Measurement of near field radiated emission in space using computer vision tracking technology.

EMC issues have been around since the early days of electronics and radio. With the increasing popularity of wireless application, faster speed of digital circuit, low power of portable device, EMC problem becomes even more challenging than ever before. Since 1996, all electronic devices sold in EU region have to comply with the European EMC norms, Standardized compliance measurements at distance of 3 or 10 meters are required to be checked to ensure the electronic device radiation level is under limit. Those compliance test can be expensive since anechoic chamber is needed. Looking for more cost effective way to identify EMC problem in the early design stage, Engineers comes up with near field measurement techniques which use sniffer probe to identify radiation sources at the IC package, PCB and system level. It is recognized as a very useful probing tool since the far field failure is always directly related to the near field findings. Manual scanning using sniffer probe is quick and convenient, but without saving probe location information, it is impossible to reconstruct the radiation pattern in space. Various automatic robotic scanning system were then developed. The probe scan a predefined map in space and then take spectrum measurement at each location and then generate heat map on those grids. Those solutions, however, all have one common limitation: the scanning surface has to free of obsticles to allow the robtic arm move freely. This requirement could be a challenge in many applications. For example, a plug-in card in a chassis is hard to reach by robotic arm. A large heat sink may prevent the robotic arm from reaching down to the PCB traces. Scanner is also cumbersome, the DUT has to be the right size to fit in. To solve those issues, a new near-field scanning system enabled by computer vision color tracking algorithm is developed. Instead of probing to the predefined locations, the new system mesh space grid by virtual pixel grid. Users are allowed to probe freely in space so that the hard-reached location isn’t a problem. The probe location is tracked lively by a selected distinguished color. The measured spectrum are stored lively to the corresponding locations. After scanning, the system then reconstructs the spectrum heatmap overlay based upon the location and selected frequency information onto the DUT image. The new system use maximum hold mode to save the maximum radiation. It is faster and much flexiable than robotic scanning system and it is scalable from chip package level all the way to the standing rack system.