

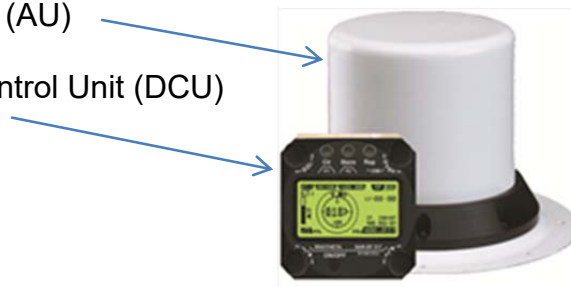
3 General Description

The RT-600 Ramptester is the DF (Direction Finder) performance measurement equipment designed for quick test and maintenance of the RT-600 SAR Direction Finder. The Ramptester consists of the antenna measurement device and an optional RF signal generator, which allows tests on any desired frequencies in the RT-600 defined frequency range. The antenna measurement device allows the bearing testing in 45° steps and can be simply attached to the RT-600 AU (Antenna Unit). Thus, the RT-600 Ramptester provides an extensive and convenient performance test of the Direction Finder installed on an aircraft, which includes the bearing accuracy, bearing sensitivity and audio modulation tests on every customer desired frequency channel.

4 Equipment for Test On-Site

Device under Test is the RT-600 SAR Direction Finder installed on the aircraft.

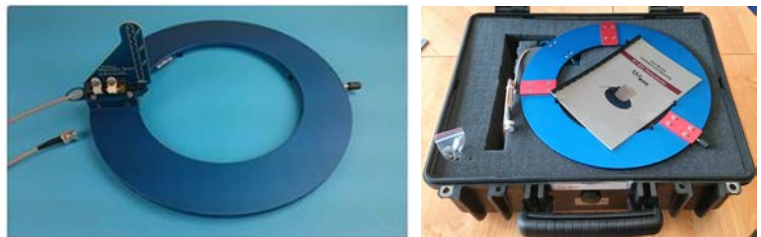
- Antenna Unit (AU)
- Display & Control Unit (DCU)



Basic Equipment:

3 1 5 7 6

- Antenna Measurement Device
- Pressure gauge
- User Manual
- Test Protocol Template



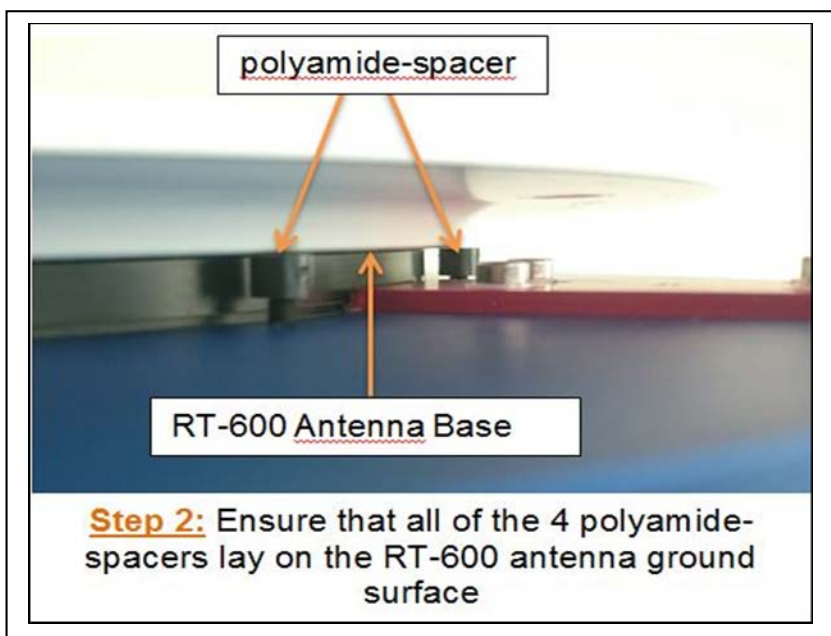
Optional Equipment:

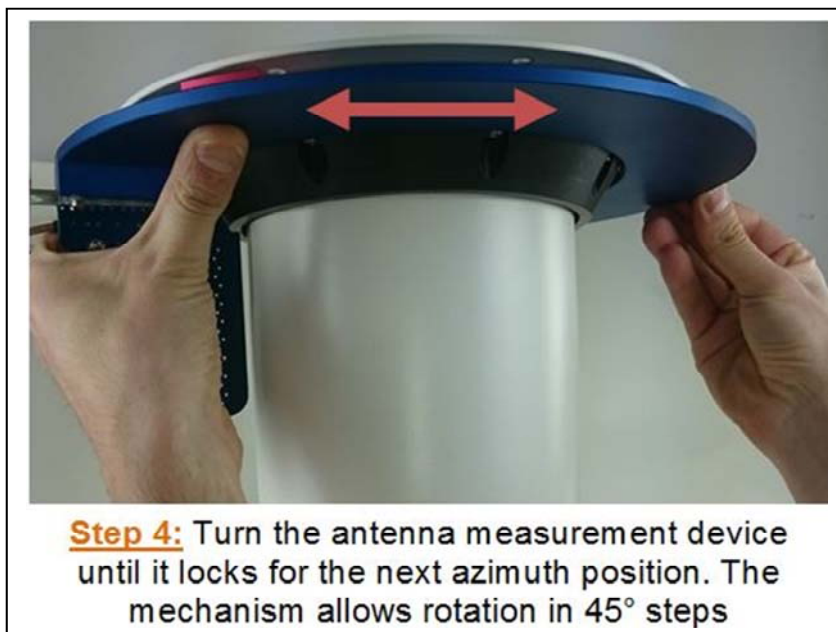
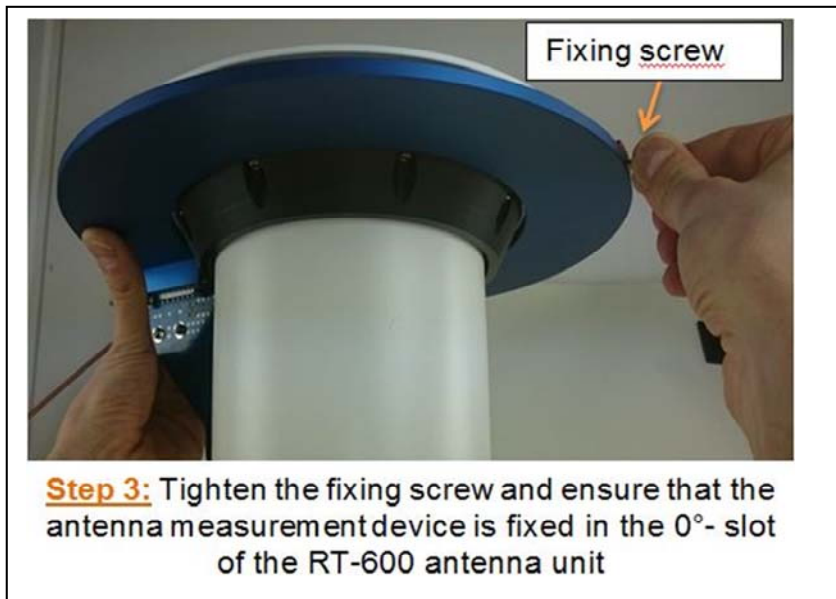
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5 Test Procedure

5.1 Test Preparation

- a.) Ensure that the RT-600 is switched on and connected to the audio system of the aircraft.
- b.) Mount the antenna measurement device on the RT-600 antenna unit as it shown in the following pictures





- c.) Connect the R&S SMC-100A generator or another signal generator that fulfills the requirements of the test procedure (see page 9 and 11) with the antenna measurement device

5.2 Bearing Accuracy Measurement

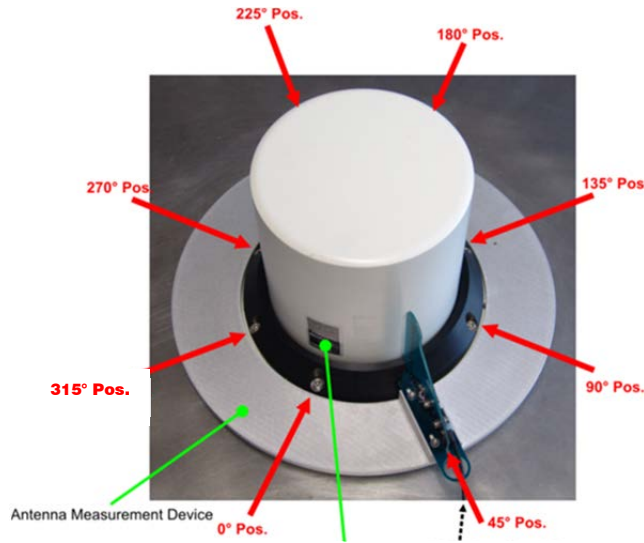


FIG 1: RT-600 and Antenna Measurement Device; azimuth positions

Test Procedure: Bearing Accuracy			
Nr.	Procedure	Setting	
1	Set the RT-600 frequency to the desired frequency.		
2	Set the signal generator frequency to the measurement frequency.		
	Depending on purchased frequency options of RT-600, RHOTHETA recommend the testing of following frequencies. Additional frequencies can be tested on demand.	VHF Air Band	121,500 MHz
		VHF Maine Band	156,800 MHz
		Military Air band	243,000 MHz
		COSPAS-SARSAT	406,025 MHz
3	Set the generator level.	-50 dBm	
4	Set the generator modulation.	AM = OFF FM = OFF	
5	Adjust the antenna measurement device to the 0° Position.		
6	Rotate the antenna measurement device to each azimuth position and note the bearing results in the test protocol.		
7	Chose the next frequency and start with the first step.		

Protocol: Bearing Accuracy Measurement (Example)				
Nr.	Description	Limits	Result	Passed
1	Frequency	--	121,500 MHz	--
2	0° Position	350° ... 10 °		OK <input type="checkbox"/>
3	45° Position	35° ... 55 °		OK <input type="checkbox"/>
4	90° Position	80° ... 100 °		OK <input type="checkbox"/>
5	135° Position	125° ... 145 °		OK <input type="checkbox"/>
6	180° Position	170° ... 190 °		OK <input type="checkbox"/>
7	225° Position	215° ... 235 °		OK <input type="checkbox"/>
8	270° Position	260° ... 280 °		OK <input type="checkbox"/>
9	315° Position	305° ... 325 °		OK <input type="checkbox"/>
10	Frequency	--	156,800 MHz	--
11	0° Position	350° ... 10 °		OK <input type="checkbox"/>
12	45° Position	35° ... 55 °		OK <input type="checkbox"/>
13	90° Position	80° ... 100 °		OK <input type="checkbox"/>
14	135° Position	125° ... 145 °		OK <input type="checkbox"/>
15	180° Position	170° ... 190 °		OK <input type="checkbox"/>
16	225° Position	215° ... 235 °		OK <input type="checkbox"/>
17	270° Position	260° ... 280 °		OK <input type="checkbox"/>
18	315° Position	305° ... 325 °		OK <input type="checkbox"/>

NOTE:

Other frequencies can be tested according to the test procedure. The see test protocol template can be adopted appropriately.

5.3 Bearing Sensitivity Measurement

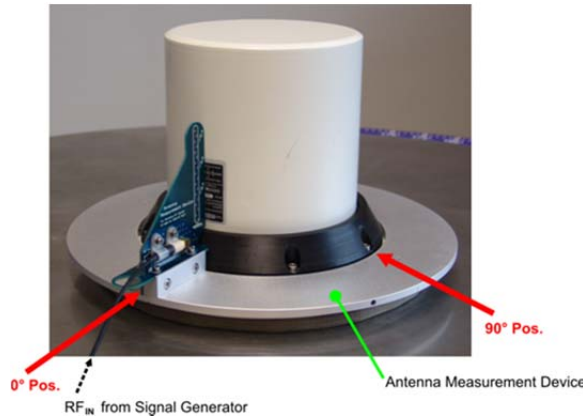


FIG 2: Antenna Measurement Device and RT-600 AU Sensitivity Measurement

Test Procedure: Bearing Sensitivity			
Nr.	Procedure	Setting	
1	Set the RT-600 frequency to the desired frequency.		
2	Set the RT-600 squelch level. (The output of the RF Generator should be set on OFF)	5% above the noise level	
3	Set the signal generator frequency to the desired frequency and switch off all modulations (AM = OFF, FM = OFF)		
	Depending on purchased frequency options of RT-600, RHOTHETA recommend the testing of following frequencies. Additional frequencies can be tested on demand	VHF Air Band	121,500 MHz
		VHF Marine Band	156,800 MHz
		Military Air band	243,000 MHz
		Cospas-Sarsat	406,025 MHz
4	Adjust the level of the RF generator and set the output on ON.	-60 dBm	
5	Adjust the antenna measurement device to the 0° position and wait until the bearing value has been stabilized. Note the bearing result.	0° -60 dBm	
6	Adjust the antenna measurement device to the 90° position and wait until the bearing value has been stabilized. Note the bearing result.	90° -60 dBm	
7	Adjust the level of the RF generator and set the output on ON.	-70 dBm	
8	Adjust the antenna measurement device to the 0° position and wait until the bearing value has been stabilized. Note the bearing result.	0° -70 dBm	
9	Adjust the antenna measurement device to the 90° position and wait until the bearing value has been stabilized. Note the bearing result.	90° -70 dBm	
10	Reduce the signal generator level until no bearing is displayed. Note the generator limit level.		

Protocol: Bearing Sensitivity Measurement (Example)

Nr.	Description	Limits	Result	Passed
1	Frequency	--	121,500 MHz	--
2	0° Position; P _{Gen} = -60 dBm	350° ... 10 °		OK <input type="checkbox"/>
3	90° Position; P _{Gen} = -60 dBm	80° ... 100 °		OK <input type="checkbox"/>
4	0° Position; P _{Gen} = -70 dBm	340° ... 20 °		OK <input type="checkbox"/>
5	90° Position; P _{Gen} = -70 dBm	70° ... 110 °		OK <input type="checkbox"/>
6	DF Receiving OFF level (Note generator RF level)	--		--
7	Frequency	--	156,800 MHz	--
8	0° Position; P _{Gen} = -60 dBm	350° ... 10 °		OK <input type="checkbox"/>
9	90° Position; P _{Gen} = -60 dBm	80° ... 100 °		OK <input type="checkbox"/>
10	0° Position; P _{Gen} = -70 dBm	340° ... 20 °		OK <input type="checkbox"/>
11	90° Position; P _{Gen} = -70 dBm	70° ... 110 °		OK <input type="checkbox"/>
12	DF Receiving OFF level (generator level)	--		--

NOTE:

Other frequencies can be tested according to the test procedure. The see test protocol template can be adopted appropriately.

5.4 Audio Test

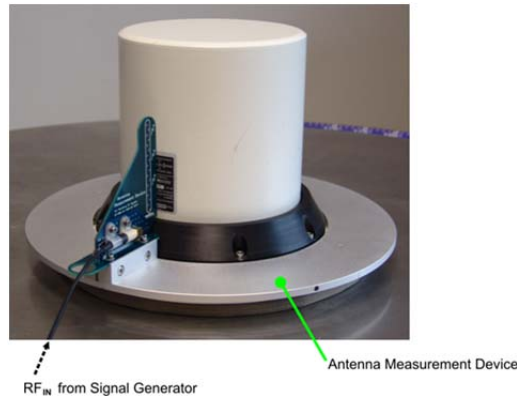


FIG 3: RT-600 and Antenna Measurement Device; Audio Test

Test Procedure: Audio Test			
Nr.	Procedure	Setting	
1	Set the RT-600 DF and the signal generator to the desired frequency. Adjust the antenna measurement device to any position.		
	Depending on purchased frequency options of RT-600, RHOTHETA recommend the testing of following frequencies. Additional frequencies can be tested on demand	VHF Air Band	121,500 MHz
		VHF Maine Band	156,800 MHz
		Military Air band	243,000 MHz
		Cospas-Sarsat	406,025 MHz
2	Set the generator modulation depending on the used frequency and set the output on ON.		
	Amplitude modulation for the VHF air band or military band	AM: 60%	
		AF: 800 Hz	
		FM: OFF	
	Frequency modulation for other frequencies	FM: 3 kHz	
		AF: 800 Hz	
		AM: OFF	
3	Set the generator on the appropriate level.		-50 dBm
4	Set the DCU volume.		50%
5	The 800 Hz tone should be hearable loud and clear (External speaker or out of the aircraft audio system)		

Protocol: Audio Test (Example)				
Nr.	Description	Limits	Result	Passed
1	Frequency	--	121,500 MHz	--
2	Audio output	loud and clear	--	OK <input type="checkbox"/>
3	Frequency	--	156,800 MHz	--
4	Audio output	loud and clear	--	OK <input type="checkbox"/>

NOTE:

Other frequencies can be tested according to the test procedure. The see test protocol template can be adopted appropriately.

6 Product Disposal

6.1 Disposal within the European Union

Product Disposal



■ Product labeling according to EN 50419

At the end of product life, this product may not to be disposed together with normal household waste. Even disposal via the municipal waste disposal collection for electrical and electronic equipment is not permitted.

The correct disposal of this product helps to protect the environment and prevent any potential damage to the environment and human health, which can occur due to improper handling of the product.

- Therefore, supply the device to an electronics recycling after the final taken out of service.

Or

- The RHOTHETA Elektronik GmbH takes back all products that are subject to the requirements of the WEEE Directive (2002/96/EC) of the European Union to supply these products to professional disposal.

6.2 Disposal outside the European Union

For disposal the equipment in accordance with national regulations in countries outside the European Union, ask your dealer or local authorities.

7 List of abbreviations

Abbreviation	Meaning	Remarks
AM	Amplitude Modulation	
AMD	Antenna Measurement Device	
AU	Antenna Unit	
CP/SS, C-S	Cospas-Sarsat System	
DCU	Display & Control Unit	
DF	Direction finder	
Deg	Degree (° = 60')	
ELT	Emergency Locator Transmitter	
FM	Frequency Modulation	
GND	Ground	
GPS	Global Positioning System	
ID	Identification	
IP	Ingress Protection rating	IP67
LAN	Local Area Network	
LCD	Liquid Crystal Display	
LED	Light-Emitting Diode	
MOB	Man-Over-Board	
MSSI	Maritime Mobile Service Identity	Ship's Ident. No.
NF	Audio Frequency	
NMEA (0183)	National Marine Electronics Association	Interface standard
PLB	Personal Locator Beacon	
PS RAM	Averaging Random Access Memory	
PTT / SBS	Push-To-Talk / Self Bearing Suppression	
RAM	Random Access Memory	
Rx	Receiver	
S/N	Signal to Noise	
SAR	Search And Rescue	
SNR	Signal to Noise-Ratio	
SQL	Squelch	
TFT	Thin Film Transistor (see also LCD)	
Tx	Transmitter	
V	VTS Version	AU-Variant V
VDC	Volts of Direct Current	
VTS	Vessel Traffic Service	