

**GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS  
(RAILWAY BOARD)**

2018/Proj./MEGA/CBTC/30/28

New Delhi, dated 04.01.2019

**Managing Director,**

Metro Link Express for Gandhinagar and Ahmadabad  
(MEGA) Company, Limited,  
5TH Floor, Nirman Bhawan,  
Opp. Sachivalaya Gate No.4,  
Sector-10-A, Gandhi Nagar  
Gujarat -382010

**Sub:- In principle approval for adopting CBTC technology of Signalling & Train Control and Telecommunication & Technical approval of Half Height Platform Screen Door (PSD) System of Metro Link Express for Gandhinagar and Ahmedabad (MEGA) Company Limited, Phase-I project.**

Ref:- MEGA's letter No. MEGA/S&T/SIG-01/Contract/05/Submission/Vol-5 dated 20.09.2018, 08.10.2018, 15.10.2018 and 24.10.2018

Signalling & Train Control and Telecommunication System & Technical approval for Half Height Platform Screen Door (PSD) System for Ahmedabad Metro Phase-I project, as proposed by Metro Link Express for Gandhinagar and Ahmedabad (MEGA) Company Limited has been examined in Board in consultation with RDSO and approval of the competent authority for the same is hereby conveyed as under:-

**A. Signaling Systems:-**

SN	Description	Minimum Requirement	Proposed equipment & reference submitted by MEGA
1.	Type of Signalling	Cab Signalling, CATC (ATP,ATO,ATS). ATP and ATS are essential, ATO is optional.	Complied: <ul style="list-style-type: none"><li>• CBTC system including CATC (ATP, ATO/DTO &amp; ATS) using 2.4 GHz ISM band</li><li>• Make: M/s Nippon Signal Co. Ltd., Japan</li><li>• Model: SPARCS</li><li>• SIL 4 Certificate of SPARCS-D, issued by M/s NRCC dtd. 29.08.2017</li><li>• User certificate of Beijing Subway line 15</li></ul>
2.	Back up Signalling	Line side (CLS) at entry and exit at all interlocked stations.	Complied: <ul style="list-style-type: none"><li>• Red &amp; Green colour Signal as per RDSO specification of M/s General Auto Electric Corporation.</li><li>• Route indicator and Violet Colour LED signal also procured from M/s General Auto Electric Corporation.</li></ul>

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SN	Description	Minimum Requirement	Proposed equipment & reference submitted by MEGA
3.	Interlocking	EI with built-in block working facilities.	Complied: <ul style="list-style-type: none"> <li>• Computer based interlocking (CBI)</li> <li>• Make: M/s Nippon Signal Co. Ltd., Japan</li> <li>• Model: EI32FA</li> <li>• SIL 4 Certificate of EI32FA, issued by M/s NRCC dtd. 29.08.2017.</li> </ul>
4.	Train Control system	CATC(ATP,ATS,ATO optional)	Complied: <ul style="list-style-type: none"> <li>• CBTC of M/s Nippon Signal Co. Ltd.</li> <li>• ATS is SIL 2 compliant, certificate issued by NRCC dtd. 14.09.2017</li> <li>• OCC/BCC has been planned</li> </ul>
5.	Type of Track Circuits	Coded Audio Frequency Track Circuits (AFTC)	Complied: <ul style="list-style-type: none"> <li>• Primary means of train detection is performed by radio based system working on 2.4 GHz as an integral part of CBTC system and secondary (fall back) means of detection will be by Digital Axle counter system of M/s Frauscher make, Model: Fadc-R2</li> <li>• SIL-4 certificate issued by M/s TUV, Germany dtd. 13.03.2015.</li> </ul>
6. Point Machine			
	i) For Main Line	i) Non-Trailable high thrust, high performance machine	Complied: Make: Vossloh Cogifer, Model: MCEM91 with VCC lock
	ii) For Depot	ii) Trailable high thrust, high performance machine	Complied: Make: Vossloh Cogifer Model: As per IRS S-24
7.	Redundancy in cab equipment for ATP (Cab Sig.)	1+1 (hot standby)	Complied: <ul style="list-style-type: none"> <li>• On-board ATP is SIL-4 system configured as a duplex hot standby system.</li> </ul>

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**B. Telecommunication systems:-**

1.	Telecommunication systems	Integrated system with OFC, Train Radio, CCTV, Centralised clocks, PA system, with the additional provision that Train Display Boards at stations should also be integrated in the system. Regarding Train Radio system, it should be fully digital and duplex system, the standards may be chosen based on techno-economic considerations.	<ul style="list-style-type: none"> <li>• Fiber Optic Transmission System (FOTS)</li> <li>• Public Address System (PAS)</li> <li>• Passenger Information System (PIDS)</li> <li>• Master Clock System (MCS)</li> <li>• Telephone System</li> <li>• Radio (TETRA) System</li> <li>• Closed Circuit Television (CCTV)</li> <li>• Office Automation and Information Technology System (OA&amp;IT)</li> <li>• Access Control System (ACS)</li> <li>• Central Digital Recording System (CDRS)</li> <li>• T-SCADA System</li> </ul>
2.	Positive Train identification	Provided with interface between ATS and Train Radio	Since Positive train identification (PTI) is now been taken care by signaling CBTC system itself, no ATS and train radio interface is required for PTI functionality.

**C. Platform Screen Door:**

SN	Description	Minimum Requirement	Proposed equipment's & reference
1.	PSD system	General details	<ul style="list-style-type: none"> <li>• Make: M/s Shenzhen Fangda Automatic System Co. Ltd., CHINA.</li> <li>• Half Height (1.7 meter) Semi-outdoor type Platform Screen Gates (PSG) at Elevated station &amp; Full height Platform Screen Doors at Underground Station.</li> <li>• SIL-2 Assessment report issued by M/s TUV, Shanghai on dtd. 27.11.2014</li> </ul>



The above approval is subject to compliance of following stipulations before opening the line for passenger operation/revenue service:-

- (i) Before opening of the line for passenger operation/revenue service, complete safety assessment report and certification by ISA for achievement of required levels of safety as per latest CENLEC standards wherever applicable for train operation in MEGA metro for complete Signaling & Train Control System including all subsystems for both phases and platform screen door, system shall be submitted to RDSO.
- (ii) The final system hazard analysis and acceptance of its mitigation by Metro Rail Administration (MRA) shall be submitted to RDSO as well as to CRS and any hazards which require manual intervention/special instruction, shall be suitably framed, incorporated and implemented by Metro authorities.
- (iii) Documents as per Annexure E1 of "Procedure for Safety Certification and Technical Clearance of Metro Systems" including EMC/EMI report related to rolling stock, PSD may be submitted considering all mission-critical frequencies.
- (iv) MEGA shall carry out rigorous testing of all mode of interference (both out of band and in band interferences) to prove non - susceptibility of 2.4 GHz band used for CBTC application to any kind of interference and shall align the access points for better reliability & test report shall be submitted to RDSO.
- (v) In case of DTO the reliability & resiliency (ability to automatically restore i.e. fast re-routing the communication) is another critical consideration of the entire communication network, wireless as well as wired, so that the system should not fail. Similarly provisions must be made for dependable communication between OCC and passenger (in case of train stopping due to unusual incidence/failures in tunnels to prevent them from panicking). The details of final communication arrangement made compatible for DTO may be submitted to RDSO before start of operation in DTO mode.
- (vi) The details of authorities responsible for maintenance of signaling system to the required level of safety during train operation shall be submitted to RDSO.
- (vii) For DTO mode of operation (GoA 3), signaling system is capable of operating the trains without driver but the issue is the compatibility of infrastructure, i.e., stations, tunnels and trains for driver less operation, especially the perceived security aspects and emergency procedures. Till these issues and procedures are complied/prepared, the train operation can't be done without driver. MEGA shall submit the details/documents/ compliance related to compatibility of infrastructures, security aspects and emergency procedures before start of operation in DTO mode.
- (viii) MEGA has submitted that the development process of ATS is SIL 2, and all potentially unsafe effects of safety related functions performed by ATS and ATO shall be mitigated by mandatory interaction with SIL 4 subsystems (ATP and CBI), however dependency of operating authorities on VDU display units to run the trains during failure situations shall require a minimum level of SIL2 for VDU. If the same level of certification is not achieved, manual running of trains during signal failure condition shall not be done relying only upon the indication by ATS & suitable instructions regarding this shall be framed and strictly implemented.

*P. K. Singh*

- (ix) Since the third rail traction of 750 V DC is being used, the signalling installations, point machines and other installations, which are imperatively connected to the running rails must be insulated against the structure earth and earth to avoid stray currents as per respective standards. Also, proper earthing & bonding should be ensured as per respective standards.

  
(Ruth Changsan)  
Director/MTP  
Railway Board  
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- Copy to: (i) **Executive Director/UTHS**, RDSO, Manak Nagar, Lucknow w.r.t RDSO's letter No. UTHS/81/MEGA Metro/S&T dated 13.12.2018.
- (ii) **OSD/UT & Ex-Officio Joint Secretary**, Ministry of Housing & Urban Affairs (MoHUA), Nirman Bhavan, New Delhi-110001