

An aerial night view of a city with a network overlay. The city is illuminated with blue and white lights, and a network of glowing blue nodes and lines is superimposed over the scene, representing a smart city or IoT network. The background is dark, making the city lights and network overlay stand out.

QUECTEL

Quectel BG77xA-GL&BG95xA-GL LPWA Module

Introduction

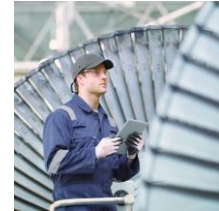
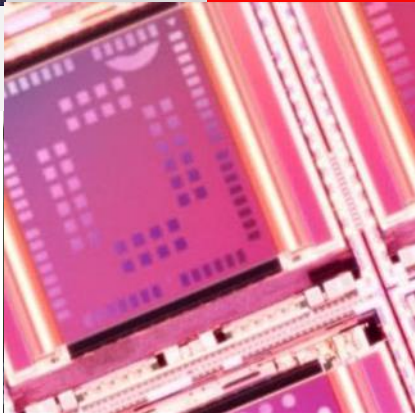
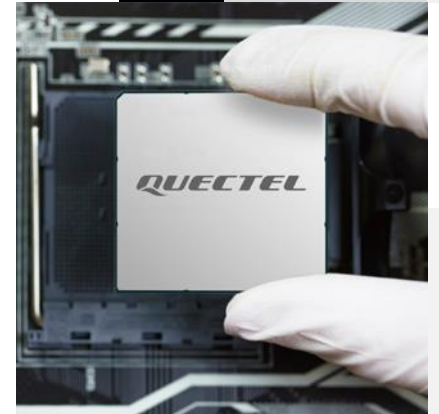
Build a Smarter World



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LPWA Introduction & Portfolio

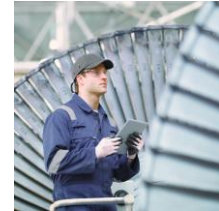
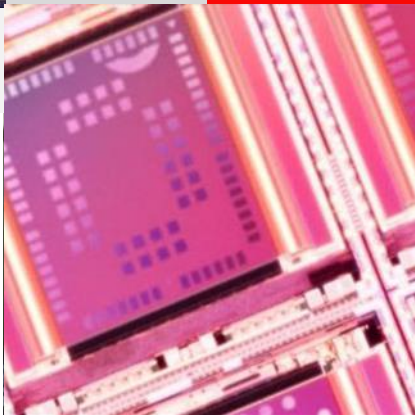
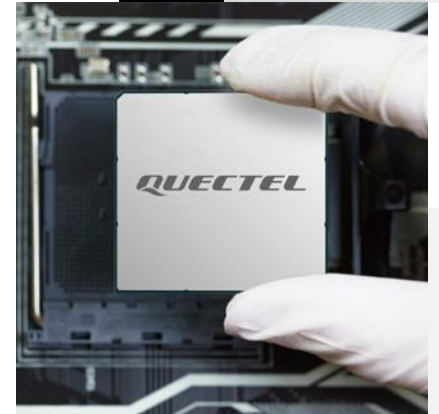
Specifications & Timelines

Advantages

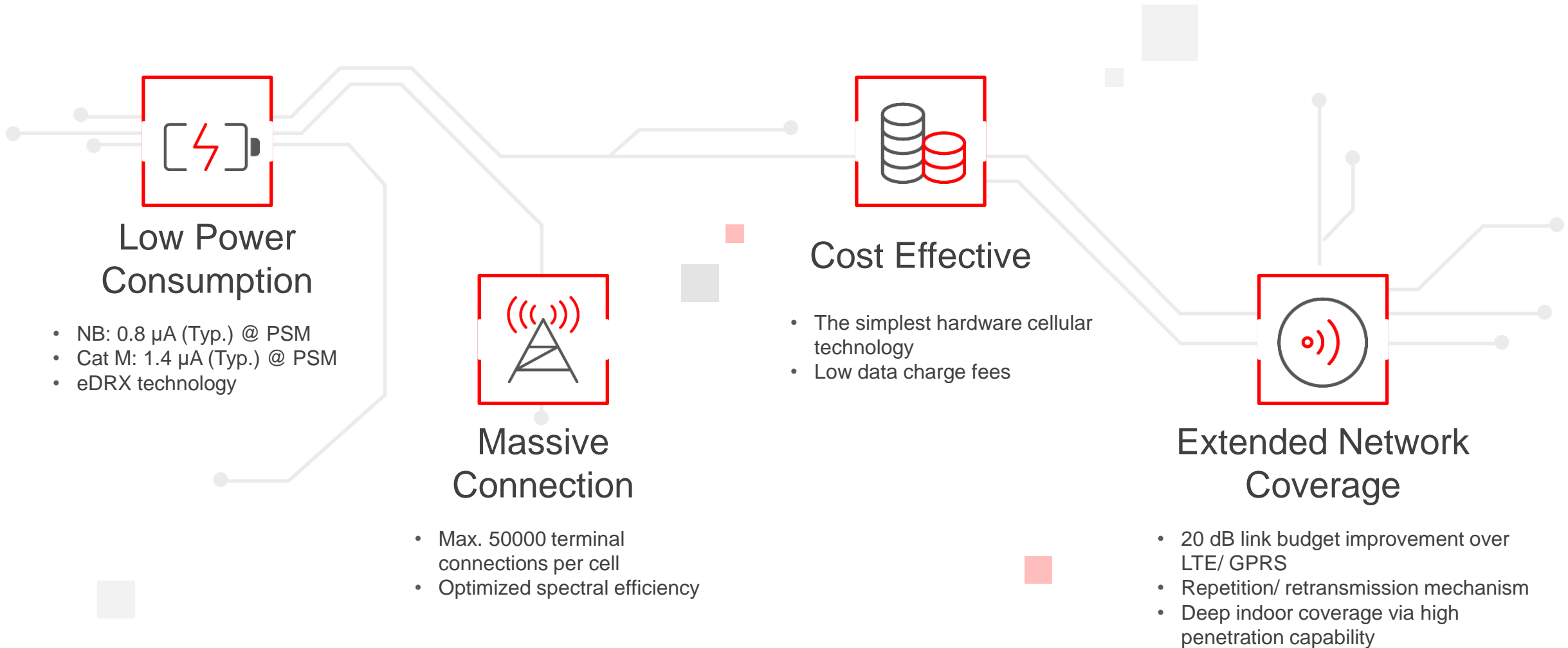
Typical Applications

Appendix

Build a Smarter World



LPWA Technical Advantages



LPWA Network Deployment



Mobile IoT Global Coverage	
Cat M & NB	NB

Note:
 1. Information sourced from GSMA and revised by Quectel, updated on Mar, 2023
 2. For more operator deployment details, please refer to [Appendix](#)

BG95xA-GL

BG77xA-GL

ALT1250



BG950A-GL

- Cat M/ NB
- Standard Version
- Cost Efficient



BG951A-GL

- Cat M/ NB
- WWAN & GNSS Concurrency



BG770A-GL

- Cat M/ NB
- Super Compact Size



BG952A-GL

- Cat M/ NB
- QuecOpen®



BG953A-GL

- Cat M/ NB
- iSIM



BG772A-GL

- Cat M/ NB
- QuecOpen®



BG955A-GL

- Cat M/ NB/ GPRS



BG773A-GL

- Cat M/ NB
- iSIM



LPWA Introduction & Portfolio

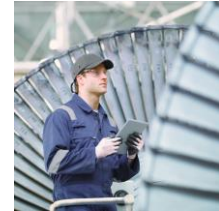
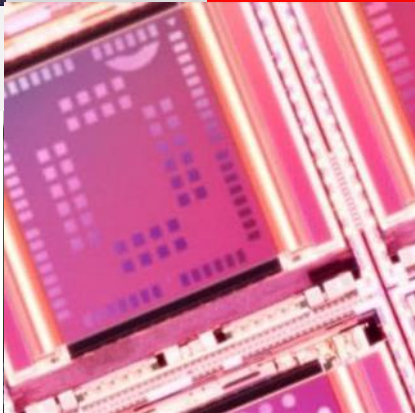
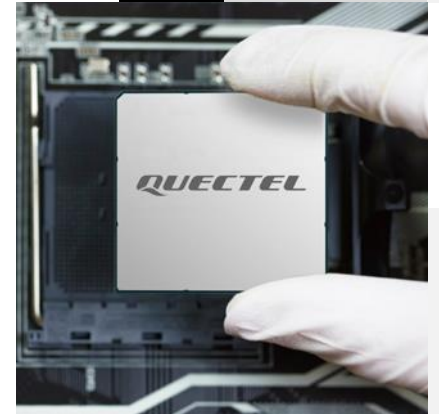
Specifications & Timelines

Advantages

Typical Applications

Appendix

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BG95xA-GL Series Highlights



Global certification:
Global mainstream carriers covered.

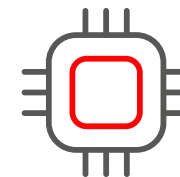


Enhanced features:
DFOTA, GNSS, QuecOpen[®],
Jamming Detection, iSIM[®], etc.

Classic Form Factor: 23.6 × 19.9 × 2.2 mm



Low power consumption:
Applicable to battery-powered devices.



Mature platform:
Sony ALT1250 based.

BG95xA-GL Series Specifications



Variant	BG950A-GL	BG951A-GL	BG952A-GL	BG953A-GL	BG955A-GL	
Cat M Band	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66					
NB Band	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 17/ 18/ 19/ 20/ 25/ 28/ 66					
GPRS Band	-	-	-	-	Quad-band	
WWAN & GNSS Concurrency	-	Supported	-	-	-	
QuecOpen®	-	-	Supported	-	-	
iSIM	-	-	-	Supported	-	
Power Class	Power Class 3	Power Class 3	Power Class 3	Power Class 3	Power Class 3	
Supply Voltage	2.2–4.35 V, Typ. 3.3 V				3.3–4.3 V, Typ. 3.8V	
Ultra Low Power Consumption	Power Saving Mode: 1.5 μ A eDRX: 0.07 mA @ eDRX = 81.92 s; PTW = 1.28 s; DRX = 1.28 s (Cat M)					
Positioning	GNSS; QuecLocator®					
SW Feature	TCP/ PPP/ UDP/ SSL/ MQTT/ FTP(S)/ HTTP(S) / LwM2M/ IPv4/ IPv6/ TLS/ DTLS/ PING/ CoAP/ NITZ/ DFOTA/ SMS/ Jamming Detection*					
HW Peripheral Interface	UART/ (U)SIM/ USB/ I2C/ SPI/ ADC/ GPIO/ GRFC (Antenna Tuner)/ NET_STATUS/ STATUS/ Antenna Interface					
Compatibility	Compatible with Quectel BG95 Series & BG96					
Certification ^②	Carrier	Vodafone/ Deutsche Telekom/ AT&T/ KT/ LGU+/ KC/ T-Mobile ^① / Rogers ^① / Telus ^① / Telstra*/ Verizon*	Vodafone/ Deutsche Telekom/ AT&T/ KT/ LGU+/ Verizon*/ Telstra*/ T-Mobile ^①	AT&T/ Telstra*	TBD	TBD
	Regulatory	GCF/ CE/ PTCRB/ FCC/ IC/ KC/ JATE/ TELEC/ RCM	GCF/ CE/ PTCRB/ FCC/ IC/ KC/ JATE/ TELEC/ RCM	GCF/ CE/ PTCRB / FCC/ IC/ RCM	JATE/ TELEC/ CE/ FCC*/IC*/RCM/GCF*/ PTCRB*	CE/ FCC/ IC/ RCM
Project Stage	MP	MP	CS	CS	CS	

BG950A-GL Timeline



2022					2023											
Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

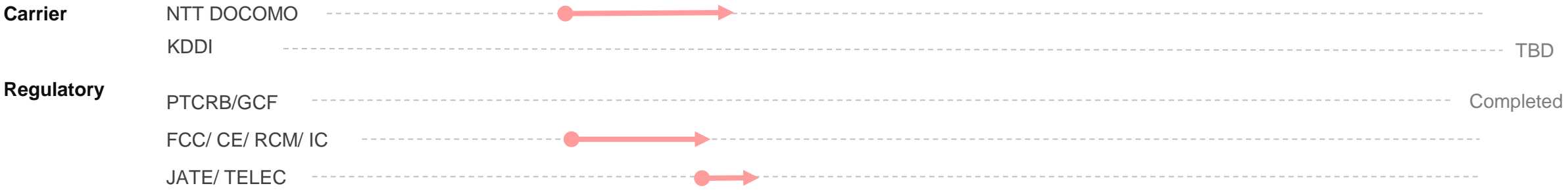
Project Stage



Certification



RK3.2 R02 Version

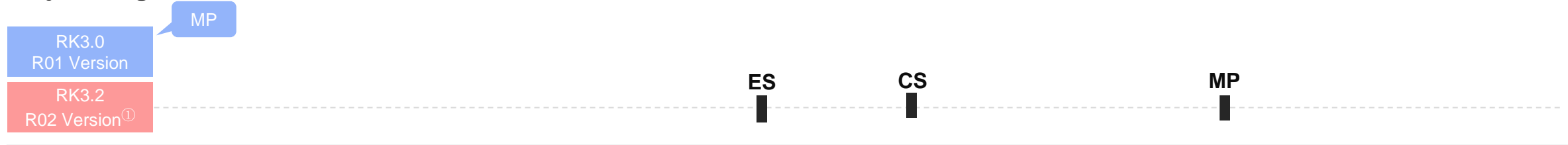


BG951A-GL Timeline

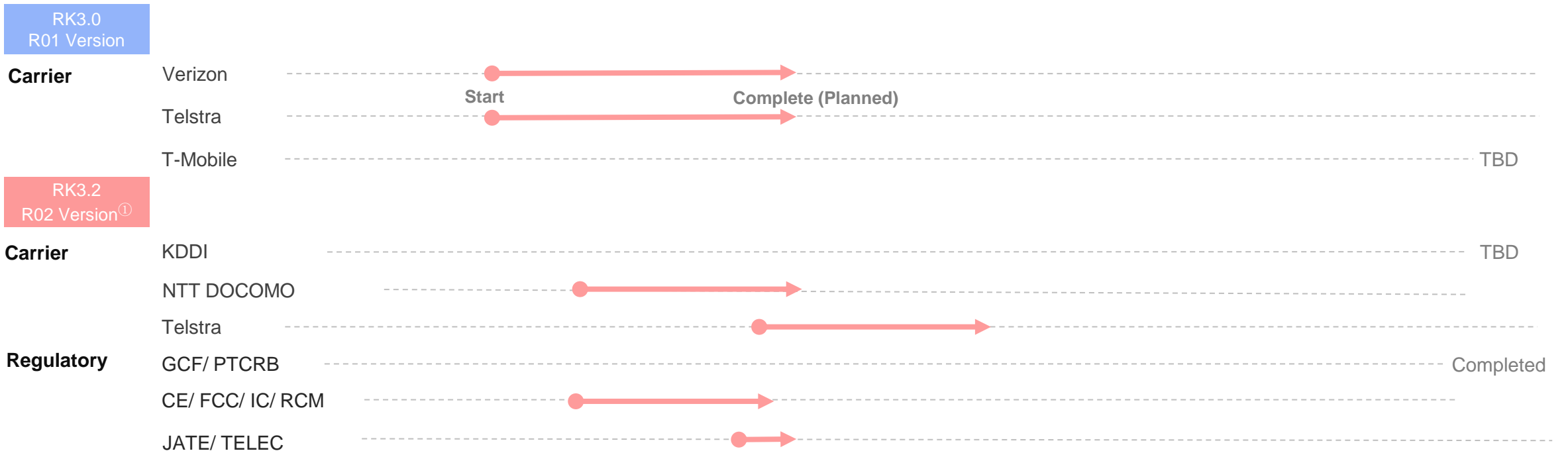


2022					2023										
Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.

Project Stage



Certification



BG952A-GL Timeline



2022						2023							
Jan.	Feb.	Mar.	...	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.

Project Schedule



Certification

RK3.0
R01 Version



BG953A-GL Timeline



2022						2023						
Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.

Project Schedule



Certification



BG955A-GL Timeline

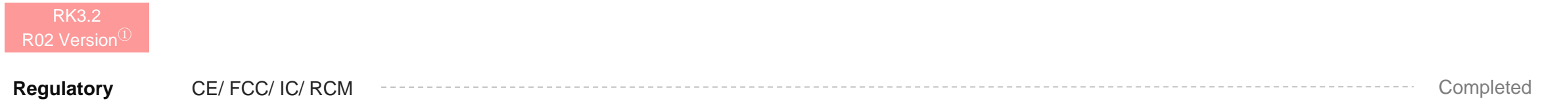


2022				2023									
Jun.	Jul.	...	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.

Project Schedule



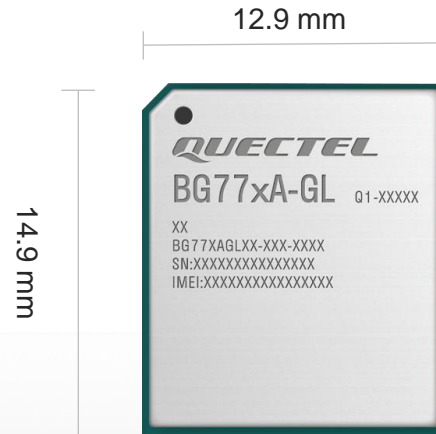
Certification



BG77xA-GL Series Highlights



Global certification:
Global mainstream carriers covered.

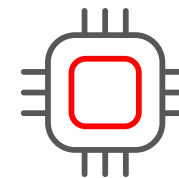


Enhanced features:
DFOTA, GNSS, QuecOpen[®],
Jamming Detection, iSIM[®], etc.

Classic Form Factor: 14.9 × 12.9 × 1.9 mm



Low power consumption & Small size:
Applicable to battery-powered, size-sensitive devices.



Mature platform:
Sony ALT1250 based.

BG77xA-GL Series Specifications



Variant		BG770A-GL	BG772A-GL	BG773A-GL
Cat M Band		B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66		
NB Band		B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 17/ 18/ 19/ 20/ 25/ 28/ 66		
Power Class		Power Class 3		
QuecOpen®		-	Supported	-
iSIM		-	-	Supported
Supply Voltage		VBAT_BB: 2.2–4.35 V; VBAT_RF: 3.1–4.35 V; Typ. 3.3 V		
Ultra Low Power Consumption		Power Saving Mode: 1.4 μ A eDRX: 0.07 mA @ eDRX = 81.92 s; PTW = 1.28 s; DRX = 1.28 s (Cat M)		
Positioning		GNSS; QuecLocator®		
SW Protocol		TCP/ PPP/ UDP/ SSL/ MQTT/ FTP(S)/ HTTP(S) / LwM2M/ IPv4/ IPv6/ TLS/ DTLS/ PING/ CoAP/ NITZ/ DFOTA/ Jamming Detection*		
HW Peripheral Interface		UART/ (U)SIM/ USB/ I2C/ SPI/ ADC/ GPIO/ GRFC (Antenna Tuner)/ NET_STATUS/ STATUS/ Antenna		
Compatibility		Compatible with BG77		
Certification ^②	Carrier	Vodafone/ Deutsche Telecom/ Verizon/ AT&T/ KT/ SKT/ LGU+/ NTT DOCOMO/ Telstra*	Deutsche Telecom/ AT&T/ T-Mobile ^① / KT/ Telstra*	TBD
	Regulatory	GCF/ CE/ PTCRB/ FCC/ IC/ KC/ JATE/ TELEC/ RCM/ ICASA	GCF/ CE/ PTCRB/ FCC/ IC/ KC/ JATE/ TELEC/ RCM	JATE/ TELEC/ GCF*/ CE*/ PTCRB* / FCC*/ IC*/ RCM*
Project Stage		MP	MP	CS

BG770A-GL Timeline

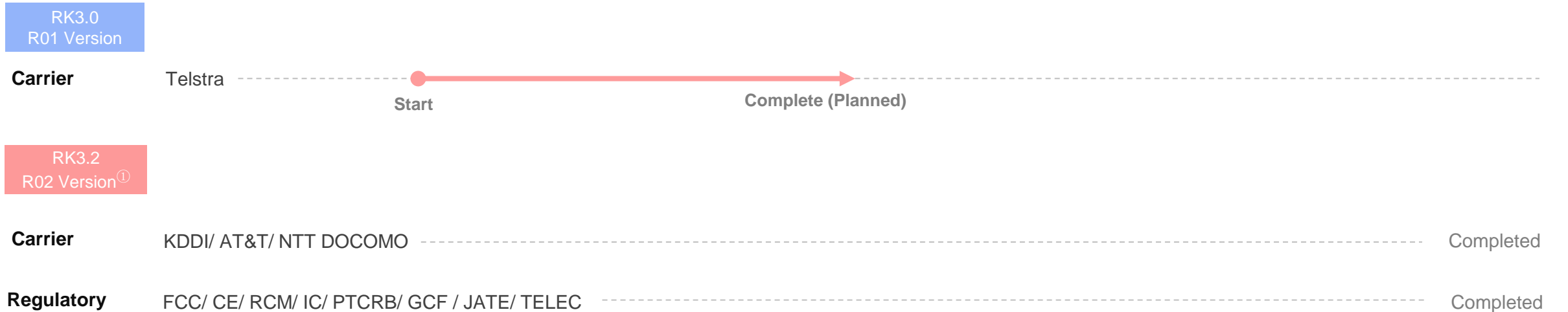


2022			2023							
Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.

Project Stage



Certification



BG772A-GL Timeline



2021		2022				2023									
Nov.	Dec.	Jan.	...	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Set.	Oct.	Nov.

Project Schedule



Certification



Carrier



BG773A-GL Timeline

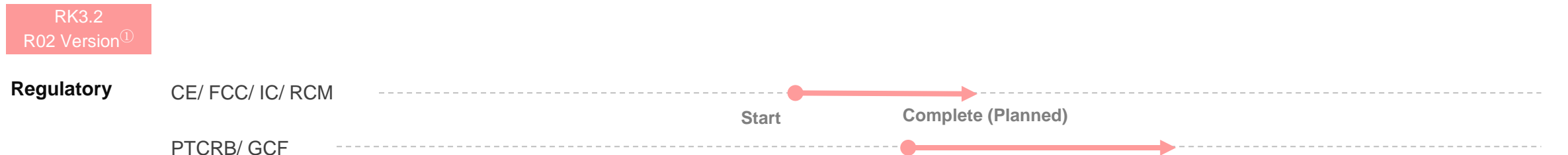


2022							2023									
Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.

Project Schedule



Certification





LPWA Introduction & Portfolio

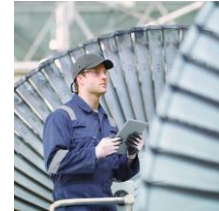
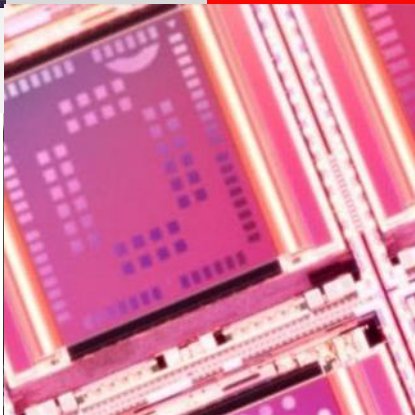
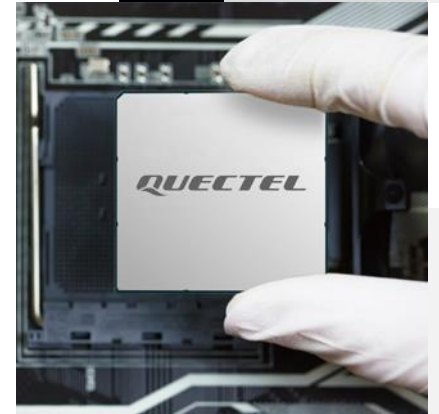
Specifications & Timelines

Advantages

Typical Applications

Appendix

Build a Smarter World

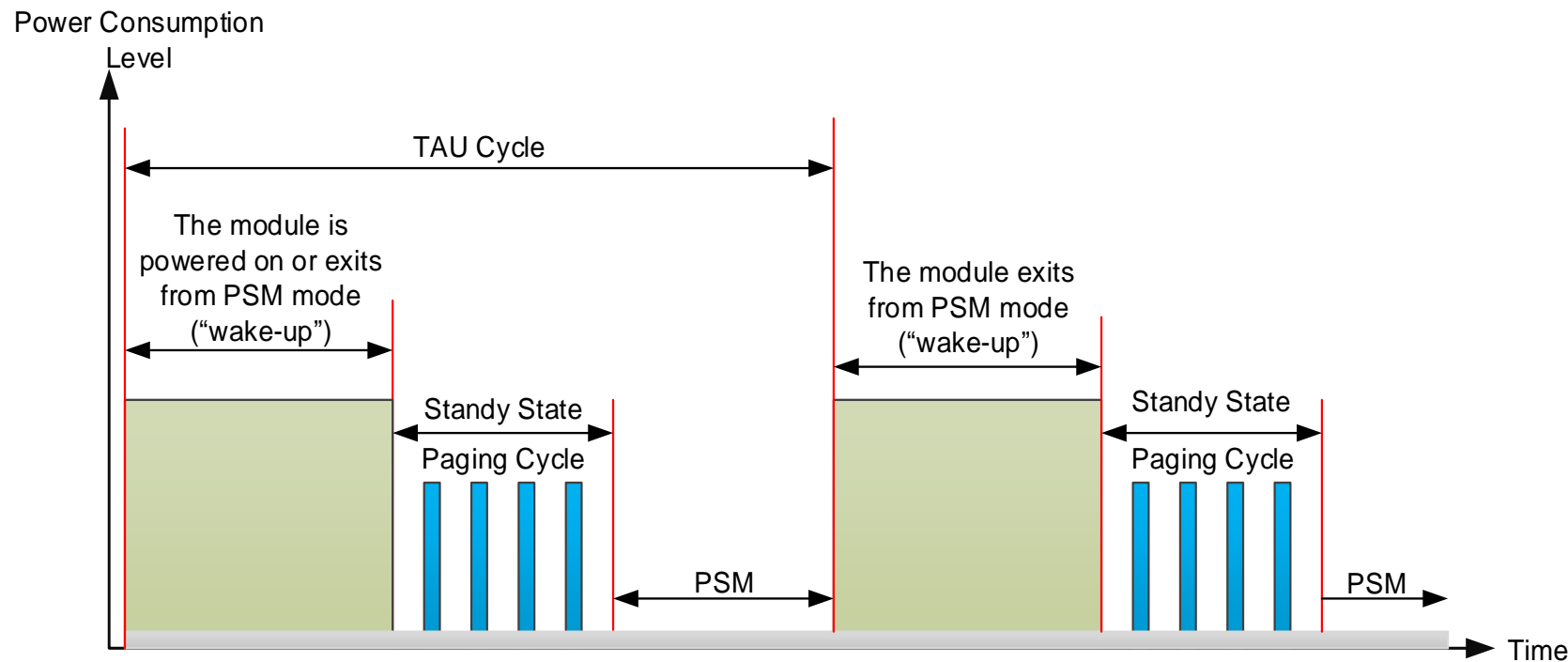


PSM

The Power Saving Mode (PSM) is similar to a power-off status, with one difference being that the module in PSM remains registered on the network. Therefore, when the module is woken up from PSM, there is no need to re-attach it to the network. When the module is in PSM, it is not reachable for mobile terminating services. PSM is thus intended for applications that expect only infrequent mobile originating and terminating services and those which can accept a corresponding latency in the mobile terminating communication.

If the module is to use PSM, it shall request an Active Time value during every Attach and TAU procedures. A network that supports PSM and allows the module to enter it will confirm the enablement of PSM by allocating an Active Time value to the module.

The following figure illustrates the power consumption cycle of the module.

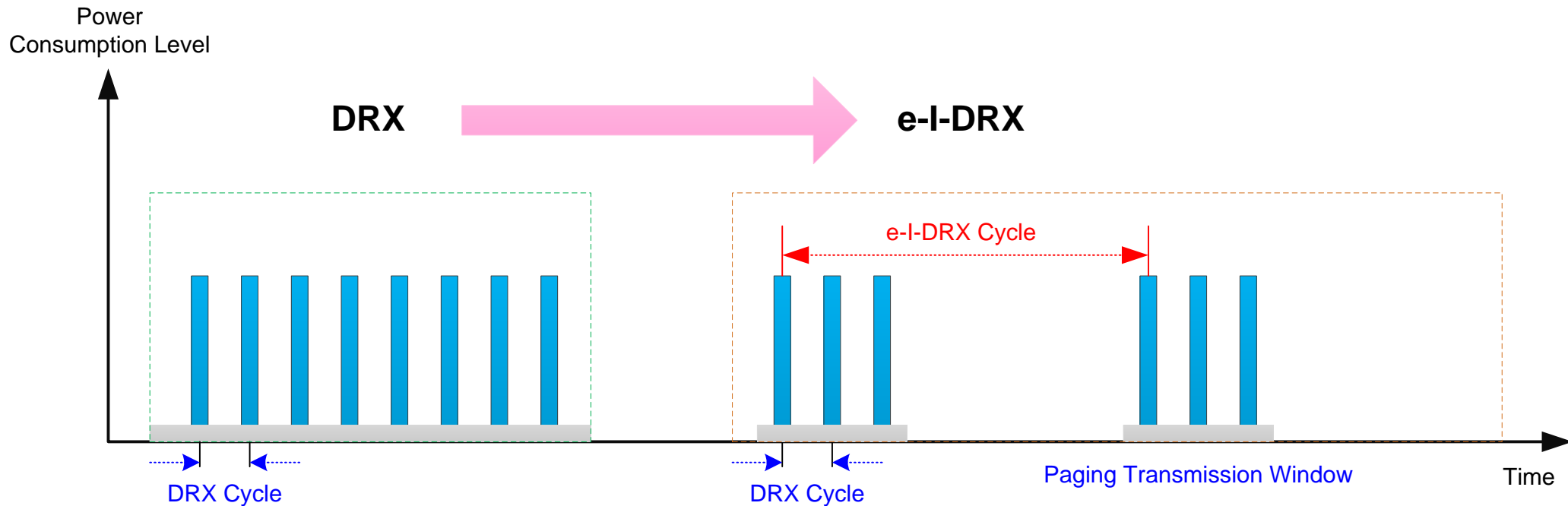


e-I-DRX

The module (UE) may negotiate with the network in the non-access stratum over the use of e-I-DRX to reduce its power consumption while remaining responsive to mobile terminated data and/or network originated procedures with a delay depending on the DRX cycle value.

To use e-I-DRX in applications, two things need consideration: its special handling of mobile terminating services and data transfers, and, most importantly, the delay tolerance of mobile terminated data.

The following figure illustrates the DRX and e-I-DRX cycle of the module.

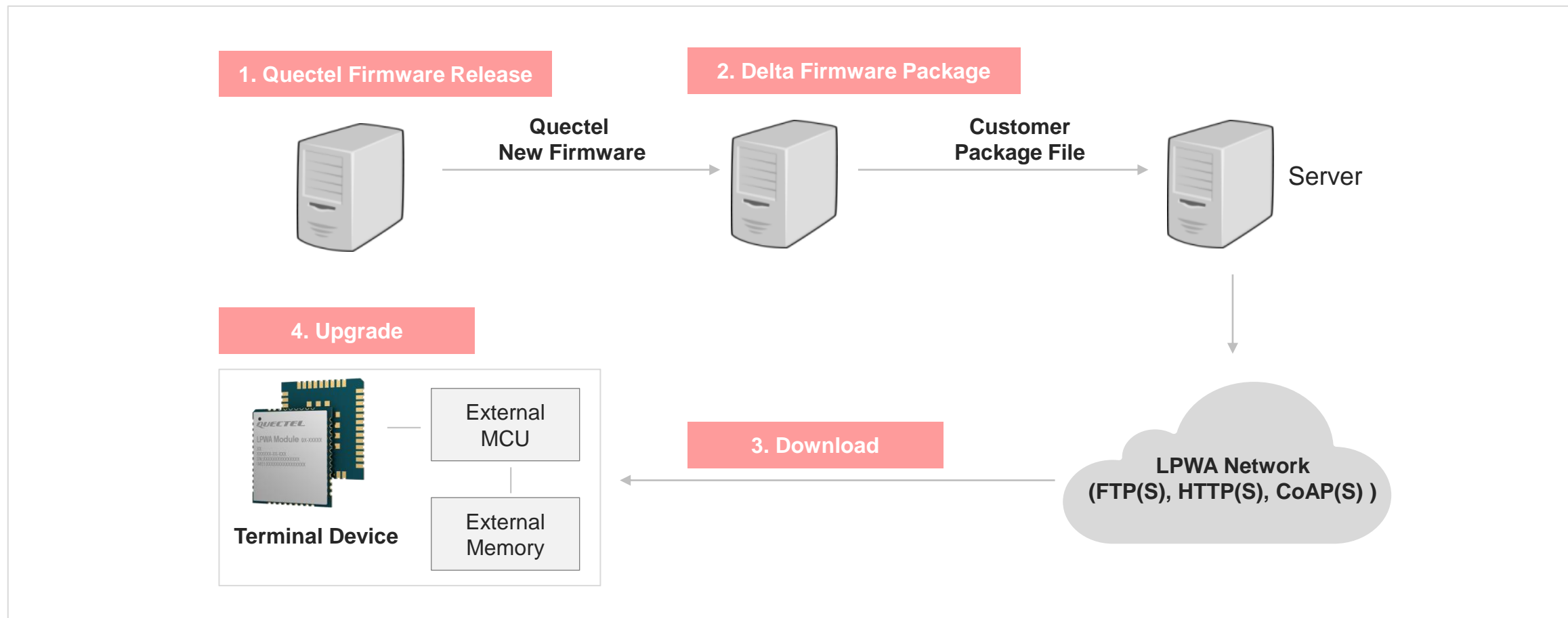


DFOTA



DFOTA (Delta Firmware Upgrade Over-The-Air)

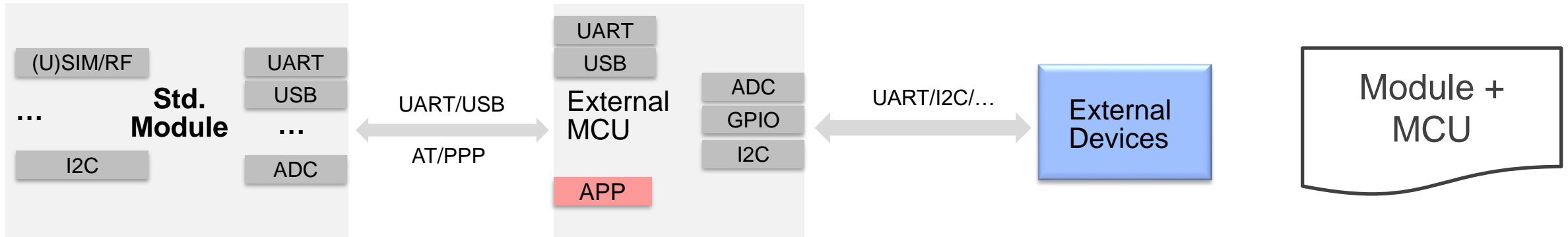
Quick firmware upgrade through cellular networks owing to differential upgrade, delta firmware package, and fast download speed.



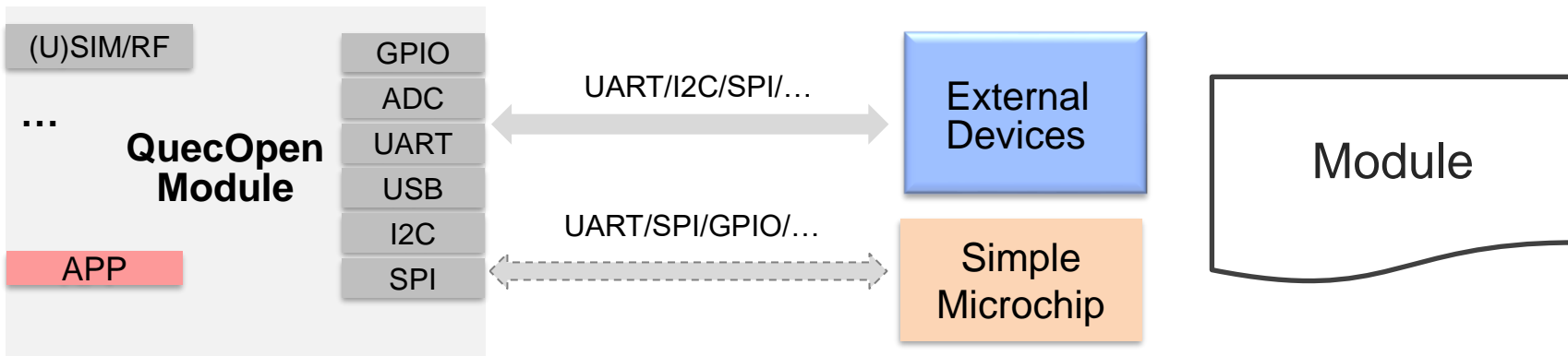
QuecOpen® vs. Standard Mode



Standard Module Mode

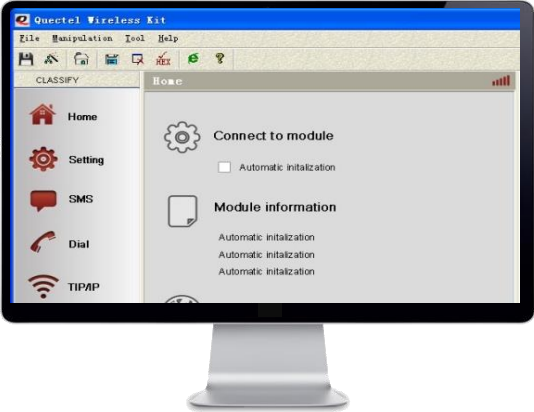


QuecOpen® Mode



- Simplify circuit design and reduce product size.
- Rich hardware interfaces, strong performance and easy development.
- Reduce costs by eliminating the need for external MCU.

Support Package



Quectel provides a graphical user interface (GUI) tool QNavigator, which can help customers quickly test the functions of Quectel modules.

EVB Kit



BG95xA-GL/ BG77xA-GL

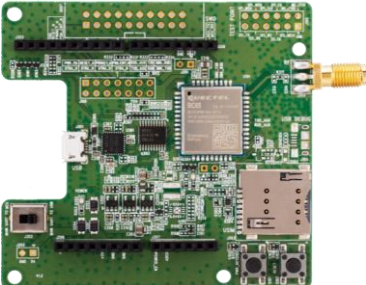
TE-B



BC660K-GL TE-B



BC92 TE-B



BC65 TE-B

EVB: Evaluation Board



LPWA Introduction & Portfolio

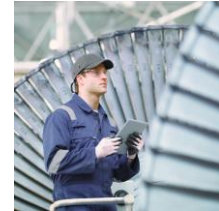
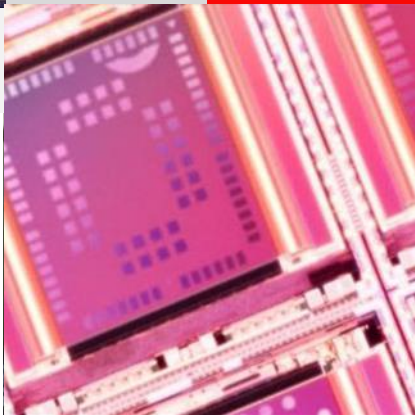
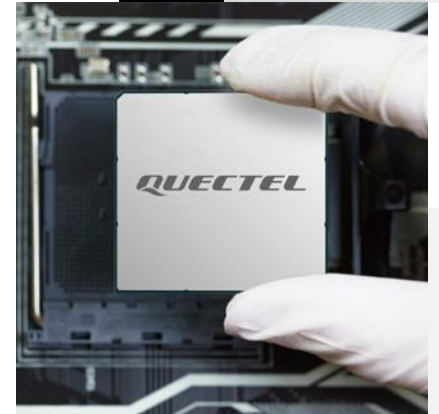
Specifications & Timelines

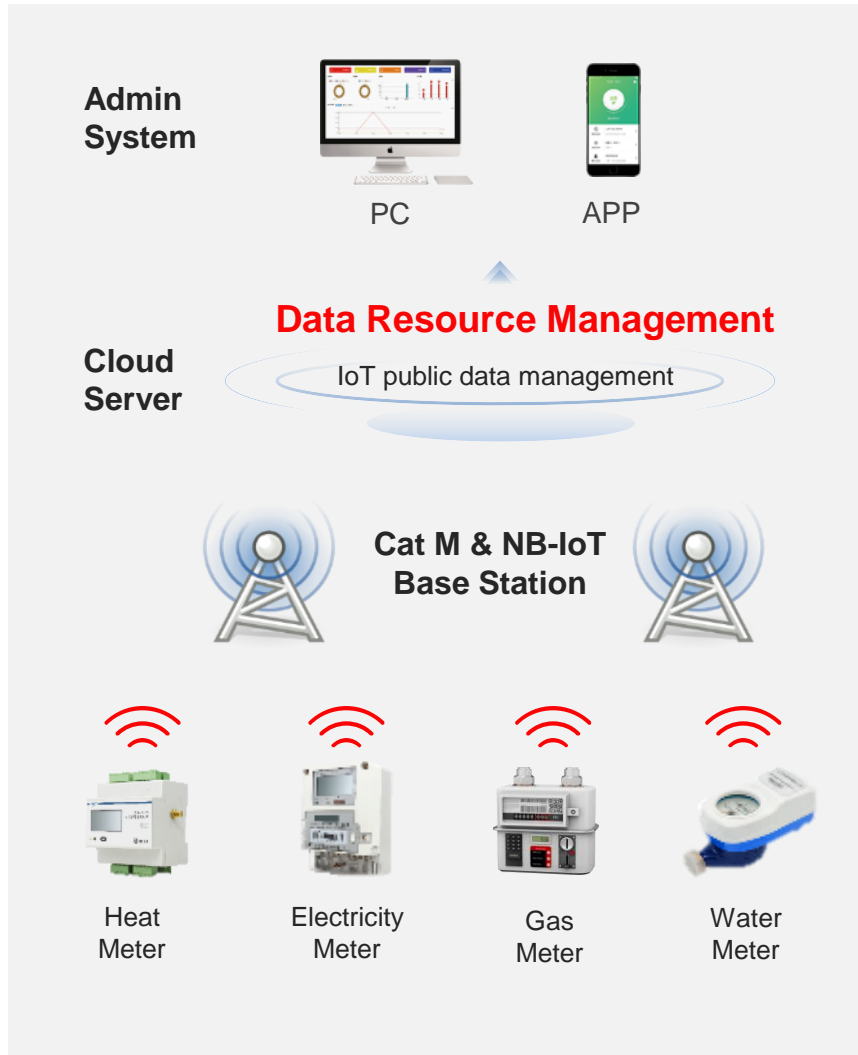
Advantages

Typical Applications


Appendix

Build a Smarter World






Remote Meter Reading




- Solve the problems of low efficiency and high cost caused by manual reading
- Real-time information of power/ water/ gas consumption

Data Analysis




- Automatically generate statistical report
- Provide accurate calculation of production and sales difference
- Regional consumption statistics
- Annual, monthly and daily consumption statistics

Energy Conservation



- Report abnormal dosage immediately
- Save energy

Stable and Reliable Data Transmission



- Establish information management system
- Improve energy consumption management
- Meet the requirements of certain data encryption

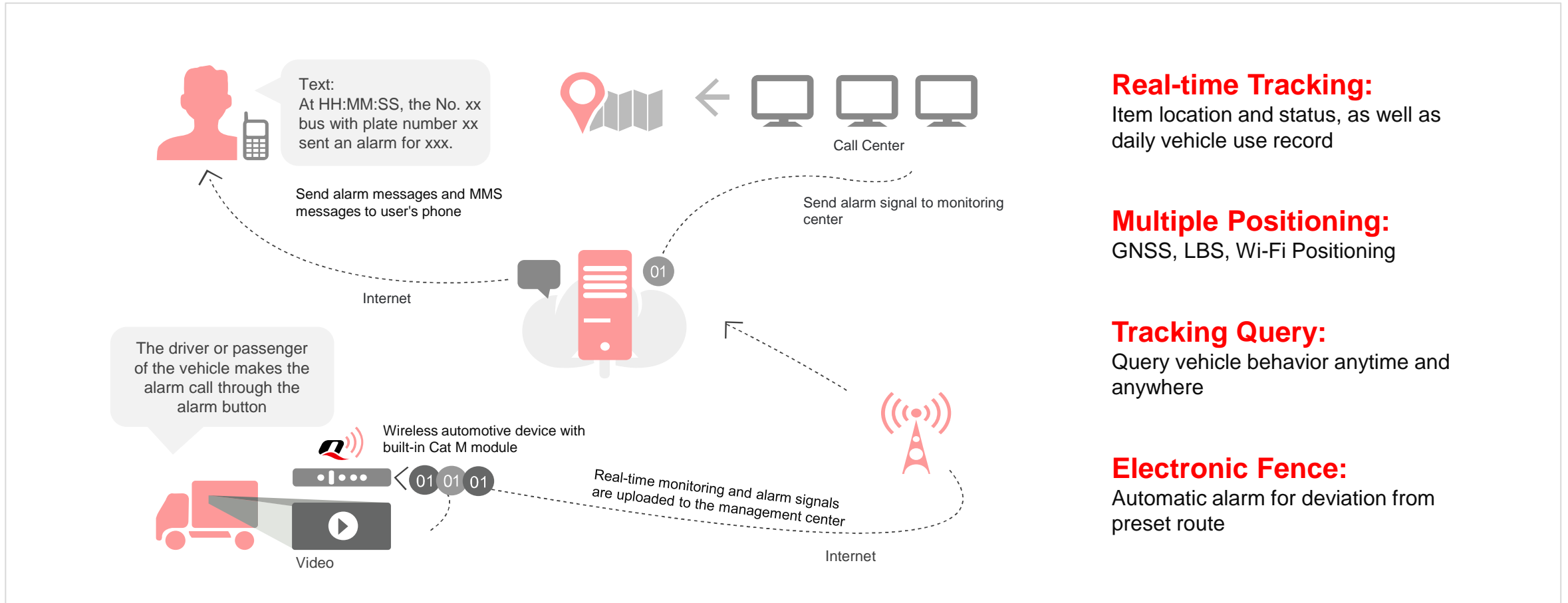
Vehicle Tracking

Goods Tracking

Asset Tracking

Pet Tracking

Person Tracking



Real-time Tracking:

Item location and status, as well as daily vehicle use record

Multiple Positioning:

GNSS, LBS, Wi-Fi Positioning

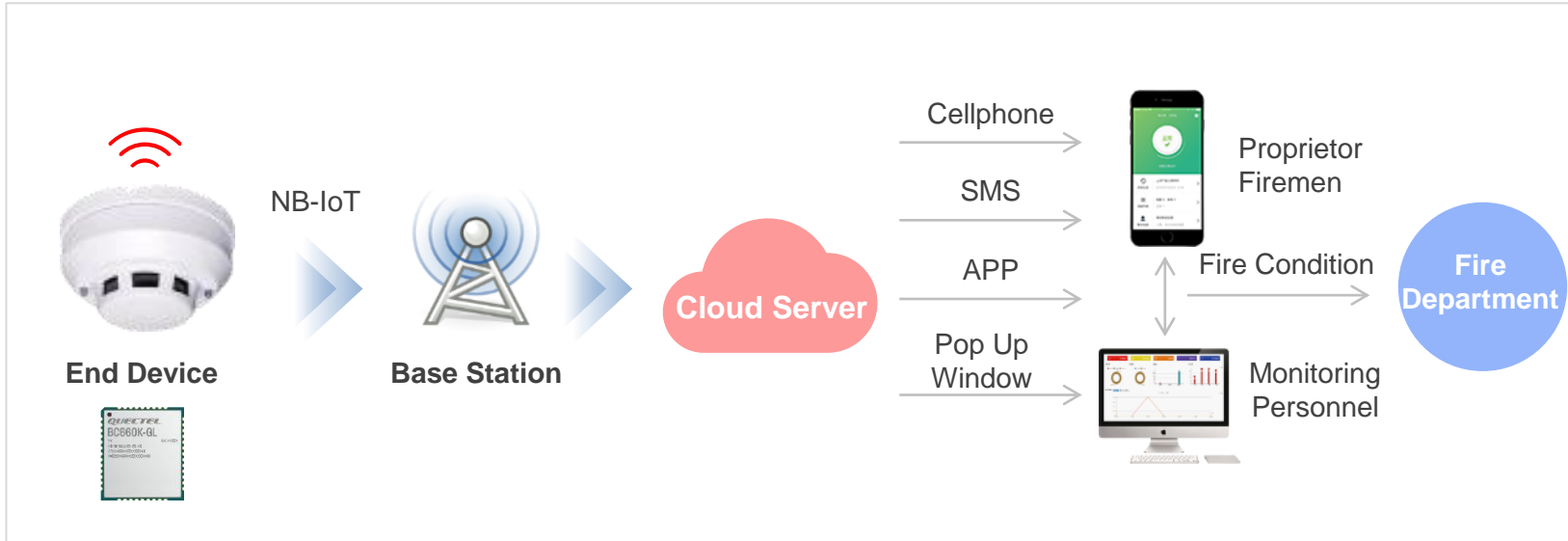
Tracking Query:

Query vehicle behavior anytime and anywhere

Electronic Fence:

Automatic alarm for deviation from preset route

Smart Sensor Detector



Features

- Long battery life
- Extended communication distance
- Battery-under-voltage reminder function
- Anti-disassembly, anti-theft and timely reminder functions
- The wireless communication adopts NB-IoT technology with strong transmission capability
- Hazardous gas monitoring, including VOCs, combustibles and toxics, etc.



Easy Connection to Sensors

Provide abundant hardware interfaces to connect to peripheral sensors



Quick Response

Audible and visual alarms, and remote alarms (notified through SMS, WeChat, telephone, etc.)



Easy Installation and Remote Maintenance

Wireless issue diagnosis implementation without physical damage



Public Cellular Network

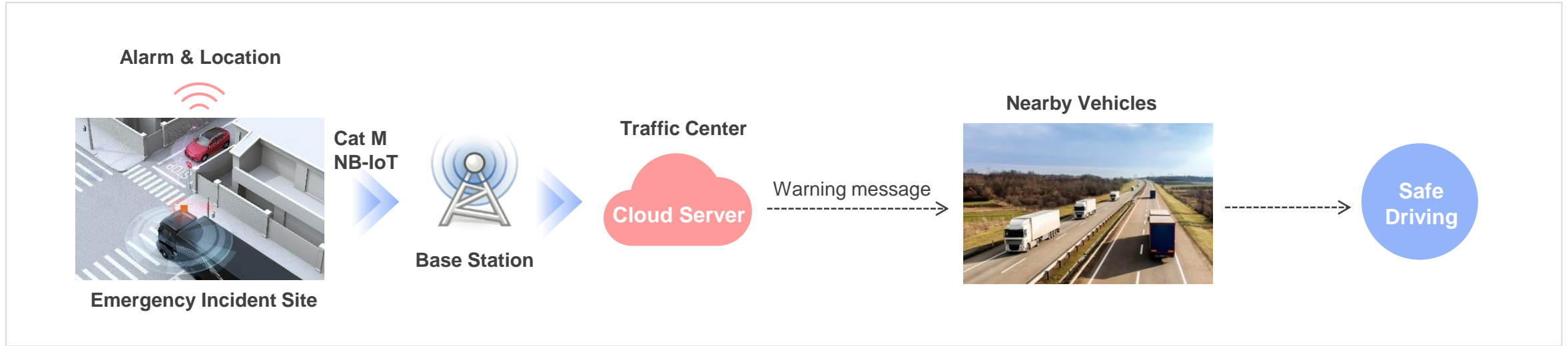
No need for Wi-Fi configuration

SMS: Short message service

APP: Application

VOC: Volatile organic compound

Smart Traffic – Emergency Light



Quick Response

NB module sends location information to traffic center immediately after emergency incident happens.

Alarm Trigger

Alarm will be triggered via NB modules control signal.

Management

Platform server send the location to other vehicles nearby with NB modules.

Warning Sign Substitute

Emergency lights will replace traditional emergency tripod in the future.

LPWA Application Scenarios



Public Utilities

- Water/ Gas Metering
- Smart Parking
- Fire Hydrant
- Smoke Detector
- Street Lighting
- Smart Dustbin



Smart Life

- Asset Tracking
- Wearable Devices
- Person/ Pet Tracking



Industry & Agriculture

- Gas Detector
- Soil PH/ Optical Sensor
- Machine Alarm
- Irrigation Controller



Smart Home

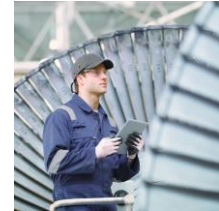
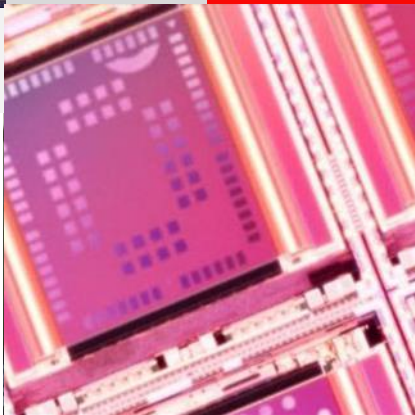
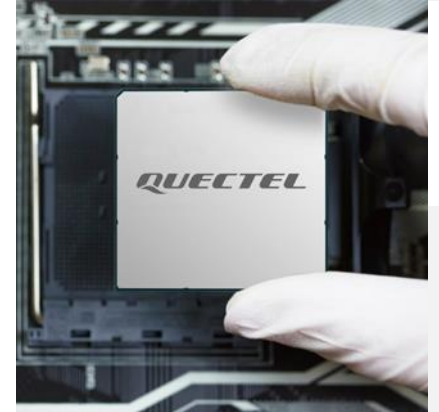
- Intelligent Door Lock
- Intelligent Control



LPWA Introduction
Module Portfolio
Specifications & Timelines
Enhanced Technologies
Typical Applications

Appendix

Build a Smarter World



Appendix – NB Deployment (1/2)



NB = 122								
Country/ Region	Operator	Bands	Country/ Region	Operator	Bands	Country/ Region	Operator	Bands
Argentina	Claro	4, 28	China	China Telecom	5	France	SFR	20
Argentina	MNO Personal	28	China	China Unicom	3, 8	Germany	Telefónica	8, 20
Argentina	Movistar	4, 28	China(Hong Kong)	3 Hong Kong	8	Germany	Vodafone	20
Australia	Telstra	28	China(Hong Kong)	China Mobile	3	Germany	Deutsche Telekom	8, 20
Australia	Vodafone	8	China(Hong Kong)	SmarTone	8	Greece	Vodafone	20
Australia	Optus	28	China(Taiwan)	APTG	8	Greece	T-Mobile (Cosmote)	20
Austria	A1	20	China(Taiwan)	Chunghwa	8	Hungary	T-Mobile	20
Austria	T-Mobile (Magenta)	8	China(Taiwan)	FarEasTone	28	Hungary	Vodafone	20
Bangladesh	Grameenphone	3, 8 (TBC)	China(Taiwan)	Taiwan Mobile	28	India	Reliance Jio	3, 5
Belarus	A1	/	Colombia	Claro	5	Indonesia	Telkomsel	8
Belarus	Velcom	8	Colombia	Movistar	5	Indonesia	XL Axiata	8
Belgium	BASE (Telenet)	3, 20	Croatia	A1	20	Ireland	Vodafone	20
Belgium	Proximus	20	Croatia	T-Mobile (DT)	8, 20	Italy	Vodafone	20
Belgium	Orange	3,20	Czech	Vodafone	8, 20	Italy	Telecom Italia/ TIM	20
Brazil	Claro	3, 28	Denmark	Telenor	20	Japan	SoftBank	1, 8
Brazil	Vivo	3, 28	Denmark	Telia	20, 8	Kazakstan	KCELL	/
Brazil	Telecom Italia/ TIM	28	Denmark	TDC	20	Kenya	SafariCom	8
Canada	Rogers	4, 5, 12	Estonia	Telia	20	Latvia	Bite	20
Chile	Claro	28	Estonia	Elisa	20	Latvia	LMT	20
Chile	Movistar	28	Finland	Telia	20	Latvia	Tele2	20
Chile	Entel	28	Finland	DNA	20, 3	Lithuania	Bite	28
China	China Mobile	8	Finland	Elisa	20, 3	Lithuania	Telia	28

Back

Appendix – NB Deployment (2/2)



NB = 122								
Country/ Region	Operator	Bands	Country/ Region	Operator	Bands	Country/ Region	Operator	Bands
Lithuania	Tele2	28	Serbia	Vip Mobile (A1)	20, 8	Turkey	Vodafone	8, 20
Malaysia (6 Cities)	Maxis	3	Singapore	M1	8	UAE	DU	20
Malta	Vodafone	/	Singapore	StarHub	3, 8	UAE	Etisalat	20
Mexico	ALTAN	28	Singapore	Singtel	8	Ukraine	Kyivstar	3
Mexico	AT&T	5	Slovakia	T-Mobile (Slovakia Telecom)	20	Ukraine	Vodafone	3
Mexico	Telcel	5	Slovenia	A1	20	United Kingdom	Vodafone	20
Netherlands	T-Mobile (DT)	20	Slovenia	Telekom Slovenije	20	Uruguay	Antel	3,28
Netherlands	Vodafone	20	South Africa	Vodafone	8	USA	AT&T	2, 4, 12
New Zealand	Spark	28	South Africa	Vodacom	3, 8, 28	USA	T-Mobile	2, 4, 12, 66, 71, 85
New Zealand	Vodafone	28	South Korea	KT	3	USA	Verizon	13
Norway	Telenor	8, 20	South Korea	LGU+	5			
Norway	Telia	20	Spain	Telefónica	20			
Peru	Claro	28	Spain	Vodafone	8, 20			
Peru	Movistar	28	Spain	Orange	20			
Poland	T-Mobile (DT)	20	Sri Lanka	Dialog Axiata	3, 8			
Portugal	Altice	20	Sri Lanka	Mobitel	3,8			
Portugal	Vodafone	8, 20	Sweden	Telia	20			
Portugal	NOS	3,20	Switzerland	Swisscom	20			
Romania	Vodafone	20	Thailand	AIS	8			
Saudi Arabia	Zain	3	Thailand	TRUE	8			
Saudi Arabia	Mobily	20	Thailand	DTAC	28			
Saudi Arabia	STC	12	Turkey	Turkcell	1, 8, 20			

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Appendix – Cat M Deployment



Cat M = 66								
Country/ Region	Operator	Bands	Country/ Region	Operator	Bands	Country/ Region	Operator	Bands
Argentina	Claro	28	France	Orange	20, 3	Peru	Movistar	4
Argentina	MNO Personal	28	Germany	Deutsche Telekom	8, 20	Romania	Orange	3
Argentina	Movistar	4,28	Germany	Telefónica	20	Singapore	SingTel	3, 8
Argentina	Personal	4,28	Hungary	Vodafone	20	South Korea	KT	3
Australia	Telstra	28	Italy	Vodafone	3	South Korea	LGU+	5
Belgium	Orange	20	Japan	KDDI	18, 26	South Korea	SKT	3, 5
Brazil	Claro	3, 28	Japan	NTT DOCOMO	1, 19	Spain	Orange	3, 20
Brazil	Vivo	3,28	Japan	SoftBank	1, 3, 8	Spain	Telefonía	20
Canada	Bell	12	Latvia	LMT	20	Spain	Vodafone	20
Canada	Rogers	4, 5, 12	Mexico	ALTAN	28	Sri Lanka	Dialog Axiata	8
Canada	Telus	2, 4, 5, 12	Mexico	América Móvil	4	Sweden	Telenor	20
Chile	Claro	28	Mexico	AT&T	4	Sweden	Telia	20
China(Taiwan)	APTG	8	Mexico	Movistar	2	Switzerland	Swisscom	20
China(Taiwan)	Chunghwa	3	Mexico	Telcel	4	Thailand	AIS	3, 8
Colombia	Claro	5	Netherlands	KPN	20	Turkey	Turkcell	20
Colombia	Movistar	4	Netherlands	T-Mobile (DT)	8	UAE	Etisalat	5
Colombia	Telefonía	2	Netherlands	Vodafone	20	UK	O2 Telefonía	20
Denmark	Telenor	20	New Zealand	Spark	3, 28	Uruguay	Antel	3, 28
Ecuador	América Móvil	2	New Zealand	Vodafone	3, 8, 28	US	USCC	2, 4, 5, 12
Estonia	Elisa	/	Norway	Telenor	20	USA	AT&T	2, 4, 12
Finland	DNA	20, 3	Peru	Claro	28	USA	Verizon	4, 13
France	Bouygues Telecom	20	Peru	Entel	2, 28	USA	Sprint	25

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