



# COMPACT TERMINAL



## COMPACT TERMINAL for M2M Services

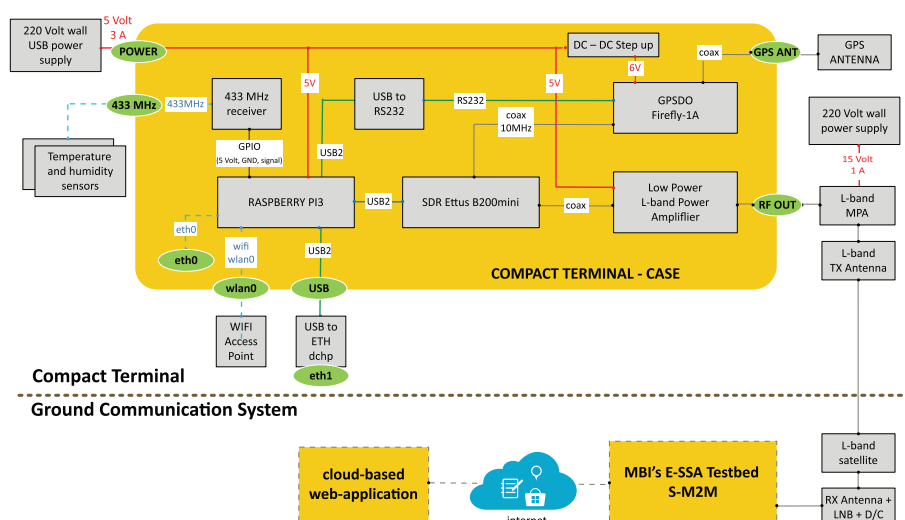
The terminal is a return-only M2M terminal compliant with E-SSA Air Interface. When coupled with the MBI E-SSA Testbed, high-level applications as well as several test functionalities are available to run end-to-end tests and demonstration in laboratory and in a real scenario using satellites.

### Key Features

- Transmission of IP datagrams received on its IP ports (eth0 and wlan0) as well as sensor readings over an L-band satellite communication channel (return link, RL) using the E-SSA Air Interface (physical and link layers).
- Delivery in just a few weeks due to its fully COTS- based architecture.
- Variety of customizations possible (i.e. integration with existing forward link or M2M adaptation to different bitrates or bandwidths).
- Energy management.



- **S-M2M LINK-LAYER:** it supports S-M2M Link-Layer:
  - RLE encapsulation and fragmentation
  - packet transmission randomization (in power and time)
  - packet re-transmission programmable by the user at application level
- **INTERNAL GPSDO with GPS ANTENNA**
- **WEB-GUI**
- **THE MBI E-SSA TESTBED** can be used to perform all the main function required a HUB (demodulation, decapsulation and IP routing). It also provides methods to compensate the Doppler drift introduced by satellite as well as phase noise.
- **THE CLOUD BASED WEB APPLICATION** is a smart application, which can be used to show the sensor readings collected.



## Protocol Specification

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Physical Layer Air Interface | E-SSA Air Interface for Satellite Machine-to-Machine (M2M) Modes 1, 2, 3, 4 and 5<br>Physical burst retransmission programmable via WEB-GUI                                                                                                                                                                                                                                                                                                                                |
| Link Layer Specifications    | IP datagrams encapsulated and fragmented using RLE. Packet transmission randomization in power (using uniformly distribution) and in time using persistence index and back off time parameters.                                                                                                                                                                                                                                                                            |
| Upper Layer Specifications   | <p>The Compact Terminal can transmit:</p> <ul style="list-style-type: none"> <li>• Sensor readings (temperature and humidity, position and speed)</li> <li>• IP datagrams received on the port wlan#0 and eth#0/eth#1</li> <li>• pings to 8.8.8.8 at the rate of 1 ping/second (internal pings)</li> <li>• transmit a continuous sequence of S-M2M bursts (in a near back-to-back configuration) with dummy payloads</li> <li>• transmit a continuous wave (CW)</li> </ul> |

## RF specifications [Interface #3]

|                                                                      |                                                                                                                                                                                              |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output Frequency Range                                               | The nominal frequency is 700-2,400 MHz                                                                                                                                                       |
| Frequency Stability Over Temperature (Unlock Condition) GPSDO specs. | <p><math>\pm 2.5E-08</math> , &lt;40 Hz at 1.5 GHz</p> <p>The use of the coaxial GPS antenna is optional. It has to be used only if a reduced implementation loss with WF#3 is required.</p> |
| Warm up time Stabilization Time GPSDO specs.                         | <5 mins at +25°C to 1E-08 Accuracy                                                                                                                                                           |
| Maximum Output Power Level @1 dB of compression                      | 7 dBm at 1660 MHz                                                                                                                                                                            |
| Max EIRP (dBW)                                                       | -18.0 (HGA, RHCP), 21.9 (LGA, LHCP), 23.5 (LGA, LHCP)                                                                                                                                        |
| Max EIRP (dBW) + external MPA                                        | 5.0 (HGA, RHCP), 1.1 (LGA, LHCP), 0.5 (LGA, LHCP)                                                                                                                                            |
| Max EIRP (dBW) + external HPA                                        | 12.0 (HGA, RHCP), 8.1 (LGA, LHCP), 6.5 (LGA, LHCP)                                                                                                                                           |

## Physical and Powering specifications

|           |                                                                                                                              |
|-----------|------------------------------------------------------------------------------------------------------------------------------|
| Dimension | Length: 154.94 mm, Width: 154.94 mm and Height: 51.82 mm                                                                     |
| Weight    | Less than 500 g                                                                                                              |
| Powering  | <p>5 Volt - 3.0 A (<math>\leq 1.6</math> typ); microUSB</p> <p>MPA and HPA are powered using dedicated wall power supply</p> |

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