



*everyday genius*

# **MiraVision**

## **Picture Quality Enhancement Technology for Displays**

**MediaTek White Paper**

**January 2015**

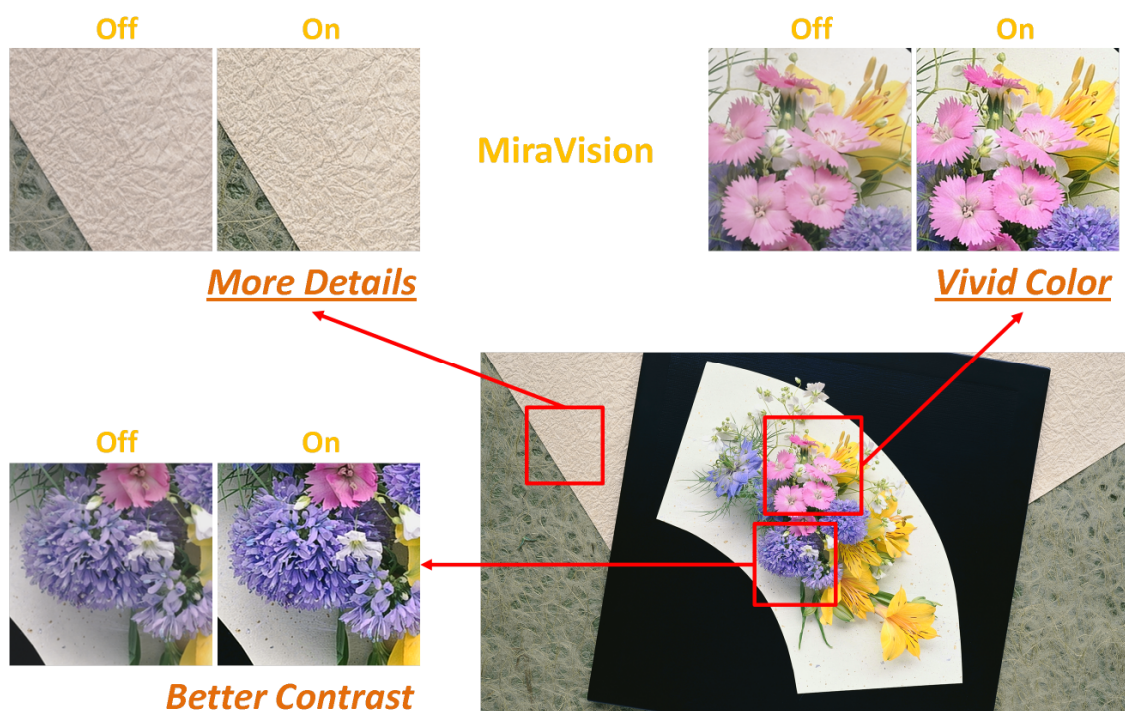


## 1 The Total Solution to Picture Quality Enhancement

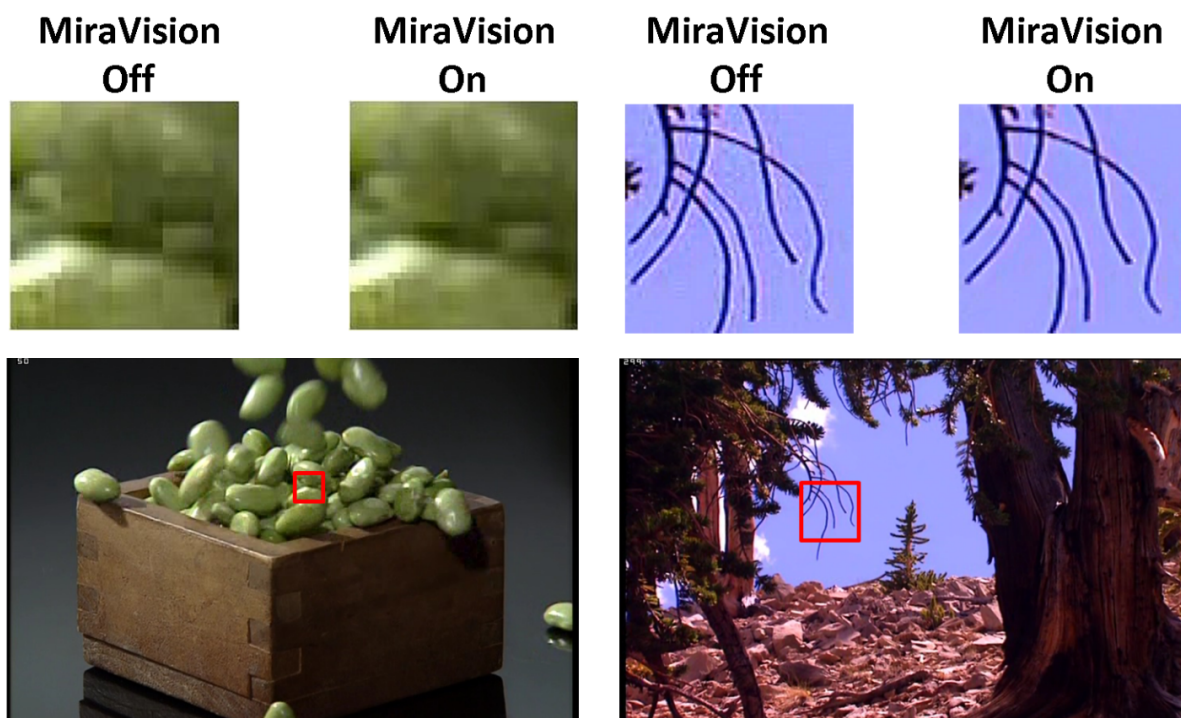
In multi-media technology the display interface is significant in determining quality user viewing experience. MediaTek MiraVision™ technology contributes significantly to display perfection and excellent user experience by intelligently altering picture attributes such as hue, saturation, brightness, resolution, frame rate. MiraVision power efficient algorithms perfect the display picture quality (PQ), thus ensuring an enjoyable viewing experience and extending battery life.

MediaTek MiraVision™ picture quality (PQ) enhancement technology for TVs has long been recognized by design wins with tier-one TV customers, including Sony, Samsung, Panasonic and Sharp. We now bring this widely recognized technology to mobile platforms.

MiraVision capabilities include picture quality enhancement, such as color, sharpness and dynamic contrast, noise reduction for blocking, mosquito and random noises, MEMC frame rate up-conversion, and visibility enhancement under different ambient lighting conditions. The images below demonstrate these features.



**Figure 1. MiraVision Picture Quality Enhancement**



**Figure 2. MiraVision Compression Noise Reduction**

**MiraVision Off**



**MiraVision On**



*Figure 3. MiraVision Random Noise Reduction*

**MiraVision ClearMotion  
Off**

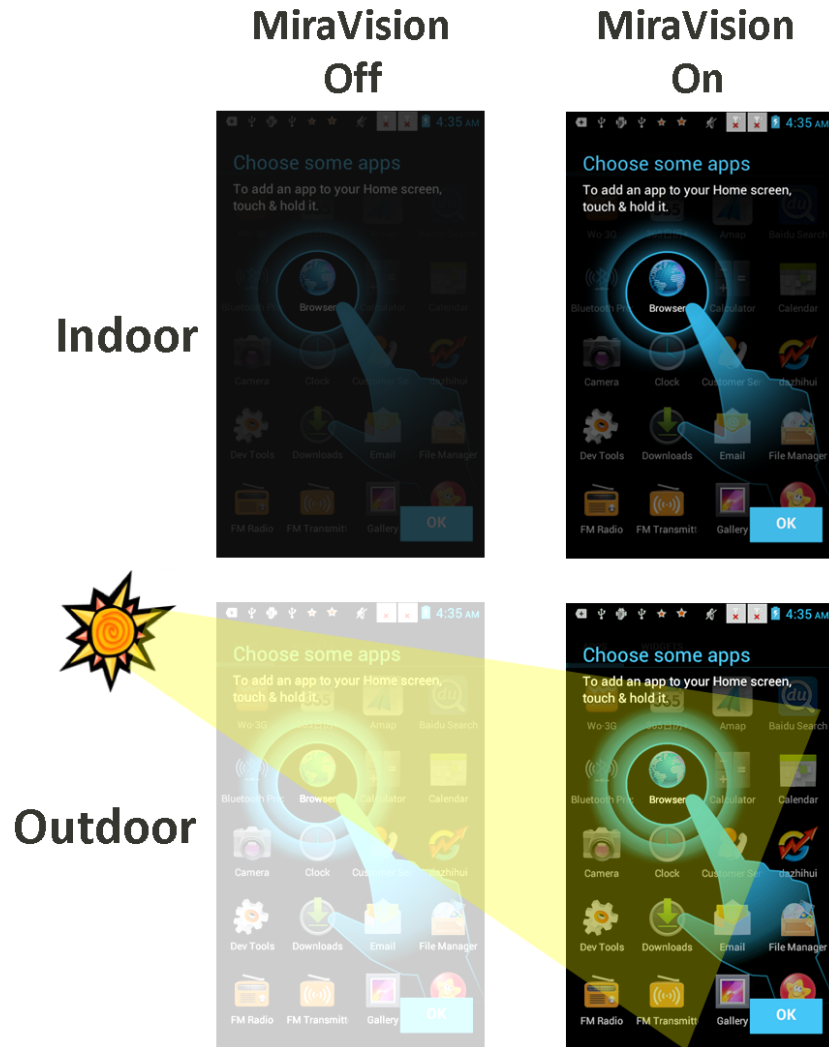


**MiraVision ClearMotion  
On**



*Figure 4. MiraVision ClearMotion Frame Rate Up-Conversion*





**Figure 5. MiraVision Visibility Enhancement**

## 2 MediaTek's Algorithms

Over the years MediaTek has specialized in developing picture quality algorithms utilizing learning from signal processing theory. These algorithms include filter design, noise reduction, Y/C separation, de-interlacing, frame rate conversion, scaling, sharpening, contrast enhancement, color management, 2D-to-3D, stereo matching, 3D depth control, and MEMC (motion estimation and compensation). In particular, MEMC has been tailored for noise reduction, de-interlacing, frame rate conversion, stereo matching, etc. We also bring premium functions, such as ClearMotion™ for frame rate conversion, from TV to mobile devices. MediaTek ClearMotion technology eliminates motion jitter and ensures smooth video playback.

### ASIC

MediaTek has a long and proven history of hardware design and optimization. Highly specialized in this field, we chose the ASIC approach to realize MiraVision, making it much more efficient in power and DRAM bandwidth consumption than pure software approaches and companion chips, a very essential for mobile devices running on batteries. Furthermore, Integrating MiraVision highly into an SoC natively resolves the quality difficulties inherent in companion chips and/or driver IC approaches.

### Quality Tuning

While algorithms serve as a foundation, optimized *tuning* renders the best PQ under certain given constraints. In fact, the quality users perceive is the net result of algorithms plus tuning. This is why we emphasize efficient customer tuning flows and tools for automation, so as to best fulfill customer display PQ requirements.



**Figure 6. Tuning as the Soul of MiraVision**

### Display-Related Health Concerns

MiraVision also readily addresses display-related health issues. For example, sleep-disturbing blue light emitted from displays can readily be reduced while PQ is optimally maintained; viewing comfort under extremely dark environments can be assured. Even the visually impaired can take advantage of MiraVision to optimize their viewing experience. And once again, all these are achieved without extra silicon cost or power consumption.

### Power Saving

Displays consume the majority of the system power. With a smart content processor and backlight control functionality, MiraVision ensures the best picture quality for an excellent viewing experience, regardless of display specifications and lighting conditions. This is accomplished while saving display power to extend battery life.

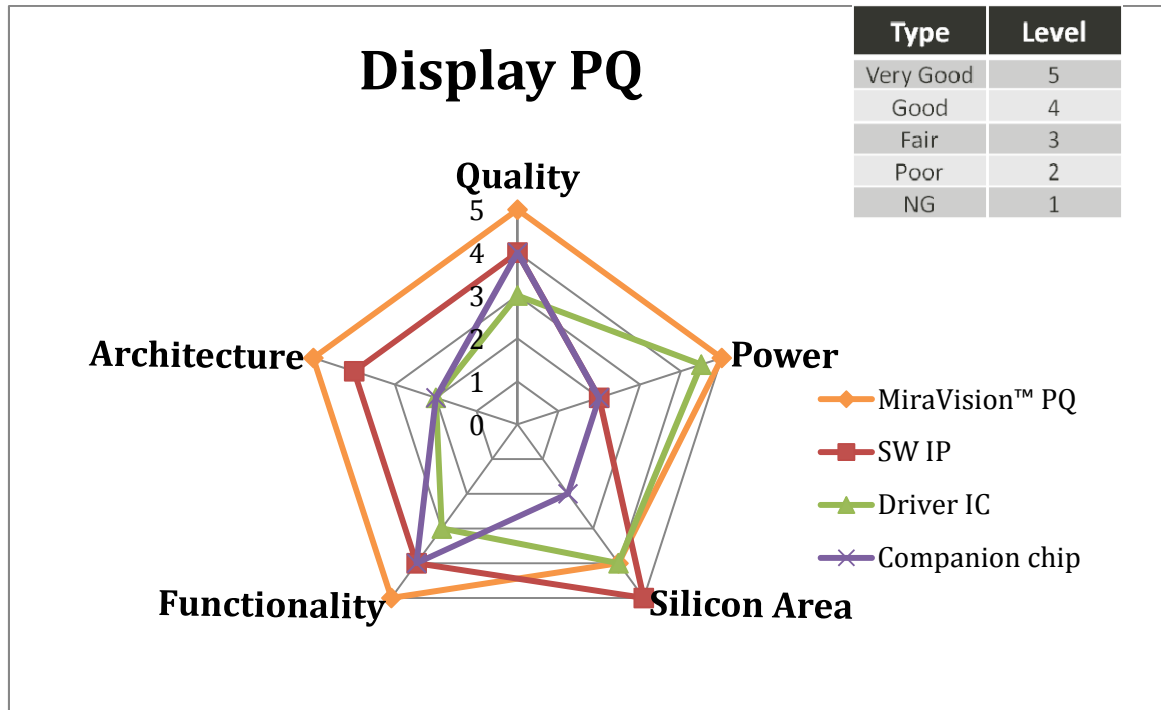
### Leadership in Display Technology

MediaTek MiraVision has achieved several world-leading records:

- The first MEMC Frame Rate Compression on Smartphones/Tablets (ClearMotion)
- The first 120Hz Displays on Smartphones
- The first Picture quality Enhancement on video APP
- Picture Quality certified by worldwide Tier-1 customers

Compared with other solutions, shown in Figure 7 and Figure 8 below, MediaTek MiraVision outperforms in quality, power consumption, functionality and architecture. And MiraVision

also provides excellent visibility enhancement with power saving for a variety of application scenarios.



**Figure 7. Display Picture Quality**



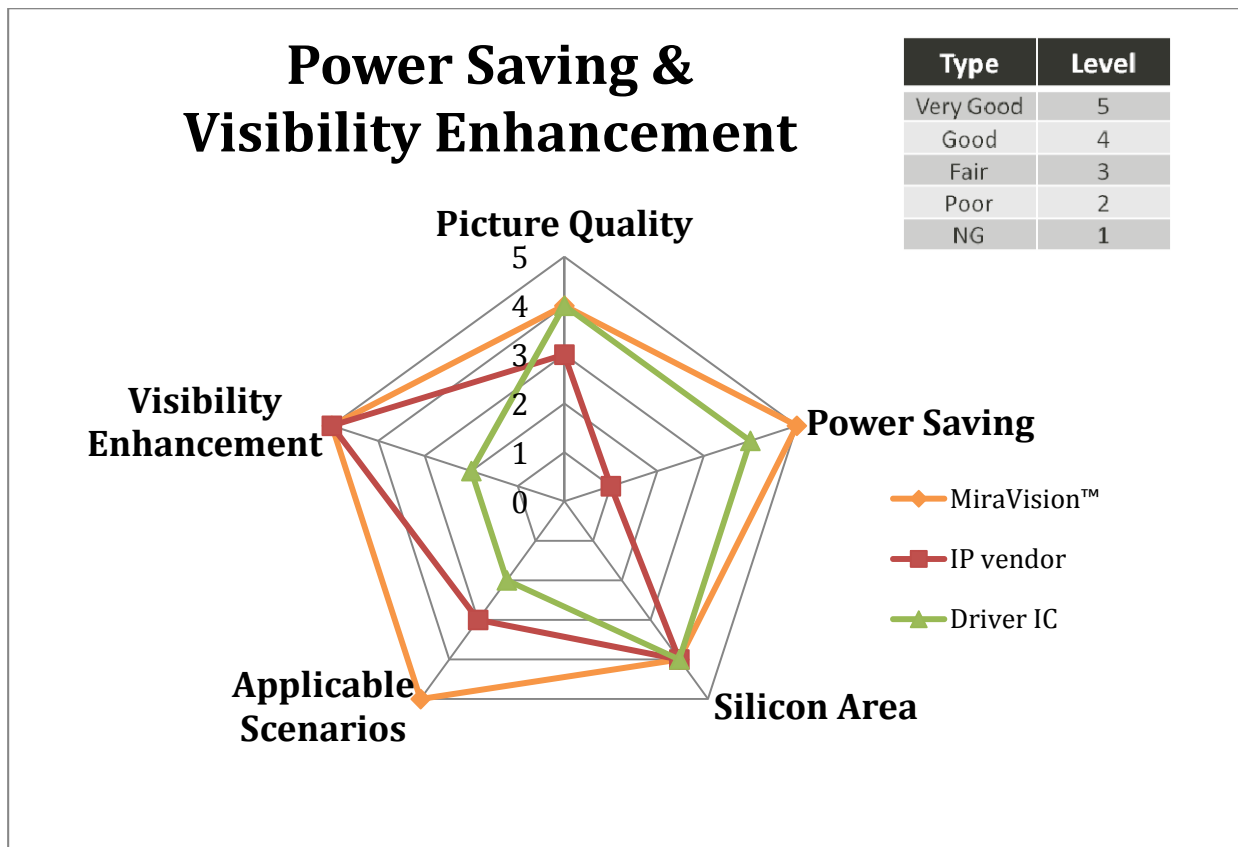


Figure 8. Power Saving and Visibility Enhancement

### 3 Conclusion

MediaTek MiraVision is a leader in display technology. By adopting MiraVision our customers are able to provide displayed pictures which are more visually pleasing to the human eye with excellent power saving. The net result is the best display viewing experience ever made possible in the industry, making the most out of the panel, power, and the content to display.

MediaTek's product lines equipped with MiraVision include TV, Feature Phones, Smartphones, Tablets, Smart Watches, and more to come. MediaTek will keep striving for excellence in display viewing experience.