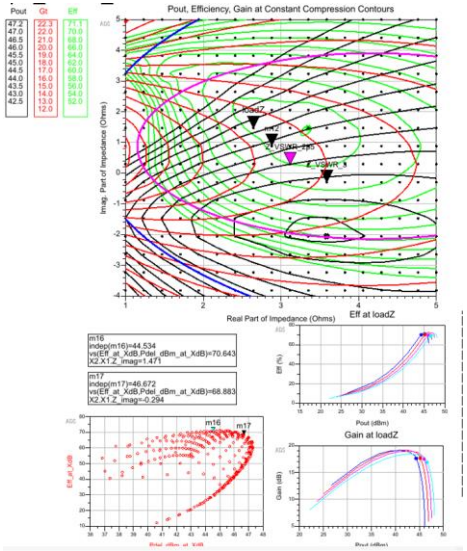
Build #3
DOE6_1 to DOE6_5
T9505A_1 (12 mm)

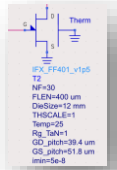
Bhagath Talluri
15-04-2022

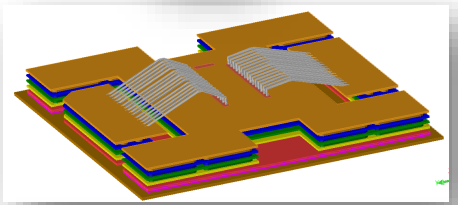
Contents

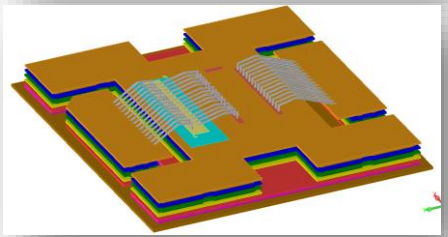
Design approach



Topology	**Doherty**	Aymmetric
Power calculation		Symmetric
		Ppeak (dBm)
Choose biasing		Gain (dB)
Choose PX dB	**Bare-die LP**	Efficiency (%)
Choose load		VSWR 1 - 3
		Zin, ZL
Chose loadline		
Choose PX db	**Die + Laminate + BW**	Ppeak, Gain, η%
DOE BW profile		Zin, ZL
Choose Pxdb, Load line		
DOE BW profile	**Die + Laminate + MOScap + BW**	Ppeak, Gain, η%
DOE MOScap		Zin, ZL
		DOE6_3
DOE6_1	**MOScap + BW DOE**	DOE6_4
DOE6_2		DOE6_5
	Assembly Drawing	DRC







Build tracking: starting point

- Minipack build tracking

Assembly build order	Variant (DOE)	RF GaN device geometry	RF GaN device name	RF GaN device wafer	RF GaN Die X (um)	RF GaN Die Y (um)	Wafer number (GaN)
3	DOE6_1	12 (30*400um)	T9505A_1	T9505A_1	1692	816	RU149505.11 wfr#18
3	DOE6_2	12 (30*400um)	T9505A_1	T9505A_1	1692	816	RU149505.11 wfr#18
3	DOE6_3	12 (30*400um)	T9505A_1	T9505A_1	1692	816	RU149505.11 wfr#18
3	DOE6_4	12 (30*400um)	T9505A_1	T9505A_1	1692	816	RU149505.11 wfr#18
3	DOE6_5	12 (30*400um)	T9505A_1	T9505A_1	1692	816	RU149505.11 wfr#18

RFP_tech_product catalog -PL55 (Active GaN die)

Tech	Mask Code	reticle kind	D9 released basetyp	Die X (um)	Die Y (um)	die area	aspect ratio	Si Thickness [µm]	Substrate	Substrate Name	suitable for 30V & 50V	cap value [pF]	Oxide [nm]	SiN [nm]	RF Top plate X [um]	RF Top plate Y [um]	RF top plate area [mm²]	BS metal
LD8C	N9501B_V4	shared	-	1770	536	0,95	3,30	85	N_3.5mOhmcm	L001-L004	x	10,22 => 10,30	1300	150	1466	261	0,38	Ag
LD8C	N9501B_V8	shared	-	1770	536	0,95	3,30	85	N_3.5mOhmcm	L001-L004	x	8,09 => 8,19	1300	150	1466	207	0,30	Ag
LD8C	N9501B_V5	shared	-	1770	536	0,95	3,30	85	N_3.5mOhmcm	L001-L004	x	6,5 => 6,58	1950	150	1466	244	0,36	Ag

Power calculation: Asymmetric Doherty

Specification				
Project	**Frequency-Range (MHz)**	**P3dB (dBm)**	**P3dB (W)**	**PAR**
PAM 2.0+	3400 - 3800	47,4	54,95	8,4
		Pavg (dBm)	**Pavg (W)**	
		39	7,94	

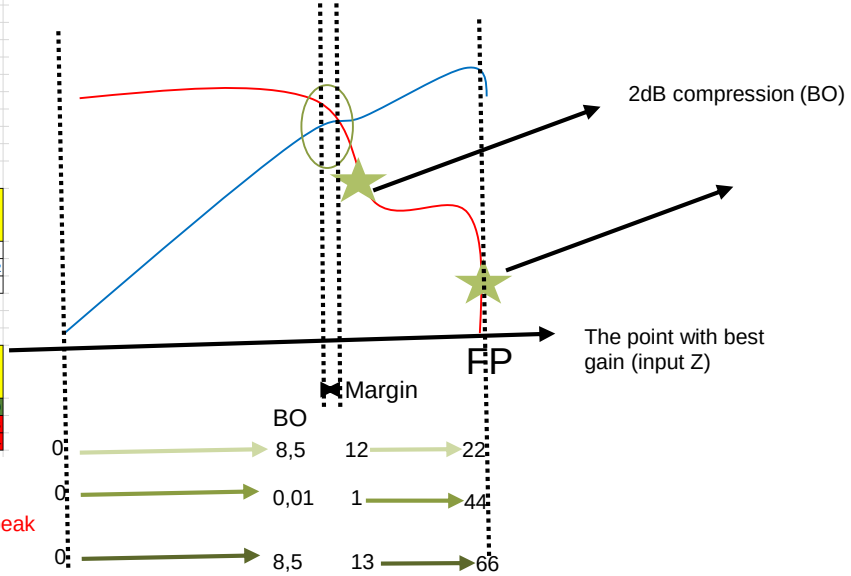
Doherty Topology	**Remark**	**Ratio**	**Main (W)**	**Peak (W)**
2-way asymmetric	To maximize efficiency	2	18,32	36,64

Estimation including loss

	Required power (W)	**Required power (dBm)**	**Loss (dBm)**	**Total required power (dBm)**	**Total required power (W)**	**Ratio**	**Total power (W)**	**Total power (dBm)**
Main	18,32	42,63	0,8	43,43	22,02			
						3,01	**66,07**	**48,2**
Peak	36,64	45,64	0,8	46,44	44,05			

	Total output power (dBm)	**PAR**	**Power @ MXE (dBm)**	**Margin (dB)**	**Power @ MXE (dB**	**Power @ MXE (W)**	**MXP (W)**	**MXP(dBm)**
	48,2	8,4					66,07	48,20
Main			39,8	1,00	40,80	12,02	22,02	43,43
Peak			Peak_start_ideal		Peak_start	0,01	44,05	46,44

Required power from peak



- Maximize Gain
  - Main section gain as high as possible while maintaining Power @ MXE
  - Peak section gain as high as possible while maintaining MXP

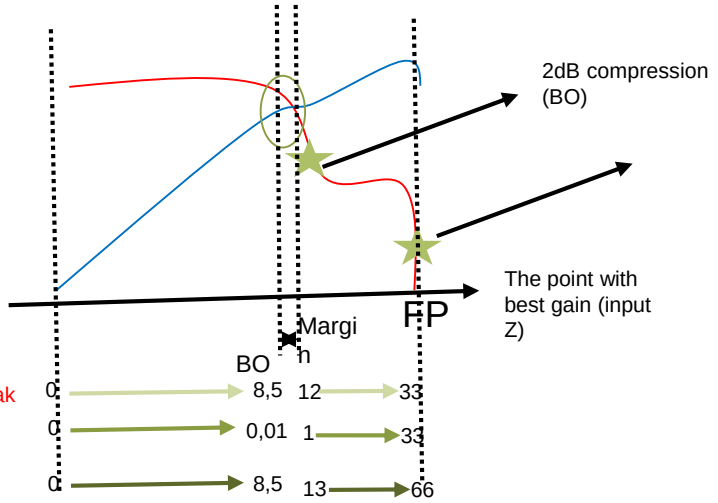
Power calculation: Hybrid Symmetric Doherty

Doherty Topology	Remark	Ratio	Main (W)	Peak (W)
Symmetric	Maximize BW	1	27,48	27,48

Estimation including loss								
	Required power (W)	Required power (dBm)	Loss (dBm)	Total required power (dBm)	Total required power (W)	Ratio	Total power (W)	Total power (dBm)
Main	27,48	44,39	0,8	45,19	33,03			
						0,00	66,07	48,2
Peak	27,48	44,39	0,8	45,19	33,03			

	Total output power	PAR	Power @ MXE (dBm)	Margin (dB)	Power @ MXE (dBm)	Power @ MXE (W)	MXP (W)	MXP (dBm)
	48,2	8,4					66,07	48,20
Main			39,8	1,00	40,80	12,02	33,03	45,19
Peak			Peak_start_ideal		Peak_start	0,01	33,03	45,19

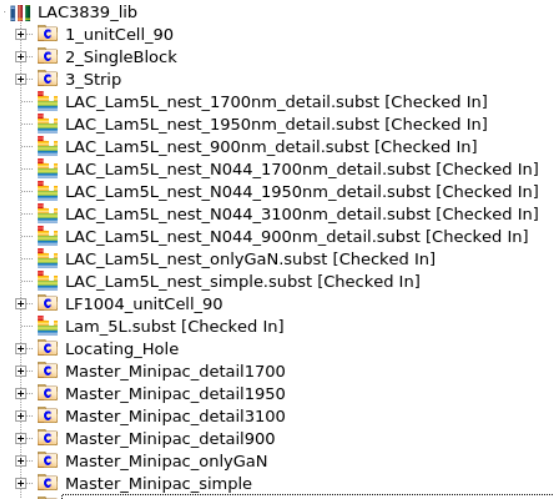
Required power from peak



- Maximize Gain
  - Main section gain as high as possible while maintaining Power @ MXE
  - Peak section gain as high as possible while maintaining MXP

Design on laminate DOE6

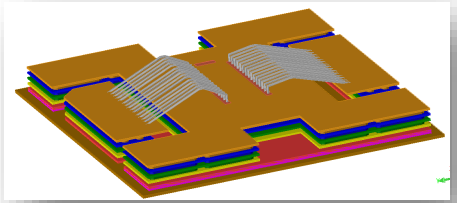
- Laminate library:LAC3839_lib



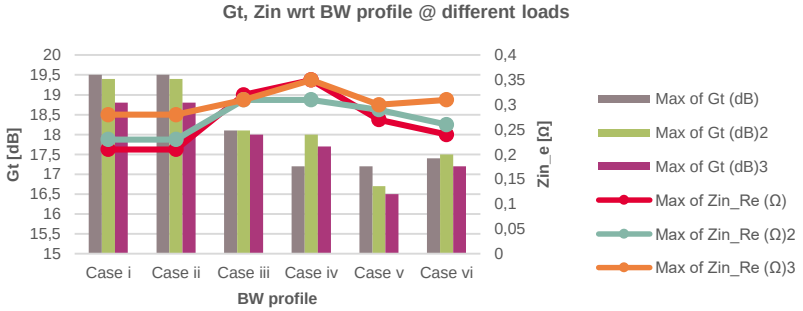
	GaN	MOSCap
Design	Die_GaN_v0_lib	IC_LD8C_lib
Assembly drawing	Central_v0_lib	

DOE6_1: Laminate, Bond Wire selection

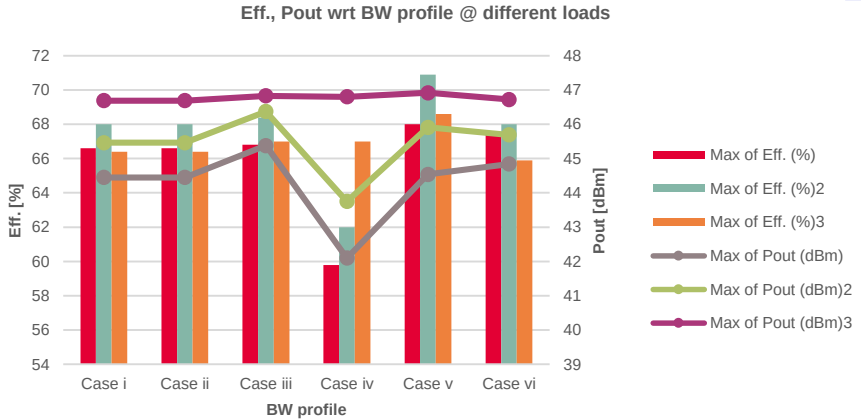
	Input – Gate Bondwire						Output – Drain Bondwire				
Sl. No.	No. of wires	No. of sets	Length	Height	Pitch	Sl.No.	No. of wires	No. of sets	Length	Height	Pitch
a	5	3	1070	150	85	A	17	1	1070	150	75
b	5	3	1070	250	85	B	15	1	1070	150	89
c	4	3	1070	250	107	C	15	1	1070	250	89
						D	12	1	1070	250	110



Simulation case	Input + Output	Objective
i	a + A	Check/select no. of wires for output (17 or 15 wires)
ii	a + B	
iii	b + B	Check/select height for gate BW (150 um or 250 um)
iv	c + B	Select No. of wires for gate BW (12 or 15)
v	a+C	Select drain BW hieght (150 / 250 um,)
vi	a+D	Select No. of drain BW (12 or 15)



› Raw data

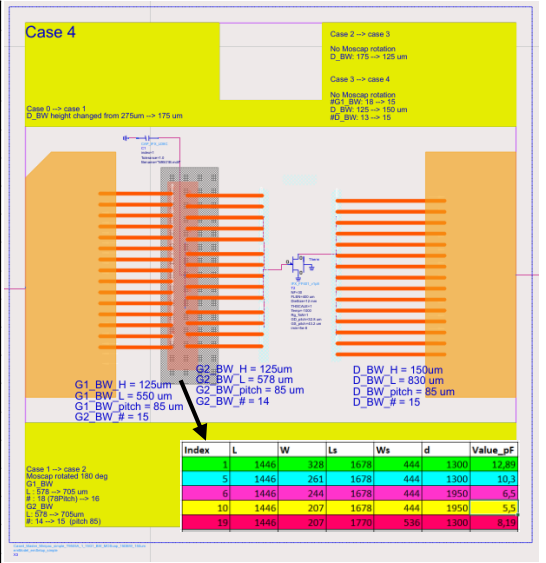


Build #3 DOE6 simulation variants

- DOE variants definition approach
  - ……
  - ……

DOE6_simulated performance: MOScap (5) X (5) BW profile (with simple EM model)

P1.5dB	Moscap		Z_load_1						Z_load_3					
Simuation case_BW_ profile	Name	Value (pF)	Zin_Re (Ω)	Zin_imag (Ω)	Pout (dBm)	Eff. (%)	Gt (dB)	IRL (dB)	Zin_Re (Ω)	Zin_L (Ω)	Pout (dBm)	Eff. (%)	Gt (dB)	IRL (dB)
Case 0	N9501B_V8	5,5	0,37	3,60	43,33	72,80	18,20	-8,50	0,40	2,7 - j 0,9	46,80	69,40	16,60	-7,60
Case 0	N9501B_V5	6,58	0,53	3,60	43,40	74,60	17,20	-13,50	0,57	2,7 - j 0,9	46,74	70,50	15,60	-10,10
Case 0	N9501B_V8	8,19	0,71	3,40	44,67	70,20	15,10	-19,00	0,62	3,1 - j 0,3	46,81	69,50	15,00	-10,70
Case 0	N9501B_V4	10,3	0,49	3,45	43,79	63,30	15,90	-12,20	0,40	2,4 - j 0,3	46,68	65,30	15,80	-7,10
Case 0	N9501B_V1	12,89	0,44	3,40	44,88	63,90	16,00	-10,30	0,36	3,1 - j 0,3	47,04	64,30	15,80	-6,70
Case 1	N9501B_V8	5,5	0,38	3,50	44,42	73,10	18,20	-7,10	0,47	2,9 - j 0,3	46,70	70,00	16,90	-11,70
Case 1	N9501B_V5	6,58	0,44	3,50	44,20	71,80	17,60	-8,30	0,51	2,7 - j 0,9	46,93	65,20	15,80	-12,00
Case 1	N9501B_V8	8,19	0,51	3,50	44,28	68,20	16,40	-10,80	0,48	2,4 - j 0,3	46,90	65,60	15,90	-11,30
Case 1	N9501B_V4	10,3	0,43	3,40	44,90	64,40	16,50	-9,40	0,41	2,7 + j 0,3	46,84	64,50	16,30	-10,00
Case 1	N9501B_V1	12,89	0,28	3,40	44,22	60,50	17,20	-5,80	0,34	2,9 + j 0,3	46,93	63,70	16,50	-7,80
Case 2	N9501B_V8	5,5	0,21	3,80	44,11	70,00	19,00	-4,10	0,33	2,7 - j 0,3	46,80	68,70	17,50	-7,60
Case 2	N9501B_V5	6,58	0,29	3,80	44,27	71,70	18,40	-5,70	0,41	2,7 - j 0,3	46,70	69,20	16,90	-9,80
Case 2	N9501B_V8	8,19	0,53	3,60	45,37	73,30	16,50	-13,00	0,56	2,9 - j 0,9	46,93	65,90	15,10	-12,90
Case 2	N9501B_V4	10,3	0,52	3,70	44,85	68,20	15,80	-12,30	0,46	2,7 - j 0,3	47,05	64,90	15,40	-10,70
Case 2	N9501B_V1	12,89	0,43	3,80	43,79	68,20	15,70	-9,00	0,34	2,4 + j 0,3	46,70	63,90	16,00	-7,80
Case 3	N9501B_V8	5,5	0,53	3,50	44,85	76,20	17,50	-17,00	0,41	2,7 - j 0,3	46,99	67,40	16,60	-7,90
Case 3	N9501B_V5	6,58	0,41	3,50	45,11	71,40	17,90	-11,70	0,53	2,7 - j 0,3	46,89	67,50	15,70	-9,40
Case 3	N9501B_V8	8,19	0,44	3,40	45,13	67,60	16,90	-12,30	0,45	2,4 - j 0,3	47,08	63,10	15,20	-7,30
Case 3	N9501B_V4	10,3	0,39	3,50	44,48	63,00	16,50	-10,80	0,34	2,4 + j 0,3	47,04	62,70	16,10	-6,50
Case 3	N9501B_V1	12,89	0,41	3,50	44,61	63,20	16,70	-11,70	0,34	2,9 + j 0,8	46,87	63,90	16,40	-7,40
Case 4	N9501B_V8	5,5	0,42	3,70	45,11	73,50	18,20	-10,70	0,41	2,7 - j 0,3	46,86	68,00	17,20	-10,90
Case 4	N9501B_V5	6,58	0,49	3,70	44,92	72,70	17,60	-13,00	0,58	2,9 - j 0,3	46,79	69,20	16,00	-16,10
Case 4	N9501B_V8	8,19	0,59	3,70	44,48	70,40	16,20	-16,80	0,55	2,7 + j 0,3	46,79	68,10	15,90	-15,20
Case 4	N9501B_V4	10,3	0,46	3,60	44,72	64,70	16,60	-12,50	0,40	2,7 + j 0,3	47,03	64,00	16,30	-10,30
Case 4	N9501B_V1	12,89	0,35	3,60	44,49	62,20	17,30	-8,90	0,31	2,7 + j 0,3	47,00	62,70	16,80	-7,80

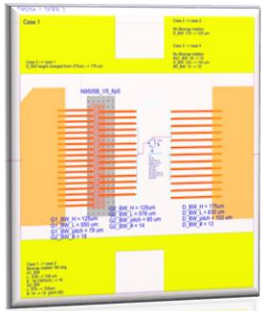
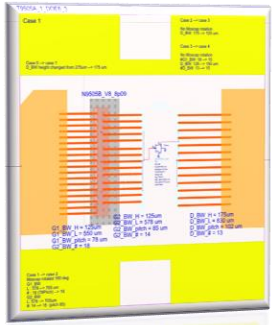
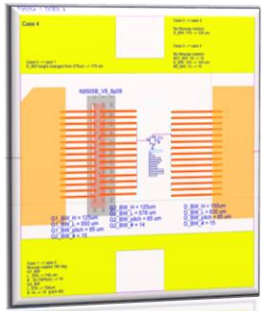


	Click for Graphs		
DOE type	Performance		Analysis
Full DOE	Gt [dB], Zin [Ω]	Eff [%], Pout [dBm]	MOScap selection
			BW profile selection
Selected DOE	Gt [dB], Zin [Ω]	Eff [%], Pout [dBm]	

Selected DOE6 variants: Simple vs detailed EM simulation

Peaking device

	Simple_EM	P1.5dB	Moscap		Max. performace @ P1.5dB			Z_load_1						Z_load_3					
Simple_EM	DOE_var	BW_profile	Name	Value (pF)	MXP (dBm)	MXE (%)	MXG (dB)	Zin_Re (Ω)	Zin_imag (Ω)	Pout (dBm)	Eff. (%)	Gt (dB)	IRL (dB)	Zin_Re (Ω)	Zin_L (Ω)	Pout (dBm)	Eff. (%)	Gt (dB)	IRL (dB)
	Simple_EM_DOE6_1	Case v	No Mocap	No Moscap	47,40	71,00	20,60	0,27	2,80	44,54	71,00	17,20	-4,00	0,30	3,4 - j 0,8	46,92	68,60	17,20	-4,00
	Simple_EM_DOE6_2	Case 1	N9501B_V5	6,5	46,90	78,00	21,30	0,44	3,50	44,20	71,80	17,60	-8,30	0,51	2,7 - j 0,9	46,93	65,20	15,80	-12,00
	Simple_EMDOE6_3	Case 1	N9501B_V8	8,19	47,30	70,10	19,40	0,51	3,50	44,28	68,20	16,40	-10,80	0,48	2,4 - j 0,3	46,90	65,60	15,90	-11,30
	Simple_EM_DOE6_4	Case 4	N9501B_V8	8,19	47,30	70,70	20,30	0,59	3,70	44,48	70,40	16,20	-16,80	0,55	2,7 + j 0,3	46,79	68,10	15,90	-15,20
	Simple_EM_DOE6_5	Case 4	N9501B_V4	10,3	47,50	65,70	18,80	0,46	3,60	44,72	64,70	16,60	-12,50	0,40	2,7 + j 0,3	47,03	64,00	16,30	-10,30
NO44_60um	detail_EM_DOE6_1	Case v	No Mocap	No Moscap	47,30	70,40	20,80	0,29	2,80	44,99	70,20	17,50	-4,40	0,32	3,6 - j 0,8	46,78	68,40	16,80	-4,00
	detail_EM_DOE6_2	Case 1	N9501B_V5	6,5	47,20	71,10	22,20	0,43	3,20	44,34	70,40	17,60	-10,40	0,46	3,4 - j0,3	46,61	68,10	17,10	-9,50
	detail_EM_DOE6_3	Case 1	N9501B_V8	8,19	47,20	71,10	22,30	0,43	3,20	44,32	70,30	17,60	-10,60	0,50	3,6 - j 0,3	46,63	68,90	16,90	-10,80
	detail_EM_DOE6_4	Case 4	N9501B_V8	8,19	47,20	71,40	21,40	0,39	3,40	44,81	70,10	17,60	-6,80	0,45	3,4 + j 0,3	46,77	67,90	17,10	-8,40
	detail_EM_DOE6_5	Case 4	N9501B_V4	10,3	47,20	71,40	21,40	0,39	3,40	44,82	70,10	17,70	-6,80	0,45	3,4 + j 0,3	46,77	68,00	17,10	-8,30
NO44_85um	Detail_EM_DOE6_1	Case v	No Mocap	No Moscap	47,30	70,40	20,80	0,29	2,80	44,99	70,20	17,50	-4,40	0,32	3,6 - j 0,8	46,78	68,40	16,80	-4,00
	detail_EM_DOE6_2	Case 1	N9501B_V5	6,5	47,10	76,60	21,20	0,36	2,60	44,75	73,00	17,50	-5,60	0,36	2,9 - j 0,9	46,90	69,10	15,70	-4,70
	detail_EM_DOE6_3	Case 1	N9501B_V8	8,19	47,00	78,30	21,40	0,47	3,00	44,17	76,90	16,60	-10,00	0,38	2,7 - j 0,9	46,81	68,90	15,50	-5,20
	detail_EM_DOE6_4	Case 4	N9501B_V8	8,19	47,00	79,00	20,40	0,48	3,20	44,11	78,00	16,60	-9,10	0,42	2,9 + j 0,3	46,68	72,30	16,10	-6,90
	detail_EM_DOE6_5	Case 4	N9501B_V4	10,3	46,90	80,50	20,50	0,45	3,20	44,66	77,20	16,60	-8,50	0,45	2,7 + j 0,3	46,63	72,40	15,70	-7,50

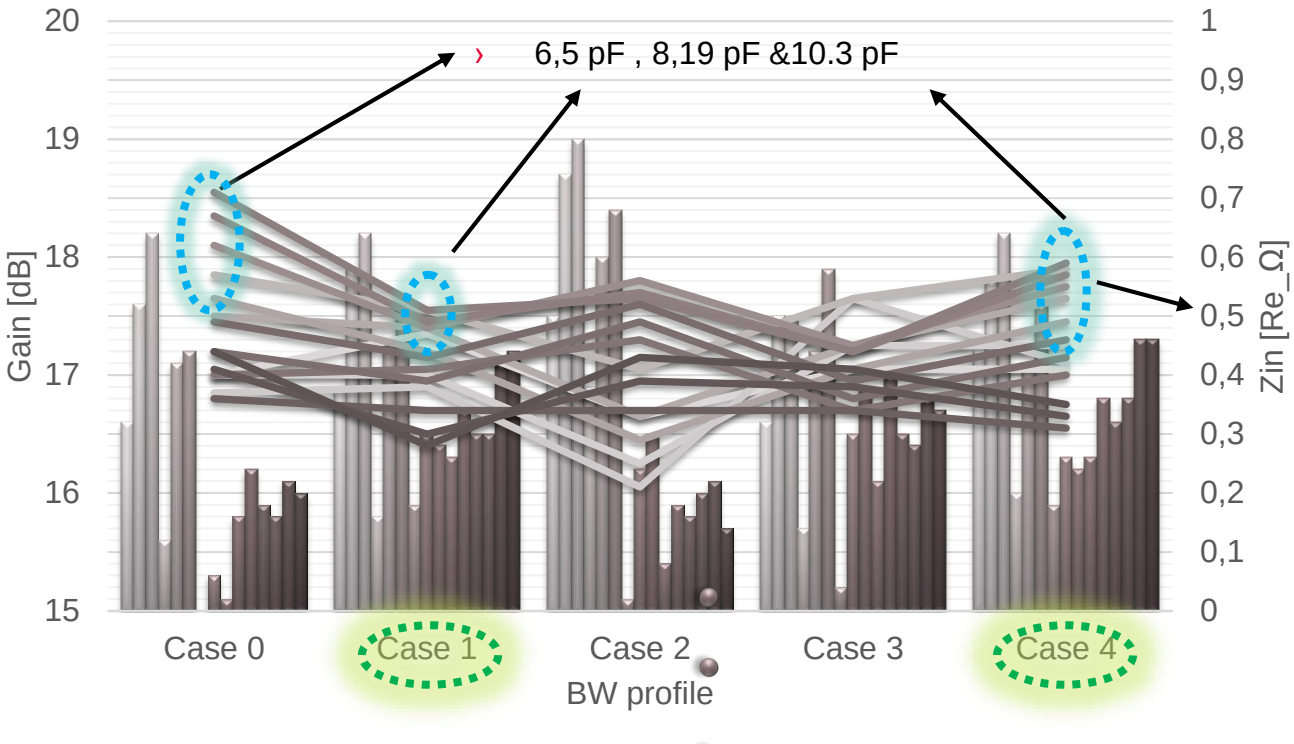






	Click for Graphs		
DOE type	Performance		Analysis
Full DOE6	Gt [dB], Zin [Ω]	Eff [%], Pout [dBm]	MOScap selection
			BW profile selection
Selected DOE6	Gt [dB], Zin [Ω]	Eff [%], Pout [dBm]	

Part of your life. Part of tomorrow.

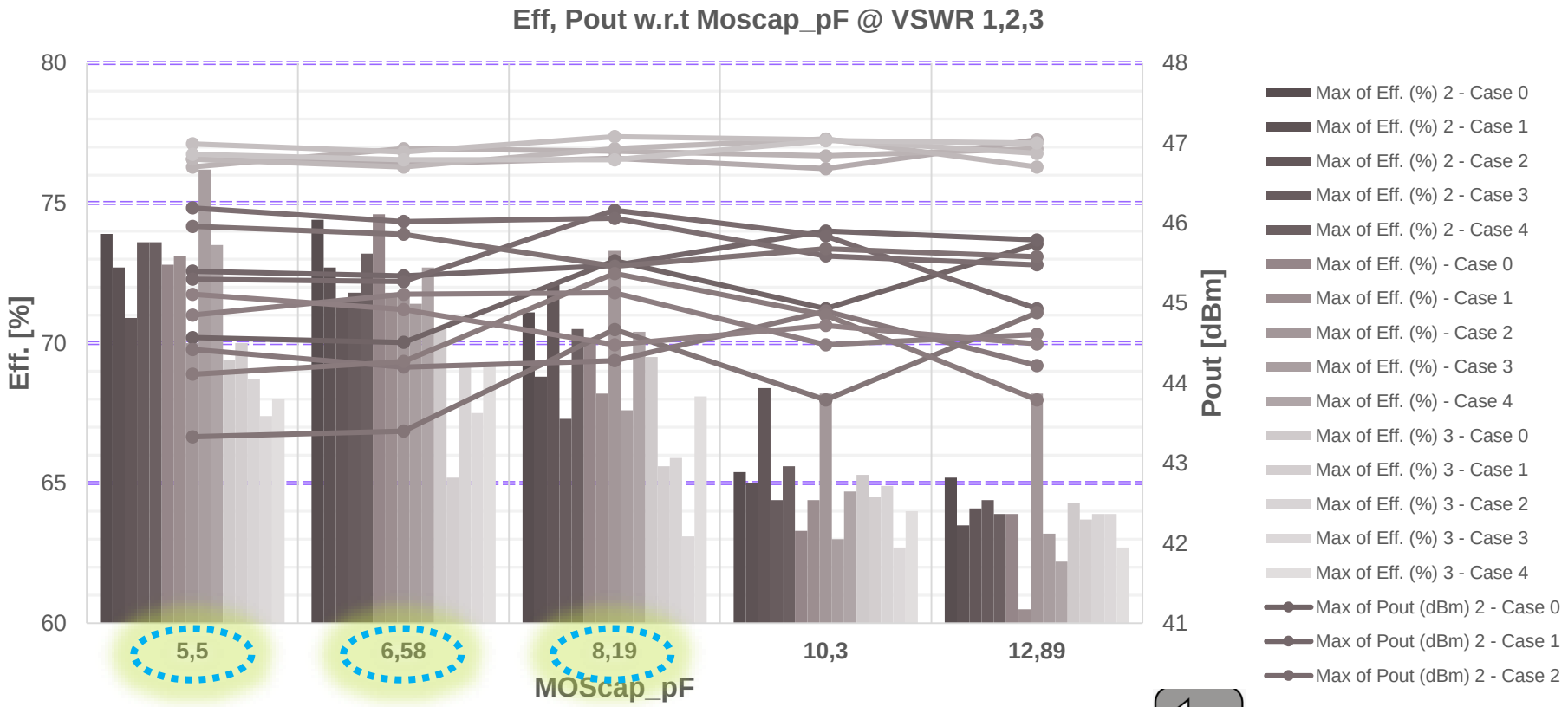
DOE6
Performance Graphs & Analysis

Zin & Gt @ ZL w.r.t BW config. & MOScap

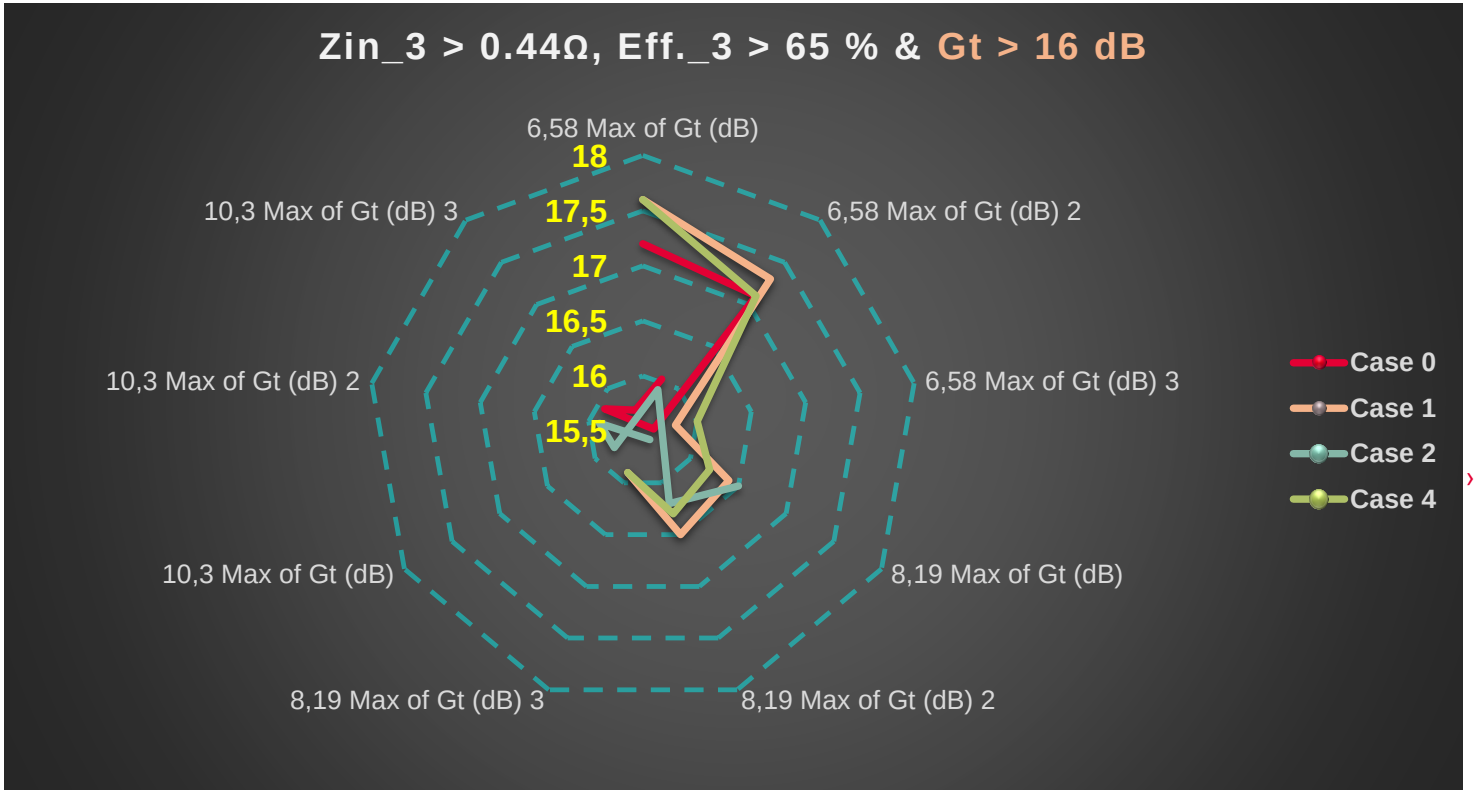


- Gain > 15,5 dB & Zin > 0,45 Ohm
- Flat response over load line
- All cases satisfy min. peak power of 46.8 dBm

Eff. & Pout @ ZL w.r.t BW config. & MOScap



MOScap selection



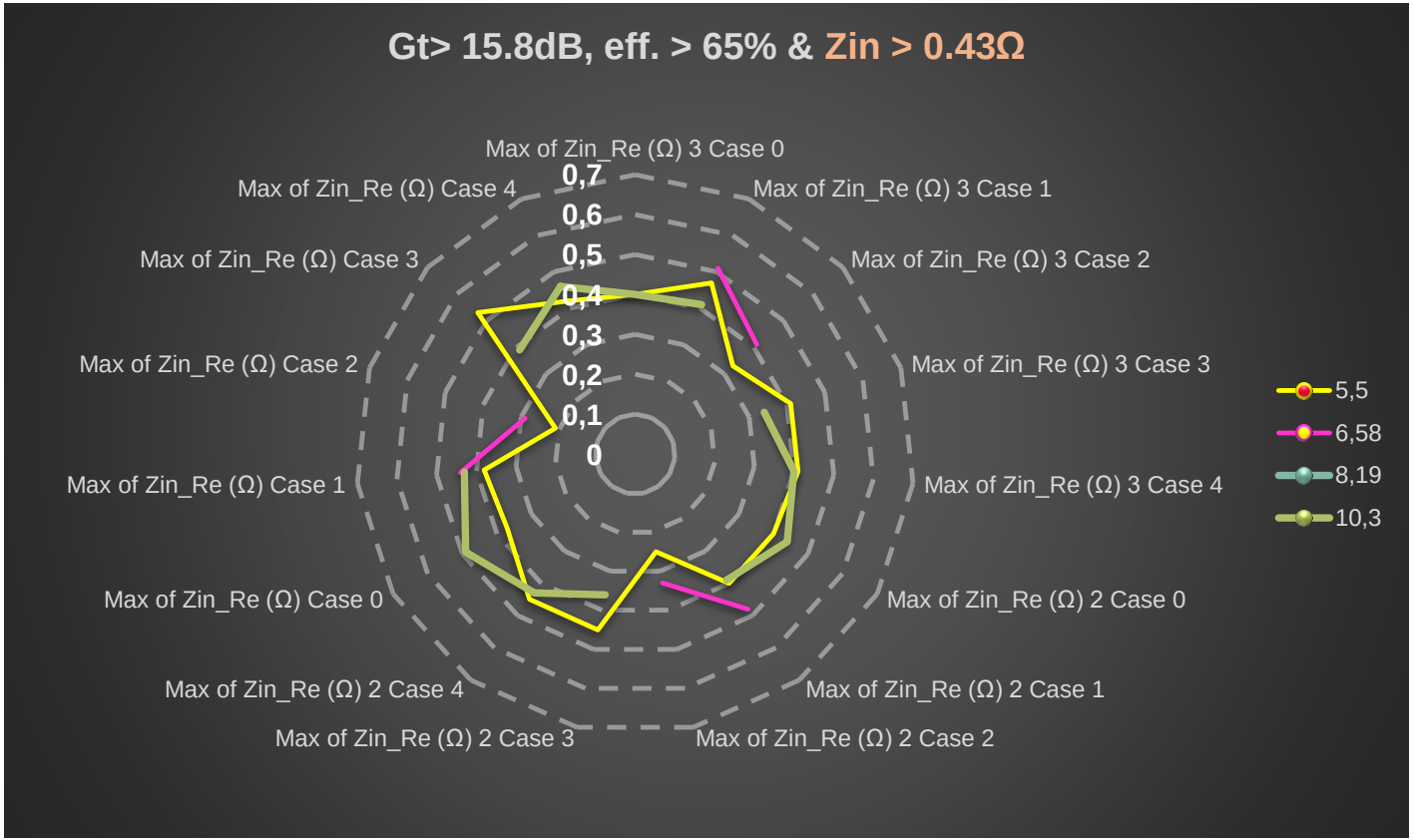
	Moscap (pF)				
Case 0	5,5	6,5	8,19	10,3	12,89
Case 1	5,5	6,5	8,19	10,3	12,89
Case 2	5,5	6,5	8,19	10,3	12,89
Case 3	5,5	6,5	8,19	10,3	12,89
Case 4	5,5	6,5	8,19	10,3	12,89

› Pass Fail

› Selected MOScap

› **6.5 pF, 8.19pF & 10.3 pF**

BW configuration selection



Moscap (pF)	BW_config.				
5,5	Case0	case1	Case 2	case3	case4
6,58	case 0	case 1	Case 2	case 3	case 4
8,19	case 0	case 1	case 2	Case 3	case 4
10,3	Case 0	Case 1	Case 2	case 3	case 4
12,89	Case 0	case 1	Case 2	Case 3	case 4

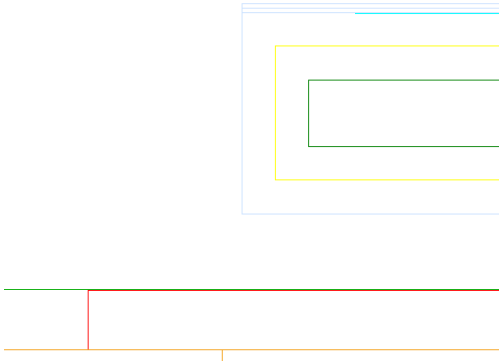
› PassFail

› Selected BW. Config

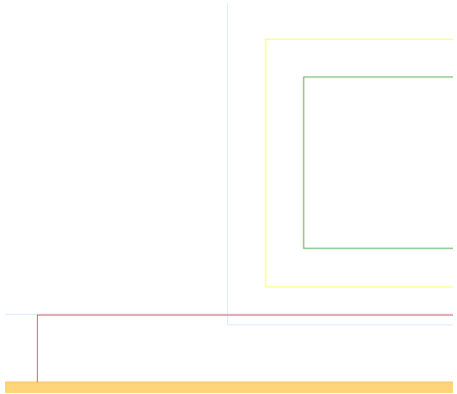
› **Case 1 & case 4**

N044 Substrate thickness

- Intially, the thickness of substrate for the Moscap with NO44 was 60um.
- The Moscap was not sitting properly in the Minipac.

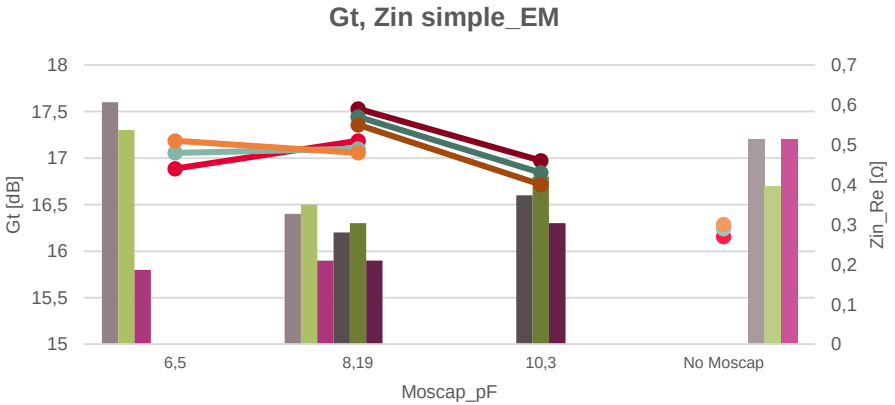


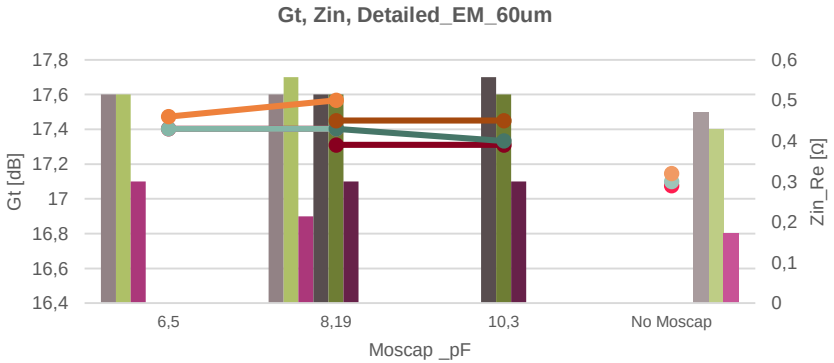
- The thickness of substrate for the Moscap with NO44 was updated to 85um.
- The Moscap is sitting properly in the Minipac.
- N044 is today not used productively in RFGaN applications.
- In LDMOS however, N044 is used at 60µm substrate thickness.
- The packaging & bonding process outside IFX RFGaN requires 85µm substrate thickness, which would be thinkable for N044 too.

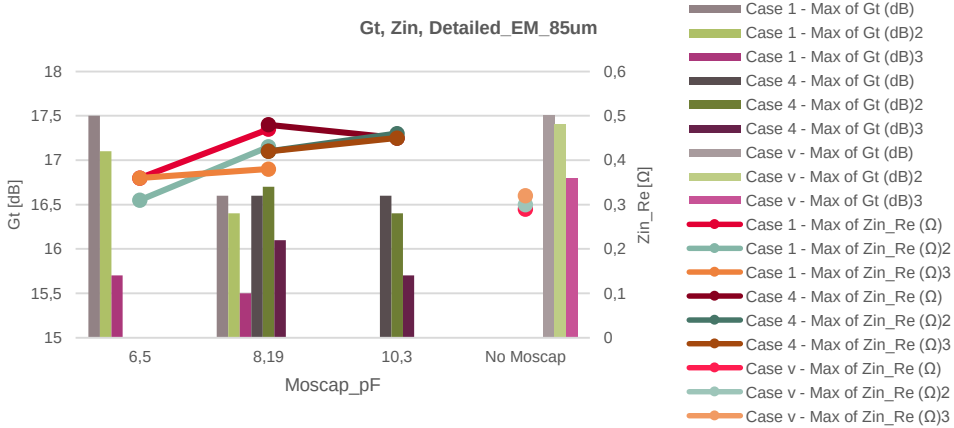


- From Theepak ShoundraBalan's PPT

DOE6_simple vs detailed EM simulation (Gt, Zin)

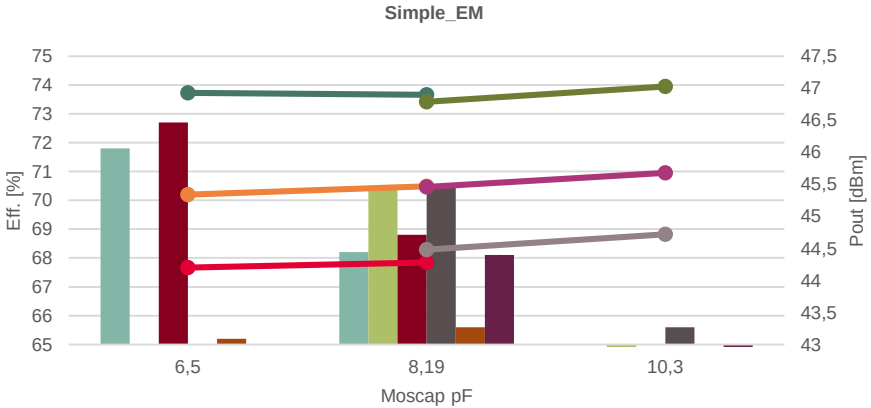


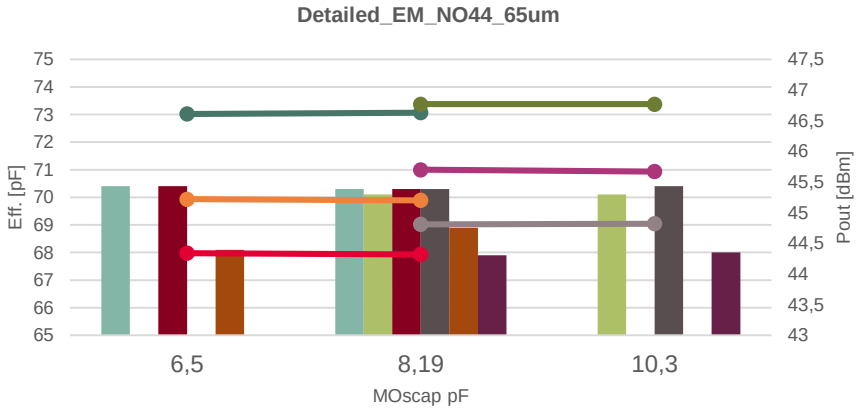


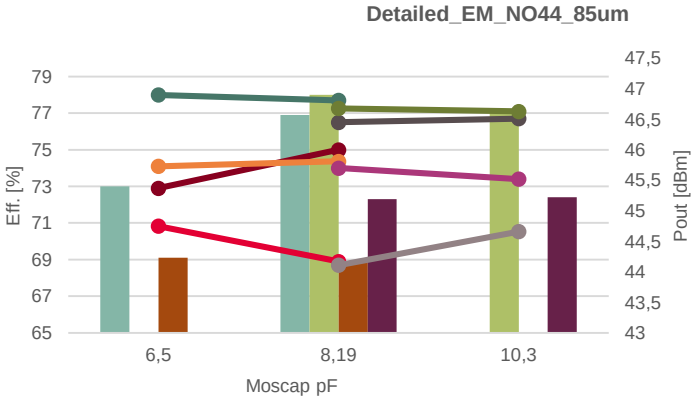


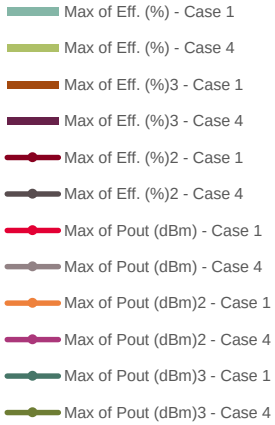
Variant	BW profile	MOScap (pF)	
DOE6_2	Case 1	N9501B_V5	6,5
DOE6_3	Case 1	N9501B_V8	8,19
DOE6_4	Case 4	N9501B_V8	8,19
DOE6_5	Case 4	N9501B_V4	10,3

DOE6_simple vs detailed EM simulation (Eff, Pout)





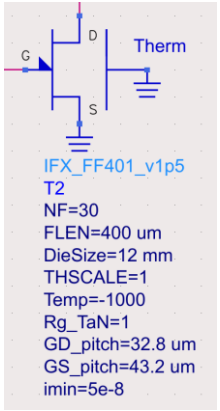


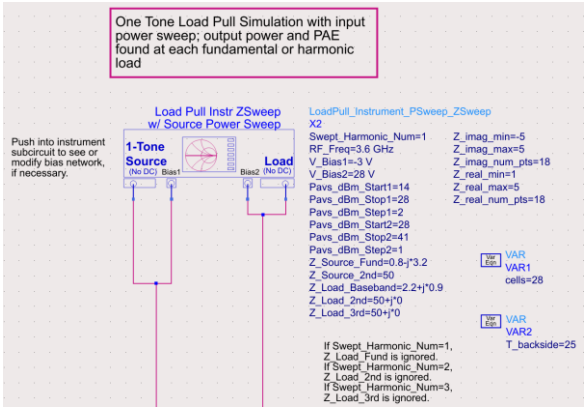


Variant	BW profile	MOScap (pF)	
DOE6_2	Case 1	N9501B_V5	6,5
DOE6_3	Case 1	N9501B_V8	8,19
DOE6_4	Case 4	N9501B_V8	8,19
DOE6_5	Case 4	N9501B_V4	10,3

Simulation Results

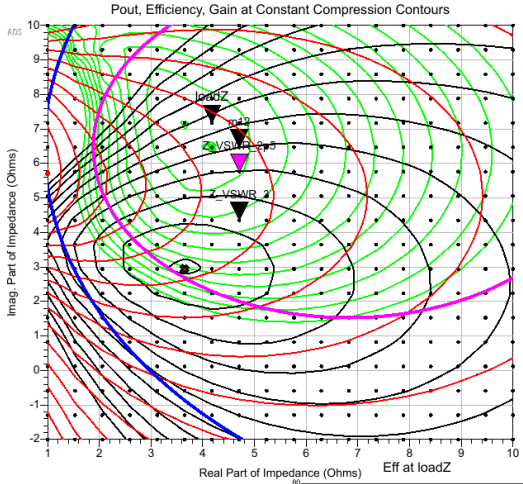
Bare die GaN Load-pull: T9505A_1

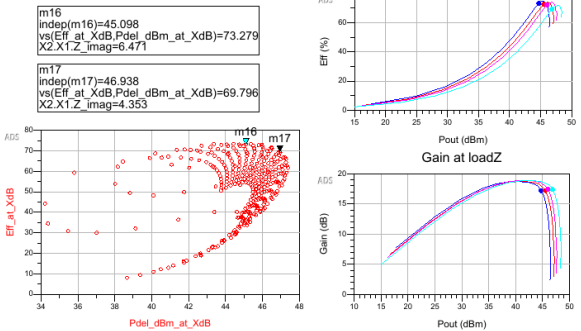




LP summary 12 mm die @ 3.6 GHz

Pout	Gt	Eff
47.3	22.8	73.4
47.0	22.0	72.0
46.5	21.0	70.0
46.0	20.0	68.0
45.5	19.0	66.0
45.0	18.0	64.0
44.5	17.0	62.0
44.0	16.0	60.0
43.5	15.0	58.0
43.0	14.0	56.0
42.5	13.0	54.0
	12.0	





Power Sweep Inspector Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.65 + j2.94

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 4.71 + j6.47

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
4.18 + j7.18	0.85 / 163.55	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.72	73.17	17.20

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-49.05	-2.52	0.23 - j1.97

✖ In plots below corresponds to this data.

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
4.71 + j6.47	0.83 / 165.12	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.49	72.63	17.21

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-45.95	-2.87	0.25 - j2.04

✖ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
4.71 + j5.76	0.83 / 166.73	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.01	72.19	17.40

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-45.41	-2.72	0.24 - j2.11

✖ In plots below corresponds to this data.

VSWR = 3 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
4.71 + j4.35	0.83 / 169.96	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.85	69.30	17.37

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-41.33	-2.75	0.24 - j2.26

✖ In plots below corresponds to this data.

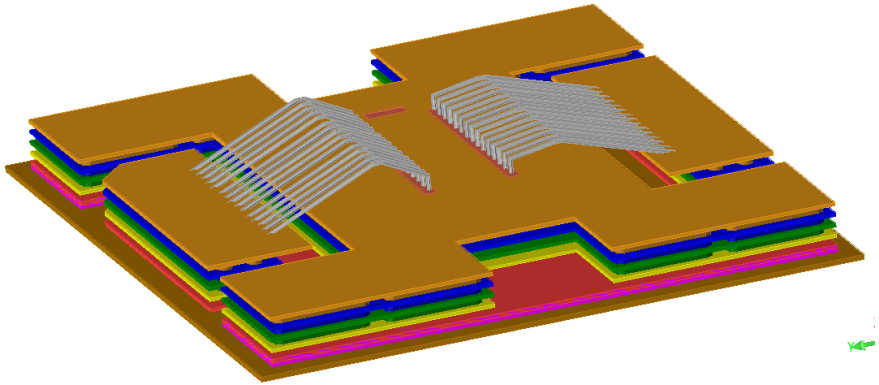
Power scaling (based on simulation)

Available dies	Device geometry (mm)	Power scaling	Power scaling (W/mm)	Power deliverd (dBm)	Power deliverd (W)	
P19	5,76	(24x240um)				
P6	5,76	36x160um				
P3	4,8	30x160um	3,88	42,7	18,62	
P14	5,12	16X320um				
P76	10,1	42x240 um				
T9503A_1	12	30X400um	5,48	48,18	65,77	
P39	11,52	36x320um				
P35	10,24	32x320um				
T9507B_2	2,4	6x400um				
P47_RF	1,92	8X240um				
P13	3,84	12X320um				
P10	3,84	16X240um				
P15	6,4	20X320um				
P15	6,4	20X320um				

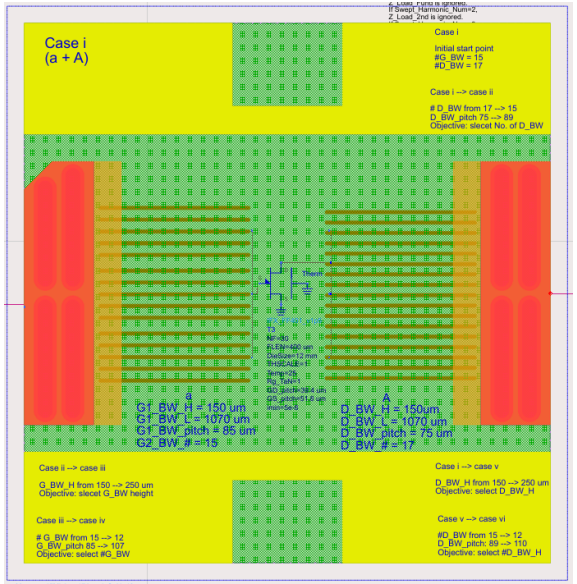
- Update for
- P1.5 dB, P3dB

- 12 mm die has lot of power
  - 65 W worst case vs needed 45 W worst case
  - Can be made operated slightly lower than Class C enabling Main to match for more gain
- Input matching can be designed for Max gain & reasonable gain still having enough power to deliver.

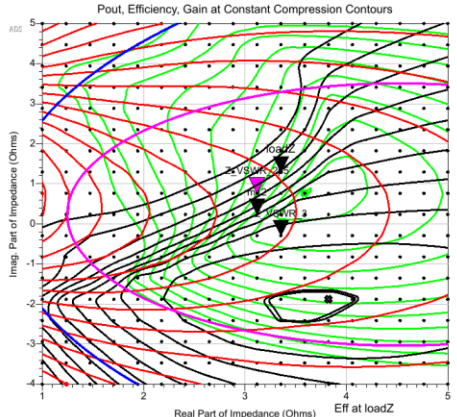
BW + GaN + LAC3839: Simple EM simulation



Case i: a+A

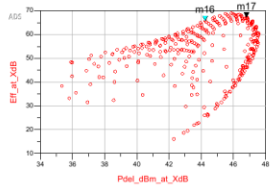


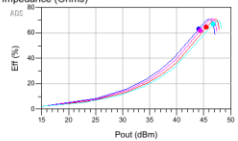
Pout	Gt	Eff
47.5	23.2	68.9
47.5	23.0	68.0
47.0	22.0	66.0
46.5	21.0	64.0
46.0	20.0	62.0
45.5	19.0	60.0
45.0	18.0	58.0
44.5	17.0	56.0
44.0	16.0	54.0
43.5	15.0	52.0
43.0	14.0	50.0



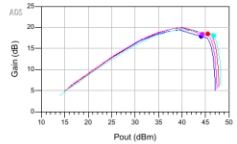
m16
indep(m16)=44.246
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=65.773
X2.X1:Z_imag=2.353

m17
indep(m17)=46.813
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=67.235
X2.X1:Z_imag=-0.294





Gain at loadZ



Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.82 - j1.88

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.12 + j0.24

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 + j1.29	0.87 / 177.02	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.05	63.01	17.91

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-58.10	-5.31	0.32 + j2.75

✕ In plots below corresponds to this data.

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.12 + j0.24	0.88 / 179.46	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.49	64.54	18.49

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-59.86	-4.28	0.25 + j2.66

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.12 + j0.76	0.88 / 178.24	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.31	61.87	18.41

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-59.94	-4.38	0.26 + j2.70

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

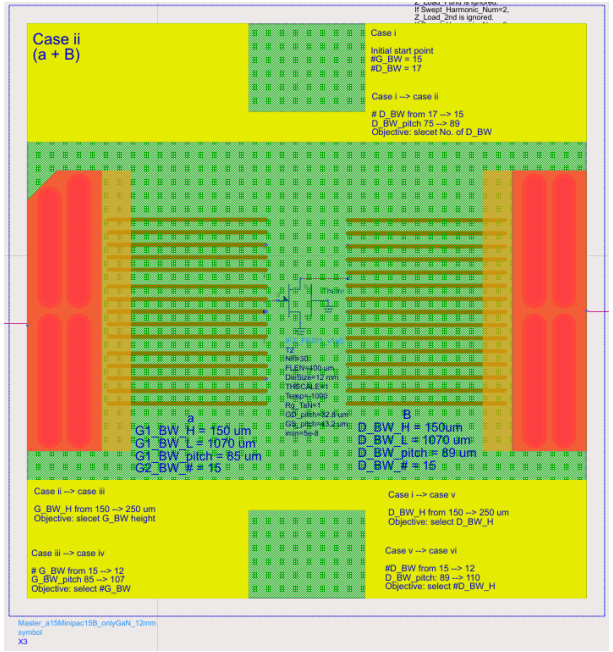
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 - j0.29	0.87 / -179.32	1.50

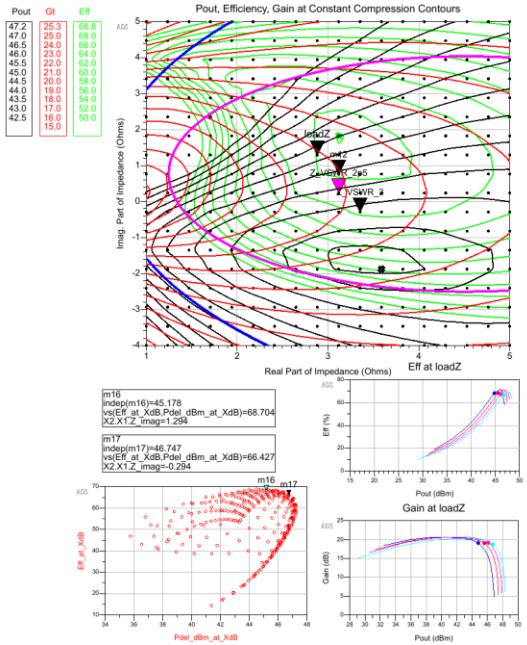
Pout (dBm)	Eff (%)	Gt (dB)
46.74	66.98	18.08

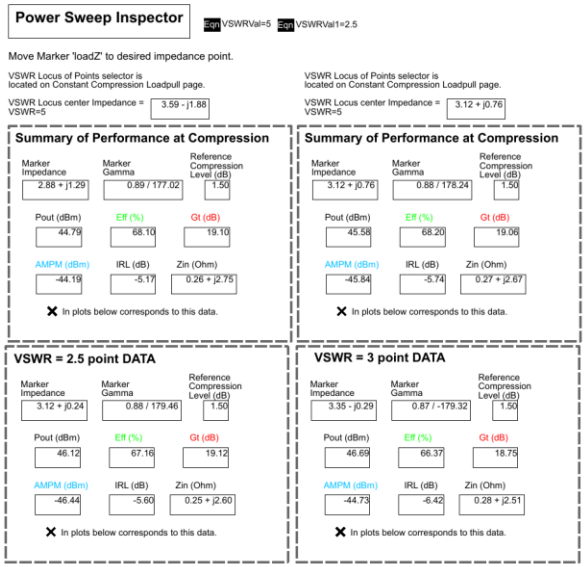
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-56.45	-5.01	0.28 + j2.60

✕ In plots below corresponds to this data.

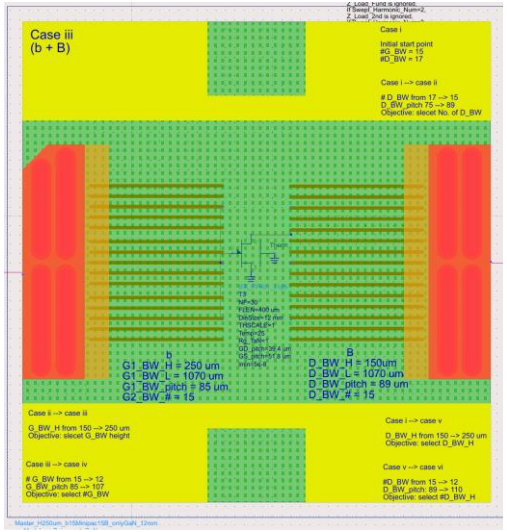
Case ii: a + B



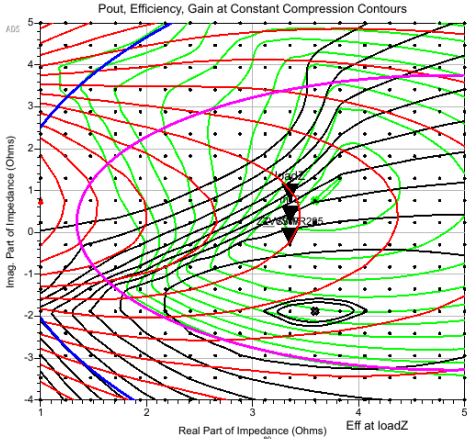


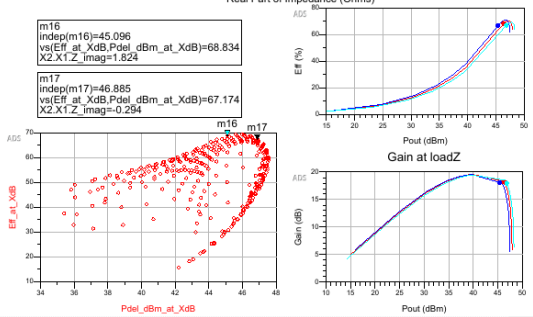


Case iii: b + B



Pout	Gt	Eff
47.5	22.9	69.2
47.5	22.0	68.0
47.0	21.0	66.0
46.5	20.0	64.0
46.0	19.0	62.0
45.5	18.0	60.0
45.0	17.0	58.0
44.5	16.0	56.0
44.0	15.0	54.0
43.5	14.0	52.0
43.0	13.0	50.0
	12.0	





Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.59 - j1.88

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.35 + j0.24

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 + j0.76	0.87 / 178.24	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.38	66.75	18.08

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-59.63	-5.38	0.32 + j3.45

✕ In plots below corresponds to this data.

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 + j0.24	0.87 / 179.46	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.37	68.39	18.12

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-59.10	-5.38	0.31 + j3.40

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 - j0.29	0.87 / -179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.83	66.99	17.98

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-56.30	-5.43	0.31 + j3.32

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

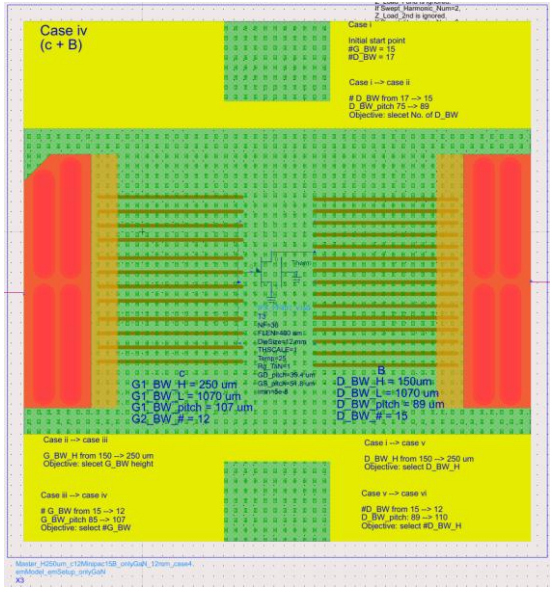
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 - j0.29	0.87 / -179.32	1.50

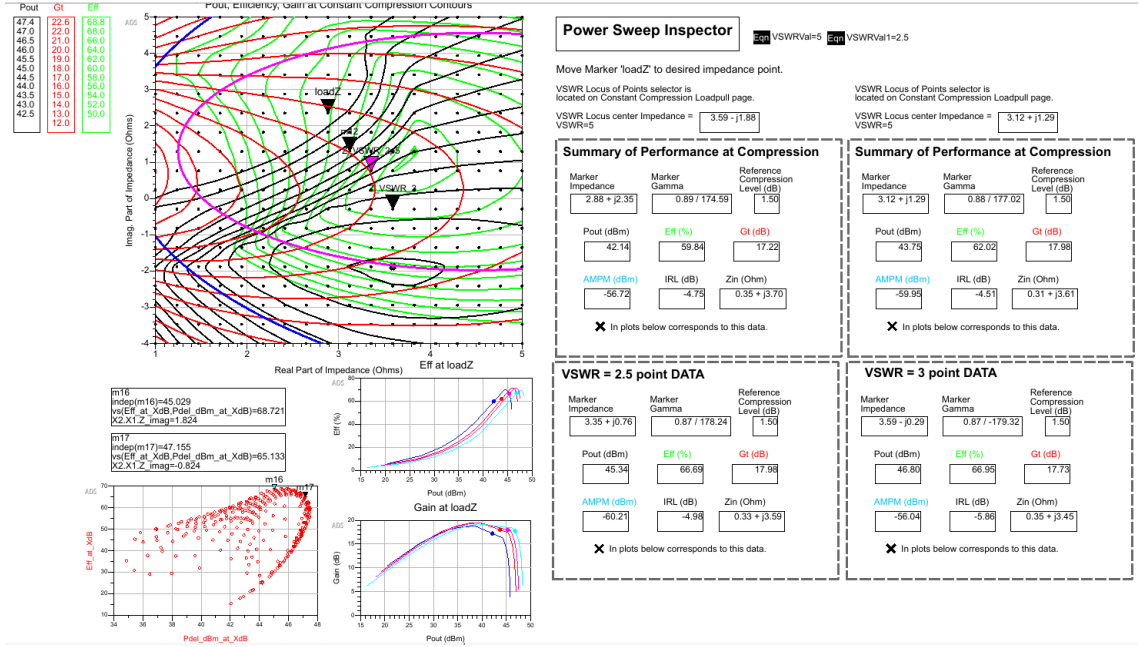
Pout (dBm)	Eff (%)	Gt (dB)
46.83	66.99	17.98

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-56.30	-5.43	0.31 + j3.32

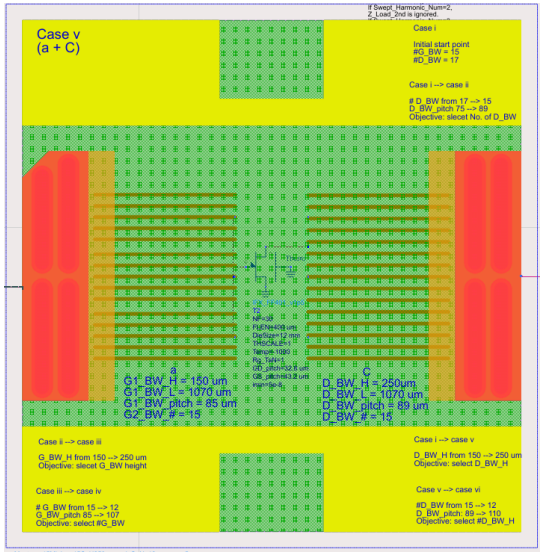
✕ In plots below corresponds to this data.

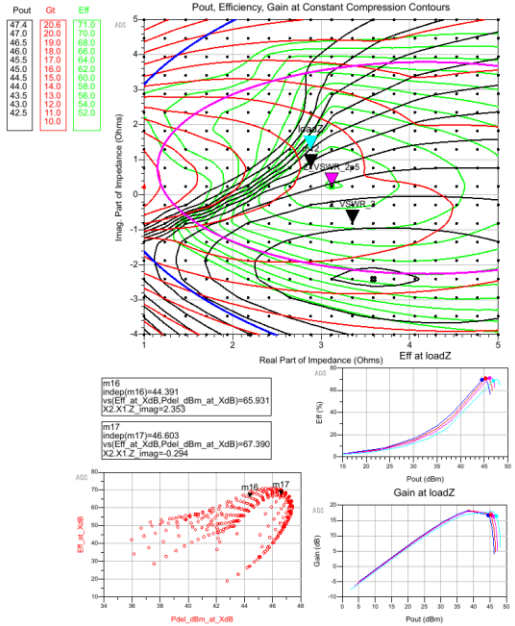
Case iv: c + B

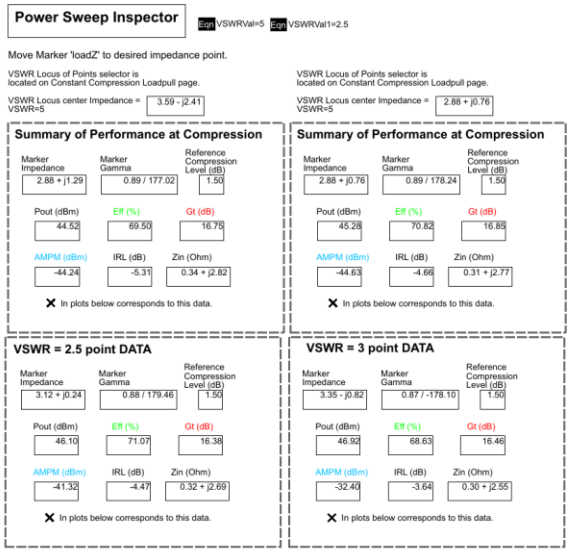




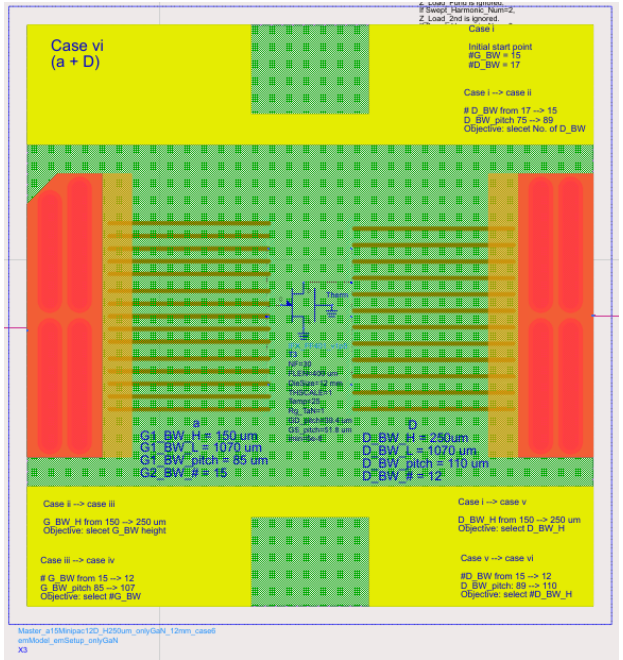
Case v: a + C 3,6 GHz

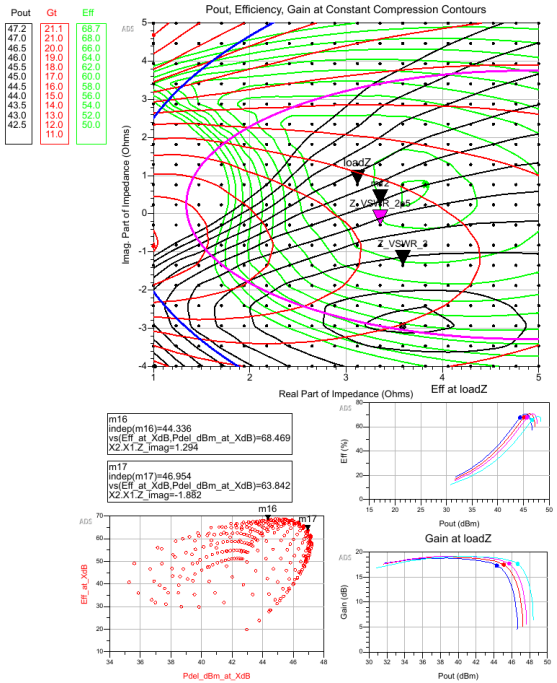






Case vi: a + D





Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = 3.59 - j2.94
VSWR=5

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.12 + j0.76	0.88 / 178.24	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.32	67.66	17.28

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-32.13	-3.26	0.30 + j2.76

✕ In plots below corresponds to this data.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = 3.35 + j0.24
VSWR=5

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 + j0.24	0.87 / 179.46	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.10	68.01	17.47

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-33.20	-3.55	0.31 + j2.70

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 - j0.29	0.87 / -179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.70	67.92	17.70

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-33.99	-3.56	0.29 + j2.64

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.59 - j1.35	0.87 / -176.88	1.50

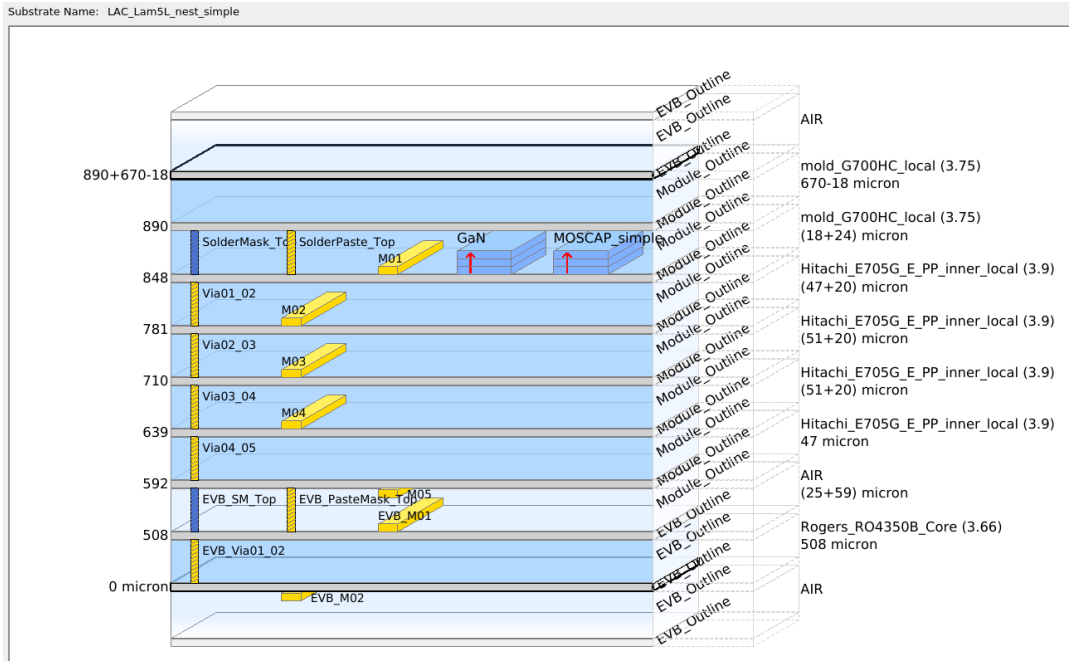
Pout (dBm)	Eff (%)	Gt (dB)
46.67	65.74	17.62

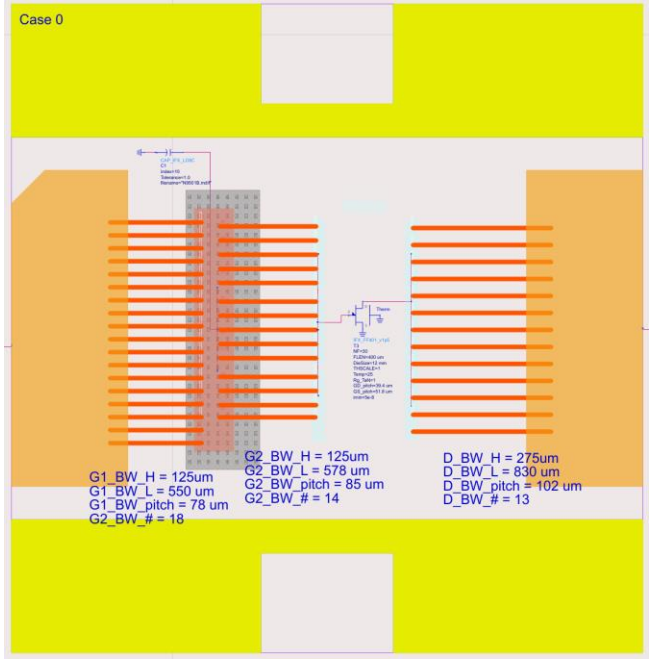
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-33.36	-4.39	0.31 + j2.49

✕ In plots below corresponds to this data.

LP simulations with simple EM model

Case 0

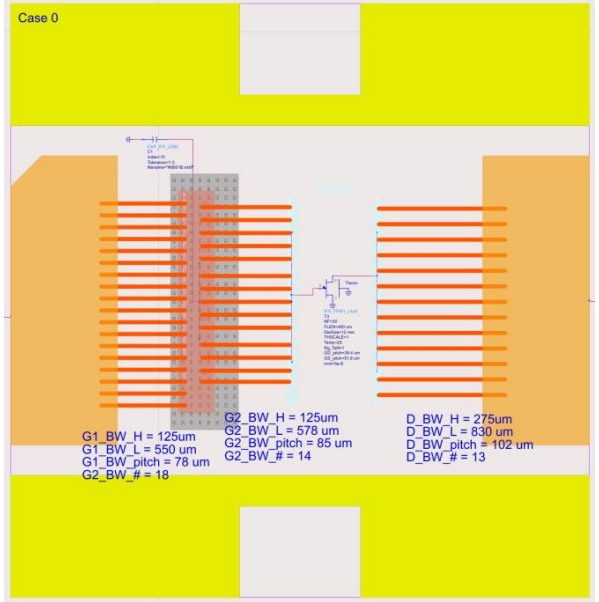




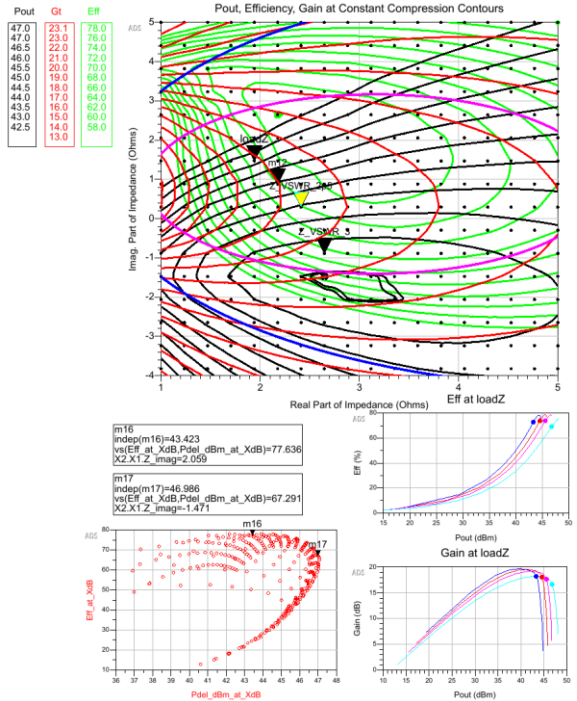
+

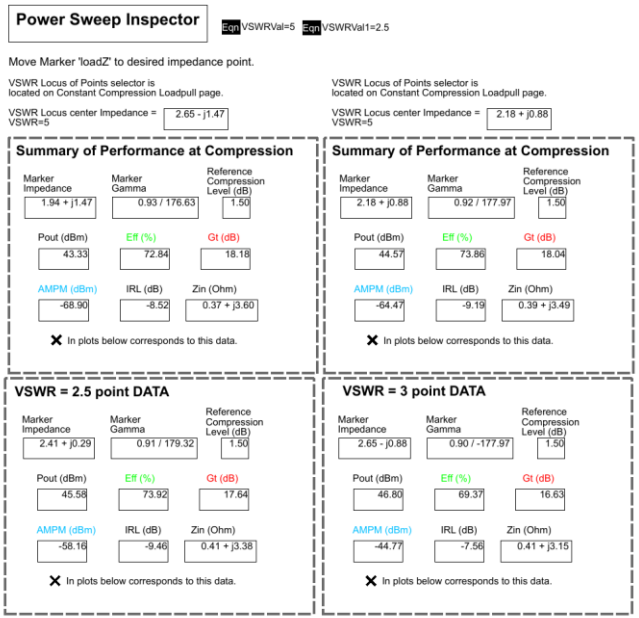
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,5
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19

Case 0 : Moscap 5,5 pF (index 10), P1.5dB,

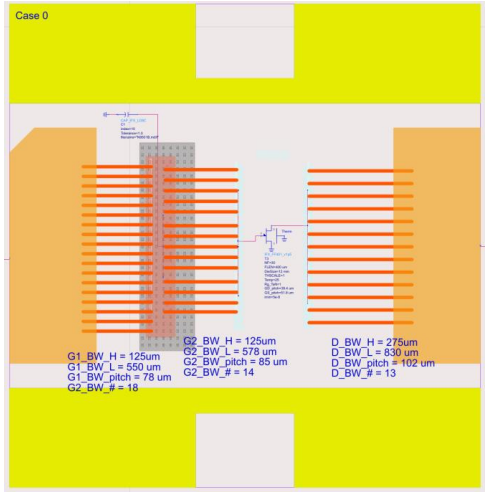


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

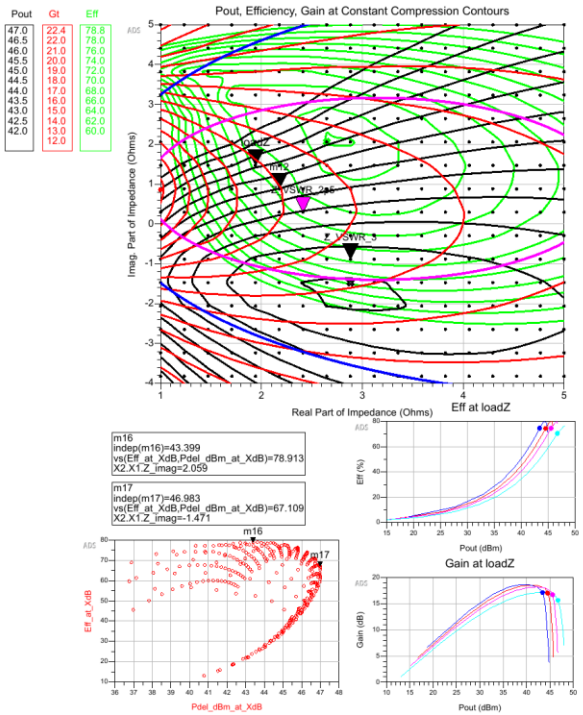


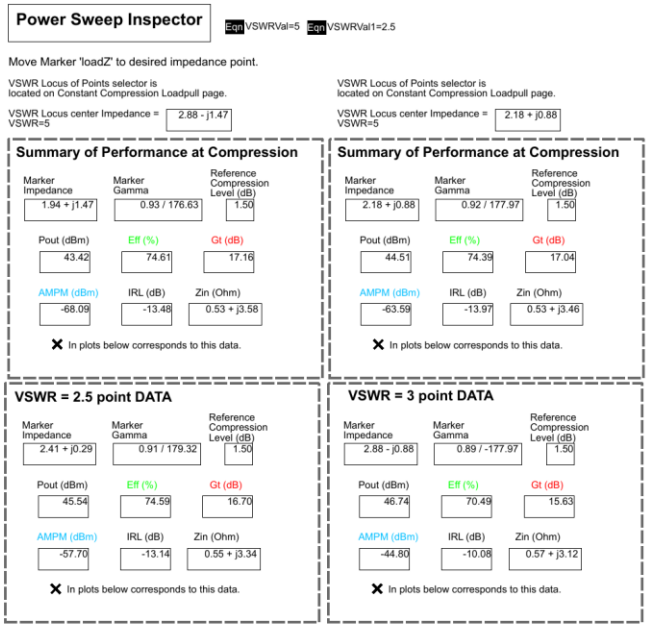


Case 0: Moscap 6,58pF (index 6), P1.5dB

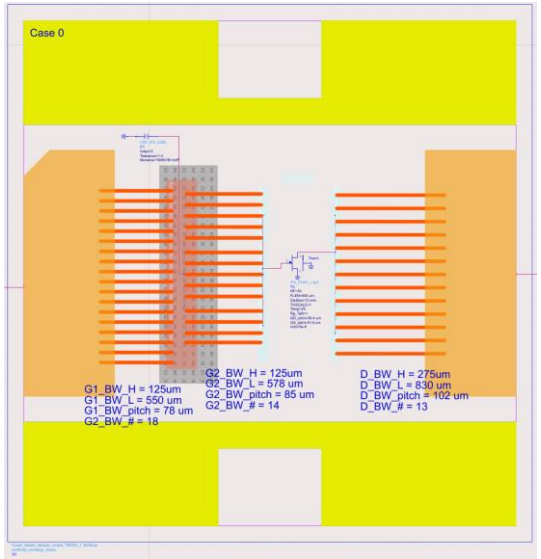


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

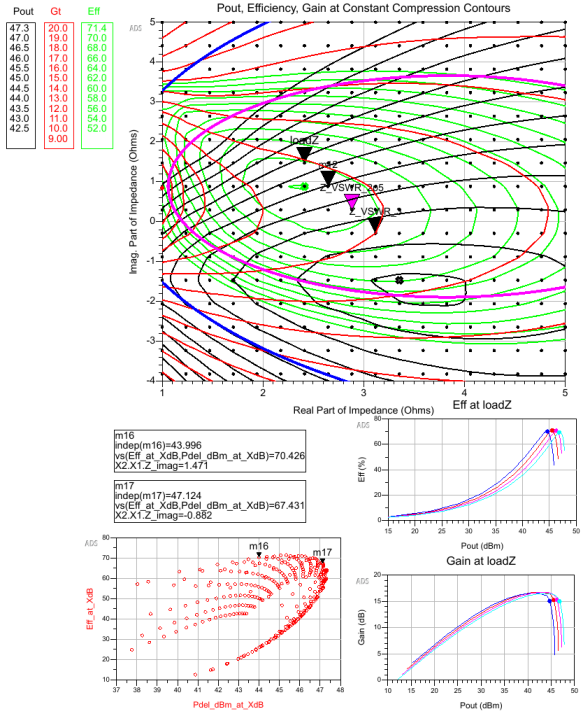


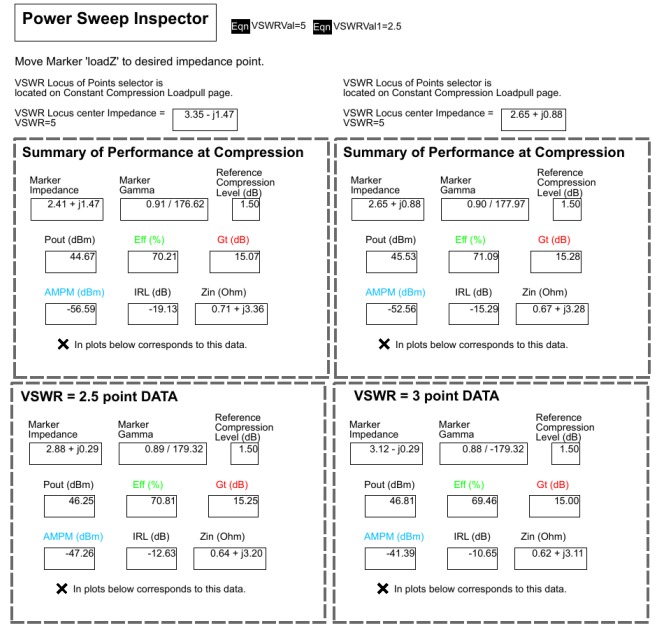


Case 0: Moscap 8,19pF (index 19), P1.5dB

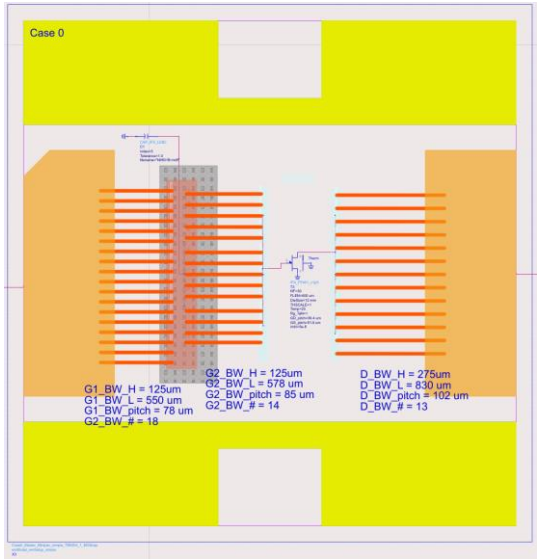


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

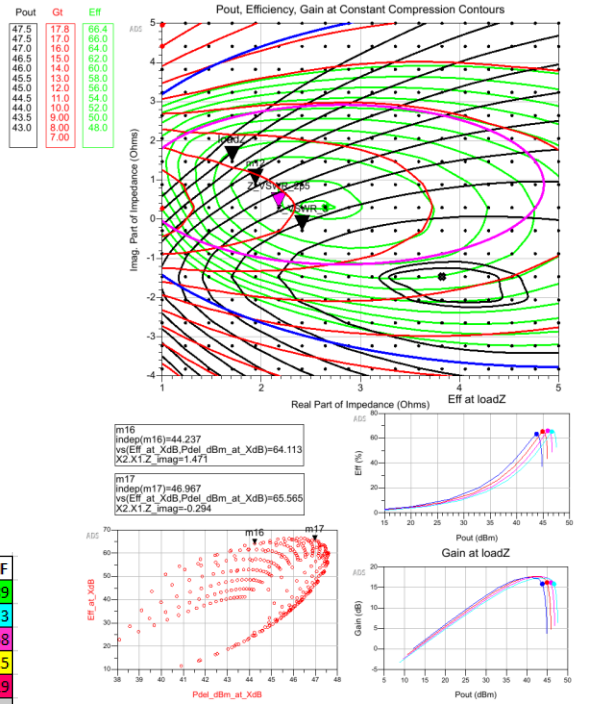


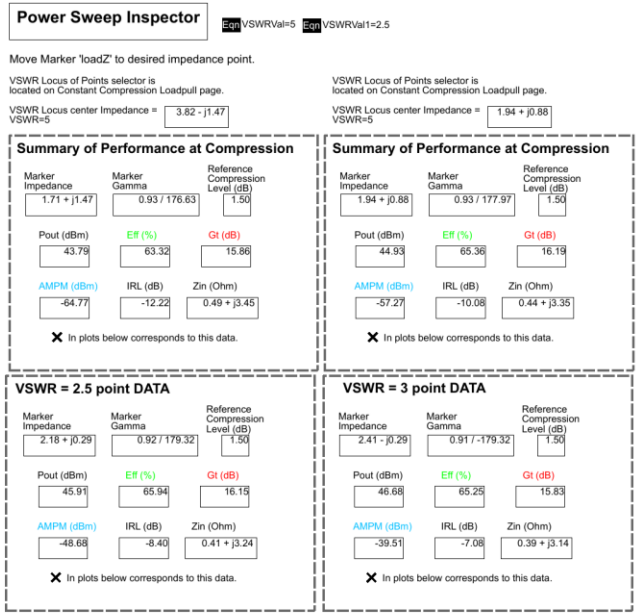


Case 0: Moscap 10,3pF (index 5), P1.5dB

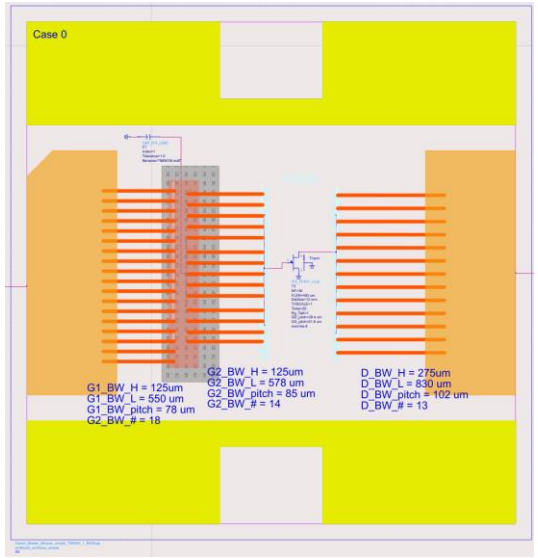


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

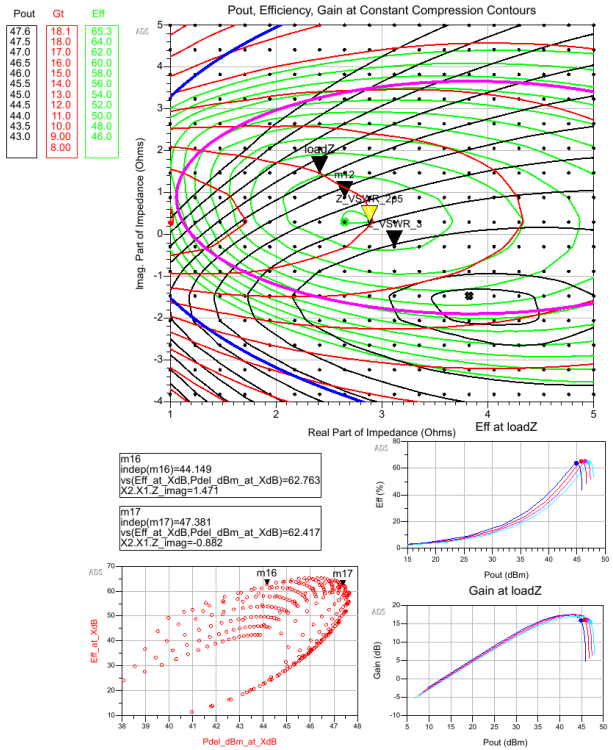


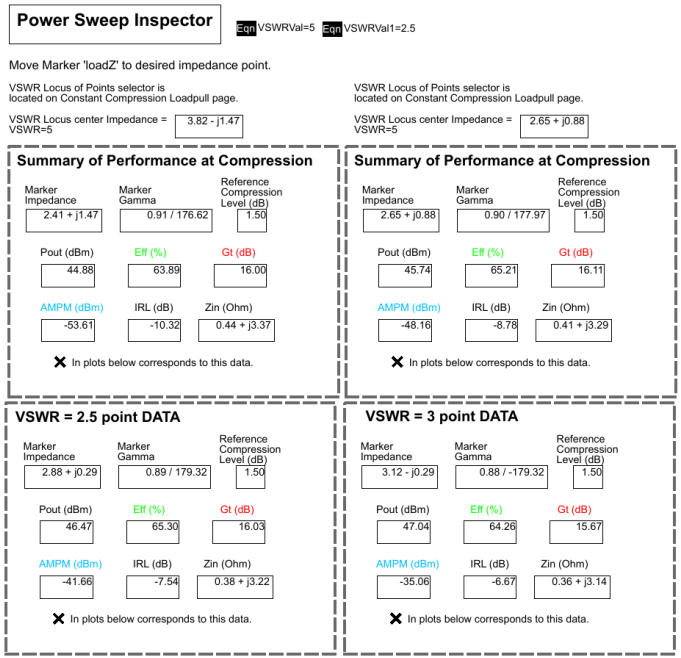


Case 0: Moscap 12,89pF (index 1), P1.5dB



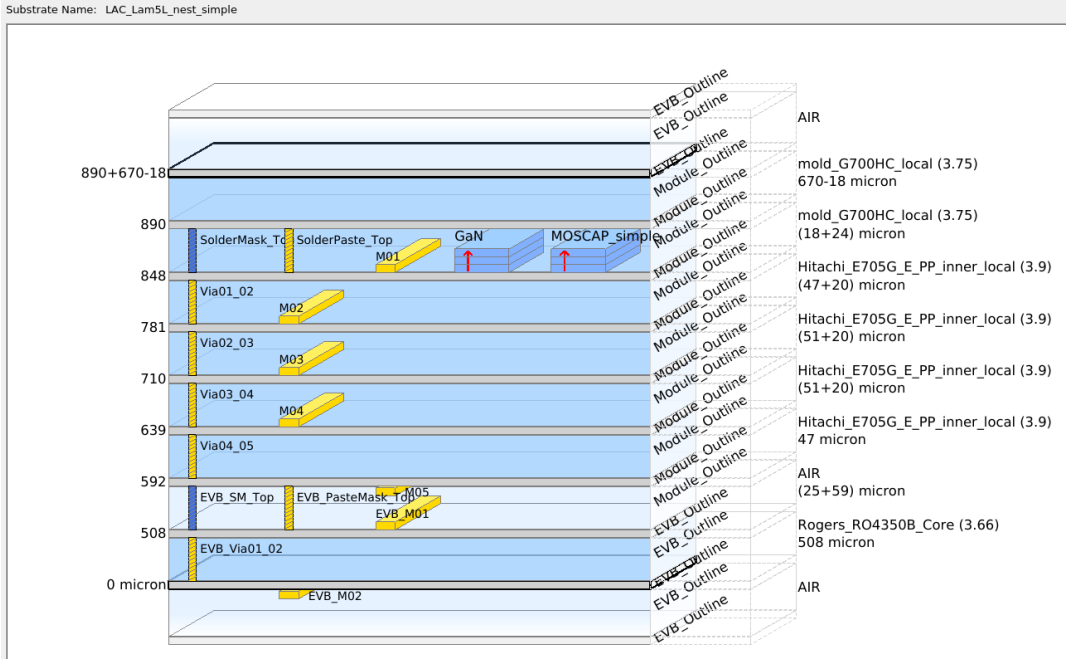
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

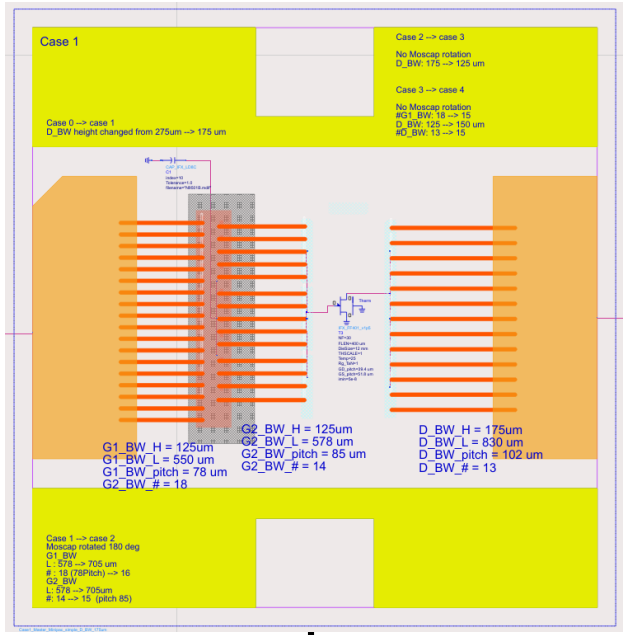




LP simulations with simple EM model

Case 1





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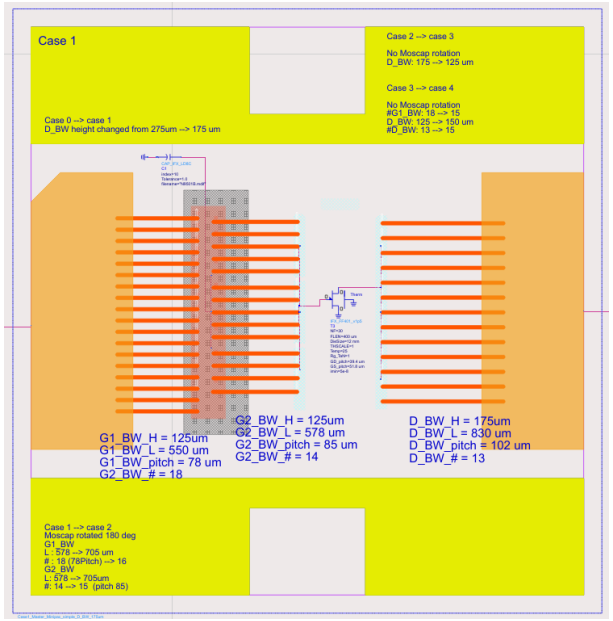
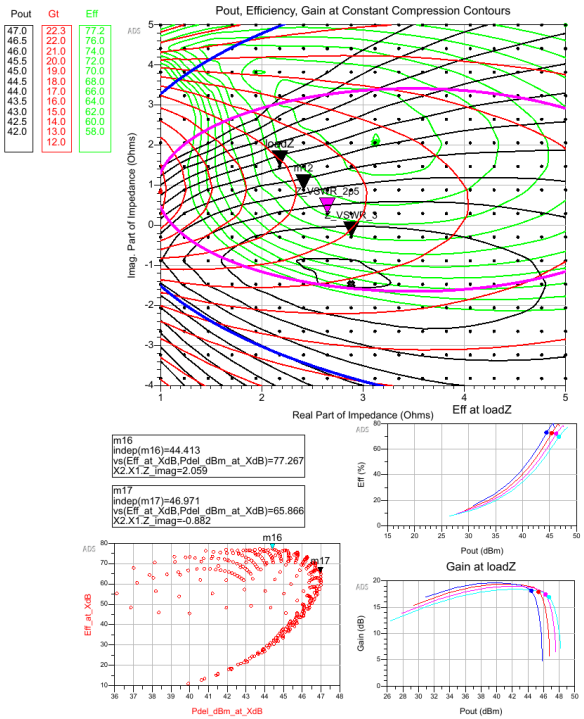
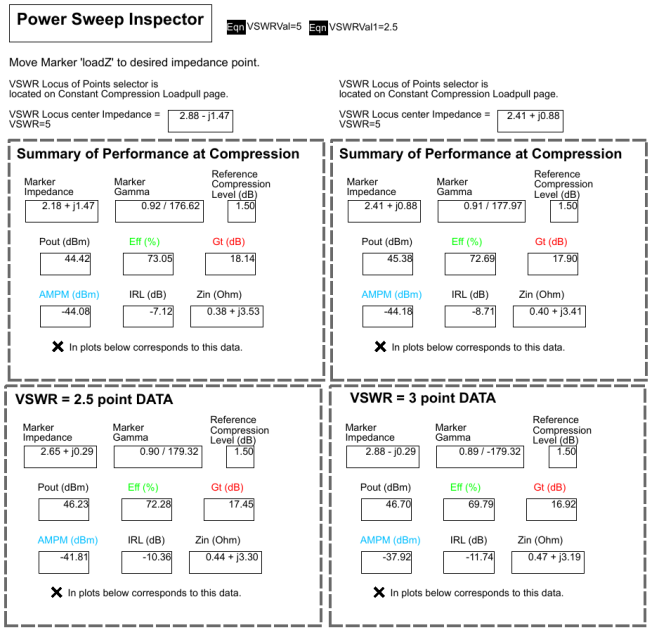
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,5
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19

Case 1 : Moscap 5,5 pF (index 10), P1.5dB,

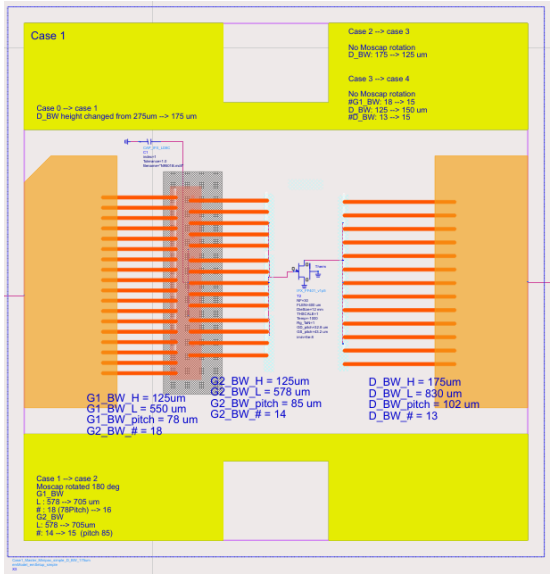


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8



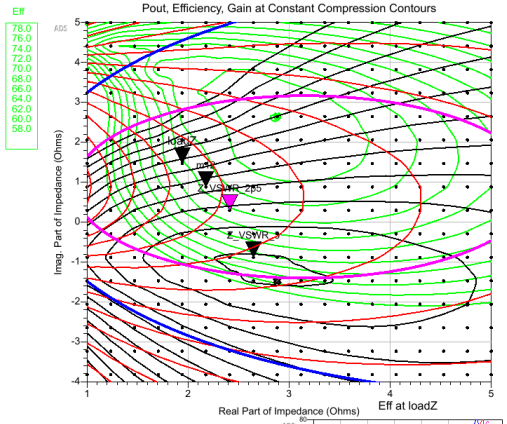


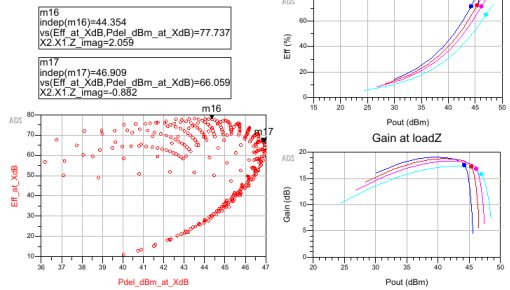
Case 1: Moscap 6,58pF (index 6), P1.5dB



Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

Pout	Gt	Eff
46.9	21.3	78.0
46.5	21.0	76.0
46.0	20.0	74.0
45.5	19.0	72.0
45.0	18.0	70.0
44.5	17.0	68.0
44.0	16.0	66.0
43.5	15.0	64.0
43.0	14.0	62.0
42.5	13.0	60.0
42.0	12.0	58.0





Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 2.88 - j1.47

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 2.18 + j0.88

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
1.94 + j1.47	0.93 / 176.63	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.19	71.79	17.57

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-46.13	-8.34	0.44 + j3.53

✕ In plots below corresponds to this data.

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.18 + j0.88	0.92 / 177.97	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.34	72.68	17.30

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-45.64	-10.66	0.48 + j3.40

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.41 + j0.29	0.91 / 179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.12	71.71	16.84

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-42.18	-12.90	0.51 + j3.27

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

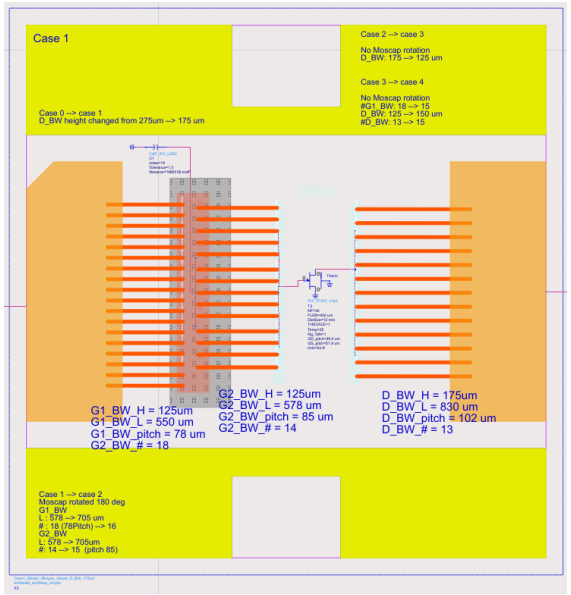
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.65 - j0.88	0.90 / -177.97	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.93	65.18	15.81

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-32.65	-11.96	0.51 + j3.03

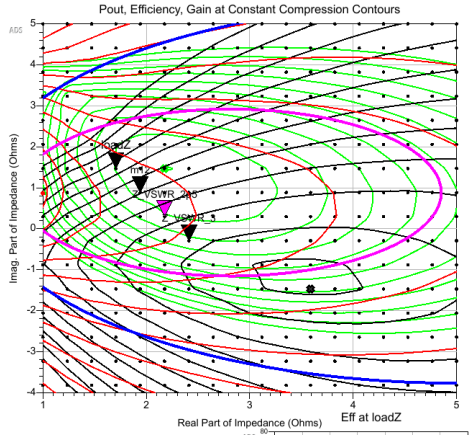
✕ In plots below corresponds to this data.

Case 1: Moscap 8,19pF (index 19), P1.5dB



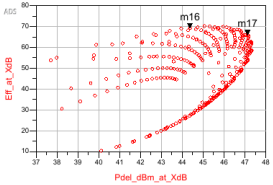
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

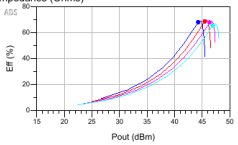
Pout	Gt	Eff
47.3	19.4	70.1
47.0	19.0	68.0
46.5	18.0	66.0
46.0	17.0	64.0
45.5	16.0	62.0
45.0	15.0	60.0
44.5	14.0	58.0
44.0	13.0	56.0
43.5	12.0	54.0
43.0	11.0	52.0
42.5	10.0	50.0
	9.00	

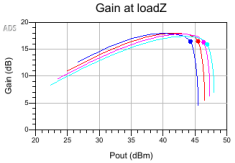


m16
indep(m16)=44.365
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=69.237
X2.X1.Z_imag=2.059

m17
indep(m17)=47.122
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=65.900
X2.X1.Z_imag=-0.294







Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.59 - j1.47

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
1.71 + j1.47	0.93 / 176.63	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.28	68.18	16.42

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-52.02	-10.81	0.51 + j3.45

✕ In plots below corresponds to this data.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 1.94 + j0.88

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
1.94 + j0.88	0.93 / 177.97	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.47	68.79	16.47

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-48.13	-11.81	0.49 + j3.32

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.18 + j0.29	0.92 / 179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.34	67.81	16.25

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-41.63	-12.07	0.48 + j3.19

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

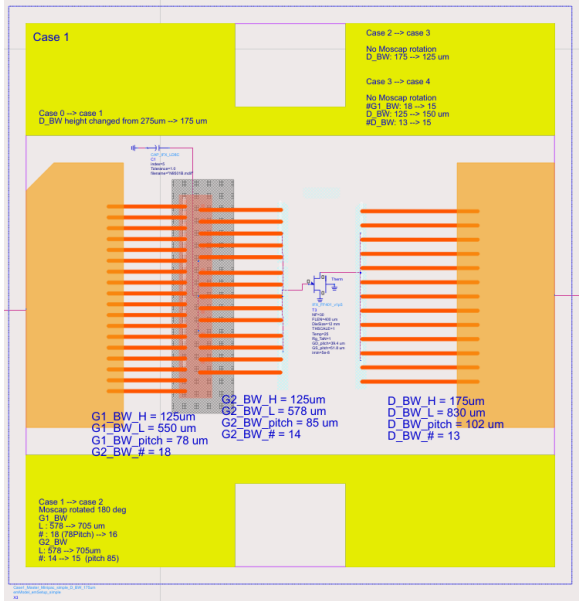
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.41 - j0.29	0.91 / -179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.90	65.57	15.88

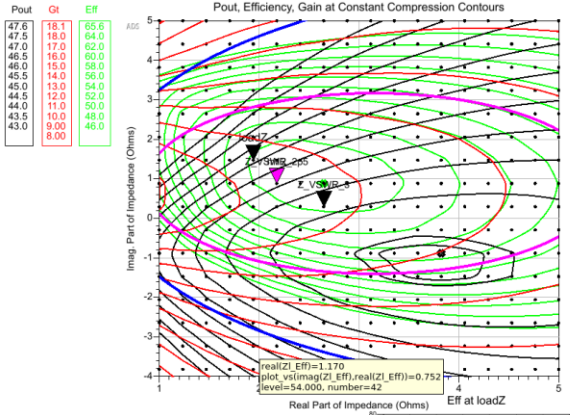
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-34.28	-11.32	0.48 + j3.07

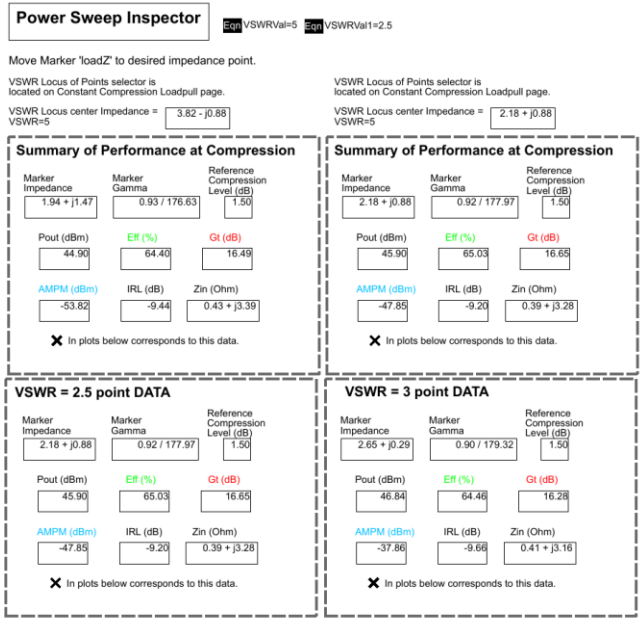
✕ In plots below corresponds to this data.

Case 1: Moscap 10,3pF (index 5), P1.5dB

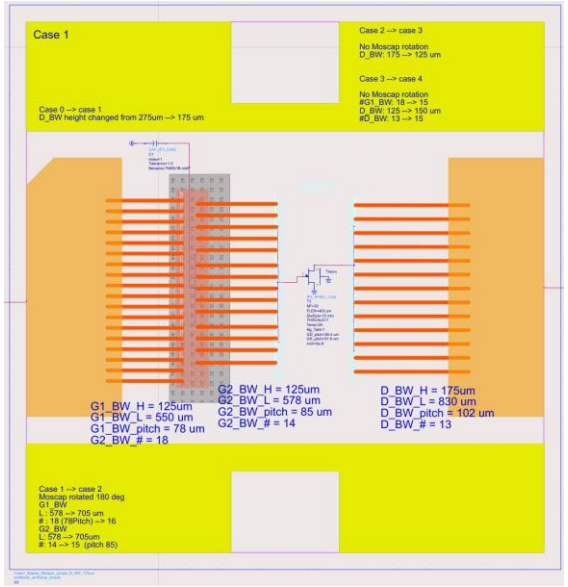


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

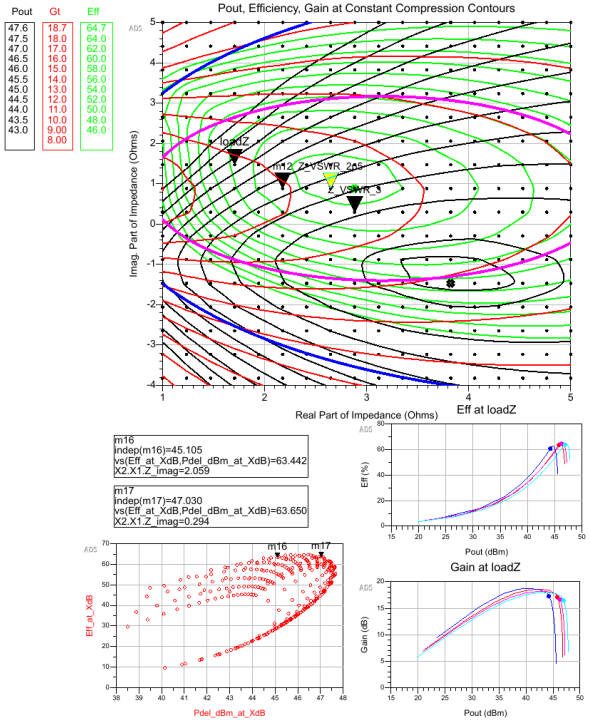


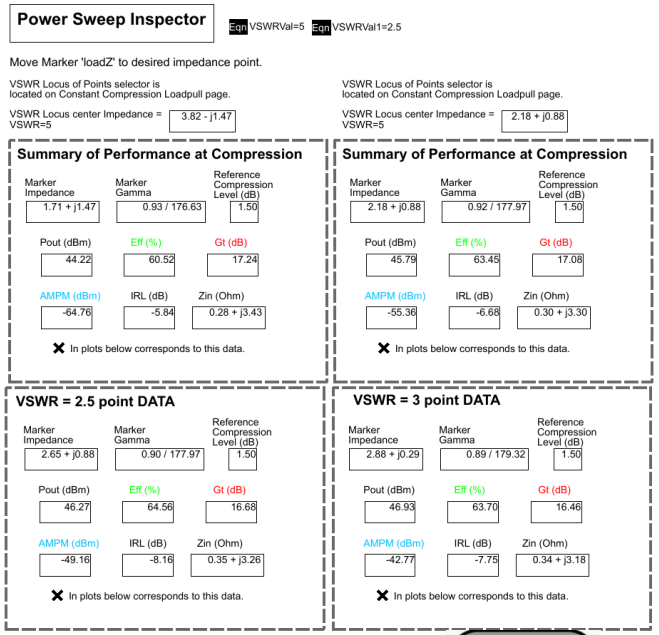


Case 1: Moscap 12,89pF (index 1), P1.5dB



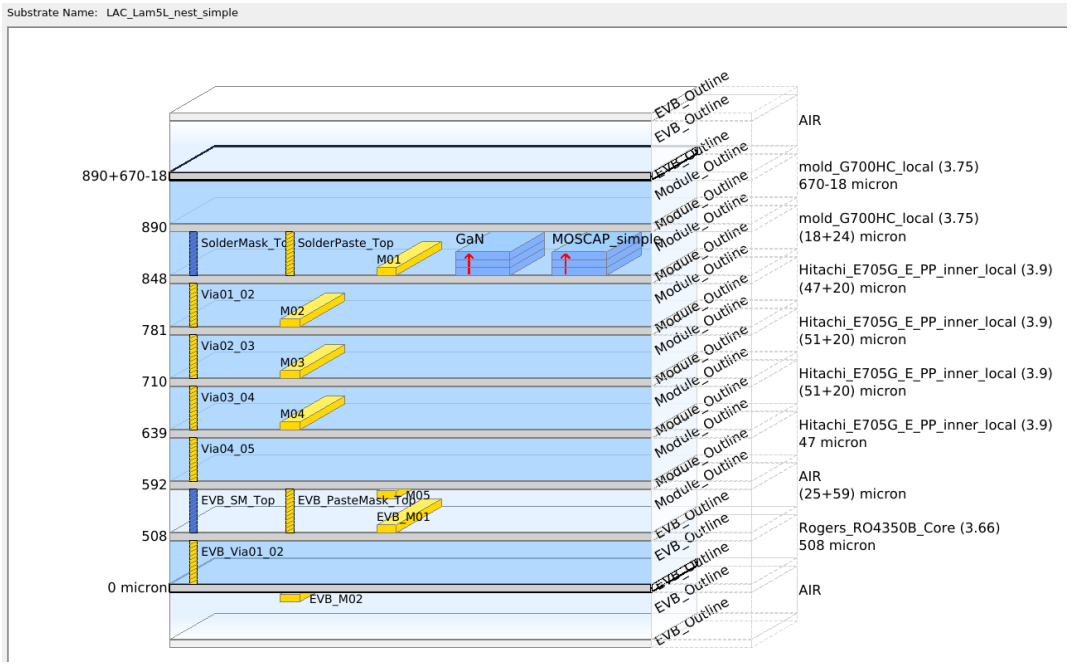
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

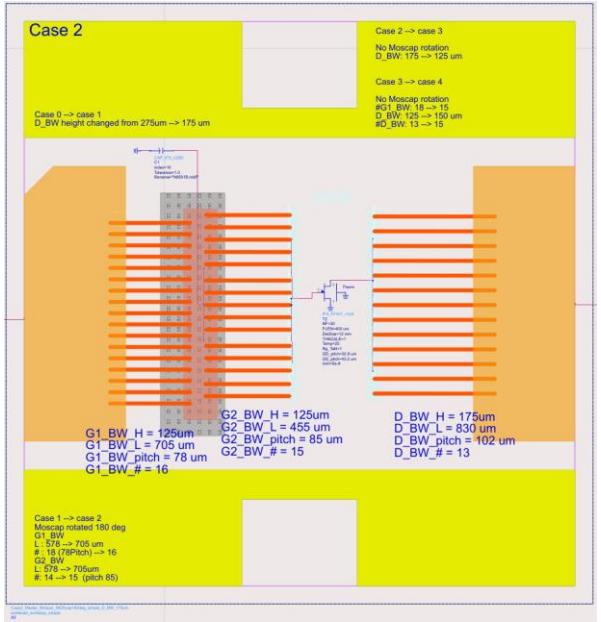




LP simulations with simple EM model

Case 2

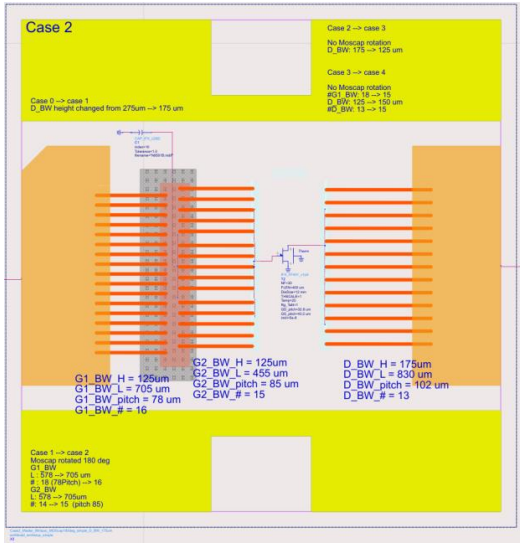




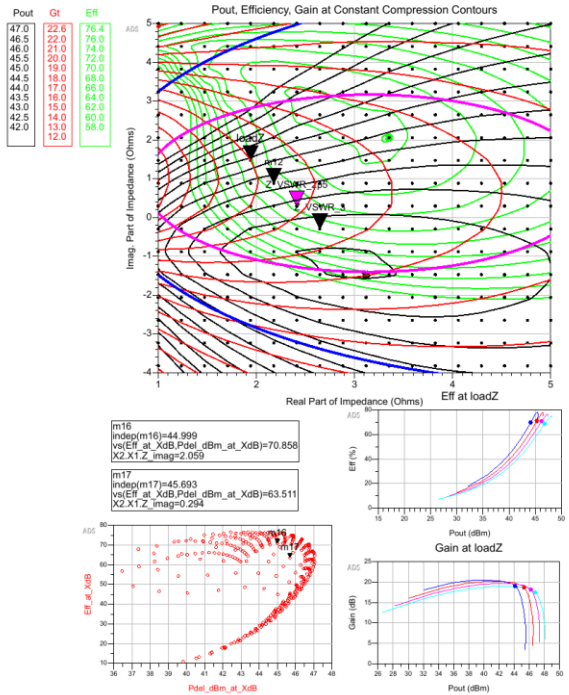
+

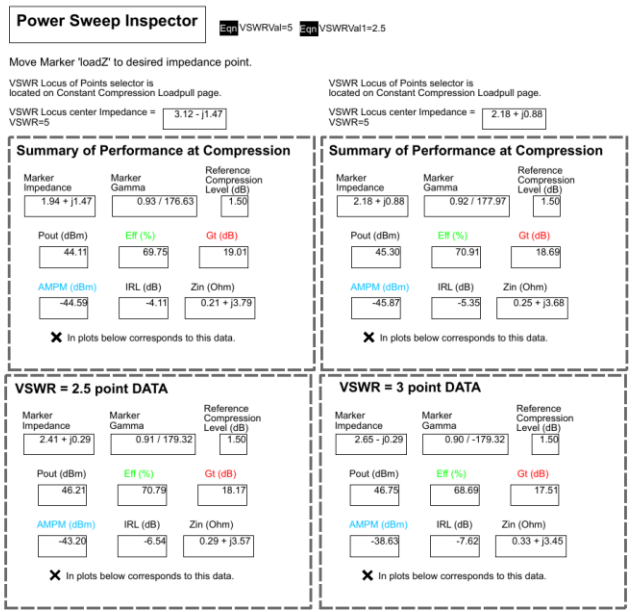
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,5
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19

Case 2 : Moscap rotate 180 deg (5,5 pF: index 10)

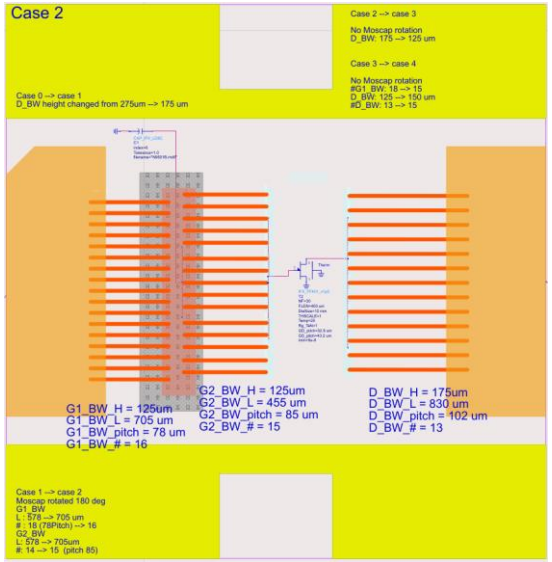


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

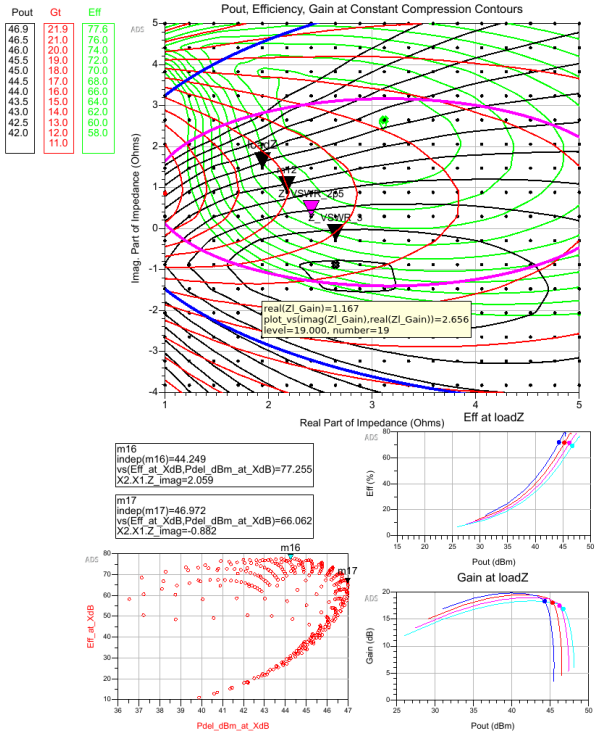


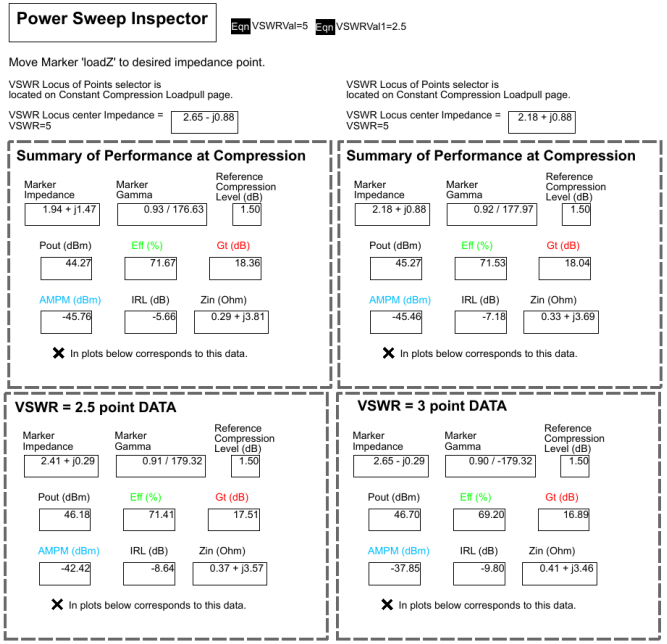


Case 2 : Moscap rotate 180 deg (6.58 pF: index 6)

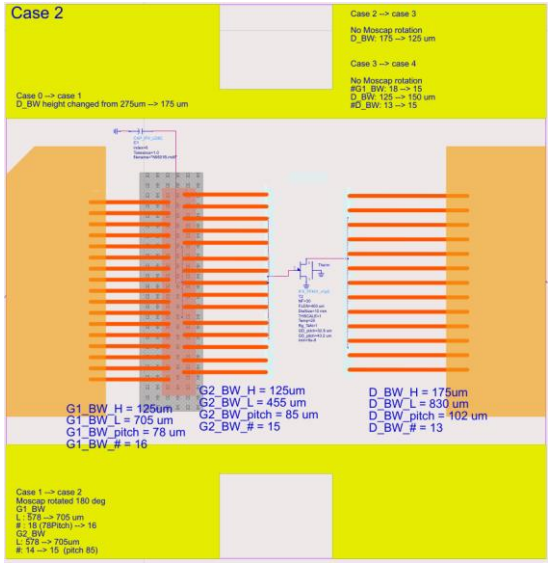


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

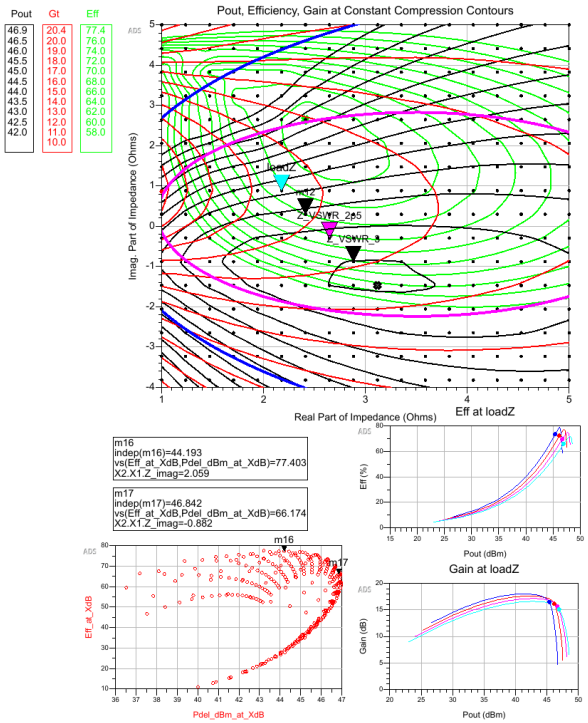


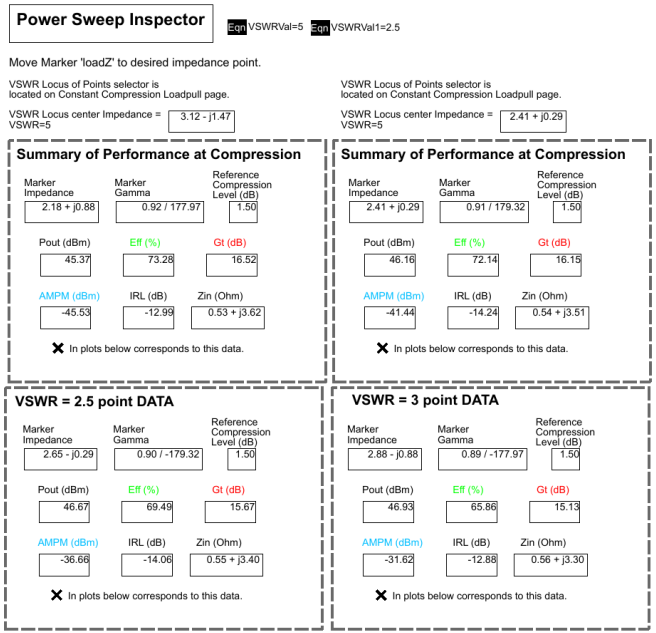


Case 2 : Moscap rotate 180 deg (8,19 pF: index 19)

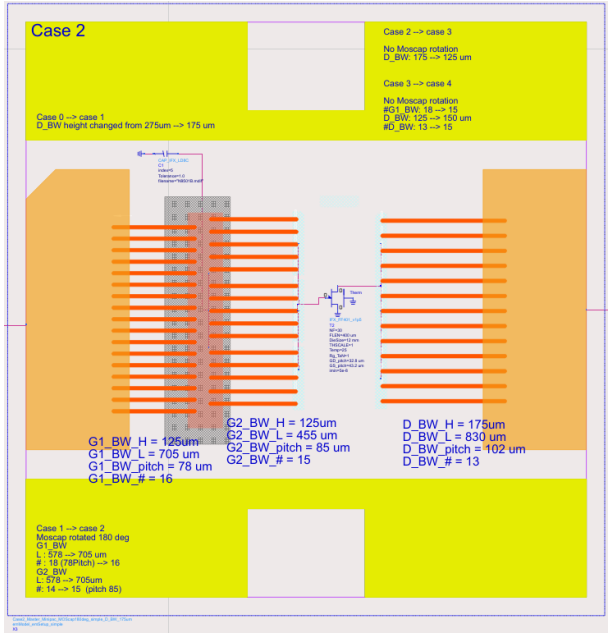


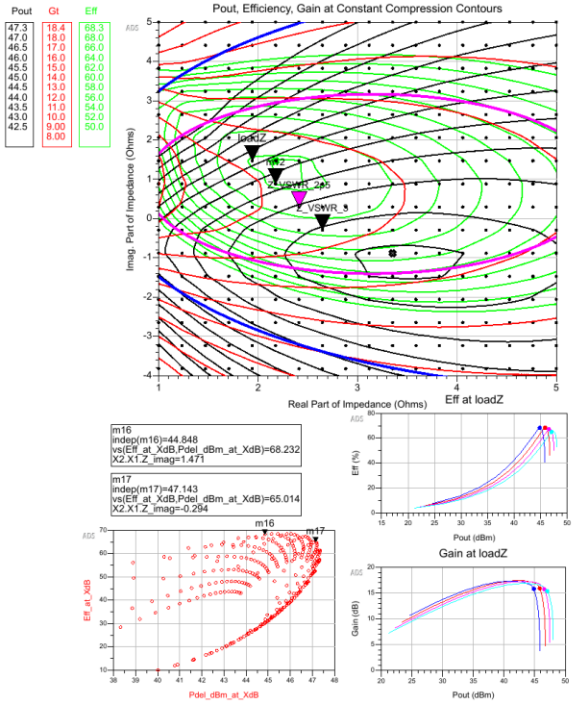
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

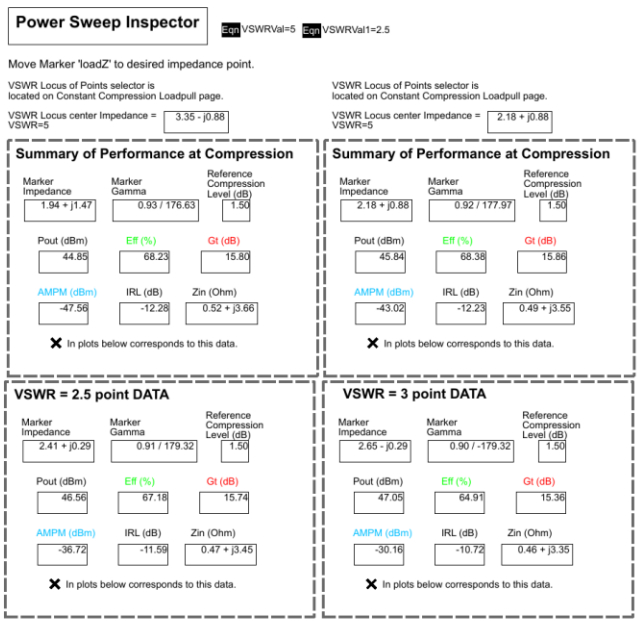




Case 2 : Moscap rotate 180 deg (10,3 pF: index 5) D_BW = 175 um

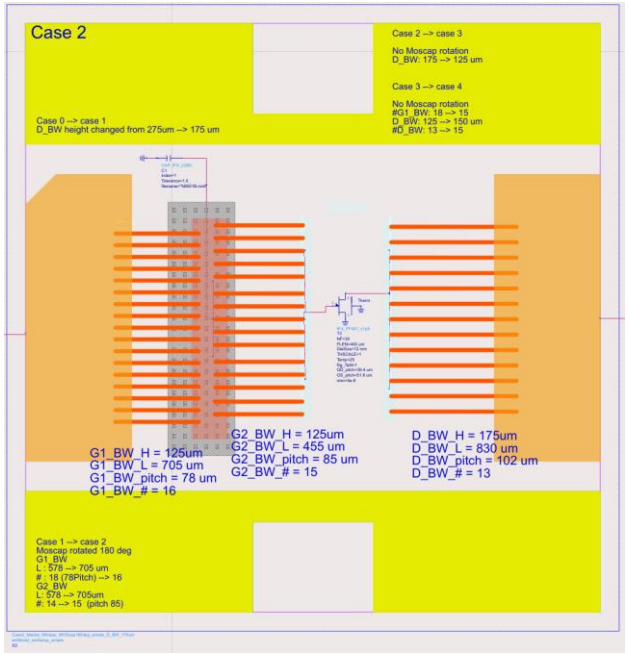




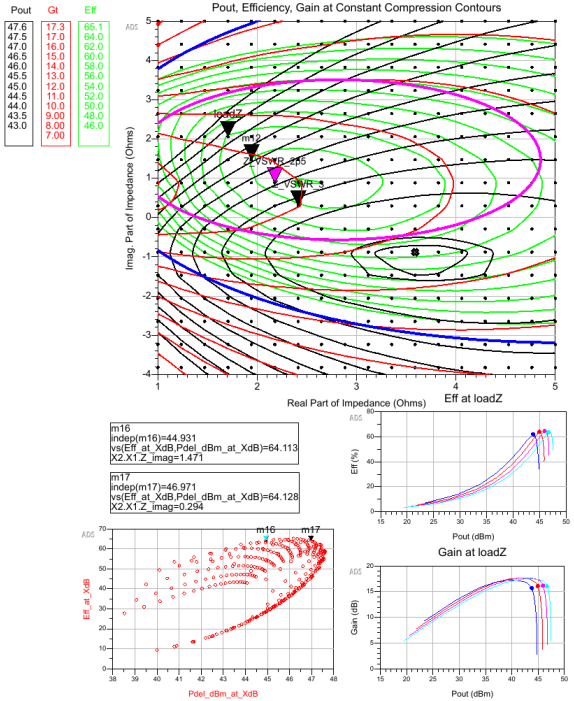


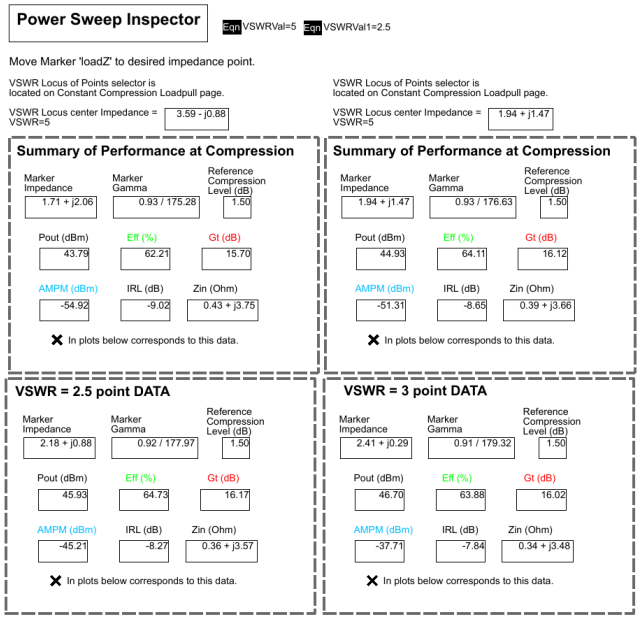
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

Case 2 : Moscap rotate 180 deg (12,89 pF: index 1)



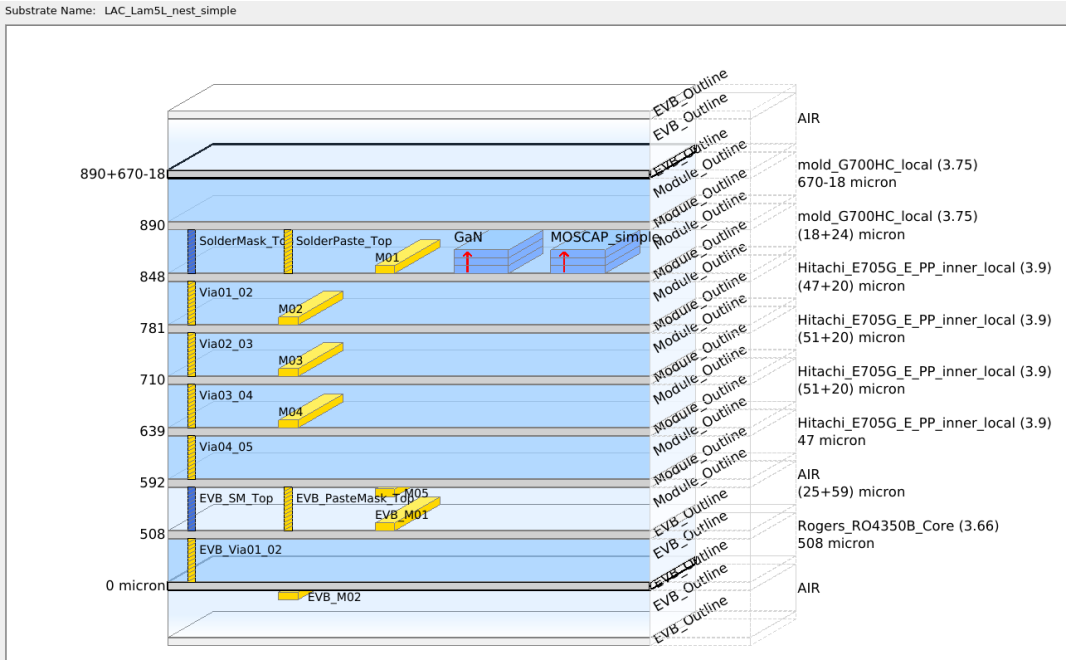
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1300	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

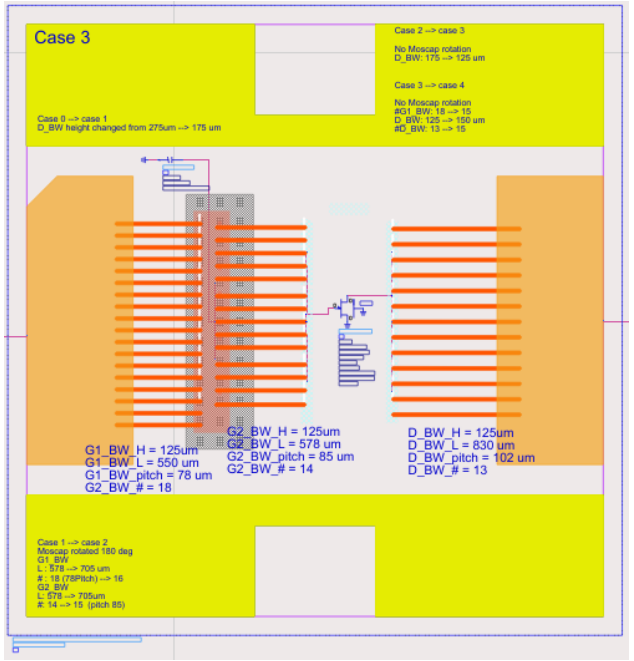




LP simulations with simple EM model

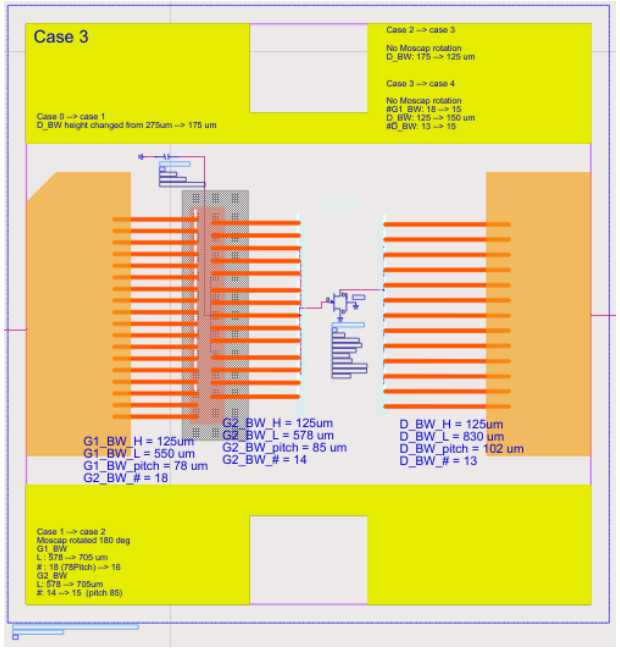
Case 3



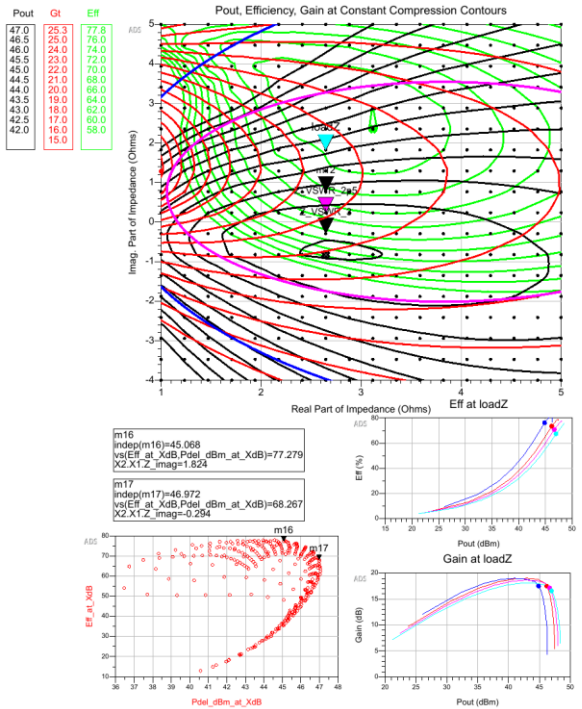


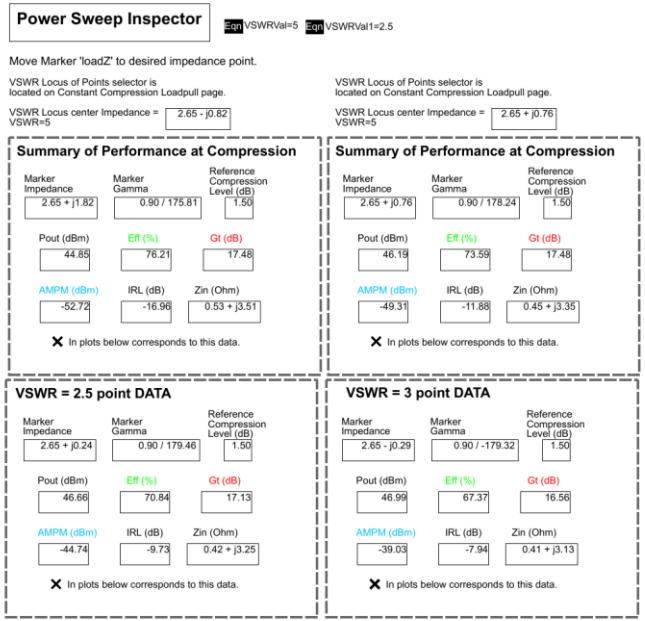
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,5
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19

Case 3 : Moscap rotate 0 deg (5,5 pF: index 10)

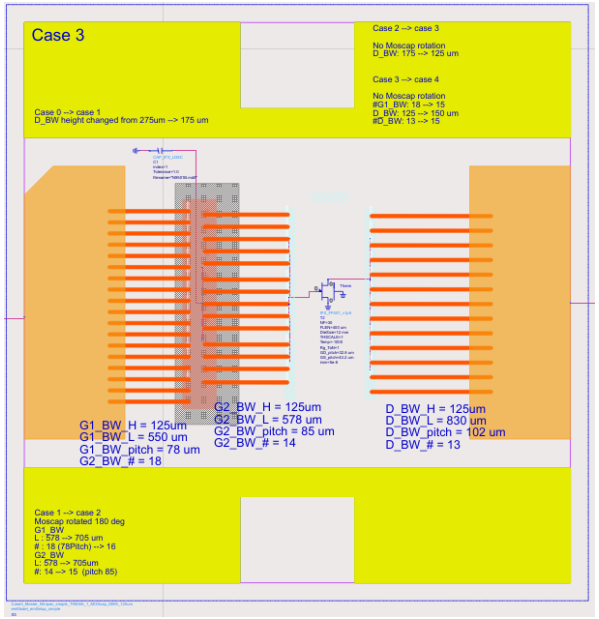


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

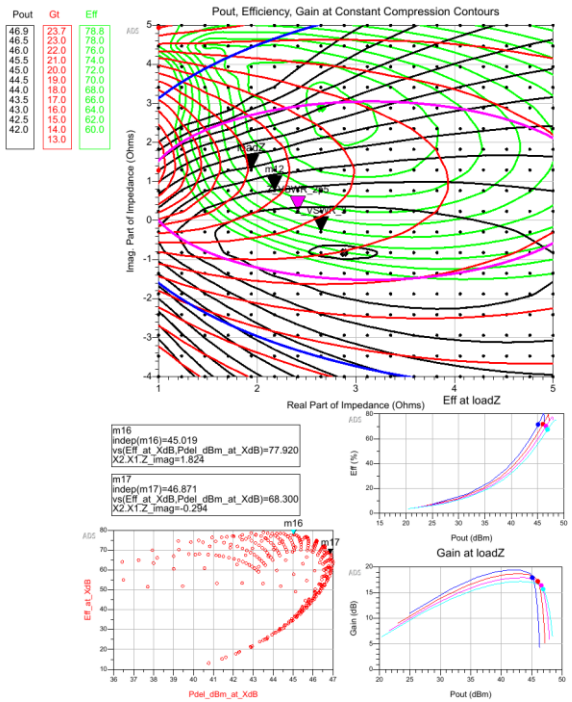




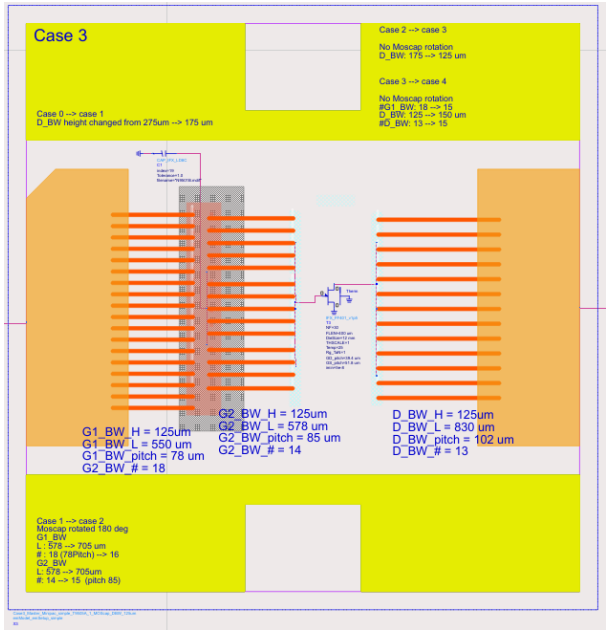
Case 3 : Moscap rotate 0 deg (6,58 pF: index 6)



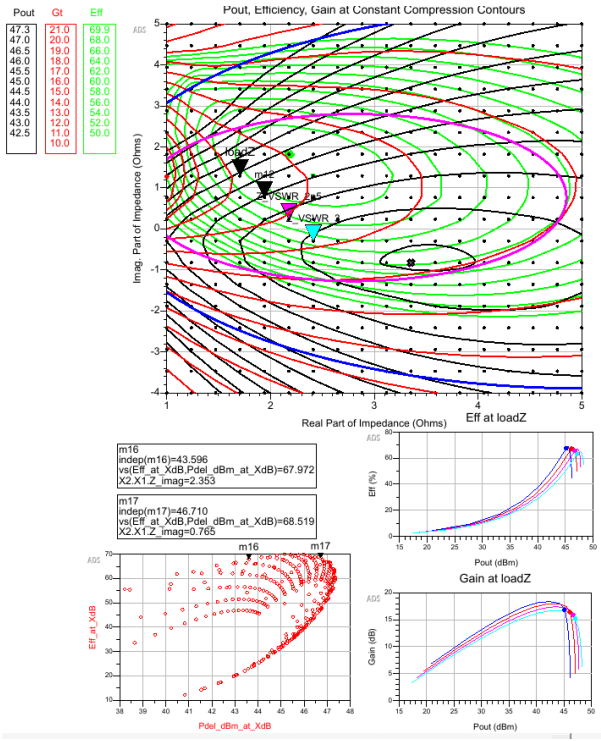
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

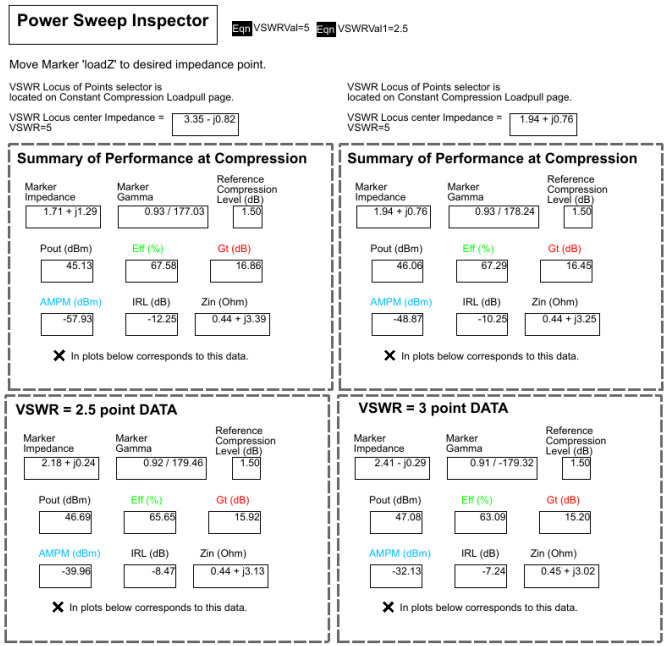


Case 3 : Moscap rotate 180 deg (8,19 pF: index 19)

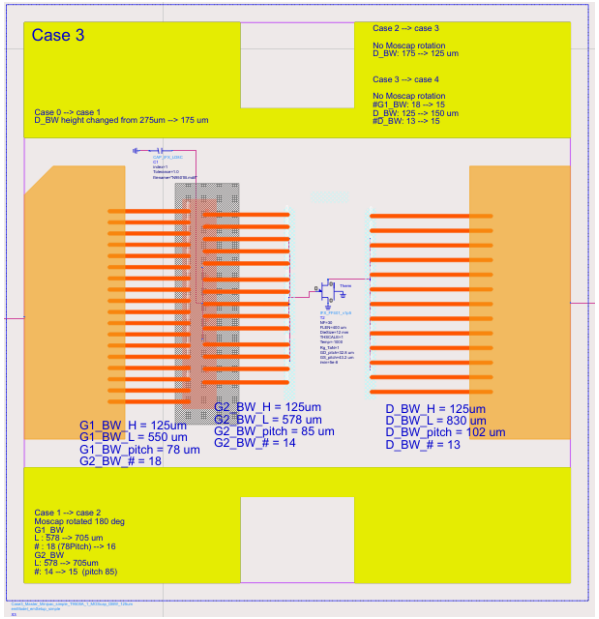


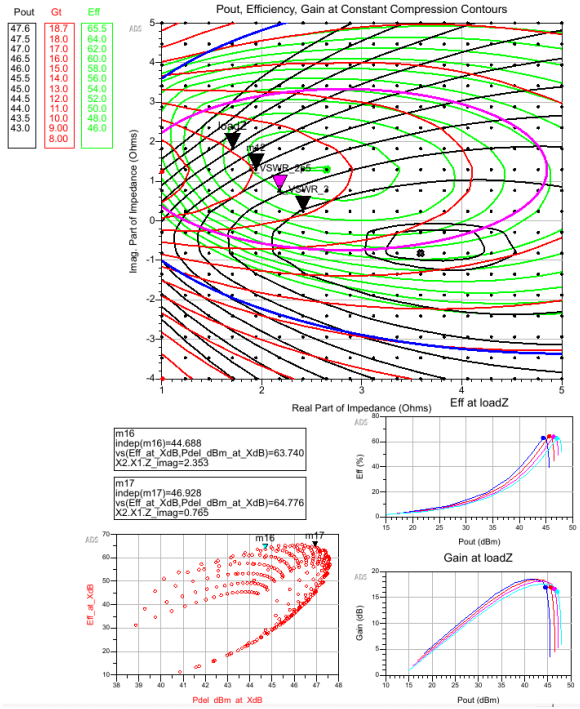
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8





Case 3 : Moscap rotate 0 deg (10,3 pF: index 5)





Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.59 - j0.82

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 1.94 + j1.29

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
1.71 + j1.82	0.93 / 175.82	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.48	62.99	16.94

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-62.58	-10.83	0.39 + j3.45

✕ In plots below corresponds to this data.

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
1.94 + j1.29	0.93 / 177.03	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.59	64.37	16.97

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-53.80	-9.14	0.36 + j3.34

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.18 + j0.76	0.92 / 178.24	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.42	64.02	16.63

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-44.34	-7.73	0.35 + j3.23

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.41 + j0.24	0.91 / 179.46	1.50

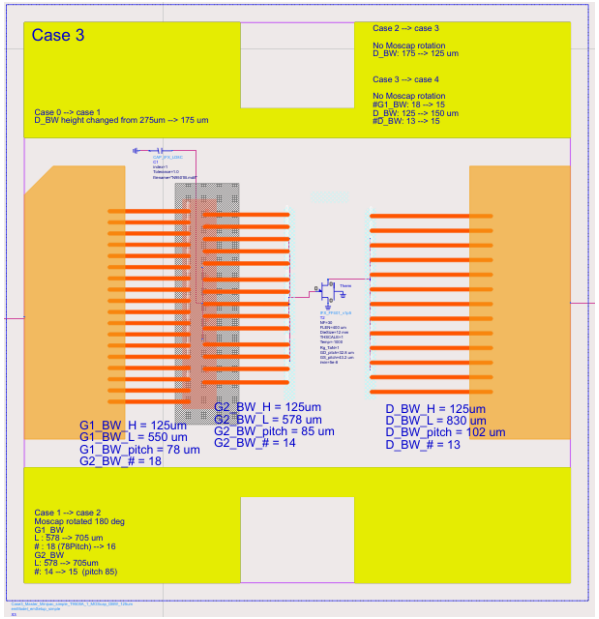
Pout (dBm)	Eff (%)	Gt (dB)
47.04	62.70	16.10

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-34.79	-6.50	0.34 + j3.12

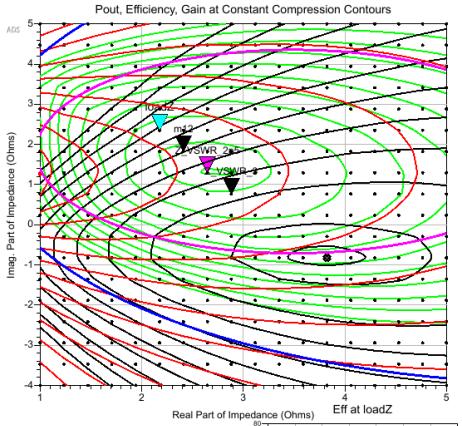
✕ In plots below corresponds to this data.

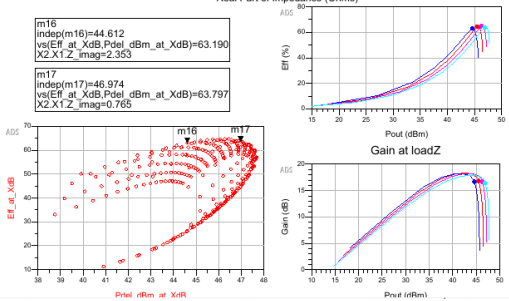
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

Case 3 : Moscap rotate 0 deg (12,89 pF: index 1)



Pout	Gt	Eff
47.6	19.4	64.7
47.5	19.0	64.0
47.0	18.0	62.0
46.5	17.0	60.0
46.0	16.0	58.0
45.5	15.0	56.0
45.0	14.0	54.0
44.5	13.0	52.0
44.0	12.0	50.0
43.5	11.0	48.0
43.0	10.0	46.0
	9.00	





Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.82 - j0.82

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.18 + j2.35	0.92 / 174.60	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.61	63.19	16.66

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-61.98	-11.65	0.41 + j3.45

✕ In plots below corresponds to this data.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 2.41 + j1.82

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.41 + j1.82	0.91 / 175.81	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.48	64.40	16.84

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-56.60	-9.97	0.38 + j3.38

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.65 + j1.29	0.90 / 177.03	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.27	64.78	16.70

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-50.03	-8.53	0.35 + j3.30

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.88 + j0.76	0.89 / 178.24	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.87	63.90	16.43

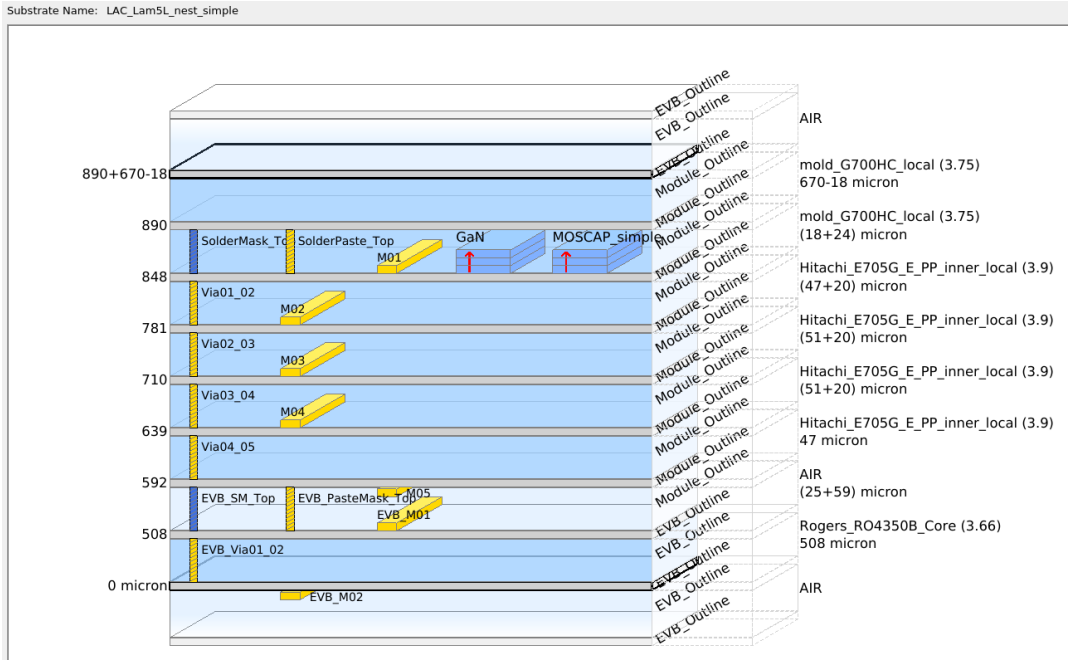
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-42.98	-7.39	0.34 + j3.22

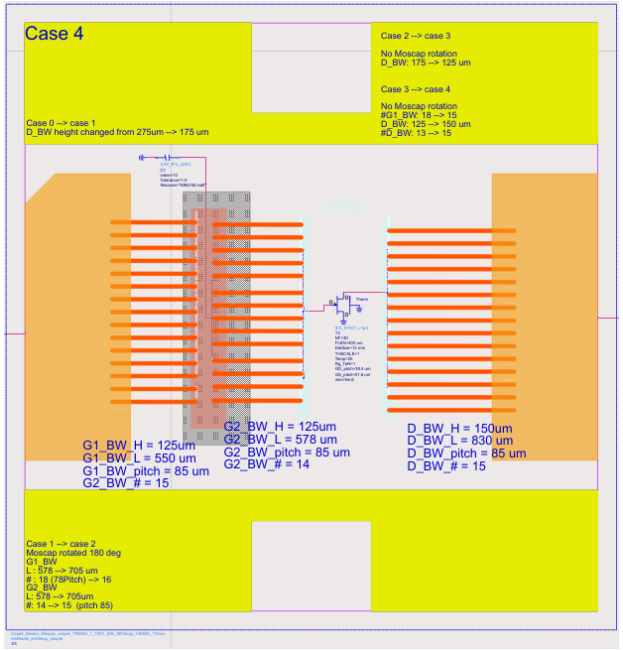
✕ In plots below corresponds to this data.

Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

LP simulations with simple EM model

Case 4

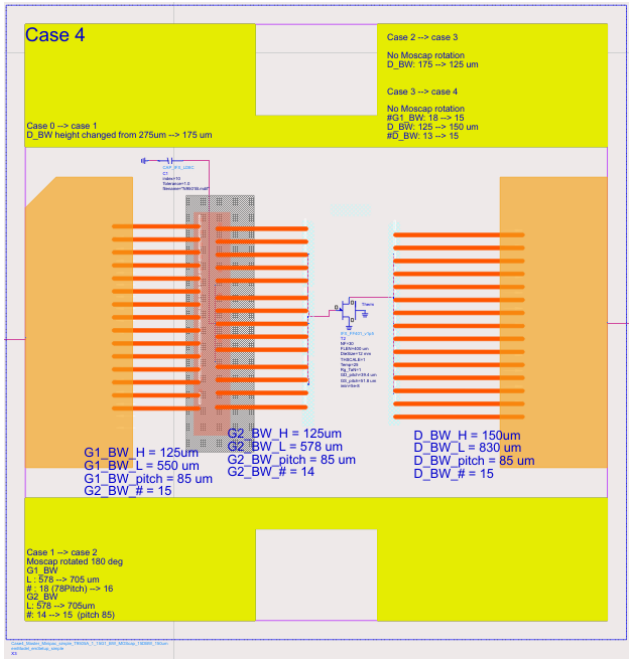




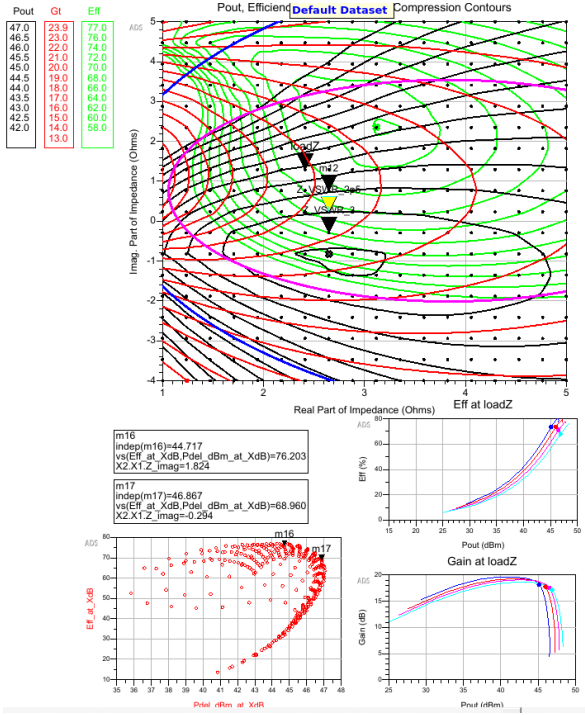
+

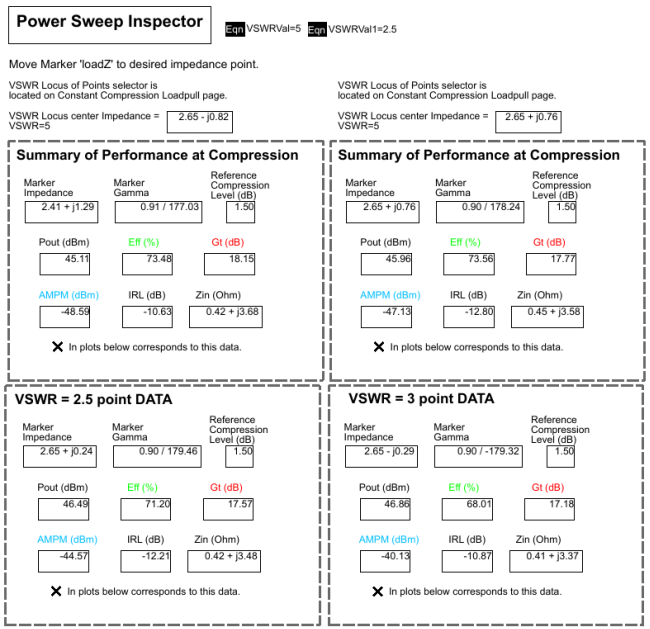
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,5
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19

Case 4 : Moscap rotate 0 deg (5,5 pF: index 10)

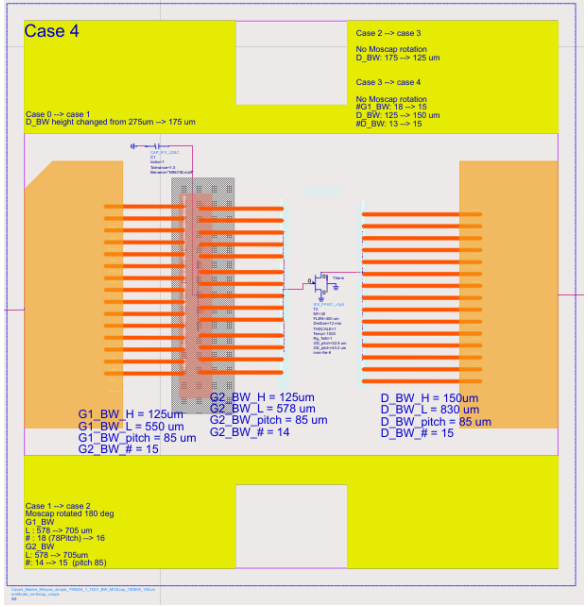


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

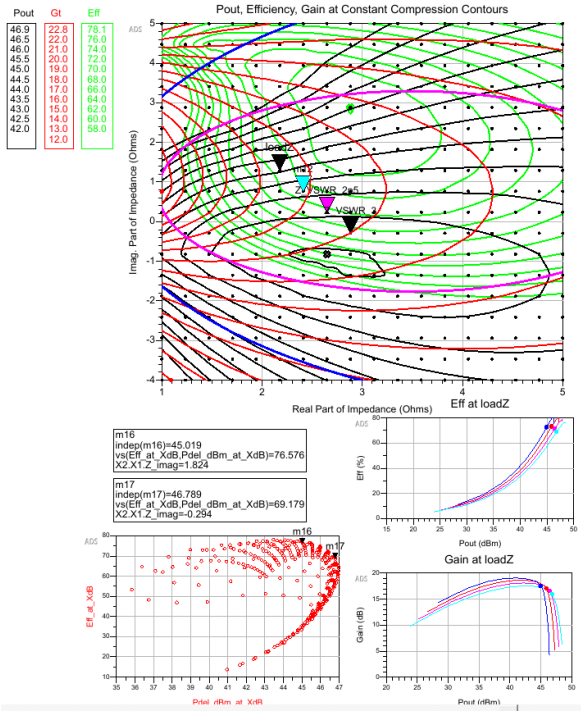




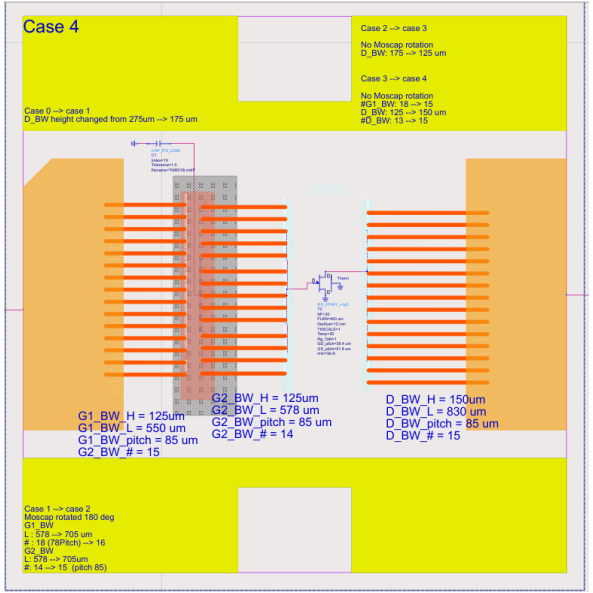
Case 4 : Moscap rotate 0 deg (6,58 pF: index 6)

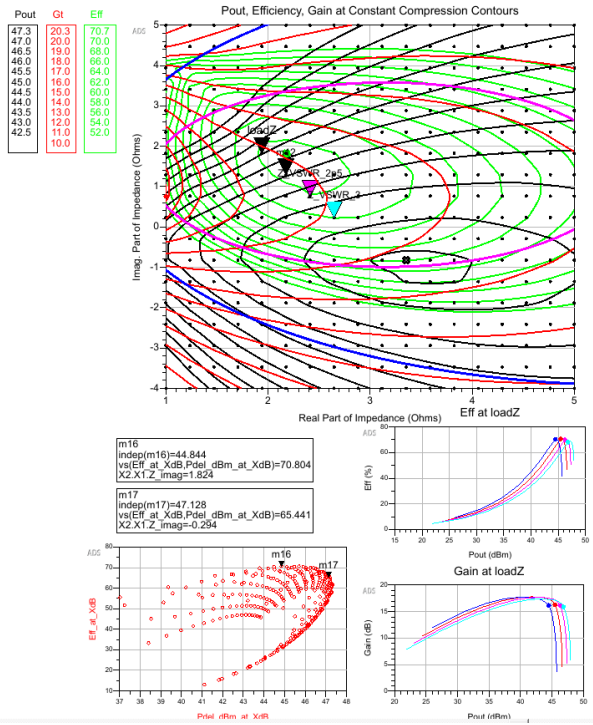


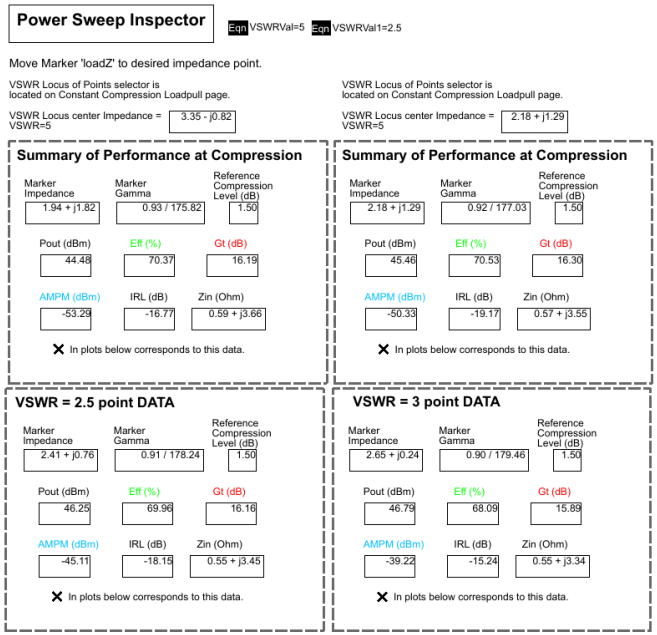
Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8



Case 4 : Moscap rotate 0 deg (8,19 pF: index 19)

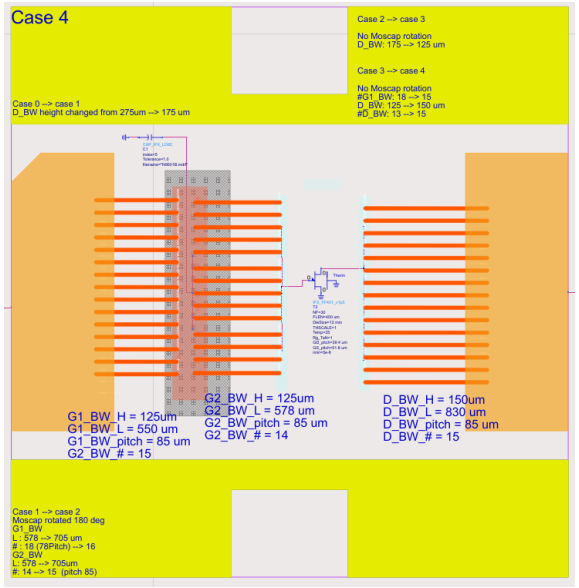




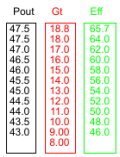


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

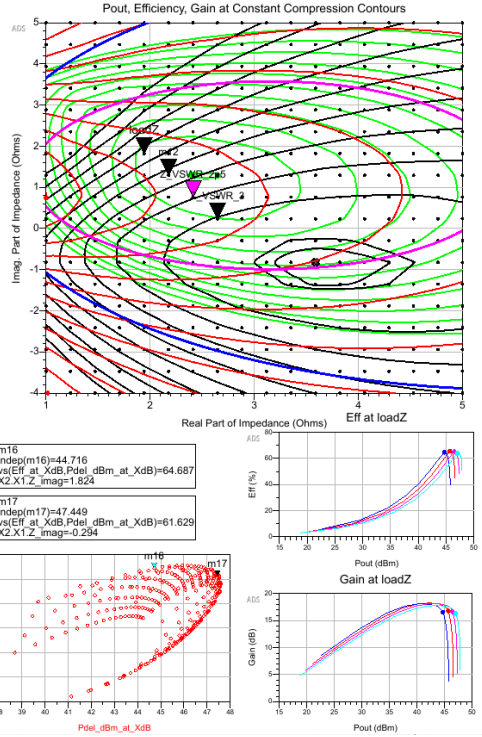
Case 4 : Moscap rotate 0 deg (10,3 pF: index 5)

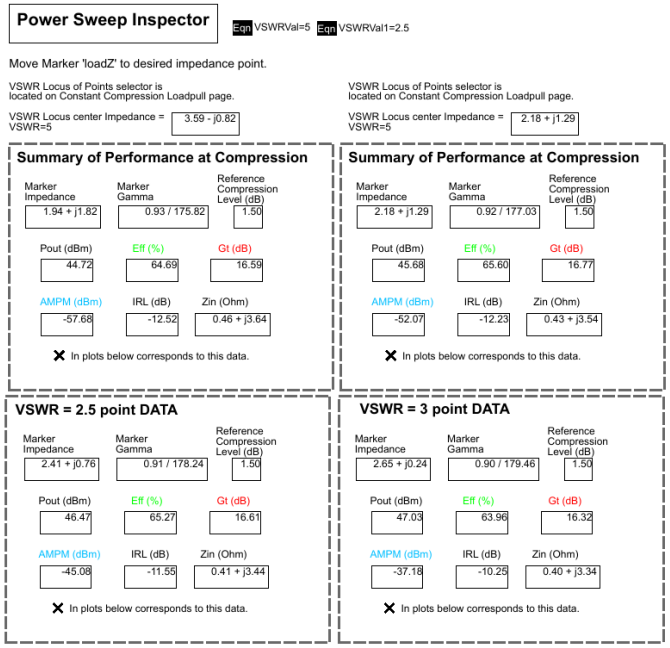


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1950	6,58
10	1446	207	1678	444	1950	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

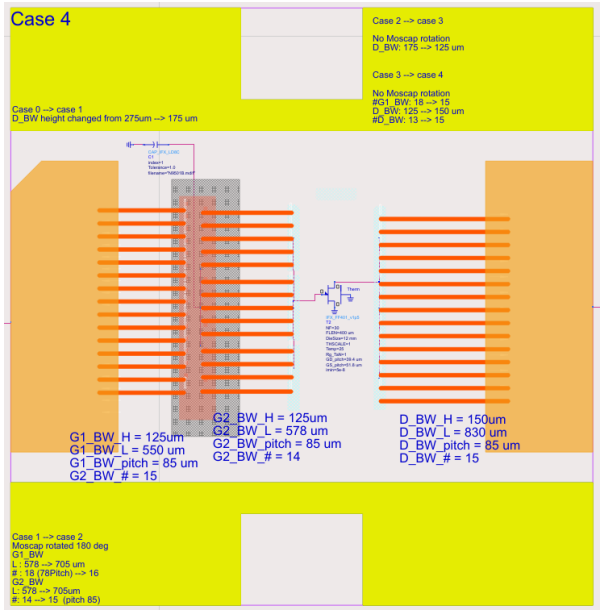


Pout	Gt	Eff
47.5	18.8	65.7
47.5	18.0	64.0
47.0	17.0	62.0
46.5	16.0	60.0
46.0	15.0	58.0
45.5	14.0	56.0
45.0	13.0	54.0
44.5	12.0	52.0
44.0	11.0	50.0
43.5	10.0	48.0
43.0	9.00	46.0
	8.00	

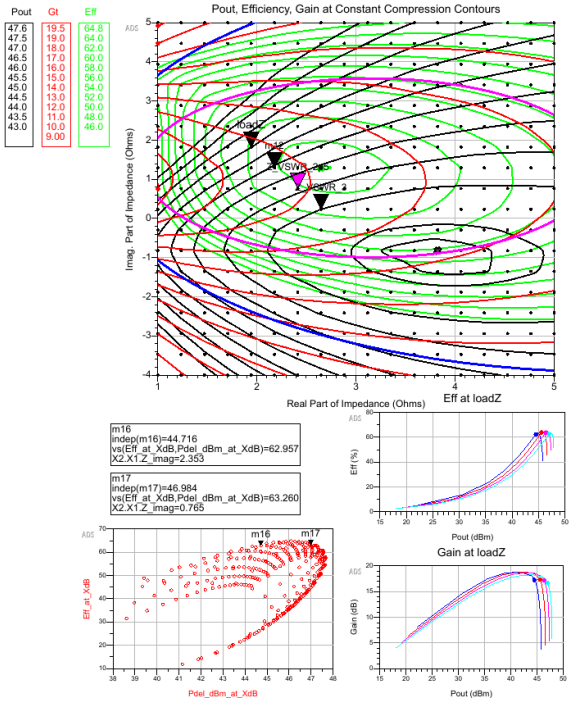


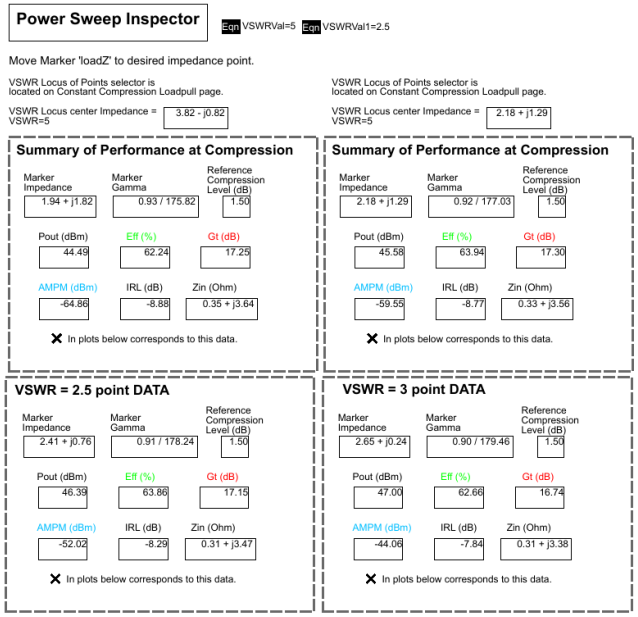


Case 4 : Moscap rotate 0 deg (12,89 pF: index 1)

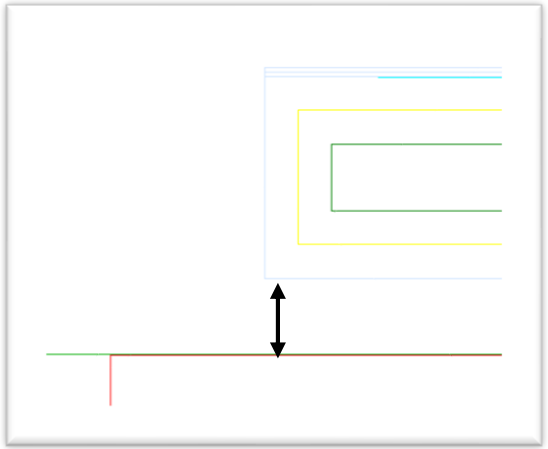


Index	L	W	Ls	Ws	d	Value_pF
1	1446	328	1678	444	1300	12,89
5	1446	261	1678	444	1300	10,3
6	1446	244	1678	444	1300	6,58
10	1446	207	1678	444	1300	5,5
19	1446	207	1770	536	1300	8,19
20	1446	328	1770	536	1950	8,8

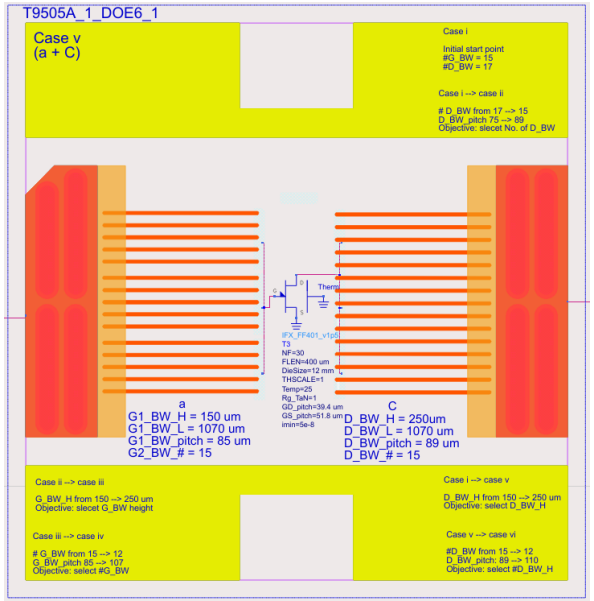


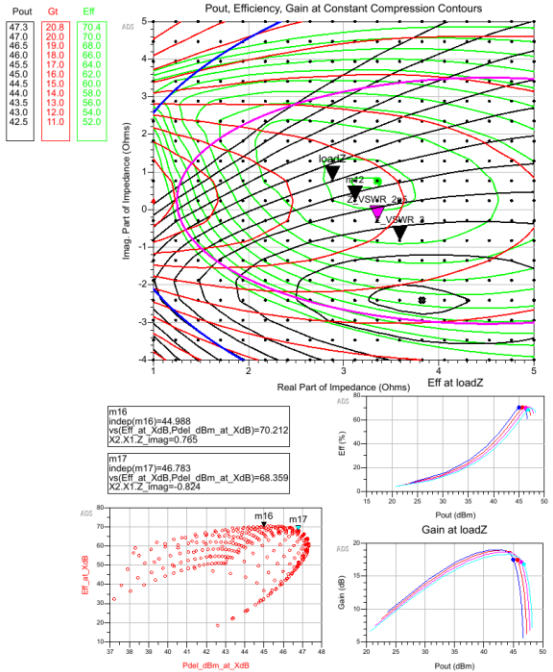


Detailed EM simulation
for
Selected DOE variants
with
NO44 thickness 60 um



T9405A_1_DOE6_1





Power Sweep Inspector

Eqn VSWRVal1=5 Eqn VSWRVal1=2.5

Move Marker "loadZ" to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.82 - j2.41

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.12 + j0.24

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.88 + j0.76	0.89 / 178.24	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.99	70.21	17.51

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-46.82	-4.43	0.29 + j2.80

✕ In plots below corresponds to this data.

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.12 + j0.24	0.88 / 179.46	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.71	70.29	17.44

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-44.22	-4.22	0.30 + j2.72

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 - j0.29	0.87 / -179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.32	69.69	17.16

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-40.95	-4.10	0.31 + j2.65

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

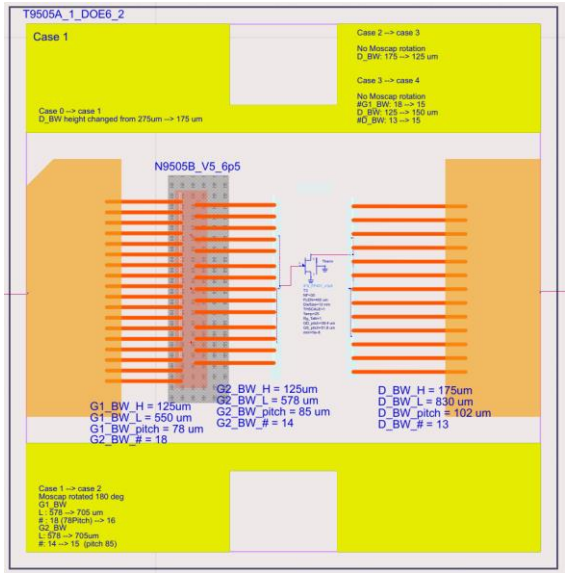
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.59 - j0.82	0.87 / -178.10	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.78	68.36	16.81

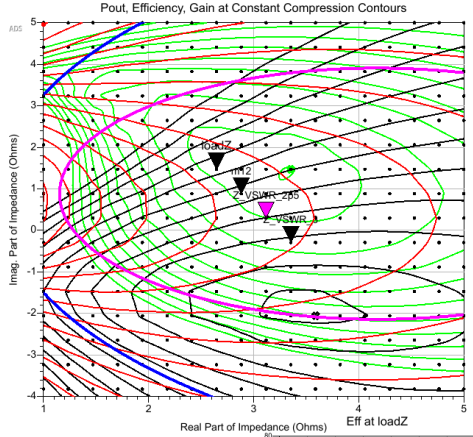
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-37.22	-4.02	0.32 + j2.57

✕ In plots below corresponds to this data.

T9405A_1_N9501B_V5_6.5pF_DOE6_2

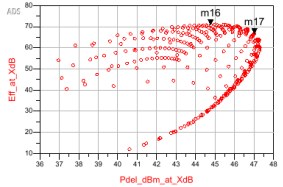


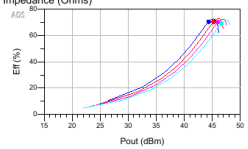
Pout	Gt	Eff
47.2	22.2	71.1
47.0	22.0	70.0
46.5	21.0	68.0
46.0	20.0	66.0
45.5	19.0	64.0
45.0	18.0	62.0
44.5	17.0	60.0
44.0	16.0	58.0
43.5	15.0	56.0
43.0	14.0	54.0
42.5	13.0	52.0

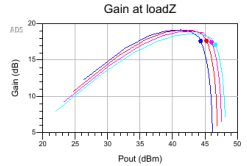


m16
indep(m16)=44.778
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=71.015
X2.X1.Z_imag=1.471

m17
indep(m17)=47.024
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=66.887
X2.X1.Z_imag=-0.882







Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.59 - j2.06

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.65 + j1.47	0.90 / 176.62	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.34	70.40	17.60

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-53.05	-10.40	0.43 + j3.20

✖ In plots below corresponds to this data.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 2.88 + j0.88

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.88 + j0.88	0.89 / 177.97	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.22	70.38	17.64

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-52.04	-10.17	0.43 + j3.11

✖ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.12 + j0.29	0.88 / 179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.01	70.00	17.47

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-49.12	-9.90	0.44 + j3.03

✖ In plots below corresponds to this data.

VSWR = 3 point DATA

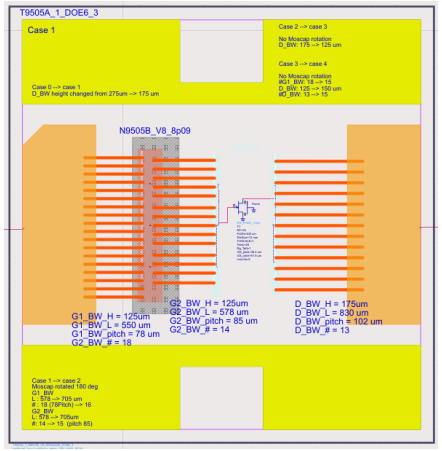
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 - j0.29	0.87 / -179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.61	68.81	17.10

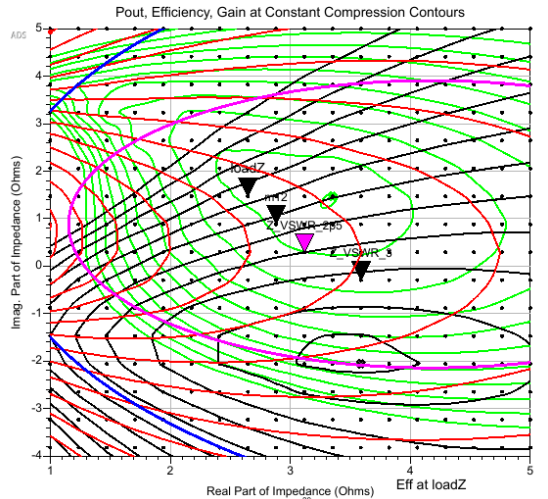
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-44.87	-9.50	0.46 + j2.94

✖ In plots below corresponds to this data.

T9405A_1_N9501B_V8_8.09pF_DOE6_3

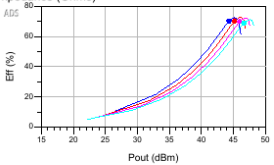


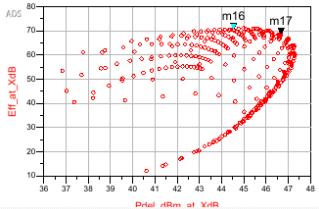
Pout	Gt	Eff
47.2	22.3	71.1
47.0	22.0	70.0
46.5	21.0	68.0
46.0	20.0	66.0
45.5	19.0	64.0
45.0	18.0	62.0
44.5	17.0	60.0
44.0	16.0	58.0
43.5	15.0	56.0
43.0	14.0	54.0
42.5	13.0	52.0

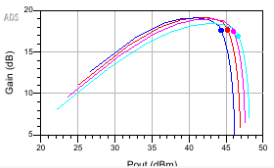


m16
indep(m16)=44.534
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=70.643
X2.X1.Z_imag=1.471

m17
indep(m17)=46.672
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=68.883
X2.X1.Z_imag=-0.294







Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.59 - j2.06

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 2.88 + j0.88

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.65 + j1.47	0.90 / 176.62	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.32	70.31	17.59

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-52.77	-10.55	0.43 + j3.23

✕ In plots below corresponds to this data.

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.88 + j0.88	0.89 / 177.97	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.20	70.29	17.65

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-52.02	-10.46	0.43 + j3.14

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.12 + j0.29	0.88 / 179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.00	69.99	17.48

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-49.35	-10.31	0.44 + j3.06

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

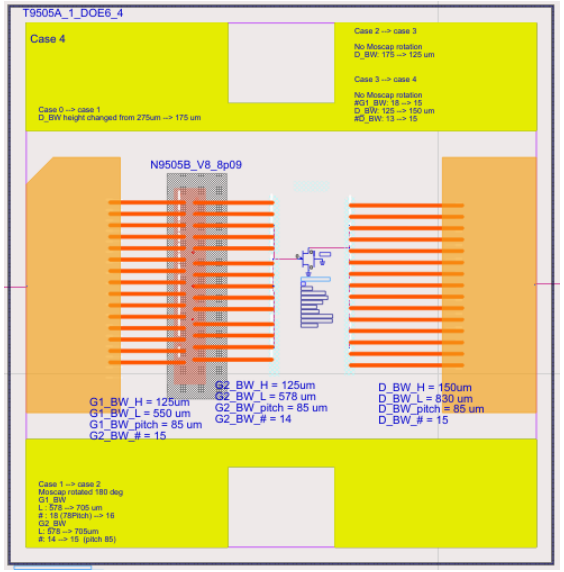
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.59 - j0.29	0.87 / -179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.63	68.87	16.90

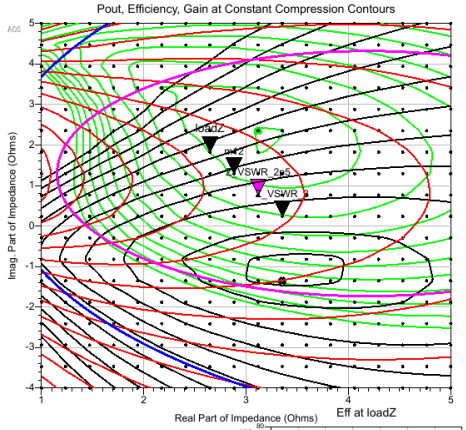
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-43.84	-10.75	0.50 + j2.97

✕ In plots below corresponds to this data.

T9405A_1_N9501B_V8_8.09pF_DOE6_4

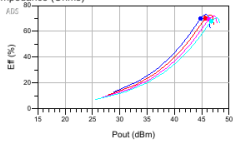


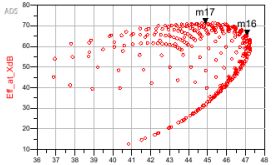
Pout	Gt	Eff
47.2	21.4	71.4
47.0	21.0	70.0
46.5	20.0	68.0
46.0	19.0	66.0
45.5	18.0	64.0
45.0	17.0	62.0
44.5	16.0	60.0
44.0	15.0	58.0
43.5	14.0	56.0
43.0	13.0	54.0
42.5	12.0	52.0
	11.0	



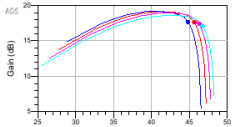
m16
indep(m16)=47.074
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=65.749
X2.X1.Z_imag=-0.294

m17
indep(m17)=44.877
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=71.377
X2.X1.Z_imag=2.353





Gain at loadZ



Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = 3.35 - j1.35

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.65 + j1.82	0.90 / 175.81	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.81	70.06	17.64

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-45.74	-6.82	0.39 + j3.40

✕ In plots below corresponds to this data.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = 2.88 + j1.29

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.88 + j1.29	0.89 / 177.02	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.67	70.31	17.63

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-45.36	-7.29	0.40 + j3.32

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.12 + j0.76	0.88 / 178.24	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.31	69.45	17.42

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-43.24	-7.84	0.42 + j3.24

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

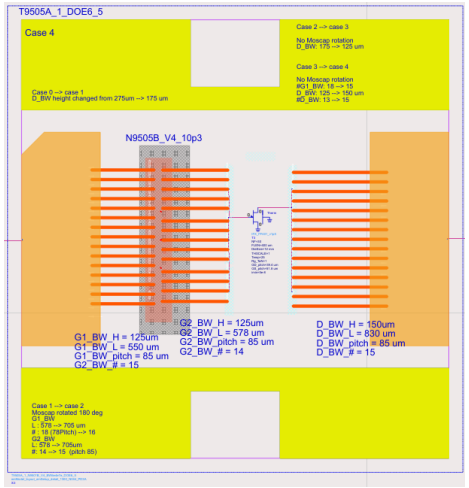
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 + j0.24	0.87 / 179.46	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.77	67.91	17.11

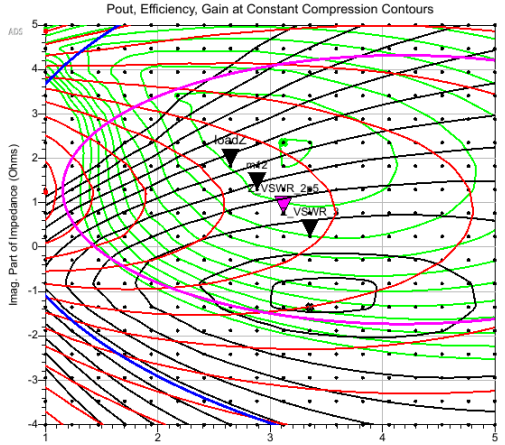
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-40.00	-8.39	0.45 + j3.15

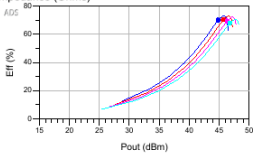
✕ In plots below corresponds to this data.

T9405A_1_N9501B_V4_10,3pF_DOE6_5



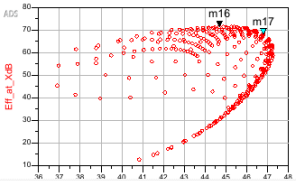
Pout	Gt	Eff
47.2	21.4	71.4
47.0	21.0	70.0
46.5	20.0	68.0
46.0	19.0	66.0
45.5	18.0	64.0
45.0	17.0	62.0
44.5	16.0	60.0
44.0	15.0	58.0
43.5	14.0	56.0
43.0	13.0	54.0
42.5	12.0	52.0
	11.0	

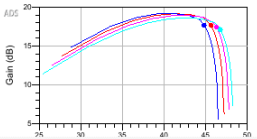




m16
indep(m16)=44.692
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=71.461
X2.X1:Z_imag=2.353

m17
indep(m17)=46.806
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=68.156
X2.X1:Z_imag=0.235





Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 3.35 - j1.35

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.65 + j1.82	0.90 / 175.81	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.82	70.13	17.66

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-45.81	-6.79	0.39 + j3.40

✕ In plots below corresponds to this data.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 2.88 + j1.29

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.88 + j1.29	0.89 / 177.02	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.67	70.36	17.64

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-45.39	-7.25	0.40 + j3.32

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.12 + j0.76	0.88 / 178.24	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.32	69.50	17.43

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-43.21	-7.77	0.42 + j3.23

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

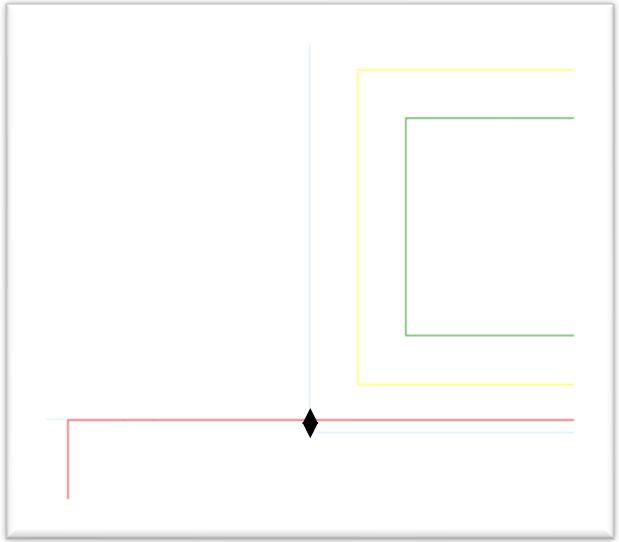
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
3.35 + j0.24	0.87 / 179.46	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.77	67.96	17.11

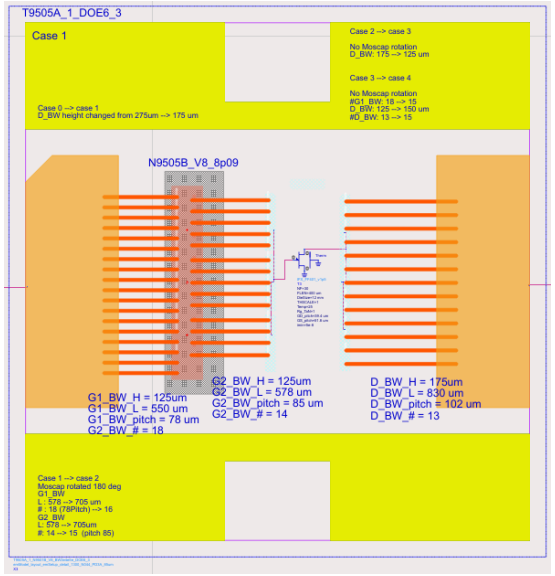
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-39.95	-8.31	0.45 + j3.14

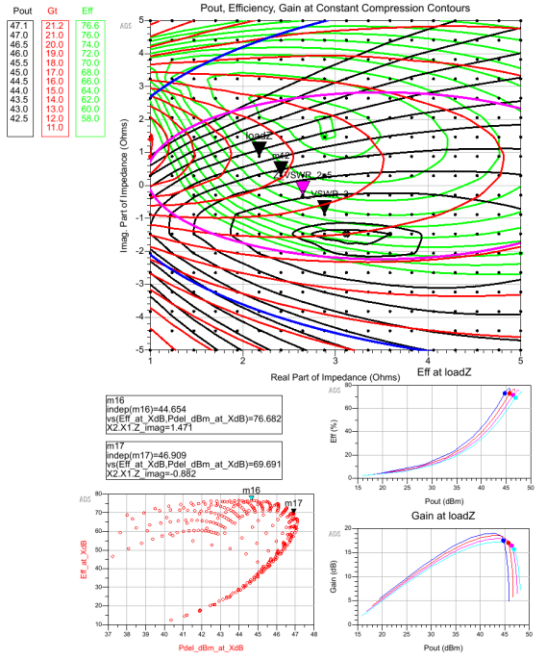
✕ In plots below corresponds to this data.

Detailed EM simulation for Selected DOE variants with Updated NO44 substrate_85um



T9405A_1_N9501B_V5_6.5pF_DOE6_2_NO44_85um





Power Sweep Inspector

EqnVSWRVal1=5 EqnVSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = 3.12 - j1.47 VSWR=5

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = 2.41 + j0.29 VSWR=5

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.18 + j0.88	0.92 / 177.97	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.75	73.02	17.51

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-50.65	-5.55	0.29 + j2.88

✕ In plots below corresponds to this data.

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.41 + j0.29	0.91 / 179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.73	72.92	17.05

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-44.85	-5.24	0.31 + j2.78

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.65 - j0.29	0.90 / -179.32	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.44	71.47	16.44

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-38.69	-4.97	0.33 + j2.68

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

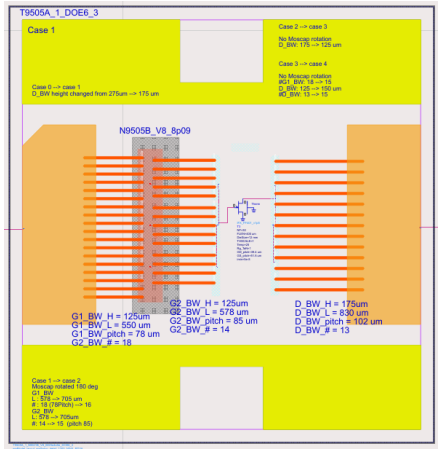
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.88 - j0.88	0.89 / -177.97	1.50

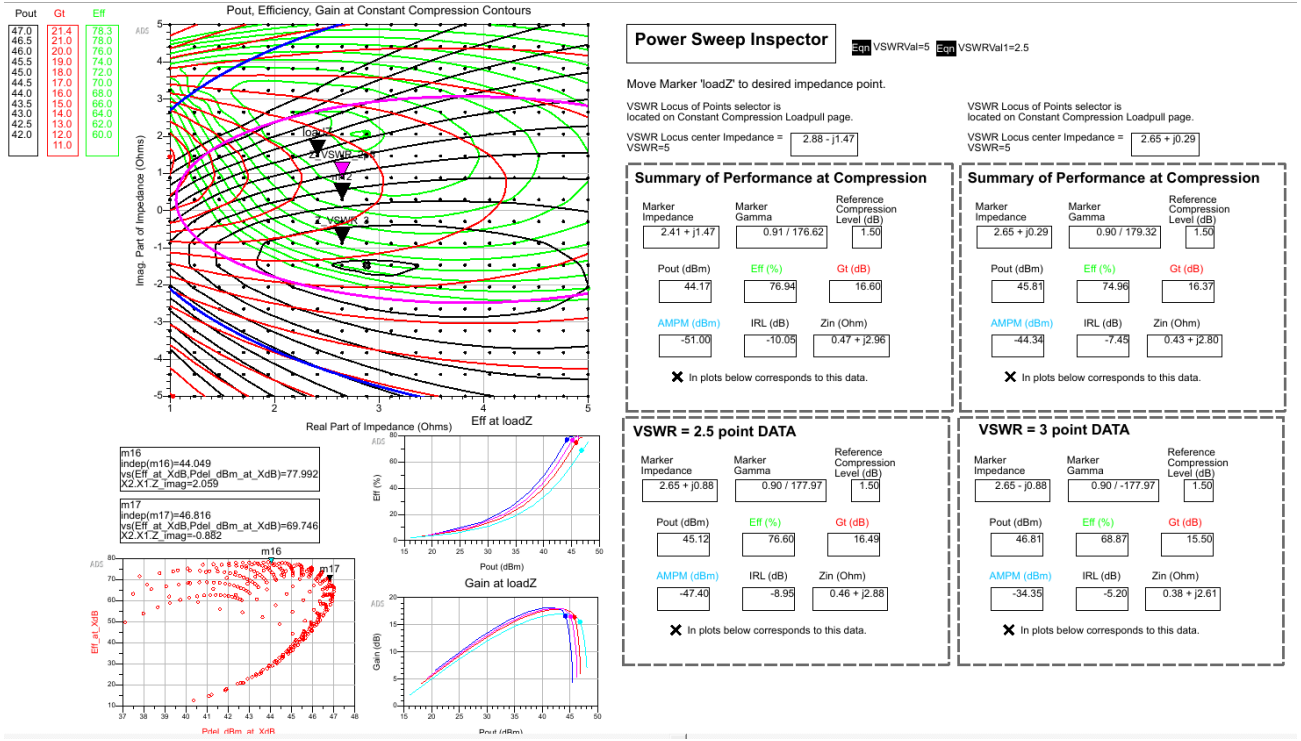
Pout (dBm)	Eff (%)	Gt (dB)
46.90	69.11	15.74

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-32.93	-4.74	0.36 + j2.59

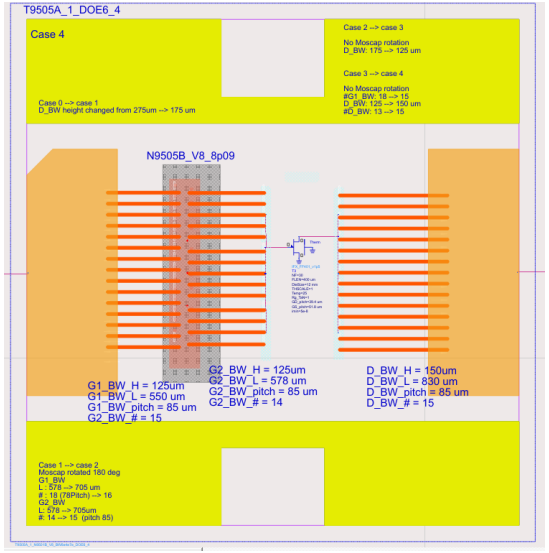
✕ In plots below corresponds to this data.

T9405A_1_N9501B_V8_8.09pF_DOE6_3_NO44_85um

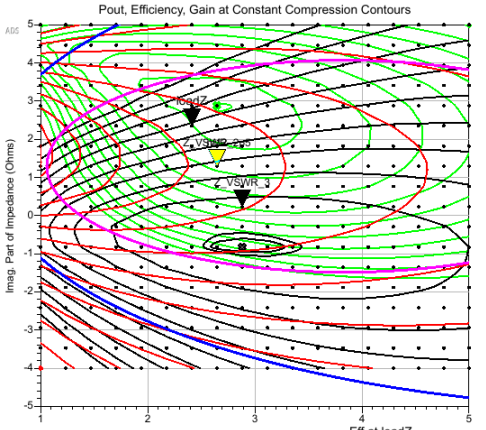




T9405A_1_N9501B_V8_8.09pF_DOE6_4_NO44_85um

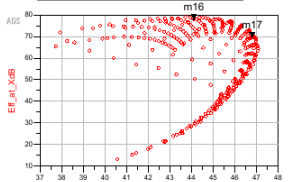


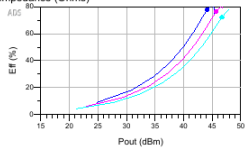
Pout	Gt	Eff
47.0	20.4	79.0
47.0	20.0	78.0
46.5	19.0	76.0
46.0	18.0	74.0
45.5	17.0	72.0
45.0	16.0	70.0
44.5	15.0	68.0
44.0	14.0	66.0
43.5	13.0	64.0
43.0	12.0	62.0
42.5	11.0	60.0
	10.0	

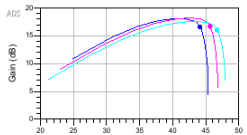


m16
indep(m16)=44.108
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=77.966
X2.X1.Z_imag=2.353

m17
indep(m17)=46.803
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=69.763
X2.X1.Z_imag=-0.294







Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 2.88 - j0.82

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 2.65 + j1.29

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.41 + j2.35	0.91 / 174.60	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.11	77.97	16.56

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-45.44	-9.05	0.48 + j3.21

✕ In plots below corresponds to this data.

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.65 + j1.29	0.90 / 177.03	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.66	76.53	16.68

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-42.36	-7.70	0.42 + j3.07

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.65 + j1.29	0.90 / 177.03	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.66	76.53	16.68

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-42.36	-7.70	0.42 + j3.07

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

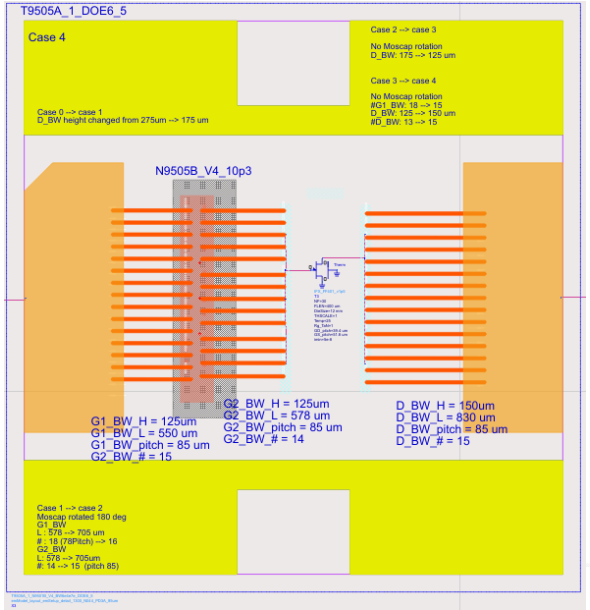
Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.88 + j0.24	0.89 / 179.46	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.68	72.30	16.06

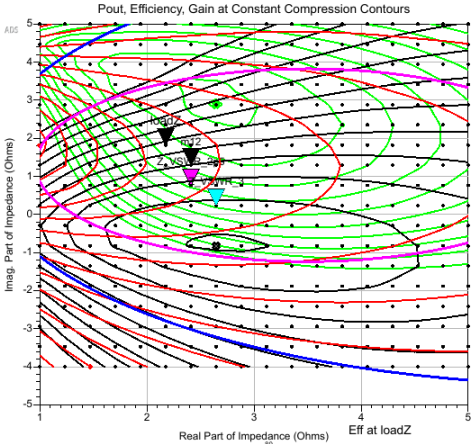
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-35.31	-6.89	0.42 + j2.90

✕ In plots below corresponds to this data.

Case 4: 10.3 pF T9405A_1_N9501B_V4_10,3pF_DOE6_5

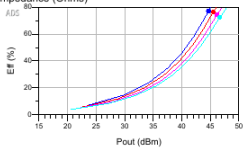


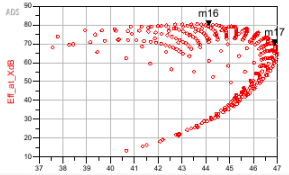
Pout	Gt	Eff
46.9	20.5	80.5
46.5	20.0	80.0
46.0	19.0	78.0
45.5	18.0	76.0
45.0	17.0	74.0
44.5	16.0	72.0
44.0	15.0	70.0
43.5	14.0	68.0
43.0	13.0	66.0
42.5	12.0	64.0
42.0	11.0	62.0

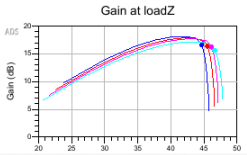


m16
indep(m16)=44.120
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=79.656
X2.X1.Z_imag=2.353

m17
indep(m17)=46.896
vs(Eff_at_XdB,Pdel_dBm_at_XdB)=69.547
X2.X1.Z_imag=-0.294







Power Sweep Inspector

Eqn VSWRVal=5 Eqn VSWRVal1=2.5

Move Marker 'loadZ' to desired impedance point.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 2.65 - j0.82

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.18 + j1.82	0.92 / 175.81	1.50

Pout (dBm)	Eff (%)	Gt (dB)
44.66	77.18	16.63

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-47.30	-8.53	0.45 + j3.19

✕ In plots below corresponds to this data.

VSWR Locus of Points selector is located on Constant Compression Loadpull page.

VSWR Locus center Impedance = VSWR=5: 2.41 + j1.29

Summary of Performance at Compression

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.41 + j1.29	0.91 / 177.03	1.50

Pout (dBm)	Eff (%)	Gt (dB)
45.52	76.67	16.35

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-43.68	-8.55	0.46 + j3.09

✕ In plots below corresponds to this data.

VSWR = 2.5 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.41 + j0.76	0.91 / 178.24	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.13	74.38	16.20

AMPM (dBm)	IRL (dB)	Zin (Ohm)
-40.58	-7.44	0.42 + j3.01

✕ In plots below corresponds to this data.

VSWR = 3 point DATA

Marker Impedance	Marker Gamma	Reference Compression Level (dB)
2.65 + j0.24	0.90 / 179.46	1.50

Pout (dBm)	Eff (%)	Gt (dB)
46.63	72.40	15.65

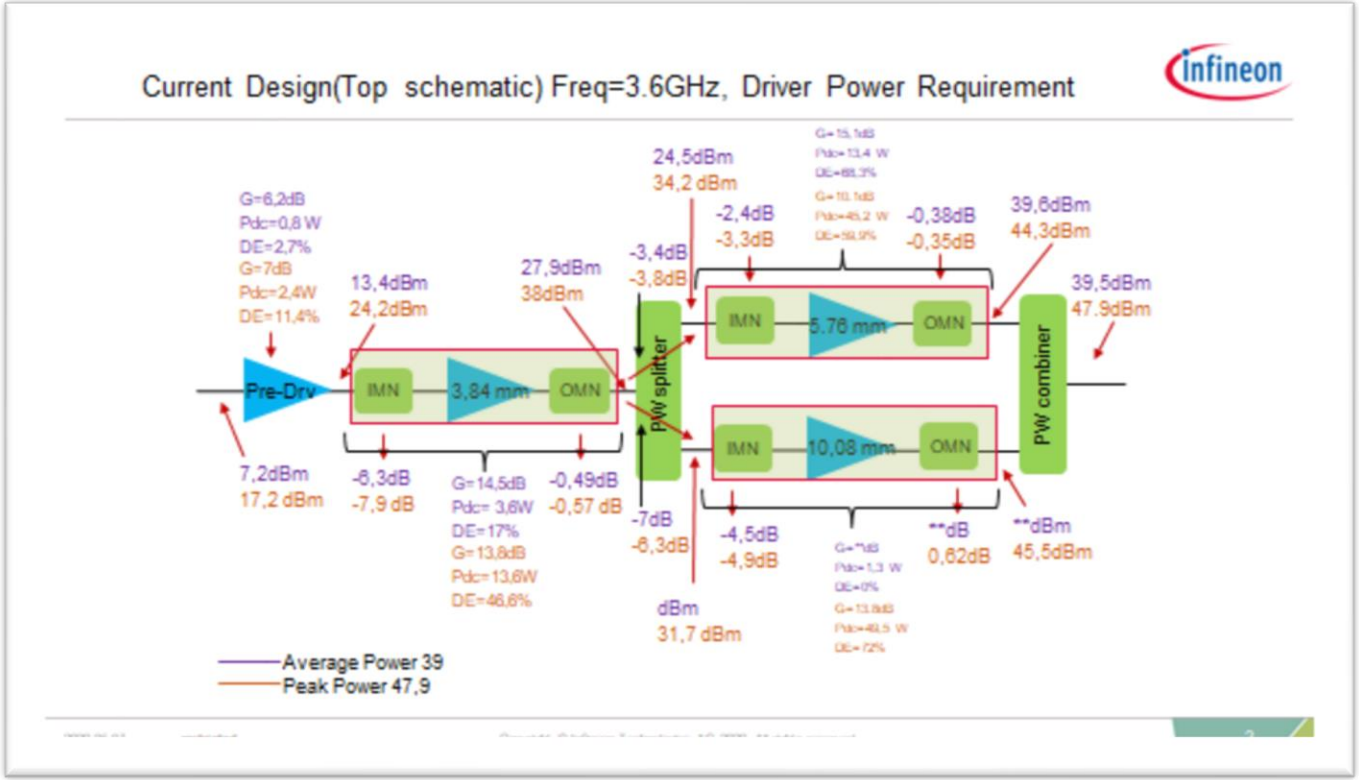
AMPM (dBm)	IRL (dB)	Zin (Ohm)
-35.96	-7.52	0.45 + j2.91

✕ In plots below corresponds to this data.

Part of your life. Part of tomorrow.

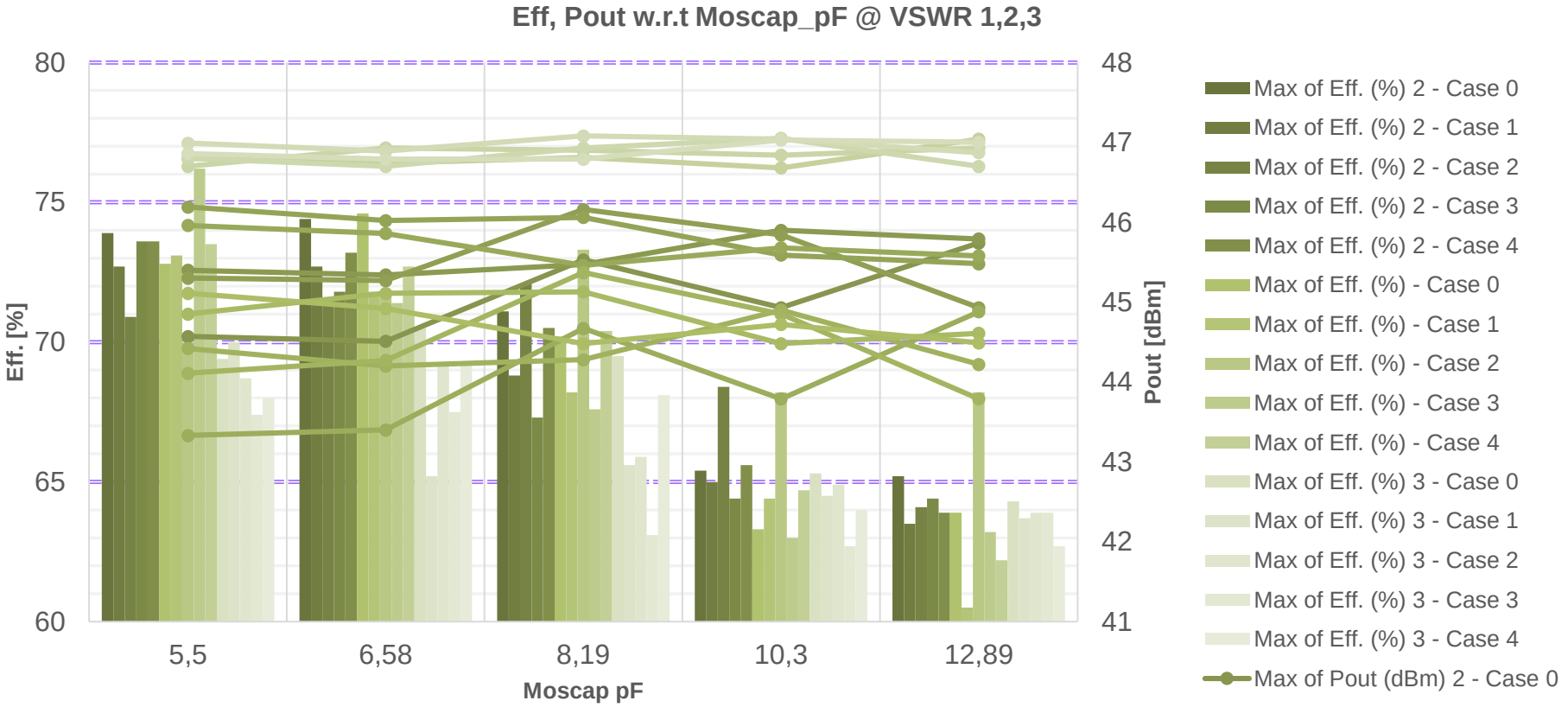
Additional slides

Power calculation Doherty



› From Theepak Shoundrabalan

Simple EM simulation: BW + LAC3839 + MOScap (DOE all)



MOScap available in mdif (8th April 2022)

```
BEGIN DSCRDATA
% INDEX L       W       Ls      Ws      d
1       1446    328     1678    444     1300
2       1446    304     1678    444     1300
3       1446    281     1678    444     1300
4       1446    261     1678    444     1950
5       1446    261     1678    444     1300
6       1446    244     1678    444     1950
7       1446    244     1678    444     1300
8       1446    233     1678    444     1950
9       1446    221     1678    444     1950
10      1446    207     1678    444     1950
11      1466    281     1770    536     3100
12      1466    261     1770    536     3100
13      1466    244     1770    536     3100
14      1466    233     1770    536     3100
15      1466    221     1770    536     3100
16      1466    207     1770    536     3100
17      1466    328     1770    536     1300
18      1466    261     1770    536     1300
19      1466    207     1770    536     1300
20      1466    328     1770    536     1950

END DSCRDATA
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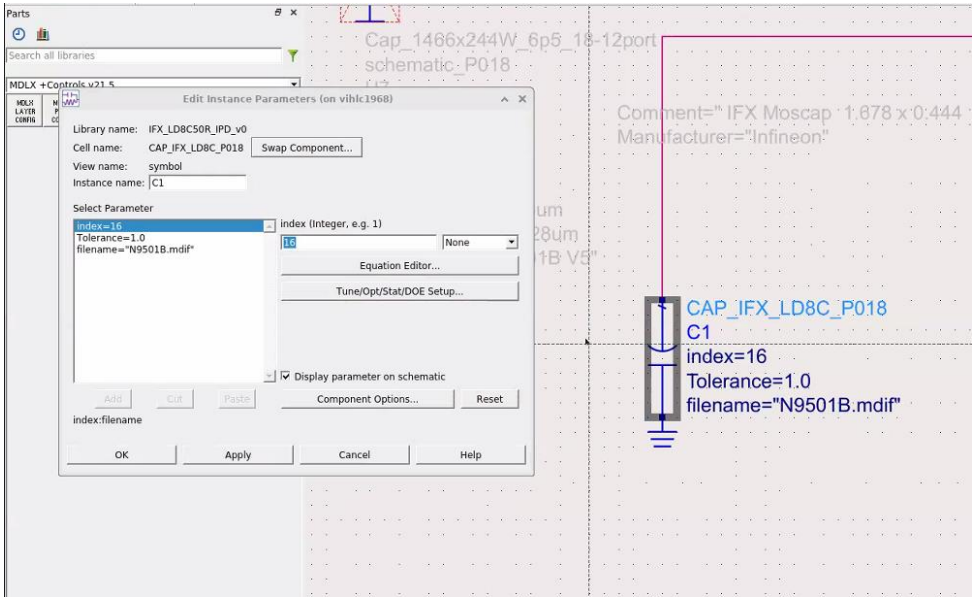
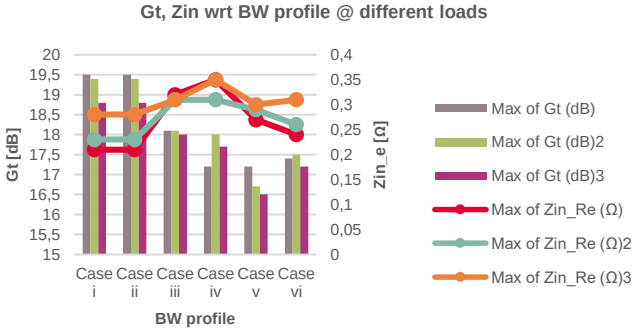
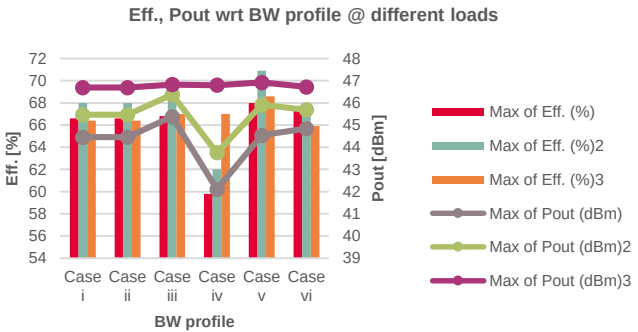
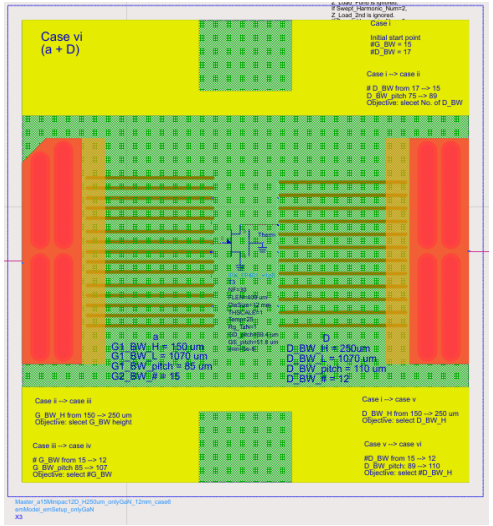


DOE6_1: Laminate, Bond Wire selection

	Input - Gate						Simulation case			Output - Drain					
Sl. No.	No. of wires	No. of sets	Length	Height	Pitch	Selection			Sl.No.	No. of wires	No. of sets	Length	Height	Pitch	Selection
a	5	3	1070	150	85		+	i	A	17	1	1070	150	75	
b	5	3	1070	250	85	iii		ii	B	15	1	1070	150	89	B
c	4	3	1070	250	107	iv	+	v	C	15	1	1070	250	89	
						a	+	vi	D	12	1	1070	250	110	C
							+								







	BW profile		Max. performace @ P1.5dB			Z_load_1						Z_load_2						Z_load_3					
DOE variant	Input_BW	Output_BW	MXP (dBm)	MXE (%)	MXG (dB)	Zin_Re (Ω)	Zin_imag (Ω)	Pout (dBm)	Eff. (%)	Gt (dB)	IRL (dB)	Zin_Re (Ω)	ZL (Ω)	Pout (dBm)	Eff. (%)	Gt (dB)	IRL (dB)	Zin_Re (Ω)	Z_L (Ω)	Pout (dBm)	Eff. (%)	Gt (dB)	IRL (dB)
Case i	a	A	47,50	68,90	23,20	0,32	2,80	44,05	63,00	17,90	-5,30	0,25	3,1 + j 0,3	45,49	64,50	18,50	-4,30	0,28	3,4 - j 0,3	46,74	67,00	18,10	-5,00
Case ii	a	B	47,20	68,80	25,30	0,21	2,80	44,45	66,60	19,50	-4,20	0,23	2,9 + j 0,8	45,46	68,00	19,40	-4,90	0,28	3,4 - j 0,3	46,69	66,40	18,80	-6,40
Case iii	b	B	47,50	69,20	22,90	0,32	3,50	45,38	66,80	18,10	-5,40	0,31	3,4 + j 0,24	46,37	68,40	18,10	-5,40	0,31	3,4 - j 0,3	46,83	67,00	18,00	-5,40
Case iv	c	B	47,40	68,80	22,60	0,35	3,70	42,10	59,80	17,20	-4,80	0,31	3,1 + j 1,3	43,75	62,00	18,00	-4,50	0,35	3,6 - j 0,3	46,80	67,00	17,70	-5,90
Case v	a	C	47,40	71,00	20,60	0,34	2,80	44,52	69,50	16,80	-5,30	0,31	2,9 + j 0,8	45,28	70,80	16,90	-4,70	0,30	3,4 - j 0,8	46,92	68,60	16,50	-3,60
Case vi	a	D	47,2	68,7	21,1	0,3	2,8	44,32	67,7	17,3	-3,3	0,31	3,4 + j 0,3	45,1	68	17,5	-3,6	0,31	3,6 - j 1,4	46,67	65,7	17,6	-4,4