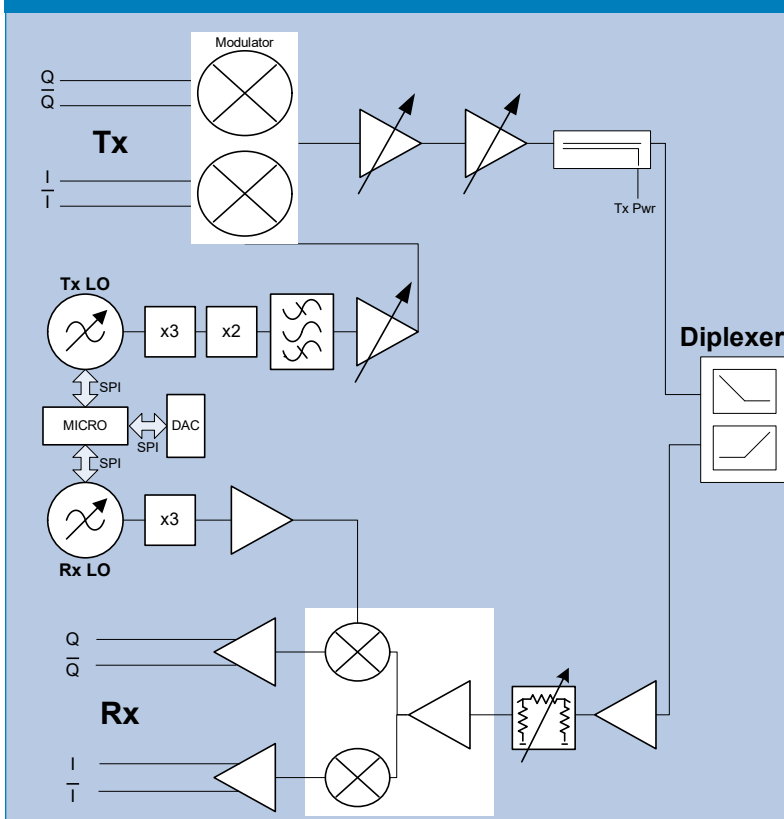




## Features

- Fully integrated 71-76 to 81-86 GHz TRx modules
- Reconfigurable architecture with options up to 27dBm  $P_{SAT}$
- Supports >2GHz channel bandwidth
- Low phase noise  $-112\text{dBc}/\text{Hz}$  at 1MHz
- Supports up to 512QAM modulation
- Integrated Diplexer
- Single T/R port for antenna interface
- Single connector for modem interface
- 100% calibrated & tested
- Compact low mass form factor

Morpheus II transceiver block diagram



## Description

Morpheus II E-Band transceiver modules provide a turn-key solution for carrier grade mobile XHaul applications. Each module contains all the transmit and receive link functions necessary for the RF section of an E-Band link and provides a simple connection to a high data rate full duplex modem. The integrated diplexer connects directly to an antenna of choice via a standard WR12 interface. Internal, low phase noise VCOs are settable via an SPI interface in 31.25MHz steps to support ECC/ITU channel arrangements.

- Proven system performance
  - 10 Gbps demonstrated with spectral efficient 256QAM modulation.
- Field proven technology
  - tens of thousands of Filtronic millimetre wave transceivers deployed worldwide.

Morpheus II modules are designed for easy incorporation into ODUs for rapid time to market with minimal customer engineering resource.

### TA408 Outline Specification

Over Baseplate operating temperature -33 to +75C  
 All RF parameters referenced to antenna port  
 (inclusive of diplexer loss)

Function	Tx Mode*	Parameter	Min	Typ	Max	Units	
Transmitter	Standard	Tx Frequency	71		76	GHz	
		Tx Power control range	-4		16		
		Output IP3 @ 16dBm		34		dBm	
	Enhanced	Tx Power control range	-4		25	dBm	
		Output IP3 @ 20dBm		35		dBm	
		P <sub>SAT</sub>		27		dBm	
		Tx ALC accuracy	-2		2	dB	
		Tx LO Cancellation		-30		-5	dBc
		Tx Sideband suppression		-40		-20	dBc
		Tx Baseband input power	-15		-5	dBm	
		I/Q Gain imbalance	-3		+3	dB	
		I/Q Phase imbalance	-7		+7	degrees	
		I/Q impedance - differential		100		Ohms	
Receiver		Rx Frequency	81		86	GHz	
		Rx Noise Figure (High gain mode)		8	10	dB	
		Rx Gain in High gain mode	22	25	28	dB	
		Rx Gain in Low gain mode	14.5	17.5	20.5	dB	
		Rx Gain accuracy reported over SPI	-1.5		+1.5	dB	
		RF input power			-23	dBm	
		Input IP3 in Low gain mode	-10	-7		dBm	
		I/Q Gain imbalance	-3		+3	dB	
		I/Q Phase imbalance	-10		+10	degrees	
Both		Phase Noise @ 100KHz			-89	dBc/Hz	
		Phase Noise @ 1MHz			-112	dBc/Hz	
		LO frequency step	31.25			MHz	

\* Software configurable Tx power enhancement option extends capabilities of Morpheus II transmitter

### Power Supplies

Voltage (V)	Max Current (mA)	Tolerance (±)	Abs' max voltage (V)
5.1	3000	2%	5.5
3.3	160	2%	3.6
2.8	300	2%	3.0
18	25	2%	20
-5	50	2%	-5.5

### TA409 Outline Specification

Over Baseplate operating temperature -33 to +75C  
 All RF parameters referenced to antenna port  
 (inclusive of diplexer loss)

Function	Tx Mode*	Parameter	Min	Typ	Max	Units	
Transmitter	Standard	Tx Frequency	81		86	GHz	
		Tx Power control range	-4		16		
		Output IP3 @ 16dBm		33		dBm	
	Enhanced	Tx Power control range	-4		25	dBm	
		Output IP3 @ 20dBm		34		dBm	
		P <sub>SAT</sub>		26		dBm	
		Tx ALC accuracy	-2		2	dB	
		Tx LO Cancellation		-30		-5	dBc
		Tx Sideband suppression		-40		-20	dBc
		Tx Baseband input power	-15		-5	dBm	
		I/Q Gain imbalance	-3		+3	dB	
		I/Q Phase imbalance	-7		+7	degrees	
		I/Q impedance - differential		100		Ohms	
Receiver		Rx Frequency	71		76	GHz	
		Rx Noise Figure (High gain mode)		7	10	dB	
		Rx Gain in High gain mode	22	25	28	dB	
		Rx Gain in Low gain mode	14.5	17.5	20.5	dB	
		Rx Gain accuracy reported over SPI	-1.5		+1.5	dB	
		RF input power			-23	dBm	
		Input IP3 in Low gain mode	-10	-7		dBm	
		I/Q Gain imbalance	-3		+3	dB	
		I/Q Phase imbalance	-10		+10	degrees	
Both		Phase Noise @ 100KHz			-89	dBc/Hz	
		Phase Noise @ 1MHz			-112	dBc/Hz	
		LO frequency step	31.25			MHz	

\* Software configurable Tx power enhancement option extends capabilities of Morpheus II transmitter

### Power Supplies

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-5	50	2%	-5.5

## Connector pin out

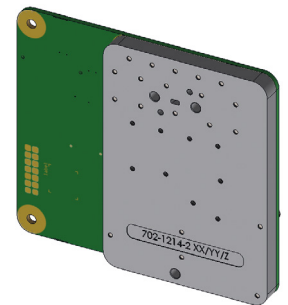
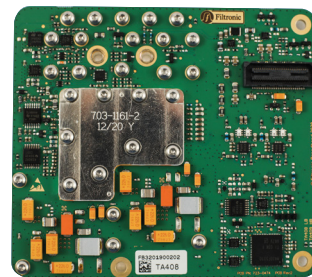
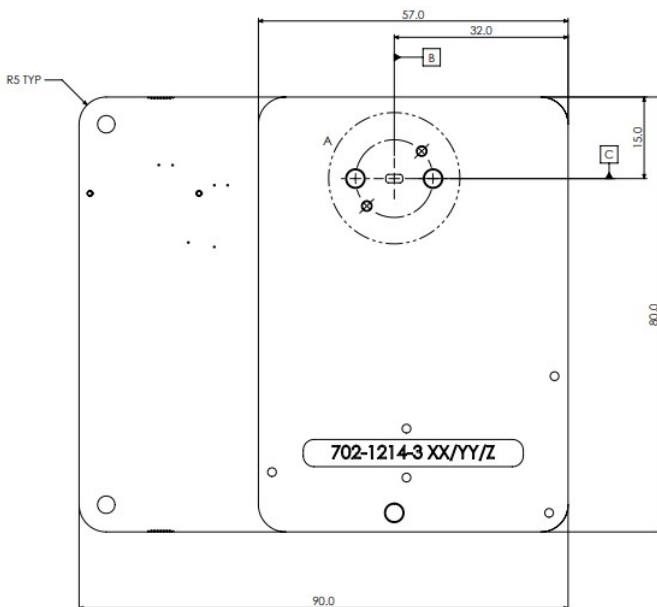
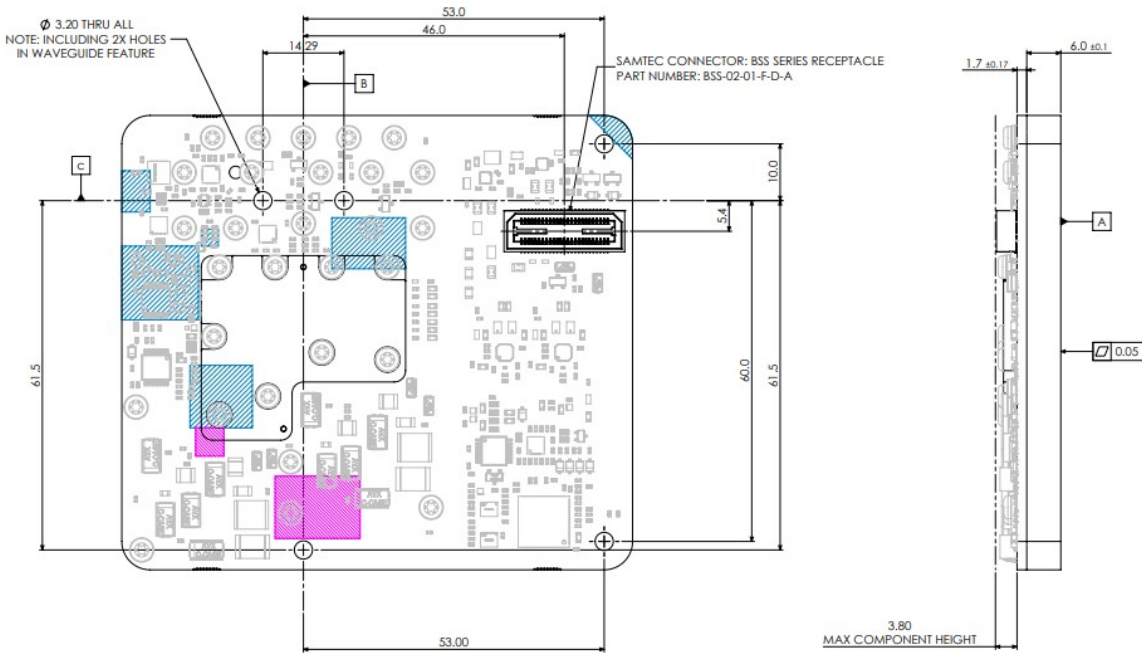
The interface between the Filtronic E-band Module and the customer modem is a single 50-way connector. This connector is used for all communication between the module and modem; DC power, baseband data and control signals.

Pin number	Description	Description	Pin number
1	5.1V	5.1V	2
3	5.1V	5.1V	4
5	GND	GND	6
7	GND	GND	8
9	-5V	3.3V	10
11	GND	3.3V	12
13	18V	GND	14
15	GND	GND	16
17	GND	2.8V	18
19	GND	2.8V	20
21	GND	GND	22
23	GND	GND	24
25	GND	Txl	26
27	Rxlbar	GND	28
29	GND	Txlbar	30
31	Rxl	GND	32
33	GND	TxQ	34
35	RxQ	GND	36
37	GND	TxQbar	38
39	RxQbar	GND	40
41	GND	GND	42
43	GND	RST-SBWD	44
45	Spare	SPL_CS_RFM	46
47	Connected	SPL_MOSI	48
49	SPL_CLK	SPL_MISO	50

## Environmental

Parameter	
Operating Temperature	-33 to 75 °C
Storage Temperature	-45 to +80 °C
Mechanical shock and vibration	ETS 300 019-2-4 Class 4M3
MTBF	>106 Hours (per Bellcore TR-332 with ambient temperature of +40oC)
ROHS & REACH	COC for ROHS & REACH Compliance available

## Mechanical Outline



Other hardware configurations also available.

Custom adapters can be provided for all popular antennas.

OMT and Polariser options for XPIC applications may also be provided.

### Contact Us

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