

This part D contains the microwave characterization of the two amplification chains on the basis of the measured data reported in parts A-B of this document.

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IRA 369/04

Measured characteristics of the components of the Bar-SPort radiometer @ 32 GHz: part D of {A, B, C, D}

Technical Report



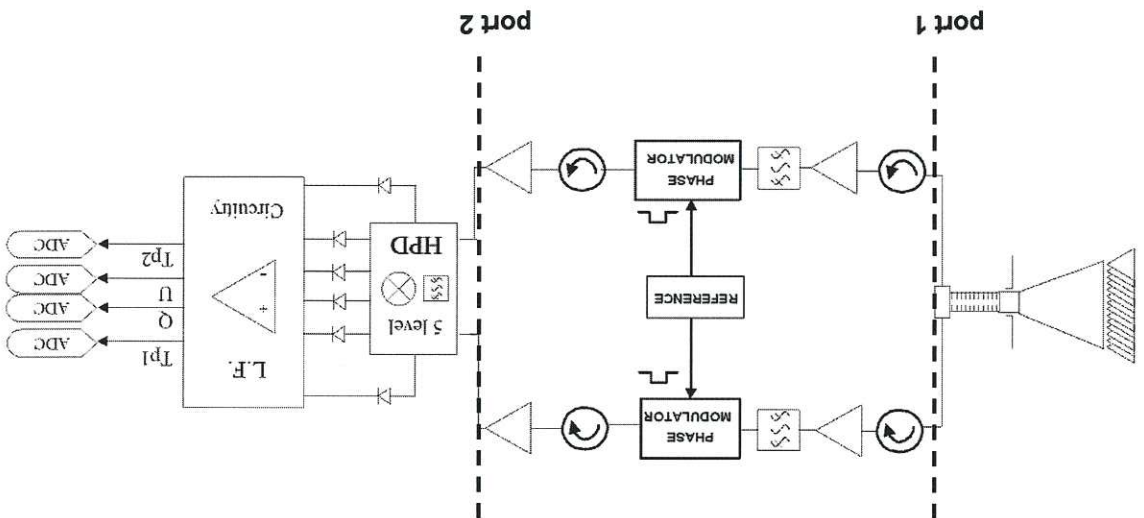
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chain B	chain A	component
SN 002	SN 003	cryogenic circulator DORADO
12.000 mm	12.000 mm	WR28 waveguide line
SN AM003	SN AM001	cold LNA NRAO
80.000 mm	80.000 mm	WR28 waveguide line
SN 002	SN 001	S-shape transition IEIT
SN F2	SN F1	outer filter IEIT
25.000 mm	25.000 mm	WR28 waveguide line
SN 11	SN 12	phase modulator PMP1640
SN 09	SN 10	isolator DORADO
SN AM002	SN AM004	warm LNA NRAO

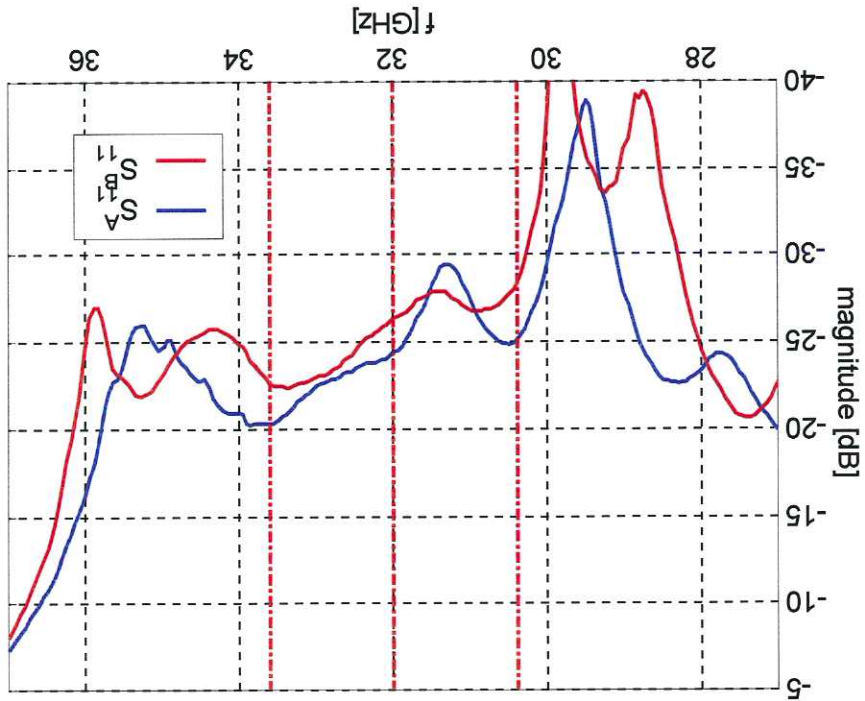


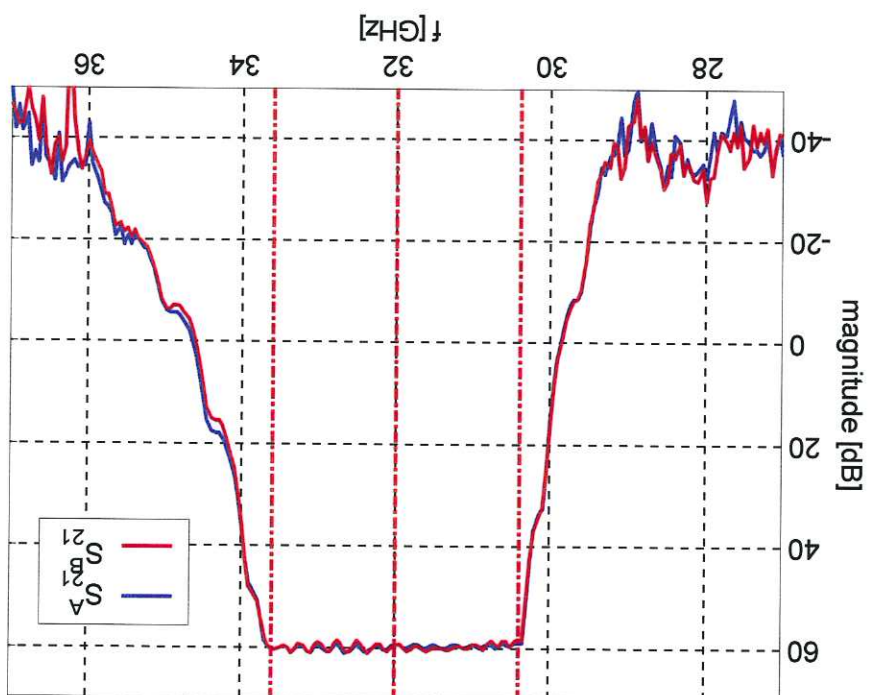
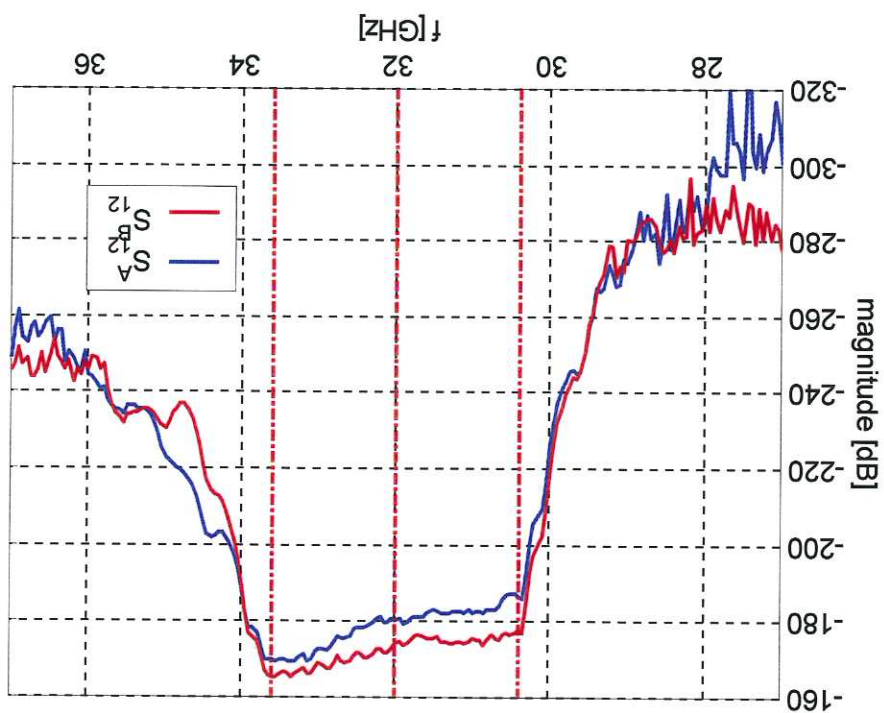
NOTES:

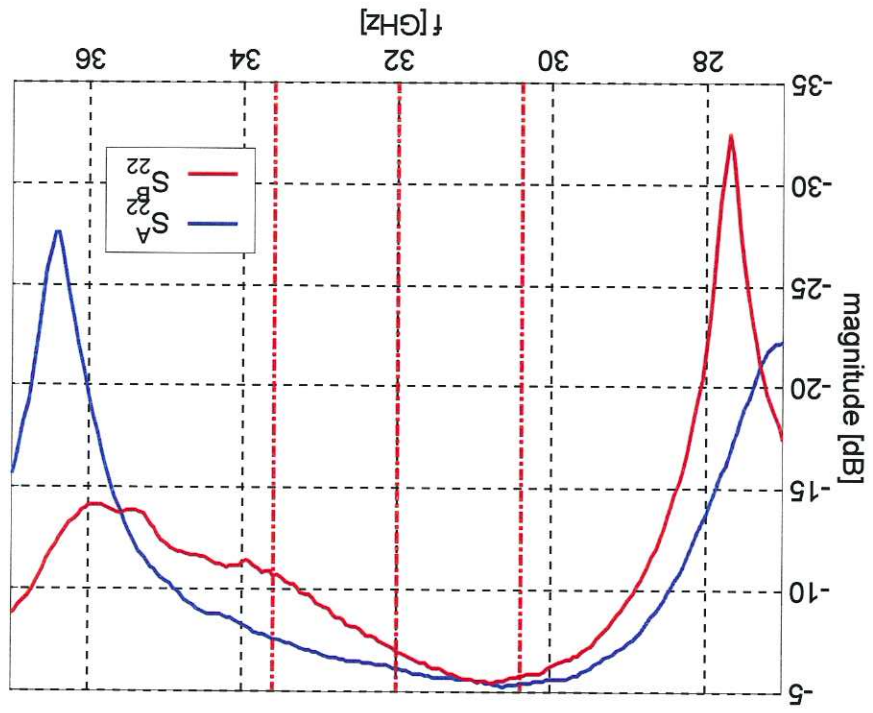
- all the reported data refer to room temperature;
- the microwave characterization of the entire chain was evaluated by cascading the measured scattering parameters of the components (slow prototyping); a mono-modal interaction between the components was assumed;
- the two outer filters can be interchanged without any significant degradation of the presented results;
- the input reflection @ port 1 of both channels is basically due to the cryogenic circulators;
- the in-band ripples in the transmission coefficients are caused by multi-reflections occurring between the amplifiers and the isolators;

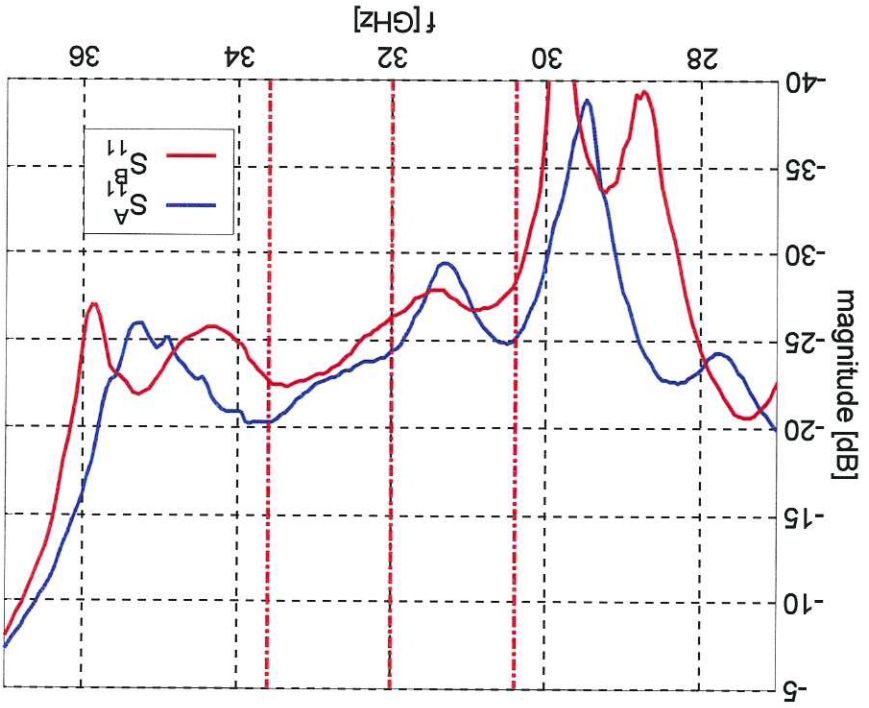
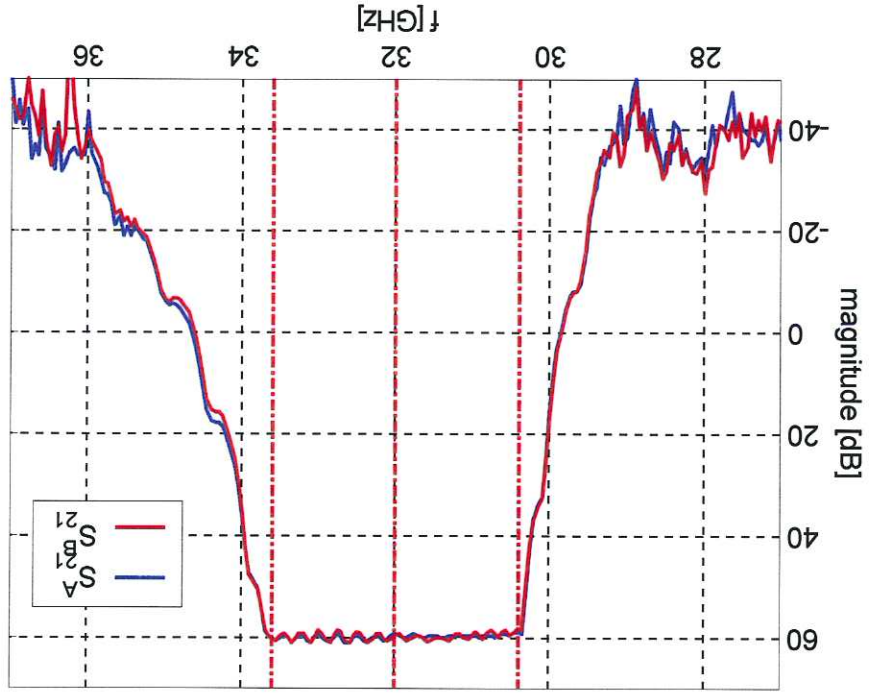
$$Y = \frac{\langle |A|^2 \rangle \cdot \langle |B|^2 \rangle}{\langle A \cdot B^* \rangle} = \frac{\sqrt{\int_{\omega}^{\Delta\omega} |S_{21}^{(A)}|^2 d\omega \cdot \int_{\omega}^{\Delta\omega} |S_{21}^{(B)}|^2 d\omega}}{\int_{\omega}^{\Delta\omega} S_{21}^{(A)} S_{21}^{(B)*} e^{+jkz_l} d\omega}$$

Measured characteristics when the phase modulators are @ status 1

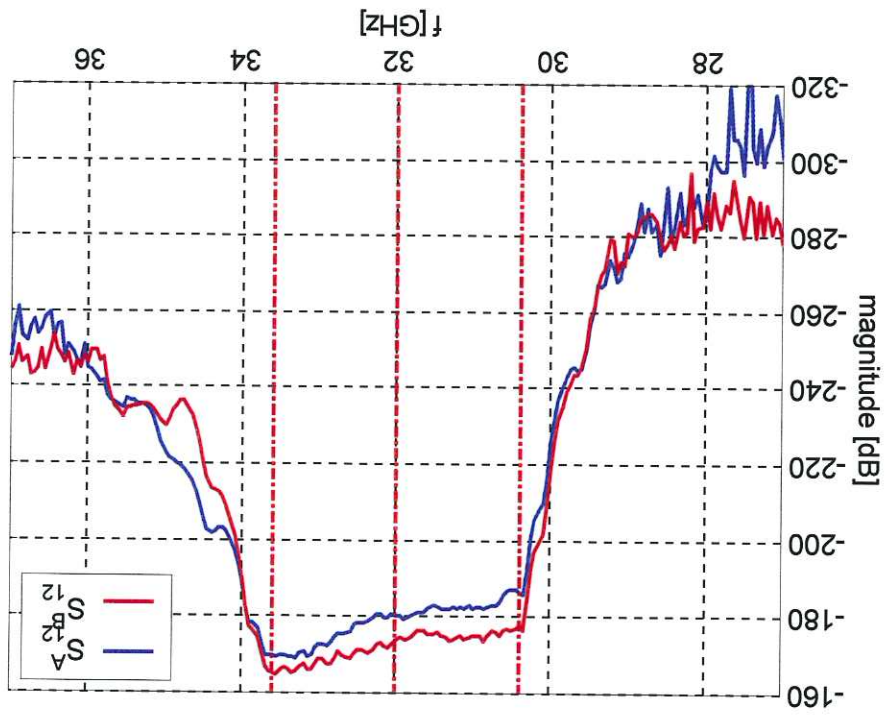
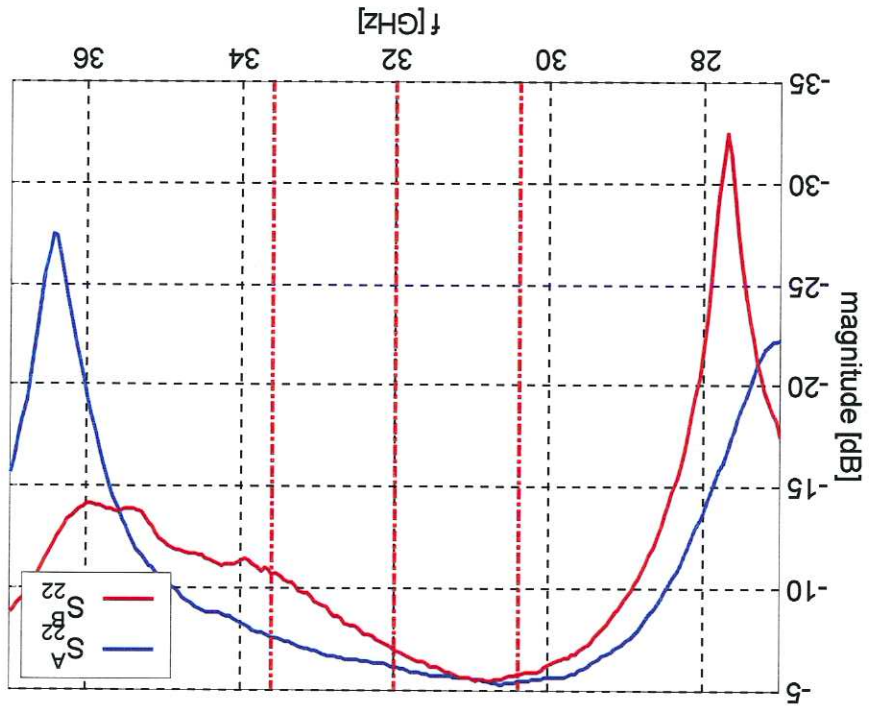






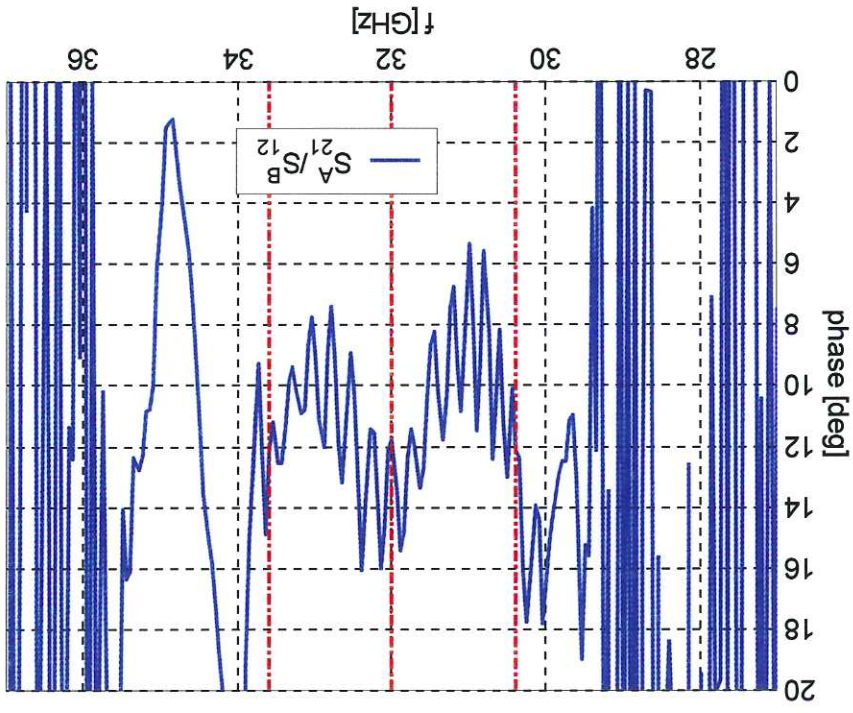
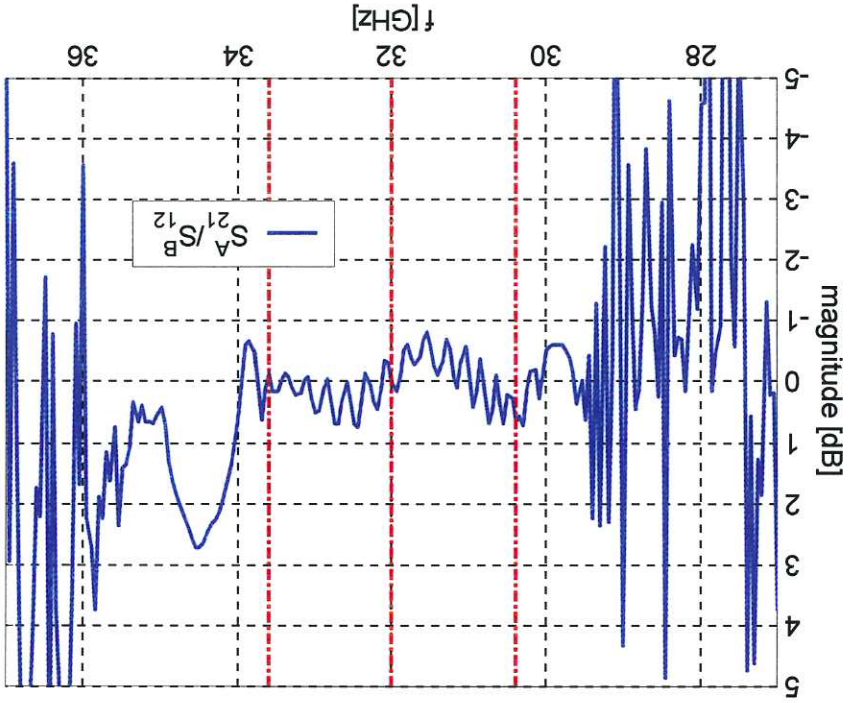


Measured characteristics when the phase modulators are @ status 2

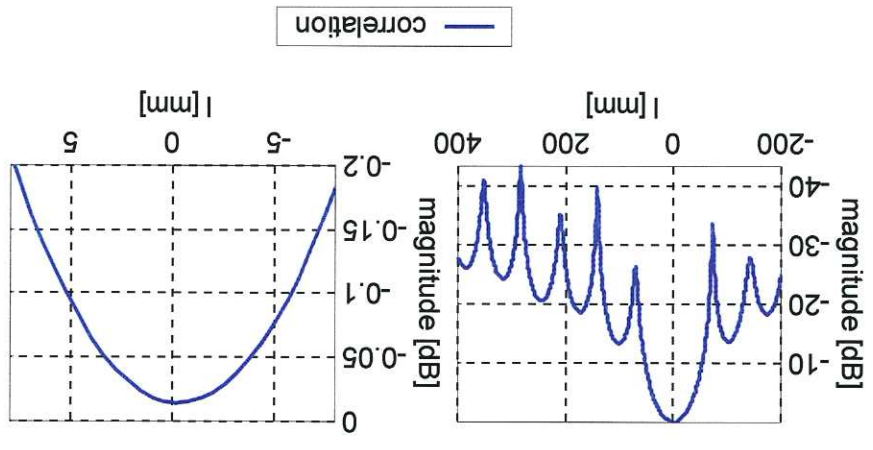


	mean value of return loss @ port 1	mean value of gain @ port 1	mean value of return loss @ port 1	
chain A @ status 1	24.272 dB	60.023 dB	6.162 dB	176.937 dB
chain A @ status 2	24.272 dB	60.097 dB	6.162 dB	176.868 dB
chain B @ status 1	25.276 dB	59.994 dB	7.220 dB	171.249 dB
chain B @ status 2	25.276 dB	60.027 dB	7.220 dB	171.227 dB

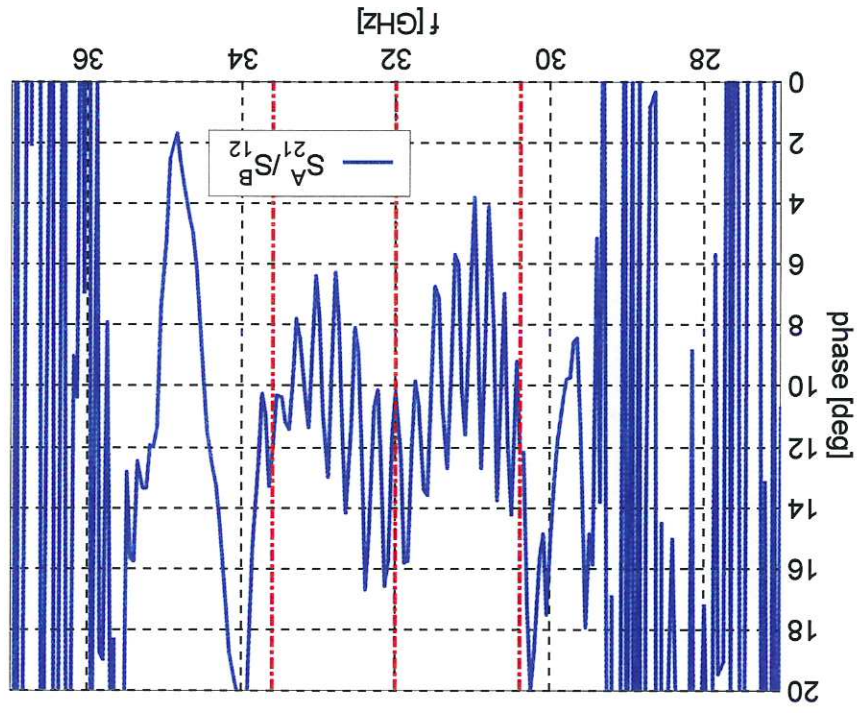
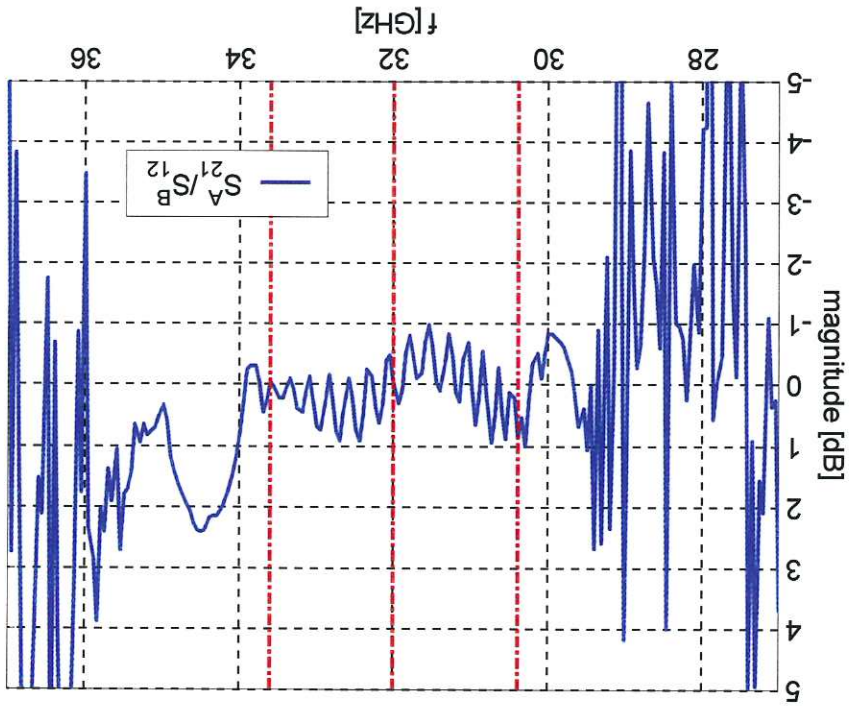
Transfer function ratio when the phase modulator of chain A is @ status 1 & the phase modulator of chain B is @ status 1



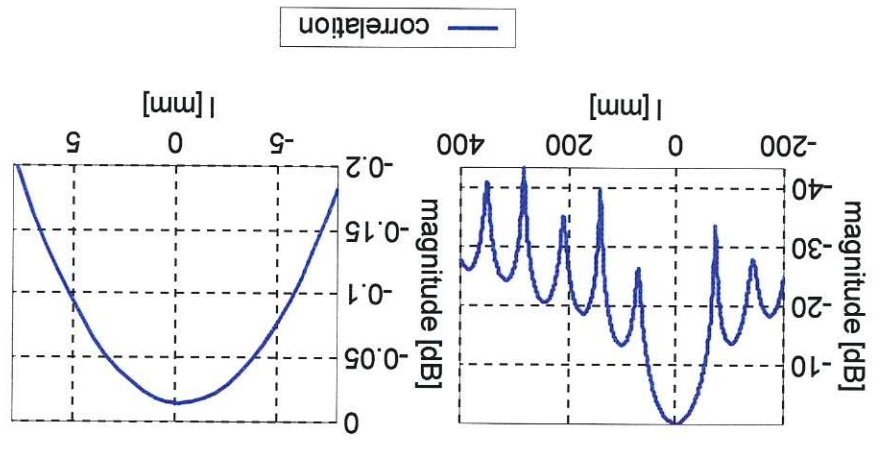
correlation $\gamma = -0.014$ dB;



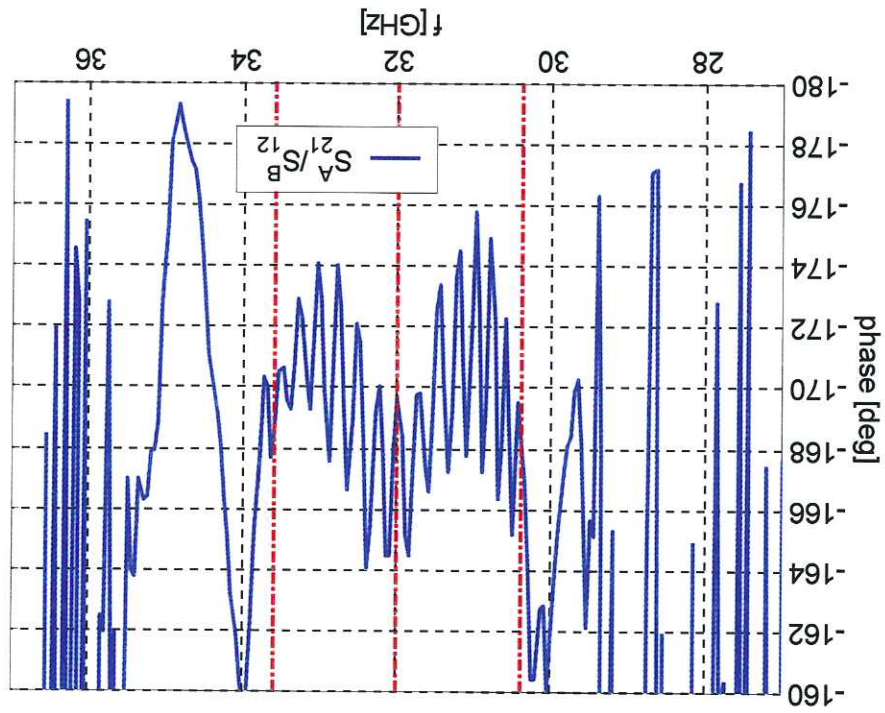
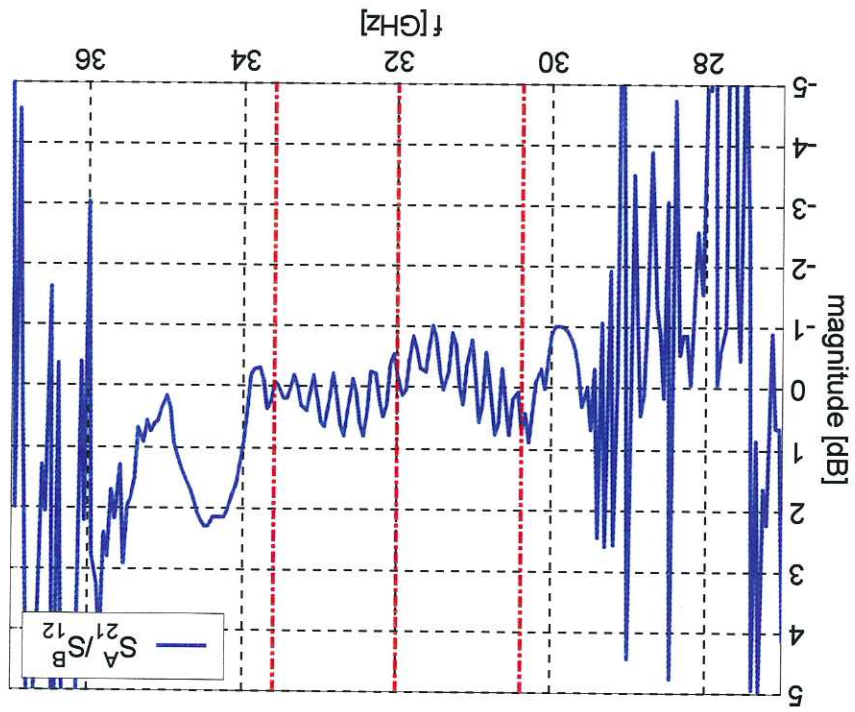
Transfer function ratio when the phase modulator of chain A is @ status 2 & the phase modulator of chain B is @ status 2



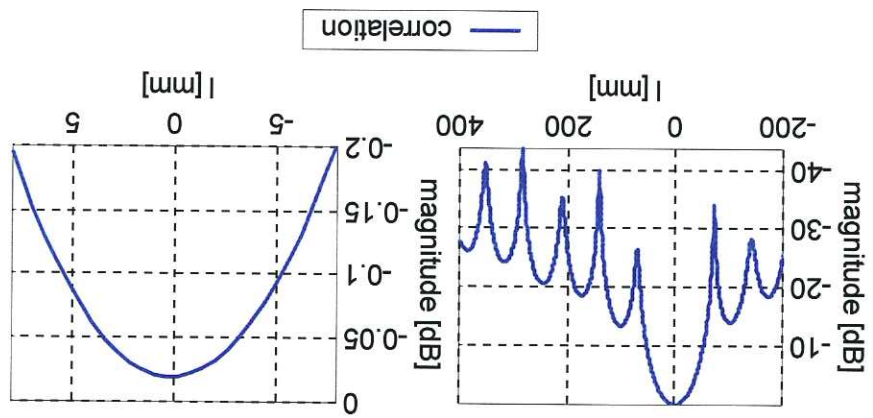
correlation $\gamma = -0.021$ dB;



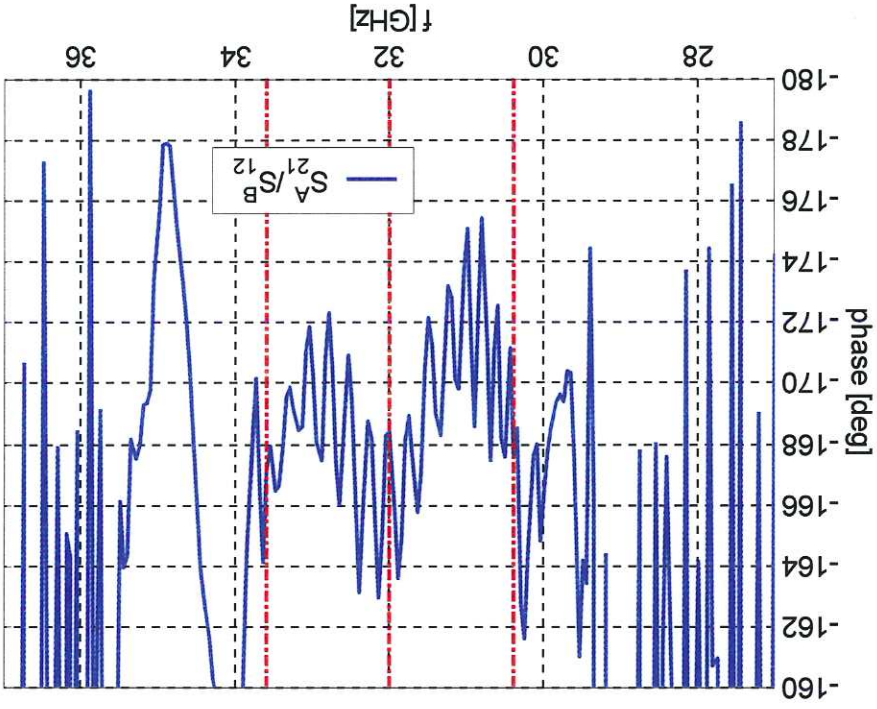
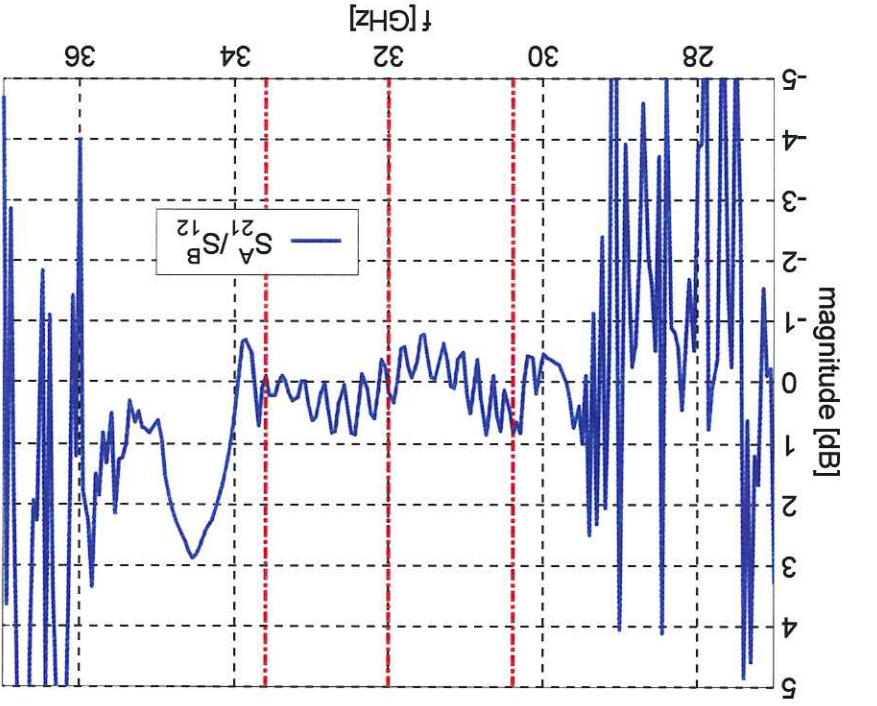
Transfer function ratio when the phase modulator of chain A is @ status 1 & the phase modulator of chain B is @ status 2



correlation $\gamma = -0.019$ dB;



Transfer function ratio when the phase modulator of chain A is @ status 2 & the phase modulator of chain B is @ status 1



correlation $\gamma = -0.017$ dB;

