BRNO UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF RADIO ELECTRONICS Technicka 3082/12 616 00 Brno Czech

Interreg
EUROPÄISCHE UNION
Österreich-Tschechische Republik
Europäischer Fonds für regionale Entwicklung

GroundCom (SME) HPA and AWR

Tomas Gotthans, Jakub Gotthans

29.7.2021

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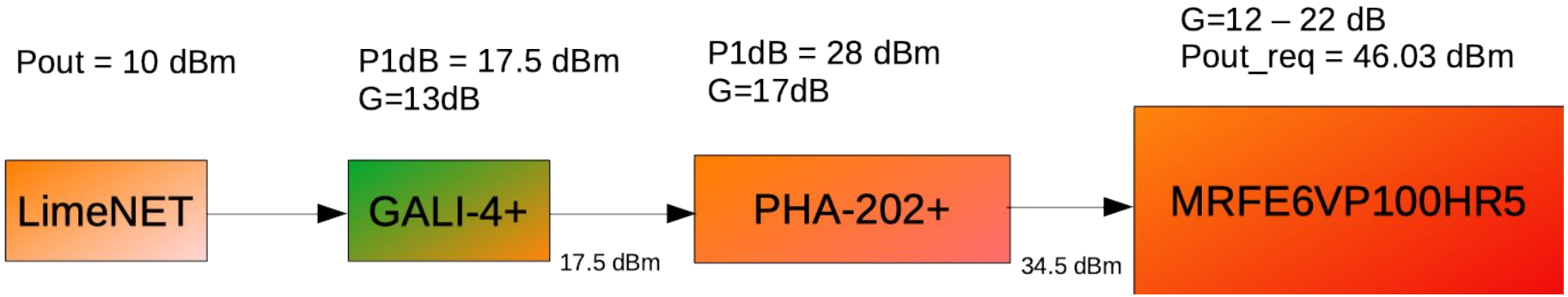
TU WIEN TECHNISCHE UNIVERSITÄT WIEN Vienna | Austria
FH OBERÖSTERREICH UNIVERSITY OF APPLIED SCIENCES UPPER AUSTRIA

Groundcom HPA Requirements

Design HPA for VHF and UHF

Max. Tx power [W]	40W
RF bandwidth UHF	435-438 MHz
RF bandwidth VHF	144-146 MHz



Groundcom HPA Simulation issues

Design HPA for VHF and UHF

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RF bandwidth UHF	435-438 MHz
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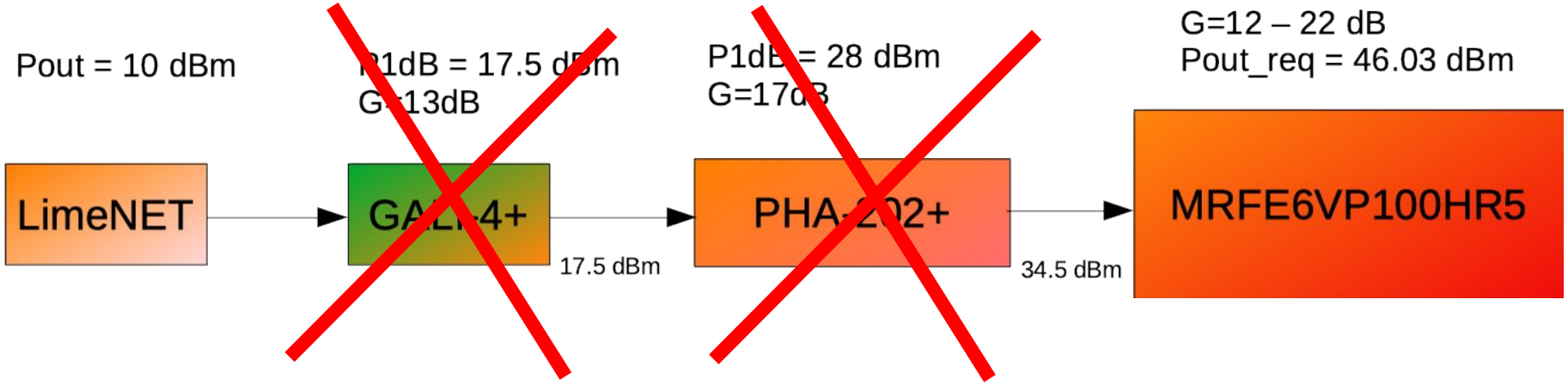
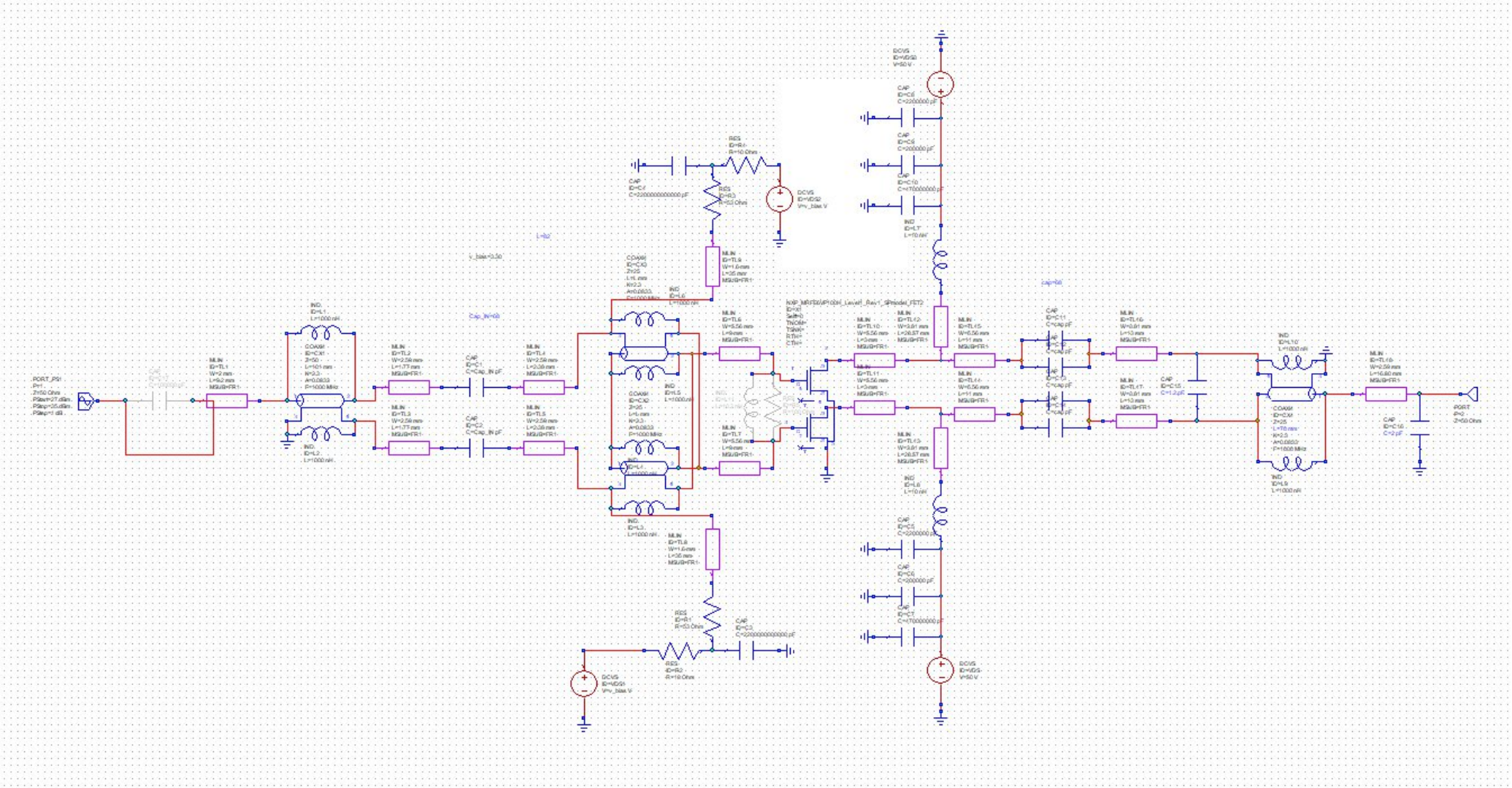
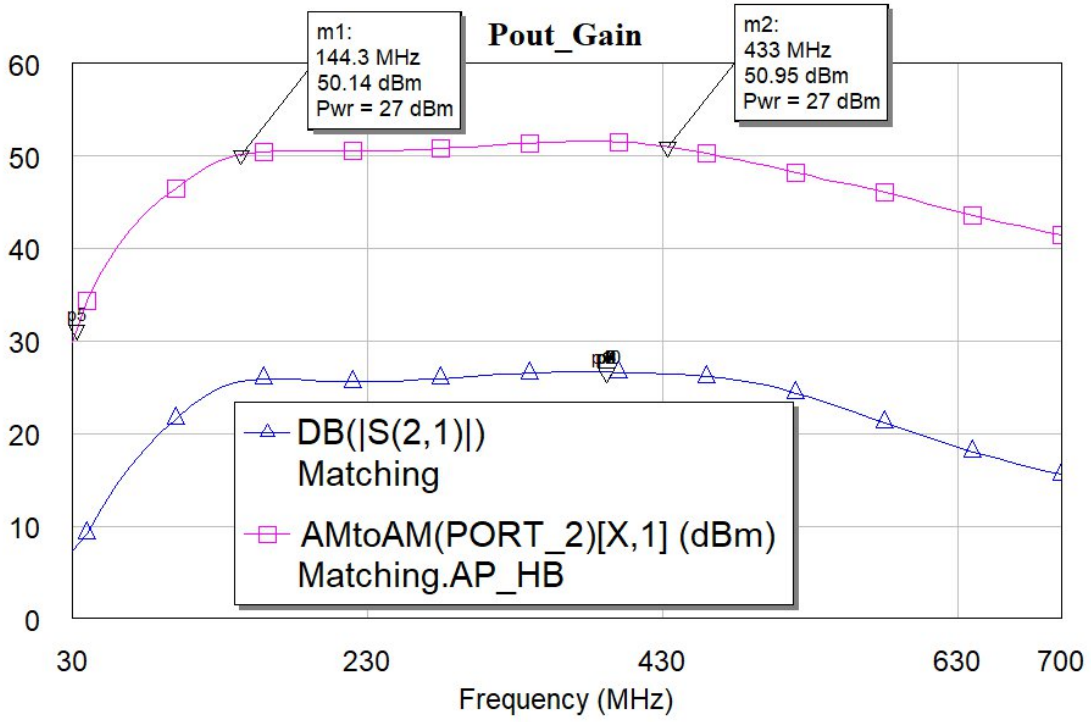
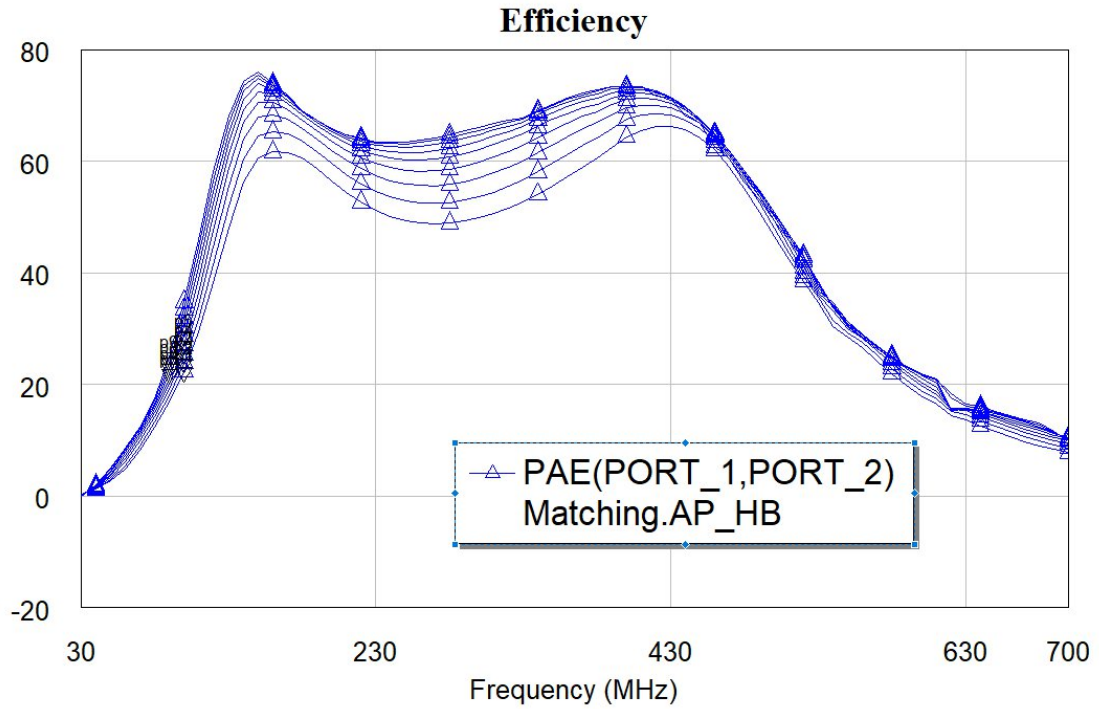


HPA AWR Design



HPA AWR Design





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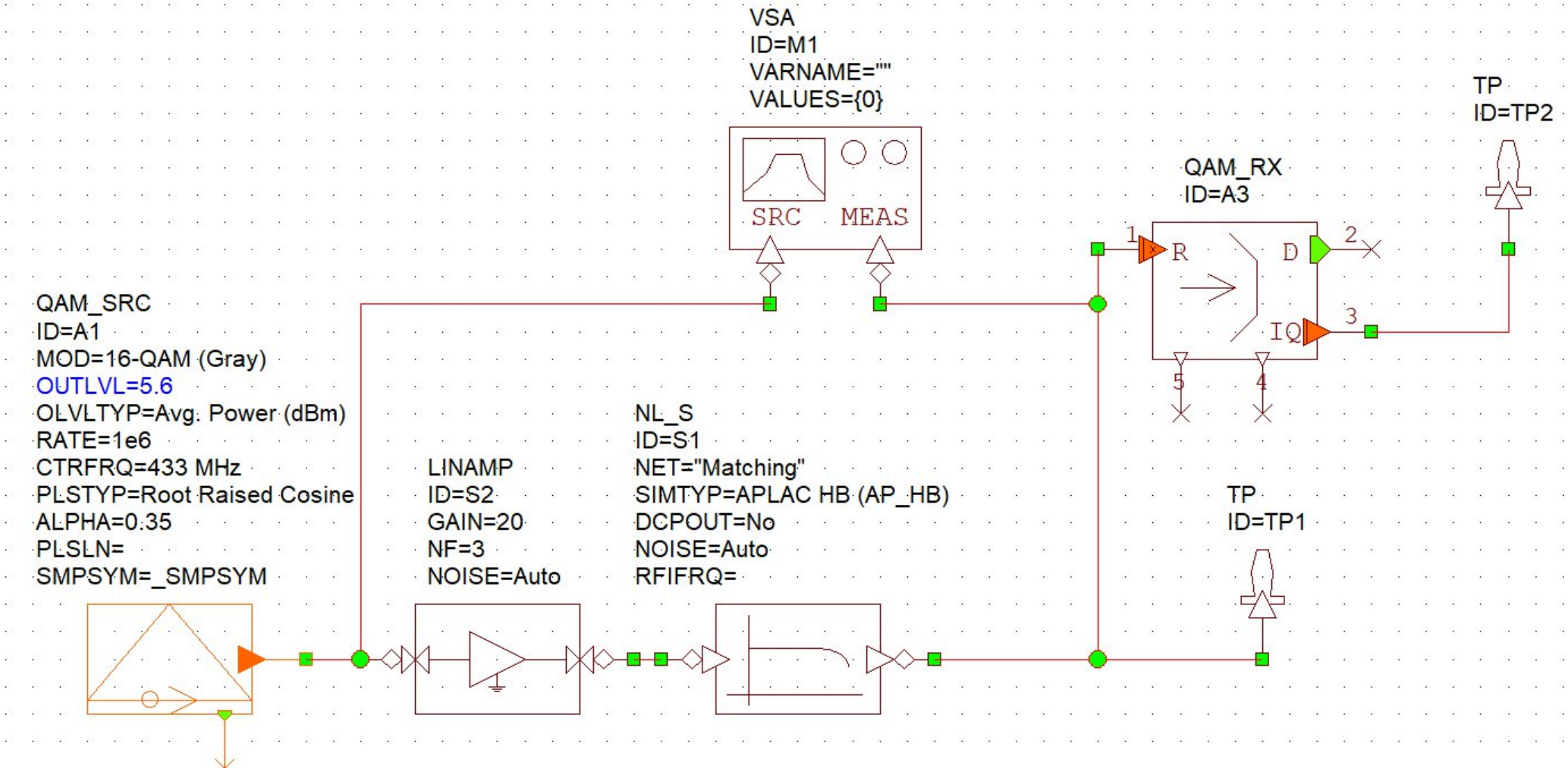
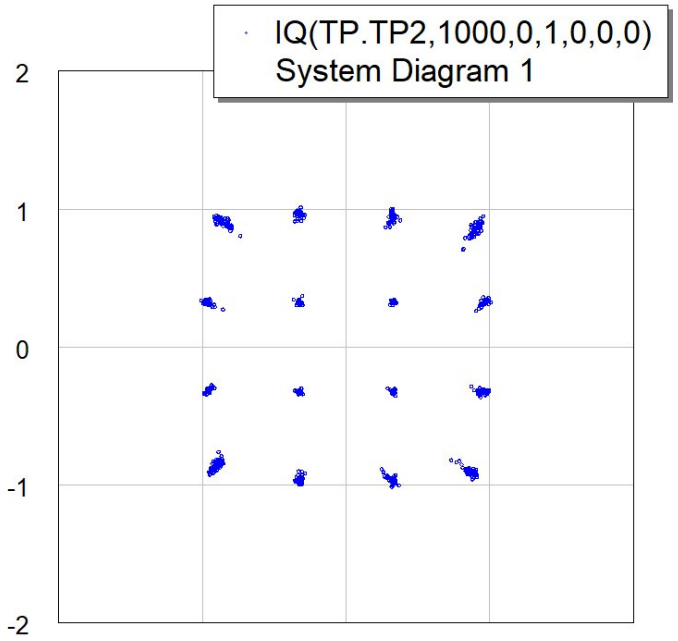
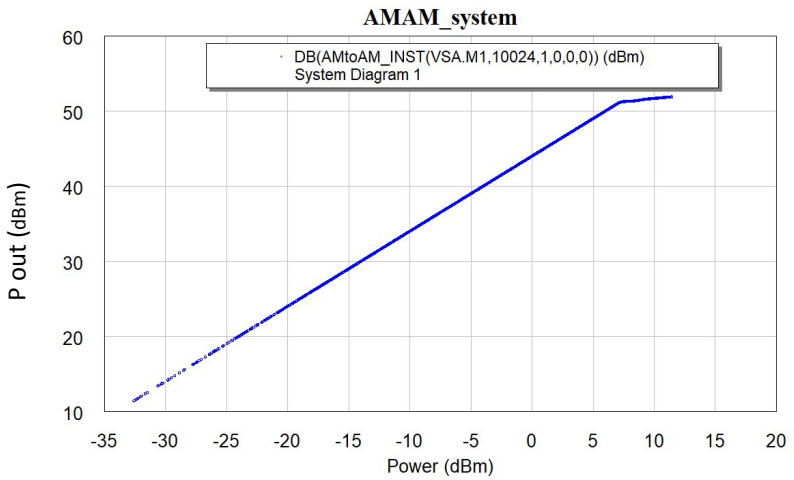
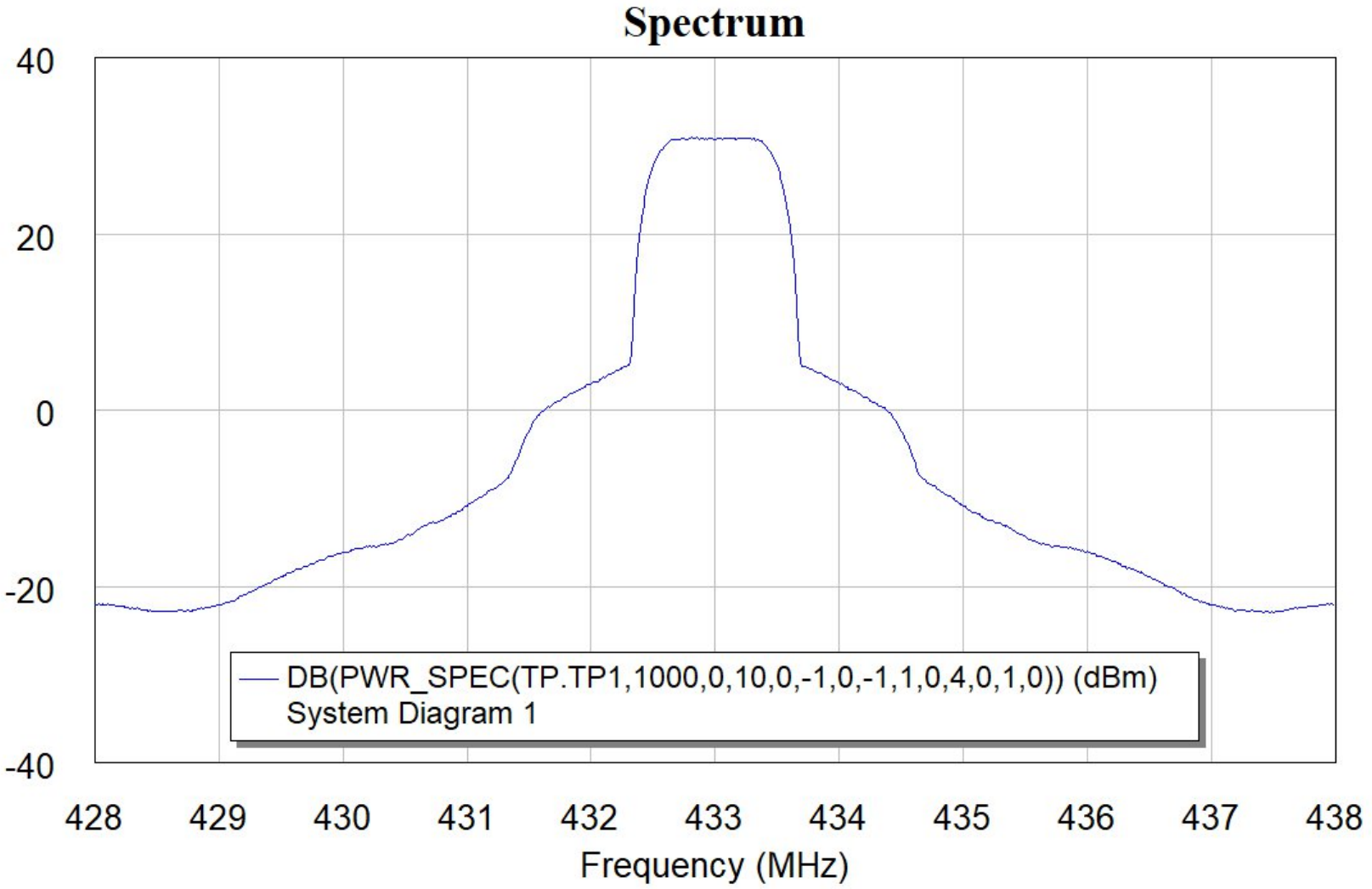


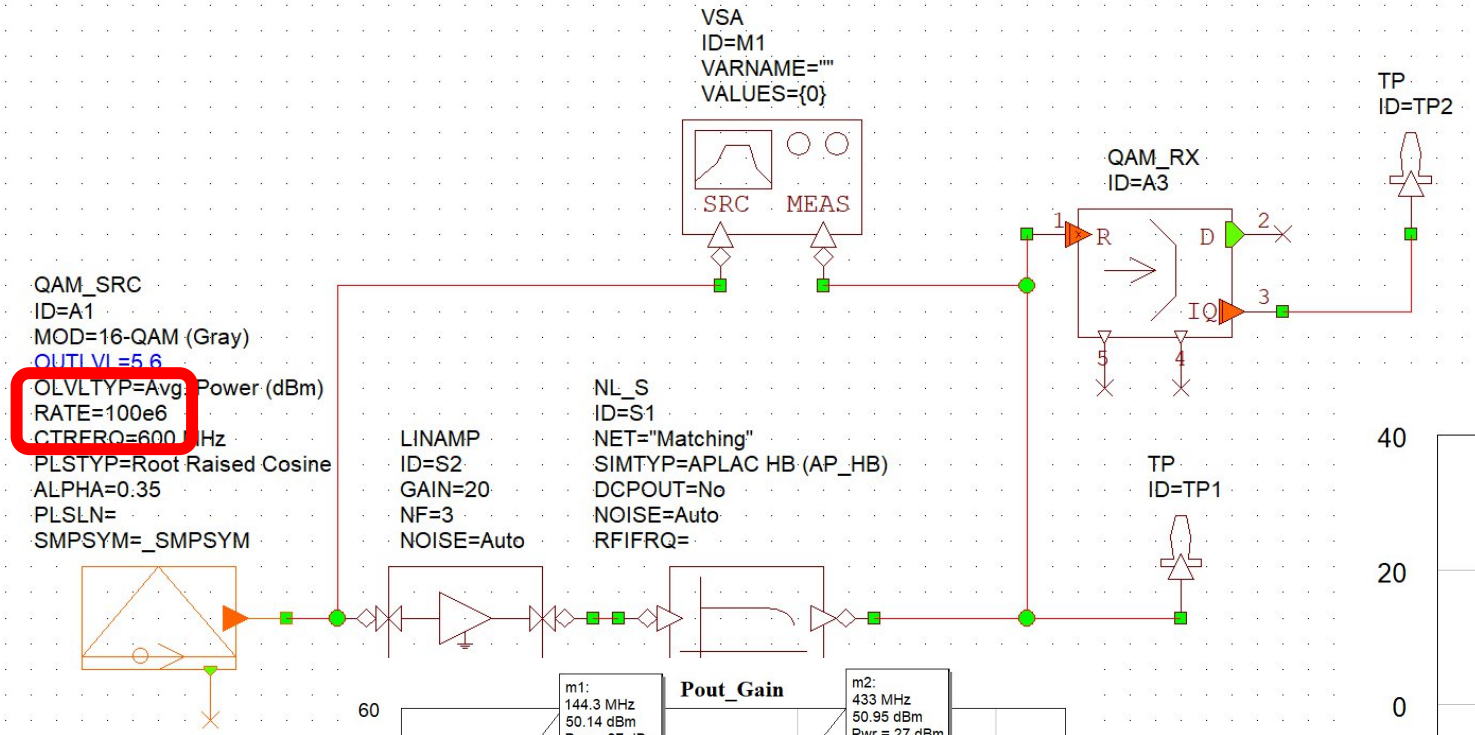
HPA AWR Design

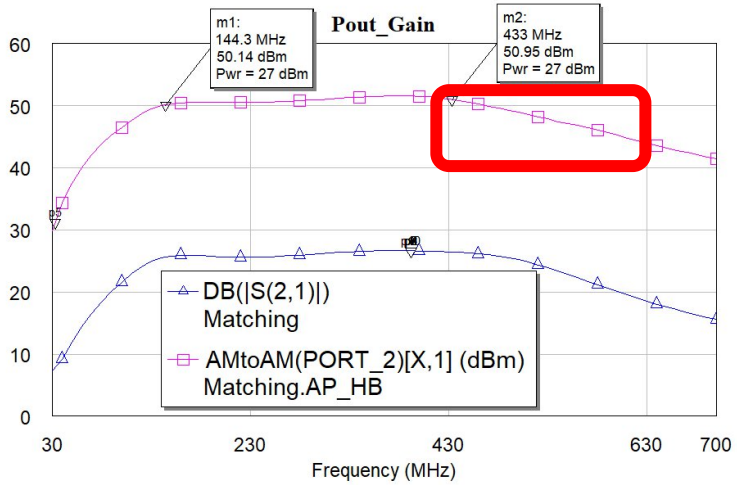


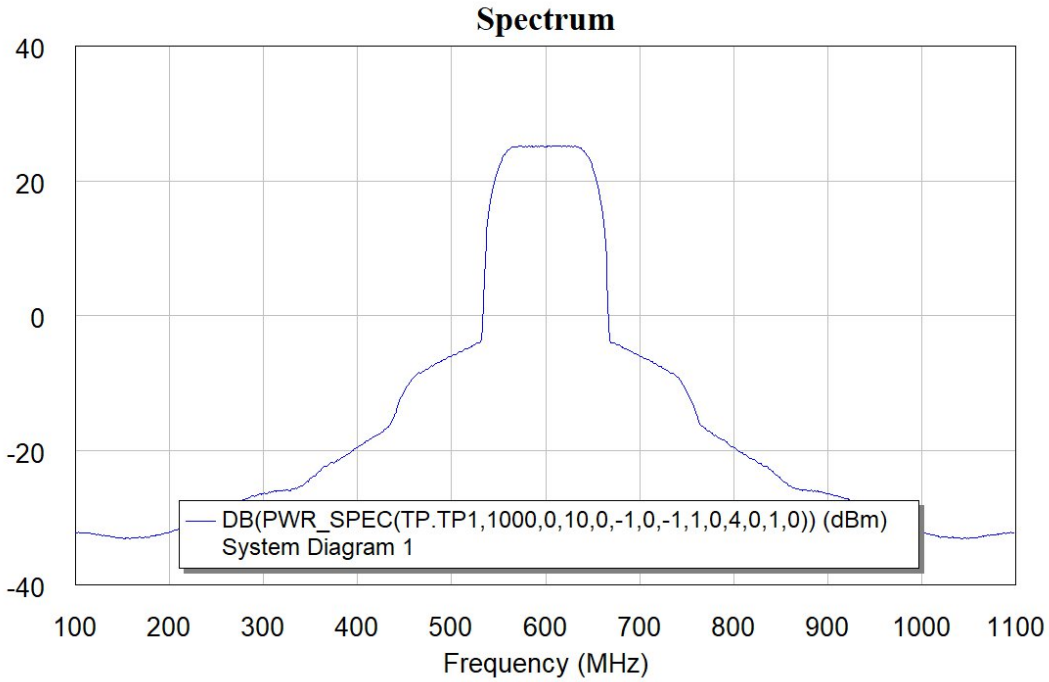




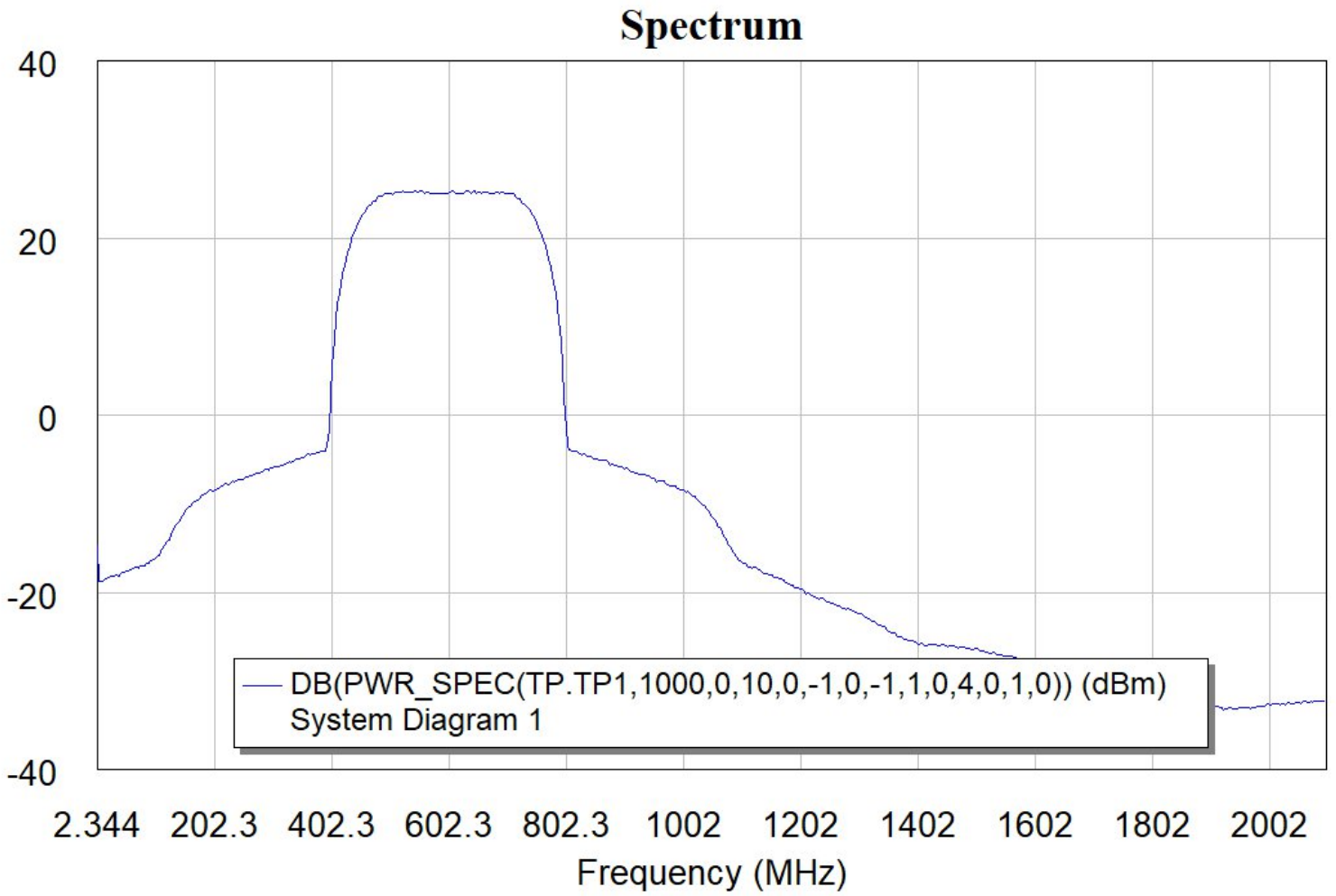
HPA AWR Design Problem







HPA AWR Design Problem



HPA Measurements

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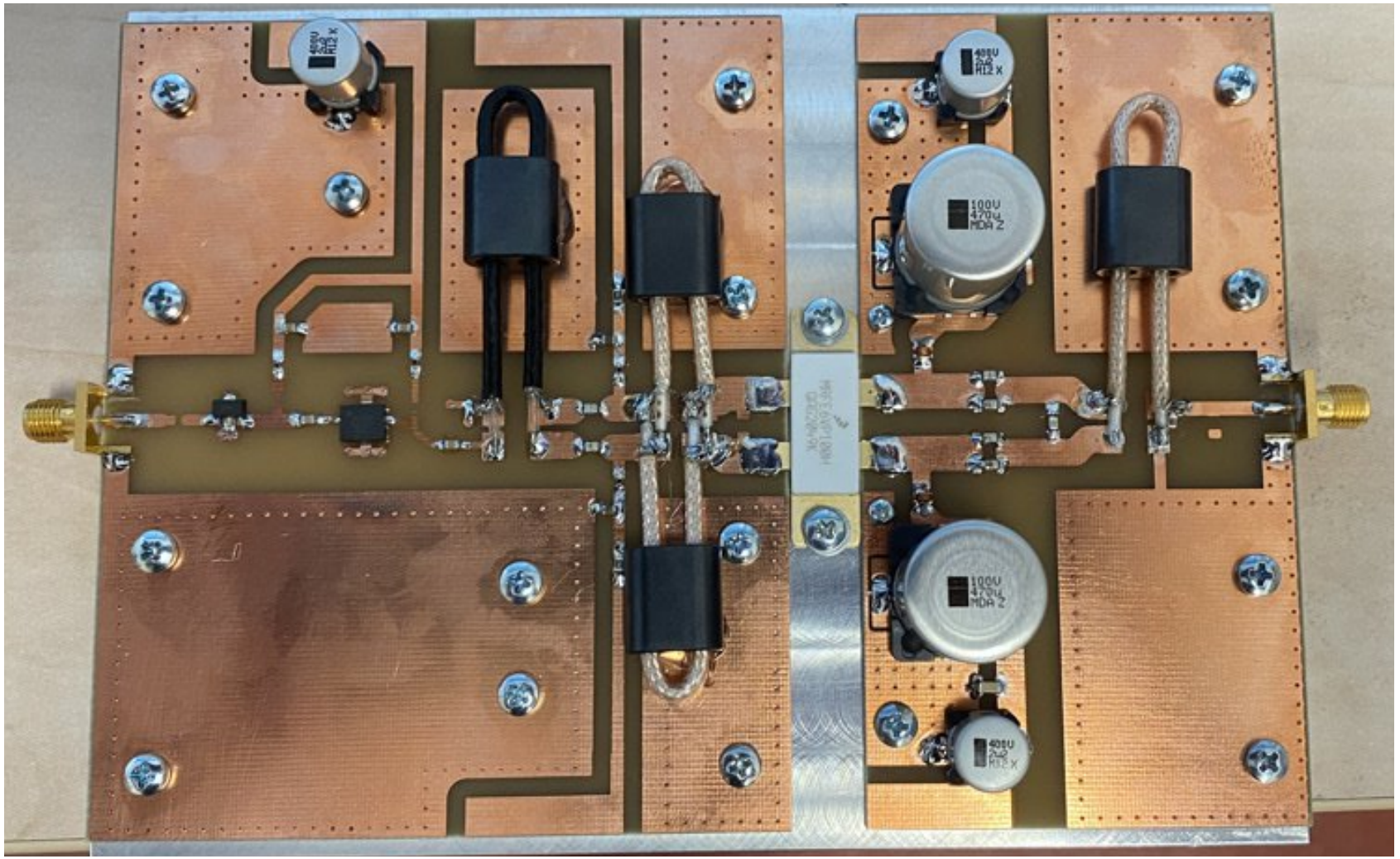
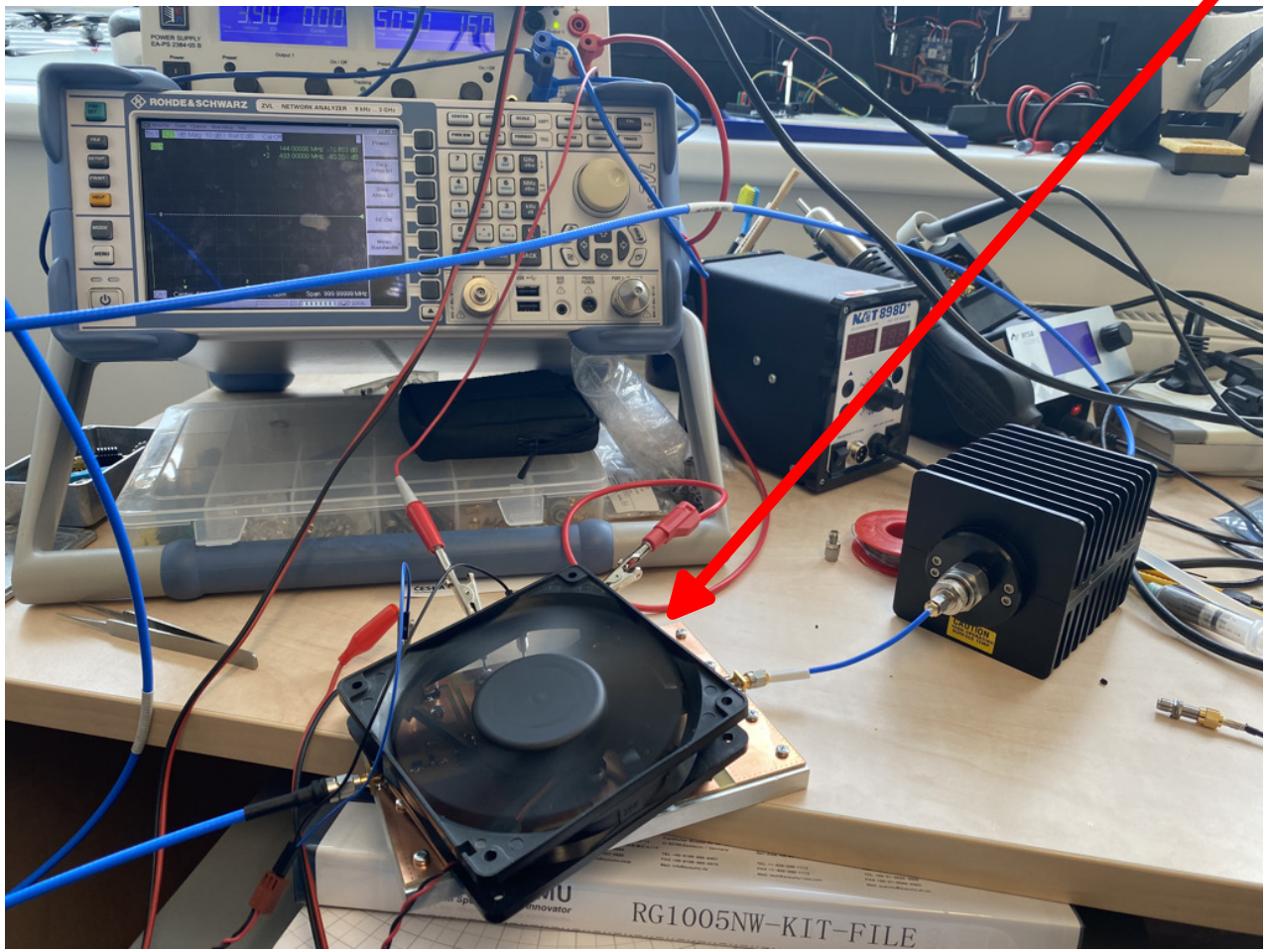
IN



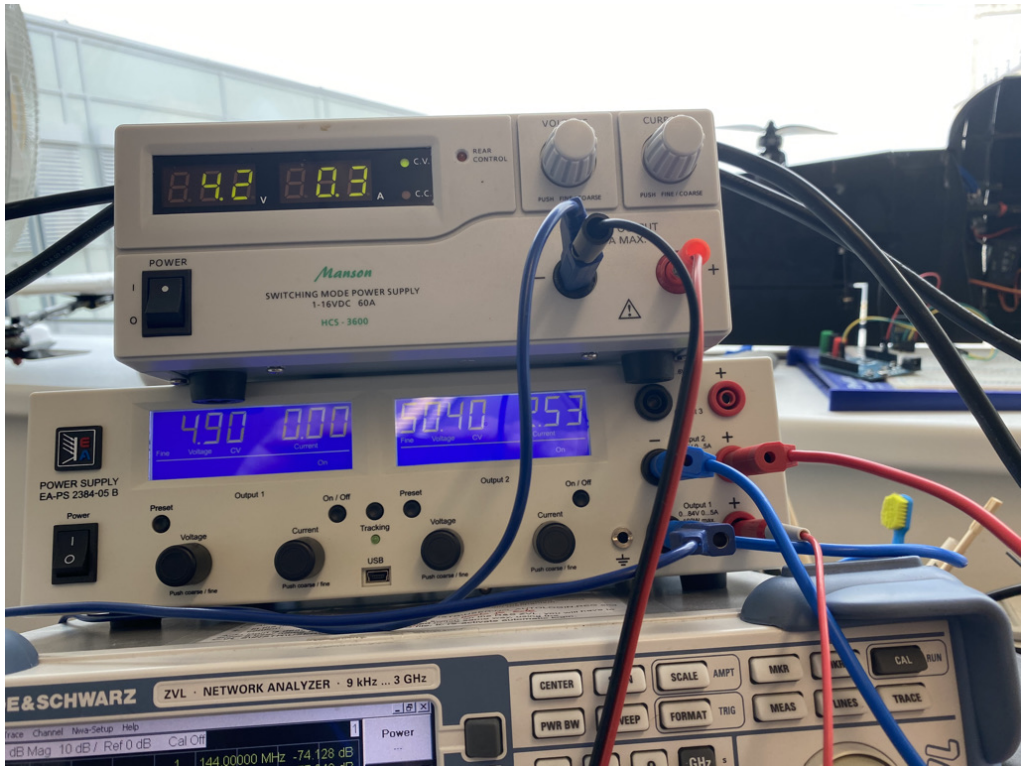
OUT

HPA Measurements

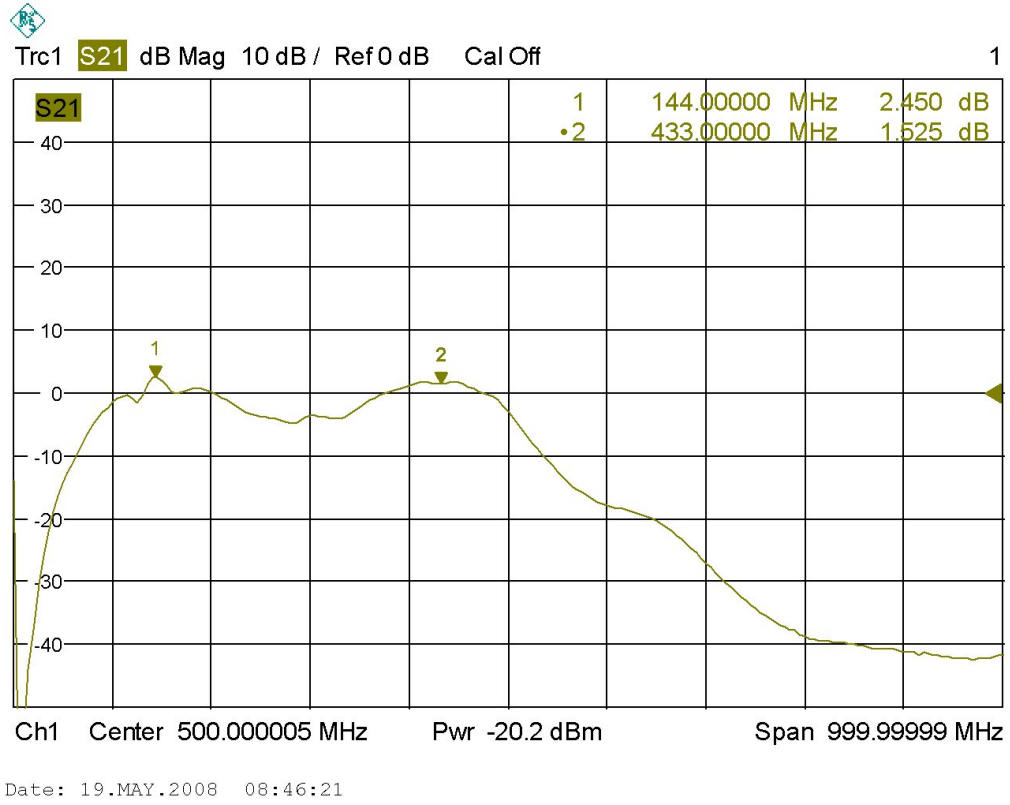
Active cooling

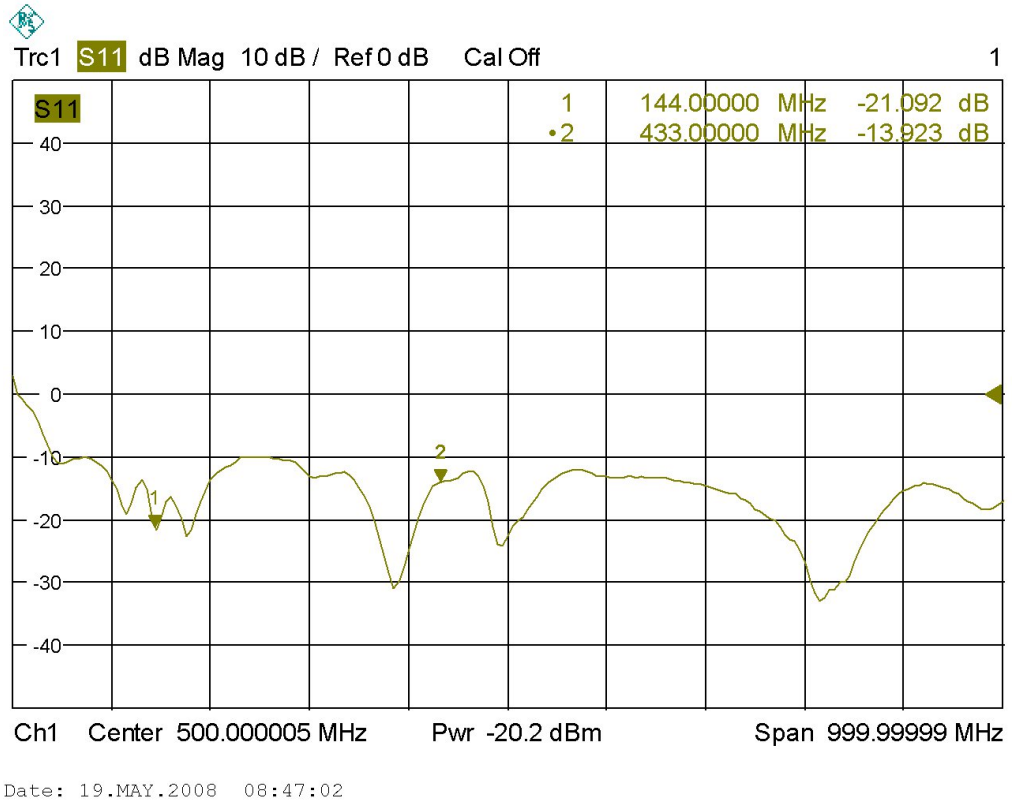


V_bias and VSS + currents



HPA Measurements



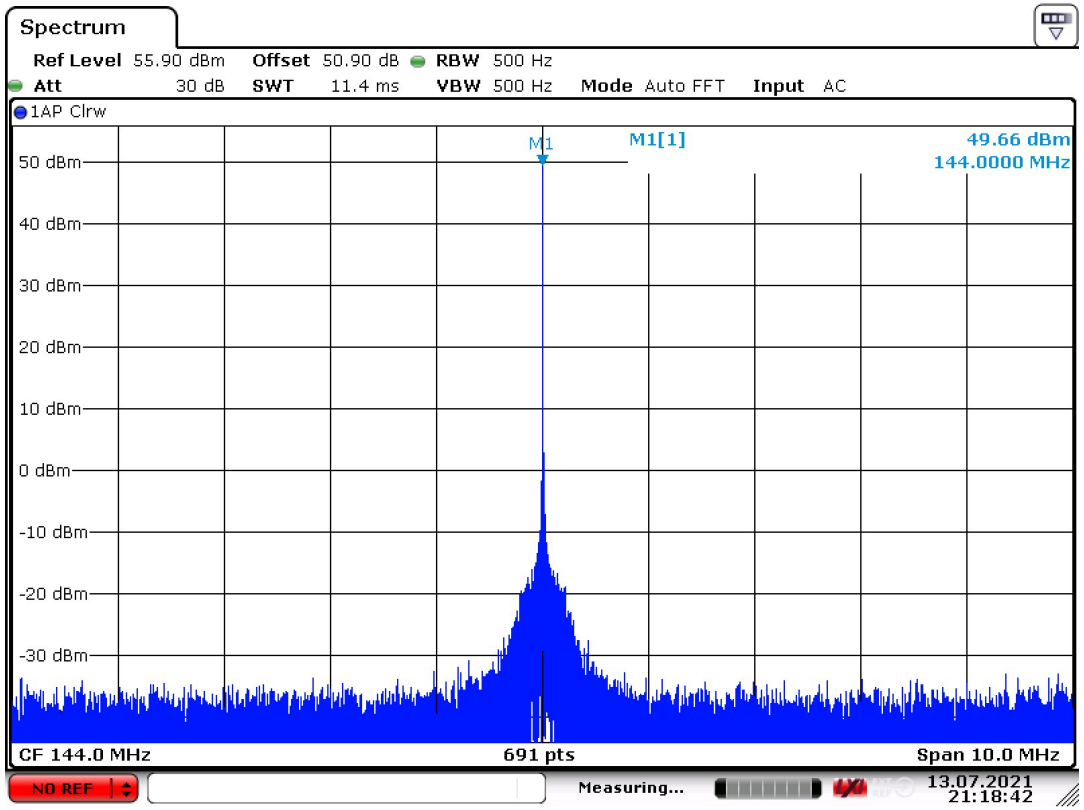


ATT: 40.6dB

Gain@144MHz: 43.050 dB

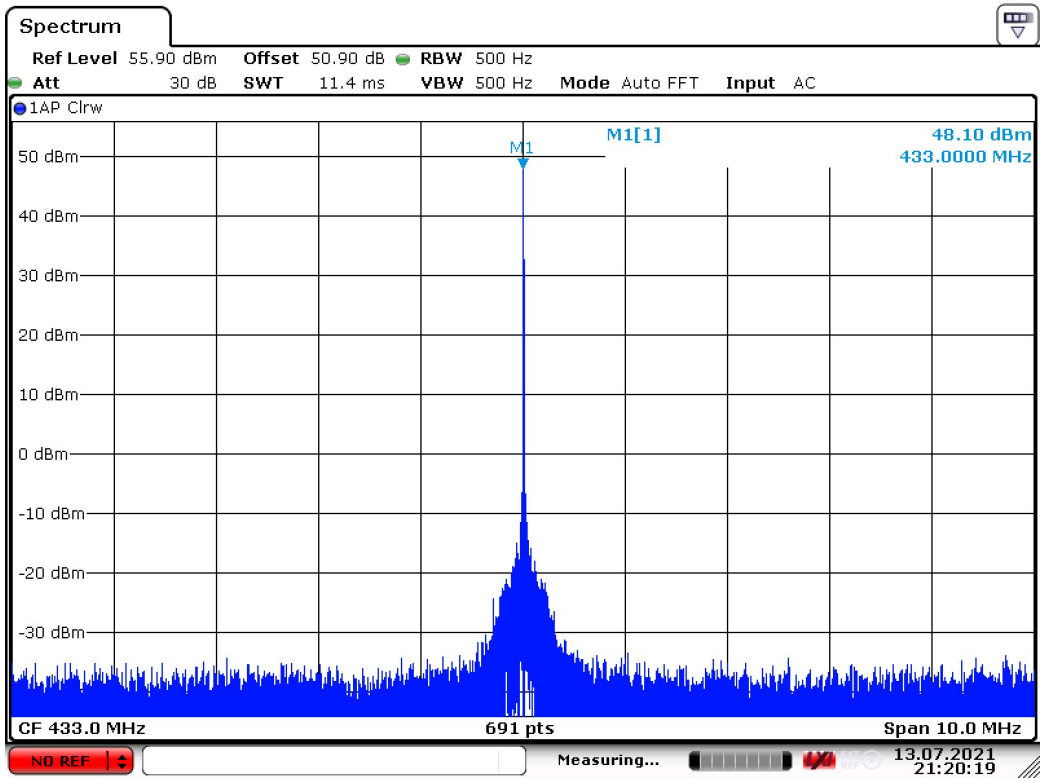
Gain@433MHz: 42.125 dB

HPA Measurements



Date: 13.JUL.2021 21:18:42

ATT: 40.6dB
Pout_max@144MHz: 49.66 dBm (92.46 W!)
Pout_max @433MHz: 48.10 dB (64.56 W!)



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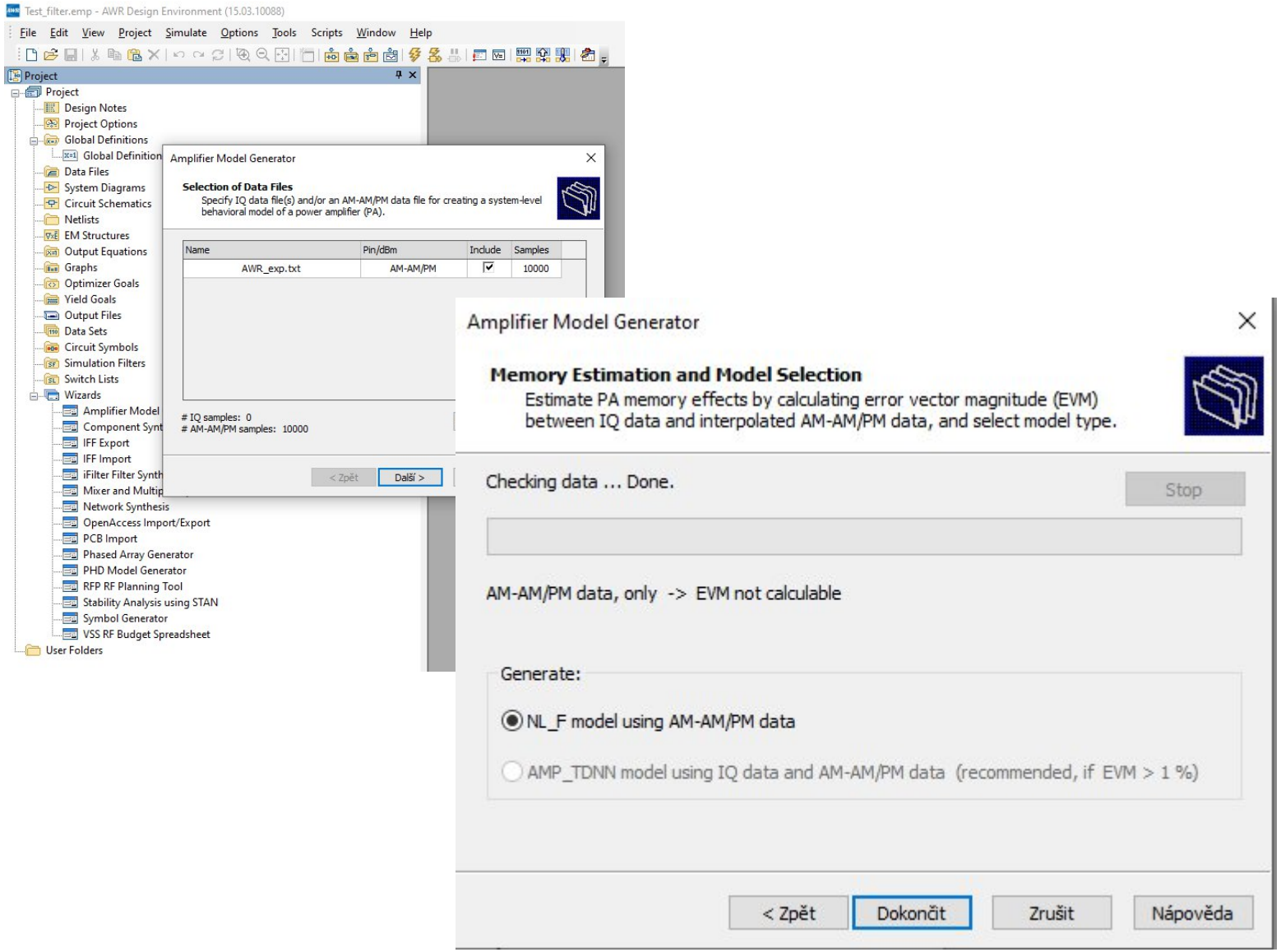
Efficiency approx. 60 %

HPA AWR Evalutation




```
! IQ data: I_in, Q_in, I_out, Q_out
! # power levels: 2
! # samples per power level: 5000
! # all samples: 10000
! PIN_start: -5 dBm
! PIN_stop: 0 dBm
! PIN_step: 5 dB

TSTEP = 2.5e-9
CTRFRQ = 1.0e9
SMPSYM = 8
Z0 = 50

PIN = -5 dBm

(I,)        (Q,)        (I,)        (Q,)
-0.071310   0.061610    -0.559396   -1.062530
-0.091102   0.079394    -0.699122   -1.334756
...         ...         ...         ...

PIN = 0 dBm

(I,)        (Q,)        (I,)        (Q,)
-0.126809   0.109559    -0.994599   -1.880855
-0.162004   0.141184    -1.188688   -2.248207
...         ...         ...         ...
```

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Europäischer Fonds für regionale Entwicklung

Thank you

gotthans@feec.vutbr.cz

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