QV-band Frequency Agile Transceiver

37.5-42.5 & 47.2-52.4 GHz

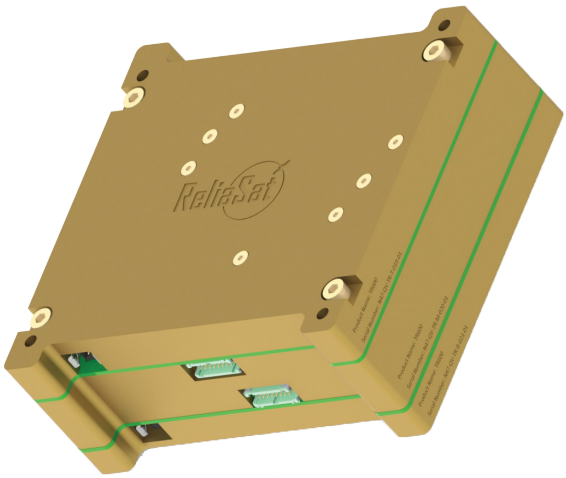
Product Datasheet

TR600

A fully integrated transceiver downlink module with programmable local oscillators for QV-band frequencies.

Overview

The TR600 is a QV-band frequency agile transceiver designed for both up-conversion and down-conversion within the QV-band range. This device is optimised for high-frequency applications and offers a robust solution with stable performance across diverse conditions. The up-converter operates within a 37.5 to 42.5 GHz frequency range, while the down-converter manages frequencies from 47.2 to 52.4 GHz. Both converters feature impressive specs like a conversion gain up to 68 dB and maintain phase noise control with reference stability at ±0.5 PPM. Suitable for extreme temperatures ranging from -40 to 85°C, the TR600 is ideal for demanding environments requiring precise frequency management, making it suitable for applications in high-speed data communications, space communications, IoT, Earth observation, security, and 5G networks.



Features

- TX output frequency 37.5-42.5 GHz
- RX input frequency 47.2-52.4 GHz
- TX IF frequency 0.4-2 GHz
- RX IF frequency 0.4-2 GHz

Applications

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

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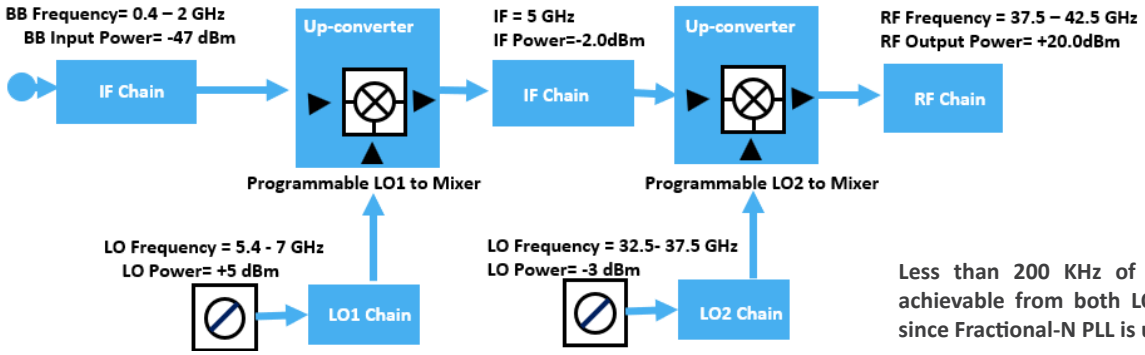
Specification Overview

Up-Converter

Parameter	Specifications	Unit
TX Output Frequency Range	37.5-42.5	GHz
TX Output Power, P1dB	20-25	dBm
IF Input Frequency Range	0.4-2	GHz
IF Input Power Range	-45 to 40 (for 20 to P1dB of 25 dBm)	dBm
LO Frequency	LO1 = 5.4-7 GHz LO2 = 32.5-37.5 GHz	GHz
Reference Frequency	100	MHz
Reference Stability	± 0.5	PPM
Conversion Gain	0 to 67	dB
Gain Flatness (250 MHz RTBW)	<3	dB
Phase Noise		
10 Hz	-37	dBc/Hz
100 Hz	-57	dBc/Hz
1 KHz	-67	dBc/Hz
10 KHz	-77	dBc/Hz
100 KHz	-97	dBc/Hz
1 MHz	-67	dBc/Hz
Spurious	50	dBc
Supply Voltage Range	6-60	Vdc
DC Power (Watts)	17 (at 28 VDC)	W
Operating Temperature Range	- 40 to 85	°C



Less than 200 KHz of step size is achievable from both LO1 and LO2, since Fractional-N PLL is used.

IF (GHz)	Programmable LO1 (GHz)	IF1 (GHz)	Programmable LO2 (Ghz)	RF (Ghz)
0.95	5.95	5	32.5	37.5
1	6	5	35.0	40
2	7	5	37.5	42.5

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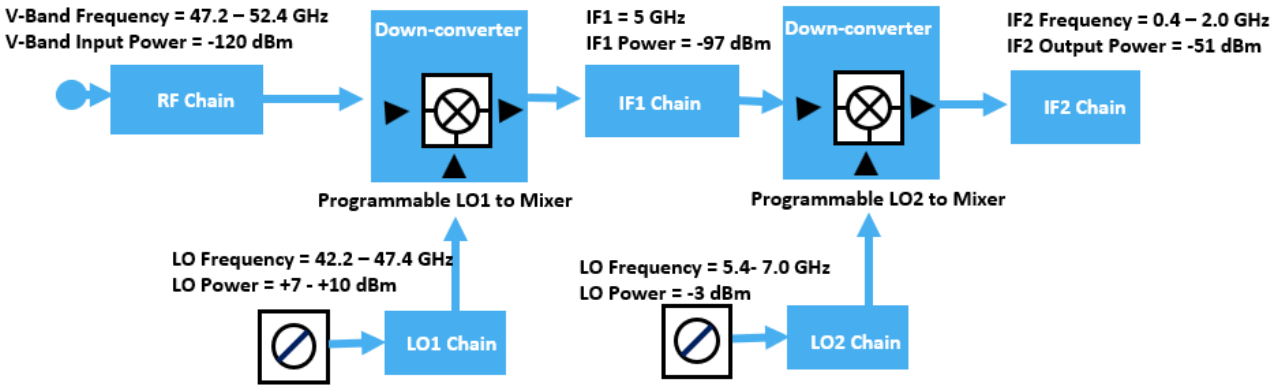
Down-Converter

Parameter	Specifications	Unit
RX Input Frequency Range	47.2-52.4	GHz
Rx Input Power	-95	dBm
IF Output Frequenccy Range	0.4-2	GHz
IF Output Power Range	-42 to 22 (-95 dBm to -31 dBm Pin)	dBm
LO Frequency	LO1 = 37.3-47.4 GHz LO2 = 5.4-7.0 GHz	GHz
Noise Figure	3 to 3.5	dB
Reference Frequency	100	MHz
Reference Stability	± 0.5	PPM
Conversion Gain	0 to 68	dB
Gain Flatness (250 MHz RTBW)	<3	dB
Phase Noise		
10 Hz	-37	dBc/Hz
100 Hz	-57	dBc/Hz
1 KHz	-67	dBc/Hz
10 KHz	-77	dBc/Hz
100 KHz	-97	dBc/Hz
1 MHz	-67	dBc/Hz
Spurious	50 (out-band)	dBc
Supply Voltage Range	6-60	Vdc
DC Power (Watts)	15 (at 28 VDC)	W
Operating Temperature Range	- 40 to 85	°C



RF (GHz)	Programmable LO1 (GHz)	IF1 (GHz)	Programmable LO2 (Ghz)	IF2 (Ghz)
47.2	42.2	5	5.95	0.95
50.0	45.0	5	6.00	1.00
52.4	47.4	5	7.00	2.00

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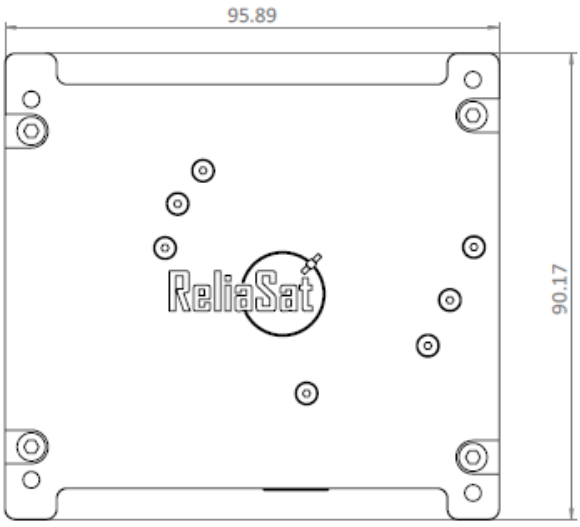
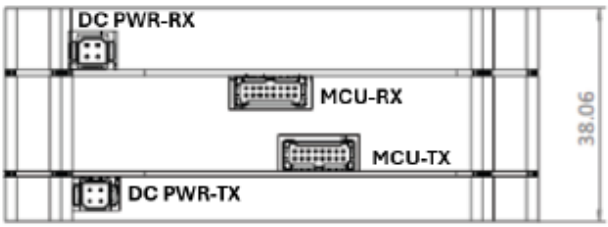
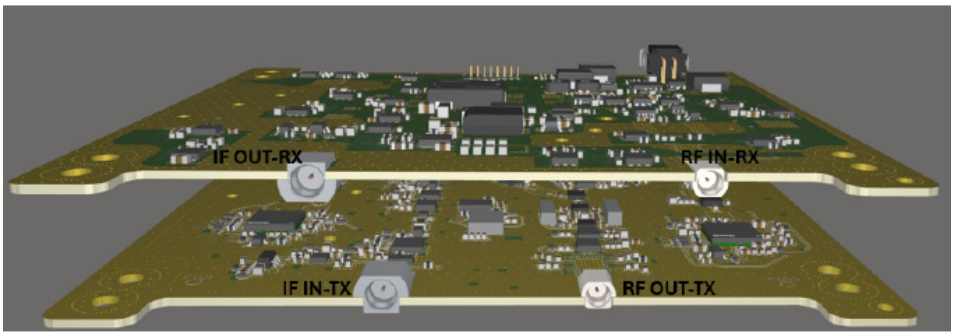




Where
DC PWR-RX- DC power connection to Receiver
MCU-RX-DC power connection to Receiver
DC PWR-TX- DC power connection to Transmitter
MCU-RX-DC power connection to Receiver

Mechanical

Parameter	Typical	Unit
PCB Dimensions	96 x 91 x 1 (max)	mm
Mechanical Enclosure Required	Yes	
Mechanical Enclosure Dimensions	95.89 x 90.17 x 38.06	mm
Total Mass	<1	kg
Form Factor Requirement	Cube Sat	
Enclosure Material Requirement	>2.4 mm thick aluminium	mm
Enclosure Planting Requirement	Gold or Nickel	
RF Connector	SMPM edge Mount	
IF signal Connector	SMP edge Mount	
DC Connector	Harwin 4-pin Connector	
Current Sensor, Temperature Sensor, Frequency Synthesiser Lock & DC Power Enable Connections to MCU	Harwin 16 pin Connectors	



Where
RF IN-RX - RF Input to Receiver
IF OUT-RX- IF Output from Receiver
IF IN-TX - RF Input to Transmitter
RX OUT-TX- RF Output from Transmitter

Contact Information

ReliaSat European Offices
e: sales@reliasat.com
www.reliasat.com

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