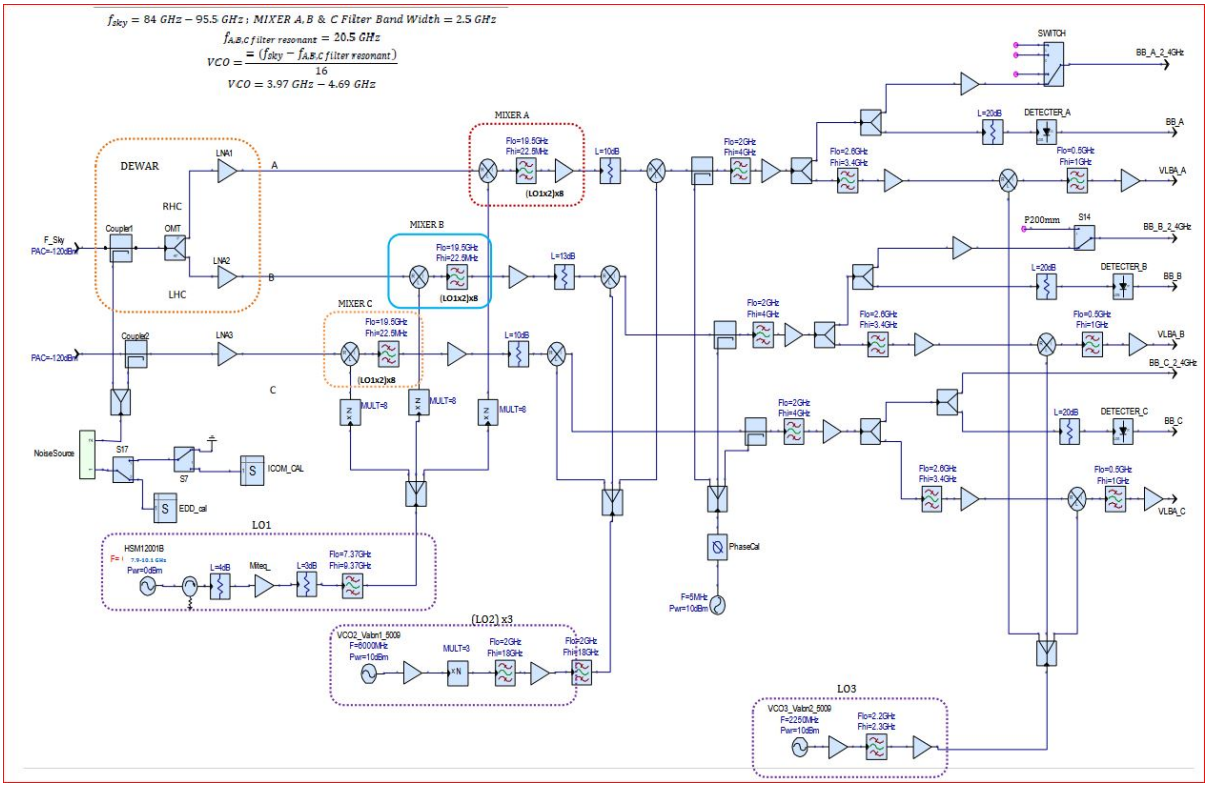
Technical Documentation of the 3mm Receiver 84 - 96 GHz (P3mm)

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		
1. IF Frequency	19.5 - 22.5 GHz		
1. Synthesizer	Holzworth HSM12001	Frequency = 7875.0 - 9375.0 MHz (f0 = 8156.25 MHz)	
Local Oscillator 1	→	LO1=8*(7875.0 - 9375.0) MHz = 63-75 GHZ	
2. IF Frequency	2-4GHz		
2. Synthesizer	Valon 5009, Synth. 1	f0=6000 MHz	
Local Oscillators	→	LO2=3*6000 MHz = 18 GHz	
3.IF Frequency	0.5-1.0 GHz		
3. Synthesizer	Valon 5009, Synth. 2	f0=2250 MHz	
Local Oscillators	→	LO3=2250 MHz	

Block Diagram



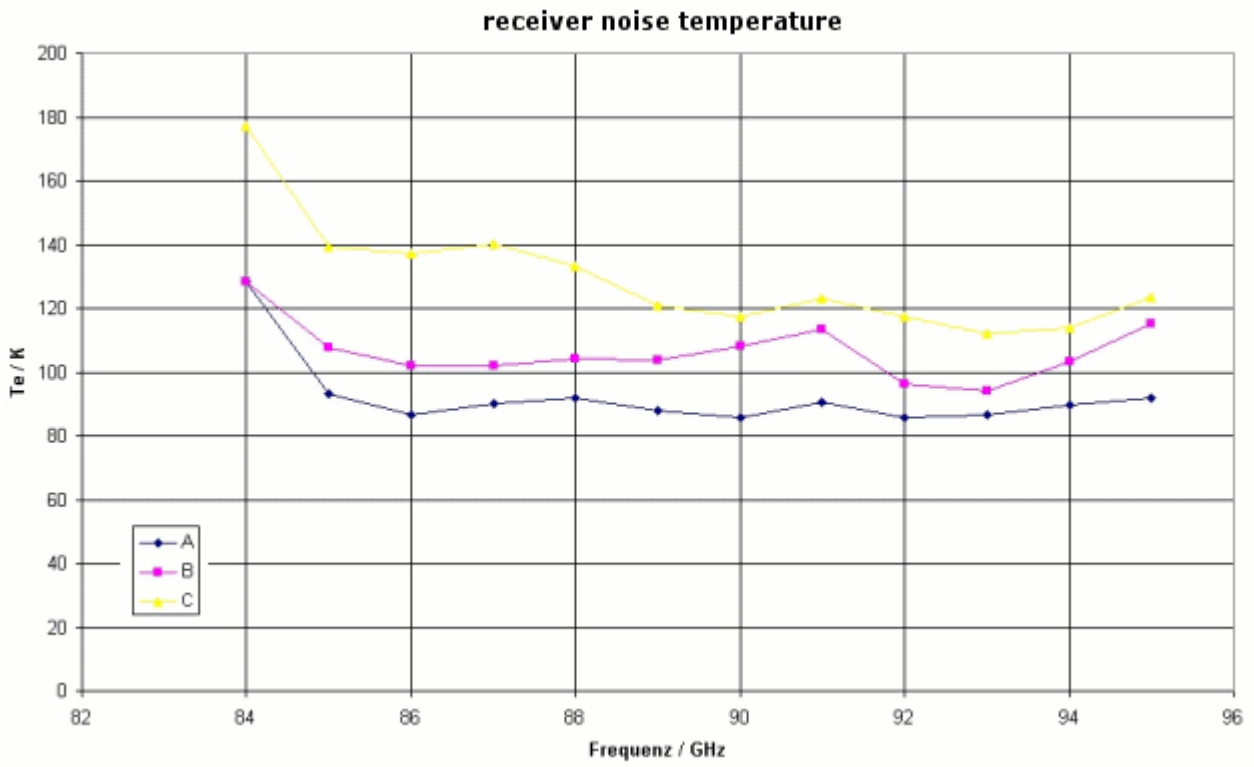
ULO Frequencies:

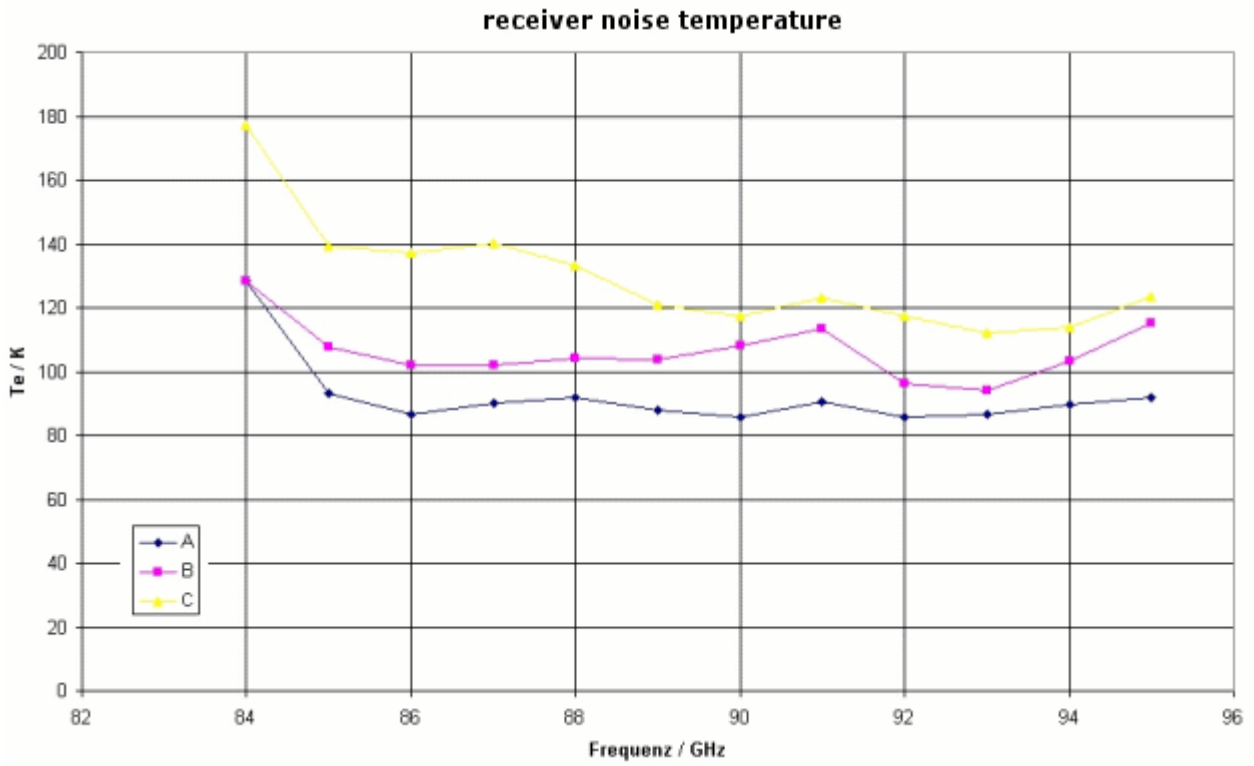
> fLO1 = (fsky– 21,0 GHz) / 16
> fLO2 = 2250MHz
>
> Simplified Block Diagram of the complete receiver,
> 3mm_receiver_hsm_valon.pdf
> (RK on 21.09.2021)
>
> Simplified Block Diagram
> (alternative design)
> (RK on 21.09.2021)
>
> Local Frequency Generation for 3mm Receiver using Holzworth HSM12001B Synthesizer

holzworth_as_lo.pdf

> Local Frequency Generation for 3mm Receiver using a Valon 5009 Dual Frequency
>
> Synthesizerprotocol_of_new_oul1_generation_for_3mm_receiver.pdf
>
> Valon5009 synthesizer'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).

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