Test report 2022-0536-EMC-TR-22-0168-V02

Designation:	CAP M2 C-Band F-DC
Manufacturer:	Andrew
Serial No(s):	BGCMAA2221001
ID No.	7851671-1002 Rev: 00
Test Specification(s):	ANSI 63.26:2015 FCC Rules and Regulations as listed in 47 CFR, Part 20 and Part 27:2022-07-29
Test Plan:	"System_Info Blatt für CAP-M2 FCC" from customer.
Test Result:	**Passed**

Date of issue:	2022-08-31		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: 2022.08.31 15:31:22 +02'00'
Date of delivery:	2022-07-19		
Performance date:	2022-07-20 – 2022-08-10	Report Reviewer:	Florian Mosandl Lab Manager Digitally signed by Florian Mosandl DN: cn=Florian Mosandl, o=Bureau Veritas CPS Germany GmbH, ou=BV NU/TG, email=Florian.Mosandl@BureauVeritas.com, c=DE Date: 2022.09.01 07:42:50 +02'00'

DAkkS Deutsche Akkreditierungsstelle D-PL-12024-06-02

Bureau Veritas Consumer Products Services Germany GmbH
www.bureauveritas.de/cps
Tel.: +49 (0)40 – 740 41 – 0

Managing Director: Sebastian Doose / Stefan Kischka
VAT-No.: DE164793120
Reg.No.: Schwerin HRB 3564

Schwerin
Wilhelm-Hennemann-Str. 8, 19061 Schwerin
cps-schwerin@bureauveritas.com

Hamburg
Oehleckerring 40, 22419 Hamburg
cps-hamburg@bureauveritas.com

Tuerkheim
Businesspark A96, 86842 Tuerkheim
cps-tuerkheim@bureauveritas.com

Nuremberg
Thurn-und-Taxis-Str. 18, 90411 Nuremberg
cps-nuernberg@bureauveritas.com

	Commscope
Client:	Andrew Wireless System GmbH
	Industriering 10
	86675 Buchdorf Germany

Test 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

Versions management:

V01.00	Initial release
V02.00	Correction of: performance date on page 1, output power level of "Wideband 3 dB > AGC" on page 20 and re-calibration date from SMBV100A on page 126.

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, (07/29/2022 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

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

Effective Radiated Power, mean output power and zone enhancer gain
The measurement was performed according to ANSI C63.26, KDB 935210 D05 v01r04: 3.5

OP-Mode Frequency Band, Direction, Input Power, Signal Type	**Final Result**
C-Band, segment 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
C-Band, segment 1, RF downlink, 3 dB > AGC, Wideband	Passed
C-Band, segment 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
C-Band, segment 1, RF downlink, 3 dB > AGC, Narrowband	Passed
C-Band, segment 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
C-Band, segment 2, RF downlink, 3 dB > AGC, Wideband	Passed
C-Band, segment 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
C-Band, segment 2, RF downlink, 3 dB > AGC, Narrowband	Passed
C-Band, segment 3, RF downlink, 0.3 dB < AGC, Wideband	Passed
C-Band, segment 3, RF downlink, 3 dB > AGC, Wideband	Passed
C-Band, segment 3, RF downlink, 0.3 dB < AGC, Narrowband	Passed
C-Band, segment 3, RF downlink, 3 dB > AGC, Narrowband	Passed

47 CFR CHAPTER I FCC PART 27 Subpart C § 27.50
[Base Stations/Repeater]

Peak to Average Ratio
The measurement was performed according to ANSI C63.26

OP-Mode Frequency Band, Direction, Input Power, Signal Type	**Final Result**
C-Band, segment 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
C-Band, segment 1, RF downlink, 3 dB > AGC, Wideband	Passed
C-Band, segment 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
C-Band, segment 1, RF downlink, 3 dB > AGC, Narrowband	Passed
C-Band, segment 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
C-Band, segment 2, RF downlink, 3 dB > AGC, Wideband	Passed
C-Band, segment 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
C-Band, segment 2, RF downlink, 3 dB > AGC, Narrowband	Passed
C-Band, segment 3, RF downlink, 0.3 dB < AGC, Wideband	Passed
C-Band, segment 3, RF downlink, 3 dB > AGC, Wideband	Passed
C-Band, segment 3, RF downlink, 0.3 dB < AGC, Narrowband	Passed
C-Band, segment 3, RF downlink, 3 dB > AGC, Narrowband	Passed

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

Occupied Bandwidth/Input-versus-output Spectrum
The measurement was performed according to ANSI C63.26, KDB 935210 D05 v01r04: 3.4

Final Result

OP-Mode Frequency Band, Direction, Input Power, Signal Type	**Final Result**
C-Band, segment 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
C-Band, segment 1, RF downlink, 3 dB > AGC, Wideband	Passed
C-Band, segment 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
C-Band, segment 1, RF downlink, 3 dB > AGC, Narrowband	Passed
C-Band, segment 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
C-Band, segment 2, RF downlink, 3 dB > AGC, Wideband	Passed
C-Band, segment 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
C-Band, segment 2, RF downlink, 3 dB > AGC, Narrowband	Passed
C-Band, segment 3, RF downlink, 0.3 dB < AGC, Wideband	Passed
C-Band, segment 3, RF downlink, 3 dB > AGC, Wideband	Passed
C-Band, segment 3, RF downlink, 0.3 dB < AGC, Narrowband	Passed
C-Band, segment 3, RF downlink, 3 dB > AGC, Narrowband	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

OP-Mode Frequency Band, Direction, Signal Type	**Final Result**
C-Band, segment 1, RF downlink, Wideband	Passed
C-Band, segment 1, RF downlink, Narrowband	Passed
C-Band, segment 2, RF downlink, Wideband	Passed
C-Band, segment 2, RF downlink, Narrowband	Passed
C-Band, segment 3, RF downlink, Wideband	Passed
C-Band, segment 3, RF downlink, Narrowband	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 v01r04: 3.6

OP-Mode Band Edge, Frequency Band, Number of signals, Direction, Input Power, Signal Type	
Upper, C-Band segment 1, 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
Upper, C-Band segment 1, 1, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, C-Band segment 1, 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Upper, C-Band segment 1, 1, RF downlink, 3 dB > AGC, Narrowband	Passed
Lower, C-Band segment 1, 1, RF downlink, , 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 1, 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 1, 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Lower, C-Band segment 1, 1, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, C-Band segment 1, 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
Upper, C-Band segment 1, 2, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, C-Band segment 1, 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Upper, C-Band segment 1, 2, RF downlink, 3 dB > AGC, Narrowband	Passed
Lower, C-Band segment 1, 2, RF downlink, , 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 1, 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 1, 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Lower, C-Band segment 1, 2, RF downlink, 3 dB > AGC, Wideband	Passed

OP-Mode

Band Edge, Frequency Band, Number of signals, Direction, Input Power, Signal Type	
Upper, C-Band segment 2, 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
Upper, C-Band segment 2, 1, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, C-Band segment 2, 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Upper, C-Band segment 2, 1, RF downlink, 3 dB > AGC, Narrowband	Passed
Lower, C-Band segment 2, 1, RF downlink, , 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 2, 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 2, 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Lower, C-Band segment 2, 1, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, C-Band segment 2, 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
Upper, C-Band segment 2, 2, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, C-Band segment 2, 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Upper, C-Band segment 2, 2, RF downlink, 3 dB > AGC, Narrowband	Passed
Lower, C-Band segment 2, 2, RF downlink, , 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 2, 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 2, 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Lower, C-Band segment 2, 2, RF downlink, 3 dB > AGC, Wideband	Passed

OP-Mode

Band Edge, Frequency Band, Number of signals, Direction, Input Power, Signal Type	
Upper, C-Band segment 3, 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
Upper, C-Band segment 3, 1, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, C-Band segment 3, 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Upper, C-Band segment 3, 1, RF downlink, 3 dB > AGC, Narrowband	Passed
Lower, C-Band segment 3, 1, RF downlink, , 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 3, 1, RF downlink, 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 3, 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Lower, C-Band segment 3, 1, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, C-Band segment 3, 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
Upper, C-Band segment 3, 2, RF downlink, 3 dB > AGC, Wideband	Passed
Upper, C-Band segment 3, 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Upper, C-Band segment 3, 2, RF downlink, 3 dB > AGC, Narrowband	Passed
Lower, C-Band segment 3, 2, RF downlink, , 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 3, 2, RF downlink, 0.3 dB < AGC, Wideband	Passed
Lower, C-Band segment 3, 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed
Lower, C-Band segment 3, 2, RF downlink, 3 dB > AGC, Wideband	Passed

47 CFR CHAPTER I FCC PART 27 Subpart C [Base Stations/Repeater]	**KDB 935210 D05 v01r04: 3.3**
Out-of-band rejection	
The measurement was performed according to ANSI C63.26; KDB 935210 D05 v01r04: 3.3	**Final Result**
OP-Mode	
Frequency Band, Direction	
C-Band, segment 1, RF downlink	Passed
C-Band, segment 2, RF downlink	Passed
C-Band, segment 3, RF downlink	Passed

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	
Frequency Band, Test Frequency, Direction	
C-Band, segment 1, RF downlink	Passed
C-Band, segment 2, RF downlink	Passed
C-Band, segment 3, RF downlink	Passed

The test case frequency stability was not performed, since the EUT is not equipped with signal processing capabilities.

Report version control			
Version	**Release date**	**Change Description**	**Version validity**
Initial	2022-08-12	--	Invalid.
V2.00	2022-08-31	Correction of: performance date on page 1, output power level of “Wideband 3 dB > AGC” on page 20 and re-calibration date from SMBV100A on page 126.	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. Frank Futter

2.3 MANUFACTURER DATA

Company Name:	Please see applicant data.
Address:	

3 TEST OBJECT DATA

3.1 GENERAL EUT DESCRIPTION

Kind of Device product description	Cellular Repeater
Product name	Cellular Repeater
Type	CAP M2 C-Band F-DC
Declared EUT data by the supplier	
General Product Description	The EUT is an industrial signal booster supporting the following: C-Band (3700 MHz – 3980 MHz) with three segements: Segment 1: 3700 MHz - 3800 MHz Segment 2: 3790 MHz - 3890 MHz Segment 3: 3880 MHz – 3980 MHz A RF operation is only supported for the downlink.
Booster Type	Industrial Signal Booster
Voltage Type	DC
Voltage Level	48 V nominal
Maximum Output Donor Port [Uplink]	-
Maximum Output Server Port [Downlink]	All segments: 35 dBm
Maximum Gain [Uplink]	-
Maximum Gain [Downlink]	All segments: 40 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	BGCMAB2221001
HW Version	7851671-1002 Rev.: 00
SW Version	4.50.0.29
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	GE Power Electronics Inc., SP800, DC18598	Power supply rack
	Cherokee International, CAR1212FPBC-Z, DC17936	Power plug-in module
AUX2	Commscope, ION-E WCS-2, SZAEAJ1819	Module rack
	Commscope, ION-E OPT, SZBEAD2012A0115	Optical plug-in module
	Commscope, ION-E SUI, SZBEAC1724A0002	Interface card plug-in module
	Commscope, ERA REF HB, US4658020012	RF card plug-in module
	Commscope, REF HB, SZBEAQ2140A0014	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

OPERATING MODES

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

3.5.1 TEST CHANNELS

Segment of C-Band	Direction	Lower Frequency Band Edge [MHz]	Upper Frequency Band Edge [MHz]	Center Frequency [MHz]	Port
1	Downlink	3700.00	3800.00	3750.00	Donor
2	Downlink	3790.00	3890.00	3840.00	Donor
3	Downlink	3880.00	3980.00	3930.00	Donor

3.5.2 AUTOMATIC GAIN CONTROL LEVELS

AGC Levels

Segment of C-Band	Direction	Signal Type	AGC Start Pin [dBm]	AGC Start Pin -0.3 dB [dBm]	AGC Start Pin +3 dB [dBm]	Frequency [MHz]	Frequency
1	downlink	Narrowband	-3.40	-3.70	-0.40	3751.00	Mid (AWGN) Mid+1 (GSM), also see chapter 3.5.3
2	downlink	Narrowband	-3.20	-3.50	-0.20	3841.00	
3	downlink	Narrowband	-3.20	-3.50	-0.20	3931.00	
1	downlink	Wideband	-3.60	-3.90	-0.60	3750.00	
2	downlink	Wideband	-3.20	-3.50	-0.20	3840.00	
3	downlink	Wideband	-3.60	-3.90	-0.60	3930.00	
1	downlink	Narrowband	-4.00	-4.30	-1.00	3700.20	
2	downlink	Narrowband	-3.40	-3.70	-0.40	3790.20	
3	downlink	Narrowband	-3.80	-4.10	-0.80	3880.20	
1	downlink	Wideband	-4.40	-4.70	-1.40	3702.50	
2	downlink	Wideband	-4.80	-5.10	-1.80	3792.50	
3	downlink	Wideband	-4.40	-4.70	-1.40	3882.50	Low
1	downlink	Narrowband	-2.80	-3.10	0.20	3799.80	
2	downlink	Narrowband	-3.80	-4.10	-0.80	3889.80	
3	downlink	Narrowband	-4.20	-4.50	-1.20	3979.80	
1	downlink	Wideband	-4.20	-4.50	-1.20	3797.50	
2	downlink	Wideband	-4.80	-5.10	-1.80	3887.50	High
3	downlink	Wideband	-4.80	-5.10	-1.80	3977.50	
1	downlink	Narrowband	-4.00	-4.30	-1.00	3793.60	
2	downlink	Narrowband	-4.40	-4.70	-1.40	3793.40	
3	downlink	Narrowband	-5.00	-5.30	-2.00	3977.40	
1	downlink	Wideband	-4.40	-4.70	-1.40	3793.60	
2	downlink	Wideband	-4.80	-5.10	-1.80	3793.40	Max.Power
3	downlink	Wideband	-5.20	-5.50	-2.20	3977.40	

3.5.3 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.

3.6 PRODUCT LABELLING

3.6.1 FCC ID LABEL

Please refer to the documentation of the applicant.

3.6.2 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: 2022-07-19, 2022-07-21, 2022-08-01, 2022-08-08 to 2022-08-09

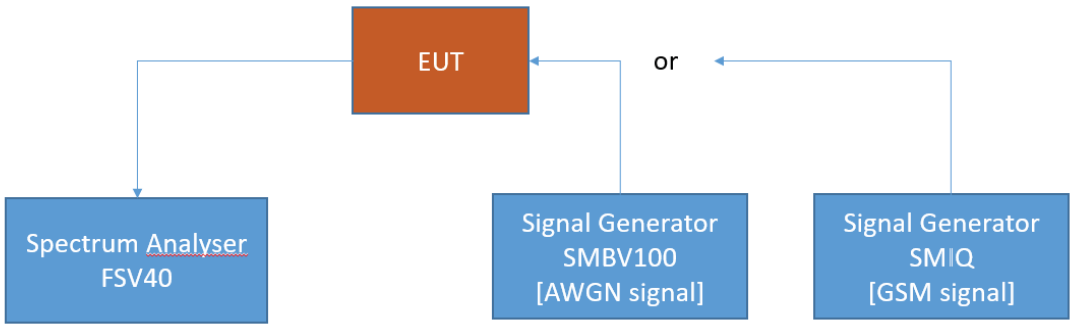
Environmental conditions: 23 ° C ± 5 K; 40 % r. F. ± 20 % r. F.

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

(j) The following power requirements apply to stations transmitting in the 3700-3980 MHz band:

(1) The power of each fixed or base station transmitting in the 3700-3980 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to an equivalent isotropically radiated power (EIRP) of 3280 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.

(2) The power of each fixed or base station transmitting in the 3700-3980 MHz band and situated in any geographic location other than that described in paragraph (j)(1) of this section is limited to an EIRP of 1640 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.

(3) Mobile and portable stations are limited to 1 Watt EIRP. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(4) Equipment employed must be authorized in accordance with the provisions of § 27.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (j)(5) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

(5) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, and any other relevant factors, so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

4.1.3 TEST PROTOCOL

C-Band, segment 1, 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]**
Wideband	0.3 dB < AGC	3793.60	-4.7	34.8	62.1	27.3	39.5
Wideband	3 dB > AGC	3793.60	-1.4	34.7	62.1	27.4	36.1
Narrowband	0.3 dB < AGC	3793.60	-4.3	34.7	62.1	27.4	39.0
Narrowband	3 dB > AGC	3793.60	-1.0	34.6	62.1	27.5	35.6

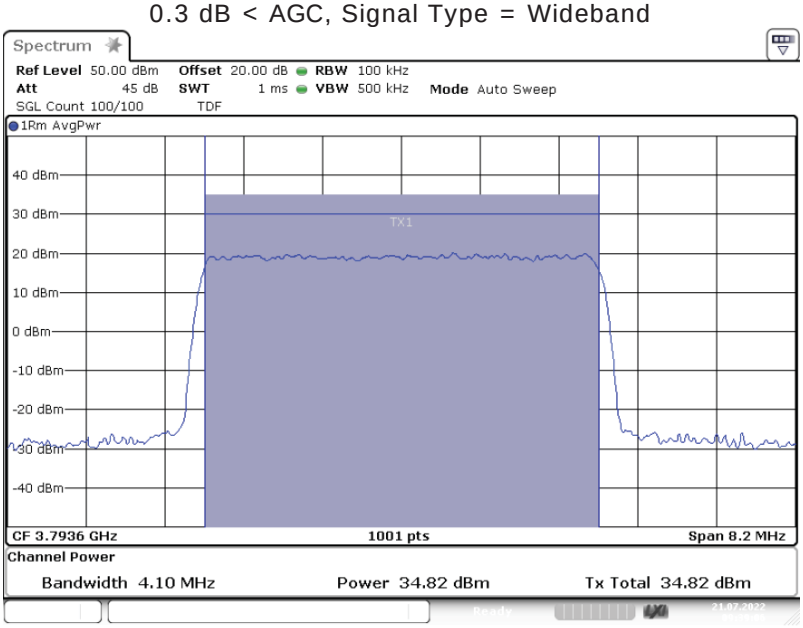
C-Band, segment 2, downlink							
Signal Type	**Input Power**	**Frequency [MHz]**	**Input Power [dBm]**	**Maximum Average Output Power [dBm]**	**Limit Average Output Power [dBm]**	**Margin to Limit [dB]**	**Gain [dB]**
Wideband	0.3 dB < AGC	3793.40	-5.1	34.8	62.1	27.3	39.9
Wideband	3 dB > AGC	3793.40	-1.8	34.8	62.1	27.3	36.6
Narrowband	0.3 dB < AGC	3793.40	-4.7	34.7	62.1	27.4	39.4
Narrowband	3 dB > AGC	3793.40	-1.4	35.4	62.1	26.7	36.8

C-Band, segment 3, 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]**
Wideband	0.3 dB < AGC	3977.40	-5.5	34.6	62.1	27.5	40.1
Wideband	3 dB > AGC	3977.40	-2.2	34.7	62.1	27.4	36.9
Narrowband	0.3 dB < AGC	3977.40	-5.3	34.6	62.1	27.5	39.9
Narrowband	3 dB > AGC	3977.40	-2.0	34.2	62.1	27.9	36.2

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

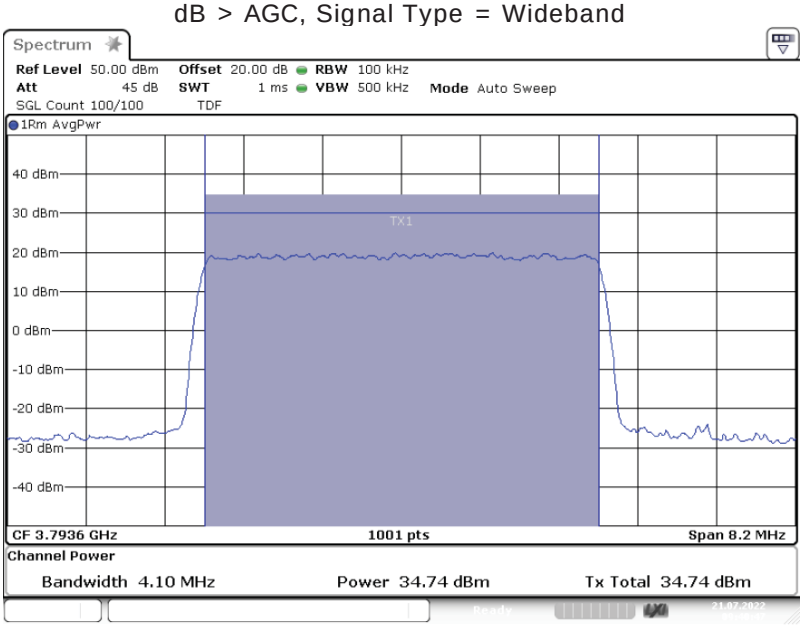
4.1.4 MEASUREMENT PLOT

Frequency Band = C-Band, Frequency f_0, Segment 1, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Wideband



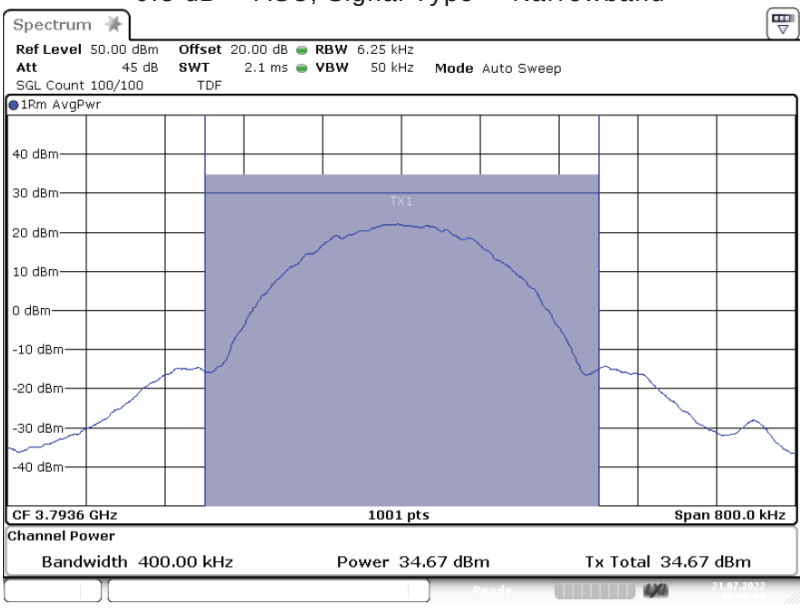
3.5.3 Power AWGN Out -0.3 3.79360G

Frequency Band = C-Band, Frequency f_0, Segment 1, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband



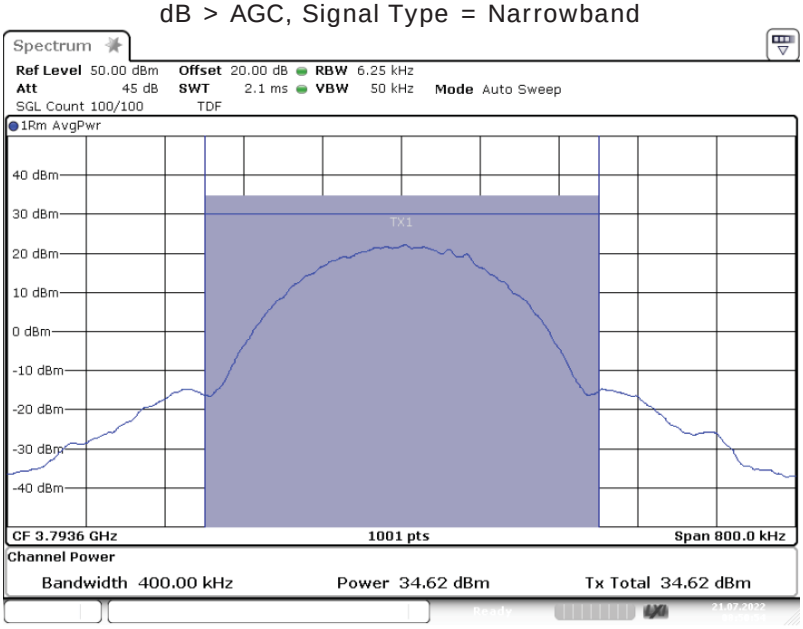
3.5.3 Power AWGN Out +3 3.79360G

Frequency Band = C-Band, Frequency f_0, Segment 1, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Narrowband



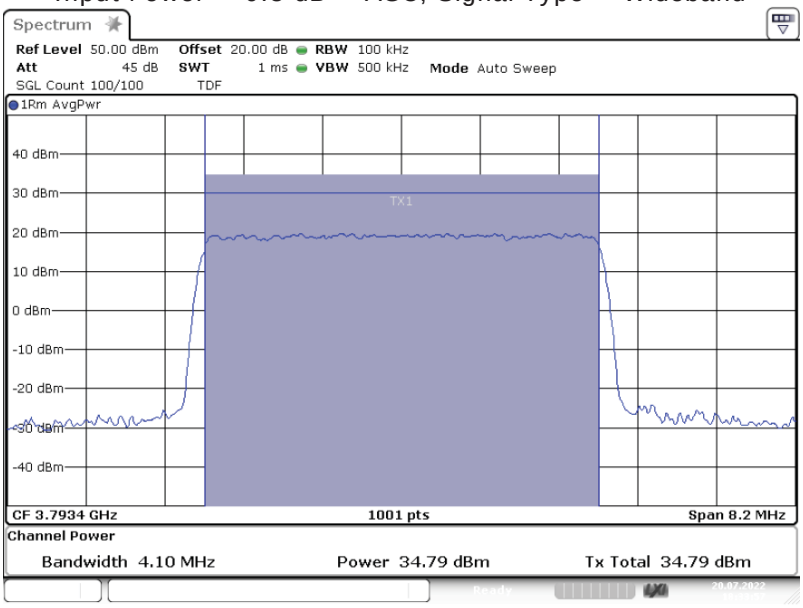
3.5.3 Power GSM Out -0.3 3.79360G

Frequency Band = C-Band, Frequency f_0, Segment 1, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband



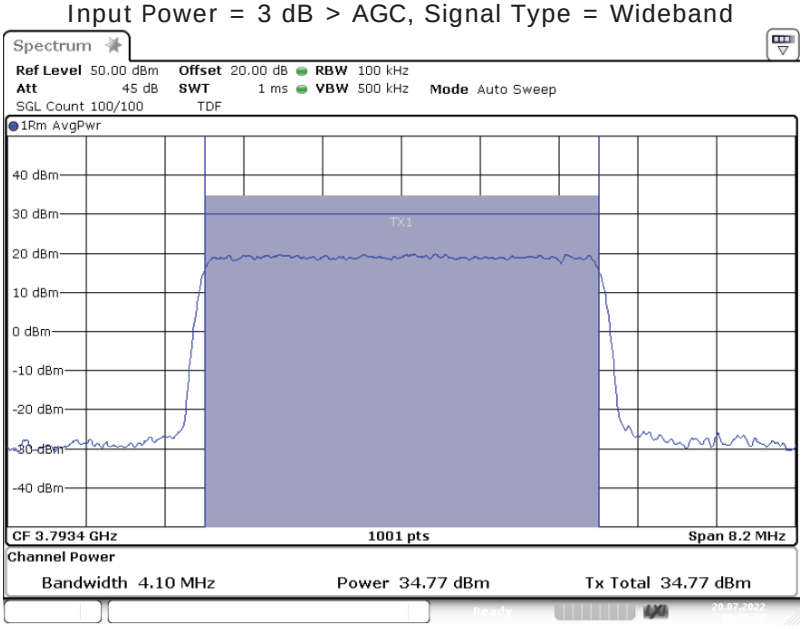
3.5.3 Power GSM Out +3 3.79360G

Frequency Band = C-Band, Frequency f_0, Segment 2, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Wideband



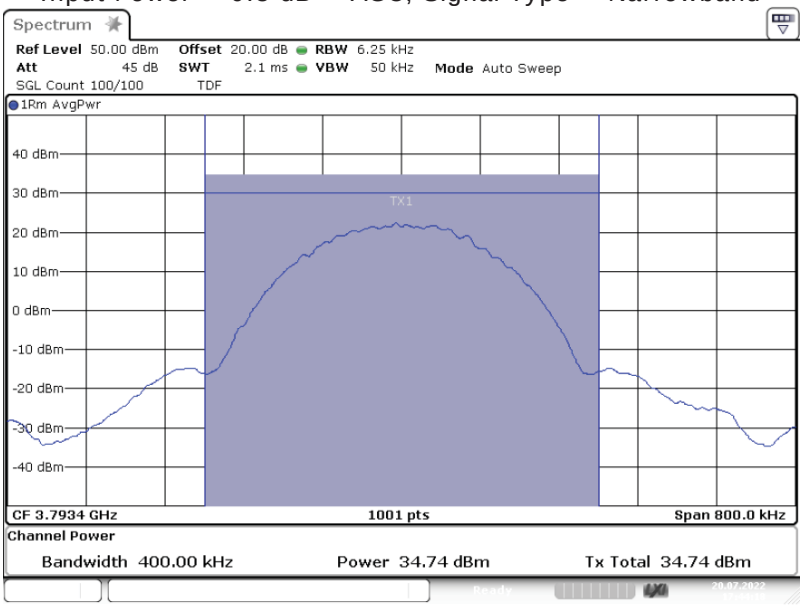
3.5.3 Power AWGN Out -0.3 3.79340G

Frequency Band = C-Band, Frequency f_0, Segment 2, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband



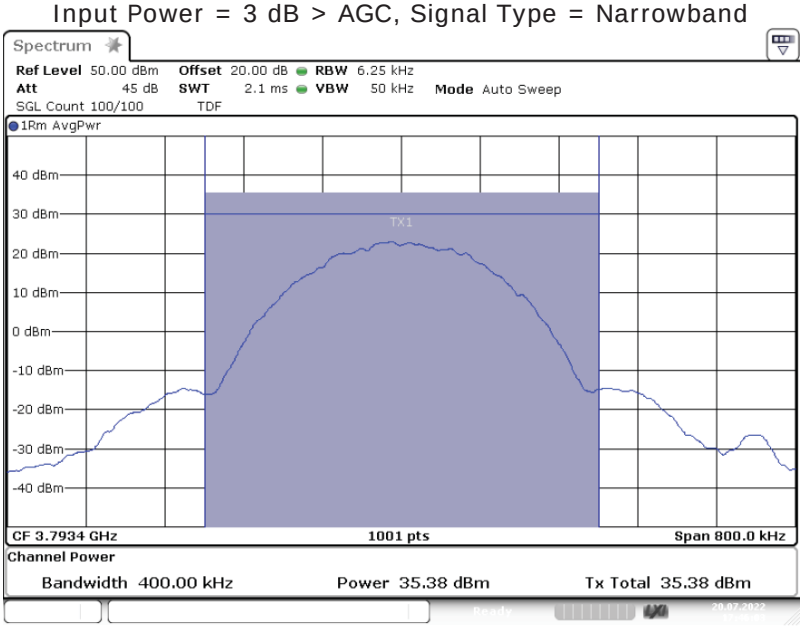
3.5.3 Power AWGN Out +3 3.79340G

Frequency Band = C-Band, Frequency f_0, Segment 2, Direction = RF downlink,
Input Power = 0.3 dB < AGC, Signal Type = Narrowband



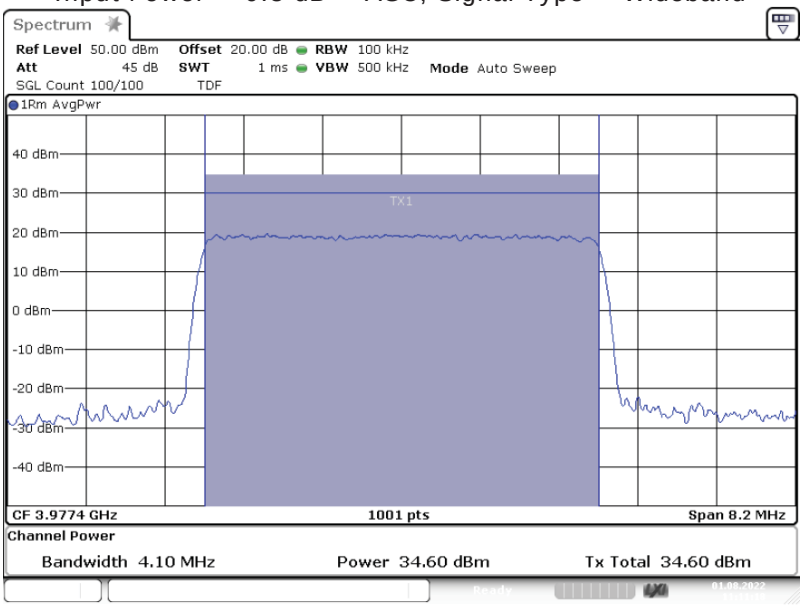
3.5.3 Power GSM Out -0.3 3.79340G

Frequency Band = C-Band, Frequency f_0, Segment 2, Direction = RF downlink,
Input Power = 3 dB > AGC, Signal Type = Narrowband



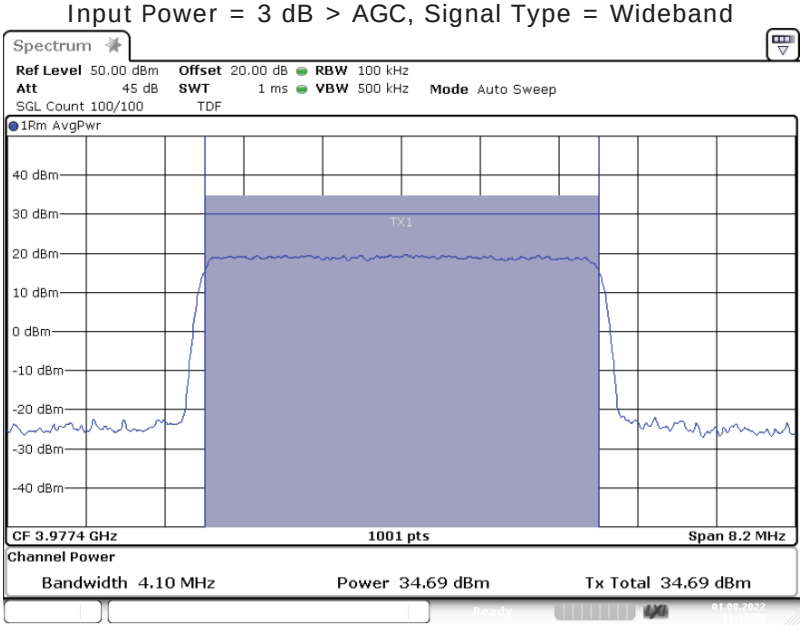
3.5.3 Power GSM Out +3 3.79340G

Frequency Band = C-Band, Frequency f_0, Segment 3, Direction = RF downlink,
Input Power = 0.3 dB < AGC, Signal Type = Wideband



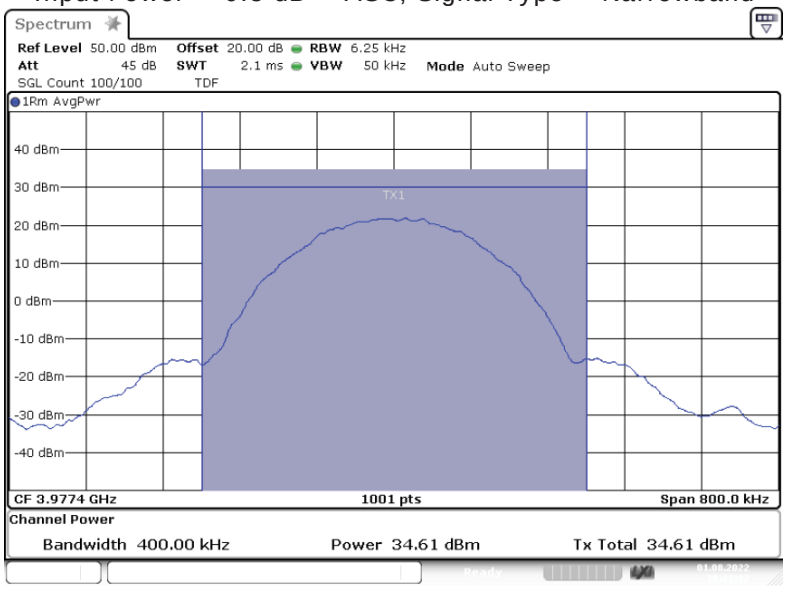
3.5.3 Power AWGN Out -0.3 3.97740G

Frequency Band = C-Band, Frequency f_0, Segment 3, Direction = RF downlink,
Input Power = 3 dB > AGC, Signal Type = Wideband



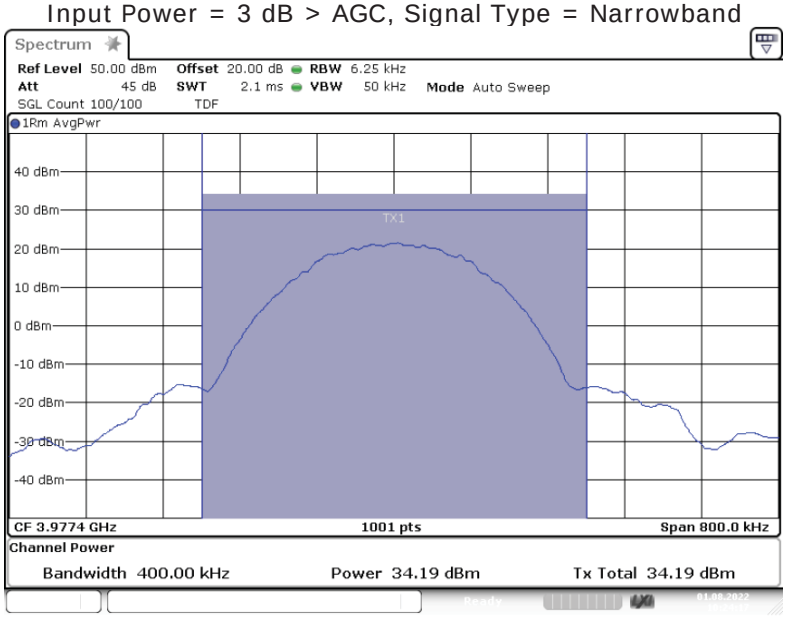
3.5.3 Power AWGN Out +3 3.97740G

Frequency Band = C-Band, Frequency f_0, Segment 3, Direction = RF downlink,
Input Power = 0.3 dB < AGC, Signal Type = Narrowband



3.5.3 Power GSM Out -0.3 3.97740G

Frequency Band = C-Band, Frequency f_0, Segment 3, Direction = RF downlink,
Input Power = 3 dB > AGC, Signal Type = Narrowband



3.5.3 Power GSM Out +3 3.97740G

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: 2022-07-19, 2022-07-21, 2022-08-01, 2022-08-08 to 2022-08-09

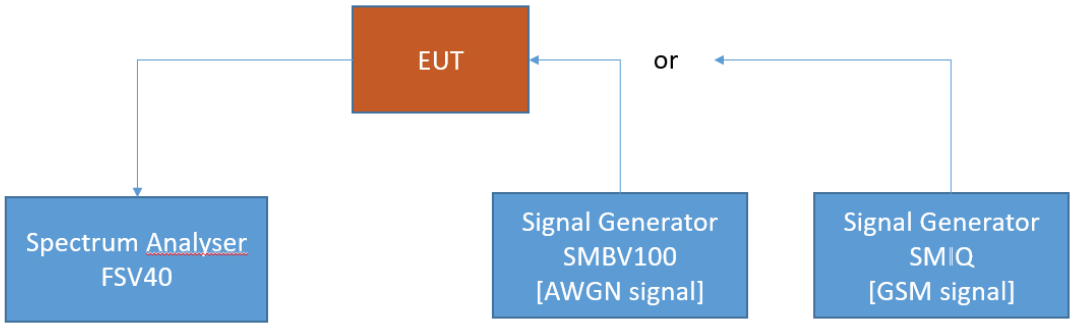
Environmental conditions: 23 ° C ± 5 K; 40 % r. F. ± 20 % r. F.

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

(j) The following power requirements apply to stations transmitting in the 3700-3980 MHz band:

(4) Equipment employed must be authorized in accordance with the provisions of § 27.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (j)(5) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.2.3 TEST PROTOCOL

C-Band, segment 1, downlink

Signal Type	Input Power	Frequency [MHz]	Input Power [dBm]	PAPR [dB]	Limit PAPR [dB]	Margin to Limit [dB]
Wideband	0.3 dB < AGC	3793.60	-4.7	8.5	13.0	4.5
Wideband	3 dB > AGC	3750.00	-0.6	8.4	13.0	4.6
Narrowband	0.3 dB < AGC	3793.60	-4.3	0.2	13.0	12.8
Narrowband	3 dB > AGC	3751.00	-0.4	0.2	13.0	12.8

C-Band, segment 2, downlink

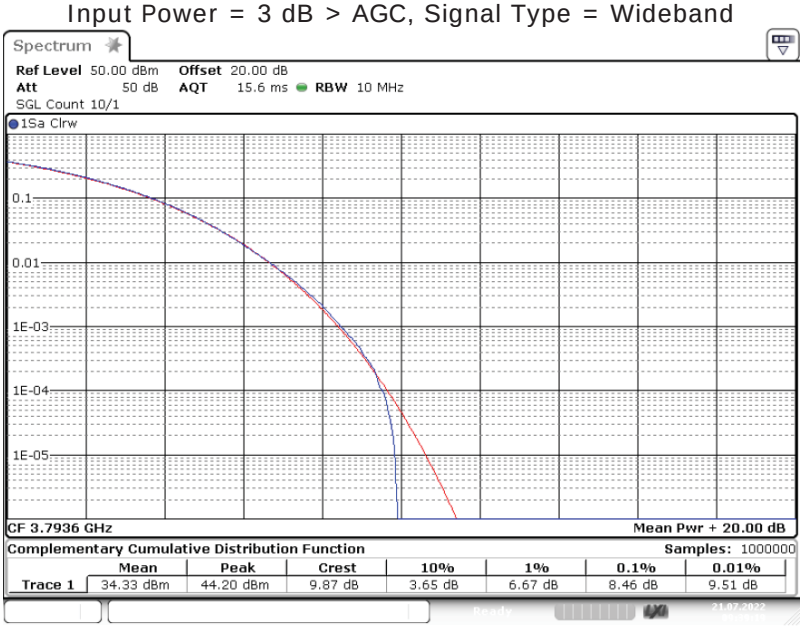
Signal Type	Input Power	Frequency [MHz]	Input Power [dBm]	PAPR [dB]	Limit PAPR [dB]	Margin to Limit [dB]
Wideband	0.3 dB < AGC	3793.40	-5.1	8.4	13.0	4.6
Wideband	3 dB > AGC	3793.40	-1.8	8.4	13.0	4.6
Narrowband	0.3 dB < AGC	3793.40	-4.7	0.2	13.0	12.8
Narrowband	3 dB > AGC	3793.40	-1.4	0.2	13.0	12.8

C-Band, segment 3, downlink						
Signal Type	**Input Power**	**Frequency [MHz]**	**Input Power [dBm]**	**PAPR [dB]**	**Limit PAPR [dB]**	**Margin to Limit [dB]**
Wideband	0.3 dB < AGC	3930.00	-3.9	8.5	13.0	4.5
Wideband	3 dB > AGC	3930.00	-0.6	8.5	13.0	4.5
Narrowband	0.3 dB < AGC	3931.00	-3.5	0.2	13.0	12.8
Narrowband	3 dB > AGC	3931.00	-0.2	0.2	13.0	12.8

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

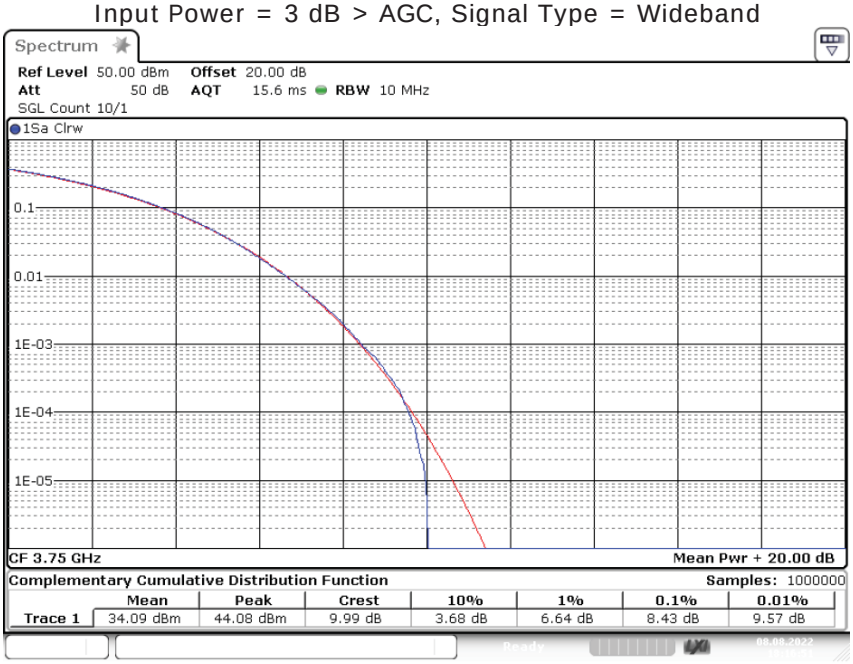
4.2.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

Frequency Band = C-Band, Segment 1, Frequency f_0, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband



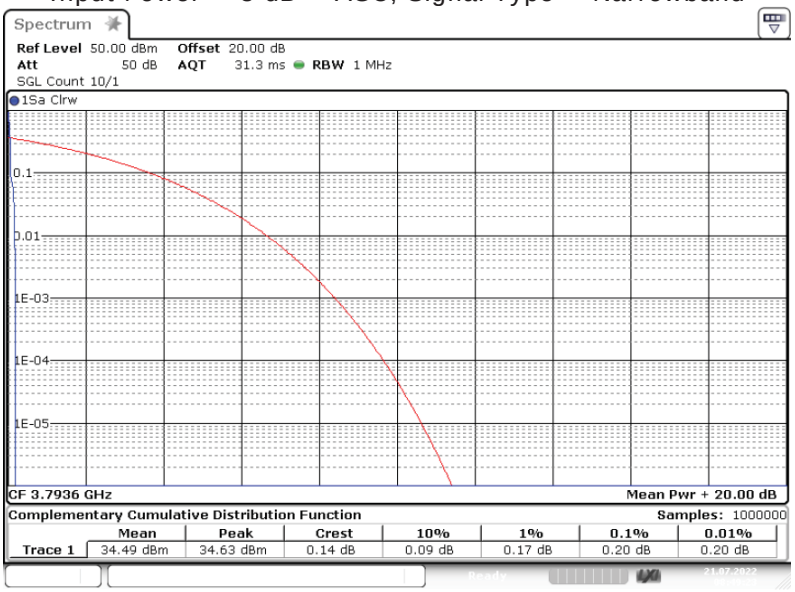
4.0 PAPR AWGN Out -0.3 3.794G

Frequency Band = C-Band, Segment 1, Frequency f_{mid}, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband



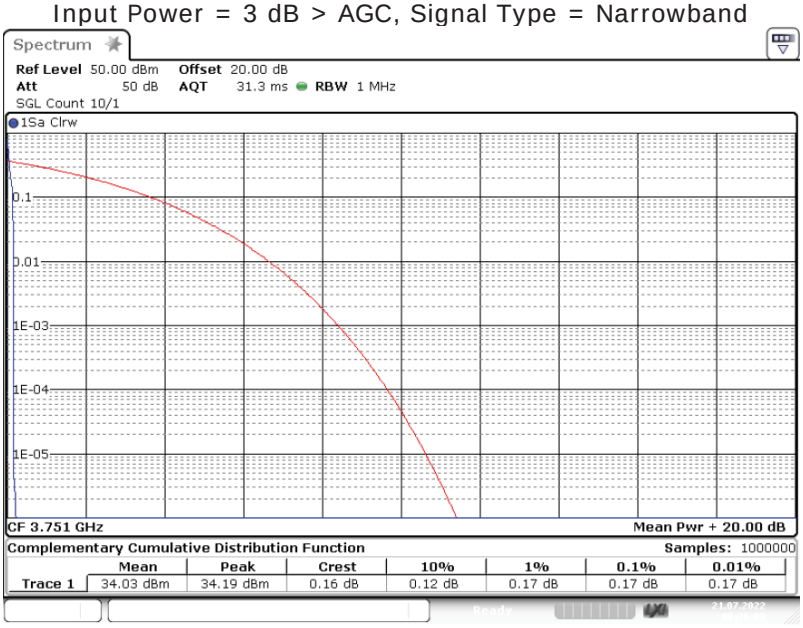
4.0 PAPR AWGN Out +3 3.750G

Frequency Band = C-Band, Segment 1, Frequency f_0, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband



4.0 PAPR GSM Out -0.3 3.794G

Frequency Band = C-Band, Segment 1, Frequency f_{mid+1}, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband

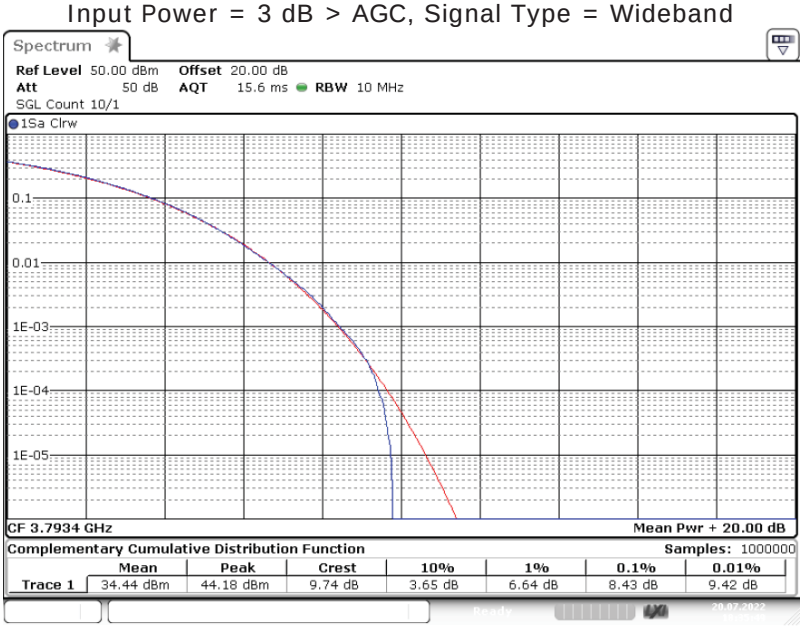


4.0 PAPR GSM Out +3 3.751G

Frequency Band = C-Band, Segment 2, Frequency f_0, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband

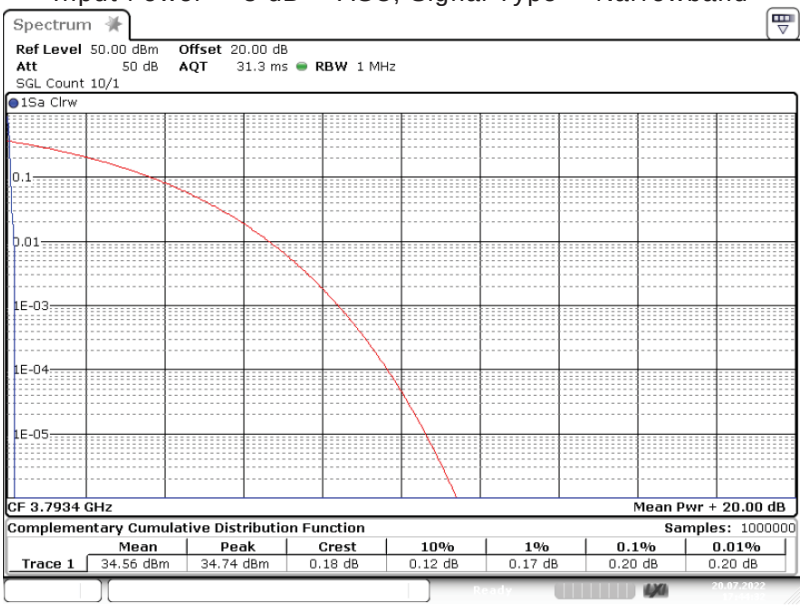
4.0 PAPR AWGN Out -0.3 3.793G

Frequency Band = C-Band, Segment 2, Frequency f_0, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband



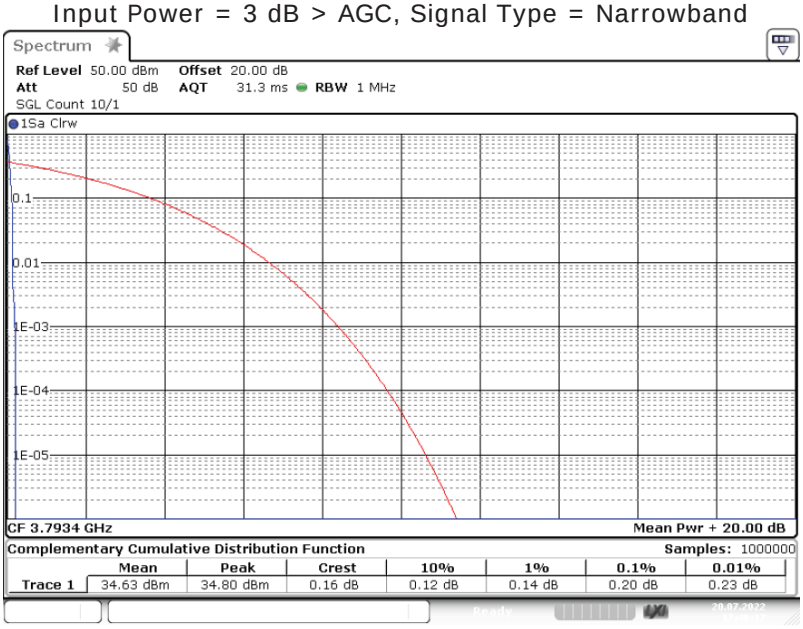
4.0 PAPR AWGN Out +3 3.793G

Frequency Band = C-Band, Segment 2, Frequency f_0, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband



4.0 PAPR GSM Out -0.3 3.793G

Frequency Band = C-Band, Segment 2, Frequency f_0, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband

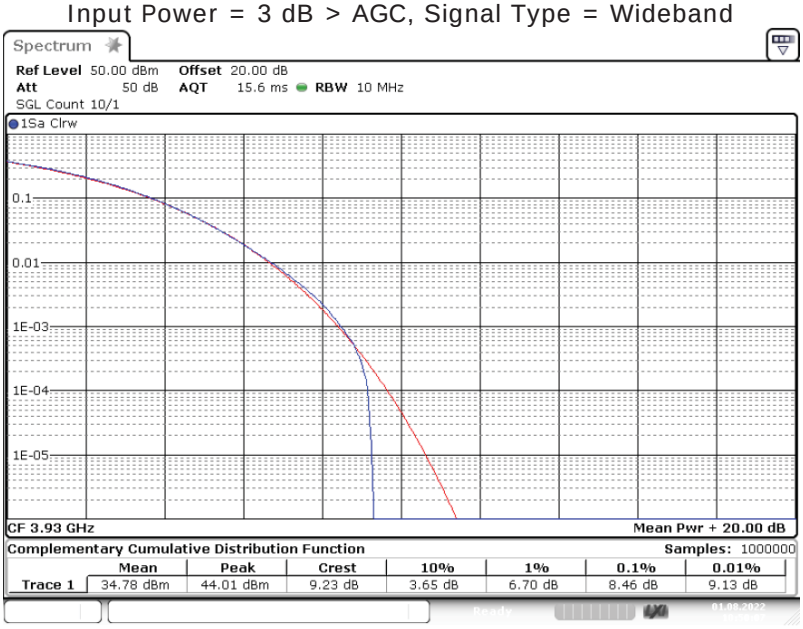


4.0 PAPR GSM Out +3 3.793G

Frequency Band = C-Band, Segment 3, Frequency f_{mid}, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband

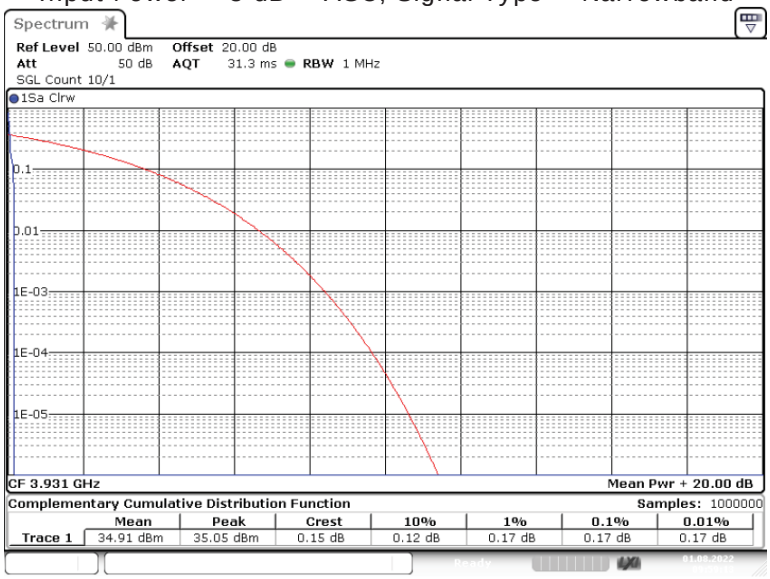
4.0 PAPR AWGN Out -0.3 3.930G

Frequency Band = C-Band, Segment 3, Frequency f_{mid}, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband



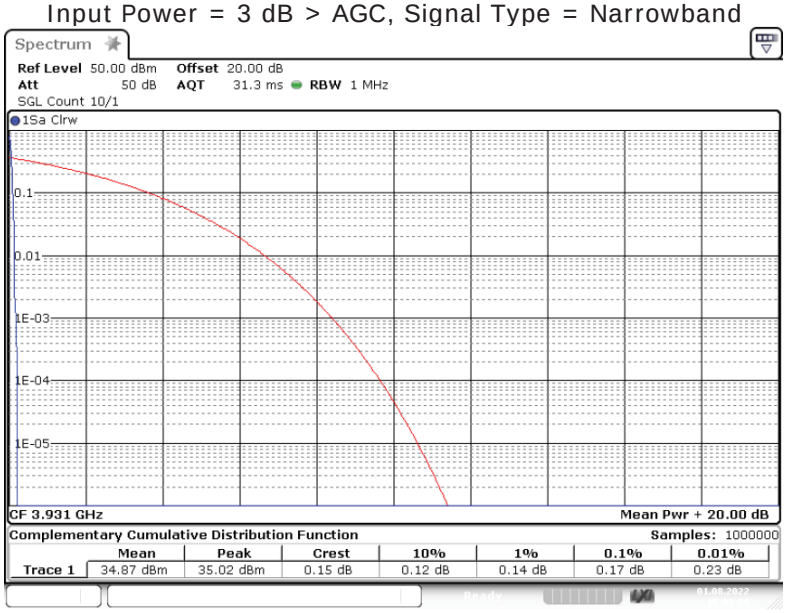
4.0 PAPR AWGN Out +3 3.930G

Frequency Band = C-Band, Segment 3, Frequency $f_{mid+1,}$ Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband



4.0 PAPR GSM Out -0.3 3.931G

Frequency Band = C-Band, Segment 3, Frequency $f_{mid+1,}$ Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband



4.0 PAPR GSM Out +3 3.931G

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: 2022-07-19, 2022-07-21, 2022-08-01, 2022-08-08 to 2022-08-10

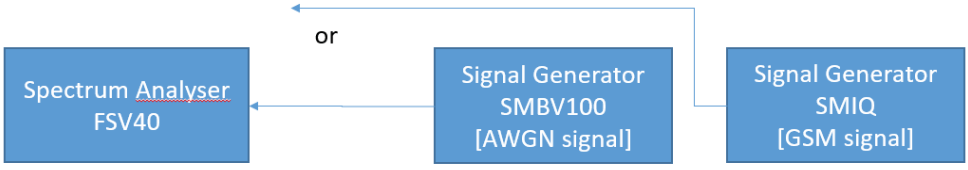
Environmental conditions: 23 ° C ± 5 K; 40 % r. F. ± 20 % r. F.

Test engineer: Thomas Hufnagel

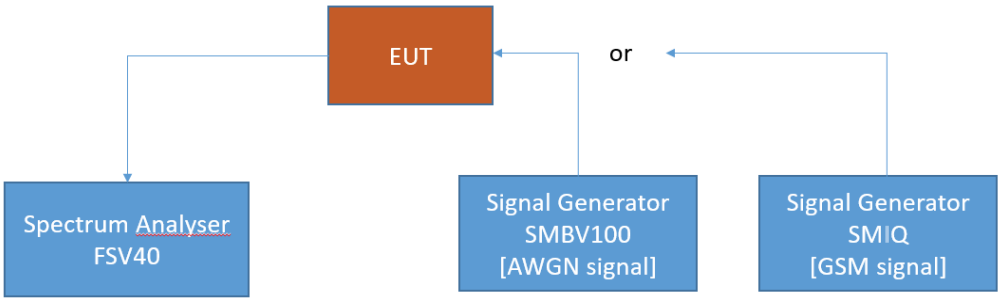
4.3.1 TEST DESCRIPTION

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

C-Band, segment 1, 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]**
Wideband	0.3 dB < AGC	3750.00	4387.0	4388.2	1.2	205.0	203.8
Wideband	3 dB > AGC	3750.00	4385.7	4389.4	3.7	205.0	201.3
Narrowband	0.3 dB < AGC	3751.00	324.7	316.8	7.9	10.0	2.1
Narrowband	3 dB > AGC	3751.00	319.5	318.3	1.2	10.0	8.8

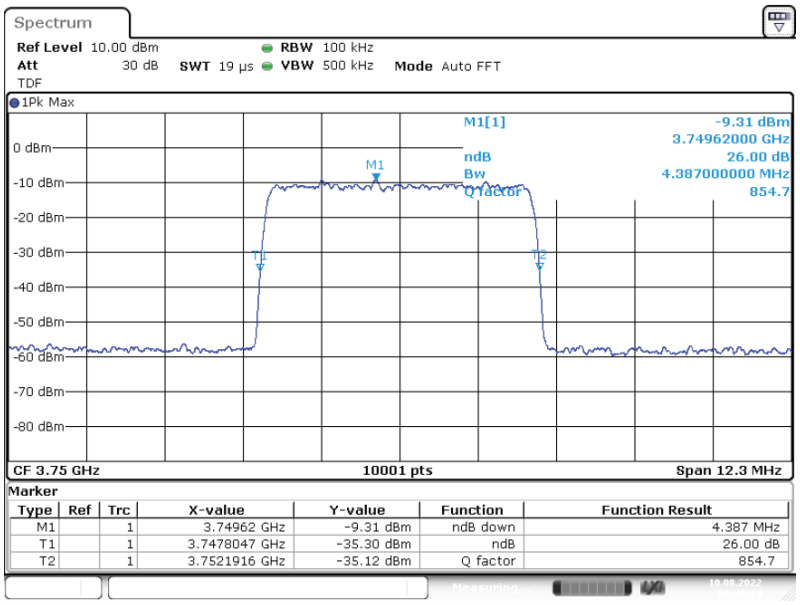
C-Band, segment 2, downlink							
Signal Type	**Input Power**	**Signal Frequency [MHz]**	**Occupied Bandwidth SG [kHz]**	**Occupied Bandwidth Booster [kHz]**	**Delta Occupied Bandwidth [kHz]**	**Limit Delta Occupied Bandwidth [kHz]**	**Margin to Limit [kHz]**
Wideband	0.3 dB < AGC	3840.00	4390.7	4387.0	3.7	205.0	201.3
Wideband	3 dB > AGC	3840.00	4389.4	4391.9	2.5	205.0	202.5
Narrowband	0.3 dB < AGC	3841.00	318.8	319.3	0.5	10.0	9.5
Narrowband	3 dB > AGC	3841.00	316.7	317.4	0.7	10.0	9.3

C-Band, segment 3, 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]**
Wideband	0.3 dB < AGC	3930.00	4387.0	4389.4	2.4	205.0	202.6
Wideband	3 dB > AGC	3930.00	4387.0	4389.4	2.4	205.0	202.6
Narrowband	0.3 dB < AGC	3931.00	317.7	318.0	0.3	10.0	9.7
Narrowband	3 dB > AGC	3931.00	319.3	316.7	2.6	10.0	7.4

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

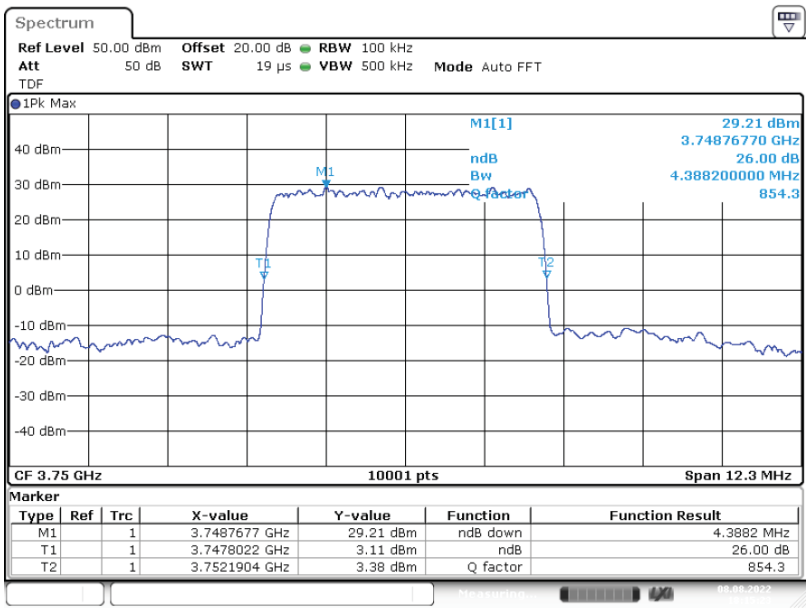
4.3.4 MEASUREMENT PLOT

Frequency Band = C-Band, Segment 1, Direction = RF downlink,
Input Power = 0.3 dB < AGC, Signal Type = Wideband



3.4 OCBw AWGN In -0.3 3.7500G _26dB

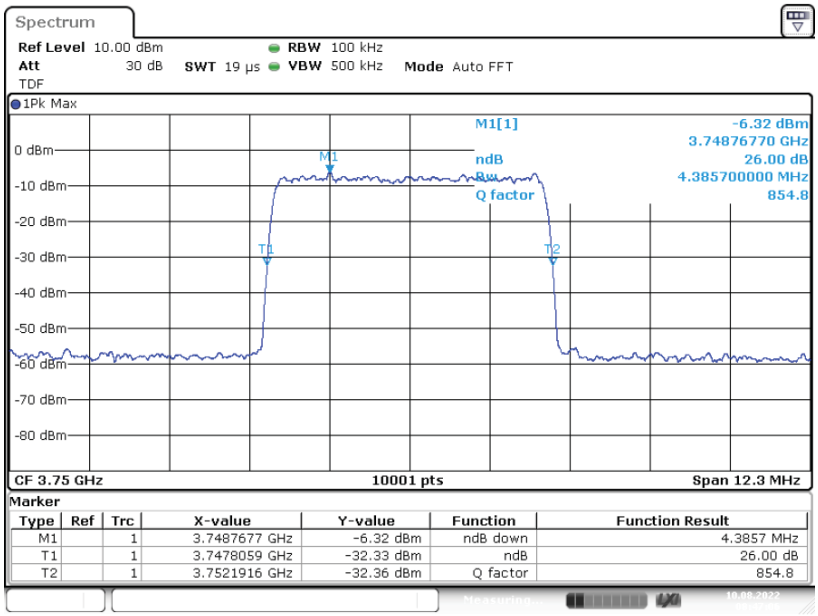
Input Signal



3.4 OCBw AWGN Out -0.3 3.7500G _26dB

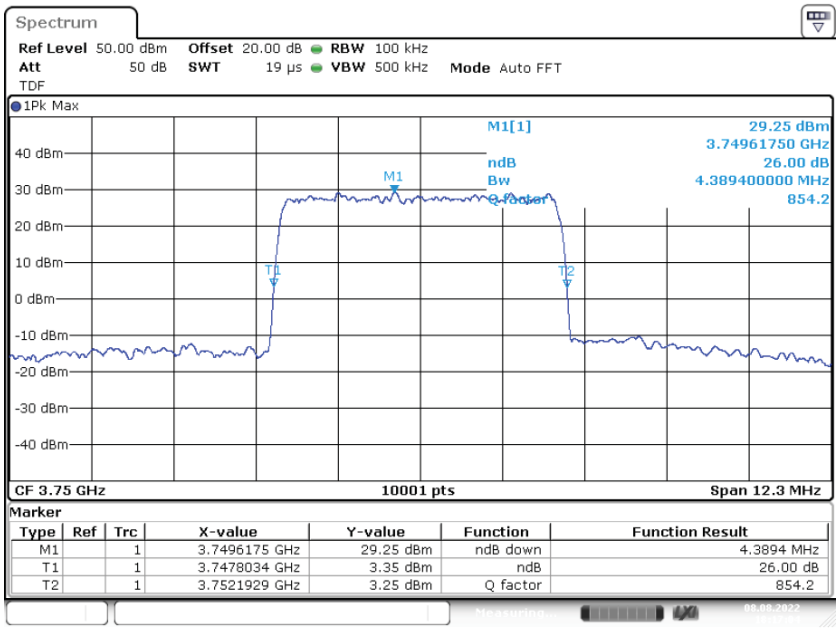
Output Signal

Frequency Band = C-Band, Segment 1, Direction = RF downlink,
Input Power = 3 dB > AGC, Signal Type = Wideband



3.4 OCBw AWGN In +3 3.7500G _26dB

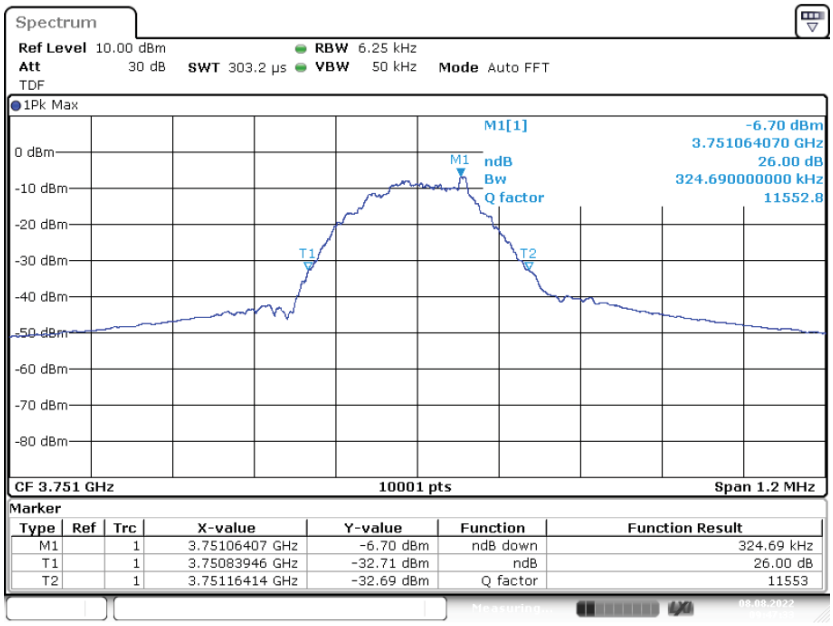
Input Signal



3.4 OCBw AWGN Out +3 3.7500G _26dB

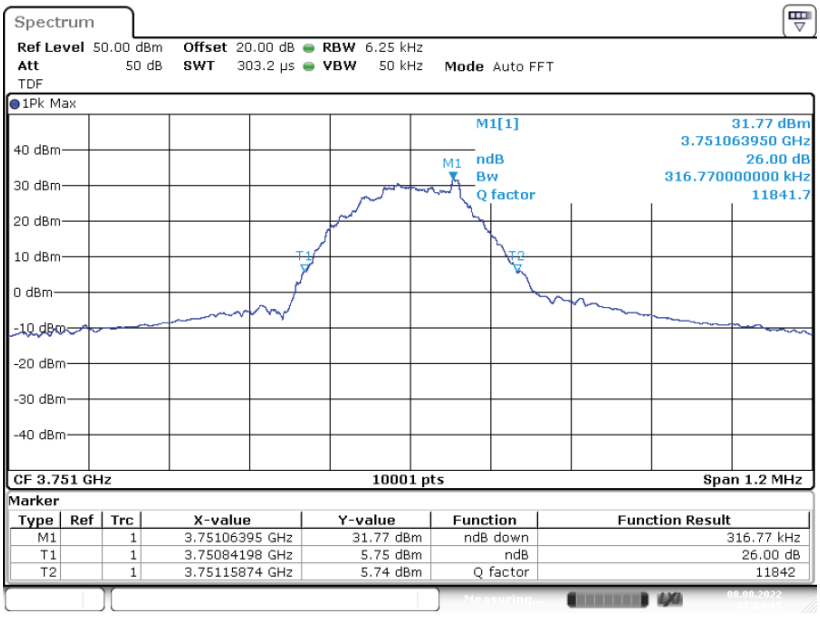
Output Signal

Frequency Band = C-Band, Segment 1, Direction = RF downlink,
Input Power = 0.3 dB < AGC, Signal Type = Narrowband



3.4 OCBw GSM In -0.3 3.7510G _26dB

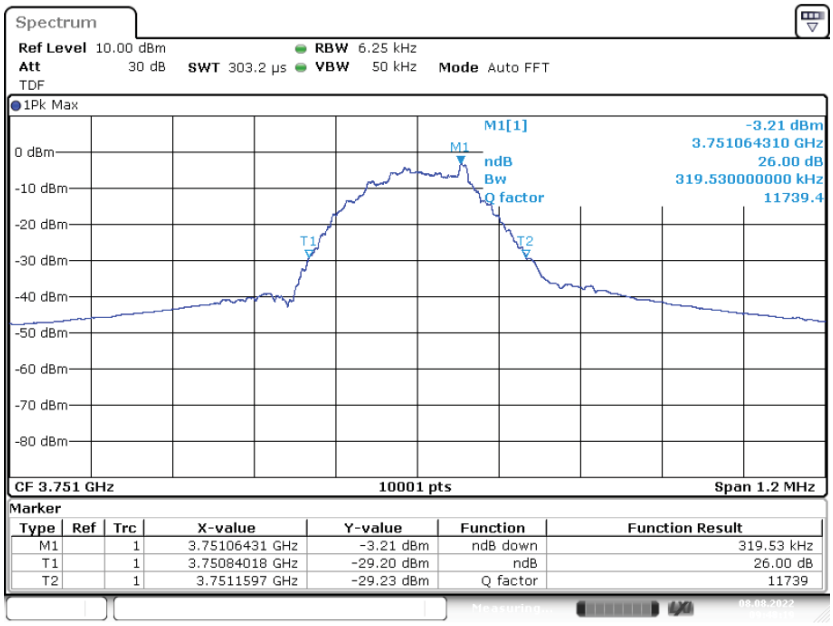
Input Signal



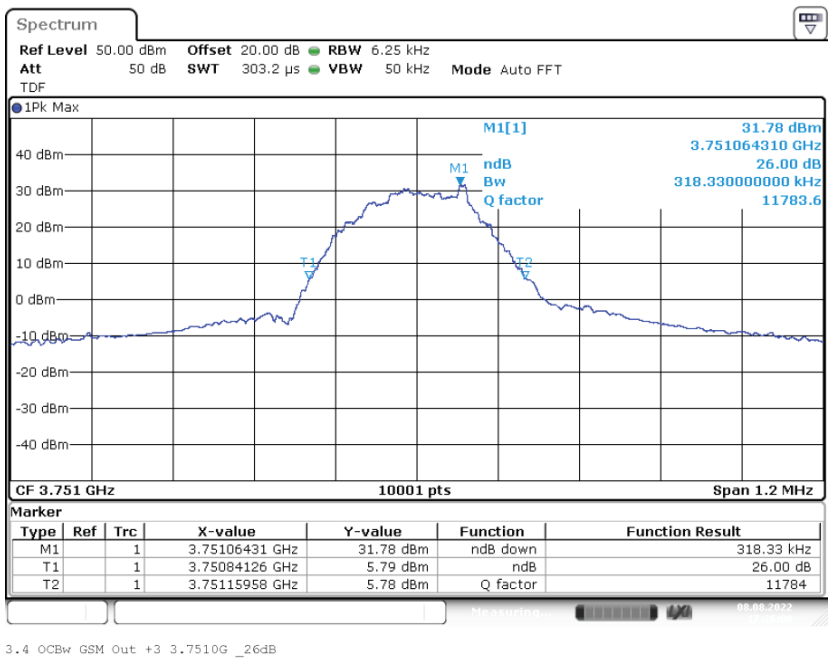
3.4 OCBw GSM Out -0.3 3.7510G _26dB

Output Signal

Frequency Band = C-Band, Segment 1, Direction = RF downlink,
Input Power = 3 dB > AGC, Signal Type = Narrowband

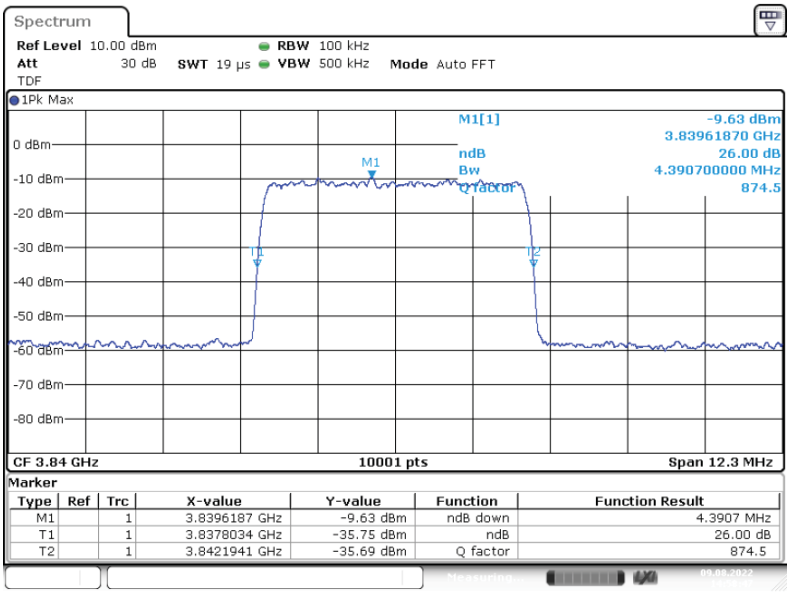


Input Signal

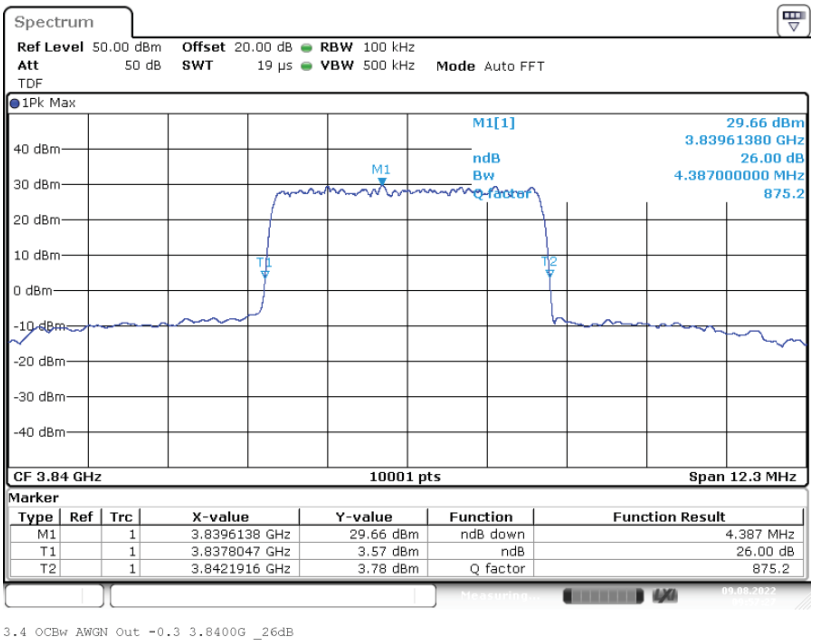


Output Signal

Frequency Band = C-Band, Segment 2, Direction = RF downlink,
Input Power = 0.3 dB < AGC, Signal Type = Wideband

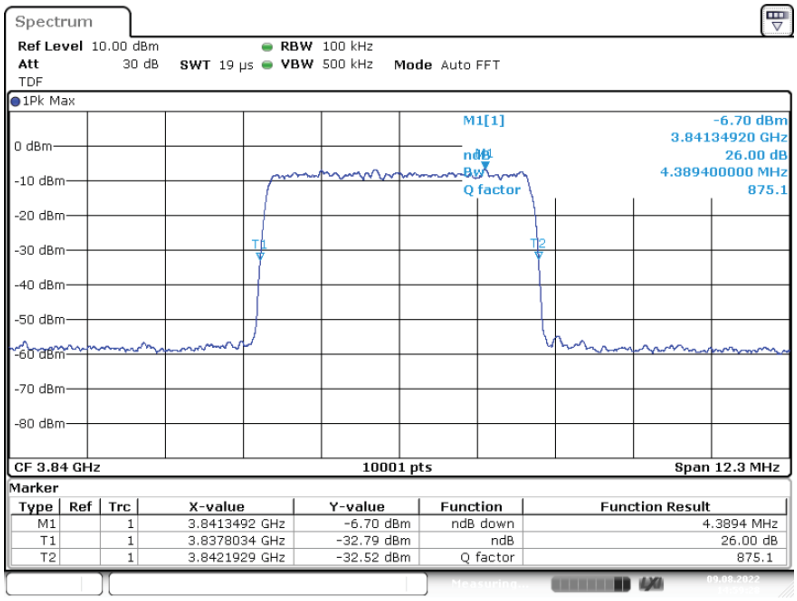


Input Signal

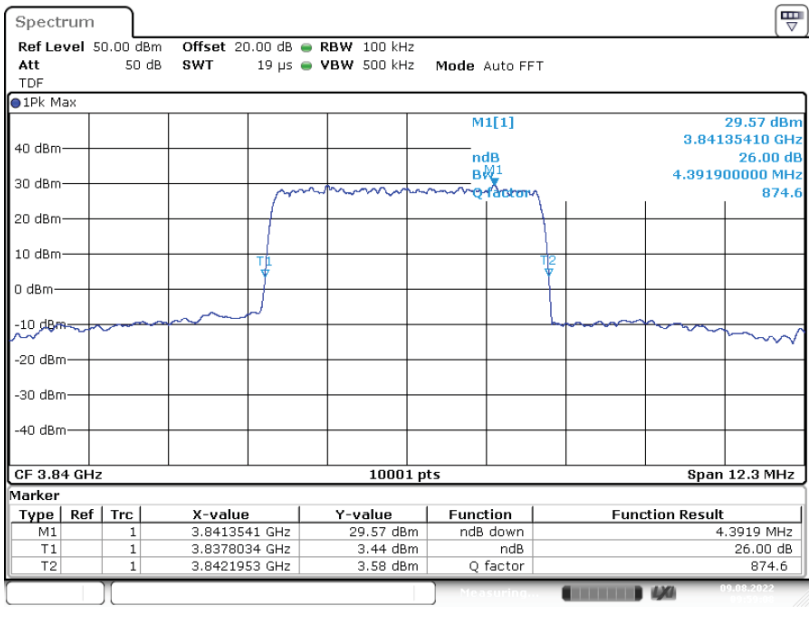


Output Signal

Frequency Band = C-Band, Segment 2, Direction = RF downlink,
Input Power = 3 dB > AGC, Signal Type = Wideband

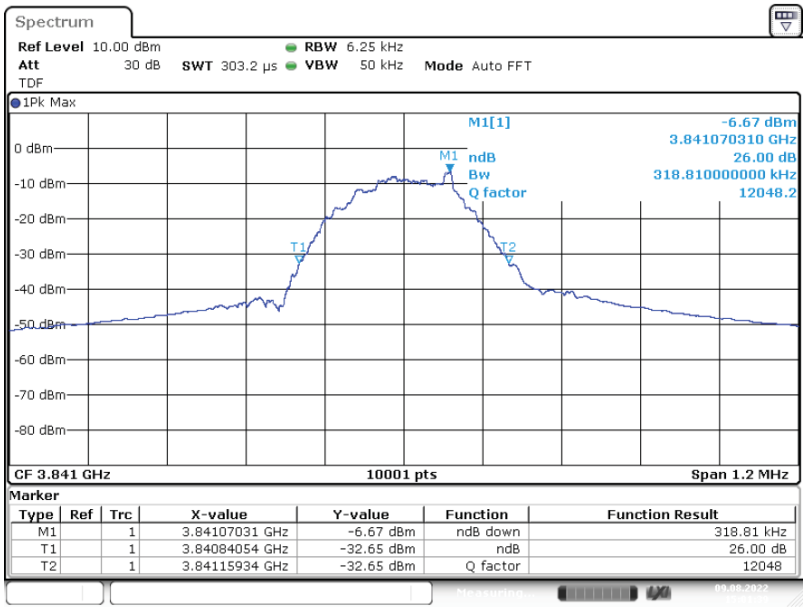


Input Signal

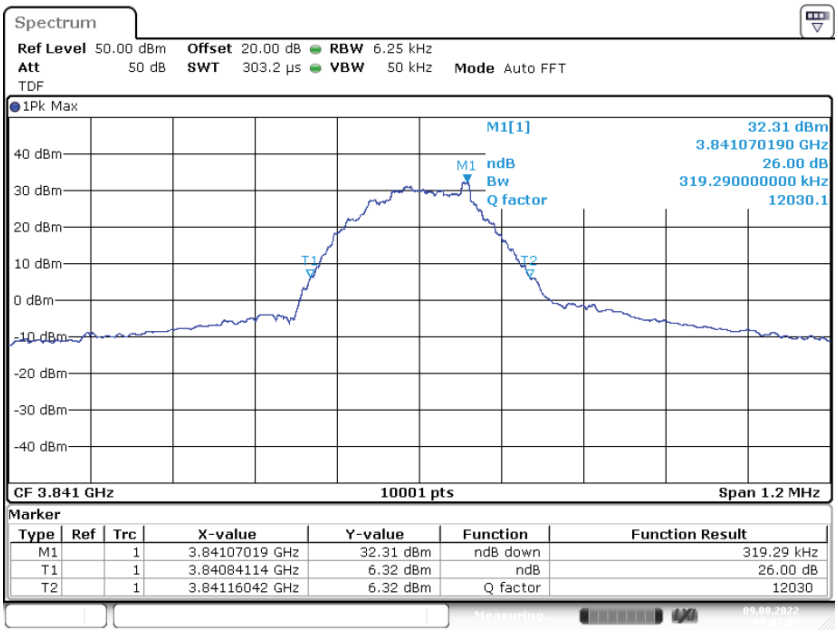


Output Signal

Frequency Band = C-Band, Segment 2, Direction = RF downlink,
Input Power = 0.3 dB < AGC, Signal Type = Narrowband

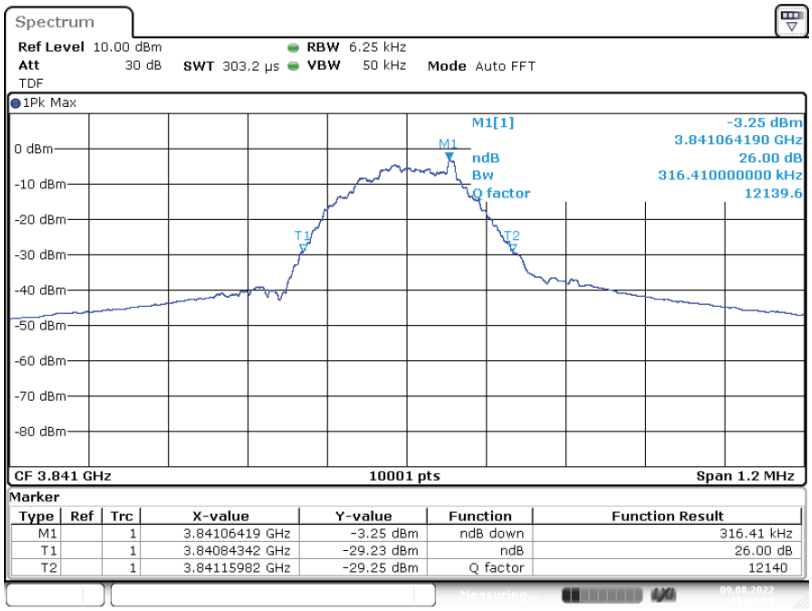


Input Signal



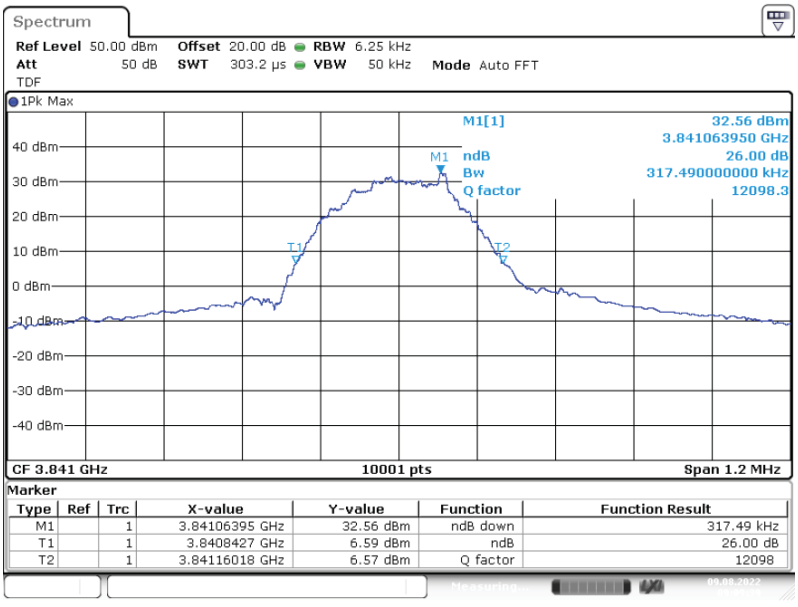
Output Signal

Frequency Band = C-Band, Segment 2, Direction = RF downlink,
Input Power = 3 dB > AGC, Signal Type = Narrowband



3.4 OCBw GSM In +3 3.8410G _26dB

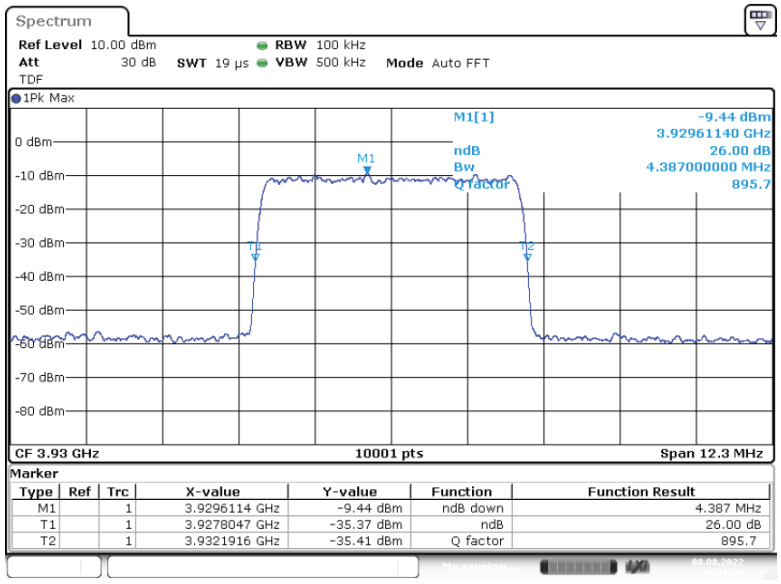
Input Signal



3.4 OCBw GSM Out +3 3.8410G _26dB

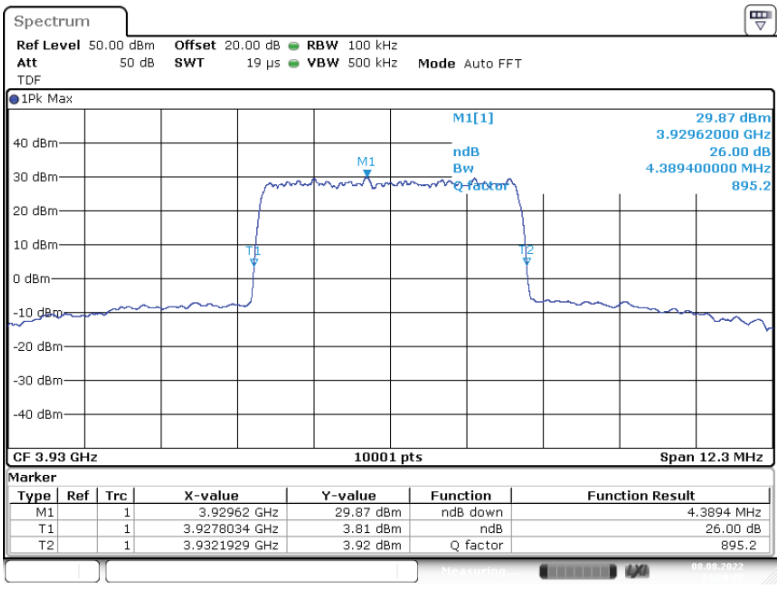
Output Signal

Frequency Band = C-Band, Segment 3, Direction = RF downlink,
Input Power = 0.3 dB < AGC, Signal Type = Wideband



3.4 OCBw AWGN In -0.3 3.9300G _26dB

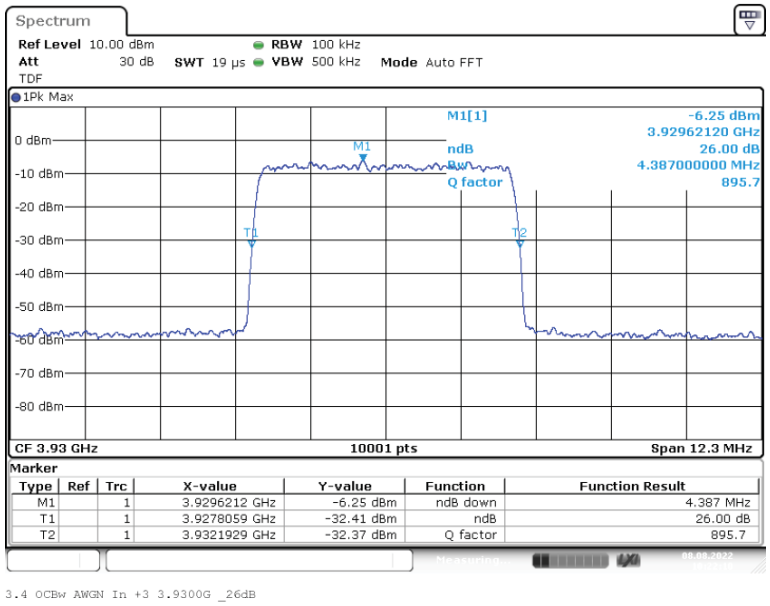
Input Signal



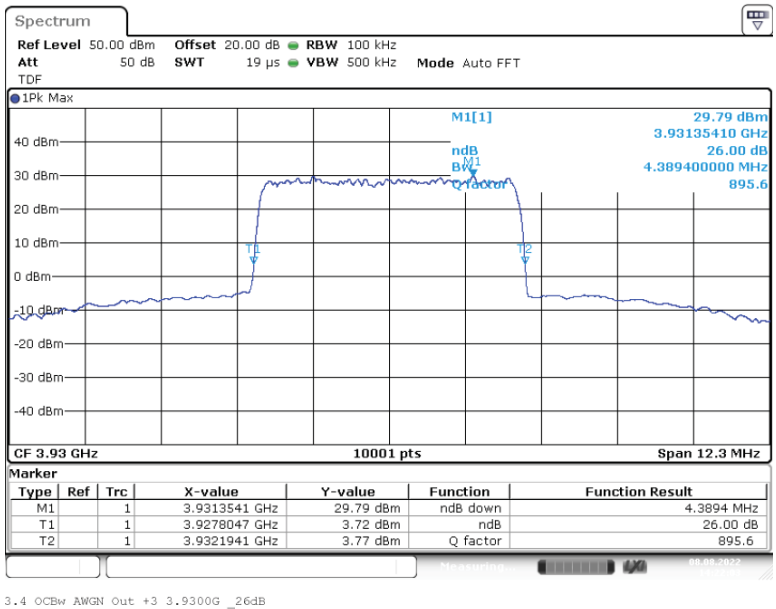
3.4 OCBw AWGN Out -0.3 3.9300G _26dB

Output Signal

Frequency Band = C-Band, Segment 3, Direction = RF downlink,
Input Power = 3 dB > AGC, Signal Type = Wideband

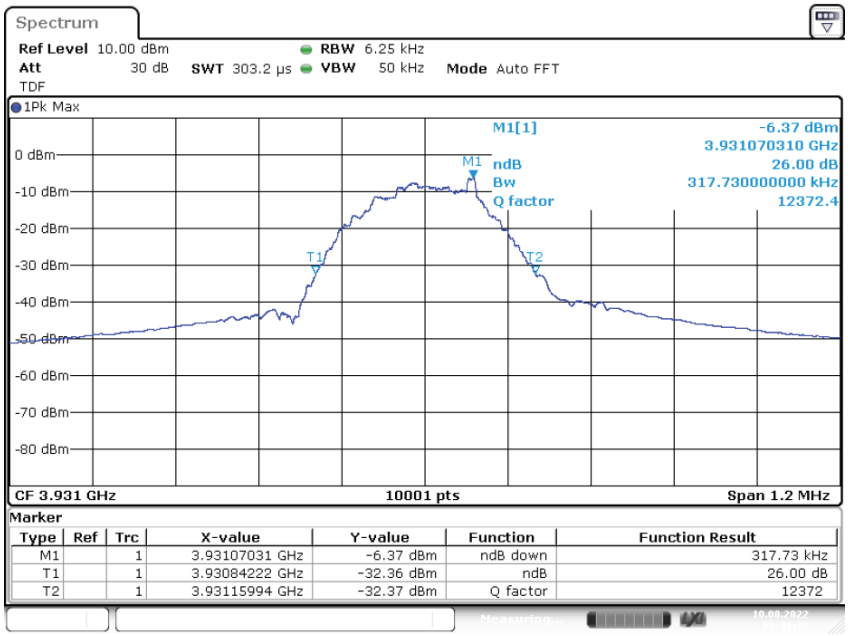


Input Signal



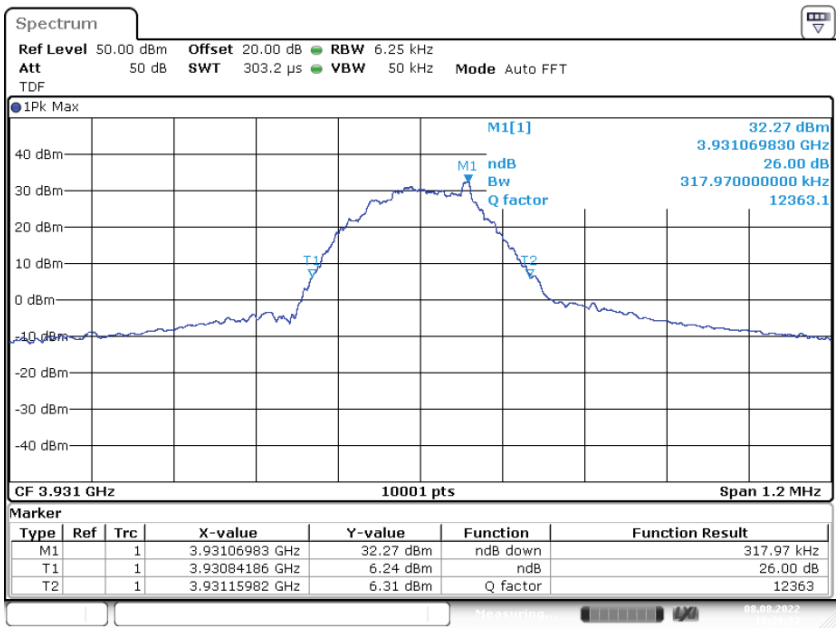
Output Signal

Frequency Band = C-Band, Segment 3, Direction = RF downlink,
Input Power = 0.3 dB < AGC, Signal Type = Narrowband



3.4 OCBw GSM In -0.3 3.9310G _26dB

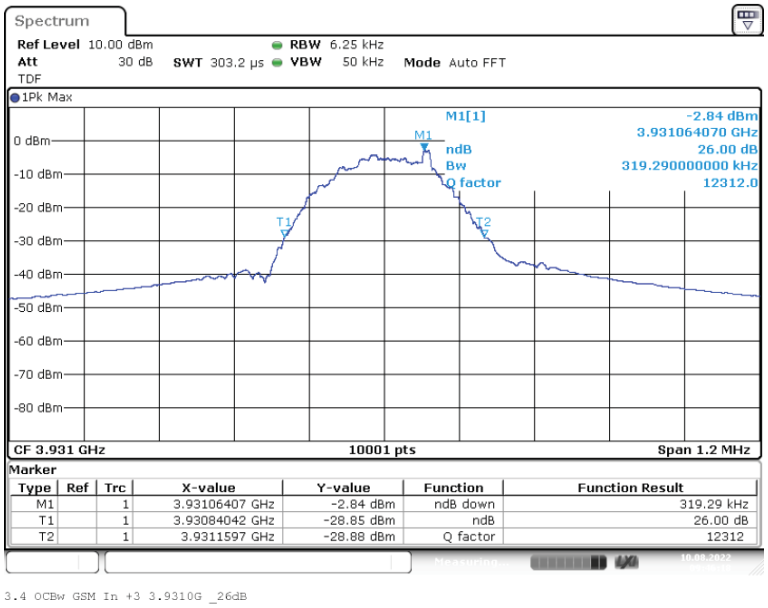
Input Signal



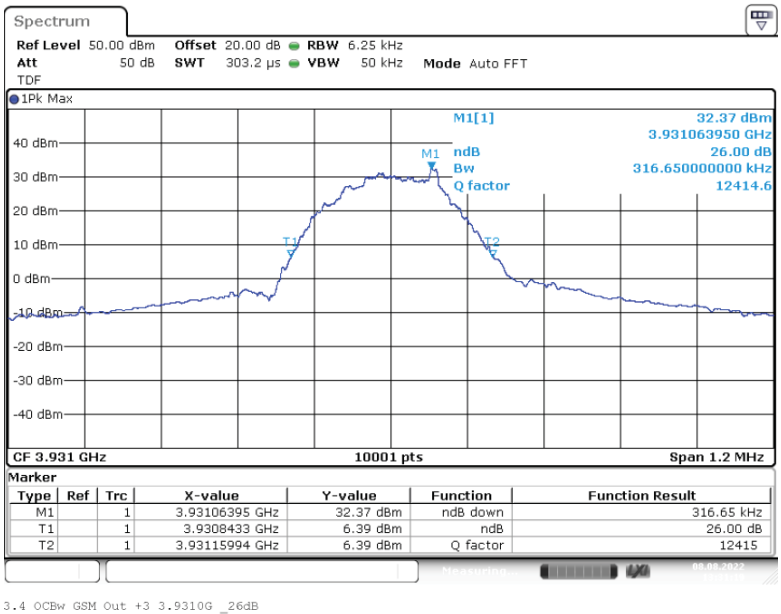
3.4 OCBw GSM Out -0.3 3.9310G _26dB

Output Signal

Frequency Band = C-Band, Segment 3, Direction = RF downlink,
Input Power = 3 dB > AGC, Signal Type = Narrowband



Input Signal



Output Signal

4.3.5 TEST EQUIPMENT USED

- Conducted

4.4 CONDUCTED SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Standard FCC Part §2.1051, §27.53

The test was performed according to:
ANSI C63.26

Test date: 2022-07-19, 2022-07-21, 2022-08-01 and 2022-08-09

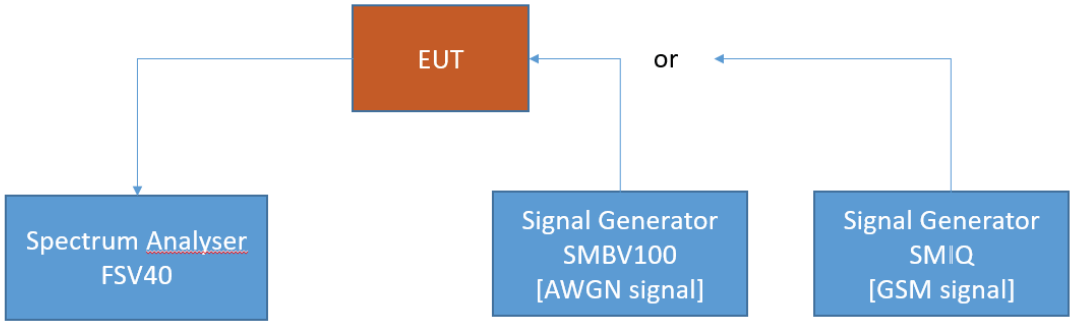
Environmental conditions: 23 ° C ± 5 K; 40 % r. F. ± 20 % r. F.

Test engineer: Thomas Hufnagel

4.4.1 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.

4.4.2 TEST REQUIREMENTS/LIMITS

FCC Part 2.1051; Measurement required: Spurious emissions at antenna terminal:

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

Part 27; Miscellaneous Wireless Communication Services

Subpart C – Technical standards

§27.53 – Emission limits

(l) **3.7 GHz Service**. The following emission limits apply to stations transmitting in the 3700-3980 MHz band:

(1) For base station operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz. Compliance with this paragraph (l)(1) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's 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.

(2) For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. 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.

4.4.3 TEST PROTOCOL

General considerations concerning the limits:

The measuring bandwidth of 1 MHz was chosen according the test requirements exept at the band edges: At the band edges reducing of measurement bandwidth was necessary to prevent overlaying the RF-signal over the spurious emissions.
Also outside the downlink frequency band at lower frequencies the measurement bandwidths were reduced to have the possibility to record the spurious emissions at these lower frequencies.

At frequencies were measuring bandwidths were reduced also the limit lines were reduced acoording the given formula:

$$p\ RBWreduced\ [dBm] = 10 * \log\left(RBWreduced\ [kHz] — 1000\ kHz\right) + pRBW\ 1000\ kHz[dBm]$$

Hereby “p” are the limit lines’ values.

C-Band, segment 1, downlink

Test Frequency	Signal Type	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Limit [dBm]	Margin to Limit [dB]
low	Wideband	0.00902	-61.3	RMS	1	-43,0	18,3
low	Wideband	0.0525	-55.8	RMS	10	-33,0	22,8
low	Wideband	321.3	-37.7	RMS	1000	-13,0	24,7
low	Wideband	894.4	-35.3	RMS	1000	-13,0	22,3
low	Wideband	3667.8	-35.4	RMS	1000	-13,0	22,4
low	Wideband	3698.8	-34.2	RMS	100	-23,0	11,2
low	Wideband	3804.8	-42.5	RMS	100	-23,0	19,5
low	Wideband	6872.0	-31.4	RMS	1000	-13,0	18,4
low	Wideband	19574.8	-30.7	RMS	1000	-13,0	17,7
low	Wideband	20282.2	-29.9	RMS	1000	-13,0	16,9
low	Wideband	30663.9	-30.4	RMS	1000	-13,0	17,4
low	Wideband	38487.9	-23.1	RMS	1000	-13,0	10,1
mid	Wideband	0.013813	-60.7	RMS	1	-43,0	17,7
mid	Wideband	0.062498	-55.3	RMS	10	-33,0	22,3
mid	Wideband	483.8	-37.6	RMS	1000	-13,0	24,6
mid	Wideband	855.9	-35.0	RMS	1000	-13,0	22,0
mid	Wideband	3673.8	-35.6	RMS	1000	-13,0	22,6
mid	Wideband	3698.0	-43.1	RMS	100	-23,0	20,1
mid	Wideband	3803.9	-43.4	RMS	100	-23,0	20,4
mid	Wideband	6888.5	-31.7	RMS	1000	-13,0	18,7
mid	Wideband	19544.3	-30.7	RMS	1000	-13,0	17,7
mid	Wideband	20277.7	-30.3	RMS	1000	-13,0	17,3
mid	Wideband	30861.9	-30.4	RMS	1000	-13,0	17,4
mid	Wideband	38522.9	-22.6	RMS	1000	-13,0	9,6
high	Wideband	0.018236	-62.2	RMS	1	-43,0	19,2
high	Wideband	0.067497	-55.0	RMS	10	-33,0	22,0
high	Wideband	418.1	-37.8	RMS	1000	-13,0	24,8
high	Wideband	889.9	-34.8	RMS	1000	-13,0	21,8
high	Wideband	3606.8	-34.8	RMS	1000	-13,0	21,8
high	Wideband	3698.5	-43.2	RMS	100	-23,0	20,2
high	Wideband	3801.1	-30.2	RMS	100	-23,0	7,2
high	Wideband	6940.5	-31.7	RMS	1000	-13,0	18,7
high	Wideband	19562.8	-30.6	RMS	1000	-13,0	17,6
high	Wideband	20296.7	-30.3	RMS	1000	-13,0	17,3
high	Wideband	30704.4	-30.3	RMS	1000	-13,0	17,3
high	Wideband	38476.9	-22.9	RMS	1000	-13,0	9,9

C-Band, segment 1, downlink

Test Frequency	Signal Type	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Limit [dBm]	Margin to Limit [dB]
low	Narrowband	0.00902	-61.7	RMS	1	-43.0	18.7
low	Narrowband	0.0525	-55.7	RMS	10	-33.0	22.7
low	Narrowband	155.1	-38.1	RMS	1000	-13.0	25.1
low	Narrowband	895.4	-35.6	RMS	1000	-13.0	22.6
low	Narrowband	3631.8	-35.3	RMS	1000	-13.0	22.3
low	Narrowband	3639.8	-37.8	RMS	100	-23.0	14.8
low	Narrowband	3801.1	-43.2	RMS	100	-23.0	20.2
low	Narrowband	6769.0	-31.6	RMS	1000	-13.0	18.6
low	Narrowband	19571.8	-30.5	RMS	1000	-13.0	17.5
low	Narrowband	20317.7	-30.2	RMS	1000	-13.0	17.2
low	Narrowband	30740.4	-29.9	RMS	1000	-13.0	16.9
low	Narrowband	38495.9	-22.9	RMS	1000	-13.0	9.9
mid	Narrowband	0.00902	-61.2	RMS	1	-43.0	18.2
mid	Narrowband	0.062498	-55.3	RMS	10	-33.0	22.3
mid	Narrowband	120.5	-45.8	RMS	1000	-13.0	32.8
mid	Narrowband	952.6	-44.6	RMS	1000	-13.0	31.6
mid	Narrowband	3715.8	-33.2	RMS	1000	-13.0	20.2
mid	Narrowband	3873.7	-41.1	RMS	100	-23.0	18.1
mid	Narrowband	3981.6	-42.8	RMS	100	-23.0	19.8
mid	Narrowband	6887.5	-31.7	RMS	1000	-13.0	18.7
mid	Narrowband	19589.3	-30.5	RMS	1000	-13.0	17.5
mid	Narrowband	20298.7	-29.9	RMS	1000	-13.0	16.9
mid	Narrowband	31419.4	-29.7	RMS	1000	-13.0	16.7
mid	Narrowband	38495.9	-22.7	RMS	1000	-13.0	9.7
high	Narrowband	0.009102	-60.7	RMS	1	-43.0	17.7
high	Narrowband	0.152483	-55.0	RMS	10	-33.0	22.0
high	Narrowband	445.3	-37.5	RMS	1000	-13.0	24.5
high	Narrowband	854.4	-34.4	RMS	1000	-13.0	21.4
high	Narrowband	3659.8	-35.4	RMS	1000	-13.0	22.4
high	Narrowband	3696.5	-43.1	RMS	100	-23.0	20.1
high	Narrowband	3801.0	-38.5	RMS	100	-23.0	15.5
high	Narrowband	6865.0	-31.7	RMS	1000	-13.0	18.7
high	Narrowband	19579.3	-30.3	RMS	1000	-13.0	17.3
high	Narrowband	20295.2	-29.8	RMS	1000	-13.0	16.8
high	Narrowband	30333.5	-30.3	RMS	1000	-13.0	17.3
high	Narrowband	38490.4	-22.9	RMS	1000	-13.0	9.9

C-Band, segment 2, downlink							
Test Frequency	**Signal Type**	**Spurious Freq. [MHz]**	**Spurious Level [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to Limit [dB]**
low	Wideband	0.010454	-60.4	RMS	1	-43.0	17.4
low	Wideband	0.0525	-53.1	RMS	10	-33.0	20.1
low	Wideband	404.9	-36.5	RMS	1000	-13.0	23.5
low	Wideband	889.9	-34.9	RMS	1000	-13.0	21.9
low	Wideband	3706.3	-33.6	RMS	1000	-13.0	20.6
low	Wideband	3774.3	-33.9	RMS	100	-23.0	10.9
low	Wideband	3891.6	-44.1	RMS	100	-23.0	21.1
low	Wideband	6809.0	-31.6	RMS	1000	-13.0	18.6
low	Wideband	19566.3	-30.5	RMS	1000	-13.0	17.5
low	Wideband	20306.2	-29.4	RMS	1000	-13.0	16.4
low	Wideband	31304.9	-30.4	RMS	1000	-13.0	17.4
low	Wideband	38501.4	-22.8	RMS	1000	-13.0	9.8
mid	Wideband	0.014796	-62.0	RMS	1	-43.0	19.0
mid	Wideband	0.057499	-54.6	RMS	10	-33.0	21.6
mid	Wideband	251.9	-37.0	RMS	1000	-13.0	24.0
mid	Wideband	890.4	-33.5	RMS	1000	-13.0	20.5
mid	Wideband	3771.3	-34.1	RMS	1000	-13.0	21.1
mid	Wideband	3781.2	-43.0	RMS	100	-23.0	20.0
mid	Wideband	3894.4	-43.2	RMS	100	-23.0	20.2
mid	Wideband	6950.0	-31.6	RMS	1000	-13.0	18.6
mid	Wideband	19596.3	-30.9	RMS	1000	-13.0	17.9
mid	Wideband	20306.7	-30.0	RMS	1000	-13.0	17.0
mid	Wideband	29667.5	-30.3	RMS	1000	-13.0	17.3
mid	Wideband	38448.4	-22.8	RMS	1000	-13.0	9.8
high	Wideband	0.021062	-62.0	RMS	1	-43.0	19.0
high	Wideband	0.152483	-55.3	RMS	10	-33.0	22.3
high	Wideband	335.9	-37.8	RMS	1000	-13.0	24.8
high	Wideband	850.9	-34.7	RMS	1000	-13.0	21.7
high	Wideband	3769.3	-33.8	RMS	1000	-13.0	20.8
high	Wideband	3786.1	-42.7	RMS	100	-23.0	19.7
high	Wideband	3891.1	-33.8	RMS	100	-23.0	10.8
high	Wideband	6768.0	-31.6	RMS	1000	-13.0	18.6
high	Wideband	19553.3	-31.0	RMS	1000	-13.0	18.0
high	Wideband	20292.2	-30.0	RMS	1000	-13.0	17.0
high	Wideband	31391.9	-29.8	RMS	1000	-13.0	16.8
high	Wideband	38494.4	-22.8	RMS	1000	-13.0	9.8

C-Band, segment 2, downlink							
Test Frequency	**Signal Type**	**Spurious Freq. [MHz]**	**Spurious Level [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to Limit [dB]**
low	Narrowband	0.00902	-62.0	RMS	1	-43.0	19.0
low	Narrowband	0.0525	-55.1	RMS	10	-33.0	22.1
low	Narrowband	184.2	-37.6	RMS	1000	-13.0	24.6
low	Narrowband	891.4	-35.3	RMS	1000	-13.0	22.3
low	Narrowband	3770.8	-33.6	RMS	1000	-13.0	20.6
low	Narrowband	3789.0	-36.5	RMS	100	-23.0	13.5
low	Narrowband	3897.7	-43.5	RMS	100	-23.0	20.5
low	Narrowband	6941.5	-31.4	RMS	1000	-13.0	18.4
low	Narrowband	19548.8	-30.8	RMS	1000	-13.0	17.8
low	Narrowband	20279.7	-29.8	RMS	1000	-13.0	16.8
low	Narrowband	31344.9	-30.3	RMS	1000	-13.0	17.3
low	Narrowband	38512.4	-22.6	RMS	1000	-13.0	9.6
mid	Narrowband	0.009758	-62.2	RMS	1	-43.0	19.2
mid	Narrowband	0.072496	-54.2	RMS	10	-33.0	21.2
mid	Narrowband	376.7	-37.9	RMS	1000	-13.0	24.9
mid	Narrowband	711.0	-35.4	RMS	1000	-13.0	22.4
mid	Narrowband	3711.3	-33.9	RMS	1000	-13.0	20.9
mid	Narrowband	3781.5	-43.7	RMS	100	-23.0	20.7
mid	Narrowband	3896.5	-43.6	RMS	100	-23.0	20.6
mid	Narrowband	6883.5	-31.5	RMS	1000	-13.0	18.5
mid	Narrowband	19570.8	-30.6	RMS	1000	-13.0	17.6
mid	Narrowband	20317.2	-29.7	RMS	1000	-13.0	16.7
mid	Narrowband	30290.5	-30.1	RMS	1000	-13.0	17.1
mid	Narrowband	38492.9	-22.8	RMS	1000	-13.0	9.8
high	Narrowband	0.012871	-62.3	RMS	1	-43.0	19.3
high	Narrowband	0.077495	-55.8	RMS	10	-33.0	22.8
high	Narrowband	182.4	-37.7	RMS	1000	-13.0	24.7
high	Narrowband	890.9	-34.8	RMS	1000	-13.0	21.8
high	Narrowband	3764.3	-33.8	RMS	1000	-13.0	20.8
high	Narrowband	3783.4	-43.5	RMS	100	-23.0	20.5
high	Narrowband	3891.0	-38.0	RMS	100	-23.0	15.0
high	Narrowband	6923.5	-31.7	RMS	1000	-13.0	18.7
high	Narrowband	19544.8	-30.6	RMS	1000	-13.0	17.6
high	Narrowband	20341.2	-30.1	RMS	1000	-13.0	17.1
high	Narrowband	30708.9	-29.5	RMS	1000	-13.0	16.5
high	Narrowband	38513.9	-22.9	RMS	1000	-13.0	9.9

C-Band, segment 3, downlink

Test Frequency	Signal Type	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Limit [dBm]	Margin to Limit [dB]
low	Wideband	0.009594	-61.3	RMS	1	-43.0	18.3
low	Wideband	0.0525	-54.3	RMS	10	-33.0	21.3
low	Wideband	390.8	-38.0	RMS	1000	-13.0	25.0
low	Wideband	891.4	-35.1	RMS	1000	-13.0	22.1
low	Wideband	3870.7	-32.6	RMS	1000	-13.0	19.6
low	Wideband	3878.8	-24.2	RMS	100	-23.0	1.2
low	Wideband	3986.5	-41.9	RMS	100	-23.0	18.9
low	Wideband	6870.5	-31.7	RMS	1000	-13.0	18.7
low	Wideband	19582.8	-30.6	RMS	1000	-13.0	17.6
low	Wideband	20291.2	-29.8	RMS	1000	-13.0	16.8
low	Wideband	30755.4	-29.9	RMS	1000	-13.0	16.9
low	Wideband	38468.9	-23.0	RMS	1000	-13.0	10.0
mid	Wideband	0.010659	-61.5	RMS	1	-43.0	18.5
mid	Wideband	0.067497	-54.6	RMS	10	-33.0	21.6
mid	Wideband	424.2	-37.5	RMS	1000	-13.0	24.5
mid	Wideband	890.9	-35.0	RMS	1000	-13.0	22.0
mid	Wideband	3775.8	-33.3	RMS	1000	-13.0	20.3
mid	Wideband	3873.1	-42.6	RMS	100	-23.0	19.6
mid	Wideband	3981.8	-41.7	RMS	100	-23.0	18.7
mid	Wideband	6876.5	-31.7	RMS	1000	-13.0	18.7
mid	Wideband	19525.3	-30.5	RMS	1000	-13.0	17.5
mid	Wideband	20282.2	-30.2	RMS	1000	-13.0	17.2
mid	Wideband	30955.9	-30.1	RMS	1000	-13.0	17.1
mid	Wideband	38495.4	-22.8	RMS	1000	-13.0	9.8
high	Wideband	0.01201	-61.4	RMS	1	-43.0	18.4
high	Wideband	0.072496	-53.8	RMS	10	-33.0	20.8
high	Wideband	210.5	-37.3	RMS	1000	-13.0	24.3
high	Wideband	709.0	-35.4	RMS	1000	-13.0	22.4
high	Wideband	3817.8	-33.8	RMS	1000	-13.0	20.8
high	Wideband	3871.2	-43.1	RMS	100	-23.0	20.1
high	Wideband	3981.5	-29.4	RMS	100	-23.0	6.4
high	Wideband	6832.0	-31.9	RMS	1000	-13.0	18.9
high	Wideband	19538.8	-30.8	RMS	1000	-13.0	17.8
high	Wideband	20305.2	-30.2	RMS	1000	-13.0	17.2
high	Wideband	29949.0	-30.4	RMS	1000	-13.0	17.4
high	Wideband	38504.4	-22.6	RMS	1000	-13.0	9.6

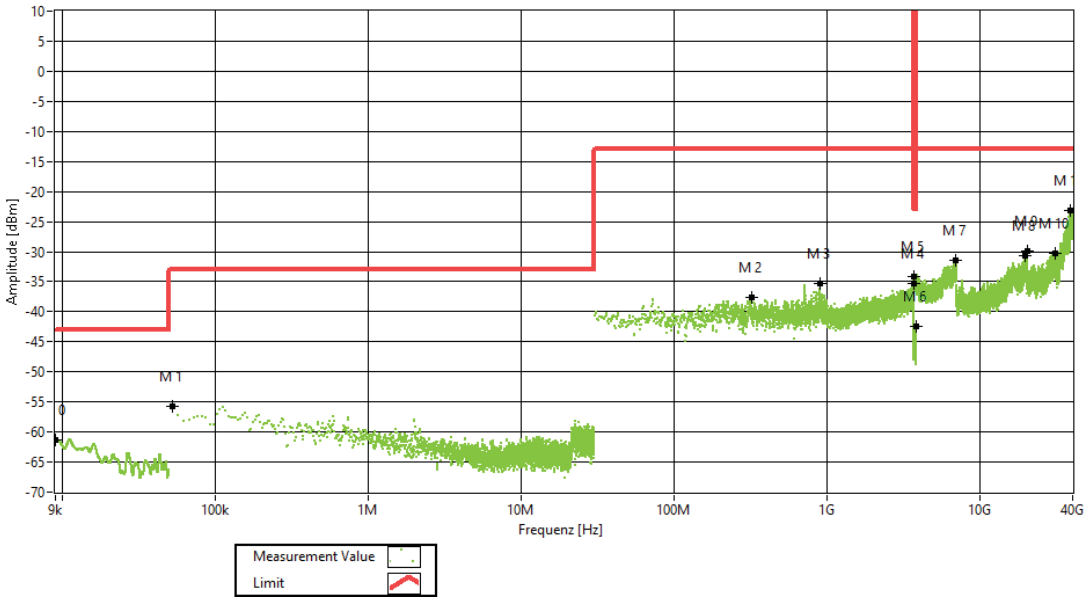
C-Band, segment 3, downlink

Test Frequency	Signal Type	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Limit [dBm]	Margin to Limit [dB]
low	Narrowband	0.00902	-60.2	RMS	1	-43.0	17.2
low	Narrowband	0.147484	-56.0	RMS	10	-33.0	23.0
low	Narrowband	440.6	-37.6	RMS	1000	-13.0	24.6
low	Narrowband	889.9	-35.9	RMS	1000	-13.0	22.9
low	Narrowband	3816.8	-33.0	RMS	1000	-13.0	20.0
low	Narrowband	3879.0	-36.9	RMS	100	-23.0	13.9
low	Narrowband	3981.1	-43.4	RMS	100	-23.0	20.4
low	Narrowband	6846.5	-31.0	RMS	1000	-13.0	18.0
low	Narrowband	19579.3	-30.4	RMS	1000	-13.0	17.4
low	Narrowband	20295.2	-30.2	RMS	1000	-13.0	17.2
low	Narrowband	31373.9	-30.1	RMS	1000	-13.0	17.1
low	Narrowband	38489.4	-23.0	RMS	1000	-13.0	10.0
mid	Narrowband	0.00902	-61.0	RMS	1	-43.0	18.0
mid	Narrowband	0.092493	-54.8	RMS	10	-33.0	21.8
mid	Narrowband	72.0	-37.9	RMS	1000	-13.0	24.9
mid	Narrowband	849.4	-35.7	RMS	1000	-13.0	22.7
mid	Narrowband	3743.8	-33.1	RMS	1000	-13.0	20.1
mid	Narrowband	3874.7	-41.0	RMS	100	-23.0	18.0
mid	Narrowband	3988.5	-43.3	RMS	100	-23.0	20.3
mid	Narrowband	6923.5	-31.7	RMS	1000	-13.0	18.7
mid	Narrowband	19546.3	-30.2	RMS	1000	-13.0	17.2
mid	Narrowband	20284.2	-30.3	RMS	1000	-13.0	17.3
mid	Narrowband	30720.4	-29.6	RMS	1000	-13.0	16.6
mid	Narrowband	38509.4	-23.0	RMS	1000	-13.0	10.0
high	Narrowband	0.009266	-60.1	RMS	1	-43.0	17.1
high	Narrowband	0.157482	-54.4	RMS	10	-33.0	21.4
high	Narrowband	357.5	-37.9	RMS	1000	-13.0	24.9
high	Narrowband	894.4	-35.7	RMS	1000	-13.0	22.7
high	Narrowband	3783.3	-33.1	RMS	1000	-13.0	20.1
high	Narrowband	3875.6	-43.1	RMS	100	-23.0	20.1
high	Narrowband	3981.0	-37.2	RMS	100	-23.0	14.2
high	Narrowband	6841.5	-31.8	RMS	1000	-13.0	18.8
high	Narrowband	19551.8	-30.7	RMS	1000	-13.0	17.7
high	Narrowband	20236.2	-30.3	RMS	1000	-13.0	17.3
high	Narrowband	30782.4	-29.9	RMS	1000	-13.0	16.9
high	Narrowband	39999.3	-22.9	RMS	1000	-13.0	9.9

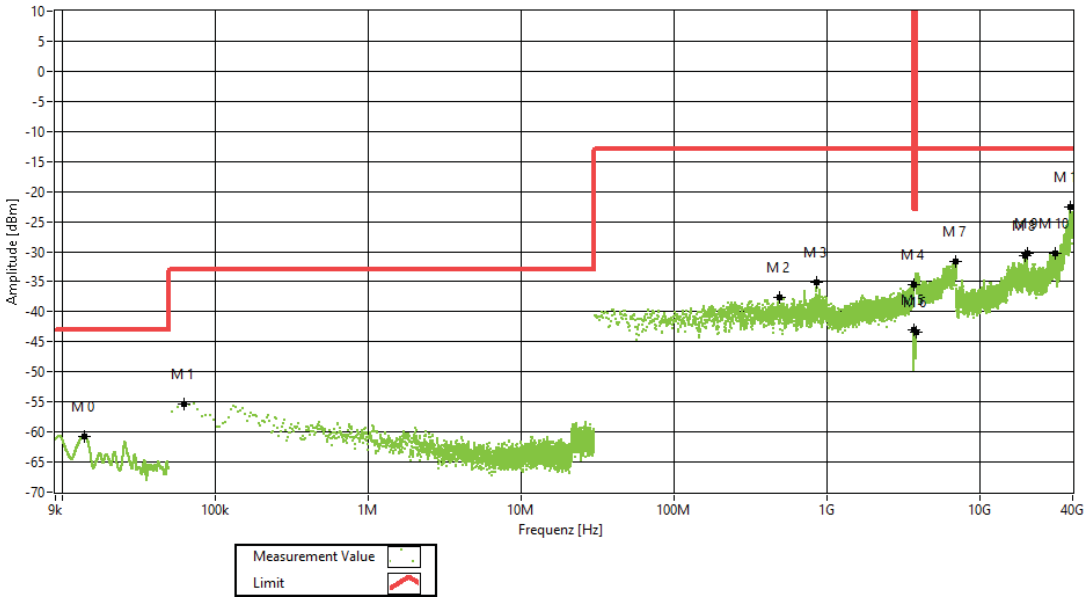
Remark: Please see next sub-clause for the measurement plot.

4.4.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

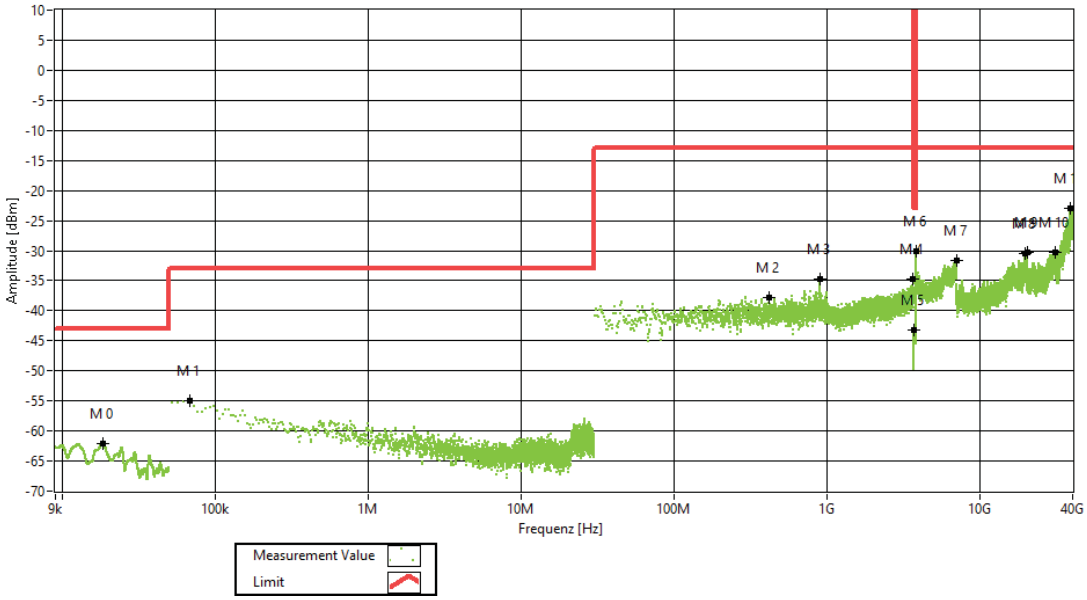
Frequency Band = C-Band, Segment 1, Test Frequency = low, Direction = RF downlink, Signal Type = Wideband



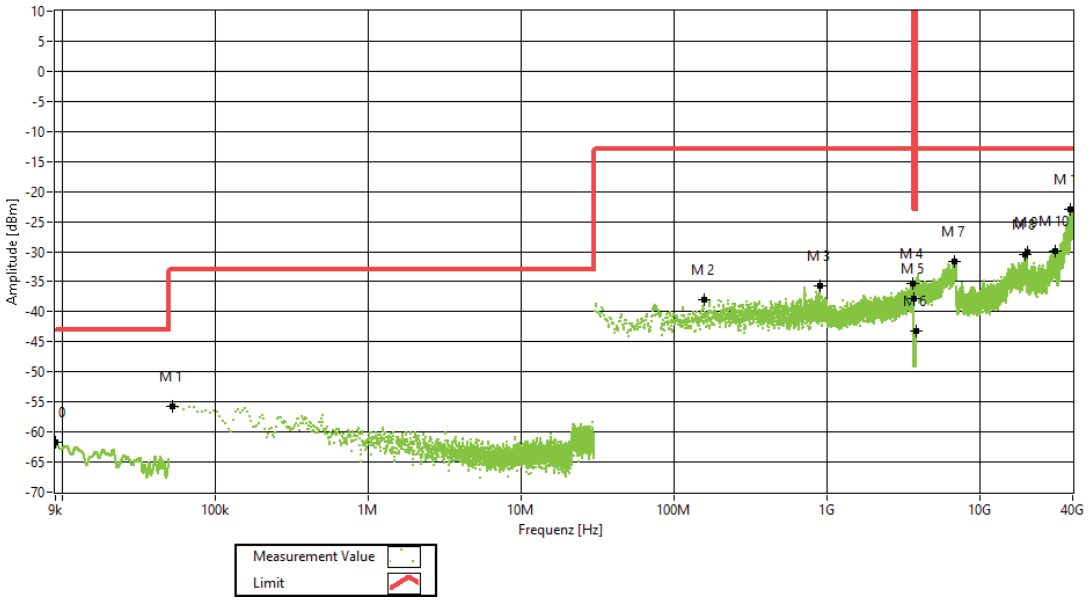
Frequency Band = C-Band, Segment 1, Test Frequency = mid, Direction = RF downlink, Signal Type = Wideband



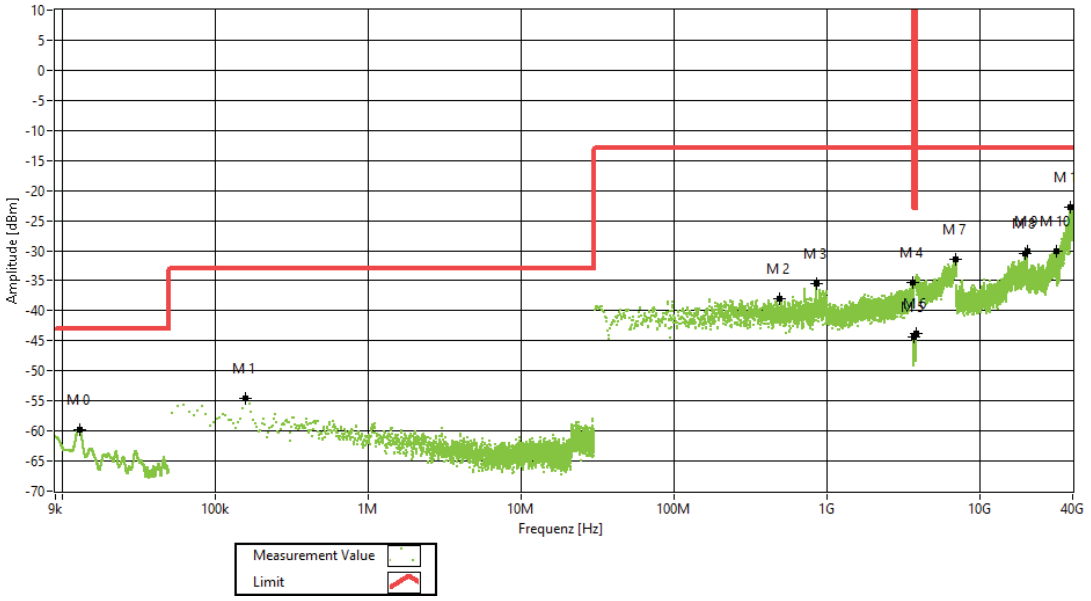
Frequency Band = C-Band, Segment 1, Test Frequency = high, Direction = RF downlink, Signal Type = Wideband



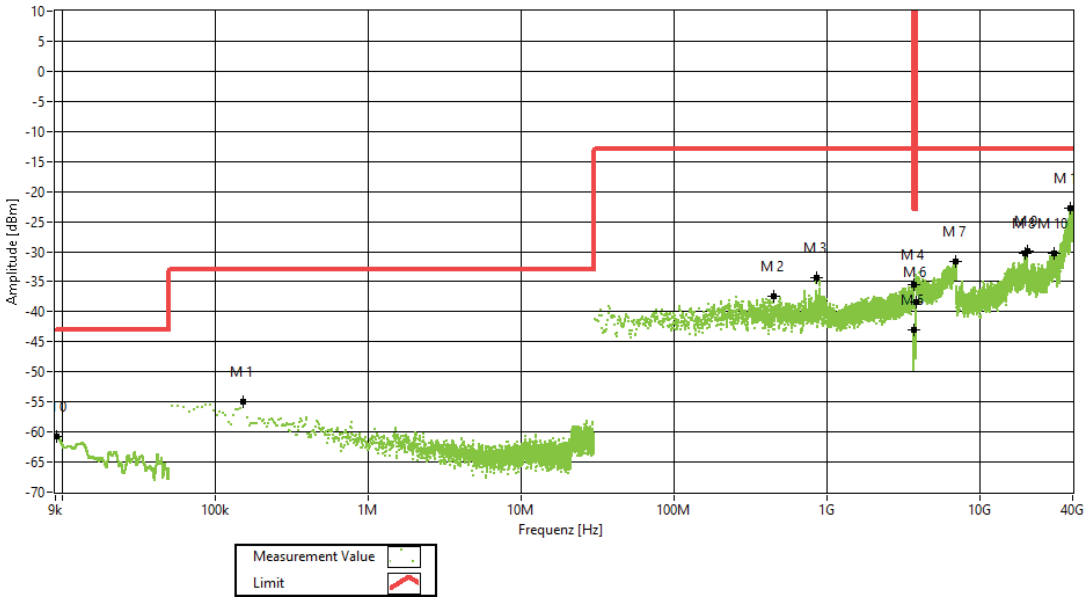
Frequency Band = C-Band, Segment 1, Test Frequency = low, Direction = RF downlink, Signal Type = Narrowband



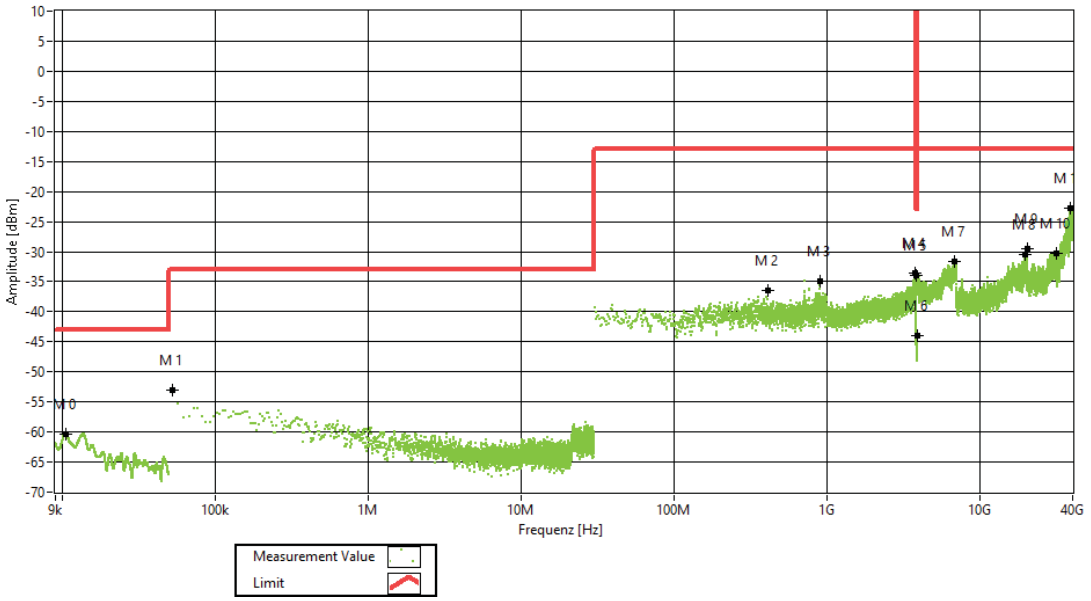
Frequency Band = C-Band, Segment 1, Test Frequency = mid, Direction = RF downlink, Signal Type = Narrowband



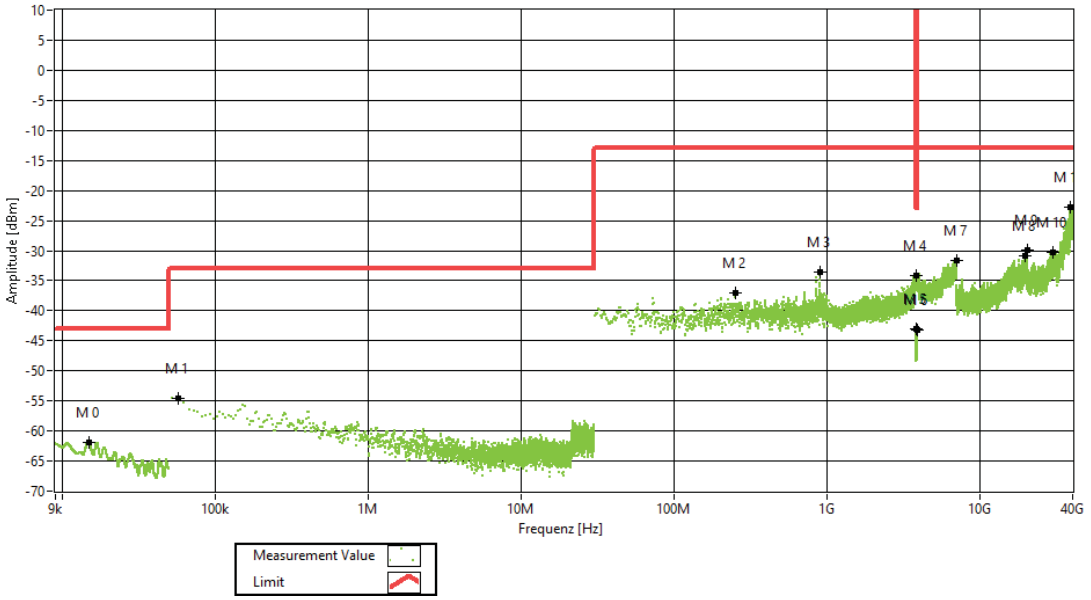
Frequency Band = C-Band, Segment 1, Test Frequency = high, Direction = RF downlink, Signal Type = Narrowband



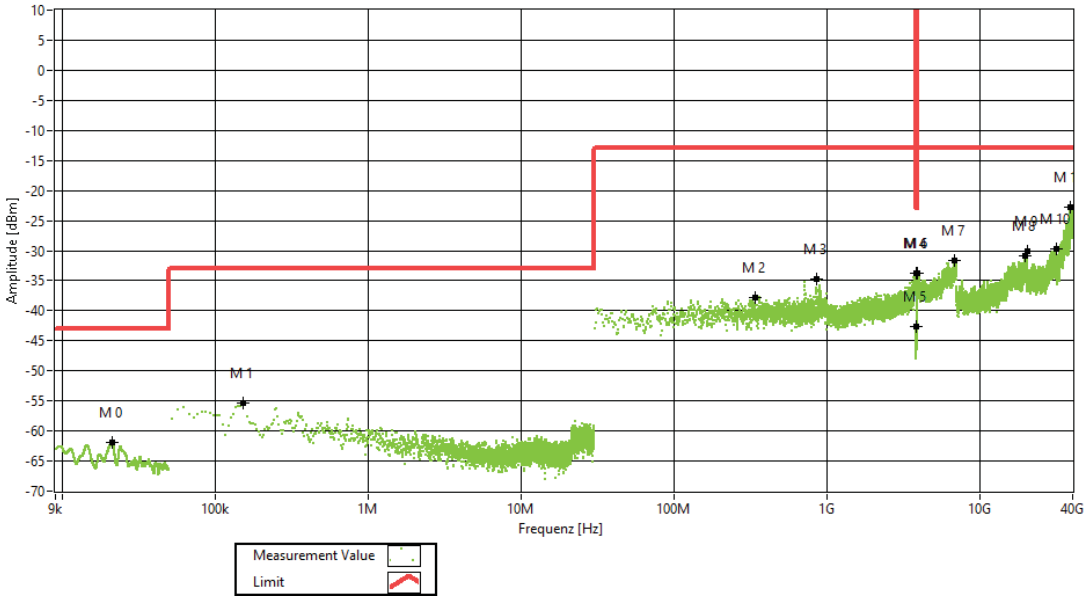
Frequency Band = C-Band, Segment 2, Test Frequency = low, Direction = RF downlink, Signal Type = Wideband



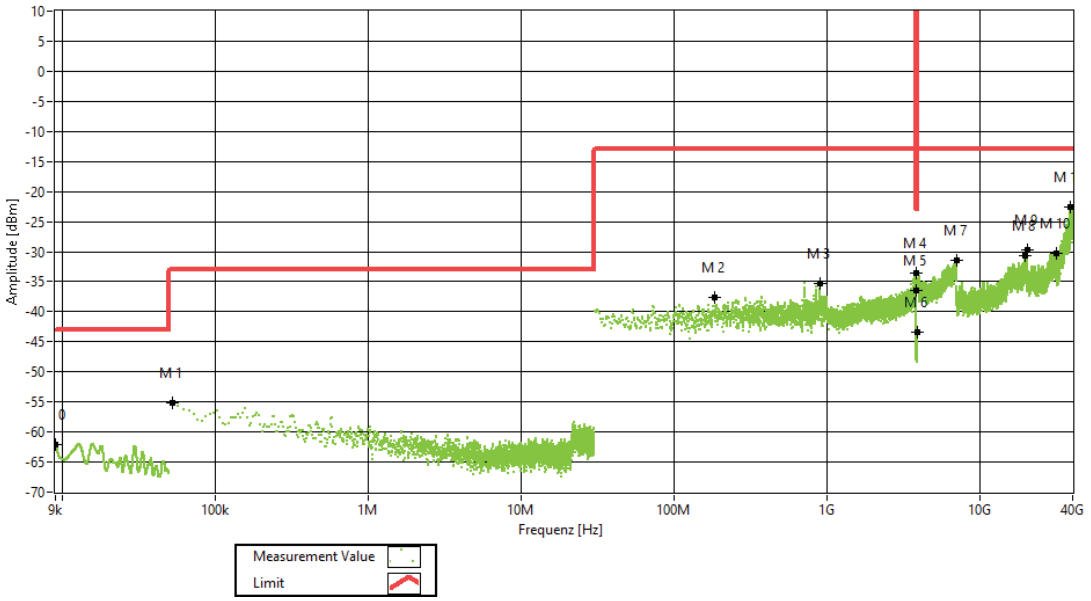
Frequency Band = C-Band, Segment 2, Test Frequency = mid, Direction = RF downlink, Signal Type = Wideband



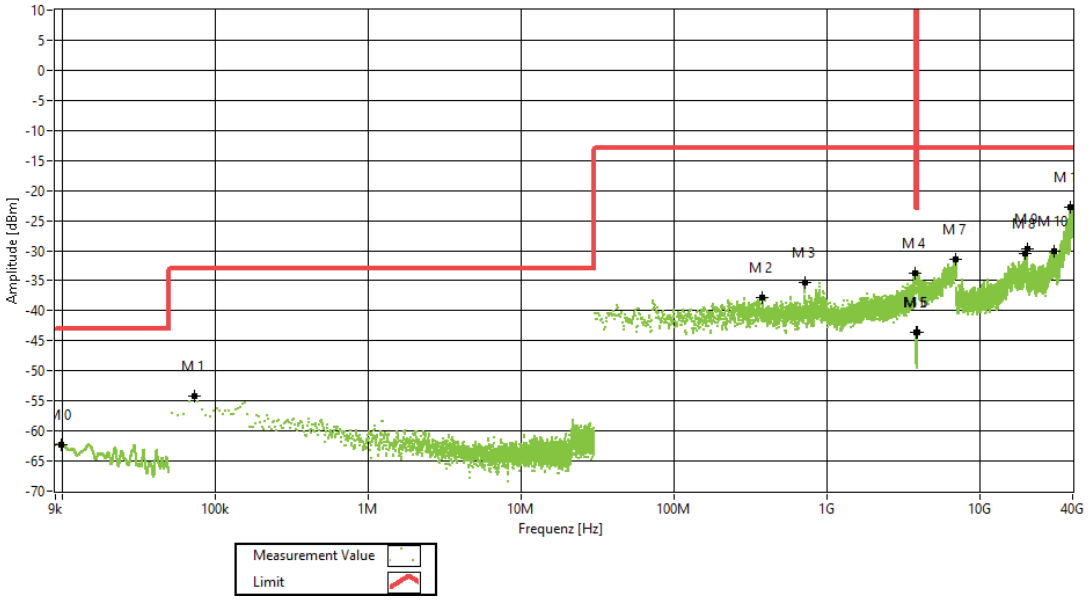
Frequency Band = C-Band, Segment 2, Test Frequency = high, Direction = RF downlink, Signal Type = Wideband



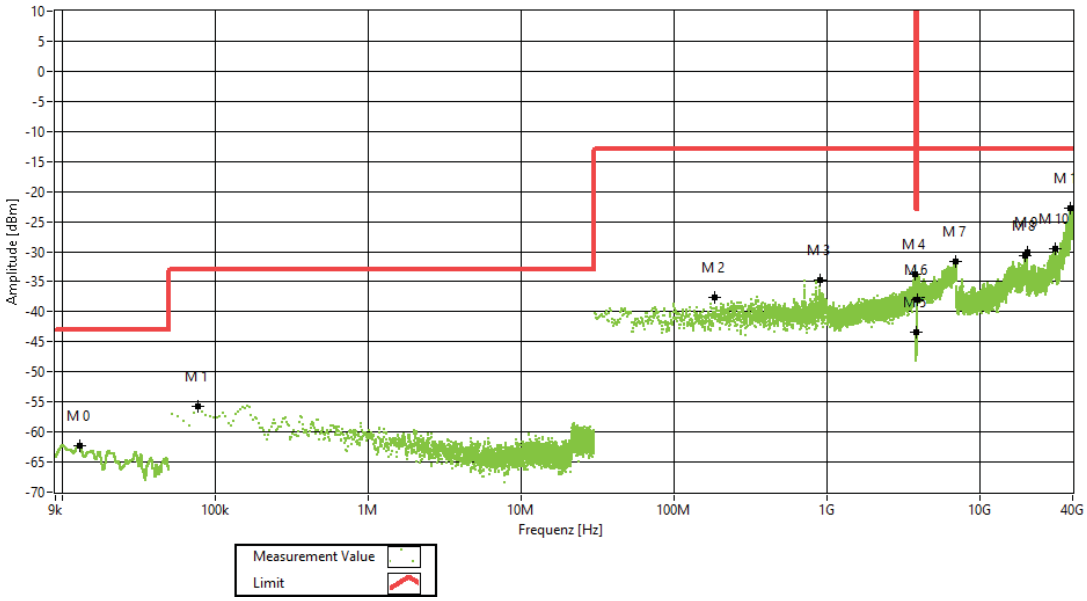
Frequency Band = C-Band, Segment 2, Test Frequency = low, Direction = RF downlink, Signal Type = Narrowband



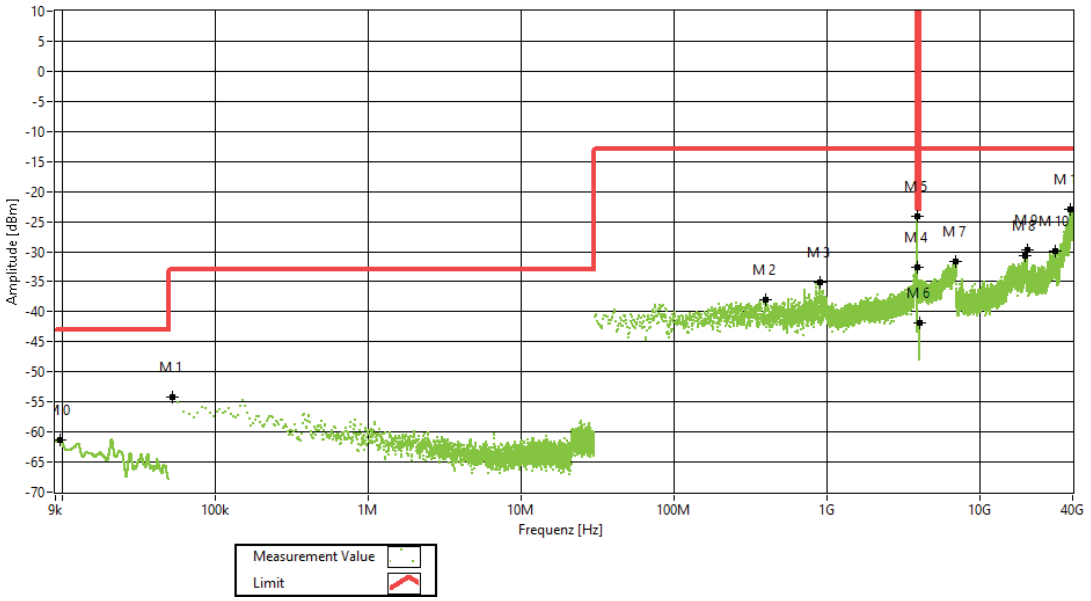
Frequency Band = C-Band, Segment 2, Test Frequency = mid, Direction = RF downlink, Signal Type = Narrowband



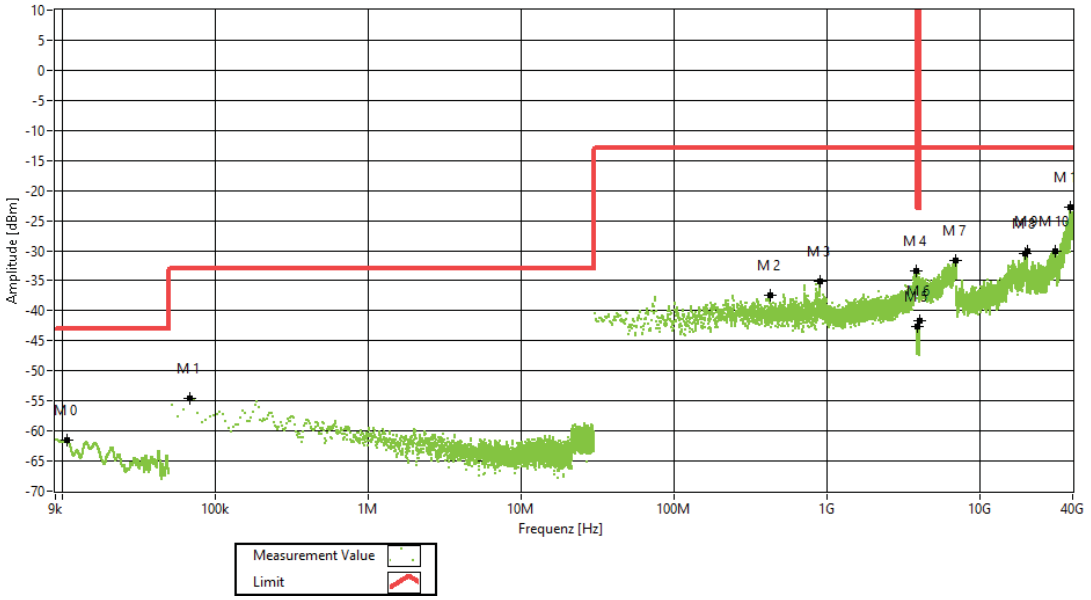
Frequency Band = C-Band, Segment 2, Test Frequency = high, Direction = RF downlink, Signal Type = Narrowband



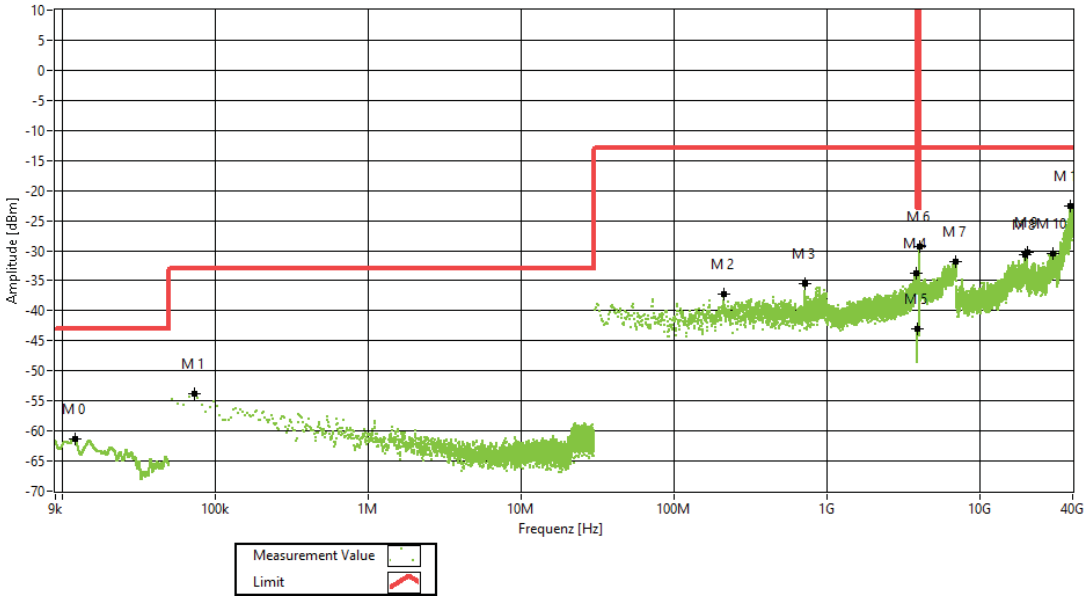
Frequency Band = C-Band, Segment 3, Test Frequency = low, Direction = RF downlink, Signal Type = Wideband



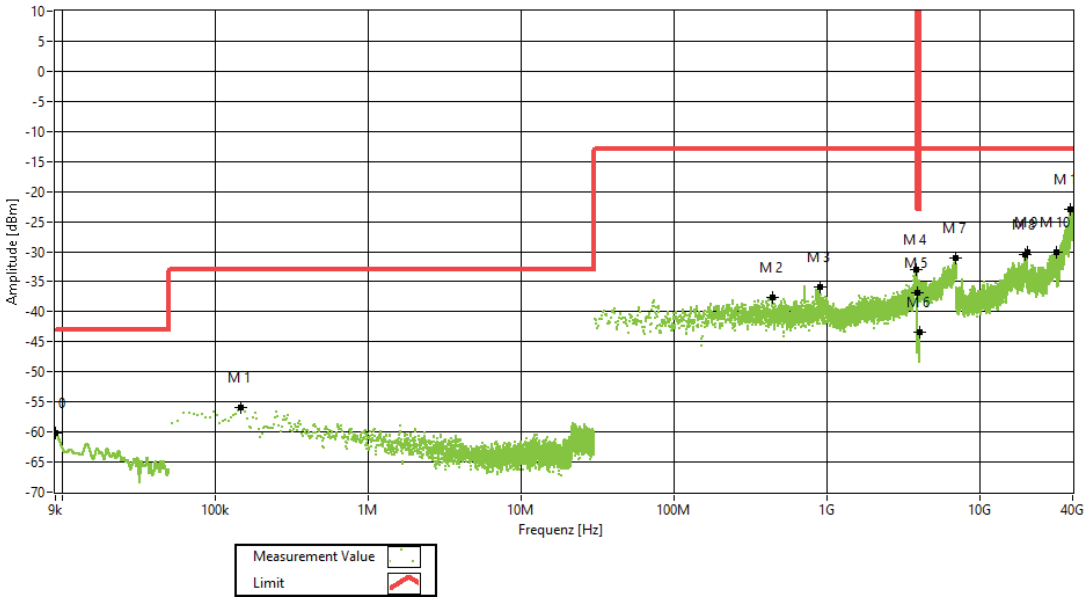
Frequency Band = C-Band, Segment 3, Test Frequency = mid, Direction = RF downlink, Signal Type = Wideband



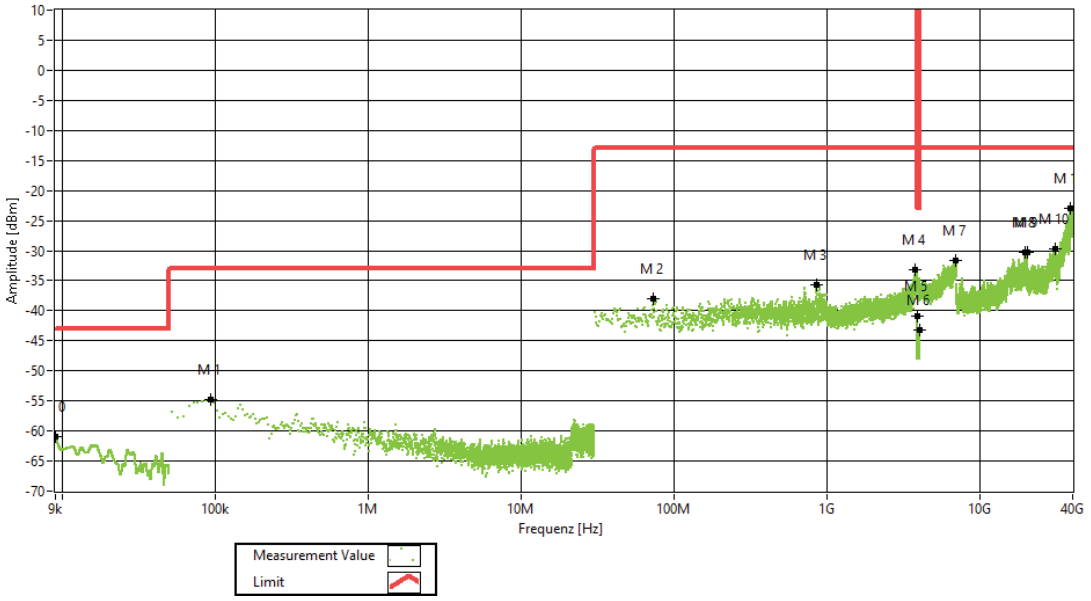
Frequency Band = C-Band, Segment 3, Test Frequency = high, Direction = RF downlink, Signal Type = Wideband



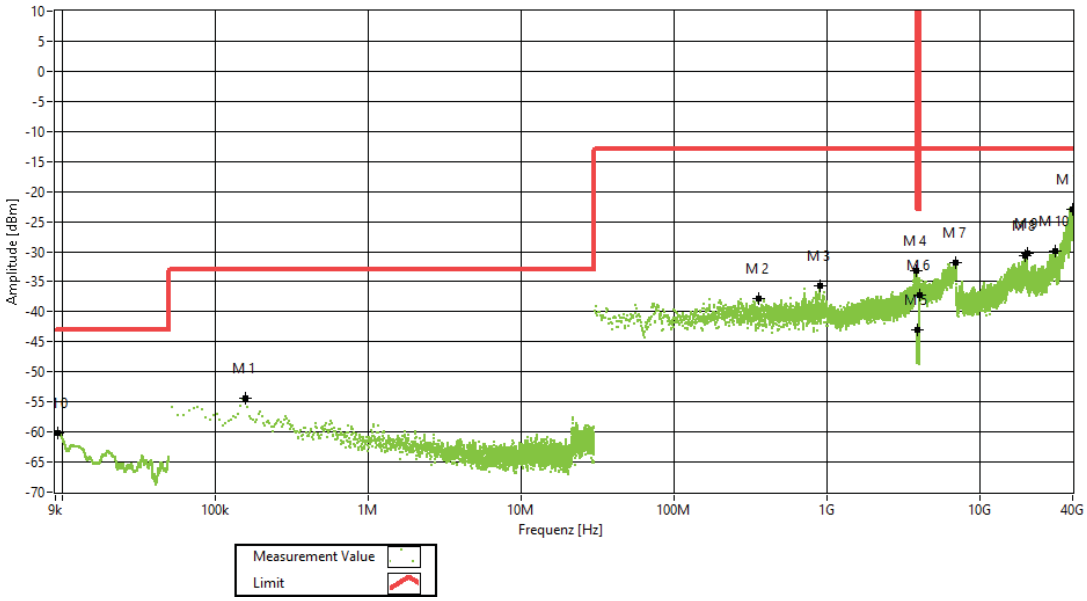
Frequency Band = C-Band, Segment 3, Test Frequency = low, Direction = RF downlink, Signal Type = Narrowband



Frequency Band = C-Band, Segment 3, Test Frequency = mid, Direction = RF downlink, Signal Type = Narrowband



Frequency Band = C-Band, Segment 3, Test Frequency = high, Direction = RF downlink, Signal Type = Narrowband



4.4.5 TEST EQUIPMENT USED

- Conducted