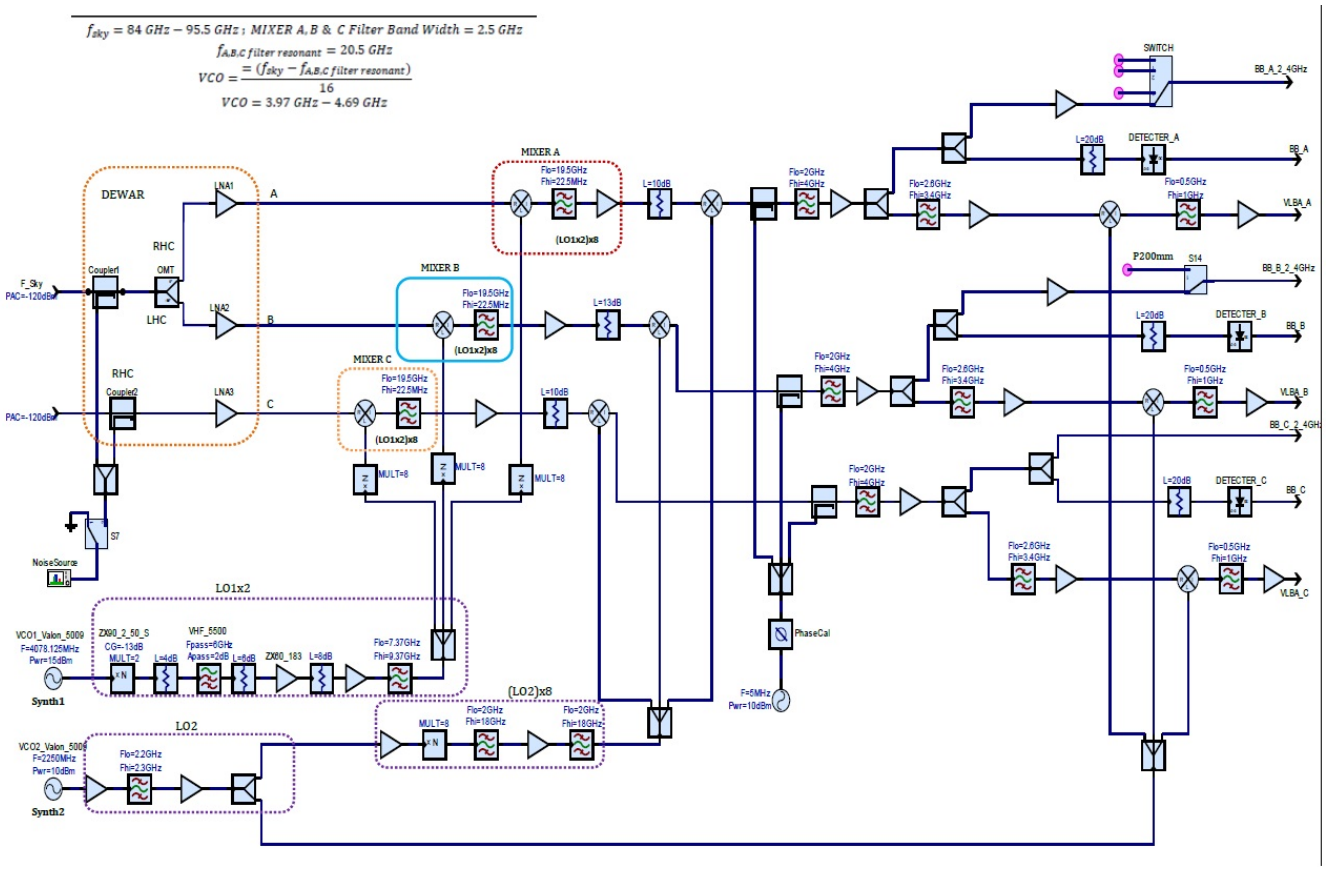
Technical Documentation of the 3mm Receiver 84 - 96 GHz (P3mm)

Type	HEMT cooled		
Channels	3		
Receiver Noise Temperature	Channel A	Channel B	Channel C
→	85K	100K	135K
Bandwidth RF-Filters	No RF Filter	No RF Filter	No RF Filter
Polarization	Horn I	Horn I	Horn II
→	LHC (Channel A)	RHC (Channel B)	LHC (Channel C)
Calibration		Noise diode and pulse cal injection in IF	
Feed		Primary fokus horns	
RF Frequency Range	84-96 GHz		
Synthesizers	Valon 5009	Valon_VC01=3937.5 - 4687.5 MHz	
Local Oscillators	→	LO1=16*(3937.5 - 4687.5) MHz = 63-75 GHZ	
1.IF Frequency	19.5 - 22.5 GHz		
Synthesizers	Valon 5009	LO2=2250 MHz	
Local Oscillators	→	8*LO2=8*2250MHz=18GHz	
2.IF Frequency	2-4GHz		
Local Oscillators	→	LO2=2250MHz	
3.IF Frequency	0.5-1.0GHz		

Block Diagram

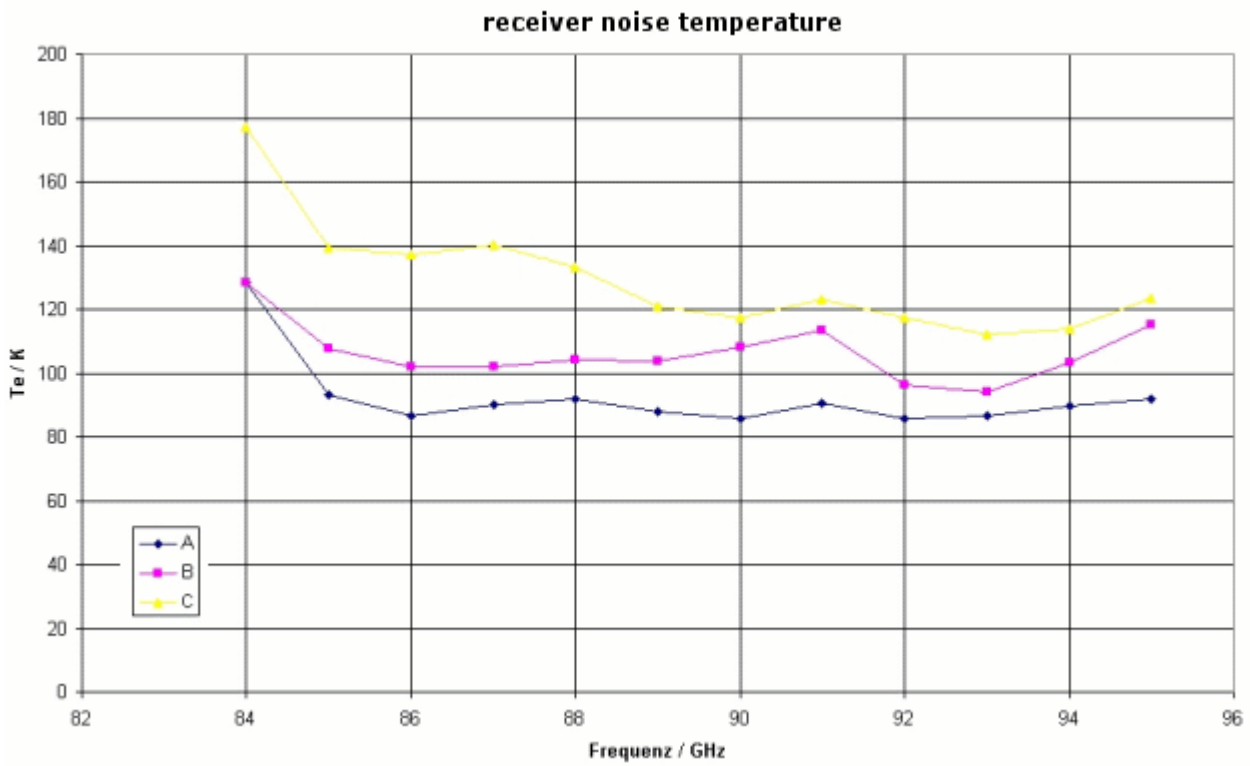


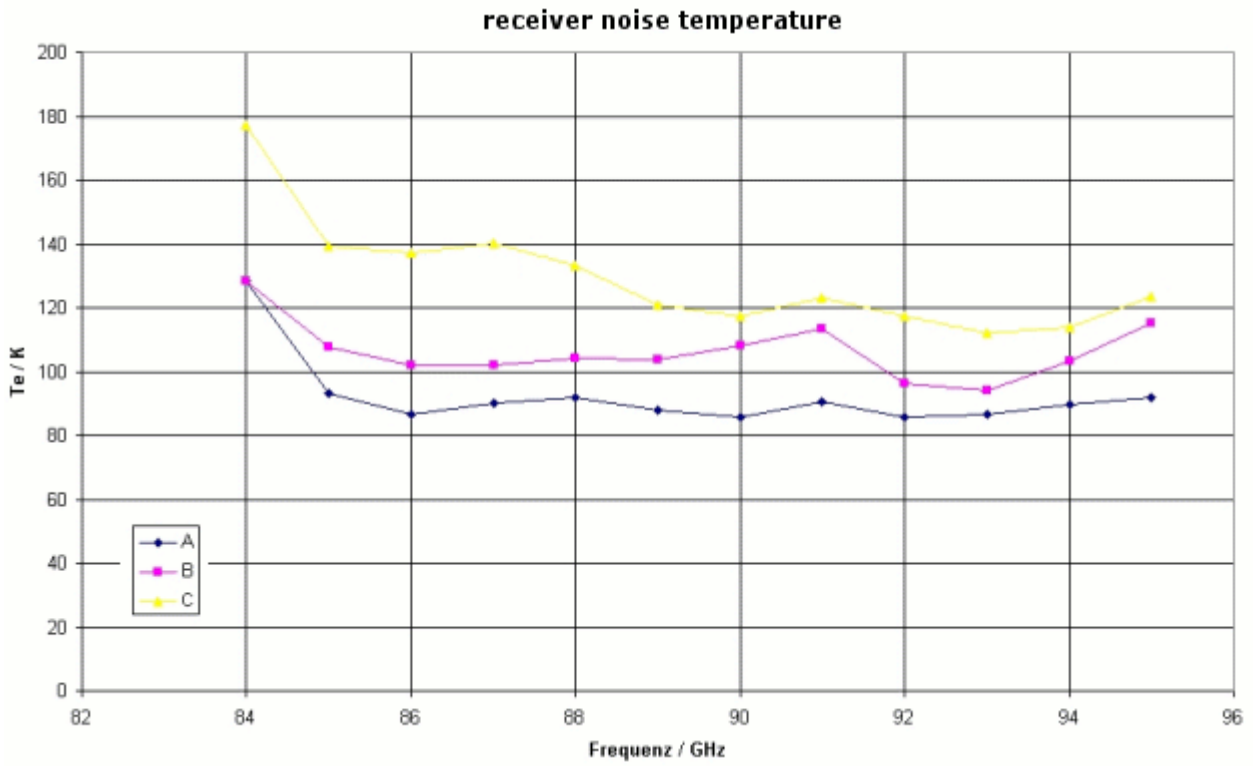
ULO Frequencies:

> fLO1 = (fskyâ□□ 21,0 GHz) / 16

> fLO2 = 2250MHz
>
> Simplified Block Diagram of 3mm_receiver_modified.pdf the complete receiver, (ZMK on 16.08.2019)
>
> Simplified Block Diagram of3mm_block_diagram_second_version.pdf (RK on 15.08.2019)
>
> Local Frequency Generation for 3mm Receiver using a Valon 5009 Dual Frequency
>
> Synthesizerprotocol_of_new_oul1_generation_for_3mm_receiver.pdf
>
> Valon5009 synthesizerâ□□s Frequency Response Consideration valon5009_frequency_response.pdf

Charts





Comments

This is a tunable single sideaband superheterodyne system fo line and total power observations. For frequency dependent receiver and calibration temperatures see diagramm below. The Receiver provides two horns for beam switching. The geometric distance of the horns is d = 9,7 mm, the beam seperation at sky is 55 Arcsec.

This system is part of the Primary Focus Multi Frequency Box #1 (PM 1).