

TITLE : General Technical Specification for  
Simultaneous Interpretation Systems

ISSUE NO. : 6

DATE : April 2021

APPROVED BY : CE/DT

Amendment	Date	Authority
3	March 2009	EDCM
4	October 2016	SE/P3
5	April 2021	SE/GES/HK2

Issued by

Electrical & Mechanical Services Department

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## C O N T E N T S

1. Scope
2. Description of System
3. Related Documents and Reference
  - 3.1 Reference to Design and Installation Specification
  - 3.2 International Standards
  - 3.3 Other National Standards
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 Infra-red 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.
- 1.3 In the event of a conflict between this General Technical Specification with the Particular Specification of the Contract or Order, the Particular Specification of the Contract or Order shall prevail.

## 2. Description of System

- 2.1 A simultaneous interpretation (SI) system shall allow interpreters to receive speech of high intelligibility from any speaker in a conference/meeting and distribute the floor and translated language(s) to delegates or anyone 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 infra-red transmission systems.
- 2.2 The SI 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 SI System shall, in general, comprise the following items of equipment:-
  - (a) Central Control Console;
  - (b) Interpreter’s Unit(s);
  - (c) Chairman Control Unit(s);
  - (d) Delegate Control Units;
  - (e) Microphones;
  - (f) Headphones;
  - (g) Infra-red Radiator; and
  - (h) Infra-red 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 specialized SI systems. Tenderers shall 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) issued by Electrical and Mechanical Services Department.
- (b) General Specification for Electrical Installation in Government Buildings of the Hong Kong Special Administrative Region - (Latest Edition) issued by the 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 61603-7 Transmission systems 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 or International Standards

Equipment complying with other national and international standards may be offered. Tenderers shall demonstrate clearly that these standards are equivalent to or better than those standards required by 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 interface of the SI System. It shall be equipped with the necessary facilities for the operator to control the entire SI System including the Chairman and Delegate Control Unit(s) as well as to adjust and monitor the 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 channel, 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 an additional priority switch and indicator.
- (f) “Infra-red Radiator”. Equipment whereby the floor and translated languages are radiated so that they can be received by pocket size receivers by members and audience of a meeting/conference.

#### 4.2 Abbreviations

The following abbreviations shall have meanings herein assigned:

- (a) IEC means International Electrotechnical Commission
- (b) ISO means International Organization for Standardization
- (c) EMSD means Electrical and Mechanical Services Department, The Government of the Hong Kong Special Administrative Region of the People’s Republic of China (HKSAR)
- (d) OFCA means Office of the Communications Authority, The Government of the Hong Kong Special Administrative Region of the People’s Republic of China (HKSAR)
- (e) SI System means Simultaneous Interpretation System
- (f) w.r.t. means “with respect to”

#### 5. System Functional Requirements and Technical Specifications

- 5.1 The SI 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 SI 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 SI System shall allow simultaneous switching on at least four (4) floor microphones and the chairman microphone without degrading the system performance as specified in clause 5.4.
- 5.4 Overall System Performance (Excluding the Infra-red 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  $\pm$  1 dB and, 125 Hz – 12.5 kHz  $\pm$  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 (4) 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 shall provide facilities and controls for signals mixing, channel selection, amplification, microphones switching,

audio distribution, 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 Central Control Console shall be a single desk top unit or a computer-based control system 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 with appropriate applications software(s) and convenient control device.

For Hardware Mimic Panel:

The Operator's interface shall consist of indicators and controls arranged as a diagram showing the relative position of each Chairman Control Unit and Delegate Control Unit 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 presses the button to switch on the corresponding microphone, the corresponding indicator shall change state. A 'lamp test' push button shall be available for testing.

For Computer-based Control System:

The computer-based control system shall consist of a computer and appropriate application software(s) which act as the operator's interface. The software shall display the floor plan of the Conference Room with the relative position of each Chairman Control Unit and Delegate Control Unit clearly indicated. The microphone status, e.g. "ON", "OFF", "request to speak", etc. shall be displayed and updated in the floor plan throughout the meeting. The operator shall be able to control the microphones through this interface.

(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 equalize the output levels of each output channel.

(c) Monitor Panel

The monitor panel shall include a speaker, on/off switch and a headphone output socket. The operator shall be able to select any input/output channel he/she intends to monitor through this monitor panel. Level meters and master control of incoming microphone

levels are preferably incorporated. All labels shall be engraved or permanently marked onto the panel.

(d) Input/Output Panel

All input and output cables to the Central Control Console, infra-red 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.

Both physical button and on-screen key in the application software are acceptable.

(f) Speaker Number Preset Switch

Speaker number preset switch shall be provided for presetting the maximum number of microphones which can be activated simultaneously. Both physical button and on-screen key in the application software are acceptable.

(g) Recording Control Panel

Recording control panel shall be provided for operator 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 microphone on/off switch with facility of automatic relay of floor language when the switch is in off position;
  - (c) a local main isolation switch and indicator lamp;
  - (d) 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;
  - (e) a volume control and preferably with tone control of floor language; and
  - (f) 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 when required.

### 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; and
  - (c) a channel select switch with volume control if wireless receiver is not provided.
- 6.3.2 If a built-in loudspeaker is provided, it shall automatically be switched off when the microphone is switched on. Acoustic feedback shall not occur notwithstanding their orientation during a conference.
- 6.3.3 Delegate Control Unit can be designed as Delegate Control Unit (Portable Type) or Delegate Control Unit (Fixed Type) described in the following sub-clauses.

#### 6.3.4 Delegate Control Unit (Portable Type)

Each Delegate Control Unit (Portable Type) 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 Delegate Control Unit (Fixed Type)

Each Delegate Control Unit (Fixed Type) shall be either surface mounted or flush mounted on the conference table or other furniture and the requirements shall be referred to the Particular Specification.

#### 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 complete with its associated indicator for overriding the microphones of Delegate Control Unit.

#### 6.5 Infra-red Transmission System

This system is used as a means to convey the floor and translated languages to members who require such service. Carrier frequencies of the transmitter shall be in the infra-red band. Each system shall be equipped with at least four (4) 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 Infra-red Transmission System shall be OFCA approved type or exempted from licensing via "Telecommunication (Low Power Devices) (Exemption from Licensing) Order, Cap. 106M".

##### 6.5.1 Infra-red Transmitter

6.5.1.1 This unit shall generally comprise a central unit with at least four (4) language channel modules and transmit audio signals to a number of remote infra-red radiators. The required number of infra-red radiators depends on the size of the area of coverage and will be specified in the Particular Specification.

6.5.1.2 The central unit shall be equipped with, modulators and their indicators, power supply and a driver for driving the remote infra-red radiators.

##### 6.5.1.3 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 (4)
Output Voltage	: $\pm 1V$
Output Impedance	: 60 ohm - 75 ohm
I.R. Output Power	: not less than 4W

## 6.5.2 Infra-red Receiver

6.5.2.1 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. The requirements shall be referred to the Particular Specification.

### 6.5.2.2 Technical Performance

Number of channel	: not less than 4
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 (4) channels in operation
Sensitivity (IR Light)	: $5mW/m^2$ (S/N ratio better than 40 dB)
Distortion	: less than 5% at rated output

## 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 (1) microphone shall be

provided for each interpreter. For microphones used in a single interpreter's booth, only one (1) 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 requirements will be specified in the Particular Specification.

### 6.6.4 Technical Performances

Frequency Response	: 100 Hz - 13 kHz $\pm$ 3 dB w.r.t. 1 kHz
Sensitivity	: better than -74 dB or 2mV/Pa at 1 kHz
Impedance	: 200 ohm - 600 ohm, balanced
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 fully enclose 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 $\pm$ 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  $\pm$ 3 dB w.r.t. 1 kHz

Impedance : 200 ohm - 2 k ohm

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  $2.5\text{mm}^2$  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 cabinets 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 hereinunder.

## 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 -