



802.16e Mini-card Module

Manual v1.00

Product Model Name: WMX-MC01

Version: 0.1
2008/09/12

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1.0 Scope

1.1 Document

This document is to specify the product requirements for **802.16e Mini-Card Module**. This Card is based on

Seqans

1130/1140 chipset that complied with IEEE 802.16e standard at 2.5GHz band.

1.2 Product Features

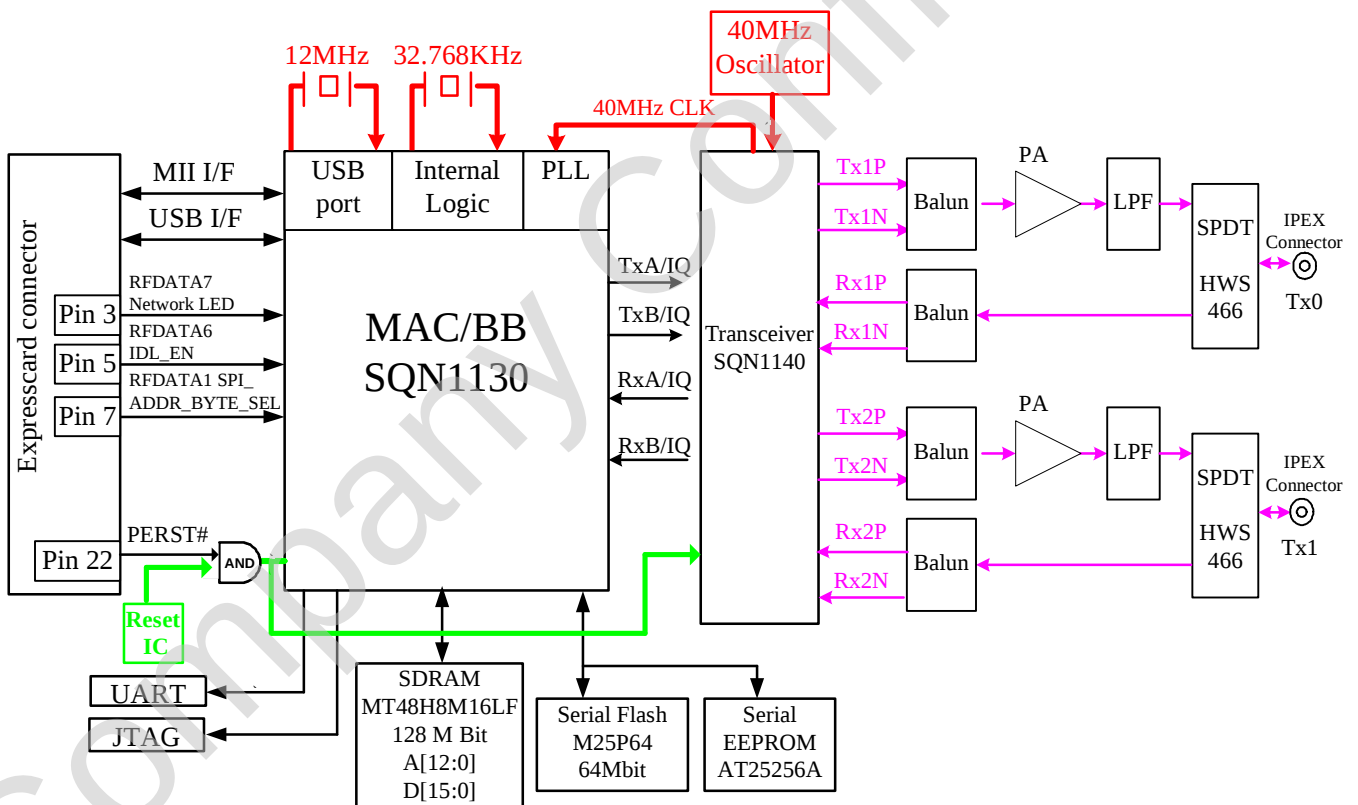
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2.0 Requirements

The following sections identify the detailed requirements of the **802.16e Mini-Card Module**.

2.1 Functional Block Diagram



2.2 General Requirements

2.2.1 IEEE 802.16e Section

#	Feature	Detailed Description
2.2.1.1	Standard	Y IEEE 802.16e
2.2.1.2	Radio and Modulation Schemes	Y QPSK, 16QAM, 64QAM, OFDMA
2.2.1.3	Operating Frequency	Y 2.496GHz to 2.69GHz for licensed band
2.2.1.4	Channel Numbers	Y Depends on the limitation of country regulatory
2.2.1.5	Duplexing Modes	Y TDD
2.2.1.6	Channel Bandwidth	Y For profile 3A, support 5MHz and 10MHz bandwidth
2.2.1.7	Transmitter Output Power at each Antenna Connector	Typical RF Output Power (Tolerance +-2dB) at each modulation type and at room Temp. 25degree C and 4.2V Y 23 dBm at 16QAM
2.2.1.8	Receiver Sensitivity at each Antenna Connector	Y Typical Sensitivity for 5MHz Bandwidth (AWGN) at which Bit Error Rate = 10-6 and at room Temp. Y PUSC CTC-QPSK -1/2 -91.5 Y PUSC CTC-QPSK -3/4 -88.1 Y PUSC CTC-16QAM-1/2 -85.8 Y PUSC CTC-16QAM-3/4 -81.7 Y PUSC CTC-64QAM-1/2 -80.6 Y PUSC CTC-64QAM-2/3 -77.5 Y PUSC CTC-64QAM-3/4 -76.4 Y PUSC CTC-64QAM-5/6 -74.5 Y FUSC CTC-QPSK -1/2 -91.4 Y FUSC CTC-QPSK -3/4 -88.0 Y FUSC CTC-16QAM-1/2 -85.7 Y FUSC CTC-16QAM-3/4 -81.6 Y FUSC CTC-64QAM-1/2 -80.5 Y FUSC CTC-64QAM-2/3 -77.4 Y FUSC CTC-64QAM-3/4 -76.3 Y FUSC CTC-64QAM-5/6 -74.4 Y Typical Sensitivity for 10MHz Bandwidth (AWGN) at which Bit Error Rate = 10-6 and at room Temp. Y PUSC CTC-QPSK -1/2 -88.5 Y PUSC CTC-QPSK -3/4 -85.1 Y PUSC CTC-16QAM-1/2 -82.8 Y PUSC CTC-16QAM-3/4 -78.7 Y PUSC CTC-64QAM-1/2 -77.6 Y PUSC CTC-64QAM-2/3 -74.5 Y PUSC CTC-64QAM-3/4 -73.4 Y PUSC CTC-64QAM-5/6 -71.5 Y FUSC CTC-QPSK -1/2 -88.4 Y FUSC CTC-QPSK -3/4 -85.0 Y FUSC CTC-16QAM-1/2 -82.7 Y FUSC CTC-16QAM-3/4 -78.6 Y FUSC CTC-64QAM-1/2 -77.5 Y FUSC CTC-64QAM-2/3 -74.4 Y FUSC CTC-64QAM-3/4 -73.3 Y FUSC CTC-64QAM-5/6 -71.4

2.2.2 General Section

#	Feature	Detailed Description
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2.2.2.1	Interface	Y	Min-Card with USB2.0 I/F and MII I/F (MII mac mode only)
2.2.2.2	Antenna Type	Y	U.F.L & SMA Plug Reverse compatible connector
2.2.2.3	Wireless transmission PHY	Y	Support 2X2 MIMO
2.2.2.4	Operating Voltage	Y	3.3 VDC +/- 5%
2.2.2.5	Current Consumption	Y	< TBD
2.2.2.6	Form Factor	Y	Non-standard size (66 X 30 mm)

2.3 Compatibility Requirements

This device passes the following compatibility requirements.

#	Feature	Detailed Description
2.3.1	WiMax	Y Conformable with WiMAX Forum Wave II certification
2.3.2	Physical Layer and Functionality	Y Meet Alpha Networks Engineering Test Plan and Test Report

2.4 Regulatory Requirements

#	Feature	Detailed Description
2.4.1		Y TBD

2.5 Requirements of Reliability, Maintainability and Quality

#	Feature	Detailed Description
2.5.1	MTBF	Y Mean Time Between Failure > 30,000 hours
2.5.2	Maintainability	Y There is no scheduled preventive maintenance required
2.5.3	Quality	Y The product quality is followed-up by Alpha Networks factory quality control system

2.6 Environmental Requirements

#	Feature	Detailed Description
2.6.1	Operating Temperature Conditions	Y The product is capable of continuous reliable operation when operating in ambient temperature of 0 °C to 45 °C .
2.6.2	Non-Operating Temperature Conditions	Y Neither subassemblies is damaged nor the operational performance is degraded when restored to the operating temperature after exposing to storage temperature in the range of -20 °C to +75 °C .
2.6.3	Operating Humidity conditions	Y The product is capable of continuous reliable operation when subjected to relative humidity in the range of 10% and 90% non-condensing.
2.6.4	Non-Operating Humidity Conditions	Y The product is not damaged nor the performance is degraded after exposure to relative humidity ranging from 5% to 95% non-condensing

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 30cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Due to the essential high output power natural of WiMAX device, use of this device with other transmitter at the same time may exceed the FCC RF exposure limit and such usage must be prohibited (unless such co-transmission has been approved by FCC in the future).

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 30 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna,
- 3) For all products market in US, OEM has to limit the operation frequencies in 2496MHz – 2690MHz by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.
- 4) This module may be used only for a WiMAX user station as regulated in US CFR part 27.50 (h)(2).

As long as 4 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered

valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 30cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: RRK2520090401-1".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.