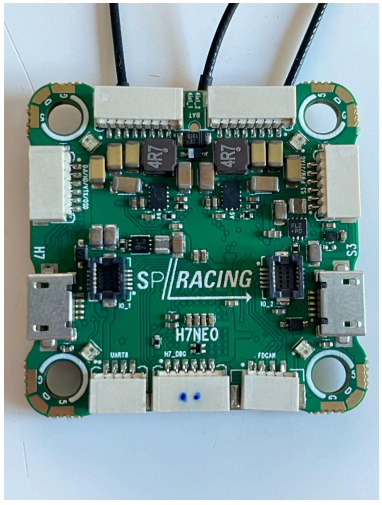
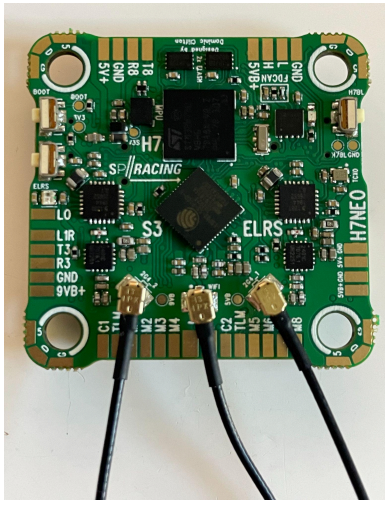
ExpressLRS Receiver Type Approval Checklist

Product Name: **SPRacingH7NEO 2.4GHz FC True Diversity TX (H7/S3)**

Lua Device Name: **SPR H7NEO S3**





Summary of results	
SUGGESTION	

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	PK	
If a button is onboard, it is connected to BOOT0. If no button, BOOT0 pad is provided	Passed	PK schugabe	
Antenna connector is u.FL (IPEX1), not smaller MHF4/IPEX4 (suggested)	Passed	PK schugabe	
VREG supports required current for wifi (>=500mA)	Passed	PK schugabe	

First Boot

Test	Result	Tester	Notes
Firmware does not have a binding phrase (boots to traditional binding mode)	Fail	PK schugabe	Was pre-bound. Remember to reset before shipping.
LED is operating with expected polarity (on/off correct for single color LEDs, RGB/GRB set correctly for ARGB)	Passed	PK schugabe	
LED on same side as antenna (suggested)	Passed	PK schugabe	
Wifi range for firmware updates is at least 2m (10m suggested)	Passed	PK schugabe	

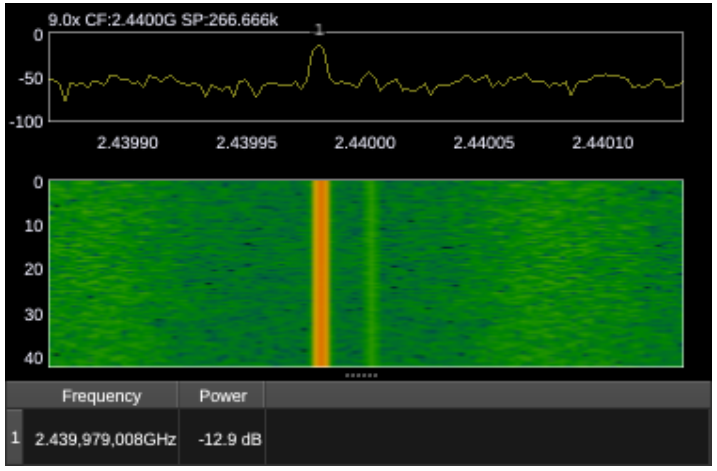
Flashing/Firmware updates

Test	Result	Tester	Notes
Via UART	Passed	PK schugabe	Using its own USB connector!
Via Betaflight Passthrough	Passed	PK	Firmware issue on our end, PR being worked on for 3.5.
Via Wifi (access point or home network)	Passed	PK schugabe	

Connectivity and RF Performance

<table>
<tr><th>Test</th><th>Result</th><th>Tester</th><th>Notes</th></tr>
<tr><td>If LNA/PA is onboard, measured power output matches expected output. If no PA, measured power output is ~17mW

Max must be within 0.5dBm of expected.</td><td>Passed</td><td>PK</td><td>Note: A bit of difference between sides
<table>
<tr><th>Expected</th><th>Actual 1</th><th>Actual 2</th></tr>
<tr><td>10mW</td><td>9</td><td>17</td></tr>
<tr><td>25mW</td><td>23</td><td>40</td></tr>
<tr><td>50mW</td><td>49</td><td>73</td></tr>
<tr><td>100mW</td><td>98</td><td>109</td></tr>
</table></td></tr>
<tr><td>RX can operate at full power on 150Hz (2.4G), 200Hz (900M), 1:2 TLM, for at least 1 hour</td><td>Passed</td><td>PK
schugabe</td><td></td></tr>
<tr><td>RSSI/LQ for both uplink and downlink checked and compared against known good data</td><td>Passed</td><td>PK</td><td>250Hz TPWR=10mW @ 1m:
Receiver power 10mW:
1RSS=-19dB
2RSS=-20dB
RQly=100%
RSNR=12dB
TRSS=-5dB
TQly=100%
TSNR=13dB</td></tr>
<tr><td></td><td></td><td></td><td>250Hz TPWR=25mW @ 1m:
Receiver power 10mW:
1RSS=-15dB
2RSS=-15dB</td></tr>
</table>

Test	Result	Tester	Notes
			RQly=100% RSNR=12dB TRSS=-18dB TQly=100% TSNR=13dB
Frequency offset of XTAL checked for compliance (SX1280 <100kHz, SX127x <50kHz)	Passed	PK	 Center Frequency 2439979008 Calculated XO Freq 51999553 Calculated XO Offset (kHz) -0.447 Calculated XO Offset (PPM) 8.596153846153847 Raw Offset (kHz) -20.992 TL;DR

Test	Result	Tester	Notes
	Passed	schugabe	Center Frequency 2440000100 Calculated XO Freq 52000002 Calculated XO Offset (kHz) 0.002 Calculated XO Offset (PPM) 0.038461538461538464 Raw Offset (kHz) 0.1 TL;DR 
Diversity RX: Antenna switching works i.e. covering an antenna switches to the other and back again, RSSI visibly changes	Passed	PK schugabe	
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)	Passed	PK schugabe	

PWM Tests

Test	Result	Tester	Notes
Jitter-free PWM output on all channels	Passed	PK	
Receiver has proper strength pull-ups to boot with servo <10k ohm impedance to ground on all channels	Passed	PK	
VBAT scale/offset valid for specified input voltage range (<0.5% error)	Not applicable		

Notes

```
{
  "button": 0,
  "serial_tx": 43,
  "serial_rx": 44,
  "radio_dcdc": true,
  "radio_miso": 13,
  "radio_mosi": 11,
  "radio_sck": 12,
  "radio_rst": 9,
  "radio_rst_2": 46,
  "radio_busy": 7,
  "radio_busy_2": 5,
  "radio_dio1": 6,
  "radio_dio1_2": 4,
  "radio_nss": 10,
  "radio_nss_2": 8,
  "power_txen": 14,
  "power_txen_2": 45,
  "_power_rxen": "N/A",      Not required
  "_power_rxen_2": "N/A",    Not required
  "power_lna_gain": 12,
  "power_min": 0,
  "power_high": 3,
  "power_max": 3,
  "power_default": 3,
  "power_control": 0,
  "power_values": [-10, -6, -3, 1],
  "pwm_outputs": [41, 42, 40, 39],
  "led_rgb": 38,
  "led_rgb_isgrb": true,
  "ledidx_rgb_status": [0],
  "ledidx_rgb_vtx": [1],     Not required, as there is only one LED and no VTX
  "ledidx_rgb_boot": [0, 1]  Only need [0]
}
```