

Communication requirements for next generation smart metering use cases

	SM Interface (WAN or HAN)	Communication type	Required data speed [Kbyte/sec]	Required latency [sec.]	Message size	Number of messages	SLA = data availability at system level to a pre-defined time [% of total meters]	Max. rural area expected density meters / Km2	Max. urban area expected density meters / Km2
Smart metering UC									
- Limitation of actual power consumption - Heartbeats	WAN	* demand - response * data push	> = 1 Kbit/ s	<= 10 s	< 1Kbyte	* on demand * 1 per minute	> 99% > 95%	100	2500
Grid stability via power limitation at Grid Connection Point	WAN	demand - response	> = 1 Kbit/ s	<= 10 s	< 1Kbyte	on demand	> 99%	100	2500
Near to power limit notification	WAN	data push	> = 10 Kbit/ s	<= 1 s	< 1Kbyte	on demand	> 99%	100	2500
Monitoring of Grid Connection Point (incl. PV)	WAN	data push	> = 10 Kbit/ s	<= 1 s	< 1Kbyte	6 per minute	> 95%	100	2500
Exchange of NRTD	WAN	data push	> = 10 Kbit/ s	<= 10 s	< 1Kbyte	1 - 6 per minutes	> 95%	100	2500
Exchange of load curves	WAN	demand - response	> = 1 Kbit/ s	<= 10 s	1 - 2kbyte	on demand	> 99%	100	2500
Dynamic tariff & usage management	WAN & HAN	demand - response	> = 1 Kbit/ s	<= 10 s	1 - 2kbyte	on demand	> 99%	100	2500
Provide dashboard to inform user about status and stimulate to use opportunities	WAN	demand - response	> = 1 Kbit/ s	<= 10 s	1 - 2kbyte	on demand	> 99%	100	2500
Monitoring active power consumption	WAN & HAN	data push	> = 10 Kbit/ s	<= 1 s	< 1Kbyte	6 per minute	> 95%	100	2500
Energy monitoring and management	WAN & HAN	demand - response	> = 1 Kbit/ s	<= 10 s	1 - 2kbyte	on demand	> 99%	100	2500
Unified user interface	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100	2500
Awareness and notifications	HAN	data push	> = 10 Kbit/ s	<= 1 s	< 1Kbyte	6 per minute	> 95%	100	2500
Monitoring energy consumption	HAN	data push	> = 10 Kbit/ s	<= 1 s	< 1Kbyte	6 per minute	> 95%	100	2500
Appliance level real time energy consumption reduction.	Local data stream	demand - response data push	>1350 - 2160 kbit/s OR raw (analogue) voltage and current signals	<< 750ms sec	Voltage and current samples 16-24 bits OR raw (analogue) voltage and current signals	constant	> 95%	100	2500
Appliance level real time behavioral demand side response.									
Real Time identification, location, & detection of grid faults.	WAN	stream to the cloud (via wifi)	> 10 kbit/s	<< 750ms sec	Up to 5mb waveforms current, voltage to disaggregator's cloud per day ongoing basis Flexing up to 80mb per day during first 4 weeks post install to disaggregator's cloud	1 per second	> 95%	100	2500
Maximize flexible energy consumption in premises	HAN	demand - response data push	> = 1 Kbit/ s	<= 10 s	< 1Kbyte	on demand 1 per minute	> 99% > 95%	100	2500
Time of use tariffs	WAN	demand - response	> = 1 Kbit/ s	<= 10 s	1 - 2kbyte	on demand	> 99%	100	2500
Flexibility provision	WAN & HAN	demand - response data push	> = 1 Kbit/ s	<= 10 s	< 1Kbyte	on demand 1 per minute	> 99% > 95%	100	2500
Manage peak load to avoid increases in the electricity invoice (peak shaving)	WAN & HAN	demand - response	> = 1 Kbit/ s	<= 10 s	1 - 2kbyte	on demand	> 99%	100	2500
Peak shaving via direct control of heat pump	WAN & HAN	demand - response	> = 1 Kbit/ s	<= 10 s	1 - 2kbyte	on demand	> 99%	100	2500
Flexibility aggregation of commercial buildings								100	2500
Convenient smart EV charging at commercial buildings								100	2500
Flexibility management for distribution grid support								100	2500
Monitoring security	WAN	data push (demand response for eg configuration)	> = 10 Kbit/ s	<= 1 s	< 1Kbyte	on demand	> 99%	100	2500
Monitoring the Wide Area communication Network	WAN	data push (demand response for eg configuration)	> = 10 Kbit/ s	<= 1 s	< 1Kbyte	daily down to every 15 min	> 99%	100	2500
Update individual functions	WAN	demand - response	> = 20 Kbit/ s	<= 10 s	up to 2Mbyte	on demand	> 99%	100	2500