ROVER INSTRUMENTS

A STEP AHEAD IN DIGITAL TELEVISION

FM Radio - DAB+ Radio - DVBT/T2 - DVBS/S2
MULTI-STANDARD BROADCAST ANALYZER

EXA 700 Tab

- SDR, Software Defined Technology
- Full DAB+, Field & Transmitter test
- Full FM, Field & Transmitter Test
- 50 Ω & 75 Ω RF Input Selectable
- Fast, Accurate, Intuitive Multimeasures
- IPTV Analyzer
- EDI / ETI analyzer
- MPEG4, HEVC, HD & 4K
- Optical Input (SC/APC opt.)
- GPS Receiver (opt.)
- 10 MHz & 1 ppm INPUT (opt.)
- Long lasting LiPO battery
- Full Remotely Controllable
- Rugged: Avionic Aluminum body

INNOVATIVE PERFORMANCE

for: SYSTEM INTEGRATOR, TELEPORT BROADCASTER, CABLE NETWORK, GOVERNMENT & MILITARY COMMUNICATIONS

CE DVB WTA MEMBER

1972 > 2023 >> 51 YEARS OF INNOVATION

EXA 700 Tab Description

Broadcasting transmitters must respect particularly stringent standards to guarantee broadcasting quality to avoid service disruptions for the listeners.

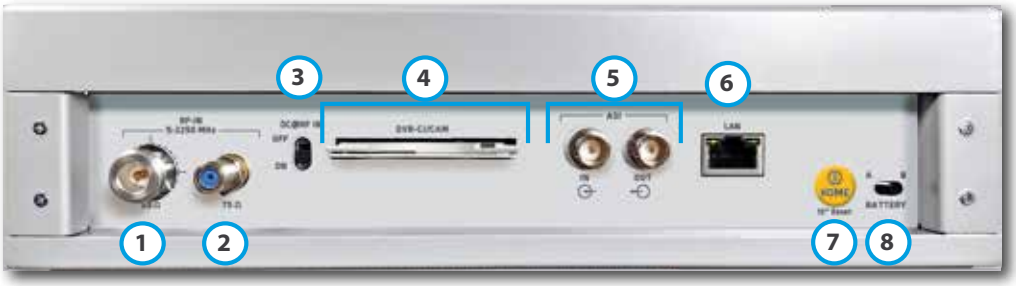
With a single instrument, the Rover EXA 700 Tab Analyzer, you can perform all required DAB+ and FM Radio measurements, from the initial acceptance to the complete testing of the transmitters, during the commissioning or maintenance, as well as all the field coverage measurements.

The EXA 700 Tab equipment described here, satisfies many countries and customers tests specifications, users only need to set the required limit value.

The EXA 700 tab is a combined analyzer that also includes Digital SAT and Digital TV complete measurements, indispensable in a modern environment, where multiple type of signals coexist.
The EXA 700 tab is a battery operated equipment, easy to use, robust, reliable with a cost effective great value.

EXA 700 Tab Physical Description and Connectors

• TOP SIDE



1. TV/RF Input type "N" 50 Ω
2. SAT/RF Input type "F" 75 Ω
3. DC at RF IN ON/OFF power switch
4. Common Interface Slot for CAM Module
5. ASI Transport Stream IN/OUT
6. LAN Ethernet RJ45
7. Power key
8. Backup Battery Switch

• OTHER SIDES

RIGHT

LEFT

9. HDMI Output
10. USB A 3.0 for memory stick
11. USB A 2.0 for memory stick
12. Power Input connector (12 VDC - 4A)
13. Right speaker
14. Left speaker

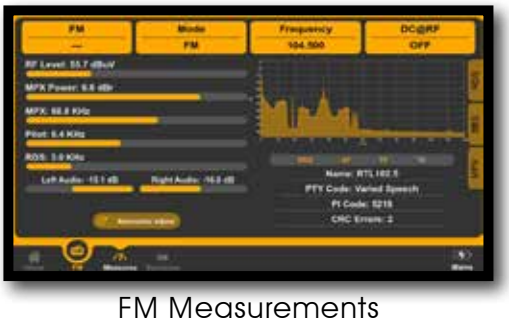
EXA 700 Tab Technical Specifications

SUPPORTED STANDARDS

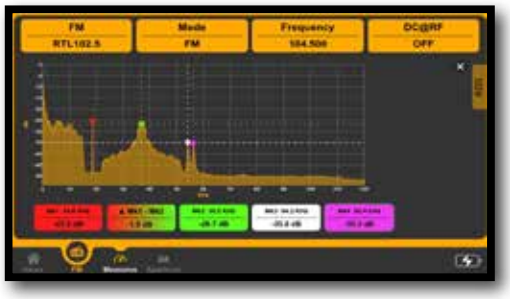
RADIO:	FM, DAB/DAB+
TV:	DVB-T, DVB-T2 Multi-PLP
SAT:	DVB-S, DVB-S2, S2X, S2 Multistream
ASI:	ASI IN/OUT
LAN:	TS over IP and EDI input
RF input performances (42-2.250 MHz)	
2 RF inputs:	N. 1 - 50 Ω “N” TV Band, N. 1 75 Ω “F” SAT Band
50Ω input matching (RL):	TV / CATV >20 dB
75Ω input matching (RL):	SAT >16 dB
Audio decoding	
MPEG-1 Layer I / II (ISO-IEC 13818-3) Dolby Digital Plus Dolby AC-3 AAC & HE AAC	
Video decoding	
MPEG-2 MP@ML HDTV (ISO-IEC 13818-2) MPEG-4/AVC (ISO-IEC 14496-10) ITU-T H.264 ITU-T HEVC - SD - HD - UHD (4K)	

FM ANALOG RADIO

Standard:	FM Radio
RF input:	50 Ω “N” connector
Input level range:	25 to 130 dBµV - Max input power without damage +30 dBm (30 V without simultaneous generation of internal voltage to the RF input)
Frequency range:	42 MHz to 900 MHz
Frequency resolution:	1 kHz
Synchronization indication:	Unlock, Power Too Low, Lock
RF power level accuracy:	1 dB typ.
RF level unit:	dBµV, dBmV, dBm Selectable
MPX power:	-12 to +12 dB, 60 sec. Integration
MPX kHz deviation peak:	up to 120 kHz, with density Graph & Spectrum
Stereo Pilot:	up to 15 kHz
RDS Pilot:	up to 15 kHz
L & R level:	- 50 to + 5 dB
Graphics:	MPX spectrum, 8 MPX density & base band Spectrum
Audio:	L/R, Mono 8 stereo
RDS:	PS, TP, Clock, Text, Alternatives Frequency mode A & B, RDS errors, PTY, PI, TA, Group analyzer, Radio Text, Program Type

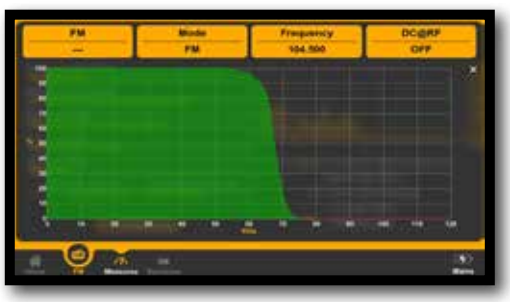


FM Measurements



MPX Graph

RDS Informations



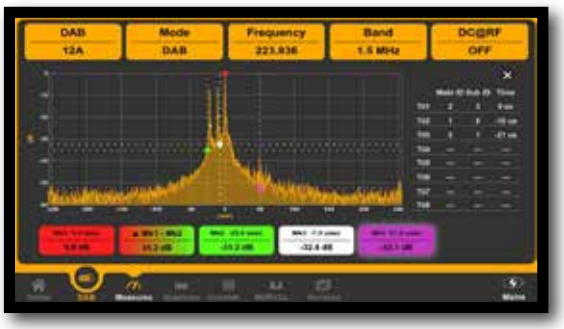
MPX Density

DAB+ DIGITAL RADIO	
Standard:	DAB, DAB+
RF input:	50 Ω “N” connector
Input level range:	25 to 130 dBμV - Max input power without damage +30 dBm (30V without simultaneous generation of internal voltage to the RF input)
Frequency range:	42 MHz to 900 MHz
Frequency resolution:	1 kHz
Channel Bandwidth:	1.5 MHz
Synchronization indication:	Unlock, Power Too Low, Lock
RF power level accuracy:	1 dB typ.
RF level unit:	dBμV, dBmV, dBm Selectable
MER Range:	Up to 40 dB
MER Accuracy:	1 dB typ.
FIC BER:	up to 1E-06
MSC BER:	up to 1E-06
Graphics:	Constellation, Echoes, Mer x Carrier, CCDF with crest factor, I & Q amplitude & phase (up to 4 markers)
TII:	Up to 8
Channel Information:	Ensamble Label & Ensambled ID, Service List & Service ID, SUB CH ID, Dynamic Label, Sample Rate, Bit Rate, Mode, Protection Info, CU Start & Size, Time & Date, MOT
Other measures:	CRC errors, RS errors, Frequency drift, Quality indicator

DAB/DAB+ Measurements

DAB/DAB+ MER vs CARRIER

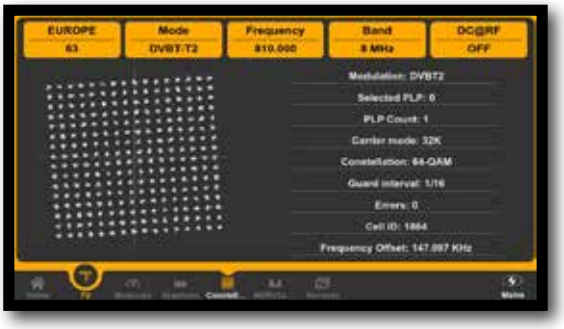
DAB/DAB+ Service Informations



DAB/DAB+ Echoes analysis

DIGITAL TERRESTRIAL TV	
Standard:	DVB-T , DVB-T2
RF input:	50 Ω “N” connector
Input level range:	25 to 130 dBμV - Max input power without damage +30 dBm (30 V without simultaneous generation of internal voltage to the RF input)
Frequency range:	42 MHz to 900 MHz
Frequency resolution:	50 kHz
Channel Bandwidth:	5 MHz, 6 MHz, 7 MHz, 8 MHz
Synchronization indication:	Unlock, Power Too Low, Lock
RF power level accuracy:	1dB max
RF level unit:	dBμV, dBmV, dBm Selectable
MER Range:	Up to 40 dB
MER Accuracy:	1 dB
BER before Viterbi (DVB-T):	up to 1E-06

BER after Viterbi (DVB-T):	up to 1E-08
BCH (DVB-T2):	up to 1E-06
LDPC (DVB-T2):	up to 1E-08
Constellation:	Normal and Rotated
Echoes measurement:	For DVB-T and DVB-T2 signals
MER vs Carrier:	MER measurement for DVB-T and DVB-T2 signals



DVB-T2 Constellation

DVB-T2 MER vs CARRIER

DIGITAL SATELLITE

Standard:	DVB-S, DVB-S2 Single Stream (DTH), DVB-S2 Multi stream (for Broadcast Multiple Network, Transmitter feeding), DVB-S2X Single Stream (DTH), DVB-S2X Multi stream (for Broadcast Multiple Network, Transmitter feeding)
RF input:	75 Ω “F” connector
Input level range:	25 to 130 dBμV - Max input power without damage +30 dBm (30 V without simultaneous generation of internal voltage to the RF input)
Frequency range:	900 MHz to 2250 MHz
Frequency resolution:	1 MHz (with 100 kHz AFC Control)
Roll Off:	Automatic selection in line with the selected standard
FEC:	Automatic selection
Symbol Rate:	DVB-S: 1 to 45MS/s DVB-S2 & S2X: 2 to 45MS/s
ISI Selection (DVB-S2 Multistream):	From 1 to 10
ISSY synchronization (DVB-S2 Multi-stream):	Automatic detection and reading
Pilot (DVB-S2):	On, off. Automatic detection & reading
FEC Frame (DVB-S2):	Normal, short. Automatic detection and reading
LNB Control:	V (13V) / H (18V) polarization, 22 kHz tone, DiSEqC 1.0 and 2.0,
Synchronization indication:	Unlock, Power Too Low, Lock
RF power level accuracy:	1dB
RF level unit:	dBμV, dBmV, dBm selectable
AFC - Capture range:	0 to 5 MHz – step 100 kHz
LNB frequency error measurement:	Up to 5 MHz
MER Range:	Up to 25 dB
MER Accuracy:	0,5 dB up to 18 dB - 1dB from 19 to 25 dB
BER before Viterbi (DVB-S):	up to 1E-06
BER after Viterbi (DVB-S):	up to 1E-08
BCH (DVB-S2) (S2X):	up to 1E-06
LDPC (DVB-S2) (SX):	up to 1E-08
Constellation:	Constellation diagram

DVB-S2 Measurements

DVB-S2 Video decoding

LAN IP / ASI / EDI / ETI / TS OVER IP

IP Interface	
LAN:	1 Gb/s Ethernet interface
IP protocol:	UNICAST/MULTICAST RTP/UDP, EDI
IP measurement	
Streaming status:	Present, Not Present, Stream type
Number of MPEG packet size:	1 - 7
TS packet size:	188, 204
Number of missing packets:	0 - ∞
IP Stream latency:	0 - 1000 ms
IAT:	MIN, MAX, LAST, AVERAGE
TS Bitrate:	0 - 216 Mb/s
Transport Stream Content:	TS and T2-MI, ETR 101-290, PSI/SI
EDI measurement	
Ensambled:	ID and name
Channel Information:	Ensamble Label & Ensambled ID, Service List & Service ID, SUB CH ID, Dynamic Label, Sample Rate, Bit Rate, Mode, Protection Info, CU Start & Size, Time & Date, MOT
ASI mode	
ASI Mode:	MPEG-TS on ASI packet length 188/204 bytes
ASI Status:	Lock 188, Lock 204, Unlock
ASI Bitrate:	0 - 216 Mb/s
Input / output:	75 Ω BNC connectors
Transport Stream Content:	TS and T2-MI, ETR 101-290, PSI/SI

ETI Analyzer

IPTV Statistics

FM RADIO, DAB+, SAT, TV SPECTRUM ANALYZER

Measurement parameters	
Frequency range:	42 MHz to 2.250 MHz
RF level range:	5 to 130 dBµV
Resolution Bandwidth:	TV = 100 kHz SAT = 4 MHz / 1 MHz selectable
SPAN:	TV: 2 MHz, 5 MHz, 7 MHz, 10 MHz, 20 MHz, 50 MHz, 100 MHz, 200 MHz SAT: 50 MHz, 100 MHz, 200 MHz, 500 MHz, FULL band 930-2.250 MHz
Markers	Up to 4 markes, shoulder mask & measure, min Hold, Max Hold, Average, DELTA Markers
dB/div scale selection:	1dB/div, 2dB/div, 5dB/div, 10dB/div
Visualization modes:	Full Picture or Envelope MENU Selectable

DAB+ Shoulder Mask

TV Spectrum

TRANSPORT STREAM ANALYZER	
TS interface	
Transport Stream content:	TS and T2-MI
TR 101 290 v1.2.1 ANALYSIS	
1st priority monitoring:	1.1 Sync loss, 1.2 Sync byte, 1.3.1 PAT Int, 1.3.2 PAT PID, 1.3.3 PAT scr, 1.4.a Cont [Ord]
2nd priority monitoring:	2.1 Transport error, 2.2 CRC error, 2.3a PCR repetition error, 2.3b PCR discontinuity error
3rd priority monitoring:	3.1 PID error, 3.2 SI Rep, 3.4 UNREF PIDS, 3.5 SDT error
TS information monitoring	
PSI/SI tables decoding:	Visualization of service list, stream type
PMT decoding:	Service PID composition; real time refresh on service selection
Bitrate measurement:	TS total bitrate, Stuffing rate Service bitrate, ES bitrate 0 to 270 Mb/s Resolution 1 kb/s
T2MI information:	Time Stamp, L1 CONF, L1 PLP, L1 PRE, L1 NEXT, L1 CURRENT

ETR 101-290 Analysis

T2MI Analysis

DATA STORAGE	
ScreenShot:	JPG format
DataShot:	JSON format
Recorder:	TS, T2-MI or ETI files
Data export:	USB-On-The-Go plug to connect an external USB device 10/100 Base-T LAN to download data on an external PC (JPG, JSON or CSV format)

Datashot example

Screenshot Example

GENERAL DATA	
Integrated Controller	
Storage:	External USB drive, Internal Memory
Interfaces	
Universal Serial Bus (USB):	1 x USB2, USB On-The-Go for USB memory stick or HD 1 x USB3, USB On-The-Go for USB memory stick or HD
Local Area Network (LAN):	1 x 1G Ethernet interface (For remote control/IPTV input/EDI input)

Asynchronous Serial Interface (ASI):	ASI input on 75 Ω BNC connector, ASI output on 75 Ω BNC connector
Audio / Video:	HDMI output
Common Interface:	PCMCIA slot for single/multi-service CAM modules
RF input:	1- 75 Ω “F” connector and 1 - 50 Ω “N”
Remote Operation	
Ethernet:	Instrument remote control. Full instrument control via Web-Browser
Very High Brightness Display	
Size:	9”
Format:	1024 x 600 high brightness, capacitive touch
Environmental conditions	
Operating temperature range:	-5° C to +50° C
Storage temperature range:	-25° C to 70° C
Humidity:	Up to 90%
AMSL:	Up to 3.000 m
Power Supply:	External power adapter - Input: 110 VAC to 240 VAC - 50 Hz to 60 Hz - Output: 12 VDC - 4A Internal Battery: - LI-ion Polymer 8A battery duration > 4h (dependent in LNB consumption and Display Brightness)
Dimensions W x H x D:	290 mm x 200 mm x 80 mm
Body:	Aluminium and Steel
Regulation reference:	CEI EN 60721-3-7, CEI EN 60529
Weight:	
Bare instruments:	2,5 kg
Instrument with batteries:	2,9 kg
Instrument with batteries and soft bag:	3,4 kg

METER ACCESSORIES	
SUPPLIED:	Hard transport case, Soft protection bag, Main power adapter ac 110/240 V to dc 12 V 4 A

RO.VE.R. Laboratories S.p.A.
Via Parini, 2 - 25019 Sirmione (BS) Italy
info@roverinstruments.com • www.roverbroadcast.com