
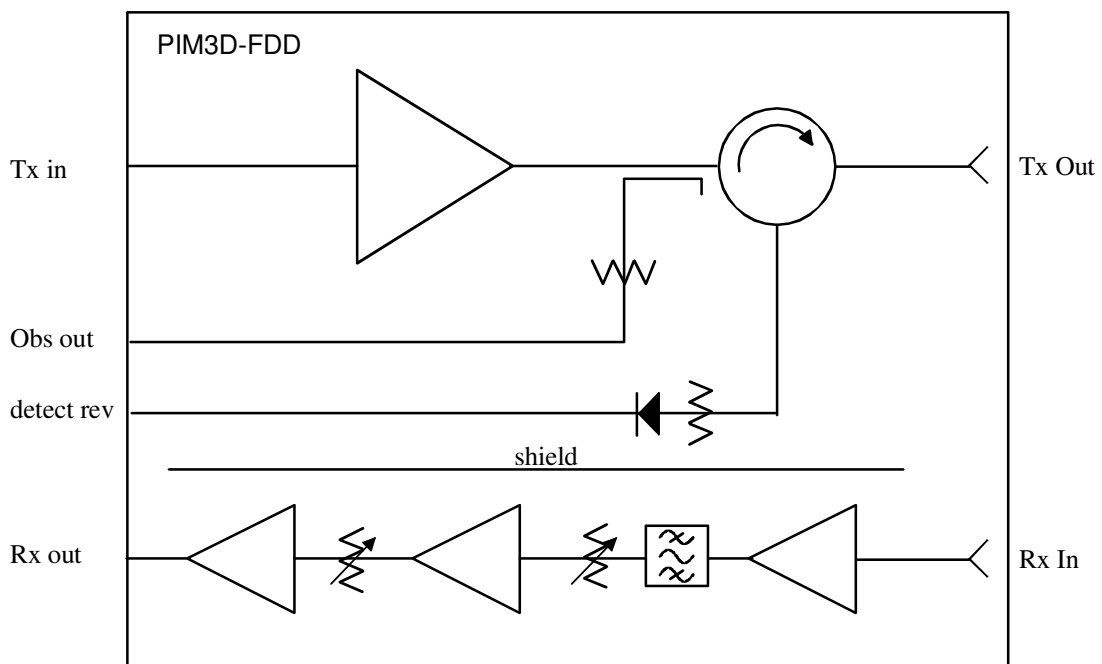


<p>PLUG IN AMPLIFIER MODULES</p>	<p>LPA-PIM3D-150DO-2140M-1950M-F0-01</p>	
<p>P1540</p>		
<p style="text-align: center;">FEATURES</p> <ul style="list-style-type: none"> ◆ BAND 7 (DL 2110-2170MHz ; UL 1920-1980MHz) MODULE ◆ DIRECT PSMP INTERFACE TO CAVITY FILTER ◆ 110dB Tx OUTPUT- Rx INPUT ISOLATION <p>Tx :</p> <ul style="list-style-type: none"> ◆ DOHERTY CONFIGURATION, 150W PEAK POWER ◆ 32dB GAIN; 50OHMS INPUT / OUTPUT ◆ 28V/2.3A AT 20W OUTPUT ◆ FORWARD OBSERVATION PATH ◆ REVERSE POWER DETECTION <p>Rx :</p> <ul style="list-style-type: none"> ◆ 10-42dB ADJUSTABLE GAIN ◆ NF=2dB at 42dB GAIN ◆ IIP3= -5dBm RX BAND 42dB LINE UP ◆ IIP3= +20dBm LNA ◆ 5V/0.27A 		<p>PACKAGE : PIM3D-FDD-PSMP</p> <p style="text-align: center;">APPLICATIONS</p> <ul style="list-style-type: none"> ◆ RRU - RRH AMPLIFIERS ◆ MIMO AMPLIFIERS <div style="text-align: center;">  </div>

Block diagram:



Transmit electrical characteristics: 50 ohms; Supply=28V; 2110-2170MHz; -20°C to +75°C (1,2)

Ref	parameter	conditions	note	min	typ	max	units
1	Bandwidth			2110		2170	MHz
2	Gain Tx with Tx on	2140MHz ; 50°C; Tx -Rx ctrl >3V			31		dB
3	Gain flatness	2110-2170MHz			0.5		dBpp
4	Gain vs temperature	2140MHz				TBD	dB
5	Instantaneous bandwidth	f=2140MHz @ 160Wp	5		60		MHz
6	Input return loss	50 ohms			-16		dB
7	Output return loss	50 ohms			-14		dB
8	Fwd Observation path	Tx out to Obs out			-42		dB
9	Fwd Obs accuracy	flatness 2040-2240MHz	6			0.2	dB
10	Peak power	LTE 10MHz TM1.1. PAR=9dB PARC=2dB			150		W
11	AM-PM	LTE 10MHz TM1.1. PAR=9dB 20W average				10	deg.
12	Adjacent channel power ratio	20W/20MHz LTE signal ACLR1 ACLR2			-33 -45		dBc dBc
13	Forward Intermodulation	2 x 10W/10MHz LTE signals			-30		dBc
14	Reverse intermodulation	10W 10MHz forward, 100mW 10MHz reverse				-70	dBc
15	Output noise	1920-1980MHz			-33		dBm/MHz
16	2d harmonic rejection	1 tone 10W output			-50		dBc
17	Current consumption Tx	28V ; Idle;			0.5	0.6	A
18	Current consumption Tx with Tx off	28V; Tx enable <0.3V			10		mA
19	Current consumption	28V ; Tx enable >3V; 1 LTE 20MHz , PAPR@0.01%=9dB ; Pout=15Wavg continuous			1.85		A
20	Current consumption	28V ; Tx enable >3V; 1 LTE 20MHz , PAPR@0.01%=9dB ; Pout=20Wavg continuous			2.3		A
21	Switching time off-on	Tx enable from 0V to 3V			3	4	µs
22	Switching time on off	Tx enable from 3V to 0V			2	3	µs

1. Unless otherwise specified
2. Housing temperature
3. Unless otherwise specified
4. Before correction
5. IMD3 dissymmetry 3dB max
6. 50ohms output load

Receive electrical characteristics : 50 ohms; Supply=5.5V; 1920-1980MHz; -20°C to +75°C (1,2)

Ref	parameter	conditions	note	min	typ	Max	units
1	Bandwidth			1920		1980	MHz
2	Max Gain Rx	1950MHz ; 50°C			42		dB
3	Gain flatness	1920-1980MHz ; 20dB<Rx Gain<42dB	7		1.0	2.0	dBpp
4	Gain vs temperature	1950MHz -20to +75°C max gain			2		dB
5	Input return loss	50 ohms			-16	-14	dB
6	Output return loss	50 ohms			-16	-14	dB
7	Noise figure	gain=42dB (ALCRX<0.3V)			2.0		dB
8	Noise figure	gain=20dB (ALCRX=2.0V)			10.0		dB
9	IIP3	gain=42dB (ALCRX<0.3V)	8		-5		dBm
10	IIP3	gain=20dB (ALCRX=2.0V)	9		+4		dBm
11	ALCRx for Minimum gain	Gain < 0dB	10		3.0		V
12	ALC ramp up time	ALCRX from 0.3V to 2.0V	11		TBD		µs
13	Current consumption	Supply 5.5V			0.27	0.3	A

7. Adjustment through analog control 0.3V-2.0V
8. 2 CW tones at input -40dBm each
9. 2 CW tones at input -30dBm each
10. Gain adjust non monotonous for ALCRX>3V
11. 0 to 90% level variation

Tx Rx isolation characteristics: 50 ohms; -20°C to +75°C (1,2)

Ref	parameter	conditions	note	min	typ	max	units
1	Tx out to Rx in	1920-1980MHz at 20W LTE10MHz output and max Rx gain	1		-115	-110	dB

1. measured in T130 and with T170 PSMP plug in interface

Maximum ratings

Ref	parameter	conditions	note	min	nom	max	units
1	Operating temperature	Flange temperature		-40°C		+90	°C
Transmit max ratings							
2	Supply voltage			0V		32	V
3	Input peak power					+15	dBm
4	Input average power					+5	dBm
5	Output VSWR	At 6W ouput power		∞			-
Receive max ratings							
5	Supply voltage			3.0		8.0	V
6	Max input average power					+15	dBm

Monitoring & Control

Ref	parameter	designation	conditions	Remarks
1	Temperature	TEMP	-40°C to +100°C	I ² C bus
2	Receive ALC	ALCRX	0.3V to 3V / 42dB to 0dB	<10mA
3	Tx enable	Tx enable	0V to 3V	<4µs switching time
4	Tx disable	Tx enable	3V to 0V	<2µs switching time
5	Amplifier identity	Id		I ² C bus

Specifications and information are subject to change without notice

PCB Connections

Bottom Surface of module to input PCB Surface : 1.6mm+/-0.2mm (***)	
RF & Power landing pads (*) (gold plated tabs Harwin S70-220101045R)	Signal landing pads (*) (PCB pads gold plated)
Landing pad 1 : RF Gnd	Landing pad 4 : SCL
Landing pad 2 : Tx input	Landing pad 5 : SDA
Landing pad 3 : +28V in	Landing pad 6: Gnd
Landing pad 10: RF Gnd	Landing pad 7 : Tx enable(**)
Landing pad 11 : fwd observation path	Landing pad 8 : Rev detect
Landing pad 12 : +5.5V in	Landing pad 9 : Tx enable (**)
Landing pad 13 : Rx Out	
Landing pad 14 : ALCRX	
Landing pad 15 : +28V in (***)	
Landing pad 16 : RF Gnd (***)	
(*) for Harwin spring contacts; 4A max per contact (***) output PCB	(*) for Molex 78732-6021; 1A max per contact (**) connected together internally

(***) 1.6mm thick input PCB required. Output PCB not required (only for alternative supply voltage input)

Mechanical

Ref	Characteristic	Description	Remarks
1	Housing size	107.0mm x 65mm x 13.0mm	
2	Mounting	6 M3 screws	
3	Base material	Aluminum 6082	
4	Base finish	Silver	
5	Housing cover finish	Electroless nickel	

Connectors

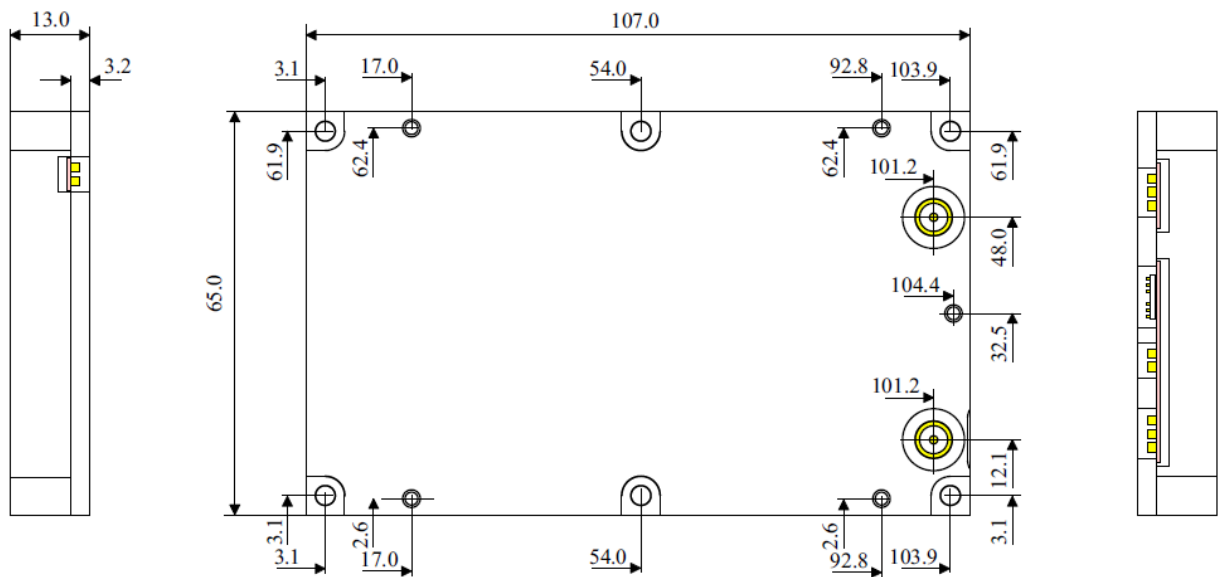
Ref	Characteristic	Description	Remarks
1	RF input/samples connectors	Spring contacts	Connects to 1.6mm multilayer board (*)
2	Tx output connector	PSMP limited detent + transition	(***)
3	Rx input connector	PSMP limited detent + transition	(***)
4	DC Supply connectors	Spring contacts	Connects to 1.6mm multilayer board (*)
5	Signal connectors	Molex 78732-6021	Connects to 1.6mm multilayer board (**)

(*) with gold plated tabs Harwin S70-220101045R

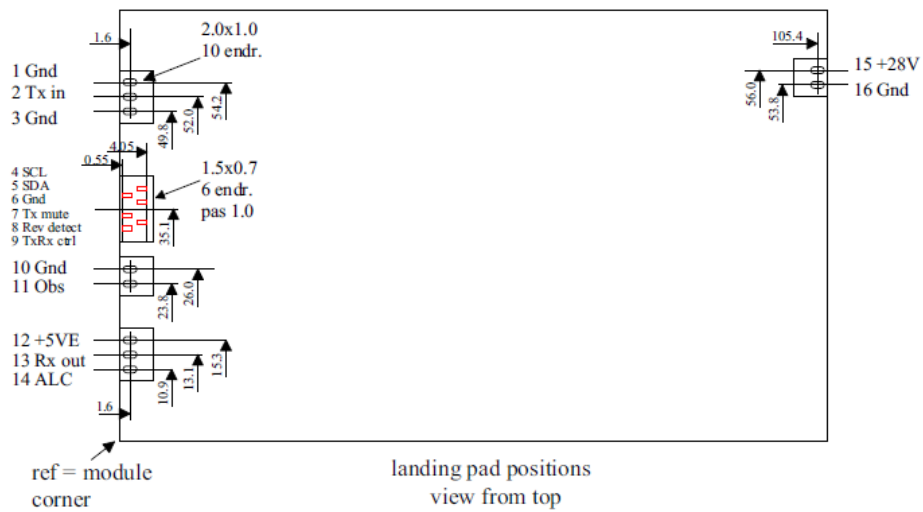
(**) direct connection to PCB

(***) 11.75mm transition installed - other standard lengths (10mm, 17.55mm, 19.70mm,...)

PIM3D - FDD - PSMP package outline:



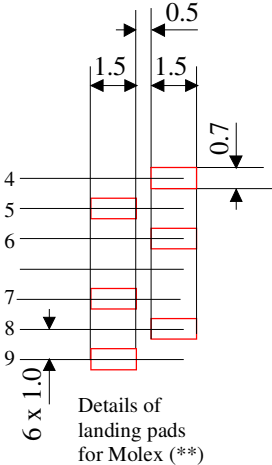
PIM3D landing pads on 1.6 (63mils) thick board:



LPA Concepts

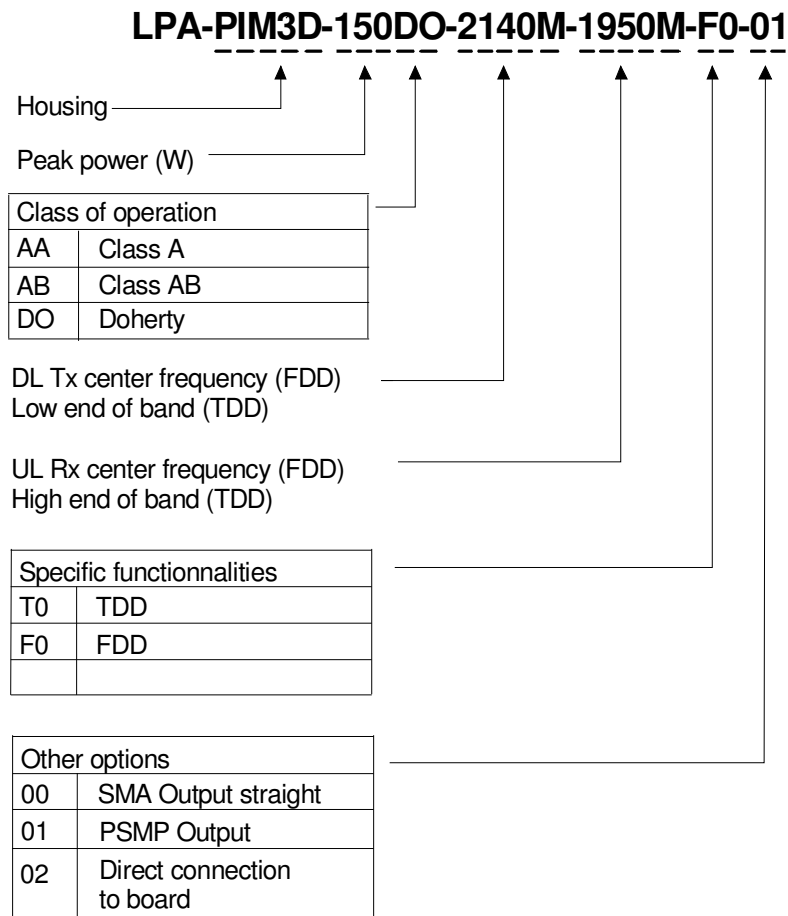
PRELIMINARY

Molex 78732-6021 detail of landing pads:



Note : landing pads for 78732-6021 are gold plated

Part numbering:



Support documents:

Ref	Document type	Document number	Title	Date
1	Application Note	APNT17001A	PIM3 Module product line	04/2018
2	Application Note	APNT18002	Using PIM3D modules	05/2018

Related products:

Ref	Part number	Description	Product code
1	TF-PIM3D-150W-FDD-PSMP	Test fixture PIM3D PSMP output	T130
2	TF-PIM3D-PSMP-SMA-ADAPTOR	PSMP to SMA interface	T170
3	Radio Demo kit	2Tx-2Rx-1Obs radio board with DPD	

TRANSMIT TYPICAL PERFORMANCE



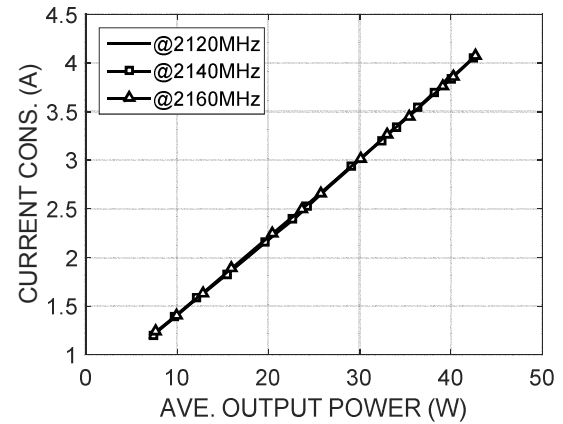
TX GAIN VS FREQUENCY



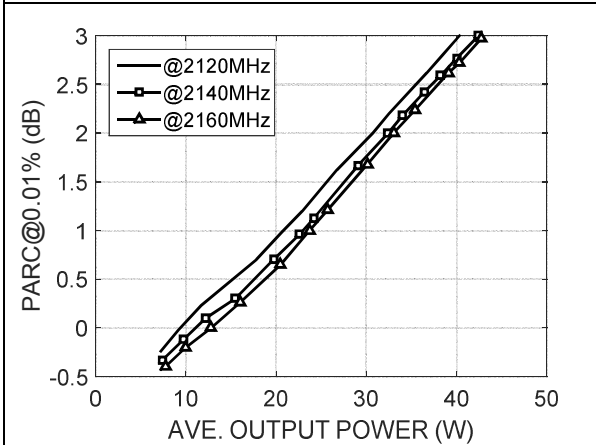
OBSERVATION PATH RELATIVE TO TX OUTPUT



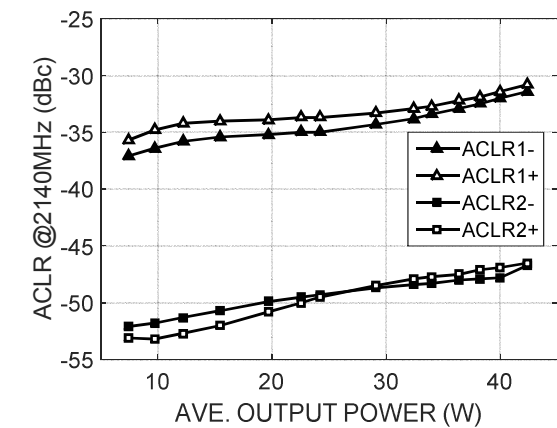
TX OUPUT MATCH



Current consumption vs output power
1LTE 20MHz signal (PAPR_{@0.01%}=9dB)

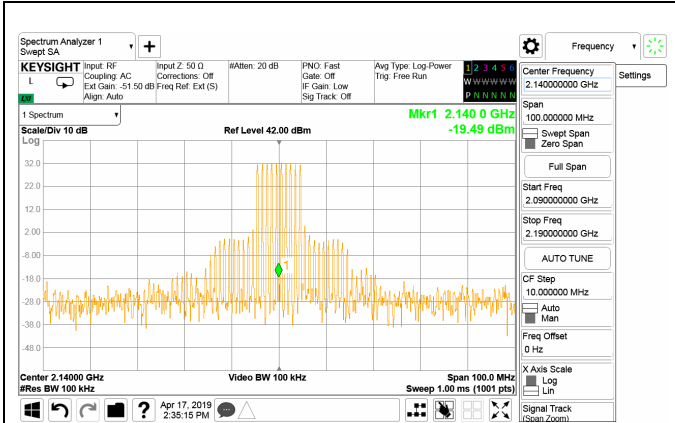


PARC vs output power 1LTE 20MHz signal
(PAPR_{@0.01%}=9dB)

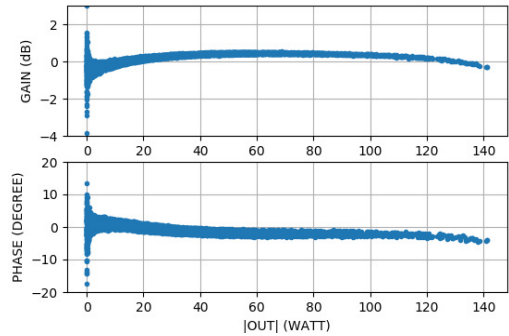


ACLR vs output power 1LTE 20MHz signal
(PAPR_{@0.01%}=9dB)

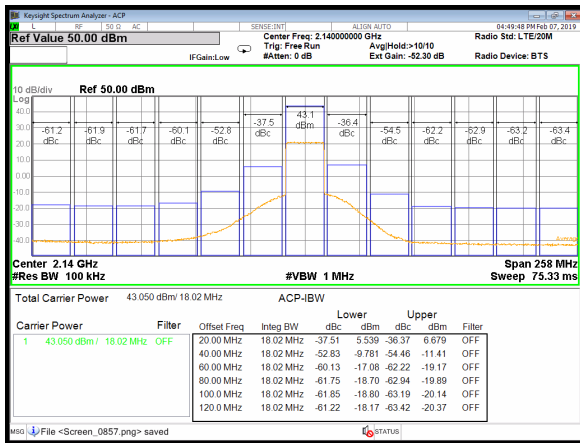
TRANSMIT TYPICAL PERFORMANCE (continued)



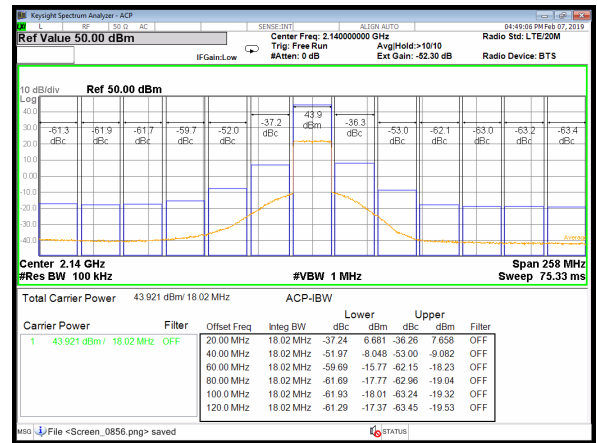
10 tones 1MHz apart 2140MHz
15Wave 28V/1.7A



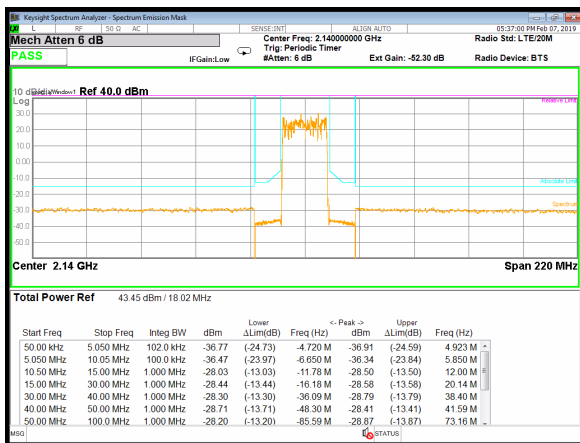
AM-AM and AM-PM; 2140MHz
LTE 10MHz PAR=9dB
20Wave 28V/2.25A



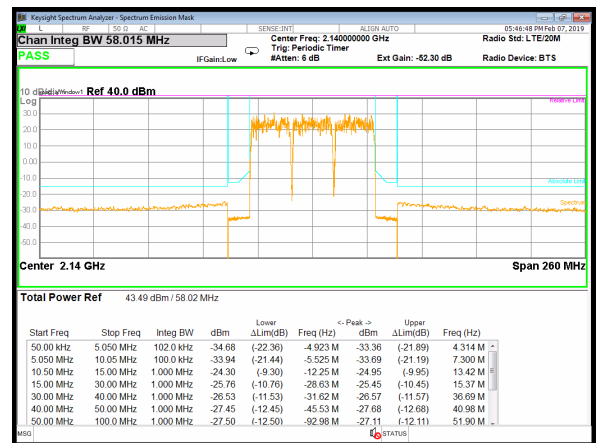
ACLR : 1LTE 20MHz, 2140MHz, 20W, 28V/2.3A



ACLR : 1LTE 20MHz, 2140MHz, 25W, 28V/2.7A



SEM : 1LTE 20MHz, 2140MHz, 22W, 28V/2.5A
linearized with DPD

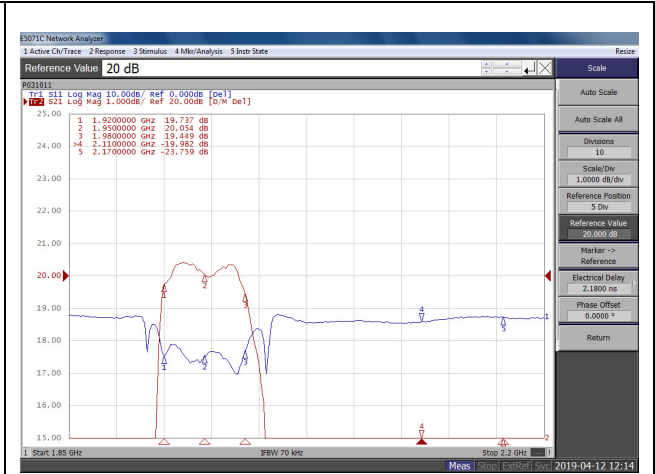


Wideband SEM : 3xLTE 20MHz, 2140MHz, 22W,
28V/2.5A linearized with DPD

RECEIVE TYPICAL PERFORMANCE



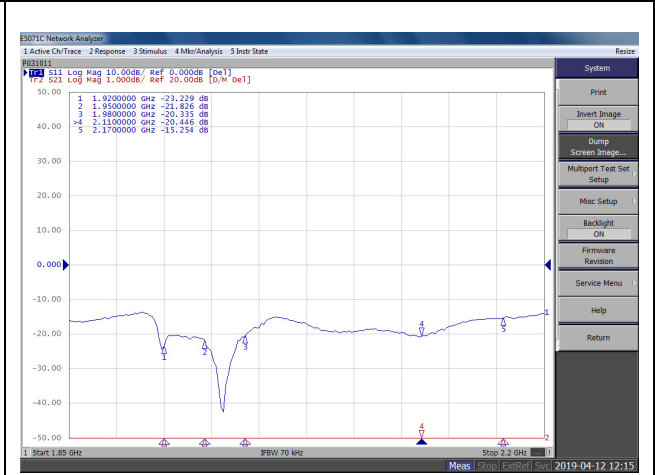
Max GAIN Rx with ALCRX=0.3V



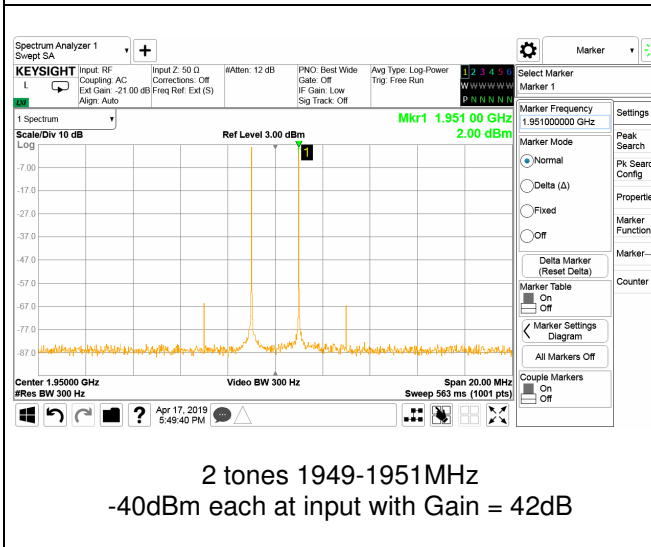
GAIN Rx with ALCRX=2.0V



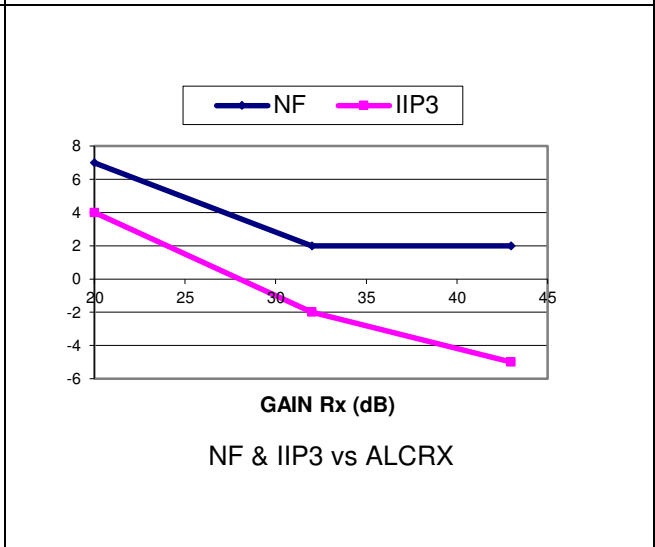
RX INPUT MATCH



RX OUTPUT MATCH

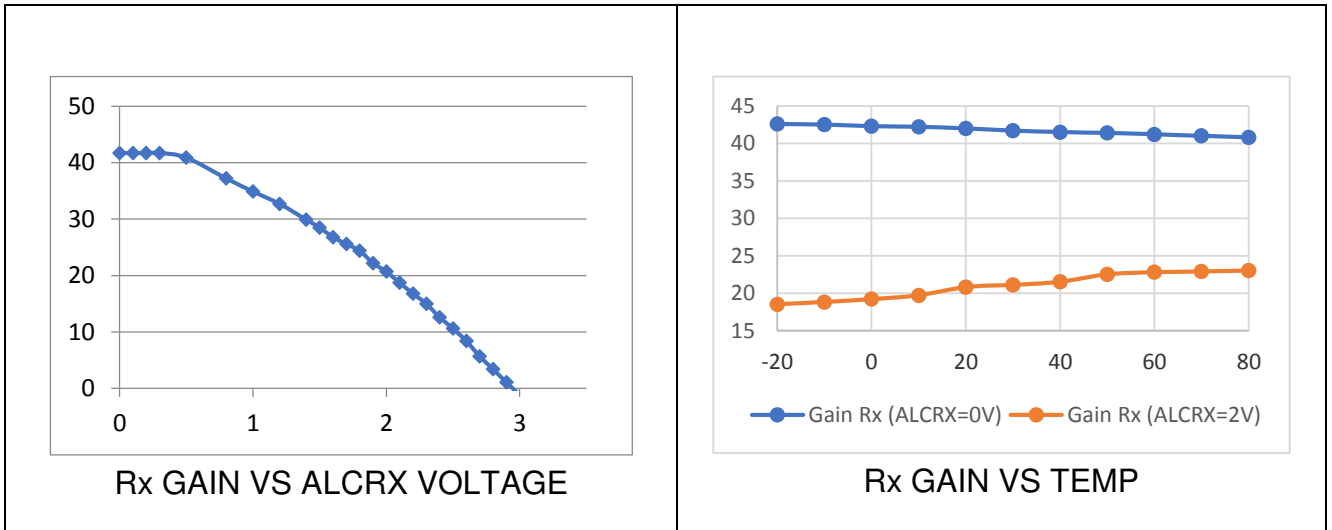


2 tones 1949-1951MHz
-40dBm each at input with Gain = 42dB



GAIN Rx (dB)
NF & IIP3 vs ALCRX

RECEIVE TYPICAL PERFORMANCE



ISOLATION TX-RX

