3M™ Near Infrared Transmission System (NITS)

Collimator (NITS-C)
Diffuser (NITS-D)
Reflector (NITS-R)

A system to allow biometric security in any LCD smartphone.

Product Description

3M Near Infrared Transmission System (NITS) allows near infrared camera sensors to detect and read fingerprint for quick and secure access into the phone.

The system has three components: collimator; diffuser; and reflector.

The new optimized ULS system provides 97% brightness or more, improved viewing angle, and equal thinness compared to the conventional LCD system.

System adapts to full screen or notch designs as well as providing under LCD sensor design with transmissions at 940 nm applicable for fingerprint biometric sensing.
Physical Characteristics

3M NITS Collimator (NITS-C) features:
- Diffuse coating on panel side
  - ~45% visible haze
  - ~65% 940 nm specular T
- Anti wet-out features on panel and backlight side
  - ~85 µm thickness
- 3M NITS-C reflects light that would otherwise be absorbed by the panel’s absorbing polarizer.
- Its design also provides polarized “collimation” allowing the removal of prism films that are difficult to image through.

3M NITS Diffuser (NITS-D) features:
- Diffuse coating on panel side
  - ~79% visible haze
  - ~58% 940 nm specular T
- Anti wet-out feature on backlight side
  - ~60 µm thickness
- 3M NITS-D utilizes 3M coating technology to optimize visible light scattering similar to conventional diffuser films and minimizes 940 nm scattering for exceptional imaging capability.

3M NITS Reflector (NITS-R) features:
- ~98% visible reflectivity
- ~83% 940 nm specular T
- Anti wet-out feature on panel side
  - ~85 µm thickness
- 3M NITS-R is specifically designed to reflect >98% of the backlight’s visible spectrum for optimal display brightness while transmitting approximately 80% of 940 nm light for imaging applications.

System Brightness Optimization

* All data based on 3M internal testing and estimation

![Graph showing system brightness optimization](image)

Power Consumption Increase
- LED Current: 20mA → 22mA
  - 6~8% higher brightness
- Optimized LED Length and Quantity
  - 5~11% higher brightness

No Power Consumption Increase
- Higher T% Panel
  - 5~20% higher brightness, depend on LCD makers
- Optimized LGP Thickness
  - 5~8% higher brightness
- Optimized LED Thickness
  - 6~8% higher brightness
Durability Performance to Environmental Conditions

The following environmental tests were conducted in the 3M laboratory under the conditions specified without any appreciable deterioration in optical quality.

<table>
<thead>
<tr>
<th>LGP Design</th>
<th>Display Visual Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 µm v-cut pitch</td>
<td>Good</td>
</tr>
<tr>
<td>60 µm v-cut pitch</td>
<td>Good</td>
</tr>
<tr>
<td>80 µm v-cut pitch</td>
<td>Good</td>
</tr>
<tr>
<td>120 µm v-cut pitch</td>
<td>Good</td>
</tr>
<tr>
<td>140 µm v-cut pitch</td>
<td>Good</td>
</tr>
</tbody>
</table>

Storage

- Avoid applying pressure or resting objects on the product to prevent marking, denting, or deforming the surface.
- Wear gloves to prevent fingerprints or nail marks when handling.
- Product needs to be unpacked and handled in a clean-room facility.
- Product must be protected from light exposure.
- Store in sealed, foil bag under -20°C to 30°C and less than 70% relative humidity. If removed from cold storage, ensure no condensation on packaging.

Regulatory

For regulatory information about this product, please contact your 3M representative.

Product Use

Many factors beyond 3M’s control and uniquely within the user’s knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for user’s method of application.

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