

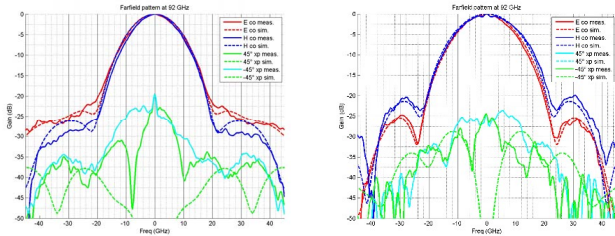


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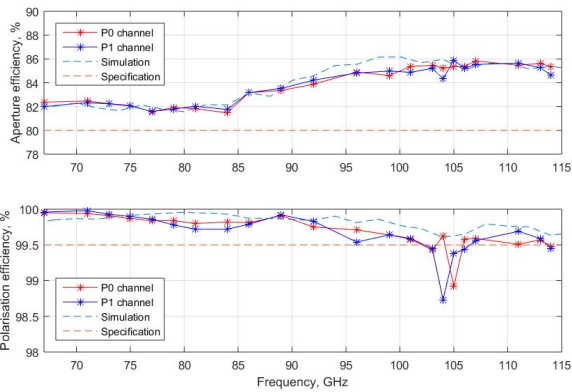


#### IV. RESULTS

The measured far field patterns have been found very similar to the simulations. Figure 2 shows the comparison of the simulated and measured beam patterns of the UdC and INAF designed horn and OMT, without the lens.



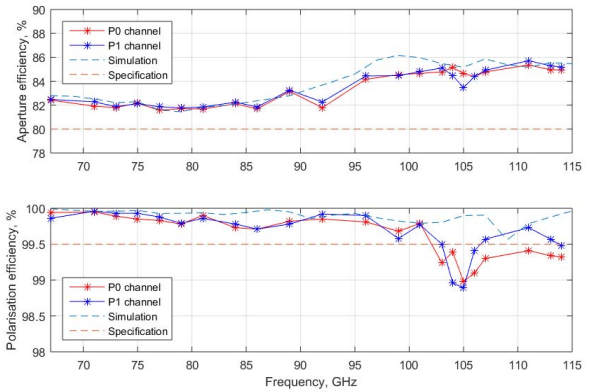
**Fig. 2.** Measured and simulated far-field beam patterns at 92 GHz for UdC horn and OMT (left panel), and INAF horn and OMT (right panel).



**Fig. 3.** Comparison between the measured and simulated aperture and polarization efficiencies for the full INAF system, including the lens. Aperture efficiencies are fully compliant to ALMA specification of  $>80\%$  across full frequency range. Polarization efficiencies are mostly compliant to ALMA specification of  $>99.5\%$ , with some degradation between 103-105 GHz.

Full optical systems, including the lens, have been so far measured with the INAF OMT only. The optical efficiencies are calculated and results are presented in Figures 3 and 4. Aperture efficiencies of both UdC and INAF optical designs are compliant to ALMA specifications of  $>80\%$  across full frequency range.

Polarization efficiencies are mostly compliant to the  $>95.5\%$  requirement as well, with some degradation above 101 GHz for both types of horns. The reason for this degradation is not clear yet and is being investigated.



**Fig. 4.** Comparison between the measured and simulated aperture and polarization efficiencies for the UdC horn, including the lens, followed by INAF OMT. Aperture efficiencies are fully compliant to ALMA specification of  $>80\%$  across full frequency range. Polarization efficiencies are mostly compliant to ALMA specification of  $>99.5\%$ , with some degradation above 101 GHz.

#### REFERENCES

- [1] ALMA Observatory: [www.almaobservatory.org](http://www.almaobservatory.org)