



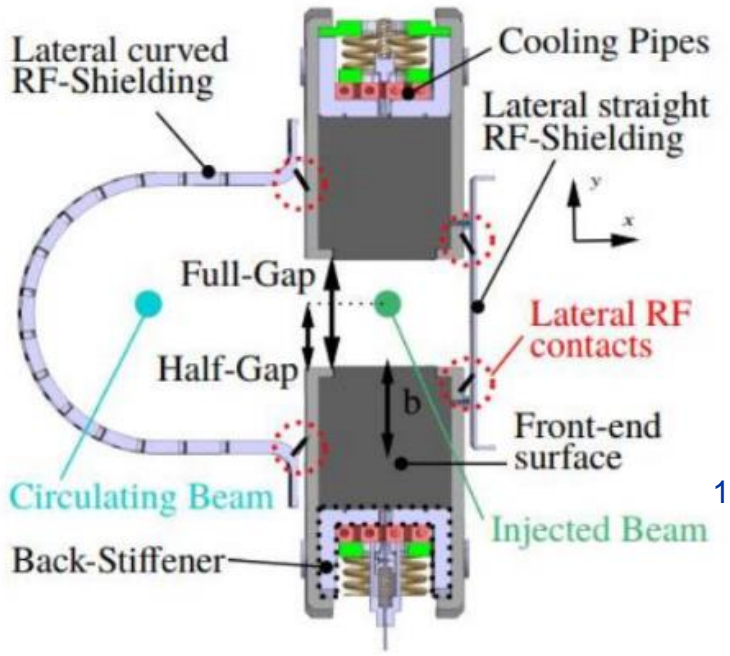
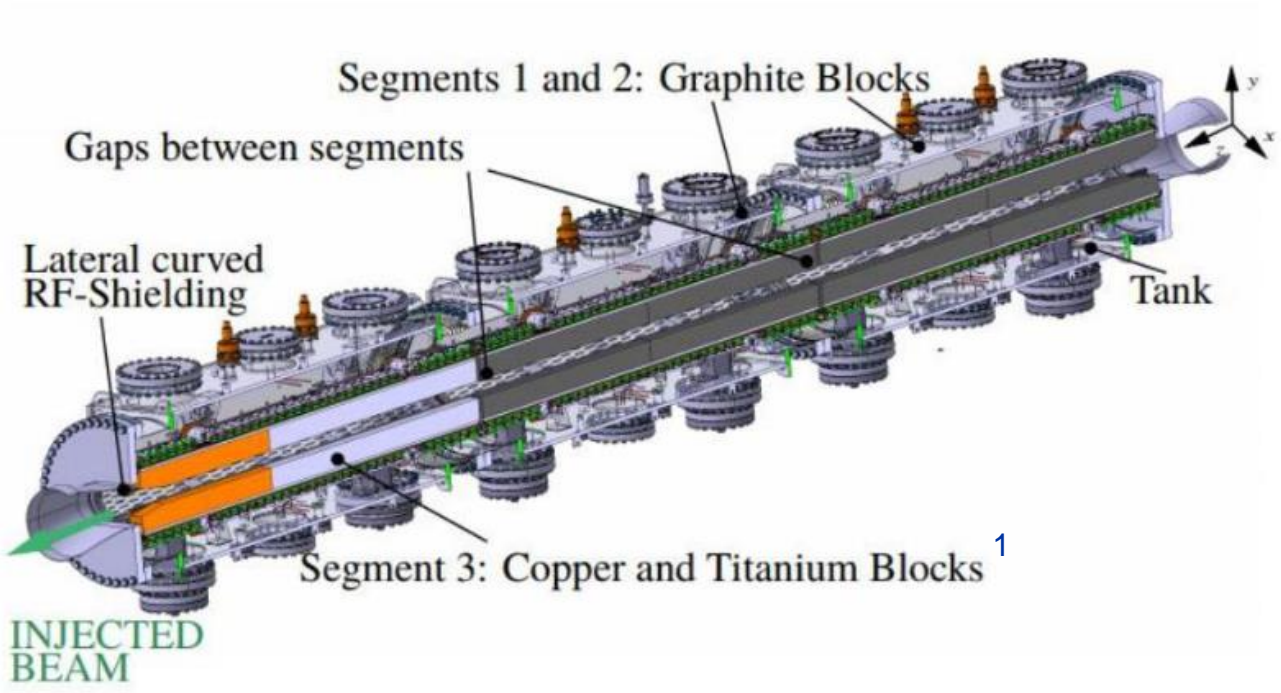
TDIS impedance measurements (preliminary results)

Sébastien Joly, Christine Vollinger

Nicolo Biancacci, David Carbajo Perez, Francesco Giordano, Patrick Kramer, Benoit Salvant, Regis Seidenbinder, Lorenzo Teofili, Carlo Zannini

12/10/2020

Device geometry



1

1

¹ Lorenzo talk

Measurements done

Wire measurements :

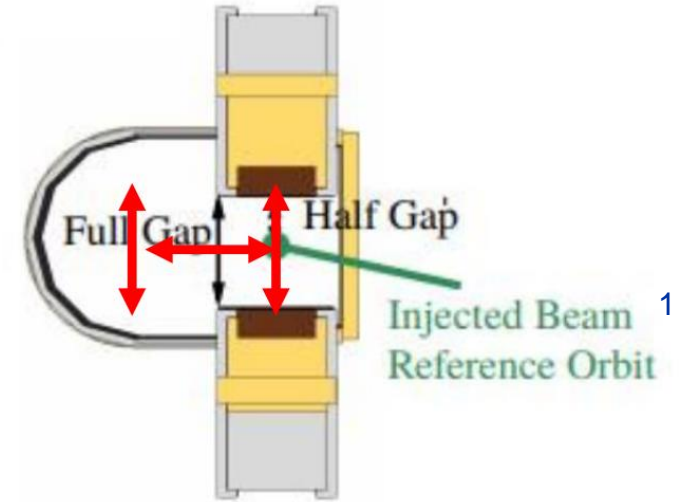
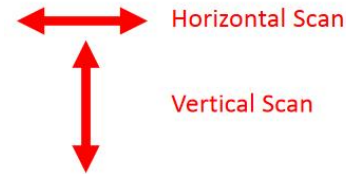
- Horizontal scan between the jaws
- Vertical scan between the jaws
- Vertical scan near the RF screen

Probes measurements (near the RF screen)

Temperature probes measurements (with wire between the jaws)

The goal of these measurements was to check if we see a similar behaviour compared to 2019's measurements.

We used different flanges than in 2019 for each configuration. As a result, the setup is slightly different and we can't reproduce exactly last measurements wire positions.



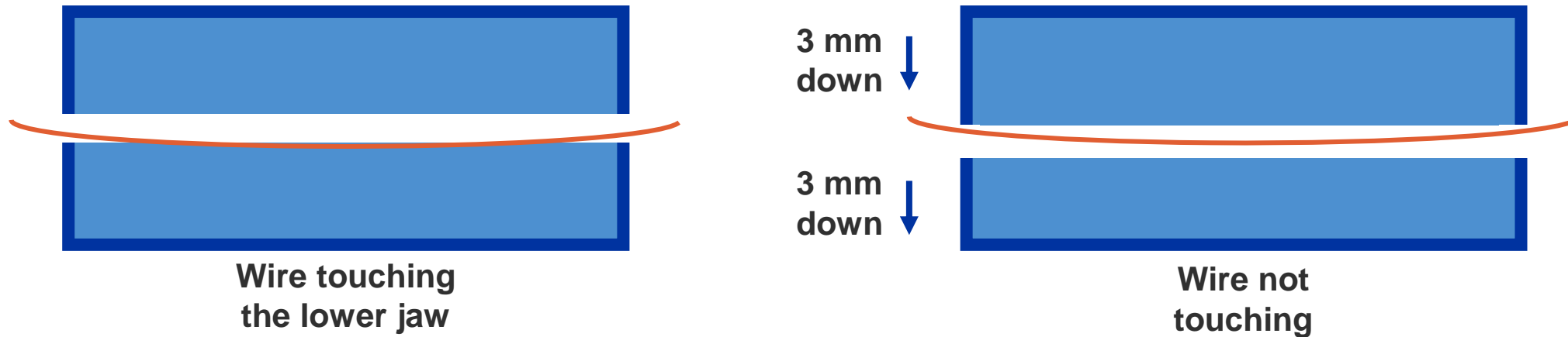
¹ Lorenzo talk

Problem while doing the 12 mm full gap measurements

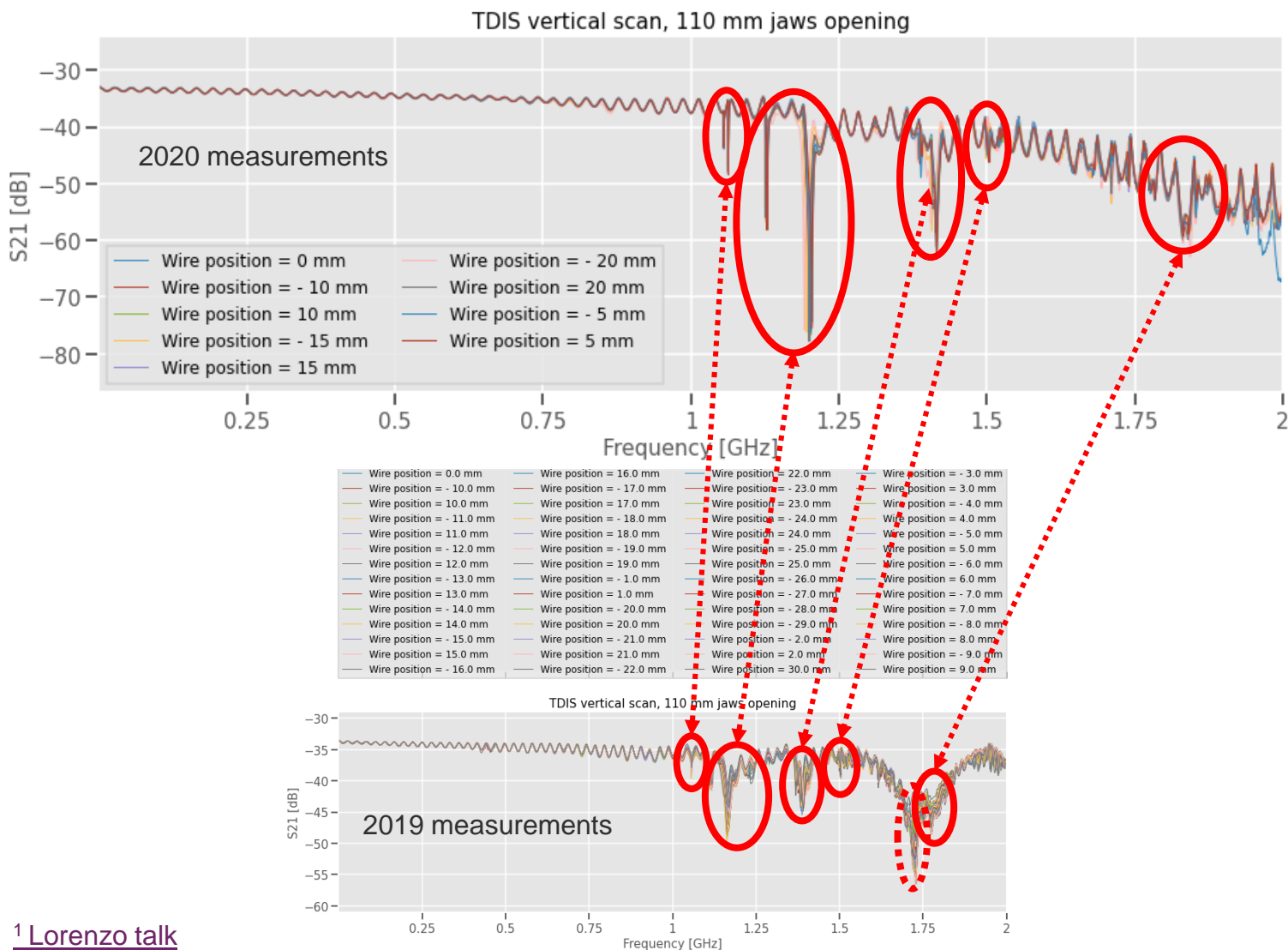
For this gap we had to slightly change the jaws position.

When we moved to the 6 mm half gap with the previous configuration, the wire was already touching one of (or several) jaw(s).

We translated upper and lower jaws 3 mm down in order to avoid the wire touching.



Vertical scan, 110 mm full gap



No significant mode is visible below 1 GHz.

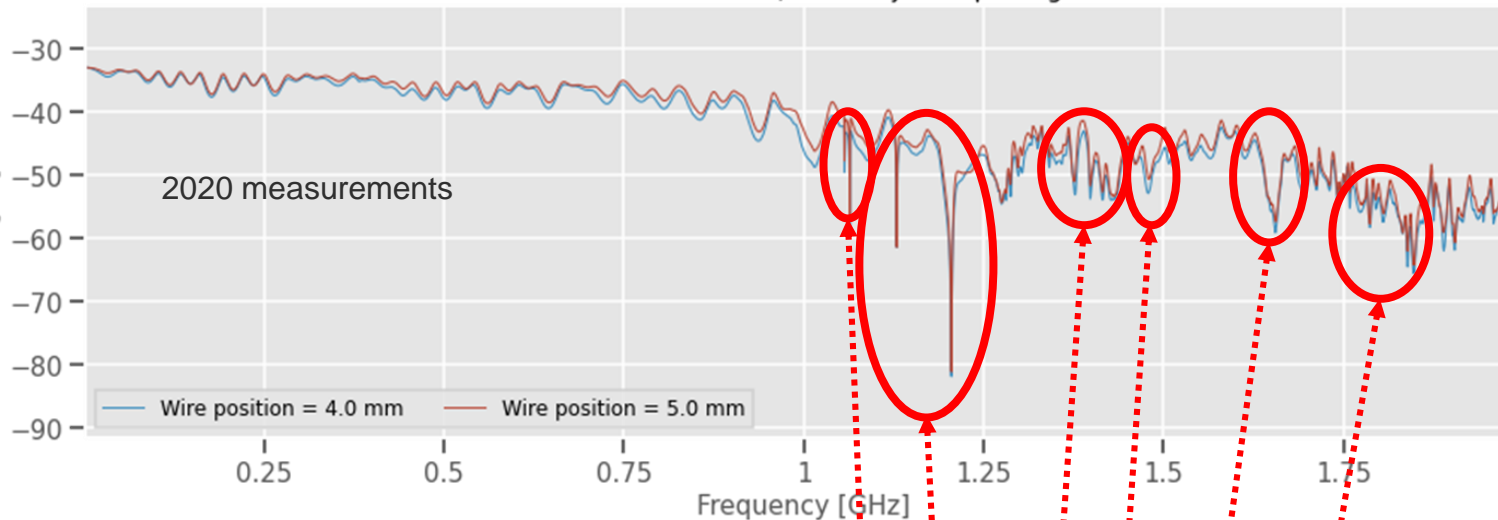
The mode at 1.75 GHz (dashed line) is not visible on the 2020 measurements. Based on Lorenzo's presentation¹ for 2019 measurements, this mode was due to the flanges used.

We are able to spot a couple of sharp modes in 2020 measurements that were not seen during 2019 measurements (could be explained by new flanges → less RF leakage).

¹ Lorenzo talk

Vertical scan, 12 mm full gap

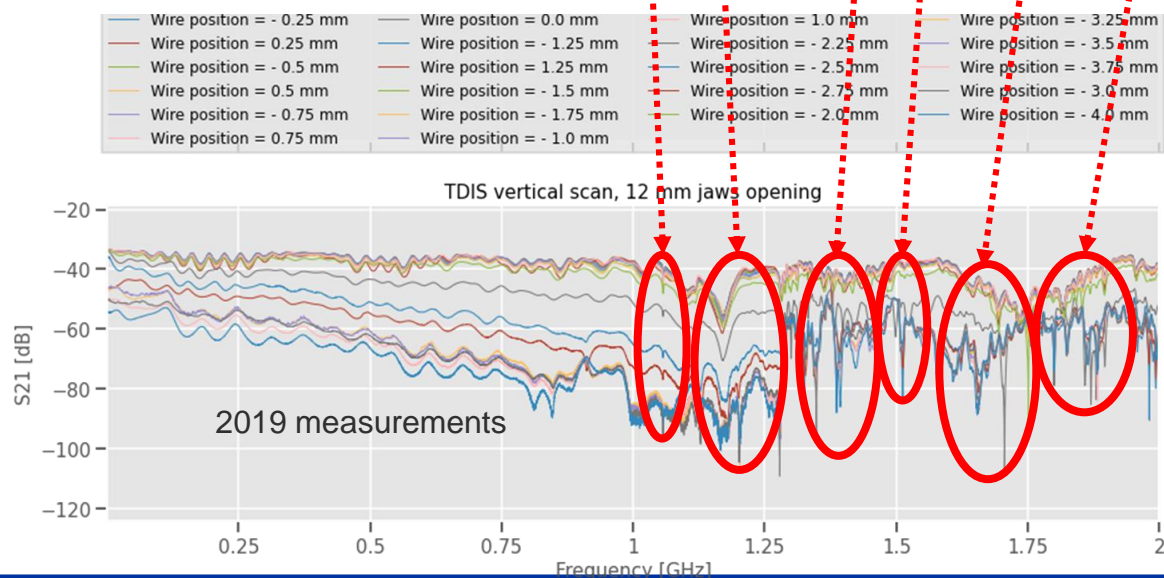
TDIS vertical scan, 12 mm jaws opening



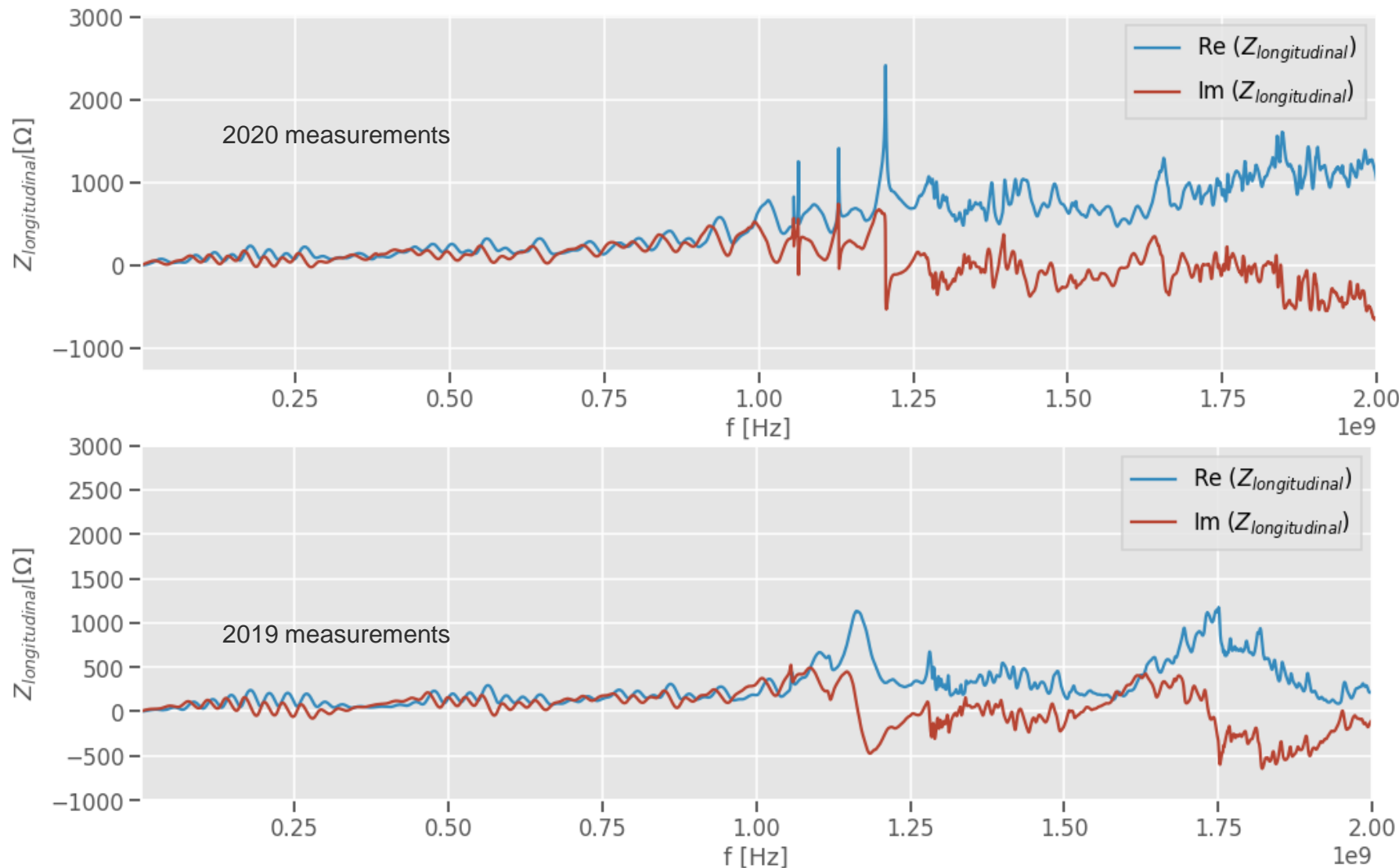
The baseline seems to be moving much more in 2019 than in 2020 (could be explained by the different setup ?).

The mode at 1.75 GHz seems to have disappeared on 2019's measurements plot.

When closing the jaws, a new mode starts to appear at ~1.6 GHz. Its source has yet to be found. However it is visible on both sets of measurements.



Vertical scan, 12 mm full gap



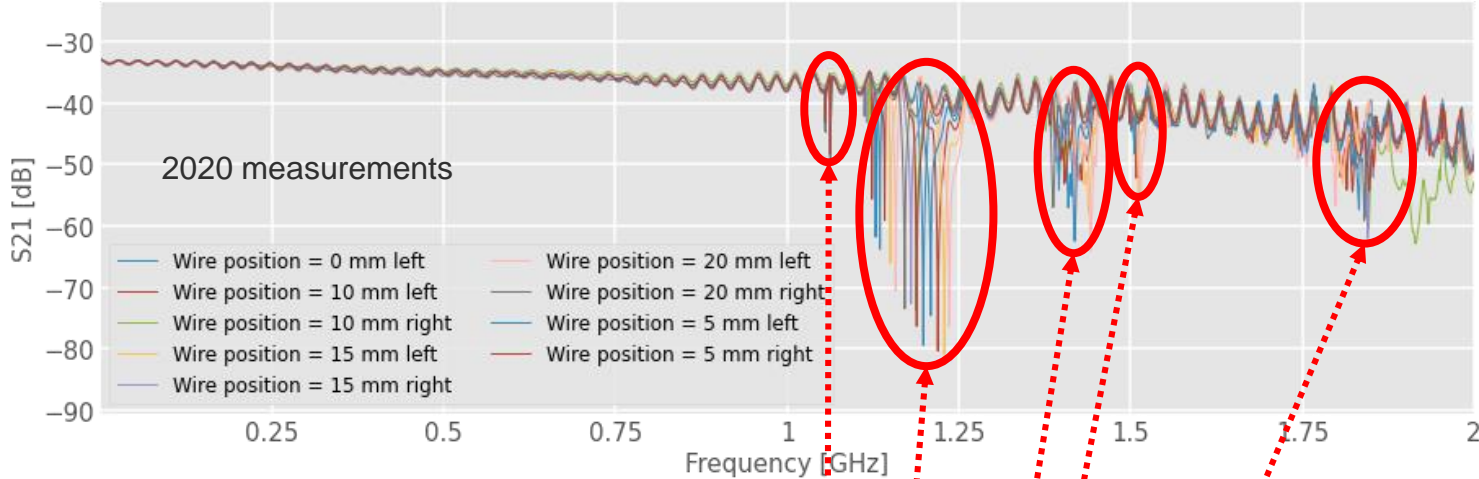
Post-processing done according to Kroyer et al. using the [improved log formula](#).

When plotting the longitudinal impedance we observe similar curves of the same order of magnitude.

Negative longitudinal impedance is due to postprocessing.

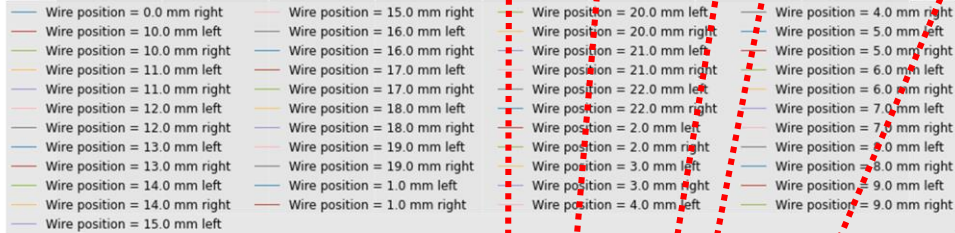
Horizontal scan, 110 mm full gap

TDIS horizontal scan, 110 mm jaws opening

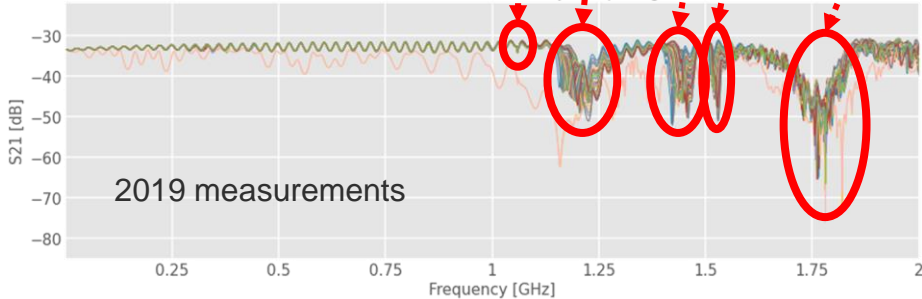


We find a good agreement between the previous and current measurements.

We are able to find the same modes at approximately the same frequencies.

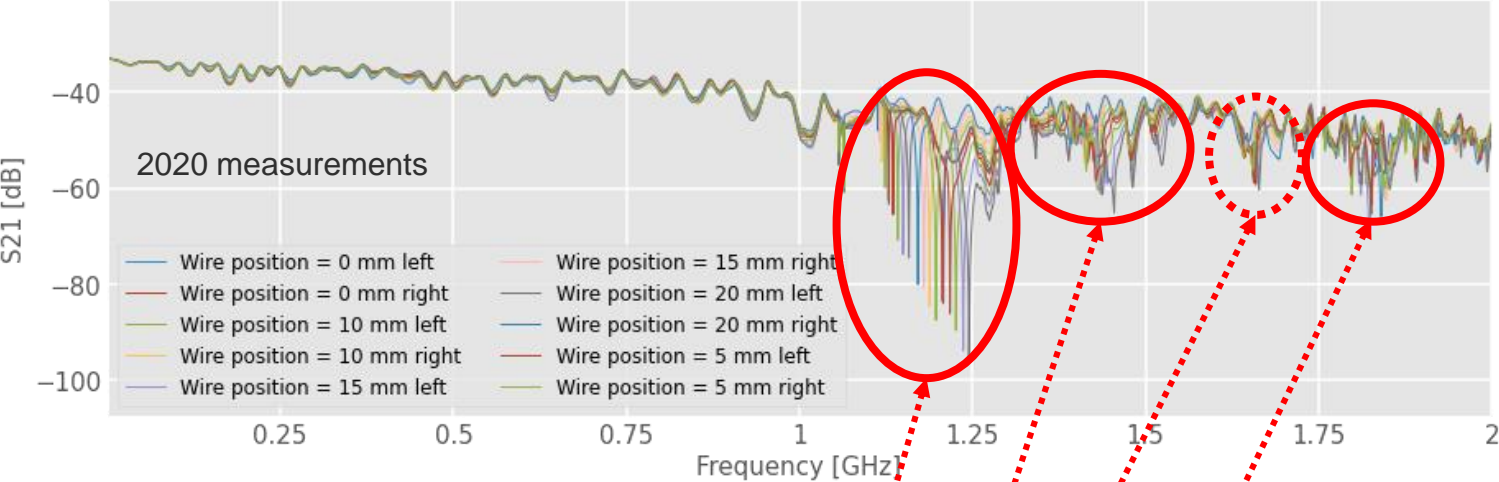


TDIS horizontal scan, 110 mm jaws opening



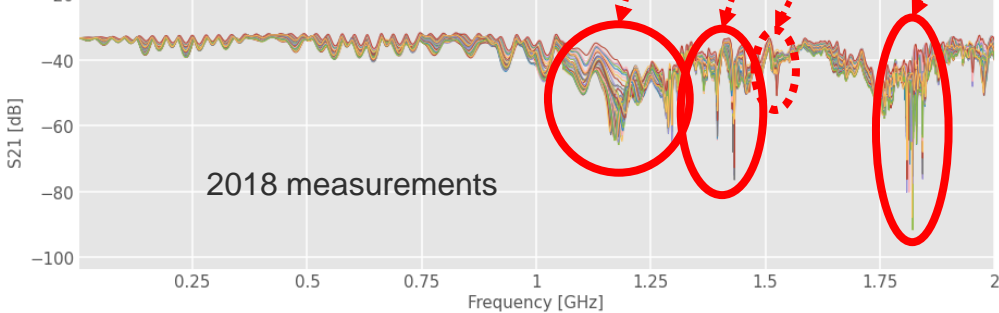
Horizontal scan, 12 mm full gap

TDIS horizontal scan, 12 mm jaws opening



- Wire position = 0 mm right
- Wire position = 10 mm left
- Wire position = 10 mm right
- Wire position = 11 mm left
- Wire position = 11 mm right
- Wire position = 12 mm left
- Wire position = 12 mm right
- Wire position = 13 mm left
- Wire position = 13 mm right
- Wire position = 14 mm left
- Wire position = 14 mm right
- Wire position = 15 mm left
- Wire position = 15 mm right
- Wire position = 16 mm left
- Wire position = 16 mm right
- Wire position = 17 mm left
- Wire position = 17 mm right
- Wire position = 18 mm left
- Wire position = 18 mm right
- Wire position = 19 mm right
- Wire position = 1 mm left
- Wire position = 1 mm right
- Wire position = 2 mm left
- Wire position = 2 mm right
- Wire position = 3 mm left
- Wire position = 3 mm right
- Wire position = 4 mm left
- Wire position = 4 mm right
- Wire position = 5 mm left
- Wire position = 5 mm right
- Wire position = 6 mm left
- Wire position = 6 mm right
- Wire position = 7 mm left
- Wire position = 7 mm right
- Wire position = 8 mm left
- Wire position = 8 mm right
- Wire position = 9 mm left
- Wire position = 9 mm right

TDIS horizontal scan, 12 mm jaws opening

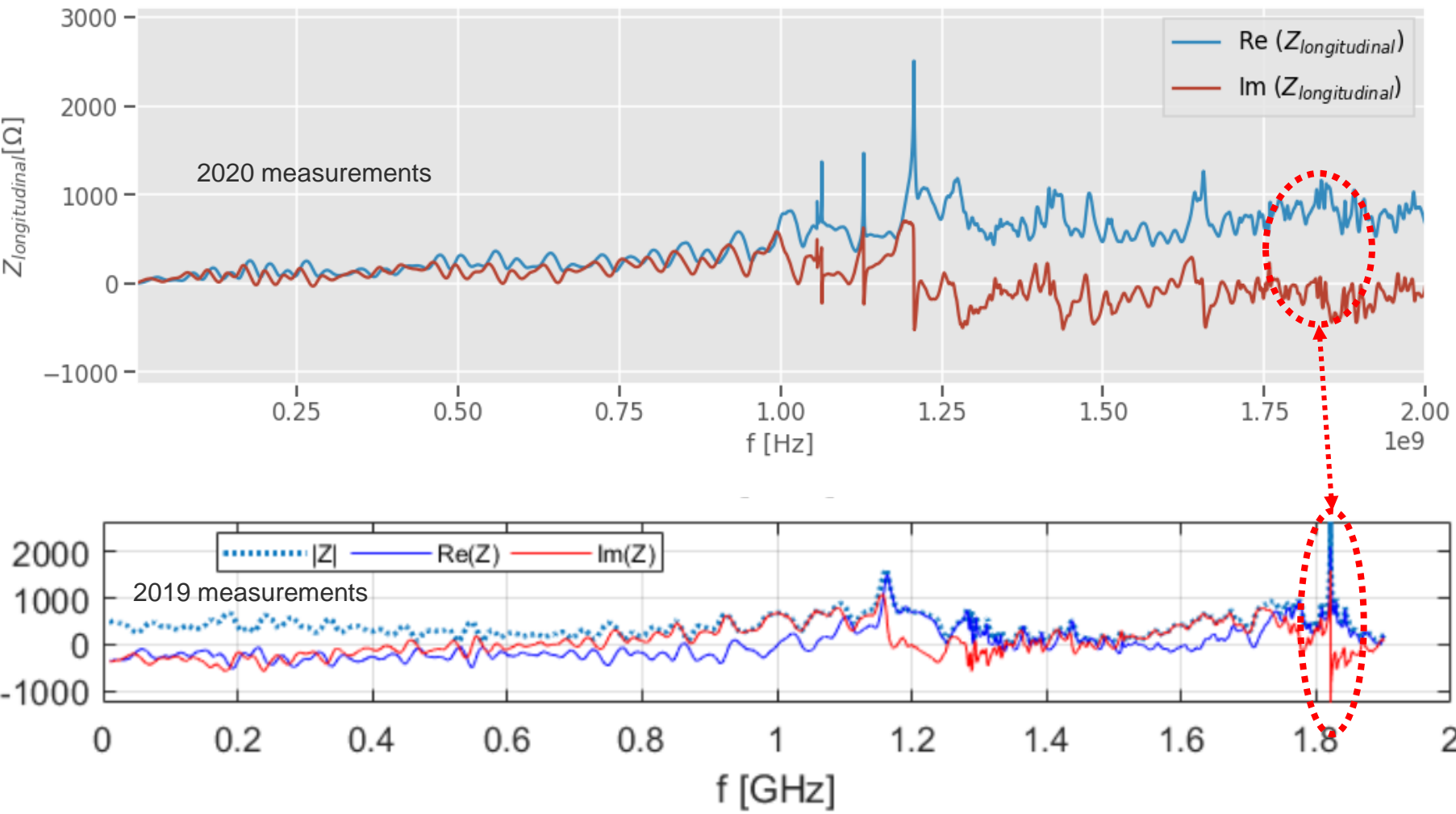


Again we find a good agreement between the previous and current measurements.

Few modes seem sharper in 2020 measurements than during 2019 measurements.

When closing the jaws, a new mode starts to appear at ~1.6 GHz. However it is visible on both sets of measurements.

Horizontal scan, 12 mm full gap



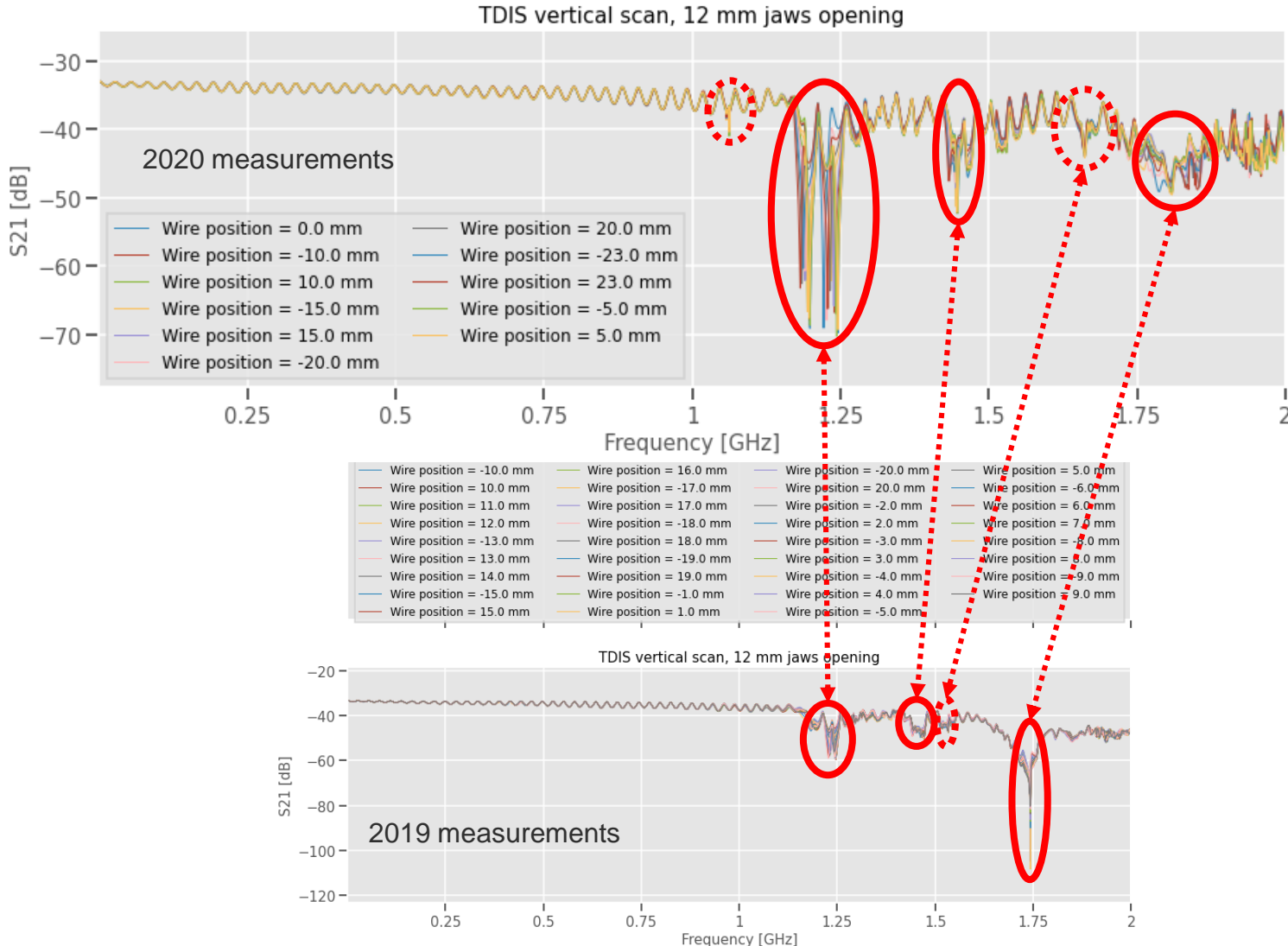
Post-processing done according to Kroyer et al. using the improved log formula.

When plotting the longitudinal impedance we observe similar curves of the same order of magnitude.

It is worth mentioning that we are not able to spot the narrow mode (dashed line) at 1.8 GHz during the 2020 measurements.

¹ Lorenzo talk

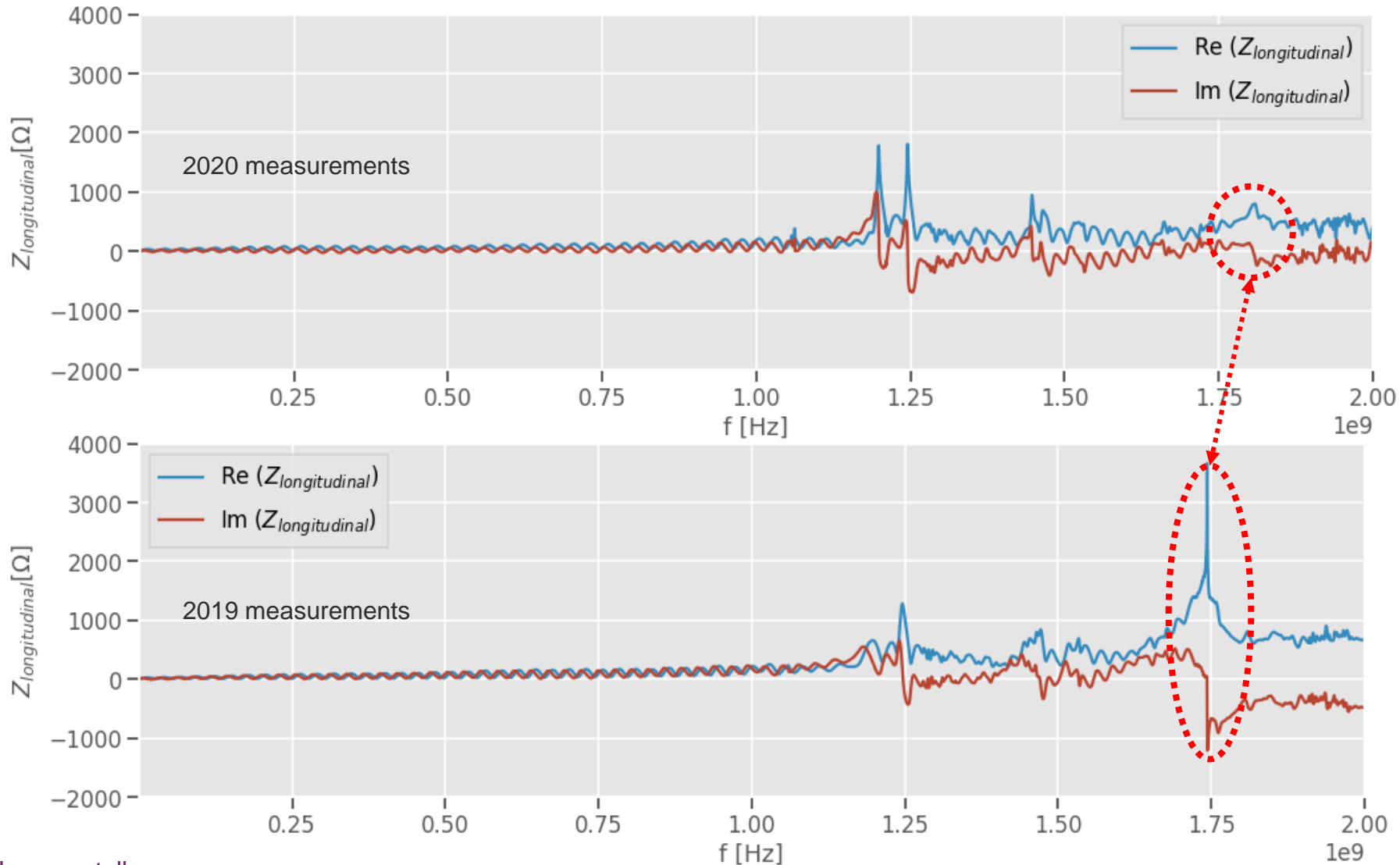
Vertical scan near the RF screen, 12 mm full gap



We observe a small mode around 1.1 GHz in the 2020 measurements which is not visible in the 2019 measurements. However it was visible in other configurations for the 2019 case.

The mode around 1.75 GHz is still smaller in the 2020 measurements compared to the 2019 ones.

Vertical scan near the RF screen, 12 mm full gap



Post-processing done according to Kroyer et al. using the improved log formula.

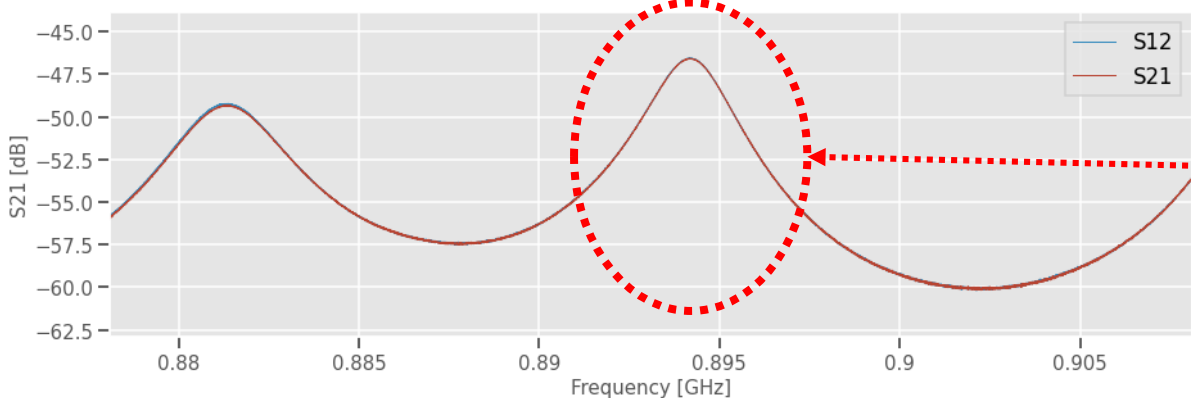
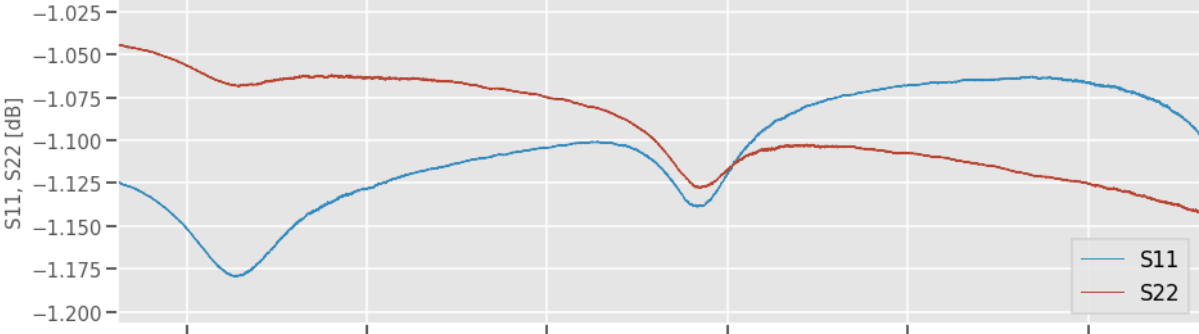
When plotting the longitudinal impedance we observe similar curves of the same order of magnitude.

The narrow mode (dashed line) at 1.8 GHz has a lesser amplitude in the 2020 measurements.

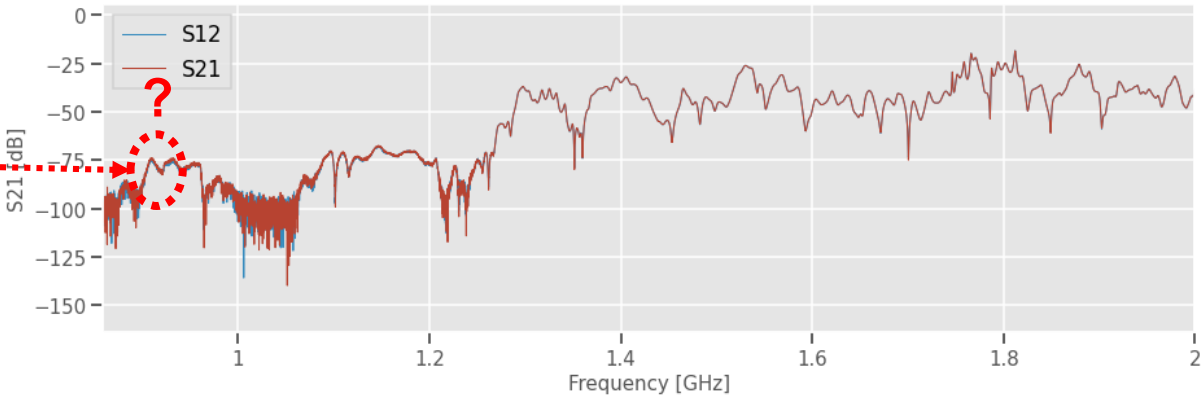
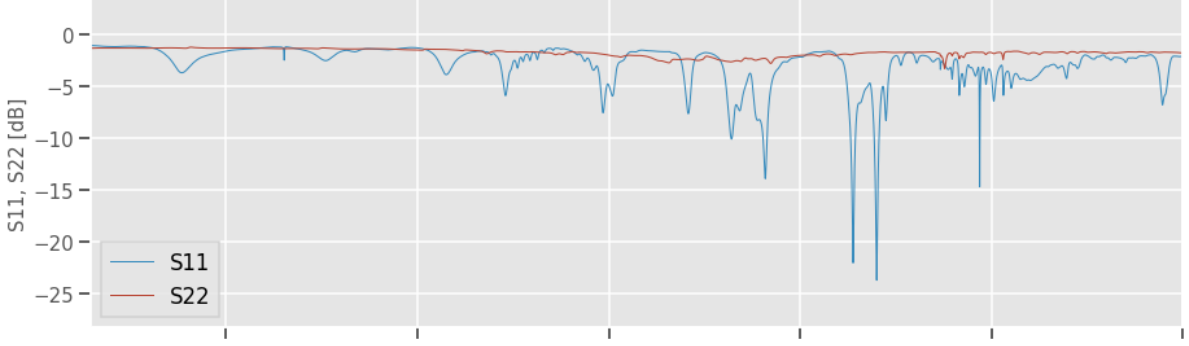
¹ Lorenzo talk

Probes measurements

Probes measurements, 110 mm jaws opening

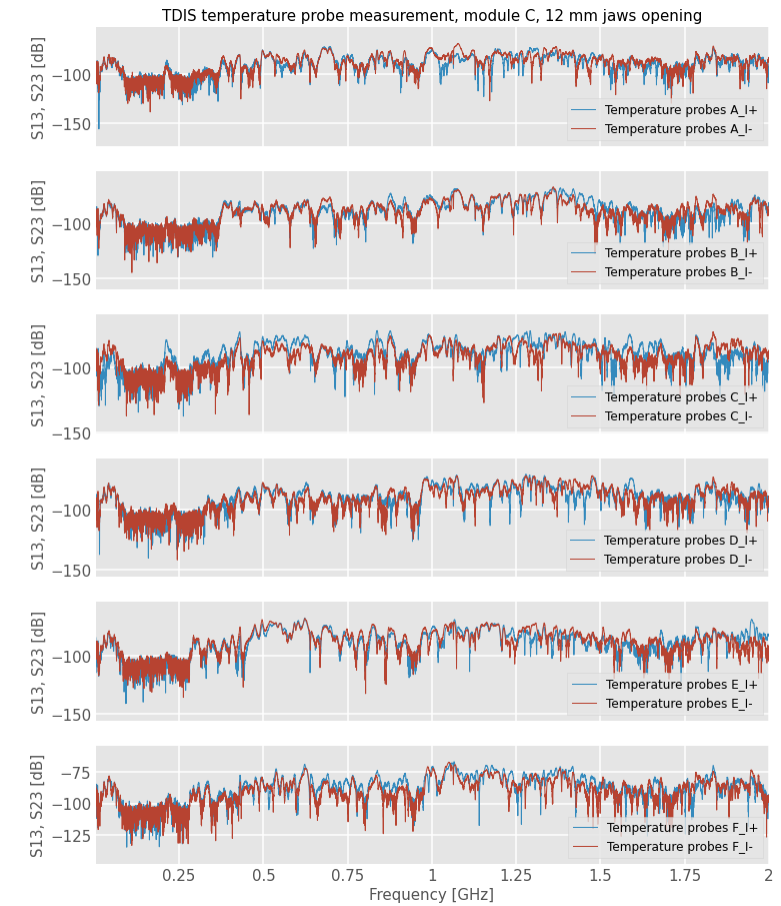
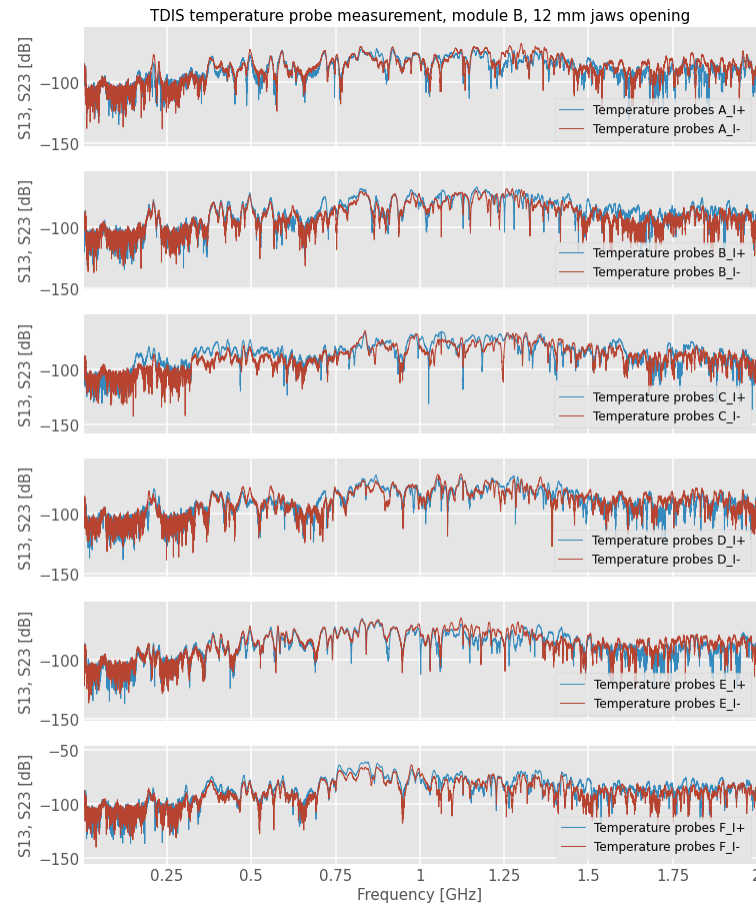
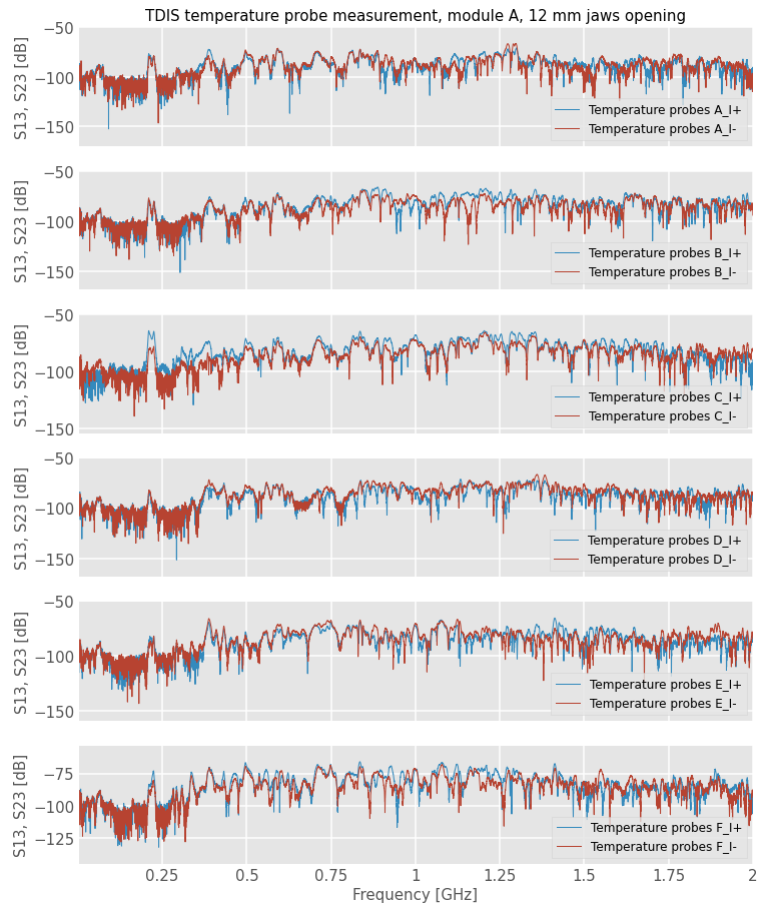


Probes measurements, 12 mm jaws opening



800 MHz mode (which was visible at 890 MHz during last measurements) can be seen around 895 MHz with fully open jaws. However it was not possible to find it back when moving to a 12 mm half gap (dashed lines).

Coupling with temperature probes, 12 mm full gap



No strong coupling with the temperature probes expected.

Conclusions

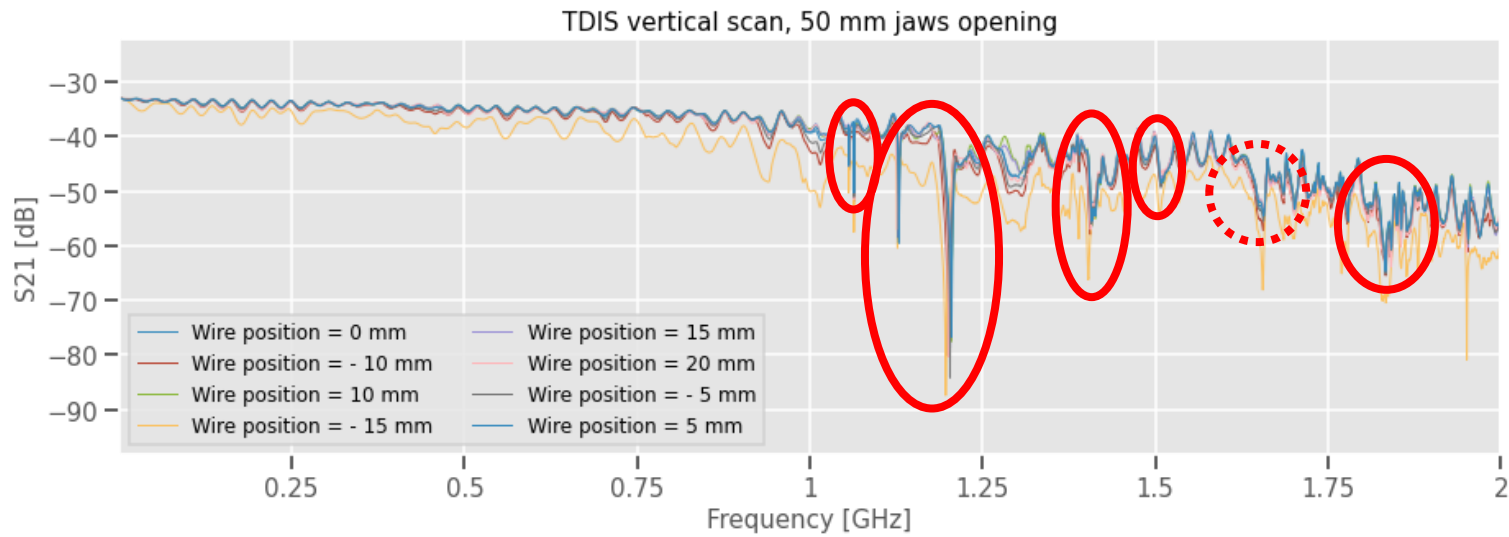
- Modes around 1.15-1.30 and 1.6 GHz could be observed in almost every configurations in both 2019 and 2020 measurements
- The small mode around 1.1 GHz seems to appear and disappear depending on the configuration we are in for both 2019 and 2020 measurements
- The strong mode around 1.75 GHz during the 2019 measurements is much weaker in the 2020 measurements.
- We were not able to spot the 800 MHz seen in the 2019 measurements during the wire measurements. We observed it with the probes in the 110 mm full gap configuration but not in the 12 mm full gap configuration.
- We do not expect a strong coupling with the temperature probes.
- Post processing Jupyter Notebooks can be found here : <https://cernbox.cern.ch/index.php/s/UI7mnWyqt3Fa5Pk>



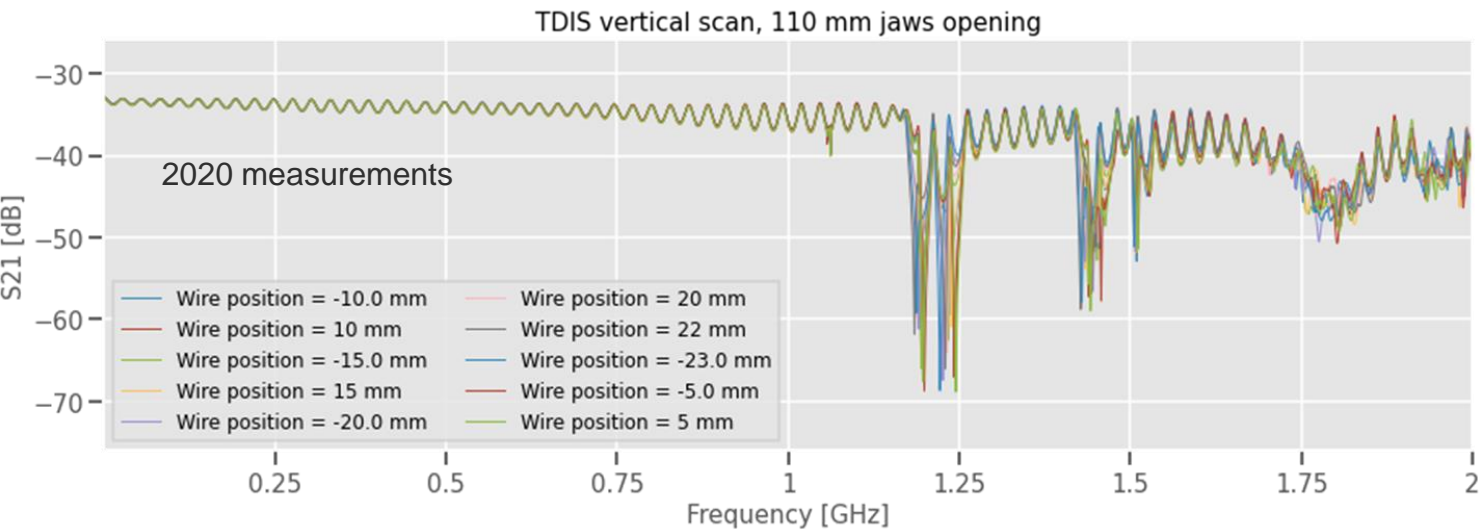
home.cern

Backup slides

Vertical scan, 50 mm jaws opening



Vertical scan near the RF screen, 110 mm jaws opening



Horizontal scan, 50 mm jaws opening

TDIS horizontal scan, 50 mm jaws opening

