
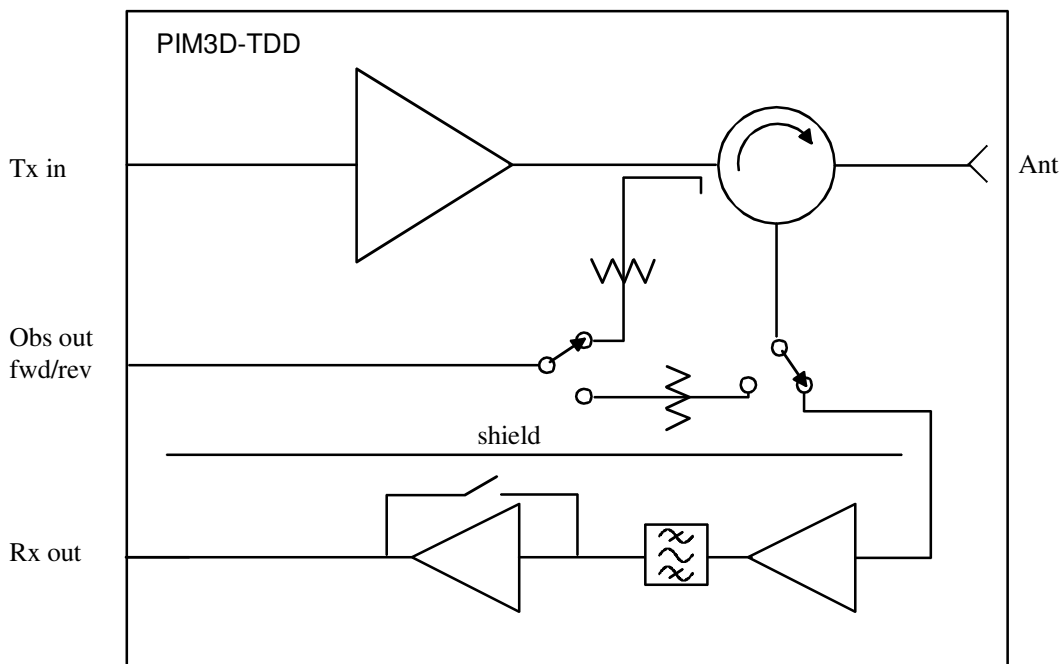


<p>PLUG IN AMPLIFIER MODULES</p>	<p>LPA-PIM3D-150DO-2300M-2400M-T0-00</p>	
<p>P1850</p>		
<p>FEATURES</p> <ul style="list-style-type: none"> ◆ BAND 40 (2300-2400MHz) TDD MODULE ◆ 5µs Tx Rx SWITCHING, SINGLE CONTROL ◆ MCX OUTPUT <p>Tx :</p> <ul style="list-style-type: none"> ◆ DOHERTY CONFIGURATION, 150W PEAK POWER ◆ 30dB GAIN; 50OHMS INPUT / OUTPUT ◆ 28V/0.5A IDLE; 28V/2.5A AT 20W OUTPUT ◆ FORWARD OBSERVATION PATH ◆ REVERSE POWER DETECTION <p>Rx :</p> <ul style="list-style-type: none"> ◆ 30dB GAIN WITH BYPASS ◆ NF=2dB at 30dB GAIN ◆ IN BAND IIP3= +10dBm AT 30dB GAIN ◆ IN BAND IIP3 =+20dBm AT 10dB GAIN ◆ 5V/0.23A 		<p>PACKAGE : PIM3D-TDD-MCX</p> 
		<p>APPLICATIONS</p> <ul style="list-style-type: none"> ◆ RRU - RRH - DAS AMPLIFIERS ◆ MIMO AMPLIFIERS

Block diagram:



Transmit electrical characteristics: 50 ohms; Supply=28V; Tx-Rx ctrl>3V; 2300-2400MHz; -20°C to +75°C (1,2)

Ref	parameter	conditions	note	min	typ	max	units
1	Bandwidth			2300		2400	MHz
2	Gain Tx with Tx on	2350MHz ; 50°C; Tx -Rx ctrl >3V			32		dB
3	Gain flatness	2300-2400MHz			0.5	1.0	dBpp
4	Gain vs temperature	2350MHz				TBD	dB
5	Instantaneous bandwidth	f=2350MHz @ 150Wp		100			MHz
6	Input return loss	50 ohms			-16		dB
7	Output return loss	50 ohms			-16		dB
8	Fwd Observation path	Tx out to Obs out			-38		dB
9	Fwd Obs accuracy	flatness 2200-2500MHz	5			0.2	dB
10	Peak power	LTE 10MHz TM1.1. PAR _{in} =9dB PARC=2dB			150		W
11	AM-PM	LTE 10MHz TM1.1. PAR _{in} =9dB PARC=2dB				15	deg.
12	Adjacent channel power ratio	20W/20MHz LTE signal ACLR1 ACLR2	3,4		-33 -45		dBc dBc
13	Output noise	2300-2400MHz during Tx			-33		dBm/MHz
14	2d harmonic rejection	1 tone 10W output			-50		dBc
15	Current consumption Tx	28V ; Idle;			0.53	0.6	A
16	Current consumption Tx with Tx off	28V; Tx enable <0.3V			10		mA
17	Current consumption	28V ; Tx enable >3V; 1 LTE 20MHz , PAPR@0.01%=9dB ; Pout=15Wavg continuous			2.0		A
18	Current consumption	28V ; Tx enable >3V; 1 LTE 20MHz , PAPR@0.01%=9dB ; Pout=20Wavg continuous			2.5		A
19	Switching time off-on	Tx enable from 0V to 3V			3	4	μs
20	Switching time on off	Tx enable from 3V to 0V			2	3	μs

1. Unless otherwise specified
2. Housing temperature
3. Before correction
4. ACLR<-50dBc DPD corrected
5. 50ohms output load

Receive electrical characteristics: 50 ohms; Supply=5.5V; Tx-Rx ctrl <0.6V; 2300-2400MHz; -20°C to +75°C (1,2)

Ref	parameter	conditions	note	min	typ	Max	units
1	Bandwidth			2300		2400	MHz
2	Gain Rx	2350MHz ; 50°C			30		dB
3	Gain flatness	2300-2400MHz ;			1.0	2.0	dBpp
4	Gain Rx bypass	2350MHz ; 50°C			11		dB
5	Gain flatness bypass	2300-2400MHz ;			1.0	2.0	dBpp
6	Gain vs temperature	2350MHz -20to +75°C max gain			2		dB
7	Input return loss	50 ohms			-16	-14	dB
8	Output return loss	50 ohms			-16	-14	dB
9	Noise figure	gain=30dB			2.0		dB
10	Noise figure	gain=11dB (bypass)			2.0		dB
11	IIP3	gain=30dB	6		+10		dBm
12	IIP3	gain=11dB (bypass)	7		+20		dBm
13	Current consumption	Supply 5.5V gain=30dB			0.23	0.26	A
14	Current consumption	Supply 5.5V gain=11dB			0.14	0.17	A

6. 2 CW tones at input -40dBm each

7. 2 CW tones at input -30dBm each

Tx-Rx Switching characteristics: Supplies Tx=28V / Rx=5.5V; -20°C to +75°C (1,2)

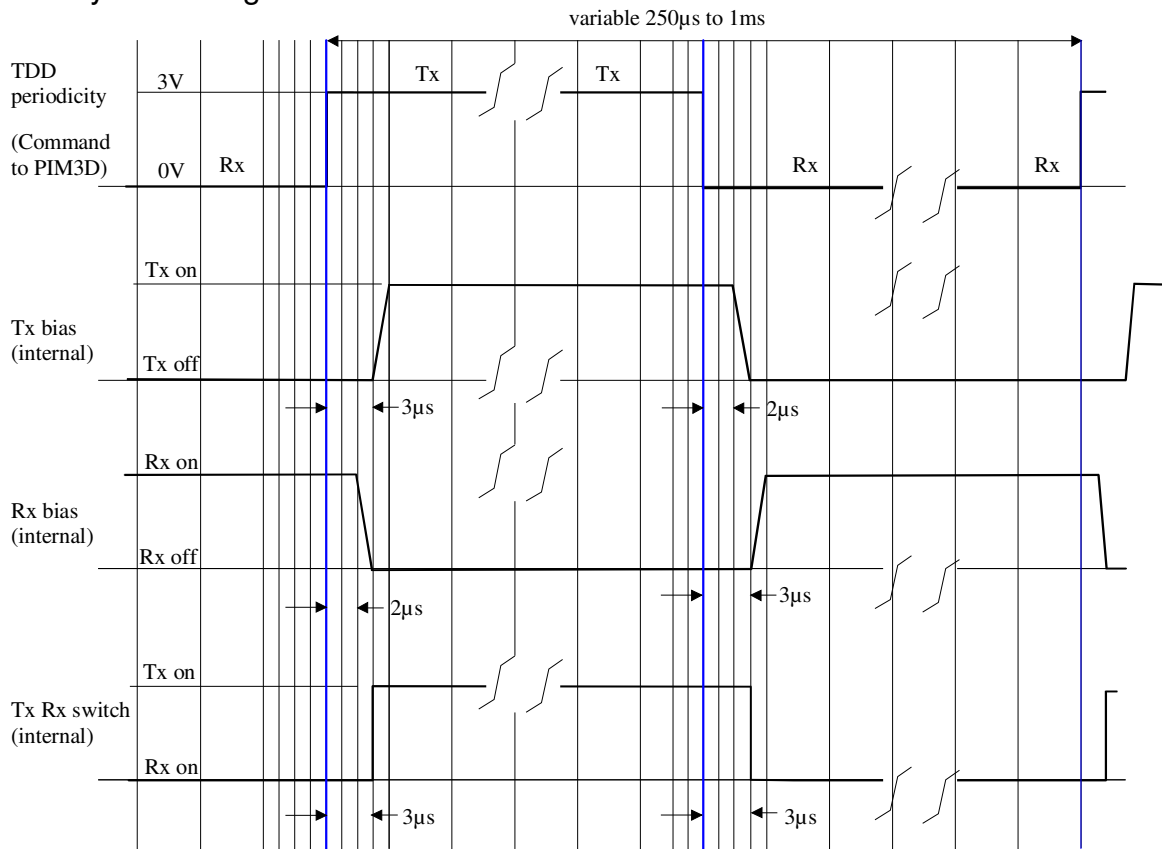
Ref	parameter	conditions	note	min	typ	max	units
1	Tx-Rx Command signal	high		1.6			V
2	Tx-Rx Command signal	low		0		0.8	V
3	Tx-Rx Command signal transition time	Low to high and high to low				0.1	µs
RX TURNS OFF / TX TURNS ON							
4	Delay before Rx turns off		8			2	µs
5	Time to turn Rx off		8			1	µs
6	Delay before Tx turns on		8	3			µs
7	Time to turn Tx on		8			1	µs
TX TURNS OFF / RX TURNS ON							
8	Delay before Tx turns off		9			2	µs
9	Time to turn Tx off		9			1	µs
10	Delay before Rx turns on		9	3			µs
11	Time to turn Rx on		9			1	µs

8. after command signal rising edge

9. after command signal falling edge

TDD INTERNAL SWITCHING:

All internal commands (Tx On/Off, Rx On/Off, TxRx switch) are derived from the TDD periodicity control signal



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 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	Fwd/rev command			
3	Bypass command			
4	Rx to Tx switching	Tx -Rx ctrl	3V ctrl	<3µs switching time
5	Tx to Rx switching	Tx -Rx ctrl	0V ctrl	<3µs switching time
6	Amplifier identity	Id		I ² C bus

Specifications and information are subject to change without notice

PCB Connections

INPUT PCB (1.6mm +/- 0.2mm Multilayer)	OUTPUT PCB (1.6mm +/-0.1mm Double sided) (****)
Bottom surface of module to input PCB surface :1.6+/- 0.2mm	Bottom surface of module to output PCB surface: 1.6mm +/- 0.2mm
Landing pad 1 : RF Gnd (*)	Landing pad 15 : +28V in (***) (alternative to land pad 3)
Landing pad 2 : Tx input (*)	Landing pad 16 : Gnd (***)
Landing pad 3 : +28V in (*) (alternative to land pad 15)	
Landing pad 4 : SCL (**)	
Landing pad 5 : SDA (**)	
Landing pad 6: Gnd (**)	
Landing pad 7 : TxRx control (**)	
Landing pad 8 : Rev detect (**)	
Landing pad 9 : Rx Bypass (**)	
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 : RF Gnd (*)	
(*) Harwin S70-220101045R contact pads on input PCB ; 4A max per contact (**) for Molex 78732-6021; 1A max per contact	(***) Harwin S70- S70-220101045R contact pads on output PCB ; 4A max per contact (****) Output PCB not required if 28V supplied by landing pad 3

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	

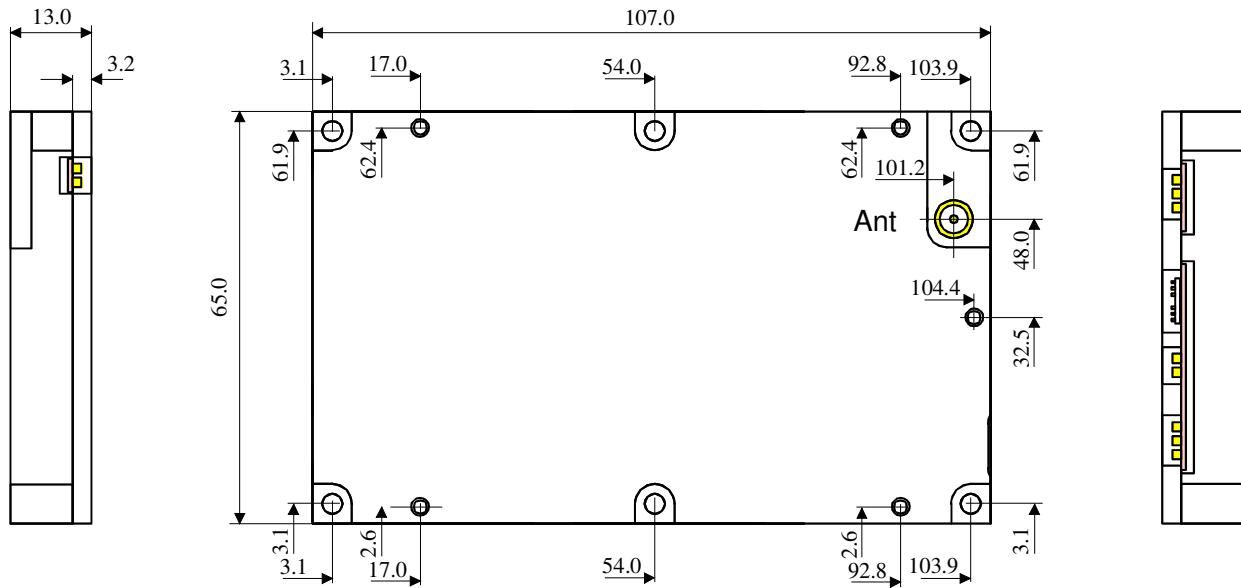
Connectors

Ref	Characteristic	Description	Remarks
1	RF input/samples connectors	Spring contacts	Connects to 1.6mm multilayer board (*)
2	Antenna connector	MCX	
3	DC Supply connectors	Spring contacts	Connects to 1.6mm multilayer board (*)
4	Signal connectors	Molex 78732-6021	Connects to 1.6mm multilayer board (**)

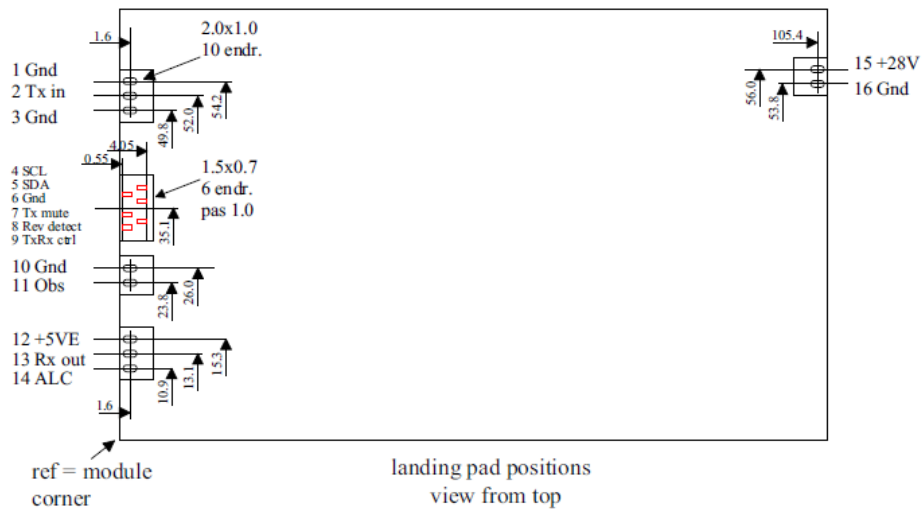
(*) with gold plated tabs Harwin S70-220101045R

(**) direct connection to PCB

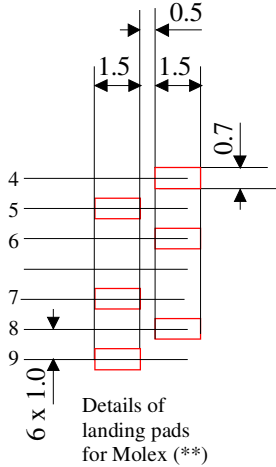
PIM3D - TDD - MCX package outline:



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

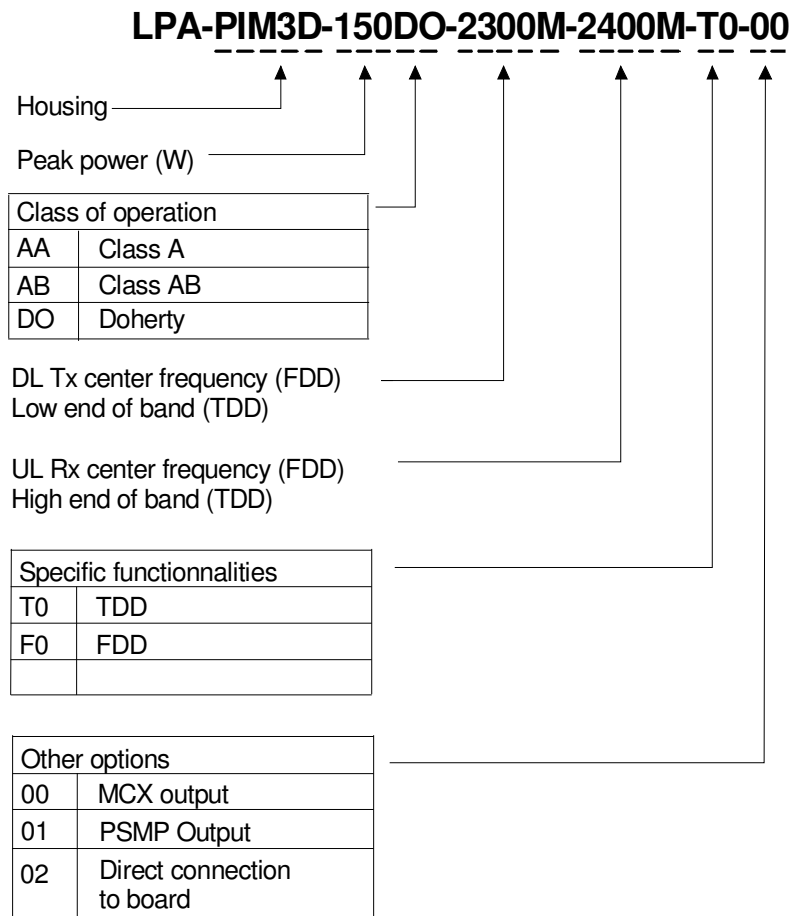


Molex 78732-6021 detail of landing pads:



Note : landing pads for 78732-6021 are gold plated

Part numbering:



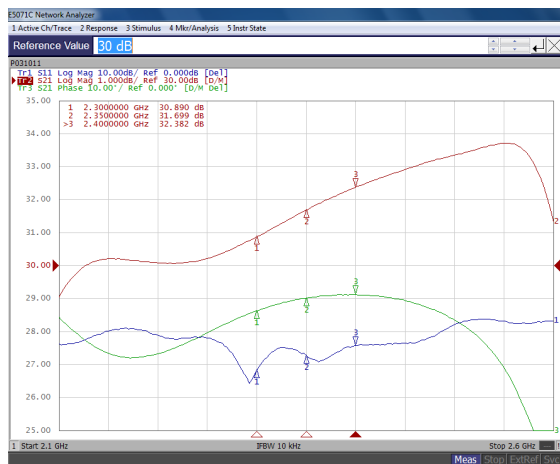
Support documents:

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

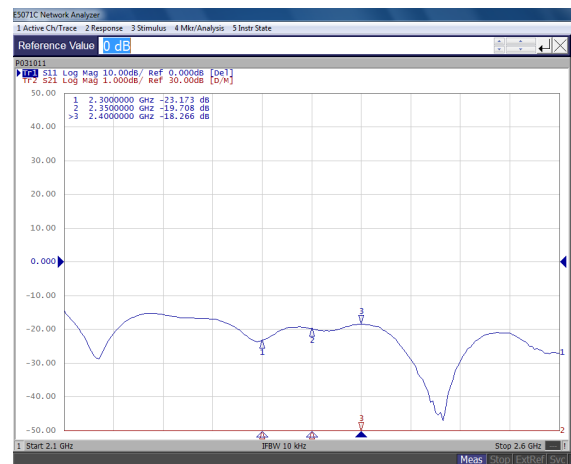
Related products:

Ref	Part number	Description	Product code
1	TF-PIM3D-150W-FDD-PSMP	Test fixture PIM3D coaxial output	T130

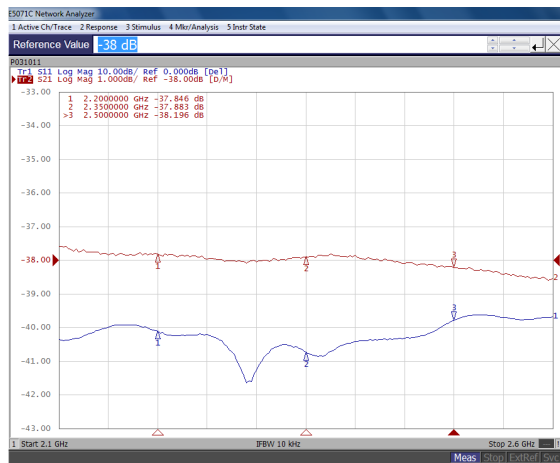
TRANSMIT TYPICAL PERFORMANCE



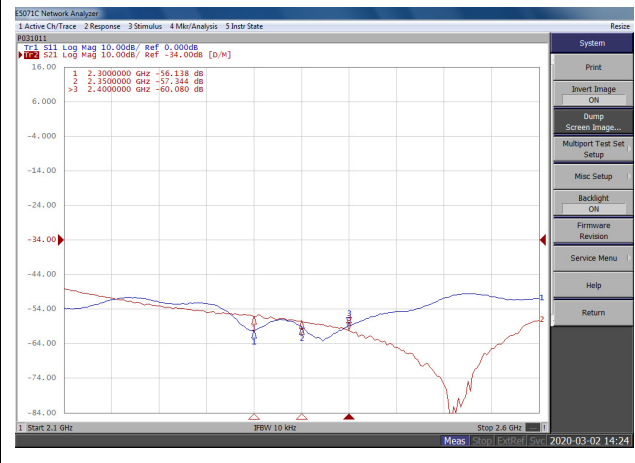
TX GAIN VS FREQUENCY



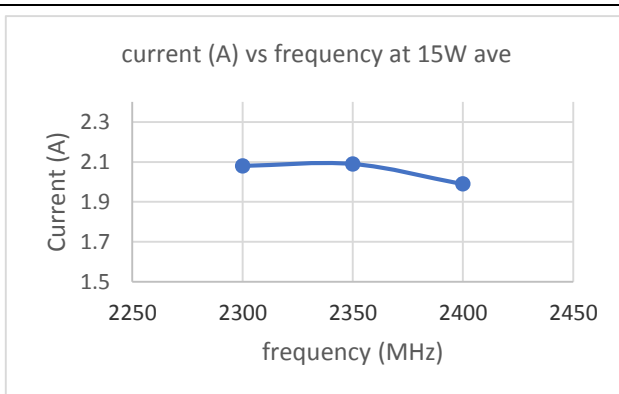
TX OUTPUT MATCH



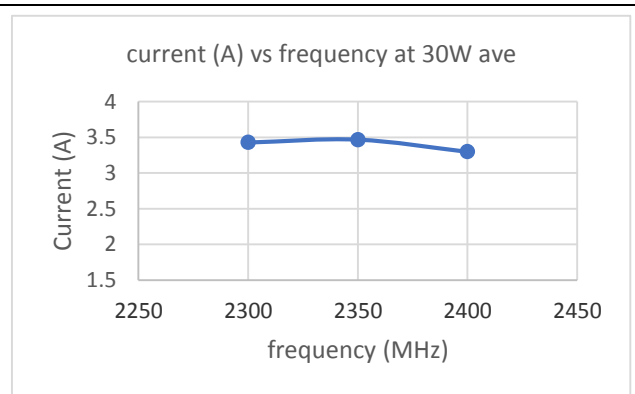
FORWARD OBSERVATION PATH RELATIVE TO TX OUTPUT



REVERSE OBSERVATION PATH OUTPUT MATCHED

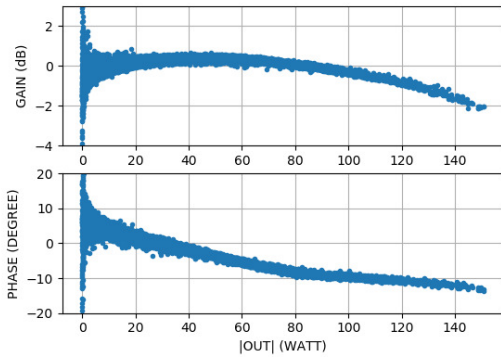


Current consumption at 15W output power
1LTE 20MHz signal ($PAR_{in}=9dB$)

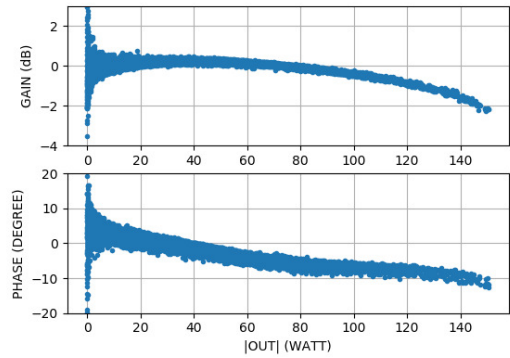


Current consumption at 30W output power
1LTE 20MHz signal ($PAR_{in}=9dB$)

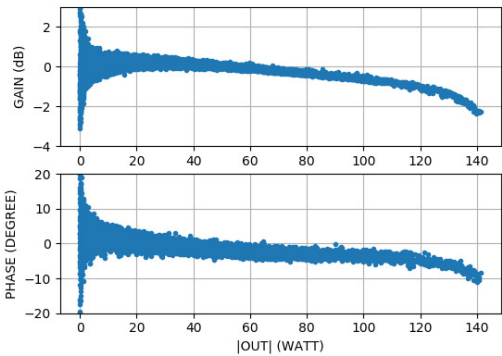
TRANSMIT TYPICAL PERFORMANCE (continued)



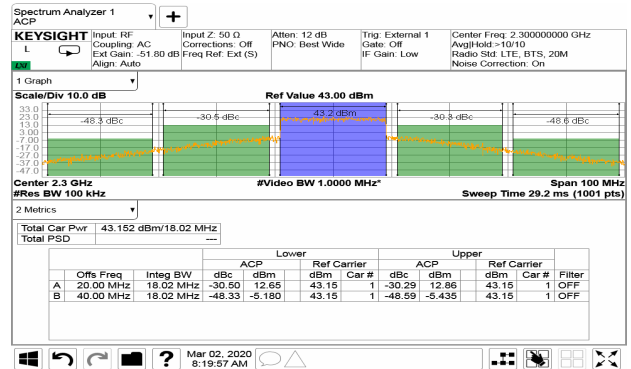
AM-AM and AM-PM; 2300MHz
LTE 20MHz PARin=9dB 30Wave



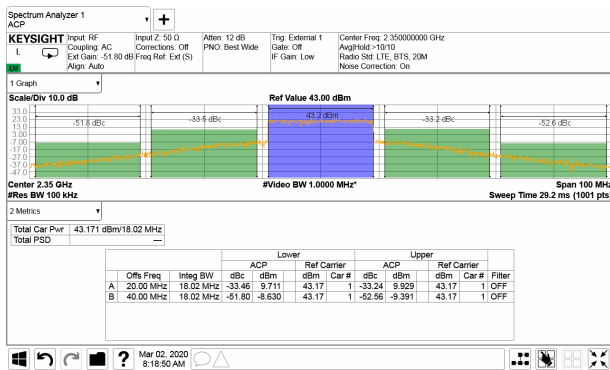
AM-AM and AM-PM; 2350MHz
LTE 20MHz PARin=9dB 30Wave



AM-AM and AM-PM; 2400MHz
LTE 20MHz PARin=9dB 30Wave



ACLR LTE20MHz PAR=9dB 2300MHz 20W
28V/2.54A

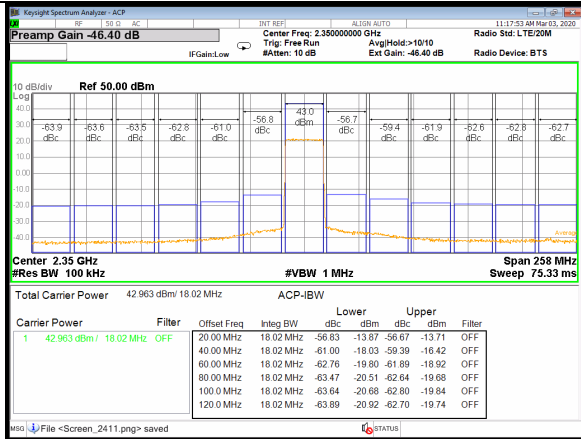


ACLR LTE20MHz PAR=9dB 2350MHz 20W
28V/2.54A

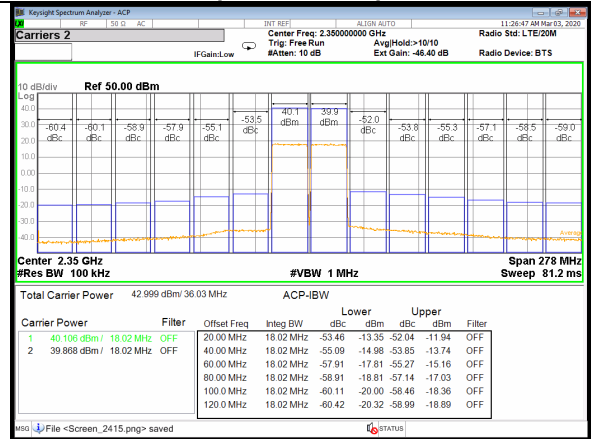


ACLR LTE20MHz PAR=9dB 2400MHz 20W
28V/2.4A

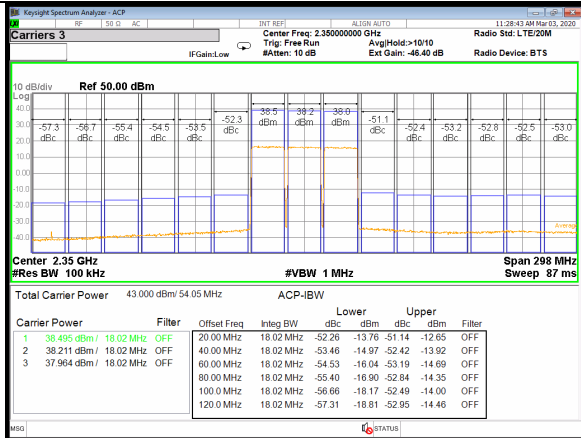
TRANSMIT TYPICAL PERFORMANCE (continued)



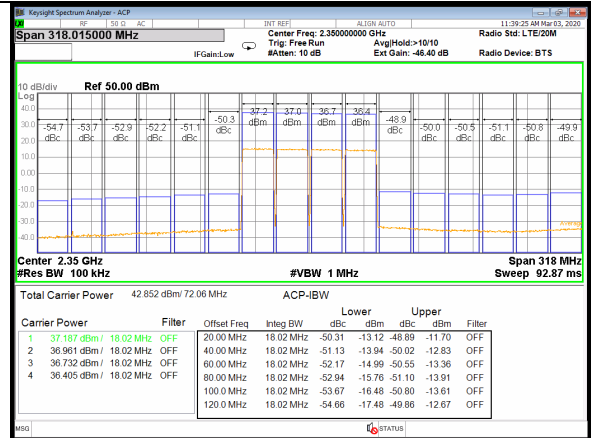
ACLR LTE20MHz PAR=9dB 2350MHz 20W WITH DPD 28V/2.54A



ACLR 2c-LTE20MHz PAR=9dB 2350MHz 20W WITH DPD 28V/2.54A



ACLR 3c-LTE20MHz PAR=9dB 2350MHz 20W WITH DPD 28V/2.54A

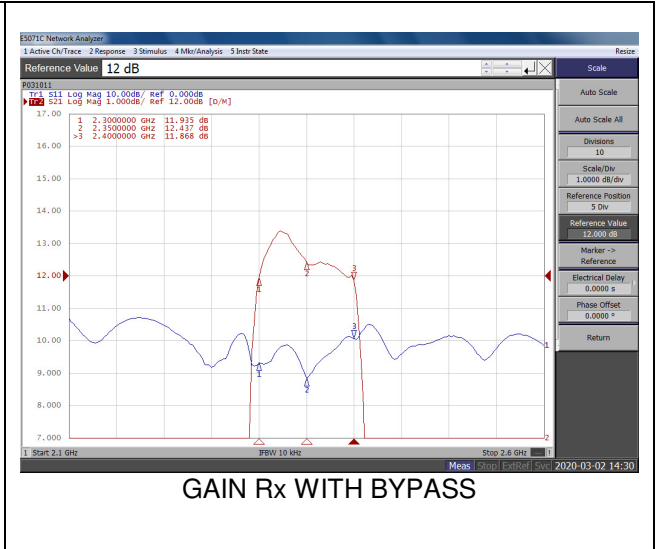


ACLR 4c-LTE20MHz PAR=9dB 2350MHz 20W WITH DPD 28V/2.54A

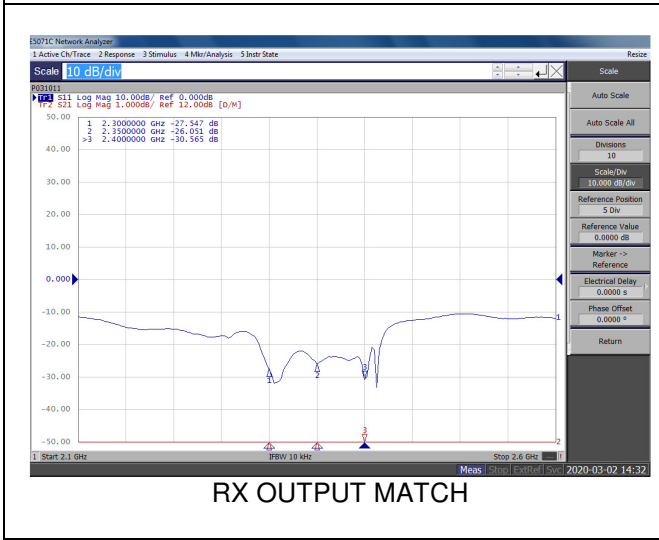
RECEIVE TYPICAL PERFORMANCE



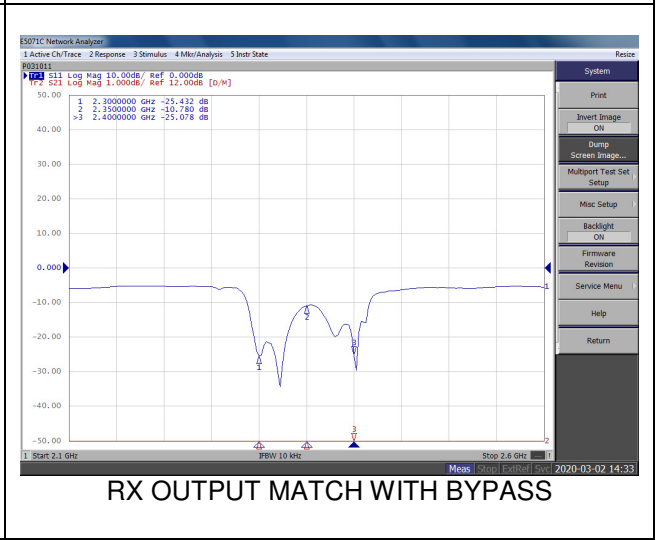
GAIN RX



GAIN Rx WITH BYPASS



RX OUTPUT MATCH



RX OUTPUT MATCH WITH BYPASS