



720P, indoor vandal

WV-SF346



SVGA, indoor vandal

WV-SF342

Security & AV Systems Business Unit
Panasonic System Networks Company

Panasonic ideas for life

WV-SF342/346 Overview

i-PRO
SmartHD

WV-SF342



800x600, 30fps

Simple D/N

Focus Assist

Face Detection

WV-SF346



HD/ 720P, 30fps

Simple D/N

Lens ABF

Face Detection

■ Key Features

- ❑ Real time HD/720P video with H.264 High Profile format
- ❑ High sensitivity: WV-SF342 : 0.2 lux @ color mode
WV-SF346 : 0.3 lux @ color mode
- ❑ On-device analytics

Panasonic ideas for life

Vandal Resistant

IEC Standard for Impact resistant test :

Regarding the Indoor vandal, we verified the IEC 62262(IK10) and IEC 60068-2-75 test Eh, 20J of impact resistant test.



Body: **Metal**

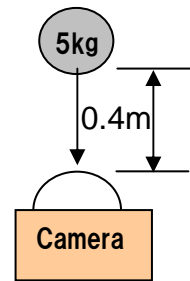
Dome:

WV-SF342/346: **Polycarbonate**

IEC 62262 => **IK10**

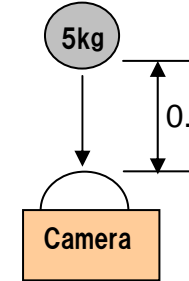
IEC 60068-2-75 test Eh, 20J

IEC 62262
IK10



0.4m x 5 times by free fall

IEC 60068-2-75 test Eh
20J



0.4m x 3 times by free fall

Weight (5kg)
The top figure:
SR50



Instrument for
Impact test



IEC 62262*	IK01	IK02	IK03	IK04	IK05	IK06	IK07	IK08	IK09	IK10	
Impact energy (J)	0.14J	0.2J	0.35J	0.5J	0.7J	1J	2J	5J	10J	20J	
Free fall (times)	5	5	5	5	5	5	5	5	5	5	
IEC 60068-2-75**	0.14J	0.2J	0.35J	0.5J	0.7J	1J	2J	5J	10J	20J	50J
Free fall (times)	3	3	3	3	3	3	3	3	3	3	3

*IEC 62262 (=originally defined in European Standard BS EN 50102:1995)

Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)

**IEC 60068-2-75:1997 (=JIS C 60068-2-75:2004)

Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests



Physical size of each dome camera *i-PRO SmartHD*

	Φ (mm)	Height (mm)	Dome (mm)
HCM705	111	73	62
NF302	124	135	83
SF330 Series	129.5	93	80
SF340 Series	132	105	83
NW502	192	146	105



Compared with SF340 and SF330 i-PRO SmartHD

Basically, the both models is same specification regarding the electrical and software except mechanical parts

	SF340 Series	SF330 Series
Vandal resistant	IEC 62262 : IK10 IEC 60068-2-75 test Eh, 20J	IEC 62262 : Less than IK07
Physical size		

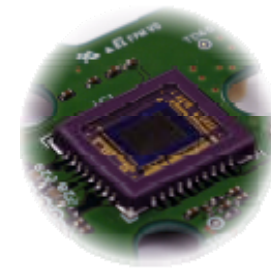
The SF340 series has an ability of vandal resistant more than 10 times compared with the SF330 series as below table.

IEC 62262*	IK01	IK02	IK03	IK04	IK05	IK06	IK07	IK08	IK09	IK10	
Impact energy (J)	0.14J	0.2J	0.35J	0.5J	0.7J	1J	2J	5J	10J	20J	
Free fall (times)	5	5	5	5	5	5	5	5	5	5	

Appendix

1.3 Megapixel RGB MOS Sensor

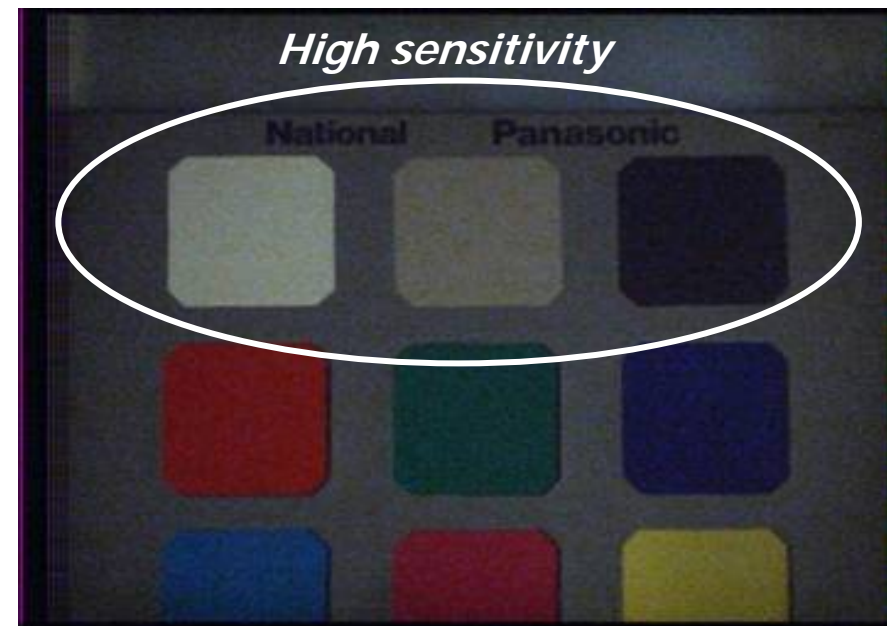
- High sensitivity (Min. illumination: 0.3lux)
- Low Power Consumption (Reduce 50% Power Consumption)
- Superior Color Reproduction by Primary (RGB) Color Filter



Low Light Condition Image (Same illumination)



Conventional MOS image



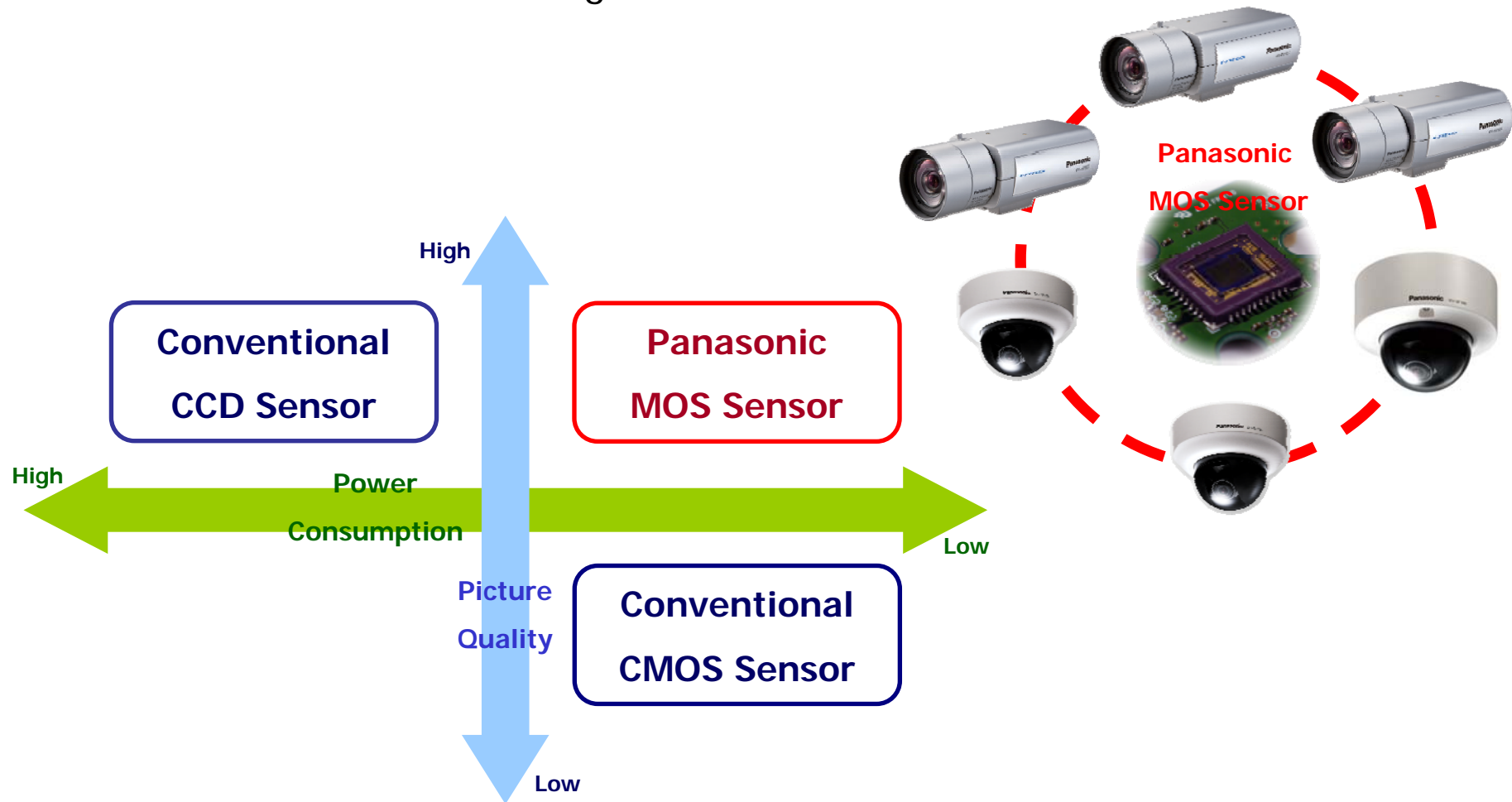
New MOS image (reference)

SF342 SF346

Panasonic MOS Sensor - 1

i-PRG
SmartHD

Panasonic develops **new original MOS sensor**, and implement it in SP/SF series camera, and the sensor achieves both high sensitivity & low power consumption of CCD & CMOS sensor advantages.



Panasonic ideas for life

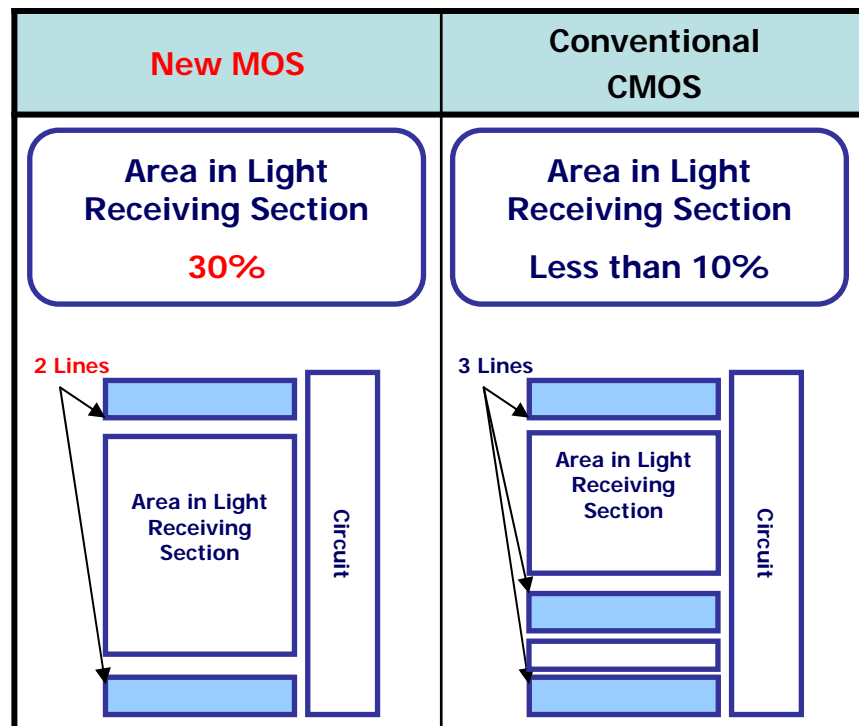
SF342 SF346

Panasonic MOS Sensor - 2

Panasonic MOS sensor has original pixel architecture technology for high sensitivity & lower noise in darker condition as the followings:

- To take wide area in light receiving section by reducing 3 lines of CMOS to 2 lines architecture.
- To reduce dark current by improving photodiode device architecture.

Light Receiving Architecture



Photodiode Device Architecture

New MOS	Conventional CMOS
Dark Current 60 electrons/s	Dark Current 1500 electrons/s

CMOS vs CCD Sensor

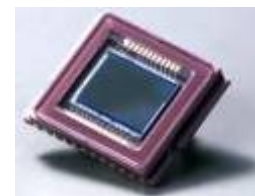
i-PRO
SmartHD

i-Pro 2nd Generation

Sensor	CCD	Conventional CMOS
Sensitivity	Better	Less
Fix Pattern Noise	Lower	Visible
Moving Object Distortion	No	Visible
Smear	Less (in case FIT)	No
Power Consumption	Higher	Lower
Cost	Higher	Lower

- CMOS can be higher density with lower cost and may be suitable for low cost market with low quality.
- However for general surveillance purpose, CCD will be the **best choice** in total performance.

Adapt & Implement CCD Sensor
in Panasonic Camera



CCD Sensor

Panasonic ideas for life

MOS vs CCD Sensor

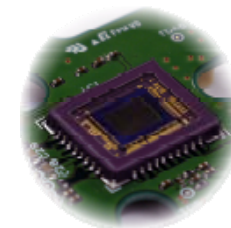
i-PRO
SmartHD

i-PRO 3rd Generation

Sensor	New MOS	CCD	Conventional CMOS
Sensitivity	Much Better	Better	Less
Fix Pattern Noise	Much Lower	Lower	Visible
Moving Object Distortion	Lower	No	Visible
Smear	No	Less (in case FIT)	No
Power Consumption	Lower	Higher	Lower
Cost	Lower	Higher	Lower

- Panasonic develops **new MOS sensor** for high sensitivity & lower noise by latest SC processing lower noise & by original amplifier technology.
- Currently for general surveillance purpose, **new MOS sensor** will be the **best choice** in total performance.

Adapt & Implement **New MOS Sensor**
in Panasonic Camera



New
MOS Sensor

Panasonic ideas for life

UniPhier (Original System LSI)

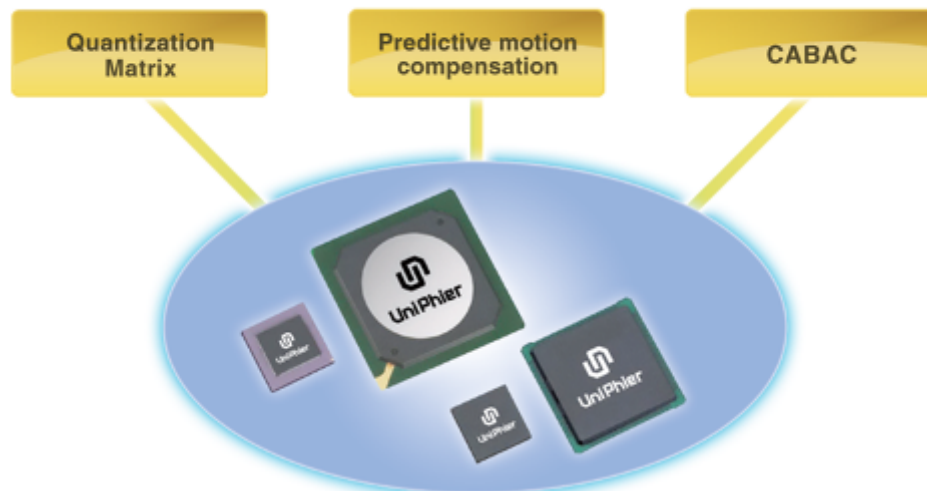
- Multiple H.264 High Profile Streams
- Real Time HD Video Processing
- On-device Intelligence Support



H.264 profiles

H.264 High Profile encoding with Panasonic Uniphier LSI enables 1280 x 960 high quality real time video with smaller data size.

UniPhier H.264 High Profile



1280x960 comparison		VGA comparison	
JPEG 11.5Mbps	1280 x 960 11 ips JPEG	MPEG-4 2 Mbps	VGA 30 ips
JPEG quality mode = 5			
H.264 4 Mbps	1280 x 960 30 ips H.264	H.264 1 Mbps	VGA 30 ips

* Superior image and high frame rate with smaller data size.

High Definition

i-PRO
SmartHD

It improves picture resolution from standard definition to high definition.



Analog Camera

i-Pro SmartHD Camera



* SP305/306 & SF335/336 support high definition.

Panasonic ideas for life

SF342 **SF346**

Progressive Scan

i-PRG
SmartHD

Progressive video output ensures clear images with less motion blur and no tearing even when the subject is moving.



Image appears with tearing when the subject is moving due to temporal difference between odd/even field.

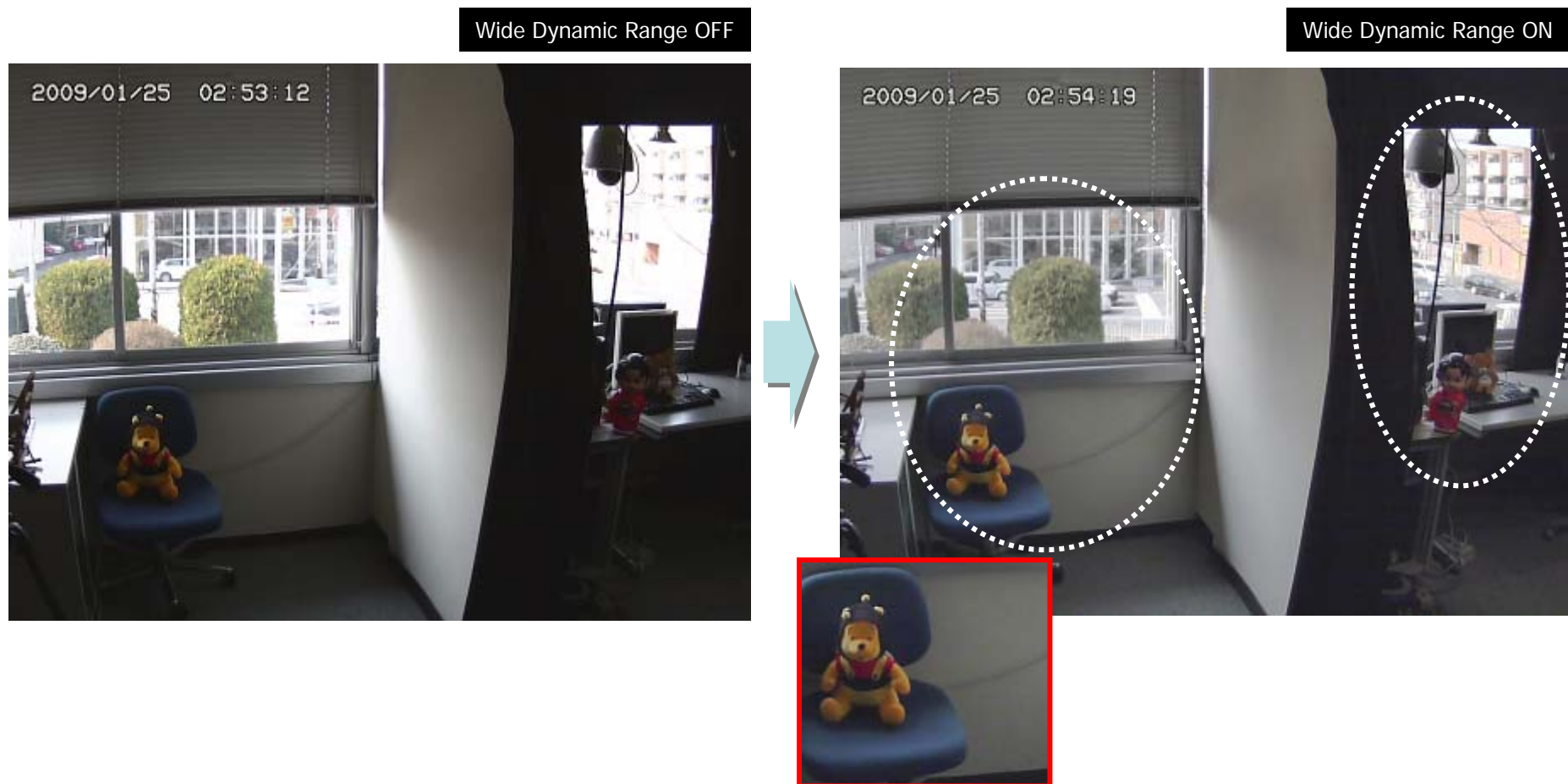


There is no tearing even when the subject is moving.

Wide Dynamic Range - 1

i-PRD
SmartHD

It expands dynamic range by tuning gain control, gamma control and dark area calibration.



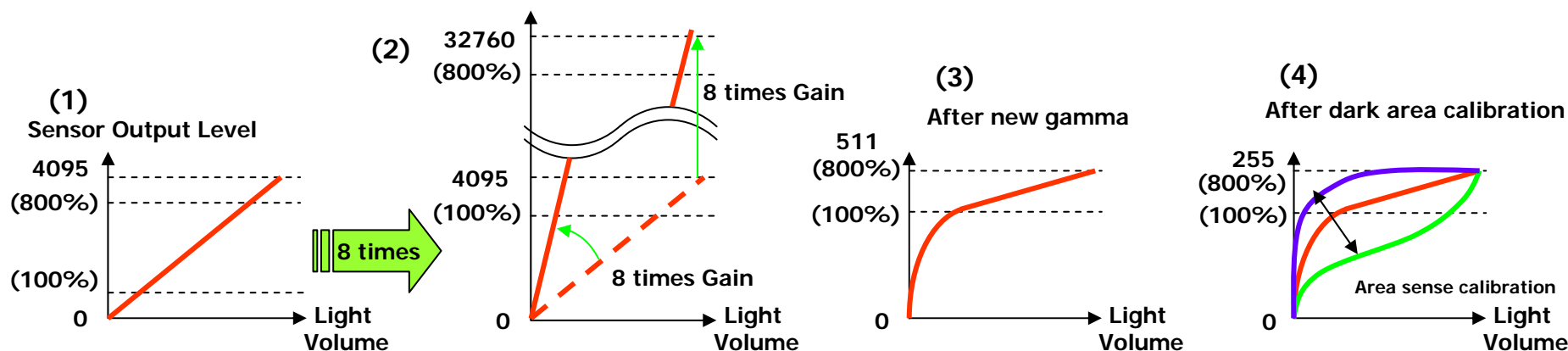
Panasonic ideas for life

SF342 SF346

Wide Dynamic Range Mechanism

1. Adjust lens iris until bright area is saturated.
 - > The areas that have less than normal brightness become darker.
2. Amplify signals digitally until normal level in the areas that became darker.
 - > Amplify signals even in bright areas up to 8 times.

Note: Signal noise is increasing in dark areas, since it is without shutter control and it just amplifies signal in the dark areas.
3. Calibrate gamma included knee characteristic by amount of signal amplifying.
 - > It is possible to control bright areas and bright conditions.
4. Make image clear by accentuating contrast as well as dark area calibration.



Face Detection

i-PRG
SmartHD

It automatically detects up to 8 faces, and transfers face data as XML.
It enables to develop custom applications such as NV200 recorder.

Automatic Face Detection



* Face detection is not handled as an alarm source.

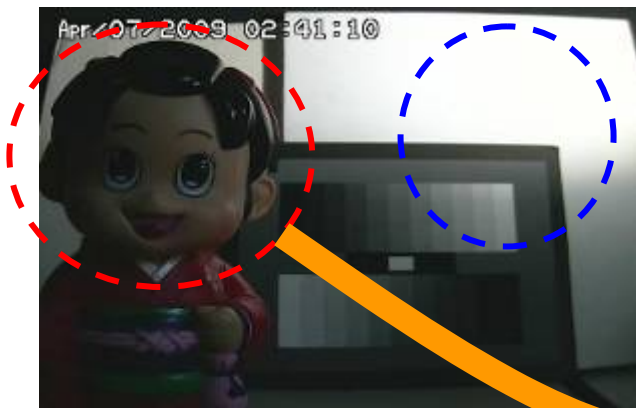
Panasonic ideas for life

SF342 **SF346**

Face Detection with WDR

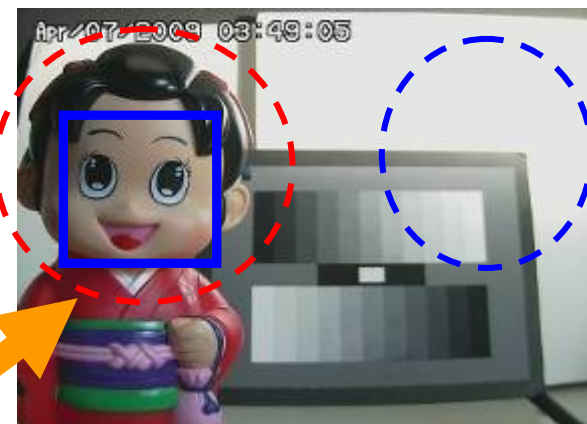
i-PRG
SmartHD

It automatically detects human faces and makes brightness adjustment to provide better identification for the faces by brightness calibration of human faces in backlight condition.



Before Calibration

To recognize a face is difficult because of backlight.
Camera is adjusted from bright section circled in blue.



After Calibration

Overall brightness level is increased without causing the saturation in the originally bright section (blue circle).

Wide Dynamic Range OFF



Wide Dynamic Range ON



Face Detection with
Wide Dynamic Range ON



* When face detection with WDR works, it just adjusts dynamic range, and bright area may be saturated by light condition around a face.

Panasonic ideas for life






SF342

SF346

Face Wide Dynamic Range

i-PRD
SmartHD

Camera automatically turn ON or OFF face WDR function by detecting whether human faces are there or not

WDR Setting	WDR : OFF Face WDR : OFF	WDR : ON Face WDR : OFF	WDR : ON Face WDR : ON
With Human Face			
Without Human Face		 <p data-bbox="1097 1348 1937 1380">Without human face, face wide dynamic range is not operated.</p>	

Panasonic ideas for life

SF342 SF346

Face Matching

i-PRO
SmartHD

The information of position detection of human faces and information is sent by XML form with video stream. And, it enables the matching of human face data in real time.



Automatic Face Detection

1.
Face registration



2.
Detect the face



3.
Recognize the face and send alarm



* Necessary to integrate with SmartHD Recorder (NV200 Series).

* NV200 requires SXVGA resolution for face matching, so SF342 is excluded as cameras for face matching.

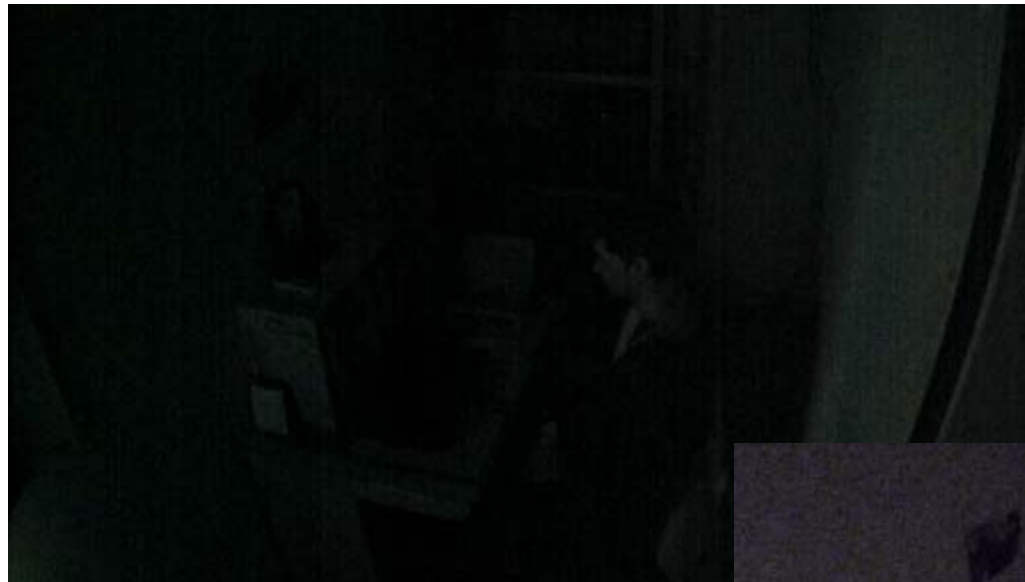
Panasonic ideas for life

SF342 SF346

High Sensitivity

i-PRO
SmartHD

It improves low illumination performance even in darker condition.



Conventional HD Camera



i-Pro SmartHD Camera

* SF346 support HD high sensitivity.

Panasonic ideas for life

SF342 **SF346**

Lens ABF

i-PRO
SmartHD

SF346 has lens ABF function which is very useful for easy installation.
Lens ABF means just "Auto Focus."

After pushing "Execute" button, focus adjustment will run automatically.

The image shows two browser windows. The left window, titled 'Focus - Microsoft Internet Explorer', displays a focus control interface with 'Auto' selected and the 'Execute' button circled in red. Below it are 'Near', 'Reset', and 'Far' buttons, and a 'Close' button at the bottom. The right window, titled 'WV-SF336', shows the camera's main interface. On the left is a 'Setup menu' with options like Basic, Image/Audio, Multi-screen, Alarm, Advanced func., User mng., Server, Network, Schedule, Maintenance, and Help. The main area shows a live video feed of two white cars on a road. A 'NEAR' and 'FAR' indicator is overlaid on the video, with a vertical bar and the number '55' between them, and the text 'INDICATOR 55 FOCUSING'. At the bottom of the interface, there are 'Setup >>' buttons for 'Image adjust', 'Focus', and 'Privacy zone'.

* SF346 supports lens ABF function.

Panasonic ideas for life

Focus Assist

i-PRG
SmartHD

Focus Assist is used is for easy, accurate and illumination independent focus adjustment.

After pushing button, focus indicator will appear.



* SF342 support focus assist function.

Adaptive DNR (Digital Noise Reduction)

i-PRG
SmartHD

2D-DNR for motion area and 3D-DNR for static area are effectively combined, realizing a clear low noise image with less motion blur and resolution deterioration.



AGC OFF: Image is too dark



AGC ON: Image is too noisy.



Conventional DNR:
Motion blur on moving subject.



Motion adaptive DNR:
Clear image without motion blur.

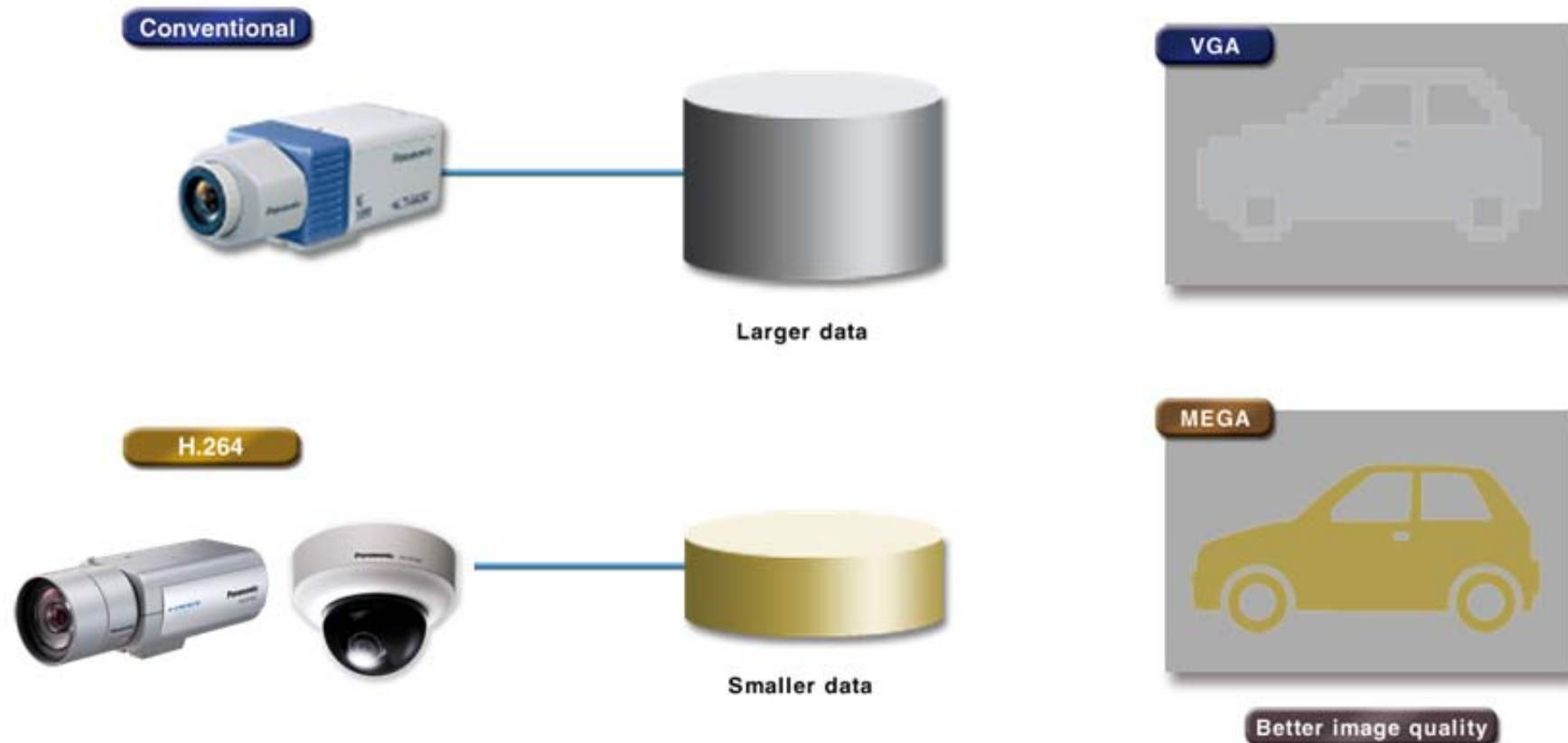
Panasonic ideas for life

SF342 SF346

H.264 Latest Encoding - 1

i-PRO
SmartHD

H.264 latest encoding technology with Panasonic Uniphier platform enables superior image of 1280 x 960 with smaller data size.



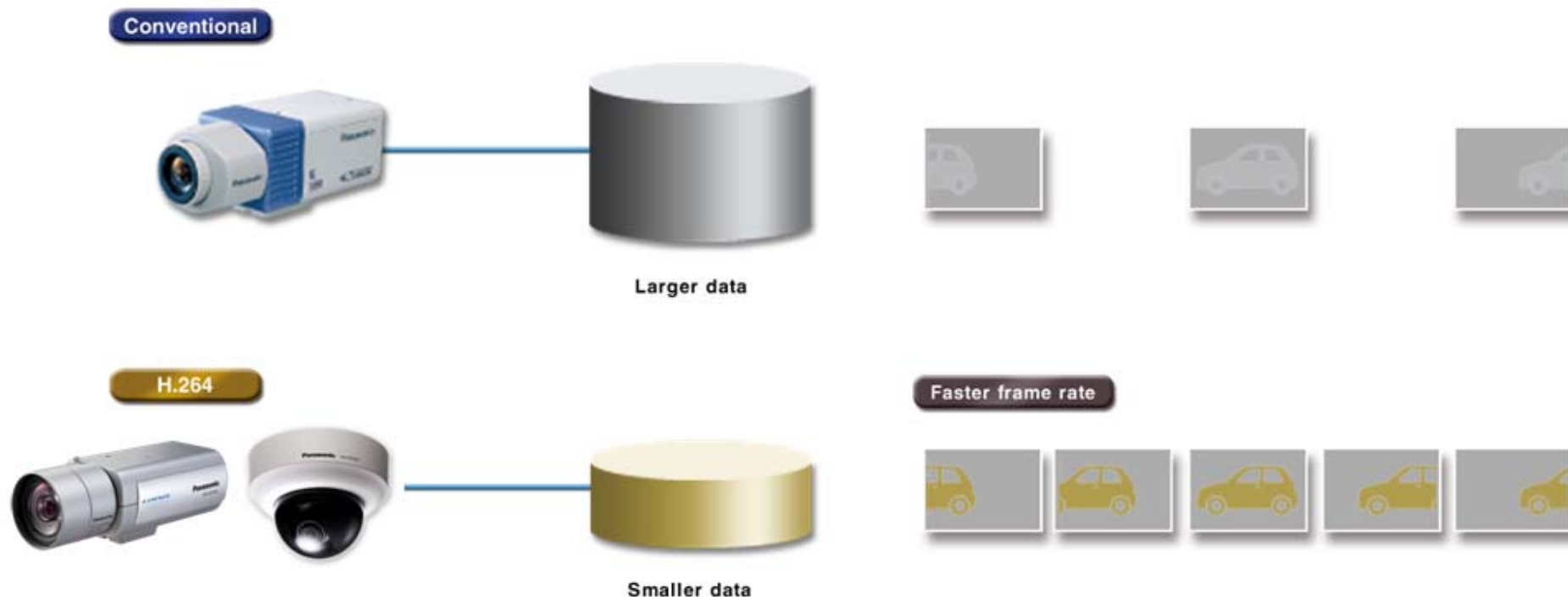
* This allows better image quality within the limited network/disk capacity.
SF346 supports H.264 encoding at a megapixel resolution.

Panasonic ideas for life

H.264 Latest Encoding - 2

i-PRO
SmartHD

H.264 latest encoding technology with Panasonic Uniphier platform enables superior image of 1280 x 960 with smaller data size.



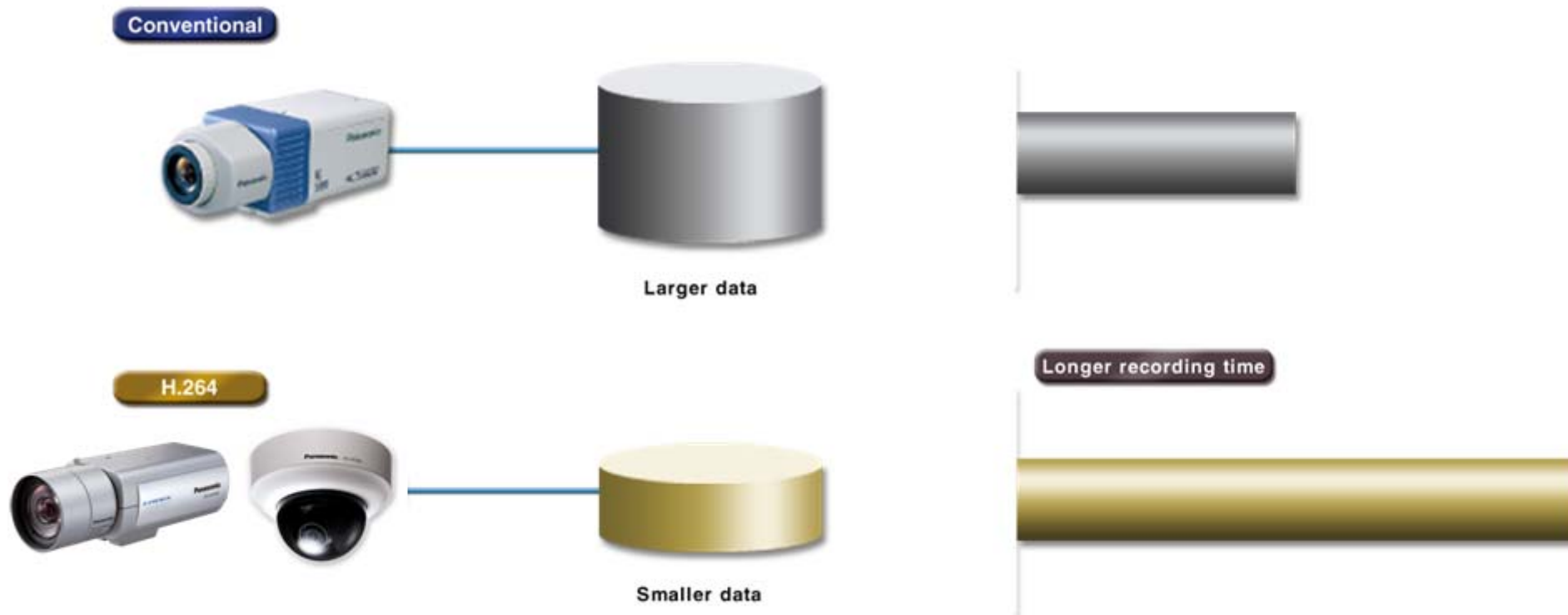
* This allows better image quality within the limited network/disk capacity.
SF346 supports H.264 encoding at a megapixel resolution.

Panasonic ideas for life

H.264 Latest Encoding - 3

i-PRO
SmartHD

H.264 latest encoding technology with Panasonic Uniphier platform enables superior image of 1280 x 960 with smaller data size.



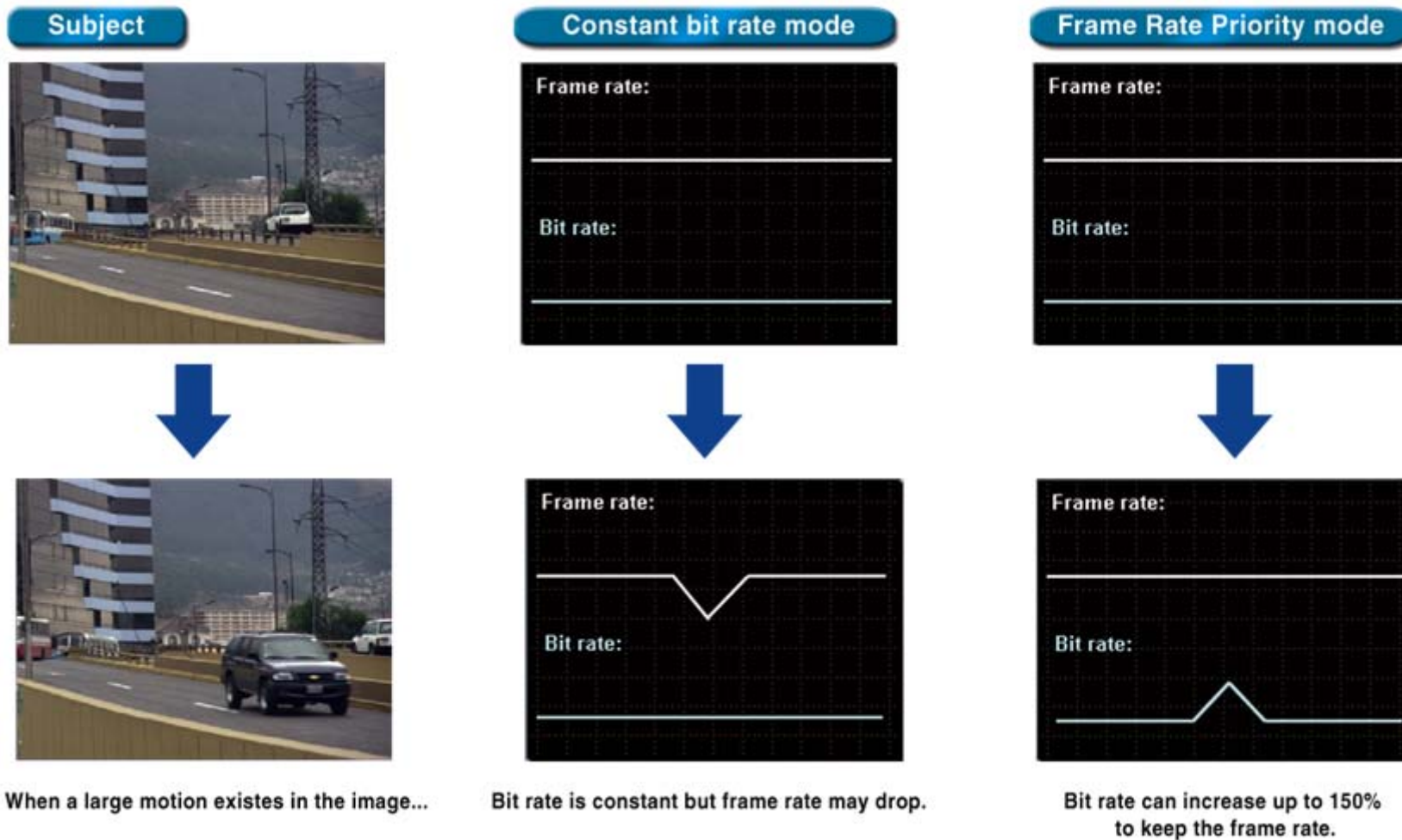
* This allows better image quality within the limited network/disk capacity.
SF346 supports H.264 encoding at a megapixel resolution.

Panasonic ideas for life

Frame Rate Priority Mode

i-PRD
SmartHD

Frame rate priority mode dynamically controls bit rate depending on the subject to maintain the frame rate.



* This mode does not always guarantee the frame rate.

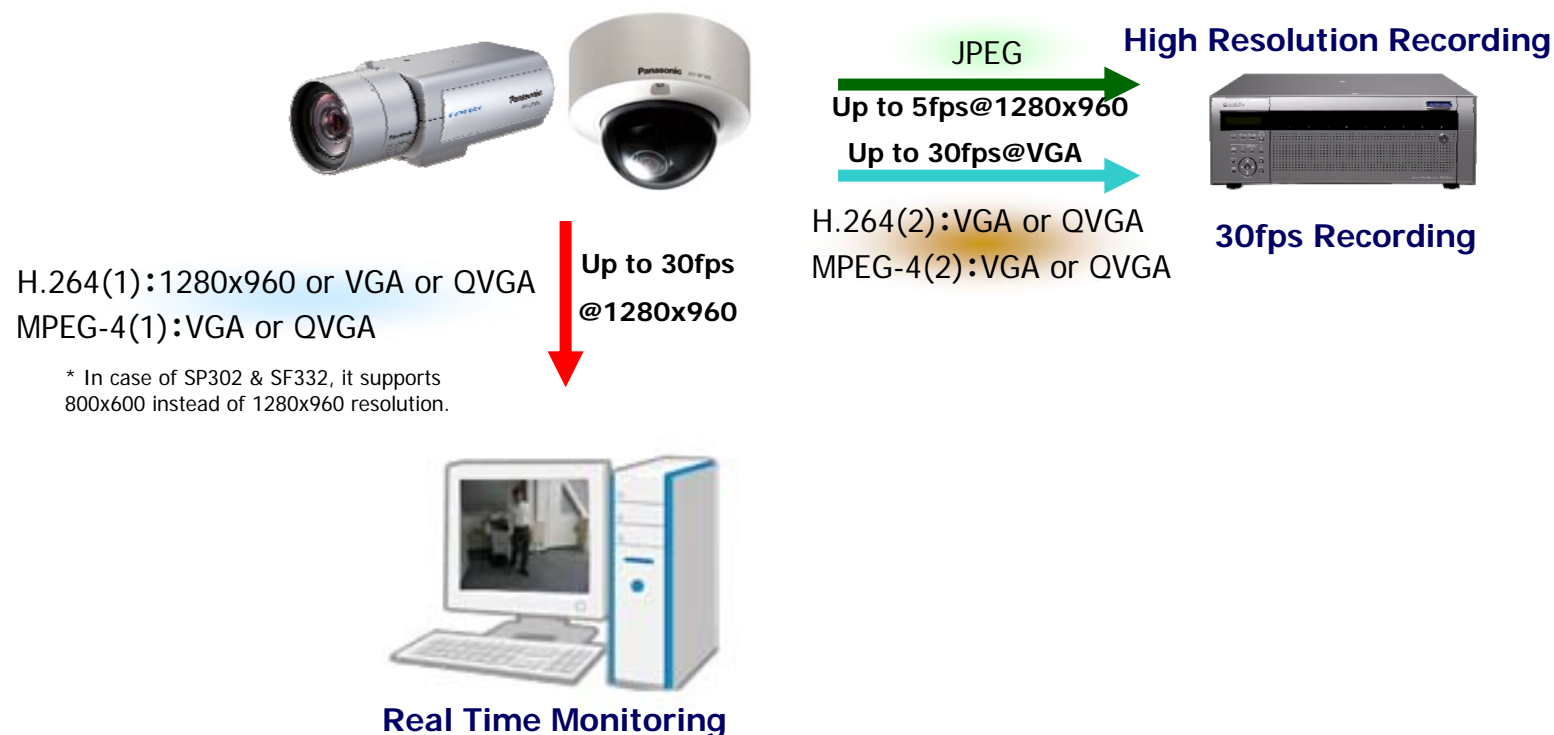
SF342 SF346

Panasonic ideas for life

Multiple Streaming – 4:3 ratio

i-PRG
SmartHD

Triple streams(4:3 aspect ratio) including JPEG and H.264(2ch) or MPEG4(2ch) can be transmitted simultaneously, enabling both real time monitoring and high quality recording.



* In case of SP302 & SF332, it supports 800x600 instead of 1280x960 resolution.

* When motion stream 1 is H.264 or MPEG-4, motion stream 2 must be H.264 or MPEG-4 (same compression type).
Total bit rate must be less than camera's max performance. Detail of the streaming combination is under study.

Panasonic ideas for life

SF342 SF346

Multiple Streaming – 16:9 ratio

i-PRO
SmartHD

Triple streams(16:9 aspect ratio) including JPEG and H.264(2ch) can be transmitted simultaneously, enabling both real time monitoring and high quality recording.



* Total bit rate must be less than camera's max performance. Detail of the streaming combination is under study.

Panasonic ideas for life

SF342 SF346

SD Memory Recording

i-PRO
SmartHD

SD/SDHC Memory card slot for manual recording (H.264/JPEG), alarm recording (H.264/JPEG) and backup upon network failure (JPEG).

SD Memory Setting



1. Select image format

- JPEG
- H.264

*** In case selecting H.264, H.264 (2) streaming is used only for SD memory recording. In case using recorder backup upon network failure, select JPEG.**

2. Select recording mode

- JPEG :Manual REC/Alarm REC (Post)
/Backup upon network failure (FTP error)
- H.264 :Manual REC/Alarm REC (Pre/Post)

3. Select recording setting

- Resolution :
 - 4:3 mode :1280x960/VGA/QVGA
 - 16:9 mode :1280x720/640x360/320x180
- Frame Rate/Bit Rate

*** In case of H.264, the setting for H.264(2) will be changed to the SD memory recording setting.**

4. Select data size setting in pre/post alarm for H.264

- Pre-Alarm :ON (data size: up to 2Mbps)/OFF
- Post-Alarm:10s – 300s

*** In case of H.264, video data is recorded in the MP4 encoding format.**

Panasonic ideas for life

Video Motion Detection

i-PRO
SmartHD

The motions in the specified areas can be detected, triggering an alarm.

Up to 4 areas can be registered. Finer tuning is possible with area and sensitivity adjustment.

Up to 4 areas can be set.

Detection size; When smaller, sensitivity becomes higher.

Area	1(White)	2(Blue)	3(Green)	4(Red)
Status	<input type="radio"/> On <input type="radio"/> Off	<input type="radio"/> On <input type="radio"/> Off	<input type="radio"/> On <input type="radio"/> Off	<input type="radio"/> On <input type="radio"/> Off
Detection area	<input type="range" value="1"/>	<input type="range" value="1"/>	<input type="range" value="1"/>	<input type="range" value="1"/>
Detection sensitivity	<input type="range" value="5"/> Low High	<input type="range" value="5"/> Low High	<input type="range" value="5"/> Low High	<input type="range" value="5"/> Low High
Delete	<input type="button" value="Delete"/>	<input type="button" value="Delete"/>	<input type="button" value="Delete"/>	<input type="button" value="Delete"/>
Light detection control	<input type="radio"/> On <input checked="" type="radio"/> Off			
<input type="button" value="Set"/>				
VMD information addition				
Information addition	<input type="radio"/> On <input checked="" type="radio"/> Off			
<input type="button" value="Set"/>				

Sensitivity: Low to High

Flexible alarm handling

i-PRO
SmartHD

Alarm sources including Terminal input, VMD and Panasonic alarm command can trigger actions such as SD memory recording, FTP image transfer, E-mail notification, Indication on browser, Alarm terminal output, and Panasonic protocol output.



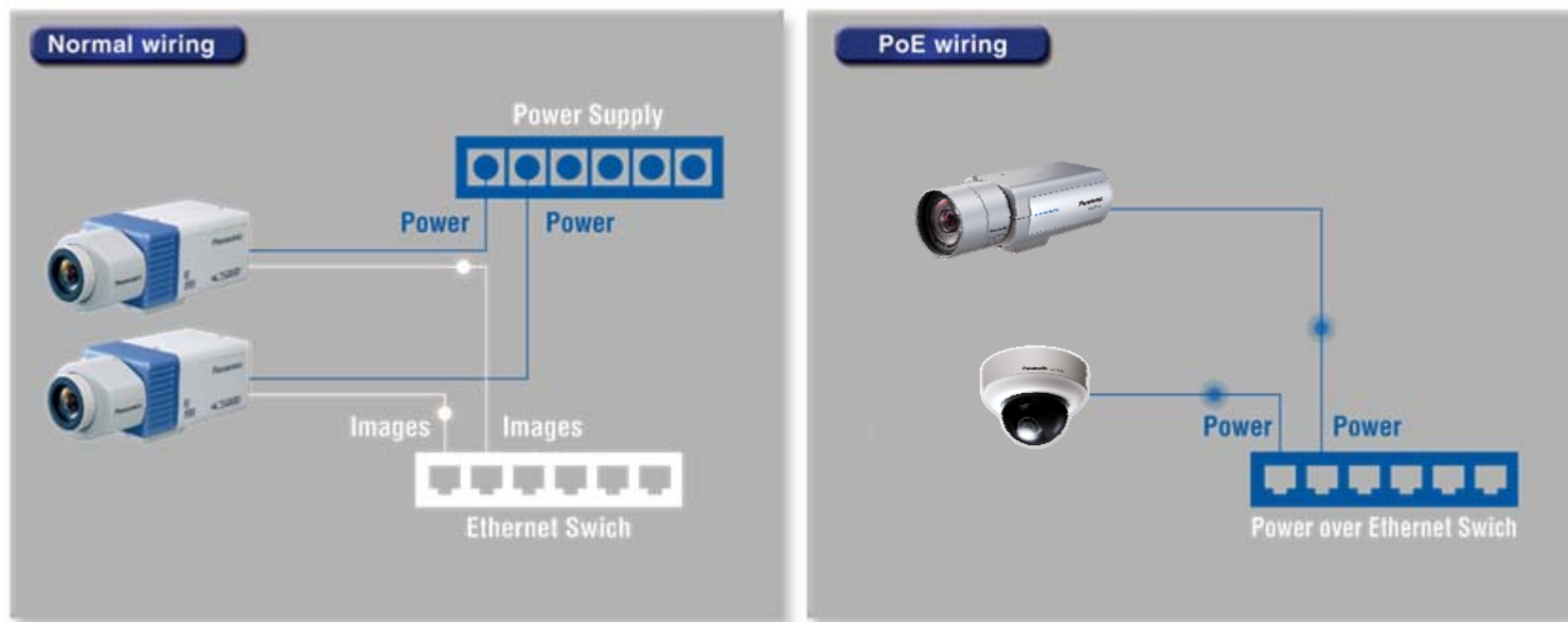
Panasonic ideas for life

PoE (Power over Ethernet)

i-PRO
SmartHD

Both power and image data can be transmitted through a signal Ethernet cable.

By eliminating the need for power cables and supplies when installing cameras or changing layouts, installation and maintenance costs are reduced.



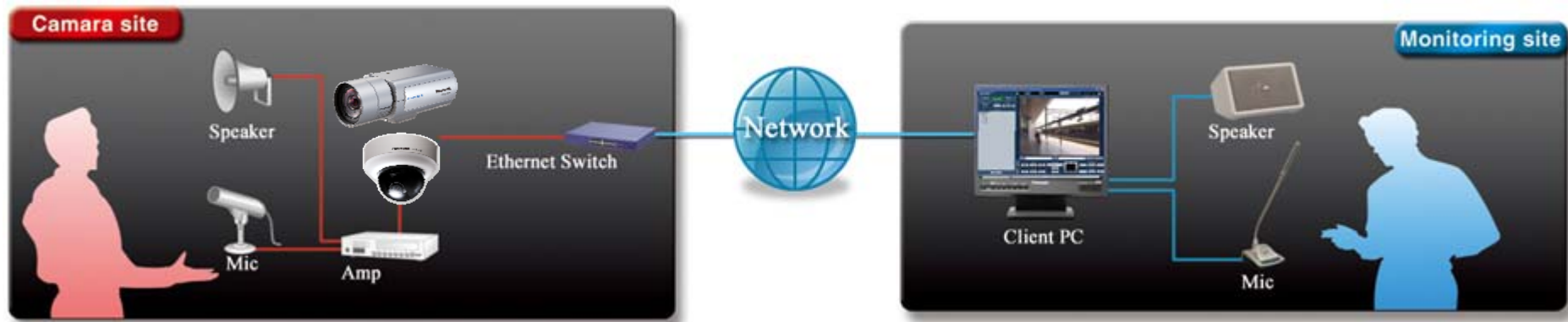
Panasonic ideas for life

SF342 SF346

Bi-directional Audio

i-PRG
SmartHD

Full duplex bi-directional audio allows interactive communication between camera site and monitoring site.



* G.726 (ADPCM) 32 kbps mode only.

Panasonic ideas for life

SF342 SF346

Bit Rate, Frame Rate Setting



Transmission Priority is “Frame rate” (Frame Rate priority mode).

Recommended bit rate for H.264

*Refresh interval for H.264 (I frame interval) should be set 1 second.

	SXVGA(1280x960)	VGA(640x480)	QVGA(320x240)
H.264 30 fps	2,048kbps	768kbps	512kbps
H.264 5 fps	1,024kbps	384kbps	256kbps
H.264 3 fps	1,024kbps	384kbps	256kbps
H.264 1 fps	768kbps	256kbps	128kbps

Bit rate for JPEG and MPEG-4

	SXVGA(1280x960)	VGA(640x480)	QVGA(320x240)
JPEG 1 fps	28KB(=1,024kbps)	48KB(=384kbps)	24KB(=192kbps)
M-JPEG 30 fps	Normal image quality: Maximum 13 fps (Low image quality : 30 fps , 13,248kbps)	11,868kbps	6,624kbps
MPEG-4 30 fps	N/A	2,048kbps	1,024kbps

H.264 requires less bit rate than JPEG for the same frame rate

H.264 is 5 time more frame rate than JPEG with the same bit rate in this case.

H.264 requires less bit rate than JPEG for the same frame rate

* The above recommended values change up to the object conditions and required image quality.

H.264 : Transmission priority is “Frame rate”, possible frame rate values are shown in the table. Refresh interval is 1 second. The image quality is equivalent to normal image quality of JPEG.

M-JPEG: Normal image quality (5 of 9 levels)

MPEG-4 : Normal image quality (Constant bit rate mode), Refresh interval is 1 second.

H.264 Bit rate Comparison



WV-SF342 / WV-NP502 H.264 Bit rate

Comparison is done by equivalent image quality: Normal Camera target is moving object.

	SXVGA (1280x960)		VGA (640x480)		QVGA (320x240)	
	NP502	SP305	NP502	SP305	NP502	SP305
H.264 30 fps	2,048 kbps		1,024 kbps	768 kbps		512 kbps
H.264 15 fps	1,536 kbps		768 kbps	512 kbps		384 kbps
H.264 10 fps	1,536 kbps		768 kbps	512 kbps		384 kbps
H.264 5 fps	1,024 kbps		512 kbps	384 kbps		256 kbps

Company A H.264 Bit rate

The values in red color are much better than Company A

	1280x720*	VGA (640x480)	QVGA (320x240)
	H.264 30 fps	8,196 kbps (30~26 fps)	1,536 kbps
H.264 15 fps	6,144 kbps	768 kbps	384 kbps
H.264 10 fps	6,144 kbps	512 kbps	256 kbps
H.264 5 fps	3,072 kbps	384 kbps	256 kbps

*As Company A doesn't have SXVGA resolution, 1280x720 resolution is measured.

The above is one of examples. The values might be different up to object conditions or required image quality.