

2002-04-23, AGS/Tokyo

An Introduction to the future High Density Optical Disc technologies

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User Requirement for High Density Optical Disc

- **To be able to record more than two hours the digital high vision broadcasting data**
- **Low cost and removable media**

Comparison of Next Age Recordable Optical Disc

Manufacturer	Capacity	Data transfer rate	Wave length	NA	Thickness of cover	Track structure	Track pitch	Min. Mark length	Modulation	Feature	
Sharp, Sony, TDK	23GB	35Mbps	405nm	0.85	0.1mm	Land & groove	0.30um	0.173um	(1,7)	Demonstrated real time recording	CEATEC2001(2001-10)
Pioneer	23.3GB	35Mbps	405nm	0.85	0.1mm	groove	0.32um	0.16um	(1,7)		CEATEC2001
Panasonic	25GB/single 50GB/double	33Mbps	405nm	0.85	0.1mm	groove	0.32um	0.185um	D8-15	50GB disc is double layer	CEATEC2001
Hitachi	20(-25)GB /single, 40(-50)GB /double	>33Mbps	405nm	0.85	0.1mm	groove	0.35um	0.20um	8-16		CEATEC2001
Toshiba	30GB	NA	405nm	NA	0.1mm	Land & groove	NA	NA	NA	PRML&UDF	CES2002 (2002-01)

Note 1: 50GB of Panasonic is approximately.

Note 2: Recording is approximately 150 min. when average transfer rate is 20 to 25Mbps.

Note 3: Maximum transfer rate of TDK recording media reached to 100Mbps



Sony



Pioneer



Panasonic



Hitachi



Toshiba

Blu-ray Disc Specification

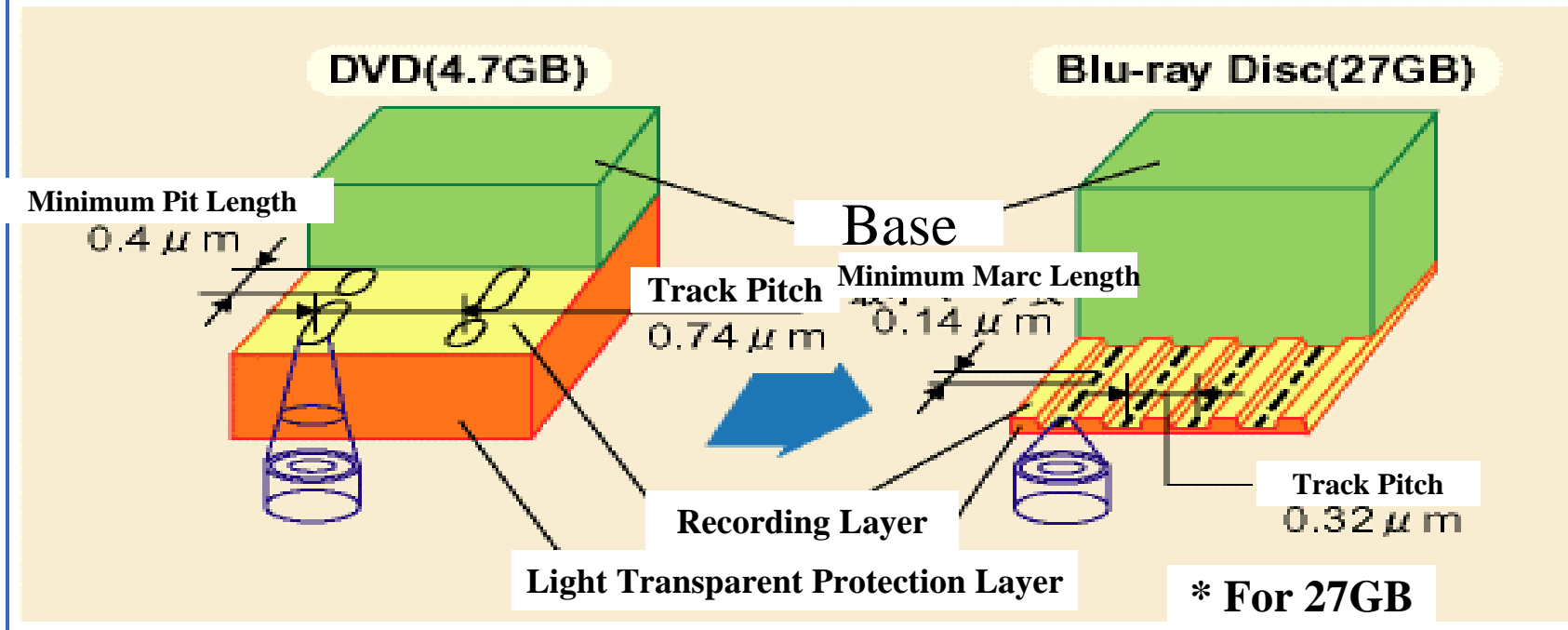
Format	Blu-ray Disc
Recording Capacity	23.3/25/27 G Byte
Laser Wavelength	405 nm (blue violet laser)
Lens Aperture	0.85
Data transfer Rate	36Mbps
Disc Diameter	120 mm
Disc Thickness	1.2 mm(Protection Layer: 0.1mm)
Recording method	Phase Shift recording
Track	Groove recording
Video Recording Format	MPEG2
Audio Recording Format	AC3 , MPEG1 Layer2 , etc
Video Audio multiplication	MPEG2 Transport stream



Member : Hitachi Ltd., LG Electronics Inc., Matsushita, Electric Industrial Co., Ltd., Pioneer Corp., Royal Philips Electronics, Samsung, Electronics Co. Ltd., Sharp Corp., Sony Corp. and Thomson Multimedia

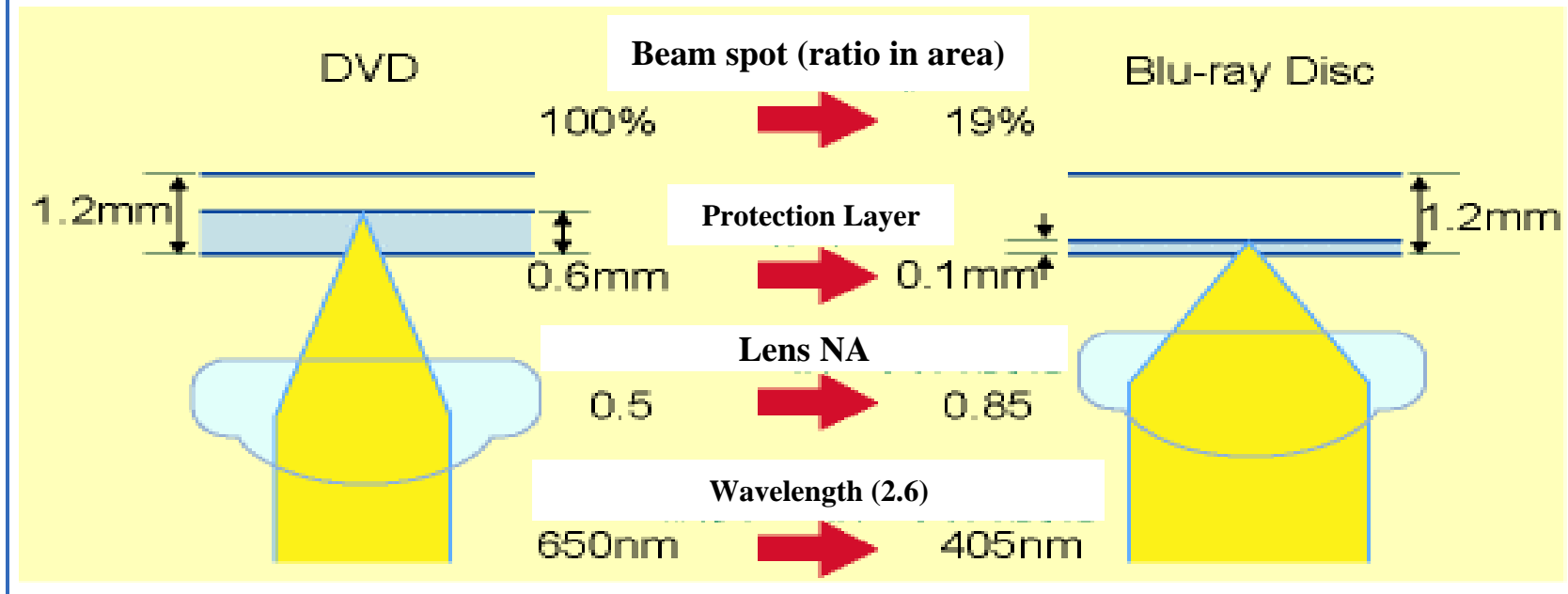
High Densitification

Narrower track pitch and shorter marc length enabled about 5 times higher density compared to that of DVD



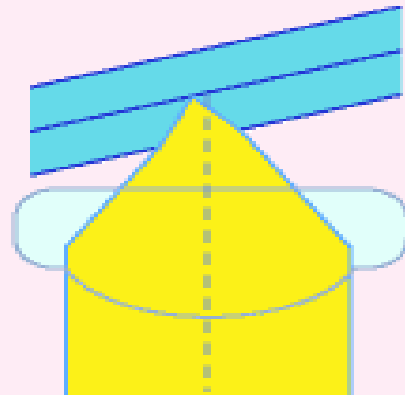
Technology for High Densitification

High NA lens (0.85), short wave length laser (405nm) enabled about factor 5 smaller beam spot in area compared to DVD

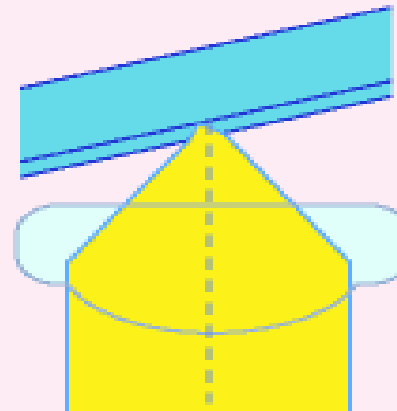


Why 0.1mm protection layer?

Thin protection layer of 0.1mm enabled to keep the almost same level in slope as DVD even for high NA lens such as 0.85.



Protection layer thickness 0.6 mm
NA0.85



Protection layer thickness 0.1 mm
NA0.85

Features of Logical Format

- 1. High affinity with Digital Broadcast data**
MPEG-2 transport stream recording method enables direct recording on digital broadcasting data including HDTV.
- 2. Data structure suitable for disc recording**
Logical data structure with random access capability enables easiness of search, simple editing function, replay of the play list.
- 3. File system suitable for HDTV real time recording**
File system is compatible with high bit rate record and play of HDTV and maximum effective use of disc space.