

# Ka band Transceiver Downlink Module

**KKa-TR-DL-1929** Previously named LE-KaTR-104

**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 communications systems.

This transceiver operates as a wideband up/down converter designed for use in Low Earth Orbit (LEO.) 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 17 – 21 GHz.
- Rx Input frequency range 27 - 31 GHz.
- Tx IF frequency 1-5 GHz.
- Rx IF frequency 1-5 GHz.

## Applications

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



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Rocket Labs Mission 18, OHB SatComm

 Arralis	Ka band Preliminary	KKa-TR-DL-1929	Issue date: September 2021	DOC REV 5	Page 1 of 7
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**Transmitter**

Parameter	Typical	Unit
TX Output Frequency Range	17 - 21	(GHz)
TX Output Linear Power	21	(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 to +85 degree C)	(PPM)
Conversion Gain	30	(dB)
Gain Flatness Over Typical Channel Bandwidth from SDR (250MHz)	<2 (specified over max channel bandwidth (250MHz) across entire 4GHz RX bandwidth. (SDR input channel band))	
Typical Phase Noise		(dBc/Hz)
10Hz	-40	(dBc/Hz)
100Hz	-60	(dBc/Hz)
1kHz	-70	(dBc/Hz)
10kHz	-80	(dBc/Hz)
100kHz	-100	(dBc/Hz)
1MHz	-123	(dBc/Hz)
10MHz	-140	(dBc/Hz)
Spurious	-50	(dBc)
Supply Voltage Range	6 - 36	(Vdc)
DC Power	<6	(Watts)

## Specification Overview

### Receiver

Parameter	Typical	Unit
RX Input Frequency Range	27 - 31	(GHz)
RX Input Power Range	-140 to -30	(dBm)
IF Output Frequency Range	1 - 5	(GHz)
IF Output Power Range	-110 to 0	(dBm)
Reference Frequency	100 (on board or external)	(MHz)
Reference Stability	+0.3	(PPM)
Conversion Gain	30	(dB)
Gain Flatness Over Typical Channel Bandwidth from SDR (250MHz)	<2	(specified over max channel bandwidth (250MHz) across entire 4GHz RX bandwidth. (SDR input channel band)
Typical Phase Noise		(dBc/Hz)
10Hz	-40	(dBc/Hz)
100Hz	-60	(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 (SMPS)	(Vdc)

## Mechanical and Environmental

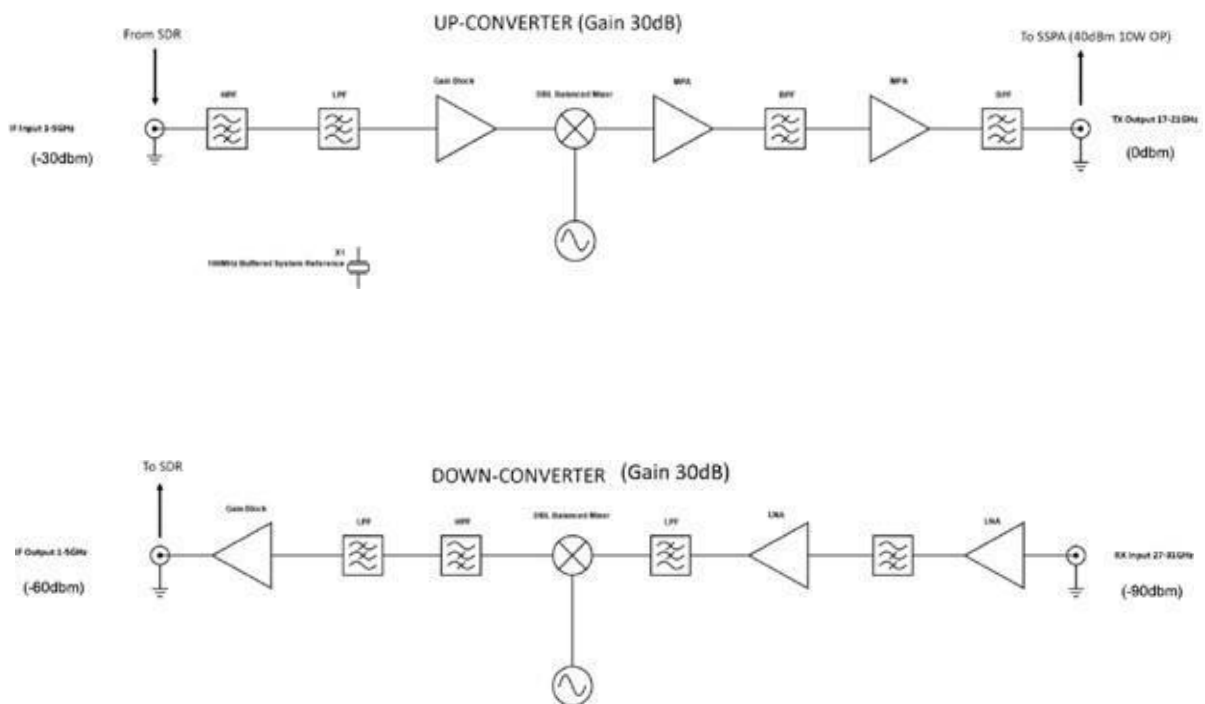
### Mechanical

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	>2.54mm 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

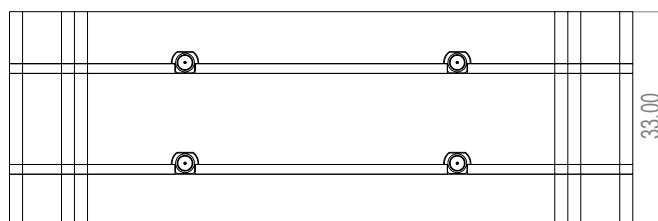
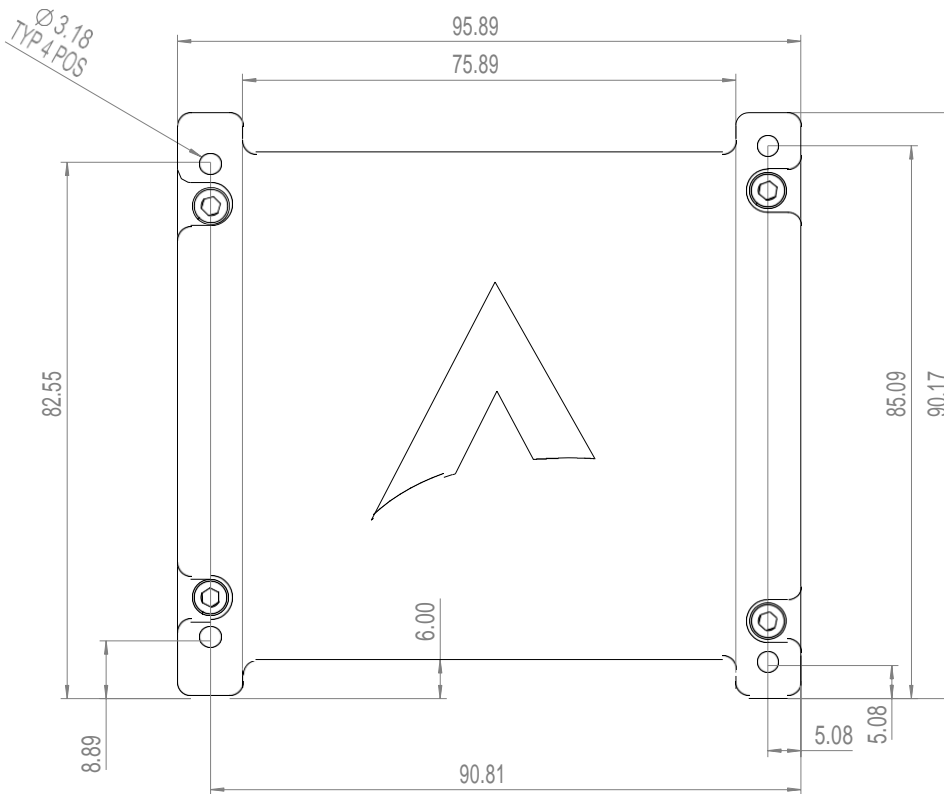
Parameter	Typical
Operating Temperature Range	-40°C to +70 °C
Operational Environment	-
Radiation Tolerance (kRad)	-
Vibration Requirement	-
Vacuum Requirement	-
Compliance Standards	-

### Simplified Schematic Diagram



	<p>Ka band Preliminary</p>	<p>KKa-TR-DL-1929</p>	<p>Issue date: September 2021</p>	<p>DOC REV 5</p>	<p>Page 5 of 7</p>
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## Mechanical Enclosure Preliminary Dimensions



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	<b>Ka band Preliminary</b>	<b>KKa-TR-DL-1929</b>	Issue date: September 2021	<b>DOC REV 5</b>	Page 7 of 7
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