

Transceiver Downlink Module 17-21 & 27-30 GHz



KKa-TR-DL-1929

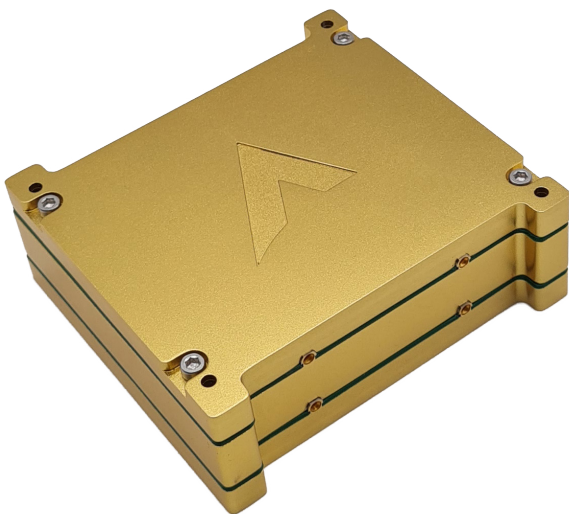
Integrated transceiver downlink module for K/Ka-band frequencies.

Overview

KKa-TR-DL-1929 is a fully integrated stand-alone transceiver module designed for K/Ka-band communication systems. The transceiver operates as a wideband up/down converter designed for use in Low Earth Orbit (LEO). It includes an on-board frequency synthesizer with low power consumption in a stackable enclosure. This transceiver offers up to 2.5 GHz of instantaneous bandwidth.

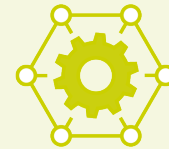
It also includes a high-precision clock for LO generation; this clock can be used as a reference for other modules, or lock to an external system reference.

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



Features

- TX output frequency 17-21 GHz
- RX input frequency 27-30 GHz
- TX IF frequency 1-5 GHz
- RX IF frequency 1-4 GHz



Applications

- High speed data communications
- Space communications
- IOT
- Security
- 5G

**Space Heritage 20th
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Rocket Labs Mission 18,
OHB SatComm

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Specification Overview

Transmitter

Parameter	Typical	Unit
TX Output Frequency Range	17-21	(GHz)
TX Output Linear Power	20	(dBm)
IF Input Frequency Range	1-5	(GHz)
IF Input Power	-30 to 0	(dBm)
Reference Frequency	100 (on-board or external)	(MHz)
Reference Stability	+0.3 (-40 °C to +85 °C)	(PPM)
Conversion Gain	23-27	(dB)
Gain Flatness Over Typical Channel Bandwidth from SDR (250 MHz)	<3 (specified over max channel bandwidth (250 MHz) across entire 4 GHz RX bandwidth. (SDR input channel band))	
Typical Phase Noise		(dBc/Hz)
1 kHz	-94	(dBc/Hz)
10 kHz	-80	(dBc/Hz)
100 kHz	-100	(dBc/Hz)
1 MHz	-123	(dBc/Hz)
Spurious (in band)	-50	(dBc)
Supply Voltage Range	12	(Vdc)
DC Power	<6	(W)

Receiver

Parameter	Typical	Unit
Rx Input Frequency Range	27-30	(GHz)
RX Input Power Range	-50 to -30	(dBm)
IF Output Frequency Range	1-4	(GHz)
IF Output Power Range	-43 to 0	(dBm)
Reference Frequency	100 (on-board or external)	(MHz)
Reference Stability	+0.28 (-40 °C to +85 °C)	(PPM)
Conversion Gain	30	(dB)
Gain Flatness Over Typical Channel Bandwidth from SDR (250 MHz)	<3 (specified over max channel bandwidth (250 MHz) across entire 4 GHz RX bandwidth. (SDR input channel band))	
Typical Phase Noise		(dBc/Hz)
10 kHz	-85	(dBc/Hz)
100 kHz	-93	(dBc/Hz)
1 MHz	-112	(dBc/Hz)
Spurious (in band)	-40	(dBc)
Noise Figure	<2.5	(dB)
Supply Voltage Range	12	(Vdc)

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Mechanical and Environmental

Mechanical

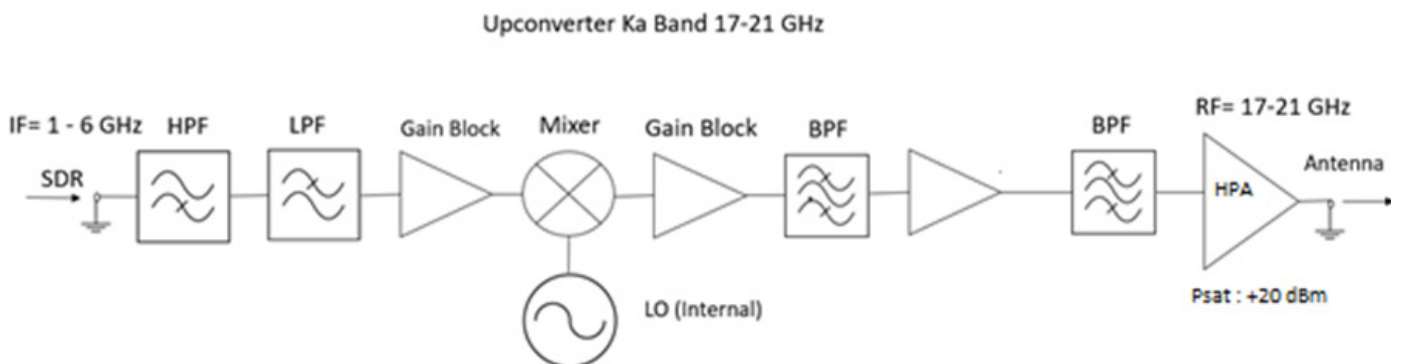
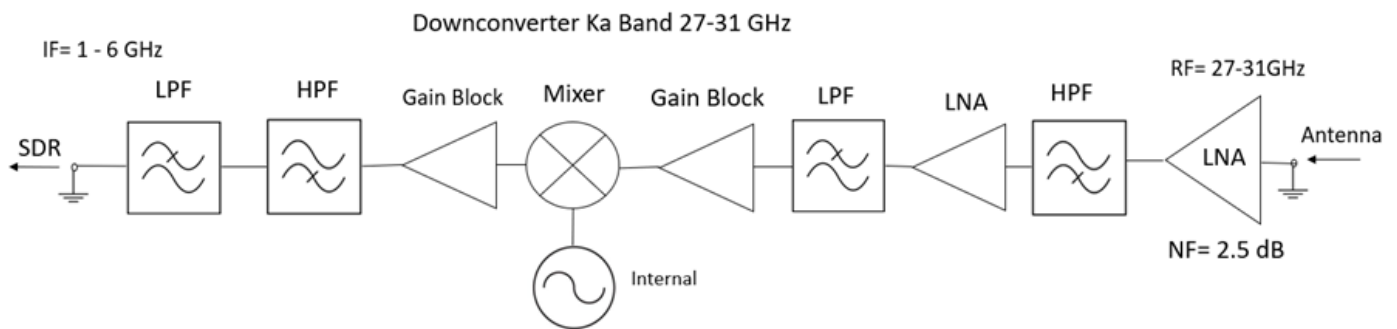
Parameter	Typical	Unit
PCB Dimensions	96 x 91 x 2 (max)	(mm)
Mechanical Enclosure Required	Yes	
Mechanical Enclosure Dimensions	96 x 91 x 33 (max)	(mm)
Total Mass	<1	(kg)
Form Factor Requirement	Enclosure	
Enclosure Material Requirement	>2.4 mm aluminium	(mm)
Enclosure Plating Requirement	Gold	
RF Connector Types	SMPM edge mount	
DC Connector Types	DC feedthrough or alt. high rel. panel mount	
IF Signal Connector Types	SMA edge mount	

Environmental

Parameter	Typical
Operating Temperature Range	-40 °C to +70 °C
Operating Environment	
Radiation Tolerance (kRad)	
Vibration Requirement	
Vacuum Requirement	
Compliance Standards	

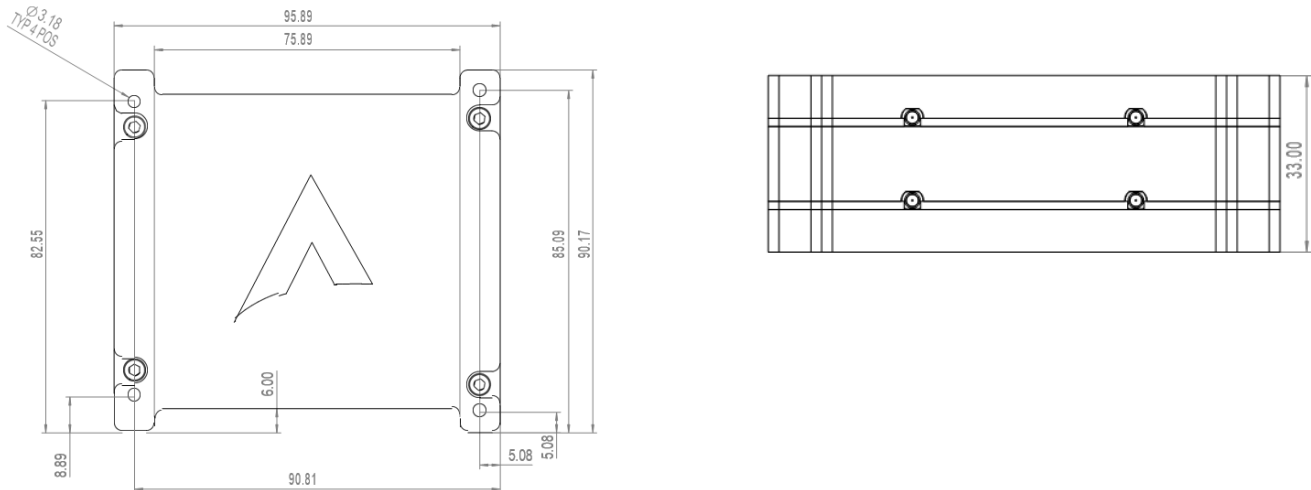
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Simplified Schematic Diagram



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Mechanical Enclosure Preliminary Dimensions



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Arralis European Offices

Arralis Space Office

e: sales@arralis.com

www.arralis.com

e: emilie.wren@arralis.us