

# Transceiver Downlink Module

## 17-21 & 27-30 GHz



Product Datasheet

### KKa-TR-DL-1929

Integrated transceiver downlink module for Ka-band frequencies.

### Overview

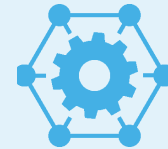
KKa-TR-DL-1929 is a fully integrated standalone transceiver module designed for Ka-band communication systems. The Transceiver operates as a wideband up/down converter when combined with a modem/ Software Defined Radio (SDR) to enable a fully functional Ka-band satellite communications system designed for use in Low Earth Orbit (LEO).

This Transceiver offers up to 250 MHz of instantaneous bandwidth. On-board frequency synthesizers able to lock to an external or on-board 10 MHz or 100 MHz reference signal are included on the Transceiver. The on-board reference signals are provided by high precision, low power consuming Temperature Compensated Crystal Oscillators (TCXO) with frequency stability of  $\pm 0.28\text{ppm}$  between  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ . The Transceiver is fully enclosed in an aluminium housing with SMP and SMPM RF connectors, DC Flying Leads for DC power and 6-Pin Pico-Lock connectors for DC power enable, PLL lock, current and temperature sensor connections.



### 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

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

**Space Heritage 20th  
January 2021**

Rocket Labs Mission 18,  
OHB SatComm

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### Specification Overview

#### Transmitter

| Parameter  | Typical                          | Unit    |        |
|--|----------------------------------|---------|--------|
| TX Output Frequency Range                                | 17-21                            | GHz     |        |
| TX Saturated Output Power (Pin=-15 dBm)                  | 27                               | dBm     |        |
| TX Output Power at P1dB Compression (Pin=-14 dBm)        | 26                               | dBm     |        |
| IF Input Frequency Range                                 | 1-5                              | GHz     |        |
| IF Input Power   | -40 to -15                       | dBm     |        |
| Reference Frequency                                      | 10 or 100 (on-board or external) | MHz     |        |
| Reference Stability                                      | ±0.28 (-40 °C to +85 °C)         | PPM     |        |
| Conversion Gain  | 38-43                            | dB      |        |
| Gain Flatness Across Full 1 - 5 GHz Band                 | ±2.5                             | dB      |        |
| Gain Flatness<br>Over 250 MHz Channel bandwidth from SDR | ±1                               | dB      |        |
| Typical Phase Noise                                      | 10 MHz                           | 100 MHz | dBc/Hz |
| 1 kHz  | -80                              | -94     | dBc/Hz |
| 10 kHz   | -81                              | -95     | dBc/Hz |
| 100 kHz  | -104                             | -110    | dBc/Hz |
| 1 MHz  | -124                             | -120    | dBc/Hz |
| Spurious (in band 1-5 GHz)                               | -50                              | dBc     |        |
| Supply Voltage Range                                     | 7-42                             | Vdc     |        |
| DC Power @ 12 VDC  | <11.5                            | W       |        |
| DC Current @ 12 VDC                                      | 1                                | A       |        |

#### Receiver

| Parameter  | Typical                          | Unit    |        |
|--|----------------------------------|---------|--------|
| Rx Input Frequency Range                                 | 27-30                            | GHz     |        |
| RX Input Power Range                                     | -120 to -30                      | dBm     |        |
| IF Output Frequency Range                                | 1-4                              | GHz     |        |
| IF Output Power Range                                    | -90 to 0                         | dBm     |        |
| Reference Frequency                                      | 10 or 100 (on-board or external) | MHz     |        |
| Reference Stability                                      | ±0.28 (-40 °C to +85 °C)         | PPM     |        |
| Conversion Gain  | 30-35                            | dB      |        |
| Gain Flatness Across Full 1-4 GHz Band                   | ±2.5                             | dB      |        |
| Gain Flatness<br>Over Typical Channel Bandwidth from SDR | ±1                               | dB      |        |
| Typical Phase Noise                                      | 10 MHz                           | 100 MHz | dBc/Hz |
| 1 kHz  | -83                              | -89     | dBc/Hz |
| 10 kHz   | -86                              | -90     | dBc/Hz |
| 100 kHz  | -108                             | -95     | dBc/Hz |
| 1 MHz  | -122                             | -119    | dBc/Hz |
| Spurious (in band 1-4 GHz)                               | -60                              | dBc     |        |
| Image Rejection  | 62                               | dB      |        |
| Noise Figure   | <2.5                             | dB      |        |
| Supply Voltage Range                                     | 7-42                             | Vdc     |        |
| DC Power @ 12 VDC  | <6                               | W       |        |
| DC Current @ 12 VDC                                      | 0.5                              | A       |        |

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## Mechanical and Environmental

### Mechanical

| Parameter  | Typical                   | Unit |
|--|---------------------------|------|
| PCB Dimensions   | 96 x 91 x 1 (max)         | mm   |
| Mechanical Enclosure Required  | Yes                       |      |
| Mechanical Enclosure Dimensions  | 96 x 91 x 38 (max)        | mm   |
| Total Mass   | <1                        | kg   |
| Form Factor Requirement  | Cube Sat                  |      |
| Enclosure Material Requirement   | >2.4 mm thick aluminium   | mm   |
| Enclosure Plating Requirement  | Gold or Nickel            |      |
| RF Connector Types   | SMPM edge mount           |      |
| DC Connector Types   | DC flying leads           |      |
| IF Signal Connector Types  | SMP edge mounts           |      |
| Current Sensor, Temperature Sensor,<br>Frequency Synthesiser Lock & DC Power<br>Enable Connections | 6-pin Pico-Lock Connector |      |

### Environmental

| Parameter                   | Typical          |
|-----------------------------|------------------|
| Operating Temperature Range | -40 °C to +85 °C |
| Operating Environment       |                  |
| Radiation Tolerance (kRad)  |                  |
| Vibration Requirement       |                  |
| Vacuum Requirement          |                  |
| Compliance Standards        |                  |

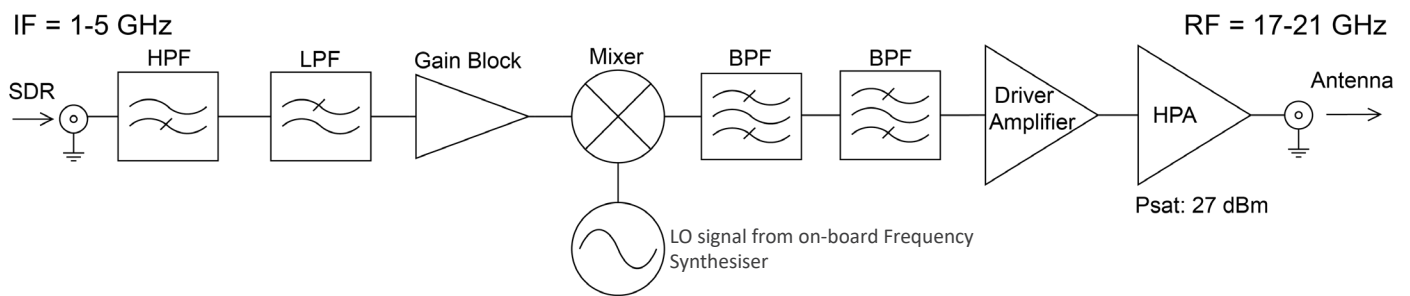
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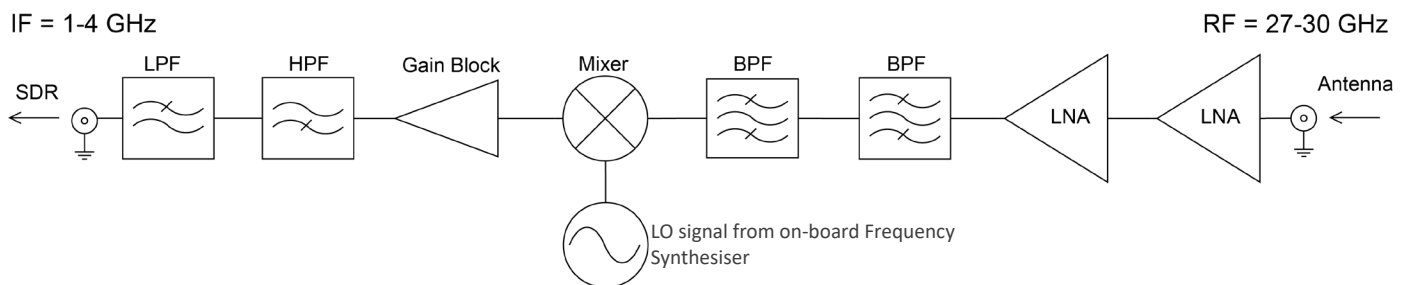
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## Simplified Schematic Diagram

### Upconverter K-band 17-21



### Downconverter Ka-band 27-30

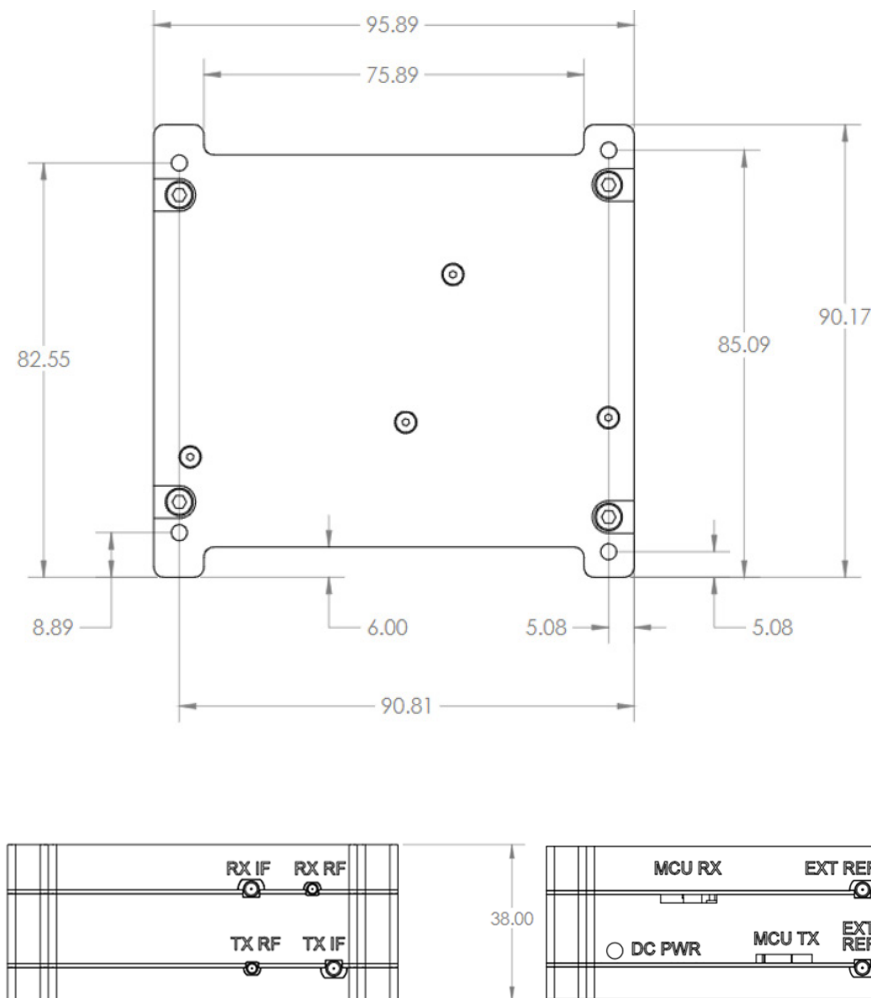


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## Mechanical Enclosure Preliminary Dimensions



## Contact Information

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