VOLUME A – ATTACHMENTS TO THE INSTRUCTIONS TO BIDDERS

Tender No. 51403

Attachments I1-I7 and I9

Technical Proposal

Attachments I1

Technical Information

Bidder is requested to detail how the proposed UNIT's (both Short Unit and Long Unit) in its Technical Proposal comply with all the requirements in the Technical Specifications.

For this purpose, Bidder shall complete Table 1 below with respect to any and all sections of the Technical Specifications, and provide all relevant data and information relating thereto. Bidder shall attach additional documentation, calculations, drawings and certificates as required in the Technical Specifications as annexes to this Attachment I1, to be referred by Bidder in Table 1 below as numbered annexes (annex 1, annex 2, etc.).

The numbering of the sections in Table 1 below shall refer to the sections in the Technical Specifications.

It is hereby clarified that the information provided by Bidder in Table 1 below shall bind Bidder and will be carefully reviewed by ISR. However it should not be considered for the purpose of scoring as per Section 13.1 of the Instructions to Bidders.

In addition, in the event that Bidder wishes to suggest alternative solution to a certain section in the following table it will specify such in the same raw. It is clarified that ISR shall not be bound to approve such alternative solution. In the event ISR shall not approve Bidder's alternative, Bidder shall be obliged to provide ISR with the solution specified in the Technical Proposal.

Table 1: Compliance with the Technical Specifications

Section	Subject	Bidder's proposed specifications		Reference to annexes attached by Bidder	Comments
		Short Unit	Long Unit		
1.1	Operational Characteristics				
1.1.1	Vehicle Concept				
1.2	Design targets				
1.3	Climatic Conditions				
[to be continued] ...	*[to be continued]* ...				

Attachments I2

Instructions for the submission of the Technical Proposal

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0. Technical Evaluation

The overall technical evaluation scoring is defined by the sum of the specific overall scoring of 6 separated main groups. These groups are as detailed below:

1. Technical Characteristics;
2. RAMS Characteristics;
3. Environmental Characteristics;
4. Supplier Characteristics;
5. Design Concept Characteristics
6. Maintenance Service Characteristics.

Bidder is requested to thoroughly follow the directions given in this **Attachment I2** and to fill out **Attachment I3-1**, **Attachment I3-2, Attachment I4, Attachment I5, Attachment I6** and **Attachment I7** as part of its Technical Proposal.

0.1. General

All values related to the characteristics shall be provided by the Bidder together with supporting proof documentation regarding how the specific value has been determined. The determination may be based on calculations, tests or estimations. In any case, the relevant documentation is to be provided and shall be complete, comprehensible and specifically allocated to the related value.

If the value shall not be sufficiently reasoned or in line with the supporting proof documentation, ISR reserves the right to try to identify the requested value based on the Technical Proposal without any obligation. If this should not be possible in a reasonable way the characteristic will be scored with 0 points.

During the tender evaluation process ISR may decide to provide related requests for clarification with respect to the values as well as the prove documentation.

All values shall be given in compliance with the Units and minimum accuracy as defined in this document. The rounding is generally to be done according the round half up method for positive figures (e.g. 1.15 -> 1.2) and round half down method for negative figures (e.g. -1.15 -> -1.2). The same rounding rules will be used in all further calculations related to the scoring process. If intermediate results should be rounded this process will be executed with the same accuracy for all Bids considering that at least 4 significant digits will be assured in all cases.

1. Evaluation Characteristics

1.1. Technical Characteristics

1.1.1. Seating Capacity

This value is the number of passenger seats including folding seats which are provided by the Unit.

The value is to be defined as integer.

1.1.2. Standees

This value is the number of standees which are provided by the Unit. The designated quantity shall consider a passenger density of 4 passengers / m².

The value is to be defined as integer.

1.1.3. Travel Time

This value is the minimum possible travel time which is required between Tel Aviv Hagana and Jerusalem Binyanei Hauma according to the boundary conditions and track data as described in Appendix B of the Technical Specification.

The time shall be given in seconds as integer value.

1.1.4. Max. Starting Acceleration

This value is defined by the maximum starting acceleration of the Unit during its start from standstill condition on a level tangent track with operational mass and normal operational payload as defined in EN 15663.

The consideration shall be made assuming half worn wheels, nominal catenary voltage, an ambient temperature of 45°C, an altitude of 800 m and a relative humidity of 10%.

The value of is to be defined in m/s² with 3 significant digits.

1.1.5. Residual Acceleration

This value is defined as the maximal possible remaining continuous acceleration at an operation speed of 160 km/h on a level tangent track with operational mass and normal operational payload as defined in EN 15663.

The consideration shall be made assuming half worn wheels, nominal catenary voltage, an ambient temperature of 45°C, an altitude of 800 m and a relative humidity of 10%.

This value is to be defined in m/s² with 3 significant digits.

1.1.6. Acceleration 0-100

This is the acceleration time which is required to accelerate the Unit from standstill to 100 km/h on a level tangent straight track with operational mass and normal operational payload as defined in EN 15663.

The consideration shall be made assuming half worn wheels, nominal catenary voltage, an ambient temperature of 45°C, an altitude of 800 m and a relative humidity of 10%.

The time shall be given in seconds as integer value.

1.1.7. Thermal Capabilities of Traction System

This value is the maximum ambient temperature up to which the full traction performance can be provided by the Unit. Above this value derating measures are necessary to avoid thermally induced damages or malfunctions.

For this consideration a humidity of 10% and an operation altitude of 800 m shall be assumed.

The value shall be defined in °C with at least 3 significant digits. The Bidder shall name the limiting component or system, respectively.

1.1.8. Efficiency Traction System

This is the weighted average value of the efficiencies η_i based on the conditions as defined in the LCC paragraph of the technical specification (index i corresponds to the percentage load level of the traction power request) without train heating power excluding the idle condition. The efficiency values η_i are defined by the ratio of the provided traction power at wheel rim and the power supply consumed via the catenary System.
The considerations shall be made assuming an ambient temperature of 45 °C, a relative humidity of 10 % and an operation altitude of 800 m.

The average is calculated as

$\eta = \Sigma\, w_i \bullet \eta_i$.

The weighting w_i is to be done according to the daily time distribution of the related load level as given in the aforementioned paragraph of the technical specification.

The Bidder shall define the individual efficiencies at the different load levels and further calculate the weighted average value of the efficiency for scoring purposes

The value is to be given in % with 3 significant digits.

1.1.9. Efficiency Auxiliary Power Supply

This is the efficiency of the auxiliary power supply at 75 % rated power over all consumers. The efficiency value is defined by the ratio of the provided auxiliary power and the related portion of the power supply via the catenary System.
The considerations shall be made assuming an ambient temperature of 45°C, a relative humidity of 10 % and an operation altitude of 800 m.

The value is to be defined in % with 3 significant digits.

1.1.10. Braking Percentage

This value is defined by the brake percentage value of the Unit based on the brake weight according to UIC 544-1 in pneumatic braking mode R+Mg considering all relevant initial speeds as defined in the mentioned UIC leaflet.

This value is to be defined in % as integer value.

1.1.11. Emergency Braking Distance from 160 km/h

This is the emergency braking distance of the Unit in pneumatic braking mode R+Mg from 160 km/h on a level tangent straight track according to the measuring method described in UIC 544-1. All emergency brake handles installed in the Unit shall be considered. The value shall be based on the handle which provides the longest braking distance.

The value is to be defined in m with at least 3 significant digits.

1.1.12. Full Service Braking Distance from 160 km/h

This is the full service braking distance of the Unit in the highest braking mode from 160 km/h on a level tangent straight track according to the measuring method described in UIC 544-1.

The value is to be defined in m with at least 3 significant digits.

1.1.13. Continuous Brake Power Friction Brake

This is the maximum continuous friction brake power at the wheel rim which can be dissipated by the friction brake system at a reference speed of 80 km/h without any thermal damage at the brake system.
The related consideration shall be based on an ambient temperature of 45 °C, a relative humidity of 10 % and an operation altitude of 800 m.

The value is to be given in kW as integer value.

The applied maximum permitted brake pad and brake disc temperatures which are relevant for this continuous thermal load shall be given additionally.

1.1.14. Maximum permitted Cant Deficiency uf_{perm} of the Vehicle

This value is the maximum cant deficiency which is permitted for the offered Unit.

The value is to be defined in mm with at least 3 significant digits.

The cant deficiency corresponds to the maximum allowed non-compensated lateral acceleration related to the plane defined by the rail surfaces (see EN 14363).

1.1.15. Maximum Axle Load

This value is the maximum axle load of the Unit considering the design load with normal design payload as defined in EN 15663 considering 4 passengers / m².

The value is to be defined in metric tons with at least 3 significant digits.

1.1.16. Empty Weight in Operation Order

This value is the maximum mass of the Unit considering the operational mass in working order as defined in EN 15663.

The value is to be defined in metric tons with at least 4 significant digits.

1.1.17. Ride Comfort

This value is the mean ride comfort N_{MV} according to EN 12299 considering a speed of 160 km/h and a track quality of QN1 according to EN 14363.

The value shall be given with 3 significant digits.

1.1.18. Starting-up Time – Shot-down Time

This value is the overall time interval which is necessary to start-up a fully deactivated Unit (pantograph down, all equipment switched off, vehicle locked) up to operational readiness (inclusive complete brake test) and the shut down process back to the initial deactivated state. All intermediate steps as well as its allocated partial duration times shall be listed.

The overall time interval shall be given in seconds as integer value.

1.1.19. Coupling Time

This value is the overall time interval of the coupling process of two Units beginning with the approach process from the initial position and ending with the operational readiness including brake test procedure as required. In the initial position both are in standstill conditions with a distance of 3 m between both coupling faces.

It shall be assumed that both Units have successfully passed the complete start-up process as single Unit.

The time shall be given in seconds as integer value.

1.2. RAMS Characteristics

1.2.1. Significant Failures of the Unit

This is the average number of significant failures per million km of travel of the Unit. The characterisation of this failure type is given in the RAMS section of the technical specification.

The value is to be given with 3 significant digits.

1.2.2. Critical Failures of the Unit

This is the average number of critical failures per million km of travel of the Unit. The characterisation of this failure type is given in the RAMS section of the Technical Specification.

The value is to be given with 3 significant digits.

1.2.3. Uncritical Failures of the Unit

This is the average number of uncritical failures per million km of travel of the Unit. The characterisation of this failure type is given in the RAMS section of the Technical Specification.

The value is to be given with 3 significant digits.

1.2.4. Subsystem Reliability (MDBF)

1.2.4.1. Running Gear

This is the MDBF value of the main assembly "Running Gear" as defined in the RAMS chapter of the Technical Specification.

The value is to be given in km with 3 significant digits.

1.2.4.2. Traction System

This is the MDBF value of the main assembly "Traction System" as defined in the RAMS chapter of the Technical Specification.

The value is to be given in km with 3 significant digits.

1.2.4.3. Train Control and Monitoring System

This is the MDBF value of the main assembly "Train Control and Monitoring System" as defined in the RAMS chapter of the Technical Specification.

The value is to be given with 3 significant digits.

1.2.4.4. HVAC

This is the MDBF value of the main assembly "HVAC" as defined in the RAMS chapter of the Technical Specification.

The value is to be given in km with 3 significant digits.

1.2.4.5. Brake-System

This is the MDBF value of the main assembly "Brake System" as defined in the RAMS chapter of the Technical Specification.

The value is to be given in km with 3 significant digits.

1.2.4.6. Train Supply System

This is the MDBF value of the main assembly "Train Supply System" as defined in the RAMS chapter of the Technical Specification.

The value is to be given in km with 3 significant digits.

1.2.4.7. Toilet System

This is the MDBF value of the main assembly "Toilet System" as defined in the RAMS chapter of the Technical Specification.

The value is to be given in km with 3 significant digits.

1.2.4.8. Automatic Coupling System

This is the MDBF value of the "Automatic Coupling System" as defined in the RAMS chapter of the Technical Specification.

The value is to be given in km with 3 significant digits.

1.2.4.9. External Door System

This is the MDBF value of the "External door System" including the equipment for gap bridging (e.g. sliding steps) as defined in the RAMS chapter of the Technical Specification.

The value is to be given in km with 3 significant digits.

1.2.5. Availability

This is the minimum monthly availability value A_M during the whole operating lifetime of the Unit fleet as defined in the RAMS chapter of the Technical Specification.

The value is to be given in % with 4 significant digits.

1.2.6. Basic Inspection Interval

This is the smallest inspection interval to perform scheduled preventative intervention in order to ensure fault-free service capability of the Unit. Daily servicing measures under the terms of TSI LOC PAS, e.g technical checks, refilling of sand, refilling of wash water are excluded. The value is to be given in km as with 3 significant digits.

1.2.7. Service Life of Wheel Set

This is the value of the minimal distance which can be reached with a wheel-set in regular operation. Damages by accidents or malfunctions of other systems (e.g. brake or traction system) are to be excluded in this consideration.

The following three values are to be defined separately:

a) Running distance between re-profiling RD_{rp} (average distance over the lifetime of the wheel-set; to be given in km with 3 significant digits);
b) Number of re-profiling actions N_{rp} which are supported by the wheel set (to be given as integer value) and
c) Running distance between last re-profiling and wear limit of wheel RD_{wl} (to be given in km with 3 significant digits).

The minimum Lifetime of the wheel set LT_{ws} will be calculated by the following equation:

$LT_{ws} = N_{rp} \bullet RD_{rp} + RD_{wl}$.

The unit of this value is km and will be rounded to 3 significant digits.

If one of the separate values as mentioned above should not been defined by the Bidder, the lifetime LT_{ws} will be set to 0 km.

1.2.8. Service Life of Wheel Set Bearing

This is the value of the total running distance related to the mean wheel diameter which can be reached by the Wheel Set Bearing corresponding to the L10 lifetime according to ISO 281:2007.

The value is to be defined in km with 3 significant digits.

1.2.9. Service Life of Traction Motor Bearing

This is the value of the total running distance related to the mean wheel diameter which can be reached by the bearings of the traction motor corresponding to the L10 lifetime according to ISO 281:2007. The bearing life-cycle with less performance shall be used for scoring purposes.

The value is to be defined in km with 3 significant digits.

1.2.10. Service Life of Gear Box Bearing

This is the value of the total running distance related to the mean wheel diameter which can be reached by the bearings of the Gear Box corresponding to the L10 lifetime according to ISO 281:2007. The bearing life-cycle with less performance shall be used for scoring purposes.

The value is to be defined in km with 3 significant digits.

1.2.11. Service Life of Pantograph Contact Strip

This is the value of the minimum total running distance which can be reached by contact strip of the Pantograph until the need of replacement.

The value is to be defined in km with 3 significant digits.

1.2.12. Service Life Main Circuit Breaker

This is the minimum number of service cycles which can be reached by the main circuit breaker.

The value is to be defined as integer value with 3 significant digits.

1.2.13. Overhaul Event Downtime

The value is to be provided by summarizing the maintenance overhaul events downtime in calendar days over the 30 year rolling stock operation period applied to one Unit. Estimated 175.000 km annual operation mileage shall be considered as a constant value over the operational time period.

The value is to be provided as integer value in calendar days.

1.3. Environmental Characteristics

1.3.1. Noise Emission

1.3.1.1. Pass-By Noise

This value is the pass-by noise LpAeq,Tp according to the definition in the European TSI Noise (CR TSI NOI).

The value shall be defined in dB(A) with at least 3 significant digits.

1.3.1.2. Starting Noise

This value is the starting noise LpAFmax according to the definition in the European TSI Noise (CR TSI NOI).

The value shall be defined in dB(A) with at least 3 significant digits.

1.3.1.3. Stationary Noise

This value is the stationary noise LpAeq,T according to the definition in the European TSI Noise (CR TSI NOI).

The value shall be defined in dB(A) with at least 3 significant digits.

1.3.1.4. Internal Noise Driver's Cab

This value is the internal noise value LpAeq,T in the driver's cab at maximum speed according to the definition in the European TSI Noise (CR TSI NOI).

The value shall be defined in dB(A) with at least 3 significant digits.

1.3.1.5. Internal Noise Passenger Compartment – Seating Area

This value is the interior noise in the passenger compartment's seating area according to ISO 3381 at maximum operation speed of 160 km/h.

The value shall be defined in dB(A) with at least 3 significant digits.

1.3.2. Energy Consumption

This is the electric energy consumption of the Unit related to the roundtrip between Tel Aviv Hagana - Jerusalem Binyanei Hauma - Tel Aviv Hagana under the conditions described in Appendix B of the Technical Specification. The recuperation energy is to be excluded in this consideration. The Bidder is free to create an energy optimized simulation to minimize the energy consumption considering maximum permitted trip time of 27 minutes.

The value is to be given in kWh as integer value.

1.3.3. Net Energy Consumption

This is the electric net energy consumption of a Unit related to the roundtrip between Tel Aviv Hagana - Jerusalem Binyanei Hauma - Tel Aviv Hagana under the conditions described in Appendix B of the Technical Specification. The net energy consumption is the difference between the energy consumed from the catenary system and energy fed back into the catenary system (all values shall be provided).

For this consideration the Bidder shall assume that the catenary system can fully take over the recuperation energy.

The Bidder is free to create an energy optimized simulation to minimize the energy consumption considering maximum permitted trip time of 27 minutes for both directions.

The value is to be given in kWh as integer value.

1.3.4. Recyclability

The recyclability will be characterised by the sum of non-recyclable and non-reusable material mass from which the Unit is made of.

The value shall be given in kg with 3 significant digits.

1.4. Supplier Characteristics

1.4.1. Customer's Satisfaction

By means of a related questionnaire ISR will contact Bidder's three (3) most recent customers, which are operating rolling stock types supplied by the Bidder and were presented in the Bid in order to prove compliance with Technical Pre-Requisites in Section 5 to the Instructions to Bidders.

Only in the event that the number of customers presented is not in compliance with the above requirement, the Bidder shall specify in **Attachment I4** at least 5 additional customers which are operating different rolling stock types supplied by the Bidder.

ISR shall have the right to contact further known customers of the Bidder (including for the removal of doubt Israel Railways) whether they have been specified by the Bidder or not and to add these customers to the evaluation.

1.4.1.1. Delivery time past projects

The questionnaire allows the following classification related to the delivery time, by the recent customer:

a) Delivery on time;
b) up to 6 months delay;
c) more than 6 months delay;

1.4.1.2. Quality Issues

The questionnaire includes the following quality criteria which shall be evaluated by the recent customers. Each of these criteria shall be evaluated based on the three classification levels "high", "medium" and "low".

1. Quality of the rolling stock supplied:
    a) Reliability;
    b) Availability;
    c) Maintainability;
2. Quality of the after sales service:
    a) Number of the service/warranty team people;
    b) Professional capabilities and performance of the service/warranty team;
    c) Response time to repair malfunctions;
    d) Engineering and logistic assistance for repair of endemic or repeating malfunctions;
    e) Satisfaction from the logistic support and the provision of ongoing spare parts.

1.4.2. Quality Certification

The quality certification of the Bidder is evaluated based on a classified ranking. The following classification levels are used:

a) IRIS certified and
b) ISO 9001 and EN 14001 certified.

1.4.3. DDEMU Past Delivery

The purpose of the DDEMU Past Delivery criteria is to identify whether the Bidder designed, manufactured and delivered to the market self- propelled double deck electric unit and such rolling stocks are operated up to now.
The verification will be done by the rolling stocks listed to demonstrate compliance with the pre-requisite criteria.

The following classification will be applied:

a) The Bidder delivered more than 10 DDEMU to the market which are successfully operated
b) Bidder delivered at least 10 DDEMU to the market which are successfully operated
c) The Bidder has not delivered DDEMU to the market

1.4.4. Existing Homologations

The Bidder shall identify the homologation level of the referenced rolling stock types listed under the terms of the technical pre-requite to submit the date and country of homologation and applying the categories as described below. Evidence of the achievement shall be demonstrated by providing the relevant documents issued by the authorities involved in the homologation procedures.
The highest homologation level achieved by a reference rolling stock type applicable close to a base ISR Unit design shall be used for scoring purposes.

a) Homologated in any European Union Member Country based on European TSI;

b) Homologated based on national rules of a European Union Member Country;

c) Homologated based on national rules of an UIC Member Country;

d) Further homologations in other countries;

The information shall be provided to fill the data in Attachment I6.

1.5. Design Concept

In this evaluation group several components and aspects with special importance have been selected to be evaluated considering characteristics as the design related state of the art, level of design adaptations to ISR's specific requirements, the effectiveness and the user-friendliness of the Unit.
In the Technical Proposal the Bidder shall exhaustively describe all concepts, design aspects (layout, materials and execution), cleaning and maintenance aspects as requested.
For each point some exemplary characteristics have been listed.
This scoring group does not distinguish between Short Unit and the Long Unit.

1.5.1. Entrance

The following exemplary characteristics shall be in special consideration besides the others:

- entrance design including step design;
- door dimensions;
- gap bridging solution;
- mechanical layout;

- drive and door locking mechanism;
- control and implemented functions;
- sealing;
- emergency functions;
- maintainability;
- insulation against noise and heat transfer;
- corrosion protection;
- operating handles.

1.5.2. Toilets

The following exemplary characteristics shall be in special consideration besides the others:

- general dimensions;
- entrance solution;
- kind and execution of the toilette system;
- layout of tank capacities;
- control and signalling system;
- equipment, materials, surfaces, fittings;
- cleaning characteristics, maintainability.

1.5.3. Seat

The following exemplary characteristics shall be in special consideration besides the others:

- principal dimensions;
- seat frame design and mounting;
- materials, surfaces, durability;
- fittings;
- seat mass;
- vandalism resistance;
- cleanability.

1.5.4. Gangway

The following exemplary characteristics shall be in special consideration besides the others:

- principal dimension, width and height of gangways
- upper and lower floor gangways, stairs and inter-car-gangways
- passenger safety;
- cleanability;
- sealing of inter-car-gangways.

1.5.5. Floor

The following exemplary characteristics shall be in special consideration besides the others:

- construction design;
- materials and surface quality;
- slip resistance;
- wear resistance, durability;
- cleanability;
- quality of noise damping and heat insulation.

1.5.6. Interior Design / arrangement / concept

The following exemplary characteristics shall be in special consideration besides the others:

- design and outfitting such as tables, coat hooks, handrails;
- outfitting of multipurpose area;
- number and outfitting of toilets;
- seating arrangement;
- illumination concept;
- waste disposal;
- design of passenger information system;
- emergency egress;

- disability-friendly design;
- fire protection concept;
- HVAC design and control;
- ease of customer service;
- environment protection.

1.5.7. Luggage Storage

The following exemplary characteristics shall be in special consideration besides the others:

- construction and design;
- principal dimensions;
- carrying capacity;
- accessibility (height, depth);
- materials and surfaces;
- vandalism resistance;
- cleanability.

1.5.8. Interior Panelling

The following exemplary characteristics shall be in special consideration besides the others:

- construction and design;
- materials and surfaces;
- grade of noise damping and heat insulation;
- vandalism resistance;
- cleanability.

1.5.9. Windows

The following exemplary characteristics shall be in special consideration besides the others:

- construction and design (mounting, bounding, sealing…);
- window arrangement, number and sizes;

- principal dimensions, mass;
- emergency egress;
- grade of noise damping and heat insulation;
- vandalism resistance;
- cleanability;
- maintainability (e.g. replacement times).

1.6. Maintenance Service

In this evaluation group relevant important performance related aspects of the Proposed Maintenance Services have been selected to be evaluated considering characteristics such as customer satisfaction, the mobilisation and organisation concept.
Bidder shall submit in its Bid and exhaustively describe all the information requested in Section 16 of the Technical Specifications.
This scoring group does not distinguish between Short Unit and the Long Unit.

1.6.1. Customer Satisfaction – Maintenance Service

By means of a related questionnaire ISR will contact Bidder's most recent customers, which received maintenance services for electric rolling stock.

In **Attachment I5** the Bidder shall list its most recent customers to whom maintenance services were provided by the Bidder.

ISR shall have the right to contact further customers whether specified by the Bidder or not and to add these customers to the evaluation.

The following specific sub-characteristics will be evaluated:

1.6.1.1. Reliability Performance

The questionnaire allows the following qualitative classification related to fulfilment of the agreed reliability:

a) higher;
b) equal;
c) lower.

1.6.1.2. Availability Performance

The questionnaire allows the following qualitative classification related to fulfilment of the agreed availability:

a) higher;
b) equal;
c) lower;

1.6.1.3. Fulfilment of Agreed Schedule

The fulfilment level of the schedule considering planning and mobilisation, maintenance service commencement and further mile-stones will be classified. The questionnaire allows the following qualitative classification:

a) advanced;
b) equal;
c) delayed;

1.6.1.4. Project Management

The relation and the interface with the management team of the Bidder will be considered to evaluate the project management of the Bidder. The questionnaire allows the following qualitative classification:

a) excellent;
b) good;
c) minor;

1.6.1.5. Co-operation and Flexibility

The responsivity and adaptation on specific requests/requirements to the Bidder during the service period will be used for evaluation of this aspect. The questionnaire allows the following qualitative classification:

a) excellent;
b) good;
c) minor;

1.6.1.6. Claims and Disputes

The number of claims and disputes will be considered for evaluation of this aspect. The questionnaire allows the following qualitative classification:

d) high;
e) medium;
f) low;

1.6.2. Proposed Maintenance Services

Proposed Maintenance Services as required by Technical Specifications will be evaluated according to Attachment I9.

The following exemplary characteristics shall be in special consideration besides the others:

- organisation;
- maintenance concept;
- interfaces;
- staff training and qualification;
- mobilisation approach;
- spare part management and handling;
- scheduling;
- working regimes (e.g. workflow, planning methodology);
- flexibility;
- safety and environmental aspects.
- equipment, materials, surfaces, fittings;
- cleaning characteristics, maintainability.

2. Scoring Process

The overall technical scoring value S_{TO} will be calculated as weighted sum of the scoring values of the six different scoring groups (Technical Scoring: S_T; RAMS Scoring: S_{RAMS}; Environmental Scoring: S_{ENV}, Supplier's Scoring: S_{SUP}, Design Concept Scoring: S_{DC} and Maintenance Service Scoring: S_{MS}):

$S_{TO} = g_T \cdot S_T + g_{RAMS} \cdot S_{RAMS} + g_{ENV} \cdot S_{ENV} + g_{SUP} \cdot S_{SUP} + g_{DC} \cdot S_{DC} + g_{MS} \cdot S_{MS}$

with g_t, g_{RAMS}, g_{ENV}, g_{SUP} , g_{DC} and g_{MS} as relevant weighting factors.

This overall technical scoring value is the main parameter for the technical comparison of the Bids as well as the further evaluation.

The scoring values of the different scoring groups are based on the weighted sum of the scoring values of the individual characteristics. Except for the Supplier's Scoring $S_{SUP,}$ the Design Concept Scoring: S_{DC} and the Maintenance Service Scoring: S_{MS}, the values are averaged in a weighted manner considering a weight of 0.25 for the Short Units and 0.75 for the Long Units. Thus the following equations will be used:

$S_T = (0.25 \cdot \Sigma\, S_{wi,Short} + 0.75 \cdot \Sigma\, S_{wi,Long})$;

$S_{RAMS} = (0.25 \cdot \Sigma\, S_{wi,Short} + 0.75 \cdot \Sigma\, S_{wi,Long})$;

$S_{ENV} = (0.25 \cdot \Sigma\, S_{wi,Short} + 0.75 \cdot \Sigma\, S_{wi,Long})$ and

$S_{SUP} = \Sigma\, S_{wi}$;

$S_{DC} = \Sigma\, S_{wi}$;

$S_{MS} = \Sigma\, S_{wi}$;

with

$S_{wi} = g_i \cdot S_i$, $S_{wi,Short} = g_i \cdot S_{i,Short}$, $S_{wi,Long} = g_i \cdot S_{i,Long}$.

The aforementioned parameters have the following meaning:

S_{wi}: weighted scoring of characteristics i;

$S_{wi.Short}$: weighted scoring of characteristics i of the Short Unit;

$S_{wi,\ Long}$: weighted scoring of characteristics i of the Long Unit;

$g_{i:}$ relevant weight of characteristic i;

S_i: non-weighted scoring value of characteristic i;

$S_{i,Short}$: non-weighted scoring value of characteristic i of the Short Unit and

$S_{i,Long}$: non-weighted scoring value of characteristic i of the Long Unit.

The scoring values S_i, $S_{i,Short}$ and $S_{i,Long}$ of all individual characteristics are determined according to the different scoring methods.

All necessary data which is required for a clear calculation of the total technical scoring value S_{TO} is listed in the tables of chapter 0 in this document.

2.1. Scoring Methods

The following describes the different methods which shall apply for scoring the individual characteristics S_i.

2.1.1. Method 1 (High to Low with Sensitivity Parameter)

According to this scoring method the proposal with the highest value receives the maximal scoring while the other proposals are scored relatively, subject to sensitivity parameter (L_{sens}), as indicated in the tables in section 3and described below.

a) If the percentage difference between the proposal with the highest value and the proposal with the lowest value of the relevant characteristic within all valid Technical Proposals is higher than or equal to the sensitivity parameter L_{sens} (either 5% or 10%, as applicable), then the proposal with the highest value shall receive 10 points (maximum score) and the proposal with the lowest value shall receive 0 points (minimum scores).

   In relation to this interval, all other proposed values shall be scored proportionally taken into account that the scoring value will be rounded to an integer.

b) If the percentage difference between the proposal with the highest value and the proposal with the lowest value of the relevant characteristic within all valid Technical Proposals is less than L_{sens} (either 5% or 10%, as applicable), then the proposal with the highest value shall receive 10 points, while 0 points are allocated to the value which results in reducing the offered highest value by L_{sens}.
   In relation to this interval, all other proposed values including the offered lowest value shall be scored proportionally taken into account that the scoring value will be rounded to an integer.

2.1.2. Method 2 (Low to High with Sensitivity Parameter)

According to this scoring method the Bid with the lowest value receives the maximal scoring while the other Bids are scored relatively, subject to sensitivity parameter (L_{sens}), as indicated in the tables in section 3and described below.

a) If the percentage difference between the proposal with the highest value and the proposal with the lowest value of the relevant characteristic within all valid Technical

Proposals is more than or equal to L_{sens} (either 5% or 10%, as applicable), then the proposal with the lowest value shall receive 10 points (maximum score) and the proposal with the highest value shall receive 0 points (minimum score).

In relation to this interval, all other proposed values shall be scored proportionally taken into account that the scoring value will be rounded to an integer.

b) If the percentage difference between the proposal with the highest and the proposal with the lowest value of the relevant characteristic within all valid Technical Proposals is less than L_{sens} (either 5% or 10%, as applicable), then the proposal with the offered lowest value shall receive 10 points, while 0 points are allocated to the value which results in increasing of the lowest value by L_{sens}.

In relation to this interval, all other proposed values including the offered highest value shall be scored proportionally taken into account that the scoring value will be rounded to an integer.

2.1.3. Method 3

The scoring value done by the following two steps:

1. The response of each considered recent customer is individually scored according to the conditions in the table below.
2. The total scoring of the delivery time is given by the arithmetic average of these individual scores rounded to an integer.

The following table defines the allocated scores with respect to the related condition.

Scores	**Condition**
10	delivery on time
5	up to 6 months delay
0	more than 6 months delay

2.1.4. Method 4

The scoring is done by the following three steps:

1. The classification of the different sub-characteristics as given by each considered recent customer is individually scored according to the conditions in the table below.
2. Each sub-characteristic will be evaluated by a sub-scoring which is calculated as arithmetic average of all individual scores rounded to one position after decimal point.

3. The total scoring of this characteristic is given by the arithmetic average of these sub-scoring values rounded to an integer.

Remark: The sub-characteristics related to the supply of rolling stocks are all the individual characteristics below "Quality of the rolling stock" as well as "Quality of after sales service" in case of the vehicle related aspects.

The following table defines the allocated scores with respect to the related condition.

Scores	**Evaluation by recent Customer**
10	high / higher / advanced / excellent
5	medium / equal / good
0	low / lower / delayed / minor

2.1.5. Method 5

The scores below are allocated according to the conditions in the following table.

Scores	**Condition**
10	IRIS certified
5	ISO 9001 and EN 14001 certified

2.1.6. Method 6

The scores below are allocated according to the conditions in the following table.

Scores	**Condition**
10	More than 10 DDEMU delivered to the market
5	Up to 10 DDEMU delivered to the market
0	No DDEMU delivery to the market

2.1.7. Method 7

The scores are allocated according to the conditions in the following table.

Scores	Condition
10	Homologated in any European Union Member Country based on European TSI
5	Homologated based on national rules of an European Union Member Country
1	Homologated based on national rules of an UIC Member Country
0	Further homologations in other countries

2.1.8. Method 8

The Design Concept issues and the Proposed Maintenance Services approach will be evaluated by a group of different experts with experiences in the field of rolling stock design, operation and maintenance. These experts have to allocate one of the following evaluation levels:

Evaluation Level	Condition
excellent	characteristic is higher-than-average
good	characteristic is average
minor	characteristic is below average

These experts shall review the different components. The final evaluation scoring allocated to each component will be agreed between all involved specialists. Based on these evaluation levels the scores as listed in the following table will be awarded.

Scores	Evaluation
10	excellent
5	good
0	minor

3. Weights and Parameters

3.1. Overall Technical Scoring

Weighting Factor	Value
g_T	0.25
g_{RAMS}	0.20
g_{ENV}	0.15
g_{SUP}	0.15
g_{DC}	0.20
g_{MS}	0.05

(maximum possible overall technical scoring value S_{OT} = 100)

3.2. Evaluation Technical Characteristics

Paragraph	Characteristic $S_{i,\ Short}$ and $S_{i,\ Long}$	Method	L_{sens} [%]	Weighting factor g_i
1.1.1.	Seating Capacity	1	10	1.00
1.1.2.	Standees	1	10	1.00
1.1.3.	Travel Time	2	5	0.75
1.1.4.	Max. Starting Acceleration	1	10	0.25
1.1.5.	Residual Acceleration	1	10	0.25
1.1.6.	Acceleration 0-100	2	10	0.25
1.1.7.	Thermal Capabilities of Traction System	1	10	0.50
1.1.8.	Efficiency Traction System	1	10	0.50
1.1.9.	Efficiency Auxiliary Power Supply	1	10	0.50
1.1.10.	Braking Percentage	1	10	0.50
1.1.11	Emergency Braking Distance from 160 km/h	2	5	0.50
1.1.12.	Full Service Braking Distance from 160 km/h	2	5	0.50
1.1.13.	Continuous Brake Power Friction Brake	1	10	0.50
1.1.14.	Maximum permitted Cant Deficiency	1	10	0.50
1.1.15.	Maximum Axle Load	2	10	0.75
1.1.16.	Empty Weight	2	10	0.75
1.1.17.	Ride Comfort	2	10	0.50
1.1.18.	Starting-up Time – Shot-down Time	2	10	0.25
1.1.19.	Coupling Time	2	10	0.25

(Maximum possible technical scoring value S_T = 100)

Remark: The complete set of values shall separately been provided for the Long Unit as well as the Short Unit.

3.3. Evaluation RAMS Characteristics

Paragraph	Characteristic $S_{i,\ Short}$ and $S_{i,\ Long}$	Method	L_{sens} [%]	Weighting factor g_i
1.2.1.	Significant Failures of the Unit	2	10	0.80
1.2.2.	Critical Failures of the Unit	2	10	0.60
1.2.3.	Uncritical Failures of the Unit	2	10	0.40
1.2.4.	Subsystem Reliability (MDBF)			
1.2.4.1	Running Gear	1	10	0.30
1.2.4.2	Traction System	1	10	0.30
1.2.4.3	Train Control and Monitoring System	1	10	0.30
1.2.4.4	HVAC	1	10	0.20
1.2.4.5	Brake-System	1	10	0.20
1.2.4.6	Train Supply System	1	10	0.20
1.2.4.7	Toilet System	1	10	0.20
1.2.4.8	Automatic Coupling System System	1	10	0.20
1.2.4.9	External Door System	1	10	0.20
1.2.5.	Availability	1	10	0.50
1.2.6.	Basic Inspection Interval	1	10	2.0
1.2.7.	Service Life of Wheel Set	1	10	0.60
1.2.8.	Service Life of Wheel Set Bearing	1	10	0.20
1.2.9.	Service Life of Traction Motor Bearing	1	10	0.20
1.2.10.	Service Life of Gear Box Bearing	1	10	0.20
1.2.11.	Service Life of Pantograph Contact Strip	1	10	0.20
1.2.12.	Service Life Main Circuit Breaker	1	10	0.20
1.2.13	Overhaul Event Downtime	2	10	2.00

(Maximum possible RAMS scoring value S_{RAMS} = 100)

Remark: The complete set of values shall separately been provided for the Long Unit as well as the Short Unit.

3.4. Environmental Characteristics

Paragraph	Characteristic S_i	Method	L_{sens} [%]	Weighting factor g_i
1.3.1.1.	Pass-By Noise	2	5	0.40
1.3.1.2.	Starting Noise	2	5	0.60
1.3.1.3.	Stationary Noise	2	5	0.50
1.3.1.4	Internal Noise Driver's Cab	2	5	1.00
1.3.1.5	Internal Noise Passenger Compartment – Seating area	2	5	1.00
1.3.2.	Energy Consumption	2	5	3.00
1.3.3.	Net Energy Consumption	2	5	3.00
1.3.4.	Recyclability	2	10	0.50

(Maximum possible Environmental scoring value S_{ENV} = 100)

Remark: The complete set of values shall separately been provided for the Long Unit as well as the Short Unit.

3.5. Evaluation Supplier Characteristics

Paragraph	Characteristic S_i	Method	L_{sens} [%]	Weighting factor g_i
1.4.1.1.	Delivery time past projects	3	n.a.	2. 0
1.4.1.2.	Quality Issues	4	n.a.	1.5
1.4.2.	Quality Certification	5	n.a.	1.5
1.4.3.	DDEMU Past Delivery	6	n.a.	2.5
1.4.4.	Existing Homologation	7	n.a.	2.5

(Maximum possible supplier scoring value S_{SUP} = 100)

3.6. Design Concept

Paragraph	Characteristic S_i	Method	L_{sens} [%]	Weighting factor g_i
1.5.1.	Entrance	8	n.a.	1.50
1.5.2.	Toilets	8	n.a.	1.00
1.5.3.	Seats	8	n.a.	1.00
1.5.4.	Gangway	8	n.a.	1.00
1.5.5.	Floor	8	n.a.	1.00
1.5.6.	Interior Design	8	n.a.	1.50
1.5.7.	Luggage Storage	8	n.a.	1.00
1.5.8.	Interior Panelling	8	n.a.	1.00
1.5.9.	Windows	8	n.a.	1.00

(Maximum possible Environmental scoring value S_{ENV} = 100)

3.7. Maintenance Service

Paragraph	Characteristic S_i	Method	L_{sens} [%]	Weighting factor g_i
1.6.1.	Customer Satisfaction MS	4	n.a.	5.00
1.6.2.	Proposed Maintenance Services	8	n.a.	5.00

(Maximum possible Environmental scoring value S_{ENV} = 100)

Attachment I3-1

Evaluation form Short Unit

Bidder: _____

Date: _____

Technical Values Short Unit		**Unit**	**Value $S_{i,Short}$**
1.1.1.	Seating Capacity	n	
1.1.2.	Standees	n	
1.1.3.	Travel Time	s	
1.1.4.	Max. Starting Acceleration	m/s²	
1.1.5.	Residual Acceleration	m/s²	
1.1.6.	Acceleration 0-100	s	
1.1.7.	Thermal Capabilities of Traction System	°C	
1.1.8.	Efficiency Traction System	%	
1.1.9.	Efficiency Auxiliary Power Supply	%	
1.1.10.	Braking Percentage	%	
1.1.11.	Emergency Braking Distance from 160 km/h	m	
1.1.12.	Full Service Braking Distance from 160 km/h	m	
1.1.13.	Continuous Brake Power Friction Brake	kW	
1.1.14.	Maximum permitted Cant Deficiency	mm	
1.1.15.	Maximum Axle Load	t	
1.1.16.	Empty Weight in Operation Order	t	
1.1.17.	Ride Comfort	-	
1.1.18.	Starting-up Time – Shut-down Time	s	
1.1.19.	Coupling Time	s	

RAMS Values Short Unit		**Unit**	**Value $S_{i,Short}$**
1.2.1.	Significant Failures of the Unit	n	
1.2.2.	Critical Failures of the Unit	n	
1.2.3.	Uncritical Failures of the Unit	n	
1.2.4.	Subsystem Reliability (MDBF)	-	-
1.2.4.1	Running Gear	km	
1.2.4.2	Traction System	km	
1.2.4.3	Train Control and Monitoring System	km	
1.2.4.4	HVAC	km	
1.2.4.5	Brake-System	km	
1.2.4.6	Train Supply System	km	

RAMS Values Short Unit		**Unit**	**Value $S_{i,Short}$**
1.2.4.7	Toilet System	km	
1.2.4.8	Automatic Coupling System	km	
1.2.4.9	External Door System	km	
1.2.5.	Availability	%	
1.2.6.	Basic Inspection Interval	km	
1.2.7.	Service Life of Wheel Set	km	
1.2.8.	Service Life of Wheel Set Bearing	km	
1.2.9.	Service Life of Traction Motor Bearing	km	
1.2.10.	Service Life of Gear Box Bearing	km	
1.2.11.	Service Life of Pantograph Contact Strip	km	
1.2.12.	Service Life Main Circuit Breaker	n	
1.2.13	Overhaul Event Downtime	Calendar day	

Environmental Values Short Unit		**Unit**	**Value $S_{i,Short}$**
1.3.1.1.	Pass-By Noise	dB(A)	
1.3.1.2.	Starting Noise	dB(A)	
1.3.1.3.	Stationary Noise	dB(A)	
1.3.1.4	Internal Noise Driver's Cab	dB(A)	
1.3.1.5	Internal Noise Passenger Compartment – Seating area	dB(A)	
1.3.2.	Energy Consumption	kWh	
1.3.3.	Net Energy Consumption	kWh	
1.3.4.	Recyclability	kg	

Attachment I3-2

Evaluation form Long Unit

Bidder: _____

Date: _____

Technical Values Long Unit		**Unit**	**Value $S_{i,Long}$**
1.1.1.	Seating Capacity	n	
1.1.2.	Standees	n	
1.1.3.	Travel Time	s	
1.1.4.	Max. Starting Acceleration	m/s²	
1.1.5.	Residual Acceleration	m/s²	
1.1.6.	Acceleration 0-100	s	
1.1.7.	Thermal Capabilities of Traction System	°C	
1.1.8.	Efficiency Traction System	%	
1.1.9.	Efficiency Auxiliary Power Supply	%	
1.1.10.	Braking Percentage	%	
1.1.11.	Emergency Braking Distance from 160 km/h	m	
1.1.12.	Full Service Braking Distance from 160 km/h	m	
1.1.13.	Continuous Brake Power Friction Brake	kW	
1.1.14.	Maximum permitted Cant Deficiency	mm	
1.1.15.	Maximum Axle Load	t	
1.1.16.	Empty Weight in Operation Order	t	
1.1.17.	Ride Comfort	-	
1.1.18.	Starting-up Time – Shut-down Time	s	
1.1.19.	Coupling Time	s	

RAMS Values Long Unit		**Unit**	**Value $S_{i,Long}$**
1.2.1.	Significant Failures of the Unit	n	
1.2.2.	Critical Failures of the Unit	n	
1.2.3.	Uncritical Failures of the Unit	n	
1.2.4.	Subsystem Reliability (MDBF)	-	-
1.2.4.1	Running Gear	km	
1.2.4.2	Traction System	km	
1.2.4.3	Train Control and Monitoring System	km	
1.2.4.4	HVAC	km	
1.2.4.5	Brake-System	km	
1.2.4.6	Train Supply System	km	
1.2.4.7	Toilet System	km	
1.2.4.8	Automatic Coupling System	km	

RAMS Values Long Unit		**Unit**	**Value $S_{i,Long}$**
1.2.4.9	External Door System	km	
1.2.5.	Availability	%	
1.2.6.	Basic Inspection Interval	km	
1.2.7.	Service Life of Wheel Set	km	
1.2.8.	Service Life of Wheel Set Bearing	km	
1.2.9.	Service Life of Traction Motor Bearing	km	
1.2.10.	Service Life of Gear Box Bearing	km	
1.2.11.	Service Life of Pantograph Contact Strip	km	
1.2.12.	Service Life Main Circuit Breaker	n	
1.2.13	Overhaul Event Downtime	Calendar day	

Environmental Values Long Unit		**Unit**	**Value $S_{i,Long}$**
1.3.1.1.	Pass-By Noise	dB(A)	
1.3.1.2.	Starting Noise	dB(A)	
1.3.1.3.	Stationary Noise	dB(A)	
1.3.1.4	Internal Noise Driver's Cab	dB(A)	
1.3.1.5	Internal Noise Passenger Compartment – Seating area	dB(A)	
1.3.2.	Energy Consumption	kWh	
1.3.3.	Net Energy Consumption	kWh	
1.3.4.	Recyclability	kg	

Attachment I4

Customers Satisfaction Form –Delivery

Bidder: _____ Date _____

No.	Customer	Contract Date	Address	Pieces	Contact Person / Telephone	Type of delivered Rolling stock
1						
2						
3						
4						
5						
6						
7						
8						
9						

Attachment I5

Most Recent Customers Satisfaction Form – Maintenance Service

Bidder: _____ Date: _____

No.	Customer	Contract Date	Address	Fleet Size	Contact Person / Telephone	Type of Maintenance Services
1						
2						
3						
4						
5						
6						
7						
8						
9						

Attachment I6

Existing Homologation

Bidder: _____ Date:_____

No	Type / Name of Units/ Trainset	Delivery Date of the Units/Trainset	Delivery Quantity of Units/ Trainset	Name of Customer / Operator	Homologation		
					Country of Homologation	Date of Homologation	Type of Homologation and Granted by Authority
1							
2							
3							
4							
5							

Attachment I7

Bidder's Manufacturing Capabilities Assessment

Bidder shall prepare a detailed documentation in accordance with the items specified in Table 1 below and attach all relevant data and information relating thereto (calculations, drawings, tables, spreadsheets etc.) as annexes to this document.
All the above documentation shall be submitted as Attachment I7 as part of the Technical Proposal.
It is hereby clarified that the information provided by Bidder as part of Attachment I7 shall bind Bidder and will be carefully reviewed by ISR, *however* it should not be considered for the purpose of scoring as per Section 13.1.2 of the Instructions to Bidders.

Table 1

1.	**Production Information**
1.1	Mobilization Plan complying with ISR's Delivery Schedule requirements
1.2	Average workload over the past 3 years
1.3	Major projects to be realized during 2017-2022 and integration of ISR's delivery requirements in such plans
1.4	Workflow and time table for the prototype Units of 4/6 vehicles and serial manufacturing process
1.5	Workflow calculation to realize the output of at least two Units in serial production per month
2.	**Human Resource Information**
2.1	Quantity and qualification of staff employed (both engineering and management) required to comply with ISR's delivery schedule
3.	**Manufacturing Facility Information**
3.1	Location dedicated to manufacture the Units and their major sub-components
3.2	The facility layout to manage the Unit's manufacturing process
3.3	The main equipment and tools available to perform the work
3.4	Estimation of the manufacturing capacity taking into account the workload of the facility dedicated to ISR's project
4.	**Cooperation**

4.1	Information concerning the major components to be ordered and their suppliers (sub-contractors)
4.2	Information concerning LLI (Long Lead Items) and their integration in the design, production and testing schedule

Attachment I9

Maintenance Services Proposal

Bidder shall prepare its Maintenance Services proposal in accordance with all of the items specified in Section 16 to the Technical Specifications, in order to demonstrate compliance with all the requirements of the Agreement (including for the removal of doubt the Maintenance Chapter) with respect to Maintenance (as defined in the Agreement).

Bidder shall attach all relevant data and information relating thereto (calculations, drawings, tables, spreadsheets etc.) as annexes to this document.

All the above documentation shall be submitted as Attachment I9 as part of the Technical Proposal.

The information provided by Bidder as part of Attachment I9 will be used for scoring purposes as per Section 13.1.2 of the Instructions to Bidders.