

## 60GHz LNA MODULE

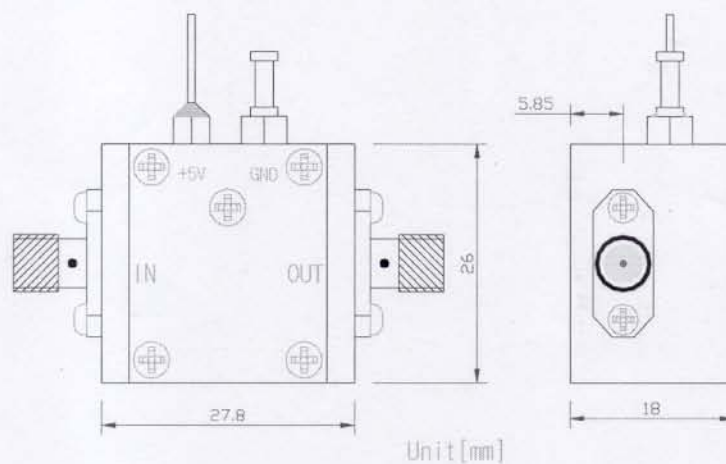
Model Name : **NRD60LNA101**  
 Serial Number : **LV020830-02/03**

DATE: AUG/30/2002

### Specifications

Parameters	Specifications		
	Min	Typical	Max
Frequency Range[GHz]	56		64
Gain[dB]	15	16	
NF[dB]		5	
Input RL[dB]	15 <small>[VSWR=1.44]</small>		8
Output RL[dB]	10 <small>[VSWR=1.91]</small>		6
P1dB[dBm]		11	
Voltage[V]	4.5	5.0	5.5
Current[mA]	60	70	100

### Dimensions



### Descriptions

1. Input and Output port are V-female flanges.
2. It contains voltage regulation circuit and over-current protection function.

37397A

MODEL: *NRD60LNA101*  
 DEVICE ID: *LV020870-02*

DATE: 08/31/2002 15:55  
 OPERATOR: *hyung Dong, Choi,*

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START: 55.000000 GHz  
 STOP: 65.000000 GHz  
 STEP: 0.025000 GHz

GATE START: -  
 GATE STOP: -  
 GATE: -  
 WINDOW: -

ERROR CORR: 12-TERM  
 AVERAGING: 1 PT  
 IF BNDWDTH: 1 KHz

PARAMETER:  
 NORMALIZATION:  
 REFERENCE PLANE:  
 SMOOTHING:  
 DELAY APERTURE:

-----CH1-----  
 -S11-  
 OFF  
 0.0000 mm  
 0.0 PERCENT

-----CH3-----  
 -S21-  
 OFF  
 0.0000 mm  
 0.0 PERCENT

CH1: S11 FWD REFL  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

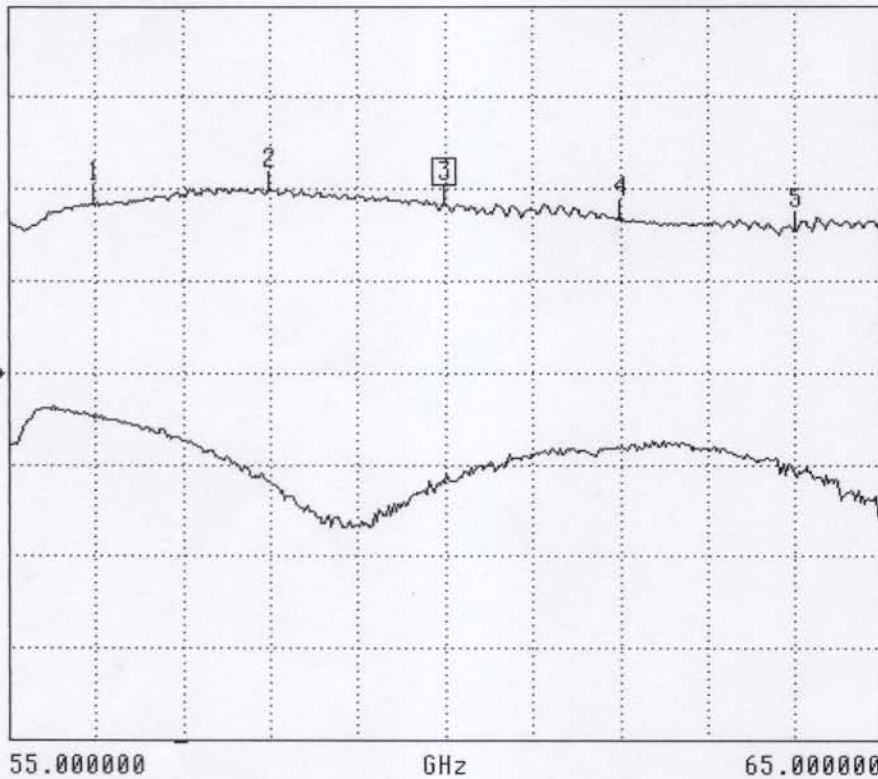
CH3: S21 FWD TRANS  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

CH 3 - S21  
 REFERENCE PLANE  
 0.0000 mm

MARKER 3  
 60.000000 GHz  
 18.420 dB

MARKER TO MAX  
 MARKER TO MIN

- 1 56.000000 GHz  
18.333 dB
- 2 58.000000 GHz  
19.775 dB
- 4 62.000000 GHz  
16.689 dB
- 5 64.000000 GHz  
15.446 dB



MARKER READOUT  
 FUNCTIONS

\* Description

1) Bias Condition  $V_{in} = +5V$   
 $I = 10mA$

# Anritsu

37397A

MODEL: NR160 LNA 101  
 DEVICE ID: LV420840-02

DATE: 08/31/2002 15:57  
 OPERATOR: *hyung hong . cho*

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START: 55.000000 GHz  
 STOP: 65.000000 GHz  
 STEP: 0.025000 GHz

GATE START: -  
 GATE STOP: -  
 GATE: -  
 WINDOW: -

ERROR CORR: 12-TERM  
 AVERAGING: 1 PT  
 IF BNDWDTH: 1 KHz

PARAMETER:	-----CH1-----	-----CH3-----
NORMALIZATION:	-S11-	-S21-
REFERENCE PLANE:	OFF	OFF
SMOOTHING:	0.0000 mm	0.0000 mm
DELAY APERTURE:	0.0 PERCENT	0.0 PERCENT

CH1: S11 FWD REFL  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

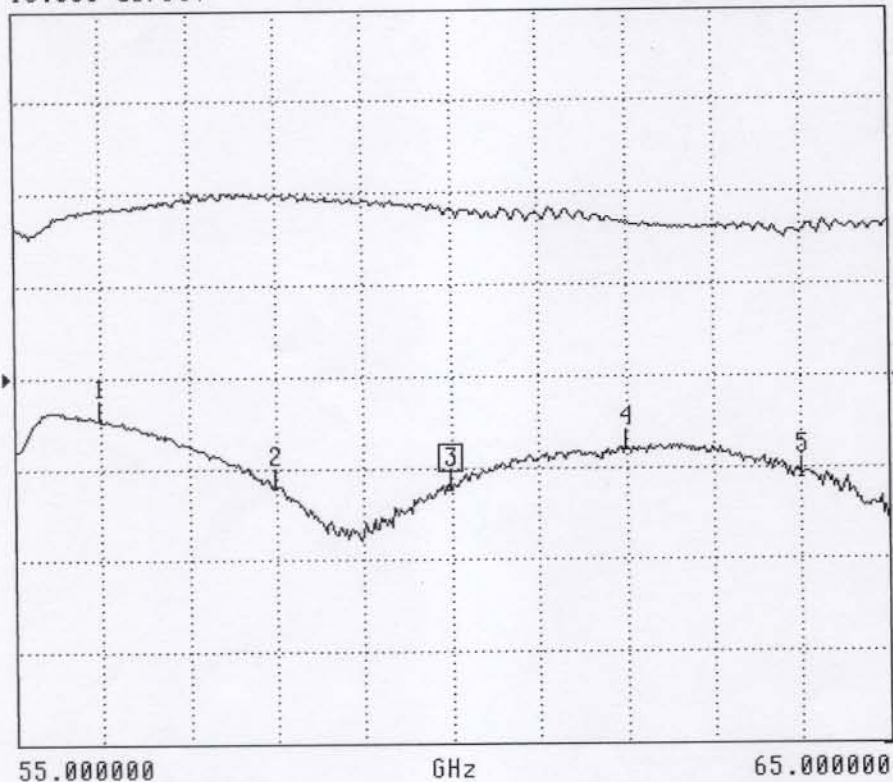
CH3: S21 FWD TRANS  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

CH 1 - S11  
 REFERENCE PLANE  
 0.0000 mm

MARKER 3  
 60.000000 GHz  
 -12.506 dB

MARKER TO MAX  
 MARKER TO MIN

- 1 56.000000 GHz  
-4.634 dB
- 2 58.000000 GHz  
-12.229 dB
- 4 62.000000 GHz  
-8.028 dB
- 5 64.000000 GHz  
-11.107 dB



MARKER READOUT  
 FUNCTIONS

37397A

MODEL: *NAD60 LNA 101*  
 DEVICE ID: *LV 020840-02*

DATE: 08/31/2002 15:59  
 OPERATOR: *Hyung Dong Choi*

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START: 55.000000 GHz  
 STOP: 65.000000 GHz  
 STEP: 0.025000 GHz

GATE START: -  
 GATE STOP: -  
 GATE: -  
 WINDOW: -

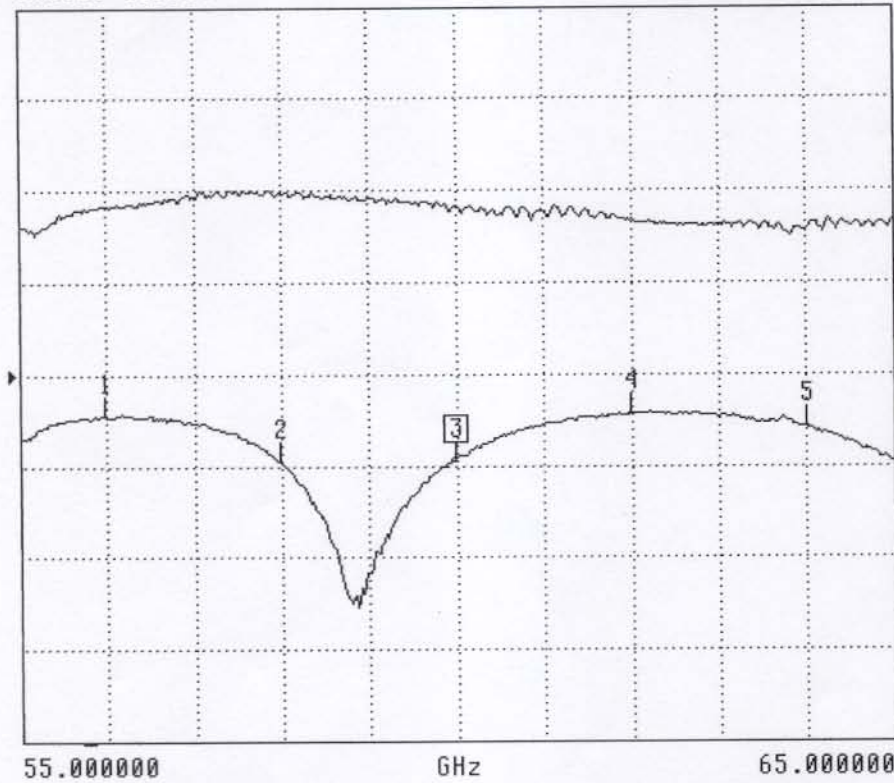
ERROR CORR: 12-TERM  
 AVERAGING: 1 PT  
 IF BNDWDTH: 1 KHz

PARAMETER:	-----CH2-----	-----CH4-----
NORMALIZATION:	-S22-	-S21-
REFERENCE PLANE:	OFF	OFF
SMOOTHING:	0.0000 mm	0.0000 mm
DELAY APERTURE:	0.0 PERCENT	0.0 PERCENT
	-	-

CH2: S22 REV REFL  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

CH4: S21 FWD TRANS  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

CH 2 - S22  
 REFERENCE PLANE  
 0.0000 mm



MARKER 3  
 60.000000 GHz  
 -9.588 dB

MARKER TO MAX  
 MARKER TO MIN

- 1 56.000000 GHz  
-4.495 dB
- 2 58.000000 GHz  
-9.614 dB
- 4 62.000000 GHz  
-4.362 dB
- 5 64.000000 GHz  
-5.861 dB

MARKER READOUT  
 FUNCTIONS

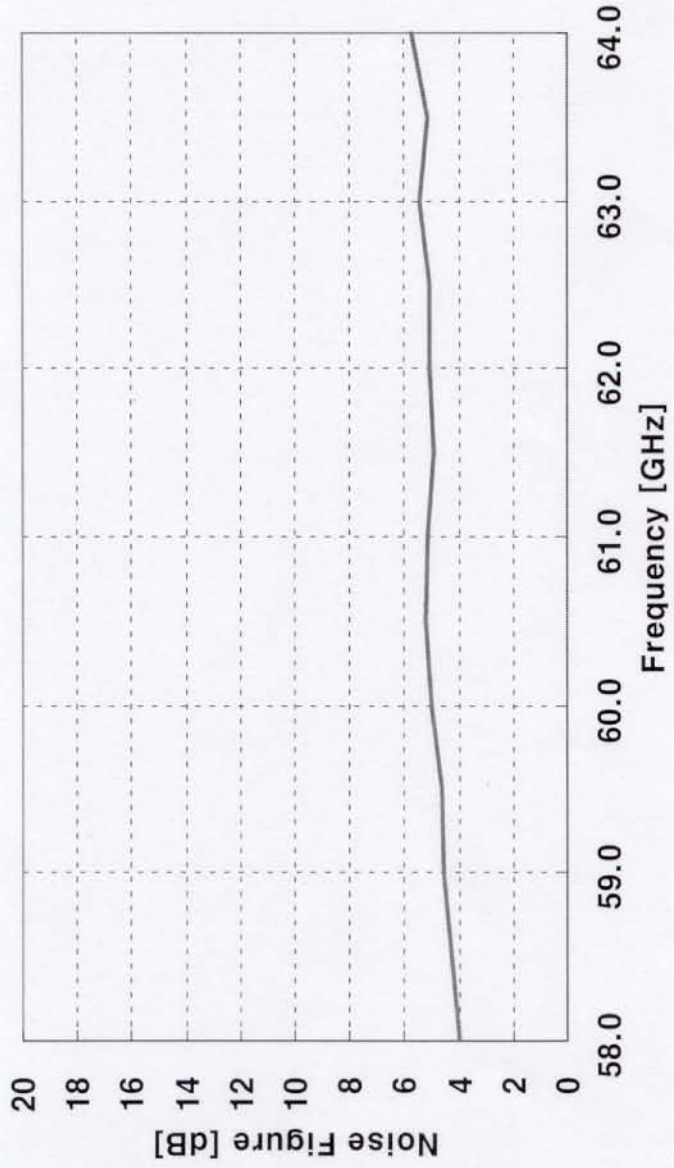
MODEL : NRDB04NA101

DEVICE ID : LV020830-02

OPERATOR : hyung Dong . Choi

DATA : Jun 2, 8, 30

Noise Figure Measured Result



37397A

MODEL: *NRD60LNA101*  
 DEVICE ID: *LVD20830-03*

DATE: 08/31/2002 16:16

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OPERATOR: *Hyung Dong. Choi*

START: 55.000000 GHz  
 STOP: 65.000000 GHz  
 STEP: 0.025000 GHz

GATE START: -  
 GATE STOP: -  
 GATE: -  
 WINDOW: -

ERROR CORR: 12-TERM  
 AVERAGING: 1 PT  
 IF BNDWDTH: 1 KHz

PARAMETER:  
 NORMALIZATION:  
 REFERENCE PLANE:  
 SMOOTHING:  
 DELAY APERTURE:

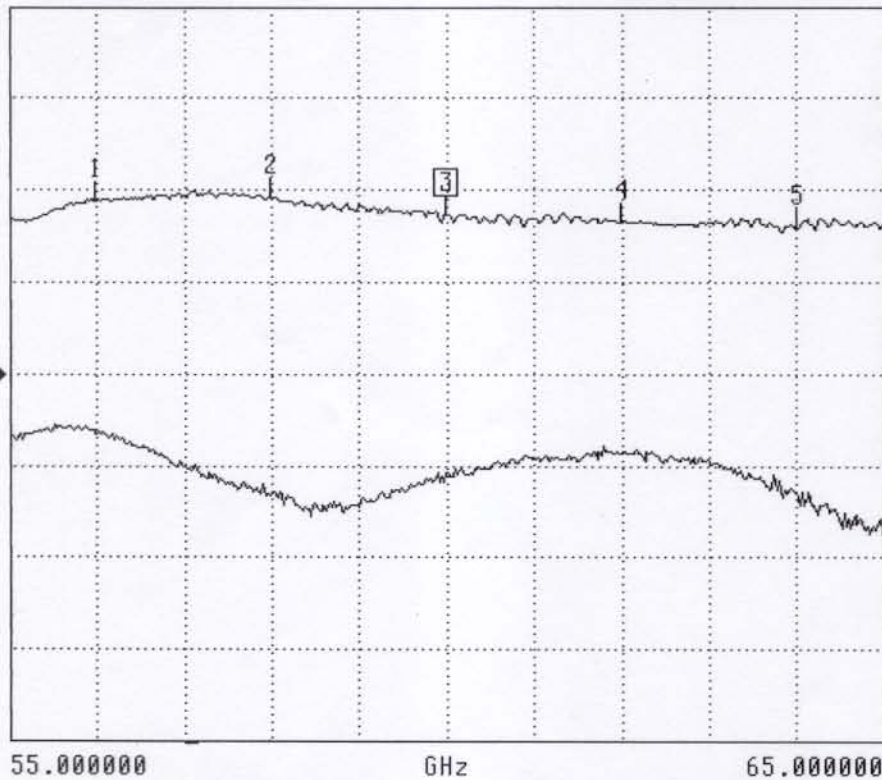
-----CH1-----  
 -S11-  
 OFF  
 0.0000 mm  
 0.0 PERCENT  
 -

-----CH3-----  
 -S21-  
 OFF  
 0.0000 mm  
 0.0 PERCENT  
 -

CH1: S11 FWD REFL  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

CH3: S21 FWD TRANS  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

CH 3 - S21  
 REFERENCE PLANE  
 0.0000 mm



MARKER 3  
 60.000000 GHz  
 17.350 dB

MARKER TO MAX  
 MARKER TO MIN

- 1 56.000000 GHz  
18.802 dB
- 2 58.000000 GHz  
19.169 dB
- 4 62.000000 GHz  
16.471 dB
- 5 64.000000 GHz  
15.828 dB

MARKER READOUT  
 FUNCTIONS

\* Description

D) Bias Condition

V<sub>b</sub> = +5V

I<sub>b</sub> = 70mA

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MODEL: *NRD60LNA101*  
 DEVICE ID: *LVD20830-03*

DATE: 08/31/2002 16:16  
 OPERATOR: *Hyung Dong Choi*

Page 1

START: 55.000000 GHz  
 STOP: 65.000000 GHz  
 STEP: 0.025000 GHz

GATE START: -  
 GATE STOP: -  
 GATE: -  
 WINDOW: -

ERROR CORR: 12-TERM  
 AVERAGING: 1 PT  
 IF BNDWDTH: 1 KHz

PARAMETER:  
 NORMALIZATION:  
 REFERENCE PLANE:  
 SMOOTHING:  
 DELAY APERTURE:

-----CH1-----  
 -S11-  
 OFF  
 0.0000 mm  
 0.0 PERCENT  
 -

-----CH3-----  
 -S21-  
 OFF  
 0.0000 mm  
 0.0 PERCENT  
 -

CH1: S11 FWD REFL  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

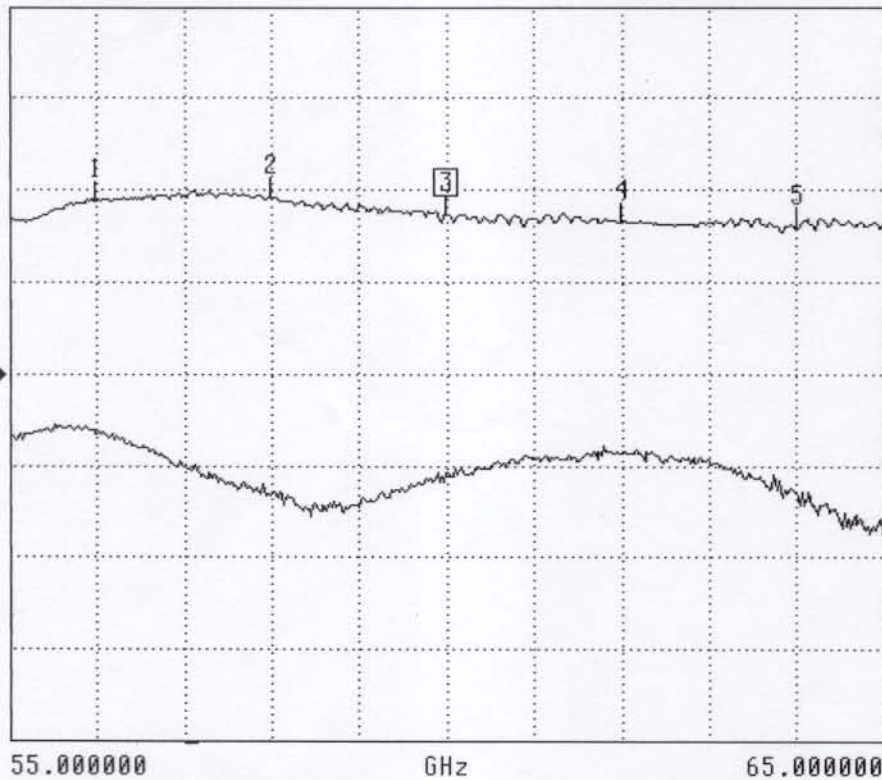
CH3: S21 FWD TRANS  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

CH 3 - S21  
 REFERENCE PLANE  
 0.0000 mm

MARKER 3  
 60.000000 GHz  
 17.350 dB

MARKER TO MAX  
 MARKER TO MIN

- 1 56.000000 GHz  
18.802 dB
- 2 58.000000 GHz  
19.169 dB
- 4 62.000000 GHz  
16.471 dB
- 5 64.000000 GHz  
15.828 dB



MARKER READOUT  
 FUNCTIONS

\* Description

1) Bias Condition

$V_m = +5V$

$I = 70mA$

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MODEL: NR760 LNA101  
 DEVICE ID: LV020840-02

DATE: 08/31/2002 16:18  
 OPERATOR: *Hyung Dong Choi*

Page 1

START: 55.000000 GHz  
 STOP: 65.000000 GHz  
 STEP: 0.025000 GHz

GATE START: -  
 GATE STOP: -  
 GATE: -  
 WINDOW: -

ERROR CORR: 12-TERM  
 AVERAGING: 1 PT  
 IF BNDWDTH: 1 KHz

PARAMETER:  
 NORMALIZATION:  
 REFERENCE PLANE:  
 SMOOTHING:  
 DELAY APERTURE:

-----CH1-----  
 -S11-  
 OFF  
 0.0000 mm  
 0.0 PERCENT  
 -

-----CH3-----  
 -S21-  
 OFF  
 0.0000 mm  
 0.0 PERCENT  
 -

CH1: S11 FWD REFL  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

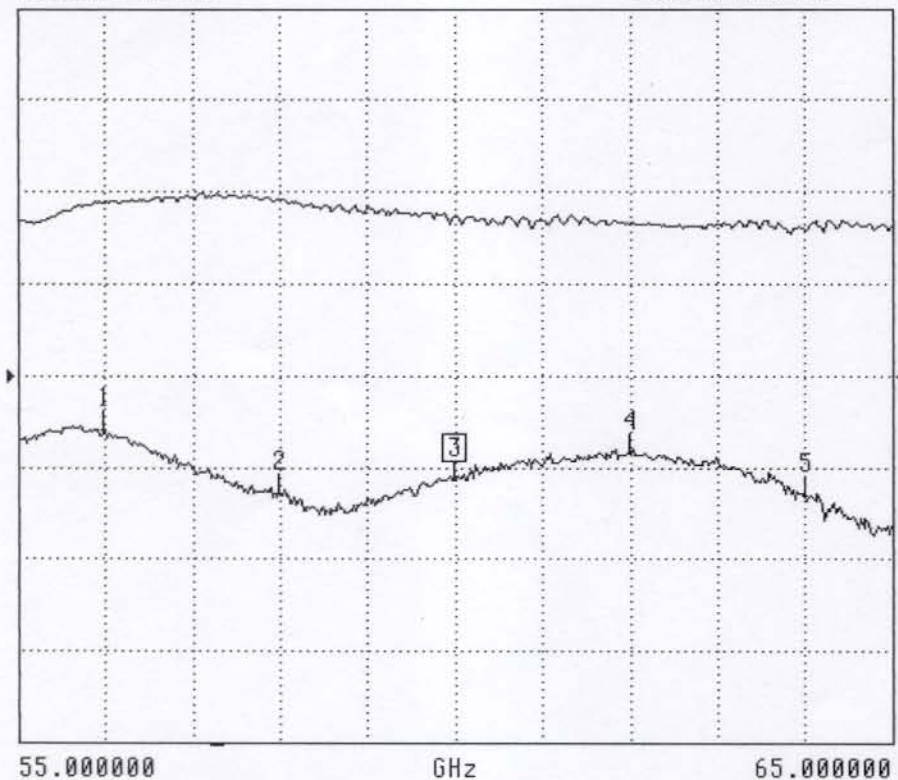
CH3: S21 FWD TRANS  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

CH 1 - S11  
 REFERENCE PLANE  
 0.0000 mm

MARKER 3  
 60.000000 GHz  
 -11.423 dB

MARKER TO MAX  
 MARKER TO MIN

- 1 56.000000 GHz  
-6.027 dB
- 2 58.000000 GHz  
-12.984 dB
- 4 62.000000 GHz  
-8.454 dB
- 5 64.000000 GHz  
-13.139 dB



MARKER READOUT  
 FUNCTIONS



37397A

MODEL: *NRD 60 LNA101*  
 DEVICE ID: *LV 020840-03*

DATE: 08/31/2002 16:20  
 OPERATOR: *Hyung Dong Choi*

Page 1

START: 55.000000 GHz  
 STOP: 65.000000 GHz  
 STEP: 0.025000 GHz

GATE START: -  
 GATE STOP: -  
 GATE: -  
 WINDOW: -

ERROR CORR: 12-TERM  
 AVERAGING: 1 PT  
 IF BNDWDTH: 1 KHz

PARAMETER:  
 NORMALIZATION:  
 REFERENCE PLANE:  
 SMOOTHING:  
 DELAY APERTURE:

-----CH2-----  
 -S22-  
 OFF  
 0.0000 mm  
 0.0 PERCENT  
 -

-----CH4-----  
 -S21-  
 OFF  
 0.0000 mm  
 0.0 PERCENT  
 -

CH2: S22 REV REFL  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

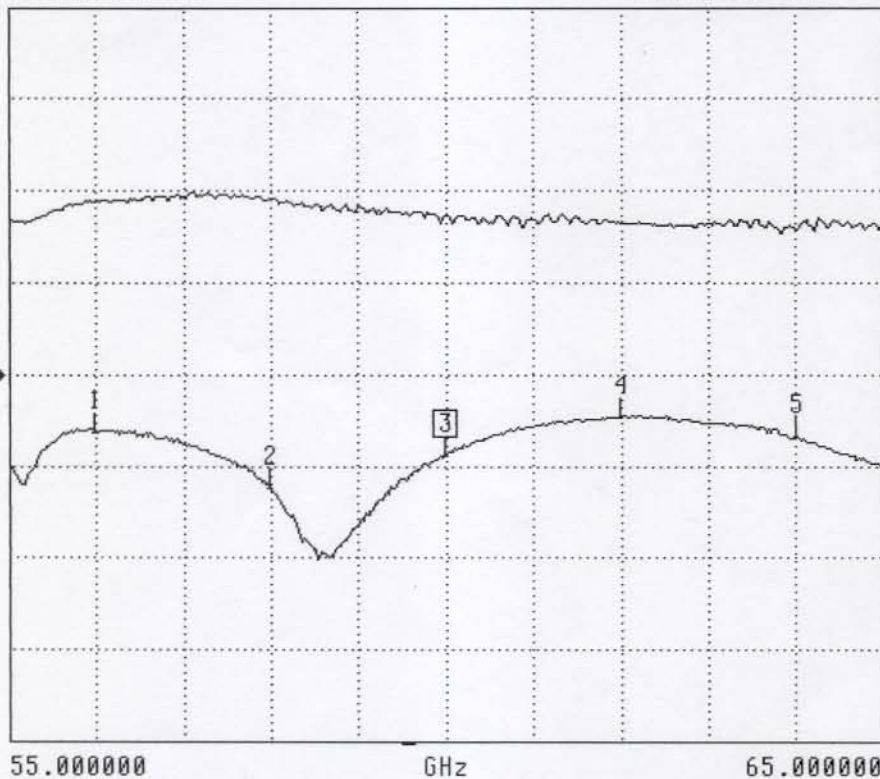
CH4: S21 FWD TRANS  
 LOG MAGNITUDE  
 REF=0.000 dB  
 10.000 dB/DIV

CH 2 - S22  
 REFERENCE PLANE  
 0.0000 mm

MARKER 3  
 60.000000 GHz  
 -8.955 dB

MARKER TO MAX  
 MARKER TO MIN

- 1 56.000000 GHz  
-6.330 dB
- 2 58.000000 GHz  
-12.454 dB
- 4 62.000000 GHz  
-4.670 dB
- 5 64.000000 GHz  
-6.852 dB



MARKER READOUT  
 FUNCTIONS

MODEL : NR060 LNA 101

DEVICE ID : LV020840-03

OPERATOR : huyng dang. chi

DATA : 2002.8.30

Noise Figure Measured Result

