

# SNA – 3050 400 kHz – 2.5 GHz Scalar Network Analyzer



## User Manual Ver. 1.2 15/06/2011



# **General Index**

1 -	- Description	4
2 -	- SNA 3050 block diagram	5
3 -	- Contents	6
4.	- Technical specifications	7
5.	- Theoretical background	8
5	5 1 - Conversion tables	۹ ۹
	5.1 Table reports of tension and power expressed in dB	9
	5.1.2 Correlation table mV / dB microvolt / dBm	
	5.1.3 Relation table ROS / attenuation / resistance load	
6 -	- Tips for the set up of a test bench	
7.	- Turning on and off the instrument	12
'	7 1 - Turning on	12
	7.2 - Turning off	
	7.3 - Detailed description of the LED functioning	
	7.4 - Using the external power supply	
8.	- Stand Alone mode	13
U	8 1 - Main Menu	13
	8 2 - Frequency Menu	13
	8.3 - Marker Menu	
	8.4 - MK1 – MK2 – MK3 - MK4 Menu	
	8.5 - Measure Menu	
	8.6 - Measure 1 Menu	
	8.7 - Measure 2	
	8.8 - Scale Menu	
	8.8.1 Scale > Meas 2 Menu	
	8.9 - Source Menu	
	8.10 - Sweep Menu	
	8.11 - Preset Menu	
	8.12 - Utility Menu	
	8.13 - Calibration Menu	
	8.14 - Save Menu	
	8.15 - Setup Menu	
	8.16 - LAN Menu	
	8.17 - System Time Menu	
	8.18 - System Menu	
~	8.19 - Mode Menu.	
9.	- Performing basic measurements in Stand Alone mode	
	9.1 - Preset loading	
	9.2 - Changing the frequency range	
	9.5 - Calibration	
	9.3.1 Dilect Power Calibration	25
	9.3.2 Calibration Status	20 27
	9 4 - Marker's Positioning	2/ 28
	9.5 - Saving the measure	
	9.6 - Use with external detectors	
10	) - Installing PC software	
	10.2 - Minimum requirements of PC and OS	
	10.3 - Setting parameters for network connection	
	10.4 - No LAN, PC on DHCP mode, SNA connected to PC via cross cable	
	10.5 - No LAN, PC with static IP, SNA connected to PC via cross cable (default)	
	10.6 - Configuring with LAN	
	10.7 - Running SNA3500 software	



11 -	PC Software Mode	
11.1 -	MEAS 1 Menu	
11.2 -	ИЕАЅ 2 Menu	45
11.3 - 9	SCALE Menu	46
11.4 -	DISPLAY Menu	47
11.	4.1 PASS/FAIL Test	47
11.	4.1.1 Tests on the full extent	47
11.	4.1.2 Testing the marker	47
11.5 - I	REQ Menu	48
11.6 - 9	SWEEP Menu	49
11.7 -	X ATTENUATION Menu	50
11.8 -	POWER Menu	51
11.9 -	MARKERS Menu	52
11.10 -	CAL Menu	53
11.11 -	SAVE Menu	
11.12 -	PRESET Menu	55
11.13 -	SYSTEM Menu	56
11.13.1	F1: Color Setup menu	56
11.13.2	2 F2: Network Analyzer Mode	57
11.13.3	B F5: Fw Update (firmware update) Menu	57
11.13.4	F6: File Manager Menu	57
11.13.	5 F8: About	57
12 -	PC – Based measurements	58
12.1 -	.oading preset from database	58
12.2 - (	Changing the Frequency range	59
12.3 - (	Calibration	60
12.	3.1 Direct power measure calibration	60
12.	3.2 Reflected power measure calibration	61
12.	3.3 Calibration Status	62
12.4 -	Marker positioning	63
12.5 - 0	Generating a report	64
12.6 - 1	Jsing external detectors	65
13 -	Using PC Software to load data from SNA	
13.1 - (	Generating a report	
14 -	Examples of practical use	
 14 1 - I	Prenare a setup on PC and then unload it to $SN\Delta$	62
15 -	SNA firmware undate	<b>7</b> 2
10-	Sign in niware update	
TO -	Creaits	



#### 1 - Description Status led FRONT PANEL USB Port Touch screen display Selection knob ADJ / Ente (Stand by) • 1 543.625THz -64.208 **RF** Out ELAD SNA-3050 **RF IN** Max. 23 dBm 16 VDC AUX2 port LAN port REAR PANEL AUX1 port 1 & 2 port Ext. detector 0 $\wedge$ **ON/OFF** switch X (E R EXT DET. 1 & 2 USE 10 MHz DC in Ext. ref. input

The SNA-3050 network analyzer is an instrument that can measure the impedance matching and gain circuits to nominal impedance of 50 ohms.

The measure is obtained by generating an un-modulated sine wave of known amplitude and frequency and measuring the incoming signal with a detector broadband. This method has some limitations for the dynamics of the detector at low levels, but has the major advantage of being able to easily measure the conversion gain of circuits where the input frequency is different from the output (e.g. converters, frequency multipliers and dividers).

It has two N connectors for connecting the device to be measured:

• RF OUT port (internal generator output) to connect to the input of the object to be tested

• RF IN port (internal detector) to be connected to the output of the object to be tested The RF OUT port is connected to a bridge circuit for measuring impedance adaptation, including a second detector bandwidth.

It can be used in stand-alone or PC-controlled via LAN (PC mode, there are some additional processing functions, and measurement functions are identical in the two modes).



## 2 - SNA 3050 block diagram





## 3 - Contents

- 1 SNA-3050 Scalar Network Analyzer
- 1 300 mm. semi-rigid RF cable
- 1 Short Circuit (N connector)
  1 Certificate of calibration and conformity
- Nr. 1 accessories bag including: •

  - 1 AC power supplyA stylus for touch screens
  - A LAN cable (cross cable)
  - 1 CD software
- Options: •
  - D04 400 kHz 450 MHz -70 ÷ +10 dBm detector



## 4 - Technical specifications

Description	Value		
Measurements taken	Gain - Impedance matching		
Frequency range	0,4 – 2.500 MHz nominal		
	(0,1 – 2.600 MHz reduced performance)		
Signal level	From -26 dBm to +5dBm (1 dB step)		
Accuracy of the level generated	- 0,4 - 900 MHz: +/- 1 dB		
	- 900 - 2500 MHz: +/- 1,5 dB (CW mode)		
Resolution of the frequency	Less than 1 Hz (the measurement is performed on 801		
generated	equidistant points in low speed or 201 points in high speed)		
Accuracy of the frequency generated	+ / - 10 ppm (+ / - 0.001%) with temperature compensation		
Full scale of the measured signal	+3 To +33 dBm in 1 dBm steps		
	(greater than +23 dBm signals only with duty cycle less than		
	0,1)		
Measuring accuracy	+ / - 3 dB before calibration;		
	+ / - 1 dB after calibration for measurements on devices that		
	are not converting the frequency		
Dynamic range gain	- Frequencies from 0.4 to 100 MHz: -60 dB from full scale		
	- Frequencies from 100 MHz to 2500: from full scale to -50 dB		
Dynamic range of impedance	30 dB from 0,4 to 100 MHz;		
matching	25 dB from 100 to 450 MHz		
	20 dB from 450 to 2000 MHz		
	15 dB from 2000 to 2500 MHz		
External power supply	17 – 19 V DC 1 A		
Operating temperature	5 ÷ 35 °C		
Storage temperature	-10 ÷ 45 °C		



## 5 - Theoretical background

For people not familiar with usual conventions applicable to network analyzer measurements, we revise some definitions and theoretical concepts:

#### A. Definition of ratio expressed in dB

- a. Voltage ratio: V<sub>1</sub> / V<sub>2</sub> (dB) = 20 X log (V<sub>1</sub> / V<sub>2</sub>)
- **b.** Power ratio:  $P_1 / P_2$  (dB) = 10 X log ( $P_1 / P_2$ )

#### B. Definition of gain

**G**<sub>p</sub> = **P**<sub>out</sub> / **P**<sub>in</sub> (gain = output power / input power of the device under test)

#### C. Definition of insertion loss

 $G_p = P_{in} / P_{out}$  (insertion loss = input power / output power of the device under test)

#### D. Definition of voltage standing wave ratio (V.S.W.R.)

In the presence of an impedance mismatching, a bi-directional energy flux is present: from the generator to the load (feed circuit) and in the opposite direction from the load (circuit) back to the generator; in this situation, the relationship between voltage and current is not constant along the line connecting generator and load, but we can find points where voltage is high and current is low and vice versa; we define as voltage standing wave ratio (V.S.W.R.) the ratio between the maximum and the minimum voltage value present along the line; this ratio is  $\infty$  (infinite) for a load impedance equal to zero or infinite, and is 1 for a load impedance purely resistive and equal to both the internal generator impedance (also purely resistive) and the characteristic impedance of the transmission line connecting them (perfect impedance matching condition)

#### E. Definition of reflection loss

In the presence of a bi-directional energy flux above described, we define as reflection loss the ratio (normally expressed in dB) between the power coming back from the load to the generator (reverse) and the power going out from the generator toward the load (forward).

#### F. Definition of dBµV

Ratio in dB between the voltage to be expressed and the reference voltage of  $1\mu V$ 

#### G. Definition of dBm

Ratio in dB between the power to be expressed and the reference voltage of 1mW

The need of impedance matching can be summarized with the following reasons:

#### - Gain maximizing

It is possible to demonstrate mathematically that we obtain the maximum gain when the output impedance of the generator and the input impedance of the subsequent amplifier have the same real (resistive) part and opposite imaginary part (reactive); the same relation holds true also for the combination output of the amplifier and load.

#### - Reduction of alterations on gain versus frequency relationship



The correct frequency response of amplifiers and filters is strongly influenced from impedances seen by their input and output ports: impedances different from the desired ones can modify the tuning of these equipments.

#### - Distortion minimization

The amplifiers are capable to generate the maximum output power with the minimum distortion only if the load impedance is the exact value specified by the designer

#### - Minimization of self-oscillations risk

Not exact impedances can generate dangerous self – oscillations or high level of noise from amplifiers.

#### **5.1 - Conversion tables**

#### 5.1.1 Table reports of tension and power expressed in dB

Ratio of tension	Correspondin q value in dB			
S	9			
0,001	- 60			
0,01	- 40			
0,1	- 20			
0,2	- 13,98			
0,3	- 10,46			
0,5	- 6,02			
0,7	-3,1			
0,8	- 1,94			
0,9	- 0,92			
1	0			
1,1	0,83			
1,2	1,58			
2	6,02			
3	9,54			
4	12,04			
5	13,98			
6	15,56			
7	16,90			
8	18,06			
9	19,08			
10	20			
100	40			
1000	60			

Ratio of tension	Correspondin g value in dB	
S	9	
0,001	- 30	
0,01	- 20	
0,1	- 10	
0,2	- 6,99	
0,3	- 5,23	
0,5	- 3,01	
0,7	- 1,55	
0,8	- 0,97	
0,9	- 0,46	
1	0	
1,1	0,41	
1,2	0,79	
2	3,01	
3	4,77	
4	6,02	
5	6,99	
6	7,78	
7	8,45	
8	9,03	
9	9,54	
10	10	
100	20	
1000	30	



#### 5.1.2 Correlation table mV / dB microvolt / dBm

Voltage mV	Voltage dBµV	Power dBm on 50 ohm
0,001	0	- 106.99
0,001122	1	- 105.99
0,00126	2	- 104.98
0,00141	3	- 104.01
0,00158	4	- 103.02
0,00178	5	- 101.98
0,00199	6	- 101.01
0,00224	7	- 99.98
0,00251	8	- 99.00
0,00281	9	- 98.02
0,00316	10	- 97.01
0,00354	11	- 96.01
0,00398	12	- 94.99
0,00446	13	- 94.00
0,00501	14	- 92.99
0,00562	15	- 91.99
0,01	20	- 86.99
0,0178	25	- 81.98
0,0316	30	- 77.01
0,0562	35	- 72.01
0,1	40	- 66.99
0,178	45	- 61.98
0,316	50	- 57.00
0,562	55	- 51.99
1,0	60	- 46.99
1,78	65	- 41.98
3,16	70	- 37.00
5,62	75	- 31.99
10,0	80	- 26.99
17,78	85	- 21.99
31,62	90	- 16.99
56,23	95	- 11.99
100,0	100	- 6.99
177,8	105	- 1.99
316,2	110	+ 3.00
562,3	115	+ 8.01
1000,0	120	+ 13.01

#### 5.1.3 Relation table ROS / attenuation / resistance load

Resistance value (ohm)	R.O.S.	Attenuation of the reflection (dB)	Gain lost by reflection (dB)
0.660	75,9 : 1	0,229	12,89
7	7,14 : 1	2,45	3,801
25	1,99 : 1	9,551	0,510
33	1,5 : 1	13,97	0,177
50	1,0 : 1	∞ (infinita)	0 (zero)
67	1,34:1	16,75	0,089
100	1,99 : 1	9,551	0,510
400	8,00 : 1	2,180	4,037
670	13,38 : 1	1,299	5,872
6600	132,0 : 1	0,013	23,98



## 6 - Tips for the set up of a test bench

Even it is an instrument designed for a trouble-free operation; the sensitivity of the measures to be carried out makes it possible to cause significant measurement errors if you do not take necessary precautions:

A. RF IN port is a meter wide band: so any incoming signal is measured and could alter the result of the measurement. So take care to possible pairs of the circuit under test with mobile phones, cordless phones or other sources of noise, even at very low frequencies such as unshielded switching power supplies. Use high shielding connecting cables (avoid if possible connections between terminals shielded and eventually use appropriate filters between circuits and SNA).

B. Long cables with high losses significantly alter the measurement of reflection: any dB loss reduces of 2 dB the reflected power: always use low loss cables.

C. Nonlinear devices, followed by selective filters can generate significant harmonic components and simulate responses of the filters submultiples frequencies of those filters. Pay particular attention to frequency converters bipolar transistor.

D. If the circuit under test requires to operate an undistorted input level of less than 80 dB $\mu$ V, the measurement of reflection loss of accuracy: in this case it is better to make measurements of the gain at a low level and then perform the measurement of reflection generated by bringing the level to 80 dB $\mu$ V.

E. If the device under test is a passive filter with high losses, to take advantage of the full dynamic range of instrument, it is helpful to include a wide-band amplifier well suited in impedance between the output of the filter and the RF IN port.

Similar is the case of a filter with low loss in pass band and high band attenuation. In this case we perform two steps: in the normal way to measure the bandwidth attenuation and with the amplifier added to measure the attenuation outside the bandwidth.

# <u>Note:</u> as a precautionary measure use an amplifier with an output power that will not dBmage the instrument

F. If the device under test is an high power nonlinear circuit exceeding the power limit allowed to the RF IN port, the measurement must be performed by inserting an attenuator between the output of the circuit and the RF IN port. The attenuator must handle the power generated by the circuit and have an attenuation value greater than or equal to: (maximum voltage coming out of the circuit in  $dB\mu V$ ) - (full voltage scale of the instrument in microvolt)

(Note: valid for signals expressed in tensions. If the levels are in power you get the same result by entering values in dBm in place in dB $\mu$ V)



## 7 - Turning on and off the instrument

#### 7.1 - Turning on

- Toggle the switch on the rear panel to "ON".
- The instrument switches on standby. At this stage the LED will turn on
- Press the encoder knob. It starts the startup procedure during which the LED flashes quickly. ELAD logo appears on the display and after a few seconds the main menu screen. When the system is booted, the LED turns off.

#### 7.2 - Turning off

- Press the encoder knob for 3 seconds
- It starts the shutdown procedure and the display shows the message "System shutdown". During this stage the LED flashes quickly.
- Wait until the instrument goes into standby mode (LED lit or slow blinking).
- Toggle the switch on the rear panel to "OFF".

#### 7.3 - Detailed description of the LED functioning

- Fixed ON: instrument in stand-by mode and powered through the power supply
- Fast blinking (150 ms): during the switch on and off the LED flashes quickly.

#### 7.4 - Using the external power supply

• The instrument is equipped with a power supply with output at about 18 V. If you wish to use an external power source different from the one provided, please refer to the manufacturer for the selection of a suitable unit. The manufacturer is not responsible for dBmages due to incorrect power supply.



## 8 - Stand Alone mode

In this chapter we will describe in detail the various menus of the graphical interface of the instrument.

#### 8.1 - Main Menu

The splash screen that appears at power on:



- "FREQ": Enter the menu to set up the frequency range
- "MARKERS": Enter the menu to set up the markers
- "MEAS": Enter the setup menu of measuring and displaying on the screen
- "SOURCE": Enter the setup menu setting parameters of output power and input attenuation
- "PRESET": Enter the list of presets saved in the device or USB memory connected
- "UTILITY": Enter the calibration menu, the instrument configuration and data storage

#### 8.2 - Frequency Menu



- "START": Set the start frequency of the measuring range
- "STOP": Set the stop frequency of the measuring range
- "CENTER": Set the center frequency of the measuring range
- "SPAN": Set the width of the measuring range
- "PREV": Returns to Main Menu



#### 8.3 - Marker Menu



- "MK1", "MK2", "MK3", "MK4": Access the menu to set the frequency of the markers
- "PREV": Returns to Main Menu



#### 8.4 - MK1 – MK2 – MK3 - MK4 Menu

- "+", "-":Increase, decrease the frequency of the marker of a measuring point on the graph (1 / 200 or 1 / 800 of the frequency depending on the sweep)
- "OFF": Turn off the selected marker; to turn it on again just re-select it
- "<u>Mk</u> -> CENTER": Modify the center frequency to the position of the selected marker
- "IIII]": Set the marker frequency using the numeric keypad
- "PREV": Returns to Main Menu



#### 8.5 - Measure Menu



- "MEAS 1":Enter the Measure 1 setup menu
- "MEAS 2": Enter the Measure 2 setup menu
- "SCALE": Enter the graph scale setup menu (for both measures)
- "PREV": Returns to Main Menu

#### 8.6 - Measure 1 Menu



- "FWD": Assign to measure 1 the reading of direct power detector
- "EXD1": If an external detector EXD1 is connected to the back port, it assign to measure 1 the reading of EXD1 (when it detects the external detector the display shows EXD1below the chart)
- "OFF": Turn off measure1
- "PREV": Returns to Measure Menu



#### 8.7 - Measure 2



- "RFL": Assign to measure 2 the reading of the reflected power
- "EXD2": If EXD2 is connected, it assign to measure 2 the EXD2 reading (as port EXD1)
- "OFF": Turn off measure 2
- "PREV": Returns to Measure Menu



#### 8.8 - Scale Menu

- "dB/div Meas 1": Enter the menu to change the scale of measure 1
- "REF LEV Meas 1": Enter the menu to change the reference level of measure 1
- "REF POS Meas 1": Enter the menu to change the position of the reference level of measure 1
- "-> Meas 2": Enter the menu to change the scale of measure 2



#### 8.8.1 Scale > Meas 2 Menu



- "dB/div Meas 2": Enter the menu to change the scale of measure 2
- "REF LEV Meas 2": Enter the menu to change the reference level of measure 2
- "REF POS Meas 2": Enter the menu to change the position of the reference level of measure 2
- "SWR": Set the unit of measurement of the reflected as SWR. If measure is already set as SWR, the text becomes "dB "; pressing the key it switches back the measure as dB (only available for measure 2).
- "-> Meas 1": Back to the edit menu of the scale of measure 1



#### 8.9 - Source Menu

- "POWER": Enter the setup menu of the output power (after entering, the button "III"" allow to set the output level in dBm from -26 dBm to +5 dBm. The output level can be read only at this stage of setting)
- "RX ATT.": Enter the setup menu of the input attenuation (after entering, the button "Image: "allow to set the output level in dBm from 0 dBm to +31 dBm. The output level can be read only at this stage of setting)
- "SWEEP": Enter "SWEEP" Menu
- "PREV": Returns to Main Menu



#### 8.10 - Sweep Menu



- "HIGH SWEEP" ("LOW SPEED"): Switches between the high-speed mode / low frequency resolution (201 points) and low speed / high frequency resolution (801 points)
- "CW Mode": Enables / disables the CW mode (single frequency). Output generates an unmodulated carrier with fixed frequency.
- "PREV": Back to "SOURCE" Menu

#### 8.11 - Preset Menu



- "UP": Change the selected preset of one step up
- "DW": Change the selected preset of one step down
- "LOAD": Apply the setting of the selected preset
- "DELETE": remove the selected preset
- "FACTORY PRESET": Apply the default settings



#### 8.12 - Utility Menu



- "CAL": Enter the calibration menu
- "SAVE": Enter the Save data menu
- "SETUP": Enter the General setting Menu
- "SYSTEM": Enter the System setting Menu
- "PREV": Back to Main Menu

#### 8.13 - Calibration Menu



- "CAL FWD": Start the Forward power measure calibration
- "CAL RFL": Start the Reflected power measure calibration
- "CAL RESET": Discard the performed calibrations
- "PREV": Back to Utility Menu



#### 8.14 - Save Menu



- "GRAPH.": Save an image of the chart by changing size and color to optimize viewing and printing
- "REPORT": save a text file containing the positions and the readings of the active marker
- "GR+REP": Save an image of chart and report with positions and readings of the marker
- "PREV": Back to Utility Menu



#### 8.15 - Setup Menu

- "LAN": Enter menu to set the parameters of the network connection (LAN)
- "SYSTEM TIME": Enter menu to set system date and time
- "PREV": Back to Utility Menu



#### 8.16 - LAN Menu



- "IP": Enter menu to set the IP address
- "MASK": Enter menu to set the Subnet mask
- "GATEWAY": Enter menu to set the Gateway
- "DNS": Enter menu to set the DNS
- "PREV": Back to Setup Menu

#### 8.17 - System Time Menu



- "Date": Enter menu to set the System Date
- "Time": Enter menu to set the System Time
- "PREV": Back to Setup Menu



#### 8.18 - System Menu



- "SYSTEM INFO": View serial number and firmware versions of the various installed components on SNA
- "POWER SUPPLY": Enter the menu to set the Auto-Off timeout
- "SYSTEM UPDATE": Performs a firmware update from remote. SNA try to connect to the server to check for updates. To make it possible the instrument must have access to an Internet connection.



#### 8.19 - Mode Menu

• "NETWORK ANALYZER": Set the function mode as Scalar Network Analyzer



## 9 - Performing basic measurements in Stand Alone mode

In this chapter you will learn how to make simple measures with the SNA-3050 in standalone mode.

#### 9.1 - Preset loading

One of the most useful functions for installers and maintenance personnel is the ability to load one of the presets stored in the device. SNA comes with some factory presets stored in memory. From the initial screen, press "PRESET" to access to list of saved presets:



Select the desired setup using "UP", "DW" and click on "LOAD" to apply the setup.

#### 9.2 - Changing the frequency range

If the frequency range of the preset is not what you like, you can change it. From initial screen press "FREQ."







Press "START" to modify the start frequency

Adjust the value using the "+" and "-" to increase / decrease the frequency of the step displayed in the third button, or use the scroll wheel. To change the step click on "STEP"(there are 6 possible step values, selected in sequence by pressing the button "STEP ": 100Hz, 1kHz, 10kHz, 10kHz, 10kHz, 10 MHz). Alternatively, press "I and insert the desired value using the numeric keypad



Screen shot with numeric keypad displayed



#### 9.3 - Calibration

For maximum measurement accuracy, you should calibrate the instrument (using the supplied cables or even better the ones that will be used in the measurement). To calibrate the instrument proceed as follows by accessing the Calibration menu.



• From the main menu press on "UTILITY"-> "CAL".

#### 9.3.1 Direct Power Calibration

Press "CAL FWD"



• Connect the calibration cable provided, or with the cable (s) to be used for following measures, the output and input RF IN and RF OUT and click "OK" when ready. The direct measurement curve (yellow) moves to the line at 0 dB and the CAL text on a green background appears in the lower left corner of the chart.





#### 9.3.2 Reflected Power Calibration



• Press "CAL RFL"

Note: The OPEN status refers to a not connected RF OUT connector. It must be done without connecting cables or adapters even if left open on one side. These sections of transmission line introduce parasitic capacitance and may also act as a small antenna capable of detect the reflected power.

	10:5	59										
+40.0	Mk1	474	.75	OMH:	z - 5	9.8	dB				· 50.0	OK
	Mk2	467	.75	OMH:	2 - 5	9.9	dB					OIL
+30.0	Mk 3	480	.18	SMH:	z -6	0.0	dB		$\vdash$		+40.0	
	Mk1	474	.75	OMH:	z 0.	0 dB						
+20.0	Mk2	467	.75	OMH:	z 0.	0dB			$\vdash$		+30.0	0011051
	Mk 3	480	.18	SMH:	z 0.	0 dB						CHNCEL
+10.0	$\vdash$								$\vdash$	—	+20.0	
+0.0											+10.0	1000000000
			_ OF	PEN	CAL	IBR	ATI(	DN 👘				1000
-10.0		OPP	N P	E O	ΠТ						•0.0	1000
		011			· ·							
-20.0											-10.0	
2010											1010	10000
. 20 0											- 20 0	1000
-30.0											-20.0	
40.0											00.0	
-40.0											-30.0	
-50.0				<u>.</u>							-40.0	
				-		1	<u> </u>					
-60.0	STRE	शा क	50.	min	1Hz	<b>S</b> I	<b>DP</b>	500.	. 000r	1Hz '	-50.0	100000000
FWD	CAL								UNC	CAL	RFL	111111
dB											dB	

• Press "OPEN"

- Leave open (not connected)the RF OUT port and press "OK" when ready.
- Press "SHORT"



	16:(	)4							-Œ-		
+20.0	Mk1	542	.87	5MH:	z -6	4.5	dB			+25.0	OK
+10.0	nk2	550	.37	5MH:	z -6	5.0	dB			+20.0	
1010	TIK1 MV2	242	.87	믦비	ξ	UdB					
+0.0	in a	000		51111	- 0.	000				+15.0	
											CANCEL
-10.0	$\vdash$									+10.0	
-20.0		_	SH	ORT	CAL	IBR	ATI	ON		+5.0	1000
- 30 0		CON	INEC	тс	UND'	T TC	DE	011	_	+0.0	11.11.11.11
		00	11160		HOK			001			
-40.0				_				_		-5.0	
											11111
-50.0	$\vdash$									-10.0	
					.	2				45.0	
-60.0					<b>.</b>	- Z.,			-	-15.0	1000
- 20 0			خففنا				<u>نام ا</u>		ن ننگز	- 20 0	11.00
10.0										20.0	
-80.0					MI 1					-25.0	1000
FWD	COL	CL 3	92.	1251	IHZ	- 51	UP	092.	1250	RFL	111111
dB	OHL								one	dB	Contraction of the

- Connect the short connector provided to the RF OUT port and press "OK" when ready.
- Press "DONE" to save the calibration

The curve of the reflected measure (blue) moves to the line at 0 dB and a green the CAL text on a green background appears in the lower right corner of the chart.



#### 9.3.3 Calibration Status

The written to the lower left and lower right corners of the graph, describe the status of calibration, respectively of Measure 1 and Measure 2.

- CAL: The measure is calibrated
- **UNCAL**: The measure is not calibrated, a calibration was not performed or the setup of the instrument was changed after calibration.
- CAL?: The measure is calibrated and the instrument setup has not changed. However, the SNA has been turned off and on again so it is recommended to repeat the calibration.

#### Note:

If the measure is performed using cables with a significant length respect to the wave length, it is recommended to connect directly (or in the shortest way using max. one adapter) the input of the device under test (DUT) to the RF OUT port and to connect the longest connection between the output of the DUT and the RF IN port of SNA.



#### 9.4 - Marker's Positioning



From main menu press "MARKERS"

• Press on "MK1" or "MK2" or "MK3" or "MK4" to select the desired marker



Once selected you can change the marker position by pressing the "+" and "-," using the knob or by pressing the button "<sup>[]]</sup>" and entering the value using the numeric keypad. Press "OFF" to deactivate the marker.



#### 9.5 - Saving the measure

Access Save data menu:

• From Main menu press "UTILITY" and then on "SAVE"



- "GRAPH.": Save a screen shot file of the measure
- "REPORT": Save a text file containing marker's measures
- "GR+REP": Save a screen shot file of the measure and a text file containing marker's measures

Select the desired option. Now you are then asked where you want to save data:



- "FTP": Save the data in a folder that can be accessed through FTP (File Transfer Protocol). Use this option if you intend to use the PC software to upload data from SNA (Concerning this please see the chapter <u>PC Software Mode</u> to load data from SNA).
- If on the USB port it has been connected a USB memory, a "USB" button will be displayed. Press this to save data in.
- After completing the saving, the button "OK" will be displayed. Push the button to complete the operation. Please note that the file of the chart is in bitmap format, and the report file is in text format (notepad).



#### 9.6 - Use with external detectors

Using the external detector EXD1 and EXD2 you can extend the capabilities of the instrument.

- Connect an external detector to the "EXD1"("EXD2") port on the rear panel
- Wait loading data setup and calibration of the detector (about 20 seconds)
- When the upload is finished the writing EXD1(EXD2) appears in the lower part of the chart



• If SNA is turned on with an external detector connected, and the setup provides for their use, the external detector is automatically selected. Otherwise if you like to use the EXD1 (EXD2) from the home screen, press "MEAS" and then "MEAS1 "(" MEAS2")



- Press "EXD1" ("EXD2") to allow to measure 1 (measure 2) to read data through the external detector.
- Then proceed with calibration: enter the CAL menu (see <u>Calibration</u>) and then press "CAL EXD1" ("CAL EXD2")





• Connect with the same cable used for the measures the "EXD1"(" EXD2") to RF OUT port and press "OK" when ready

#### Note:

The external detector may have to use a frequency band lower than the one of the instrument; in such case you should limit the measure and therefore the calibration frequency range to a compatible range with the detector used.



## 10 - Installing PC software

#### ! Compatibility Notes: Windows XP / Windows Vista / Windows 7/ 32 & 64 bits.

Open the folder containing the installation package and then double-click the file setup.exe. The installer will proceed by installing the main application and the required components (. NET Framework 4.0, Microsoft SQL Server Express 2008, Microsoft Report Viewer)

**!** Note: If you already have a version of SNA3500 you'll need to remove from menu Control Panel -> Add / Remove Programs (Windows XP) / Programs and Features (Windows Vista and Win7)

#### 10.1 - SQL Server Express 2008 manual installation

The simultaneous use of SQL Server Express 2008 with earlier versions may cause malfunctions and data loss. Anyway, if you do not want to uninstall an already installed version of SQL Server (e.g. SQL Server 2005) to avoid problems with other software that use it, you need to manually install SQL Server 2008 and all the prerequisites:

- **Windows Installer 4.5.** Open the folder "WindowsInstaller4\_5" and double click on file: "WindowsXP-KB942288-v3-x86.exe" (not necessary on Windows 7)
- **.NET Framework 4.0**. Open the folder "DotNetFX40" and double click on file: "dotNetFx40\_Full\_x86\_x64.exe"
- **SQL Server Express 2008.** Open the folder "SqlExpress2008" and double click on file: "SQLEXPR32\_x86\_ENU.E.exe" (in case of 32 bit OS) or "SQLEXPR\_x64\_ENU.exe" (in case of 64 bit OS).

Follow the instructions below to install SQL Server 2008 Express:





On the left side of the screen to click on Installation and then click the first option "New SQL stand-alone installation or add features to an existing installation":



## Proceed by clicking OK:

🚼 SQL Server 2008 Setup										
Setup Support Rules										
Setup Support Rules identify problems that might occur when you install SQL Server Setup support files. Failures must be corrected before Setup can continue.										
Setup Support Rules	Operation completed. Passed: 6. Failed 0. Warning 0. Skipped 0.									
	Hide details <<	Re-run								
	<u>View detailed report</u>									
	Rule	Status								
	Minimum operating system version	Passed								
	Setup administrator	Passed								
	Restart computer	Passed								
	Windows Management Instrumentation (WMI) service	Passed								
	Consistency validation for SQL Server registry keys	Passed								
	long path names to files on SQL Server installation media	Passed								
	<u> </u>									



## Proceed by clicking Next:

💱 SQL Server 2008 Setup	LOX
Product Key	
Specify the edition of SQL S	ierver 2008 to install.
Product Key License Terms Setup Support Files	Specify a free edition of SQL Server or provide a SQL Server product key to validate this instance of SQL Server 2008. Enter the 25-character key from the Microsoft certificate of authenticity or product packaging. If you specify Enterprise Valuation, the instance will be activated with a 180-day expiration. To upgrade from one edition to another edition; Specify a free edition: Specify a fr
	< Back Net Cancel

## Proceed by clicking Next:

🚼 SQL Server 2008 Setup			×						
Setup Support Files									
Click Install to install Setup Suppor	t files. To install or update SQL Serve	r 2008, these files are required.							
			0665559						
Product Key	The following components are required for SQL Server Setup:								
License Terms	Feature Name	Status							
Setup Support Files	Setup Support Files								
			< Back InstNI Capcel						



## Proceed by clicking Next:

Setup Support Rules identify proble before Setup can continue.	ms that might occur when you install SQL Server Setup support files. Failures	must be corrected		
Setup Support Rules Feature Selection Disk Space Requirements Error and Usage Reporting Installation Rules Ready to Install Installation Progress Complete	Operation completed. Passed: 9. Failed 0. Warning 1. Skipped 1.  Hide details << <u>Yiew detailed report</u>			
	Rule         Puision Active Template Library (ATL)         Unsupported SQL Server products         Performance counter registry hive consistency         Previous releases of SQL Server 2008 Business Intelligence Develop         Previous CTP Installation         Consistency validation for SQL Server registry keys         Computer domain controller         Microsoft .NET Application Security         Edition WOW64 platform         Windows PowerShell         Microsoft Firewall	Status       Passed       Passed		

Select features to install (the minimum is Database Engine Services). Proceed by clicking Next:

🍀 SQL Server 2008 Setup		
Feature Selection Select the Express features to insta clustered.	II. For clustered installations, only Database Engine Services and Analysis :	Services can be
Setup Support Rules Feature Selection Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error and Usage Reporting Installation Rules Ready to Install Installation Progress Complete	Features:         Instance Features         SQL Server Replication         Shared Features         SQL Client Connectivity SDK         Redistributable Features         Select All         Unselect All         Shared feature directory:	Description: Include the Database Engine, the core service for storing, processing and securing data. The Database Engine provides controlled access and rapid transaction processing and also provides rich support for sustaining high availability. 
	< Back	Next > Cancel Help



## **Important!** In the next screen, select **Default Instance.** Proceed by clicking Next:

🍀 SQL Server 2008 Setup					
Instance Configuration					
Specify the name and instance ID fo	r the SQL Server Instance.				
Setup Support Rules	<ul> <li>Default instance</li> </ul>	>			
Feature Selection Instance Configuration	C Named instance:				
Disk Space Requirements					
Server Configuration Database Engine Configuration	Instance ID:	MSSQLSERVER			
Error and Usage Reporting	Instance root directory	/: C:\Program Files\Mic	rosoft SQL Server\		
Installation Rules Ready to Install	SOL Server directory:	C:\Program Files\Mic	rosoft SOL Server'iM'	550I 10.MSSOI SERVEI	R
Installation Progress	Installed instances:				
Complete	Instance	Features	Edition	Version	Instance ID
	SQLEXPRESS	SQLEngine,SQLEng	Express	9.00.1399.06	MSSQL.1
				1	
			< Back	Next X	Cancel Help

## Proceed by clicking Next:

🎀 SQL Server 2008 Setup		<u> </u>
Disk Space Requiremen	ts	
Review the disk space summary for t	he SQL Server features you selected.	
Setup Support Rules Feature Selection Instance Configuration <b>Disk Space Requirements</b> Server Configuration Database Engine Configuration Error and Usage Reporting Installation Rules Ready to Install Installation Progress Complete	Disk Usage Summary:           Drive C: 295 MB required, 16109 MB available         System Drive (c:): 118 MB required           Shared Install Directory (c:\Program Files\Microsoft SQL Server\): 0 MB required           Instance Directory (C:\Program Files\Microsoft SQL Server\): 177 MB required	
	< Back Next Cancel	Help


In the next screen, select the option on the account name as shown on figure. Proceed by clicking Next:

SQL Server 2008 Setup Server Configuration Specify the configuration.				
Setup Support Rules Feature Selection Instance Configuration Disk Space Requirements <b>Server Configuration</b> Database Engine Configuration Error and Usage Reporting Installation Rules Ready to Install Installation Progress Complete	Service Accounts Collation Microsoft recommends that you us Service SQL Server Database Engine These services will be configured older Windows versions the user of	e a separate account for each SQL Account Name NT AUTHORITY/NETWORK S NT AUTHORITY/SYSTEM <browse>&gt; Use the s use the s automatically where possible to us will need to specify a low privilege</browse>	Password Password ame account for a low privilege account. For mo	Startup Type Automatic 💽 all SQL Server services account. On some ore information, click
	Service	Account Name	Password	Startup Type
	SOL Server Browser	NT ALITHORITY'Network		Disabled V
		< Back	Next >	Cancel Help

Leave selected the default option "Windows authentication mode", then click Add Current User. Proceed by clicking Next:

Specify Database Engine authentication security mode, administrators and data directories.         Setup Support Rules         Feature Selection         Instance Configuration         Disk Space Requirements         Server Configuration         Database Engine Configuration         Database Engine Configuration         Error and Usage Reporting         Installation Rules         Ready to Install         Installation Progress         Complete         Specify SQL Server administrators         Specify SQL Server administrators         Specify SQL Server administrators	SQL Server 2008 Setup Database Engine Config	Juration
Setup Support Rules       Account Provisioning       Data Directories       User Instances       FILESTREAM         Feature Selection       Instances       FILESTREAM       Specify the authentication mode and administrators for the Database Engine.         Disk Space Requirements       Authentication mode       Authentication mode         Database Engine Configuration       Authentication mode       Configuration         Database Engine Configuration       Mixed Mode (SQL Server administrator account       Enter Password:         Installation Rules       Ready to Install       Enter password:       Confirm password:         Complete       Specify SQL Server administrators       SQL Server administrators	Specify Database Engine authentica	tion security mode, administrators and data directories.
	Setup Support Rules Feature Selection Instance Configuration Dick Space Requirements Server Configuration <b>Database Engine Configuration</b> Error and Usage Reporting Installation Rules Ready to Install Installation Progress Complete	Account Provisioning Data Directories User Instances FILESTREAM Specify the authentication mode and administrators for the Database Engine. Authentication Mode    Windows authentication mode  Mitted Media (SQL Server authentication and Windows authentication) Built-in SQL Server authentication and Windows authentication) Built-in SQL Server authentistrator account Enter password: Specify SQL Server administrators  SQL Server administrators  SQL Server administrators  SQL Server administrators  L



# Select the desired options, then proceed by clicking Next:

🊼 SQL Server 2008 Setup	
Error and Usage Repo	rting
Help Microsoft improve SQL Serve	er features and services.
Setup Support Rules Feature Selection Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration	Specify the information that you would like to automatically send to Microsoft to improve future releases of SQL Server. These settings are optional. Microsoft treats this information as confidential. Microsoft may provide updates though Microsoft Update to modify feature usage data. These updates might be downloaded and installed on your machine automatically, depending on your Automatic Update settings. <u>View the Microsoft policy for SQL Server privacy and data collection</u> .
Error and Usage Reporting Installation Rules Ready to Install Installation Progress Complete	Ead more about microsoft update and Automatic update.
	Send feature usage data to Microsoft. Feature usage data includes information about your hardware configuration and how you use Microsoft software and services.
	< Back Nex

# Proceed by clicking Next:

🚼 SQL Server 2008 Setup		<u>_   ×</u>
Installation Rules		
Setup is running rules to determine	if the Installation process will be blocked. For more information, click Help.	
Setup Support Rules	Operation completed. Passed: 8. Failed 0. Warning 0. Skipped 4.	
Feature Selection		
Instance Configuration		
Disk Space Requirements	Hide details <<	Re-run
Server Configuration	View detailed report	
Database Engine Configuration	Dula Status	
Error and Usage Reporting	Kule     Same architecture installation     Desced	
Installation Rules		
Ready to Install	Cross language installation Passed	
Installation Progress	Existing clustered or cluster-prepared instance Passed	
Complete	Reporting Services Catalog Database File Existence <u>Not applicable</u>	
	Reporting Services Catalog Temporary Database File Existence <u>Not applicable</u>	
	SQL Server 2005 Express tools Not applicable	
	Operating system supported for edition Passed	
	FAT32 File System Passed	
	SQL Server 2000 Analysis Services (64-bit) install action Passed	
	Instance name Passed	
	Previous releases of Microsoft Visual Studio 2008 Not applicable	
	Update Setup Media Language Compatibility Passed	
	< Back Next> Cancel	Help



The installation summary will be displayed. Proceed by clicking Install:

Deadu to Install	
Ready to Instan	
Verify the SQL Server 2008 features to	o be installed.
Setup Support Rules Feature Selection Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error and Usage Reporting Installation Rules <b>Ready to Install</b> Installation Progress Complete	Ready to install SQL Server 2008:         Summary         Edition: Express         Action: Install (Slipstream)         General Configuration         F-Beatures         Database Engine Services         Instance Name: MSSQLSERVER         Instance ID:         SQL Database Engine: MSSQLSERVER         Instance ID:         Shared component root directory         Shared feature directory: c:\Program Files\Microsoft SQL Server\         Shared feature directory: c:\Program Files\Microsoft SQL Server\         Error and Usage Reporting         Usage Reporting: False         Error Reporting: False         Error Reporting: False         Error Reporting: False         Slipstream         PCU source directory: c:\2d211d8345328cec25a3468ce25a\PCUSOURCE         CU source directory: undefined         Instance configuration         Database Engine

Wait until the end of installation. At the end the following screen appears:





Now you can install the SNA software by double clicking **SNA3500Setup.msi**.

## 10.2 - Minimum requirements of PC and OS

- Windows XP/Vista/Win7 32/64 bit
- Personal Computer AT-compatibile
- Intel Pentium 4 1.8 GHz or equivalent
- 128 MB RAM
- 100 MB Hard Disk free space
- LAN port
- Graphic video board 1024 X 768 pixel, 65.536 (16/32 bit) colors



## 10.3 - Setting parameters for network connection

In order to control the SNA3500 with PC software, you must properly configure the parameters of the network connection of the instrument.

Using the touch screen you can set the parameters of the SNA network connection. From initial screen to access to the menu by pressing in sequence on LAN UTILITY-> Setup-> LAN.



Press the button that corresponding to the parameter you want to change, then change the value of the cursor with the keys '+' and '-'or using the scroll wheel. Press'-->' to change the parameter field to be edited



<mark>192</mark>.168.2.219 '->' 192.<mark>168</mark>.2.219.

Press "SAVE" to save the configuration

**!** Note: The changes will take effect only after restarting the SNA.

In the case to changing the DNS and Gateway parameters, by pressing 'NONE' it is set a null value. The configuration without the DNS and Gateway is the default one and is recommended to use the SNA connected to a PC via a cross cable.



## 10.4 - No LAN, PC on DHCP mode, SNA connected to PC via cross cable

If your PC is set to DHCP and does not detect a DHCP server able to assign an IP address, for example if it is connected via a cross cable to SNA, Windows acts giving the PC an IP address with the type 169.254.xy, with Net Mask 255.255.0.0.

Additional documentation could be found searching for "APIPA (Automatic Private IP Addressing) on the Web.



### 10.5 - No LAN, PC with static IP, SNA connected to PC via cross cable (default)

In this case you must set on SNA an IP address that is in the same subnet than the PC



#### 10.6 - Configuring with LAN

In this case it must be set on SNA the IP address, NetMask, Gateway and DNS provided by your network administrator.



### 10.7 - Running SNA3500 software

- Run the SNA3500 software from the list of programs, if present, or from the desktop shortcut (if necessary verify correspondence between the PC and SNA IP addresses)
- You'll see a startup screen to select the normal operating mode or demo: click the LAN mode and press START





• You will see the initial screen of the program (the buttons and arrows on the screen can be selected only with the mouse)



 SNA3500 will display "REMOTE CONTROL"; until the software is open, you cannot bring back the SNA3550 in stand-alone mode by pressing the "LOCAL"



• Once you close the program, to return to stand-alone mode, press "LOCAL" on SNA3500 (the text "REMOTE CONTROL" will disappear).



## 11 - PC Software Mode

In this chapter we will describe in detail the various menus of the GUI software.

#### 11.1 - MEAS 1 Menu

### Allocation of measure 1:

D SNA3050 Scalar Netwo	rk Analyzer	MENU << M	IEASUREMENT	SOURCE	MARKERS
MEAS 11         FORWARD 10dB/div           MEAS 2:         REFLECTED 10dB/div           MKI Méas 1:         475.250MHz -1.27dB           MKZ Méas 1:         477.750MHz -4.32dB           MKS Méas 1:         480.1875MHz -4.32dB           MK4 Méas 1:         476.20MHz -1.760BHz	MK1 Męas 2: 475.250MHz -22.§1dB MK2 Męas 2: 467.750MHz -8.56dB MK3 Męas 2: 460.1975MHz - 8.48dB MK4 Męas 2: 459.000MHz -24.§1dB	+50 MEA	IS 1 SCALE	FREQ. RX ATT SWEEP POWER	MK1         475.250MHz 475.250MHz 475.250MHz           MK2         467.750MHz 467.750MHz 467.750MHz 480.1875MHz 480.1875MHz
MK5 Meas 1: 476.500MHz -1.35dB	MK5 Meas 2: 476.500MHz -25.08dB	+30	MEASURE 1		469.000MHz 469.000MHz -
+024	153	+20 F1	Forward	F5 Offset dB: 0.0	476.500MHz 476.500MHz -
10		+10	External Det. 1	F6 Offset dB: 0.0	МКб
20		+0	off	F7	MK7
30		-10		F8	МКВ
40		-20 Dat	ta 👘		UTILITY
50		-30		7 8 9 F9	Factory Preset
60		-40			SAVE
DMk(1,2): 7.500MHz Meas1: 3.1dB M DMk(1,3): -4.938MHz Meas1: 3.1dB M	eas2:-14.3dB leas2:-14.3dB	50			
70 [DMk(1,B): -4.938MHz Meas1: 3.1dB N Start: 450.000 MHz Power: 0.dBm	1ets2: -14,3dB Stop: 500.000 MH BX Attenuation: 0.d	-50		CANC ENTER	CAL

- F1: Set to Measure 1 the reading of the direct power
- F2: Set to Measure 1 the reading of EXD1 (if connected)
- F3: Disable measure 1
- F5:. Set an offset to the measure of direct power. Enter the value using the keypad on the software or the numeric keypad of the PC.
- F6: Set an offset to the measure of EXD1. Enter the value using the keypad on the software or the numeric keypad of the PC.



#### 11.2 - MEAS 2 Menu

Allocation of measure 2:



- F1: Set to Measure 2 the reading of the reflected power
- F2: Set to Measure 2 the reading of EXD2 (if connected)
- F3: Disable measure 2
- F5: Set an offset to the measure of the reflected power. Enter the value using the keypad on the software or the numeric keypad of the PC.
- F6: Set an offset to the measure of EXD2. Enter the value using the keypad on the software or the numeric keypad of the PC.



#### 11.3 - SCALE Menu

#### Setting parameters of the chart.

The function keys pane shows the selected measure. To select an alternative measure click on "F7".



- F1: Set 10dB/division to the selected measure
- F2: Set 5dB/division to the selected measure
- If you want to set a different value of dB / div click F3 and enter the value using the keypad of the software or the keypad. The value entered is saved and is recallable by clicking the "F3"
- F4: Automatically changes the vertical scale factor in order to have maximum and minimum value measured respectively the top and bottom of the graph
- F5: Assign the level associated with the reference position. Enter the value using the keypad of the software or the keypad of the PC
- F6: Assign the reference position. Enter the value (0 to 10) using the keypad of the software or the keypad of the PC
- F7: Toggles the selected Measure 1 -> Measure 2 and vice versa.
- F8: Switches the SWR in dB scale and vice versa only if Measure 2 is selected and only measures the reflected power.



### 11.4 - DISPLAY Menu

Controls the display of the curves of the chart and sets the parameters for the "PASS / FAIL Test".

You can choose whether to store data and run tests to measure or both.



- F1: Set it to display only the current reading of the measure
- F2: Set it to display only the stored measurement
- F3: Sets the simultaneous display of the current measure and the stored measure
- F4: Save the current measure.
- F5: View a trace obtained as a difference (in dB) between the current and the stored measure.
- F6: Enable / disable the PASS / FAIL test on the whole extent or only on the active marker (in sequence "Test on Mem / Test on Mk / Test Disabled")
- F7: Set the threshold for the feature PASS / FAIL Test
- F8: Toggles the selection of the measure, Meas1 -> Meas2 and vice versa.

### 11.4.1 PASS/FAIL Test

#### **11.4.1.1 Tests on the full extent**

The test will return PASS result if the current reading for each frequency is in the range (measure stored) + / - (threshold of tolerance). Otherwise the results will be FAIL

### 11.4.1.2 Testing the marker

The test results will return PASS if the frequencies in which markers are positioned the current reading is in the range (measure stored) + / - (threshold of tolerance). Otherwise the results will be FAIL



### 11.5 - FREQ Menu

Setting the frequency range of the measure.

To set a parameter, click the corresponding button and enter the value using the keypad on the software or the keypad of the PC.



- F1: Sets the initial frequency of the measure
- F2: Sets the final frequency of the measure
- F3: Set the amplitude of the frequency range
- F4: Sets the center frequency of the measure



### 11.6 - SWEEP Menu

#### Scan parameters.



- F1: Select the linear scale for the frequency axis
- F2: Select the logarithmic scale for the frequency axis
- F3: Switches the mode of high-speed scanning / low frequency resolution (201 points) or low speed / high frequency resolution (801 points)
- F4: Enable / Disable mode CW (Continuous Wave) @ single frequency. In CW mode the instrument generates an unmodulated carrier with fixed frequency.



## 11.7 - RX ATTENUATION Menu

Allows you to select the input attenuation of the RF IN port. It would be possible to insert attenuation from 0 to 31 dB in 1 dB steps.



- F1: Sets 0 dB attenuation
- F2: Sets 10 dB attenuation
- F3: Sets 20 dB attenuation
- If you wish to have a different attenuation value, click F4 and enter the desired value using the keypad on the software or the keypad of the PC. The value entered is saved and will be opened by clicking on F4
- F5: Enable the compensation of the attenuation in the reading of the measure. Measure displayed = measure read + inserted attenuation
- F6: Disable the compensation of the attenuation in the reading of the measure. Measure displayed = measure read
- F7: Use this setting if there are no conversions in frequency (frequency generated equal to the frequency applied to RF IN)
- F8: Use this setting to measure the loss / gain of converting a circuit with frequency conversion (e.g. mixer)



### 11.8 - POWER Menu

Set the output level on RF OUT. The minimum output level is -26 dBm, the maximum level is 5 dBm (only when the ext. detector D04 is connected).



- F1: Set an output level of 0 dBm (107 dBµV)
- F2: Set an output level of 10 dBm (97 dB $\mu$ V)
- F3: Set an output level of 20 dBm (87 dBµV)
- If you wish to have a different output level click F4 and enter the desired value using the keypad on the software or the keypad of the PC.
- F5: Toggles dBm to dBµV and vice versa



### 11.9 - MARKERS Menu

LAD SNA3050 - Ver. 1.05	
ELAD SNA3050 Scalar Network Analyzer	MENU << MEASUREMENT SOURCE MARKERS
dB         MEAS 1: FORWARD 10dB/div MEAS 22 REFLECTED 10dB/div MK1 Meas 1: 475.250MHz -1.27dB MK2 Meas 2: 475.250MHz -2.2.78dB MK2 Meas 2: 475.250MHz -2.8.58dB MK3 Meas 1: 480.1875MHz -4.32dB MK4 Meas 1: 480.000Hz -1.76dB MK5 Meas 2: 480.000Hz -2.4.75dB MK5 Meas 2: 476.500MHz -2.5.08dB           +10         4         1.5           +0         2         3           -10         2         3	dB         MEAS 1         SCALE         FREQ:         RX ATT         MK1         475.250MHz         -12.27dB           +50         MEAS 2         DISPLAY         SWEEP         POWER         MK2         467.750MHz         -43.31dB           +40         MEAS 2         DISPLAY         SWEEP         POWER         MK1         475.250MHz         -4.31dB           +40         MK3         460.1875MHz         -4.32dB         460.1875MHz         -4.32dB           +30         MARKER         FS         Mkon Peak         MK3         460.1875MHz         -4.32dB           +20         F1         Mk -> Center         F5         Mk on Peak         MK5         476.500MHz         -1.32dB           +10         F2         Delta Marker         F6         Marker Order         MK6         MK6
-20	+0 F4 Mk on screen dis. F8 MK8
-40 -50 -60 DMk(1,2): 7.500MHz Meas1: 3.0dB Meas2: -14.2dB -70 Start: 450.000 MHz Power: 0 dBm RX Attenuation: 0 d EXT Det: 2	- 20 - 20 - 30 - 40 - 50 - 61 - 7 - 8 - 9 - 9 - 9 - 9 - 9 - 9 - 9 - 9

The menu is recalled by clicking on one of the keys of the box MARKERS.

- F1: Moves the center frequency at the same frequency of the active marker, leaving span the same
- F2: Allows you to make measures (frequency and amplitude) between marker 1 and the active marker. The result is displayed in the lower left of the chart; you can activate more Delta Marker
- F3: Allows you to automatically extract the -3dB bandwidth (or-6dB,-30dB or other value) of a filter or an amplifier. For proper operation must be active at least 3 markers and the frequency span must be large enough.



- F4: Enable / Disable the display of marker values on the chart. The values are always visible in the Markers pane.
- F5: Automatically moves the active marker on the point of maximum gain
- F6: Place the viewing written on the chart ordered by number of markers
- F7: Place the viewing written on the chart ordered by track: measure 1 to the left and measure 2 to the right



## 11.10 - CAL Menu



For details see chapter <u>"PC BASED measurements" – Calibration.</u>

- F1: Start calibration or direct measurement of EXD1 if this is selected
- F2: Start the calibration of the measurement of reflected or EXD2 if this is selected
- F3: Delete all calibrations previously carried out



## 11.11 - SAVE Menu

ELAD SNA\$050 - Ver. 1.05		
ELAD SNA3050 Scalar Network Analyzer	MENU << MEASUREMENT SOURCE	MARKERS
MEAS 1: FORWARD 10dB/dv           1000000000000000000000000000000000000	dB HEAS 1 SCALE HEAS 2 DISPLAY HEAS 2 DISPLAY SWEEP POWER HEAS 2 DISPLAY SWEEP POWER FI Setup FI S	HK1         475.250MHz         -1.27dB           475.250MHz         22.81dB           475.250MHz         -2.81dB           467.750MHz         -4.34dB           467.750MHz         -4.34dB           469.1875MHz         -4.32dB           469.1875MHz         -4.32dB           469.1875MHz         -4.32dB           469.1875MHz         -4.32dB           469.1875MHz         -4.63dB           MK4         469.000MHz           476.500MHz         -2.63dB           MK5         476.500MHz           MK6         MK6
40         50           50         50           60         DMk(1,2): 7.500MHz JMas1: 3.1dB Mes2: -14.2dB           70         DMk(1,2): 4.393MHz Meas1: 3.1dB Mes2: -14.4dB           Start 450.000 MHz         Stop: 500.000 MHz           Power: 0 dBm         RX Attenuation: 0 did           Ext Det. 2         Stop: 500.000 MHz	-20 -30 -40 -50 -50 -50 -512	UTILITY Factory Preset SAVE PRESET CAL SYSTEM

• F1: Save the current setup in the database. This opens the Save Setup. Select the setup you want to change by applying the current settings in the Setup panel, or click on "Save As New Setup" to create a new preset

Facto	ory Preset 470MHz	
Name		
Filter 470MHz		
Modify Selected	Save As New Setup	Delete Selected

- "Modify Selected": Changing the setup selected in the setup panel
- "Save As New Setup": Adds a new setup in the database
- "Delete Selected": Delete the setup selected in the setup panel
- "Export As File": Save the setup to a .stp file format
- "Transfer": Allow to transfer to SNA a .stp setup file
- "CLOSE": Close the window
- F2: Save the chart to an image. The available formats are jpg, png, and bmp.
- F3: Opens a print preview that allows you to print out the chart
- F4: Creates a report. For details see chapter <u>"PC BASED measurements" Generating a report.</u>



## 11.12 - PRESET Menu





	-15-
SwrMessung2mBOS.stp SwrMessungTetraBOS.stp SwrMessung4mBOS.stp	Add to instrument
ullSpan.stp Entkopplung Tetra Koppler.stp	Save To PC
	APPLY
	DELETE

- **F1**: Allows to load a setup .stp file for the PC database:
  - "Load ":Apply the setup selected in the Setup panel
    - "Load From File": Loads a setup .stp file
    - "Cancel": Close the form
- F2: Load a setup .stp file saved in SNA; pane displays the setup saved on SNA
  - "Add to instrument": Allows to select a .stp setup file and to transfer it to A
  - "Save To PC": Transfer a .stp setup file from SNA to PC

• "Apply": Applies to PC the setup selected on the right panel. In this case setup is not saved both on database and on .stp file.

• "DELETE": Removes from SNA the selected setup



## 11.13 - SYSTEM Menu

ELAD SNA3050 - Ver. 1.05			\$	- <b>- X</b>
ELAD SNA3050 Scalar Network Analyzer	MENU <<	MEASUREMENT	SOURCE	MARKERS
dB MEAS 1: FORWARD 10dB/div	dB	MEAS 1 SCALE	FREQ. RX ATT	МК1 475.250MHz -1.24dB 475.250MHz -22.78dB
+30 MK1 Méas 1: 475.250MHz -1.24dB MK1 Méas 2: 475.250MHz -22.78dB MK2 Méas 1: 487.750MHz -4.31dB MK2 Méas 2: 475.750MHz -2.5.8dB	+50	MEAS 2 DISPLAY	SWEEP POWER	467.750MHz -4.31dB 467.750MHz -8.58dB
+20 MK3 M¢as 1: 440.187/5MH72 -4.3/205 MK3 M¢as 2: 440.187/5MH72 -6.3/505 MK4 M¢as 1: 469.000/MH72 -17.681 MK4 M¢as 2: 459.000/H12-24.99d6 MK5 M¢as 1: 476.500/H12 -1.3/2dB MK5 M¢as 2: 476.500/H12-25.14dB	+40			480.1875MHz -4.32dB 480.1875MHz -8.45dB
+10	+30	SYSTEM	_	469.000MHz -1.76dB 469.000MHz -24.69dB
+0	+20	F1 Color Setup	F5 Fw Update	476.500MHz -1.32dB 476.500MHz -25.14dB
-10	+10	F2	F6 File Manager	мкб
-20	+0	F3	F7	MK7
-30	-10	F4	F8 About	МКВ
-40	-20	Data		UTILITY
	-30		6 9 6	Filter 470MHz
	10			SAVE
-00 DMk(1,2): 7.500MHz Meas1: 3.1dB Meas2: -14.2dB DMk(1,3): -4.938MHz Meas1: 3.1dB Meas2: -14.3dB	-40		• • F12	التقليل التنكر
-70 Community - 9000 MHz Stop: 500.000 MH SALL Power: 0 dBm RX Attenuation: 0 d	IZ -50 IB CAL		CANC	CAL SYSTEM
Ext Det. 2		»		

## 11.13.1 F1: Color Setup menu

Open a window to change the colors of the tracks both on screen and for printing.

isplay Color Setup		Print/Save Color	Setup
Meas 1	Yellow	• Meas 1	Blue 💌
Meas 2	Cyan 🔻	Meas 2	Green
Meas 1 Mem 📗	Goldenrod	Meas 1 Mem	DarkSlateBlu 👻
Meas 2 Mem	LightSteelBlu •	Meas 2 Mem	OliveDrab 💌
Meas 1 Ref	Khaki 🔹	Meas 1 Ref	DarkCyan 💌
Meas 2 Ref	DodgerBlue	Meas 2 Ref	LightGreen 💌
🔲 Use Image B	Background		
Background	Black _	Background	White 💌
Grid 📗	DimGray 🔻	Grid	Black 💌
Notes	Lime	Notes	Black 💌
Notes	Lime	Notes	Black

In the left panel you can set the colors for the software displaying. In the right panel you can set the colors when saving as a picture, reports and printing. Using the option "Use Background Image" a custom background an image will be used on the

Using the option "Use Background Image" a custom background an image will be used on the chart.



#### 11.13.2 F2: Network Analyzer Mode

Open a menu to work in Network Analyzer Mode

## 11.13.3 F5: Fw Update (firmware update) Menu

Open a window to select the folder containing the firmware update previously downloaded.

#### 11.13.4 F6: File Manager Menu

Open a window displaying the setup stored in the SNA memory. It allows save on PC and delete operations.

#### 11.13.5 F8: About

Displays information about the software version, serial number of the connected device, firmware version of SNA and of the other components (DSP Encoder).



## 12 - PC – Based measurements

In this chapter you will learn how to make simple measurements with the SNA3500 controlled through the software.

ELAD SNA3	050 Scalar Netwo	rk Analyzer	MENU	MEAS	UREMENT	SOURCE		ARKERS
dB MEAS 1	FORWARD 10dB/div	Load Se	itup	-		FREQ. RX	ATT MK1 47	5.250MHz - 5.250MHz -
+30 MK1 Mea MK2 Mea +20 MK3 Mea	IS 1: 475.250MHz -1.24dB IS 1: 467.750MHz -1.24dB IS 1: 467.750MHz -4.31dB IS 1: 480.1875MHz -4.34dB	MK1 M MK2 M MK3 M	Setup Factory Preset Filter 470MHz			SWEEP	WER MK2 46 MK3 480	7.750MHz - 7.750MHz - .1875MHz
+10	is 1: 476.500MHz -1.32dB	MK5 M					480 МК4 46!	, 1875MHz 9.000MHz 9.000MHz -2
+0	24	15			te	F5	A70	5.500MHz - 5.500MHz -2
-10						F7	MK7	
-30	- A	Note Facto	ny Preset			F8	МКВ	
-40		15/					L 514 470	лштү
-50	$\neg$				4	8 9 F9 5 6 F10	Filter 470	
-60 DMk(1,2	: 7.500MHz Meas1: 3.1dB M	eas2: -14	d From File	oad	Cancel 1	2 3 F11	SAVE	

## 12.1 - Loading preset from database

To load a setup saved on local database click on the "PRESET" and then "F1" Load from Local. This opens the "Load Setup ". In this window, select a setup in the top panel and click the button "Load" to apply the selected setup or click on "Load From File" to load a previously saved setup file



#### 12.2 - Changing the Frequency range

If the frequency range of the preset is not what you like, you can change it. Click on the "FREQ" to access the menu to set the frequency.



- Click on "F1" Start to modify the start frequency
- Then enter the desired value using the keypad or the keypad of the software on your PC.
- In a similar way you can change the end frequency ("F2 " Stop) or the center frequency ("F4" Center) and the magnitude of range ("F3" Span)



#### 12.3 - Calibration

For maximum measurement accuracy, you should calibrate the instrument using the cables that will be used in the measurement. To calibrate the instrument proceed as follows:

• Click "CAL" on the "UTILITY" panel.



#### 12.3.1 Direct power measure calibration

To calibrate the direct measurement, click on the button "F1 " Cal. Forward.



• Connect the cables used for measuring, the output and input RF IN and RF OUT and click "OK" when ready. The direct measurement curve (yellow) moves to the line at 0 dB and the CAL text on a green background appears in the lower left corner of the chart.



	51175050 5			lalyze	-1	MENU <<	MEAS	UREMENT	SOL	JRCE		MARKERS
									TREO	DYATT	MKL	475.250MHz -0
+30	MEAS 2: REFLEC	CTED 10dB/div				dB	MEAS 1	SCALE	FREQ.	RAATT		475.250MHz -34
	MK1 Meas 1: 475 MK2 Meas 1: 467	5.250MHz -0.03dB 7.750MHz 0.0dB	MK1 MK2	Meas 2: Meas 2:	475.250MHz - 34.88dB 467.750MHz - 34.25dB	100	MEAS 2	DISPLAY	SWEEP	POWER	MK2	467.750MHz 0 467.750MHz -3
+20	MK3 Meas 1: 480 MK4 Meas 1: 469	.1875MHz -0.03dE 9.000MHz 0.0dB	B MK3 MK4	Meas 2:4 Meas 2:	480.1875MHz -35.19dB 469.000MHz -34.41dB	+40					MK3	180.1875MHz -(
1000	MK5 Meas 1: 476	5.500MHz 0.0dB	MK5	Meas 2:	476.500MHz -34.93dB	1000				1		459 000MH+ 0
+10						+30	C/	ALIBRATION			MK4	469.000MHz -34
+0		24	15	3		+20	F1 Ca	l. Forward	F5		MK5	476.500MHz 0
							<b>F2</b> (a)	Reflected	F6			470,0000012-0-
-10						+10		k Reflected			MK6	
- 20							F3 Re	set	F7		MK7	
-20 -						- +0	F4		F8			
-30						-10					МК8	
40						20	Data					UTILITY
-						-20	_					
-50		2 4	15	3		-30				Ea l	ritter 4	Johnz
				-					5 6	F10		
-60			and service			-40			23	F11	SAVE	PR
70	DMR(1,2): 7.500N DMR(1,3): -4.9381	MH2 Meas1: 0.0dB MH2 Meas1: 0.0dB	Meas2: -0 Meas2: 0	.odB .3dB		50				F12		

### 12.3.2 Reflected power measure calibration

To calibrate the reflected power measure, click on "F2" Cal Reflected.

ELAD SNA3050 - Ver. 1.05					_ = ×
ELAD SNA3050 Scalar N	Network Analyzer	MENU <<	MEASUREMENT	SOURCE	MARKERS
dB MEAS 1: FORWARD 100B/ +30 MK1 Meas 1: 475.250MHz - MK1 Meas 1: 475.250MHz - MK2 Meas 1: 457.750MHz - 420 MK3 Meas 1: 450.1875MHz	div 3rdiv 53 §8dB MK1 Méas 2: 475 250MHz 0.0 59 §2dB MK2 Méas 2: 457 750MHz 0.0 -59 §4dB MK3 Méas 2: 467 750MHz 0.0 -59 §4dB MK3 Méas 2: 467 070MHz 0.0	dB +50 0dB 0dB 0dB +40	MEAS 1 SCALE MEAS 2 DISPLAY	FREQ. RX ATT SWEEP POWER	MK1         475.250MHz         -59.88dB           475.250MHz         0.0dB           MK2         467.750MHz         -59.82dB           467.750MHz         -0.0dB           MK2         467.750MHz         -59.82dB           467.750MHz         -59.94dB
MK5 Meas 1: 476.500MHz - +10	59.98dB MK5 Meas 2: 476.500MHz 0.0	0dB +30			480.1875MHz 0.0dB 469.000MHz -59.92dB 469.000MHz 0.0dB
+0		+20	F1 Cal. Forward	F5	476.500MHz -59.98dB 476.500MHz 0.0dB
-10	2.4 1.5 3	Reflected Calibra	ition 📧	F6 F7	МК6 МК7
-30			OPEN	F8	МКВ
-40			SHORT		YILLIY
-50	24 15 3		DONE CAL.	8 9 F9 5 6 F10	Filter 470MHz
-60 DMk(1,2): 7.500MHz Meas1 -70 DMk(1,8): -4.938MHz Meas2 CAL Power: 0 dBm	:-0.1dB Meas2: 0.0dB 1:0.1dB Meas2: 0.0dB Stop: 500.0 RX Attenuati Ext Det. 2	000 MHz -50 on: 0 dB		2 3 F11 • F12 ANC ENTER	CAL SYSTEM

- Leave open the RF OUT port, then click "OPEN"
- Connect the short connector to RF OUT then click "SHORT"
- Click on "DONE CAL." To save calibration



Aυ	5NA30	ou scal	ar Net	wor	K AN	aiyze	er		MENU <<	ME/	ASUREMENT	SOURCE	MARKERS
B +30 +20	MEAS 1: F MEAS 2: R MK1 Méas MK2 Méas MK3 Méas MK4 Méas MK5 Méas	ORWARD 1 EFLECTED 1: 475.2501 1: 467.7501 1: 469.0001 1: 469.0001 1: 476.5001	0dB/div 10dB/div /Hz -59.94 /Hz -59.99 /Hz -59.99 /Hz -59.98 /Hz -59.88	4dB 5dB 4dB 3dB 3dB	MK1 M MK2 N MK3 N MK4 N MK5 N	Aeas 2: Aeas 2: Aeas 2: 4 Aeas 2: 4 Aeas 2:	475.250M 467.750M 180.1875N 459.000M 476.500M	Hz 0.0dB Hz 0.0dB Hz 0.0dB Hz 0.0dB Hz 0.0dB Hz 0.0dB	dB +50 +40	MEAS	1 SCALE 2 DISPLAY	FREQ. RX ATT SWEEP POWER	MK1         475.250MHz -60           475.250MHz -0         475.250MHz 0           MK2         467.750MHz -55           467.750MHz 0         480.1875MHz 0           MK3         480.1875MHz -55
+10									+30		CALIBRATION		469.000MHz -59
+0	-				-	-			+20	F1	Cal. Forward	F5	476.500MHz -59 476.500MHz 0
10									10	F2	Cal. Reflected	F6	МКб
-10			24		1.5	a			+IV	F3	Reset	E7	
-20						*	-		+0				MK7
-30									-10	F4		F8	МКВ
-40									-20	Data	Area T		UTILITY
										1		7 8 9 F9	Filter 470MHz
-50			2 4		15	3			-30			4 5 6 F10	SAVE
-00	DMk(1,2): 7	.500MHz M	eas1: 0.00	dB Me	as2: 0.0	)dB						0 F12	

The curve of the reflected measure (blue) moves to the line at 0 dB and a green the CAL text on a green background appears in the lower right corner of the chart.

#### 12.3.3 Calibration Status

The written to the lower left and lower right corners of the graph, describe the status of calibration, respectively of Measure 1 and Measure 2.

- **CAL**: The measure is calibrated
- **UNCAL**: The measure is not calibrated, a calibration was not performed or the setup of the instrument was changed after calibration.
- **CAL?**: The measure is calibrated and the instrument setup has not changed. However, the SNA has been turned off and on again so it is recommended to repeat the calibration.

#### Note:

If the measure is performed using cables with a significant length respect to the wave length, it is recommended to connect directly (or in the shortest way using max. one adapter) the input of the device under test (DUT) to the RF OUT port and to connect the longest connection between the output of the DUT and the RF IN port of SNA.



### 12.4 - Marker positioning



The setup also includes the placement of the marker, but you can change its position.

First click on "MK1" ... "MK8" to activate a marker.

When the marker is active and selected, the corresponding button turns green and you can place a point on the curve by clicking on the chart When a marker is active (that appears on the chart) but not selected, the corresponding button turns blue.

Alternatively you can enter the frequency at which you want to place the marker with the number keys on the software in the "Marker Freq." or the numeric keypad on the PC. In this case, the marker will be placed at a frequency as close as possible to the one you entered.

To deactivate a marker, click the corresponding button to select it (the button turns green) and click again to disable it (the button turns gray).



#### 12.5 - Generating a report

To generate a report with the results of a measure click on the button "SAVE" and then "F4" report. A window appears where some parameters could be set:

Lad SNA3050 - Ver. 1.05	Report Parameters	_ <b>_</b> ×
ELAD SNA3050 Scalar Network Analyzer	Report Title	SOURCE MARKERS
MEAS 1: FORWARD 10dB/div           *30         MC4AS22           MK1 Meas 1: 463.6525MHz - 32.5948         MK1 Meas 2: 463           MK2 Meas 1: 4775MHz - 43.408         MK3 Meas 2: 463           MK3 Meas 1: 469.000/Hz - 1.7848         MK3 Meas 2: 463           MK4 Meas 1: 476 500/Hz - 1.3248         MK4 Meas 2: 471           MK5 Meas 1: 476 500/Hz - 1.3248         MK4 Meas 2: 471	Report Sub-Title Report Sub-title Graphics Take Screenshot Graphics file	FREQ.         RX ATT           Y         SWEEP           POWER         MK1           463.5625MHz         -0.78d8           467.750MHz         -4.51d8           467.750MHz         -8.65d8           MK3         490.1875MHz         -4.34d8           MK3         490.1875MHz         -4.34d8           MK4         -469.000MHz         -2.6648
+0	Browse local From instrument	F5 476.500MHz -1.32dB 476.500MHz -25.13dB
-10	Markers Current Measurement 👻 Markers file	F6 MK6 F7 MK7 F8 MK8
	Browse local From Instrument Report Note Test Note	7 8 9 F9 Filter 470MHz
-60 DMkr(1,2): -4.18B/H/z Meas1: -28.3dB Meas2: 7.9dB -70 Start: 450.000 MHz Power: 0 dBm	OK CANCEL	1 2 3 F11 SAVE PRESET 0 F12 CANC ENTER CAL SYSTEM

To obtain a report of the current measure:

- You can customize the report by entering the title (Title Report) and subtitle (Report Sub-Title) that will be re-proposed in following saves. It is also possible to place notes as desired (Report Note).
- In the Graphics combo box select "Take Screenshot", in Markers combo box select "Current Measurement".
- By clicking on "OK" the report is generated and opened with the report viewer of Windows. Using this component you can also save the report to Word, Excel or Acrobat (PDF).
- If you want to get the report of a measurement made previously and stored in the instrument, in the combo box Graphics select "From File " and in the Markers combo box select "From File". Click on "From Instrument" in the combo box Graphics and select the file saved, then click "Load".Follow the same procedure for the box Markers and then click OK. If the file is saved on a USB key, select the file by clicking on "Browse Local".





#### 12.6 - Using external detectors

Using the external detector EXD1 EXD2 you can get a dynamic measure up to 80 dB (75 dB in case of attenuation measures) for frequencies from 100kHz to 470MHz.

Connect an external detector to the "EXD1" ("EXD2") on the rear panel. Wait for the data load of the detector (about 20 seconds). When the upload is finished writing EXD1 (EXD2) appears in the chart at the bottom center.



If SNA is turned on with an external detector connected, and the setup provides for their use, the external detector is automatically selected. Otherwise, if you want to use the EXD1 (EXD2), click on the "MEAS 1" ("MEAS 2") then "F3" EXD1 ("F3" EXD2).

Now you can calibrate the measure. Click on "CAL" then on "EXD1" ("EXD2")

LAD SNA3050 - Ver. 1.05					- • ×
ELAD SNA3050 Scalar Network Ana	alyzer	MENU <<	MEASUREMENT	SOURCE	MARKERS
dB MEAS 1: EXTERNAL Det 1 10dB/div +30 MEAS 2: REFLECTED 10dB/div +30 MEAS 2: REFLECTED 10dB/div		dB +50	MEAS 1 SCALE	FREQ. RX ATT	463.5625MHz -4.26dB 463.5625MHz -19.36dB
MK2 Meas 1: 463.3623MH2 - 4.200 MK2 M MK2 Meas 1: 467.750MHz - 4.23dB MK2 M MK3 Meas 1: 480.1875MHz - 4.26dB MK3 M	eas 2: 467.750MHz - 19.360B eas 2: 467.750MHz - 19.32dB eas 2: 480.1875MHz - 19.34dB	10	MEAS 2 DISPLAY	SWEEP POWER	467.750MHz -19.32dB
+20 MK4 Meas 1: 459.000MHz -4.28dB MK4 M MK5 Meas 1: 476.500MHz -4.3dB MK5 M	eas 2: 469.000 MHz -19.3dB eas 2: 476.500 MHz -19.3dB	+40			480.1875MHz -19.34dB
+10		+30	CALIBRATION	· · · · · ·	469.000MHz -4.28dB 469.000MHz -19.3dB
+0	3	+20	Cal. Ext 1	F5	476.500MHz -4.3dB 476.500MHz -19.3dB
-10		+10	F2 Cal. Reflected	F6	МК6
-20		+0	Reset	F7	MK7
-30		-10			МК8
-40	3	-20	Data		UTILITY
-50		-30		899	Filter 470MHz
-60		-40		2 3 611	SAVE PRESET
DNR(1) 2): -4 18/MHz Mens1: 0.048 Mels2: 0.0           -70         DNR(1) 2): -6 65/DH1z Mens1: 0.048 Mels2: 0.           Start: 450.000 MHz         Start: 450.000 MHz           Power: 0 dBm         Ext Det. 1	dB 0dB Stop: 500.000 MH	-50 CAL		ANC ENTER	CAL SYSTEM



If you are planning a direct measure of the power, connect the external detector to the RF OUT connector and then click "OK " when ready.



The yellow curve (blue) moves to the line at 0 dB and CAL text appears on a green background in the lower left (right) of the chart.



## 13 - Using PC Software to load data from SNA

#### 13.1 - Generating a report

Using the software it is possible to generate reports containing data stored on SNA. Before proceeding, make sure you have saved data on SNA (<u>See Saving Measure</u>) Enter the SAVE menu clicking on the "F4"Report:

Report Title	N
SNA-3050 REPORT	6
Report Sub-Title	
Report Sub-title	
Graphics	
Take Screenshot 🛛 👻	
Graphics file	
Browse local	From Instrument
Markers	
Current Measurement 👻	
Markers file	
Browse local	From Instrument
Deces Net	
Report Note	
OK	CANCEL
UN	CANCEL

- You can customize the report by entering the title (Title Report) and subtitle (Report Sub-Title) that will be re-proposed in following saves. It is also possible to place notes as desired (Report Note).
- Choose on the combo box "Graphics" the option "From file".
- Click "Browse local ..." if you want a screen-shot of the chart saved on your PC (or on a USB key connected to the PC).
- Click on "From instrument" if you want a screen-shot saved in SNA memory (save destination ftp)
- Choose in the combo box "Markers" the option "From file".
- Click "Browse local..." if you want a marker table saved on your PC (or on a USB key connected to the PC).
- Click on "From instrument" if you want a marker table saved in SNA memory (save destination ftp)
- Click OK to generate the report.



## 14 - Examples of practical use

### 14.1 - Prepare a setup on PC and then upload it to SNA

• Assign the two tracks MEAS 1 (MEAS 2) to read the measurement of direct (reflected) or via EXD1 (EXD2). If you want to display a single measure you can exclude the other



- Set the frequency range for measuring
- Set POWER and RX parameters: these parameters are connected to the type of DUT and the measurement to be performed (determine before the acceptable input and output levels of the DUT).
- Adjust the parameters of the chart (menu SCALE) for optimal viewing of the curves
- Place the markers. The SNA on standalone mode support (for reasons of space) only 4 markers, but in PC-based mode 8 markers are available. For this reason on SNA will be considered only the first 4 active markers. For example, if on the SWPC you've activated all markers, the markers displayed on SNA will be only MK1-MK4.
- Once you have an Optimal setup for the measure, save it in the local database. Click "SAVE" and then F1 "Setup", then proceed as explained in <u>Save Menu</u>



ELAD SNA2050 - Ver 1.05		X
	Save Setup	
ELAD SNA3050 Scalar Network Analyz	Setup	OURCE MARKERS
MEAS 1: +30         FORWARD 10dB/div MK1 Meas 1: 463 6525/MH2 - 32.64dB MK2 Meas 1: 467.750/H2 - 42.9dB MK3 Meas 1: 467.750/H2 - 4.34dB MK3 Meas 1: 467.750/H2 - 4.34dB MK3 Meas 1: 469.100/H2 - 1.73dB MK5 Meas 2: MK5 Meas 1: 476.500/H2 - 1.32dB MK5 Meas 2:           +10         -4         5	Factory Preset Filter 470MHz	RX ATT         HK1         463.5623MHz         32.64dB           POWER         467.750MHz         40.756B           MK2         467.750MHz         4.34dB           460.1875MHz         4.34dB           460.1875MHz         4.34dB           469.000MHz         4.34dB           MK4         469.000MHz         4.34dB           MK5         476.500MHz         1.72dB
$ \begin{array}{c}                                     $	Name Factory Preset Note Factory Preset	476, 500MHz -25, 16dB MKG MK7 MKB
40 -50 -60 DMk(1,2): -4.188MHz Meas1: -28.4dB Meas2: 7.9dB	Modfy Selected Save As New Setup Delete Selected Export As File Transfer CLOSE	9 F9 Filter 470MHz 6 F10 3 F11 SAVE PRESET
-70 [DMkr(1):-16.8/25MHz [kleas1:-28.3dB]/kleas2: 7.6dB Start: 450.000 MHz CAL: Power: 0.dBm Ext Det. 1	Stop: 500 000 MHz -50 RX Alternution: 0 dB CAL	ENTER CAL SYSTEM

 Click "Save As New Setup" to add a new setup in the database, or select a setup in the "Setup" pane. Click "Modify Selected" to change a previously saved setup

LAD SNA3050 - Ver. 1.05		-	_ = ×
	Save Setup		
ELAD SNA3050 Scalar Network Analyz	Setup	SOURCE	MARKERS
dB	Factory Preset Filter 470MHz	RX ATT	MK1 463.5625MHz -32.64dB 463.5625MHz -0.75dB
+30 MK1 Méas 1: 463.5625MHz -32.64dB MK2 Méas 1: 467.750MHz -4.29dB MK2 Méas 2: MK2 Méas 2: MK2 Méas 2: MK2 Méas 2: MK2 Méas 2:		P POWER	467.750MHz -4.29dB 467.750MHz -8.59dB
+20 MK3 Meas 1: 480.1875MHz -4.370B MK3 Meas 2: MK4 Meas 1: 459.000MHz -1.76dB MK4 Meas 2: MK5 Meas 1: 476.500MHz -1.32dB MK5 Meas 2:			480.1875MHz -4.37dB 480.1875MHz -8.42dB
+10			469.000MHz -1.76dB 469.000MHz -24.32dB
+0			476.500MHz -1.32dB 476.500MHz -25.26dB
-10	Factory Preset		МКб
-201Sav	e New Setup		MK7
-30 1 2 3/	Name		МКВ
			UTILITY
	Fest DUT1	9 F9	Filter 470MHz
-50		6 F10	
-60 DMk(1,2): -4.188MHz Meas1: -28.4dB Meas2: 7/8	OK Cancel	3 F11	SAVE
-70 DMk(1,3): -16.625MHz Meas1: -28.3dB Meas2: 7. Start: 450.000 MHz Power: 0 dBm	Stop: 500.000 MHz <sup>-DU</sup>	ENTER	CAL SYSTEM
Ext Det. 1			

• Write a setup name and then click on OK. The setup will be saved on the database.



ve Setup	Catura	Contract of the	and the second s
	Setup Factory Pr Filter 470N Test DUT	eset IHz 1	
Name Test DUT1			
Test DUT1			
Modify Sele	cted	Save As New Setup	Delete Selected
Export As	File	Transfer	CLOSE

• Now it is necessary to export the setup in a .stp file. Click on "Export As File":

AD SNA3050	0 Scalar Netwo	🖳 Save As	- I	-	×	MARKERS
MEAS 1: FOR	RWARD 10dB/div	SNA SETUP		Search SNA SETUP	P	63.5625MHz -32.6 63.5625MHz -0.7
+30 MK1 Meas 1: MK2 Meas 1:	463.5625MHz -32.64dB 467.750MHz -4.29dB	Organize 🔻 New folder			<b>≡ • 0</b>	167.750MHz -4.29
+20 MK3 Meas 1: MK4 Meas 1:	480.1875MHz -4.37dB 469.000MHz -1.73dB	🚖 Favorites 🕺 Nam	ne	Date modified	Туре	80.1875MHz -4.3 80.1875MHz -8.3
+10	4/6.500MHZ -1.350B	Desktop	No items match you	r search.		69.000MHz -1.73
+0	2 <del>,</del> 4	Recent Places E				+76.500MHz -1.35 +76.500MHz -25.1
-10		LOCAL_PROD				
-20		🥽 Libraries				
-30	17	Documents LOCAL PRJ				_
		LOCAL_PROD				UTILITY
-40		J Music				
-50		Pictures +	m			171
60	V	File name: DUT1			•	PRES
DMk(1,2): -4.	188MHz Meas1: -28.4dE	Save as type: stp files (*.stp	)		•	
-70 [DMk(1,β): -16 Start: 450.000 AL Power: 0 dBn	0.6/25MHz Meas1: -28.3d ) MHz n Evo	Hide Folders	[	Save	Cancel	SYST

• Then transfer the file to SNA. In the Save Setup window click on Transfer and select the file you just saved

	E
1	ELAD®

	🖞 Open			-		MARKERS
MEAS 1. FORWARD 10dB/div MEAS 2: REFLECTED 10dB/div	🕞 💮 - 🕌 🕨 SNA SETU	IP	• • • ] [	Search SNA SETUP	Q	63.5625MHz
30 MK1 Meas 1: 463.5625MHz -32.62dB MK2 Meas 1: 467.750MHz -4.29dB	Organize 🔻 New folde	r.		•		167.750MHz 167.750MHz
20 MK3 Meas 1: 480.1875MHz -4.34dB MK4 Meas 1: 469.000MHz -1.73dB	🔶 Favorites	Name		Date modified	Туре	80.1875MHz 80.1875MHz
MK5 Meas 1: 476.500MHz -1.35dB	📃 Desktop	DUT1.stp		6/14/2011 10:19 AM	STP File	69.000MHz -
	Downloads					69.000MHz -:
+02 4	Recent Places					+76.500MHz -
	LOCAL_PRJ					
-10	LOCAL_PROD					
20	Cibraries					
-301/ 🗧						
-40	Music					UTITIA
•	Pictures					T1
-50	Videos					

• The file is transferred on SNA using FTP protocol.

LAD SNA3050 - Ver. 1.05		_ <b>_</b> ×
ELAD SNA3050 Scalar Network Analyzer	Save Setup	MARKERS
MEAS 11: FORWARD 10dB/div           MEAS 22: REFLECTED 10dB/div           MK1 Meas 1: 483 5625WHz - 32.82dB           MK1 Meas 1: 483 5625WHz - 32.82dB           MK2 Meas 1: 480.1875MHz - 4.29dB           MK3 Meas 1: 480.1875MHz - 4.29dB           MK3 Meas 1: 480.000Hz - 1776dB           MK6 Meas 1: 480.000Hz - 1776dB           MK6 Meas 1: 480.000Hz - 1776dB           MK5 Meas 1: 476.500MHz - 4.32dB           MK5 Meas 1: 476.500MHz - 4.32dB           MK5 Meas 2: 490.000Hz - 2           MK5 Meas 1: 476.500MHz - 4.32dB           MK5 Meas 2: 490.000Hz - 1.32dB           MK5 Meas 2: 490.000Hz - 2           MK5 MEas 2: 490.000Hz - 2	Setup         Factory Preset           Filter 470MHz         Test DUT1           Name         Test DUT1           Note         Test DUT1	MK1         463.5625MHz-32.62dB           463.5625MHz-32.62dB         463.55625MHz-32.62dB           MK2         467.750MHz-3.62dB           MK2         467.750MHz-3.62dB           MK2         460.1875MHz-4.34dB           460.1875MHz-4.34dB           460.1875MHz-4.34dB           MK4         469.000MHz-1.76dB           MK4         469.000MHz-2.4.35dB           MK4         465.500MHz-1.32dB           MK5         476.500MHz-1.32dB           MK6         MK6           MK7         MK8
-60 -60 -60 -60 -60 -60 -60 -60	ELAD-UT82\Desktop\SNA SETUP\DUT1.stp Delete Selected OK	UTILITY Test DUT1 SAVE PRESET CAL SYSTEM

Now the file (TestDUT.stp on image below) has been saved on SNA memory and could be recalled from Preset menu (after closing the PC software).





## 15 - SNA firmware update

Using the PC software you can upgrade the SNA firmware. To proceed with the upgrade:

• Click on "SYSTEM" then on "F5" Fw Update

ELAD SN	NA3050 - Ver. 1.05			33		
ELAD	SNA3050 Scalar Netwo	rk Analyzer	MENU <<	MEASUREMENT	SOURCE	MARKERS
dB +30	MEAS 1: FORWARD 10dB/div MEAS 2: REFLECTED 10dB/div MK1 Meas 1: 463.5625MHz -32.64dB MK2 Meas 1: 467.750MHz -4.29dB MK3 Meas 1: 480.1876MHz -4.27dB	MK1 Meas 2: 463.5625MHz -0.72dB MK2 Meas 2: 467.750MHz -8.62dB MK3 Meas 2: 440.875.MHz -8.39dB	dB +50	MEAS 1 SCALE MEAS 2 DISPLAY	FREQ. RX ATT SWEEP POWER	MK1         463.5625MHz -32.64dB           463.5625MHz -0.72dB           MK2         467.750MHz -4.29dB           467.750MHz -8.62dB
+20	MK4 Meas 1: 469.000MHz -1.76dB MK5 Meas 1: 476.500MHz -1.32dB	MK4 Meas 2: 469.000MHz -24.35dB MK5 Meas 2: 476.500MHz -25.22dB	+40			MK3 460, 1875MHz -4, 37db 480, 1875MHz -8, 39dB
+10		5	+30	SYSTEM	FS Fortherday	469.000MHz -1.76dB 469.000MHz -24.35dB
+0	27		+20	F2	F6 File Manager	476.500MHz -25.22dB
-10			+10	F3	F7	MKG
-20	2	3	+0	F4	F8 About	MK8
-30	<u> </u>		-10			
-40		5	-20	Data		
-50			-30		8 9 F9 5 6 F10	Test DUT1
-60		March 70dB	-40		23 111	SAVE PRESET
-70 CAL	DMk(1,3): -16.625MHz Meas1: -26.40D DMk(1,3): -16.625MHz Meas1: -28.3dt Start: 450.000 MHz Power: 0 dBm	3 Meas2: 7.7dB 5 Meas2: 7.7dB Stop: 500.000 MH RX Attenuation: 0 d Det. 1	IZ -50 IB CAL		ANC ENTER	CAL SYSTEM

• You are prompted to select the folder containing the update files:

wse For Folder	
select firmware update folder	
Libraries	
ELAD-UT82	
🖻 🜉 Computer	
🖻 👊 Network	
Control Panel	
🔄 Recycle Bin	E
🖻 퉬 miniVNA230	
📕 SNA SETUP	
🏿 🍌 sna_update_2.07	
🔒 Graphics	1
	+

- Once you select the folder the update proceed by copying the files on SNA.
- Press OK and restart SNA software


	AD SNA3050 Scalar Network Analyzer					MEASUREMENT SOURC		CE	MARKERS		
B +30 ME MK MK	AS 1: FORWARD AS 2: REFLECTE 11 Méas 1: 463.562 2 Meas 1: 467.750	10dB/div D 10dB/div 5MHz -32.62dB 0MHz -4.29dB	MK1 Meas 2: 46 MK2 Meas 2: 4	3.5625MHz -0.75dB 57.750MHz -8.62dB	dB +50	MEAS 1 MEAS 2	SCALE DISPLAY	FREQ. SWEEP	RX ATT	K1 463.5625 463.5625 K2 467.750 467.750	MHz -32 MHz -0, MHz -4, MHz -8,6
+20 MK MK +10	3 Meas 1: 460.187 4 Meas 1: 469.00 5 Meas 1: 476.50	5MHz -4.34db 0MHz -1.76dB 0MHz -1.32dB	BdB MK5 Meas 2: 400.0079MHz -0.42 2dB MK5 Meas 2: 476.500MHz -25.22		+40					480.1875MHz -4.3 480.1875MHz -8.4 469.000MHz -1.7 469.000MHz -24.1	
+0		24	5	Firmware Update	4	El Colo	X	F5 Fw Up	date Manager	476.500M 476.500M	4Hz -1.3 4Hz -25.
-10 -20 -		Le la	3	Close	e the software	and restart the S	5NA.	F7 F8 About		к7 к8	
-30	7						ок 💦			UTILI	TY
-50		*		$\square$	-30			89 56 F	F9 Te	est DUT1	
-60	k(1,2): -4.188MHz k(1,3): -16.625MH	Meas1: -28.3dB z Meas1: -28.3d	Meas2: 7.9dB B Meas2: 7.7dB		-40				11	SAVE	PRE

## 16 - Credits

- Windows 2000, Windows XP, Windows Vista and Windows 7 are trademarks of Microsoft Corporation
- USB 2.0 is a trademark of USB IF
- ELAD is a registered mark of ELAD Srl Italy





Per ulteriori specifiche tecniche visitate i siti: www.elad.it
www.eladit.com



ELAD S.r.I. · Via Col de Rust, 11 · Sarone · I-33070 CANEVA (PN) Italy Tel. +39 0434 77248 r.a. · Fax +39 0434 77231 · email: eladit@eladit.com