Future Requirements in Reverberation Testsing

Rohde & Schwarz on future requirements in Reverberation Testing

de Nederlandse EMC-ESD Vereniging

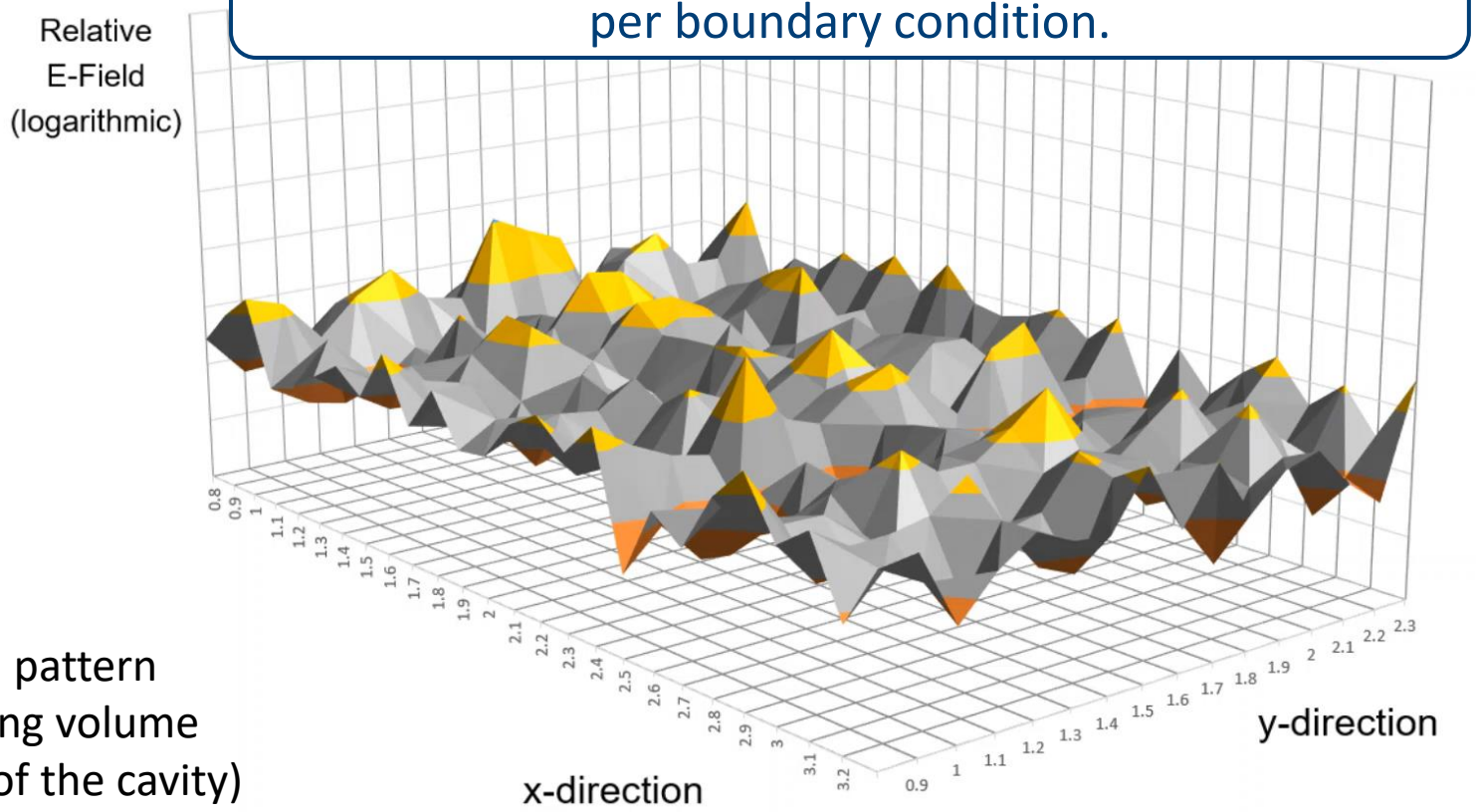
EMC-ESD Event 2023

Hotel van der Valk Vianen

Dinsdag 21 november

Spatial Field Strength Pattern within Cavity

One individual spatial field pattern
per boundary condition.



Example of
fieldstrength pattern
within working volume
(subsection of the cavity)

Video 1

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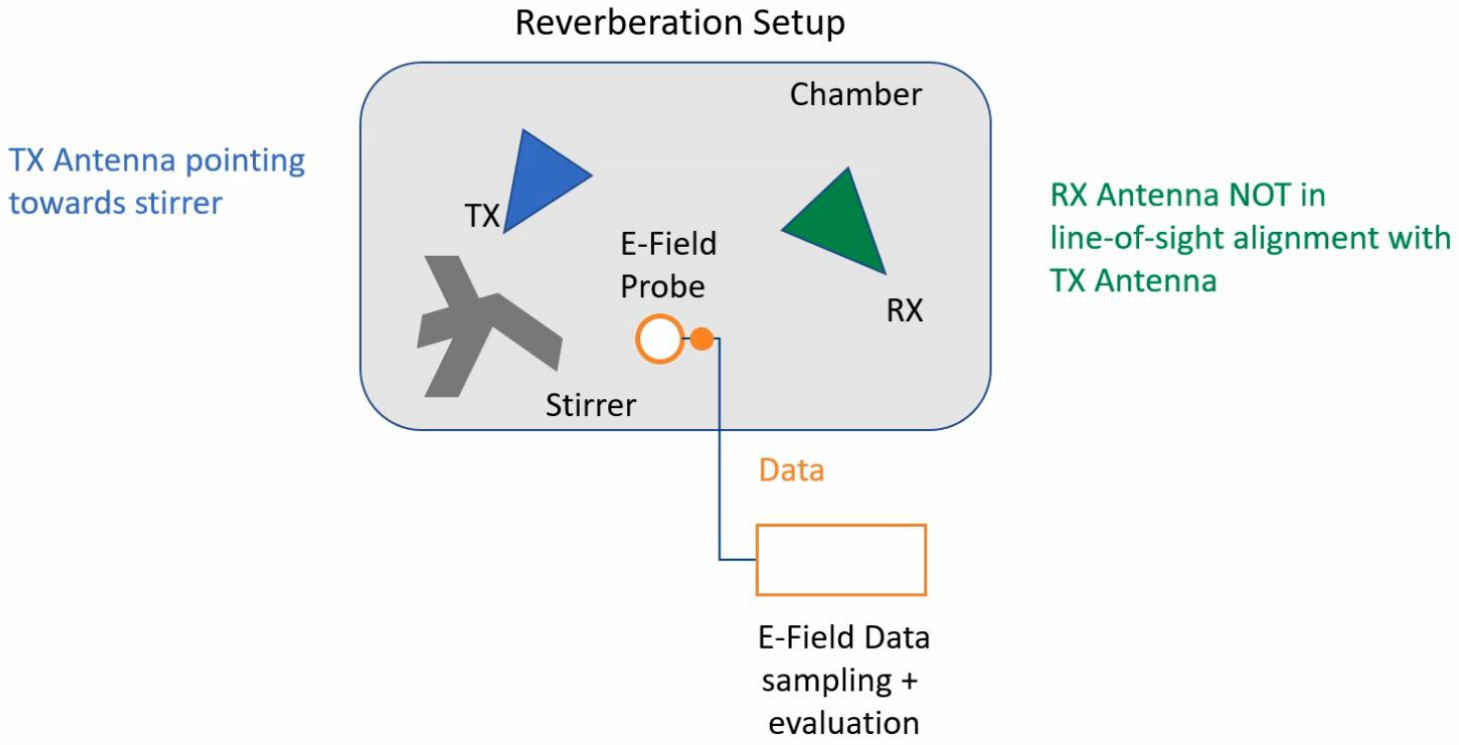
Field Evaluation per Probe Position



Video 2

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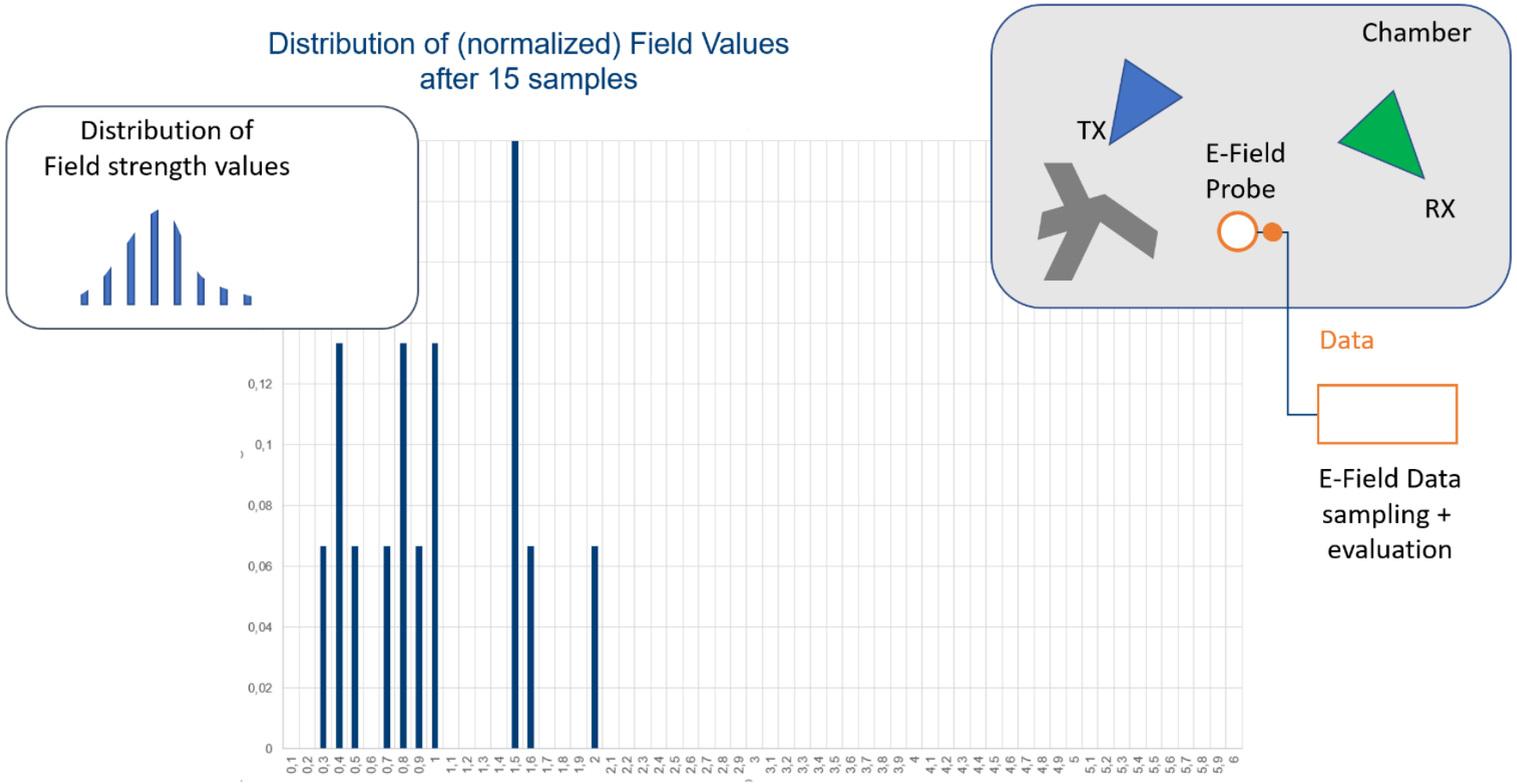
Statistic Field Evaluation per Probe Position



At the begin of sample collection the statistic evaluation does not allow a comparison with any distribution curves.

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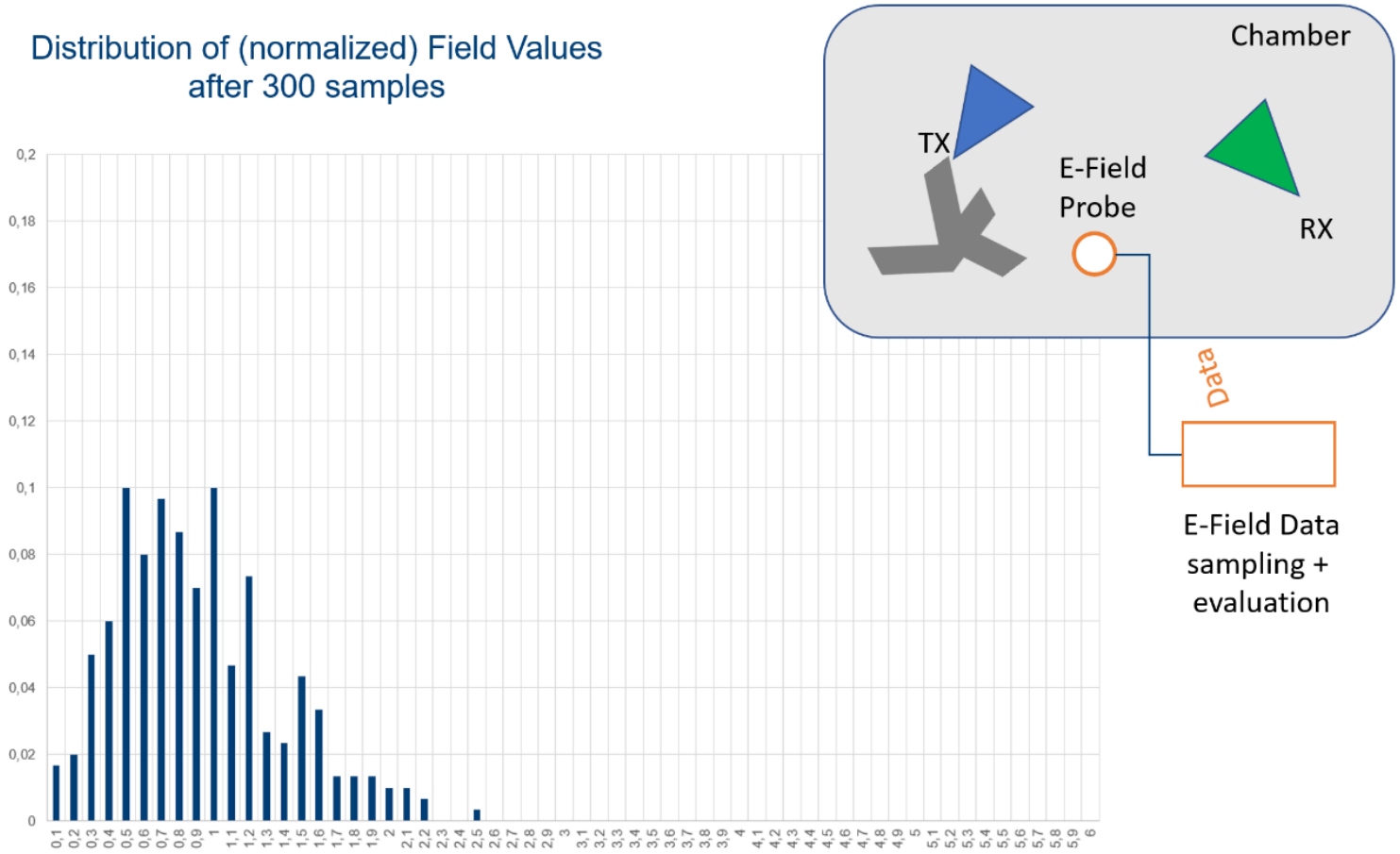
Statistic Field Evaluation per Probe Position



It requires a larger amount of samples to allow a comparison with well known types of distribution curves.

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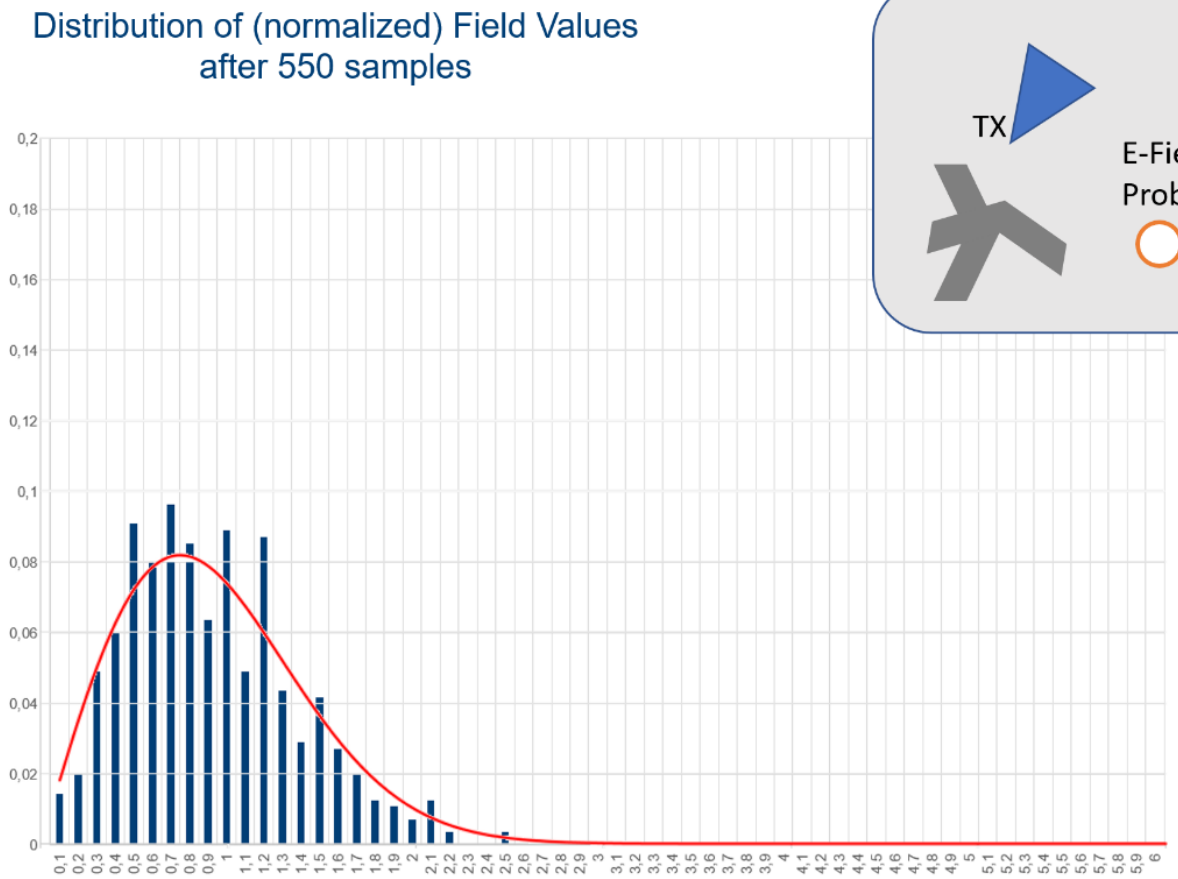
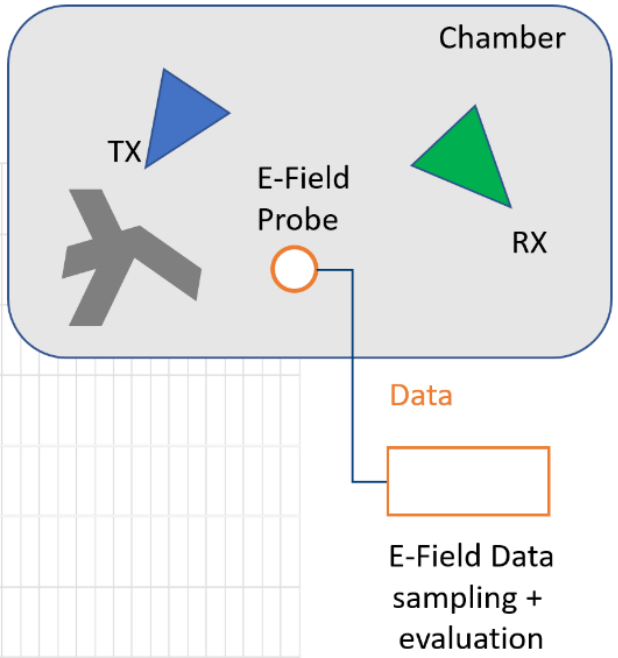
Statistic Field Evaluation per Probe Position





The more samples are collected, the better will be the curve fit of a distribution function. Here, the Rayleigh Distribution is applied.

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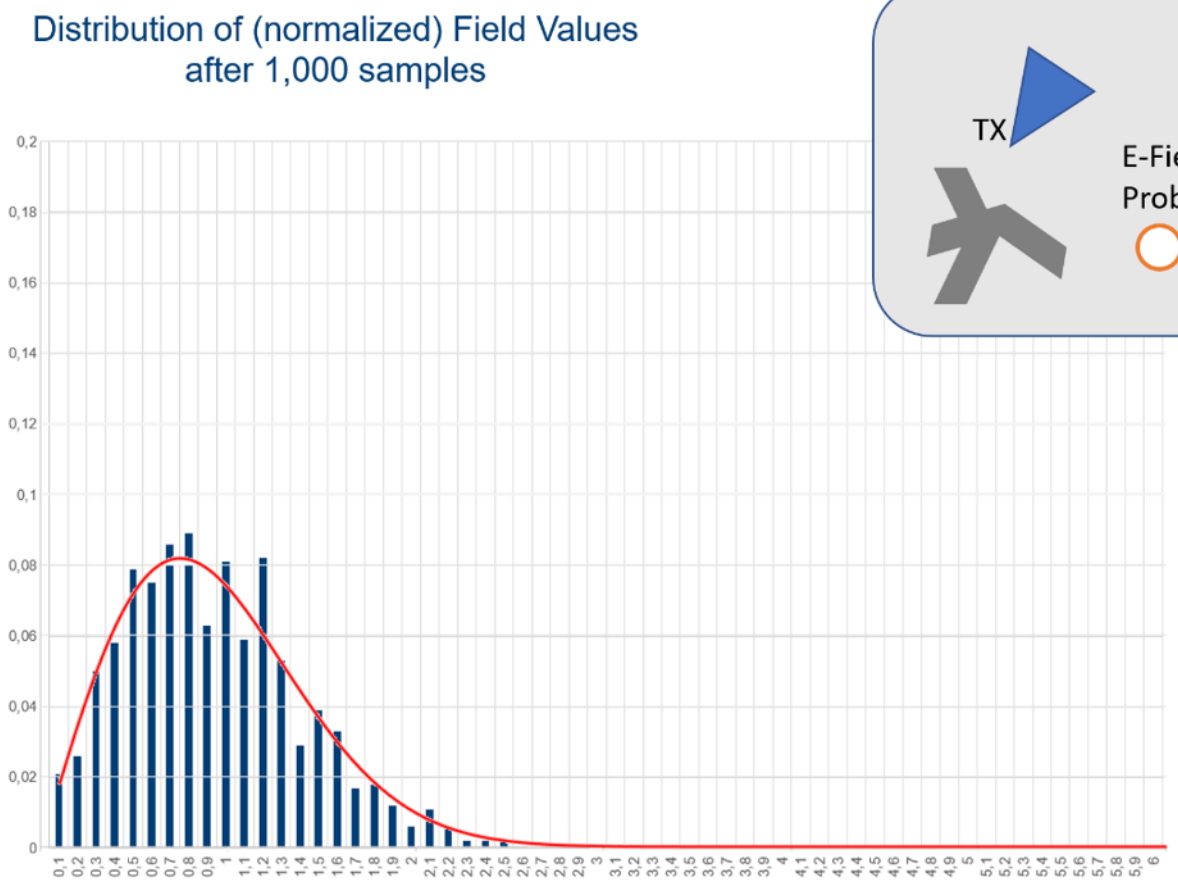
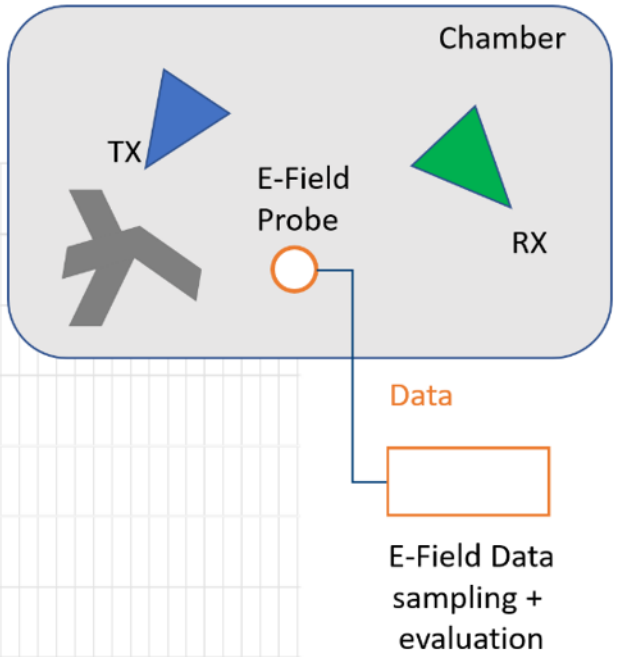
Statistic Field Evaluation per Probe Position





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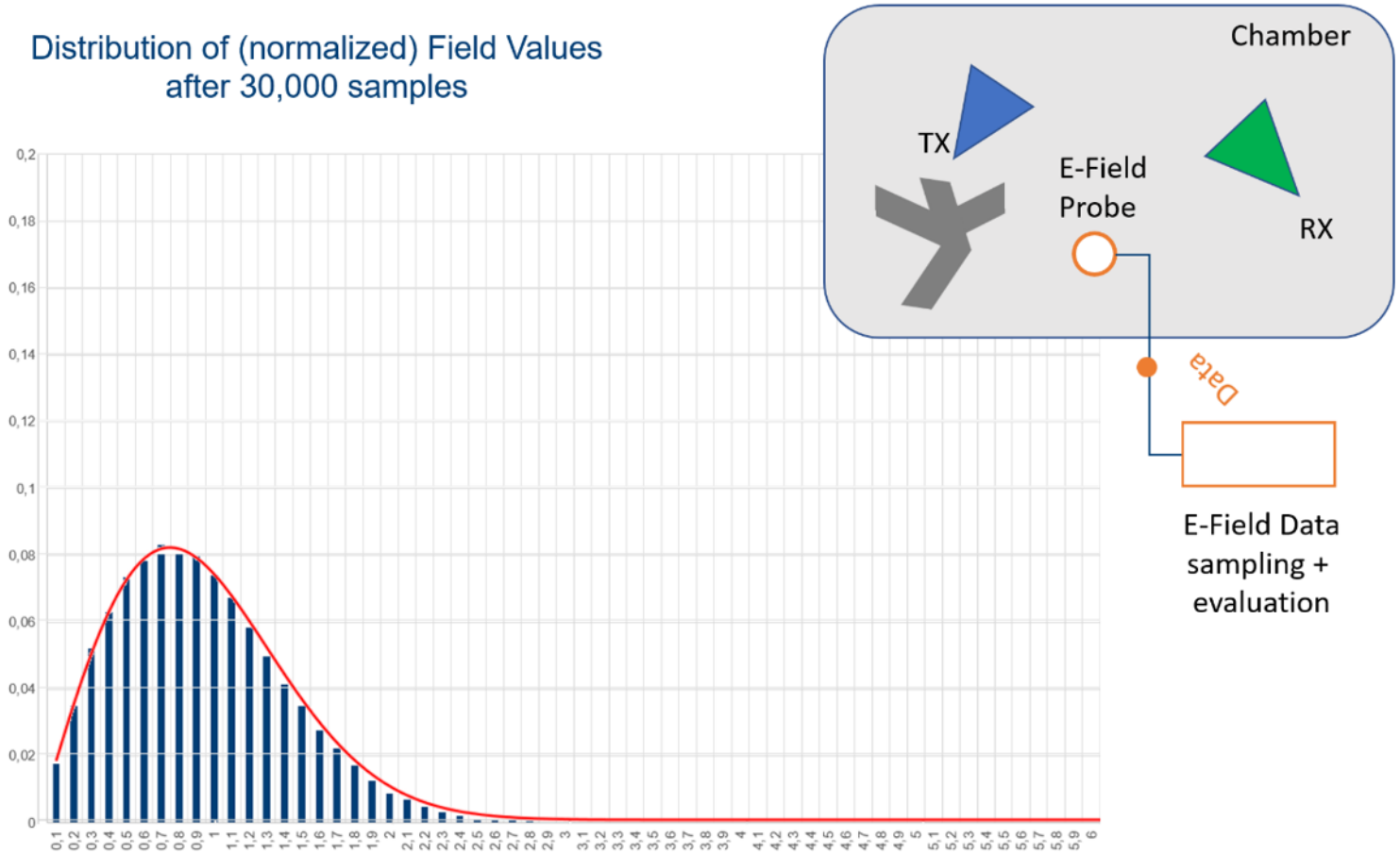
Statistic Field Evaluation per Probe Position



A good curve fit would require a high number of samples.

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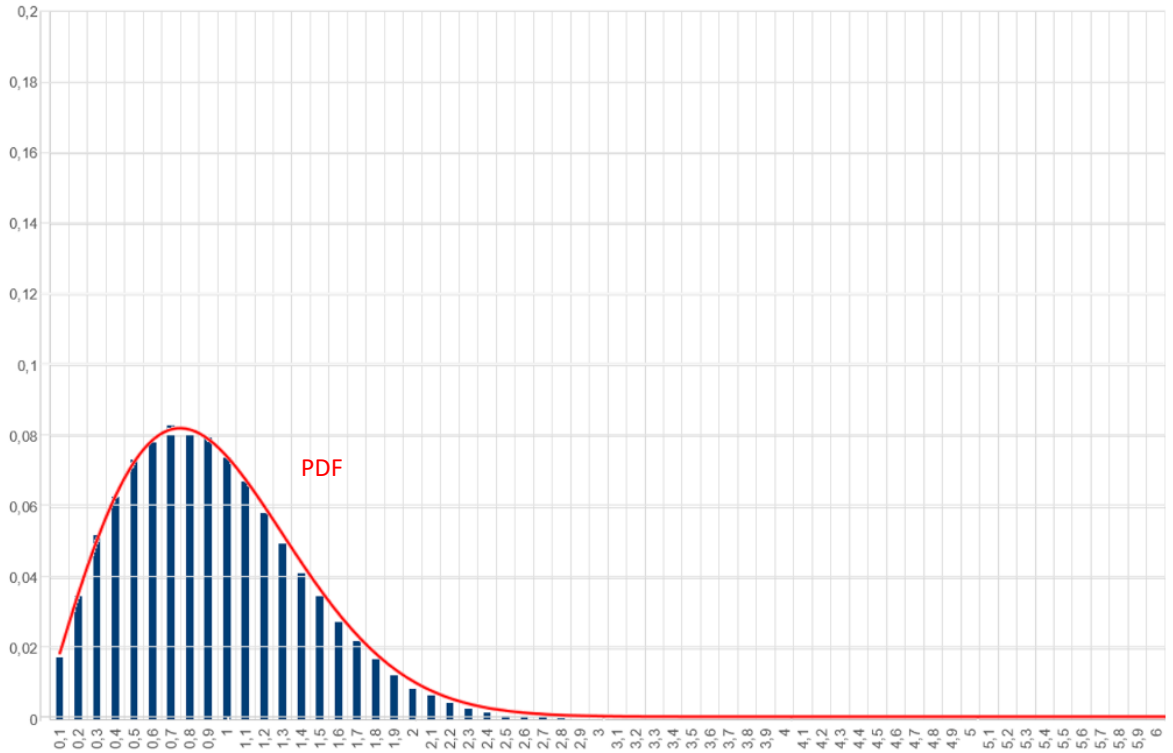
Statistic Field Evaluation per Probe Position

Questions

What to select as figure of merit?

- Mean value
- Maximum value
- Average value

What to use for the power control of the immunity test system?



Would a PDF curve fit procedure be a good choice?

Is there another way to check the statistic behavior of the field?

PDF = Probability Distribution Function

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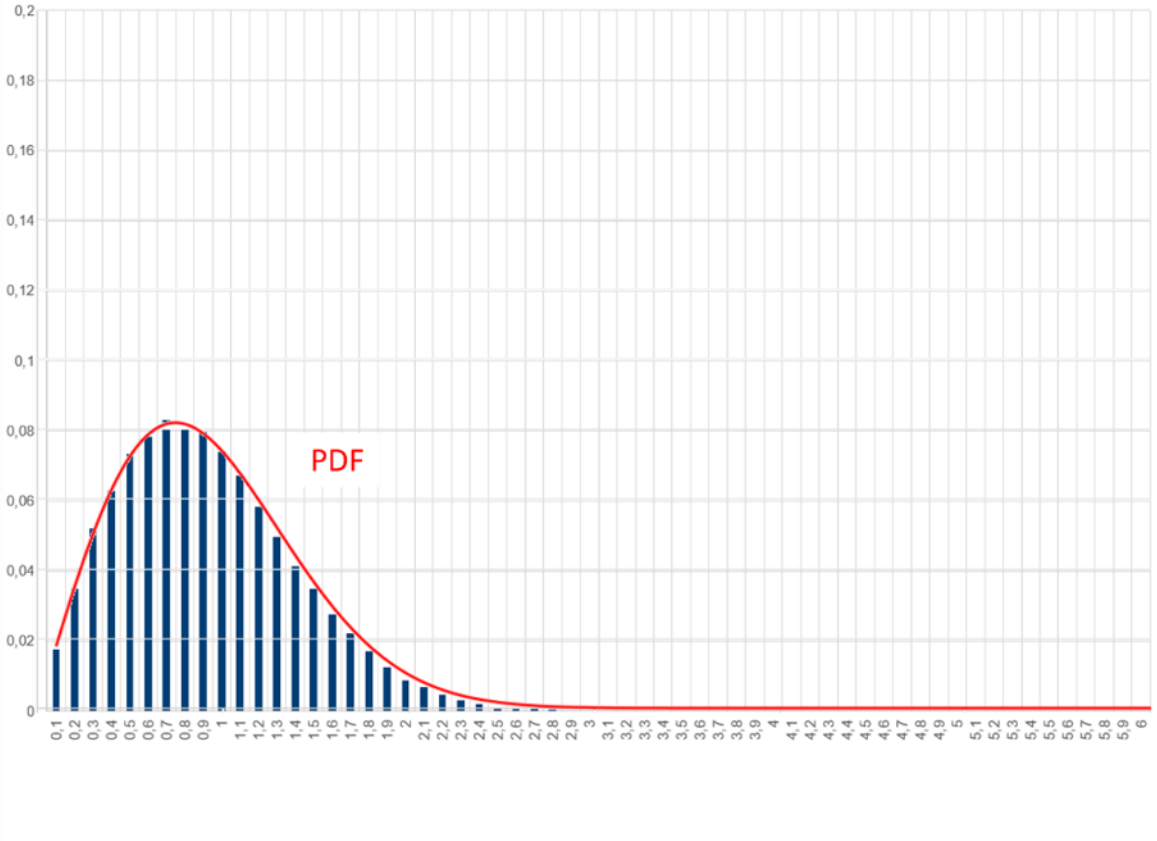
Statistic Field Evaluation per Probe Position

Is there another way to check the statistic behavior of the field?



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Statistic Field Evaluation per Probe Position

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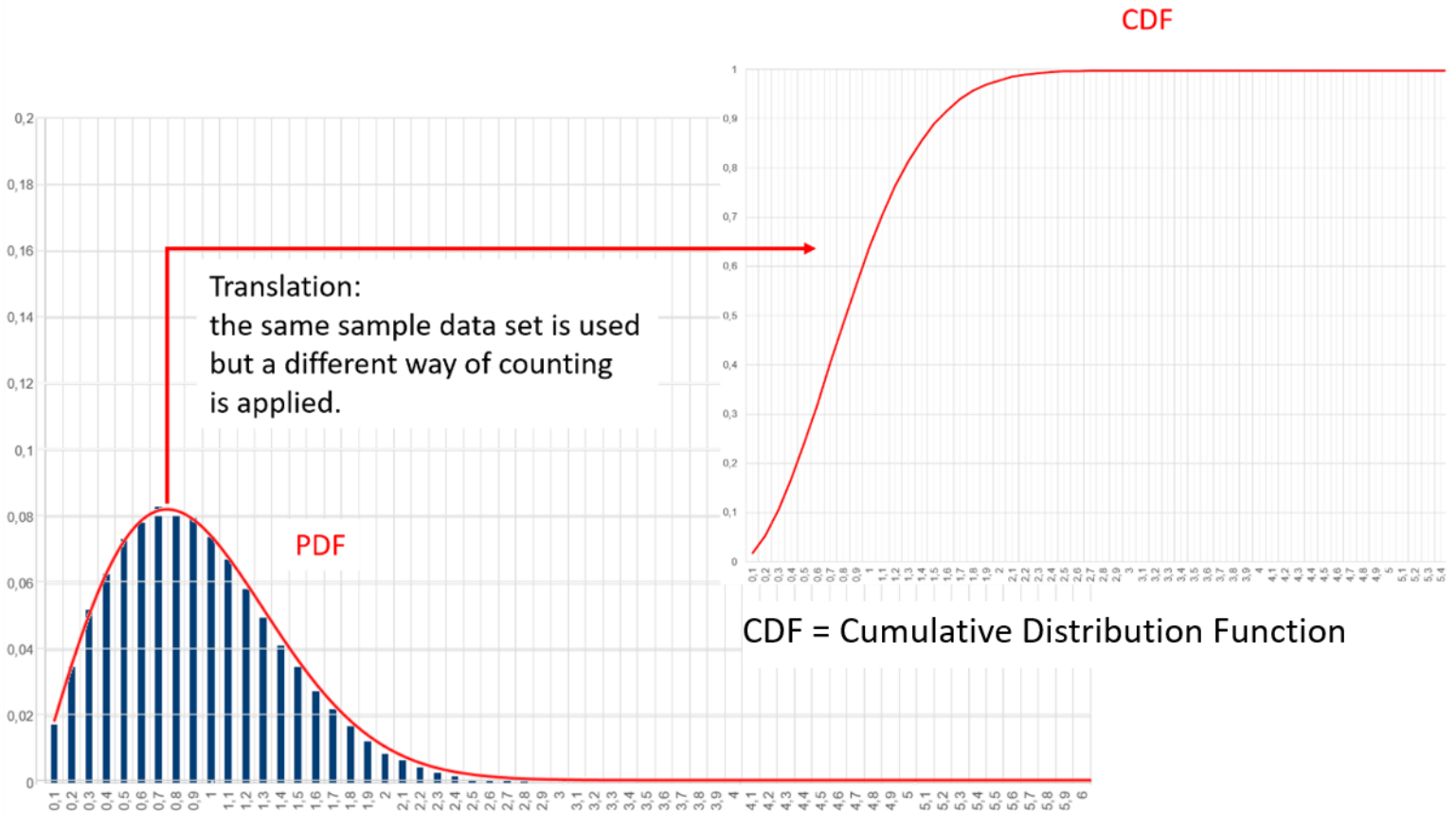

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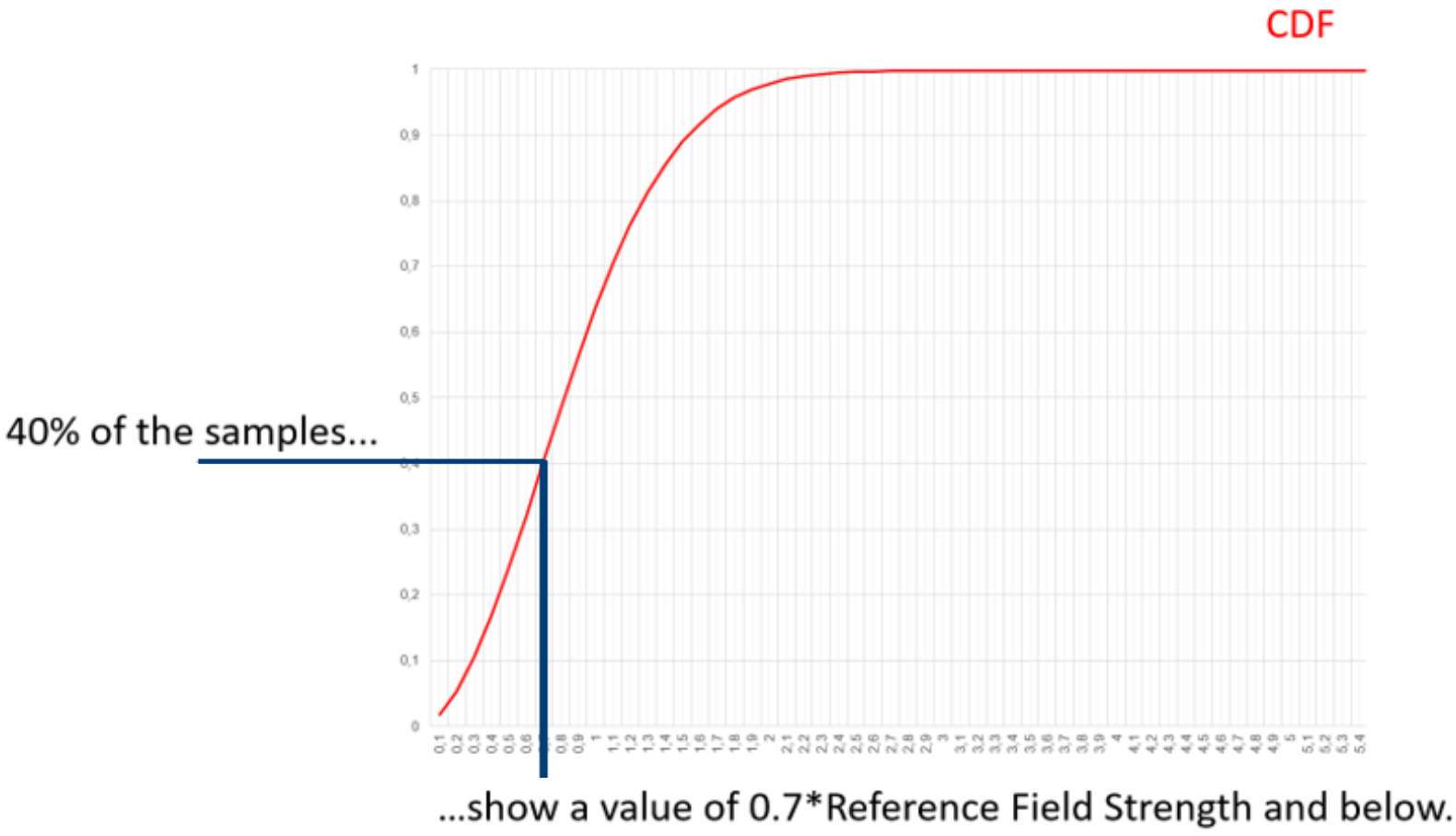
Cumulative Distribution Function

How to read a CDF chart?



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Cumulative Distribution Function

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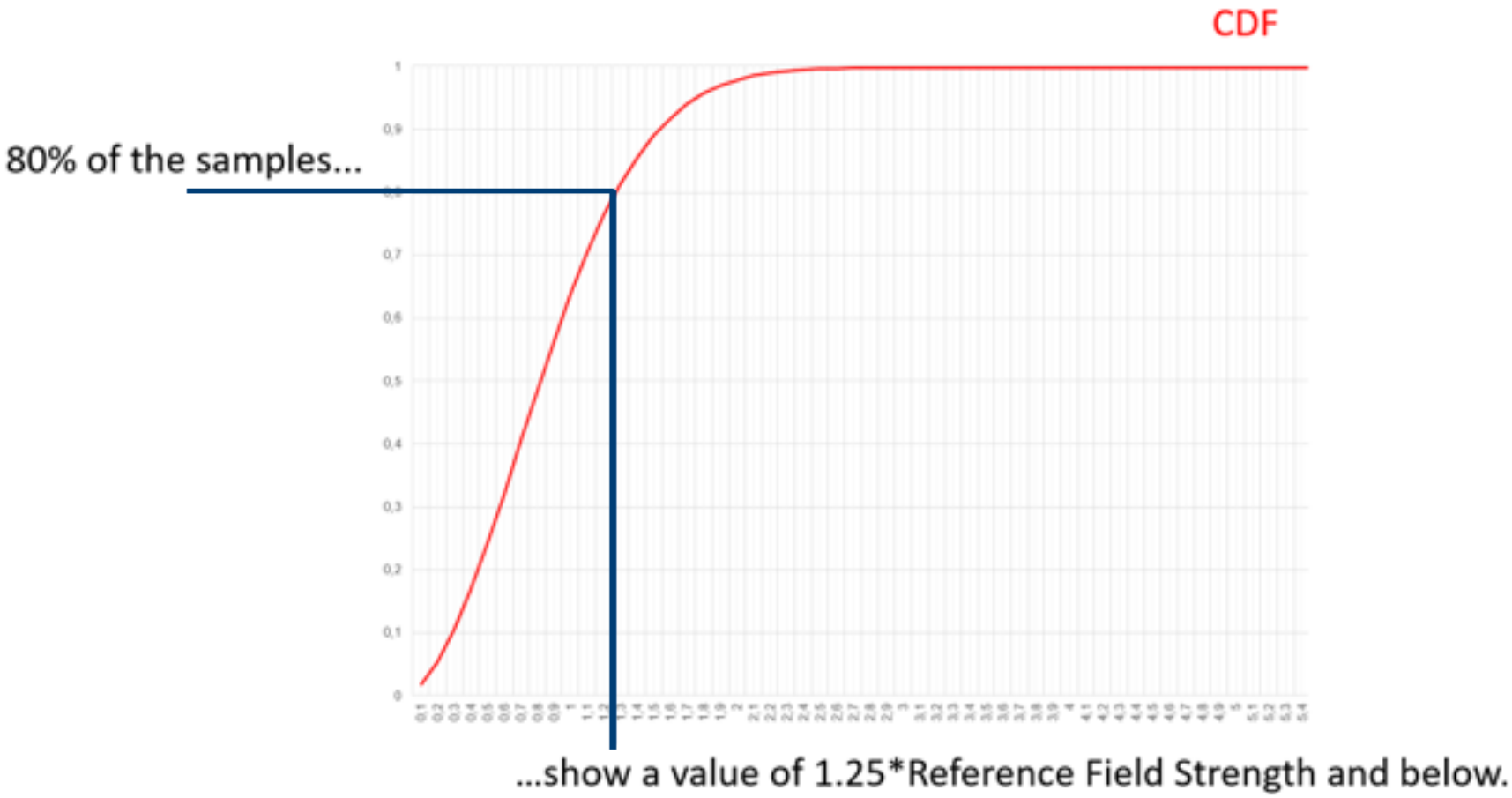

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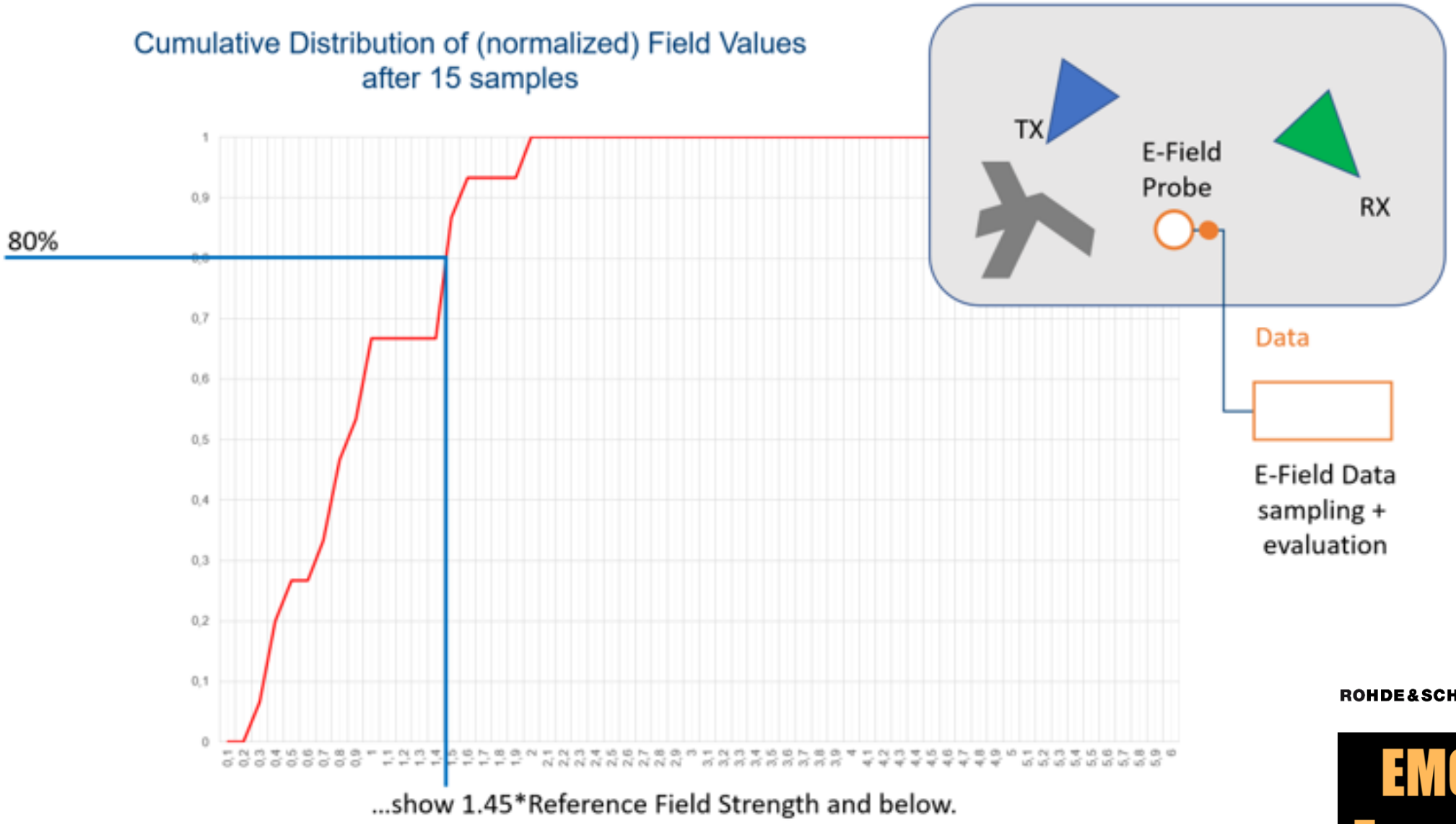
Cumulative Distribution Function per Probe Position



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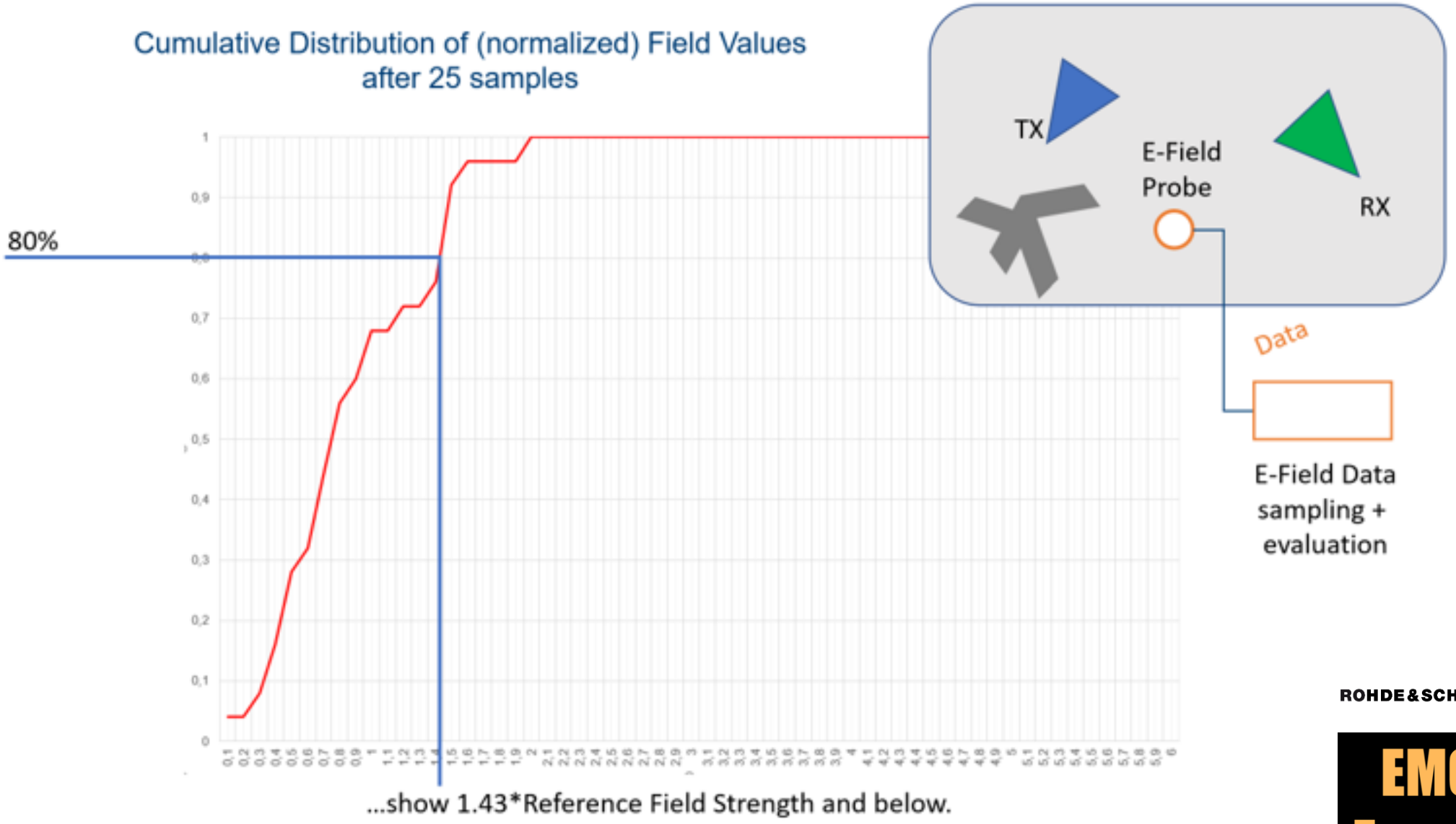

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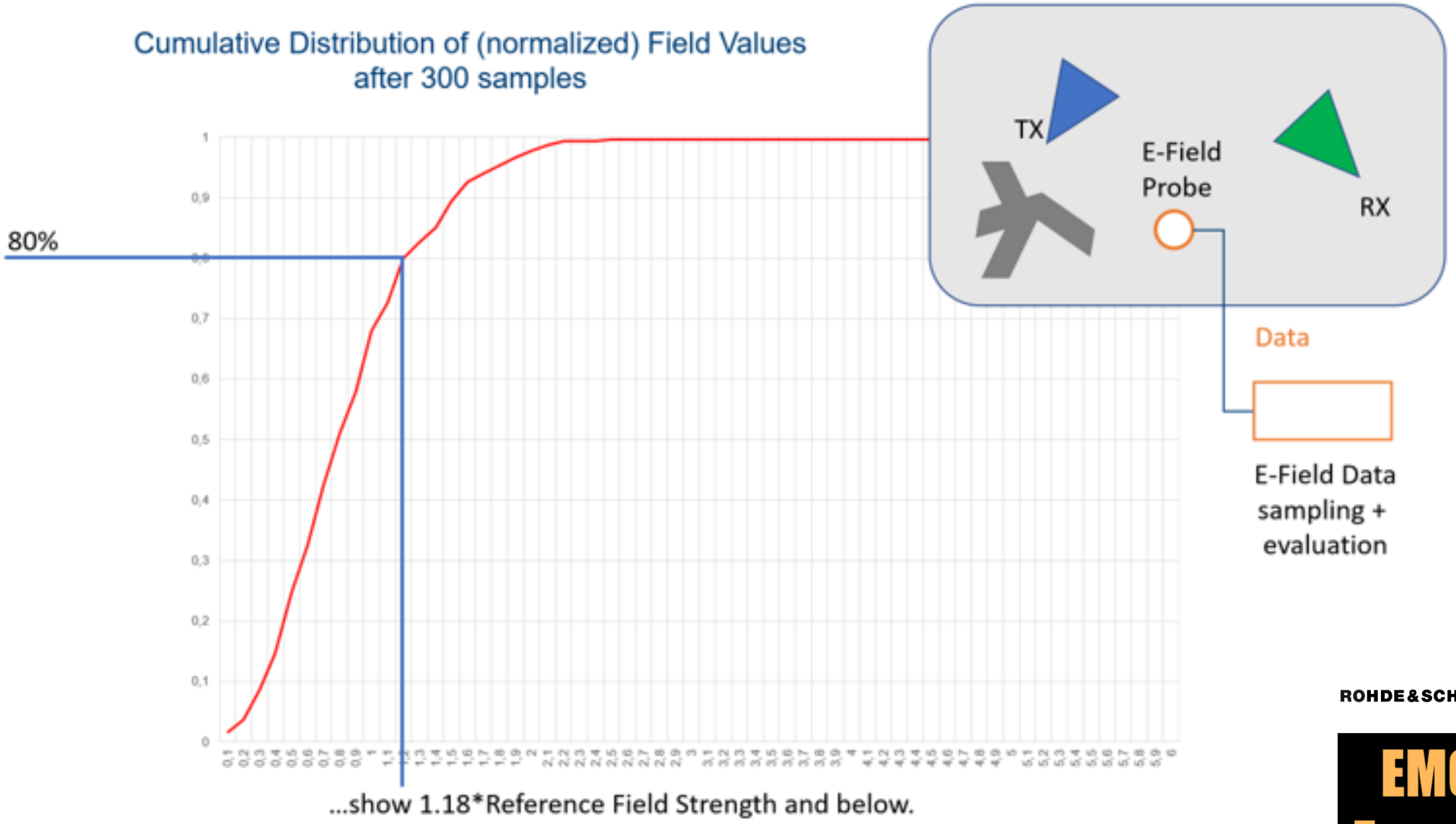

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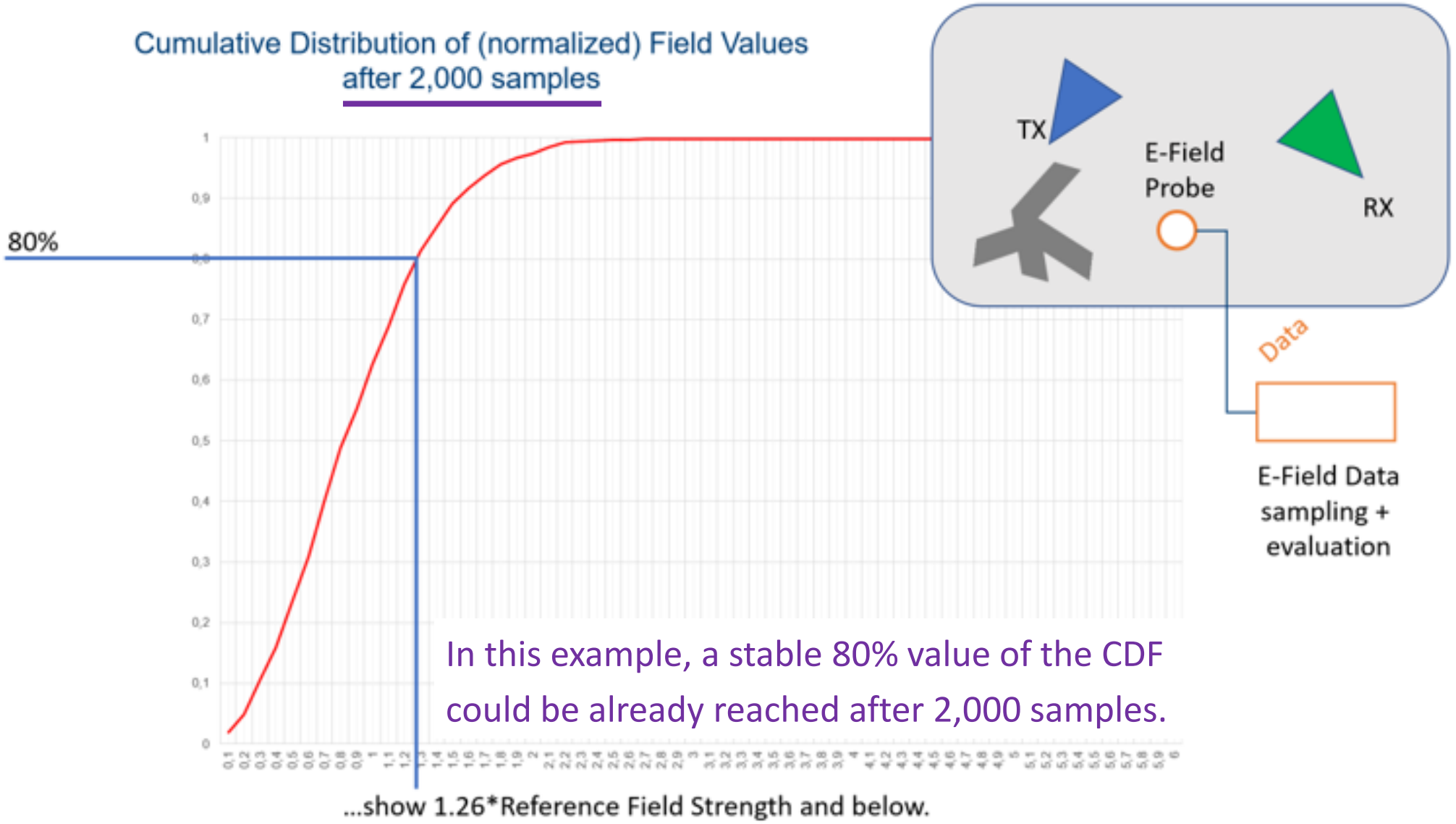
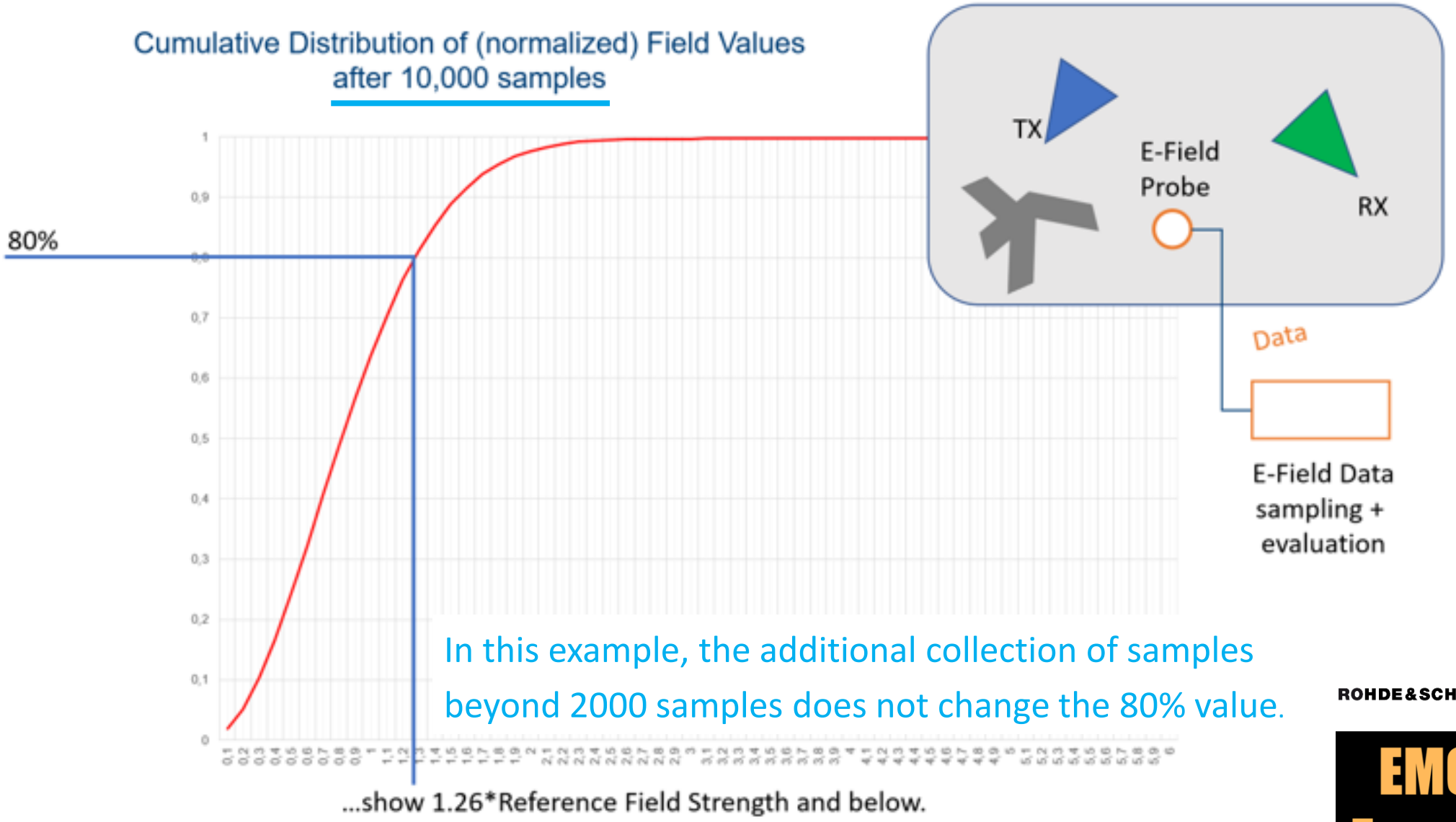
Cumulative Distribution Function per Probe Position



Cumulative Distribution Function per Probe Position



In this example, the additional collection of samples beyond 2000 samples does not change the 80% value.

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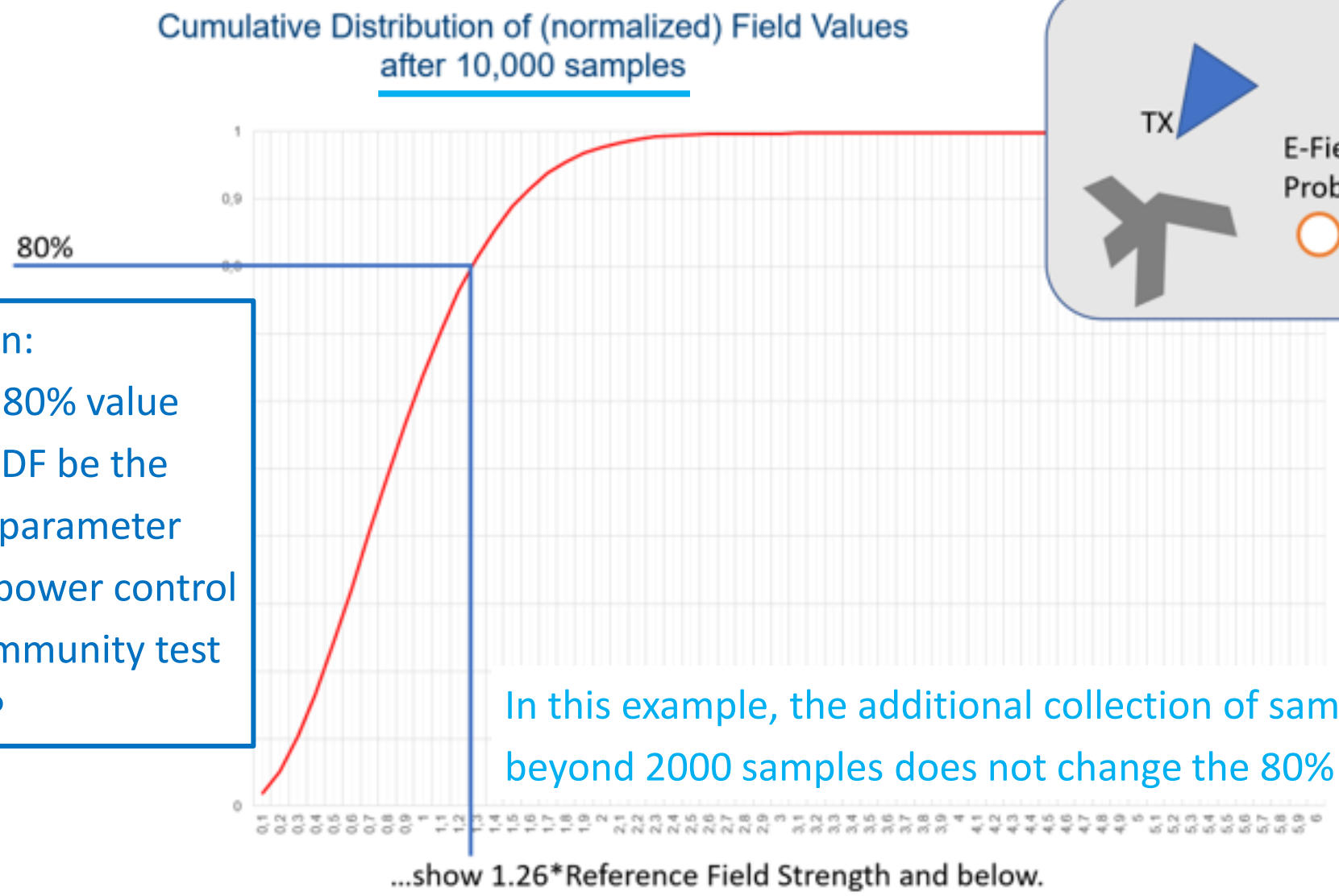
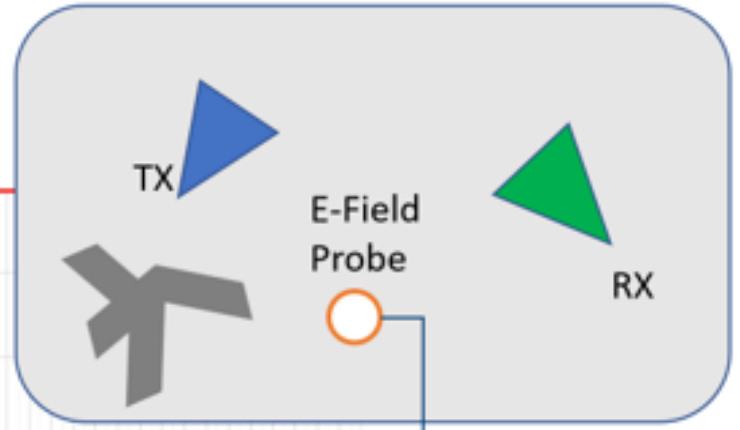
Cumulative Distribution Function per Probe Position





Data

E-Field Data sampling + evaluation

Question:
will the 80% value of the CDF be the control parameter for the power control of the immunity test system?

In this example, the additional collection of samples beyond 2000 samples does not change the 80% value.

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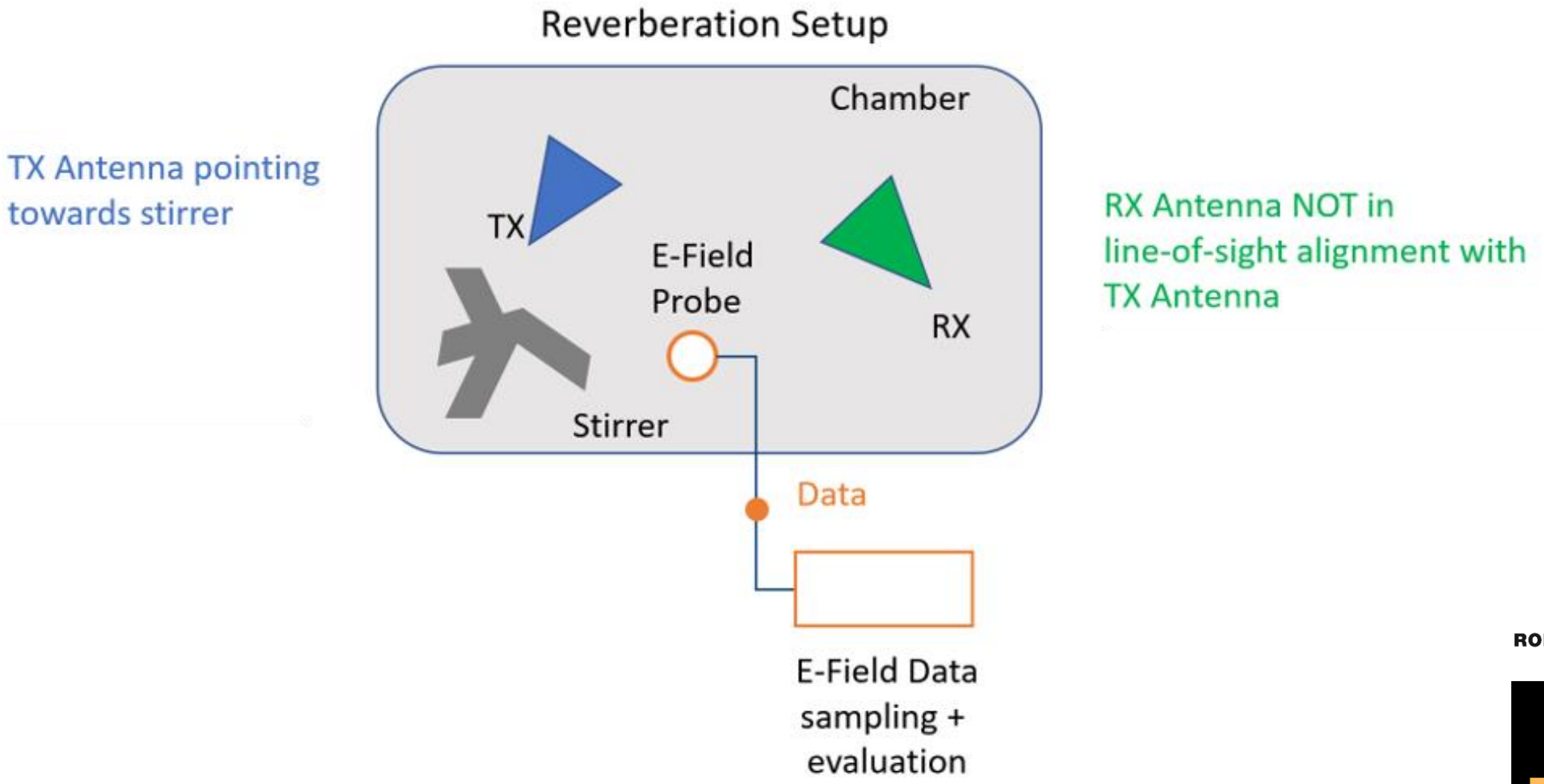
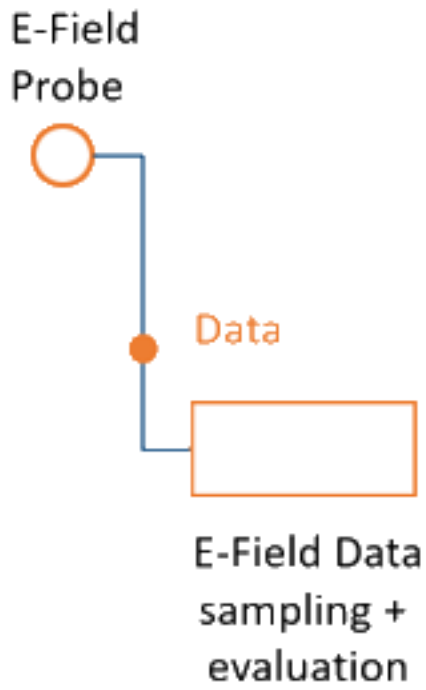
Cumulative Distribution Function per Probe Position



Cumulative Distribution Function per Probe Position



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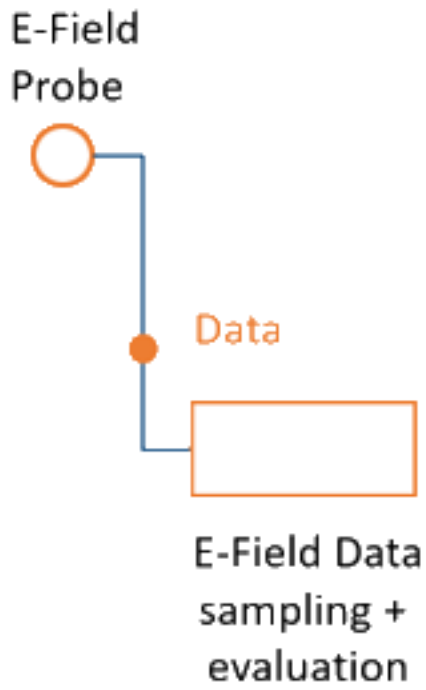
Cumulative Distribution Function per Probe Axis



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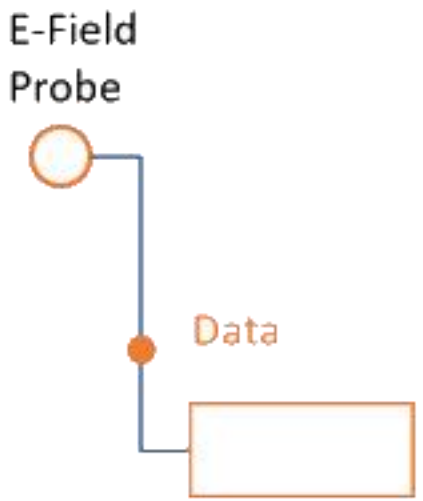
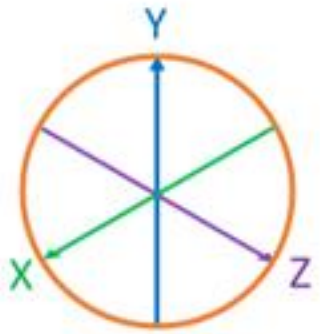
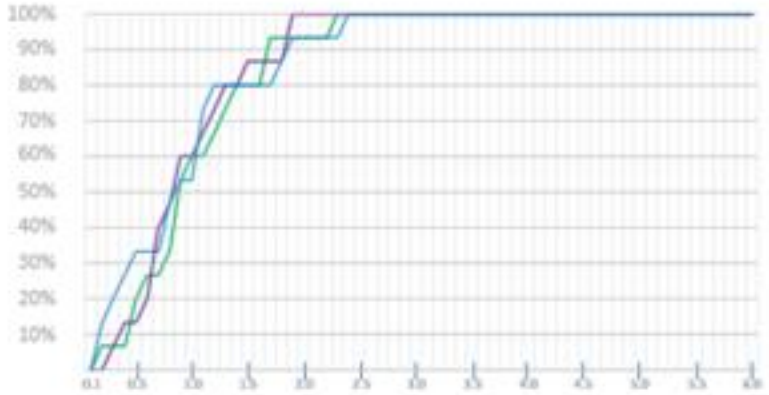
Cumulative Distribution Function per Probe Axis





The field probe provides with E-field data for the 3 directions x,y and z.



The statistic evaluation can be done per E-field component, E_x, E_y and E_z.

In this example, the CDF evaluation has been selected for normalized field strength values.

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Cumulative Distribution Function per Probe Axis

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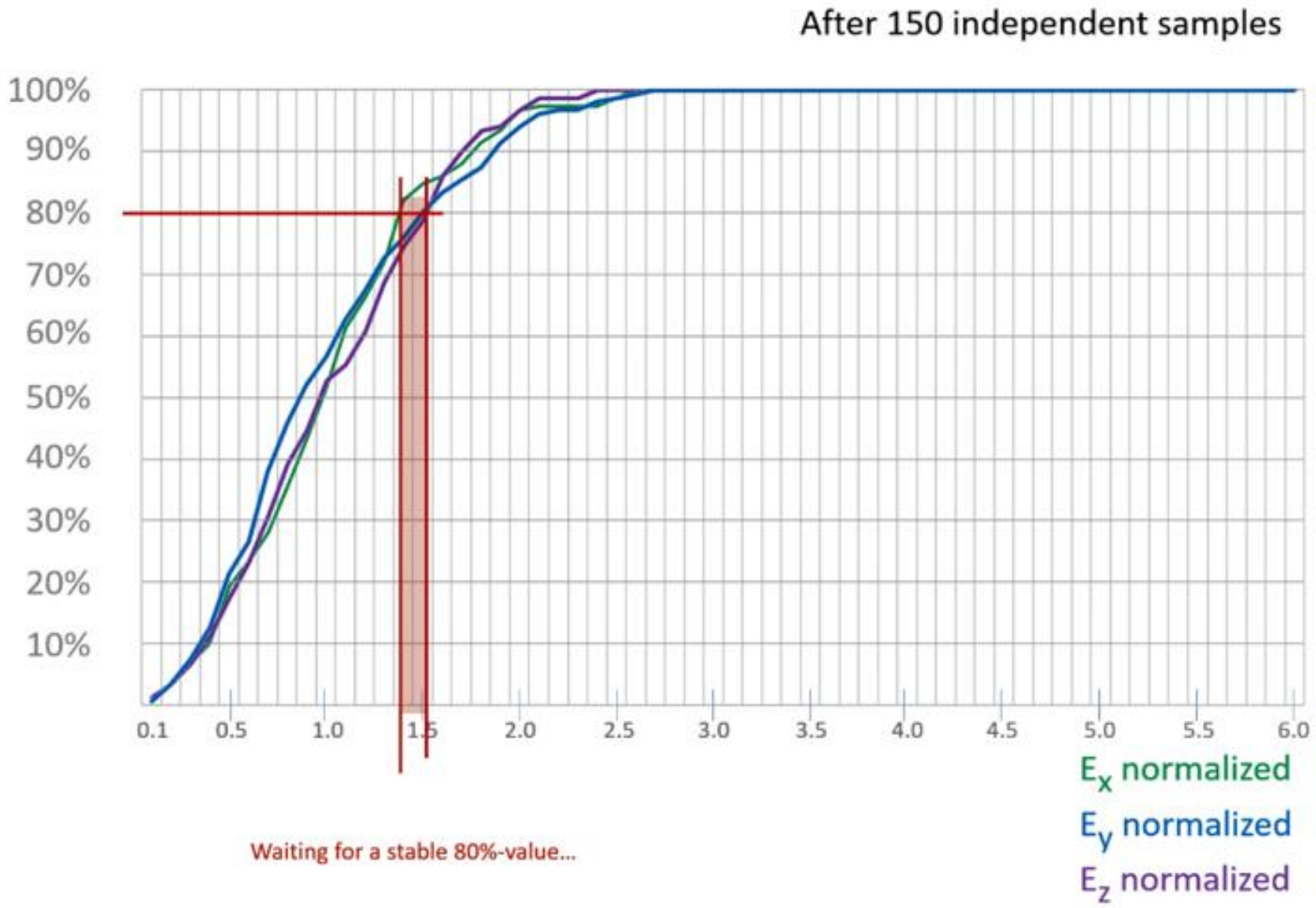
Cumulative Distribution Function per Probe Axis



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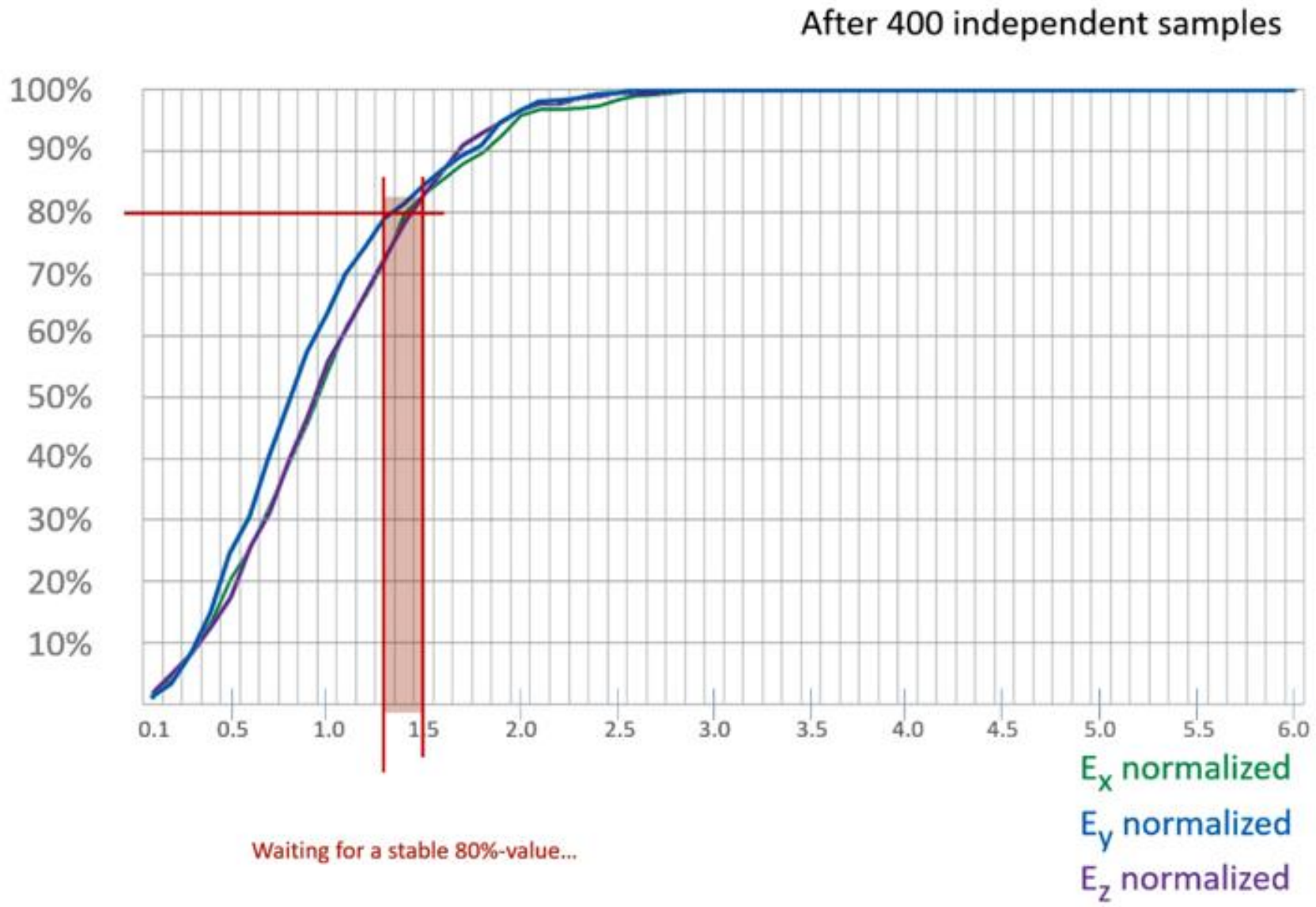
Cumulative Distribution Function per Probe Axis



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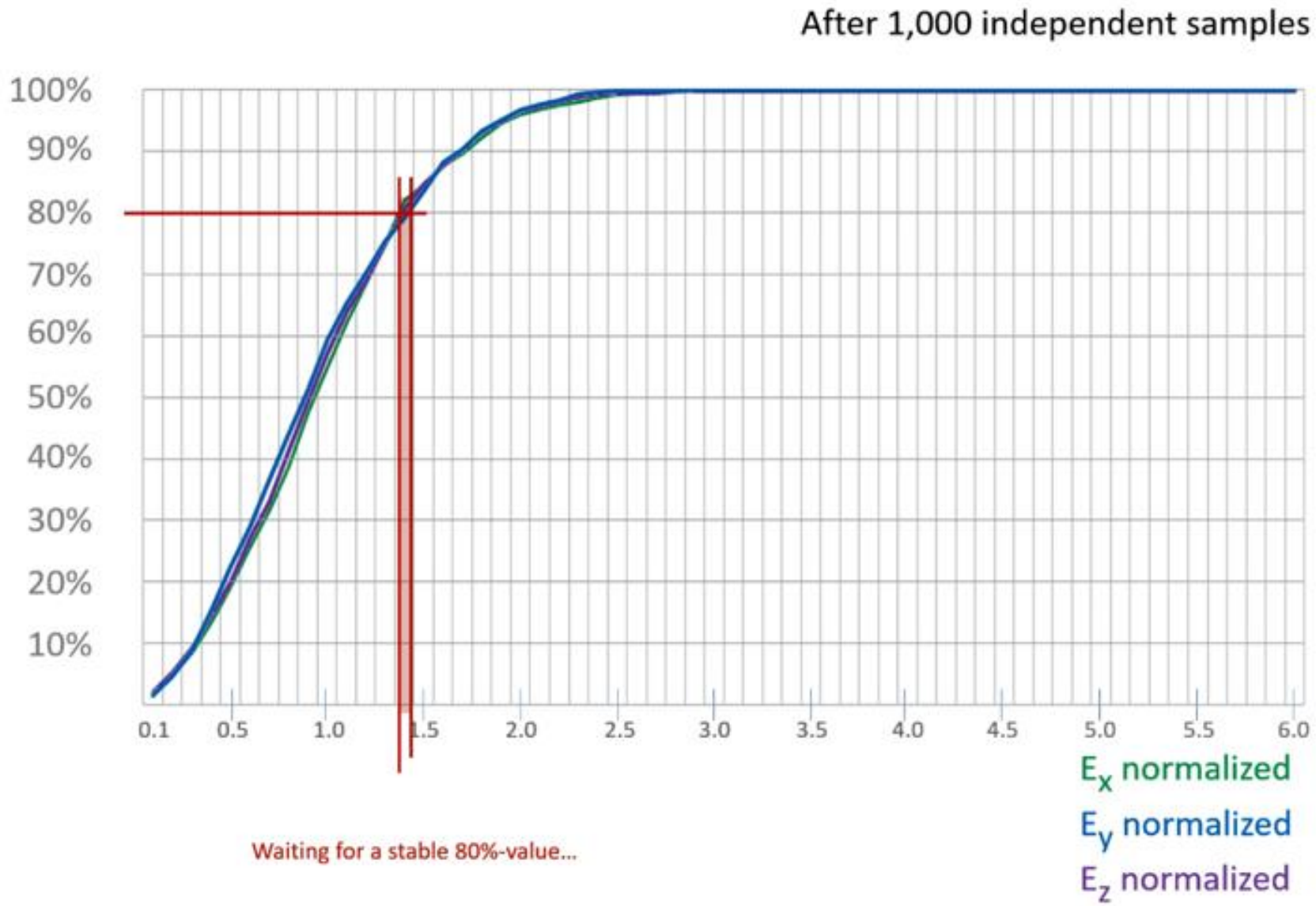
Cumulative Distribution Function per Probe Axis



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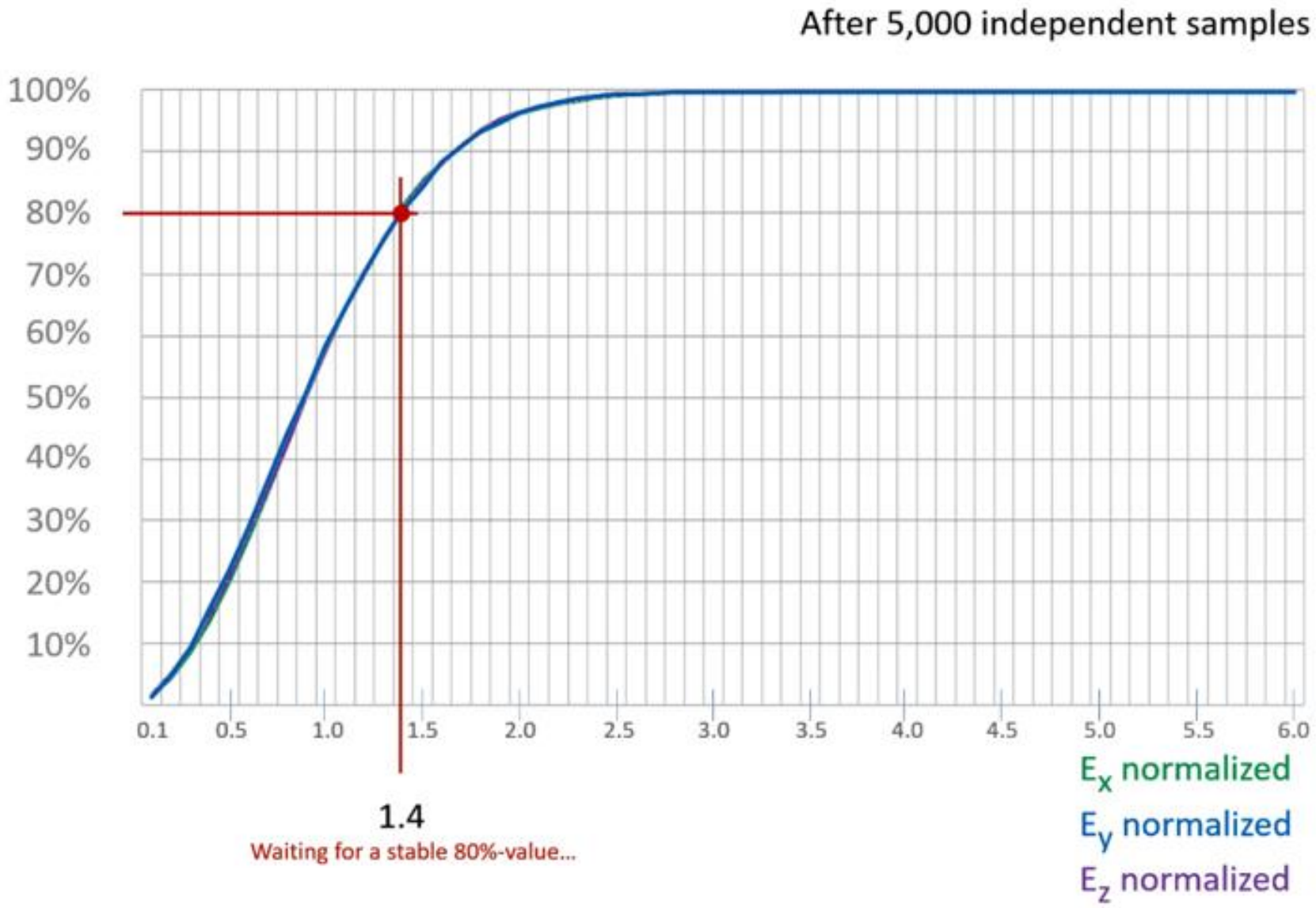

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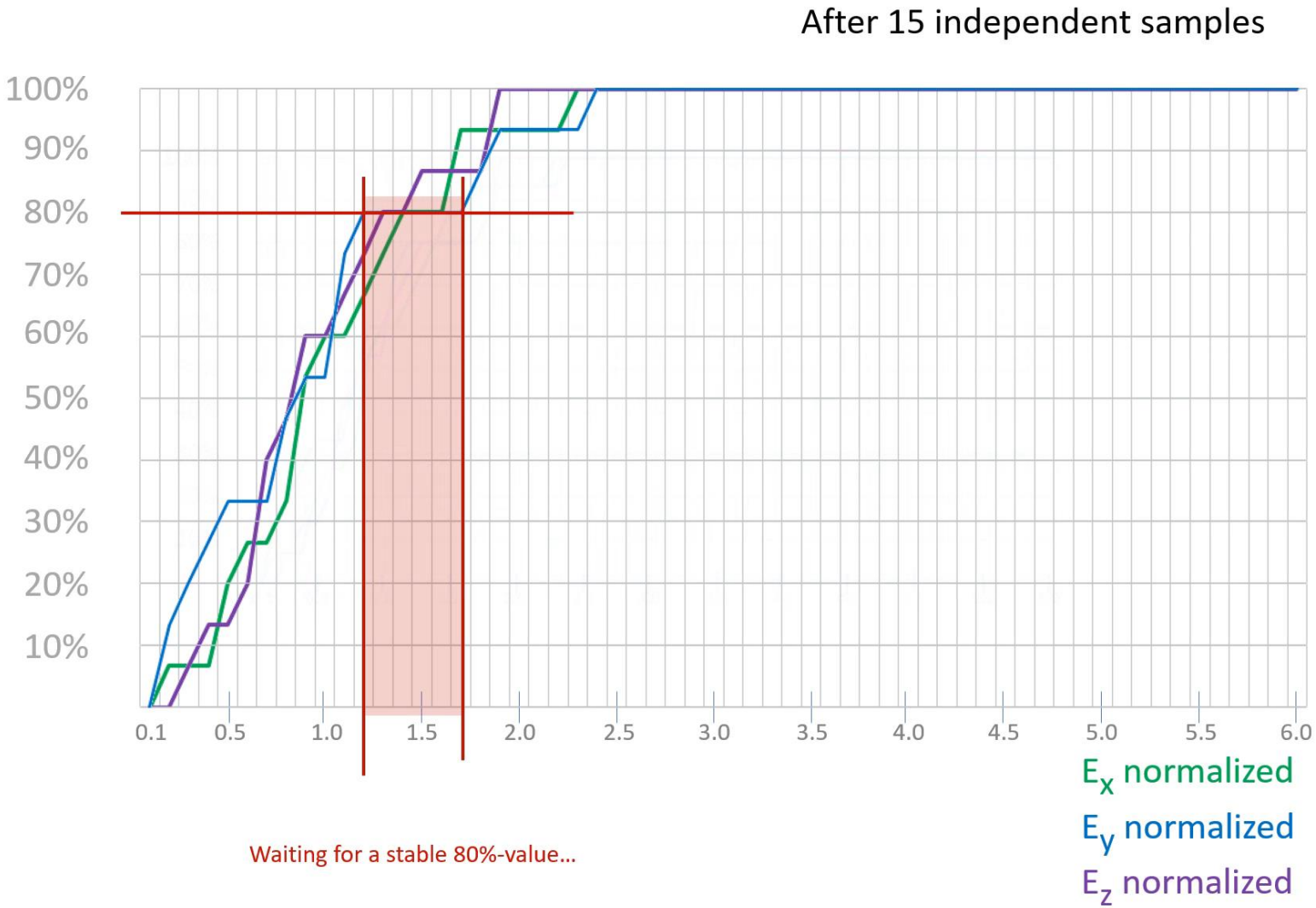

Video 3 (optional)

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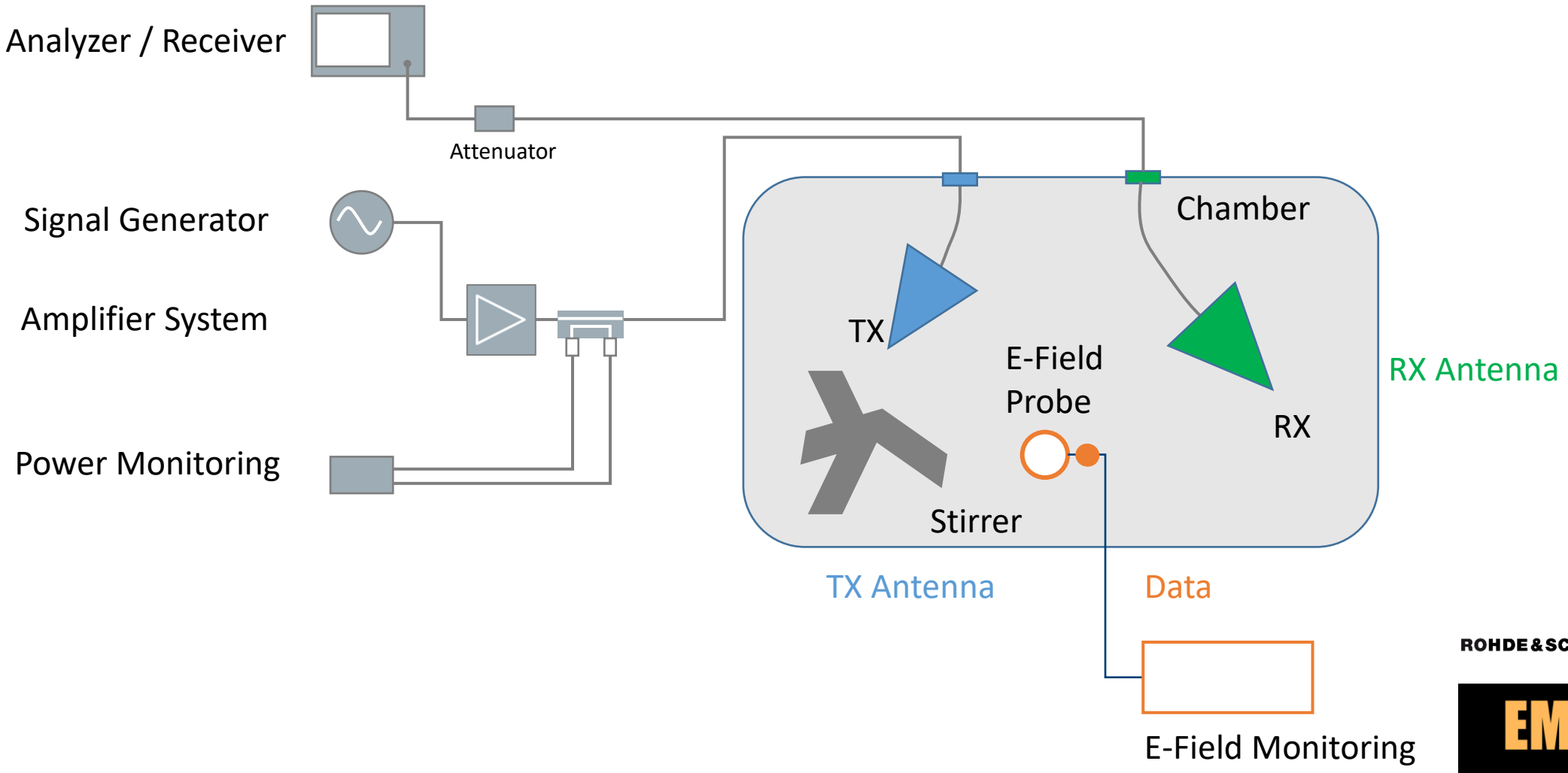
Typical Setup



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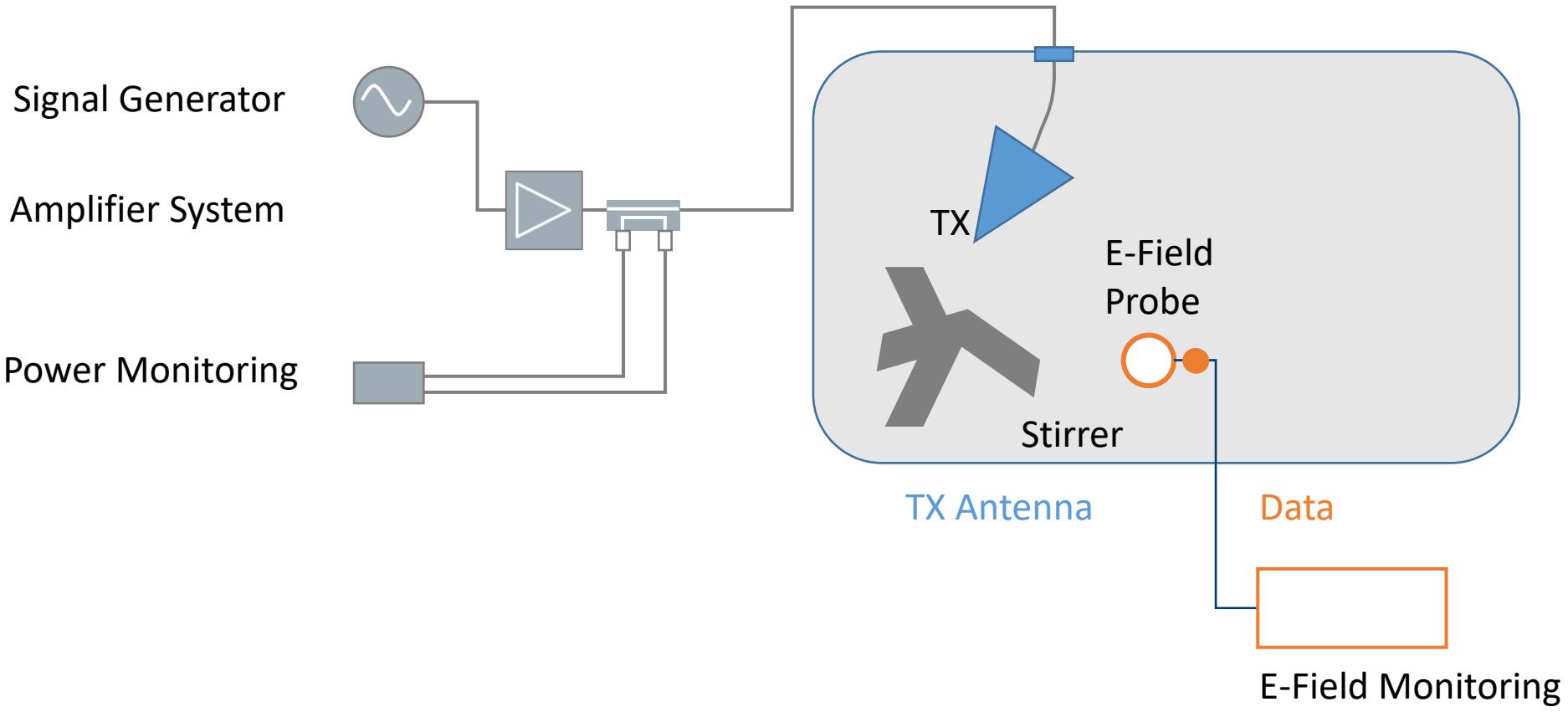
Typical Setup

Radiated Immunity



Device Portfolio Example

Signal Generators, e.g. SMCV

Analyzers, e.g. FPL

Power Meter, e.g. NRX + Sensor

Amplifiers, e.g. SAM100, BBA300

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Contact Details

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