EMPOWER RF SYSTEMS, INC.

ACCEPTANCE TEST REPORT

SKU 2198

ELECTRICAL SPECIFICATIONS @ 120VAC, 25°C ambient, 50Ω System, MGC mode unless specified otherwise

Parameter	Specifications						Frequency (MHz) & Test Results											
	Symbol	Min	Typ	Max	Unit	Notes	20	100	200	300	400	500	600	700	800	900	1000	Pass/Fail
Operating Frequency Range	BW	20		1000	MHz	Plot 1 (pg4)	x	x	x	x	x	x	x	x	x	x	x	Pass
Input Frequency Hopping F1=20MHz, F2=500MHz Min. Dwell =20µS *(ALC fast Peak Detection mode only)*	F_{1-2}	100			µSec	DVT Only	x	x	x	x	x	x	x	x	x	x	x	-
Output Power CW @ 900W (into 2:1 VSWR)	P_{out}	59.6			dBm	Record	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	Pass
Input Power for rated P_{OUT} = 100W	P_{IN}		-5		dBm	Record												Pass
Small Signal Gain Flatness, P_{IN} = -20dBm	ΔG			±3.5	dB	Plot 1 (pg4)	x	x	x	x	x	x	x	x	x	x	x	Pass
Leveled ALC Flatness @ 50dBm	ΔALC			±1.5	dB	Plot 2 (pg4)	x	x	x	x	x	x	x	x	x	x	x	Pass
Gain Adjustment Range	VVA	20			dB	Plot 3 (pg4)	x	x	x	x	x	x	x	x	x	x	x	Pass
Wide Band Noise Level, beyond 3MHz from carrier, including phase noise	No_{WIDE}			-50	dBm/kHz	DVT Only	x	x	x	x	x	x	x	x	x	x	x	-
RF Noise in transmission mode @ 59.6dB Gain, @ 5MHz from carrier, inc phase noise	No			-80	dBm/Hz	DVT Only	x	x	x	x	x	x	x	x	x	x	x	-
Inter-modulation (2nd Order) 2-Tones @ 53.6dBm/Tone	IMD_{2nd} Δ=1MHz			-20	dBc	Record	-26.42	-37.09	-42.58	-50.32	-36.84	-32.51	-45.43	-82.43	-84.59	-79.58	-82.37	Pass
Inter-modulation (3rd Order) 2-Tones @ 44dBm/Tone	500-520MHz			-25	dBc	Record												
	>520MHz			-60	dBc													
Harmonics @ P_{out} = 100W	3rd		-20	-9	dBc	Record												
Out-of-Band Harmonic Distortion Level @ Pout = 900W	>500-700MHz			-25	dBc	Record	-75	-57.94	-28.27	-58.79	-27.29	-87.39	-81.06	-86.59	-80	-80	-80	Pass
	>700MHz			-60	dBc		-75	-75	-90.8	-92.11	-89.36	-91.83	-89.3	-91.85	-91.87	-90.63	-86.71	Pass
Pulse performance Fc =225MHz, P_{OUT} = 900W(peak) Pulse Period: 100µSec, 50%	$T_{RISE\ 90\%}$			150	nSec	DVT Only												
Operating Voltage	V_{AC}	100	120	240	Volt	Verify	√											Pass
Power Consumption @ Cold Standby	I_{SD}			180	VA	Record												Pass
Power Consumption @ Hot Standby	I_{SB}			240	VA	Record												Pass
Power Consumption @ P_{OUT} = 500W (ALC mode)	P_D				VA	Record												Pass
Power Consumption @ P_{OUT} = 100W	P_D			700	VA	Record												Pass
Input Overdrive –Shut down	P_{IOD}			10	dBm	Verify	√											Pass
Thermal Overload –Shut down	T_{SD}			115	°C	DVT Only	-											-
Reflected Power Reduction Point (Approx. 3.5:1 VSWR trip point; max reduction -6dB)	VSWR			>3:1	VSWR	Verify	√											Pass

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Parameter	Specifications						Frequency (MHz) & Test Results											
	Symbol	Min	Typ	Max	Unit	Notes	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	Pass/Fail
Operating Frequency Range	BW	1000		3000	MHz	Plot 1 (pg5)	x	x	x	x	x	x	x	x	x	x	x	Pass
Input Frequency Hopping F1=20MHz, F2=500MHz Min. Dwell =20µS *(ALC fast Peak Detection mode only)*	F_{1-2}	100			µSec	DVT Only	x	x	x	x	x	x	x	x	x	x	x	-
Output Power CW @ 900W (into 2:1 VSWR)	P_{out}	59.6			dBm	Record	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	Pass
Input Power for rated P_{OUT} = 100W	P_{IN}		-5		dBm	Record												Pass
Small Signal Gain Flatness, P_{IN} = -20dBm	ΔG			±3.5	dB	Plot 1 (pg5)	x	x	x	x	x	x	x	x	x	x	x	Pass
Leveled ALC Flatness @ 50dBm	ΔALC			±1.5	dB	Plot 2 (pg5)	x	x	x	x	x	x	x	x	x	x	x	Pass
Gain Adjustment Range	VVA	20			dB	Plot 3 (pg5)	x	x	x	x	x	x	x	x	x	x	x	Pass
Wide Band Noise Level, beyond 3MHz from carrier, including phase noise	No_{WIDE}			-50	dBm/kHz	DVT Only	x	x	x	x	x	x	x	x	x	x	x	-
RF Noise in transmission mode @ 59.6dB Gain, @ 5MHz from carrier, inc phase noise	No			-80	dBm/Hz	DVT Only	x	x	x	x	x	x	x	x	x	x	x	-
Inter-modulation (2nd Order) 2-Tones @ 53.6dBm/Tone	IMD_{2nd} Δ=1MHz			-20	dBc	Record	-26.42	-37.09	-42.58	-50.32	-36.84	-32.51	-45.43	-82.43	-84.59	-79.58	-82.37	Pass
Inter-modulation (3rd Order) 2-Tones @ 44dBm/Tone	500-520MHz			-25	dBc	Record												
	>520MHz			-60	dBc													
Harmonics @ P_{out} = 100W	3rd		-20	-9	dBc	Record												
Out-of-Band Harmonic Distortion Level @ Pout = 900W	>500-700MHz			-25	dBc	Record	-75	-57.94	-28.27	-58.79	-27.29	-87.39	-81.06	-86.59	-80	-80	-80	Pass
	>700MHz			-60	dBc		-75	-75	-90.8	-92.11	-89.36	-91.83	-89.3	-91.85	-91.87	-90.63	-86.71	Pass
Pulse performance Fc =225MHz, P_{OUT} = 900W(peak) Pulse Period: 100µSec, 50%	$T_{RISE\ 90\%}$			150	nSec	DVT Only												
Operating Voltage	V_{AC}	100	120	240	Volt	Verify	√											Pass
Power Consumption @ Cold Standby	I_{SD}			180	VA	Record												Pass
Power Consumption @ Hot Standby	I_{SB}			240	VA	Record												Pass
Power Consumption @ P_{OUT} = 500W (ALC mode)	P_D				VA	Record												Pass
Power Consumption @ P_{OUT} = 100W	P_D			700	VA	Record												Pass
Input Overdrive –Shut down	P_{IOD}			10	dBm	Verify	√											Pass
Thermal Overload –Shut down	T_{SD}			115	°C	DVT Only	-											-
Reflected Power Reduction Point (Approx. 3.5:1 VSWR trip point; max reduction -6dB)	VSWR			>3:1	VSWR	Verify	√											Pass

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ACCEPTANCE TEST REPORT

SKU 2198

ELECTRICAL SPECIFICATIONS @ 120VAC, 25°C ambient, 50Ω System, MGC mode unless specified otherwise

Parameter	Specifications						Frequency (MHz) & Test Results											
	Symbol	Min	Typ	Max	Unit	Notes	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	Pass/Fail
Operating Frequency Range	BW	2000		6000	MHz	Plot 1 (pg4)	x	x	x	x	x	x	x	x	x	x	x	Pass
Input Frequency Hopping F1=20MHz, F2=500MHz Min. Dwell =20µS *(ALC fast Peak Detection mode only)*	F_{1-2}	100			µSec	DVT Only	x	x	x	x	x	x	x	x	x	x	x	-
Output Power CW @ 900W (into 2:1 VSWR)	P_{out}	59.6			dBm	Record	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	Pass
Input Power for rated P_{OUT} = 40W	P_{IN}		-5		dBm	Record												Pass
Small Signal Gain Flatness, P_{IN} = -20dBm	ΔG			±3.5	dB	Plot 1 (pg4)	x	x	x	x	x	x	x	x	x	x	x	Pass
Leveled ALC Flatness @ 46dBm	ΔALC			±1.5	dB	Plot 2 (pg4)	x	x	x	x	x	x	x	x	x	x	x	Pass
Gain Adjustment Range	VVA	20			dB	Plot 3 (pg4)	x	x	x	x	x	x	x	x	x	x	x	Pass
Wide Band Noise Level, beyond 3MHz from carrier, including phase noise	No_{WIDE}			-50	dBm/kHz	DVT Only	x	x	x	x	x	x	x	x	x	x	x	-
RF Noise in transmission mode @ 59.6dB Gain, @ 5MHz from carrier, inc phase noise	No			-80	dBm/Hz	DVT Only	x	x	x	x	x	x	x	x	x	x	x	-
Inter-modulation (2nd Order) 2-Tones @ 53.6dBm/Tone	IMD_{2nd} Δ=1MHz			-20	dBc	Record	-26.42	-37.09	-42.58	-50.32	-36.84	-32.51	-45.43	-82.43	-84.59	-79.58	-82.37	Pass
Inter-modulation (3rd Order) 2-Tones @ 40dBm/Tone	500-520MHz			-25	dBc	Record												
	>520MHz			-60	dBc													
Harmonics @ P_{out} = 40W	3rd		-20	-9	dBc	Record												
Out-of-Band Harmonic Distortion Level @ Pout = 900W	>500-700MHz			-25	dBc	Record	-75	-57.94	-28.27	-58.79	-27.29	-87.39	-81.06	-86.59	-80	-80	-80	Pass
	>700MHz			-60	dBc		-75	-75	-90.8	-92.11	-89.36	-91.83	-89.3	-91.85	-91.87	-90.63	-86.71	Pass
Pulse performance Fc =225MHz, P_{OUT} = 900W(peak) Pulse Period: 100µSec, 50%	$T_{RISE\ 90\%}$			150	nSec	DVT Only												
Operating Voltage	V_{AC}	100	120	240	Volt	Verify	√											Pass
Power Consumption @ Cold Standby	I_{SD}			180	VA	Record												Pass
Power Consumption @ Hot Standby	I_{SB}			240	VA	Record												Pass
Power Consumption @ P_{OUT} = 500W (ALC mode)	P_D				VA	Record												Pass
Power Consumption @ P_{OUT} = 100W	P_D			600	VA	Record												Pass
Input Overdrive –Shut down	P_{IOD}			10	dBm	Verify	√											Pass
Thermal Overload –Shut down	T_{SD}			115	°C	DVT Only	-											-
Reflected Power Reduction Point (Approx. 3.5:1 VSWR trip point; max reduction -6dB)	VSWR			>3:1	VSWR	Verify	√											Pass

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PERFORMANCE PLOTS

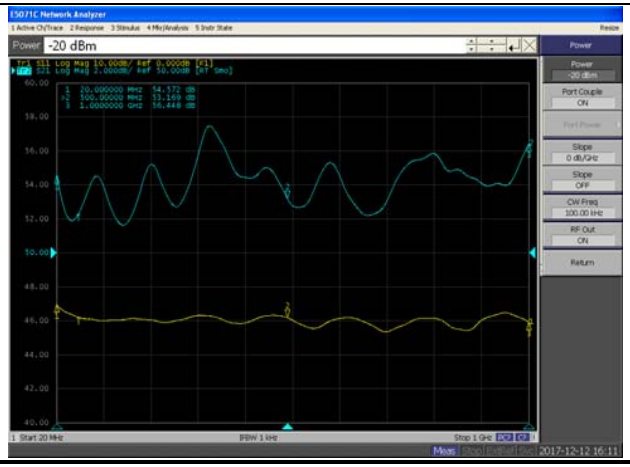
Plot 1 - Small Signal Gain & Input Return Loss

Top Curve: Small Signal Gain @ P_{IN} = -20dBm

Reference: 50dB, 2dB/div.

Bottom Curve: Input Return Loss

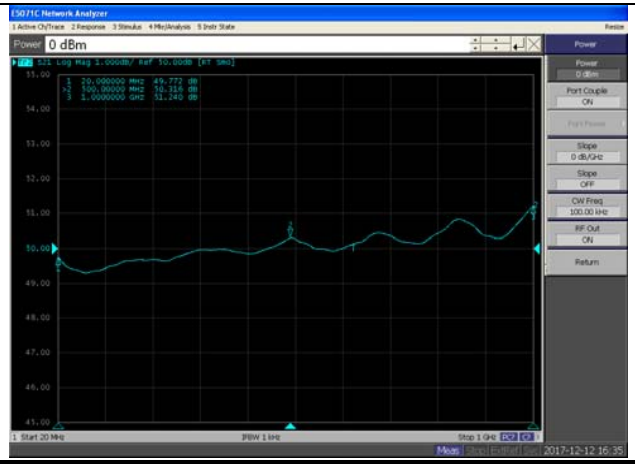
Reference: 0dB, 10dB/div.



Plot 2 - Leveled ALC Flatness - 100W

Top Curve: ALC Response @ Constant PIN = 0dBm

Reference: 50dB, 1dB/Div.

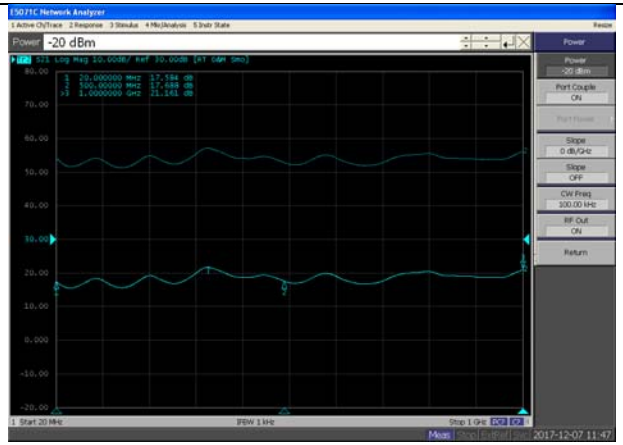


Plot 3 -Gain Adjustment Range

Top Curve: Max Signal Gain @ PIN = -20dBm

Reference Level: 30dB, 10dB/div.

Bottom Curve: Minumum Signal Gain @ PIN = -20dBm



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ACCEPTANCE TEST REPORT

PERFORMANCE PLOTS

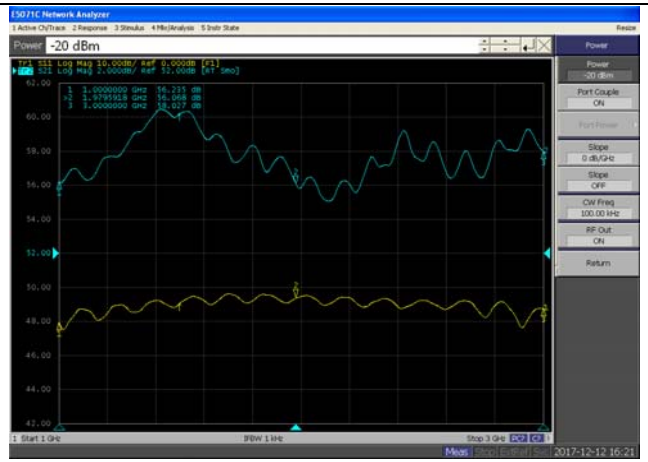
Plot 1 - Small Signal Gain & Input Return Loss

Top Curve: Small Signal Gain @ P_{IN} = -20dBm

Reference: 52dB, 2dB/div.

Bottom Curve: Input Return Loss

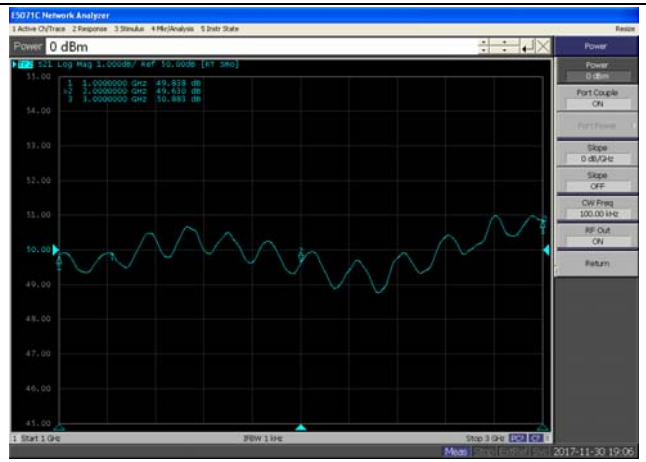
Reference: 0dB, 10dB/div.



Plot 2 - Leveled ALC Flatness - 100W

Top Curve: ALC Response @ Constant PIN = 0dBm

Reference: 50dB, 1dB/Div.



Plot 3 -Gain Adjustment Range

Top Curve: Max Signal Gain @ PIN = -20dBm

Reference Level: 30dB, 10dB/div.

Bottom Curve: Minumum Signal Gain @ PIN = -20dBm

PERFORMANCE PLOTS

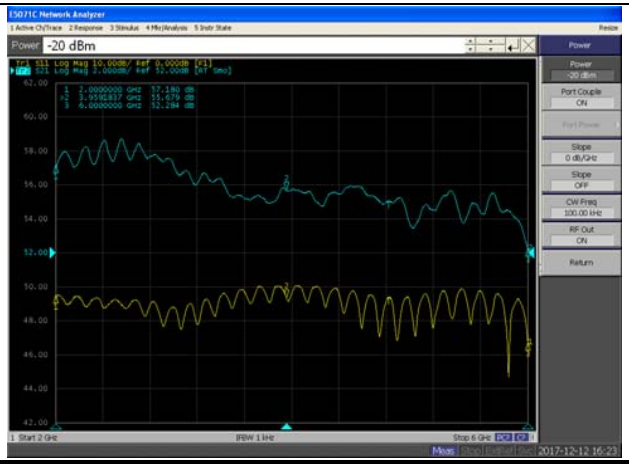
Plot 1 - Small Signal Gain & Input Return Loss

Top Curve: Small Signal Gain @ P_{IN} = -20dBm

Reference: 52dB, 2dB/div.

Bottom Curve: Input Return Loss

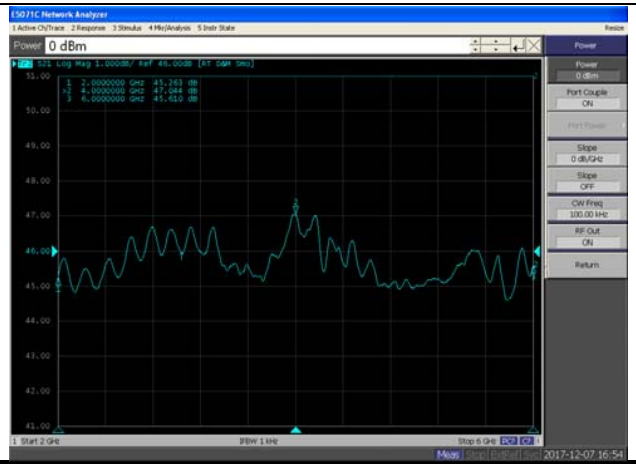
Reference: 0dB, 10dB/div.



Plot 2 - Leveled ALC Flatness - 40W

Top Curve: ALC Response @ Constant PIN = 0dBm

Reference: 46dB, 1dB/Div.



Plot 3 -Gain Adjustment Range

Top Curve: Max Signal Gain @ PIN = -20dBm

Reference Level: 30dB, 10dB/div.

Middle Curve: Minumum Signal Gain @ PIN = -20dBm