Issue Date: 07/07/2023

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Transceiver **Uplink Module** 17-21 & 27-30 GHz

TR300

Integrated transceiver uplink module for K/Kaband frequencies.

Overview

TR300 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 either on ground segment or an airborne environment. It includes an on-board frequency synthesizer and low power consumption in a stackable enclosure. This transceiver offers up to 250 MHz 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 fullfunction K/Ka-band satellite communication.

TR300

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



Applications

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- Space communications
- IOT
- Security
- 5G

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Transceiver Uplink Module 17-21 & 27-30 GHz



Product Datasheet

Specification Overview

Transmitter

Parameter		Typical	Unit
TX Output Frequency Range		27-30	(GHz)
TX Output Linear Power		20	(dBm)
IF Input Freque	ncy Range	1-4	(GHz)
IF Input Power		-10 to 0	(dBm)
Reference Frequ	uency	100 (on-board or external)	(MHz)
Reference Phase Noise		-145	(dBc/Hz)
Reference Signal Characteristics		Square input: 0.6 Vpp (min) / 2.5 Vpp (max) - slew rate >0.5 V/ns Sine wave: +5 dBm (min) / +15 dBm (max)	
Reference Stability		5	(PPM)
Conversion Gain		30 (extended 50 dB with SSPA)	(dB)
	Gain Flatness Over typical channel bandwidth from SDR (250 MHz)		
Over typical channe	l bandwidth from	3 (specified over max channel bandwidth (250 MHz) across entire 4 GHz) RX bandwidth. (SDR input channel band)	e(dB)
Over typical channe		bandwidth (250 MHz) across entire 4 GHz) RX bandwidth. (SDR input	° (dB) (dBc/Hz)
Over typical channe SDR (250 MHz)		bandwidth (250 MHz) across entire 4 GHz) RX bandwidth. (SDR input	
Over typical channe SDR (250 MHz)	oise	bandwidth (250 MHz) across entir 4 GHz) RX bandwidth. (SDR input channel band)	(dBc/Hz)
Over typical channe SDR (250 MHz)	oise <u>1 kHz</u>	bandwidth (250 MHz) across entir 4 GHz) RX bandwidth. (SDR input channel band) -70	(dBc/Hz) (dBc/Hz)
Over typical channe SDR (250 MHz)	oise 1 kHz 10 kHz	bandwidth (250 MHz) across entir 4 GHz) RX bandwidth. (SDR input channel band) -70 -80	(dBc/Hz) (dBc/Hz) (dBc/Hz)
Over typical channe SDR (250 MHz)	oise <u>1 kHz 10 kHz 100 kHz</u>	bandwidth (250 MHz) across entir 4 GHz) RX bandwidth. (SDR input channel band) -70 -80 -100	(dBc/Hz) (dBc/Hz) (dBc/Hz) (dBc/Hz)
Over typical channe SDR (250 MHz)	oise <u>1 kHz 10 kHz 100 kHz 1 MHz</u>	bandwidth (250 MHz) across entire 4 GHz) RX bandwidth. (SDR input channel band) -70 -80 -100 -123	(dBc/Hz) (dBc/Hz) (dBc/Hz) (dBc/Hz) (dBc/Hz)
Over typical channe SDR (250 MHz) Typical Phase N	oise 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz	bandwidth (250 MHz) across entire 4 GHz) RX bandwidth. (SDR input channel band) -70 -80 -100 -123 -140	(dBc/Hz) (dBc/Hz) (dBc/Hz) (dBc/Hz) (dBc/Hz) (dBc/Hz)
Over typical channe SDR (250 MHz) Typical Phase N	oise 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz	bandwidth (250 MHz) across entire 4 GHz) RX bandwidth. (SDR input channel band) -70 -80 -100 -123 -140 -60	(dBc/Hz) (dBc/Hz) (dBc/Hz) (dBc/Hz) (dBc/Hz) (dBc/Hz) (dBc)

Receiver

D		T	11.1.1
Parameter		Typical	Unit
RX Input Frequency Range		17-21	(GHz)
RX Input Power Range		-90 to -30	(dBm)
IF Output Frequ	ency Range	1-5	(GHz)
IF Output Powe	r Range	-60 to 0	(dBm)
Reference Frequ	uency	100 (on-board or external)	(MHz)
Reference Phase Noise		-145	(dBc/Hz)
Reference Signal Characteristics		Square input: 0.6 Vpp (min) / 2.5 Vpp (max) - slew rate >0.5 V/ns Sine wave: +5 dBm (min) / +15 dBm (max)	
Reference Stabi	lity	5	(PPM)
Conversion Gain		30 (extended 50 dB with SSPA)	(dB)
Gain Flatness Over Typical Channel Bandwidth from SDR (250MHz)		3 (specified over max channel bandwidth (250 MHz) across entire (dB) 4 GHz) RX bandwidth. (SDR input channel band)	
Typical Phase N	oise		(dBc/Hz)
	<u>1 kHz</u>	-70	(dBc/Hz)
	<u>10 kHz</u>	-80	(dBc/Hz)
	100 kHz	-100	(dBc/Hz)
	1 MHz	-123	(dBc/Hz)
	<u>1 MHz</u> 10 MHz	-123 -140	(dBc/Hz) (dBc/Hz)
Spurious		-	
Spurious Noise Figure		-140	(dBc/Hz)
	10 MHz	-140 -60	(dBc/Hz) (dBc)
Noise Figure	10 MHz	-140 -60 <2.5	(dBc/Hz) (dBc) (dB)

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Transceiver Uplink Module 17-21 & 27-30 GHz



Mechanical and Environmental

Mechanical

Parameter	Typical	Unit
PCB Dimensions	80 x 80 x 2 (max)	(mm)
Mechanical Enclosure Required	Yes	
Mechanical Enclosure Dimensions	100 x 120 x 70 (max)	(mm)
Total Mass	<2	(kg)
Form Factor Requirement	Enclosure	
Enclosure Material Requirement	>2.54 mm Aluminium	(mm)
Enclosure Planting Requirement	Gold	
RF Connector Types	2.92	(mm)
DC Connector Types	DC feedthrough or alt. high rel. panel	
DC Connector Types	mount	
IF Signal Connector Types	SMA	

Environmental

Parameter	Typical
Operating Temperature Range	-40 °C to +70 °C
Storage Temperature Range	-40 °C to +85 °C
Operating Environment	Terrestrial; IP65 enclosures standard
Vibration Requirement	MIL-STD-810
Compliance Standards	1) ETSI EN 301 459 2) ETSI EN 301.489-12 (EMC standard for satellite earth stations)

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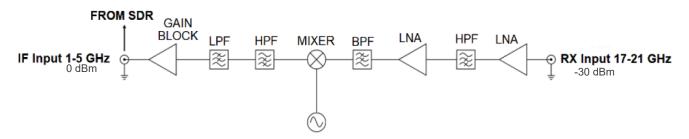
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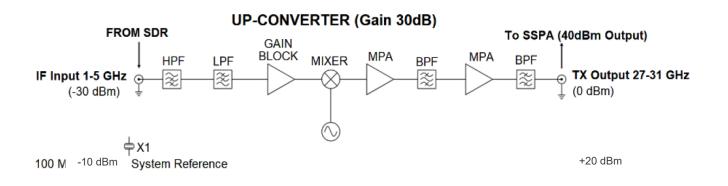
Transceiver Uplink Module 17-21 & 27-30 GHz



Simplified Schematic Diagram

DOWN-CONVERTER (Gain 30dB)





Contact Information

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