

High stability, very low phase noise, ultra stable oscillator PULSAR-SP Platform



3rd Space Passive Component Days
9-12 October 2018 | ESA\ESTEC
Noordwijk, The Netherlands



AR ELECTRONIQUE

Short presentation

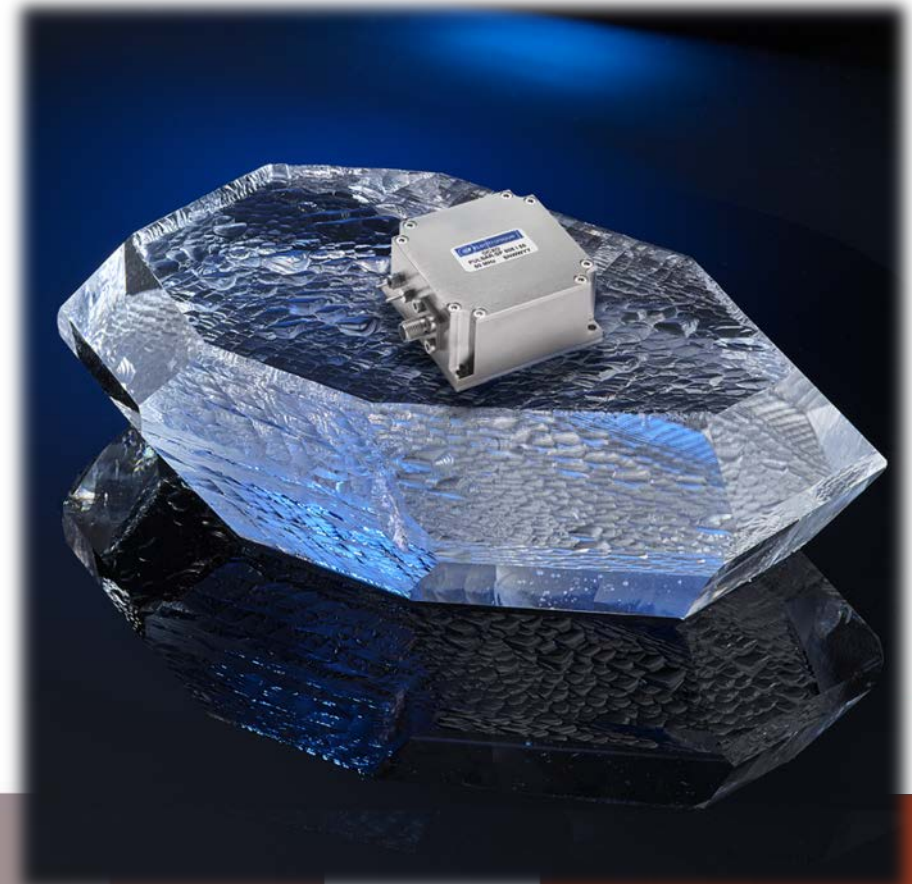
- ✱ French SME, independent, located at Besancon
- ✱ Founded 30 years ago
- ✱ 40 collaborators
- ✱ Design and manufacturing high end Time & Frequency products, including crystal resonators (AT, SC... cuts)
- ✱ ISO 9001 : 2016 & EN9100 : 2015 certified
- ✱ Space Quality Management System successfully evaluated by the CNES



PULSAR-SP :

Versatile HiREL platform

- ✱ Oven-Controlled Crystal Oscillator (OCXO)
- ✱ SC Cut crystal resonator
- ✱ Designed for 18 years operation in GEO orbit
- ✱ 10-120 MHz frequency range
- ✱ EEE ESCC-Q-ST-60, Class 1 or 2
- ✱ Development and EQM evaluated by the CNES



PULSAR-SP :

Stable & compact family

- ✱ 50 x 50 x 25 mm
- ✱ 120 grams
- ✱ 2.5 W Steady state under vacuum
- ✱ ITAR Free
- ✱ Option US-Free BOM
- ✱ Very low noise phase noise performances
- ✱ Ultra stable oscillator



Typical Stability Class

10MHz	50MHz	120MHz
1.10^{-9} pk-pk	3.10^{-9} pk-pk	1.10^{-7} pk-pk

PULSAR-SP :

High reliability product

- ✱ Crystal resonators manufactured acc.to PID
- ✱ Soldering activities covered acc.to PID
- ✱ Oscillator are screened and qualified acc. to MIL-PRF-55310 class S
- ✱ 135 FIT per 10^9 hours (MIL-HDBK-217F2)



PULSAR-SP 108 I 50

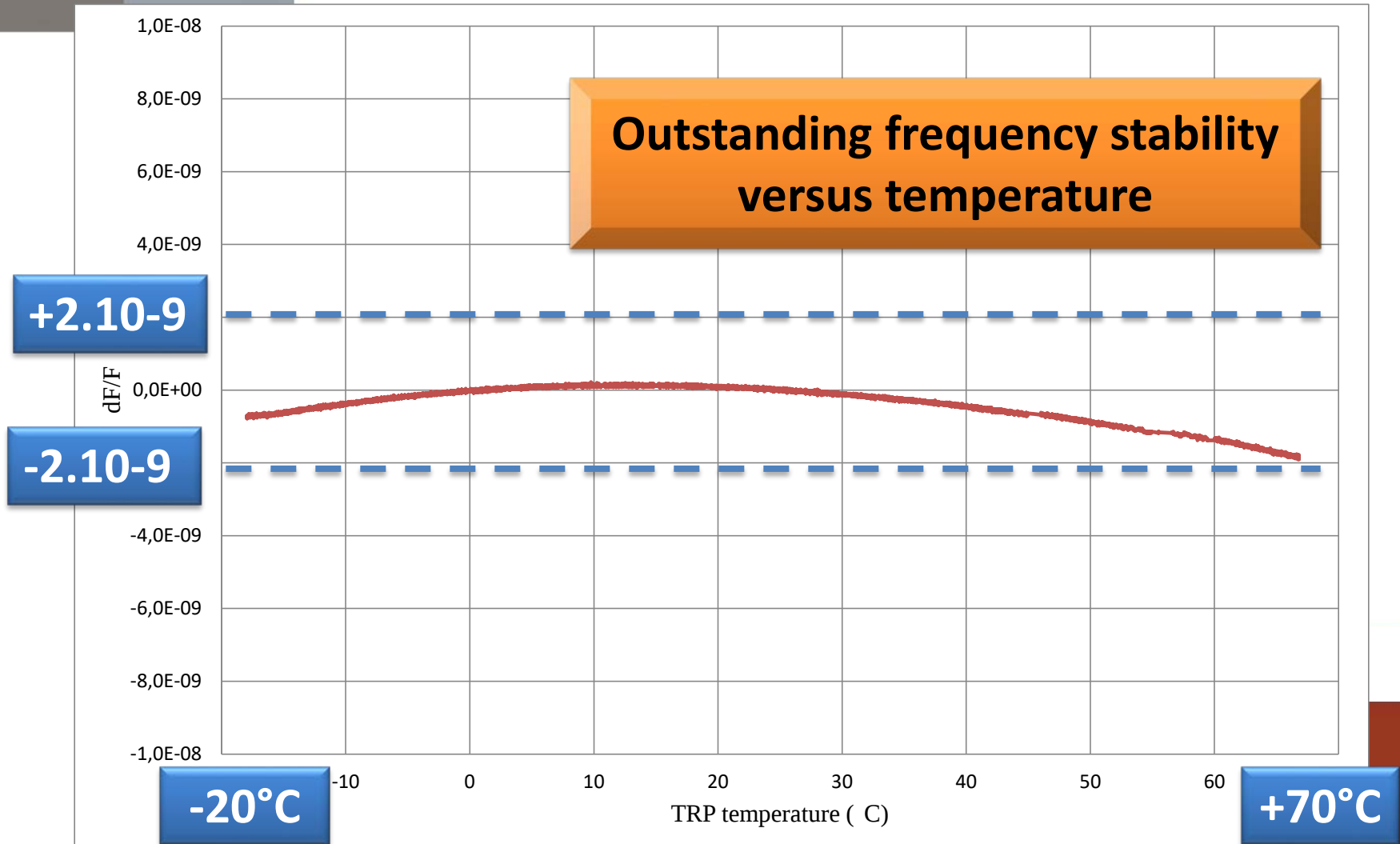
Evaluated
by the



50MHz version

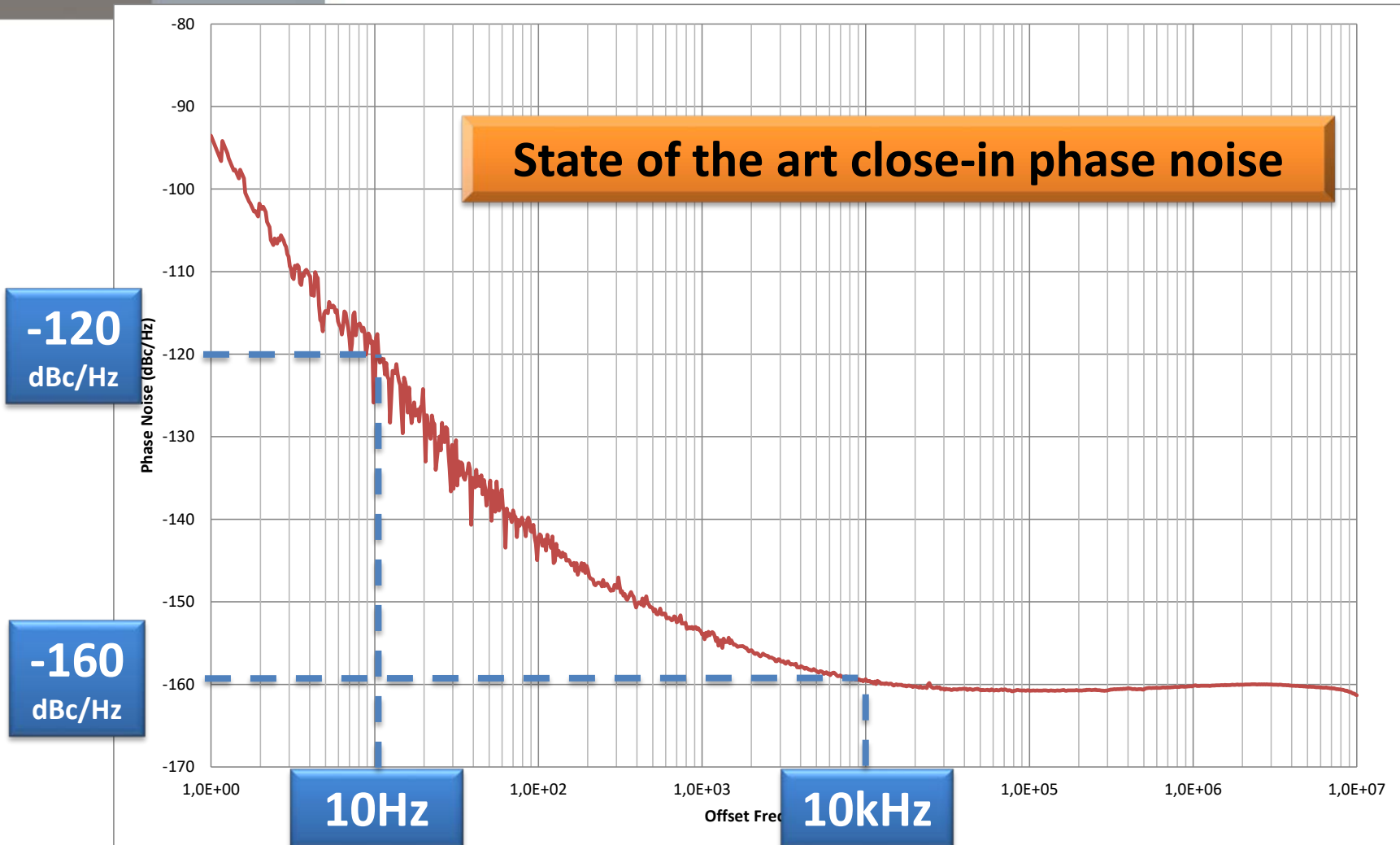
PULSAR-SP 108 I 50

Frequency stability vs temperature



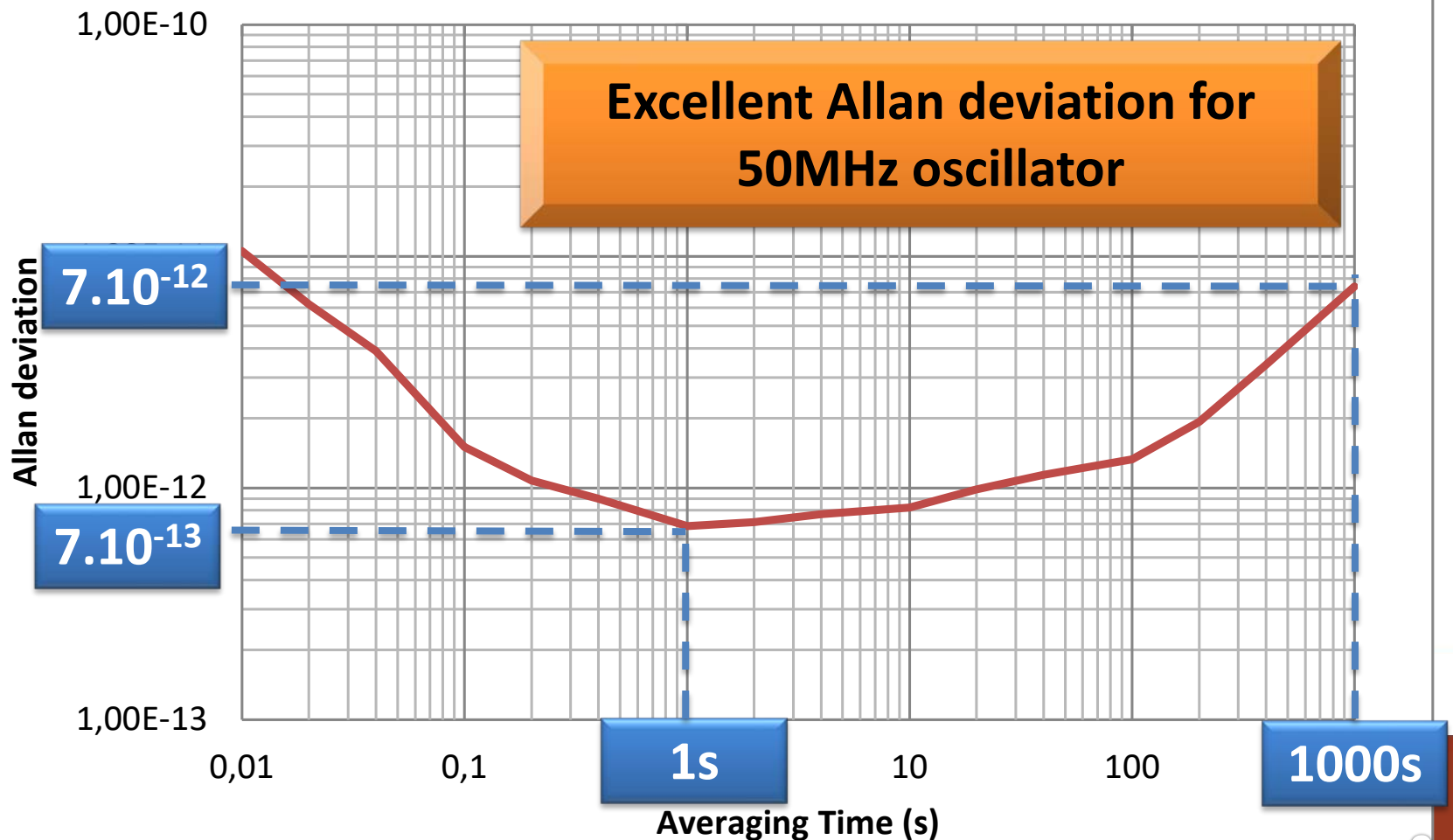
PULSAR-SP 108 I 50

Phase noise



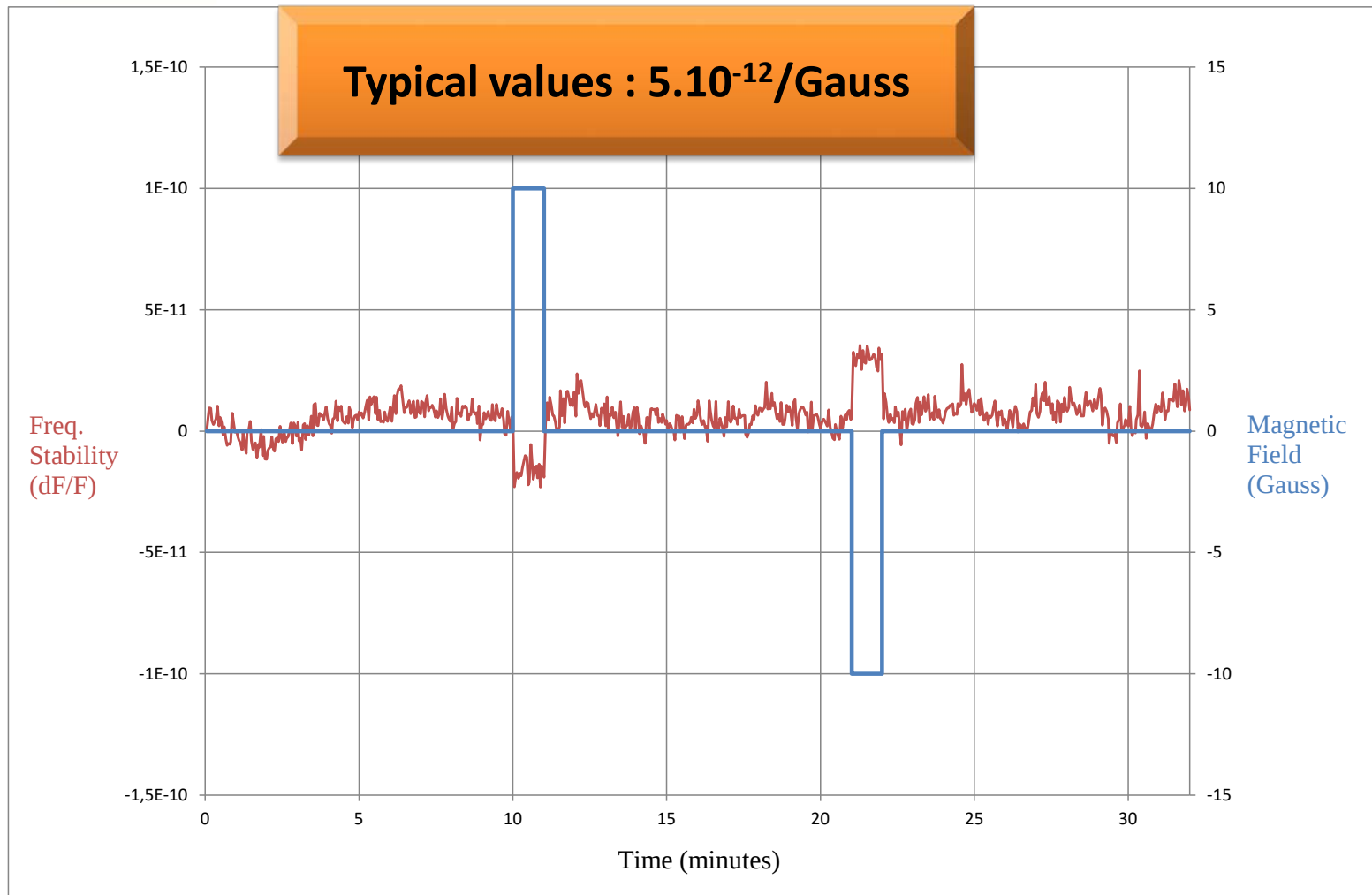
PULSAR-SP 108 I 50

Allan deviation



PULSAR-SP 108 I 50

Low magnetic sensitivity



Radiations (TID & Heavy Ions)

- ✦ TID sensitivity (100krad) is currently tested by the CNES
- ✦ By design, PULSAR-SP is SEL free up to 40 MeV/mg/cm² (option 60 MeV)
- ✦ SEE events will be evaluated by the CNES

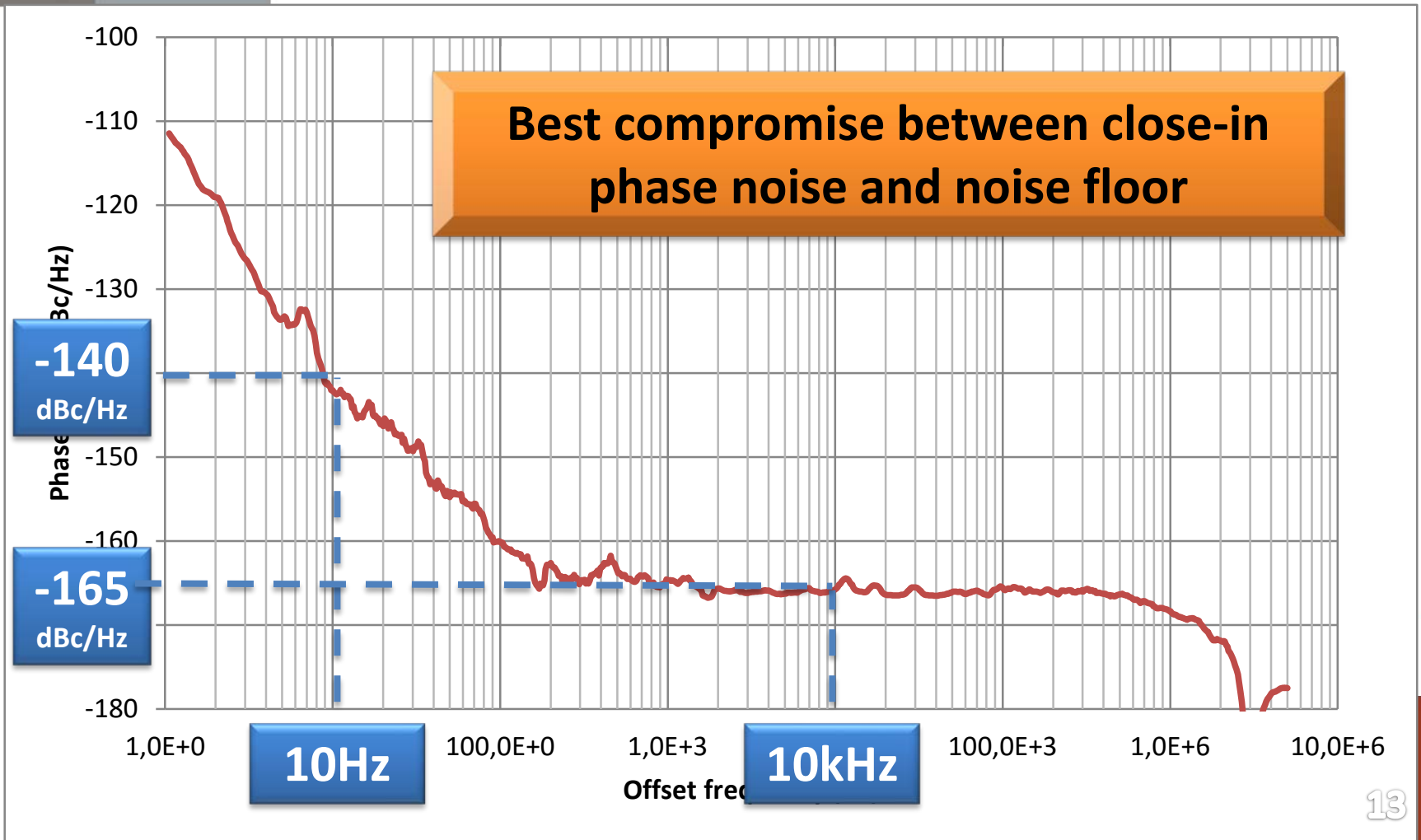
PULSAR-SP 109 I 10



10MHz version

PULSAR-SP 109 I 10

Phase noise



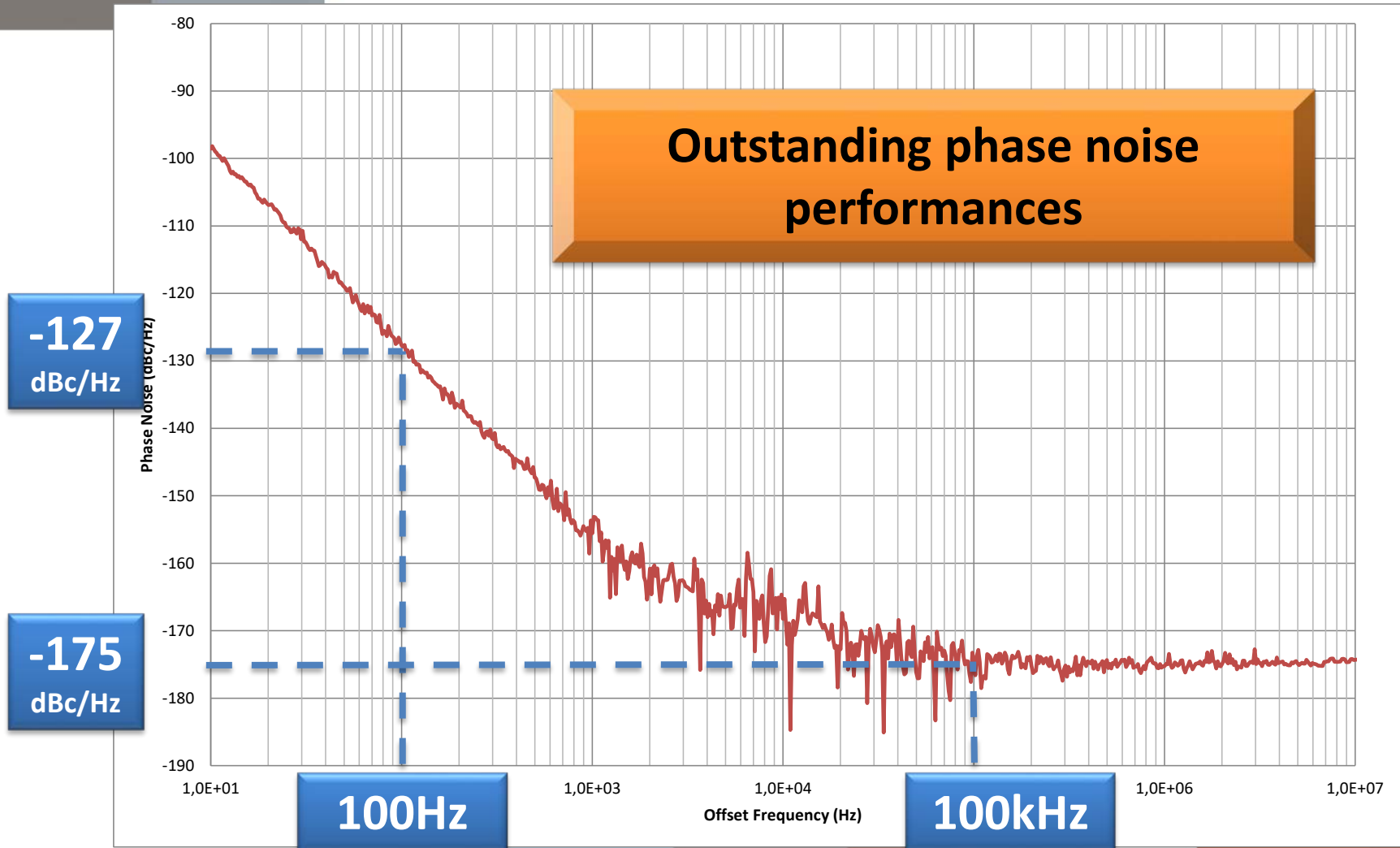
PULSAR-SP 107 I 120



120MHz version

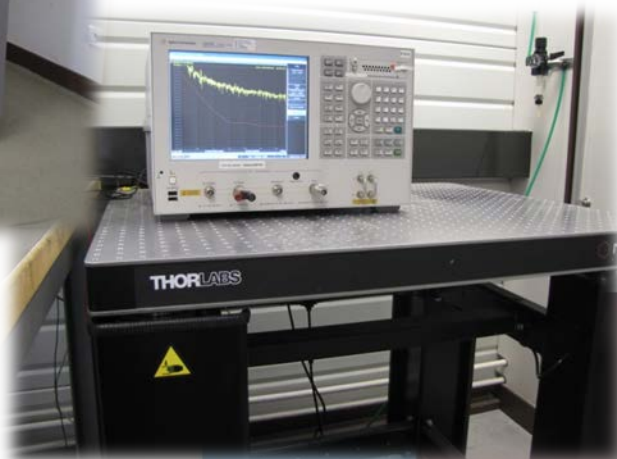
PULSAR-SP 107 I 120

Phase noise



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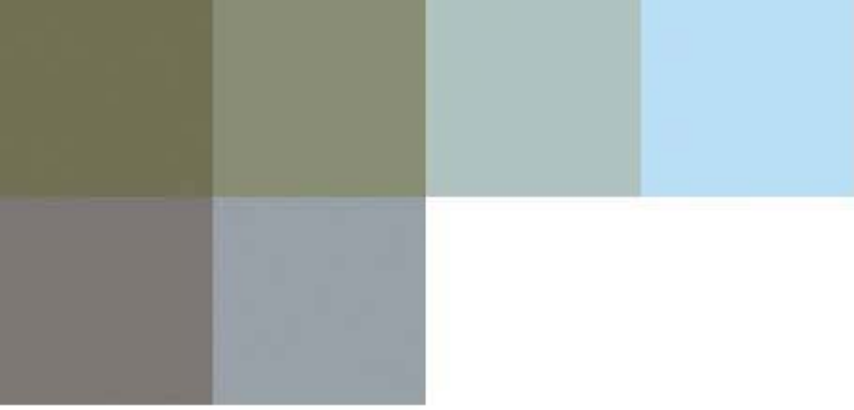
Test internal capabilities



PULSAR-SP Family

- ✱ Designed and manufactured by company highly skilled
- ✱ Wide frequency range
- ✱ Compact, ultra stable and state of the art oscillators
- ✱ High reliability





Thank you for your attention

QUESTIONS AND ANSWERS

73's from F4CUU



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Contact

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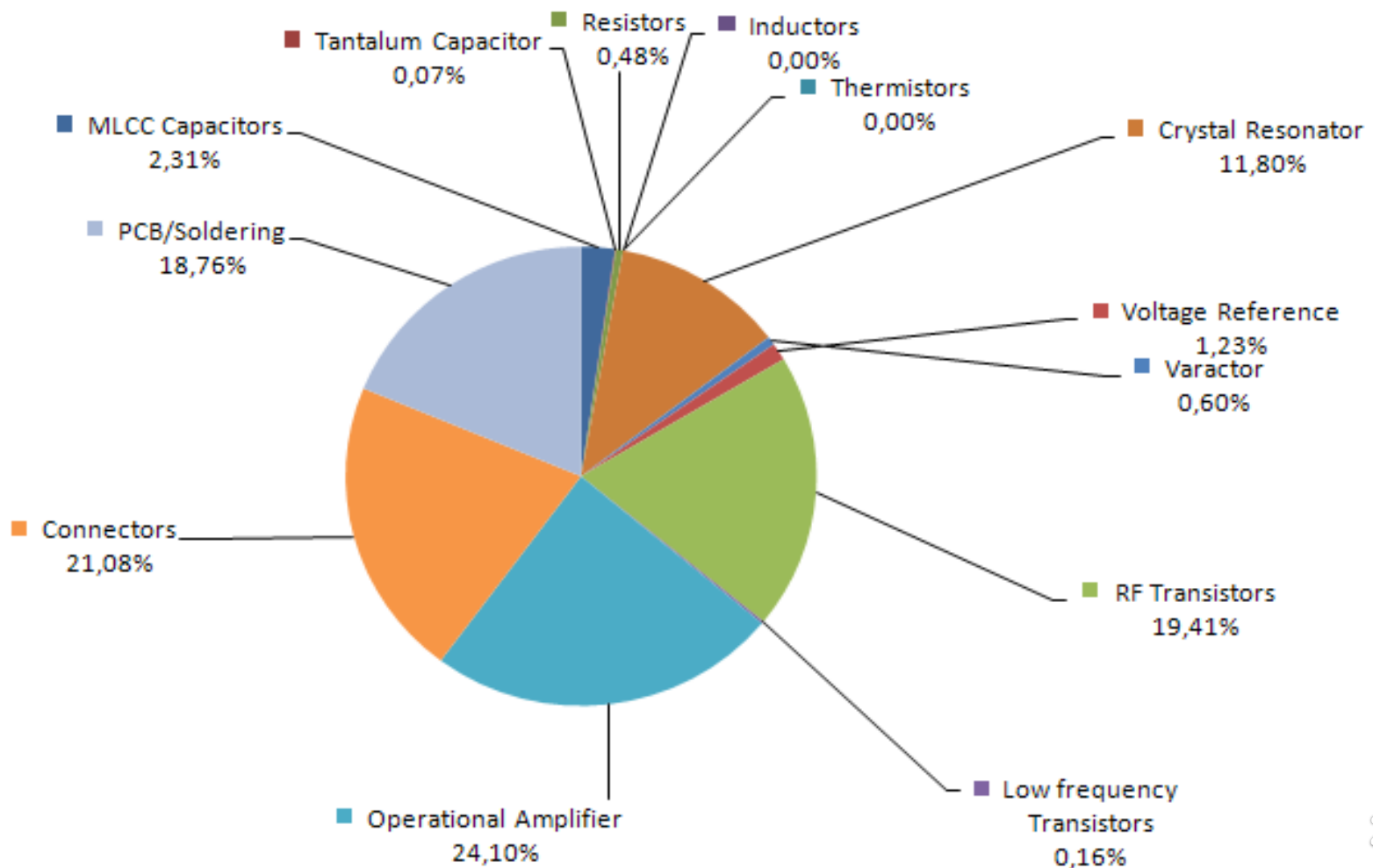


New Space Oscillator Available

Backup slides

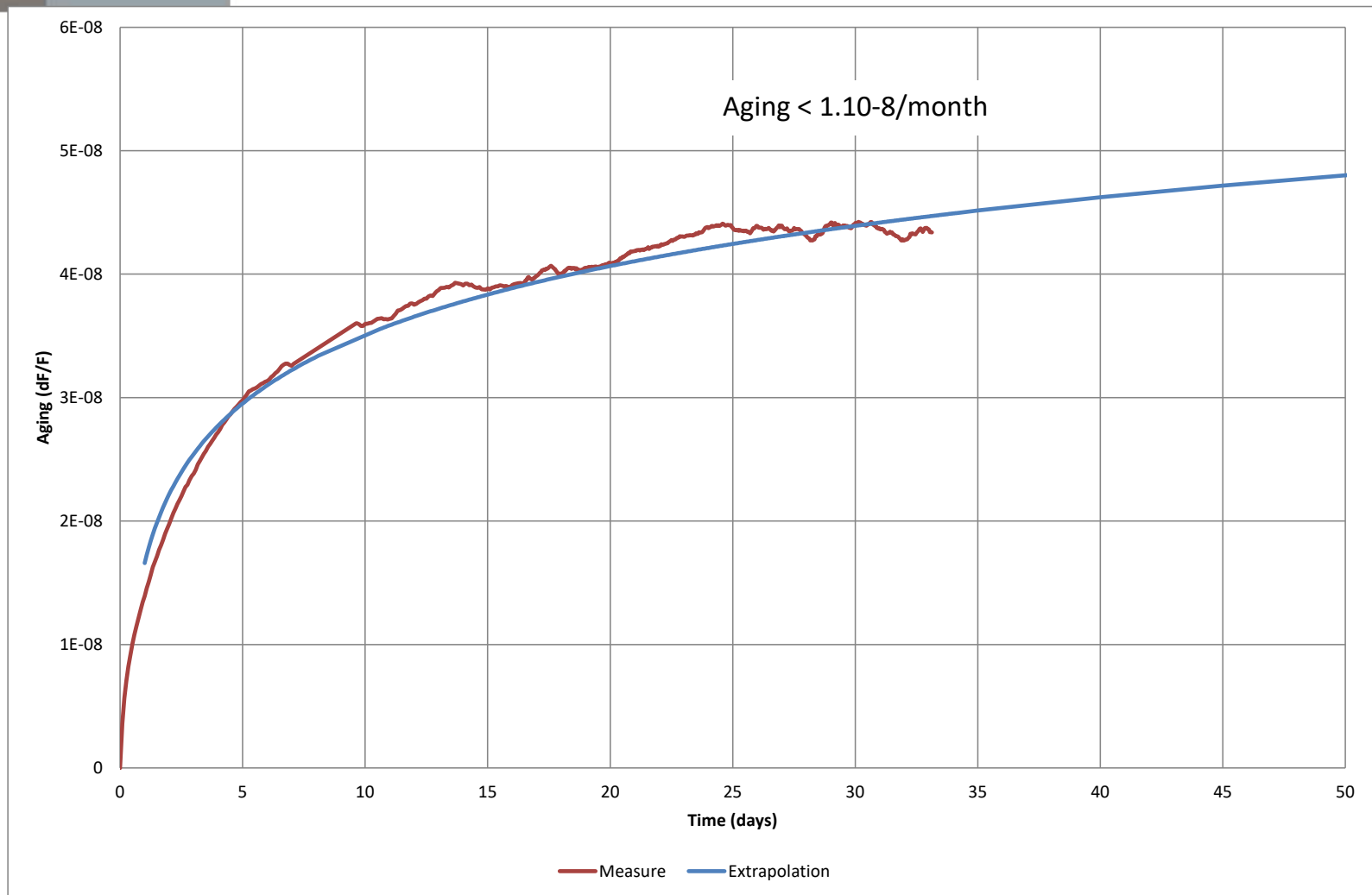
PULSAR-SP 108 I 50

MTBF



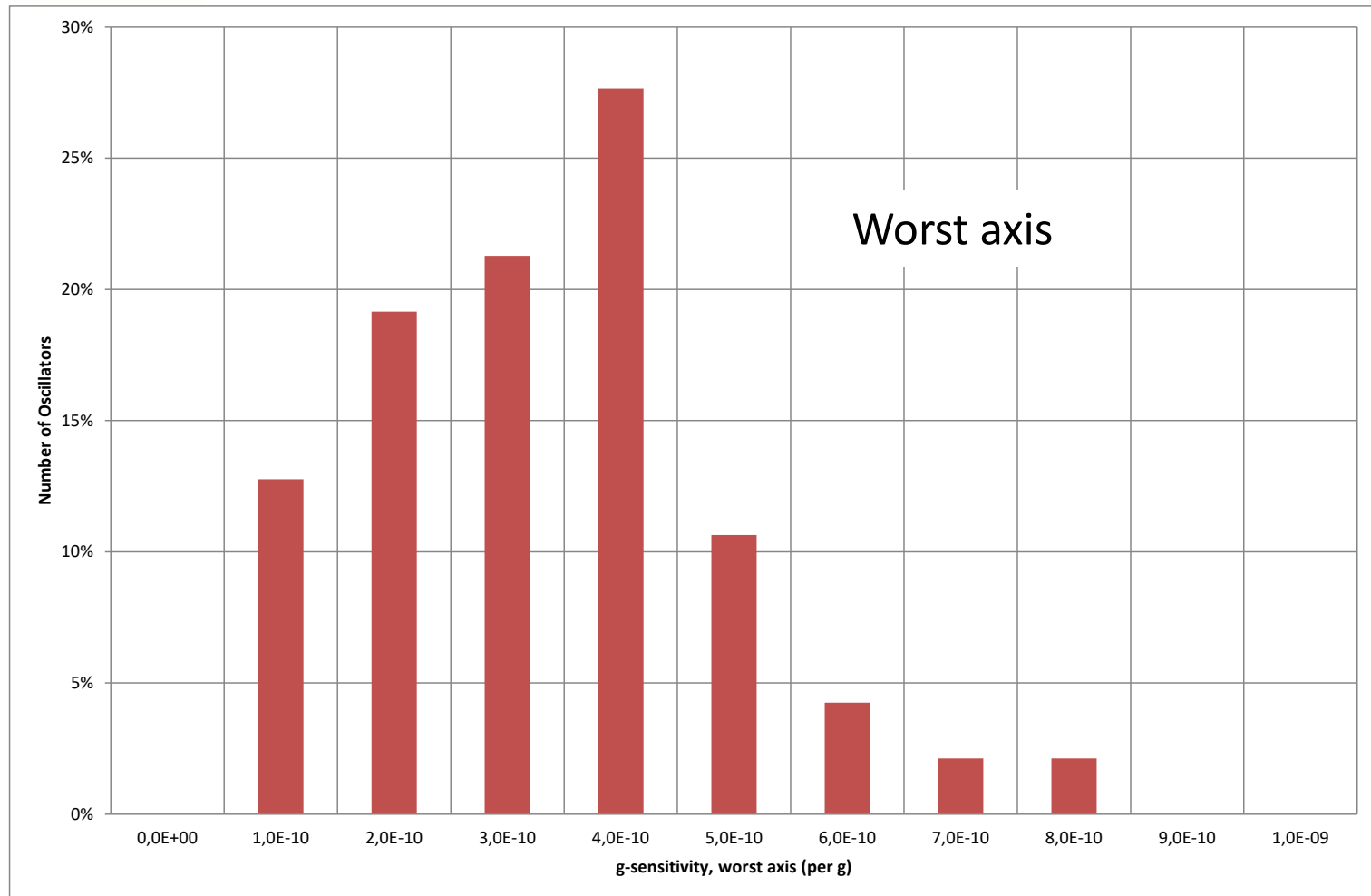
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Long term stability (aging)



PULSAR-SP 108 I 50

Acceleration sensitivity



PULSAR-SP 109 I 10

Frequency stability vs temperature

