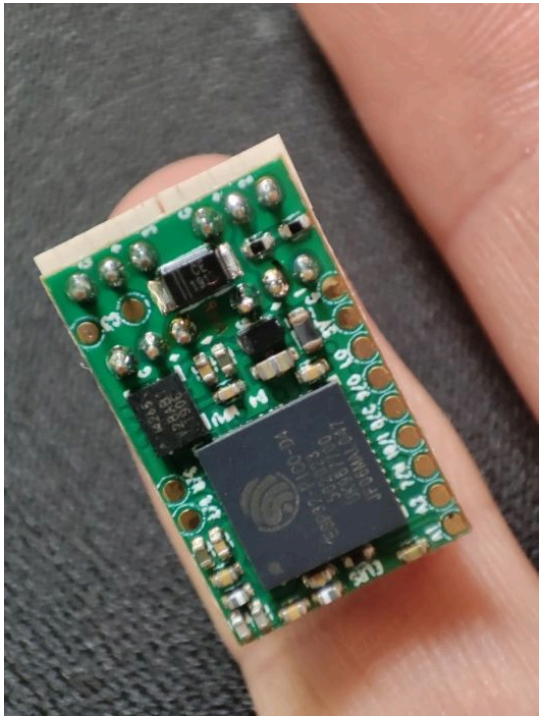
ExpressLRS Receiver Type Approval Checklist

Product Name: **SPRacing RXN1 Gyro 2.4GHz RX/GYRO/IR (D4)**

Lua Device Name: **SPR_RXN1_D4**



Summary of results

SUGGESTION	

Tlm Power in other devices always shows ERR

Legend	
Passed	Item meets the requirement
Suggestion	Item could be improved, still acceptable
Fail	Item failed and device will not be approved
Not tested	

Visual Inspection

Test	Result	Tester	Notes
Pad layout **must** use standard crossfire receiver ordering (RX, TX, 5V, GND; as seen from the side where the antenna is) with 2.54mm pitch spacing	Not applicable	schugabe	
	Not applicable	PK	Due to the target audience for this receiver this is not applicable.
If a button is onboard, it is connected to BOOT0. If no button, BOOT0 pad is provided	Passed	PK	
Antenna connector is u.FL (IPEX1), not smaller MHF4/IPEX4 (suggested)	Not applicable	schugabe	Tower Antenna
	Not applicable	PK	
VREG supports required current for wifi (>=500mA)	Passed	schugabe	Wifi boots
	Passed	PK	Semtech SC189 1.5A Step-down

First Boot

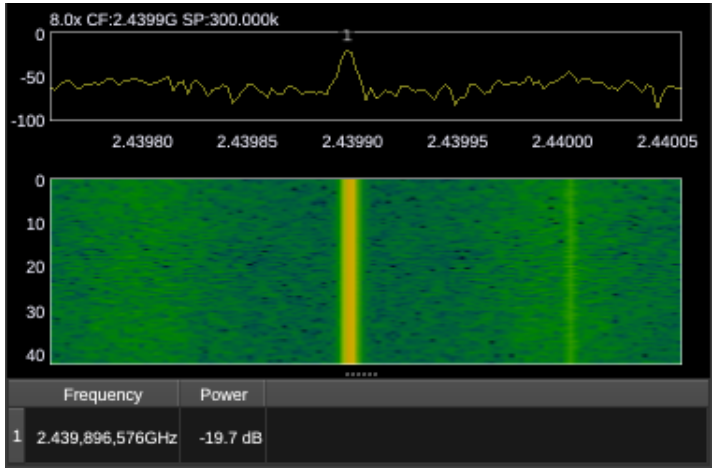
Test	Result	Tester	Notes
Firmware does not have a binding phrase (boots to traditional binding mode)	Passed	schugabe	
	Passed	PK	
LED is operating with expected polarity (on/off correct for single color LEDs, RGB/GRB set correctly for ARGB)	Passed	schugabe	
	Passed	PK	
LED on same side as antenna (suggested)	Passed	schugabe	
	Passed	PK	
Wifi range for firmware updates is at least 2m (10m suggested)	Passed	schugabe	
	Passed	PK	Nice strong signal! -45dB @ 1m

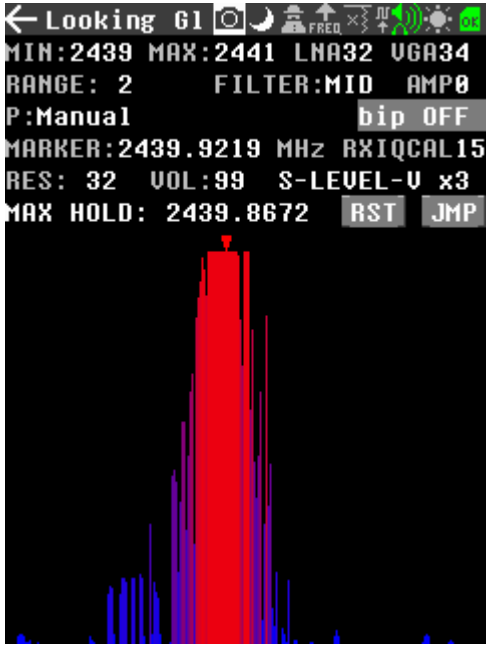
Flashing/Firmware updates

Test	Result	Tester	Notes
Via UART	Passed	PK	
Via Betaflight Passthrough	Not applicable		
Via Wifi (access point or home network)	Passed	PK	

Connectivity and RF Performance

Test	Result	Tester	Notes
If LNA/PA is onboard, measured power output matches expected output. If no PA, measured power output is ~17mW	Passed	PK	Measured similar to other tower antenna devices
RX can operate at full power on 150Hz (2.4G), 200Hz (900M), 1:2 TLM, for at least 1 hour	Passed	PK	
	Passed	schugabe	
RSSI/LQ for both uplink and downlink checked and compared against known good data	Passed	PK	**250Hz TPWR=10mW @ 1m:** **Receiver power 10mW:** 1RSS=-40dB RQly=100% RSNR=13dB TRSS=-60dB TQly=88-100% TSNR=13dB
	Passed	schugabe	**250 Hz TPWR=25mW @1m** 1RSS=-34DB RQLy=100% RSNR=12dB TRSS=-55DB TQLY=100 TSNR=13dB

Test	Result	Tester	Notes
Frequency offset of XTAL checked for compliance (SX1280 <100kHz, SX127x <50kHz)	Suggestion	PK	Might want to look for a better source of XTALs.  Center Frequency 2439895576 Calculated XO Freq 51997775 Calculated XO Offset (kHz) -2.225 Calculated XO Offset (PPM) 42.78846153846154 Raw Offset (kHz) -104.424 TL;DR

Test	Result	Tester	Notes
	Passed	schugabe	 Center Frequency 2439921900 Calculated XO Freq 51998336 Calculated XO Offset (kHz) -1.664 Calculated XO Offset (PPM) 32 Raw Offset (kHz) -78.1 TL;DR

Test	Result	Tester	Notes
Diversity RX: Antenna switching works i.e. covering an antenna switches to the other and back again, RSSI visibly changes	Not applicable		
True Diversity RX: Interference between the two radios is minimal, compare SNRs and LQs between Diversity mode vs. Gemini mode ● LoRa 500Hz SNR (good ref: Diversity 10-11dB, Gemini 11-12 dB) ● F1000 LQ: (ref: Stable 100 all the time)	Not applicable		

PWM Tests

Test	Result	Tester	Notes
Jitter-free PWM output on all channels	Passed	PK	
	Passed	schugabe	
Receiver has proper strength pull-ups to boot with servo <10k ohm impedance to ground on all channels	Passed	PK	Not required due to pin selection
VBAT scale/offset valid for specified input voltage range (<0.5% error)	Passed	PK	After calibration values applied in Notes section
	Passed	schugabe	Same calibration values as PK

Notes

- Special target with extra fields needing to be added to hardware.cpp for gyro, IR transponder and extra ADC pins.
- Missing power settings, which is why ERR is shown in the Lua script.
- serial_rx/tx should not be defined if listed as PWM pins.
- "vbat_atten": 4
- "vbat_offset": -3
- "vbat_scale": 905


```
{
  "//": "LED",
  "button": 0,
  "serial_tx": 1,
  "serial_rx": 3,
  "radio_dcdc": false,
  "radio_miso": 4,
  "radio_mosi": 32,
  "radio_sck": 33,
  "radio_nss": 27,
  "radio_rst": 22,
  "radio_busy": 36,
  "radio_dio1": 37,
  "ir_transponder": 21,
  "gyro_nss": 5,
  "gyro_miso": 19,
  "gyro_mosi": 23,
  "gyro_sck": 18,
  "gyro_int": 38,
  "pwm_outputs": [25,26,10,9,1,3,14,13,12,15],
  "vbat": 39,
  "vbat_offset": 12,
  "vbat_scale": 410,
  "adc_a1": 34,
  "adc_a2": 35,
  "led_rgb": 2,
  "led_rgb_isgrb": true,
  "ledidx_rgb_status": [0],
```

```
  "ledidx_rgb_boot": [0]
}
```