

PORSCHE

# Transparent Film Display [TLM] Presentation

APR, 2023

LED SOLUTION

[TLM : Transparent LED film Module]

# Introduction to TLM

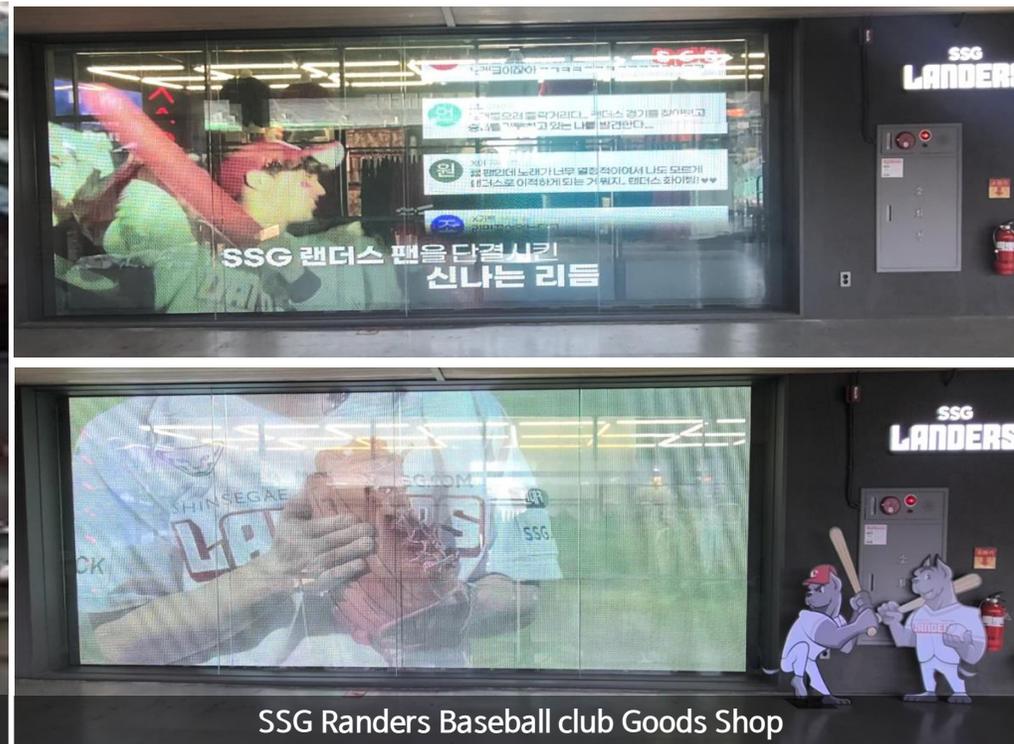
[TLM : Transparent LED film Module]

■ As the next generation digital signage, it can be attached to the surface of the glass for use.

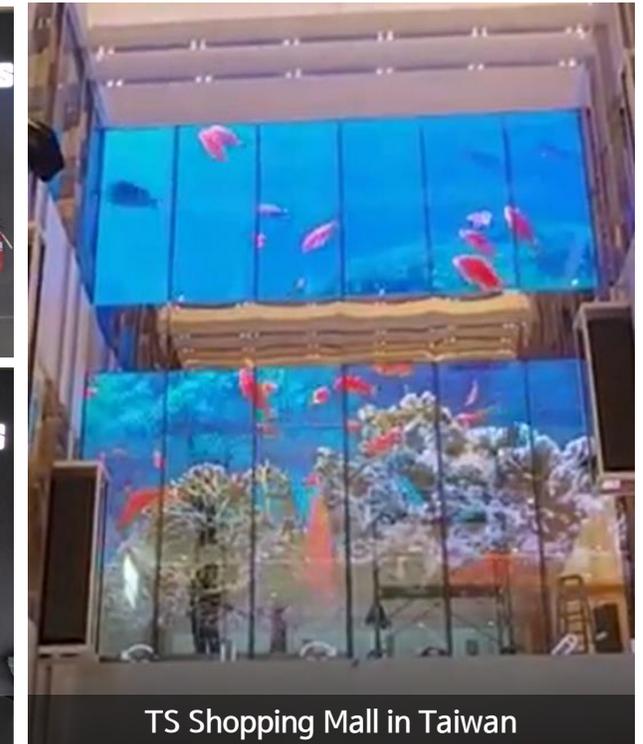
\* LED mounting on transparent film (PET) - Attach it to the inside of the glass to display video and images → Securing transparency makes a big difference from the electronic display



Lotte Center Hanoi Elevator



SSG Landers Baseball club Goods Shop



TS Shopping Mall in Taiwan

# TLM Competitiveness\_1

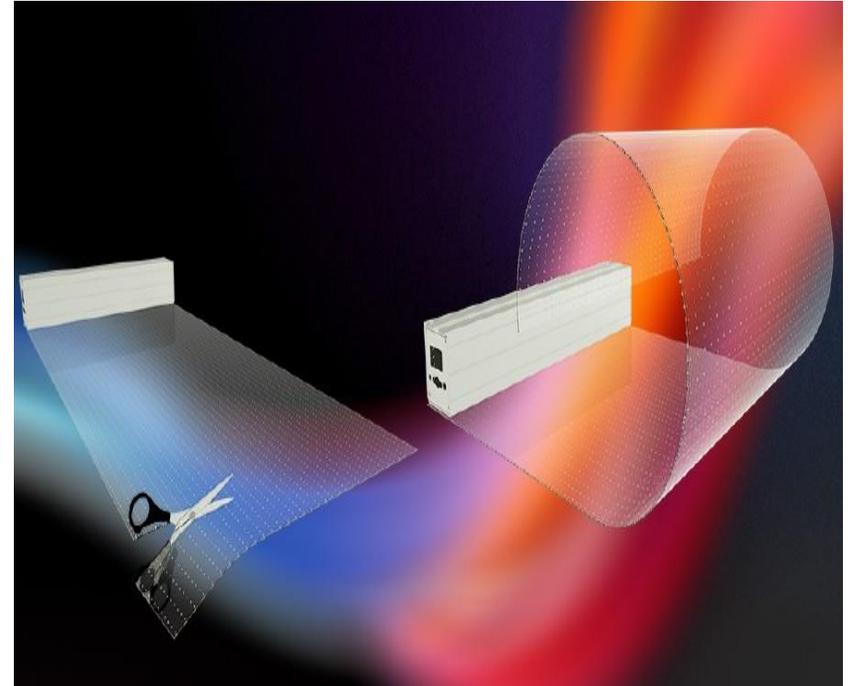
1. very thin and flexible



2. more transparent  
high definition



3. Infinite extension without  
bezel



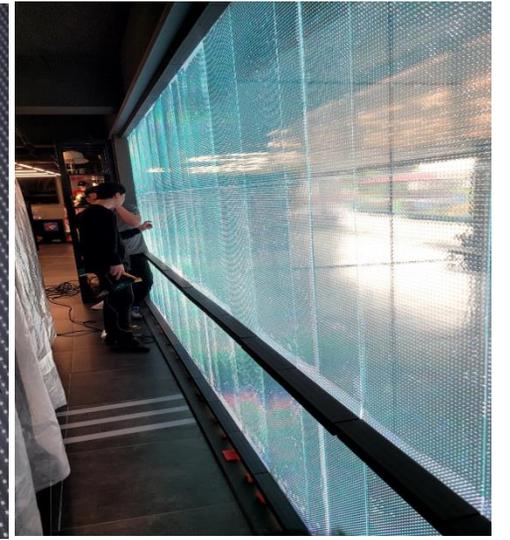
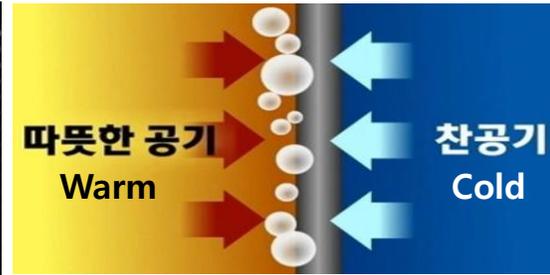
# TLM Competitiveness\_1

1. Very Thin and Flexible

2. More Transparent  
High Definition

3. LED fully molded,  
resistant to condensation  
and moisture

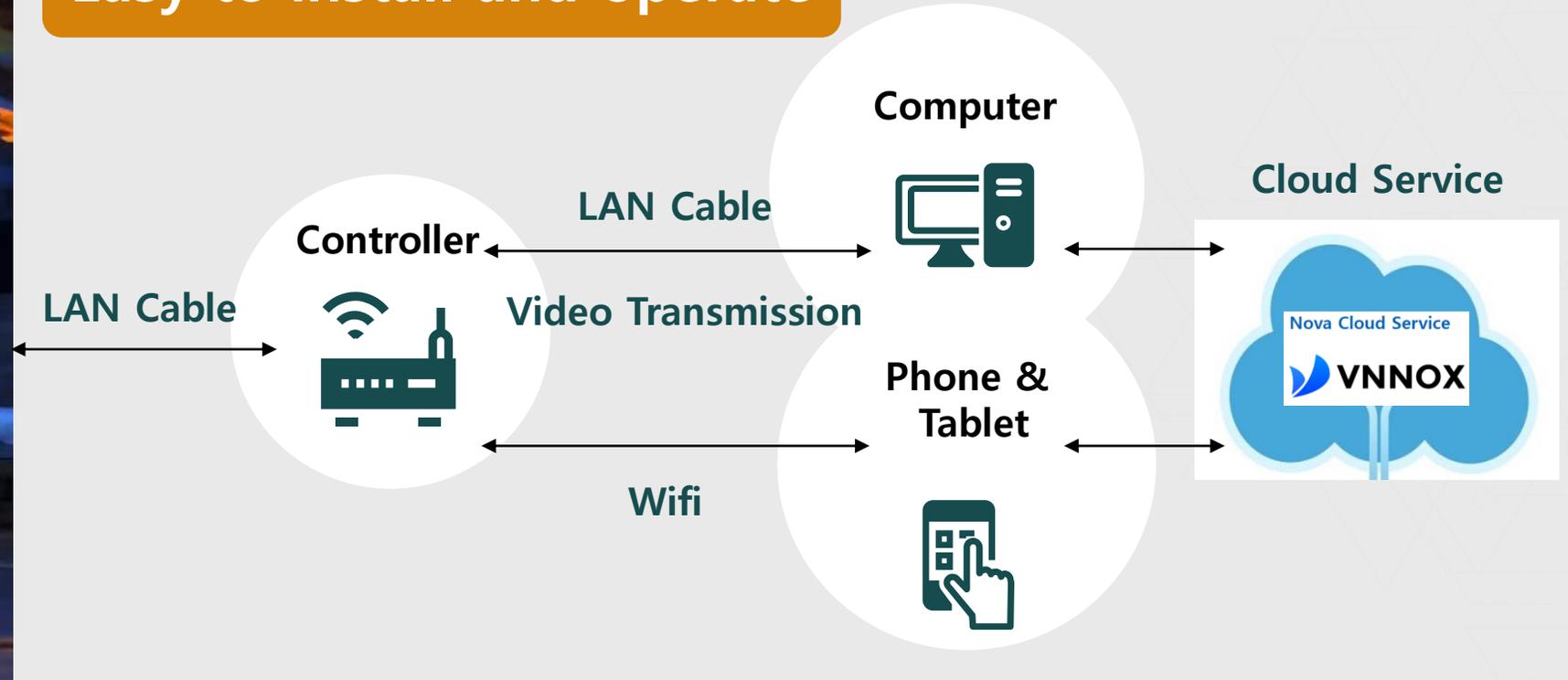
4. Cuttable and Extensible Installation



# TLM Competitiveness\_2



Easy to install and operate



# TLM Product Line Up [6~20mm Pitch]

Model	LS-TLM06	LS-TLM08	LS-TLM10	LS-TLM15	LS-TLM20
LED Pitch (mm)	P6	P8	P10	P15	P20
Film Max. Size (WxHxD)	384 x 900 x 2 mm	448 x 1000 x 2 mm	460 x 1000 x 2 mm	450 x 1005 x 2 mm	440 x 1000 x 2 mm
No. of LED (Pixel) / Film	8,768	7,000	4,600	2,010	1,100
Array of LEDs (row x column) / Film	64 x 137	56 x 125	46 x 100	30 x 67	22 X 50
No. of LEDs (Pixel) / m <sup>2</sup>	27,777	15,625	10,000	4,440	2,500
Brightness (cd/m <sup>2</sup> )	> 4,000	> 4,000	> 4,000	> 4,000	> 4,000
LED	IC Built in RGB 4 in 1	IC Built in RGB 4 in 1	IC Built in RGB 4in 1	IC Built in RGB 4 in 1	IC Built in RGB 4 in 1
Power (Max.) / Film	175W	150W	100W	45W	30W
Power (Max.) / m <sup>2</sup>	560W	340W	220W	100W	70W
Film Module Weight / m <sup>2</sup>	6.5Kg (with SMPS, SCU, DRIVER)	7.2Kg (with SMPS, SCU, DRIVER)			
Transparncy	> 85%	> 90%	> 90%	> 95%	> 95%
Film Attachment Method	Special Resin				
Driving Temperature	-20°C~+60°C	-20°C~+60°C	-10°C~+60°C	-10°C~+60°C	-10°C~+60°C
Stroage Temperature	-20°C~+85°C	-20°C~+85°C	-20°C~+85°C	-20°C~+85°C	-20°C~+85°C
Driving Humidity	10~90% relative humidity	10~90% humidity	10~90% humidity	10~90% humidity	10~90% humidity
Storage Humidity	5~95% humidity	5~95% humidity	5~95% humidity	5~95% humidity	5~95% humidity

# Installation Reference [P6]

## Bukchon Cafe 'Shining Space'

Item	Detail
TLM	6mm Pitch
Optimum Distance	Around 3M (close-distance)
Installation Size	H 1.8 x W 2.7 M
Driving time	24 Hours
Brightness	>6000cd/m <sup>2</sup>
Power consumption (Max.)	About 175W/m <sup>2</sup>
Etc.	Installed in 2023

\* Click on the image and play it with the bottom play button

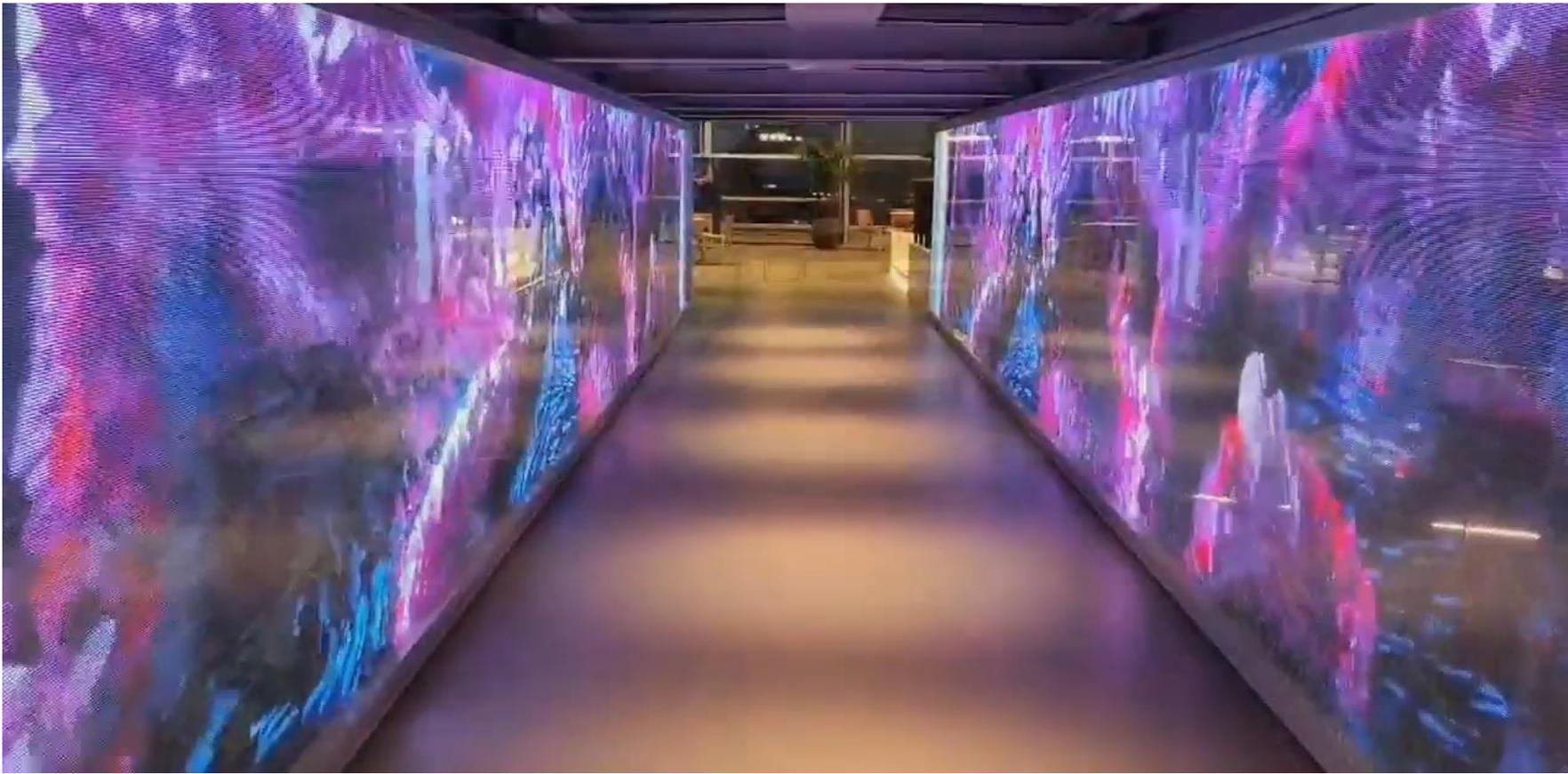


# Installation Reference [P6]

## Jongno Tower Building

Item	Detail
TLM	6mm Pitch
Optimum Distance	Around 2M (close-distance)
Installation Size	H 2.0 x W 13 M (1 side)
Driving time	18 Hours
Brightness	>6000cd/m <sup>2</sup>
Power consumption (Max.)	About 175W/m <sup>2</sup>
Etc.	Installed in 2023

\* Click on the image and play it with the bottom play button

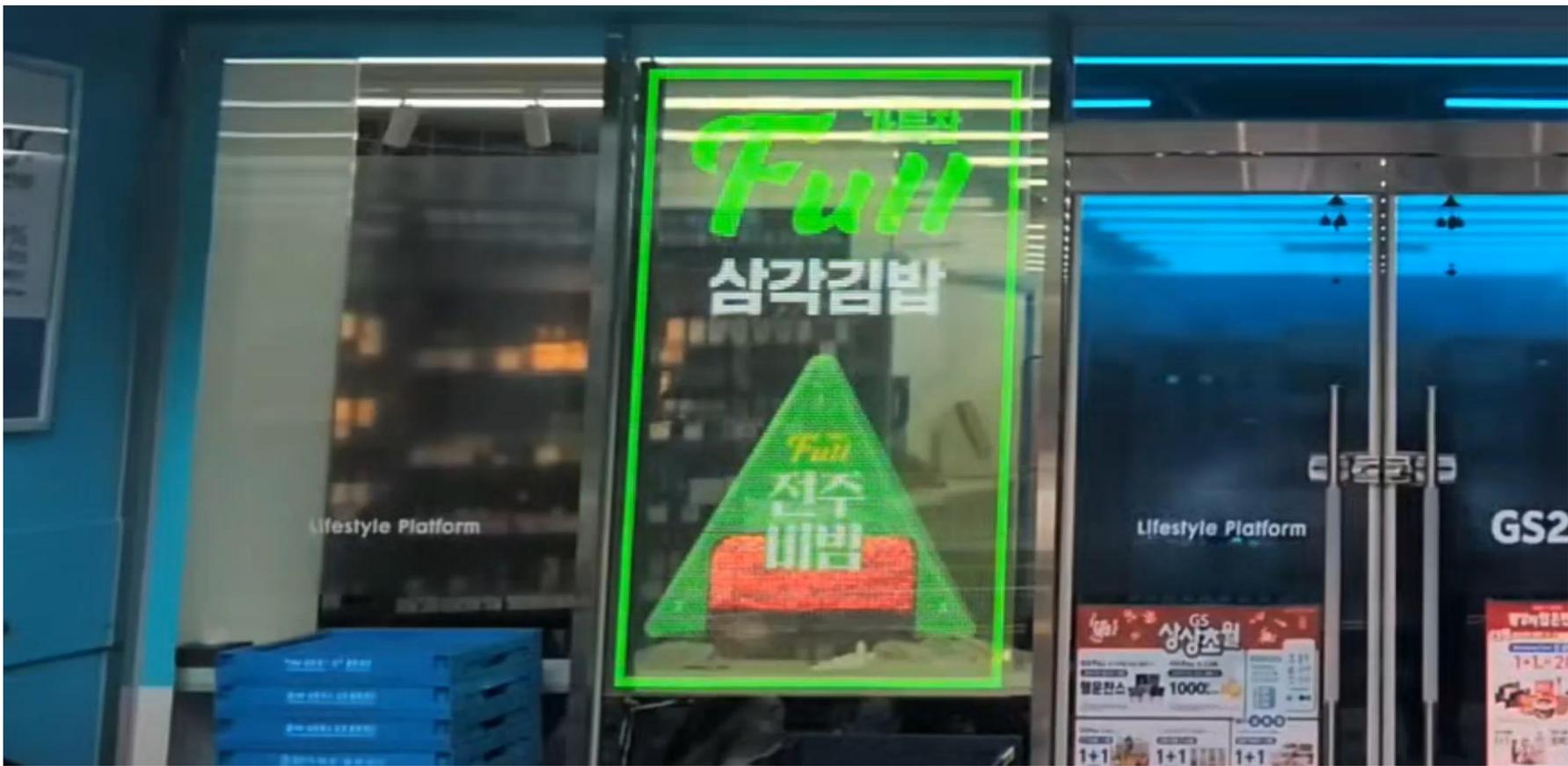


# Installation Reference [P8]

## GS25 Convenience Store

Item	Detail
TLM	8mm Pitch
Optimum Distance	Around 3M (close-distance)
Installation Size	H 1.6 x W 1.0 m
Driving time	24시간
Brightness	> 5000cd/m <sup>2</sup>
Power consumption (Max.)	340W/m <sup>2</sup>
Etc.	Installed in 2022

\* Click on the image and play it with the bottom play button



# Installation Reference [P30]

## SSG Landers Goods Shop

Item	내용
TLM	10mm Pitch
Optimum Distance	Around 5M (close-distance)
Installation Size	H 2.4 x W 6 m
Driving time	About 7 Hours (On a day of game)
Brightness	>4000cd/m <sup>2</sup>
Power consumption (Max.)	220W/m <sup>2</sup>
Etc.	Installed in 2022

\* Click on the image and play it with the bottom play button



# Installation Reference [P10]

## Yeoncheon Media Wall

Item	Detail
TLM	10mm Pitch
Optimum Distance	Around 5M (근거리)
Installation Size	H 2.4 x W 12 m
Driving time	05:00 ~ 23:00
Brightness	>4000cd/m <sup>2</sup>
Power consumption (Max.)	220W/m <sup>2</sup>
Etc.	Installed in 2022

\* Click on the image and play it with the bottom play button



# Installation Reference [P20]

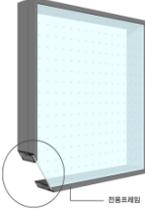
## Lotte Center Hanoi in Vietnam

Item	Detail
TLM	6mm Pitch
Optimum Distance	Around 10M (close-distance)
Installation Size	Lotte : H 6 x W 14 m (4 sides)
Driving time	18:00~23:00
Brightness	>4000cd/m <sup>2</sup>
Power consumption (Max.)	100W/m <sup>2</sup>
Etc.	Lotte: Installed in 2021

\* Click on the image and play it with the bottom play button



# Comparison

	Electronic Display	Glass Integral Type	TLM (Transparent LED film Module)
Image			
Usage Scale	Small	Large	Medium & Large
Module Size	Standard	Standard	Standard / Custom
Resolution(LED Pitch)	High (1.5~10mm)	Low (20~40mm) *Difficult to express in short distance, small area	High (6~30mm) *Selectable according to Installation environment
Transparency	None	95% (20mm pitch)	90% (10mm pitch)
Installation	Complex (Steel Structure)	Difficult (Glass+Frame Full Replacement)	Easy (Film Attached)
Defective Phenomenon	Serial connected LEDs all not illuminated	Serial connected LEDs all not illuminated	Only 1 LED not illuminated (Bypass Circuit Applied)
Maintenance	Easy (Replacing Only that Module)	Difficult (Glass+Frame Full Replacement)	Easy (Replacing Only that Film)
Installable Environment	Only when newly constructed (or remodeled)	Only when newly constructed (or remodeled)	No restrictions
Curved Surface	Partially possible	Impossible	Possible
Waranty	1 Year	2 Years	2 Years

# TLM Material & Installation Method

## TLM

[ LED Driver Board+ Sub-Controller ]

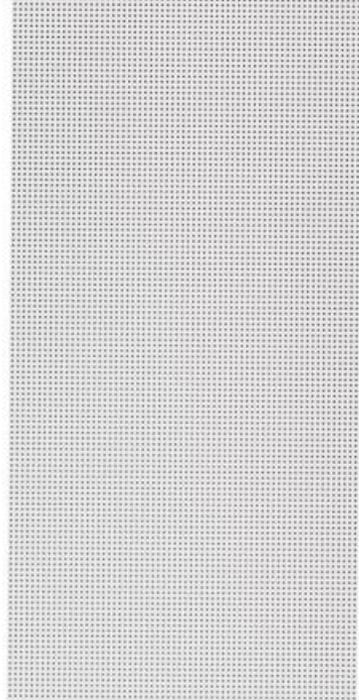


[ AI Housing, All-in-One SMPS ]



[ Main-Controller ]

[ LED Film ]



## Installation Methode



- Attach the film to the inner side of the glass (special resin)  
: **Apply soapy water to the glass and attach it easily**
  - Assemble the aluminum housing on the sub-controller mounted on the back of the LED film. (SMPS is attached to the housing cover)  
→ **Film+Driver, Power All-in-One System**
  - Connect the data cable and power cable. (Data cable: UTP)
  - Assemble the aluminum housing cover
  - Connect the main controller and TLM with a UTP cable.
  - Connect the main controller and PC using HDMI and USB ports.
- \* The type and amount of main controller are determined by the construction area.

# TLM Installation Process

## 1. Glass installation completed



## 3. Cleaning the Glass Surface



## 2. Material preparation: TLM, Aluminum housing, SMPS, Cable leading-in duct, etc



## \* TLM module (packed individually in styrofoam tray)



# TLM Installation Process

## 4. Attaching the first TLM sheet

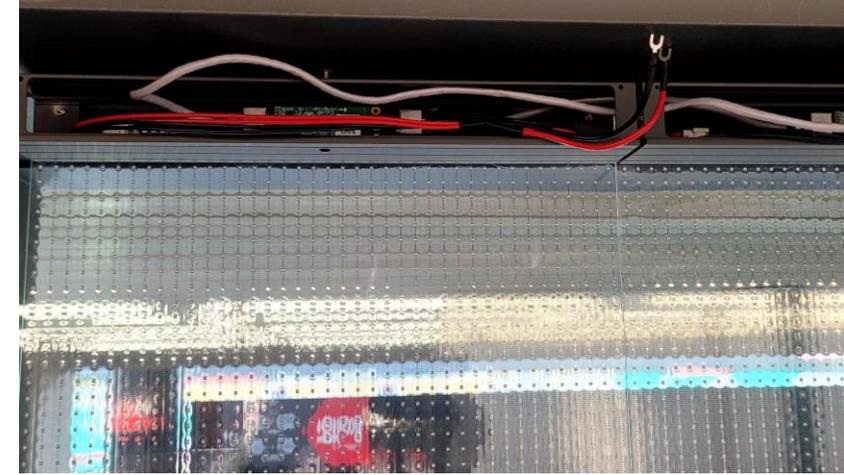


## 5. Attach the TLM sequentially from the top of the glass (in the order of top, middle, and bottom)



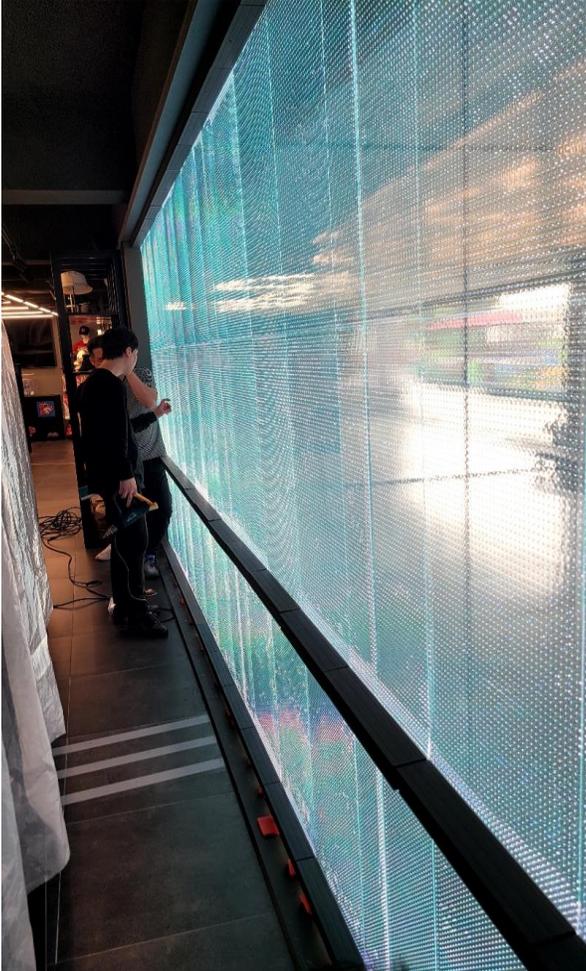
# TLM Installation Process

## 6. Power cable connection – Communication wire (UTP) connection - Aluminum housing (including SMPS) assembly and communication wire to main controller



# TLM Installation Process

## 7. Complete indoor and outdoor installation after TEST



# CONTENTS PROPOSAL



**LED SOLUTION**

# Contents Solution

- Have a variety of image/video content by theme
- Ease of content selection
- Affordable Costs and Operations
  - Reasonable monthly content usage fees
  - Provide real-time content operation and management measures if necessary (On-Line service)



# Contents Solution

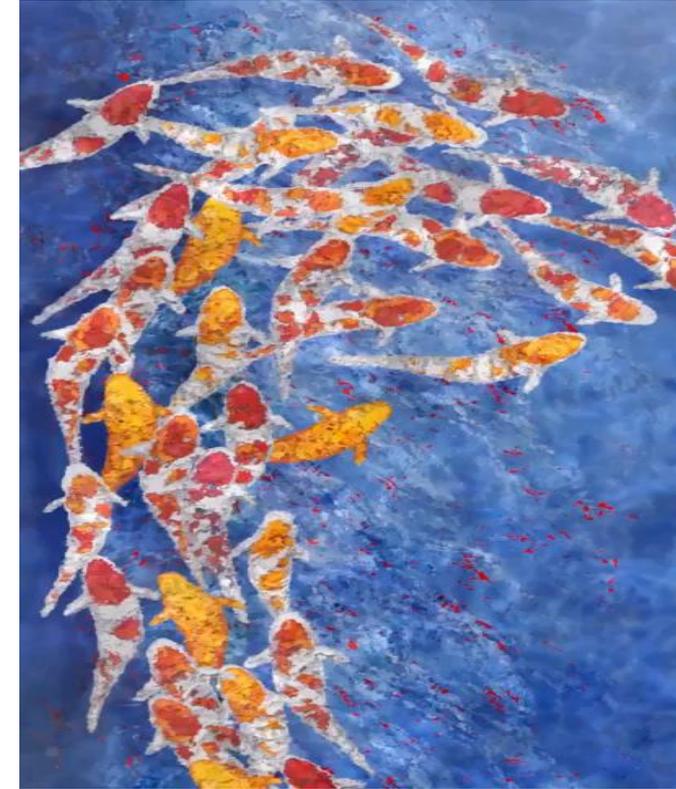
## 4 Seasons



## Traditional



## Work by professional photographer



## Engineering



과학 3 버전 2

과학 7 버전 2

## Geometric



노랑 빨강 파랑: 파트 1

노랑 빨강 파랑: 파트 6

## Mobility



과학 11 버전 2



뉴턴 구슬 (카메라 모션)



구성 VIII: 파트 6



구성 VIII: 파트 5



A variety of high-quality video content produced by professional photographers is provided at a reasonable cost

# Thank You !



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