The CoPtCr-SiO$_2$ medium shows great potential for high-density perpendicular magnetic recording, as it displays excellent signal-to-noise ratio (SNR) characteristics together with high thermal stability. However, significant bit percolation, involving a partial combination with the neighboring magnetic bits, has been observed at a high linear recording density, and has been shown to degrade the magnetic-recording patterns. On the other hand, it is known that the magnetic cluster size is a significant factor limiting the linear recording. Therefore, in this paper, we have investigated the relationship between magnetic cluster size and the recording bit length at which bit percolation begins to occur in a CoPtCr-SiO$_2$ perpendicular magnetic-recording medium to the range of 1500 kfc.

According to our experiments using perpendicular recording media with four types of recording layers, which determine the magnetic properties, high-resolution magnetic-force microscopy patterns indicate that the bit length at which percolation begins to occur is almost the same as the magnetic cluster size. These results suggest that the bit length with percolation, which determines the limit of the recording density, can be improved by decreasing the magnetic cluster size of the medium.

Digital broadcasting makes it possible for viewers to enjoy a variety of new services on many channels. However, the receivers require complex operations in some cases. A survey conducted in England, which started digital broadcasting before Japan did, shows that the difficulty of operating a digital television or interactive television was almost equal to that of a PC. Since television is a media for everyone, from children to the elderly, an easy-to-use user interface is needed so that all the users can make full use of the convenient services of digital broadcasting.

In order to solve the problem, we prototyped an easy-to-use user interface for digital broadcasting receivers whose features are a small number of buttons on the remote control and consistently operable GUI menu.

Two design strategies - to lower psychological barrier in the initial stage of usage, and to avoid looking down at a remote control - were adopted on the basis of the usability tests that we conducted.

To evaluate the prototype, we conducted experiments using the semantic differential method. Two major components -“functionality” and “appearance”- were extracted from the results of the principal component analysis. We found that there were significant differences in the each component score between the prototype user interface and a conventional one that had many buttons. The results indicate the effectiveness of our design methodology to develop an easy-to-use user interface.

Digital broadcasting makes it possible for viewers to enjoy a variety of new services on many channels. However, the receivers require complex operations in some cases. A survey conducted in England, which started digital broadcasting before Japan did, shows that the difficulty of operating a digital television or interactive television was almost equal to that of a PC. Since television is a media for everyone, from children to the elderly, an easy-to-use user interface is needed so that all the users can make full use of the convenient services of digital broadcasting.

In order to solve the problem, we prototyped an easy-to-use user interface for digital broadcasting receivers whose features are a small number of buttons on the remote control and consistently operable GUI menu.

Two design strategies - to lower psychological barrier in the initial stage of usage, and to avoid looking down at a remote control - were adopted on the basis of the usability tests that we conducted.

To evaluate the prototype, we conducted experiments using the semantic differential method. Two major components - “functionality” and “appearance” - were extracted from the results of the principal component analysis. We found that there were significant differences in the each component score between the prototype user interface and a conventional one that had many buttons. The results indicate the effectiveness of our design methodology to develop an easy-to-use user interface.