

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	40dBm/ WCDMA 4FA, LTE		
SPECTRUM EMISSION MASK (with DPD)	SEM	PER 3GPP TS-25.141 & TS25.141		
ACLR (WCDMA 4FA) @ Po=+40dBm (typ.)	ACLR	Non-DPD	-25dBc@±5MHz -28dBc@±10MHz	@-30 ~ +60°C @ 28V ~ 31V @ PAR 7.5dB
		With-DPD	-45dBc@±5MHz -48dBc@±10MHz	
ACLR (LTE 10MHz 1FA) @ Po=+40dBm (typ.)		Non-DPD	-28dBc@±10MHz	
		With-DPD	-52dBc@±10MHz	
RF Gain	G	45dB ±3dB @frequency range, 10W Pavg, -30 ~ +60°C		
Input Return Loss	S11	-16dB (Max.)		
Output Return Loss	S22	-18dB (Max.)		
Normal Operating Voltage	VDC	+5.6V~6V, +28V ~32V		
Current Consumption	IDD	0.12A / 5.6V, 0.865A / 28V (typ.)		
Efficiency	Eff	40%@28V(typ.)		
Gain Flatness	ΔG	Peak to peak 2dB Over operating frequency		
		Peak to peak 0.5dB Over any 3.84MHz		
Harmonics (2 nd , with DPD)	H	-45dBc (Max.)		
Feedback Output level @ 40dBm	FB	+2dBm ± 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	0.2(MAX)	Kg	
RF Input Connector	MCX(Female)		
RF Output Coupling Connector	MCX(Female)		
RF Output Connector	SMA(Female)		
DC Connector	Molex_4pin male (0022035045)		
Cooling	External Heat-sink		

Maximum Rating

Input Overdrive	P _{OD}	-2dBm	Max.
Load VSWR	Ψ	∞ : 1 (All Phase & Amplitude)	Nom.
Operating Case Temperature	Tc	+100	°C

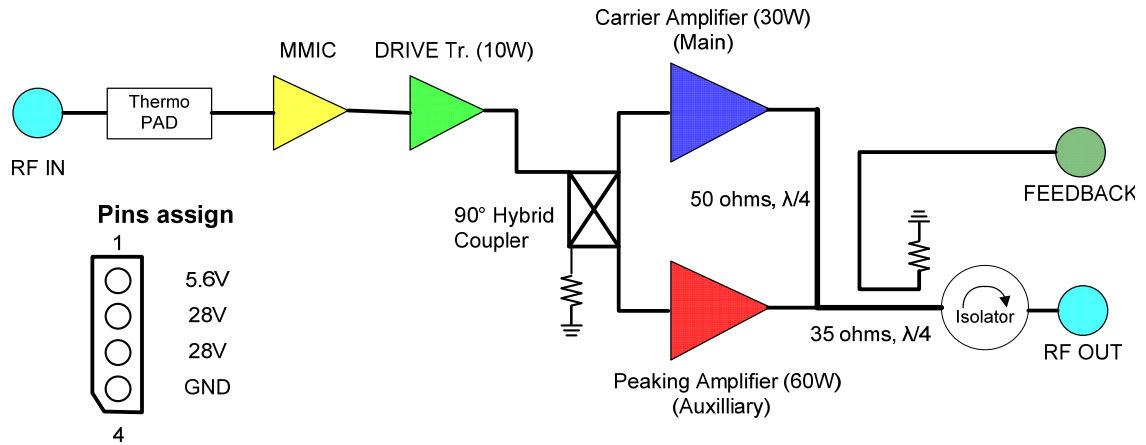
Interface Connector

Connector type: MOLEX_4pin male (0022035045)

Pin #	Description	I/O	Specifications
1	VDC1	I	+5.6V
2, 3	VDC2	I	+28V
4	GND	-	Ground

Gain Budget & Block Diagram

GAIN(dB) :	-3dB	17dB	18dB	-3dB	15dB	1.3dB	-0.3dB	TOTAL
POWER :	-5dBm	-8dBm	9dBm	27dBm	24dBm	39dBm	40.3dBm	40dBm



Outline Drawing

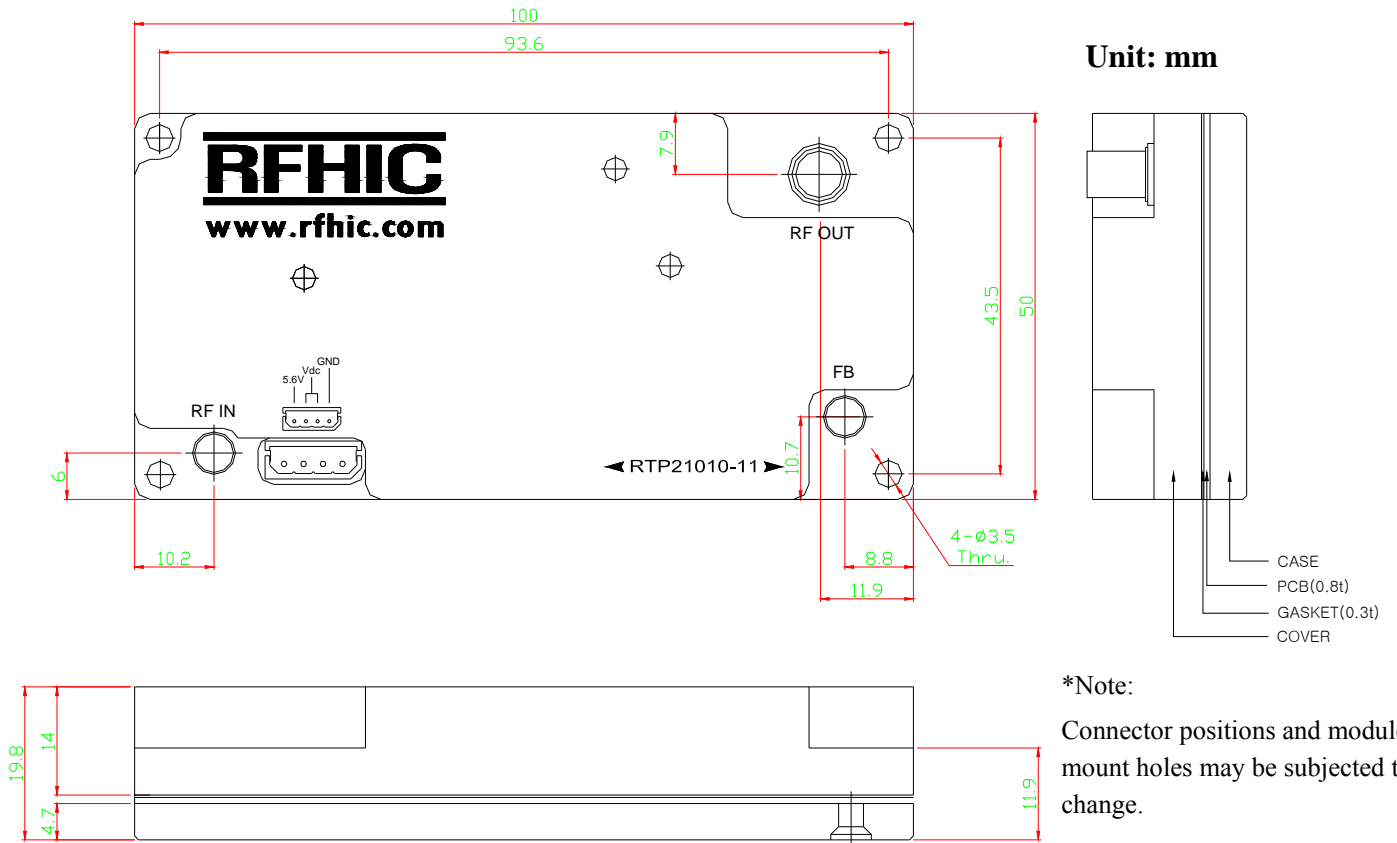
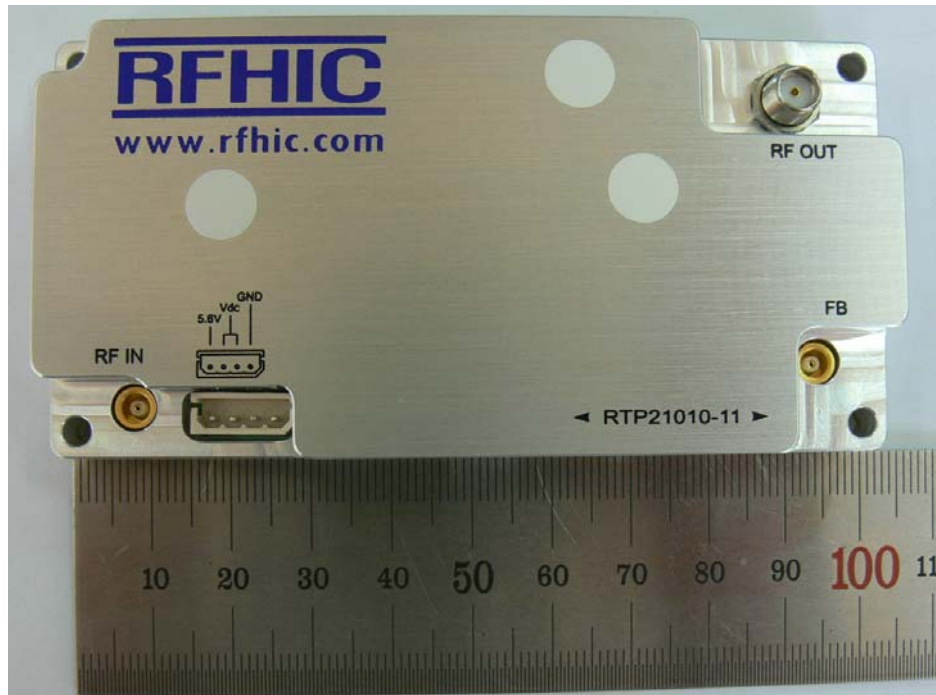


Photo of Product



Test Equipments:

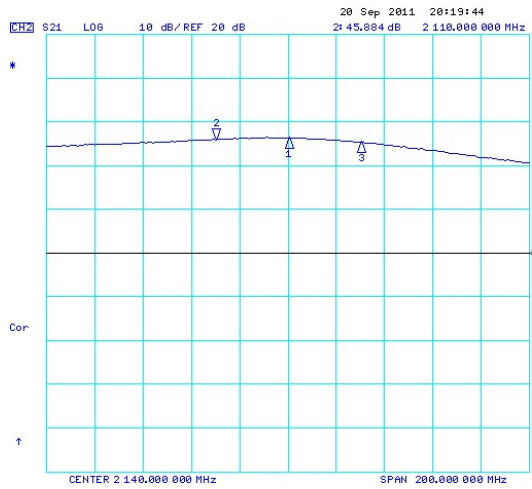
- **DPD Engine : Optichron board (OP6180)**
- **Signal Generator: E4438C (Agilent)**
- **Spectrum Analyzer: E4440A (Agilent)**
- **Network Analyzer: 8753E (HEWLET PACKARD)**
- **Power Supply: IPS-30B05DD (INTERACT)**
- **RTP21010-11: (S/N: RTP21-11090001)**

Test Condition:

- **Signal: WCDMA 4FA (Test Model 1 W/ 64DPCH) & LTE 10MHz 1FA**
- **PAR: 7.5dB**
- **CFR apply**
- **Temperature: 25°C**
- **AMP Temperature: 35°C**

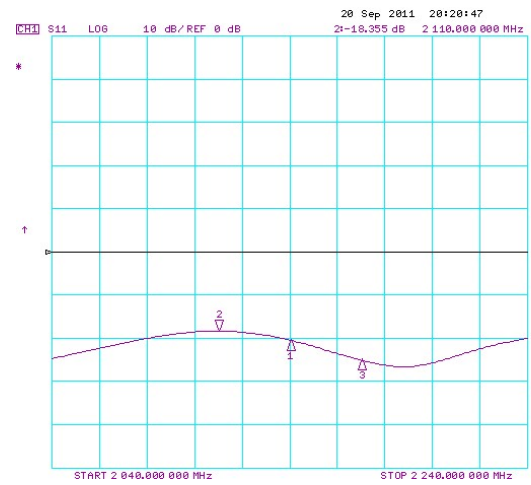
Test Data

GAIN & GAIN FLATNESS



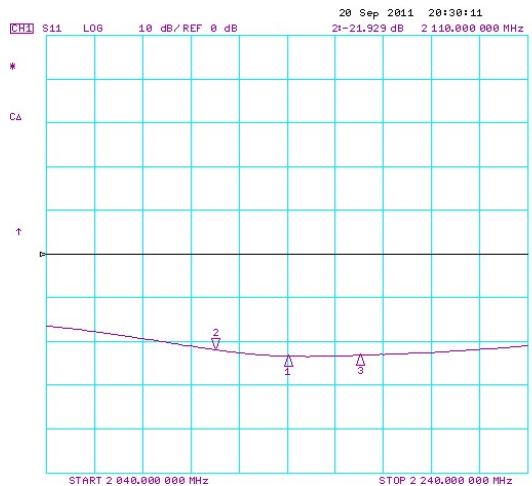
CH2 Markers
1: 46.272 dB
2.14000 GHz
3: 45.275 dB
2.17000 GHz

S11



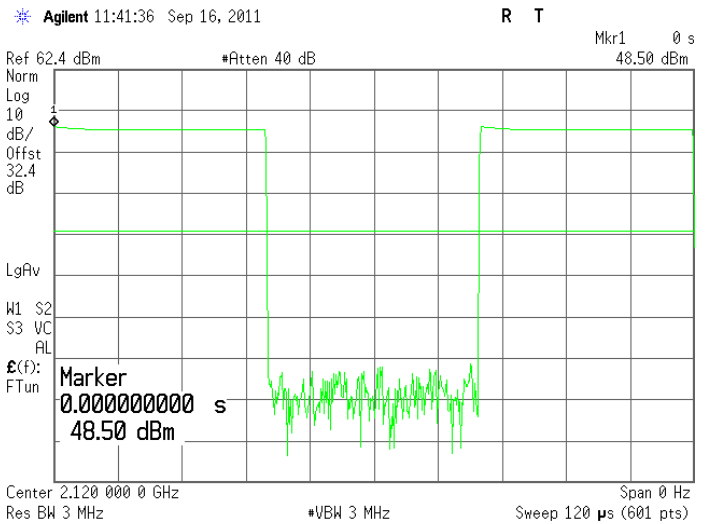
CH1 Markers
1: -20.442 dB
2.14000 GHz
3: -25.067 dB
2.17000 GHz

S22

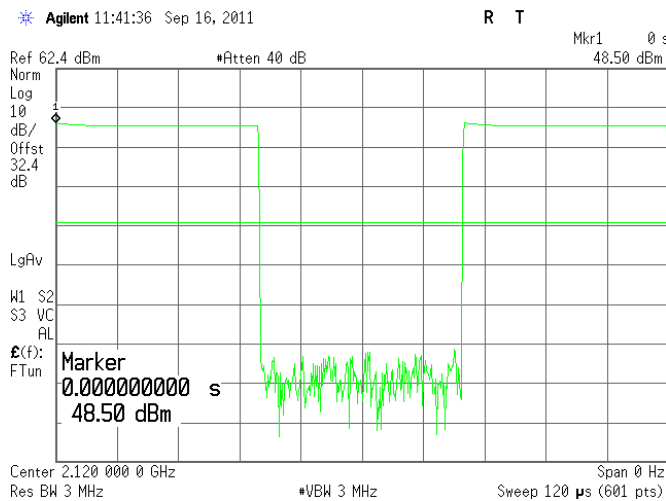


CH1 Markers
1: -23.406 dB
2.14000 GHz
3: -23.111 dB
2.17000 GHz

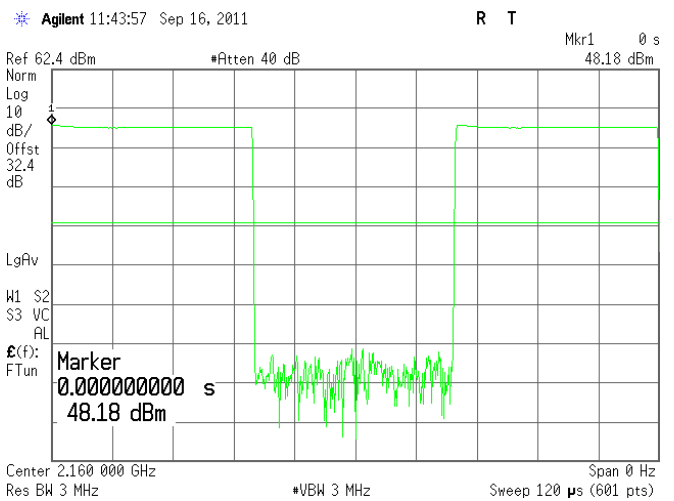
Psat = 48.5dBm@2120MHz (Pulse duty cycle 10%)



Psat = 48.5 dBm@2140MHz (Pulse duty cycle 10%)

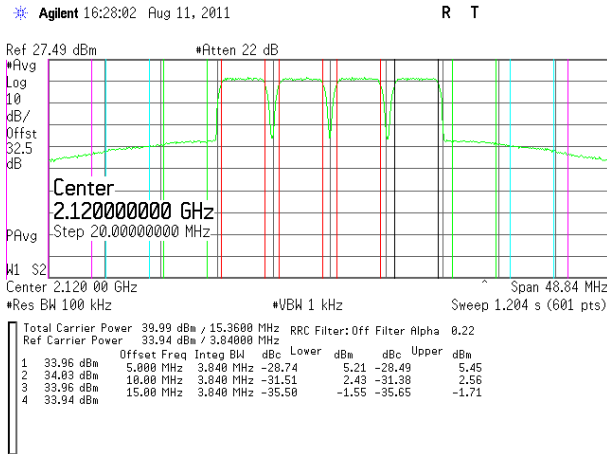


Psat = 48.18dBm@2160MHz (Pulse duty cycle 10%)

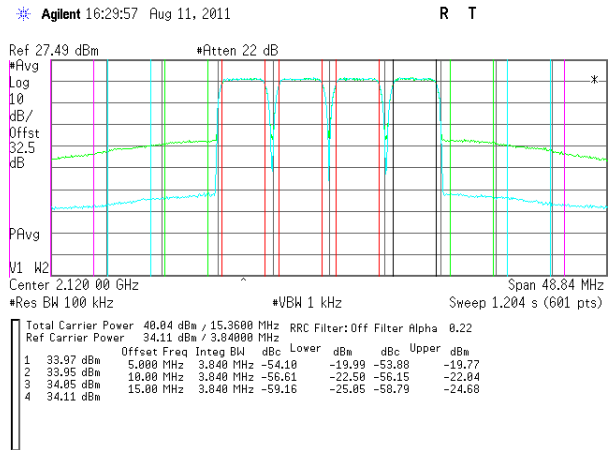


Test Results: DPD Operation (WCDMA 4FA)

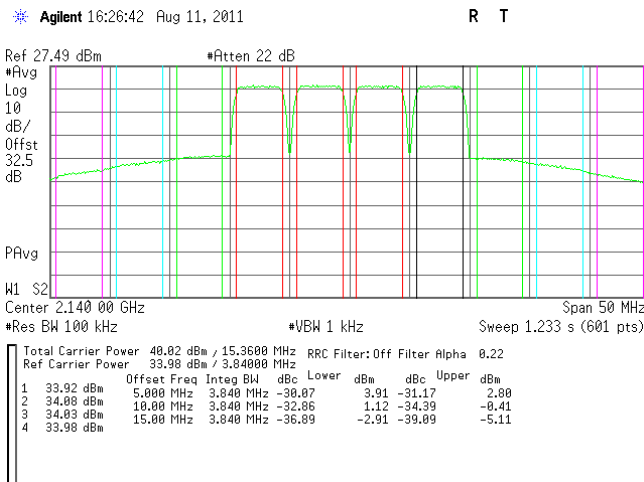
Pre - DPD@2120MHz



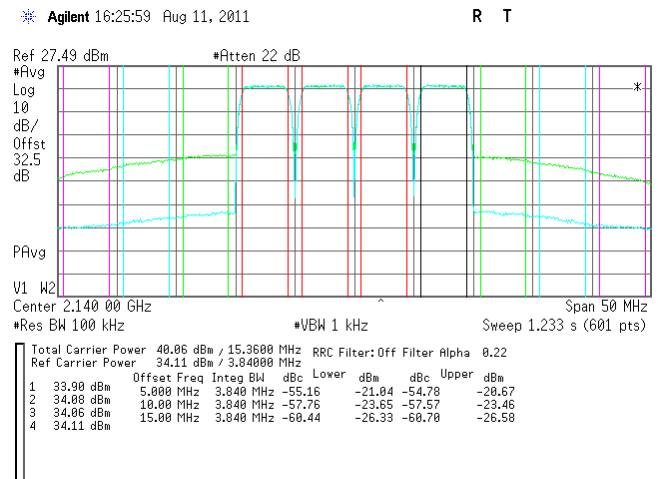
Post- DPD@2120MHz



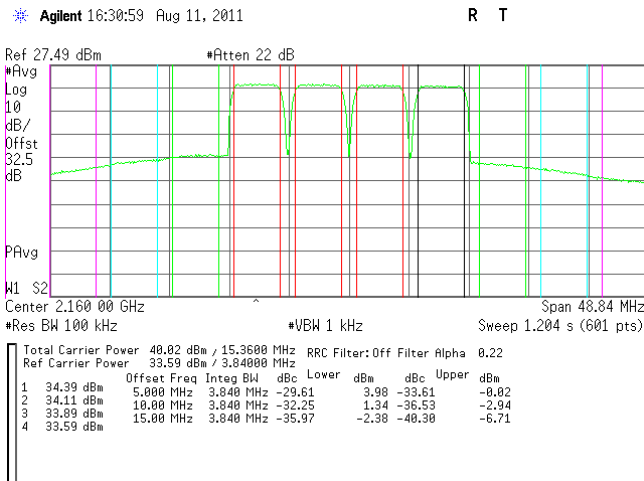
Pre - DPD@2140MHz



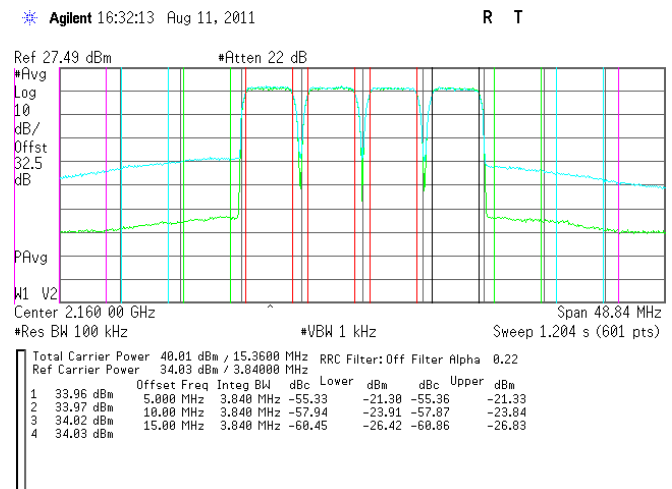
Post - DPD@2140MHz



Pre - DPD@2160MHz

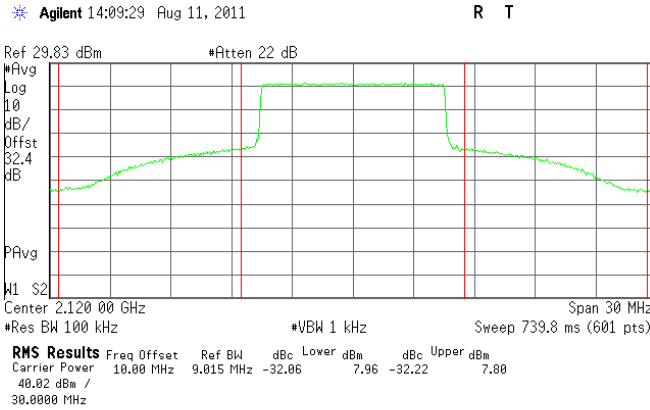


Post - DPD@2160MHz

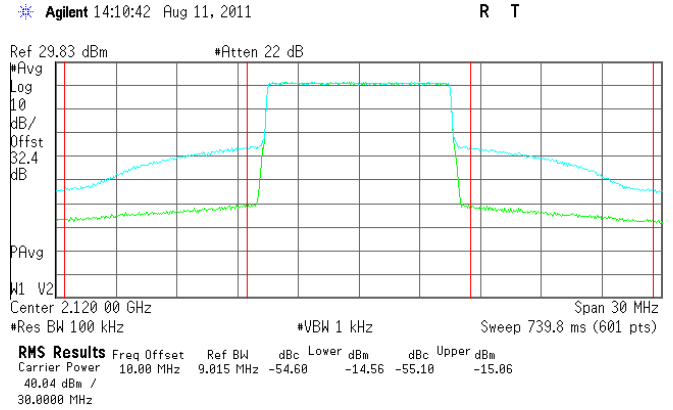


Test Results: DPD Operation (LTE 10MHz 1FA)

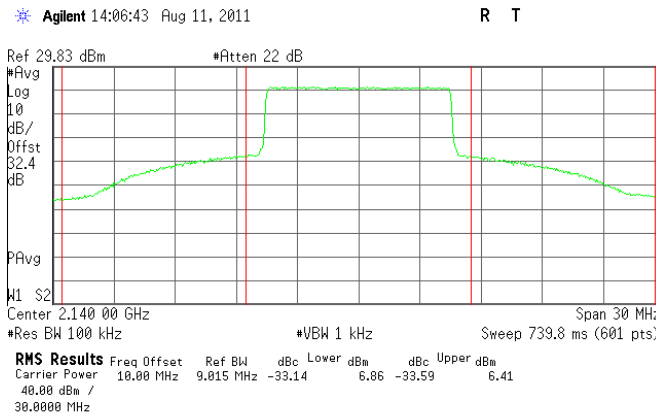
Pre - DPD@2120MHz



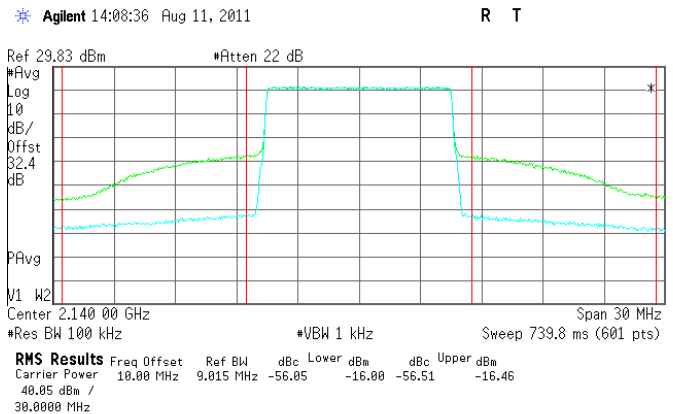
Post - DPD@2120MHz



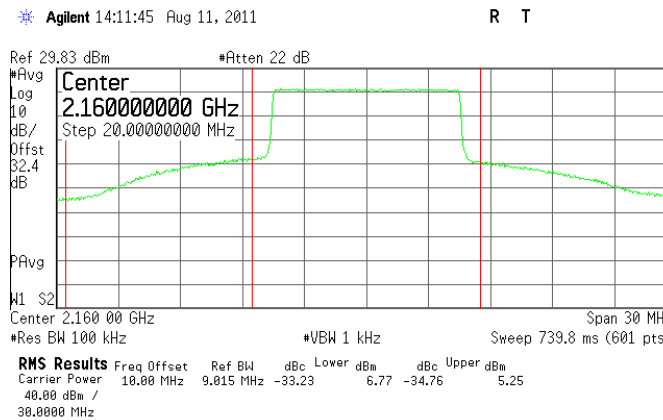
Pre - DPD@2140MHz



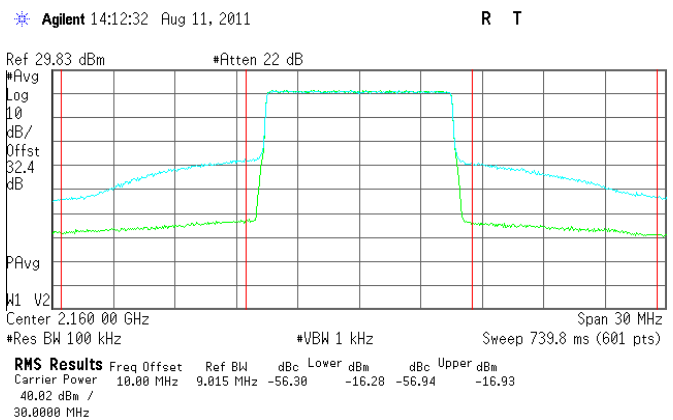
Post - DPD@2140MHz



Pre - DPD@2160MHz



Post - DPD@2160MHz



Test Sheet (S/N: RTP21-11090001)

S/N					
Gain		46.2dB			
Gain Flatness		1.0dB			
S11 (Max.)		-18.3dB			
S22 (Max.)		-21.9dB			
Feedback level@ 40dBm		2.5dBm			
Test Frequency (@Center)		2120MHz	2140 MHz	2160 MHz	
Psat (dBm)		48.5	48.5	48.2	
WCDMA 4FA @10W PAR:7.5dB	ACLR@±5MHz (dBc)	Pre-DPD	-28.5	-30.0	-29.6
		Post-DPD	-53.9	-54.8	-55.3
	ACLR@±10MHz (dBc)	Pre -DPD	-31.4	-32.8	-32.2
		Post-DPD	-56.1	-57.5	-57.8
	ACLR@±15MHz (dBc)	Pre -DPD	-35.5	-36.9	-35.9
		Post-DPD	-58.8	-60.4	-60.4
105mA/5.6V, Current/28V		860mA	865mA	871mA	
Efficiency		%	40.5	40.3	40.0

LTE 1FA PAR:7.5dB	ACLR@±10MHz (dBc)	Pre -DPD	-32.0	-33.1	-33.2
		Post-DPD	-54.6	-56.5	-56.3
105mA/5.6V, Current/28V		837mA	845mA	865mA	
Efficiency		%	41.6	41.2	40.3

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