ADVANTEST®

ADVANTEST CORPORATION

D3371

Transmission Analyzer

Operation Manual (Vol.2)

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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.
  - Connect the power cable to a power outlet that is connected to a protected ground terminal. Grounding will be defeated if you use an extension cord which does not include a protected 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 anything on the product and do not apply excessive pressure to the 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 before their expected lifespan has expired to maintain the performance and function of the instrument.
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.

Each product may use parts with limited life.
For more information, refer to the section in this document where the parts with limited life are described.

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
Memory backup battery	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 solder).

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
- Altitude of up to 2000 m

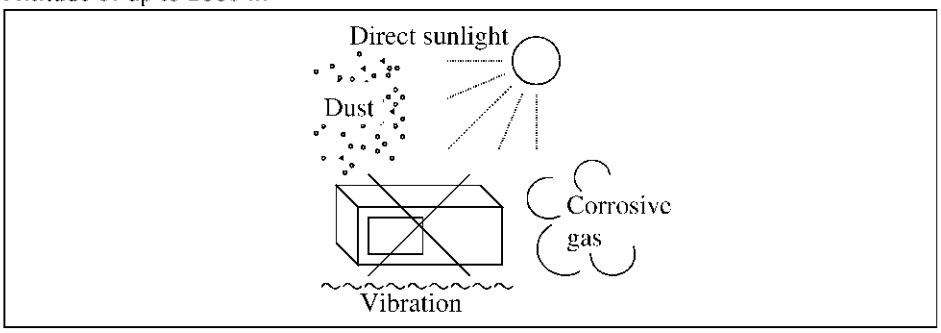


Figure-1 Environmental Conditions

- Operating position

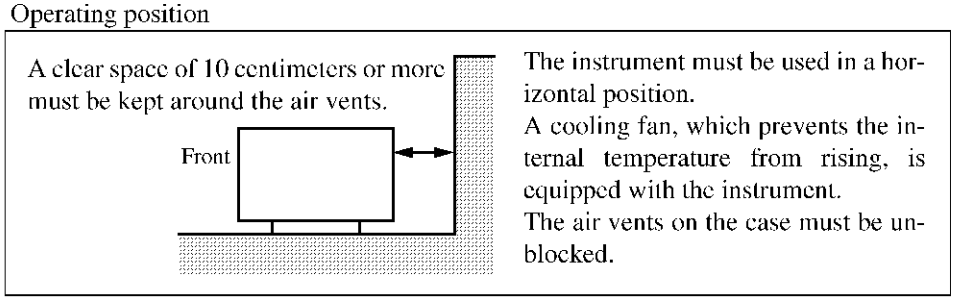


Figure-2 Operating Position

- Storage position

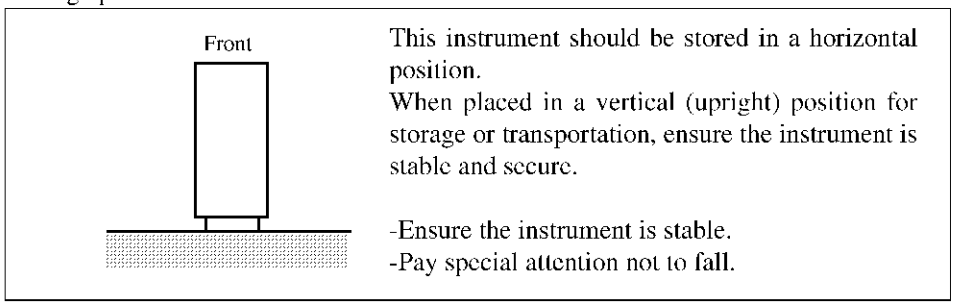


Figure-3 Storage Position

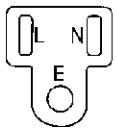
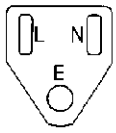
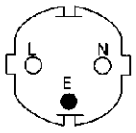
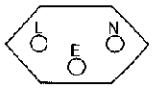
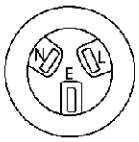
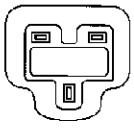
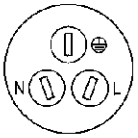
- The classification of the transient over-voltage, which exists typically in the main power supply, and the pollution degree is defined by IEC61010-1 and described below.

  Impulse withstand voltage (over-voltage) category II defined by IEC60364-4-443

  Pollution Degree 2

Types of Power Cable

Replace any references to the power cable type, according to the following table, with the appropriate power cable type for your country.

Plug configuration	Standards	Rating, color and length	Model number (Option number)
	PSE: Japan Electrical Appliance and Material Safety Law	125 V at 7 A Black 2 m (6 ft)	Straight: A01402 Angled: A01412
	UL: United States of America CSA: Canada	125 V at 7 A Black 2 m (6 ft)	Straight: A01403 (Option 95) Angled: A01413
	CEE: Europe DEMKO: Denmark NEMKO: Norway VDE: Germany KEMA: The Netherlands CEBEC: Belgium OVE: Austria FIMKO: Finland SEMKO: Sweden	250 V at 6 A Gray 2 m (6 ft)	Straight: A01404 (Option 96) Angled: A01414
	SEV: Switzerland	250 V at 6 A Gray 2 m (6 ft)	Straight: A01405 (Option 97) Angled: A01415
	SAA: Australia, New Zealand	250 V at 6 A Gray 2 m (6 ft)	Straight: A01406 (Option 98) Angled: ---------
	BS: United Kingdom	250 V at 6 A Black 2 m (6 ft)	Straight: A01407 (Option 99) Angled: A01417
	CCC:China	250 V at 10 A Black 2 m (6 ft)	Straight: A114009 (Option 94) Angled: A114109

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1. PERFORMANCE VERIFICATION

1.1 General Information

1.1.1 Introduction

This chapter provides D3371 transmission analyzer performance verification test procedures, item by item as listed on Table 1-1 including option 70, 71, and 72.

The test items required are depending on the D3371 firmware version.

Check the firmware version first, and perform the performance verification test properly.

Performance verification will be carried out under following condition.

Temperature range: 20°C to 30°C

Relative Humidity: 85% or less

Table 1-1 List of Performance Verification Test Items (1 of 2)

No.	Test Description		Notes
1.2	PPG Module		OPTD3371+10(11)
	1.2.1	CLOCK, X-CLOCK Output	-
	1.2.2	DATA, X-DATA Output	-
	1.2.3	DATA Pattern Generation-1-1	-
	1.2.4	DATA Pattern Generation-1-2	OPTD3371+71
1.3	ED Function Module		OPTD3371+12
	1.3.1	DATA Input Level	-
	1.3.2	Clock Input Level	-
	1.3.3	Bit Error Rate Measurement	-
	1.3.4	Data Pattern Receiving-1-1	-
	1.3.5	Data Pattern Receiving-1-2	OPTD3371+71
	1.3.6	Error Free	-
	1.3.7	Burst Error Free	-
	1.3.8	Error Phase Analysis	OPTD3371+72
	1.3.9	Jitter Tolerance	OPTD3371+70

Table 1-1 List of Performance Verification Test Items (2 of 2)

No.	Test Description		Notes
1.4	3.6 GHz SSG Module		OPTD3371+13
	1.4.1	Clock Output Level	-
	1.4.2	Phase Lock	-
	1.4.3	Frequency Accuracy	-
	1.4.4	SSB Phase Noise	-
	1.4.5	10 MHz Output	-
	1.4.6	External Reference Signal Input	-
	1.4.7	Jitter Amplitude Accuracy	OPTD3371+70

1.1.2 Test Equipment

Table 1-2 lists equipment for the performance verification test.
The equipment needed to perform all of the performance test.
Equipment lists for individual tests are provided in each performance verification test procedure.

Table 1-2 Equipment List for Performance Verification Test

No.	Description	Critical Specifications for Substitution Models	Recommended Models	Manufacturer	Notes
1	Sampling Oscilloscope	Frequency Bandwidth: 50 GHz Residual Jitter: £10 psec	HP54750A with HP54752A	Agilent Technologies	OSC
2	Transmission Analyzer	No substitute model recommended	D3371 installed option11,12,13,70,71,72	Advantest	$D3371_{STD}$
3	Spectrum analyzer	Frequency Range: 10 MHz to 3.6 GHz SSB Phase Noise: -90 dBc/Hz at 10 kHz offset Frequency Accuracy: ≤ < 0.1ppm* *ppm: ppm is abbreviation of pulse per million	R3267	Advantest	SPA Use only for Option 13
4	Frequency Standard	Accuracy: ± 0.1 ppm Output Voltage: 0dBm ± 5 dB Output Impedance: 50 Ω	Generic	-	FreqSTD Use only for Option 13
5	Coaxial cable	No substitute model recommended SMA(m)-SMA(m)	SF104-11SMA-1000	Advantest	CB1
6	Attenuator	20dB DC-40GHz 2WATTS	41KC-20	Anritsu	ATT
7	RF cable	BNC(m)-BNC(m), 50 Ω	A01036-1500	Advantest	Use only for Option 13
8	Adapter	BNC(m)-SMA(f)	33 BNC-SMA-50-1/NE	HUBER+ SCHUNER	Use only for Option 13
9	Adapter	SMA(f)-N(m)	HRM-554S	Advantest	Use only for Option 13
10	Adapter	SMA(m)-N(f)	33 SMA-N-50-1/1--UE	HUBER+ SCHUNER	Use only for Option 13
11	Adapter	SMA(f)-SMA(f)	HRM-501	Advantest	Use only for Option 13

CAUTION:

1. ***Electrical Input/output terminal circuits and trigger input/output terminal can be damaged by electrostatic discharge (ESD). Therefore, avoid applying static discharges to the input/output connectors on the front panel.***
   Prior to connecting any coaxial cable to the connectors, momentarily short the center and outer conductors of the cable together. Avoid touching the front panel connectors without first touching frame of the instrument. Be sure that the instrument properly earth-grounded to prevent buildup of static charge. Wear a wrist-strap or heel strap.
2. ***When tightening SMA connectors of coaxial cable and terminations, ensure that the maximum torque setting used is 8-lb.***

NOTE:

1. ***The D3371 to be tested should be warmed up for at least 30 minutes before starting tests. Any additional equipment used for this performance verification tests should be warmed up as appropriate.***
2. ***Make sure that the test equipment used meets its own published specifications and that all connectors are clean, before starting test.***
3. ***Any equipment that meets critical specifications given in the Table can be substituted for recommended models.***

1.1.3 Calibration Cycle

The performance verifications should be used to check the transmission analyzer against its specifications every once a year recommended.

1.1.4 Performance Verification Test Record Sheets

The performance verification test record sheets at the end of this chapter are provided the value measured in each performance verification.
The test record lists test specification and acceptable limits.
Performance verification test record sheets for D3371 is provided at end of this manual.
Recommend that make a copy of this table, record the complete test results on the copy, and keep the copy for calibration test record.
This record could prove invaluable in tracking gradual changes in test result over long periods of the time.

1.1.5 Conventions Used in this Manual

The following conventions are used in this manual.

- **BOLD**: Bold text denotes the keys on the front panel.
  e.g.: **TAB**
- ",": A series key operation denotes using a comma between two keys.
  e.g.: **SHIFT**, **ESC**
- **[BOLD]**: Bold text with square brackets denotes buttons, list, and tabs on the touch screen.
  e.g.: **[CLOCK]**, **[Apply]**, **[OK]**
- **[BOLD]-[BOLD]**: Connecting two or more of Bold text with square brackets with "-" leads you through nested menu items to a final action.
  e.g.: **[Measurement]-[Set Installation Default]**
- X-CLOCK, X-DATA denotes of $\overline{\text{CLOCK}}$, and $\overline{\text{DATA}}$.
- UUT denotes the device under test

1.2 PPG Function Module Performance Verification Test Procedure

This section provides the Pulse Pattern Generator (PPG) function module performance verification test procedures of D3371 item by item listed on Table 1-1.

This procedure applies for D3371+OPT10 and D3371+OPT11.

1.2.1 CLOCK, X-CLOCK Output

[Description]

Verify the output level and offset voltage of CLOCK and X-CLOCK against specifications by using digital oscilloscope at several settings of amplitude and offset voltage.
Measure at the SSG frequency of 2.5 GHz.

[Specification]

Amplitude: Setting ± Setting × 10% ± 100 mV

Offset voltage: Setting ± Setting × 10% ± 100 mV

[Equipment required]

Digital Oscilloscope:	OSC
Coaxial cable:	CB1 × 3 pcs
Attenuator:	ATT × 2 pcs

[Setup]

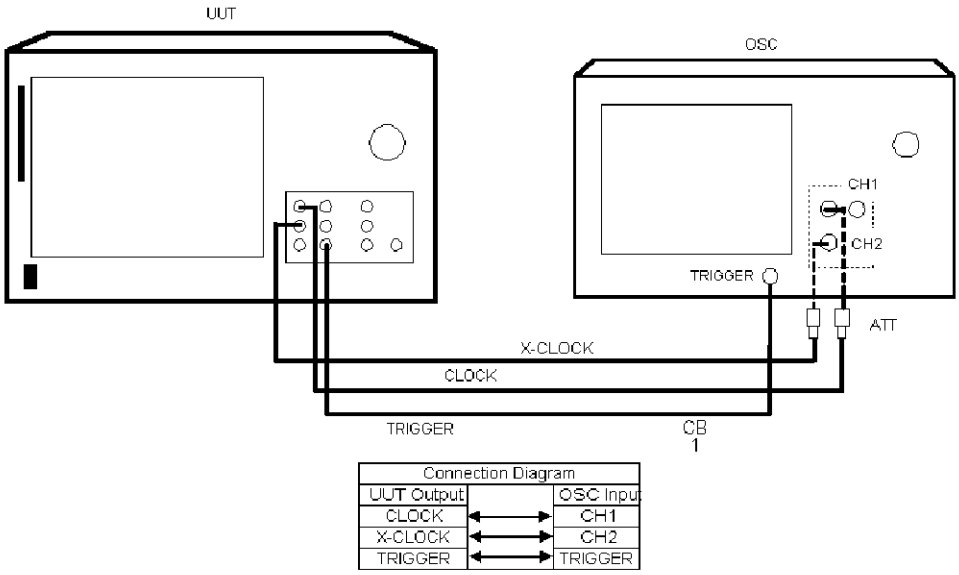


Figure 1-1 Setup of CLOCK/X-CLOCK Output Test

[Procedure]

1. Connect equipment as shown in Figure 1-1.
2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set
3. On the UUT, click **[Output]** on the standard tool bar to set output signal to on.
4. On the UUT, click **[Settings]** button on the standard tool bar.
5. On the UUT, click **[PPG]** icon on the function selection list bar.
6. On the UUT, click **[Trigger/Aux]** tab, and then set controls as follows;
   [Trigger output], **[Trigger Signal]**: 1/32 CLK
7. On the UUT, click **[Clock]** tab, and then set controls as follows;
   [Track Clock]: ON
   [CLOCK], **[Termination]**:to GND (0 V)
   [CLOCK], **[Offset]**: High, 0 V
   [CLOCK], **[Amplitude]**: 1.00 V_{P-P}
8. On the UUT, click **[Apply]** button to activate the new setting.
9. Measure the output signal both CLOCK and X-CLOCK by OSC, and then confirm the output signals are within the specification.
10. Record the measurement result on the performance verification record sheets.
11. Repeat steps 7 through 10 for each setting of amplitude and offset voltage listed on Table 1-3.

Table 1-3 Setting for CLOCK/X-CLOCK Output Test

Amplitude (V_{P-P})	Offset voltage (V)
1.0	0.0
0.3	0.0
2.0	0.0
1.0	0.0
1.0	2.0
1.0	-2.0

1.2.2 DATA, X-DATA Output

[Description]

Verify the amplitude and offset voltage of DATA and XDATA output signals by using oscilloscope at several setting of amplitude and offset voltage with the SSG frequency of 2.5 GHz.

[Specification]

Amplitude: Setting ± Setting × 10% ± 100 mV or (Setting value ±100 mV), whichever is greater.

Offset voltage: Setting ± Setting × 10% ± 100 mV or (Setting value ± 100 mV), whichever is greater.

[Equipment required]

Digital Oscilloscope: OSC

Coaxial cable: CB1 × 3 pcs

Attenuator: ATT × 2 pcs

[Setup]

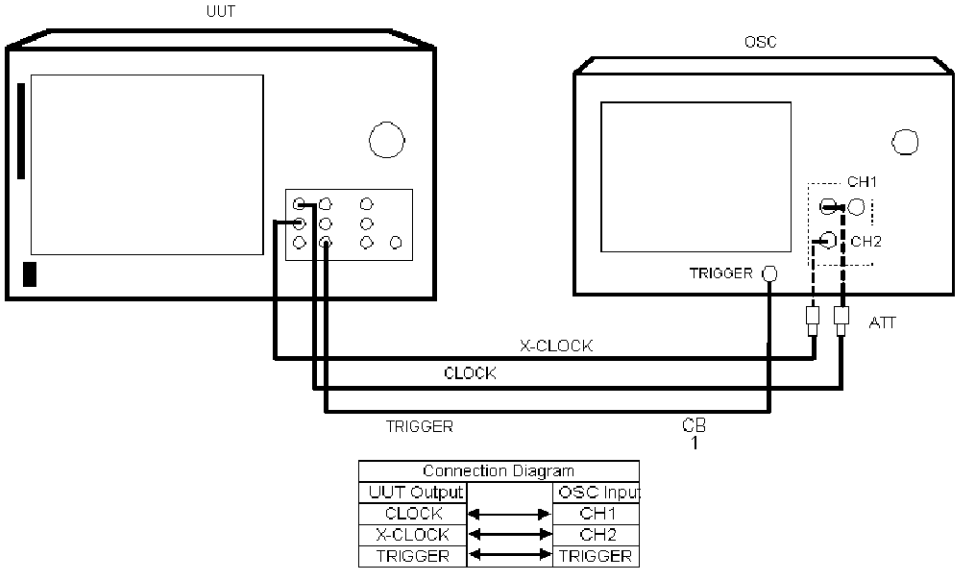


Figure 1-2 Setup of DATA/X-DATA Output Test

[Procedure]

1. Connect equipment as shown in Figure 1-2.
2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the UUT, click **[Output]** button on the standard tool bar to set output signal to on.

4. On the UUT, click **[Settings]** button on the standard tool bar.
5. On the UUT, click **[PPG]** icon on the module select list bar.
6. On the UUT, click **[Trigger/Aux]** tab, and then set controls as follows;
   [Trigger output], [Trigger Signal]: 1/32 CLK
7. On the UUT, click **[DATA]** tab, and then set controls as follows;
   [Track Data]: ON
   [DATA], [Termination]: to GND (0 V)
   [DATA], [Offset]: High, 0 V
   [DATA], [Amplitude]: 1.00 V_{P-P}
8. On the UUT, click **[Apply]** button to activate the new settings.
9. Measure the output signal both of DATA and X-DATA by OSC, and then confirm the output signals are within the specification.
10. Record the measurement result on the performance verification test record sheets.
11. Repeat steps 7 through 10 for each amplitude and offset voltage listed on Table 1-4.

Table 1-4 Setting for DATA/X-DATA Output Test

Amplitude (V_{P-P})	Offset voltage (V_{P-P})	Notes
1.0	0.0	-
0.3	0.0	
2.0	0.0	-
1.0	0.0	-
1.0	2.0	-
1.0	-2.0	-
3.0	0.0	Apply only for OPTD3371+11
3.0	1.0	Apply only for OPTD3371+11
3.0	-1.0	Apply only for OPTD3371+11

1.2.3 DATA Pattern Generation-1

[Description]

Check the data pattern generation function of PRBS, ZSUB by using calibrated D3371 as standard ($D3371_{STD}$).
Apply the generation data to ED module of $D3371_{STD}$, and then measure error count after auto search function performed.
The procedures are provides into two parts of PRBS and ZSUB.

[Specification]

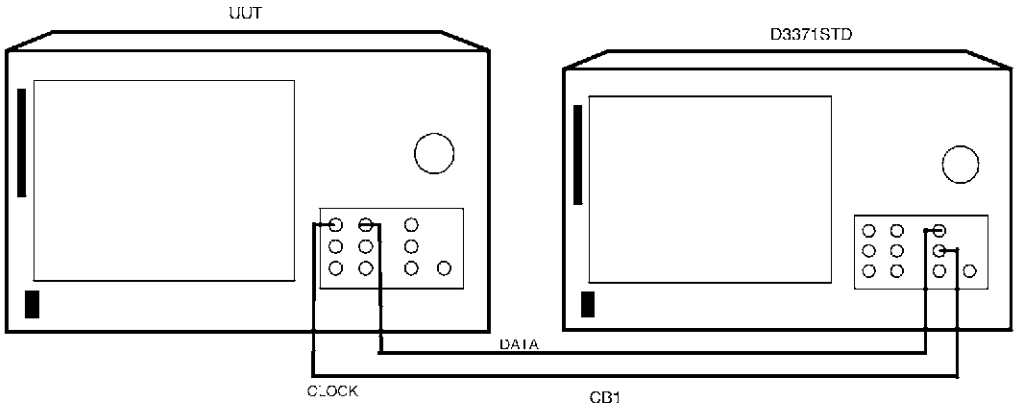
Error Count: 0 (zero)

[Equipment required]

D3371 Standard: $D3371_{STD}$

Coaxial cable: CB1 × 2 pcs

[Setup]



Connection Diagram		
UUT Terminal(PPG)		$D3371_{STD}$ Terminal (ED)
CLOCK	⟷	CLOCK
DATA	⟷	DATA

Figure 1-3 Setup of Data Pattern Generation Test

[Procedure]

Part 1. PRBS

1. Connect equipment as shown in Figure 1-3.

2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the UUT, click **[Settings]** button on the standard tool bar.
4. On the UUT, click **[Frequency]** text box on the settings dialog box.
5. On the UUT, key-in as follows to set output frequency to 3.6 GHz on the virtual keyboard.
   [3], [.], [6], [GHz], [OK]
6. On the UUT, click **[Apply]** button to activate the new settings.
7. On the $D3371_{STD}$, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
8. On the UUT, click **[Output]** button on the standard tool bar to output the signal.
9. On the $D3371_{STD}$, click **[A-Search]** button to perform the auto search function.
10. On the $D3371_{STD}$, click **[Start]** button to start a measurement.
11. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
12. On the $D3371_{STD}$, click **[ED]** icon on the module selection list bar.
13. On the UUT, click **[PPG]** icon on the on the module selection list bar.
14. On the UUT, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: PRBS
    Pattern Length: 2^31-1
    Mark Ratio: 1/2
15. On the UUT, click **[Apply]** button to activate the new settings.
16. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: PRBS
    Pattern Length: 2^31-1
    Mark Ratio: 1/2
17. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
18. On the $D3371_{STD}$, verify the error count total is 0 (zero) on the basic measurement display.
19. Record the result on the performance verification test record sheets.
20. Repeat steps 14 through 19 for each setting listed on Table 1-5.

Table 1-5 Setting for Data Generation Pattern Test (PRBS)

UUT (PPG) Setting		$D3371_{STD}$ (ED) Settings	
Data Length	Mark Ratio	Data Length	Mark Ratio
2^{31}-1	1/8	2^{31}-1	1/8
2^{31}-1	7/8	2^{31}-1	7/8

Part 2. ZSUB

21. On the UUT, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: ZSUB
    Data Length: 2^15
22. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
23. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: ZSUB
    Data Length: 2^15
24. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
25. On the $D3371_{STD}$, verify the error count total is 0 (zero) on the basic measurement display.
26. Record the result on the performance verification test record sheets.

1.2.4 DATA Pattern Generation-2

[Description]

This test only applies to D3371 installed option 71.

Verify the data pattern generation function of STM and FLEX by using calibrated D3371 as standard ($D3371_{STD}$).
Apply the generation data to ED module of $D3371_{STD}$, and then measure error count after auto search function performed.
The procedures are provided in two parts of STM mode and FLEX mode.

[Specification]

Error Count Total : 0 (zero)

[Equipment required]

Same as the Section 1.2.3.

[Setup]

Same as the Section 1.2.3.

[Procedure]

Part 1. STM

1. On the UUT, click **[SSG]** icon on the module selection list bar.
2. On the UUT, click **[Frequency]** text box on the settings dialog box.
3. On the UUT, key-in as follows to set output frequency to 2488.32 MHz on the virtual keyboard.
   [2], [4], [8], [8], [.], [3], [2], [MHz], [OK]
4. On the UUT, click **[PPG]** icon on the module selection bar.
5. On the UUT, click **[Pattern]** tab, and then set controls as follows;
   Pattern Type: STM
   Insert PRBS into Payload: ON
   Scramble: ON
   Insert B1: ON
6. On the UUT, click **[Apply]** button to activate the new settings.
7. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;
   Pattern Type: STM
   Insert PRBS into Payload: ON
   Scramble: ON
   Insert B1: ON
8. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
9. On the $D3371_{STD}$, verify the error count total on the basic measurement display is 0 (zero).
10. Record the result on the performance verification test record sheets.

Part 2. FLEX

11. On the UUT, click **[PPG]** icon on the module selection bar.
12. On the UUT, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: FLEX
13. On the UUT, click **[Pattern Sequence Table]** button.
14. On the UUT, click **[*]** in the index column to select the **[*]** column.
15. On the UUT, click **[New...]** button on the pattern sequence table dialog box.

16. On the UUT, set controls on the pattern sequence dialog box as follows;
    Pattern: PRBS Pattern
    Length: 256
17. On the UUT, click **[OK]** button on the pattern sequence table dialog box.
18. On the UUT, click **[Set Seq. Memory]** button to set the sequence to memory.
19. On the UUT, click **[Close]** button on the pattern sequence table dialog box to close.
20. On the UUT, click **[Apply]** button to activate the new settings.
21. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: FLEX
22. On the $D3371_{STD}$, click **[Pattern Sequence Table]** button.
23. On the $D3371_{STD}$, click [*] in the index column to select the [*] column.
24. On the $D3371_{STD}$, click **[New...]** button on the pattern sequence table dialog box.
25. On the $D3371_{STD}$, set controls on the pattern sequence dialog box as follows;
    Pattern: PRBS Pattern
    Length: 256
26. On the $D3371_{STD}$, click **[OK]** button on the pattern sequence table dialog box.
27. On the $D3371_{STD}$, click **[Set Seq. Memory]** button to set the sequence to memory.
28. On the $D3371_{STD}$, click **[Close]** button on the pattern sequence table dialog box to close.
29. On the $D3371_{STD}$ UUT, click **[Apply]** button to activate the new settings.
30. On the $D3371_{STD}$, verify the error count total on the basic measurement display is 0 (zero).
31. Record the result on the performance verification test record sheets.

1.2.5 Error Free

[Description]

Verify the error free at several clock frequencies.

[Specification]

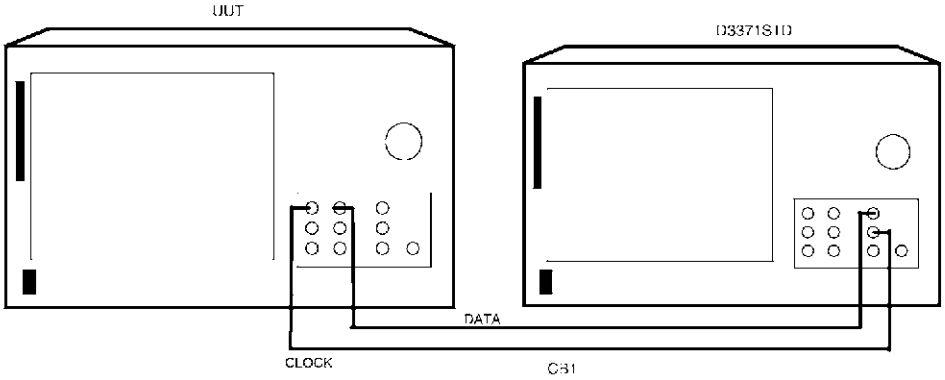
Error count:0 (zero)

[Equipment required]

D3371 Standard: $D3371_{STD}$

Coaxial cable: CB1× 2pcs

[Setup]



Connection Diagram		
UUT Terminal(PPG)		$D3371_{STD}$ Terminal (ED)
CLOCK	⟷	CLOCK
DATA	⟷	DATA

Figure 1-4 Setup of Error Free Test

[Procedure]

1. Connect equipment as shown in Figure 1-4.
2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the UUT, click **[Settings]** button on the standard tool bar.
4. On the UUT, click **[Frequency]** text box on the settings dialog box.
5. On the UUT, key-in as follows to set output frequency to 3.6 GHz on the virtual keyboard.

   [3], [.], [6], [GHz], [OK]
6. On the UUT, click **[PPG]** icon on the module selection list bar.

7. On the UUT, click **[Pattern]** tab, and then set controls as follows;
   Pattern Type: PRBS
   Pattern Length: 2^31-1
   Mark Ratio: 1/2
8. On the UUT, click **[OK]** button to close the dialog box.
9. On the $D3371_{STD}$, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
10. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
11. On the $D3371_{STD}$, click **[ED]** icon on the module selection bar.
12. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: PRBS
    Pattern Length: 2^31-1
    Mark Ratio: 1/2
13. On the $D3371_{STD}$, click **[OK]** button to close the dialog box.
14. On the UUT, click **[Output]** button on the standard tool bar to output the signal.
15. On the $D3371_{STD}$, click **[A-Search]** button on the standard tool bar to perform auto search function.
16. On the $D3371_{STD}$, click **[Start]** button on the standard tool bar to start measurement.
17. On the $D3371_{STD}$, verify the error count total on the basic measurement display is 0 (zero).
18. Record the result on the performance verification test record sheets.
19. On the UUT, click **[Settings]** button on the standard tool bar.
20. On the UUT, click **[SSG]** icon on the module selection list bar.
21. On the UUT, click **[Frequency]** text box on the settings dialog box.
22. On the UUT, key-in as follows to set output frequency to 2.5 GHz on the virtual keyboard.
    [2], [.], [5], [GHz], [OK]
23. On the UUT, click **[OK]** button to close the dialog box.
24. On the $D3371_{STD}$, click **[A-Search]** button on the standard tool bar to perform auto search function.
25. On the $D3371_{STD}$, verify the error count total on the basic measurement display is 0 (zero).
26. Record the result on the performance verification test record sheets.
27. Repeat steps 19 through 26 for each SSG setting listed on Table 1-6.

Table 1-6 Setting for SSG Setting (Error Free Test)

UUT SSG Setting in step 36
620 MHz
150 MHz
10 MHz

1.3 ED Module Performance Verification Test Procedures

This section provides the ED (Error Detection) function module performance verification test procedures of D3371 item by item listed on Table 1-1.

This procedure applies for D3371+OPT12.

1.3.1 DATA Input Level

[Description]

Verify the data input sensitivity of the ED module.

Applying an output signal with several amplitude setting from PPG module, and then measure error count. Confirm the error count total is 0 (zero) in the result.
The specification is depending on the D3371 firmware revision.

[Specification]

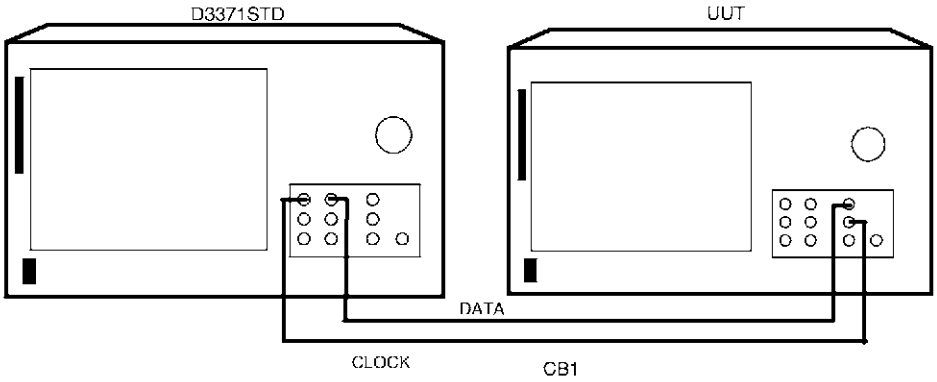
0.3 V_{P-P} to 2.0 V_{P-P}

[Equipment required]

D3371 Standard: $D3371_{STD}$

Coaxial cable: CB1 × 2 pcs

[Setup]



Connection Diagram		
$D3371_{STD}$ Terminal (PPG)		UUT Terminal(ED)
CLOCK	↔	CLOCK
DATA	↔	DATA

Figure 1-5 Setup of Data Input Level Test

[Procedure]

1. Connect equipment as shown in Figure 1-5.
2. On the $D3371_{STD}$, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
4. On the $D3371_{STD}$, click **[Frequency]** text box on the settings dialog box.
5. On the $D3371_{STD}$, key-in as follows to set output frequency to 3.6 GHz on the virtual keyboard.
   [3], [.], [6], [GHz], [OK]
6. On the $D3371_{STD}$, click **[PPG]** icon on the module selection bar.
7. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;
   Pattern Type: PRBS
   Pattern Length: 2^31-1
   Mark Ratio: 1/2
8. On the $D3371_{STD}$, click **[OK]** button to close the dialog box.
9. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
10. On the UUT, click **[Settings]** button on the standard tool bar.
11. On the UUT, click **[ED]** icon on the module selection list bar.
12. On the UUT, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: PRBS
    Pattern Length: 2^31-1
    Mark Ratio: 1/2
13. On the UUT, click **[OK]** button to close the dialog box.
14. On the $D3371_{STD}$, click **[Output]** button on the standard tool bar to output the signal.
15. On the UUT, click **[A-Search]** button to perform auto search function.
16. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
17. On the $D3371_{STD}$, click **[Data]** tab, and then set controls as follows;
    Amplitude: 0.3 V_{P-P}
18. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
19. On the UUT, click **[Start]** button on the standard tool bar to start measurement.

20. Verify the measurement of error count total on the basic measurement display is 0 (zero).
21. Record the result on the performance verification test record sheets.
22. On the $D3371_{STD}$, click **[Data]** tab, and then set controls as follows;
    Amplitude: 2.00 V_{P-P}
23. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
24. On the UUT, click **[Start]** button on the standard tool bar to start measurement.
25. Verify the measurement of error count total on the basic measurement display is 0 (zero).
26. Record the result on the performance verification test record sheets.

1.3.2 Clock Input Level

[Description]

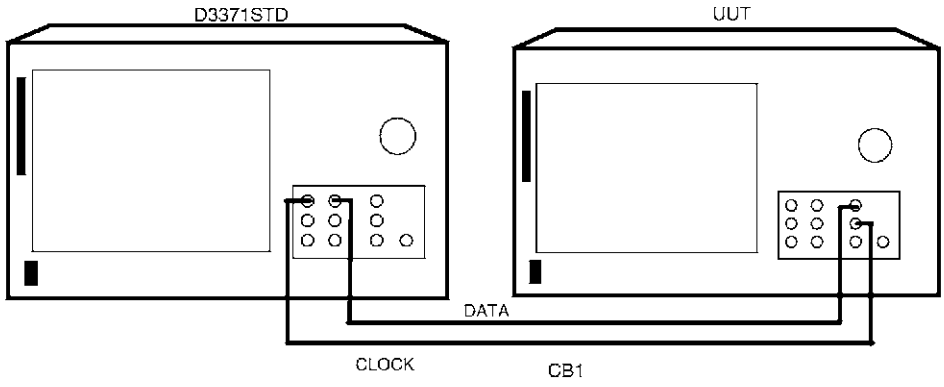
Verify the clock input sensitivity of the ED module.

Applying an output signal with several amplitude setting from PPG module, and then measure error count. Confirm the error count total is 0 (zero) in the result.
The specification is depending on the D3371 firmware revision.

[Specification]

0.3 V_{P-P} to 2.0 V_{P-P}

[Setup]



Connection Diagram		
$D3371_{STD}$ Terminal (PPG)		UUT Terminal(ED)
CLOCK	⟷	CLOCK
DATA	⟷	DATA

Figure 1-6 Setup of Clock Input Level Test

[Procedure]

1. Connect equipment as shown in Figure 1-7.
2. On the $D3371_{STD}$, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
4. On the $D3371_{STD}$, click **[Frequency]** text box on the settings dialog box.
5. On the $D3371_{STD}$, key-in as follows to set output frequency to 3.6 GHz on the virtual keyboard.
   [3], [.], [6], [GHz], [OK]
6. On the $D3371_{STD}$, click **[PPG]** icon on the module selection bar.
7. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;
   Pattern Type: PRBS
   Pattern Length: 2^31-1
   Mark Ratio: 1/2
8. On the $D3371_{STD}$, click **[OK]** button to close the dialog box.
9. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
10. On the UUT, click **[Settings]** button on the standard tool bar.
11. On the UUT, click **[ED]** icon on the module selection list bar.
12. On the UUT, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: PRBS
    Pattern Length: 2^31-1
    Mark Ratio: 1/2
13. On the UUT, click **[OK]** button to close the dialog box.
14. On the $D3371_{STD}$, click **[Output]** button on the standard tool bar to output the signal.
15. On the UUT, click **[A-Search]** button to perform auto search function.
16. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
17. On the $D3371_{STD}$, click **[Clock]** tab, and then set controls as follows;
    Amplitude: 0.3 V_{P-P}
18. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
19. On the UUT, click **[Start]** button on the standard tool bar to start measurement.
20. Verify the measurement of error count total on the basic measurement display is 0 (zero).

21. Record the result on the performance verification test record sheets.
22. On the $D3371_{STD}$, click **[Clock]** tab, and then set controls as follows;
    Amplitude: 2.00 V_{P-P}
23. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
24. On the UUT, click **[Start]** button on the standard tool bar to start measurement.
25. Verify the measurement of error count total on the basic measurement display is 0 (zero).
26. Record the result on the performance verification test record sheets.

1.3.3 Bit Error Rate Measurement

[Description]

Verify the measurement function of the bit count (BIT COUNT), error rate (ERR), error count (ERC), error intervals (EI), and error free intervals (EFI) by measuring the bit error rate.

[Specification]

BIT COUNT = 3.6000×10^{10}

ERR = 1.0000×10^{-4} (Error Ratio)

ERC = 3.6000×10^{6} (Error Count)

EI = 100% (Error Intervals)

EFI = 0% (Error Free Interval)

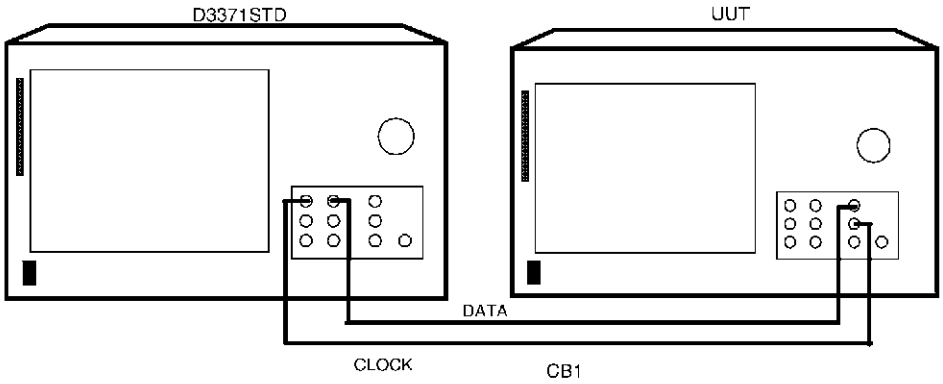
FREQ = 3,600,000,000 ± 10ppm

[Equipment required]

D3371 Standard: $D3371_{STD}$

Coaxial cable: CB1 × 2pcs

[Setup]



Connection Diagram		
$D3371_{STD}$ Terminal (PPG)		UUT Terminal(ED)
CLOCK	⟷	CLOCK
DATA	⟷	DATA

Figure 1-7 Setup of Bit Error Rate Measurement Test

[Procedure]

1. Connect equipment as shown in Figure 1-7.
2. On the $D3371_{STD}$, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the $D3371_{STD}$, click **|Settings|** button on the standard tool bar.
4. On the $D3371_{STD}$, click **[Frequency]** text box on the settings dialog box.
5. On the $D3371_{STD}$, key-in as follows to set output frequency to 3.6 GHz on the virtual keyboard.
   |3|, |.|, |6|, |GHz|, |OK|
6. On the $D3371_{STD}$, click **[PPG]** icon on the module selection list bar.
7. On the $D3371_{STD}$, click **|Pattern|** tab, and then set controls as follows;
   Pattern Type: PRBS
   Pattern Length: 2^31-1
   Mark Ratio: 1/2
8. On the $D3371_{STD}$, click **[Error Addition]** tab, and then set controls as follows;
   Add Errors: Repeat
   Rate: 1E-4
9. On the $D3371_{STD}$, click **[OK]** button on the dialog box to close.
10. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.

11. On the UUT, click **[Settings]** button on the standard tool bar.
12. On the UUT, click **[ED]** icon on the module selection list bar.
13. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;

Pattern Type:	PRBS
Pattern Length:	2^31-1
Mark Ratio:	1/2

14. On the UUT, click **[Condition]** tab, and then set controls as follows;

Timer Mode:	Single
Interval:	1 s
Period:	10 sec

15. On the UUT, click **[OK]** button on the dialog box to close.
16. On the $D3371_{STD}$, click **[Output]** button on the standard tool bar to output the signal.
17. On the UUT, click **[A-Search]** button on the standard tool bar to perform auto search function.
18. On the UUT, click **[Start]** button on the standard tool bar to start measurement.
19. After 10 second, verify the measurement data of error count total on the basic measurement display is within specification.
20. Record the result on the performance verification test record sheets.

1.3.4 Data Pattern Receiving-1

[Description]

Verify the data pattern receiving function of PRBS, ZSUB by using calibrated D3371 as standard ($D3371_{STD}$).

Apply data to ED module of D3371 (UUT), and then measure error count after auto search function performed.
The procedures are provided in three parts of PRBS mode, and ZSUB mode.

If the D3371 (UUT) installed option 71, perform the test described following section 1.3.5.

[Specification]

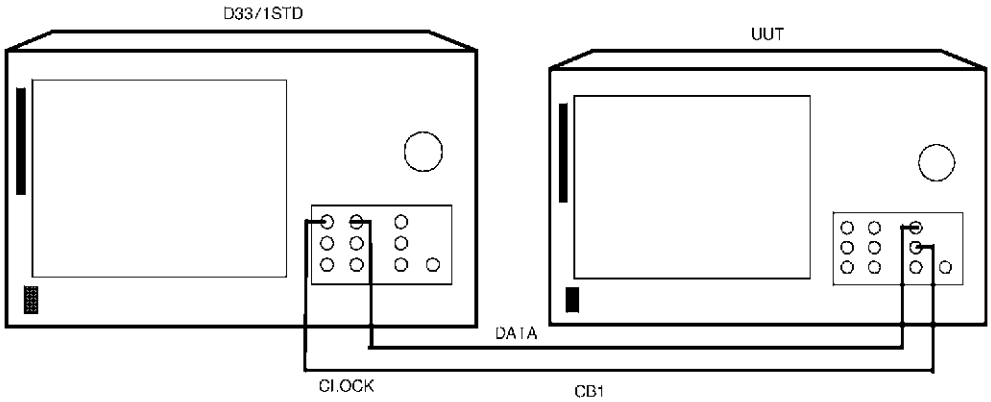
Error Count Total: 0 (zero)

[Equipment required]

D3371 Standard: $D3371_{STD}$

Coaxial cable: CB1 × 2 pcs

[Setup]



Connection Diagram		
$D3371_{STD}$ Terminal(PPG)		UUT Terminal(ED)
CLOCK	◄——►	CLOCK
DATA	◄——►	DATA

Figure 1-8 Setup of Data Pattern Receiving Test

[Procedure]

Part 1. PRBS mode

1. Connect equipment as shown in Figure 1-8.

2. On the $D3371_{STD}$, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the $D3371_{STD}$, click **|Settings|** button on the standard tool bar.
4. On the $D3371_{STD}$, click **[Frequency]** text box on the settings dialog box.
5. On the $D3371_{STD}$, key-in as follows to set output frequency to 3.6 GHz on the virtual keyboard.
   [3], [.], [6], [GHz], [OK]
6. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
7. On the UUT, click **|Measurement|-|Set Installation Default|** on the menu bar to set default condition.
8. On the $D3371_{STD}$, click **[Output]** button on the standard tool bar to output the signal.
9. On the UUT, click **[A-Search]** button on the standard tool bar to perform auto search function.
10. On the UUT, click **|Start|** button on the standard tool bar to start measurement.
11. On the UUT, click **[Settings]** button on the standard tool bar.
12. On the UUT, click **[ED]** icon on the module selection list bar.
13. On the $D3371_{STD}$, click **[PPG]** icon on the module selection list bar.
14. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;

Pattern Type:	PRBS
Pattern Length:	2^31-1
Mark Ratio:	1/2

15. On the $D3371_{STD}$, click **|Apply|** button to activate the new settings.
16. On the UUT, click **[Pattern]** tab, and then set controls as follows;

Pattern Type:	PRBS
Pattern Length:	2^31-1
Mark Ratio:	1/2

17. On the UUT, click **[Apply]** button to activate the new settings.
18. Verify the measurement data of error count total on the basic measurement display is within specification.
19. Record the result on the performance verification test record sheets.
20. Repeat steps 14 through 19 for each setting listed on Table 1-7.

Table 1-7 Setting for Data Pattern Receiving Test (PRBS)

$D3371_{DUT}$ (PPG) Setting		$D3371_{STD}$ (ED) Setting	
Data Length	Mark Ratio	Data Length	Mark Ratio
2^{31}-1	1/8	2^{31}-1	1/8
2^{31}-1	7/8	2^{31}-1	7/8

Part 2. ZSUB mode

21. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: ZSUB
    Pattern Length: 2^15
22. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
23. On the UUT, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: ZSUB
    Pattern Length: 2^15
24. On the UUT, click **[Apply]** button to activate the new settings.
25. Verify the measurement data of error count total on the basic measurement display is within specification.
26. Record the result on the performance verification test record sheets.

1.3.5 Data Pattern Receiving-2

[Description]

This test only applies to D3371 installed option 71.

Verify the data pattern receiving function of STM, and FLEX by using calibrated D3371 as standard ($D3371_{STD}$).
Apply data to ED module of D3371 (UUT), and then measure error count after auto search function performed.
The procedures are provided in two parts of STM, and FLEX.

[Specification]

Error Count Total: 0 (zero)

[Equipment required]

Same as section 1.3.4

[Setup]

Same as section 1.3.4

[Procedure]

Part 1: STM

1. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
2. On the $D3371_{STD}$, click **[SSG]** icon on the module selection list bar.
3. On the $D3371_{STD}$, click **[Frequency]** text box on the settings dialog box.
4. On the $D3371_{STD}$, key-in as follows to set output frequency to 2.48832 GHz on the virtual keyboard.
   [2], [.], [4], [8], [8], [3], [2], [GHz], [OK]
5. On the $D3371_{STD}$, click **[PPG]** icon on the module selection list bar.
6. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;

Pattern Type:	STM
Insert PRBS into Payload:	ON
Scramble:	ON
Insert B1:	ON

7. On the $D3371_{STD}$, click **[OK]** button on the settings dialog box to close.
8. On the UUT, click **[Settings]** button on the standard tool bar.

9. On the UUT, click **[ED]** icon on the module selection list bar.
10. On the UUT, click **[Pattern]** tab, and then set controls as follows;

    Pattern Type: STM
    Insert PRBS into Payload: ON
    Scramble: ON
    Insert B1: ON
11. On the UUT, click **[OK]** button on the settings dialog box to close.
12. On the $D3371_{STD}$, click **[Output]** button on the standard tool bar to output the signal.
13. On the UUT, click **[A-Search]** button on the standard tool bar to perform the auto search function.
14. On the UUT, click **[Start]** button on the standard tool bar to start measurement.
15. Verify the measurement data of error count total on the basic measurement display is within specification.
16. Record the result on the performance verification test record sheets.

Part 2: FLEX

17. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
18. On the $D3371_{STD}$, click **[PPG]** icon on the module selection list bar.
19. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;

    Pattern Type: FLEX
20. On the $D3371_{STD}$, click **[Pattern Sequence Table]** button.
21. On the $D3371_{STD}$, click **[*]** button in the index column to select the **[*]** column.
22. On the $D3371_{STD}$, click **[New...]** button on the pattern sequence table dialog box.
23. On the $D3371_{STD}$, set control as follows in the pattern dialog box.

    Pattern: PRBS Pattern
    Length: 256
24. On the $D3371_{STD}$, click **[OK]** button on the pattern dialog box to close.
25. On the $D3371_{STD}$, click **[Set Seq. Memory]** button to set the sequence to memory.
26. On the $D3371_{STD}$, click **[Close]** button on the pattern sequence table dialog box to close.
27. On the $D3371_{STD}$, click **[OK]** button on the settings dialog box to close.
28. On the UUT, click **[Settings]** button on the standard tool bar.

29. On the UUT, click **[PPG]** icon on the module selection list bar.
30. On the UUT, click **[Pattern]** tab, and then set controls on the pattern dialog box as follows;

    Pattern Type: FLEX
31. On the UUT, click **[Pattern Sequence Table]** button.
32. On the UUT, click **[*]** button in the index column to select the **[*]** column.
33. On the UUT, click **[New...]** button on the pattern sequence table dialog box.
34. On the UUT, set control as follows in the pattern dialog box.

    Pattern: PRBS Pattern

    Length: 256
35. On the UUT, click **[OK]** button on the pattern dialog box to close.
36. On the UUT, click **[Set Seq. Memory]** button to set the sequence to memory.
37. On the UUT, click **[Close]** button on the pattern sequence table dialog box to close.
38. On the UUT, click **[OK]** button on the settings dialog box to close.
39. On the $D3371_{STD}$, click **[Output]** button on the standard tool bar to output the signal.
40. On the UUT, click **[A-Search]** button to perform the auto search function.
41. On the UUT, click **[Start]** button on the standard tool bar to start measurement.
42. Verify the measurement data of error count total on the basic measurement display is within specification.
43. Record the result on the performance verification test record sheets.

1.3.6 Error Free

[Description]

Verify the error free at several clock frequencies.

[Specification]

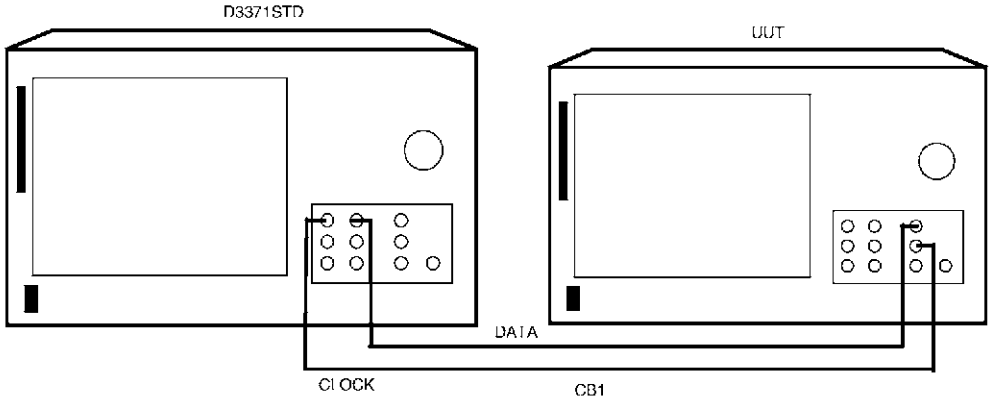
Error count:0 (zero)

[Equipment required]

D3371 Standard: $D3371_{STD}$

Coaxial cable: CB1 × 2 pcs

[Setup]



Connection Diagram		
$D3371_{STD}$ Terminal(PPG)		UUT Terminal(ED)
CLOCK	⟷	CLOCK
DATA	⟷	DATA

Figure 1-9 Setup of Error Free Test

[Procedure]

1. Connect equipment as shown in Figure 1-9.
2. On the $D3371_{STD}$, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
4. On the $D3371_{STD}$, click **[Frequency]** text box on the settings dialog box.

5. On the $D3371_{STD}$, key-in as follows to set output frequency to 3.6 GHz on the virtual keyboard.
   [3], [.], [6], [GHz], [OK]
6. On the $D3371_{STD}$, click **[PPG]** icon on the module selection bar.
7. On the $D3371_{STD}$, click **[Pattern]** tab, and then set controls as follows;
   Pattern Type: PRBS
   Pattern Length: 2^31-1
   Mark Ratio: 1/2
8. On the $D3371_{STD}$, click **[OK]** button on the settings dialog box to close.
9. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
10. On the UUT, click **[Settings]** button on the standard tool bar.
11. On the UUT, click **[ED]** icon on the module selection list bar.
12. On the UUT, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: PRBS
    Pattern Length: 2^31-1
    Mark Ratio: 1/2
13. On the UUT, click **[OK]** button on the settings dialog box to close.
14. On the $D3371_{STD}$, click **[Output]** button on the standard tool bar to output the signal.
15. On the UUT, click **[A-Search]** button on the standard tool bar to perform auto search function.
16. On the UUT, click **[Start]** button on the standard tool bar to start measurement.
17. Verify the measurement data error count total on the basic measurement display is within specification.
18. Record the result on the performance verification test record sheets.
19. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
20. On the $D3371_{STD}$, click **[SSG]** icon on the module selection list bar.
21. On the $D3371_{STD}$, click **[Frequency]** text box on the settings dialog box.
22. On the $D3371_{STD}$, key-in as follows to set output frequency to 2.5 GHz on the virtual keyboard.
    [2], [.], [5], [GHz], [OK]
23. On the $D3371_{STD}$, click **[Apply]** button to activate the new settings.
24. On the UUT, click **[A-Search]** button on the standard tool bar to perform auto search function.

25. Verify the measurement data error count total on the basic measurement display is within specification.
26. Record the result on the performance verification test record sheets.
27. Repeat steps 21 through 26 for each SSG setting listed on Table 1-8.

Table 1-8 Setting for SSG Setting (Error Free Test)

$D3371_{STD}$ SSG Setting in step 22
620 MHz
150 MHz
10 MHz

1.3.7 Burst Error Free

[Description]

Verify the burst error free.

[Specification]

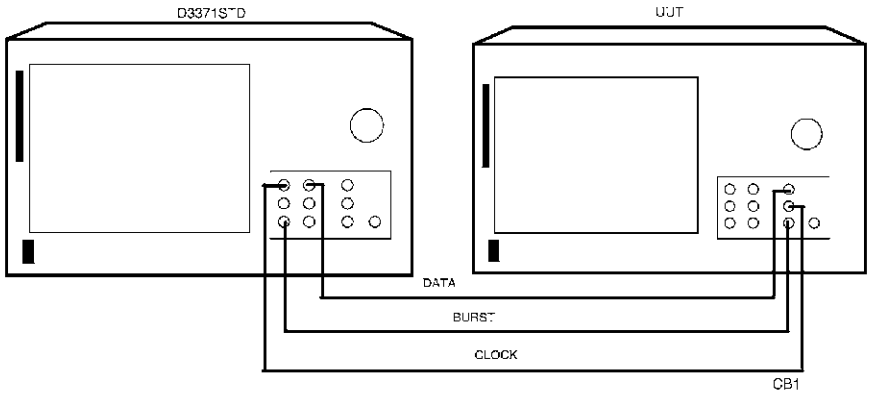
Error Count:0 (zero)

[Equipment required]

D3371 Standard: $D3371_{STD}$

Coaxial cable: CB1 × 3 pcs

[Setup]



Connection Diagram		
$D3371_{STD}$ Terminal (PPG)		UUT Terminal(ED)
CLOCK	↔	CLOCK
DATA	↔	DATA
BURST	↔	BURST

Figure 1-10 Setup of Burst Error Free Test

[Procedure]

1. Connect equipment as shown in Figure 1-10.
2. On the $D3371_{STD}$, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
4. On the $D3371_{STD}$, click **[Frequency]** text box on the settings dialog box.
5. On the $D3371_{STD}$, key-in as follows to set output frequency to 3.6 GHz on the virtual keyboard.
   [3], [.], [6], [GHz], [OK]
6. On the $D3371_{STD}$, click **[PPG]** icon on the module selection list bar.
7. On the $D3371_{STD}$, click **[Pattern]** tab, and set controls as follows;

Pattern Type:	PRBS
Pattern Length:	2^31-1
Mark Ratio:	1/2

8. On the $D3371_{STD}$, click **[OK]** button to close the dialog box.
9. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
10. On the UUT, click **[Settings]** button on the standard tool bar.
11. On the UUT, click **[ED]** icon on the module selection list bar.
12. On the UUT, click **[Pattern]** tab, and set controls as follows;

Pattern Type:	PRBS
Pattern Length:	2^31-1
Mark Ratio:	1/2

13. On the UUT, click **[OK]** button to close the dialog box.
14. On the $D3371_{STD}$, click **[Output]** button on the standard tool bar to output the signal
15. On the UUT, click **[A-Search]** button on the standard tool bar to perform auto search function.
16. On the $D3371_{STD}$, click **[Settings]** button on the standard tool bar.
17. On the $D3371_{STD}$, click **[Burst]** tab, and set controls as follows;

Burst Mode:	ON
Source:	Internal
Cycle:	1000 µs
OFF Time:	500 µs

18. On the $D3371_{STD}$, click **[OK]** button on the dialog box to close.

19. On the UUT, click **[Settings]** button on the standard tool bar.
20. On the UUT, click **[Condition]** tab, and then set control as follow;
    Burst Mode: ON
21. On the UUT, click **[OK]** button to close the dialog box.
22. On the UUT, click **[Start]** button on the standard tool bar to start measurement.
23. Verify the measurement data of error count total on the basic measurement display is 0 (zero).
24. Record the result on the performance verification test record sheets.

1.3.8 Error Phase Analysis

[Description]

This test only applies to the D3371 installed option 72.
Verify the error phase analysis function of ED module.

Set a different output pattern for both the PPG module and ED module to occurring an error.

[Specification]

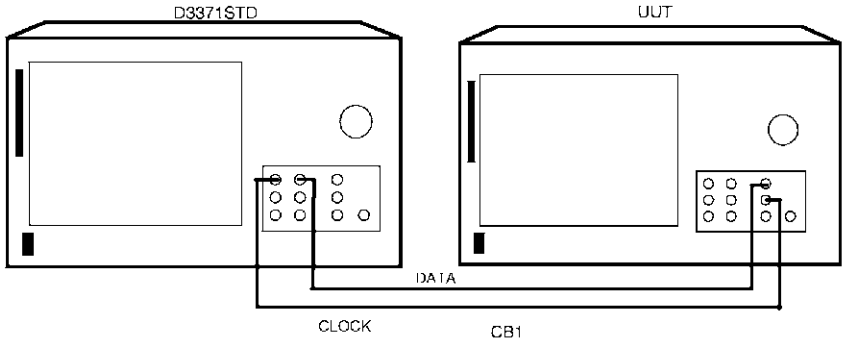
Error occurred in the column specified.

[Equipment required]

D3371 Standard: $D3371_{STD}$

Coaxial cable: CB1 × 2 pcs

[Setup]



Connection Diagram		
$D3371_{STD}$ Terminal (PPG)		UUT Terminal(ED)
CLOCK	⟷	CLOCK
DATA	⟷	DATA

Figure 1-11 Setup of Error Phase Analysis Test

[Procedure]

1. Connect equipment as shown in Figure 1-11.
2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the UUT, click **[Settings]** button on the standard tool bar.
4. On the UUT, click **[ED]** icon on the module selection list bar.
5. On the UUT, click **[Pattern]** tab, and then set controls as follows;
   Pattern Type: STM
6. On the UUT, click **[Pattern Settings...]** button to enter the pattern settings dialog box.
7. On the UUT, press keys as follows to set a pattern.
   ▼, ▼, ▼, ▼, ▼, ▼, ▼, ▼, ▼
   (press **▼** key for nine times to move to the payload (1,1))
   A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A
   (Press **A** key for 32 time to set A data to the payload (1,1) through (1,16))
   Figure 1-12 shows the pattern settings dialog box.

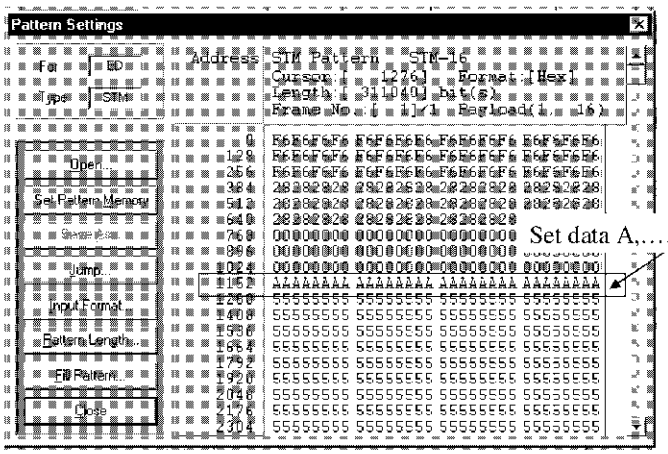


Figure 1-12 Pattern Settings Display Sample

8. On the UUT, click **[Set Pattern Memory]** button to set the pattern to memory.
9. On the UUT, click **[Close]** button on the pattern settings dialog box to close.
10. On the UUT, click **[Sync]** tab, and then set controls as follows;
    Auto Threshold: OFF
    Sync Loss Threshold
    Memory: 1E-2

11. On the UUT set control as follow;
    Sync Gain Threshold
    Memory: 1E-2
12. On the UUT, click **[OK]** button to close the settings dialog box.
13. On the D3371STD, click **[Measurement|-|Set Installation Default]** on the menu bar to set default condition.
14. On the D3371STD, click **[Settings]** button on the standard tool bar.
15. On the D3371STD, click **[PPG]** icon on the module selection list bar.
16. On the D3371STD, click **[Pattern]** tab, and then set controls as follows;
    Pattern Type: STM
17. On the D3371STD, click **[OK]** button to close the settings dialog box.
18. On the D3371STD, click **[Output]** button on the standard tool bar to output the signal.
19. On the UUT, click **[A-Search]** button to perform the auto-search function.
20. On the UUT, click **[Start]** button on the standard tool bar to start measurement.
21. On the UUT, while monitoring the **[REC]** indicator on the monitor tool bar, once **[REC]** indicator color change from blue to back, click **[Stop]** button to stop measurement.
22. On the UUT, click **[Error Phase Analysis]** button on the function tool bar, and set control as follow;
    Display Format: Statistics
23. On the UUT, click [▼] button and then confirm the error occurred in the following column.
    Column: 145 through 160.
    Figure 1-13 show a measurement result sample.

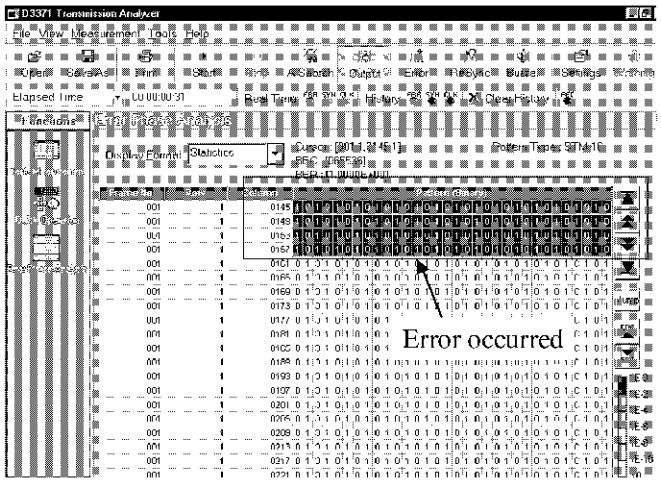
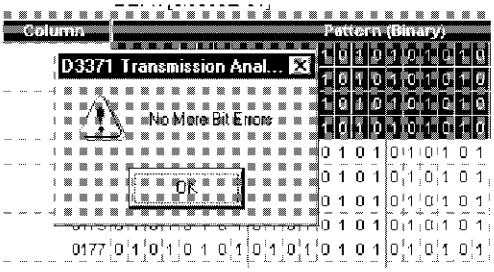


Figure 1-13 Measurement Result Sample

24. On the UUT, click the last error bit on the result display.

25. Click [ERR] button, and then confirm no more error exist with the following message on the display.



26. Record the result on the performance verification test data sheets.

1.3.9 Jitter Tolerance

[Description]

This test only applies to the D3371 installed option 70.

Apply jitter with the maximum amplitude to the pulse pattern generator module (PPG), and measure the PPG output signal by the error detector module (ED).
Confirm the measurement result with error free.

[Specification]

Error free at the maximum jitter amplitude applied.

[Equipment required]

PPG Module:	OPT3371+10 (10)
ED Module:	OPT3371+12
Coaxial cable:	CB1 × 2 pcs

[Setup]

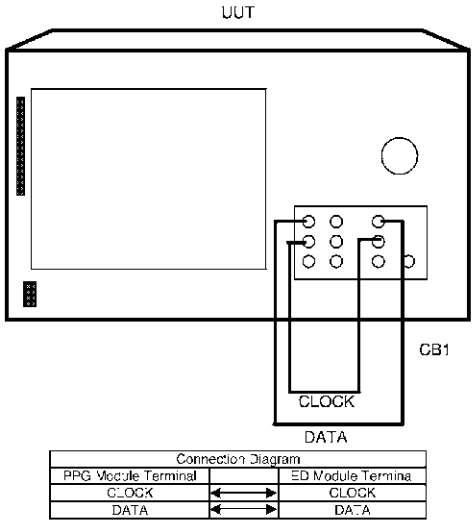


Figure 1-14 Setup of Jitter Tolerance Test

[Procedure]

1. Connect equipment as shown in Figure 1-14.
2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the UUT, click **[Setting]** button on the standard tool bar.
4. On the UUT, click **[PPG]** icon on the module selection list bar.
5. On the UUT, click **[Pattern]** tab, and then set controls as follows;
   Pattern Type: PRBS
   Pattern Length: 2^23-1
6. On the UUT, click **[ED]** icon on the module selection list bar.
7. On the UUT, click **[Pattern]** tab, and then set controls as follows;
   Pattern Type: PRBS
   Pattern Length: 2^23-1
8. On the UUT, click **[OK]** button to close the settings dialog box.
9. On the UUT, click **[Output]** button on the standard tool bar to output the signal.
10. On the UUT, click **[Jitter Tolerance]** icon on the function selection bar.
11. On the UUT, click **[Start]** button on the standard tool bar to start measurement.
12. Confirm the all measurement result is with △ mark.
    Figure 1-15 shows a measurement result sample.

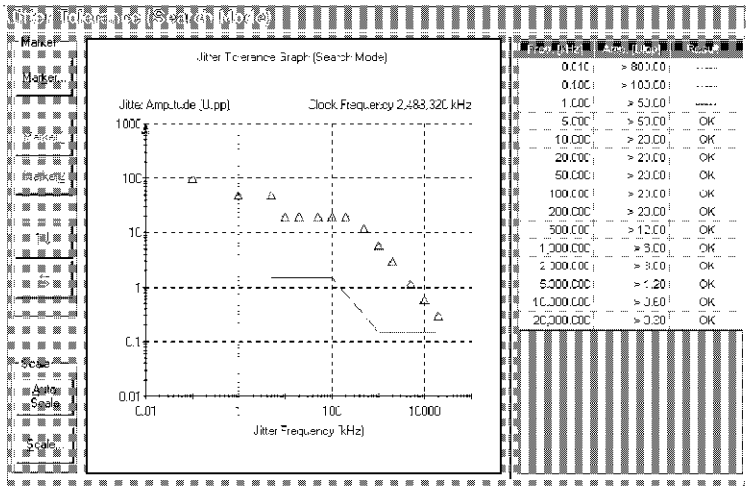


Figure 1-15 Jitter Tolerance Test Result Sample

13. Record the result in the result column with pass or fail on the performance verification test record sheets.

1.4 SSG Module Performance Verification Test Procedure

This section provides the SSG (Pulse Pattern Generator) function module performance verification test procedures of D3371 item by item listed on Table 3-1.

This performance test applies to D3371+OPT13.

1.4.1 Clock Output Level

[Description]

This tests clock output level at several setting of frequencies.
Measure the output signal level by using an external calibrated spectrum analyzer.

[Specification]

Sine waveform:+5 dBm ± 3 dB, Frequency range: 175 MHz to 3.6 GHz

Rectangular waveform :0.7 V_{P-P} ± 0.2 V_{P-P}, Frequency range: 10 MHz to 175 MHz
(+3dBm ± 2dB, converted into dBm)

[Equipment required]

RF Spectrum Analyzer: SPA

Coaxial cable: CB1

Adapter: N(m)-SMA(f)

[Setup]

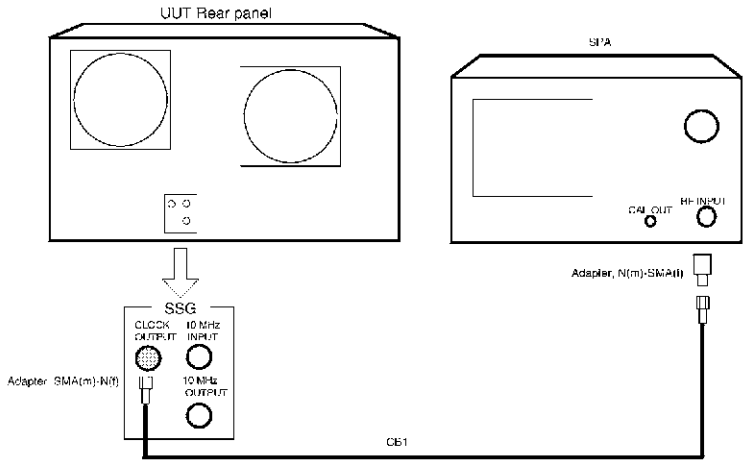


Figure 1-16 Setup of SSG Output Level Test

[Procedure]

Part 1. Measure the sine waveform

1. Connect equipment as shown in Figure 1-16.
2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the UUT, click **[Settings]** button on the standard tool bar.
4. On the UUT, click **[Frequency]** text box on the settings dialog box.
5. On the UUT, key-in as follows to set output frequency to 3.6 GHz on the virtual keyboard.

   [3], [.], [6], [GHz], [OK]
6. On the UUT, click **[Apply]** button to activate the new settings.
7. On the SPA, set controls as follows;

   Center Frequency: 3.6 GHz

   Frequency Span: 5 MHz

   Reference Level: +10 dBm
8. On the SPA, press SINGLE key for a single sweep.
9. On the SPA, after the single sweep has completed, press SRCH key to capture the signal peak.
10. Read the level of marker, and record it on the performance verification test record sheets.
11. Repeat steps 5 through 10 for each frequency listed on Table 1-9.

Table 1-9 Setting for SSG output Level Test

SSG Setting in step 5	SPA Setting in step 7
Output Frequency	Center Frequency
2488 MHz	2488 MHz
622 MHz	622 MHz
175 MHz	175 MHz

Part 2. Measure the rectangular waveform

12. On the UUT, key-in as follows to set output frequency to 174 MHz on the virtual keyboard.

    [1], [7], [4], [MHz], [OK]
13. On the UUT, click **[Apply]** button to activate the new settings.

14. On the SPA, set controls as follows;
    Center Frequency: 174 MHz
    Frequency Span: 5 MHz
    Reference Level: +10 dBm
15. On the SPA, press **SINGLE** key for a single sweep.
16. On the SPA, after the single sweep has completed, press **SRCH** key to capture the signal peak.
17. Read the level of marker, and record it on the performance verification test record sheets.
18. On the UUT, key-in as follows to set output frequency to 10 MHz on the virtual keyboard.
    [1], [0], [MHz], [OK]
19. On the UUT, click **[Apply]** button to activate the new settings.
20. On the SPA, set control as follow;
    Center Frequency: 10 MHz
21. On the SPA, press **SINGLE** key for a single sweep.
22. On the SPA, after the single sweep has completed, press **SRCH** key to capture the signal peak.

1.4.2 Phase Lock

[Description]

Verify phase lock function for SSG output signal.
It is evaluated to measure output signal stability at several settings of frequencies by using an external spectrum analyzer frequency counter function.

The 10 MHz reference signal of spectrum analyzer connect to 10 MHz INPUT of D3371 as external frequency reference.

[Specifications]

± 5 Hz of Frequency counter reading

[Equipment required]

Spectrum Analyzer:	SPA
Coaxial cable:	CB1
Adapter:	BNC(m)-SMA(f)
Adapter:	SMA(f)-N(m)

[Setup]

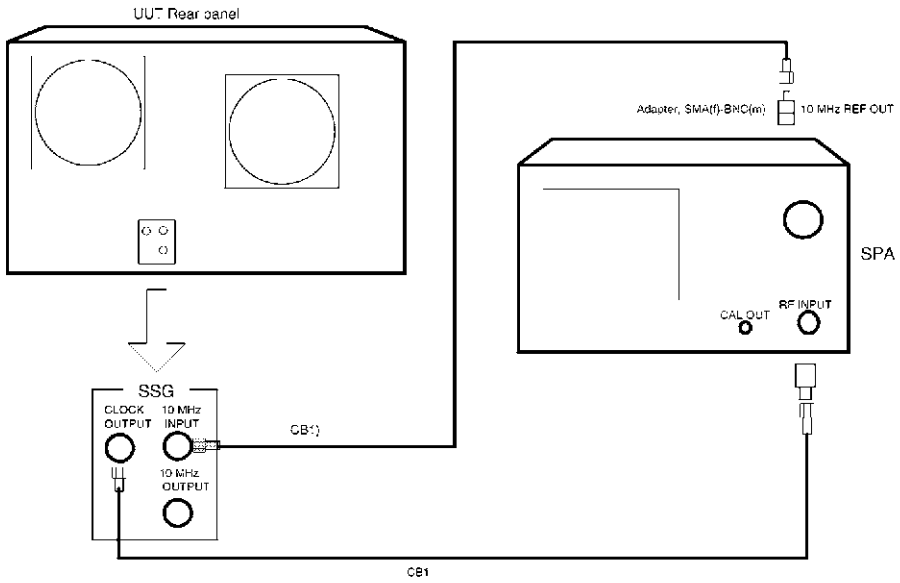


Figure 1-17 Setup of Phase Lock Test

[Procedure]

1. Connect equipment as shown in Figure 1-17.
2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the UUT, click **[Settings]** button on the standard tool bar.
4. On the UUT, click **[Frequency]** text box on the settings dialog box.
5. On the UUT, key-in as follows to set output frequency to 3.6 GHz on the virtual keyboard.

   [3], [.], [6], [GHz], [OK]
6. On the UUT, click **[Apply]** button to activate the new settings.
7. On the SPA, press keys as follows to preset.

   SHIFT, CONFIG (PRESET)
8. On the SPA, set controls as follows;

   Center Frequency: 3600 MHz

   Frequency Span: 10 kHz
9. On the SPA, press keys as follows to set frequency counter mode to on with resolution of 1 Hz.

   MEAS, *Counter, Resolution 1 Hz*
10. Verify the frequency counter reading is within ± 5 Hz, and record the result on the performance verification test record sheets.

11. Repeat step 4 through 10 for each frequency setting listed on Table 1-10.

Table 1-10 Setting for Phase Lock Test

SSG Setting step in 6	SPA Setting in step 9
Output Frequency	Center Frequency
3600 MHz	3600 MHz
2488.32 MHz	2488.32 MHz
622.08 MHz	622.08 MHz
175 MHz	175 MHz
174.999 MHz	174.999 MHz
155.52 MHz	155.52 MHz
51.84 MHz	51.84 MHz
10 MHz	10 MHz

1.4.3 Frequency Accuracy

[Description]

Verify the SSG output frequency accuracy by using the frequency counter function of spectrum analyzer.

The spectrum analyzer uses an external frequency standard as frequency reference.
Test point is at frequency of 1 GHz.
The specification is depending on the D3371 firmware revision.

[Specification]

Frequency accuracy: ± 4.5 ppm* (for Firmware revision before B00)

Frequency accuracy: ± 2 ppm* (for Firmware revision B00 or later)

*ppm is an abbreviation of parts per million

[Equipment required]

Spectrum Analyzer: SPA

Frequency Standard: FreqStd

RF Cable: BNC (m)-BNC (m)

Coaxial cable: CB1

Adapter: N (m)-SMA (f)

[Setup]

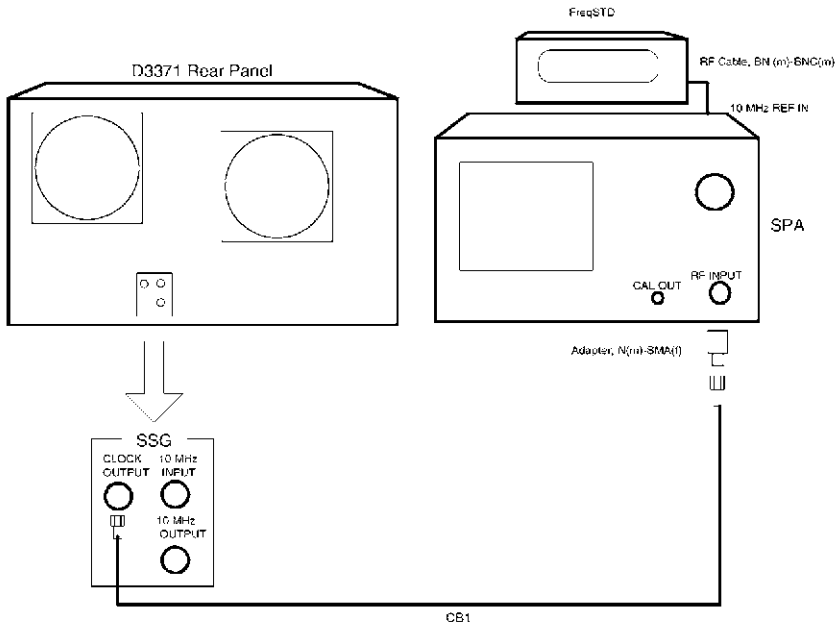


Figure 1-18 Setup of SSG Output Frequency Accuracy Test

[Procedure]

1. Connect equipment as shown in Figure 1-18.
2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the UUT, click **[Settings]** button on the standard tool bar.
4. On the UUT, click **[Frequency]** text box on the settings dialog box.
5. On the UUT, key-in as follows to set output frequency to 1 GHz on the virtual keyboard.

   [1], [GHz], [OK]
6. On the UUT, click **[Apply]** button to activate the new settings.
7. On the SPA, set controls as follows;

   Center Frequency: 1 GHz

   Frequency Span: 10 kHz
8. On the SPA, press keys as follows to set frequency counter mode to on with resolution of 1 Hz.

   MEAS, *Counter*, *Resolution 1 Hz*
9. Verify the frequency counter reading is within the specification, and record the result on the performance verification test record sheets.

1.4.4 SSB Phase Noise

[Description]

Measure the SSB phase noise of SSG output signal at 10 kHz offset.

[Specification]

SSB Phase Noise: ≤ -85 dBc/Hz at 10 kHz offset

[Equipment required]

Spectrum Analyzer: SPA

RF Adapter: N(m)-SMA(f)

Coaxial cable: CB1

[Setup]

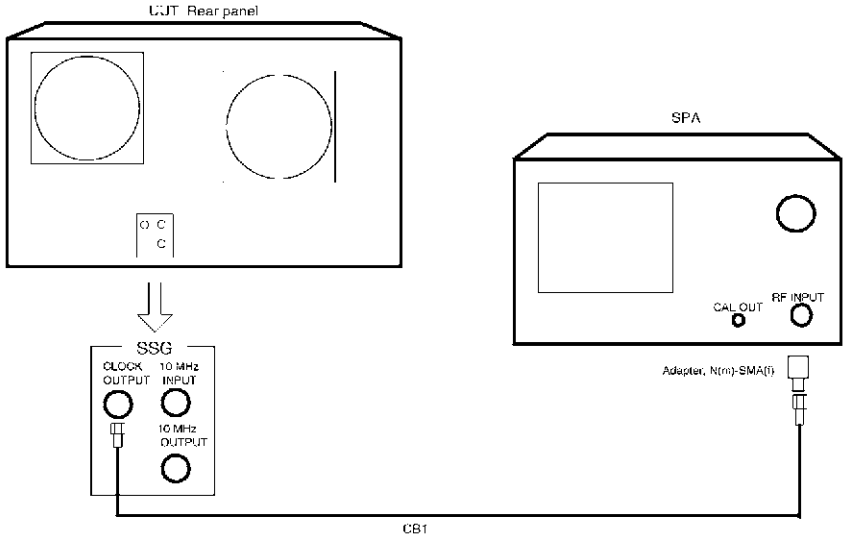


Figure 1-19 Setup of SSB Phase Noise Test

[Procedure]

1. Connect equipment as shown in Figure 1-19.
2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the UUT, click **[Settings]** button on the standard tool bar.
4. On the UUT, click **[Frequency]** text box on the settings dialog box.

5. On the UUT, key-in as follows to set output frequency to 2488.32 MHz on the virtual keyboard.
   [2], [4], [8], [8], [.], [3], [2], [MHz], [OK]
6. On the UUT, click **[Apply]** button on the virtual keyboard.
7. On the SPA, set controls as follows;
   Center Frequency: 2,488.32 MHz
   Frequency Span: 50 kHz
8. On the SPA, press keys as follows to set the peak signal to the reference level position on the screen.
   SRCH, MKR⇒, MKR⇒REF
9. On the SPA, press **SRCH** to capture the signal peak.
10. On the SPA, press keys as follows to set the noise marker to on.
    MEAS, NOISE/Hz, dBc/Hz
11. On the SPA, rotate data knob to clockwise and counterclockwise to put marker on the measurement data at ± 10 kHz offset.
12. Record the higher value as the SSB phase noise on the performance verification test record sheets.

1.4.5 10 MHz Output

[Description]

Measure the level of 10 MHz reference output signal by using an spectrum analyzer.

[Specification]

Output Level:0 dBm ± 4 dB

[Equipment required]

Spectrum Analyzer: SPA

Coaxial cable: CB1

Adapter: N(m)-SMA(f)

[Setup]

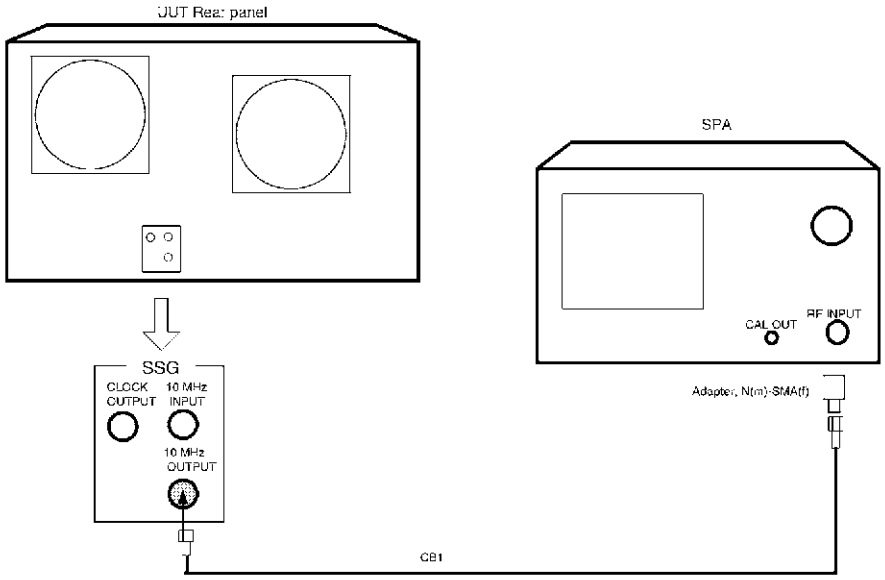


Figure 1-20 Setup of 10 MHz Reference Output Test

[Procedure]

1. Connect equipment as shown in Figure 1-20.
2. On the SPA, press keys as follows to preset.
   SHIFT, CONFIG (PRESET)
3. On the SPA, set controls as follows;
   Center Frequency: 10 MHz
   Frequency Span: 10 kHz
4. On the SPA, press **SINGLE** for a single sweep.
5. On the SPA, press **SRCH** to capture the signal peak.
6. Record the level of marker reading on the performance verification test record sheets.

1.4.6 External Reference Signal Input

[Description]

Verify the 10 MHz external reference signal input function.

Apply 10 MHz reference signal output of a spectrum analyzer to 10 MHz INPUT terminal.
It is evaluated to measure output signal stability at the frequency of 1 GHz by using an external spectrum analyzer frequency counter function.

[Specifications]

10 MHz Input Signal Level:0 dBm ± 5 dB

[Equipment required]

Spectrum Analyzer:	SPA
Coaxial cable:	CB1
Adapter:	N(m)-SMA(f)
Adapter:	SMA(f)-BNC(m)

[Setup]

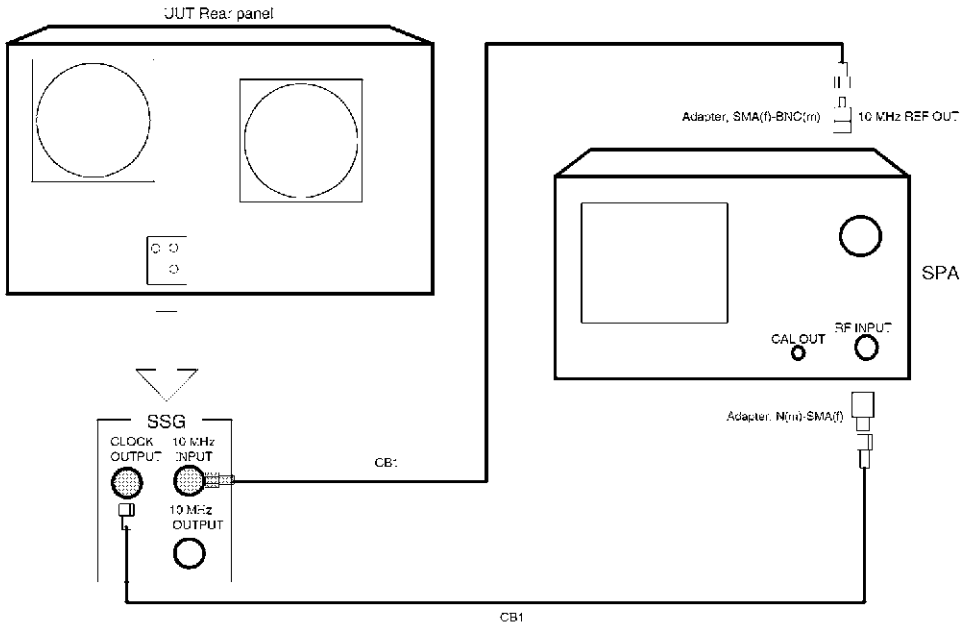


Figure 1-21 Setup of External Reference Input Test

[Procedure]

1. Connect equipment as shown in Figure 1-21.
2. On the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the SPA, set controls as follows;
   Center Frequency: 10 MHz
   Frequency Span: 10 kHz
4. On the SPA, press keys as follows to set frequency counter mode to on with measurement resolution of 1 Hz.
   MEAS, *Counter, Resolution 1 Hz*
5. On the SPA, press **SRCH** key to capture the signal peak.
6. Record the frequency of marker reading on the performance verification test record sheets.

1.4.7 Jitter Amplitude Accuracy

[Description]

This test only applies to D3371 installed option 70.

Test jitter amplitude accuracy by measuring output carrier signal level with a spectrum analyzer based on the carrier null method.

Measure the SSG output level with the spectrum analyzer, and record the result on the work sheets. Pick up the minimum measurement data point from the work sheets, record the output setting as jitter amplitude accuracy.

The test points are at output frequency of 2488.32 MHz, 622.08 MHz with jitter frequency of 200 Hz, 1 kHz, 50 kHz, 500 kHz, and 2 MHz, and 155.52 MHz with jitter frequency of 200 Hz, 1 kHz, 50 kHz, and 500 kHz.

The spectrum analyzer is phase locked with a SSG module (Option13).

[Specification]

fc: Output Frequency, fm: Jitter Frequency

BAND1 : 800 MHz ≤ fc ≤ 3200 MHz

0.77 UI_{P-P} ± 15% ± 0.02UI_{P-P} or less (Range A: 10 Hz ≤ fm < 5 kHz)

0.77 UI_{P-P} ± 8% ± 0.02UI_{P-P} or less (Range B: 5 kHz ≤ fm < 500 kHz)

0.77 UI_{P-P} ± 12% ± 0.02UI_{P-P} or less (Range C: 500 kHz ≤ fm < 2 MHz)

0.77 UI_{P-P} ± 15% ± 0.02UI_{P-P} or less (Range D: 2 MHz ≤ fm ≤ 20 MHz)

BAND2 : 175MHz ≤ fc ≤ 800MHz

0.77 UI_{p-p} ± 15% ± 0.02UI_{p-p} or less (Range A: 10 Hz ≤ fm< 1 kHz)

0.77 UI_{p-p} ± 8% ± 0.02UI_{p-p} or less (Range B: 1 kHz ≤ fm< 500 kHz)

0.77 UI_{p-p} ± 12% ± 0.02UI_{p-p} or less (Range C: 500 kHz ≤ fm < 2 MHz)

0.77 UI_{p-p} ± 15% ± 0.02UI_{p-p} or less (Range D: 2 MHz ≤ fm ≤ 5 MHz)

BAND3 : 10MHz ≤ fc ≤ 175MHz

0.77 UI_{p-p} ± 15% ± 0.02UI_{p-p} or less (Range A: 10 Hz ≤ fm< 300 Hz)

0.77 UI_{p-p} ± 8% ± 0.02UI_{p-p} or less (Range B: 300 Hz ≤ fm< 500 kHz)

0.77 UI_{p-p} ± 12% ± 0.02UI_{p-p} or less (Range C: 500 kHz ≤ fm ≤ 2 MHz)

[Equipment required]

Spectrum Analyzer: SPA

RF Cable: CB1

Adapter: N (m)-SMA (f)

[Setup]

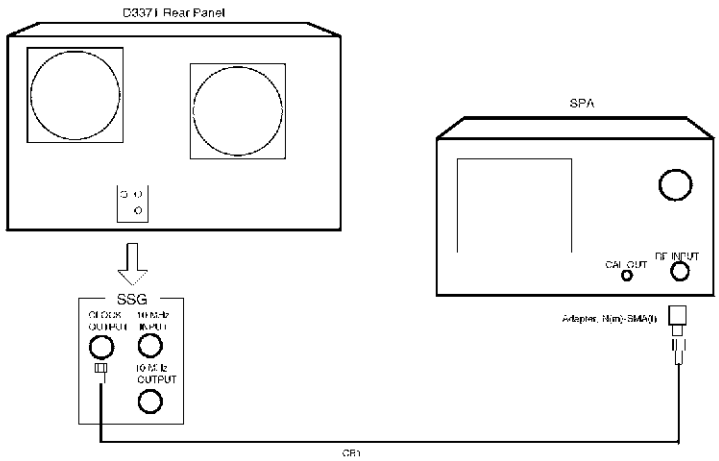


Figure 1-22 Setup of Jitter Amplitude Accuracy test

[Procedure]

BAND1

1. Connect equipment as shown in Figure 1-22.
2. On n the UUT, click **[Measurement]-[Set Installation Default]** on the menu bar to set default condition.
3. On the SPA, press keys as follows to preset.
   SHIFT, CONFIG (PRESET)
4. On the UUT, click **[Setting]** button on the standard tool bar.
5. On the UUT, click **[Frequency]** text box on the settings dialog box.
6. On the UUT, key-in as follows to set output frequency to 2488.32 MHz on the virtual keyboard.
   [2], [4], [8], [8], [.], [3], [2], [MHz], [OK]
7. On the UUT, click **[Apply]** button to activate the new settings.
8. On the SPA, set controls as follows;
   Center Frequency: 2488.32 MHz
   Frequency Span: 2 kHz
   Reference Level: +20 dBm
9. On the SPA, press keys as follows to set the fixed marker mode.
   SRCH, MKR, *Delta Marker ON/OFF*(ON), *Fixed Marker ON/OFF*(ON)
10. On the UUT, click the jitter modulation check box to jitter modulation to on.
11. On the UUT, set controls as follows;
    Jitter frequency: 200 Hz
12. On the UUT, click **[Apply]** button to activate the new settings.
13. On the UUT, set controls as follows;
    Jitter Amplitude: 0.59 UI_{P-P}
14. On the UUT, click **[Apply]** button to activate the new settings.
15. On the SPA, press **SINGLE** key for a single sweep.
16. On the SPA, after the single sweep has completed, record the level of delta marker level in the SPA measured value column on Table 1-11.
17. Repeat steps 14 through 17 for each amplitude setting listed on Table 1-11.

Table 1-11 Work sheets-1 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{p-p})	SPA Measured Value (dB)
2488.32	200	0.59	
		0.64	
		0.69	
		0.73	
		0.77	
		0.81	
		0.85	
		0.90	
		0.95	

18. Pick the minimum measured value from the work sheet-1 up, and record the jitter amplitude setting on the performance verification test record sheet as jitter amplitude accuracy.

19. On the UUT, set controls as follows;
    Jitter Frequency: 1 kHz

20. On the UUT, click **[Apply]** button to activate the new settings.

21. On the SPA, set control as follow;
    Frequency Span: 5 kHz

22. Repeat steps 13 through 18. (Use Table 1-12 to Table 1-15)

Table 1-12 Work sheets-2 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{p-p})	SPA Measured Value (dB)
2488.32	1 k	0.59	
		0.64	
		0.69	
		0.73	
		0.77	
		0.81	
		0.85	
		0.90	
		0.95	

23. Repeat steps 19 through 22 for each jitter frequency and span setting listed on Table 1-13.

Table 1-13 Setting for Jitter Frequency and Frequency Span

Jitter Frequency Setting in step 19	Frequency Span Setting in step 21	Woek Sheet used
50 kHz	200 kHz	Work sheet-3
500 kHz	2MHz	Work sheet-4
3 MHz	10 MHz	Work sheet-5

Table 1-14 Work sheets-3 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
2488.32	50 k	0.66	
		0.69	
		0.72	
		0.75	
		0.77	
		0.79	
		0.82	
		0.85	
		0.88	

Table 1-15 Work sheets-4 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
2488.32	500 k	0.62	
		0.66	
		0.70	
		0.74	
		0.77	
		0.80	
		0.84	
		0.88	
		0.92	

Table 1-16 Work sheets-5 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{p-p})	SPA Measured Value (dB)
2488.32	2 M	0.59	
		0.64	
		0.69	
		0.73	
		0.77	
		0.81	
		0.85	
		0.90	
		0.95	

24. On the UUT, On the UUT, click the jitter modulation check box to jitter modulation to off.
25. On the UUT, click **[Apply]** button to activate the new settings.
26. On the SPA, press keys as follows to the marker mode to off.
    MKR, *Marker OFF*

BAND 2

27. On the UUT, click [Frequency] text box on the settings dialog box.
28. On the UUT, key-in as follows to set output frequency to 622.08 MHz on the virtual keyboard.
    [6], [2], [2], [.], [0], [8], [MHz], [OK]
29. On the UUT, click [Apply] button to activate the new settings.
30. On the SPA, set controls as follows;
    Center Frequency: 622.08 MHz
    Frequency Span: 2 kHz
31. On the SPA, press keys as follows to set the fixed marker mode.
    SRCH, MKR, *Delta Marker ON/OFF*(ON), ***Fixed Marker ON/OFF***(ON)
32. Repeat steps 10 through 26. (Use Table 1-17 to Table 1-21)

Table 1-17 Work sheets-6 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
622.08	200	0.59	
		0.64	
		0.69	
		0.73	
		0.77	
		0.81	
		0.85	
		0.90	
		0.95	

Table 1-18 Work sheets-7 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
622.08	1 k	0.66	
		0.69	
		0.72	
		0.75	
		0.77	
		0.79	
		0.82	
		0.85	
		0.88	

Table 1-19 Work sheets-8 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
622.08	50 k	0.66	
		0.69	
		0.72	
		0.75	
		0.77	
		0.79	
		0.82	
		0.85	
		0.88	

Table 1-20 Work sheets-9 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
622.08	500 k	0.62	
		0.66	
		0.70	
		0.74	
		0.77	
		0.80	
		0.84	
		0.88	
		0.92	

Table 1-21 Work sheets-10 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
622.08	2 M	0.59	
		0.64	
		0.69	
		0.73	
		0.77	
		0.81	
		0.85	
		0.90	
		0.95	

BAND 3

33. On the UUT, click [Frequency] text box on the settings dialog box.
34. On the UUT, key-in as follows to set output frequency to 622.08 MHz on the virtual keyboard.
    [1], [5], [5], [.], [5], [2], [MHz], [OK]
35. On the UUT, click [Apply] button to activate the new settings.
36. On the SPA, set controls as follows;
    Center Frequency: 155.52 MHz
    Frequency Span: 2 kHz
37. On the SPA, press keys as follows to set the fixed marker mode.
    SRCH, MKR, *Delta Marker ON/OFF*(ON), *Fixed Marker ON/OFF*(ON)

38. Repeat steps 11 through 24.

Table 1-22 Work sheets-11 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
155.52	200	0.59	
		0.64	
		0.69	
		0.73	
		0.77	
		0.81	
		0.85	
		0.90	
		0.95	

Table 1-23 Work sheets-12 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
155.52	1 k	0.66	
		0.69	
		0.72	
		0.75	
		0.77	
		0.79	
		0.82	
		0.85	
		0.88	

Table 1-24 Work sheets-13 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
155.52	50 k	0.66	
		0.69	
		0.72	
		0.75	
		0.77	
		0.79	
		0.82	
		0.85	
		0.88	

Table 1-25 Work sheets-14 for Jitter Amplitude Accuracy Test

Output Frequency (MHz)	Jitter Frequency (Hz)	Jitter Amplitude (UI_{P-P})	SPA Measured Value (dB)
155.52	500 k	0.62	
		0.66	
		0.70	
		0.74	
		0.77	
		0.80	
		0.84	
		0.88	
		0.92	

1.5 Performance Verification Test Record Sheets

Performance Verification Test Record

Report Number :
Customer Name :
Address :

Description :
Model Number :
Serial Number :
Asset Number :

Testing Environment : °C± °C/ % ± % RH
Verification Date :
Due Date :

Equipment Used :

Model No.	Description	Trace No.	Cal Due Date

Test Officer
Date:

Head of Laboratory
Date:

1.5.1 PPG Module Performance Verification Test Record Sheets

Model : OPT3371+10(11) Date : _____

Serial Number :

Test No.	Test Description	Test Data			Specification			Result
		Frequency	Output	Parameter	Min.	Measured Value	Max.	Pass/Fail
1.2.1	CLOCK, X-CLOCK Output (Apply only for the firmware revision B00 or later)	2500 MHz	OFFSET= 0 V, AMP = 1.0 V_{P-P}	AMPLITUDE	0.8 V_{P-P}		1.2 V_{P-P}	
			OFFSET = 0 V, AMP = 0.3 V_{P-P}	AMPLITUDE	0.17 V_{P-P}		0.43 V_{P-P}	
			OFFSET = 0 V, AMP = 2.0 V_{P-P}	AMPLITUDE	1.7 V_{P-P}		2.3 V_{P-P}	
			OFFSET = 0 V, AMP = 1.0 V_{P-P}	OFFSET	-0.1 V		0.1 V	
			OFFSET = 2 V, AMP = 1.0 V_{P-P}	OFFSET	1.7 V		2.3V	
			OFFSET = -2 V, AMP = 1.0 V_{P-P}	OFFSET	-1.7 V		-2.3 V	
1.2.2	DATA, X-DATA Output (Apply only for the firmware revision B00 or later)	2500 MHz	OFFSET = 0 V, AMP = 1.0 V_{P-P}	AMPLITUDE	0.9 V_{P-P}		1.1 V_{P-P}	
			OFFSET = 0 V, AMP = 0.3 V_{P-P}	AMPLITUDE	0.2 V_{P-P}		0.4 V_{P-P}	
			OFFSET = 0 V, AMP = 2.0 V_{P-P}	AMPLITUDE	1.8 V_{P-P}		2.2 V_{P-P}	
			OFFSET = 0 V, AMP = 1.0 V_{P-P}	OFFSET	-0.1 V		0.1 V	
			OFFSET = 2V, AMP = 1.0 V_{P-P}	OFFSET	1.8 V		2.2 V	
			OFFSET = -2 V, AMP = 1.0 V_{P-P}	OFFSET	-1.8 V		-2.2 V	
	(Apply only for Option 11)		OFFSET = 0 V, AMP = 3.0 V_{P-P}	AMPLITUDE	2.7 V_{P-P}		3.3 V_{P-P}	
			OFFSET = 1 V, AMP = 3.0 V_{P-P}	OFFSET	0.9 V		1.1 V	
			OFFSET = -1 V, AMP = 3.0 V_{P-P}	OFFSET	-0.9 V		-1.1 V	
1.2.3	DATA Pattern Generation-1	3600 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
			PRBS 2^31-1 MARK 1/8	ERC	0		0	
			PRBS 2^31-1 MARK 7/8	ERC	0		0	
			ZSUB	ERC	0		0	

1.5.1 PPG Module Performance Verification Test Record Sheets

Test No.	Test Description	Test Data			Specification			Result
		Frequency	Output	Parameter	Min.	Measured Value	Max.	Pass/Fail
1.2.4	DATA Pattern Generation-2	2488.32 MHz	STM	ERC	0		0	
			FLEX	ERC	0		0	
1.2.5	Error Free	3600 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
		2400 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
		620 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
		150 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
		10 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	

1.5.2 ED Module Performance Verification Test Data Sheets

Model : OPT3371+12 Date : _____

Serial Number :

Test No.	Test Description	Test Data			Specification			Result
		Frequency	Output	Parameter	Min.	Measured Value	Max.	Pass/Fail
1.3.1	DATA Input Level	3600 MHz	DATA INPUT: 0.3 V_{P-P}	ERC	0		0	
			DATA Input: 1.0 V_{P-P}	ERC	0		0	
			DATA Input: 2.0 V_{P-P}	ERC	0		0	
1.3.2	Clock Input Level	3600 MHz	DATA INPUT: 0.3 V_{P-P}	ERC	0		0	
			DATA Input: 1.0 V_{P-P}	ERC	0		0	
			DATA Input: 2.0 V_{P-P}	ERC	0		0	
1.3.3	Bit Error Rate Measurement	3600 MHz	-	BIT COUNT	3.6000×10^{10}		3.6000×10^{10}	
			-	ERR	1.0000×10^{-4}		1.0000×10^{-4}	
			-	ERC	3.6000×10^{-6}		3.6000×10^{-6}	
			-	EI	100%		100%	
			-	EFI	0%		0%	
			-	FREQ	3,599,964,000 Hz		3,600,036,000 Hz	
1.3.4	DATA Pattern Receving-1	3600 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
			PRBS 2^31-1 MARK 1/8	ERC	0		0	
			PRBS 2^31-1 MARK 7/8	ERC	0		0	
			ZSUB	ERC	0		0	
1.3.5	DATA Pattern Receving-2	2488.32 MHz	STM	ERC	0		0	
			FLEX	ERC	0		0	

1.5.2 ED Module Performance Verification Test Data Sheets

Test No.	Test Description	Test Data			Specification			Result
		Frequency	Output	Parameter	Min.	Measured Value	Max.	Pass/Fail
1.3.6	Error Free	3600 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
		2400 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
		620 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
		150 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
		10 MHz	PRBS 2^31-1 MARK 1/2	ERC	0		0	
1.3.7	Burst Error Free	3600 MHz	BURST	ERC	0		0	
1.3.8	Error Phase Analysis	2500 MHz	STM	ERC	128 bits ERR		128 bits ERR	
1.3.9	Jitter Tolerance	2488.32 MHz	-	-	-	-	-	

1.5.3 SSG Module Performance Verification Test Record Sheets

Model : OPT3371+13 Date : _____

Serial Number :

Test No.	Test Description	Test Data	Specifications			Result
			Min.	Measured Value	Max.	Pass/Fail
1.4.1	Clock Output Level	3600 MHz	2 dBm		8 dBm	
		2488 MHz	2 dBm		8 dBm	
		622 MHz	2 dBm		8 dBm	
		175 MHz	2 dBm		8 dBm	
		174 MHz	0.06 dBm		5.16 dBm	
		10 MHz	0.06 dBm		5.16 dBm	
1.4.2	Phase Lock	3600 MHz	3 599 999 995 MHz		3 600 000 005 MHz	
		2488.32 MHz	2 488 319 995 MHz		2 488 320 005 MHz	
		622.08 MHz	622 079 995 MHz		622 080 005 MHz	
		175 MHz	174 999 995 MHz		175 000 005 MHz	
		174.999 MHz	174 998 995 MHz		174 999 005 MHz	
		155.52 MHz	155 519 995 MHz		155 520 005 MHz	
		51.84 MHz	51 839 995 MHz		51 840 005 MHz	
		10 MHz	9 999 995 MHz		10 000 005 MHz	
1.4.3	Frequency Accuracy	1 000 MHz	999 995 500 MHz		1 000 004 500 MHz	
1.4.4	SSB Phase Noise	2 488.32 MHz	N/A		-85 dBc/Hz	
1.4.5	10 MHz Output	10 MHz	-4 dBm		+4 dBm	
1.4.6	External Reference Signal Input	1000 MHz	999.999 995 MHz		1000.000 005 MHz	

Test No.	Test Description	Test Data		Specifications			Result
		Output Frequency	Jitter Frequency	Min.	Measured Value	Max.	Pass/Fail
1.4.7	Jitter Amplitude Accuracy	2488.32 MHz	200 Hz	0.64 UI_{P-P}		0.90 UI_{P-P}	
			1 kHz	0.64 UI_{P-P}		0.90 UI_{P-P}	
			50 kHz	0.69 UI_{P-P}		0.85 UI_{P-P}	
			500 kHz	0.66 UI_{P-P}		0.88 UI_{P-P}	
			2 MHz	0.64 UI_{P-P}		0.90 UI_{P-P}	
		622.08 MHz	200 Hz	0.64 UI_{P-P}		0.90 UI_{P-P}	
			1 kHz	0.69 UI_{P-P}		0.85 UI_{P-P}	
			50 kHz	0.69 UI_{P-P}		0.85 UI_{P-P}	
			500 kHz	0.66 UI_{P-P}		0.88 UI_{P-P}	
			2 MHz	0.64 UI_{P-P}		0.90 UI_{P-P}	
		155.52 MHz	200 Hz	0.64 UI_{P-P}		0.90 UI_{P-P}	
			1 kHz	0.69 UI_{P-P}		0.85 UI_{P-P}	
			50 kHz	0.69 UI_{P-P}		0.85 UI_{P-P}	
			500 kHz	0.66 UI_{P-P}		0.88 UI_{P-P}	

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   (f) Advantest's incorporation or use of any specifications or designs supplied by Purchaser;

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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.

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SALES & SUPPORT OFFICES

Advantest Korea Co., Ltd.
22BF, Kyobo KangNam Tower,
1303-22, Seocho-Dong, Seocho-Ku, Seoul #137-070, Korea
Phone: +82-2-532-7071
Fax: +82-2-532-7132

Advantest (Suzhou) Co., Ltd.
Shanghai Branch Office:
Bldg. 6D, NO.1188 Gumei Road, Shanghai, China 201102 P.R.C.
Phone: +86-21-6485-2725
Fax: +86-21-6485-2726

Shanghai Branch Office:
406/F, Ying Building, Quantum Plaza, No. 23 Zhi Chun Road,
Hai Dian District, Beijing,
China 100083
Phone: +86-10-8235-3377
Fax: +86-10-8235-6717

Advantest (Singapore) Pte. Ltd.
438A Alexandra Road, #08-03/06
Alexandra Technopark Singapore 119967
Phone: +65-6274-3100
Fax: +65-6274-4055

Advantest America, Inc.
3201 Scott Boulevard, Suite, Santa Clara, CA 95054, U.S.A
Phone: +1-408-988-7700
Fax: +1-408-987-0691

ROHDE & SCHWARZ Europe GmbH
Mühldorfstraße 15 D-81671 München, Germany
(P.O.B. 80 14 60 D-81614 München, Germany)
Phone: +49-89-4129-13711
Fax: +49-89-4129-13723

ADVANTEST®

http://www.advantest.co.jp

ADVANTEST CORPORATION
Shin-Marunouchi Center Building, 1-6-2 Marunouchi, Chiyoda-ku, Tokyo 100-0005, Japan
Phone: +81-3-3214-7500