Research Design and Standard Organisation
Telecom Section/ S&T Directorate

Reasoned document for provisional draft specification of specification No. RDSO/SPN/TC/51/2021, Rev.- 2.0 for "Electronic LC Gate Telephone System" based on the internal review and comments received on specification posted online on RDSO website.

S. N	Clause No of RDSO specification	Clause, as it exists in RDSO Specification	Comments Received from	RDSO Remark	Modified Clause
1.	1.0	This document covers the technical requirements, constructional features, electrical characteristics, and provisions of tests & inspection of ELECTRONIC LC GATE TELEPHONE SYSTEM for use over Indian Railways and is issued under the serial **No. RDSO/SPN/ TC/51/2021 Revision** ~~1.0.~~ 2.0. Two type of system have been defined in this specification. PART A is for system having two wire as a media and another part B **is** for system having OFC as a media.	**M/s BENTRON:** We suggest three separate specifications. 1.For Electronic LC Gate Telephone System 2.For OFC based communication system 3.For Centralized Voice Recording System to store recorded voice files at HQ. **Justification:** 1.OFC based System can be used in any 4W/2W communication system to eliminate quad cable used for Telephone system in that section. 2.Centralized Storage System	RDSO review	This document covers the technical requirements, constructional features, electrical characteristics, and provisions of tests & inspection of ELECTRONIC LC GATE TELEPHONE SYSTEM for use over Indian Railways and is issued under the serial **No. RDSO/SPN/ TC/51/2021 Revision** ~~1.0.~~ 2.0. Two types of system have been defined in this specification. ~~PART A is for system having two wire as a media and another part B is for system having OFC as a media.~~ One is for system using Quad cable as media and other is for

			should have its own processing system which can process the voice from each location and transfer and store it to centralized location like HQ.		system using OFC as media.
2.	2.9 Part-B	**Gate-Gate Conversation:** Only when Master presses two or more Gate Buttons, those Gates are activated and will be able to converse to the Master as well as between them. ~~The activated Gate Telephone will remain activated for conversation even if the handset of the Station Telephone Unit is placed on the hook so that conversation between the Gate Telephones can continue.~~ The Gate Telephone will be disconnected and Indicating LED on Station Telephone Unit meant for that particular Gate Telephone will go OFF, when the handset of that particular Gate Telephone is placed on the hook. Here as only selected Gate Telephones were activated for conversation, other Gate Telephones were not activated for conversation and they can neither speak nor listen	**M/s. BENTRON:** We suggest to keep this point: The activated Gate Telephone will remain activated for conversation even if the handset of the Station Telephone Unit is placed on the hook so that conversation between the Gate Telephones can continue. Justification 1.Otherwise, when handset of the Station Telephone Unit will be placed on hook Gate-Gate conversation will be discontinued.	Clause modified.	**Gate-Gate Conversation:** Only when Master presses two or more Gate Buttons, those Gates are activated and will be able to converse to the Master as well as between them. The activated Gate Telephone will remain activated for conversation even if the handset of the Station Telephone Unit is placed on the hook so that conversation between the Gate Telephones can continue. The Gate Telephone will be disconnected and Indicating LED on Station Telephone Unit meant for that particular Gate Telephone will go OFF, when the handset of that particular Gate Telephone is placed on the hook. Here as only selected Gate Telephones were activated for conversation, other Gate Telephones were

		to ongoing voice communication.			not activated for conversation and they can neither speak nor listen to ongoing voice communication.
3.	2.15 Part-A	All the Voice Recording shall be Date and Time Stamped along with stamping of Station Identity. At least Date, Time & Station Identity shall be part of file name of voice files. Recording shall be in *.wav file format, so that it can be replayed on Windows Media Player on any PC/Laptop with Windows OS. Following minimum Information listed below should be made available from the recorded data. 1. Station identity (Station code: minimum 4 characters). 2. Recording Start time and End time in HH/MM/SS with date format for all voice recorded files. 3. "Who calls whom" information.	**South Eastern Railway** All the Voice Recording shall be Date and Time Stamped along with stamping of Station and Gate Identity. Recording shall be in *.wav file format, so that it can be replayed on Windows Media Player on any PC/Laptop with Windows OS. Following minimum Information listed below should be made available from the recorded data. 1. Station identity (Station code: minimum 4 characters). 2. Gate identity (Gate code: minimum 4 characters). 3. Recording Start time and End time in HH/MM/SS with date format for all voice recorded files. 4. "Who calls whom" information.	Clause is being modified to incorporate Gate identity.	All the Voice Recording shall be Date and Time Stamped along with stamping of Station and Gate Identity**.** At least Date, Time & Station Identity shall be part of file name of voice files. Recording shall be in *.wav file format, so that it can be replayed on Windows Media Player on any PC/Laptop with Windows OS. Following minimum Information listed below should be made available from the recorded data. 1. Station identity (Station code: minimum 4 characters). 2. Gate identity (Gate code: minimum 4 characters). 3. Recording Start time and End time in HH/MM/SS with date format for all voice recorded files. 4. "Who calls whom" information.
4.	2.15 Part-B	All the Voice Recording shall be Date and Time Stamped along	**M/s. BENTRON:** We suggest:	Typographical mistake rectified.	

		with stamping of Station Identity. At least Date, Time & Station Identity shall be part of file name of voice files. Recording shall be in *.wav file format, so that it can be replayed on Windows Media Player on any PC/Laptop with Windows OS. Following minimum Information listed below should be made available from the recorded data. 4. Station identity (Station code: minimum 4 characters). 5. Recording Start time and End time in HH/MM/SS format for all voice recorded files. 6. "Who calls whom" information.	1.It should be 1.Station identity (Station code: minimum 4 characters). 2.Recording Start time and End time in HH/MM/SS format for all voice recorded files. 3."Who calls whom" information Justification As it is typographical mistake		Centralized voice logs shall be saved in subsequent station folder. The station folder shall have sub folder of LC Gate and recording shall save in that sub folder.
5.	2.16 Part-A	The capacity of Voice Storage shall be at least 200 Hours on a Minimum 8 GB Solid State Memory Device. Solid State Memory Device should be FAT32 formatted. Storage of Voice Communication should follow the FIFO (First in First Out) methodology. Once Voice Communication is stored in, no way it should get corrupted. It	**RDSO** review:	Voice recording facility given in master phone. Additionally, provision is being given to bring the recording to a centralized location as well.	The capacity of Voice Storage shall be at least 200 Hours on a Minimum 8 GB Solid State Memory Device. Solid State Memory Device should be FAT32 formatted. Storage of Voice Communication should follow the FIFO (First in First Out) methodology. Once Voice Communication is stored in, no way it should get corrupted. It

		shall also be not possible to format the Solid-State Memory Device by conventional methods.			shall also be not possible to format the Solid-State Memory Device by conventional methods. There shall be a provision of ~~simultaneously copy~~ sending these recorded voice files at HQ (through Ethernet port or E1 channel provided on ASM unit) in computer system having necessary software. The computer system provided at Head Quarter should have capability to monitor at least 100 such units. This device shall have live recording facility and 6month backup. The storage for taking backup of these files should be minimum 1TB once 1 TB storage is full FIFO should be activated. The centralized voice recording system must support multiple vendors. The centralized voice logging system must have high quality microphones and noise cancellation technology.
6.	2.16 Part-B	The capacity of Voice Storage shall be at least 200 Hours on a Minimum 8 GB Solid State Memory Device. Solid State Memory Device should be FAT32 formatted. Storage of Voice Communication should follow the FIFO (First in First Out) methodology. Once Voice Communication is stored in, no way it should get corrupted. It shall also be not possible to format the Solid-State Memory Device by conventional methods. There shall be a provision to simultaneously copy these recorded voice files at HQ (through Ethernet port or E1 channel provided on ASM unit) in computer system having necessary software. The computer system provided at Head Quarter should have capability to monitor atleast 100 such units. this device shall have live recording facility and 6month backup. The storage for taking	**M/s. BENTRON:** We suggest: Deletion of point Justification: As this is part of Centralized Voice Recording System.	The clause suffices the requirement.	
			M/s. EEC: The capacity of voice Storage shall be at least 200 Hours on a minimum 8 GB Solid State Memory Device. Solid State Memory Device should be FAT 32 formatted. Storage of Voice Communication should follow the FIFO (First in First Out) methodology. Once Voice Communication is stored in, no way it should get corrupted. It shall also be not possible to format the Solid-State Memory Device by Conventional methods. Justification: File transfer process from station Master Station to Server will take place when recording is not under progress i.e. Station master is "ON-	Simultaneous file transfer not required. Hence clause modified.	

		backup of these files should be minimum 1TB once 1 TB storage is full FIFO should be activated.	HOOK" Mode.		
			M/s. GENERAL AUTO ELECTRIC: Need to specify live recording unique Protocol for interoperability.	Since simultaneous file transfer not required, no requirement of unique protocol.	
			SWR: Requests increasing log storage from 200 hours to minimum 500 hours. Justification: Required during enquiry conducts**.**	Clause suffices the requirement.	
			M/s. SIRVEEN: Need more Clarity on the scope of supply for the computer system and backup storage of 1TB (Is it Railway or device vendor). If multiple vendors are maintaining backup storage systems, then how to arrive with common data storage protocol.	Necessary modification done.	
		New clause (Network Voice logging)	**SWR:** Guidelines on Network Voice Logging should be given. Justification:	Relevant clause modified.	

			Strongly recommended centralized logging, suggests time-based and LC Gate number-based download capabilities.		
		New clause (Real time data transmission and storage)	**Southern Railway:** The process of retrieving voice logs should be streamlined, allowing for more efficient access to specific data.	Since provision of centralized recording is being provided this issue will be addressed automatically.	
		New clause (Advanced microphone and noise filtering)	**Central Railway:** Upgrading the logger with higher Quality microphones and noise-Cancelling technology Can help ensure that Conversations between master and gateman are clear, even in noisy environment.	Relevant clause modified.	
		New clause (Automatic gain control)	**Central Railway:** The features would balance audio levels making feeble voices clearer without distorting louder Sounds.	Relevant clause modified.	
		New clause (Real time data transmission and storage)	**Central Railway:** In case, of a device is damaged or compromised, incorporating cloud-based storage for real-time audio logs Could help Centralise data and ensure that logs are saved.	Clause suffices the requirement.	

7.	2.18 Part-A	There should be provision of an USB Interface Port in Station Telephone Unit through which Recorded Voice can be transferred from Station Telephone Unit to Laptop for replay or taking backup on CD/DVD. Feature of Auto Copy of voice Data on insertion of USB Pen Drive shall also be available. This USB Interface Port shall be protected from unauthorized access through arrangement of Mechanical Locking & Sealing. Through this USB Interface it should also be possible to set Station Identity in Alpha characters. It shall also be possible to set Station identity through the master telephone key board housed inside the Station Telephone Unit.	**West Central Railway:** It is found that during the transfer of recorded Voice from Station Telephone Unit to pen drive transferring stops if any calling/ringing from Gate to Station ASM or Station ASM to Gate is initiated. Again, the process of transfer or recorded voice data must be started from initial. This issue makes the process of taking back up from the system a tedious and time-consuming job.	With centralized voice recording facility, this problem will be overcome.	There should be provision of Ethernet, E1 and USB port in Station Telephone Unit through which Recorded voice can be transferred ~~an USB Interface Port in Station Telephone Unit through which Recorded Voice can be transferred~~ from Station Telephone Unit to any network working on Ethernet/Server/ Laptop for replay or taking backup on CD/DVD. Feature of Auto Copy of voice Data on insertion of USB Pen Drive shall also be available. All these Interface Ports shall be protected from unauthorized access through arrangement of Mechanical Locking & Sealing. Through this Ethernet, E1 and USB Port it should also be possible to set Station Identity in Alpha characters. It shall also be possible to set Station identity through the master telephone key board housed inside the Station Telephone Unit. Menu based software
			Eastern Railway: Back up CD/DVD- not available Pen drive may be considered.	Option of Pen drive is already given.	
			South Eastern Railway: it is recommended to provide an Ethernet port in the Station Telephone Unit to enable secure transfer of recorded voice data to a centralized storage or monitoring system. To ensure data security, this Ethernet interface shall be access-controlled through user authentication mechanisms (e.g. FTP/SFTP or HTTPS).	Relevant clause modified.	

			M/s. GENERAL AUTO ELECTRIC: There should be provision of an USB Interface Port / Ethernet Port in Station Telephone Unit through which Recorded Voice can be transferred from Station Telephone Unit to Laptop for replay or taking backup on CD/DVD. Feature of Auto Copy of voice Data on insertion of USB Pen Drive shall also be available. This USB Interface Port shall be protected from unauthorized access through arrangement of Mechanical Locking & Sealing. Through this USB Interface it should also be possible to set Station Identity in Alpha characters. It shall also be possible to set Station identity through the master telephone key board housed inside the Station Telephone Unit. **Justification:** If Ethernet port also need to be added in Part A station telephone. So that part A & B	Ethernet and E1 ports are being included.	application, which runs on server/Computer/Laptop shall be provided by the firm. To ensure data security, the voice logged data shall be password protected.

			station Telephone unit internal main can circuit be same. This will also help PART A station telephone live recording/monitoring.		
8.	2.18 Part-B	There should be provision of Ethernet port from which Recorded voice can be transferred ~~an USB Interface Port in Station Telephone Unit through which Recorded Voice can be transferred~~ from Station Telephone Unit to any network working on Ethernet/Server ~~Laptop~~ for replay or taking backup on CD/DVD. Through this Ethernet Port it should also be possible ~~Feature of Auto Copy of voice Data on insertion of USB Pen Drive shall also be available. This USB Interface Port shall be protected from unauthorized access through arrangement of Mechanical Locking & Sealing. Through this USB Interface it should also be possible~~ to set Station Identity in Alpha characters. ~~It shall also be possible to set Station identity~~	**SWR:** Propose gate number-wise file creation, on-hook/off-hook file access and download filtering by time/date. Justification: Ease of operation.	Clause suffices the requirement.	
			M/s. BENTRON: We suggest: There should be provision of Ethernet port or USB Interface Port in Station Telephone Unit through which Recorded Voice can be transferred from Station Telephone Unit to Laptop for replay or taking backup on CD/DVD. Feature of Auto Copy of voice Data on insertion of USB Pen Drive shall also be available. This USB Interface Port shall be protected from unauthorized access through arrangement of Mechanical Locking & Sealing. Through this USB Interface/	Clause being modified accordingly.	

		~~through the master telephone key board housed inside the Station Telephone Unit.~~	Ethernet Port it should also be possible to set Station Identity in Alpha characters. It shall also be possible to set Station identity through the master telephone key board housed inside the Station Telephone Unit. Justification Ethernet Port or USB Port is required as per protocol used in centralized recording system.		
			M/s. EEC: Firm will provide necessary Menu based software application, which runs on server (Personal Computer/Laptop). Server should have the Provision of Ethernet port form which recorded voice can be transferred from station Telephone Unit. Through this Ethernet Port it should possible to set Station identity in Alpha characters and Time stamp of Station master unit. **Justification:** Firm will provide Menu Based	Clause being modified accordingly.	

			application software for data transfer and Station Master Configuration.		
			M/s. SIRVEEN: We can have this feature in our station unit. However, if our station unit has to work with systems from other vendors, common protocol has to be defined.	Relevant clause modified.	
			Eastern Railway: 1.Back up CD/DVD- not available Pen drive may be considered. 2. For OFC based system central monitoring is required through NMS, centrally storage/back up for the voice logging (if required).	1. Clause suffices the requirement. 2. Provision of NMS shall be discussed in specification of UNOC.	
		New clause (Authentic control networking for voice recording)	**Central Railway:** Only authorized personnel should have access to recorded Conversation through Multifactor authentication.	Relevant clause is being modified.	
			Central Railway: Networking of LC Gate Telephone for voice recording.	Relevant clause is being modified.	
9.	2.19 Part-A	The equipment should have GPS receiver to update its local clock.	**Eastern Railway:** GPS antenna with minimum 10	The clause suffices the requirement.	The equipment should have ~~GPS~~ GNSS (NAVIC or GPS)

		Whenever equipment is energised it should update its clock within four minute of switching it on, further it should correct its local clock at an interval of one hour through GPS receiver. If the equipment is not receiving the GPS signal same should be indicated as „GPS Failure" or in form of symbolic notification in LCD Display. In addition to this the equipment shall have Real Time Clock with an accuracy of + 3.5 PPM within Operating Temperature Range of -10oC to +55oC. It should be possible to set Station ID, Date and Clock Time using Laptop through USB Interface Port. It shall also be possible to set the same from the Station Telephone unit itself. Necessary arrangements like speaker, switches should be provided inside the Station Telephone Unit to enable above facilities. Suitable GPS antenna with minimum 5 mtr cable should be connected to GPS module to have exposure to sky.	mtrs. Cable may be considered in place of 5mtr. Cable.		receiver to update its local clock. Whenever equipment is energised it should update its clock within four minute of switching it on, further it should correct its local clock at an interval of one hour through ~~GPS~~ GNSS (NAVIC or GPS) receiver. If the equipment is not receiving the ~~GPS~~ GNSS (NAVIC or GPS) signal same should be indicated as '~~GPS~~ GNSS (NAVIC or GPS) Failure' or in form of symbolic notification in LCD Display. Or the equipment should be able to extract clock signal from Ethernet network. Equipment may be configurable from a remote location through Ethernet port/E1 channel. In addition to this the equipment shall have Real Time Clock with an accuracy of + 3.5 PPM within Operating Temperature Range of -10oC to +55oC. It should be possible to set Station ID, Date and Clock Time using Laptop through USB Interface or RJ45 Port. It shall also be

10.	2.19 Part-B	The equipment should have GPS receiver to update its local clock. Whenever equipment is energised it should update its clock within four minute of switching it on, further it should correct its local clock at an interval of one hour through GPS receiver. If the equipment is not receiving the GPS signal same should be indicated as 'GPS Failure' or in form of symbolic notification in LCD Display. Or the equipment should be able to extract clock signal from Ethernet network. In addition to this the equipment shall have Real Time Clock with an accuracy of + 3.5 PPM within Operating Temperature Range of -10oC to +55oC. It should be possible to set Station ID, Date and Clock Time using Laptop through ~~USB Interface~~ RJ45 Port. ~~It shall also be possible to set the same from the Station Telephone unit itself.~~ Necessary arrangements like speaker, switches should be provided inside the Station	**M/s BENTRON:** We suggest: It should be possible to set Station ID, Date and Clock Time using Laptop through USB Interface or RJ45 Port. It shall also be possible to set the same from the Station Telephone unit itself. Justification: 1.Ethernet Port or USB Port is required as per protocol used in centralized recording system.	Clause is being modified.	possible to set the same from the Station Telephone unit itself. Necessary arrangements like speaker, switches should be provided inside the Station Telephone Unit to enable above facilities. Suitable GPS antenna with minimum 5 mtr cable should be connected to ~~GPS~~ GNSS (NAVIC or GPS) module to have exposure to sky.
			M/s. EEC: The equipment should have GPS receiver to update its local clock. Whenever equipment is energized it should update its clock within four minutes of switching it on, further it should correct its local clock at an interval of one hour through GPS receiver. If the equipment is not receiving the GPS signal same should be indicated as 'GPS Failure' or in form of symbolic notification in LCD Display Or the	The clause suffices the requirement.	

		Telephone Unit to enable above facilities. Suitable GPS antenna with minimum 5 mtr cable should be connected to GPS module to have exposure to sky.	equipment can be configured through Ethernet network by Firm's software application**.** In addition to this the equipment shall have Ral Time Clock with an accuracy of +3.5 PPM within Operating Temperature Range of -10O C TO + 55O C. it should be possible to set Station ID, Date and Clock Time using Laptop through RJ 45 Port by Firm's Software application. Necessary arrangements like speaker, switches should be provided inside the Station Telephone Unit to enable above facilities. Suitable GPS antenna with minimum 5 mtr cable should be connected to GPS module to have exposure to sky. Justification: Menu based software application will be password protected, to prevent from unknown entity.		
			M/s. SIRVEEN This feature can be done either through laptop or from the	Clause suffices the requirement.	

			connected computer system. In the later case, we have a similar comment as above. All features can be done when Station computer system and external devices are all operated by us (or a single source). Otherwise, common protocol to be defined.		
		New clause	**Southern Railway:** Measure should be taken to improve GPS signal reception for accurate time logging.	Master clock specification is under preparation. This issue will be resolved once the spec. is finalized.	
11.	2.2 Part-B	The "**Electronic LC Gate Telephone System (OFC)**" will consist of the following items: ~~5)~~**1) Station Telephone Unit** ~~6)~~2) **Gate Telephone** (Slave Telephones) ~~7) Surge Protection & Line Connection Unit~~ 3) **Suitable Modem for 2W Electrical to Optical interface** ~~8)~~4) ~~Centralized~~ **Power Supply System with Battery** Purchaser will estimate the requirement of items (1), (2), ~~(3)~~ and (3) (4) separately as per actual field conditions.	**M/s BENTRON:** We suggest: 1. There should be provision for 2W and 4W communication in both Station Telephone Unit and Gate Telephone by means of a Switch. 2.Requirement of Suitable Modem for 4W Electrical to Optical Interface	The term 2W is being removed so that Zonal Railway may decide suitable optical interface. Relevant Clause are also being revised accordingly.	The "Electronic LC Gate Telephone System **(OFC)**" will consist of the following items: ~~5)~~1**)** Station Telephone Unit ~~6)~~2) Gate Telephone (Slave Telephones) ~~7) Surge Protection & Line Connection Unit~~ 3) **Suitable ~~Modem for~~ ~~2W~~ ~~Electrical to~~ Optical** to E&M Converter ~~interface~~ (Media Converter) ~~8)~~4) ~~**Centralized**~~ Power Supply System with Battery Purchaser will estimate the requirement of items (1), (2),

		New clause (Gate phone interface)	**M/s. CYGNUS:** Gate Phone Interface: Unit shall be provided with one 2-wire RDSO/SPN/TC/51 compatible OMNIBUS interface with RJ45 connector for connecting Omnibus Gate telephone. Justification: This will allow existing RDSO/SPN/TC/51 certified telephones to be interconnected on Fiber. No special phones shall be required.		~~(3)~~ and (3) (4) separately as per actual field conditions.
12.	2.2.1 Part-B	"**Station Telephone Unit**" will be used at Stations/Cabins. SM will be able to call the Gates from this Telephone Equipment. This Station Telephone Unit ~~will be connected to the Line through a "Surge Protection & Line Connection Unit/Circuit". This Station Telephone Unit is to be directly connected to~~ is to be directly connected to 12 V output of Power Supply Unit. 2 Wire electrical output of Station Telephone unit will be fed to suitable modem to give optical	**M/s BENTRON:** We suggest: 1.SC-APC or LC-UPC port Justification: 1.As LC-UPC port is also widely used in Indian Railway	Using suitable port as provided by Zonal Railways.	**"Station Telephone Unit"** will be used at Stations/Cabins. SM will be able to call the Gates from this Telephone Equipment. This Station Telephone Unit ~~will be connected to the Line through a "Surge Protection & Line Connection Unit/Circuit". This Station Telephone Unit is to be directly connected to~~ is to be directly connected to Media converter to give optical connectivity using ~~SC-APC port~~ suitable port as provided

		connectivity using SC-APC port.			by Zonal Railways.
		New clause (OFC interface)	**M/s. CYGNUS:** OFC Interface: The product should have two fiber optic interfaces. Each fiber optic interface shall have a Single Mode Bi-Directional Fiber Transceiver with 1x9 FC connector. Fiber Driving range on single mode fiber shall be 20 km. The connector shall be FC type. Justification: Two fiber interfaces allow each unit to be connected to its logical neighbours on either side, allowing a Ring topology to be formed. Using Bi-Directional Transceivers will save on fiber as simultaneous 2-way communication would be possible on a single fiber backbone. •20 km range of the	Using suitable port as provided by Zonal Railways.	

			transceiver is sufficient as the distance between two adjacent sites (LC Gate or Station) is likely to be much less than 20 km. •LC gates are situated next to the track. Equipment at LC gates is subject to heavy vibration when a train passes. FC connectors are threaded, and therefore the chance of accidental disconnection due to vibration and other causes will be reduced**.** Therefore, we recommend FC Transceiver.		
13.	2.2.4 Part-B	"**Power Supply Unit**" Power Supply Unit will be ~~centrally~~ located at Stations/Cabins and each Gate unit. 12V DC output of supply ~~shall be connected to the~~ will be fed to Station Telephone Unit & ~~24V shall be fed to Line Circuit~~ optical Interface unit connected to gate unit & Slave Telephone.	**M/s EPSILON:** Power Supply Voltage is 12V DC and also mentioned maximum current rating.	The clause suffices the requirement.	"Power Supply Unit": Power Supply Unit shall be located at station/cabin as well as LC Gates. At station, 12V DC output of supply unit ~~shall be connected to the~~ will be fed to both the Telephone Unit & ~~24V shall be fed to Line Circuit~~ the media converter connected to it ~~gate unit & Slave Telephone.~~ Similarly at the LC gate, 12V DC output of supply unit will be fed to the gate unit & media converter connected to it.

14.	2.3 Part-B	The Electronic LC Gate Telephone System shall be used for point to point and point to multipoint communication between Station/Cabin & Level Crossing Gates, where the number of points to be connected are up-to 7(Seven), [1(Station Tel) + 6(Gate Tel)]. Master telephone, gate telephone and Power supply of all other RDSO approved sources of this specification shall be able to get connected in the Electronic LC gate telephone to be supplied without any limitation or modification. The "Electronic LC Gate Telephone System" shall be used in Master-Slave configuration as shown in Annexure-I.	**M/s. EPSILON:** Number of gates should be 8 as per Customer requirement. It should be mentioned as a optional.	Number of gates shall be six however it can extend up to 10 if required.	The Electronic LC Gate Telephone System shall be used for point to point and point to multipoint communication between Station/Cabin & Level Crossing Gates, where the number of points to be connected are up-to 7(Seven), [1(Station Tel) + 6(Gate Tel)]. However, it can extend up to 10 if required. Master telephone, gate telephone and Power supply of all other RDSO approved sources of this specification shall be able to get connected in the Electronic LC gate telephone to be supplied without any limitation or modification. The "Electronic LC Gate Telephone System" shall be used in Master-Slave configuration as shown in Annexure-I.
		New clause	**Southern Railway:** Master phone shall be designed to connect up to 8 to 10 Gate/Slave Telephones.	Relevant clause is being modified.	

15.	2.8 Part-B	The system shall permit working of Voice Communication and Signaling ~~on 2-Wire (Overhead or PE Quad) Omnibus Line tapped at different places for point to point and point to multipoint communication.~~ through Optical fiber media. OFC media given between master and slave phone units shall have ring protection in such a manner that one fiber cut in complete ring will not break communication.	**M/s. BENTRON:** We suggest: A switch will be provided by which OFC media given between master and slave phone units shall have ring protection so that one Fiber cut in complete ring will not break communication. justification As it is convenient and easy solution.	The clause suffices the requirement.	No change
		New clause (Fiber ring topology with protection)	**M/s. CYGNUS:** Should work in Fiber Ring topology with protection against disconnection of Fiber: The station and every LC Gate will have one unit of the product. Each unit shall be connected to its two immediate neighbours on both sides. Facility shall be provided to connect the last unit to the first unit to form a Fiber Ring. The Ring so formed shall be capable of providing uninterrupted communication between all nodes of the network even if the fiber gets		

			cut/disconnected at one point in the network. Justification: The Ring Protection feature will ensure uninterrupted communication between the station and the LC gates even if the fiber breaks or gets disconnected at a place. The better uptime that will result from this, is necessary for this critical application.		
16.	4.0 Part-B	POWER SUPPLY ARRANGEMENT	**SWR:** Justification: In case of IP Telephone: PoE shall be required as per site distance.	Not related with this specification.	Surge protection shall be provided as per the specification no RDSO/SPN/TC/98/2011 Amdt.1 or latest and STS/E/TAN/3006 version 3.0 or latest.
			SWR: Detailed Technical cause and mitigation direction should be provided. Justification: Identifies SPD failures recommend quality improvement and power surge resilience.	Clause is being modified.	
		New clause	**Southern Railway:** Improved surge protection**,** would reduce the incidence of	Relevant clause is being modified.	

			phone damage during electrical fluctuations.		
		New clause	**Central Railway:** In case of power fluctuation and surge the Mater/Slave Telephone hangs.	Relevant clause is being modified.	
17.	4.1 Part-B	One DC Power source having 12 V ~~and 24 V~~ DC Output Terminals will be required at Station Telephone unit and suitable power source should be provided at Gate Unit. ~~a centralized place. Station Telephone Unit and all the 6 Gate Telephones connected as per Figure-1 should work from this Single Power Source and no separate Power supply will be provided at the Gates.~~	**M/s. EPSILON:** Power Supply Voltage is 12V DC and also mentioned maximum current rating.	Clause suffices the requirement.	~~One DC Power source~~ In case of quad cable, Power Supply Unit having 12 V and 24 V DC Output Terminals will be required at a centralized place. Station Telephone Unit and all the 6 Gate Telephones connected as per Figure-1 should work from this Single Power Source and no separate Power supply will be provided at the Gates. In case of OFC, Power Supply Unit will be required at both station and LC Gates arranged as per Figure-9.
18.	4.3 Part-B	The power supply arrangement shall be a part of supply along with "Electronic LC Gate Telephone System". Power Supply unit consists of a	**M/s. EPSILON:** Power Supply Voltage is 12V DC and also mentioned maximum current rating**.**	Clause suffices the requirement.	The power supply arrangement shall be a part of supply along with "Electronic LC Gate Telephone System". Power Supply unit consists of a

		battery charger having 230 V AC, 50 Hz nominal input and having 12 V ~~27.2 + 0.5~~ DC output. The battery charger in addition to supplying the load, shall also charge the battery. The maintenance free 12 V ~~24 V(12 V+12 V)~~ battery is provided for back up of at least 12 hours. The capacity of the same should not be less than 7 AH. However, the railways can ask for a higher capacity of the battery to commensurate with the load. Provision should also be made to charge the battery from Solar Panel of suitable capacity.	**M/s. BENTRON:** We suggest: Power Supply unit consists of a battery charger having 13.6 +/- 0.5 VDC output. Justification: For charging the battery this voltage is required.	Clause suffices the requirement.	battery charger having 230 V AC, 50 Hz nominal input and having 27.2 ± 0.5 DC output. The battery charger in addition to supplying the load, shall also charge the battery. The maintenance free 24 V (12 V+12 V) battery is provided for back up of at least 12 hours at station and 72 hours at LC Gates. The capacity of the same should ~~not be less than 7 AH~~ according to the above requirement. However, the railways can ask for a higher capacity of the battery to commensurate with the load. Provision should also be made to charge the battery from Solar Panel of suitable capacity.
19.	5.1 Part-B	~~k) Suitable keys for selection of voice file/setting the ID/ setting the Date and time etc.and USB port for accessing the recorded voice files. This part should have locking arrangement to avoid unauthorized access.~~	**M/s. BENTRON:** We suggest: The point should not be deleted. Justification: Keyboard is required for setting the system.	Clause is being restored.	k) Suitable keys for selection of voice file/setting the ID/ setting the Date and time etc. and USB port for accessing the recorded voice files. This part should have locking arrangement to avoid unauthorized access.
20.	5.5 Part-B	**Piezo Electric Buzzer:** Piezo Electric Buzzer of 40 mm dia and	**SWR:** High volume Piezo buzzer in	Clause is being modified accordingly.	High volume Piezo Electric Buzzer ~~of 40 mm dia and~~

		20mm thickness, operating at suitable voltage generated internally by the circuitry shall be provided. Buzzer of shall be fixed inside the Station Telephone Unit body firmly. Suitable holes or grills should be available in the body of the Station Telephone Unit for audibility of sound from Piezo Electric Buzzer.	place of standard piezo electric buzzer **Justification:** A high-volume piezo electric buzzer produces significantly louder sound than a standard piezo buzzer. This shall be useful when gatemen is out of Gate Lodge for some routing maintenance activities.		~~20mm thickness,~~ operating at suitable voltage generated internally by the circuitry shall be provided. Buzzer ~~of~~ shall be fixed inside the Station Telephone Unit body firmly. Suitable holes or grills should be available in the body of the Station Telephone Unit for audibility of sound from Piezo Electric Buzzer.
21.	6.10 Part-B	**Optical interface unit**: The fiber coming from the station telephone unit will be terminated in this unit having SC-APC female port. This unit shall be kept near Slave Telephone and same power source should be used for both. ~~**Surge Protection & Line Connection Unit:** This unit shall be housed suitably and the 2-Wire line will be terminated to this unit. This unit will have a separate earth terminal for connecting it to Earthing Point. Technical requirements will be as per Cl. 2.2.3 of this specification.~~	**M/s. BENTRON:** We suggest: The Fiber coming from the station telephone unit will be terminated in Optical Interface unit having SC-APC/LC-UPC female port. Justification: As LC-UPC port is also widely used in Indian Railway.	Using suitable port as provided by Zonal Railways.	When OFC is used as media (~~Optical interface unit~~ **Media converter)**: The fiber coming from the station telephone unit will be terminated in this unit having ~~SC-APC~~ ~~female~~ suitable port as provided by Zonal Railways. This unit shall be kept near Slave Telephone and same power source should be used for both. ~~**Surge Protection & Line Connection Unit:** This unitshall be housed suitably and the 2-Wire line will be terminated to this unit. This unit will have a separate earth terminal for connecting it to Earthing Point. Technical requirements will be as per Cl.~~
			M/s. GENERAL AUTO: Optical Interface Unit specification should be mentioned there in the specification. 1) TX/RX wavelength 2)TX/RX separate Fiber link or single Fiber link using WDM 3) Optical Power Output of TX	Shall be mentioned by zonal Railway as per their requirement.	

			4) Sensitivity of Rx		~~2.2.3 of this specification.~~
New Clause					
22.	New Clause	VHF+LC Gate Channel Recording	**SWR:** In addition to this, one voice logger for VHF and LC Gate to optimize channels/Storage.	Not part of this specification.	----
23.	New Clause	Redundancy in Master Phone& Fault Alerts	**SWR:** Recommended 1+1 redundancy for master phones and visual fault indicators. **North Central Railway:** Master phone 1+1 redundancy is required as when master phone is defective, 6 gates are interrupted. **North Eastern Railway:** "The system (Mater/Slave phone) may be designed with hot standby as device level redundancy, media redundancy (E1, Dark Fiber, Quad) and Power Supply in line with HASSDAC/UFSBI".	Zonal Railway may decide.	
24.	New Clause	Use of magneto phones in addition to the Electronic LC Gate Phones	**SWR:** Guidelines are sought: In addition to the Electronic LC Gate Phone communication	Zonal Railway may decide.	---

			system, on a separate pair of Quad Whether ring type conventional magneto phones can be used where high traffic gates are operated and as a stand by arrangement.		
25.	New Clause	Migration of Gate Communication to OFC/Ethernet & IP-based telephony	**South Western Railway** Guidelines are sought: For Migration to OFC/Ethernet & IP-MPLS network and proposed 2*48F OFC in both side of the tracks.	Not in the purview of this specification.	-----
26.	New Clause	Salve Phone Bell issue at Distance	**Southern Railway:** At present the electronic gate telephone system is working with quad cable. The following disadvantage are noticed while working with quad cable. A. Lc gates with more than 8KM could not be connected. B. Noise is more; hence the voice is not clear. To overcome these, dual media working arrangements with OFC/Quad is suggested.	Clause suffices the requirement.	-----
			SWR: Noticed ring Failure beyond 8KM Due to high induced voltage to be addressed.	This problem will be overcome when OFC is used as a media.	

27.	New Clause	New comment	**Southern Railway:** The hardware and software should be reviewed and upgraded to reduce noise sensitivity and improve connection reliability. A reset feature should be incorporated into the system to address frequent hang-ups. **SWR:** Noticed complete freeze of master unit requiring hard reset. Issue to be addressed.	This problem will be overcome when OFC is used as a media.	
28.	New Clause	New comment	**Southern Railway:** The adaptation of magnetic cradle switches for slave phones should be explored to improve call connection reliability.	Clause suffices the requirement.	----
29.	New Clause	Group Messaging Facility	**North Central Railway:** There shall be a facility of "Group Messaging to all the gates on either side which are required to be CLOSED/OPENED.	Clause suffices the requirement.	----
30.	New Clause	Provision of problem key at way side station equipment	**North Central Railway:** In case LC gate man is unable to execute the order of ASM for closing the gate man is unable to execute the order of	Clause suffices the requirement.	---

			ASM for closing the gate for any unforeseen reason, he will immediately press the PROBLEM key which will intimate ASM about his inability.		
31.	New Clause	IP based Ethernet Technology	**North Central Railway:** "Electronic LC Gate Telephone System (OFC)" working on OFC media should adopt IP-based ethernet technology.	Not part of this specification.	---
32.	Annexure II	Code Structure for Electronic LC Gate Telephone System	**Bentron Power Systems:** We suggest: It should not be deleted Justification: As it is a part of LC Gate Telephone System	This is being restored.	Annexure -II restored.
33.	New Clause	Visual Monitoring of the network from the Central Station	**M/s. CYGNUS:** The station unit shall have a facility to visually indicate the failure of any remote unit or Fiber link. Justification This will allow quick attention to be drawn to unit or link failures, enabling corrective action.	Indication shall come on the media converter device. if the master unit is having media converter and no external media converter is required. Then indication shall be come on master unit.	----