



## 『Report on Sales Activities and R&D of Tamagawa Electronics Co., Ltd. for the Business Year Ending in March 2017』

The business result of Tamagawa Electronics Co., Ltd. of the business year ending in March 2016 was significant decrease of revenue and profit due to the effect by drastic investment control in mobile phone communication infrastructure market. However, as a result of focusing on acquirement of orders from governmental agencies, communication and broadcasting industries of other public domain to recover the business result, order balance as of the end of May 2016 as the latest increased up to 54.3% compared to the same period of the previous year. Since this period started, furthermore, inquiries from such industries have been increasing and order balance has been accordingly recovering at a good rate.

Responding to order recover since the previous period, Tamagawa Electronics Co., Ltd. began to work on active research and development based on high-frequency and analog technologies which we have elaborated in the following industries for 48 years since our foundation to lead to order acquirement, as well as focusing on order acquirement activities of device for overseas mobile communication infrastructure based on low price proposal by Tamagawa Electronics Vietnam Co., Ltd., our subsidiary which began production activities in October of last year in order to respond to our stakeholders' expectations and contribute to fulfillment of advanced information society by creating new value and aiming for continuous growth with our best effort.

### 1. Mobile phone infrastructure market



5G (next generation mobile system) of which research and development have been accelerated worldwide for commercialization in 2020 is planning to newly have technologies of SHF band, quasi-millimeter to millimeter band frequency use, and “carrier aggregation,” “Massive-MIMO,” “beam forming,” “NOMA,” etc. in order to accomplish transmission speed 100 times as fast as the existing system, and we are working on the following development themes to meet these technical needs.

- Development of quasi-millimeter to millimeter band analog frontend modules
- Development of multiple transmission frequency compatible multichannel filters (multiple wave duplexer)
- Development of electromagnetic field measurement / electric field sensor for field test of beam forming
- Development of next generation high efficiency power amplifier for portable base station
- Development of reliability evaluation test device for next generation mobile terminals

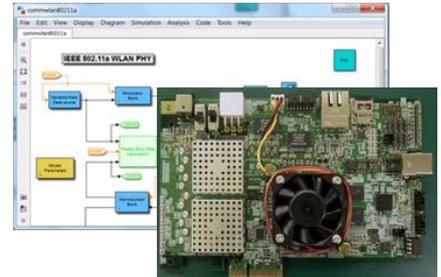


## 2. Governmental agency infrastructure market



We are working on the following development themes as a major electric appliance manufacturer participating in the projects such as security, disaster prevention, space / satellite, weather observation in the “national territory strengthen plan” aiming for self-defense in rationality with neighboring countries and nation-building having resistance to act of God and natural disaster.

- Development of digital signal board which enables high-speed transmission of large capacity in the latest weather observation and electric wave monitoring system
- Development of optical transmission device for radar detection system and extension unit for subsystem
- Development of quasi-millimeter band wireless device for blind zones in remote areas



## 3. Wireless for professional use



Infrastructure construction along with digitalization and enlargement of communication has been active in wireless for professional use, and more of our optical transmission systems have been employed for railways and wireless for professional use in airport for its future expandability and convenience for laying. We are working on the following development themes in order to respond to further needs for smaller scale and high frequency.

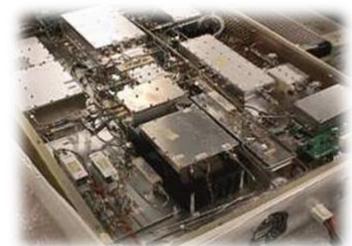
- Development of small-size C band optical transmission device

## 4. Infrastructure construction for the Olympics in 2020

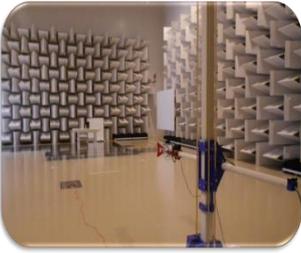


Communication and broadcasting infrastructure constructions have been accelerated along with express way construction in the capital region. Furthermore, as terrestrial digital broadcasting system renewal has been started and such demand has been increasing due to the Olympics Although we have large share in the existing system, we are also working on the following development themes in order to respond to the needs for the next generation system.

- Development of AM / FM retransmission device for blind zones
- Development of subsystem for the next generation terrestrial digital broadcasting



## 5. Measuring devices, etc.



It has become very important to accurately measure and grasp electromagnetic compatibility (EMC) which induces malfunction of electronic devices in today's car electronics which has become a lump of electronic control devices by improvement of fuel cost and safety system such as crash prevention and automatic driving system, etc. starting from hybrid cars. In order to respond to further arising needs for accurate measurement, we are working on the following development themes

We are emphasizing its validity through presentation at academic conferences and industrial paper so that it becomes the industry's standard measurement

- Development of low frequency optical power feeding for automobiles RoF system