S-parameters of the Front-end Network in the Low-Band 1 Receiver

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Summary

Here we show the S-parameters of the receiver Low-Band 1 *front-end network*, measured in 2015 (September) and 2017 (May). The *front-end network* corresponds to the path between the receiver input and the reference plane at the 4-position switch. This network is part of the VNA signal chain used to measure the reflection coefficient of devices connected at the input of the receiver. Part of this network —the receiver input connector and the input 2-position switch— is shared with the path that takes the antenna signal to the LNA.

Figure 1 shows the S-parameters measured in 2015 (50-100 MHz) and 2017 (40-120 MHz).

Figure 2 shows the difference between the two measurements. In general, the observed differences are a combination of small changes of the network, and measurement errors. The fact that the differences are small, in particular for the magnitude and phase of $s_{12}s_{21}$, suggests that the front-end network has not changed significantly between 2015 and 2017.

Figure 3 shows the effect of calibrating different reflection coefficients (ambient load, open cable, antenna simulator 2, and antenna from day 2017-93) with the 2017 S-parameters, when the true S-parameters are those from 2015.

S-Parameters of Front-End Network

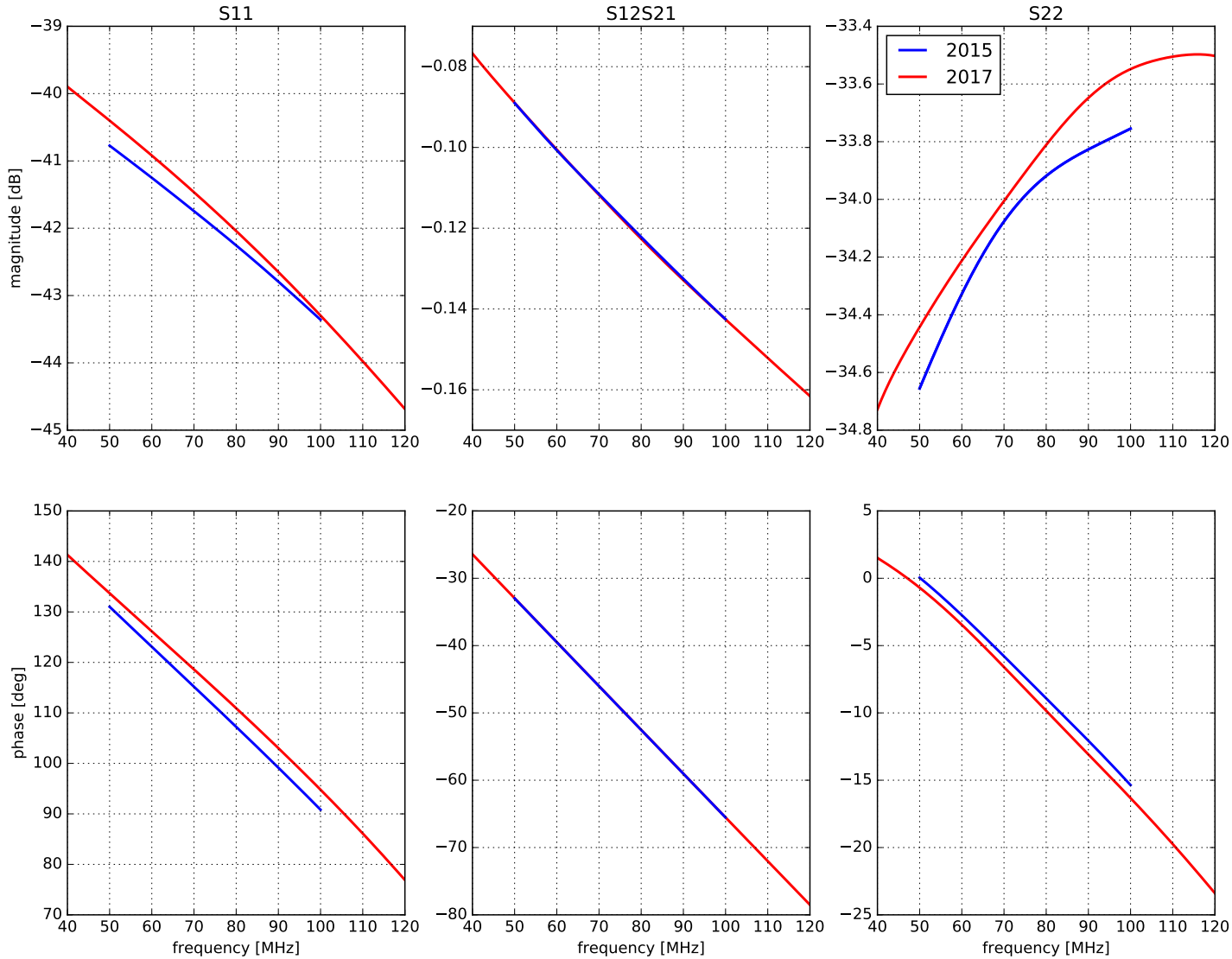

Figure : (1) S-parameters of the front-end network measured in 2015 and 2017.

S-Parameter Differences

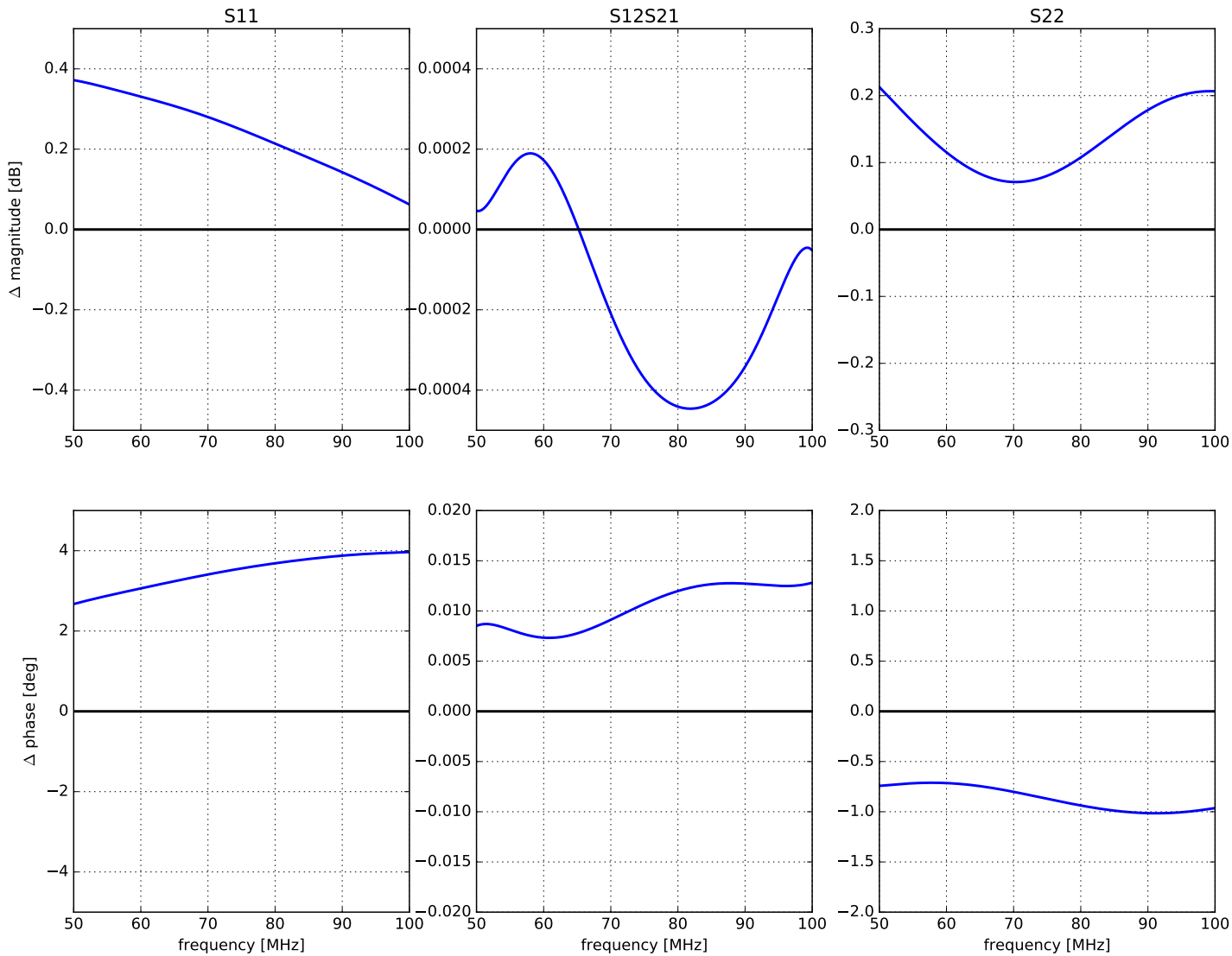

Figure : (2) Difference between S-parameters measured in 2017 and 2015.

Reflection Coefficient Differences

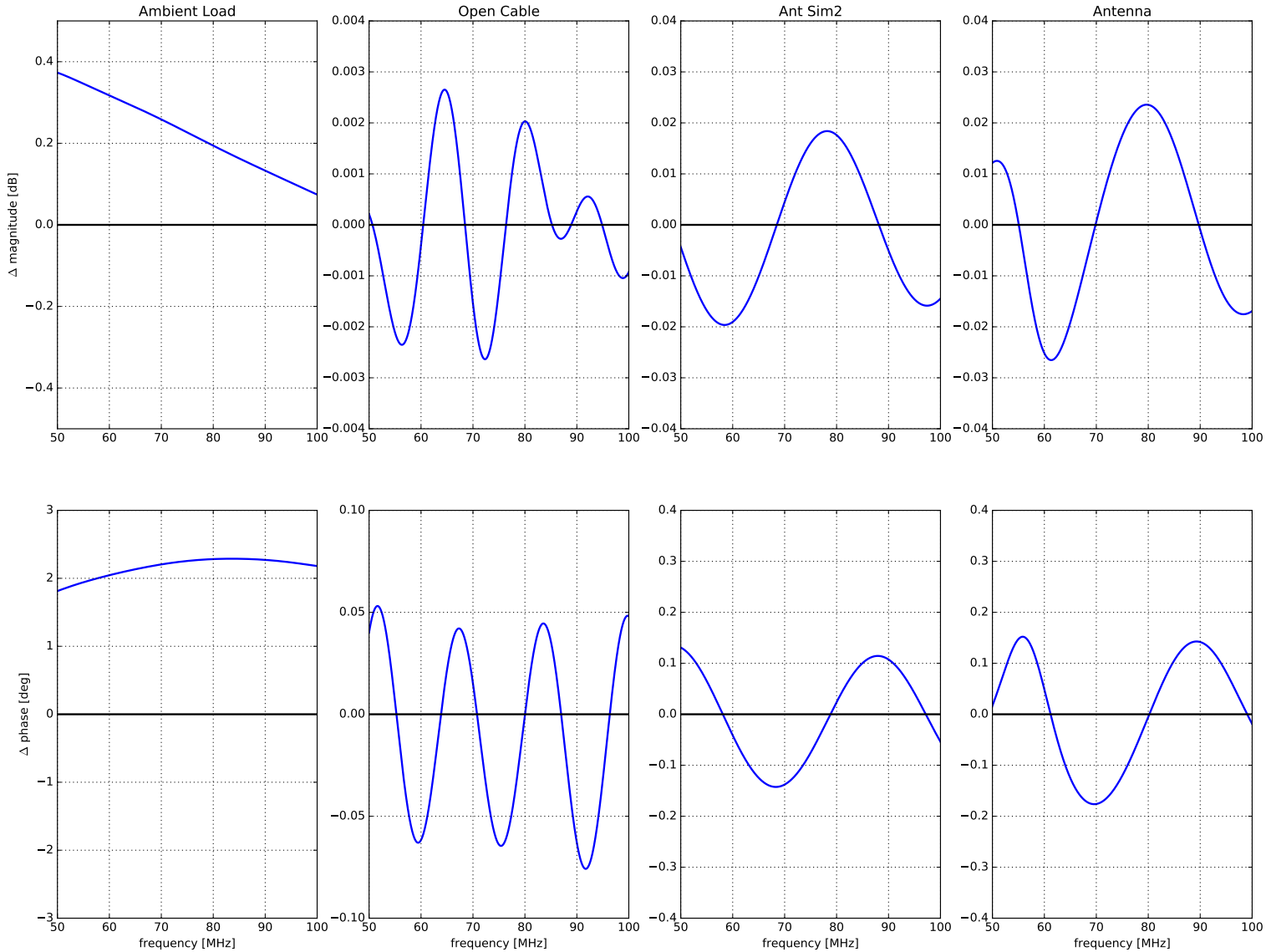

Figure : (3) Difference in reflection coefficient of ambient load (column 1), open cable (column 2), antenna simulator 2 (column 3), and antenna (column 4), when calibrated with the S-parameters measured in 2015 (assumed as true) and 2017.