

Fig.2 The result of the DNA examination of the DNA standard solution

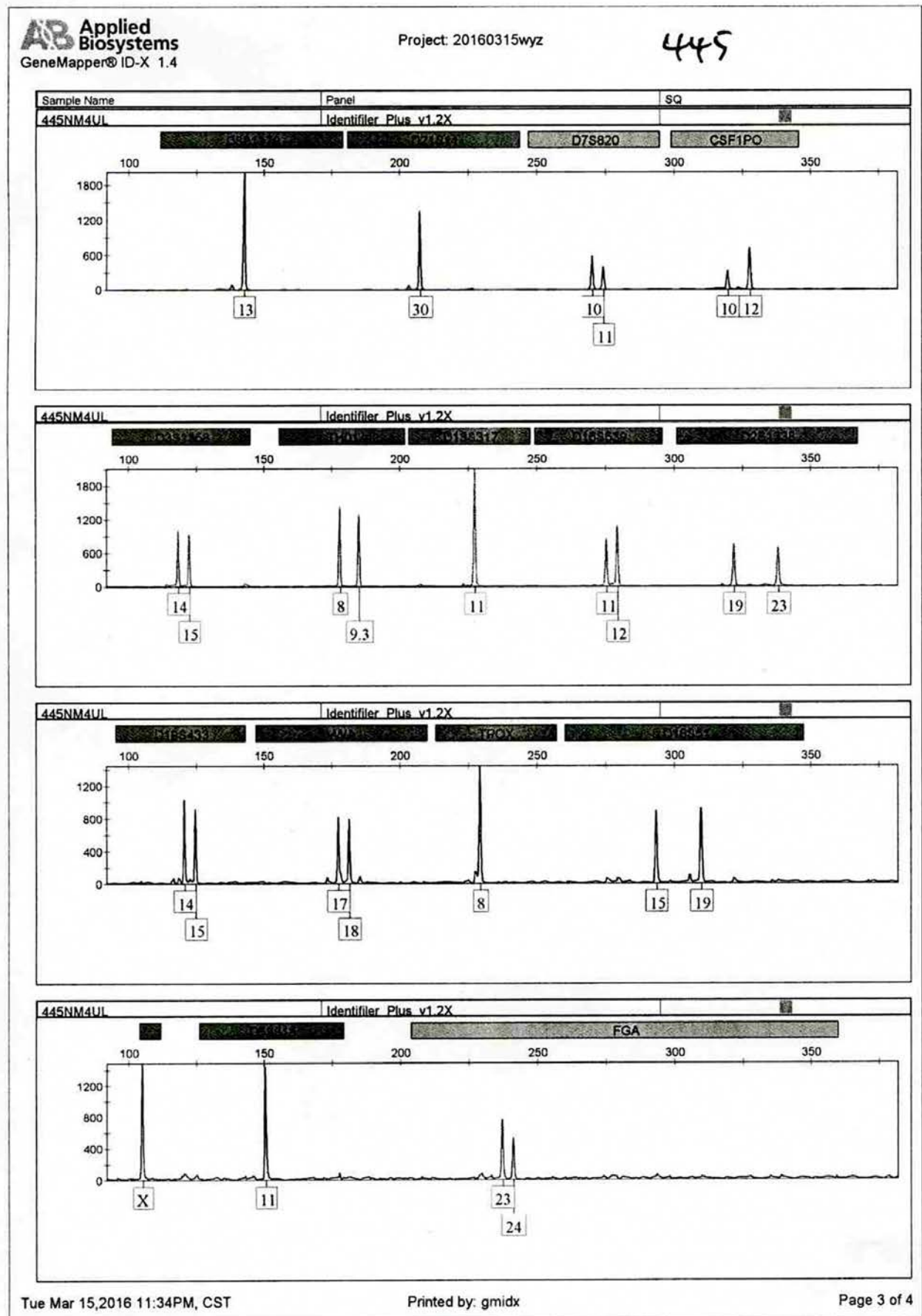


Fig.3 The result of the DNA examination of the DNA standard solution after irradiation with 445nm laser

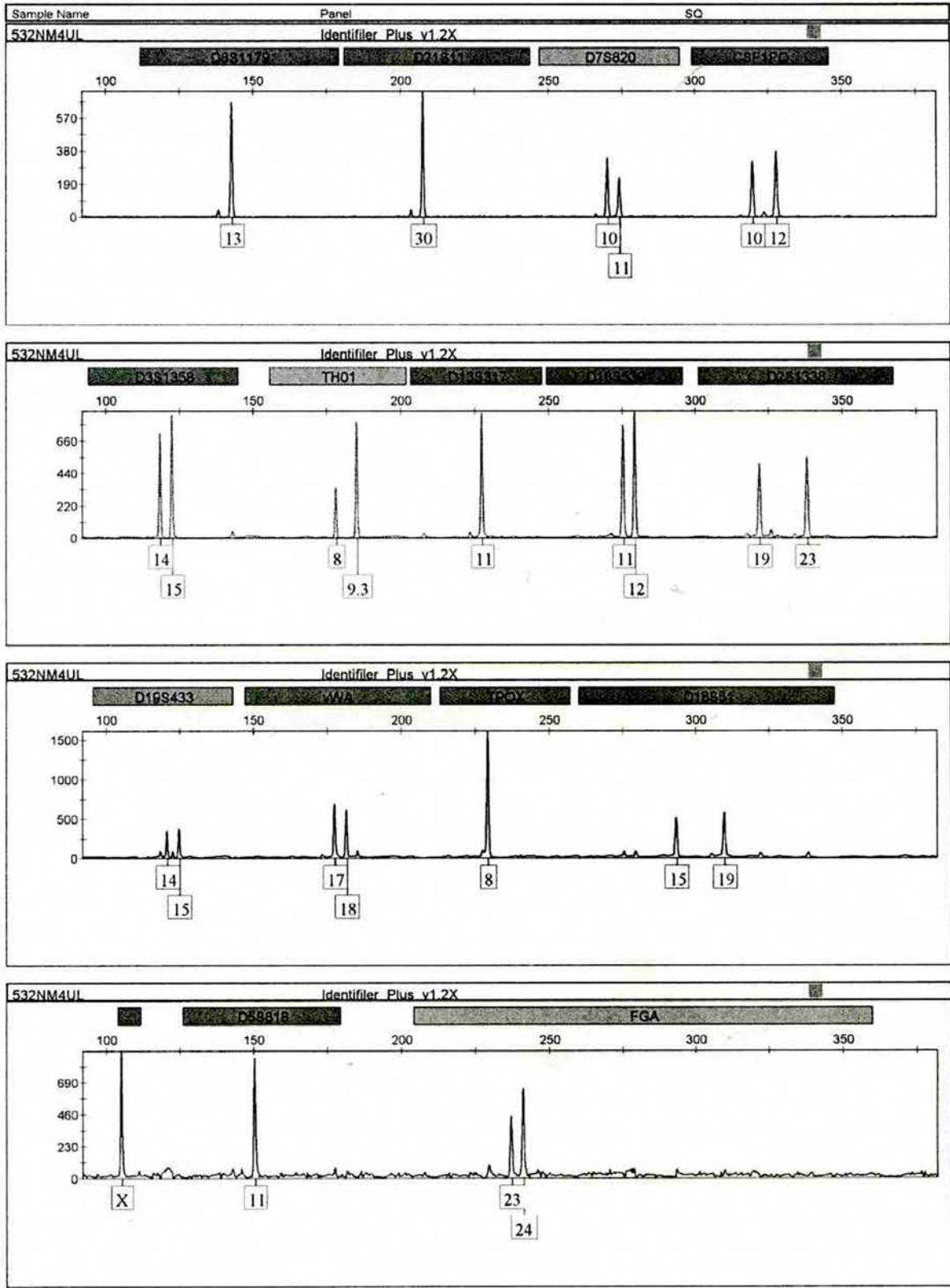


Fig.4 The result of the DNA examination of the DNA standard solution after irradiation with 532nm laser

254

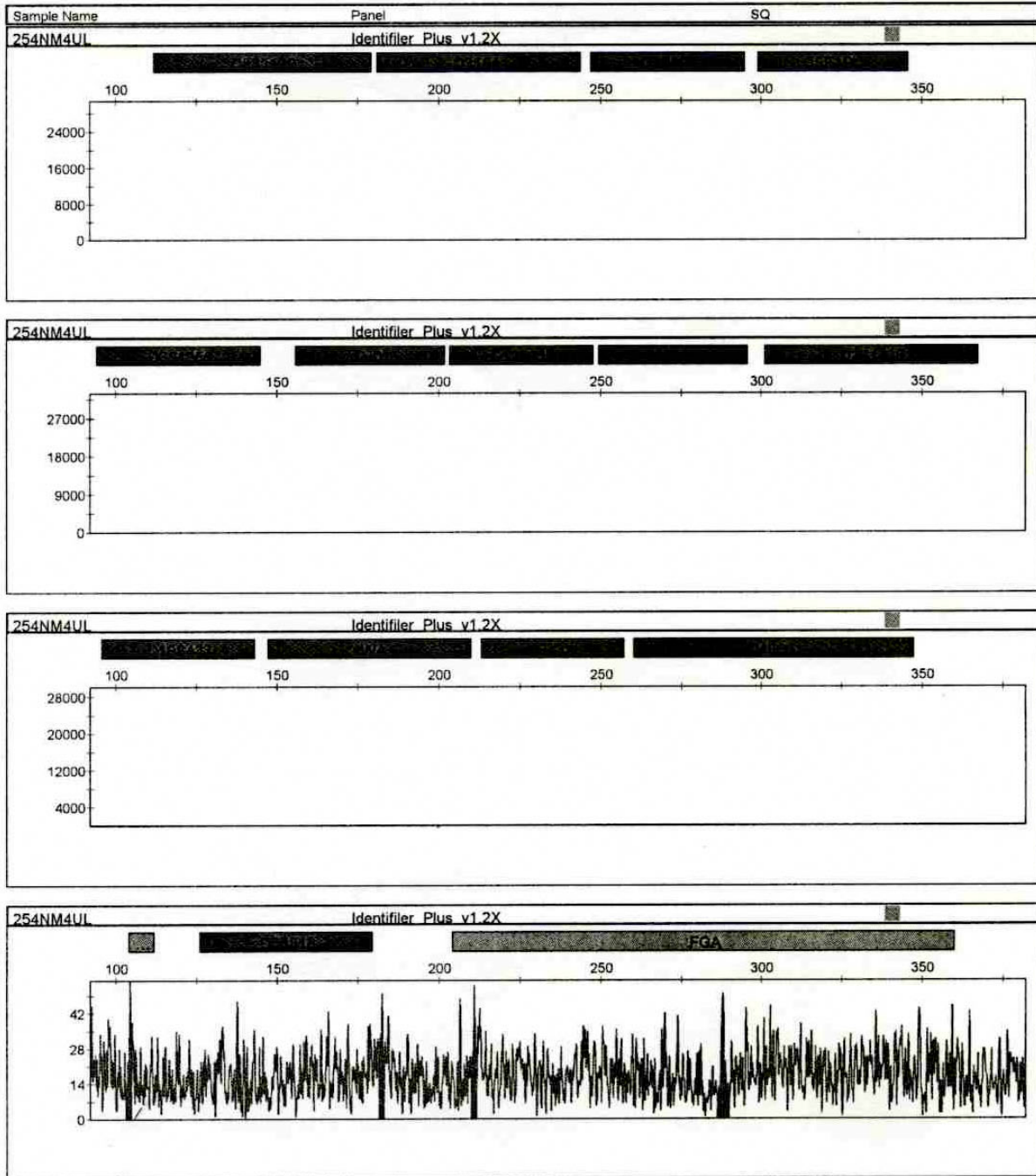


Fig.5 The result of the DNA examination of the DNA standard solution after irradiation with 254nm UV light

It uses laser to search scene traces of evidence, mainly through the laser excitation fluorescence to achieve the presence of traces of the scene. On the scene, the atoms or molecules in the fluorescent substance absorb the laser energy under the excitation of the laser to form the excited state, and the atoms or molecules in the excited state migrate to the ground state and emit a certain wavelength of fluorescence. However, DNA molecules can hardly absorb visible light and cannot fluoresce under visible laser excitation, and the endogenous fluorescence of DNA is very weak^[15], and cannot be detected by conventional detection equipment. In the crime scene DNA molecules do not exist independently, but included in a variety of biological samples. The fluorescence observed under laser excitation in the actual scene investigation is not the fluorescence emitted by the DNA itself. Fluorescence signal mainly comes from the two parts, one is a variety of components in the sample issued by the fluorescence, such as fine spot, in the laser excitation of the fluorescence signal is mainly semen in the protein, amino acids, Component of the fluorescence emitted^[15]; the other is the object of the object issued by the fluorescence, such as blood footprint where the cement floor, cement flooring in the laser excitation issued under the strong fluorescence, and blood show the dark traces and cement floor The emitted fluorescence is clearly contrasted. Although the visible band of laser irradiation does not destroy the DNA molecules, a variety of biological samples and the object on the visible band of laser often have strong absorption. Laser energy is absorbed by the specimen or object, part of the conversion into fluorescence, the other part into heat. The heat generated by this energy conversion is very easy to damage the DNA molecules, especially dark objects such as dark clothing, leather, etc., in high-power laser irradiation is easy to produce high temperature caused by damage to the test material, and even lead to DNA Molecular damage. Therefore, in the scene investigation process, in achieving the effect of the premise, it should use low-power laser and reduce the irradiation time, to avoid the laser on the object and the damage. 254nm shortwave ultraviolet light can also stimulate a variety of biological samples and produce fluorescence, because of its high photon energy and most of the material on the 254nm showed strong absorption. However, 254 nm shortwave UV has a significant destructive effect on the molecular structure of DNA, and requires careful caution when searching and traces using 254 nm shortwave UV.

5. CONCLUSIONS

DNA molecules in the visible band are almost no absorption. In scene investigation, the commonly used 445nm, 532nm visible band laser on the DNA molecules will not produce significant

damage, almost no impact on the current forensic DNA test. However, due to the complexity of the objects and samples in the crime scene, the laser on the different objects and the role of different materials, 445nm and 532nm laser in the course of the use of laser attention to the object and the damage, try to use low power And reduce the exposure time, to avoid the laser object and the destruction of the material. Laser display technology in the scene investigation has played a significant role, has become an indispensable exploration scene investigation means. In the process of using laser to carry out exploration, we need to take full account of the characteristics of laser and the actual scene, take the appropriate technology and methods and combined with a variety of other investigation techniques, give full play to the role and advantages of laser in order to improve the efficiency of investigation.

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