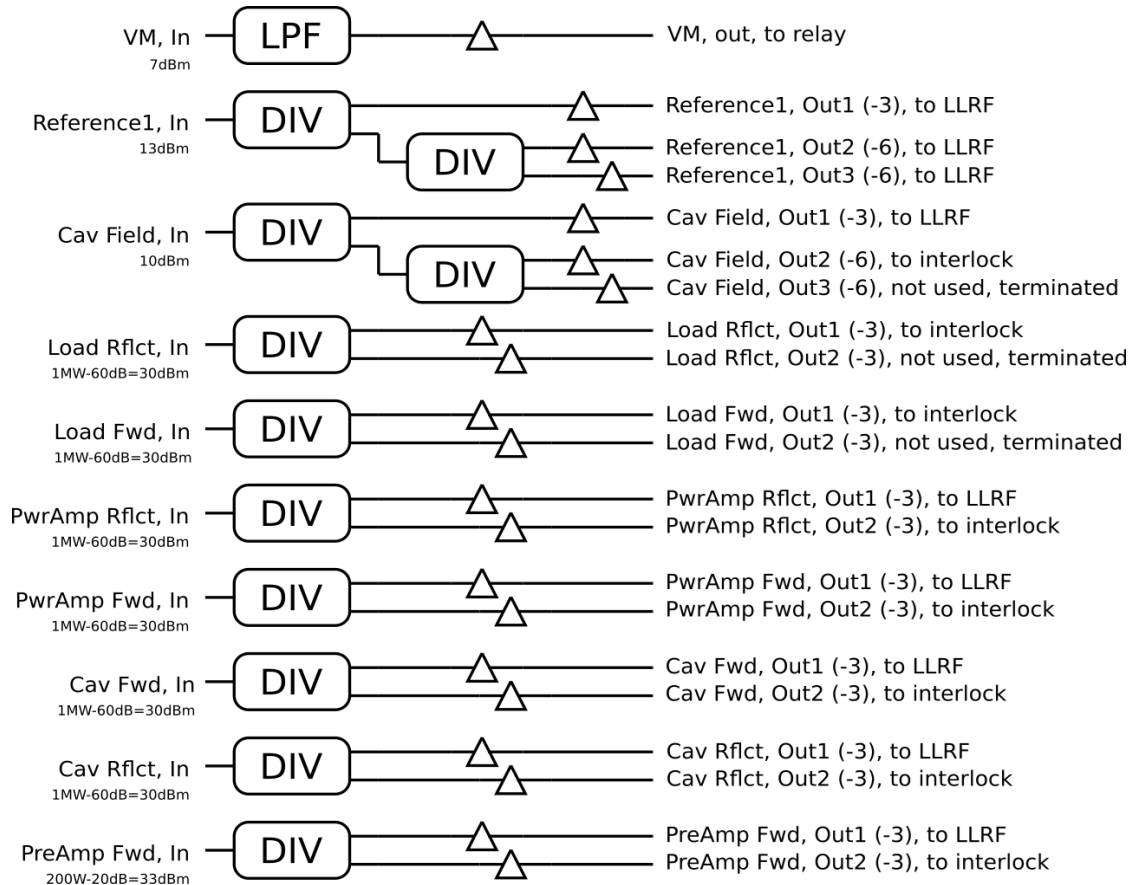


RF SplitBox CDR

Kamil Sapor
Institute of Electronic Systems
25.04.2018, Lund

Block Diagram



Main requirements

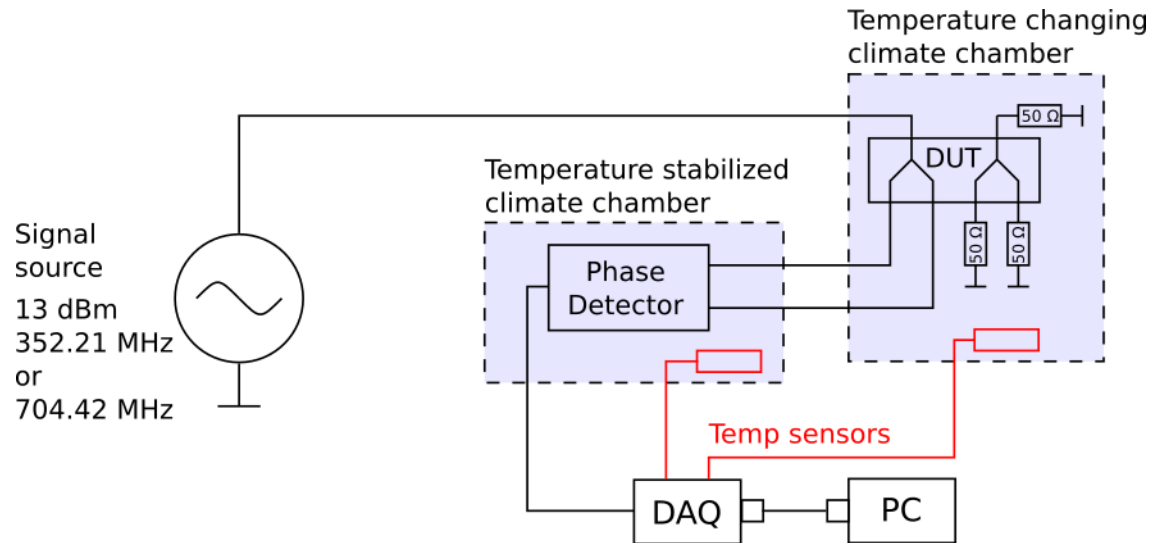
Requirement	Value
Signal Frequency (F_0)	352.21 MHz or 704.42 MHz
Maximum phase drift between paths: <ul style="list-style-type: none"> • Cavity Field In to Cavity Field Out 1 • Reference In to Reference Out 2 	0.02° change from 22 to 27°C (0.004°/°C)
Isolation (Common Inputs)	10 dB
Isolation (Different Inputs)	75 dB
VM Filter Attenuation: <ul style="list-style-type: none"> • F_0 • $2 \times F_0$ • $3 \times F_0$ • $4 \times F_0$ • $5 \times F_0$ • $6 \times F_0$ 	<div>< 2 dB</div> <div>> 35 dB</div> <div>> 40 dB</div> <div>> 40 dB</div> <div>> 40 dB</div> <div>> 30 dB</div>

Components selected

- Power Splitter:
 - Mini Circuits GP2S1+
- VM filter
 - 352.21 MHz : Mini Circuits LFCN-320 +
 - 704.42 MHz : Mini Circuits LFCN-630 +

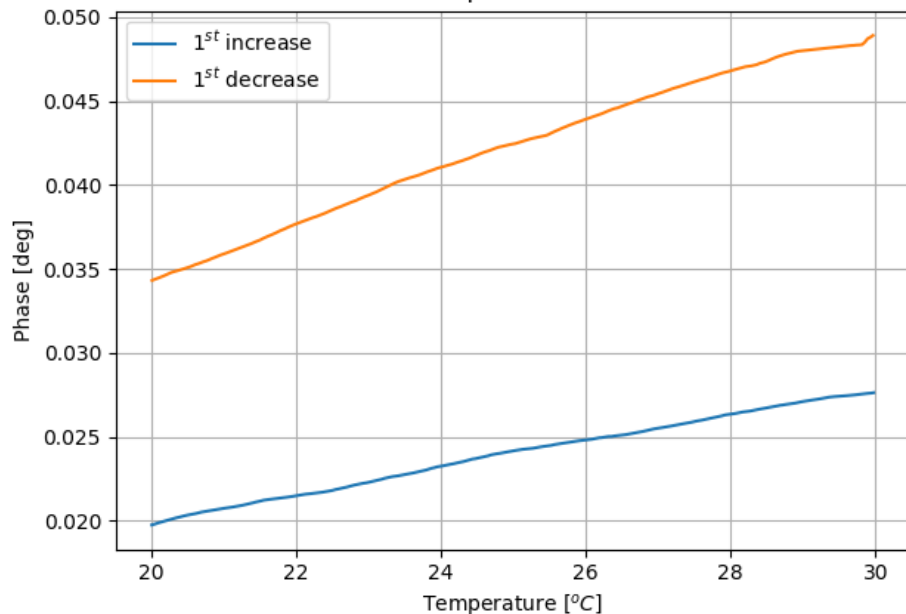
Frequency	Requirements	LFCN-320+ ($F_0 = 352.21$ MHz)	LFCN-630+ ($F_0 = 704.42$ MHz)
F_0	< 2 dB	~ 1 dB	~ 1 dB
$2 \times F_0$	> 35 dB	~ 40 dB	~ 48 dB
$3 \times F_0$	> 40 dB	~ 45 dB	~ 72 dB
$4 \times F_0$	> 40 dB	~ 45 dB	~ 51 dB
$5 \times F_0$	> 40 dB	~ 55 dB	~ 44 dB
$6 \times F_0$	> 30 dB	~ 72 dB	~ 36 dB

Power Splitters Measurements – Test #1

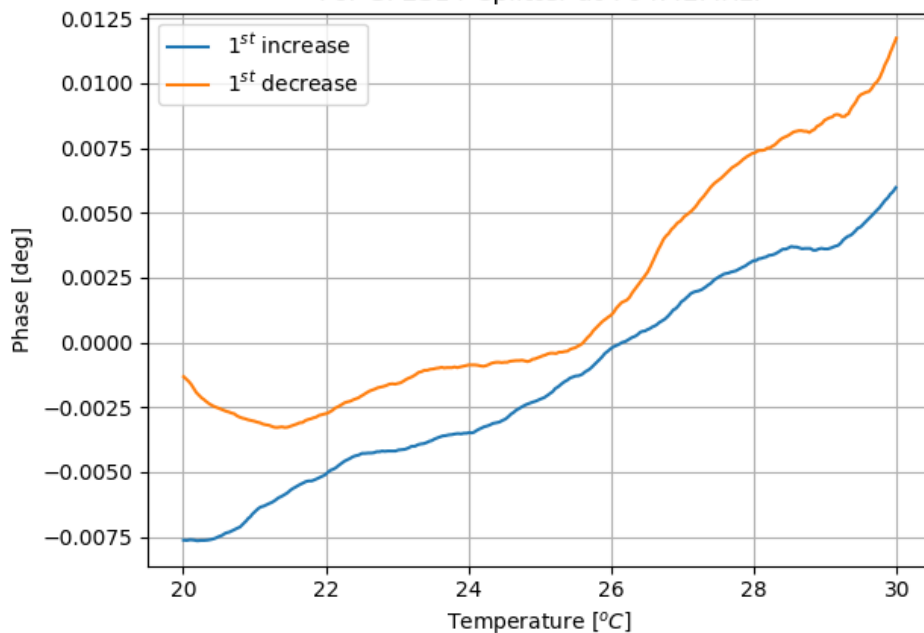


Power Splitters Measurements – Test #1

Phase difference over temperature.
For GP2S1+ splitter at 352.21MHz.

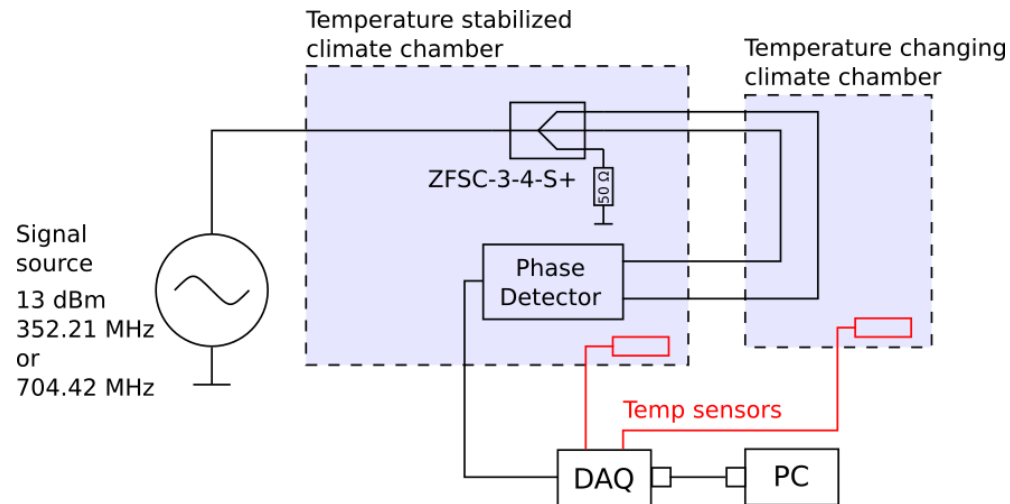
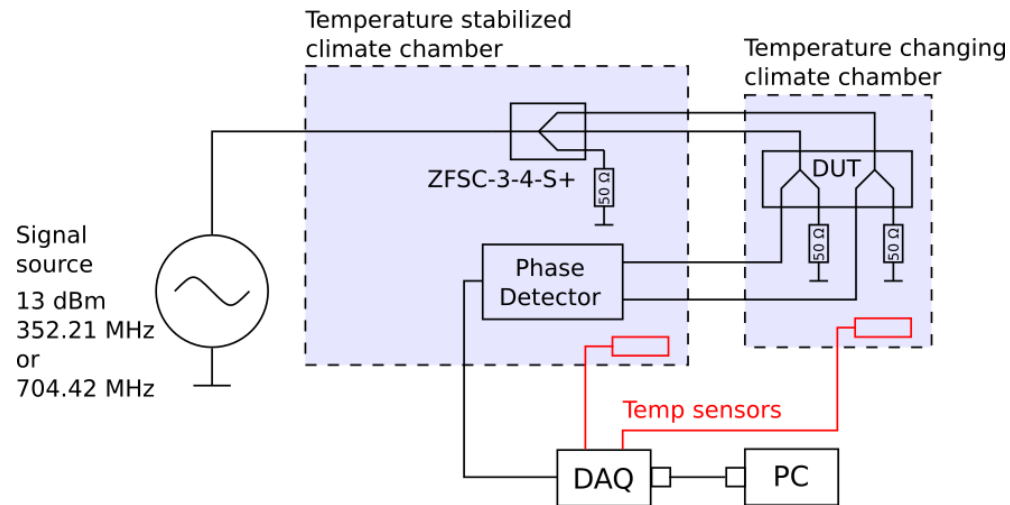


Phase difference over temperature.
For GP2S1+ splitter at 704.42MHz.

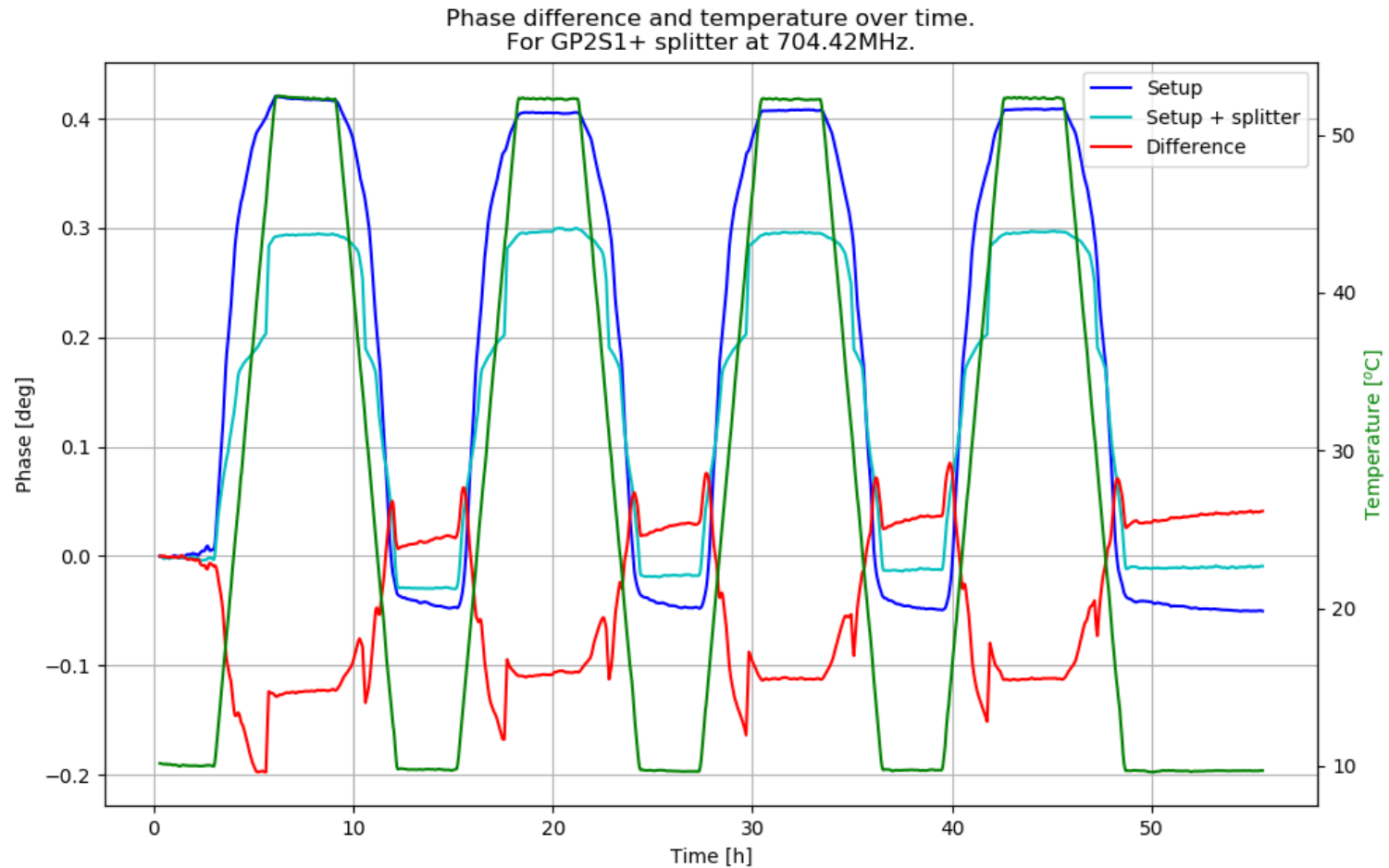


Frequency [MHz]	Mean linear regression slope [°/°C]	Allowed maximum phase drift [°/°C]
704.42	0.0014	0.004
352.21	0.0012	

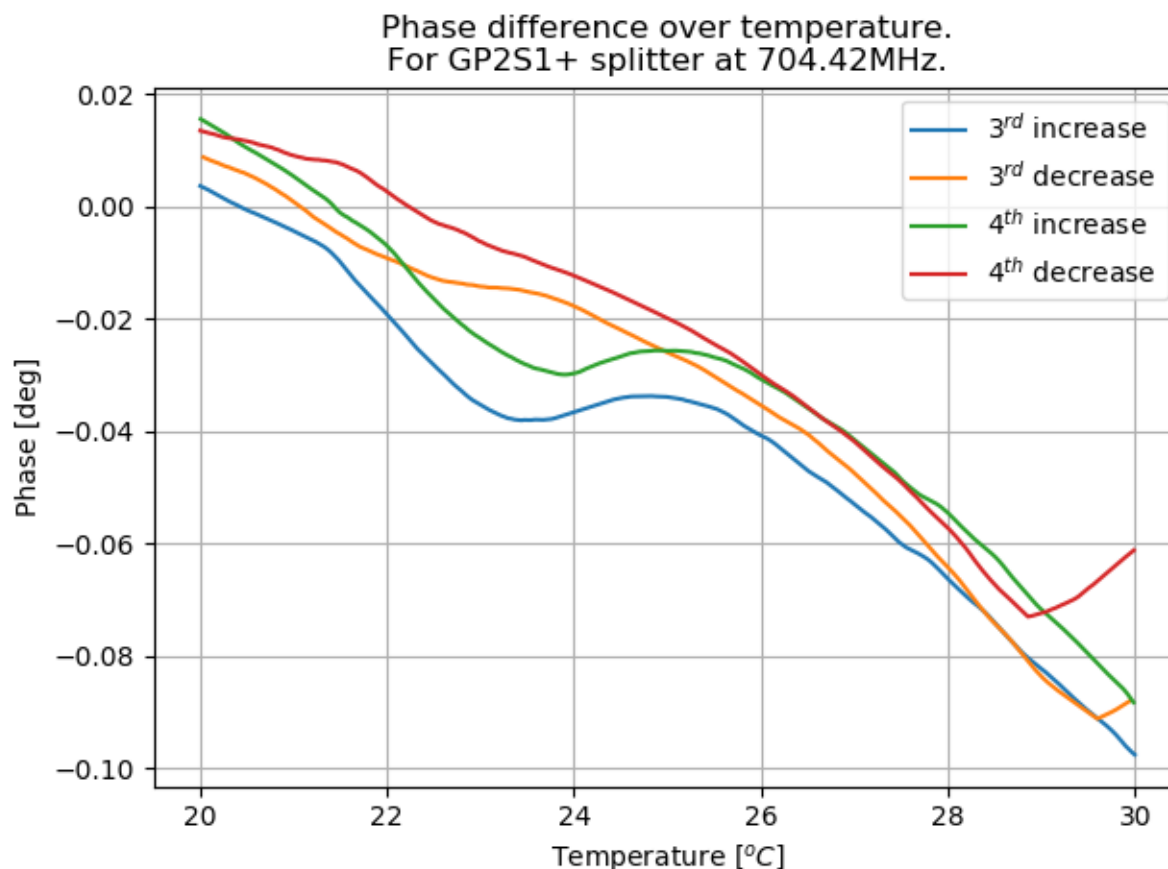
Power Splitters Measurements – Test #2



Power Splitters Measurements – Test #2

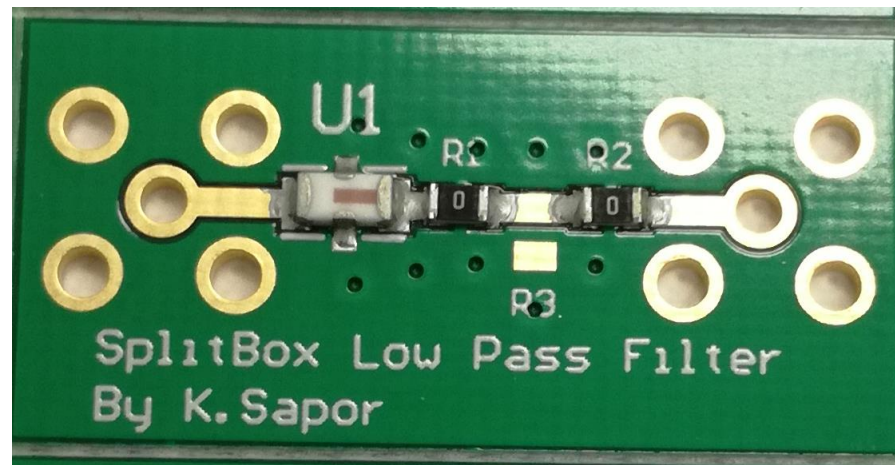
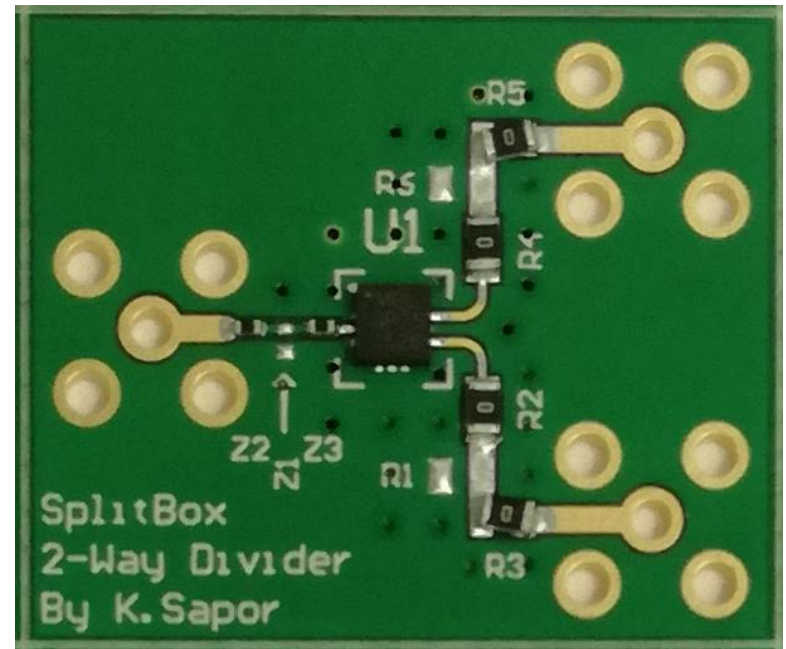
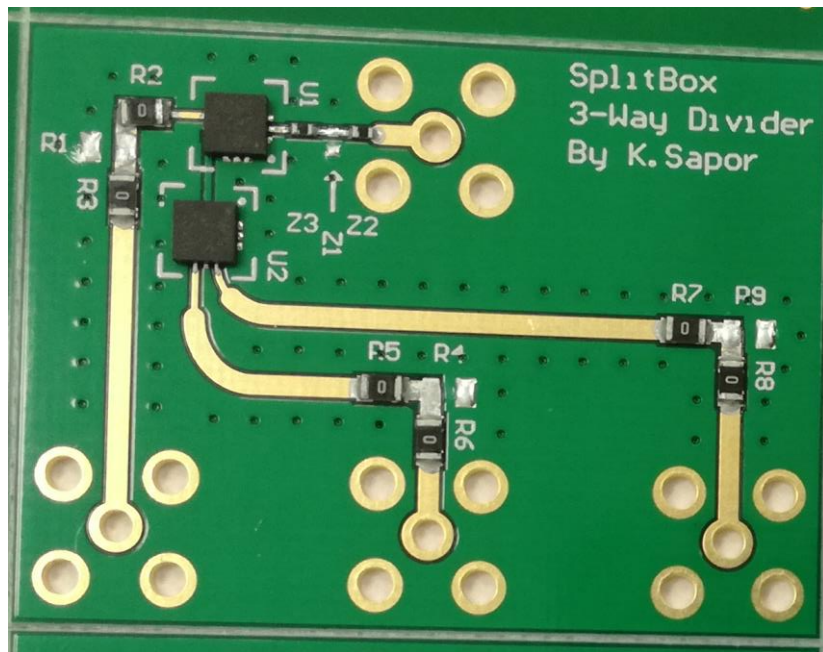


Power Splitters Measurements – Test #2

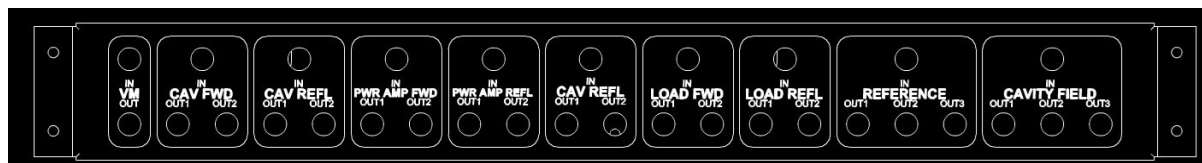
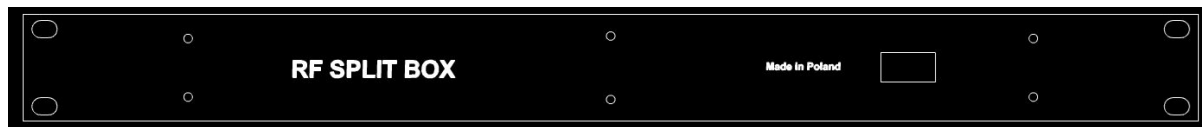
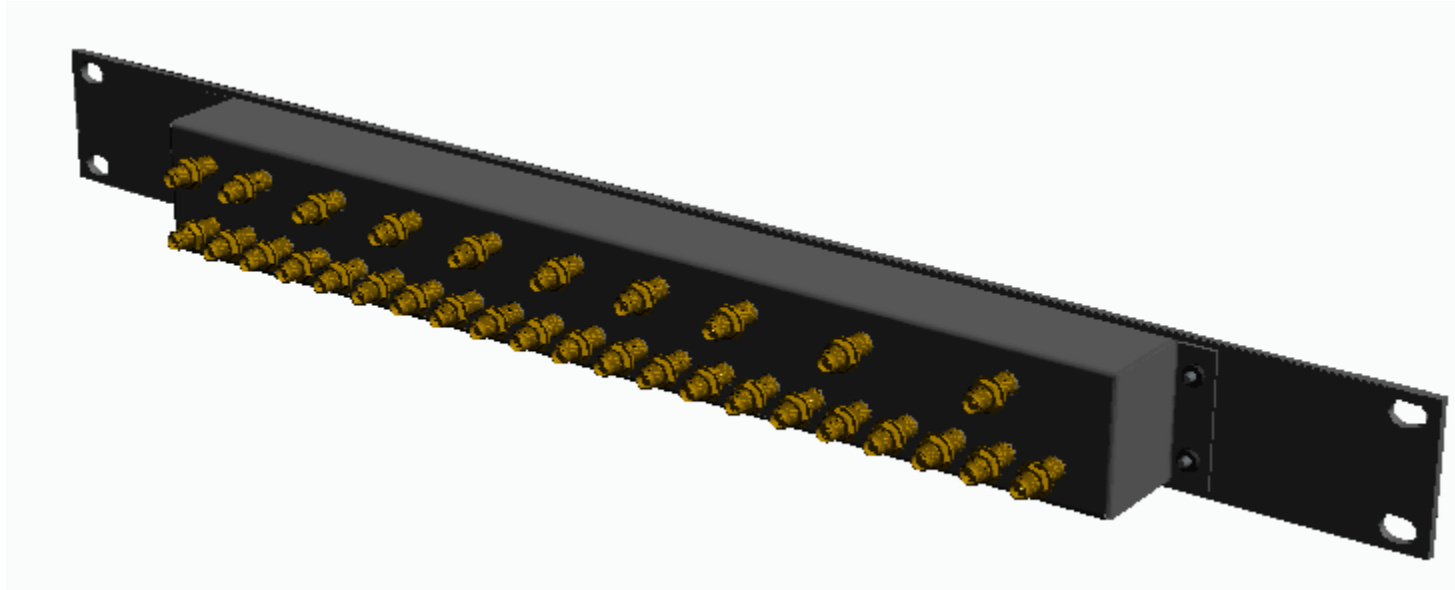


Frequency [MHz]	Mean linear regression slope [°/°C]	Allowed maximum phase drift [°/°C]
704.42	-0.0091	0.004

Electronic Submodules



Mechanical design



Status and Schedule

- The PCBs for first prototype were manufactured.
- The mechanical design needs to be revised.

Activity	End Date	Comment
Prototype boards measurements	10.06.2018	
Revised mechanical design	31.05.2018	
Delivery of first batch	31.07.2018	Should be postponed by at least 2 months.
Delivery of second batch	28.02.2021	The second batch will be manufactured just after first batch and will be stored at PEG permises

Summary

- The main aspects of the design were presented.
- The prototype boards were manufactured.
- The phase drifts of the power splitters were measured – further investigation is needed.
- The mechanical design need to be revised.

Thank you