TEST REPORT # EMCC-170121B, 2017-12-14

EQUIPMENT UNDER TEST:

Device:	700S
Serial Number:	Prototype
Application:	Amplifier
Manufacturer:	Acom Ltd.
Address:	Bul. Nikola Mushanov 151 1330 Sofia Bulgaria
Phone:	+359 2 920 97 80
Email:	bmarinov@acom-bg.com

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

TEST REPORT PREPARED BY:

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TEST PERSONNEL:

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Daniel Mayle

HEAD OF COMMERCIAL EMC AND RADIO DEPT.:

Wolfgang Döring

CONTENTS

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 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 Manufacturer

Company Name:	Acom Ltd.
Street:	Bul. Nikola Mushanov 151
City:	1330 Sofia
Country:	Bulgaria

1.5 Applicant

Company Name:	Acom Ltd.
Street:	Bul. Nikola Mushanov 151
City:	1330 Sofia
Country:	Bulgaria
Name for contact purposes:	Mr Bilyan Marinov
Phone:	+359 2 920 97 80
E-Mail:	bmarinov@acom-bg.com

1.6 Dates and Test Location

Date of Receipt of EUT:	2017-11-28
Test Date:	CW 48/2017, 2017-11-28
Test Location:	Lab IV

1.7 Ordering Information

Purchase Order:	P.O. dated 2017-11-14

1.8 Climatic Conditions

Date	Temperature [°C]	Relative Humidity [%]	Air Pressure [hPa]	Lab	Customer attended tests
2017-11-28	22	34	966	IV	Yes, Mr Bilyan Marinov

2 PRODUCT DESCRIPTION

2.1 Equipment Under Test (EUT)

Application:	Amplifier
Trade Name:	700S
Serial Number:	Prototype
Hardware Version:	1.2/1.1/1.0/1.2
Firmware Version:	1.7
Bootloader Version:	1.2
Power Supply:	93-265 VAC
Highest internally generated or used frequency:	54 MHz
Ports:	1x GND stud 1x KEY-IN jack 1x KEY-OUT jack 1x RF INPUT 1x RF OUTPUT 1x power cord socket 1x CAT/AUX interface 1x RS232 port
Accessories delivered with EUT:	power cord operating manual with CE declaration of compliance spare fuses
Variants:	None
Remarks:	None

For further information concerning port description see Annex 3.

2.2 Intended Use

The following information was delivered by the customer:

Product description (description of equipment function):

Amplifier for amateur radio service.

General product information:

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

8-1. Parameters

a) Standard frequency coverage (*):

1.800 - 2.000 MHz
3.500 - 4.000 MHz
5.250 - 5.450 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

(*) Extensions or changes of the frequency coverage are possible on request.

b) Rated output power: 700W +/-0.5dB, PEP or continuous carrier.

c) Intermodulation distortions (IM3): better than 31dB below the rated PEP.

d) Harmonic and parasitic emissions output suppression: better than 60dB (65dB typically).

e) Input and output impedances:

- nominal value: 50 Ohm unbalanced, UHF (SO239) type connectors;
- input circuit: broadband, SWR below 1.2:1 (1.1:1 typically); 1.8 – 54 MHz continuous range without retuning or switching;
- RF by-pass path SWR - below 1.1:1, 1.8-54 MHz;
- acceptable SWR at the output load (the antenna): up to 3:1 with proportional power reduction and up to 1.5:1 for full output power;

f) RF power gain: 14dB +/-1dB (typically 27W for 700W output power);

g) Mains power supply voltage: 93-265VAC.

h) Mains power consumption at full output power: 1350VA or less wth a power factor of 0.95 or higher;

i) Mains power consumption in Low Energy (waiting) mode: less than 1VA;

j) Complies with EU safety regulations and electromagnetic compatibility standards, as well as with the US Federal Communications Commission (FCC) rules;

k) Environmental conditions:

- temperature range: -10ºC to +40ºC (14ºF to 104ºF);

- relative air humidity: up to 95% @ 35ºC (95ºF);

l) Dimensions (projections not included) and weight, operating: (W x H x D) 372 x 171 x 427 mm (14.6 x 6.7 x 16.8 In); 10.5 kg (23.15 Lbs).

8-2. Functions

a) Receive / transmit control:

- KEY-IN input – Phono RCA jack; voltage applied to the transceiver keying output up to +12V; current drawn by the transceiver keying output up to 6mA;

- An optional KEY-OUT output – Phono RCA jack; output resistance: not more than 120 Ohm; maximum safe input voltage from the transceiver +50V; maximum safe current drawn by the transceiver: 20mA;

- **minimum** dead time, necessary for safe amplifier switchingover from receive to transmit: 10ms between the transmit request on the KEY IN input and the RF drive on the RF INPUT jack.

b) Frequency control directly by CAT from the transceiver.

c) Remote control through RS232 interface.

d) Remote power on by DSR/DTR and CTS/RTS lines on the RS232 port.

e) Remote power on/turn off by DC voltage impulse or continuous DC voltage on CAT/AUX port ON_RMT input.

8-3. Storage and shipment

a) Environment conditions for storage and shipment:

- temperature range: -40ºC to +70ºC (-40ºF to 158ºF);

- relative air humidity: up to 75% @ 35ºC (95ºF);

- above sea-level: up to 12000m, including the luggage compartment of an aircraft.

b) Dimensions and weight at transportation (max): (W x H x D) 481 x 291 x 475 mm (18.94 x 11.46 x 18.70 In); 15kg (33 Lbs).

2.3 EUT Peripherals/Simulators

An Elecraft K3 Transceiver, Serial No. 2972, was used as exciter.

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

Specifications

⚠ Some specifications apply only if the corresponding option modules are installed (see ***Options***, pg. 45).

GENERAL

Frequency Range	Main and Sub Receivers, 490 kHz - 30 MHz and 44-54 MHz. Transmitter: Amateur bands between 1.8 and 54 MHz (varies by country). 144-148 MHz with K144XV option. MARS coverage on request (excluding transmit from 7.550-8.999 MHz at 13 W and higher, and 7.650-8.999 MHz at 12 W or lower).
Tuning Step Sizes	1, 10, 20, and 50 Hz fine steps; user-configurable coarse tuning steps (per-mode). Direct keypad frequency entry in either MHz or kHz.
Memories	100 general purpose, plus 4 scratch-pad memories per band
Frequency Stability	+/- 5 ppm (0-50 C) TCXO standard; +/- 1 ppm TCXO opt. (+/- 0.5 PPM typ., 0-50 C). K3EXREF option locks TCXO to an external 10-MHz reference (+/- 1 to 2 Hz typ.).
Antenna Jacks	50 ohms nominal. One SO-239 supplied (2nd SO-239 jack supplied with KAT3 ATU). BNC jacks for RX antenna in/out and transverter in/out (KXV3 Option).
Modes	USB, LSB, AM, FM, CW, DATA (FSK D [direct], AFSK A [Audio], PSK D [Direct] and DATA A [Audio]; PSK). Built in PSK, RTTY, and CW text decode/display.
VFOs	Dual VFOs (A and B) with separate weighted tuning knobs
Remote Control Port	EIA-232 standard DE-9F; USB adapter option. Full control of all radio functions.
Audio I/O	Line-level isolated TX/RX audio interface (stereo outputs); front (1/4") and rear (1/8") stereo headphone jacks; stereo speaker jack.
Transverter Interface	Transmit, 0 dBm typ.; BNC in/out connectors on KXV3 option module. KXV3A (updated KXV3) includes connectors for K144XV internal 2-meter module.
Buffered IF output	BNC connector (KXV3 Option); see pg. 39 for interface recommendations.
Other I/O	Key/Keyer/Computer, Paddle, PTT In, and KEY Out. Band information output via binary interface and AUXBUS on ACC connector.
Real-Time Clock/Calendar	Accuracy: Approx. +/- 20 ppm (+/- 2 seconds/day). U.S. and E.U. date formats. Battery: 3 V coin cell (see pg. 48 for replacement instructions).
Supply Voltage and Current	13.8 V nominal (11 V min, 15 V max). 17-22 A typical in TX for K3/100, 3-4 A typical in TX for K3/10. 0.9A typical RX (less sub receiver). When using reduced supply voltage (< 12 V), power output should be reduced (e.g. 70 W at 11 V). **Recommended supply:** 13.8VDC @ 25A, continuous duty for K3/100; 13.8VDC @ 6A for K3/10. For best results, use the supplied 5 foot (1.53 m) power cable. When a battery is used, both sides of the battery cable should be protected by fast-blow fuses.
Accessory DC output	Switched, 0.5 A max; 13 V no-load, 12 V max load (@ Vsupply = 13.8 V)
Weight (K3/100)	Approx. 8.5 lbs. (3.8 kg). With KRX3 sub receiver option, 9.5 lbs. (4.3 kg).
Size	Enclosure only, 4.0 x 10.7 x 10.0 in., HWD (10.2 x 27.2 x 25.4 cm). With projections, 4.4 x 11.1 x 11.8 in. (11.2 x 28.2 x 30.0 cm).

*RECEIVER (Main and Sub)**

Sensitivity (MDS)	-136 to -138 dBm (typ.), preamp on, 500 Hz bandwidth. 6 m MDS with PR6 option: -143 to -144 dBm (typ.). Reduced sensitivity near 8.2 MHz (first I.F.) and from 44-49.5 MHz. Sensitivity decreases gradually below 1.8 MHz due to intentional high-pass response at the T-R switch. (Use RX ANT input or sub receiver's AUX input to avoid the high-pass filter loss.) **Note:** KBPF3 option required for full general coverage (including 0.49 to 1.7 MHz).
Dynamic Range	IMD3 > 100 dB, Blocking 140 dB, typical (at 5, 10, and 20 kHz spacing)
Image and I.F. Rejection	> 70 dB
Audio Output	2.5 W per channel into 4 ohms; typ. 10% THD @ 1 kHz, 2 W
S-Meter	Nom. S9 = 50 µV, preamp on; user-adjustable
Noise Blanker	Adjustable, multi-threshold/multi-width hardware blanker plus DSP blanker
Receive AF graphic EQ	+/- 16 dB/octave, 8 bands
Filter Controls	IF Shift/Width & Lo/High Cut with automatic crystal filter selection

*** Receive specifications are guaranteed only within ham bands.** Dynamic range measurements based on 400-Hz, 8-pole filter. Other available filters have very similar performance; see www.elecraft.com for full list.

*TRANSMITTER **

Output Power	K3/100: 0.1 W –100 W typ. Suggested max from 51-52 MHz, 85 W; 52-54, 70 W. K3/10 (or K3/100 with PA bypassed): 0.1 W –12 W, HF-10 m; 8 W max on 6 m. XVTR OUT (KXV3 option): -10 to +1.8 dBm. K144XV: ~10 W, 144-148 MHz. **Note:** Output can be set up to 110 W. However, IMD and spurious products are specified at 100 W, the recommended max. If a KAT3 ATU is installed, actual output will be slightly lower (typ. loss < 0.5 dB below 28 MHz, < 0.8 dB above).
Duty Cycle	CW and SSB modes, 100% 10-min. 100W key-down at 25 C ambient
True RF Speech Processor	Adjustable compression
Transmit AF graphic EQ	+/- 16 dB/octave, 8 bands
SSB TX Bandwidth	4 kHz max (> 2.8 kHz requires 6 kHz AM filter)
SSB TX Monitor	Post-DSP filtering/processing
VOX	DSP-controlled, adjustable threshold, delay, and anti-VOX
Full and Semi CW Break-In	Adjustable delay; diode T/R Switching
SSB Carrier Suppression	> 50 dB
Harmonic / Spurious Outputs	> 50 dB below carrier @ 100W (> 60 dB on 6 meters)
CW Offset/Sidetone	300-800 Hz, adjustable (filter center frequency tracks sidetone pitch)
Mic Connector	Front panel, 8 pin; rear panel 3.5 mm. Switchable DC bias (*MAIN:MIC SEL*)

*** Transmit specifications are guaranteed only within ham bands.**

2.4 Mode of Operation During Testing and Test Setup

Test mode a:

The EUT was supplied with 230 VAC and switched on. The terminal “RF INPUT” was connected via coaxial cable to exciter “Elecraft K3 Transceiver”. The exciter provided the desired parameters. “RF OUTPUT” was connected to a dummy load.

Terminal	Tested with
Power supply	230 VAC
RF input	“RF INPUT”, for all frequencies
RF output	“RF OUTPUT”, for all frequencies

2.5 Modifications Required for Compliance

None.

3 TEST RESULTS SUMMARY

Summary of test results for the following EUT:

Manufacturer: Acom Ltd.
Device: 700S
Serial No: Prototype

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.
The measurements contained in this report were made in accordance with the procedures described in ANSI C63.4-2014. 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: 2017-11-28

4 SPURIOUS EMISSIONS & GAIN

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

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.

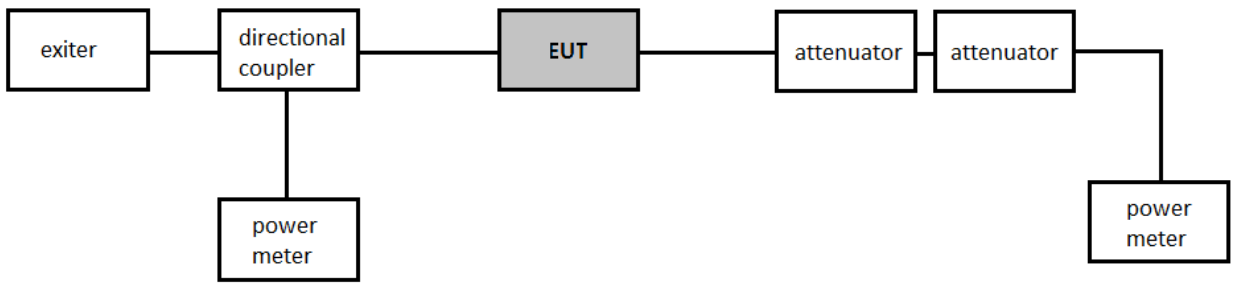
(b) Certification shall be denied when:
(1) The Commission determines the amplifier can be used in services other than the Amateur Radio Service, or
(2) The amplifier can be easily modified to operate on frequencies between 26 MHz and 28 MHz.

4.2 Test Equipment

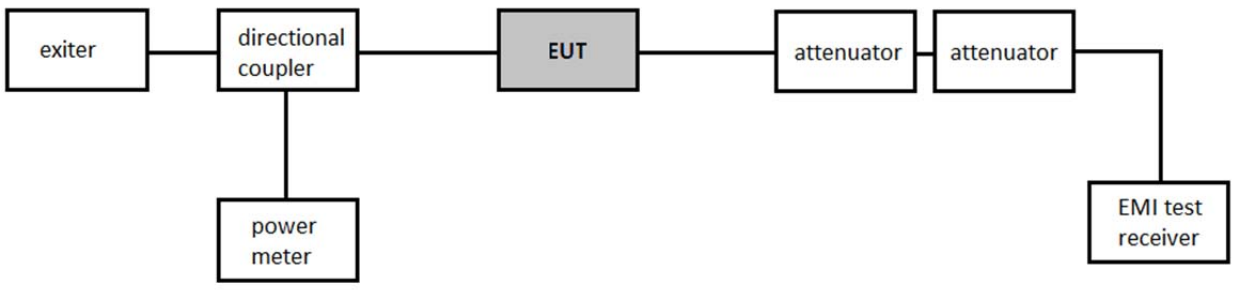
Type	Manufacturer/ Model No.	EMCC Ident No.	Last Calibration	Next Calibration
EMI Test Receiver	R&S / ESU8	3846	2017-01	2018-01
60-Hz-Converter	California Instruments	34	n.a.	n.a.
Digital Multimeter	Agilent / U1241A	2717	2016-01	2018-01
Dual Directional Coupler	Pulsar / C40-112-481/5N	5468	2016-01	2018-01
RF Power Meter	R&S / NRVD	1265	2016-11	2018-11
Power Sensor	R&S / URV 5-Z32	528	2017-11	2019-11
Power Sensor	R&S / URV 5-Z55	536	2016-11	2017-11
Attenuator	Bird / 8329-300	828	2017-03	2018-12
Attenuator	Bird / 2-18A-MFN-10	2727	2017-06	2019-06

4.3 Test Setups

Schematic test setups for spurious emissions and gain:



test setup “gain”



test setup “spurious emissions”

4.4 Test Result

Mode: test mode a

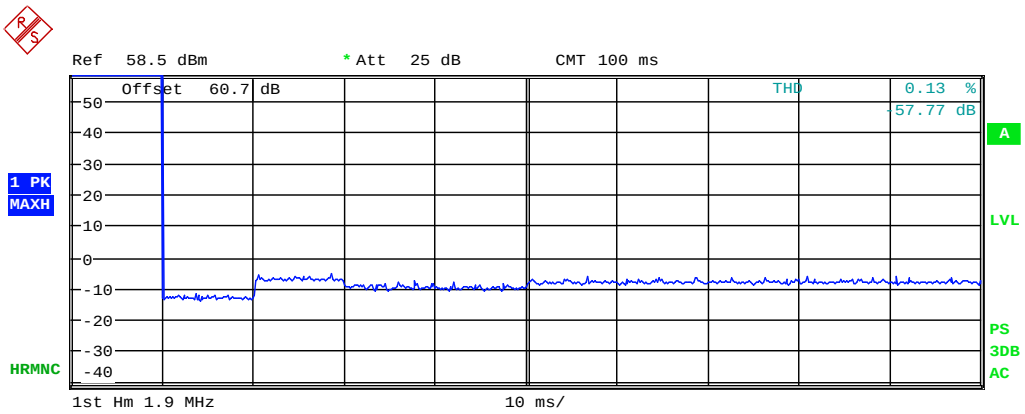
power gain § 97.317				spurious emissions § 97.307(d), § 97.307(e)			
Frequency f1 [MHz]	Input power [W]	output power [W]	amplifier gain [dB]	2 * f1 [dBc]	3 * f1 [dBc]	4 * f1 [dBc]	5-10 * f1 [dBc]
1.9	46.6	700	11.8	-71.86	-65.81	-68.15	≤ -66.73
3.75	24.7	700	14.5	-71.01	-68.02	-70.08	≤ -66.83
7.15	24.1	700	14.6	-73.08	-63.88	-69.73	≤ -66.81
10.125	34.6	700	13.1	-73.29	-61.31	-69.62	≤ -67.08
14.175	28.4	700	13.9	-72.64	-59.39	-69.15	≤ -66.64
18.118	33.2	700	13.2	-71.82	-67.04	-68.76	≤ -65.59
21.225	23.6	700	14.7	-70.69	-63.27	-69.34	≤ -62.64
24.93	26.8	700	14.2	-72.56	-67.37	-69	≤ -65.89
26	11.1	11.1	0	/			
27	10.9	10.9	0				
28	10.9	10.9	0				
28.5	26.9	700	14.2	-72.52	-67.45	-69.5	≤ -66.07
52	25.1	700	14.5	-70.88	-67.62	-68.99	≤ -65.22

Manufacturer: Acom Ltd.
Device: 700S
Serial No: Prototype
Test Date: 2017-11-28

The EUT meets the requirements of this section.

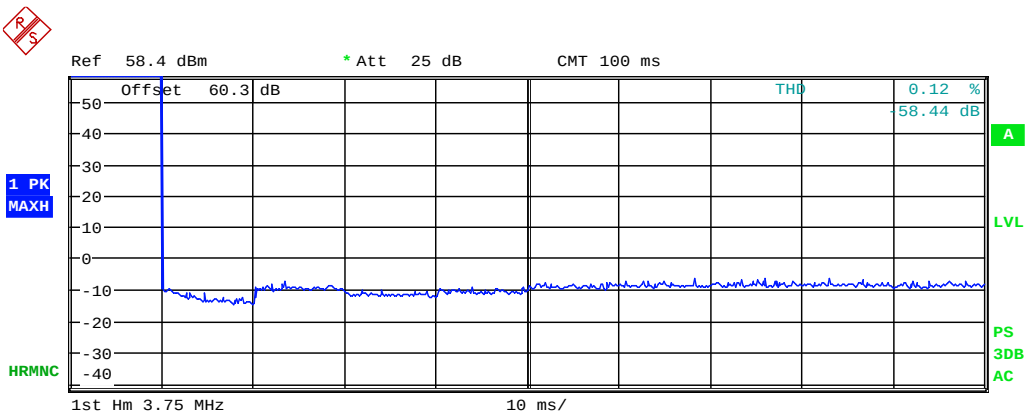
4.5 Measurement Plots

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



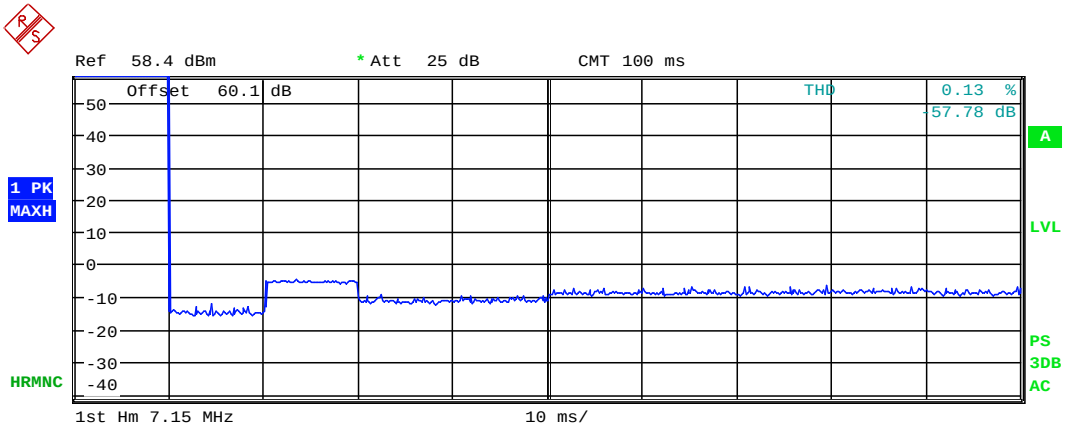
No	Frequency	RBW	Power
1	1.90 MHz	20 kHz	58.53 dBm
2	3.80 MHz	50 kHz	-71.86 dBc
3	5.70 MHz	100 kHz	-65.81 dBc
4	7.60 MHz	100 kHz	-68.15 dBc
5	9.50 MHz	100 kHz	-68.60 dBc
6	11.40 MHz	200 kHz	-66.81 dBc
7	13.30 MHz	200 kHz	-66.75 dBc
8	15.20 MHz	200 kHz	-66.73 dBc
9	17.10 MHz	200 kHz	-66.73 dBc
10	19.00 MHz	200 kHz	-66.81 dBc

$f_{carrier}$ = 1.9 MHz



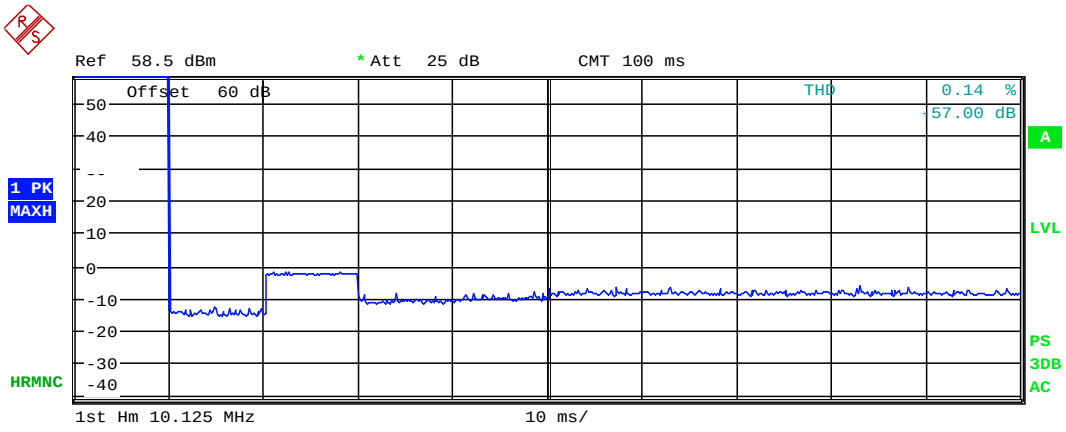
No	Frequency	RBW	Power
1	3.75 MHz	20 kHz	58.37 dBm
2	7.50 MHz	50 kHz	-71.01 dBc
3	11.25 MHz	100 kHz	-68.02 dBc
4	15.00 MHz	100 kHz	-70.08 dBc
5	18.75 MHz	100 kHz	-69.13 dBc
6	22.50 MHz	200 kHz	-67.49 dBc
7	26.25 MHz	200 kHz	-67.13 dBc
8	30.00 MHz	200 kHz	-66.83 dBc
9	33.75 MHz	200 kHz	-66.97 dBc
10	37.50 MHz	200 kHz	-67.07 dBc

$f_{carrier}$ = 3.75 MHz



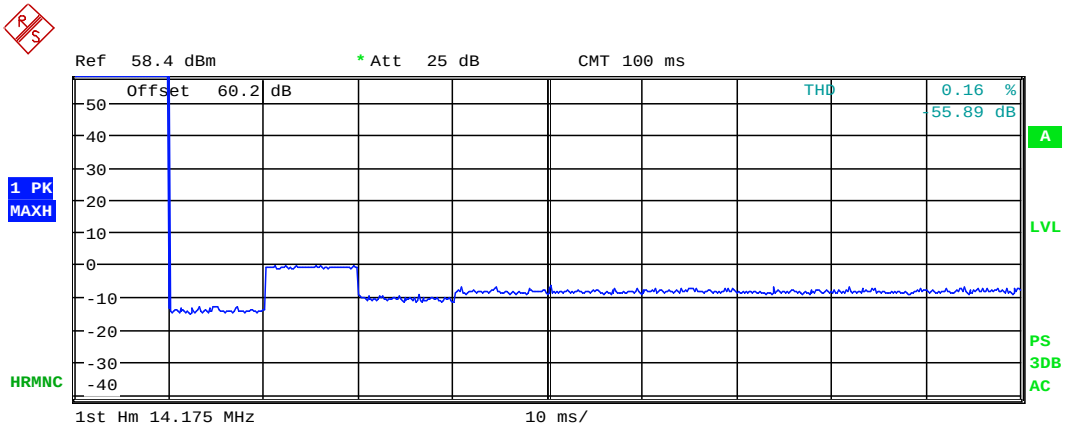
No	Frequency	RBW	Power
1	7.15 MHz	20 kHz	58.35 dBm
2	14.30 MHz	50 kHz	-73.08 dBc
3	21.45 MHz	100 kHz	-63.88 dBc
4	28.60 MHz	100 kHz	-69.73 dBc
5	35.75 MHz	100 kHz	-69.37 dBc
6	42.90 MHz	200 kHz	-67.19 dBc
7	50.05 MHz	200 kHz	-67.12 dBc
8	57.20 MHz	200 kHz	-67.02 dBc
9	64.35 MHz	200 kHz	-66.81 dBc
10	71.50 MHz	200 kHz	-67.10 dBc

$f_{carrier}$ = 7.15 MHz



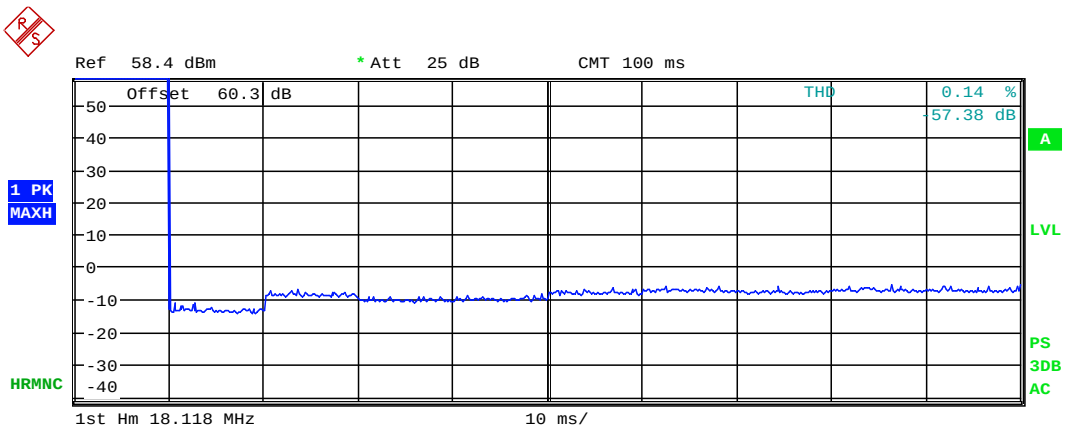
No	Frequency	RBW	Power
1	10.13 MHz	20 kHz	58.48 dBm
2	20.25 MHz	50 kHz	-73.29 dBc
3	30.38 MHz	100 kHz	-61.31 dBc
4	40.50 MHz	100 kHz	-69.62 dBc
5	50.63 MHz	100 kHz	-68.65 dBc
6	60.75 MHz	200 kHz	-67.16 dBc
7	70.88 MHz	200 kHz	-67.08 dBc
8	81.00 MHz	200 kHz	-67.21 dBc
9	91.13 MHz	200 kHz	-67.14 dBc
10	101.25 MHz	200 kHz	-67.25 dBc

$f_{carrier}$ = 10.125 MHz



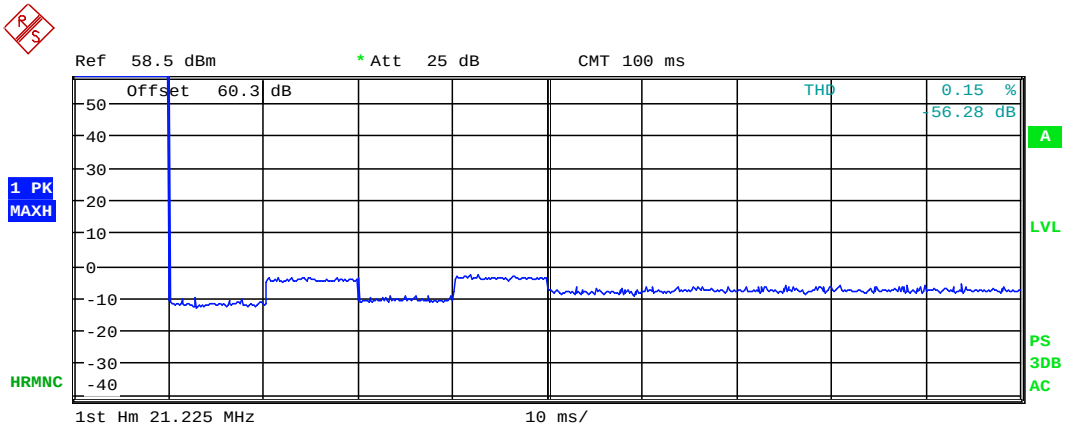
No	Frequency	RBW	Power
1	14.18 MHz	20 kHz	58.39 dBm
2	28.35 MHz	50 kHz	-72.64 dBc
3	42.52 MHz	100 kHz	-59.39 dBc
4	56.70 MHz	100 kHz	-69.15 dBc
5	70.88 MHz	100 kHz	-66.91 dBc
6	85.05 MHz	200 kHz	-66.85 dBc
7	99.22 MHz	200 kHz	-66.64 dBc
8	113.40 MHz	200 kHz	-66.95 dBc
9	127.58 MHz	200 kHz	-66.85 dBc
10	141.75 MHz	200 kHz	-66.66 dBc

$f_{carrier}$ = 14.175 MHz



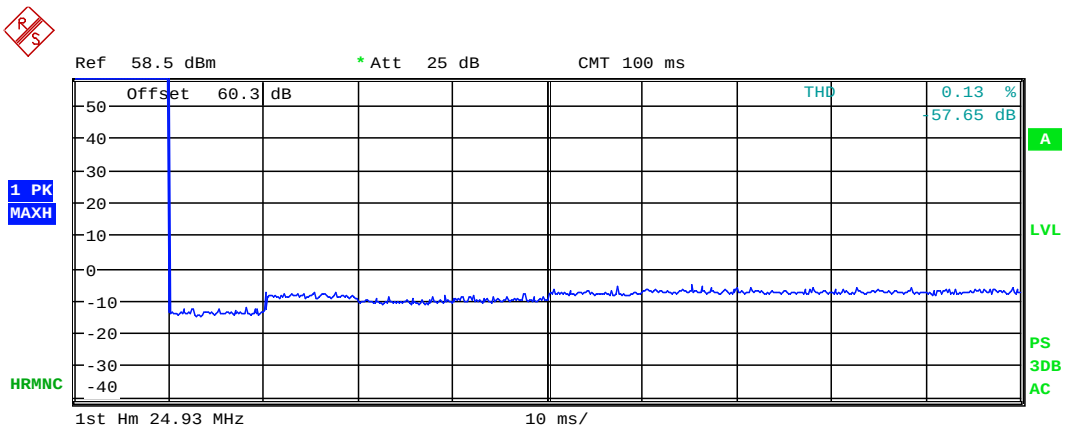
No	Frequency	RBW	Power
1	18.12 MHz	20 kHz	58.40 dBm
2	36.24 MHz	50 kHz	-71.82 dBc
3	54.35 MHz	100 kHz	-67.04 dBc
4	72.47 MHz	100 kHz	-68.76 dBc
5	90.59 MHz	100 kHz	-68.34 dBc
6	108.71 MHz	200 kHz	-66.42 dBc
7	126.83 MHz	200 kHz	-65.69 dBc
8	144.94 MHz	200 kHz	-66.18 dBc
9	163.06 MHz	200 kHz	-65.59 dBc
10	181.18 MHz	200 kHz	-65.70 dBc

$f_{carrier}$ = 18.118 MHz



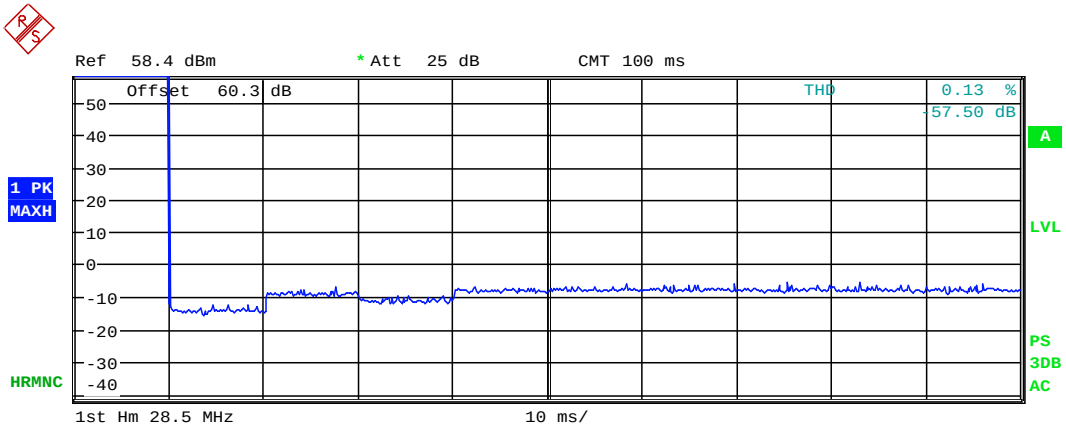
No	Frequency	RBW	Power
1	21.23 MHz	20 kHz	58.44 dBm
2	42.45 MHz	50 kHz	-70.69 dBc
3	63.67 MHz	100 kHz	-63.27 dBc
4	84.90 MHz	100 kHz	-69.34 dBc
5	106.13 MHz	100 kHz	-62.64 dBc
6	127.35 MHz	200 kHz	-66.91 dBc
7	148.57 MHz	200 kHz	-66.40 dBc
8	169.80 MHz	200 kHz	-66.24 dBc
9	191.03 MHz	200 kHz	-66.25 dBc
10	212.25 MHz	200 kHz	-66.43 dBc

$f_{carrier}$ = 21.225 MHz



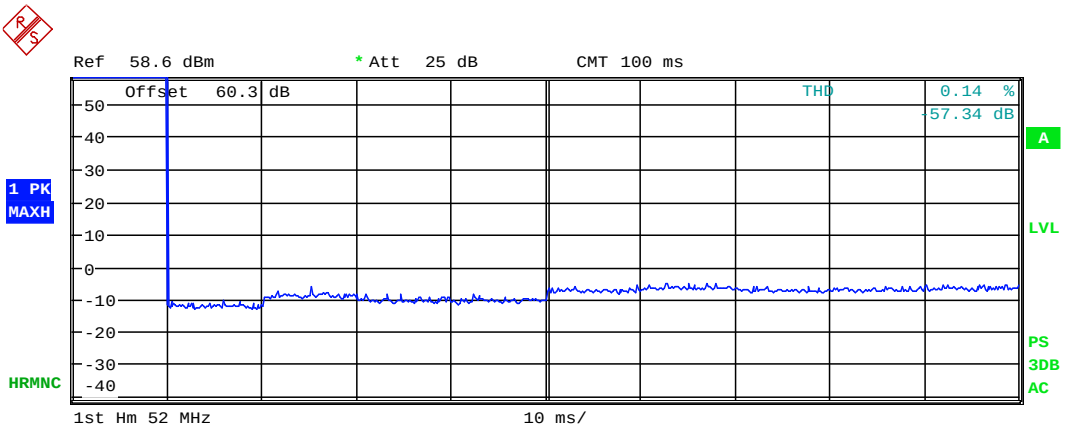
No	Frequency	RBW	Power
1	24.93 MHz	20 kHz	58.40 dBm
2	49.86 MHz	50 kHz	-72.56 dBc
3	74.79 MHz	100 kHz	-67.37 dBc
4	99.72 MHz	100 kHz	-69.00 dBc
5	124.65 MHz	100 kHz	-68.50 dBc
6	149.58 MHz	200 kHz	-66.56 dBc
7	174.51 MHz	200 kHz	-65.89 dBc
8	199.44 MHz	200 kHz	-66.14 dBc
9	224.37 MHz	200 kHz	-66.07 dBc
10	249.30 MHz	200 kHz	-66.12 dBc

$f_{carrier}$ = 24.93 MHz



No	Frequency	RBW	Power
1	28.50 MHz	20 kHz	58.34 dBm
2	57.00 MHz	50 kHz	-72.52 dBc
3	85.50 MHz	100 kHz	-67.45 dBc
4	114.00 MHz	100 kHz	-69.50 dBc
5	142.50 MHz	100 kHz	-66.51 dBc
6	171.00 MHz	200 kHz	-66.23 dBc
7	199.50 MHz	200 kHz	-66.07 dBc
8	228.00 MHz	200 kHz	-66.15 dBc
9	256.50 MHz	200 kHz	-66.17 dBc
10	285.00 MHz	200 kHz	-66.22 dBc

$f_{carrier}$ = 28.5 MHz



No	Frequency	RBW	Power
1	52.00 MHz	20 kHz	58.54 dBm
2	104.00 MHz	50 kHz	-70.88 dBc
3	156.00 MHz	100 kHz	-67.62 dBc
4	208.00 MHz	100 kHz	-68.99 dBc
5	260.00 MHz	100 kHz	-69.08 dBc
6	312.00 MHz	200 kHz	-66.12 dBc
7	364.00 MHz	200 kHz	-65.22 dBc
8	416.00 MHz	200 kHz	-66.04 dBc
9	468.00 MHz	200 kHz	-65.94 dBc
10	520.00 MHz	200 kHz	-65.36 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)	3
Annex 3: Description of equipment under test (EUT), ports	6

Annex 1 to Test Report # EMCC-170121B, 2017-12-14

PHOTOGRAPHS OF TEST SET-UP

EQUIPMENT UNDER TEST:

Device:	700S
Serial Number:	Prototype
Equipment Class:	Amplifier
Manufacturer:	Acom Ltd.
Address:	Bul. Nikola Mushanov 151 1330 Sofia Bulgaria
Phone:	+359 2 920 97 80
Fax:	bmarinov@acom-bg.com

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

Photo A1-1: gain measurement

Photo A1-2: spurious emissions

Annex 2 to Test Report # EMCC-170121B, 2017-12-14

PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST:

Device:	700S
Serial Number:	Prototype
Equipment Class:	Amplifier
Manufacturer:	Acom Ltd.
Address:	Bul. Nikola Mushanov 151 1330 Sofia Bulgaria
Phone:	+359 2 920 97 80
Fax:	bmarinov@acom-bg.com

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

Photo A2-1: EUT, front

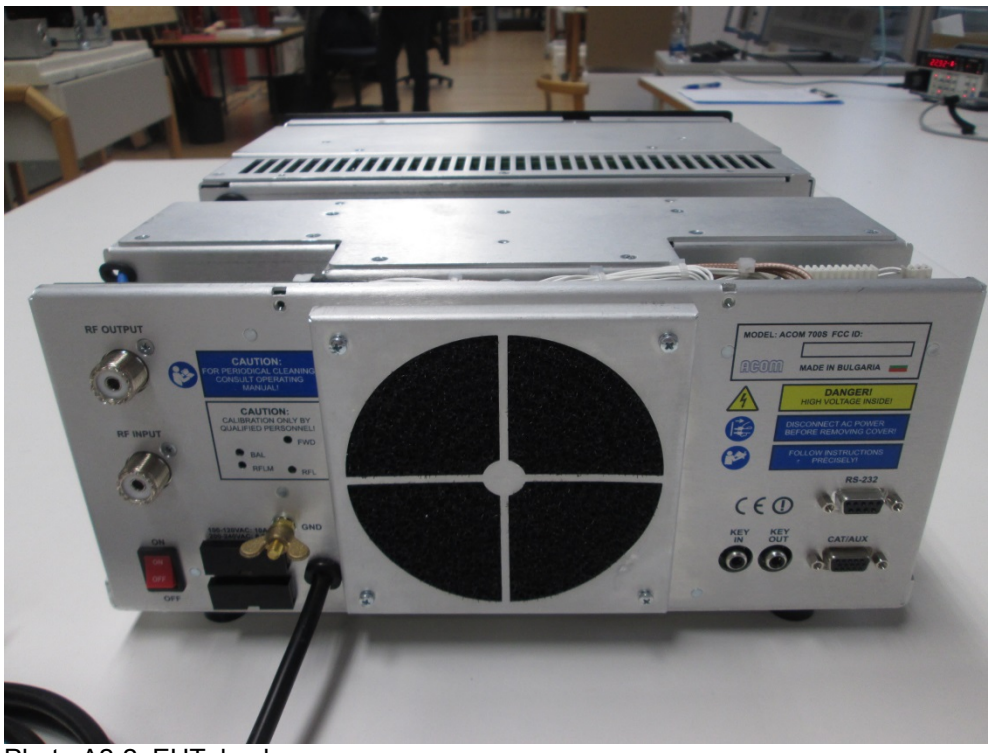


Photo A2-2: EUT, back

Photo A2-3: EUT, top with open casing

Photo A2-4: EUT, side

Annex 3 to Test Report # EMCC-170121B, 2017-12-14

DESCRIPTION OF EQUIPMENT UNDER TEST (EUT), PORTS

EQUIPMENT UNDER TEST:

Device:	700S
Serial Number:	Prototype
Equipment Class:	Amplifier
Manufacturer:	Acom Ltd.
Address:	Bul. Nikola Mushanov 151 1330 Sofia Bulgaria
Phone:	+359 2 920 97 80
Fax:	bmarinov@acom-bg.com

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

The following pages are an excerpt from user's manual delivered by the customer:

2-3. Connecting the amplifier in the shack

WARNING

Before you connect the amplifier to external grounding, you should advise with a licensed electrician and confirm such kind of connection is allowed by your national and local electrical code, safety rules, and regulations in force. Simultaneous connection to the earth grounding and protective earth may be inadmissible or may fall under special requirements in some countries!

WARNING

Never use the gas installation pipes for grounding. This can cause an EXPLOSION!

WARNING

Do not use the steam-heating or water-supply network pipes for grounding! You may expose to dangerous voltage not only yourself but also other people using the same installation.

CAUTION

Bear in mind that the grounding installation may have to withstand emergency currents over 15A with minimal voltage drop on it. Therefore it may be necessary to improve its conductivity using heavier leads and lower-resistance grounding path. The grounding lead should be at least 4mm^2 (AWG 11 or SWG 13).

For details and recommendations on the grounding and RF counterpoise system concerning the electromagnetic compatibility see also S. 3-6(f).

a) GND stud - First connect the grounding stud of the amplifier (located on the rear panel and marked GND – Fig. 2-1) to the grounding system of the shack.

b) KEY-IN jack - amplifier input for receive/transmit control from the transceiver.

The transceiver switches the amplifier from receive mode into transmit mode (RX/TX) by grounding of the KEY-IN input.

Run a shielded cable from the output of your transceiver, providing "ground on transmit", to the KEY-IN input on the amplifier rear panel (RCA PHONO jack – Fig. 2-1). Use a standard RCA PHONO plug for connection to the amplifier.

Transceiver manufacturers give different names to this output, for example: TX-GND, SEND, T/R LINE, RELAY, and others. In some transceivers "ground on transmit" output should be activated by a menu or via changing a switch on the rear panel or inside the transceiver. See instructions in your transceiver manual.

N O T E

Voltage on the KEY-IN jack does not exceed 12V and the current is below 6mA. See also S. 8-2(a).

N O T E

Your amplifier will not work if the KEY-IN input is not connected correctly. If you experience any difficulty consult your dealer.

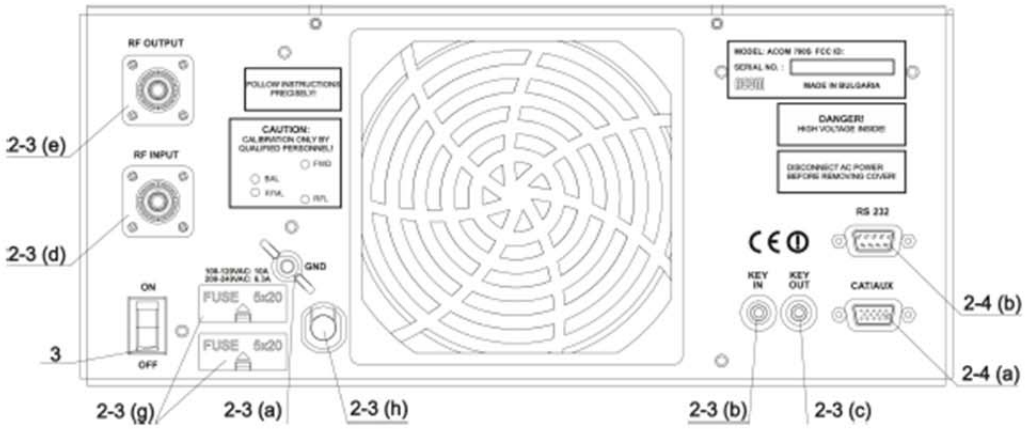


Fig. 2-1 Rear panel connections

c) KEY-OUT jack - transmit-enabling control output from amplifier to the transceiver.

The KEY-OUT jack on the rear panel provides an extra control signal from the amplifier to the transceiver. This can be used for improving the receive/transmit (RX/TX) switching safety.

C A U T I O N

KEY-OUT is a low-powered open-collector output, make sure that the signal voltage coming from the respective transceiver connection does not exceed 50VDC (open circuit) and the closed-circuit current is below 20mA.

If your transceiver has a suitable input, that disables transmission unless grounded externally, we recommend this to be connected to the KEY-OUT jack of the amplifier. Use shielded cable terminated with a standard RCA PHONO plug.

The transceiver manufacturers give different names to this input, for example: TX-INHIBIT, MUTE, LINEAR, and others. Check the manual of your transceiver. Approach your dealer for details. If your transceiver has no such input, do not worry – ACOM 700S will operate normally with KEY-OUT unconnected.

d) RF INPUT - Connect a coaxial cable with a PL-259 plug from the transceiver output (antenna jack) to the amplifier RF INPUT jack.

CAUTION

In order to avoid at damage, turn off your transceiver's internal antenna tuner.

e) RF OUTPUT - Connect a suitable coaxial cable with a PL-259 plug from the RF OUTPUT on the rear amplifier panel to the antenna switch, tuner or antenna intended for the respective frequency band.

CAUTION

If you use an amplifier for the first time in your shack, pay serious attention to the size of coaxial cable from your amplifier output to the antenna. The cable must be capable of handling the increased power safely, particularly on the 10m and 6m bands. This warning applies equally for the antenna switch, tuner, and the whole antenna system, especially when using multi-band trap antennas.

We recommend using RG213 or better. Consult your local coax cable supplier.

f) Preparation of the mains outlet for the amplifier, requirements for the installation and the mains voltage.

CAUTION

Before connecting your amplifier to the power grid, be sure that the outlet is correctly wired and is capable of providing the required current i.e. (up to 10A from 200/240VAC mains and up to 16A from 100/120VAC mains). Also make sure that the grounding lead is connected properly in the outlet, intended for the amplifier. If subsequently you connect the amplifier to a different outlet, check it as well.

It is preferable to use the mains outlet closest to the source. Make sure that the respective fuses and voltage, of your power mains match the ACOM 700S amplifier's specifications (see S. 8-1(g)).

g) Main fuses.

CAUTION

Make sure you check whether the main fuses installed in your amplifier correspond to your local mains nominal voltage and if necessary replace them as described in Section 7-2!

h) Power cord inlet. Due to different mains standards in different countries, the ACOM 700S is delivered without a power plug for the mains cable. You dealer might be able to provide the correct Safety Class I plug. The ground lead of the power cable is colored yellow with two green stripes. If you have any doubts about the correct way to connect these wires, consult your dealer.

2-4. Installing options and connecting to external devices (transceiver, computer, etc.)

a) CAT/AUX interface – used for connecting and operating with various transceiver models (see table 2-1 below and the respective menu in S. 5-3, table 5-1 and Fig. 5-3).

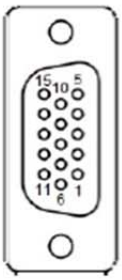
Most of the modern transceivers can be connected by CAT to the ACOM 700S. This will allow the amplifier to track the transceiver frequency without any transmission and change the bands automatically when in Operate mode. The cable can be supplied optionally, ordered separately or home brewed according to table 2-1 and the transceiver's manual.

The CAT connection requires a cable made especially for the ACOM 700S and your transceiver. Wiring diagrams of such cables can be found at www.acom-bg.com.

Note that some of the connections - to the transceiver's BCD band data outputs and Band Voltage outputs do not provide an exact frequency data, but only band data. Those connections cannot be used when ACOM 700S works together with ACOM 04AT because the tuner needs to know the exact frequency, not the band.

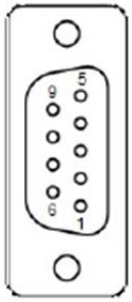
Table 2-1 shows the signals and the pin out of the CAT/AUX connector - rear panel of the amplifier.

Table 2-1

CAT/AUX interface	PIN NO.	PIN NAME	DESCRIPTION	SPECIFICATIONS
 Rear panel view	1	RxD	Received Data	TTL input
	2	RxD	Received Data	RS232 input
	3	TxD	Transmitted Data	RS232 output
	4	TxD	Transmitted Data	TTL output
	5	GND	Ground	0 Volt
	6	BAND voltage	Analogue input	0 to +8V
	7	Band data 0	Bit 0	TTL input
	8	Band data 1	Bit 1	TTL input
	9	Band data 2	Bit 2	TTL input
	10	Band data 3	Bit 3	TTL input
	11	ON RMT	Remote Pwr On	+4.5 to + 15V / 3mA max
	12	Debug mode	CPU only Pwr Input	+8 to + 15V / 0.4A
	13	KEY-IN	Tx Request	Less than +12V / 6mA
	14	KEY-OUT	Tx Ready	O.C. output, up to +50V / 20mA
	15	GND	Ground	0 Volt

b) RS232 port. Table 2-2 shows signals and pinout of the RS232 port on the amplifier's rear panel.

This connector may remain unused until you decide to control the amplifier remotely.

RS 232 interface	PIN NO.	PIN NAME	DESCRIPTION	SPECIFICATIONS
 Rear panel view	1	-	Not connected	-
	2	TxD	Transmitted Data	RS232 level output
	3	RxD	Received Data	RS232 level input
	4	-	Not connected	-
	5	GND	Ground	0 Volt
	6	DSR	Remote Power On	RS232 level input
	7	-	Not connected	-
	8	CTS	Remote Power On	RS232 level input
	9	-	Not connected	-