Indra reserves the right to modify these specifications without prior notice.

MANPACK II
DUAL-BAND ROBUST
FIELD-READY SATELLITE
COMMUNICATIONS

Satellite communications, earth observation, navigation and positioning and control stations

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>SHR Band</th>
<th>SHF Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna type</td>
<td>Cassegrain 0.6 m (4 petals)</td>
<td>Cassegrain 0.3 m (1 petal)</td>
</tr>
<tr>
<td>Tx bandwidth</td>
<td>7.9-8.4 GHz</td>
<td>8.4-8.7 GHz</td>
</tr>
<tr>
<td>Rx bandwidth</td>
<td>7.25-7.75 GHz</td>
<td>7.9-8.4 GHz</td>
</tr>
<tr>
<td>Polarization</td>
<td>Tx/Rx RHCP/LHCP</td>
<td>RHCP/LHCP</td>
</tr>
<tr>
<td>Tx power (SSPA)</td>
<td>4 Watt</td>
<td>3 Watt</td>
</tr>
<tr>
<td>EIRP</td>
<td>36 dBW</td>
<td>30 dBW</td>
</tr>
<tr>
<td>G/T</td>
<td>7 dB/ºK</td>
<td>6 dB/ºK</td>
</tr>
<tr>
<td>Data rate</td>
<td>Up to 2 Mbps</td>
<td>Up to 1 Mbps</td>
</tr>
<tr>
<td>Crypto equipment</td>
<td>Serial interface included</td>
<td>Serial interface included</td>
</tr>
<tr>
<td>Max. prime power consumption</td>
<td>85 Watt</td>
<td>20 Watt</td>
</tr>
<tr>
<td>Power supply</td>
<td>• DC 10 V to 30 V</td>
<td>• DC 10 V to 30 V</td>
</tr>
<tr>
<td>• Solar panel</td>
<td>• BA-5590 compatible</td>
<td>• BA-5590 compatible</td>
</tr>
<tr>
<td>Autonomy with batteries provided (1 kg)</td>
<td>• Unlimited (Rx)</td>
<td>• Unlimited (Rx)</td>
</tr>
<tr>
<td>Transport</td>
<td>Unlimited with solar panel</td>
<td>Unlimited with solar panel</td>
</tr>
</tbody>
</table>

Total weight: 13 kg.
MANPACK II
DUAL-BAND ROBUST FIELD-READY SATELLITE COMMUNICATIONS

Indra’s advanced technology provides security and mobility to satellite communications

Introduction

Indra is a leader in the development of satellite communication remote terminals, providing security and mobility to satellite communications. MANPACK II is designed to meet both requirements by using advanced and proven technology.

The use of spread spectrum allows both to use small antennas suitable for portable terminals, and to provide a robust and secure modulation.

Nowadays two of the most important trends within the telecommunications users community are secure communications and mobility.

Indra’s satellite communications remote terminal MANPACK is designed to meet both requirements by means of using advanced and proven technology.

MANPACK II remote terminal

The design of the remote communications terminal developed by Indra is built around the most advanced concept of efficient military and civilian satellite communications networks.

Software radio design concept of the MANPACK II modem allows different waveforms to be selectable from user without any change in hardware:
- QPSK Single Channel Per Carrier (SCPC)
- Direct Sequence Spreading SCPC
- Frequency Hopping SCPC
- CDMA

Elements and accessories

- Batteries
- Portable AC and DC universal battery charger
- Solar panel
- Rugged telephone handset
- Rugged PDA or laptop
- Compass
- Protection cover
- Backpacks
- Digital camera

Operation temperature

-20ºC < T < +50ºC

Storage and transport temperature

-20ºC < T < +60ºC

MIL-STD-810 F

100%

MIL-STD-108 E

System overview

The network is a fully automated Demand Assigned Multiple Access (DAMA) multistar and multibeam system that provides a very efficient use of the highly-valued space segment. This DAMA network is designed to provide personal communications including either fixed portable or mobile remote terminals, and can support all three types at the same time.

The network manager can handle several waveforms simultaneously over the same network: SCPC, CS/SCPC, and DS-SCPC, allowing to choose the most efficient mechanism to share satellite resources. Services available are voice, data (IP) and SPCS-like messaging.

Highlights

- Fully automated network, including DAMA, access control, accounting, services, QoS and group/priorities management, full network SNMP monitoring and control, automatic power control.
- IP router modem, optional 2 wire voice interface available.
- Customer-specific applications can be loaded on to the terminal.
- Interface for data encryption (IP or link-layer).
- Full software-defined radio terminal: waveform definition by software configuration, CDMA, QPSK, DS-QPSK and FH-QPSK, allowing the use of more appropriate waveforms for each deployment.
- Modem ready for SOTM: STANAG 4485 and high-speed vehicles (up to 300 km/h).
- Point-to-point and network managed modes, configurable through the front menu.
- Asymmetrical and bidirectional communications up to 2 Mbps.

Specifications

- User data rates:
  - 64 kbps – 2048 kbps
  - 12 kbps – 2048 kbps
  - 8 kbps – 256 kbps
  - 8 kbps – 1524 kbps

- Waveform based on:
  - QPSK
  - Convolutional
  - Reed-Solomon

- Performance:
  - Meets IESS308
  - IESS 308/309, STANAG 4486
  - STANAG 4606
  - STANAG 4485

- Environmental characteristics:
  - Operating temperature: -20ºC to +50ºC
  - Storage and transport temperature: -20ºC to +60ºC
  - Humidity: 100%
  - Operating altitude: 10,000 ft
MANPACK II
DUAL-BAND ROBUST FIELD-READY SATELLITE COMMUNICATIONS

Introduction

Indra’s advanced technology provides security and mobility to satellite communications.

The use of spread spectrum allows both to use small antennas suitable for portable terminals, as well as provides a robust and secure modulation.

Nowadays two of the most important trends within the telecommunications users community are secure communications and mobility.

Indra’s satellite communications remote terminal MANPACK is designed to meet both requirements by means of using advanced and proven technology.

System overview

The network is a fully-automated Demand Assigned Multiple Access (DAMA) multi-satellite and multi-beam system that provides a very efficient use of the highly-valued space segment. This DAMA network is designed to handle all types of satellite communications adding either fixed mobile or mobile satellite systems, and can support all these types at the same time.

The network manager can handle several networks such as DAMA, DS-SCPC, FH-SCPC, QPSK-SCPC, and CDMA, allowing to choose the most efficient mechanism to share satellite resources.

Software radio design concept of the MANPACK II modem allows different waveforms to be selectable from user without any change in hardware: QPSK Single Channel Per Carrier (SCPC), Direct Sequence Spread SCPC, Frequency Hopping SCPC, and CDMA.

MANPACK II remote terminal

The design of the remote communications terminal developed by Indra is built around the most advanced concepts and technologies on satellite communications networks.

Elements and accessories

• Batteries
• Portable AC and DC universal battery charger
• Solar panel
• Rugged telephone handset
• Rugged PDA or laptop
• Compass
• Protection cover
• Backpacks
• Digital camera

Highlights

• Fully automated network, including DAMA, access control, accounting, terminal services, QoS, and group/priorities management. Full network DAMA, CDMA, DS-SCPC, FH-SCPC, and QPSK-SCPC are available.

• IP router-modem, optional 2 wire voice interface available

• Full software-defined radio terminal: waveform definition by software configuration, CDMA, QPSK, DS-QPSK and FH-QPSK, which allows the use of more appropriate waveform for each deployment

• Modem ready for SOTM: STANAG 4485 and high-speed vehicles (up to 300 km/h)

• Asymmetrical and bidirectional communications up to 2 Mbps

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>User data rates</td>
<td>64 kbps – 2048 kbps</td>
</tr>
<tr>
<td>Modulation</td>
<td>QPSK</td>
</tr>
<tr>
<td>FEC (selectable)</td>
<td>Convolutional 1/2 or 3/4</td>
</tr>
<tr>
<td>SW jamming detector</td>
<td>Yes</td>
</tr>
<tr>
<td>Waveform based on</td>
<td>CDMA</td>
</tr>
<tr>
<td>User data rates</td>
<td>8 kbps – 1524 kbps</td>
</tr>
<tr>
<td>Spreading factor</td>
<td>31, 63, 127</td>
</tr>
<tr>
<td>FEC (selectable)</td>
<td>Convolutional 1/2 or 3/4</td>
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<tr>
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<td>Convolutional 1/2 or 3/4</td>
</tr>
</tbody>
</table>

Environmental characteristics

- Operating temperature: -20ºC / +60ºC
- Storage and transport temperature: -20ºC / +70ºC
- Operating humidity: 100%
MANPACK II
DUAL-BAND ROBUST FIELD-READY SATELLITE COMMUNICATIONS

Indra’s advanced technology provides security and mobility to satellite communications

Introduction

Indra’s satellite communications remote terminal MANPACK is designed to meet both requirements by means of using advanced and proven technology.

The use of spread spectrum allows both to use small antenna suitable for portable terminals, as well as provides a robust and secure modulation.

Nowadays two of the most important trends within the telecommunications users community are secure communications and mobility.

The network manager can handle several waveforms: QPSK Single Channel Per Carrier (SCPC), Direct Sequence Spreading SCPC, Frequency Hopping SCPC, and CDMA.

The MANPACK II remote terminal provides security and mobility to satellite communications networks.

The MANPACK II modem allows efficient waveforms to be selectable from user interface.

The MANPACK II terminal can operate in different satellite communications networks.

Elements and accessories

- Batteries
- Portable AC and DC universal battery charger
- Solar panel
- Rugged telephone handset
- Rugged PDA or laptop
- Compass
- Protection cover
- Backpacks
- Digital camera

Highlights

- Full software-defined radio terminal is fully defined by software configuration, which allows the use of any waveform assigned to the terminal, and includes a broad and secure modulation.
- Fully automated network, including MANPACK II modem, services, QoS, and QoS management. Full software radio terminal is able to switch between different waveforms to optimize the use of available resources.
- Whenever a change is made in the network, the terminal automatically switches to the new waveform, ensuring continuous service.
- 500 kHz – 5 MHz

Specifications

- User data rates
- Modulation
- Performance
- Frequency
- Terminal power
- Spectrum
- User data rates
- Spreading factor
- FEC (selectable)
- Performance
- Frequency
- User data rates
- Spreading factor
- FEC (selectable)
- Performance
- Frequency
- User data rates
- Spreading factor
- FEC (selectable)
- Performance
- Frequency

Environmental characteristics

- Operating temperature
- Storage and transport temperature
- Operating altitude
- Operating humidity

Operation temperature
-0ºC – 50ºC
-0ºC – 60ºC
-0ºC – 50ºC
-0ºC – 60ºC

Storage and transport temperature
-0ºC – 60ºC
-0ºC – 60ºC
-0ºC – 60ºC
-0ºC – 60ºC

Operating altitude
10000 ft
30000 ft
30000 ft
30000 ft

Operating humidity
100%
100%
100%
100%

Performance

- Fully automated network, including MANPACK II modem, services, QoS, and QoS management. Full software radio terminal is able to switch between different waveforms to optimize the use of available resources.
- Whenever a change is made in the network, the terminal automatically switches to the new waveform, ensuring continuous service.
- 500 kHz – 5 MHz
Indra reserves the right to modify these specifications without prior notice.

**MANPACK II**

**DUAL-BAND ROBUST FIELD-READY SATELLITE COMMUNICATIONS**

Satellite communications, earth observation, navigation and positioning and control stations

**Characteristics**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
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<tbody>
<tr>
<td><strong>Antenna type</strong></td>
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<td>7.9-8.4 GHz</td>
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<td><strong>RX bandwidth</strong></td>
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<td><strong>Polarization</strong></td>
<td>Tx/Rx RHCP/LHCP</td>
</tr>
<tr>
<td><strong>TX power (SSPA)</strong></td>
<td>4 Watt</td>
</tr>
<tr>
<td><strong>EIRP</strong></td>
<td>36 dBW</td>
</tr>
<tr>
<td><strong>G/T</strong></td>
<td>7 dB/ºK</td>
</tr>
<tr>
<td><strong>Data rate</strong></td>
<td>Up to 2 Mbps</td>
</tr>
<tr>
<td><strong>Crypto equipment</strong></td>
<td>Serial interface included</td>
</tr>
<tr>
<td><strong>Max. prime power consumption</strong></td>
<td>85 Watt</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>• DC 10 V to 30 V</td>
</tr>
<tr>
<td></td>
<td>• Solar panel</td>
</tr>
<tr>
<td></td>
<td>• BA-5590 compatible</td>
</tr>
<tr>
<td><strong>Autonomy with batteries provided (1 kg)</strong></td>
<td>• 130 minutes (Tx)</td>
</tr>
<tr>
<td></td>
<td>• Unlimited with solar panel</td>
</tr>
<tr>
<td><strong>Total weight</strong></td>
<td>13 kg.</td>
</tr>
</tbody>
</table>

**Transport**

1 or 2 backpacks

**Space**

Indraspace.com
### MANPACK II

**DUAL-BAND ROBUST FIELD-READY SATELLITE COMMUNICATIONS**

Satellite communications, earth observation, navigation and positioning and control stations

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Specifications</th>
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<tbody>
<tr>
<td><strong>Antenna Type</strong></td>
<td>SHF-band (C/ Mar Egeo, 4)</td>
</tr>
<tr>
<td><strong>Satellite Rx</strong></td>
<td>Polígono industrial, 1</td>
</tr>
<tr>
<td><strong>Positioning</strong></td>
<td>28830 San Fernando de Henares</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>Madrid (Spain)</td>
</tr>
<tr>
<td><strong>Contact</strong></td>
<td>T +34 91 626 90 00</td>
</tr>
<tr>
<td><strong>Email</strong></td>
<td><a href="mailto:space@indra.es">space@indra.es</a></td>
</tr>
</tbody>
</table>

**Transport**

1 or 2 backpacks

**Autonomy with batteries provided (1 kg):**

- Unlimited with solar panel

**Total weight:**

13 kg.

**Power Supply:**

- DC 10 V to 30 V
- Solar panel
- BA-5590 compatible

**Max. prime power consumption:**

85 Watt

**Data Rate:**

Up to 2 Mbps

**Crypto Equipment:**

Serial interface included

**EIRP:**

36 dBW

**G/T:**

7 dB/ºK

**Tx power (SSPA):**

4 Watt

**Polarization:**

Tx/Rx  RHCP/LHCP

**Tx bandwidth:**

7.9-8.4 GHz

**Rx bandwidth:**

7.25-7.75 GHz

**Characteristics:**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>SHF-band</th>
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</tbody>
</table>

**Transport**

1 or 2 backpacks

**Autonomy with batteries provided (1 kg):**

- Unlimited with solar panel

**Total weight:**

13 kg.