

OSA 3230B PRC and ePRC

Cesium primary reference clock sources

Most relevant infrastructure demands a cesium primary reference clock (PRC) source that generates highly stable and precise frequency signals. Moreover, mission-critical applications cannot rely on GNSS alone for the supply of accurate timing. GNSS threats, such as jamming and spoofing, are growing. ePRTC solutions, including cesium enhanced PRC (ePRC) sources, provide the necessary immunity against GNSS outages. Our OSA 3230B PRC and ePRC cesium units are the key for assured and precise synchronization, even in absence of a GNSS signal.

Highly accurate synchronization has become vital not only for mobile network infrastructure but also for other fields such as defense, metrology and space-related applications, as well as data centers and speed trading. Our OSA 3230B PRC is a highly stable and accurate cesium clock that provides a frequency source with an accuracy better than $\pm 1 \times 10^{-12}$, together with very high frequency stability. The OSA 3230B ePRC achieves this and more. It meets the much more stringent enhanced PRC requirements, including maintaining sub-nanosecond time deviation (TDEV) for at least 10,000s. This enables the deployment of enhanced primary reference time clocks (ePRTCs) compliant with the stringent ITU-T G.8722.1 recommendation. Our ePRTCs solve the GNSS dependency while providing higher performance levels than standard PRTC systems.



Your benefits

✓ **Superior accuracy and stability**

Accuracy better than $\pm 1 \times 10^{-12}$, meeting ITU-T G.811 PRC and G.811.1 ePRC MTIE and TDEV masks

✓ **Extremely compact size**

4RU front access and 3RU rear access variants for space-efficient 19" and 23" rack deployment

✓ **Unique flexibility**

Optional digital and analog signal expansion providing up to five additional low-noise outputs

✓ **Extended performance**

10-year long-life cesium beam tube for OSA 3230B PRC variants and 7-year life for ePRC variants

✓ **Standards compliant**

Designed according to all relevant industry standards including ITU-T, ETSI, ANSI, Telcordia and CE; fully compliant with RoHS

✓ **Operational simplicity**

Multiple local and remote management options for easy integration into industrial, professional time and frequency host systems

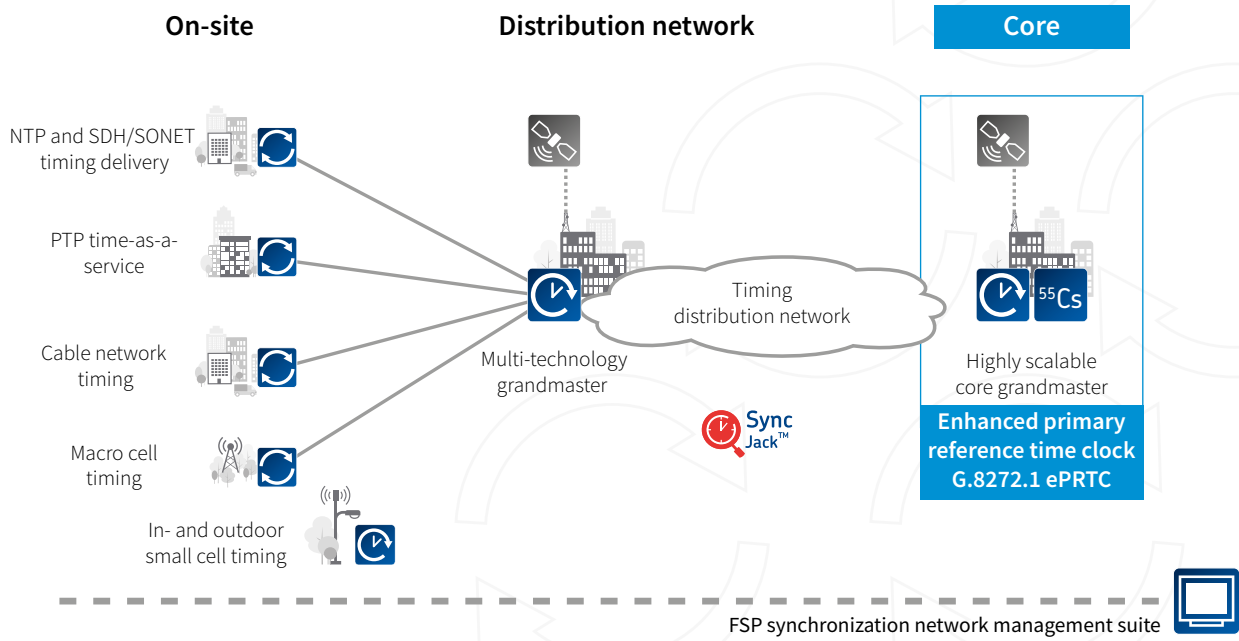
High-level specifications

| | | |
|---|--|--|
| <p>Cesium performance</p> <ul style="list-style-type: none"> • Two variants: PRC (ITU-T G.811) and ePRC (G.811.1) compliant • Freq. accuracy: $\pm 1 \times 10^{-12}$ • Reproducibility: $\pm 1 \times 10^{-12}$ • Adjustability: <ul style="list-style-type: none"> - Resolution $< 1 \times 10^{-15}$ - Range $\pm 1 \times 10^{-9}$ | <p>Sync input</p> <ul style="list-style-type: none"> • 1PPS TTL ($\geq 3V$) at 50 Ω • BNC connector • One on rear side plus one on front side for 19" version | <p>Outputs</p> <ul style="list-style-type: none"> • Two direct frequency interfaces 1 x 5MHz and 1 x 10MHz • One analog interface programmable from 0.1MHz to 50MHz sine • Three digital outputs: 1PPS, 1.5MHz and 10MHz |
| <p>Optional output expansion</p> <ul style="list-style-type: none"> • Five additional outputs: <ul style="list-style-type: none"> - Four digital output interfaces configurable to 2048MHz/E1/T1/1PPS/10MHz - One analogue output interface configurable from 0.1MHz to 50MHz sine | <p>Management</p> <ul style="list-style-type: none"> • Control and monitoring via: <ul style="list-style-type: none"> - Three alarm contacts, - RS232 communication for local management with GUI - FSP NM SW for remote management via external TCP-IP device | <p>Mechanical</p> <ul style="list-style-type: none"> • ETSI (4RU shelf) and 19" (3RU shelf) variants • Redundant 48VDC or mixed 110-240VAC/48DC power supply • Power consumption: 50W at 25°C |

Applications in your network

PRC and ePRC cesium clocks for highly precise synchronization of mission-critical infrastructure

- Precise synchronization of time-based communication networks such as radio access networks for mobile communications, defense systems or metrology applications; also legacy networks such as SONET/SDH
- Deployment of ePRTC solutions that provide highly accurate and stable synchronization even without GNSS



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Product specifications are subject to change without notice or obligation.

Cesium performance

- Frequency Accuracy: $\pm 1 \times 10^{-12}$
- Reproducibility: $\pm 1 \times 10^{-12}$
- Adjustability:
 - Resolution $< 1 \times 10^{-15}$
 - Range $\pm 1 \times 10^{-9}$

Wander generation

OSA 3230B PRC

- Conforming to ITU-T G.811 and GR-2830 - PRS
- 45 minutes warm-up time at 25°C
- MTIE limit (μs) Observation interval τ (s)

| | |
|------------------------------------|-------------------------|
| $0.275 \times 10^{-3}\tau + 0.025$ | $0.1 < \tau \leq 1,000$ |
| $10^{-5}\tau + 0.29$ | $\tau > 1,000$ |
- TDEV limit (ns) Observation interval τ (s)

| | |
|-------------|------------------------|
| 3 | $0.1 < \tau \leq 100$ |
| 0.03 τ | $100 < \tau \leq 1000$ |
| 30 | $1000 < \tau < 10000$ |

OSA 3230B ePRC

- Conforming to ITU-T G.811.1
- 45 minutes warm-up time at 25°C
- MTIE limit (μs) Observation interval τ (s)

| | |
|--|------------------------|
| 0.004 | $0.1 < \tau \leq 1$ |
| $0.11114 \times 10^{-3}\tau + 0.00389$ | $1 < \tau \leq 100$ |
| $0.0375 \times 10^{-6}\tau + 0.015$ | $100 < \tau \leq 1000$ |
| $10^{-6}\tau + 0.0140375$ | $\tau > 1000$ |
- TDEV limit (ns) Observation interval τ (s)

| | |
|---|--------------------------|
| 1 | $0.1 < \tau \leq 100000$ |
|---|--------------------------|

Outputs

- Direct frequency output
 - Interfaces: 2
 - Frequency: 1 x 5MHz + 1 x 10MHz
 - Level and connector: 13dBm at 50 Ω (BNC)
 - Phase noise: not applicable
- Analog output
 - Interfaces: 1
 - Frequency: programmable from 0.1 to 50MHz sine
 - Shape: wave output at 50 Ω (BNC)
 - Level:
 - 500mVrms (typical)
 - 250mVrms (minimal)
- Digital output
 - Interfaces: 3
 - Frequency: 1PPS / 1, 5 and 10MHz
 - Level: $\geq 3\text{V}$ at 50 Ω
 - Shape: square
 - Connector: BNC

Synchronization input

- Type: 1PPS TTL ($\geq 3\text{V}$)
- Connector: BNC
- Location: 1 on rear side plus 1 on front side for 19" version

Power supply

- Voltage: 48VDC nominal floating (24V to 60V)
- Power feeds: dual
- Power consumption: 50W at 25°C (max. 60W during warm-up)
- Optional configuration: 1xAC plus 1xDC with OSA 3230B 19" version (110-240VAC 50-60Hz)

Management interface

- Interface: RS232C on DB-9 for both local management with CMSW GUI and remote management using FSP NM management software with UMI interface module
- Locations: 1 connector on rear side plus 1 connector on front side for 19" version
- Alarms: 3 relay contacts
- LED Monitoring: 3 LEDs for monitoring power supply status, operation and alarms
- LED Location: 3 LEDs on front side plus 3 LEDs on rear side for 19" version

Mechanical

- ETSI: 436mm x 176mm (4RU) x 240mm (W x H x D) with front access connectors, adapter for 19" rack standard
- 19": 436mm x 132mm (3RU) x 400mm (W x H x D) with rear access connectors, adapter for 23" rack standard
- Weight $< 15\text{kg}$ (excluding packaging)

Telecom signal expansion (optional)

- Digital Output
 - Interfaces: 4
 - Frequency: configurable to 2.048MHz / E1 / T1 / 1PPS / 10MHz
 - Level: according to G.703
 - Connector: BNC 75 Ω or DB9 120 Ω (T1:DB-9 100 Ω)
- Analog Output
 - Interfaces: 1
 - Frequency: configurable from 0.1 to 50MHz
 - Format: Sine wave output
 - Connector: BNC 50 Ω
 - Level: 500mVrms (typical) / 250mVrms (minimal)

Environmental

- Operating conditions:
 - EN 300 019-1-3, class 3.2.
 - Extended range from -5°C to +55°C
- Transportation: EN 300 019-1-2, class 2.2
- Storage: EN 300 019-1-1, class 1.1
- Humidity: Up to 95%
- Altitude (operating): 0 to 15,000m
- DC magnetic field: ±2 Gauss (maximum)
- Safety: EN 60950-1:2005
- EMC emission:
 - EN 55032: 2012, 2015
 - EN 61000-6-2: 2005
 - EN 61326-1: 2013
- EMC immunity:
 - EN 55024: 2010
 - EN 61000-6-2: 2005
 - EN 61326-1: 2013
- CE certified
- UL certified by NRTL laboratory
- RoHS compliant

OSA 3230B ePRC for enhanced PRTC solutions

- The *OSA ePRTC solution* (figure 1) comprises two OSA devices: an OSA 3230B ePRC cesium clock that is connected to an OSA 5421 grandmaster.

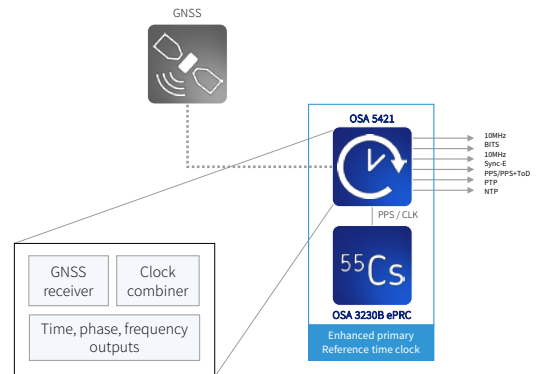


Fig. 1 Unprotected ePRTC (OSA 5421 + OSA 3230B ePRC Cesium)

- The *fully protected OSA ePRTC solution* (figure 2) comprises two OSA 3230B ePRC cesium clocks connected to an OSA 5430 grandmaster.

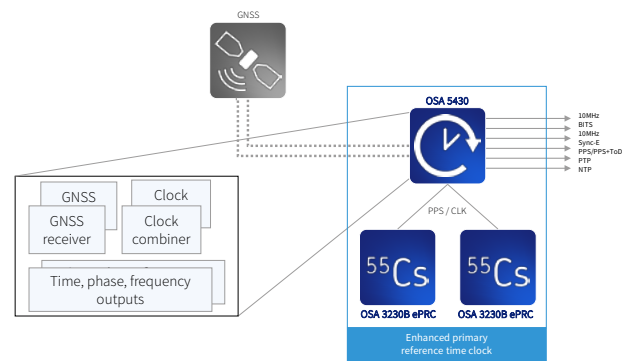


Fig. 2 Protected ePRTC (OSA 5430 + two OSA 3230B ePRC Cesium)