

# K/Ka band Transceiver Uplink Module

## KKa-TR-UL-1929

Previously named LE-KaTR-103

### Integrated Transceiver Uplink Module for K/Ka-Band Frequencies

#### Overview

KKa-TR-UL-1929 is a fully integrated stand-alone transceiver module designed for K/Ka-band communications systems.

This transceiver operates as a wideband up/down converter designed for either on ground segment or an airborne environment. It includes an on-board frequency synthesizer and low power consumption in a stackable enclosure. This transceiver offers up to 2.5GHz of instantaneous bandwidth.

It also includes a high-precision clock for LO generation; this clock can be used as a reference for other modules, or lock to an external system reference.

This transceiver can be used as a stand-alone up/down converter or combined with a modem/Software Defined Radio (SDR) enabling full-function K/Ka band satellite communication system.

#### Features

- Tx output frequency range 27 - 31 GHz.
- Rx Input frequency range 17 - 21 GHz.
- Tx IF frequency 1-5 GHz.
- Rx IF frequency 1-5 GHz.

#### Applications

- High speed data communications.
- Space communications.
- IOT.
- Security.



## Specification Overview

### Transmitter

Parameter	Typical	Unit
TX Output Frequency Range	27 - 31	(GHz)
TX Output Linear Power	20	(dBm)
IF Input Frequency Range	1 - 5	(GHz)
IF Input Power	-10 to 0	(dBm)
Reference Frequency*	100 (on board or external)	(MHz)
Reference Phase Noise	-145	(dBc/Hz)
Reference Signal Characteristics	Square Input: 0.6Vpp (min) / 2.5Vpp (max) - Slew Rate >0.5V/ns Sinewave:+5dBm (min) /+15dBm (max)	
Reference Stability	5	(PPM)
Conversion Gain	30 (extended 50 50dB with SSPA)	(dB)
Gain Flatness Over Typical Channel Bandwidth from SDR (250MHz)	3 (specified over max channel bandwidth (250MHz) across entire 4GHz) RX bandwith. (SDR input channel band)	(dB)
Phase Noise		(dBc/Hz)
10Hz	-	(dBc/Hz)
100Hz	-	(dBc/Hz)
1kHz	-70	(dBc/Hz)
10kHz	-80	(dBc/Hz)
100kHz	-100	(dBc/Hz)
1MHz	-123	(dBc/Hz)
10MHz	-140	(dBc/Hz)
Spurious	-60	(dBc)
Supply Voltage Range	6 - 42	(Vdc)
DC Current	<1.5	(Amps)
DC Power	<6	(Watts)

## Specification Overview

### Receiver

Parameter	Typical	Unit
RX Input Frequency Range	17 - 21	(GHz)
RX Input Power Range	-90 to -30	(dBm)
IF Output Frequency Range	1 - 5	(GHz)
IF Output Power Range	-60 to 0	(dBm)
Reference Frequency	100 (on board or external)	(MHz)
Reference Phase Noise	-145	(dBc/Hz)
Reference Signal Characteristics	Square Input: 0.6Vpp (min) / 2.5Vpp (max) - Slew Rate > 0.5V/ns Sinewave: +5dBm (min) /+15dBm (max)	
Reference Stability	5	(PPM)
Conversion Gain	30 (extended 50 50dB with SSPA)	(dB)
Gain Flatness Over Typical Channel Bandwidth from SDR (250MHz)	3 (specified over max channel bandwidth (250MHz) across entire 4GHz) RX bandwith. (SDR input channel band)	(dB)
Phase Noise		(dBc/Hz)
10Hz	-	(dBc/Hz)
100Hz	-	(dBc/Hz)
1kHz	-70	(dBc/Hz)
10kHz	-80	(dBc/Hz)
100kHz	-100	(dBc/Hz)
1MHz	-123	(dBc/Hz)
10MHz	-140	(dBc/Hz)
Spurious	-60	(dBc)
Noise Figure	<2.5	(dB)
Supply Voltage Range	6 - 42	(Vdc)
DC Current	<1.5	(Amp)
DC Power	<6	(Watts)

## Mechanical and Environmental

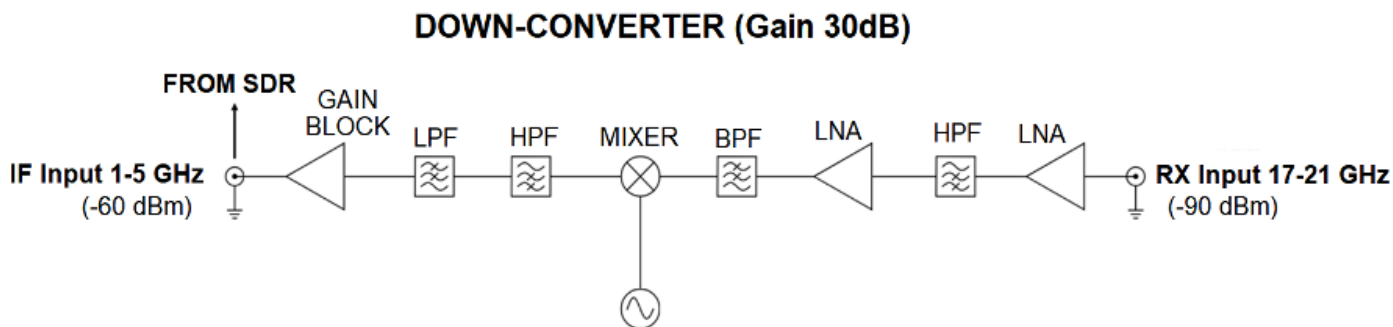
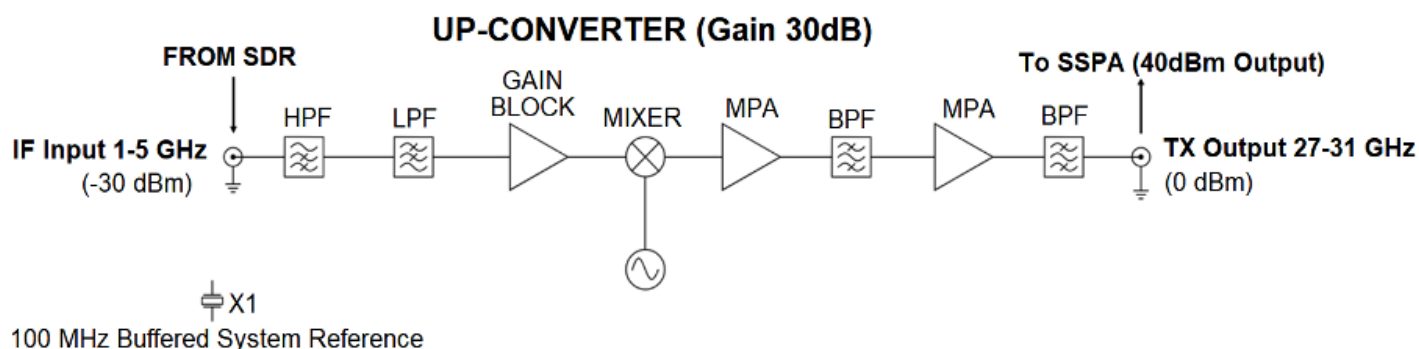
### Mechanical

Parameter	Typical	Unit
PCB Dimensions	80 x 80 x 2 (Max)	(mm)
Mechanical Enclosure Required	Yes	
Mechanical Enclosure Dimensions	100 x 120 x 70 (Max)	(mm)
Total Mass	<2	(kg)
Form Factor Requirement	Enclosure	
Enclosure Material Requirement	>2.54mm Aluminium	(mm)
Enclosure Plating Requirement	Gold	
RF Connector Types	2.92mm	(mm)
DC Connector Types	DC Feedthrough or alt. high rel. panel mount	
IF Signal Connector Types	SMA	

### Environmental

Parameter	Typical
Operating Temperature Range	-40°C to +70 °C
Storage Temperature Range	-40°C to +85°C
Operational Environment	Terrestrial; IP65 Enclosures Standard
Vibration Requirement	MIL-STD-810
Compliance Standards	1)ETSI EN 301 459 2)ETSI EN 301.489-12 (EMC standard for Satellite Earth Stations)

### Simplified Schematic Diagram



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