


SUPPORT BULLETIN		Distribution : ✂ FSC confidential ✂ Service partner		
	Fujitsu Siemens Computers	Date : Mar. 28, 2002	Ver. : 1.0	Page 1/2
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SI02003		Subject: LCD acceptance criteria		

LCD acceptance criteria

Problem:

What are the requirements for an LCD-monitor to be repaired under warranty. I.e. the acceptance criteria.

General:

In the warranty requirements, Fujitsu Siemens Computers refer to the international standard for LCD-Monitors and the acceptable amount of defect pixels and/or subpixels.

As a definition, each pixel consists of three(3) sub-pixels (red, green and blue)

Going by the current state of production technology, it is not possible to guarantee an absolute error-free monitor. Several less constant light or dark pixels may be present. The maximum number of faulty subpixels permitted is determined and restricted by the strict international standard, ISO 13406-2 (Class II).

That standard defines the maximum amount of defect pixels per million pixels, before it is granted for warranty repair.

ISO 13406-2 (class II) states the following as an acceptable amount of defect pixels:

Type 1	Type 2	Type 3
Light pixel (>75%)	Dark pixel (>75%)	Others, e.g. subpixels
2	2	5

Note that these values are per million pixels. See the examples below:

Example 1:

A 15" flatscreen with the resolution 1024 x 768 has 1024 x 768 = 786432 pixels.

Each pixel consists of 3 subpixels (red, green and blue), resulting in approx. 2.4 million pixels (subpixels/dots).

According to ISO 13406-2 (Class II) a maximum of 4 graphic elements and an additional 5 subpixels may be defect, i.e. a total of 17 faulty pixels.

This represents a percentage of approx. 0.002% of the complete number of pixels.

Example 2:

A 18" flatscreen with the resolution 1280 x 1024 has 1280 x 1024 = 1310720 pixels.


Each pixel consists of 3 subpixels (red, green and blue), resulting in almost 4 million pixels (subpixels / dots).

According to ISO 13406-2 (Class II) only a maximum of 6 graphic elements and an additional 7 pixels may be defect, i.e. a total of 25 faulty pixels.

This is a percentage of approx. 0.0006% of the complete number of pixels.

The information in the text above concerns all Fujitsu Siemens Computers LCD-monitors.

The table on the following page states the warranty requirements for Fujitsu Siemens Computers range of notebook computers called LIFEBOOK.

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Panel type	Bright sub-pixel	Black sub-pixel
DSTN 11.3" / 12.1" & DSTN-HPA 12.1" 520D, 735Dx, 765Dx, 270Dx	8	8
TFT 8.4" / 10.4" / 12.1" / 13.3" / 14.1" / 15.1" B110, B112, B142, B-213x, 555T, 555Tx, 531Tx, 556Tx, 635T, 655Tx, 656Tx, 675Tx, 690Tx, 755Tx, 765Tx, 780Tx, 790Tx, C325, E330, E342, E351, E352, C-4000, C-4135, C-4325, S-4xxx 985Tx, 990Tx2, E340, E350, L440, L460, E360, E370, E380, C345, C-5000, E-5xxx, C-6000, C- 6135, C-6325, E-6xxx, X-7xxx	4	10
TFT 11.3" 520T, 530T	6	10

All panels; One dot consists of three(3) sub-pixels
All panels; Minimum distance between neighbouring coloured dots: 10 mm (15 mm for C-xxx5, E-xxxx, B-213x and X-7xxx)
All panels; Minimum distance between neighbouring black and white dots: 5 mm
All panels; Connected bright dots: 3 or less
All panels; Groups of connected bright dots: 5 or less.
All panels; Connected black dots: 2 or less