

	<b>Space Ultra-Stable-OCXO</b> (Space Grade USO)	<b>Stp "tbd"</b> 2010-April-17 <sup>th</sup> .
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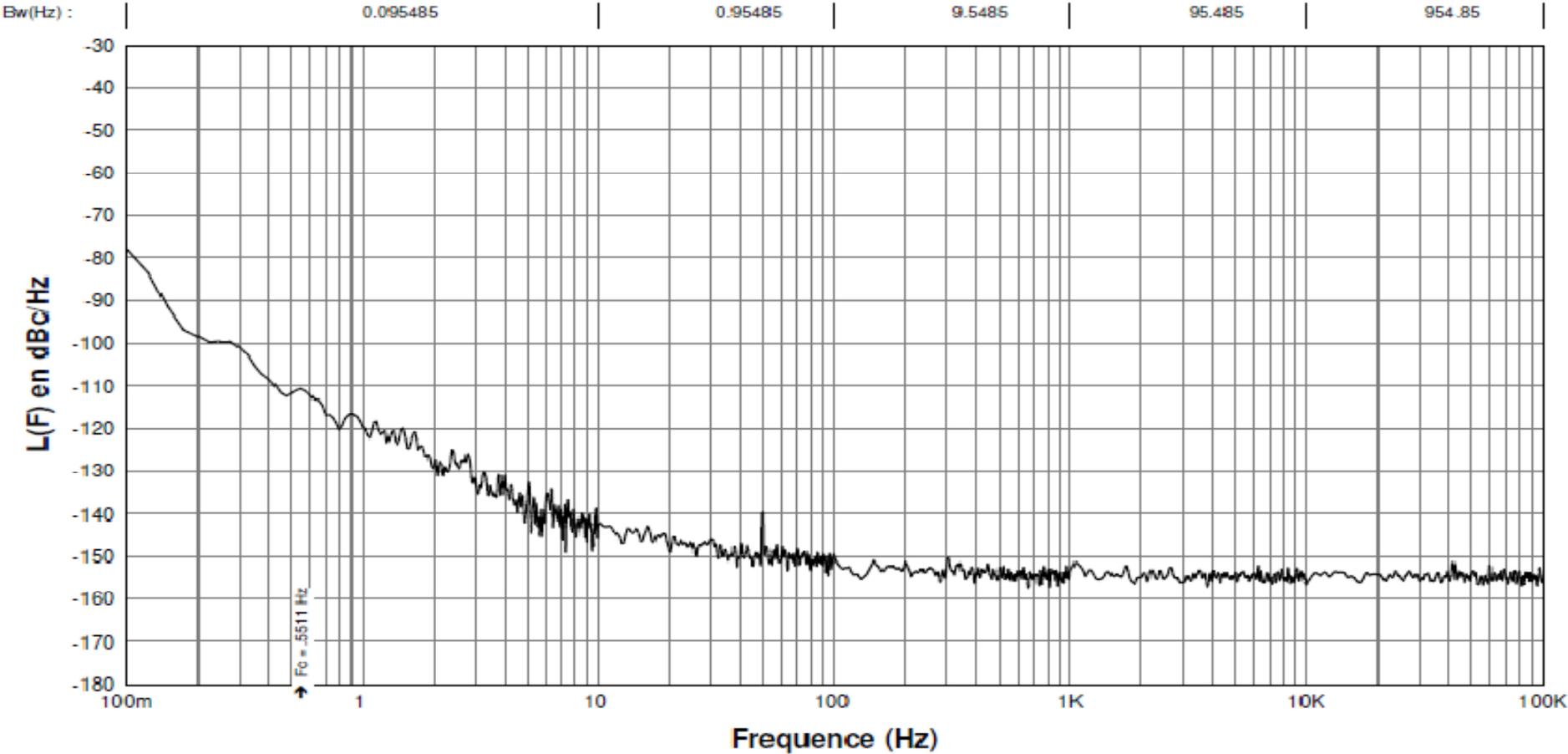
<b>1.</b>	<b>Frequency</b>	<b>Standard</b>	
1.1	Nominal output frequency (Fo)	10.0 MHz	Option : from 5.0 MHz to 12 MHz
1.2	Initial frequency setting accuracy	Fo ± 5 E-8	@ +25°C at shipment
<b>2.</b>	<b>Temperature Range</b>		
2.1	Operating range	-20°C to +60°C	Frequency stability specified
2.1	Storage	-40°C to +70°C	Not operating
2.2	Warm-Up Functional Range	-30°C to +65°C	No frequency stability specified
<b>3.</b>	<b>Input Power Supply</b>		
3.1	Input voltage	+20V ± 1V	Option : +24.0V ± 5%
3.2	Continuous Input voltage protection	0V to 32V	Rating - No damage
<b>4.</b>	<b>Power Consumption (in W)</b>		
4.1	Steady state power	≤ 1.5	@ +45°C under vacuum
		≤ 3.0	@ +20°C under vacuum
		≤ 3.5	@ -20°C under vacuum
4.2	Steady state power	≤ 1.5	@ +45°C at atmospheric pressure
		≤ 3.0	@ +20°C at atmospheric pressure
		≤ 5.0	@ -20°C at atmospheric pressure
4.3	Warm-Up Power	≤ 6.0	
<b>5.</b>	<b>Electrical Frequency Control</b>	<b>Not applicable</b>	
<b>6.</b>	<b>Output Signal</b>		Into 50 ohms pure resistive load
6.1	Signal wave-form	Sine	
6.2	Output level	+0dBm to +3dBm.	Possible option for 2 outputs
6.3	Harmonics/Sub-Harmonics	≤ -40dBc	
6.4	Non-harmonics	≤ -90dBc	
6.5	Load / VSWR	50 ohms nom.	± 5% / 1.25 : 1 max.
6.6	Warm-Up Times	≤ 2 seconds	100% of output level
		≤ 2 hours	Full performances except frequency stability versus time (short & long term ageing)
<b>7.</b>	<b>Frequency Stability</b>		versus operating conditions
7.1	Stability versus -20°C to +60°C operating temperature range	≤ 1 E-10 ( <i>peak to peak</i> )	with temperature gradient of ± 0.1°C maximum per minute
7.2	Stability versus Supply Voltage	≤ ± 5 E-11	with +/-1V variation
7.3	Stability versus Load change	≤ ± 1 E-11	50ohms & VSWR 1.2
7.4	Acceleration sensitivity	≤ ± 1 E-9 / G	3 axis quadratic sum
7.5	Frequency vs. pressure variation	≤ ± 2 E-8	per 1E+5 Pa
7.6	Frequency vs. magnetic field	≤ ± 1 E-11	per Gauss
7.7	Frequency retrace @ +25°C	≤ ± 2 E-9	after more than 40 hours ON, 24 hours OFF and 24 hours of continuous operation

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<b>8.</b>	<b>Long Term Stability</b> ( <i>Ageing</i> )	<b>after 30 days minimum of continuous operation</b>	
8.1	per day ( <i>measured before shipment</i> )	$\leq \pm 5.0 \text{ E-11}$	Continuous operation
8.2	per year ( <i>extrapolated from real data</i> )	$\leq \pm 2.0 \text{ E-08}$	
8.3	for lifetime ( <i>extrapolated as above</i> )	$\leq \pm 2.5 \text{ E-07}$	5 years (storage & test) + 10 years operation
<b>9.</b>	<b>Phase Noise</b>	<b>SSB Phase Noise</b>	
9.1	@ 1Hz offset	$\leq -108$	<i>in dBc/Hz</i> <i>(stable operating conditions)</i>
9.2	@ 10Hz	$\leq -138$	
9.3	@ 100Hz& over	$\leq -150$	
<b>10.</b>	<b>Short term stability</b>	<i>Allan Standard Deviation @ 10MHz in steady-state conditions</i>	
	Integration time from 1s to 100s	$\leq 3.5 \text{ E-13}$ (mean value) $\leq 5.0 \text{ E-13}$ (99%)	After complete re-stabilization of the device after interruption <i>(ageing slope <math>\leq 1\text{E-10}</math> per day)</i>
	Integration time of 1,000s	$\leq 1.0 \text{ E-12}$ (mean value) $\leq 2.0 \text{ E-12}$ (99%)	
<b>11.</b>	<b>Mechanical Requirements</b>	<b>Qualification level</b>	<b>Acceptance level</b>
11.1	Mechanical Shocks (each orthogonal axis / 5 directions)	Qualification Model (QM) half sine / 800 G / 0.25 ms	Flight Model (FM) Not applicable
11.2	Sine Vibration	each orthogonal axis	each orthogonal axis
	Frequency	sweep rate 2oct./minute up and down	sweep rate 4oct./minute up and down
	5Hz to 21Hz	11.0 mm peak	9 mm peak
	21Hz to 100Hz	20g	16g
11.3	Random Vibration - Frequency	Power Spectrum Density on each orthogonal axis	Power Spectrum Density on each orthogonal axis
	20 Hz to 100 Hz	+3 dB/oct	+3 dB/oct
	100 Hz to 400 Hz	0.7 g <sup>2</sup> /Hz	0.3 g <sup>2</sup> /Hz
	400 Hz to 2000 Hz	-3 dB/oct	-3 dB/oct
	Duration	120 s per axis	60 s per axis
	Overall	26.38grms	17.27grms
<b>12.</b>	<b>Radiation</b>		
12.1	Equipment exposed to external total cumulated dose over lifetime.	equivalent to 40 k Rad	Shielding made of 4 mm thick aluminum sheet (or equivalent) & Ultra-Stable OCXO structure
12.2	Radiation Level for components	30 k Rad min.	Applicable to Flight Models
<b>13.</b>	<b>Reliability</b>		
13.1	Reliability MIL-HDBK-217E	SF +50°C = 500 fits max	SF +50°C = 210 fits typical
13.2	General specification	MIL-PRF-55310	
13.3	Components Quality level	Standard component list	(DCL)
<b>14.</b>	<b>Package/ Pin Out</b>	<i>Outline Drawing (ICD)</i>	Refer to Rakon's ICD-409386
14.1	Connectors /	SMA-Female for RF-Out & Male Subminiature-D 15pins for Power Supply	
14.3	Mass / Weight	< 1200g	

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STP 2828  
2010-April-17<sup>th</sup>.



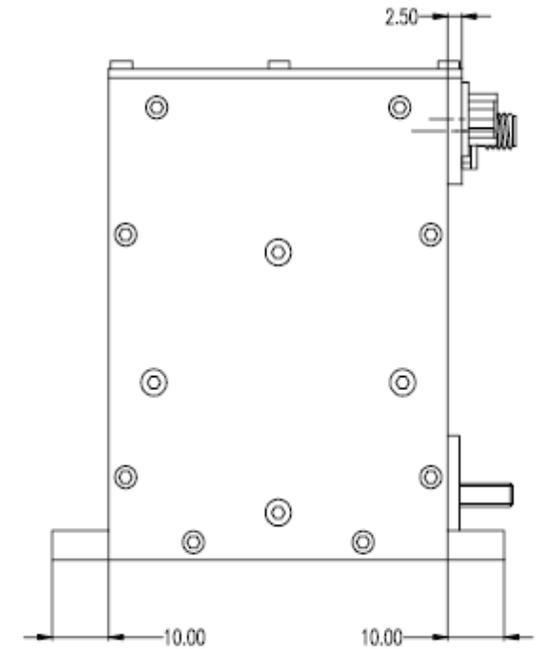
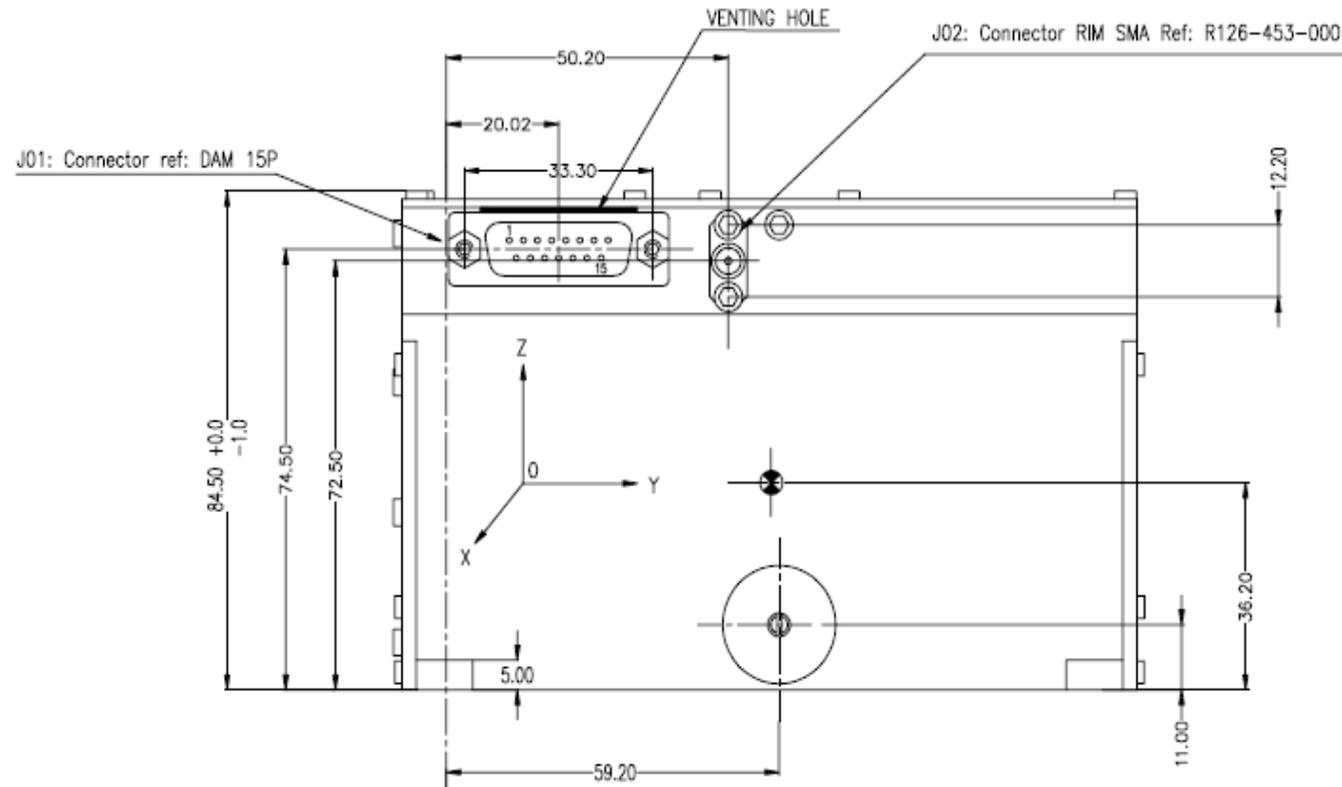
Typical Phase Noise @ 10.0MHz



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# Standard Space Ultra-Stable OCXO

**STP 2828**  
2010-April-17<sup>th</sup>.



CONNECTOR	TYPE	FUNCTION
J01	CANNON DAM 15P	DC POWER
J02	SMA FEMALE	RF OUTPUT

### **Connector J01**

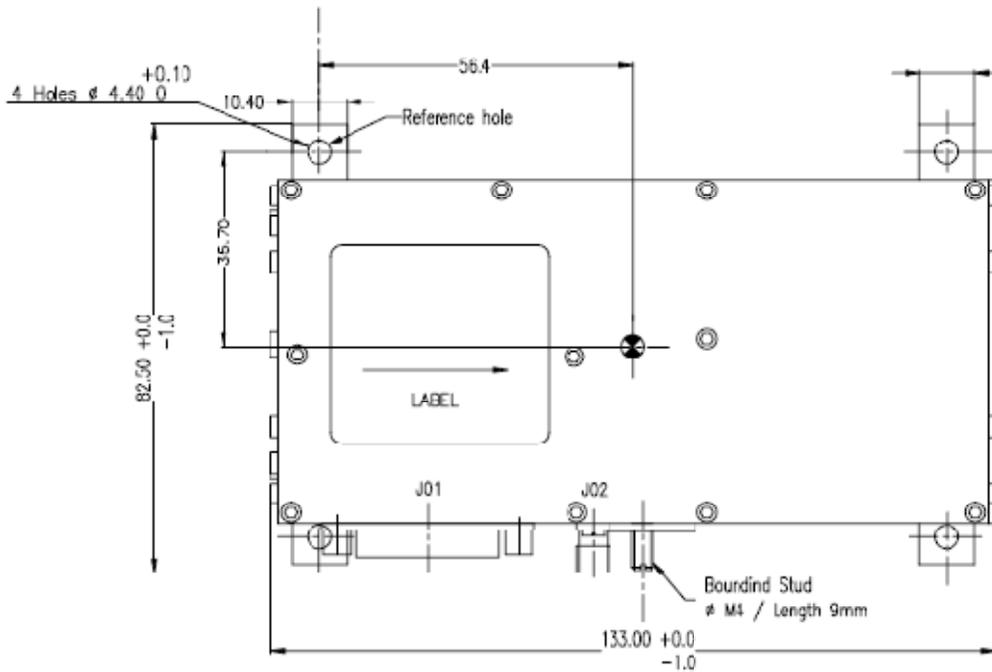
Pin 1, 2 & 8 = Mechanical & Electrical Ground

Pin 9 & 10 = Power Supply Input (+)

Other Pins not connected

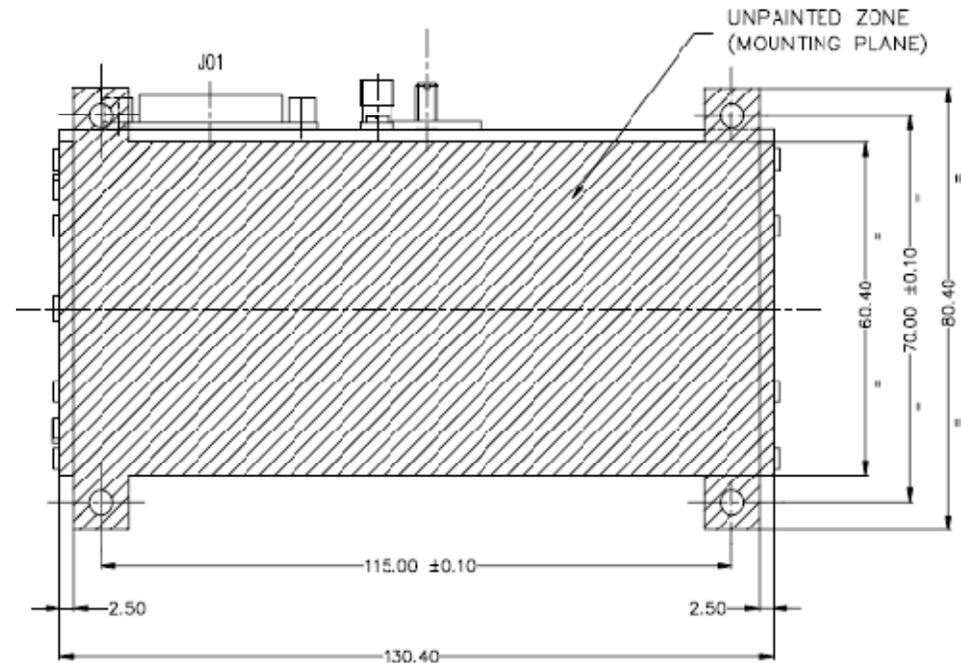
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**Top View**

Serial Number SN FM-xxx  
Date Code (Year / Week) DC Yy Ww



**Bottom View**



WARNING: Helium exposure  
Detail in doc 93076: Notice d'utilisation

**Marking**

Specification : Stp "td"  
Nominal Frequency F : 10.0 MHz



WARNING: Magnetic field sensitive  
Detail in doc 93076: Notice d'utilisation