



Name of contact person, if different than CEO: Zhou Xu

Date and signature of CEO: _____

Questions to be responded to by the firm submitting the application Why do you think this project should receive an award? How does it demonstrate:

- innovation, quality, and professional excellence
- transparency and integrity in the management and project implementation
- sustainability and respect for the environment

This project offered a total of 222 items of network services and communication support to Nanjing 2014 Youth Olympic Games (abbreviated as Nanjing 2014), including Nanjing 2014 Dedicated Network, Results Network over Internet, Video Conferencing, Video Monitoring, Call Center, Trunk Radio and Network Security System, covering 29 competition venues, 8 non-competition venues, 2 Sports Lab venues and 8 training venues. These communication services included next-generation Internet, 4G hybrid communication network (LTE-TDD & FDD network), and cloud computing. This project successfully supported the Nanjing Youth Olympic Games Organizing Committee to hold the first international large-scale sports event with the 4G hybrid network services.

Nanjing Youth Olympic Games is another major Olympic event hosted by China after Beijing Olympic Games, the first Youth Olympic Games in China, and the second Olympic event hosted by China. Totally 3787 athletes from 204 countries participated in the Games, and the Games included 216 sessions and attracted 5 million viewers. It is one of the sports events involving the largest number of participating countries and regions. The hosting of Youth Olympic Games made Nanjing the second city in Greater China having hosted over 200 countries and regions after Beijing.

Viewers watched diversified live shows online at any time and any place. Reporters distributed and handled real-time emails in the way of cloud computing. Referees collected the competition results of various venues synchronously. The host and International Olympic Committee shared the achievements of the Olympic Gam via network cloud platform. Nanjing Youth Olympic Games actually was proved to be a high-degree information technology application games.

1. Innovatively bringing in many new technology, and ushering in the new epoch of communication technology application

The largest scale of LTE eMBMS (enhanced multimedia broadcasting multicast service) was achieved. The eMBMS network of Nanjing was large in scale, and was applied in global events for the first time. The number of stations set a record of 500, over 100 times that of the commercial network of South Korea, covering 5 Olympic venues (with business coverage of 100 thousand people), over 30 universities and colleges(covering 350 thousand students), and 4 Metro lines (Line 1, Line 2, Line 10 and Line S1 the Airport Line, covering 80 thousand passengers/day). Depending on the network capacity and service capacity of LTE eMBMS, Nanjing Youth Olympic Games deployed network resources effectively in both time and service dimensions, offered mobile video service in flexible ways including multi-cast and broadcasting, effectively relieved the pressure of network capacity expansion and improved user experience.

The large-scale commercial application of eMBMS not only effectively ensured the high-quality video experience of LTE mobile terminal users during Nanjing Youth Olympic Games, but also bore over 10 thousand eMBMS users during the opening ceremony, promoted the brand image of 4G service development of China Telecom, and maintained a



leading position amidst market competition.

This project innovatively integrated cloud computing technology into 4G network services, and assisted the Nanjing Youth Olympic Games Organization Committee in running the games as a sports event with the strongest capacity of integrated information services.

First, 4G network helped to achieve the highly-efficient link-up among various competition venues of Nanjing Youth Olympic Games. The platform of cloud computing helped to conduct real-time data distribution and processing, synchronously collect data from 29 competition venues, 8 non-competition venues, 2 Sports Lab venues and 8 training venues, and upload these data to the cloud big-data platform.

In addition, through the technology of 4G superimposition cloud computing, this project offered high-rate characteristic services of LTE including Wireless Info, videophone and video-conference. The application of these brand-new services changed the traditional work mode of media reporters and enormously promoted work efficiency.

The uniform and concealed construction of light bulb stations ensured user experience, saved investment and reduced impact on the environment as well. The venues of Nanjing Youth Olympic Games covered a large area, and the competition area and the spectator area were separated from each other, with different user behaviors. The wireless high-frequency signal of LTE was obviously subject to the influence from topographic factors. The traditional construction modes of application would result in the weak coverage or the dead zone of some areas. The construction of machine rooms and iron towers would damage natural landscape and ecological environment. Therefore, this project abandoned the traditional idea, and applied the overall solutions of light bulb stations, thus achieving “multiple stations and small power”. On the one hand, the communication demand of users could be met. On the other hand, the distribution of base stations was as simple as the replacement of light bulbs, machine rooms, supporting facilities, operation and maintenance cost could be saved, and maintenance would be more convenient. During the opening ceremony of Youth Olympic Games, the design scheme of light bulb stations successfully bore a user pressure of up to 60 thousand spectators as well as 18 thousand volunteers at the Olympic Sports Center.

The devices of light bulb stations were highly-integrated, beautified and disguised, making their functions diversified and applicable. These stations showed up in public with multi-functions including lighting and advertising, instead of traditional communication stations. The maximized utilization of environmental characteristics enabled the simplicity, convenience, minor impact and quick progress of supporting construction, and promoted the success rate of station building.

This project applied the centralized deployment (BBU pool) technology of wireless signal process devices to concentrate BBU in the central machine room. This technology could not only effectively overcome the traffic tidal effect of competition venues and promote resource efficiency, but also avoid the dramatic increase of investment attributed to the large-scale occupancy and new addition of trunk and wiring optical cables which could eventually satisfy coverage and minimize the destruction of venues at the same time. BBU pool technology could help to flexibly regulate wireless equipment resources, thus not only enabling wireless resources to cover competition venues during events, but also automatically regulating wireless resources to cover surrounding residential communities after the events. This could effectively promote the rate of resource utilization and bring about a remarkable social benefit.

In order to meet the networking requirement of Youth Olympic Games, 4G hybrid network (LTE-TDD & FDD network) was first used, this project adopted the hybrid networking deployment strategy of “step-by-step construction and gradual commercial application” of the planned area. Therein, TDD network highlighted network capacity and was deployed in heavy traffic areas including large venues and residential communities, or areas difficult in the construction of FTTH (Fiber To The Home); FDD network highlighted



network coverage, and formed continuous coverage in densely-populated urban districts and ordinary urban districts. Optimization algorithm based on network load balance was adopted for dual-network switch, dynamically collecting network load parameters. With user experience as the first factor, the switch could fully ensure the consistency of user feeling.

Smart Youth Olympics, Young Dreams Fly. With an intelligent integrated service system of Youth Olympic Games based on a complete set of up-to-date communication techniques, this project successfully created green, high-tech and intelligent “Smart Youth Olympics”, and achieved the very first application of 4G hybrid network in a large-scale integrated sports event organized by the International Olympic Committee. As a matter of fact, Nanjing Youth Olympic Games has become a high-tech “Smart Youth Olympic Games”.

2. Network construction triggered newborn service, ushering in a new phase of public services

Based on the desirable coverage and large capacity characteristics of 4G networks of China Telecom Jiangsu Company, applying more newly-launched services on a large scale in Nanjing Youth Olympic Games became possible.

4G platform enabled Immediate Shooting and Transmission. The 4G network of China Telecom could easily achieve the real-time transmission or live broadcasting of what had been shot, thus enabling immediate shooting, transmission and broadcasting. Compared with traditional rebroadcasting technology, “Immediate Shooting and Transmission” enjoyed such advantages as low cost, simple operation, easy maintenance and support of mobile shooting, and could effectively ensure image quality to the maximum of HDTV (1920*1080dpi) code rate, thus considerably increasing the application scope of outdoor live broadcasting of TV station. During Nanjing Youth Olympic Games, this service was applied for real-time transmission of competition images among different venues, so that the Commanding Center and the Monitoring Center could be timely kept informed of the latest competition results.

AR (Augmented Reality) . The 4G broadband mobile internet of China Telecom and the client-side software of mobile phones can achieve the augmented depth video display of realistic scenic objects, namely, the technique of Augmented Reality. Users of “Augmented Reality” can shoot advertising pictures, publicity manuals and realistic scenic objects via the client side of Augmented Reality to achieve the online broadcasting of videos, pictures, scripts, etc. AR boasts a high value of commercial application.

Mobile Video Monitoring. For Mobile Video Monitoring, the application capacity of clear and continuous videos is an important key quality indicator. Perfect 4G network of China Telecom can help to easily achieve monitoring of high-definition mobile videos, monitoring of venue construction of Youth Olympic Games, terminal experience, demonstration path throughput, high-definition videos on demand and broadcasting of feature films. Mobile Video Monitoring can be widely employed in industrial domain, personal domain and corporate domain.

3. Implementing the construction idea of “being green and environment friendly” and ensuring sustainable development

First, existing devices were applied as much as possible, thus reducing the cost. This project applied the station and site resources of China Telecom, including PHS (Personal Handy-phone System), light pole and monitoring pole, and priority to applying outdoor cabinets, thus effectively reducing the newly-built percentage of outdoor-towers and machine rooms, saving the supportive cost of civil construction, and saving a total supporting investment of RMB 60 million yuan.

Next, green and environment-friendly devices were applied to achieve low carbon emission. Non-air-conditioning cabinets were applied for heat dissipation. One-off investment could reduce the investment in cabinets by RMB 5000 yuan and save a single-machine-room total operation expense of about RMB 10 thousand yuan a year. The power supply and environment monitoring system was converted into core node monitoring, and one-off



investment could reduce RMB 5000 yuan on average for each station or site.

In addition, integrated beautified antennas were applied, thus solving such problems as the high beautification requirement for the construction of Olympic venues and the inimical emotion of residents around venues due to their worry about radiation. Thanks to the large-scale application of integrated beautified antennas, their characteristics, including convenient construction, easy maintenance and coordination with the environment, would bring greater social and economic benefit.

Finally, this project applied the floor installing support for outdoor mobile communication devices for the first time in China. This support has a simple and reasonable structure, capable of reducing the possibility of damages due to unreasonable device installation, especially the loophole of device damage attributed to water inflow, and also capable of reducing the space for LTE device installation and promoting the concealment of device installation.

In addition to the above-mentioned construction idea of “green and environment-friendly”, this project fully considered the recycling and flexible scheduling of post-Games resources. Temporary devices and lines were timely dismantled after the Games, thus effectively reducing land occupancy and power dissipation. The communication facilities of permanent venues could continue to service the public. A series of measures effectively promoted the popularization and application of “green and environment-friendly” idea and technology and boosted the construction of a resource-efficient and environment-friendly society.

4. Transparent and standardized operation, building an information-based project benefiting the whole society

First, all operations were based on relevant standards. The relevant regulations on project construction and management were carried out resolutely. In the process of project tendering, operations were strictly based on legal specified procedures, and various black case work was strictly forbidden.

China Telecom Jiangsu Company supplied seamless coverage of 4G network and excellent transmission channel of high-definition video rebroadcasting to Nanjing 2014 Youth Olympic Games, and undertook the information-based renovation and security network construction and other projects for various competition venues. Considering the huge investment involved (a total investment of up to RMB 1.043 billion yuan), the project team uniformly purchased communication devices and project services in an open way. The whole process of the project was tracked, and strict control was carried out from planning and project approval to as-built auditing. Strict approval procedures were carried out. The construction was carried out according to the approved design scheme. Arbitrary alteration of construction was forbidden.

Next, in order to reasonably use the fund in practice, the project team worked out a plan in advance and made careful preparation. First, the project team strictly carried out the system of investment plan management, used the fund as earmarked, and ensured the timely and full availability and effective use of construction fund. Next, during project construction, the project team earnestly carried out the daily report system, focused on reporting project fund availability and completion, project progress, existing problems, etc., and timely solved problems. Finally, together with China Telecom Jiangsu Company, the supervisory authorities and the project team tried to meet the work requirements of the three phases of project implementation (early phase, middle phase and late phase), consolidated the data and ledgers and timely sorted out and filed them.

By rigorously deploying assignments and specifying work requirements, the project team effectively relieved the problem of tight scheduling. In addition, the project team paid attention to fund supervision, and ensured the accuracy of project fund, thus ensuring the standardized and highly-efficient use of project funds.



Finally, the Environmental Impact Assessment (EIA) result of base stations of the whole network is far beyond the international level. Based on the influence of Olympic Games, the methods of status quo monitoring, theoretic model analysis and analog analysis were adopted for the EIA of this project. Based on project analysis, more than 1000 typical base stations were selected from among all base stations which fell into the scope of EIA, and status quo monitoring and analysis were carried out for them respectively. The results of status quo monitoring indicate that the public exposure control value of electromagnetic environment around the base stations was no more than 0.1W/sq. m., far lower than the set threshold 0.4W/sq.m. in Controlling Limits for Electromagnetic Environment (GB 8702-2014) .

According to the results of theoretic prediction and continuous analog monitoring, the electromagnetic radiation level of base stations beyond the protective distance meets the requirement of the threshold limit value 0.08W/sq.m. of environmental management objective.

5. Participating in the whole process to ensure that the construction goals could be smoothly attained

During the consulting work, the project team used the rolling evaluation and participated in the whole process, repeatedly contrasted goals, feedbacks and control, contrasted construction goals with the process of enforcement, timely identified the gap between construction goals and results, and cleared causes and carried out timely rectification, thus ensuring the consistency between construction goals and reality, and giving better play to the leading role of the consulting project scheme.

What services did the member firm provide to the project? Please describe briefly.

As the only consulting company of the project, and FIDIC MA member, Jiangsu Posts & Telecommunications Planning and Designing Institute Co., Ltd. dedicated to plan a complete set of intelligent integrated service systems for Nanjing 2014 Youth Olympic Games based on the latest communication technology, and built the Games into a green, high-tech and intelligent “Smart Youth Olympic Games”, and first of all achieved the application of 4G hybrid network in a large-scale integrated Sports event organized by the International Olympic Committee.

For the 4G hybrid networking project of Nanjing 2014 Youth Olympic Games, Jiangsu Posts & Telecommunications Planning and Designing Institute Co., Ltd applied the methods of “thorough survey, all-round analysis, meticulous testing and accurate construction”, collected and sorted out relevant planning data, summarized construction experience of domestic and overseas operators, tracked the latest 4G technology and the overall direction of network evolution, and combined service prediction, network pre-coverage effect and technical network experiment, so as to set up 4G network which could vigorously support the demand of service development in terms of breadth and depth.

Based on meticulous design, the 4G network coverage of Nanjing Youth Olympic Games exceeded 95%. Under the pressure of extra-heavy traffic, the 4G network of Nanjing Youth Olympic Games remained firm and steady. Devices were operated normally. Various KPI of communities remained stable, at the same time, a successful connection rate of 99.9%, and with a user peak rate of 150Mbps (downloading) &70Mbps (uploading). In particular, during the opening ceremony of Youth Olympic Games, this project successfully bore the user pressure of 60 thousand spectators at the Olympic Sports Center, and 18 thousand volunteers of Youth Olympic Games, achieving the vision of China Telecom Jiangsu Company: “desirable network, good experience, excellent service”.

Nanjing 2014 Youth Olympic Games achieved several applications based on 4G network technology, thus greatly promoting the successful hosting of Youth Olympic Games and further setting up the international brand image of China Telecom.



THE CLIENT/OWNER(S) OF THE PROJECT

Client/Owner(s): Network Development Department, China Telecom Jiangsu Division

hereby grants permission to enter the above mentioned project in the FIDIC competition and authorises promotion and publication of its outstanding aspects according to the aims and conditions of the Awards.

Name of President or CEO: Xie Yang

Title: Managing Director of the Network Development Department

Date and signature: May 19, 2015

Client/Owner (s) Contact details

Address (no P.O. Box): No. 260, Zhongyang Road, Nanjing, Jiangsu Province

City, Postal code: 210000

Country: China

Phone (with country code): +86 25 86588838

Fax: +86 25 86588888

E-mail: 15301588838@189.cn

This form should be submitted with a letter of endorsement from the Director or President of the FIDIC Member Association or Associate in the country where the project is located or where the firm is based. Thank you!