FEMTOSIX™

Deployable Microwave Clock Source for Systems That Rely on Lab-Grade Timing

Bring laboratory-grade timing performance into a compact, deployable clock-source architecture.

In many systems, achieving peak performance today requires bulky lab equipment that cannot be deployed, creating a gap FEMTOSIX™ is designed to close.

Modern RF systems often rely on laboratory-grade clock sources to achieve peak performance, particularly in high-speed DAC/ADC evaluation and advanced RF architectures.

Prototype measurements demonstrate timing performance comparable to laboratory-grade clock sources in a compact, deployable architecture.



Conceptual product rendering; final configuration subject to change.

Key Advantages:

- Prototype-demonstrated laboratory-grade timing performance
- Enables high-speed DAC/ADC evaluation platforms
- Improves spectral purity and dynamic range
- Compact, integrable, SWaP-C-optimized design
- Designed as an alternative to non-deployable laboratory clock sources

FEMTOSIX™ Use Cases

High-Speed DAC/ADC Platforms

Replace lab sources in evaluation and test setups.

Phased Array & EW Subsystems

Support coherent signal generation and timing alignment.

RF Test & Validation Systems

Support laboratory-grade timing in field-ready configurations.

FEMTOSIX™ Performance at a Glance[1]

~5 fs RMS Jitter	≤ –145 dBc/Hz at 10 kHz Offset	Typical Far-Out Phase Noise ≈ –160 dBc/Hz	2.56 GHz Nominal Output
Enables high-fidelity timing in microwave systems	Low close-in phase noise for cleaner signals	Maintains spectral integrity at higher offsets	Aligned with modern high-speed converter architectures

1. Typical characterization results shown are based on laboratory measurements of connectorized prototype hardware. Integrated-product performance has not yet been verified and may differ.

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PRELIMINARY SPECIFICATIONS	MIN	MAX	UoM
Nominal Center Frequency[1]	2.56 nominal		GHz
Frequency Accuracy	Same as External Reference		
Frequency Drift v. Temperature	Same as External Reference		
Free Running Frequency Accuracy	N/A		
Frequency Pulling into 12 dB Return Loss	Stable for all phases		
Frequency Pushing over ±0.5 V, free-running		10	ppb/V
RF Output Differential Power into 100 Ω @ +25 °C[2]	0	6	dBm
RF Power Variation into 12 dB Return Loss, all phases at +25 °C		< 3.0	dB
RF Power Variation v. Temperature		± 1.5	dB
RF Power Differential Impedance	100 nominal		Ω
External Reference Frequency	10 nominal		MHz
External Reference Power Range	-5	+5	dBm
External Reference Characteristic Impedance	50 nominal		Ω
Phase Noise at Δ1 kHz Offset from 2.56 GHz Carrier		-122	dBc/Hz
Phase Noise at Δ10 kHz Offset from 2.56 GHz Carrier		-145	dBc/Hz
Phase Noise at Δ100 kHz Offset from 2.56 GHz Carrier		-157	dBc/Hz
Phase Noise at Δ1 MHz Offset from 2.56 GHz Carrier		-157	dBc/Hz
Phase Noise at Δ10 MHz Offset from 2.56 GHz Carrier		-156	dBc/Hz
AM Noise at Δ10 kHz Offset from 2.56 GHz Carrier	-152 nominal		dBc/Hz
RMS Jitter over 12 kHz to 20 MHz Interval	5.0 nominal	6.0	fs
Residual FM over 12 kHz to 20 MHz interval @ +25 °C	1 nominal		kHz
Integrated Phase Noise over 12 kHz to 20 MHz at +25 °C	-85 nominal		dBc
RF Output Non-Harmonic Spurious		-70	dBc
RF Output Reference Subharmonics		-67	dBc
RF Output 2nd Harmonic		-35	dBc
RF Output 3rd Harmonic		-50	dBc
Settling Time to within 1.0 kHz	25 nominal		ms
Settling Time to within 1° of final phase	50 nominal		ms
Supply Current at +12 V ± 1 V	750 nominal		mA
Operating Temperature Range (specified)	-25	+70	°C
Operating Temperature Range (functional)[3]	-40	+85	°C
Random Vibration (Endurance, 5 Hz – 2 kHz)	16.8		g RMS
Half-Sine Shock, 11 ms duration	20		g peak
Acoustic Noise, 50 Hz to 8 kHz, profile TBD	140		dB SPL
PCA Nominal Size (without mechanical housing)	5.0 × 2.2 × 1.25		inches
Nominal Size with shock-mounted housing	TBD		inches

1. This is a frequency-multiplied source.
2. After a 15-minute warm-up. RF output connectors have a characteristic impedance of 50 Ω.
3. The unit may not start at the functional temperature limits; specified performance is not warranted outside the specified temperature range.

TYPICAL PERFORMANCE[1]

SSB Phase Noise at 2.56 GHz

Phase-noise markers

Offset	dBc/Hz
1 Hz	-13.5
10 Hz	-48.2
100 Hz	-87.4
1 kHz	-124.5
10 kHz	-147.9
100 kHz	-159.3
1 MHz	-160.0
10 MHz	-158.2
100 MHz	-160.3

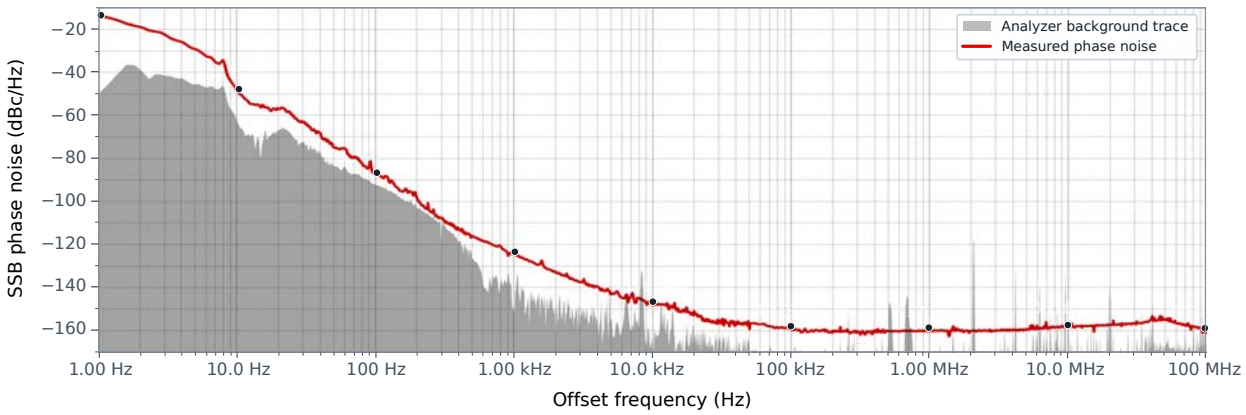
DUT

Selected trace	**Trace 1**
DUT frequency	**2.55986144 GHz**
Analyzer input power	**13.5 dBm**

Measurement parameters

K (CH1/2)	**0.254 / 0.255 V/rad**
Tune slope (CH1/2)	**950 / 904 Hz/V**
PLL bandwidth	**9.2 Hz**
Correlations	**127**
Reference	**Internal references - low noise**

Measured phase-noise trace



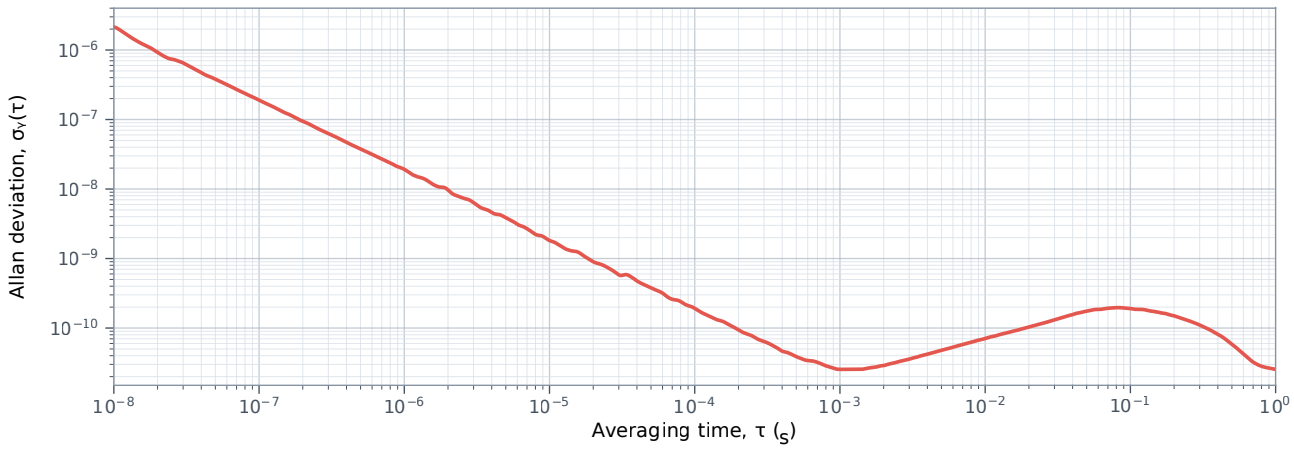
TYPICAL PERFORMANCE[1]

Calculated Allan Deviation at 2.56 GHz[2]

Residual noise

Integration range	**12 kHz to 20 MHz**
RMS jitter	**4.8 fs**
Residual PM	**0.0044° RMS**
Residual FM	**0.96 kHz RMS**
Integrated phase noise	**−85.3 dBc (12 kHz to 20 MHz)**

Calculated Allan deviation

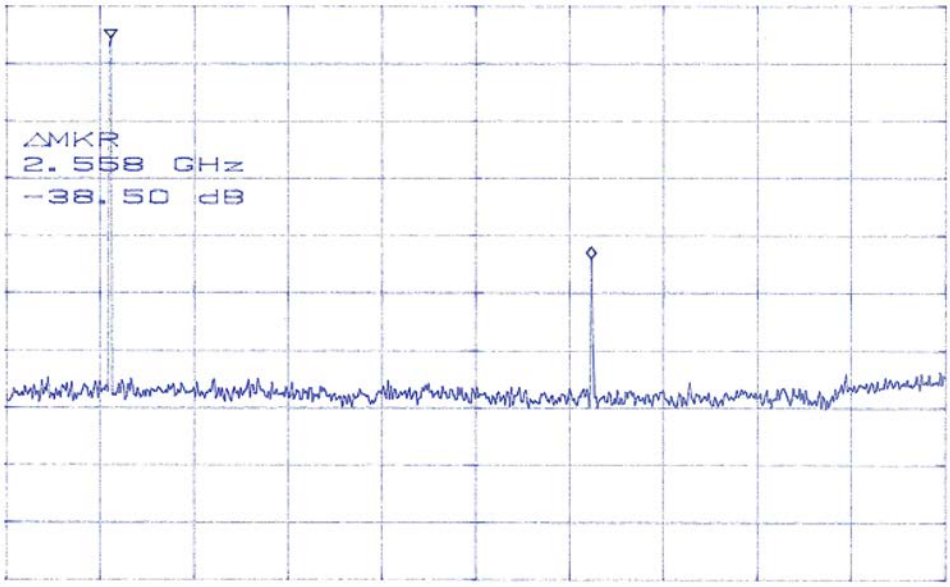


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2. Calculated by the measurement instrument from frequency-domain data.

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TYPICAL PERFORMANCE[1]

Second Harmonic of the 2.56 GHz Output



Relative second-harmonic level

-38.50 dBc

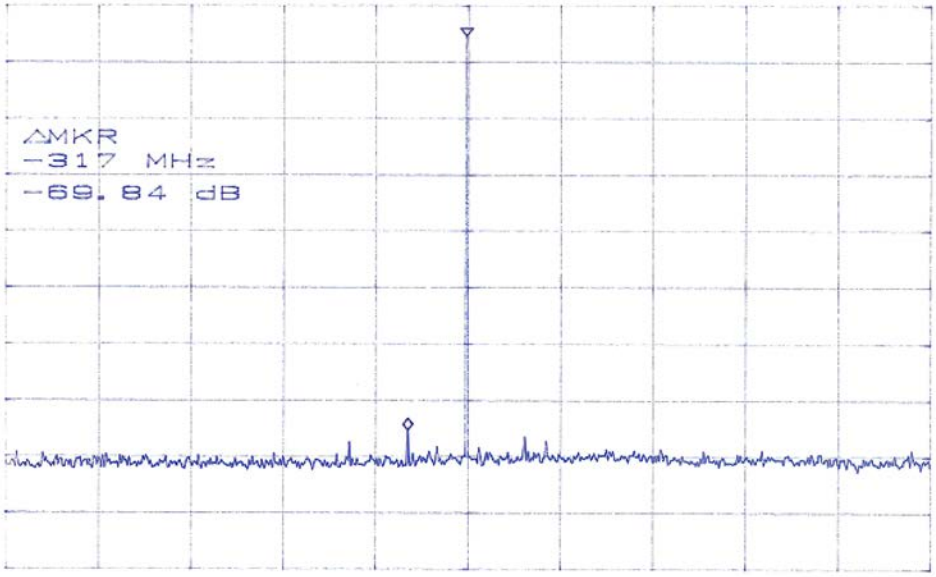
Carrier	**2.560 GHz**
Analyzer-indicated marker separation:	**2.558 GHz**
Actual second-harmonic location:	**5.120 GHz**

Analyzer settings

Start	**2.000 GHz**
Stop	**7.000 GHz**
Ref level	**10.0 dBm**
Attenuation	**20 dB**
Scale	**10 dB/div**
RBW / VBW	**1.0 / 1.0 MHz**
Sweep	**100 ms**

TYPICAL PERFORMANCE[1]

Reference-Related Spur and Spurious Response at 2.56 GHz



Relative reference-related spur level

-69.84 dBc

Carrier	**2.560 GHz**
Wide-span analyzer indication:	**2.243 GHz (−317 MHz)**
Actual location:	**2.240 GHz (−320 MHz)**
Other non-harmonic spurious:	**< −70 dBc**

Analyzer settings

Center	**2.560 GHz**
Span	**5.000 GHz**
Ref level	**10.0 dBm**
Attenuation	**20 dB**
Scale	**10 dB/div**
RBW / VBW	**30 / 30 kHz**
Sweep	**14.0 s**

MICROSOURCE
Excellence by Design

If your system depends on a lab-grade clock source today, FEMTOSIX™ is designed as a compact, deployable alternative.

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