



Build a smarter world

Quectel LPWA Module

Product Overview

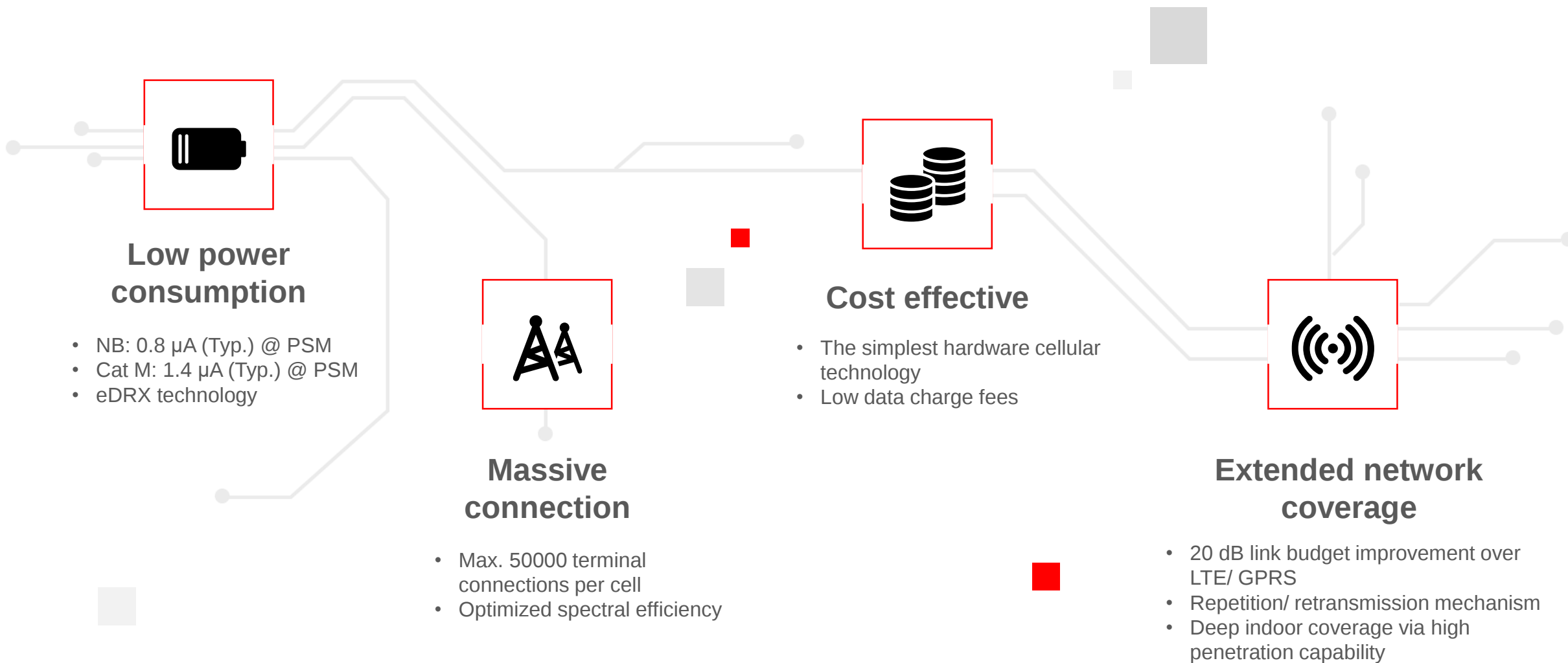
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Contents

LPWA introduction & portfolio	04
Specifications & timelines	09
Advantages	49
Typical applications	53
Appendix	59

LPWA technical advantages



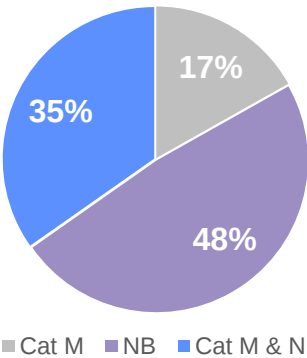
LPWA network deployment



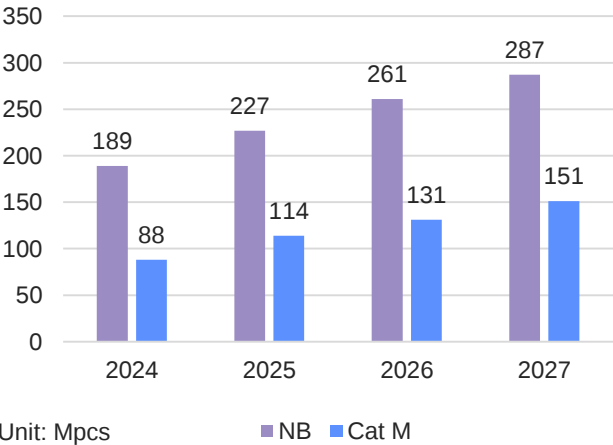
Note:

1. Information sourced from GSMA and revised by Quectel, updated on March, 2024
2. For more operator deployment details, please refer to [Appendix](#)

LPWA operators volume



LPWA connectivity growth trend



Source: ABI Research.

Cat M module portfolio

	BG9xx Series	BG77x Series	BG600L
MDM9205	 BG95-M1 • Cat M • Best Cost for Cat M Only • Power Class 5  BG95-M2 • Cat M/ NB • Cost Efficient • Power Class 5  BG95-M3 • Cat M/ NB/ EGPRS • Mainstream Option • Power Class 5  BG95-M4 • Cat M/ NB • 450 MHz (B31/ 72/ 73) • Power Class 5  BG95-M5 • Cat M/ NB/ EGPRS • Power Class 3  BG95-M6 • Cat M/ NB • Power Class 3  BG95-MF • Cat M/ NB • Wi-Fi Positioning • Power Class 5  BG95-M8 • Cat M/ NB/ EGPRS • 450 MHz (B31/ 72/ 73) • Power Class 5  BG95-M9 • Cat M/ NB • 450 MHz & 410 MHz • Power Class 3	 BG77 • Cat M/ NB • Super Compact Size • Power Class 5	 BG600L-M3 • Cat M/ NB/ EGPRS • Compact Tri-Mode Module • Power Class 5
ALT1250	 BG950A-GL • Cat M/ NB • Standard Version • Cost Efficient  BG951A-GL • Cat M/ NB • WWAN & GNSS Concurrency  BG952A-GL • Cat M/ NB • QuecOpen®  BG953A-GL • Cat M/ NB • iSIM  BG955A-GL • Cat M/ NB • GPRS	 BG770A-GL • Cat M/ NB • Cost Efficient • Super Compact Size  BG772A-GL • Cat M/ NB • QuecOpen®  BG773A-GL • Cat M/ NB • iSIM	
ALT1350	 BG950S-GL • Cat M/ NB • Ultra Low Consumption		

NB module portfolio

	BC6xx Series	BC9xx Series
QCX212	 BC660K-GL • NB Only • Super Low Power Consumption • Global Certification • Mainstream Option	 BC950K-GL • NB Only • Super Low Power Consumption • Mainstream Option • Compatible design with BC95
RDA8908A	 BC65 • NB Only • Cost Efficient • Standard Voltage (3.2-4.2V)	 BC95-GR • NB Only • Low cost • Compatible with BC95/BG95 series
RDA8909B		 BC92 • Cat NB + GSM • Standard Voltage (3.4-4.2V)
XY1200S	 BC680Z-EU • QuecOpen® • Super Low Power Consumption • Support GNSS	

Contents

LPWA introduction & portfolio	04
Specifications & timelines	09
Advantages	49
Typical applications	53
Appendix	59

Cat M solution



BG95 series highlights



Global certification:
global mainstream carriers covered.



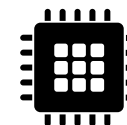
Classic form factor: 23.6 × 19.9 × 2.2 mm



Enhanced features:
DFOTA, GNSS, VoLTE, QuecOpen®, etc.



Large market share:
hundreds of millions of modules deployed in the market.



Mature platform:
Qualcomm MDM9205 based.

DFOTA: Delta Firmware Upgrade Over-the-Air

GNSS: Global Navigation Satellite System

VoLTE: Voice over Long-Term Evolution

[Back](#)

BG95 series specifications

Variant	BG95-M1	BG95-M2	BG95-M3	BG95-M4	BG95-M5	BG95-M6	BG95-MF	BG95-M8	BG95-M9
Cat M Band	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 31/ 66/ 72/ 73/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 31/ 66/ 72/ 73/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 31/ 66/ 72/ 73/ 85/ 87/ 88
NB Band	-	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 28/ 66/ 71/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 28/ 66/ 71/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 28/ 31/ 66/ 72/ 73/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 28/ 66/ 71/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 28/ 66/ 71/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 28/ 66/ 71/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 28/ 31/ 66/ 72/ 73/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 28/ 31/ 66/ 72/ 73/ 85/ 86/ 87/ 88
EGPRS Band	-	-	Quad-band	-	Quad-band	-	-	Quad-band	-
Power Class	Power Class 5	Power Class 5	Power Class 5	- Power Class 2 @ B31/ 72/ 73 - Power Class 5 @ Other Bands	Power Class 3	Power Class 3	Power Class 5	- Power Class 2 @ B31/ 72/ 73 - Power Class 5 @ Other Bands	- Power Class 2 @ B31/ 72/ 73 - Power Class 3 @ Other Bands
Supply Voltage	2.6–4.8 V, Typ. 3.3 V	2.6–4.8 V, Typ. 3.3 V	3.3–4.3 V, Typ. 3.8 V	3.2–4.2 V, Typ. 3.8 V	3.3–4.3 V, Typ. 3.8 V	3.3–4.3 V, Typ. 3.8 V	3.3–4.3 V, Typ. 3.8 V	3.3–4.3 V, Typ. 3.8 V	3.2–4.2 V, Typ. 3.8 V
Power Consumption	4 µA @ PSM	3.9 µA @ PSM	3.9 µA @ PSM	4 µA @ PSM	6 µA @ PSM	5 µA @ PSM	4 µA @ PSM	3.9 µA @ PSM	4.4 µA @ PSM
Positioning	• GNSS ^①	• GNSS ^①	• GNSS ^①	• GNSS ^①	• GNSS ^①	• GNSS ^①	- GNSS^① 2.4G Wi-Fi Positioning	• GNSS ^①	• GNSS ^①
Protocol	PPP/ TCP/ UDP/ SSL/ TLS/ FTP(S)/ HTTP(S)/ NITZ/ PING/ MQTT/ LwM2M/ CoAP/ IPv6/ SMS								
Hardware Interface	USB2.0/ PCM/ I2C/ ADC/ UART/ GPIO/ GRFC ^② (Antenna Tuner)/ (U)SIM								
Special Feature	- VoLTE for Cat M/ CS Voice for GSM - nuSIM/ eSIM/ SoftSIM - Jamming Detection - Fast Shutdown - QuecPython® - QuecOpen®: Integrated ARM Cortex A7 processor supporting ThreadX								
Certification	<u>Major Global Carriers</u>	<u>Major Global Carriers</u>	<u>Major Global Carriers</u>	<u>Major Global Carriers</u>	<u>Major Global Carriers</u>	<u>Major Global Carriers</u>	<u>Major Global Carriers</u>	<u>Major Global Carriers</u>	<u>Major Global Carriers</u>
Project Stage	MP	MP	MP	MP	MP	MP	MP	MP	MP

① : BG95 series does not support concurrent operation of WWAN (Wireless Wide Area Network) and GNSS

② : BG95-M4 and BG95-M9 do not support GRFC

BG95-M1 timeline

2021	2022	2023
Q3	Q4	Q1

Project schedule

TX1.0
R02 Version

MP

TX2.0
R04 Version^①

MP

TX2.0
R05 Version^①

MP

Certification

TX1.0 R02 Version	Carrier	Deutsche Telekom/ Verizon/ AT&T/ Sprint/ U.S. Cellular	-----	Completed
	Regulatory	GCF/ CE/ PTCRB/ FCC/ UKCA/ IC/ JATE/ TELEC/ RCM	-----	Completed
TX2.0 R04 Version ^①	Carrier	AT&T	-----	TBD
	Regulatory	CE/ FCC/ UKCA/ IC/ JATE/ TELEC/ RCM	-----	Completed
		GCF/ PTCRB	-----	TBD
TX2.0 R05 Version ^①	Carrier	T-Mobile/ AT&T	-----	Completed
	Regulatory	Verizon	-----	Completed
		CE/ FCC/ UKCA/ IC/ JATE/ TELEC/ RCM/ GCF/ PTCRB	-----	Completed

The timeline may be adjusted according to the actual development status

^① : R04 Version for VoLTE, R05 Version for Data Only.

Back

Build a smarter world

BG95-M2 timeline

2021	2023
Q3	Q1

Project schedule

TX1.0
R02 Version

MP

TX2.0
R04 Version^①

MP

TX2.0
R05 Version^①

MP

Certification

TX1.0 R02 Version	Carrier	Vodafone/ Deutsche Telekom/ Verizon/ AT&T (FirstNet)/ T-Mobile/ Sprint/ U.S. Cellular/ Telus	Completed
	Regulatory	GCF/ CE/ PTCRB/ FCC/ UKCA/ IC/ Anatel/ IFETEL/ JATE/ TELEC/ RCM/ IMDA/ ATEX / NCC	Completed
TX2.0 R04 Version ^①	Carrier	AT&T	TBD
	Regulatory	CE/ FCC/ UKCA/ IC/ Anatel/ IFETEL/ JATE/ TELEC/ RCM/ IMDA / NCC	Completed
		GCF/ PTCRB	TBD
TX2.0 R05 Version ^①	Carrier	T-Mobile/ AT&T	Completed
		Verizon	TBD
	Regulatory	CE/ FCC/ UKCA/ IC/ Anatel/ IFETEL/ JATE/ TELEC/ RCM/ IMDA / GCF/ PTCRB / NCC	Completed

The timeline may be adjusted according to the actual development status

^① : R04 Version for VoLTE, R05 Version for Data Only.

Back

Build a smarter world

BG95-M3 timeline

2021	2022			2023	
Q2	Q1	...	Q4	Q1	Q2

Project schedule

TX1.0
R02 Version

MP

TX2.0
R04 Version^①

MP

TX2.0
R05 Version^①

MP

Certification

TX1.0 R02 Version	Carrier	Vodafone/ Deutsche Telekom/ Telefónica/ Orange/ Verizon/ AT&T (FirstNet)/ T-Mobile/ Sprint/ U.S. Cellular/ Rogers/ Telus/ Claro	Completed
	Regulatory	GCF/ CE/ PTCRB/ FCC/ UKCA/ IC/ Anatel/ IFETEL/ JATE/ TELEC/ PEN/ CCC/ NCC/ RCM	Completed
TX2.0 R04 Version ^①	Carrier	AT&T	Completed
	Regulatory	CE/FCC/ UKCA/ IC/ Anatel/ IFETEL/ JATE/ TELEC/ CCC/ NCC/ RCM/ GCF/ PTCRB	Completed
TX2.0 R05 Version ^①	Carrier	Deutsche Telekom/ AT&T/ T-Mobile	Completed
		Verizon	Completed
	Regulatory	CE/FCC/ UKCA/ IC/ Anatel/ IFETEL/ JATE/ TELEC/ CCC/ NCC/ RCM/ GCF/ PTCRB	Completed

The timeline may be adjusted according to the actual development status

^① : R04 Version for VoLTE, R05 Version for Data Only.

Back

Build a smarter world

BG95-M4 timeline

2021	2022	2023
Q3	Q4	Q1

Project schedule

TX1.0
R02 Version

MP

TX2.0
R05 Version^①

MP

Certification

TX1.0 R02 Version	Carrier	Deutsche Telekom	-----	Completed
	Regulatory	GCF/ CE/ Anatel/ RCM	-----	Completed
TX2.0 R05 Version ^①	Regulatory	CE/ Anatel/ RCM	-----	Completed

The timeline may be adjusted according to the actual development status

^① : R05 Version for Data Only.

BG95-M5 timeline

2021	2022	2023
Q2	Q4	Q1

Project schedule

TX1.0
R02 Version

MP

TX2.0
R05 Version^①

MP

Certification

TX1.0 R02 Version	Carrier	Vodafone/ Deutsche Telekom/ Verizon/ AT&T/ T-Mobile/ NTT DOCOMO/ KDDI/ Telstra/ Rogers	Completed
	Regulatory	GCF/ CE/ PTCRB/ FCC/ UKCA/ IC/ Anatel/ KC/ JATE/ TELEC/ RCM	Completed
TX2.0 R05 Version ^①	Carrier	Verizon/ AT&T	TBD
	Regulatory	CE/FCC/ UKCA/ IC/ Anatel/ KC/ JATE/ TELEC/ RCM	Completed
		GCF/ PTCRB	TBD

The timeline may be adjusted according to the actual development status

^① : R05 Version for Data Only.

Back

Build a smarter world

BG95-M6 timeline

2021	2022	2023
Q2	Q4	Q1

Project schedule

TX1.0
R02 Version

MP

TX2.0
R05 Version^①

MP

Certification

TX1.0 R02 Version	Carrier	Vodafone/ Deutsche Telekom/ Verizon/ AT&T/ T-Mobile/ KT/ SKT/ LGU+/ NTT DOCOMO/ KDDI/ Telstra	Completed
	Regulatory	GCF/ CE/ PTCRB/ FCC/ UKCA/ IC/ KC/ JATE/ TELEC/ RCM/ Anatel	Completed
TX2.0 R05 Version ^①	Carrier	Verizon/ AT&T	TBD
	Regulatory	CE/FCC/ UKCA/ IC/ KC/ JATE/ TELEC/ RCM/ Anatel	Completed
		GCF/ PTCRB	TBD

The timeline may be adjusted according to the actual development status

^① : R05 Version for Data Only.

Back

Build a smarter world

BG95-M8 timeline

2021	2022		2023
Q2	Q1	Q4	Q1

Project schedule

TX2.0
R05 Version^①

MP

Certification

TX2.0
R05 Version^①

Regulatory

CE

Completed

The timeline may be adjusted according to the actual development status

① : R05 Version for Data Only.

BG95-MF timeline

2021	2022		2023
Q2	Q1	Q4	Q1

Project schedule

TX2.0
R05 Version^①

MP

Certification

TX2.0
R05 Version^①

Carrier	Vodafone/ Deutsche Telekom	Completed
	Verizon/ AT&T	TBD
Regulatory	GCF/ CE/ PTCRB/ FCC/ IC/ RCM	Completed

The timeline may be adjusted according to the actual development status

① : R05 Version for Data Only.

BG95-M9 timeline

2021	2022		2023
Q2	Q1	Q4	Q1

Project schedule

TX2.0
R05 Version^①

MP

Certification

TX2.0
R05 Version^①

Regulatory

CE/ RCM	Completed
GCF	Completed

The timeline may be adjusted according to the actual development status

^① : R05 Version for Data Only.

BG77/ BG600L-M3 highlights



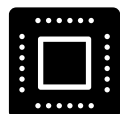
Global certification:
global mainstream carriers covered.



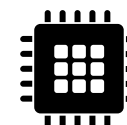
Classic form factor: 14.9 × 12.9 × 1.7 mm (BG77)
18.7 × 16.0 × 2.1 mm (BG600L-M3)



Enhanced features:
DFOTA, GNSS, Fast Shutdown,
QuecOpen®, Jamming Detection®, etc.



Small size:
applicable to size-sensitive devices.



Mature platform:
Qualcomm MDM9205 based.

DFOTA: Delta Firmware Upgrade Over-the-Air

GNSS: Global Navigation Satellite System

[Back](#)

BG77/ BG600L-M3 specifications

Module		BG77	BG600L-M3
Cat M Band		B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66/ 85*	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66/ 85
NB Band		B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 28/ 66/ 71/ 85*	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 28/ 66/ 71/ 85
EGPRS Band		-	Quad-band
Power Class		Power Class 5	Power Class 5
Supply Voltage		2.6–4.8 V, Typ. 3.3 V	3.3–4.3 V, Typ. 3.8 V
Power Consumption		3.44 μ A @ PSM	4.0 μ A @ PSM
Voice		VoLTE for Cat M	VoLTE for Cat M & CS Voice for GSM
Positioning		GNSS	GNSS
Protocols		PPP/ TCP/ UDP/ SSL/ TLS/ FTP(S)/ HTTP(S)/ NITZ/ PING/ MQTT/ LwM2M/ CoAP/ IPv6/ SMS	
Hardware Interface		USB 2.0/ PCM/ I2C/ ADC/ UART/ GPIO/ GRFC(Antenna Tuner)/ (U)SIM	
Special Feature		• Jamming Detection • Fast Shutdown • SoftSIM • QuecOpen®: Integrated ARM Cortex A7 processor supporting ThreadX	
Certification ^①	Carrier	Vodafone/ Deutsche Telekom/ Verizon/ AT&T/ T-Mobile / Sprint/ U.S. Cellular	Vodafone/ Deutsche Telekom/ T-Mobile
	Regulatory	GCF/ CE/ PTCRB/ FCC/ UKCA/ IC/ NCC/ JATE/ TELEC/ RCM	GCF/ CE/ PTCRB/ FCC/ UKCA/ IC/ RCM/ Anatel/ IMDA
Project Stage		MP	MP

* : Under development ① : For TX1.0 versions VoLTE: Voice over Long Term Evolution PSM: Power Saving Mode MP: Massive Production

BG77 timeline

2021	2022	2023
Q2	Q1	Q1

Project schedule

TX1.0
R02 Version

MP

TX2.0
R04 Version^①

MP

TX2.0
R05 Version^①

MP

Certification

TX1.0 R02 Version	Carrier	Verizon/ T-Mobile/ AT&T	Completed
	Regulatory	CE/ FCC/ IC/ RCM/ UKCA/ JATE/ TELEC / NCC/ GCF/ PTCRB	Completed
TX2.0 R04 Version ^①	Carrier	AT&T	Completed
	Regulatory	CE/ FCC/ IC/ RCM/ UKCA/ JATE/ TELEC / NCC/ PTCRB	Completed
TX2.0 R05 Version ^①	Carrier	T-Mobile/ AT&T	Completed
		Verizon	TBD
	Regulatory	CE/ FCC/ IC/ RCM/ UKCA/ JATE/ TELEC / NCC/ PTCRB	Completed

The timeline may be adjusted according to the actual development status

^① : R04 Version for VoLTE, R05 Version for Data Only.

BG600L-M3 timeline

2021	2022		2023
Q2	Q1	Q4	Q1

Project schedule

TX1.0
R02 Version

MP

TX2.0
R04 Version^①

MP

TX2.0
R05 Version^①

MP

Certification^②

TX2.0
R05 Version^①

Carrier	T-Mobile/ AT&T	Completed
Regulatory	CE/ FCC/ IC/ RCM/ UKCA/ Anatel/ PTCRB/ IMDA	Completed
	GCF	TBD

^① : R04 Version for VoLTE, R05 Version for Data Only.

^② : TX2.0 R04 version no Carrier & Regulatory Certification.

The timeline may be adjusted according to the actual development status

BG95xA-GL series highlights



Global certification:
global mainstream carriers covered.



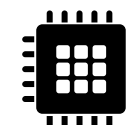
Classic form factor: 23.6 × 19.9 × 2.2 mm



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



Low power consumption:
applicable to battery-powered devices.



Mature platform:
Sony ALT1250 based.

DFOTA: Delta Firmware Upgrade Over-the-Air

GNSS: Global Navigation Satellite System

iSIM: Integrated Subscriber Identity Module

[Back](#)

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				
Ultra Low Power Consumption		Power Saving Mode: 1.5 µA eDRX: 0.07 mA @ eDRX = 81.92 s; PTW = 1.28 s; DRX = 1.28 s (Cat M)				
Positioning		GNSS				
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 / Telstra/ Verizon	Vodafone/ Deutsche Telekom/ AT&T/ KT/ LGU+/ Verizon*/ Telstra	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	MP	MP	MP

* : Under development/ in progress

① : TBD

② : For RK3.0 versions, BG953A-GL/BG955A-GL only support RK3.2.

BG950A-GL timeline

2023												2024								
Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.

Project schedule



Certification



Carrier T-Mobile/ Rogers ----- TBD



Carrier T-Mobile ----- Start -----> Complete (Planned)

The timeline may be adjusted according to the actual development status ① : R02 Version for R14 Support.

BG951A-GL timeline

2023								2024							
Jan.	Feb.	Mar.	Apr.	May	...	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.

Project schedule

RK3.0
R01 Version

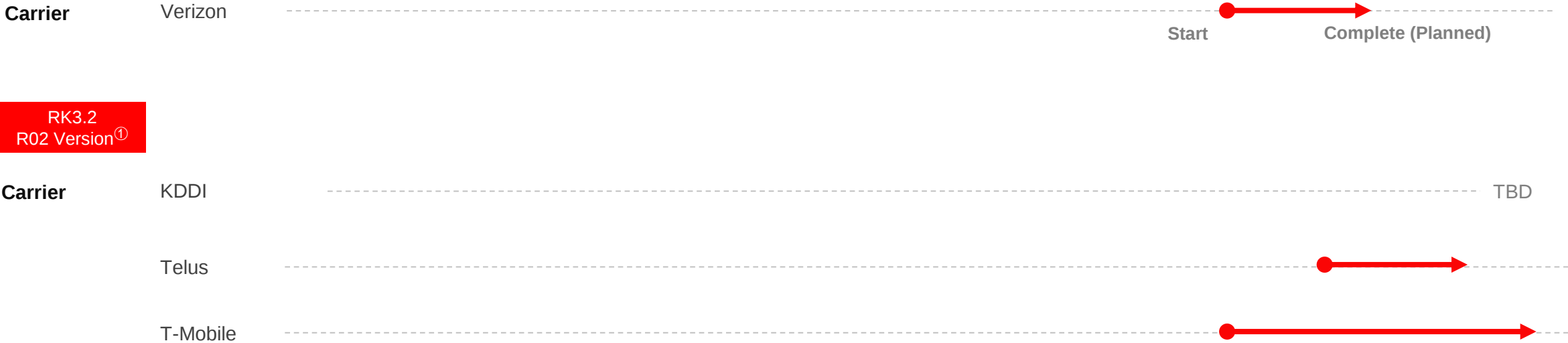
MP

RK3.2
R02 Version^①

MP

Certification

RK3.0
R01 Version



The timeline may be adjusted according to the actual development status

^① : R02 Version for R14 Support.

BG952A-GL/ BG953A-GL/ BG955A-GL timeline

2022				2023							2024						
Jun.	Jul.	...	Dec.	Jan.	Feb.	Mar.	...	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	

Project schedule

BG952A-GL

RK3.0
R01 Version

MP

BG953A-GL

RK3.2
R02 Version^①

MP

BG955A-GL

RK3.2
R02 Version^①

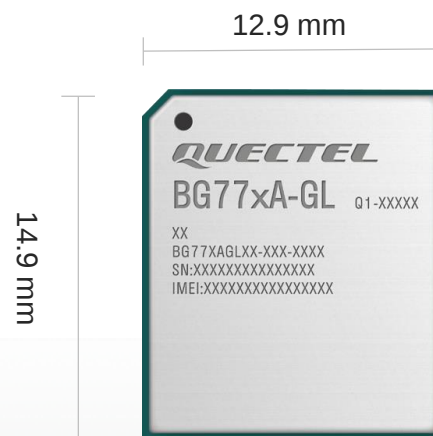
MP

① : R02 Version for R14 Support.

BG77xA-GL series highlights



Global certification:
global mainstream carriers covered.



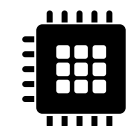
Classic form factor: 14.9 × 12.9 × 1.9 mm



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



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



Mature platform:
Sony ALT1250 based.

DFOTA: Delta Firmware Upgrade Over-the-Air

GNSS: Global Navigation Satellite System

iSIM: Integrated Subscriber Identity Module

[Back](#)

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		
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 ^①	Carrier	Vodafone/ Deutsche Telecom/ Verizon/ AT&T/ KT/ SKT/ LGU+/ NTT DOCOMO/ Telstra/ Orange	Deutsche Telecom/ AT&T/ 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	MP

* : Under development/ in progress

① : For RK3.0 versions, BG773A-GL only supports RK3.2.

BG770A-GL timeline

2022				2023							2024					
Jun.	Jul.	...	Dec.	Jan.	Feb.	Mar.	...	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.

Project schedule

RK3.0
R01 Version

MP

RK3.2
R02 Version^①

MP

Certification

RK3.2
R02 Version^①

Carrier	KDDI/ AT&T/ NTT DOCOMO	-----	Completed
Regulatory	FCC/ CE/ RCM/ IC/ PTCRB	-----	Completed
	TMO/ GCF / JATE/ TELEC	-----	Completed

The timeline may be adjusted according to the actual development status

^① : R02 Version for R14 Support.

BG772A-GL timeline

2024											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

Project schedule

RK3.0
R01 Version

MP

Certification

RK3.0
R01 Version

Carrier	Deutsche Telecom/ AT&T/ KT/ Telstra	-----	Completed
Regulatory	GCF/ CE/ PTCRB/ FCC/ IC	-----	Completed
	KC/ JATE/ TELEC/ RCM	-----	Completed

The timeline may be adjusted according to the actual development status

BG773A-GL timeline

2022				2023							2024					
Jun.	Jul.	...	Dec.	Jan.	Feb.	Mar.	...	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.

Project schedule

RK3.2
R02 Version^①

MP

Certification

RK3.2
R02 Version^①

Regulatory	CE/ FCC/ IC/ RCM	-----	Completed
	PTCRB/ GCF	-----	Completed

The timeline may be adjusted according to the actual development status

^① : R02 Version for R14 Support.

BG950S-GL highlights



Global certification:
global mainstream carriers covered.

19.9 mm

23.6 mm

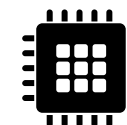


Enhanced features:
DFOTA, GNSS, iSIM[®], etc.

Classic form factor: 23.6 × 19.9 × 2.2 mm



Low power consumption:
applicable to battery-powered devices.



Latest platform:
Sony ALT1350 based.

DFOTA: Delta Firmware Upgrade Over-the-Air

GNSS: Global Navigation Satellite System

iSIM: Integrated Subscriber Identity Module

[Back](#)

BG950S-GL specifications

Variant		BG950S-GL
Cat M Band		B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 18/ 19/ 20/ 25/ 26/ 27/ 28/ 66/ 71/ 85
NB Band		B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 17/ 18/ 19/ 20/ 25/ 26/ 28/ 66/ 71/ 85
GPRS Band		-
WWAN & GNSS Concurrency		-
QuecOpen®*		Supported
iSIM*		Supported
Power Class		Power Class 3
Supply Voltage		VBAT_BB/ VBAT_RF: 2.2–4.35 V, typ. 3.3 V
Ultra Low Power Consumption		TBD
Positioning*		GPS/ GLONASS
SW Feature*		TCP/ PPP/ UDP/ SSL/ MQTT(S) / FTP(S) / HTTP(S) / LwM2M/ IPv4/ IPv6/ TLS/ DTLS/ PING/ CoAP/ NITZ/ DFOTA/ SMS
HW Peripheral Interface		UART/ ADC/ USIM/ GPIO/ GRFC/ NET_STATUS/ STATUS/ I2C*/ SPI*/ Antenna Interface
Compatibility		Compatible with Quectel BG95 Series & BG96 & BG95xA-GL series
Certification	Carrier	-
	Regulatory*	FCC/ CE/ IC/ RCM/ PTCRB/ GCF
Project Stage		ES

* : Under development/ in progress.

BG950S-GL timeline

2023			2024											
Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

Project schedule



Certification



The timeline may be adjusted according to the actual development status

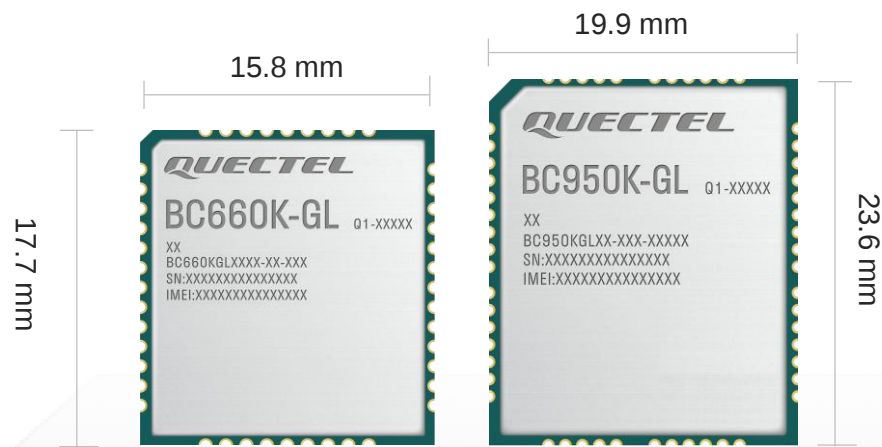
NB-IoT solution



BC660K-GL/ BC950K-GL highlights



Global certification:
global mainstream carriers covered.



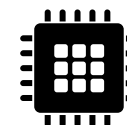
Classic form factor: 17.7 × 15.8 × 2.0 mm (BC660K-GL)
23.6 × 19.9 × 2.2 mm (BC950K-GL)



Enhanced features:
DFOTA, QuecOpen®, etc.



Super low power consumption:
applicable to battery-powered devices.



Mature platform:
Qualcomm QCX212 based.

DFOTA: Delta Firmware Upgrade Over-the-Air

[Back](#)

BC660K-GL/ BC950K-GL specifications

Module		BC660K-GL	BC950K-GL
Mode		NB	NB
Band		B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 17/ 18/ 19/ 20/ 25/ 28/ 66/ 70/ 85	B1/ 2/ 3/ 4/ 5/ 8/ 12/ 13/ 17/ 18/ 19/ 20/ 25/ 28/ 66/ 70/ 85
Size		17.7 × 15.8 × 2.0 mm	23.6 × 19.9 × 2.2 mm
Data Rate		NB2 (Max.): 127 kbps (DL)/ 158.5 kbps (UL)	NB2 (Max.): 127 kbps (DL)/ 158.5 kbps (UL)
Hardware Interface		UART/ RI/ USIM/ ADC/ NETLIGHT/ PSM_EINT/ BOOT/ RESET_N/ Antenna/ GPIO/ I2C ^① / PWM ^① / SPI ^①	UART/ RI/ USIM/ ADC/ NETLIGHT/ PSM_EINT/ BOOT/ RESET_N/ Antenna/ GPIO/ I2C ^① / PWM ^① / SPI ^①
SW Feature		UDP/ TCP/ PING/ LwM2M/ SNTP/ COAP/ COAPS/ HTTP/ HTTPS*/ MQTT/ MQTTS/ SSL/ TLS	UDP/ TCP/ PING/ SNTP/ LwM2M/ MQTT/ MQTTS/ SSL/ TLS/ SMS/ DFOTA*
Power Supply		2.2–4.3 V, Typ. 3.3 V	2.2–4.3 V, Typ. 3.6 V
Power Consumption		• 0.8 μA @ PSM^② • 0.11 mA @ Idle (DRX = 2.56 s)	• 0.8 μA @ PSM^② • 0.11 mA @ Idle (DRX = 2.56 s)
QuecOpen®		Supported	Supported*
Compatibility		M66/ BC66/ BC66-NA/ BC65/ BC68	M95/ BG95/ BC95
Certification	Carrier	Vodafone/ Deutsche Telekom/ AT&T/ T-Mobile/ KT/ LGU+/ Telefónica/ Orange/ Optus/ Telstra/ Spark	Vodafone ^③ / Deutsche Telekom ^③ / KT*/ LGU+*/ Telefónica ^③ / Telstra ^③
	Regulatory	GCF/ CE/ PTCRB/ FCC/ IC/ Anatel/ KC/ RCM/ IMDA/ NBTC/ ICASA/ ATEX/ JATE/ TELEC/ NCC	GCF/ CE/ Anatel ^③ / KC/ RCM/ IMDA ^③ / NBTC ^③ / ICASA ^③
Project Stage		MP	MP

* : Under development/ in progress ① : Only supported on QuecOpen® solution ② : Reference data provided by baseband chip platform ③ : TBD

BC660K-GL timeline

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

Project schedule



Certification

Carrier	Telefónica/ Orange/ Optus/ Telstra/ Spark	-----	Completed
	Vodafone/ Deutsche Telekom	-----	Completed
	AT&T/ T-Mobile/ KT/ LGU+	-----	Completed
Regulatory	GCF/ CE/ PTCRB/ FCC/ IC/ NCC	-----	Completed
	Anatel/ KC/ RCM/ IMDA/ NBTC	-----	Completed
	ICASA/ ATEX/ JATE/ TELEC	-----	Completed

The timeline may be adjusted according to the actual development status

BC950K-GL timeline

2024												2025	
Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.

Project schedule

BC950K-GL

MP

Certification

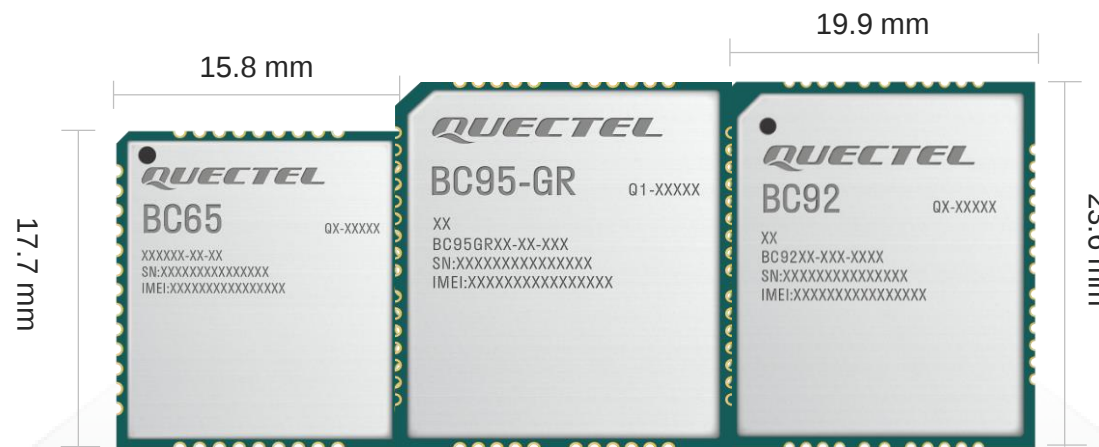
Carrier	Vodafone												TBD
	Deutsche Telekom												TBD
	KT												
	Telefónica												TBD
	Telstra												TBD
	LGU+												
Regulatory	PTCRB												TBD
	Anatel												TBD
	KC												Completed
	IMDA												TBD
	NBTC												TBD
	ICASA												TBD
	GCF												Completed
	CE/ RCM												Completed

The timeline may be adjusted according to the actual development status

BC65/ BC92/ BC95-GR highlights



Global certification:
global mainstream carriers covered.

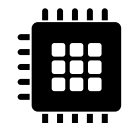


Enhanced features:
DFOTA, abundant protocols, etc.

Classic form factor: 17.7 × 15.8 × 2.2 mm (BC65)
23.6 × 19.9 × 2.2 mm (BC92/ BC95-GR)



Diversified demands:
BC65: Cost efficient
BC92: NB + GSM
BC95-GR: Low Cost, Compatible with BC95 series



Mature platform:
BC65: Unisoc RDA8908A
BC92: Unisoc RDA8909B
BC95-GR: Unisoc RDA8908A

DFOTA: Delta Firmware Upgrade Over-the-Air

[Back](#)

BC65/ BC92/ BC95-GR specifications

Module		BC65	BC92	BC95-GR
Mode		NB	NB/ GSM	NB
Band		B3/ 5/ 8/ 20/ 28	NB: B3/ 5/ 8/ 20/ 28 GSM: Quad-band	B3/ 5/ 8/ 20/ 28
Size		17.7 × 15.8 × 2.2 mm	23.6 × 19.9 × 2.2 mm	23.6 × 19.9 × 2.2 mm
Data Rate		NB2 (Max.): 127 kbps (DL)/ 158.5 kbps (UL)	NB2 (Max.): 127 kbps (DL)/ 158.5 kbps (UL) GPRS (Max): 85.6 kbps (DL)/ 85.6 kbps (UL)	NB2 (Max.): 127 kbps (DL)/ 158.5 kbps (UL)
Hardware Interface		UART/ (U)SIM/ PSM_EINT/ ADC/ RESET/ PWRKEY/ RI/ NETLIGHT/ Antenna	UART/ (U)SIM/ ADC/ NETLIGHT/ PSM_EINT/ PWRKEY/ RI/ RESET/ Antenna	UART/ (U)SIM/ PSM_EINT/ ADC/ RESET/ PWRKEY/ RI/ NETLIGHT/ Antenna
SW Feature		UDP/ TCP/ SNTP/ MQTT/ CoAP*/ PPP/ TLS/ DTLS/ HTTP/ HTTPS/ SMS/ DFOTA	UDP/ TCP/ SNTP/ PPP/ MQTT/ CoAP*/ HTTP/ HTTPS/ FTP/ SMS/ DFOTA	UDP/ TCP/ SNTP/ MQTT/ CoAP/ PPP/ TLS/ DTLS/ HTTP/ HTTPS/ SMS/ DFOTA
Power Supply		3.2–4.2 V, Typ. 3.8 V	3.4–4.2 V, Typ. 3.8 V	3.2–4.2 V, typical 3.6 V
Power Consumption		• 4 μA @ PSM • 1.0 mA @ Idle (DRX = 2.56 s)	• NB: 4 μA @ PSM; 1.2 mA @ Idle (DRX = 2.56 s) • GSM: 1 mA @ DRX = 5; 0.9 mA @ DRX = 9	3.8 μA @ PSM 1.2 mA @ Idle, DRX = 2.56 s, ECL 0
Compatibility		M66/ BC66/ BC660K-GL/ BC68	M95/ BG95/ BC95	BC95/ BC950K-GL
Certification	Carrier	Vodafone/ Deutsche Telekom/ Telefónica	Vodafone/ Deutsche Telekom/ MTN/ Vodacom	-
	Regulatory	GCF/ CE/ RCM	GCF/ CE/ RCM/ ICASA/ Anatel/ NTRA	CE/ RCM
Project Stage		MP	MP	MP

* : Under development/ in progress

BC680Z-EU



Diversified demands:

- LCC package with classic size
- super low consumption and high sensitivity



Classic form factor: 17.7 × 15.8 × 2.2 mm

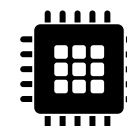


Enhanced features:

GNSS, DFOTA, QuecOpen®, etc.



Super low power consumption:
applicable to battery-powered devices.



Mature platform:
XINYISEMI XY1200S based.

[Back](#)

BC680Z-EU specification

Module		BC680Z-EU
Mode		NB2
Band		B3/ 5/ 8/ 20/ 28
Data Rate		NB2 (Max.) : 126.5 kbps (DL) / 158.5 kbps (UL)
Hardware Interface		UART/ RI*/ USIM/ ADC/ NET_STATUS/ RESET/ BOOT/ VDD_EXT/ Antenna
SW Feature		UDP/ TCP/ LwM2M*/ SNTP/ IPv4/ IPv6/ NITZ/ PING/ HTTP (only for DFOTA)/ HTTPS*
Power Consumption		2.8 μ A @ PSM 0.19 mA @ DRX in Sleep mode, DRX = 2.56 s, ECL0 0.11 mA @ eDRX in Sleep mode, eDRX=10.24s,ECL0
Power Supply		2.2–4.5 V, Typ. 3.6 V
Enhanced Features		Support GNSS, QuecOpen®, DFOTA and RAI
Certification	Carrier	Vodafone*/ Telefónica*
	Regulatory	GCF*/ CE/ RCM/ FCC ^①
Project Stage		ES

* : Under development/ in progress

① : TBD

BC680Z-EU timeline

2023								2024											
May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

Project schedule



Certification



The timeline may be adjusted according to the actual development status

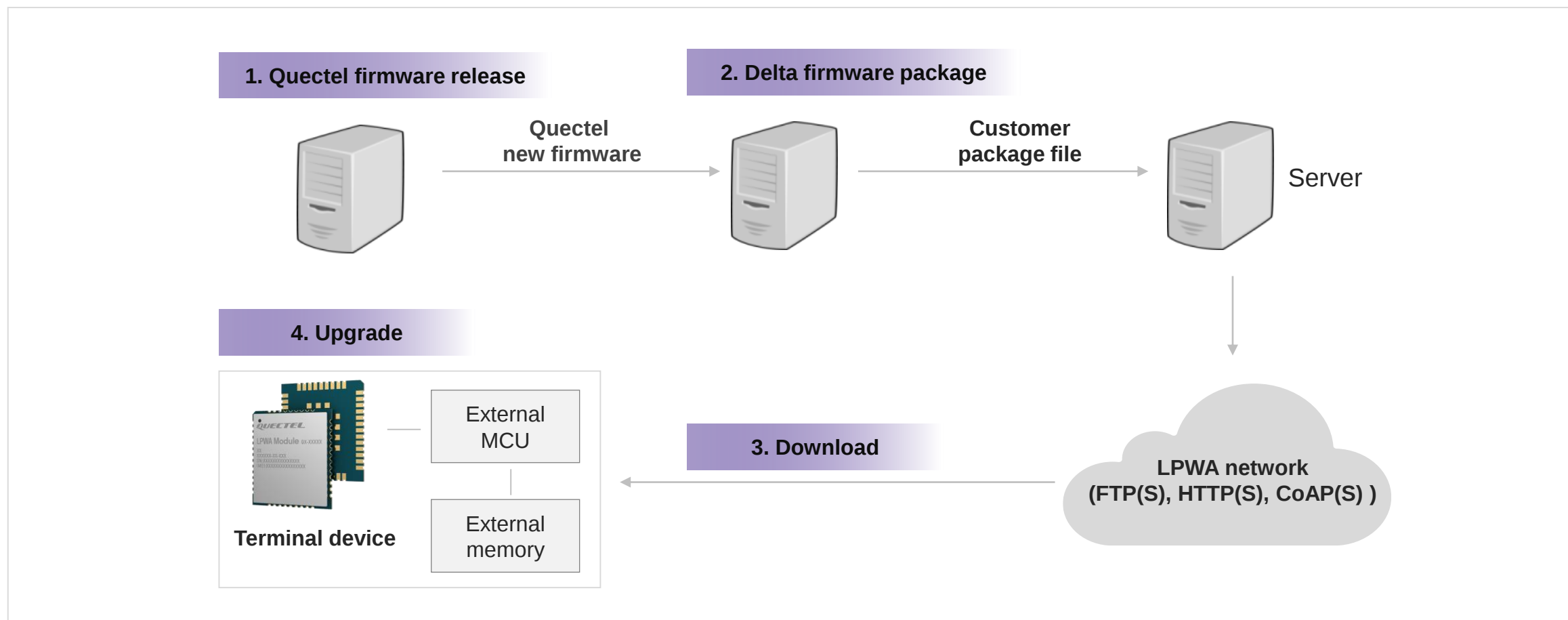
Contents

LPWA introduction & portfolio	04
Specifications & timelines	09
Advantages	49
Typical applications	53
Appendix	59

DFOTA

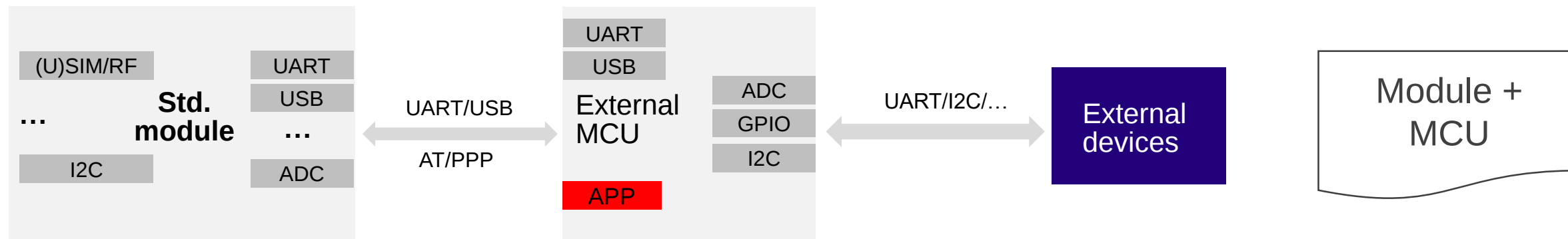
DFOTA (Delta Firmware Upgrade Over-The-Air)

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

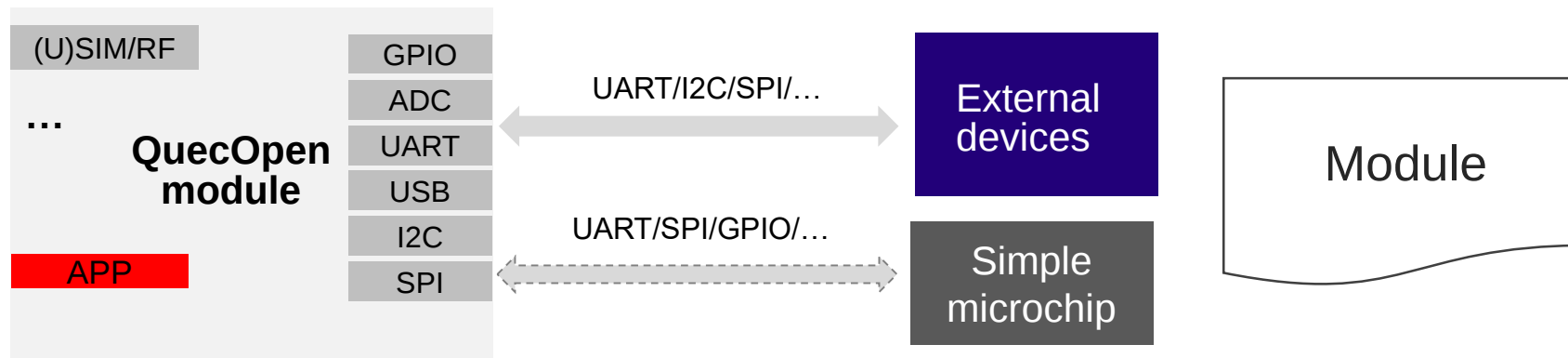


QuecOpen® vs. Standard mode

Standard module mode

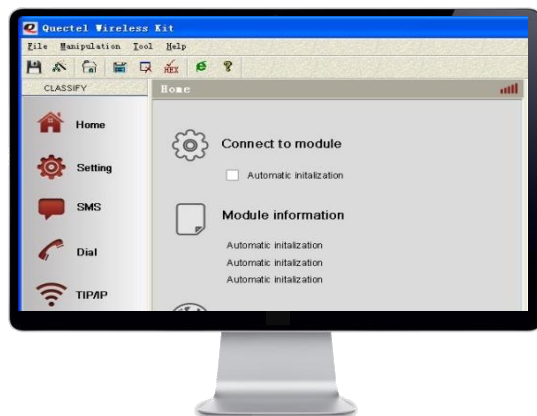


QuecOpen® mode



- 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



BG95 Series/ BG77/ BG600L-M3/
BG95xA-GL/ BG77xA-GL

TE-B



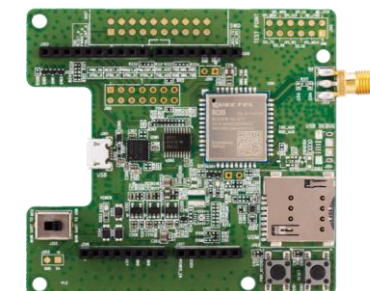
BC660K-GL



BC950K-GL



BC92



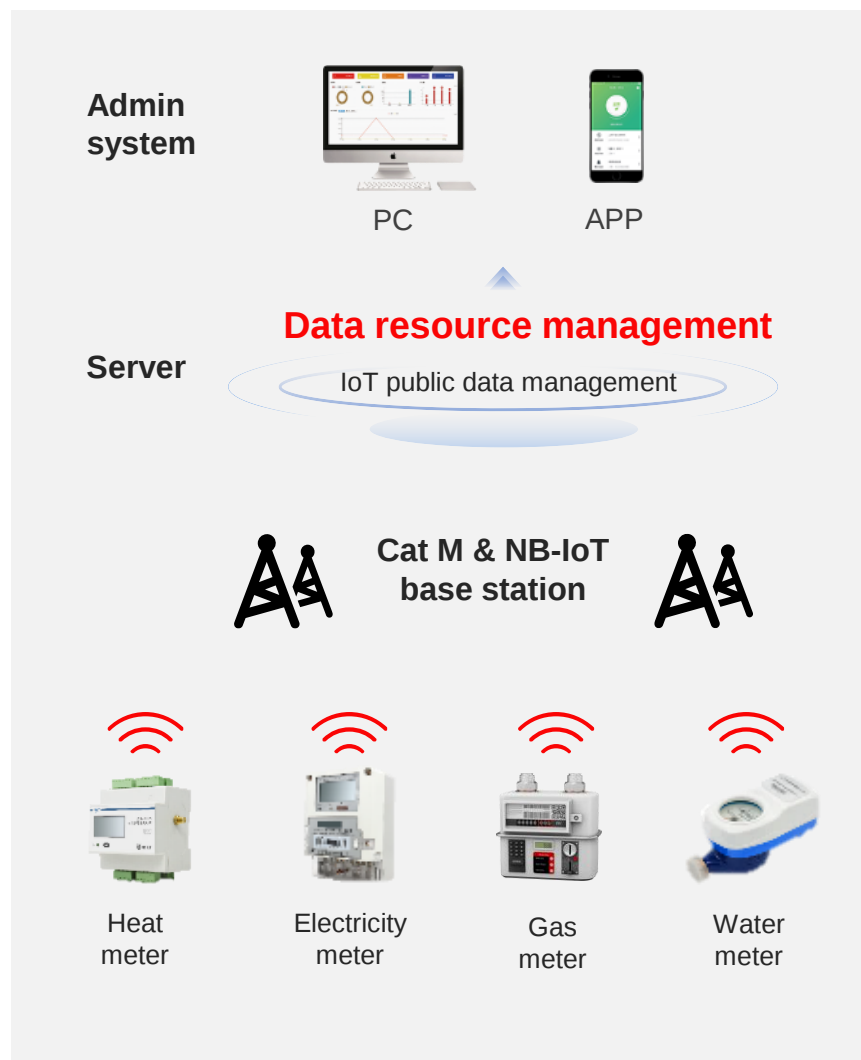
BC65

EVB: Evaluation Board

Contents

LPWA introduction & portfolio	04
Specifications & timelines	09
Advantages	49
Typical applications	53
Appendix	59

Smart meter



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

IoT: Internet of Things

Build a smarter world

Smart tracker



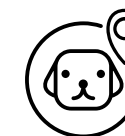
Vehicle tracking



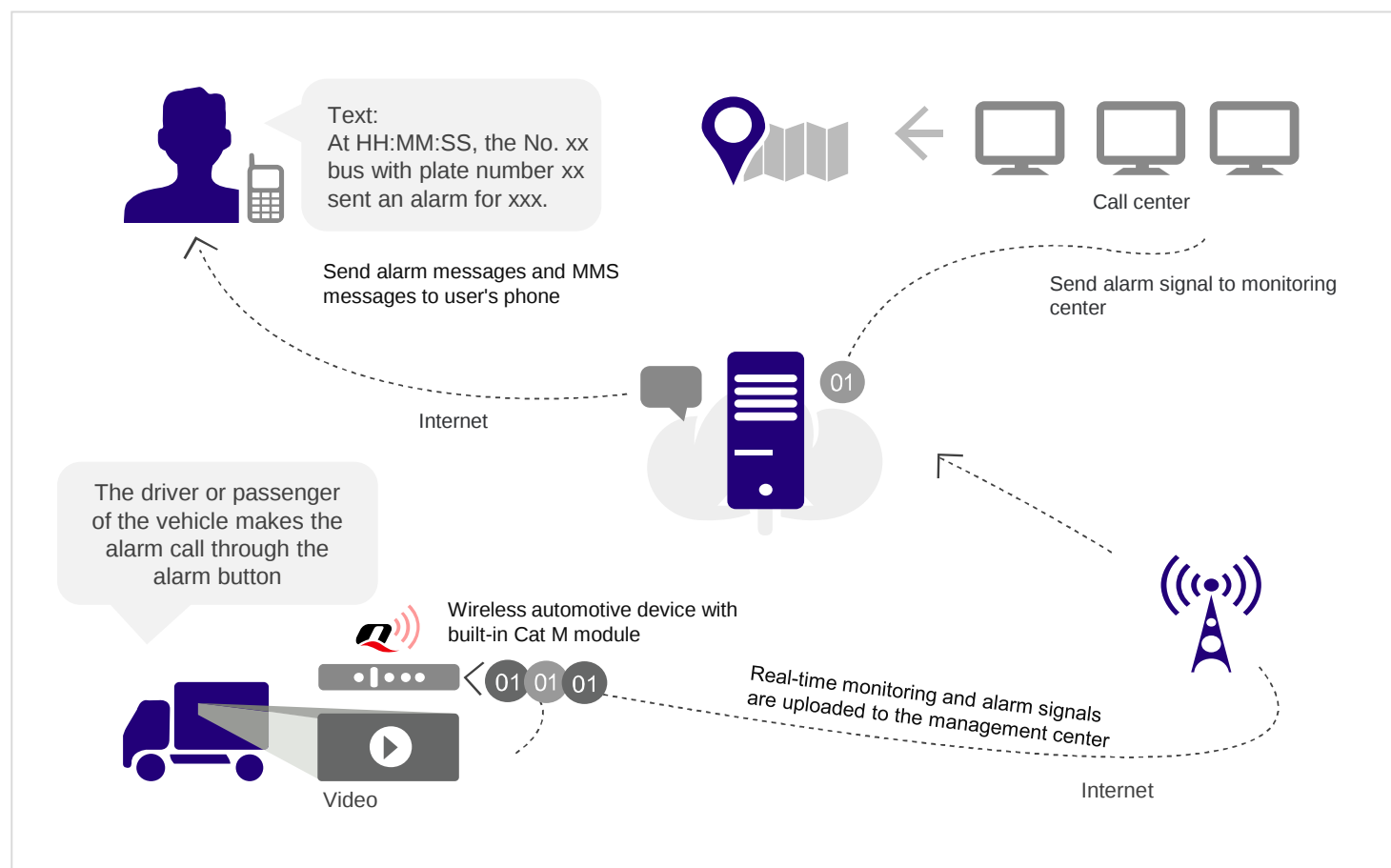
Goods tracking



Asset tracking



Pet tracking



Real-time tracking:

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



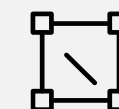
Multiple positioning:

GNSS, LBS, Wi-Fi Positioning



Tracking query:

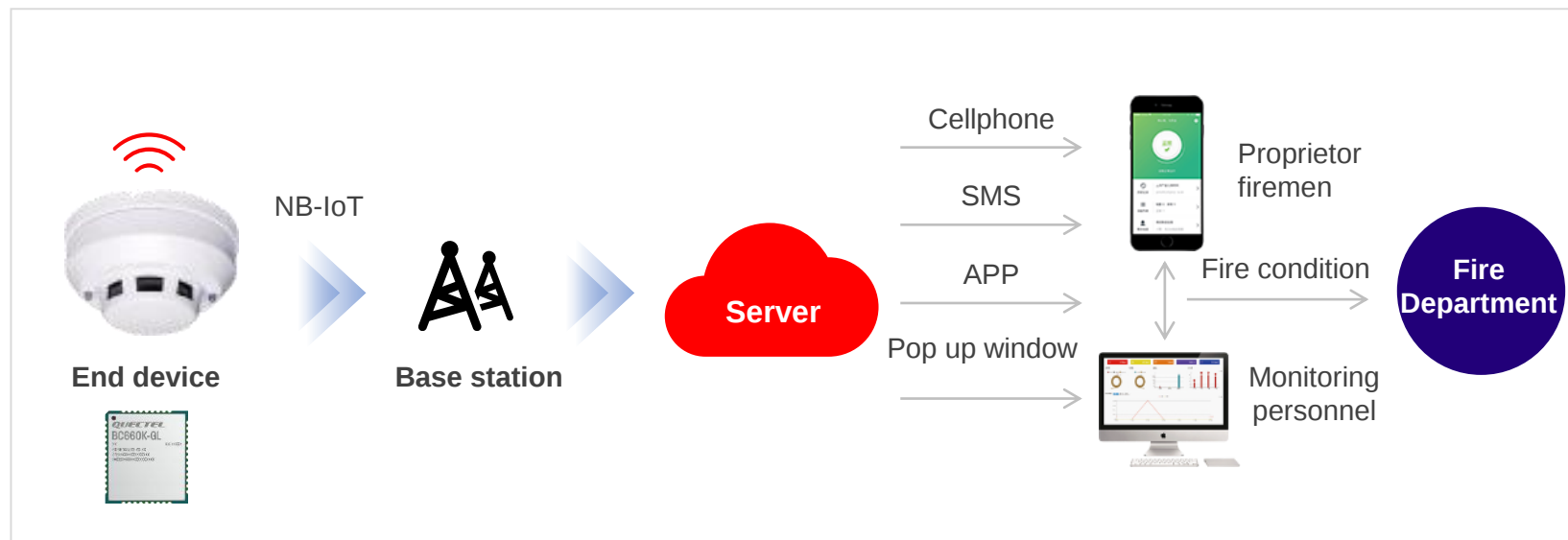
Query vehicle behavior anytime and anywhere



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



Easy installation and remote maintenance

Wireless issue diagnosis implementation without physical damage



Quick response

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



Public cellular network

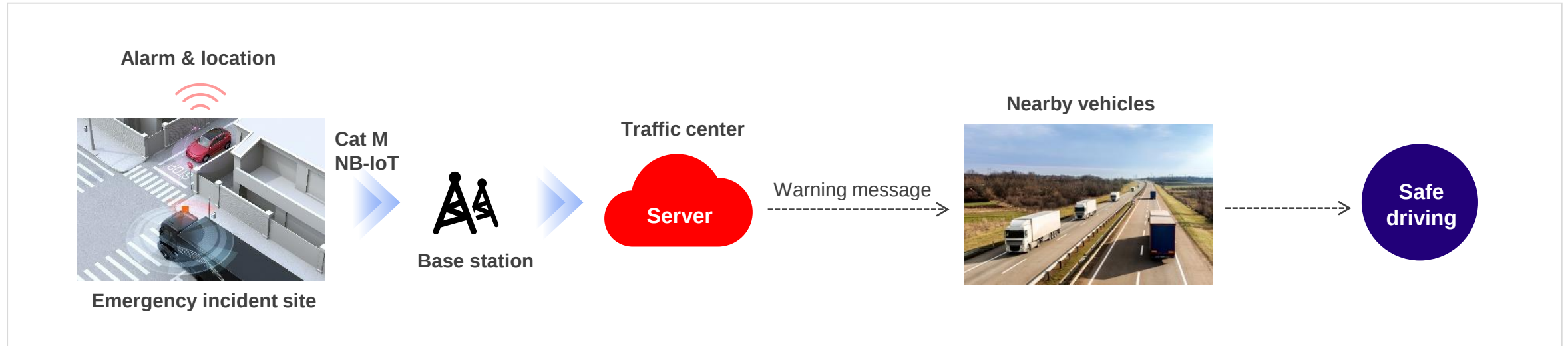
No need for Wi-Fi configuration

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



01

Public utilities

- Water/ gas metering
- Smart parking
- Fire hydrant
- Smoke detector
- Street lighting
- Smart dustbin



02

Smart life

- Asset tracking
- Wearable devices
- Person/ pet tracking



03

Industry & agriculture

- Gas detector
- Soil PH/ optical sensor
- Machine alarm
- Irrigation controller



04

Smart home

- Intelligent door lock
- Intelligent control

Contents

LPWA introduction & portfolio	04
Specifications & timelines	09
Advantages	49
Typical applications	53
Appendix	59

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 Unicom	3, 8	Germany	Telefónica	8, 20
Argentina	MNO Personal	28	China(Hong Kong)	3 Hong Kong	8	Germany	Vodafone	20
Argentina	Movistar	4, 28	China(Hong Kong)	China Mobile	3	Germany	Deutsche Telekom	8, 20
Australia	Telstra	28	China(Hong Kong)	SmarTone	8	Greece	Vodafone	20
Australia	Vodafone	8	China(Taiwan)	APTG	8	Greece	T-Mobile (Cosmote)	20
Australia	Optus	28	China(Taiwan)	Chunghwa	8	Hungary	T-Mobile	20
Austria	A1	20	China(Taiwan)	FarEasTone	28	Hungary	Vodafone	20
Austria	T-Mobile (Magenta)	8	China(Taiwan)	Taiwan Mobile	28	India	Reliance Jio	3, 5
Bangladesh	Grameenphone	3, 8 (TBC)	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	Kenya	SafariCom	8
Brazil	Telecom Italia/ TIM	28	Denmark	TDC	20	Latvia	Bite	20
Canada	Rogers	4, 5, 12	Estonia	Telia	20	Latvia	LMT	20
Chile	Claro	28	Estonia	Elisa	20	Latvia	Tele2	20
Chile	Movistar	28	Finland	Telia	20	Lithuania	Bite	28
Chile	Entel	28	Finland	DNA	20, 3	Lithuania	Telia	28
China	China Mobile	8	Finland	Elisa	20, 3	Lithuania	Tele2	28
China	China Telecom	5	France	SFR	20	Malaysia (6 Cities)	Maxis	3

Appendix – NB deployment (2/2)

NB = 122								
Country/ Region	Operator	Bands	Country/ Region	Operator	Bands	Country/ Region	Operator	Bands
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			
Serbia	Vip Mobile (A1)	20, 8	Turkey	Vodafone	8, 20			
Singapore	M1	8	UAE	DU	20			
Singapore	StarHub	3, 8	UAE	Etisalat	20			

[Back](#)

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

[Back](#)

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