

## LPIT bandwidth considerations

A3 PS3 Q18

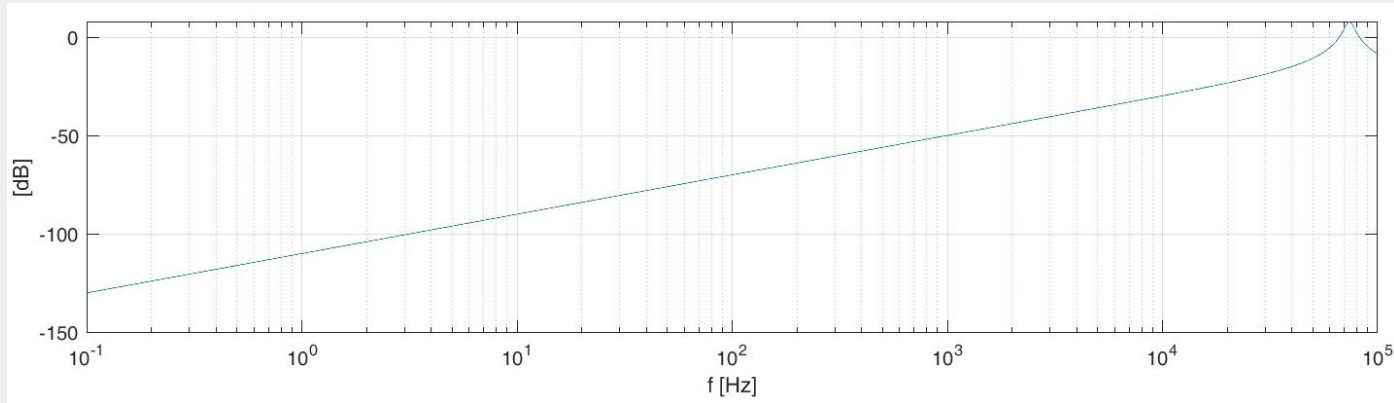
One argument for using LPITs is their wideband characteristic for measurement of harmonics up to kHz ranges. In this report, only the frequency response up to 250 Hz is presented. What is the expected frequency response behaviour of the voltage and current part?

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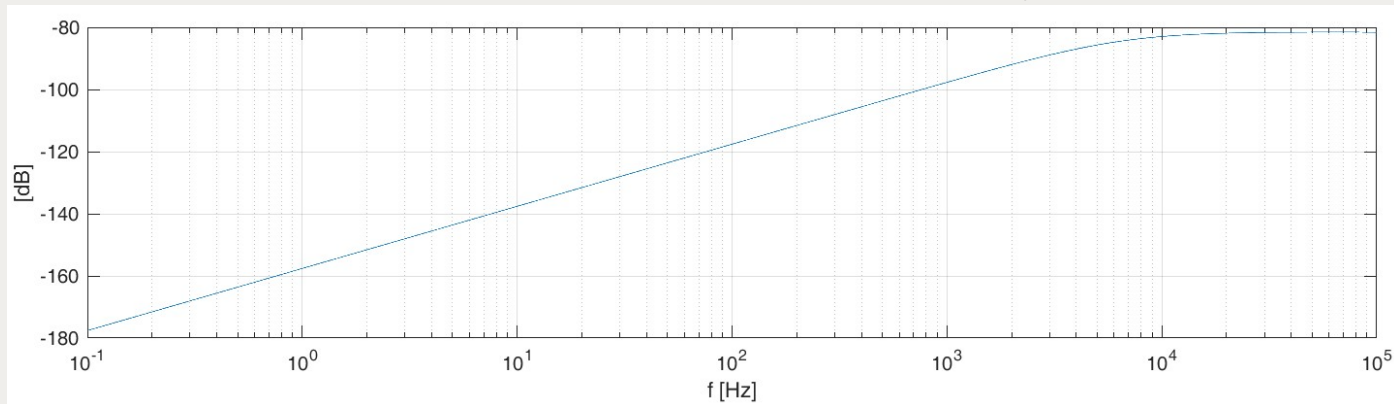
**SIEMENS**  
energy

# Frequency response of typical LPIT sensors

Attenuation of induced voltage vs. frequency



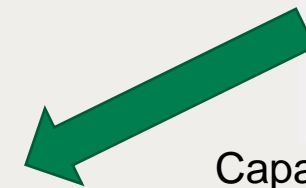
Attenuation of displacement current vs. frequency



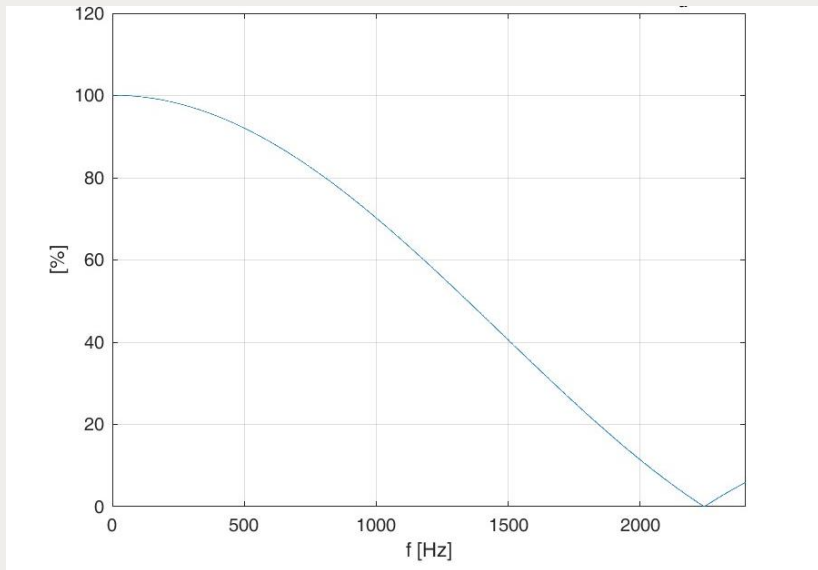
Rogowski  
Coil



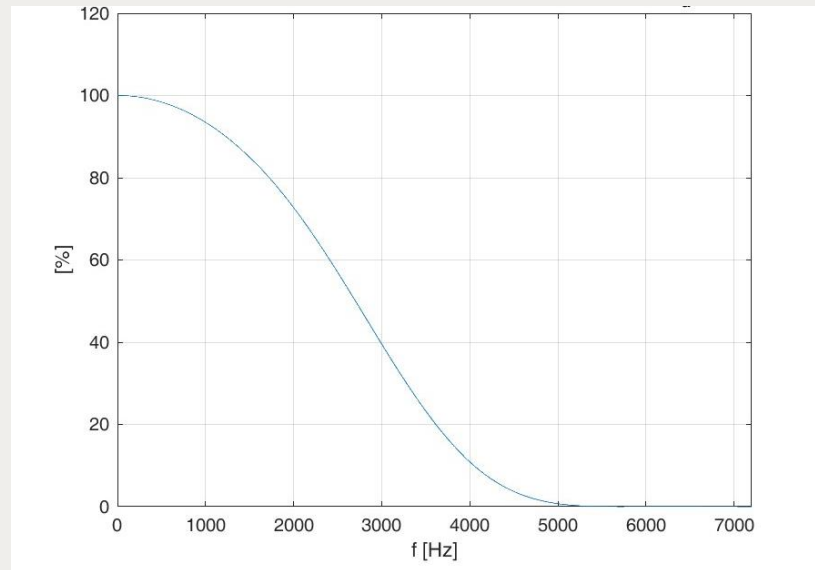
Capacitive  
Divider



# Frequency response of a complete GIS LPIT system with digital output according to IEC 61869-5 / IEC 61850-9-2



Data rate 4,80 kHz



Data rate 14,4 kHz



# Requirements defined by IEC and overall accuracy

1. IEC 61879-6 defines accuracy requirements at harmonic frequencies for measuring applications up to the 13th harmonics and for PQ applications up to 3kHz.
2. IEC 61850-7-4:2020 Ed 2.1 describes a mechanism which allows the LPIT frequency response to be corrected by using the frequency correction setting “CorCrv” contained within the logical nodes for current and voltage transformers (TCTR and TVTR). This can be used to compensate the effect of the anti-aliasing filter.
3. An overall accuracy including LPIT and PQ-meter of < 5% up to the 50<sup>th</sup> harmonic frequency is achievable.
4. See CIGRE TB814, 2020, Chapter 2.4 for bandwidth considerations on different LPIT technologies.