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Abstract
Due to the fast and fruitful development of computer technology, move and move people choose slim, powerful, and mobile notebook computer. At present, notebook computers sold mainly employ edge-lighting backlight modules (BLUs). In this research, we first measured and analyze a 14” edge-lighting BLU sample. According to the analysis, we build models for the BLU elements in the optical simulation software ASAP in order to increase the credibility of optical simulation for BLUs. In addition, we study the flux loss ratio and mechanism of main components in the BLU and hope the results can help the optical design of BLUs in the future.
For the measurement, we first measured and analyze the micro-structure of the light guide plate (LGP). We use α-step and microscope to measure the incident, top and bottom surface. We find that the incident and top surfaces have random roughness and the bottom surface has V-cut structure. Then we use BM-7 to measure the luminance of the BLU and the cold cathode fluorescent lamp(CCFL). We obtain the axial luminance distribution of the CCFL and luminance uniformity and average luminance of the BLU. Finally we use integrating sphere to measure the luminous flux emitting from the whole BLU and part of the BLU, in order to understand the flux loss ratio of the main components of the BLU. From the measurement, we find the emitting flux of the BLU under investigation is 60% of the emitting flux of the CCFL, i.e. the flux loss ratio of the BLU is 40%. Through the above measurement and analysis, we can obtain the flux loss ratio and optical model of main component of the BLU. We build those models in the simulation software ASAP, run simulations, and compare with measurement results to understand the credibility of the simulation. Furthermore, to know the internal mechanisms of the BLU better, we also study the behavior of light inside the BLU.
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