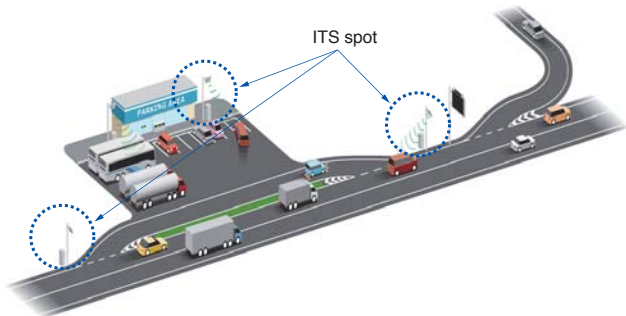


Social Infrastructure Systems

Roadside Equipment for ITS Spot Service



Configuration of ITS spot system

Toshiba has developed roadside equipment for a new intelligent transport systems (ITS) service called ITS spot service, which uses the 5.8 GHz active dedicated short range communication (DSRC) standard (ITU-R M.1453 Annex 1).

ITS spot service provides various types of traffic information and warnings to vehicles on the road, by means of communication using the modulation of $\pi/4$ -shift quadrature phase shift keying (QPSK) at a speed of 4.096 Mbits/s.

The equipment consists of an antenna unit and a controller unit. Each unit is connected by high-speed optical serial communication. The antenna unit was designed to achieve small size and low cost by integrating the analog board and the modulation/demodulation board into one board. Low cost was also achieved for the controller unit by adopting new general-purpose boards for both the communication control unit and the application unit.

We have already installed more than 480 units of ITS roadside equipment. The ITS spot service commenced operation in Japan at the end of March 2011.

ITU-R: International Telecommunication Union-Radiocommunication Sector



Controller unit

Antenna unit

Roadside equipment

Toshiba International Corporation Completes Installation of LED Display Screen for Turner Broadcasting System, Inc.



LED display screen for Turner Broadcasting System, Inc.

Toshiba International Corporation has successfully completed the installation of a light-emitting diode (LED) display screen of 10.67 m in width and 4.57 m in height (screen area: 39.8 m²) for Turner Studios, the production division of Turner Broadcasting System, Inc. (TBS) in Atlanta, Georgia, using the TCO-4iF indoor surface mount device (SMD) LED display system with a pixel pitch of 4 mm made by Toshiba. The display screen was installed in October 2010, and is offering superior performance as a backdrop to the "NBA on TNT" (Turner Network Television's coverage of the National Basketball Association) set.

The display screen consists of 90 display modules; each module has a size of 0.768 m in width and 0.576 m in height, and 19 200 (160 × 120) pixels. In total, the entire display screen consists of 1 728 000 pixels. Each pixel provides three colors—red, green, and blue—that work in tandem to provide outstanding resolution and an unparalleled viewing experience.



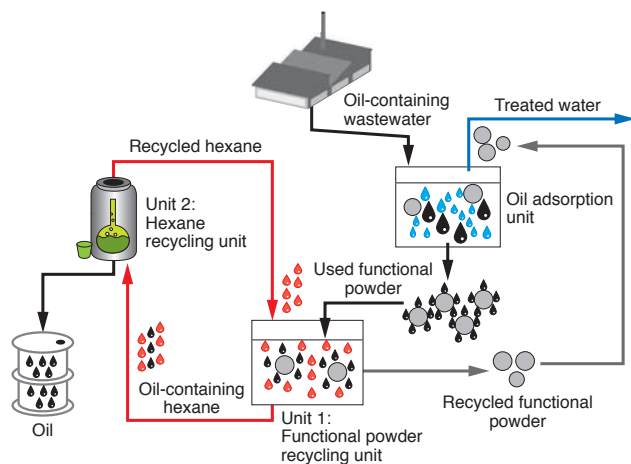
Display module

Functional Powder Recycling Unit

The dissolved air flotation (DAF) method is generally used for the treatment of oil-containing wastewater. Since this method consumes large quantities of coagulants, there is a need for a treatment process without chemicals.

Toshiba has already developed a functional powder that selectively adsorbs oil content. This functional powder is expected to reduce the consumption of coagulants when applied to the treatment of oil-containing wastewater.

We have now developed a functional powder recycling unit. When powder that has adsorbed oil is fed into this unit together with hexane, the functional powder, oil, and hexane are separated and each can be retrieved. Since the functional powder and hexane can be used repeatedly, this recycling unit will contribute to reductions in the cost of treatment and the reduction of wastes.



Demonstration 50 kg/day-class functional powder recycling unit

Distributed Antenna System for Indoor Coverage of LTE Cellular Phone Base Transceiver Stations



Distributed antenna system for indoor coverage of LTE cellular phone BTS

Toshiba has developed a distributed antenna system for indoor coverage that is applicable to both Long Term Evolution (LTE) 3.9th-generation (3.9G) and 3rd-generation (3G) base transceiver stations (BTS).

This distributed antenna system for indoor coverage allows expansion of cellular phone communication areas by distributing the radio frequency (RF) signals from LTE and 3G BTS to multiple antennas via optical fibers. Fiber optic technology makes it possible to transmit the signals over long distances, realizing wide indoor communication areas such as in high-rise buildings and underground shopping malls.

This new system uses our original multiplex technology for the LTE and 3G BTS signals, which can transmit 3G signals and LTE multiple-input multiple-output (MIMO) signals bidirectionally over one optical fiber.

Thanks to these technologies, our new indoor coverage system allows cellular phone operators to flexibly realize a large variety of indoor communication areas, including LTE MIMO high-speed data services.

High-Efficiency Power Amplifier Module for LTE Cellular Phone Base Transceiver Stations



High-efficiency power amplifier module for LTE cellular phone BTS

Toshiba has newly developed a high-efficiency, low-power-consumption power amplifier module for Long Term Evolution (LTE) cellular phone base transceiver stations (BTS).

Emphasis was placed on integration using our original circuit optimizing technology and the mounting of high-efficiency devices, making it possible to realize world-class power efficiency together with miniaturization. This power amplifier module achieves 47% power efficiency at 46 dBm output power in the 800 MHz frequency band. Superior radio performance with an adjacent channel leakage ratio (ACLR) of -52 dBc is also accomplished by controlling the digital predistortion (DPD) circuits.

Because it is a MIMO system, an LTE BTS requires multiple power amplifiers. The installation of our power amplifier module in LTE BTS reduces construction costs as a result of downsizing of the equipment, reduces running costs due to lower electricity consumption, and realizes various environmentally friendly effects.

X-band Solid-State Weather Radar for Observation of Local Torrential Downpours



Solid-state multiparameter weather radar

With the occurrence of many disasters in recent years caused by anomalous weather events, including local torrential downpours and wind gusts, weather radars have become increasingly important for weather observation.

To capture such phenomena, Toshiba has developed an advanced weather radar and installed one set at a facility of the Kinki Regional Development Bureau, five sets at facilities of the Kyushu Regional Development Bureau, and four sets at facilities of the Chugoku Regional Development Bureau. At present, these radars account for about half of all X-band weather radars capable of observing local rainstorms in Japan.

We adopted the following new technologies for the radar to achieve the design goals of highly precise measurement of weather phenomena and significant reductions in size and life-cycle costs:

- multiparameter observation utilizing dual-polarization measurement and Doppler velocity measurement
- solid-state transmitter
- pulse compression.

The use of a solid-state transmitter also contributed to a decrease in the bandwidth of the radar signals, which mitigated the problem of radar interference and enabled us to make efficient use of radar frequency bands.

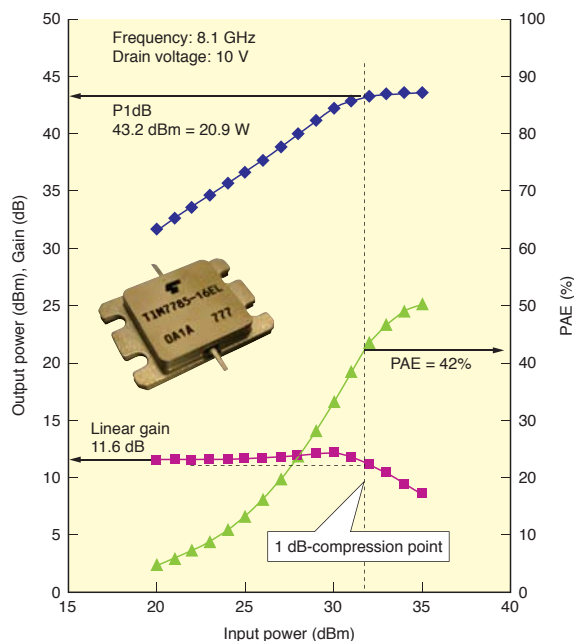
As a result of these breakthrough technologies, our new weather radar is enhancing the safety and security of society by providing highly accurate weather data.

EL Series C-Band 16 W-Class High-Gain GaAs FETs

Most communication applications, such as point-to-point microwave communication and satellite communication systems, require power devices with high-gain, high-efficiency, and low-distortion characteristics.

Toshiba has developed four new 16 W-class high-gain gallium arsenide (GaAs) internally matched field-effect transistors (IM FETs) operating in the C band, to meet the strong market demand for such products. We optimized the device structure and chip design for high-gain performance using advanced simulation methods to deal with oscillation phenomena, which often occur in the optimization process. Our new IM FETs feature a linear gain of 11.0 dB at 8 GHz, which is 1.5 dB higher than our current products, and a power added efficiency (PAE) of 42.0%.

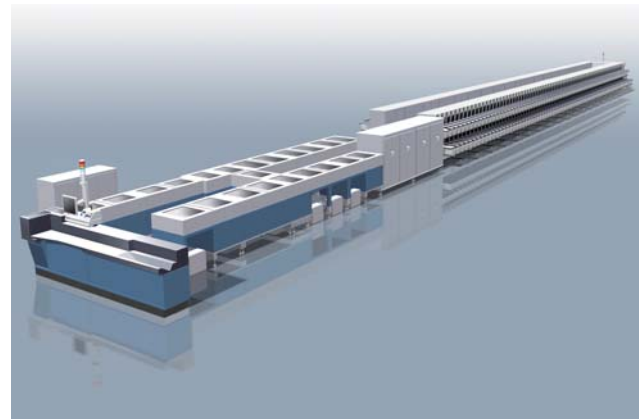
The addition of these four new IM FETs to our EL series lineup, for frequency ranges between 5.9 GHz and 8.5 GHz, will enable customers to reduce parts and power consumption in their systems.



P1dB: power at 1 dB compression

Pin-Pout characteristics of a newly developed GaAs FET (TIM7785-16EL)

TT-1200 Letter Sorting Machine for Canada Post



TT-1200 letter sorting machine

The TT-1200 is a letter sorting machine that is customizable to accommodate a country's particular needs. Toshiba has been installing this equipment for Canada Post Corporation since January 2010.

In addition to its high processing capacity (45 000 mail pieces per hour), the design of the TT-1200 with its two-tier stacker realizes high operability and space efficiency.

The feeder section processes mail piece by piece. The machine performs address recognition in conjunction with an optical character recognition (OCR) system, the address barcode is printed on the mail piece, and it is then sorted to the designated stacker.