

# **K-Band Doppler Sensor Module**

RF Frequency: 24.075 to 24.175 GHz

Model No. NJR4262F3P3/F3P5

**Specifications**  
**Rev.00-03    December 15, 2014**

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New Japan Radio Co., Ltd.  
Microwave Components Division

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  - \* Life Maintenance Medical Equipment
  - \* Fire Alarm/Intruder Detector
  - \* Vehicle Control Equipment (automobile, airplane, railroad, ship, etc.)
  - \* Various Safety Equipment
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Category: K-Band Doppler Sensor Module  
Type Name: NJR4262F3P3, NJR4262F3P5

**Description:**

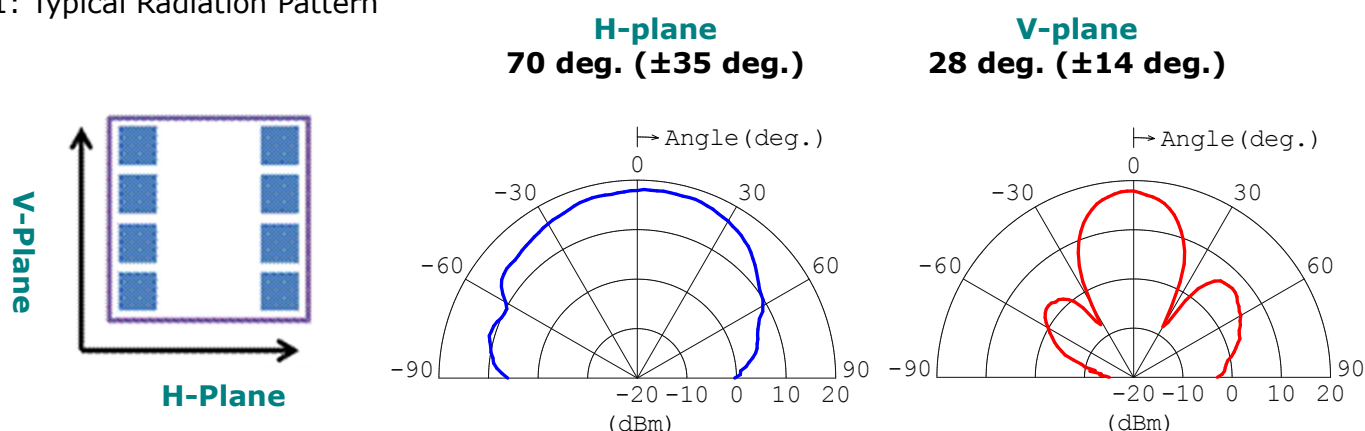
- Motion detector using microwave doppler effect
- Miniaturized RF circuit with MMIC technology
- High accurate I-Q mixer

**Specification:**

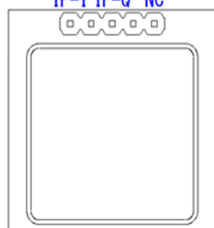
1. Electric Characteristics (Common measure condition Ta= +25 deg.C)

| Item                                  | Specification |             |             | Unit        | Condition / Note                                                                       |
|---------------------------------------|---------------|-------------|-------------|-------------|----------------------------------------------------------------------------------------|
|                                       | Min.          | Typ.        | Max.        |             |                                                                                        |
| 1.1 Operation voltage                 | 3.3           | -           | 5.5         | V           |                                                                                        |
| 1.2 Operation current                 | -             | 45          | 55          | mA          |                                                                                        |
| 1.3 Operation frequency               | -             | 24.125      | -           | GHz         |                                                                                        |
| 1.4 E.I.R.P.                          | -             | +16<br>(40) | +17<br>(50) | dBm<br>(mW) | *measured value<br>Field Strength at 3m<br>109.1dBuV/m (Average)<br>109.3dBuV/m (Peak) |
| 1.5 Frequency Stability               | -1            | -           | 0           | MHz/deg.C   | Ta= -20 to +60 deg.C                                                                   |
| 1.6 Start-up time                     | -             | 4           | 6           | msec        |                                                                                        |
| 1.7 2nd Harmonics (E.I.R.P.)          | -             | -           | -30         | dBm         |                                                                                        |
| 1.8 Radiation pattern                 | -             | -           | -           | -           | See Fig.1: Typical Radiation Pattern.                                                  |
| 1.8.1 -3dB beam width (H-plane)       | -             | 70          | -           | deg.        |                                                                                        |
| 1.8.2 -3dB beam width (V-plane)       | -             | 28          | -           | deg.        |                                                                                        |
| 1.8.3 Side lobe suppression (H-plane) | -             | -           | -           | dB          | No side lobe                                                                           |
| 1.8.4 Side lobe suppression (V-plane) | -             | 13          | -           | dB          |                                                                                        |
| 1.9 Noise Voltage                     | -             | -           | 400         | mV          | Upon amplified with 85dB Gain amp.<br>Band width: 10 to 300Hz                          |
| 1.10 Signal level                     | 0.5           | 0.8         | -           | Vp-p        | Refer to Fig.2 : Signal Test System                                                    |
| 1.11 Offset voltage                   | 1.1           | 1.35        | 1.6         | V           |                                                                                        |
| I-Q Amplitude Balance                 | -3            | -           | +3          | dB          |                                                                                        |
| I-Q Phase Balance                     | 85            | -           | 95          | deg.        |                                                                                        |

Fig.1: Typical Radiation Pattern



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| 2. Mechanical characteristics    |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
|----------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-------|------------------|-------------|-------------|-------------|---|------|-----------------------|-----|-----|-----|------|------|-----------------------|-----|-----|----------------|---|----|---------------|
| Item                             |                            | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 2.1                              | Size                       | 25(W) x 25(D) x 7.3(H) mm<br>Tolerance: ±0.5 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 2.2                              | Weight                     | 7 g max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 2.3                              | Interface / Pin assignment | <div>Pin Size: 0.64 mm square<br/>Pin Pitch: 2.54 mm</div> <table><tr><th>NJR4262F3P3</th><th>NJR4262F3P5</th><th>Descreption</th></tr><tr><td>-</td><td>IF-I</td><td>Doppler signal output</td></tr><tr><td>GND</td><td>GND</td><td>GND</td></tr><tr><td>IF-Q</td><td>IF-Q</td><td>Doppler signal output</td></tr><tr><td>VCC</td><td>VCC</td><td>Voltage supply</td></tr><tr><td>-</td><td>NC</td><td>No connection</td></tr></table> <div><div>GND VCC<br/>IF-I IF-Q NC</div></div> <div>Recommended via hole diameter: 1.2 ± 0.05 mm</div> |      |      |       |                  | NJR4262F3P3 | NJR4262F3P5 | Descreption | - | IF-I | Doppler signal output | GND | GND | GND | IF-Q | IF-Q | Doppler signal output | VCC | VCC | Voltage supply | - | NC | No connection |
| NJR4262F3P3                      | NJR4262F3P5                | Descreption                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| -                                | IF-I                       | Doppler signal output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| GND                              | GND                        | GND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| IF-Q                             | IF-Q                       | Doppler signal output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| VCC                              | VCC                        | Voltage supply                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| -                                | NC                         | No connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 3. Environmental characteristics |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| Item                             |                            | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 3.1                              | Operation Temperature      | -20 to +60 deg.C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 3.2                              | Storage Temperature        | -40 to +80 deg.C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 3.3                              | Humidity                   | 0 to 95 % @ +30 deg.C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 3.4                              | Vibration                  | 49.03 m/s <sup>2</sup> (5 G)<br>30 to 50 Hz, 10 minutes, XYZ direction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 3.5                              | Shock                      | 196.13 m/s <sup>2</sup> (20 G)<br>Half sine, 11 msec, XYZ direction, 3 times                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 4. Absolute Maximum Rating       |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |      |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| Item                             |                            | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      | Unit  | Condition / Note |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
|                                  |                            | Min.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Typ. | Max. |       |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 4.1                              | Supply voltage             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -    | 7    | V     |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 4.2                              | Operation Temperature      | -40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -    | +85  | deg.C | No damage        |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |
| 4.3                              | Storage Temperature        | -40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -    | +85  | deg.C |                  |             |             |             |   |      |                       |     |     |     |      |      |                       |     |     |                |   |    |               |

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## 5. FCC Statement

### Responsible party:

New Japan Radio Co.,Ltd.  
1-1, Fukuoka 2-chome Fujimino city Saitama Japan  
+81-49-278-1271 Fax: +81

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

### NOTE:

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### Caution:

When this module is installed in the host product, this module shall be connected directly to a PCB of the host product, and shall not extend connection distance by cable etc.

### WARNING:

The FCC regulations provide that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Manual and Product Labeling information To The End User:

The end user manual shall include all required regulatory information/warning as show in this manual.

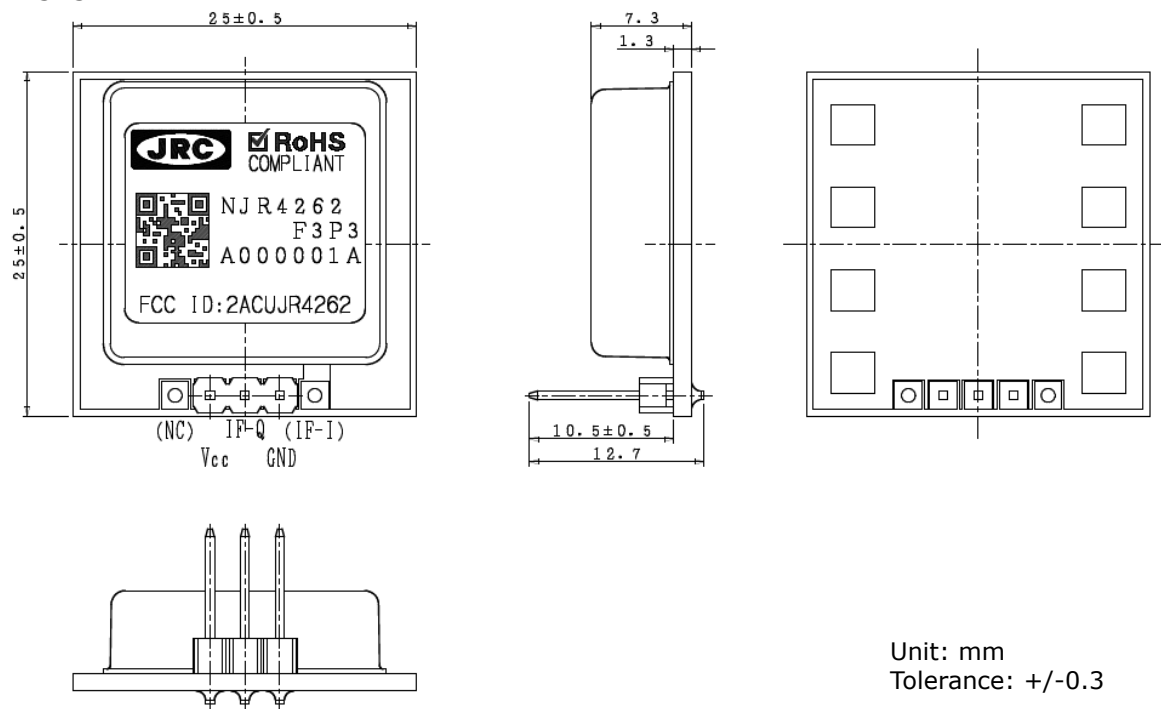
And when this module is installed in the host product, you must include a "**Contain FCC ID: 2ACUJR4262**" in the label of the host product.

This equipment complies with radio frequency exposure limits set forth by the FCC for an uncontrolled environment.

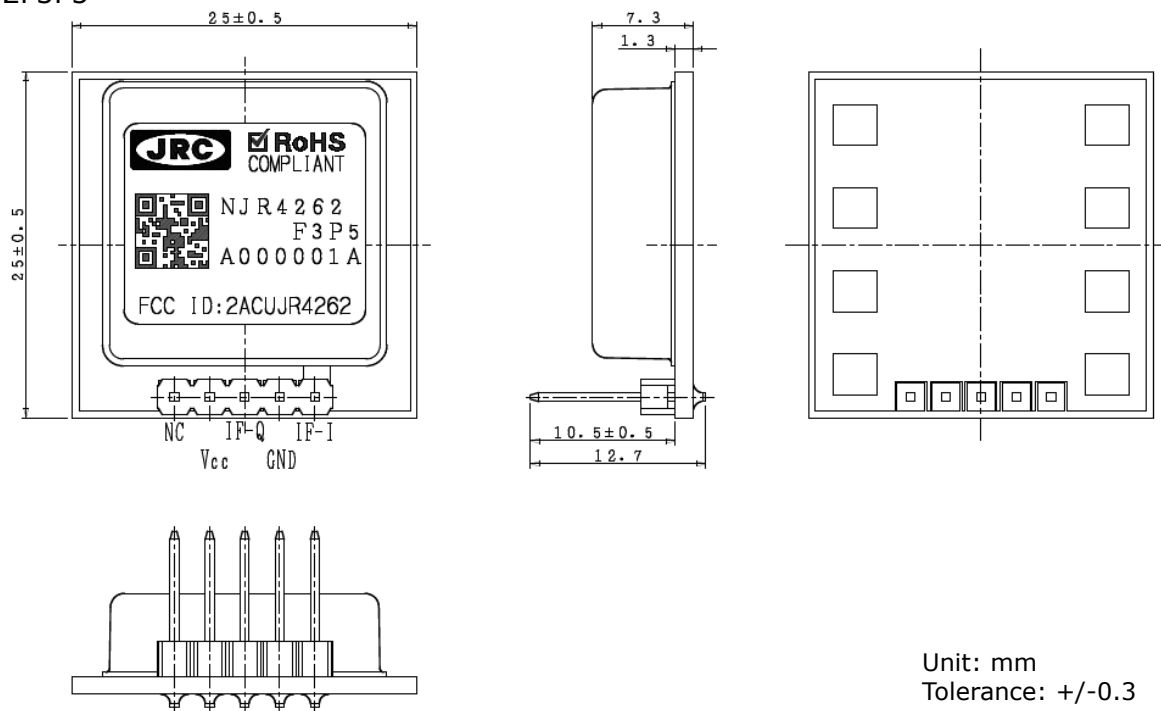
This device must not be co-located or operating in conjunction with any other antenna or transmitter.

## 5. Outline

### \*NJR4262F3P3

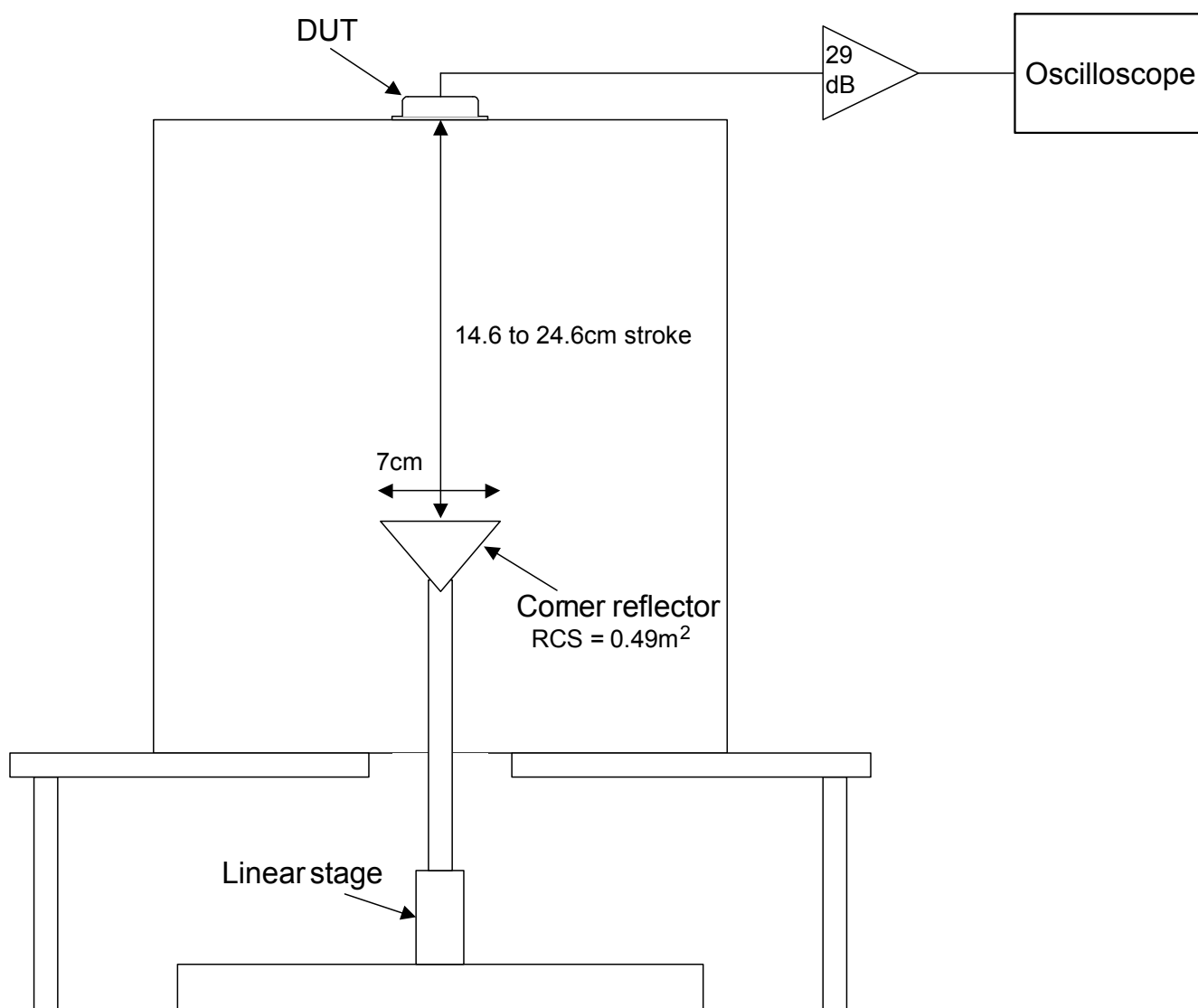


### \*NJR4262F3P5



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Fig2. Signal Test System



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