Solutions for Social Issues

Contributing to Society through Test and Measurement Solutions

■ Contributing to the Spread of IoT by Participating in Demonstration Tests and with New Products

IoT (Internet of Things) allows for the automatic or remote control of everyday items as well as communication devices such as computers by equipping our means of communication so that we can communicate among each other over the network. Telecommunications companies in Japan have been conducting demonstration tests with the intention of introducing IoT-related services in 2017. These tests include verification of connectivity and power consumption performance of IoT devices. Anritsu is participating in these tests and supporting verification processes by using MD8475A and MD8430A operating as pseudo base stations. In addition to these efforts, the company supports the development and production of IoT devices by developing measurement instruments used for Bluetooth and WLAN, widely adopted standards for IoT networking.

Social Innovation through 5G/IoT

9 Major Industries to Use 5G

Sports	Entertainment	Offices
Medicine	Smart houses/life	Retail
Agriculture	Smart cities/houses	Transportation

Measuring Instruments Supporting IoT

Signalling tester	WLAN tester	Measuring the instruments of high-volume production
A base station simulator capable of building the near-to-real network environment necessary for verifying IoT devices	Capable of measuring the performance of WLAN devices in an actual operating state, which was difficult for conventional measuring devices	Capable of measuring the performance of four Bluetooth 5 devices at the same time, which supports productivity improvement

Cat-M1

※Reference: World Economic Forum

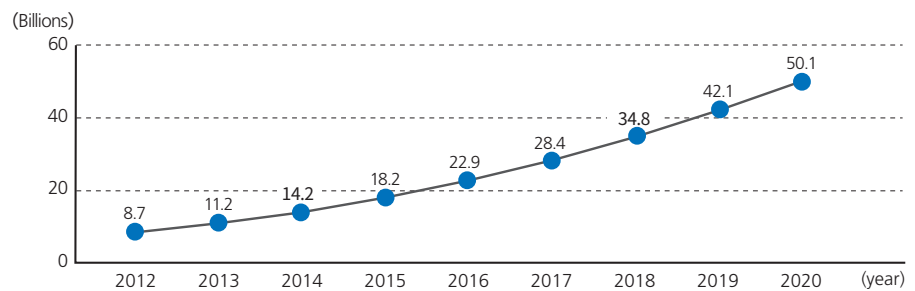## ■ Supporting IoT Connectivity with Conformance Testing

The Cat-M1 is a cellular IoT standard for which some North American communications operators have already launched services. More of these service introductions by communications operators in countries such as Japan and Europe are expected in 2017, which will further drive the spread of Cat-M1 devices. However, one challenge operators face is ensuring interoperability between devices developed by different manufacturers. To address this, the Global Certification Forum (GCF) requires conformance testing to be conducted by validated test cases. Anritsu is developing these test cases and has successfully acquired the industry's first and largest number of GCF certifications.

Tens of billions of devices may be connected to the internet by 2020, and Anritsu will continue to provide conformance testing systems as it contributes to the proliferation of IoT.
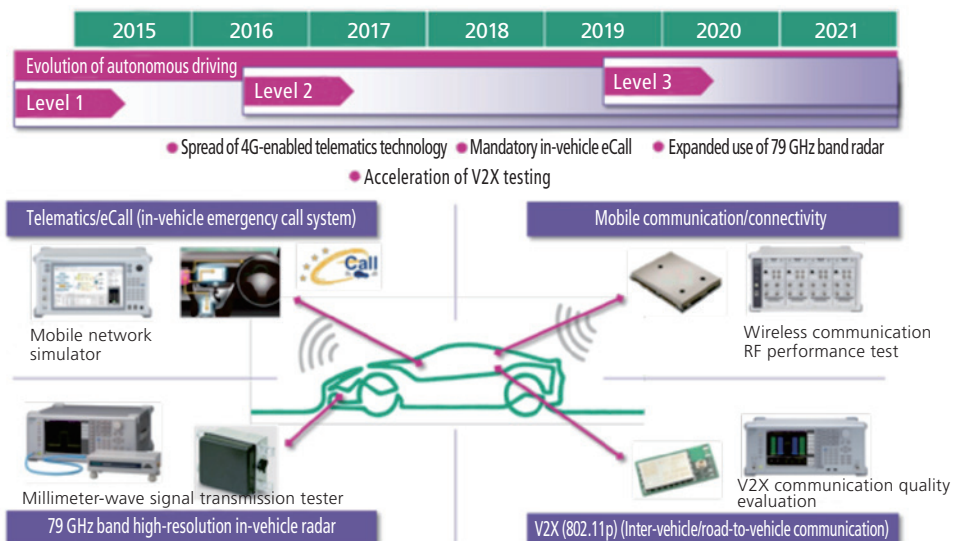
▶ **Number of IoT devices**

(Billions)

Year	Value
2012	8.7
2013	11.2
2014	14.2
2015	18.2
2016	22.9
2017	28.4
2018	34.8
2019	42.1
2020	50.1

■ Supporting the Evolution of Automotive Technology for Autonomous Cars

In new vehicles, communication functions using cellular networks have been introduced that improve convenience along with new wireless technologies that enhance safety for passengers and pedestrians.

Anritsu supports safe, secure and comfortable automotive lifestyles by offering solutions in the fields of Telematics/eCall, automotive networking, radar systems, and V2X.

▶ **Introduction of New Technologies in Automotive Markets and Anritsu's Contributions**

| 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |

Evolution of autonomous driving

Level 1
Level 2
Level 3

● Spread of 4G-enabled telematics technology ● Mandatory in-vehicle eCall ● Expanded use of 79 GHz band radar
● Acceleration of V2X testing

Telematics/eCall (in-vehicle emergency call system)

Mobile communication/connectivity

Mobile network simulator

Wireless communication RF performance test

Millimeter-wave signal transmission tester

V2X communication quality evaluation

79 GHz band high-resolution in-vehicle radar

V2X (802.11p) (Inter-vehicle/road-to-vehicle communication)

TOPICS

Saving Lives— Contributing to the Dissemination of eCall

When a car accident occurs, the eCall system automatically opens an emergency connection to a Public Safety Answering Point (PSAP) and sends accident information using voice signals. With eCall, a PSAP operator can talk to the passenger about the emergency message received and then, if necessary, request assistance from the fire department or other rescue services.

European nations have mandated the installation of eCall in all new car models sold after March 31, 2018. This indicates that automobile manufacturers around the world as well as eCall device makers will be accelerating their response to eCall demand. Anritsu supports the spread of eCall by offering test and measurement solutions that conform to EU's test standards.

■ Offering Solutions for the Development and Manufacturing of 5G Communication Devices

Major communications operators in the U.S., South Korea, Japan and China are planning to conduct 5G trials (5th generation mobile networks) from 2017 to 2018. This will further boost demand for 5G network testing and measurement devices in the development and manufacturing fields.

The 5G signal analyzer must handle the frequency ranges required for 5G technology (9 kHz to 32 GHz/44.5 GHz), have a 1 GHz analysis bandwidth and support evaluation of multi-carrier signals.

However, measuring took time with conventional signal analyzers since only one carrier can be analyzed at a time, using an external PC installed with general analysis software. Also, the use of expensive and high-end analyzers drives up costs for developing and producing commercial devices, as a large number of signal analyzers is required.

To address these issues, Anritsu developed the MS2850A as a low cost unit capable of simultaneously analyzing multi-carrier signals.

Looking ahead, we will continue to meet customer demand while contributing to the spread of 5G with our MS2850A along with its outstanding cost performance.

MS2850A

■ Palm-sized Spectrum Master MS2760A Family

As the popularity of wireless communication devices such as smartphones and tablets continues to grow, the commercialization of next-generation communication networks (5G) is expected to provide the infrastructure for a wide range of mobile broadband services.

Moreover, along with automotive radar systems that offer safe, reliable driving, the application of millimeter wave/high-frequency communication systems capable of transmitting large volumes of data is progressing.

The Spectrum Master MS2760A family embodies Anritsu's signature features as a small, light, high-performance and low-cost spectrum analyzer capable of measuring millimeter wave/high frequency bands. These features improve efficiency at the development sites for wireless communication devices, reduce the level of investments for production lines and improve measurement in outdoor environments. By supporting mobile broadband services, we contribute to realizing a more convenient and comfortable society.

MS2760A family

## ■ Solutions that Support High-speed Data Centers

Data centers are a key component of cloud computing services, and cloud data center traffic is expected to continue rising to 10.4 zettabytes by 2019, nearly three-fold growth from 2014.

To address this rapid growth in data traffic, which is reflected in demand from society, communication systems are provided with higher speeds and more data capacity. Data centers are equipped with high-speed next-generation standard connectivity options: a network interface connected to a communication line using the latest 200/400 GbE and a bus interface with PCI Express Gen 4 and Gen 5 buses connected to internal and external computer devices, respectively.

These high-speed data centers need a BER tester* that can evaluate signal quality with high accuracy because network and bus interface devices are more likely to experience data loss and the deterioration of signal purity as the speed increases. While two testing devices, one for the network and another for the bus, are typically required for evaluation of these two next-generation standards, Anritsu has developed and provided a better solution. Its MP1900A signal quality analyzer can measure the 200/400 GbE interfaces as well as the PCI Express Gen 4 and Gen 5 bus interfaces, thereby addressing the social demand.

In addition to BER testing, eye pattern analysis (waveform quality) is generally used in the development and evaluation of devices. Anritsu developed the BERTWave MP2110A, an all-in-one instrument capable of simultaneously handling these BER measurements and eye pattern analysis (waveform quality) to provide a better solution for production sites. It also offers the Network Master Pro MT1000A, the industry's smallest multirate module that can test the data transmission quality of 100 Gbps data centers and has a greater portability, making it ideal for installation and network maintenance.

*BER tester: A tester that evaluates the Bit Error Rate (BER), which is a percentage of error bits contained in digital data.

Cloud services   Big data   AI

Data center

➢ High speed
➢ Large capacity
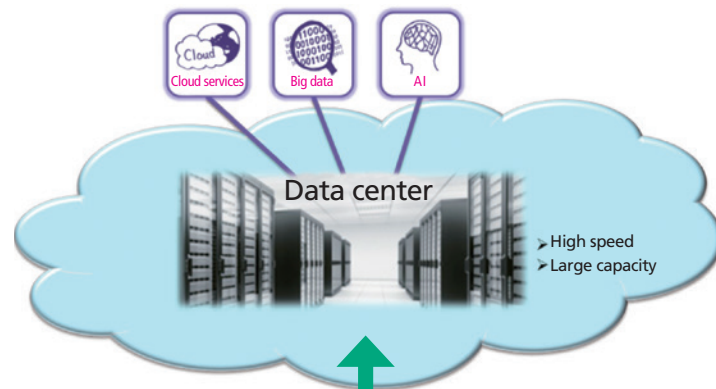
Measuring Instrument Supporting Data Centers

BER tester	BERTWave	Transport tester
An all-in-one measuring instrument for various ultra-high-speed interfaces establishaed in data centers, capable of measuring BER with the highest accuracy in the industry	An all-in-one measuring instrument capable of performing eye pattern analysis by a BERT and a sampling oscilloscope incorporated into a single cabinet	The industry's smallest-in-class unit capable of testing the data transmission quality of 100 Gbps data centers

30

Contributing to "Connected" Networks

* WAN (Wide Area Network): A general term for a communications network linking locations that are geographically distant, such as domestic branches and overseas operation sites; the term is often used to refer to a network that is constructed and operated by a communications carrier, as compared to LAN (local area network), which is set up within one building

Unified Network Controllers
PureFlow® WSX Series

Company use of WAN* has been expanding dramatically along with server consolidation and cloud use through the outsourcing of services due to growing awareness of information security. Ongoing progress in business globalization, which requires more frequent exchanges of massive volumes of data with overseas offices, is also driving WAN use.

However, many current WAN systems available for connecting a company's global sites or multiple companies in a supply chain are subject to lengthy delays in data transmission, which decrease the efficiency of operations such as development and quality control while also driving up the time and cost of manufacturing. The PureFlow® WSX is enabling us to build a high-speed yet reliable communications infrastructure between distant locations because of its unique capabilities for optimizing processes that would otherwise be time-consuming.
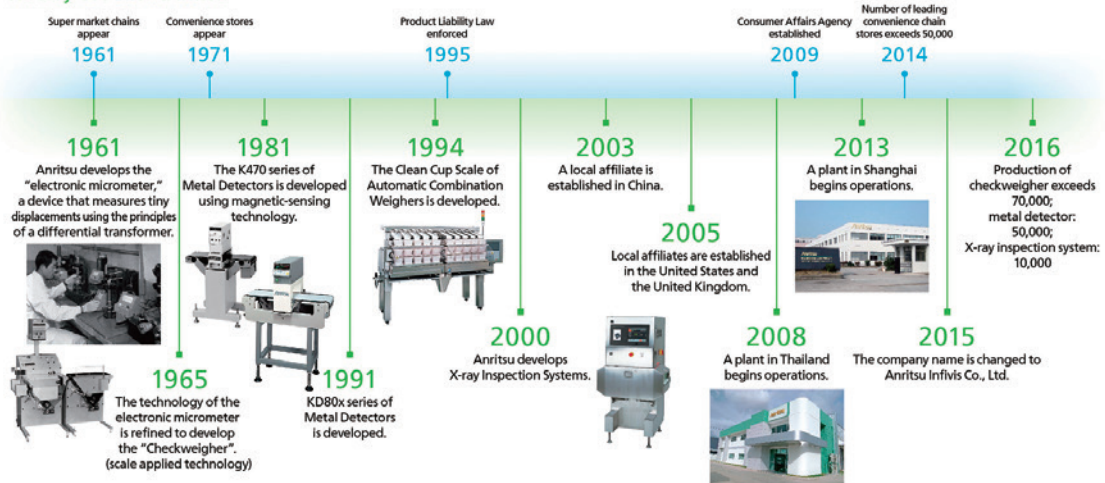
Contributing to Food Safety and Security

Ensuring the stable supply of safe, secure products is a persistent challenge for the food and pharmaceutical industries, particularly in a society in which safety and security are top priority concerns and quality accidents can lead directly to a brand's collapse. Consequently, there are increased efforts focused on undertaking thorough quality assurance measures and reducing costs to increase productivity.

Anritsu Infivis has been safeguarding the quality of food and pharmaceutical products for about 50 years. The company's original technology, which started with a checkweigher with the differential transformer of a measuring instrument, has since evolved and been put to use for detecting metallic foreign matter and then X-ray inspection, thereby helping customers to solve problems.

The X-ray inspection system the company developed in 2000 for the first time in Japan is a total quality assurance solution that is not only capable of detecting contaminants but also of identifying product shape defects, inspecting packaging defects, and checking for missing products, and it has since been widely used by food manufacturers around the world.

▶ **Anritsu Infivis Milestones**

History of Anritsu Infivis

Super market chains appear
1961

Convenience stores appear
1971

Product Liability Law enforced
1995

Consumer Affairs Agency established
2009

Number of leading convenience chain stores exceeds 50,000
2014

1961 Anritsu develops the "electronic micrometer," a device that measures tiny displacements using the principles of a differential transformer.

1981 The K470 series of Metal Detectors is developed using magnetic-sensing technology.

1994 The Clean Cup Scale of Automatic Combination Weighers is developed.

2003 A local affiliate is established in China.

2013 A plant in Shanghai begins operations.

2016 Production of checkweigher exceeds 70,000; metal detector: 50,000; X-ray inspection system: 10,000

2005 Local affiliates are established in the United States and the United Kingdom.

2000 Anritsu develops X-ray Inspection Systems.

2008 A plant in Thailand begins operations.

1965 The technology of the electronic micrometer is refined to develop the "Checkweigher". (scale applied technology)

1991 KD80x series of Metal Detectors is developed.

2015 The company name is changed to Anritsu Infivis Co., Ltd.

XR75 series X-ray inspection system

Checkweigher for multiple lanes

Improving the Quality of Life of Patients

◼ Contributing to the Increased Use of Packaging that Reduces Food Waste

As the global population continues to rise, the food packaging industry continues to advance in its research and development of aluminum vapor deposition packaging, which can preserve food for long periods, and small packaging bags for the preservation of single-serving quantities of food. However, while these new technologies are valuable for reducing food waste, they are also associated with new concerns over quality assurance. These include the difficulty of conducting conventional visual and camera inspections as well as the necessity of packaging and inspecting large numbers of products at the same time.

Anritsu Infivis contributes to the widespread use of packaging for reducing food waste by offering products that keep pace with advances in packaging technologies, such as X-ray inspection machines capable of highly accurate detection of any contaminant or packaging defect, even for non-transparent packaging, and multiple lane checkweighers that can confirm the unit weights of up to 12 rows of products.

◼ Improving the Quality of Life of Patients through Manufacturing Technologies

Many people take cancer treatment, and the prolonged nature of this treatment has led to increased demand for approaches to alleviate pain and suffering. Photodynamic therapy (PDT), a procedure that uses a photosensitizing agent and applies lasers to target lesions, is a treatment known for causing little damage to normal cells with less physical burden on patients.
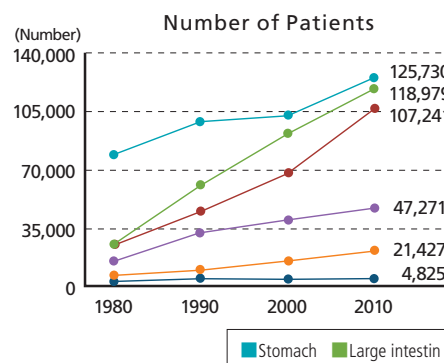
Anritsu has started manufacturing and shipping PDT semiconductor lasers and single use probes for PDT semiconductor lasers under contract with Meiji Seika Pharma, a seller and manufacturer of pharmaceutical and medical equipment. PDT semiconductor lasers are approved as medical devices for treating early-stage lung cancer, locally residual and recurrent esophageal cancer treated with chemoradiotherapy, and primary brain malignancy.

Anritsu will aim to contribute to the improvement of the quality of life of patients through its collaboration with Meiji Seika Pharma, the supplier of PDT semiconductor lasers and the photosensitizing agent Laserphyrin 100 mg for injection.
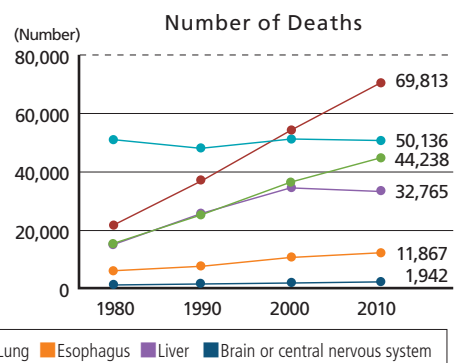
PDT Semiconductor Laser

▶ **Number of Patients with Cancer**

Number of Patients

(Number)

140,000	
105,000	
70,000	
35,000	
0	

1980　1990　2000　2010

125,730
118,979
107,241
47,271
21,427
4,825

▶ **Cancer Mortality Rates**

Number of Deaths

(Number)

80,000	
60,000	
40,000	
20,000	
0	

1980　1990　2000　2010

69,813
50,136
44,238
32,765
11,867
1,942

■ Stomach ■ Large intestin ■ Lung ■ Esophagus ■ Liver ■ Brain or central nervous system

Source: Center for Cancer Control and Information Services, National Cancer Center