
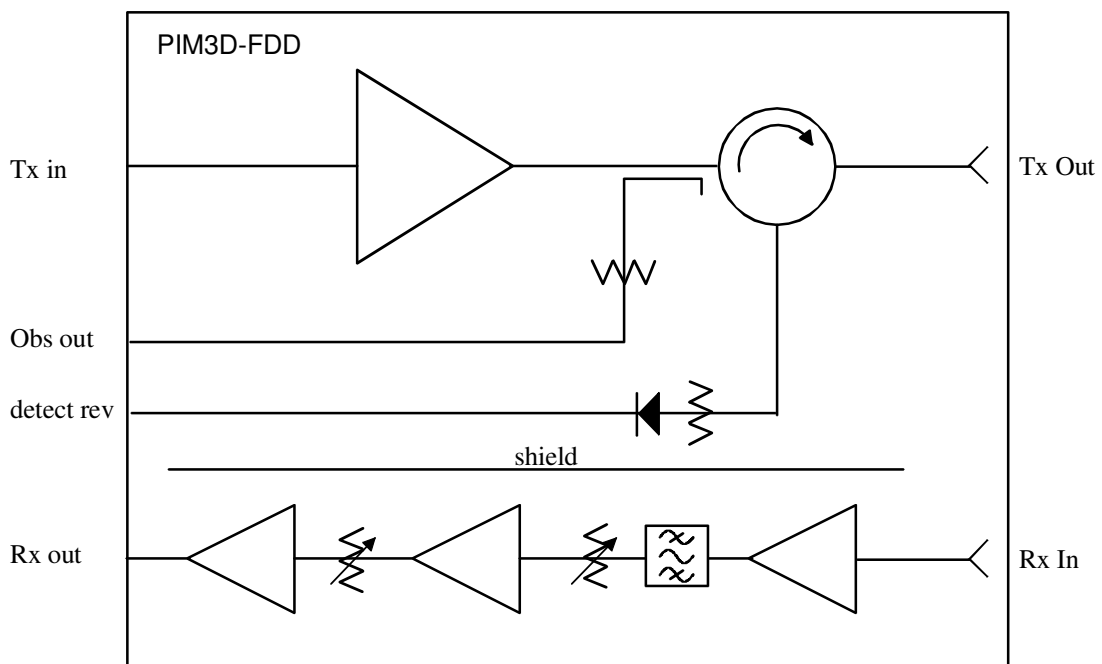


<p>PLUG IN AMPLIFIER MODULES</p>	<p>LPA-PIM3D-050DO-2655M-2535M-F0-02</p>
<p>P1450</p>	
<p>FEATURES</p> <ul style="list-style-type: none"> ◆ BAND 7 (DL 2620-2690MHz ; UL 2500-2570MHz) MODULE ◆ DIRECT INTERFACE TO INPUT/OUTPUT PCBs ◆ 90dB Tx OUTPUT- Rx INPUT ISOLATION <p>Tx :</p> <ul style="list-style-type: none"> ◆ DOHERTY CONFIGURATION, 50W PEAK POWER ◆ 26dB GAIN; 50OHMS INPUT / OUTPUT ◆ 28V/0.75A AT 6W OUTPUT ◆ FORWARD OBSERVATION PATH ◆ REVERSE POWER DETECTION 	 <p>PACKAGE : PIM3D-FDD-PCB</p>
<p>Rx :</p> <ul style="list-style-type: none"> ◆ 20-43dB ADJUSTABLE GAIN ◆ NF=2dB at 43dB GAIN ◆ IN BAND IIP3= -4 dBm (43dB GAIN) ◆ OUT OF BAND IIP3=+20dBm (LNA) ◆ 5.5V/0.38A 	<p>APPLICATIONS</p> <ul style="list-style-type: none"> ◆ DAS RF HEADS ◆ RRH AMPLIFIERS ◆ MIMO RADIO HEADS

Block diagram:



Specifications and information are subject to change without notice

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	3		26.0		dB
3	Gain flatness	2620-2690MHz	3		0.7	1.2	dBpp
4	Gain vs temperature	2655MHz	3	-2		+2	dB
5	Instantaneous bandwidth	3 Carriers LTE20M	4	60	70		MHz
6	Input return loss	50 ohms			-20	-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	55		W
11	Peak power at 2dB PAR compression	1 LTE10 MHz		47	47.5		dBm
12	Adjacent channel power ratio	5W/10MHz LTE signal ACLR1 ACLR2			-35 -45		dBc dBc
13	Forward Intermodulation	2 x 2.5W/10MHz LTE signals			-34		dBc
14	Reverse intermodulation	10W 10MHz forward, 100mW 10MHz reverse				-70	dBc
15	Out of band spurious with one 5W/10MHz signal	1-2490MHz 2500-2570MHz 2700-3800MHz			-34 -34 -34		dBm/MHz
16	Out of band spurious with 2.5W/10MHz 2625MHz and 2.5W/10MHz 2685MHz	2555MHz			0		dBm/MHz
17	Output noise	2500-2570MHz			-73		dBm/MHz
18	2d harmonic rejection	1 tone 10W output			-60		dBc
19	Current consumption Tx	28V ; Idle;			0.21	0.23	A
20	Current consumption Tx with Tx off	28V; Tx enable >3V			0.01	0.02	A
21	Current consumption	28V ; Tx enable >3V; LTE TM1.1. 10MHz ; Pout=6.0Wavg			0.8	1.0	A
22	Switching time off-on	Tx enable from 0V to 3V			3	4	µs
23	Switching time on off	Tx enable from 3V to 0V			2	3	µs

1. Unless otherwise specified
2. Housing temperature
3. Small signal
4. ACLR1 dissymmetry 3dB max

Receive electrical characteristics : 50 ohms; Supply=5.5V; 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<42dB	5		2.0	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)			1.8	2.2	dB
8	Noise figure	gain=20dB (ALCRX=2.5V)			5.0	6.0	dB
9	Inband IIP3	gain=43dB (ALCRX=0.3V)	6	-4	-2		dBm
10	Inband IIP3	gain=20dB (ALCRX=2.5V)		8	+10		dBm
11	ALCRx for Minimum gain		8		3.5		V
12	ALC ramp up time	ALCRX from 0.3V to 2.5V	7		TBD		µs
13	Current consumption	Supply 5.5V		0.34	0.38	0.42	A

5. Adjustment through analog control 0.3V-2.5V
6. 2 tones input power -35dBm each
7. 0 to 90% level variation
8. gain variation reversal around this point

Tx Rx isolation characteristics : 50 ohms

Ref	parameter	conditions	note	min	typ	max	units
1	Tx out to Rx in T100 Fixture	2500-2570MHz at 5W LTE10MHz output and max Rx gain	1		-65		dB
2	Tx out to Rx in AH2 Fixture	2500-2570MHz at 5W LTE10MHz output and max Rx gain	2		-90		dB

1. This measurement is characteristic of the fixture isolation.
2. The AH2 fixture is a high isolation fixture enabling the measurement of the module intrinsic isolation

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 output 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	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		I ² C bus

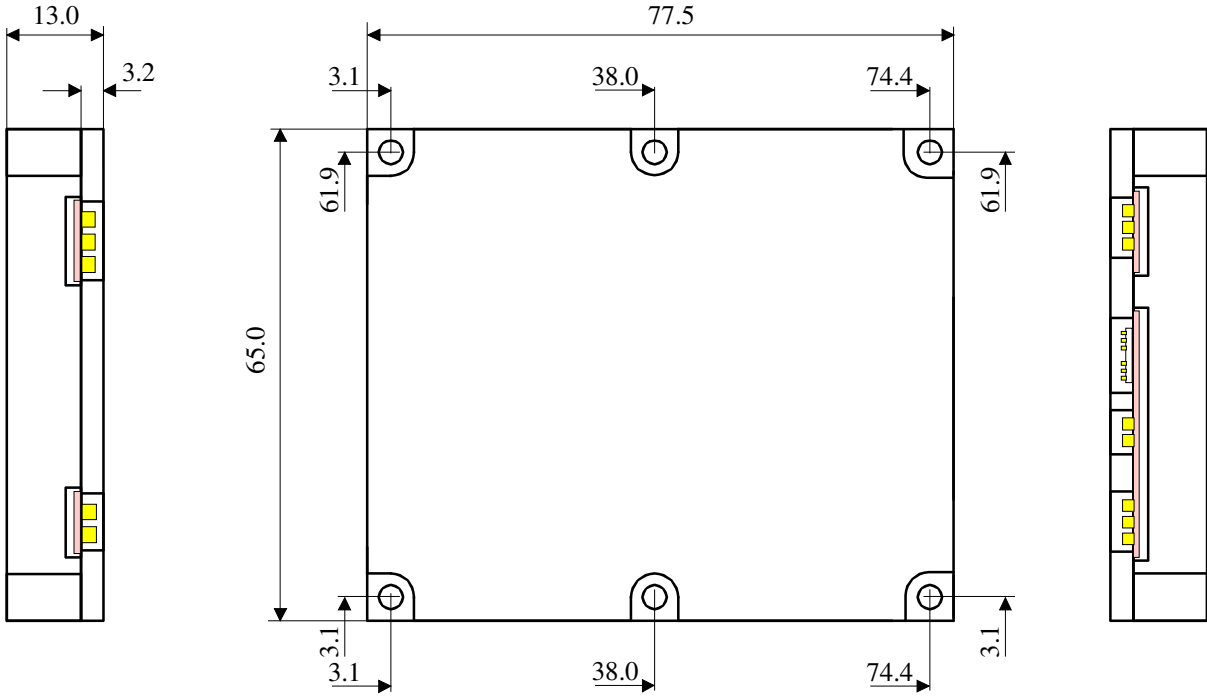
PCB Connections

INPUT PCB (1.6mm +/- 0.2mm Multilayer)	OUTPUT PCB (0.8mm +/-0.1mm Double sided)
Bottom surface of module to input PCB surface :1.6+/- 0.2mm	Bottom surface of module to output PCB surface: 0.8 +/- 0.1mm
Landing pad 1 : RF Gnd (*)	Landing pad 15 : +28V in (***) (alternative to land pad 3)
Landing pad 2 : Tx input (*)	Landing pad 16 : RF Gnd (***)
Landing pad 3 : +28V in (*) (alternative to land pad 15)	Landing pad 17 : Tx output (***)
Landing pad 4 : SCL (**)	Landing pad 18 : RF Gnd (***)
Landing pad 5 : SDA (**)	Landing pad 19 : Rx input (***)
Landing pad 6: Gnd (**)	
Landing pad 7 : Tx enable(**) (internally connected to 9)	
Landing pad 8 : Rev detect (**)	
Landing pad 9 : Tx enable (**) (internally connected to 7)	
Landing pad 10: RF Gnd (*)	
Landing pad 11 : fwd observation path (*)	
Landing pad 12 : +5.5V in (*)	
Landing pad 13 : Rx Out (*)	
Landing pad 14 : ALCRX (*)	
(*) Harwin S70-220101045R contact pads on input PCB ; 4A max per contact (**) for Molex 78732-6021; 1A max per contact	(***) Harwin S70-125161545R contact pads on output PCB ; 4A max per contact

Mechanical

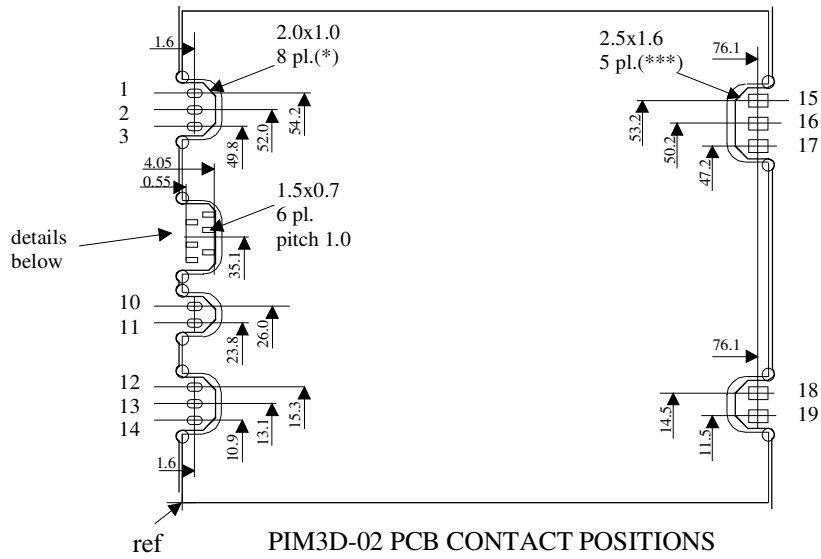
Ref	Characteristic	Description	Remarks
1	Housing size	77.5mm x 65mm x 13.0mm	
2	Mounting	6 M3 screws	
3	Base material	Aluminum 6082	
4	Base finish	Silver	
5	Housing cover finish	Electroless nickel	

PIM3D - FDD - PCB output package outline:



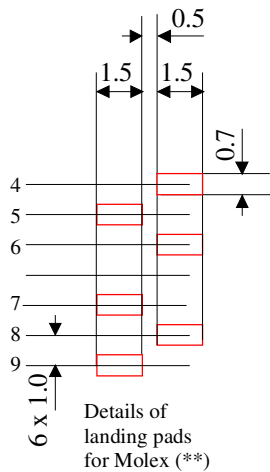
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PIM3D landing pads on 1.6 (63mils) thick board at input and 0.8mm (32 mils) thick board at output.



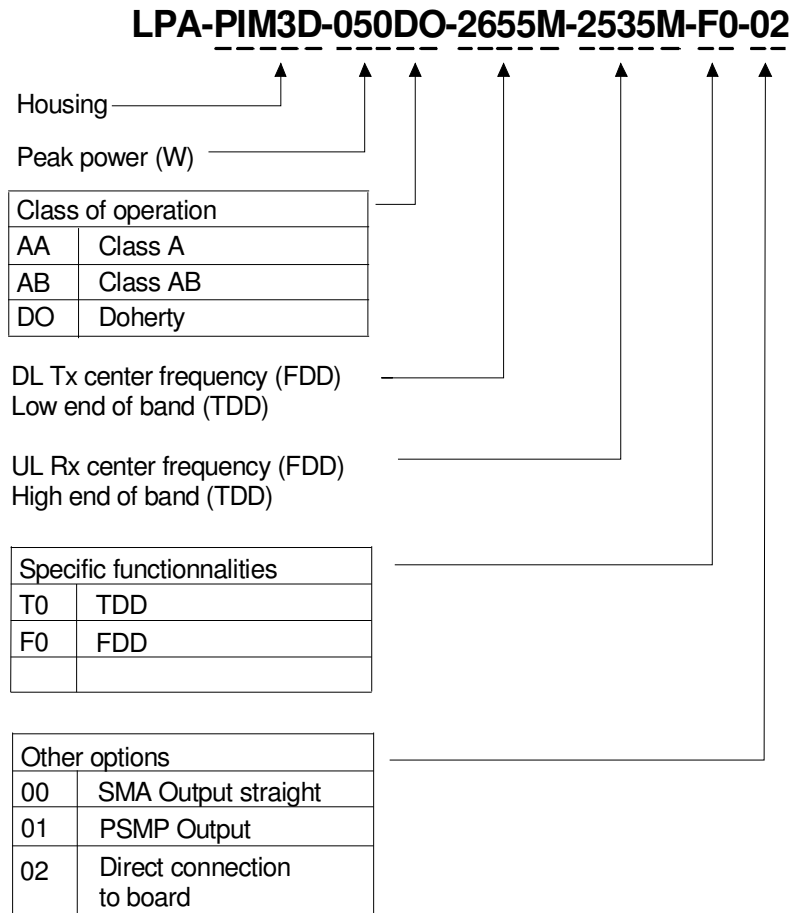
(*) Harwin S70-220101045R
 (***) Harwin S70-125161545R

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	APNT18002B	Using PIM3D modules	05/2018

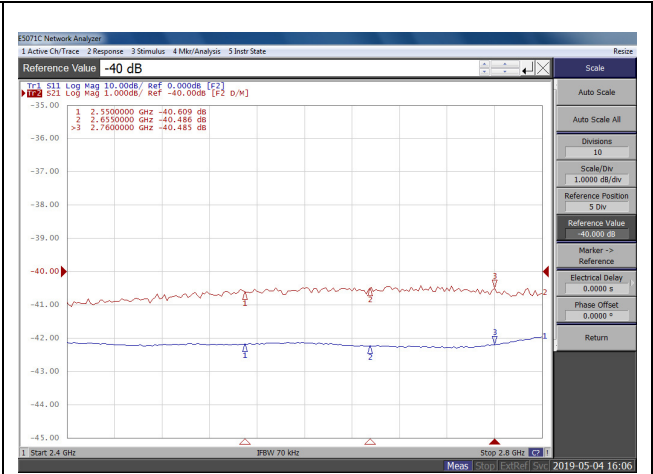
Related products:

Ref	Part number	Description	Product code
1	TF-PIM3D-50W-FDD-PCB	Test fixture PIM3D PCB output	T100
2	<i>consult factory</i>	High isolation housing	AH2
3	LPA-AH3-04DO-2655M-2535M-F0-00	RF input Band 7 radio head	P1560
4	Radio Demo kit	Digital input MIMO 2x2 radio head	

TRANSMIT TYPICAL PERFORMANCE



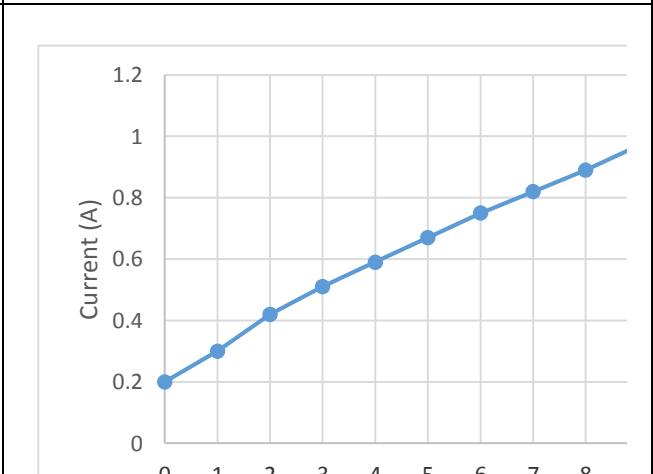
TX GAIN VS FREQUENCY



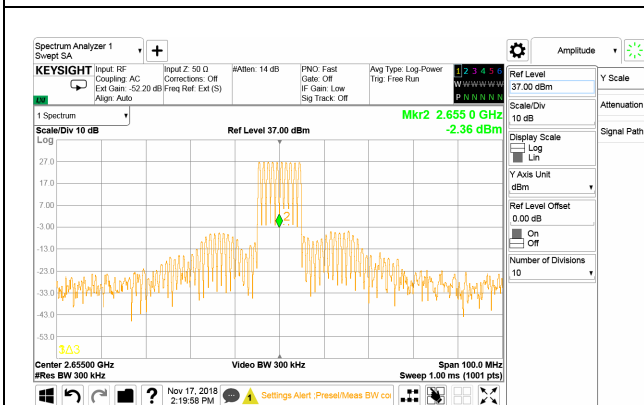
OBSERVATION PATH RELATIVE TO TX OUTPUT



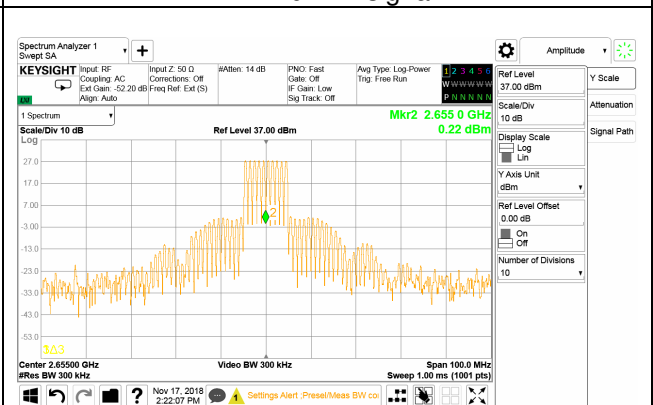
TX OUTPUT MATCH



Current consumption vs output power
LTE 10MHz signal

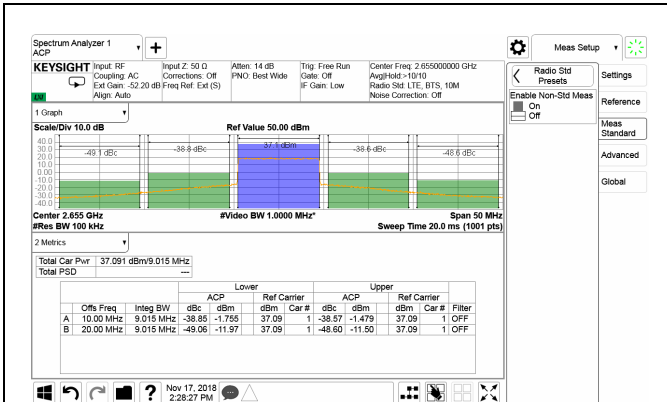


10 tones 1MHz apart 2655MHz 5Wave 28V/0.66A

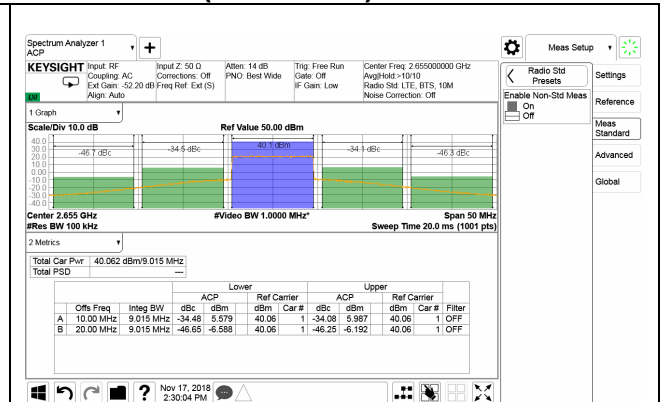


10 tones 1MHz apart 2655MHz 6Wave 28V/0.75A

TRANSMIT TYPICAL PERFORMANCE (continued)



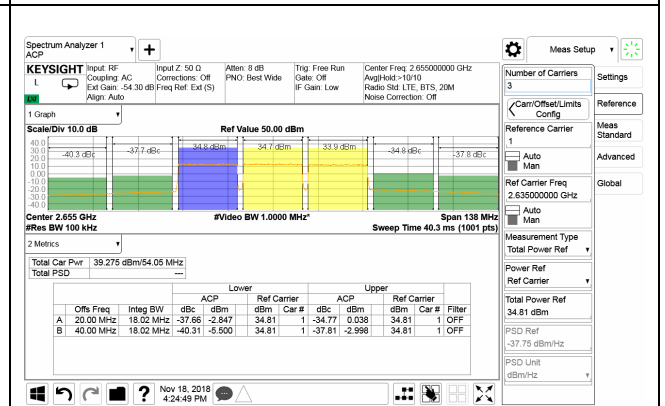
ACLR: 1LTE 10MHz, 2655MHz, 5W, 28V/0.72A



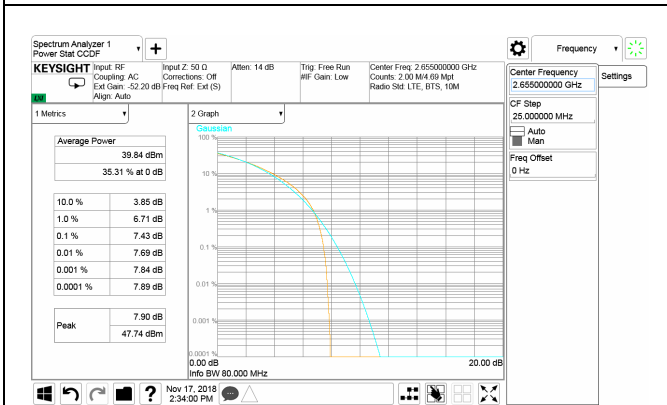
ACLR: 1LTE 10MHz, 2655MHz, 10W, 28V/1.22A



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



Wideband ACLR: 3c-LTE 20MHz 5W ave

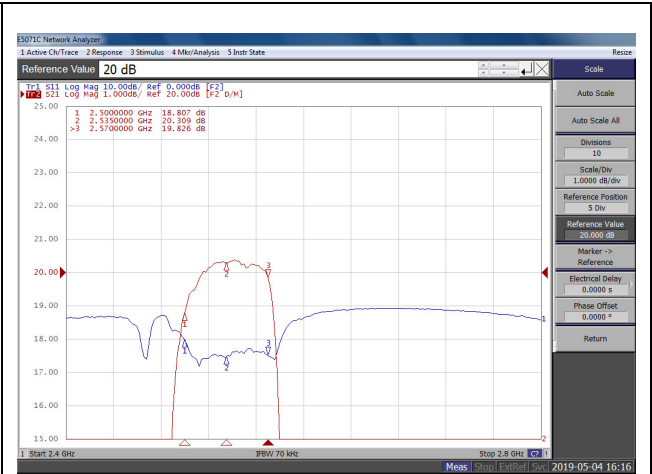


Peak power : LTE10MHz 2dB PAR compression

RECEIVE TYPICAL PERFORMANCE



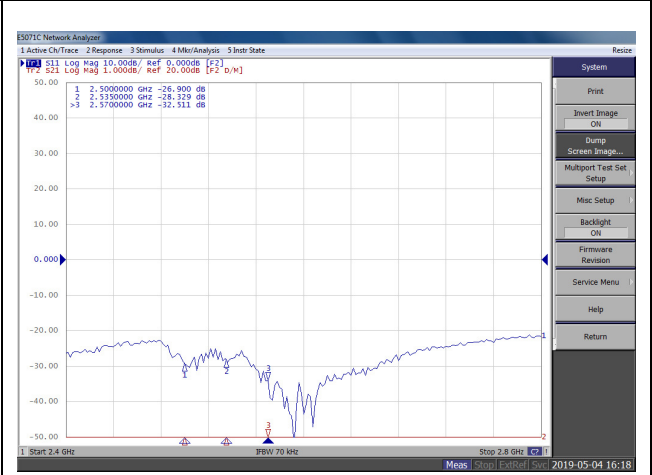
Max GAIN Rx with ALCRX=0.3V



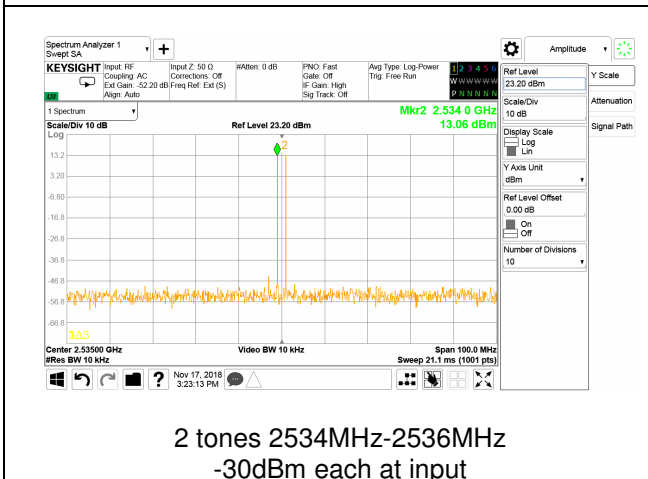
GAIN Rx with ALCRX=2.5V



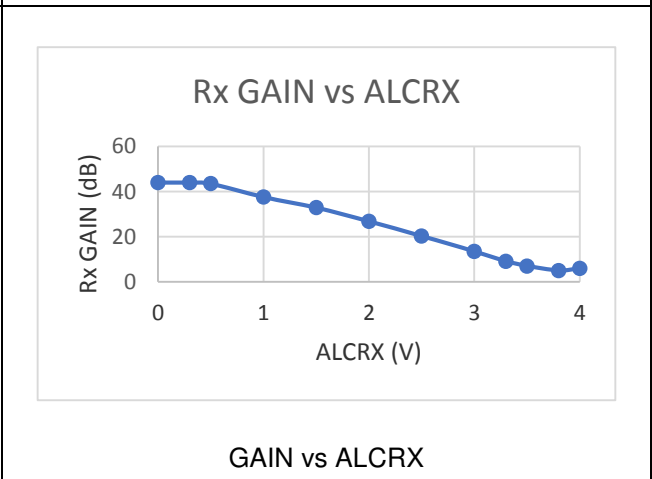
RX INPUT MATCH



RX OUTPUT MATCH

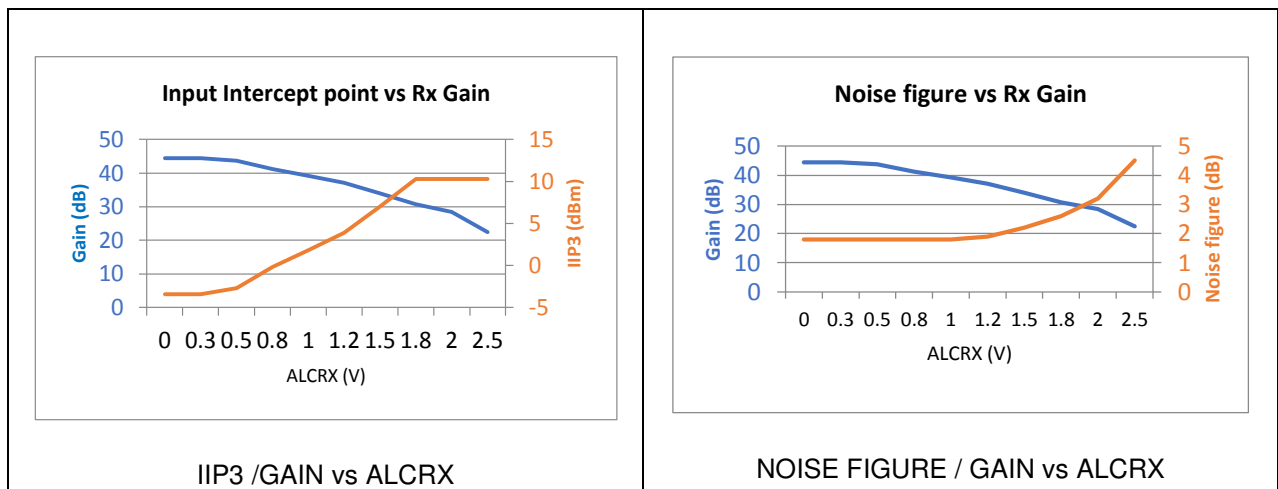


2 tones 2534MHz-2536MHz
-30dBm each at input



GAIN vs ALCRX

RECEIVE TYPICAL PERFORMANCE (CONTINUED)



ISOLATION TX-RX

