WAVE
Timing Link

APPLICATIONS

- Clock or RF signal transfer over long distances, such as:
    - Maser distribution
    - Atomic clock distribution
    - Particle accelerators
    - Radio telescope arrays
- High flexibility in terms of clock type, clock frequency and transfer length
- Robust and fully automated operation

BENEFITS

- Transmission stability **better than state-of-the-art masers**
- **Optical transfer** of clock or RF signals
- **Any frequency** up to 10 GHz possible
- **Kilometers of fiber link length** possible

DESCRIPTION

WAVE LINK is based on state-of-the art optical fiber delay stabilization techniques developed by Cycle GmbH. It consists of **a transmitter (TX)** and **a receiver unit (RX)**; and can be used either for remote clock comparison or high-quality RF signal transmission.

Due to its unique design, WAVE LINK can transfer any RF or microwave frequency up to 10 GHz to a remote location which can be even tens of kilometers away.

SPECIFICATIONS

- **Guaranteed phase noise***

Offset Frequency	Phase noise at 10 MHz	Phase noise at 100 MHz**
1 Hz	-105 dBc/Hz	-100 dBc/Hz
10 Hz	-130 dBc/Hz	-115 dBc/Hz
100 Hz	-150 dBc/Hz	-125 dBc/Hz
1 kHz	-160 dBc/Hz	-153 dBc/Hz
10 kHz	-160 dBc/Hz	-162 dBc/Hz
100 kHz	-160 dBc/Hz	-163 dBc/Hz

*With appropriate RF/clock input.
**Contact Cycle GmbH for the phase noise of other frequencies.

- **Guaranteed frequency stability*****

Averaging time	Allan Deviation
1 s	1.5×10^{-13}
10 s	2.0×10^{-14}
100 s	5.0×10^{-15}
1 000s	2.0×10^{-15}
10 000s	2.0×10^{-15}

***valid for all frequency inputs.

- **Other specifications**

Parameter	Specification	Comment
Fiber link length	<5 km	longer links on request
Monitor & control interface	included	via TCP/IP
Number of RX outputs	4 x SMA type	
Dimensions, TX	19” & 3HU	standard module
Dimensions, RX	19” & 3HU	standard module
Weight, Transmitter	8 kg	standard module
Weight, Receiver	8 kg	standard module
Power input	100 – 240 VAC	redundant power supply

OPTIONS

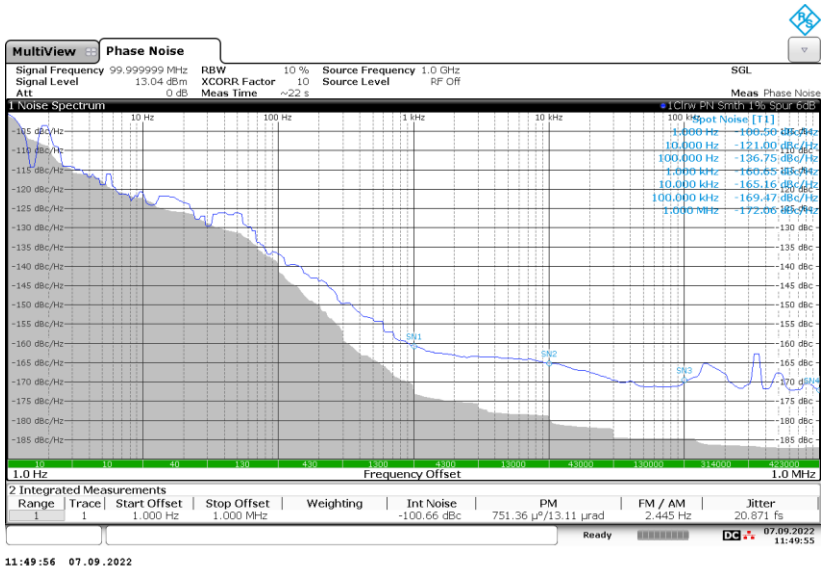
- **Multiple RX output option:** up to 16 outputs possible.

Please contact our team of timing experts for your customization needs.

Contact sales@cyclelasers.com to discuss your requirements and receive a free white paper on timing jitter measurements

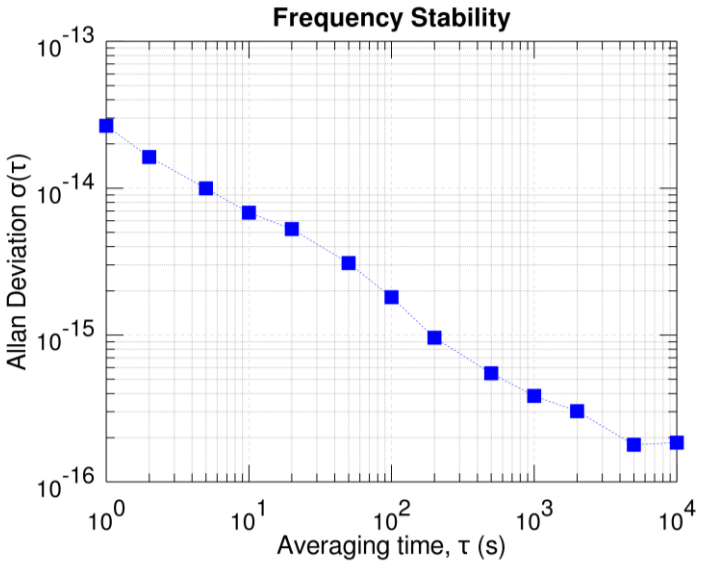
MEASUREMENT DATA

- **Absolute phase noise measurement at 100 MHz:**



Freq. (Hz)	Phase Noise (dBc/Hz)
1	-100.50
10	-121.00
100	-136.75
1 000	-160.65
10 000	-165.16
100 000	-169.47
1 000 000	-172.06

- **Frequency stability measurement at 100 MHz:**



Tau (s)	ADEV
1	2.66×10^{-14}
2	1.63×10^{-14}
5	9.97×10^{-15}
10	6.81×10^{-15}
20	5.27×10^{-15}
50	3.09×10^{-15}
100	1.81×10^{-15}
200	9.59×10^{-16}
500	5.49×10^{-16}
1 000	3.85×10^{-16}
2 000	3.03×10^{-16}
5 000	1.79×10^{-16}
10 000	1.85×10^{-16}