



BUREAU
VERITAS

EMC Test Report

2024-0450-EMC-TR-25-0092-V01

Designation:	UAP-R [AWS 1700]
Manufacturer:	CommScope
Serial No(s):	SZBEBE2508A0005
ID No.	7862370-00 Rev: 00
FCC ID	XS5-IONEUAPR
ISED ID	2237E-IONEUAPR
Test Specifications:	ANSI 63-26:2015 Spot check according the following rules: FCC Rules and Regulations as listed in 47 CFR, Part 20 and Part 27 RSS-139 Issue 4 with RSS-GEN Issue 5, RSS-131 Issue 4 and SRSP-513 Issue 3
Test Plan:	"BU-PC-2336-58" from customer
Test Result:	Passed

Date of issue:	13.06.2025		Signature:
Version:	01	Technical Reviewer:	
Date of receipt EUT:	26.02.2025		
Performance date:	14.05.2025 - 15.05.2025	Report Reviewer:	



Bundesnetzagentur

BNetzA-CAB-19/21-20



Deutsche
Akkreditierungsstelle
D-PL-12024-06-00

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

Schwerin
Mettenheimer Straße 12-14, 19061 Schwerin
cps-schwerin@bureauveritas.com

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

Managing Director: Jörg-Timm Kilisch
VAT-No.: DE164793120
Reg.No.: Schwerin HRB 3564

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

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



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Client: CommScope

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

Test location: Bureau Veritas Consumer Products Services Germany GmbH

Thurn-und-Taxis-Straße 18
D-90411 Nürnberg

DAkkS D-PL-12024-06-04

Laboratory accreditation no:

BNETZA-CAB-19/21-20

FCC Designation Number: DE0023

FCC Test Firm Registration: 366481

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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 Chapter 1 Parts 2 and 20 and 27. The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

Part 20, Commercial Mobile Services

§ 20.21 Signal Boosters

Part 27; Miscellaneous Wireless Communications Services

Subpart C – Technical standards

§ 27.50 – Power and duty cycle limits

§ 27.54 – Frequency stability

§ 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, 2024-11-20.
- FCC Public Notice 935210 applying "Measurement guidance for industrial and non-consumer signal booster, repeater and amplifier devices" 935210 D05, 2020-04-03.
- FCC Public Notice 971168 applying "Measurement guidance for certification of licensed digital transmitters" 971168 D01, 2018-04-09.

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- ANSI C63.26: 2015 "American National Standard for Compliance Testing of Transmitters Used in Licensec Radio Services"
- RSS-139 Issue 4 "Advanced Wireless Services Equipment Operating in the Bands 1710-1780 MHz and 2110-2200 MHz"
- SRSP-513 Issue 3 "Technical Requirements for Advanced Wireless Services (AWS) in the Bands 1710-1780 MHz and 2110-2180 MHz"
- RSS-GEN Issue 5 "General Requirements for Compliance of Radio Apparatus"
- RSS-131 Issue 4 "Zone Enhancers"

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1.2 DECLARATION TO THE TESTS IN THIS REPORT

A similar type of signal booster with the AWS band, UAP-XR was tested in all required tests, see test report "2024-0451-EMC-TR-25-0067-V01".

The difference between UAP-XR and UAP-R is, that UAP-XR has one connector for an external antenna and UAP-R has two internal antennas connected via a BALUN to the internal RF output.

Therefore the power of each antenna output connector of the UAP-R is less than the output power of the UAP-XR at its one antenna connector.

In this report the values of the antenna port with the most output power are shown.

Because of the similarity of the two types only the most important tests regarding the conducted tests were performed.



1.3 FCC-ISED CORRELATION TABLE

Correlation of measurement requirements for Industrial signal booster from FCC and ISED Canada

Measurement	FCC reference	ISED reference
Effective radiated power, mean output power and zone enhancer gain	§ 27.50 KDB 935210 D05 v01r04: 3.5	RSS-GEN Issue 5, 6.12 RSS-139 Issue 4, 5.5 SRSP-513, Issue 3, 6.1.3
Peak to Average Ratio	§ 27.50	RSS-139 Issue 4, 5.5
Occupied bandwidth Input-versus-output spectrum	§ 2.1049 KDB 935210 D05 v01r04: 3.4	RSS-GEN Issue 5, 6.7 RSS-131 Issue 4: 9.2
Conducted spurious Emission at Antenna Terminal	§ 2.1051 § 27.53 KDB 935210 D05 v01r04: 3.6	RSS-GEN Issue 5, 6.13 RSS-139 Issue 4, 5.6
Out-of-band emissions limits	§ 2.1051 § 27.53 KDB 935210 D05 v01r04: 3.6	RSS-GEN Issue 5, 6.13 RSS-139 Issue 4, 5.6
Out-of-band rejection	KDB 935210 D05 v01r04: 3.3	RSS-131 Issue 4: 9.1
All measurements	ANSI 63.26	ANSI 63.26

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**BUREAU
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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

Final Result**OP-Mode**

Frequency Band, Direction, Input Power, Signal Type
AWS 1700, RF downlink, 0.3 dB < AGC, Wideband
AWS 1700, RF downlink, 3 dB > AGC, Wideband
AWS 1700, RF downlink, 0.3 dB < AGC, Narrowband
AWS 1700, RF downlink, 3 dB > AGC, Narrowband
AWS 1700, RF downlink, 0.3 dB < AGC, Wideband 5G
AWS 1700, RF downlink, 3 dB > AGC, Wideband 5G

FCC ISED

Passed	Passed

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

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

Final Result

AWS 1700, RF downlink, 0.3 dB < AGC, Wideband
AWS 1700, RF downlink, 3 dB > AGC, Wideband
AWS 1700, RF downlink, 0.3 dB < AGC, Narrowband
AWS 1700, RF downlink, 3 dB > AGC, Narrowband
AWS 1700, RF downlink, 0.3 dB < AGC, Wideband 5G
AWS 1700, RF downlink, 3 dB > AGC, Wideband 5G

Passed	Passed

47 CFR CHAPTER I FCC PART 2 § 2.1049

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
AWS 1700, RF downlink, 0.3 dB < AGC, Wideband
AWS 1700, RF downlink, 3 dB > AGC, Wideband
AWS 1700, RF downlink, 0.3 dB < AGC, Narrowband
AWS 1700, RF downlink, 3 dB > AGC, Narrowband
AWS 1700, RF downlink, 0.3 dB < AGC, Wideband 5G
AWS 1700, RF downlink, 3 dB > AGC, Wideband 5G

Passed	Passed

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

Conducted spurious emissions at antenna terminals

The measurement was performed according to ANSI C63.26

Final Result

OP-Mode

Frequency Band, Direction, Input Power, Signal Type

	FCC	ISED
AWS 1700, low, RF downlink, Wideband	Passed	Passed
AWS 1700, mid, RF downlink, Wideband	Passed	Passed
AWS 1700, high, RF downlink, Wideband	Passed	Passed
AWS 1700 low, RF downlink, Narrowband	Passed	Passed
AWS 1700, mid, RF downlink, Narrowband	Passed	Passed
AWS 1700, high, RF downlink, Narrowband	Passed	Passed
AWS 1700, low, RF downlink, Wideband 5G	Passed	Passed
AWS 1700, mid, RF downlink, Wideband 5G	Passed	Passed
AWS 1700, high, RF downlink, Wideband 5G	Passed	Passed

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**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

	FCC	ISED
Upper, Band 66 AWS 1700, 1, RF downlink, 0.3 dB < AGC, Wideband	Passed	Passed
Upper, Band 66 AWS 1700, 1, RF downlink, 3 dB > AGC, Wideband	Passed	Passed
Upper, Band 66 AWS 1700, 1, RF downlink, 0.3 dB < AGC, Wideband 5G	Passed	Passed
Upper, Band 66 AWS 1700, 1, RF downlink, 3 dB > AGC, Wideband 5G	Passed	Passed
Upper, Band 66 AWS 1700, 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed	Passed
Upper, Band 66 AWS 1700, 1, RF downlink, 3 dB > AGC, Narrowband	Passed	Passed
Lower, Band 66 AWS 1700, 1, RF downlink, 0.3 dB < AGC, Wideband	Passed	Passed
Lower, Band 66 AWS 1700, 1, RF downlink, 3 dB > AGC, Wideband	Passed	Passed
Lower, Band 66 AWS 1700, 1, RF downlink, 0.3 dB < AGC, Wideband 5G	Passed	Passed
Lower, Band 66 AWS 1700, 1, RF downlink, 3 dB > AGC, Wideband 5G	Passed	Passed
Lower, Band 66 AWS 1700, 1, RF downlink, 0.3 dB < AGC, Narrowband	Passed	Passed
Lower, Band 66 AWS 1700, 1, RF downlink, 3 dB > AGC, Narrowband	Passed	Passed
Upper, Band 66 AWS 1700, 2, RF downlink, 0.3 dB < AGC, Wideband	Passed	Passed
Upper, Band 66 AWS 1700, 2, RF downlink, 3 dB > AGC, Wideband	Passed	Passed
Upper, Band 66 AWS 1700, 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed	Passed
Upper, Band 66 AWS 1700, 2, RF downlink, 3 dB > AGC, Narrowband	Passed	Passed
Lower, Band 66 AWS 1700, 2, RF downlink, 0.3 dB < AGC, Wideband	Passed	Passed
Lower, Band 66 AWS 1700, 2, RF downlink, 3 dB > AGC, Wideband	Passed	Passed
Lower, Band 66 AWS 1700, 2, RF downlink, 0.3 dB < AGC, Narrowband	Passed	Passed
Lower, Band 66 AWS 1700, 2, RF downlink, 3 dB > AGC, Narrowband	Passed	Passed

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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

Band 66 AWS 1700, RF downlink

Setup

FCC

ISED

Passed

Passed

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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 Čečka

2.3 MANUFACTURER DATA

Company Name: Please see applicant data.

Address:

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3 TEST OBJECT DATA

3.1 GENERAL EUT DESCRIPTION

Kind of Device product description	Cellular repeater
Product name	Cellular repeater
Type	UAP-R
Declared EUT data by the supplier	
General Product Description	<p>The EUT is an industrial signal booster supporting the following:</p> <p>Band 30/WCS 2300: 2350 – 2360 MHz</p> <p>Band 41 (BRS 2500), Broadband Radio Service:</p> <ul style="list-style-type: none">• Lower Band Segment (LBS): 2496- 2568 MHz (Range for FCC)• Lower Band Segment (LBS): 2500- 2568 MHz (Range for ISED)• Middle Band Segment (MBS): 2572- 2614 MHz• Upper Band Segment (UBS): 2618 – 2690 MHz <p>Band 25/PCS 1900</p> <p>Band 66/AWS 1700</p> <p>A RF operation is only supported for the downlink.</p>
Booster Type	Industrial signal booster
Voltage Type	DC, supply about PoE
Voltage Level	-60 V - -36 V, -57 V nominal
Maximum Output Donor Port [Uplink]	-
Maximum Output Server Port [Downlink]	18 dBm in all bands at amplifier output. before the BALUN, after the BALUN about 13 dBm per antenna connection port.
Maximum Gain [Uplink]	-
Maximum Gain [Downlink]	20 dB in all bands at amplifier output before the BALUN, after the BALUN about 15 dB per antenna connection port.

After the amplifier output the signal is routed to a BALUN with two antenna port connectors. Two built in dipole antennas are connected to the antenna port connectors of the BALUN.

The measurements were taken at the antenna port with the higher output level, here Antenna port 1.

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

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3.2 EUT MAIN COMPONENTS

Sample Parameter	Value
Serial Number	SZBEBE2508A0005
HW Version	7862370-00 Rev: 00
SW Version	01.03.0012
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
-	-	-

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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; HD20882	Power supply rack
AUX1	CommScope; ION-E WCS-2; SZAEAJ1952A0032	Power supply rack
AUX3	GE Power Electronics Inc.; CAR1212FPBC-Z; FK69111	Power module
AUX4	GE Energy; CP2000AC54TEP-CM; LBLNPW13KZ07004506	Power module
AUX5	CommScope; ION E SUI; (e1)MA34	Ethernet module
AUX6	CommScope; ION E CAT; SZBEAE1810A0009	PoE module
AUX8	CommScope, ION E RFD, SZBEAG1825A0004	RF card plug-in module
AUX8	CommScope, ION E RFD, SZBEA G1849A0043	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

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3.6 OPERATING MODES

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

3.6.1 TEST CHANNELS

Band	Direction	Lower Frequency Band Edge [MHz]	Upper Frequency Band Edge [MHz]	Center Frequency [MHz]	Port
66, AWS 1700	Downlink	2110.00	2180	2145.00	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 43.6 MHz

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3.6.3 AUTOMATIC GAIN CONTROL LEVELS

3.6.4 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
66	Downlink	Narrowband	-0.4	-0.7	2.7	2145.0	Mid
66	Downlink	Wideband	-0.7	-1.0	2.4	2145.0	
66	Downlink	Wideband 5G	-0.3	-0.6	2.7	2145.0	
66	Downlink	Narrowband	0.4	0.1	3.4	2110.2	Low
66	Downlink	Wideband	0.6	0.3	3.6	2112.5	
66	Downlink	Wideband 5G	0.3	0.0	3.0	2132.5	
66	Downlink	Narrowband	0.4	0.1	3.4	2179.8	High
66	Downlink	Wideband	0.2	-0.1	3.2	2177.5	
66	Downlink	Wideband 5G	-0.1	-0.4	2.6	2157.5	
66	Downlink	Narrowband	-0.7	-1.0	2.4	2152.6	Max.Power
66	Downlink	Wideband	-0.7	-1.0	2.4	2152.6	
66	Downlink	Wideband 5G	-0.3	-0.6	2.7	2145.0	

Remark:

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 was 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 were performed, because of the signal width.

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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.

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4 DESCRIPTION OF EMC TEST CENTRE

4.1 CLIMATIC CONDITIONS DURING MEASUREMENTS

The climatic conditions were within the following ranges.

For ESD testing, the conditions during the test were denoted in the corresponding chapter.

Ambient temperature: 25 ± 10 °C

Relative humidity: 20 – 60 %

Air pressure: 860 - 1060 hPa

4.2 CONFORMITY STATEMENT/DECISION RULE

4.2.1 EMISSION

If the standard or the customer defines no decision rule, the laboratory applies a decision rule following the "Binary Statement for Simple Acceptance Rule ($w=0$)" (chapter 4.2.1) of ILAC Guidelines on Decision Rules and Statements of Conformity (ILAC-G8:09/2019). If the measured value is at the limit value, it is evaluated as PASS. The client has agreed with application of the decision rule prior testing and demanded a statement of conformity by the test laboratory.

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4.3 MEASUREMENT UNCERTAINTIES

KDB 935210 D05	Test laboratory
Power measurement	0,68 dB
Measuring AGC threshold level	0,90 dB
Out of band rejection	0,90 dB
Input-versus-output signal comparison	0,91 dB
Mean power output	0,90 dB
Measuring out-of-band/out-of-block (including intermodulation) emissions and spurious emissions	0,90 dB
Out-of-band/out-of-block emissions conducted measurements	0,90 dB
Spurious emissions conducted	2,18 dB
Spurious emissions radiated measurements	5,38 dB
Total frequency uncertainty	2×10^{-7}

Reference : ECL-MU5.4.6.3-EMC-14-001-V03.00 MU Wireless.xlsx

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5 TEST RESULTS

5.1 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 935210 D05 v01r04: 3.5

Test date: 2025-04-14 – 2025-05-15

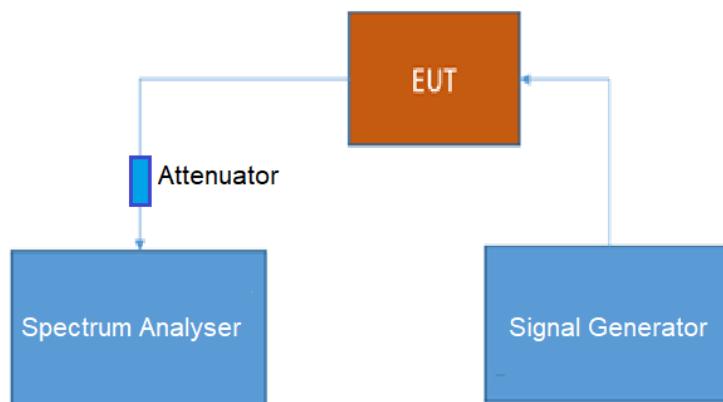
Environmental conditions: 23.6 °C; 25 % r. H./24.0 °C; 26 % r. H.

Test engineer: Thomas Hufnagel

5.1.1 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:



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.

The test results relate only to the tested item. The sample has been provided by the client.
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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

5.1.2 TEST REQUIREMENTS/LIMITS

Part 27; Miscellaneous Wireless Communication Services

Subpart C – Technical standards

§ 27.50

Abstract § 27.50 from FCC:

(d) The following power and antenna height requirements apply to stations transmitting in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz and 2180-2200 MHz bands:

(1) The power of each fixed or base station transmitting in the 1995-2000 MHz, 2110-2155 MHz, 2155-2180 MHz or 2180-2200 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:

- (i) An equivalent isotropically radiated power (EIRP) of 3280 watts when transmitting with an emission bandwidth of 1 MHz or less;
- (ii) An EIRP of 3280 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

(2) The power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:

- (i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;
- (ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

The test results relate only to the tested item. The sample has been provided by the client.

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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Abstract RSS-139 from ISED:

5.5 Transmitter output power

The maximum output power of the equipment shall comply with the limits specified below. In the tables, maximum power refers to the equivalent isotropically radiated power (e.i.r.p.) or total radiated power (TRP), measured in terms of average values.

The limits in this RSS are specified for the purpose of certification and may not apply to all deployment scenarios. Consult SRSP-513 and SRSP-519 for more details on the bands 2110-2180 MHz and 2180-2200 MHz respectively.

Table 3: Maximum power of equipment in the band 1710-1780 MHz

Equipment type	Maximum power
Fixed station and base station	30 dBm e.i.r.p./channel bandwidth
Subscriber equipment	30 dBm e.i.r.p./channel bandwidth

Table 4: Maximum power of equipment in the band 2110-2180 MHz

Equipment type	Maximum power
Non-AAS fixed station and base station	65 dBm e.i.r.p./MHz
AAS fixed station and base station	46 dBm TRP/MHz
Subscriber equipment	30 dBm e.i.r.p./channel bandwidth

Table 5: Maximum power of equipment in the band 2180-2200 MHz

Equipment type	Maximum power
Non-AAS base station	65 dBm e.i.r.p./MHz
AAS base station	46 dBm TRP/MHz

The test results relate only to the tested item. The sample has been provided by the client.

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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

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Abstract SRSP-513 from ISED:

6.1.3 E.i.r.p. limits and antenna height limits for non-AAS systems

19. In non-AAS uncorrelated transmission, multiple non-AAS antennas can be used at a station to each transmit different digital data in a given symbol period (i.e. space-time codes) or independent parallel data streams over the same frequency bandwidth in order to increase data rates (i.e. spatial multiplexing), or to form any other transmission mode where signals from different antennas are completely uncorrelated. For these uses, the e.i.r.p. shall be calculated based on the aggregate power conducted across all antennas and the maximum antenna gain (G_{max}).

6.1.3 E.i.r.p. limits and antenna height limits for non-AAS systems

20. For fixed and base stations operating in the band 2110-2180 MHz with a channel bandwidth equal to or less than 1 MHz, the maximum permissible e.i.r.p. is 62 dBm, with an antenna height above average terrain (HAAT) of up to 300 m.

21. For fixed and base stations operating in the band 2110-2180 MHz with a channel bandwidth greater than 1 MHz, the maximum permissible e.i.r.p. is 62 dBm/MHz (i.e. no more than 62 dBm e.i.r.p. in any 1 MHz band segment), with an antenna HAAT of up to 300 m.

22. Fixed and base stations operating in the band 2110-2180 MHz and located in geographic areas at a distance greater than 26 km from large or medium population centres may increase their e.i.r.p. to a maximum of 65 dBm/MHz (i.e. no more than 65 dBm e.i.r.p. in any 1 MHz band segment), with an antenna HAAT of up to 300 m. According to Statistics Canada's [Census Dictionary](#), a large urban population centre has a population of 100,000 or more and a population density of 400 persons or more per km^2 , and a medium population centre has a population of between 30,000 and 99,999 and a population density of 400 persons or more per km^2 . MapInfo files describing the [boundaries of these centres](#) are available online.

23. Within 26 km of any large or medium population centre, fixed and base stations may operate with an increased e.i.r.p. if more than 50% of the population within a particular sector's coverage is located outside a large or medium population centre. The population within the sector's coverage may be determined using the MapInfo spectrum grid-cell data available online at ISED's [Service areas for competitive licensing](#) web page.

24. Fixed and base stations operating with an increased e.i.r.p., as specified above, must not be used to provide coverage to large and medium population centres. However, some incidental coverage of these population centres by stations operating with an increased e.i.r.p. is permitted.

25. The above provisions to allow increased e.i.r.p. limits also apply to fixed and base stations with a channel bandwidth equal to or less than 1 MHz. The e.i.r.p. may be increased up to a maximum of 65 dBm.



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Tests performed on UAP-R [AWS 1700]

26. Fixed and base stations with an antenna HAAT exceeding 300 m shall apply a reduction in e.i.r.p. according to the following formula:

$$\text{e.i.r.p.}_{\text{reduction}} = 20 \log_{10}(\text{HAAT}/300) \text{ dB}$$

HAAT of a fixed or base station with multiple antennas shall be calculated based on the measurements of the highest antenna.

The test results relate only to the tested item. The sample has been provided by the client.
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Tests performed on UAP-R [AWS 1700]

5.1.3 TEST PROTOCOL

FCC Table

Band 66 AWS 1700, 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	2164.0	-1.0	13.7	62.1	48.4	14.7
Wideband	3 dB > AGC	2164.0	2.4	13.5	62.1	48.7	11.1
Narrowband	0.3 dB < AGC	2164.0	-1.0	13.8	62.1	48.3	14.8
Narrowband	3 dB > AGC	2164.0	2.4	13.5	62.1	48.6	11.2
Wideband 5G	0.3 dB < AGC	2145.0	-0.6	13.5	62.1	48.6	14.1
Wideband 5G	3 dB > AGC	2145.0	2.7	13.2	62.1	48.9	10.5

For the output power limit the lowest value of the FCC table from § 27.50 is taken. This is 1640 W which equates 62.1. dBm according the given formula:

$$P_{dBm} = 10 \log_{10} \frac{1640 \text{ W}}{0.001 \text{ W}} = \text{dBm}$$

ISED Table

Band 66 AWS 1700, 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	2164.0	-1.0	13.7	62.0	48.3	14.7
Wideband	3 dB > AGC	2164.0	2.4	13.5	62.0	48.6	11.1
Narrowband	0.3 dB < AGC	2164.0	-1.0	13.8	62.0	48.2	14.8
Narrowband	3 dB > AGC	2164.0	2.4	13.5	62.0	48.5	11.2
Wideband 5G	0.3 dB < AGC	2145.0	-0.6	13.5	62.0	48.5	14.1
Wideband 5G	3 dB > AGC	2145.0	2.7	13.2	62.0	48.8	10.5

Remark:

Please see next sub-clause for the measurement plot.

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Tests performed on UAP-R [AWS 1700]

5.1.4 SAMPLE CALCULATION OF OUTPUT POWER

FCC calculation:

Maximum output power (EIRP) in consideration together with the send antennas

The highest power level in the tables above is

$p_{\text{highest}} = 13.7 \text{ dBm}$ at the channel which has the most output power of all channels.

Hereby at an antenna gain of $G_{\text{dBi}} = 9.0 \text{ dB}$ the highest effecitve radiated output power EIRP $p_{\text{EIRP 1CH}}$ of one channel is:

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

This results in:

$$p_{\text{EIRP 1CH}} = 13.7 \text{ dBm} + 9.0 \text{ dB} = 22.7 \text{ dBm}$$

The eqivalent power P is according the given formula:

$$P_{\text{EIRP 1CH}} =$$

$$P_{\text{EIRP 1CH}} [W] = 10 \text{EXP} \left(\frac{p_{\text{EIRP 1CH}} [\text{dBm}]}{10} \right) * 0.001 [W]$$

This results in:

$$P_{\text{EIRP 1CH}} [W] = 10 \text{EXP} \left(\frac{22.7 [\text{dBm}]}{10} \right) * 0.001 [W] = 0.19 \text{ W}$$

MIMO level:

There are two antennas built in the device therefore at MIMO the maximum power is:

$$P_{\text{MIMO}} = 2 * P_{\text{EIRP 1CH}} = 2 * 0.19 \text{ W} = 0.38 \text{ W}$$

Final result of this consideration:

$P_{\text{EIRP all channels}} = 0.38 \text{ W} < 1640 \text{ W/MHz}$, hereby 1640 W/MHz is the highest allowed limit in this band which equates 62.1 dBm/MHz.

The DUT doesn't exceed the limit.



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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

ISED calculation:

Maximum output power (EIRP) in consideration together with the send antennas

The highest power level in the tables above is

$p_{\text{highest}} = 13.7 \text{ dBm}$ at the channel which has the most output power of all channels.

Hereby at an antenna gain of $G_{\text{dBi}} = 9.0 \text{ dB}$ the highest effective radiated output power EIRP $p_{\text{EIRP 1CH}}$ of one channel is:

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

This results in:

$$p_{\text{EIRP 1CH}} = 13.7 \text{ dBm} + 9.0 \text{ dB} = 22.7 \text{ dBm}$$

MIMO level:

There are two antennas built in the device therefore at MIMO the maximum power is:

$$p_{\text{MIMO}} = p_{\text{EIRP 1 CH}} + 3 \text{ dB} = 22.7 \text{ dBm} + 3 \text{ dB} = 25.7 \text{ dBm}$$

Final result of this consideration:

$p_{\text{EIRP all channels}} = 25.7 \text{ dBm} < 61.0 \text{ dBm/MHz}$, hereby the limit of 61.0 dBm/MHz equates the ISED limit of 68 dBm/5 MHz

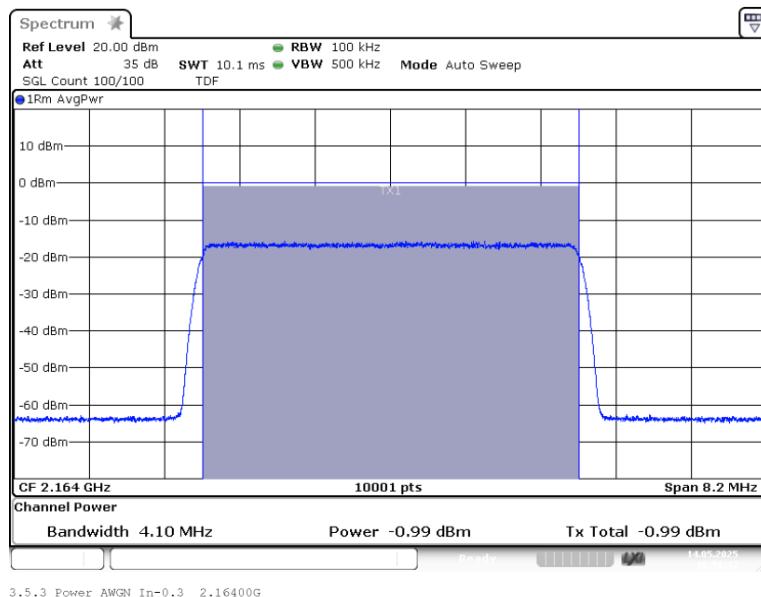
The DUT doesn't exceed the limit.

Test Report No.: 25-0092

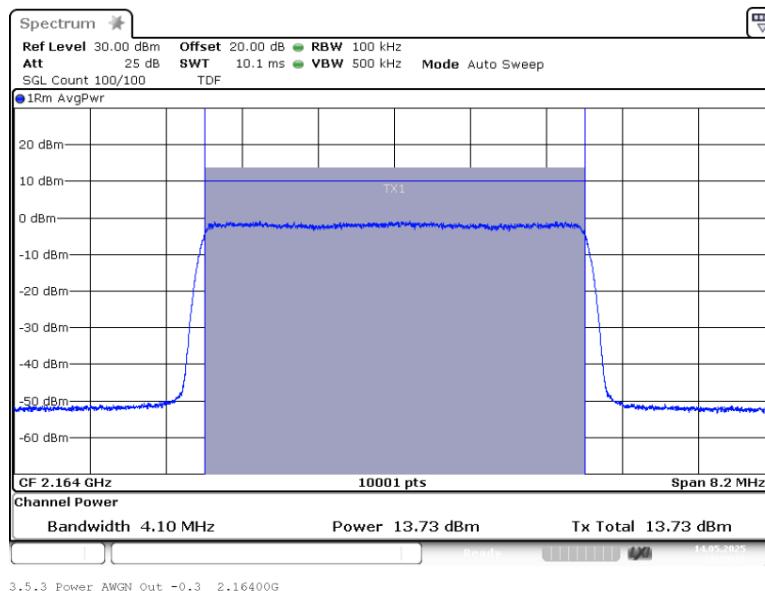
Tests performed on UAP-R [AWS 1700]

5.1.5 MEASUREMENT PLOT
Combined FCC and ISED Plots

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Band edge: f0; Mod: AWGN;
Input power 0.3 dB < AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Band edge: f0; Mod: AWGN;
Output power 0.3 dB < AGC



The test results relate only to the tested item. The sample has been provided by the client.

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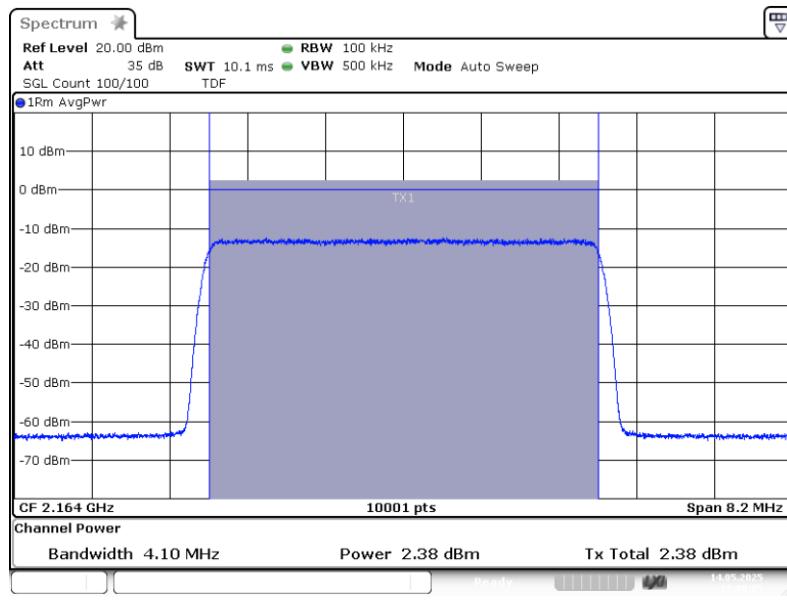


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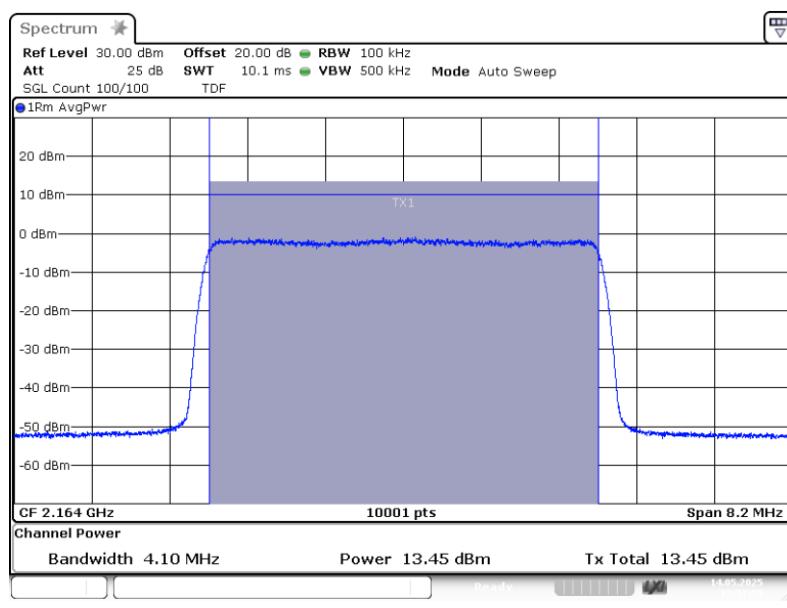
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Band edge: f0; Mod: AWGN;
Input power 3 dB > AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Band edge: f0; Mod: AWGN;
Output power 3 dB > AGC



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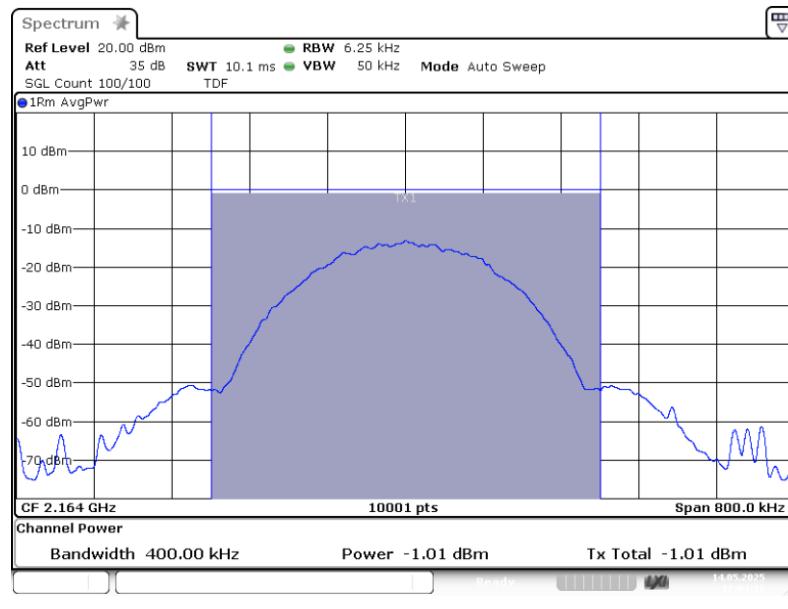


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Test Report No.: 25-0092

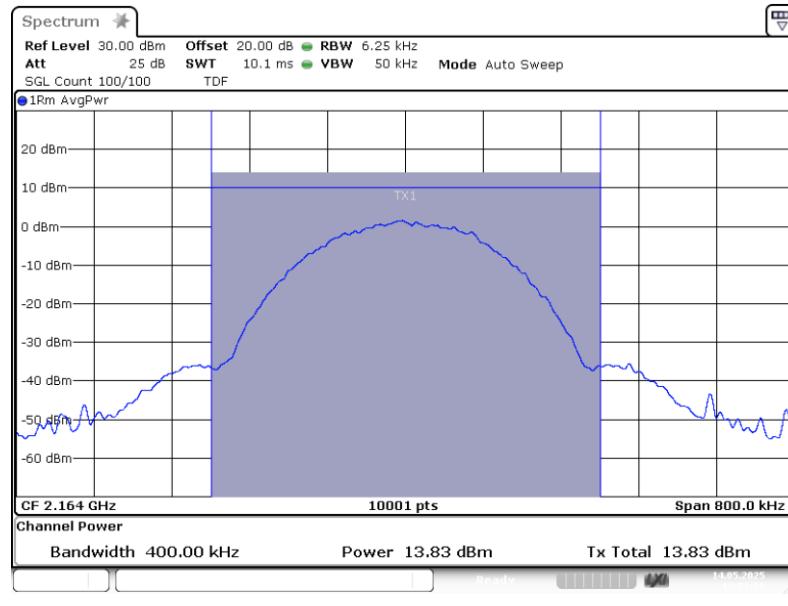
Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Band edge: f0; Mod: GSM;
Input power 0.3 dB < AGC



3.5.3 Power GSM In=0.3 2.1640G

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Band edge: f0; Mod: GSM;
Output power 0.3 dB < AGC



3.5.3 Power GSM Out -0.3 2.1640G

The test results relate only to the tested item. The sample has been provided by the client.

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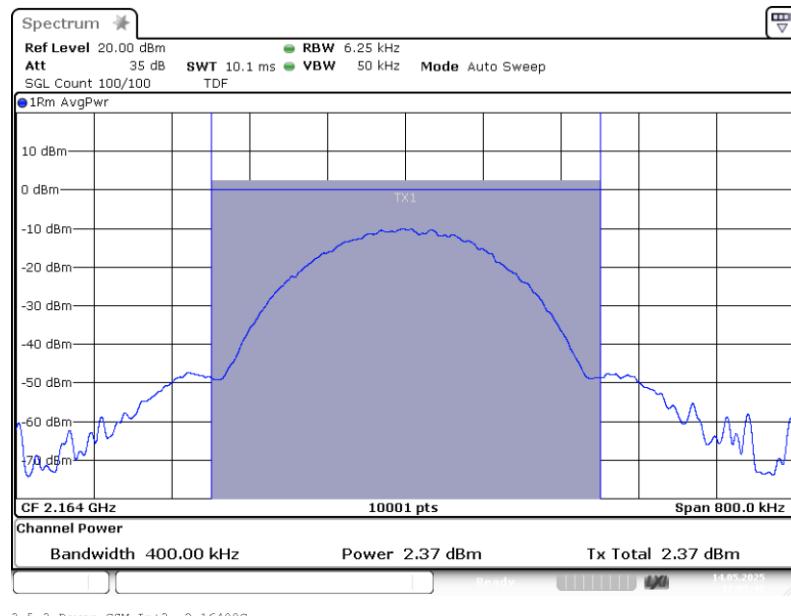


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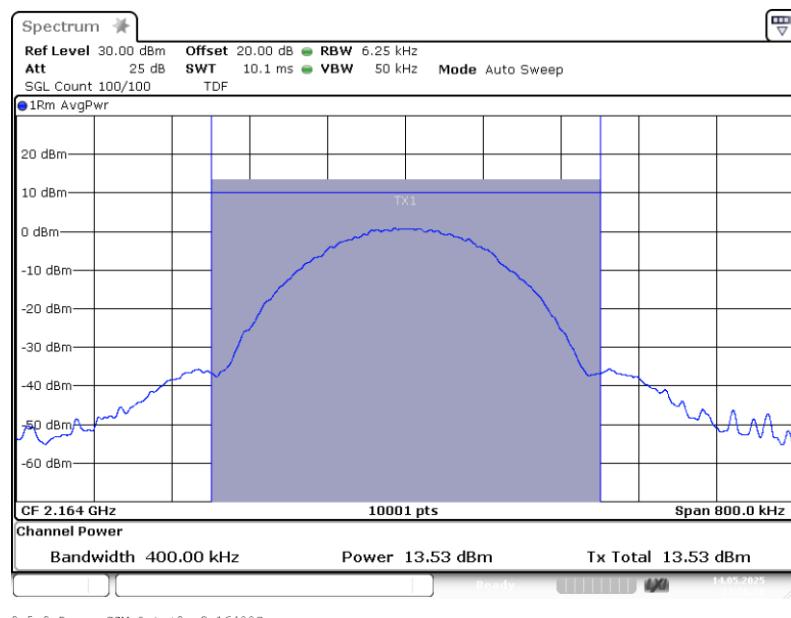
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Band edge: f0; Mod: GSM;
Input power 3 dB > AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Band edge: f0; Mod: GSM;
Output power 3 dB > AGC



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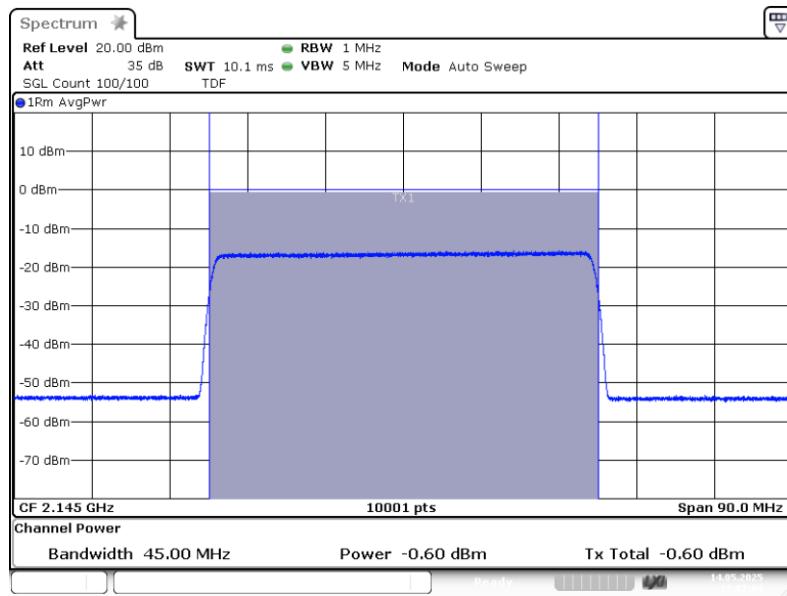


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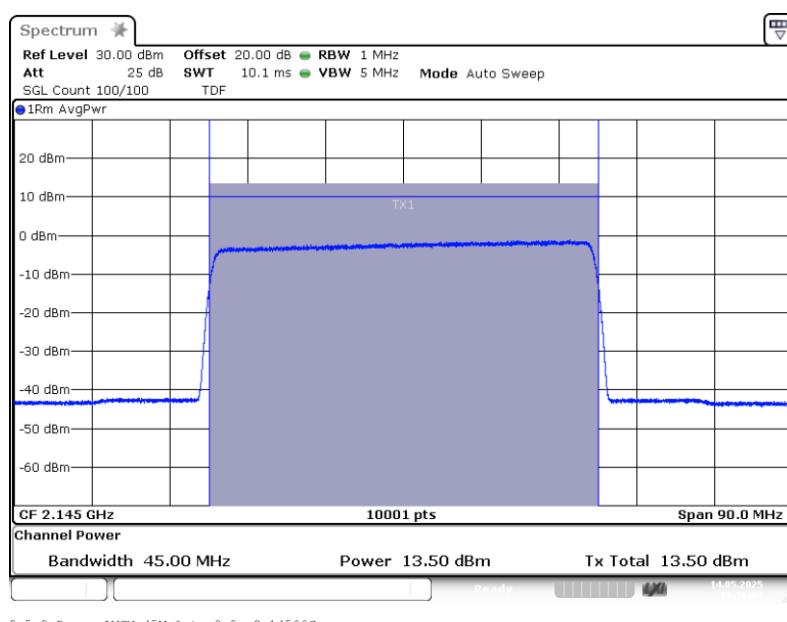
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN 45M;
Input power 0.3 dB < AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN 45M;
Output power 0.3 dB < AGC



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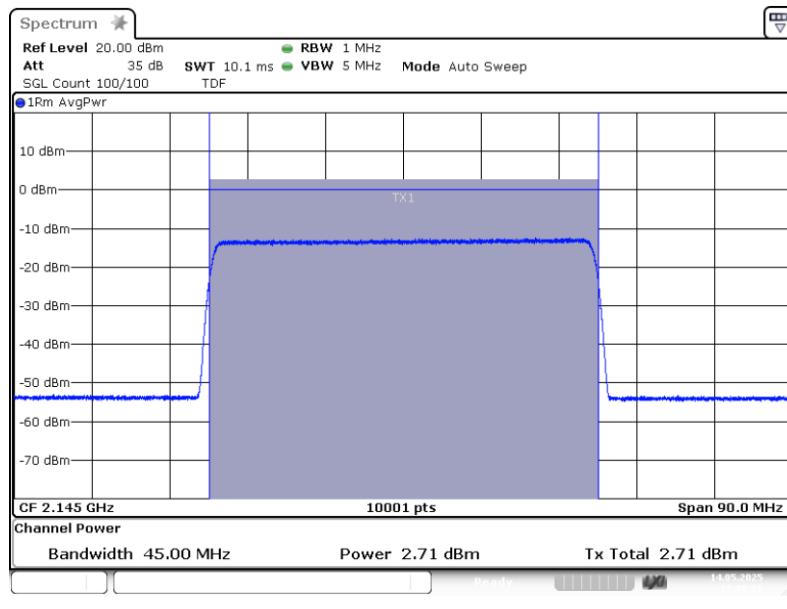


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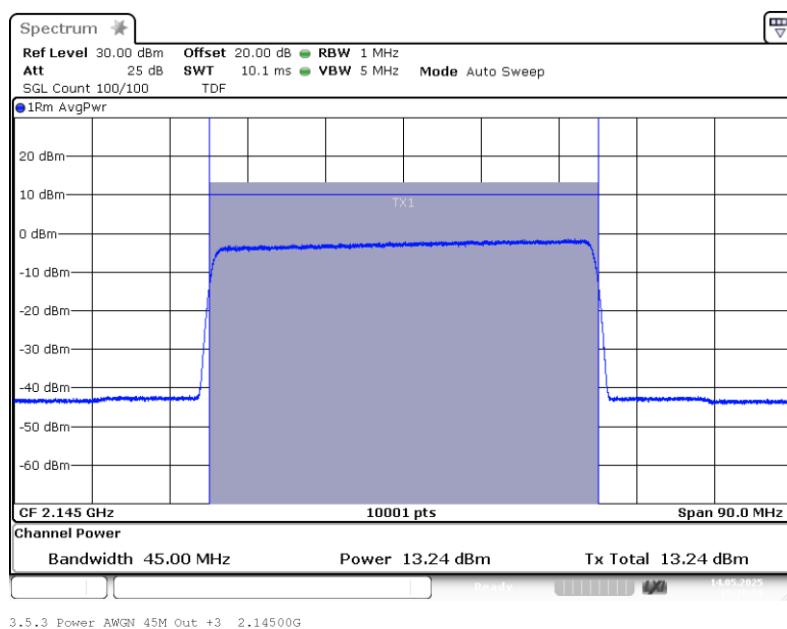
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN 45M;
Input power 3 dB > AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN 45M;
Output power 3 dB > AGC



The test results relate only to the tested item. The sample has been provided by the client.

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Tests performed on UAP-R [AWS 1700]

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5.1.6 TEST EQUIPMENT USED

- Conducted

The test results relate only to the tested item. The sample has been provided by the client.
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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

5.2 PEAK TO AVERAGE RATIO

Standard FCC Part 27, §27.50

The test was performed according to:

ANSI C63.26

Test date: 2025-04-14 – 2025-05-15

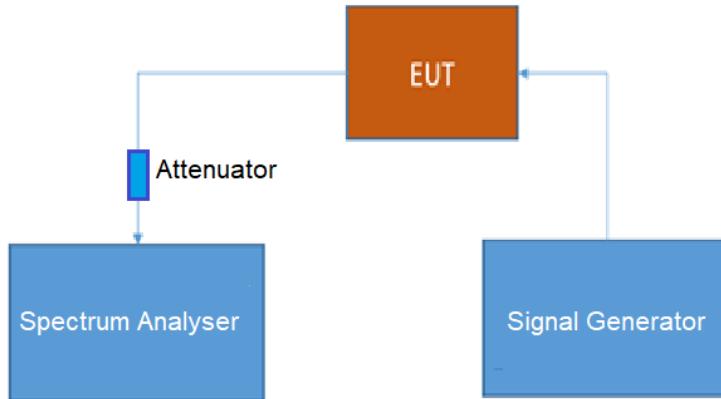
Environmental conditions: 23.6 °C; 25 % r. H./24.0 °C; 26 % r. H.

Test engineer: Thomas Hufnagel

5.2.1 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:



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.

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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

5.2.2 TEST REQUIREMENTS/LIMITS

Subpart C – Technical standards

§ 27.50

Abstract § 27.50 from FCC:

(d) The following power and antenna height requirements apply to stations transmitting in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz and 2180-2200 MHz bands:

(5) Equipment employed must be authorized in accordance with the provisions of §24.51. 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 (d)(6) 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.

Abstract RSS-139 from ISED:

5.5 Transmitter output power

In addition, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.



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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

5.2.3 TEST PROTOCOL

Band 66 AWS 1700, downlink						
Signal type	Input power	Frequency [MHz]	Input power [dBm]	PAPR [dB]	Limit PAPR [dB]	Margin to limit [dB]
Wideband	0.3 dB < AGC	2164.0	-1.0	8.4	13.0	4.6
Wideband	3 dB > AGC	2164.0	2.4	8.4	13.0	4.6
Narrowband	0.3 dB < AGC	2164.0	-1.0	0.2	13.0	12.8
Narrowband	3 dB > AGC	2164.0	2.4	0.2	13.0	12.8
Wideband 5G	0.3 dB < AGC	2145.0	-0.6	8.4	13.0	4.6
Wideband 5G	3 dB > AGC	2145.0	2.7	8.4	13.0	4.6

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

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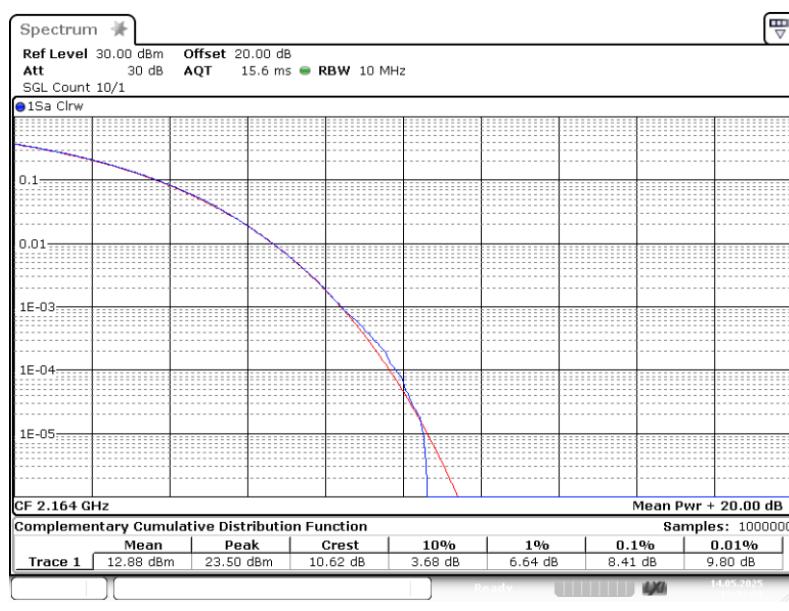
Tests performed on UAP-R [AWS 1700]

5.2.4 MEASUREMENT PLOT

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: AWGN;
PAPR 0.3 dB < AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: AWGN;
PAPR 3 dB > AGC



The test results relate only to the tested item. The sample has been provided by the client.

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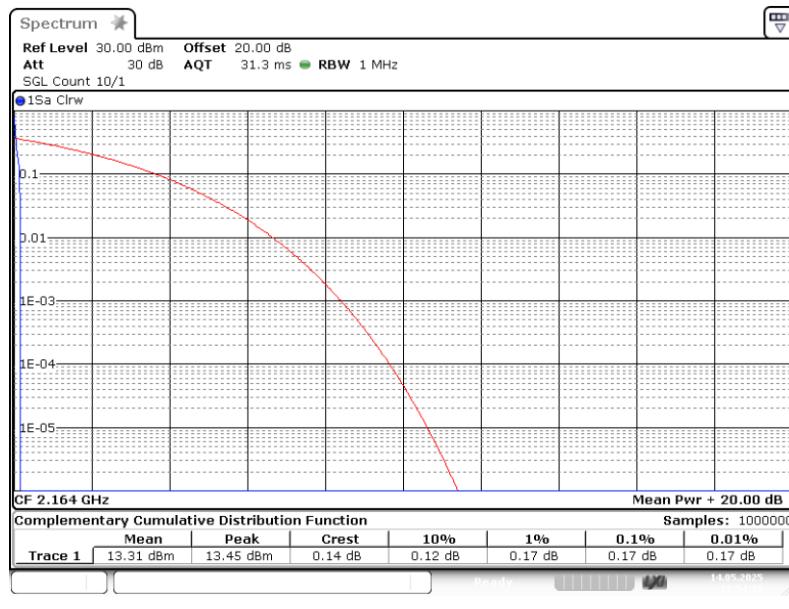


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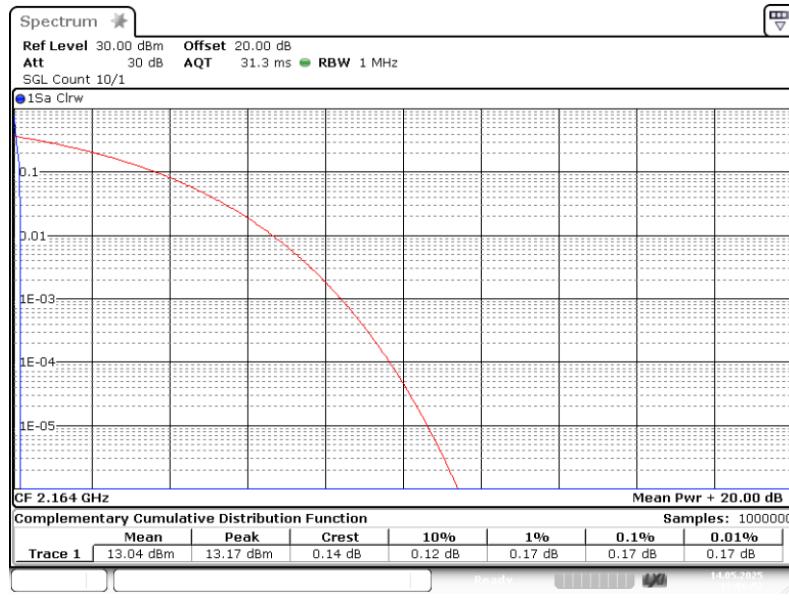
Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: GSM;
PAPR 0.3 dB < AGC



4.0 PAPR GSM Out -0.3 2.164G

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: GSM;
PAPR 3 dB > AGC



4.0 PAPR GSM Out +3 2.164G

The test results relate only to the tested item. The sample has been provided by the client.

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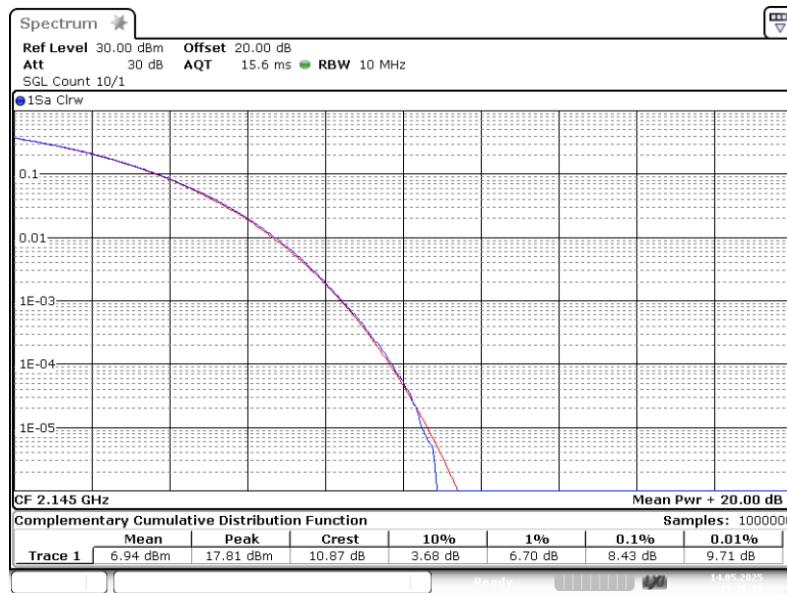


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Test Report No.: 25-0092

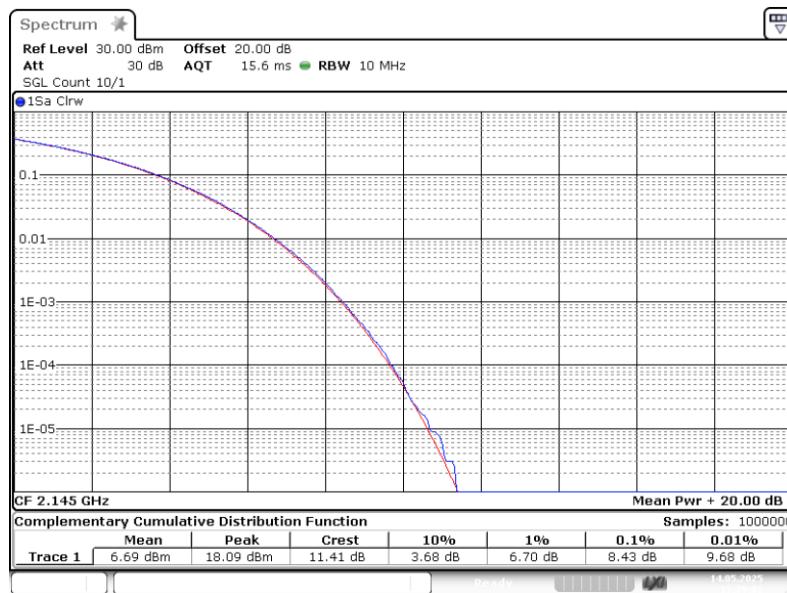
Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Bande edge: mid; Mod: AWGN 45M;
PAPR 0.3 dB < AGC



4.0 PAPR AWGN 45M Out -0.3 2.145G

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Bande edge: mid; Mod: AWGN 45M;
PAPR 3 dB > AGC



4.0 PAPR AWGN 45M Out +3 2.145G

The test results relate only to the tested item. The sample has been provided by the client.

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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

5.2.5 TEST EQUIPMENT USED

- Conducted

The test results relate only to the tested item. The sample has been provided by the client.
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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

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5.3 OCCUPIED BANDWIDTH/INPUT-VERSUS-OUTPUT SPECTRUM

Standard FCC Part 2.1049; Occupied bandwidth

The test was performed according to:

ANSI C63.26, KDB 935210 D05 v01r04: 3.4

Test date: 2025-04-14 – 2025-05-15

Environmental conditions: 23.6 °C; 25 % r. H./24.0 °C; 26 % r. H.

Test engineer: Thomas Hufnagel

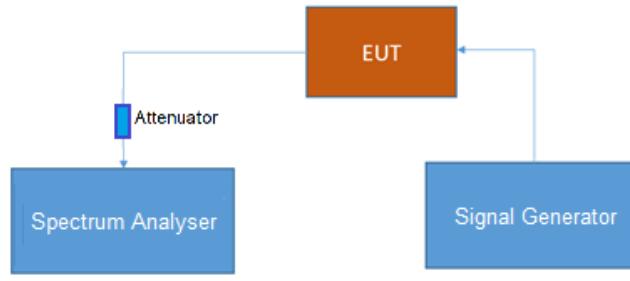
5.3.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the occupied bandwidth in comparison between the input and output signal of a booster.

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



Test Setup step 1: Measuring characteristics of test signals



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.

The test results relate only to the tested item. The sample has been provided by the client.
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Tests performed on UAP-R [AWS 1700]

5.3.2 TEST REQUIREMENTS/LIMITS

Abstract § 2.1049 from FCC:

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 0.3 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.

The test results relate only to the tested item. The sample has been provided by the client.

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Abstract RSS-GEN from ISED:

RSS-GEN; 6.7 Occupied Bandwidth

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

The test results relate only to the tested item. The sample has been provided by the client.

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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Abstract RSS-131 from ISED:

RSS-131; 9.2 Input-versus-output spectrum

The spectral growth of the 26 dB bandwidth or occupied bandwidth of the output signal shall be less than 5% of the input signal spectrum.

5.3.3 TEST PROTOCOL

Band 66 AWS 1700, 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	2145	4390.9	4387.2	3.7	205.0	201.3
Wideband	3 dB > AGC	2145	4385.4	4388.4	3.1	205.0	201.9
Narrowband	0.3 dB < AGC	2145	315.7	316.5	0.8	10.0	9.2
Narrowband	3 dB > AGC	2145	317.4	312.9	4.5	10.0	5.5
Wideband 5G	0.3 dB < AGC	2145	46012.4	46025.9	13.5	1195.0	1181.5
Wideband 5G	3 dB > AGC	2145	46032.7	46032.7	0.0	1195.0	1195.0

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



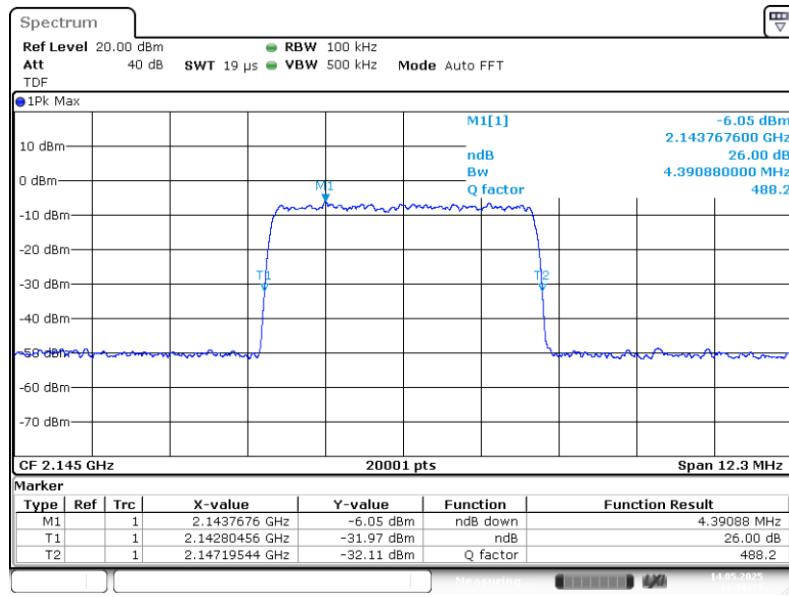
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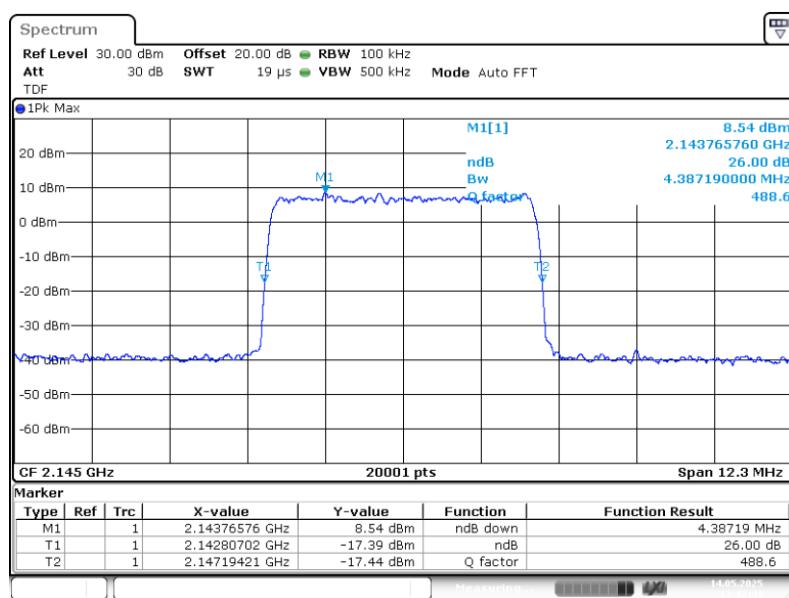
Tests performed on UAP-R [AWS 1700]

5.3.4 MEASUREMENT PLOT

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN;
Input OCBw 0.3 dB < AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN;
Output OCBw 0.3 dB < AGC



The test results relate only to the tested item. The sample has been provided by the client.

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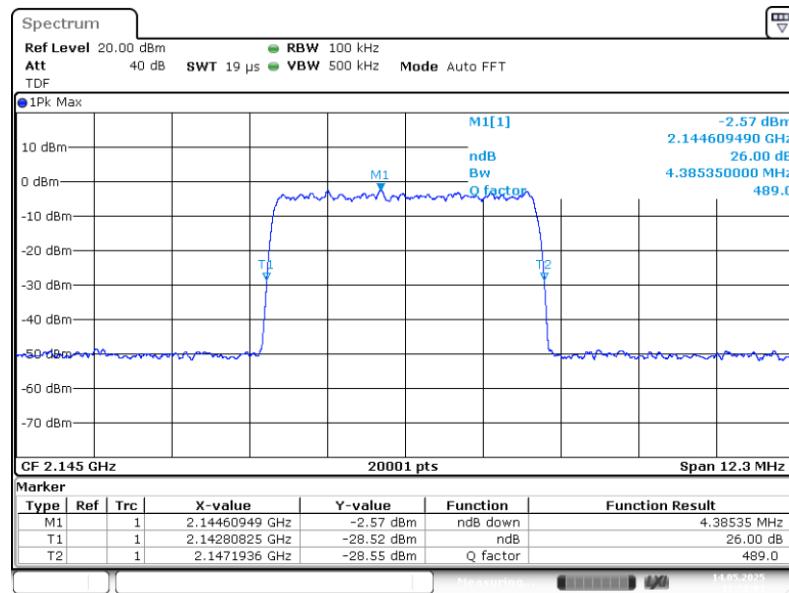


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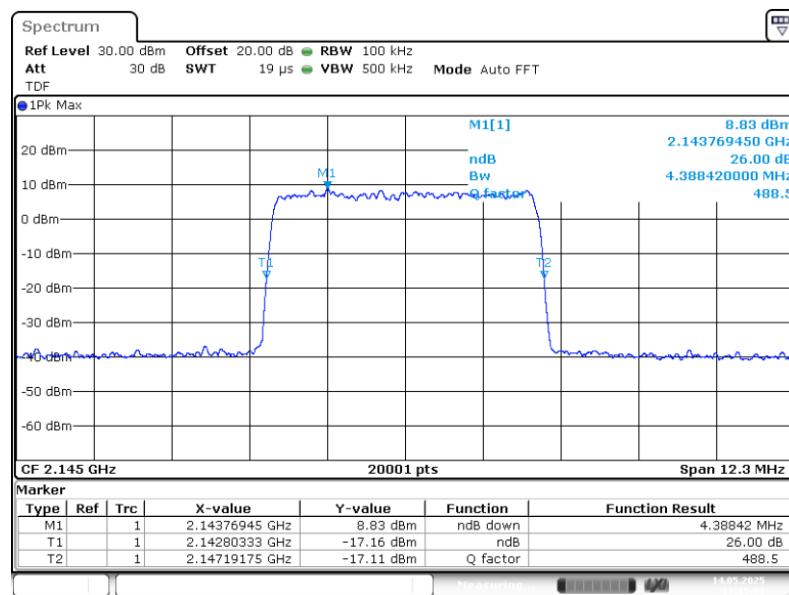
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN;
Input OCBw 3 dB > AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN;
Output OCBw 3 dB > AGC



The test results relate only to the tested item. The sample has been provided by the client.

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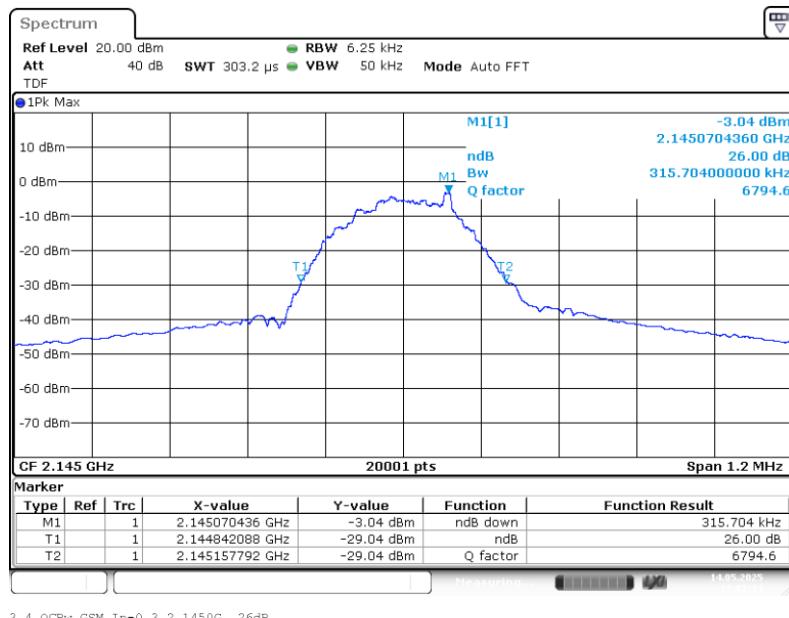


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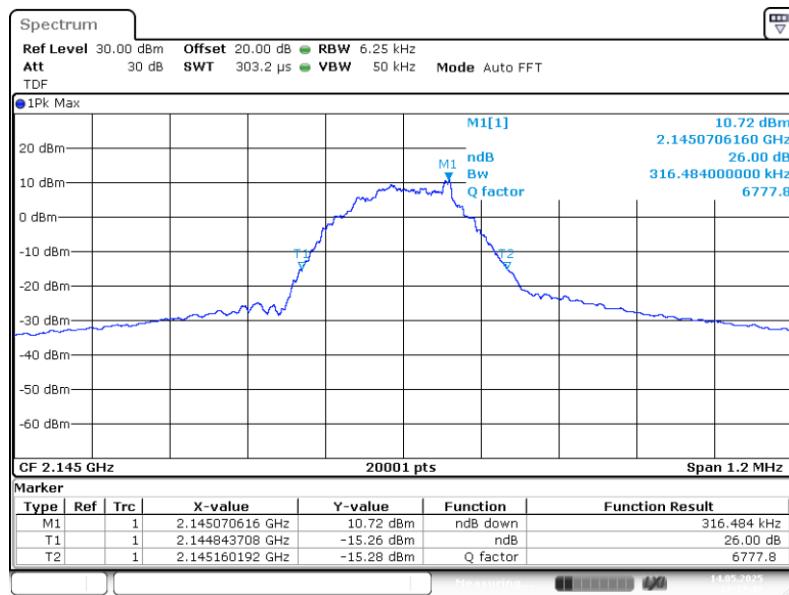
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: GSM;
Input OCBw 0.3 dB < AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: GSM;
Output OCBw 0.3 dB < AGC



The test results relate only to the tested item. The sample has been provided by the client.

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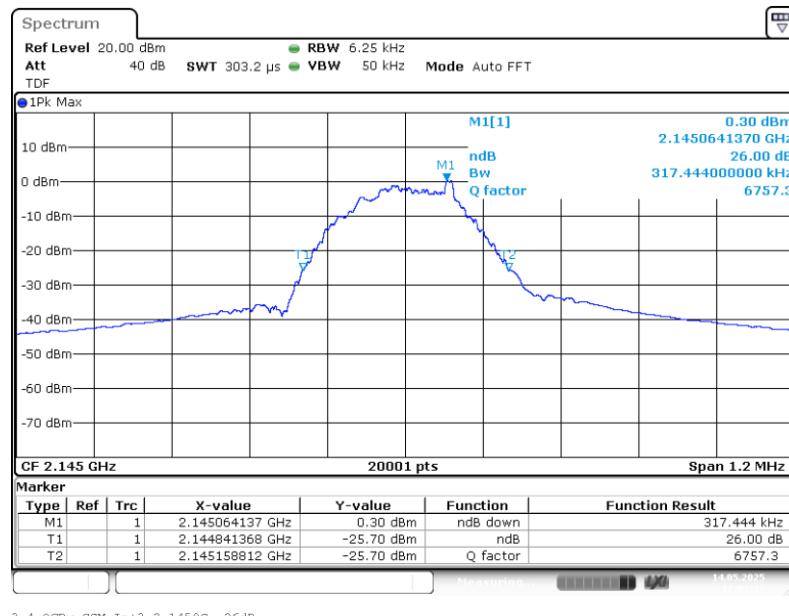


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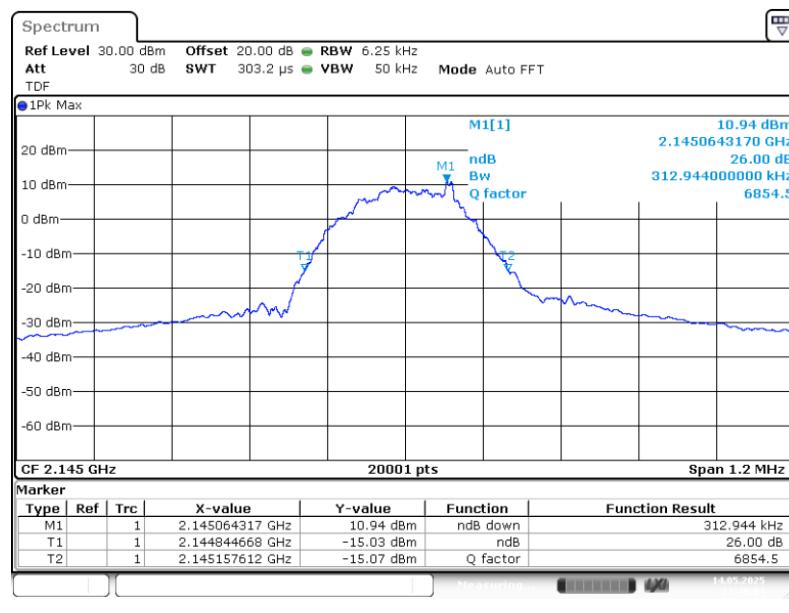
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: GSM;
Input OCBw 3 dB > AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: GSM;
Output OCBw 3 dB > AGC



The test results relate only to the tested item. The sample has been provided by the client.

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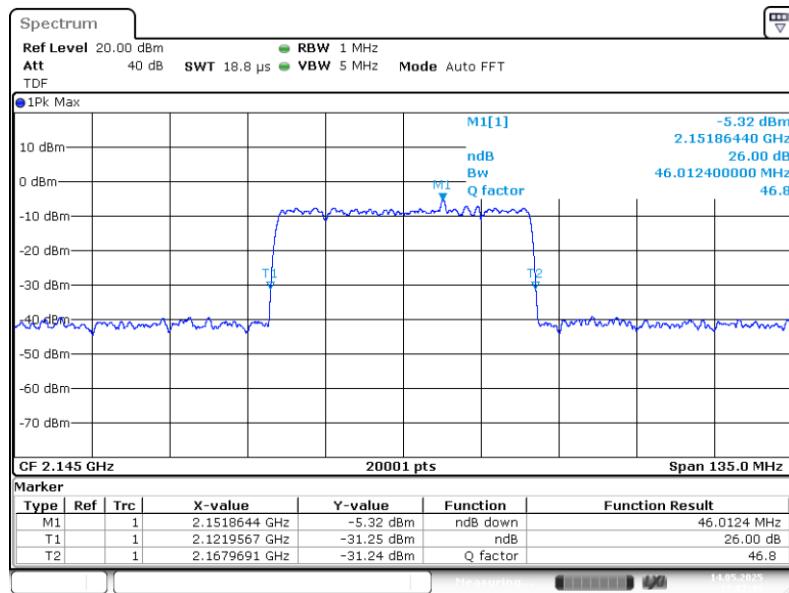


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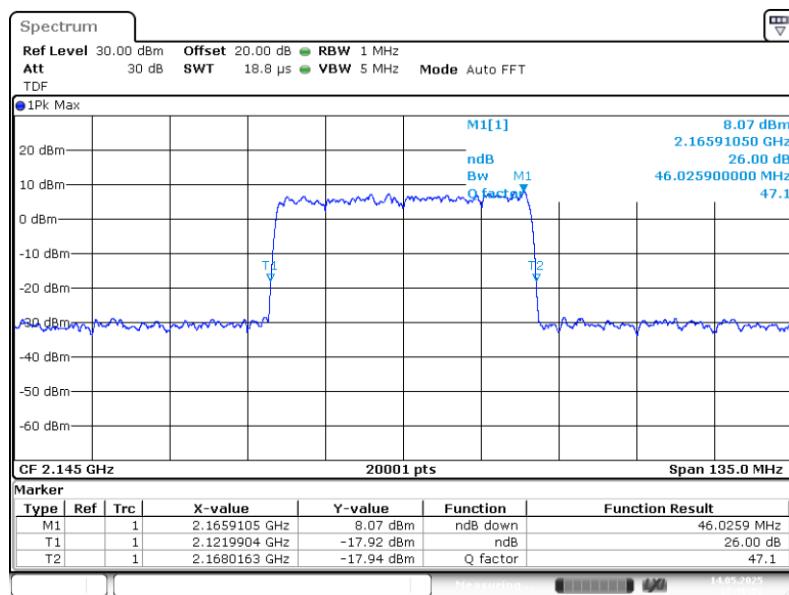
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN 45M;
Input OCBw 0.3 dB < AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN 45M;
Output OCBw 0.3 dB < AGC



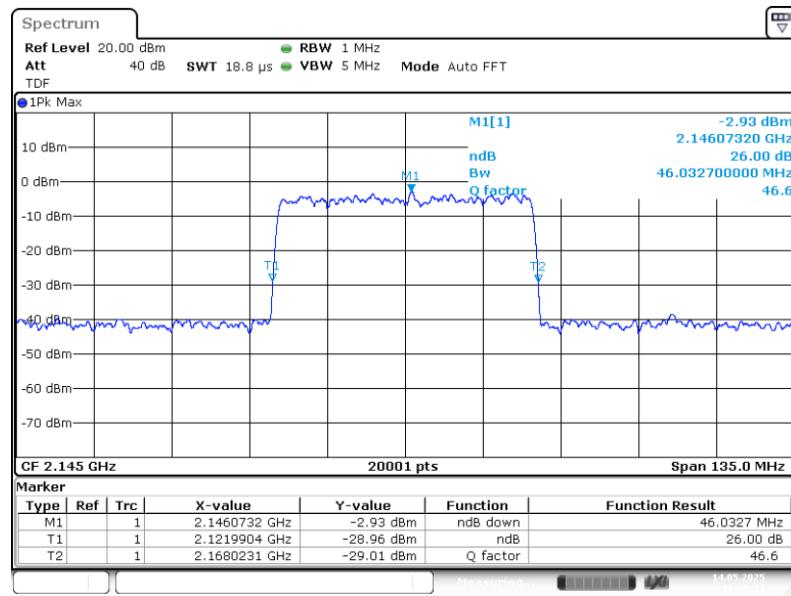
The test results relate only to the tested item. The sample has been provided by the client.

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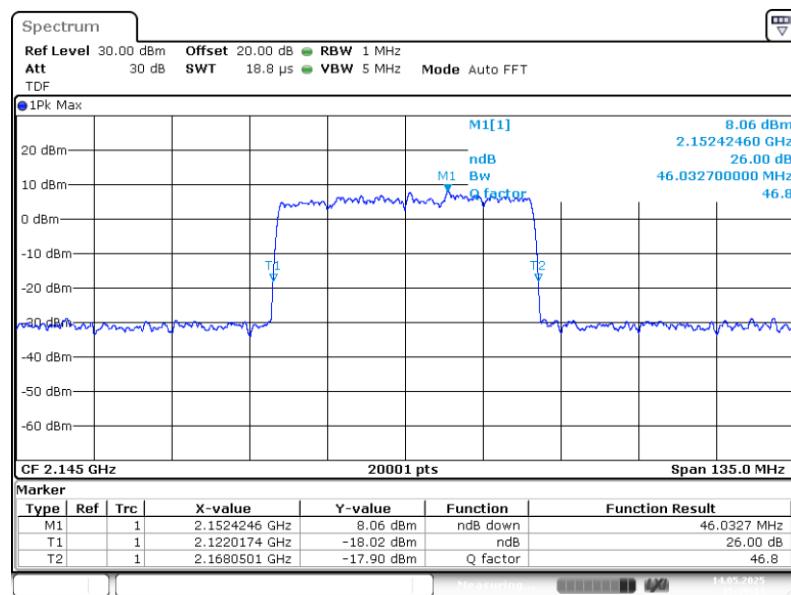
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN 45M;
Input OCBw 3 dB > AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Band edge: mid; Mod: AWGN 45M;
Output OCBw 3 dB > AGC



The test results relate only to the tested item. The sample has been provided by the client.

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Tests performed on UAP-R [AWS 1700]

5.3.5 TEST EQUIPMENT USED

- Conducted

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Tests performed on UAP-R [AWS 1700]

5.4 CONDUCTED SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Standard FCC Part §2.1051, §27.53

The test was performed according to:
ANSI C63.26

Test date: 2025-04-14 – 2025-05-15

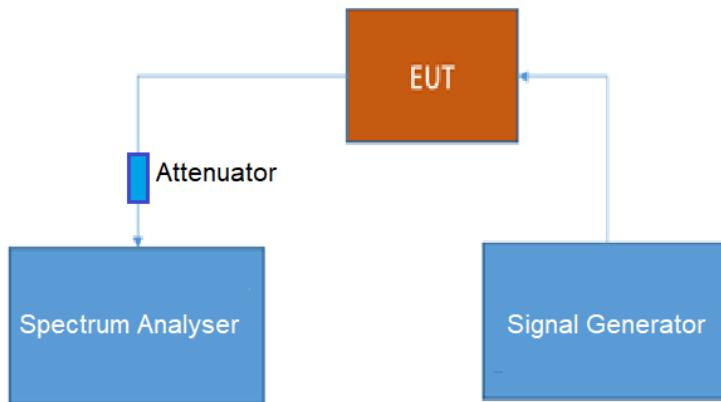
Environmental conditions: 23.6 °C; 25 % r. H./24.0 °C; 26 % r. H.

Test engineer: Thomas Hufnagel

5.4.1 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:



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.

The test results relate only to the tested item. The sample has been provided by the client.
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Tests performed on UAP-R [AWS 1700]

5.4.2 TEST REQUIREMENTS/LIMITS

Abstract § 2.1051 from FCC:

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

Abstract § 27.53 FCC:

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

The test results relate only to the tested item. The sample has been provided by the client.

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Abstract RSS-139 from ISED

5.6 Unwanted emission limits

Unwanted emissions shall be measured in terms of average value.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table 6.

Table 6: Unwanted emission limits

Offset from the edge of the frequency block or frequency block group	Unwanted emission limits
≤1 MHz	-13 dBm/(1% of OB*)
>1 MHz	-13 dBm/MHz

*OB is the occupied bandwidth.

In addition to complying with the above limits, equipment operating in the band 2180-2200 MHz may require additional filtering (see SRSP-519).



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Tests performed on UAP-R [AWS 1700]

5.4.3 TEST PROTOCOL

General considerations concerning the limits:

The measuring bandwidth of 1 MHz was chosen according the test requirements except 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 where measuring bandwidths were reduced also the limit lines were reduced according the given formula:

$$p \text{ RBW}_{\text{reduced}} [\text{dBm}] = 10 * \log \left(\text{RBW}_{\text{reduced}} [\text{kHz}] / 1000 \text{ kHz} \right) + p \text{ RBW} \text{ 1000 kHz} [\text{dBm}]$$

Hereby "p" are the limit lines' values.

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Tests performed on UAP-R [AWS 1700]

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Band 66, AWS 1700, downlink							
Test frequency	Signal type	Spurious freq. [MHz]	Spurious level [dBm]	Detector	RBW [kHz]	Limit [dBm]	Margin to limit [dB]
low	Wideband	0.01455	-78.9	RMS	1	-43.0	35.9
low	Wideband	0.06250	-70.9	RMS	10	-33.0	37.9
low	Wideband	953.7	-64.4	RMS	100	-23.0	41.4
low	Wideband	1954.8	-56.7	RMS	1000	-13.0	43.7
low	Wideband	2108.2	-62.4	RMS	100	-23.0	39.4
low	Wideband	2183.3	-66.0	RMS	100	-23.0	43.0
low	Wideband	2784.6	-43.5	RMS	1000	-13.0	30.5
low	Wideband	6873.1	-50.9	RMS	1000	-13.0	37.9
low	Wideband	19528.8	-51.3	RMS	1000	-13.0	38.3
low	Wideband	20323.7	-50.4	RMS	1000	-13.0	37.4
low	Wideband	30325.5	-51.3	RMS	1000	-13.0	38.3
low	Wideband	39985.3	-52.9	RMS	1000	-13.0	39.9
mid	Wideband	0.01602	-79.3	RMS	1	-43.0	36.3
mid	Wideband	0.12249	-71.4	RMS	10	-33.0	38.4
mid	Wideband	949.4	-62.5	RMS	100	-23.0	39.5
mid	Wideband	2046.3	-56.7	RMS	1000	-13.0	43.7
mid	Wideband	2104.9	-67.0	RMS	100	-23.0	44.0
mid	Wideband	2183.4	-65.8	RMS	100	-23.0	42.8
mid	Wideband	2784.6	-43.7	RMS	1000	-13.0	30.7
mid	Wideband	6974.6	-51.0	RMS	1000	-13.0	38.0
mid	Wideband	19572.8	-50.9	RMS	1000	-13.0	37.9
mid	Wideband	20284.7	-50.7	RMS	1000	-13.0	37.7
mid	Wideband	30323.5	-51.6	RMS	1000	-13.0	38.6
mid	Wideband	39980.8	-52.1	RMS	1000	-13.0	39.1
high	Wideband	0.00902	-79.1	RMS	1	-43.0	36.1
high	Wideband	0.28246	-71.0	RMS	10	-33.0	38.0
high	Wideband	816.0	-63.7	RMS	100	-23.0	40.7
high	Wideband	1783.4	-56.6	RMS	1000	-13.0	43.6
high	Wideband	2106.5	-65.9	RMS	100	-23.0	42.9
high	Wideband	2181.1	-61.6	RMS	100	-23.0	38.6
high	Wideband	2784.6	-43.3	RMS	1000	-13.0	30.3
high	Wideband	6814.1	-50.2	RMS	1000	-13.0	37.2
high	Wideband	19986.2	-51.3	RMS	1000	-13.0	38.3
high	Wideband	20292.2	-50.7	RMS	1000	-13.0	37.7
high	Wideband	30010.0	-51.5	RMS	1000	-13.0	38.5
high	Wideband	39983.3	-52.7	RMS	1000	-13.0	39.7

The test results relate only to the tested item. The sample has been provided by the client.

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**Test Report No.: 25-0092**

Tests performed on UAP-R [AWS 1700]

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Band 66, AWS 1700, downlink							
Test frequency	Signal type	Spurious freq. [MHz]	Spurious level [dBm]	Detector	RBW [kHz]	Limit [dBm]	Margin to limit [dB]
low	Narrowband	0.01140	-81.8	RMS	1	-43.0	38.8
low	Narrowband	0.09749	-74.6	RMS	10	-33.0	41.6
low	Narrowband	810.1	-63.8	RMS	100	-23.0	40.8
low	Narrowband	2075.8	-55.8	RMS	1000	-13.0	42.8
low	Narrowband	2108.9	-65.0	RMS	100	-23.0	42.0
low	Narrowband	2182.2	-66.3	RMS	100	-23.0	43.3
low	Narrowband	2784.6	-43.5	RMS	1000	-13.0	30.5
low	Narrowband	6850.6	-51.3	RMS	1000	-13.0	38.3
low	Narrowband	19544.3	-51.6	RMS	1000	-13.0	38.6
low	Narrowband	20309.7	-50.8	RMS	1000	-13.0	37.8
low	Narrowband	30314.0	-51.2	RMS	1000	-13.0	38.2
low	Narrowband	39973.3	-52.8	RMS	1000	-13.0	39.8
mid	Narrowband	0.01045	-79.2	RMS	1	-43.0	36.2
mid	Narrowband	0.05250	-72.8	RMS	10	-33.0	39.8
mid	Narrowband	952.0	-63.8	RMS	100	-23.0	40.8
mid	Narrowband	1739.9	-56.0	RMS	1000	-13.0	43.0
mid	Narrowband	2101.4	-67.0	RMS	100	-23.0	44.0
mid	Narrowband	2183.7	-66.0	RMS	100	-23.0	43.0
mid	Narrowband	2784.6	-43.3	RMS	1000	-13.0	30.3
mid	Narrowband	6862.1	-50.7	RMS	1000	-13.0	37.7
mid	Narrowband	19535.8	-51.1	RMS	1000	-13.0	38.1
mid	Narrowband	20264.2	-51.0	RMS	1000	-13.0	38.0
mid	Narrowband	30283.0	-51.2	RMS	1000	-13.0	38.2
mid	Narrowband	39913.3	-53.3	RMS	1000	-13.0	40.3
high	Narrowband	0.01140	-80.4	RMS	1	-43.0	37.4
high	Narrowband	0.10749	-75.1	RMS	10	-33.0	42.1
high	Narrowband	706.6	-63.7	RMS	100	-23.0	40.7
high	Narrowband	1697.9	-56.8	RMS	1000	-13.0	43.8
high	Narrowband	2106.7	-66.7	RMS	100	-23.0	43.7
high	Narrowband	2181.1	-63.0	RMS	100	-23.0	40.0
high	Narrowband	2784.6	-43.6	RMS	1000	-13.0	30.6
high	Narrowband	6991.1	-50.6	RMS	1000	-13.0	37.6
high	Narrowband	19972.3	-51.3	RMS	1000	-13.0	38.3
high	Narrowband	20287.2	-50.7	RMS	1000	-13.0	37.7
high	Narrowband	30302.0	-51.5	RMS	1000	-13.0	38.5
high	Narrowband	39947.8	-52.9	RMS	1000	-13.0	39.9

The test results relate only to the tested item. The sample has been provided by the client.

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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band 66, AWS 1700, downlink						Margin to limit [dB]	
Test frequency	Signal type	Spurious freq. [MHz]	Spurious level [dBm]	Detector	RBW [kHz]	Limit [dBm]	
low	Wideband 5G	0.00902	-80.7	RMS	1	-43.0	37.7
low	Wideband 5G	0.15248	-74.4	RMS	10	-33.0	41.4
low	Wideband 5G	961.9	-63.1	RMS	100	-23.0	40.1
low	Wideband 5G	2082.8	-56.3	RMS	1000	-13.0	43.3
low	Wideband 5G	2106.7	-64.3	RMS	100	-23.0	41.3
low	Wideband 5G	2188.8	-65.7	RMS	100	-23.0	42.7
low	Wideband 5G	2784.6	-43.4	RMS	1000	-13.0	30.4
low	Wideband 5G	6856.1	-50.7	RMS	1000	-13.0	37.7
low	Wideband 5G	19891.3	-51.2	RMS	1000	-13.0	38.2
low	Wideband 5G	20289.7	-50.2	RMS	1000	-13.0	37.2
low	Wideband 5G	30312.5	-51.3	RMS	1000	-13.0	38.3
low	Wideband 5G	39950.8	-53.0	RMS	1000	-13.0	40.0
mid	Wideband 5G	0.00902	-80.6	RMS	1	-43.0	37.6
mid	Wideband 5G	0.09749	-74.6	RMS	10	-33.0	41.6
mid	Wideband 5G	810.9	-63.4	RMS	100	-23.0	40.4
mid	Wideband 5G	2099.8	-56.0	RMS	1000	-13.0	43.0
mid	Wideband 5G	2105.4	-65.3	RMS	100	-23.0	42.3
mid	Wideband 5G	2181.7	-66.0	RMS	100	-23.0	43.0
mid	Wideband 5G	2784.6	-43.2	RMS	1000	-13.0	30.2
mid	Wideband 5G	6827.1	-51.1	RMS	1000	-13.0	38.1
mid	Wideband 5G	19983.8	-51.1	RMS	1000	-13.0	38.1
mid	Wideband 5G	20290.7	-50.8	RMS	1000	-13.0	37.8
mid	Wideband 5G	30363.5	-51.2	RMS	1000	-13.0	38.2
mid	Wideband 5G	39987.2	-52.9	RMS	1000	-13.0	39.9
high	Wideband 5G	0.02585	-81.7	RMS	1	-43.0	38.7
high	Wideband 5G	0.13749	-72.2	RMS	10	-33.0	39.2
high	Wideband 5G	954.5	-63.6	RMS	100	-23.0	40.6
high	Wideband 5G	1728.9	-56.5	RMS	1000	-13.0	43.5
high	Wideband 5G	2108.3	-66.2	RMS	100	-23.0	43.2
high	Wideband 5G	2182.7	-65.5	RMS	100	-23.0	42.5
high	Wideband 5G	2784.6	-43.4	RMS	1000	-13.0	30.4
high	Wideband 5G	6770.6	-50.8	RMS	1000	-13.0	37.8
high	Wideband 5G	19998.8	-50.7	RMS	1000	-13.0	37.7
high	Wideband 5G	20282.2	-50.6	RMS	1000	-13.0	37.6
high	Wideband 5G	30298.0	-51.6	RMS	1000	-13.0	38.6
high	Wideband 5G	39992.8	-52.6	RMS	1000	-13.0	39.6

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

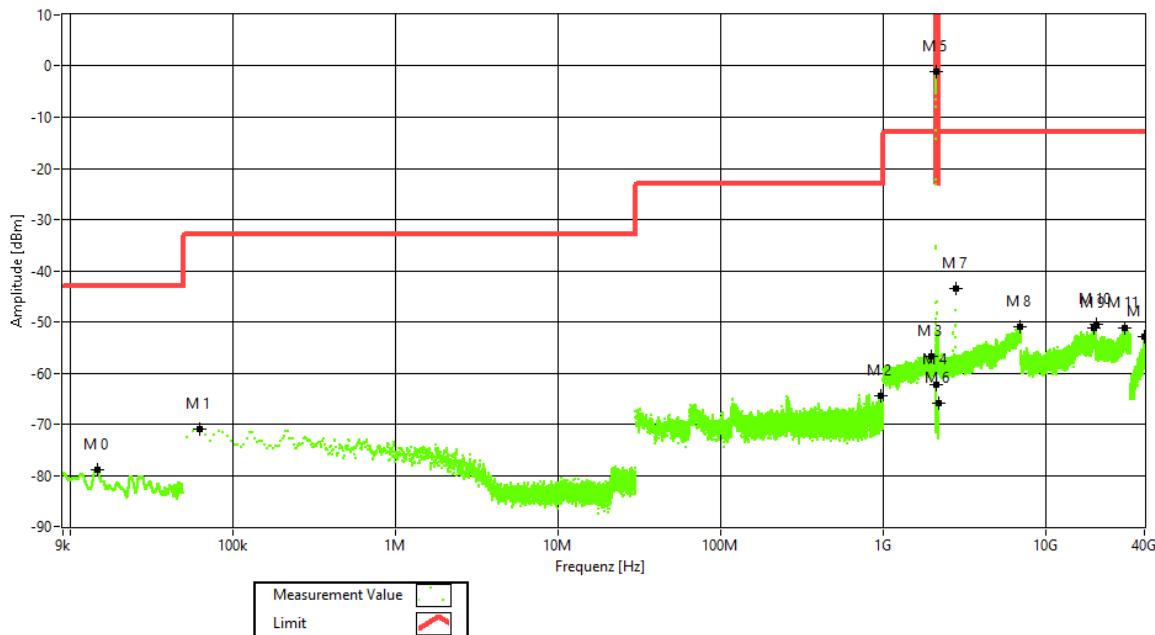
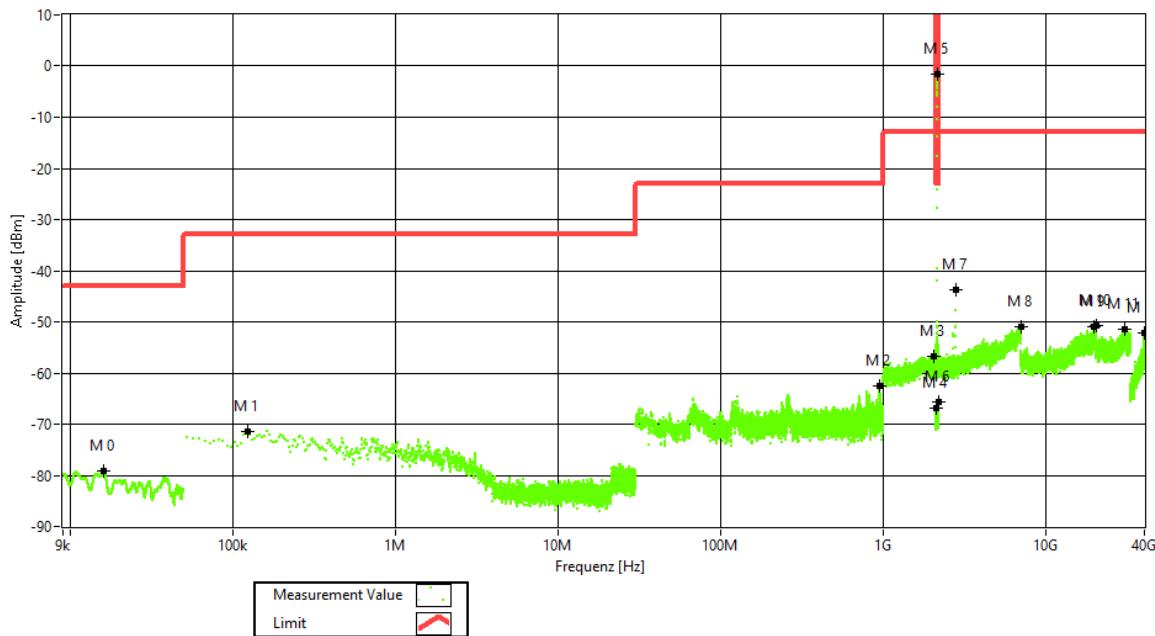
The test results relate only to the tested item. The sample has been provided by the client.
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Tests performed on UAP-R [AWS 1700]

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5.4.4 MEASUREMENT PLOT

 Frequency Band = AWS 1700, Antenna 1; Test frequency = low; Direction = RF downlink;
 Signal type = Wideband

 Frequency Band = AWS 1700, Antenna 1; Test frequency = mid; Direction = RF downlink;
 Signal type = Wideband


The test results relate only to the tested item. The sample has been provided by the client.

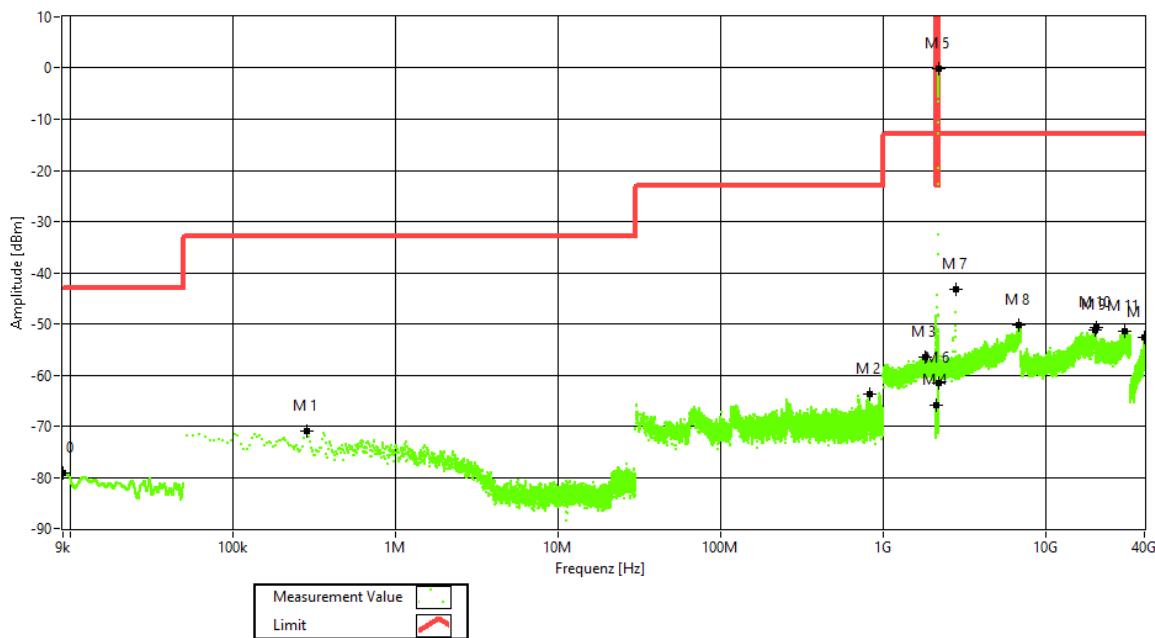
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Tests performed on UAP-R [AWS 1700]

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Frequency Band = AWS 1700, Antenna 1; Test frequency = high; Direction = RF downlink;
Signal type = Wideband



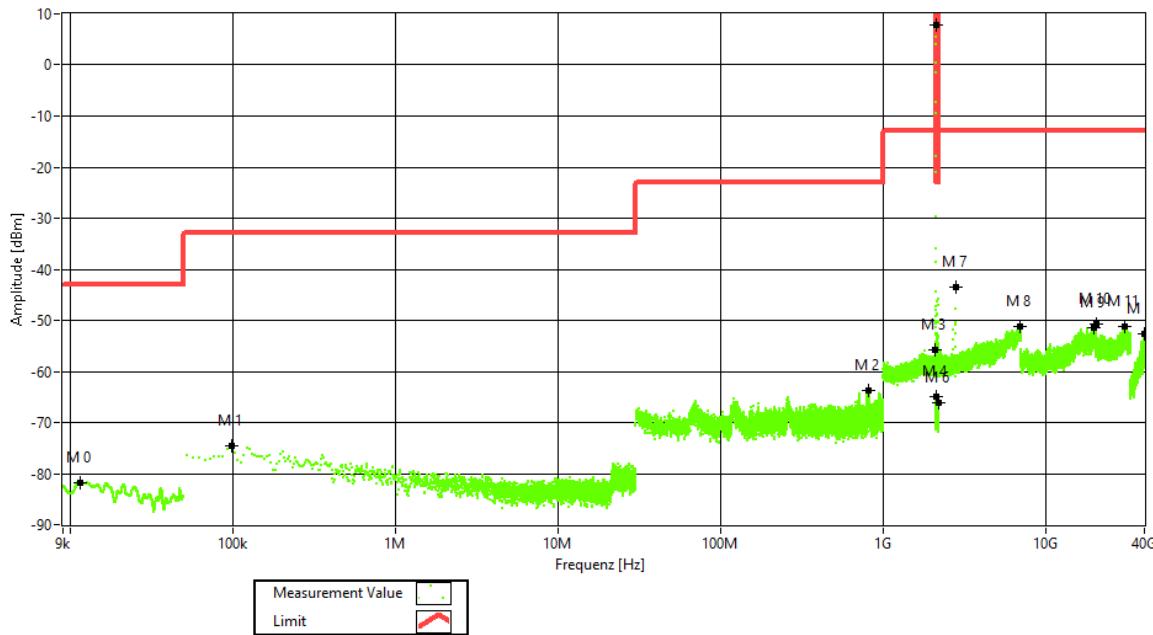
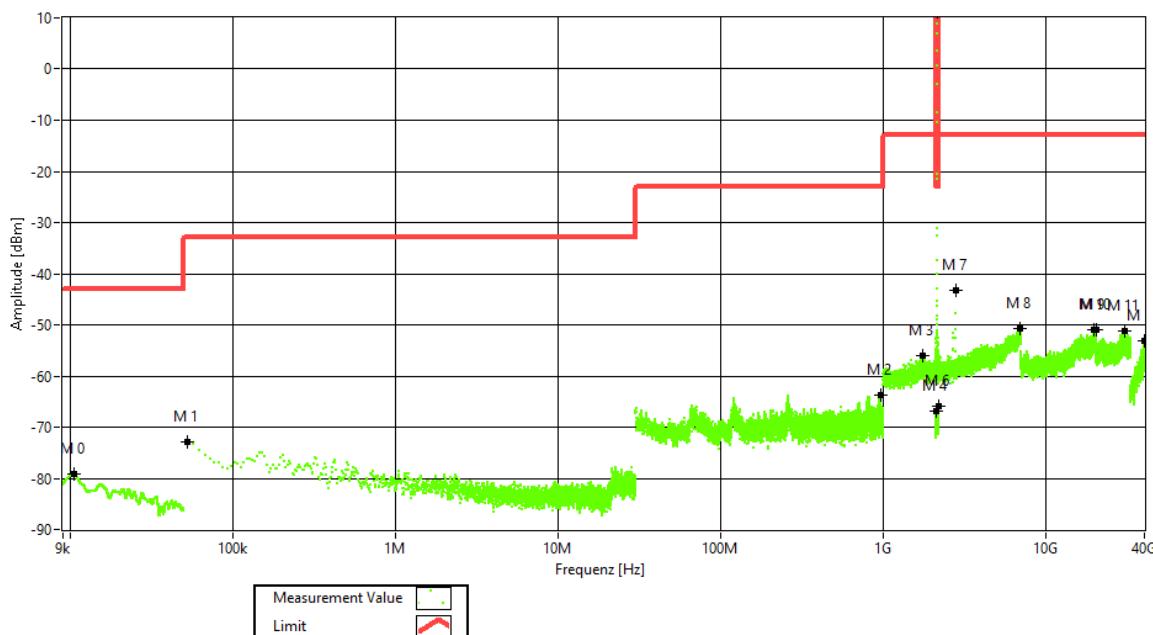
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Tests performed on UAP-R [AWS 1700]

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 Frequency Band = AWS 1700, Antenna 1; Test frequency = low; Direction = RF downlink;
 Signal type = Narrowband

 Frequency Band = AWS 1700, Antenna 1; Test frequency = mid; Direction = RF downlink;
 Signal type = Narrowband


The test results relate only to the tested item. The sample has been provided by the client.

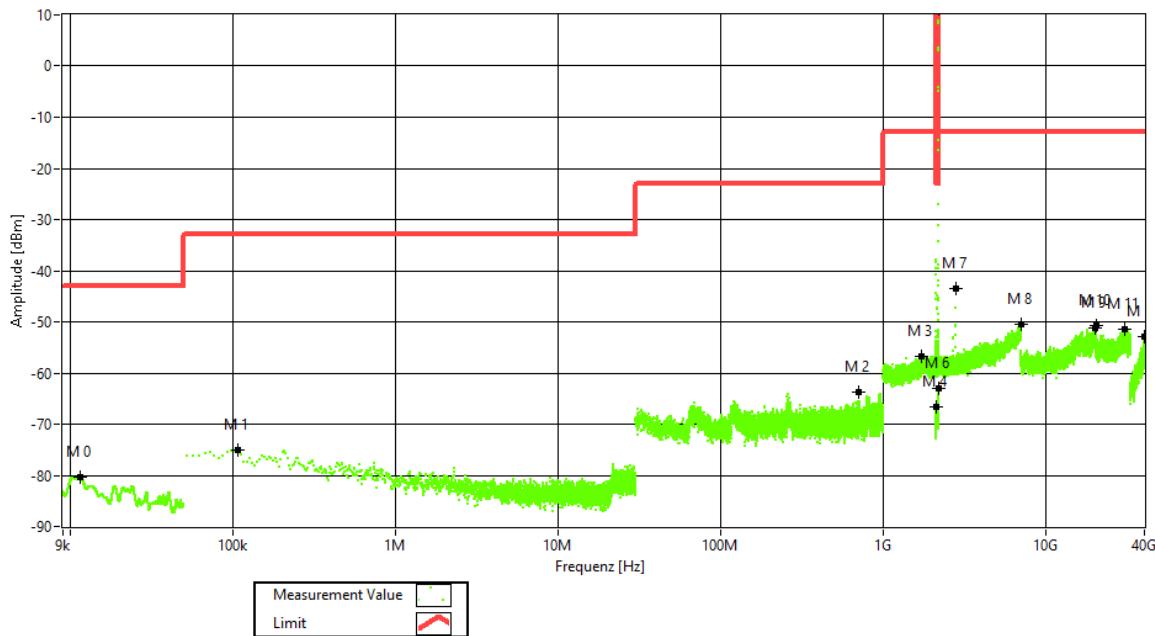
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Tests performed on UAP-R [AWS 1700]

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Frequency Band = AWS 1700, Antenna 1; Test frequency = high; Direction = RF downlink;
Signal type = Narrowband

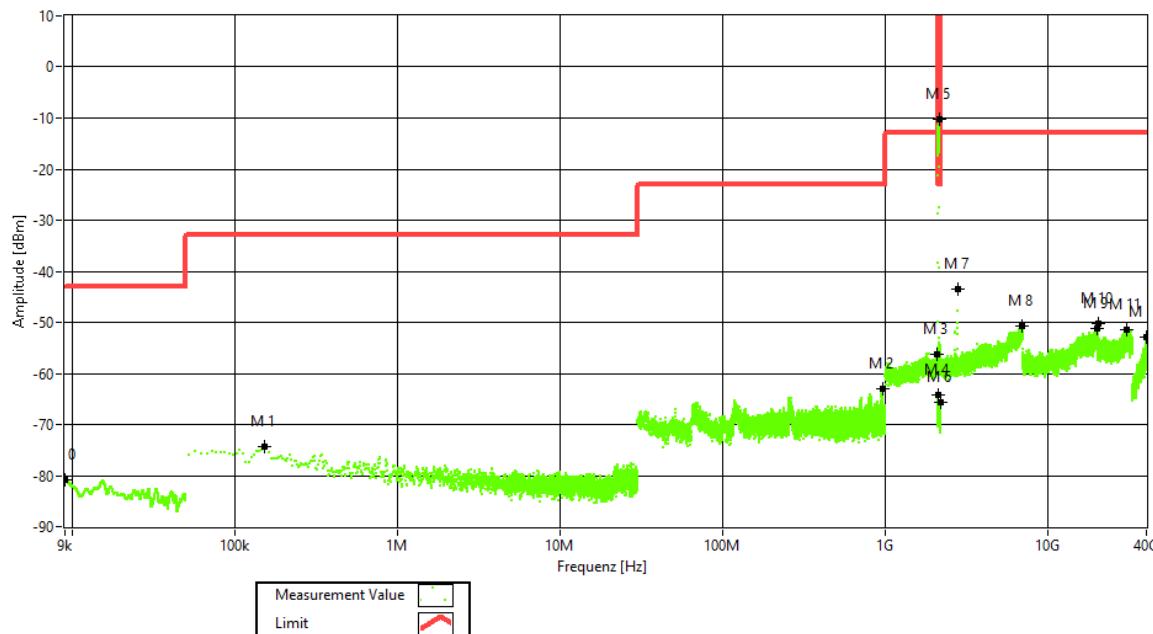


The test results relate only to the tested item. The sample has been provided by the client.
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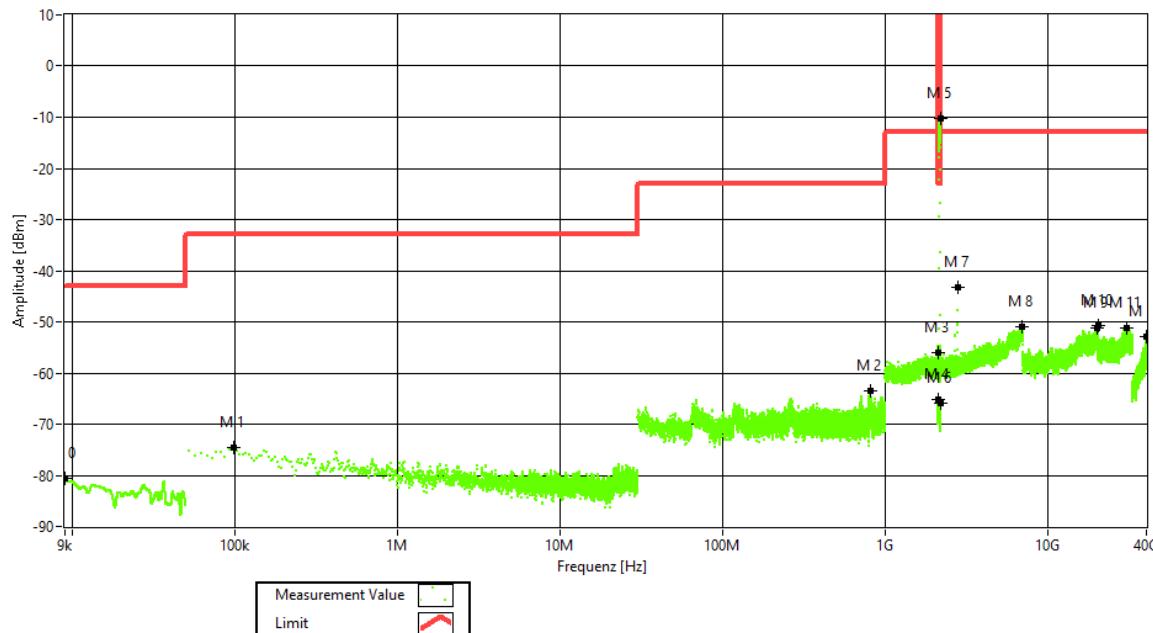
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Frequency Band = AWS 1700, Antenna 1; Test frequency = low; Direction = RF downlink;
Signal type = Wideband 5G



Frequency Band = AWS 1700, Antenna 1; Test frequency = mid; Direction = RF downlink;
Signal type = Wideband 5G



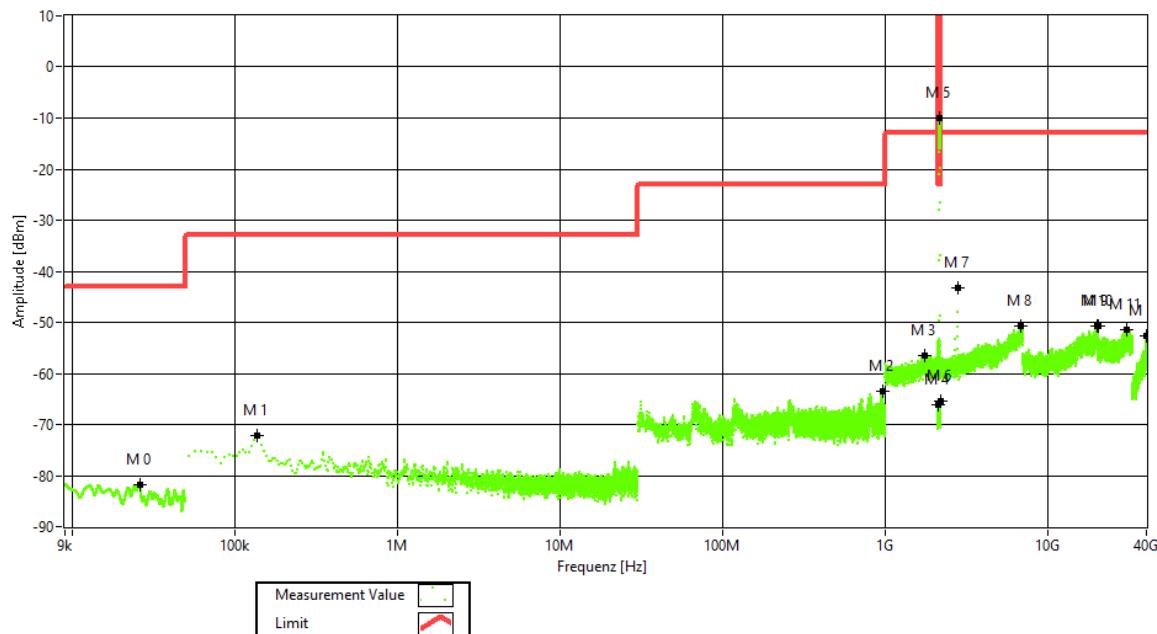
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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Frequency Band = AWS 1700, Antenna 1; Test frequency = high; Direction = RF downlink;
Signal type = Wideband 5G



5.4.5 TEST EQUIPMENT USED

- Conducted



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Tests performed on UAP-R [AWS 1700]

5.5 OUT-OF-BAND EMISSION LIMITS

Standard FCC Part §2.1051, §27.53

The test was performed according to:

ANSI C63.26, KDB 935210 D05 v01r04: 3.6

Test date: 2025-04-14 – 2025-05-15

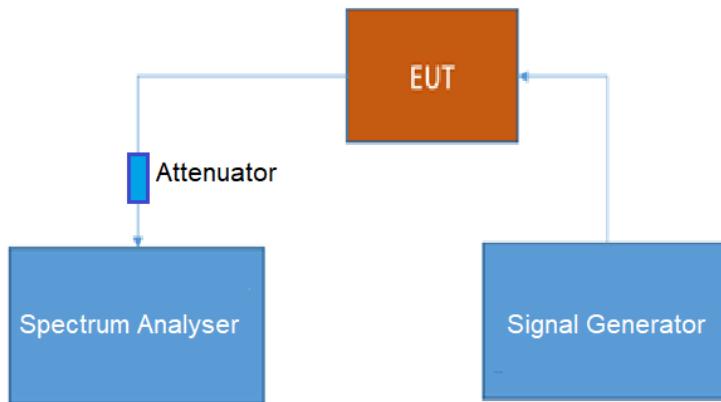
Environmental conditions: 23.6 °C; 25 % r. H./24.0 °C; 26 % r. H.

Test engineer: Thomas Hufnagel

5.5.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the out-of-band emission limit for industrial signal boosters. The limits itself come from the applicable rule part for each operating band.

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



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.



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Tests performed on UAP-R [AWS 1700]

5.5.2 TEST REQUIREMENTS/LIMITS

Abstract § 2.1051 from FCC:

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

Abstract § 27.53 FCC:

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

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Tests performed on UAP-R [AWS 1700]

Abstract RSS-133 from ISED

5.6 Unwanted emission limits

Unwanted emissions shall be measured in terms of average value.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table 6.

Table 6: Unwanted emission limits

Offset from the edge of the frequency block or frequency block group	Unwanted emission limits
≤1 MHz	-13 dBm/(1% of OB*)
>1 MHz	-13 dBm/MHz

*OB is the occupied bandwidth.

In addition to complying with the above limits, equipment operating in the band 2180-2200 MHz may require additional filtering (see SRSP-519).



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Tests performed on UAP-R [AWS 1700]

5.5.3 TEST PROTOCOL

Band 66 AWS 1700, downlink, Number of input signals = 1							
Signal type	Input power	Band edge	Signal frequency [MHz]	Input power [dBm]	Maximum out-of-band power [dBm]	Limit out-of-band power [dBm]	Margin to limit [dB]
Wideband	0.3 dB < AGC	upper	2177.5	-0.1	-58.4	-13.0	45.4
Wideband	3 dB > AGC	upper	2177.5	3.2	-58.1	-13.0	45.1
Wideband 5G	0.3 dB < AGC	upper	2157.5	-0.4	-54.4	-13.0	41.4
Wideband 5G	3 dB > AGC	upper	2157.5	2.6	-55.3	-13.0	42.3
Narrowband	0.3 dB < AGC	upper	2179.8	0.1	-45.9	-13.0	32.9
Narrowband	3 dB > AGC	upper	2179.8	3.4	-46.1	-13.0	33.1
Wideband	0.3 dB < AGC	lower	2112.5	0.3	-57.8	-13.0	44.8
Wideband	3 dB > AGC	lower	2112.5	3.6	-57.6	-13.0	44.6
Wideband 5G	0.3 dB < AGC	lower	2132.5	0.0	-54.5	-13.0	41.5
Wideband 5G	3 dB > AGC	lower	2132.5	3.0	-55.3	-13.0	42.3
Narrowband	0.3 dB < AGC	lower	2110.2	0.1	-45.0	-13.0	32.0
Narrowband	3 dB > AGC	lower	2110.2	3.4	-45.4	-13.0	32.4

Band 66 AWS 1700, downlink, Number of input signals = 2							
Signal type	Input power	Band edge	Signal frequency f1 [MHz]	Signal frequency f2 [MHz]	Input power [dBm]	Maximum out-of-band power [dBm]	Limit out-of-band power [dBm]
Wideband	0.3 dB < AGC	upper	2177.5	2175.0	-0.3	-59.4	-13.0
Wideband	3 dB > AGC	upper	2177.5	2175.0	3.0	-59.6	-13.0
Narrowband	0.3 dB < AGC	upper	2179.8	2179.6	0.1	-48.5	-13.0
Narrowband	3 dB > AGC	upper	2179.8	2179.6	3.4	-49.0	-13.0
Wideband	0.3 dB < AGC	lower	2112.5	2115.0	0.3	-59.5	-13.0
Wideband	3 dB > AGC	lower	2112.5	2115.0	3.6	-59.3	-13.0
Narrowband	0.3 dB < AGC	lower	2110.2	2110.4	0.3	-48.8	-13.0
Narrowband	3 dB > AGC	lower	2110.2	2110.4	3.6	-48.6	-13.0

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

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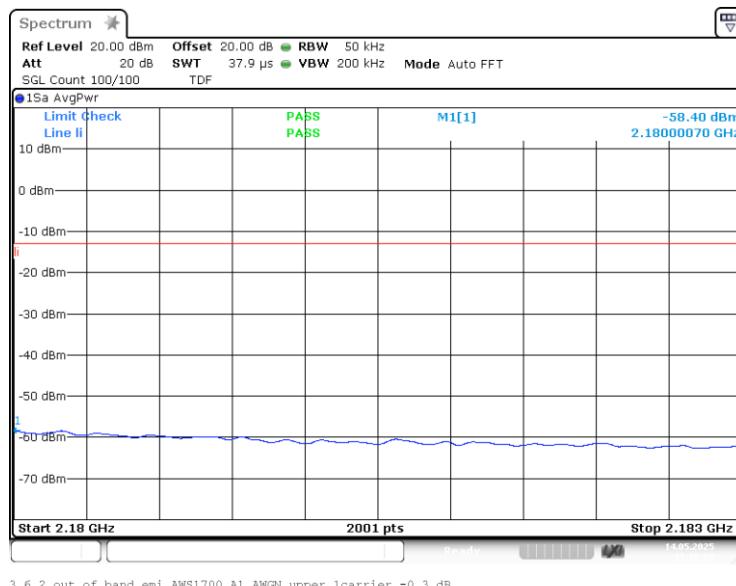
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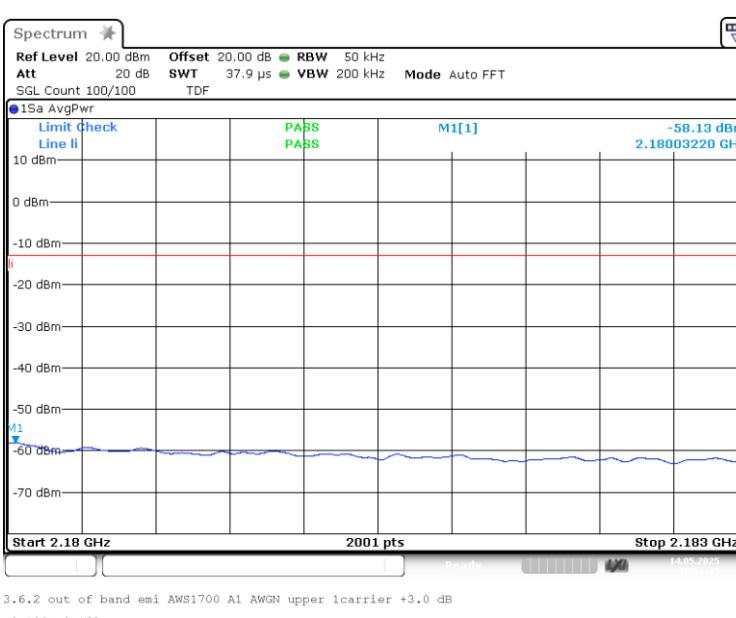
Tests performed on UAP-R [AWS 1700]

5.5.4 MEASUREMENT PLOT

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: upper;
Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 1



Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: upper;
Mod: AWGN; Input power = 3 dB > AGC; Number of signals 1



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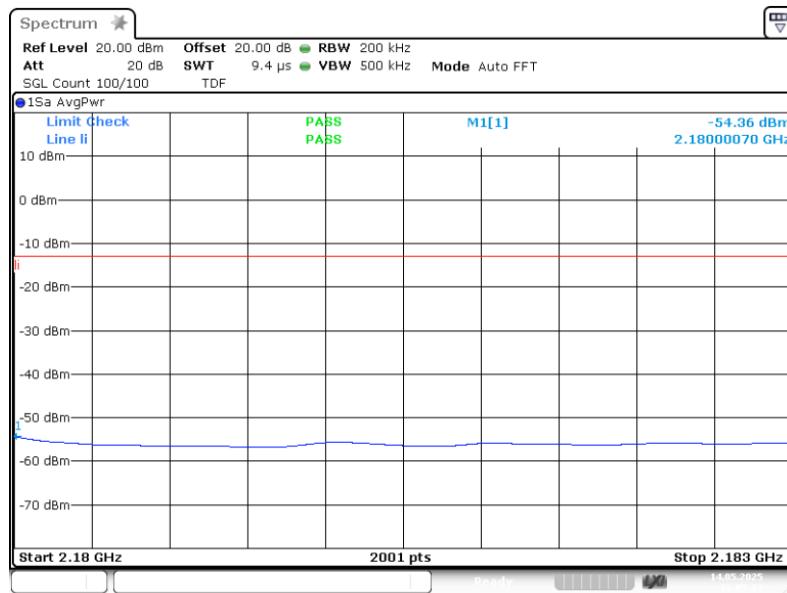


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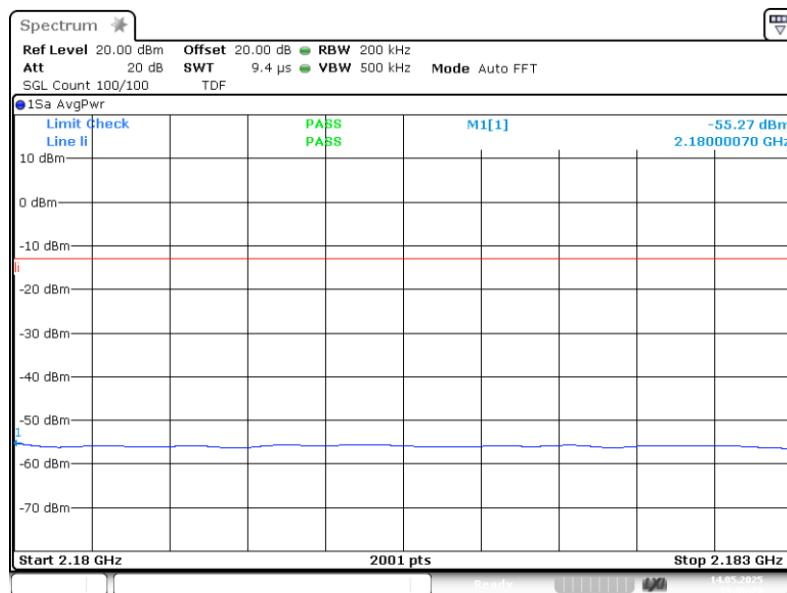
Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: upper;
Mod: AWGN 45M; Input power = 0.3 dB < AGC; Number of signals 1



3.6.2 out of band emi AWS1700 A1 AWGN 45M upper 1carrier -0.
3 dB 2.180G 2.183G

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: upper;
Mod: AWGN 45M; Input power = 3 dB > AGC; Number of signals 1



3.6.2 out of band emi AWS1700 A1 AWGN 45M upper 1carrier +3.
0 dB 2.180G 2.183G

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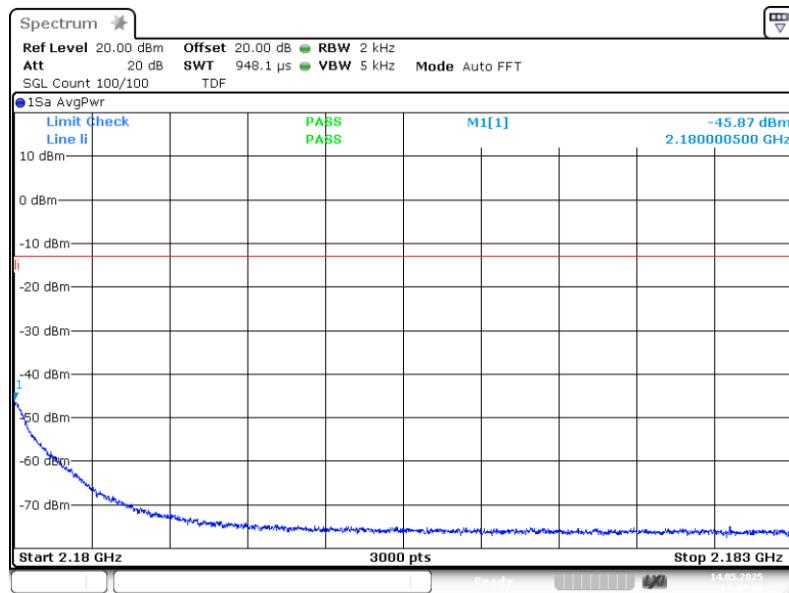


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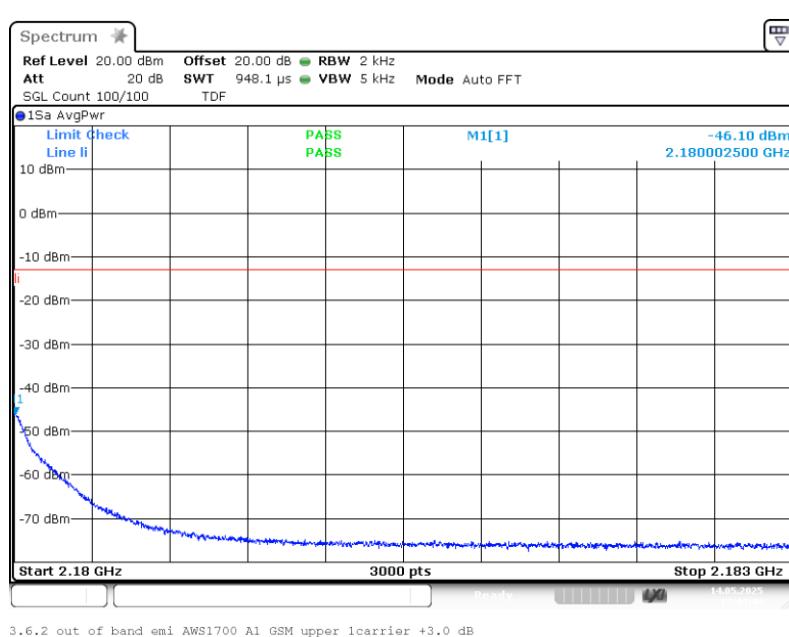
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: upper;
Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 1



Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: upper;
Mod: GSM; Input power = 3 dB > AGC; Number of signals 1



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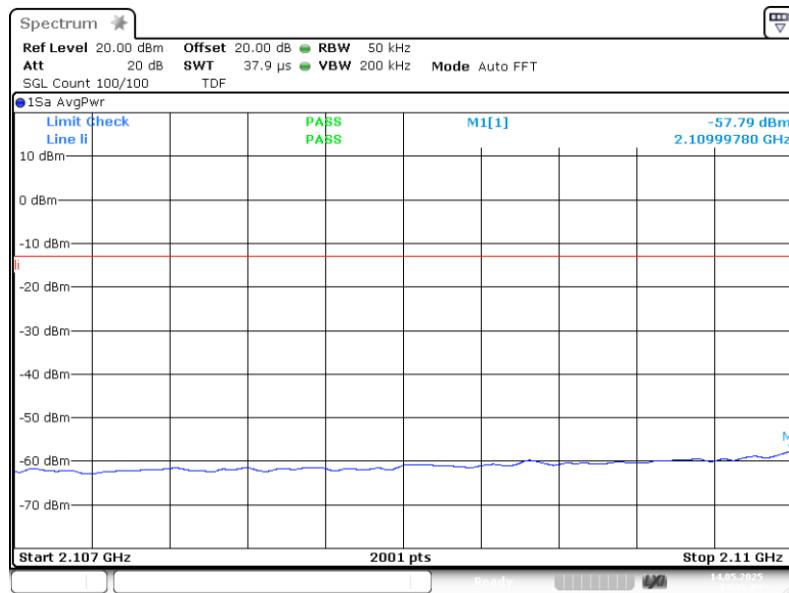


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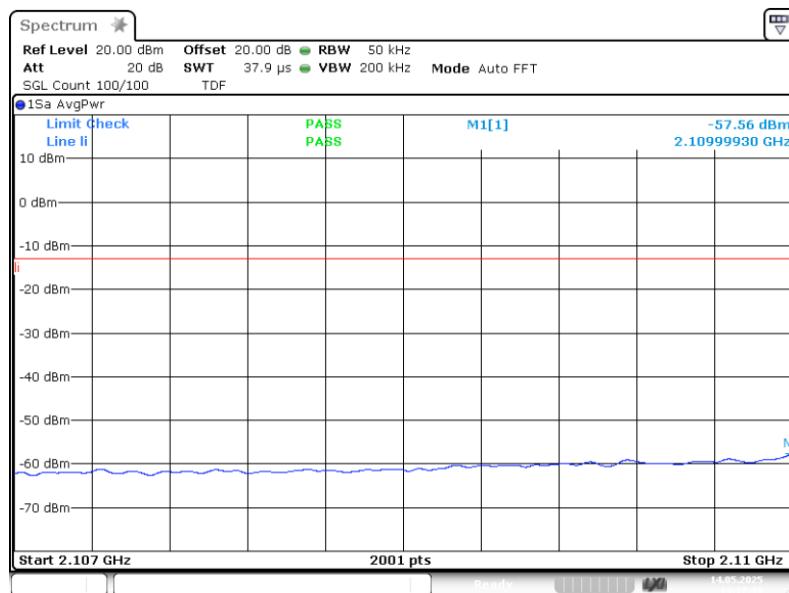
Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: lower;
Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 1



3.6.2 out of band emi AWS1700 A1 AWGN lower 1carrier -0.3 dB
2.107G 2.110G

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: lower;
Mod: AWGN; Input power = 3 dB > AGC; Number of signals 1



3.6.2 out of band emi AWS1700 A1 AWGN lower 1carrier +3.0 dB
2.107G 2.110G

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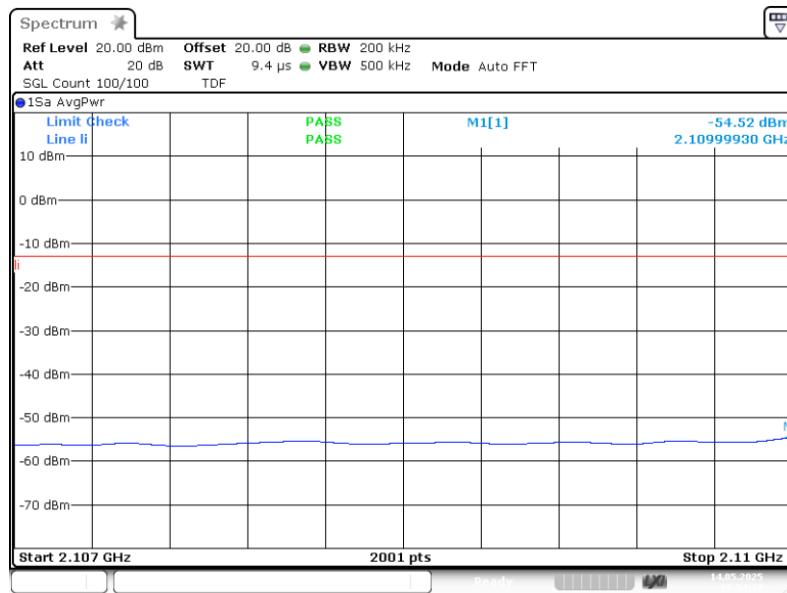


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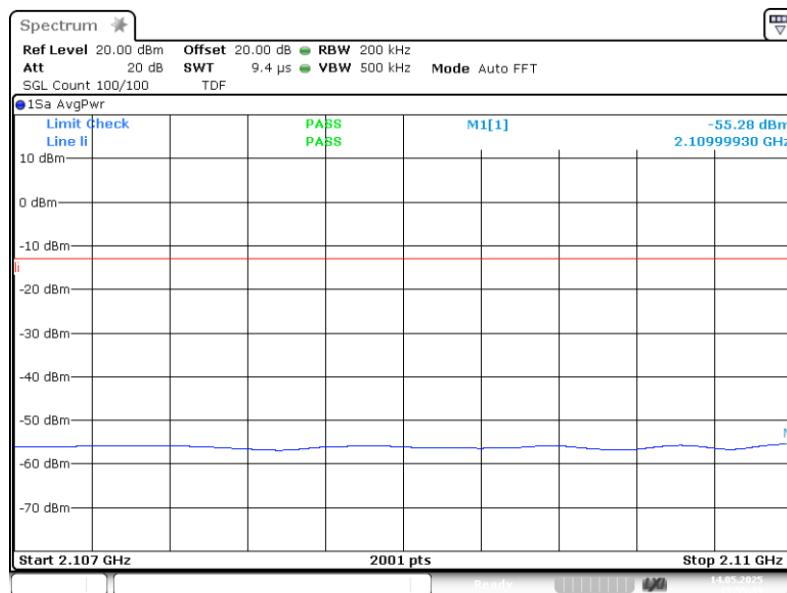
Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: lower;
Mod: AWGN 45M; Input power = 0.3 dB < AGC; Number of signals 1



3.6.2 out of band emi AWS1700 A1 AWGN 45M lower lcarrier -0.
3 dB 2.107G 2.110G

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: lower;
Mod: AWGN 45M; Input power = 3 dB > AGC; Number of signals 1



3.6.2 out of band emi AWS1700 A1 AWGN 45M lower lcarrier +3.
0 dB 2.107G 2.110G

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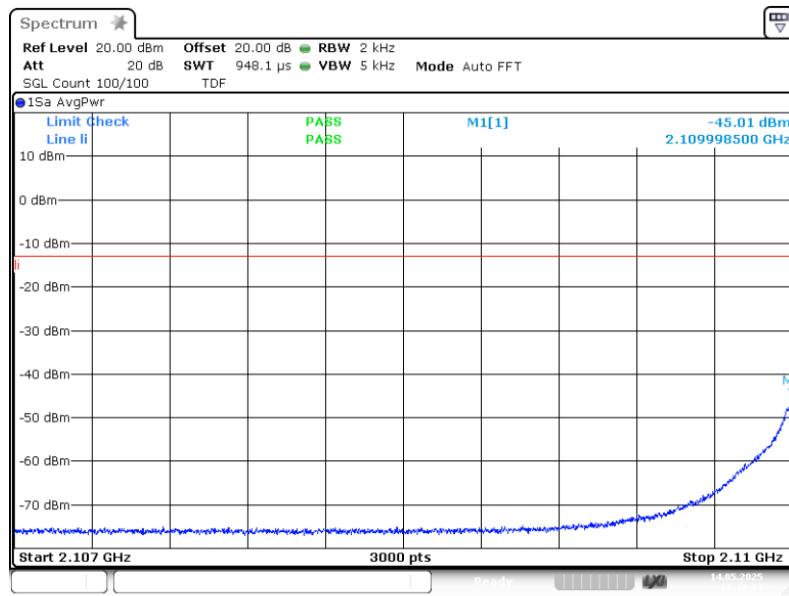


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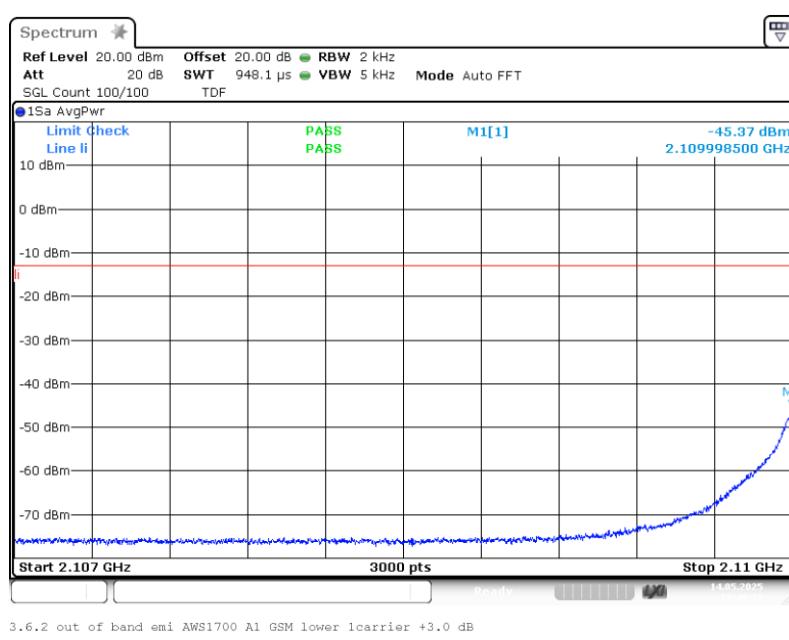
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: lower;
Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 1



Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: lower;
Mod: GSM; Input power = 3 dB > AGC; Number of signals 1



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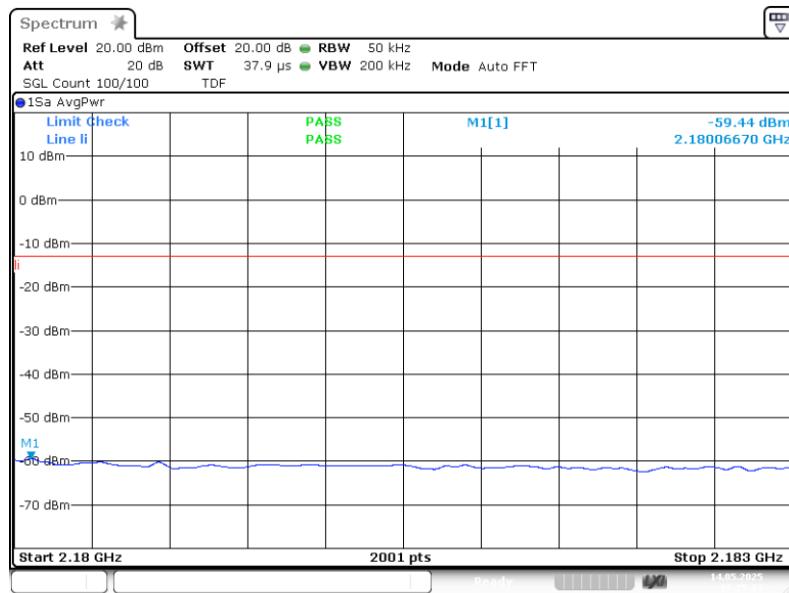


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Test Report No.: 25-0092

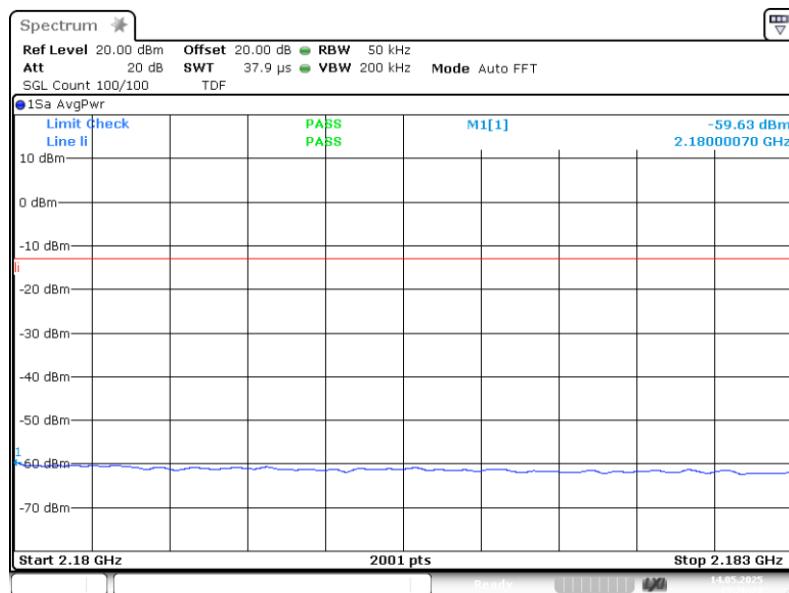
Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: upper;
Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 2



3.6.2 out of band emi AWS1700 A1 AWGN upper 2carriers -0.3 d
B 2.180G 2.183G

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: upper;
Mod: AWGN; Input power = 3 dB > AGC; Number of signals 2



3.6.2 out of band emi AWS1700 A1 AWGN upper 2carriers +3.0 d
B 2.180G 2.183G

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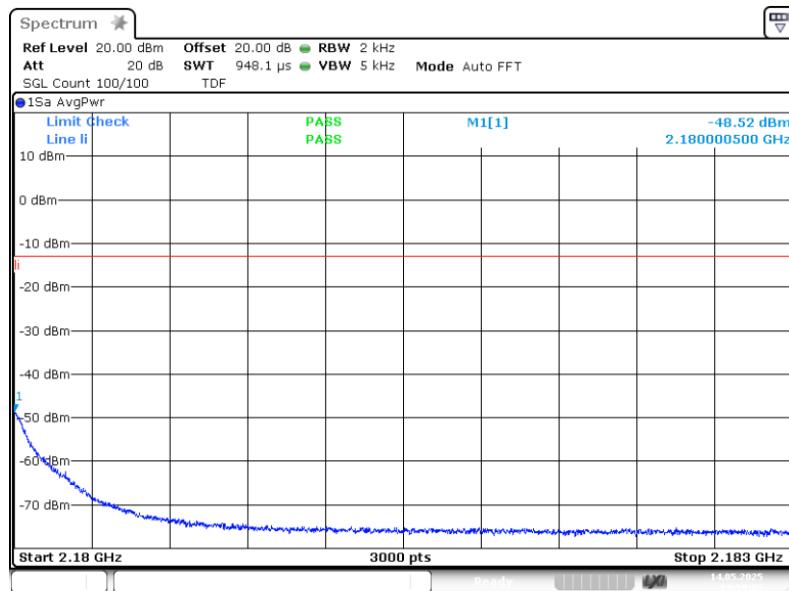


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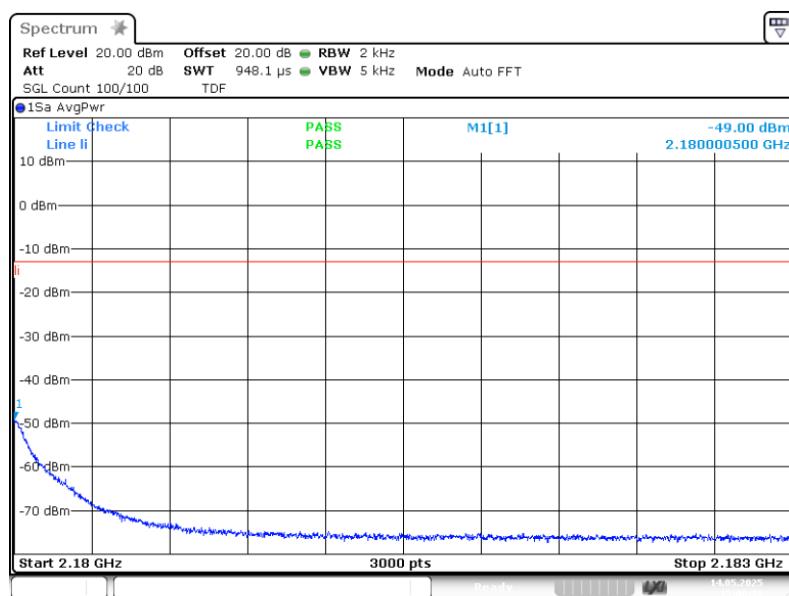
Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: upper;
Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 2



3.6.2 out of band emi AWS1700 A1 GSM upper 2carriers -0.3 dB
2.180G 2.183G

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: upper;
Mod: GSM; Input power = 3 dB > AGC; Number of signals 2



3.6.2 out of band emi AWS1700 A1 GSM upper 2carriers +3.0 dB
2.180G 2.183G

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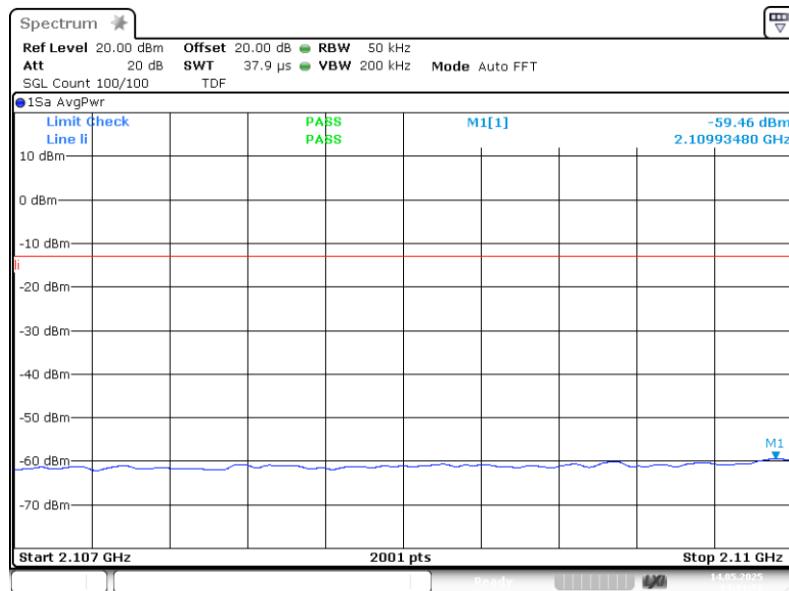


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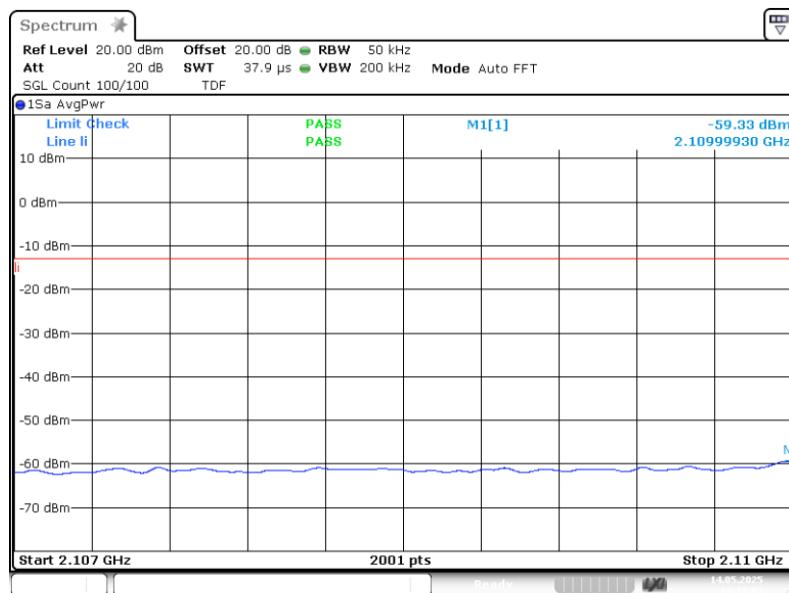
Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: lower;
Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 2



3.6.2 out of band emi AWS1700 A1 AWGN lower 2carriers -0.3 d
B 2.107G 2.110G

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: lower;
Mod: AWGN; Input power = 3 dB > AGC; Number of signals 2



3.6.2 out of band emi AWS1700 A1 AWGN lower 2carriers +3.0 d
B 2.107G 2.110G

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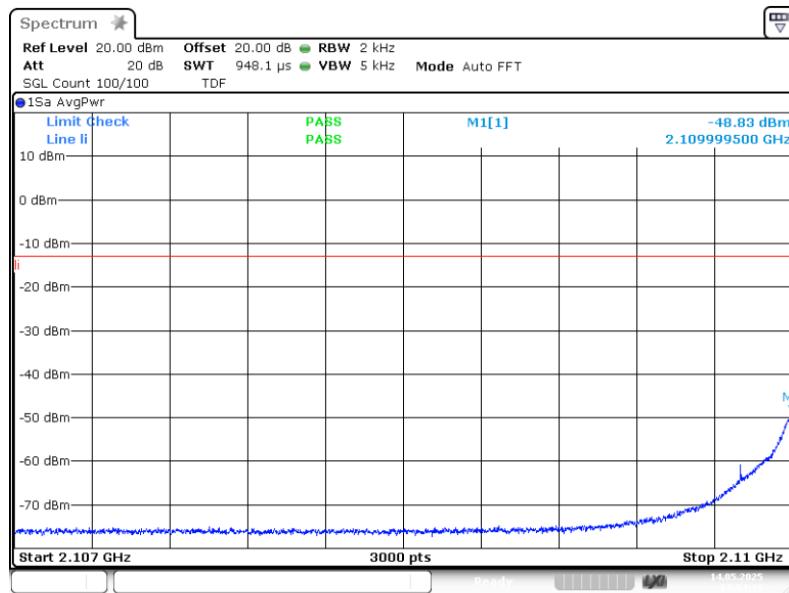


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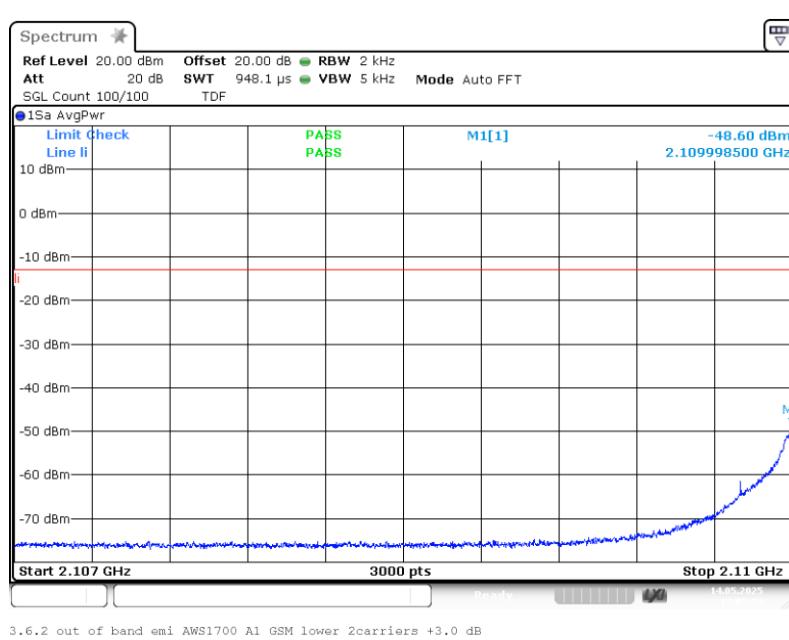
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: lower;
Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 2



Band: AWS 1700, Antenna 1; Frequency: 2.1100 GHz to 2.1800 GHz; Bande edge: lower;
Mod: GSM; Input power = 3 dB > AGC; Number of signals 2



The test results relate only to the tested item. The sample has been provided by the client.

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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Description	Input	Output
Band edge: f0; Mod: AWGN; -0.3 dB < AGC; Ausgangspegel [dBm]	-0.99	13.73
Band edge: f0; Mod: AWGN; 3 dB < AGC; Ausgangspegel [dBm]	2.38	13.45
Band edge: f0; Mod: GSM; -0.3 dB < AGC; Ausgangspegel [dBm]	-1.01	13.83
Band edge: f0; Mod: GSM; 3 dB < AGC; Ausgangspegel [dBm]	2.37	13.53
Band edge: mid; Mod: AWGN 45M; -0.3 dB < AGC; Ausgangspegel [dBm]	-0.60	13.50
Band edge: mid; Mod: AWGN 45M; 3 dB < AGC; Ausgangspegel [dBm]	2.71	13.24

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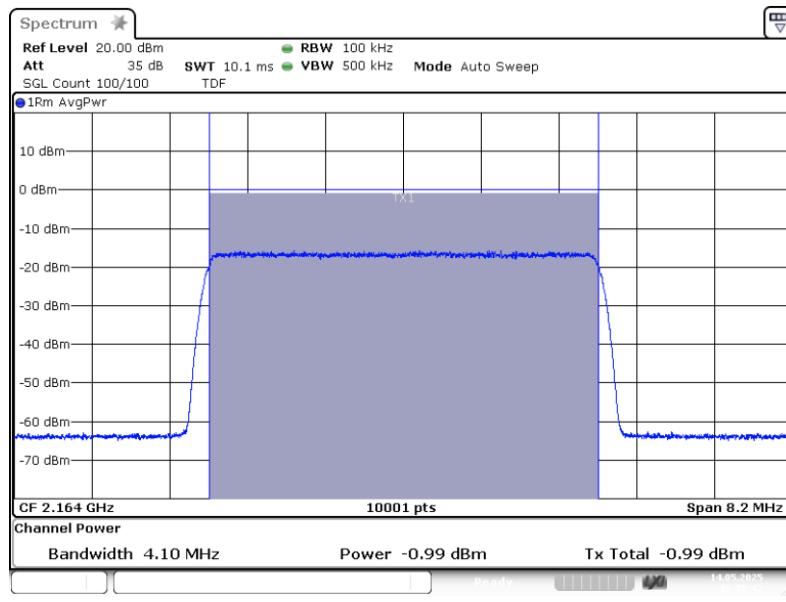


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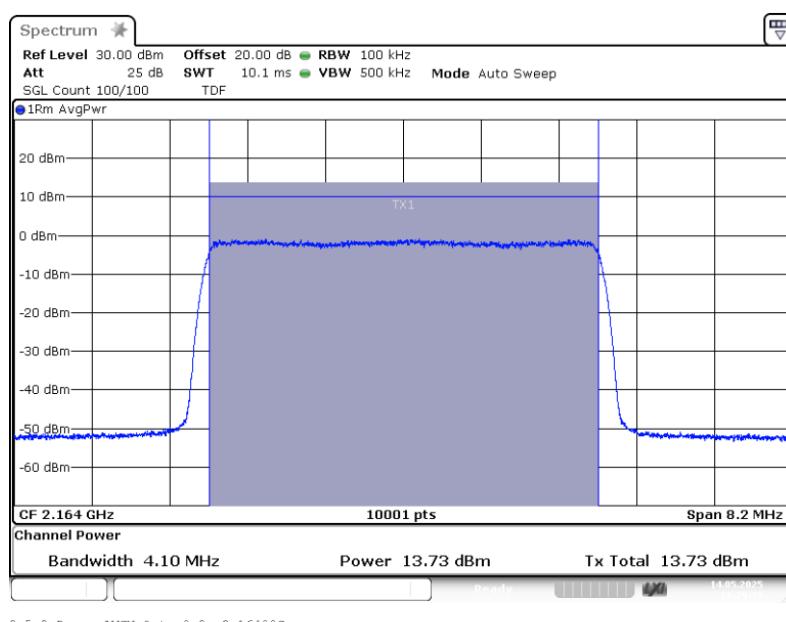
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: AWGN; Input power 0.3 dB < AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: AWGN; Output power 0.3 dB < AGC



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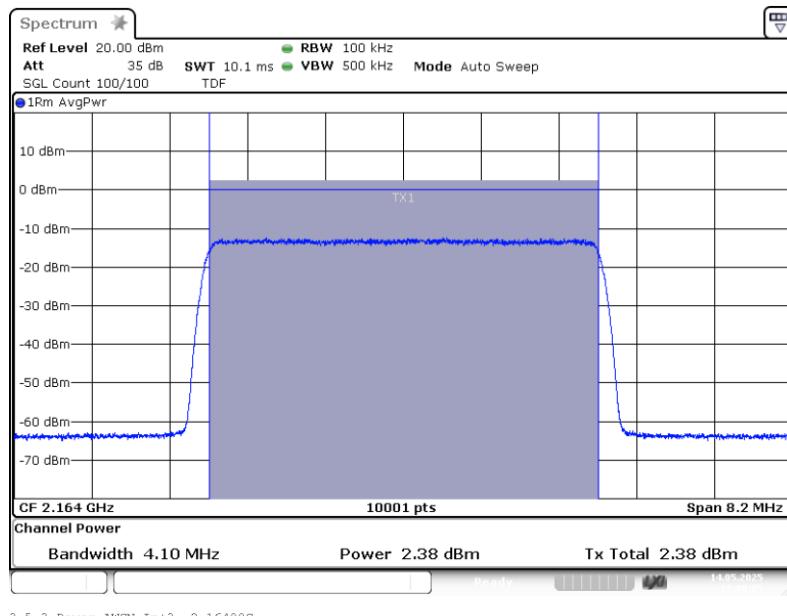


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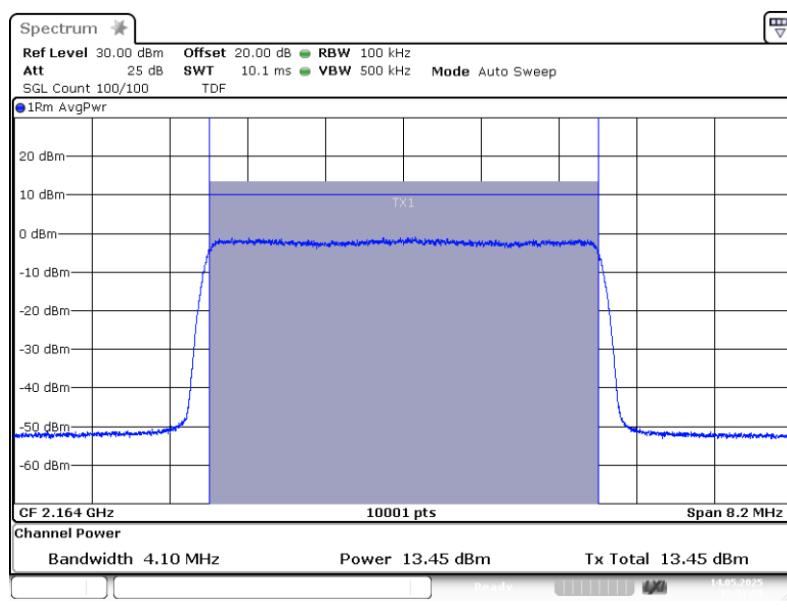
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: AWGN; Input power 3 dB > AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: AWGN; Output power 3 dB > AGC



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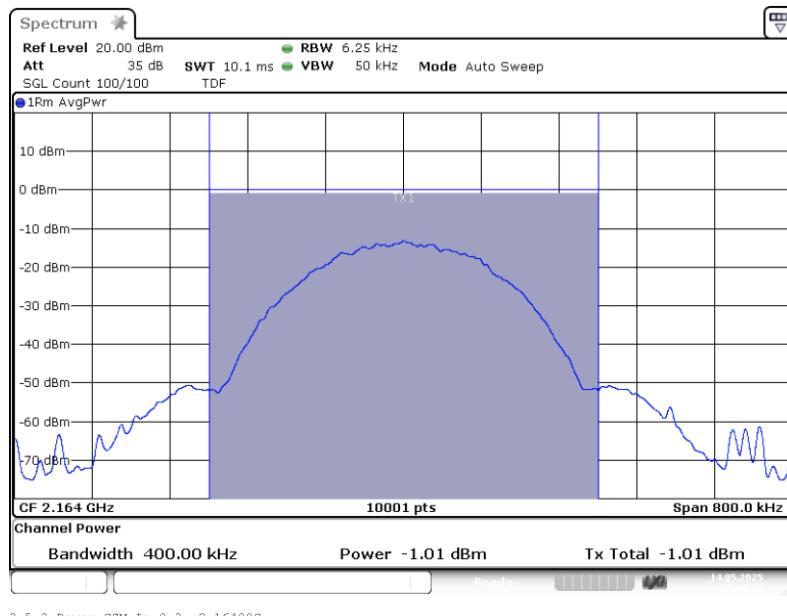


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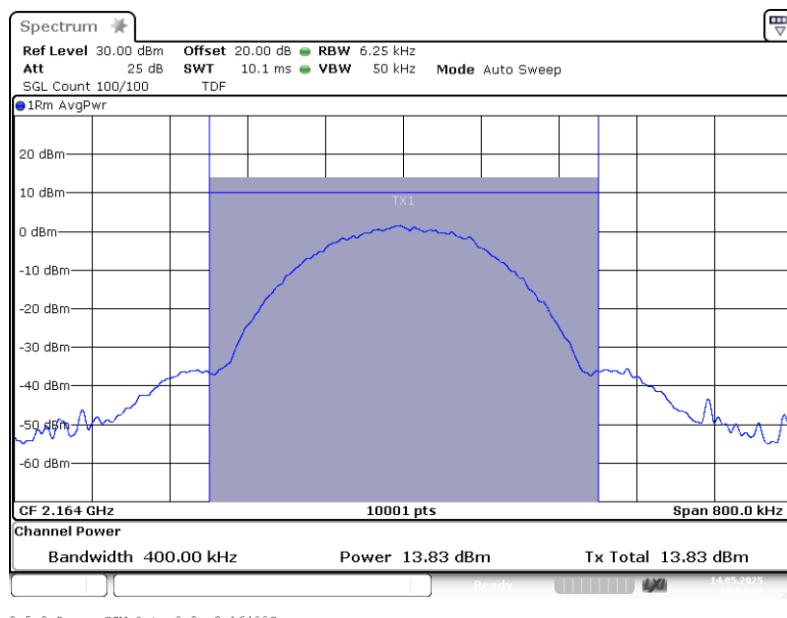
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: GSM; Input power 0.3 dB < AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: GSM; Output power 0.3 dB < AGC



The test results relate only to the tested item. The sample has been provided by the client.

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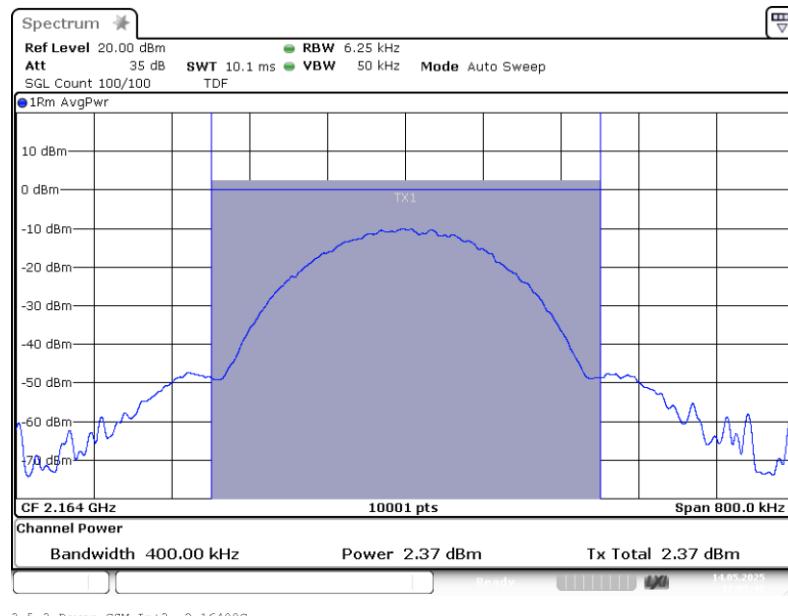


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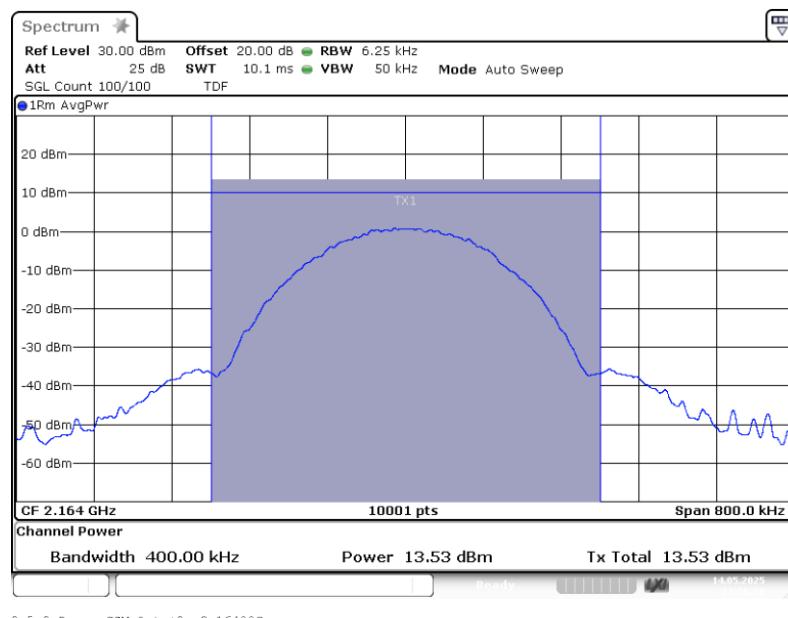
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: GSM; Input power 3 dB > AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1640 GHz; Bande edge: f0; Mod: GSM; Output power 3 dB > AGC



The test results relate only to the tested item. The sample has been provided by the client.

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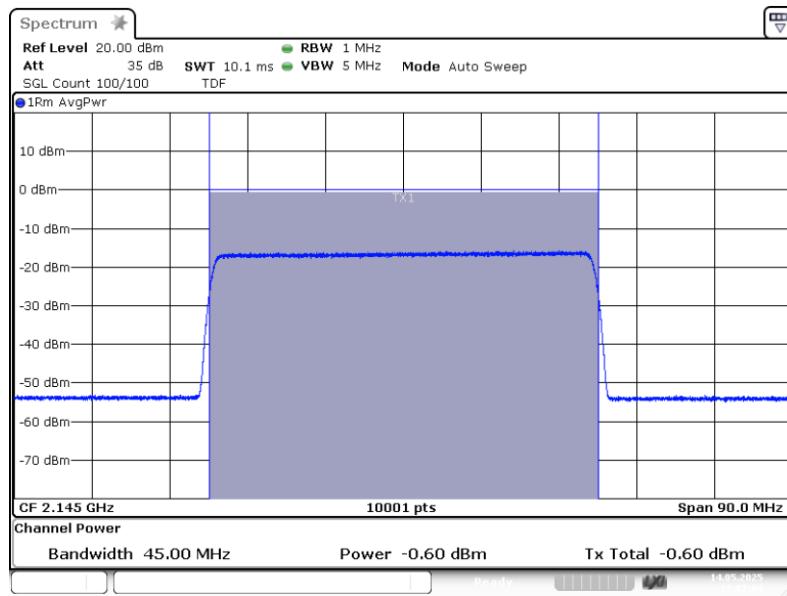


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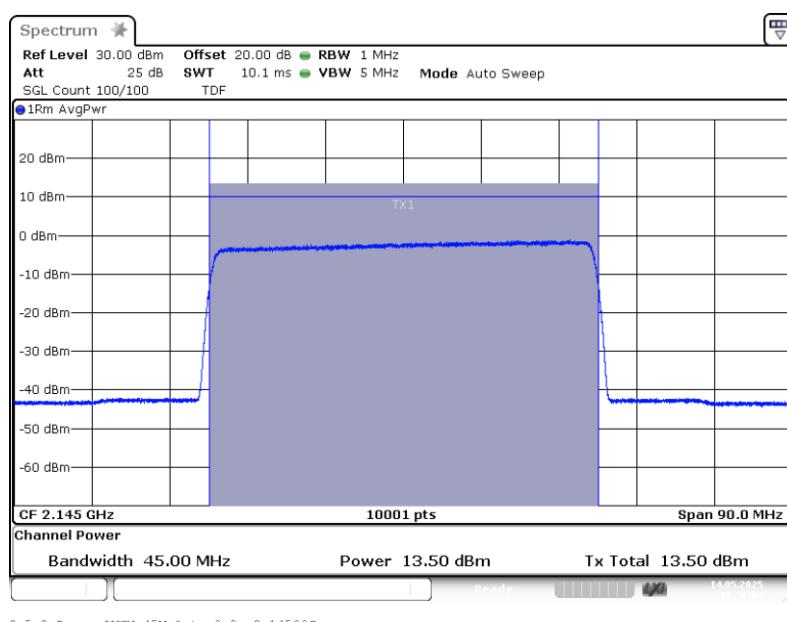
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Bande edge: mid; Mod: AWGN 45M;
Input power 0.3 dB < AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Bande edge: mid; Mod: AWGN 45M;
Output power 0.3 dB < AGC



The test results relate only to the tested item. The sample has been provided by the client.

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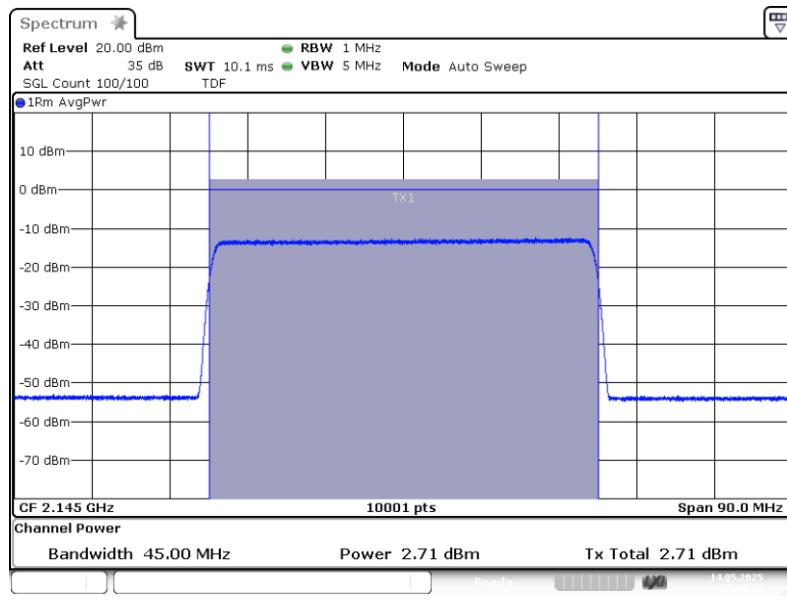


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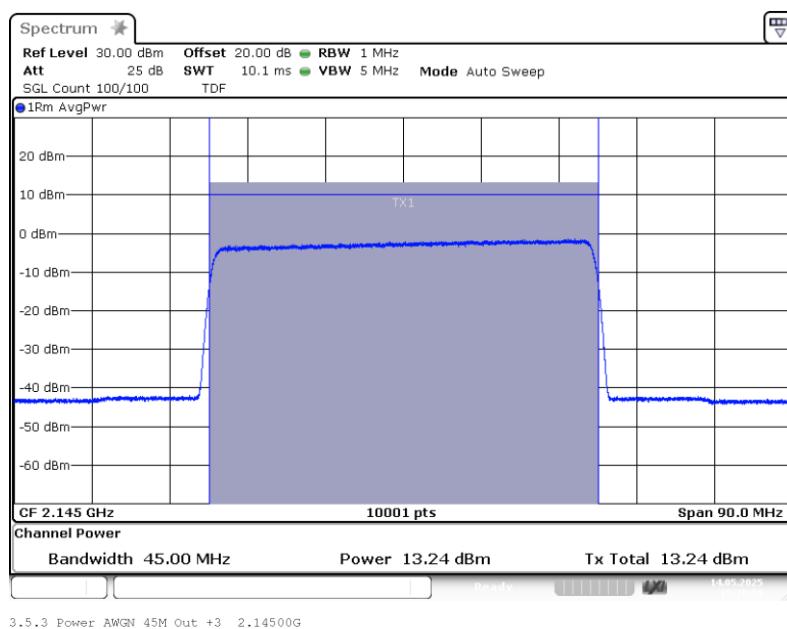
Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Bande edge: mid; Mod: AWGN 45M;
Input power 3 dB > AGC



Band: AWS 1700, Antenna 1; Frequency: 2.1450 GHz; Bande edge: mid; Mod: AWGN 45M;
Output power 3 dB > AGC



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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

5.5.5 TEST EQUIPMENT USED

- Conducted

The test results relate only to the tested item. The sample has been provided by the client.
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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

5.6 OUT-OF-BAND REJECTION

Standard FCC Part 27

The test was performed according to:

ANSI C63.26

Test date: 2025-04-14

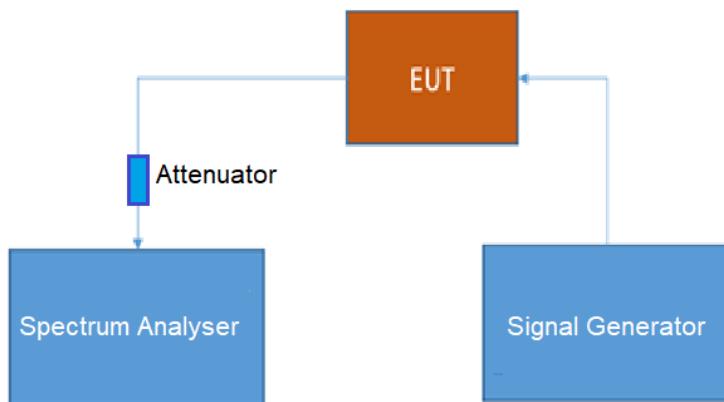
Environmental conditions: 23.6 °C; 25 % r. H.

Test engineer: Thomas Hufnagel

5.6.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the out-of-band rejection test case for industrial signal boosters.

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



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.



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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

5.6.2 TEST REQUIREMENTS/LIMITS

TEST REQUIREMENTS/LIMITS

Abstract RSS-131 from ISED:

9.1 Out-of-band rejection

The gain-versus-frequency response and the 20 dB passband bandwidth of the zone enhancer shall be reported. The zone enhancer shall reject amplification of other signals outside the passband of the zone enhancer.

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Tests performed on UAP-R [AWS 1700]

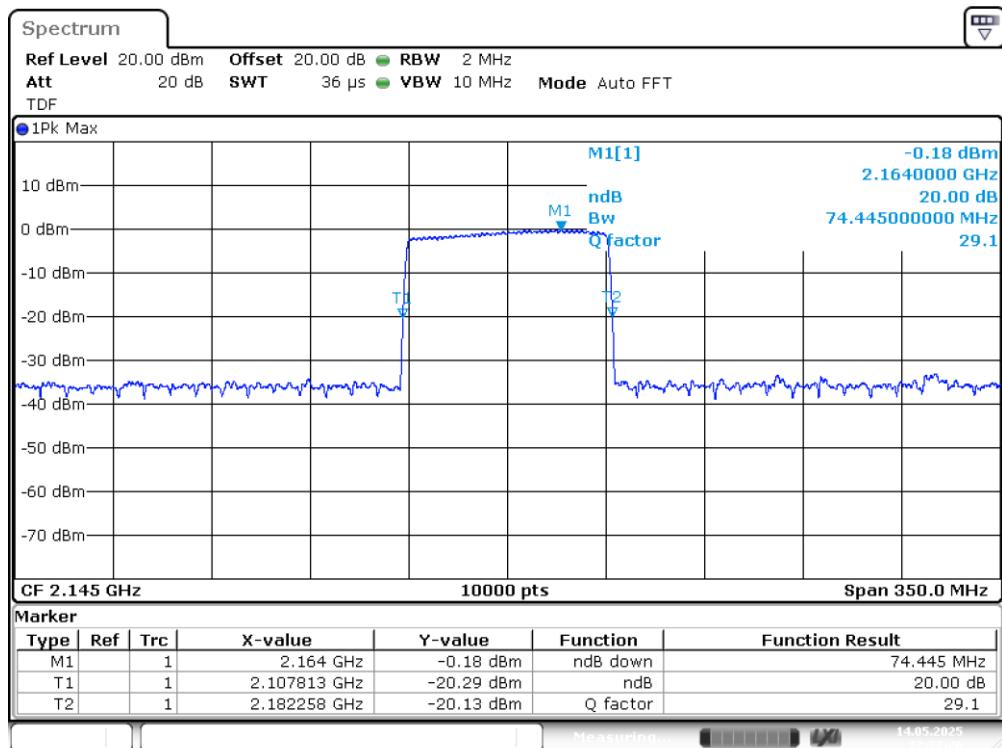
5.6.3 TEST PROTOCOL

Band 66 AWS 1700, downlink				
Highest power frequency [MHz]	Output power [dBm]	Lower highest power -20 dB frequency [MHz]	Upper highest power -20 dB frequency [MHz]	20 dB bandwidth [MHz]
2164.0	-0.18	2107.813	2182.258	74.445

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

5.6.4 MEASUREMENT PLOT

Frequency Band = AWS 1700, Antenna 1, Direction = RF downlink



5.6.5 TEST EQUIPMENT USED

- Conducted

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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

6 TEST EQUIPMENT

6.1 CONDUCTED EMISSIONS

Ref.No.	Type	Description	Manufacturer	Inventory no.	Last calibration	Calibration due
1.1	FSV40	Signal Analyzer 10 Hz - 40 GHz	Rohde & Schwarz	E-003138	2023-10	2025-10
1.2	SMBV100A	Vector Signal Generator 9 kHz - 6 GHz	Rohde & Schwarz	E-003206	2023-01	2026-01
1.3	CA-2.9MF-20-40-10W-RDC	Attenuator 20 dB	Tactron	E-004057	2024-10	2026-10
1.4	testo 175 H1	Thermo-Hygrometer	Testo	E-003922	2024-12	2025-12
1.5	Auto Messung 1 Channel V8.1	Software	Bureau Veritas	Software V8.1	---	---

The calibration interval is the time interval between "Last Calibration" and "Calibration Due".

6.2 ANTENNA FACTORS. CABLE LOSS AND SAMPLE CALCULATION

The used factors for antennas, cables etc. are deposited in the used test systems (LabView program and BAT EMC programm). They are actualised by the returing calibration control.

Sample calculation

$$E (\text{dB } \mu\text{V/m}) = U (\text{dB } \mu\text{V}) + AF (\text{dB } 1/\text{m}) + \text{Corr. (dB)}$$

U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
distance correction = $-20 * \text{LOG} (d_{\text{Limit}}/ d_{\text{used}})$
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values.

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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

7 PHOTO REPORT

Please see separate photo report.

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Test Report No.: 25-0092

Tests performed on UAP-R [AWS 1700]

Annex A: Accreditation certificate (for information)

The accreditation relates to competences stated on the accreditation certificate. The current certificate is available on the homepage of the DAkkS and can be downloaded under accredited bodies with the processing number:

<https://www.dakks.de/en>

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Tests performed on UAP-R [AWS 1700]

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Annex B: Additional information provided by client

None.

***** End of test report *****

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