

• Applications

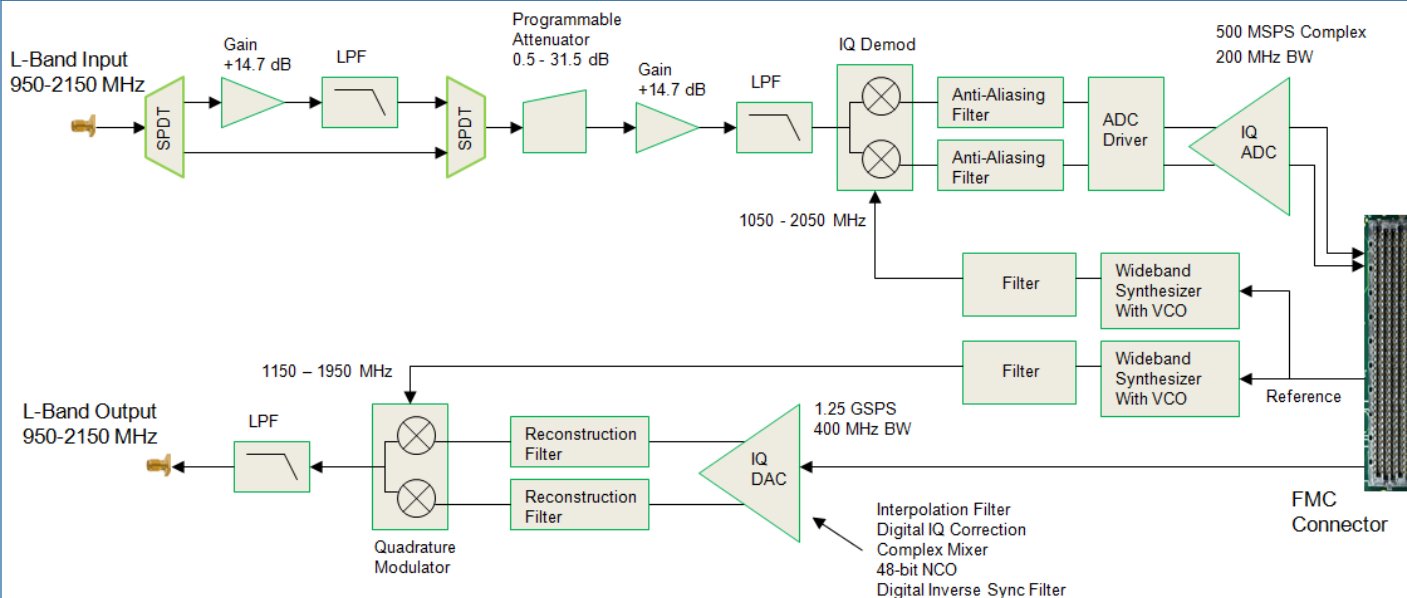
- Software Defined Radio
- SATCOM
- Modulation / Demodulation
- Low Power Wireless Mesh
- VSAT
- Wireless
- LNB Interface
- Fixed Site

FMC L-Band Transceiver

The FMC-XCVR-1 uses an analog mixer to center up to 200 MHz of the analog L-Band input (950 MHz–2150 MHz input frequency range) at $F_c=0$. The 200 MHz bandwidth is then digitized by a 500 MSPS Complex ADC, with the LVDS output routed to the FMC connector.

The FMC-XCVR-1 also features an IQ 16-bit DAC, followed by an IQ modulator to provide up to 400 MHz bandwidth between 950 MHz-2150 MHz. The input and output center frequencies are independently tunable.

Internal PLL's for clock generation, lockable to an external 10 MHz reference.



Key Specifications— L-band Input and Digitizer

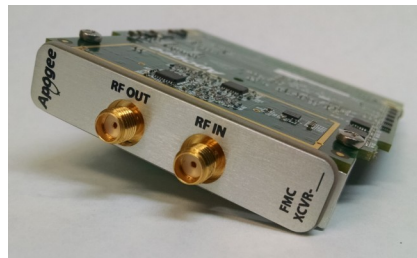
Connector.....	SMA, 50 Ohm
L-Band Input Frequency Range.....	950-2150 MHz
Input Power Range, VSWR.....	-80 dBm to 0 dBm (up to +10 dBm without damage), VSWR \leq 1.3:1
Manual Gain.....	0 to 31 dB in increments of 1 dB steps
IQ Demod.....	950-2150 MHz, 1050–2050 MHz LO
ADC Clocking.....	Internal Wideband Synthesizer with VCO, lockable to Carrier or EXT 10 MHz reference
Carrier 10 MHz Reference Requirement.....	LVDS, 325mV swing
IQ ADC Converter.....	12-bit, 500 MSPS, Texas Instruments—ADC12D500RFIUT/NOPB
IQ Output Correction.....	Digital, IP Core provided by Apogee
ADC LVDS Output.....	LVDS outputs are compatible with IEEE 1596.3-1996
DAC.....	Dual 16-bit 1.25 GSPS, Texas Instruments— DAC3482IRKD
FMC Card Form Factor.....	ANSI/ VITA 57.1 FPGA Mezzanine Card (FMC), High Pin Count (HPC)

Key Specifications – RF Input Chain and Digitizer Performance

Amplitude Flatness.....	Uncorrected amplitude ripple over any 80 MHz segment less than ± 0.5 dB Uncorrected amplitude ripple over any 40 MHz segment less than ± 0.25 dB
Out of Band Rejection.....	Minimum of 50 dB rejection between 0-900 MHz. Minimum of 50 dB rejection between 2200 -3200 MHz.
System Spurious Performance.....	Minimum SFDR of -50 dBc, Minimum IMD3 of -57 dBFS
Noise Power Ratio.....	L-Band NPR at the minimum decimation (11 ENOB) is greater than 53 dB.
Noise Figure.....	Maximum Noise Figure of 27 dB, bypassed input gain Maximum Noise Figure of 11 dB with input gain selected
Phase Noise.....	Phase noise does not exceed -60 dBc at 100 Hz. Phase noise does not exceed -70 dBc/Hz at 1 kHz. Phase noise does not exceed -80 dBc/Hz at 10kHz. Phase noise does not exceed -90 dBc/Hz at 100 kHz. Phase noise does not exceed -115 dBc/Hz at 1 MHz.

Key Specifications – Digital to Analog Converter (DAC) and L-Band Output

Digital to Analog Converter.....	Texas Instruments – Part Number – DAC3482IRKDT
Resolution, Sample Rate.....	16-bit, Dual Channel, 800 MSPS
Data Interface.....	The DAC3482 has a 16-bit LVDS bus that accepts 16-bit I and Q data in either word-wide or byte-wide formats. In word-wide mode data is sent through a 16-bit bus.
Input FIFO.....	The DAC3482 includes a 2-channel, 16-bits wide, and 8-samples deep input FIFO which acts as an elastic buffer.
Interpolation.....	2x to 16x digital interpolation filters with over 90 dB of stop-band rejection
Mixer.....	Complex mixer allows flexible carrier placement, 32-bit frequency register, 12-bit phase
IQ Offset Correction.....	Digital Offset, 2s-complement range from -4096 to 4095
Group Delay Correction.....	DAC3482 has group delay correction block for each DAC channel. The maximum delay ranges from 30 ps to 100 ps.
Quadrature Modulator.....	Up-convert DAC output to RF frequencies of 950–2150 MHz
Output power.....	3-5 dBm typical
Output Frequency Range.....	L-band, 950 to 2150 MHz
Output Connector.....	SMA, 50 Ohm





Apogee Applied Research, Inc. provides engineering services and hardware systems to commercial and government end users. Our main area of expertise is ultra high bandwidth Software Defined Radios. Apogee systems feature advanced Digital Signal Processing techniques and the ability to process a wide variety of signal types.

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Our leadership team has over 45 years combined experience in the field of Digital Signal Processing, and a reputation for outstanding customer service long after the sale. We have a proven track record of delivering systems on time and exceeding customer expectations from concept to delivery.

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