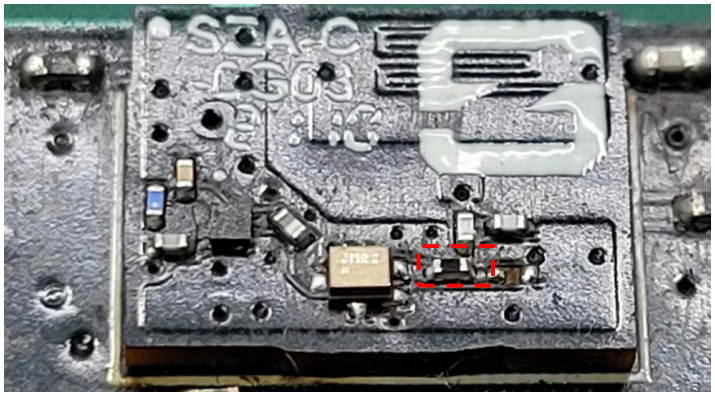
SZA-C-0G0x Manual Tuning Guide

How to measure S11

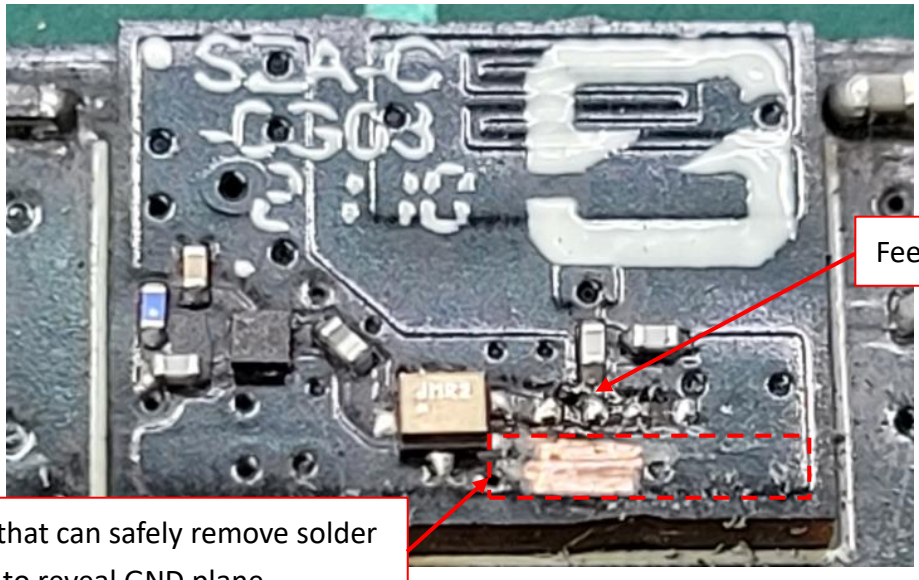
When trying to measure the s11 of the internal antenna you should first have the antenna module reflowed onto the intended host PCB. Use a solderable coax cable to connect to the front end before the antenna internal Pi network components, this can be located as shown in the image below.

Image 1



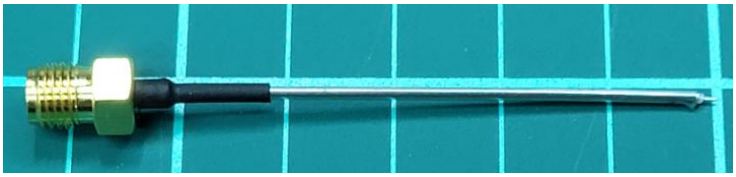
1) The component highlighted above is a 0R resistor. This must be removed to isolate the SAW filter and LNA from the antenna Pi network.
2) Remove a small area of solder mask in the region shown in image 2. The whole area highlighted can be used as a soldering point.

Image 2

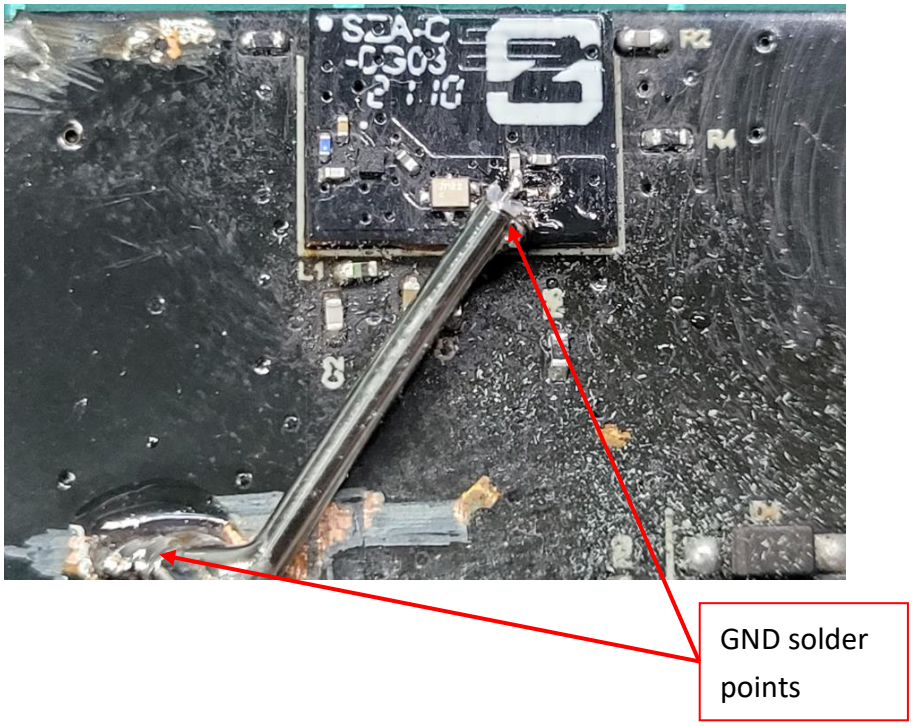


3) Connect coax cable, the length of cable depends on host PCB/device. Cable direction should be away from the antenna as shown.

Coax cable (solderable)

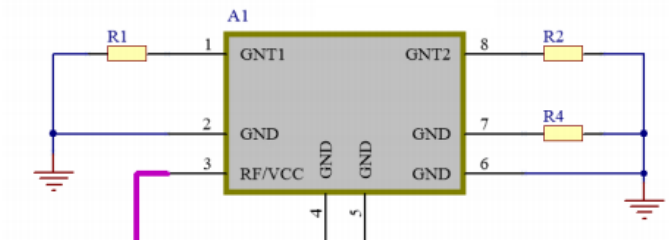


Soldered cable on antenna module and host PCB



4) The antenna requires a GND connection very close to the feed point. Also 1 or 2 more GND connections on host to prevent cable radiation and for mechanical stability.

Please note: The Pi matching cannot be modified as the BOM is fixed for generic values. Please use R2 for primary tuning.



5) No requirement to set the delay as the tuning is going to be conducted with R2 as the SW to calculate this cannot be used.

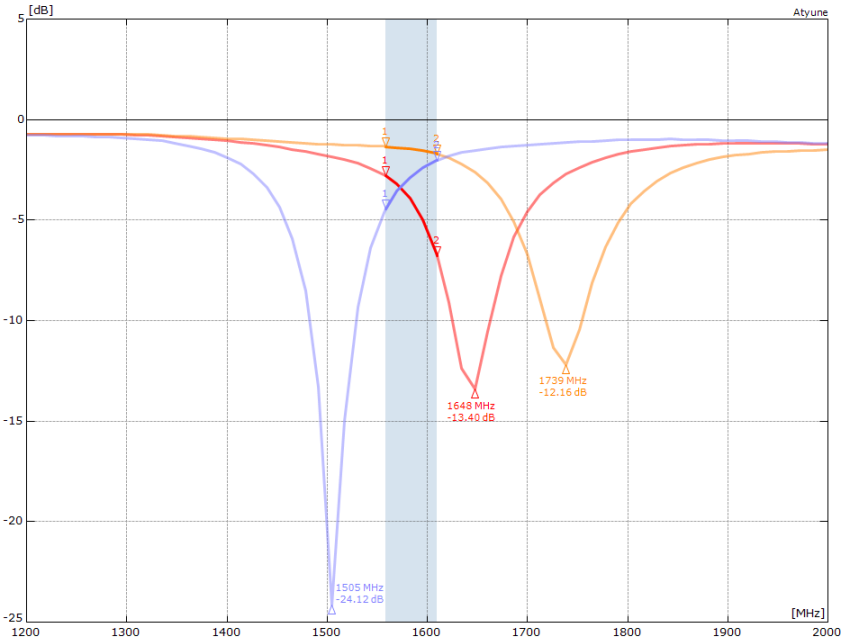
6) Check where the resonance sits with R1,R2,R4 all fitted with 0R value. If the resonance is too low then fit a capacitor value starting at 15pF, the lower the value the more of an increase in shift upward the resonance will move.

- *15pf ≈ 90MHz upward shift from 0R starting point.*

- *If the resonance is too high, then R2 should be fitted with an inductor with a low starting value.*

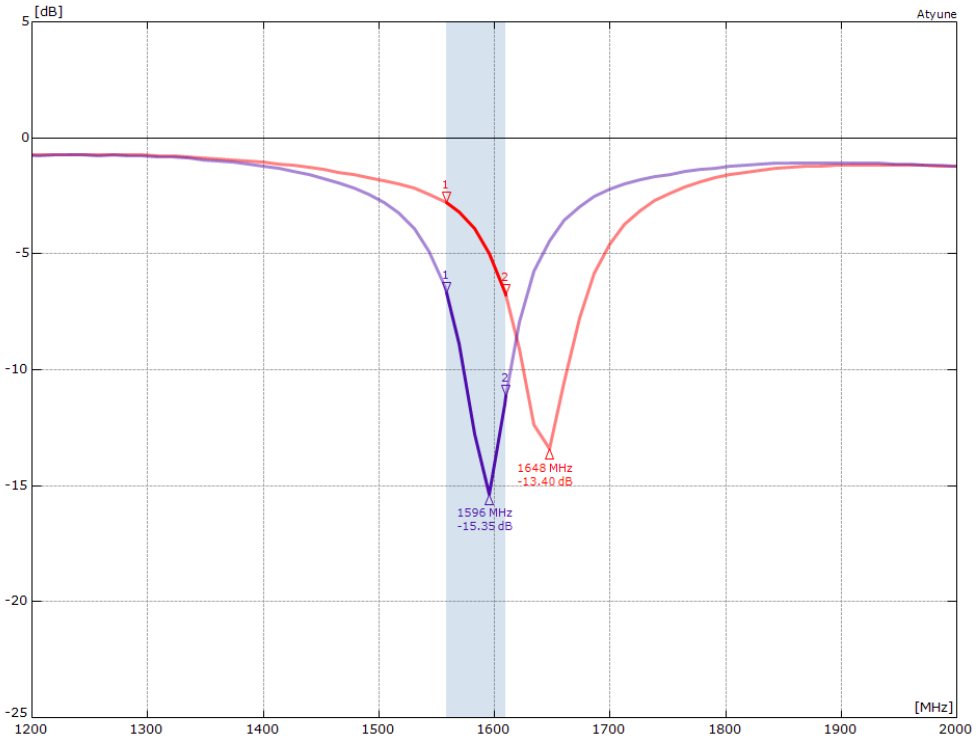
- *1.5nH ≈ 140MHz shift down from 0R starting point*

Example of expected shift with different values of R2. R1 and R4 are 0R resistor. S11 shown for a 45mm PCB.



MARKERS: MHz	dB
SZA-C-0G03-45mm- R1-ohm R2-0ohm.s1p - S11	
1: 1559	-2.78
2: 1610	-6.76
SZA-C-0G03-45mm- R1-ohm R2-15pF.s1p - S11	
1: 1559	-1.32
2: 1610	-1.68
SZA-C-0G03-45mm- R1-ohm R2-1.5nH.s1p - S11	
1: 1559	-4.42
2: 1610	-2.00

7) Tuning for a smaller 45mm PCB example is shown below. The required value of R2=0.8nH to achieve a resonance on the required GNSS bands of frequency range 1559-1609MHz



MARKERS: MHz dB
SZA-C-0G03-45mm- R1-ohm R2-0ohm.s1p - S11
1: 1559 -2.78 2: 1610 -6.76
SZA-C-0G03-45mm- R1-ohm R2-0.8nH.s1p - S11
1: 1559 -6.66 2: 1610 -11.12