

# LTE-Lite

## LTE-Lite Low Cost SMT GPSDO Module

Defense | 5G Communications | SATCOM | Transportation  
Data Center Energy | Financial | Critical Infrastructure

The LTE-Lite Frequency and Timing SMT module integrates a GPS receiver, filtered power supplies, and a software-disciplined crystal oscillator into a 0.7 x 1.18 inch GPSDO SMT module. The LTE-Lite uses true analog crystal disciplining for superior phase noise and jitter performance.

The LTE-Lite provides GNSS time and frequency synchronization for cost-sensitive network equipment, in particular LTE 4G applications and Small Cell products from Micro Cells to Femto Cells.

The LTE-Lite provides all the standard NMEA output messages at rates of 1 Hz or 5 Hz. Providing true 5 Hz GPS NMEA messaging allows for very precise positioning in UAV and other mobile applications. The LTE-Lite also provides a proprietary NMEA message with oscillator lock-status and health information, with the same information being mirrored on the TTL status outputs for applications without serial interface.



LTE-Lite Module

### Highlights

- SMT, 0.7 x 1.2 x 0.1 inches
- Telecom Frequencies: 10, 15.36, 20 MHz
- Internal 65 channel GPS and TCXO
- 3.3 V operation, very low power consumption, and TTL strap configuration
- Two independent frequency outputs (one synthesized)
- Support for disciplining external oscillators including CSAC
- Full NMEA output with 1 Hz and 5 Hz PVT update rates, and oscillator lock status message
- Typical frequency accuracy of 1 ppb or better when locked to GPS
- Frequency stability of 100 ppb over temperature when operating in free-running mode or not locked to GPS.

## Typical Electrical Specifications

Module Specifications	Description
1 PPS Timing Accuracy from GPS Receiver	<8 ns to UTC RMS (1-Sigma) GPS Locked
Holdover Stability (1 week with GPS)	< $\pm 50 \mu\text{s}$ over 3 hour period @+25°C (No Motion, No Airflow)
1 PPS Output	3.3 V DC CMOS
Serial Port	TTL Level, GPS NMEA Output with 1 Hz or 5 Hz update rate
GPS Frequency	L1, C/A 1574 MHz
GPS Antenna	Active or Passive (0 dB to +30 dB gain)
GPS Receiver	65 Channels, QZSS, SBAS WAAS, EGNOS, MSAS capable Supports Position and Hold over-determined clock mode
Sensitivity	
Acquisition	-148 dBm
Tracking	-165 dBm
GPS TTFF	
Cold Start	<32 sec
Warm Start	1 sec
Hot Start	1 sec
ADEV	
10 s	<7E-011
10 Ks	<2E-012 (GPS Locked, 25°C, no motion, no airflow)
TTL Alarm Output	GPS LOCK indicator, ALARM output, Survey status, Warmup status
Warm Up Time / Stabilization Time	<10 min at +25°C to better than 1E-09 Accuracy
Supply Voltage (Vdd)	3.3 V Single-Supply, +0.2 V/-0.15 V
Power Consumption	<0.16 W
Operating Temperature	-10°C to +70°C, -40°C to +85°C optional
Additional Features	Firmware field-upgradable, status LED, external oscillator option

## Typical Electrical Specifications continued

Oscillator Specification (Internal)	Description		
Frequency Output of Low Phase Noise Crystal			
10 MHz variant	10 MHz CMOS 3 Vpp		
20 MHz variant	20 MHz CMOS 3 Vpp		
Secondary Synthesized CMOS Output			
10 MHz variant	80 MHz/40 MHz/26.666 MHz/20/16 MHz/13.333 MHz/5 MHz (Phase-Locked to 10 MHz)		
20 MHz variant	80 MHz/40 MHz/26.666 MHz/16 MHz/13.333 MHz/10 MHz/5 MHz (Phase-Locked to 20 MHz)		
Retrace	±2E-08 After 1 Hour @ +25°C without GPS		
Frequency Stability Over Temperature	±0.1 ppm (internal TCXO without GPS), (0°C to +60°C)		
RF Output Amplitude	3 Vpp CMOS		
Phase Jitter	<0.135 ps rms (100 Hz to 10 MHz)		
Phase Noise (at 20 MHz)		<b>10 MHz Variant</b>	<b>20 MHz Variant</b>
	1 Hz	-69 dBc/Hz	-65 dBc/Hz
	10 Hz	-96 dBc/Hz	-92 dBc/Hz
	100 Hz	-119 dBc/Hz	-116 dBc/Hz
	1 kHz	-138 dBc/Hz	-136 dBc/Hz
	10 kHz	-150 dBc/Hz	-148 dBc/Hz
	100 kHz	<-155 dBc/Hz	<-155 dBc/Hz
<b>Connections</b>			
1 PPS Output (2x), 19.2 MHz Output, power, system status, NMEA, ISP mode enable, antenna input, Synthesized reference frequency output		<b>Connector Type</b>	
		SMT module with 50 mils (1.27 mm) pin spacing, U.FL RF antenna	

NOTE: Specifications subject to change without notice.

Available Crystal options and PLL synthesized output frequencies:

FREQ_SEL	10 MHz TCXO	15.36 MHz TCXO	19.2 MHz TCXO	20 MHz TCXO
111	disabled	disabled	disabled	disabled
110	5 MHz	4.608 MHz	4.8 MHz	5 MHz
101	13.33333333 MHz	10.24 MHz	9.6 MHz	10 MHz
100	16 MHz	15.36 MHz	12.8 MHz	13.33333333 MHz
011	20 MHz	23.04 MHz	15.36 MHz	16 MHz
010	26.66666667 MHz	30.72 MHz	25.6 MHz	26.66666667 MHz
001	40 MHz	46.08 MHz	38.4 MHz	40 MHz
000	80 MHz	92.16 MHz	76.8 MHz	80 MHz

## Product Ordering Information

VIAMI offers the following LTE products:

Product Number	Description
100407-G2	LTE Lite Module 10MHz - RoHS
100421-G2	LTE Lite Module 15.36MHz - RoHS
100402-G2	LTE Lite Module 20MHz - RoHS

VIAMI offers the following LTE Evaluation kits:

Product Number	Description
100406	LTE Evaluation Kit 10MHz - RoHS
100404	LTE Evaluation Kit 20MHz - RoHS

The evaluation kits contain the following:

Item	Qty
LTE Lite Module (10 MHz or 20 MHz)	1
MMCX R/A Plug to BNC STR Cable	1
USB 1.83m USB 2.0 Type A to Mini USB 2.0 Type B Cable Assembly	1
USB Power Adapter 5Vdc	1
GPS Antenna 10M Cable Magnetic Mount BNC	1
CB Assy LTE Lite Evaluation PCBA r 1.4	1
DIP Socket SKT 14 POS 15.24mm Solder ST Thru-Hole Connector	1
Unshrouded Header HDR 36 POS 2.54mm Solder ST Top Entry Thru-Hole Connector	1



Contact Us: +1 800 835 2352 | [avcomm.sales@viavisolutions.com](mailto:avcomm.sales@viavisolutions.com).

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ltelite-ds-avi-nse-ae  
30195018 900 0326

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