

**Product Features**

- GaN on SiC + Doherty Technology
- High Efficiency
- Solid-state Linear Design
- Small and Light Weight
- Suitable for WCDMA/LTE
- 50 Ohm Input/Output Impedance
- High Reliability and Ruggedness
- Built in Output Isolator

**Application**

- WCDMA / LTE Repeater



**Description**

This HPA Module is a high gain and compact amplifier module for WCDMA and LTE Repeater use.

**Electrical Specifications**

PARAMETER	Symbol	Specification		
Frequency Range	BW	2110 ~ 2170MHz		
Operating Bandwidth within BW	OBW	5 ~ 20MHz		
Output Power	Pout	44dBm/ WCDMA 4FA, LTE		
SPECTRUM EMISSION MASK (with DPD)	SEM	PER 3GPP TS-25.141 & TS25.141		
ACLR (WCDMA 4FA) @ Po=+44dBm (typ.)	ACLR	Non-DPD	-25dBc@±5MHz -28dBc@±10MHz	@-30 ~ +60°C @ 48V @ PAR 7.5dB
		With-DPD	-45dBc@±5MHz -48dBc@±10MHz	
ACLR (LTE 10MHz 1FA) @ Po=+44dBm (typ.)		Non-DPD	-28dBc@±10MHz	
		With-DPD	-52dBc@±10MHz	
RF Gain	G	47dB ±3dB @frequency range, 25W Pavg, -30 ~ +60°C		
Input Return Loss	S11	-16dB (Max.)		
Output Return Loss	S22	-18dB (Max.)		
Normal Operating Voltage	VDC	+5.6V, +48V		
Current Consumption	IDD	0.13A / 5.6V, 1.3A / 48V (typ.)		
Efficiency	Eff	40%@48V(typ.)		
Gain Flatness	ΔG	Peak to peak 2dB Over operating frequency		
		Peak to peak 0.5dB Over any 3.84MHz		
Harmonics (2 <sup>nd</sup> , with DPD)	H	-45dBc (Max.)		
Feedback Output level @ 44dBm	FB	+6dBm ± 1dB		
Operating Temperature	To	-30°C ~ + 60°C (Ambient temp)		

**Environmental Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	Ta	-30		+60	°C
Storage Temperature	Tstg	-40		+130	°C
Relative humidity w/o condensation	RH			95	%

**Mechanical Specifications**

Parameter	Value	Units	Limits
Dimensions	100.0 x 50.0 x 20.0	mm	
Weight	200(Max.)	g	
RF Input Connector	MCX(Female), customizable*		
RF Output Coupling Connector	MCX(Female), customizable*		
RF Output Connector	SMA(Female), customizable*		
DC Connector	Molex_4pin male (0022035045)		
Cooling	External Heat-sink		

**Maximum Rating**

Input Overdrive	P <sub>OD</sub>	-2dBm	Max.
Load VSWR	Ψ	∞ : 1 (All Phase & Amplitude)	Nom.
Operating Case Temperature	T <sub>c</sub>	+100	°C

**Interface Connector**

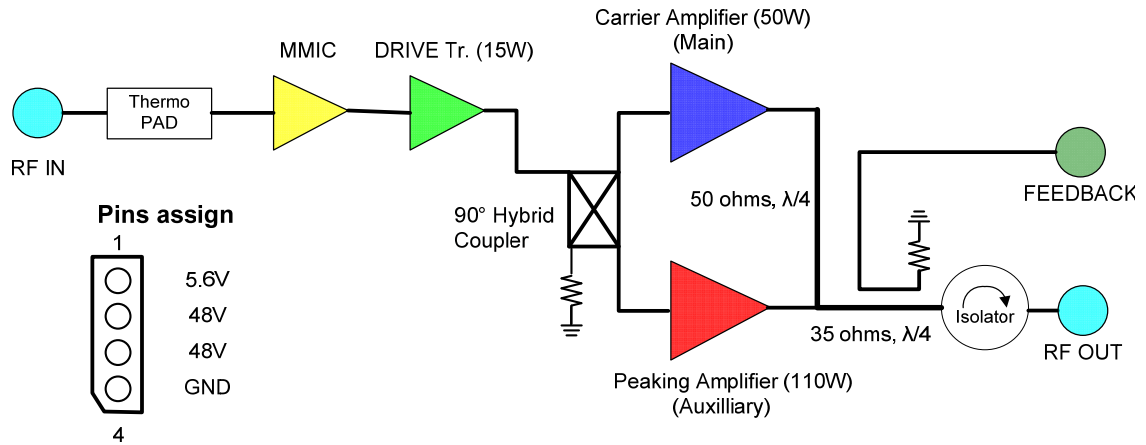
Connector type: MOLEX\_4pin male (0022035045)

Pin #	Description	I/O	Specifications
1	VDC1	I	+5.6V
2, 3	VDC2	I	+48V
4	GND	-	Ground

\*Note: Based on the customer's need, RFHIC can provide different types of connectors. Price may vary.

**Gain Budget & Block Diagram**

GAIN(dB) :	-3dB	17dB	18dB	-3dB	17dB	1.3dB	-0.3dB	TOTAL
POWER :	-3dBm	-6dBm	11dBm	29dBm	26dBm	43dBm	44.3dBm	44dBm



**Outline Drawing**

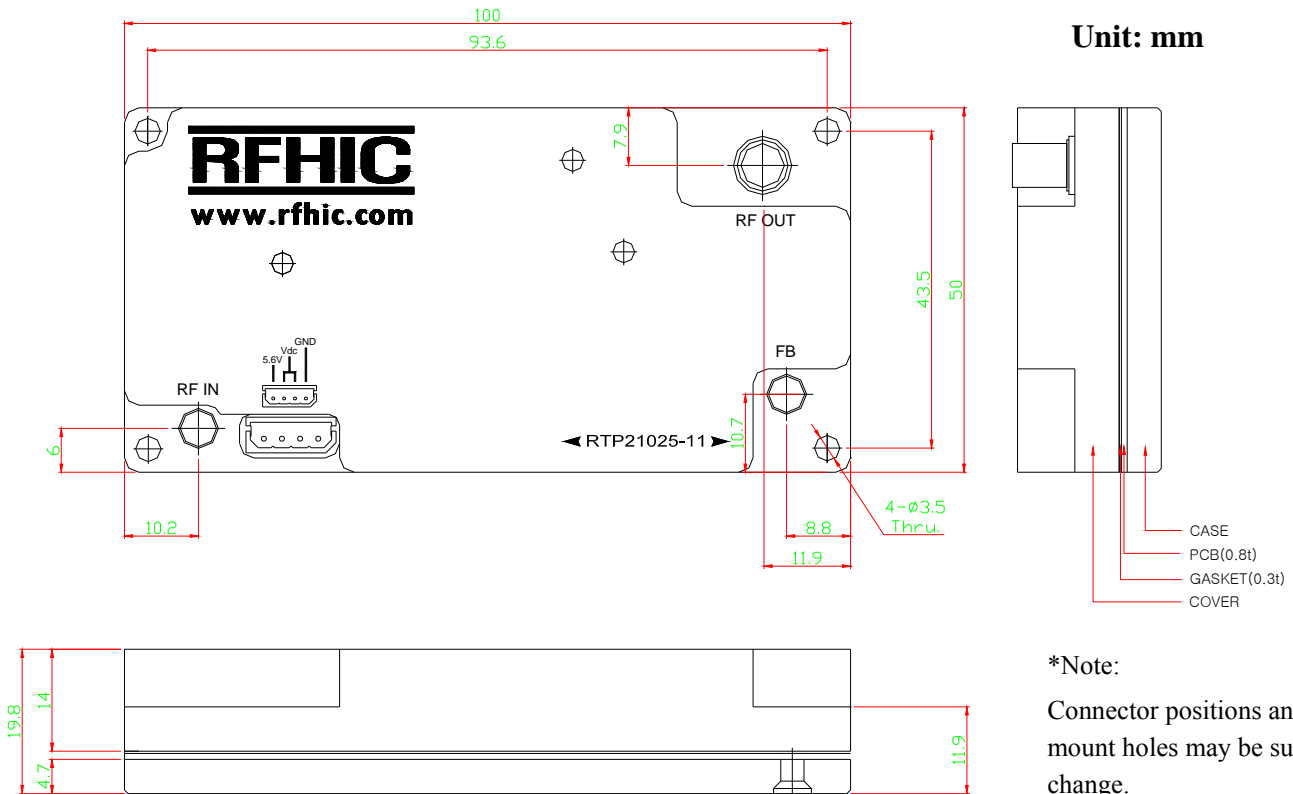


Photo of Product



**Test Equipments:**

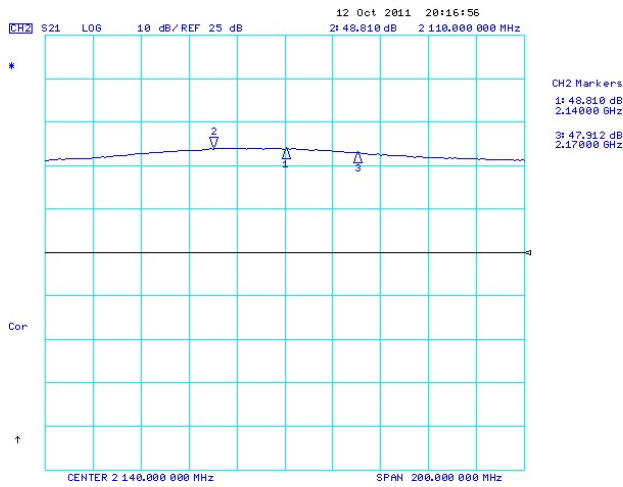
- DPD Engine : Optichron board (OP6180)
- Signal Generator: E4438C (Agilent)
- Spectrum Analyzer: E4440A (Agilent)
- Network Analyzer: 8753E (HEWLET PACKARD)
- Power Supply: 6674A (Agilent)

**Test Condition:**

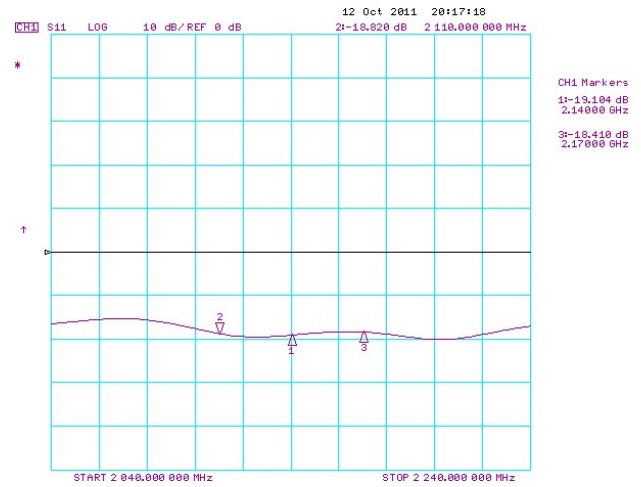
- Signal: WCDMA 4FA (Test Model 1 W/ 64DPCH) & LTE 10MHz 1FA
- PAR: 7.5dB
- CFR apply
- Temperature: 25°C
- AMP Temperature: 45°C

**Test Data**

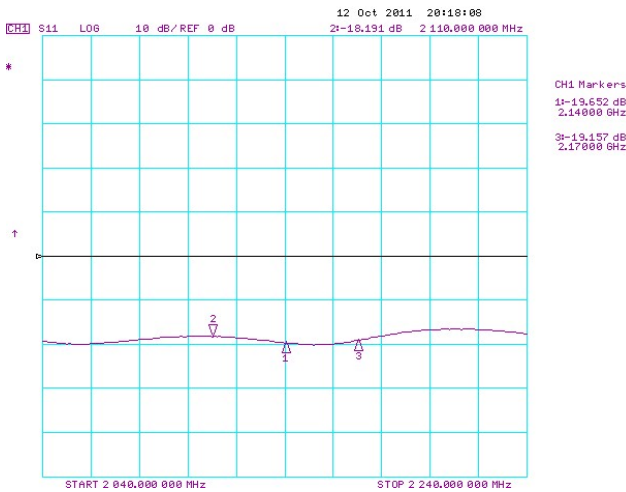
**GAIN & GAIN FLATNESS**



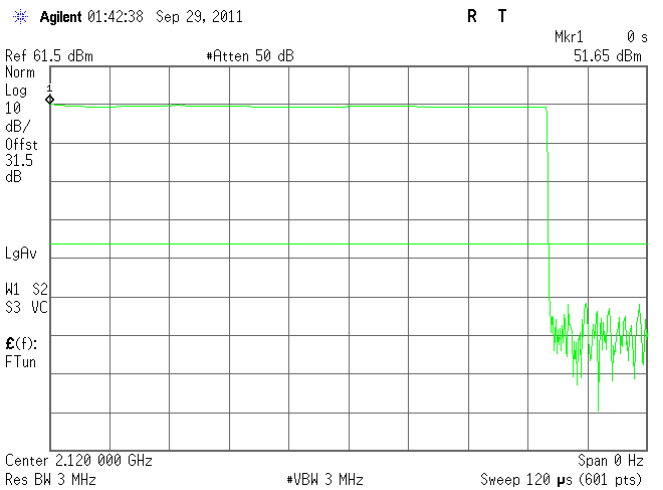
**S11**



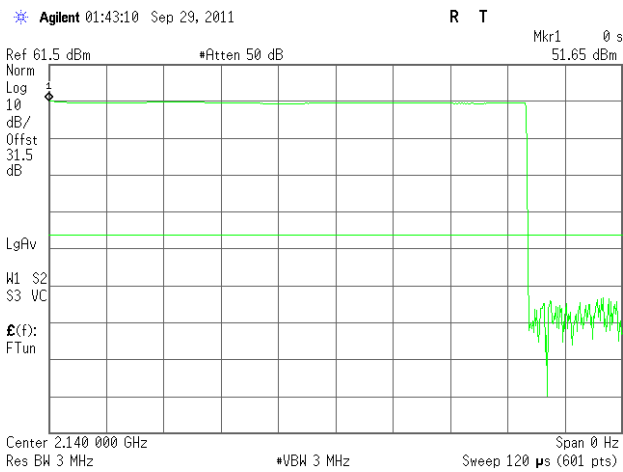
**S22**



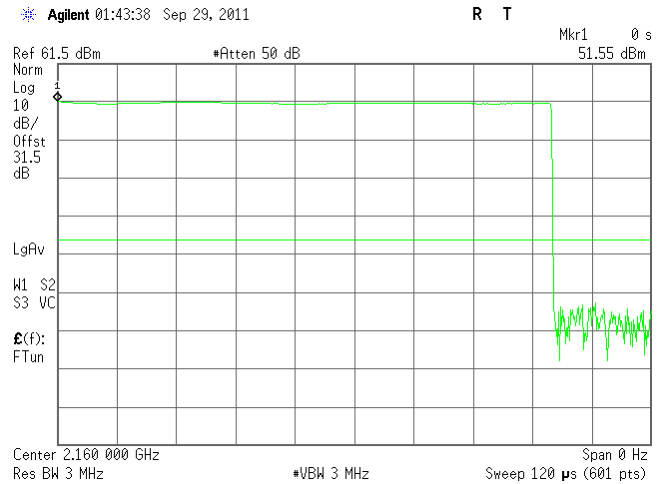
**Psat = 51.65 dBm@2120MHz (Pulse duty cycle 10%)**



**Psat = 51.65 dBm@2140MHz (Pulse duty cycle 10%)**

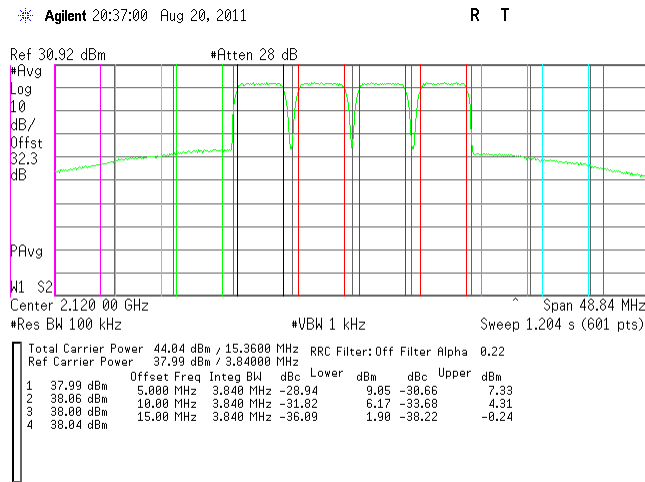


**Psat = 51.55 dBm@2160MHz (Pulse duty cycle 10%)**

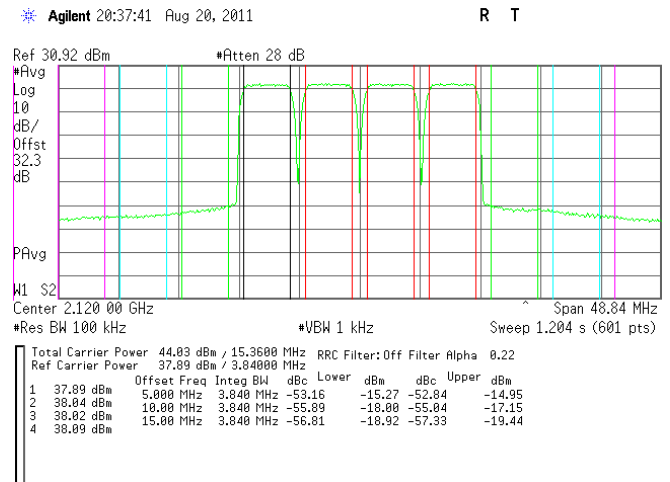


**Test Results: DPD Operation (WCDMA 4FA)**

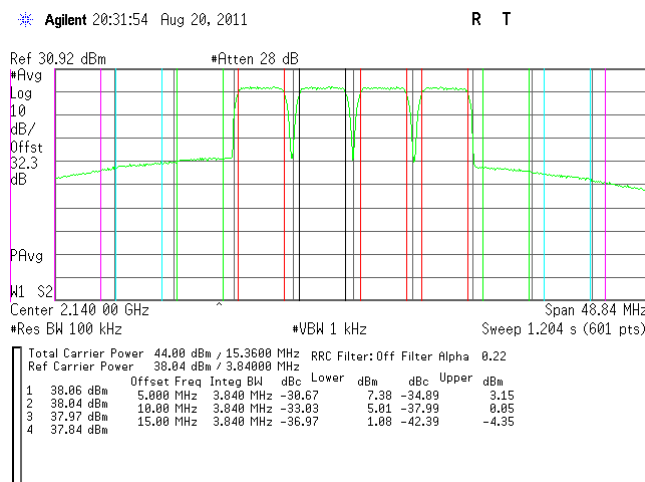
**Pre - DPD@2120MHz**



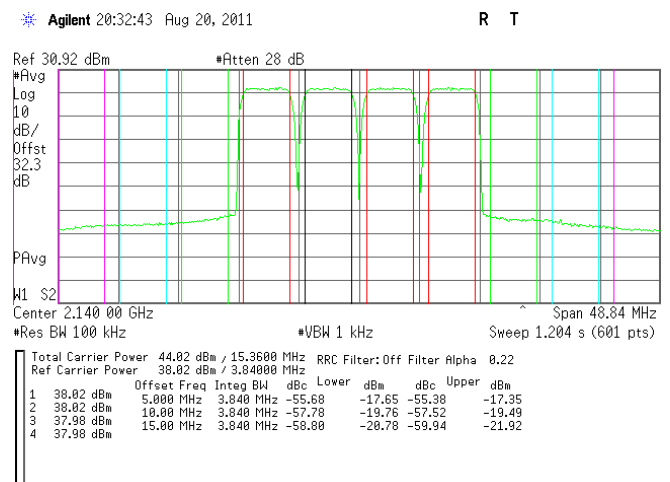
**Post - DPD@2120MHz**



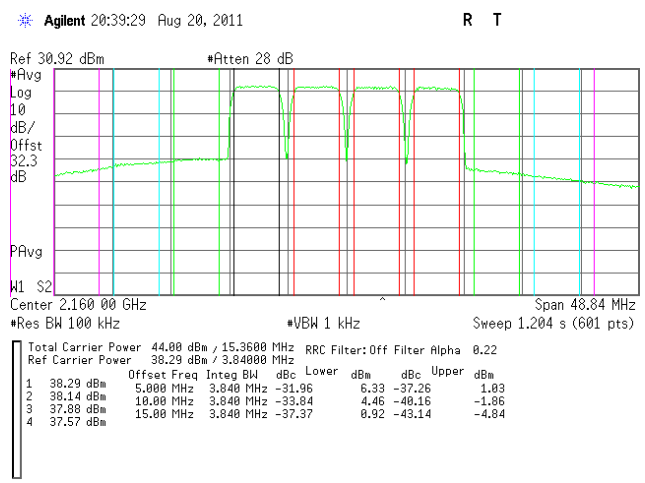
**Pre - DPD@2140MHz**



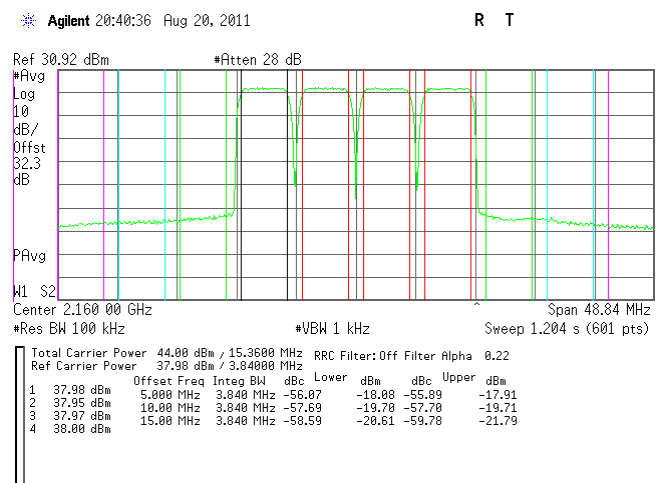
**Post - DPD@2140MHz**



**Pre - DPD@2160MHz**

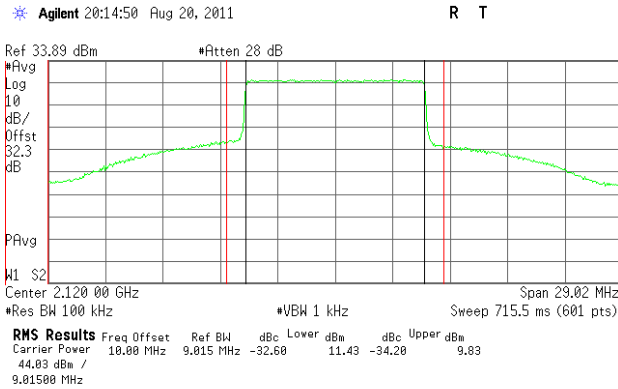


**Post - DPD@2160MHz**

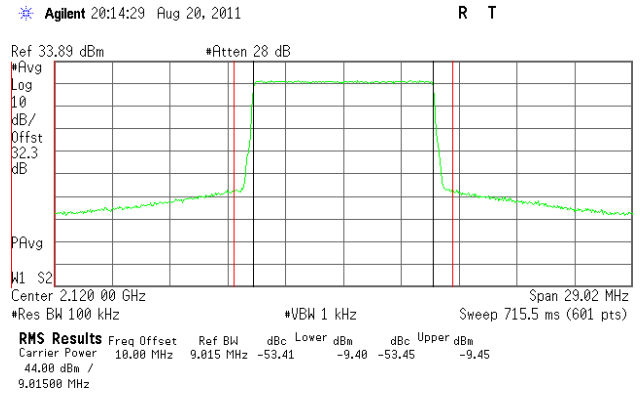


**LTE 10MHz 1FA**

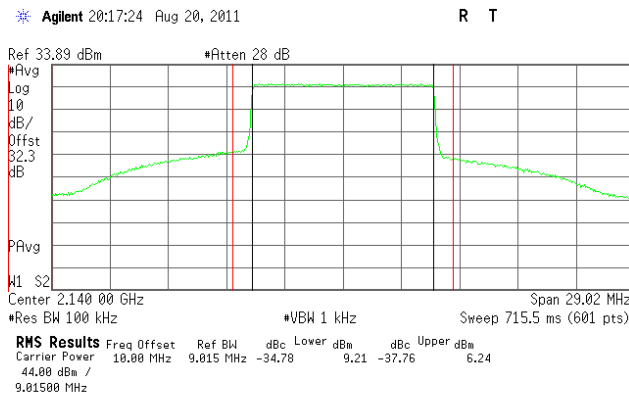
**Pre - DPD@2120MHz**



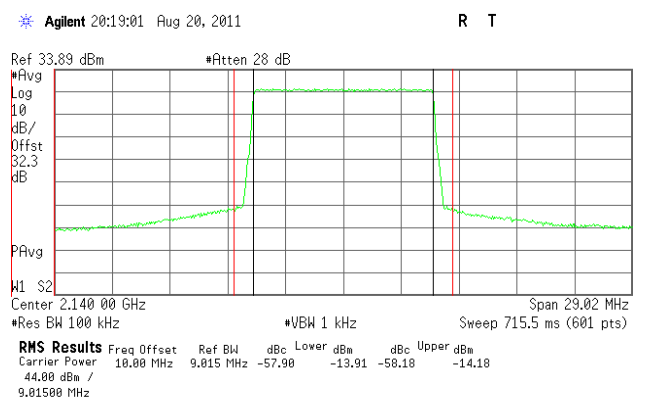
**Post - DPD@2120MHz**



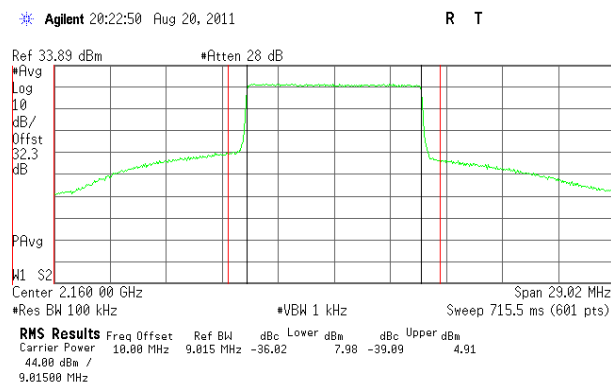
**Pre - DPD@2140MHz**



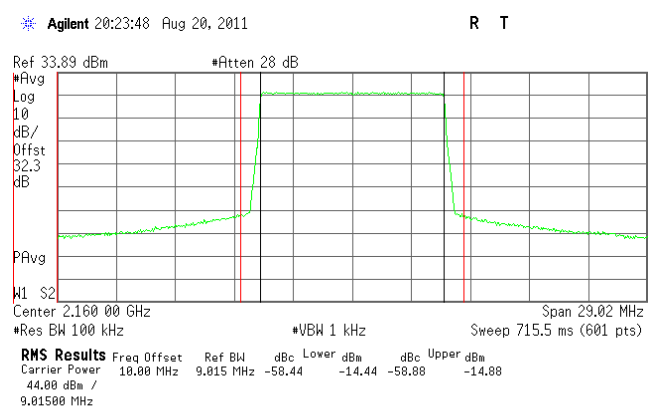
**Post - DPD@2140MHz**



**Pre - DPD@2160MHz**



**Post - DPD@2160MHz**



**Test Sheet**

<b>S/N</b>					
<b>Gain</b>		48.8dB			
<b>Gain Flatness</b>		0.9dB			
<b>S11 (Max.)</b>		-18.4dB			
<b>S22 (Max.)</b>		-18.2dB			
<b>Feedback level@ 44dBm</b>		6.5dBm			
<b>Test Frequency</b> (@ Center)		2120MHz	2140 MHz	2160 MHz	
<b>Psat (dBm)</b>		51.65	51.65	51.55	
<b>WCDMA</b> <b>4FA</b> <b>@25W</b> <b>PAR:7.5dB</b>	<b>ACLR@±5MHz</b> (dBc)	<b>Pre-DPD</b>	-28.9	-30.6	-31.9
		<b>Post-DPD</b>	-52.8	-55.3	-55.9
	<b>ACLR@±10MHz</b> (dBc)	<b>Pre -DPD</b>	-31.8	-33.0	-33.8
		<b>Post-DPD</b>	-55.0	-57.5	-57.7
	<b>ACLR@±15MHz</b> (dBc)	<b>Pre -DPD</b>	-36.1	-36.9	-37.3
		<b>Post-DPD</b>	-56.8	-58.8	-58.6
<b>125mA/5.6V, Current/48V</b>		1.30A	1.32A	1.35A	
<b>Efficiency</b>		<b>%</b>	39.6	39.0	38.1

<b>LTE</b> <b>10MHz</b> <b>1FA</b> <b>PAR:7.5dB</b>	<b>ACLR@±10MHz</b> (dBc)	<b>Pre -DPD</b>	-32.6	-34.7	-36
		<b>Post-DPD</b>	-53.4	-57.9	-58.4
<b>125mA/5.6V, Current/48V</b>		1.25A	1.27A	1.31A	
<b>Efficiency</b>		<b>%</b>	41.2	40.5	39.3

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