



# Calibration Certificate

Factory Standard Calibration

No: 64336-1041-001 / 01

Date: Sep 8, 2011

Recommended calibration interval: 1 Year

**Manufacturer**

Advantex LLC  
 Russian Federation,  
 111250, Moscow, Krasnokazarmennaya st., 13/1  
 tel. +7(495)721-47-74  
 e-mail: info@advantex.ru  
 www.advantexrf.com

**Customer**

Contract No  Contract Date

**Location of calibration:**

Company

Address

City  State  Zip Code

Country

**Calibrated / Tested Instrument Information**

Model Name  Description

Part Number

Serial Number  Firmware version

Power-on Count  Total Operation Time, hours

**Installed Hardware**

Part Number	Serial Number	Description
LNO-HP31M-RF		RF Frequency synthesizer 4MHz-8GHz, +27dBm
LNO-REF-20M-RF		Dual frequency PLL 147/150MHz

Calibration equipment used

Model Name	Description	Cal due date	Certificate No
R&S NRP-Z22	Average power sensor	Nov 10, 2012	20-311889
R&S FSUP26	Signal source analyzer 26.5GHz	Nov 16, 2012	20-312658
R&S SMBV100A	Vector signal generator	May 31, 2013	20-336295

Test conditions (unless explicitly specified)

Ambient Temperature: 23  $\pm$  5 / -3 °C      Test program name: SG8\_CLP  
Humidity: 20 to 70% RH      Test program version: 1.0

Test results summary

#	Test Name	Status	Note / Resolution
1	Mechanical Test Set		
1.1	Mechanical defects / damages test (case, display, connectors)	PASSED	
2	Power-On Test Set		
2.1	Power-on, display, keyboard, rotary knob operation test	PASSED	
2.2	EEPROM integrity test	PASSED	
3	PLL Lock Test		
3.1	PLL lock test at 1GHz+1Hz	PASSED	
3.2	PLL lock test at 1GHz-1Hz	PASSED	
4	Remote Control Interfaces		
4.1	USB *IDN? response	PASSED	
4.2	RS-232 *IDN? response	PASSED	
5	RF Level Calibration Area		
5.1	Min. value of high bound of calibration area	PASSED	
5.2	Max. value of low bound of calibration area	PASSED	
6	RF Level Accuracy		
6.1	Absolute accuracy at Pout=0..+20dBm	PASSED	
6.2	Absolute accuracy within calibration area	PASSED	
7	RFout Frequency / Spectrum		
7.1	Frequency accuracy	PASSED	
7.2	Normalized phase noise	PASSED	
8	REF Out		
8.1	REF Out level	PASSED	
8.2	REF Out phase noise	PASSED	
9	REF In Sensitivity		
9.1	External reference signal 20MHz, +10dBm PLL lock	PASSED	
9.2	External reference signal 150MHz, -10dBm PLL lock	PASSED	
10	Analog Inputs		
10.1	Mic In	PASSED	
10.2	AUX In / TRIG	PASSED	

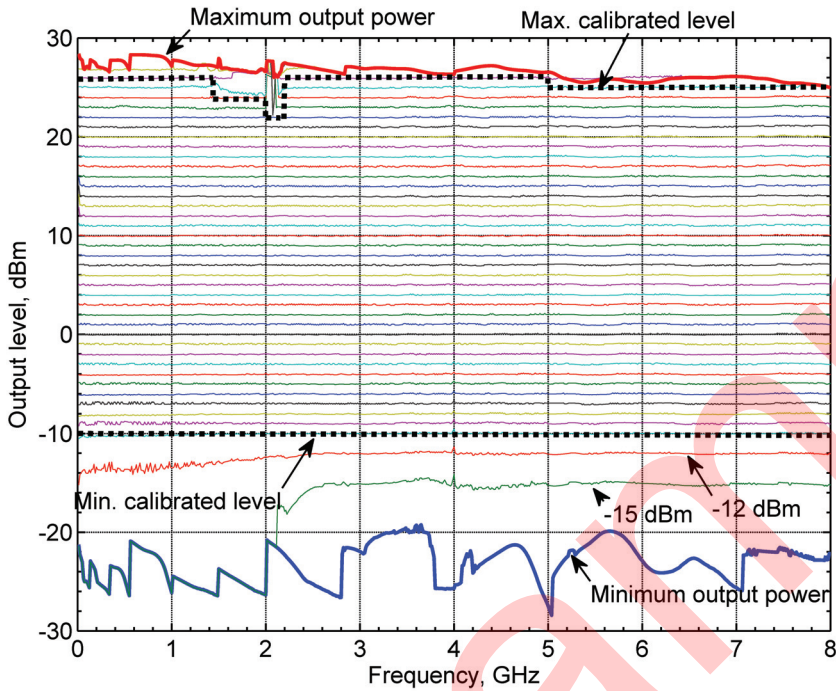
Notes:

Test Report Details - RF Level Calibration Area

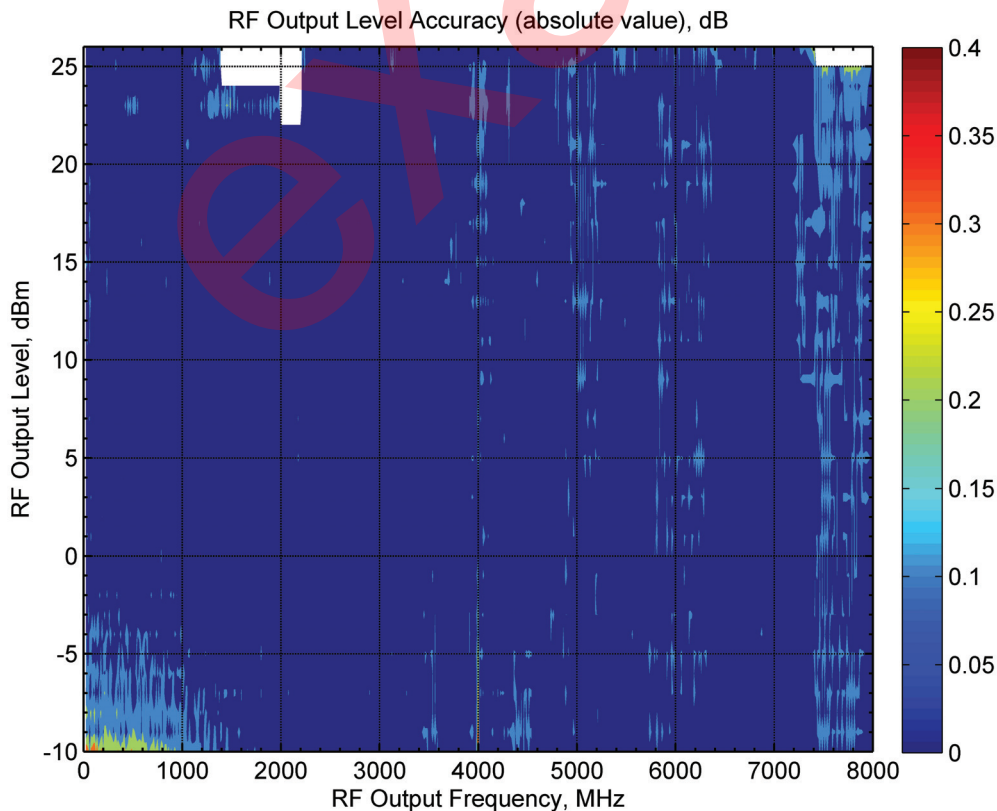
#	Test Name	Measured	Op.	Spec.	Meas. Accuracy	Units
5.1	Min. value of high bound of calibration area	+22	≥	+22	0.16	dBm
5.2	Max. value of low bound of calibration area	-10	≤	-10	0.14	dBm

Test Report Details - RF Level Accuracy (ambient temp = +20..+25°C, int. block temp = +37°C)

#	Test Name	Measured	Op.	Spec.	Meas. Accuracy	Units
6.1	Absolute accuracy at Pout=0..+20dBm	0.19	<	0.2	0.13	dBm
6.2	Absolute accuracy within calibration area	0.46	<	0.5	0.12	dBm

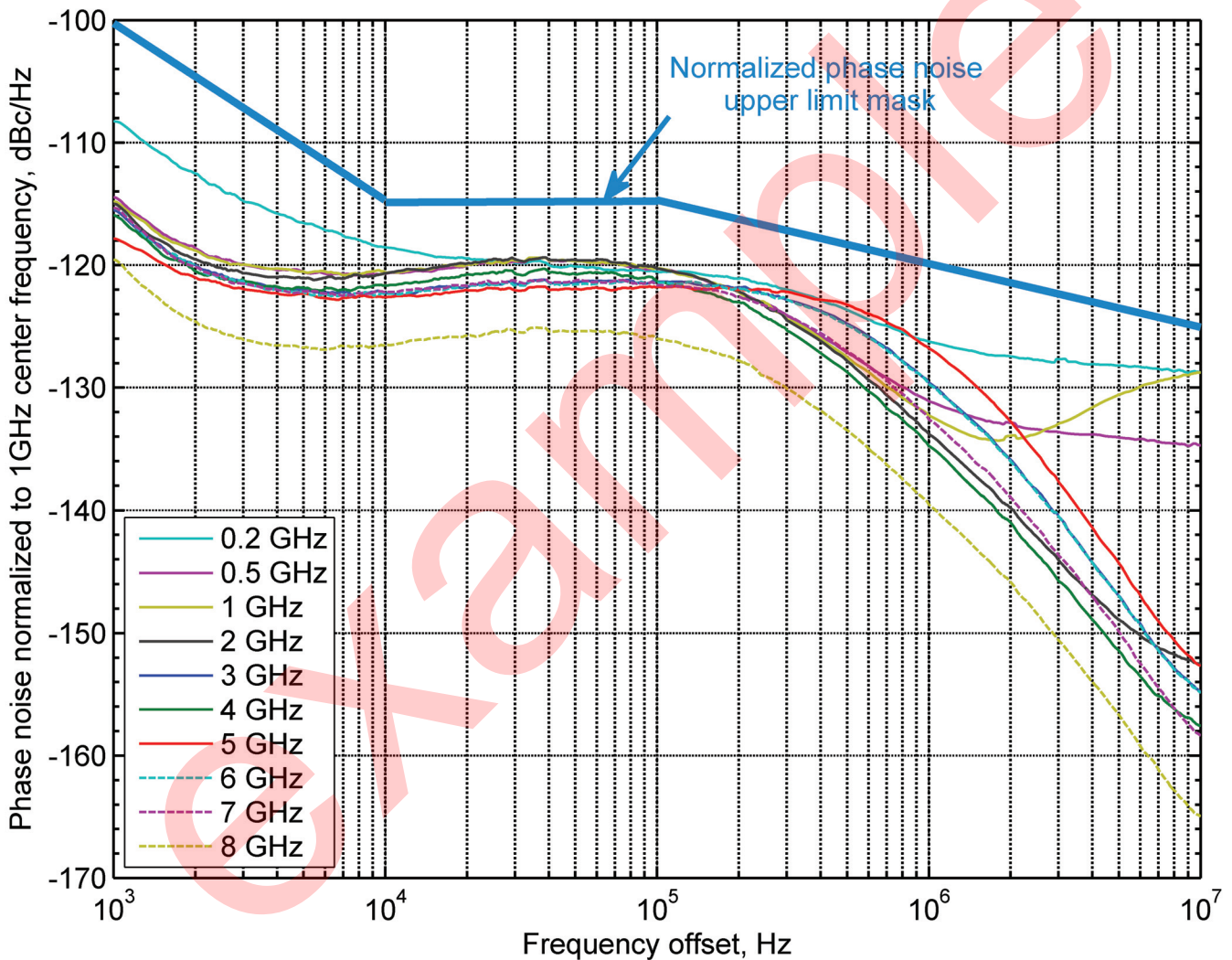


Level scan



Test Report Details - RFout Frequency / Spectrum (int. reference = 147MHz, int. block temp = +37°C)

#	Test Name	Measured	Op.	Spec.	Meas. Accuracy	Units
7.1	Frequency Accuracy					
7.1.1	Relative error	+1.2	><	±5	0.2	ppm
7.2	Phase noise normalized to 1GHz center frequency, max for 0.2, 0.5, 1, 2 .. 8GHz center frequencies at offsets:					
7.2.1	1 kHz	-108	≤	-100	1	dBc/Hz
7.2.2	10 kHz	-118	≤	-115	1	dBc/Hz
7.2.3	100 kHz	-120	≤	-115	1	dBc/Hz
7.2.4	1 MHz	-126	≤	-120	1	dBc/Hz
7.2.5	10 MHz	-128.5	≤	-125	1	dBc/Hz



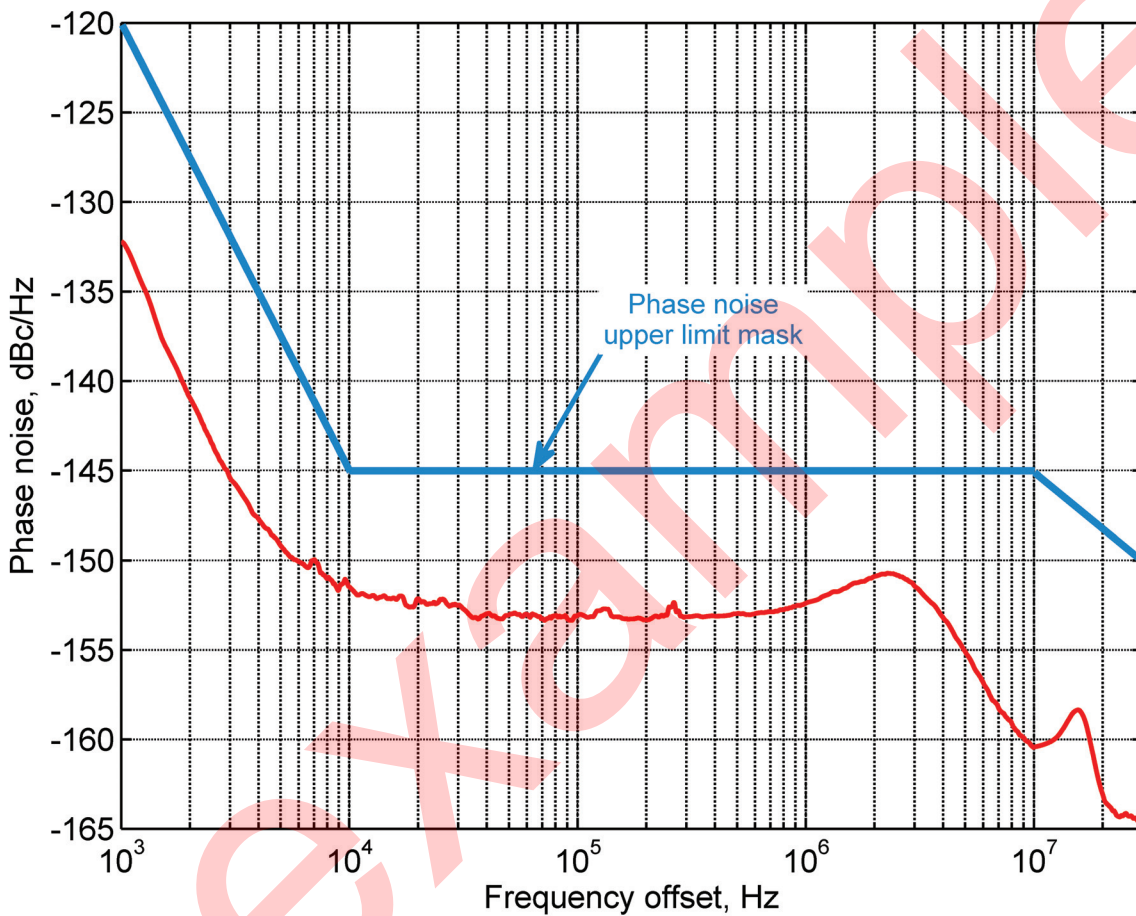
Normalized phase noise



Test Report Details - REF Out

(int. reference = 147MHz, int. block temp = +37°C)

#	Test Name	Measured	Op.	Spec.	Meas. Accuracy	Units
8.1	REF Out level					
8.1.1	REF Out level	0.5	≥	-5	0.1	dBm
8.2	Phase noise at offsets:					
8.2.1	1 kHz	-132	≤	-120	1	dBc/Hz
8.2.2	10 kHz	-151	≤	-145	1	dBc/Hz
8.2.3	100 kHz	-153	≤	-145	1	dBc/Hz
8.2.4	1 MHz	-155	≤	-145	1	dBc/Hz
8.2.5	10 MHz	-160	≤	-145	1	dBc/Hz



REF Out phase noise

Remarks:

(executive)

(sign)