# TEST REPORT # EMCC-180517AC, 2018-04-23

**EQUIPMENT UNDER TEST:**

| | |
|---|---|
| Device: | DUO-ART 120 |
| Serial Number: | SJ07W8 |
| Application: | Amplifier |
| FCC ID: | 2AAE5ART120 |
| Manufacturer: | ELAD srl |
| Address: | Via Col de Rust, 11 Sarone<br>33070 Caneva PN<br>ITALY |
| Phone: | +39 0434 77248 |
| Fax: | +39 0434 77231 |

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

**TEST REPORT PREPARED BY:**

Manuel Zenk
EMCCons DR. RAŠEK GmbH & Co. KG
Boelwiese 8
91320 Ebermannstadt
Germany
Phone: +49 9194 7262-0
Fax: +49 9194 7262-199
E-Mail: m.zenk@emcc.de

**TEST PERSONNEL:**

Manuel Zenk

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

Wolfgang Döring

# CONTENTS

**Page**

**1 General Information ..... 3**
1.1 Purpose ..... 3
1.2 Limits and Reservations ..... 3
1.3 Test Location ..... 3
1.4 Customer ..... 3
1.5 Manufacturer ..... 3
1.6 Dates and Test Location ..... 4
1.7 Ordering Information ..... 4
1.8 Climatic Conditions ..... 4
**2 Product Description ..... 5**
2.1 Equipment Under Test (EUT) ..... 5
2.2 Intended Use ..... 5
2.3 EUT Peripherals/Simulators ..... 6
2.4 Mode of Operation during Testing and Test Setup ..... 6
2.5 Modifications Required for Compliance ..... 6
**3 Test Results Summary ..... 7**
**4 Spurious Emissions & Gain ..... 8**
4.1 Regulation ..... 8
4.2 Test Equipment ..... 9
4.3 Test Setups ..... 10
4.4 Test Result ..... 11
4.5 Measurement Plots ..... 12
**5 List of Annexes ..... 18**

# 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 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<br>Boelwiese 8<br>91320 Ebermannstadt<br>GERMANY |
| Address of Labs IV and V: | EMCCons DR. RAŠEK GmbH & Co. KG<br>Stoernhofer Berg 15<br>91364 Unterleinleiter<br>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: | ELAD srl |
| Street: | Via Col de Rust, 11 Sarone |
| City: | 33070 Caneva PN |
| Country: | ITALY |
| | |
| Phone: | +39 0434 77248 |
| E-Mail: | +39 0434 77231 |

## 1.5 Manufacturer

| | |
|---|---|
| Company Name: | ELAD srl |
| Street: | Via Col de Rust, 11 Sarone |
| City: | 33070 Caneva PN |
| Country: | ITALY |

## 1.6 Dates and Test Location

Date of Receipt of EUT: 2018-04-17
Test Date: 2018-04-17
Test Location: Lab IV

## 1.7 Ordering Information

Purchase Order: OF1/273/2018, dated 2018-03-29

## 1.8 Climatic Conditions

| Date | Temperature [°C] | Relative Humidity [%] | Air Pressure [hPa] | Lab | Customer attended tests |
|---|---|---|---|---|---|
| 2018-04-17 | 24 | 39 | 984 | IV | Mr Milan |

# 2 PRODUCT DESCRIPTION

## 2.1 Equipment Under Test (EUT)

| | |
|---|---|
| Trade Name: | DUO-ART 120 |
| Serial Number: | SJ07W8 |
| FCC ID | 2AAE5ART120 |
| Control Board Firmware: | 000.058 |
| Software Version: | 0.042 |
| Hardware Revision: | 1.0, composed by this boards:<br>FALCD Ver 1.5<br>FACTR Ver. 1.3<br>FASW Ver. 1.0<br>FABP Ver. 1.0<br>FAHEV Ver. 1.0<br>FAPM120 Ver 1.0<br>FAATU Ver 1.3 (optional) |
| Application: | Amplifier |
| Power Supply: | 100 - 240 VAC |
| Highest internally generated or used frequency: | Internal Crystals:<br>RPI Compute Module Crystal 19.2 MHz<br>(1.2 GHz ARM internal frequency)<br>LAN controller Crystal 25 MHz<br>FACTR Microcontroller Crystal 12 MHz<br>(100 MHz ARM internal frequency) |
| Frequency bands as defined by the customer | 1.800-2.000 MHz<br>3.500-4.000 MHz<br>7.000-7.300 MHz<br>10.100-10.150 MHz<br>14.000-14.350 MHz<br>18.068-18.168 MHz<br>21.000-21.450 MHz<br>24.890-24.990 MHz<br>28.000-29.700 MHz<br>50.000-54.000 MHz |
| Output power | 120 W |
| Ports: | ANT1 - ANT2 - ANT3, EXT I/O, LAN, USB HOST, PTT In, PTT Out,<br>USB, RS232, DCOUT, AC Mains Inlet Socket, RTX, RX<br>(see Annex 3 for detailed information) |
| Accessories delivered with EUT: | Exciter, Button, 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

<table>
<tr>
<td> <br>Button</td>
<td>
<br>Exciter (front view), Serial no. SI0JJS</td>
</tr>
<tr>
<td>
<br>Exciter (back view with cable connection)</td>
<td> <br>Cable harness</td>
</tr>
</table>

An ELAD FDM-DUO Transceiver was used as exciter. The setup was provided by the customer.

FDM-DUO is low power SDR Radio TRANSCEIVER (nominal 5 W, 10 W maximum) for Amateur Radio Operation. It can works stand-alone or with a PC. It can produce Modulation type CW-AM-LSB-USB and FM.

## 2.4 Mode of Operation during Testing and Test Setup

The EUT was supplied with 115 VAC / 60 Hz and switched on. “ANT1” was connected to a dummy load. The output power was set to full output power (nominal power).

| Terminal | Tested with |
|---|---|
| Power supply | 115 VAC / 60 Hz |
| RF input | “RTX”, for all frequencies |
| RF output | “ANT1”, for all frequencies |
| Data | via EXTIO Interface |

## 2.5 Modifications Required for Compliance

The internal voltage was reduced from 50.0 V to 49.3 V.

# 3 TEST RESULTS SUMMARY

Summary of test results for the following EUT:

Manufacturer: ELAD srl
Device: DUO-ART 120
Serial No: SJ07W8

| 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: 2018-04-23

© EMCCons DR. RAŠEK GmbH & Co. KG

# 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.

(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.

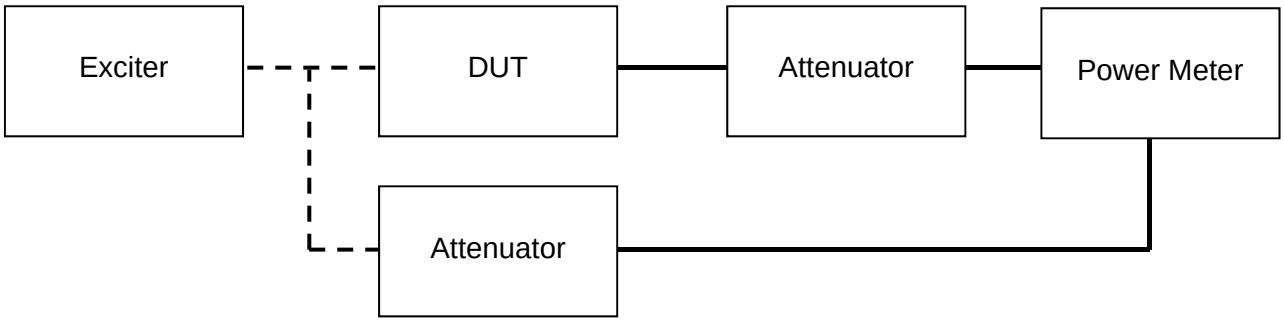
© EMCCons DR. RAŠEK GmbH & Co. KG

## 4.2 Test Equipment

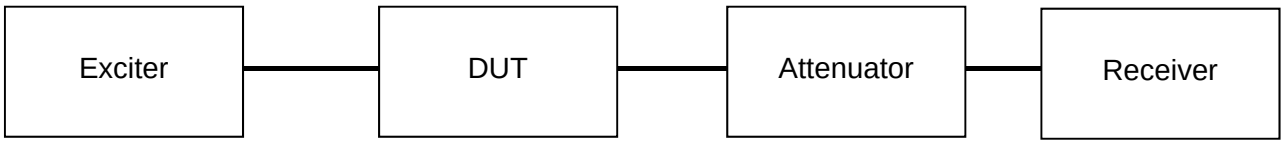
| Instrument | Manufacturer | Type | EMCC Ident No. | Last Calibration | Next Calibration |
|---|---|---|---|---|---|
| 60-Hz-Converter | AEG | DAMK4/DAGK4 | 1 | n/a | n/a |
| Power Sensor | Rohde & Schwarz | NRV-Z32 Mod. 05 | 527 | 2018-01 | 2020-07 |
| Power Sensor | Rohde & Schwarz | NRV-Z55 | 536 | 2017-12 | 2018-12 |
| 25W/20dB Attenuator | Weinschel | 46-20-34 | 815 | n/a | n/a |
| RF Power Meter | Rohde & Schwarz | NRVD | 1265 | 2016-11 | 2018-11 |
| 500 W/3dB Attenuator/N | Bird | 500-WA | 1473 | n/a | n/a |
| 100 W/6 dB Attenuator/N | Res-Net | RFA 100 NMF-DB 06 | 1515 | n/a | n/a |
| N-Cable N/50 | EMCC DR. RASEK | RG 214 | 2397 | n/a | n/a |
| 20 W Attenuator 20dB | Narda | 766-20 | 2428 | n/a | n/a |
| N-Cable N/50 | EMCC DR. RASEK | RG 214 | 2646 | n/a | n/a |
| N-Cable N/50 | EMCC DR. RASEK | RG 214 | 2649 | n/a | n/a |
| 2 W Attenuator 10dB | bird | 2-18A-MFN-10 | 2725 | n/a | n/a |
| EMI Test Receiver | Rohde & Schwarz | ESU8 | 3846 | 2018-01 | 2019-01 |

## 4.3 Test Setups

Schematic test setup for gain measurement:




Schematic test setup for spurious emissions measurement:



## 4.4 Test Result

| Amplifier Gain § 37.317 | | | | Spurious Emissions § 37.307(d), § 37.307(e) | | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency | Input Power | Output Power | Amplifier Gain | 2 * f1 | 3 * f1 | 4 * f1 | 5 * f1 | 6...10 * f1 |
| [MHz] | [dBm] | [dBm] | [dB] | [dBc] | [dBc] | [dBc] | [dBc] | [dBc] |
| 1.900 | 38.2 | 50.3 | 12.1 | -70.5 | -70.3 | -69.1 | -53.8 | ≤ -63.2 |
| 3.650 | 37.8 | 50.5 | 12.7 | -69.2 | -56.3 | -71.9 | -70.9 | ≤ -77.0 |
| 5.357 | 37.6 | 49.7 | 12.1 | -52.4 | -53.0 | -68.3 | -70.3 | ≤ -72.3 |
| 7.100 | 37.6 | 51.2 | 13.6 | -72.9 | -58.9 | -77.1 | -63.3 | ≤ -72.4 |
| 10.125 | 37.3 | 50.6 | 13.3 | -57.8 | -58.2 | -73.3 | -64.6 | ≤ -76.7 |
| 14.175 | 37.3 | 50.9 | 13.6 | -65.6 | -60.3 | -80.0 | -78.4 | ≤ -77.6 |
| 18.110 | 37.2 | 50.8 | 13.6 | -66.7 | -75.6 | -78.3 | -69.0 | ≤ -77.6 |
| 21.225 | 36.4 | 50.6 | 14.2 | -63.5 | -63.3 | -71.3 | -70.7 | ≤ -75.9 |
| 24.945 | 36.3 | 50.4 | 14.1 | -78.1 | -75.6 | -72.3 | -72.7 | ≤ -72.7 |
| 26.000 | 36.7 | 35.8 | -0.9 | | | | | |
| 27.000 | 36.7 | 35.7 | -1.0 | | | | | |
| 27.999 | 36.6 | 35.4 | -1.2 | | | | | |
| 28.000 | 36.6 | 50.5 | 13.9 | | | | | |
| 28.850 | 37.1 | 50.8 | 13.7 | -55.6 | -72.7 | -80.0 | -71.1 | ≤ -75.9 |
| 52.000 | 37.4 | 50.1 | 12.7 | -68.6 | -73.4 | -70.0 | -70.4 | ≤ -73.5 |

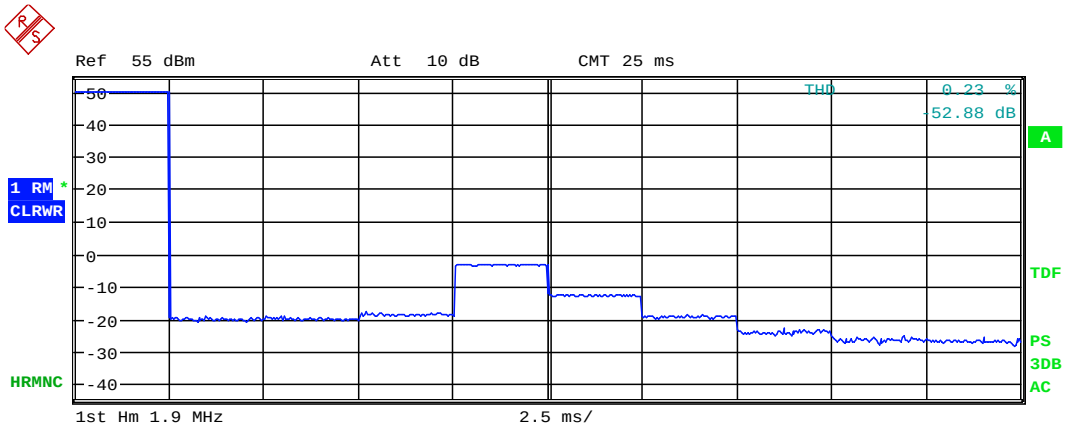
Remark: An amplifier gain of up to 15 dB @ 28 MHz is allowed as stated in § 97.301
(lower band edge of 10 meter band 28 … 29.7 MHz)

Manufacturer: ELAD srl
Device: DUO-ART 120
Serial No: SJ07W8
Test Date: 2018-04-17

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

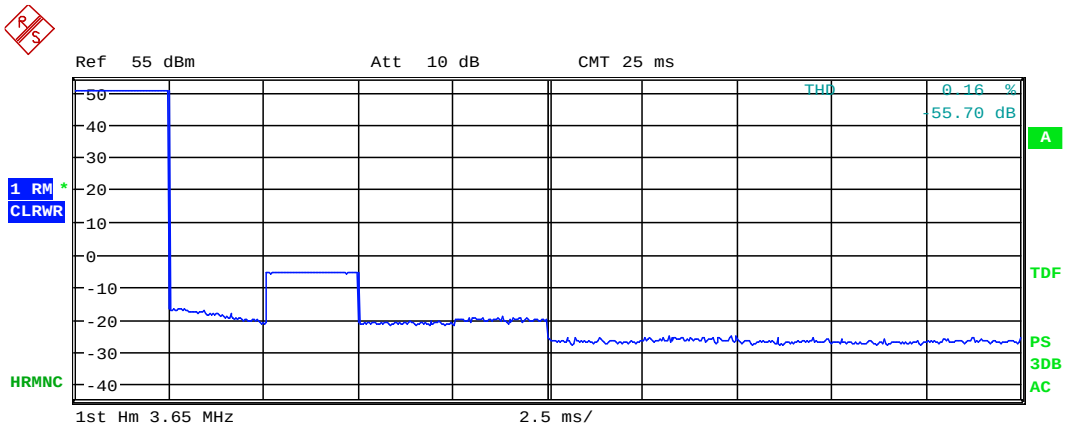
## 4.5 Measurement Plots

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



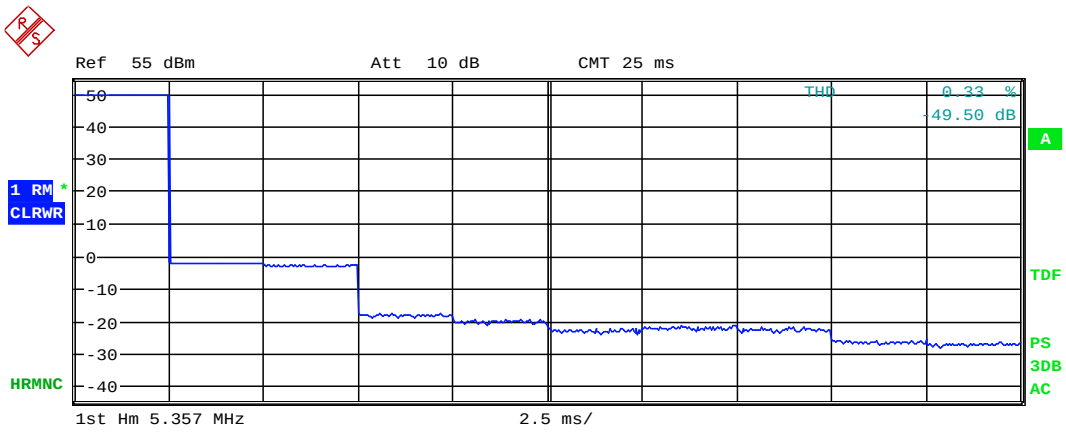

| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 1.90 MHz | 100 kHz | 50.14 dBm |
| 2 | 3.80 MHz | 200 kHz | -70.48 dBc |
| 3 | 5.70 MHz | 300 kHz | -70.33 dBc |
| 4 | 7.60 MHz | 500 kHz | -69.10 dBc |
| 5 | 9.50 MHz | 500 kHz | -53.78 dBc |
| 6 | 11.40 MHz | 1 MHz | -63.20 dBc |
| 7 | 13.30 MHz | 1 MHz | -69.72 dBc |
| 8 | 15.20 MHz | 1 MHz | -74.51 dBc |
| 9 | 17.10 MHz | 1 MHz | -76.88 dBc |
| 10 | 19.00 MHz | 1 MHz | -77.31 dBc |

$f_{carrier}$ = 1.9 MHz



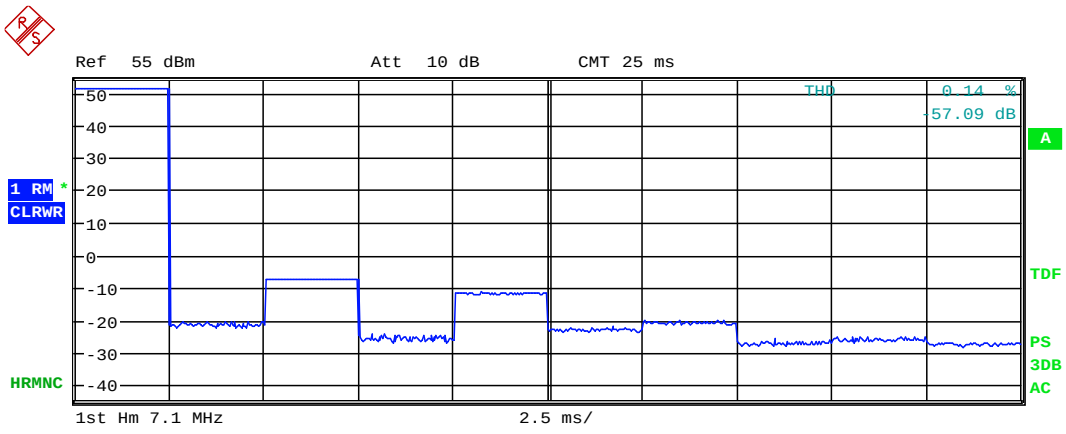

| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 3.65 MHz | 100 kHz | 50.44 dBm |
| 2 | 7.30 MHz | 200 kHz | -69.23 dBc |
| 3 | 10.95 MHz | 300 kHz | -56.31 dBc |
| 4 | 14.60 MHz | 500 kHz | -71.93 dBc |
| 5 | 18.25 MHz | 500 kHz | -70.86 dBc |
| 6 | 21.90 MHz | 1 MHz | -77.52 dBc |
| 7 | 25.55 MHz | 1 MHz | -76.97 dBc |
| 8 | 29.20 MHz | 1 MHz | -77.64 dBc |
| 9 | 32.85 MHz | 1 MHz | -77.94 dBc |
| 10 | 36.50 MHz | 1 MHz | -77.45 dBc |

$f_{carrier}$ = 3.65 MHz




| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 5.36 MHz | 100 kHz | 49.74 dBm |
| 2 | 10.71 MHz | 200 kHz | -52.38 dBc |
| 3 | 16.07 MHz | 300 kHz | -52.97 dBc |
| 4 | 21.43 MHz | 500 kHz | -68.31 dBc |
| 5 | 26.79 MHz | 500 kHz | -70.32 dBc |
| 6 | 32.14 MHz | 1 MHz | -73.15 dBc |
| 7 | 37.50 MHz | 1 MHz | -72.32 dBc |
| 8 | 42.86 MHz | 1 MHz | -72.82 dBc |
| 9 | 48.21 MHz | 1 MHz | -76.61 dBc |
| 10 | 53.57 MHz | 1 MHz | -77.33 dBc |

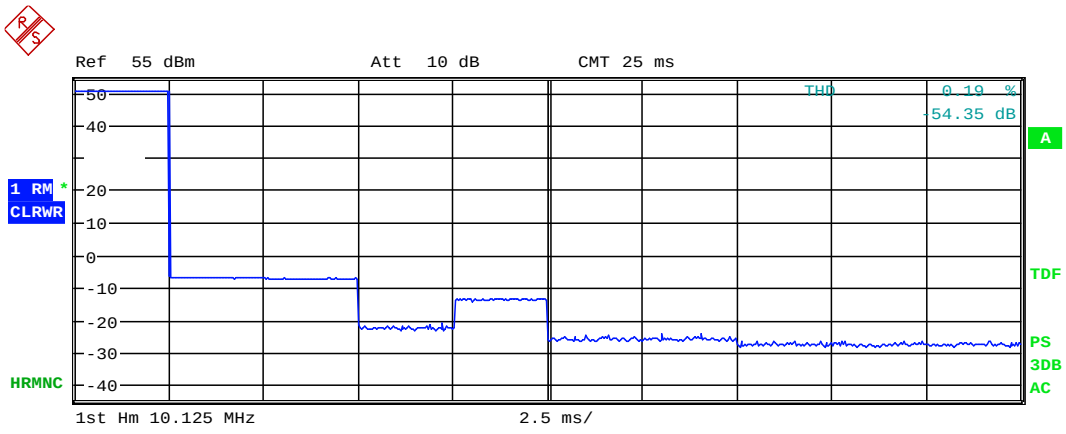
$f_{carrier}$ = 5.357 MHz




| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 7.10 MHz | 100 kHz | 51.28 dBm |
| 2 | 14.20 MHz | 200 kHz | -72.90 dBc |
| 3 | 21.30 MHz | 300 kHz | -58.93 dBc |
| 4 | 28.40 MHz | 500 kHz | -77.12 dBc |
| 5 | 35.50 MHz | 500 kHz | -63.31 dBc |
| 6 | 42.60 MHz | 1 MHz | -74.53 dBc |
| 7 | 49.70 MHz | 1 MHz | -72.39 dBc |
| 8 | 56.80 MHz | 1 MHz | -78.69 dBc |
| 9 | 63.90 MHz | 1 MHz | -77.54 dBc |
| 10 | 71.00 MHz | 1 MHz | -78.89 dBc |

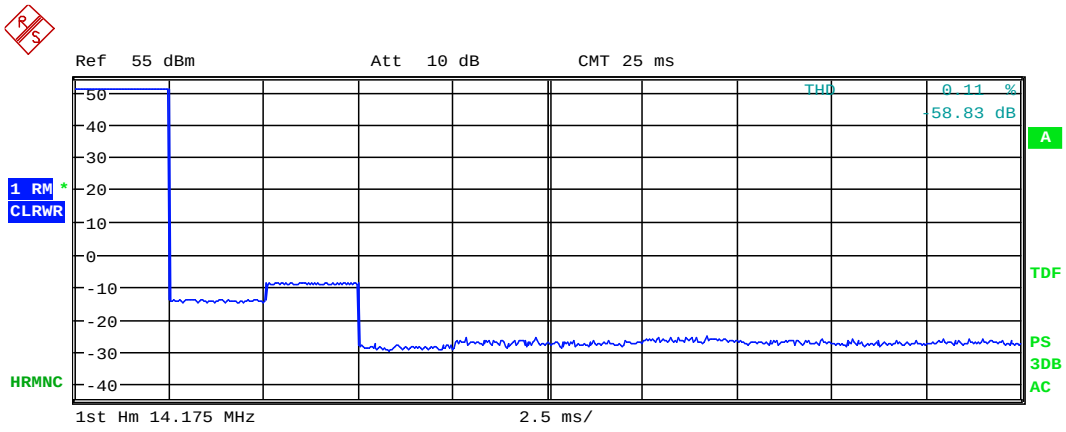
$f_{carrier}$ = 7.1 MHz

© EMCCons DR. RAŠEK GmbH & Co. KG




| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 10.13 MHz | 100 kHz | 50.60 dBm |
| 2 | 20.25 MHz | 200 kHz | -57.77 dBc |
| 3 | 30.38 MHz | 300 kHz | -58.16 dBc |
| 4 | 40.50 MHz | 500 kHz | -73.31 dBc |
| 5 | 50.63 MHz | 500 kHz | -64.61 dBc |
| 6 | 60.75 MHz | 1 MHz | -76.78 dBc |
| 7 | 70.88 MHz | 1 MHz | -76.73 dBc |
| 8 | 81.00 MHz | 1 MHz | -78.34 dBc |
| 9 | 91.13 MHz | 1 MHz | -78.40 dBc |
| 10 | 101.25 MHz | 1 MHz | -78.46 dBc |

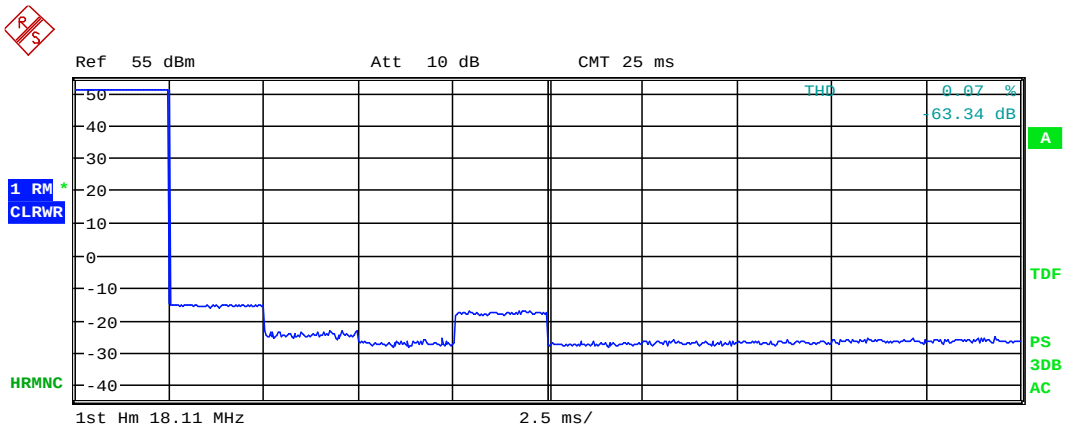
$f_{carrier}$ = 10.125 MHz




| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 14.18 MHz | 100 kHz | 50.96 dBm |
| 2 | 28.35 MHz | 200 kHz | -65.58 dBc |
| 3 | 42.52 MHz | 300 kHz | -60.29 dBc |
| 4 | 56.70 MHz | 500 kHz | -80.00 dBc |
| 5 | 70.88 MHz | 500 kHz | -78.38 dBc |
| 6 | 85.05 MHz | 1 MHz | -78.75 dBc |
| 7 | 99.22 MHz | 1 MHz | -77.61 dBc |
| 8 | 113.40 MHz | 1 MHz | -78.36 dBc |
| 9 | 127.58 MHz | 1 MHz | -78.69 dBc |
| 10 | 141.75 MHz | 1 MHz | -78.39 dBc |

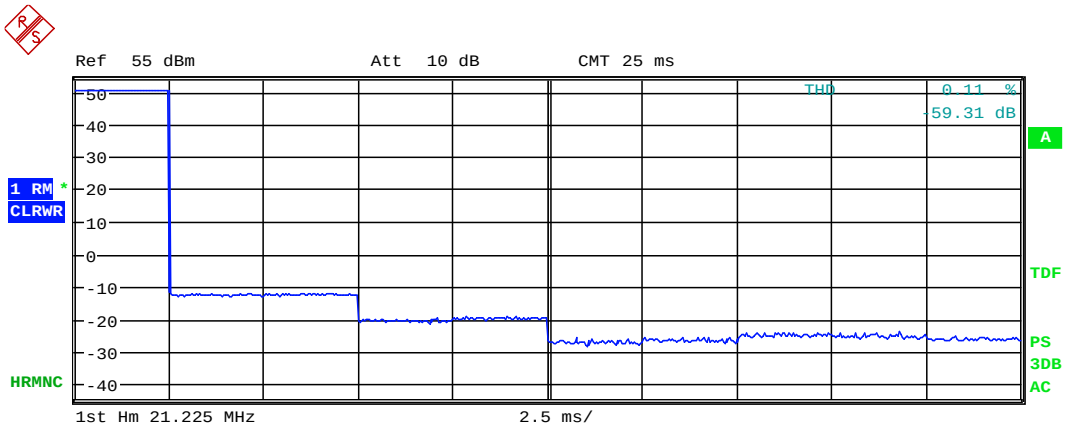
$f_{carrier}$ = 14.175 MHz

© EMCCons DR. RAŠEK GmbH & Co. KG



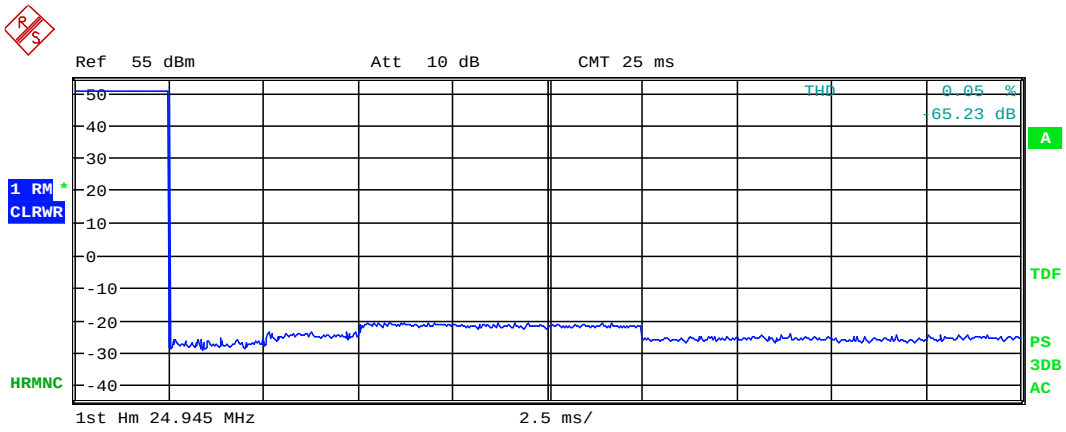

| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 18.11 MHz | 100 kHz | 50.81 dBm |
| 2 | 36.22 MHz | 200 kHz | -66.66 dBc |
| 3 | 54.33 MHz | 300 kHz | -75.61 dBc |
| 4 | 72.44 MHz | 500 kHz | -78.32 dBc |
| 5 | 90.55 MHz | 500 kHz | -68.97 dBc |
| 6 | 108.66 MHz | 1 MHz | -78.65 dBc |
| 7 | 126.77 MHz | 1 MHz | -78.25 dBc |
| 8 | 144.88 MHz | 1 MHz | -78.13 dBc |
| 9 | 162.99 MHz | 1 MHz | -77.62 dBc |
| 10 | 181.10 MHz | 1 MHz | -77.57 dBc |

$f_{carrier}$ = 18.11 MHz



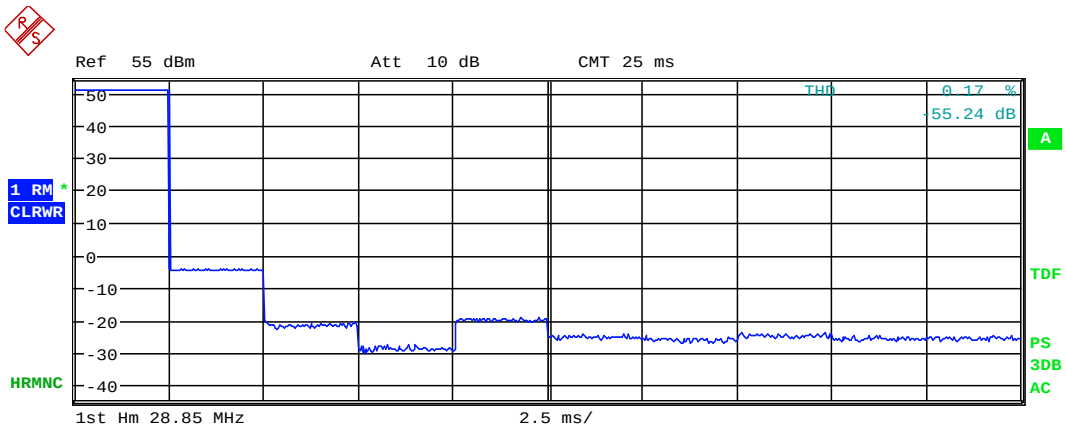

| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 21.23 MHz | 100 kHz | 50.66 dBm |
| 2 | 42.45 MHz | 200 kHz | -63.45 dBc |
| 3 | 63.67 MHz | 300 kHz | -63.33 dBc |
| 4 | 84.90 MHz | 500 kHz | -71.34 dBc |
| 5 | 106.13 MHz | 500 kHz | -70.70 dBc |
| 6 | 127.35 MHz | 1 MHz | -78.02 dBc |
| 7 | 148.57 MHz | 1 MHz | -77.44 dBc |
| 8 | 169.80 MHz | 1 MHz | -75.88 dBc |
| 9 | 191.03 MHz | 1 MHz | -76.17 dBc |
| 10 | 212.25 MHz | 1 MHz | -77.14 dBc |

$f_{carrier}$ = 21.225 MHz



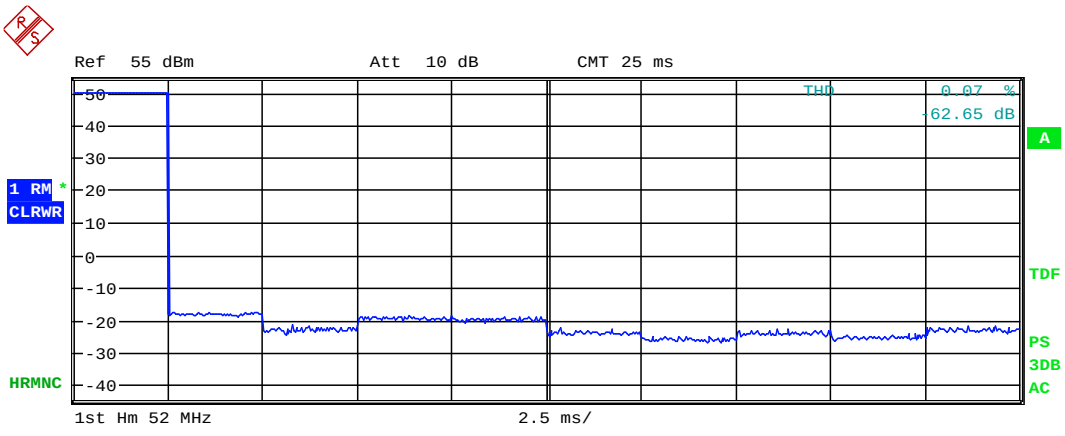

| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 24.95 MHz | 100 kHz | 50.46 dBm |
| 2 | 49.89 MHz | 200 kHz | -78.08 dBc |
| 3 | 74.83 MHz | 300 kHz | -75.60 dBc |
| 4 | 99.78 MHz | 500 kHz | -72.28 dBc |
| 5 | 124.72 MHz | 500 kHz | -72.65 dBc |
| 6 | 149.67 MHz | 1 MHz | -72.66 dBc |
| 7 | 174.62 MHz | 1 MHz | -76.63 dBc |
| 8 | 199.56 MHz | 1 MHz | -76.46 dBc |
| 9 | 224.51 MHz | 1 MHz | -76.89 dBc |
| 10 | 249.45 MHz | 1 MHz | -76.35 dBc |

$f_{carrier}$ = 24.945 MHz




| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 28.85 MHz | 100 kHz | 50.89 dBm |
| 2 | 57.70 MHz | 200 kHz | -55.58 dBc |
| 3 | 86.55 MHz | 300 kHz | -72.71 dBc |
| 4 | 115.40 MHz | 500 kHz | -79.95 dBc |
| 5 | 144.25 MHz | 500 kHz | -71.07 dBc |
| 6 | 173.10 MHz | 1 MHz | -76.36 dBc |
| 7 | 201.95 MHz | 1 MHz | -77.22 dBc |
| 8 | 230.80 MHz | 1 MHz | -75.91 dBc |
| 9 | 259.65 MHz | 1 MHz | -76.90 dBc |
| 10 | 288.50 MHz | 1 MHz | -76.82 dBc |

$f_{carrier}$ = 28.85 MHz




| No | Frequency | RBW | Power |
|---|---|---|---|
| 1 | 52.00 MHz | 100 kHz | 50.20 dBm |
| 2 | 104.00 MHz | 200 kHz | -68.63 dBc |
| 3 | 156.00 MHz | 300 kHz | -73.39 dBc |
| 4 | 208.00 MHz | 500 kHz | -70.00 dBc |
| 5 | 260.00 MHz | 500 kHz | -70.37 dBc |
| 6 | 312.00 MHz | 1 MHz | -74.40 dBc |
| 7 | 364.00 MHz | 1 MHz | -76.47 dBc |
| 8 | 416.00 MHz | 1 MHz | -74.55 dBc |
| 9 | 468.00 MHz | 1 MHz | -75.85 dBc |
| 10 | 520.00 MHz | 1 MHz | -73.52 dBc |

$f_{carrier}$ = 52.0 MHz

# 5 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) | 4 |
| Annex 3: Description of equipment under test (EUT), ports | 2 |

# Annex 1 to Test Report # EMCC-180517AC, 2018-04-23

## PHOTOGRAPHS OF TEST SET-UP

**EQUIPMENT UNDER TEST:**

| | |
|---|---|
| Device: | DUO-ART 120 |
| Serial Number: | SJ07W8 |
| Application: | Amplifier |
| FCC ID: | 2AAE5ART120 |
| Manufacturer: | ELAD srl |
| Address: | Via Col de Rust, 11 Sarone<br>33070 Caneva PN<br>ITALY |
| Phone: | +39 0434 77248 |
| Fax: | +39 0434 77231 |

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

Photo A1-1: conducted spurious emissions and amplifier gain measurement

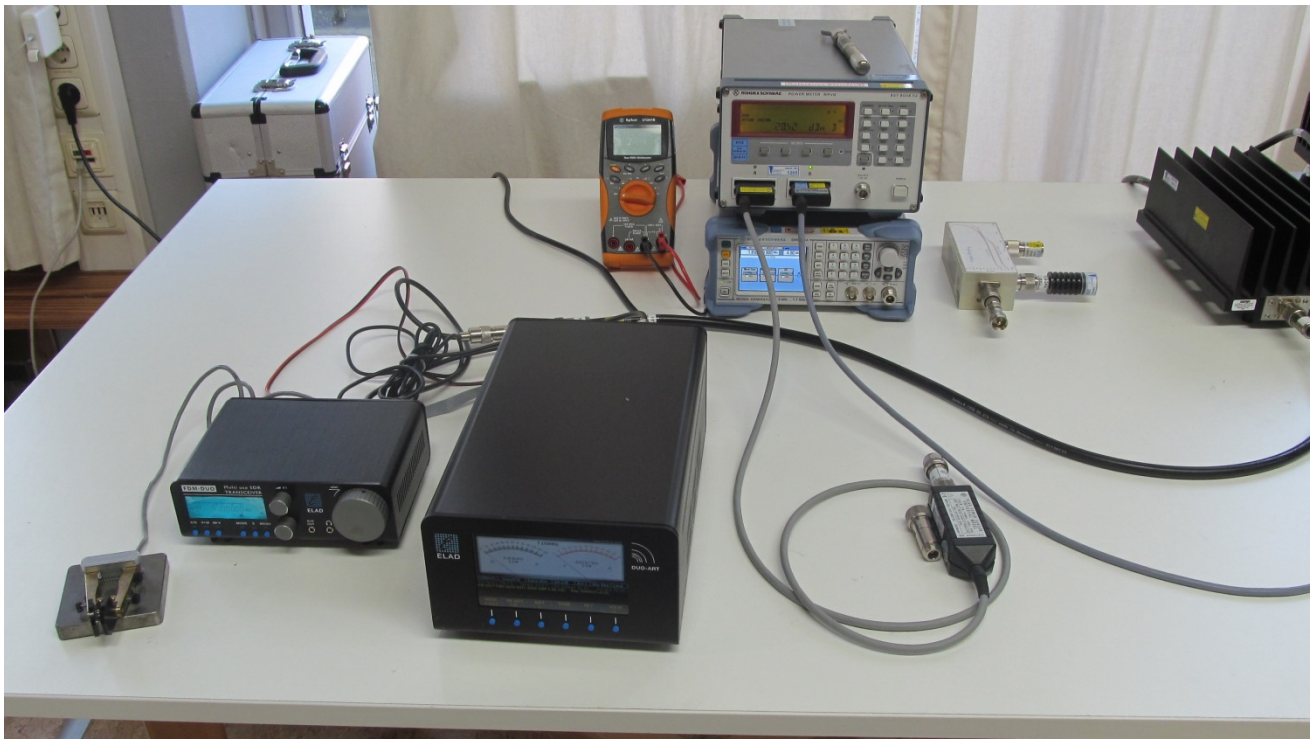


Photo A1-2: conducted spurious emissions and amplifier gain measurement (detail view)

© EMCCons DR. RAŠEK GmbH & Co. KG

# Annex 2 to Test Report # EMCC-180517AC, 2018-04-23

## PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

**EQUIPMENT UNDER TEST:**

| | |
|---|---|
| Device: | DUO-ART 120 |
| Serial Number: | SJ07W8 |
| Application: | Amplifier |
| FCC ID: | 2AAE5ART120 |
| Manufacturer: | ELAD srl |
| Address: | Via Col de Rust, 11 Sarone<br>33070 Caneva PN<br>ITALY |
| Phone: | +39 0434 77248 |
| Fax: | +39 0434 77231 |

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

Photo A2-1: EUT

Photo A2-2: EUT, front

© EMCCons DR. RAŠEK GmbH & Co. KG

Photo A2-3: EUT, back

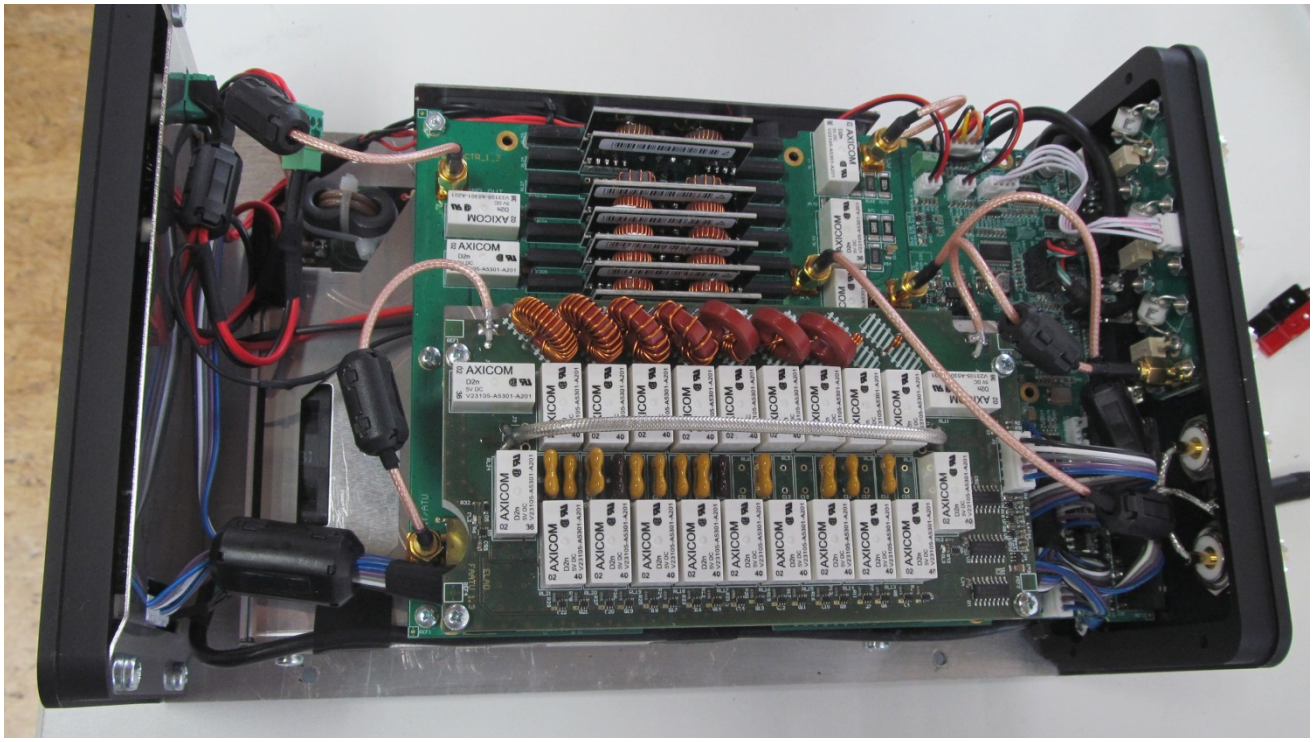


Photo A2-4: EUT, top with open case

Photo A2-5: EUT, label Serial Number

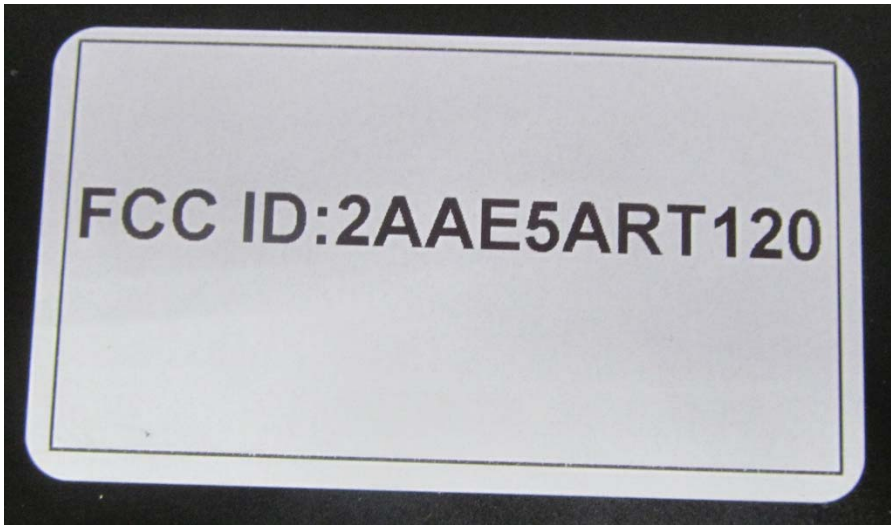


Photo A2-6: EUT, label FCC ID

# Annex 3 to Test Report # EMCC-180517AC, 2018-04-23

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

**EQUIPMENT UNDER TEST:**

| | |
|---|---|
| Device: | DUO-ART 120 |
| Serial Number: | SJ07W8 |
| Application: | Amplifier |
| FCC ID: | 2AAE5ART120 |
| Manufacturer: | ELAD srl |
| Address: | Via Col de Rust, 11 Sarone<br>33070 Caneva PN<br>ITALY |
| Phone: | +39 0434 77248 |
| Fax: | +39 0434 77231 |

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

The following information was delivered by the customer:

ANT1 - ANT2 - ANT3:
Antenna Connection Selectable by software

EXT I/O:
DB9 connectors (2x) Proprietary Communication port with FDM-DUO and accessories

LAN:
Port for remote operation

USB HOST:
ports for connecting to FDM-DUO for Remote Operations
(USB CAT - USB RX - USB TX)

PTT In:
Push to talk input to activate the Power Amplifier

PTT Out:
is the repeat open collector of PTT In for chain operation

USB:
Device AUX for Service

RS232:
for connecting others Transceiver (for example FT817)

DC OUT:
Power output for DUO or for auxiliary equipment

AC Mains Inlet Socket

RTX:
Input Connector

RX:
output Connector