Precision Timing Solutions

Fixed Wireless Access (FWA)

Precision Timing for Fixed Wireless Access (FWA)

5G FWA (fixed wireless access) provides ultra-high bandwidth to deliver heavy content at significantly faster speeds and at a lower cost to fiber and other fixed internet lines. While a seamless shift from traditional networks to 5G front and back haul is difficult to achieve due the large existing investment by the telecom operators in their 4G/LTE infrastructure, some companies are choosing to integrate 5G FWA fronthaul equipment with their 4G/LTE backhaul for a faster rollout and improved ROI.

Key Considerations

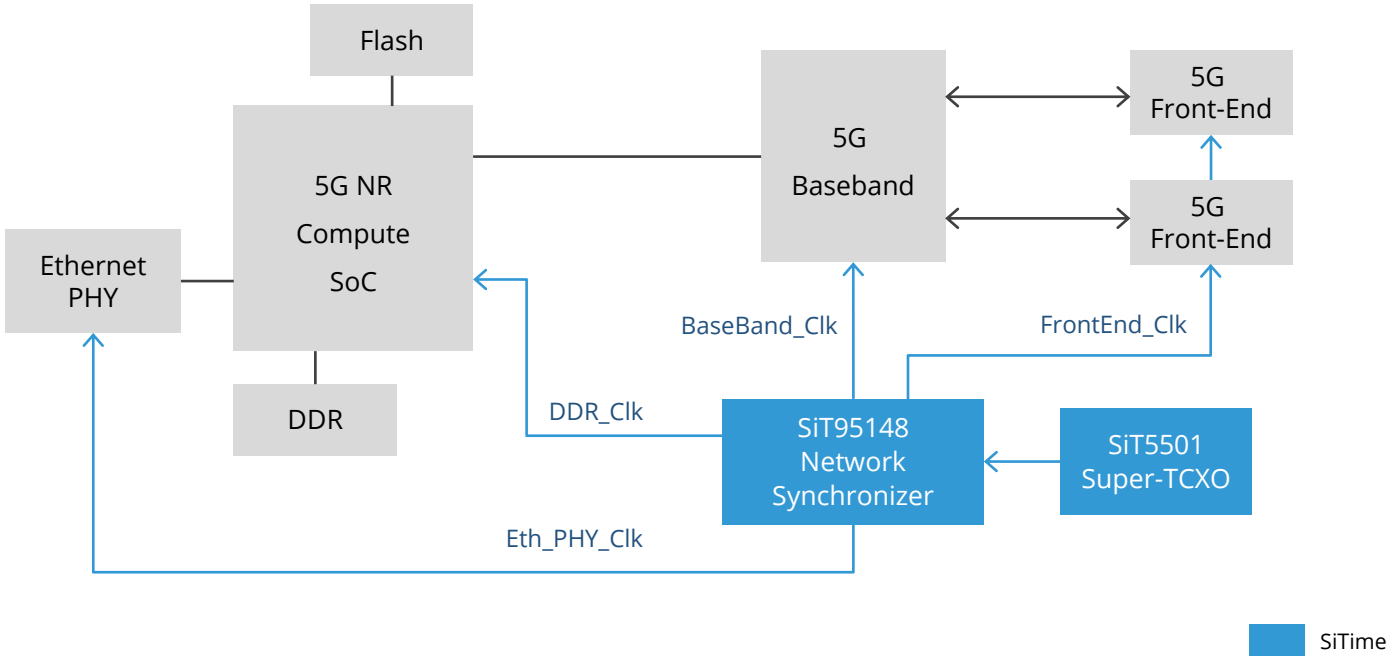
- Wide temperature range
- EMI resilience
- Temperature stability
- Low phase noise

The preferred mmWave band being deployed by most carriers is sub-6GHz.or the C-band, specifically 3.3 GHz to 4.2 GHz range as it covers a radius of more than 5 km and supports a maximum throughput of 5 Gbps.

Key reasons for 5G FWA growth are:

- Reduced connectivity costs: wireless infrastructure is lower cost than fixed wired infrastructure
- Faster speeds: 300 Mbps internet access is being touted with the expectation of reaching 1 Gbps
- Lower latency: 5G offers very low latency making it ideal for environments requiring dependable connectivity
- Lower energy use: 5G uses less energy to connect and transmit than alternative options

FWA Block Diagram



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Featured products – please refer to SiTime.com or contact us for more options.

Type	Product	Frequency	Key Features	Key Values
Network Synchronizer	SiT95148	1 to 220 MHz	• 4 inputs, 11 outputs • Up to 2 GHz clock output frequencies • 120 fs integrated phase jitter[1] • Programmable PLL loop bandwidth, 1 mHz to 4 KHz • Digital frequency control • -40°C to 85°C • 9.0 x 9.0 mm package	• Multiple clock domains, multiple clock outputs enables complex clock architectures • 10x more resistant to vibration and board bending
Super-TCXO	SiT5501[2]	1 to 60 MHz	• ±10 ppb stability • ±0.5 ppb/°C • $2x10^{-11}$ Allan deviation • -40°C to 105°C • 7.0 x 5.0 mm package	• Ensures QoS requirements are met in Telecom Equipment in hostile environments
Differential Oscillator	SiT9375	25 to 644.5 MHz, 70 fs Integrated Phase Jitter[1]	• ±20 ppm to ±50 ppm frequency stability • LVPECL, LVDS, HCSL • 1.8 V to 3.3 V • -40°C to 105°C • 2.0 x 1.6 mm, 2.5 x 2.0 mm, 3.2 x 2.5 mm packages	• Meets demanding jitter requirements • Small PCB footprint, easier layout • Easy design due to flexibility • MEMS reliability
	SiT9501	25 to 644.5 MHz, 150 fs Integrated Phase Jitter[1]		
Clock Generator	SiT91211[3]	1 to 750 MHz, 200 fs Integrated Phase Jitter[1]	• 4 differential output clocks • ±20 ppm frequency stability • LVDS, LVPECL, LPHCSL • 0.01 ps/mV PSRR • -40°C to 105°C • 4 mm x 4 mm package	• Simplifies clock tree design with multiple low jitter clocks • Programmable clocks add flexibility to complex clocking architectures • Better frequency stability and noise immunity in harsh environments • Small PCB footprint, compact layout
	SiT91213[3]	1 to 750 MHz, 90 fs Integrated Phase Jitter[1]		

[1] 12 kHz to 20 MHz integration range; [2] Contact SiTime for higher frequencies. [3] Contact SiTime for availability.

SiTime advantages:

SiTime devices offer the following advantages over quartz crystals, which are particularly important for telecom applications:

- SiT9514x family of synchronizer devices offer a complete synchronization clock tree on a chip. No external crystal is required.
- dF/dT, the effect of temperature variation on frequency stability, is 4x better than crystal-based TCXOs. This ensures better quality of service under airflow, heating, and cooling conditions.
- Silicon MEMS TCXOs offer similar stability as crystal-based OCXOs, at smaller form factor and lower power
- SiTime oscillators are factory programmable to any frequency.
- Silicon MEMS-based timing devices have a 30x higher reliability than quartz.
- No activity dip or cold start issues.

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