

Ku band Transceiver Downlink Module

Ku-TR-DL-1113 Previously named LE-KuTR-102
Ku band Down Link Transceiver Design Specifications

Overview

KU-TR-DL-1113 is a fully integrated stand-alone transceiver module designed for Ku band communications systems. Designed to operate in Low Earth Orbit (LEO) with an on-board a 1U stackable enclosure.

The transmitter has an IF input frequency range of 1 - 3GHz with an output range of 10.7 - 12.7GHz, having an LO Frequency of 13.7GHz and Output Power of >20dBm.

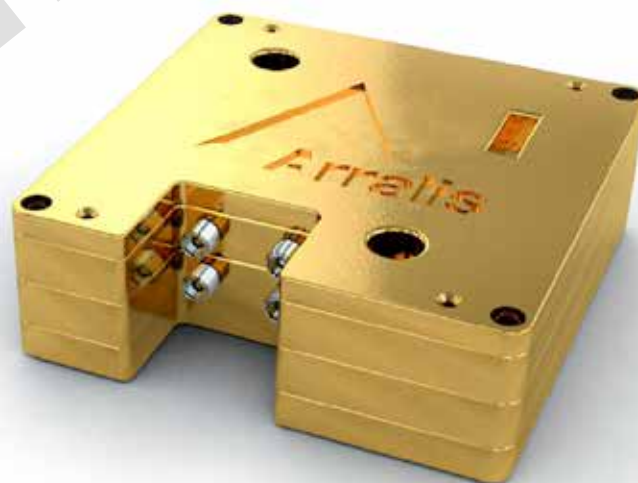
The receiver has an IF output frequency range of 1 - 3GHz with an input range of 12.75 - 14.75GHz, having an LO Frequency of 11.7GHz and LO Power of >15dBm.

Features

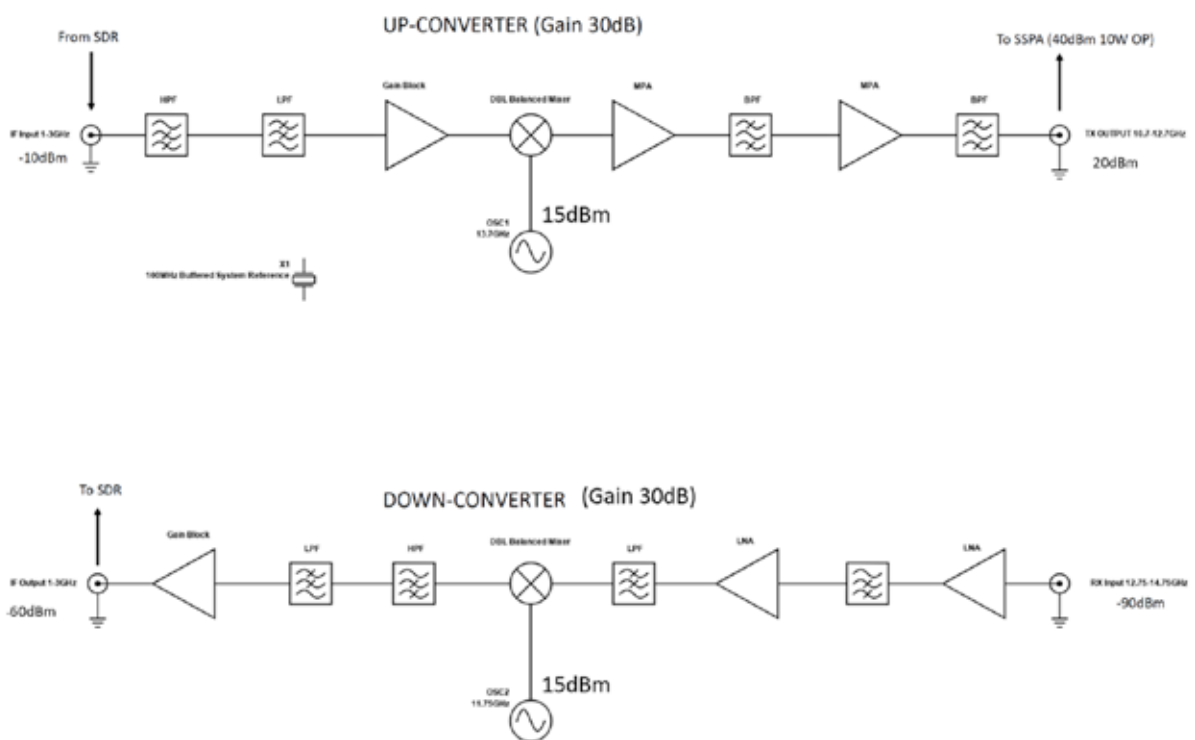
- Tx output frequency range 10.7 - 12.7 GHz.
- Rx input frequency range 12.75 - 14.75 GHz.
- Tx LO frequency 13.7 GHz.
- Rx LO frequency 11.75 GHz.

Applications

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



System Diagrams



Simplified Preliminary Block Diagram Below

Requirements Specification

Transmitter

Parameter	Typical	Unit
TX Output Frequency Range	10.7 – 12.7	(GHz)
TX Output Linear Power	20 +	(dBm)
IF Input Frequency Range	1 - 3	(GHz)
IF Input Power	-30 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	< 25	(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 bandwidth. (SDR input channel band)	(dB)
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	8 - 42	(Vdc)
DC Current	1	(Amps)
DC Power	<6	(Watts)

Requirements Specification

Receiver

Parameter	Typical	Unit
RX Input Frequency Range	12.75 - 14.75	(GHz)
RX Input Power Range	-90 to -30 (LNA dependant)	(dBm)
IF Output Frequency Range	1 - 3	(GHz)
IF Output Power Range	-60 to 0	(dBm)
Reference Frequency	100 (on board or external)	(MHz)
Reference Phase Noise	-100	(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	<25	(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)
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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	8 - 42	(Vdc)
DC Current	1	(Amp)
DC Power	<6	(Watts)

Mechanical and Environmental

Mechanical

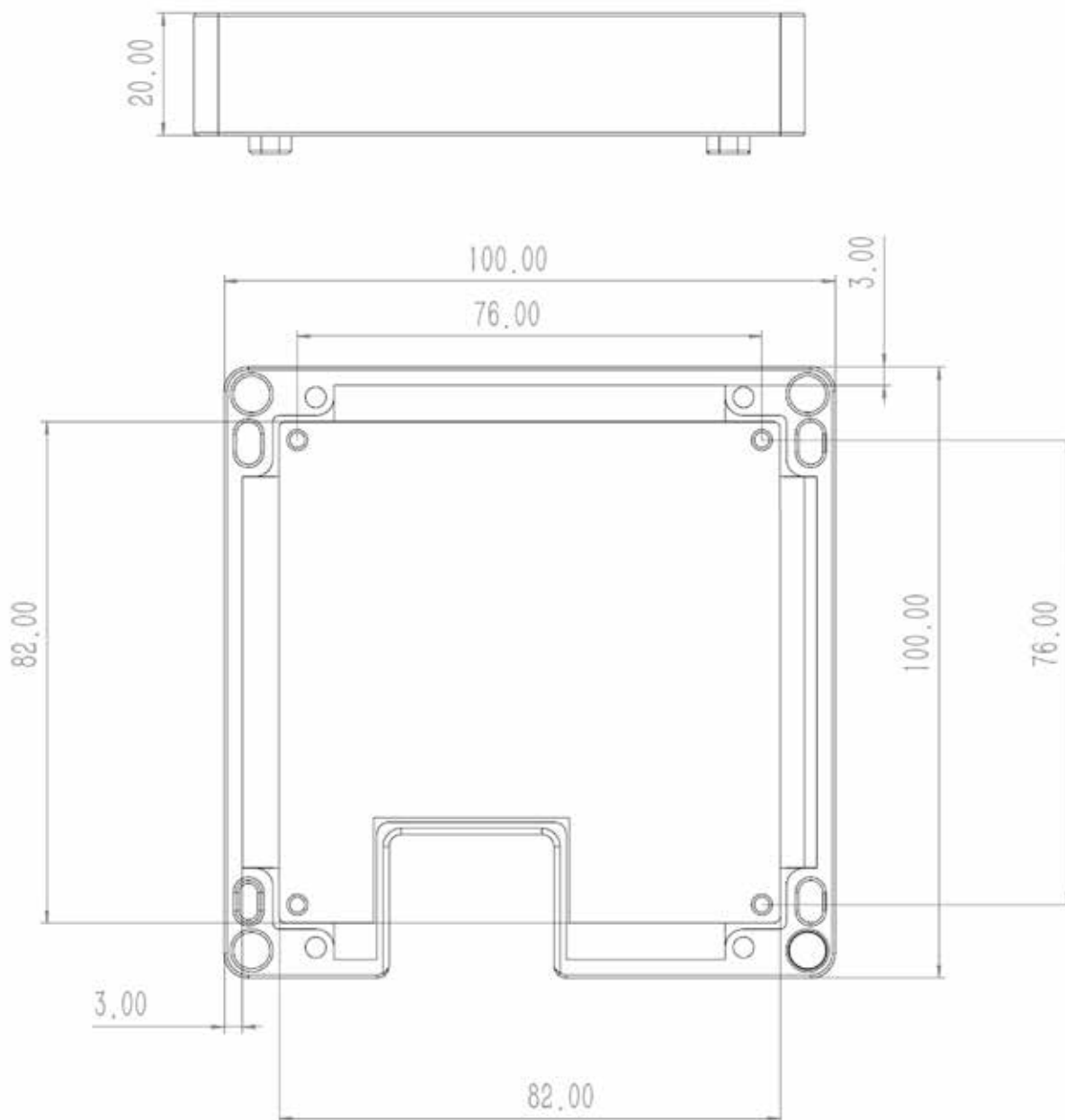
Parameter	Typical	Unit
PCB Dimensions	92 x 96 x 20 (PC-104 form factor)	(mm)
Mechanical Enclosure Required	Customer Requirement	Yes/No
Mechanical Enclosure Dimensions	1U Cubesat (100 x 100 x 100)	(mm)
Total Mass	<2.5	(kg)
Form Factor Requirement	PC-104	
Enclosure Material Requirement	>2.54mm Aluminium	(mm)
Enclosure Plating Requirement	Gold	
RF Connector Types	SMA	
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
Operational Environment	-
Radiation Tolerance (kRad)	-
Vibration Requirement	-
Vacuum Requirement	-
Compliance Standards	-

3. Requirements Specification

3.4 Mechanical Enclosure Preliminary Dimensions



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Arralis European Offices
t: +(44) 1793 239670 (UK)
e: sales@arralis.com

arralis.com

Arralis USA Office
+(1) 386 301 3249 (USA)
e: emilie.wren@arralis.com

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