MITRA
Experience Peace of Mind

Technology & Innovation

About Us

MITRA is a reputed and established name in the Healthcare Industry in India involved in manufacturing and marketing of healthcare devices with several product patents in our name. MITRA is the only manufacturer in India of flexible video Endoscopes and related Ancillary products.

Our Vision is to make next generation products and devices which provide high quality life care available and affordable for everyone. To achieve this vision we have set up our own state-of-art Research & Development (R&D) and manufacturing facilities. We have strict standards when it comes to our manufacturing process, and never settle for less. We are constantly innovating and improving to meet the latest needs of our customers, and do our best to ensure complete satisfaction and bring innovative technology products to the market at affordable costs.

Our strong focus in R & D has made us the world leaders in FIBRELESS ILLUMINATION LED-AT-TIP technology which puts an end to light-guide glass fibres in video endoscopes. By developing devices from the component level, MITRA is able to provide a wide range of technologies in a rapid development environment. Coupled with a focus on quality and speed to market, our solutions exceed market expectations for performance and value.

Mitra is the only company in India to manufacture:

- Peritoneal Dialysis Bags & its accessories
- Automated Peritoneal Dialysis Machine
- Leukocyte Filters
- Flexible Video Endoscopes & Endoscopy Ancillaries

We have a strong sales & service presence with offices & service points across the country. We are committed to meet global standards and offer quality, time bound services to all our customers.

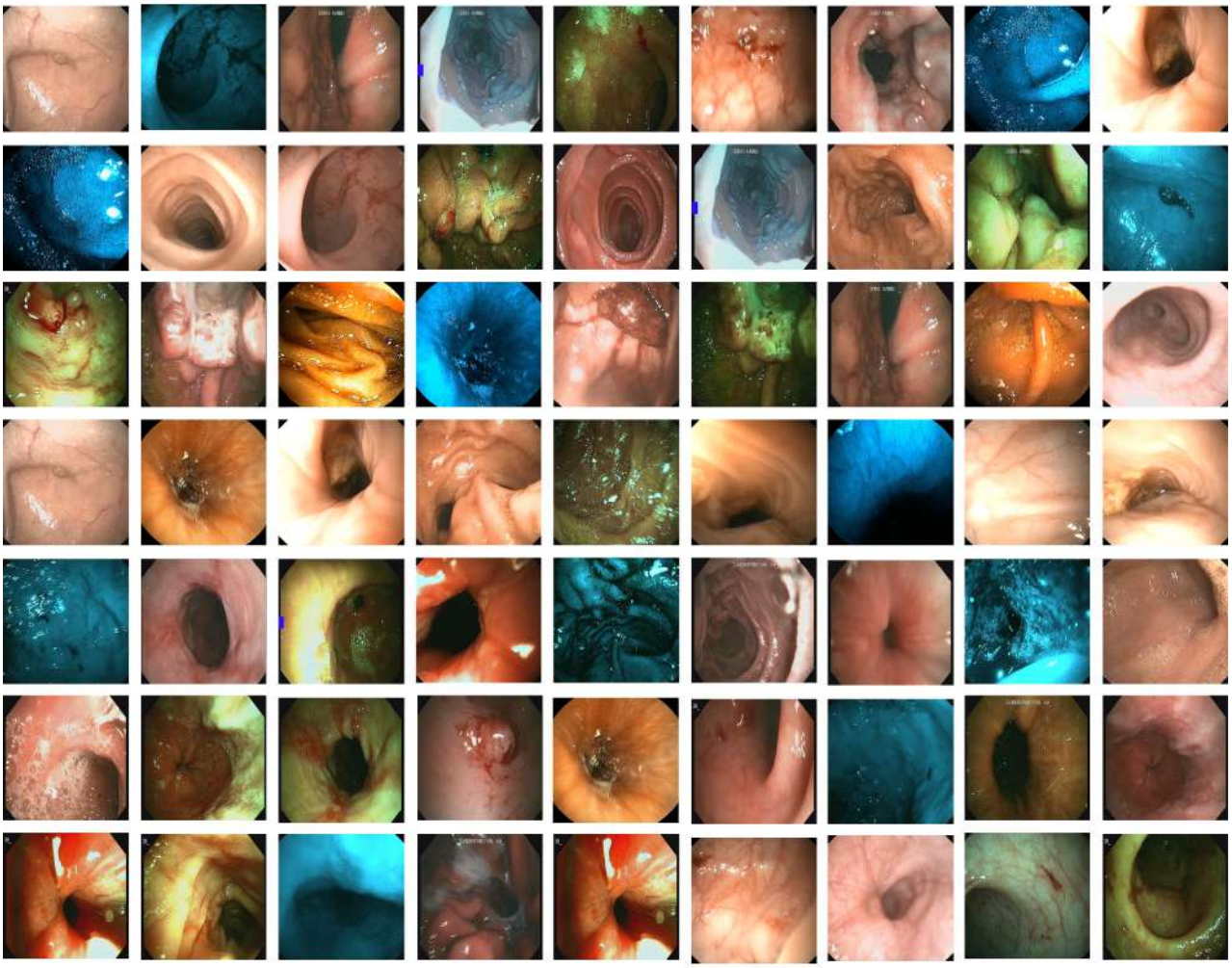
Our high-quality products are available internationally in many countries in Asia, Europe and parts of African sub-continent.

Our Products:

- Ottomed Endoscopy - Flexible Video Endoscopy Systsems & Ancillaries.
- Peritoneal Dialysis Systems.
- Blood Bags and Blood Banking Systems.
- Leukocyte Filter Bags.
- Non-Cardiac Metallic Stents (SEMS).
- Information Management Systems.

contents

mBLU Spectral Imaging



What is mBLU technology?

mBLU is a milestone in flexible video endoscopy.
It is a Mucosal Structure Detail Enhancement mode which uses advanced High-Definition spectral image enhancement techniques to improve the visibility of mucosal structure & blood vessels, resulting in a detailed and more accurate diagnosis.

How does the mBLU technology work?

During GI endoscopy procedures precision, in diagnosis & identification of Neoplastic & Non-Neoplastic lesions, is quite difficult in ordinary white light endoscopy (WLE) whereas using spectral imaging technology gives precise results.

mBLU is available in two modes:

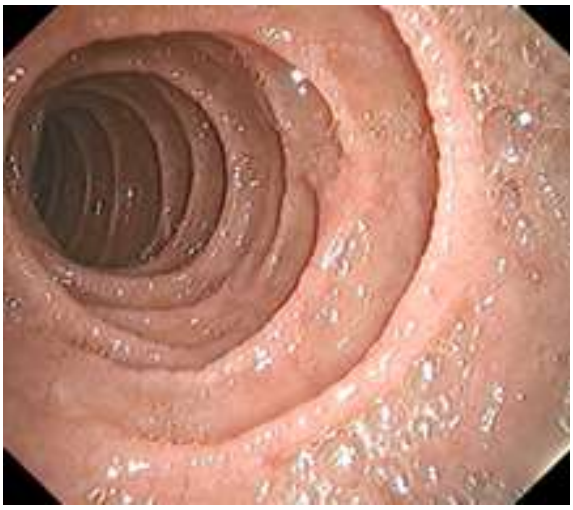
mBLU-1
mBLU-2

mBLU Experience:

mBLU's advanced optical & light sensor technology uses two LEDs (wavelength of 400-700nm & 450nm respectively) eliminating energy consuming & expensive xenon light source.

The possibility of detecting and characterising lesions / polyps increases due to brighter & clearer endoscopic images provided by Image-Enhanced Endoscopy (IEE) using mBLU.

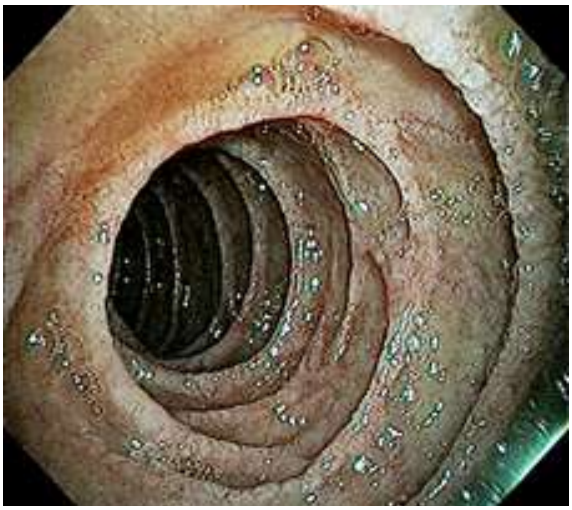
mBLU Spectral Imaging



White Light Endoscopy

the next generation image technology

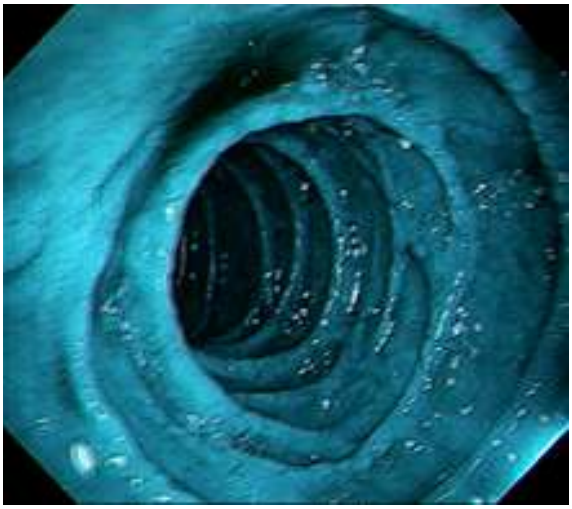
Different from conventional white light generated by a xenon light source, White Light mode using the mBLU system uses a 400~700 nm LED to enhance vascular images. Thus, the vascular microstructure is clearly depicted using the white light mode as compared with that obtained using xenon light.



mBLU - 1

spectral mucosal tissue structure enhancement

The color spectrum is raised to maximize the contrast of the micro vascular pattern of the mucosal surface to be seen. In this mode the endoscope light will remain white & color spectral (Red, Green, Blue) changed between 400nm to 700nm. Vascular mucosa pattern will be enhanced by the built-in software of the video processor. The mBLU 1 mode is dedicated to near structure contrast view.

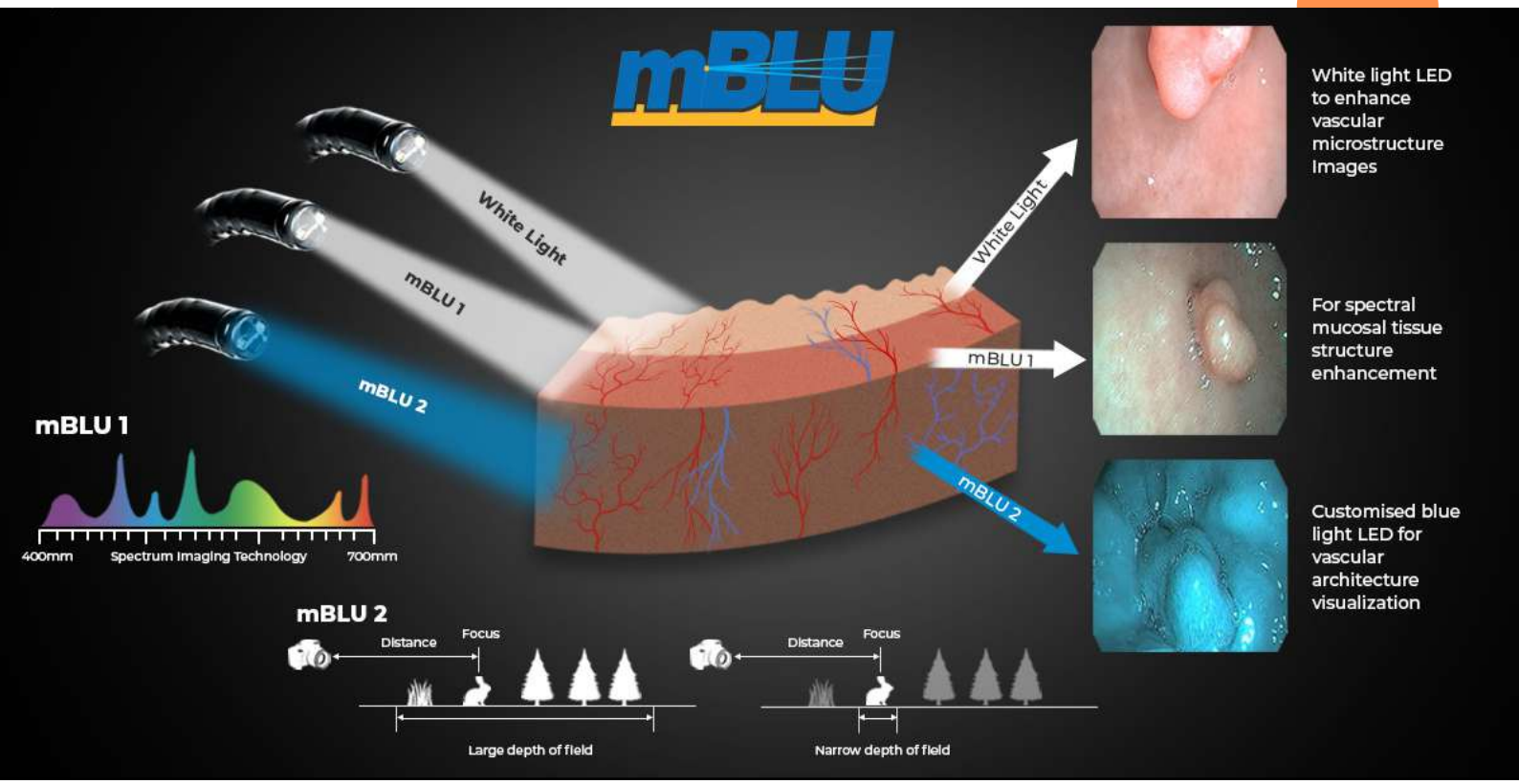


mBLU - 2

Customized Blue Light for vascular pattern observation

mBLU Blue Light technology is vital to visualize the vascular microarchitecture on the mucosal surface. The blue light penetrates the superficial epithelium & visualizes microstructures in the mucosa as well as the sub-mucosa. Blue light is characterized by spatial & temporal coherence, resulting in clearer images for vessel/surface microstructure of the mucosal surface through 'further narrowing'. This mode uses monochromatic light 450 +/- 10nm. and can facilitate differentiation of adenoma from invasive cancer. The mBLU 2 mode is dedicated to more close-up view or detailed view.

mBLU



Advantages:

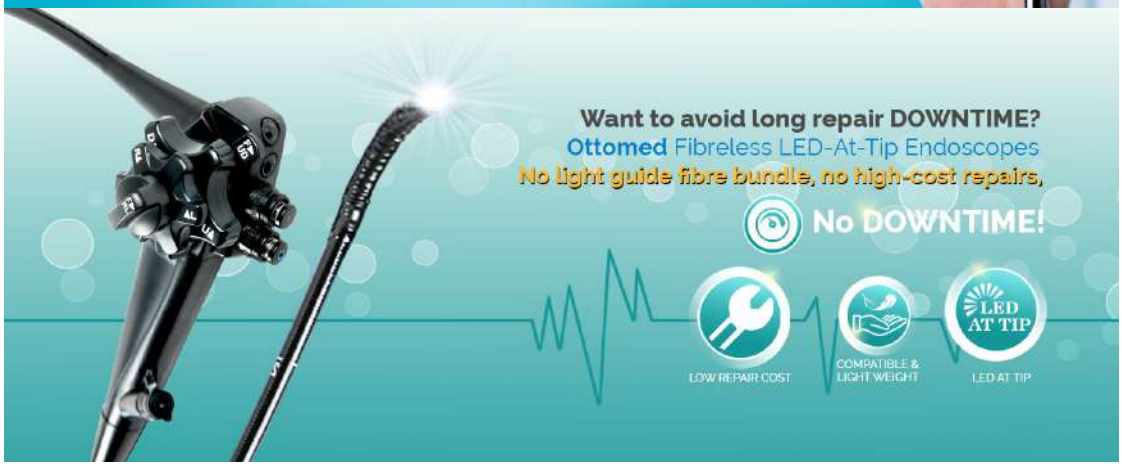
• Precision diagnosis & identification helps in early detection of Cancer & Mucosal pattern changes.

• Both mBLU modes options are available in a single endoscopy unit with one touch button operation.

• Low operational cost & user-friendly.

• The diagnostic ability using the mBLU system allows more accurate discrimination of adenomas from non-adenomatous lesions as compared with conventional white light.

Green, Eco-friendly & Sustainable



Green, Eco-friendly & Sustainable

SN	Comparison	LED	Non-LED	Remarks
1	Image			Output spectra of xenon light & LED Light are same.
2	Energy Consumption	Very Low	High	High cost of operation of xenon light source
3	Waste Generation (from Repair Parts)	Durable & having Long life span, resulting in very little waste generation.	Less Durable, on an average every 2 years parts need to be replaced, especially light guide fibres + connecting tube + bending tube.	Xenon lamps have limited Life of just 500 Hrs. & replacement cost can be approx. Rs. 1.00 L to Rs. 1.50 L.
4	Cost	Low	Recurring, appx. 3L in every 2 years.	Intrinsic glass fiber characteristics & macro/micro bending cause light transmission losses.
5	Technology	Advanced	Classic: Image guide replaced with CCD/CMOS Light Guide Bundle : Continuous use of scope for diagnostic as well as therapeutic procedures may damage delicate glass bundles, resulting in high repair cost.	LEDs are becoming the first choice for lighting owing to high luminous durability and efficiency.
6	Repair - TAT (Turn Arround Time)	Appx. 1-Day	Min. 5-6 days	High downtime causes loss of patient throughput.
7	Repair category	Minor	Major	major repairs are complicated, requiring high labour charges
8	Eco-friendly	Yes	No	Need special disposal techniques for Xenon lamps.
9	Portability	Yes	No	Xenon light sources are very heavy & bulky.

Conclusion:

Fibreless LED-AT-TIP technology is green, eco-friendly and sustainable.It addresses the frequent damage of classical / old Light / Image glass fibres used in endoscopes for illumination.

Green Benefits of FIBRELESS LED-AT-TIP

1) Longer life: LEDs have no moving filaments or any parts that burn out or get damaged and have long working hours life. LEDs last at least 10 times longer than Xenon lamps and 50 times more than Halogen lamps.

2) Low operation, maintenance & replacement cost: LEDs are highly efficient & have close to zero maintenance cost which reduces maintenance & operational costs as they are energy efficient and have a very long lifespan.

Xenon lamps are expensive and need to be replaced more often than LED. Replacement cost of xenon is also high, as it requires separate housing for installation. Halogen lamps are comparatively cheaper than Xenon lamps but its short life span and frequently blow-out problems increase operational & maintenance cost.

3) NO High Cost Light Guide Fibre Replacements: Statistics show that light guide fibre bundles in scopes deteriorate over time leading to lesser illumination and darker images which makes accurate diagnosis difficult. Replacement of these light fibre bundles is an expensive and time-consuming affair.

Ottomed Fibreless LED-AT-TIP scopes allow advanced diagnosis and treatment with minimal downtime by eliminating high cost light guide bundles.

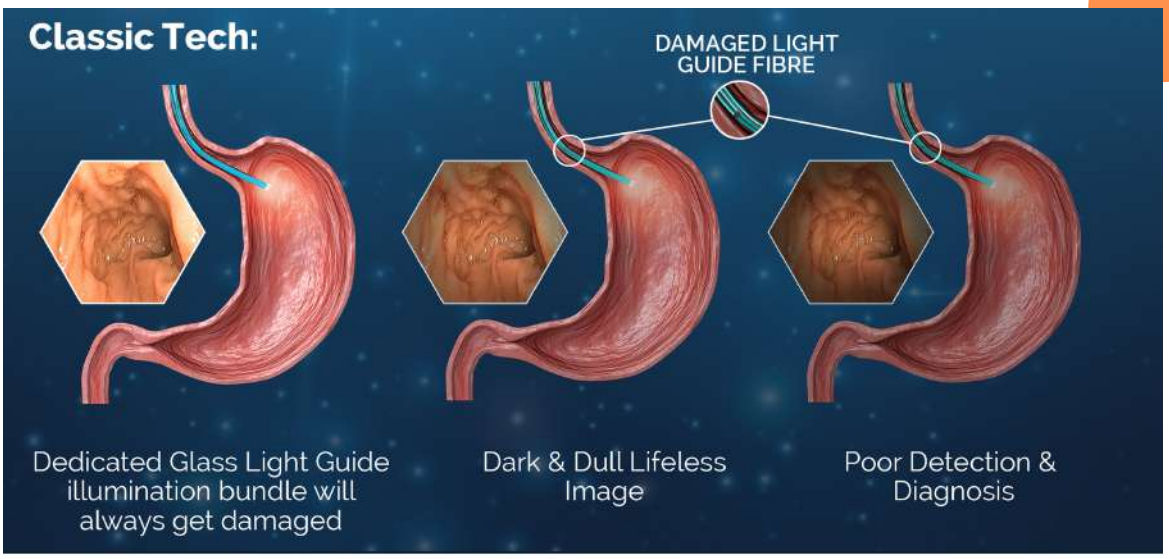
4) Downtime: Telling a patient that diagnosis/treatment cannot be done due to equipment breakdown is a never a good experience. Long repair downtimes cause reputation loss in the long term and opportunity loss in the short term. Ottomed's Fibreless LED-AT-TIP technology has benefited hundreds of users through advanced detection / treatment tools and saved high cost repair burdens and mental fatigue of downtime.

5) Reduces electricity consumption & minimal heat generation: LED is a semiconductor & as electrons pass through it, they generate light. Most of the energy used in LED is converted into light with very little heat radiation. In comparison Xenon & Halogen lamps need a lot of energy to start up, resulting in higher consumption of electricity.

6) EcoFriendly: Low Waste generation and disposal make LED the most eco-friendly option for illumination. Low power consumption by LEDs indirectly reduces greenhouse emissions from power plants. CO_2 emissions for LEDs are also low. Manufacturing LED lamps also causes very little damage to the environment. Long life & low energy consumption make LED the most eco-friendly source of light.

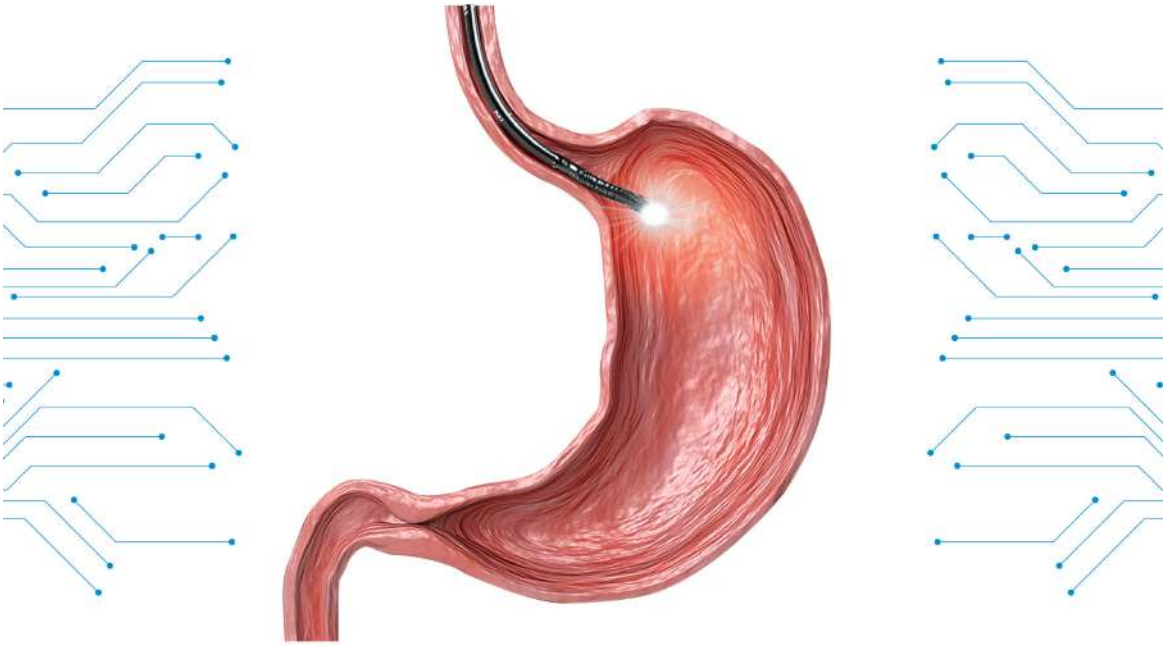
7) High intensity and White light illumination: LED produces very high quality and steady light without any flickering. LEDs provide high lumen output as they turn most of the energy into light.

FIBRELESS LED-AT-TIP



With Ottomed Advanced Tech - Fiberless LED-AT-TIP

Visible sharp detection, lively and crystal clear image



Going Fiberless helps cut repair costs and downtime

Traditional endoscope technologies use glass fibers for transmission of light from the light source to the tip of the endoscope. These glass fibers break with wear and tear of endoscopy procedures and patient trauma like biting on shaft, causing diminished illumination from the endoscope tip and great difficulty in performing endoscopy procedure.

Mitra developed and patented a technology whereby high intensity LEDs could be fitted directly at the tip of the endoscope, thereby eliminating completely, the need of light guide glass fibers in endoscopes. Mitra is the first company in the world to manufacture fibreless LED At The Tip endoscopes and these are being widely used in India and abroad .

Using LEDs instead of conventional xenon lamp based light source has several benefits like LEDs are energy efficient, durable, inexpensive and small.

eCUE - Extreme Close-Up Endoscopy

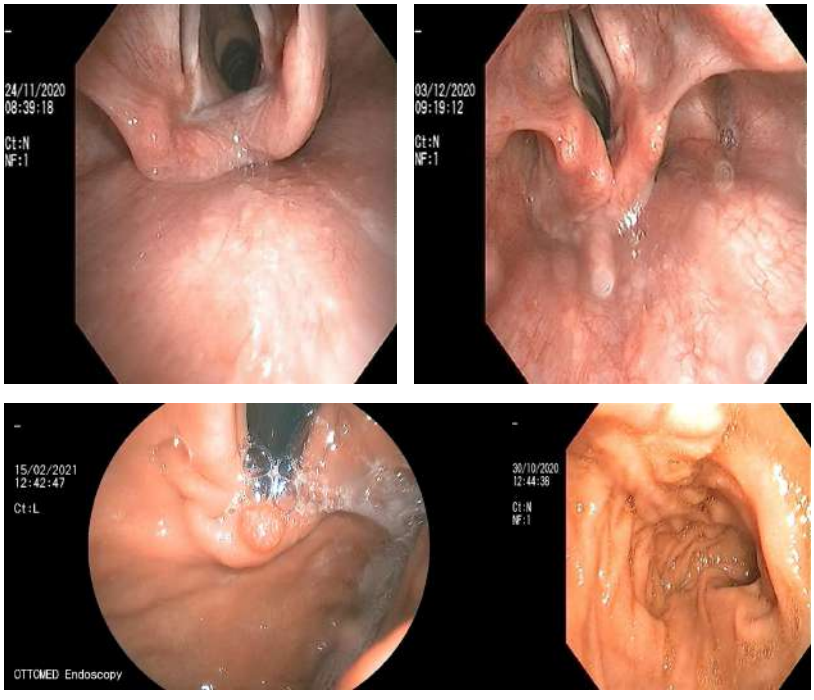
Endoscopy has advanced greatly in recent years, enabling many forms of surgery to be conducted using an advanced endoscope making the surgery less invasive.

Ottomed endoscopes push the boundaries of endoscopic imaging and diagnosis by improving visualisation of miniature structures and mucosal pit patterns with great detail, with clarity and sharp focus thereby allowing investigation, confirmation and diagnosis with safety.

Ottomed endoscopes are fitted with highly specialised custom made HD micro lenses which at the press of a button can generate sharp close-up endoscopic images.

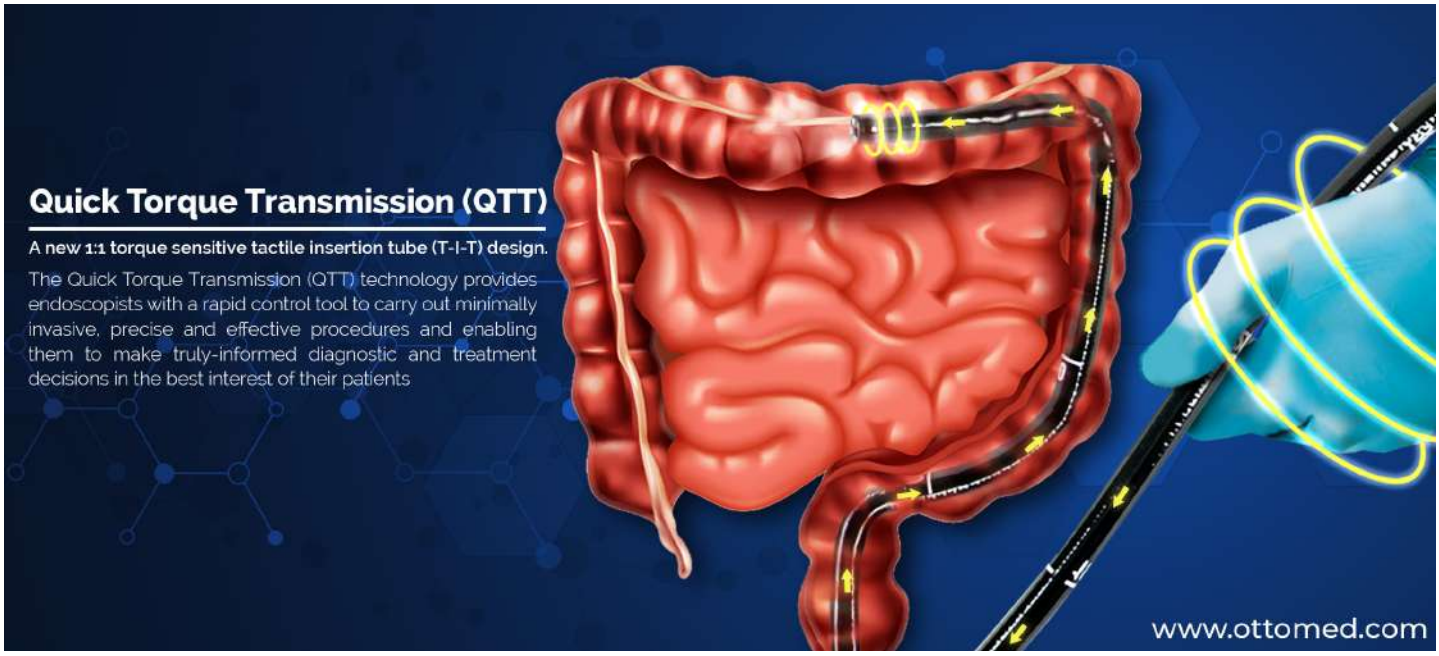
SMARTEYEII PLUS

Next-Generation Digital Video Endoscopy System offering best in class features to Gastroenterologists.



Endoscope Shaft Quick Torque Tech

The quality of endoscope shafts have also gone under tremendous change. Using specialised materials, Ottomed endoscopes have become light weight and with Quick Torque Transmission assembly technique, the endoscopy procedures have become less traumatic and smooth for the patient as well as for the doctor.



mBLU Spectral Imaging

Simplicity in perfection for the early detection and characterisation of lesions / polyps / tissue structure / etc & enabling wide Therapeutic Procedures: ARM, POEM, EMR, ESD, etc.

Ottomed Endoscopy Systems do not have any "LIGHT-SOURCE". The Fibreless LED-AT-TIP technology saves several Kilo-Watts of energy and helps save our environment.

ABSTRACT:

One Procedure. Two Settings.
Unequaled Results.

A standard endoscopic procedure is performed utilising white light, and its success is entirely dependent on the ability to see tumours / lesions/etc.

mBLU Imaging is an **advanced optical and light sensor technology,** for image-enhanced endoscopy (IEE) using two LEDs (400~700nm and 450nm) eliminating energy consuming xenon light-sources.

The 450nm blue LED visualises more closer microarchitecture and 400~700nm LED provides white light.

mBLU imaging, has the possibility to increase the detection / characterisation of lesions/polyps by depicting brighter and clearer endoscopic images.

Keywords :

- **Image enhanced endoscopy-mBLU imaging,**
- **Multi Focus Imaging,**
- **Integrated Irrigation Channel**

Recently, hardware based IEE, has played an important role in not only the detection, but also in the characterisation of polyps / lesions / tissue structure / etc. First-generation hardware-based IEE systems include narrow band imaging (NBI) [Machida et al. 2004], flexible spectral-imaging color enhancement (FICE) [Togashi et al. 2009] and i-SCAN [Hoffman et al. 2010a], all of which were initially released in the early 2000s. These systems do not involve injection of any dye and rely solely on hardware-based technology. However, first-generation IEEs have critical drawbacks, e.g. dark images at a distant view and low-resolution images. us, first-generation NBI does not demonstrate a higher adenoma detection rate than white light endoscopy in large clinical trials [Rex and Helbig, 2007; Kaltenbach et al. 2008a; Uraoka et al. 2008; Adler et al. 2009].

mBLU imaging successfully achieves a bright and clear image even at a distant view-These capabilities may lead to improved detection/ characterization of lesions/polyps and more accurate diagnoses.
The vast majority of gastroenterologists are not familiar with mBLU due to general lack of availability of this equipment.

Principles of mBLU :
First, we review the principles of NBI in generating endoscopic images. NBI uses optical filters to change the wavelength of the transmitted light, which in turn targets the micro-vessels of the mucosa. NBI utilises two kinds of light: blue light (wavelength of 415 ± 30 nm) and green light (wavelength 540 ± 30 nm). The blue light penetrates the superficial epithelium and visualises microstructures in the mucosa as well as the submucosa. is selective narrowing of the blue and green light, and the omission of red light, increases the fidelity of the images and improves visualisation of micro-vessels as well as surface patterns resembling pit patterns.

The word 'LED' is an acronym for 'light emitting diode'. LEDs are characterised by spatial and temporal coherence, resulting in clearer images for vessel/surface microstructure of the mucosal surface through 'further narrowing'. mBLU uses two sets of LEDS (400~700nm and 450 ± 10 nm) instead of xenon light to obtain image enhanced endoscopy. e 400~700 nm LEDs when activated produce white light, providing the standard view obtained with conventional xenon light sources. e brightness of the white light is controlled by the LEDs output power. In addition, longer wavelength light such as a 450 ± 10nm LED is less absorbed by small vessels and reaches the deeper layers in the tissue, thus depicting larger blood vessels in the deeper layers.

The mBLU system utilises three modes: White Light mode, mBLU mode1, mBLU mode2.
To alter the mode, the endoscopist simply selects the desired mode on the operating portion of the endoscope with the endoscope remote switch button. The intensity balance of the LEDs differs in each mode, enabling high contrast images of blood vessels over a wide range from distant images to close-up images, along with multi-magnification.

(A) White light endoscopy (WLE)
Different from conventional white light generated by a xenon light source, white light mode using the mBLU system uses a 400~700 nm LED to enhance vascular images. Thus, the vascular microstructure is clearly depicted using the white light mode as compared with that obtained using xenon light.
This is normal focus mode.

(B) mBLU1 mode
The colour spectrum is raised to maximise the contrast of the microvascular pattern of the mucosal surface to be seen. In this mode, the vascular pattern as well as the surface pattern can be most clearly visualised on the display.
The mBLU1 is dedicated to near structure contrast view.

mBLU Articles

(C) mBLU2 mode

A brighter view is accomplished using the mBLU high-contrast image by controlling the power ratio of the blue light LED. In this mode, both the vascular pattern and the surface pattern are more visible on display while maintaining the brightness, even at a distant view. This mode can facilitate differentiation of adenoma from invasive cancer.

The mBLU2 is dedicated to more closeup view or detailed view.

Recommended Approach :

It is important to match the mode and application properly:

- At the beginning, perform an overall observation of the lesion using the white light mode with normal magnification.
- Next, the mBLU1 mode is applied: The extent of the lesion should be evaluated using this mode. Using this mode, identify the region with advanced histological atypia based on changes in color tone and superficial structure.
- Finally, apply the mBLU2 mode to obtain detailed images of the surface pattern and vascular pattern by focusing on the region identified.

Conclusion :

The diagnostic ability using the mBLU system may allow more accurate discrimination of adenomas from non-adenomatous lesions compared with conventional white light. Further, studies can be made to validate these observations.

To sum up: The mBLU1 is suitable for more microvascular pattern & the mBLU2 mode is more suitable for Detection.

Development and Evaluation of a Light Emitting Diode Endoscopic Light Source

Neil Clancy[1,2*], Rui Li[1,2], Kevin Rogers[3,4], Paul Driscoll[4], Peter Excel[5], Ron Yandle[4], George Hanna[1], Nigel Copner[3,4], Daniel S. Elson[1,2]
[1]Hamlyn Centre for Robotic Surgery, Imperial College London, UK;
[2]Department of Surgery and Cancer, Imperial College London, UK;
[3]Faculty of Advanced Technology, University of Glamorgan, UK;
[4]Cymtec Ltd. Cardiff, UK;
[5]Glyndwr University, Wrexham, UK

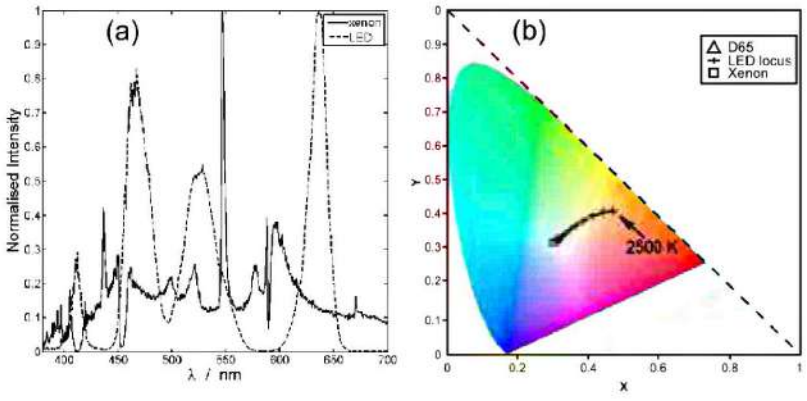
ABSTRACT:

Light-emitting diode (LED) based endoscopic illumination devices have been shown to have several benefits over arclamp systems. LEDs are energy-efficient, small, durable, and inexpensive, however their use in endoscopy has been limited by the difficulty in efficiently coupling enough light into the endoscopic light cable. We have demonstrated a highly homogenised lightpipe LED light source that combines the light from four Luminus LEDs emitting in the red, green, blue and violet using innovative dichroics that maximise light throughput. The light source spectrally combines light from highly divergent incoherent sources that have a Lambertian intensity profile to provide illumination matched to the acceptance numerical aperture of a liquid light guide or fibre bundle. The LED light source was coupled to a standard laparoscope and performance parameters (power, luminance, colour temperature) compared to a xenon lamp. Although the total illuminance from the endoscope was lower, adjustment of the LEDs' relative intensities enabled contrast enhancement in biological tissue imaging. The violet LED also makes fluorescence imaging of protoporphyrins IX for photodynamic diagnosis in bladder cancer detection possible. The LED light engine has been evaluated in a minimally invasive surgery box trainer where it was used to generate 'narrowband' images.

RESULTS

Comparison with xenon lamp

The output spectra of the LED source and xenon lamp are shown in Figure 2 (a). The characteristic xenon peaks are visible while the relative emission strengths of the four LEDs are also evident. The maximum power achieved using the xenon and LED source were 1.50 W and 0.61 W respectively. Adjusting the relative intensities of the LEDs in the unit made it possible to obtain different colour temperatures, which are plotted on the CIE 1931 chromaticity diagram in Figure 2 (b). It can be seen that the broad spectrum xenon lamp results in an output colour very close to natural daylight, but also that the LED source is capable of achieving a similar result.



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Open Access

Light-Emitting Diode-Assisted Narrow Band Imaging Video Endoscopy System in Head and Neck Cancer

Hsin-Jen Chang [1], Wen-Hung Wang [1], Yen-Liang Chang [1], Tzuan-Ren Jeng [2], Chun-Te Wu [2], Ludovic Angot [2], Chun-Hsing Lee [2] and Pa-Chun Wang [1]

[1]Department of Otolaryngology, Head and Neck Surgery, Cathay General Hospital, Taipei, [2]Electronic and Optoelectronic Research Laboratories, Industrial Technology Research Institute, Hsinchu, Taiwan

Background/Aims: To validate the effectiveness of a newly developed light-emitting diode (LED)-narrow band imaging (NBI) system for detecting early malignant tumors in the oral cavity.

Methods: Six men (mean age, 51.5 years) with early oral mucosa lesions were screened using both the conventional white light and LED-NBI systems.

Results: Small elevated or ulcerative lesions were found under the white light view, and typical scattered brown spots were identified after shifting to the LED-NBI view for all six patients. Histopathological examination confirmed squamous cell carcinoma. The clinical stage was early malignant lesions (T1), and the patients underwent wide excision for primary cancer. This is the pilot study documenting the utility of a new LED-NBI system as an adjunctive technique to detect early oral cancer using the diagnostic criterion of the presence of typical scattered brown spots in six high-risk patients.

Conclusions: Although large-scale screening programs should be established to further verify the accuracy of this technology, its lower power consumption, lower heat emission, and higher luminous efficiency appear promising for future clinical applications.

Key Words: Light-emitting diode; Narrow band imaging; Endoscopy; Screening; Mouth neoplasms

INTRODUCTION

Most cases of head and neck cancer are encountered in the late stages, and as such, these lesions can be easily detected by standard endoscopy. By contrast, superficial mucosal cancer in the early stages often has occult or shallow layer lesions that may be overlooked by standard endoscopy.[1]

The detection of recurrent or second primary tumors in the early stages of disease results in better outcomes after salvage chemotherapy. However, because of the limited availability of clinical diagnostic tools, two-thirds of patients requiring salvage chemotherapy have their diseases diagnosed only after the tumors have progressed to locally advanced cancers.[2]

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Correspondence: Pa-Chun Wang
Department of Otolaryngology, Cathay General Hospital, 280 Sec 4, Jen-Ai Rd, 106 Taipei, Taiwan
Tel: +886-2-2708-2121, **Fax:** +886-2-6636-2836, **E-mail:** drtony@seed.net.tw

The use of narrow band imaging (NBI) is currently considered of great benefit in detecting superficial mucosal lesions over the pharyngeal mucosa.[3] A literature review revealed that the effectiveness of NBI in the early detection of head and neck squamous cell carcinoma (SCC) of the larynx,[4] mouth floor,[5] nasopharynx,[6] oropharynx, and hypopharynx[7,8] has been documented over time. The NBI system (Olympus Medical Systems, Tokyo, Japan) is a noninvasive optical device that uses reflected light to visualize the superficial structure and enhance vasculature within the mucosal layer. NBI provides a unique image that emphasizes the morphological and structural character of lesions as well as their surface capillary patterns. The first clinical study of the NBI system for the diagnosis of gastrointestinal tumors was reported by Sano et al.[9] in 2001. Unique images are created by the sequential lighting of the tissue through an endoscope, and the sequence of light is produced by a rotation disk with red, green, and blue optical filters placed in front of a high-power white light source, typically a xenon lamp. The physical phenomena are based on the fact that the penetration depth of light is dependent on its wavelength (i.e.,

the longer the wavelength, the deeper the penetration), and visible blue light only penetrates superficial areas of the tissue. Therefore, the use of white light combined with a special narrow-band filter (400 to 430 nm for blue, 430 to 460 nm for green, 485 to 515 nm for red) enables imaging of the superficial tissue structures with an increased contrast compared with pure white light.[10]

A literature review found that all of the studies about the effectiveness of NBI in the early detection of head-and-neck SCC used "brownish spots" as the typical image pattern for detecting early cancerous lesions.[4,7,8,11] As such, brownish spots appear to have become a gold standard in identifying early mucosal head and neck cancer.

However, current commercially available NBI systems based on xenon lamps remain expensive and have higher power consumption, thus restricting their widespread use in general clinical practice. As we know, the light source for light-emitting diodes (LEDs) has lower power consumption, emits much less heat, and exhibits higher luminous efficiency.[12] Therefore, the objectives of this pilot study were to develop and validate the usefulness of a new NBI system based on an LED light source for detecting early malignant tumors in the oral cavity for high-risk patients.

MATERIALS AND METHODS

Study participants

The present study was a pilot study conducted at a tertiary referral center. From January 1, 2012 through July 1, 2012, a total of six men (mean±SD age, 51.5±13 years) (Table 1) with early oral cavity cancer (T1) were enrolled. These patients underwent video endoscopic screening using both conventional white light and LED-NBI systems. Two patients (cases 1 and 4) previously completed treatment for oral cancer, and the remaining patients had heavy betel nut chewing habits. The screening was undertaken during their routine outpatient department sessions without any clinical complaint.

The criteria for diagnosing a cancerous lesion with conventional white light endoscopic imaging included the presence of elevated lesions and ulcerative lesions. The criterion for classifying a lesion as malignant using the NBI system was the presence of a well-demarcated brownish area with scattered brown spots (Fig. 1), as we described in our previously published paper.[10] Patients with lesions that were deemed noncancerous by these diagnostic methods did not undergo any additional examinations or biopsy. On the contrary, patients determined to have abnormal lesions underwent biopsy or lesion resection.

The study was approved by the Ethics Committee of Cathay General Hospital, and written informed consent was obtained from all patients before the endoscopic examinations and tumor excision.

NBI equipment and procedure

Industrial Technology Research Institute of Taiwan NBI system

The present study uses an LED-equipped NBI light source. The system is shown in Fig. 2A. The Industrial Technology Research Institute of Taiwan (ITRI) NBI system is based on three LED light sources: green, blue, and white. The white LED source allows working in bright light mode, as a traditional light fountain is typically used for endoscopes. The other mode mixes green and blue light with the purpose of obtaining the same effect as that produced with the Olympus NBI system, as

Table 1. Clinical Characteristics of Six High-Risk Patients with Early Oral Cancer Detected by Endoscopy

No.	Age/Sex	Previous history	NBI examination	Site of biopsy	Diagnosis	Treatment
1	72/M	Lip SCC (T1N0M0 stage I) Right buccal SCC (T1M0N0 stage I) Left buccal hybrid (verrucous-squamous) carcinoma (T2N0M0 stage II)	Scattered brown spots	Left buccal mucosa	SCC (T1N0M0 stage I)	Excision
2	56/M	Nil	Scattered brown spots	Left lateral tongue	Tongue SCC (T1N0M0 stage I)	Left partial glossectomy+CCRT
3	51/M	Right buccal leukoplakia	Scattered brown spots	Right buccal mucosa	Buccal SCC (T1N0M0 stage 1)	Excision
4	38/M	Left tongue SCC (T4aN0M0 stage IVA) status hemiglossectomy, post-CCRT	Scattered brown spots	Left retromolar trigone	SCC (rpT1N0M0 stage I)	Excision+chemotherapy
5	43/M	Diabetes mellitus	Scattered brown spots	Left tonsil	SCC (T1N0M0)	Excision+RT
6	61/M	Hypertension CAD	Scattered brown spots	Left buccal mucosa	SCC (T1N1M0 stage III)	Excision+neck Dissection+RT

NBI, narrow band imaging; M, male; SCC, squamous cell carcinoma; CCRT, concurrent chemoradiotherapy; RT, radiotherapy; CAD, cardiovascular disease.

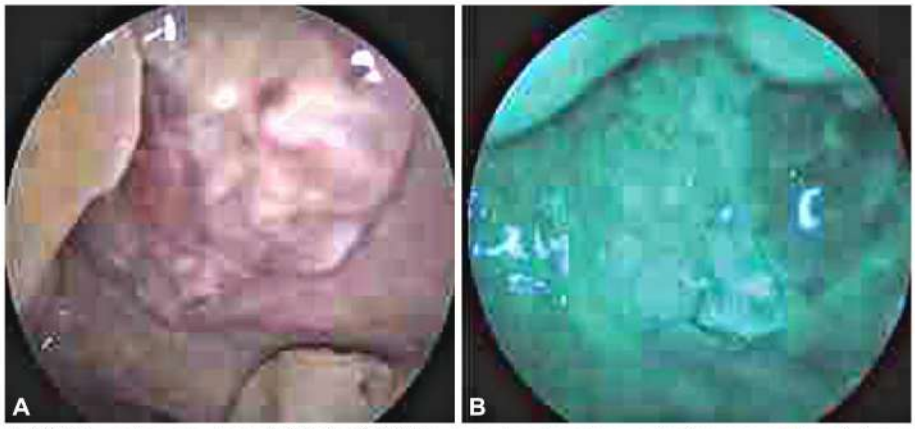

Fig. 1. Case 6, (A) left buccal mucosa lesion (1.8×1.7 cm²). (B) The narrow band imaging examination uncovered a well-demarcated brownish area with scattered brown spots. Histopathology revealed squamous cell carcinoma, moderately differentiated.

Fig. 2. (A) Light-emitting diode (LED)-narrow band imaging light source PR650, cursors for 0% to 100% white, green/blue light mix. (B) Left ⇨: white LED chip; right ⇦: green/blue LED chips. (C) Close-up view: green/blue LED chips.

shown in Fig. 2B. The central wavelength and bandwidth of the blue LED are 415 and 30 nm, respectively, compared to 528 and 40 nm, respectively, for the green LED. As shown in Fig. 2C, there are four chips packaged on a single die that were designed specifically for the light source. The brightness of the blue and green LED units can be tuned independently. The power is supplied by a pulse width modulation unit. The white LED is rated at 12 A, whereas the blue and green LEDs are both rated at 660 mA.

The NBI system was equipped with a videoscope, light source, and head light. A button on the control section of the videoscope enabled switching between the conventional and NBI views. All endoscopic examinations were performed by one experienced otolaryngologist (HJC) in the outpatient clinic. The patients were examined while in the seated position. Before the endoscopic procedure, the oral cavity of each patient was anesthetized with a 4% lidocaine hydrochloride spray. The oral cavity and oropharynx were first examined by direct visual inspection and palpation and subsequently by transoral endoscopy, first in the white light mode and then using the NBI system.

RESULTS

Small elevated or ulcerative lesions were found under the white light view, and typical scattered brown spots were identified after shifting to the LED-NBI view for all six patients. The effectiveness of LED-NBI using "brownish spots" as the typical gold standard image pattern for detecting these early cancerous lesions appears encouraging. Histopathological examination also confirmed SCC (Fig. 1). The clinical stage was early malignant lesions (T1), and the patients underwent wide excision for primary cancer, with four patients also receiving postoperative radiotherapy or chemotherapy (Table 1).

DISCUSSION

Head and neck cancer screening could be an effective method for detecting positive findings of head and neck cancer in at-risk populations because early-stage head and neck cancer might be discovered while it is more readily treatable. To date, visual examination and palpation have remained the standard techniques for the identification of mucosal lesions of the head and neck.[13,14] A comprehensive examination of the head, neck,

and primary lesion site during routine examinations is crucial. The reported feasibility of conventional oral examinations for detecting oral cancer has varied among previous studies. Although conventional physical examination may be useful for identifying oral lesions, it is not as effective for identifying other potentially premalignant lesions.[15]

NBI-assisted endoscopy is highly useful for the detection of precancerous lesions in the oropharyngeal and hypopharyngeal mucosa, and it is not affected by a history of radiotherapy in patients with head and neck SCC[10]. A commercial available NBI system was equipped with a videoscope, light source, and central video control system (Olympus Medical Systems). A button on the control section of the videoscope enabled switching between the conventional and NBI views.

We developed a new NBI system using an LED light source and found that it also could be practical for detecting early cancerous lesions using the diagnostic criterion of the presence of scattered brown spots in our pilot study. Table 2 shows the differences between the Olympus NBI and ITRI systems in terms of spectral properties. The ITRI LED system has a 2-fold larger bandwidth for the green LED and an offset of 12 nm for that color. The features of the blue color are closer to those of the Olympus NBI system, with only a shift of 5 nm for the center wavelength and a 1.5-fold larger bandwidth. The life span of the ITRI LED light source exceeds 20,000 hours.

Despite the spectral differences from the Olympus NBI, the advantages of the LED are however multiple. First, LEDs are solid-state chips and therefore can withstand mishandling much better than traditional xenon or halogen bulbs, which contain a filament. Additionally, because of the absence of a burning filament, LEDs outlast the life span of filament lamps by a factor of 10 to several hundred, with a life span of more than 20,000 hours for the ITRI LED. Another advantage is that for the same luminous flux, the power consumption of an LED is much lower than that of a filament lamp. A direct consequence of the previous advantage is that LED light sources emit much less heat than their filament-based counterparts. The luminous efficiency of LEDs is higher than that of filament lamps. Finally, LED chips can be tuned to a bandwidth and center wavelength according to specific requirements, rendering the use of a high-power light source and rotating filter obsolete (Table 3).

Table 2. Comparison of Spectral Properties between the Olympus and ITRI Systems

	ITRI, nm	Olympus, nm
Green center wavelength	528	540
Green bandwidth	40	20
Blue center wavelength	415	420
Blue bandwidth	30	20

ITRI, Industrial Technology Research Institute of Taiwan.

The goal of screening for high-risk populations requires both rapidity and convenience, but the goals of low cost and higher efficiency should also be considered seriously in the future. Our preliminary data revealed that the ITRI NBI system can achieve the same imaging performance for early cancer detection as the xenon NBI system, but the main advantages of the ITRI NBI system are lower power consumption, lower heat emission, and higher luminous efficiency. A large-scale screening program should be established to investigate the actual accuracy of the ITRI NBI system.

In conclusion, this is a pilot study documenting the utility of a new LED-NBI system as an adjunctive technique to detect early oral cancer using the diagnostic criterion of the presence of typical scattered brown spots in six high-risk patients. Although a large-scale screening program should be established to further verify the accuracy of this technique in daily practice, its lower power consumption, lower heat emission, and higher luminous efficiency appear promising for future clinical applications.

Conflicts of Interest

The authors have no financial conflicts of interest.

Table 3. Comparison of the Main Specifications between the Olympus NBI and ITRI Systems

	ITRI	Olympus[a]
Dimensions, W×H×D, mm	320×175×335	381×162×536
Weight, kg	3	16
Power consumption, VA	45 (white) 20 (narrow band)	500
Lamp	1 White LED and 1 green/blue LED array	Xenon 300 W
Main functions	White light and specific spectral observation: NBI in green and blue; 99 levels of light adjustment (independently for white or green+blue)	Specific spectral observation: NBI±8-level automatic light level adjustment, 3 fan levels (low, medium, high), automatic switching of emergency lights

NBI, narrow band imaging; ITRI, Industrial Technology Research Institute of Taiwan; VA, volt-Ampere; LED, light-emitting diode.
[a]Specifications of the EVIS LUCERA Xenon Light Source CLV-260 NBI.

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SEMS Article

Original Article

Assessment of safety and efficacy of an indigenous self-expandable fully covered esophageal metal stent for palliation of esophageal cancer

Padhan RK, Nongthombam SK, Venuthurimilli A, Dhingra R, Shalimar, Sahni P1, Garg PK
Departments of Gastroenterology and 1Gastrointestinal Surgery, All India Institute of Medical Sciences, New Delhi, India
Correspondence to: *Prof. Pramod Kumar Garg, E-mail: pkgarg@aiims.ac.in*

Abstract

BACKGROUND: Patients with unresectable esophageal cancer require palliation for dysphagia. Placement of a self-expandable metal stent (SEMS) is the procedure of choice for palliation of dysphagia. **OBJECTIVE:** To evaluate the safety and efficacy of an indigenous fully-covered SEMS in patients with esophageal cancer. **METHODS:** Eligible patients with unresectable esophageal cancer requiring palliation for dysphagia were included in the study. An indigenous fully covered SEMS of appropriate length was placed under endoscopic and fluoroscopic guidance. Outcome measures assessed were adverse events and improvement in dysphagia. **RESULTS:** Twenty one patients (mean age 57.71±13.14 years; 17 males) were included. After stenting, dysphagia score decreased from 3.2+0.4 to 0.35+0.74 at 4 weeks. Adverse events included retrosternal pain, respiratory distress and aspiration pneumonia in 12, 2 and 1 patients respectively. Five patients required repeat stenting due to stent migration in 4 (following radiotherapy in 3) and tumour ingrowth in 1. There was primary stent malfunction in one patient. The median survival of patients was 140 (76-199) days, which was higher in those who received radiotherapy.

Key Words: Dysphagia, esophageal cancer, metal stent

Characteristics of the indigenous self-expandable metal stent

SEMS manufactured indigenously (Mitra Industries Pvt. Ltd., Faridabad, India) was used in the study. The stent is made up of nitinol and is fully covered with a medical grade polymer. The delivery catheter is made up of polytetrafluoroethylene and stainless steel tubes. The markings are with gold wires. There is a nylon thread (lasso) at the proximal end. Physical inspection of a bare stent and stent deployment in vitro were satisfactory. The data of its physical characteristics such as radial force have been shown to be comparable with other imported stents available in India.

Conclusion

In summary, the indigenous SEMS was reasonably safe and provided adequate palliation of dysphagia in patients with inoperable esophageal cancer.

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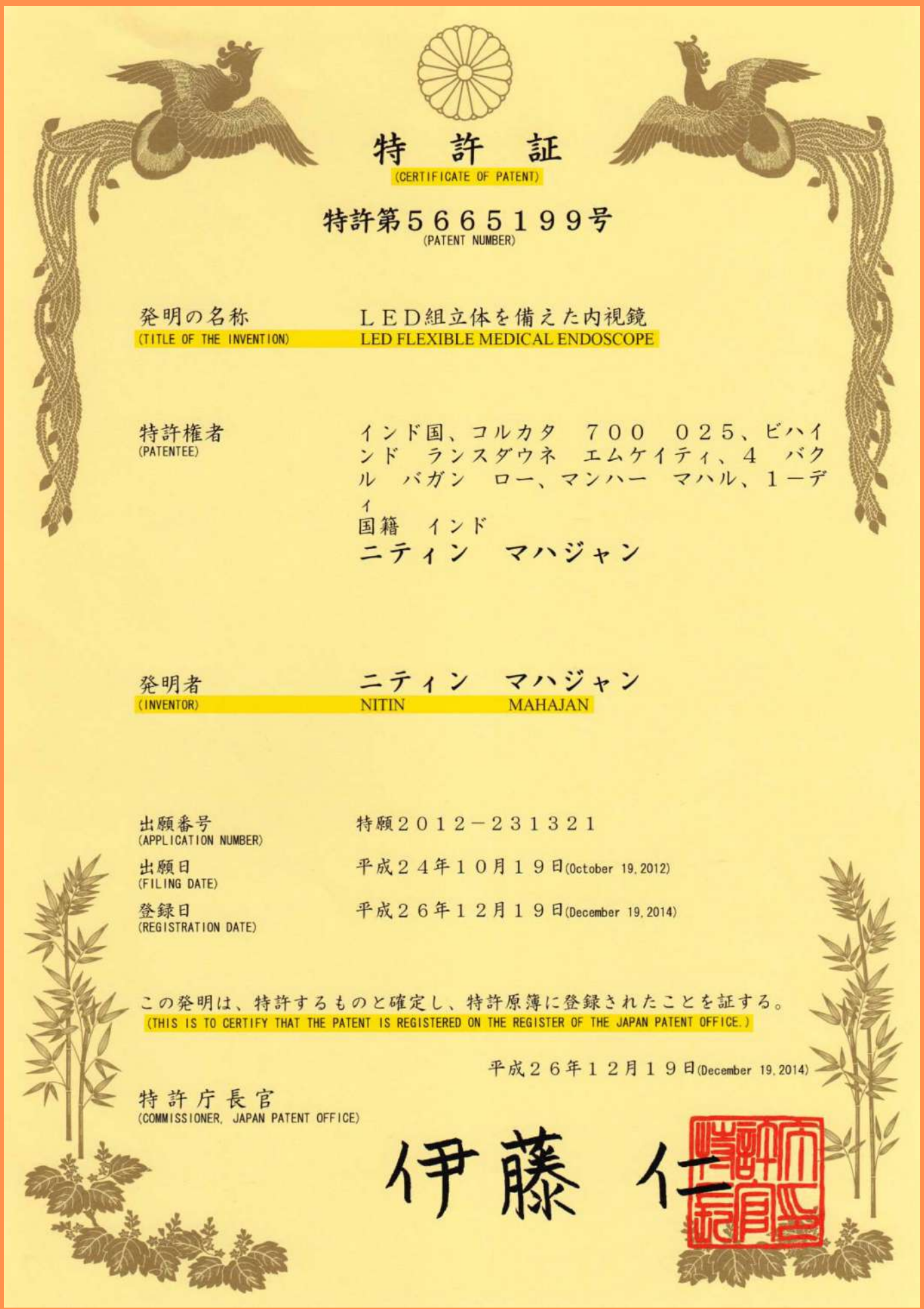

特　許　証
(CERTIFICATE OF PATENT)

特許第５６６５１９９号
(PATENT NUMBER)

発明の名称
(TITLE OF THE INVENTION)
ＬＥＤ組立体を備えた内視鏡
LED FLEXIBLE MEDICAL ENDOSCOPE

特許権者
(PATENTEE)
インド国、コルカタ　７００　０２５、ビハインド　ランスダウネ　エムケイティ、４　バクル　バガン　ロー、マンハー　マハル、１－ディ
国籍　インド
ニティン　マハジャン

発明者
(INVENTOR)
ニティン　マハジャン
NITIN　MAHAJAN

出願番号
(APPLICATION NUMBER)
特願２０１２－２３１３２１

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平成２４年１０月１９日(October 19, 2012)

登録日
(REGISTRATION DATE)
平成２６年１２月１９日(December 19, 2014)

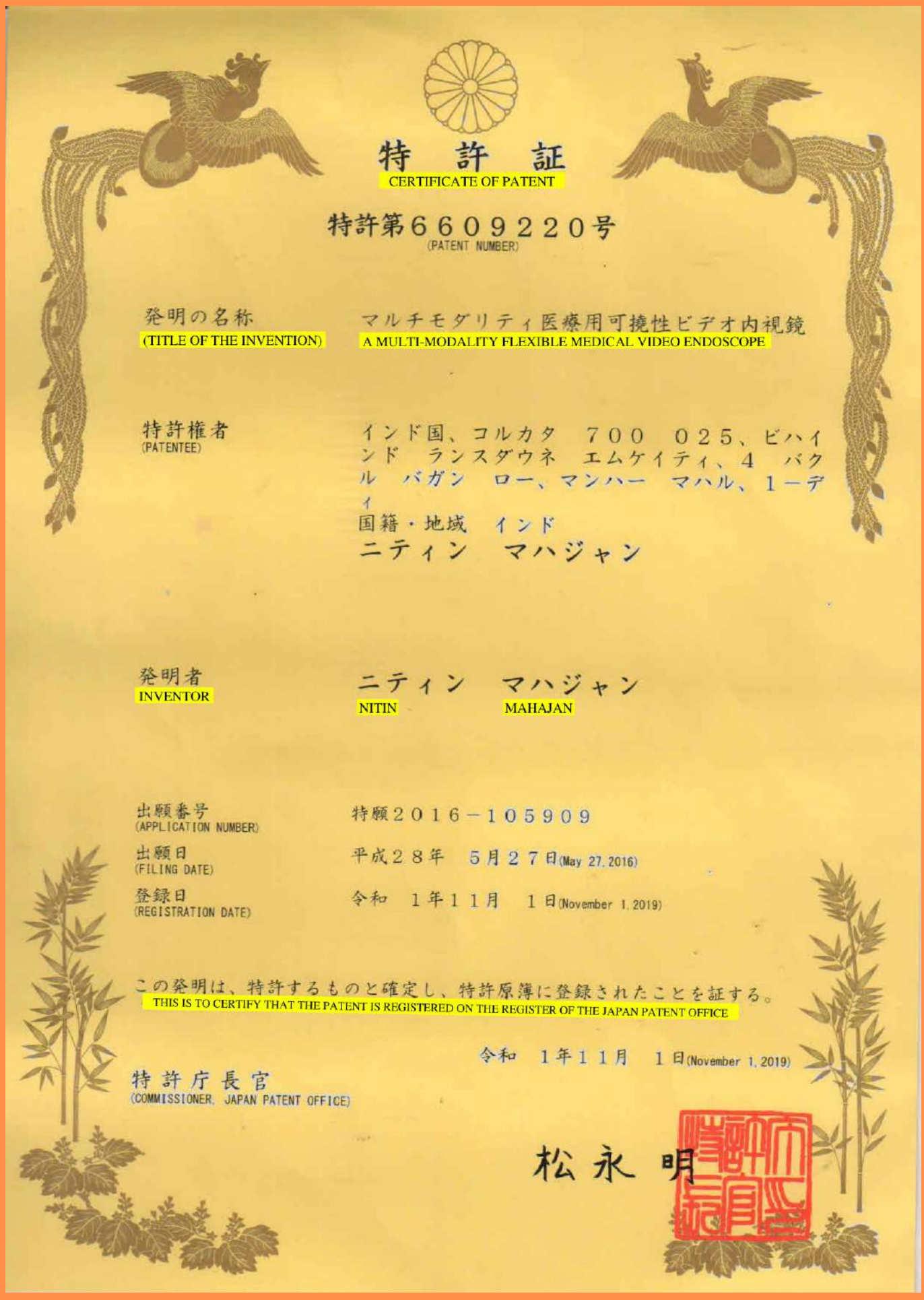
この発明は、特許するものと確定し、特許原簿に登録されたことを証する。
(THIS IS TO CERTIFY THAT THE PATENT IS REGISTERED ON THE REGISTER OF THE JAPAN PATENT OFFICE.)

平成２６年１２月１９日(December 19, 2014)

特許庁長官
(COMMISSIONER, JAPAN PATENT OFFICE)

伊藤 仁

Patents



特　許　証
CERTIFICATE OF PATENT

特許第６６０９２２０号
(PATENT NUMBER)

発明の名称
(TITLE OF THE INVENTION)
マルチモダリティ医療用可撓性ビデオ内視鏡
A MULTI-MODALITY FLEXIBLE MEDICAL VIDEO ENDOSCOPE

特許権者
(PATENTEE)
インド国、コルカタ　７００　０２５、ビハインド　ランスダウネ　エムケイティ、４　バクル　バガン　ロー、マンハー　マハル、１－ディ
国籍・地域　インド
ニティン　マハジャン

発明者
INVENTOR
ニティン　マハジャン
NITIN　MAHAJAN

出願番号
(APPLICATION NUMBER)
特願２０１６－１０５９０９

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登録日
(REGISTRATION DATE)
令和　１年１１月　１日(November 1, 2019)

この発明は、特許するものと確定し、特許原簿に登録されたことを証する。
THIS IS TO CERTIFY THAT THE PATENT IS REGISTERED ON THE REGISTER OF THE JAPAN PATENT OFFICE

令和　１年１１月　１日(November 1, 2019)

特許庁長官
(COMMISSIONER, JAPAN PATENT OFFICE)

松永　明

Patents

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

क्रमांक : 033105942
SL No :

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE

पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

पेटेंट सं. / Patent No.	:	307673
आवेदन सं. / Application No.	:	1395/KOL/2010
फाइल करने की तारीख / Date of Filing	:	10/12/2010
पेटेंटी / Patentee	:	MAHAJAN, NITIN

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित A LENS FREE, SPRING LOADED ILLUMINATION APPARATUS FOR ENDOSCOPE नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 10th day of December 2010 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled A LENS FREE, SPRING LOADED ILLUMINATION APPARATUS FOR ENDOSCOPE as disclosed in the above mentioned application for the term of 20 years from the 10th day of December 2010 in accordance with the provisions of the Patents Act,1970.

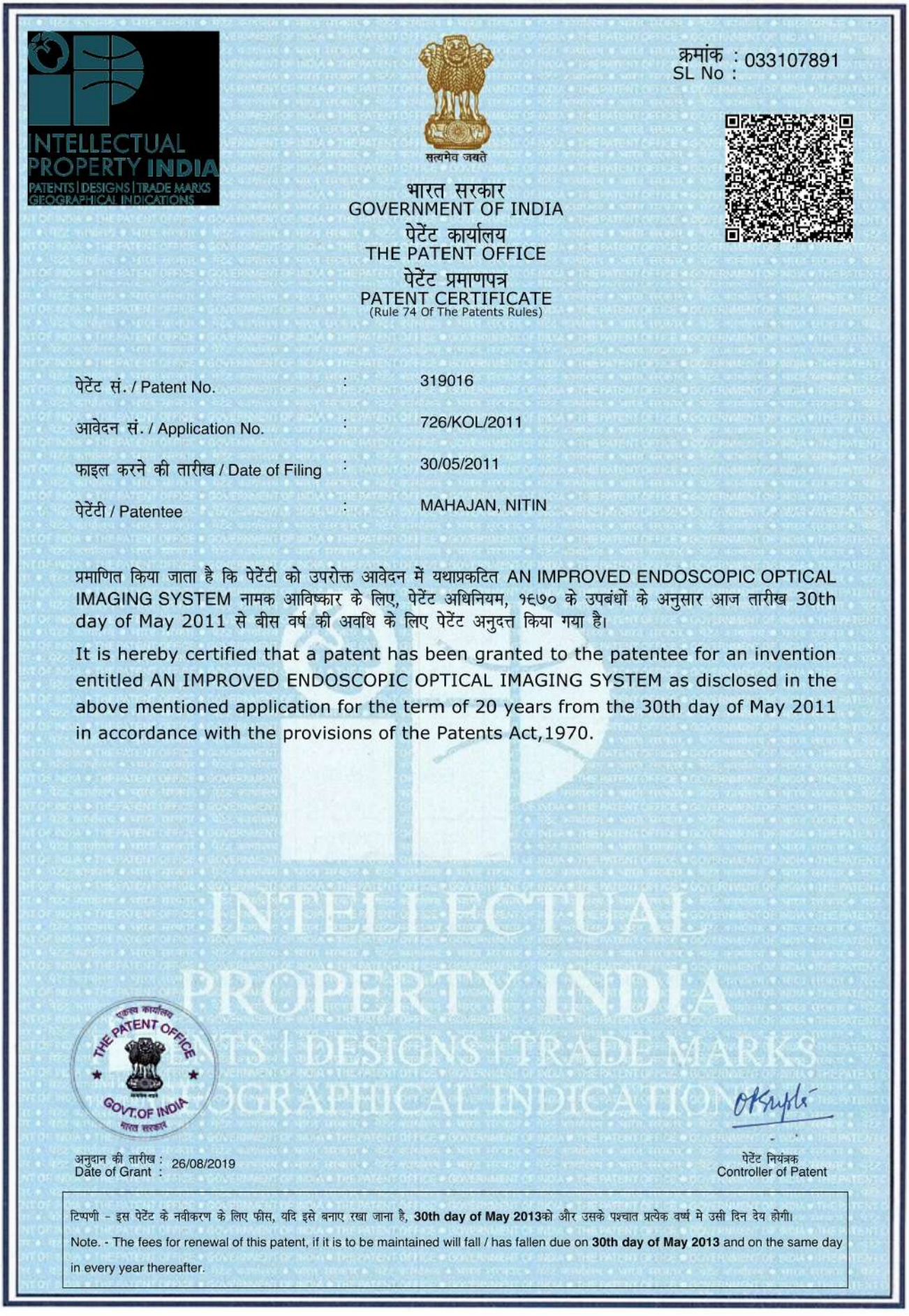
THE PATENT OFFICE GOVT. OF INDIA

अनुदान की तारीख :
Date of Grant : 20/02/2019

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, **10th day of December 2012**को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।
Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on **10th day of December 2012** and on the same day in every year thereafter.

Patents



INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

क्रमांक : 033107891
SL No :

भारत सरकार
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(Rule 74 Of The Patents Rules)

पेटेंट सं. / Patent No.	:	319016
आवेदन सं. / Application No.	:	726/KOL/2011
फाइल करने की तारीख / Date of Filing	:	30/05/2011
पेटेंटी / Patentee	:	MAHAJAN, NITIN

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित AN IMPROVED ENDOSCOPIC OPTICAL IMAGING SYSTEM नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 30th day of May 2011 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled AN IMPROVED ENDOSCOPIC OPTICAL IMAGING SYSTEM as disclosed in the above mentioned application for the term of 20 years from the 30th day of May 2011 in accordance with the provisions of the Patents Act,1970.

एकस्व कार्यालय THE PATENT OFFICE GOVT.OF INDIA भारत सरकार

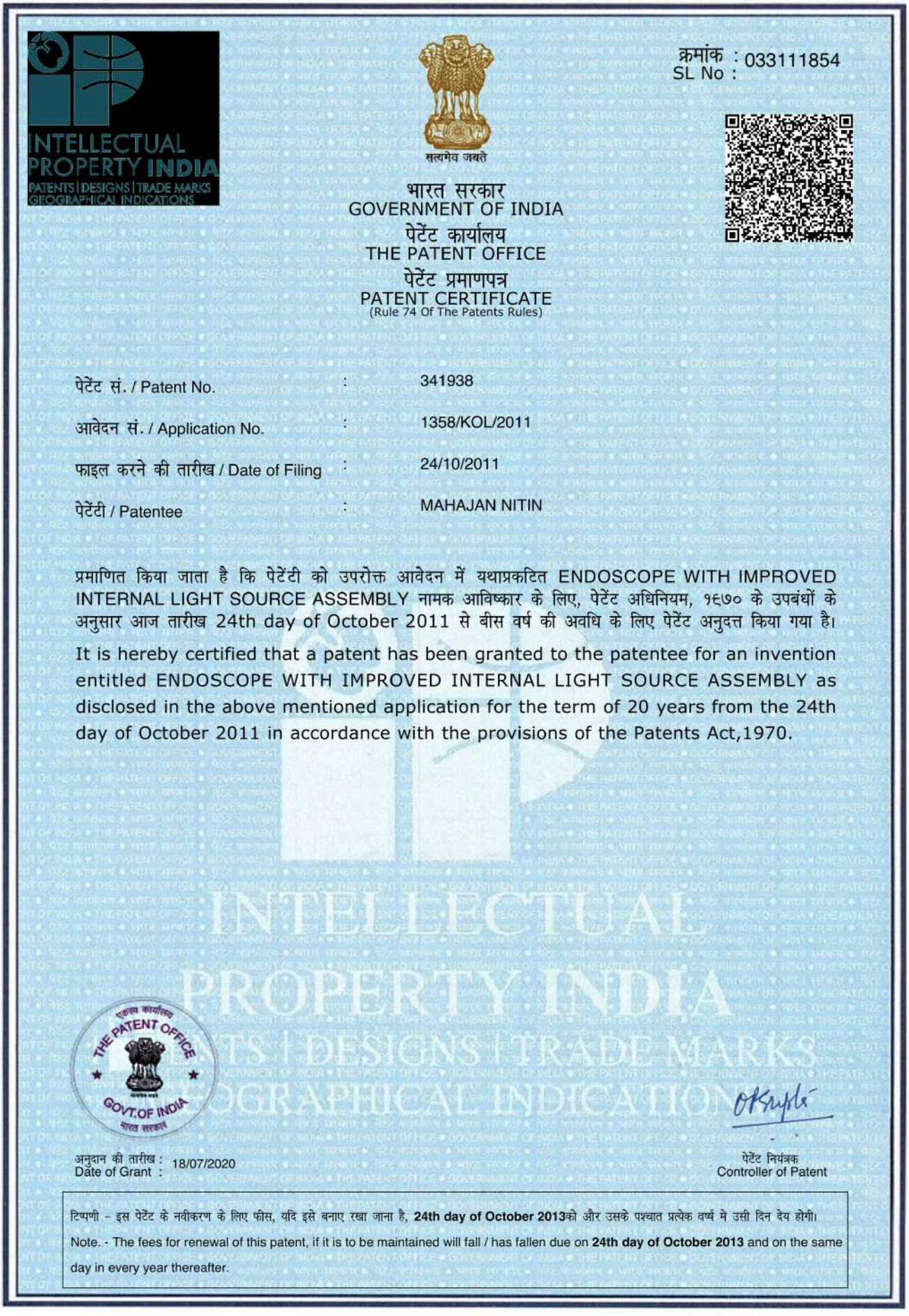
अनुदान की तारीख : 26/08/2019
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, **30th day of May 2013**को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on **30th day of May 2013** and on the same day in every year thereafter.

Patents



क्रमांक : 033111854
SL No :

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पेटेंट सं. / Patent No.	:	341938
आवेदन सं. / Application No.	:	1358/KOL/2011
फाइल करने की तारीख / Date of Filing	:	24/10/2011
पेटेंटी / Patentee	:	MAHAJAN NITIN

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित ENDOSCOPE WITH IMPROVED INTERNAL LIGHT SOURCE ASSEMBLY नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 24th day of October 2011 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled ENDOSCOPE WITH IMPROVED INTERNAL LIGHT SOURCE ASSEMBLY as disclosed in the above mentioned application for the term of 20 years from the 24th day of October 2011 in accordance with the provisions of the Patents Act,1970.

एकस्व कार्यालय THE PATENT OFFICE GOVT.OF INDIA भारत सरकार

अनुदान की तारीख : 18/07/2020
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, **24th day of October 2013**को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

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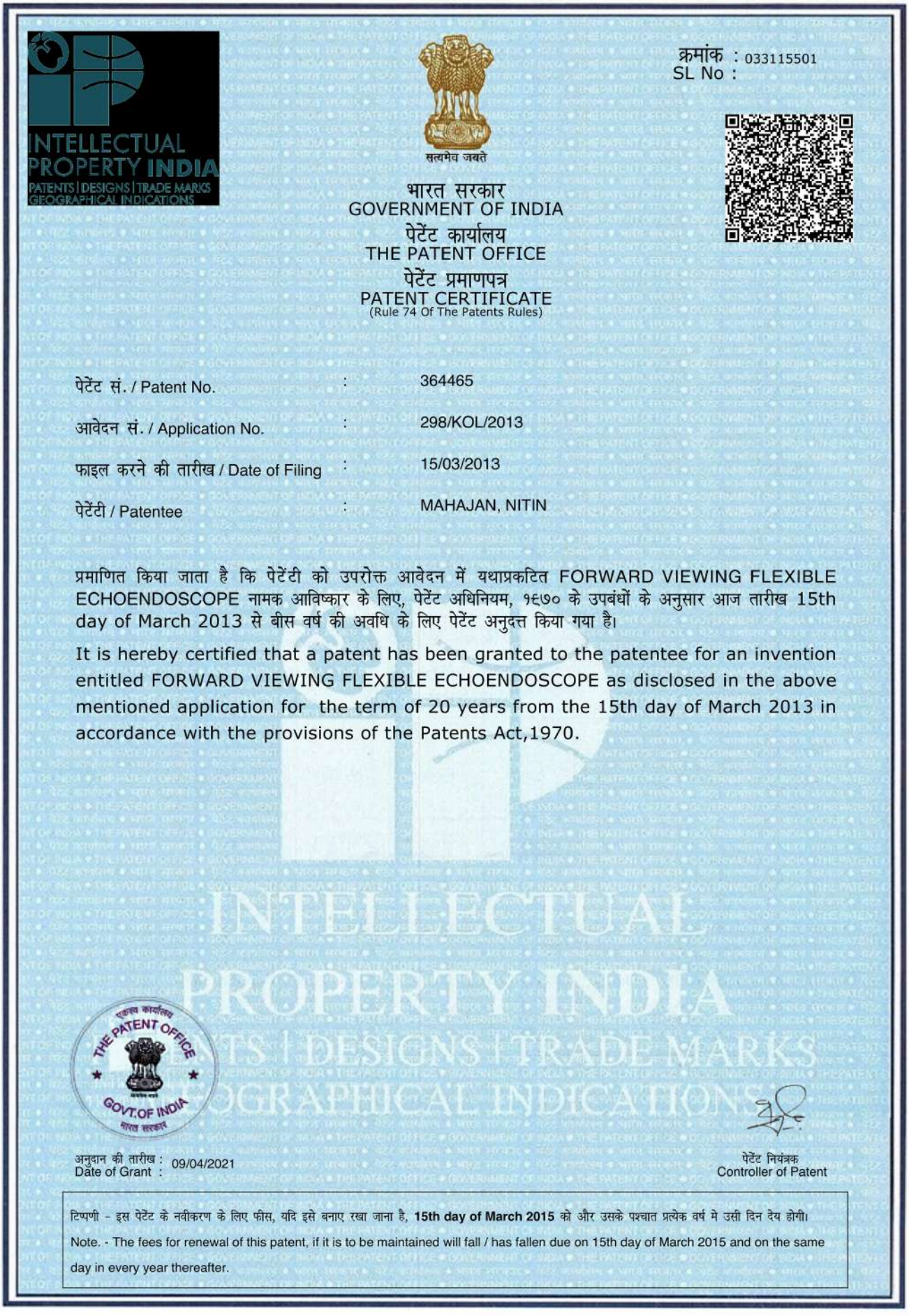

क्रमांक : 033115501
SL No :

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PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

पेटेंट सं. / Patent No.	:	364465
आवेदन सं. / Application No.	:	298/KOL/2013
फाइल करने की तारीख / Date of Filing	:	15/03/2013
पेटेंटी / Patentee	:	MAHAJAN, NITIN

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित FORWARD VIEWING FLEXIBLE ECHOENDOSCOPE नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 15th day of March 2013 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled FORWARD VIEWING FLEXIBLE ECHOENDOSCOPE as disclosed in the above mentioned application for the term of 20 years from the 15th day of March 2013 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 09/04/2021
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, **15th day of March 2015** को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

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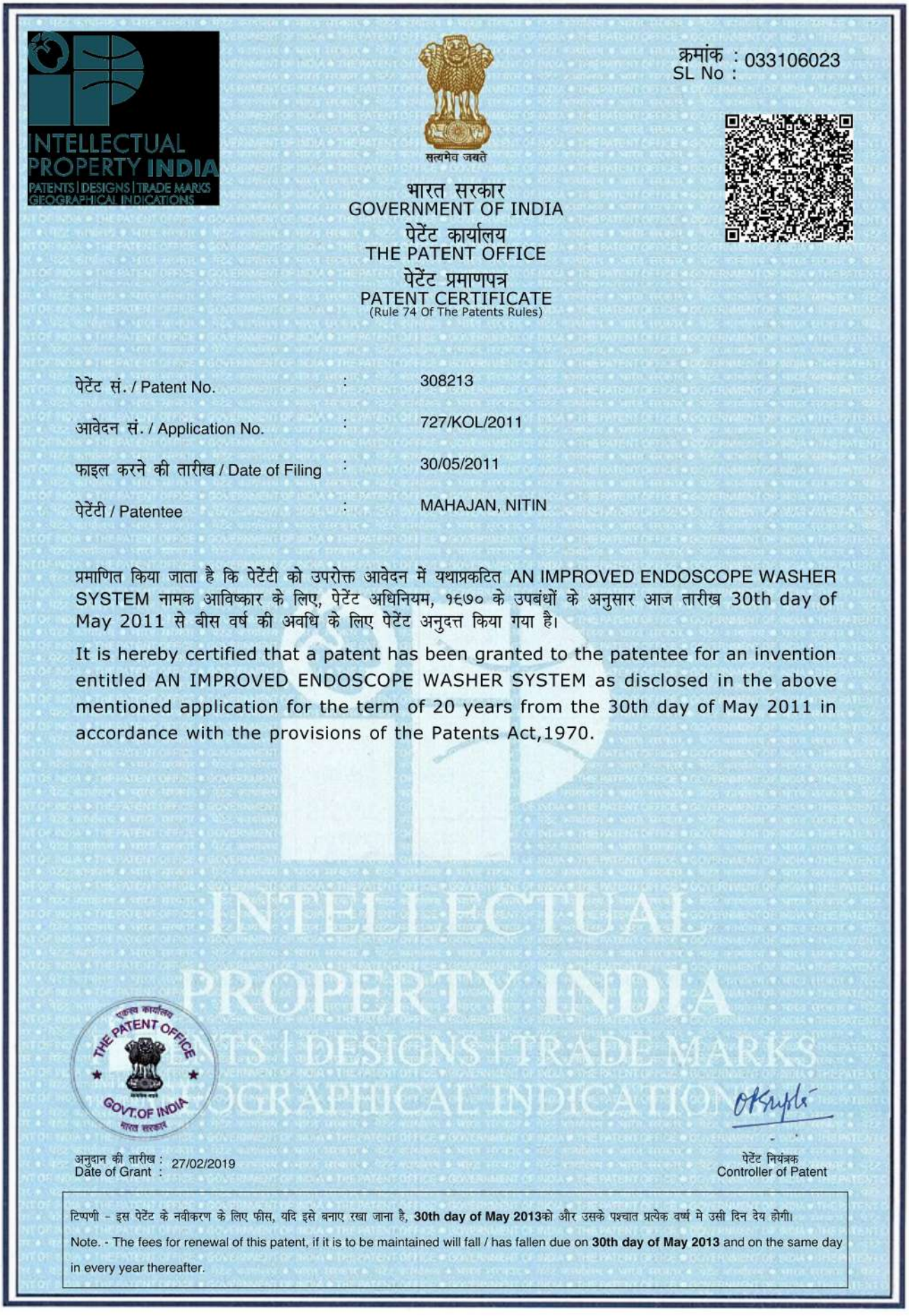
Patents



क्रमांक : 033106023
SL No :

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

पेटेंट सं. / Patent No.	:	308213
आवेदन सं. / Application No.	:	727/KOL/2011
फाइल करने की तारीख / Date of Filing	:	30/05/2011
पेटेंटी / Patentee	:	MAHAJAN, NITIN

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित AN IMPROVED ENDOSCOPE WASHER SYSTEM नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 30th day of May 2011 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled AN IMPROVED ENDOSCOPE WASHER SYSTEM as disclosed in the above mentioned application for the term of 20 years from the 30th day of May 2011 in accordance with the provisions of the Patents Act,1970.

एकस्व कार्यालय THE PATENT OFFICE GOVT.OF INDIA भारत सरकार

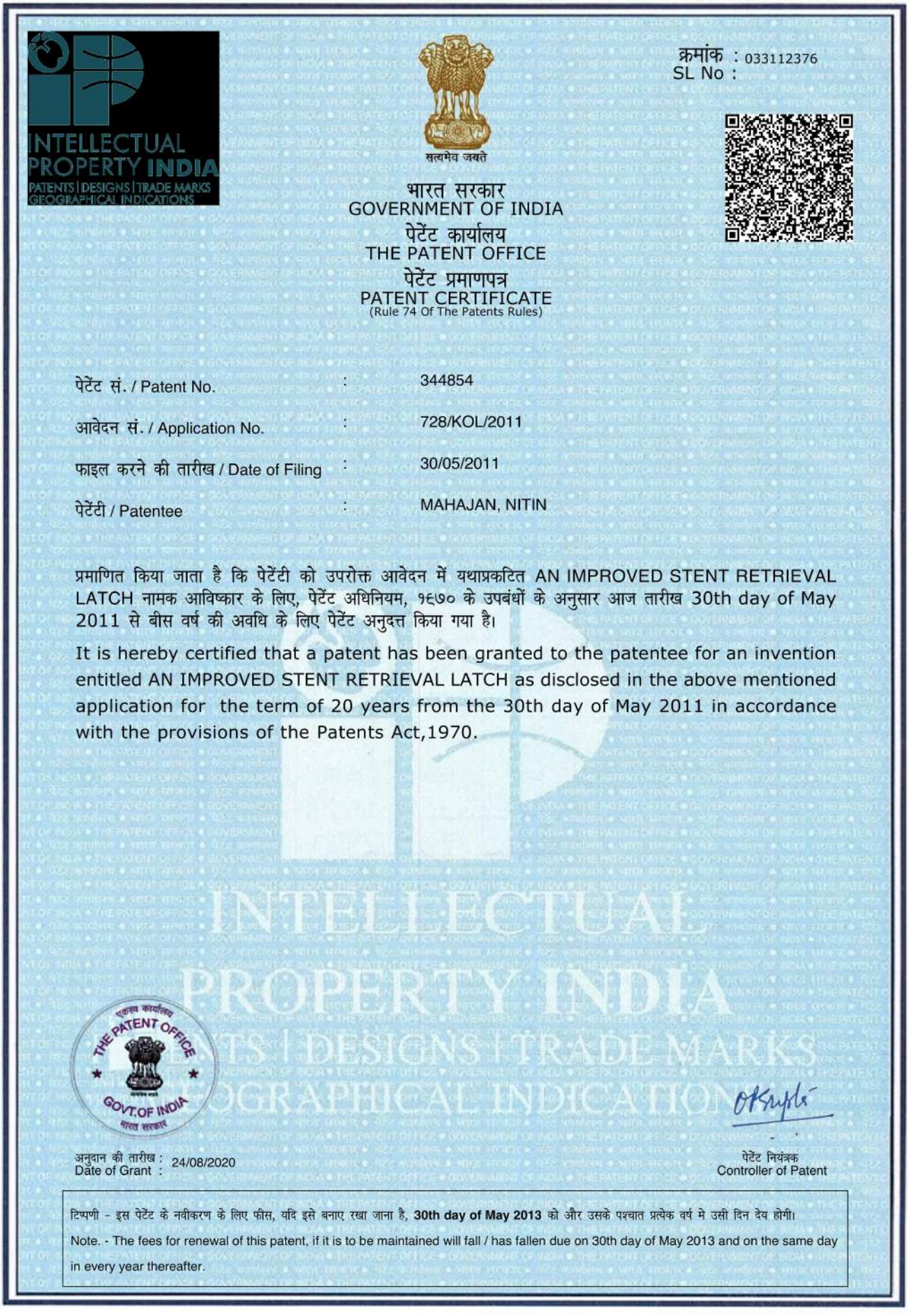
अनुदान की तारीख : 27/02/2019
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, **30th day of May 2013**को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on **30th day of May 2013** and on the same day in every year thereafter.

Patents



क्रमांक : 033112376
SL No :

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

पेटेंट सं. / Patent No.	:	344854
आवेदन सं. / Application No.	:	728/KOL/2011
फाइल करने की तारीख / Date of Filing	:	30/05/2011
पेटेंटी / Patentee	:	MAHAJAN, NITIN

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित AN IMPROVED STENT RETRIEVAL LATCH नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 30th day of May 2011 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled AN IMPROVED STENT RETRIEVAL LATCH as disclosed in the above mentioned application for the term of 20 years from the 30th day of May 2011 in accordance with the provisions of the Patents Act,1970.

एकस्व कार्यालय THE PATENT OFFICE GOVT.OF INDIA भारत सरकार

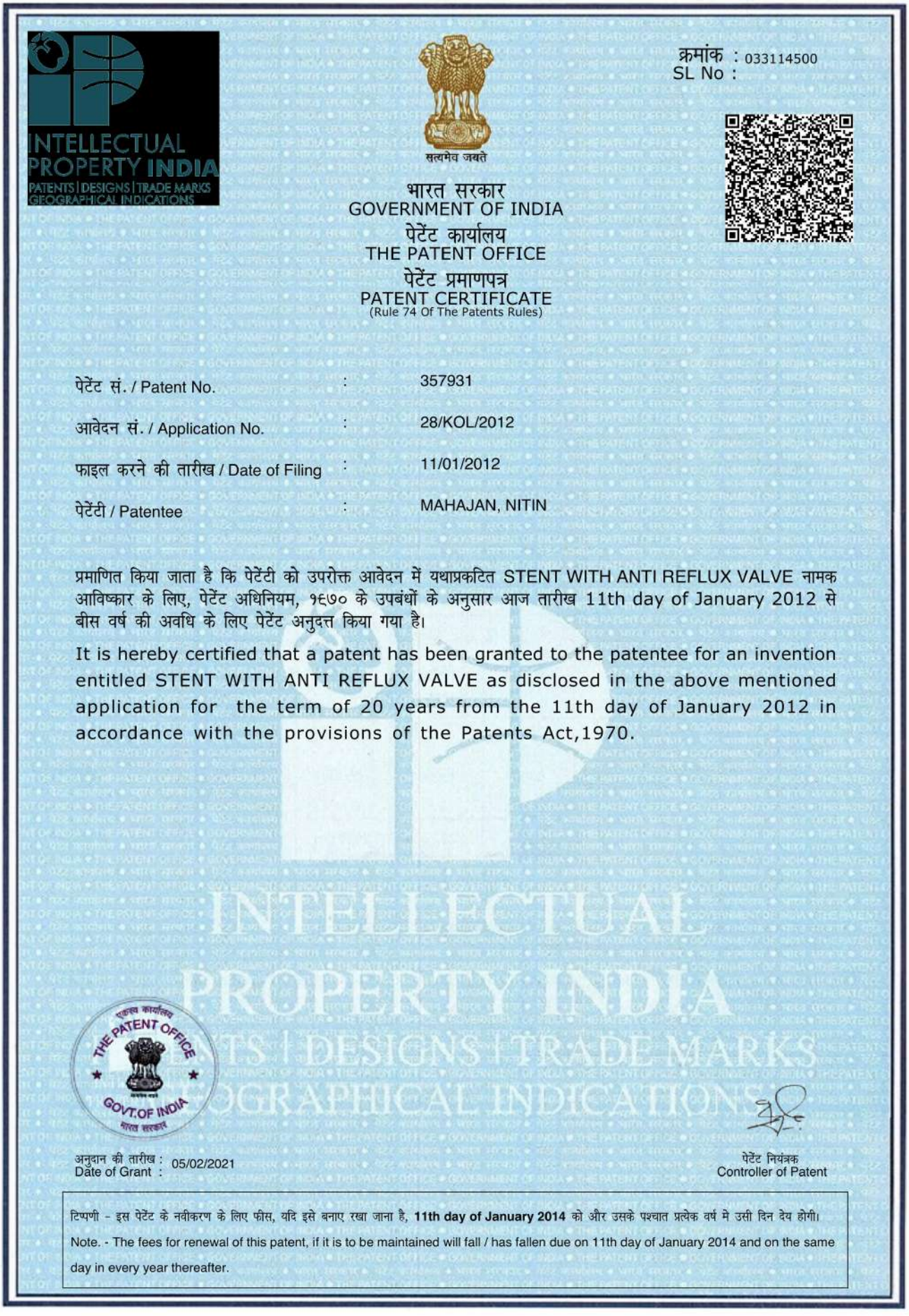
अनुदान की तारीख : 24/08/2020
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, **30th day of May 2013** को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 30th day of May 2013 and on the same day in every year thereafter.

Patents



क्रमांक : 033114500
SL No :

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

पेटेंट सं. / Patent No.	:	357931
आवेदन सं. / Application No.	:	28/KOL/2012
फाइल करने की तारीख / Date of Filing	:	11/01/2012
पेटेंटी / Patentee	:	MAHAJAN, NITIN

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित STENT WITH ANTI REFLUX VALVE नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 11th day of January 2012 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

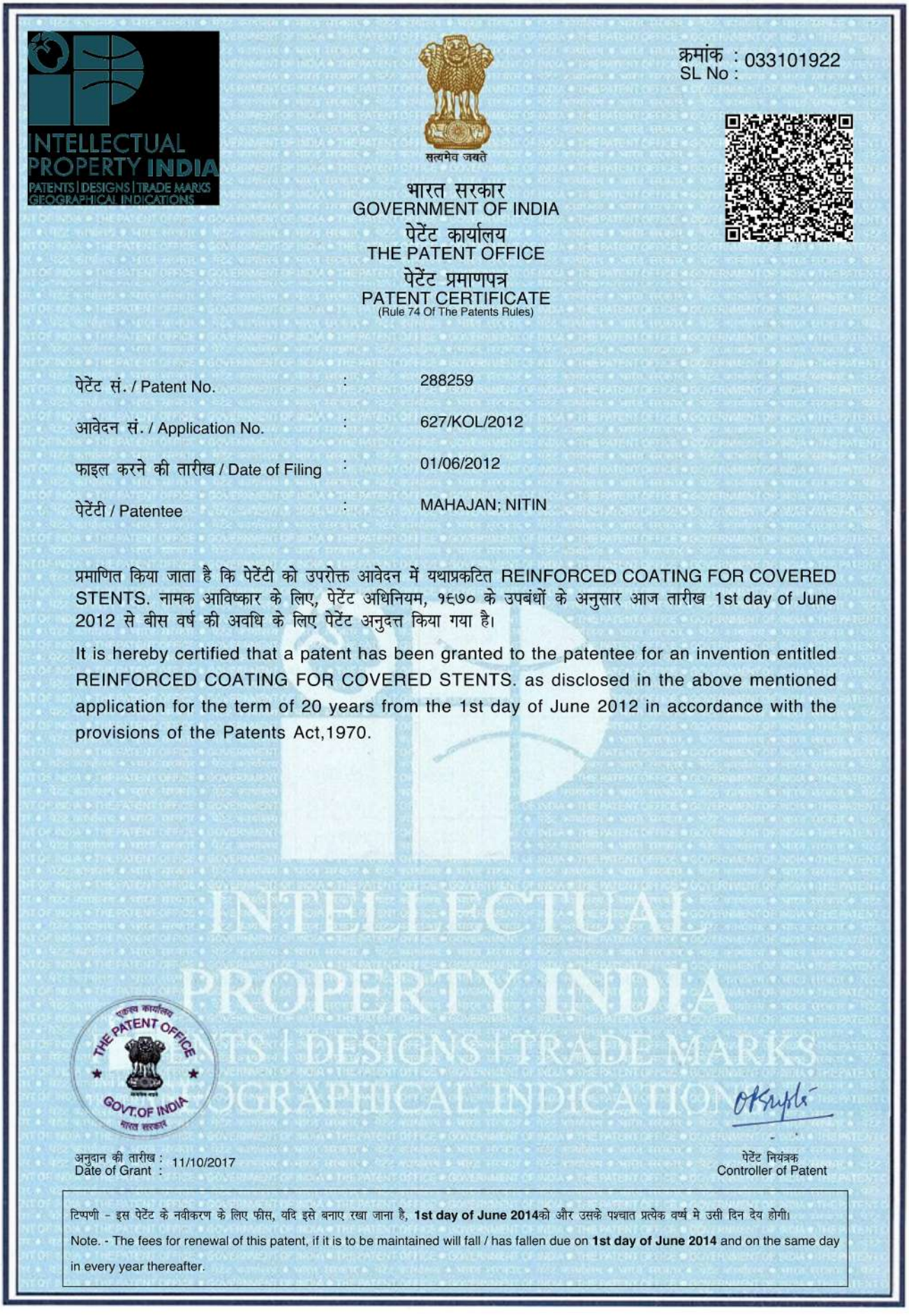
It is hereby certified that a patent has been granted to the patentee for an invention entitled STENT WITH ANTI REFLUX VALVE as disclosed in the above mentioned application for the term of 20 years from the 11th day of January 2012 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 05/02/2021
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, **11th day of January 2014** को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।
Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 11th day of January 2014 and on the same day in every year thereafter.

Patents



क्रमांक : 033101922
SL No :

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

पेटेंट सं. / Patent No.	:	288259
आवेदन सं. / Application No.	:	627/KOL/2012
फाइल करने की तारीख / Date of Filing	:	01/06/2012
पेटेंटी / Patentee	:	MAHAJAN; NITIN

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित REINFORCED COATING FOR COVERED STENTS. नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 1st day of June 2012 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled REINFORCED COATING FOR COVERED STENTS. as disclosed in the above mentioned application for the term of 20 years from the 1st day of June 2012 in accordance with the provisions of the Patents Act,1970.

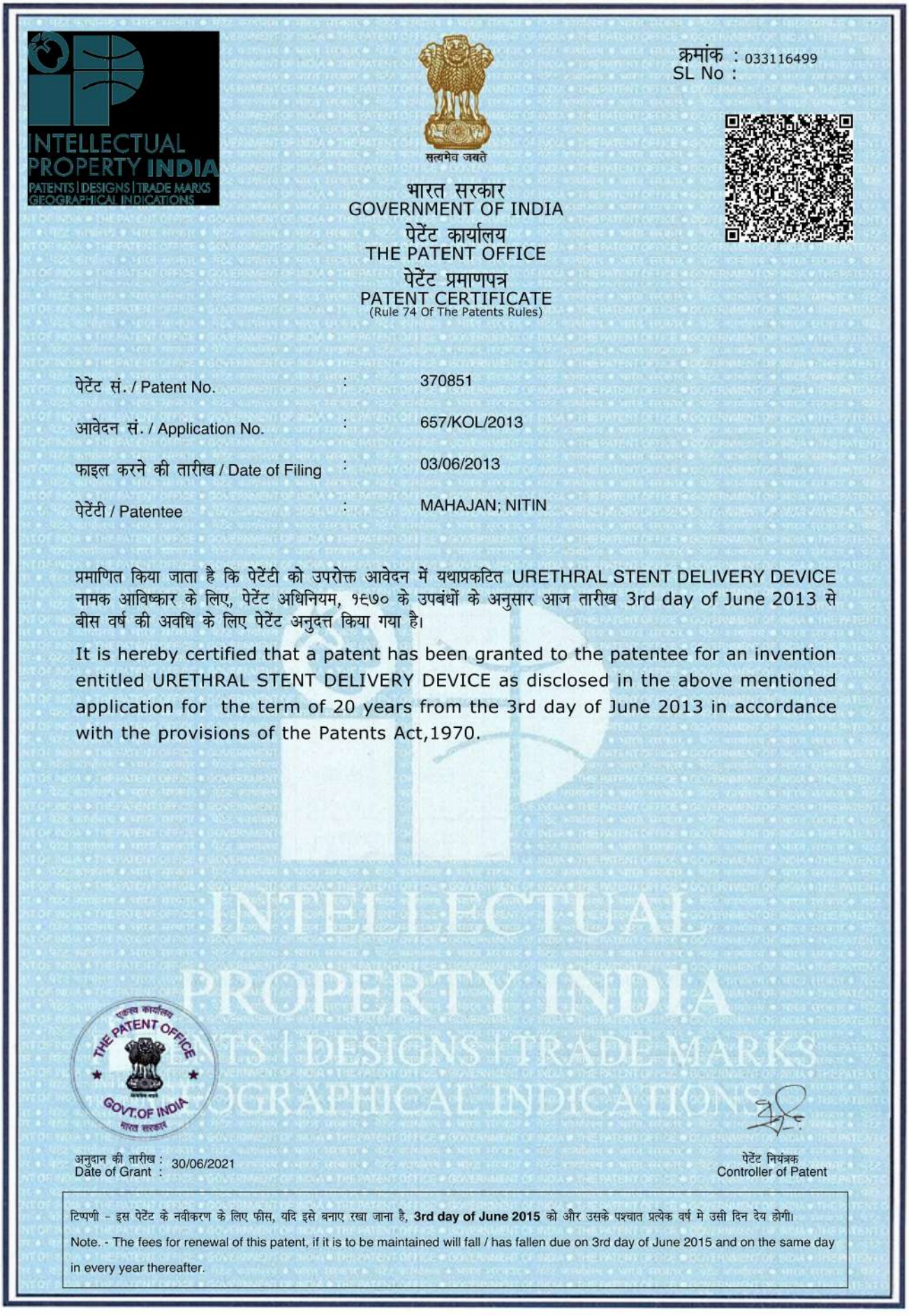
अनुदान की तारीख : 11/10/2017
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, **1st day of June 2014**को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on **1st day of June 2014** and on the same day in every year thereafter.

Patents



क्रमांक : 033116499
SL No :

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

पेटेंट सं. / Patent No.	:	370851
आवेदन सं. / Application No.	:	657/KOL/2013
फाइल करने की तारीख / Date of Filing	:	03/06/2013
पेटेंटी / Patentee	:	MAHAJAN; NITIN

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित URETHRAL STENT DELIVERY DEVICE नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 3rd day of June 2013 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled URETHRAL STENT DELIVERY DEVICE as disclosed in the above mentioned application for the term of 20 years from the 3rd day of June 2013 in accordance with the provisions of the Patents Act,1970.

एकस्व कार्यालय THE PATENT OFFICE GOVT.OF INDIA भारत सरकार

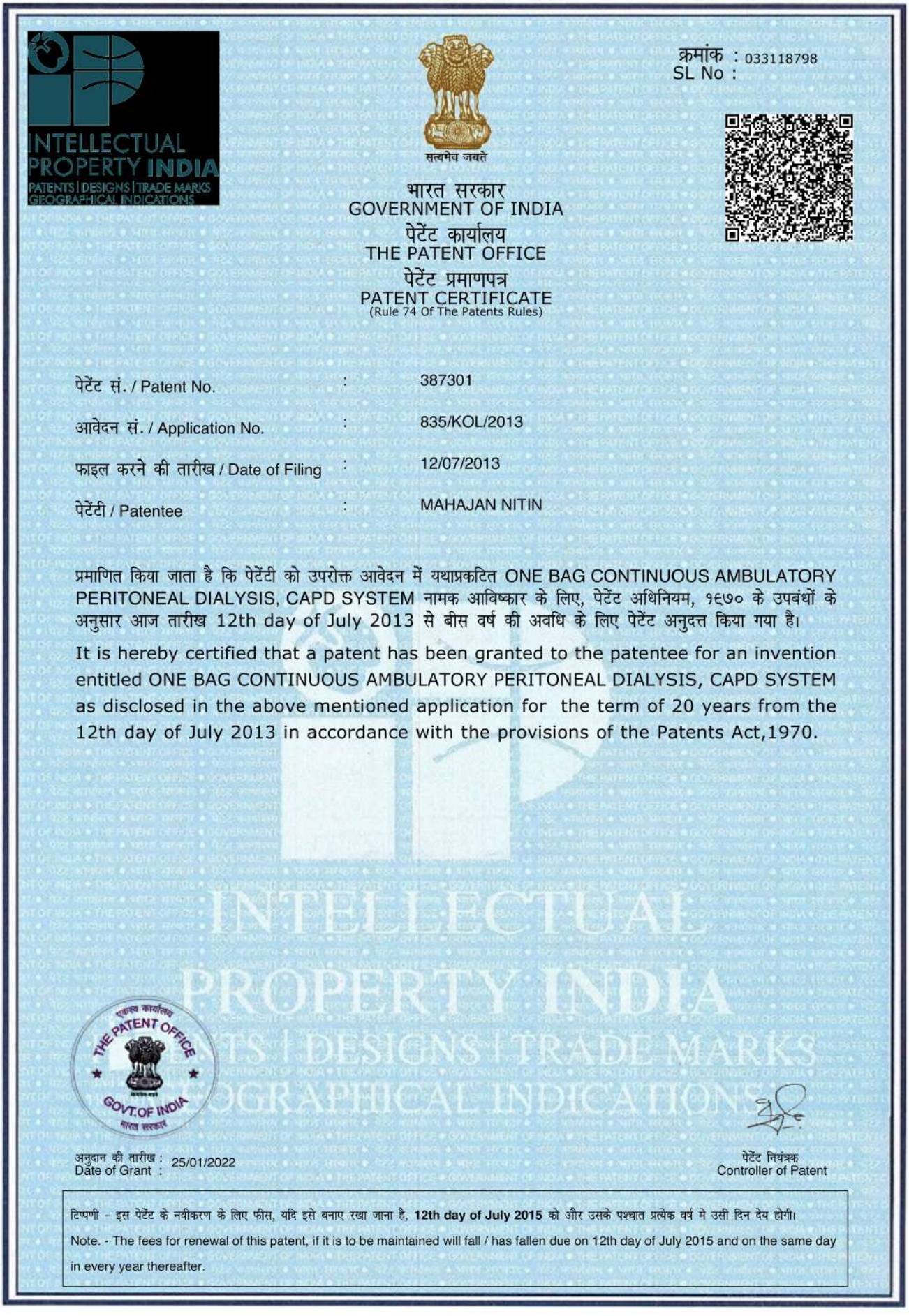
अनुदान की तारीख : 30/06/2021
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, **3rd day of June 2015** को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 3rd day of June 2015 and on the same day in every year thereafter.

Patents



क्रमांक : 033118798
SL No :

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

पेटेंट सं. / Patent No.	:	387301
आवेदन सं. / Application No.	:	835/KOL/2013
फाइल करने की तारीख / Date of Filing	:	12/07/2013
पेटेंटी / Patentee	:	MAHAJAN NITIN

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित ONE BAG CONTINUOUS AMBULATORY PERITONEAL DIALYSIS, CAPD SYSTEM नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 12th day of July 2013 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled ONE BAG CONTINUOUS AMBULATORY PERITONEAL DIALYSIS, CAPD SYSTEM as disclosed in the above mentioned application for the term of 20 years from the 12th day of July 2013 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 25/01/2022
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, **12th day of July 2015** को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 12th day of July 2015 and on the same day in every year thereafter.

CONFORMITY TO EUROPEAN DIRECTIVES

ATTESTATION OF CONFORMITY

CERTIFICATE NO. : CII/CE/201709/093

HOLDER OF CERTIFICATE:

M/S Mitra industries (P) Ltd.
14/4, Delhi – Mathura Road, Faridabad, Haryana – 121003 (India)

CERTIFICATE ISSUED ON : 24.09.2020

PRODUCT (S) : Stripper

TRADE MARK : MITRA *Experience Peace of Mind*

MODEL NO. : 1. m.stripper

MANUFACTURED AT : M/S Mitra industries (P) Ltd.
14/4, Delhi – Mathura Road, Faridabad, Haryana – 121003 (India)

APPLICABLE DIRECTIVES (S) : **MDD Directive:** 93/42/EEC

APPLICABLE SPECIFICATIONS & TEST REPORTS :
Safety Specification No.: IEC 60900:2018
Report No.: 202202035001, Dated – 16.09.2020

The product (s) was tested on voluntary basis as per above directives & specifications and it complies with all the requirements. This attestation is released with the above mentioned Conformity India International Certificate No. and remains valid in conjunction with Declaration of Conformity duly signed by organization.

VALID UP TO : 23.09.2023

CERTIFICATE OF CONFORMITY

SEAL :

For Conformity Certification Services

CONFORMITY INDIA
International Private Limited
A-33, 2nd Floor, Mayapuri Industrial Area, Phase-I, New Delhi 110064, India
Email: mktg@ciindia.in, Website: http://www.ciindia.in

CONFORMITY TO SAFETY STANDARDS

SAFETY CERTIFICATION

CERTIFICATE NO. : CII/SAF/20170616/0013

HOLDER OF CERTIFICATE:

Mitra Industries (P) Ltd.
14/4, Delhi - Mathura Road, Faridabad, Haryana – 121003 (India)

CERTIFICATE ISSUED ON : 21.09.2020

CERTIFIED SINCE : 04.09.2010

VALID UPTO : 20.09.2023

PRODUCT (S) : Stripper
Model Nos.: m.stripper
Trade Mark.: MITRA

MANUFACTURED AT : Mitra Industries (P) Ltd.
14/4, Delhi - Mathura Road, Faridabad, Haryana – 121003 (India)

TYPE OF SCHEME : **Full Certification Scheme (FCS) – Type 05**

Certified that the stated product (s) manufactured at the above unit under the control of this certificate holder qualify the requirement (s) of above mentioned scheme of the Conformity India International Pvt. Ltd. The product (s) have been tested as per following standard (s) :

SPECIFICATION NO.: IEC 60900:2018

CERTIFICATE OF CONFORMITY

SEAL :

Conformity India International Pvt. Ltd. New Delhi

For Conformity Certification Services

CONFORMITY INDIA
International Private Limited
A-33, 2nd Floor, Mayapuri Industrial Area, Phase-I, New Delhi 110064, India
Email: mktg@ciindia.in, Website: http://www.ciindia.in

CONFORMITY TO EMC STANDARDS

EMC CERTIFICATION

CERTIFICATE NO. : CII/EMC/201709/006

HOLDER OF CERTIFICATE:

M/S Mitra Industries (P) Ltd.
14/4, Delhi – Mathura Road, Faridabad, Haryana – 121003 (India)

CERTIFICATE ISSUED ON : 24.09.2020

CERTIFIED SINCE : 11.04.2014

VALID UPTO : 23.09.2023

PRODUCT (S) : RF Tube Sealer (s)
Model - 1. m.SEAL, 2. m.SEAL_BS,
Trade Mark - MITRA Experience Peace of Mind

MANUFACTURED AT : M/S Mitra industries (P) Ltd.
14/4, Delhi – Mathura Road, Faridabad, Haryana – 121003 (India)

TYPE OF SCHEME : Full Certification Scheme (Type 05)

Certified that the stated product (s) manufactured at the above unit under the control of this certificate holder qualify the requirement (s) of above mentioned scheme of the Conformity India International Pvt. Ltd. The product (s) have been tested as per following standard (s) :

EMC Specification No.: IEC 60601-1-2:2014 (CISPR 11:2015, IEC 61000 – 4 -2 : 2008, IEC 61000-4-3:2006, IEC 61000 – 4- 4:2012, IEC 61000 – 4-5:2014, IEC 61000-4-8:2009)

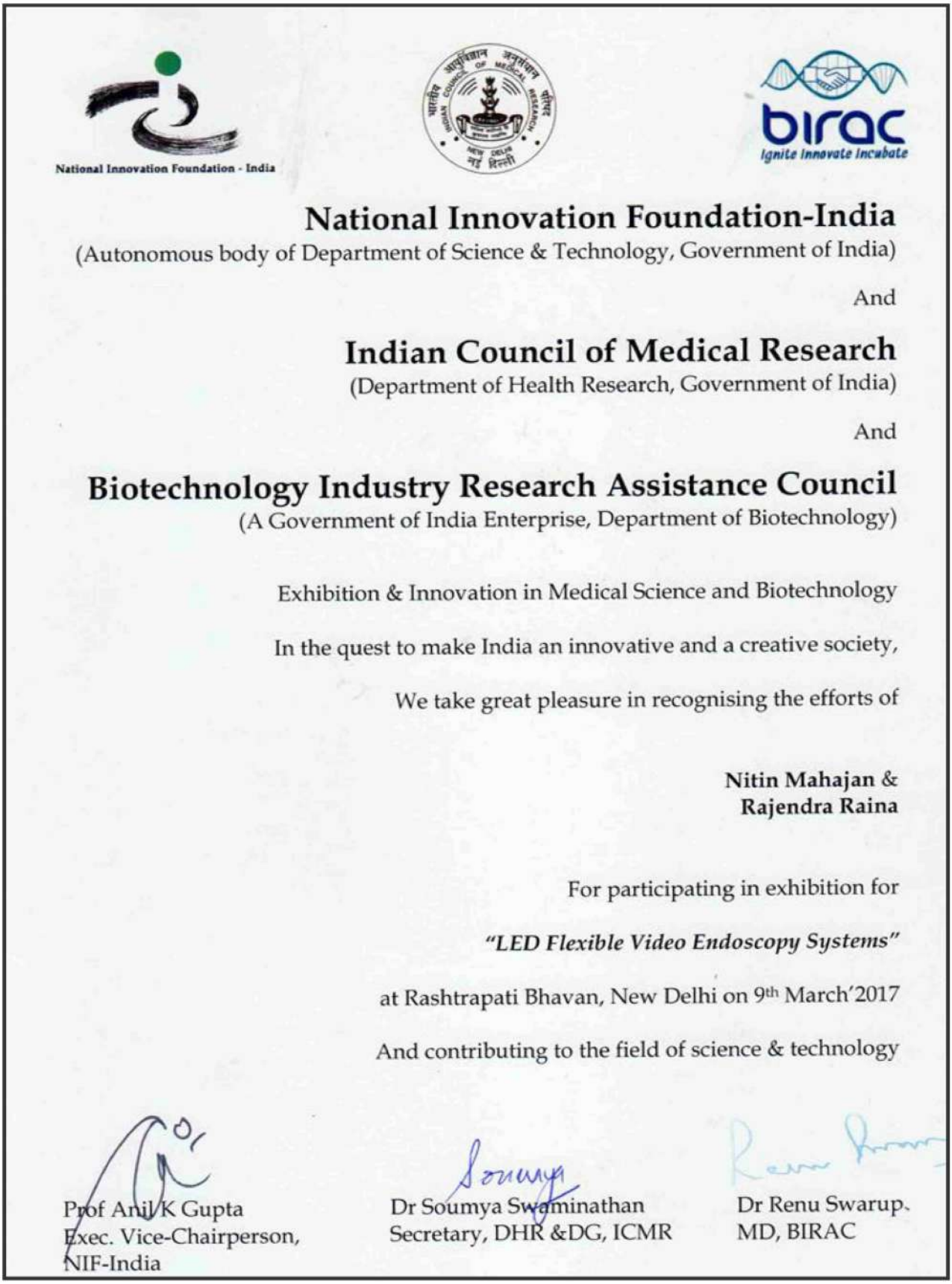
CERTIFICATE OF CONFORMITY

SEAL : **For Conformity Certification Services**

CONFORMITY INDIA
International Private Limited

A-33, 2nd Floor, Mayapuri Industrial Area, Phase-I, New Delhi 110064, India
Email: mktg@ciindia.in, Website: http://www.ciindia.in

Recognition



National Innovation Foundation - India

birac
Ignite Innovate Incubate

National Innovation Foundation-India
(Autonomous body of Department of Science & Technology, Government of India)

And

Indian Council of Medical Research
(Department of Health Research, Government of India)

And

Biotechnology Industry Research Assistance Council
(A Government of India Enterprise, Department of Biotechnology)

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For participating in exhibition for

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Exec. Vice-Chairperson,
NIF-India

Dr Soumya Swaminathan
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Dr Renu Swarup.
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Government of India
Given this 22nd Day of February, 2016 at New Delhi.

Siddharth Sharma
Dy. Director General

NATIONAL PRODUCTIVITY COUNCIL

G.R. Raghavender
Director General

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FIRST PRIZE

Presented to

MITRA MEDICAL SERVICES LLP (Ottomed Endoscopy)

by

SHRI KALRAJ MISHRA

Hon'ble Union Minister for Micro, Small & Medium Enterprises
Government of India
Given this 22nd Day of February, 2016 at New Delhi

HD

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Endowasher Qubey II

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- EndoClinic Xi
- EndoClinic 7LAN
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mCycler APD-II

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MITRA

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05/04/2022