Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT		
Title of the project activity	20 MW Solar Project in Sanwreej, Jodhpur, Rajasthan	
UNFCCC reference number of the project activity	10392	
Version number of the PDD applicable to this monitoring report	03	
Version number of this monitoring report	01	
Completion date of this monitoring report	05/04/2020	
Monitoring period number	01	
Duration of this monitoring period	01/08/2018 – 29/02/2020 (Inclusive of both the dates)	
Monitoring report number for this monitoring period	Not applicable	
Project participants	Janardan Wind Energy Pvt. Ltd.	
Host Party	India	
Applied methodologies and standardized baselines	ACM0002: Grid-connected electricity generation from renewable sources --- Version 17.0	
Sectoral scopes	Sectoral Scope 1: Energy industries (renewable - / non-renewable sources)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	NA	59,957[1]
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	55,238[2]	

[1] Please refer ER sheet for detailed calculation.

[2] Please refer ER Sheet for detailed calculation and section E.5 of this document.

SECTION A. Description of project activity

A.1. General description of project activity

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The project activity is a 20 MW solar power project, promoted by Janardan Wind Energy Pvt. Ltd. (JWEPL). The purpose of the project activity is to generate clean electricity with utilization of solar energy. The project activity involves installation of 10 MWAC (Project-I) & 10 MWAC (Project-II), totalling to 20 MW_{AC}(corresponding to 22.5 MWp) solar power project under Jawaharlal Nehru National Solar Mission (JNNSM) Phase-II, Batch-II (DCR1 Category).Both the projects are installed in the same project boundary at Village: Sanwreej, Teshil: Phalodi, Disrtict: Jodhpur, State: Rajasthan.

The electricity generated by the project is exported to the NTPC Vidyut Vyapar Nigam (NVVN) Ltd. The electricity generated from the project activity will be evacuated through 132 kV sub-station located at Sanwreej for consumption in the Indian Electricity Grid. The project activity therefore displaces an equivalent amount of electricity, which would have otherwise been generated by fossil fuel dominant electricity grid and there by reduces the associated CO_2 emissions.

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source for sale of electricity to the grid. Janardan Wind Energy Pvt. Ltd. (JWEPL) is the promoter of the proposed project activity. The project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 34,882 tCO2e per annum, thereon displacing 35,678 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian electricity grid, which is mainly dominated by thermal/fossil fuel-based power plant

This is the first monitoring period under first crediting period and the present monitoring period is from 01/08/2018 to 29/02/2020 through which emission reduction claimed is 59,957 tCO_{2e}.

A.2. Location of project activity

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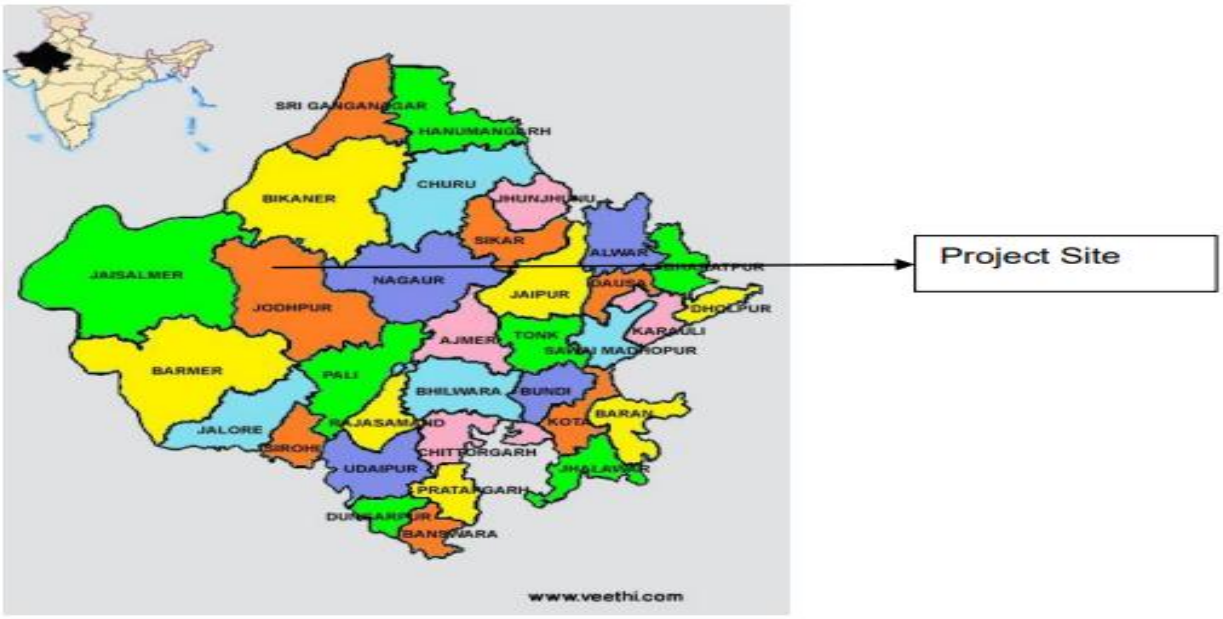
JWEPL has installed solar panels at Village: Sanwreej, Teshil: Phalodi, Disrtict: Jodhpur, State: Rajasthan., India.

Geographical coordinates are given below:

Project Investors' Name	Latitude	Longitude	Altitude of Site (m)	Part Commissioning	Commissioning Date
JWEPL	26.98º N	72.25º E	265 m	(Project – I) 10 MW	30-Mar-2017
				(Project –II) (10 MW (Project – II)	18-Apr-2017



A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Janardan Wind Energy Pvt. Ltd. (Private entity)	No

A.4. References to applied methodologies and standardized baselines

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Title: Large Scale Consolidated Methodology to describe baseline and monitoring methodology for "Grid-connected electricity generation from renewable sources"

References: Approved Large-Scale Consolidated Methodology: ACM0002 "Grid-connected electricity generation from renewable sources" (Version 17.0, EB 89)[3]

ACM0002 draws upon the following tools which have been used in the PDD:
Methodological Tool: Tool to calculate the emission factor for an electricity system – Version 05.0, EB 87 Annex 9[4]

Methodological Tool: Tool for the demonstration and assessment of additionality - Version 07.0.0, EB 70 Annex 8[5]

Methodological Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation - Version 02.0, EB 87 Annex 8[6]

[3] https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN

[4] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf

[5] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

[6] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v2.0.pdf

A.5. Crediting period type and duration

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Type: Renewable
Duration: 01/08/2018 – 31/07/2025[7]

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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(JWEL) has implemented 20 MW solar photovoltaic technology-based power project in Village Sanwreej, Teshil: Phalodi, Disrtict: Jodhpur, State: Rajasthan., India.

Solar power plant has ran successfully during the reported monitoring period. No events or situations happened during the reported monitoring period which can alter the applicability of the applied methodology. The solar PV power plant will have solar PV modules, inverters, transformers and other protection system and supporting components as under:

The technical details of the project are given below:
A. Solar PV modules:

Module Supplier	Module Model	Capacity (p)	Number	Total Capacity (MWp)
TATA Power Solar Systems Ltd.	TP 303 series	303	19520	5.91456
	TP 306 series	306	9920	3.03552
	TP 309 series	309	19200	5.9328
	TP 312 series	312	19,360	6.04032
	TP 315 series	315	9760	3.0741

B. Inverters:

S.No.	Make	10 MW (Project – I)	10 MW (Project – II)
1	Manufacturer	Sungrow Power	Sungrow Power
2	Model	SG2500	SG2500
3	Rated Capacity	2500 kVA	2500 kVA
4	No. of Inverters	4	4
5	Rated Input Voltage (Max.Input Voltage)	1000V	1000V

C. Transformers

S.No.	Make	10 MW (Project – I)	10 MW (Project – II)
1	Manufacturer	Danish Private Limited	Danish Private Limited
2	Model	Oil Cooled	Oil Cooled
3	Rated Capacity	2800KVA	2800KVA
4	No. of Transformers	4	4
5	Rated Input Voltage	33 KV/360V	33 KV/360V

D. Metering Equipment Details

S.No.	Make	10 MW (Project – I)	10 MW (Project – II)
1	Manufacturer	Secure Make	Secure Make
2	Type	ABT meters	ABT meters
3	Accuracy Level	0.2S	0.2S

[7] Changed from: 12 Oct 17 - 11 Oct 24. (https://cdm.unfccc.int/Projects/DB/Applus1501572247.73/view)

4	Total no of meter (Site and Substation)	4	4

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

>>
There are no deviations/delays regarding the registered Monitoring & Reporting Plan, applied methodology or applied standardized baseline.

B.2.2. Corrections

>>
There are corrections to project information fixed at validation during the current monitoring period.

During project conception phase, the total 72,960 No. of Module was planned to achieve 20 MW AC capacity. However, actually 77,760 No. of Module have been commissioned to achieve 20 MW AC. The corrections can be seen in the section B.1 “Description of implemented project”

B.2.3. Changes to the start date of the crediting period

>>
There have been changes to start date of crediting period.
Crediting Period Date: 01 Aug 18 - 31 Jul 25
Changed from: 12 Oct 17 - 11 Oct 24[8]

B.2.4. Inclusion of monitoring plan

>>
PP would like to confirm that no inclusion of monitoring plan into the PDD has been approved by the Board or submitted together with this monitoring report.

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

>>
Monitoring plan is already included, in the registered PDD. No change from registered monitoring plan, applied methodology or applied standardized baseline

B.2.6. Changes to project design

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The technical specification of the project will change from the registered PD as during project conception phase, the total 72,960 No. of Module was planned to achieve 20 MW AC capacity. However, actually 77,760 No. of Module have been commissioned to achieve 20 MW AC.

B.2.7. Changes specific to afforestation or reforestation project activity

>>
The project is installation and operation of Solar power project and not afforestation or reforestation project activity and hence not applicable.

[8] https://cdm.unfccc.int/Projects/DB/Applus1501572247.73/view

SECTION C. Description of monitoring system

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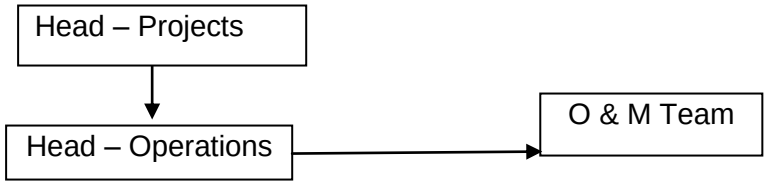
The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is proposed for grid-connected solar power projects being implemented in Rajasthan, India. The monitoring plan, describes about the monitoring organisation, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project participants. The following structure is proposed for data monitoring, collection, data archiving and calibration of equipment for this project activity. The team comprises of the following members:

Organisational Structure for Monitoring



Responsibilities of Head- Projects: Tracking and reviewing the overall functioning and maintenance of the project activity from Head (Operations). Head (Operations) will be reporting Head (Projects).

Responsibilities of Head - Operations: Overall functioning of the project activity and Coordinating with the O & M Team for the proper functioning of Project activity. He will be reporting to Head (Projects).

Responsibilities of O & M Team: O & M team is responsible for Operations and Maintenance related issues, they are also responsible for day-to-day data collection and monitoring, ensures completeness and reliability of data (calibration of equipment).

Data Measurement

Projects activity comprises of installation of 4 Energy meters, 2 Energy meters (1 main meter and 1 check meter for each 10 MW) at project site and 2 Energy meters (1 main meter and 1 check meter for each 10 MW) at substation.

The export and import energy was measured using Main & Check meters installed at Sub-station. Authorized officer of NVVN in the presence of representative of PP took Export & Import readings of Main & Check meters on monthly basis. The meter reading was taken jointly and signed by the representatives of the NVVN and PP. Based on the readings, invoices/ monthly bills was raised by PP. These invoices and monthly bills are used for cross checking the meter readings taken for the respective project activity.

The Project representatives are available during meter reading, the calculations of net electricity supplied to grid is completely under purview of (SEB/Discom officer) NTPC Vidyut Vyapar Nigam Ltd. In addition, accuracy class of meters and calibration frequency is under purview of SEB/Discom officer and Project owner do not have any control on it. Project owner gets the monthly credit report from where net electricity supplied to grid is obtained and used for emission reduction calculations.

Data collection and archiving

Export & Import readings from main & check meter are collected under the supervision-authorized representatives of PP. The net electricity supplied to grid are calculated based on export & import readings. Export and Import data would be recorded and stored in electronic&/or Paper. The records are checked periodically by the Head (Operations) and discussed thoroughly with the O & M Team. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of CERs for the project activity whichever occurs later.

Both the main and check meter of both the project I &II are found within the acceptable limits of accuracy functioning properly.

Mismatch in Monitoring Period and the Billing Period

In case the dates of a particular monitoring period do not match with the dates of the billing period, the net electricity exported to the grid would be calculated from:

D = (A/B) * C

A = Difference of number of days which are not matching of billing period and monitoring period.
B = Number of days of the billing period/ month which was not matched with the monitoring period.
C = Net Electricity supplied to the grid for that given billing period/ month.

The calculated value after apportioning would be used for calculation of emission reductions during that period

Emergency preparedness

The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized. In the unlikely event of failure of both Main meter & Check meter installed at sub-station, where both the faulty meters are required to repair or replaced simultaneously, the export & import readings from Main & Check Meter installed at the inter-connection point at the project site will be used for monitoring of net electricity exported to the grid.

Personnel training

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff (CDM team) will be trained. The plant helpers will be trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,OM,y}$
Unit	tCO_2/MWh
Description	Operating Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 11, April 2016[9]
Value(s) applied	0.9941
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0.0" as 3-year generation weighted average using data for the years 2012-2013, 2013-2014 & 2014-15. The data are obtained from "CO_2 Baseline Database for Indian Power Sector" version 11.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data/parameter	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period.

Data/Parameter	$EF_{grid,BM,y}$
Unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 11, April 2016[10]
Value(s) applied	0.9258
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0.0". The data are obtained from "CO2 Baseline Database for Indian Power Sector" version 11.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data/parameter	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period.

Data/Parameter	$EF_{grid,CM,y}$
Unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 11, April 2016[11]
Value(s) applied	0.9777
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0.0". The data are obtained from "CO2 Baseline Database for Indian Power Sector" version 11.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data/parameter	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period.

[9] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver11.pdf

[10] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver11.pdf

[11] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver11.pdf

D.2. Data and parameters monitored

Data/Parameter	$EG_{facility,y}$
Unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh)
Measured/calculated/ default	Measured and Calculated
Source of data	Monthly Meter Reading Reports (separately for each individual 10 MW (Project-I and Project-II)
Value(s) of monitored parameter	61,324.75
Monitoring equipment	Energy Meters of accuracy class 0.2s
Measuring/reading/recording frequency	Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually
Calculation method (if applicable)	Electricity exported/imported to the grid is in kWh. However, for the calculation purpose electricity exported is converted in MWh. The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid obtained from Monthly Meter reading reports provided by SEB as per below equation: $EG_{facility,y} = EG_{Export} - EG_{Import}$
QA/QC procedures	Calibration of all the meters will be undertaken once in 5 years as per CEA guidelines and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.2.
Purpose of data/parameter	The Data/Parameter is required to calculate the baseline emission
Additional comments	Data will be archived electronically for a period of 2 years beyond the end of crediting period

D.3. Implementation of sampling plan

>>

Sampling is not required for the given project activity.

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

>>

In the baseline, there were no Social Development activities taking place; whereas baseline Emissions for electricity supplied by project activity, BEy is calculated as:

$BEy = EG_{PJ,y} * EF_{grid,CM.y}$

Where,
BEy = Baseline emissions in year y (tCO_2/yr)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr).

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO2/MWh)

Therefore,
BEy = 61,324.75 MWh × 0.9777 tCO2/MWh
= 59,957.208 tCO_{2e}
= 59,597 tCO_{2e} (Rounded down)

E.2. Calculation of project emissions or actual net removals

>>

Since, the project activity is the installation of new – grid connected Solar power project, which generates electricity using Solar power; therefore, in accordance with the applied methodology, ACM0002;

$PE_y = 0$.

E.3. Calculation of leakage emissions

>>

In accordance with the applied methodology ACM0002; no leakage emission has been considered for the project activity.

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	59,957	0	0	0	59,957	59,957

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante for this monitoring period in the PDD (t CO_2e)
59,957	55,238

E.5.1. Explanation of calculation of "amount estimated ex ante for this monitoring period in the PDD"

>>
Generation as per registered PDD (MWh) = 35,972 MWh
Ex- Ante Emission Reductions = 35,678 MWh/year × 0.9777 tCO_2/MWh
= 34,882 tCO_{2e}/annum (rounded down)
Now amount estimated ex ante for this monitoring period for 578 days
= 34,882 / 365 * 578
= 55,238 tCO_2/year

E.6. Remarks on increase in achieved emission reductions

>>
The estimated annual emission reductions as per the registered CDM PDD corresponding to the current monitoring period are 55,238 tCO_{2e}. The actual emission reductions achieved during the current monitoring period is 59,957 tCO_{2e} which is 8.54% more than the estimated emission reduction. The difference is due variation in the Solar radiation's availability during the current monitoring period.

E.7. Remarks on scale of small-scale project activity

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The project activity is large scale hence not applicable.

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Document information

Version	*Date*	*Description*
07.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).

Version	*Date*	*Description*
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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