

# Detector Adapter Reflections

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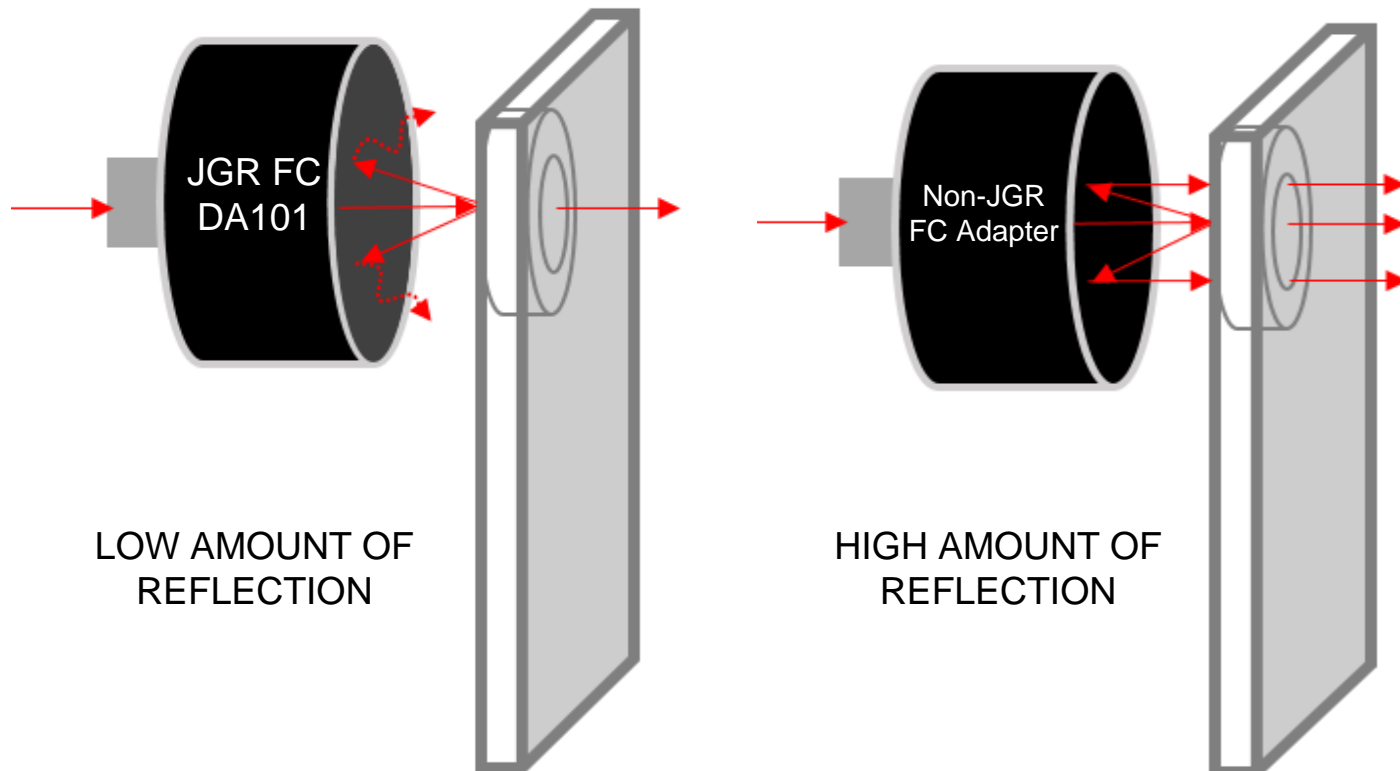
# Detector Adapter Reflections

- In order to take consistent, accurate and reliable measurements it is important to have detector adapters that are designed with the same type of material.
- JGR has done a great deal of testing to produce low reflection detector adapters that are consistent and do not influence IL measurements.



# Detector Adapter Reflections

- Even if a material is black it does not mean that it will absorb/reflect the same amount of light as another black material. It can still vary in reflectivity and influence measurements.
- The images below show the possible differences between a JGR detector adapter and a Non-JGR detector adapter that was not properly designed and tested.



# Detector Adapter Reflections

- Detector adapters that have not been designed and tested for consistency will make unreliable and inaccurate measurements.
- JGR has seen variations up to  $\pm 0.3\text{dB}$  in IL measurements due to Non-JGR detector adapters.
- All of JGR's detector adapters are made using the same material to provide the most consistent and accurate results possible.



# Detector Adapter Reflections

- In today's market, many IL specifications are very low. This makes consistency between detector adapters very important.
- To demonstrate how using inconsistent detector adapters will affect test results, a couple examples will be shown in the following slides.
- Note: a BR5 reads Relative Power to indicate loss or gain.  
(Ex. -0.15dB = loss, 0.15dB = gain)
- The adapters that will be used in the following examples are:
  - a JGR FC DA101 detector adapter
  - a Non-JGR detector adapter with 0.1dB of gain due to high reflections.

Typical simplex IL specification:

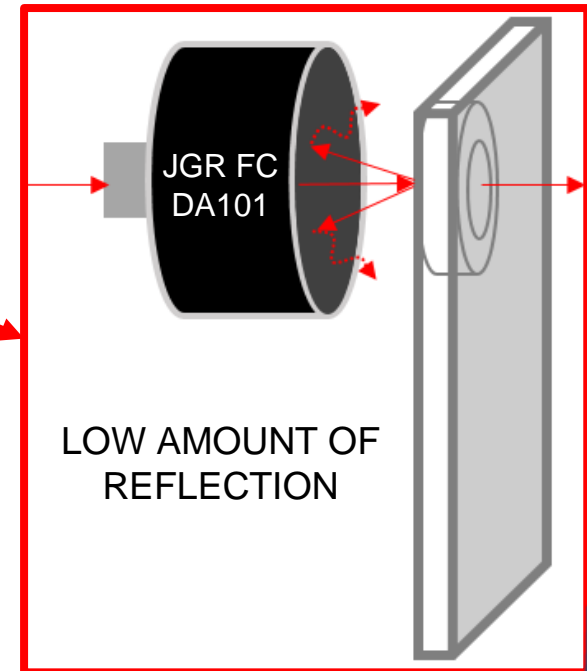
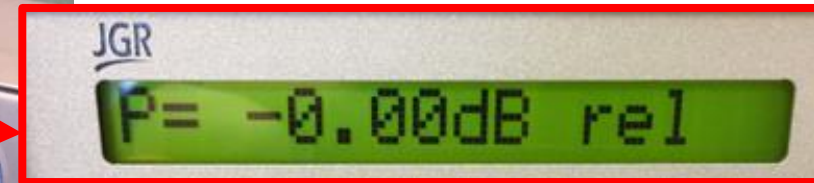
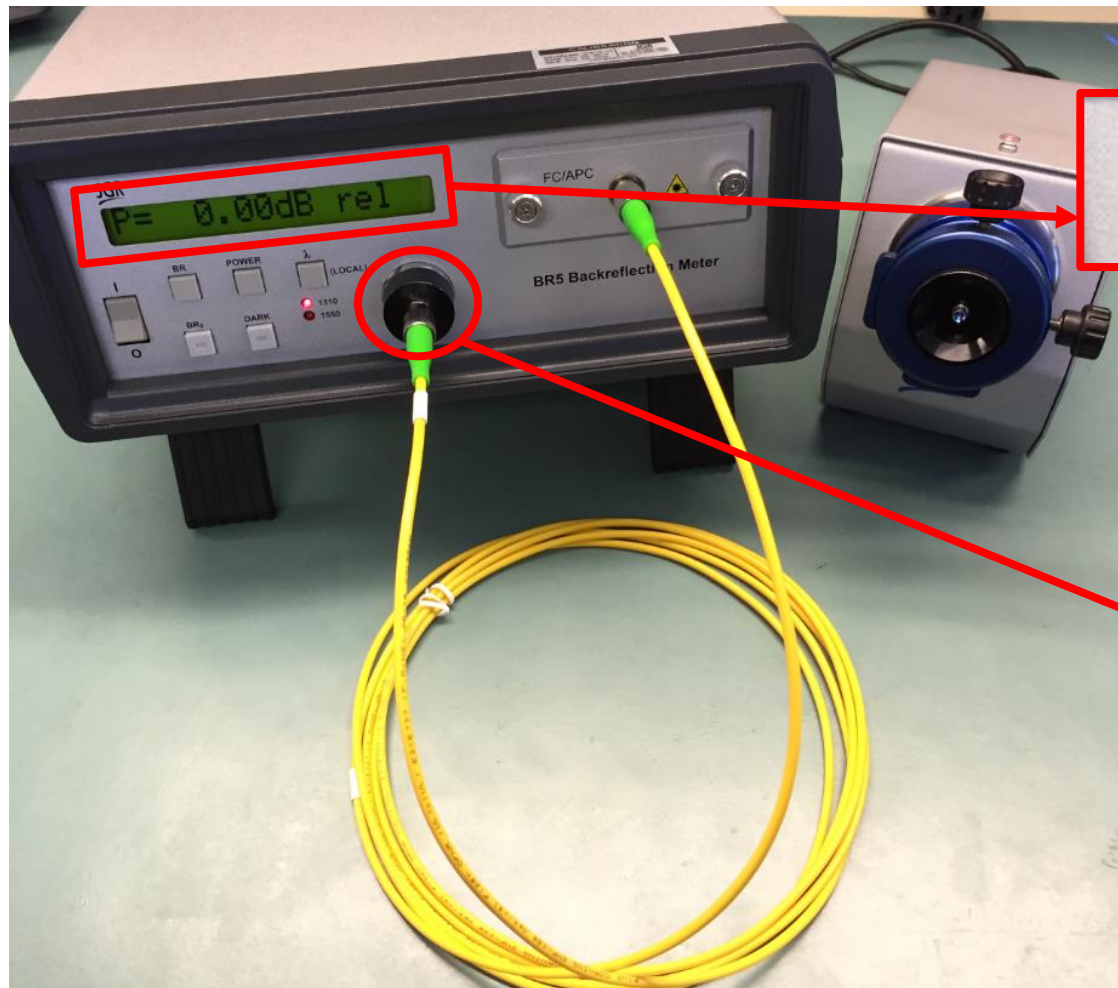
0.15dB or less = **PASS**

0.16dB of more = **FAIL**

# Detector Adapter Reflections

## Example: *False PASS*

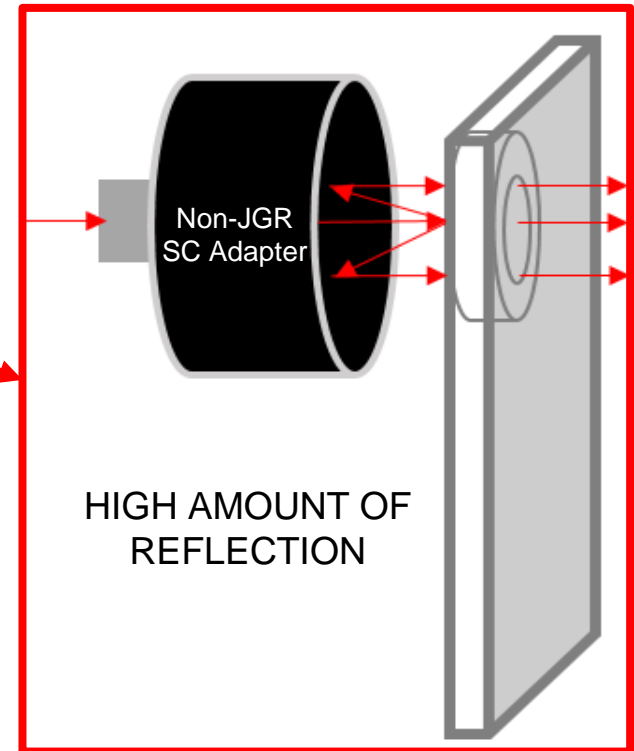
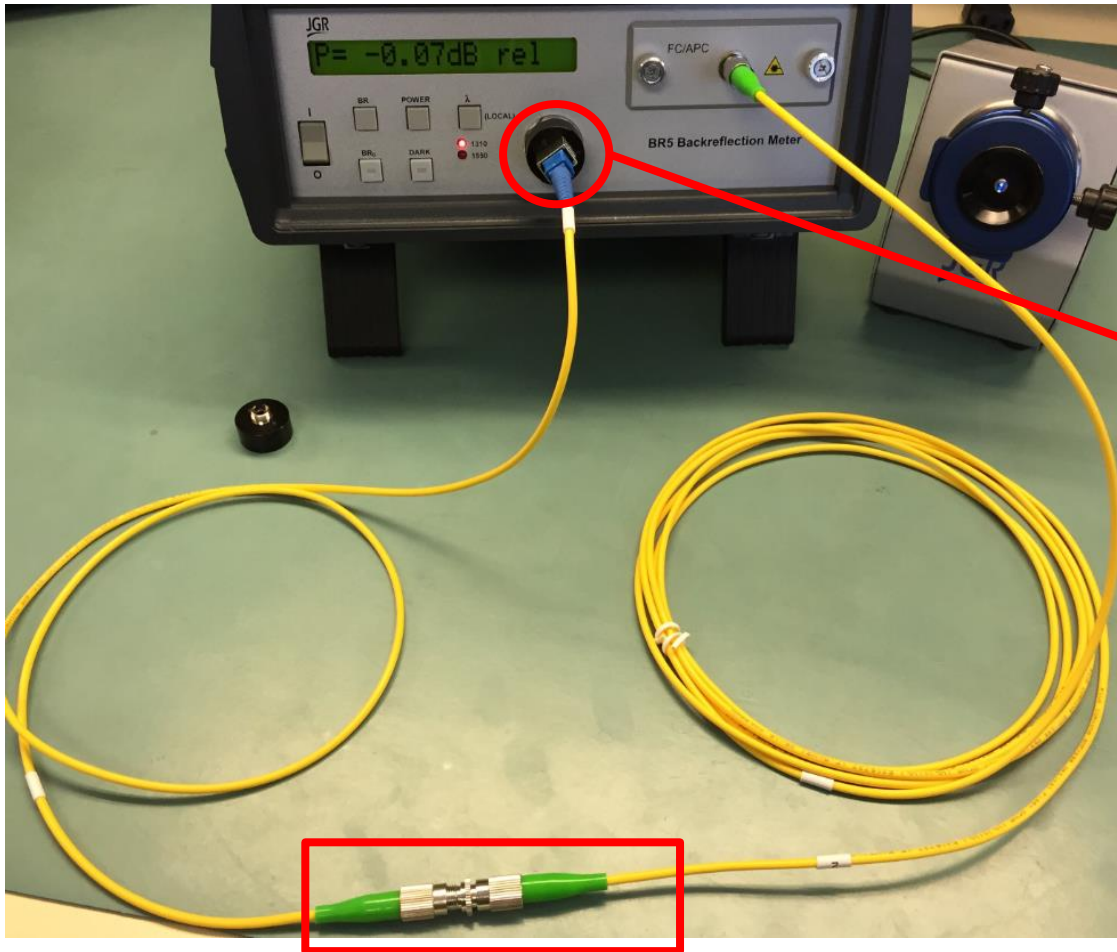
- A *false PASS* will be explained first.
- A reference is taken using a JGR FC DA101 detector adapter.



# Detector Adapter Reflections

## Example: *False* PASS

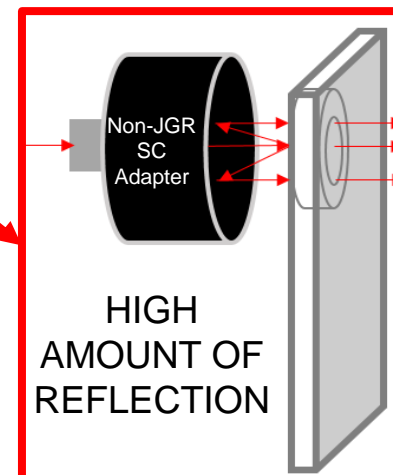
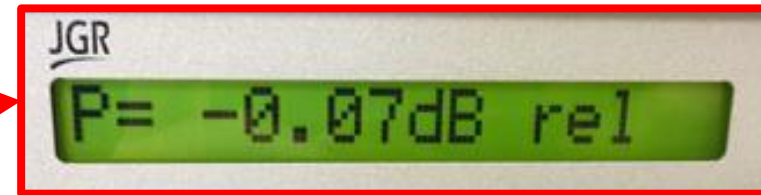
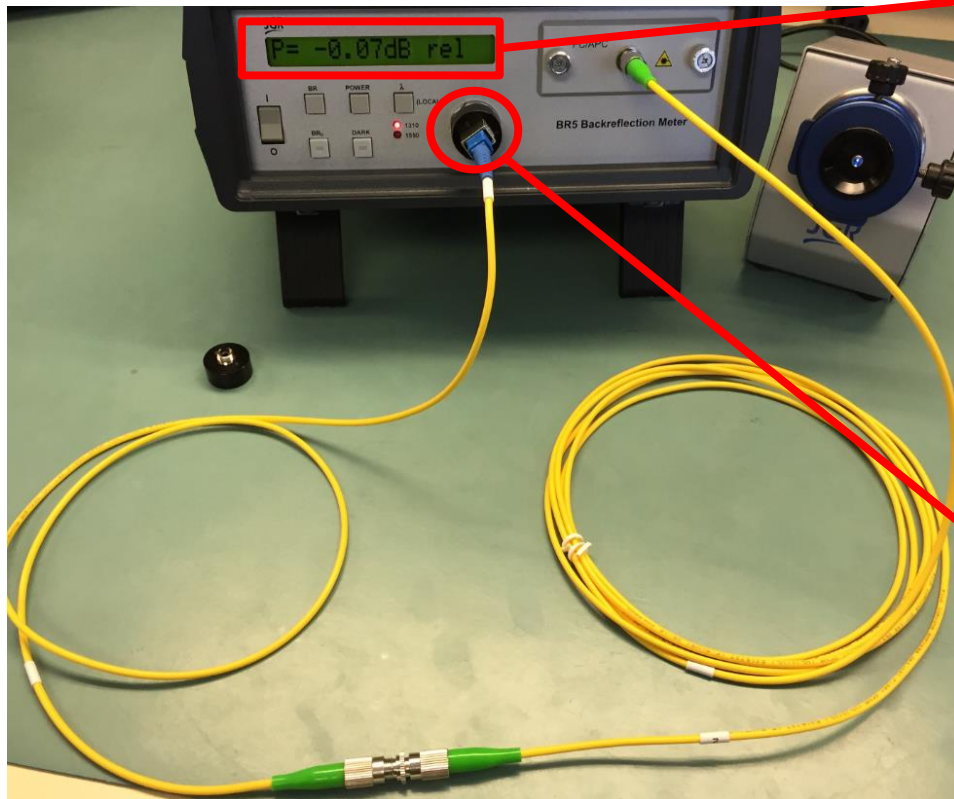
- A connection is made between the reference jumper and the DUT.
- The DUT is then connected to the Non-JGR detector adapter.
- This setup tests the IL of the FC/APC-FC/APC connection shown below.



# Detector Adapter Reflections

## Example: *False PASS*

- The IL on the meter in this example is 0.07dB which is a PASSING result.
- The operator is unaware that the Non-JGR adapter has 0.1dB of gain because of the highly reflective material used to manufacture it.
- The DUT *false PASSES* but without the 0.1dB of gain from the adapter the DUT should actually **FAIL**
- See the calculation below.



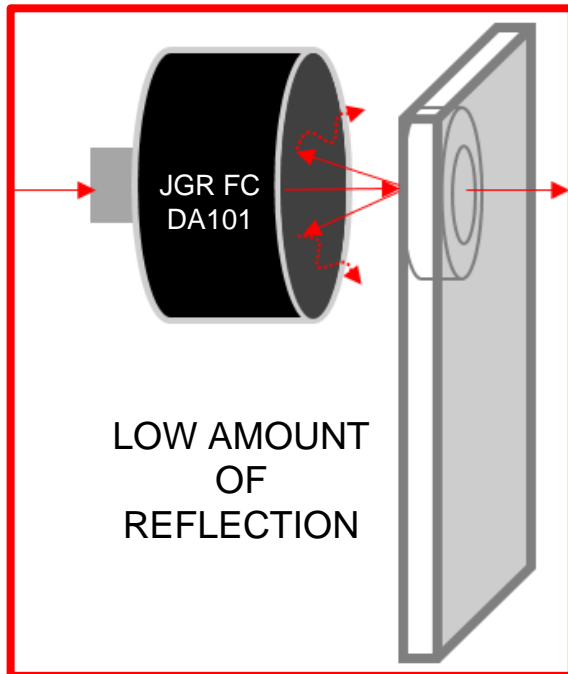


# Detector Adapter Reflections

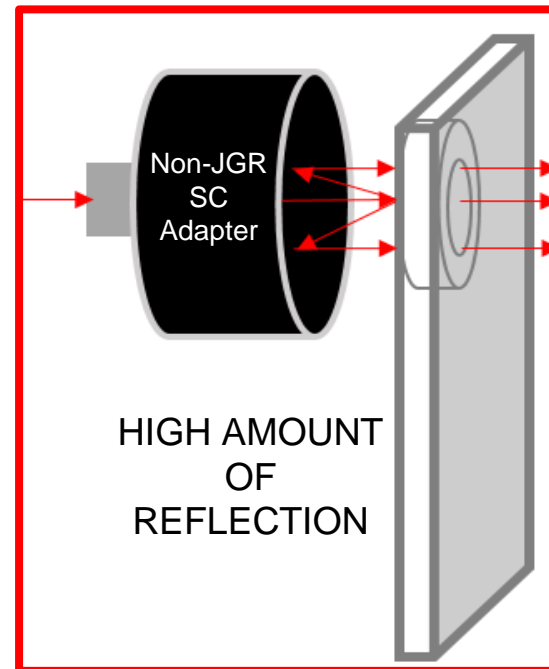
## Example: *False* PASS

- Due to the highly reflective material of the Non-JGR adapter, more light reflects internally and strikes the detector of the meter.
- This inconsistency in reflection adds gain during the measurement.
- This is why it is not advised to use a Non-JGR detector adapter during the measurement because these added reflections decrease the real IL resulting in a *false* PASS

Referenced with low reflections



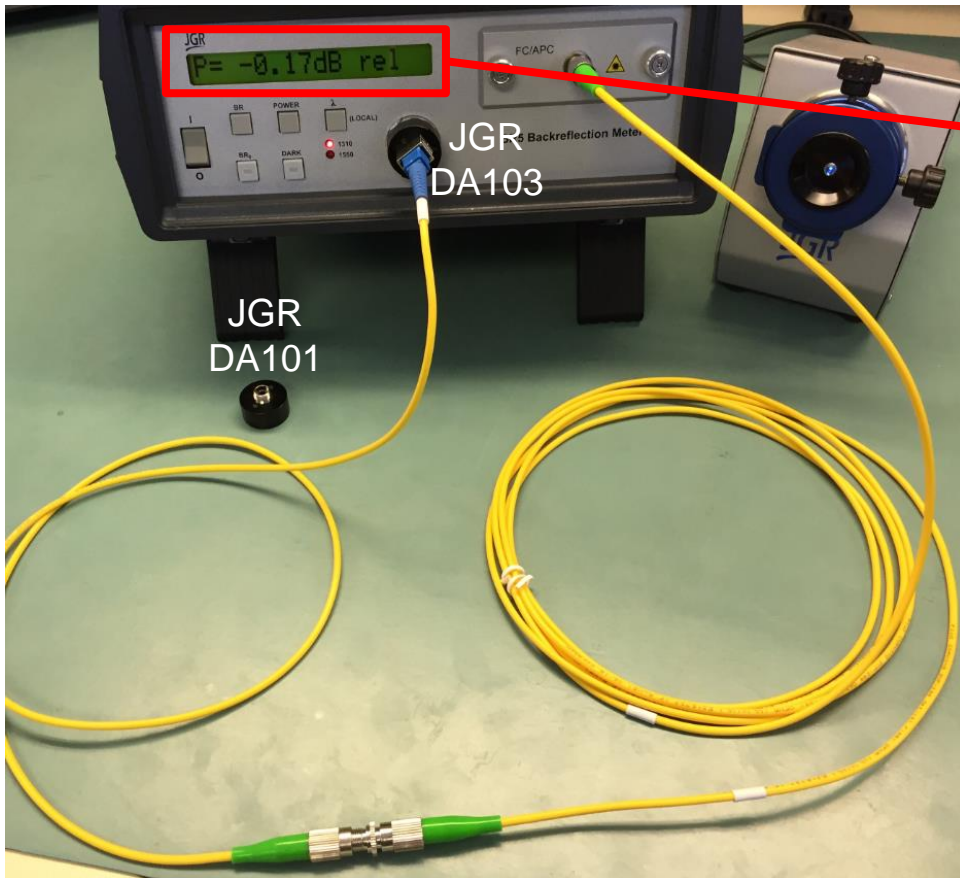
Measured with high reflections



# Detector Adapter Reflections

## Example: *False PASS*

- Using JGR adapters, it is possible to see that the DUT **FAILS** Staying consistent with JGR's detector adapters (using them for the reference and the measurement) will show the real IL of the connection. An example of the correct measurement is shown below.

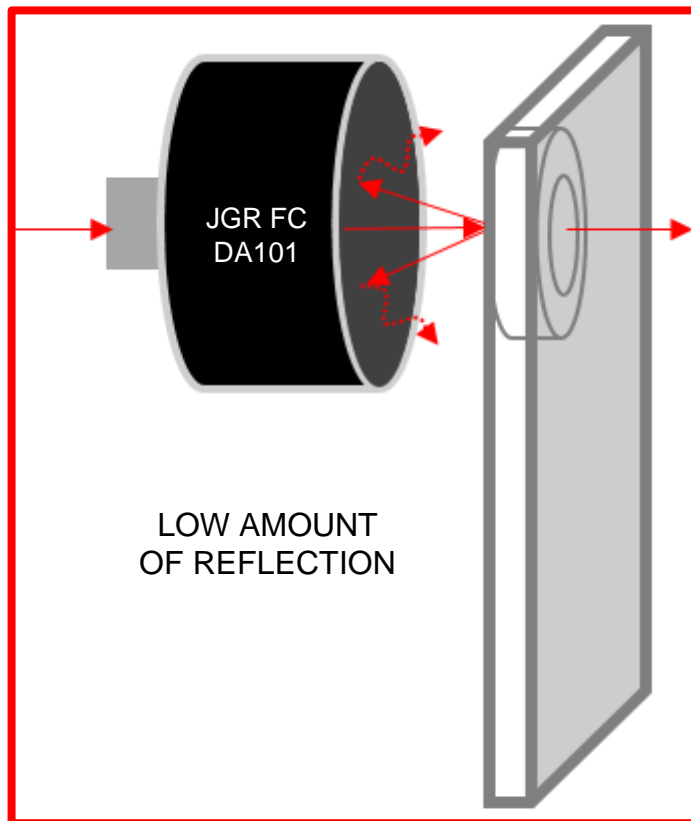


This shows that the DUT **FAILS** the testing.  
(IL is greater than 0.15dB)

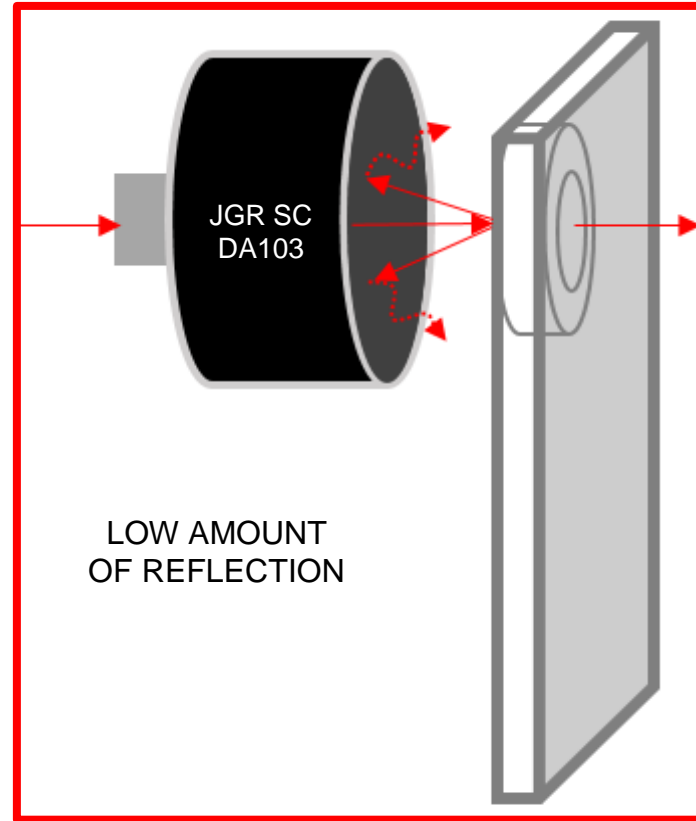
# Detector Adapter Reflections

- The below diagrams give a visual representation of why JGR's adapters are consistent.
- Since they are made with the same material, they all reflect the same amount of light so there is no influence on the measurement.

Referenced with low reflections



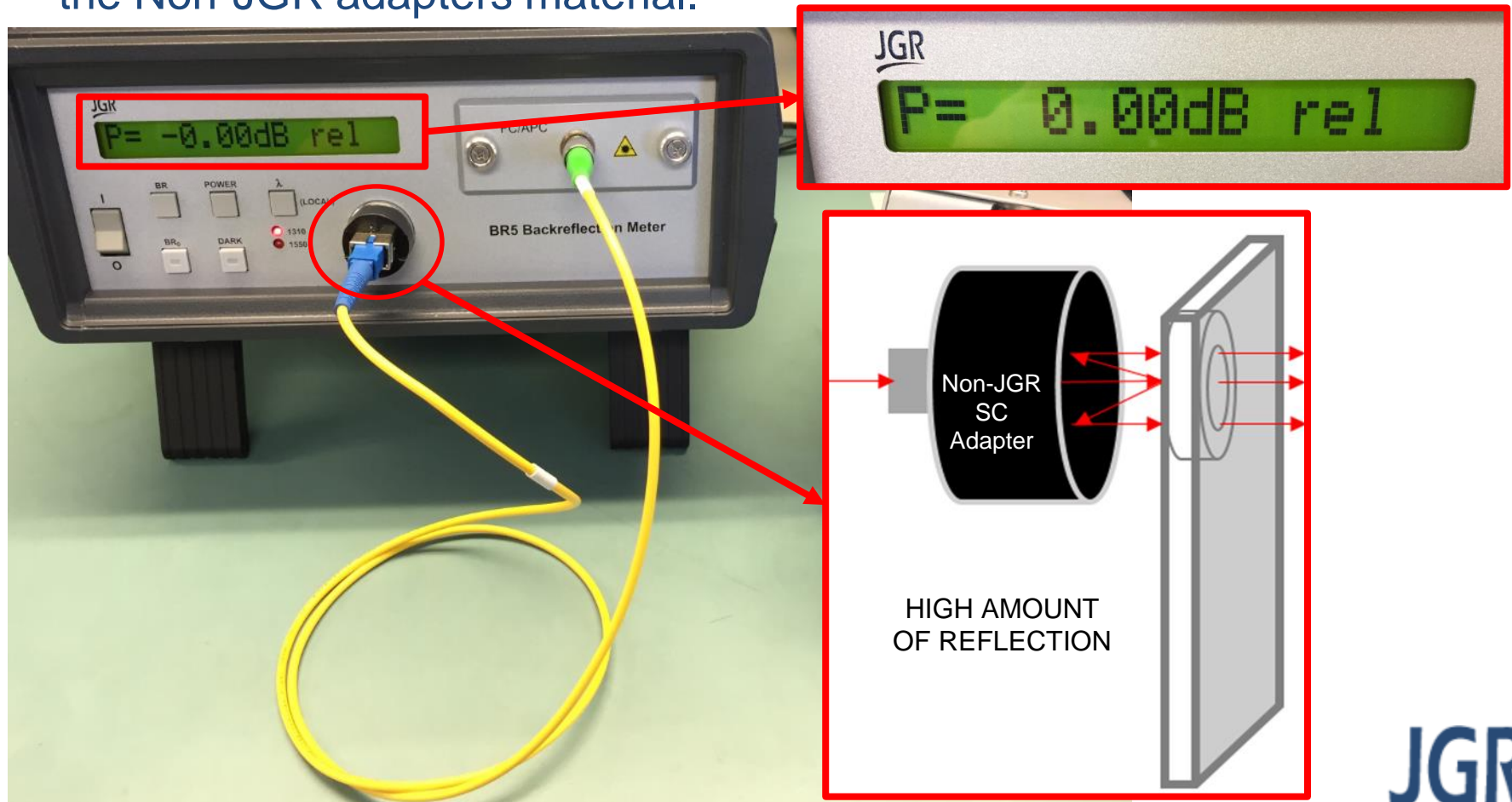
Measured with low reflections



# Detector Adapter Reflections

## Example: *False FAIL*

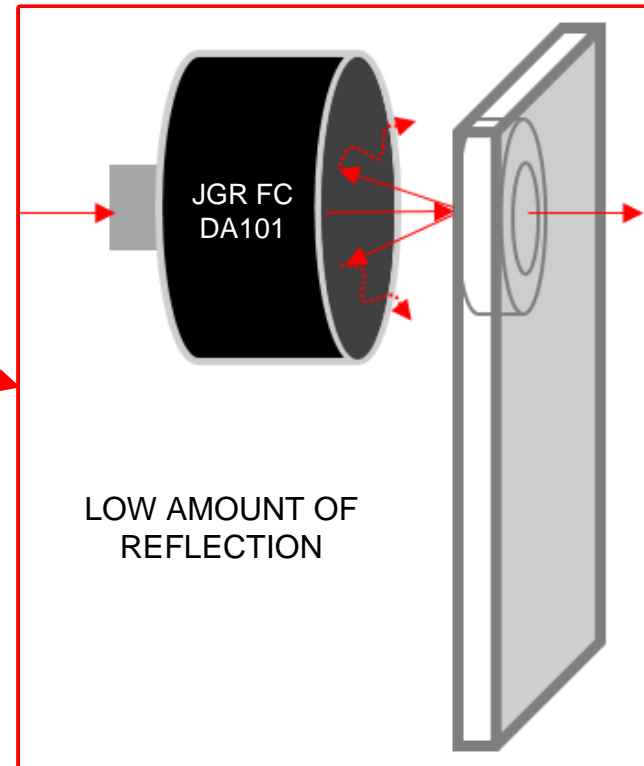
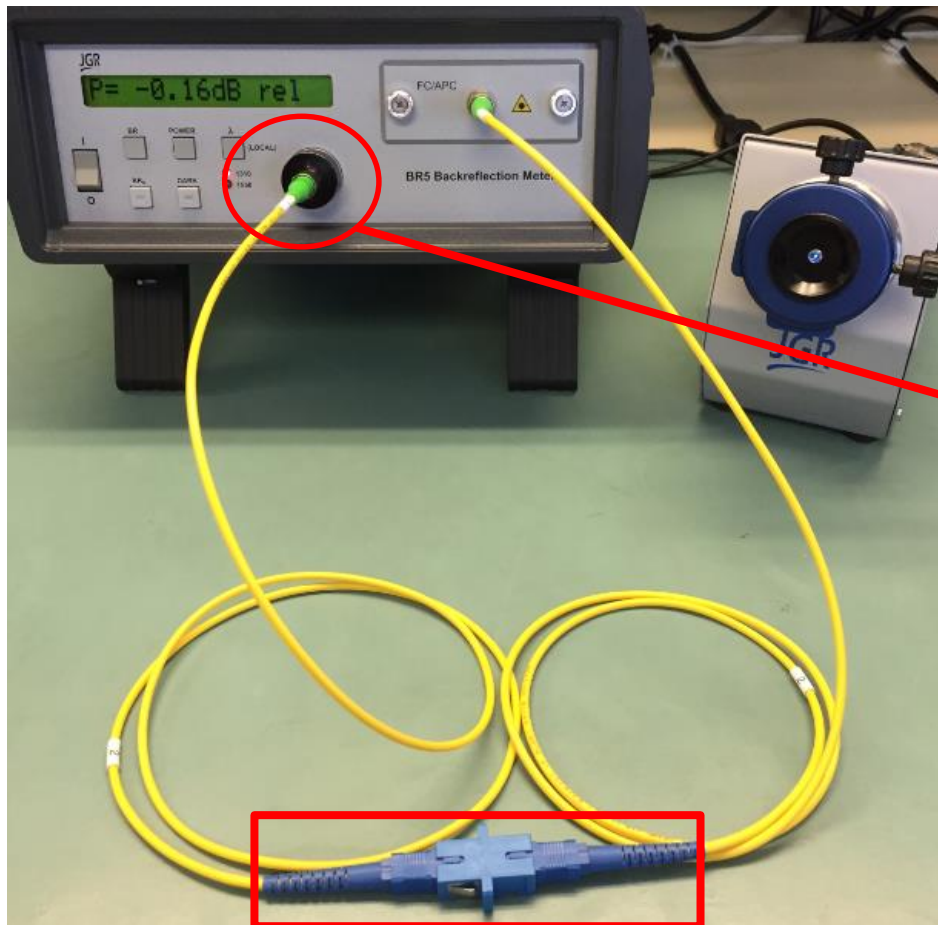
- A *false FAIL* case will now be explained.
- A reference is taken using the highly reflective Non-JGR adapter.
- 0.1dB of gain is unknowingly referenced out due to reflections from the Non-JGR adapters material.



# Detector Adapter Reflections

## Example: *False FAIL*

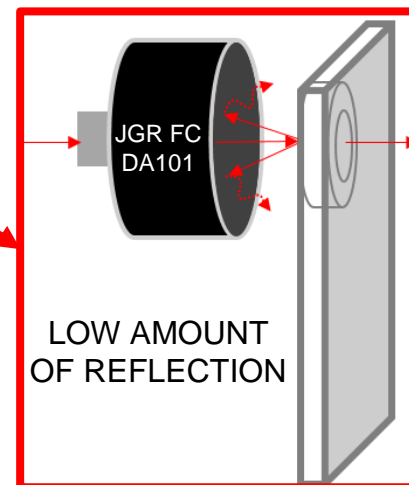
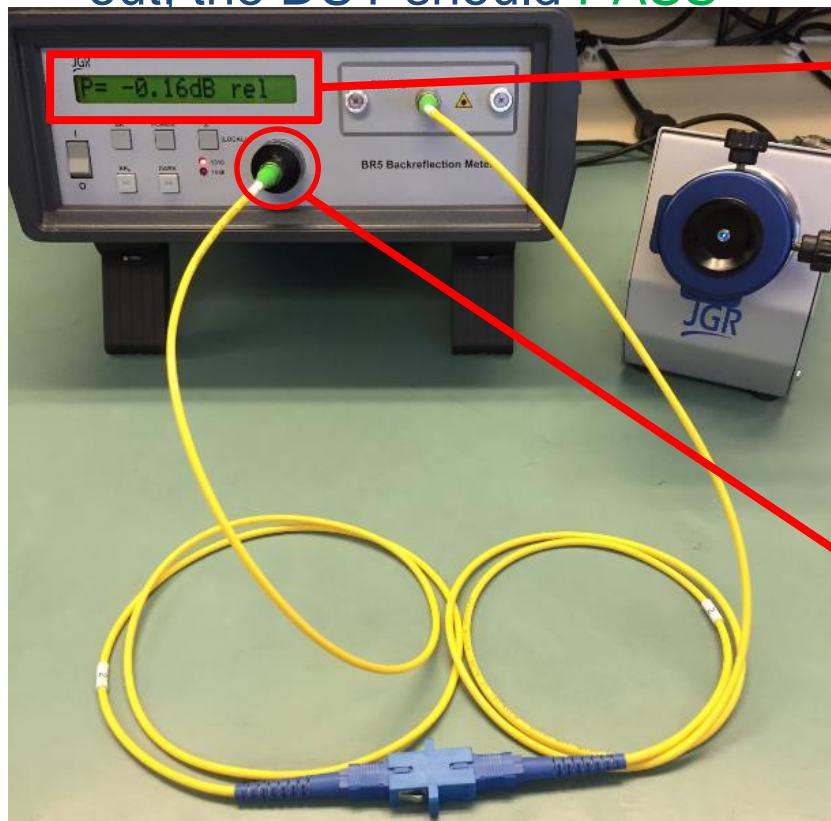
- A connection is made between the reference jumper and the DUT.
- The DUT is then connected to JGR's FC DA101.
- This setup will test the IL of the SC/UPC-SC/UPC connection shown below.



# Detector Adapter Reflections

## Example: *False FAIL*

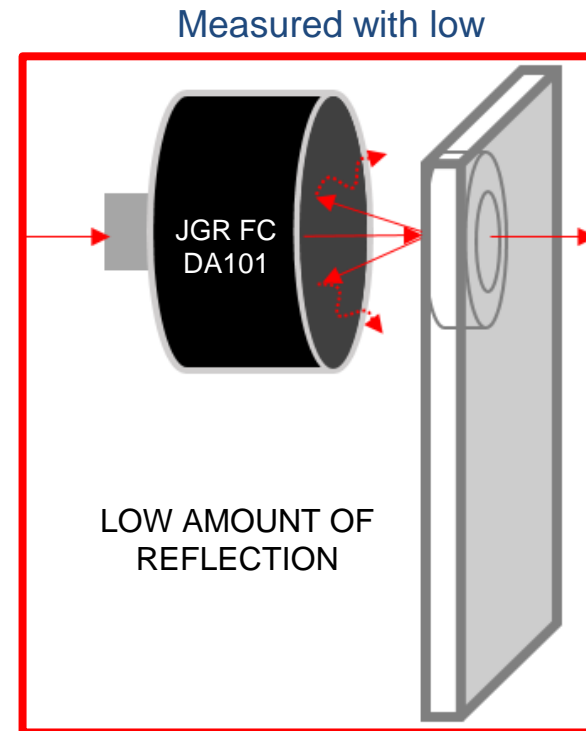
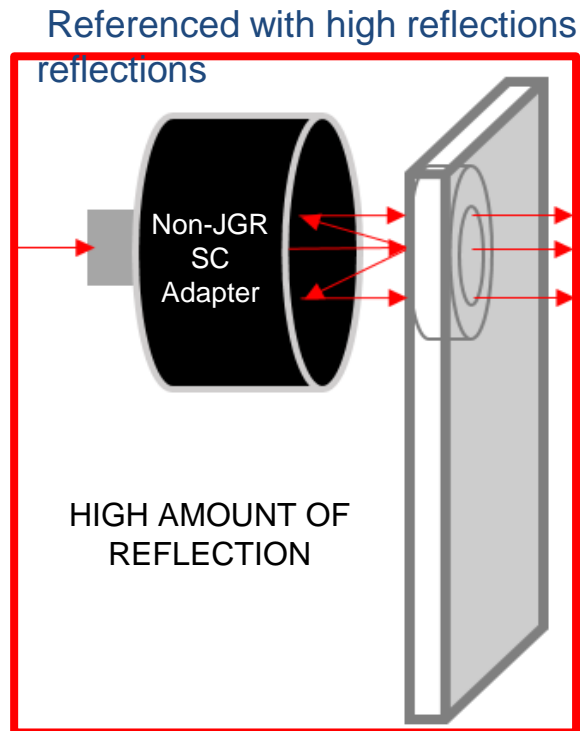
- The IL on the meter in this example is 0.16dB which is a **FAILING** result.
- The operator is unaware that due to the highly reflective material of the Non-JGR detector adapter, 0.1dB of gain was referenced out.
- The DUT *false FAILS*, because without the 0.1dB of gain referenced out, the DUT should **PASS**



# Detector Adapter Reflections

## Example: *False FAIL*

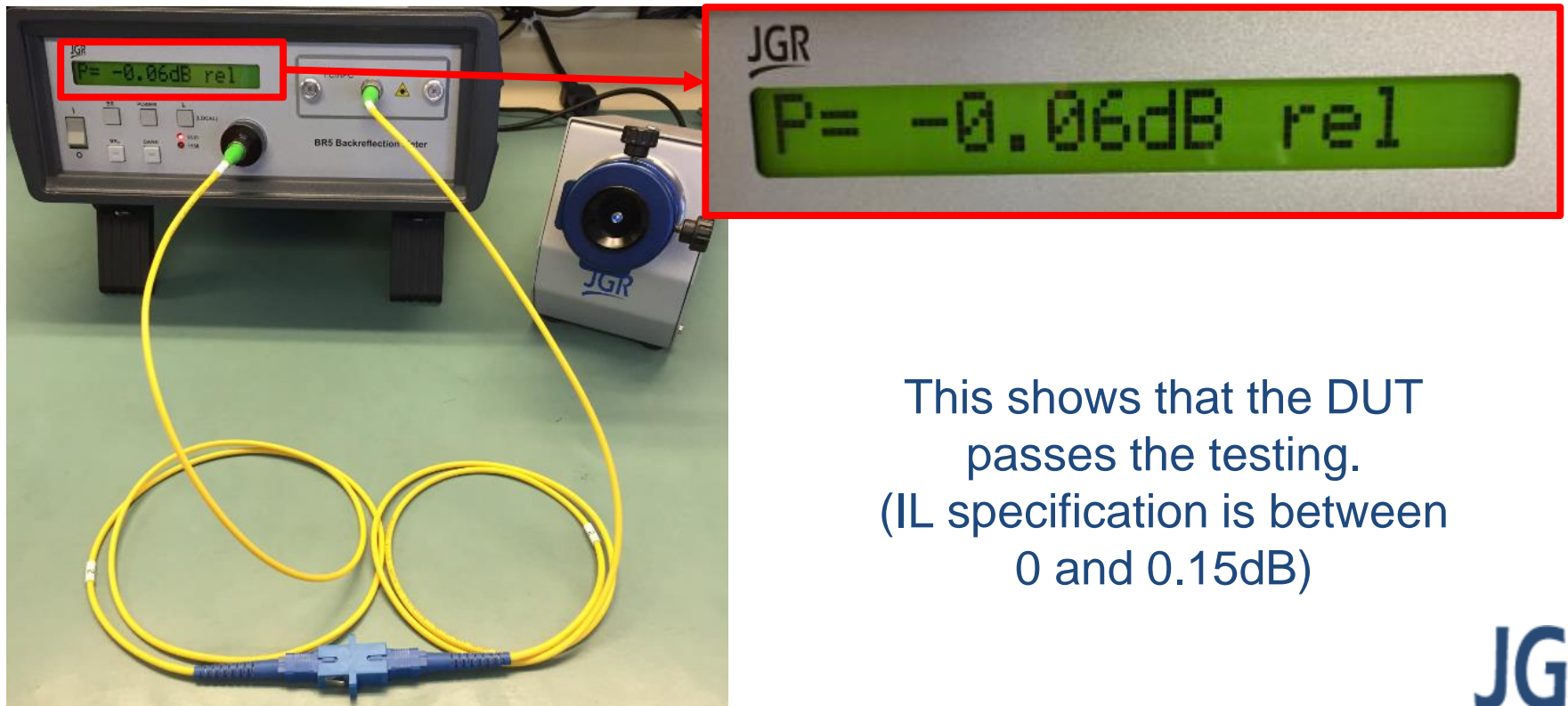
- Due to the highly reflective material of the Non-JGR adapter, more light reflects internally and strikes the detector.
- This inconsistency in reflection adds gain during the reference.
- When making the switch to the JGR adapter for the measurement, the reflections are reduced making the IL appear to increase resulting in a *false FAIL*



# Detector Adapter Reflections

## Example: *False FAIL*

- Using JGR adapters it is possible to see that the DUT **PASSES**
- Staying consistent with JGR's detector adapters (using them for the reference and the measurement) will show the real IL of the connection. An example of the correct measurement is shown below.



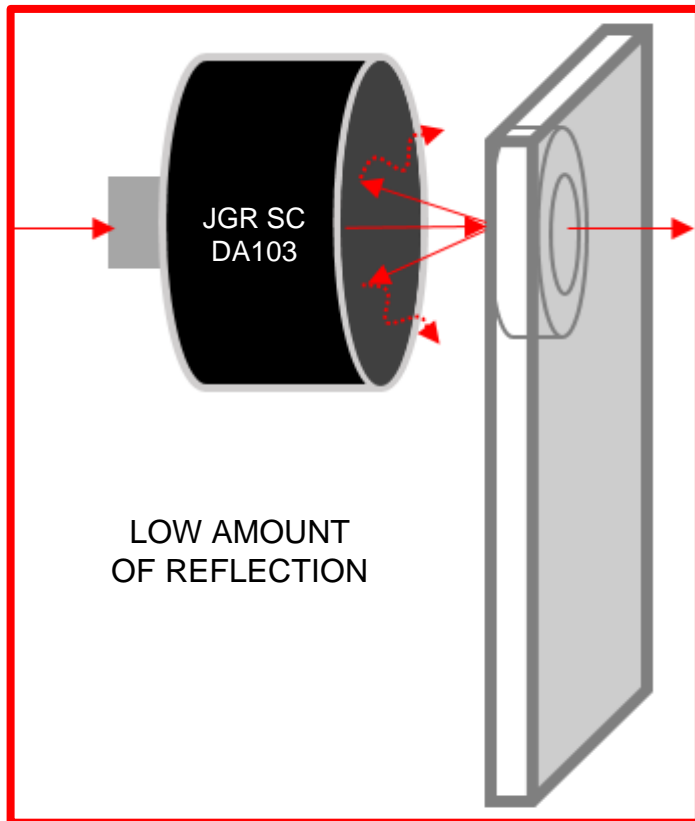
This shows that the DUT passes the testing.  
(IL specification is between 0 and 0.15dB)



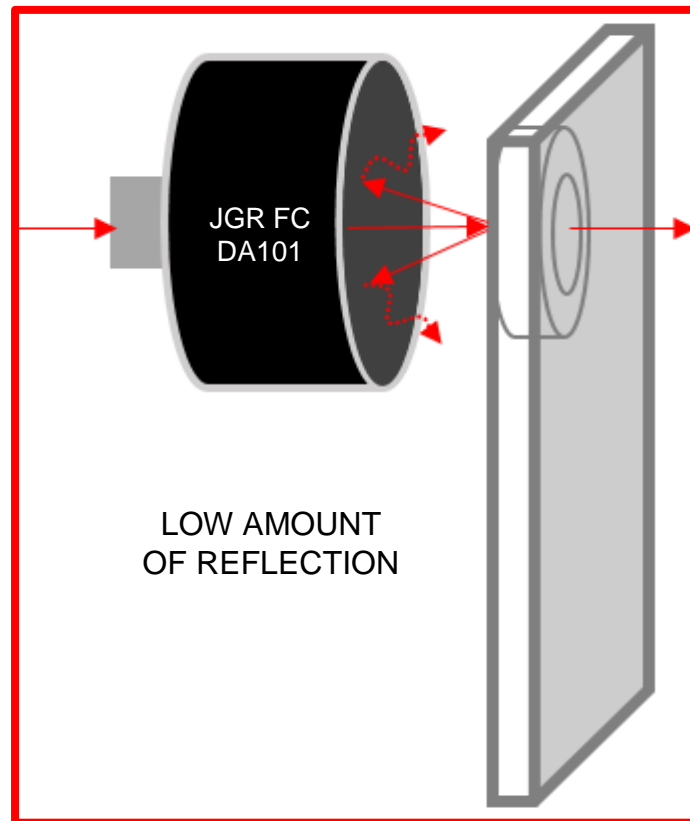
# Detector Adapter Reflections

- The below diagrams give a visual representation of why JGR's adapters are consistent.
- Since they are made with the same material, they all reflect the same amount of light so there is no variation from one to another.

Referenced with low reflections



Measured with low reflections



# Detector Adapter Reflections Summary

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- Using Non-JGR adapters during testing is not advised by JGR. The reflections are not controlled and can be unpredictable. This will cause unreliable, inaccurate and inconsistent IL test results.
- By using JGR's detector adapters throughout the test, customers can be confident in their measurements.
- Through engineering, design, and testing, JGR can ensure that their detector adapters will not have an impact on their IL measurements.
- Consistently using JGR detector adapters will make sure that you can trust your test results saving you time and money.