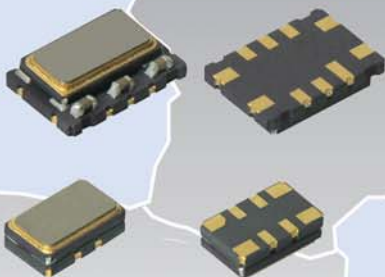
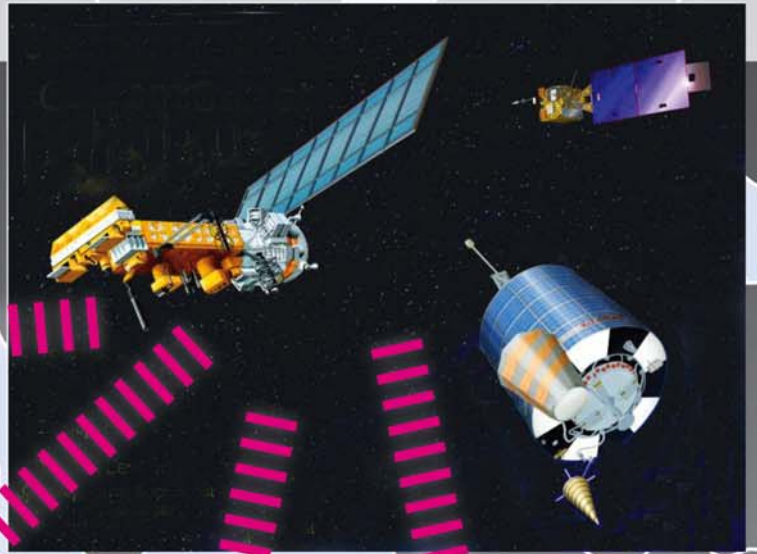
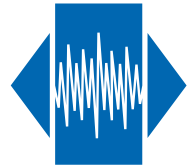




TCXO Temperature Compensated Crystal Oscillators for **COSPAS-SARSAT** emergency beacon





for COSPAS-SARSAT emergency beacon

TX7-705CM-SQ-CoSa (7.0 x 5.0 mm)	10.0, 12.688375, 12.688656, 12.688750, 12.80, 20.0, 25.0, 26.0, 30.0 & 32.0 MHz	
TX7-503CM-SQ-CoSa (5.0 x 3.2 mm)	10.0, 12.678303, 12.80, 16.3840, 20.0 25.0 & 26.0 MHz	
Frequency stability:		
vs. temperature reference to (F _{MAX} +F _{MIN})/2	≤ ±0.2 ppm ≤ ±0.2 ppm	-40 ~ +55 °C Class 1 beacon -20 ~ +55 °C Class 2 beacon
vs. supply voltage changes reference to frequency at nominal supply	≤ ±0.05 ppm	±5 %
vs. load changes reference to frequency at nominal load	≤ ±0.05 ppm	±5 %
vs. aging	≤ ±1.0 ppm ≤ ±3.0 ppm	1 st year 10 years
Frequency tolerance @ +25 °C	≤ ±0.5 ppm	
Frequency tolerance after reflow	≤ ±1.0 ppm	
Allan variance (ADEV)	< 1 x 10 ⁻¹⁰	τ = 1 s
Medium-term stability: Mean slope ΔF/dt after 15 min power-up: steady state during temperature ramp Residual ΔF (rms) from slope	IAW C/S T.007 and C/S IP TCXO ≤ ±0.7 ppb/min ≤ ±1.7 ppb/min ≤ 2.0 ppb	T = constant ΔT/dt = ± 5 °C/h over 18 points
Supply voltage (Vdc)	+3.3 V	±5 %
Supply current	4 mA	Max.
Output signal	CMOS	
Output level	V _{OH} > 0.9 x Vdc V _{OL} < 0.1 x Vdc	
Output load	15 pF	±5 %
Symmetry (duty cycle)	45 % ~ 55 %	@ ½ Vdc
Tri-state function	Input ≥ 2.3 V or open Input ≤ 0.9 V or GND	Output → oscillation Output → high impedance
Operating temperature range	-40 ~ +55 °C -20 ~ +55 °C	Class 1 beacon Class 2 beacon
Storage temperature range	-55 ~ +125 °C	
Packing units	tape & reel	500 or 1'000 pieces

TX7-705CM-SQ-CoSa	TX7-503CM-SQ-CoSa
Pin function # 1 Do not connect # 5 GND # 6 Output # 9 Tri-state # 10 Vdc Do not connect: #2, #3, #4, #7 & #8	Pin function # 1 Do not connect # 4 GND # 5 Output # 6 Tri-state # 8 Vdc Do not connect: #2, #3 & #7
Solder pattern 	Solder pattern

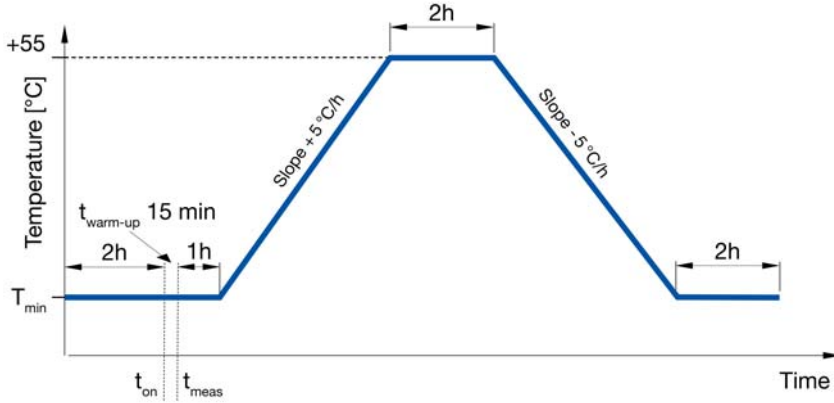
Additionally used components	<ul style="list-style-type: none"> • 406 MHz RF SAW filter • 121.50 MHz accurate, low power consumption clock oscillator
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for COSPAS-SARSAT emergency beacon

Medium term stability

Frequency stability measurement procedure according the COSPAS/SARSAT T.001



Note #1: T_{min} = -40 °C (Class 1 beacon)
 T_{min} = -20 °C (Class 2 beacon)
 T_{ON} = beacon turn-ON time after 2 hours “cold soak”
 T_{meas} = start time of frequency stability measurement (TON + 15 min)

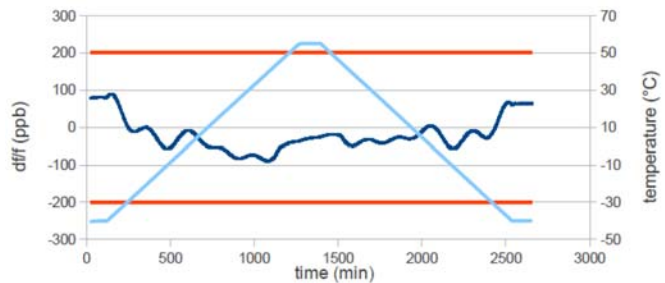
Note: #2 The 2 h and 1 h warm-up and stabilisation times are for type approval test of complete beacon. For testing of TCXO these times may be shortened accordingly.

Test data:

(Example)

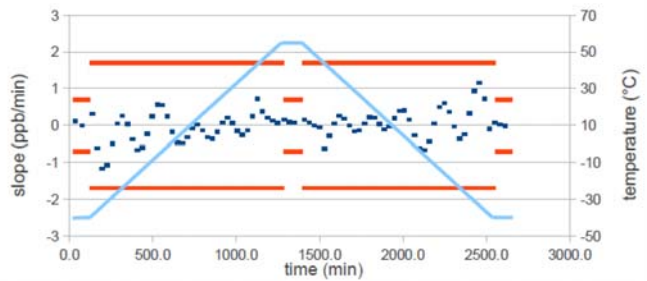
Frequency stability vs. temperature $\leq \pm 0.2$ ppm:

over -40 ~ +55 °C for Class 1 beacon
 over -20 ~ +55 °C for Class 2 beacon



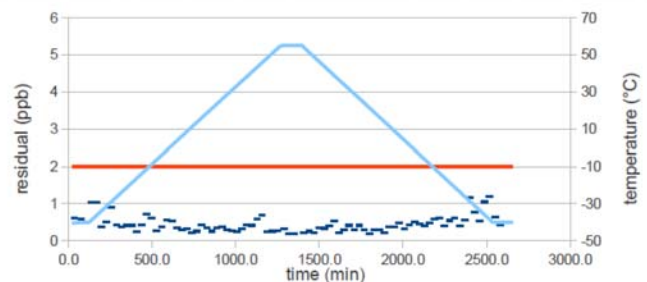
Mean slope $\Delta F/dt$ after 15 min power-up:

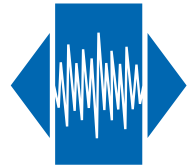
steady state: $\leq \pm 0.7$ ppb/min by T = constant
 during temp. ramp $\leq \pm 1.7$ ppb/min for $\Delta T/dt = \pm 5$ °C/h



Residual ΔF (rms) from slope:

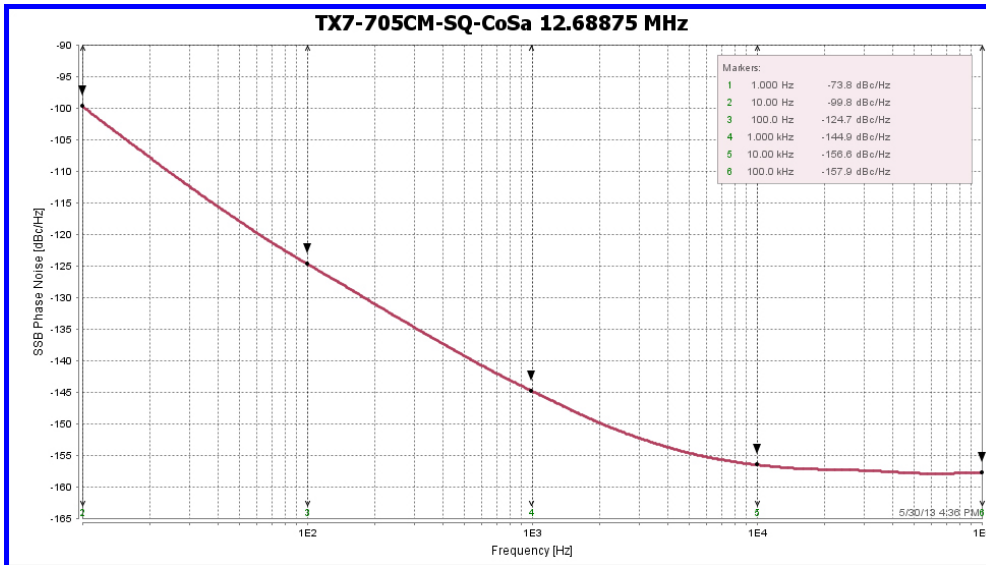
over 18 points ≤ 2.0 ppb



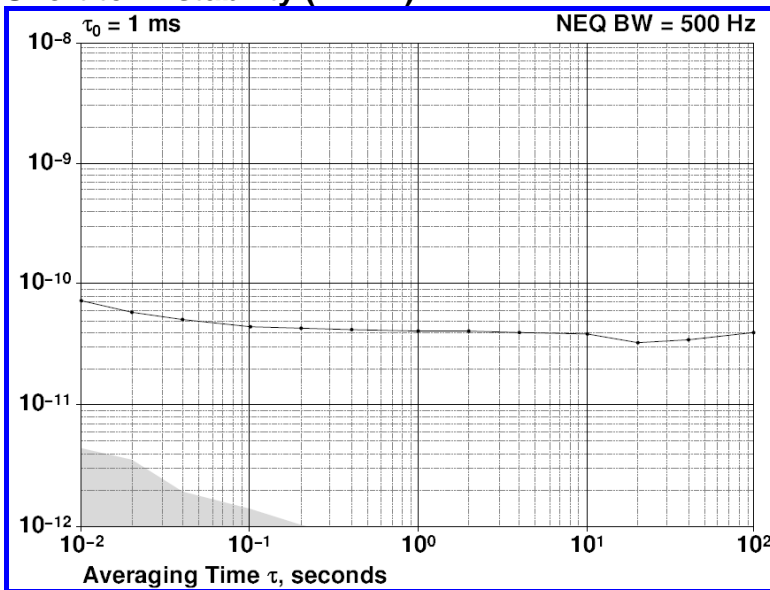


for COSPAS-SARSAT emergency beacon

Phase noise



Short term stability (ADEV)



Environmental	Reference STD.		Test condition
Vibration sinusoidal	IEC 60028-2-6	IEC 60679-1-5.6.7	Test Fc, 30 min per axis 10 Hz – 55 Hz with 0.75 mm, 55 Hz – 2 kHz with 10 g
Shock	IEC 60028-2-27	IEC 60679-1-5.6.8	Test Ea, 3 x per axis, 100 g, 6 ms half sine pulse
Solder ability	IEC 60028-2-20 IEC 60028-2-58	IEC 60679-5.6.3	Test Ta (235 ±2) °C Method 1 Test Tb Method 1A, 5 s



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