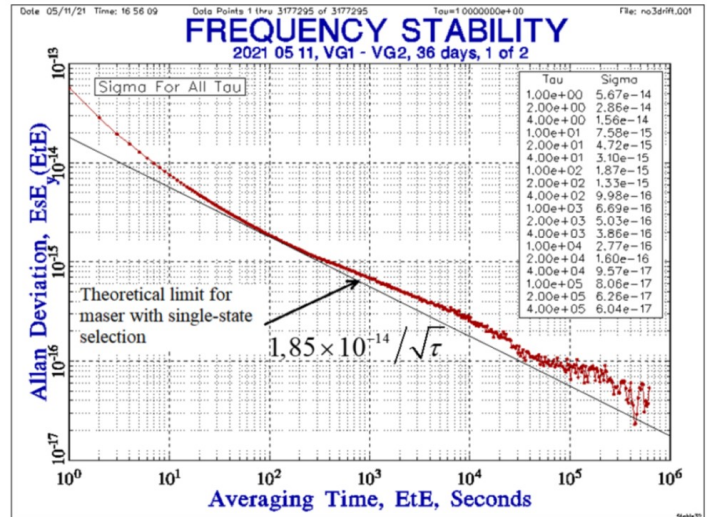




Active Hydrogen Maser VCH-2021



VCH-2021 is the first successful realization of hydrogen maser with a single state selection system. It demonstrates absolutely record frequency stability for active H-masers.

Best technologies including internal stand-alone Cavity Auto Tuning system are inherited from the previous model VCH-1003M.

Option: optical output with wavelengths 1310 nm and 1550 nm.

Key Features:

- ◆ Overall dimensions of the device: (H × W × D) : 950 × 445 × 625mm ;
- ◆ Weight : ~115kg.;
- ◆ VCH-2021 operates from both 85-264 VAC and an external DC source 12-30 VDC;
- ◆ Power consumption: ≤100 W;

Applications:

- National Time Keeping Service.
- Deep space tracking and navigation.
- VLBI systems.
- GNSS satellite monitoring.

VCH-2021 Specifications

Outputs :

Waveform	Qty	Amplitude	Width	Rise time	Termination
5MHz (sine)	2	1 ±0.2 V _{RMS}	-	-	50 Ω
10 MHz (sine)	2	1 ±0.2 V _{RMS}	-	-	50 Ω
100 MHz (sine)	2	1 ±0.2 V _{RMS}	-	-	50 Ω
1 Hz (pulse) PPS	2	>2.5 V	15±5 μs	< 3 ns	50 Ω

Optical Outputs: (Option)

Optical Fiber Specifications		Remarks
Distance	max. attenuation ≤15dB (≤ 50~70Km)	Remote end requires a VCH-608 for 1PPS, 5,10 & 100MHz output.
Connector Type	FC/APC	
Class 1 Laser	IEC 60825-2-2013	

Metrological characteristics:

Averaging time, τ	Frequency stability (Allan deviation) 5 MHz, 10 MHz, 100 MHz		
	VCH-2021 (std.)	VCH-2021 Option L	
	3 Hz measuring bandwidth	0.5 Hz measuring bandwidth	3 Hz measuring bandwidth
1 s	≤ 1.0x10 ⁻¹³	≤ 5.0x10 ⁻¹⁴	≤ 7.0x10 ⁻¹⁴
10 s	≤ 1.5x10 ⁻¹⁴	≤ 0.9x10 ⁻¹⁴	≤ 1.0x10 ⁻¹⁴
100 s	≤ 3.0 x 10 ⁻¹⁵	≤ 2.5x10 ⁻¹⁵	≤ 2.5 x 10 ⁻¹⁵
1000 s *	≤ 1.0x10 ⁻¹⁵	≤ 1.0x10 ⁻¹⁵	≤ 1.0x10 ⁻¹⁵
1 Hour *	≤ 8.0x10 ⁻¹⁶	≤ 8.0x10 ⁻¹⁶	≤ 8.0x10 ⁻¹⁶
1 Day*	≤ 1.0x10 ⁻¹⁶	≤ 1.0x10 ⁻¹⁶	≤ 1.0x10 ⁻¹⁶

* Specified only under laboratory conditions: ambient temperature in the range ±0.1 °C, changing rate <0.3 °C/hour.
ADEV at 1 day is specified for measurements with removed linear frequency drift

Phase noise (SSB Phase Noise, dBc/Hz)	Offset	VCH-2021			Option L		
		5MHz	10MHz	100MHz	5MHz	10MHz	100MHz
	1 Hz	≤-118	≤-112	≤-92	≤-130	≤-121	≤-100
	10 Hz	≤-135	≤-129	≤-109	≤-148	≤-135	≤-115
	100 Hz	≤-149	≤-143	≤-122	≤-151	≤-145	≤-125
	1 kHz	≤-156	≤-149	≤-122	≤-158	≤-150	≤-130
	10 kHz	≤-158	≤-153	≤-153	≤-158	≤-153	≤-153
	100 kHz	≤-158	≤-153	≤-153	≤-158	≤-153	≤-153

Frequency drift/Aging:	<3.0x10 ⁻¹⁶ /Day (After extended period of unperturbed operation.)
Frequency tuning range/ resolution:	1x10 ⁻¹⁰ / 1x10 ⁻¹⁶
Temperature sensitivity	< 1.5x10 ⁻¹⁵ /°C
Magnetic sensitivity/Gauss :	< 5x10 ⁻¹⁵
Input: 1 PPS synchronization	≤ 15 ns
Harmonic distortion @5 MHz :	< -40 dB
Non-harmonic distortion @5MHz:	< -100 dB (10 Hz to 10 kHz)
Power:	1x AC(85~264)V@ (49~51)Hz; 2x DC(24~27)V.
Power consumptions:	150 VA AC/ 100W DC
Temperature operating range:	(10...30)°C
Humidity:	< 80% @25
Dimensions (WxHxD):	445x950x625mm.
Weight:	~115 kg

Note: For Option L, the required OCXO is to be provided by customer locally.

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