

TEST REPORT # EMCC-170187CC, 2020-02-05

This report replaces Test Report # EMCC-170187C, 2020-01-09

EQUIPMENT UNDER TEST:

Device:	BLA 350 Plus
Serial Number:	021019
Application:	Amplifier
FCC ID:	2ACTR-BLA350
Manufacturer:	RM Costruzioni Elettroniche srl
Address:	Via IV Novembre, 42 - Ponte della Venturina 40046 Alto Reno Terme (Bo) ITALY
Phone:	+39 0534 60-460
Fax:	-

RELEVANT STANDARD(S):

47 CFR §§ 97.307, 97.317

TEST REPORT PREPARED BY:

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TESTED:



Manuel Zenk

APPROVED:



Ludwig Kraft

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1 GENERAL INFORMATION

1.1 Purpose

The purpose of this report is to show compliance with the 47 CFR §97.307 and §97.317 requirements for the certification of external RF amplifiers operating in the amateur radio service.

1.2 Limits and Reservations

The test results in this report apply only to the particular equipment under test (EUT) as declared in this report. This test report shall not be reproduced except in full without the written permission of EMCCCons DR. RAŠEK GmbH & Co. KG.

1.3 Test Location

Test Laboratory:	EMCCCons DR. RAŠEK GmbH & Co. KG
Accreditation No.:	D-PL-12067-01-04
FCC Test Firm Registration No.:	368753
Address of Labs I, II, III and Head Office:	EMCCCons DR. RAŠEK GmbH & Co. KG Boelwiese 8 91320 Ebermannstadt GERMANY
Address of Labs IV and V:	EMCCCons DR. RAŠEK GmbH & Co. KG Stoernhofer Berg 15 91364 Unterleinleiter GERMANY
Phone:	+49 9194 7262-0
Fax:	+49 9194 7262-199
E-Mail:	emc.cons@emcc.de
Web:	www.emcc.de

1.4 Customer

Company Name:	RM Costruzioni Elettroniche srl
Street:	Via IV Novembre, 42 - Ponte della Venturina
City:	40046 Alto Reno Terme (Bo)
Country:	ITALY
Phone:	+39 0534 60-460
E-Mail:	a.molinari@scc-info.it

1.5 Manufacturer

Company Name:	RM Costruzioni Elettroniche srl
Street:	Via IV Novembre, 42 - Ponte della Venturina
City:	40046 Alto Reno Terme (Bo)
Country:	ITALY

1.6 Dates and Test Location

Date of Receipt of EUT: 2019-12-19
Test Date: 2019-12-19
Test Location: Lab IV

1.7 Ordering Information

Purchase Order: signed quote EMCC-170187C, dated 2019-10-02

1.8 Climatic Conditions

Date	Temperature [°C]	Relative Humidity [%]	Air Pressure [hPa]	Lab	Customer attended tests
2019-12-19	22	34	974	IV	no

2 PRODUCT DESCRIPTION

2.1 Equipment Under Test (EUT)

Trade name:	BLA 350 Plus
Serial number:	021019
FCC ID	2ACTR-BLA350
Firmware revision:	1.15F
Hardware revision:	Rel 1.15
Application:	Amplifier
Power supply:	230 / 60 Hz AC
Highest internally generated or used frequency:	16 MHz
Amateur Radio bands as defined in Manual BLA 350 Plus:	160 m, 80 m, 40 m, 30 m, 20 m, 17 m, 15 m, 12 m, 10 m 60 m band with reduced harmonic attenuation No Tx < 1.5 MHz & > 30 MHz
Output power:	300 W
Ports:	ANT RTX ALC PTT In IEC (European AC input socket) (see Annex 3 for detailed information)
Accessories delivered with EUT:	Exciter, Signal Generator, cable harness (see chapter 2.3)
Variants:	None
Remarks:	None

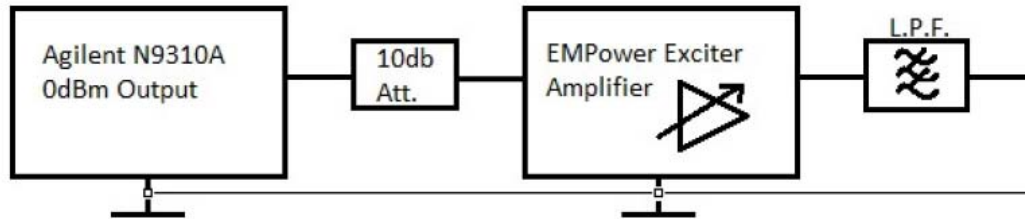
For further information concerning port description see Annex 3.

2.2 Intended Use

Amplifier for amateur radio service.

2.3 EUT Peripherals/Simulators

An Agilent N9310A signal generator together with a EMPower 2005-BBS0A3FKO Exciter Power Amplifier and special filters were used as exciter. The complete exciter set-up was provided by the customer.



For further information concerning set-up description see Annex 4. The information was submitted by the customer.

2.4 Mode of Operation during Testing and Test Setup

The EUT was supplied with 230 V / 60 Hz AC and switched on. “ANT” was connected to a dummy load. The input of the amplifier was set to 10 W / 40 dBm as defined by the customer and document BLA 350 Plus Test Configuration (see Annex 4).

Terminal	Tested with
Power supply	230 V / 60 Hz AC
RF input	10 W / 40 dBm / CW

2.5 Modifications Required for Compliance

None.

3 TEST RESULTS SUMMARY

Summary of test results for the following EUT:

Manufacturer: RM Costruzioni Elettroniche srl
Device: BLA 350 Plus
Serial No: 021019

Requirement	47 CFR Section	Report Section	Result
Spurious Emissions & Gain	97.307(d), 97.317(a)	4	Passed

The client has made the determination that EUT Condition, Characterization, and Mode of Operation are representative of production units and meet the requirements of the specifications referenced herein.

Consistent with Industry practice, measurement and test equipment not directly involved in obtaining measurement results but having an impact on measurements (such as cable loss, antenna factors, etc.) are factored into the "Correction Factor" documented in certain test results. Instrumentation employed for testing meets tolerances consistent with known Industry Standards and Regulations.

All requirements were found to be within the limits outlined in this report.

The test results in this report apply only to the particular equipment under test (EUT) as declared in this report.

Test Personnel: Manuel Zenk
Issuance Date: 2020-02-05

4 SPURIOUS EMISSIONS & GAIN

Test Requirement: FCC 47 CFR, § 97.307(d), § 97.307(e), § 97.317(a) & § 97.317(b)

4.1 Regulation

§ 97.307 Emission standards.

(d) For transmitters installed after January 1, 2003, the mean power of any spurious emission from a station transmitter or external RF power amplifier transmitting on a frequency below 30 MHz must be at least 43 dB below the mean power of the fundamental emission. For transmitters installed on or before January 1, 2003, the mean power of any spurious emission from a station transmitter or external RF power amplifier transmitting on a frequency below 30 MHz must not exceed 50 mW and must be at least 40 dB below the mean power of the fundamental emission. For a transmitter of mean power less than 5 W installed on or before January 1, 2003, the attenuation must be at least 30 dB. A transmitter built before April 15, 1977, or first marketed before January 1, 1978, is exempt from this requirement.

§ 97.317 Standards for certification of external RF power amplifiers.

(a) To receive a grant of certification, the amplifier must:

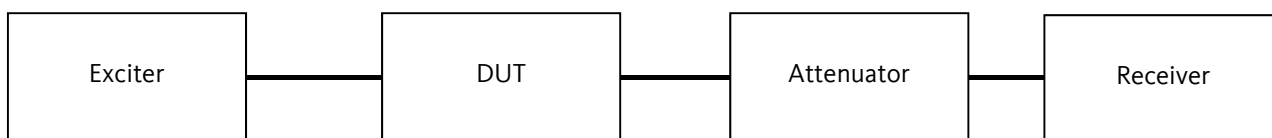
- (1) Satisfy the spurious emission standards of §97.307 (d) or (e) of this part, as applicable, when the amplifier is operated at the lesser of 1.5 kW PEP or its full output power and when the amplifier is placed in the “standby” or “off” positions while connected to the transmitter.
- (2) Not be capable of amplifying the input RF power (driving signal) by more than 15 dB gain. Gain is defined as the ratio of the input RF power to the output RF power of the amplifier where both power measurements are expressed in peak envelope power or mean power.
- (3) Exhibit no amplification (0 dB gain) between 26 MHz and 28 MHz.

4.2 Test Equipment

Instrument	Manufacturer	Type	EMCC Ident No.	Last Calibration	Next Calibration
AC Power Source with plug in variable frequ. oszill. and arbitrary function generator	California Instruments	HGA 5001ih-400, 5001ih-400, 5001ih-400	34	n.a.	n.a.
200 W/30dB Attenuator/N	Bird/Tenuline	8322	831	2018-06	2020-06
N-Cable N/50	EMCC DR. RASEK	RG 214	2398	n.a.	n.a.
10W Attenuator 10dB	JFW	50FHB-010-10	2430	2018-07	2020-07
N-Cable N/50	EMCC DR. RASEK	RG 214	2654	n.a.	n.a.
N-Cable N/50	EMCC DR. RASEK	RG 214	2662	n.a.	n.a.
EMI Test Receiver	Rohde & Schwarz	ESU8	3846	2019-02	2020-02

4.3 Test Setup

Schematic test setup for spurious emissions and gain measurement:



4.4 Test Result

Amplifier Gain § 97.317				Spurious Emissions § 97.307(d), § 97.307(e)			
Frequency f1	Input Power	Output Power	Amplifier Gain	2 * f1	3 * f1	4 * f1	5-10 * f1
[MHz]	[dBm]	[dBm]	[dB]	[dBc]	[dBc]	[dBc]	[dBc]
1.900	40.0	53.3	13.3	-78.7	-76.3	-88.62	≤ -71.1
3.650	40.0	53.8	13.8	-78.3	-58.4	-87.7	≤ -68.7
7.100	40.0	54.3	14.3	-88.3	-75.3	-87.0	≤ -70.2
10.125	40.0	54.5	14.5	-47.8	-46.5	-84.8	≤ -57.4
14.175	40.0	54.4	14.4	-67.2	-58.1	-62.3	≤ -61.4
18.118	40.0	53.6	13.6	-73.8	-61.6	-79.0	≤ -78.3
21.225	40.0	54.2	14.2	-69.7	-74.8	-82.8	≤ -78.0
24.945	40.0	54.8	14.8	-48.9	-75.6	-85.1	≤ -85.1
28.850	40.0	54.7	14.7	-64.0	-81.4	-79.4	≤ -70.9

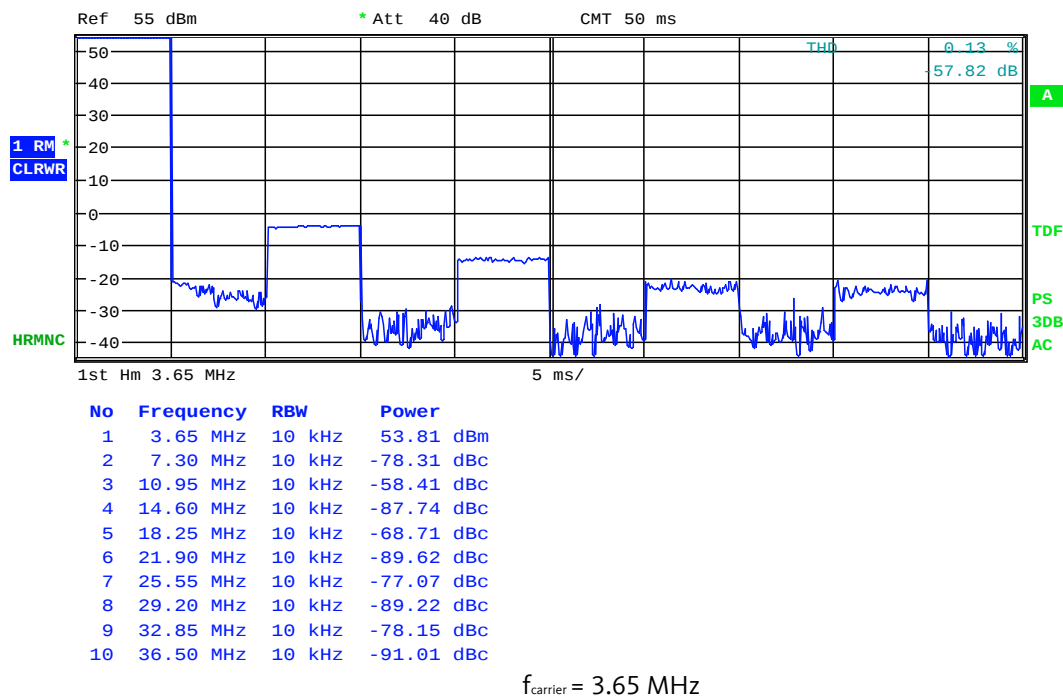
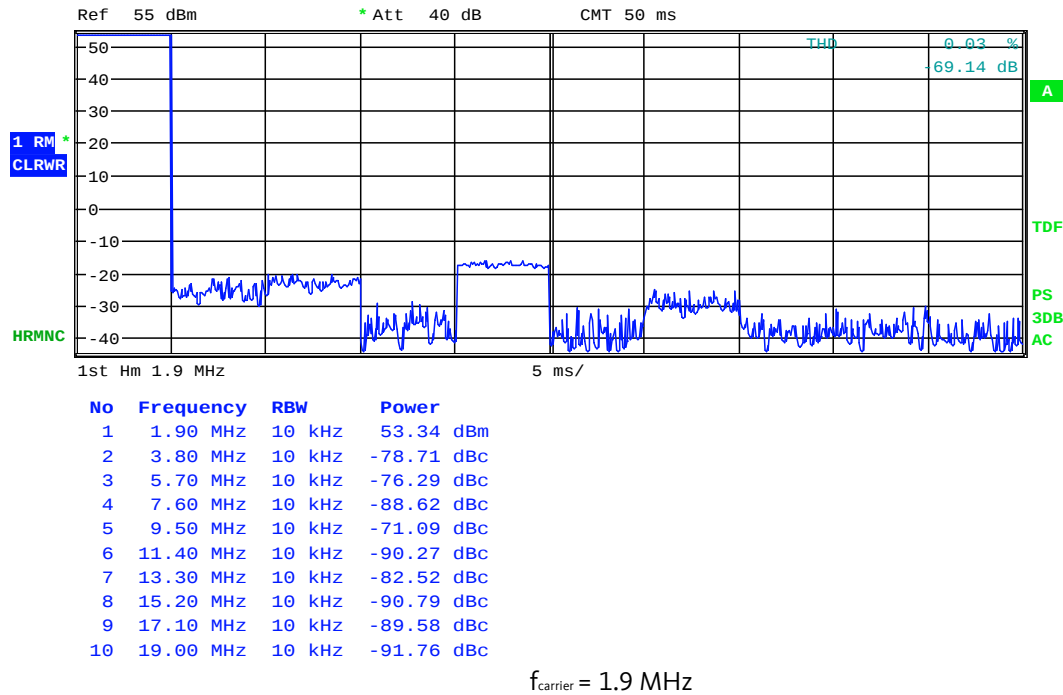
No gain was measured between the frequencies 25.9 MHz and 28.0 MHz.

Manufacturer: RM Costruzioni Elettroniche srl
Device: BLA 350 Plus
Serial No: 021019
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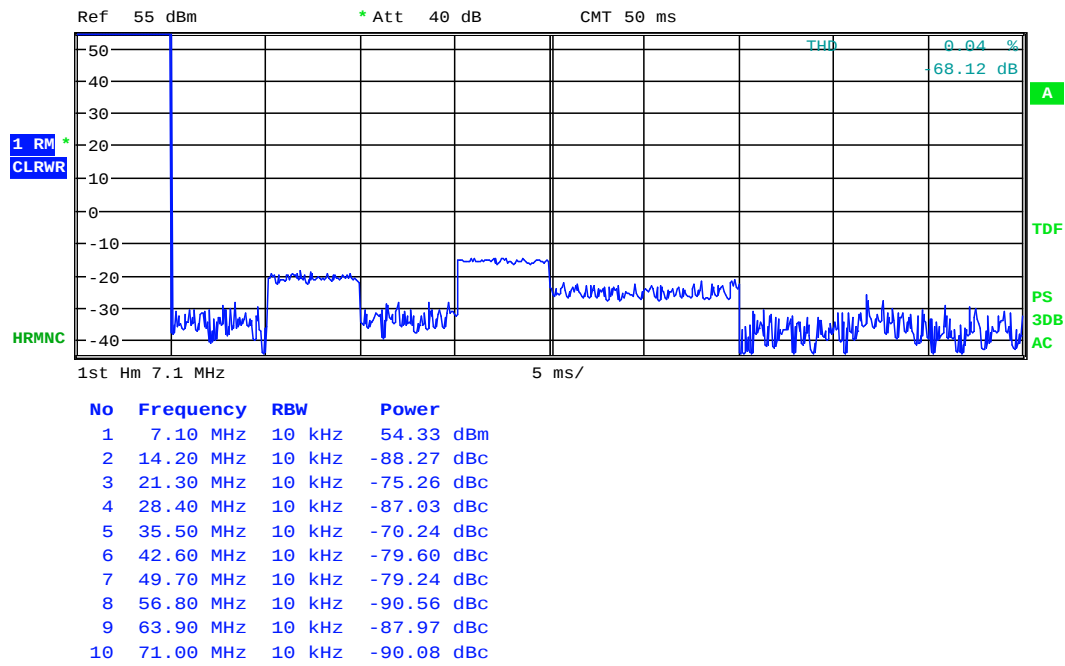
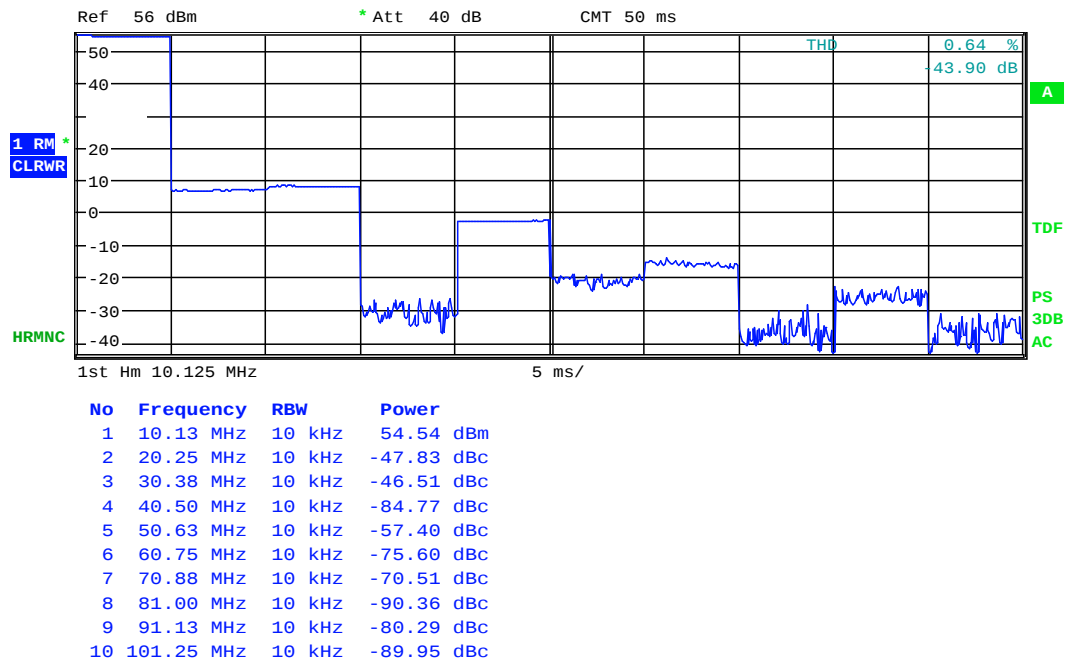
The EUT meets the requirements of this section.

4.5 Measurement Plots

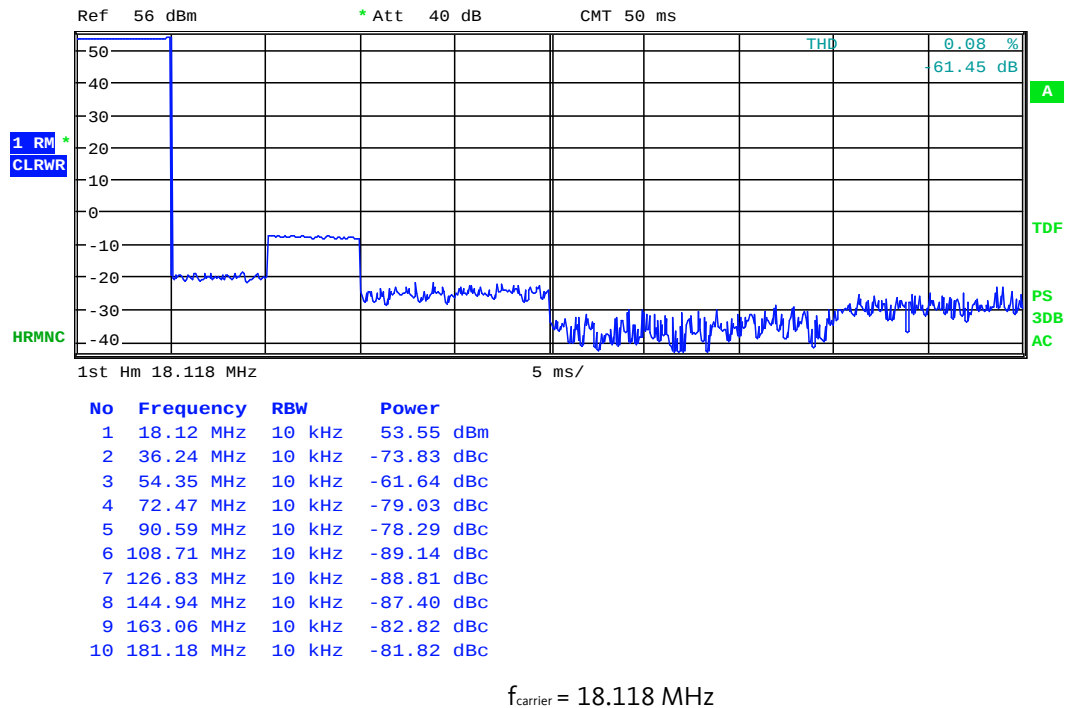
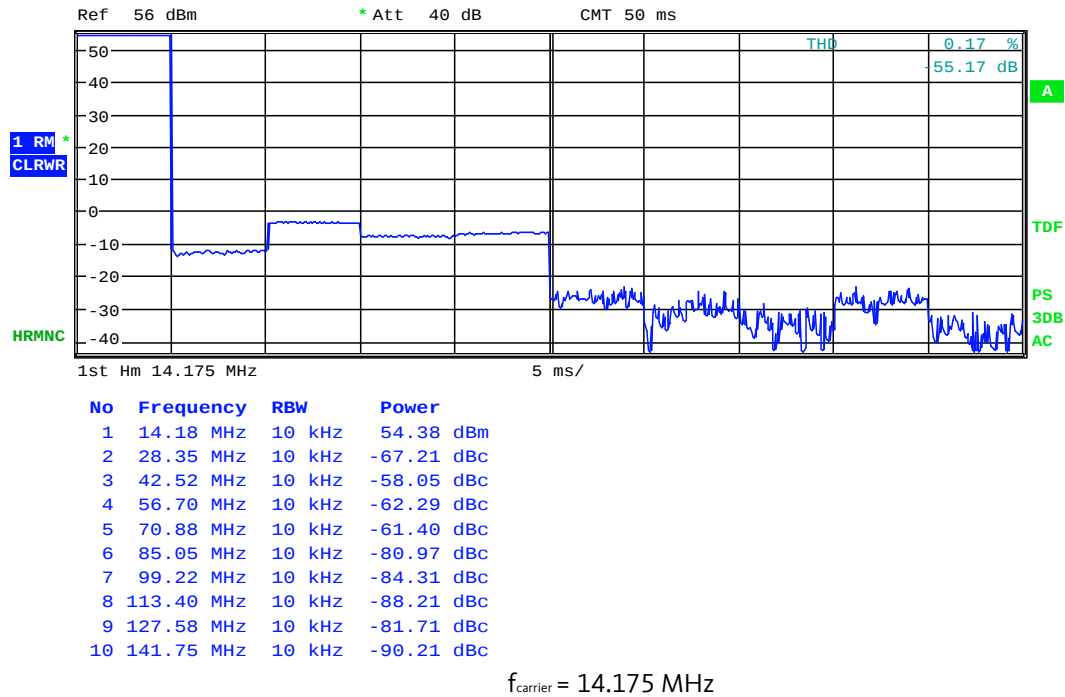
The R&S ESU8 implemented function “harmonic distortion” was used to proof compliance.



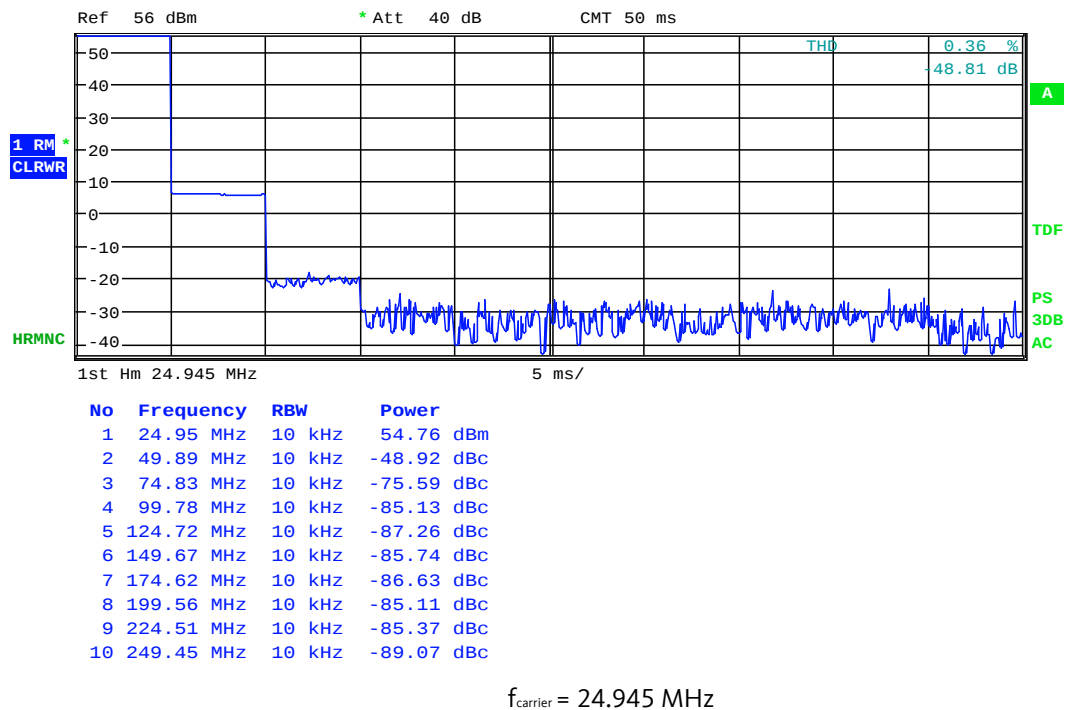
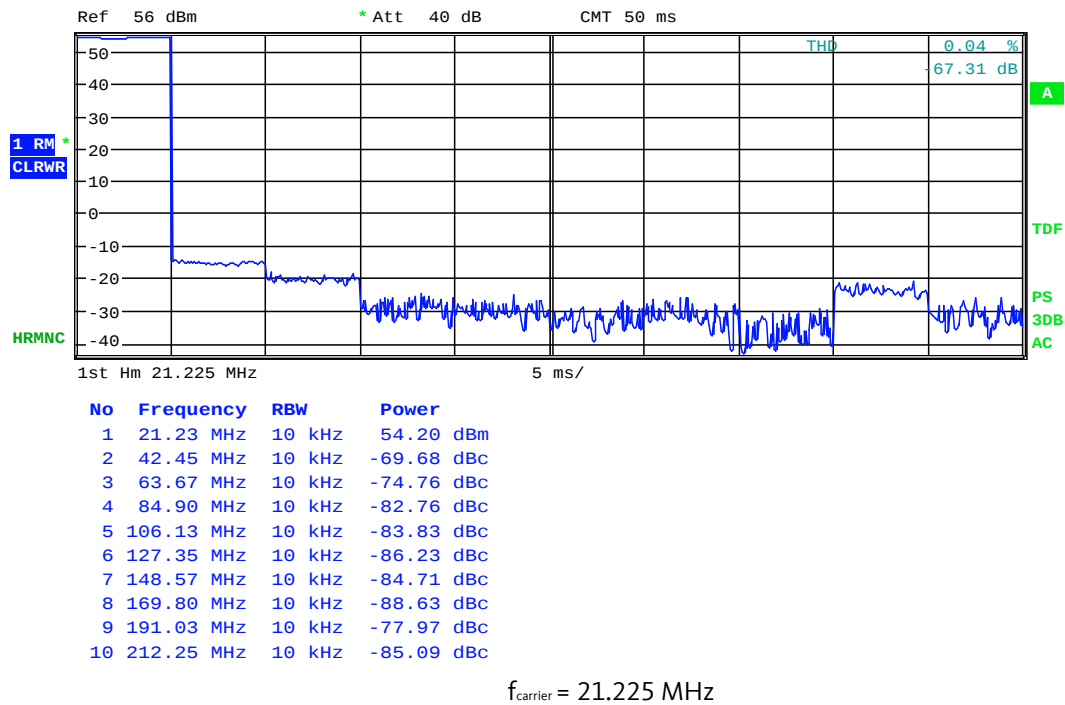
Test of RM Costruzioni Elettroniche srl Amplifier BLA 350 Plus to 47 CFR §§ 97.307, 97.317


 $f_{\text{carrier}} = 7.1 \text{ MHz}$

 $f_{\text{carrier}} = 10.125 \text{ MHz}$

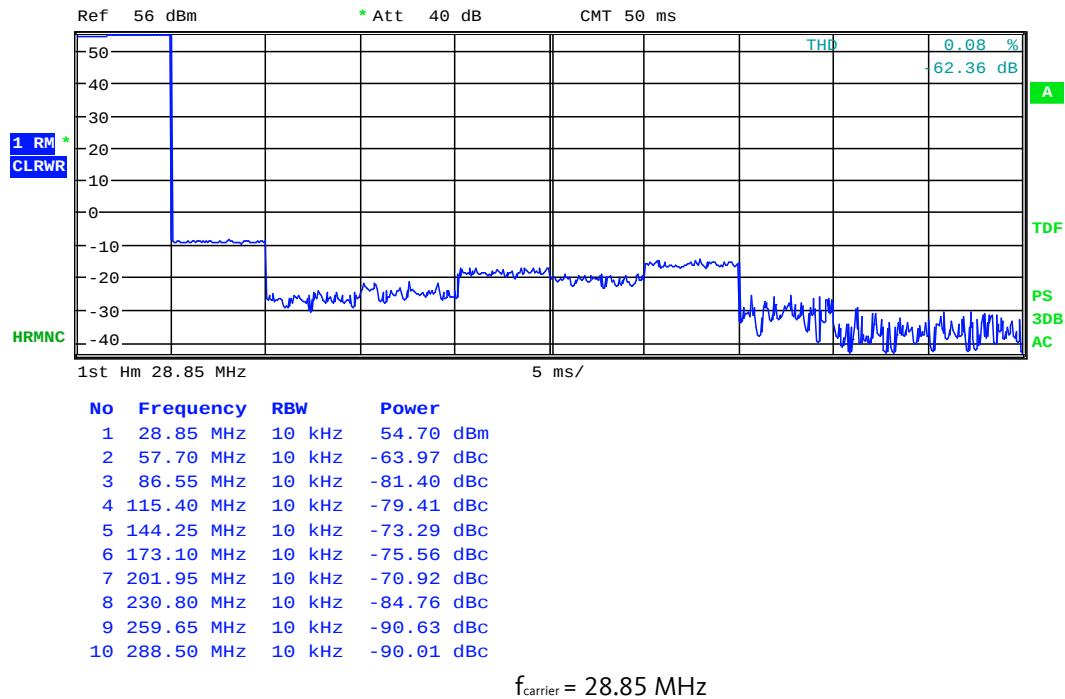
Test of RM Costruzioni Elettroniche srl Amplifier BLA 350 Plus to 47 CFR §§ 97.307, 97.317



Test of RM Costruzioni Elettroniche srl Amplifier BLA 350 Plus to 47 CFR §§ 97.307, 97.317



Test of RM Costruzioni Elettroniche srl Amplifier BLA 350 Plus to 47 CFR §§ 97.307, 97.317



5 MEASUREMENT UNCERTAINTY

Relevant Standard	Measurement	Measurement Uncertainty
ANSI C63.23-2012	Harmonics measurement (conducted)	± 2.4 dB
ANSI C63.23-2012	Power measurement (conducted)	± 2.4 dB

The reported uncertainty values are based on a standard uncertainty multiplied by a coverage factor of $k=2.0$, providing a level of confidence of 95 %.

The given values have been calculated on the basis of the following documents:

CISPR 16-4-2:2011+A1:2014, Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-2: Uncertainties, statistics and limit modelling - Measurement instrumentation uncertainty.

JCGM 100:2008, Evaluation of measurement data - Guide to the expression of uncertainty in measurement.

6 LIST OF ANNEXES

Following annexes are separated parts from this test report.

Description	Pages
Annex 1: Photographs of test set-up	2
Annex 2: Photographs of equipment under test (EUT)	3
Annex 3: Description of equipment under test (EUT), ports	1
Annex 4: Description of exciter set-up provided by the customer	7