Boosters

Part 27; Miscellaneous Wireless Communications Services
Subpart C – Technical standards

§ 27.50 – Power and duty cycle limits
§ 27.53 – Emission limits

The tests were selected and performed with reference to:

- FCC Public Notice 935210 applying "Signal Boosters Basic Certification Requirements" 935210 D02 v04r02, 2019-04-15.
- FCC Public Notice 935210 applying "Measurement guidance for industrial and non-consumer signal booster, repeater and amplifier devices" 935210 D05 v01r04, 2020-04-03.
- FCC Public Notice 971168 applying "Measurement guidance for certification of licensed digital transmitters" 971168 D01 v03r01,2018-04-09
- ANSI C63.26: 2015

Summary Test Results:

The EUT complies with all performed tests as listed in chapter 1.3 Measurement Summary/Signatures.

1.2 FCC REFERENCE TABLE

Measurement	FCC reference
Effective radiated power, mean output power and zone enhancer gain	§ 2.1046 § 27.50 KDB 935210 D05 v01r04: 3.5
Peak to Average Ratio	§ 27.50
Occupied bandwidth Input-versus-output spectrum	§ 2.1049 KDB 935210 D05 v01r04: 3.4
Conducted spurious Emission at Antenna Terminal	§ 2.1051 § 27.53 KDB 935210 D05 v01r04: 3.6
Out-of-band emissions limits	§ 2.1051 § 27.53 KDB 935210 D05 v01r04: 3.6
Frequency stability	§ 2.1055 § 27.54
Field strength of spurious radiation	§ 2.1053 § 27.53
Out-of-band rejection	KDB 935210 D05 v01r04: 3.3
All measurements	ANSI 63.26

1.3 MEASUREMENT SUMMARY/SIGNATURES

47 CFR CHAPTER I FCC PART 27 Subpart C [Base Stations/Repeater]	**§2.1046, §27.50**
Effective Radiated Power, mean output power and zone enhancer gain	
The measurement was performed according to ANSI C63.26, KDB 935210 D05 v01r03: 3.5	**Final Result**
OP-Mode	
Frequency Band, Direction, Input Power, Signal Type	
Band 41 BRS (UBS), RF downlink, 0.3 dB < AGC, Narrowband	Passed
Band 41 BRS (UBS), RF downlink, 0.3 dB < AGC, Wideband	Passed
Band 41 BRS (UBS), RF downlink, 0.3 dB < AGC, Wideband 5G	Passed
Band 41 BRS (UBS), RF downlink, 3 dB > AGC, Narrowband	Passed
Band 41 BRS (UBS), RF downlink, 3 dB > AGC, Wideband	Passed
Band 41 BRS (UBS), RF downlink, 3 dB > AGC, Wideband 5G	Passed
Band 41 BRS (LBS), RF downlink, 0.3 dB < AGC, Narrowband	Passed
Band 41 BRS (LBS), RF downlink, 0.3 dB < AGC, Wideband	Passed
Band 41 BRS (LBS), RF downlink, 0.3 dB < AGC, Wideband 5G	Passed
Band 41 BRS (LBS), RF downlink, 3 dB > AGC, Narrowband	Passed
Band 41 BRS (LBS), RF downlink, 3 dB > AGC, Wideband	Passed
Band 41 BRS (LBS), RF downlink, 3 dB > AGC, Wideband 5G	Passed

47 CFR CHAPTER I FCC PART 27 Subpart C [Base Stations/Repeater]	**§27.50**
Peak to Average Ratio	
The measurement was performed according to ANSI C63.26	**Final Result**
OP-Mode	
Frequency Band, Direction, Input Power, Signal Type	
Band 41 BRS (UBS), RF downlink, 0.3 dB < AGC, Narrowband	Passed
Band 41 BRS (UBS), RF downlink, 3 dB > AGC, Narrowband	Passed
Band 41 BRS (UBS), RF downlink, 0.3 dB < AGC, Wideband	Passed
Band 41 BRS (UBS), RF downlink, 3 dB > AGC, Wideband	Passed
Band 41 BRS (LBS), RF downlink, 0.3 dB < AGC, Narrowband	Passed
Band 41 BRS (LBS), RF downlink, 3 dB > AGC, Narrowband	Passed
Band 41 BRS (LBS), RF downlink, 0.3 dB < AGC, Wideband	Passed
Band 41 BRS (LBS), RF downlink, 3 dB > AGC, Wideband	Passed

47 CFR CHAPTER I FCC PART 27 Subpart C [Base Stations/Repeater] **§2.1049**

Occupied Bandwidth / Input-versus-output Spectrum

The measurement was performed according to ANSI C63.26, KDB 935210 D05 v01r03: 3.4 **Final Result**

OP-Mode

Frequency Band, Direction, Input Power, Signal Type	
Band 41 BRS (UBS), RF downlink, 0.3 dB < AGC, Narrowband	Passed
Band 41 BRS (UBS), RF downlink, 3 dB > AGC, Narrowband	Passed
Band 41 BRS (UBS), RF downlink, 0.3 dB < AGC, Wideband	Passed
Band 41 BRS (UBS), RF downlink, 3 dB > AGC, Wideband	Passed
Band 41 BRS (UBS), RF downlink, 0.3 dB < AGC, Wideband 5G	Passed
Band 41 BRS (UBS), RF downlink, 3 dB > AGC, Wideband 5G	Passed
Band 41 BRS (LBS), RF downlink, 0.3 dB < AGC, Narrowband	Passed
Band 41 BRS (LBS), RF downlink, 3 dB > AGC, Narrowband	Passed
Band 41 BRS (LBS), RF downlink, 0.3 dB < AGC, Wideband	Passed
Band 41 BRS (LBS), RF downlink, 3 dB > AGC, Wideband	Passed
Band 41 BRS (LBS), RF downlink, 0.3 dB < AGC, Wideband 5G	Passed
Band 41 BRS (LBS), RF downlink, 3 dB > AGC, Wideband 5G	Passed

47 CFR CHAPTER I FCC PART 27 Subpart C [Base Stations/Repeater]	**§2.1051, §27.53**
Conducted spurious emissions at antenna terminals	
The measurement was performed according to ANSI C63.26	**Final Result**
OP-Mode	
Frequency Band, Test Frequency, Direction, Signal Type	
Band 41 BRS (UBS), low, RF downlink, Narrowband	Passed
Band 41 BRS (UBS), mid, RF downlink, Narrowband	Passed
Band 41 BRS (UBS), high, RF downlink, Narrowband	Passed
Band 41 BRS (UBS), low, RF downlink, Wideband	Passed
Band 41 BRS (UBS), mid, RF downlink, Wideband	Passed
Band 41 BRS (UBS), high, RF downlink, Wideband	Passed
Band 41 BRS (UBS), low, RF downlink, Wideband 5G	Passed
Band 41 BRS (UBS), mid, RF downlink, Wideband 5G	Passed
Band 41 BRS (UBS), high, RF downlink, Wideband 5G	Passed
Band 41 BRS (LBS), low, RF downlink, Narrowband	Passed
Band 41 BRS (LBS), mid, RF downlink, Narrowband	Passed
Band 41 BRS (LBS), high, RF downlink, Narrowband	Passed
Band 41 BRS (LBS), low, RF downlink, Wideband	Passed
Band 41 BRS (LBS), mid, RF downlink, Wideband	Passed
Band 41 BRS (LBS), high, RF downlink, Wideband	Passed
Band 41 BRS (LBS), low, RF downlink, Wideband 5G	Passed
Band 41 BRS (LBS), mid, RF downlink, Wideband 5G	Passed
Band 41 BRS (LBS), high, RF downlink, Wideband 5G	Passed

47 CFR CHAPTER I FCC PART 27 Subpart C [Base Stations/Repeater] **§2.1051, § 27.53**

Out-of-band emission limits

The measurement was performed according to ANSI C63.26, KDB 935210 D05 v01r03: 3.6 **Final Result**

OP-Mode

Band Edge, Frequency Band, Number of signals, Direction, Input Power, Signal Type	
Lower, Band 41 BRS (UBS), 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Lower, Band 41 BRS (UBS), 1, RF downlink, 3 dB > AGC, Narrowband	Passed
Lower, Band 41 BRS (UBS), 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
Lower, Band 41 BRS (UBS), 1, RF downlink, 3 dB > AGC, Wideband	Passed
Lower, Band 41 BRS (UBS), 1, RF downlink, 0.3 dB < AGC, Wideband 5G	Passed
Lower, Band 41 BRS (UBS), 1, RF downlink, 3 dB > AGC, Wideband 5G	Passed
Upper, Band 41 BRS (UBS), 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Upper, Band 41 BRS (UBS), 1, RF downlink, 3 dB > AGC, Narrowband	Passed
Upper, Band 41 BRS (UBS), 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
Upper, Band 41 BRS (UBS), 1, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, Band 41 BRS (UBS), 1, RF downlink, 0.3 dB < AGC, Wideband 5G	Passed
Upper, Band 41 BRS (UBS), 1, RF downlink, 3 dB > AGC, Wideband 5G	Passed
Lower, Band 41 BRS (UBS), 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Lower, Band 41 BRS (UBS), 2, RF downlink, 3 dB > AGC, Narrowband	Passed
Lower, Band 41 BRS (UBS), 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
Lower, Band 41 BRS (UBS), 2, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, Band 41 BRS (UBS), 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Upper, Band 41 BRS (UBS), 2, RF downlink, 3 dB > AGC, Narrowband	Passed
Upper, Band 41 BRS (UBS), 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
Upper, Band 41 BRS (UBS), 2, RF downlink, 3 dB > AGC, Wideband	Passed

47 CFR CHAPTER I FCC PART 27 Subpart C [Base Stations/Repeater] **§2.1051, § 27.53**

Out-of-band emission limits

The measurement was performed according to ANSI C63.26, KDB 935210 D05 v01r03: 3.6 **Final Result**

OP-Mode

Band Edge, Frequency Band, Number of signals, Direction, Input Power, Signal Type	
Lower, Band 41 BRS (LBS), 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Lower, Band 41 BRS (LBS), 1, RF downlink, 3 dB > AGC, Narrowband	Passed
Lower, Band 41 BRS (LBS), 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
Lower, Band 41 BRS (LBS), 1, RF downlink, 3 dB > AGC, Wideband	Passed
Lower, Band 41 BRS (LBS), 1, RF downlink, 0.3 dB < AGC, Wideband 5G	Passed
Lower, Band 41 BRS (LBS), 1, RF downlink, 3 dB > AGC, Wideband 5G	Passed
Upper, Band 41 BRS (LBS), 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Upper, Band 41 BRS (LBS), 1, RF downlink, 3 dB > AGC, Narrowband	Passed
Upper, Band 41 BRS (LBS), 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
Upper, Band 41 BRS (LBS), 1, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, Band 41 BRS (LBS), 1, RF downlink, 0.3 dB < AGC, Wideband 5G	Passed
Upper, Band 41 BRS (LBS), 1, RF downlink, 3 dB > AGC, Wideband 5G	Passed
Lower, Band 41 BRS (LBS), 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Lower, Band 41 BRS (LBS), 2, RF downlink, 3 dB > AGC, Narrowband	Passed
Lower, Band 41 BRS (LBS), 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
Lower, Band 41 BRS (LBS), 2, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, Band 41 BRS (LBS), 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Upper, Band 41 BRS (LBS), 2, RF downlink, 3 dB > AGC, Narrowband	Passed
Upper, Band 41 BRS (LBS), 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
Upper, Band 41 BRS (LBS), 2, RF downlink, 3 dB > AGC, Wideband	Passed

47 CFR CHAPTER I FCC PART 27 Subpart C [Base Stations/Repeater]	**KDB 935210 D05 v01r03: 3.3**
Out-of-band rejection	
The measurement was performed according to ANSI C63.26	**Final Result**
OP-Mode	
Frequency Band, Direction	
Band 41 BRS (UBS), RF downlink	Passed
Band 41 BRS (LBS), RF downlink	Passed

47 CFR CHAPTER I FCC PART 27 Subpart C [Base Stations/Repeater]	**§2.1055, §27.54**
Frequency stability	
	Final Result
OP-Mode	Not applicable
Not applicable	

47 CFR CHAPTER I FCC PART 27 Subpart C [Base Stations/Repeater]	**§2.1053, §27.53**
Field strength of spurious radiation	
The measurement was performed according to ANSI C63.26	**Final Result**
OP-Mode, one antenne in use	
Frequency Band, Test Frequency, Direction	
Band 41 BRS (UBS), high, RF downlink	Passed
Band 41 BRS (UBS), low, RF downlink	Passed
OP-Mode, MIMO	
Frequency Band, Direction	
Band 41 BRS (UBS), high, RF downlink	Passed
Band 41 BRS (UBS), low, RF downlink	Passed

Report version control			
Version	**Release date**	**Change Description**	**Version validity**
Initial	2024-01-31	--	Valid

2 ADMINISTRATIVE DATA

2.1 TESTING LABORATORY

Bureau Veritas Consumer Products Services
Germany GmbH
Thurn-und-Taxis-Straße 18
D-90411 Nürnberg
Tel.: +49 40 74041 0
Fax: +49 40 74041-2755

2.2 APPLICANT DATA

Company Name:	Commscope Andrew Wireless Systems GmbH
Address:	Industriering 10 86675 Buchdorf Germany
Contact Person:	Mr. Jiri Cecka

2.3 MANUFACTURER DATA

Company Name:	Please see applicant data.
Address:	Please see applicant data.

3 TEST OBJECT DATA

3.1 GENERAL EUT DESCRIPTION

Kind of Device product description	Cellular Repeater
Product name	Cellular Repeater
Type	CAP M2 17E/19/23/25T F-AC-F1
Declared EUT data by the supplier	
General Product Description	The EUT is an industrial signal booster supporting the following: Band 41 (BRS-2500), Broadband Radio Service: ● Lower Band Segment (LBS): 2496- 2596 MHz ● Upper Band Segment (UBS): 2590 – 2690 MHz A RF operation is only supported for the downlink.
Booster Type	Industrial Signal Booster
Voltage Type	AC
Voltage Level	100 to 240 V
Maximum Output Donor Port [Uplink]	-
Maximum Output Server Port [Downlink]	33 dBm
Maximum Gain [Uplink]	-
Maximum Gain [Downlink]	38 dB

The main components of the EUT are listed and described in chapter 3.2 EUT Main components.

3.2 EUT MAIN COMPONENTS

Sample Parameter	**Value**
Serial Number	FICMBA2338001
HW Version	7856326-1010 Rev: 00
SW Version	V5.0.0.196
Comment	-----

NOTE: The short description is used to simplify the identification of the EUT in this test report.

3.3 ANCILLARY EQUIPMENT

For the purposes of this test report, ancillary equipment is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT. It is necessary to configure the system in a typical fashion, as a customer would normally use it. But nevertheless Ancillary Equipment can influence the test results.

Device	**Details (Manufacturer, Type Model, OUT Code)**	**Description**
-	-	-

3.4 AUXILIARY EQUIPMENT

For the purposes of this test report, auxiliary equipment is defined as equipment which is used temporarily to enable operational and control features especially used for the tests of the EUT which is not used during normal operation or equipment that is used during the tests in combination with the EUT but is not subject of this test report. It is necessary to configure the system in a typical fashion, as a customer would normally use it.
But nevertheless Auxiliary Equipment can influence the test results.

Device	**Details (Manufacturer, Type, S/N)**	**Description**
AUX1	Commscope, ION-E PSU Shelf AC, DC18596	Power supply rack
	GE Power Electronisc Inc., CAR1212FPBC-Z, DC17936	Power plug-in module
AUX2	Commscope, ION-E WCS-2, SZAEAJ1819A0005	Module rack
	Commscope, ION-E OPT, SZBEAD2012A0115	Optical plug-in module
	Commscope, RFD HB, SZBEAQ2140A0006	RF card plug-in module
	Commscope, RFD HB, SZBEAG2210A0008	RF card plug-in module
	Commscope, ION-E RFD, SZBEAG1825A0018	RF card plug-in module
	Commscope, ION-E RFD, SZBEAP2103A0457	RF card plug-in module

3.5 EUT SETUPS

This chapter describes the combination of EUTs and equipment used for testing. The rationale for selecting the EUTs, ancillary and auxiliary equipment and interconnecting cables, is to test a representative configuration meeting the requirements of the referenced standards.

Setup	Combination of EUTs	Description and Rationale
	,	Setup for all tests

3.6 OPERATING MODES

This chapter describes the operating modes of the EUT used for testing.

3.6.1 TEST CHANNELS

Band name	Direction	Lower Frequency Band Edge [MHz]	Upper Frequency Band Edge [MHz]	Center Frequency [MHz]	Port
41, BRS (UBS)	Downlink	2590	2690	2640	Donor
41, BRS (LBS)	Downlink	2496	2596	2546	Donor

3.6.2 DEFINITION OF USED FREQUENCY BANDS

Narrowband: representation by a GSM signal
Wideband : representation by an AWGN signal with 4.1 MHz
Wideband 5G: representation by an AWGN signal with 98.3 MHz

3.6.3 AUTOMATIC GAIN CONTROL LEVEL

AGC Levels							
Band	Direction	Signal Type	AGC Start Pin [dBm]	AGC Start Pin -0.3 dB [dBm]	AGC Start Pin +3 dB [dBm]	Frequency [MHz]	Frequency
41, BRS (UBS)	Downlink	Narrowband	-3.6	-3.9	-0.6	2641.0	Mid
41, BRS (UBS)	Downlink	Wideband	-3.6	-3.9	-0.6	2640.0	
41, BRS (UBS)	Downlink	Wideband 5G	-5.1	-5.4	-2.1	2640.0	
41, BRS (LBS)	Downlink	Narrowband	-3.2	-3.5	-0.2	2547.0	
41, BRS (LBS)	Downlink	Wideband	-3.2	-3.5	-0.2	2546.0	
41, BRS (LBS)	Downlink	Wideband 5G	-4.6	-4.8	-1.6	2546.0	
41, BRS (UBS)	Downlink	Narrowband	-3.2	-3.5	-0.2	2590.2	Low
41, BRS (UBS)	Downlink	Wideband	-4.8	-5.1	-1.8	2592.5	
41, BRS (LBS)	Downlink	Narrowband	-3.4	-3.7	-0.4	2496.2	
41, BRS (LBS)	Downlink	Wideband	-3.8	-4.1	-0.8	2498.5	
41, BRS (UBS)	Downlink	Narrowband	-4.4	-4.7	-1.4	2689.8	High
41, BRS (UBS)	Downlink	Wideband	-5.2	-5.5	-2.2	2687.5	
41, BRS (LBS)	Downlink	Narrowband	-3.2	-3.5	-0.2	2595.8	
41, BRS (LBS)	Downlink	Wideband	-4.0	-4.3	-1.0	2593.5	
41, BRS (UBS)	Downlink	Narrowband	-6.3	-6.5	-3.3	2687.5	Max. Power
41, BRS (UBS)	Downlink	Wideband	-5.9	-6.1	-2.9	2687.5	
41, BRS (UBS)	Downlink	Wideband 5G	-5.1	-5.4	-2.1	2640.0	
41, BRS (LBS)	Downlink	Narrowband	-4.8	-5.2	-1.8	2590.6	
41, BRS (LBS)	Downlink	Wideband	-5.1	-5.4	-2.1	2590.6	
41, BRS (LBS)	Downlink	Wideband 5G	-4.6	-4.8	-1.6	2546.0	

If the measured frequency f_0 for the max power has a too low distance to the band edges, because in the tests modulated signals must be used: The next possible frequency to the according band edge is used.
For example for minimum distances to the band edges:

GSM signal (narrowband): 0.2 MHz
AWGN signal (wideband): 2.5 MHz
AWGN signal (wideband 5G): Here only measurements at the mid frequency are possible, because the signal band has the same bandwidth as the used channel.

3.6.4 REMARKS TO THE MEASUREMENTS

Cause of an inappropriate control mode in the transmission of the narrowband signal (GSM signal) at f_{mid}, f_{mid} is increased by 1 MHz, Hereby the abbreviations are:

f_{mid} for wideband signals (AWGN signals)
f_{mid+1} for narrowband signals (GSM signals)

In the real use of the repeater narrowband signals aren't used.

3.7 PRODUCT LABELLING

3.7.1 FCC ID LABEL

Please refer to the documentation of the applicant.

3.7.2 LOCATION OF THE LABEL ON THE EUT

Please refer to the documentation of the applicant.

4 TEST RESULTS

4.1 EFFECTIVE RADIATED POWER, MEAN OUTPUT POWER AND ZONE ENHANCER GAIN

Standard FCC Part 27, §27.50

The test was performed according to:
ANSI C63.26, KDB KDB 935210 D05 v01r04: 3.5

Test date: 2023-10-26 – 2023-10-27; 2023-11-28

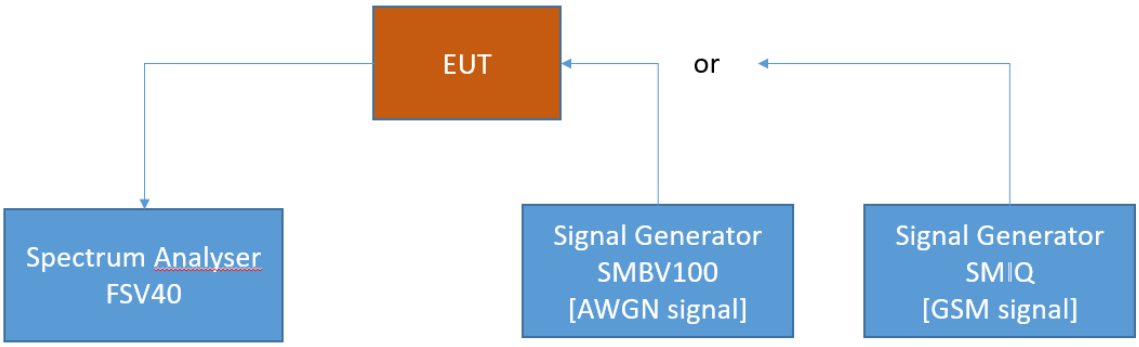
Environmental conditions: 23 °C ± 5 K; 40 % r. F. ± 20 % r. F.

Test engineer: Thomas Hufnagel

4.1.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the signal booster power and gain limits and requirements for industrial signal boosters.

The EUT was connected to the test setup according to the following diagram:



FCC Part 22/24/27/90 Industrial signal booster – Test Setup; RF Output Power / Gain

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

4.1.2 TEST REQUIREMENTS/LIMITS

Part 27; Miscellaneous Wireless Communication Services

Subpart C – Technical standards

§ 27.50

Band 41:

(h) The following power limits shall apply in the BRS and EBS:

(1) *Main, booster and base stations.* (i) The maximum EIRP of a main, booster or base station shall not exceed 33 dBW + 10log(X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section.

(ii) If a main or booster station sectorizes or otherwise uses one or more transmitting antennas with a non-omnidirectional horizontal plane radiation pattern, the maximum EIRP in dBW in a given direction shall be determined by the following formula: EIRP = 33 dBW + 10 log(X/Y) dBW + 10 log(360/beamwidth) dBW, where X is the actual channel width in MHz, Y is either (i) 6 MHz if prior to transition or the station is in the MBS following transition or (ii) 5.5 MHz if the station is in the LBS and UBS following transition, and beamwidth is the total horizontal plane beamwidth of the individual transmitting antenna for the station or any sector measured at the half-power points.

4.1.3 TEST PROTOCOL

Band 41, BRS (UBS), downlink							
Signal Type	**Input Power**	**Frequency [MHz]**	**Input Power [dBm]**	**Maximum Average Output Power [dBm]**	**Limit Average Output Power [dBm]**	**Margin to Limit [dB]**	**Gain [dB]**
Narrowband	0.3 dB < AGC	2687.5	-6.1	32.9	51.5	18.6	39.0
Narrowband	3 dB > AGC	2687.5	-2.9	32.7	51.5	18.8	35.6
Wideband	0.3 dB < AGC	2687.5	-6.5	32.9	62.6	29.7	39.4
Wideband	3 dB > AGC	2687.5	-3.3	32.8	62.6	29.8	36.1
Wideband 5G	0.3 dB < AGC	2640.0	-5.4	33.0	76.0	43.0	38.4
Wideband 5G	3 dB > AGC	2640.0	-2.1	33.0	76.0	43.0	35.1

Band 41, BRS (LBS), downlink							
Signal Type	**Input Power**	**Frequency [MHz]**	**Input Power [dBm]**	**Maximum Average Output Power [dBm]**	**Limit Average Output Power [dBm]**	**Margin to Limit [dB]**	**Gain [dB]**
Narrowband	0.3 dB < AGC	2590.6	-5.2	33.0	51.5	18.5	38.2
Narrowband	3 dB > AGC	2590.6	-1.8	33.0	51.5	18.5	34.8
Wideband	0.3 dB < AGC	2590.6	-5.4	33.1	62.6	29.5	38.5
Wideband	3 dB > AGC	2590.6	-2.1	33.1	62.6	29.5	35.2
Wideband 5G	0.3 dB < AGC	2546.0	-4.8	33.0	76.0	43.0	34.6
Wideband 5G	3 dB > AGC	2546.0	-1.6	33.0	76.0	43.0	37.8

Remark: Please see next sub-clause for the measurement plots.

Maximum output power at the worst case consideration

The highest power level in the tables above is:

$p_{highest}$ = 31.5 dBm at the channel which has the most output power of all channels.

Hereby at an antenna gain of G_{dB} = 15 dBi the highest effecitve radiated output power EIRP $p_{EIRP\ 1CH}$ of one channel is:

$p_{EIRP\ 1CH} = p_{highest} + G_{dB}$

This results are:

$p_{EIRP\ 1CH}$ = 33.1 dBm + 15 dB = 48.1 dBm

Hereby the channel bandwidth is 5 MHz and it is used in the LBS band.

Therefore the maximum allowed power pEIRP is calculated according the given formula:

$$pEIRP\ 1CH\ [dBm] = pEIRP\ 1CH\ [dBW] + 10 * log\left(\frac{channel\ bandwidth}{5.5\ MHz}\right) + 30\ dB$$

This results dBm are:

$$pEIRP\ 1CH\ [dBm] = 33\ [dBW] + 10 * log\left(\frac{5\ MHz}{5.5\ MHz}\right) + 30\ dB = 62.6\ dBm$$

Supposed all two antenna ports are working together in MIMO operation the worst case of the highest output power $p_{EIRP\ 2CH}$ is:

$p_{EIRP\ 2CH} = p_{EIRP\ 1CH + 3\ dB}$

Hereby the result is:

$p_{EIRP\ 2CH}$ = 48.1 dBm + 3 dB = 51.1 dBm

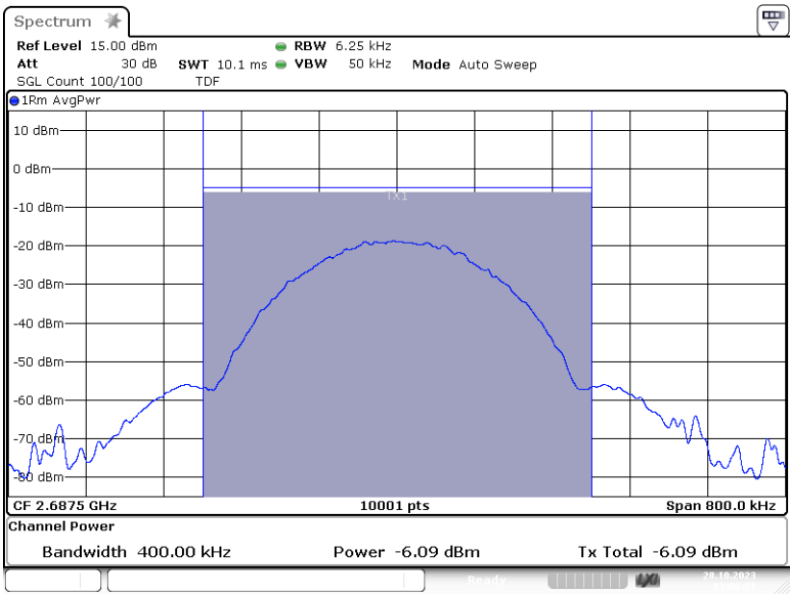
The f inal comparison of this consideration is:

$p_{EIRP\ 4CH}$ = 51.1 dBm <62.6 dBm, hereby 62.6 dBm is the highest allowed limit in this band.

The DUT doesn’t exceed the limit.

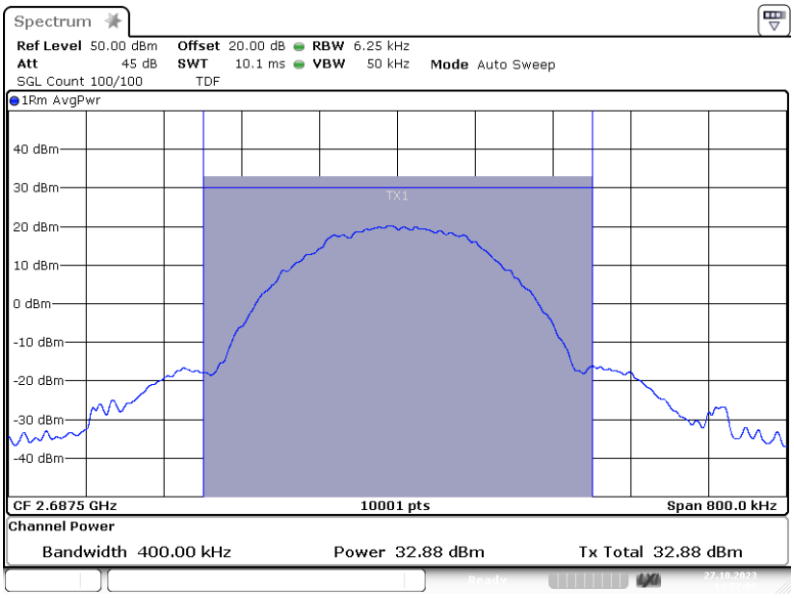
4.1.4 MEASUREMENT PLOT

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: GSM; Input Power 0.3 dB < AGC



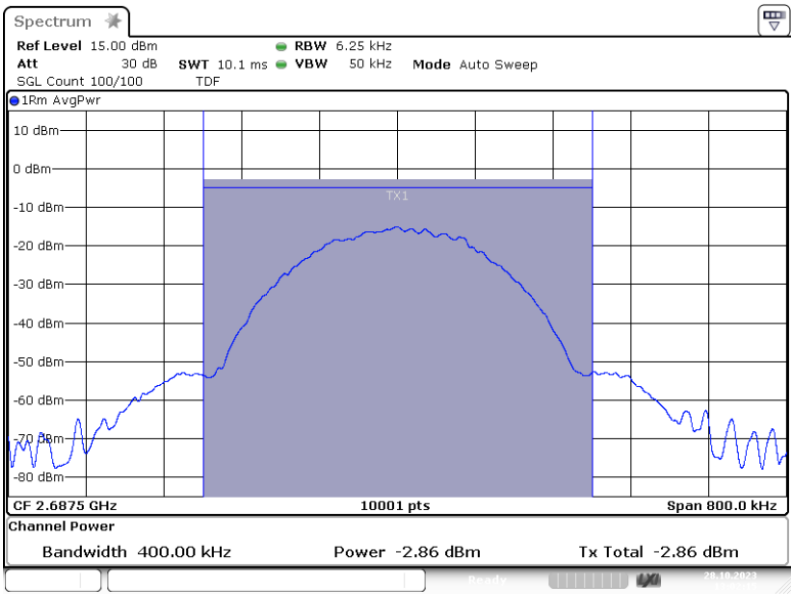
3.5.3 Power GSM In-0.3 2.68750G

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: GSM; Output Power 0.3 dB < AGC



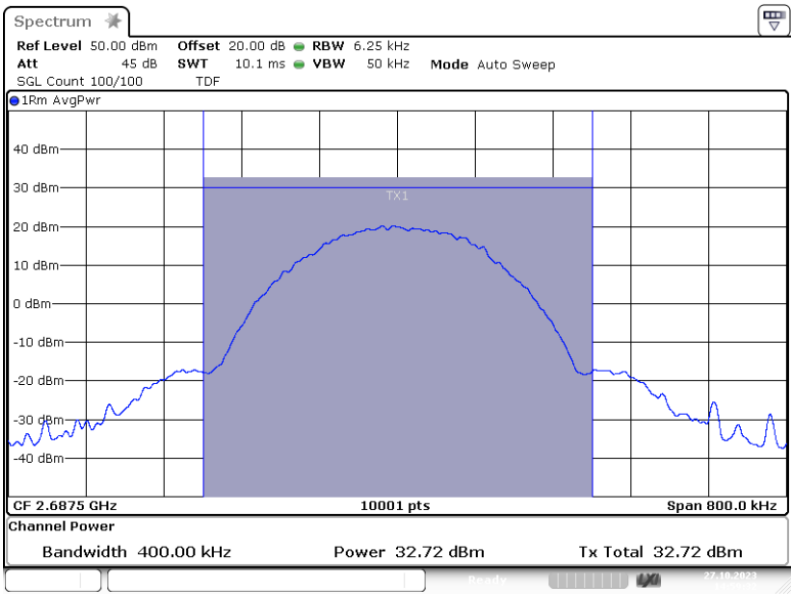
3.5.3 Power GSM Out -0.3 2.68750G

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: GSM; Input Power 3 dB > AGC



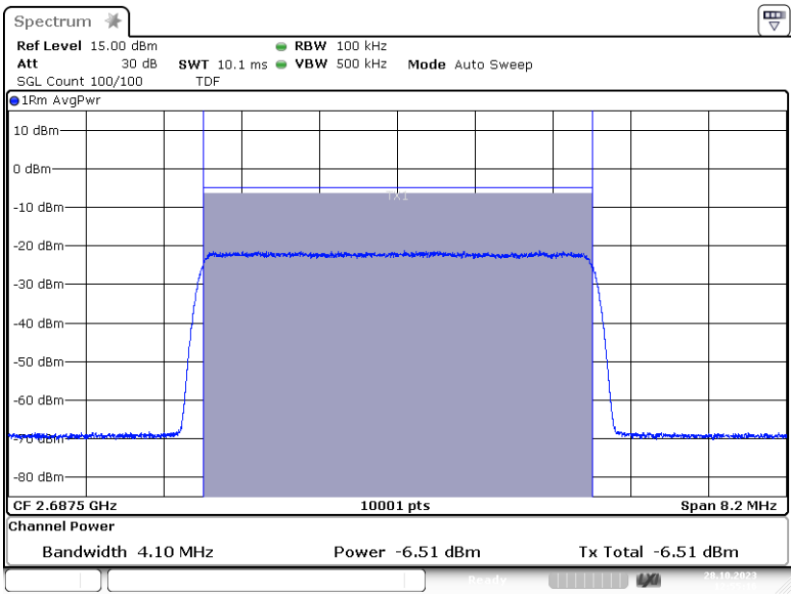
3.5.3 Power GSM In+3 2.68750G

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: GSM; Output Power 3 dB > AGC



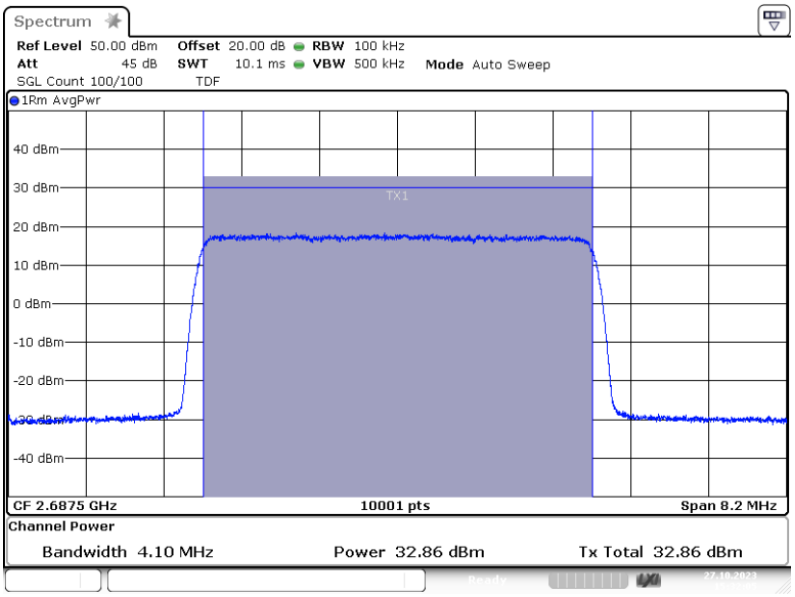
3.5.3 Power GSM Out +3 2.68750G

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: AWGN; Input Power 0.3 dB < AGC



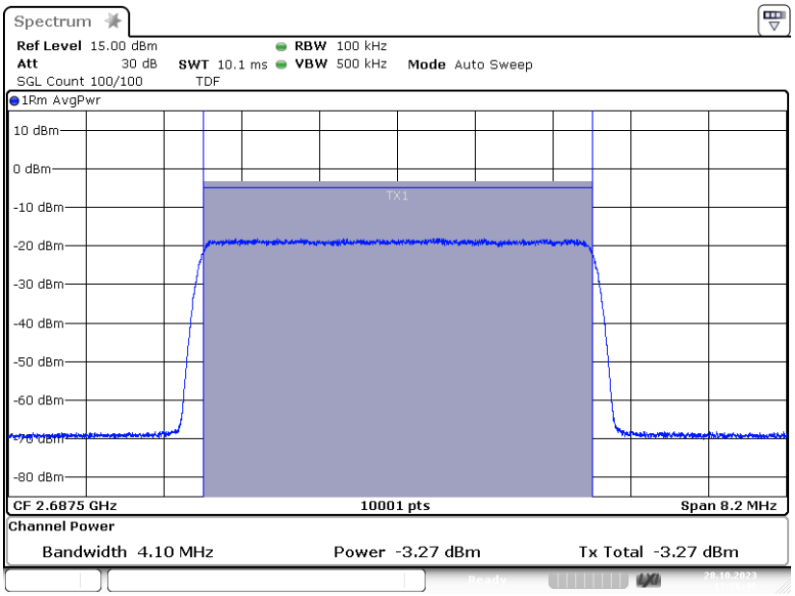
3.5.3 Power AWGN In-0.3 2.68750G

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: AWGN; Output Power 0.3 dB < AGC



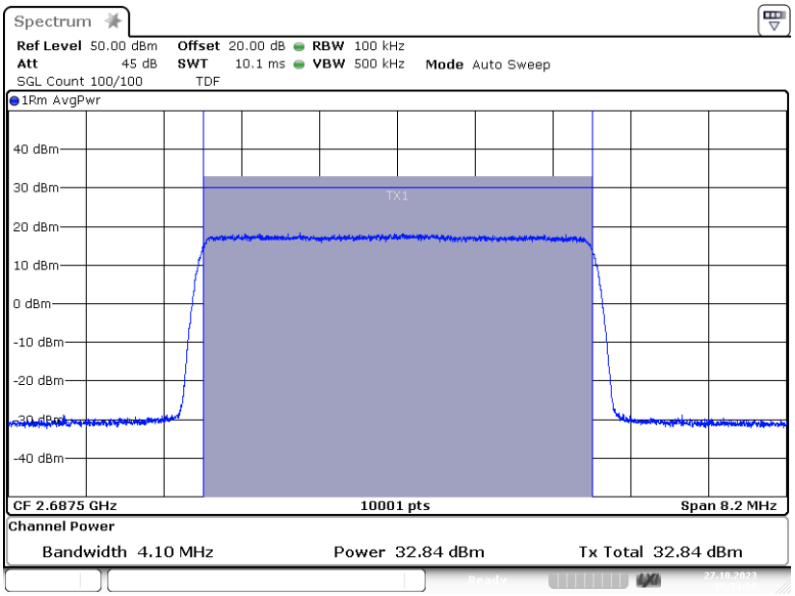
3.5.3 Power AWGN Out -0.3 2.68750G

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: AWGN; Input Power 3 dB > AGC



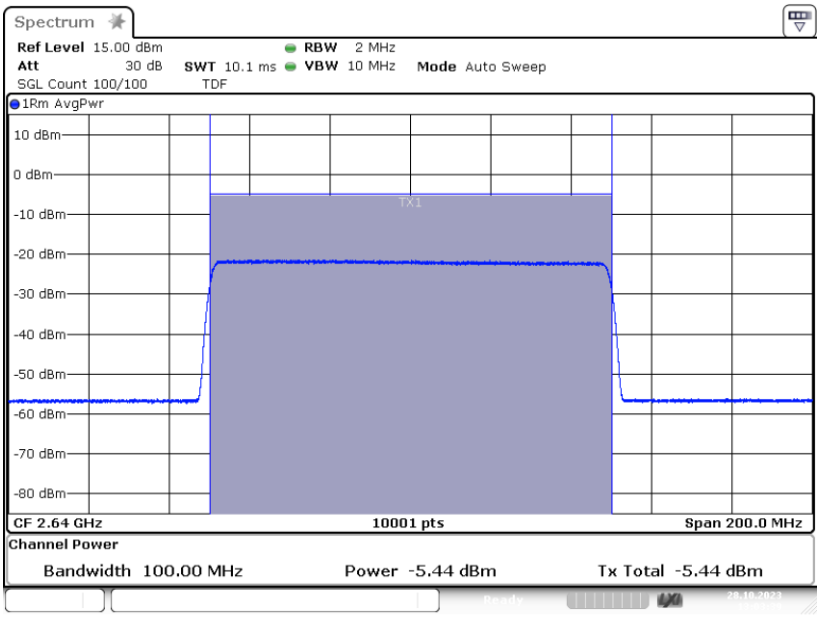
3.5.3 Power AWGN In+3 2.68750G

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: AWGN; Output Power 3 dB > AGC



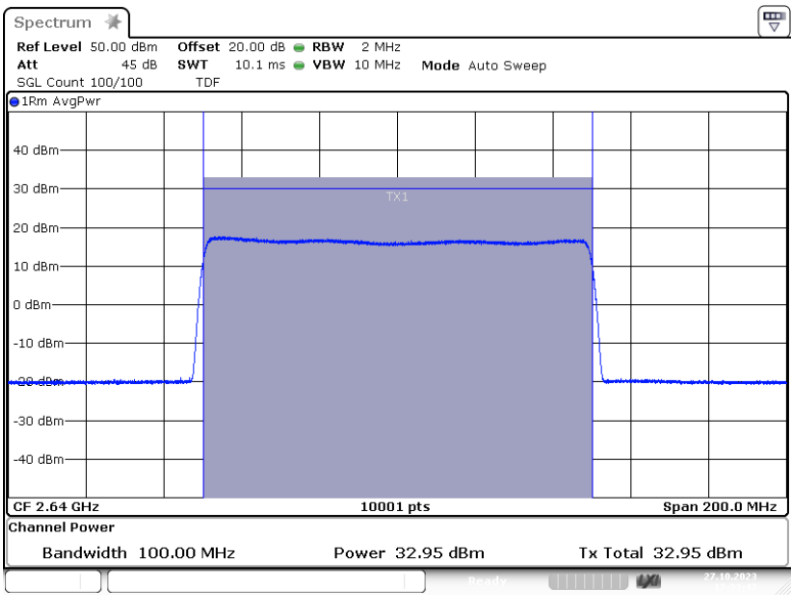
3.5.3 Power AWGN Out +3 2.68750G

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN100; Input Power 0.3 dB < AGC



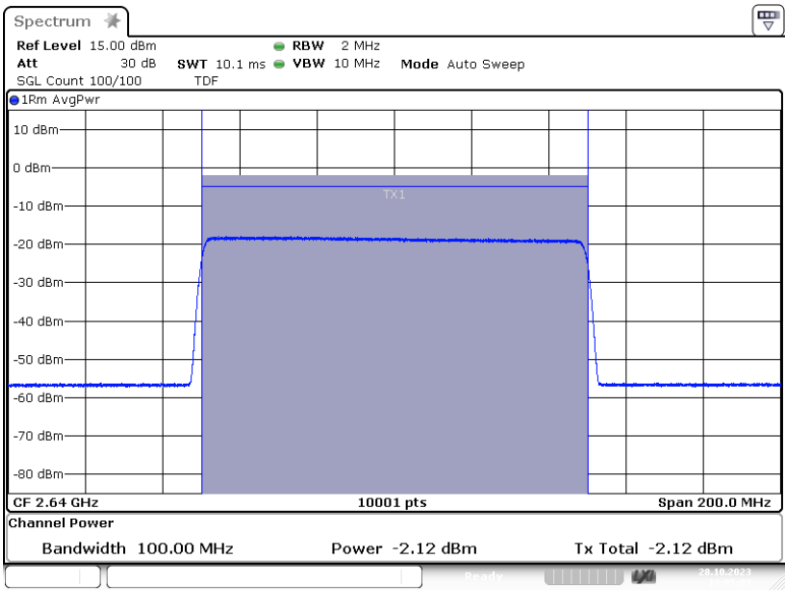
3.5.3 Power AWGN100 In-0.3 2.64000G

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN100; Output Power 0.3 dB < AGC



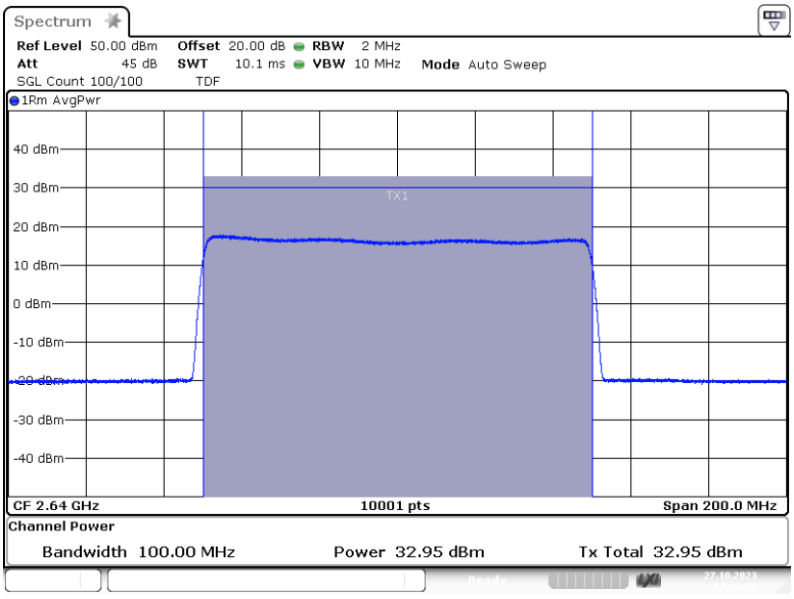
3.5.3 Power AWGN100-0.3 2.64000G

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN100; Input Power 3 dB > AGC



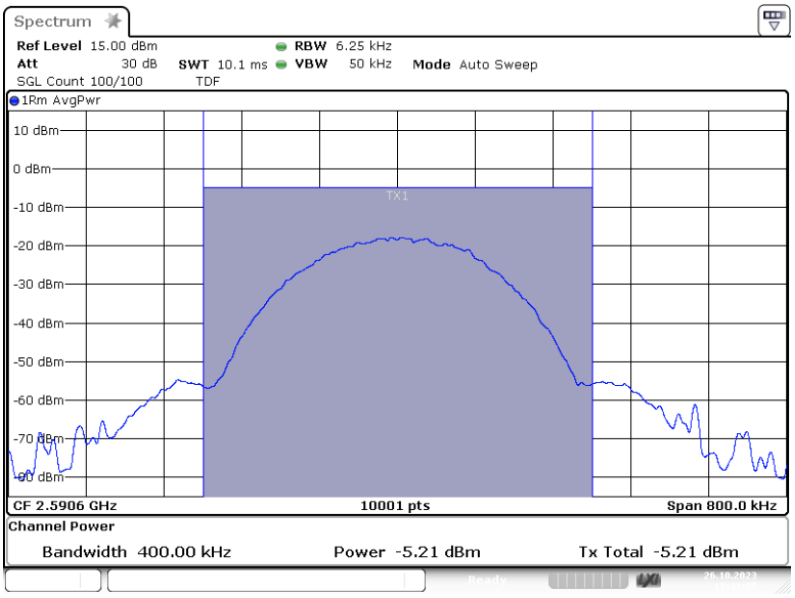
3.5.3 Power AWGN100 In+3 2.64000G

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN100; Output Power 3 dB > AGC



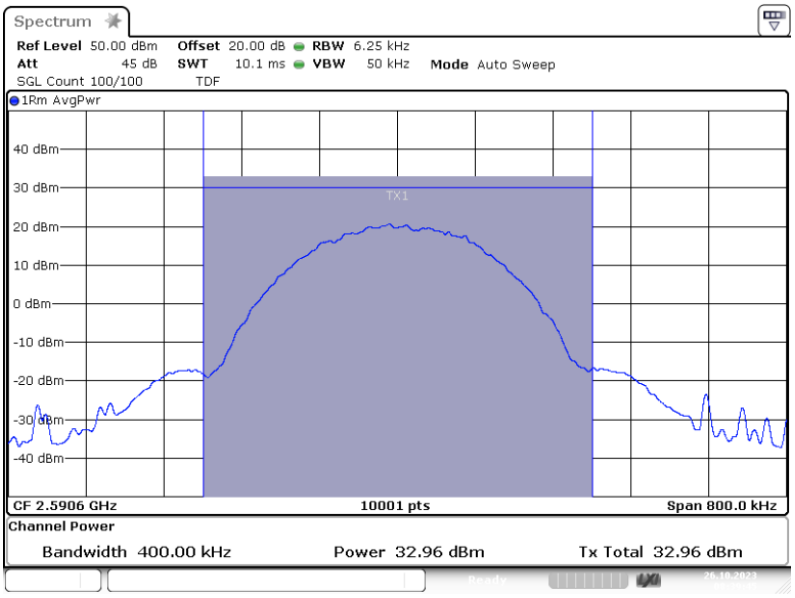
3.5.3 Power AWGN100+3 2.64000G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: GSM; Input Power 0.3 dB < AGC



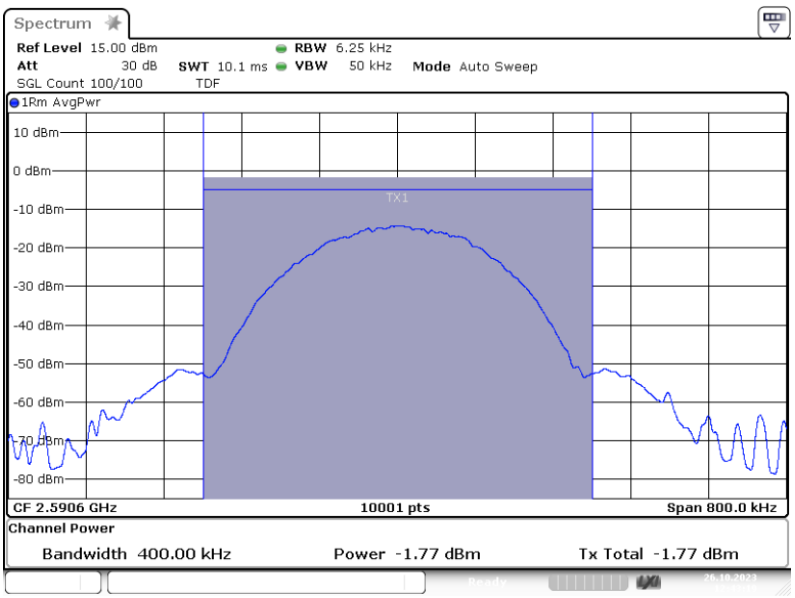
3.5.3 Power GSM In-0.3 2.59060G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: GSM; Output Power 0.3 dB < AGC



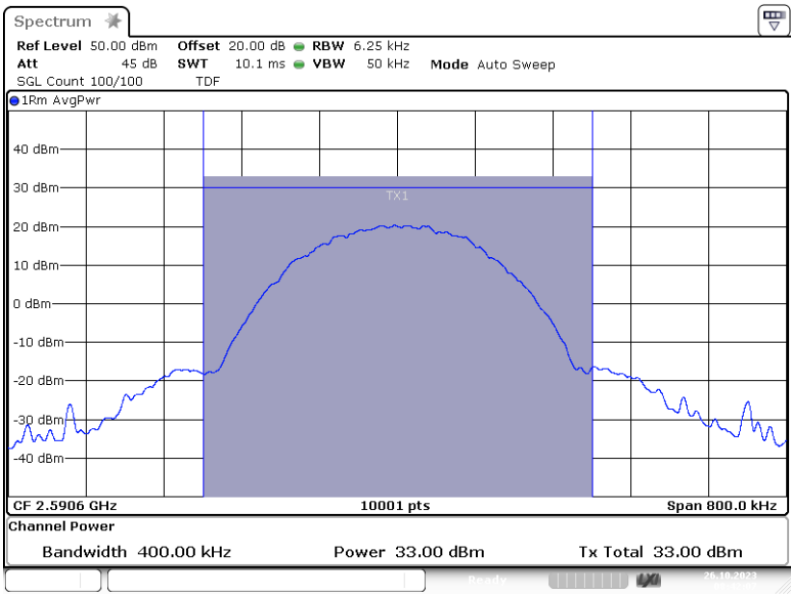
3.5.3 Power GSM Out -0.3 2.59060G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: GSM; Input Power 3 dB > AGC



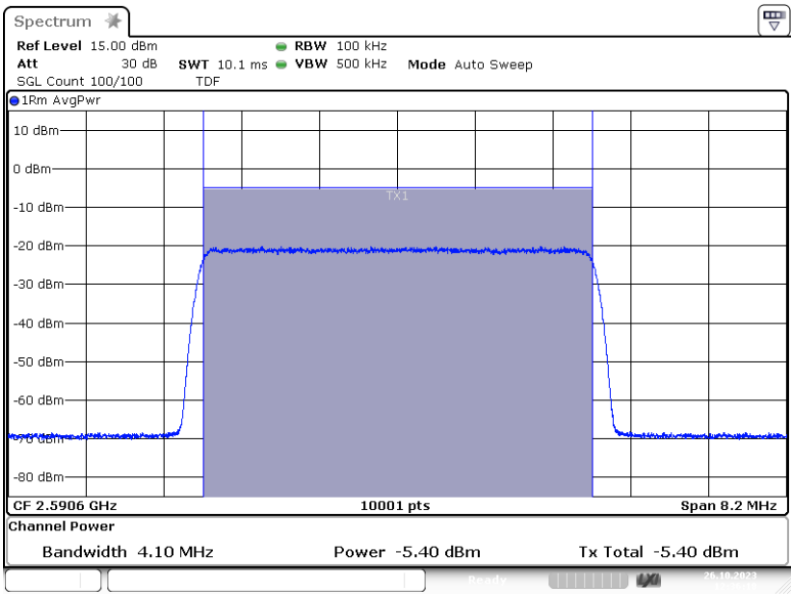
3.5.3 Power GSM In+3 2.59060G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: GSM; Output Power 3 dB > AGC



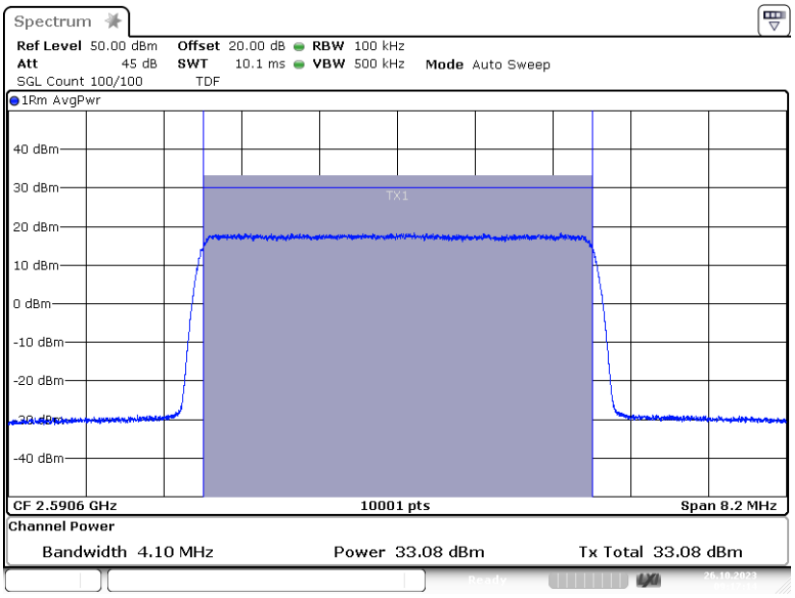
3.5.3 Power GSM Out +3 2.59060G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: AWGN; Input Power 0.3 dB < AGC



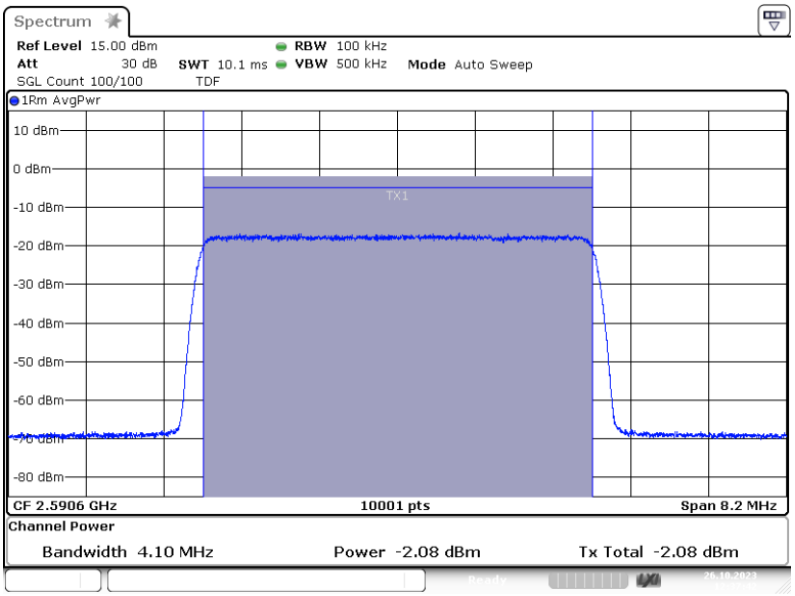
3.5.3 Power AWGN In-0.3 2.59060G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: AWGN; Output Power 0.3 dB < AGC



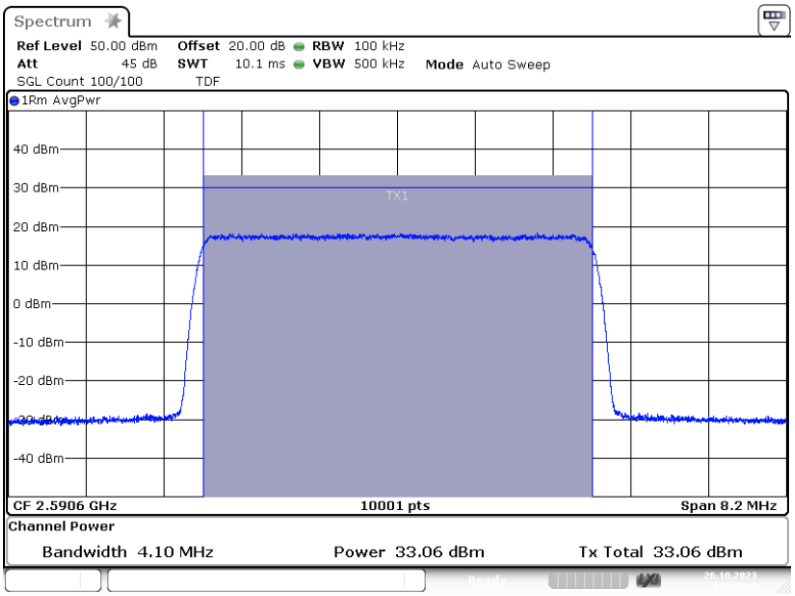
3.5.3 Power AWGN Out -0.3 2.59060G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: AWGN; Input Power 3 dB > AGC



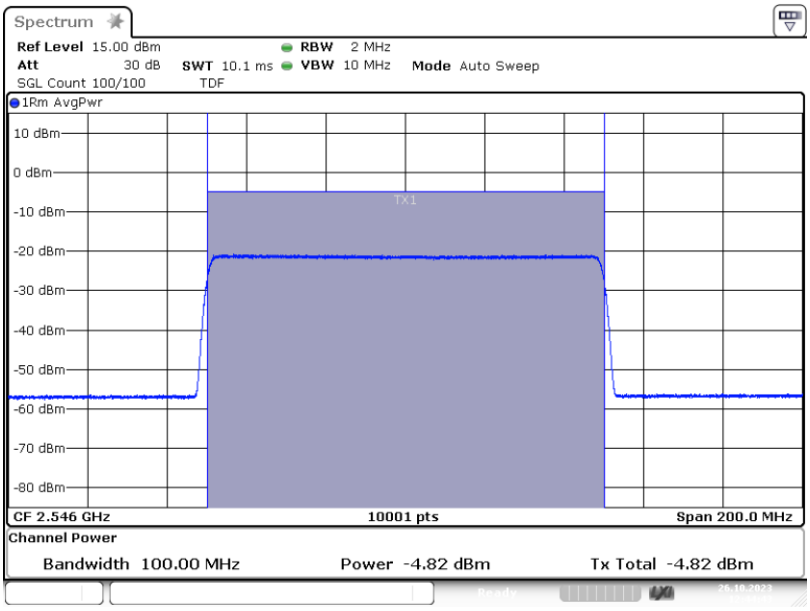
3.5.3 Power AWGN In+3 2.59060G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: AWGN; Output Power 3 dB > AGC



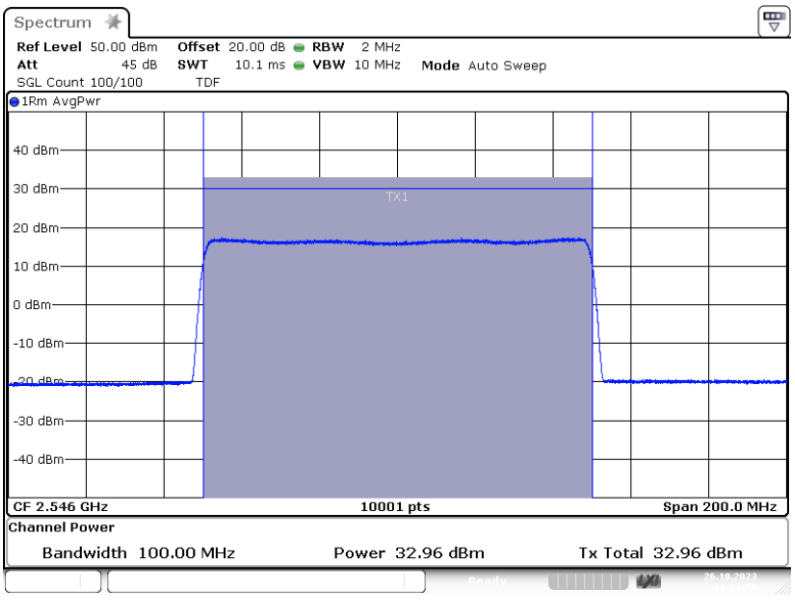
3.5.3 Power AWGN Out +3 2.59060G

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN100; Input Power 0.3 dB < AGC



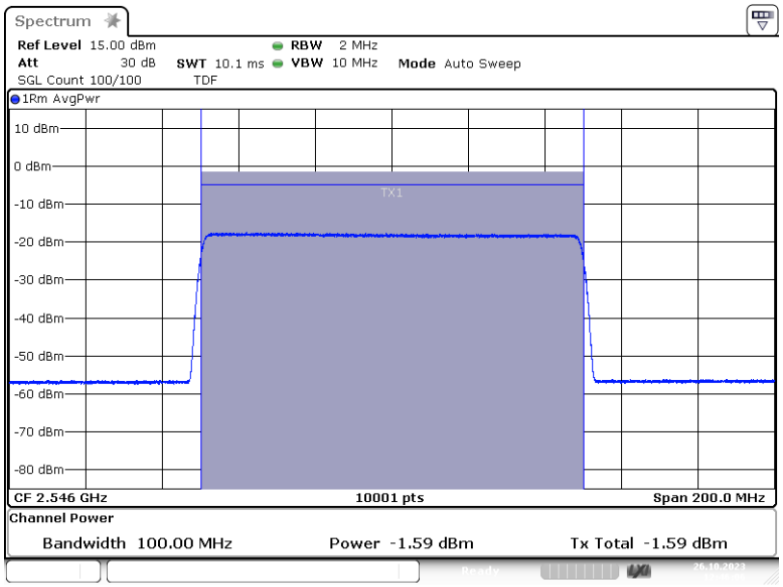
3.5.3 Power AWGN100 In-0.3 2.54600G

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN100; Output Power 0.3 dB < AGC



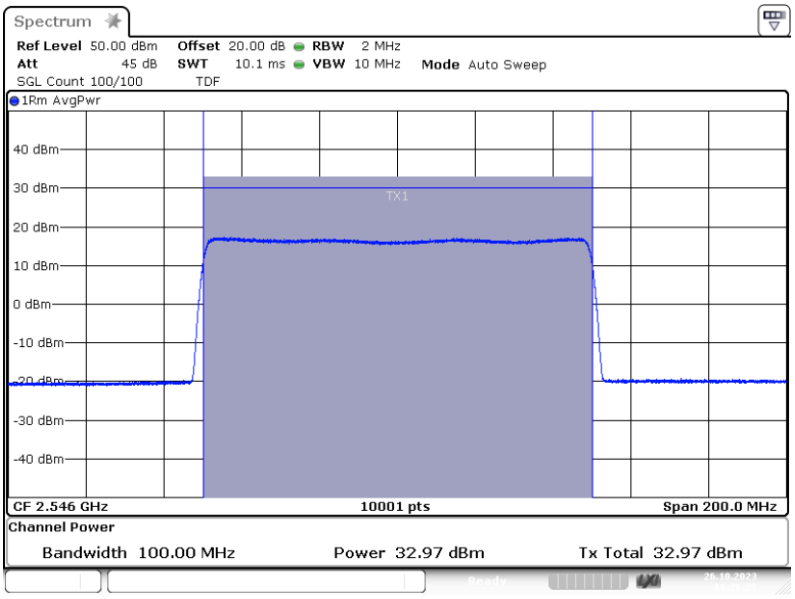
3.5.3 Power AWGN100-0.3 2.54600G

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN100; Input Power 3 dB > AGC



3.5.3 Power AWGN100 In+3 2.54600G

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN100; Output Power 3 dB > AGC



3.5.3 Power AWGN100+3 2.54600G

4.1.5 TEST EQUIPMENT USED

- Conducted

4.2 PEAK TO AVERAGE RATIO

Standard FCC Part 27, §27.50

The test was performed according to:
ANSI C63.26

Test date: 2023-10-26 – 2023-10-27; 2023-11-28

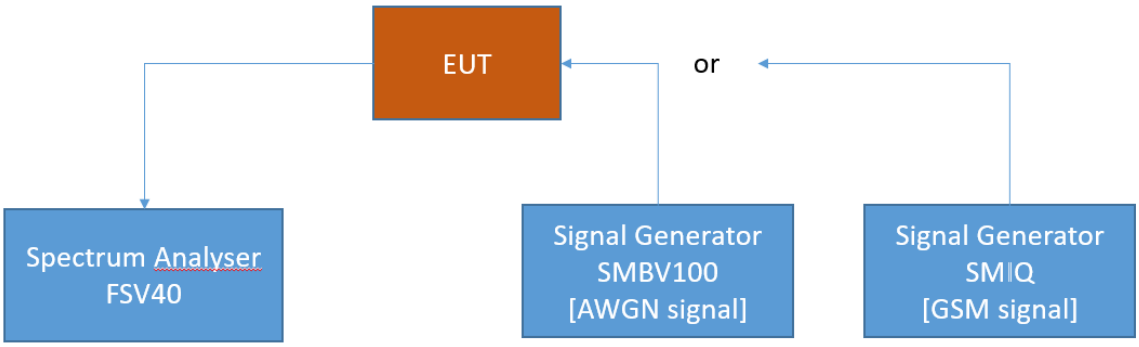
Environmental conditions: 23 °C ± 5 K; 40 % r. F. ± 20 % r. F.

Test engineer: Thomas Hufnagel

4.2.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the signal booster power and gain limits and requirements for industrial signal boosters.

The EUT was connected to the test setup according to the following diagram:



FCC Part 22/24/27/90 Industrial signal booster – Test Setup; RF Output Power / Gain

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

4.2.2 TEST REQUIREMENTS/LIMITS

Part 27; Miscellaneous Wireless Communication Services

Subpart C – Technical standards

§ 27.50

Band 41:
For the band 41(BRS, LBS/UBS) exists no FCC peak-to-average power ratio (PAPR) limit. Although here no limit exits, a fictive limit with the usual 13 dB value is set and the margin to this fictive limit is calculated.

4.2.3 TEST PROTOCOL

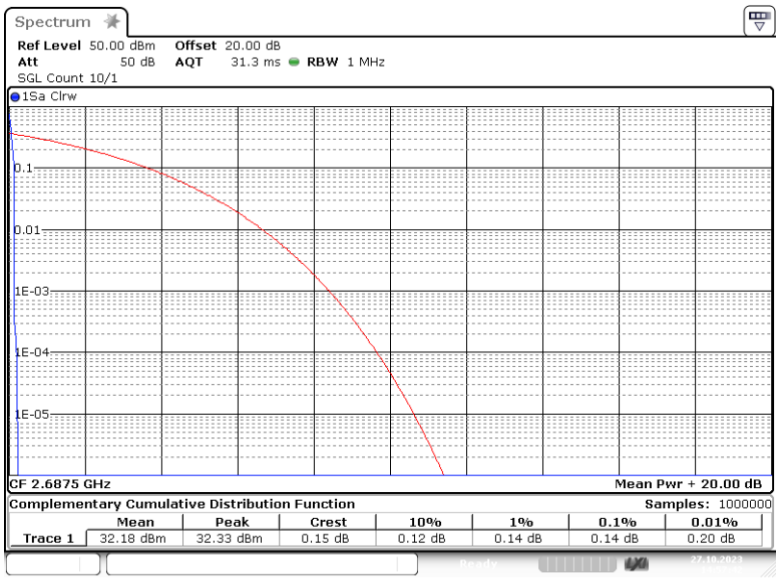
Band 41 BRS (UBS), downlink						
Signal Type	**Input Power**	**Frequency [MHz]**	**Input Power [dBm]**	**PAPR [dB]**	**Fictive Limit PAPR [dB]**	**Margin to fictive Limit [dB]**
Narrowband	0.3 dB < AGC	2687.5	-6.5	0.1	13.0	12.9
Narrowband	3 dB > AGC	2687.5	-3.3	0.1	13.0	12.9
Wideband	0.3 dB < AGC	2687.5	-6.1	6.6	13.0	6.4
Wideband	3 dB > AGC	2687.5	-2.9	6.6	13.0	6.4

Band 41 BRS (LBS), downlink						
Signal Type	**Input Power**	**Frequency [MHz]**	**Input Power [dBm]**	**PAPR [dB]**	**Fictive Limit PAPR [dB]**	**Margin to Fictive Limit [dB]**
Narrowband	0.3 dB < AGC	2590.6	-5.2	0.1	13.0	12.9
Narrowband	3 dB > AGC	2590.6	-1.8	0.1	13.0	12.9
Wideband	0.3 dB < AGC	2590.6	-5.4	6.6	13.0	6.4
Wideband	3 dB > AGC	2590.6	-2.1	6.6	13.0	6.4

Remark: Please see next sub-clause for the measurement plot.

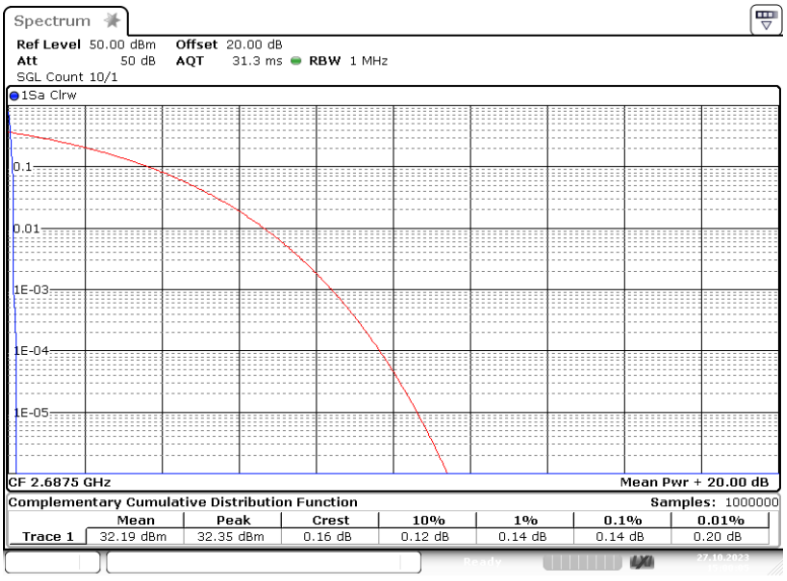
4.2.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE. "WORST CASE")

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: GSM; PAPR 0.3 dB < AGC



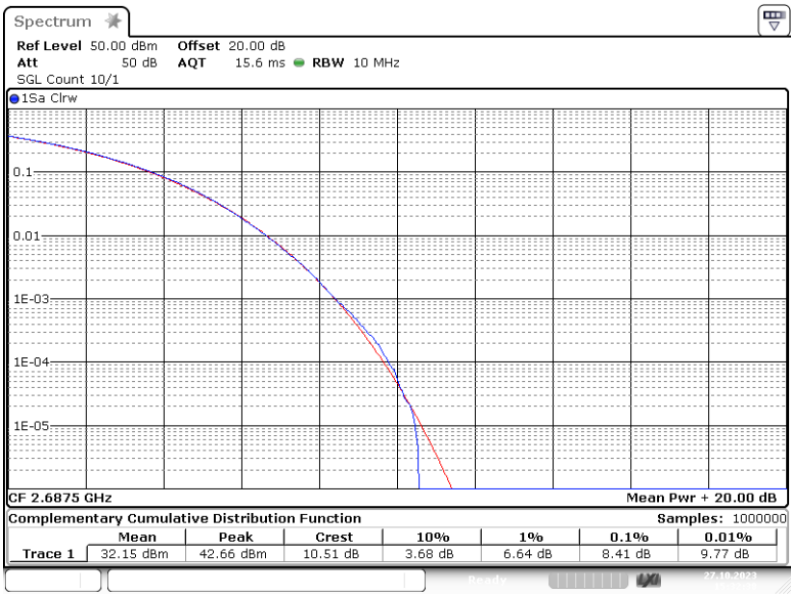
4.0 PAPR GSM Out -0.3 2.688G

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: GSM; PAPR 3 dB > AGC



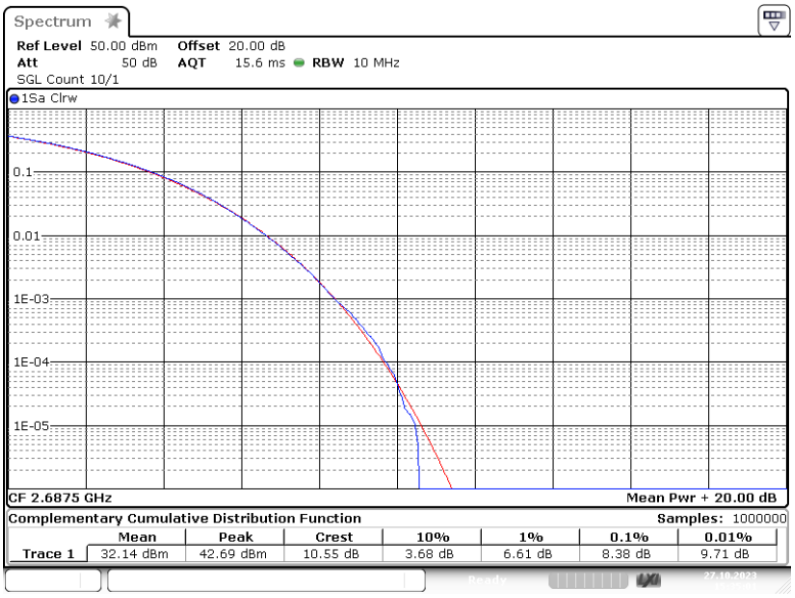
4.0 PAPR GSM Out +3 2.688G

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: AWGN; PAPR 0.3 dB < AGC



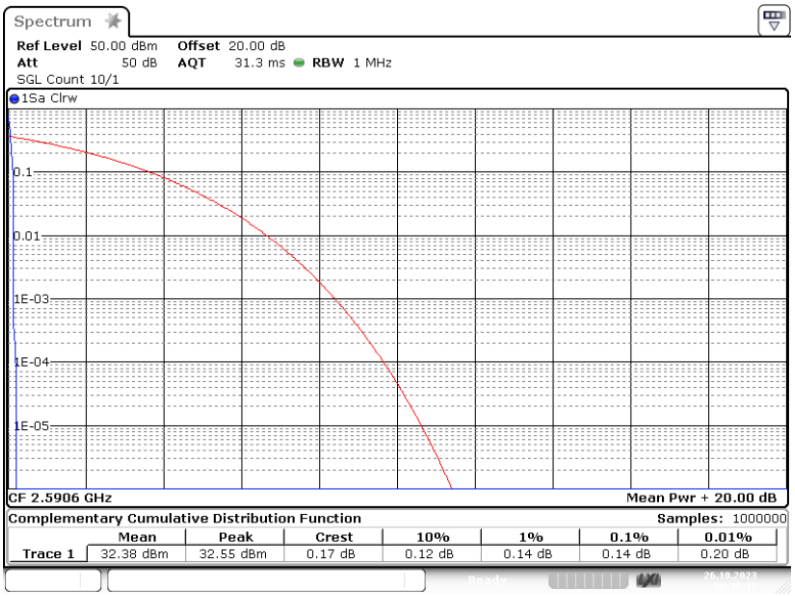
4.0 PAPR AWGN Out -0.3 2.688G

Band: BRS (UBS); ANT 2; Frequency: 2.6875 GHz; Band Edge: f0; Mod: AWGN; PAPR 3 dB > AGC



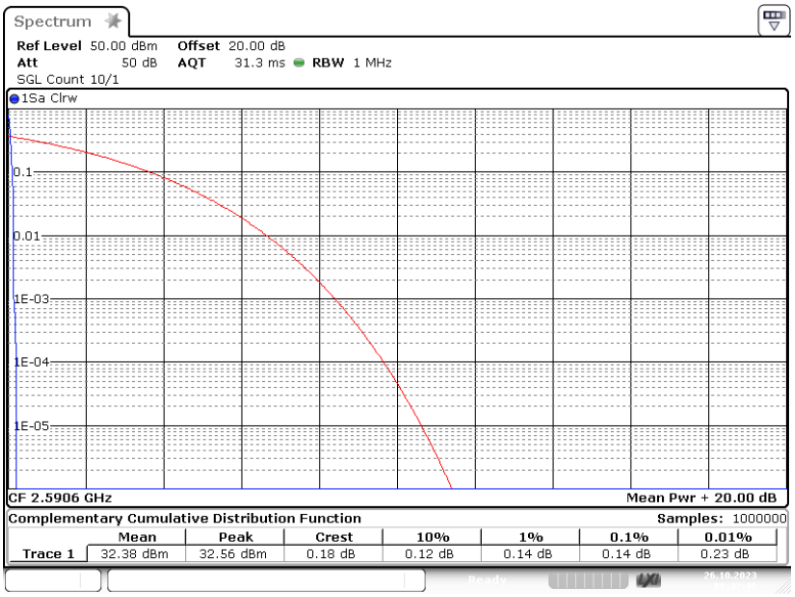
4.0 PAPR AWGN Out +3 2.688G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: GSM; PAPR 0.3 dB < AGC



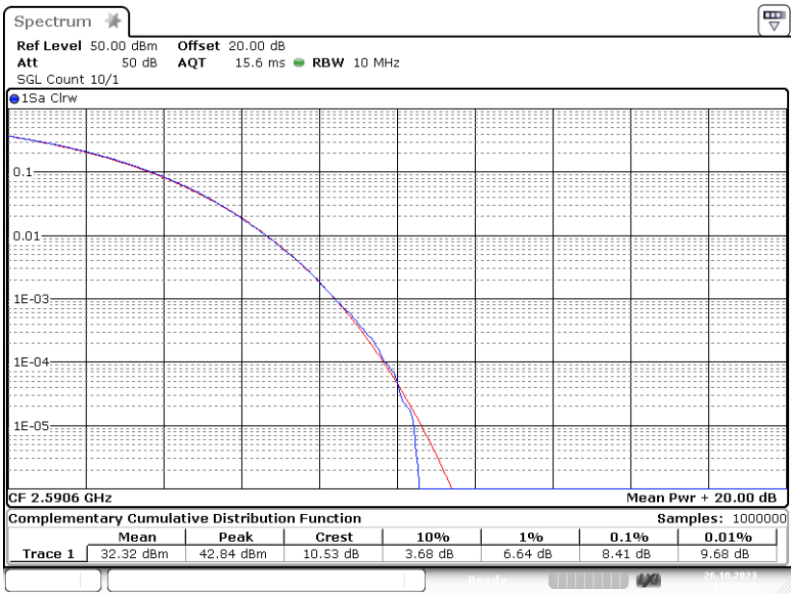
4.0 PAPR GSM Out -0.3 2.591G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: GSM; PAPR 3 dB > AGC



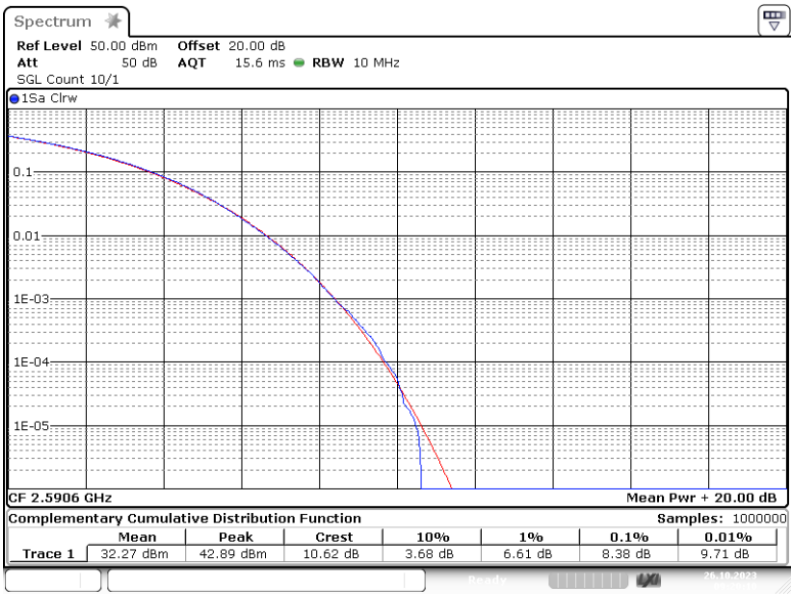
4.0 PAPR GSM Out +3 2.591G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: AWGN; PAPR 0.3 dB < AGC



4.0 PAPR AWGN Out -0.3 2.591G

Band: BRS (LBS); ANT 2; Frequency: 2.5906 GHz; Band Edge: f0; Mod: AWGN; PAPR 3 dB > AGC



4.0 PAPR AWGN Out +3 2.591G

4.2.5 TEST EQUIPMENT USED

- Conducted

4.3 OCCUPIED BANDWIDTH/INPUT-VERSUS-OUTPUT SPECTRUM

Standard FCC Part 2.1049; Occupied Bandwidth

The test was performed according to:
ANSI C63.26. KDB KDB 935210 D05 v01r04: 3.4

Test date: 2023-10-26 – 2023-10-27; 2023-11-28

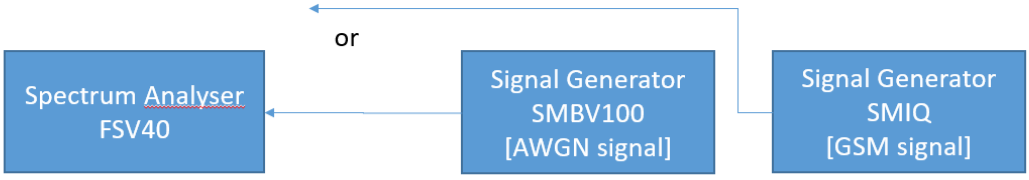
Environmental conditions: 23 °C ± 5 K; 40 % r. F. ± 20 % r. F.

Test engineer: Thomas Hufnagel

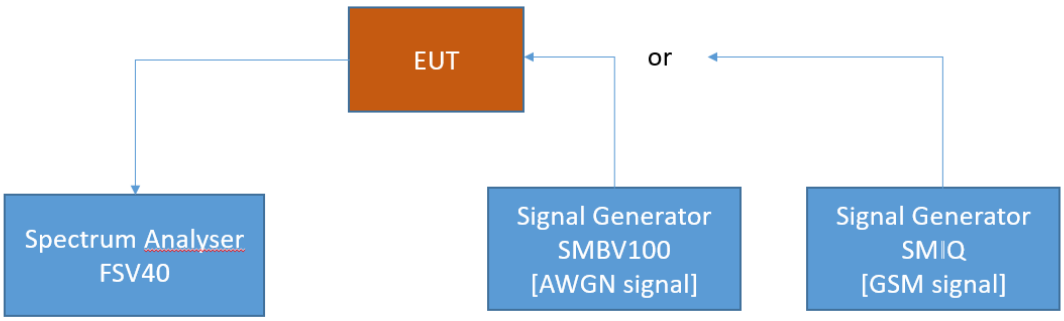
4.3.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the applicable conducted spurious emission limits per FCC §2.1049

The EUT was connected to the test setups according to the following diagram:



FCC Part 22/24/27/90; Industrial Signal Booster
Test Setup step 1: Measuring characteristics of test signals



FCC Part 22/24/27/90; Industrial Signal Booster
Test Setup step 2; Occupied Bandwidth/Input-versus-output spectrum

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

4.3.2 TEST REQUIREMENTS/LIMITS

FCC Part 2.1049; Occupied Bandwidth:

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 under the following conditions as applicable:

(h) Transmitters employing digital modulation techniques—when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks. pseudo-random generators or other devices required in normal service. Additionally. the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

(i) Transmitters designed for other types of modulation—when modulated by an appropriate signal of sufficient amplitude to be representative of the type of service in which used. A description of the input signal should be supplied.

4.3.3 TEST PROTOCOL

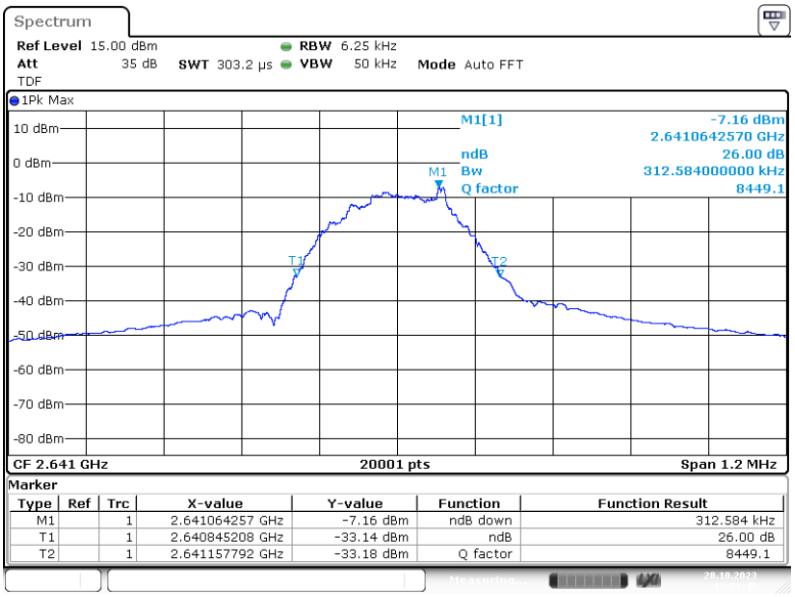
Band 41 BRS (UBS), downlink							
Signal Type	**Input Power**	**Signal Frequency [MHz]**	**Occupied Bandwidth SG [kHz]**	**Occupied Bandwidth Booster [kHz]**	**Delta Occupied Bandwidth [kHz]**	**Limit Delta Occupied Bandwidth [kHz]**	**Margin to Limit [kHz]**
Narrowband	0.3 dB < AGC	2641.0	312.6	314.3	1.7	10.0	8.3
Narrowband	3 dB > AGC	2641.0	313.5	317.9	4.4	10.0	5.6
Wideband	0.3 dB < AGC	2640.0	4392.7	4386.6	6.1	205.0	198.9
Wideband	3 dB > AGC	2640.0	4394.6	4389.0	5.6	205.0	199.4
Wideband 5G	0.3 dB < AGC	2640.0	103375	103240	135.0	4915	4780
Wideband 5G	3 dB > AGC	2640.0	103315	103255	60	4915	4855

Band 41 BRS (LBS), downlink							
Signal Type	**Input Power**	**Signal Frequency [MHz]**	**Occupied Bandwidth SG [kHz]**	**Occupied Bandwidth Booster [kHz]**	**Delta Occupied Bandwidth [kHz]**	**Limit Delta Occupied Bandwidth [kHz]**	**Margin to Limit [kHz]**
Narrowband	0.3 dB < AGC	2547.0	314.9	316.2	1.3	10.0	8.7
Narrowband	3 dB > AGC	2547.0	315.6	311.6	4.0	10.0	6.0
Wideband	0.3 dB < AGC	2546.0	4389.7	4389.7	0.0	205.0	205.0
Wideband	3 dB > AGC	2546.0	4389.7	4386.0	3.7	205.0	201.3
Wideband 5G	0.3 dB < AGC	2546.0	103225	103195	30	4915	4885
Wideband 5G	3 dB > AGC	2546.0	103015	103165	150	4915	4765

Remark: Please see next sub-clause for the measurement plot.

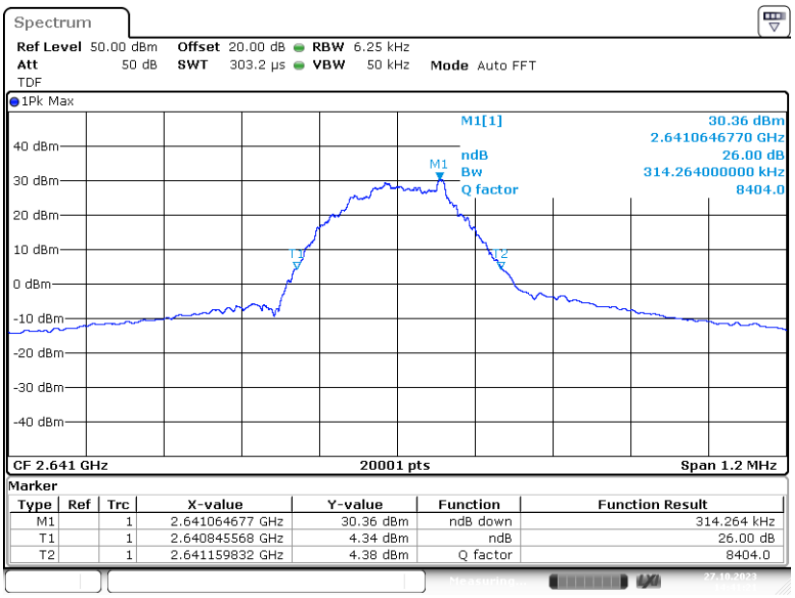
4.3.4 MEASUREMENT PLOT

Band: BRS (UBS); ANT 2; Frequency: 2.6410 GHz; Band Edge: mid; Mod: GSM;
Input OCBw 0.3 dB < AGC



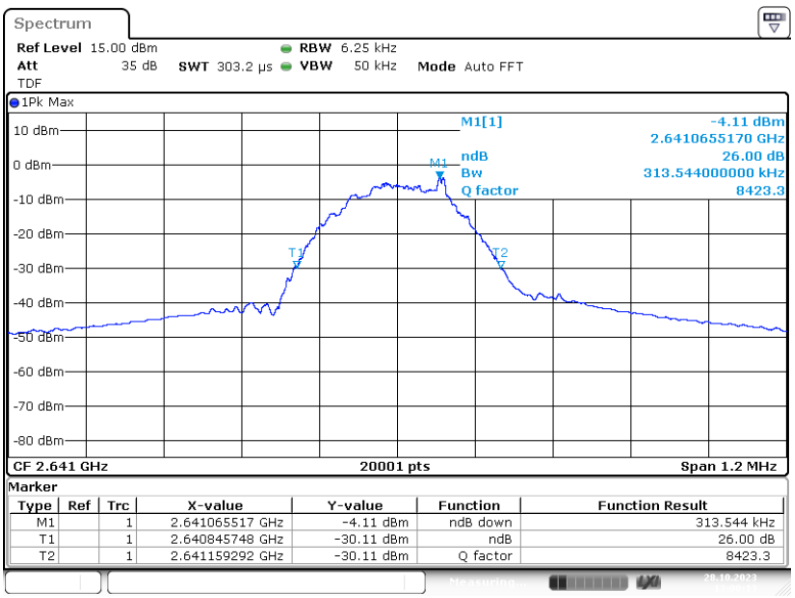
3.4 OCBw GSM In-0.3 2.6410G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6410 GHz; Band Edge: mid; Mod: GSM;
Output OCBw 0.3 dB < AGC



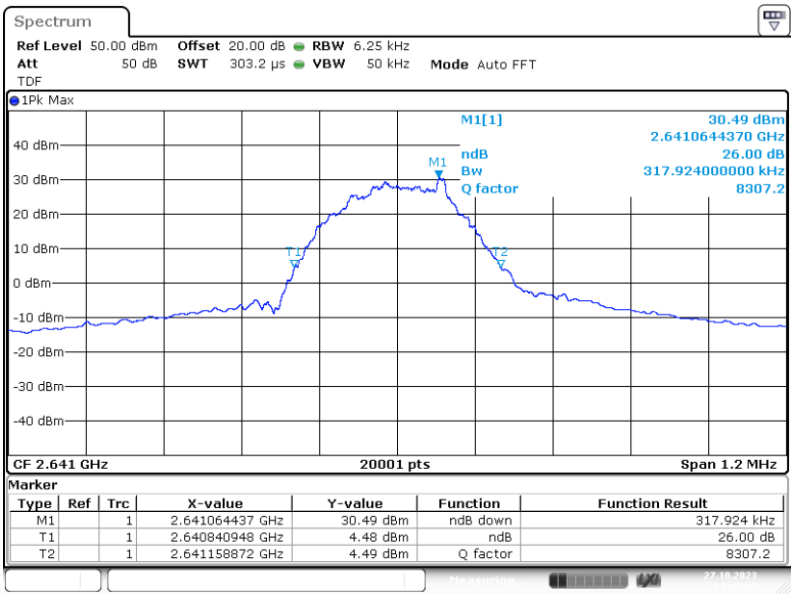
3.4 OCBw GSM Out -0.3 2.6410G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6410 GHz; Band Edge: mid; Mod: GSM;
Input OCBw 3 dB > AGC



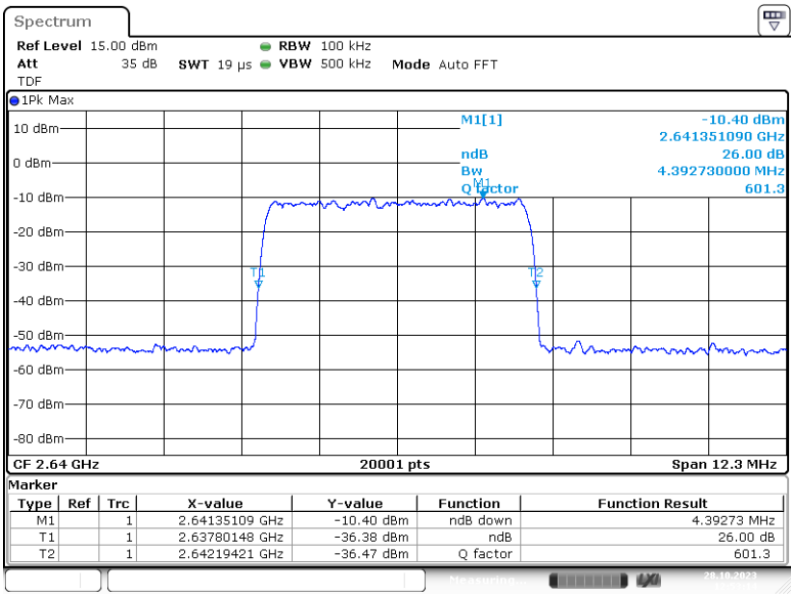
3.4 OCBw GSM In+3 2.6410G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6410 GHz; Band Edge: mid; Mod: GSM;
Output OCBw 3 dB > AGC



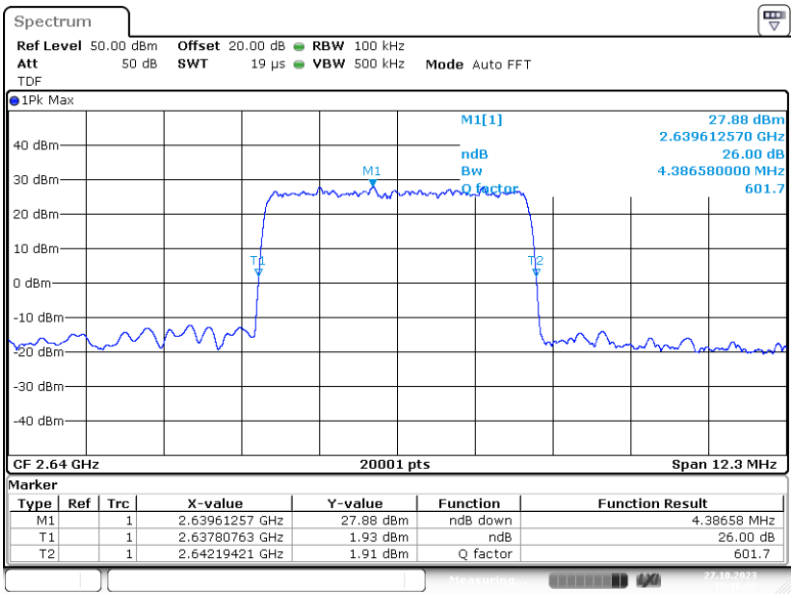
3.4 OCBw GSM Out +3 2.6410G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN;
Input OCBw 0.3 dB < AGC



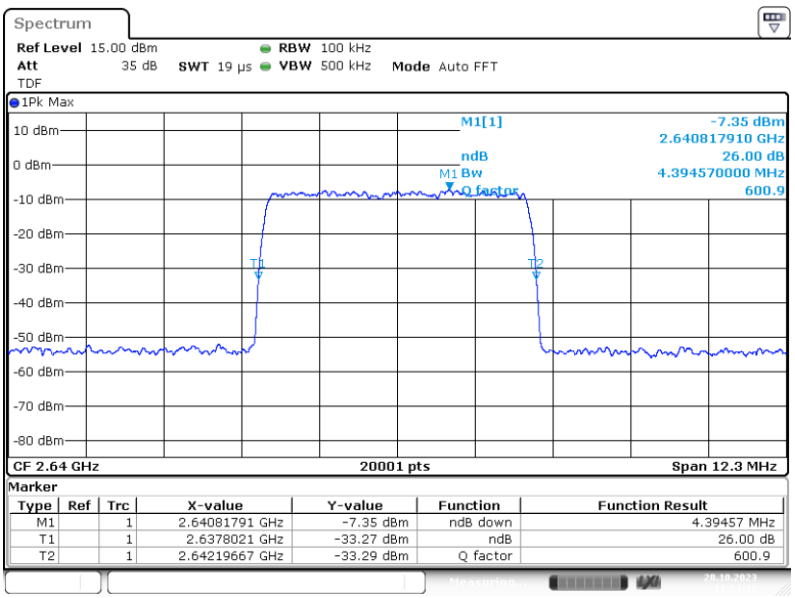
3.4 OCBw AWGN In-0.3 2.6400G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN;
Output OCBw 0.3 dB < AGC



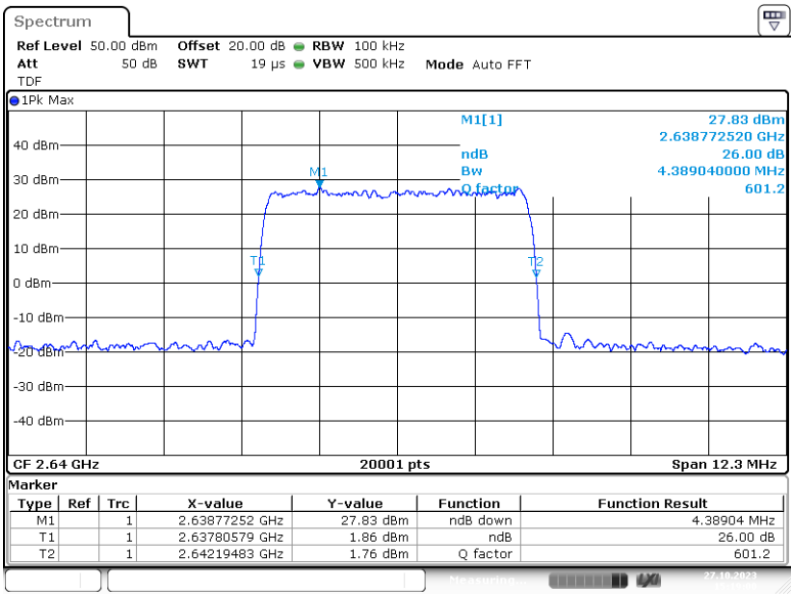
3.4 OCBw AWGN Out -0.3 2.6400G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN;
Input OCBw 3 dB > AGC



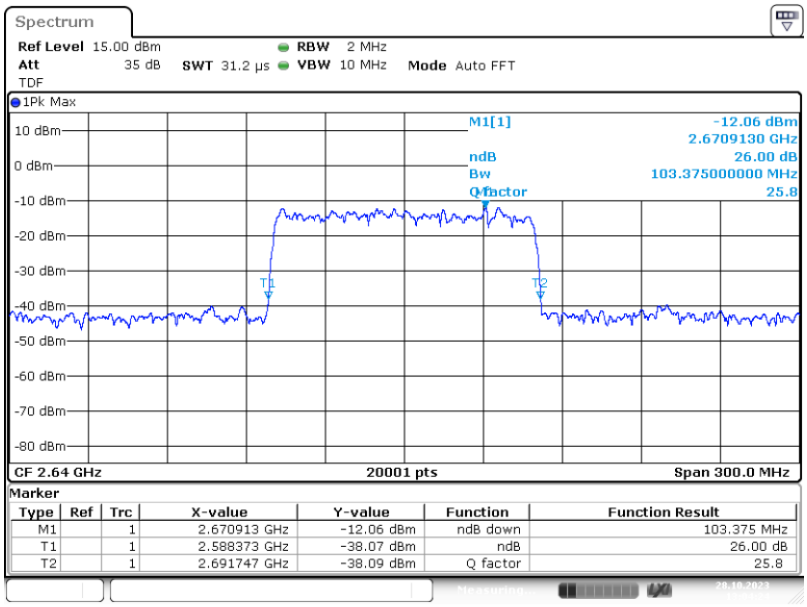
3.4 OCBw AWGN In+3 2.6400G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN;
Output OCBw 3 dB > AGC



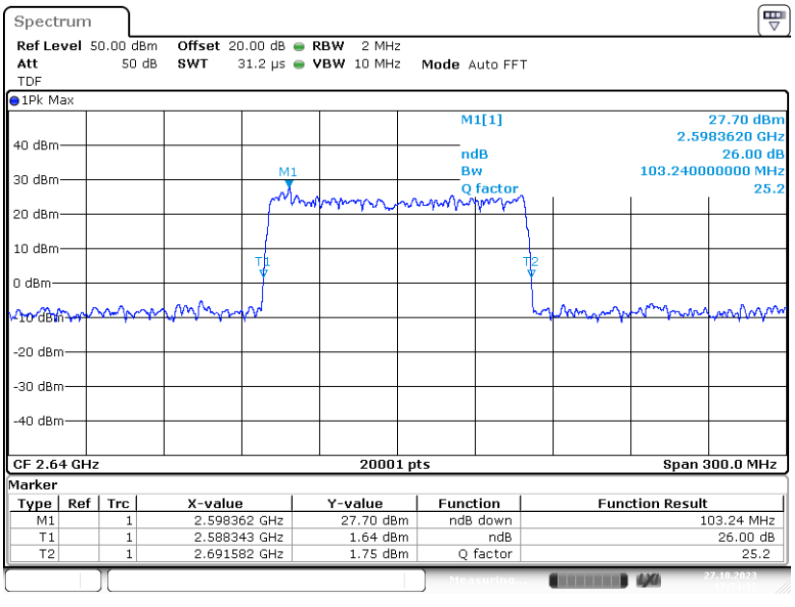
3.4 OCBw AWGN Out +3 2.6400G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN100;
Input OCBw 0.3 dB < AGC



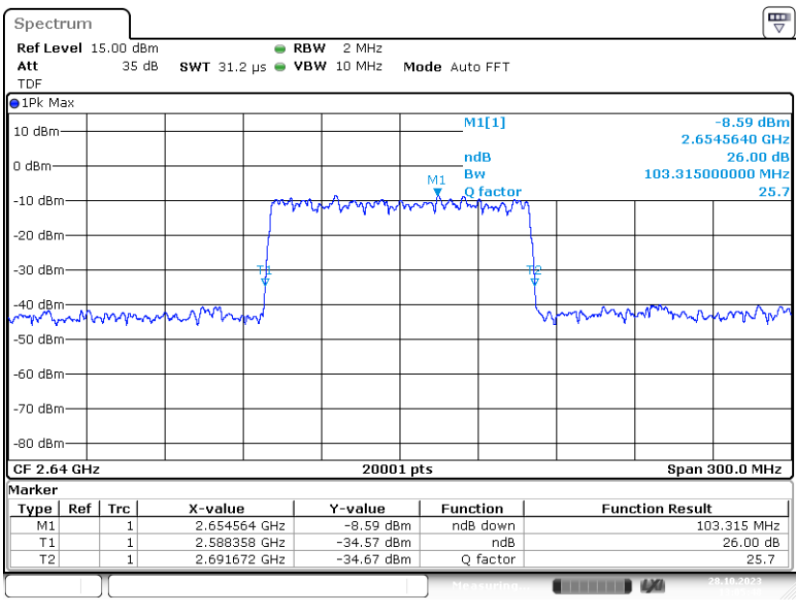
3.4 OCBw AWGN100 In-0.3 2.6400G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN100;
Output OCBw 0.3 dB < AGC



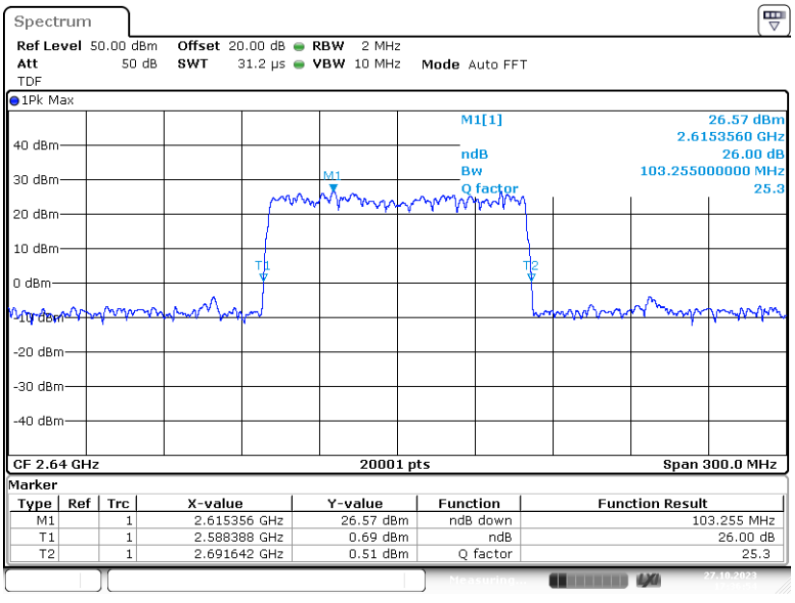
3.4 OCBw AWGN100-0.3 2.6400G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN100; Input OCBw 3 dB > AGC



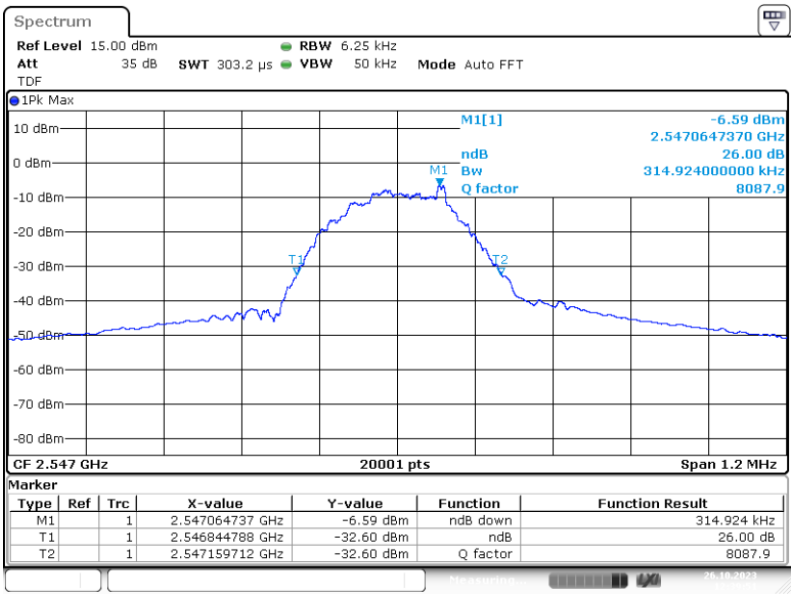
3.4 OCBw AWGN100 In+3 2.6400G _26dB

Band: BRS (UBS); ANT 2; Frequency: 2.6400 GHz; Band Edge: mid; Mod: AWGN100; Output OCBw 3 dB > AGC



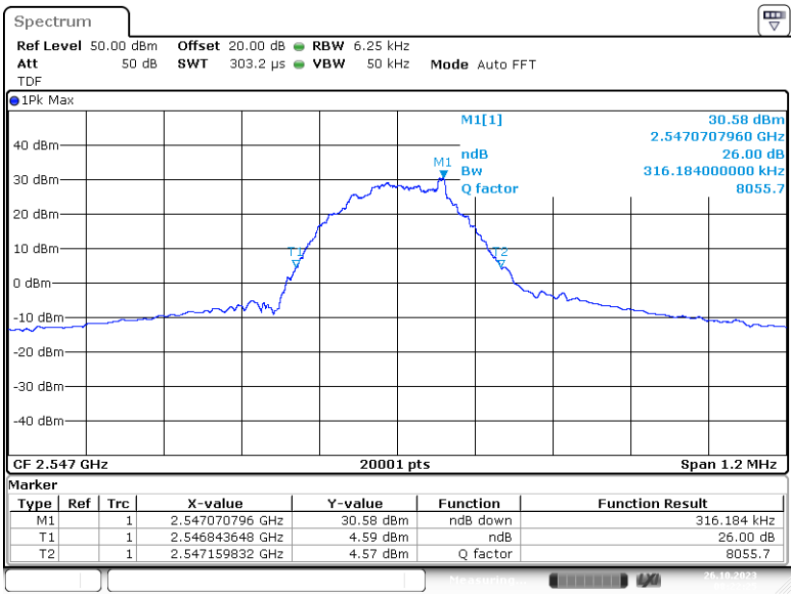
3.4 OCBw AWGN100+3 2.6400G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5470 GHz; Band Edge: mid; Mod: GSM;
Input OCBw 0.3 dB < AGC



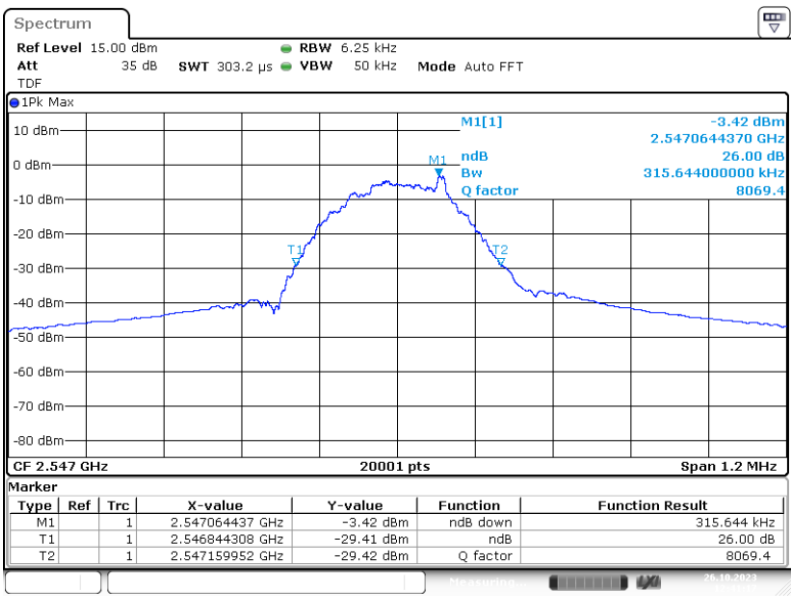
3.4 OCBw GSM In-0.3 2.5470G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5470 GHz; Band Edge: mid; Mod: GSM;
Output OCBw 0.3 dB < AGC



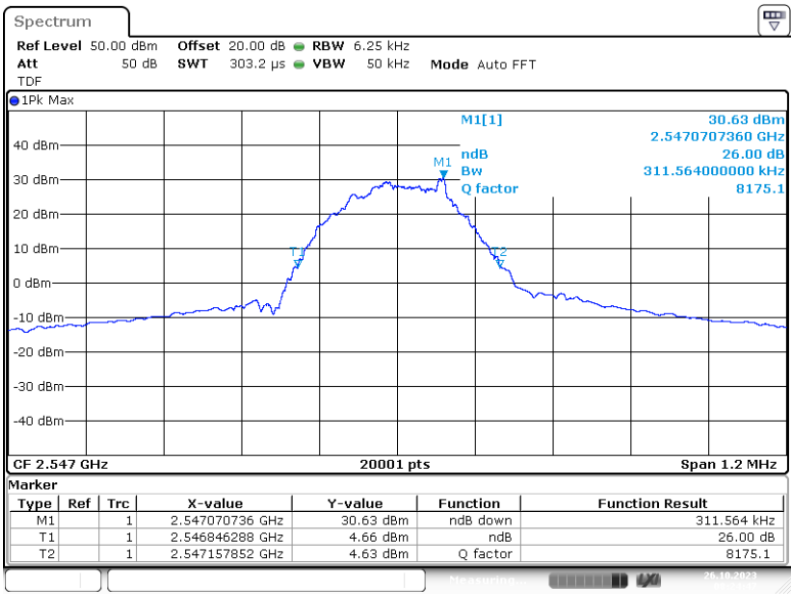
3.4 OCBw GSM Out -0.3 2.5470G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5470 GHz; Band Edge: mid; Mod: GSM;
Input OCBw 3 dB > AGC



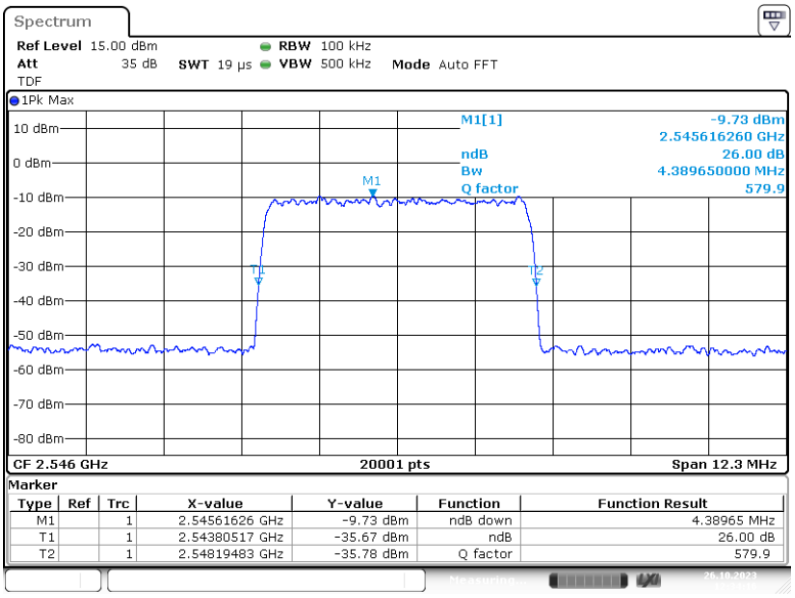
3.4 OCBw GSM In+3 2.5470G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5470 GHz; Band Edge: mid; Mod: GSM;
Output OCBw 3 dB > AGC



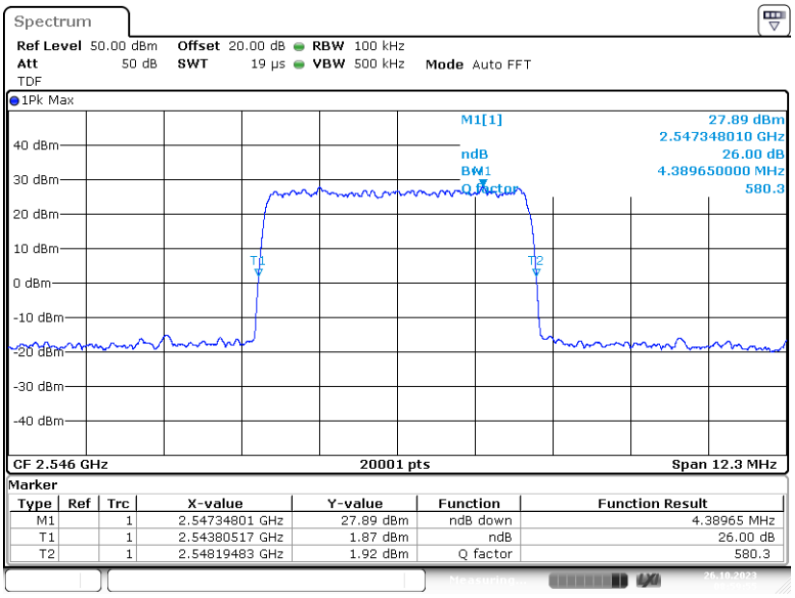
3.4 OCBw GSM Out +3 2.5470G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN;
Input OCBw 0.3 dB < AGC



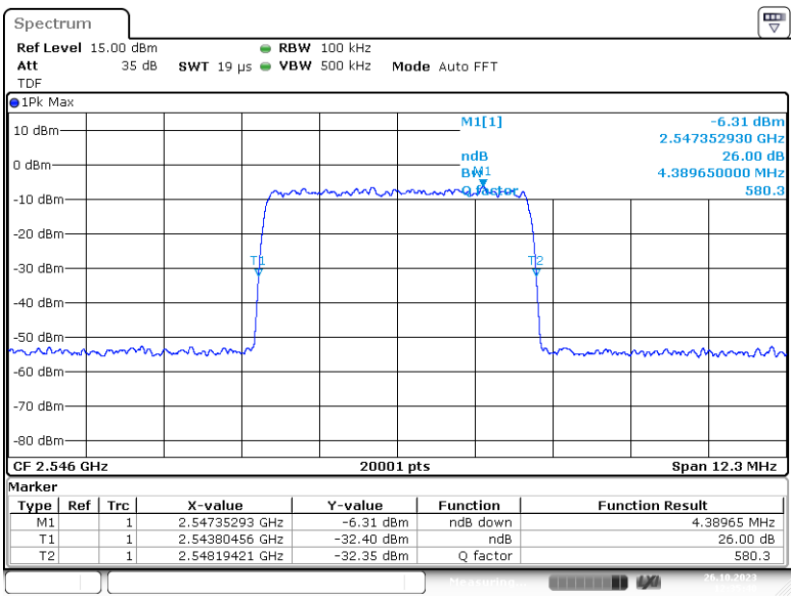
3.4 OCBw AWGN In-0.3 2.5460G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN;
Output OCBw 0.3 dB < AGC



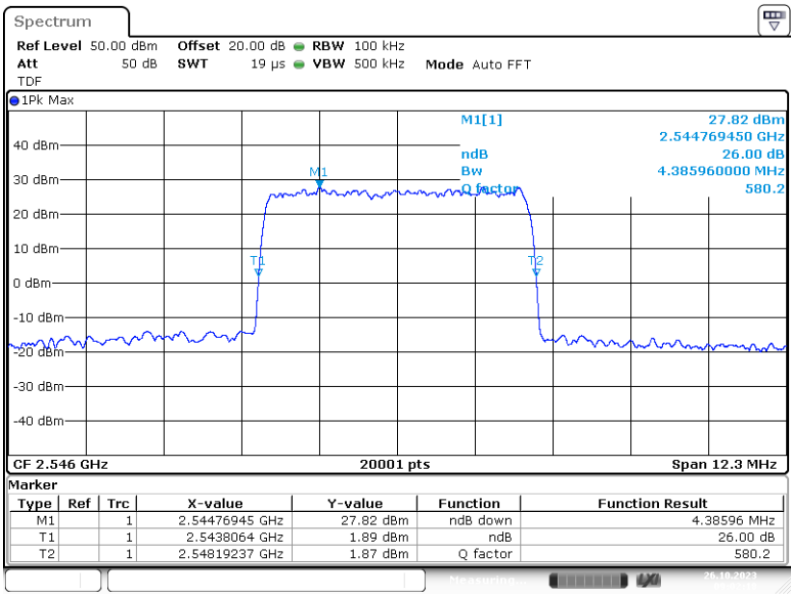
3.4 OCBw AWGN Out -0.3 2.5460G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN;
Input OCBw 3 dB > AGC



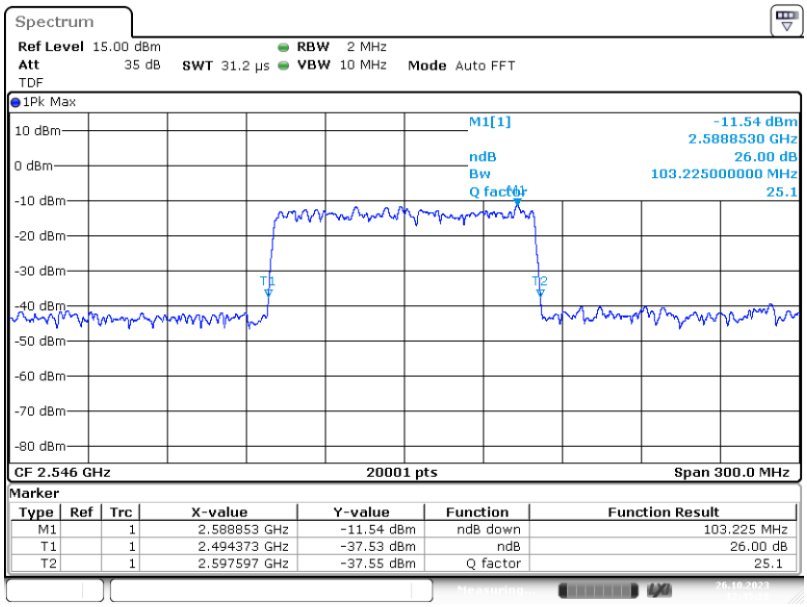
3.4 OCBw AWGN In+3 2.5460G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN;
Output OCBw 3 dB > AGC



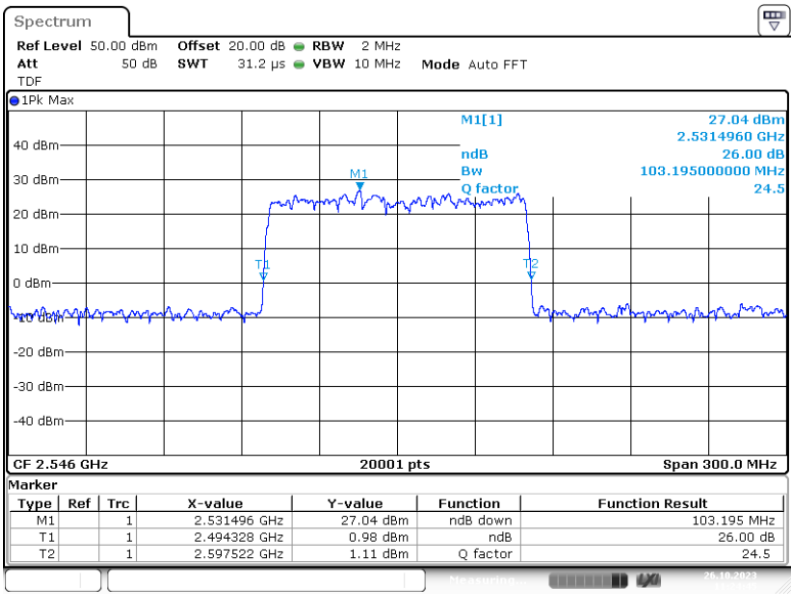
3.4 OCBw AWGN Out +3 2.5460G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN100; Input OCBw 0.3 dB < AGC



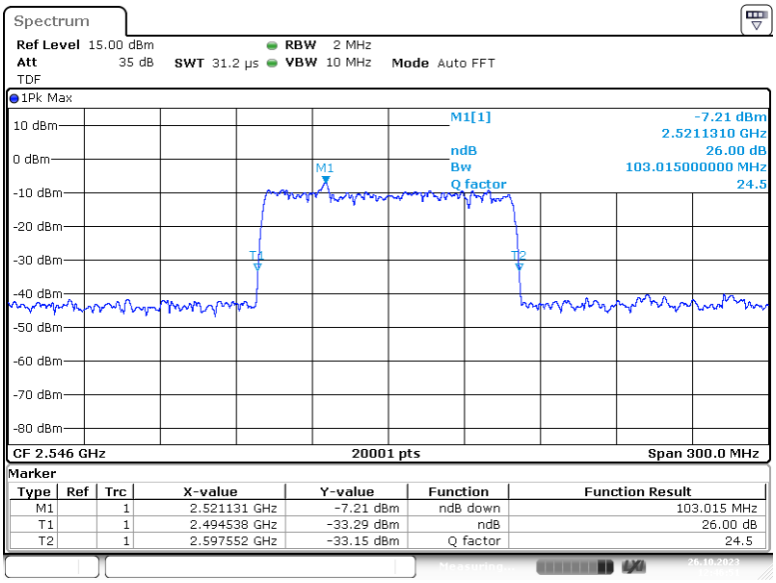
3.4 OCBw AWGN100 In-0.3 2.5460G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN100; Output OCBw 0.3 dB < AGC



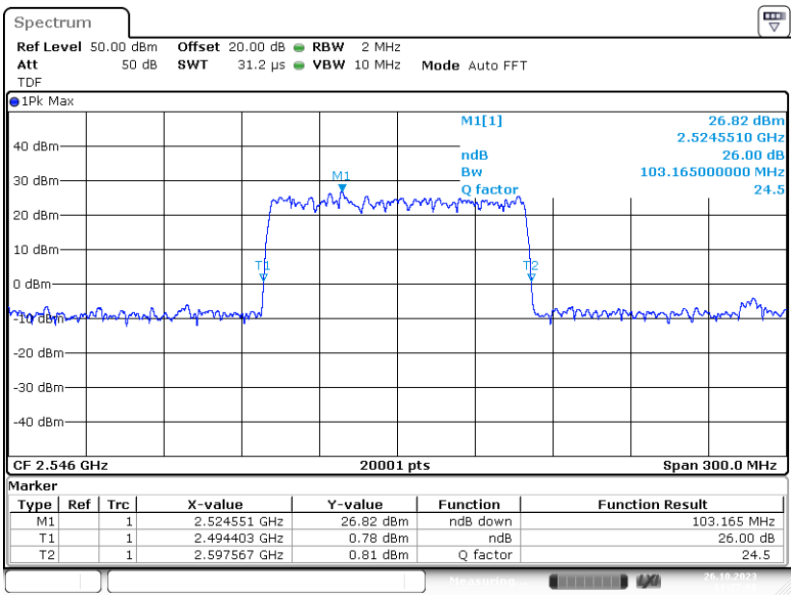
3.4 OCBw AWGN100-0.3 2.5460G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN100;
Input OCBw 3 dB > AGC



3.4 OCBw AWGN100 In+3 2.5460G _26dB

Band: BRS (LBS); ANT 2; Frequency: 2.5460 GHz; Band Edge: mid; Mod: AWGN100;
Output OCBw 3 dB > AGC



3.4 OCBw AWGN100+3 2.5460G _26dB

4.3.5 TEST EQUIPMENT USED

- Conducted