

**TEST REPORT # EMCC-170187AB, 2018-01-31***This report replaces Test Report # EMCC-170187A, 2017-12-22***EQUIPMENT UNDER TEST:**

Device: BLA600  
Serial Number: 0090717  
Application: Amplifier  
FCC ID: 2ACTR-BLA600  
Manufacturer: RM Costruzioni Elettroniche  
Address: Via IV Novembre, 42 - Ponte della Venturina  
40046 Alto Reno Terme (BO)  
ITALY  
Phone: +39 0534 60460  
Fax: +39 0534 60463

**RELEVANT STANDARD(S):** 47 CFR §§ 97.307, 97.317**TEST REPORT PREPARED BY:**

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**TEST PERSONNEL:****HEAD OF COMMERCIAL  
EMC AND RADIO DEPT.:**

Daniel Mayle



Wolfgang Döring

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## 1 GENERAL INFORMATION

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### 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 EMCCons DR. RAŠEK GmbH & Co. KG.

### 1.3 Test Location

Test Laboratory:	EMCCons DR. RAŠEK GmbH & Co. KG
Accreditation No.:	D-PL-12067-01-02
Address of Labs I, II, III and Head Office:	EMCCons DR. RAŠEK GmbH & Co. KG Boelwiese 8 91320 Ebermannstadt GERMANY
Address of Labs IV and V:	EMCCons 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
Street:	Via IV Novembre, 42 - Ponte della Venturina
City:	40046 Alto Reno Terme (BO)
Country:	ITALY
Phone:	+39 0534 60460
E-Mail:	+39 0534 60463

### 1.5 Manufacturer

Company Name:	RM Costruzioni Elettroniche
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: 2017-07-31  
Test Date: CW 48/2017, 2017-11-27  
Test Location: Lab IV

## 1.7 Ordering Information

Purchase Order: E-Mail dated 2017-11-17 from S.C. Consulting, Mr Molinari

## 1.8 Climatic Conditions

Date	Temperature [°C]	Relative Humidity [%]	Air Pressure [hPa]	Lab	Customer attended tests
2017-12-04	21	30	984	IV	No
2017-12-06	22	33	990	IV	No

## 2 PRODUCT DESCRIPTION

### 2.1 Equipment Under Test (EUT)

Trade Name:	BLA600	
Serial Number:	0090717	
FCC ID	2ACTR-BLA600	
Software Version:	Control board (on frontal side)	software Rel. 1.94
Hardware Revision:	Power Amplifier Board	Rev. 1.0
	Power supply board (Top)	Rev. 1.1
	Power supply board (Bottom)	Rev.1.1
	Control board (frontal side)	Rel.1.0
	Output filter board	Rev. 1.0
	EMI filter and Soft start board	Rev. 0.2
Application:	Amplifier	
Power Supply:	120 VAC, 230 VAC, 240 VAC, 50/60 Hz	
Highest internally generated or used frequency:	54 MHz	
Frequency bands	1.800-2.000 MHz 3.500-4.000 MHz 7.000-7.300 MHz 10.100-10.150 MHz 14.000-14.350 MHz 18.068-18.168 MHz 21.000-21.450 MHz 24.890-24.990 MHz 28.000-29.700 MHz 50.000-54.000 MHz	
Output power	500 W	
Ports:	AC Mains Inlet Socket ALC Output Connector (Phono / RCA Type) PTT Input Connector (Phono / RCA Type) Antenna 1 Output Connector (SO239) Antenna 2 Output Connector (SO239) Antenna 3 Output Connector (SO239) RTX Input Connector (SO239) RF Ground Stud M5	
Accessories delivered with EUT:	Power cord User Manual	
Variants:	None	
Remarks:	None	

For further information concerning port description see Annex 3.

## 2.2 Intended Use

Amplifier for amateur radio service.

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Test of RM Costruzioni Elettroniche Amplifier BLA600 to 47 CFR §§ 97.307, 97.317

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General product information:

The following information was taken out of user's manual delivered by the customer.

**14. Specifications:**

Frequency:	1.8-30 MHz & 50-54 MHz
LPF's Optimised for the following Bands:	1.800-2.000 MHz 3.500-4.000 MHz 7.000-7.300 MHz 10.100-10.150 MHz 14.000-14.350 MHz 18.068-18.168 MHz 21.000-21.450 MHz 24.890-24.990 MHz 28.000-29.700 MHz 50.000-54.000 MHz
Active Device:	NXP / Freescale MRFE6VP5600H (50V)
Output Power:	500W+ PEP P1dB
Input Power:	20-25W for 500W O/P 80-10m 30-40W for 500W O/P 160m & 6m
Power Gain:	Typical 14dB +/- 1dB (80-10m)
Output Harmonic / Spurious Distortion:	HF >-45dB 6m >-60dBc
Input:	50 Ohms Unbalanced UHF SO239 Female
Input Matching:	<1.5:1 VSWR (160-6m)
Output:	3x 50 Ohms Unbalanced UHF SO239 Female Teflon Insulator, Gold plated terminal.
Supply Voltage:	120 Vac +5-5% 230 Vac +6-10% 240 Vac +10-6% 50/60Hz 1200VA max
AC Input Fuse:	5 x 20mm F LBC 250V (Fast Blow) 240Vac Supply 5A 230Vac Supply 6A 115Vac Supply 10A
PA Current:	27A max (hardware protected)
Metering:	Drain Current (Id), Drain Voltage (Vd), Relative Output Power, Input Power (Pin), Relative Load VSWR, Heatsink Temperature, Transistor Temperature, PSU Temperature.

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Test of RM Costruzioni Elettroniche Amplifier BLA600 to 47 CFR §§ 97.307, 97.317

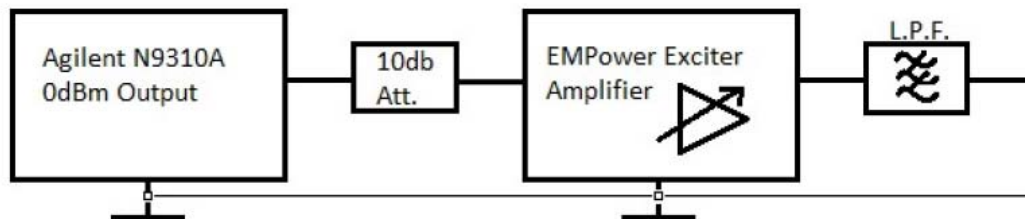
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PTT Input:	Close to ground TX, Open Circuit RX, (Suitable for Open Drain / Collector / Relay switching). Output +5V S/C current <15mA in TX.
ALC Output:	Negative going voltage, (0 to -10V), Adjustable.
Dimensions:	430mm x 142mm x 324mm (Width x Height x Depth)
Weight:	21.5 kg



## 2.3 EUT Peripherals/Simulators

An Agilent N9310A signal generator together with a EMPower 2005-BBS0A3FKO Exciter Power Amplifier and special filters was 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

### Test mode a:

The EUT was supplied with 240 VAC / 60 Hz and switched on. The terminal "RTX" was connected via coaxial cable to exciter set-up as described above. The exciter provided the desired parameters. "ANT1" was connected to a dummy load.

Terminal	Tested with
Power supply	240 VAC / 60 Hz
RF input	"RTX", for all frequencies
RF output	"ANT1", for all frequencies

## 2.5 Modifications Required for Compliance

None.

### 3 TEST RESULTS SUMMARY

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Summary of test results for the following EUT:

Manufacturer: RM Costruzioni Elettroniche  
Device: BLA600  
Serial No: 0090717

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: Daniel Mayle  
Issuance Date: 2017-12-14

## 4 SPURIOUS EMISSIONS & GAIN

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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.

(e) The mean power of any spurious emission from a station transmitter or external RF power amplifier transmitting on a frequency between 30-225 MHz must be at least 60 dB below the mean power of the fundamental. For a transmitter having a mean power of 25 W or less, the mean power of any spurious emission supplied to the antenna transmission line must not exceed 25 µW and must be at least 40 dB below the mean power of the fundamental emission, but need not be reduced below the power of 10 µW. 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:

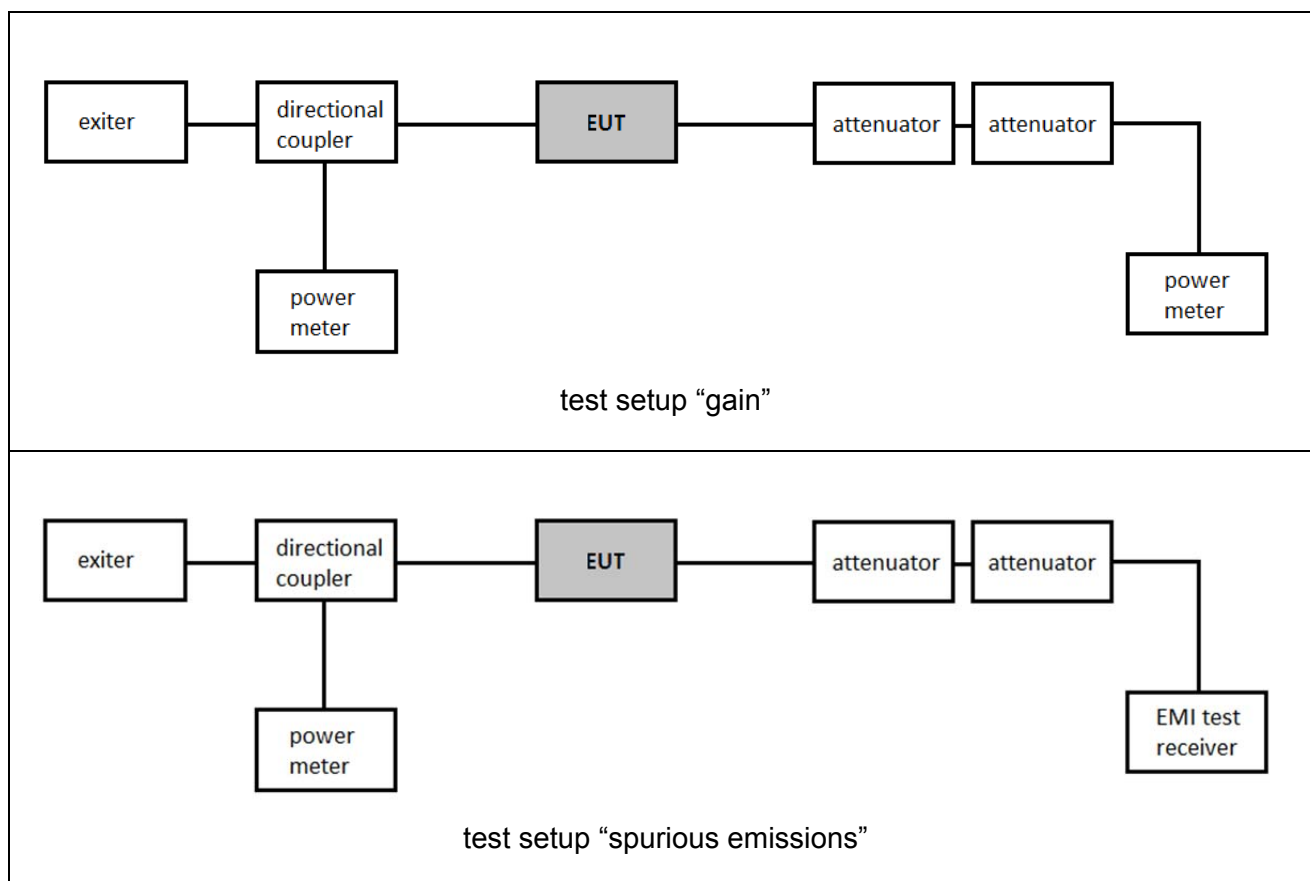
- (1) Satisfy the spurious emission standards of §97.307 (d) or (e) of this part, as applicable, when the amplifier is operated at the lesser of 1.5 kW PEP or its full output power and when the amplifier is placed in the "standby" or "off" positions while connected to the transmitter.
- (2) Not be capable 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

Type	Manufacturer/ Model No.	EMCC Ident No.	Last Calibration	Next Calibration
EMI Test Receiver	R&S / ESU8	3846	2017-01	2018-01
60-Hz-Converter	California Instruments	34	n.a.	n.a.
Digital Multimeter	Agilent / U1241A	2717	2016-01	2018-01
Dual Directional Coupler	Pulsar / C40-112-481/5N	5468	2016-01	2018-01
RF Power Meter	R&S / NRVD	233	2016-02	2018-02
Power Sensor	R&S / URV 5-Z32	528	2017-11	2019-11
Power Sensor	R&S / URV 5-Z55	536	2017-12	2018-12
Attenuator	Bird / 8329-300	828	2017-03	2018-12
Attenuator	Bird / 2-18A-MFN-10	2727	2017-06	2019-06
Termination	RFT / KAW5	4700	2016-07	2018-07

## 4.3 Test Setups

Schematic test setups for spurious emissions and gain:



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Test of RM Costruzioni Elettroniche Amplifier BLA600 to 47 CFR §§ 97.307, 97.317

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## 4.4 Test Result

Mode: test mode a

power 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]	[W]	[W]	[dB]	[dBc]	[dBc]	[dBc]	[dBc]
1.9	53	500	9.7	-65.66	-64.92	-70.56	≤ -59.49
3.65	20.9	500	13.8	-65.36	-67.29	-71.42	≤ -60.86
7.1	17.9	500	14.5	-67.22	-63.28	-68.96	≤ -57.35
10.125	24.8	500	13	-54.68	-54.59	-71.27	≤ -68.94
14.175	23.4	500	13.3	-70.04	-69.42	-71.43	≤ -60.06
18.118	22	500	13.6	-69.45	-60.26	-71.11	≤ -65.33
21.225	21.4	500	13.7	-69.42	-69.89	-70.81	≤ -70.77
24.945	29.8	500	12.2	-62.03	-61.7	-70.72	≤ -70.22
26	amplifier switched off: "error frequency"			/			
27	amplifier switched off: "error frequency"						
28	amplifier switched off: "error frequency"						
28.85	29.3	500	12.3	-69.77	-71.07	-71.34	≤ -69.79
52	40	460	10.6	-69.75	-67.72	-69.19	≤ -63.20

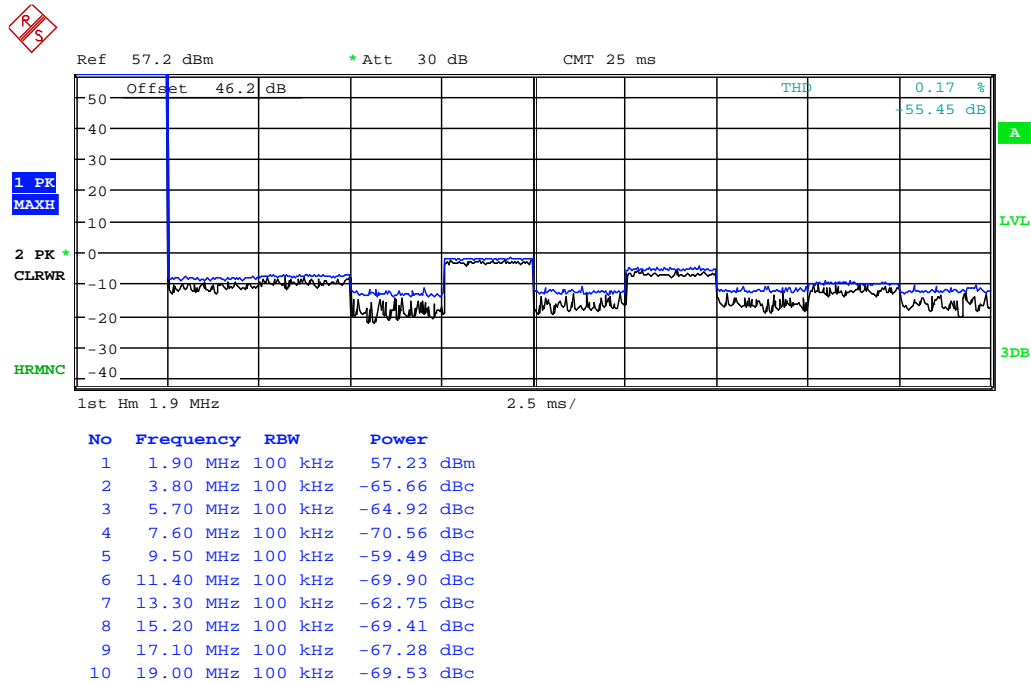
Manufacturer: RM Costruzioni Elettroniche  
 Device: BLA600  
 Serial No: 0090717  
 Test Date: 2017-12-04/06

**The EUT meets the requirements of this section.**

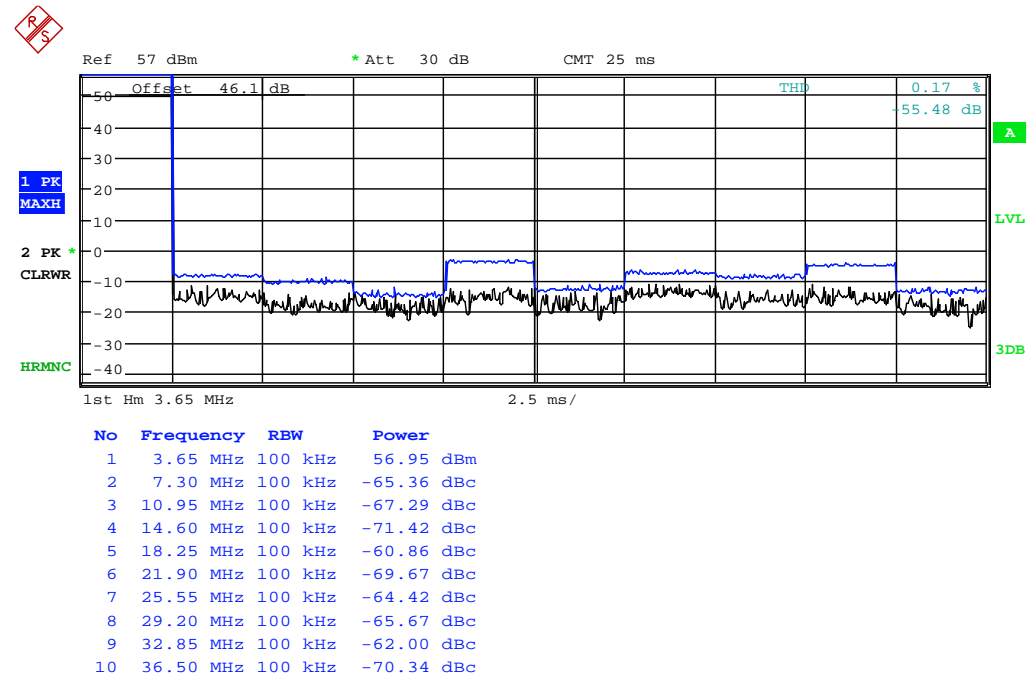
## Test of RM Costruzioni Elettroniche Amplifier BLA600 to 47 CFR §§ 97.307, 97.317

### 4.5 Measurement Plots

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

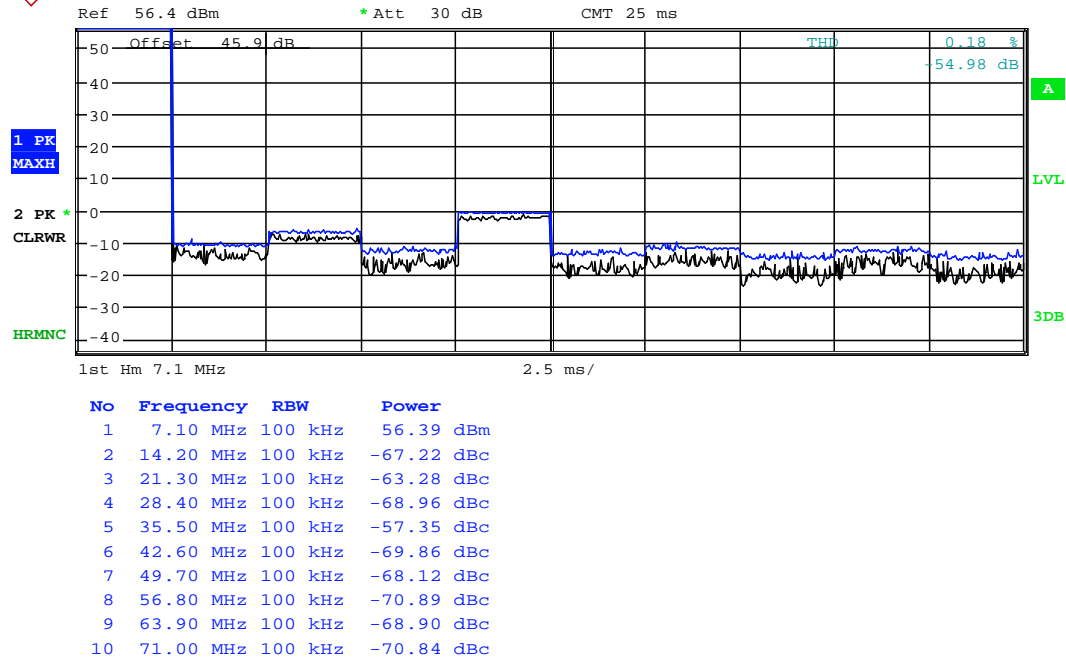
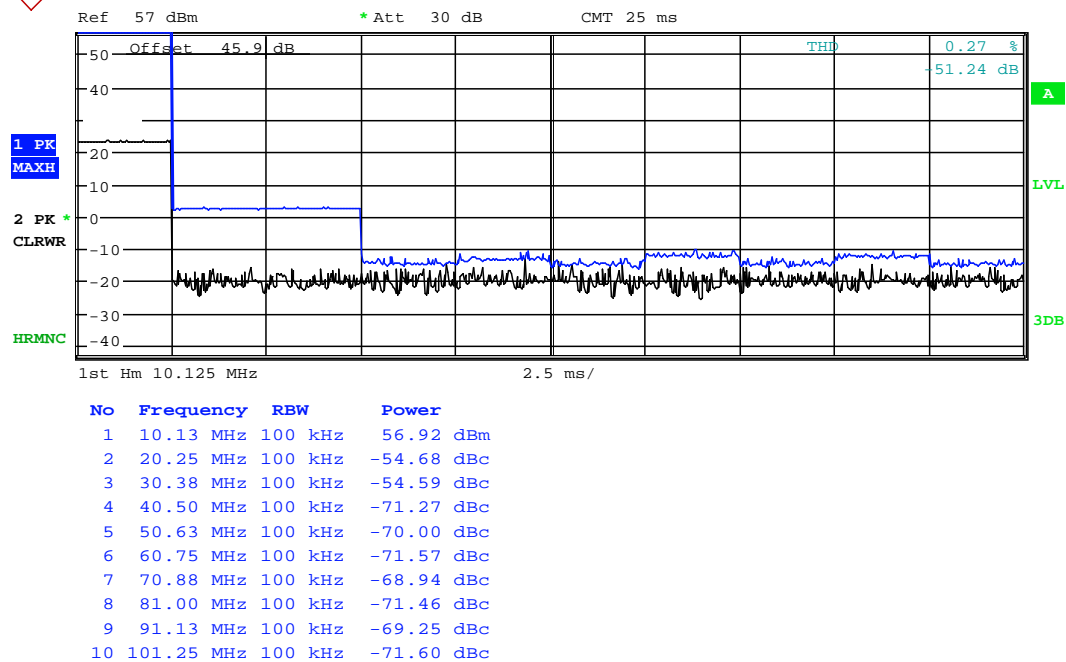


$f_{\text{carrier}} = 1.9 \text{ MHz}$

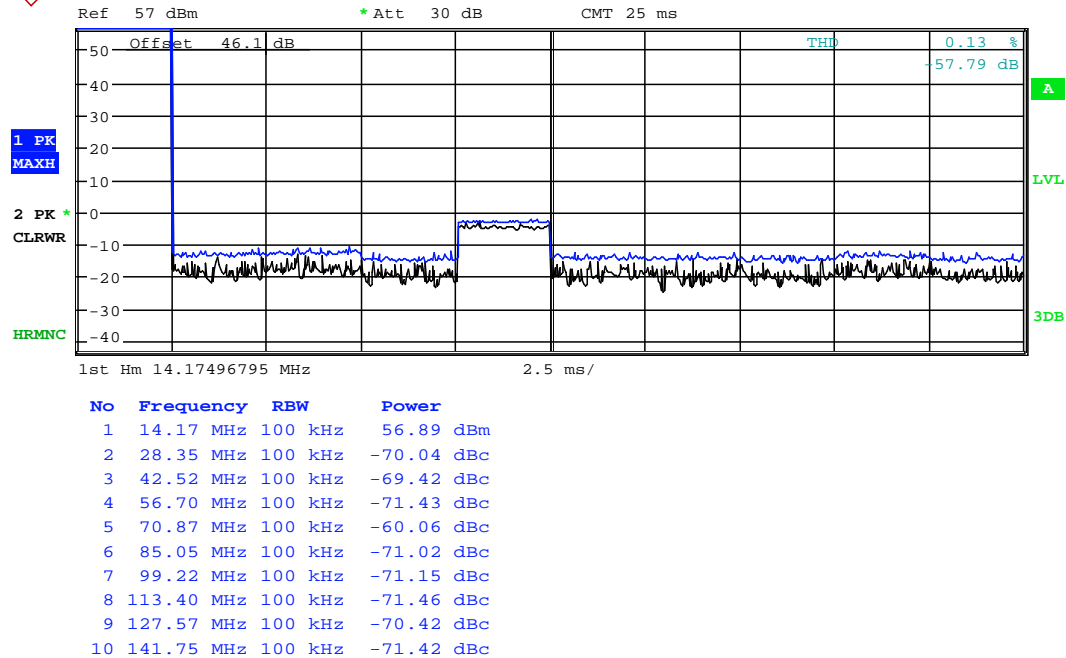
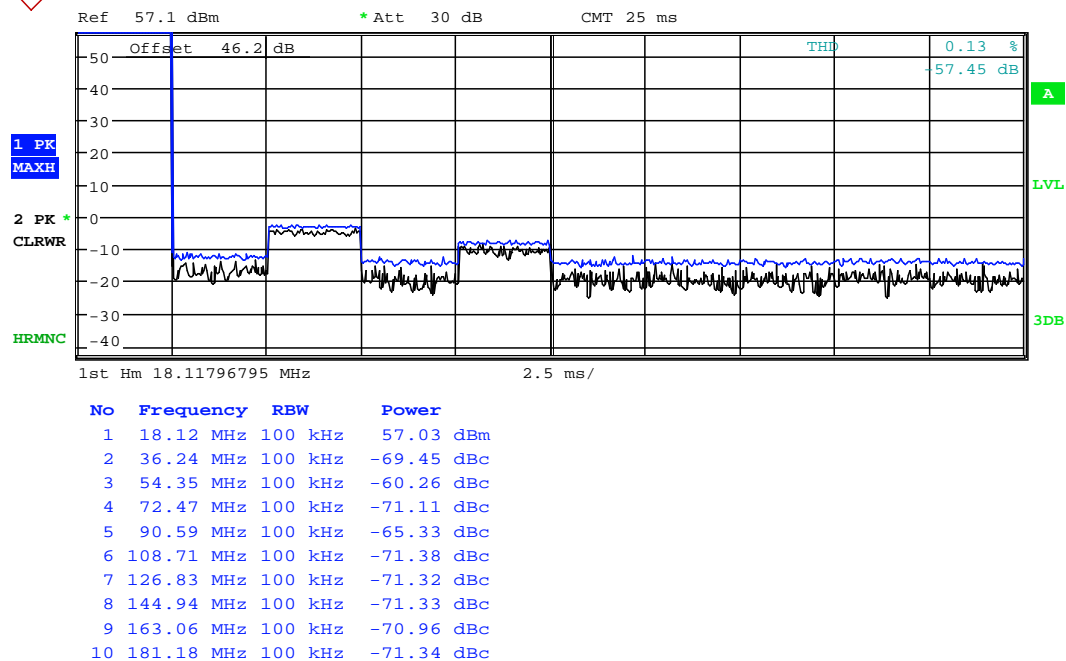


$f_{\text{carrier}} = 3.65 \text{ MHz}$

## Test of RM Costruzioni Elettroniche Amplifier BLA600 to 47 CFR §§ 97.307, 97.317

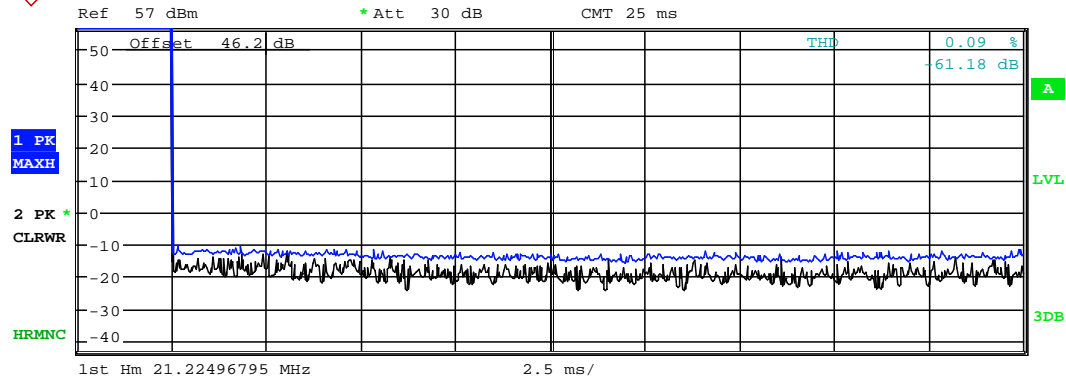

 $f_{\text{carrier}} = 7.1 \text{ MHz}$ 

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

## Test of RM Costruzioni Elettroniche Amplifier BLA600 to 47 CFR §§ 97.307, 97.317

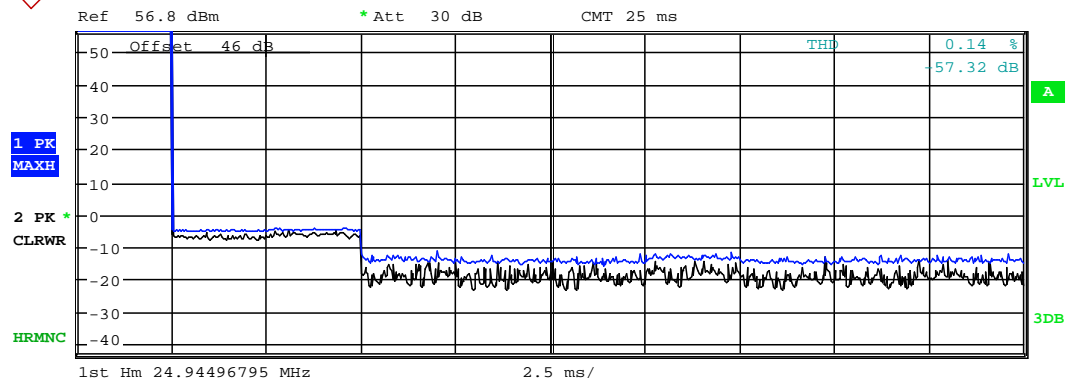

 $f_{\text{carrier}} = 14.175 \text{ MHz}$ 

 $f_{\text{carrier}} = 18.118 \text{ MHz}$



## Test of RM Costruzioni Elettroniche Amplifier BLA600 to 47 CFR §§ 97.307, 97.317



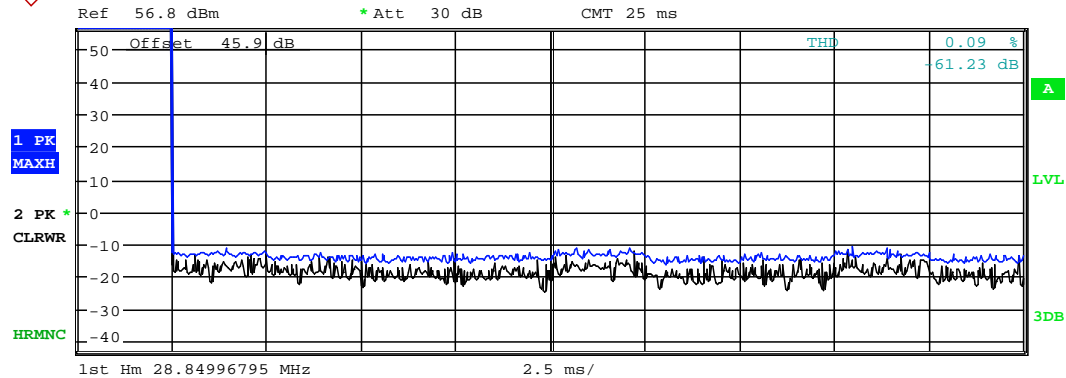
No	Frequency	RBW	Power
1	21.22 MHz	100 kHz	57.01 dBm
2	42.45 MHz	100 kHz	-69.42 dBc
3	63.67 MHz	100 kHz	-69.89 dBc
4	84.90 MHz	100 kHz	-70.81 dBc
5	106.12 MHz	100 kHz	-71.01 dBc
6	127.35 MHz	100 kHz	-71.58 dBc
7	148.57 MHz	100 kHz	-71.00 dBc
8	169.80 MHz	100 kHz	-71.54 dBc
9	191.02 MHz	100 kHz	-70.94 dBc
10	212.25 MHz	100 kHz	-70.77 dBc

 $f_{\text{carrier}} = 21.225 \text{ MHz}$ 


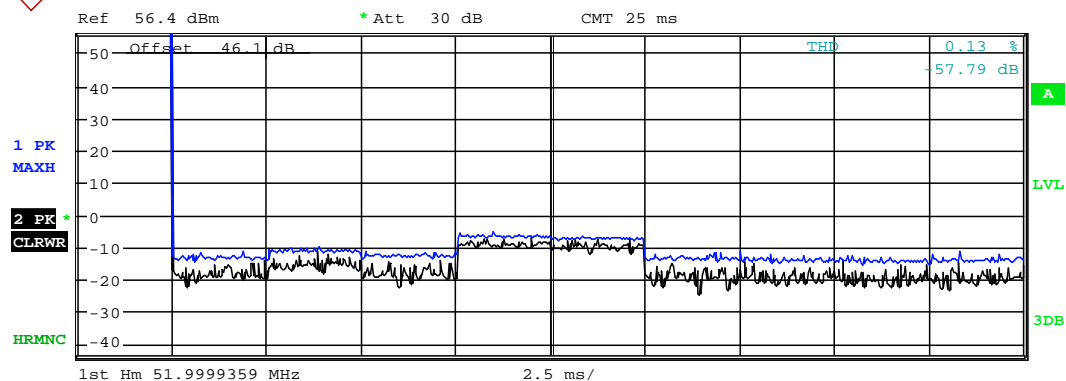
No	Frequency	RBW	Power
1	24.94 MHz	100 kHz	56.80 dBm
2	49.89 MHz	100 kHz	-62.03 dBc
3	74.83 MHz	100 kHz	-61.70 dBc
4	99.78 MHz	100 kHz	-70.72 dBc
5	124.72 MHz	100 kHz	-71.34 dBc
6	149.67 MHz	100 kHz	-71.39 dBc
7	174.61 MHz	100 kHz	-70.22 dBc
8	199.56 MHz	100 kHz	-71.47 dBc
9	224.50 MHz	100 kHz	-71.13 dBc
10	249.45 MHz	100 kHz	-71.05 dBc

 $f_{\text{carrier}} = 24.945 \text{ MHz}$

## Test of RM Costruzioni Elettroniche Amplifier BLA600 to 47 CFR §§ 97.307, 97.317



No	Frequency	RBW	Power
1	28.85 MHz	100 kHz	56.67 dBm
2	57.70 MHz	100 kHz	-69.77 dBc
3	86.55 MHz	100 kHz	-71.07 dBc
4	115.40 MHz	100 kHz	-71.34 dBc
5	144.25 MHz	100 kHz	-71.19 dBc
6	173.10 MHz	100 kHz	-69.79 dBc
7	201.95 MHz	100 kHz	-71.74 dBc
8	230.80 MHz	100 kHz	-71.24 dBc
9	259.65 MHz	100 kHz	-69.82 dBc
10	288.50 MHz	100 kHz	-71.59 dBc

 $f_{\text{carrier}} = 28.85 \text{ MHz}$ 


No	Frequency	RBW	Power
1	52.00 MHz	100 kHz	56.47 dBm
2	104.00 MHz	100 kHz	-69.75 dBc
3	156.00 MHz	100 kHz	-67.72 dBc
4	208.00 MHz	100 kHz	-69.19 dBc
5	260.00 MHz	100 kHz	-63.20 dBc
6	312.00 MHz	100 kHz	-63.81 dBc
7	364.00 MHz	100 kHz	-69.79 dBc
8	416.00 MHz	100 kHz	-70.48 dBc
9	468.00 MHz	100 kHz	-70.67 dBc
10	520.00 MHz	100 kHz	-70.37 dBc

 $f_{\text{carrier}} = 52.0 \text{ MHz}$

## 5 LIST OF ANNEXES

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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)	4
Annex 3: Description of equipment under test (EUT), ports	5
Annex 4: Description of exciter set-up provided by the customer	7

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**Annex 1 to Test Report # EMCC-170187AB, 2018-01-31**

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**PHOTOGRAPHS OF TEST SET-UP**

**EQUIPMENT UNDER TEST:**

Device:	BLA600
Serial Number:	0090717
Application:	Amplifier
FCC ID:	2ACTR-BLA600
Manufacturer:	RM Costruzioni Elettroniche
Address:	Via IV Novembre, 42 - Ponte della Venturina 40046 Alto Reno Terme (BO) ITALY
Phone:	+39 0534 60460
Fax:	+39 0534 60463

**RELEVANT STANDARD(S):** 47 CFR §§ 97.307, 97.317



Photo A1-1: conducted spurious emissions measurement



Photo A1-2: amplifier gain emissions

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**Annex 2 to Test Report # EMCC-170187AB, 2018-01-31**

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**PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)**

**EQUIPMENT UNDER TEST:**

Device:	BLA600
Serial Number:	0090717
Application:	Amplifier
FCC ID:	2ACTR-BLA600
Manufacturer:	RM Costruzioni Elettroniche
Address:	Via IV Novembre, 42 - Ponte della Venturina 40046 Alto Reno Terme (BO) ITALY
Phone:	+39 0534 60460
Fax:	+39 0534 60463

**RELEVANT STANDARD(S):** 47 CFR §§ 97.307, 97.317





Photo A2-1: EUT



Photo A2-2: EUT, front



Photo A2-3: EUT, back

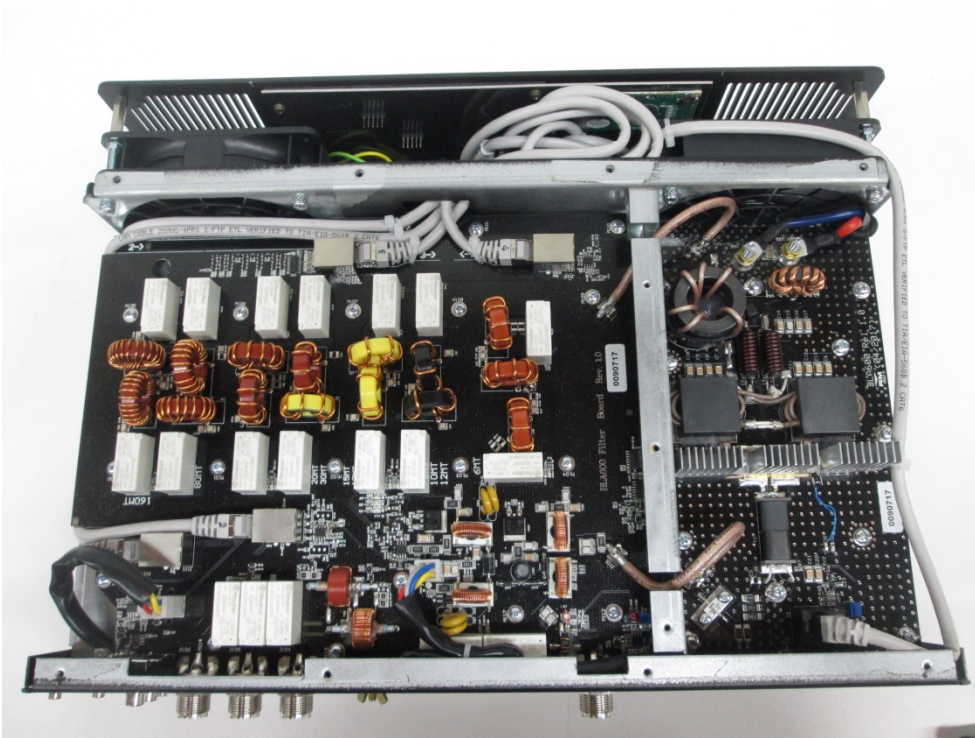


Photo A2-4: EUT, top with open casing



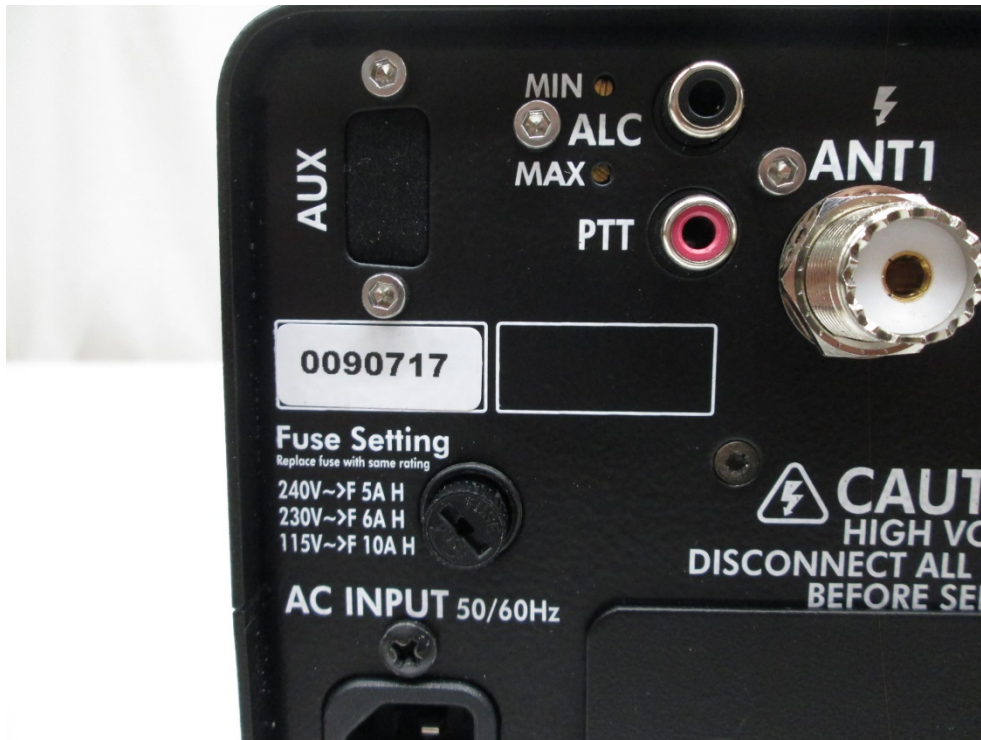


Photo A2-5: EUT, label

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**Annex 3 to Test Report # EMCC-170187AB, 2018-01-31**

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**DESCRIPTION OF EQUIPMENT UNDER TEST (EUT), PORTS**

**EQUIPMENT UNDER TEST:**

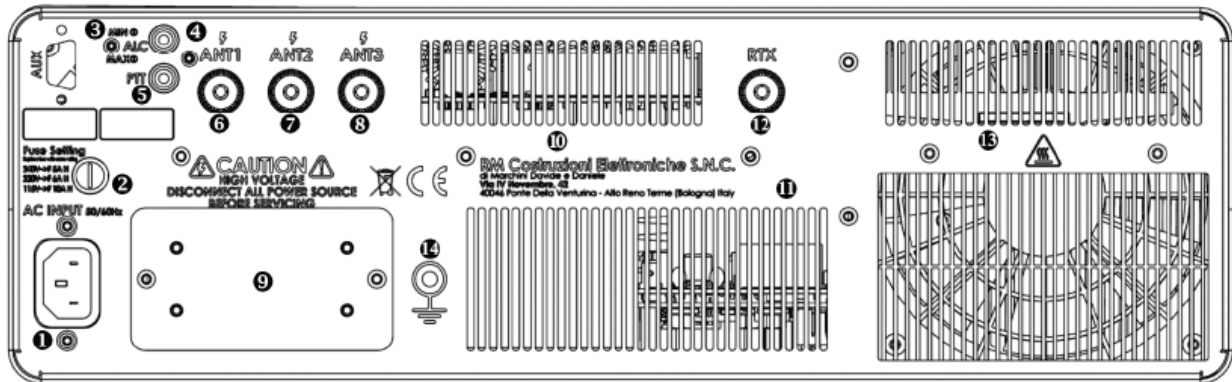
Device:	BLA600
Serial Number:	0090717
Application:	Amplifier
FCC ID:	2ACTR-BLA600
Manufacturer:	RM Costruzioni Elettroniche
Address:	Via IV Novembre, 42 - Ponte della Venturina 40046 Alto Reno Terme (BO) ITALY
Phone:	+39 0534 60460
Fax:	+39 0534 60463

**RELEVANT STANDARD(S):** 47 CFR §§ 97.307, 97.317

# Test of RM Costruzioni ELETTRONICHE BLA600 to 47 CFR §§ 97.307, 97.317

The following pages are an excerpt from the User Manual delivered by the customer:

## BLA600 Rear Panel



- |  |                                 |
|--|---------------------------------|
| 1. AC Mains Inlet Socket                   | 9. AC Input Voltage Selection   |
| 2. AC Line Fuse                            | 10. Exhaust Grille LPF PCB      |
| 3. ALC Min / Max Adjustment                | 11. Exhaust Grille PSU          |
| 4. ALC Output Connector (Phono / RCA Type) | 12. RTX Input Connector (SO239) |
| 5. PTT Input Connector (Phono / RCA Type)  | 13. RF Deck Exhaust Grille      |
| 6. Antenna 1 Output Connector (SO239)      | 14. RF Ground Stud M5           |
| 7. Antenna 2 Output Connector (SO239)      |                                 |
| 8. Antenna 3 Output Connector (SO239)      |                                 |

## Connection:

The BLA600 requires the following connections in order to function.

The output of the transceiver should be connected to the RTX ⑫ input on the rear panel with a suitable 50 Ohm patch cable terminated in PL259 UHF connectors. The length is not critical but should be kept as short as practically possible.

The BLA600 has 3 antenna outputs ⑥⑦⑧ that may be configured on a per band basis to the users requirements see section 7. Default from the factory **Ant:1 ⑥** is active for all bands. The output from the antenna socket should be connected to a suitably rated 50 Ohm cable, minimum rating 500W continuous at the highest used frequency, (52 / 54MHz), terminated in a PL259 UHF connector. (We recommend a 50 Ohm low loss 10mm cable for the output side such as RG213 spec. or better). This may be connected directly to a suitable resonant antenna of 50 Ohms resistive input impedance which must be continuously rated at least to the maximum output of the amplifier.

The BLA600 also requires a PTT input from the transceiver to switch between RX and TX. Without this input the amplifier cannot be used. Look in the manual of your transceiver for how to connect to the PTT Output. (Do not confuse this with the PTT input on some radios, usually made available for a foot switch or separate PTT input if the standard microphone PTT is not used). The PTT input ⑤ is a close to ground system which is compatible with all modern radios that use open collector or open drain outputs, for further information consult the instruction manual for the transceiver or your dealer on how to connect an external linear amplifier. The PTT Input to the amplifier requires an RCA / Phono type plug. The cable should be screened, length is not critical but should be as short as practically possible.

The RF ground post ④ on the rear panel should be securely connected to your station RF ground with a suitable low inductance ground strap. The house Gas or Water pipes should **NEVER** be used for this purpose. (Gas pipes for obvious reasons with risk of explosion, water pipes as they do not necessarily provide a low impedance path to ground and may well actually be isolated from ground if the house water supply is from a plastic water pipe, they can also introduce a higher noise floor and cause risk of electric shock to other uses of the water supply if not grounded). See section on Grounding page 20 for further details.

The ALC ④ may also optionally be connected, (See ALC menu for further details), however the drive power for the BLA600 should be manually controlled on the transceiver by the user to obtain the required output power from the amplifier.

## 7. Antenna Output Selection

S	t	a	n	d	b	y			A	n	t	:	1	
P	i	n	:	-	-	W		T	1	:	2	0	°	C

The BLA600 has 3 user configurable antenna outputs. As supplied from the factory the default antenna output is **Ant:1** for all bands. Each band may be independently configured to any one of the three outputs.

To change any particular band to different antenna output it is necessary to be in 'Standby' mode. First select the band by pressing the relevant band select key **1**. Then select the required antenna output by using the '+' **6** or '-' **5** keys under the LCD display to select **Ant:1**, **Ant:2** or **Ant:3**. To memorise the new selection press and hold the 'Navigate' key **7** for 3 seconds. The antenna output number will begin to flash and then after 3 seconds a beep will be heard confirming the saved selection. Each time the same band is returned to the last memorised selection will be returned.

In 'Standby' mode pressing the band key of any band will display the currently memorised Antenna output on the LCD display.

The antenna output may also be changed temporarily without saving the selection. This can be useful in RX/TX if testing two different antennas for the same band. Simply use the '+' **6** and '-' **5** keys to change the antenna output without saving the selection. Again this must be done in 'Standby' mode but after the change has been made it is possible to change to 'Operate' mode and use the new selection. If a new band is selected the non saved output will return to the default or last memorised selection when that band is returned to.



The radio must be capable of about 40W to obtain full output on all bands. Generally around 20W is sufficient for full output on the bands 80 to 10m). More power is required on 160m and 6m for full output. Due to the accurate frequency reading and high speed band switching of the BLA600 a CAT interface connection is not required for automatic band change. A high speed PIN Diode switch is used so the amplifier will switch back to bypass briefly whilst the Low Pass Filter relays insert a different filter, so at no point are any relays hot switched thus avoiding possible contact damage from arcing and presenting the amplifier briefly with an open circuit load. The amplifier is supplied with the default antenna output as antenna 1 ⑥ for all bands, so we suggest that for initial testing this output should not be changed. We also recommend that the first test should be carried out with the output connected directly to a power meter / dummy load whilst familiarity is gained with the operation of the amplifier.

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## Annex 4 to Test Report # EMCC-170187AB, 2018-01-31

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### ANNEX 4: DESCRIPTION OF EXCITER SET-UP PROVIDED BY THE CUSTOMER

#### EQUIPMENT UNDER TEST:

Device:	BLA600
Serial Number:	0090717
Application:	Amplifier
FCC ID:	2ACTR-BLA600
Manufacturer:	RM Costruzioni Elettroniche
Address:	Via IV Novembre, 42 - Ponte della Venturina 40046 Alto Reno Terme (BO) ITALY
Phone:	+39 0534 60460
Fax:	+39 0534 60463

**RELEVANT STANDARD(S):** 47 CFR §§ 97.307, 97.317

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The following information was delivered by the customer:

## **BLA600 Test Configuration.**

### **Packing List:**

- Aluminium Test platform
- Agilent N9310A Signal Generator
- 10dB Attenuator (Input to Exciter Amplifier)
- EMPower 2005-BBS0A3FKO Exciter Power Amplifier
- 10 Low Pass Filters for Output of Exciter for:
  - 160m (1.900 MHz Test Freq.)
  - 80m (3.650 MHz Test Freq.)
  - 40m (7.100 MHz Test Freq.)
  - 30m (10.125 MHz Test Freq.)
  - 20m (14.175 MHz Test Freq.)
  - 17m (18.168 MHz Test Freq.)
  - 15m (21.225 MHz Test Freq.)
  - 12m (24.945 MHz Test Freq.)
  - 10m (28.850 MHz Test Freq.)
  - 6m (52.000 MHz Test Freq.)
- 1x coaxial cable RG142 34cm N-N Signal Generator O/P to 10dB Attenuator
- 1x coaxial cable RG142 51cm N-N Output of Exciter amplifier to input external LP Filter
- 1x coaxial cable RG223 94cm N-PL259 Filter O/P to Amplifier RTX Input
- 1x coaxial cable RG223 94cm N-PL259 Amplifier O/P ANT 1 to Dummy Load
- 1x manual PTT switch for Amplifier PTT input
- 4x N-PL259 Adaptor (If required)
- 1x spare coaxial cable RG223 N-PL259 92cm

### **Note:**

It was understood that the power measurement instruments, directional coupler and dummy load / High Power attenuator will be provided by the test house. The typical set up is shown below in the photographs together with a simple block diagram.



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BLOCK DIAGRAM OF CONNECTION

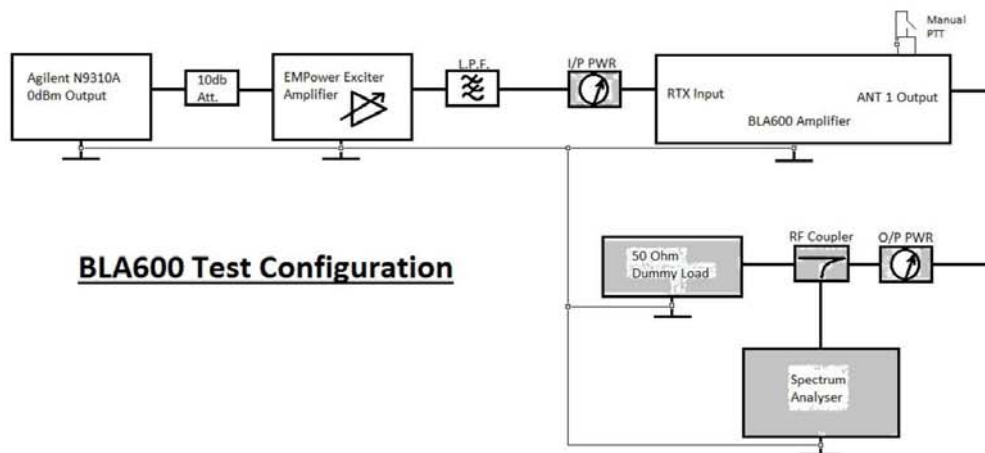


Fig.1

Front Panel Connections



Photo 1.

Test of RM Costruzioni Elettroniche BLA600 to 47 CFR §§ 97.307, 97.317

Rear Panel General view.



Photo 2

Output Power sensor and manual PTT switch.



Photo 3.



Input Power sensor

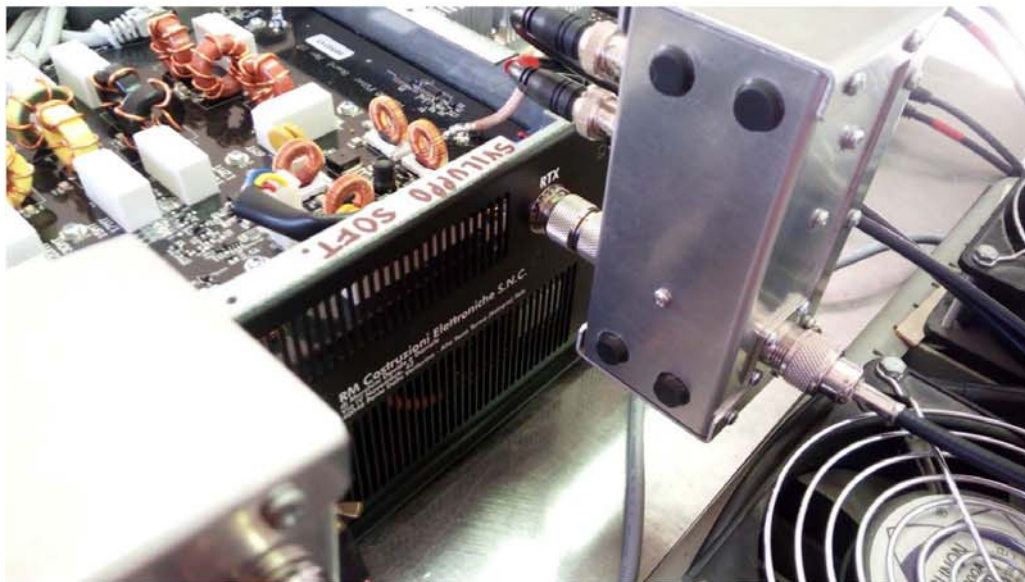


Photo 4.

Attenuator and output to Spectrum Analyser.

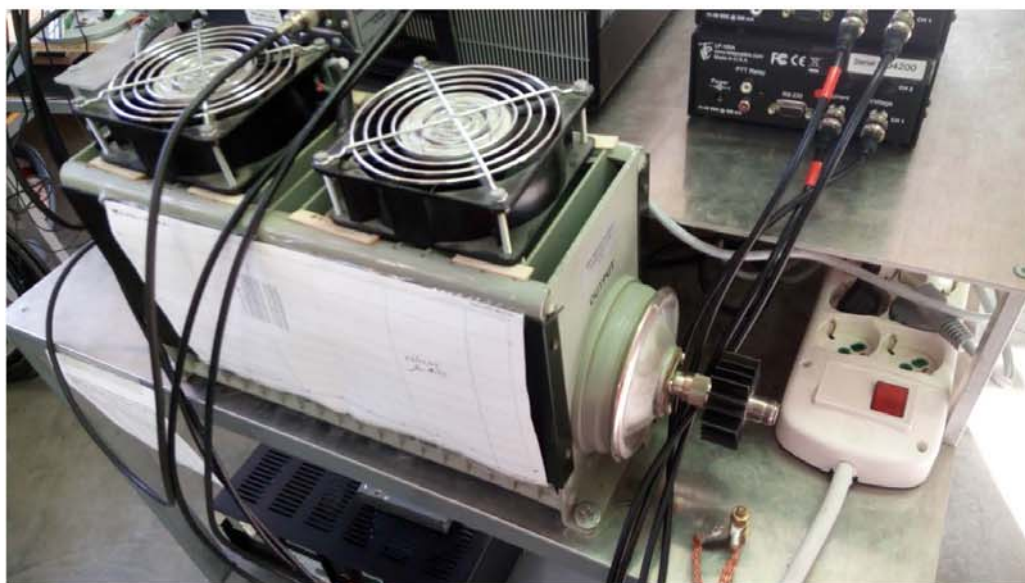


Photo 5.

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**Test of RM Costruzioni Elettroniche BLA600 to 47 CFR §§ 97.307, 97.317**

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The Agilent N9310A signal generator set to 0dBm output, no modulation, at the chosen test frequency.

The Empower 2005-BBS0A3FKO should be set to minimum gain. It should also have a 10dB attenuator fitted to the input for protection against excessive input power. Connections are shown in Photo 1.

Depending on the test frequency the corresponding Low Pass Filter should be selected, they are all clearly labelled, one for each of the corresponding amateur radio bands, they have an IN and OUT port. IN connected to the output of the exciter amplifier and OUT connected to RTX input of the BLA600 amplifier under test.

Output exciter power is regulated by the gain adjustment on the front panel. 160m (1.900 MHz) and 6m (52.000 MHz) require about 40W for full output of the BLA600 (500W), and the bands from 80m (3.650 MHz) to 10m (28.850MHz) require no more than about 25W input drive. Output power 500W of the BLA600 amplifier under test is simply regulated by adjusting the gain of the exciter amplifier. The output of the signal generator should remain at 0dBm.

BLA600 amplifier under test should be connected as shown in the block diagram, Fig 1. RF Drive input from the output of the corresponding external low pass filter from the exciter amplifier to the RTX input of the BLA600. The output connector is by default ANT1 for all bands. ( 50 Ohm impedance for all RF connections).

The amplifier requires a PTT input signal in order to amplify the signal so a manual PTT switch must be inserted into the PTT input on the BLA600 rear panel. See Photo 3. This needs to be manually operated in order for the BLA600 to work when in 'Operate' mode.

The amplifier under test (BLA600) should be switched on from the front panel 'POW' switch. A short self-test ensues after which time the amplifier will be in 'Standby' condition. At this state the output filter may be user selected by pressing the correct band button on the front panel which will then illuminate to indicate it is the current active filter.

To amplify the incoming signal the amplifier must first be switched to transmit state by pressing the STB/OPR button on the front panel. The PTT switch connected to the PTT input connector on the rear panel should then be operated to switch the amplifier to TX state. (At this point the signal generator should have its output disabled and the exciter amplifier should be set at 0 gain).

The amplifier will indicate it is in TX state by illuminating the 'TX' indicator on the front panel. The signal generator may now be switched on and the gain of the exciter amplifier increased until 500W is seen on the output of the BLA600 amplifier. The amplifier can remain in TX for a reasonable amount of time in order to make power reading / spectrum plots however it is not a full duty cycle amplifier so should not be left in transmission at full output for long periods of time

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if not required. The signal generator RF ON and OFF can be used to switch the power on and off, if required during tests done within the same band.

When a new frequency/band test is made the correct sequence is to switch the RF out off on the signal generator. Toggle the PTT switch on the rear panel of the BLA600 test amplifier to return to Operate, (the front panel TX led extinguished). Press the STB / OPR button to return the amplifier to Standby. Return the gain of the exciter amplifier to zero.

The frequency of the Signal generator can now be changed along with changing to the appropriate Low Pass filter for the output of the exciter amplifier. The BLA600 test amplifier can also be switched to the new band of operation etc. And then the same procedure followed.

The user manual of the BLA600 amplifier has been included for any additional information required and for explanation of any error condition from incorrect operation.