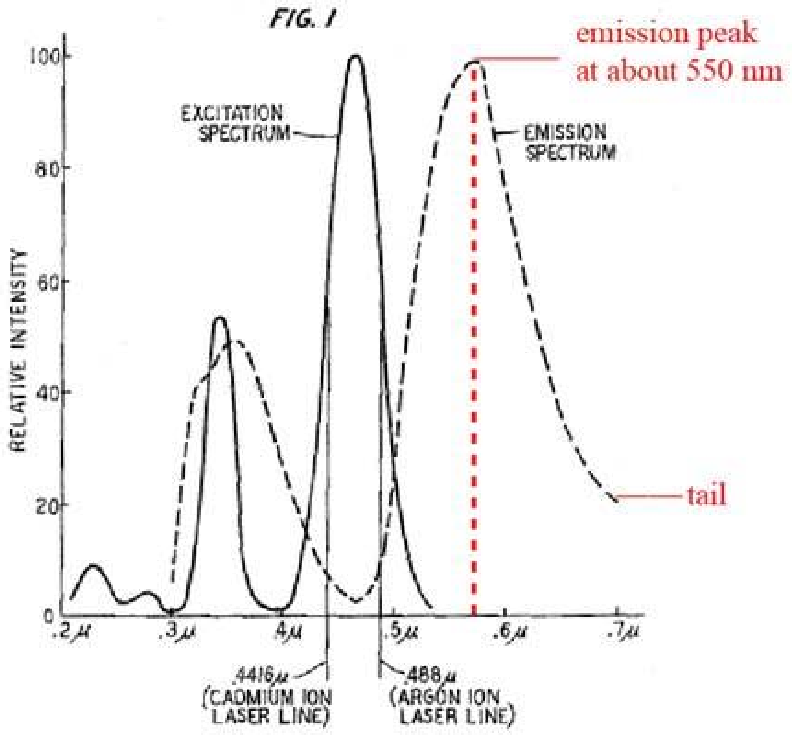
Exhibit 631-1

The following chart demonstrates that asserted claims 1, 4, 7, and 8 of U.S. Patent No. 7,915,631 (the "'631 patent") are anticipated by U.S. Patent No. 6,600,175 ("Baretz"), and obvious in view of Baretz alone or in combination with one or more of the following references:

- U.S. Patent No. 3,699,478 ("Pinnow")
- U.S. Patent No. 6,245,259 ("Hohn")
- U.S. Patent No. 3,875,456 ("Kano")
- U.S. Patent No. 5,208,462 ("O'Connor")
- U.S. Patent No. 4,966,862 ("Edmond")
- Japanese Patent Publication No. 50-059514 ("Kawamura")
- Japanese Patent Publication No. H7-99345 ("Matoba")
- Japanese Patent Publication No. 52-40959 ("Hasetani")
- Pinnow et al., *Photoluminescent Conversion of Laser Light for Black and White and Multicolor Displays*, Applied Optics, Vol. 10, No. 1 (1971) ("Pinnow Publication")
- J.M. Robertson et al., *Colourshift of the CE^{3+} Emission in Monocrystalline Epitaxially Grown Garnet Layers*, Philips J. Res. 36 (1981) ("Robertson")
- L.G. Van Uitert et al., "Photoluminescent Conversion of Laser Light for Black and White and Multicolor Displays. 1: Materials" Applied Optics Vol. 10, No. 1 (1971) ("Van Uitert")
- M.V. Hoffman, "Improved Color Rendition in High Pressure Mercury Vapor Lamps," Journal of the Illuminating Engineering Society, Vol. 6, No. 2 (1977) ("Hoffman")
- G. Blasse et al., "Luminescent Materials," Springer-Verlag (1994) ("Blasse")
- Schlotter et al., *Luminescence Conversion of Blue Light Emitting Diodes*, Applied Physics A 64, 417-18 (Feb. 27, 1997) ("Schlotter")
- Kano et al., *Efficient Green-Emitting Infrared-Excited Phosphors*, J. Electrochem. Soc.: Solid State Science and Technology (Nov. 1972) ("Kano Publication")

The analysis in this chart is based on the apparent claim constructions and interpretations that Nichia has advanced to allege infringement of the asserted claims of the '631 patent, as set forth in Nichia's Supplemental Infringement Contentions served December 29, 2016 and Nichia's Third Amended and Supplemented Preliminary Disclosure of Asserted Claims and Infringement Contentions served September 14, 2017. Nothing in this chart should be interpreted as VIZIO conceding that Nichia's apparent claim constructions and interpretations are correct or supported by intrinsic or extrinsic evidence.

The analysis in this chart is preliminary, and VIZIO's investigation into the invalidity of the asserted claims of the '631 patent is ongoing. VIZIO reserves the right to provide additional theories under which the cited prior art anticipates or renders obvious the asserted claims of the '631 patent. The citations to specific disclosure of the prior art references in this chart are exemplary, and VIZIO reserves the right to rely on additional disclosures to the same references. VIZIO also reserves the right to offer expert

	 3:16-19 ("[a]bsorbed energy usefully converted in this fashion may be represented in terms of an 'excitation' spectrum, and it is in these terms that the data of FIG. 1 is represented."), 4:26-36 ("In the unmodified YAG:Ce system using an argon or cadmium laser, white images may result by compensation of the secondary yellow cast emission by some reflection of the shorter wavelength laser emission. Under these circumstances it is desired to design layer thicknesses and compositions or provide for some reflection such that total absorption does not result."), 6:1-6 ("2. Apparatus of claim 1 in which the said phosphorescent composition and screen design are such that a portion of the laser emission is unconverted so that the combination of reflected laser emission and the μ emission from the screen appears approximately white."). A person of ordinary skill in the art would have understood that Pinnow's YAG emission spectrum has a tail continuing beyond 700 nm because the relative intensity (normalized to 100) of the YAG emission spectrum is at least 20% at 700 nm and has a gradually decreasing slope. Furthermore, it was well-known that YAG produces an emission spectrum with a tail continuing beyond 700 nm. *See* Blasse at Fig. 6.17.

Modifying Baretz to include a phosphor that emits light having a spectrum with a peak in the range from 510 to 600 nm and a tail continuing beyond 700 nm, and said spectrum of the light emitted from said phosphor and said spectrum of the light emitted from said LED chip overlap with each other to make a continuous combined spectrum, would have been nothing more than a combination of known elements according to known techniques to yield predictable results. It also would have been a simple substitution of one known element for another, such as a simple substitution of the phosphor disclosed in Pinnow for the phosphor disclosed in Baretz. Persons of skill in the art were familiar with using different phosphors as substitutes, and there would have been nothing surprising or unexpected about modifying Baretz to use a phosphor with the claimed characteristics. The combination would also have been obvious to try as one of a finite number of known solutions for phosphors that achieved the benefits Baretz was seeking, and in particular, phosphors capable of withstanding operations conditions of the LEDs disclosed in Baretz. A person of ordinary skill in the art would have been motivated to modify Baretz to include a phosphor like Pinnow's cerium-doped YAG phosphor because of its known and predictable advantages, such as improved color output and color rendering, and ability to withstand harsh operating conditions.

Exemplary details of why it would have been obvious to combine the teachings of these references are set forth below:

First, Baretz and Pinnow are in the same field of endeavor as the '092 patent and pertinent to the problem the inventors were trying to solve. The '092 patent is generally directed to creating white light, by combining light emitted from a solid-state device (such as an LED) and light emitted from a phosphor. Baretz is in this same field because it discloses creating white light by combining a blue light-emitting LED with light emitting from a down-converting phosphor. Baretz at 9:4-9. Pinnow, likewise, is in the same field of endeavor addressed by the '092 patent – the partial down-conversion of blue light to make white light. Pinnow at Abstract, 1:44-49. In addition, Pinnow discloses systems for down converting blue light to generate white light using a source of light emitting within the excitation spectrum of YAG phosphor. Pinnow at Abstract, 2:14-26, 4:26-33, Fig.1. In addition, the fact that YAG was used in the prior art to improve and modify blue light sources from lasers, high pressure mercury vapor lamps, and low pressure mercury vapor lamps suggests the obviousness of using YAG for blue LEDs. See KSR, 550 U.S. at 417 ("[I]f a technique has been

	used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill."). A POSITA would have been aware, and would have considered, prior work published in the field of phosphors used with other light sources like Pinnow. A POSITA would not have ignored Pinnow simply because it related primarily to a laser, and not an LED. He or she would have understood that the fundamental principles discussed in Pinnow – that a YAG phosphor will emit a yellow light when excited by a blue light – are as applicable to a LED as they are to a laser. Pinnow's teachings are a fundamental aspect of optics, and would have been considered as being in the same field of endeavor as the '092 patent. ***Second***, Pinnow's relevance to the field of the '092 patent has already been considered by the Federal Circuit in In re Cree, 828 F.3d 694 (Fed. Cir. 2016). In that case, the Federal Circuit affirmed the unpatentability of Baretz, based, in part, to another patent to Pinnow, U.S. Patent No. 3,691,482. Like Pinnow here, the '482 patent disclosed a display system that "creates black and white images using a combination of a blue laser and appropriate phosphors." *In re Cree*, 828 F.3d at 697. The Federal Circuit affirmed the Board's rulings that a POSITA "is not going to fail to appreciate the other teachings in Pinnow simply because a laser is used as the primary light source, because the phosphors cannot tell from what light source a wavelength of light comes." *Id.* at 699. The Federal Circuit expressly found that the Board's conclusion that Pinnow would "work with blue light of any source . . . was an entirely reasonable conclusion to draw from Pinnow." *Id.*,700. The Federal Circuit also found that "the examiner pointed to ample evidence that Pinnow's teachings are applicable to LEDs," and specifically, that "the phosphors' ability to convert the UV-to-blue light is predicated only on whether or not it can absorb a given wavelength of light, not on which kind of light source a particular wavelength of light is emitted, laser, LED, or otherwise, as a [POSITA] would readily appreciate." *Id.*,701. Put more succinctly, "in other words, a phosphor does not care how an incident photon of light at a particular wavelength is generated." Id. ***Third***, the evidence shows that there are very few phosphors that absorb blue, emit yellow and operate the harsh conditions, which, as Baretz acknowledges, are present in an LED and may lead to

degradation of certain phosphors. A POSITA would have been aware of a discrete number of well-known phosphors that were capable of surviving in such harsh environments. Nichia's own expert confirmed this fact in the Everlight litigation when he conceded that "stringent requirements required for the phosphor to be used with a blue LED strongly limited the choice of potential phosphors."

The YAG phosphor disclosed Pinnow is one such phosphor. Not only was YAG one of only a few phosphors that met the above requirements, it was widely known to be the single best phosphor in such circumstances—no other phosphor at that time had YAG's properties, and even today, it is the standard by which new phosphors are gauged. A POSITA would have understood that YAG was one of the few phosphors that could overcome the deterioration problems relevant to Baretz. Thus, the YAG phosphor disclosed in Pinnow would have been one of a "finite number of identified, predictable solutions" and a POSITA would have had "good reason to pursue the known options within his or her technical grasp." *KSR v. Teleflex*, 550 U.S. 398, 420 (2007).

Fourth, there is no teaching away of the proposed combination because both references address the same issue – namely down conversion of a blue light source to make white light. Both references relate to using phosphors to change the color of light emitted from a monochromatic light source to create white light. Both references are in the same field, aimed at the same problems, have similar design incentives, and use similar techniques to satisfy that goal. Rather than teaching away, as described here and above, the references' express teachings towards the same problem would motivate one in the art to combine their teachings.

Fifth, it would have been a predictable combination to combine the blue light LED of Baretz with the YAG phosphor disclosed in Pinnow. The emission spectrum of Baretz's "gallium nitride based LED[,] which exhibits blue light emission with an emission maximum at approximately 450nm with a FWHM of approximately 65nm," almost completely overlaps with the excitation spectrum of Pinnow's YAG:Ce, and falls in between the cadmium ion laser line and the argon ion laser line that Pinnow teaches is suitable for use with YAG:Ce.

Like Baretz, Pinnow further teaches that the yellow light emitted by the YAG:Ce phosphor mixes with the blue light from the blue light source to make white light. While Baretz discloses examples of phosphors that may be used to make the white light LED, Baretz

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