PLUG IN AMPLIFIER MODULES	LPA-PIM3D-050DO-2655M-2535M-F0-01
P1460	

FEATURES

- ♦ BAND 7 (DL 2620-2690MHz ; UL 2500-2570MHz) MODULE
- ♦ DIRECT PSMP INTERFACE TO CAVITY FILTER
- ♦ 110dB Tx OUTPUT- Rx INPUT ISOLATION

Tx :

- ♦ DOHERTY CONFIGURATION, 50W PEAK POWER
- ♦ 26dB GAIN; 50OHMS INPUT / OUTPUT
- ♦ 28V/0.75A AT 6W OUTPUT
- ♦ FORWARD OBSERVATION PATH
- ♦ REVERSE POWER DETECTION

Rx :

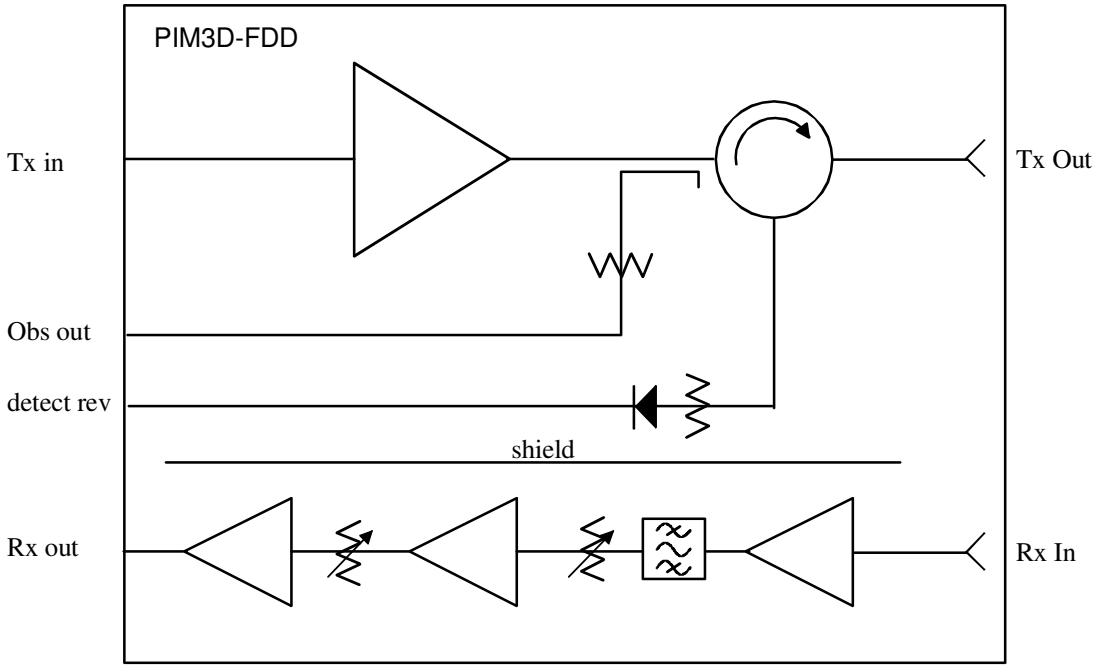
- ♦ 20-43dB ADJUSTABLE GAIN
- ♦ NF=2dB at 43dB GAIN
- ♦ IIP3= -4dBm RX BAND LINE UP
- ♦ IIP3= +20dBm LNA
- ♦ 5.5V/0.38A

PACKAGE : PIM3D-FDD-PSMP

APPLICATIONS

- ♦ RRU - RRH AMPLIFIERS
- ♦ MIMO AMPLIFIERS

Block diagram:



Transmit electrical characteristics : Supply=28V; 2620MHz-2690MHz; -20°C to +75°C (1,2)

Ref	parameter	conditions	note	min	typ	max	units
1	Bandwidth			2620		2690	MHz
2	Gain Tx with Tx on	2655MHz ; 50°C; Tx -Rx ctrl >3V			26.0		dB
3	Gain flatness	2620-2690MHz			0.5	1.0	dBpp
4	Gain vs temperature	2655MHz		-2		+2	dB
5	Instantaneous bandwidth	F=2655MHz @ 60Wp	5		70		MHz
6	Input return loss	50 ohms			-23	-16	dB
7	Output return loss	50 ohms			-20	-16	dB
8	Fwd Observation path	Tx out to Obs out			-40		dB
9	Fwd Obs accuracy	flatness 2620-2690MHz				0.5	dB
10	Peak envelope power	10 tones peaked phases at -27dBc		50	60		W
11	Adjacent channel power ratio	5W/20MHz LTE signal ACLR1 ACLR2			 -30 -40		 dBc dBc
12	Forward Intermodulation	2 x 2.5W/10MHz LTE signals			-30		dBc
13	Reverse intermodulation	10W 10MHz forward, 100mW 10MHz reverse				-70	dBc
14	Out of band spurious with one 5W/10MHz signal	1-2360MHz 2402-2472MHz 3400-3800MHz			-38 -28 -58		dBm/MHz
15	Out of band spurious with 2.5W/10MHz 2625MHz and 2.5W/10MHz 2685MHz	2555MHz	4		+4		dBm/MHz
16	Output noise	2500-2570MHz			-33		dBm/MHz
17	2d harmonic rejection	1 tone 10W output			TBD		dBc
18	Current consumption Tx	28V ; Idle;			0.2	0.25	A
19	Current consumption Tx with Tx off	28V; Tx enable >3V			0.01	0.02	A
20	Current consumption	28V ; Tx enable >3V; 1 W-CDMA TM1 64ch ; Pout=6.0Wavg continuous			0.8	1.0	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

Receive electrical characteristics : 50 ohms; Supply=5V; 2500MHz-2570MHz; -20°C to +75°C (1,2)

Ref	parameter	conditions	note	min	typ	max	units
1	Bandwidth			2500		2570	MHz
2	Max Gain Rx	2535MHz ; 50°C		41.5	43.0	44.5	dB
3	Gain flatness	2500-2570MHz ; 20dB<Rx Gain<43dB	6		1.5	3.0	dBpp
4	Gain vs temperature	2535MHz		-2		+2	dB
5	Input return loss	50 ohms			-16	-14	dB
6	Output return loss	50 ohms			-18	-16	dB
7	Noise figure	gain=43dB (ALCRX=0.3V)			1.5	2.0	dB
8	Noise figure	gain=20dB (ALCRX=2.5V)			9.0	10.0	dB
9	IIP3	gain=43dB (ALCRX=0.3V)	7	-4			dBm
10	IIP3	gain=20dB (ALCRX=2.5V)		8			dBm
11	ALCRx for Minimum gain	Gain < 0dB			3.5		V
12	ALC ramp up time	ALCRX from 0.3V to 2.5V	8		TBD		µs
13	Current consumption	Supply 5.5V		0.34	0.38	0.42	A

6. Adjustment through analog control 0.3V-2.5V
7. 2 tones input power -35dBm each
8. 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	2500-2570MHz at 5W LTE10MHz output and max Rx gain	1,2		-115	-110	dB

1. measured in T120 and with T170 PSMP plug in interface
2. from Txout to Rx in based on measurement from Txin to Rxout

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					+23	dBm
4	Input average power					+18	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	I²C bus
2	Reverse power	Rev detect	Rms 31mV/dB	1W reverse = 0.83V
3	Receive ALC	ALCRX	0.3V to 3.3V / 43dB to 0dB	<10mA
4	Tx enable	Tx enable	0V to 3V	<4µs switching time
5	Tx disable	Tx enable	3V to 0V	<2µs switching time
6	Amplifier identity	Id		I²C bus

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

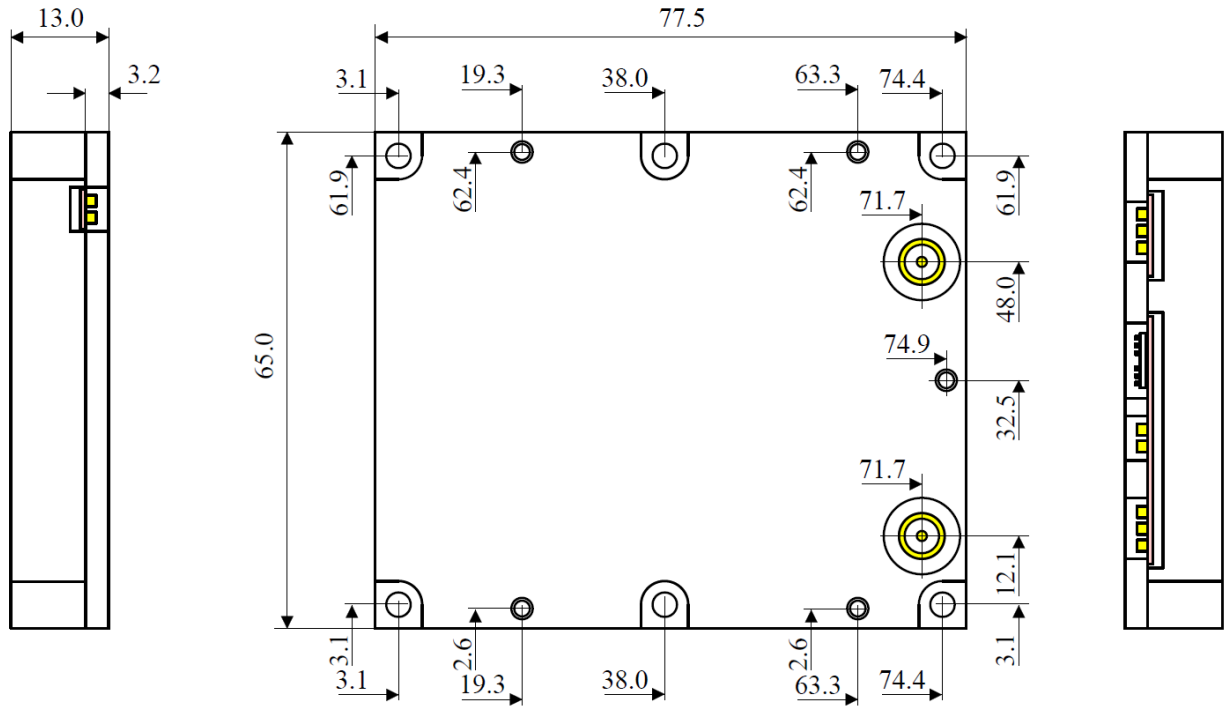
Ref	Characteristic	Description	Remarks
1	Housing size	77.5mm x 65mm x 13.0mm	
2	Mounting	6 M3 screws	
3	Base material	Aluminum 6082	
4	Base finish	Silver	
5	Housing cover finish	Electroless nickel	

Connectors

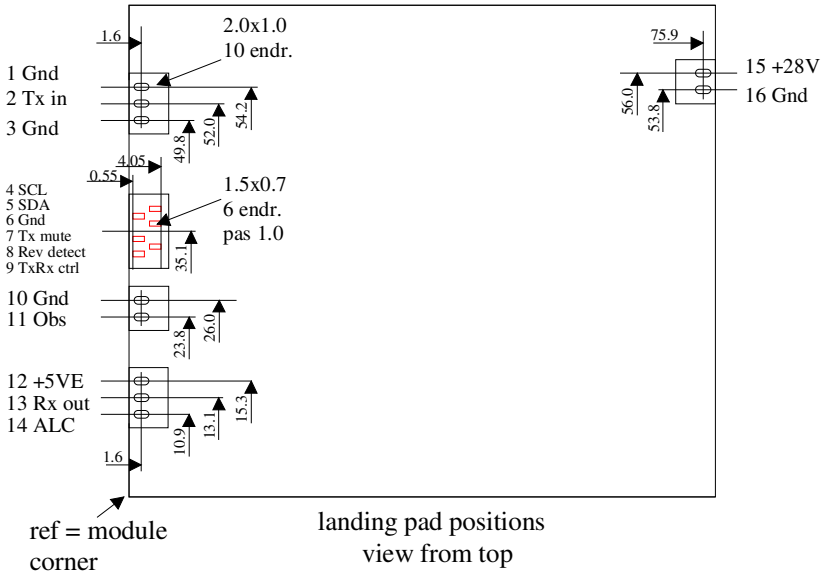
Ref	Characteristic	Description	Remarks
1	RF input/samples connectors	Spring contacts	Connects to 1.6mm multilayer board (*)
2	Tx output connector	PSMP limited detent + transition	(***)
3	Rx input connector	PSMP limited detent + transition	(***)
4	DC Supply connectors	Spring contacts	Connects to 1.6mm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

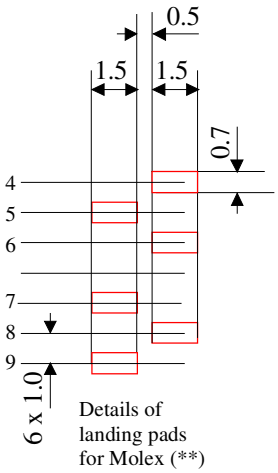
PIM3D - FDD - PSMP package outline:



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



Molex 78732-6021 detail of landing pads:



Note : landing pads for 78732-6021 are gold plated

Part numbering:

LPA-PIM3D-050DO-2655M-2535M-F0-01

Housing

Peak power (W)

Class of operation	
AA	Class A
AB	Class AB
DO	Doherty

DL Tx center frequency (FDD)
Low end of band (TDD)

UL Rx center frequency (FDD)
High end of band (TDD)

Specific functionnalities	
T0	TDD
F0	FDD

Other options	
00	SMA Output straight
01	PSMP Output
02	Direct connection to board

Support documents:

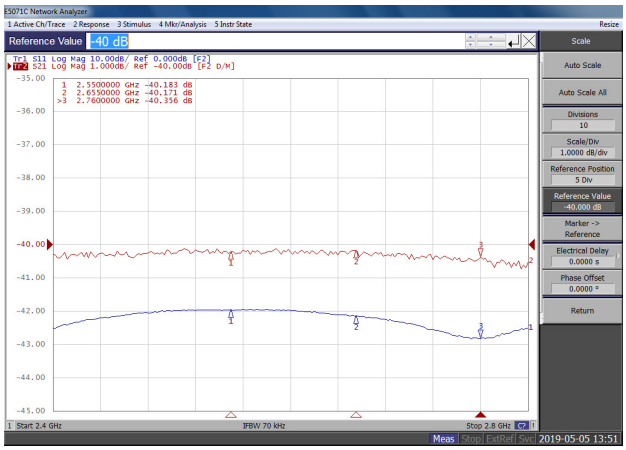
Ref	Document type	Document number	Title	Date
1	Application Note	APNT17001A	PIM3 Module product line	04/2018
2	Application Note	APNT18002	Using PIM3D modules	05/2018

Related products:

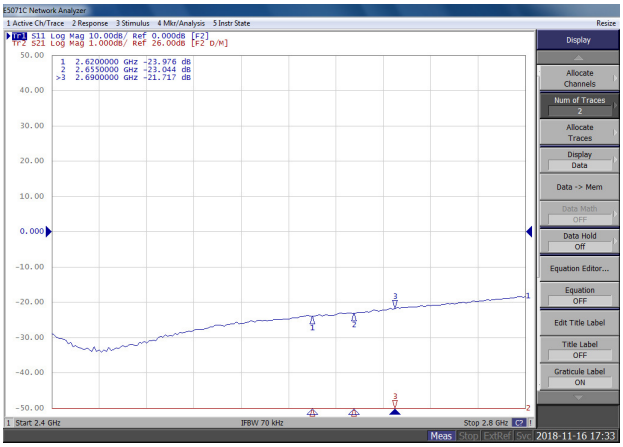
Ref	Part number	Description	Product code
1	TF-PIM3D-50W-FDD-PSMP	Test fixture PIM3D PSMP output	T120
2	TF-PIM3D-PSMP-SMA-ADAPTOR	PSMP to SMA interface	T170
3	Radio Demo kit	2Tx-2Rx-1Obs radio board with DPD	

TRANSMIT TYPICAL PERFORMANCE

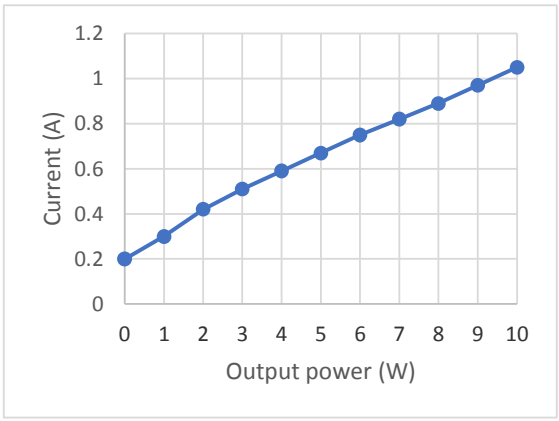
TX GAIN VS FREQUENCY



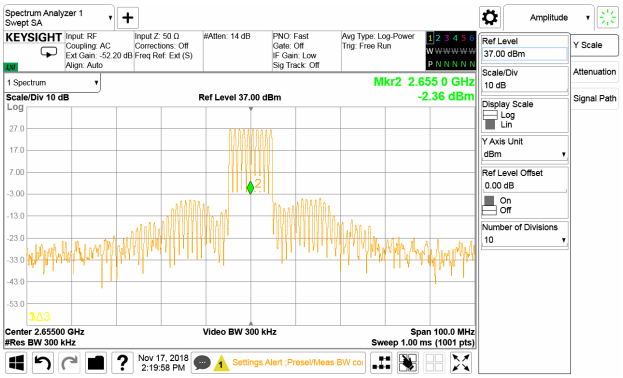
OBSERVATION PATH RELATIVE TO TX OUTPUT



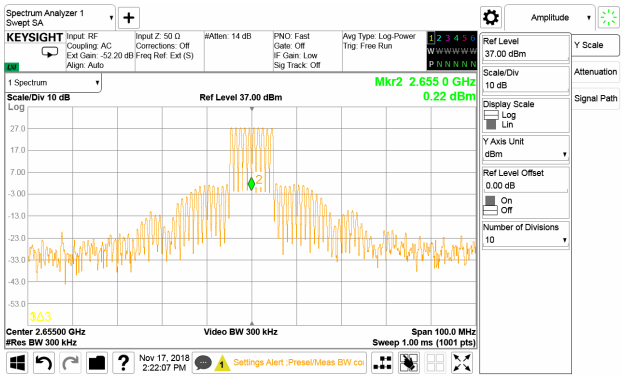
TX OUPUT MATCH



Current consumption vs output power
LTE 10MHz signal



10 tones 1MHz apart 2655MHz
5Wave 28V/0.66A

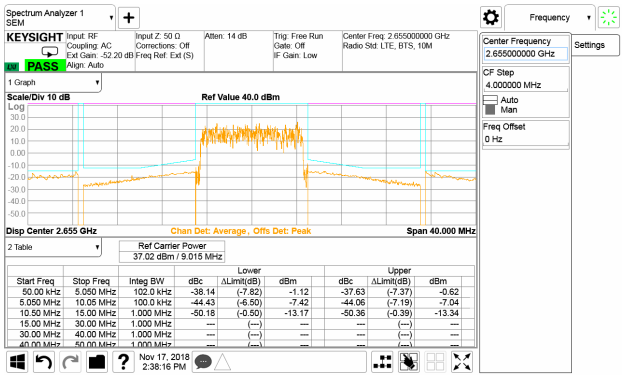


10 tones 1MHz apart 2655MHz
6Wave 28V/0.75A

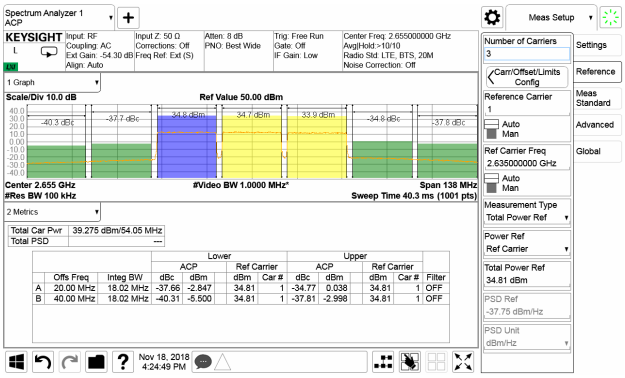
TRANSMIT TYPICAL PERFORMANCE (continued)

ACLR : 1LTE 10MHz, 2655MHz, 5W, 28V/0.72A

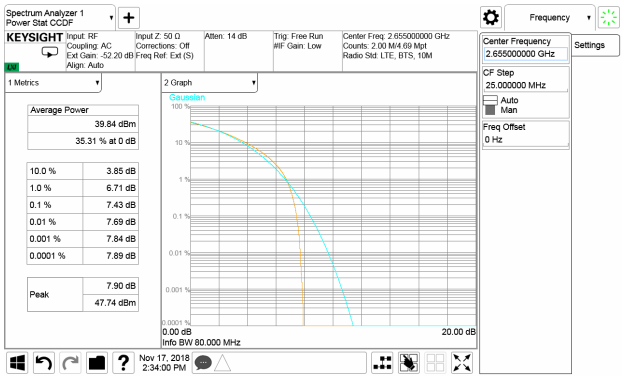
ACLR : 1LTE 10MHz, 2655MHz, 10W, 28V/1.22A



SEM : 1LTE 10MHz, 2655MHz, 5W, 28V/0.73A



Wideband ACLR : 3xLTE 20MHz 5W ave

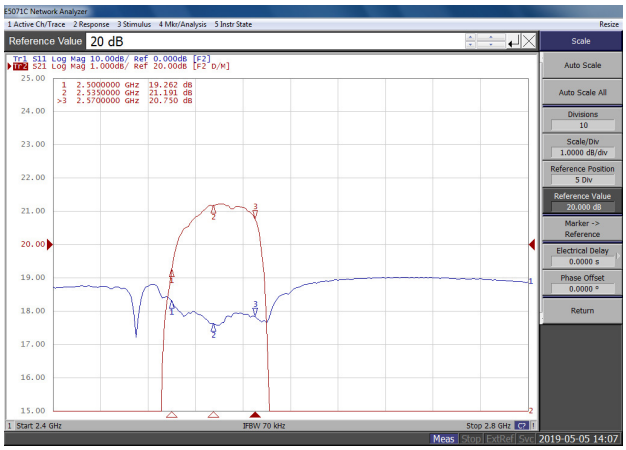


Peak power : LTE10MHz 2dB PAR compression

Specifications and information are subject to change without notice

RECEIVE TYPICAL PERFORMANCE

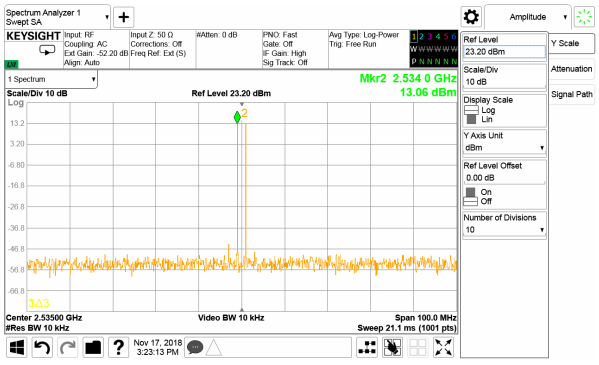
Max GAIN Rx with ALCRX=0.3V



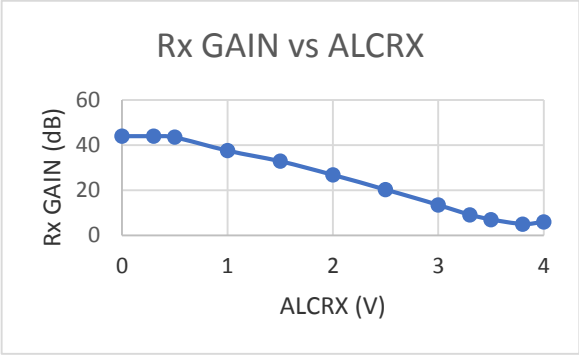
GAIN Rx with ALCRX=2.5V

RX INPUT MATCH

RX OUTPUT MATCH

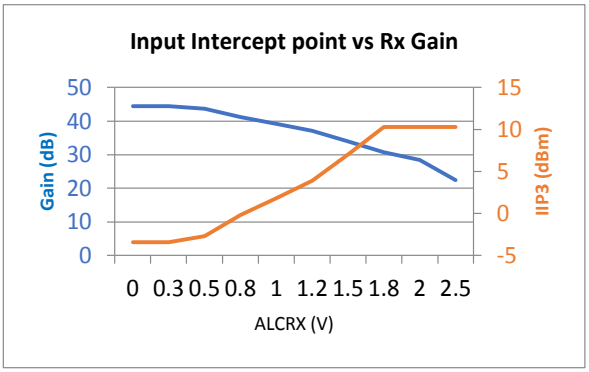


2 tones 2534MHz-2536MHz
-30dBm each at input

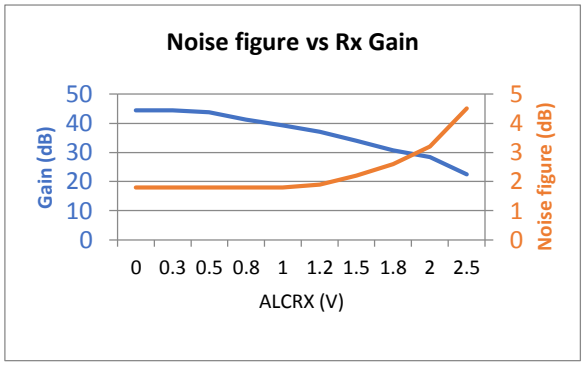


Rx GAIN vs ALCRX

RECEIVE TYPICAL PERFORMANCE (CONTINUED)

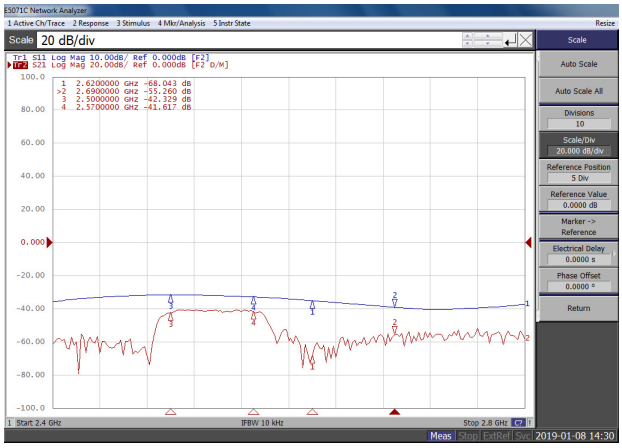


IIP3 /GAIN vs ALCRX

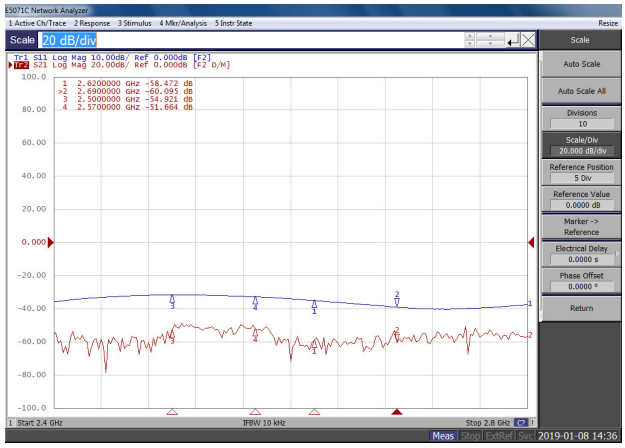


NOISE FIGURE / GAIN vs ALCRX

ISOLATION TX-RX



Tx input (Gain=26dB) to Rx output (Gain=42dB) measured using T170 PSMP-SMA adaptor
0.5mm spacing and spring finger contacts
isolation = 26+43+40=109dB



Tx input (Gain=26dB) to Rx output (Gain=42dB) measured using T170 PSMP-SMA adaptor with direct contact
isolation = 26+43+50=119dB