

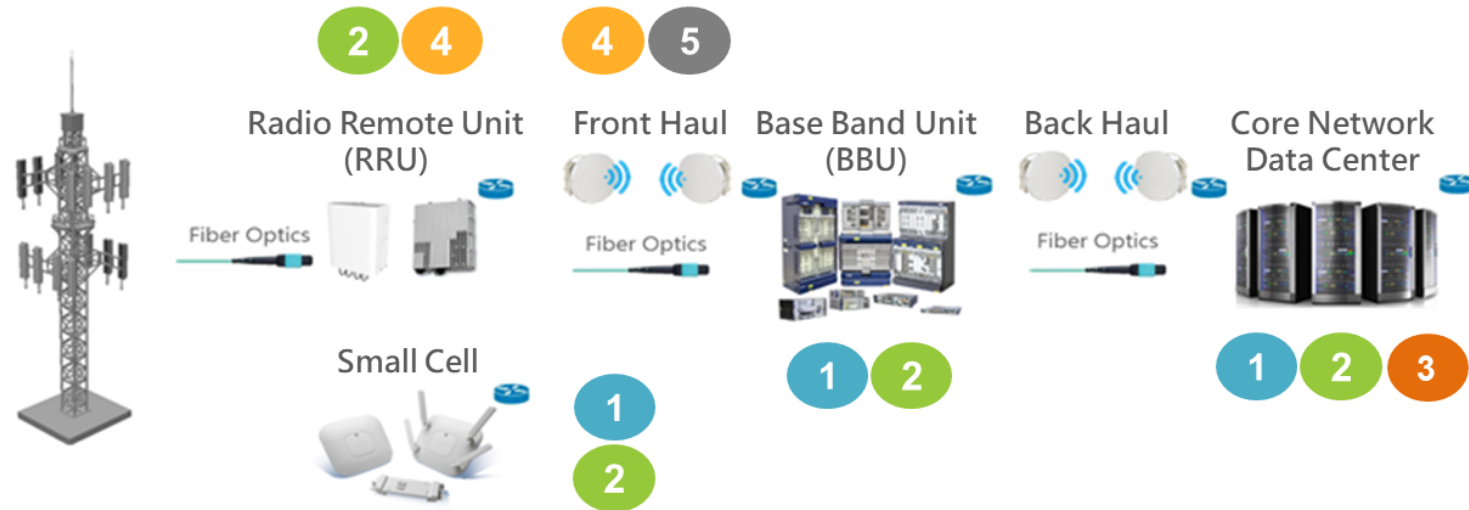


FUEL THE DIGITAL WORLD

Telecom & Networking Infrastructure Solutions

[Miniature SMD OCXO]

HIGH PERFORMANCE CRYSTAL & OSCILLATOR



1

Ultra Stability OCXO (9775, 1409); +/-10ppb

2

Ultra Stability S3 TCXO (7050, 5032); +/-100ppb

IEEE 1588 and Sync-E Compliant

3

High Frequency, XO/VCXO (7050);
Up to 2.1GHz, ultra low jitter 0.15pS

4

Ultra Low Phase Noise VCXO (3225);
Close-in phase noise -80dBc/Hz

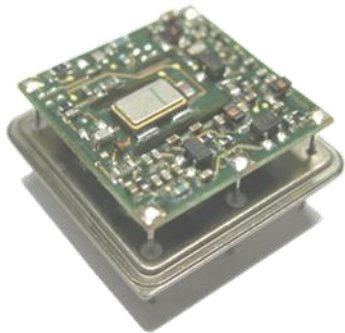
5

High Frequency Crystal (MESA 3225); 200MHz

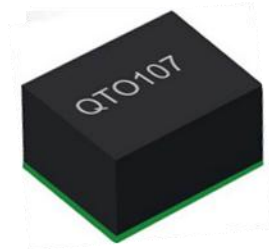
MINIATURE SMD 9x7mm OCXO

Highly Integrated, Smallest, Ultra Stability
Oven Controlled Crystal Oscillator (OCXO)
integrated in 9x7mm SMD package
(Heated Ceramic Package Patented)

Convention OCXO (20x20mm)
100~110 pcs components



SMD OCXO (9x7mm)
<10pcs components

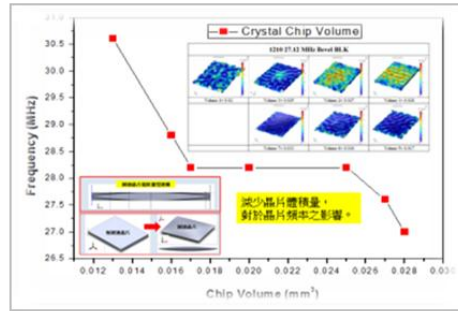


Baseband Radio Access Network, Small Cell,
Synchronous Networks (IEEE 1588, SyncE)

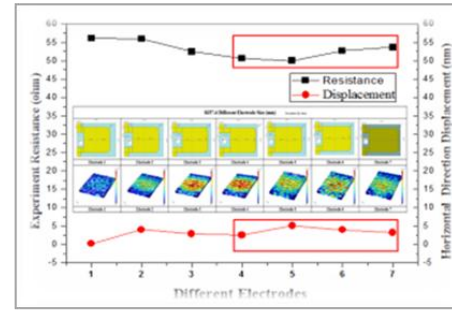
Item	QST	Competitor
Oven structure	IC with heater embedded PKG Symmetric mini-oven	Heater IC with conventional PKG Asymmetric mini-oven
X'tal type	Highly-stable SC-cut SMD	Stable AT-cut SMD
Airflow variation	6X better (<5ppb variation, No overshoot)	Normal
Temperature stability (over -40~85C)	2X~5X better (±10ppb)	Normal
Reflow variation	2X~4X better (<200ppb)	Normal
Short-term stability	2X~3X better (ADEV<5E-11/s)	Normal
Phase noise	10dB better (Close-in -70dBc/Hz; Floor <-160dBc/Hz)	Normal
Jitter (12kHz~5MHz)	3X better (Typ. 110ps)	Normal
Aging	better (1 year <±200ppb) (20years <±2.0ppm)	Normal

DESIGN CAPABILITY

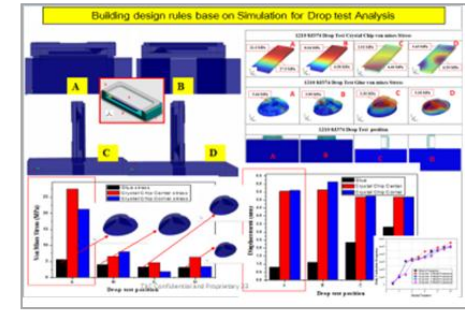
- Blank Design



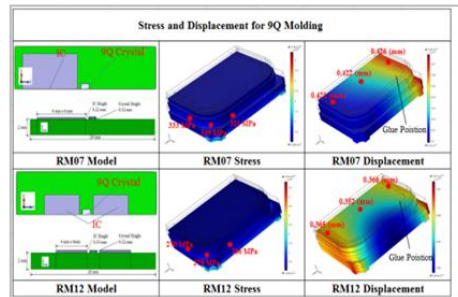
- Electrode Design



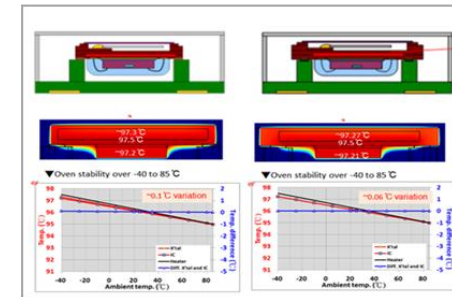
- Reliability



- Stress Analysis



- Thermal Analysis

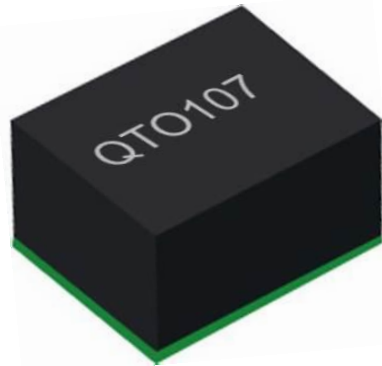


- Thermal Testing



To improve the design cycle by using CAD tool and database

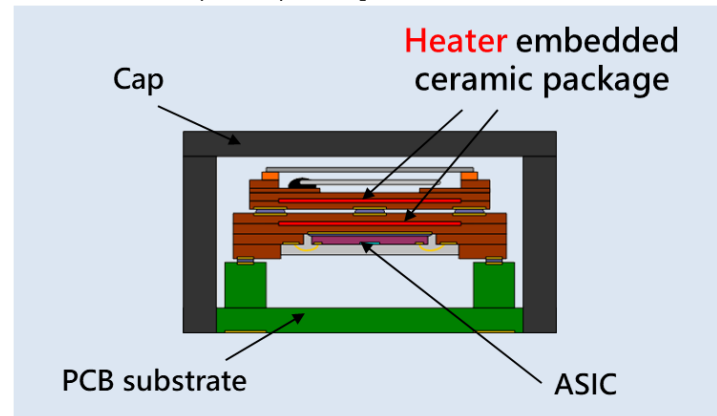
THERMAL SYMMETRIC STRUCTURE



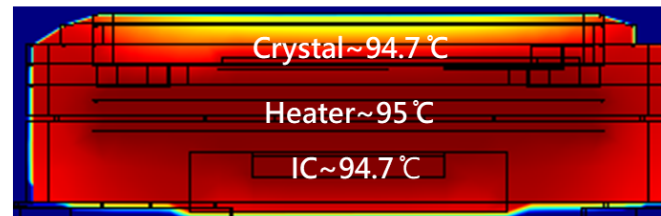
SMD 9x7mm OCXO
(L 9.7 x W 7.5 x H 5.5 mm)

Patented Oven Structure

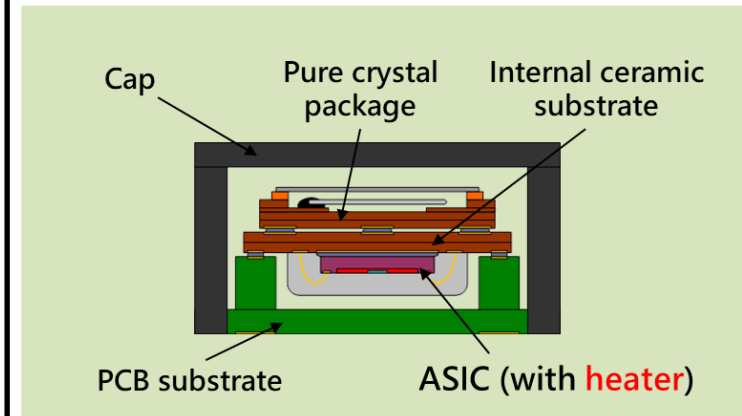
(US patent pending : US15066274, US62308323)



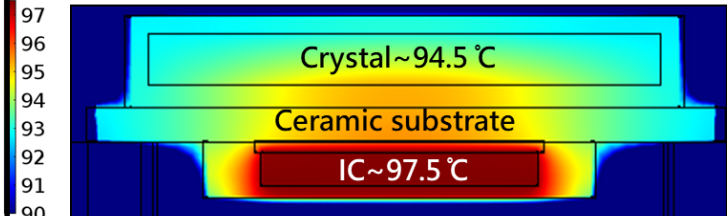
Symmetric thermal field



Conventional ASIC OCXO Structure



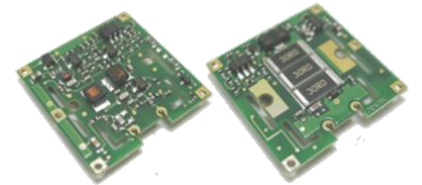
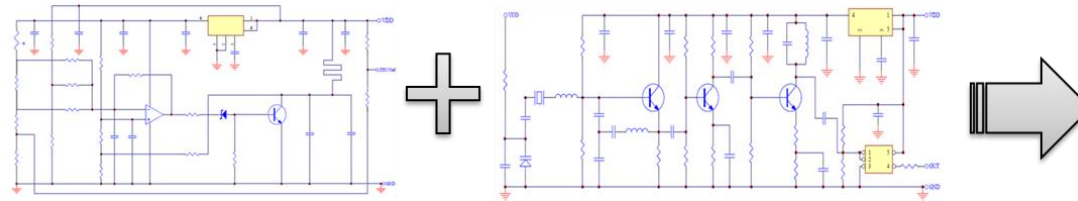
Asymmetric thermal field



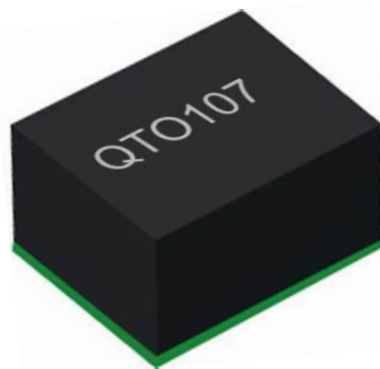
✓ Symmetric thermal field possess low temperature gradient between X'tal and IC.

CUSTOM ASIC ARCHITECT

- Conventional discrete-type OCXO circuits : oven control + oscillation

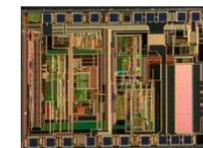
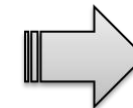
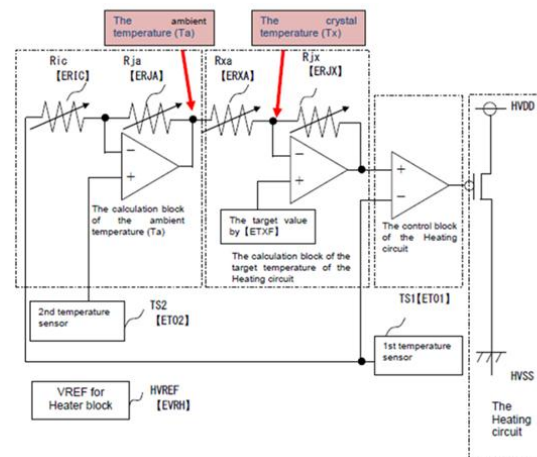


Over 20 x 20 mm² with double-side PCB layout



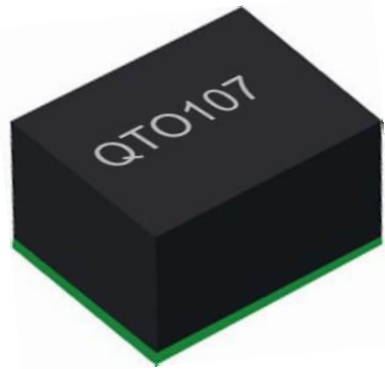
SMD 9x7mm OCXO
(L 9.7 x W 7.5 x H 5.5 mm)

- Fully integrated IC circuits for oven control & oscillation



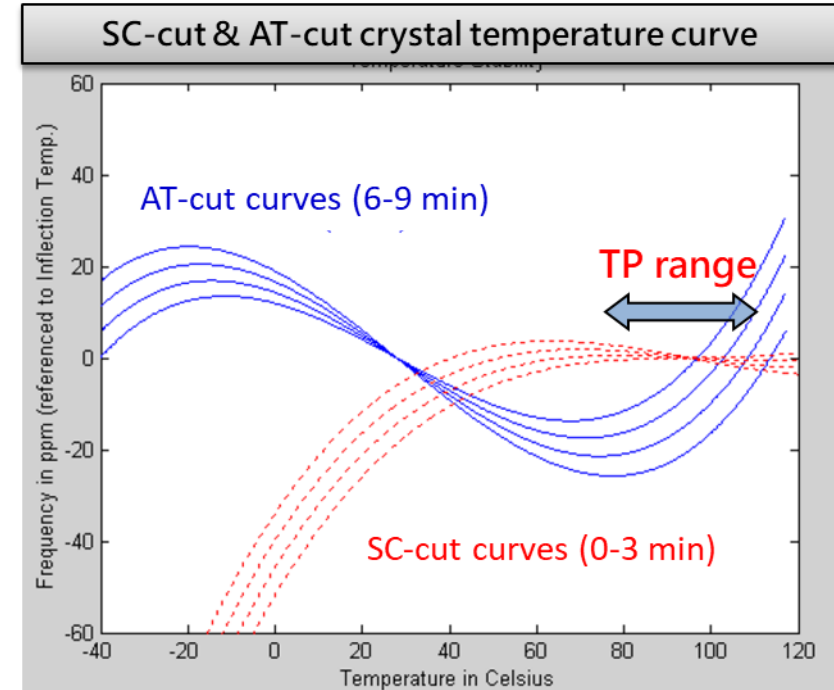
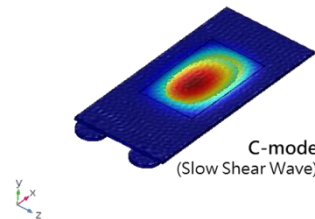
Fully integrated circuit

SC-CUT CRYSTAL IMPROVED TEMPERATURE RANGE

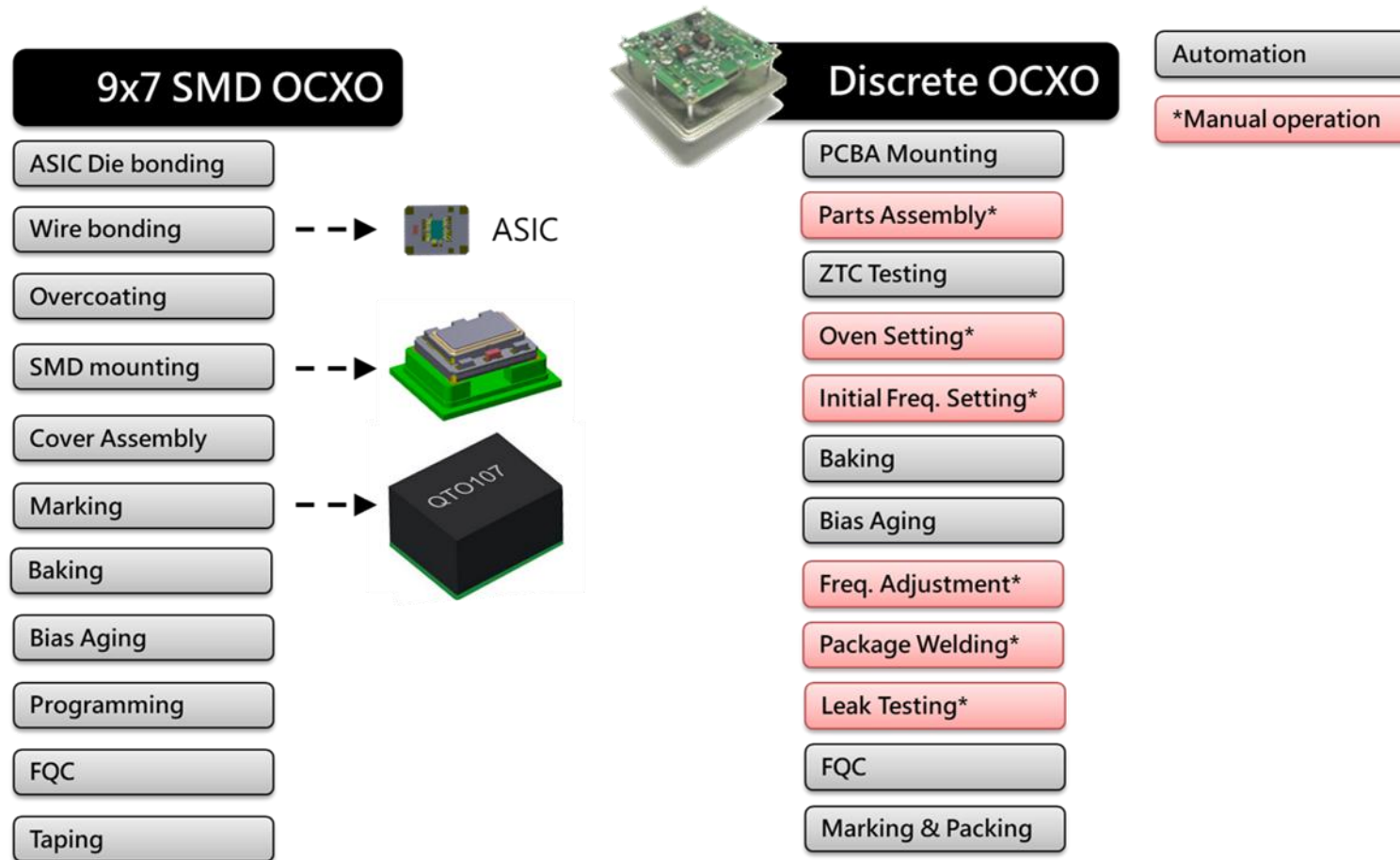


SMD 9x7mm OCXO
(L 9.7 x W 7.5 x H 5.5 mm)

SMD 9x7mm OCXO
by SC-Cut Crystal

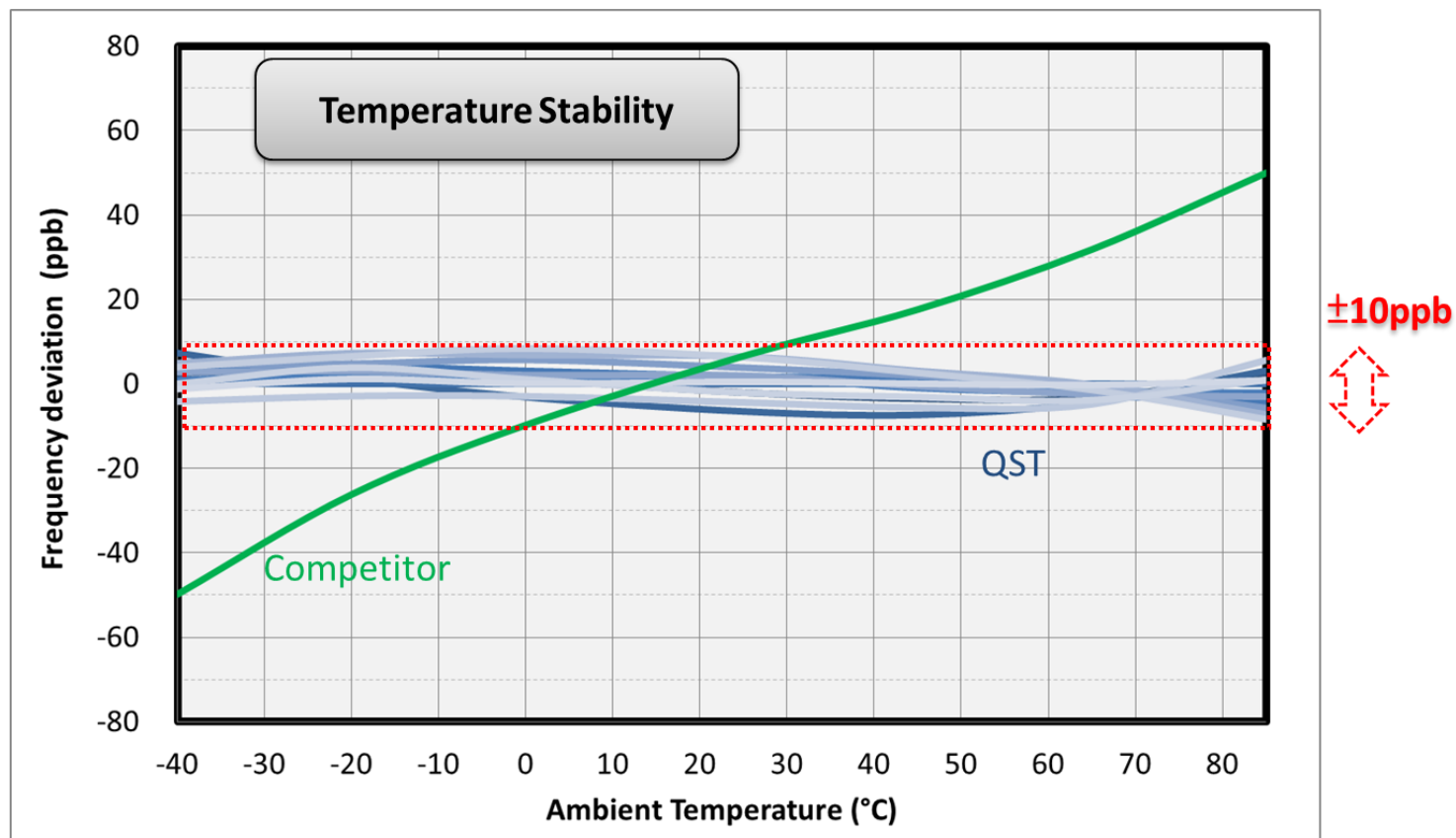


SIMPLIFIED AND AUTOMATED PRODUCTION



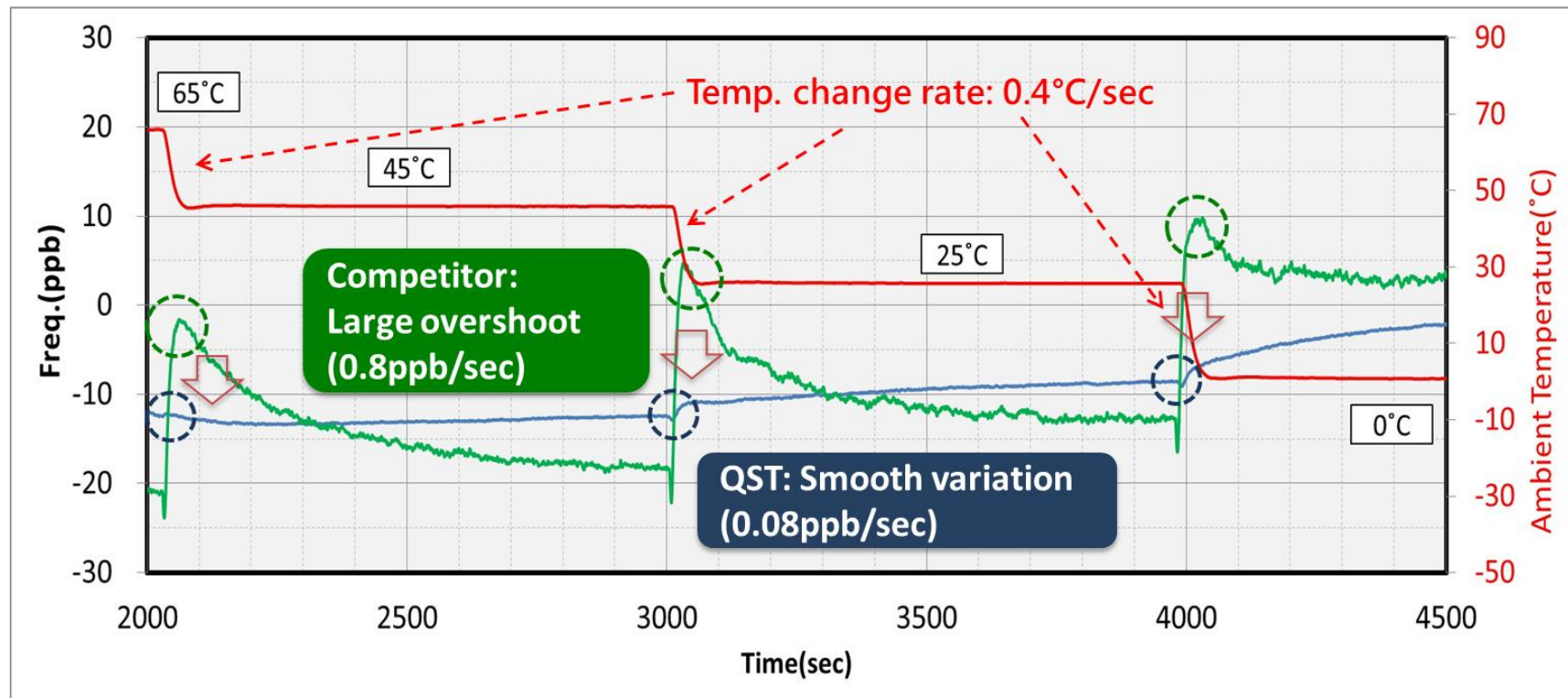
BENCHMARK – Temp. Stability

QST : $\pm 10\text{ppb}$ over $-40\sim 85^\circ\text{C}$ (2X~5X better)



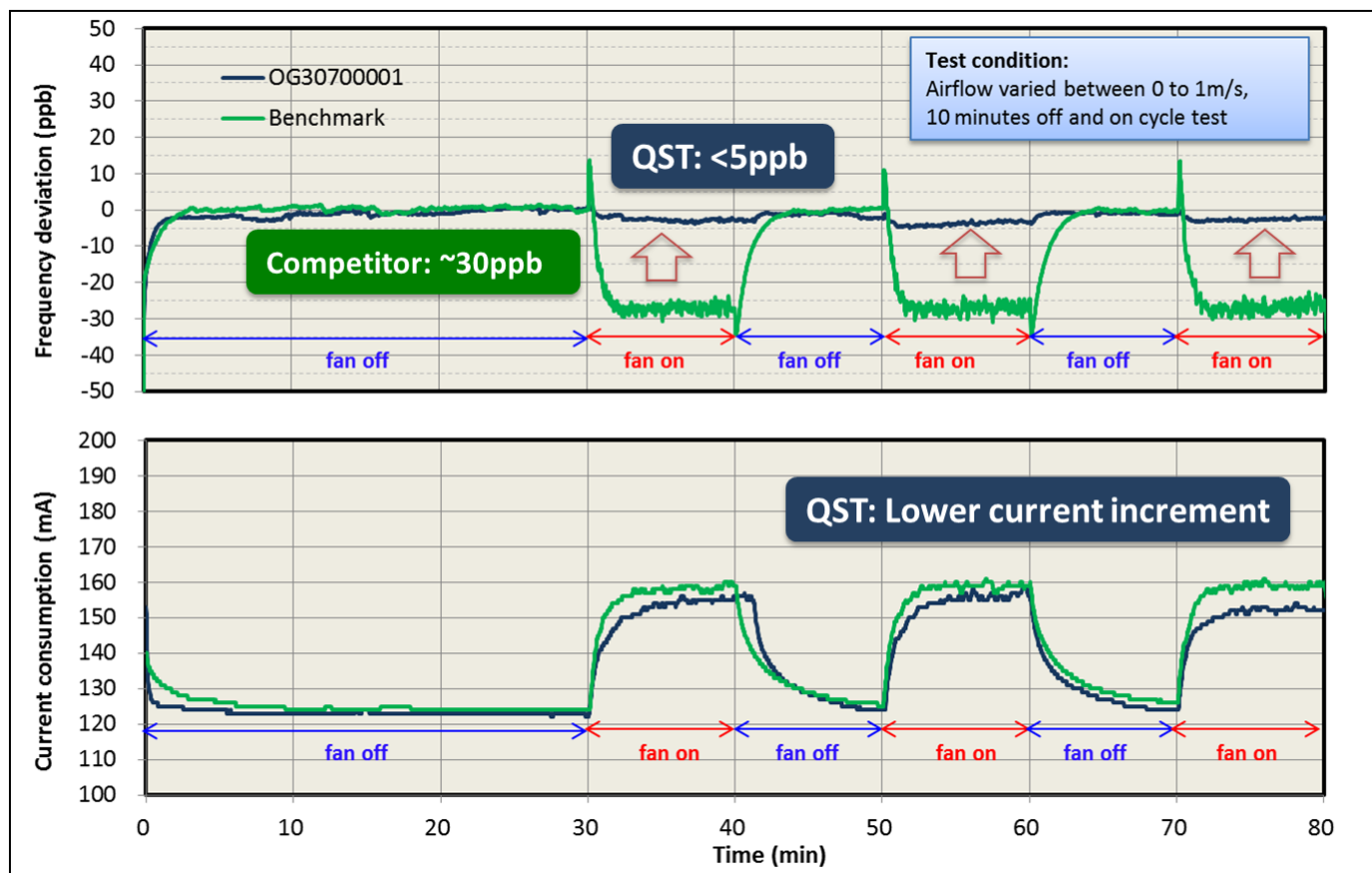
BENCHMARK – Severe Temperature Change

QST : Low over shoot under severe temperature change (5X~10X better)



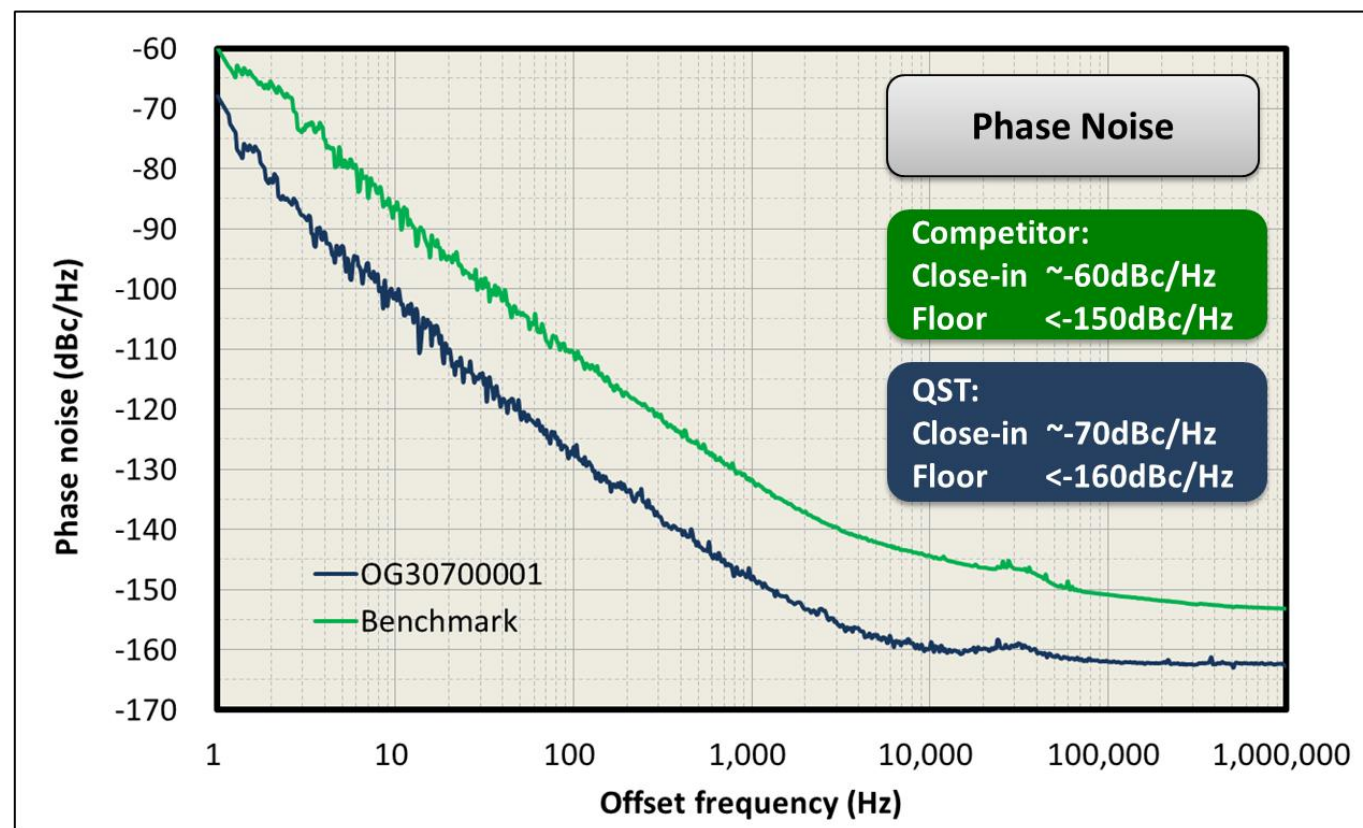
BENCHMARK – Air Flow Variation

QST : Lower disturbance under air-flow operation (6X better)



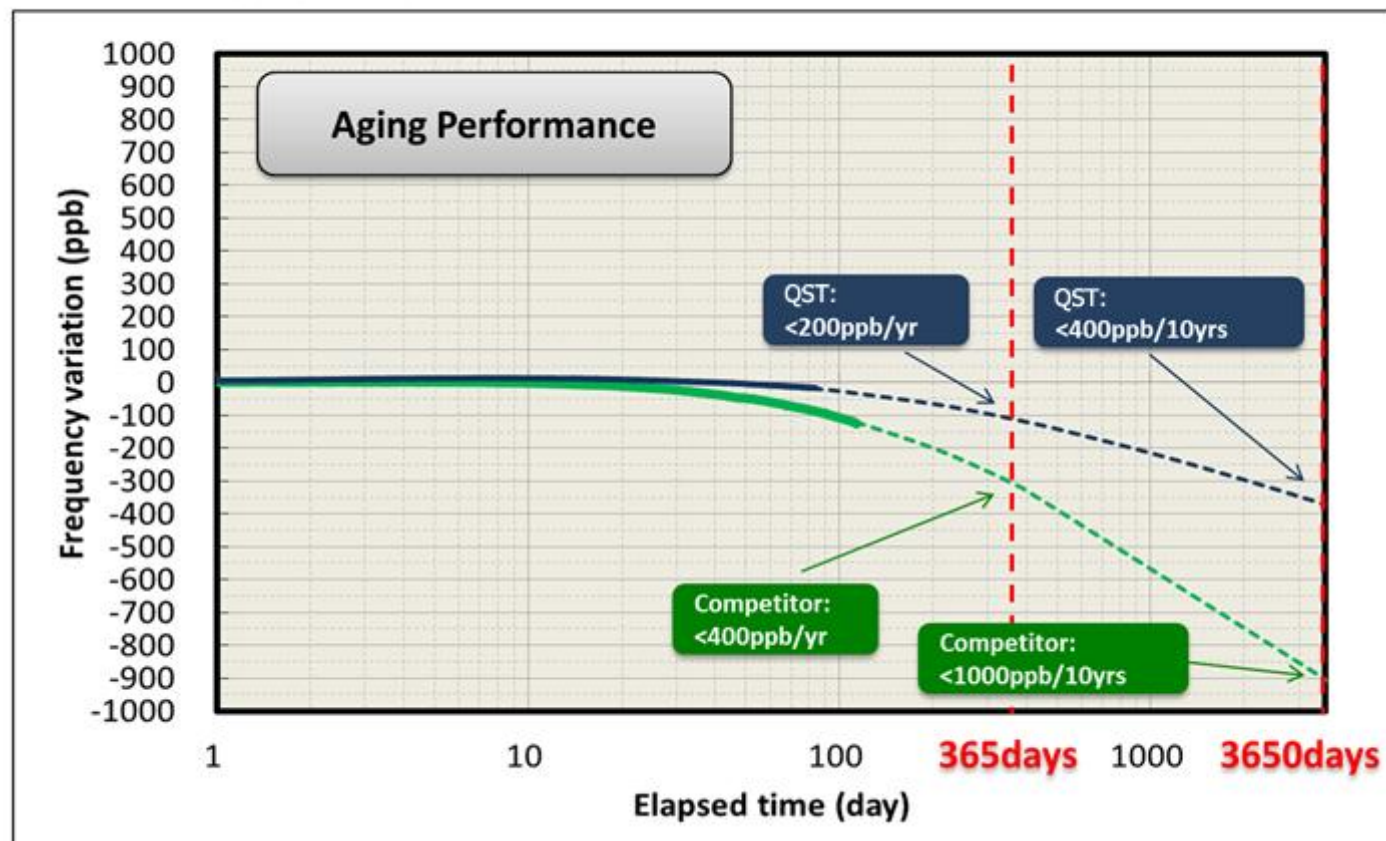
BENCHMARK – Phase Noise

QST : Close-in -70dBc/Hz; Floor <-160dBc/Hz (10dB better)



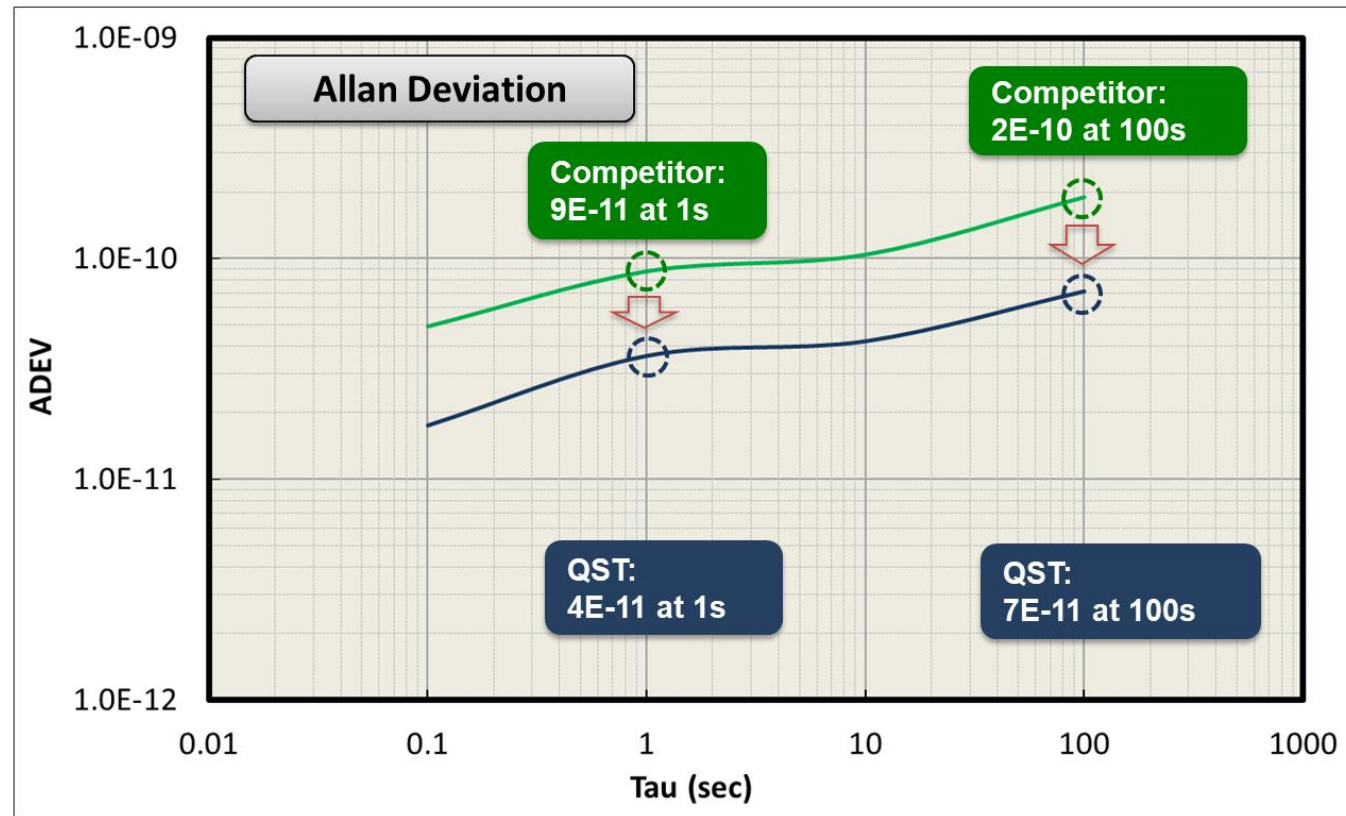
BENCHMARK – Aging

QST : Year aging <200ppb (better)



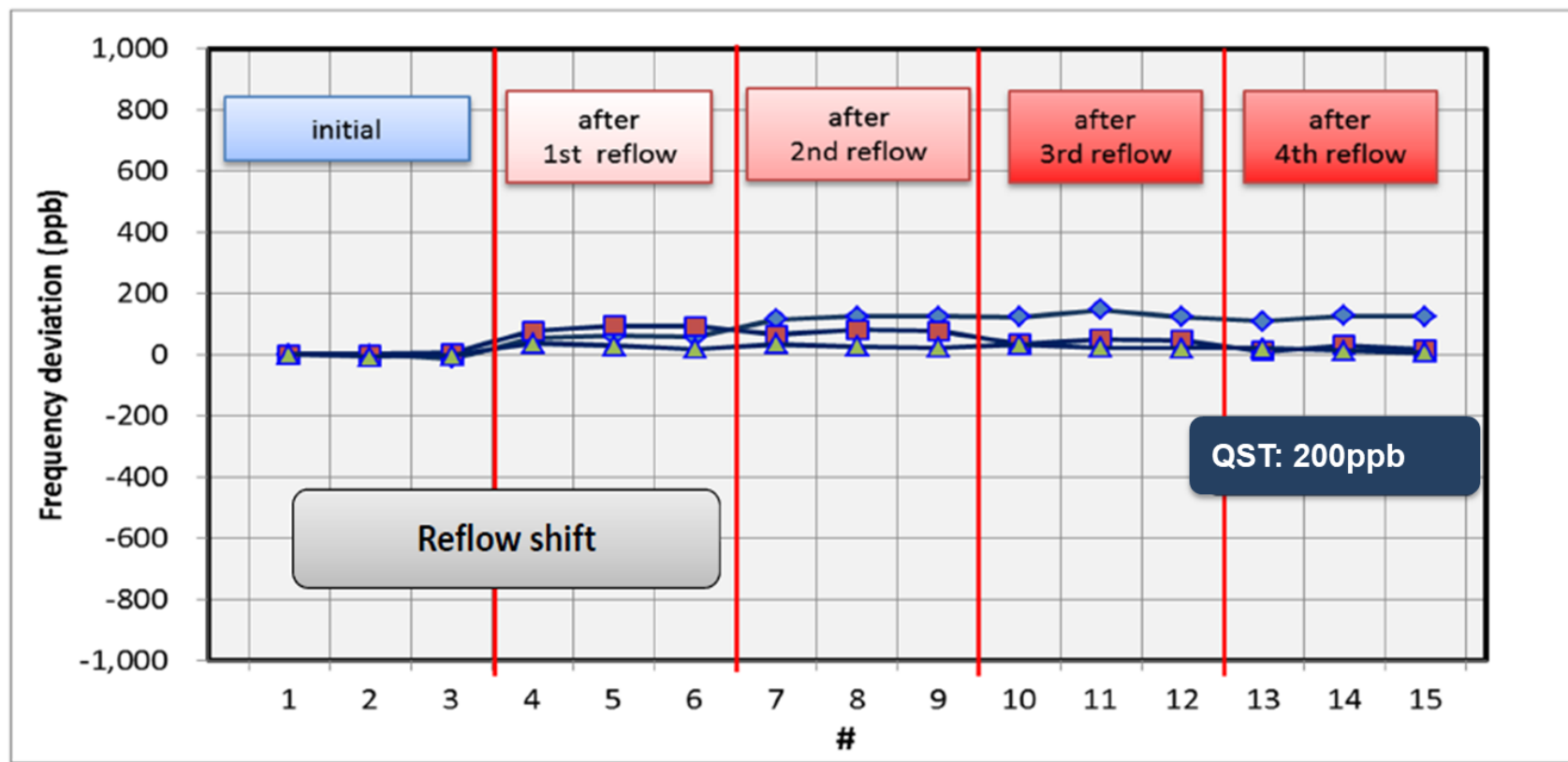
BENCHMARK – Short-Term Stability

QST : ADEV < 5E-11/s (2X~3X better)



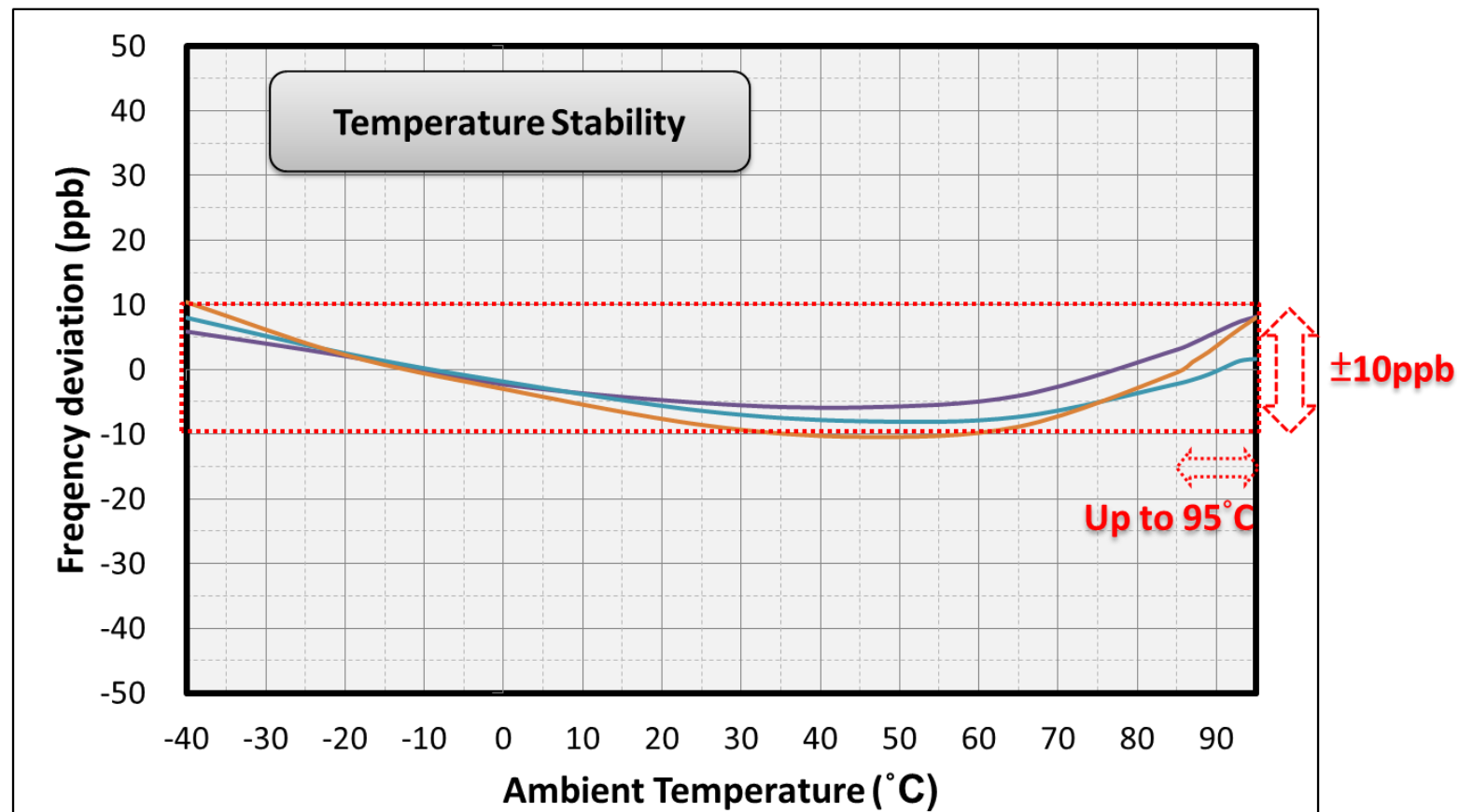
BENCHMARK – Reflow Variation

QST : Low frequency shift after reflow



BENCHMARK – Wide Temperature Range

QST: Extending to $-40\sim 95^{\circ}\text{C}$ for out-door application



ELECTRICAL SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

Item	Parameters		Measurement Condition	Electrical Specifications			
				MIN	TYP	MAX	UNITS
1	Nominal frequency				30.72		MHz
2	Supply voltage (Vcc)		±5%	2.85	3	3.15	V
3	Current consumption	During warm up	Ambient temperature at 25 °C		550		mA
4		At steady state				170	mA
5	Warm-up time		Time needed for frequency to be within ±20 ppb reference to frequency after 1 hour, at 25°C.			3	minute
6	Initial frequency accuracy		At time of shipment, reference to nominal frequency, at 25°C ±2°C	-500		500	ppb
7	Reflow shift		After 1 hour recovery at 25°C	-1		1	ppm
8	Operating temperature range			-40		95	°C
9	Frequency stability	vs. temperature	Within -40°C to 85°C, reference to (Fmax+Fmin)/2	-15		15	ppb
			Within 85°C to 95°C, reference to (Fmax+Fmin)/2	-20		20	
10		vs. Vcc variation	Vcc variation ±5%, reference to frequency at Vcc=3.0V		±10		ppb
11		vs. load variation	Load variation ±10%, reference to frequency at load= 15pF		±5		ppb

CONTACT



Info@qstproducts.com



2260 W. Whittier Blvd
La Habra, CA 90631
(562)475-5047



QST



A Division of **TXC**

- 35 yrs in the Industry
- 3 Manufacturing Sites
- #1 in Asia Market
- #4 in WW Timing Market