

STUDY OF THE UNCERTAINTY AND ITS MININIZATION IN THE MEASUREMENTS OF ANTENNA GAIN IN FAR-FIELD CONDITIONS

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Motivation of the work

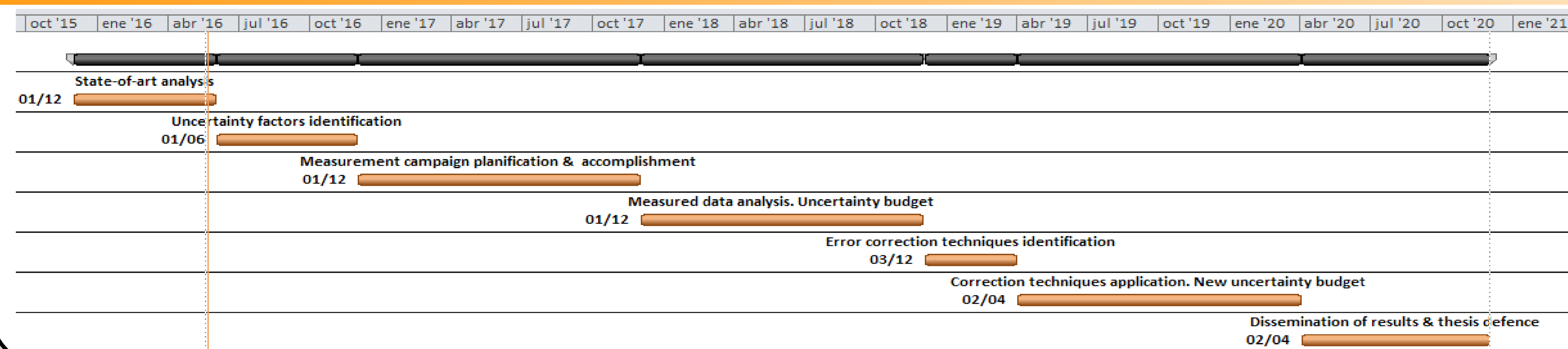
- Telecommunication services require **precise measurements** of antenna parameters => accurate **characterization of uncertainty** and error reduction techniques are needed.
- TRUE VALUE = MEASUREMENT RESULT ± UNCERTAINTY
- Uncertainty {
 - Quantitative indication of the reliability of the measurement result.
 - Implies assessment of all error sources and possible corrections.
 - Allows comparison with references or values obtained by others.
- Measurements of antenna parameters follow defined procedures globally accepted but **no international standard exist for uncertainty.**

Thesis objectives

This study has as main objective to gain in-depth knowledge about the factors contributing to the uncertainty in antenna gain measurements in far field and about how to mitigate their influence. Further description of objectives is:

- State-of-art of uncertainty characterisation in antenna measurements.
- Identification of the factors contributing to uncertainty.
- Measurement campaign to identify and quantify each factor.
- Error correction techniques.
- Uncertainty budget.

Research plan



Next year planning

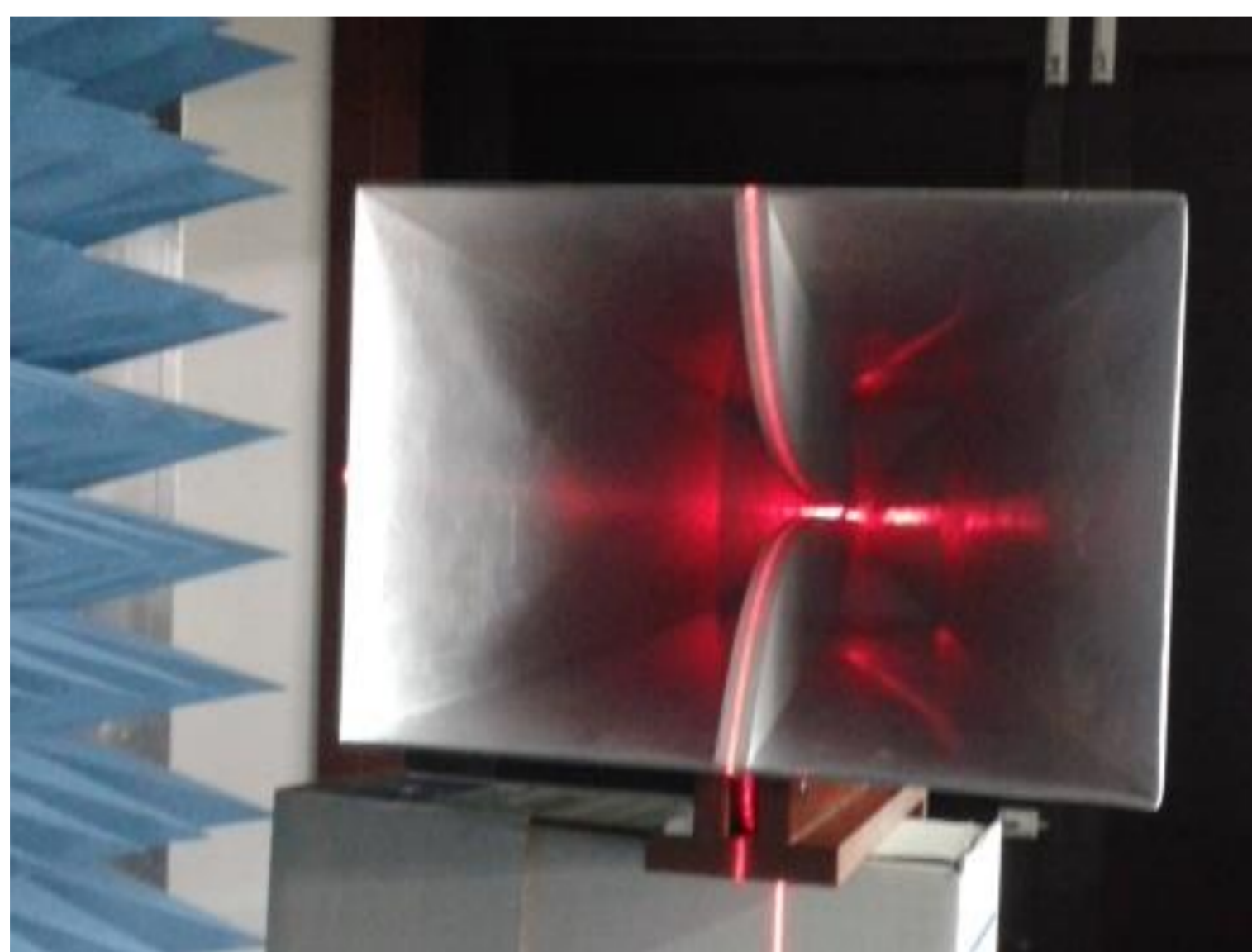
- Conducting a theoretical approach to identify the factors contributing to the uncertainty in antenna gain measurements.
- Design and accomplishment of an extensive measurement campaign to identify the uncertainty components in far field measurements and how much they affect.

Results & Discussion

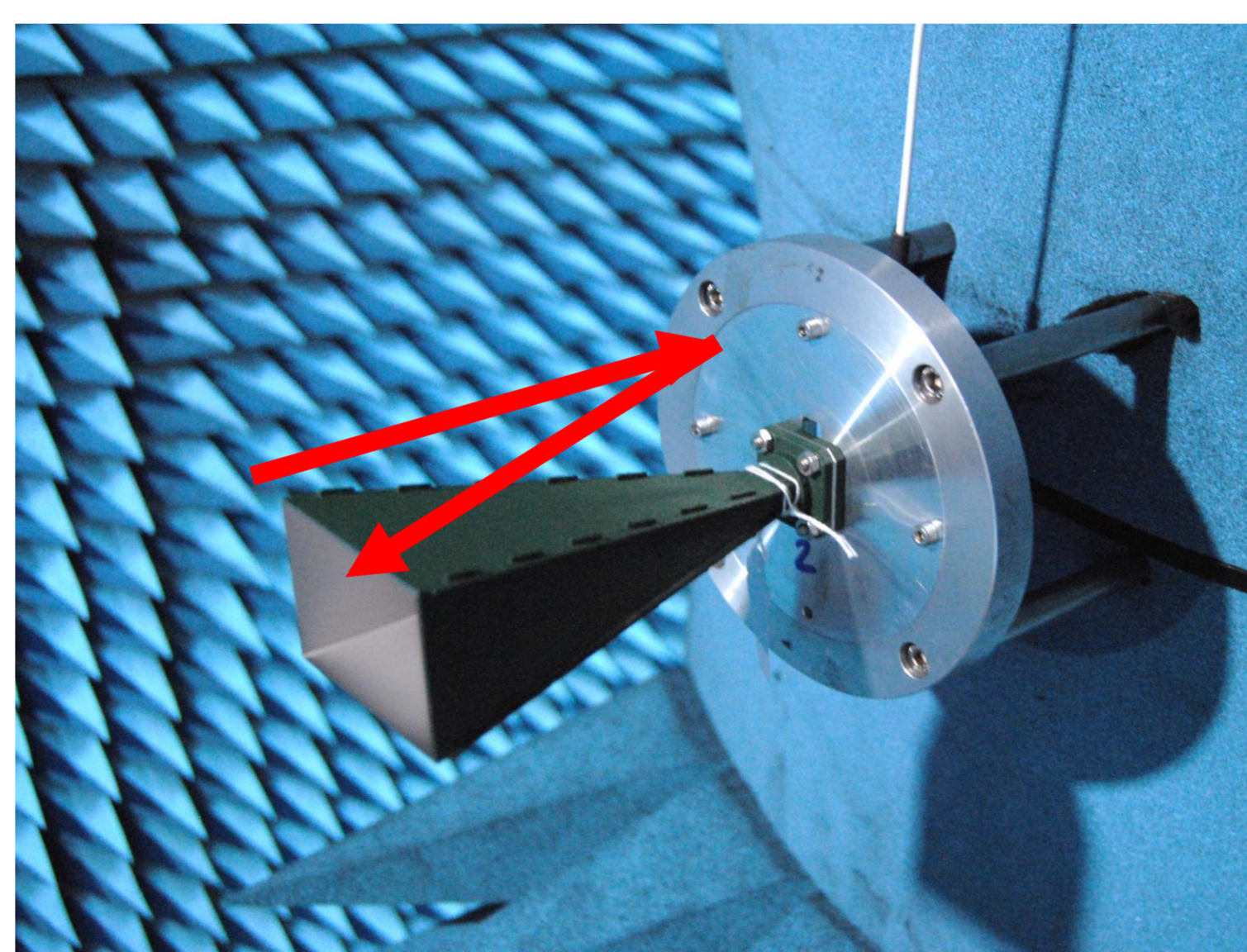
Measurement uncertainty comprises many components that can be evaluated by:

- Type A evaluation: by a statistical analysis of measured values obtained under defined measurement conditions.
- Type B evaluation: determined by other means like: authoritative published values, values of a certified reference material, values from a calibration certificate, about drift, through personal experience.

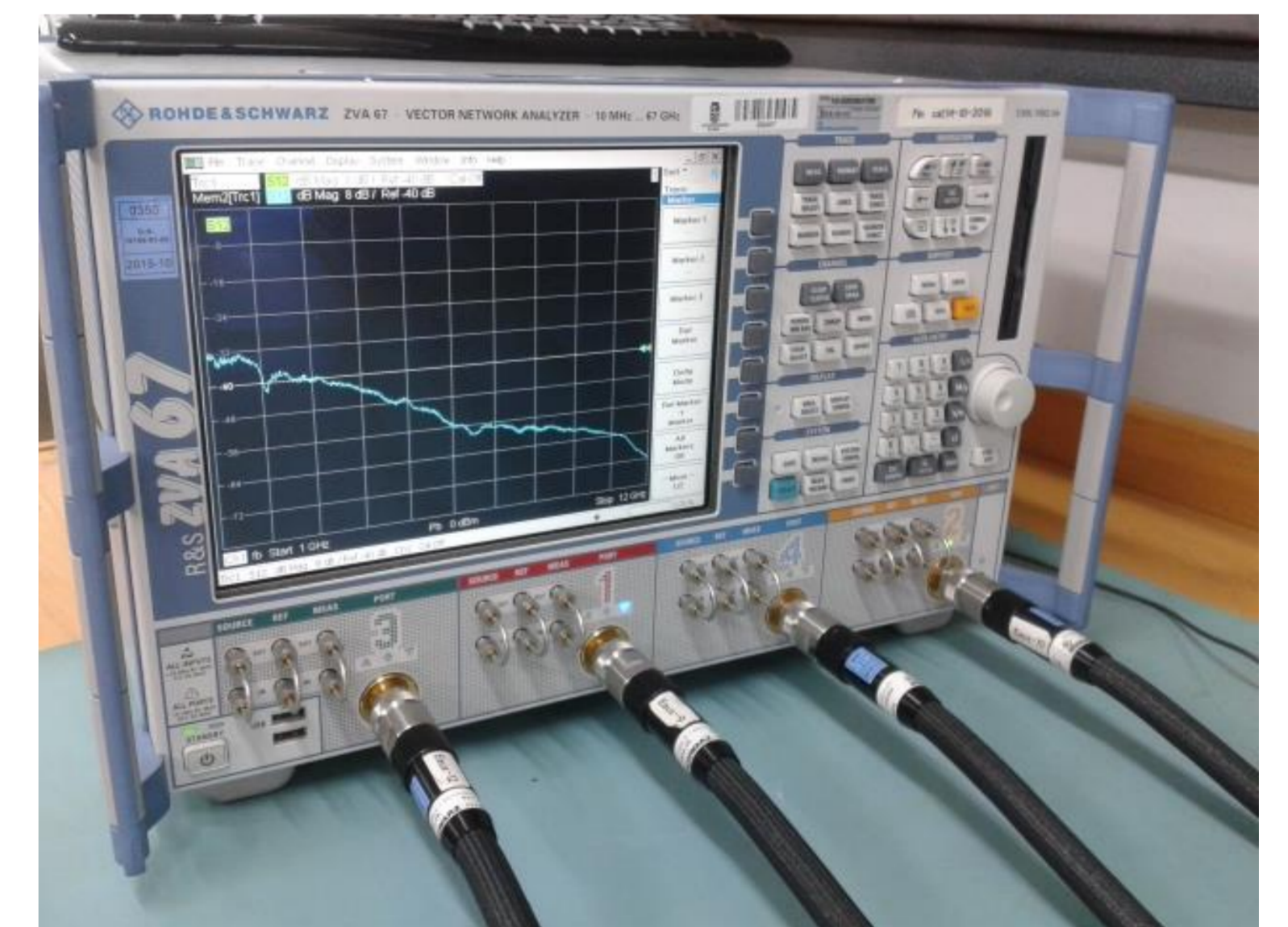
Some sources of error in antenna measurement



Alignment of the antenna under test



Undesired signals



Instrumentation non-linearities

References

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