TRANSMISSION PERFORMANCE STANDARDS CODE

ELECTRICITY REGULATORY COMMISSION

OF JORDAN

TABLE OF CONTENTS:

Date		Council Directive
26/2/2007	Initial approval	68/2007
	Amendment 1:	
	Amendment 2:	
	Amendment 3:	
	Amendment 4:	

PART 1: GLOSSARY AND DEFINITIONS

Any word or expression defined in the General Electricity Law or the Grid Code or the Distribution Code or the Metering Code, and that is not defined otherwise in this Performance Standards shall have, unless the contrary intention appears, the same meaning and interpretation when used in this Performance Standards, including its Annexes.

When applying the provisions contained in this Performance Standards, and unless otherwise specified or the subject matter or context otherwise requires or is inconsistent therewith, the following words and expressions shall have the following meaning:

- **Actual Commissioning Date** means the actual date (expressed in month and year) a Transmission Facility entered into service for the first time.

- **Annex** means an annex of this Performance Standards.

- **Border Point:** mean the physical point on which transmission line and / or cable that interconnect Jordan with other country cross Jordanian border.

- **Bulk Supply Licensee** means the holder of the licence that authorises bulk supply, pursuant to Article 28 and 35 of the General Electricity Law

- **Bulk Supply Point (BSP)** means:

  - For a Distributor: The Connection Point between the Transmission Licensee and the Distributor, as reflected in the corresponding Connection Agreement.

  - For a Principal Consumer: The Connection Point between the Transmission Licensee and the Principal Consumer, as reflected in the corresponding Connection Agreement.

- **Bulk Supply Tariff Methodology** means the principles for bulk supply tariff calculation and review, determined by the ERC and applicable to the Transmission Licensee and modified from time to time by the ERC, in accordance to article 9 B and 47 of the General Electricity Law;

- **Business Day** means any day other than Friday, Saturday or a public holiday in Jordan, when commercial banks are open for business in Jordan.

- **Condition** means a condition in this Performance Standards.

- **Connection Point** means the site at which the **User** connects its User's Equipment to the Transmission Licensee, as reflected in the corresponding Connection Agreement.

- **Control Area** means a definite portion within the Transmission System where the Transmission Licensee shall keep control in order to determine the Outages or Interruptions and to calculate the prescribed Indicators accordingly.

- **Control Phase** has the meaning defined in the Transmission Performance Standards Code

- **Defence Plan** means the plan prepared by the Transmission Licensee and the System Operation Licensee which determines a set of minimum procedures to protect the Transmission System against widespread disconnections, abnormal overload of Transmission Equipment or voltage collapse.

- **Distributor** means a holder of a distribution and retail supply licence or concession.

- **Energy** means, unless otherwise specified, active energy.

- **Emergency Condition in a Transmission System** means a condition when a contingency or unexpected circumstances produces an Interruption (Partial or Total) to more than one Bulk Supply Point.

- **ERC** means the Electricity Regulatory Commission constituted under the General Electricity Law.

- **External Interruption** means a scheduled or Forced Interruption, due to generation shortage or having its origin in facilities owned and operated by third parties or in the part of the Interconnection Lines that run outside Jordan.

- **External Outage** means a scheduled or Forced Outage having its origin in facilities owned and operated by third parties or in the part of the Interconnection Lines that run outside Jordan.

- **Expected Commissioning Date** means the earliest date (expressed in month and year) a Transmission Facility is reasonably expected to enter into service for the first time.

- **Force Majeure** means any circumstance not within the reasonable control of the affected party, but only if and to the extent that (i) such circumstance, despite the exercise of reasonable diligence and observing prudent industry practice, cannot be, or be caused to be, prevented, avoided or removed by such party, and (ii) such circumstance materially and adversely affects the ability of the affected party to comply with its performance obligations under this Performance Standards, and such party has taken all reasonable precautions, due care and reasonable alternative measures in order to avoid the effect of such event on the affected party's ability to perform its obligations under its performance obligations under this Performance Standards and to mitigate the consequences thereof.

- **Force Majeure Interruption** means an Interruption caused by Force Majeure .

- **Force Majeure Outage** means an Outage caused by Force Majeure.

- **Forced Interruption** means an Interruption that does not qualify as temporary, external or scheduled, regardless of the cause and duration.

- **Forced Outage** an Outage that does not qualify as temporary, external, scheduled, or instructed regardless of the cause and duration

- **General Electricity Law** means the General Electricity Law No. 64 of the Year 2002 or any amendments thereto or any other law that replaces the said law.

- **Harmonics** means sinusoidal voltages and currents having frequencies that are integral multiples of the fundamental frequency.

- **High Voltage (HV):** means a voltage level exceeding 33 kV.

- **Individual Performance Indicator** means a Performance Indicator to measure the performance of the service provided by a Transmission Licensee to an individual Bulk Supply Point, or to measure the performance of a specific piece of equipment.

- **Instructed Interruptions** means an unplanned disconnection of a Bulk Supply Point (either Partial or Total) due to an instruction issued by the System Operator, or directly performed by itself using the SCADA system, in order to maintain system integrity, stability or for voltage control reasons.

- **Instructed Outage** means an unplanned disconnection of a Transmission Circuit due to an instruction issued by the System Operator, or directly performed by it using the SCADA system, in order to maintain system integrity, stability or for voltage control reasons.

- **Interconnection Lines** means the overhead or underground transmission lines that interconnect Jordan Transmission System with neighbouring countries.

- **Interruption** means the interruption of electricity supply to a Distributor, Principal Consumer or to a group of Distributors or Principal Consumers.

- **Interruption Duration** means the period from the initiation of an Interruption up to the time when supply is restored.

- **Load** means electrical equipment that consumes Energy.

- **Low Voltage (LV)** means a voltage level not exceeding 1000 volts.

- **Medium Voltage (MV)** means a voltage level greater than one (1) kV up to 33 kV.

- **Normal Condition** means the condition in the Transmission or Distribution System, as applicable, when the system frequency, voltage, and transmission and/or distribution lines and equipment loading are within their normal operation limits.

- **Outage** means the removal of service of any equipment or facility or any full or partial unavailability that prevents it to adequately perform the function for which it was designed.

- **Overall Performance Indicator** means a Performance Indicator to measure the performance of a Transmission Licensee.

- **Performance Indicator** means a parameter (measured or calculated) that is related to lines or transformers availability, service continuity, voltage wave or the compliance with the approved Transmission Master Plan.

- **Performance Standard** means the Transmission Performance Standards Code.

- **Power Quality** means the quality of the voltage, including its frequency and the resulting current that exists at the connection point during normal conditions.

- **Principal Consumer** means a consumer which is directly connected to the Transmission System and supplied by electric power from the Bulk Supply Licensee.

- **RMS** means the root-mean-square.

- **SCADA** means Supervisory Control and Data Acquisition

- **Scheduled Interruptions** means an Interruption to a Distributor or Principal Consumer decided by the Transmission Licensee. An Interruption will be considered scheduled if it has been advertised to the affected Distributor or Principal Consumer at least 7 days in advance.

- **Section** means a section of this Performance Standards.

- **Scheduled Maintenance Outage** means the disconnection of a Transmission Circuit programmed by the Transmission Licensee to perform maintenance or repair activities.

- **Scheduled Reinforcement Outage** means the disconnection of a Transmission Circuit programmed by the Transmission Licensee due to construction for system extensions, reinforcements, or new connections.

- **Substation** means a facility at which one or more lines or transformers are switched for operational purposes. It may include equipment of different nominal voltages levels.

- **System Loss** means in a Transmission System, the difference between the Energy purchased and the Energy sold by the Bulk supplier.

- **System Operator** means the holder of the licence that authorises system operation pursuant to Articles 28 and 34 of the General Electricity Law.

- **Targeted Commissioning Date** means the date (expressed in month and year) a Transmission Facility should enter into service according with the Transmission Master Plan approved by the ERC.

- **Tariff Review Period** means the period of time for which the ERC will set tariffs for the Transmission Licensee, as established in the Bulk Supply Tariff Methodology.

- **Temporary Interruption** means an Interruption that lasts less than 1 minute.

- **Transmission Circuit** means a Transmission Line or Transmission Transformer

- **Transmission Equipment** means all the equipment connected to the Transmission Network owned by the Transmission Licensee other than Circuits and Substations and other equipment required to control, monitoring or operate the Transmission network.

- **Transmission Facility** means, for the purpose of this Performance Standards, any Transmission Circuit, Substations and/or Transmission Equipment, or any upgrade,

extension or modification of an existing Transmission Circuit, Substation or Transmission Equipment.

- **Transmission Line** means a HV overhead transmission line, underground cable or combination of both, owned and operated by the Transmission Licensee, including its associated connection protection and control equipments. For calculating performance indicators a Transmission Line will include also HV breakers and isolators connected to the line.

- **Transmission Licensee** means the holder of the transmission licence pursuant to Articles 28 and 33 of the General Electricity Law, and that during the single buyer model is also the system operation licensee and the bulk supply licensee**.**

- **Transmission Transformer** means a HV/HV transformer, or a HV/MV transformer, owned and operated by the Transmission Licensee, including its associated connection protection and control equipment. For calculating performance indicators a Transmission Transformer will include also HV and MV breakers and isolators.

- **User** means a person or entity that uses the Transmission System and related transmission facilities, including generator, Distributors and Principal Consumers.

PART 2: TRANSMISSION PERFORMANCE STANDARDS

SECTION 01 : GENERAL CONDITIONS

(A) INTRODUCTION AND PURPOSE

(01) This Transmission Performance Standards Code establishes the rules, procedures, requirements and indicators for the technical performance of the Transmission System and for the performance of NEPCO as responsible to execute the approved Transmission Master Plan.

(B) APPLICABILITY

(01) This Transmission Performance Standards Code must be applied and used together with the Grid Code or any other codes issued or approved by ERC that applies to the Transmission Licensee.

(02) This Transmission Performance Standards Code applies to:

1) The Transmission Licensee (NEPCO),

(2) System Operator

3) Distributors

4) Generator connected to the Transmission System, and

5) Principal Consumers

(C) OBJECTIVES

(01) The objectives of this Transmission Performance Standards Code are:

1) To ensure high availability of the Transmission System;

2) To ensure that Interruptions at the Bulk Supply Points are minimized

3) To ensure that the Transmission System will be maintained and operated in a safe and efficient manner and with a high degree of reliability

4) To ensure that the Transmission Master Plan is adequately and timely implemented, and to detect any possible considerable delay in advance; and

5) To ensure adequate installation and setting of protection devices under the control of the Transmission Licensee, the Distributors, Generators connected to the Transmission System and Principal Consumers.

(D) CONFIDENTIALITY

Unless otherwise specifically stated in this Performance Standards, the ERC shall be at liberty to publish the Performance Indicators, and performance results of the Transmission Licensee to whom this Performance Standards applies.

SECTION 02 : QUALITY OF SUPPLY

TRANSMISSION SYSTEM AVAILABILITY INDICATORS

(A) TYPES OF OUTAGES

(01) Availability of the Transmission System will be expressed as a function of the Transmission Circuit Outages, and will be evaluated using indicators that measure the number of Outages and their durations.

(02) Transmission Circuit Outages will be classified according to origin as:

1) Scheduled Maintenance Outage
2) Scheduled Reinforcement Outage
3) Forced Outage
4) External Outage (both scheduled and Forced)
5) Instructed Outage

(B) OUTAGES REGISTER

(01) The Transmission Licensee is obliged to have a detailed chronological register of all Outages occurred in any Transmission Circuit, with clear identification of starting and ending date and time. The information in this register shall be maintained by the Transmission Licensee for at least five (5) calendar years

(02) The Outage starting time in the register shall be:

1) For a Scheduled or Instructed Outage (Maintenance or Reinforcement), the initiation of the manoeuvring,
2) For an Forced or External Outage, the starting time in the register shall be earliest of :
    a) The time the SCADA system of the System Operator detects and reports as the disconnection of the Transmission Circuit, or
    b) The time the Transmission Licensee or the System Operator has knowledge of the situation by any other means.

(03) In the register the ending date and time of an Outage shall be the time when the Transmission Circuit is reconnected to the Transmission System.

(04) The Transmission Licensee, in coordination with the System Operator shall implement a system and procedures to ensure time synchronization in assigning times to the Outages.

(C) SPECIAL CASES

(01) The following Outages will not be considered for the calculation of availability indicators:

1) Temporary Interruption
2) Force Majeure Outages
3) Outages of Dedicated Lines or Transformers opened due to an authorised disconnection of a Principal Consumer due to non payment

(D) AVAILABILITY PERFORMANCE INDICATORS

(01) Transmission System availability of the Transmission Licensee will be assessed thorough two types of Performance Indicators:

1) Individual Performance Indicators
2) Overall Performance Indicators

(02) The Individual Performance Indicators to measure Transmission System availability of each individual Transmission Circuit will be:

1) Total number of Scheduled Maintenance Outages per Transmission Line per calendar year ($N_{L,S}$)
2) Total number of Scheduled Maintenance Outages per Transmission Transformer per calendar year ($N_{T,S}$)
3) Total number of Forced Outages per Transmission Line per calendar year ($N_{L,F}$)
4) Total number of Forced Outages per Transmission Transformer per calendar year ($N_{T,F}$)
5) Total number of External Outages per Transmission Line per calendar year ($N_{L,E}$)
6) Total number of External Outages per Transmission Transformer per calendar year ($N_{T,E}$)

(03) The Availability Overall Performance Indicators to measure average Transmission System availability of the Licensee will be the following:

1) **Overall System Unavailability (Transmission Lines) (SU_L):** The average fraction of time during a pre-specified period (expressed in percent) Transmission Lines are unavailable and disconnected to the Transmission System.
2) **System Transmission Transformer Unavailability (SU_T):** The average fraction of time during a pre-specified period (expressed in percent) Transmission Transformers are unavailable and disconnected to the Transmission System.
3) **Interconnection Unavailability (SU_I):** The average fraction of time during a pre-specified period (expressed in percent) the circuits that interconnect Jordan with neighbouring countries are unavailable and disconnected to the Transmission System.
4) **System Average Frequency of Outages (Transmission Lines) indicator (SAOFI_L):** The average number of Outages, during a pre-specified period, of a Transmission Lines.

5) **System Average Frequency of Outages per km (Transmission Lines) indicator (SAOFI_100):** The average number of Outages per km of Transmission Lines (Expressed in number of outages per 100 km of lines)

6) **System Average Frequency of Outages (Transmission Transformers) indicator (SAOFI_T):** The average number of Outages, during a pres-specified period, of Transmission Transformers.

7) **System Average Frequency of Outages (Interconnectors) indicator (SAOF_I):** The average number of Outages, during a pre-specified period, of the circuits that interconnect Jordan with neighbouring countries.

8) **System Average frequency of Temporary Outages indicator (SAOFI_TI)**: the total number of times a Transmission Lines have experienced a Temporary Interruption during a pre-specified period.

(04) All these Performance Indicators, except SAOFI_TI will be calculated and differentiated for Scheduled Maintenance Outages, Scheduled Reinforcement Outages, Forced Outages, External Outages (both scheduled and Forced) and Instructed Outages.

(05) The calculation of the Overall Performance Indicators will be done by the Transmission Licensee on a monthly and yearly basis. When calculated on a yearly basis, the pre-specified period mentioned above shall be considered as a calendar year. When calculated on a monthly basis the pre-specified period shall be considered from the beginning of the calendar year up to the end of the month the Overall Performance Indicator is calculated.

(06) The detailed description and mathematical formulation of overall Performance Indicators are established in Annex 1.

(E) TOLERANCE OF AVAILABILITY PERFORMANCE INDICATORS

(01) The ERC will assign the numerical values for the tolerances of the Availability Performance Indicators for the Transmission Licensee taking into consideration past performance and a benchmarking with international transmission companies.

(02) The tolerances for the Performance Indicators shall be approved by the ERC in each Tariff Review Period and may be different for each calendar year during such period. The tolerances to be used for the first Tariff Review Period are established in Annex 3.

(03) The indicators related to External Outages or with the Interconnection Lines Outages shall not have tolerances associated to them, but shall be calculated and reported for statistical purposes.

BULK SUPPLY POINTS AVAILABILITY INDICATORS

(F) TYPES OF INTERRUPTIONS

(01) Availability of Bulk supply points will be expressed as a function of the Interruptions (disconnections) to Distributors and/or Principal Consumers at the Bulk Supply Points, caused by actions or events occurring in the Transmission System, and will be evaluated using indicators that measure the number of Interruptions and their durations.

(02) Interruptions can be either total or partial. A disconnection shall be considered a Total Interruption when the entire load connected at the Bulk Supply Point is disconnected or Partial Interruption when only some part of the load is disconnected.

(03) Interruptions will be classified according to type and origin as:

1) Scheduled Interruptions,

2) Forced Interruptions,

3) External Interruptions (both scheduled and Forced), and

4) Instructed Interruptions

(G) BULK SUPPLY POINTS INTERRUPTION REGISTER

(01) The Transmission Licensee is obliged to have a detailed chronological register of all Interruptions caused at any Bulk Supply Point, with clear identification of starting and ending date and time. The information in this register shall be maintained by the Transmission Licensee for at least five (5) calendar years

(02) The Interruption starting time in the register shall be:

1) For a Scheduled or Instructed Interruption, the initiation of the manoeuvring,

2) For a Forced or External Interruption, starting time in the register shall be the earliest of:

a) The time the SCADA system of the System Operator detects and reports as the disconnection of the Transmission Circuit, or

b) The time the Transmission Licensee or the System Operator has knowledge of the situation by any other means, in case the particular Bulk Supply Point is not under the SCADA control.

(03) In the register the ending date and time of an Interruption shall be the time when all the load at the Bulk Supply Point is restored and reconnected to Transmission System, unless for reasons outside the control of the Transmission Licensee not all the load can be reconnected although the Transmission System is prepared for that reconnection. In the later case, the register ending date and time shall be the time the MV busbars of the Bulk Supply Points is energised and ready to connect all the load that existed before the interruption took place.

(04) The Transmission Licensee, in coordination with the System Operator shall implement a system and procedures to ensure time uniformity in assigning times to the Interruptions.

(H) SPECIAL CASES

(01) The following Interruptions will not be considered for the calculation of availability indicators:

1) Force Majeure Interruptions

2) Interruptions due to authorised disconnection of a Principal Consumer due to non payment

(02) For the calculation of the availability indicators, the following considerations will be taken into account;

1) Automatic disconnection of Load at a Bulk Supply Point due to the action of any protection system linked to the outage of any transmission circuit (inter-tripping, transfer-trip or similar) shall be considered Forced Interruption if the source of the event that caused the protection action occurred within the Transmission System. The same criteria will apply if the disconnection of Load is finally produced due to the action of under-frequency relays;

2) Automatic disconnection of Load at a Bulk Supply Point due to the action of under-frequency relays and/or any other protection installed in the Transmission System forming part of the Defence Plan shall be considered External Interruption if the source of the event that caused the disconnection has not occurred within the Transmission System, and all the involved protections installed in the Transmission System acted properly; and

3) When, due to protection malfunctioning, a fault in a facility owned by a Distributor or Principal Consumer is not correctly cleared by an equipment under the responsibility of the Distributor or Principal Consumer, and the protections installed in the Transmission System act as back-up protections, all the disconnected Load will be classified as External Interruptions, provided the back-up protection system operated properly. In other cases they will be classified as Forced Interruptions.

4) Except for the calculation of SAIFI_TI, temporary interruptions shall not be included in the calculations.

(I) BULK SUPPLY POINTS AVAILABILITY PERFORMANCE INDICATORS

(01) Bulk supply points availability of the Transmission Licensee will be assessed thorough two types of Performance Indicators:

1) Individual Performance Indicators

2) Overall Performance Indicators

(02) The Individual Performance Indicators to measure bulk supply availability at each individual Bulk Supply Point will be:

1) Total number of Scheduled Interruptions (Total or Partial) per calendar year (N_s)
2) Total number of Forced Interruptions (Total or Partial) per calendar year (N_f)
3) Total number of External Interruptions (Total or Partial) per calendar year (N_e)
4) Total duration of Scheduled Interruptions (Total or Partial) per calendar year (D_s)
5) Total duration of Forced Interruptions (Total or Partial) per calendar year (D_f)
6) Total duration of External Interruptions (Total or Partial) per calendar year (D_e)

(03) The Overall Performance Indicators measure the average availability of the Transmission Licensee at the Bulk Supply Points will be the following:

1) **Average frequency of Interruptions per MW of Demand (AFIK):** the number of times that the average MW of demand had an Interruption during a pre-specified period.
2) **Total time of Interruption per MW of Demand (TTIK):** the total time during a pre-specified period which an average MW of demand has been interrupted.
3) **System average Interruption duration indicator (SAIDI):** the total time an average Bulk Supply Points have been interrupted during a pre-specified period.
4) **System average Interruption frequency indicator (SAIFI_SI):** the number of times an average Bulk Supply Points have been out of service during a pre-specified period.
5) **Energy not supplied (ENS)**: an estimation of the Energy not supplied to the connected Load due to the Interruptions during a pre-specified period.
6) **System average Temporary Interruptions frequency indicator (SAIFI_TI)**: the total number of times an average Bulk Supply Point has experienced a Temporary Interruption during a pre-specified period.

(04) Except for SAIFI_TI, all these Performance Indicators will be calculated and differentiated for Scheduled Interruptions, Forced Interruptions and External Interruptions.

(05) The calculation of the Overall Performance Indicators will be done by the Transmission Licensee on a monthly and yearly basis. When calculated on a yearly basis, the pre-specified period mentioned above shall be considered as a calendar year. When calculated on a monthly basis the pre-specified period shall be considered from the beginning of the calendar year up to the end of the month the Overall Performance Indicator is calculated.

(06) The detailed description and mathematical formulation of overall Performance Indicators are established in Annex 2.

(07) In order to calculate the above mentioned indicators, the Control Area will cover the whole Transmission System extending from the interconnection with the Generators to:

1) For the Distribution Licensees: The medium voltage breaker of the HV/MV transformers of the Bulk Supply Points

2) For Principal Consumers: The Connection Point between the Transmission Licensee and the Principal Consumer, as stated in the relevant Connection Agreement

(J) TOLERANCE OF BULK SUPPLY POINTS PERFORMANCE INDICATORS

(01) The ERC will assign the numerical values for the tolerances of the Bulk Supply Points Performance Indicators for the Transmission Licensee taking into consideration past performance and a benchmarking with international transmission companies.

(02) The tolerances for the Performance Indicators shall be approved by the ERC in each Tariff Review Period and may be different for each calendar year during such period. The tolerances to be used for the first Tariff Review Period are established in Annex 3.

(03) The indicators related to External Interruptions or with the Interconnection Lines shall not have tolerances associated to them, but shall be calculated and reported for statistical purposes.

SECTION 03 : MONITORING AND CONTROL

(A) CONTROL PHASES

(01) The implementation of this Transmission Performance Standards shall be done in two consecutive Control Phases.

(02) The first Control Phase shall be called Control Phase 1 or adaptation Control Phase, and will have duration of twelve (12) months, after the ERC approval of this Transmission Performance Standards or the granting of a transmission licence that includes Performance Indicators in accordance with this Transmission Performance Standards. During Control Phase 1 the Transmission Licensee will have the following obligations:

1) Provide the ERC monthly the numerical values resulting from the calculation of all Performance Indicators as defined in (Section 2 D3) of Condition “Transmission System Availability Indicators”, and (Section 2 I3) of Condition “Bulk Supply points Availability Indicators” in this Transmission Performance Standards Code.

2) Coordinate procedures and information exchange with the System Operator.

3) Develop, organise and maintain data bases and information systems to properly register and calculate all Performance Indicators as defined in (Section 2 D2 and D3) of Condition “Transmission System Availability

Indicators", and (Section 2 I2 and I3) of Condition "Bulk Supply points Availability Indicators" in this Transmission Performance Standards Code.

(03) The Final Control Phase will begin at the end of Control Phase 1.

(04) During the Final Control Phase, the Transmission Licensee will have the following obligations:

1) Calculate and send to the ERC the Overall Performance Indicators and Individual Performance Indicators for Bulk Supply Points and Transmission System as defined and established in this Transmission Performance Standards Code.

2) Plan and maintain the Transmission System in order to comply with the Overall Performance Indicators and the Individual Performance Indicators within the tolerances approved by the ERC.

(05) Upon a specific request by the Transmission Licensee, the ERC will have the right to extend the duration of Control Phase 1. The Transmission Licensee shall raise the request for that extension at least 3 months in advance to the starting of Final Control Phase with adequate supporting documentation that proves its impossibility to comply with the obligations stated in this Performance Standards and its endeavour to adapt itself to the requirements imposed.

(B) INFORMATION SYSTEM, MONITORING AND CONTROL

(01) Before the end of Control Phase 1, the Transmission Licensee shall prepare and submit a report to the ERC for approval, containing adequate documentation regarding coordination procedures with the System Operator, data bases and information systems to be implemented in order to control Transmission Circuits Outages and Bulk Supply Points Interruption, and calculate Performance Indicators in accordance with this Transmission Performance Standards Code.

(02) The ERC will have the right and the Transmission Licensee shall allow the ERC or its authorised representatives to inspect and revise the data bases and information system defined in (Section 3 B2) of this Transmission Performance Standards Code, in order for the ERC to audit the process, data and the accuracy of the information submitted periodically by the Transmission Licensee to the ERC.

(03) As most of the primary source of data required to calculate the Overall and Individual Performance Indicators lies within the SCADA system under the control of the System Operator, the Transmission Licensee can coordinate and agree with it for the System Operator to retrieve and archive this data, and to calculate some of the Performance Indicators. In any case, the primary responsibility will remain under the Transmission Licensee, and no kind of agreement will relief itself from obtaining and supplying ERC with accurate and reliable information.

(04) With the purpose of carrying out suitable control and monitoring of the obligations regarding Transmission Circuits Outages and Bulk Supply Points Interruptions and associated Performance Indicators, the Transmission Licensee shall submit to the ERC, in a suitable organized manner or in such format as the ERC may establish the following monthly information:

1) List of the Outages of any Transmission Circuit, and its duration
2) List of Bulk Supply Points that experienced Interruption, identifying for each Interruption:
   a) Affected Load
   b) Total time to reconnect total Load
3) Overall Performance Indicators as calculated until that month of the calendar year, as established in this Transmission Performance Standards Code.
4) List of Force Majeure Outages and/or Interruptions, including the reports and/or documents that support that the Outage or Interruption qualifies as Force Majeure.

(05) The ERC will issue directives regarding the format in which the above mentioned information will be supplied.

(06) In case of an Emergency Condition in the Transmission System, the Transmission Licensee shall,

1) Not later than eight (8) hours after the beginning of the emergency, submit to the ERC by fax or electronic mail, information with preliminary analysis of the incident;
2) Following the information submitted in accordance to (a) and up to the moment all the Load is reconnected, at least every eight (8) hours submit to the ERC (by fax or electronic mail) an update regarding the estimated amount of Load and Consumers affected by the emergency and not restored;
3) Once the emergency has ended and not later than five (5) Business Days after the end of the emergency, submit to the ERC a detailed report of the event, its consequences and any remedial action to avoid or mitigate a similar incident in the future. In the cases that, in order to determine the exact nature of the incident, more detailed studies or analysis will be required, this situation shall be explicitly pointed out in the above mentioned report. In these cases, the ERC can authorise an additional period to complete it, and to submit an amended report.

(07) The ERC shall have the right to request additional information as necessary to perform its monitoring and control role, and the Transmission Licensee shall allow the access to the primary documentation and/or send the necessary data regarding Transmission Circuits Outages and Bulk Supply Interruptions as requested by the ERC. The deadline to submit this additional information shall be not less than seven (7) Business Days from the date of receipt of the request by the Transmission Licensee.

(C) NON COMPLIANCE WITH ESTABLISHED TOLERANCES

(01) During Control Phase 1, the ERC will not establish tolerances for the Performance Indicators. The Transmission Licensee shall calculate the Overall Performance Indicators and submit to the ERC the information established in this Transmission Performance Standards Code in order for the ERC to evaluate the performance of the Transmission Licensee.

(02) Before the starting of Final Control Phase, the ERC will establish tolerance values for the Overall Performance Indicators of the Transmission Licensee. Not later than one year after the starting of Final Control Phase, the ERC will establish tolerance values for the Individual Performance Indicators.

(03) During Final Control Phase, if the Transmission Licensee fails to perform in one or more of the Overall or Individual indicators, Transmission Circuits Outage or Bulk Supply Points Interruption, Performance Indicators established in this Performance Standard Code, the Transmission Licensee, not later than ninety (90) calendar days after the end of the year shall submit to the ERC for approval a detailed report with an action plan to solve or mitigate the deficiency. The report shall include, among others, the following:

1) Analysis of the causes of the deficiencies
2) Description of the current situation and the detected deficiency
3) Description of electrical equipment which contribute in a large extent to the non-compliance
4) Remedial actions to correct the situation, including (immediate and medium term actions) and expected improvements
5) In the cases the above mentioned remedial actions require investments in the Transmission System, a clear indication if they are or not included in the approved Transmission Master Plan. In case they are not included, the reason for the non inclusion, and an indication if they will be asked to be included in the near future.
6) Detailed work-plan with the proposed actions and required investments,

(04) When the Transmission Licensee submits a report in accordance to the previous paragraph, the ERC will review the proposed plan and may request clarifications or modifications prior to approval. If it is required, the ERC can instruct the Transmission Licensee to submit a new amended version of the Transmission Master Plan. Once approved, the plan will be binding to the Transmission Licensee and the ERC shall have the right to monitor and audit its effective execution. During the plan, for the implementation of the remedial actions, the ERC will have the right to exempt the Transmission Licensee from compliance with the affected Overall or Individual Performance Indicators, and/or to modify the tolerances in accordance with the approved plan.

SECTION 04 : POWER QUALITY

POWER QUALITY INDICATORS

(A) DEFINITION

(01) A Power Quality at a Bulk Supply Point problem exists when at least one of the following conditions is present:

1) The System Frequency has deviated from the nominal value of 50 Hz;
2) Voltage magnitudes are outside their allowed range of variation;
3) There are imbalances in the magnitude of the phase voltages;
4) The phase displacement between the voltages is not equal to 120 degrees;
5) Voltage fluctuations cause by:
   a) Flicker that is outside the allowed flicker severity limits; or
   b) Harmonics that are outside the allowed values; or
   c) High frequency over voltages.

(B) FREQUENCY STANDARDS

(01) The nominal fundamental frequency shall be 50 Hz.

(02) The Transmission Licensee shall design its Transmission System in order to assist the System Operator in maintaining the fundamental frequency within the limits according to the Grid Code

(C) VOLTAGE STANDARDS

(01) Voltage control at the Bulk Supply Points that are included in the System Operator SCADA system shall be exercised by the System Operator, and therefore no targets on deviations of voltage shall be imposed to the Transmission Licensee for these Bulk Supply Points. The Transmission Licensee shall design its Transmission System and make its best endeavours to maintain it with a high degree of availability in order to assist the System Operator in controlling the Voltage at these Bulk Supply Points.

(02) A Bulk Supply Point of 33 kV is considered to be under the System Operator Control if the Transmission Licensee has agreed with the System Operator to include the 33 kV busbar voltage measurements into the System Operation SCADA system.

(03) The Transmission Licensee shall coordinate with System Operator the requirements that needed by the System Operator to perform its obligations, seeking for incorporating voltage control equipment within the Transmission Master Plan if judged appropriate and economically feasible.

(04) The Transmission Licensee shall submit every year (in the month of January), a complete list of the Bulk Supply Points, indicating for each of them if it is included in the SCADA system of the System Operator (and therefore under its control, or not).

(05) For those Bulk Supply Points that are not included in the SCADA system of the System Operator;

1) The Transmission Licensee shall carry out a dedicated campaign of voltage measurements at selected Connection Points. Measurements shall be made by the Transmission Licensee also on the following cases:

a) If a Distributor or Principal Consumer presents a complaint on this matter. All these complaints shall be copied to ERC, with an indication of the time when the measurement verifications will be performed.

b) At a request of ERC for control and verification of compliance purposes, even if no Distributor or Principal Consumer complaint exists.

2) The Transmission Licensee Within three (3) months of approval of this Performance Standards shall submit to the ERC for approval, the specification of the equipment to be used to perform these measurements. The points to be measured, and the duration of each measurement shall be instructed by the ERC.

3) The Transmission Licensee shall process the information registered by the voltage measurement equipment installed by a requirement of the ERC, and will submit to the ERC, every time a measurement campaign is conducted a report containing the following information:

i) For each Connection Point:

a) The results of the processing of the above mentioned information, indicating the total amount of time the registered voltage lied outside the voltage band agreed with the Distributor or the Principal Consumer.

b) Percentage of registries are outside the voltage band agreed, grouped in different voltage bands

c) Maximum and minimum voltage registered (excluding the periods corresponding to Interruptions and those when the System Operator explicitly requested a different value of voltage to be maintained)

d) Reasons for major deviations

e) A global assessment of the voltage quality at the Connection Point

4) The ERC will issue directives regarding the format in which the above mentioned information will be supplied.

5) The detailed information of each measurement performed shall be suitable organized and maintained by the Transmission Licensee for at least five

(5) calendar years. The ERC will have the right and the Transmission Licensee shall allow the ERC or its authorised representatives to revise and analyse the stored registers for each measurement in order for the ERC to audit the process, data and the accuracy of the information submitted periodically by the Transmission Licensee to the ERC. The ERC will have the right to hire qualified companies or persons to perform this activity on its behalf.

6) Voltage levels at a Connection Point will be considered out of range if the results of the performed measurements show that the registered values are outside the agreed band during more than 3 % of the reported or measured period.

7) When voltage levels fall out of range, the Transmission Licensee, in consultation with the System Operator, shall take remedial actions to correct the deficiency as soon as possible. If no major investments are required, the situation shall be corrected within the following four (4) months.

8) In the cases the magnitude of remedial actions to be undertaken will require important works or investments (included or not in the Transmission Master Plan) that require a longer timeframe to be corrected, it shall inform this situation to the ERC in its report, indicating at least:

   a) The cause of the deficiency

   b) The actions to be undertaken to remedy the deficiency

   c) A clear indication if they are (or not) included in the approved Transmission Master Plan. In case they are not included, the reason for the non inclusion, and an indication if they will be asked to be included in the near future.

   d) Detailed work-plan with the proposed actions and required investments,

The ERC will analyse the situation and if it is justified, it can grant an authorisation for executing the remedial actions within a longer period.

(D) PERTURBATIONS STANDARDS

(01) The following perturbation Indicators will be controlled:

1) Flicker: defined as the impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time

2) Harmonic distortion: defined as the sinusoidal voltages and currents having frequencies that are integral multiples of the fundamental frequency.

(02) Due to existing reported problems and based on technical and economic studies, the ERC may establish additional perturbation Indicators in order to control other disturbances as necessary.

(03) The Performance Indicators to measure flicker and harmonics distortion will be those stated in the Grid Code.

(04) The allowed ranges for flicker and harmonic indicators are established in the Grid Code, and shall not be exceeded, at the Connection Point, during a time greater than 3 % of a measurement period.

(05) Control of the adequacy of flicker and harmonic distortion will be assessed through measurements at Connection Points. Measurements shall be performed by the Transmission Licensee at these Connection Points, in accordance with the methodologies of IEC 1000-4-7, during at least 48 hours with measurements taken at 10 minute intervals.

(06) The Transmission Licensee shall periodically perform measurements at the Connection Points. It shall be assured to perform at least one measurement at each Connection Point every two years.

(07) Measurements shall be made by the Transmission Licensee also on the following cases:

1) If a Distributor or Principal Consumer presents a complaint on this matter. All these complaints shall be copied to ERC, with an indication of the time when the measurement verifications will be performed.

2) At a request of ERC for control and verification of compliance purposes, even if no Distributor or Principal Consumer complaint exists.

(08) To monitor and measure flicker and harmonic distortion, the Transmission Licensee shall have:

1) At least two portable flicker meters, with their associated equipment

2) At least two portable harmonic meters, with their associated equipment

(09) Every six months, in the months of February and August the Transmission Licensee shall submit to the ERC a report containing at least the following:

1) Data describing the measured points

2) Date and hour at which the measurements started and ended

3) Registered values of flicker or harmonics, as applicable

4) An identification whether the values measured are within or outside the allowed tolerances

5) In case of non compliance with the allowed tolerances:

a) A description of the causes of non compliance

b) When the cause of non compliance is caused by the characteristics of the current drag by the Distributor or Principal Consumer, copies of:

i) Requirements of a Derogation issued by the Distributor or Principal Consumer in accordance with the Grid Code, with clear indication regarding if it was accepted or not by the Transmission Licensee, or

ii) Notifications issued by the Transmission Licensee to the Distributor or Principal Consumer requiring correcting the situation.

c) Either remedial action to be taken in order to correct the situation, indicating time required to implement these actions and a cost estimate of them or a requirement for a Derogation of the related provision of the Grid Code.

(10) Based on the information supplied by the Transmission Licensee, the ERC will evaluate the situation and will issue derogation or will instruct the Transmission Licensee to correct the situation.

(11) In cases the derogation is not granted, the ERC will have the right to exempt the Transmission Licensee from compliance with the affected Performance Indicator during the plan for the implementation of the remedial actions.

SECTION 05 : LOSSES

TRANSMISSION LOSSES

(A) DEFINITIONS

(01) For a specified period, Transmission Energy Losses are defined as the difference between the total energy purchased by the Bulk Supply Licensee from Generators connected to the Transmission System or imported from neighbouring countries, at the point of connection with the Transmission System, and the total energy sold to the Distributors and Principal Consumers at the point of connection with the Transmission System or exported to neighbouring countries, calculated at the Borders Points , during such period, independently on whether the energy (purchased or sold) has been paid or not.

(B) CAP TO TRANSMISSION ENERGY LOSSES

(01) The ERC will determine and approve in each Tariff Review Period, after due notice and consultation with the Transmission Licensee, a cap on the Transmission Losses. The cap approved may be different for each calendar year during such Review Period. The Transmission Licensee shall be allowed to pass through to tariffs and recover from the Distributors and Principal Consumers the caps to the Transmission System Losses approved by the ERC.

(02) The caps to the Transmission System Losses approved by the ERC will be used for tariff determination and as Performance Indicators, and the Transmission Licensee shall procure to maintain Transmission Energy Losses below these caps.

(03) The caps to the Transmission System Losses to be used for the first Tariff Review Period are established in Annex 4.

(C) MONITORING AND REPORTING

(01) With the purpose of carrying out suitable monitoring and control of the performance of the Transmission Licensee regarding Distribution Energy Losses, the Transmission Licensee shall submit to the ERC, in a suitable organized manner or such format as may be established by the ERC, the following information:

1) Information to be provided on a monthly basis:

a) Total Energy incorporated in the Transmission System from the Generators identifying the connection points where the energy enters the Transmission System.

b) Total Energy imported from neighbouring countries, at the Borders Point.

c) Total Energy transferred to each Distributor and Principal Consumer at the Bulk Supply Points.

d) Total Energy exported to neighbouring countries.

2) Every year, within the first three months of each year, an Annual Report on Losses, covering the full previous year performance, including among others the following:

a) Statistical losses data of the previous year and comparison with at least the two (2) years proceeding the previous year.

b) Main actions undertaken by the Transmission Licensee in order to reduce transmission losses, with an identification of the cost of such actions and the achieved or expected results.

c) Any study or analysis carried out by the Transmission Licensee to reduce losses.

d) Plans for the following 24 months associated to loss reduction, together with the corresponding cost – benefit analysis.

SECTION 06 : PROTECTION SYSTEM

TRANMISSION PROTECTION SYSTEM

(A) GENERAL CRITERIA

(01) Within one year following the issuing of the System Operator Performance Standards, the System Operator, in close coordination with the Transmission Licensee shall produce and submit to the ERC for approval, the "General Criteria for Protection of the Electric System of Jordan"[1].

[1] Definitions, content details and way to produce this document will be included in the System Operation Performance Standards

(02) The Transmission Licensee and each User of the Transmission System will be responsible for its protection system to be designed and adjusted accordingly with the provisions of the document stated in (Section 6 A1).

(03) Prior to connect to the Transmission System, the Transmission Licensee shall ensure that the protection devices installed by the Users, and its respective settings fully agrees with the provision of the document stated in (Section 6 A1). This situation shall be reflected in the corresponding Connection Agreement.

(B) MONITORING AND REPORT

(01) The Transmission Licensee shall promptly inform the System Operator the list of its protection system or devices, already in service at the moment of approving the document stated in (Section 6 A1), that do not comply with the provision stated in this document.

(02) The Transmission Licensee shall agree with the System Operator a plan to correct the detected deficiencies. Copy of this plan shall be submitted to the ERC for approval. The ERC will review it and may request clarifications or modifications prior to its approval.

(03) Once approved, the plan will be binding to the Transmission Licensee and the ERC shall have the right to monitor and audit its effective execution.

(04) Every year, in the month of January the Transmission Licensee shall submit to the System Operator and the ERC a Protection System report containing, at least:

1) The list of protection devices, installed in the Transmission System, that do not comply with the provisions stated in the document “General Criteria for Protection of the Electric System of Jordan”
2) The changes produced in its protection system, during the last calendar year, to comply with the above mentioned provisions
3) A comparison between the plan agreed with the System Operator and the executed one, during the last calendar year
4) The time required to eliminate all the detected deficiencies.

(05) When the Transmission Licensee submits a report in accordance to the previous paragraph, the ERC will review it and may request clarifications or modifications prior to its approval.

SECTION 07 : MASTER PLAN

TRANSMISSION MASTER PLAN

(A) TRANSMISSION MASTER PLAN SCHEDULE

(01) Following the procedures stated in the Grid Code, the Transmission Licensee shall produce, by September 30th each year a Transmission Master Plan covering at least the following 10 years. Once produced, this Transmission Master Plan should be submitted to the ERC, with all necessary supporting documentation. The ERC will review the proposed plan and may request clarifications or modifications prior to approval.

(02) Within two (2) months following the approval of the Transmission Master Plan, the Transmission Licensee shall submit to the ERC a schedule of planned new investment entry (the Transmission Master Plan Schedule) that should contain at least the following information for each one of the facilities (Substations, Circuits and Equipment) identified in the Transmission Master Plan for the following three (3) years:

1) Targeted Commissioning Date (month and year).

2) Expected schedule for works and activities required to commission the facility at the stated date. This schedule should contain information on the time required to perform (at least) the following activities:

   a) Obtain the required administrative authorisations,

   b) Procurement of land and right of ways,

   c) Basic and detailed engineering design,

   d) Procurement of material and equipments,

   e) Construction and

   f) Commissioning tests.

3) Explanation of any problem or constrain, under or outside the control of the Transmission Licensee, that could prevent the facility to be committed at the Targeted Commissioning Date. In this case the Expected Commissioning Date should also be informed.

(03) The ERC will review the proposed Transmission Master Plan Schedule and may request clarifications or modifications prior to approval. Once approved, the plan will be binding to the Transmission Licensee and the ERC shall have the right to monitor and audit its effective execution.

(04) Unless explicitly authorised by the ERC, Targeted Commissioning Dates should remain unchanged in consecutive Transmission Master Plan Schedules. In cases where a new Transmission Master Plan indicates that a specific Transmission Facility is no longer required, or is required but at later date than in previous Transmission Master Plans, the Transmission Licensee should apply to the ERC asking for an authorisation for modifying the Targeted Commissioning Date, with proper justification. In case this authorisation is

issued, this date will be considered by the Transmission Licensee as the new Targeted Commissioning Date.

(B) MASTER PLAN PERFORMANCE INDICATORS

(01) The Transmission Licensee is committed to make its maximum effort to put into service all the Transmission Facilities indicated in the Transmission Plan Schedule at their approved Targeted Commissioning Date

(02) The delays in commissioning Transmission Facilities stated in the Transmission Plan Schedule will be considered as a Performance Indicator for the responsibilities of the Transmission Licensee on the execution of the approved Master Plan ($MPEPI_i$)

(03) The $MPEPI_i$ (Master Plan Execution Performance Indicator) for the Transmission Facility "i" will be the difference (expressed in calendar months) between the Actual Commissioning Date and the Targeted Commissioning Date, if this value is positive.

(04) If nothing is stated in contrary by the ERC, the allowed tolerance for each $MPEPI_i$ is [six (6)] months.

(05) The ERC could assign a different tolerance for a specific $MPEPI_i$ in cases of Transmission Facilities of special complexity and/or subject to a higher degree of uncertainty.

(C) NON COMPLIANCE WITH AUTHORISED TOLERANCES, MONITORING AND REPORTING

(01) The Transmission Licensee shall comply with the tolerances of each $MPEPI_i$ for the Transmission Facilities included in the Transmission Plan Schedule.

(02) In the cases of delays in the Actual Commissioning Date of any Transmission Facility, or group of Transmission Facilities, due to causes that the Transmission Licensee considered are outside its control, the Transmission Licensee should ask the ERC for a revision of the specific $MPEPI_i$'s indicators, with proper documentation to prove its claim. In the case the ERC approves, totally or partially, this claim, it will notify the Transmission Licensee the acceptance, with a clear indication of the number of months that should be deducted from the total delay for each of the Transmission Facilities. With this information, the Transmission Licensee should recalculate the new $MPEPI_i$'s values of the involved Transmission Facilities.

(03) With the purpose of carrying out suitable monitoring and control of the actual implementation of the Transmission Master Plan, the Transmission Licensee shall submit to the ERC, every three (3) months on the months of March, June, September and December in a suitable organized manner or such format as may be established by the ERC, a Quarterly Transmission Master Plan Progress Report, with at least the following information for each facility included in the Transmission Master Plan Schedule:

1) Targeted Commissioning Date (month and year).

2) Expected Commissioning Date (month and year)

3) Progress of works and activities required to commissioning the facility, compared against what it was indicated in the last approved Transmission Master Plan Schedule.

4) Detailed explanation of any delay in the works and activities actually performed and those indicated in the last approved Transmission Master Plan Schedule. In this case, a clear indication if the delay could be recovered or not in following months.

5) Any problem or constrain, either under or outside the control of the Transmission Licensee, that it is reasonably expected in the future and could prevent the facility to be actually committed at the Targeted Commissioning Date, even in the cases the works and activities for this particular facility are expected to be initiated at a later date.

6) Any other comment the Transmission Licensee seems relevant in order the ERC can fulfil its regulatory commitments.

(04) The Annual Transmission Performance Report, the Transmission Licensee will submit every year to the ERC, should include a chapter with the $MPEPI_i$ indicators for all the facilities that have entered in service during the last calendar year.

PART 3: NON COMPLIANCE

SECTION 08 : NON COMPLIANCE

(A) DEFINITION

(01) If the Transmission Licensee performs below the provisions established in this Performance Standard Code, it shall be considered a Non Compliance situation.

(02) A Non Compliance situation will include (but not be limited to):

1) Failure to provide the ERC, on time, with all the information established in this Transmission Performance Standards
2) Providing the ERC incomplete or inaccurate data or reports, in particular inaccuracies or other problems verified by the audits of the ERC in the information submitted by the Transmission Licensee.
3) Failure to implement in time the procedures and information systems established in this Performance Standard
4) Failure or unsuitable delays in the execution of the approved remedial actions and plans to improve Bulk Supply quality
5) Failure or unsuitable delays in correcting situations that imply inadequate Power Quality (Voltage, Flicker or Harmonics)
6) Failure to maintain $MPEPI_i$ indicators below the authorised tolerance.

(B) PENALTIES

(01) If the Transmission Licensee is in a Non Compliance situation, the ERC can apply penalties, according to Article 40 of the General Electricity Law and consider the situation a non-compliance with its licence conditions.

ANNEX 1: OVERALL PERFORMANCE INDICATORS FOR AVAILABILITY

Availability Indicators

Indicator	Definition	Mathematical Formula	Parameters
SU_L$_T$	Overall System Unavailability (Transmission Lines)	$SU\_L_T = \frac{\sum_{j=1}^{NL}\sum_{i=1}^{kt} H_{i,j}}{NL * HS\_P}$	$H_{i,j}$ = Duration of Outage "i", that affected Transmission Line "j" (in hours). *NL* = Total number of Transmission Lines *HS_P* = Total hours of the reporting period *kt* = Total number of Outages of type "T" of Transmission Line "j" during the reported period. *T* = Type of Outage: - Scheduled Maintenance Outage - Scheduled Reinforcement Outage - Forced Outages - External Outages
SU_T$_T$	Overall System Unavailability (Transformers)	$SU\_T_T = \frac{\sum_{j=1}^{NT}\sum_{i=1}^{kt} H_{i,j}}{NT * HS\_P}$	$H_{i,j}$ = Duration of Outage "i", that affected Transmission Transformer "j" (in hours). *NT* = Total number of Transmission Transformers *HS_P* = Total hours of the reporting period *kt* = Total number of Outages of type "T" of Transmission Transformer "j" during the reported period. *T* = Type of Outage: - Scheduled Maintenance Outage - Scheduled Reinforcement Outage - Forced Outage - External Outages

Indicator	Definition	Mathematical Formula	Parameters
SU_I$_T$	Overall Interconnections Unavailability	$SU\_I_T = \frac{\sum_{j=1}^{NI}\sum_{i=1}^{kt} H_{i,j}}{NI * HS\_P}$	$H_{i,j}$ = Duration of Outage "i", that affected Interconnection Line "j" (in hours). *NI* = Total number of interconnection lines (with neighbouring countries) *HS_P* = Total hours of the reporting period *kt* = Total number of Outages of type "T" of Interconnection Line "j" during the reported period. *T* = Type of Outage: - Scheduled Maintenance Outage - Scheduled Reinforcement Outage - Forced Outage - External Outages **Note:** Only the Outages that have its origin in facilities (lines or substations) that are located in the Jordanian territory shall be used to calculate this indicator.
SAOFI_L$_T$	System Average Frequency of Outages (Transmission Lines)	$SAOFI\_L_T = \frac{\sum_{j=1}^{NL} \#Out_j}{NL}$	$\#Out_j$ = Number of Outages of type "T" of Transmission Line "j" *NL* = Total number of Transmission Lines *T* = Type of Outage: - Scheduled Maintenance Outage - Scheduled Reinforcement Outage - Forced Outage - External Outages

Indicator	Definition	Mathematical Formula	Parameters
***SAOFI_L*$_{100\,T}$**	System Average Frequency of Outages per 100 km of Transmission Lines	$SAOFI\_L_{100\,T} = \dfrac{\sum_{j=1}^{NL} \#Out_j}{\sum_{j=1}^{NL} Long_j \,/\, 100}$	*# Out*$_j$ = Number of Outages of type "T" of Transmission Line "j" *NL* = Total number of Transmission Lines *T* = Type of Outage: - Scheduled Maintenance Outage - Forced Outage
***SAOFI_T*$_T$**	System Average Frequency of Outages (Transformers)	$SAOFI\_T_T = \dfrac{\sum_{j=1}^{NT} \#Out_j}{NT}$	*# Out*$_j$ = Number of Outages of type "T" of Transformer "j" *NT* = Total number of Transformers *T* = Type of Outage: - Scheduled Maintenance Outage - Scheduled Reinforcement Outage - Forced Outage - External Outages
***SAOFI_I*$_T$**	System Average Frequency of Outages (Interconnection Lines)	$SAOFI\_I_T = \dfrac{\sum_{j=1}^{NI} \#Out_j}{NI}$	*# Out*$_j$ = Number of Outages of of type "T" Interconnection Line "j" *NT* = Total number of Interconnection Lines (with neighbouring countries) *T* = Type of Outage: - Scheduled Maintenance Outage - Scheduled Reinforcement Outage - Forced Outage - External Outages **Note:** Only the Outages that have its origin in facilities (lines or substations) that are located in the Jordanian territory shall be used to calculate this indicator.

ANNEX 2: OVERALL PERFORMANCE INDICATORS FOR BULK SUPPLY POINTS

Indicator	Definition	Mathematical Formula	Parameters
TTIK$_T$	Average time of Interruptions per MW of Demand	$TTIK_T = \frac{\sum_{i=1}^{kt}(MW_i \cdot H_i)}{ENER/8760}$	MW_i = Total demand affected by the Interruption "i" (in MW) H_i = Duration of Interruption "i" that affected the demand *MWi* (in hours). *ENER* = Total yearly demand (MWh) *kt* = Total number of Interruptions of type *"T"* during the reported period *T* = Type of Interruption: - Scheduled Interruption - Forced Interruption - External Interruption

Indicator	Definition	Mathematical Formula	Parameters
AFIK$_T$	Average frequency of Interruptions per MW of Demand	$AFIK_T = \frac{\sum_{i=1}^{kt} MW_i}{ENER/8760}$	MW_i = Total demand affected by the Interruption "i" (in MW) H_i = Duration of Interruption "i" that affected the demand *MWi* (in hours). *ENER* = Total yearly demand (MWh) *kt* = Total number of Interruptions of type *"T"* during the reported period. *T* = Type of Interruption: - Scheduled Interruption - Forced Interruption - External Interruption

Indicator	Definition	Mathematical Formula	Parameters
SAIDI$_T$	System Average Interruption Duration	$SAIDI_T = \frac{\sum_{i=1}^{kt}(NB_i \cdot H_i)}{TNB}$	NB_i = Number of Bulk Supply Points, affected by the Interruption "i". H_i = Duration of Interruption "i", that affected NB_i Bulk Supply Points. *TNB* = Total number of Bulk Supply Points of the Transmission Licensee. *kt* = Total number of Interruptions of type *"T"* during the reported period. *T* = Type of Interruption: - Scheduled Interruption - Forced Interruption - External Interruption **Note:** All the interruptions, either Total or Partial shall be included in the calculation.
SAIFI_SI$_T$	System Average Frequency Interruption	$SAIFI\_SI_T = \frac{\sum_{i=1}^{kt}(NB_i)}{TNB}$	NB_i = Number of Bulk Supply Points, affected by the Interruption "i". *TNB* = Total number of Bulk Supply Points of the Transmission Licensee. *kt* = Total number of Interruptions of type *"T"* during the reported period. *T* = Type of Interruption: - Scheduled Interruption - Forced Interruption - External Interruption **Note:** All the interruptions, either Total or Partial shall be included in the calculation.

Indicator	Definition	Mathematical Formula	Parameters
SAIFI_TI$_T$	System Average Frequency of Temporary Interruption	$SAIFI\_TI_T = \frac{\sum_{i=1}^{kt}(NB_i)}{TNB}$	NB_i = Number of Bulk Supply Points, affected by the Temporary Interruption "i". TNB = Total number of Bulk Supply Points of the Transmission Licensee. kt = Total number of Temporary Interruptions during the reported period. T = Type of Interruption: - Scheduled Interruption - External Interruption **Note:** All temporary interruptions, either Total or Partial shall be included in the calculation. Interruptions successfully restored by any automatic mechanism (as for example automatic reclosing) shall also be counted.
ENS$_T$	Energy not supplied, due to Interruptions	$ENS_T = \sum_{i=1}^{kt}(PD_i \cdot H_i)$	EPD_i = Power disconnected by Interruption "i" (in MVA). H_i = Duration of Interruption "i". (in hours). kt = Total number of Interruptions of type *"T"* during the reported period T = Type of Interruption: - Scheduled Interruption - Forced Interruption - External Interruption **Note:** If the Interruption "i" last less than 2 hours, the value of EPD_i shall be the last value registered by the SCADA system prior to the interruption. If the Interruption last longer, the value EPD_i shall be affected by a coefficient that will take into account the probable increase or decrease of the interrupted load during the Interruption period. The value of the coefficient shall be calculated taken into account the load profile at this point in previous similar days.

ANNEX 3: TOLERANCES TO AVAILABILITY AND BULK SUPPLY INDICATORS

The following tolerances will apply for the First Tariff Review period (excluding Control Phase 1), unless the ERC, when issuing a new license to the Transmission Licensee, specifies different values for one or more of these tolerances:

AVAILABILITY

The following values shall be used as tolerances for the Overall Availability Performance Indicators.

(A) FORCED OUTAGES

(01) Overall Performance Indicators

Overall Performance Indicator		Value
Name	**Acronym**	
Overall System Unavailability (Transmission Lines)	SU_L_F	$3{,}0 \times 10^{-4}$ (160 min/year) (1)
Overall System Unavailability (Transformers)	SU_T_F	$2{,}5 \times 10^{-4}$ (130 min/year) (2)
Average Frequency of Outages (Transmission Lines)	$SAOFI\_L_F$	0,70 Outages/year (3)
Average Frequency of Outages (Transformers)	$SAOFI\_T_F$	0,50 Outages/year (4)
Average Frequency of Outages per 100 km of Transmission Lines	$SAOFI\_L_{100\,F}$	5,0 Outages/100 km/year (5)

(B) SCHEDULED OUTAGES

No limits on Scheduled Outages (either maintenance or reinforcement) Performance Indicators will be applied during Control Phase 1 and the first two years of Final Control Phase. Following this period, the ERC will decide whether or not to impose tolerance to these Performance Indicators and, if tolerances are imposed, the ERC will establish and approve the corresponding values.

(C) EXTERNAL AND INSTRUCTED OUTAGES

No limits on External and Instructed Outages will be applied.

BULK SUPPLY POINTS AVAILABILITY

The following values shall be used as tolerances for the Overall Bulk Supply Points Availability Performance Indicators.

(A) FORCED INTERRUPTIONS

(01) Overall Performance Indicators:

Overall Performance Indicator		Value	
Name	**Acronym**		
Average time of Interruptions per nominal HV/MV transformers installed MVA (1)	$TTIK_F$	90 minutes / year	Total value
		30 minutes	Excluding events that implies tripping of Jordan-Egypt Tie Line
Average frequency of Interruptions per nominal HV/MV transformer installed MVA (2)	$AFIK_F$	1,5 Interruptions / year	Total value
		0,5 Interruptions / year	Excluding events that implies tripping of Jordan-Egypt Tie Line
System Average Interruption Duration (3)	$SAIDI_F$	90 minutes / year	Total value
		30 minutes	Excluding events that implies tripping of Jordan-Egypt Tie Line
System Average Frequency Interruption (4)	$SAIFI\_SI_F$	1,5 Interruptions / year	Total value
		0,5 Interruptions / year	Excluding events that implies tripping of Jordan-Egypt Tie Line
Energy not supplied, due to Interruptions (5)	ENS_F	$15x10^{-5}$ of total Energy supplied	Total value
		$5x10^{-5}$ of total Energy supplied	Excluding events that implies tripping of Jordan-Egypt Tie Line

(B) SCHEDULED INTERRUPTIONS

No limits on Scheduled Interruptions Performance Indicators will be applied during Control Phase 1 and the first two years of Final Control Phase. Following this period, the ERC will decide whether or not to impose tolerance to these Performance Indicators and, if tolerances are imposed, the ERC will establish and approve the corresponding values.

(C) EXTERNAL AND INTERRUPTIONS

No limits on External and Instructed Outages will be applied.

ANNEX 4: CAPS TO TRANSMISSION ENERGY LOSSES

Following values for caps to transmission losses will apply for the first 3 years following the approval of this Performance Standards, unless the ERC, when applying the Bulk Supply Tariff Methodology for the next Tariff Period, specifies different values for the tolerance. In the latter case, the values used by the ERC in the calculation of Bulk Supply tariffs will apply. In following years, the values used during the Tariff Review Period will apply

	First year	**Second year**	**Third year**
% Losses	3,7	3,6	3,5