Preliminary

Power Amplifier Pallet RTP21005-11

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	37dBm/ WCDMA 4FA, LTE		
SPECTRUM EMISSION MASK (with DPD)	SEM	PER 3GPP TS-25.141 & TS25.141		
ACLR (WCDMA 4FA) @ Po=+37dBm (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=+37dBm (typ.)		Non-DPD	-28dBc@±10MHz	
		With-DPD	-52dBc@±10MHz	
RF Gain	G	47dB ±3dB @frequency range, 5W 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, 0.42A / 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 (2nd, with DPD)	H	-45dBc (Max.)		
Feedback Output level @ 40dBm	FB	+2dBm ± 1dB		
Operating Temperature	To	-30℃ ~ + 60℃ (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), 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_{OD}	-2dBm	Max.
Load VSWR	Ψ	∞ : 1 (All Phase & Amplitude)	Nom.
Operating Case Temperature	Tc	+100	°C

Interface Connector

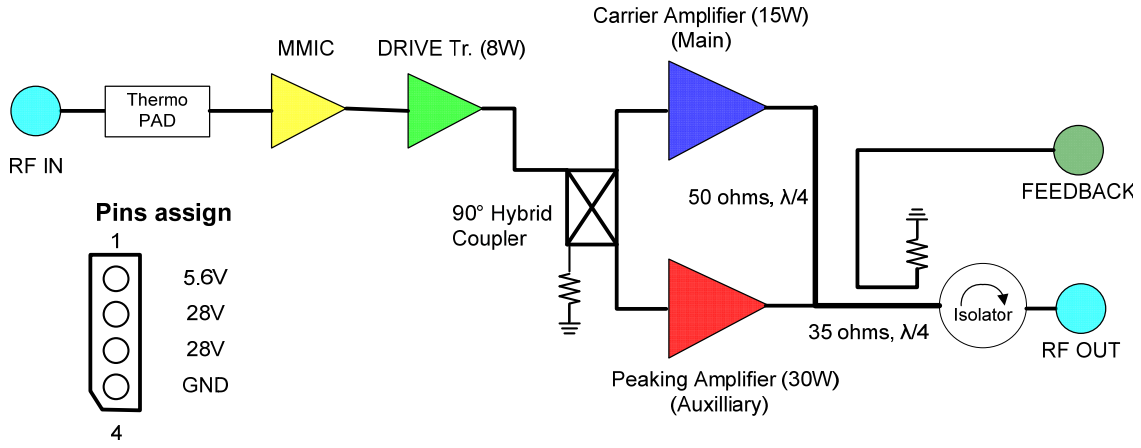
Connector type: MOLEX_4pin male (0022035045)

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

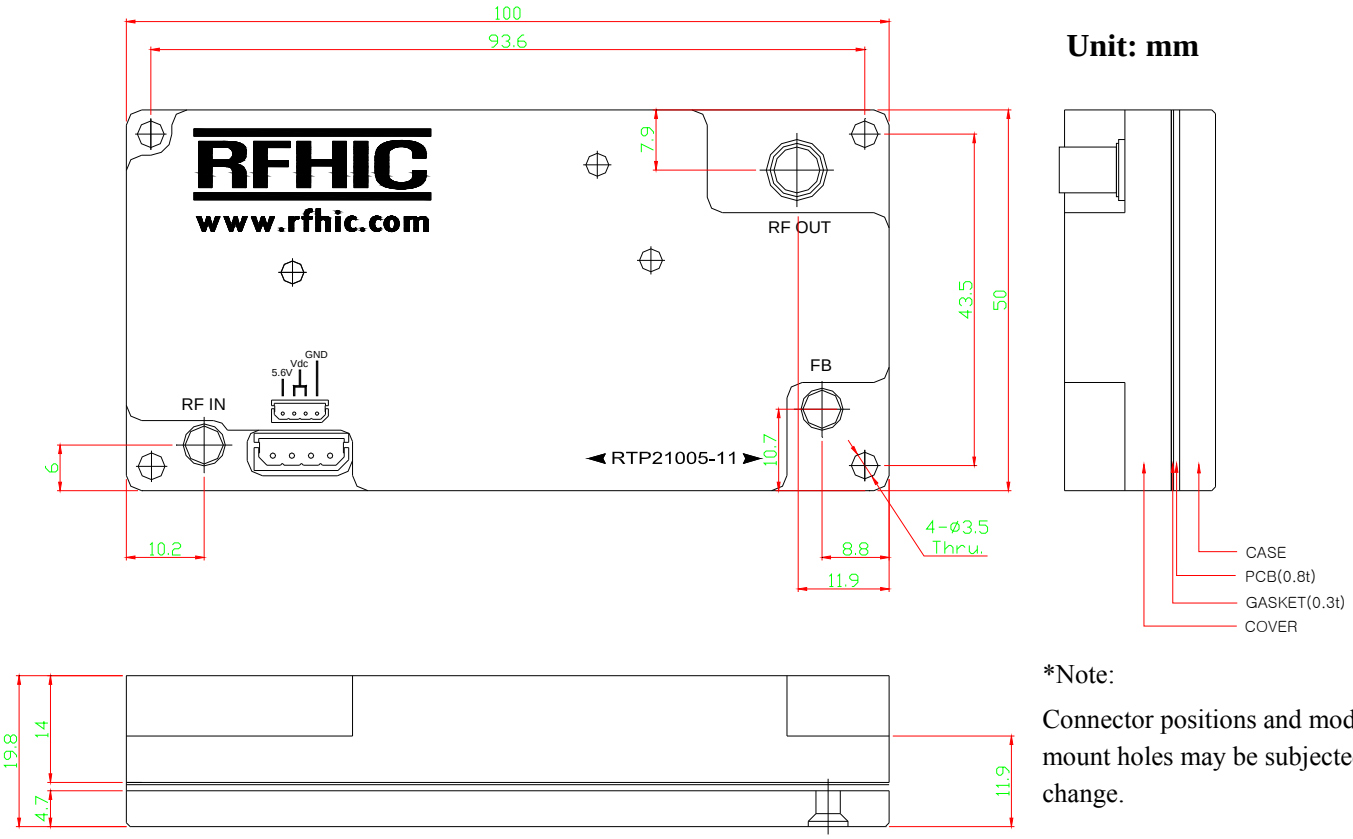
*Note: Based on the customer's need, RFHIC can provide different types of connectors. Price may vary.

Gain Budget & Block Diagram

								TOTAL
GAIN(dB) :	-3dB	17dB	18dB	-3dB	17dB	1.3dB	-0.3dB	47dB
POWER :	-10dBm	-13dBm	4dBm	22dBm	19dBm	36dBm	37.3dBm	37dBm



Outline Drawing



*Note:

Connector positions and module mount holes may be subjected to change.

Photo of Product

Test Equipments:

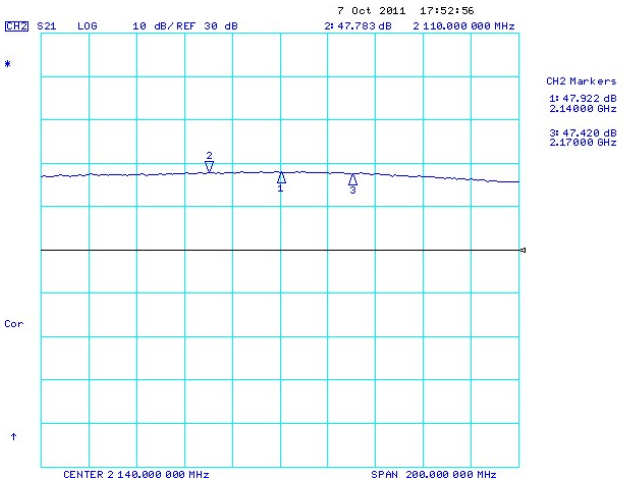
- DPD Engine : TI(GC5325EVM) & Optichron board (OP6180)
- Signal Generator: E4438C (Agilent)
- Spectrum Analyzer: E4440A (Agilent)
- Network Analyzer: 8753E (HEWLET PACKARD)
- Power Supply: IPS-30B05DD (INTERACT)

Test Condition:

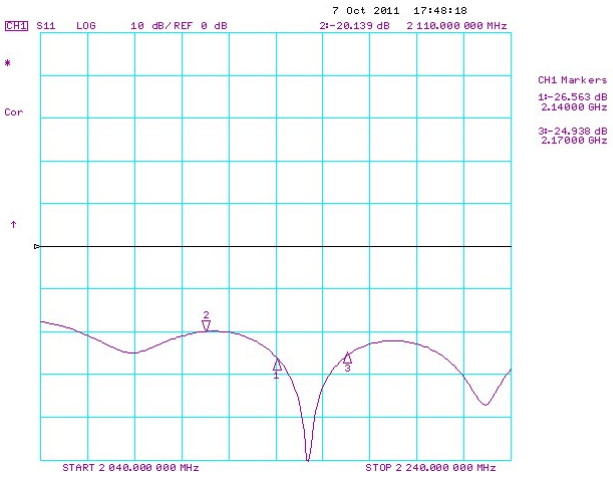
- Signal: WCDMA 4FA (Test Model 1 W/ 64DPCH) & LTE 10MHz 1FA
- PAR: 7.5dB
- CFR apply
- Temperature: 25°C
- AMP Temperature: 35°C

Test Data

GAIN & GAIN FLATNESS

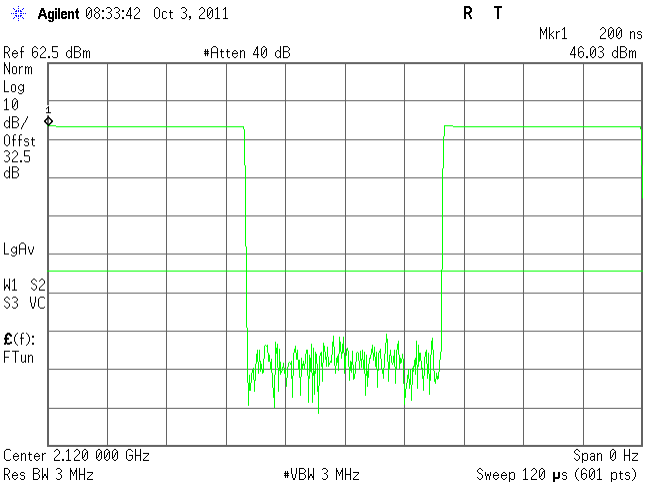


S11

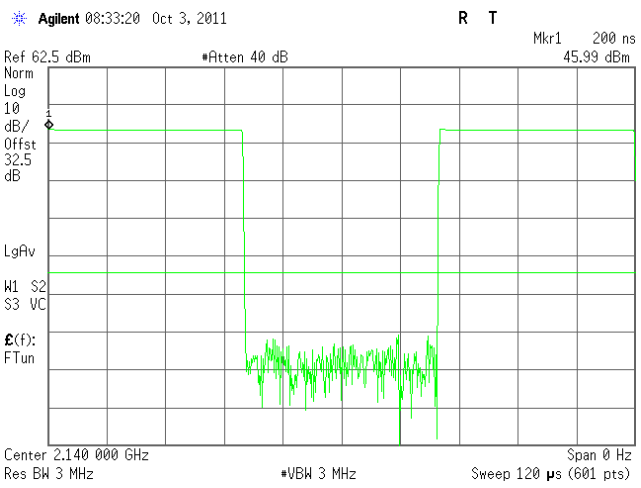


S22

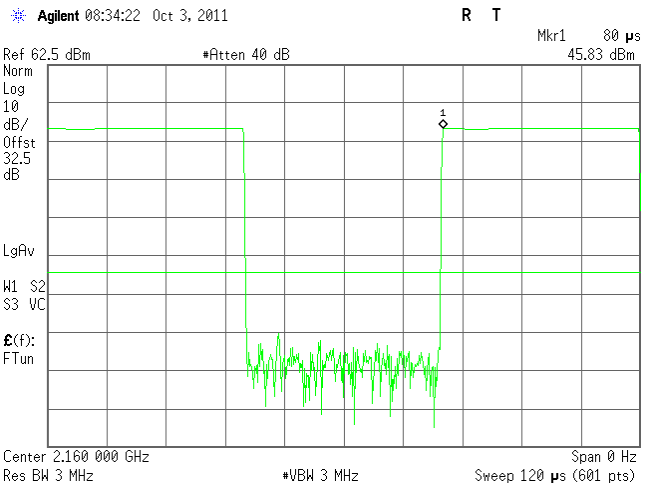
Psat = 46.0 dBm@2120MHz (Pulse duty cycle 10%)



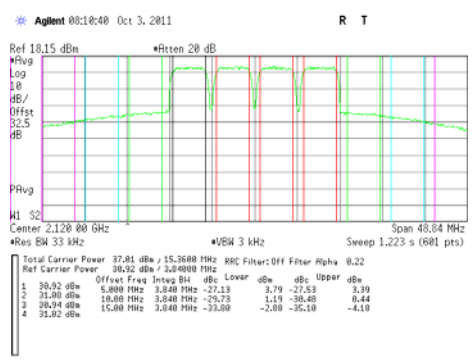
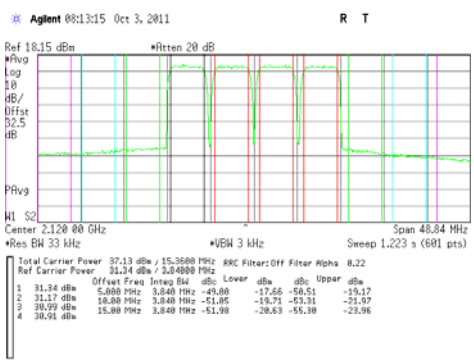
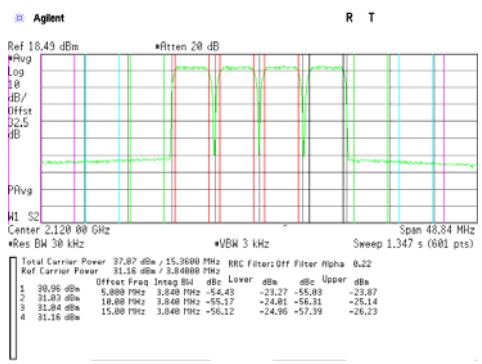
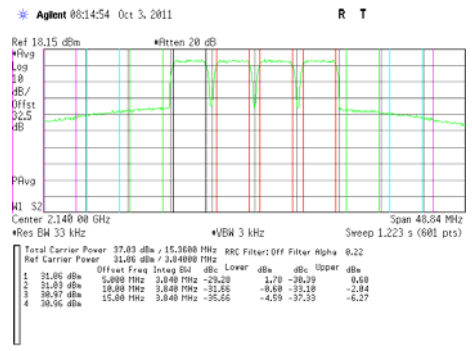
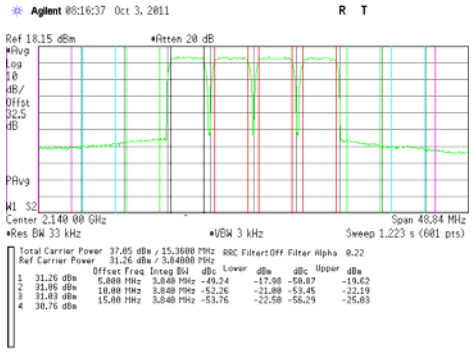
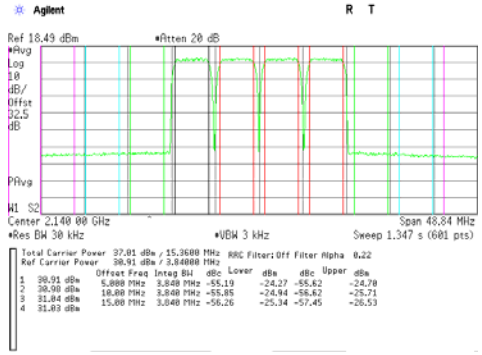
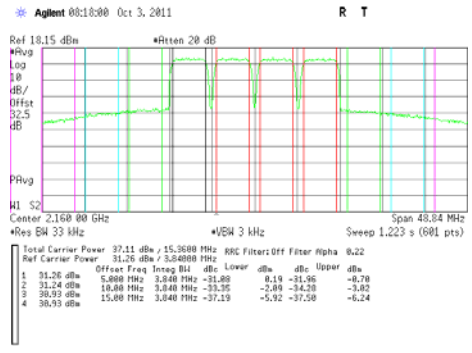
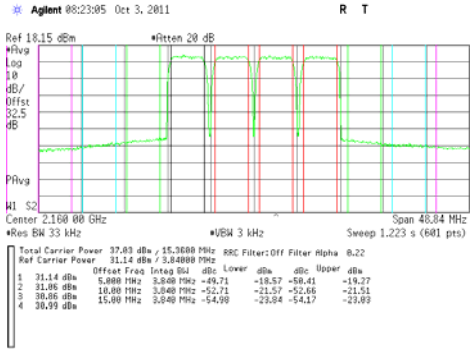
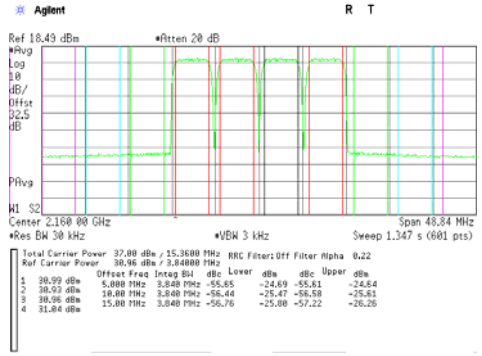
Psat = 46.0 dBm@2140MHz (Pulse duty cycle 10%)



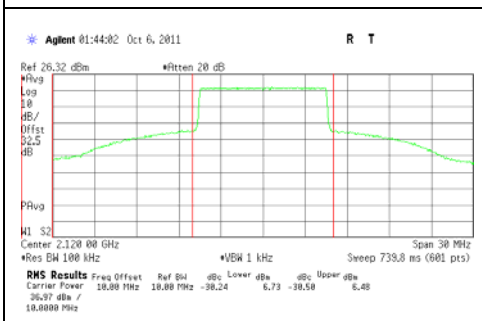
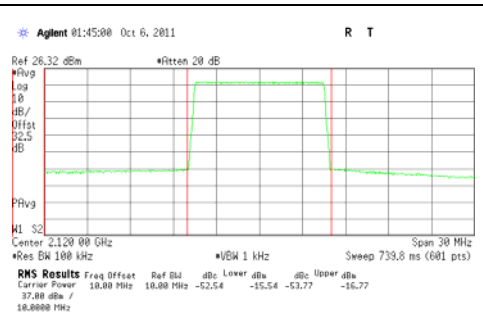
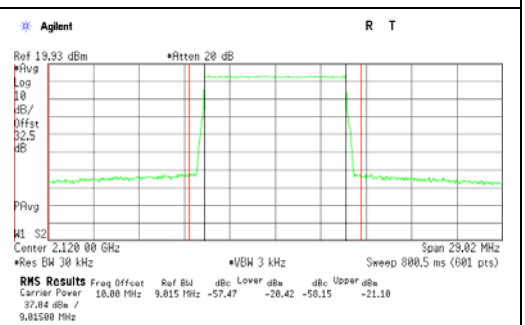
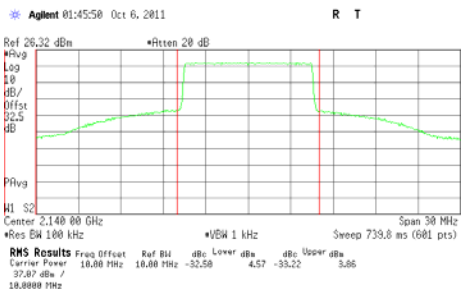
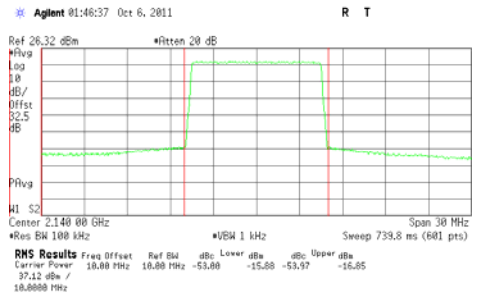
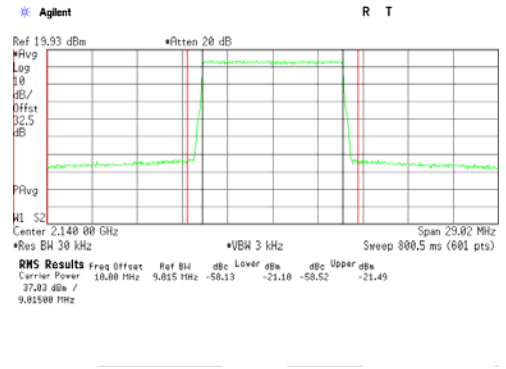
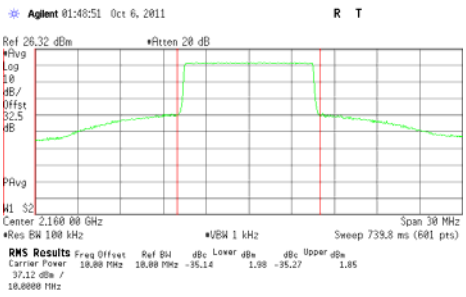
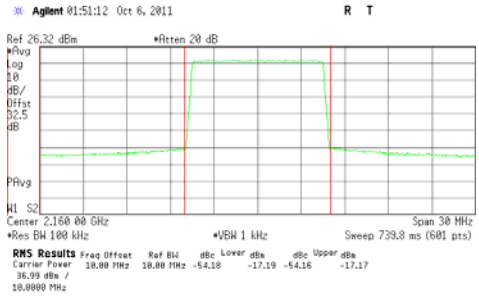
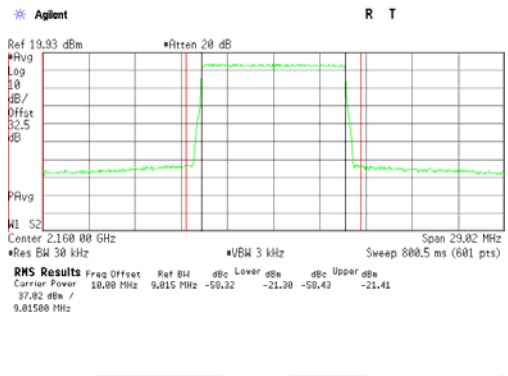
Psat = 45.8dBm@2160MHz (Pulse duty cycle 10%)



Test Results: DPD Operation (WCDMA 4FA)

Pre - DPD@2120MHz	Post- DPD@2120MHz (TI)	Post- DPD@2120MHz (Optichron)
		
Pre - DPD@2140MHz	**Post- DPD@2140MHz (TI)**	**Post- DPD@2140MHz (Optichron)**
		
Pre - DPD@2160MHz	**Post- DPD@2160MHz (TI)**	**Post- DPD@2160MHz (Optichron)**
		

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

Pre - DPD@2120MHz	Post- DPD@2120MHz (TI)	Post- DPD@2120MHz (Optichron)
		
Pre - DPD@2140MHz	**Post- DPD@2140MHz (TI)**	**Post- DPD@2140MHz (Optichron)**
		
Pre - DPD@2160MHz	**Post- DPD@2160MHz (TI)**	**Post- DPD@2160MHz (Optichron)**
		

Test Sheet

S/N					
Gain			47.7dB		
Gain Flatness			0.5dB		
S11 (Max.)			-20.0 dB		
S22 (Max.)			-18.9dB		
Test Frequency (Center)			2120MHz	2140 MHz	2160 MHz
Psat (dBm)			46.0	46.0	45.8
WCDMA 4FA @5W PAR:7.5dB	ACLR@±5MHz (dBc)	Pre-DPD	-27.1	-29.2	-31.1
		Post-DPD (TI)	-49.0	-49.2	-49.7
		Post-DPD (Optichron)	-54.4	-55.2	-55.6
	ACLR@±10MHz (dBc)	Pre-DPD	-29.7	-31.6	-33.3
		Post-DPD (TI)	-51.0	-52.2	-52.6
		Post-DPD (Optichron)	-55.1	-55.8	-56.4
	ACLR@±15MHz (dBc)	Pre-DPD	-33.8	-35.6	-37.2
		Post-DPD (TI)	-52.0	-53.7	-54.2
		Post-DPD (Optichron)	-56.1	-56.3	-56.7
125mA/5.6V, Current/28V			408mA	413mA	424mA
Efficiency		%	41.2	40.8	39.8

LTE 10MHz 1FA @5W PAR:7.5dB	ACLR@±10MHz (dBc)	Pre-DPD	-30.2	-32.5	-35.1
		Post-DPD (TI)	-52.5	-53.0	-54.1
		Post-DPD (Optichron)	-57.5	-58.1	-58.3
125mA/5.6V, Current/28V			395mA	398mA	416mA
Efficiency		%	42.5	42.2	40.5