DASH NO.	APPLICATION		REVISIONS			
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AWID PROPRIETARY INFORMATION

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	ISSUED	DATE				
	PREP BY:					
	CHK BY:		**Design Specification for MPR-1710 Reader Module**			
	REVIEW:					
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			SIZE A	**FSCM NO.**	**DWG NO.** 1710RM-041358	**REV** 2.11c3
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Revision Records:
Enter all revision records by stating “Paragraph Numbers," revision “From” and “To”, “Revision Level” and “Time of Revision.”

1.0 Scope

This specification describes the electrical, mechanical and environmental requirements for multiple protocol RFID reader modules for data collection, data programming and other embedded RFID enable systems or sub-systems.

2.0 Applicable Documents

The following documents of the exact issue shown, form a part of this specification to the extent specified herein. In the event of conflict between this document and the documents referenced herein, the contents of this document shall prevail.

Specifications

Handbooks

Mil-HDBK-217E	Reliability Prediction for Electronic Equipment

Standards

ISO-18000-6B/C	ISO/IEC FCD 18000-6 (ISO/IEC JTC 1/SC 31/WG 4/SG 3)
EPC C1G2	EPC RFID Protocols Class-1 Generation-2 UHF RFID, V1.0.1

3.0 Requirements

This RFID module shall transmit a CW or command signals to activate RFID tags in its zone of surveillance and this RFID module shall also decode the backscattered signal from RFID tags.

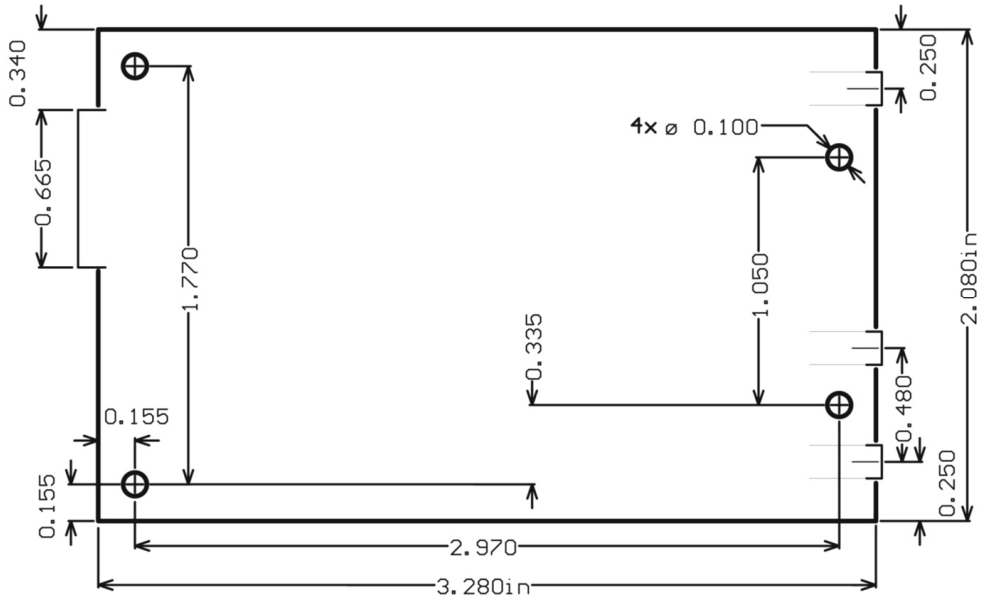

Figure 1, Mechanical Dimensions

3.1 Common Requirements

3.1.1 Form factor

The outline dimensions of the RFID module are shown in Figure 1. The RFID module shall be 3.25”L x 2”W x 0.25”H.

3.1.2 Weight

This RFID module shall weigh less than 1.8 oz. (50 gram)

3.1.3 Power Supply and Consumption

This RFID module shall operate between the following voltages:

5.5 VDC ± 5% @ 1.5 amps

Maximum Ripple: 200 mV P-P, Ripple frequency: Above 500 kHz
Maximum Ripple: 5 mV P-P, Ripple frequency: Below 500 kHz

Overall power consumption shall not exceed 7.5 watts under any combination of environmental and input/output signal conditions.

3.1.4 Multi-protocol operations

This reader is designed to read/write EPC C1 Gen 2 (64 bit, 96 bit and 256 bit), EPC 1.19 and ISO-18000-6 Type B & Type C tags.

3.2 Environmental Characteristics

3.2.1 General

This RFID module is intended for use in a fixed and/or mobile environment.

3.2.2 Cooling

This RFID module shall be designed to conduct its heat into its chassis mounting walls. The temperature of the chassis wall may be assumed to be constant and less than 20 ºc above the ambient.

3.2.3 Temperature Change

The receiver must be capable of functioning during a temperature change

-30 °C to +65 °C

3.2.4 Humidity

The RFID module shall withstand the following humidity extremes:

Minimum --	0% RH
Maximum --	95% RH

3.2.5 **Random Vibration --** TBD

3.2.6 **Shock --** TBD

3.3 Electromagnetic Compatibility

This reader module shall be designed to operate within the environment of barcode printers, handheld data collection terminals, portable printers and other embedded applications.

3.4 Warm up time

Less than 150 millisecond for power level stability

3.5 Reliability Requirement

3.5.1	**Component Selection --**	MIL-HDBK-338B
3.5.2	**De-Rating --**	AWID's component de-rating guide. DWG # 041234
3.5.3	**MTBF**	27,154 hour MIL-HDBK-217F Ground, Sheltered Benign

4.0 RFID Module Electrical Requirement

4.1 Output Signal Characteristic

4.1.1	**Output Frequency --**	902 to 928 MHz frequency
4.1.2	**Frequency Accuracy --**	Standard: ± 10 ppm,
4.1.3	**Channel Spacing --**	Region dependent
4.1.4	**Regional Code --**	North America – 902 to 928 MHz Taiwan – 922 to 928 MHz Singapore – 920 to 925 MHz Thailand – 920 to 925 MHz Hong Kong – 920 to 925 MHz Korea – 910 to 914 MHz China – 920 to 925 MHz Malaysia – 919 to 923 MHz Philippines – 918 to 920 MHz Australia – 920 to 926 MHz South Africa – 917 to 921 MHz Brazil – 915 to 928 MHz
4.1.5	**Modulation --**	ASK
4.1.6	**Output Power** --	+24 dBm Max
4.1.7	**Output Power Range** –	0~24 dBm, 0.5 dBm Step
4.1.8	**Power Control Format** –	Digital, user programmable
4.1.9	**Output Impedance** –	50 Ohms
4.1.10	**Output Flatness** --	+/- 0.5 dB
4.1.11	**Harmonic Content** –	2nd harmonic: -65 dBc 3rd harmonic: -75 dBc
4.1.12	**Antenna VSWR –**	Peak performance: 1.2:1 maximum

Antenna return loss controls the signal reflected to the receiver port. For VSWR higher than 1.2, system performance will start to degrade.

4.2 Input Signal Requirement

4.2.1	**Input Frequency** –	902 to 928 MHz
4.2.2	**Channel Spacing --**	Region dependent
4.2.3	**Frequency Stability** --	Standard -- +/- 10 ppm
4.2.4	**Min. Detectable Signal** --	-85 dBm
4.2.5	**Input VSWR –**	1.5:1 Maximum
4.2.6	**Modulation** –	ASK/PR-ASK
4.2.7	**Input Impedance** –	50 Ohms
4.2.8	**Input Connector** --	MMCX female

4.3 Interface with External Systems

4.3.1 Connector and PIN Assignment

Pin #	Function description
1	USB
2	USB D-
3	USB D+
4	+5.5 V
5	+5.5 V
6	GND
7	+3V Aux Data
8	+3V TTL Rx
9	+3V TTL Tx
10	GND

4.3.2	**Serial Interface –**	+3V TTL Level
4.3.3	**Input Interface –**	+3V TTL Level
4.3.4	**Output Interface –**	+3V TTL Level

5.0 Self-Test

Memory check sum and temperature monitoring capability

6.0 Marking

Reader module shall be marked with part name/number, hardware revision level and serial number. Part name/number for this RFID module is MPR-1710.