

RW

DVD+ReWritable

OSS 2004

DVD+RW Alliance



Excellent Compatibility of DVD+R/+RW Format

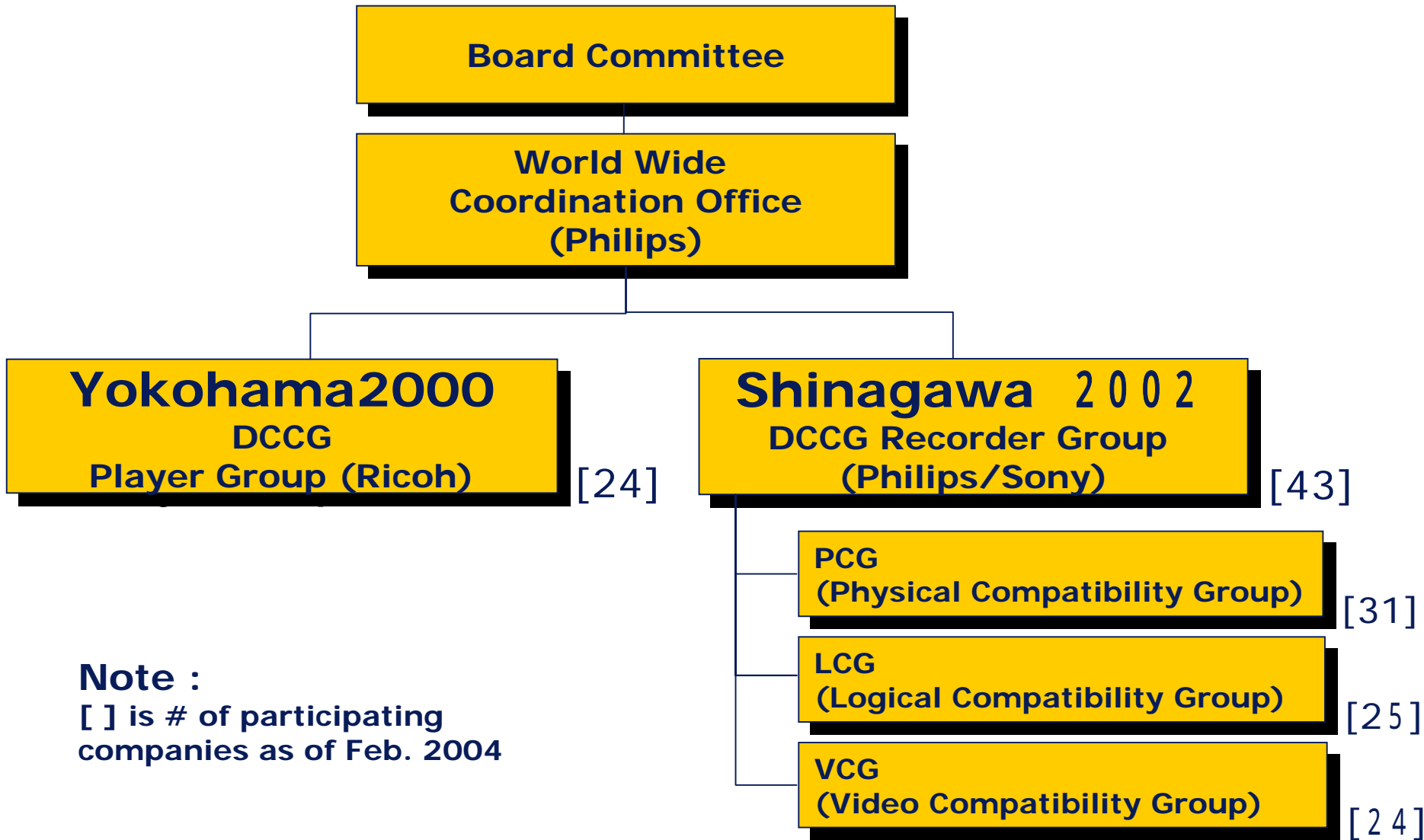


DVD+ReWritable

Ted Matsui

Ricoh Company, Ltd





Note :

[] is # of participating companies as of Feb. 2004

1. Compatibility Test Result

Sequential Write, At once recording, Single session,

2. Open Consortium / DCCG

For increasing compatibility level

3. Why can the DVD+RW Format realize such a high level of compatibility?

“Appended” & “Overwritten” Disc can be kept compatibility with the legacy RO players



DVD+ReWritable

DVD+RW Alliance

Compatibility Test Result

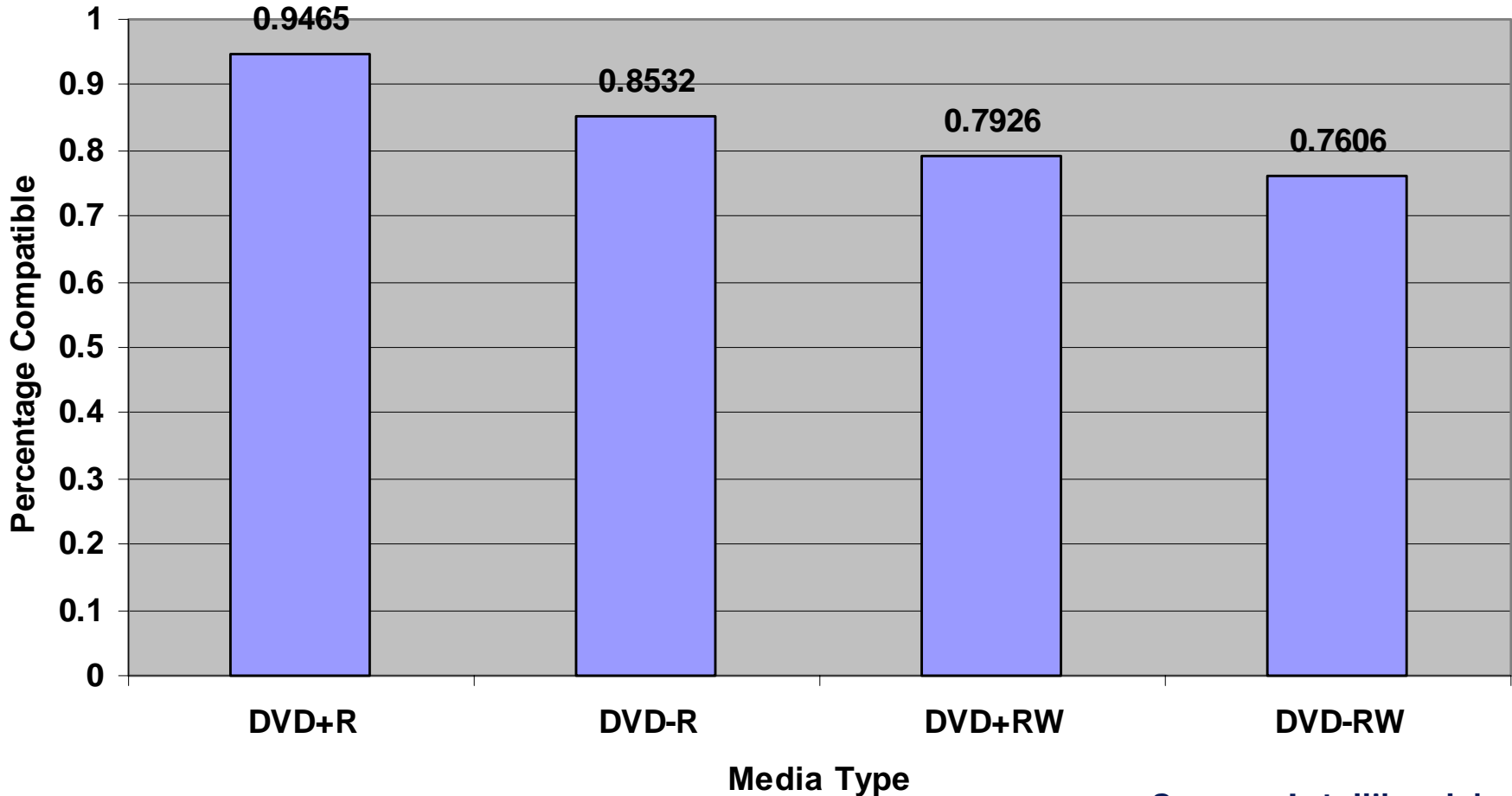




DVD Player & DVD ROM Compatibility

DVD+ReWritable

DVD+RW Alliance

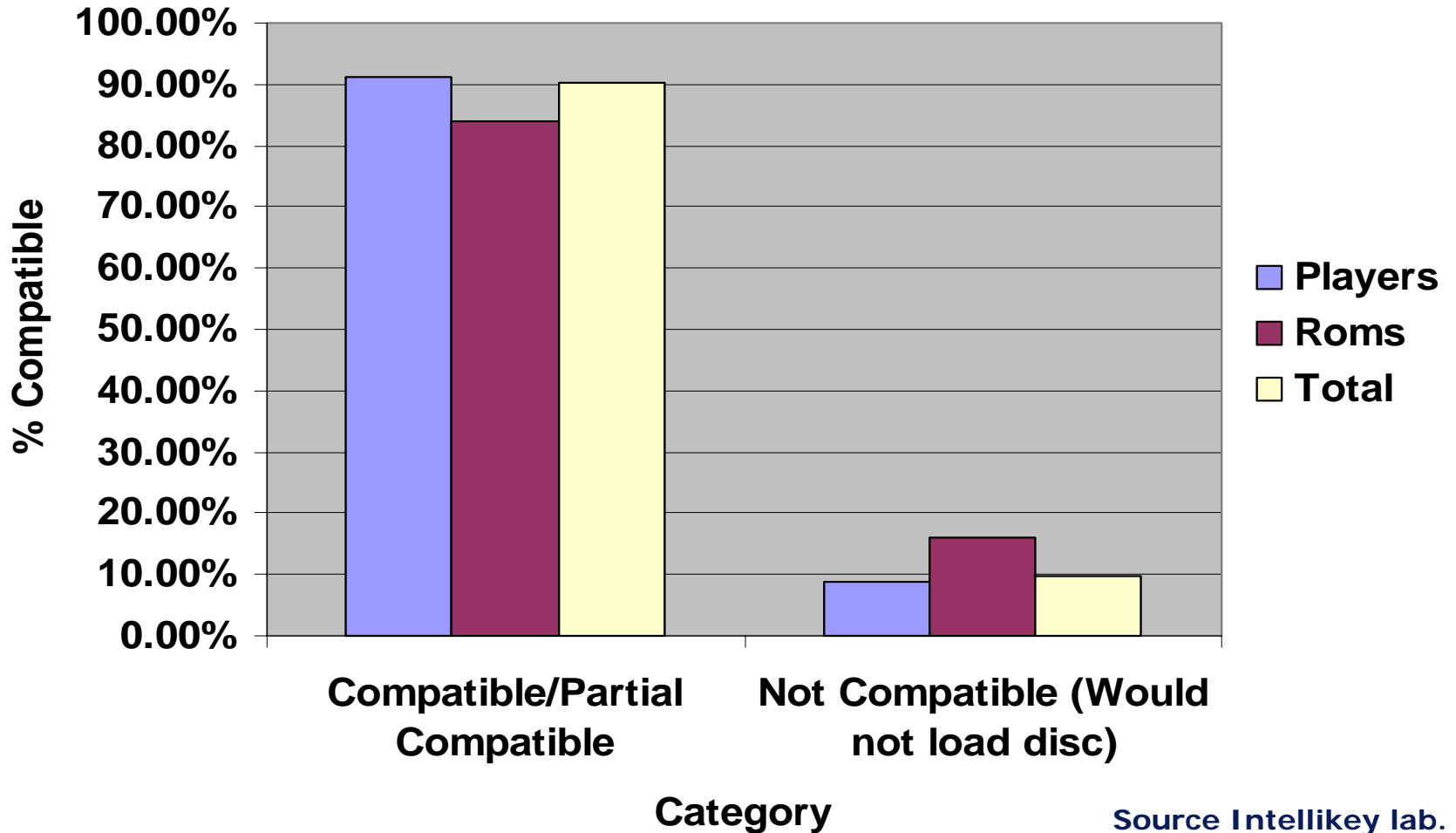


Source Intellikey lab.

DVD+R and DVD-R included ; results from Aug. 2002, Jan 2003, and March 2004. 216 players and 36 DVD-ROMs

DVD+RW and DVD-RW results from Aug. 2002 and Jan 2003. 159 players and 17 DVD-ROMs

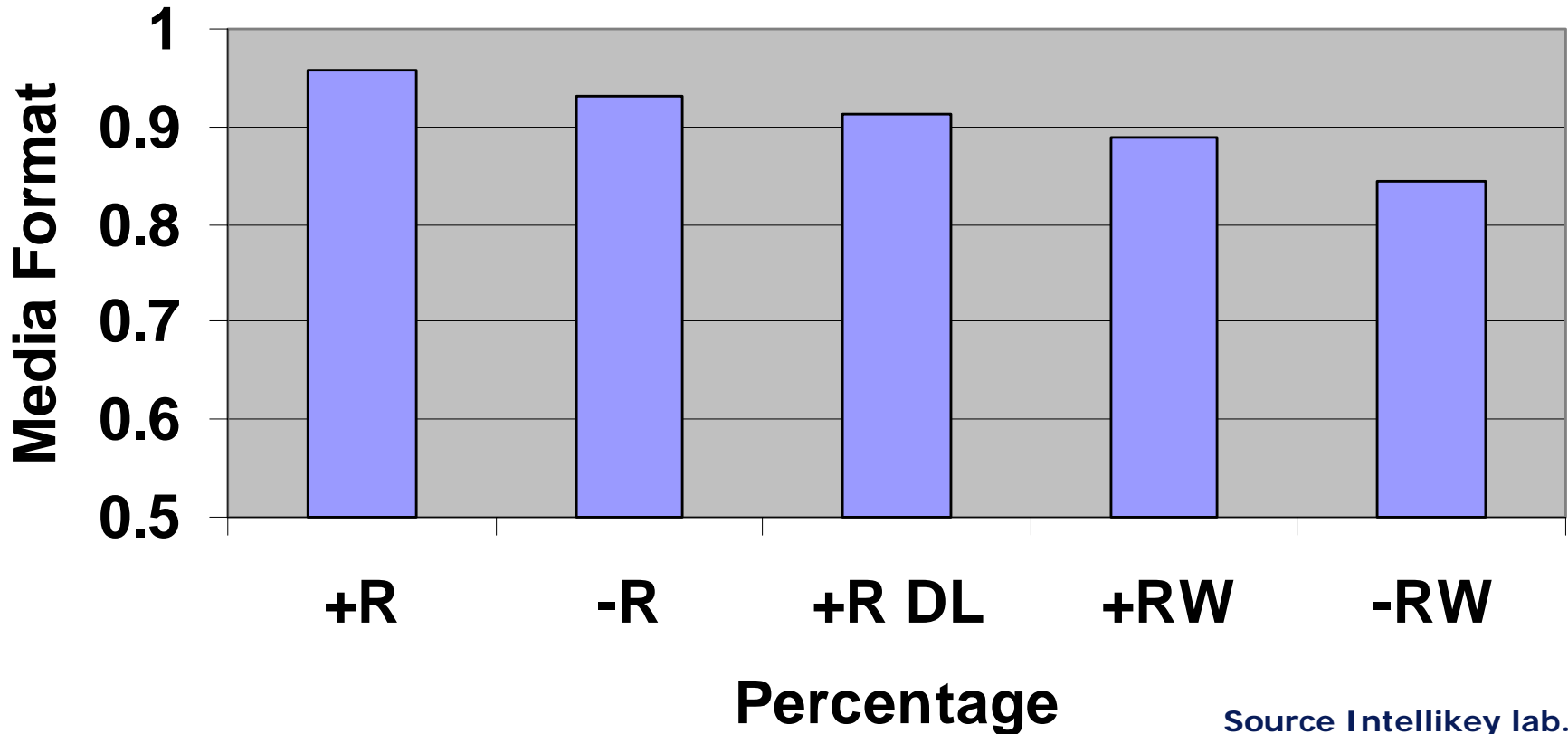




Source Intellikey lab.

Tested in May-Jul 2004 - 281 players, 31 DVD-ROM/Combo/Writers (Total 312)

Compatibility w/ newer players & ROMS

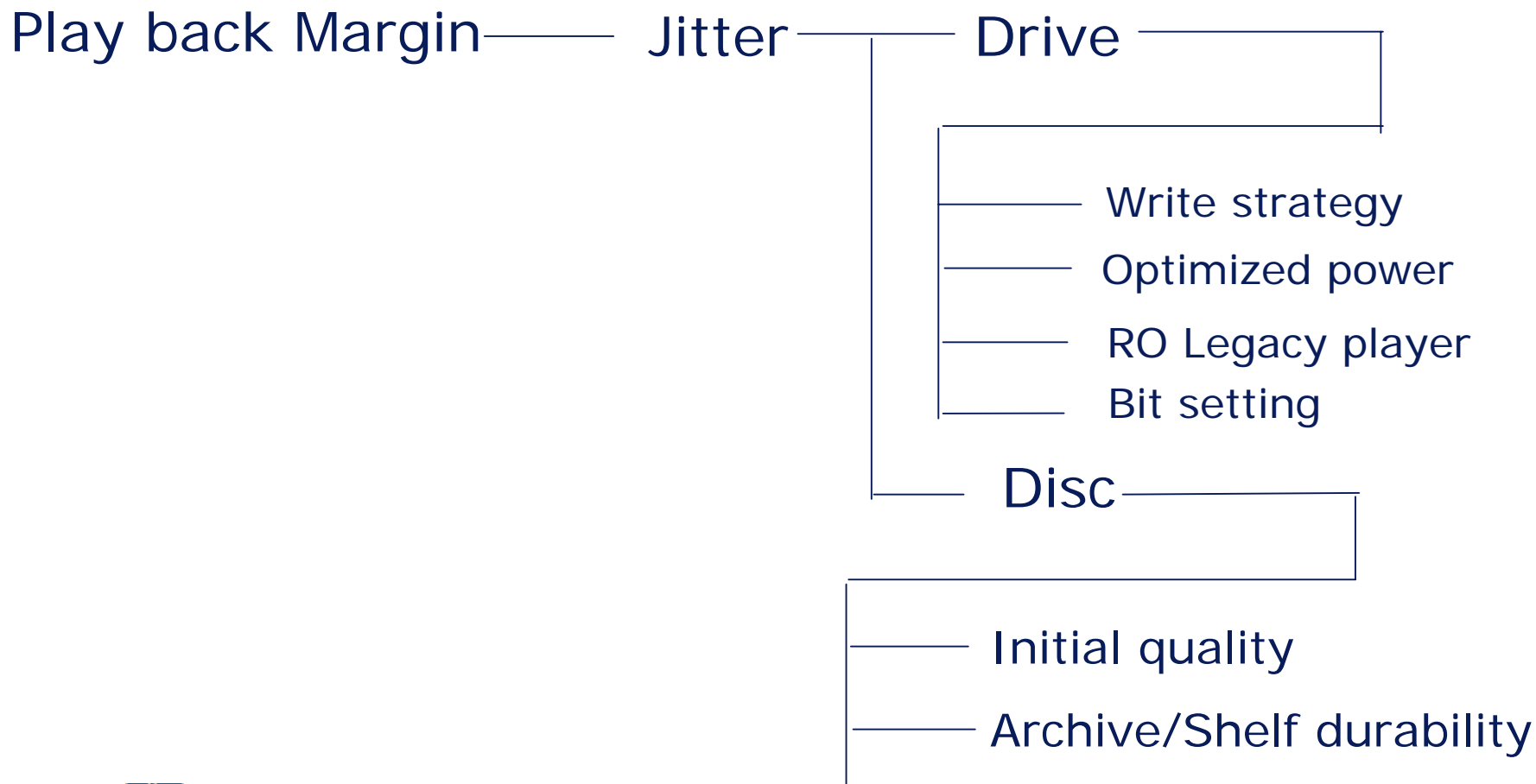


Source Intellikey lab.

Formats tested on newer players (2002/2003 models) in March 2004.

Total of 46 Players and 12 ROMs tested +R DL tested in May-Jun 2004.

between NIST and Intellikery lab.





Open Consortium / DCCG

**DCCG Player Group update
(Yokohama2000)**

<http://www.yokohama2000.org>

**DCCG-RG Activities update
(Shinagawa 2002)**

Main topics (Current)

1. DVD+R 4X playability test using discs written with multiple writers

12 drive 12 media 18 RO Player vendors

collaboration with DCCG RG (shinagawa 2002) PCG

2. DVD+R DL playability test

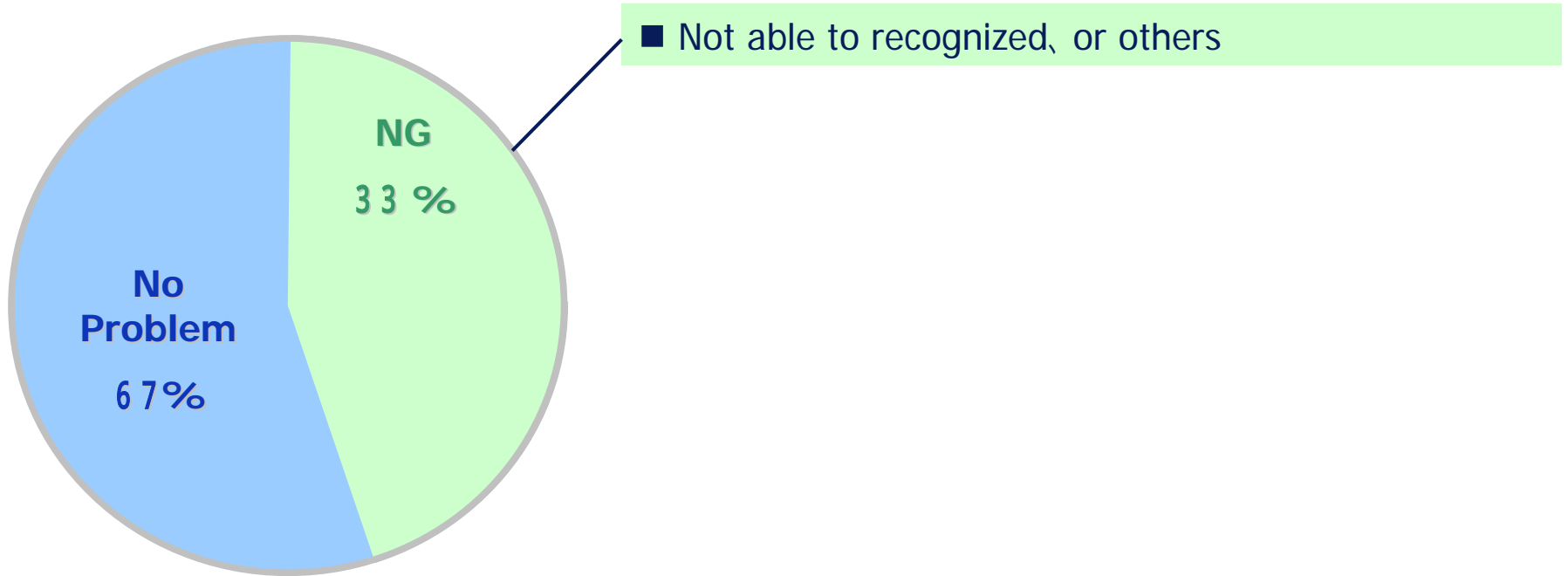
17 RO Player vendors

3. Lectures / Copy protection scheme "VCPS"

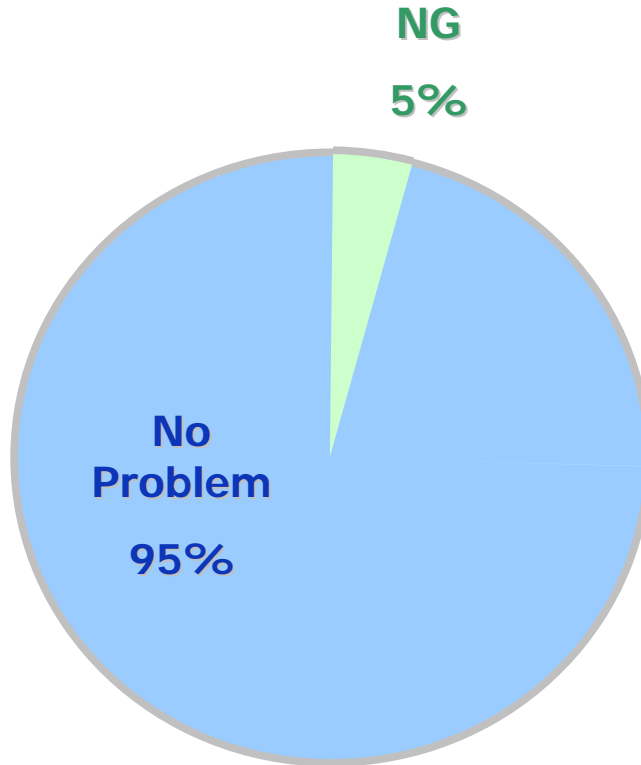
MPV

DVD+VR

■ Bit setting DVD+R DL



■ Bit setting DVD-ROM



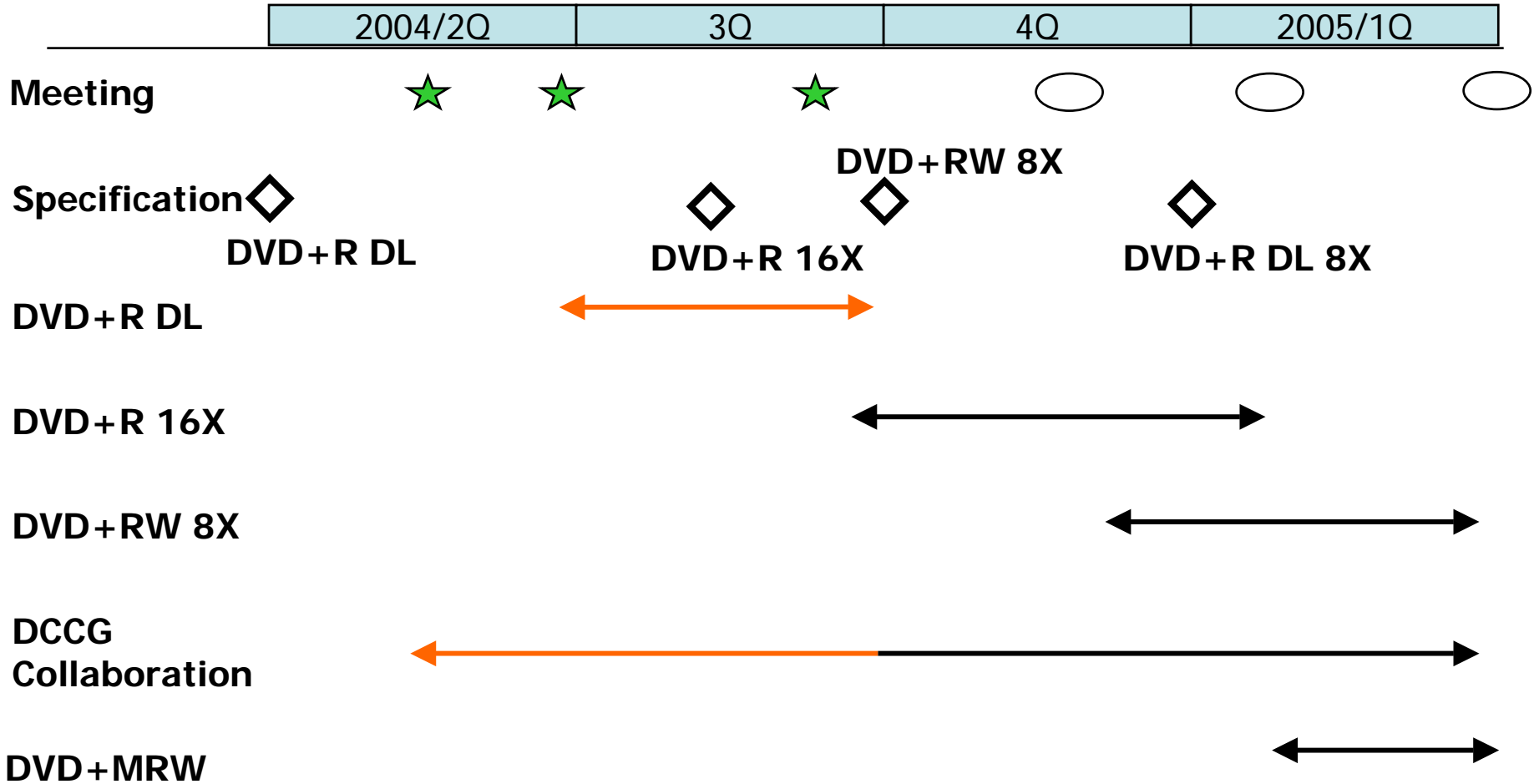
Almost perfect !!



Yokohama 2000 Annual Schedule

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Shinagawa 2002

Physical Compatibility WG

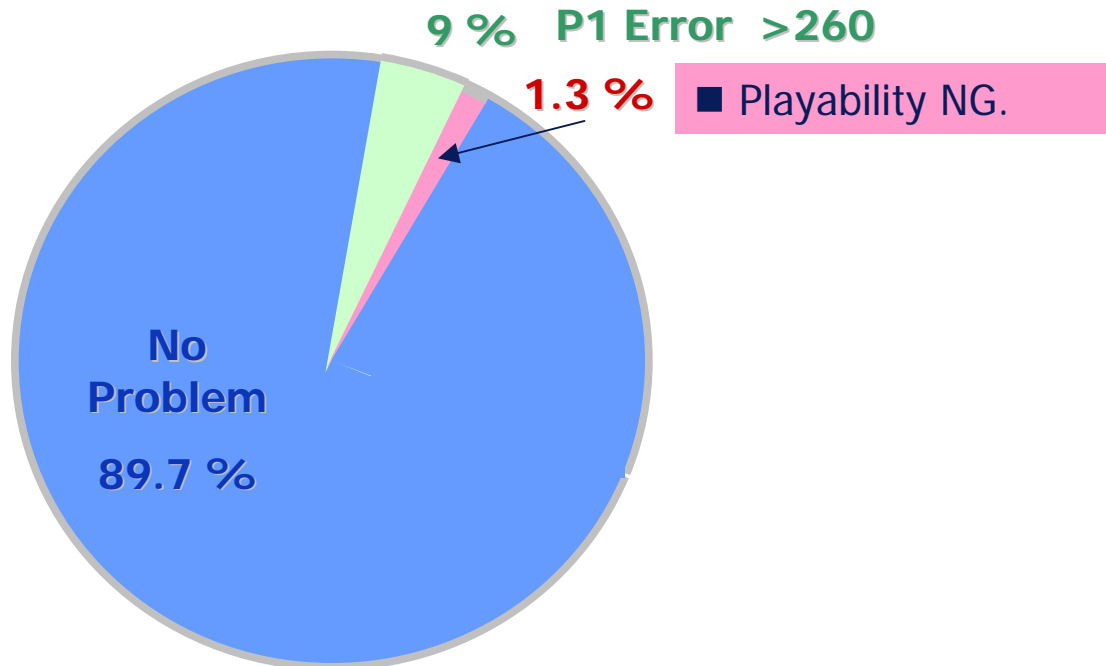
DCCG PCG

Main topics;

1. **DVD+R 4X Written disc compatibility with RO players**
Drive 12, Media 12,
2. **DVD+RW 2.4,4X cross DOW check such as NSL jump, among the multiple writers**
Drive 9, Media 10,
3. **DVD+R DL 2.4 X cross write check , such as layer jump**
Drive 6, Media 7,
4. **DVD+R 8 X cross check the smooth write at higher speed**
Drive 10, Media 7,

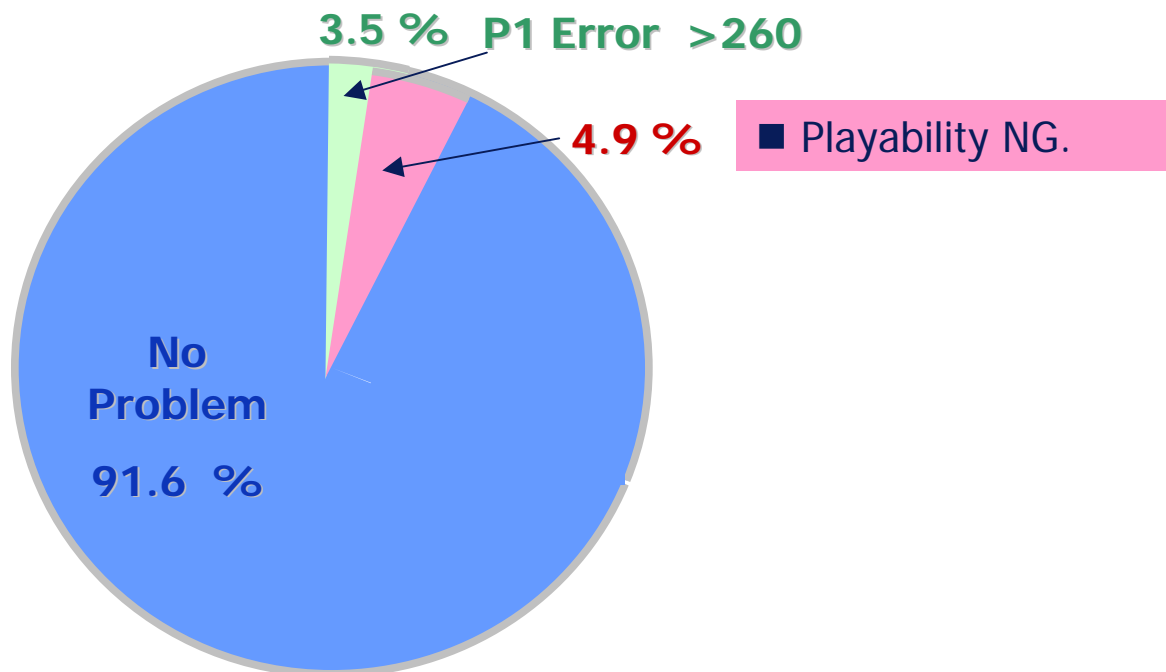
- 12 Multiple Discs, 12 Multiple Drives cross test

Test point ; at radius 24.5 mm



- 12 Multiple Discs, 12 Multiple Drives cross test

Test point radius at 52.4 mm



Shinagawa 2002

Logical Compatibility WG DCCG LCG



DVD+ReWritable

Main topics

1. DVD+R 4X Fragment handling

Drive 11, Disc 3 finished in Sept. '04

2. DVD+R DL Check "the append incomplete fragment

Drive 11, Disc 3 finished in Nov. '04

3. DVD+R DL check more "complicated writing mode"

plan March '05

4. DVD+RW check "Sparing criteria"

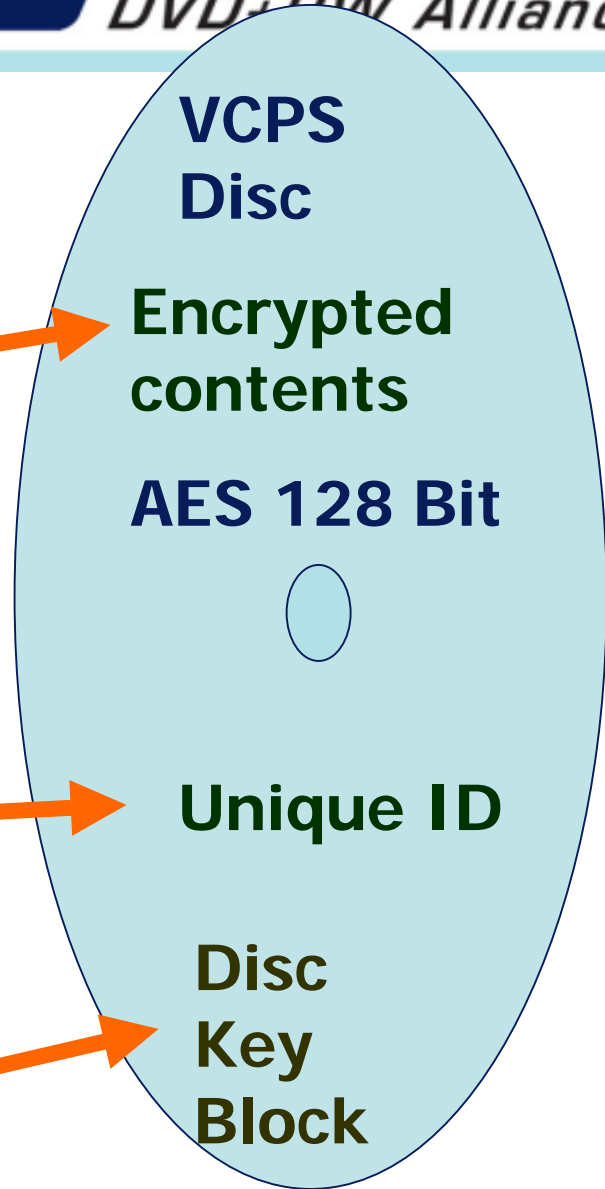
plan Mar. '05



Capture the digital contents through broadcasting or cablenet

Drive shall record random number at loaded disc

Drive, Disc Secure keys are installed in ADIP



- **RDL-2: DVD+R Double layer (intended start Nov '04)**
 - Same discs as RDL-1 (repeat of test)
 - Tests already defined
 - For new participants and participants who want to repeat RDL-1
- **RDL-3: DVD+R Double layer (intended start Nov '04)**
 - More complex discs than RDL-1
 - Tests already defined
- **MRW-1: Mount Rainier (intended start Nov 2004)**
 - *Goal: convergence of sparing criteria*
 - *Spec compatibility covered by EasyWrite disc verifier*
 - R/W Interchange test
- **RW-2: second DVD+RW test**

- Updated including DVD+R DL questions and answers
- Are electronically available at Philips' partners web site

(<http://www.licensing.philips.com/partners/dvdrw/documents1062.html>)

Shinagawa 2002

Video Compatibility WG DCCG VCG



Main topics

1. DVD+RW ; check the “video quality” write protection, unprotection, Smoothness

8 Writers

2. DVD+RW; check “no destruction” No recording

11 writers

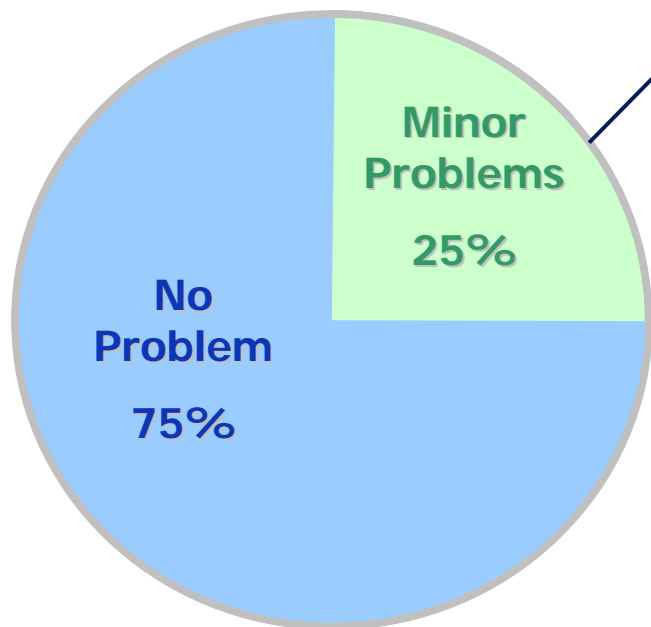
3. DVD+R 4X; Append recording HQ,EP

10 writers

4. DVD+DL; planned

■ Summary of results

Protection/Unprotection Test



■ Can not change protection mode. 25%

Almost minor problems are in relation to change protection-mode. Specific recorder and software does not support changing protection-mode.

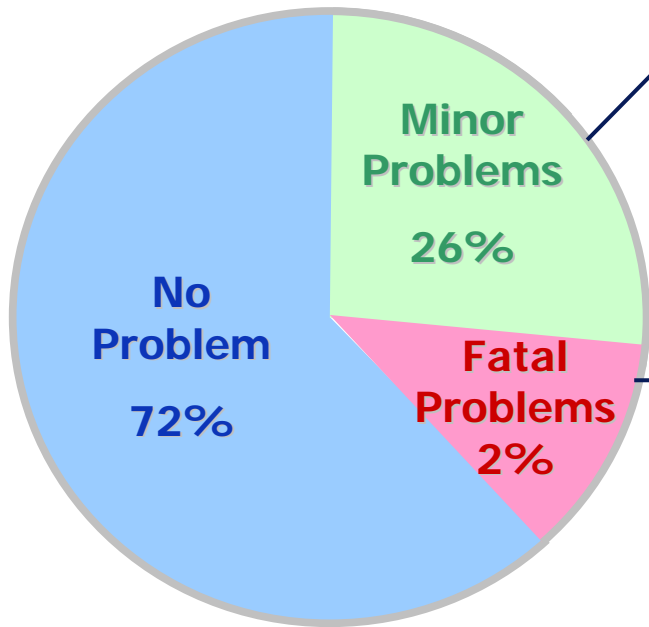
Last meeting, VCG found fatal problems which means incorrect playback. →

Relevant recorder and software have already improved these problems as of today.

There was no fatal problem which means erasing protected titles.

Summary of results

Picture smoothness Test



- Hiccups or few seconds freeze of AV. 21%
- Access from Menu is not successful. 5%

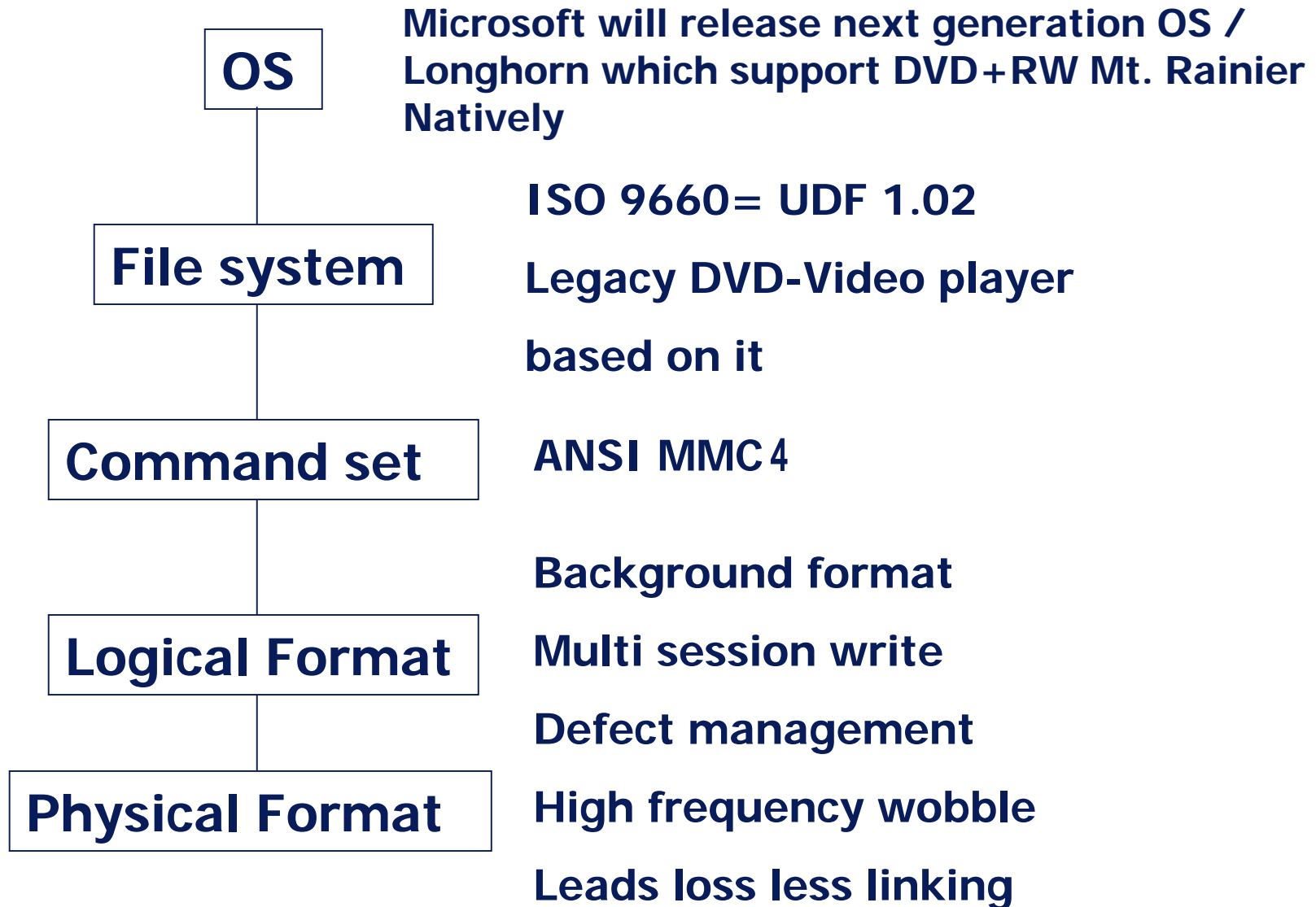
Hiccups and freeze were occurred in each title independently of recording bit rate.

- Can not playback titles correctly. 2%

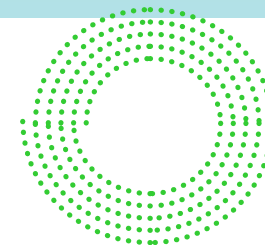
Relevant recorder and software are going to improve this problem among 3 companies.

The causes of hiccups and freezing may be depend on basic functionality of AV encoding/decoding/packetize. VCG will take close communication among relevant participants to improve these problems.

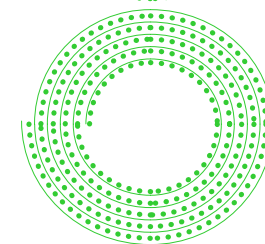
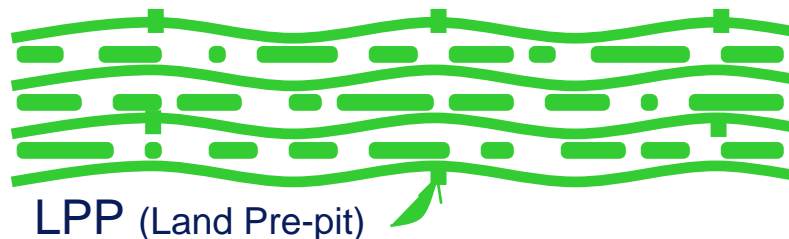
**Why can the DVD+RW Format
realize such a high level
of compatibility ?**



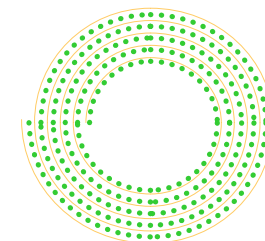
DVD-ROM Pit



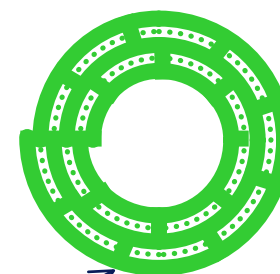
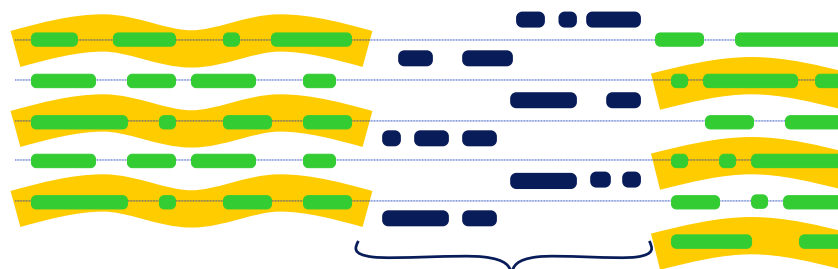
DVD-RW Wobbled Groove



DVD+RW HF Wobbled Groove

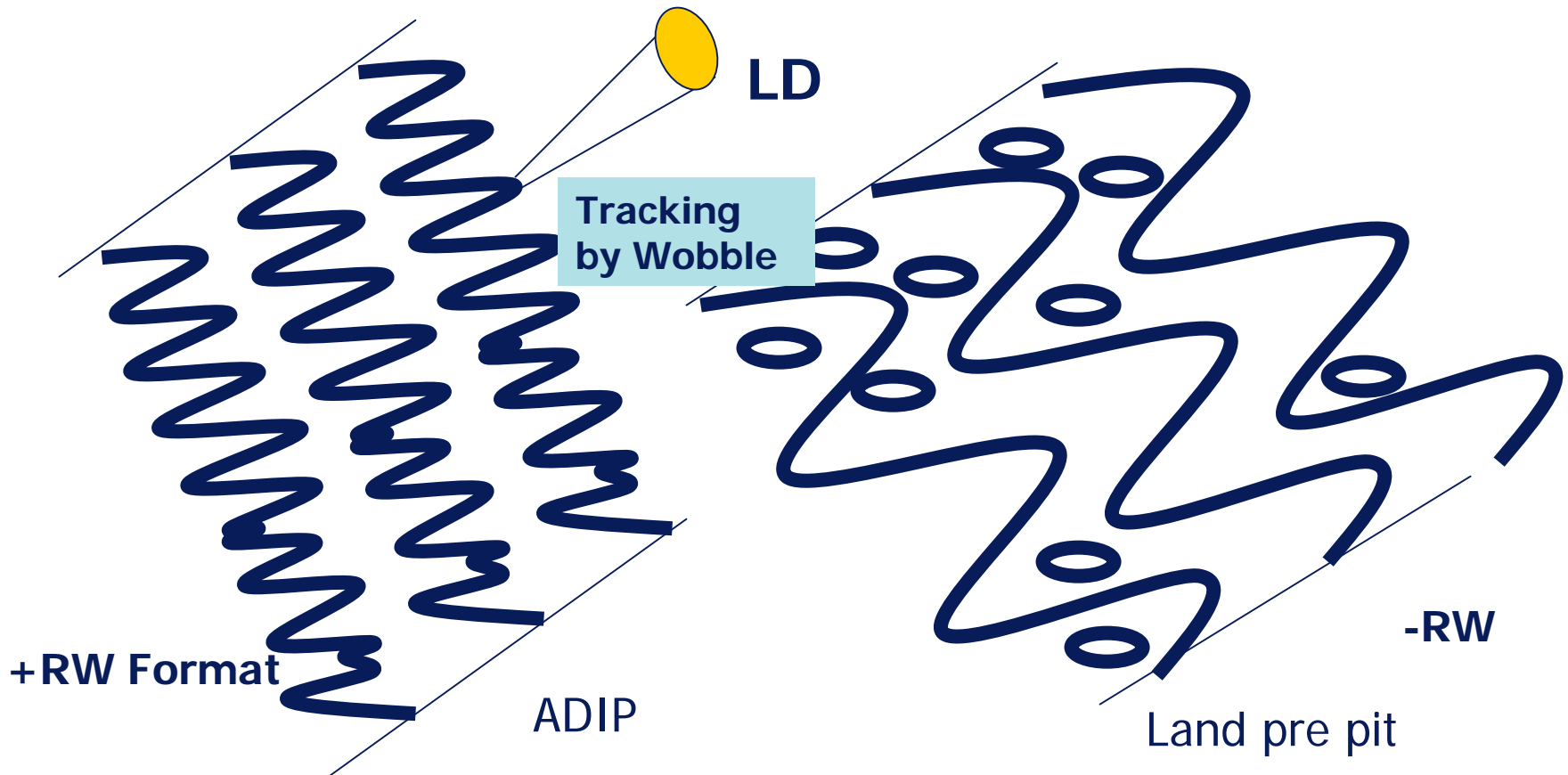


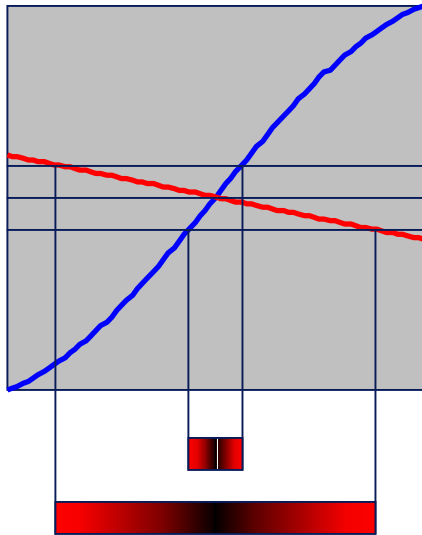
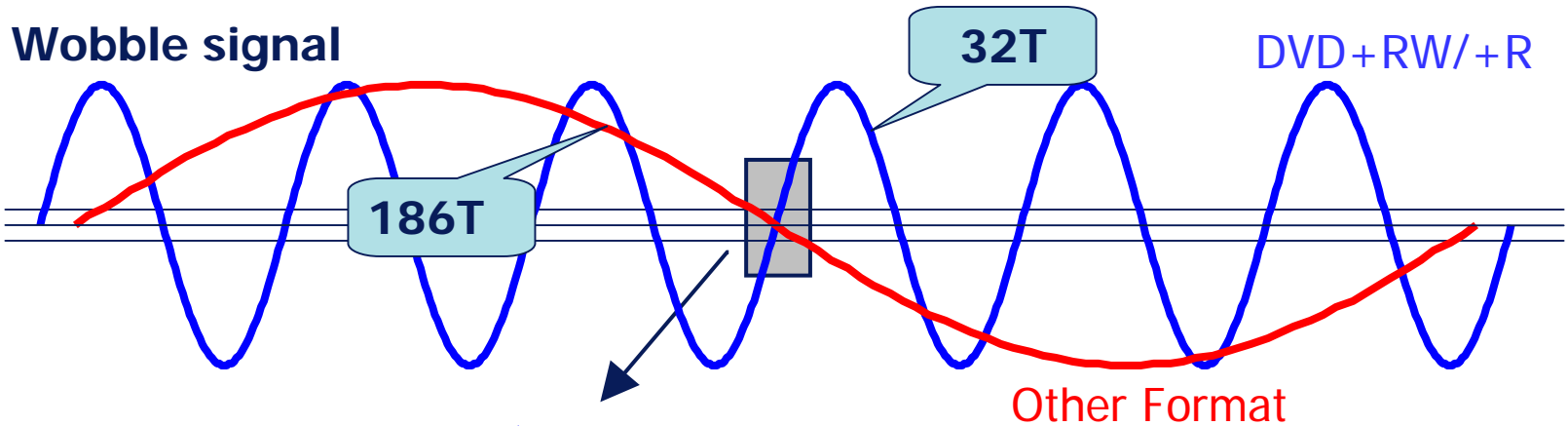
DVD-RAM Wobbled Land & Groove with Pit Header



Pre-mastered Pit Header Field

High frequency wobble ; 32 channel bit provides the accurate link
+/- 5 Channel bits, +RW Format is ~6 times higher than -RW





Positioning Error

- When Append / Over write , OPU has to return exactly the original position.
- DVD+RW format has high frequent wobble, so it can keep loss less linking.

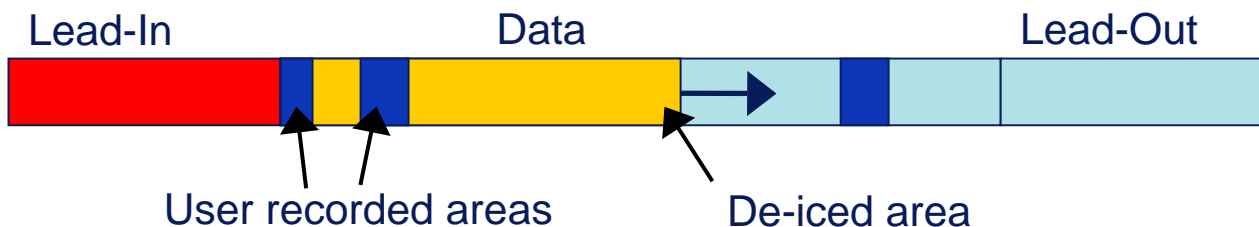
Initial stage

- Need minimum recording for control data (less than 1 min.)



De-Icing

- Automatically null data is recorded during idling. = Back grad format

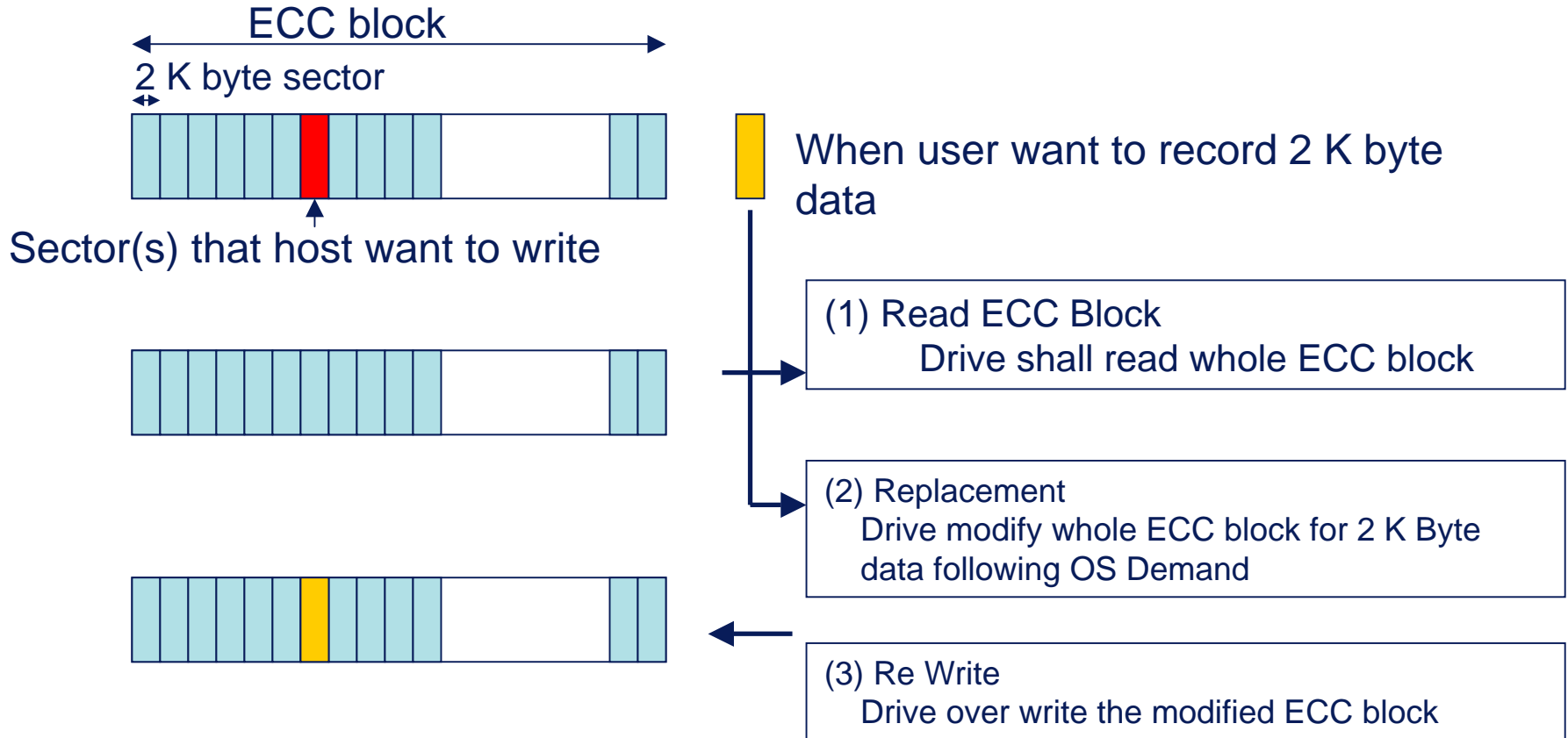


- De icing is stopped ,if OS requests the drive to read/write data.

Quick eject by temporary lead out

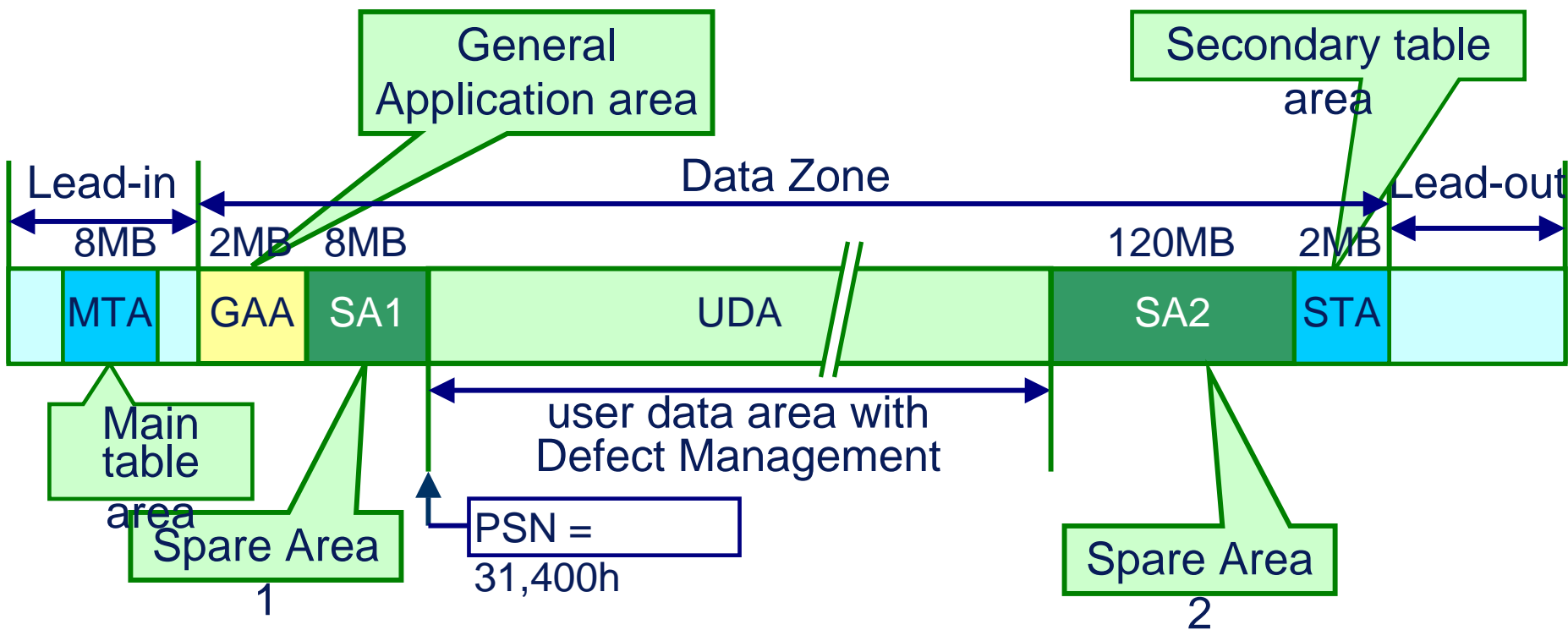


ECC Block consists of 32K bytes, with 2k byte addressable sectors.



Consumer can feel as random overwrite !!

Layout of a Mount Rainier DVD+RW disc



Mt Rainier format = "H/W Defect Management"
leads to same functionality as FDD, HDD, MO

OS will treat drives as true block addressable devices.

- **User can enjoy as same random access write as HDD**
- **2 k Byte size file is available / suitable for small size data update**



DVD+ReWritable

Loss less linking affects positive ability for video application

DVD+RW Alliance

Loss linking can lead real time video editing, capturing = DVD+VR Format

1. Consumer can enjoy the same use model they are familiar with in a conventional Video Tape recorder.

2. Available Time shift with out HDD

Low cost recorder

3. Such new functionality per disk shall drive conversion from Tape media.



- 1. DVD+R/+RW Format has the much higher score compatibility test result.**

By physical simple mode written disc compatibility with legacy RO.

- 2. More complicate mode, such as append, over write mode also quite positive results have been achieved.**

Through various tests by DCCG working groups

- 3. The key reasons are obtainable because of high frequency wobble groove, Phase modulated address mark and support of published logical specifications**