

Telit Technical Workshop

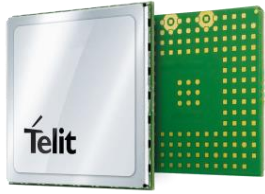
OCTOBER 29-31, 2019 | TELIT HQ – TRIESTE, ITALY

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LE910Cx Series

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Telit



xE910
(28x28mm)



xL865
(24x24mm)



xE310
Flex-perimeter Form Factor
(13x14mm, 15,18mm)



mPCIe
(30x51mm)



M.2
(30x42mm)



Cellular IoT & Broadband Modules

Form Factors

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xE910 Family (28x28mm)



2G	3G	LTE					
3GPP		Cat 4/3	Cat 1		Cat M1 & NB1		Cat M1 & NB2
GE910-QUAD GSM GPRS	UE910 HSPA EDGE	LE910-SV V2 LTE Cat 4	LE910-SV1/SVL LTE Cat 1	LE910C1-NA LTE Cat 1 3G 2G	ME910C1-WW (Global) LTE Cat M1/NB1 2G	ME910C1-NA (NA SS) LTE Cat M1	ME910G1-WW (Global) LTE Cat M1/NB2 2G
GE910-QUAD V3 GSM GPRS	HE910 HSPA+ EDGE	LE910-NA V2/B4-NA LTE Cat 4 HSPA+	LE910-NA1/B1-NA LTE Cat 1 HSPA+	LE910C1-AP LTE Cat 1 3G	ME910C1-P1 (Global) LTE Cat M1/NB2	ME910C1-E1 LTE Cat M1/NB1	ME910G1-W1 (Global) LTE Cat M1/NB2
	<i>NRND</i>	LE910-EU V2 LTE Cat 4 HSPA+	LE910B1-SA LTE Cat 1	LE910C1-NS LTE Cat 1		ME910C1-E2 LTE Cat M1/NB1 2G	
		LE910C4-NF LTE Cat 1 3G	LE910-EU1 LTE Cat 1 2G	LE910C1-EU LTE Cat 1 3G 2G		ME910C1-E2 LTE Cat M1/NB1 2G	
		LE910C4-EU LTE Cat 4 3G 2G		LE910C1-NF LTE Cat 1 3G		ME910C1-K1 LTE Cat M1/NB1	
		LE910C4-AP LTE Cat 4 3G 2G		LE910C1-SV LTE Cat 1		ME910C1-J1 LTE Cat M1/NB1	
		LE910C4-LA LTE Cat 4 3G 2G		LE910C1-SA LTE Cat 1		ME910C1-AU LTE Cat M1/NB1	
		LE910C4-CN LTE Cat 4 3G 2G		LE910C1-ST LTE Cat 1		NE910C1-E1 LTE Cat NB1	
				LE910C1-LA LTE Cat 1 3G 2G			

xE910 Family (28x28mm)



2G		3G		LTE			
3GPP		Cat 4/3	Cat 1	Cat M1 & NB1		Cat M1 & NB2	
GE910-QUAD GSM GPRS	UE910 HSPA EDGE	LE910-SV V2 LTE Cat 4	LE910-SV1/SVL LTE Cat 1	ME910C1-WW (Global) LTE Cat M1/NB1 2G	ME910C1-NA (NA SS) LTE Cat M1	ME910G1-WW (Global) LTE Cat M1/NB2 2G	
GE910-QUAD V3 GSM GPRS	HE910 HSPA+ EDGE	LE910-NA V2/B4-NA LTE Cat 4 HSPA+	LE910-NA1/B1-NA LTE Cat 1 HSPA+	ME910C1-P1 (Global) LTE Cat M1/NB2	ME910C1-E1 LTE Cat M1/NB1	ME910G1-W1 (Global) LTE Cat M1/NB2	
	<i>NRND</i>	LE910-EU V2 LTE Cat 4 HSPA+	LE910B1-SA LTE Cat 1		ME910C1-E2 LTE Cat M1/NB1 2G		
		LE910C4-NF LTE Cat 1 3G	LE910-EU1 LTE Cat 1 2G	LE910C1-NA LTE Cat 1 3G 2G	ME910C1-E2 LTE Cat M1/NB1 2G		
		LE910C4-EU LTE Cat 4 3G 2G		LE910C1-AP LTE Cat 1 3G	ME910C1-K1 LTE Cat M1/NB1		
		LE910C4-AP LTE Cat 4 3G 2G		LE910C1-NS LTE Cat 1	ME910C1-J1 LTE Cat M1/NB1		
		LE910C4-LA LTE Cat 4 3G 2G		LE910C1-NS LTE Cat 1	ME910C1-AU LTE Cat M1/NB1		
		LE910C4-CN LTE Cat 4 3G 2G		LE910C1-SV LTE Cat 1	NE910C1-E1 LTE Cat NB1		
				LE910C1-SA LTE Cat 1			
				LE910C1-SA LTE Cat 1			
				LE910C1-ST LTE Cat 1			
				LE910C1-LA LTE Cat 1 3G 2G			

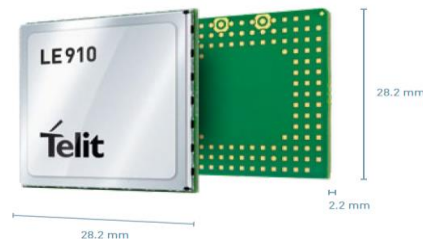
LE910Cx Family

Designed for:

- Products to be deployed in the APAC/NA/EMEA/Latam Markets
- Cost optimized LTE solution (Cat.1/Cat.4 technology)
- 2G - 3G fall-back
- Ease migration to 4G within the xE910 series
- Telit AT command set compliance
- Telit SWM : FUMO (OMA-DM FOTA)

LE 910 Cat.1 Series

LTE Cat.1 10/5 Embedded



- Pin-to-pin compatible with xE910 product family
- 3GPP protocol stack release 10, LTE cat.1/4
- CAT1 4G throughput up to UL:5 Mbps / DL: 10 Mbps
- CAT4 4G throughput up to UL:50 Mbps / DL: 150 Mbps
- MIMO/RxDiv 2x2 DL (option to disable the second antenna)
- 10 GPIOs (@1.8V), 1 USB 2.0 HS, 2 UART, 1 SPI
- Voltage range: 3.1 - 4.5 V
- Temp range: -40 ÷ +85 C
- Approvals:
 - NF – PTCRB, GCF, AT&T, T-Mobile VzW
 - AP – RCM, Telstra, JRT/JTBL, NTT, KDDI
 - NS – FCC, Sprint
 - NA – FCC, PTCRB, AT&T
 - EU – RED, GCF
 - LA – FCC, Anatel, Enacom (Argentina), MTC (Peru), Ifetel (Mexico), Subtel (Chile)
 - CN – CCC, SRRC
 - RoHS & REACH compliant

LE910Cx Variants 1/2

Cat.1&Cat.4

Variant	QCT BL	Latest sw	Region	LTE Bands	FB	Status	Certifications
LE910Cx-NF	2.1	25.26.xx3	NA	B12, B14, B4, B2, B5, B13, B66, B71	3G	MP (AT&T only)	AT&T, TMO, Verizon
LE910Cx-EU	2.1	25.20.xx3	EMEA	B1, B3, B7, B8, B20, B28A	3G/2G	MP	GCF, RED
LE910Cx-AP	2.1	25.26.xx5	AU/NZ/JN	B1, B3, B5, B8, B9, B18(B26), B19, B28	3G	MP (AU/NZ) ENG(JN)	RCM, Telstra JRL/JTBL, NTT, Anatel, NCC (Taiwan)
LE910Cx-LA	2.1	25.20.xx2	Latam	B1, B2, B3, B4, B5, B7, B28	3G/2G	ENG	FCC, Anatel, Enacom, MTC, Ifetel, Subtel
LE910C1-NS*	1.0.1	25.00.xx6	NA	B2, B4, B5(B26), B12, B25	-	MP	Sprint
LE910C1-NA*	1.0.1	25.00.xx2	NA	B2, B4, B12	3G/2G	MP	AT&T

LE910Cx Variants 2/2

Variant	QCT BL	Latest sw	Region	LTE Bands	FB	Status	Certifications
LE910C1-SA*	2.1	25.20.xx2	NA	B4/66, B2, B12, B14	-	ENG	PTCRB, AT&T
LE910C1-SV*	2.1	25.20.xx2	NA	B4, B13	-	ENG	GCF, Verizon
LE910C1-ST*	2.1	25.20.xx2	NA	B4/66, B2, B12, B71	-	ENG	PTCRB, TMO
LE910C4-CN	2.1	25.20.xx2	CN/IN	B1, B3, B5, B8, TDD: B38, B39, B40, B41	2G/3G	MKT	CCC, SRRC

(*) Single mode variants 2+1 Gb memory, no AppZone, no WiFi bundling

LE910C1 | LTE Cat 1 5/10 Mbps



Form Factor	xE910 181-pin LGA	OneEdge	No
Size	28.2 x 28.2 x 2.2 mm	Application Development Environment	AppZone (Roadmap)
Region(s)	EMEA, NA, Australia, Japan, APAC, LATAM	Memory (available for integrators)	TBD
Operator(s) / Bands	AT&T, Verizon, Sprint, Telstra, NTT, KDDI	FOTA	Yes
GNSS	Yes	DM	Yes
Approvals	FCC/IC, PTCRB RCM / RED / GCF, JATE/TELEC	Cloud	-
Voice	CS, VoLTE	Software features	Dual Stack IPV4/IPV6, Embedded TCP/IP, SSL, BIP
Power Supply	3.4V – 4.2VDC (Nominal 3.8VDC)	Interfaces	USB 2.0 HS/HSIC, UART, SPI, PCM
Temperature (operating)	-40°C to + 85°C	Drivers Support	Windows, Linux, Android

Availability – Now

Applications

IoT applications and mobile data and computing devices with ultra-compact design

Key Benefits

- MTC features ready according to 3GPP Rel.12
- Integrated TCP/IP; UDP/IP stacks
- VoLTE
- Integrated GNSS

Product Datasheet
[LE910C1 SERIES](#)



LE910C1 Roadmap

In Production	Planned / In Development	2019				2020			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
LE910C1-NA (MM-LTE) AT&T 3G/2G LTE: B2, 4, 12 DC-HSPA+ / HSPA / UMTS: B1, 2, 4, 5, 8 GSM/GPRS quad band gpsOne VoLTE support <div style="display: flex; justify-content: space-around; width: 100px;"> 2G 3G 4G </div>	LE910C1-AP (MM-LTE) APAC/ANZ + Japan FDD-LTE: B28, 5/19, 8, 3/9, 1, 18/26 DC-HSPA+ / HSPA / UMTS: B5/6/19, 8, 1 gpsOne VoLTE support <div style="display: flex; justify-content: space-around; width: 100px;"> 3G 4G </div>				▼	Extension to Japan (NTT MR)			
LE910C1-NS (SM-LTE) Sprint FDD-LTE: B12, 4, 5, 26, 2, 25 gpsOne <div style="display: flex; justify-content: space-around; width: 100px;"> 4G </div>	LE910C1-NF (MM-LTE) AT&T/FirstNet, Verizon w/ 3G FB LTE: B12, 13, 14, 4, 5, 66, 2, 71 DC-HSPA+ / HSPA / UMTS: B5, 2 gpsOne VoLTE support <div style="display: flex; justify-content: space-around; width: 100px;"> 3G 4G </div>				▼				
LE910C1-EU (MM-LTE) Europe FDD-LTE: B28A, 8, 3, 1, 7, 20 DC-HSPA: B8, 3, 1 GSM/GPRS 900/1800 gpsOne VoLTE support <div style="display: flex; justify-content: space-around; width: 100px;"> 2G 3G 4G </div>	LE910C1-SV (SM-LTE) Verizon LTE: B4, 13 gpsOne VoLTE support <div style="display: flex; justify-content: space-around; width: 100px;"> 4G </div>				▲				
LE910C1-NF (MM-LTE) AT&T/FirstNet, w/ 3G FB LTE: B12, 13, 14, 4, 5, 66, 2, 71 DC-HSPA+ / HSPA / UMTS: B5, 2 gpsOne VoLTE support <div style="display: flex; justify-content: space-around; width: 100px;"> 3G 4G </div>	LE910C1-SA (SM-LTE) AT&T/FirstNet LTE: B2, 4, 12, 14 gpsOne VoLTE support <div style="display: flex; justify-content: space-around; width: 100px;"> 4G </div>				▲				
	LE910C1-ST (SM-LTE) T-Mobile LTE: B71, 12, 4/66, 2 gpsOne VoLTE support <div style="display: flex; justify-content: space-around; width: 100px;"> 4G </div>				▲				
	LE910C1-LA (MM-LTE) LATAM LTE: B28, 5, 3, 1, 2, 4, 7 DC-HSPA: B5, 2, 4, 1 4B GSM/GPRS gpsOne VoLTE support <div style="display: flex; justify-content: space-around; width: 100px;"> 2G 3G 4G </div>				▲				

LE910C4 | LTE Cat 4 50/150 Mbps



Form Factor	xE910 181-pin LGA	OneEdge	No
Size	28.2 x 28.2 x 2.2 mm	Application Development Environment	AppZone (Roadmap)
Region(s)	EMEA, NA, Australia, Japan, APAC, LATAM	Memory (available for integrators)	TBD
Operator(s) / Bands	AT&T, Verizon, Sprint, Telstra, NTT, KDDI	FOTA	Yes
GNSS	Yes	DM	Yes
Approvals	FCC/IC, PTCRB RCM / RED / GCF, JATE/TELEC	Cloud	-
Voice	CS, VoLTE	Software features	Dual Stack IPV4/IPV6, Embedded TCP/IP, SSL, BIP
Power Supply	3.4V – 4.2VDC (Nominal 3.8VDC)	Interfaces	USB 2.0 HS/HSIC, UART, SPI, PCM
Temperature (operating)	-40°C to + 85°C	Drivers Support	Windows, Linux, Android

Availability – Now

Applications

IoT applications and mobile data and computing devices with ultra-compact design

Key Benefits

- MTC features ready according to 3GPP Rel.12
- Integrated TCP/IP; UDP/IP stacks
- VoLTE
- Integrated GNSS

Product Datasheet
[LE910C4 SERIES](#)



LE910C4 Roadmap

In Production	Planned / In Development	2019				2020			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
LE910C4-NF (MM-LTE) AT&T/FirstNet LTE: B12, 13, 14, 4/66, 2, 5, 71 DC-HSPA+ / HSPA / UMTS: B5, 2 gpsOne VoLTE support	LE910C4-NF (MM-LTE) AT&T/FirstNet, VZW, TMO LTE: B12, 13, 14, 4/66, 2, 5, 71 DC-HSPA+ / HSPA / UMTS: B5, 2 gpsOne VoLTE support				TMO ▼				
LE910C4-EU (MM-LTE) Europe FDD-LTE: B28A, 8, 3, 1, 7, 20 DC-HSPA: B8, 3, 1 GSM/GPRS 900/1800 gpsOne VoLTE support	LE910C4-AP (MM-LTE) Japan, ANZ FDD-LTE: B28, 5/19, 8, 3/9, 1, 13/26 DC-HSPA+ / HSPA / UMTS: B5/6/19, 8, 1 gpsOne VoLTE support			▲ VZW	▲ AT&T				
3G 4G	3G 4G								
2G 3G 4G	NEW 4G								

Planned / In Development	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
LE910C4-LA (MM-LTE) LATAM LTE: B28, 5, 3, 1, 2, 4, 7 DC-HSPA: B5, 2, 4, 1 4B GSM/GPRS gpsOne VoLTE support								
LE910C4-CN (MM-LTE) CHINA LTE FDD: 1,3,5,8 TDD: 38,39,40,41 DC-HSPA: 1, 8 TDSCDMA: 34,39 GSM/GPRS 3,8 gpsOne VoLTE support								
2G 3G 4G								
2G 3G 4G								



In Dev



In Prod

LE910Cx SW Roadmap

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
LE910Cx-NF								



MP



MP



MP

25.00.xx3:
AT&T certified
sw

25.00.xx4:
TMO certified
sw

25.00.xx6 /
MOFxx0006
Single SKU:
AT&T/TMO/Verizon

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
LE910Cx-EU								



MP

25.00.xx3:
MP release



MR

25.00.xx6 /
MOFxx0006:
Bug fixes and general
enhancements



In Dev



In Prod

LE910Cx SW Roadmap [cont'd]

	2018		2019		2020			
	H1	H2	H1	H2	Q1	Q2	Q3	Q4
LE910Cx-AP	→							

▲
MP

25.00.xx3:
Generic AU

▲
MR

25.00.xx3:
Telstra
certified

▲
MR

25.00.xx6 /
MOFxx0006:
Single SKU version
New HW with Japan Bands
Telstra/NTT/KDD certification

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
LE910Cx-LA	→				→			

▲
MP

25.00.xx6/
MOFxx0006
Brazil,
Argentina,
Peru certified

→
In Dev

→
In Prod

LE910Cx SW Roadmap [cont'd]

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
LE910C1-SV	→				→			

▲
MP

25.00.386/
M0F380006
Verizon
certified

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
LE910C1-NS	→							

▲
MP

25.00.217
/M0F210007
MR planned with BL
alignment
Sprint certification

→
In Dev

→
In Prod



LE910Cx - WE866C3 WiFi bundling support

Variant	Baseline	SW Version	Support	Notes	Plan
LE910Cx-NF	2.1	25.26.xx6	Y	Hosted mode (AT)	Host-less mode (AppZone) Q1-20
LE910Cx-EU	2.1	25.20.xx6	Y	Hosted mode (AT)	Host-less mode (AppZone) Q1-20
LE910C1-AP	2.1	25.26.xx6	Y	Hosted mode (AT)	Host-less mode (AppZone) Q1-20
LE910C1-NA/NS	1.0.1	25.00.xx2/xx6	N	Old QCT baseline	Host-less mode (AppZone) Q1-20
LE910C1-SA/SV/ST	2.1	25.20.xx6	N	2Gb+1Gb mem limitation	-

WiFi add-ons:

- Wi-Fi STA mode
- STA mode AT commands
- USB interface

LE910Cx embedded GNSS location solution

- Simultaneous support of GPS, Glonass, Beidou, Galileo, QZSS
- All in view satellite tracking
- -163dBm sensitivity
- Full client side A-GNSS support with control plane and user plane solutions
- OTDOA based Advanced positioning solutions on LTE network (Operator dependent)
- Smaller overall footprint and Lower BOM vs external GNSS solutions

LE910Cx Certification plan 1/2

Product variant	Regulatory approvals					Carrier approvals		
	CE(RED)	FCC/IC	GCF	PTCRB	RCM	AT&T	VZW	TMO
LE910Cx-EU	Completed		Completed					
LE910Cx-NF		Completed	Completed	Completed		Completed xx6	Completed xx6	Completed xx4 Ongoing xx6
LE910C1-SV		Completed	Completed				Completed	
LE910C1-SA		Completed		Completed		Completed		
LE910C1-ST		Completed		Completed				Completed

Product variant	Regulatory approvals						Carrier approvals			
	Japan	RCM	FCC/IC	GCF	Anatel	Taiwan (NCC)	Telstra	Docomo	KDDI	SBM
LE910Cx-AP*	Completed	C1 Completed C4 ongoing		Completed	Completed	Completed	C1 Completed C4 ongoing	Completed	Completed	TBD
LE910Cx-LA			Completed		C1 Completed C4 ongoing					

LE910Cx Certification plan 2/2

Product variant	Regulatory approvals					Carrier approvals			
	CE(RED)	FCC/IC	GCF	PTCRB	RCM	AT&T/First Net	Sprint	VZW	T-Mobile
LE910C1-NA (AT&T)		Completed		Completed		Completed *			
LE910C1-NS (Sprint)		Completed	Completed				Completed *		

(*) MR planned to align QCT baseline

Frequently Asked Questions

Q: VOLTE support?

- Fully supports Volte

Q: AppZone support?

LE910Cx support Linux AppZone. Maximum memory allowed 7M.

More information is via Telit Technical Support (TS-APAC, TS-AMERICAS, TS-EMEA).

LE910Cx family is planned to add support for AppZone 2.0 by Q1 2020.

Q: LE910C1 pinout vs. xE910 FF?

LE910C1 have the same pinout as xE910 FF with additional pins for new functionality. More info in “xE910 Updated Form Factor Pin Out” doc.

Q: Are we planning to have miniPCIe variants?

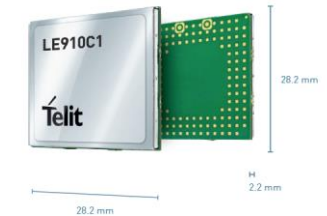
Yes all variants will have miniPCIe, but setup on demand only.

Q: QC baseline support?

- Please check if you P/N is new or old baseline before ordering, since there is a limitation in updating procedure (no FOTA). More information is via TS-EMEA
- By Q1 2020 we are planning to have all the products aligned to 2.1 Baseline (including NA and NS)

LE910C1 Series

LTE Cat.1 10/5 Embedded





Thank You!

Fabrizio Filizzola, PM

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