SkydioLink 5GHz Radio User Manual

version 1.0 (2021/03/16)

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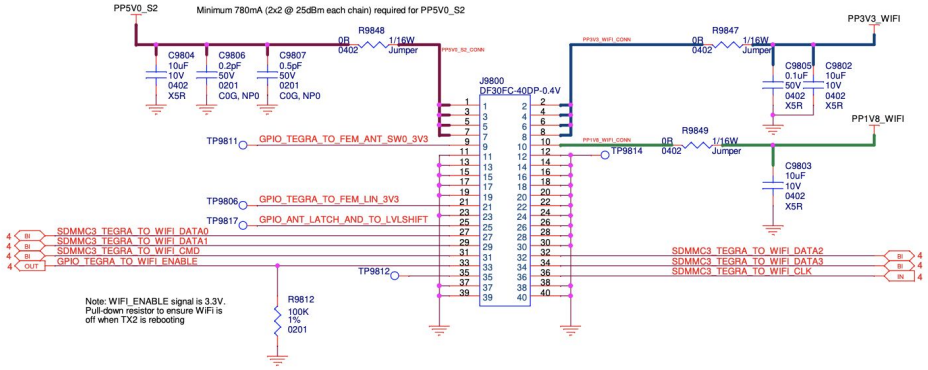
Overview

This document provides integration, installation and usage instructions for the SkydioLink 5GHz Radio (FCC 2ATQRSMO5GV1 / IC 25280-SMO5GV1).

Module Integration

Pinout & power requirements

All module power and control signals are passed from the end device to the module over J9800, following the below pinout:



Detail on pin-out requirements:

Pin Number	Required Signal	Purpose
1, 3, 5, 7	5V (780 mA minimum)	5V Supply for RF front end modules
2, 4, 6, 8	3.3V	3.3V Supply for Switcher & QCA617A
9		Unused GPIO
10		1.8V Supply for QCA6174A
21		Unused GPIO
25		Unused GPIO
27		SDIO Data (0) from Host to WiFi
29		SDIO Data (1)) from Host to WiFi
31		SDIO Command from Host to WiFi
32		SDIO Data (2) from Host to WiFi
33		WiFi enable signal from Host
34		SDIO Data (3) from Host to WiFi
35	-	test point
36		SDIO Clock from Host to WiFi
11 - 20, 23, 23, 26, 28, 30, 37 - 40	-	Ground

Boot Sequence

When first turning on the radio, the below power on sequence must be used to ensure that the radio will operate correctly:

Symbol	Parameter	Min	Max	Units
t_{a1}	No requirment if VDD_IO_3V3 connect to PP3V3_WIFI	-	-	us
t_{a2}	90% of 'PP3V3_WIFI' to 10% of 'PP1V8_WIFI'	1	-	us
t_{a3}	90% of 'PP1V8_WIFI' to WLAN_EN input active (high)	10	-	us
t_{a4}	WLAN_EN valid to '32KHz Clock' input	0	-	us
t_{a5}	Chip internal timing - WLAN_EN valid to VDD11AO_PM_OUT established	-	50	us
t_{a6}	Chip internal timing - WLAN_EN to DVDD_1V1	-	3.5	ms
t_{a7}	Chip internal timing - WLAN_EN to AVDD_1V1	-	4	ms
t_{a8}	Chip internal timing - AVDD_1V1 to XTAL clock stable	1	-	ms
t_{a9}	WLAN_EN de-assert ('LOW') to 32KHz_CLK_IN de-assert (Tri-state or Low)	0	-	us
t_{a10}	WLAN_EN de-assert to 'PP1V8_WIFI'	10	-	us
t_{a11}	10% of 'PP1V8_WIFI' to PP3V3_WIFI that PP3V3_WIFI should be higher than 1.62v	0	-	us
t_{a12}	No requirment if VDD_IO_3V3 connect to PP3V3_WIFI	-	-	us

Module Mechanical Integration

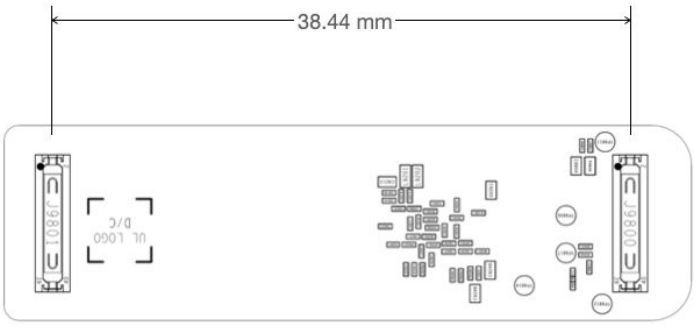
The SkydioLink 5GHz Radio snaps into place using the two board to board connectors (Hirose DF30FC-40DP-0.4V) on the lower side of the module. All power and signal lines are passed via J9800, and J9801 is only used to secure the module in place instead of using screws.

When installing the module, it is important to ensure that the technician using ESD protection

On the end device, the spacing and board to board MPN must match the module side specifications:

Mating board to board type: DF30FC-40DS-0.4V

Mating Board to board spacing: 38.44mm,



Antenna Connectors

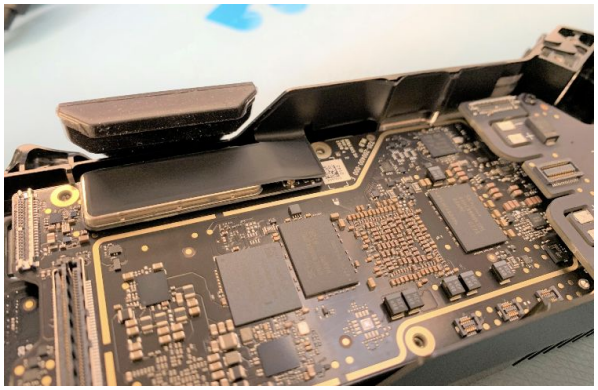
The radio module uses two I-PEX u.FL connectors (20441-001E-01) to connect external antennas to the module. The connectors are snapped an place, and do not require any external pressure or screws.

On the antenna cable, the mating connector is an I-PEX 20351-1 series (or equivalent) connector. Antenna types and gains must follow the FCC / IC regulatory filings submitted by Skydio.

Thermal Management

In order to prevent overheating when operating at high power levels, it is important to move heat out of the module. It is recommended to heat sink via the shield can on the top of the module, which has a direct thermal interface to the radio & front end module components that generate the most heat.

An example of this is shown below on the Skydio X2 UAV, using a graphite strap to move heat from the module to the UAV chassis.



Usage Guidelines

Power & frequency settings are not advised to be exposed to the user, and should be set at the factory to ensure that the radio is correctly configured relative to the regulatory filings submitted by Skydio.

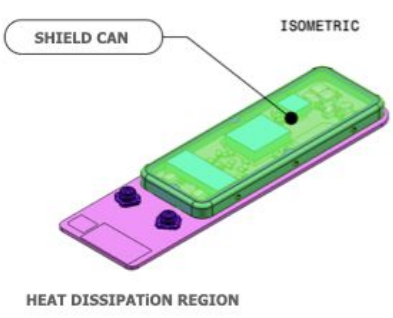
Regional Settings

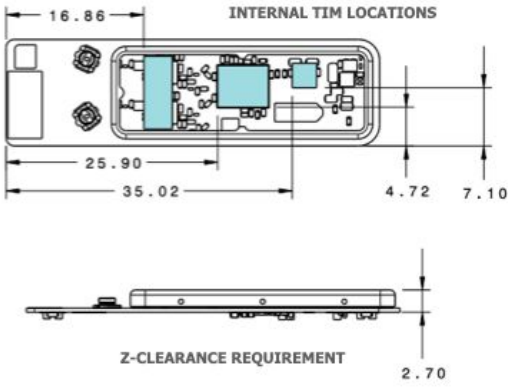
All power levels & frequency bands must follow regional restrictions. Two methods can be used to ensure that these are followed:

1. During a factory installation, set the power tables based on the intended country of sale for the specific end device SKU
2. Use GPS data from the host device to select a specific power table to be referenced. This is recommended for devices that are portable.

Note that the end device ultimately controls power levels, frequency band and other radio settings and it is up to the end device manufacturer to ensure compliance with existing filings for this module.

Mechanical Requirements





Compliance Information

FCC

Any changes or modifications to this equipment not expressly approved by Skydio for compliance will void the user's authorization to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The distance between user and products should be no less than 20cm. The end user must follow the specific operating instruction for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

IC

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Heath Canada's website www.hc-sc.gc.ca/rpb

L'installateur de cet équipement radio doit s'assurer que l'antenne est située ou pointée de manière à ne pas émettre de champ RF au-delà des limites données par Santé Canada pour la population générale; consultez le Code de sécurité 6, disponible sur le site Web de Santé Canada www.hc-sc.gc.ca/rpb.