OPTOSKY
Spectroscopy Solutions

DataSheet

High-Sensitivity & High-Resolution, TE-Cooled Back-Thinned Spectrometer

ATP5020P

Feature:

- Detector: Back-thinned illuminated CCD (cooled to -10C).
- Pixels: 2048 pixels
- UV or NIR response enhanced optimization:
- UV response enhanced: ATP5020P
- NIR response enhanced: ATP5020R
- Low noise CCD signal processing circuit
- Max. Wavelength Range: 180-1180 nm
- (depends on specific requirements)
- Optical Sensitivity: 0.2-3 nm
- (Depends on range and slit).
- Optical Path: Crossed C-T.
- Integration Time：10ms-65s.
- Power Supply：DC 5V±10% @ <2.3A
- 18 bit, 570KHz ADC (workable output 16bit)
- Interface：SMA905 or free space
- Trigger: USB2.0 (High speed) or UART.
- 20 pins dual-row programmable external expansion interface.

Applications:

- Raman spectrometer, online Raman analysis
- Micro volume spectrophotometer
- Weak fluorescent light detection
- Reflectance, Transmittance, absorbance detection;
- Fruit Sorting.

Description:

ATP5020P is a new generation of TE-cooled high performance spectrometer, which is self-developed by Optosky, It uses a back-thinned TE-cooled linear CCD with a semi-conductor cooling technology. The CCD can set in constant temperature environment (up to -10 degree), which greatly reduces sensor noise at an excellent signal-to-noise ratio (about 2 times higher than competitors level), and it improves the reliability, so the measurement results can not change with the ambient temperature.

Meanwhile, it uses lowest noise CCD signal processing pcb to reach a noise less than 3 counts, which still the best low noise level..

The ATP5020P can receive SMA905 fiber optic input or free-space light to output spectral data via USB2.0 or UART port.

The ATP5020P connects to 5V DC power supply, easy-to-integrate to wide industrial spectroscopy application.

Model	Features
ATP5020P	2048 pixels, cooled -10°C
ATP5020R	NIR enhanced, 2048 pixels, cooled -10°C

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1 PARAMETER

DETECTOR	
Model	TE-cooled back-illuminated linear array CCD (cooling to -5C)
Spectrum Range	180-1180 nm
Effective Pixels	2048 pixels
Pixel size	14μm×14μm
Full well capacity	~600 ke$^-$
CCD node Sensitivity	6.5uV/e-
Readout noise	6e-
OPTICAL PARAMETER	
Wavelength Range	180-1100 nm depends on specific application
Optical Resolution	0.2-3 nm (Depend on range & slit)
SNR	> 900:1
Dynamic Range	10000：1
Working T	-10-45 ℃
OPTICAL PATH	
Optical Design	f/4 crossed, asymmetrical C-T
Focus	98 mm for incidence / 107 mm for output
Silt size	5,10,25,50,100,150,200μm (optional)
Optical Interface	Fiber optic interface SMA905, free space
ELECTRICAL PARAMETERS	
Integration Time	10ms - 65s
Data output interface	USB 2.0
ADC	18 bit （Workable Output 16bit）
Supply Voltage	DC 5V±10%
Working current	<2.3A
Storing Temp	-20°C to +70°C
Working Temp	-10°C to +45°C
PHYSICAL	
Size	217×110×52 mm
Wight	1.6 kg
Sealing	Anti-sweat

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2 ATP5020P vs ATP5020R

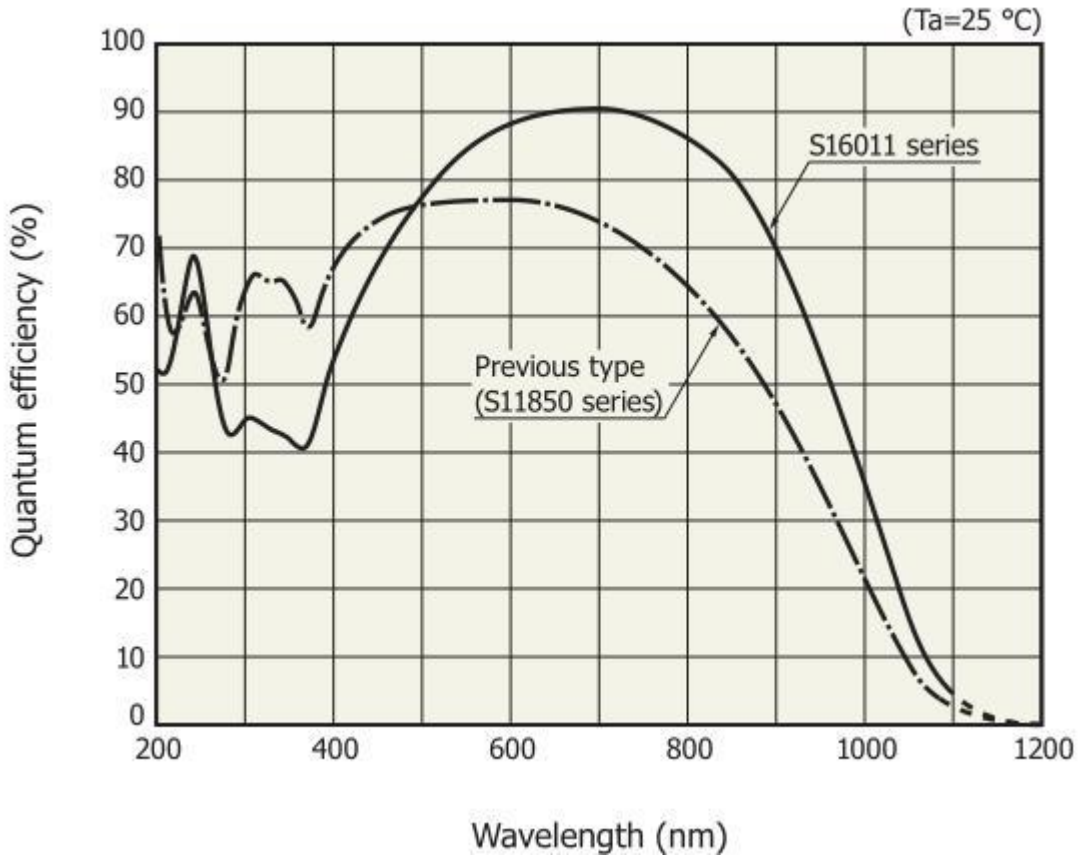

Fig 1

ATP5020R is designed to enhance NIR response,
the higher NIR response in the rear range >500 nm,
ATP5020P is designed to enhance UV response,
the higher UV response in the front range <500 nm.

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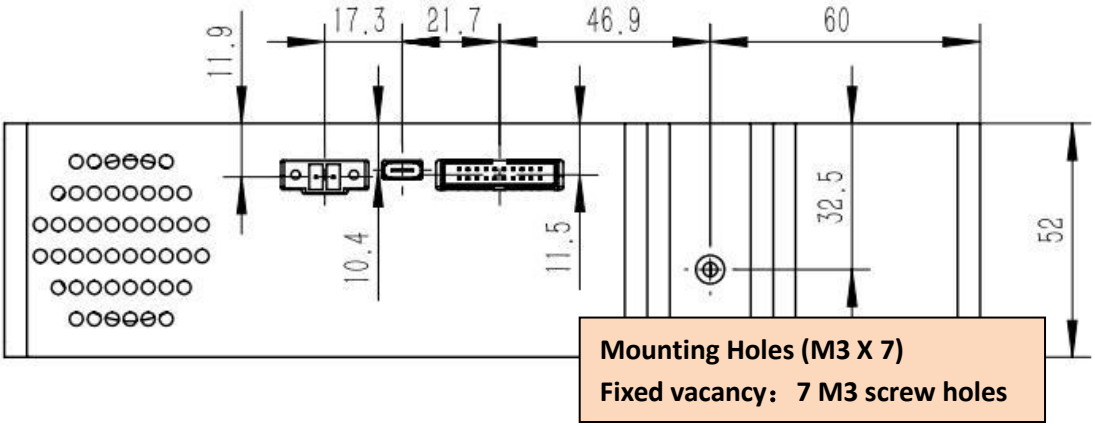
3 Mechanical Diagrams



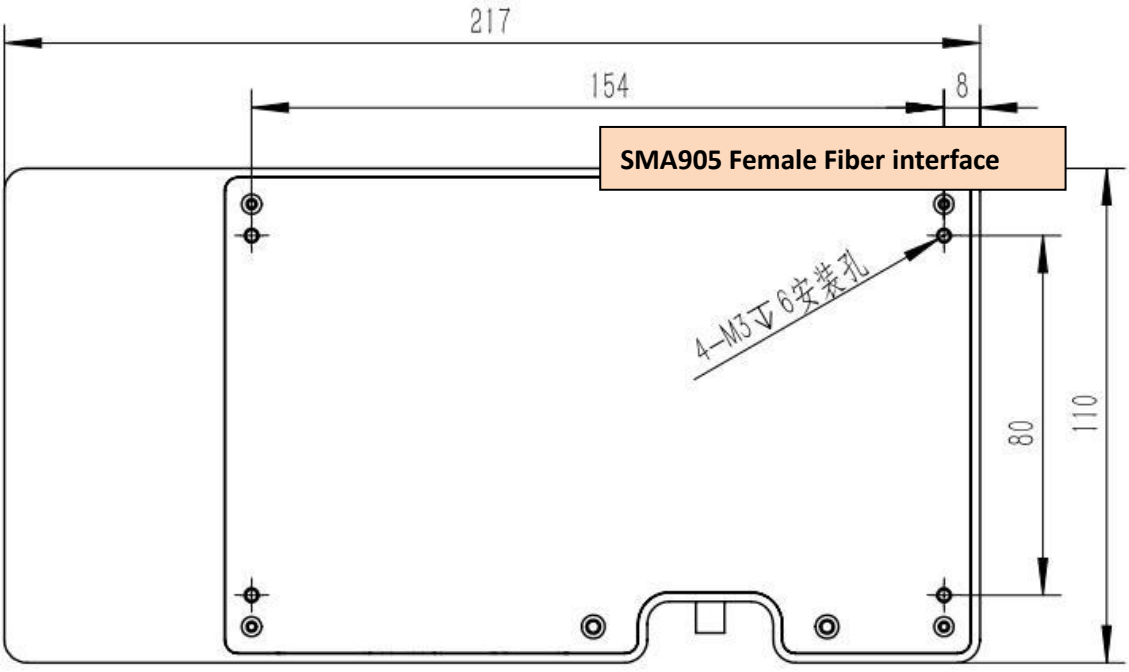


Fig 2 Dimension

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4 Electrical Pin-out

Table 1 Electrical Characteristics

Parameter	Min	Typ	Max	Unit
Power Supply				
Operating voltage range	4.5	5	5.5	V
Operating current	170	500	2000	mA
Logic Inputs(3.3V LVTTL, Five-volt tolerant)				
High level input voltage	1.7		3.6	V
Low level input voltage	-0.3		1.0	V
Logic Output(3.3V LVTTL)				
High level output voltage	2.4			V
Low level output voltage			0.4	V

The module is equipped with a 20-pin male angled box header(2x10, 2.00 mm pitch) and USB2.0 B type interface. The 20-pin connector is a Samtec part # STMM-110-02-L-D-RA connector. The mate to this is a Samtec part # TCSD-10-D-XX.XX-01-N.

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Table 2 Electrical Pin-Out

Pin#	Description	I/O	Function Description
1	VCC	/	Power Supply, 5V±0.5,
2	GND	/	Ground
3	UART_TX	Output	UART Transmit signal
4	UART_RX	Input	UART Receive signal
5	Lamp_En	Output	LVTTL output the lamp enable signal.
6	Continuous_strobe	Output	LVTTL output the continues strobe signal.
7	Ext_trigger_in	Input	LVTTL input the trigger signal.
8	Single_strobe	Output	LVTTL output the single strobe signal.
9	SPI_SCK	Output	The SPI Clock signal for communications to other SPI peripherals
10	SPI_MOSI	Output	The SPI Master Out Slave In (MOSI) signal for communications to other SPI peripherals
11	SPI_MISO	Input	The SPI Master In Slave Out (MISO) signal for communications to other SPI peripherals
12	SPI_CS	Output	The SPI Chip/Device Select signal for communications to other SPI peripherals
13	GPIO0	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
14	GPIO1	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
15	GPIO2	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
16	GPIO3	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
17	GPIO4	Input	General Purpose Software Programmable Digital
		/Output	Inputs/Outputs, LVTTL Logic.
18	GPIO5	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
19	GPIO6	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
20	GPIO7	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.

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5 Order Guide

Order number Rules:

Model	Spectral region		Slit width	
ATP5020P	Shortwavelength	Longwavelength	Slit width	

For example:

What to buy ATP5020P, spectral region: 200-1000nm, slit width is 50 um, then the order no is:

ATP5020P-200-1000-050

Order No	Spectral region	Slit	
ATP5020P-200-400-###	200~400	10 μm	
ATP5020P-200-850-###	200~850	25 μm	
ATP5020P-200-1100-###	200~1000	50 μm	
ATP5020P-340-850-###	340~850	100 μm	
ATP5020P-600-1100-###	600~1100	200 μm	
ATP5020P-###-###-###	Other	Other:_____μm	

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6. Company Profile

Optosky company is a first-class spectroscopy solution provider, with the headquarter locates in the 7th floor of the research institute of the Chinese Academic of Science at an area of 2500 square meter in Xiamen city where successfully held the international 9th BRICK summit in 2017.The subsidiary company locates in Wuhu city with an area of 2035 square meters.

The company founder Dr.Hongfei,Liu graduated Docter degree from the Chinese Academic of Science and postdoctoral degree from Xiamen University, by integrating both of top Universities' spectroscopy technology background into Optosky company aiming at developing the leading spectroscopy equipment in the world.

The company bases on unique technologies of Optomechatronics, Spectroscopy Analysis, Process Weak Optical and Electrical Signals, Cloud Computing, and have been developed wide products line of the competitive Raman spectroscopy instruments, micro spectrometer, hyperspectral imager, field spectroradiometer, fluorescence spectroscopy, LIBS etc. Driven by advanced technologies and products, Optosky brand has been well-known to customers all over the world.

Optosky company base on technology innovation, market-driven direction, customer first, provides first-class products and services, and one-stop solutions to many fortune 500 companies in many industries. The company received praise from different industry companies, as well as many innovative intellectual properties, software copyright, qualification certification, and winner awards over hundred numbers.

Optosky receives top class A introduced the high-tech company to international Xiamen city, the national high-tech and new innovative technology company award. The founder Dr.Hongfei Liu receives the innovation talent award by the ministry of science and technology.

The company is currently conducting the exclusive project of major industrialization national oceanic administration with a total fund of five million us dollars. The company in charge of drafting national industry standard of VNIR and SWNIR Field Spectroradiometer, and six national standard drafters, including China National Standard Drafter for Hazmat detector based on Raman spectroscopy, China National Standard Drafter for Buoy-type Monitor eco-environment, China National Standard Drafter for water quality monitor in the unmanned boat, China National Standards drafter for online water quality monitor by spectroscopy, China National Standard Drafter for UV-absorbent measure fabrics.

The company has over 70 IPs and over 20 innovative patents.

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The company received ISO9001:2015 certification, CE certification, Police Administration Certification, FDA approval compliant, IQOQPQ compliant.

Figure 1 Optosky (Xiamen) Photonics Inc. Company Headquarter

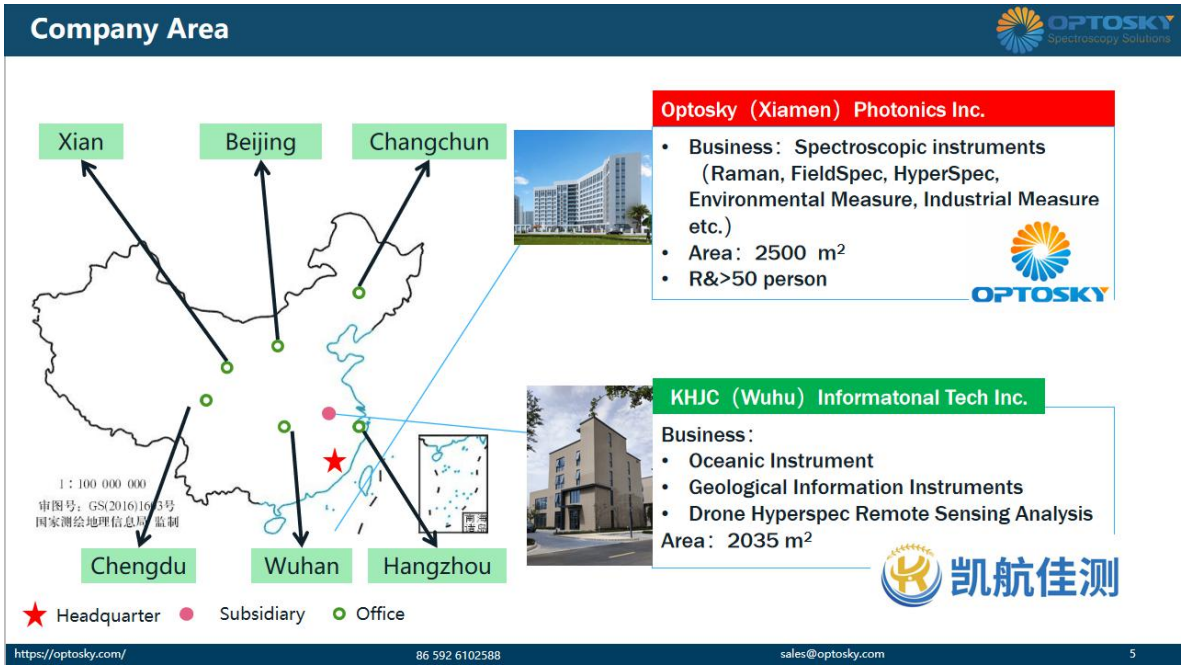

Figure 2 Optosky Company Area

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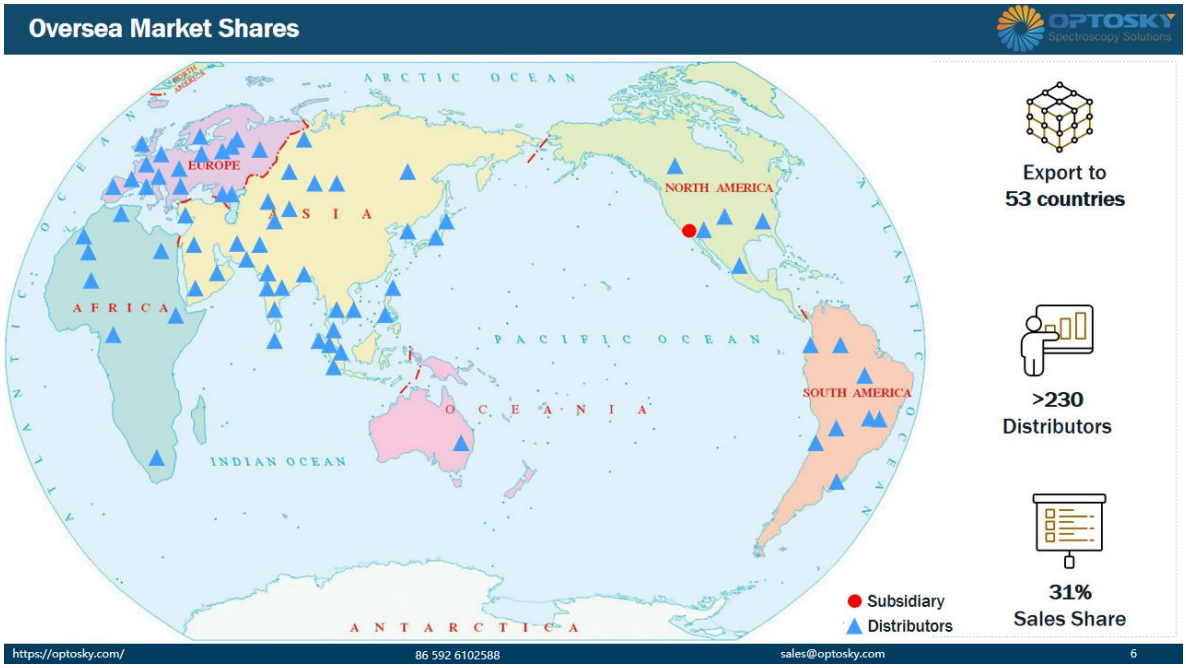

Figure 3 Oversea Market Shares

Figure 4 Optosky Chair and Draft National Standards Lists.

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Figure 5 Qualification

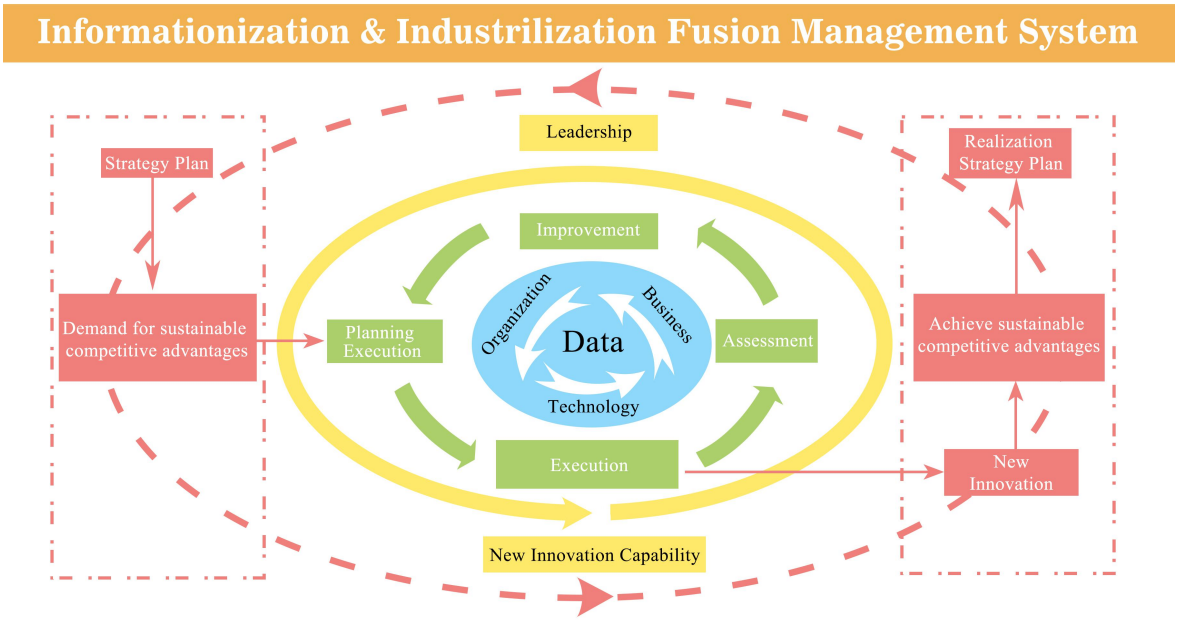

Figure 6 GB/T 23001_Informationization & Industrilization Fusion Management System

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Figure 7 Optosky's Co-founder_Dr. Hongfei Liu

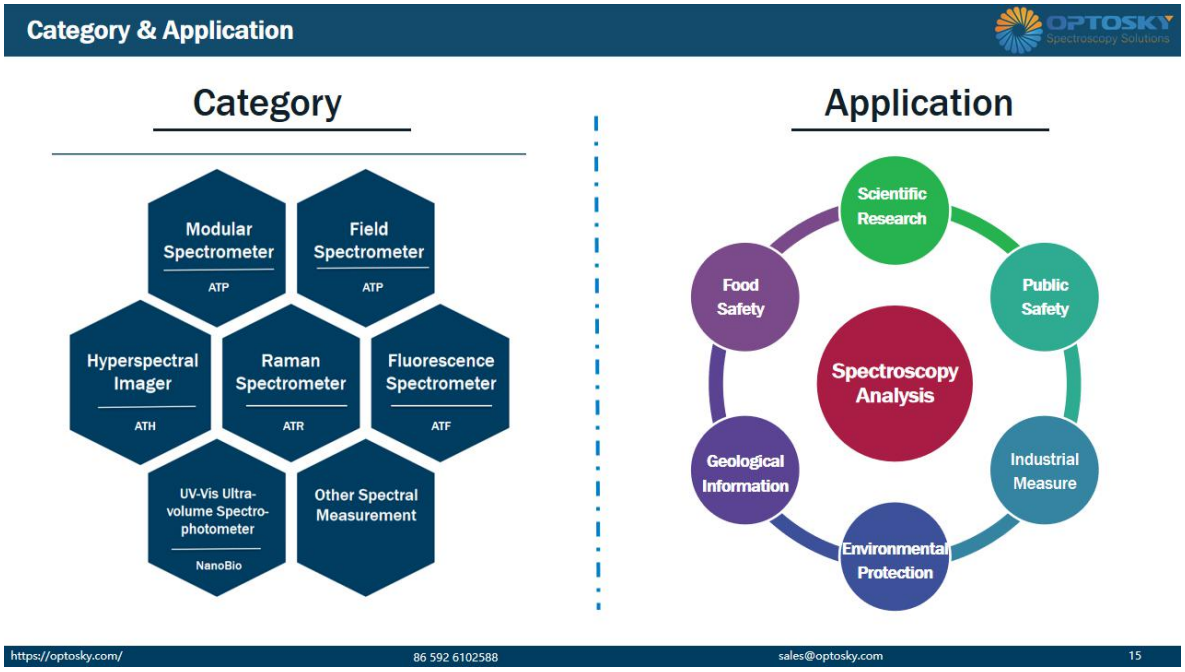

Figure 8 Category & Application

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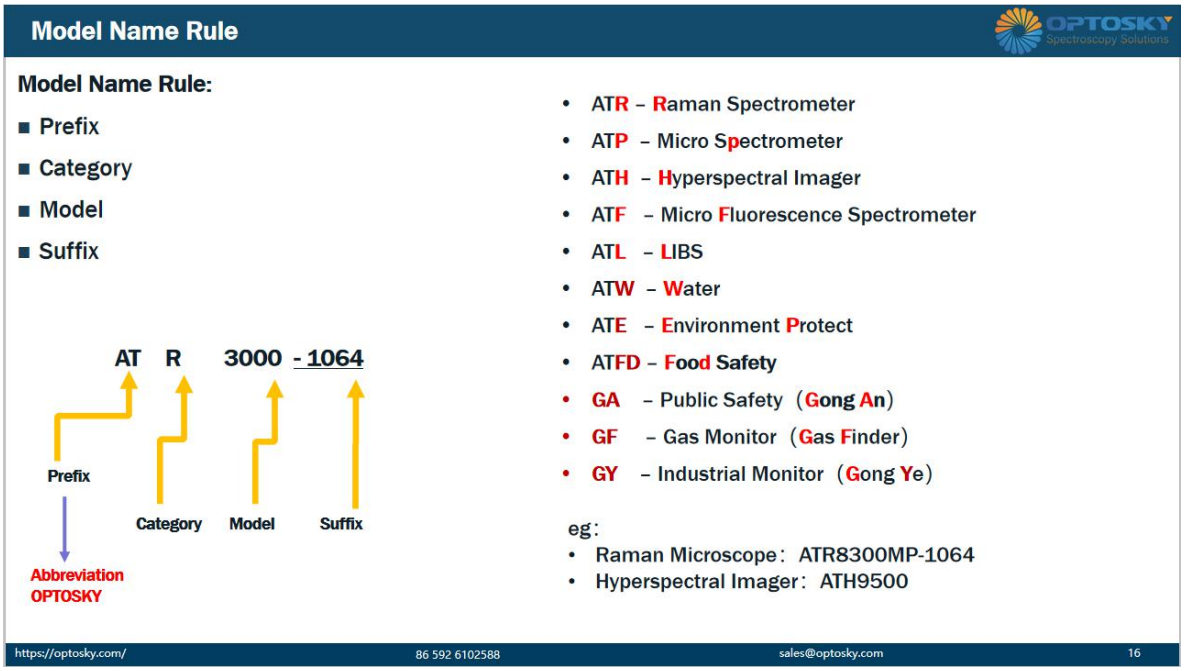

Figure 9 Model Name Rule

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