

ViaLiteHD® – Mil-Aero 6 GHz Link Pair

Mil-Aero RF over Fiber 6 GHz Link Pair

- 10 MHz to 6 GHz Link Pair (7 GHz at 4 dB pt)
- Application specific gain pair options: standard gain, high gain or high output power
- Multiple packaging configurations
- High Spurious Free Dynamic Range (SFDR)
- High 1 dB compression point available
- Low Noise Figure
- Connectivity for M&C
 - Rack cards utilising chassis SNMP
 - Modules utilising USB-C connection
- Supports > 10 km to 50 km distances
- -20 to + 60 °C Operating Temp
- 5-year warranty



Blue OEM
Module
Individual
TX or RX

Outdoor IP55 rated
Black Module
Individual TX or RX



The **ViaLite** Mil-Aero RF over Fiber Link Pairs have been designed for use in Mil-Aero applications such as Bore-sight communications (for both transmit and receive), Telemetry, Tracking and Control (TT&C), and Signal Intelligence gathering (SIGINT). Each different **ViaLite** Link Pair's electrical performance can be optimized in the field to create an excellent balance between desired gain level, high P1dB CP and output power and low noise figure (NF). All Link Pairs come with the same industry leading spurious free dynamic range (SFDR).

When harsh environmental conditions are a design consideration, **ViaLite's** outdoor rated IP55 modules can be used, or the **ViaLite** Blue OEM modules can be installed within a variety of outdoor enclosures, such as the 2 port **ViaLite** ODE-MINI or the 4 port ODE-A4. **ViaLite's** Mil-Aero Link Pair comes in various form factors, such as stand-alone modules (Blue and Black) and chassis rack cards for use in a **ViaLite** 1U or 3U chassis. Chassis rack cards are managed and configured via a site controller which utilizes SNMP and web interface, whereas stand-alone modules are field configurable via USB-C serial cable.

Deployment examples

Teleport



Bore Site



SigInt



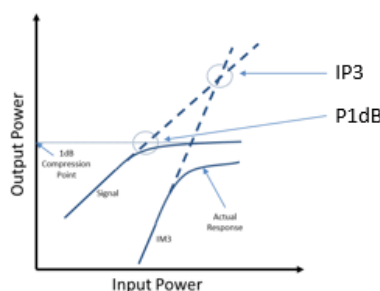
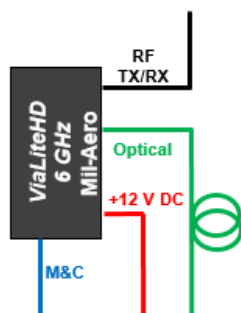
Direction Finding



GPS



Telemetry, Tracking & Control (TT&C)



Standard Gain Link Pair:
Higher input level, P1dB = 0 dBm
Typically used for unity gain

High Gain Link Pair:
Typical input level, P1dB = -15 dBm
High gain = 20 dB

High Output Link Pair:
Higher input level, P1dB = 0 dBm
Higher output level, +10 dBm

Technical specification

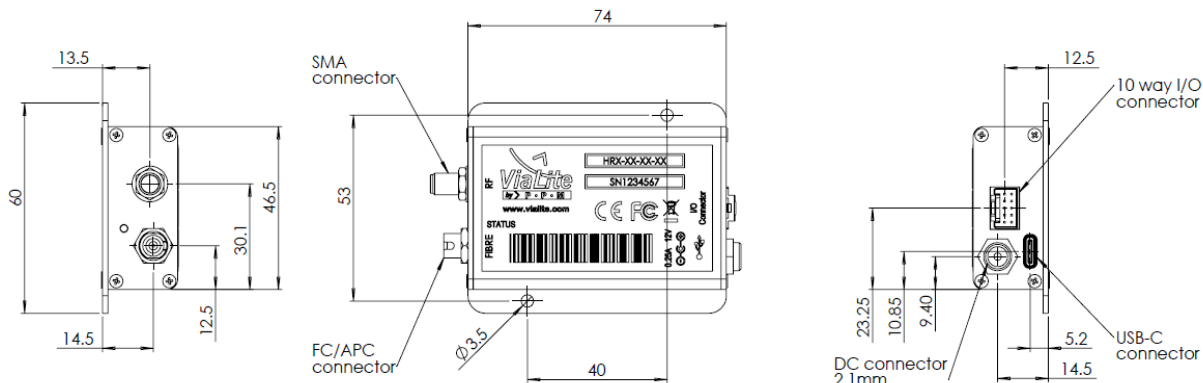
	Standard Gain Link HRT-Y1-xx-04-C1550 HRR-Y1-xx-05	High Gain Link HRT-Y1-xx-01-C1550 HRR-Y1-xx-05	High Output Link HRT-Y1-xx-04-C1550 HRR-Y1-xx-03
Frequency (typ.)	20 MHz to 6 GHz (1 dB Pt) 10 MHz to 7 GHz (4 dB Pt)	20 MHz to 6 GHz (1 dB Pt) 10 MHz to 7 GHz (4 dB Pt)	20 MHz to 6 GHz (1 dB Pt) 10 MHz to 7 GHz (4 dB Pt)
Input P1dB (typ. @ 1500MHz)	0 dBm	-15 dBm	0 dBm
IP3 (typ. @ 1500MHz)	10 dBm	-5dBm	10 dBm
Gain Slope	<-0.35 dB /GHz	<-0.35 dB /GHz	<-0.40 dB /GHz
Gain Ripple	< +/-1 dB	< +/-1 dB	< +/-1.2 dB
Gain Adjustment from Nominal	+5 dB to -9.5 dB 0.5 dB attenuation steps	+5 dB to -9.5 dB 0.5 dB attenuation steps	+5 dB to -9.5 dB 0.5 dB attenuation steps
Nominal Link Gain (typ.)	+5 dB Gain Tx -10dB, Rx +15dB P/N Tx = 04, P/N Rx = 05	+20 dB Gain Tx +5dB, Rx +15dB P/N Tx = 01, Rx = 05	+10 dB Gain Tx -10dB, Rx +20dB P/N Tx = 04, Rx = 03
Impedance	50 ohm	50 ohm	50 ohm
Noise Figure (typ. @ 1500MHz)	20 dB	10 dB	20 dB
Isolation (typ.)	>60 dB	>60 dB	>60 dB
VSWR (typ.)	1.5:1	1.5:1	1.5:1
Gain Stability over Temperature (typ.) ^a	+/-3 dB	+/-3 dB	+/-3 dB
SFDR (typ. @ 1500 MHz)	109 dB/Hz(2/3)	109 dB/Hz(2/3)	109 dB/Hz(2/3)
SFDR (typ. @ 5 GHz)	104 dB/Hz(2/3)	104 dB/Hz(2/3)	104 dB/Hz(2/3)
Additional control features	Software controllable parameters via USB-C (Black & Blue OEM), p/n 55058 Software controllable parameters via SNMP (Rack card) Antenna Fault Detection (AFD), senses LNA current feed		
Maximum RF input power without damage	+20 dBm (min)		
Operating temperature	-20°C to +60 °C (OEM Modules)		
Humidity	0-95% non-condensing		
Cooling	Convection		
Power consumption	Transmitter: 1.8 W typical Receiver: 1.2 W typical		
DC Input voltage	OEM Modules Only 8-15 V, 12 V nominal (>18 V damage)		
Power supply compatibility	Blue OEM p/n 73502 +12 VDC PSU Black OEM p/n 73955 OEM power connector, 2 m cable, bare wire end Black OEM p/n 70094 IP55 rated enclosure with +12 VDC PSU, requires AC main connection		
RF module Types	Rack Chassis Card: 1xTX, 1xRX, 2xTX, 2xRX, 1xTRX Blue OEM Module: 1xTX, 1xRX Black OEM Module: IP55 Rated 1xTX or 1xRX		

^a measured across a temperature window of 40 °C

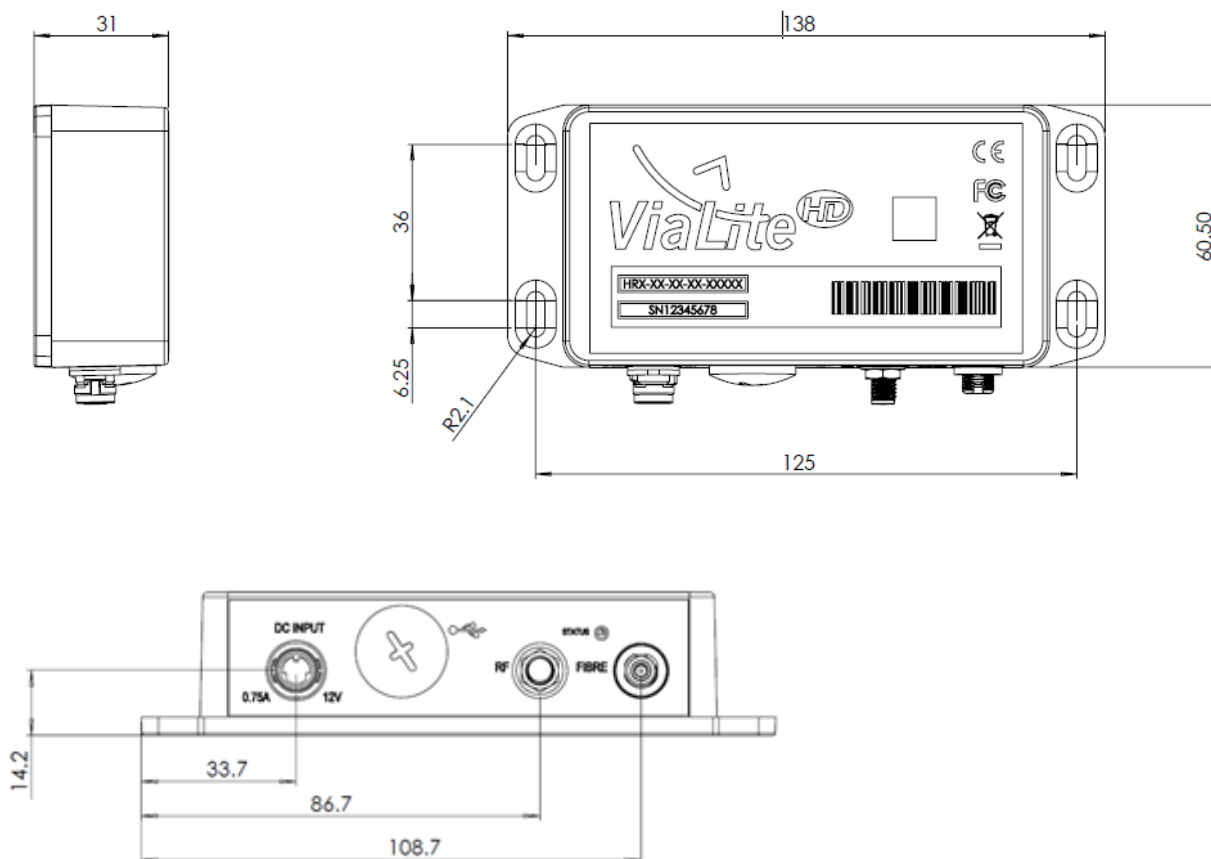


Single (Tx or Rx) or Dual (2xTx or 2xRx or TRX) Rack Card for 1U or 3U Chassis
+ Dual PSU
+ SNMP for M&C

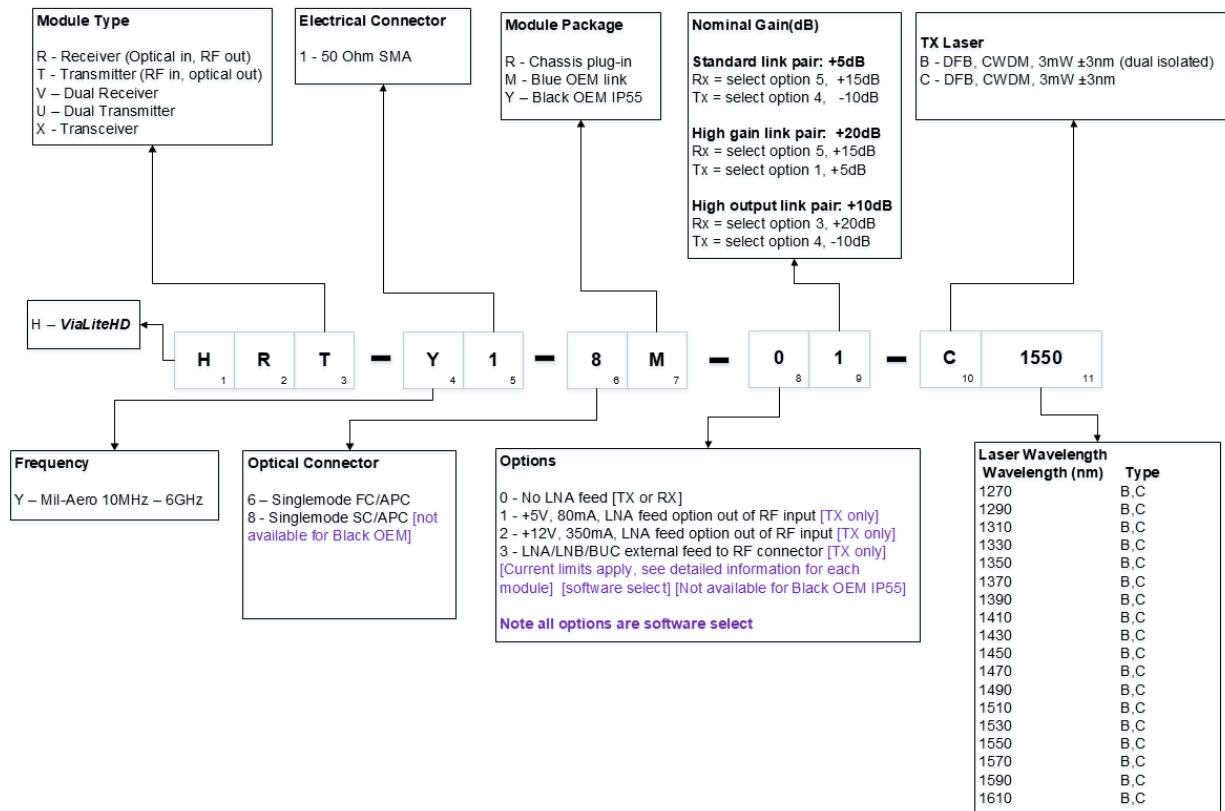
OEM Physical Dimensions (Blue OEM)



OEM Physical Dimensions (Black OEM)



Product Configurator



Note: C1550 nm is default laser & wavelength

Link Selection – Standard, High Gain or High Output?

Customer Application	Recommended Link Gain
<ul style="list-style-type: none"> Versatile, general purpose Higher input RF power level range e.g. <= 0 dBm (typ.) Typical +5 dB to 0 dB gain in the link Typical use case; modem signal 	Standard gain link pair
<ul style="list-style-type: none"> Low Noise Figure needed e.g. <1 0dB Input RF power level range e.g. <= -20 dBm Significant gain in the link Typical use case; Low power level signal intelligence, downlink 	High gain link pair
<ul style="list-style-type: none"> Highest output power, +10dBm signal output with lowest harmonics < -3 5 dBc (typ) Higher input RF power level range e.g. <= 0 dBm (typ.) Typical use case; Boresight transmit uplink without additional external amplification 	High output link

Popular products

Standard Gain Link Pair, High P1dB

HRT-Y1-8M-04-C1550

ViaLiteHD RF Link, Transmitter (E/O), Mil-Aero 10 MHz-6 GHz, 50 Ohm SMA, Singlemode SC/APC, Blue OEM link, No LNA Feed, -10 dB RF Gain, CWDM single isolated DFB, Wavelength 1550 +/- 3 nm.

HRR-Y1-8M-05

ViaLiteHD RF Link, Receiver (O/E), Mil-Aero 10 MHz-6 GHz, 50 Ohm SMA, Singlemode SC/APC, Blue OEM link, No LNA Feed, 15 dB RF Gain.

High Gain Link Pair, Low P1dB

HRT-Y1-8M-01-C1550

ViaLiteHD RF Link, Transmitter (E/O), Mil-Aero 10 MHz-6 GHz, 50 Ohm SMA, Singlemode SC/APC, Blue OEM link, No LNA Feed, +5 dB RF Gain, CWDM single isolated DFB, Wavelength 1550 +/- 3 nm.

HRR-Y1-8M-05

ViaLiteHD RF Link, Receiver (O/E), Mil-Aero 10 MHz-6 GHz, 50 Ohm SMA, Singlemode SC/APC, Blue OEM link, No LNA Feed, 15 dB RF Gain.

High Output Link Pair, +10dBm output

HRT-Y1-8M-04-C1550

ViaLiteHD RF Link, Transmitter (E/O), Mil-Aero 10MHz-6 GHz, 50 Ohm SMA, Singlemode SC/APC, Blue OEM link, No LNA Feed, -10 dB RF Gain, CWDM single isolated DFB, Wavelength 1550 +/- 3 nm.

HRR-Y1-8M-03

ViaLiteHD RF Link, Receiver (O/E), Mil-Aero 10 MHz-6 GHz, 50 Ohm SMA, Singlemode SC/APC, Blue OEM link, No LNA Feed, 20 dB RF Gain.

Gain adjustment & fine tune

With each link pair comprising transmitter and receiver, it is also possible to adjust the gain parameters from the factory default settings to optimize the link performance further.

The following tables can be used as a guide for adjusting the gain settings and the corresponding effects on P1dB compression point, IP3, Noise Figure (NF), Spurious Free Dynamic Range (SFDR) etc. Adjustment can be made via the SNMP controller, or through the USB-C field controllable option for Blue OEM and Black OEM modules; further details can be found in the Mil-Aero 6 GHz RF over Fiber Handbook.

Standard gain link

Mil-Aero 10 MHz - 6 GHz RFoF link: Standard gain link											1.5 GHz		
SFDR	109.4	109.6	109.7	109.8	109.9	110.0	110.1	110.1	110.1	110.1	110.1	dB/Hz	
IP1	3.6	2.9	2.2	1.5	0.7	-0.2	-1.0	-1.9	-2.8	-3.8	-4.7	dBm	
IIP3	15.0	14.3	13.5	12.7	11.9	11.0	10.1	9.2	8.3	7.3	6.4	dBm	
NF	24.8	23.8	22.8	21.8	20.8	19.9	18.9	17.9	17.0	16.0	15.1	dB	
TX Gain (dB)	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6		
Nominal RX Gain (dB)	12	-4	-3	-2	-1	0	1	2	3	4	5	6	Available link gains (dB)
	13	-3	-2	-1	0	1	2	3	4	5	6	7	
	14	-2	-1	0	1	2	3	4	5	6	7	8	
	15	-1	0	1	2	3	4	5	6	7	8	9	
	16	0	1	2	3	4	5	6	7	8	9	10	
	17	1	2	3	4	5	6	7	8	9	10	11	
	18	2	3	4	5	6	7	8	9	10	11	12	
	19	3	4	5	6	7	8	9	10	11	12	13	
	20	4	5	6	7	8	9	10	11	12	13	14	
	21	5	6	7	8	9	10	11	12	13	14	15	
	22	6	7	8	9	10	11	12	13	14	15	16	

Mil-Aero 10 MHz - 6 GHz RFoF link: Standard gain link											5 GHz		
SFDR	102.1	102.2	102.3	102.4	102.4	102.5	102.5	102.5	102.5	102.6	102.6	dB/Hz	
IP1	2.6	1.9	1.2	0.4	-0.4	-1.2	-2.0	-2.9	-3.8	-4.8	-5.7	dBm	
IIP3	11.4	10.6	9.7	8.8	7.9	6.9	6.0	5.0	4.1	3.1	2.1	dBm	
NF	32.1	31.1	30.1	29.1	28.1	27.1	26.1	25.1	24.1	23.1	22.1	dB	
TX Gain (dB)	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6		
Nominal RX Gain (dB)	12	-4	-3	-2	-1	0	1	2	3	4	5	6	Available link gains (dB)
	13	-3	-2	-1	0	1	2	3	4	5	6	7	
	14	-2	-1	0	1	2	3	4	5	6	7	8	
	15	-1	0	1	2	3	4	5	6	7	8	9	
	16	0	1	2	3	4	5	6	7	8	9	10	
	17	1	2	3	4	5	6	7	8	9	10	11	
	18	2	3	4	5	6	7	8	9	10	11	12	
	19	3	4	5	6	7	8	9	10	11	12	13	
	20	4	5	6	7	8	9	10	11	12	13	14	
	21	5	6	7	8	9	10	11	12	13	14	15	
	22	6	7	8	9	10	11	12	13	14	15	16	

Note: Circles indicate factory default TX & Rx gain settings, combined gain and resulting performance

High gain link

Mil-Aero 10 MHz - 6 GHz RFoF link: High gain link											1.5 GHz		
SFDR	107.7	107.9	108.0	108.0	108.0	107.9	107.8	107.5	107.3	106.9	106.5	dB/Hz	
IP1	-10.9	-11.6	-12.2	-13.0	-13.7	-14.5	-15.4	-16.2	-17.1	-18.0	-19.0	dBm	
IIP3	-0.8	-1.3	-1.9	-2.5	-3.2	-3.9	-4.7	-5.5	-6.3	-7.2	-8.1	dBm	
NF	11.5	10.7	10.0	9.3	8.6	8.1	7.5	7.1	6.6	6.3	6.0	dB	
TX Gain (dB)	-2	-1	0	1	2	3	4	5	6	7	8		
Nominal RX Gain (dB)	12	10	11	12	13	14	15	16	17	18	19	20	Available link gains (dB)
	13	11	12	13	14	15	16	17	18	19	20	21	
	14	12	13	14	15	16	17	18	19	20	21	22	
	15	13	14	15	16	17	18	19	20	21	22	23	
	16	14	15	16	17	18	19	20	21	22	23	24	
	17	15	16	17	18	19	20	21	22	23	24	25	
	18	16	17	18	19	20	21	22	23	24	25	26	
	19	17	18	19	20	21	22	23	24	25	26	27	
	20	18	19	20	21	22	23	24	25	26	27	28	
	21	19	20	21	22	23	24	25	26	27	28	29	
	22	20	21	22	23	24	25	26	27	28	29	30	

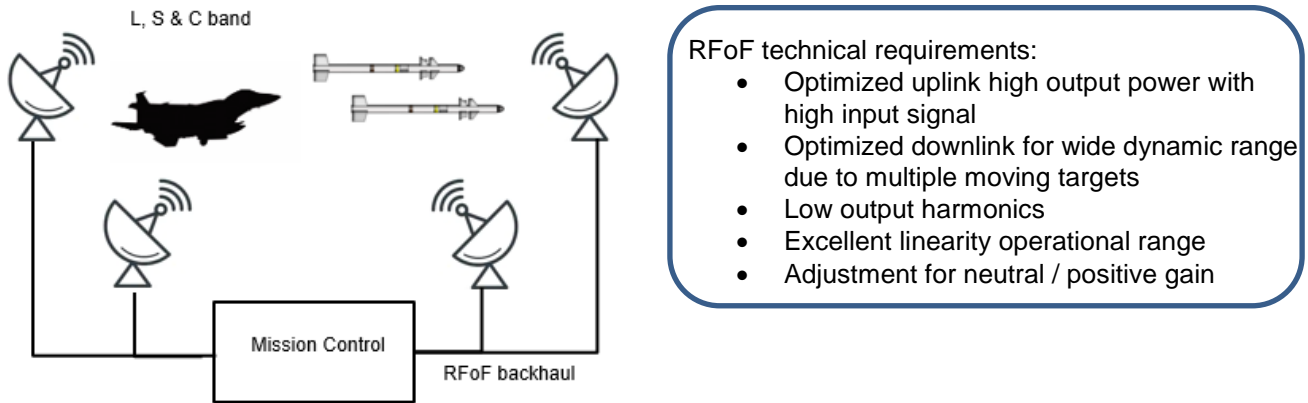
Mil-Aero 10 MHz - 6 GHz RFoF link: High gain link											5 GHz		
SFDR	101.4	101.5	101.7	101.8	101.9	102.0	102.0	102.0	101.9	101.9	101.8	dB/Hz	
IP1	-11.9	-12.4	-13.1	-13.7	-14.5	-15.2	-16.0	-16.9	-17.7	-18.6	-19.5	dBm	
IIP3	-3.3	-4.0	-4.7	-5.5	-6.3	-7.1	-8.0	-8.9	-9.8	-10.8	-11.7	dBm	
NF	18.5	17.5	16.6	15.6	14.7	13.8	12.9	12.0	11.1	10.3	9.5	dB	
TX Gain (dB)	-2	-1	0	1	2	3	4	5	6	7	8		
Nominal RX Gain (dB)	12	10	11	12	13	14	15	16	17	18	19	20	Available link gains (dB)
	13	11	12	13	14	15	16	17	18	19	20	21	
	14	12	13	14	15	16	17	18	19	20	21	22	
	15	13	14	15	16	17	18	19	20	21	22	23	
	16	14	15	16	17	18	19	20	21	22	23	24	
	17	15	16	17	18	19	20	21	22	23	24	25	
	18	16	17	18	19	20	21	22	23	24	25	26	
	19	17	18	19	20	21	22	23	24	25	26	27	
	20	18	19	20	21	22	23	24	25	26	27	28	
	21	19	20	21	22	23	24	25	26	27	28	29	
	22	20	21	22	23	24	25	26	27	28	29	30	

Note: Circles indicate factory default TX & Rx gain settings, combined gain and resulting performance

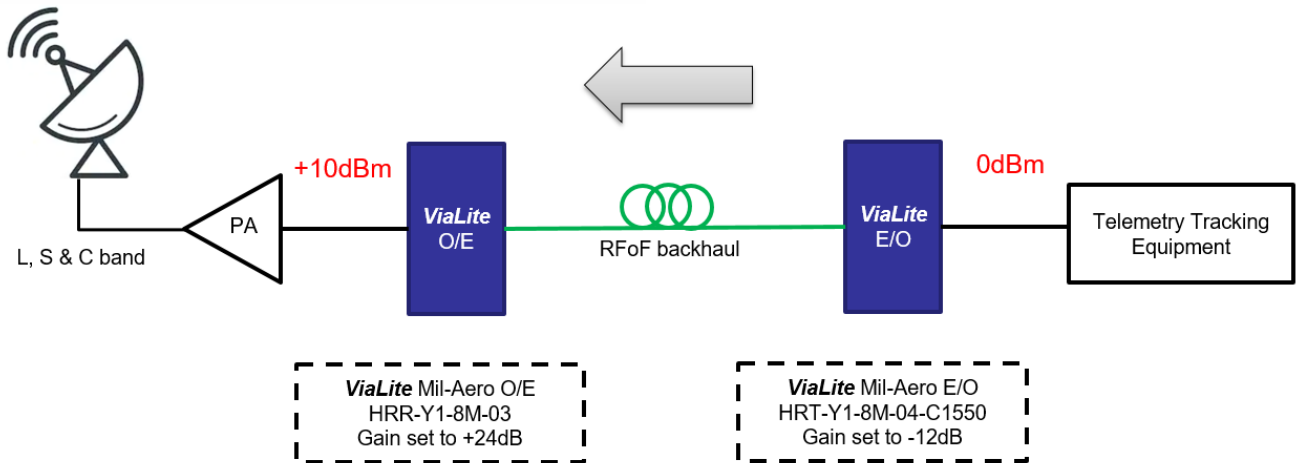
Example application – Mil-Aero Boresight & Telemetry

Telemetry antenna* used for tracking and collecting flight test instrumentation data from various types of test articles including manned aircraft, missile and drone. Frequencies used P, L, S & C-band through to 5150 MHz. The signals are received through these antenna systems and sent to mission control rooms through RF over Fiber (RFoF) backhaul network, where it is then analyzed and recorded.

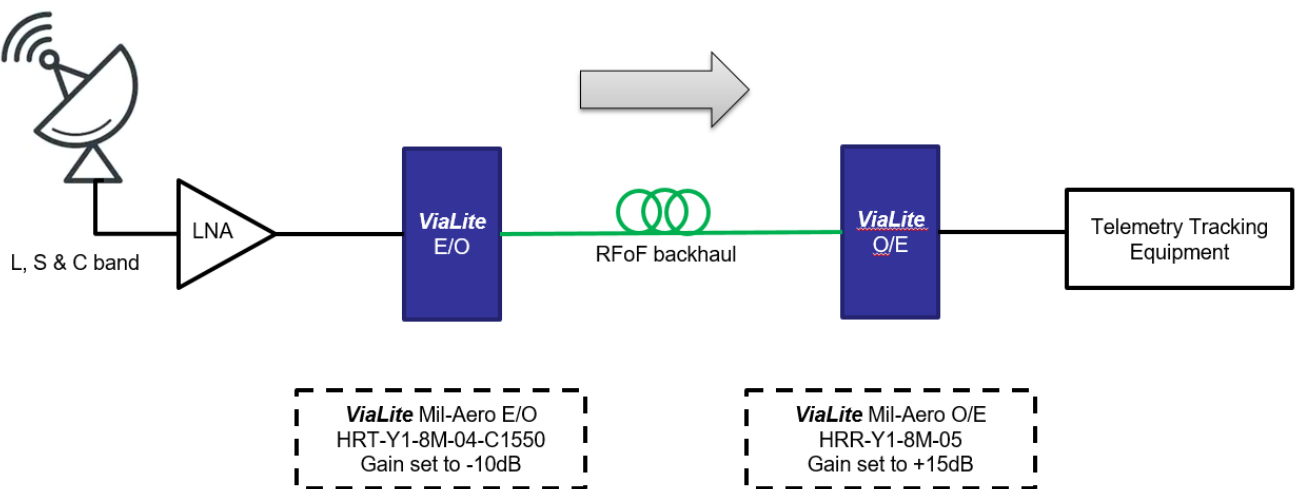
*Also referred to as Boresight Testing – narrow radio beam created by a parabolic antenna.



- RFoF technical requirements:
- Optimized uplink high output power with high input signal
 - Optimized downlink for wide dynamic range due to multiple moving targets
 - Low output harmonics
 - Excellent linearity operational range
 - Adjustment for neutral / positive gain



RFoF example application – Mil-Aero Boresight & Telemetry, Uplink



RFoF example application – Mil-Aero Boresight & Telemetry, Downlink