TITLE : General Technical Specification for Simultaneous Interpretation Systems
ISSUE NO. : 4
DATE : March 2009
APPROVED BY : SE/EDC2
ENDORSED BY : EDCM

<table>
<thead>
<tr>
<th>Amendment</th>
<th>Date</th>
<th>Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>16 March 2009</td>
<td>EDCM</td>
</tr>
</tbody>
</table>

Issued by

Electrical & Mechanical Services Department

COPYRIGHT

All rights including subsequent amendments are reserved. This general specification is intended for use on Government installations managed by the EMSD. Prior written consent by the Director of Electrical & Mechanical Services must be obtained for adoption of or extraction from this specification for other use.
CONTENTS

1. Scope
2. Description of System
3. Related Documents and Reference
   3.1 Reference to User/Design/Installation Specification
   3.2 International Standards
   3.3 Other National Standards
   3.4 Case of Conflict
4. Definitions
   4.1 Terminology and Glossary of Terms
   4.2 Abbreviations
5. System Functional Requirements and Technical Specifications
6. Equipment Operational and Functional Requirements and Technical Specifications
   6.1 Central Control Console
   6.2 Interpreter’s Unit
   6.3 Delegate Control Unit
   6.4 Chairman Control Unit
   6.5 Wireless Transmission System
   6.6 Microphones
   6.7 Headphones
   6.8 Cables
7. Installation Requirements
   7.1 General
   7.2 Material and Workmanship
   7.3 Equipment Fixing and Interconnection
1. **Scope**

1.1 This Specification lays down the general technical specification, functional features, performance characteristics and installation requirements of a simultaneous interpretation system and its ancillary equipment and components.

1.2 This Specification should be read in conjunction with the "General Requirements for Electronic Contracts, ESG01 (Latest Edition)" and the Particular Specification. Unless otherwise stated elsewhere in the Contract document, the requirements in this Specification shall apply to all contracts for the supply and installation of simultaneous interpretation systems issued by the Electrical & Mechanical Services Department.

2. **Description of System**

2.1 A simultaneous interpretation system shall allow interpreters to receive speech of high intelligibility from any speaker in a conference/meeting and distribute the translated language(s) to delegates or any one who requires such service. Each delegate should be able to listen to either the speech itself (floor language) or a translation of the speech through headphones. Transmission of the translated languages may be via cable or wireless/infra-red transmission systems.

2.2 The system may either be a fixed installation in a conference room or a mobile system suitable for easy setting up at various locations.

2.3 The system shall, in general, comprise the following items of equipment :-

(a) Central Control Console;

(b) Interpreter's Unit(s);

(c) Chairman Control Unit;

(d) Delegate Control Units;

(e) Microphones;

(f) Headphones;

(g) Infra-red Radiator/Induction Loop Transmitters;

(h) Infra-red or Induction Loop Receivers.

2.4 Other ancillary equipment of the system includes carrying cases for mobile equipment, recording equipment, audio amplifier for sound reinforcement, audio distribution amplifiers to drive sound feeds for recording by reporters etc.

2.5 This Specification does not cover full details on special equipment or features which may be required in some particular systems. Tenderers should refer to the Particular Specification for such requirements.
3. **Related Documents and References**

The following documents and references shall be observed and complied with where appropriate.

3.1 **Reference to Design and Installation Specification**

(a) General Requirements for Electronic Contracts ESG01 - (Latest Edition), EMSD.

(b) General Specification for Electrical Installation in Government Buildings of the Hong Kong Special Administrative Region - (Latest Edition) issued by Building Services Branch, Architectural Services Department.

3.2 **International Standards**

Materials and equipment shall be built and installed complying with the general principles of the standards and Codes of Practice laid down by the International Standards Institutions. The following are of particular relevance:

(a) IEC 60914 Conference systems- Electrical and audio requirements

(b) IEC 61603 -Transmission of audio and/or video and related signals using infra-red radiation

(c) ISO 2603: Booths for Simultaneous Interpretation - General characteristics and equipment

(d) ISO 4043: Mobile booths for simultaneous interpretation -- General characteristics and equipment

3.3 **Other National Standards**

When equipment complying with other standard specification is offered, the Contractor shall satisfy the Engineer that the quality of the equipment offered is equal to or better than that specified in the appropriate International Standards.

3.4 **Case of Conflict**

In case of conflict between the technical requirements of this Specification and any other requirements, the following order of preference shall apply :-

(1) The Particular Specification

(2) This Specification
4. Definitions

4.1 Terminology and Glossary of Terms

(a) "Crosstalk". Crosstalk refers to the introduction of unwanted signals into one audio channel by others causing interference through inductive or capacitive couplings.

(b) "Central Control Console". This is the central control unit of the system equipped with the necessary facilities for the operator to select switching of microphones as well as adjustment and monitoring of input/output levels of incoming and outgoing audio channels.

(c) "Interpreter's Unit". This is desk top control unit used by the interpreter to select an outgoing channel for the transmission of the translated language and adjustment of incoming levels etc.

(d) "Delegate Control Unit". This unit comprises the microphone and any other fixed controls such as channel selector, microphone request switch, volume control etc. used by the delegate member.

(e) "Chairman Control Unit". This unit shall be similar to a "Delegate Control Unit" but shall be equipped with a priority switch and indicator.

(f) "Loop transmitter/Infra-red radiator". Equipment whereby the floor and translated languages are transmitted/radiated so that they can be received by pocket size receivers by members and audience of a meeting/conference.

4.2 Abbreviations

The following abbreviation shall have meanings herein assigned:

(a) IEC means International Electrotechnical Commission.

(b) ISO means International Organization for Standardisation

(c) EMSD means Electrical and Mechanical Services Department, HKSAR

(d) w.r.t. means “with respect to”

5. System Functional Requirements and Technical Specifications

5.1 The system shall be designed to provide clear and natural speech of a conference
to the interpreters, and to reproduce highly intelligible speech translation to the chairman, delegate members and anyone who is using the system.

5.2 The system shall be of a modular design so that it can be set up, dismantled and, in case of failure, restored to full normal operation in the shortest period of time.

5.3 The system shall allow simultaneous switching on at least four floor microphones and the chairman microphone microphones without degrading the system performance as specified in clause 5.4.

5.4 Overall System Performance (Excluding the Wireless Transmission Equipment)

5.4.1 For an input level of -68 dBm at the chairman or any delegate microphone input, and for an output level of 4mW across 1 kohm load as measured at the headphone outlet of the interpreter’s unit

and

for an input level of -68 dBm at the interpreter unit’s microphone input and for an output level of 4mW across 1 kohm load as measured at any delegate or the chairman control unit headphone socket:

(a) the frequency response shall be better than 300 Hz – 7 kHz ± 1 dB and, 125 Hz – 12.5 kHz + 1/3dB, w.r.t. 1 kHz.

(b) the total harmonic distortion at 1 kHz shall be less than 1%.

(c) the signal to noise ratio shall be better than

(i) with four floor microphones and the chairman microphone on, 45 dB;

(ii) with 3 floor microphones on, 50 dB.

(d) Crosstalk : better than 60 dB with four channels in operation.

5.5 The system shall be provided with audio recording for floor and interpretation channels.

6. Equipment Operational and Functional Requirement and Technical Specifications

6.1 Central Control Console

6.1.1 The Central Control Console is the heart of the system and shall provide facilities and controls for signals mixing, channel selection, amplification, microphones switching and audio recording etc.

6.1.2 It shall be of a modular design and constructed in such a way that it can
be easily manned by a single operator exercising control of the whole system.

6.1.3 The Control Console shall be a desk top unit and shall be provided with the following controls and facilities:

(a) Operator's Interface

The Operator's interface could be in the form of a hardware Mimic Panel or a Computer Screen with touch Screen Control or other Convenience pointing/selecting device.

The Operator's interface shall consist of indicators and controls arranged as a diagram showing the relative position of each potential speaker in the Conference Room. On receipt of a "request to speak" signal from any of the delegate members or the chairman, a corresponding indicator on the operator's interface shall be illuminated. When the operator depresses the button to switch on the corresponding microphone, the corresponding indicator shall change state. A 'lamp test' push button shall be available for testing if hardware Mimic Panel is provided.

(b) Audio Amplifier Module

At least four (4) line amplifier modules shall be provided. Level meters with volume control shall be incorporated for each amplifier to enable the operator to equalise the output levels of each output channel.

(c) Monitor Panel

A built-in speaker with volume control on/off switch, and a switch for the operator to select any input/output channel which he intends to monitor shall be provided on this panel. A headphone output socket shall be included also. In addition, level meters and master control of incoming microphone levels shall be incorporated. All labels shall be engraved or permanently marked onto the panel.

(d) Input/Output Panel

All input and output cables to the Console, wireless transmission system, interpreter's units, chairman control unit, delegate control units and all other equipment shall be terminated on multipin connectors so that every item can be easily disconnected and taken away for maintenance. All cables shall be properly identified. All labels shall be engraved or permanently marked onto the panel. All connectors shall have mechanical lock.
(e) **Auto/Manual Switch**

Auto/manual mode selection switch should be provided such that:

(i) auto mode - the delegate members can switch ON/OFF their delegate control units without the help of the operator;

(ii) manual mode - an operator is required to activate the delegate control units, upon receiving the “request-to-speak” signals from delegate members.

(f) **Speaker Number Preset Switch**

Switch for presetting the maximum number of microphones which may be activated simultaneously.

(g) **Recording Control Panel**

To control and monitor the recording channels.

6.2 **Interpreter’s Unit**

6.2.1 The unit shall comprise a control panel designed to allow for one or two interpreters working together.

6.2.2 The controls of the Interpreter’s Unit shall include a switch to select the output of each of the languages used at the conference. The selectors shall not generate mechanical and electrical noise, and no short-circuiting shall occur when the switch is operated from one position to another.

6.2.3 The Control panel shall include a sound volume control of logarithmic progression type. No “crackle” shall be heard throughout the headphone when operating the controls.

6.2.4 The control panel shall have jacks for connecting a microphone and a headphone. The following control and indicators shall also be provided:

(a) a cough key for muting the microphone;

(b) a call button installed inside the interpreters’ booth to the Central Control Console;

(c) a microphone on/off switch with facility of automatic relay of floor language when the switch is in off position;

(d) a local main isolation switch and indicator lamp;
(e) one set of language selecting switch and its associated indicator lamps. The selecting switch should automatically relay to the floor language when the switch is not selected;

(f) a volume control and preferably with tone control of floor language;

(g) a jack and volume control for headphones.

6.2.5 The interpreter’s units shall be of ergonomic design for easy relay of simultaneous interpretation operation.

6.2.6 The interpreter’s units shall be equipped with the necessary control facilities such that when the microphone of one unit is ‘ON’, the other one shall automatically be inhibited.

6.3 Delegate Control Unit

6.3.1 Each Delegate Control Unit shall be equipped with the following:

(a) a microphone request switch;

(b) a microphone with suitable ‘live’ indicator;

(c) a channel select switch with volume control if wireless receiver is not provided;

(d) a built-in loudspeaker for conferencing.

6.3.2 When the microphone is switched on, the built-in loudspeaker shall automatically be switched off. Acoustic feedback shall not occur notwithstanding their orientation during a conference.

6.3.3 Delegate control units shall be capable of being permanently mounted under the conference table or other seating furniture or can be designed as portable desk top units. Exact requirements will be stated in the Particular Specification.

6.3.4 Portable Unit

Each portable control unit shall incorporate all its controls, input/output sockets into an aesthetic, compact, light weight, slim line desk top unit. If a loudspeaker is provided, it shall be housed in the unit. All cables shall be terminated with multipin connectors.

6.3.5 Fixed Unit

Each fixed unit shall be either surface mounted or flush mounted on the furniture as required in the Particular Specification. The front panel
shall be made of stainless steel with engraved labels.

6.4 Chairman Control Unit

The functional requirements and construction of a Chairman Control Unit shall be similar to those of the Delegate Control Unit. In addition, it shall be equipped with a priority switch e/w its associated indicator for overriding the microphones of Delegate Control Unit.

6.5 Wireless Transmission System

This system is used as a means to convey the original and translated languages to members who require such service. Carrier frequencies of the transmitter may be in the High Frequency (HF) band using an inductive loop as aerial or in the infra-red band. Each system shall be equipped with at least four transmitting channels. The system shall not cause interference to other electronic equipment, and must be fully resistant to electrical noises generated by other equipment such as fluorescent tube and light dimmer. The Transmission System shall be OFTA approved type or exempted from licensing via “Telecommunication (Low Power Device) (Exemption from Licensing) Order, Cap. 106”.

6.5.1 Loop Transmitter

6.5.1.1 The transmitter shall be of a modular design and installed in the control console as a plug-in unit for each transmitting channel.

6.5.1.2 Each modulator is to be provided with separate level fader-control, monitoring VU meters and L.E.D. fault/overload indicators. Each channel frequency is to be crystal-controlled or synthesizer controlled.

6.5.1.3 A single loop driving amplifier is to be provided. This shall handle the combined output of all modulators. Provisions shall be made for remote switching of the associated interpretation booth equipment, and for adjustment, and control of the loop drive level.

6.5.1.4 If the carrier frequencies are in HF band, they shall cause no interference to the broadcasting radio or vice versa.

6.5.1.5 Facilities for tuning the output impedance of the transmitter to match the loop aerial of various lengths and configurations shall be provided.

6.5.1.6 The system shall offer full freedom of movement of delegates within the conference room.

6.5.1.7 Technical Performance
Input sensitivity : not more than 150mV for rated output

Control Range : continuous, zero to full input

Output Impedance : 4 ohm minimum, continuously adjustable to match loop of inductance up to 1.4mH and a minimum loop length of 30 metres

Frequency Response : 100 Hz - 8 kHz \( \pm 1 \) dB w.r.t. 1 kHz at rated output

Distortion : less than 5% at rated output

No. of Channel : at least 4

Crosstalk : better than 40 dB at rated output with four channels in operation

Frequency tolerance : not more than \( \pm 0.05\% \) of the carrier frequency

6.5.2 Infra-red Transmitter

6.5.2.1 This unit shall generally comprise a central unit with at least four language channel modules and a number of remote infra-red emitters. The required number of emitters depends on the size of the area of coverage and will be specified in the Particular Specification.

6.5.2.2 The central unit shall be equipped with, modulators and their indicators, power supply and a driver for driving the remote emitters.

6.5.2.3 Technical Performance

Frequency Response : 100 Hz - 8 kHz \( \pm 3 \) dB w.r.t. 1 kHz at rated output

Total Harmonic Distortion : less than 1% at rated output

Signal to Noise Ratio : greater than 50 dB at rated output

Number of Channel : at least four

Output Voltage : \( \pm 1V \)
Output Impedance : 60 ohm - 75 ohm

I.R. Output Power : not less than 4W

6.5.3 Wireless Receiver

6.5.3.1 Either loop or infra-red type wireless receiver is acceptable. Exact requirement will be specified in the Particular Specification. The receiver shall be designed as a compact, light weight, rugged and easy-to-operate unit. It shall be battery operated and complete with volume control, channel selector and headphone output socket.

6.5.3.2 Technical Specification for Loop Receiver

Number of channel : Not less than 6

Frequency Range : 100 Hz - 8 kHz - 6dB w.r.t. 1 kHz

Weight : not more than 250g.

Sensitivity : better than 4μV/m for 20 dB S/N ratio

Headphone Output : not less than 4mW into 1 kohm

Crosstalk : better than 38 dB with four channels in operation.

Distortion : less than 5% at rated output.

6.5.3.3 Technical Specification for Infra-red Receiver

Number of channel : not less than 6

Frequency Range : 100 Hz - 8 kHz - 6dB w.r.t. 1 kHz

Weight : not more than 150g.

Headphone Output : not less than 4mW into 1 kohm.

Crosstalk : better than 45 dB with four channels in operation.

Sensitivity (IR Light) : 5mW/m² (S/N ratio better than 40 dB)
6.6 Microphones

6.6.1 High quality microphones shall be provided for each of the Chairman, the Interpreters and the Delegate Control Units.

6.6.2 Interpreter’s Microphone

This shall be a unidirectional cardioid microphone completed with desk stand, microphone cable and connector. One microphone shall be provided for each interpreter. For microphones used in a single interpreter’s booth, only one microphone shall be allowed to turn on at any moment.

6.6.3 Delegate’s and Chairman’s Microphones

These shall either be a unidirectional microphones or miniature omnidirectional tie-clip condenser microphones. Exact requirement will be specified in the Particular Specification.

6.6.4 Technical Performances

Frequency Response : 100 Hz - 13 kHz ± 3 dB w.r.t. 1 kHz

Sensitivity : better than -74 dB or 2mV/Pa at 1 kHz

Impedance : 200 ohm - 600 ohm, balance

Connector : Cannon XLR-3-12C type

6.7 Headphones

6.7.1 Interpreter’s Headphone

6.7.1.1 This shall be high quality, overhead type with replaceable foam padding, light weight, with large but well-ventilated ear pieces. Earpieces which are inserted into the ears or which are fully enclosed the ears are not considered acceptable. It shall be designed for comfortable wearing for long hours. Headband shall be adjustable in width and length and sufficiently flexible to adapt to individual ear pressure requirements.

6.7.1.2 Technical Performance (Dynamic)

Frequency Response : 250 Hz - 13 kHz ± 3 dB w.r.t. 1 kHz
Weight : less than 100 grams
Cable Length : more than 1.5 metres
Impedance : 200 ohms - 1 kohms
Nominal Sound Pressure Level : Not less than 94 dB

6.7.2 Headphones for the chairman and delegates can either be of dynamic type as specified in 6.7.1.2 or stethoscopic type as specified below. Exact requirements will be stated in the Particular Specification.

Technical Performance (Stethoscopic with cushion ear piece)

Frequency response : 100 Hz – 3.5 kHz
Impedance : 200 ohm - 2 kohm
Weight : Less than 40 grams

6.8 Cables
(a) All cables shall be made of stranded, tinned and annealed copper conductors with polyethylene or PVC insulation.
(b) Microphone cable shall be used for all interconnecting cables for audio signal and microphone level inputs. This cable shall be of miniature type, shielded, and with two stranded copper conductors.
(c) Individually screened twisted pair, multicore cable with screened outer sheath shall be used for each language channel so as to reduce the crosstalk level among channels.
(d) Headphone cable shall be complete with an outer polyethylene jack and be able to resist pulling and abrasion.
(e) Power supply cable shall be three-core PVC insulated with stranded copper conductors of not less than 2.5mm² and with an overall protective sheath of PVC.

7. Installation Requirements

7.1 General

7.1.1 All equipment, cabling etc. shall be installed in locations as indicated on the floor plans and drawings accompanied with the Particular
Specification or as instructed by the Engineer on site.

7.1.2 All equipment in the technician booth, except the Control Console, shall be housed in a single cabinet which shall be easily accessed by the operator during operation.

7.1.3 All cables shall, as far as practicable, be run inside conduits or trunkings already provided for the purpose by others.

7.1.4 The Contractor shall provide and install all conduits, trunkings, raceways and adaptable boxes to supplement the conduits or trunkings already provided, or to the requirement laid down in the Particular Specification.

7.1.5 The Contractor shall make good any work disturbed during installation at his own expense.

7.1.6 Where appropriate, the installation of surface wiring, conduit and trunking systems shall conform to the requirements as specified hereunder.

7.2 Material and Workmanship

7.2.1 Material and equipment shall be of high quality, and shall comply with, where applicable, the appropriate International Standard Specifications (or equivalent) and Codes of Practice, together with any amendments made thereto.

7.2.2 All works shall be carried out in a first class workman-like manner and shall be subjected to the approval of the Engineer.

7.2.3 The Engineer reserves the right to reject any part of the installation not complying with the Specification. The Contractor shall carry out the necessary remedial work or replacement without extra cost or delay.

7.3 Equipment Fixing and Interconnection

7.3.1 If the Chairman and Delegate Control Units are to be permanently fixed to the furniture, the Contractor shall be required to submit detailed mounting proposal for the approval of the Engineer.

7.3.2 All switches, connectors, jacks and receptacles shall be clearly, logically and permanently marked during installation. All wires and cables shall be identified at every termination and connection point with permanent type markers.

7.3.3 Interconnection of various items of equipment shall be mechanically and electrically connected by multipin connectors or terminals.

7.3.4 All cables shall be jointed by properly designed connectors or inside joint
boxes.

7.3.5 All equipment and joint box shall have unique identification number. A list of identification number shall be provided and to be referred to wherever practicable.

*** End ***