

# TECHNICAL SPECIFICATION, FUNCTIONAL REQUIREMENTS AND SLA FOR THE PILOT PROJECT OF DIGITAL VILLAGE (LED STREET LIGHTING & Wi-Fi HOTSPOT SERVICE)

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## Change History

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1.	Version 1.0	09 Dec 2016	Devendra Azad	Technical committee for LED lighting and Wi Fi hotspot
2.	Version 1.1	11 Jan 2017	Gunjan Shivhare	

**This is version 1.1**

## Metadata of the Standard

S. No.	Data Elements	Values
1.	<b>Title</b>	Technical Specification, Functional Requirements And SLA For The Pilot Project Of Digital Village (LED Lighting & Wi-Fi hotspot Service)
2.	<b>Present Status</b> (Draft/Released/Withdrawn)	Updated draft -for consultation
3.	<b>Publisher</b>	MeitY along with NISG
4.	<b>Brief Description</b>	This document provides the technical specification of the IT setup, function requirement specification and service level agreements for LED Lighting & Wi-Fi hotspot Service. This document would act as base document for the technical committee to finalize the technical & functional specifications along with SLAs.
5.	<b>Target Audience</b>	Digital village - Technical Committee and other stakeholders for LED Lighting & Wi-Fi hotspot Service
6.	<b>Source</b> (Reference to the resource from which present resource is derived)	The source of the document is the overall understanding and the documents prepared for the following services to be provided in the Digital village pilot project:- a) Tele-Education Service b) Tele-Medicine Service c) LED Lighting & Wi-Fi hotspot service d) Skill development - Resource Centre <b><u>This document is “Technical Specification, Functional Requirements And SLA For The Pilot Project Of Digital Village (LED Lighting &amp; Wi-Fi hotspot Service)”</u></b>
7.	<b>Document Number</b>	DV/Specification/LEDWI-FI /v1.1

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## 1. Introduction to Pilot project of Digital Village

In line with the vision of Digital India, Ministry of Electronics and Information Technology (GoI) has envisaged the Pilot of Digital Village with a view to showcase the transformation that Digital India Programme can bring about, to different stakeholders like Departments of Union Government, State Governments, Private Telecom Players, other corporate services providers and citizens especially living in the rural areas.

Digital Village pilot intends to provide a platform for availability of services such as tele medicine, tele education, LED Lighting and Wi-Fi Hotspot, skill development to the people at the Gram Panchayat level in select blocks across various States/UTs. This project moves away from the traditional approach of e-Governance projects (that focused on creating infrastructure) and adopts a service based approach for pilot of the Digital Village and will be launched across 30 States and UTs.

The key sub components under Digital Village pilot Project are:

1. Tele Medicine services – which is realization of ekranti pillar of Digital India.
2. Tele Education services – which is realization of ekranti pillar of Digital India.
3. LED Lighting and Wi-Fi Hotspot services – which is part of Digital Connectivity of Digital India.
4. Skill Development services – which is part of Digital empowerment of Digital India

Digital Village is envisaged to be rolled out pan India in two stages. The first stage would be a pilot implementation in selected block(s) across 30 States/UTs in India for Digital Village. The total duration of the pilot shall be 3 years out of which, the operations & maintenance/service delivery phase will span over 2.5 years post implementation. Post incorporating the learning's from the pilot, implementation strategy for pan India roll out shall be prepared.

## **Objectives:**

Given this context, MeitY along with NISG has come out with the Technical & Functional Specifications with the following key objectives:

Provide basic development services to rural areas using digital technology and demonstrate the potential of digital technologies to improve quality of life in rural areas

- a) To provide Wi-Fi access at common place in the village
- b) To facilitate access to regional medical centres for local population for expert opinion, thus, ensuring availability of basic medical facilities at village level.
- c) To provide access to interactive teaching in local schools having shortage of teachers.
- d) To provide LED lighting at a common area in the village.
- e) To provide resource centres to be used for providing skill development training, holding information sharing sessions and organizing interactive sessions with experts, government officers etc.

## **2. LED Street Lighting & Wi-Fi hotspot**

LED Lighting & Wi-Fi hotspot is one of the services envisaged under Digital Village pilot. Under this service, LED Street light of appropriate specification (Solar powered) along with wireless access point for Wi-Fi hotspot will be installed at common public place. LED Street light will be operated from dawn to dusk and free Wi-Fi hotspot for internet will be given for at least 5 hours per day. It is envisaged that upto 30 concurrent users would be able to derive the benefits of the Wi-Fi hotspot.

In line with above objectives, Technical Committees have been formed to review & finalize the technical & functional specifications along with SLA for all services under pilot project of digital village.

### 3. Major Components for LED Street Lighting & Wi-Fi hotspot service

Mentioned below are the major IT component envisaged under LED street lighting & Wi-Fi hotspot service:

Sl.No	Equipment name
1.	Solar Powered LED Mast Tower Street light
2.	Outdoor Wireless Access Point
3.	Layer 2 switch with mounting rack
4.	3 KVA Online UPS
5.	Battery
6.	Desktop
7.	Mobile Charging Points

#### 3.1 Technical Specification

Given below are the technical specifications for the various IT components envisaged under LED street lighting & Wi-Fi hotspot service

##### 3.1.1 Solar Powered LED Mast Tower Street light

SI No	Technical Specification
<b>1</b>	<b>PV MODULE</b>
	<ul style="list-style-type: none"> <li>a) The power output of the module(s) under STC should be a minimum of 110 Wp (4 Nos)</li> <li>b) The PV module should have crystalline silicon solar cells and must have a certificate of testing conforming to IEC 61215 Edition II / BIS 14286 from an NABL or IECQ accredited Laboratory</li> <li>c) The module efficiency should not be less than 14 %.</li> <li>d) PV Junction box: IP 65</li> <li>e) The terminal box on the module should have a provision for opening it for replacing the cable, if required.</li> <li>f) Indigenously manufactured PV module should be used.</li> </ul>
<b>2</b>	<b>LED</b>

SI No	Technical Specification
	<ul style="list-style-type: none"> <li>a) 18 Watt (Max.), W-LED luminaire, X 4 Nos. light source with fixture along with proper heat sink to dissipate heat generated by LEDs</li> <li>b) Light Output: Minimum 16 Lux when measured at the periphery of 4 meter diameter from a height of 7 meter. The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye.</li> <li>c) The light source will be of white LED type</li> <li>d) The color temperature of W-LEDs used in the system should be in the range of 5500 K–6500 K</li> <li>e) LEDs should not emit ultraviolet light.</li> <li>f) Autonomy: 3 days or 12 operating hours per permissible discharge</li> <li>g) Dispersed beam, soothing to eyes with the use of proper optics and diffuser</li> <li>h) Duty cycle: Dusk to dawn at full brightness</li> <li>i) To be certified in complying with LM-80-for LED &amp; LM79-for Luminary</li> <li>j) LED Casing: Water Proof, UV stabilized reinforced, Plastic or treated plastic with IP65</li> <li>k) Operating Temp. (-20 to 50 °C)</li> <li>l) Life span of LEDs used in the Luminaire shall be more than 50,000 hours at 70% light output</li> <li>m) The LED Drivers for Luminaries must be approved from BIS under Compulsory Registration Scheme</li> </ul>
<b>3</b>	<b>ELECTRONICS</b>
	<ul style="list-style-type: none"> <li>a) Efficiency of the electronic system should be at least 85%.</li> <li>b) Electronics should have temperature compensation for proper charging of the battery throughout the year.</li> <li>c) The PCB containing the electronics should be capable of solder free installation and replacement.</li> <li>d) The PV module itself should be used to sense the ambient light level for switching ON and OFF the lamp.</li> </ul>



SI No	Technical Specification
	<p>e) Necessary lengths of wires/ cables, switches suitable for DC use and other protections should be provided.</p>
<b>4</b>	<b>ELECTRONIC PROTECTIONS</b>
	<p>a) Adequate protection is to be incorporated for “No Load” condition, e.g. when the lamp is removed and the lantern is switched ON.</p> <p>b) The system should have protection against battery overcharge and deep discharge conditions.</p> <p>c) The load reconnect should be provided at around 80% of the battery capacity status.</p> <p>d) Adequate protection should be provided against battery reverse polarity.</p> <p>e) A fuse should be provided to protect against short circuit conditions.</p> <p>f) Protection for reverse flow of current through the PV module should be provided.</p> <p>g) During the charging, lamp cannot be switched “ON”.</p> <p>h) Electronics should have temperature compensation for proper charging of the battery throughout the year</p>
<b>5</b>	<b>MOUNTING OF LIGHT</b>
	<p>a) A corrosion resistant metallic frame structure should be fixed on the pole to hold the SPV module.</p> <p>b) The frame structure should have provision to adjust its angle of inclination to the horizontal between 0 and 45, so that the module can be oriented at the specified tilt angle.</p> <p>c) The pole should be made of Galvanized Iron (GI) pipe / as per IS standards.</p> <p>d) The height of the pole should be 7 meters above the ground level, after grouting and final installation.</p> <p>e) The lamp housing should be IP 65 and should be painted with a corrosion resistant paint.</p>

SI No	Technical Specification
<b>6</b>	<b>REMOTE MONITORING SYSTEM</b>
	<ul style="list-style-type: none"> <li>a) To monitoring, controlling and logging of Mast lighting system</li> <li>b) System to generate data on parameters like ON time, Off Time, Power Down time, Volt Fault, Over Current Fault, Short Circuit Fault, Neutral Fault, RTC Fault, Memory Fault, Low Ampere Fault, Relay Fault, Calibration Data, etc. and acknowledge the message</li> <li>c) Should be able to send data to any external application through wireless access point</li> </ul>

### 3.1.2 Outdoor Wireless Access Point

Sl.No	Technical Specification							
1.	OEM should preferably be in the Leaders quadrants of Gartner Magic Quadrant for wired and wireless LAN access infrastructure, as on August 2016 or The product should valid NDPP certification.							
2.	<table border="1"> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">Hardware</td> <td>a) Access Points proposed must include frequency band as mandated by Govt of India</td> </tr> <tr> <td>b) Access Points must support signal rejection in co-located environment</td> </tr> <tr> <td>c) Must have -97 dB or better Receiver Sensitivity</td> </tr> <tr> <td>d) Ports: minimum 2 x 10/100/1000 BaseT RJ45 Ethernet ports</td> </tr> </table>	Hardware	a) Access Points proposed must include frequency band as mandated by Govt of India	b) Access Points must support signal rejection in co-located environment	c) Must have -97 dB or better Receiver Sensitivity	d) Ports: minimum 2 x 10/100/1000 BaseT RJ45 Ethernet ports		
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Sl.No	Technical Specification	
		g) 802.11e (Wireless QoS) h) IPv4 (RFC 791) i) IPv6 (RFC 2460) j) 802.11n
4.	Antennas	External antennas optimized for tower mounting to provide coverage of at least 100 meters radius
5.	Rate Limiting	Supported per SSID
6.	MESH & RF Specifications	Access Point should support point-to-point, point-to-multipoint bridging Must incorporate radio resource management for power, channel, coverage hole detection and performance optimization
7.	Frequency Bands	a) IEEE 802.11n: 2.4 – 2.484 GHz and 5.15 - 5.875GHz b) IEEE 802.11a: 5.15–5.85 GHz c) IEEE 802.11b: 2.4–2.484 GHz d) IEEE 802.11g: 2.4–2.484 GHz
8.	Environmental and Electrical Specifications	Access point shall support powering from AC Adapter, DC and POE(802.3at+) Access point shall support pole, wall, and roof mounting options. Mounting option support according to Geographic orientation flexibility – tilt angle for pole, wall, and roof mounting units The Access point shall be IP65/IP67 or better rated for dust and water ingress The Access point shall be rated for operation over an ambient temperature range of -5 to 55 C

Sl.No	Technical Specification	
9.	Data Rates	Up to 300 Mbps with automatic rate adaptation
10.	Security	WPA/WPA2 (802.11i) with TKIP or AES-CCMP encryption and PSK or 802.1x authentication
11.	WIPS	Integrated WIPS back ground scanning and Rogue AP detection / prevention. Wi-Fi presence monitoring and analytics.
12.	Mounting Kit	Supply of Mounting Kit is necessary for all Access Points
13.	Warranty	5 years warranty

### 3.1.3 Layer 2 Switch

Sl.No	Technical Specification	
1	OEM should be in the Leaders or Challengers or Niche player quadrants of Gartner's magic quadrants for switching components as on July 2016	
2	<b>PORT TYPE/DENSITY/ARCHITECTURE</b>	
	a) L2 managed switch with minimum Ethernet 8 port 10/100/1000Mbps ports Base T with min 1 gigabit SFP ports for uplink b) All ports on the switch should be of non-blocking architecture c) Switch should be equipped with Variable speed Fan for cooling d) Supports Layer 2 features such as Port Trunking, SNMP, IGMP, VLAN and other required protocols e) High performance architecture of switch that is capable for providing the non-blocking switch fabric and wire-speed throughput of min 20Gbps	
3	Should have minimum 256 MB DRAM and 256 MB Flash	
4	Should support IPv6 in hardware and software from day 1	
5	Switch should have a console port for configuration and diagnostic purposes	
6	<b>MANAGEMENT FEATURES</b>	

Sl.No	Technical Specification
	<ul style="list-style-type: none"> <li>a) SNMPv3, NTP, HTTPS, SSHv2, SCP2, SFTP, TELNET</li> <li>b) L2 Ping &amp; L2 trace route, IPv6 telnet and TFTP, LLDP and CDP</li> <li>c) Switch should have OS API interfaces to integrate with 3rd party applications</li> <li>d) Should have automated port profile technology for smart plug and play and seamless deployment</li> <li>e) Should have media traffic monitoring with 802.1AVB or any other protocols for lossless audio video transport</li> <li>f) Switch should support 4 groups of embedded RMON (history, statistics, alarm and 3events)</li> </ul>
7	<b>OPERATING CONDITION</b>
	<ul style="list-style-type: none"> <li>a) Operating Temp: -5 to 55 C</li> <li>b) Operating Humidity: 10% to 95% non- condensing</li> </ul>

### 3.1.4 3 KVA Online UPS

Sl.No	Parameter	Technical Specification
1.	UPS type	Integrated system consisting of Solar Charge Controller, Inverter and Grid charger
2.	System to converts energy from solar panel as the first priority and incase the solar power cannot support the load grid power is used to charge the battery and supply load	
3.	Features	<ul style="list-style-type: none"> <li>Pure sine wave output</li> <li>In-built heavy duty Solar charge Controller</li> <li>Optimal battery protection</li> <li>Grid charging enable disable option</li> <li>Solar and Grid charging current sharing for maximum solar usage</li> </ul>

Sl.No	Parameter	Technical Specification
	Displays	Display showing PV & Inverter output along with various input and output parameters
4.	Electronic Protection	Battery low protection Battery over voltage shutdown Over temperature and overload protection Short circuit protection Reverse polarity protection by internal fuse Over load & over heating protection Automatic Charger Restart Time after High Current
5.	Power device	IGBTs cum MOSFETs

### 3.1.5 Battery

Sl.No	Technical Specification
<b>1</b>	<b>BATTERY</b>
	a) Lead acid Tubular Flooded or Tubular GEL / VRLA , 12V. b) SMF batteries of sufficient AH rating for the UPS to be able to run all the equipment: <ul style="list-style-type: none"> <li>• The LED lighting from dawn to dusk for 3 days</li> <li>• For other components including wireless access point for at least 4 hours per day for 3 days</li> </ul> c) Battery should conform to the latest BIS/ International standards d) Battery need to be housed in the luminaire fixture only along with proper ventilation. No separate battery box is allowed e) 75 % of the rated capacity of the battery should be between fully charged and load cut off conditions f) Protection: Temperature compensated charging for battery

### 3.1.6 Mobile Charging Points

Sl.No	Technical Specification
1.	Solution should provide and facilitate at least 4 mobile charging points

### 3.1.7 Desktop

Sl.No	Technical Specification
1.	The OEM should fall in the leaders quadrant of Gartner’s magic quadrant for global Enterprise desktop and notebook as per November 2014
2.	<p><b>COMPUTER DESKTOP</b></p> <p>a) Intel Core i5 2.4GHz (or higher), 4 GB DDR3 RAM,500GB SATA HDD or above</p> <p>b) Windows 8 or above, MS Office 2016, Standard Antivirus</p> <p>c) Integrated Graphics Card - Full HD Graphics</p> <p>d) Standard Keyboard &amp; Optical Scroll Mouse(optionally wireless)</p> <p>e) Minimum 15.6" Full HD screen or higher standard Color TFT/LCD</p> <p>f) Network Interface Card : Ethernet 10/100/1000 Mbps Wireless Connectivity : IEEE 802.11 b/g/n WLAN</p> <p>g) Speakers: In-built</p> <p>h) Min External I/O Ports : VGA- 1 Nos, Network RJ-45 -1 Nos;USB Port – Min 4 Nos, audio port -1 Nos, Speaker jack-1 Nos, HDMI-1 Nos</p>

## 3.2 Functional and Other Requirement Specification

### 3.2.1 Wireless Access Point

#### 3.2.1.1 Technology Solution

SI No.	Functional Requirement Specification
1.	At each hotspot, the Wi-Fi service shall be available across a radius of at least 100 meters
2.	At each Wi-Fi hotspot, at least 100 concurrent users should be able to access Wi-Fi internet facility at the same time without any decrease in minimum bandwidth. Point to Point connectivity to be established from Point of presence of connectivity to the WAP
3.	The system shall be capable of controlling the bandwidth at user level to prevent the users from monopolizing all the bandwidth e.g. by downloading videos
4.	The Wi-Fi solution proposed by the Service provider shall not be based on any restrictive technology that prevents other service providers to setup similar services in the area
5.	The system shall be able to provide access to any device which is Wi-Fi enabled, regardless of software (operating system and browser) of the device
6.	The system shall be scalable for future expansion without capacity throughput or other performance constraints. It shall be able to add new Wi-Fi hotspots as per requirement
7.	The system shall be able to provide real time performance monitoring, management and reporting. The system shall be capable of monitoring each site / location individually
8.	The system shall comply with all the applicable guidelines, laws and legislative requirements laid down by DoT / TRAI or any other agencies authorized by Govt. of India.
9.	The system shall not violate any radiation standards specified by DoT / TRAI or any other agencies authorized by Govt. of India.
10.	The system shall comply to the DoT guidelines regarding provision of Wi-Fi internet service under de-licensed frequency band issued vide letter no. 820-1/2008-DS Pt.II dt. 23.2.2009 and other guidelines of Government of India.



SI No.	Functional Requirement Specification
11.	The system / equipment proposed to be installed at the identified locations shall not pose any threat to the residents or public property
12.	For entering the network, client will have to open the wi-fi application on their device and register themselves through registering their mobile number. The software registers the client receive the OTP through SMS
13.	OTP received after client request for registration should not exceed time limit of three minutes. If OTP is not received within the prescribed time limit then client should be able to resend the registration request
14.	Wi-Fi hotspot solution shall create profile automatically based on the WPA/WPA2 preferences configured for the access points. E.g. suppose access point is configured based on TTLS/MS-CHAP2 protocol then Wi-Fi Dialer will automatically communicate and create profile accordingly. It shall handle the complex technical details automatically and provide a simplified interface to the user. User remains liable for specifying the user credentials only. Should not support for Guest Access
15.	On successful WPA/WPA2 ,WEP, WPA-TKIP, AES, 802.11i etc authenticated user will be allowed to enter the wireless network
16.	Access Point Controller can be either software based (which can be installed on a VM) or hardware based. Must support Auto AP Software update
17.	System should have the feature to inform the client if number of concurrent clients exceeds the limit
18.	Should support comprehensive reporting like Rogue AP /Client list, currently Associated Clients devices with IP address, mac address etc
19.	Compatibility: Must not require a separate controller for Wireless Intrusion Prevention Access Points.
20.	Service provider should ensure session logs to be push / pull to any external application

### 3.2.1.2 Service Provider

S. No.	Functional Requirement Specification
1.	Service provider should ensure that at each hotspot, the Wi-Fi service shall be available across a radius of at least 100 meters for 4 to 5 hours in a day
2.	Service provider must be able to manage, monitor, control and optimize the bandwidth allocation / distribution across all the proposed hotspots
3.	Service provider should ensure the uptime to the concurrent users to access Wi-Fi internet facility at the same time without any decrease in minimum bandwidth.
4.	Service provider should lay connecting wire/wireless for Point to Point connectivity to be established from Point of presence of connectivity to the WAP
5.	Service provider should provide option of controlling the bandwidth at user level to prevent the users from monopolizing all the bandwidth e.g. by downloading videos
6.	The system shall be able to provide complete coverage in the areas identified, including but not necessarily inside the buildings
7.	The system shall be scalable for future expansion without capacity throughput or other performance constraints. It shall be able to add new Wi-Fi hotspots as per requirement
8.	Service provider shall comply with all the applicable guidelines, laws and legislative requirements laid down by DoT / TRAI or any other agencies authorized by Govt. of India.
9.	Service provider should not violate any radiation standards specified by DoT / TRAI or any other agencies authorized by Govt. of India
10.	Service provider shall comply to the DoT guidelines regarding provision of Wi-Fi internet service under de-licensed frequency band issued vide letter no. 820-1/2008-DS Pt.II dt. 23.2.2009 and other relevant guidelines of Government of India.
11.	Service provider should install the equipment at the identified locations shall not pose any threat to the residents or public property
12.	Service provider should ensure session logs to be push / pull to any external application

S. No.	Functional Requirement Specification
13.	Service provider should ensure supply of equipment, installation, integration, testing, Commissioning and maintenance/support of fully functional Wi-Fi System along with the collaborative tools, material/consumables and services at all sites
14.	Service Provider will be responsible to maintain the equipment's of Wi-Fi system on site, for a period of 2.5 years from commissioning. The make & model of the product supplied by service provider for the project should not come to end of life and end of support in next 5 years from the date of commissioning (OEM Certificate should be submitted by service provider)
15.	Service Provider shall provide on-call support including assistance with operation and maintenance of the system at respective location(s) all free of cost from the date of the first successful start/functioning/operation of the equipment

### 3.2.2 LED Street light

#### 3.2.2.1 Technology Service Provider

SNo	Functional Requirement Specification
1.	LED street light should be controlled by feeder panel with switchgear cabinet
2.	Incorporation of additional components as required
3.	The street lights can be switched on for any predefined periodicity including dusk to dawn. Suitable sensor is installed to sense the day/night time
4.	The complete Solar Street Light setup and overall workmanship must be warranted against any manufacturing/ design/ supply/ installation defects for a minimum period of 3 years from the date of commissioning.
5.	The Warrantee Card to be supplied with the Solar Street Light must contain the details of the system supplied. The manufacturers can provide additional information about the system and conditions of warranty as necessary
6.	An Operation, Instruction and Maintenance Manual, in English and the local language, should be provided with the Solar Street Lighting System

SNo	Functional Requirement Specification
7.	Only indigenously manufactured LED Based Solar Street Lights which fully conform to the MNRE specifications
8.	PV modules used in LED based Solar Street Lights shall be warranted by the TSP for their output peak watt capacity
9.	Remote monitoring system to be capable to capture and disseminate the parameters are required in the document
10.	UPS should be able to charge through solar (as primary) and grid based power.

### 3.2.2.2 Service Provider

SNo	Functional Requirement Specification
1.	Service provider should install the equipment at the identified locations shall not pose any threat to the residents or public property
2.	Service provider should ensure operation & maintenance including cleaning of PV module of the LED street lighting system
3.	Service provider should ensure overall LED lighting system must be warranted against any manufacturing/ design/ supply/ installation defects for a minimum period of 3 years from the date of commissioning
4.	Service provider should ensure that necessary lengths of wires/cables, switches suitable for DC use and fuses should be provided
5.	Service provider should ensure that the LED lighting system is up and running for provisioned hours
6.	Service provider should ensure proper erection of the LED based Solar Street Lights at all sites
7.	Rectification of all the defects developed in the LED based Solar Street Light during Warrantee period shall have to be done by the service provider promptly
8.	Replacement of any component broken or lost due to theft or natural calamity shall not be the responsibility of the service provider

SNo	Functional Requirement Specification
9.	Service provider should ensure session logs to be push / pull to any external application
10.	Service provider should ensure supply of equipment, installation, integration, testing, Commissioning and maintenance/support of fully functional LED lighting System along with the collaborative tools, material/consumables and services at all sites
11.	Service Provider will be responsible to maintain the equipment's of LED lighting system on site, for a period of 3 years. The make & model of the product supplied by service provider for the project should not come end of support in next 5 years from the date of commissioning (OEM Certificate should be submitted by service provider).

## 4. Service Level Agreement

### 4.1 Service Level Agreement for LED Street Lighting

Service Level Agreement of Service provider																
1.	<p><b>Uptime of LED street lighting</b>  <i>"Uptime" shall mean the time period for which the specified services / components with specified technical and service standards are available at that location.</i></p> <p><i>Uptime, in percentage, will be calculated as:</i>  <i>Uptime LED street lighting % = (actual uptime of LED burning hours) / (Total Time during that period for that location) * 100 ]</i></p>															
2.	<p>Based on the uptime identified above , the following penalty shall be applicable</p> <table border="1" data-bbox="414 1455 1312 1831"> <thead> <tr> <th colspan="3">Service Availability SLAs and Penalty per location</th> </tr> <tr> <th>S.No</th> <th>Service availability value for month/quarter</th> <th>Penalty</th> </tr> </thead> <tbody> <tr> <td>a)</td> <td>&gt;= 99.7%</td> <td>Nil</td> </tr> <tr> <td>b)</td> <td>&gt; 99% but &lt; 99.7%</td> <td>1% of monthly/quarterly billed amount for that location</td> </tr> <tr> <td>c)</td> <td>&gt;= 98% but &lt; 99%</td> <td>3% of monthly/quarterly billed amount for that location</td> </tr> </tbody> </table>	Service Availability SLAs and Penalty per location			S.No	Service availability value for month/quarter	Penalty	a)	>= 99.7%	Nil	b)	> 99% but < 99.7%	1% of monthly/quarterly billed amount for that location	c)	>= 98% but < 99%	3% of monthly/quarterly billed amount for that location
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	d)	$\geq 96\%$ but $< 98\%$	5% of monthly/quarterly billed amount for that location
	e)	$\geq 90\%$ but $< 95\%$	9% of monthly/quarterly billed amount for that location
	f)	$< 90\%$	15% of monthly/quarterly billed amount for that location
<b>Penalty capping</b>			
3.	The maximum penalty is capped at 15% of the monthly/quarterly billed amount for that location		

## 4.2 Service Level Agreement for Wi-Fi Hotspot service

SI no	Service Level Agreement of Service provider																					
1.	<p><b>Uptime of wi-fi hotspot service</b>  <i>"Uptime" shall mean the time period for which the specified services / components with specified technical and service standards are available to at that location.</i></p> <p><i>Uptime, in percentage, will be calculated as:</i>  <i>Uptime wi-fi hotspot service % = (actual uptime of that wi-fi hotspot service) / (Total Time during that period for that wi-fi hotspot service) * 100 ]</i></p>																					
2.	<p>Based on the uptime identified above , the following penalty shall be applicable</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th colspan="3">System Availability SLAs and Penalty per location</th> </tr> <tr> <th>S.No</th> <th>System availability value for month/quarter</th> <th>Penalty</th> </tr> </thead> <tbody> <tr> <td>a)</td> <td><math>\geq 99.7\%</math></td> <td>Nil</td> </tr> <tr> <td>b)</td> <td><math>&gt; 99\%</math> but <math>&lt; 99.7\%</math></td> <td>1% of monthly/quarterly billed amount for that location</td> </tr> <tr> <td>c)</td> <td><math>\geq 98\%</math> but <math>&lt; 99\%</math></td> <td>3% of monthly/quarterly billed amount for that location</td> </tr> <tr> <td>d)</td> <td><math>\geq 96\%</math> but <math>&lt; 98\%</math></td> <td>5% of monthly/quarterly billed amount for that location</td> </tr> <tr> <td>e)</td> <td><math>\geq 90\%</math> but <math>&lt; 95\%</math></td> <td>9% of monthly/quarterly billed amount for that location</td> </tr> </tbody> </table>	System Availability SLAs and Penalty per location			S.No	System availability value for month/quarter	Penalty	a)	$\geq 99.7\%$	Nil	b)	$> 99\%$ but $< 99.7\%$	1% of monthly/quarterly billed amount for that location	c)	$\geq 98\%$ but $< 99\%$	3% of monthly/quarterly billed amount for that location	d)	$\geq 96\%$ but $< 98\%$	5% of monthly/quarterly billed amount for that location	e)	$\geq 90\%$ but $< 95\%$	9% of monthly/quarterly billed amount for that location
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	f)	< 90%	15% of monthly/quarterly billed amount for that location
<b>Penalty capping</b>			
3.	The maximum penalty is capped at 15% of the monthly/quarterly billed amount for that location		

## 5. Session logs

To enable central monitoring of the service delivery, the following parameters are proposed to be captured and pushed/ pulled to the external centralized monitoring application from the remote monitoring system of LED street lighting, Wi-Fi Hotspot component and L2 switch or any other component as required.

Authentication	Session	Hardware	User details	Demography	Network
User ID (of service provider)	Start time	Mac ID	Name of Service provider	Gram Panchayat name	Avg. packet loss
Access ID/ Participants ID (end users)	End Time	Device ID		Block name	Max. packet loss
SSID/Security	Date of session			District name	IP address (IPv4)
	Daily Logins			State Name	IPv6
	Time Used				Avg Jitter
	Expire In				Max Jitter
	Expire Out				Bandwidth capacity estimate
	Download & Upload (in Mb/Gb per device)				Link Speed
				L3 & L2 Up	
				L3 & L2 Down	

\*\*\*\*END\*\*\*\*