

Rubidium frequency Generator

Functions

The equipment is a high precision frequency generator.
The equipment is presented in the form of a 19 " rackable drawer, 2 U height.

The equipment integrates a high stability and low noise Rubidium oscillator.

The front face of the equipment present:

- 5 LEDS giving the current state of the five outputs frequencies.
- A LED tension presence
- A LED indicating the current state of Rubidium (green: the parameters of operation are OK. Red: the parameters are out, which is the case during "the warm-up" or launching phase)
- A multi-turn potentiometer allows a retiming of the oscillator in the event of need.

The signals outputs are carried out on the rear face of the equipment.
The connectors are five:

- Five 10 MHz sine outputs,
- Five multi-turn potentiometers allow the adjustment of the level of each output.

A standard EEC 230V AC connector with fuse, filter sector and On/Off switch is used for power supply.



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Characteristics

- **Internal pilot:** high stability
- **Output Frequency:** frequency available 10 MHz or 5 MHz sine. Level +13 dBm max out of 50 Ohm.
- **Connector:** female base plates BNC for the sine outputs, SubD 9 points for RS232 remote control connection of the equipment.
- **Dimensions:** L = 19 " (483 mm), H = 2U (89 mm), P = 295 mm, Overall: 483 X 45 X340 Misters.
- **Weight:** 5 kg
- **Consumption:** 30 W

Specifications			
long term Stability	< 5x10 ⁻¹¹ /mois (typical ±1x10 ⁻¹¹)	< 3x10 ⁻¹¹ /mois (typical ±1x10 ⁻¹¹) Option A	
short term Stability		Standard	Option S
	1s	3x10 ⁻¹¹	1x10 ⁻¹¹
	10s	1x10 ⁻¹¹	3x10 ⁻¹²
	100s	3x10 ⁻¹²	1x10 ⁻¹²
phase noise		Standard	Q3 option
	1 Hz	- 70 dBc/Hz	- 80 dBc/Hz
	10 Hz	- 80 dBc/Hz	- 100 dBc/Hz
	100 Hz	- 115 dBc/Hz	- 130 dBc/Hz
	1 Khz	- 135 dBc/Hz	- 140 dBc/Hz
	10 Khz	- 140 dBc/Hz	- 150 dBc/Hz
Warm-up	< 15 minutes to reach 5x10 ⁻¹⁰		
Adjustment of the pilot frequency	2.5x10 ⁻⁹ (1x10 ⁻¹¹ resolution) ±20%		
Outputs Level	Sine 13 dBm out of 50 Ω, adjustable individually by step of ±1 dB		
Insulation enters the exits	> 20 dB		
Harmonics	<-25 dBc	<-40 dBc (option X)	
Spurious	<-80 dBc	<-110 dBc (option X)	
Sensitivity to temperature	< ± 1x10 ⁻¹⁰ on the beach: -5°Cwith +55°C		
Sensitivity to magnetic field	< 2x10 ⁻¹¹ /Gauss for axes X and Y. < 1x10 ⁻¹⁰ on axis Z.		
T° of storage	-55°Cwith +85°C		
T° of operation	-25°Cwith +55°C		
Humidity	35°C, 95% of relative humidity		
Pressure/altitude	Equivalent at an altitude of2000 m		
MTBF equipment	90.000 hours		
MTBF Rubidium	175.000 hours		
EEC Standards	73/23/EEC Low Voltage Directive. IN 60950 electrical and mechanical safety. 89/336/EEC Electromagnetic Compatibility IN 50081-1 Emissions; IN 55022 Class B; IN 55103-1; IN 50082-1 Immunity; IN 55024; IN 55103-2		

Characteristics (continuation)

Remote control:

- RS232 connector, SubD 9 pins
- Accessible parameters:

Parameters related to the operation of the Rubidium cell	Parameters related to the equipment operation
Tension (cd.) of the rubidium cell (0-5V)	Test of the signal presence on each output
Signal peak of Rb (0-5V)	global test of the current status of rubidium (cf LED front face)
Reading of instruction control of adjustment of the frequency (0 to 5V)	
Heater current of the cell (0-500 my)	
Output of the frequency correction, by step of 1×10^{-11}	

Command codes

SR2021 - F-ASQ3X

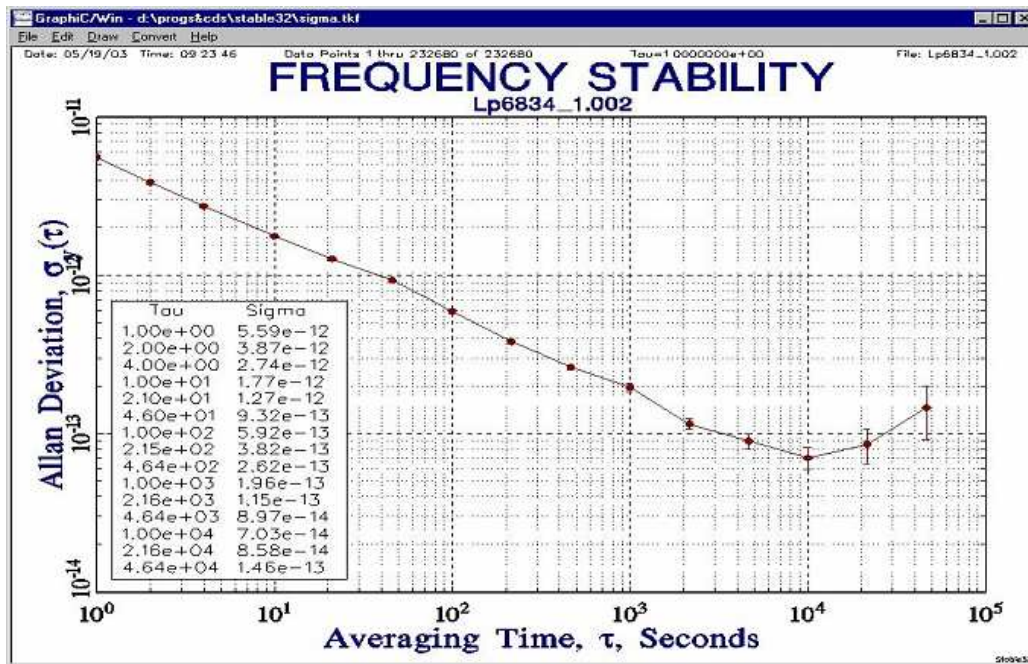
Rubidium Generator

F= 5 or 10 (oscillator 5 MHz or 10 MHz)

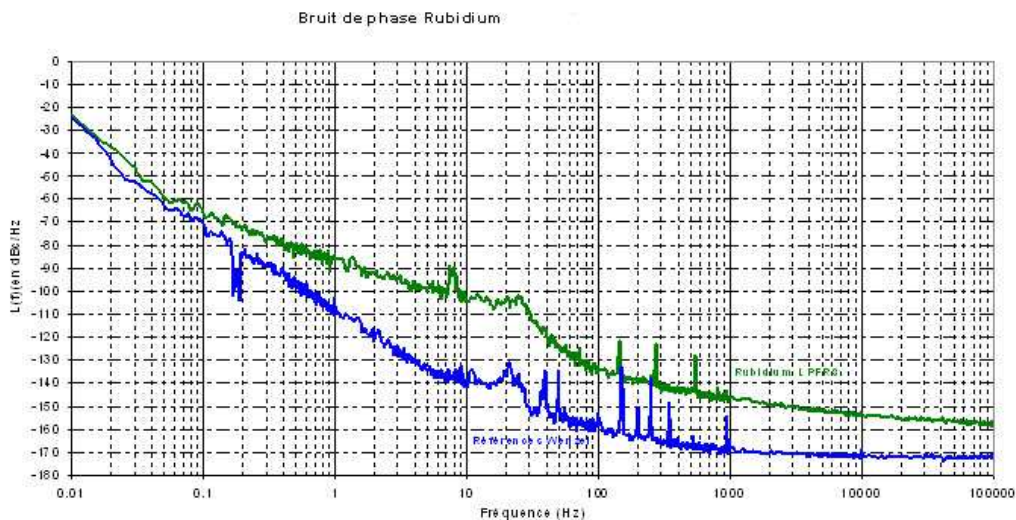
Measurements

Measurements carried out concerning the stability and the phase noise of Rubidium.

- **Short-term stability**



- **Phase Noise**



Variation with carrying (Hz)	1	10	100	103	104	105
Specification	-80	-100	-130	-145	-153	N.S.
Measurements Rb	-86	-103	-134	-147	-153	-158