INTEGRATION GUIDE FOR TRANSITIONING FROM LT2510 TO RM024

INTRODUCTION

The RM024 is the first new module in Laird's rebranded RAMP (Range Amplified MultiPoint) line of modules. Laird's RAMP modules excel at providing a wireless serial link over long ranges and with support for multipoint networks. RAMP modules utilize a Frequency Hopping Spread Spectrum (FHSS) protocol for greater interference and multipath immunity. With two transceivers, the RAMP line can provide a wireless serial cable replacement capable of extending communications well beyond the 50 foot maximum for wired connections. RAMP modules also support multipoint – Star network topologies – and users can employ a nearly unlimited number of clients for applications such as sensors, controls, and text display boards.

The RM024 is based on the same core technology as the LT2510 and is designed to be a drop in replacement. Differences between the modules may affect customer designs though; this document will identify those differences. The RM024 and the LT2510 are over the air compatible and can both be used in the same network.

PART NUMBERS

LT2510 Part Number	RM024 Part Number	Form Factor	Maximum Tx Power	Antenna	EEPROM Product ID
PRM110	RM024-S125-C-01	SMT	125 mW	u.FL Jack	RM024125C01
PRM111	RM024-S125-M-01	SMT	125 mW	Chip Antenna	RM024125M01
PRM120	RM024-P125-C-01	Pluggable	125 mW	u.FL Jack	RM024125C01
PRM121	RM024-P125-M-01	Pluggable	125 mW	Chip Antenna	RM024125M01
PRM112	RM024-S50-C-01	SMT	50 mW (CE)	u.FL Jack	RM02450C01
PRM113	RM024-S50-M-01	SMT	50 mW (CE)	Chip Antenna	RM02450M01
PRM122	RM024-P50-C-01	Pluggable	50 mW (CE)	u.FL Jack	RM02450C01
PRM123	RM024-P50-M-01	Pluggable	50 mW (CE)	Chip Ant	RM02450M01

SPECIFICATIONS

Detailed Specifications

General	LT2510	RM024
Form Factor	SMD-ANT, SMD-U.FL, Pluggable-ANT, Pluggable-U.FL	SMD-U.FL, Pluggable-U.FL, SMD-ANT+U.FL, Pluggable-ANT+U.FL
Antenna	Integrated chip antenna or external antenna through U.FL connector	external antenna through U.FL connector or both U.FL and Integrated Chip Antenna
Transceiver		
Output Power Conducted[2]	FCC: +11 to +21dBm selectable CE: +8 to +17dBm selectable	FCC: +5 to +21dBm selectable CE: +3.5 to +17dBm selectable
Supply Voltage	3.3V – 3.6V ± 50mV ripple	2.3 – 3.6V ± 50mV ripple
Current Draw	100% Tx: 190 mA, 85 mA 1/8 Tx (when selected): 40mA, 40 mA 100% Rx: 40 mA, 40 mA Rx average (idle current): 10 mA, 10 mA Deep sleep: 50 µA, 50 µA	100% Tx: 166 mA, 85 mA 1/8 Tx (when selected): 40mA, 40 mA 100% Rx: 36 mA, 36 mA Rx average (idle current): 9.5 mA, 11.6 mA Deep sleep[3]: 50 µA, 50 µA
Receiver Sensitivity (1% PER)	-95 dBm at 280 kbps RF Data Rate[4] -94 dBm at 500 kbps RF Data Rate	-95 dBm at 280 kbps RF Data Rate -94 dBm at 500 kbps RF Data Rate
Range (based on external 2.5dBi antenna at 280kbps RF Data Rate)[5]	FCC: 2.5 miles (4 km), 1300 ft (400 m) CE: 1.5 miles (2.4 km), 790 ft (240 m)	FCC: 2.5 miles (4 km), 1300 ft (400 m) CE: 1.5 miles (2.4 km), 790 ft (240 m)
Physical[6]		
SMD-ANT and SMD-Both Dimensions	1.0" x 1.54" x 0.14" (25.4 mm x 39 mm x 3.6 mm)	1.0" x 1.54" x 0.14" (25.4 mm x 39 mm x 3.6 mm)
SMD-U.FL Dimensions	1.0" x 1.28" x 0.14" (25.4 mm x 32.4 mm x 3.6 mm)	1.0" x 1.28" x 0.14" (25.4 mm x 32.4 mm x 3.6 mm)
Pluggable-ANT and Pluggable-Both Dimensions	0.96" x 1.42" x 0.406" (24.3 mm x 36 mm x 10.3 mm)	1.05" x 1.56" x 0.44" (26.7 mm x 39.6 mm x 11.3 mm)

General	LT2510	RM024
Pluggable-U.FL Dimensions	0.96" x 1.185" x 0.406" (24.3 mm x 30.1 mm x 10.3 mm)	1.05" x 1.29" x 0.42" (26.7 mm x 33 mm x 10.6 mm)
Certificate		
FCC Part 15.247	KQL-2510100P KQL-2510100P	TBD
Industry Canada (IC)	2268C-2510100P 2268C-2510100P	TBD
CE	N/A EN 300 328-2 V1.71,EN 301 489	TBD
RoHS	Yes	Yes
Japan	PRM122: 005WWCA0358 PRM123: 005WWCA0359	TBD
Brazil (Anatel)[1]	3000-10-6625 No	None

1. Contact your sales representative for more details.
2. Maximum Output power stated, step measurements for power could vary by +/- 1.5 dBm. Step downs on RM024 are larger than on LT2510, resulting in lower Maximum Power for each step.
3. Sleep current is estimated.
4. Estimated. Measurements were taken at 4.1 miles with 5 dBi antenna.
5. RX Sensitivity is listed at -98 dBm in the LT2510 User Manual, restated here based on new measurements.
6. Physical Dimensions are estimated, actual measurements are printed in Mechanical Drawings section of this document.

PIN FUNCTION CHANGES

No pins change function.

EEPROM Address Changes

The following EEPROM addresses are different on the RM024.

EEPROM Address	Notes	LT2510 Name	RM024 Name	LT2510 Description	RM024 Description
0x00 – 0x23	Product ID is changing to reflect new RM024 part number	Product ID	Product ID	Product identifier string; includes revision information for software and hardware.	Product identifier string; includes revision information for software and hardware.
0x90 – 0x9F	Part Numbers is changing to reflect new RM024 part number	Part Numbers	Part Numbers	Factory set part number for the unit	Factory set part number for the unit
0xC1, Bit 5	This bit has been repurposed. In LT2510, this bit enabled sleep timer calibration. In RAMP modules, the sleep timer is constantly undergoing calibration, so this bit is no longer required. The Antenna Select EEPROM bit is loaded at boot on the RM024.	Sleep Calibration Enabled	Antenna Select	bit-5: Sleep Calibration Enable 0 = Disable 1 = Enable	Selects which antenna port is to be used 0 == Antenna Port 2 (Black Chip) 1 == Antenna Port 1 (u.FL)

AT Commands

The following is a new AT Command for Antenna Select on the RM024:

Antenna Switch Command: Command sets the antenna port for the transceiver to use.

Command: <0xCC><0x26><Port Select>
Response: <0xCC><0x26><Port Select>
Port Select: Antenna Port 2 == 0x00 (Integrated Antenna)
Antenna Port 1 == 0x01 (U.FL Port)

REGULATORY INFORMATION

FCC

Due to changes to the key components of the radio frequency (RF) Path, the RM024 will carry a different regulatory approval number, model number, and have new test reports. Customers are recommended to have a qualified test lab perform FCC Part 15 Subpart B unintentional radiator testing on their device to make sure that it continues to be in compliance with the emission limits for either a Class A or B digital device. In addition, customers will need to update their label information on their product with the new FCC and IC identification numbers and will need to update their user manuals and other documentation to reflect the new regulatory information.

CE

A new Declaration of Conformity will be issued for the RM024. Customers will need to update their Declaration of Conformity to reflect new reports that we issue.

MECHANICAL DRAWINGS

The form factor of the surface mount integrated antenna versions of the RM024 and LT2510 are the same. Customers using the U.FL version of the SMT module can either purchase the new integrated antenna version and use the new on board U.FL or purchase a U.FL only version directly from Laird.

The form factor of the RM024 pluggable module will be slightly larger than the LT2510, see the drawings below for details.

Note on Mechanical Drawings:

- All dimensions are in millimetres
- PC Board Material is 0.79mm thick FR4
- Provide clearance of at least 1.5mm around the module to be free of other components and features
- Module should not exceed 260 degrees C during reflow soldering

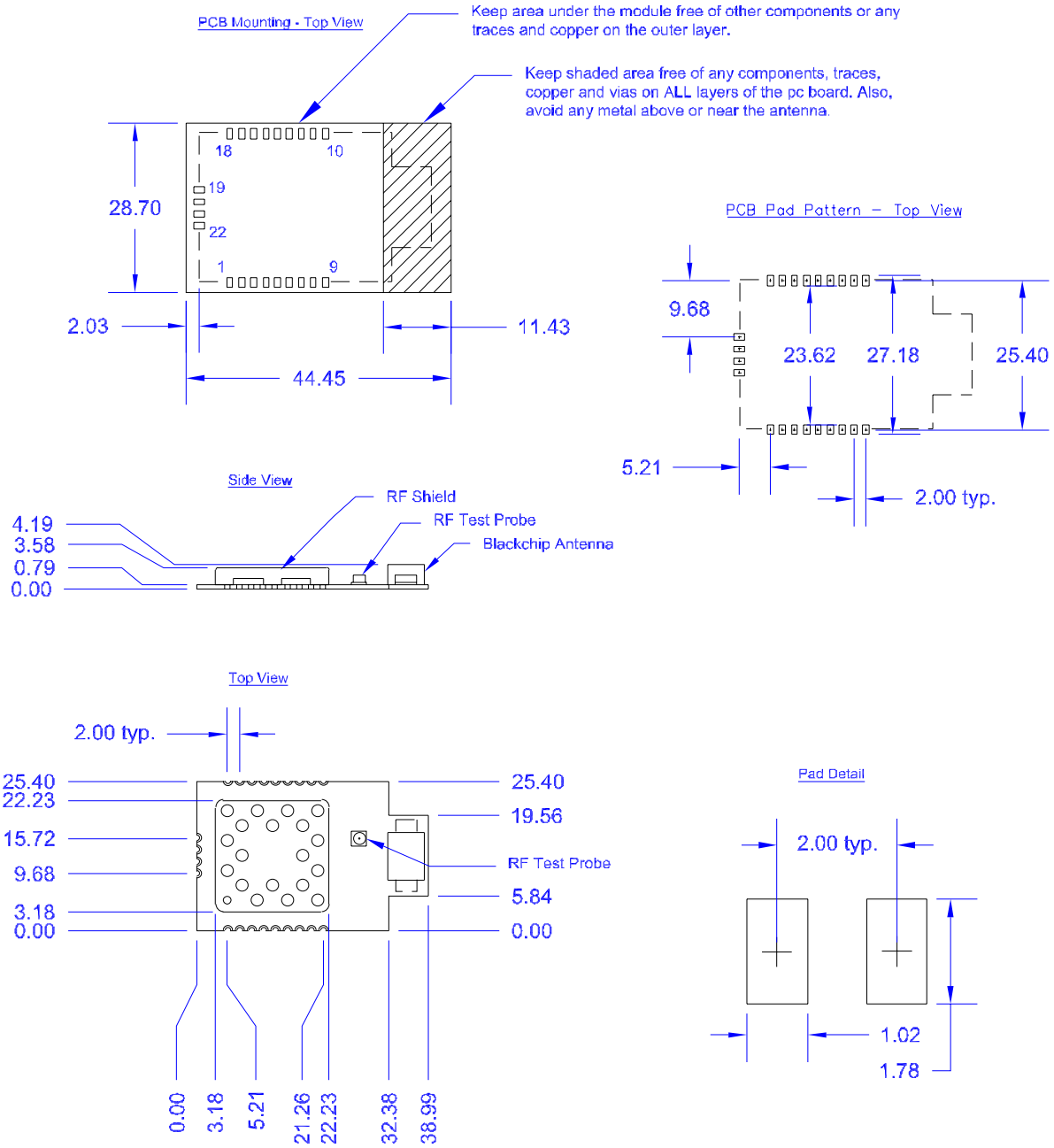

Figure 1: SMT LT2510 with Integrated Antenna (PRM111, PRM113)

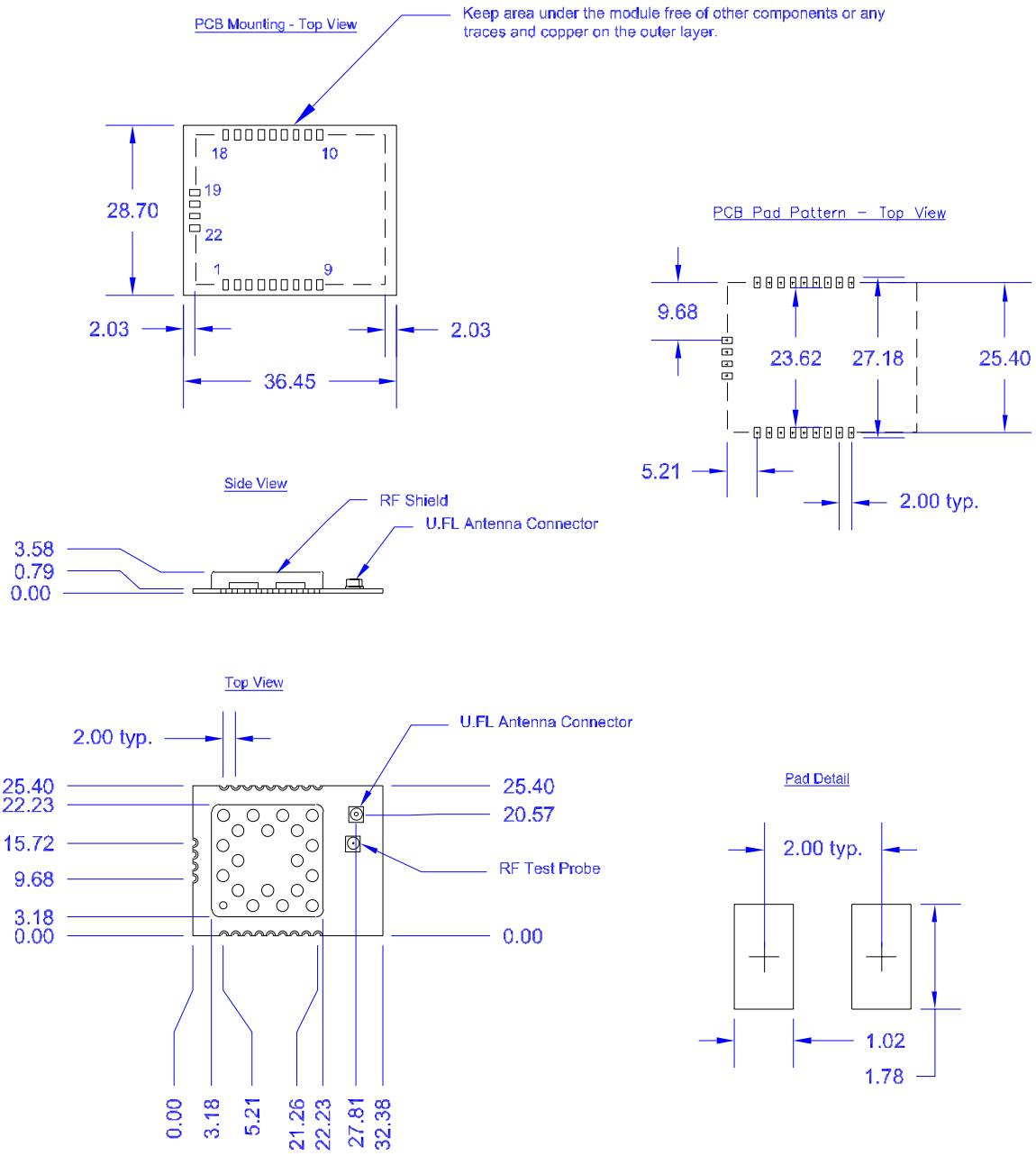

Figure 2: SMT LT2510 with U.FL (PRM110, PRM112)

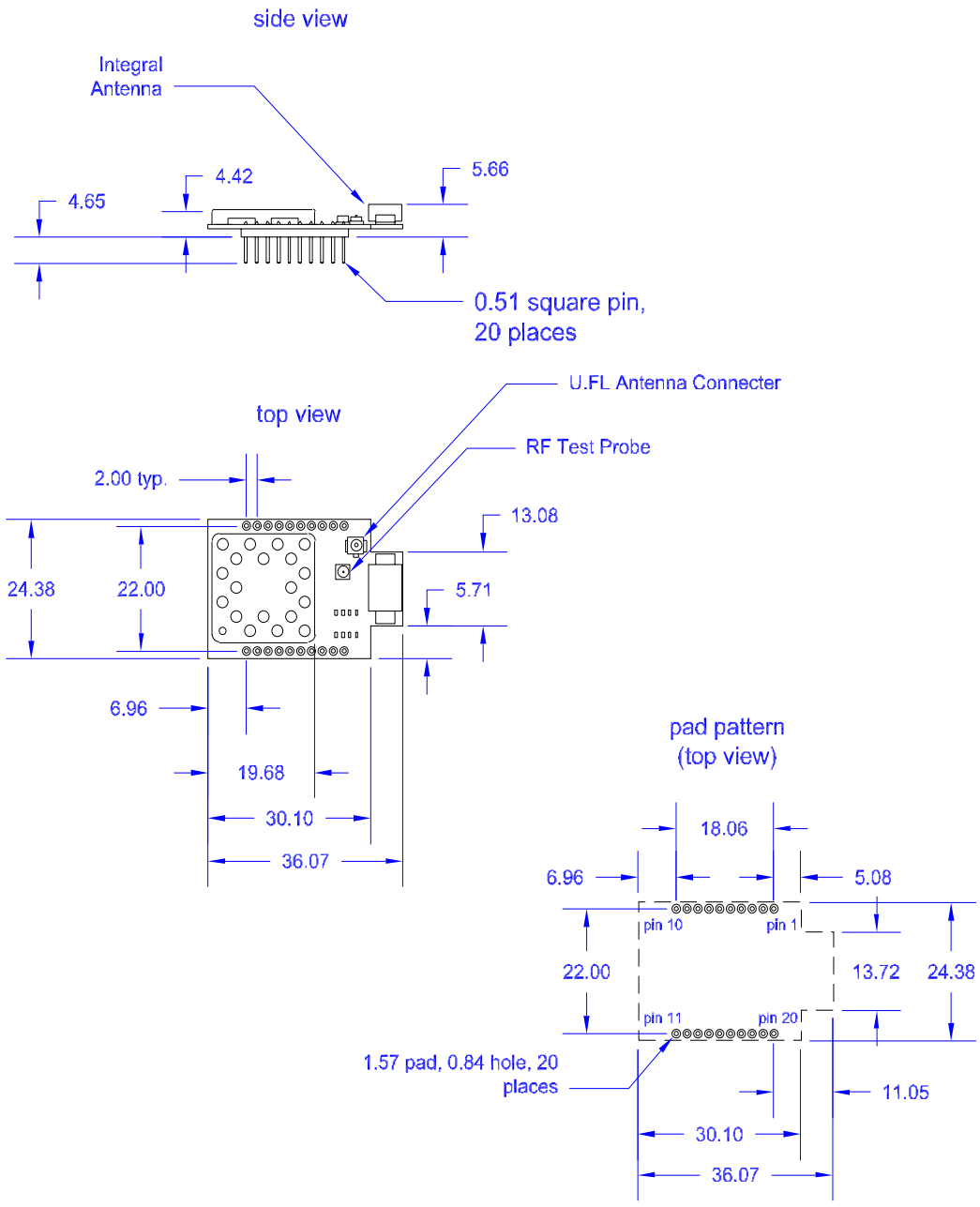

Figure 3: Pluggable LT2510 with Antenna (PRM121, PRM123)

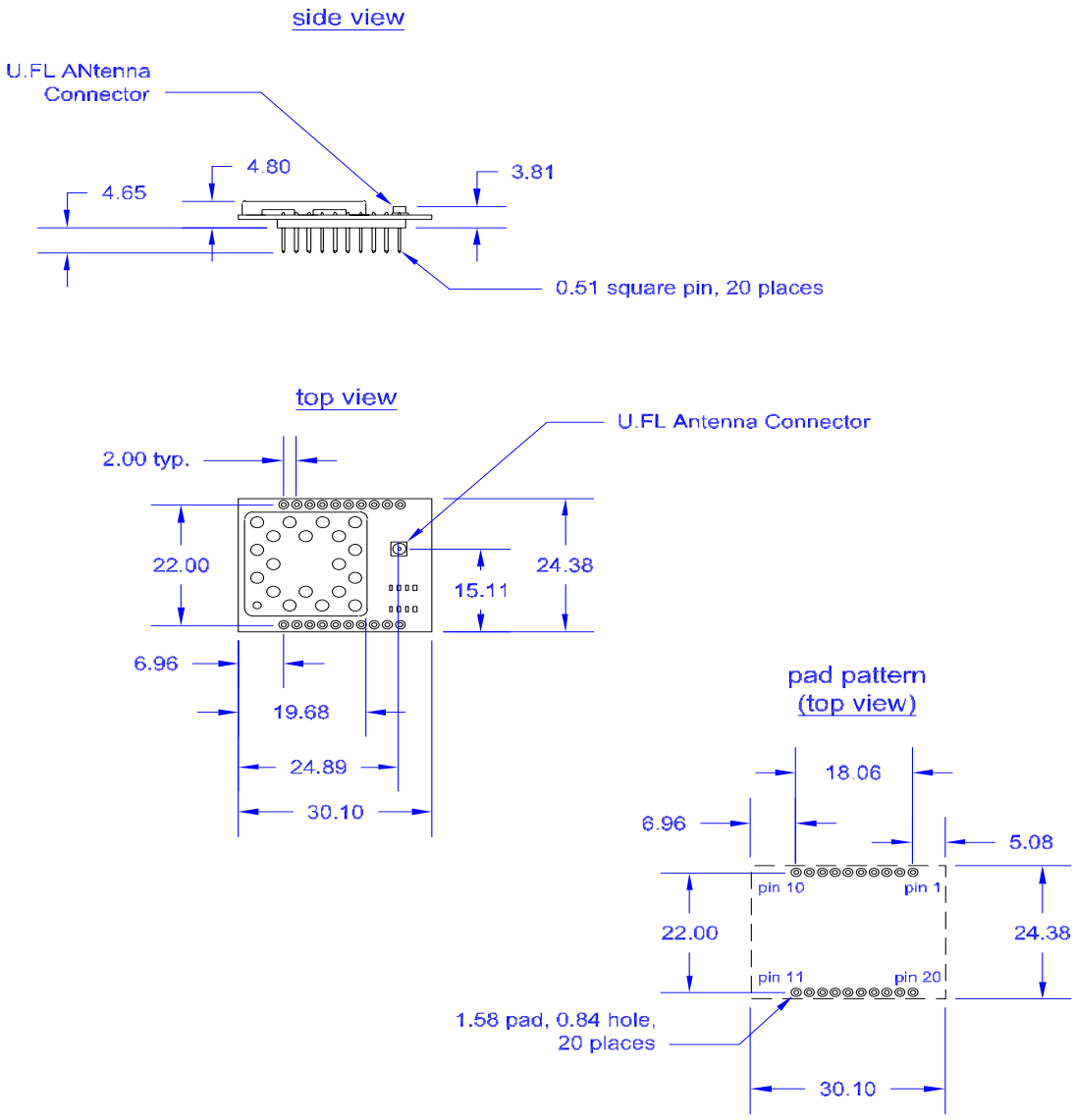

Figure 4: Pluggable LT2510 with U.FL (PRM120, PRM122)

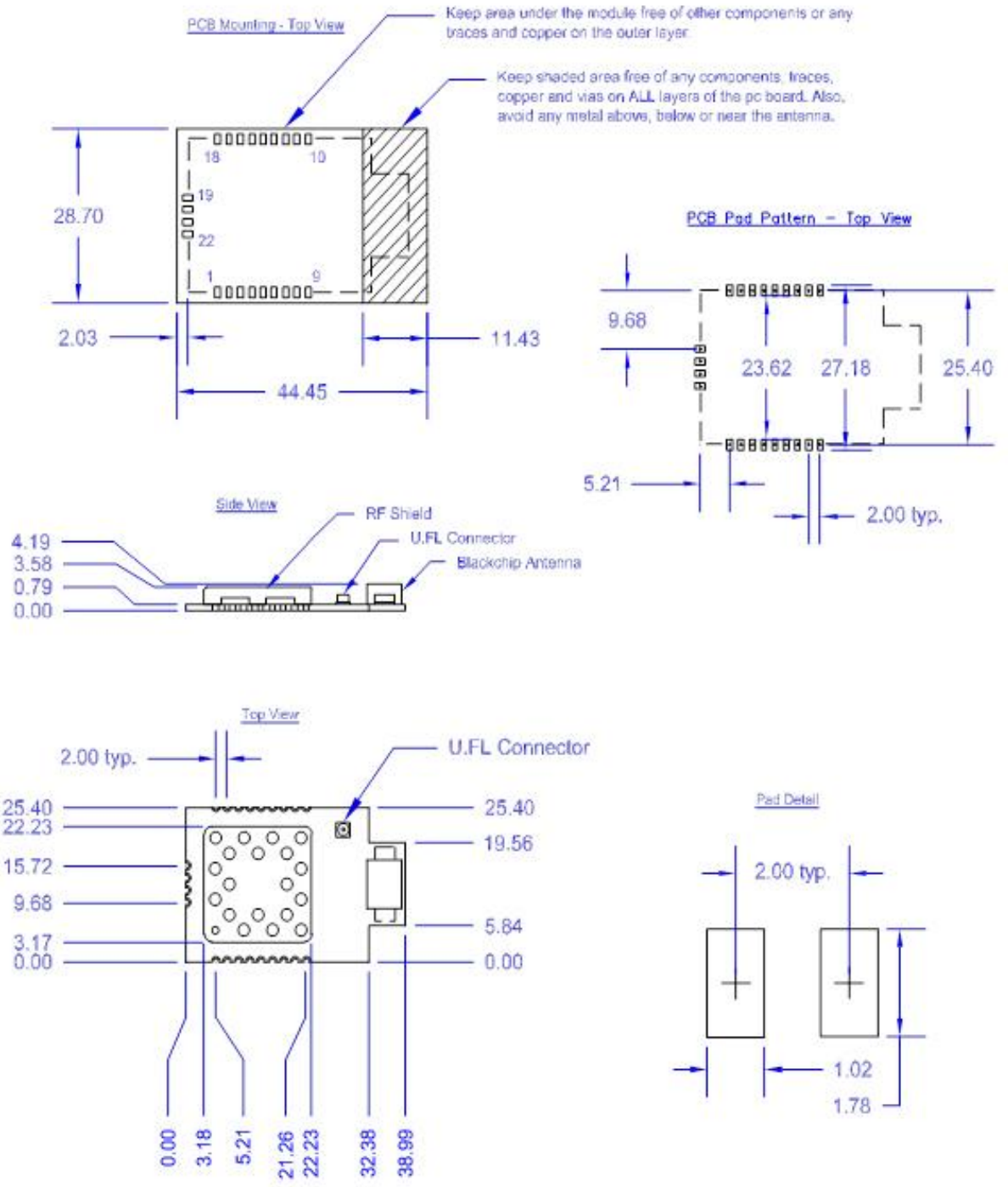

Figure 5: SMT RM024 (RM024-SXXX-M-01)

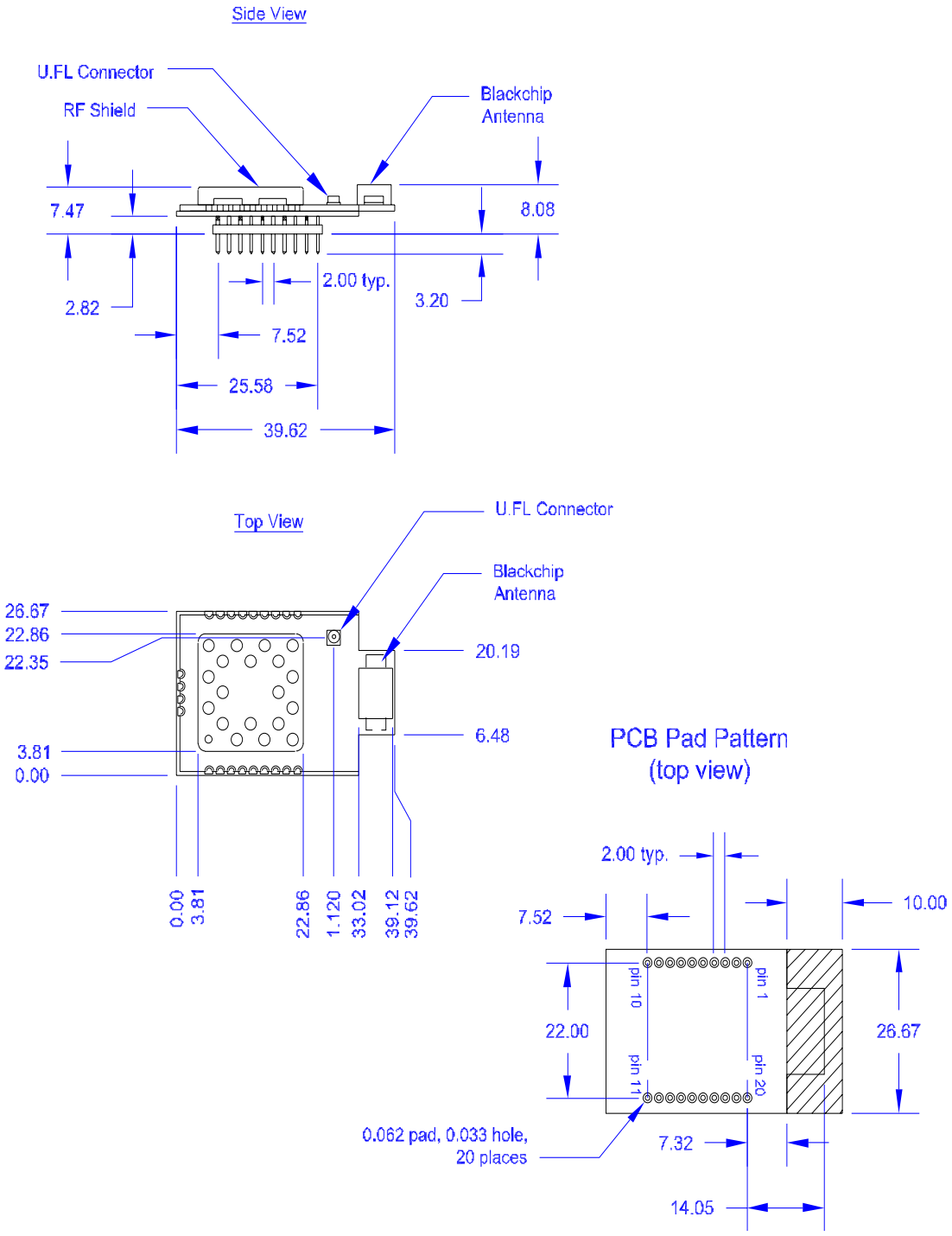

Figure 6: Pluggable RM024 (RM024-PXXX-M-01)

PHYSICAL APPEARANCE

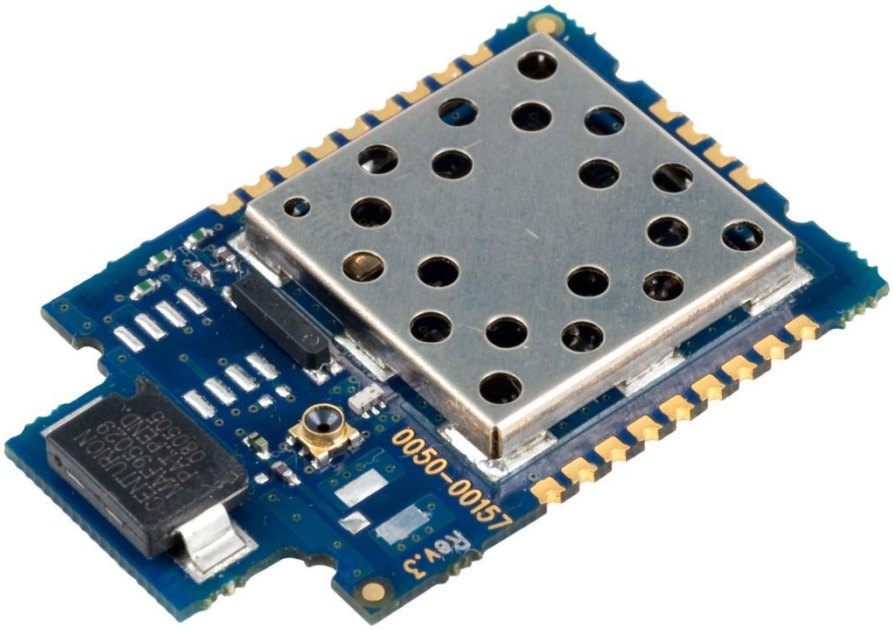

Figure 7: Surface Mount LT2510

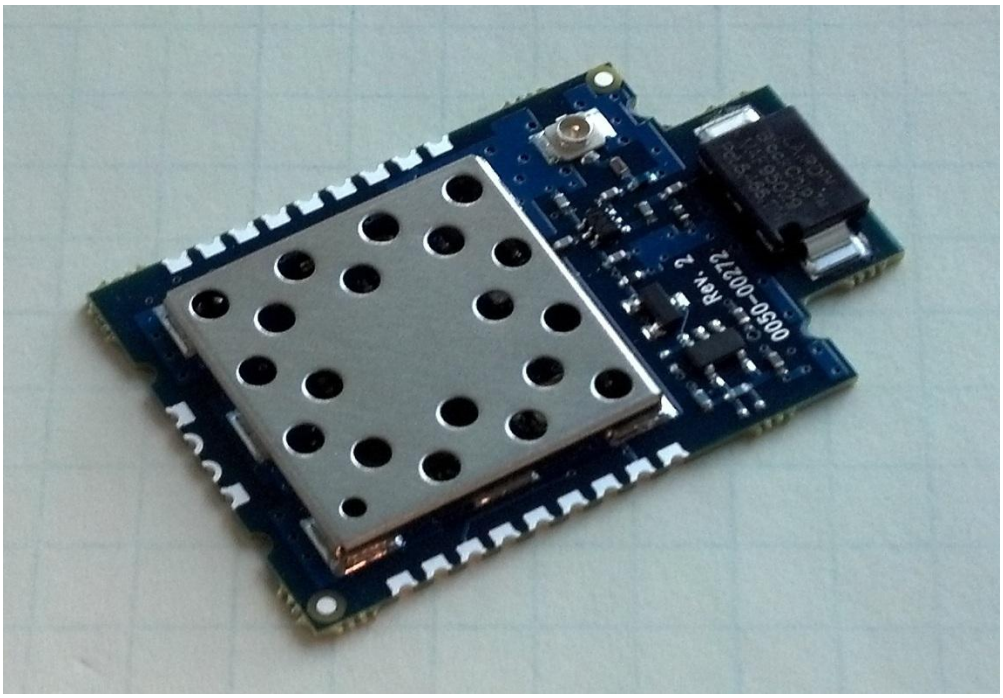

Figure 8: Surface Mount RM024