ADVANTEST

ADVANTEST CORPORATION

R3267 Series

Spectrum Analyzer

Operation Manual (Vol.2)

MANUAL NUMBER FOE-8335034D00

Applicable models

R3264
R3267
R3273

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Safety Summary

To ensure thorough understanding of all functions and to ensure efficient use of this instrument, please read the manual carefully before using. Note that Advantest bears absolutely no responsibility for the result of operations caused due to incorrect or inappropriate use of this instrument.

If the equipment is used in a manner not specified by Advantest, the protection provided by the equipment may be impaired.

- **Warning Labels**

  Warning labels are applied to Advantest products in locations where specific dangers exist. Pay careful attention to these labels during handling. Do not remove or tear these labels. If you have any questions regarding warning labels, please ask your nearest Advantest dealer. Our address and phone number are listed at the end of this manual.

  Symbols of those warning labels are shown below together with their meaning.

  DANGER: Indicates an imminently hazardous situation which will result in death or serious personal injury.

  WARNING: Indicates a potentially hazardous situation which will result in death or serious personal injury.

  CAUTION: Indicates a potentially hazardous situation which will result in personal injury or a damage to property including the product.

- **Basic Precautions**

  Please observe the following precautions to prevent fire, burn, electric shock, and personal injury.

  - Use a power cable rated for the voltage in question. Be sure however to use a power cable conforming to safety standards of your nation when using a product overseas.
  - When inserting the plug into the electrical outlet, first turn the power switch OFF and then insert the plug as far as it will go.
  - When removing the plug from the electrical outlet, first turn the power switch OFF and then pull it out by gripping the plug. Do not pull on the power cable itself. Make sure your hands are dry at this time.
  - Before turning on the power, be sure to check that the supply voltage matches the voltage requirements of the instrument.
  - Be sure to plug the power cable into an electrical outlet which has a safety ground terminal. Grounding will be defeated if you use an extension cord which does not include a safety ground terminal.
  - Be sure to use fuses rated for the voltage in question.
  - Do not use this instrument with the case open.
  - Do not place objects on top of this product. Also, do not place flower pots or other containers containing liquid such as chemicals near this product.

- When the product has ventilation outlets, do not stick or drop metal or easily flammable objects into the ventilation outlets.
- When using the product on a cart, fix it with belts to avoid its drop.
- When connecting the product to peripheral equipment, turn the power off.

- **Caution Symbols Used Within this Manual**

  Symbols indicating items requiring caution which are used in this manual are shown below together with their meaning.

  DANGER: Indicates an item where there is a danger of serious personal injury (death or serious injury).

  WARNING: Indicates an item relating to personal safety or health.

  CAUTION: Indicates an item relating to possible damage to the product or instrument or relating to a restriction on operation.

- **Safety Marks on the Product**

  The following safety marks can be found on Advantest products.

   : ATTENTION - Refer to manual.

   : Protective ground (earth) terminal.

   : DANGER - High voltage.

   : CAUTION - Risk of electric shock.

- **Replacing Parts with Limited Life**

  The following parts used in the instrument are main parts with limited life.
  Replace the parts listed below after their expected lifespan has expired.
  Note that the estimated lifespan for the parts listed below may be shortened by factors such as the environment where the instrument is stored or used, and how often the instrument is used.
  The parts inside are not user-replaceable. For a part replacement, please contact the Advantest sales office for servicing.

  There is a possibility that each product uses different parts with limited life. For more information, refer to Chapter 1.

Main Parts with Limited Life

Part name	Life
Unit power supply	5 years
Fan motor	5 years
Electrolytic capacitor	5 years
LCD display	6 years
LCD backlight	2.5 years
Floppy disk drive	5 years

- **Hard Disk Mounted Products**

The operational warnings are listed below.

- Do not move, shock and vibrate the product while the power is turned on.
  Reading or writing data in the hard disk unit is performed with the memory disk turning at a high speed. It is a very delicate process.

- Store and operate the products under the following environmental conditions.
  An area with no sudden temperature changes.
  An area away from shock or vibrations.
  An area free from moisture, dirt, or dust.
  An area away from magnets or an instrument which generates a magnetic field.

- Make back-ups of important data.
  The data stored in the disk may become damaged if the product is mishandled. The hard disc has a limited life span which depends on the operational conditions. Note that there is no guarantee for any loss of data.

- **Precautions when Disposing of this Instrument**

When disposing of harmful substances, be sure dispose of them properly with abiding by the state-provided law.

Harmful substances: (1) PCB (polycarbon biphenyl)
(2) Mercury
(3) Ni-Cd (nickel cadmium)
(4) Other
Items possessing cyan, organic phosphorous and hexadic chromium and items which may leak cadmium or arsenic (excluding lead in sol der).

Example: fluorescent tubes, batteries

Environmental Conditions

This instrument should be only be used in an area which satisfies the following conditions:

- An area free from corrosive gas
- An area away from direct sunlight
- A dust-free area
- An area free from vibrations

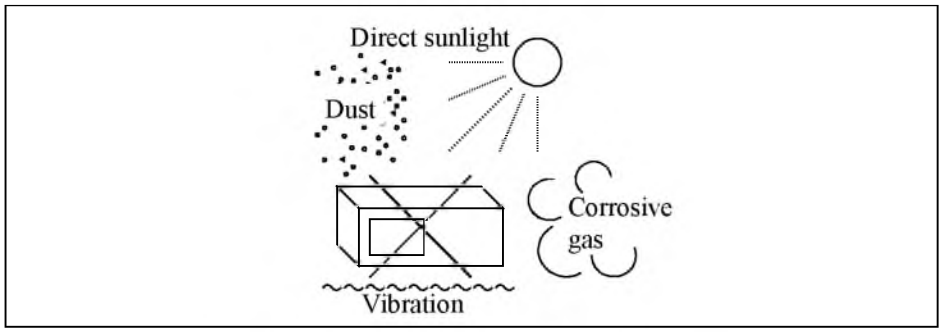

Figure-1 Environmental Conditions

- Operating position

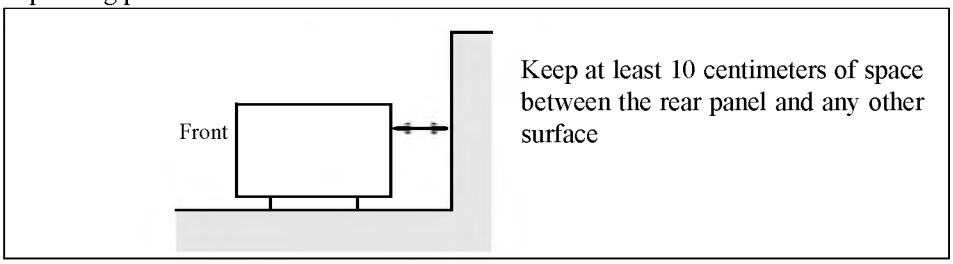

Figure-2 Operating Position

- Storage position

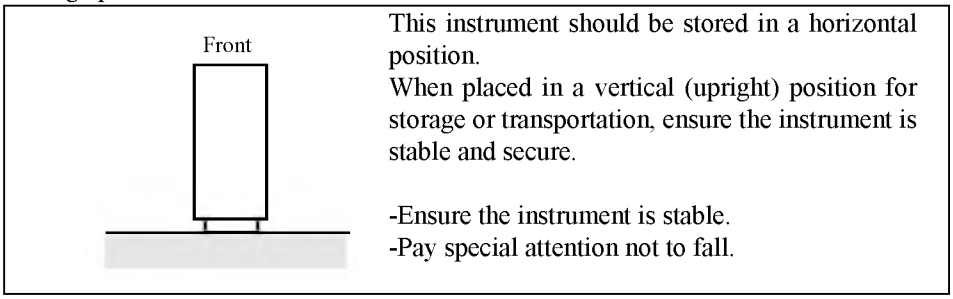

Figure-3 Storage Position

This instrument can be used safely under the following conditions:

- Altitude of up to 2000 m
- Installation Categories II
- Pollution Degree 2

PREFACE

This manual (VOL.2) describes how to test the performance of the R3267 Series.

A separate volume (VOL.1) describes the operations, performance and remote programming of the R3267 Series.

(1) Configuration of this manual

1. Performance Verification	Describes how to test performance.

(2) Typeface conventions used in this manual

- Panel keys and soft keys are printed in a contrasting typestyle to make them stand out from the text as follows:

  Panel keys: Boldface type — Example: **FREQ, FORMAT**
  Soft keys: Boldface and italic type — Example: ***Center, Trace Detector***

- When a series of key operations are described using a comma between two keys.
- There are various soft menus used to switch between two states such as ON/OFF and AUTO/MNL. For example, when turning off the ***Display ON/OFF*** function, the annotation "***Display ON/OFF***(OFF)" is used.
  When switching the ***RBW AUTO/MNL*** function to MNL, the annotation "***RBW AUTO/MNL***(MNL)" is used.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

1 PERFORMANCE VERIFICATION

This chapter explains how to check the R3267 Series. We recommend that you have a copy of the performance check sheet with you when performing these checks. If a problem occurs with the R3267 Series, contact ADVANTEST service center with measurement data filled out on the performance check sheet (including the model, serial number and so on). For information on how to ship the R3267 Series for repairs, refer to Section 1.5.3, "Transporting" in Vol.1.

NOTE: ***Perform the CAL ALL before starting this performance verification tests.***

1.1 Preparation

This chapter decribes the instruments using on this performance verification tests.

NOTE:

1. ***The R3267 Series to be tested should be warmed up for at least 30 minutes before starting tests. Any additional instrument used for this performance verification tests should be warmed up as appropriate.***
2. ***Make sure that the test instrument used meets its own published specifications and that all connectors are clean, before starting test. All connectors should be firmly connected.***

Table 1-1 Instrument Required (1 of 3)

No.	Instrument	Specification	Recommended Model	Quantity
1	Frequency Standard	Output Frequency: 10 MHz Stability: 5×10^{-10}/ day Output Impedance: 50 Ω Output Level: 1 Vpp or more	R3031 ADVANTEST	1
2	Frequency Counter	Resolution: 0.1 Hz	R5372 ADVANTEST	1
3	Signal Generator	Frequency Range: 10 MHz to 18 GHz Output Level: -15 dBm to +10 dBm Stability: 1×10^{-6}/ year	SMP02 (with B11 option) Rohde&Schwarz	1
4	Signal Generator	Frequency Range: 10 MHz to 27 GHz Output Level: -15 dBm to +10 dBm Stability: 1×10^{-6}/ year	SMP03 (with B11 option) Rohde&Schwarz	1

Table 1-1 Instrument Required (2 of 3)

No.	Instrument	Specification	Recommended Model	Quantity
5	Signal Generator	Frequency Range: 10 MHz to 2.5 GHz Output Level: -20 dBm to +10 dBm Residual SSB Phase Noise at 1 kHz offset: less than -115 dBc/Hz at 10 kHz offset: less than -124 dBc/Hz at 100 kHz offset: less than -130 dBc/Hz	HP8663A Hewlett Packard	1
6	Function Generator	Frequency Range: 10 mHz to 20 MHz Output Level: -10 dBm to +13 dBm Stability: 5×10^{-6}/ year	HP3325B Hewlett Packard	1
7	Power Meter Power Sensor	Frequency Range: 10 MHz to 26.5 GHz Input Level: 1µW to 100 mW Maximum SWR: 1.25 (26.5 GHz)	NRVS NRV-Z52 Rohde&Schwarz	1
8	1 dB Step Attenuator	Attenuation Range: 0 dB to 12 dB Frequency Range: DC to 18 GHz	HP8494H Hewlett Packard	1
9	10 dB Step Attenuator	Attenuation Range: 0 dB to 70 dB Frequency Range: DC to 18 GHz	HP8495H Hewlett Packard	1
10	Attenuator Driver		HP11713A Hewlett Packard	1
11	Terminator	Impedance: 50 Ω	RNA Rohde&Schwarz	1
12	3 dB Attenuator	Impedance: 50 Ω Attenuation: 3 dB SMA(m)-SMA(f)	DEF-000685-1 ADVANTEST	1
13	20 dB Attenuator	Impedance: 50 Ω Attenuation: 20 dB SMA(m)-SMA(f)	DEE-000480-1 ADVANTEST	1

Table 1-1 Instrument Required (3 of 3)

No.	Instrument	Specification	Recommended Model	Quantity
14	Power Splitter	Frequency Range: 10 MHz to 26.5 GHz Insertion Loss: 6 dB (nominal)	1579 Weinschel	1
15	Power Devider	Frequency Range: 20 MHz to 1.5 GHz Isolation: greater than 18 dB	DDUL-20A-100 Merrimac	1
16	Power Devider	Frequency Range: 2 GHz to 18 GHz Isolation: greater than 18 dB	DDUL-24M-10G Merrimac	1
17	Low-pass Filter	Cutoff Frequency: 2.2 GHz Rejection (3 GHz): greater than 40 dB Rejection (3.8 GHz): greater than 80 dB	DEE-001172-1 ADVANTEST	1
18	RF Cable	Impedance: 50 Ω BNC(m)-BNC(m) Length: Approx. 1.5 m	MI-09 ADVANTEST	2
19	RF Cable	Impedance: 50 Ω SMA(m)-SMA(m) Frequency Range: DC to 26.5 GHz Maximum SWR: 1.45 at 26.5 GHz Length: Approx. 0.7 m	A01002 ADAVNTEST	3
20	Adapter	N(m)-SMA(f)	Generic	5
21	Adapter	SMA(f)-SMA(f)	Generic	1
22	Adapter	N(f)-BNC(m)	Generic	1
23	Adapter	N(m)-BNC(f)	Generic	3

1.2 Procedure

This section describes the method of how to test the performance verification of the R3267 Series.

NOTE: ***In the following procedure, the values used are for the recommended instruments. When using other instruments, use the values conforming to the specifications of each instrument.***

1.2.1 Frequency Reference Output Accuracy

This section explains how to check the reference frequency accuracy of the spectrum analyzer using the calibration signal.

For checking the frequency reference output accuracy when the OPT21, OPT22 and OPT23 are installed, refer to Section 1.2.2, "Frequency Reference Output Accuracy (when the OPT21, OPT22 and OPT23 are installed)."

CAUTION: ***If the frequency reference of the R3267 Series is set to EXT, perform 15 minutes warm-up operation after instrument preset.***

Specifications:
30 MHz ± 3 Hz

Instruments Required

Instruments	QTY	Recommended Model
Frequency Standard	1	R3031
Frequency Counter	1	R5372
RF Cable BNC(m)-BNC(m)	2	MI-09
Adapter N(m)-BNC(f)	1	

Procedures:

Setup

1. Connect the frequency counter and the frequency standard as shown in Figure 1-1.

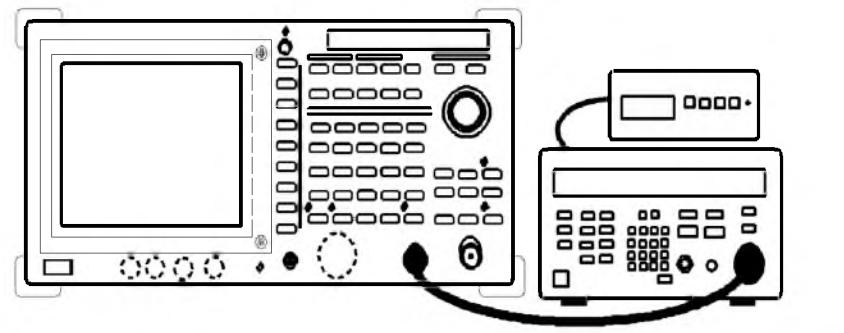

Figure 1-1 Setup for Measuring a Frequency Reference Output Accuracy

Setting the Frequency Counter

2. Set the R5372 controls as follows:
   Input: B
   Resolution: 0.1 Hz
   10 MHz Reference: External

Initialization

3. Press **SHIFT** and **CONFIG(PRESET)**.

4. Wait for the frequency counter to settle down.

5. Record the counter reading on the performance check sheet.

1.2.2 Frequency Reference Output Accuracy (when the OPT21, OPT22 and OPT23 are installed)

This section explains how to check the frequency reference output accuracy when the OPT21, OPT22 and OPT23 are installed. Input the signal from the signal generator into the spectrum analyzer, and measure it using the counter function of the spectrum analyzer.

CAUTION: ***If the frequency reference of the R3267 Series is set to EXT, perform 15 minutes warm-up operation after instrument preset.***

Specifications:

1 GHz ± 80Hz (OPT21)
1 GHz ± 20Hz (OPT22)
1 GHz ± 5Hz (OPT23)

Instruments Required

Instruments	QTY	Recommended Model
Frequency Standard	1	R3031
Signal Generator	1	SMP03
RF Cable BNC(m)-BNC(m)	1	A01002
RF Cable SMA(m)-SMA(m)	1	MI-09
Adapter N(m)-SMA(f)	1	

Procedures:

Setup

1. Connect the signal generator as shown in Figure 1-2.

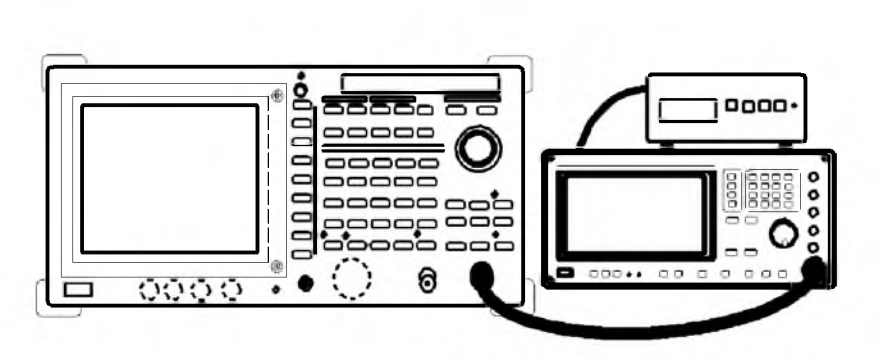

Figure 1-2 Connections for Measuring the Frequency Reference Output Accuracy (when the OPT21, OPT22 and OPT23 are installed)

Initialization

2. Press **SHIFT** and **CONFIG(PRESET)**.

Measurement using a center frequency of 1 GHz

3. Set the SMP03 controls as follows:
   Frequency: 1 GHz
   Output level: -10 dBm
   10 MHz Reference: External

4. Press **FREQ**, **1** and **GHz**.

5. Press **SPAN**, **1** and **MHz**.

6. Press **SCRH**.

7. Press **MEAS**, ***Counter*** and ***Resolution 1 Hz***.

8. Press ***Counter ON/OFF***(ON).

9. Record the frequency of the counter marker reading on the performance check sheet.

10. Press ***Counter ON/OFF***(OFF).

1.2.3 Accuracy of Frequency Readout and Frequency Counter

This section explains how to check the accuracy of the frequency readout and frequency counter using the signal generator.

Specifications:

Accuracy of Frequency Readout

± (0.01 × Frequency span + 0.15 × Resolution bandwidth + 10 Hz)

Accuracy of Frequency Counter marker SPAN < 1 GHz : S/N > 25 dB

± (5 Hz × N + 1 LSD)

N: Harmonic order

Instruments Required

Instruments	QTY	Recommended Model
Signal Generator	1	SMP03
RF Cable BNC(m)-BNC(m)	1	A01002
RF Cable SMA(m)-SMA(m)	1	MI-09
Adapter N(m)-SMA(f)	1	

Procedures:

Setup

1. Connect the signal generator as shown in Figure 1-3.

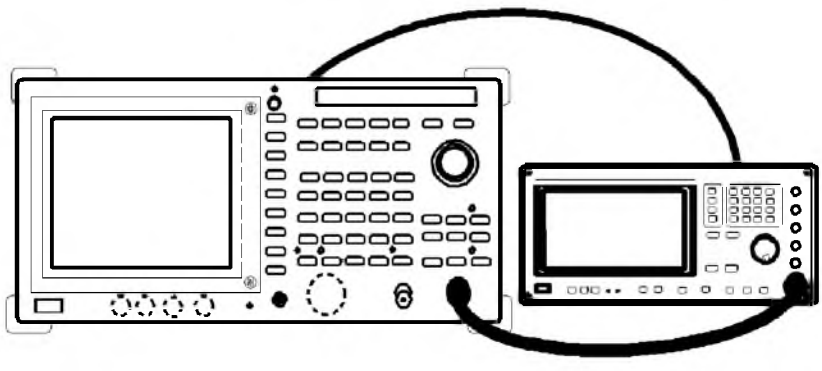

Figure 1-3 Setup for Measuring a Frequency Readout Accuracy and Frequency Counter

Initialization

2. Press **SHIFT** and **CONFIG(PRESET)**.

Measurement using a center frequency of 2 GHz

3. Set the SMP03 controls as follows:
   Frequency: 2 GHz
   Output level: -10 dBm
   10 MHz Reference: External

4. Press **FREQ**, **2** and **GHz**.

5. Press **SPAN**, **1** and **MHz**.

6. Press **SCRH**.

7. Record the frequency of the marker reading on the performance check sheet.

8. Repeat steps 5 through 7 for each frequency setting listed on Table 1-2.

Table 1-2 Frequency Span Setting at a Center Frequency of 2 GHz

Frequency span
10 MHz
20 MHz
50 MHz
100 MHz
2 GHz

Frequency measurement using the counter marker

9. Press **SPAN**, **1** and **MHz**.

10. Press **SRCH**.

11. Press **MEAS**, ***Counter*** and ***Resolution 1 Hz***.

12. Press ***Counter ON/OFF***(ON).

13. Record the frequency of the counter marker reading on the performance check sheet.

14. Press ***Counter ON/OFF***(OFF).

For the R3267/73
Measurement using a center frequency of 5 GHz

15. Set both the frequency on the SMP03 and the center frequency to 5 GHz and repeat steps 3 through 14.

For the R3273 only
Measurement using a center frequency of 11 GHz and 18 GHz

16. Set the frequency on the SMP03 and the center frequency to 11 GHz and repeat steps 3 through 14.

17. Set the frequency on the SMP03 and the center frequency to 18 GHz and repeat steps 3 through 14.

1.2.4 Frequency Span Accuracy

This section explains how to check the frequency span accuracy using signals from the signal generator and the delta marker.

Check the span accuracy using the signal frequency difference measured with the delta marker function.

Specifications:
less than ± 1 % of the frequency span setting

Instruments Required

Instruments	QTY	Recommended Model
Signal Generator	1	SMP03
RF Cable BNC(m)-BNC(m)	1	A01002
RF Cable SMA(m)-SMA(m)	1	MI-09
Adapter N(m)-SMA(f)	1	

Procedures:

Setup

1. Connect the signal generator as shown in Figure 1-4.

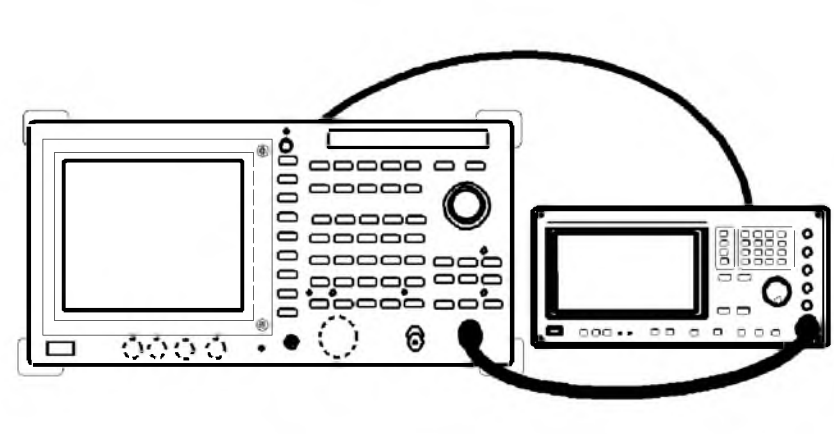

Figure 1-4 Setup for Measuring a Frequency Span Accuracy

Setting the signal generator

2. Set the SMP03 controls as follows:
   Output level: -5 dBm
   10 MHz Reference: External

Initialization

3. Press **SHIFT** and **CONFIG(PRESET)**.

Measurement of the span accuracy

4. Set the frequency of the SMP03 to 1.999992 GHz.
5. Press **FREQ**, **2** and **GHz**.
6. Press **SPAN**, **2, 0** and **kHz**.
7. Press **SINGLE**.
8. Press **SRCH**, after the sweep has completed.
9. Press **MKR**, ***Delta Marker*** and ***Delta Marker ON/OFF*** (ON).
10. Set the frequency of the SMP03 to 2.000008 GHz.
11. Press **SINGLE**.
12. Press **SRCH**, after the sweep has completed.
13. Record the frequency of the delta marker reading on the performance check sheet.
14. Repeat steps 4 through 13 for each frequency setting listed on Table 1-3.

Table 1-3 Center/Span Frequencies for the R3267

SMP03 1st Frequency	SMP03 2nd Frequency	Center Frequency	Frequency Span	Remarks
1.999980 GHz	2.000020 GHz	2 GHz	50 kHz	
1.999940 GHz	2.000160 GHz	2 GHz	400 kHz	
1.9992 GHz	2.0008 GHz	2 GHz	2 MHz	
1.998 GHz	2.002 GHz	2 GHz	5 MHz	
1.996 GHz	2.004 GHz	2 GHz	10 MHz	
1.992 GHz	2.008 GHz	2 GHz	20 MHz	
1.98 GHz	2.02 GHz	2 GHz	50 MHz	
1.96 GHz	2.04 GHz	2 GHz	100 MHz	
1.92 GHz	2.08 GHz	2 GHz	200 MHz	
1.8 GHz	2.2 GHz	2 GHz	500 MHz	
1.6 GHz	2.4 GHz	2 GHz	1 GHz	
1.2 GHz	2.8 GHz	2 GHz	2 GHz	
2.4 GHz	5.6 GHz	4 GHz	4 GHz	R3267/73
0.8 GHz	7.2 GHz	4 GHz	8 GHz	R3267/73

For the R3273 only
Measurement for a center frequency of 10 GHz and 17 GHz.

15. Repeat steps 4 through 13 for each frequencies setting listed on Table 1-4.

Table 1-4 Center/Span Frequencies for the R3273

SMP03 1st Frequency	SMP03 2nd Frequency	Center Frequency	Frequency Span
9.996 GHz	10.004 GHz	10 GHz	10 MHz
9.96 GHz	10.04 GHz	10 GHz	100 MHz
9.6 GHz	10.4 GHz	10 GHz	1 GHz
9.2 GHz	10.8 GHz	10 GHz	2 GHz
16.996 GHz	17.004 GHz	17 GHz	10 MHz
16.96 GHz	17.04 GHz	17 GHz	100 MHz
16.6 GHz	17.4 GHz	17 GHz	1 GHz
16.2 GHz	17.8 GHz	17 GHz	2 GHz
8 GHz	12 GHz	10 GHz	5 GHz
6 GHz	14 GHz	10 GHz	10 GHz
2.4 GHz	17.6 GHz	10 GHz	19 GHz

1.2.5 Calibration Amplitude Accuracy

This section explains how to check the output level accuracy of the calibration signal.

Specifications:
-10 dBm ± 0.3 dB

Instruments Required

Instruments	QTY	Recommended Model
Power Meter and Power Sensor	1	NRVS / NRV-Z52
Adapter N(f)-BNC(m)	1	
Adapter N(m)-SMA(f)	1	

Procedures:

Initialization

1. Set the unit to dBm on the NRVS.
2. Perform the zeroing of the NRVS.
3. Press **SHIFT** and **CONFIG(PRESET)**.

Measuring of the CAL OUT level

4. Connect the power sensor to CAL OUT connector through the adapter, N(f)-BNC(m) and N(m)-SMA(f).
5. Set the correction frequency to 30 MHz on the NRVS.
6. Record the level of the power meter reading on the performance check sheet.

1.2.6 IF Gain Uncertainty

This section explains how to check IF gain errors in the RBWs of 1 MHz, 300 kHz and 3 kHz. If the reference level is reduced, the IF gain is increased. The IF gain error can be measured if you deduce the input level in steps of 1 dB or 10 dB in order to reduce the reference level in steps of 1 dB or 10 dB as in the input level. In addition, the frequency reference source signal of the generator is supplied from the spectrum analyzer.

Specifications:

Less than ± 0.5 dB Range: 0 to -50 dBm 10 dB Attenuation
Less than ± 0.7 dB Range: 0 to -80 dBm 10 dB Attenuation

Instruments Required

Instruments	QTY	Recommended Model
Function Generator	1	HP3325B
1 dB Step Attenuator	1	HP8494H
10 dB Step Attenuator	1	HP8495H
Attenuator Driver	1	HP11713A
RF Cable BNC(m)-BNC(m)	3	MI-09
Adapter N(m)-BNC(f)	3	

Procedures:

Setup

1. Connect the signal generator and step attenuator as shown in Figure 1-5.

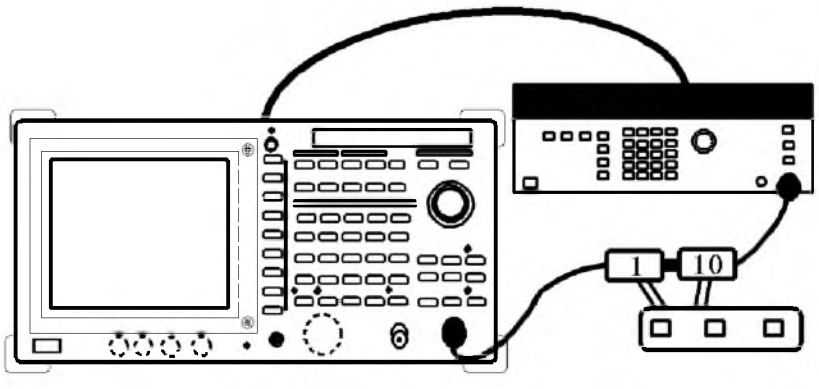

Figure 1-5 Setup for Measuring a IF Gain Uncertainty

Setting the function generator

2. Set the HP3325B controls as follows:
   Frequency: 11 MHz
   Output level: -5 dBm
   10MHz Reference:External

Setting the step attenuator

3. Set the HP8494H and HP8495H to 0 dB using the HP11713A.

Initialization

4. Press **SHIFT** and **CONFIG(PRESET)**.

Setting the measurement conditions

5. Press **FREQ, 1, 1** and **MHz**.
6. Press **SPAN** and ***Zero Span***.
7. Press **LEVEL,** ***dB/div*** and ***1dB/div***.
8. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **1** and **MHz**.
9. Press ***VBW AUTO/MNL***(MNL), **1** and **Hz**.
10. Adjust the output level on the HP3325B to position the trace peak to a level 5 divisions below the reference line.
11. Press **SINGLE.**
12. Press **SINGLE,** after the sweep is completed.
13. Press **A,** ***View A*** and **SRCH,** after the sweep is completed.
14. Record the marker readout at the reference value box on the performance check sheet.
15. Press **B,** ***Write B*** and **MKR.**
16. Press ***Delta Marker,*** **RETURN** and ***Trace Marker Move.***

IF gain error measurement

17. Set the attenuation level to 1 dB on the HP11713A.
18. Press **LEVEL, 1** and **MHz(-dBm)** to set the reference level to -1 dBm.
19. Press **SINGLE.**

20. Press **SINGLE,** after the sweep is completed.
21. Press **SRCH,** after the sweep is completed.
22. Record the marker readout on the performance check sheet.
23. Repeat steps 17 through 22 for each frequency setting listed on Table 1-5.
24. Repeat steps 2 through 23 for each frequency setting listed on Table 1-6.

Table 1-5 IF Gain Uncertainty Setting

Step attenuator	Reference level
1 dB	-1 dBm
2 dB	-2 dBm
3 dB	-3 dBm
4 dB	-4 dBm
5 dB	-5 dBm
6 dB	-6 dBm
7 dB	-7 dBm
8 dB	-8 dBm
9 dB	-9 dBm
10 dB	-10 dBm
20 dB	-20 dBm
30 dB	-30 dBm
40 dB	-40 dBm
50 dB	-50 dBm
60 dB	-60 dBm
70 dB	-70 dBm
80 dB	-80 dBm *

*: Make a measurement only when the RBW is at 3 kHz.

Table 1-6 RBW Setting

RBW setting
3 kHz
300 kHz

1.2.7 Input Attenuator Switching Accuracy

This section explains how to check the input attenuator switching accuracy. The signal generator frequency reference source is supplied from the spectrum analyzer. The input attenuator switching accuracy is calculated based on the 10 dB attenuator.

IF Gain uncertainty is measured when the resolution bandwidth is set to 3kHz and the result is filled in on the IF Gain uncertainty of the performance check sheet.

NOTE: ***You may hear some clicking noises during the tests. This is normal.***

Specifications:

Reference to 10 dB input attenuation, in the range of 20 dB to 70 dB.

R3264
Less than ± 1.1 dB/5 dB step 9 kHz to 3.5 GHz: Maximum deviation ± 2 dB

R3267
Less than ± 1.1 dB/5 dB step 100 Hz to 8 GHz: Maximum deviation ± 2 dB

R3273
Less than ± 1.1 dB/10 dB step 100 Hz to 12.4 GHz: Maximum deviation ± 2 dB
Less than ± 1.3 dB/10 dB step 12.4 GHz to 18 GHz: Max. deviation ± 2.5 dB
Less than ± 1.8 dB/10 dB step 18 GHz to 26.5 GHz: Max. deviation ± 3.5 dB

Instruments Required

Instruments	QTY	Recommended Model
Signal Generator	1	SMP02
RF Cable SMA(m)-SMA(m)	2	A01002
RF Cable BNC	1	MI-09
Adapter N(m)-SMA(f)	2	

Procedures:

Setup

1. Connect the signal generator as shown in Figure 1-6.

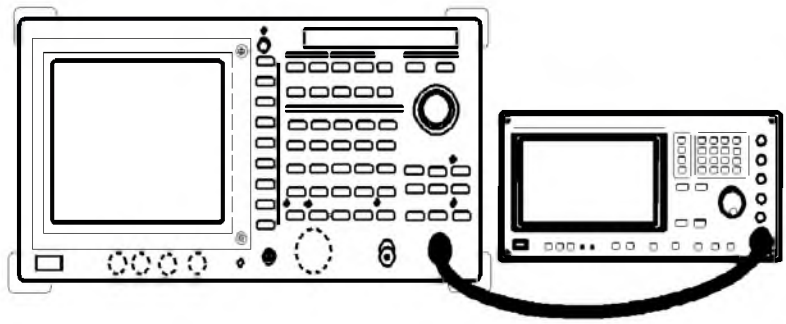

Figure 1-6 Setup for Measuring an Input Attenuator Accuracy

Setting the signal generator

2. Set the SMP03 controls as follows:
   Frequency: 2 GHz(R3264)
   4 GHz(R3267/73)
   Output level: -5 dBm

Initialization

3. Press **SHIFT** and **CONFIG(PRESET)**.

Setting the measurement conditions

4. Press **FREQ, 2** and **GHz**(R3264).
   Press **FREQ, 4** and **GHz**(R3267/73).
5. Press **SPAN 1, 0** and **kHz**.
6. Press **LEVEL, 0, MHz(-dBm)**, ***dB/div*** and ***1 dB/div***.
7. Press **COUPLE**, ***RBW AUTO/MNL***(MNL) and **3** and **kHz**.
8. Press ***VBW AUTO/MNL***(MNL), **1, 0** and **Hz**.
9. Adjust the output level on the SMP02 to position the trace peak to a level 5 divisions below the reference line.
10. Press **SINGLE**.
11. Press **SINGLE**, after the sweep has completed.
12. Press **SRCH**, after the sweep has completed.
13. Record the marker readout at the reference value box on the performance check sheet.

14. Press **ATT** and ***ATT AUTO/MNL***(MNL).

Measuring the attenuator switching accuracy

15. Press **ATT, 2, 0** and **GHZ(dB)** to change the attenuator setting.

16. Press **SINGLE**.

17. Press **SINGLE**, after the sweep has completed.

18. Press **SRCH**, after the sweep has completed.

19. Calculate the switching accuracy using the marker readout and the expression shown below.
    Switching accuracy = Reference Value (in step 13) - Marker readout (in step 18) + IF gain uncertainty (in section 1.2.5)

20. Record the switching accuracy on the performance check sheet.

21. Repeat steps 15 through 20 for each frequency setting listed on Table 1-7.

Table 1-7 Input Attenuator Setting

Input Attenuator
20 dB
30 dB
40 dB
50 dB
60 dB
70 dB

Step-to-step accuracy calculation

22. Calculate the step-to-step accuracy for the 20, 30, 40, 50, 60 and 70 dB ATT settings using the switching accuracy calculated in step 19 together with the following expression, and record the results on the performance check sheet.

    Step-to-step accuracy for an input attenuation of x dB = A - B

    A: Switching accuracy for an input attenuation of x dB

    B: Switching accuracy for an input attenuation of (x -10) dB

For the R3273

23. Repeat steps 2 thru 22 for a frequency of 15 GHz (which is set on the SMP02 and used as the center frequency).

24. Repeat steps 2 thru 22 for a frequency of 18 GHz (which is set on the SMP02 and used as the center frequency).

1.2.8 Frequency Response

This section explains how to check the frequency response of the spectrum analyzer. The signal generator signal is fed through a power splitter and the power level is monitored with a power meter. A signal of 30 MHz is positioned at the display center of the spectrum analyzer so that its level can be used as the reference value.
For each frequency band, a signal with the specified frequency is set so that it can always be displayed in the display center of the spectrum analyzer and the level relative to the 30 MHz signal is measured.

Specifications:

Set the input attenuator to 10 dB. The frequency ranges for frequency bands 1 thru 3 are valid only after the preselector has been adjusted.

R3264	Frequency range	Frequency band
± 1.5 dB	9 kHz to 3.5 GHz	0

Frequency response relative to the 30 MHz: less than ± 3 dB

R3267	Frequency range	Frequency band
± 1.5 dB	100 Hz to 3.5 GHz	0
± 1.0 dB	50 MHz to 2.6 GHz	0
± 1.5 dB	1.6 GHz to 3.5 GHz	1
± 1.5 dB	3.5 GHz to 7.0 GHz	2
± 1.5 dB	6.9 GHz to 8.0 GHz	3

Frequency response relative to the 30 MHz: less than ± 3 dB
Band switching incertainly: less than ± 0.5 dB

R3273	Frequency range	Frequency band
± 1.5 dB	100 Hz to 3.5 GHz	0
± 1.0 dB	50 MHz to 2.6 GHz	0
± 1.5 dB	3.5 GHz to 7.5 GHz	1
± 3.5 dB	7.4 GHz to 15.4 GHz	2
± 4.0 dB	15.4 GHz to 26.5 GHz	3

Frequency response relative to the 30 MHz: less than ± 5 dB
Band switching incertainly: less than ± 0.5 dB

Instruments Required

Instruments	QTY	Recommended Model
Signal Generator	1	SMP03
Power Meter and Power Sensor	1	NRVS / NRV-Z52
Power Splitter	1	1579
RF Cable SMA(m)-SMA(m)	2	A01002
Adapter N(m)-SMA(f)	3	

Procedures:

Initializing the Power meter with the sensor

1. Set the unit to dBm on the NRVS.
2. Perform the zeroing of the NRVS.

Setup

3. Connect the signal generator as shown in Figure 1-7.

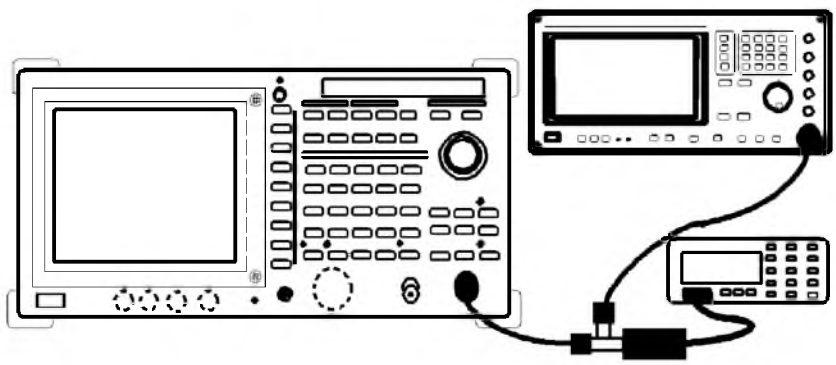

Figure 1-7 Setup for Measuring a Frequency Response

Initialization

4. Press **SHIFT** and **CONFIG(PRESET)**.

Setting the measurement conditions

5. Press **FREQ, 3, 0** and **MHz**.
6. Press **SPAN, 4, 0** and **MHz**.
7. Press **LEVEL, 5** and **MHz(-dBm)**.
8. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **3** and **MHz**.
9. Press ***VBW AUTO/MNL***(MNL), **1** and **kHz**.
10. Press **LEVEL**, ***dB/div*** and ***1 dB/div***.
11. Press **FREQ**, ***CF Step Size AUTO/MNL***(MNL), **1, 0**, **0** and **MHz**.
12. Set the SMP03 controls as follows:
    Frequency: 30 MHz
    Output Level: -4 dBm
    Frequency step size: 100 MHz

13. Set the correction frequency to the 30 MHz on the NRVS.
14. Press **SRCH**.
15. Press ***Cont Peak ON/OFF***(ON).
16. Adjust the output level on the SMP03 using the data knob to obtain a marker readout of -10±0.09 dBm on the spectrum analyzer.
17. Set the display mode of the NRVS to the relative.

Measuring the frequency band 0

18. (For the R3267 only) Press **FREQ,** ***more 1/2*** and ***Preselector 1.6 G/3.6 G***(3.6G).
19. Press **FREQ, 1, 0, 0** and **MHz**.
20. Set the frequency of the SMP03 to 100 MHz.
21. Set the correction frequency on the NRVS to 100 MHz.
22. Adjust the output level on the SMP03 (using the data knob) so that the level of the marker readout is -10 dBm±0.09 dB.
23. Record the reverse sign value of the power meter reading on the performance check sheet.
24. Press **FREQ** and △.
25. Increase the frequency on the SMP03 by one step.
26. Set the correction frequency of the NRVS to the entire frequency.
27. Repeat steps 22 through 26 up to the center frequency to 3.5 GHz.

Calculating the maximum deviation

28. Calculate the maximum deviation for each of the frequency bands, 100 Hz thru 3.5 GHz and 50 MHz thru 2.6 GHz, by subtracting the minimum value from the maximum value and then dividing the difference by 2. Record the result on the performance check sheet.

NOTE: ***Perform the measurement from step 29 onwards for the R3267 and R3273 only.***

Measuring the frequency band 1

29. (For the R3267 only) Press **FREQ,** ***more 1/2*** and ***Preselector 1.6 G/3.6 G***(1.6G).
30. Press **FREQ, 1, ., 7** and **GHz**(R3267), **FREQ, 3, ., 6** and **GHz**(R3273).

31. Set the frequency of the SMP03 to 1.7 GHz(R3267), 3.6 GHz(R3273).
32. Set the correction frequency on the NRVS to 1.7 GHz(R3267), 3.6 GHz(R3273).
33. Press **FREQ,** ***more1/2, Presel Tune*** and ***Auto Tune***.
34. After the auto tuning is completed, adjust the output level on the SMP03 (using the data knob) so that the level of the marker readout is -10 dBm±0.09 dB.
35. Record the reverse sign value of the power meter on the performance check sheet.
36. Press **FREQ** and △.
37. Increase the frequency on the SMP03 by one step.
38. Set the correction frequency of the NRVS to entire frequency.
39. Repeat steps 33 through 38 up to the following frequency.
    R3267: 3.5 GHz
    R3273: 7.4 GHz

Calculating the maximum deviation

40. Calculate the maximum deviation by subtracting the minimum value from the maximum value on the performance check sheet and then dividing the difference by 2. Record the result on the performance check sheet.

Measuring the frequency band 2

41. Press **FREQ, 3, ., 6** and **GHz**(R3267), **FREQ, 7, ., 5** and **GHz**(R3273).
42. (For the R3273 only) Press ***CF Stepsize AUTO/MNL***(MNL)**, 2, 0, 0** and **MHz**.
43. Set the frequency of the SMP03 to 3.6 GHz(R3267), 7.5 GHz(R3273).
44. (For the R3273 only) Set the frequency step size on the SMP03 to 200 MHz.
45. Set the correction frequency on the NRVS to 3.6 GHz(R3267), 7.5 GHz(R3273).
46. Press **FREQ,** ***more1/2, Presel Tune*** and ***Auto Tune***.
47. After the auto tuning is completed, adjust the output level on the SMP03 (using the data knob) so that the level of the marker readout is -10 dBm±0.09 dB.
48. Record the reverse sign value of the power meter on the performance check sheet.
49. Press **FREQ** and △.
50. Increase the frequency on the SMP03 by one step.
51. Set the correction frequency of the NRVS to entire frequency.

52. Repeat steps 46 through 51 up to the following frequency.
    R3267: 6.9 GHz
    R3273: 15.3 GHz

Calculating the maximum deviation

53. Calculate the maximum deviation by subtracting the minimum value from the maximum value on the performance check sheet and then dividing the difference by 2. Record the result on the performance check sheet.

Measuring the frequency band 3

54. Press **FREQ,** 7 and **GHz**(R3267), **FREQ, 1, 5, ., 4** and **GHz**(R3273).

55. Set the frequency of the SMP03 to 7 GHz(R3267), 15.4 GHz(R3273).

56. Set the correction frequency on the NRVS to 7 GHz(R3267), 15.4 GHz(R3273).

57. Press **FREQ,** ***more1/2, Presel Tune*** and ***Auto Tune***.

58. After the auto tuning is completed, adjust the output level on the SMP03 (using the data knob) so that the level of the marker readout is -10 dBm±0.09 dB.

59. Record the reverse sign value of the power meter on the performance check sheet.

60. Press **FREQ** and △.

61. Increase the frequency on the SMP03 by one step.

62. Set the the correction frequency of the NRVS to entire frequency.

63. Repeat steps 57 through 62 up to the following frequency.
    R3267: 7.9 GHz
    R3273: 26.4 GHz

Calculating the maximum deviation

64. Calculate the maximum deviation by subtracting the minimum value from the maximum value on the performance check sheet and then dividing the difference by 2. Record the result on the performance check sheet.

1.2.9 Scale Fidelity

This section explains how to check the display accuracy for 1 dB/div and 10 dB/div in the log scale and x1 in the linear scale.
The function generator frequency reference source is supplied from the spectrum analyzer.

Specifications:

log scales
Less than ± 0.2 dB/1 dB
Less than ± 0.85 dB over 0 dB to 90 dB range

Linear scales
Less than ± 5% of Reference Level

Instruments Required

Instruments	QTY	Recommended Model
Function Generator	1	HP3325B
1 dB Step Attenuator	1	HP8494H
10 dB Step Attenuator	1	HP8495H
Attenuator Driver	1	HP11713A
RF Cable BNC(m)-BNC(m)	3	MI-09
Adapter BNC(f)-N(m)	3	

Procedures :

Setup

1. Connect the signal generator and step attenuator as shown in Figure 1-8.

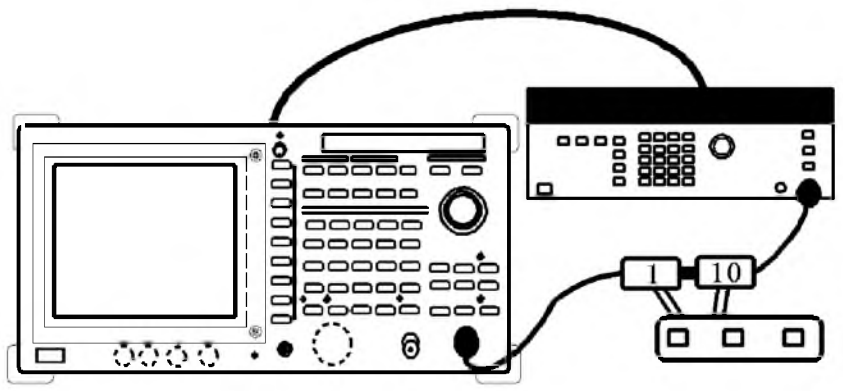

Figure 1-8 Setup for Measuring a Scale Fidelity

Setting the function generator

2. Set the HP3325B controls as follows:
   Frequency: 11 MHz
   Output level: 0 dBm

3. Set the HP8494H and HP8495H to 0 dB using the HP11713A.

Initialization

4. Press **SHIFT** and **CONFIG(PRESET)**.

Setting the measurement conditions

5. Press **FREQ, 1, 1** and **MHz**.

6. Press **SPAN** and ***Zero Span***.

7. Press **LEVEL, 0, MHz(-dBm)**, ***dB/div*** and ***1dB/div***.

8. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **1** and **MHz**.

9. Press ***VBW AUTO/MNL***(MNL), **1** and **Hz**.

10. Press **MKR**.

Measuring the 1 dB/div Scale fidelity

11. Adjust the output level on the HP3325B so that the marker readout is 0.00±0.1 dB.

12. Press **A**, ***View A***, **B**, ***Write B***, **MKR**, ***Delta Marker***, **RETURN** and ***Trace Marker Move***.

13. Increase the attenuation of the HP8494H by 1 dB.

14. Press **SINGLE**.

15. Press **SINGLE,** after the sweeping has completed.

16. Record the level of the delta marker reading in the performance check sheet.

17. Calculate the incremental error according to the following formula.and record the result on the performance check sheet.
    Incremental error = (the level of the current delta marker reading) - (previous delta marker level) + 1 dB

18. Repeat steps 13 through 17 for each output level setting listed on Table1-8.

Table 1-8 1 dB Step Scale Fidelity Setting

HP8494H output level
2 dB
3 dB
4 dB
5 dB
6 dB
7 dB
8 dB
9 dB
10 dB

Measuring the 10 dB/div scale fidelity

19. Adjust the HP8494H output level to 0 dB.
20. Press **REPEAT**.
21. Press **LEVEL** and ***10 dB/div***.
22. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **3**, **kHz, A,** ***Write A*****, B,** ***Blank B*****, MKR** and ***Normal Marker***.
23. On the HP3325B, adjust the amplitude until the marker reading 0.00 dBm exactly.
24. Record the HP3325B setting level at the reference output level on the performance check sheet.
25. Press **A,** ***View A*****, B,** ***Write B*****, MKR,** ***Delta Marker*****, RETURN** and ***Marke Trace Move***.
26. Adjust the HP8495H output level to 10 dB.
27. Press **SINGLE**.
28. Press **SINGLE**, after the averaging has completed.
29. Record the level of the delta marker reading on the performance check sheet.
30. Repeat steps 26 through 29 for each attenuation level setting listed on Table 1-9.

Table 1-9 HP8495H and HP3325B Settings

HP8495H Setting	HP3325B Setting (With reference to the reference output level)
20 dB	0 dB
30 dB	0 dB
40 dB	0 dB
50 dB	0 dB
60 dB	0 dB
70 dB	0 dB
80 dB	-10 dB
90 dB	-20 dB

Measuring the linear scale fidelity

31. Set the HP8494H and HP8495H to 0 dB using the HP11713A.

32. Set the HP3325B controls as follows:
    Frequency: 11 MHz
    Level: 0 dBm

33. Press **SHIFT** and **CONFIG(PRESET)**.

34. Press **FREQ, 1, 1** and **MHz**.

35. Press **SPAN, 1, 0** and **kHz**.

36. Press **ATT**, ***ATT AUTO/MNL***(MNL), **2, 0** and **GHz(dB)**.

37. Press **LEVEL, 0, GHz(+dBm),** ***Linear*** and ***x1***.

38. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **1** and **kHz**.

39. Press ***VBW AUTO/MNL***(MNL)**, 1** and **kHz**.

40. Press **SRCH,** ***Cont Peak ON/OFF***(ON).

41. Adjust the output level on the HP3325B so that the trace peak is aligned with the reference level.

42. Press **SINGLE**.

43. Record the setting level used in the HP3325B at the reference output level box on the performance check sheet.

44. Reduce the output level on the HP3325B by 0.92 dB in relation to the reference output level.

45. Press **SINGLE**.

46. Press **SINGLE**, after the averaging has completed.

47. Record the level of the maker reading on the performance check sheet.

48. Repeat steps 44 through 47 for each level setting listed on Table 1-10.

Table 1-10 Settings on the HP3325B in relation to the Reference Output Level

HP3325B set level
-1.94 dB
-3.10 dB
-4.44 dB
-6.02 dB
-7.96 dB
-10.46 dB
-13.98 dB
-20 dB

1.2.10 RBW Switching Uncertainty

This section explains how to check the RBW switching uncertainty using the calibration output. The switching accuracy is calculated based on an RBW of 300 kHz.

Specification:

less than ± 0.3 dB 100 Hz to 5 MHz RBW setting : RBW 300 kHz reference

less than ± 1.0 dB 30 Hz RBW setting : RBW 300 kHz reference

Instruments Required

Accessories (BNC cable and adapter)

Procedures :

Initialization

1. Press **SHIFT** and **CONFIG(PRESET)**.

Connecting calibration signal

2. Connect the BNC cable from the CAL OUT connector to the INPUT connector.
3. Press **SHIFT, 7(CAL),** ***Cal Each Item*** and ***RBW Switching***.

Setting the reference value (RBW = 300 kHz)

4. Press **FREQ, 3, 0** and **MHz**.
5. Press **SPAN, 1** and **MHz**.
6. Press **LEVEL, 5, MHz(-dBm)**, ***dB/div***, and ***1 dB/div***.
7. Press **COUPLE**, ***RBW AUTO/MNL(MNL)***, **3, 0, 0** and **kHz**.
8. Press **SINGLE, SRCH** and ***Cont Peak ON/OFF***(ON).
9. Press **MKR**, ***Delta Marker*** and ***Fixed Marker ON/OFF***(ON).

Measurement the RBW switching uncertainty

10. Press **COUPLE,** ***RBW AUTO/MNL***(MNL)**, 5** and **MHz.**
11. Press **SPAN, 8** and **MHz**.
12. Press **SINGLE**.
13. After the sweeping has completed, record the level of the delta marker reading on the performance check sheet.

14. Repeat steps 10 through 13 for each bandwidth and span frequency setting listed on Table 1-11.

Table 1-11 RBW Switching Uncertainty Setting

RBW setting	Frequency span
5 MHz	8 MHz
3 MHz	5 MHz
1 MHz	2 MHz
100 kHz	200 kHz
30 kHz	50 kHz
10 kHz	20 kHz
3 kHz	5 kHz
1 kHz	2 kHz
300 Hz	500 Hz
100 Hz	200 Hz
30 Hz	200 Hz

1.2.11 RBW Accuracy and Selectivity

This section explains how to check a bandwidth of 3 dB and the selectivity. To calculate the selectivity, a bandwidth of 60 dB is measured first and then the selectivity is calculated (Selectivity = 60 dB BW divided by 3 dB BW).

Specifications:

Range

10 Hz to 10 MHz; 1, 3, 10 Sequence and 5 MHz

Accuracy

± 15% : 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz
± 25% : 30 Hz, 3 MHz, 5 MHz Note: 30 Hz at 25 °C±10 °C

Selectivity

less than 15:1 (RBW = 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 5MHz)
less than 20:1 (RBW = 30 Hz)

Instruments Required

Accessories (BNC cable and adapter)

Procedures:

Connecting calibration signal

1. Connect the BNC cable from the CAL OUT connector to the INPUT connector.

Initialization

2. Press **SHIFT** and **CONFIG(PRESET)**.

Setting the measurement conditions

3. Press **FREQ, 3, 0** and **MHz**.
4. Press **LEVEL, 5, MHz(-dBm),** ***dB/div*** and ***1 dB/div***.
5. Press **A**, ***Trace A Detector*** and ***Sample***.

Measurement for accuracy of Resolution Bandwidth

6. Press **SPAN, 1, 0** and **MHz**.
7. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **5** and **MHz**.
8. Press **SRCH**.
9. Press **MEAS**, ***x dB Down*** and ***Continuous Down ON/OFF***(ON).

10. Press **SINGLE**.

11. After sweep has completed, record the frequency of the marker reading on the performance check sheet.

12. Repeat steps 10 and 11 for each frequency setting listed on Table 1-12.

Table 1-12 3 dB Band Width Setting

RBW setting	Frequency span
3 MHz	5 MHz
1 MHz	2 MHz
300 kHz	500 kHz
100 kHz	200 kHz
30 kHz	50 kHz
10 kHz	20 kHz
3 kHz	5 kHz
1 kHz	2 kHz
300 Hz	500 Hz
100 Hz	200 Hz
30 Hz	200 Hz

Measuring the 60 dB bandwidth

13. Press **SHIFT** and **CONFIG(PRESET)**.

14. Press **FREQ, 3, 0** and **MHz**.

15. Press **SPAN, 3, 0** and **MHz**.

16. Press **COUPLE** ***RBW AUTO/MNL***(MNL), **5** and **MHz**.

17. Press ***VBW AUTO/MNL***(MNL), **1, 0** and **kHz**.

18. Press **A**, ***Trace Detector*** and ***Sample***.

19. Press **SRCH**.

20. Press **MEAS**, ***x dB Down, x dB Down***, **6, 0, GHz(dB)** and ***Continuous Down ON/OFF***(ON).

21. Press **SINGLE**.

22. Record the frequency of the marker reading on the performance check sheet.

Calculation of the selectivity

23. For each set Resolution Bandwidth, calculate the selectivity using the following formula. And record the result on the performance check sheet.
    (Selectivity) = (60 dB Band Width) / (3 dB Band Width)

24. Repeat steps 15 through 23 for each frequency setting listed on Table 1-13.

Table 1-13 60 dB Band Width Setting

RBW setting	Frequency span
3 MHz	25 MHz
1 MHz	20 MHz
300 kHz	5 MHz
100 kHz	1 MHz
30 kHz	500 kHz
10 kHz	200 kHz
3 kHz	50 kHz
1 kHz	20 kHz
300 Hz	5 kHz
100 Hz	2 kHz
30 Hz	1 kHz

1.2.12 Noise Sidebands

This section explains how to check noise sidebands for a signal of 1.5 GHz and 0 dBm with the offset of 1 kHz, 10 kHz, 100 kHz and 1 MHz.

Specifications:

R3264

Offset	9 kHz ≤ f ≤ 1 GHz	1 GHz< f ≤ 2.6 GHz	2.6 GHz < f ≤ 3.5 GHz
1 kHz	< -100 dBc/Hz	< -100 dBc/Hz	< -98 dBc/Hz
10 kHz	< -113 dBc/Hz	< -110 dBc/Hz	< -108 dBc/Hz
100 kHz	< -118 dBc/Hz	< -118 dBc/Hz	< -112 dBc/Hz
1 MHz	< -135 dBc/Hz	< -135 dBc/Hz	< -135 dBc/Hz

R3267

Offset	100 Hz ≤ f ≤ 1 GHz	1 GHz< f ≤ 2.6 GHz	2.6 GHz < f ≤ 8 GHz
1 kHz	< -100 dBc/Hz	< -100 dBc/Hz	< -98 dBc/Hz
10 kHz	< -113 dBc/Hz	< -110 dBc/Hz	< -108 dBc/Hz
100 kHz	< -118 dBc/Hz	< -118 dBc/Hz	< -112 dBc/Hz
1 MHz	< -135 dBc/Hz	< -135 dBc/Hz	< -135 dBc/Hz

R3273

Offset	100 Hz ≤ f ≤ 1 GHz	1 GHz< f ≤ 2.6 GHz	2.6 GHz ≤ f < 7.5 GHz
1 kHz	< -100 dBc/Hz	< -100 dBc/Hz	< -98 dBc/Hz
10 kHz	< -113 dBc/Hz	< -110 dBc/Hz	< -108 dBc/Hz
100 kHz	< -118 dBc/Hz	< -118 dBc/Hz	< -112 dBc/Hz
1 MHz	< -135 dBc/Hz	< -135 dBc/Hz	< -135 dBc/Hz

Offset	7.4 GHz ≤ f < 15.4 GHz	15.2 GHz ≤ f < 26.5 GHz
1 kHz	< -89 dBc/Hz	< -83 dBc/Hz
10 kHz	< -102 dBc/Hz	< -96 dBc/Hz
100 kHz	< -106 dBc/Hz	< -100 dBc/Hz
1 MHz	< -129 dBc/Hz	< -123 dBc/Hz

1 kHz offset and 10 kHz offset : SPAN ≤ 150 kHz

100 kHz offset : 150 kHz < SPAN ≤ 2 MHz

1 MHz offset : SPAN > 2 MHz

Instruments Required

Instruments	QTY	Recommended Model
Signal Generator	1	HP8663A
RF Cable SMA(m)-SMA(m)	1	A01002
RF Cable BNC(m)-BNC(m)	1	MI-09
Adapter N(m)-SMA(f)	2	

Procedures:

Setup

1. Connect the signal generator as shown in Figure 1-9.

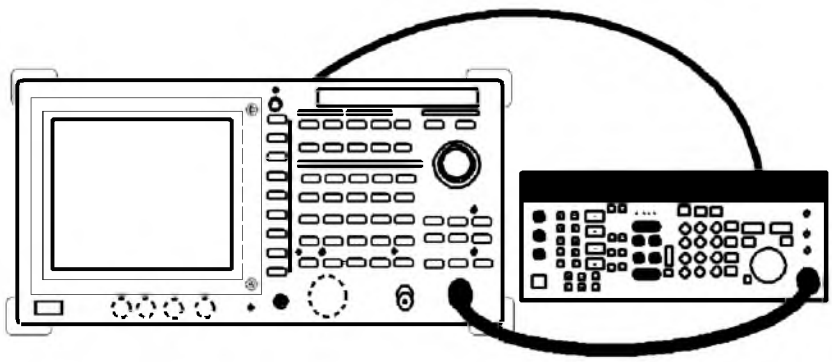

Figure 1-9 Setup for Measuring a Noise Sidebands

2. Set the HP8663A controls as follows:
   Frequency: 1.5 GHz
   Output level: - 5 dBm

Initialization

3. Press **SHIFT** and **CONFIG(PRESET)**.

Setting measurement conditions

4. Press **FREQ**, **1, ., 5** and **GHz**.

5. Press **SPAN, 2, 5, 0** and **kHz**.
   Since the measurement is made for each of 1kHz, 10kHz, 100kHz and 1MHz offset frequency, set the frequency span to 2.5 times each offset frequency, or 2.5 kHz, 25 kHz, 250 kHz and 2.5 MHz. Keep other settings unchanged.

Measurement of Noise Sidebands

The following procedure is used to measure noise sidebands with an offset of 100 kHz.

6. Press **SRCH**.
7. Press **MKR** → and ***Marker*** → ***Ref***.
8. Press **SRCH**.
9. Press **MEAS**, ***Noise/Hz, dBc/Hz***, **1, 0, 0** and **kHz**.
10. Press **LEVEL,** ▽ and ▽.
11. Press **A**, ***Average A***, **2, 0,** and **Hz(ENTR)**.
12. Record the level of the marker reading on the performance check sheet, after the sweep has completed.
13. Press **A, *Write A*, Level, 0, GHz(dBm), SHIFT** and **MKR(OFF)**.
14. Repeat steps 5 through 13 for each frequency setting listed on Table 1-14.

Table 1-14 Offset Setting at a Center Frequency of 1 GHz

Offset	Frequency span
1 kHz	2.5 kHz
10 kHz	25 kHz
1000 kHz	2500 kHz

1.2.13 Displayed Average Noise Level

This section explains how to check the displayed average noise level of the spectrum analyzer. Terminate the spectrum analyzer input with a 50 Ω terminator to check the displayed average noise levels at 1 kHz, 10 kHz, 100 kHz, 1 MHz and the frequency at which the noise level is the maximum within the measurement bandwidth.

Specifications:

R3264:less than -100 dBm 10 kHz
less than -101 dBm 100 kHz
less than -125 dBm 1 MHz
less than -(130-2f) dBm 10 MHz to 3.5 GHz f: GHz

R3267: less than -90 dBm 1 kHz
less than -100 dBm 10 kHz
less than -101 dBm 100 kHz
less than -125 dBm 1 MHz
less than -(130-f) dBm 10 MHz to 3.5 GHz f: GHz
less than -125 dBm 3.5 GHz to 8 GHz

R3273: less than -90 dBm 1 kHz
less than -100 dBm 10 kHz
less than -101 dBm 100 kHz
less than -(130-f) dBm 10 MHz to 3.5 GHz f: GHz
less than -125 dBm 3.5 GHz to 7.5 GHz
less than -122 dBm 7.4 GHz to 15.4 GHz
less than -120 dBm 15.2 GHz to 22.0 GHz
less than -117 dBm 22.0 GHz to 26.5 GHz
RBW 100 Hz, VBW 1Hz, Input attenuator 0 dB settings

Instruments Required

Instruments	QTY	Recommended Model
50 Ω Terminator	1	RNA

Procedures:

Setup

1. Connect the RNA to the RF INPUT.

Initialization

2. Press **SHIFT** and **CONFIG(PRESET)**.

NOTE: ***Skip to step 14 for the R3264.***

Setting the measurement conditions

3. Press **FREQ, 1** and **kHz**.

4. Press **SPAN** and ***ZERO SPAN***.
5. Press **ATT**, ***Min ATT ON/OFF***(OFF), ***ATT AUTO/MNL***(MNL), **0** and **GHz(dB)**.
6. Press **LEVEL, 6, 0** and **MHz(-dBm)**.
7. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **3, 0** and **Hz**.
8. Press ***VBW AUTO/MNL***(MNL), **1** and **Hz**.
9. Press **SWP**, ***Sweep Time Auto/MNL***(MNL), **1** and **MHz(sec)**.

Measurement the noise level, 100 Hz to 3.5 GHz Band

10. Press **A**, ***AVERAGE A***, **1, 0** and **Hz(ENTER)**.
11. Press **SRCH**, after the averaging has completed.
12. Record the level of the marker reading on the performance check sheet.
13. Press **SHIFT** and **CONFIG(PRESET)**.
14. Press **SPAN** and **ZERO SPAN**.
15. Press **ATT, *Min ATT ON/OFF***(OFF), ***ATT AUTO/MNL***(MNL), **0** and **GHz(dB)**.
16. Press **LEVEL, 6, 0** and **MHz(-dBm)**.
17. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **1, 0**, **0** and **Hz**.
18. Press **VBW *AUTO/MNL***(MNL), **1** and **Hz**.
19. Press **SWP, Sweep Time *AUTO/MNL***(MNL), **1** and **MHz(Sec)**.
20. Press **A, *Average A*, 1, 0** and **Hz(ENTR)**.
21. Press **FREQ, 1, 0** and **kHz**.
22. Press **SRCH**, after the averaging has completed.
23. Record the level of the marker reading on the performance check sheet.
24. Repeat steps 21 through 23 for each frequency setting listed on Table 1-15.

Table 1-15 Center Frequency Setting for Displayed Average Noise Level

Center frequency
100 kHz
1 MHz
10.1 MHz
101 MHz
501 MHz
1001 MHz
1.5 GHz
2.0 GHz
2.5 GHz
3.0 GHz
3.5 GHz

NOTE: ***Perform the measurement from step 25 onwards for the R3267 and R3273 only.***

25. Press **SHIFT** and **CONFIG(PRESET)**.
26. Press **FREQ**, ***Start***, **3, ., 5, 0, 1** and **GHz**.
27. Press ***Stop***, **8** and **GHz**.
    For the R3273, the stop frequency is set to 7.5 GHz.
28. Press **ATT**, ***Min ATT ON/OFF***(OFF), ***ATT AUTO/MNL***(MNL), **0** and **GHz(dB)**.
29. Press **LEVEL, 4, 0** and **GHz(-dBm)**.
30. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **3** and **MHz**.
31. Press ***VBW AUTO/MNL***(MNL), **1, 0, 0** and **kHz**.
32. Press **A**, ***AVERAGE A***, **1, 0** and **Hz(ENTER)**.
33. Press **SRCH**, after the averaging has completed.
34. Press **MKR** → and ***MKR*** → ***CF***.
35. Press **A** and ***WRITE A***.
36. Press **SPAN** and ***Zero Span***.
37. Press **LEVEL, 6, 0** and **MHz(-dBm)**.

38. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **1, 0, 0** and **Hz**.
39. Press ***VBW AUTO/MNL***(MNL), **1** and **Hz**.
40. Press **SWP**, ***Sweep Time AUTO/MNL***(MNL), **1** and **MHz(sec)**.
41. Press **SINGLE**.
42. Press **SRCH**, after the sweep has completed.
43. Record the level of the marker reading on the performance check sheet.

For R3273 only, Display Average noise level for remaining bands

44. Repeat steps 25 through 43 for each frequency setting listed on Table 1-16.

Table 1-16 Start and Stop Frequencies Setting

BAND	Start frequency	Stop frequency
7.5 GHz to 15.4 GHz	7.501 GHz	15.4 GHz
15.2 GHz to 22 GHz	15.201 GHz	22.0 GHz
22 GHz to 26.5 GHz	22.0 GHz	26.5 GHz

1.2.14 Residual FM

This section explains how to check the residual FM of an internal local oscillator in Zero Span Mode. Connect a stable signal to the input and perform a slope detection in Zero Span Mode to measure the residual FM. The residual FM is expressed as the product of the IF filter slope (Hz/dB) and the change in the measured signal amplitude.

Specifications:

less than 3 Hz × N_{P-P}/0.1 sec

Instruments Required

Instruments	QTY	Recommended Model
Signal Generator	1	HP8663A
RF Cable SMA(m)-SMA(m)	1	A01002
RF Cable BNC(m)-BNC(m)	1	MI-09
Adapter N(m)-SMA(f)	2	

Procedures :

Setup

1. Connect the signal generator as shown in Figure 1-10.

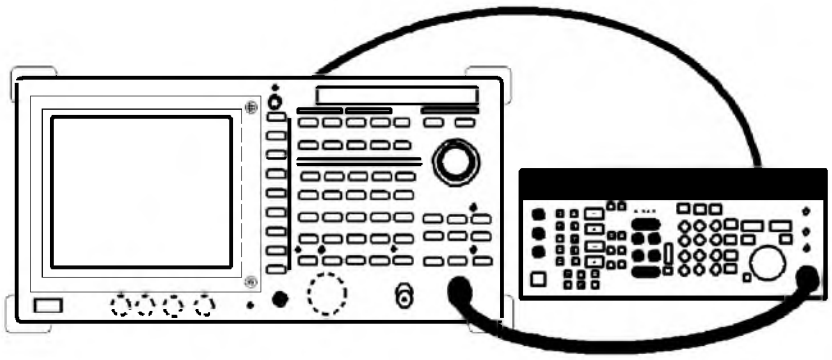

Figure 1-10 Setup for Measuring a Residual FM

Setting the signal generator

2. Set the HP8663A controls as follows:
   Frequency: 2.5 GHz
   Output level: -10 dBm

Initialization

3. Press **SHIFT** and **CONFIG(PRESET)**.

Setting the measurement conditions

Determining the IF filter slope

4. Press **FREQ, 2, ., 5** and **GHz**.
5. Press **SPAN, 1, 0, 0** and **kHz**.
6. Press **SRCH**.
7. Press **MKR**, ***more 1/2*** and ***Signal Track ON/OFF***(ON).
8. Press **SPAN, 1** and **kHz**.
9. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **3, 0** and **Hz**.
10. Press **MKR** and ***Signal Track ON/OFF*** (OFF).
11. Press **LEVEL, 5, MHz(-dBm)**, ***dB/div*** and ***1 dB/div***.
12. Press **SPAN, 2, 0, 0** and **Hz**.
13. Press **SRCH**.
14. Press **MKR** → and ***MKR*** → ***REF***.
15. Press **SRCH**.
16. Press **MKR** → and ***MKR*** → ***REF***.
17. Press **SINGLE**.
18. Press **MKR**, ***more2/2, Delta Marker*** and ***Delta Marker ON/OFF*** (ON).
19. Rotate the data knob counter clockwise until the marker reads - 3 dB±0.1 dB.
20. Press **MKR**, ***Delta Marker***, ***Delta Marker ON/OFF***(ON) and rotate the data knob counter clockwise until the marker reads -6 dB±0.1 dB.
21. Record the frequency and the level of the delta marker reading on the performance check sheet.
22. Calculate the Slope using the following formula and record the result on the performance check sheet.

$$\text{Slope} = \frac{\text{(the frequency of the delta marker reading)}}{\text{(the level of the delta marker reading)}} \quad \text{[Hz/dB]}$$

Measuring the Residual FM

23. Press **SHIFT** and **MKR(OFF)**.
24. Press **REPEAT**.
25. Press **SPAN** and ***Zero Span***.
26. Press **COUPLE,** ***VBW AUTO/MNL***(MNL)**, 3, 0, 0** and **Hz**.
27. Press **SWP**, ***Sweep Time AUTO/MNL***(MNL), **1, 0, 0** and **kHz(ms)**.
28. Press **FREQ** and turn the data knob slowly counter-clockwise so that the trace peak can be positioned to a level 6 divisions below the reference level.
29. Press **SINGLE**.
30. Press **SRCH**.
31. Press **MKR,** ***Delta Marker*** and ***Delta Marker ON/OFF***(ON).
32. Press **SRCH** and ***Min Peak***.
33. Record the level, ΔLevel of the Delta Marker reading on the performance check sheet.

Calculation Residual FM

34. Calculate the residual FM using the following formula.

$$\underset{[\text{Hz}]}{\text{Residual FM}} = \underset{[\text{Hz/dB}]}{\text{Slope}} \times \underset{[\text{dB}]}{\Delta\text{Level}}$$

1.2.15 Residual Response

This section explains how to check the residual response of a narrow frequency span and narrow resolution bandwidth using the display line. Connect a 50 Ω terminator to the spectrum analyzer input connector.

Specifications:
with no signal at input and 0 dB input attenuation

R3264
less than -100 dBm Range: 1 MHz to 3.5 GHz
less than - 90 dBm Range: 300 kHz to 3.5 GHz

R3267
less than -100 dBm Range: 1 MHz to 3.5 GHz
less than - 90 dBm Range: 300 kHz to 8 GHz

R3273
less than -100 dBm Range: 1 MHz to 3.5 GHz
less than - 90 dBm Range: 300 kHz to 26.5 GHz

Instruments Required

Instruments	QTY	Recommended Model
50 Ω Terminator	1	RNA

Procedures :

Initialization

1. Press **SHIFT** and **CONFIG(PRESET)**.

Connecting calibration signal

2. Connect the BNC cable from the CAL OUT connector to the INPUT connector.

Checking the CALL OUT signal level

3. Press **FREQ, 3, 0** and **MHz**.
4. press **SPAN, 1, 0** and **kHz**.
5. Press **LEVEL, 1, 0** and **MHz(-dBm)**.
6. Press **COUPLE,** ***RBW AUTO/MNL***(MNL), **3, 0, 0** and **Hz**.
7. Press **ATT,** ***Min ATT ON/OFF***(OFF), ***ATT AUTO/MNL***(MNL), **1, 0** and **GHz(dB)**.
8. press **SRCH**.
9. Check the marker level within -10.0dBm±0.3dB

10. If the level is out of range, press **SHIFT, 7(CAL)** and ***Cal All.***

Measurement the residual response on the 1 MHz to 3.5 GHz range

11. Connect the 50 Ω terminator to the input, after the calibration has completed.
12. Press **FREQ, 1, ., 3** and **MHz**.
13. Press **SPAN, 2** and **MHz**.
14. Press **ATT**, ***ATT AUTO/MNL***(MNL), **0** and **GHz(dB)**.
15. Press **LEVEL, 5, 0** and **MHz(-dBm)**.
16. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **1, 0**, and **kHz**.
17. Press ***VBW AUTO/MNL***(MNL), **3, 0, 0** and **Hz**.
18. Press **FREQ**, ***CF Step Size AUTO/MNL***(MNL), **1, ., 9** and **MHz**.
19. Press **FORMAT**, ***Display Line ON/OFF***(ON), **1, 0, 0** and **MHz(-dBm)**.
20. Press **SINGLE**.
    The noise level should be at least 3 dB below the display line. If is not, it will necessary to reduce the Span and RBW setting to reduce the noise level. Set the frequency step size to 95% or less of the frequency span.
21. If a residual is suspected, press **SINGLE** again. A residual response presist, but a noise peak will not.
22. Record any frequency responses above the display line on the performance check sheet.
23. If a response is marginal, verify the response amplitude as follows. If not, go to step 34.
24. Press **SHIFT, RCL(SAVE)**, **1** and **Hz(ENTR)**.
25. Press **REPEAT** and **MKR**.
26. Move the marker to the trace peak using the data knob.
27. Press **MKR** → and **MKR** → **CF**.
28. Press **COUPLE**, ***RBW AUTO/MNL***(MNL) and ***RBW AUTO/MNL***(AUTO).
29. Press **SPAN** and ▽ to make the frequency span narrower until the RBW is set to 300 Hz.
30. Press **SRCH**.

31. Press **MKR** → and **MKR** → **CF**.
32. Record any frequency responses above the display line on the performance check sheet.
33. Press **RCL, 1** and **Hz(ENTR)**.
34. Press **FREQ** and △.
35. Repeat steps 20 through 34 until a center frequency of 3.5 GHz is set.

NOTE: ***Perform the measurement from step 36 onwards for the R3267 and R3273 only.***

Residual Response in a range between 3.5 GHz to 7.5 GHz

36. Press **FREQ, 3, ., 5, 2, 5** and **GHz**.
37. Press **SPAN, 5, 0** and **MHz**.
38. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **3, 0, 0** and **kHz**.
39. Press ***VBW AUTO/MNL***(MNL), **3, 0, 0** and **Hz**.
40. Press **FREQ**, ***CF Step Size AUTO/MNL***(MNL), **4, 7, ., 5** and **MHz**.
41. Press **FORMAT**, ***Display Line ON/OFF***(ON), **9, 0** and **MHz(-dBm)**.
42. Repeat steps 20 through 34 until a center frequency of 7.425 GHz is set.

1.2.16 Gain Compression

This section explains how to check the gain compression. The gain compression is measured as follows: two signals with a difference of 1 MHz are merged using a power splitter.

One of the two inputs is fixed at -30 dBm and the other input is gradually increased until the fixed input has been reduced by 1 dB. When the fixed input has been reduced by 1 dB, the level of variable input is referred to as the gain compression level.

Specifications:

R3264/67

less than -3 dBm(mixer input level):	10 MHz to 100 MHz
less than 0 dBm(mixer input level):	>100 MHz

R3273

less than -3 dBm(mixer input level):	10 MHz to 100 MHz
less than 0 dBm(mixer input level):	100 MHz to 3.5 GHz
less than -10 dBm(mixer input level):	3.5 GHz to 7.5 GHz
less than -3 dBm(mixer input level):	7.5 GHz to 26.5 GHz

Instruments Required

Instruments	QTY	Recommended Model
Signal Generator	1	SMP02
Signal Generator	1	SMP03
Power Meter and Power Sensor	1	NRVS / NRV-Z52
Power Splitter	1	1579
3 dB Attenuator	1	DEF-000685-1
10 dB Attenuator	1	DEE-000480-1
RF Cable SMA(m)-SMA(m)	3	A01002
Adapter N(m)-SMA(f)	4	

Procedures :

Initializing the power meter and the sensor

1. Set the unit to dBm on the NRVS.
2. Perform the zeroing of the NRVS.

Setup

3. Connect the signal generators and the power sensor as shown in Figure 1-11.

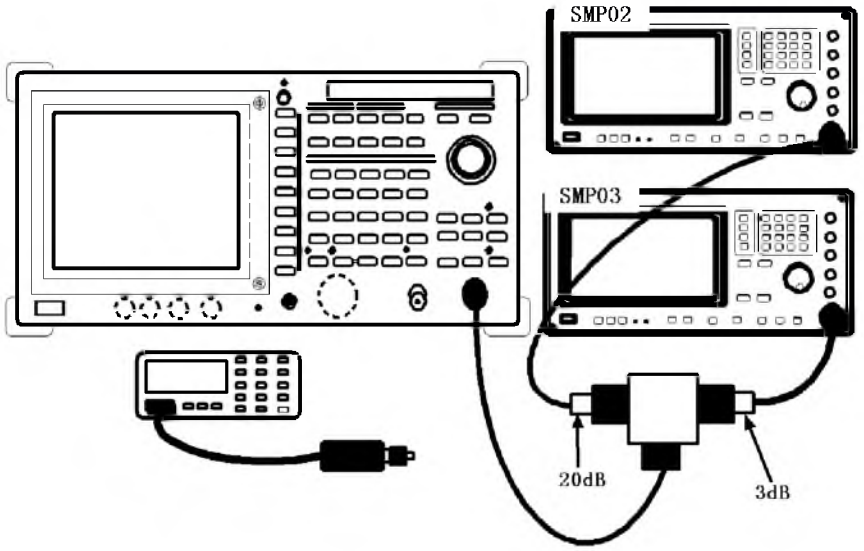

Figure 1-11 Setup for the Gain Compression

Setting the signal generator

4. Set the SMP03 controls as follows:
   Frequency: 11 MHz
   Output level: -2 dBm

5. Set the SMP02 controls as follows:
   Frequency: 10 MHz
   Output level: -4 dBm

6. Set the correction frequency on the NRVS to 10.5 MHz.

Initialization

7. Press **SHIFT** and **CONFIG(PRESET)**.

Measurement a center frequency of 10.5 MHz

8. Press **FREQ, 1, 0, ., 5** and **MHz**.

9. Press **SPAN, 2** and **MHz**.

10. Press **ATT**, ***ATT Min ON/OFF***(OFF), ***ATT AUTO/MNL***(MNL), **0** and **GHz(dB)**.

11. Press **LEVEL, 3, 0, MHz(-dBm)**, ***dB/div*** and ***1 dB/div***.

12. Turn off the output of the SMP03.

13. Press **SRCH**.

14. Change the output level on the SMP02 using the data knob to adjust the level on the screen to -30±0.1 dBm.

15. Turn on the output level of the SMP03.

16. Turn the data knob on the SMP03 until the signal level at 5 div in the left hand part on the R3267 Series screen is lowered by 1 dB from - 30 dBm.If the power level knob cannot be turned any more, stop it here.

17. Disconnect the RF cable that is connected to the spectrum analyzer, and connect it to the power sensor.

18. Record the level of the power meter reading on the performance check sheet.

Measurement at a center frequency of 200.5 MHz

19. Set the SMP03, SMP02 and NRVS controls as follows:
    SMP03: 200 MHz
    SMP02: 201 MHz
    Correction frequency(NRVS):200.5 MHz

20. Press **FREQ, 2, 0, 0, ., 5** and **MHz**.

21. Press **SPAN, 2** and **MHz**.

22. Repeat steps 12 through 18.

NOTE: ***Perform the measurement from step 23 onwards for the R3267 and R3273 only.***

Measurement at a center frequency of 3600.5 MHz

23. Set the SMP03, SMP02 and NRVS controls as follows:
    SMP03: 3600 MHz
    SMP02: 3601 MHz
    Correction frequency(NRVS):3.6 GHz

24. Press **FREQ, 3, 6, 0, 0, ., 5** and **MHz**.

25. Press **SPAN, 2** and **MHz**.

26. Press **LEVEL, 1, 0** and **MHz(-dBm)**, ***dB/div*** and ***10 dB/div***.

27. Press **SRCH**.

28. Press **FREQ,** ***more 1/2, Presel Tune*** and ***AUTO Tune***.

29. Repeat 11 through 18.

For R3273 only: Measurement at a center frequency of 7600.5 MHz

30. Set the SMP03, SMP02 and NRVS controls as follows:
    SMP03: 7600 MHz
    SMP02: 7601 MHz
    Correction frequency(NRVS):7.6 GHz

31. Press **FREQ, 7, 6, 0, 0, ., 5** and **MHz**.

32. Repeat steps 25 through 29.

1.2.17 Second Harmonic Distortion

This section explains how to check the second harmonic distortion. The output of the signal generator is input to the spectrum analyzer through a low-pass filter, the second harmonic distortion frequency is set to the spectrum analyzer center frequency, and then the second harmonic distortion is measured. The low-pass filter is used to eliminate any harmonic distortion originating at the signal source. The signal generator frequency reference source is supplied from the spectrum analyzer.

Specifications:

R3264:
less than -70 dBc: 10 MHz to 3.5 GHz (-30 dBm mixer input level)

R3267:
less than -70 dBc: 10 MHz to 3.5 GHz (-30 dBm mixer input level)
less than -90 dBc: >1.6 MHz (-10 dBm mixer input level)

R3273:
less than -70 dBc: 10 MHz to 3.5 GHz (-30 dBm mixer input level)
less than -100 dBc: >3.5 GHz (-10 dBm mixer input level)

Instruments Required

Instruments	QTY	Recommended Model
Signal Generator	1	SMP02
Power Meter and Power Sensor	1	NRVS / NRV-Z52
Power Splitter	1	1579
Low-pass Filter	1	DEE-001172-1
RF Cable SMA(m)-SMA(m)	3	A01002
RF Cable BNC(m)-BNC(m)	1	MI-09
Adapter N(m)-SMA(f)	5	

Procedures :

Initializing the power meter and the sensor

1. Set the unit to dBm on the NRVS.
2. Perform the zeroing of the NRVS.

Setup

3. Connect the signal generator and the power sensor as shown in Figure 1-12.

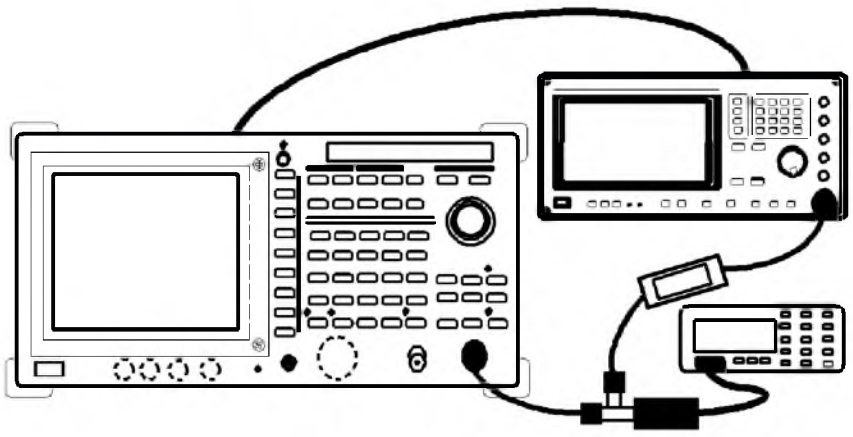

Figure 1-12 Setup for Measuring a Second Harmonics Distortion

Setting the signal generator

4. Set the SMP02 controls as follows:
   Frequency: 1.5 GHz
   Output level: 0 dBm
   10 MHz Reference: External

Initialization

5. Press **SHIFT** and **CONFIG(PRESET).**

6. Set the correction frequency of the NRVS to 1.5 GHz.

Measurement 100 Hz to 3.5 GHz band

7. Press **FREQ, 1, ., 5** and **GHz**.

8. Press **SPAN, 1, 0** and **kHz**.

9. Press **ATT**, ***ATT AUTO/MNL***(MNL), **2, 0** and **GHz(dB)**.

10. Press **LEVEL, 1, 0** and **MHz(-dBm)**.

11. Press **COUPLE**, ***VBW AUTO/MNL***(MNL), **3, 0** and **Hz**.

12. Adjust the output level of the SMP02 using the data knob so that the level of the power meter reading is -10 dBm ± 0.09 dB.

13. Press **SINGLE**.

14. Press **SRCH**, after the sweep has completed.

15. Press **MKR**, ***Delta Marker*** and ***Fixed Marker ON/OFF*** (ON).
16. Press **FREQ, 3** and **GHz**.
17. Press **SINGLE**.
18. Press **SRCH**, after the sweep has completed.
19. Record the level of the marker reading on the performance check sheet.

NOTE: ***Perform the measurement from step 20 onwards for the R3267 and R3273 only.***

Measurement 3.6 GHz or more band

20. Remove the low-pass filter and connect the RF cable between the SMP02 and the R3267/73.
21. Press **SHIFT** and **CONFIG(PRESET)**.
22. Press **FREQ, 3, ., 8** and **GHz**.
23. Press **SPAN, 5, 0, 0** and **kHz**.
24. Set the SMP02 controls as follows:
    Frequency: 3.8 GHz
    Output level: -10 dBm
25. Press **SRCH**.
26. Press **FREQ**, ***more 1/2, Presel Tune*** and ***Auto Tune***.
27. After the auto tuning has completed, set the SMP02 controls as follows:
    Frequency: 1.9 GHz.
    Output level: 0 dBm
28. Connect the signal generator and the power sensor as shown in Figure 1-11.
29. Set the correction frequency of the NRVS to 1.9 GHz.
30. Change the output level on the SMP02 using the data knob to adjust the power meter value to 0 dBm±0.09 dB.
31. Press **FREQ, 1, ., 9** and **GHz**.
32. Press **SPAN, 1** and **kHz**.
33. Press **SRCH**.
34. Press **MKR**, ***Delta Marker*** and ***Fixed Marker ON/OFF***(ON).

35. Press **FREQ, 3, ., 8** and **GHz**.
36. Press **LEVEL, 4, 0** and **MHz(-dBm)**.
37. Press **A**, ***Average A***, **2, 0** and **Hz(ENTR)**.
38. Press **SRCH**, after the averaging has completed.
39. Record the level of the delta marker reading on the performance check sheet.

1.2.18 Third Order Intermodulation Distortion

This section explains how to check the third order intermodulation distortion which occurs when two signals are input. Third order intermodulation distortion is reduced by 20 dB when the input signal is reduced by 10 dB.

Specifications:

R3264:When the mixer input is -30 dBm.
less than -70dBc (less than -50dBc *1): 10MHz to 100MHz band
less than -80dBc (less than -60dBc *1): 100MHz to 1GHz band
less than -85dBc(less than -65dBc *1): 1GHz to 3.5GHz band

*1: Calculated value when the mixer input is -20 dBm.

R3267:When the mixer input is -30 dBm.
less than -70dBc (less than -50dBc *2): 10MHz to 100MHz band
less than -80dBc (less than -60dBc *2): 100MHz to 1.0GHz band
less than -85dBc(less than -65dBc *2): 1.0GHz to 3.5GHz band
less than -90dBc(less than -70dBc *2): 1.6GHz to 8.0GHz band *3

*2: Calculated value when the mixer input is -20 dBm.
*3: When the preselector is used.

R3273:When the mixer input is -30 dBm.
less than -70dBc (less than -50dBc *4): 10MHz to 100MHz band
less than -80dBc (less than -60dBc *4): 100MHz to 1.0GHz band
less than -85dBc (less than -65dBc *4): 1.0GHz to 3.5GHz band
less than -70dBc (less than -50dBc *4): 3.5GHz to 7.5GHz band *5
less than -75dBc (less than -55dBc *4): 7.5GHz to 26.5GHz band *5

*4: Calculated value when the mixer input is -20 dBm.
*5: When the preselector is used.

Instruments Required

Instruments	QTY	Recommended Model
Signal Generator	1	SMP02
Signal Generator	1	SMP03
Power Meter and Power Sensor	1	NRVS / NRV-Z52
Power Divider	1	DDUL-20A-1000
Power Divider	1	DDUL-24M-10G
RF Cable SMA(m)-SMA(m)	3	A01002
Adapter N(m)-SMA(f)	5	
Adapter SMA(f)-SMA(f)	1	

Procedures :

Setting the power meter

1. Set the unit to dBm on the NRVS.
2. Perform the zeroing of the NRVS.

Setup

3. Connect the signal generators as shown in Figure 1-13.

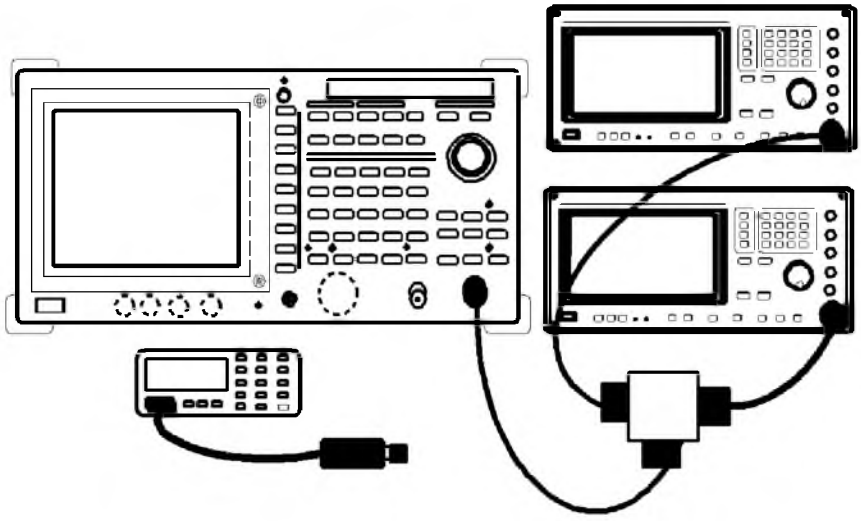

Figure 1-13 Setup for Measuring a Third Order Intermodulation Distortion

Setting the measurement conditions

4. Set the correction frequency to 20.5 MHz on the NRVS.
5. Set the frequency of the SMP02 to 20.5 MHz.
6. Set the frequency of the SMP03 to 20.6 MHz.
7. Turn off the RF output of the SMP02 and the SMP03.

Frequency measurement no using the preselector

8. Press **SHIFT** and **CONFIG(PRESET)**.
9. Press **FREQ, 2, 0, ., 5** and **MHz**.

10. Press **SPAN, 1** and **MHz**.

11. Press **ATT,** ***ATT AUTO/MNL***(MNL), **1, 0** and **GHz(dB)**.

12. Press **LEVEL, 1, 0** and **MHz(-dBm)**.

13. Press **COUPLE,** ***RBW AUTO/MNL***(MNL), **3** and **kHz**.

14. Press ***VBW AUTO/MNL***(MNL)**, 3, 0, 0** and **Hz**.

15. Connect the power sensor to the output of the power devider using the RF cable.

16. Turn on the SMP03 and adjust the level into a -10 dBm ± 0.1 dB reading on power meter by the data knob of the SMP03.

17. Turn off the RF output of the SMP03.

18. Turn on the SMP02 and adjust the level into a -10 dBm ± 0.1 dB reading on power meter by the data knob of the SMP02.

19. Turn on the RF output of the SMP03.

20. Disconnect the cable connected to the power sensor, and connect it to the spectrum analyzer input.

21. Press **SINGLE**.

22. Press **SRCH**, after the sweep has completed.

23. Press **MKR** →, ***MKR*** → ***REF*** and **SINGLE**.

24. Press **SRCH**, after the sweep has completed.

25. Press **MKR** and ***Delta Marker***.

26. Third order intermodulation distortion appear at two frequencies: one is 100 kHz higher the one input frequency, and the other is 100 kHz lower the other input. Record one of the third order intermodulation distortion levels, whichever is greater, on the performance check sheet.

27. Repeat Steps 4 through 26 for each frequency setting listed on Table 1-17.

Table 1-17 Third Order Intermodulation Distortion

SMP02	SMP03	Center Frequency	VBW	NRVS
105 MHz	105.1 MHz	105 MHz	300 Hz	105 MHz
1500 MHz	1500.1 MHz	1500 MHz	300 Hz	1.5 GHz

NOTE: ***Perform the measurement from step 28 onwards for the R3267 and R3273 only.***

Frequency measurement using the preselector

28. Set the correction frequency to 3600 MHz on the NRVS.
29. Set the frequency of the SMP02 to 3600 MHz.
30. Set the frequency of the SMP03 to 3600.1 MHz.
31. Turn off the RF output of the SMP02 and the SMP03.
32. Press **SHIFT** and **CONFIG(PRESET)**.
33. Press **FREQ, 3, 6, 0, 0** and **MHz**.
34. Press **SPAN, 1** and **MHz**.
35. Press **ATT,** ***ATT AUTO/MNL***(MNL), **1, 0** and **GHz(dB)**.
36. Press **LEVEL, 1, 0** and **MHz(-dBm)**.
37. Disconnect the RF cable that is connected to the power divider, and connect it to the spectrum analyzer.
38. Turn the SMP03 output on and set the output to -20 dBm.
39. Press **SRCH**.
40. Press **FREQ,** ***More 1/2, Presel Tune*** and ***AUTO Tune.***
41. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **3** and **kHz**.
42. Press ***VBW AUTO/MNL***(MNL), **3 , 0, 0** and **Hz**.
43. Disconnect the RF cable that is connected to the spectrum analyzer, and connect it to the power sensor.
44. Changing the output level on the SMP03 using the data knob to adjust the power meter value to -10 dBm±0.1 dB.
45. Turn off the RF output of the SMP03.
46. Turn on the SMP02 and adjust the level into a -10 dBm ± 0.1 dB reading on power meter by the data knob of the SMP02.
47. Turn on the RF output of the SMP03.

48. Disconnect the cable connected to the power sensor, and connect it to the spectrum analyzer input.

49. Press **SINGLE**.

50. Press **SRCH**, after the sweep has completed.

51. Press **MKR** →, ***MKR*** → ***REF*** and **SINGLE**.

52. Press **SRCH**, after the sweep has completed.

53. Press **MKR** and ***Delta Marker***.

54. Third order intermodulation distortion appear at two frequencies: one is 100 kHz higher the one input frequency, and the other is 100 kHz lower the other input. Record one of the third order intermodulation distortion levels, whichever is greater, on the performance check sheet.

55. Repeat Steps 28 through 54 for each frequency setting listed on Table 1-18.

Table 1-18 Third Order Intermodulation Distortion (When the Preselector is Used)

SMP02	SMP03	Center Frequency	VBW	NRVS	Remarks
2000 MHz	2000.1 MHz	2000 MHz	300 Hz	2.00 GHz	R3267 only
8000 MHz	8000.1 MHz	8000 MHz	300 Hz	8.00 GHz	R3273 only

1.2.19 Image, Multiple and Out of Band Responses (For the R3267/73)

This section explains how to check the image, multiple and out of band responses for each band.

Specifications:

R3267:
less than -70 dBc 10 MHz to 8 GHz Band

R3273:
less than -70 dBc 10 MHz to 18 GHz Band
less than -60 dBc 10 MHz to 23 GHz Band
less than -50 dBc 10 MHz to 26.5 GHz Band

Instruments Required

Instruments	QTY	Recommended Model
Signal Generator	1	SMP03
Power Meter and Power Sensor	1	NRVS / NRV-Z52
Power Splitter	1	1579
RF Cable SMA(m) - SMA(m)	2	A01002
Adapter N(m)-SMA(f)	4	

Procedures :

Initializing the power meter and the sensor

1. Set the unit to dBm on the NRVS.
2. Perform the zeroing of the NRVS.

Setup

3. Connect the signal generator and the power sensor as shown in Figure 1-14.

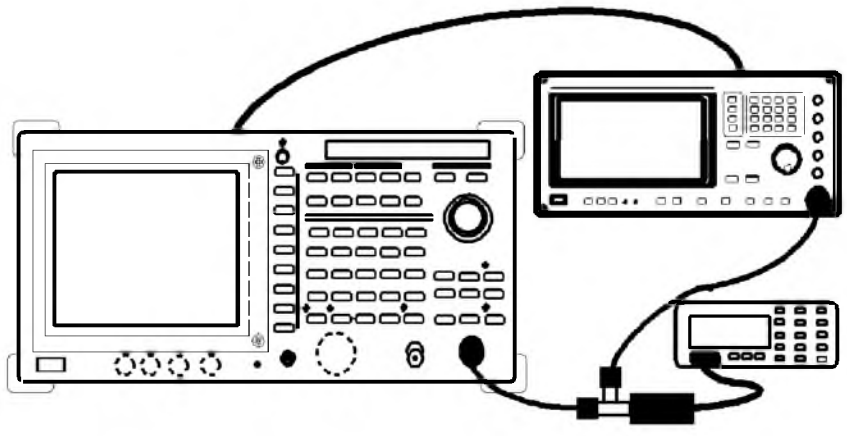

Figure 1-14 Setup for Measuring a Image, Multiple, Out of Band

Setting the signal generator

4. Set the SMP03 controls as follows:
   Frequency: 2 GHz
   Output level: 0 dBm

Initialization

5. Press **SHIFT** and **CONFIG(PRESET)**.

Setting the measurement conditions

6. Press **FREQ, 2** and **GHz**.
7. Press **SPAN, 5** and **MHz**.
8. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **1, 0, 0** and **kHz**.
9. Press ***VBW AUTO/MNL***(MNL), **3, 0, 0** and **Hz**.
10. Set the correction frequency of the NRVS to 2 GHz.
11. Adjust the output level of the SMP03 using the data knob so that the level of the power meter reading is 0.0 dBm±0.1 dB.
12. Press **SINGLE**.
13. Press **SRCH**, after the sweep has completed.
14. Press **MKR**, ***Delta Marker*** and ***Fixed Marker ON/OFF***(ON).

Measurement in the range of 100 Hz to 3.6 GHz band

15. Press **REPEAT**.
16. Set the SMP03 controls as follows:
    Frequency: 1957.159 MHz
17. Set the correction frequency of the NRVS to 1.96 GHz.
18. Adjust the output level of the SMP03 using the data knob so that the level of the power meter reading is 0.0 dBm ± 0.1 dB.
19. Press **SINGLE**.
20. Press **SRCH**, after the sweep has completed.
21. Record the level of the Delta marker reading on the performance check sheet.
22. Repeat steps 15 through 21 for each frequency setting listed on Table 1-19.

Table 1-19 Image, Multiple, Out of Band Setting (Center Frequency: 2 GHz)

BAND	Signal generator	Correction Frequency of NRVS
100 Hz to 3.6 GHz	1157.159 MHz	1.16 GHz
	10462.841 MHz	10.46 GHz
	8231.4205 MHz	8.23 GHz

For the R3273 only, Measurement in the range of 3.5 GHz to 7.5 GHz band

Measurement at 5.5 GHz

23. Press **FREQ, 5, ., 5** and **GHz**.
24. Set the frequency of the SMP03 to 5.5 GHz.
25. Set the correction frequency on the NRVS to 5.5 GHz.
26. Adjust the output level of the SMP03 using the data knob so that the level of the power meter reading is 0.0 dBm ± 0.1 dB.
27. Press **REPEAT**.
28. Press **SHIFT** and **MKR**(OFF).
29. Press **SRCH, FREQ,** ***more 1/2, Presel Tune*** and ***AUTO Tune***.
30. Press **SINGLE, SRCH, MKR,** ***Delta Marker*** and ***Fixed Marker ON/OFF***(ON).
31. Repeat steps 15 through 21 for each frequency setting listed on Table 1-20.

Table 1-20 Image, Multiple, Out of Band Setting for the R3273

BAND	Center Frequency	SMP03 Frequency	Correction Frequency of NRVS
3.5 GHz to 7.5 GHz	5.5 GHz	6342.841 MHz	6.34 GHz
	5.5 GHz	11421.421 MHz	11.4 GHz
	5.5 GHz	17342.841 MHz	17.3 GHz
	5.5 GHz	23267.262 MHz	23.3 GHz
7.4 GHz to 15.4 GHz	12.0 GHz	12842.841 MHz	12.8 GHz
	12.0 GHz	5789.29 MHz	5.79 GHz
	12.0 GHz	18210.71 MHz	18.2 GHz
	12.0 GHz	24421.421 MHz	24.4 GHz
15.2 GHz to 23.3 GHz	21.0 GHz	21842.841 MHz	21.8 GHz
	21.0 GHz	6719.053 MHz	6.72 GHz
	21.0 GHz	13859.527 MHz	13.9 GHz
23 GHz to 26.5 GHz	24.4 GHz	25242.841 MHz	25.2 GHz
	24.4 GHz	5783.935 MHz	5.78 GHz
	24.4 GHz	11989.29 MHz	12.0 GHz
	24.4 GHz	18194.645 MHz	18.2 GHz

For the R3273 only, Measurement in the range of 7.4 GHz to 15.4 GHz band

Measurement at 12 GHz

32. Press **FREQ, 1, 2** and **GHz**.
33. Set the frequency of the SM03 to 12 GHz.
34. Set the correction frequency of the NRVS to 12 GHz.
35. Repeat steps 26 through 31 for each frequency setting listed on Table 1-20.

For the R3273 only, Measurement in the range of 15.2 GHz to 23.3 GHz band

Measurement at 21 GHz

36. Press **FREQ, 2, 1** and **GHz**.
37. Set the frequency of the SM03 to 21 GHz.
38. Set the correction frequency of the NRVS to 21 GHz.
39. Repeat steps 26 through 31 for each frequency setting listed on Table 1-20.

For the R3273 only, Measurement in the range of 23 GHz to 26.5 GHz band

Measurement at 24.4 GHz

40. Press **FREQ, 2, 4, ., 4** and **GHz**.
41. Set the frequency of the SM03 to 24.4 GHz.
42. Set the correction frequency of the NRVS to 24.4 GHz.
43. Repeat steps 26 through 31 for each frequency setting listed on Table 1-20.

For the R3267 only, Measurement in the range of 3.5 GHz to 8 GHz band

Measurement at 7 GHz

44. Press **FREQ, 7** and **GHz**.
45. Set the frequency of the SM03 to 7 GHz.
46. Set the correction frequency of the NRVS to 7 GHz.
47. Adjust the output level of the SMP03 using the data knob so that the level of the power meter reading is 0.0 dBm ± 0.1 dB.
48. Press **REPEAT**.
49. Press **SHIFT** and **MKR**(OFF).
50. Press **SRCH, FREQ,** ***more 1/2, Presel Tune*** and ***AUTO Tune***.
51. Press **SINGLE, SRCH, MKR,** ***Delta Marker*** and ***Fixed Marker ON/OFF***(ON).
52. Set the frequency of the SMP03 and NRVS to the following Table 1-21 and repeat steps 15 through 21.

Table 1-21 Image, Multiple, Out of Band Setting for the R3267

BAND	Center Frequency	SMP03 Frequency	Correction Frequency of NRVS
3.5 GHz to 8 GHz	7.0 GHz	7842.841 MHz	7.84 GHz
	8.0 GHz	4632.131 MHz	4.63 GHz
	8.0 GHz	3789.29 MHz	3.79 GHz

Measurement at 8 GHz

53. Press **FREQ, 8** and **GHz**.
54. Set the frequency of the SM03 to 8 GHz.

55. Set the correction frequency of the NRVS to 8 GHz.

56. Repeat Steps 47 through 52 for each frequency setting listed on Table 1-21.

1.2.20 Sweep Time Accuracy

This section explains how to check sweep time accuracy, measuring a square wave in time domain in Zero Span Mode.

Specifications:

Less than or equal ± 3% of sweep time setting : Span = 0

Instruments Required

Instruments	QTY	Recommended Model
Function Generator	1	HP3325B
RF Cable BNC(m)-BNC(m)	1	MI-09
Adapter N-BNC	1	

Procedures:

Setup

1. Connect the function generator as shown in Figure 1-15.

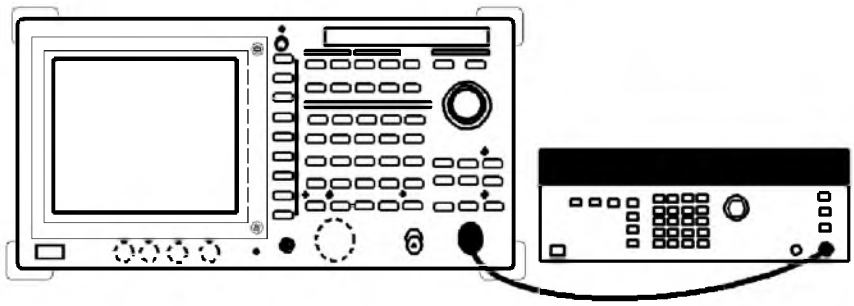

Figure 1-15 Setup for Measuring a Sweep Time Accuracy

Setting the measurement conditions

2. Set the HP3325B controls as follows:
   Frequency: 550 kHz
   Output level: -10 dBm
   Waveform: SQUARE

Initialization

3. Press **SHIFT** and **CONFIG(PRESET)**.

4. Press **FREQ, 0** and **MHz**.

5. Press **SPAN** and ***Zero Span***.
6. Press **COUPLE**, ***RBW AUTO/MNL***(MNL), **1, 0** and **MHz**.
7. Press ***VBW AUTO/MNL***(MNL),**1,0** and **MHz**.
8. Press **LEVEL**, ***dB/Div*** and ***2dB/Div***.
9. Press **SWP, *Trigger Setup***.
10. Select ***Source:VIDEO*** using the data knob.
11. Press the data knob.
12. Press ▽.
13. Turn the data knob slowly to adjust the ***Trigger Level***.
14. Press the data knob.
15. Press **SWP** and ***Sweep Time AUTO/MNL***(NML).
16. Set the output frequency on the HP3325B to 550 kHz.
17. Press **SWP, 2** and **Hz(μs)**.
18. Press ***TriggerDelay*, 0** and **Hz(μs)**.
19. Turn the data knob counter-clockwise until two leading edges appear on the screen.
20. Press **Single**.
21. Press **Single**, after the sweep has completed.
22. Press **MKR**, after the sweep has completed.
23. Move the marker to the first leading edge using the data knob.
24. Press **MKR** and ***Delta Marker***.
25. Move the marker to the second leading edge using the data knob.
26. Record the marker readout on the performance check sheet.
27. Press **MKR** and ***Marker OFF***.
28. Press **REPEAT**.
29. Repeat steps 16 through 28 for each frequency setting listed on Table 1-22.

1.2.20 Sweep Time Accuracy

Table 1-22 Sweep Time Setting

Function Generator	Sweep Time Setting
550 kHz	2 µs
220 kHz	5 µs
110 kHz	10 µs
55 kHz	20 µs
22 kHz	50 µs
11 kHz	100 µs
5.5 kHz	200 µs
2.2 kHz	500 µs
1.1 kHz	1 ms
550 Hz	2 ms
220 Hz	5 ms
110 Hz	10 ms
55 Hz	20 ms
22 Hz	50 ms
11 Hz	100 ms
5.5 Hz	200 ms
2.2 Hz	500 ms
1.1 Hz	1 s
0.55 Hz	2 s
0.22 Hz	5 s
0.11 Hz	10 s
0.055 Hz	20 s
0.022 Hz	50 s
0.011 Hz	100 s

1.3 Performance Check Sheet

1.3.1 Frequency Reference Output Accuracy

Setting	Spec.(min.) Hz	Spec.(max.) Hz	Measured value Hz	Remarks
30 MHz	29,999,997	30,000,003		
1 GHz	999,999,920	1,000,000,080		OPT21
1 GHz	999,999,980	1,000,000,020		OPT22
1 GHz	999,999,995	1,000,000,005		OPT23

1.3.2 Frequency Readout Accuracy and Frequency Counter Marker

(1) Frequency Readout Accuracy

Setting			Spec.(min.) GHz	Spec.(max.) GHz	Measuring GHz	Remarks
Frequency Span	Center Frequency	SMP03 Frequency				
1 MHz	2 GHz	2 GHz	1.999989	2.000011		
10 MHz	2 GHz	2 GHz	1.99989	2.00011		
20 MHz	2 GHz	2 GHz	1.99976	2.00024		
50 MHz	2 GHz	2 GHz	1.99946	2.00054		
100 MHz	2 GHz	2 GHz	1.9989	2.0011		
2 GHz	2 GHz	2 GHz	1.980	2.020		
1 MHz	5 GHz	5 GHz	4.999989	5.000011		R3267/73
10 MHz	5 GHz	5 GHz	4.99989	5.00011		R3267/73
20 MHz	5 GHz	5 GHz	4.99976	5.00024		R3267/73
50 MHz	5 GHz	5 GHz	4.99946	5.00054		R3267/73
100 MHz	5 GHz	5 GHz	4.9989	5.0011		R3267/73
2 GHz	5 GHz	5 GHz	4.980	5.020		R3267/73
1 MHz	11 GHz	11 GHz	10.999989	11.000011		R3273 only
10 MHz	11 GHz	11 GHz	10.99989	11.00011		R3273 only
20 MHz	11 GHz	11 GHz	10.99976	11.00024		R3273 only
50 MHz	11 GHz	11 GHz	10.99946	11.00054		R3273 only
100 MHz	11 GHz	11 GHz	10.9989	11.0011		R3273 only
2 GHz	11 GHz	11 GHz	10.980	11.020		R3273 only
1 MHz	18 GHz	18 GHz	17.999989	18.000011		R3273 only
10 MHz	18 GHz	18 GHz	17.99989	18.00011		R3273 only
20 MHz	18 GHz	18 GHz	17.99976	18.00024		R3273 only
50 MHz	18 GHz	18 GHz	17.99946	18.00054		R3273 only
100 MHz	18 GHz	18 GHz	17.9989	18.0011		R3273 only
2 GHz	18 GHz	18 GHz	17.980	18.020		R3273 only

(2) Frequency Counter Marker Accuracy

Setting	Spec.(min.) GHz	Spec.(max.) GHz	Measured value GHz	Remarks
2 GHz	1.999999994	2.000000006		
5 GHz	4.999999994	5.000000006		R3267/73
11 GHz	10.999999989	11.000000011		R3273 only
18 GHz	17.999999979	18.000000021		R3273 only

1.3.3 Frequency Span Accuracy

(1) R3264/67/73

Setting		Spec.(min.)	Spec.(max.)	Measured value	Remarks
Frequency Span	Center Frequency				
20 kHz	2 GHz	15.84 kHz	16.16 kHz	kHz	
50 kHz	2 GHz	39.6 kHz	40.4 kHz	kHz	
400 kHz	2 GHz	316.8 kHz	323.2 kHz	kHz	
2 MHz	2 GHz	1.584 MHz	1.616 MHz	MHz	
5 MHz	2 GHz	3.96 MHz	4.04 MHz	MHz	
10 MHz	2 GHz	7.92 MHz	8.08 MHz	MHz	
20 MHz	2 GHz	15.84 MHz	16.16 MHz	MHz	
50 MHz	2 GHz	39.6 MHz	40.4 MHz	MHz	
100 MHz	2 GHz	79.2 MHz	80.8 MHz	MHz	
200 MHz	2 GHz	158.4 MHz	161.6 MHz	MHz	
500 MHz	2 GHz	396 MHz	404 MHz	MHz	
1 GHz	2 GHz	792 MHz	808 MHz	MHz	
2 GHz	2 GHz	1.584 GHz	1.616 GHz	GHz	

(2) R3267/73

Setting		Spec.(min.)	Spec.(max.)	Measured value	Remarks
Frequency Span	Center Frequency				
4 GHz	4 GHz	3.168 GHz	3.232 GHz	GHz	
8 GHz	4 GHz	6.336 GHz	6.464 GHz	GHz	

(3) R3273

Setting		Spec.(min.)	Spec.(max.)	Measured value	Remarks
Frequency Span	Center Frequency				
10 MHz	10 GHz	7.92 MHz	8.08 MHz	MHz	
100 MHz	10 GHz	79.2 MHz	80.8 MHz	MHz	
1 GHz	10 GHz	792 MHz	808 MHz	MHz	
2 GHz	10 GHz	1.584 GHz	1.616 GHz	GHz	
10 MHz	17 GHz	7.92 MHz	8.08 MHz	MHz	
100 MHz	17 GHz	79.2 MHz	80.8 MHz	MHz	
1 GHz	17 GHz	792 MHz	808 MHz	MHz	
2 GHz	17 GHz	1.584 GHz	1.616 GHz	GHz	
5 GHz	10 GHz	3.96 GHz	4.04 GHz	GHz	
10 GHz	10 GHz	7.92 GHz	8.08 GHz	GHz	
19 GHz	10 GHz	15.048 GHz	15.352 GHz	GHz	

1.3.4 Calibration Amplitude Accuracy

Setting	Spec.(min.)	Spec.(max.)	Measured value	Remarks
-10 dBm	- 10.3 dBm	- 9.7 dBm	dBm	

1.3.5 IF Gain Uncertainty

(1) RBW: 1 MHz

Reference value	dBm

Reference Level	Spec.(min.)	Spec.(max.)	Measured value	Remarks
-1 dBm	-0.5 dB	+0.5 dB	dB	
-2 dBm	-0.5 dB	+0.5 dB	dB	
-3 dBm	-0.5 dB	+0.5 dB	dB	
-4 dBm	-0.5 dB	+0.5 dB	dB	
-5 dBm	-0.5 dB	+0.5 dB	dB	
-6 dBm	-0.5 dB	+0.5 dB	dB	
-7 dBm	-0.5 dB	+0.5 dB	dB	
-8 dBm	-0.5 dB	+0.5 dB	dB	
-9 dBm	-0.5 dB	+0.5 dB	dB	
-10 dBm	-0.5 dB	+0.5 dB	dB	
-20 dBm	-0.5 dB	+0.5 dB	dB	
-30 dBm	-0.5 dB	+0.5 dB	dB	
-40 dBm	-0.5 dB	+0.5 dB	dB	
-50 dBm	-0.5 dB	+0.5 dB	dB	
-60 dBm	-0.7 dB	+0.7 dB	dB	
-70 dBm	-0.7 dB	+0.7 dB	dB	

(2) RBW: 3 kHz

Reference value	dBm

Reference Level	Spec.(min.)	Spec.(max.)	Measured value	Remarks
-1 dBm	-0.5 dB	+0.5 dB	dB	
-2 dBm	-0.5 dB	+0.5 dB	dB	
-3 dBm	-0.5 dB	+0.5 dB	dB	
-4 dBm	-0.5 dB	+0.5 dB	dB	
-5 dBm	-0.5 dB	+0.5 dB	dB	
-6 dBm	-0.5 dB	+0.5 dB	dB	
-7 dBm	-0.5 dB	+0.5 dB	dB	
-8 dBm	-0.5 dB	+0.5 dB	dB	
-9 dBm	-0.5 dB	+0.5 dB	dB	
-10 dBm	-0.5 dB	+0.5 dB	dB	
-20 dBm	-0.5 dB	+0.5 dB	dB	
-30 dBm	-0.5 dB	+0.5 dB	dB	
-40 dBm	-0.5 dB	+0.5 dB	dB	
-50 dBm	-0.5 dB	+0.5 dB	dB	
-60 dBm	-0.7 dB	+0.7 dB	dB	
-70 dBm	-0.7 dB	+0.7 dB	dB	
-80 dBm	-0.7 dB	+0.7 dB	dB	

(3) RBW: 300 kHz

Reference value	dBm

Reference Level	Spec.(min.)	Spec.(max.)	Measured value	Remarks
-1 dBm	-0.5 dB	+0.5 dB	dB	
-2 dBm	-0.5 dB	+0.5 dB	dB	
-3 dBm	-0.5 dB	+0.5 dB	dB	
-4 dBm	-0.5 dB	+0.5 dB	dB	
-5 dBm	-0.5 dB	+0.5 dB	dB	
-6 dBm	-0.5 dB	+0.5 dB	dB	
-7 dBm	-0.5 dB	+0.5 dB	dB	
-8 dBm	-0.5 dB	+0.5 dB	dB	
-9 dBm	-0.5 dB	+0.5 dB	dB	
-10 dBm	-0.5 dB	+0.5 dB	dB	
-20 dBm	-0.5 dB	+0.5 dB	dB	
-20 dBm	-0.5 dB	+0.5 dB	dB	
-30 dBm	-0.5 dB	+0.5 dB	dB	
-40 dBm	-0.5 dB	+0.5 dB	dB	
-50 dBm	-0.5 dB	+0.5 dB	dB	
-60 dBm	-0.7 dB	+0.7 dB	dB	
-70 dBm	-0.7 dB	+0.7 dB	dB	

1.3.6 Input Attenuator Accuracy

(1) R3264/67/73

Measurement a center frequency of 2 GHz for the R3264 or 4 GHz for the R3267/73, RBW 3 kHz

Reference value dBm

Input Attenuator	IF Gain (dB)	IF Gain Uncertainty (dB)	Switching Accuracy		Step-to-Step Accuracy		Remarks
			Spec. (dB)	Actual value (dB)	Spec. (dB)	Calculated value (dB)	
10 dB	0	0	0(Ref)	Reference	0(Ref)	0	
20 dB	10		±2		±1.1		
30 dB	20		±2		±1.1		
40 dB	30		±2		±1.1		
50 dB	40		±2		±1.1		
60 dB	50		±2		±1.1		
70 dB	60		±2		±1.1		

(2) R3273

Measurement a center frequency of 15 GHz, RBW 3 kHz

Reference value dBm

Input Attenuator	IF Gain (dB)	IF Gain Uncertainty (dB)	Switching Accuracy		Step-to-Step Accuracy		Remarks
			Spec. (dB)	Measured value (dB)	Spec. (dB)	Calculated value (dB)	
10 dB	0	0	0(Ref)	Reference	0(Ref)	0	
20 dB	10		±2.5		±1.3		
30 dB	20		±2.5		±1.3		
40 dB	30		±2.5		±1.3		
50 dB	40		±2.5		±1.3		
60 dB	50		±2.5		±1.3		
70 dB	60		±2.5		±1.3		

Measurement a center frequency of 18 GHz, RBW 3 kHz

Reference value dBm

Input Attenuator	IF Gain (dB)	IF Gain Uncertainty (dB)	Switching Accuracy		Step-to-Step Accuracy		Remarks
			Spec. (dB)	Measured value (dB)	Spec. (dB)	Calculated value (dB)	
10 dB	0	0	0(Ref)	Reference	0(Ref)	0	
20 dB	10		±3.5		±1.8		
30 dB	20		±3.5		±1.8		
40 dB	30		±3.5		±1.8		
50 dB	40		±3.5		±1.8		
60 dB	50		±3.5		±1.8		
70 dB	60		±3.5		±1.8		

1.3.7 Frequency Response

(1) Frequency band 0 for the R3264/67

Setting	Spec.(min.)	Spec.(max.)	Measured value	Remarks
100 MHz	-3.0 dB	+3.0 dB		
200 MHz	-3.0 dB	+3.0 dB		
300 MHz	-3.0 dB	+3.0 dB		
400 MHz	-3.0 dB	+3.0 dB		
500 MHz	-3.0 dB	+3.0 dB		
600 MHz	-3.0 dB	+3.0 dB		
700 MHz	-3.0 dB	+3.0 dB		
800 MHz	-3.0 dB	+3.0 dB		
900 MHz	-3.0 dB	+3.0 dB		
1000 MHz	-3.0 dB	+3.0 dB		
1100 MHz	-3.0 dB	+3.0 dB		
1200 MHz	-3.0 dB	+3.0 dB		
1300 MHz	-3.0 dB	+3.0 dB		
1400 MHz	-3.0 dB	+3.0 dB		
1500 MHz	-3.0 dB	+3.0 dB		
1600 MHz	-3.0 dB	+3.0 dB		
1700 MHz	-3.0 dB	+3.0 dB		
1800 MHz	-3.0 dB	+3.0 dB		
1900 MHz	-3.0 dB	+3.0 dB		
2000 MHz	-3.0 dB	+3.0 dB		
2100 MHz	-3.0 dB	+3.0 dB		
2200 MHz	-3.0 dB	+3.0 dB		
2300 MHz	-3.0 dB	+3.0 dB		
2400 MHz	-3.0 dB	+3.0 dB		
2500 MHz	-3.0 dB	+3.0 dB		
2600 MHz	-3.0 dB	+3.0 dB		
2700 MHz	-3.0 dB	+3.0 dB		
2800 MHz	-3.0 dB	+3.0 dB		
2900 MHz	-3.0 dB	+3.0 dB		
3000 MHz	-3.0 dB	+3.0 dB		
3100 MHz	-3.0 dB	+3.0 dB		
3200 MHz	-3.0 dB	+3.0 dB		
3300 MHz	-3.0 dB	+3.0 dB		
3400 MHz	-3.0 dB	+3.0 dB		
3500 MHz	-3.0 dB	+3.0 dB		
Max. deviation 9 kHz to 3.5 GHz	-1.5 dB	+1.5 dB		R3264 only
Max. deviation 100 Hz to 3.5 GHz	-1.5 dB	+1.5 dB		R3267 only
Max. deviation 50 MHz to 2.6 GHz	-1.0 dB	+1.0 dB		R3267 only

Frequency band 0 for the R3273

Setting	Spec.(min.)	Spec.(max.)	Measured value	Remarks
100 MHz	-5.0 dB	+5.0 dB		
200 MHz	-5.0 dB	+5.0 dB		
300 MHz	-5.0 dB	+5.0 dB		
400 MHz	-5.0 dB	+5.0 dB		
500 MHz	-5.0 dB	+5.0 dB		
600 MHz	-5.0 dB	+5.0 dB		
700 MHz	-5.0 dB	+5.0 dB		
800 MHz	-5.0 dB	+5.0 dB		
900 MHz	-5.0 dB	+5.0 dB		
1000 MHz	-5.0 dB	+5.0 dB		
1100 MHz	-5.0 dB	+5.0 dB		
1200 MHz	-5.0 dB	+5.0 dB		
1300 MHz	-5.0 dB	+5.0 dB		
1400 MHz	-5.0 dB	+5.0 dB		
1500 MHz	-5.0 dB	+5.0 dB		
1600 MHz	-5.0 dB	+5.0 dB		
1700 MHz	-5.0 dB	+5.0 dB		
1800 MHz	-5.0 dB	+5.0 dB		
1900 MHz	-5.0 dB	+5.0 dB		
2000 MHz	-5.0 dB	+5.0 dB		
2100 MHz	-5.0 dB	+5.0 dB		
2200 MHz	-5.0 dB	+5.0 dB		
2300 MHz	-5.0 dB	+5.0 dB		
2400 MHz	-5.0 dB	+5.0 dB		
2500 MHz	-5.0 dB	+5.0 dB		
2600 MHz	-5.0 dB	+5.0 dB		
2700 MHz	-5.0 dB	+5.0 dB		
2800 MHz	-5.0 dB	+5.0 dB		
2900 MHz	-5.0 dB	+5.0 dB		
3000 MHz	-5.0 dB	+5.0 dB		
3100 MHz	-5.0 dB	+5.0 dB		
3200 MHz	-5.0 dB	+5.0 dB		
3300 MHz	-5.0 dB	+5.0 dB		
3400 MHz	-5.0 dB	+5.0 dB		
3500 MHz	-5.0 dB	+5.0 dB		
Max. deviation 100 Hz to 3.5 GHz	-1.5 dB	+1.5 dB		
Max. deviation 50 MHz to 2.6 GHz	-1.0 dB	+1.0 dB		

(2) Frequency band 1 for the R3267

Setting	Spec.(min.)	Spec.(max.)	Measured value	Remarks
1.7 GHz	-3.0 dB	+3.0 dB		
1.8 GHz	-3.0 dB	+3.0 dB		
1.9 GHz	-3.0 dB	+3.0 dB		
2.0 GHz	-3.0 dB	+3.0 dB		
2.1 GHz	-3.0 dB	+3.0 dB		
2.2 GHz	-3.0 dB	+3.0 dB		
2.3 GHz	-3.0 dB	+3.0 dB		
2.4 GHz	-3.0 dB	+3.0 dB		
2.5 GHz	-3.0 dB	+3.0 dB		
2.6 GHz	-3.0 dB	+3.0 dB		
2.7 GHz	-3.0 dB	+3.0 dB		
2.8 GHz	-3.0 dB	+3.0 dB		
2.9 GHz	-3.0 dB	+3.0 dB		
3.0 GHz	-3.0 dB	+3.0 dB		
3.1 GHz	-3.0 dB	+3.0 dB		
3.2 GHz	-3.0 dB	+3.0 dB		
3.3 GHz	-3.0 dB	+3.0 dB		
3.4 GHz	-3.0 dB	+3.0 dB		
3.5 GHz	-3.0 dB	+3.0 dB		
Max. deviation 1.6 GHz to 3.5 GHz	-1.5 dB	+1.5 dB		

Frequency band 1 for the R3273

Setting	Spec.(min.)	Spec.(max.)	Measured value	Remarks
3.6 GHz	-5.0 dB	+5.0 dB		
3.8 GHz	-5.0 dB	+5.0 dB		
4.0 GHz	-5.0 dB	+5.0 dB		
4.2 GHz	-5.0 dB	+5.0 dB		
4.4 GHz	-5.0 dB	+5.0 dB		
4.6 GHz	-5.0 dB	+5.0 dB		
4.8 GHz	-5.0 dB	+5.0 dB		
5.0 GHz	-5.0 dB	+5.0 dB		
5.2 GHz	-5.0 dB	+5.0 dB		
5.4 GHz	-5.0 dB	+5.0 dB		
5.6 GHz	-5.0 dB	+5.0 dB		
5.8 GHz	-5.0 dB	+5.0 dB		
6.0 GHz	-5.0 dB	+5.0 dB		
6.2 GHz	-5.0 dB	+5.0 dB		
6.4 GHz	-5.0 dB	+5.0 dB		
6.6 GHz	-5.0 dB	+5.0 dB		
6.8 GHz	-5.0 dB	+5.0 dB		
7.0 GHz	-5.0 dB	+5.0 dB		
7.2 GHz	-5.0 dB	+5.0 dB		
7.4 GHz	-5.0 dB	+5.0 dB		
Max. deviation 3.5 GHz to 7.5 GHz	-1.5 dB	+1.5 dB		

(3) Frequency band 2 for the R3267

Setting	Spec.(min.)	Spec.(max.)	Measured value	Remarks
3.6 GHz	-3.0 dB	+3.0 dB		
3.7 GHz	-3.0 dB	+3.0 dB		
3.8 GHz	-3.0 dB	+3.0 dB		
3.9 GHz	-3.0 dB	+3.0 dB		
4.0 GHz	-3.0 dB	+3.0 dB		
4.1 GHz	-3.0 dB	+3.0 dB		
4.2 GHz	-3.0 dB	+3.0 dB		
4.3 GHz	-3.0 dB	+3.0 dB		
4.4 GHz	-3.0 dB	+3.0 dB		
4.5 GHz	-3.0 dB	+3.0 dB		
4.6 GHz	-3.0 dB	+3.0 dB		
4.7 GHz	-3.0 dB	+3.0 dB		
4.8 GHz	-3.0 dB	+3.0 dB		
4.9 GHz	-3.0 dB	+3.0 dB		
5.0 GHz	-3.0 dB	+3.0 dB		
5.1 GHz	-3.0 dB	+3.0 dB		
5.2 GHz	-3.0 dB	+3.0 dB		
5.3 GHz	-3.0 dB	+3.0 dB		
5.4 GHz	-3.0 dB	+3.0 dB		
5.5 GHz	-3.0 dB	+3.0 dB		
5.6 GHz	-3.0 dB	+3.0 dB		
5.7 GHz	-3.0 dB	+3.0 dB		
5.8 GHz	-3.0 dB	+3.0 dB		
5.9 GHz	-3.0 dB	+3.0 dB		
6.0 GHz	-3.0 dB	+3.0 dB		
6.1 GHz	-3.0 dB	+3.0 dB		
6.2 GHz	-3.0 dB	+3.0 dB		
6.3 GHz	-3.0 dB	+3.0 dB		
6.4 GHz	-3.0 dB	+3.0 dB		
6.5 GHz	-3.0 dB	+3.0 dB		
6.6 GHz	-3.0 dB	+3.0 dB		
6.7 GHz	-3.0 dB	+3.0 dB		
6.8 GHz	-3.0 dB	+3.0 dB		
6.9 GHz	-3.0 dB	+3.0 dB		
Max. deviation 3.5 GHz to 7.0 GHz	-1.5 dB	+1.5 dB		

Frequency band 2 for the R3273

Setting	Spec.(min.)	Spec.(max.)	Measured value	Remarks
7.5 GHz	-5.0 dB	+5.0 dB		
7.7 GHz	-5.0 dB	+5.0 dB		
7.9 GHz	-5.0 dB	+5.0 dB		
8.1 GHz	-5.0 dB	+5.0 dB		
8.3 GHz	-5.0 dB	+5.0 dB		
8.5 GHz	-5.0 dB	+5.0 dB		
8.7 GHz	-5.0 dB	+5.0 dB		
8.9 GHz	-5.0 dB	+5.0 dB		
9.1 GHz	-5.0 dB	+5.0 dB		
9.3 GHz	-5.0 dB	+5.0 dB		
9.5 GHz	-5.0 dB	+5.0 dB		
9.7 GHz	-5.0 dB	+5.0 dB		
9.9 GHz	-5.0 dB	+5.0 dB		
10.1 GHz	-5.0 dB	+5.0 dB		
10.3 GHz	-5.0 dB	+5.0 dB		
10.5 GHz	-5.0 dB	+5.0 dB		
10.7 GHz	-5.0 dB	+5.0 dB		
10.9 GHz	-5.0 dB	+5.0 dB		
11.1 GHz	-5.0 dB	+5.0 dB		
11.3 GHz	-5.0 dB	+5.0 dB		
11.5 GHz	-5.0 dB	+5.0 dB		
11.7 GHz	-5.0 dB	+5.0 dB		
11.9 GHz	-5.0 dB	+5.0 dB		
12.1 GHz	-5.0 dB	+5.0 dB		
12.3 GHz	-5.0 dB	+5.0 dB		
12.5 GHz	-5.0 dB	+5.0 dB		
12.7 GHz	-5.0 dB	+5.0 dB		
12.9 GHz	-5.0 dB	+5.0 dB		
13.1 GHz	-5.0 dB	+5.0 dB		
13.3 GHz	-5.0 dB	+5.0 dB		
13.5 GHz	-5.0 dB	+5.0 dB		
13.7 GHz	-5.0 dB	+5.0 dB		
13.9 GHz	-5.0 dB	+5.0 dB		
14.1 GHz	-5.0 dB	+5.0 dB		
14.3 GHz	-5.0 dB	+5.0 dB		
14.5 GHz	-5.0 dB	+5.0 dB		
14.7 GHz	-5.0 dB	+5.0 dB		
14.9 GHz	-5.0 dB	+5.0 dB		
15.1 GHz	-5.0 dB	+5.0 dB		
15.3 GHz	-5.0 dB	+5.0 dB		
Max. deviation 7.4 GHz to 15.4 GHz	-3.5 dB	+3.5 dB		

1.3.7 Frequency Response

(4) Frequency band 3 for the R3267

Setting	Spec.(min.)	Spec.(max.)	Measured value	Remarks
7.0 GHz	-3.0 dB	+3.0 dB		
7.1 GHz	-3.0 dB	+3.0 dB		
7.2 GHz	-3.0 dB	+3.0 dB		
7.3 GHz	-3.0 dB	+3.0 dB		
7.4 GHz	-3.0 dB	+3.0 dB		
7.5 GHz	-3.0 dB	+3.0 dB		
7.6 GHz	-3.0 dB	+3.0 dB		
7.7 GHz	-3.0 dB	+3.0 dB		
7.8 GHz	-3.0 dB	+3.0 dB		
7.9 GHz	-3.0 dB	+3.0 dB		
Max. deviation 6.9 GHz to 8.0 GHz	-1.5 dB	+1.5 dB		

Frequency band 3 for the R3273

Setting	Spec.(min.)	Spec.(max.)	Measured value	Remarks
15.4 GHz	-5.0 dB	+5.0 dB		
15.6 GHz	-5.0 dB	+5.0 dB		
15.8 GHz	-5.0 dB	+5.0 dB		
16.0 GHz	-5.0 dB	+5.0 dB		
16.2 GHz	-5.0 dB	+5.0 dB		
16.4 GHz	-5.0 dB	+5.0 dB		
16.6 GHz	-5.0 dB	+5.0 dB		
16.8 GHz	-5.0 dB	+5.0 dB		
17.0 GHz	-5.0 dB	+5.0 dB		
17.2 GHz	-5.0 dB	+5.0 dB		
17.4 GHz	-5.0 dB	+5.0 dB		
17.6 GHz	-5.0 dB	+5.0 dB		
17.8 GHz	-5.0 dB	+5.0 dB		
18.0 GHz	-5.0 dB	+5.0 dB		
18.2 GHz	-5.0 dB	+5.0 dB		
18.4 GHz	-5.0 dB	+5.0 dB		
18.6 GHz	-5.0 dB	+5.0 dB		
18.8 GHz	-5.0 dB	+5.0 dB		
19.0 GHz	-5.0 dB	+5.0 dB		
19.2 GHz	-5.0 dB	+5.0 dB		
19.4 GHz	-5.0 dB	+5.0 dB		
19.6 GHz	-5.0 dB	+5.0 dB		
19.8 GHz	-5.0 dB	+5.0 dB		
20.0 GHz	-5.0 dB	+5.0 dB		
20.2 GHz	-5.0 dB	+5.0 dB		
20.4 GHz	-5.0 dB	+5.0 dB		
20.6 GHz	-5.0 dB	+5.0 dB		
20.8 GHz	-5.0 dB	+5.0 dB		
21.0 GHz	-5.0 dB	+5.0 dB		
21.2 GHz	-5.0 dB	+5.0 dB		
21.4 GHz	-5.0 dB	+5.0 dB		
21.6 GHz	-5.0 dB	+5.0 dB		
21.8 GHz	-5.0 dB	+5.0 dB		
22.0 GHz	-5.0 dB	+5.0 dB		
22.2 GHz	-5.0 dB	+5.0 dB		
22.4 GHz	-5.0 dB	+5.0 dB		
22.6 GHz	-5.0 dB	+5.0 dB		

22.8 GHz	-5.0 dB	+5.0 dB		
23.0 GHz	-5.0 dB	+5.0 dB		
23.2 GHz	-5.0 dB	+5.0 dB		
23.4 GHz	-5.0 dB	+5.0 dB		
23.6 GHz	-5.0 dB	+5.0 dB		
23.8 GHz	-5.0 dB	+5.0 dB		
24.0 GHz	-5.0 dB	+5.0 dB		
24.2 GHz	-5.0 dB	+5.0 dB		
24.4 GHz	-5.0 dB	+5.0 dB		
24.6 GHz	-5.0 dB	+5.0 dB		
24.8 GHz	-5.0 dB	+5.0 dB		
25.0 GHz	-5.0 dB	+5.0 dB		
25.2 GHz	-5.0 dB	+5.0 dB		
25.4 GHz	-5.0 dB	+5.0 dB		
25.6 GHz	-5.0 dB	+5.0 dB		
25.8 GHz	-5.0 dB	+5.0 dB		
26.0 GHz	-5.0 dB	+5.0 dB		
26.2 GHz	-5.0 dB	+5.0 dB		
26.4 GHz	-5.0 dB	+5.0 dB		
Max. deviation 15.4 GHz to 26.5 GHz	-4.0 dB	+4.0 dB		

1.3.8 Scale Fidelity

(1) Log scale Fidelity

0 to -10 dB/1 dB Step

Input Signal Level (dBm) nominal	dB from Reference Level (nominal)	Delta Marker Level		Measured value dB	Incremental Error dB	Remarks
		Spec.(min.) dB	Spec.(max.) dB			
0	0	0 (Ref)	0 (Ref)	0 (Ref)	0 (Ref)	
-1	-1	-1.2	-0.8			
-2	-2	-2.4	-1.6			
-3	-3	-3.6	-2.4			
-4	-4	-4.8	-3.2			
-5	-5	-5.85	-4.15			
-6	-6	-6.85	-5.15			
-7	-7	-7.85	-6.15			
-8	-8	-8.85	-7.15			
-9	-9	-9.85	-8.15			
-10	-10	-10.85	-9.15			

0 to -90 dB/10 dB Step

Reference output level	dBm

Input Signal Level (dBm) nominal	dB from Reference Level (nominal)	Delta Marker Level		Measured value dB	Remarks
		Spec.(min.) dB	Spec.(max.) dB		
0	0	0 (Ref)	0 (Ref)	0 (Ref)	
-10	-10	-10.85	-9.15		
-20	-20	-20.85	-19.15		
-30	-30	-30.85	-29.15		
-40	-40	-40.85	-39.15		
-50	-50	-50.85	-49.15		
-60	-60	-60.85	-59.15		
-70	-70	-70.85	-69.15		
-80	-80	-80.85	-79.15		
-90	-90	-90.85	-89.15		

(2) Linear scale Fidelity

0 to 10 div

Reference output level	dBm

Input Signal Level (dB, nominal)	Div. from Reference Level	Marker Level			Remarks
		Spec.(min.) mV	Spec.(max.) mV	Measured value mV	
0 (Ref)	0	223.6	223.6	223.6 (Ref)	
-0.92	1	190.06	212.42		
-1.94	2	167.7	190.06		
-3.10	3	145.34	167.7		
-4.44	4	122.98	145.34		
-6.02	5	100.62	122.98		
-7.96	6	78.26	100.62		
-10.46	7	55.9	78.26		
-13.98	8	33.54	55.9		
-20	9	11.18	33.54		

1.3.9 Resolution Bandwidth Switching

Setting		Spec.(min.) dB	Spec.(max.) dB	Measured value dB	Remarks
RBW	Frequency Span				
5 MHz	8 MHz	-0.3	+0.3		
3 MHz	5 MHz	-0.3	+0.3		
1 MHz	2 MHz	-0.3	+0.3		
100 kHz	200 kHz	-0.3	+0.3		
30 kHz	50 kHz	-0.3	+0.3		
10 kHz	20 kHz	-0.3	+0.3		
3 kHz	5 kHz	-0.3	+0.3		
1 kHz	2 kHz	-0.3	+0.3		
300 Hz	500 Hz	-0.3	+0.3		
100 Hz	200 Hz	-0.3	+0.3		
30 Hz	200 Hz	-1	+1		

1.3.10 Resolution Bandwidth Accuracy and Selectivity

3 dB bandwidth

Setting		Spec.(min.)	Spec.(max.)	Measured value	Remarks
RBW	Frequency Span				
5 MHz	10 MHz	3.75 MHz	6.25 MHz	MHz	
3 MHz	5 MHz	2.25 MHz	3.75 MHz	MHz	
1 MHz	2 MHz	850 kHz	1150 kHz	kHz	
300 kHz	500 kHz	255 kHz	345 kHz	kHz	
100 kHz	200 kHz	85 kHz	115 kHz	kHz	
30 kHz	50 kHz	25.5 kHz	34.5 kHz	kHz	
10 kHz	20 kHz	8.5 kHz	11.5 kHz	kHz	
3 kHz	5 kHz	2.55 kHz	3.45 kHz	kHz	
1 kHz	2 kHz	850 Hz	1150 Hz	Hz	
300 Hz	500 Hz	255 Hz	345 Hz	Hz	
100 Hz	200 Hz	85 Hz	115 Hz	Hz	
30 Hz*	200 Hz	22.5 Hz	37.5 Hz	Hz	

Note: * the Spec(min.) and Spec(max.) values for RBW 30 Hz are those when the temperature is 25 °C±10 °C. Values for other temperature are not specified.

60 dB bandwidth and Selectivity

Setting		Measured value	Spec.(max.)	Selectivity 60dB : 3 dB bandwidth	Remarks
RBW	Frequency Span				
5 MHz	30 MHz	MHz	15 : 1	: 1	
3 MHz	25 MHz	MHz	15 : 1	: 1	
1 MHz	20 MHz	kHz	15 : 1	: 1	
300 kHz	5 MHz	kHz	15 : 1	: 1	
100 kHz	1 MHz	kHz	15 : 1	: 1	
30 kHz	500 kHz	kHz	15 : 1	: 1	
10 kHz	200 kHz	kHz	15 : 1	: 1	
3 kHz	50 kHz	kHz	15 : 1	: 1	
1 kHz	20 kHz	Hz	15 : 1	: 1	
300 Hz	5 kHz	Hz	15 : 1	: 1	
100 Hz	2 kHz	Hz	15 : 1	: 1	
30 Hz	1 kHz	Hz	20 : 1	: 1	

1.3.11 Noise Sidebands

Frequency 1.5 GHz

Offset	Spec.(min.)	Spec.(max.)	Measured value	Remarks
1 kHz offset	- -	-100 dBc/Hz	dBc/Hz	
10 kHz offset	- -	-110 dBc/Hz	dBc/Hz	
100 kHz offset	- -	-118 dBc/Hz	dBc/Hz	
1000 kHz offset	- -	-135 dBc/Hz	dBc/Hz	

1.3.12 Displayed Average Noise Level

Center Frequency	Spec.(min.)	Spec.(max.)	Measured value	Remarks
1 kHz	- -	-90 dBm	dBm	
10 kHz	- -	-100 dBm	dBm	
100 kHz	- -	-101 dBm	dBm	
1 MHz	- -	-125 dBm	dBm	
10.1 MHz	- -	-130 dBm	dBm	
101 MHz	- -	-129.8 dBm (R3264) -129.9 dBm (R3267/73)	dBm	
501 MHz	- -	-129 dBm (R3264) -129.5 dBm (R3267/73)	dBm	
1001 MHz	- -	-128 dBm (R3264) -129 dBm (R3267/73)	dBm	
1.5 GHz	- -	-127 dBm (R3264) -128.5 dBm (R3267/73)	dBm	
2.0 GHz	- -	-126 dBm (R3264) -128 dBm (R3267/73)	dBm	
2.5 GHz	- -	-125 dBm (R3264) -127.5 dBm (R3267/73)	dBm	
3.0 GHz	- -	-124 dBm (R3264) -127 dBm (R3267/73)	dBm	
3.5 GHz	- -	-123 dBm (R3264) -126.5 dBm (R3267/73)	dBm	

For the R3267 only

Frequency Band	Spec.(min.)	Spec.(max.)	Measured value	Remarks
3.5 GHz to 8.0 GHz	- -	-125 dBm	dBm	

For the R3273 only

Frequency Band	Spec.(min.)	Spec.(max.)	Measured value	Remarks
3.5 GHz to 7.5 GHz	- -	-125 dBm	dBm	
7.5 GHz to 15.4 GHz	- -	-122 dBm	dBm	
15.2 GHz to 22 GHz	- -	-120 dBm	dBm	
22 GHz to 26.5 GHz	- -	-117 dBm	dBm	

1.3.13 Residual FM

Marker Reading		3 dB Slope	FM Deviation	Spec. (min)	Spec. (max)	Calculated Residual FM	Remarks
Δ f	Δ level						
		Hz/dB	dB	- -	3 Hz	Hz	

1.3.14 Residual Response

Frequency Band	Spec.(min.)	Spec.(max.)	Measured value	Remarks
1 MHz to 3.5 GHz	- -	-100 dBm	dBm	
3.5 GHz to 7.5 GHz	- -	-90 dBm	dBm	R3267/73

1.3.15 Gain Compression

Setting MHz			Spec.(min.)	Spec.(max.)	Measured value	Remarks
Center Frequency	SMP02	SMP03				
10.5 MHz	10 MHz	11 MHz	-3 dBm	- -	dBm	
200.5 MHz	200 MHz	201 MHz	0 dBm	- -	dBm	
3600.5 MHz	3600 MHz	3601 MHz	Note*1	- -	dBm	R3267/73
7600.5 MHz	7600 MHz	7601 MHz	-3 dBm	- -	dBm	R3273 only

Note*1 : For R3267: 0dBm R3273: -10 dBm

1.3.16 Second Harmonics Distortion

Frequency Band	Center Frequency	Spec.(min.)	Spec.(max.)	Measured value	Remarks
100 MHz to 3.5 GHz	1.5 GHz	- -	-70 dBc	dBc	
Bands excluding the above	1.9 GHz	- -	Note*2	dBc	R3267/73

Note*2 : For R3267: -90dBc R3273: -100 dBc

1.3.17 Third Order Intermodulation Distortion

For the R3264/67

Center Frequency	Spec.(min.)	Spec.(max.) dBc	Measured value dBc	Remarks
20.5 MHz	- -	-50		
105 MHz	- -	-60		
1500 MHz	- -	-65		
2000 MHz	- -	-70		R3267 only
3600 MHz	- -	-70		R3267 only

For the R3273

Center Frequency	Spec.(min.)	Spec.(max.) dBc	Measured value dBc	Remarks
20.5 MHz	- -	-50		
105 MHz	- -	-60		
1500 MHz	- -	-65		
3600 MHz	- -	-50		
8000 MHz	- -	-55		

1.3.18 Image, Multiple, Out of Band

For the R3273

BAND	Setting		Spec. (min.)	Spec.(max.)	Measured value	Remarks
	Center Frequency	SMP03				
100 Hz to 3.6 GHz	2 GHz	1957.159 MHz	- -	- 70 dBc	dBc	
	2 GHz	1157.159 MHz	- -	- 70 dBc	dBc	
	2 GHz	10.462841 GHz	- -	- 70 dBc	dBc	
	2 GHz	8.2314205 GHz	- -	- 70 dBc	dBc	
3.5 GHz to 7.5 GHz	5.5 GHz	6.342841 GHz	- -	- 70 dBc	dBc	
	5.5 GHz	11.421421 GHz	- -	- 70 dBc	dBc	
	5.5 GHz	17.342841 GHz	- -	- 70 dBc	dBc	
	5.5 GHz	23.264262 GHz	- -	- 50 dBc	dBc	
7.4 GHz to 15.4 GHz	12 GHz	12.842841 GHz	- -	- 70 dBc	dBc	
	12 GHz	5.78929 GHz	- -	- 70 dBc	dBc	
	12 GHz	18.21071 GHz	- -	- 60 dBc	dBc	
	12 GHz	24.421421 GHz	- -	- 50 dBc	dBc	
15.2 GHz to 23.3 GHz	21 GHz	21.842841 GHz	- -	- 60 dBc	dBc	
	21 GHz	6.719053 GHz	- -	- 70 dBc	dBc	
	21 GHz	13.859527 GHz	- -	- 70 dBc	dBc	
23 GHz to 26.5 GHz	24.4 GHz	25.242841 GHz	- -	- 50 dBc	dBc	
	24.4 GHz	5.783935 GHz	- -	- 70 dBc	dBc	
	24.4 GHz	11.98929 GHz	- -	- 70 dBc	dBc	
	24.4 GHz	18.194645 GHz	- -	- 60 dBc	dBc	

For the R3267

BAND	Setting		Spec. (min.)	Spec.(max.)	Measured value	Remarks
	Center Frequency	SMP03				
100 Hz to 3.6 GHz	2 GHz	1957.159 MHz	- -	- 70 dBc	dBc	
	2 GHz	1157.159 MHz	- -	- 70 dBc	dBc	
	2 GHz	10.462841 GHz	- -	- 70 dBc	dBc	
	2 GHz	8.2314205 GHz	- -	- 70 dBc	dBc	
3.5 GHz to 8 GHz	7 GHz	7.842841 GHz	- -	- 70 dBc	dBc	
	8 GHz	4.632131 GHz	- -	- 70 dBc	dBc	
	8 GHz	3.78929 GHz	- -	- 70 dBc	dBc	

1.3.19 Sweep Time Accuracy

Setting		Spec.(min.)	Spec.(max.)	Measured value	Remarks
HP3325B Frequency	Frequency Span				
550 kHz	2 µs	1.7 7µs	1.87 µs	µs	
220 kHz	5 µs	4.41 µs	4.68 µs	µs	
110 kHz	10 µs	8.82 µs	9.36 µs	µs	
55 kHz	20 µs	17.7 µs	18.7 µs	µs	
22 kHz	50 µs	44. 1µs	46.8 µs	µs	
11 kHz	100 µs	88.2 µs	93.6 µs	µs	
5.5 kHz	200 µs	177 µs	187 µs	µs	
2.2 kHz	500 µs	441 µs	468 µs	µs	
1.1 kHz	1 ms	882 µs	936 µs	µs	
550 Hz	2 ms	1.77 ms	1.87 ms	ms	
220 Hz	5 ms	4.41 ms	4.68 ms	ms	
110 Hz	10 ms	8.82 ms	9.36 ms	ms	
55 Hz	20 ms	17.7 ms	18.7 ms	ms	
22 Hz	50 ms	44.1 ms	46.8 ms	ms	
11 Hz	100 ms	88.2 ms	93.6 ms	ms	
5.5 Hz	200 ms	177 ms	187 ms	ms	
2.2 Hz	500 ms	441 ms	468 ms	ms	
1.1 Hz	1 s	882 ms	936 ms	ms	
0.55 Hz	2 s	1.77 s	1.87 s	s	
0.22 Hz	5 s	4.41 s	4.68 s	s	
0.11 Hz	10 s	8.82 s	9.36 s	s	
0.055 Hz	20 s	17.7 s	18.7 s	s	
0.022 Hz	50 s	44.1 s	46.8 s	s	
0.011 Hz	100 s	88.2 s	93.6 s	s	

ALPHABETICAL INDEX

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1. Unless otherwise specifically agreed by Seller and Purchaser in writing, ADVANTEST will warrant to the Purchaser that during the Warranty Period this Product (other than consumables included in the Product) will be free from defects in material and workmanship and shall conform to the specifications set forth in this Operation Manual.

2. The warranty period for the Product (the "Warranty Period") will be a period of one year commencing on the delivery date of the Product.

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   (b) any improper or inadequate handling, carriage or storage of the Product by the Purchaser or any third party (other than ADVANTEST or its agents);

   (c) use of the Product under operating conditions or environments different than those specified in the Operation Manual or recommended by ADVANTEST, including, without limitation, (i) instances where the Product has been subjected to physical stress or electrical voltage exceeding the permissible range and (ii) instances where the corrosion of electrical circuits or other deterioration was accelerated by exposure to corrosive gases or dusty environments;

   (d) use of the Product in connection with software, interfaces, products or parts other than software, interfaces, products or parts supplied or recommended by ADVANTEST;

   (e) the occurrence of an event of force majeure, including, without limitation, fire, explosion, geological change, storm, flood, earthquake, tidal wave, lightning or act of war; or

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CUSTOMER SERVICE DESCRIPTION

In order to maintain safe and trouble-free operation of the Product and to prevent the incurrence of unnecessary costs and expenses, ADVANTEST recommends a regular preventive maintenance program under its maintenance agreement.

ADVANTEST's maintenance agreement provides the Purchaser on-site and off-site maintenance, parts, maintenance machinery, regular inspections, and telephone support and will last a maximum of ten years from the date the delivery of the Product. For specific details of the services provided under the maintenance agreement, please contact the nearest ADVANTEST office listed at the end of this Operation Manual or ADVANTEST's sales representatives.

Some of the components and parts of this Product have a limited operating life (such as, electrical and mechanical parts, fan motors, unit power supply, etc.). Accordingly, these components and parts will have to be replaced on a periodic basis. If the operating life of a component or part has expired and such component or part has not been replaced, there is a possibility that the Product will not perform properly. Additionally, if the operating life of a component or part has expired and continued use of such component or part damages the Product, the Product may not be repairable. Please contact the nearest ADVANTEST office listed at the end of this Operation Manual or ADVANTEST's sales representatives to determine the operating life of a specific component or part, as the operating life may vary depending on various factors such as operating condition and usage environment.

CLAIM FOR DAMAGE IN SHIPMENT TO ORIGINAL BUYER

The product should be thoroughly inspected immediately upon original delivery to buyer. All material in the container should be checked against the enclosed packing list or the instruction manual alternatively. ADVANTEST will not be responsible for shortage unless notified immediately.
If the product is damaged in any way, a claim should be filed by the buyer with carrier immediately. (To obtain a quotation to repair shipment damage, contact ADVANTEST or the local supplier.) Final claim and negotiations with the carrier must be completed by buyer.

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