



Quectel Smart Module SC20/SC600/SC66

Product Overview

James Jia
February, 2019

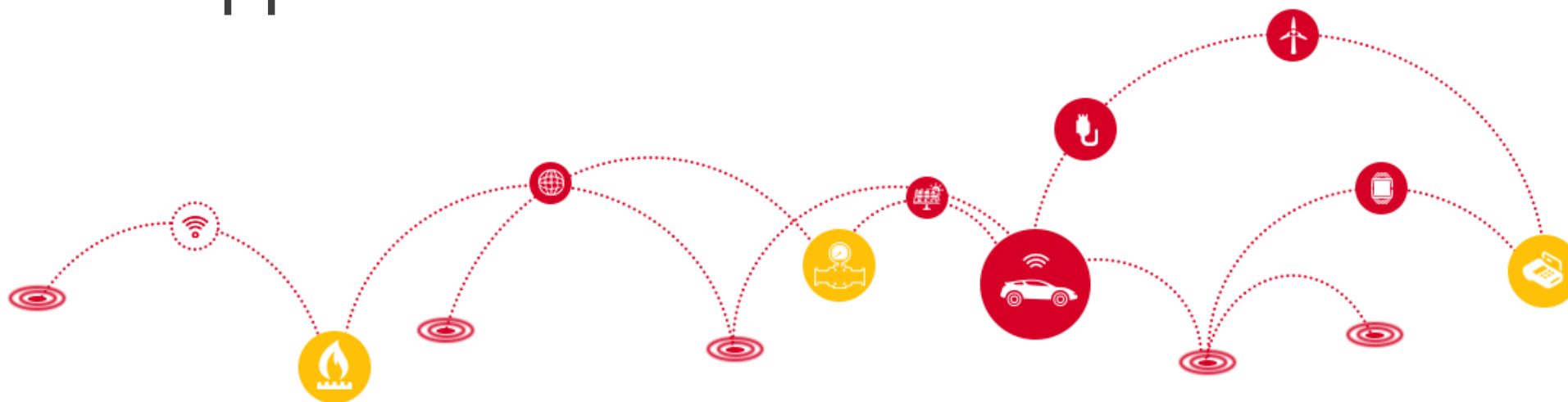
Smart Module Roadmap

Smart Solution Overview

Specifications

Applications

Customer Support



Smart Module Roadmap

LTE Cat 4
SC20
MSM8909



- Multi-mode LTE
- Quad-core A7 1.1GHz
- HD Display
- Camera 8MP
- Cat 4, 150M DL/ 50M UL
- LCC+LGA Form Factor

LTE Cat 6
SC600Y
SDM450



- Multi-mode LTE
- Octa-core A53 (1.8GHz)
- 2GB LPDDR3+16GB eMMC
- WUXGA Display
- Camera 21MP
- Cat 6, 300M DL/ 50M UL
- LCC+LGA Form Factor

LTE Cat 6
SC600T
MSM8953



- Multi-mode LTE
- Octa-core A53 (2.0GHz)
- 2GB LPDDR3+16GB eMMC
- WUXGA Display
- Camera 24MP
- Video 4K@30fps
- Cat 6, 300M DL/ 50M UL
- LCC+LGA Form Factor

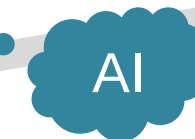
LTE Cat 6
SC66
SDM660



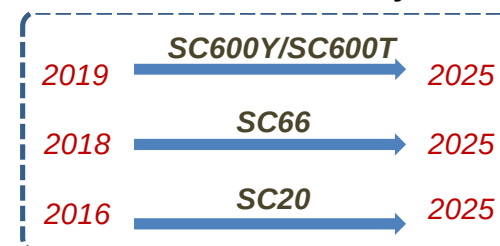
- Multi-mode LTE
- Octa-core Kryo 260
- 3GB LPDDR4X+32GB eMMC
- Display 2560x1600 @60fps Primary + 4K@30fps over DP
- Camera 24 MP at 30 fps ZSL
- Cat 6, 300M DL/ 50M UL
- **Neural processing engine**
- LCC+LGA Form Factor



Android



Smart Module Life Cycle



.....2025

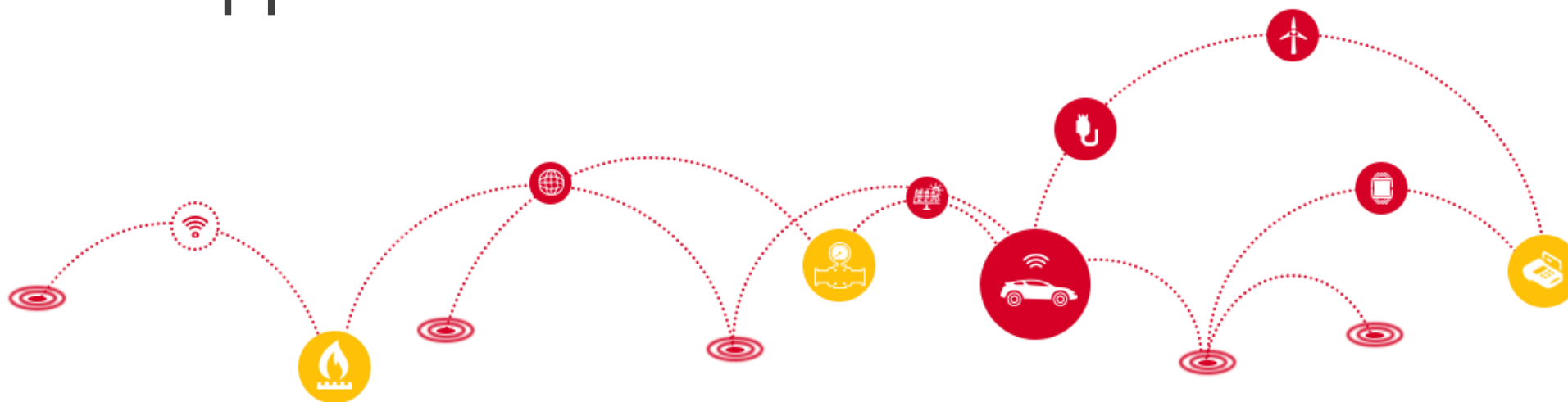
Smart Module Roadmap

Smart Solution Overview

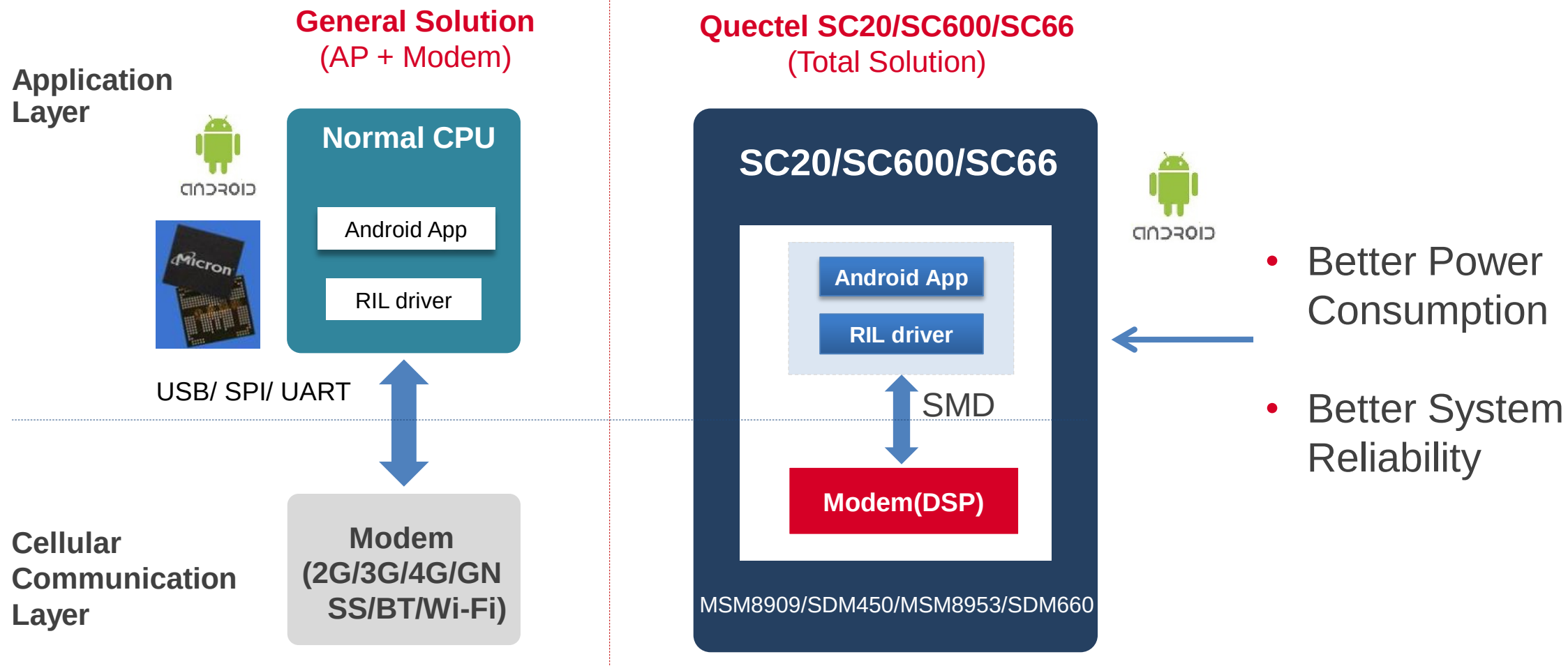
Specifications

Applications

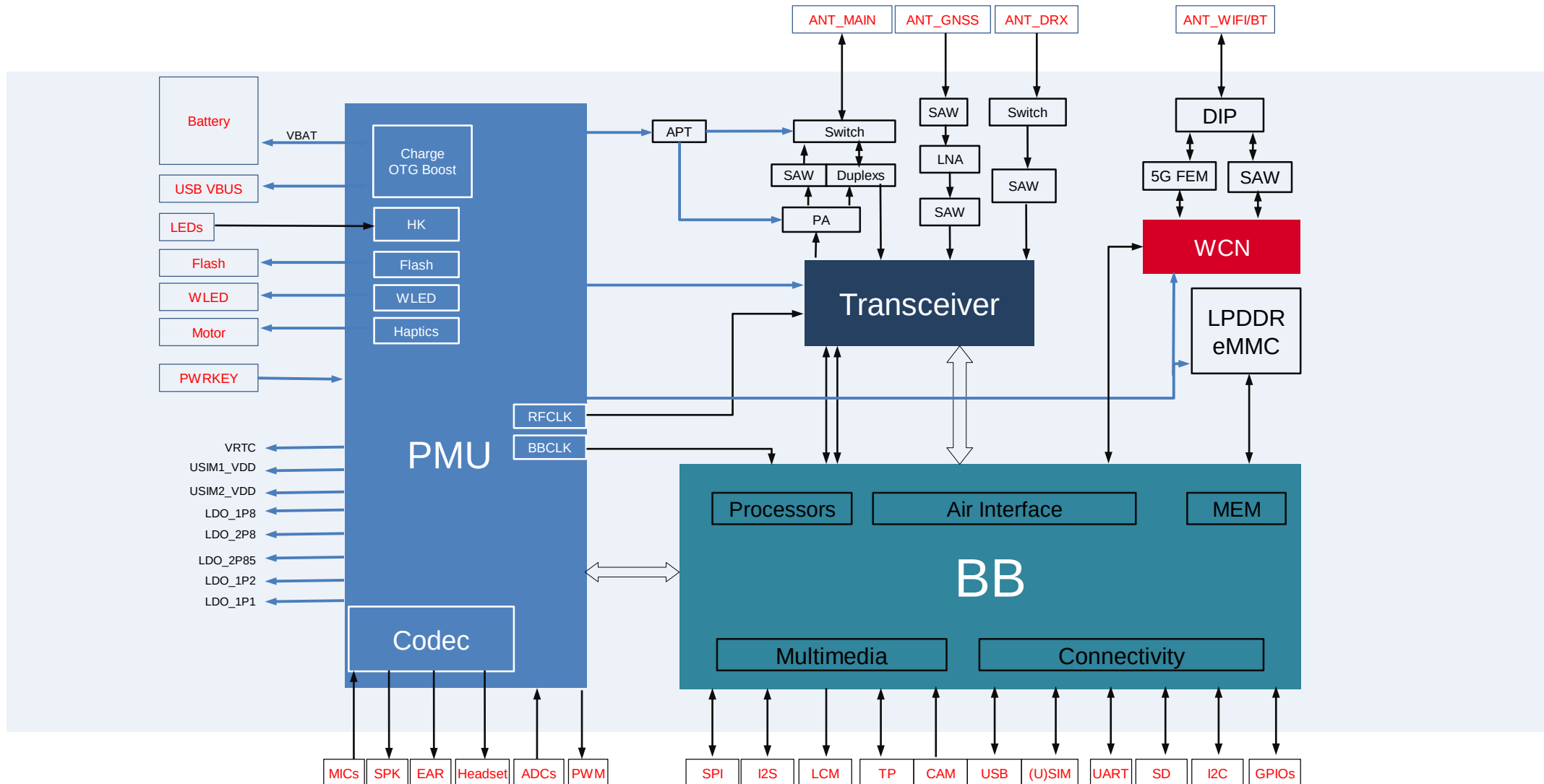
Customer Support



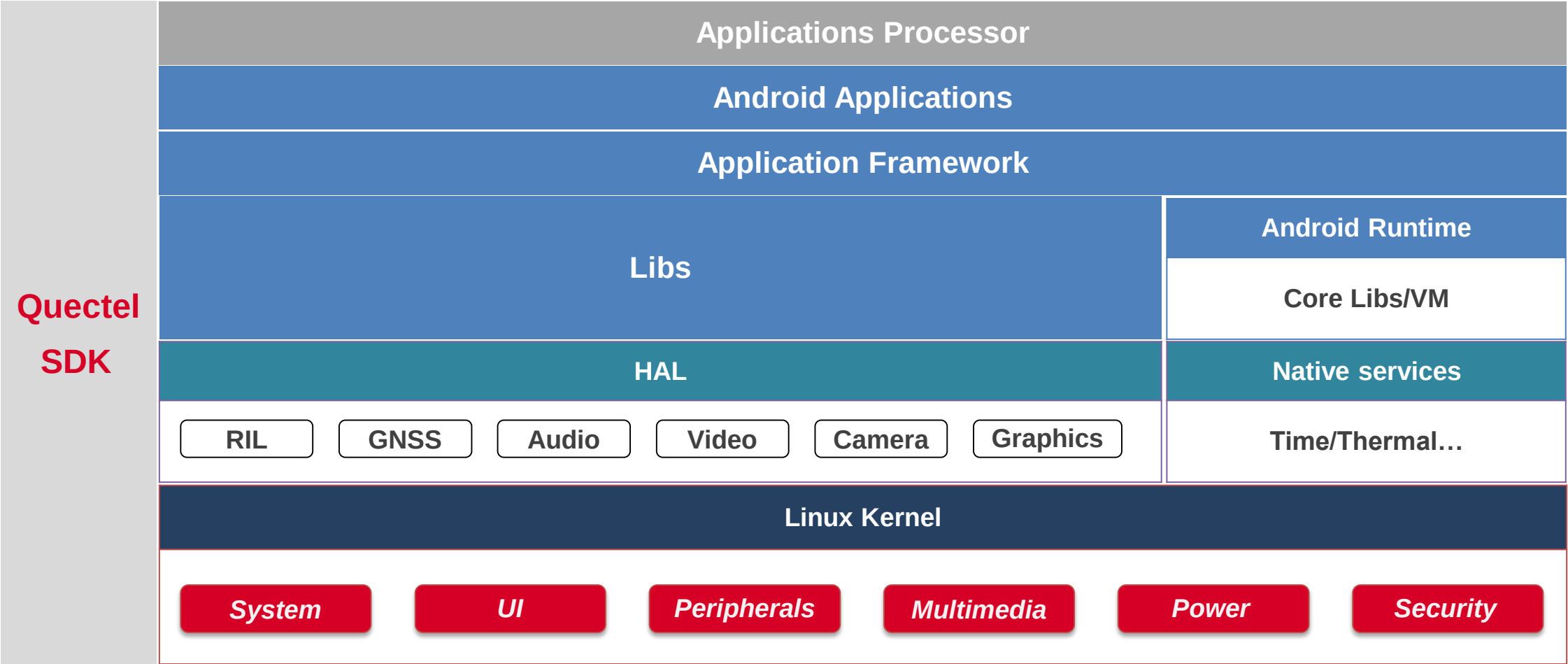
Traditional Smart System vs Smart SC20&SC600&SC66



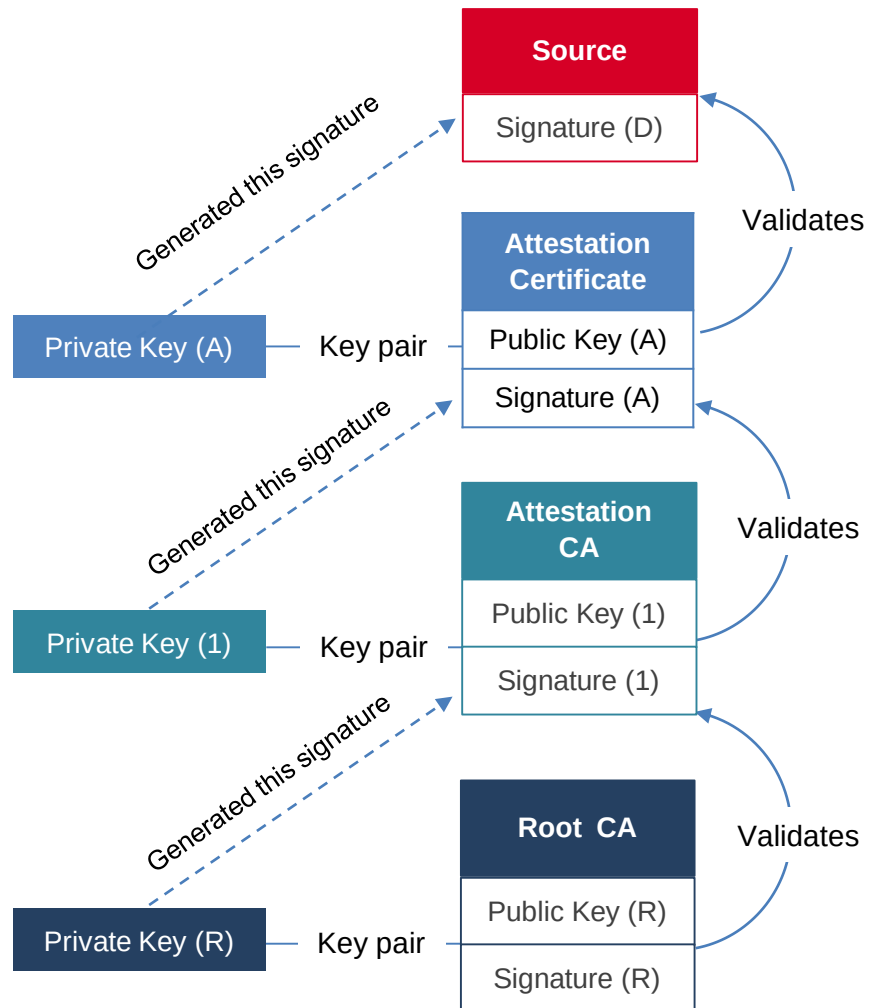
SC20/SC600/SC66 Hardware System Block Diagram



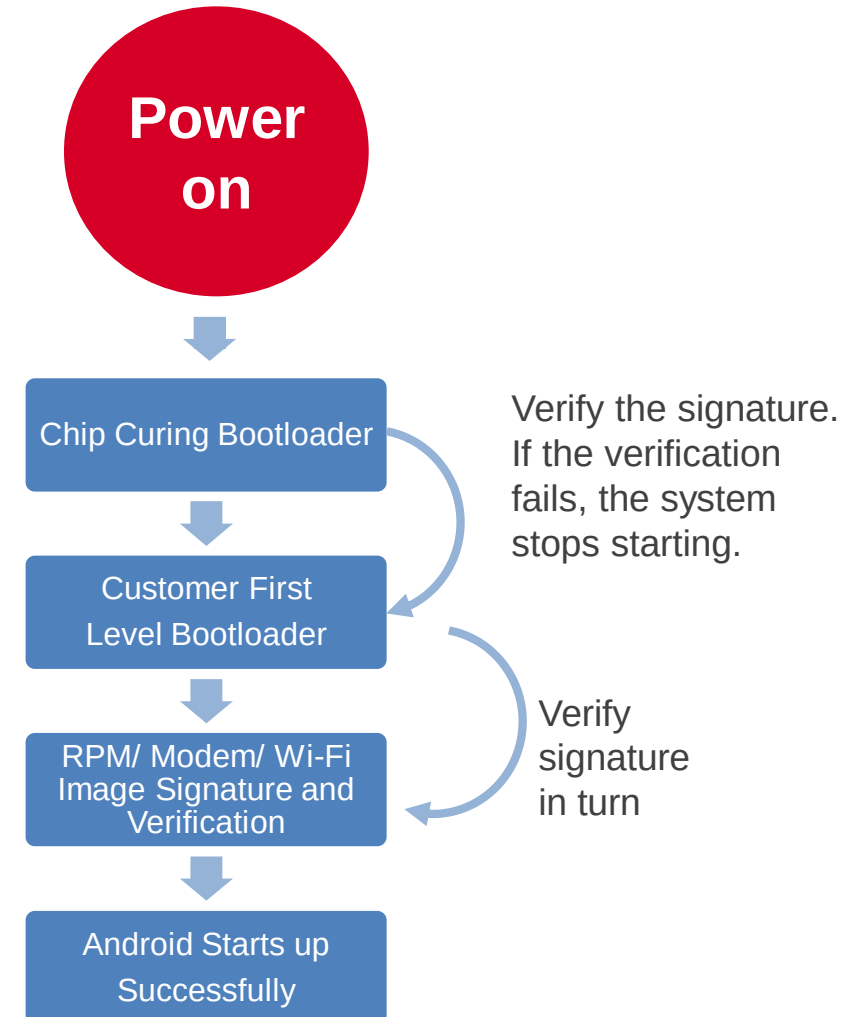
SC20/SC600/SC66 Software Structure



Firmware Signature and Secure Boot



- Sign every image with private key.
- Enhanced system security: the previous level trusted firmware will verify the signature of the next firmware in booting process, to prevent firmware on the Flash from malicious tampering.



Android Security Solution



SeLinux Authority Control



Android Against Root



Boot Image Verification



Kernel Module Signature



eMMC File System Encryption



Android APK Signature



Copyright Protection



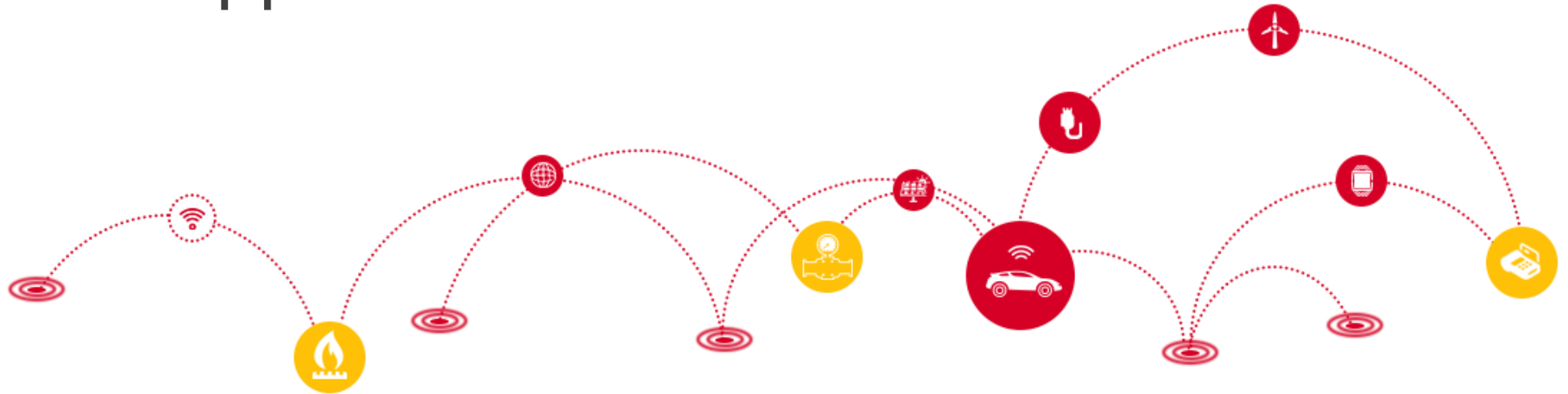
Smart Module Roadmap

Smart Solution Overview

Specifications

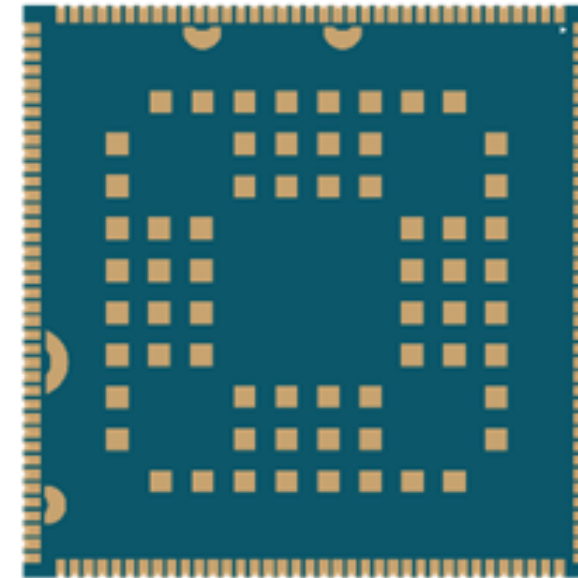
Applications

Customer Support



SC20 Mechanical Dimensions

Multi-Mode LTE Cat 4 Module (MSM8909)



Length: 40.5mm (± 0.15 mm)
Width: 40.5mm (± 0.15 mm)
Height: 2.8mm (± 0.2 mm)
Weight: Approx. 9.8g

[back](#)

SC20 Support Package



Evaluation Board

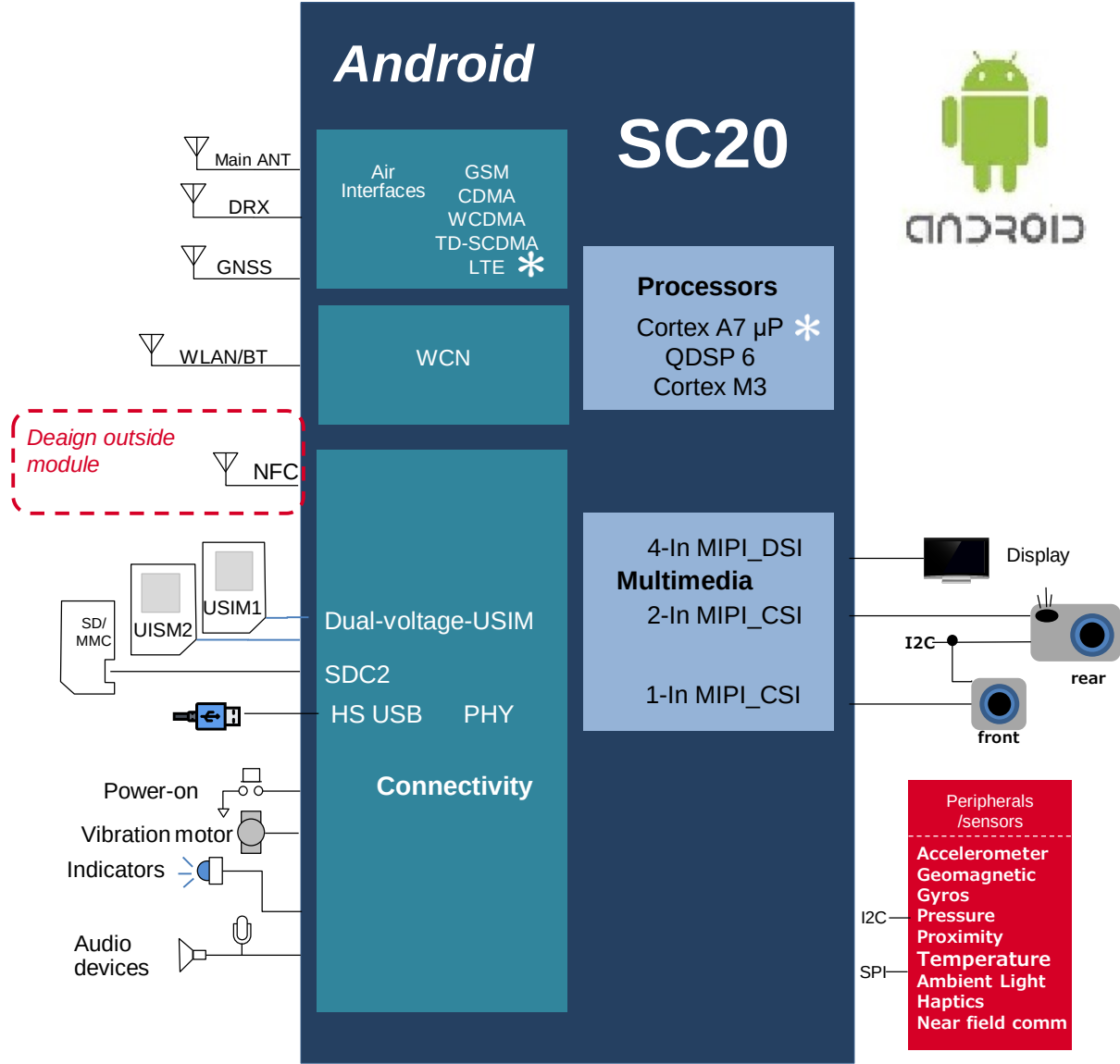
Interfaces

- Serial port
- Antenna interface
- Micro-USB interface

Accessories

- Micro-USB cable
- Antenna
- Battery

SC20 Overview



SC20 Specifications

Variant		SC20-E	SC20-EU	SC20-A	SC20-J	SC20-AU	SC20-CE	SC20-W
LTE	LTE-FDD	B1/ B3/ B5/ B7/ B8/ B20	B1/ B2 ^① / B3/ B5 ^① / B7/ B8/ B20/ B28A	B2/ B4/ B5/ B7/ B12/ B13/ B25/ B26	B1/ B3/ B8/ B18/ B19/ B26	B1/ B3/ B5/ B7/ B8/ B28	B1/ B3/ B5/ B8	\
	LTE-TDD	B38/ B40/ B41	B38/B41 ^②	\	B41	B40	B38/ B39/ B40/ B41	\
UMTS	WCDMA	B1/ B5/ B8	B1/B2/B5/B8	B1/ B2/ B4/ B5/ B8	B1/ B6/ B8/ B19	B1/ B2/ B5/ B8	B1/ B8	\
	TD-SCDMA	\	\	\	\	\	B34/ B39	\
EVDO/CDMA		\	\	\	\	\	BC0	\
GSM/EDGE		Quad-band	Quad-band	850/ 1900MHz	\	Quad-band	900/ 1800MHz	\
Embedded GNSS		Y	Y	Y	Y	Y	Y	\
Wi-Fi/BT		Y	Y	Y	Y	Y	Y	Y
Region		EMEA/ Korea/ Thailand/ India	EMEA/ Korea/ Thailand	America	Japan	Australia/ Taiwan/ Brazil	China (CMCC, CUCC)	Global
Certification		CE/ GCF/ NBTC	CE/ RCM/ GCF	Verizon/ AT&T/ T-Mobile ^③ / Sprint*/ Rogers/Telus ^④ / FCC/ IC/ GCF/ PTCRB/ Bell*	JATE/ TELEC/ NTT DOCOMO*	CE/ RCM/ Anatel/ GCF/ Telstra	SRRC/ NAL/ CCC	CE/ RCM/ FCC/ IC/ Anatel/ JATE/ TELEC

“Y” means supported.

“*” means under development.

① Rx-diversity is not supported on LTE B2/B5 for SC20-EU.

② LTE B41 for SC20-EU is optional and not certified by GCF.

③ T-Mobile for Data Only version has been done and that for Voice version is ongoing.

④ Telus for Data Only version has been done and that for Voice version is ongoing.

SC20 Features

Item	Description
CPU	• MSM8909, Quad-core A7, up to 1.1GHz
Memory	• 1GB LPDDR3 + 8GB eMMC/2GB LPDDR3 + 16GB eMMC
OS	• Android 7.1 (<i>Android 8.1 Optional</i>)/ <i>Linux(Optional)</i>
WLAN	• 2.4G/5G, 802.11 a/b/g/n • 150Mbps, STA/AP/P2P
BT	• BT 2.1 + EDR/3.0/4.1 LE /BT4.2 • Support a maximum of 10 ACL/BEL/SCO links
GNSS	• GPS/BeiDou/GLONASS, or GPS/BeiDou/Galileo
Modem	• 3GPP Release 10 compliant

SC20 Interfaces

Item	Description
LCM	• 4-lane MIPI_DSI, 1.5Gbps/lane, HD (720P) @60fps • Support MIPI to RGB, MIPI to LVDS and MIPI to HDMI
Camera	• 4-lane MIPI_CSI, 1.5Gbps/lane, 1 ISP, Bayer/YUV format
Touch panel	• Capacitive-screen, I2C controls
Audio	Analog channels: • Two inputs: MIC1, MIC2 • Three outputs: speaker, earpiece, headphone
Video	• Encode: 720P (H.264) @30fps; WVGA (MPEG-4/VP8) @30fps • Decode: 1080P (H.264/MPEG-4/VP8/H.265/DivX4/5/6) @30fps; WVGA (H.263) @30fps
USB 2.0 Device	• High Speed, 480Mbps • Support USB 2.0 OTG, USB OTG+Charge and USB to Ethernet functions
(U)SIM	• 2, support 1.8/3V (U)SIM cards, with (U)SIM card detection function; DSDS supported
UART	• 2, support up to 4Mbps with Hardware Flow Control
SDIO	• SD 3.0, 4 bit SDIO
I2C/SPI/ADC/GPIO	• Supported
PWRKEY	• Supported
Antenna	• 4 pads (for main antenna, diversity antenna, GNSS antenna and BT/Wi-Fi antenna, respectively)

SC20 OS support

Module	Operating System		
	Android 7.1	Android 8.1	Android 9
SC20(Linux 3.10)	Y	Y(Optional)	N (Waiting for Qualcomm's original Android 9 release)

SC20 Linux

2018			2019						
Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.

Linux Schedule



SC20-A Timeline



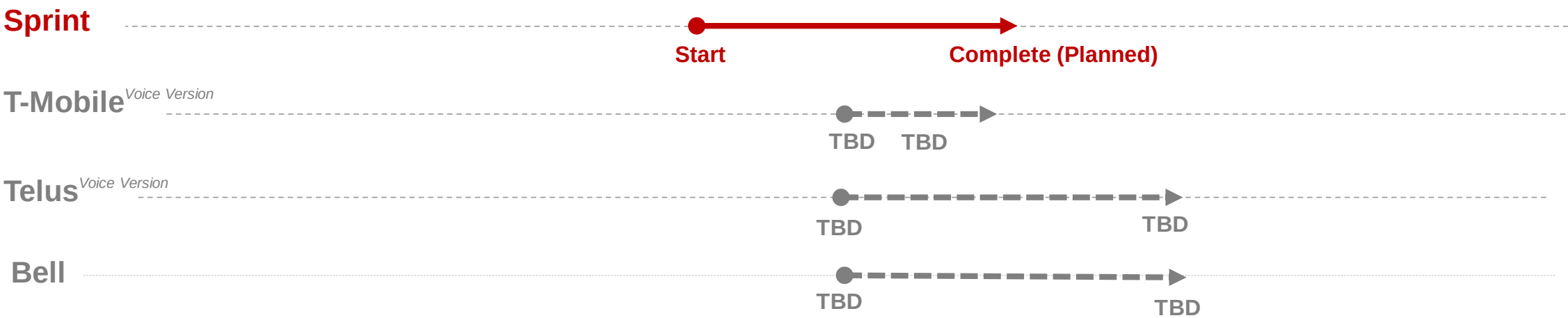
2018			2019						
Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.

Project Schedule

SC20-A MP

Certification Schedule

Verizon/ AT&T/ T-Mobile^{Data Version} / Rogers/ Telus^{Data Version} / FCC/ IC/ GCF/ PTCRB Completed



SC20-AU Timeline

2018

Project Schedule

SC20-AU 

Certifications

CE/ RCM/ Anatel/ Telstra/ GCF



SC20-E Timeline

2018

Project Schedule

SC20-E

MP

Certifications

CE/ GCF/ NBTC



SC20-W Timeline

2018

Project Schedule

SC20-W 

Certifications

CE/ RCM/ FCC/ IC/ Anatel/ JATE/ TELEC



SC20-J Timeline



2018											2019			
Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.

Project Schedule

SC20-J 

Certifications

JATE/ TELEC



NTT DOCOMO



SC20-CE Timeline

2018

Project Schedule

SC20-CE

MP

Certifications

SRRC/ NAL/ CCC



SC20-EU Timeline



2018												2019		
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.

Project Schedule

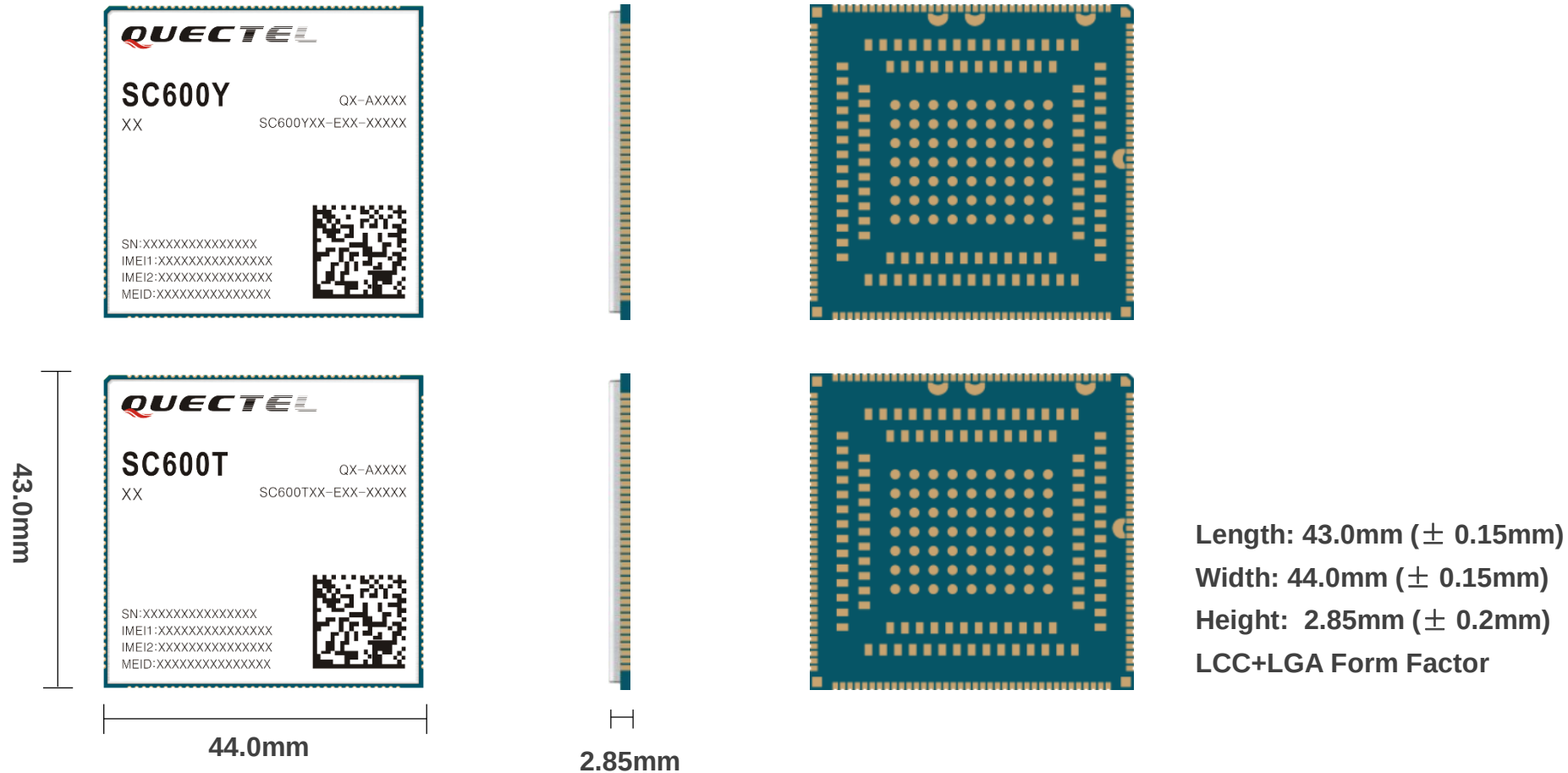
SC20-EU 

Certification Schedule

CE/RCM/GCF Completed

SC600Y/SC600T Mechanical Dimensions

Multi-Mode LTE Cat 6 Module (SDM450/MSM8953)



SC600 Support Package



Evaluation Board

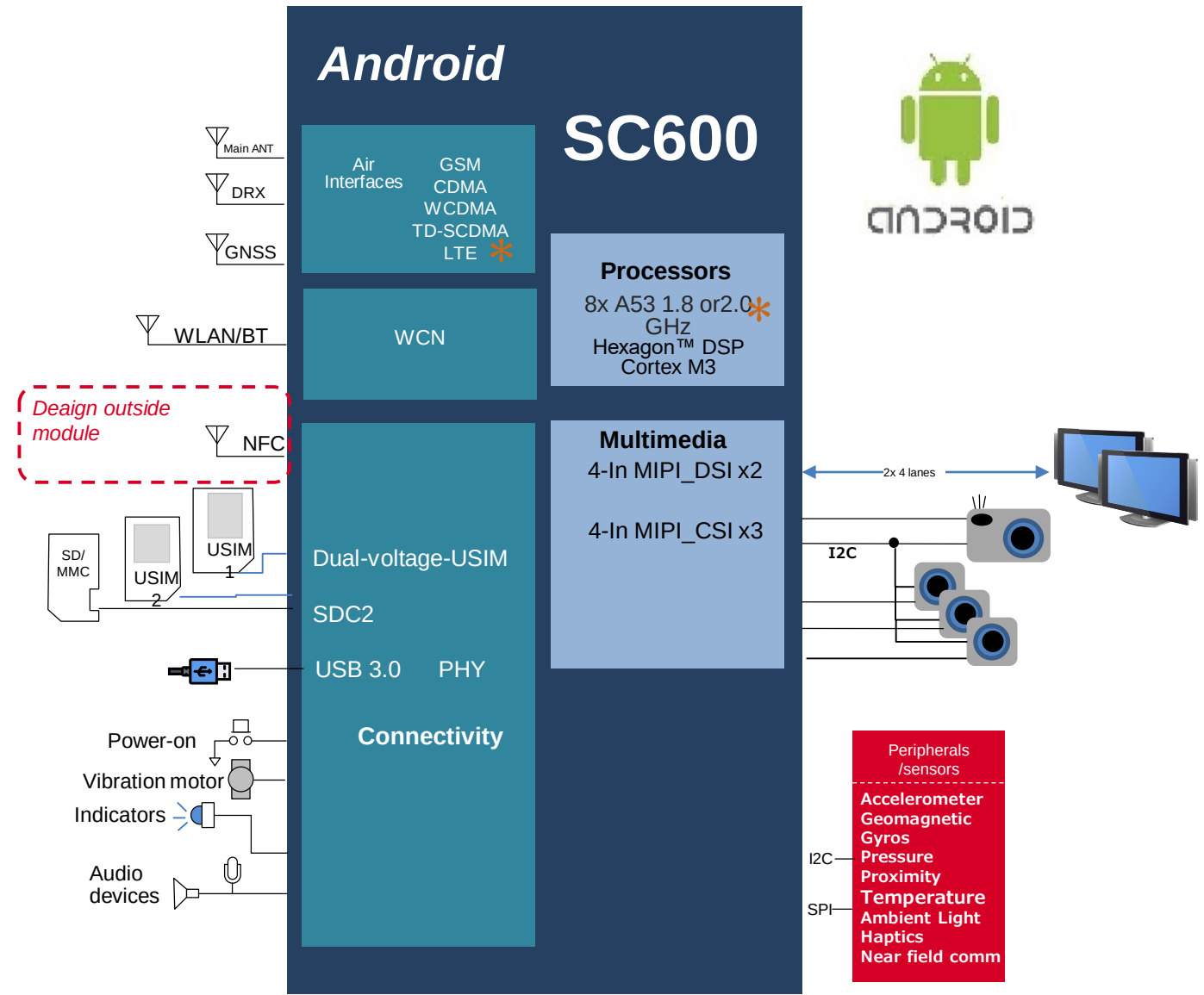
Interfaces

- Serial port
- Antenna interface
- USB Type-C Interface

Accessories

- Antenna
- Battery
- Power adapter
- USB Type-C cable
- USB to RS232 converter cable

SC600 Overview



SC600Y/SC600T Specifications

Variant		SC600Y-EM/SC600T-EM	SC600Y-NA/SC600T-NA	SC600Y-JP/SC600T-JP	SC600Y-WF/SC600T-WF
LTE	LTE-FDD	B1/ B2/ B3/ B4/ B5/ B7/ B8/ B20/ B28	B2/ B4/ B5/ B7/ B12/ B13/ B14/ B17/ B25/ B26/ B66/ B71	B1/ B3/ B5/ B8/ B11/ B18/ B19/ B21/ B26/ B28	\
	LTE-TDD	B38/ B39/ B40/ B41	B41	B41	\
UMTS	WCDMA	B1/ B2/ B4/ B5/ B8	B2/ B4/ B5	B1/ B6/ B8/ B19	\
	TD-SCDMA	\	\	\	\
CDMA		\	\	\	\
GSM/EDGE		850/900/1800/1900MHz	\	\	\
Embedded GNSS		Y	Y	Y	\
Wi-Fi/BT		Y	Y	Y	Y
Region		EMEA/ India/ Korea/ Taiwan/ South Asia/ Latin America/ Australia/ New Zealand/ South Africa	North America	Japan	Global
Certification		CE*/ RCM*/ GCF*/ Telstra*	Verizon*/ AT&T*/ FCC*/ IC*/ GCF*/ PTCRB*	JATE*/ TELEC*/ NTT DOMOCO*	TBD

"Y" means supported.
"*" means under development.

SC600Y/SC600T Features

Item	Description
CPU	• SC600Y: SDM450, Octa-core ARM Cortex-A53 64-bit CPU @1.8GHz • SC600T: MSM8953, Octa-core ARM Cortex-A53 64-bit CPU @2.0GHz
GPU	• Qualcomm® Adreno™ 506 graphics processing unit (GPU) with 64-bit addressing
Memory	• 2GB LPDDR3 + 16GB eMMC
OS	• Android 9
Battery Charge	• PMI632(Optional) Qualcomm Quick Charge 3.0 support
WLAN	• 2.4G/5GHz, 802.11 a/b/g/n/ac, 433Mbps, STA/AP/P2P
BT	• BT2.1+EDR/ 3.0/ 4.1LE/ 4.2LE • Support a maximum of 10 ACL/BEL/SCO links
GNSS	• GPS/BeiDou/GLONASS, or GPS/BeiDou/Galileo
Modem	• Partial 3GPP Release 12 compliant

SC600Y/SC600T Interfaces

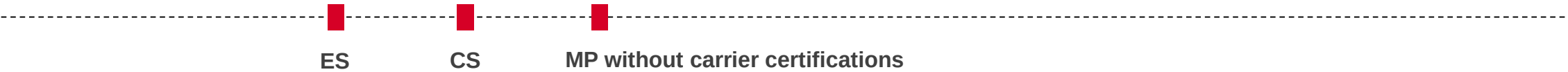
Item	Description
LCM	- Support dual LCDs for independent display: dual 4-lane MIPI_DSI; WUXGA (1920*1200) @60fps - Wi-Fi display: 1080P 30fps (UBWC)
Camera	3 groups of 4-lane MIPI_CSI, up to 2.1Gbps per lane - Support three cameras (4-lane + 4-lane + 4-lane) or four cameras (4-lane + 4-lane + 2-lane + 1-lane) - Up to 21MP with dual ISP @SC600Y - Up to 24MP with dual ISP @SC600T
Touch panel	2, Capacitive-screen, I2C controls
Audio	Analog channels: - Two inputs: MIC1, MIC2 - Three outputs: speaker, earpiece, headphone
Video	- Video encoding and decoding: up to 1080P @60fps @SC600Y - Video encoding and decoding: up to 4K at 30fps @SC600T Encoder HFR: 720P@120ps; 60Mbps; Maximum 972000 macro block/s; 1080P@60fps decode+1080P@30fps encode
USB	USB 3.0 and 2.0 Compliant, Type-C, USB OTG + Charge
(U)SIM	2, support 1.8/3V (U)SIM cards, with (U)SIM card detection function; DSDS supported
UART	3, support 4Mbps with hardware flow control
SDIO	SD 3.0, 4 bit SDIO
I2C/SPI/PWM/ADC/GPIO/PWRKEY	Supported
Antenna	4 pads (for main antenna, diversity antenna, GNSS antenna and BT/Wi-Fi antenna, respectively)

SC600Y-EM/ SC600T-EM Timeline

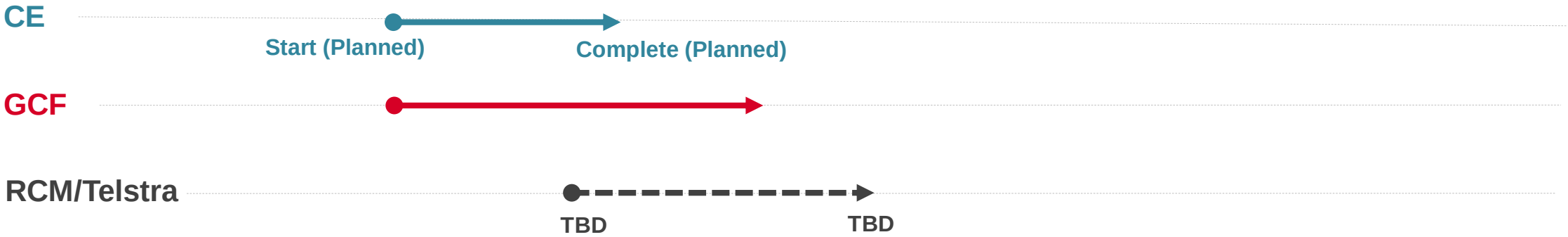


2019											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

Project Schedule



Certification Schedule



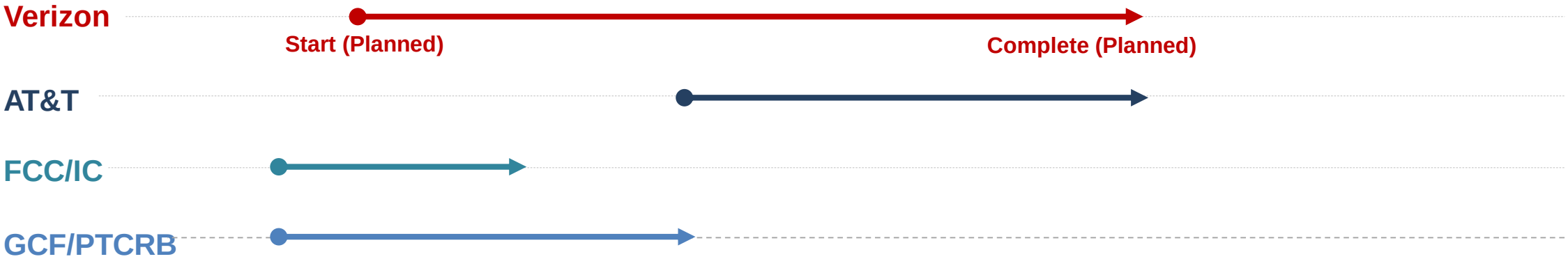
SC600Y-NA/ SC600T-NA Timeline



Project Schedule



Certification Schedule



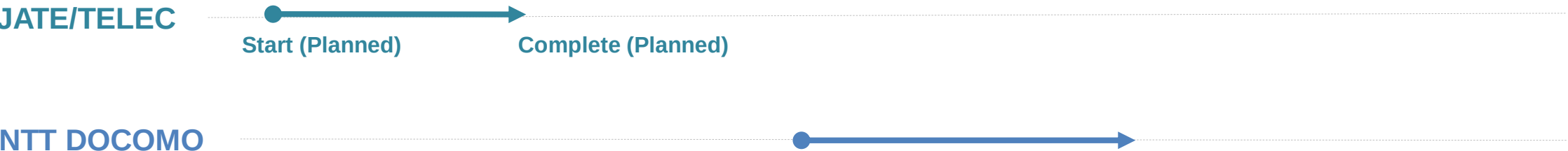
SC600Y-JP/ SC600T-JP Timeline



Project Schedule



Certification Schedule

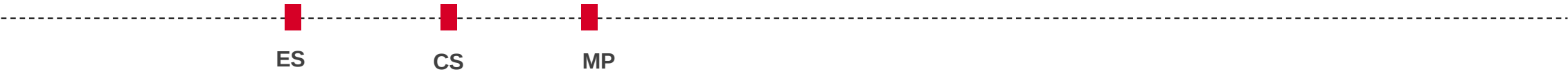


SC600Y-WF/ SC600T-WF Timeline



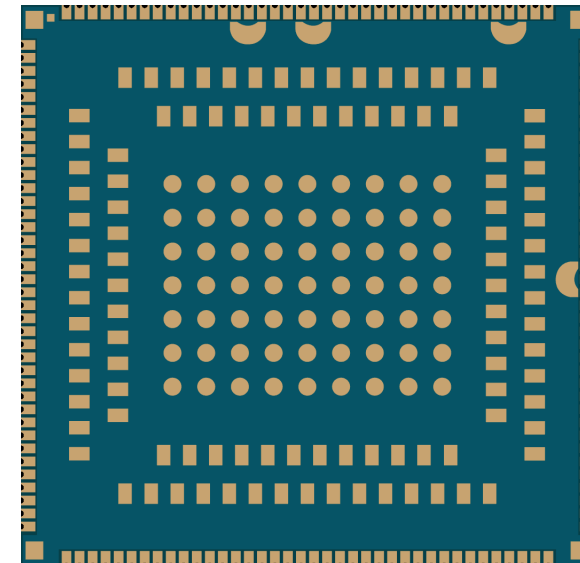
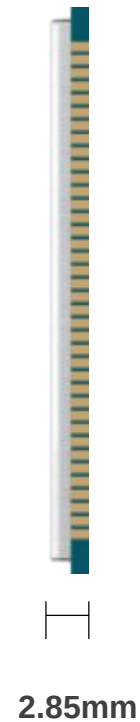
2019											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

Project Schedule



SC66 Mechanical Dimensions

Multi-Mode LTE Cat 6 Module (SDM660)



Length: 43.0mm (± 0.15 mm)

Width: 44.0mm (± 0.15 mm)

Height: 2.85mm (± 0.2 mm)

LCC+LGA Form Factor

[back](#)

SC66 Support Package



Evaluation Board

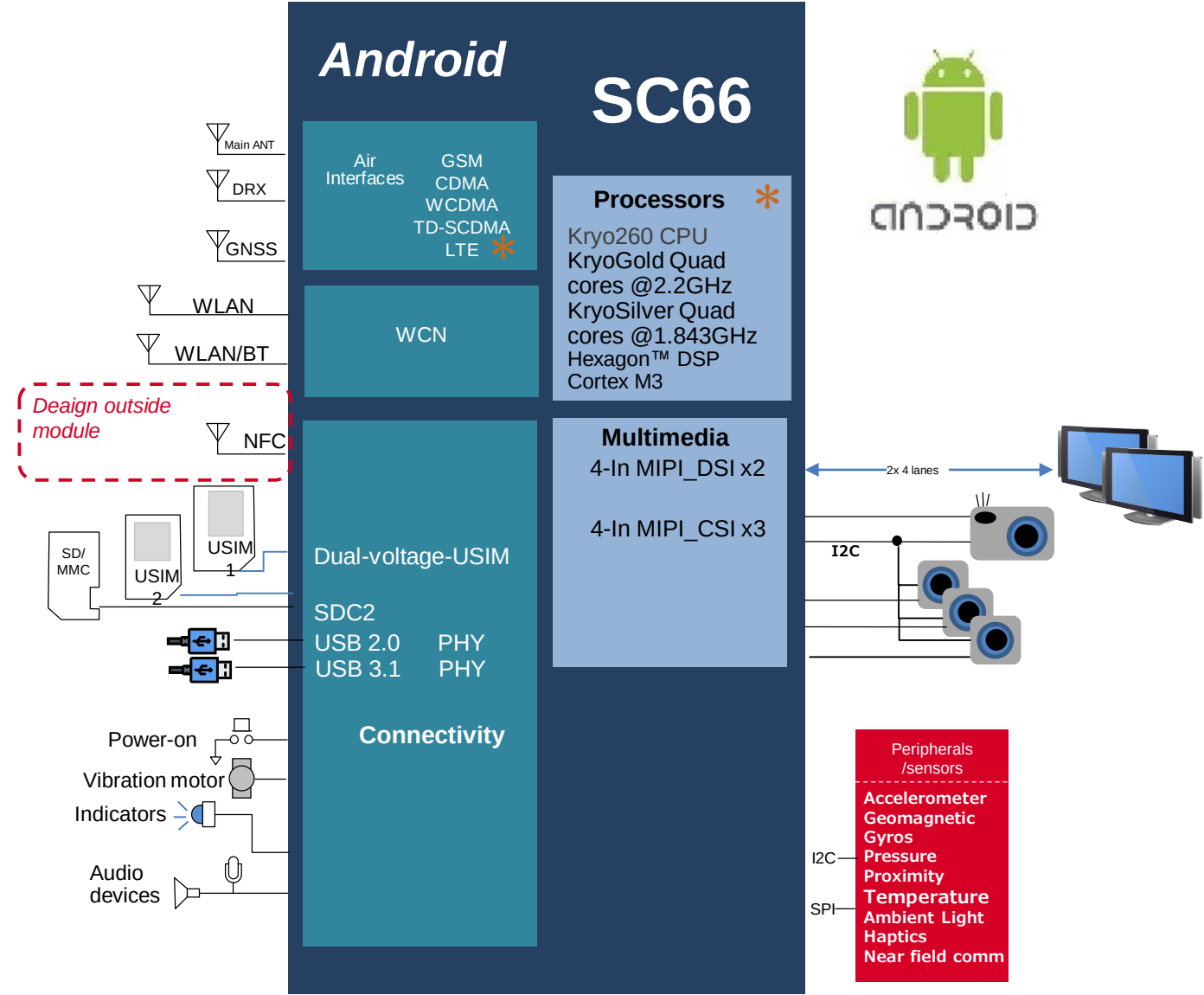
Interfaces

- Serial port
- Antenna interface
- USB Type-C Interface

Accessories

- Antenna
- Battery
- Power adapter
- USB Type-C cable
- USB to RS232 converter cable

SC66 Overview



SC66 Specifications

Variant		SC66-E	SC66-A	SC66-J	SC66-CE	SC66-MW
LTE	LTE-FDD	B1/ B2/ B3/ B4/ B5/ B7/ B8/ B20/ B28(A+B)	B2/ B4/ B5/ B7/ B12/ B13/ B14/ B17/ B25/ B26/ B66/ B71	B1/ B3/ B5/ B8/ B11/ B18/ B19/ B21/ B26/ B28(A+B)	B1/ B3/ B5/ B8/	\
	LTE-TDD	B38/ B39/ B40/ B41 ^①	B41 ^①	B41 ^②	B34/ B38/ B39/ B40/ B41 ^①	\
UMTS	WCDMA	B1/ B2/ B4/ B5/ B8	B2/ B4/ B5	B1/ B6/ B8/ B19	B1/ B8	\
	TD-SCDMA	\	\	\	B34/ B39	\
EVDO/CDMA		\	\	\	BC0	\
GSM/EDGE		B2/ B3/ B5/ B8	\	\	B3/ B8	\
Embedded GNSS		Y	Y	Y	\	\
Wi-Fi/BT		Y(MIMO supported)	Y(MIMO supported)	Y(MIMO supported)	Y(MIMO is not supported)	Y(MIMO supported)
Region		Europe/ India/ Korea/ Taiwan/ South Asia/ Latin America/ Australia/ South Africa	North America	Japan	Global	Global
Certification		CE*/ GCF*/ RCM*/ Telstra*(TBD)/ Anatel*(TBD)/ KC*(TBD)	Verizon*/ AT&T*/ FCC*/ IC*/ GCF*/ PTCRB* (TBD)	JATE*/ TELEC*/ NTT DOCOMO*(TBD)	TBD	TBD

“Y” means supported.

“*” means under development.

①: Only 200MHz bandwidth is supported.

②: Only 120MHz bandwidth is supported.

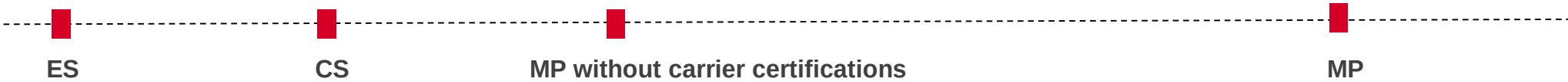
SC66 Features

Item	Description
CPU	SDM660, Customized 64-bit ARM v8.0-compliant AP (Kryo260 CPU) KryoGold Quad high-performance cores targeting 2.2GHz, L2 - 1MB KryoSilver Quad low-power cores targeting 1.843GHz, L2 - 1MB
GPU	Qualcomm® Adreno 512 at 650MHz, OpenGL ES3.1 + AEP, DX12_FL12, Vulkan, OpenCL2.0 FP, RenderScript
Memory	3GB LPDDR4X + 32GB eMMC
WLAN/BT	2.4G/5GHz, 802.11 a/b/g/n/ac; Bluetooth 5.0; 2×2 MIMO Wi-Fi
Video	Decoder: 4K30 8-bit; H.264, VP8, and VP9, 4K30 10-bit; HEVC Encoder: 4K30; HEVC, H264, VP8, and MPEG-4
GNSS	GPS, GLONASS, BeiDou, Galileo
Modem	3GPP Release 12 compliant
OS	Android 9
AI Engine	Qualcomm® Snapdragon™ Neural Processing Engine (SNPE)
USB	Dual USB: 1×USB 3.1, 1×USB 2.0
LCM	2560×1600 @60fps primary display + 4k@30fps over DP 24 bpp RGB; Dual MIPI DSI Wi-Fi display: 1080P @30fps + 1080P @30fps external wireless display

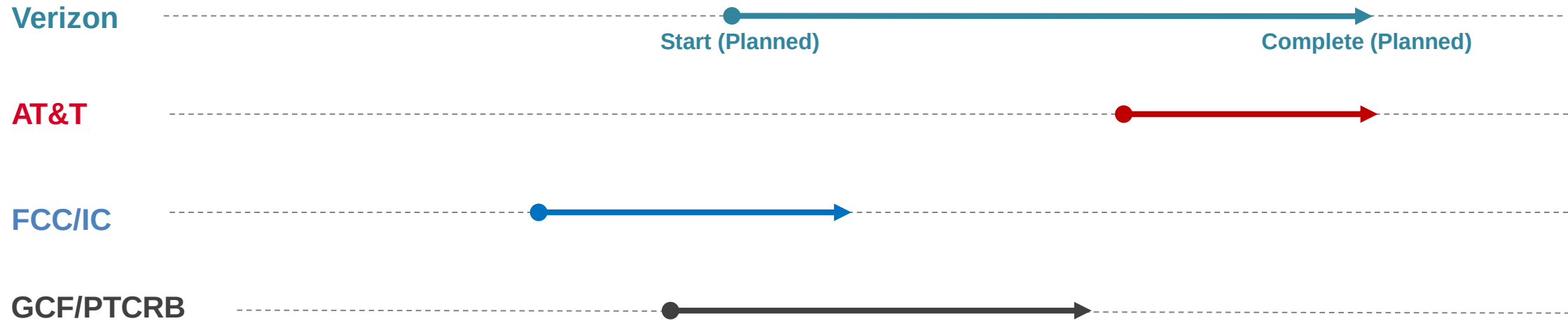
SC66-A Timeline



Project Schedule



Certification Schedule



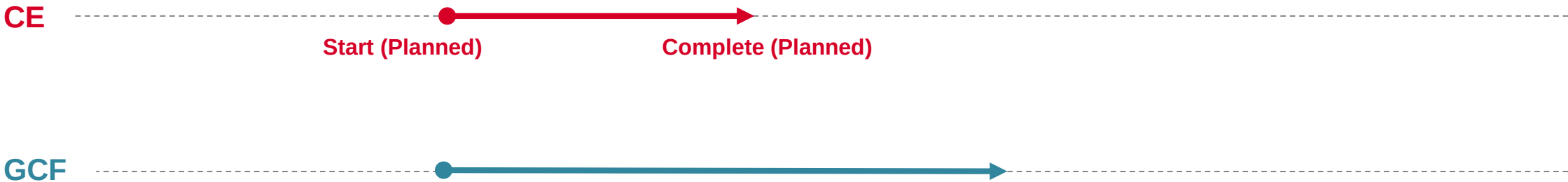
SC66-E Timeline



Project Schedule



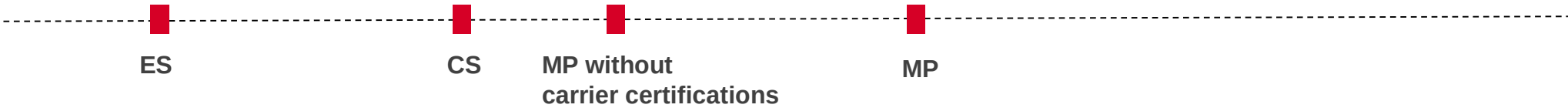
Certification Schedule



SC66-J Timeline



Project Schedule



Certification Schedule

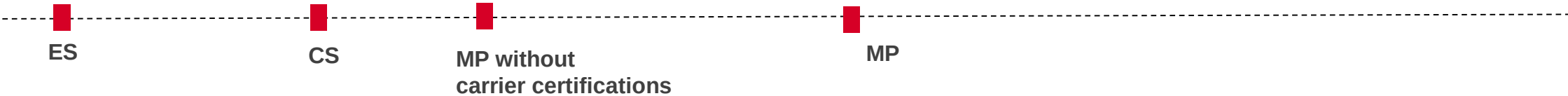


SC66-CE Timeline



2019											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

Project Schedule



Certification Schedule

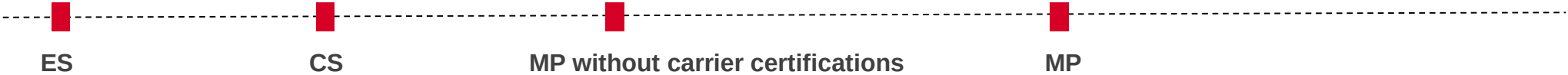


SC66-MW Timeline

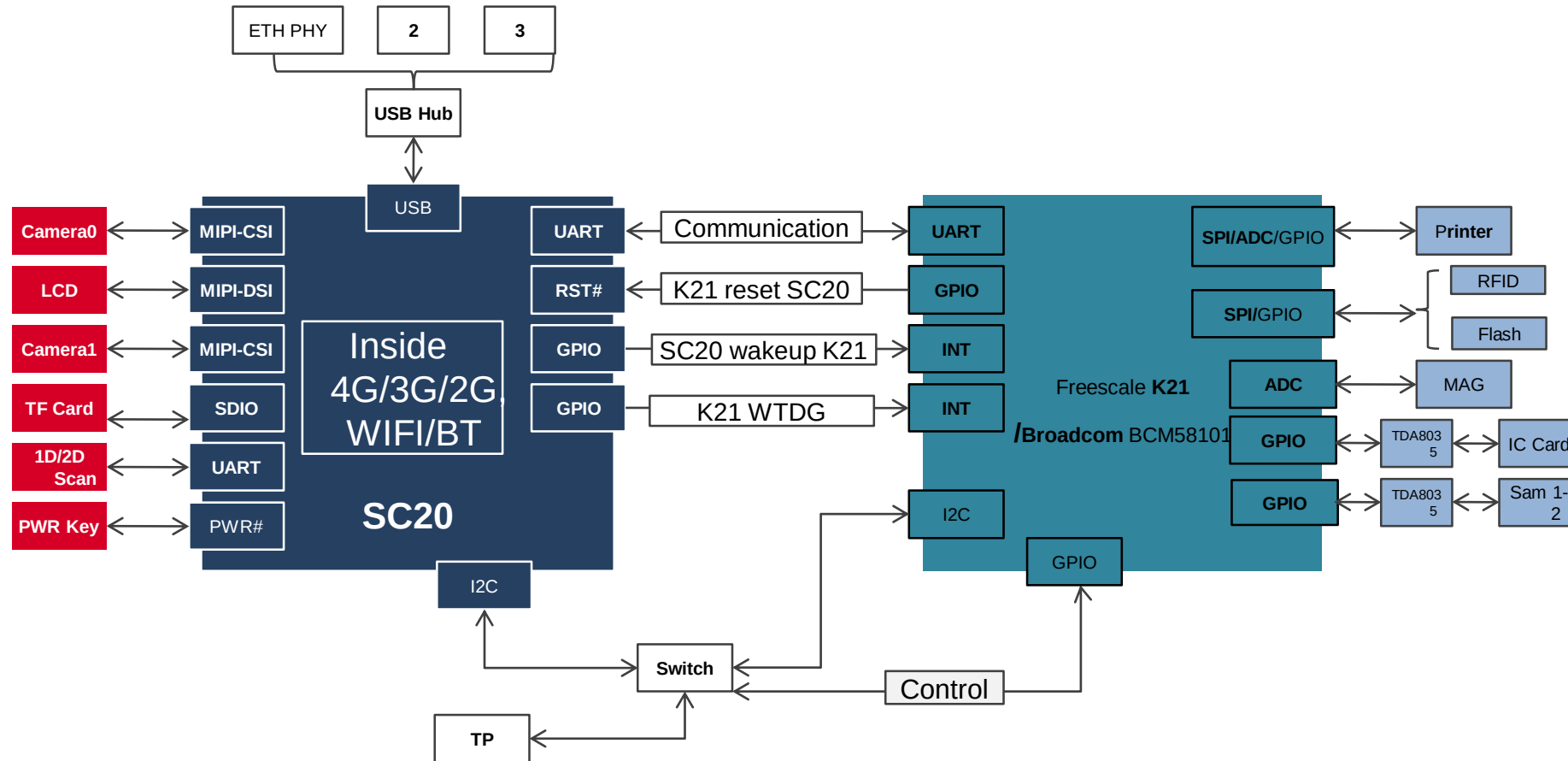


2019											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

Project Schedule



POS Architecture Example (SC20)



- K21 or BCM58101 take charge of secure things.
- SC20 take charge of no secure things

Platform Chipsets

Module	Platform Chipsets					
	Main IC	PMIC	WIFI/BT	Transceiver	Charge	eMCP
SC20	MSM8909	PM8909	WCN3660B	WTR4905	SW in PM8909	Hynix H9TQ64A8GTCCUR-KUM
SC600Y	SDM450	PM8953	WCN3680	WTR3925	PMI632 (Optional)	Hynix H9TQ17ABJTBCUR-KUM
SC600T	MSM8953	PM8953	WCN3680	WTR3925	PMI632 (Optional)	Hynix H9TQ17ABJTBCUR-KUM
SC66-CE	SDM660	PM660	WCN3980	SDR660	PM660L	KMDD60018M-B320
SC66-A/-E/-J /-MW	SDM660	PM660	WCN3990(MIMO)	SDR660	PM660L	KMDD60018M-B320

Android OS

Module	Operating System			
	Android 7.1	Android 8.1	Android 9.1	Linux
SC20(Linux 3.10)	Y	Y	N	Y (Developing)
SC600(Linux 4.9)	N	N	Y	N (Planning)
SC66(Linux 4.4)	N	N	Y	N

Modem

Module	Modem							
	3GPP Rel	GERAN	WCDMA	TDSCDMA	CDMA	1xEV-DO	LTE-FDD	LTE-TDD
SC20	Full conform R10 Partly support R11	GSM/GPRS/EDGE EDGE Multi Slot Class 33 DL-236 Kbps UL-59.2 Kbps	HSDPA-CAT24 HSUPA-CAT6 DL-42.2 Mbps UL -5.76 Mbps	HSDPA-Cat 24 HSUPA-Cat 6 DL-4.2 Mbps UL-2.2 Mbps	1x-Advanced DL-307.2 Kbps UL -307.2 Kbps	DL-3.1 Mbps UL-1.8 Mbps	Cat 4 DL-150 Mbps UL-50 Mbps	Cat 4 DL-130 Mbps UL-35 Mbps
SC600	Full conform R10 Partly support R12	GSM/GPRS/EDGE EDGE Multi Slot Class 33 DL-236 Kbps UL-59.2 Kbps	DC-HSDPA-CAT29 DC-HSUPA-CAT8 DL-84 Mbps UL -11 Mbps	HSDPA-Cat 24 HSUPA-Cat 6 DL-4.2 Mbps UL-2.2 Mbps	1x-Advanced DL-307.2 Kbps UL -307.2 Kbps	DL-3.1 Mbps UL-1.8 Mbps	Cat 6 DL-300 Mbps UL-50 Mbps	Cat 6 DL-265 Mbps UL-35 Mbps
SC66	Full conform R12	GSM/GPRS/EDGE EDGE Multi Slot Class 33 DL-236 Kbps UL-59.2 Kbps	DC-HSDPA-CAT29 DC-HSUPA-CAT8 DL-84 Mbps UL -11 Mbps	HSDPA-Cat 24 HSUPA-Cat 6 DL-4.2 Mbps UL-2.2 Mbps	1x-Advanced DL-307.2 Kbps UL -307.2 Kbps	DL-3.1 Mbps UL-1.8 Mbps	Cat 6 DL-300 Mbps UL-50 Mbps	Cat 6 DL-265 Mbps UL-35 Mbps

CPU

Module	CPUs					
	Application	Modem	RPM	GPU	Audio DSP	Video
SC20	Cortex-A7, Quad core 1.1GHz, 32bit, 512 KB L2 cache	QDSP6V5, 691.2 MHz , 768 kB L2 caches	Cortex-M3	Adreno 304@409.6 MHz	Share with modem	Venus 310 266MHz
SC600Y	Cortex-A53, Octa core, 64bit, 4X1.8GHz, 512 KB L2 cache; 4X1.8GHz, 512 KB L2 cache	Hexagon DSP V56 850 MHz , 768 kB L2 caches	Cortex-M3	Adreno 506@600 MHz, 64bit	Hexagon DSP V56 850 MHz , 768 kB L2 caches	Venus 333
SC600T	Cortex-A53, Octa core, 64bit, 4X2.0GHz, 1 MB L2 cache; 4X2.0GHz, 1 MB L2 cache	Hexagon DSP V56 850 MHz , 768 kB L2 caches	Cortex-M3	Adreno 506@600 MHz, 64bit	Hexagon DSP V56 850 MHz , 768 kB L2 caches	Venus 333
SC66	Customized 64-bit Armv8.0-compliant AP (Kryo260 CPU) KryoGold Quad high-performance cores targeting 2.2GHz, L2 –1MB KryoSilver Quad low-power cores targeting 1.843GHz, L2 –1MB	Hexagon DSP with Hexagon Vector eXtensions (dual-HVX512) 787 MHz , 768 kB L2 caches	Cortex-M3	Adreno 512@650 MHz, 64bit	Hexagon DSP with Hexagon Vector eXtensions (dual-HVX512) 787 MHz , 768 kB L2 caches	Venus 333

Memory

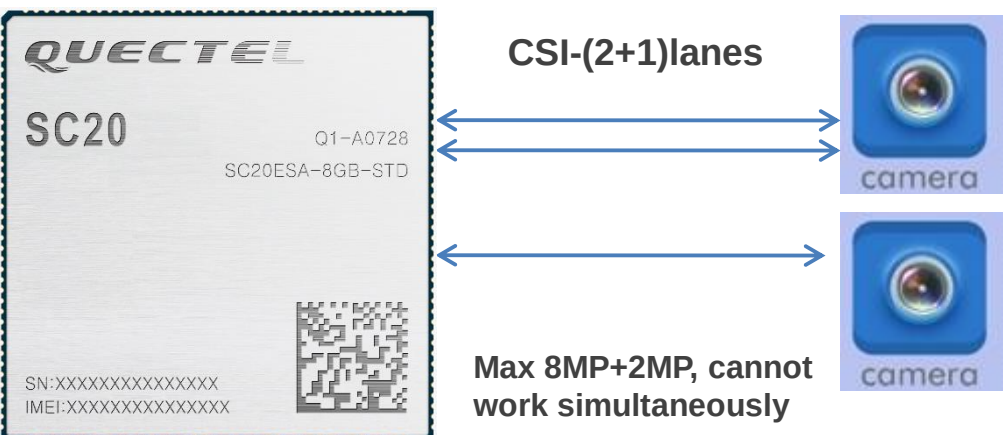
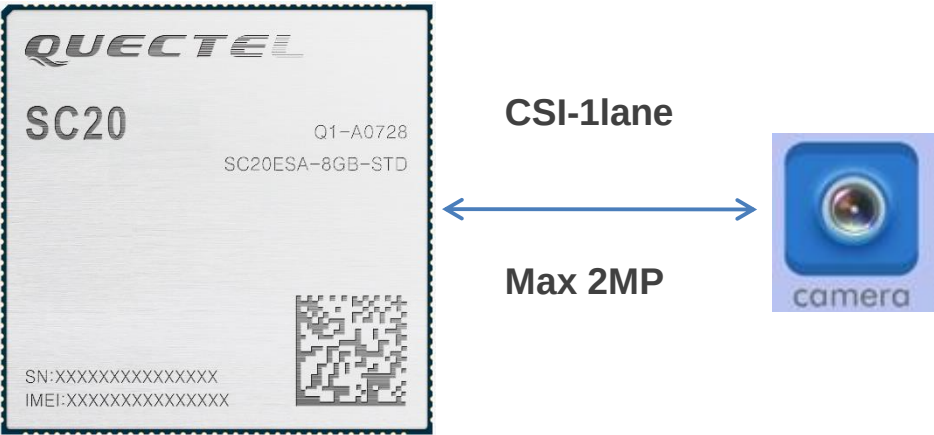
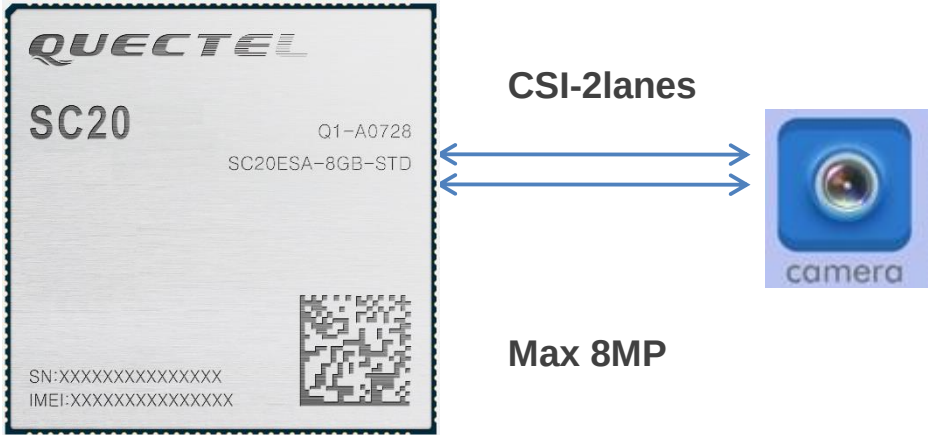
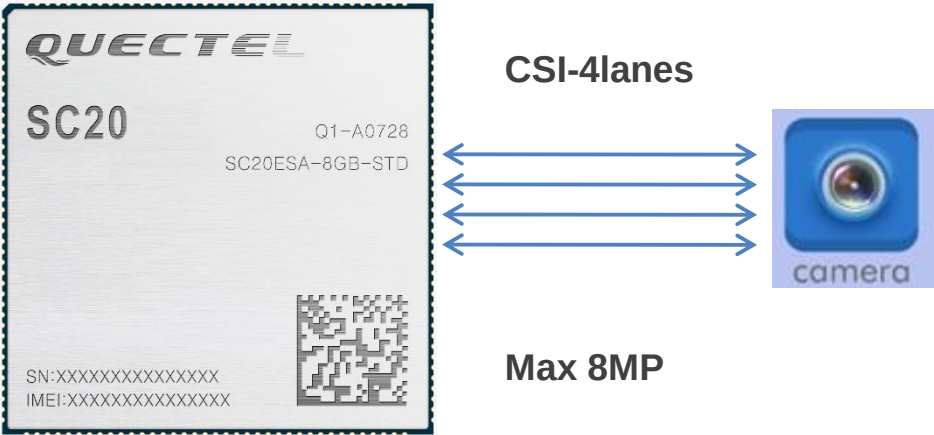
Module	Memory(LPDDR3 + eMMC)				
	1GB+8GB	2GB+16GB	3GB+32GB	4GB+32GB	4GB+64GB
SC20	Y	Y	N	N	N
SC600	N	Y	Option	Option	Option

Module	Memory(LPDDR4X + eMMC)				
	1GB+8GB	2GB+16GB	3GB+32GB	4GB+32GB	4GB+64GB
SC66	N	N	Y	Option	Option

Camera(MIPI)

Module	Camera
SC20	1 ISP, 2 CSI, 2lanes+1lane, 1.5Gbps/lane, 2-lane rear camera@8MP
SC600Y	2 ISP, 3 CSI, 4 lanes/CSI, 2.1Gbps/lane, 13MP@1 ISP, 21MP@2 ISP, CSI0(4/2/1), CSI1(4/2/1), CS2(4/2/1/2+1), maximum support 4 cameras, maximum simultaneously support 2 cameras(CSI0<=13MP,CSI1<=13MP,CSI2<=13MP)
SC600T	2 ISP, 3 CSI, 4 lanes/CSI, 2.1Gbps/lane, 13MP@1 ISP, 24MP@2 ISP, CSI0(4/2/1), CSI1(4/2/1), CS2(4/2/1/2+1), maximum support 4 cameras, maximum simultaneously support 2 cameras(CSI0<=13MP,CSI1<=13MP,CSI2<=13MP)
SC66	2 ISP, 3 CSI, 4 lanes/CSI, 2.1Gbps/lane, 16MP@1 ISP, 24MP@2 ISP, CSI0(4/2/1), CSI1(4/2/1), CS2(4/2/1/2+1), maximum support 4 cameras, maximum simultaneously support 2 cameras(CSI0<=16MP,CSI1<=16MP,CSI2<=16MP)

SC20 Camera

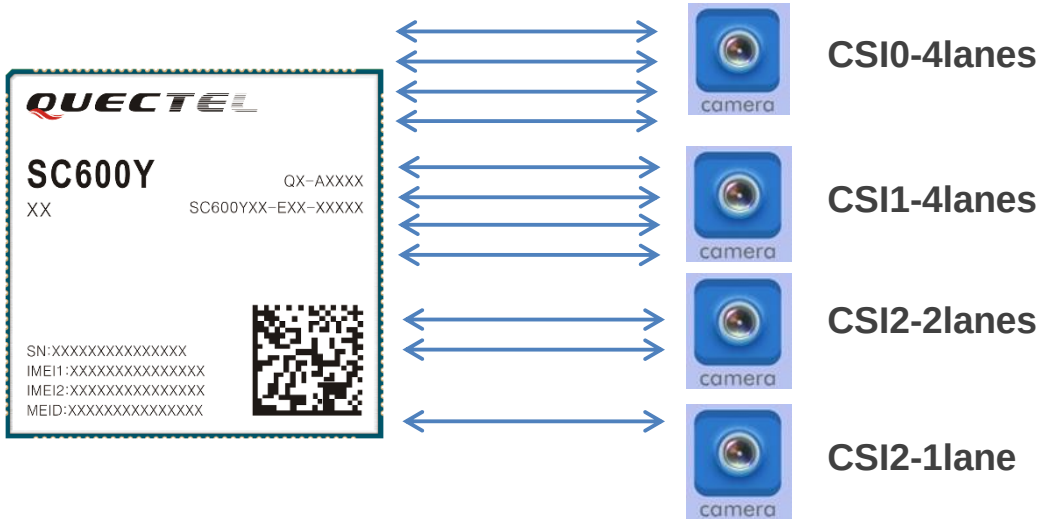
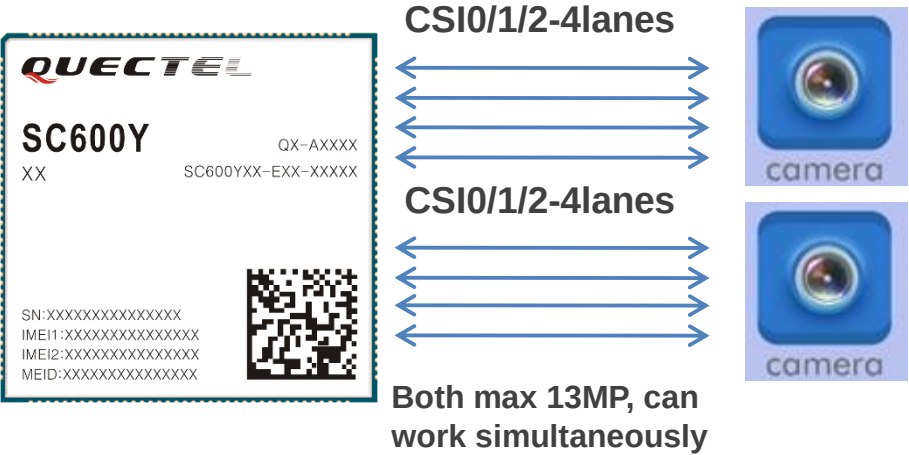
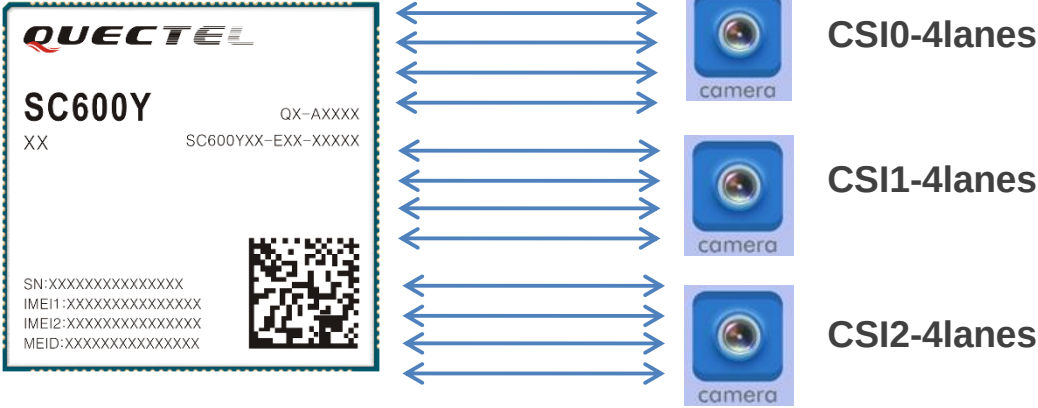
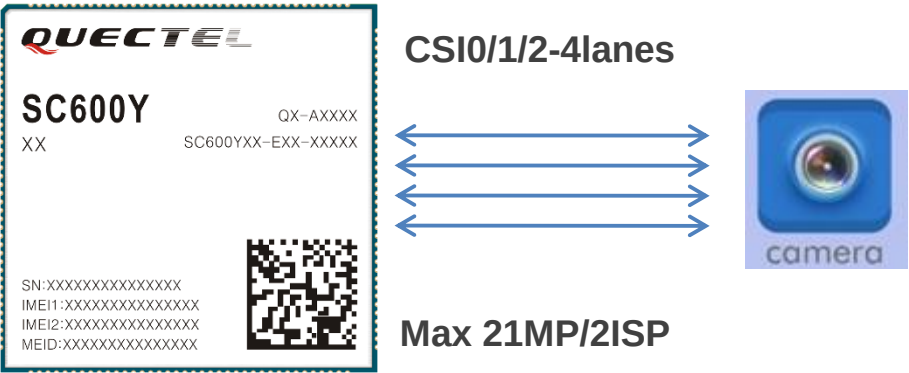


SC20 Camera Supported List

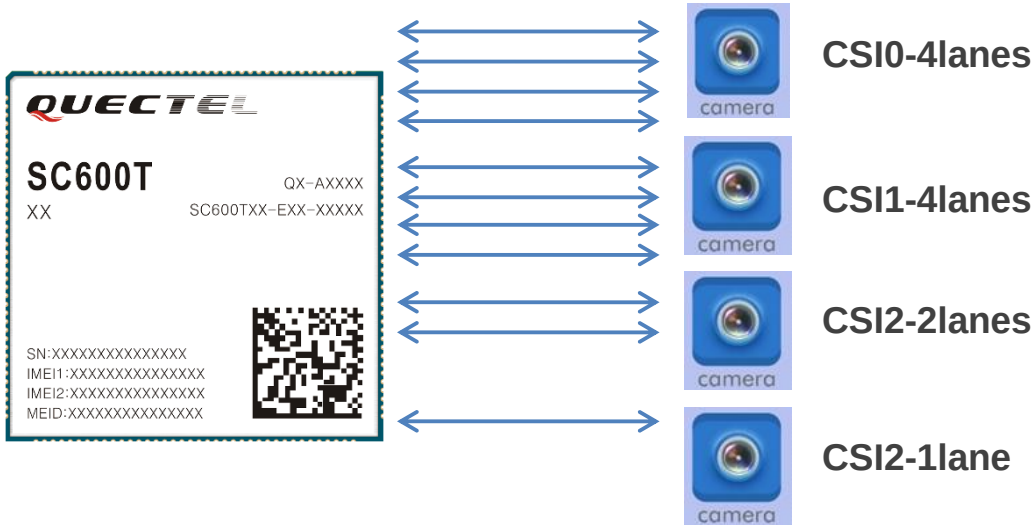
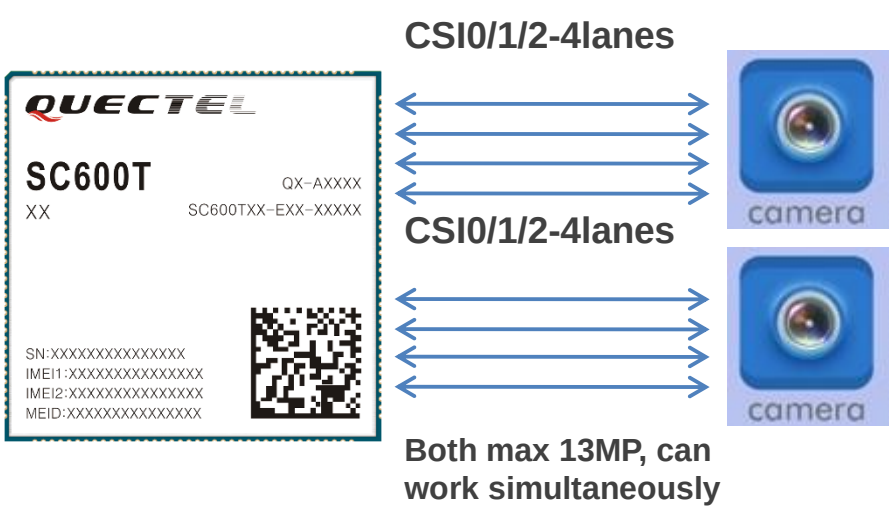
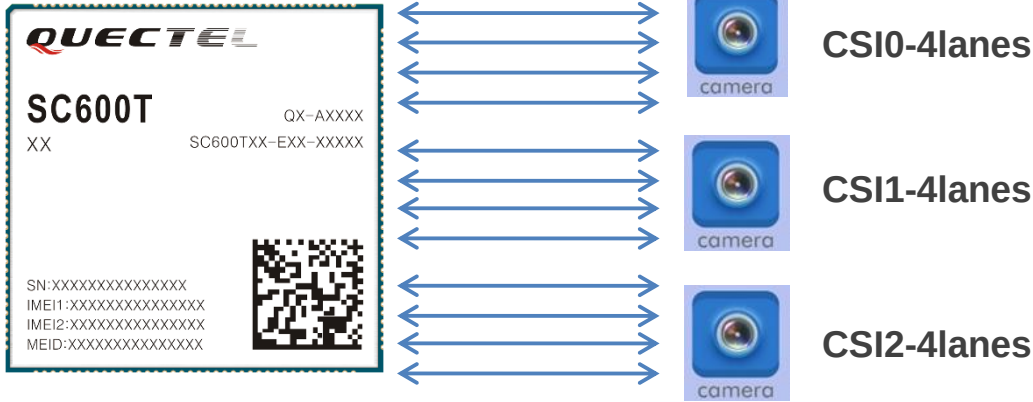
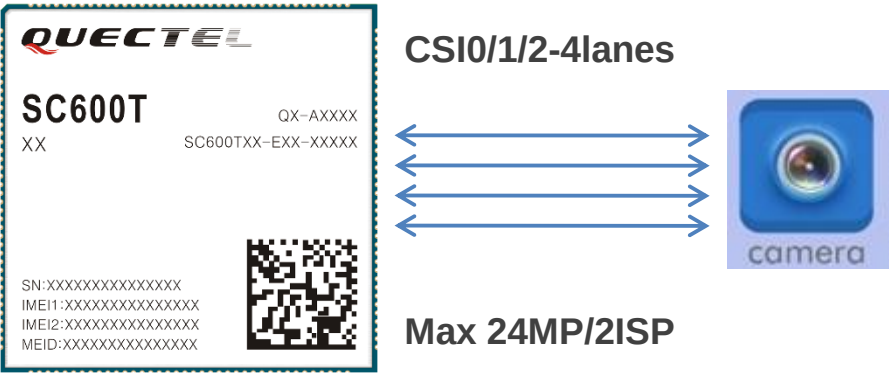
- Camera list that SC20 has been supported. Some are brought up by Quectel, some are brought up by Qualcomm.
- Customers could use cameras in the list, then it's easy to bring up.
- Customer could also select cameras not in the list, Quectel could provide some support for bringing up the cameras.

IC Vendor	Sensor Type	Lane Num.
Tuned and brought up by Quectel		
Toshiba	T4KA3/8M/AF	2
SuperPix	SP2508/2M/no AF	1
SuperPix	SP2509/2M/no AF	1
Hynix	HI842/8M/AF	2
Hynix	HI843B/8M/AF	2
Hynix	HI259/2M/no AF	1
OV	OV5670/5M/AF	2
OV	OV5648/5M/AF	2
OV	OV2710/1080P/no AF	1
X-CHIP	XC6130(isp)+ov2710	1
GC	GC5024/5M/AF	2
GC	GC030A/30W/no AF	1
GC	GC2365/2M/no AF	1
GC	GC0310/30W/no AF	1
HM	HM5040/5M/AF	2
Tuned and brought up by Qualcomm		
GC	gc0339	1
GC	gc2355	2
Hynix	HI551	2
HM	HM8040	2
OV	OV5675	2
OV	OV5695	2
OV	OV8856	2
OV	OV8858	2
Samsung	S5K5E2	2
SuperPix	SP5409	2

SC600Y Camera



SC600T Camera

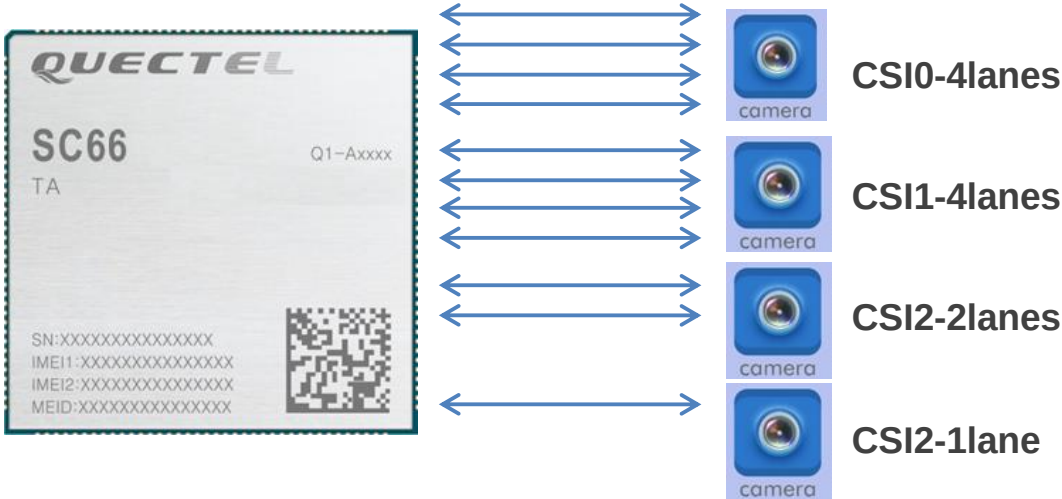
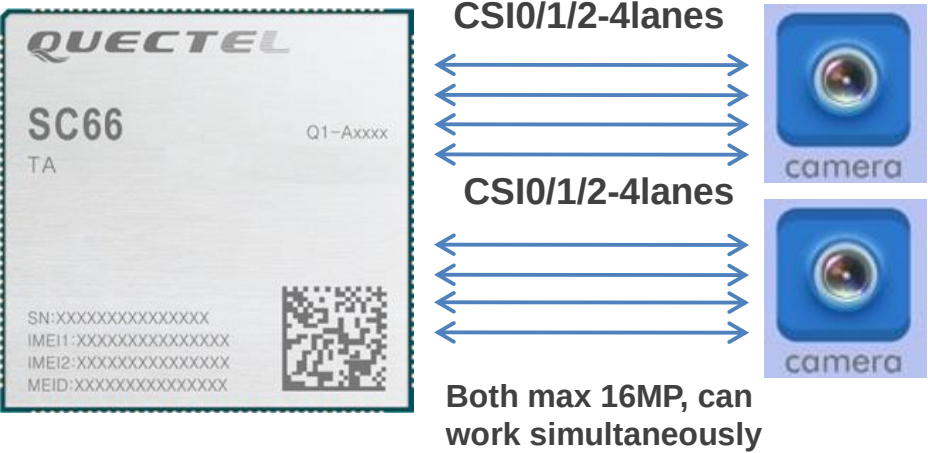
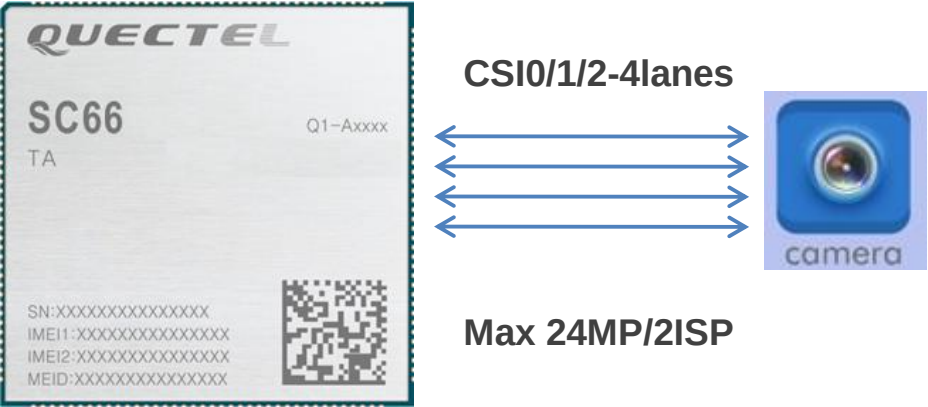


SC600 Camera Supported List

- Camera list that SC600 has supported. Some are brought up by Quectel, some are brought up by Qualcomm.
- Customers could use cameras in the list, then it's easy to bring up.
- Customer could also select cameras not in the list, Quectel could provide some support for bringing up the cameras.

Sensor Type	Lane Num.	SC60
AR1337	4lane	Y
Hi553	2lane	NC
Hi556	2lane	NC
Hi843	4lane	NC
	2lane	Y
Hi259	1lane	Y
GC2375	1lane	NC
GC5005	2lane	NC
MN34150	4lane	Y
IMX230	4lane	Y
IMX318	4lane	Y
IMX386	4lane	Y
IMX258	4lane	Y
IMX298	4lane	Y
IMX486	4lane	NC
OV12890	4lane	Y
OV13853	4lane	Y
OV13855	4lane	Y
OV13870	4lane	Y
OV16860	4lane	Y
OV16880	4lane	Y
OV2680	1lane	Y
OV5648	2lane	Y
OV5675	2lane	Y
OV5695	2lane	Y
OV8856	2lane	Y
ov8858	2lane	Y
OV8865	2lane	Y
S5K2M8	4lane	Y
SP5507	2lane	NC
S5K2P7	4lane	Y
S5K3P3	4lane	Y
S5K3P3ST	4lane	Y
S5K3P8	4lane	Y
S5K3L8	4lane	Y
S5K3M2	4lane	Y
S5K3M3	4lane	Y
S5K4H8	2lane	Y
S5K5E8	2lane	Y

SC66 Camera



Video

Module	Video		
	HW performance	HW codec	SW codec
SC20	Decoder: 1080P@30fps, 20Mbps Encoder: 720P@30fps, 14Mbps Encoder HFR: 800x480@60fps, 4Mbps Maximum 244800 macro block/s FWVGA@30fps de+FWVGA@30fps en	Decoder: H.264 BP/MP/HP, VP8, HEVC Main Encoder: H.264 BP/MP	Decoder: MPEG-4 SP/ASP, H.263 P0, DivX 4.x, 5.x, 6.x, XVID Encoder: MPEG-4 SP, H.263 P0
SC600Y	Decoder: 1080P@60fps, 60Mbps Encoder: 1080P@60fps, 60Mbps Encoder HFR: 720P@120ps, 60Mbps Maximum 972000 macro block/s 1080P@60fps de+1080P@30fps en	Decoder: HEVC/H.264/VC-1/MPEG-4/DivX/H.263/MPEG-2/VP8/VP9 Encoder: HEVC/H.264/MPEG-4/H.263/VP8	-
SC600T	Video encoding and decoding: up to 4K @ 30fps Encoder HFR: 720P@120ps; 60Mbps; Maximum 972000 macro block/s; 1080P@60fps decode+1080P@30fps encode	Decoder: HEVC/H.264/VC-1/MPEG-4/DivX/H.263/MPEG-2/VP8/VP9 Encoder: HEVC/H.264/MPEG-4/H.263/VP8	-
SC66	Decoder: 4K@30fps 8-bit; H.264, VP8, and VP9/4K@30fps 10-bit; HEVC Encoder: 4K@30fps; HEVC, H264, VP8, and MPEG-4 Encoder: 1080p@60fps decode + 1080p@30fps encode	Decoder: 4K@30fps 8-bit; H.264, VP8, and VP9/4K@30fps 10-bit; HEVC Encoder: 4K@30fps; HEVC, H264, VP8, and MPEG-4 Encoder: 1080p@60fps decode + 1080p@30fps encode	-

Module	Audio	
	Digital interface	Analog interface
SC20	N	2 input channels: mic1, mic2 3 output channels: speaker, earpiece, headphone Support two mics for denoising, but headphone cannot be used
SC600Y /600T	I2S	3 input channels: mic1, mic2, mic3 3 output channels: speaker, earpiece, headphone Support two mic(mic1&mic3) for denoising
SC66	I2S	3 input channels: mic1, mic2, mic3 3 output channels: speaker, earpiece, headphone Support two mic(mic1&mic3) for denoising

SC20 LCD Supported List

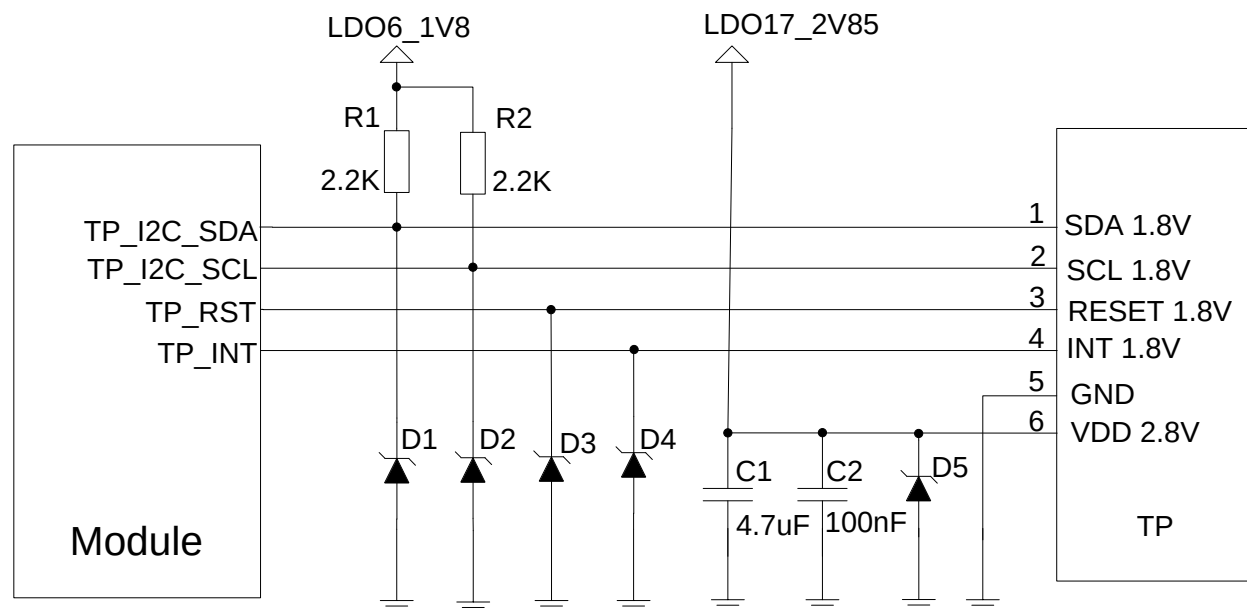
- For developing LCD drivers, We only care about the resolution and need to get initialization parameters from the LCD module manufacturer, we generally do not care LCD ID.
- So here just list a few of LCDs.
- MIPI to RGB, MIPI to LVDS, MIPI to HDMI also support.

Manufacturers	IC	Resolution
ILITEK	ili9881c	1280x800
ORISE TECH	OTM1283A	1280x800
forcelead	FL11281	1280x800
forcelead	SC7798-A	800x480
fitipower	JD9365/JD9366	1280x720
NOVATEK	NT35512S	800x480

Module	LCM							
	Interface	Resolution(1)	Resolution(2)	DisplayPort (USB Type-C)	WIFI display	Scaling	Composition layers	MDP clock
SC20	1xMIPI_DSI, 1.5Gbps/lane	HD(720P)@60fps maximum 1280x800	N	N	N	1/4 to 4x	Two layers + hardware cursor	300MHz
SC600Y /SC600T	2xMIPI_DSI, 1.5Gbps/lane	WUXGA(1920x1200)@60fps	FHD(1920x1080)@60fps	N	FHD(1920x1080)@30fps	4 (1VIG + 2 RGB + 1 DMA) + BG color + hardware cursor	4 (1VIG + 2 RGB + 1 DMA) + BG color + hardware cursor	320MHz
SC66	2xMIPI_DSI, 2.1Gbps/lane	WQXGA (2560x1600) @60 fps	WQXGA (2560x1600) @60 fps	4K(4096 ×2160)@ 30fps	FHD(1920x1080)@30fps	Arbitrary 1/64-20x (decimation when < 1/4)	8 (2ViG+ 3×2RGB with Smart DMA 1.0)	412.5MHz

Touch Panel

Module	SC20	SC600Y/600T	SC66
Number of Touch Panel	1	2	2



UART

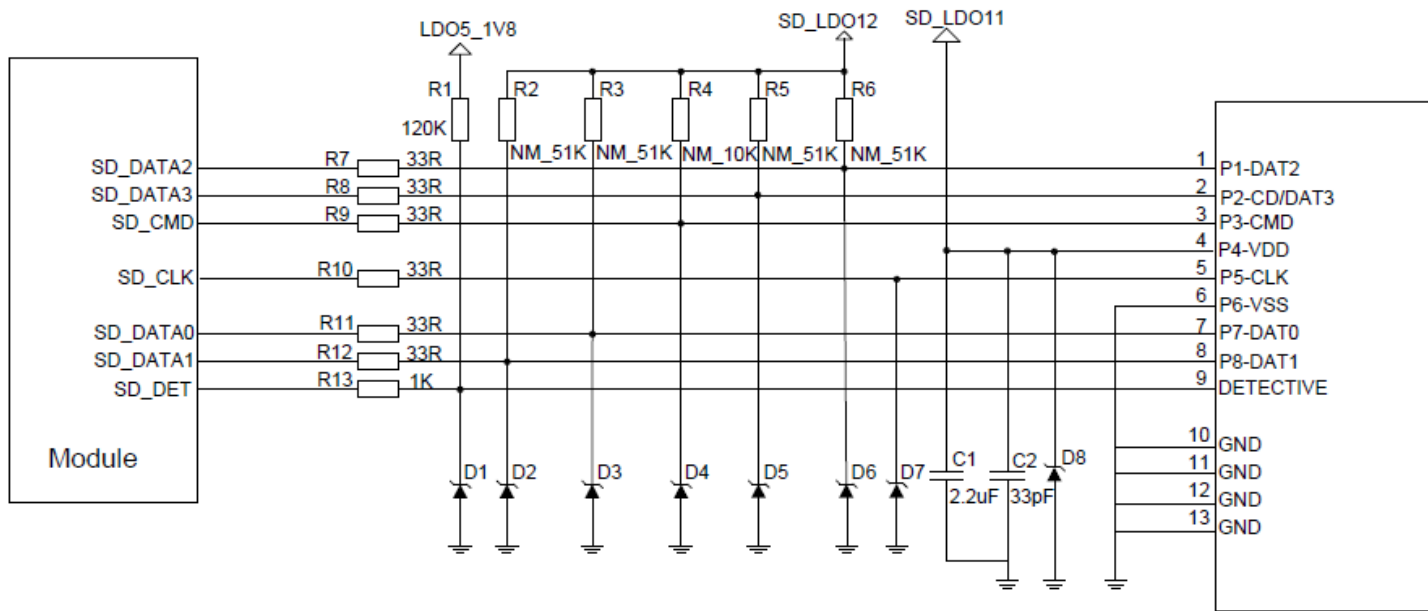
Module	UART					
	Number of UARTs	UART-1	UART-2	UART-3	Speed	Power Domain
SC20	2	4-wire uart, hw flow control, available for customers	2-wire uart, Linux console for log and debug	N	High speed up to 4Mbps	1.8V
SC600Y /SC600T	3(4)	4-wire uart, hw flow control, available for customers(uart5)	2-wire uart, Linux console for log and debug(uart2)	2-wire uart, available for customers(uart4)	High speed up to 4Mbps	1.8V
SC66	3(4)	4-wire uart, hw flow control, available for customers(uart5)	2-wire uart, Linux console for log and debug(uart2)	2-wire uart, available for customers(uart4)	High speed up to 4Mbps	1.8V

USB

Module	USB				
	Number of USBs	Standard	Mode	Speed	OTG+Charge
SC20	1	USB 2.0	Both slave and host, but cannot work simultaneously	480Mbps	Yes
SC600Y /SC600T	1	USB 2.0/3.0	Both slave and host, but cannot work simultaneously	5Gbps	Yes
SC66	2	1x USB 2.0/3.1, 1x USB2.0	Both slave and host, can work simultaneously	10Gbps	Yes

SDIO

- 1 SDIO interface for SC20/SC600/SC66, SDIO 3.0, 4 bit
- Used for SD card, maximum 2Tbytes, now 128Gbytes have been test and verified
- Up to class 10



Module	I2C	
	Groups of I2C	Functions
SC20	3	Touch panel, camera, sensors, also could be used for other devices.
SC600Y /SC600T	5	Touch panel, 2xcamera, sensors, NFC, 2 groups of camera I2C could only used for cameras, other 3 groups I2C could also be used for other devices.
SC66	5	Touch panel, 2xcamera, sensors, NFC, 2 groups of camera I2C could only used for cameras, other 3 groups I2C could also be used for other devices.

ADC

Module	ADC							
	Number of ADCs	Special used	General used for customers	Input voltage	Resolution	Effective number of bits	Sample rate	Offset/Gain error
SC20	3	133-battery voltage 134-battery temperature	Pin-128(PM8909)	0.1-1.7V	16bits	12bits	XO/8=2.4MHz	±1%
SC600Y /SC600T	6	17/27/28-battery detect 36-battery voltage 29-battery temperature	Pin-153(PMI8952) Pin-151(PM8953)	0.05-1.5V 0.1-1.7V	15bits	11bits	XO/8=2.4MHz	±1%
SC66	5	27/28-battery detect 29-battery temperature	Pin-153 Pin-151	0.05-1.5V 0.1-1.7V	15bits	11bits	XO/8=2.4MHz	±1%

Module	SPI		
	Groups of SPI	Mode	Functions
SC20	1	Master only	SPI driver is ready, it's available for customers to develop applications, for example, fingerprint identification, sensors, SPI to Ethernet and other SPI slave devices.
SC600Y /SC600T	2	Master only	
SC66	2	Master only	

GPIO

- Abundant GPIO interfaces with logic level of 1.8V
- Wakeup: interrupt pins that can wake up the system

Product	GPIO number
SC20	25
SC600	19

SC20 HD documents

99	GPIO_88	GPIO_88	B-PD: nppukp	
100	GPIO_89	GPIO_89	B-PD: nppukp	
101	GPIO_69	GPIO_69	B-PD: nppukp	
102	GPIO_68	GPIO_68	B-PD: nppukp	
103	GPIO_97	GPIO_97	B-PD: nppukp	Wakeup
104	GPIO_110	GPIO_110	B-PD: nppukp	Wakeup
105	GPIO_0	GPIO_0	B-PD: nppukp	
106	GPIO_98	GPIO_98	B-PD: nppukp	Wakeup
107	GPIO_94	GPIO_94	B-PD: nppukp	Wakeup

SC60HD documents

248	GPIO_0	B-PD: nppukp	
247	GPIO_1	B-PD: nppukp	Wakeup
201	GPIO_2	B-PD: nppukp	
200	GPIO_3	B-PD: nppukp	
238	GPIO_33	B-PD: nppukp	
237	GPIO_36	B-PD: nppukp	Wakeup
252	GPIO_42	B-PD: nppukp	Wakeup
253	GPIO_43	B-PD: nppukp	Wakeup
254	GPIO_44	B-PD: nppukp	Wakeup
255	GPIO_45	B-PD: nppukp	Wakeup
234	GPIO_66	B-PD: nppukp	
232	GPIO_89	B-PD: nppukp	
231	GPIO_90	B-PD: nppukp	Wakeup
230	GPIO_96	B-PD: nppukp	
229	GPIO_97	B-PD: nppukp	Wakeup
177	GPIO_98	B-PD: nppukp	
178	GPIO_99	B-PD: nppukp	
242	GPIO_105	B-PD: nppukp	Used for RF tuner control
241	GPIO_107	B-PD: nppukp	Used for RF tuner control

Battery Charge

Battery Charge		
Module	HW IC	Characters&Performance
SC20	PM8909: charge(hw)&fuel gauge(sw)	Charge current: 1.44A-90mA(450mA for USB) Charging voltage input range: 4.35V-6V Battery voltage: typical 4.2V, max 4.35V, need external charge IC for high voltage battery Boot voltage: 3.5V, Shutdown voltage: 3.3V
SC600Y/ SC600T	PMI632: Charge and fuel gauge(hw)	Charge current: 3A-300mA, typical 2A, Charging voltage input range: 4V-10V Battery voltage: typical 4.2V, max 4.35V, need external charge IC for high voltage battery Boot voltage: 3.55V, Shutdown voltage: 3.1V
SC66	PML660L:Charge and fuel gauge(hw)	Charge current: 3A-300mA, typical 2A, Charging voltage input range: 4V-10V Battery voltage: typical 4.2V, max 4.35V, need external charge IC for high voltage battery Boot voltage: 3.55V, Shutdown voltage: 3.1V

WIFI

Module	WIFI				
	WIFI Chipset	Band & Protocol	2*2 MIMO	WIFI Display	Mode
SC20	WCN3660B	2.4G&5G 802.11 a/b/g/n, 150Mbps	N	N	STA AP(32) & Wifi direct Wifi probe
SC600Y /SC600T	WCN3680	2.4G&5G 802.11 a/b/g/n/ac, 433Mbps	N	FHD(1920x1080)@ 30fps Both host&device	STA AP(32) & Wifi direct Wifi probe
SC66	WCN3980(SC66-CE) WCN3990	2.4G&5G 802.11 a/b/g/n/ac, 433Mbps	Y	FHD(1920x1080)@ 30fps Both host&device	STA AP(32) & Wifi direct Wifi probe

2.4G: 2402MHz~2482MHz
5G: 5180MHz~5825MHz

Bluetooth

BT			
Module	BT Chipset	Protocol	Profiles
SC20	WCN3660B	BT3.x, BT4.2/LE(Android 7)	FTP 1.1, HDP 1.0, HID 1.0 - Hos, OPP 1.1, PAN 1.0, SAP 1.1, AVRCP 1.3, BLE GATT Client/Server, A2DP 1.2 – SRC/SNK, HFP 1.6 – AG/HS, MAP 1.0 - MSE/MCE, PBAP 1.0 – PSE/PCE, AVRCP 1.5 - Target, DUN 1.1, HID 1.0 - Client, HOGP 1.0, OPP 1.2, Dual-HFP, OBEX over L2CAP, AVRCP1.5 - Controller, BR/EDR Secure Connections, Dual Mode Topology, BLE Peripheral Mode, Multi-HFP HFP1.7, Dual A2DP Handoff MAP 1.2 – MSE/MCE, BLE Secure Connections, BLE Privacy 1.2
SC600Y /SC600T	WCN3680	BT3.x, BT4.2/LE	
SC66	WCN3980(used by SC66-CE) WCN3990	BT5.x	



2.4G: 2402MHz~2480MHz

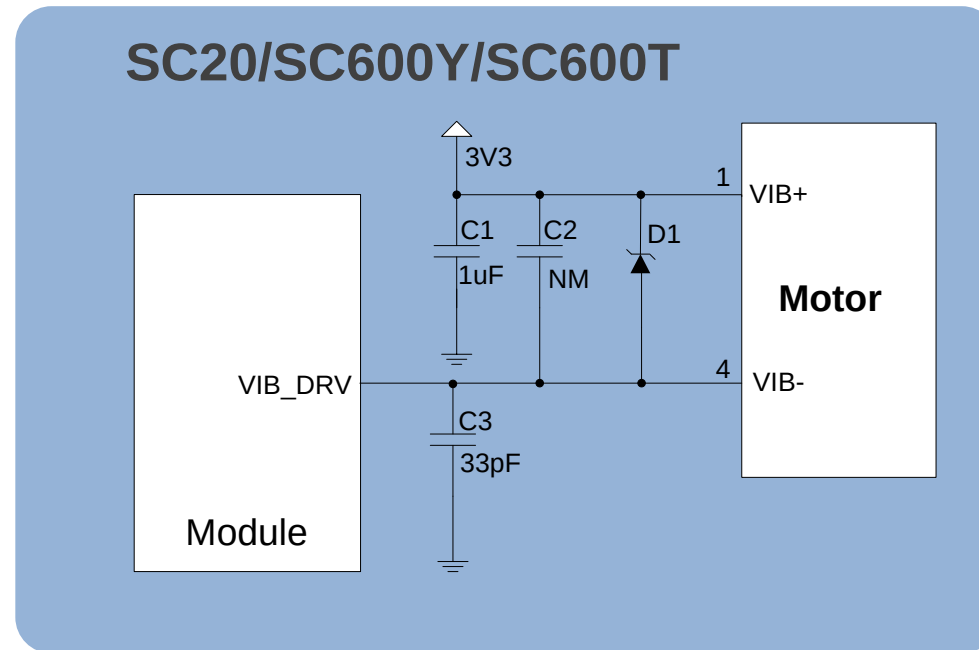
GNSS

Module	GNSS						Note
	GPS	Beidou	GLONASS	Galileo	QZSS	SBAS	
SC20	Y	Y	Y	Y	N	N	▶ GPS, Beidou, and GLONASS or ▶ GPS, Beidou, and Galileo
SC600Y /SC600T	Y	Y	Y	Y	N	N	
SC66	Y	Y	Y	Y	Y	Y	



GPS:1575.42MHz±1.023MHz
GLONASS:1597.5MHz~1605.8MHz
BeiDou:1561.098MHz±2.046MHz

Vibrator



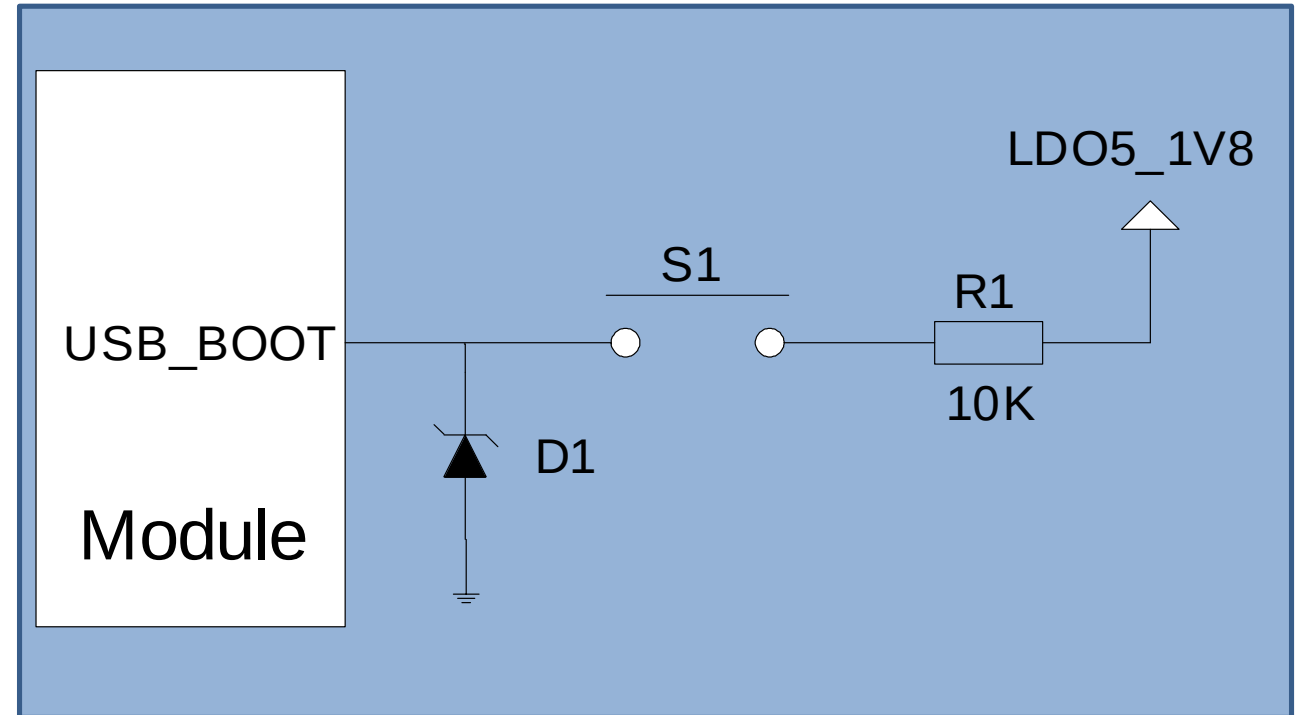
The motor is driven by an exclusive circuit, the module is connected to the negative terminal of the motor. Support only eccentric vibrator.

USIM

- 2 USIM interfaces, 1.8/2.95V
- Support hot-plug via SIM-DETECT pin
- One SIM up to LTE, the other SIM up to WCDMA
- DSDS, Dual SIM Dual Standby, for idle mode, both SIM could make/receive a call, when one SIM is in a call, the other cannot make/receive a call.

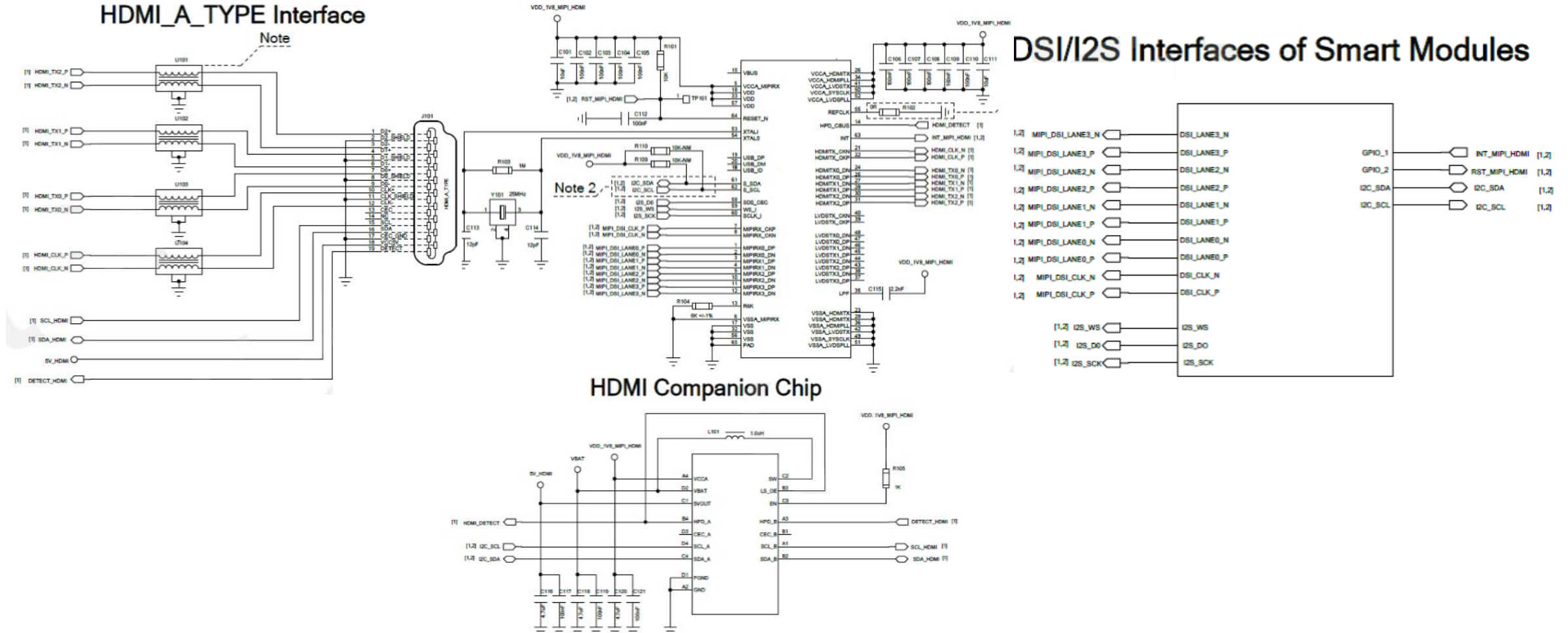
Emergency Download

USB_BOOT is an emergency download interface. Pull up USB_BOOT to LDO5_1V8 with a 10K resistor will make the module enter into emergency download mode, and this is the final option to be selected when there are module failures such as abnormal startup or running. For convenience of firmware upgrade and debugging in the future, please reverse this pin.



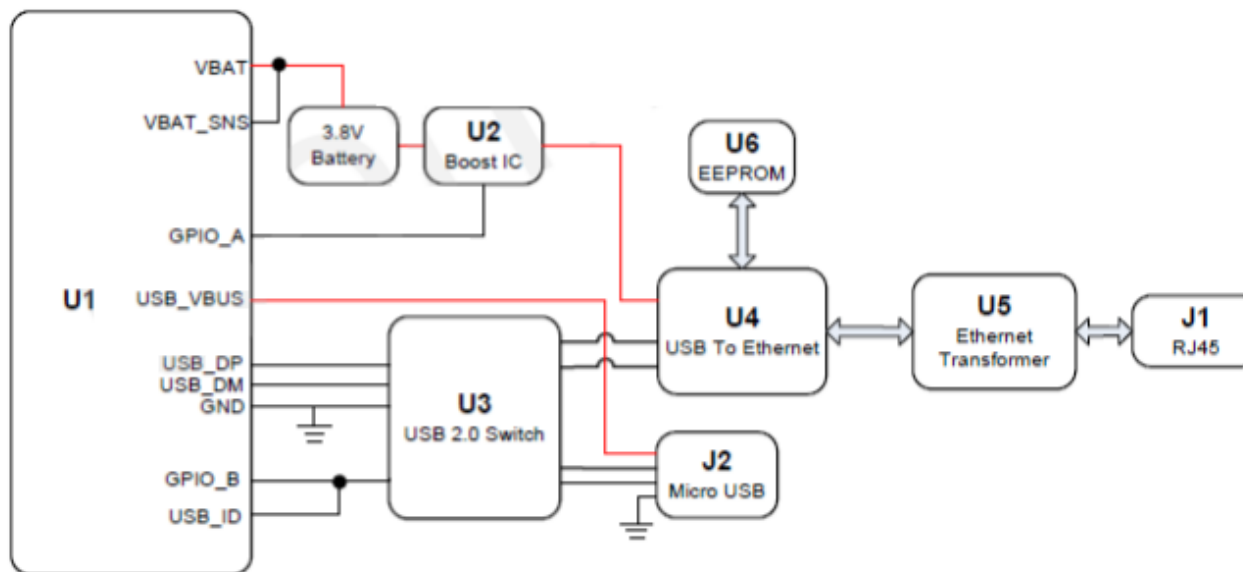
MIPI DSI to HDMI

MIPI DSI signal to HDMI data with an external bridge IC

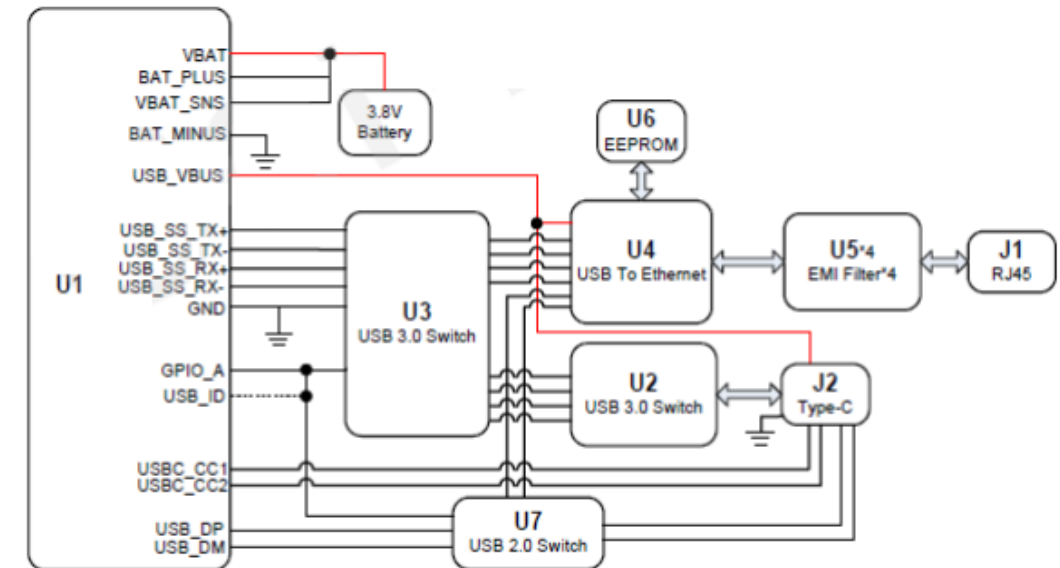


USB/(SPI) to Ethernet

Smart modules do not support Ethernet interface. The USB can be converted to Ethernet to make the smart modules to support Ethernet when the smart modules work in Host mode . An external conversion chipset is needed to convert USB interface to Ethernet interface, with the converting USB 2.0 to 10/100M and USB 3.0 to 10/100/1000M Ethernet.



Hardware Design Diagram of Converting USB 2.0 to 10/100M Ethernet



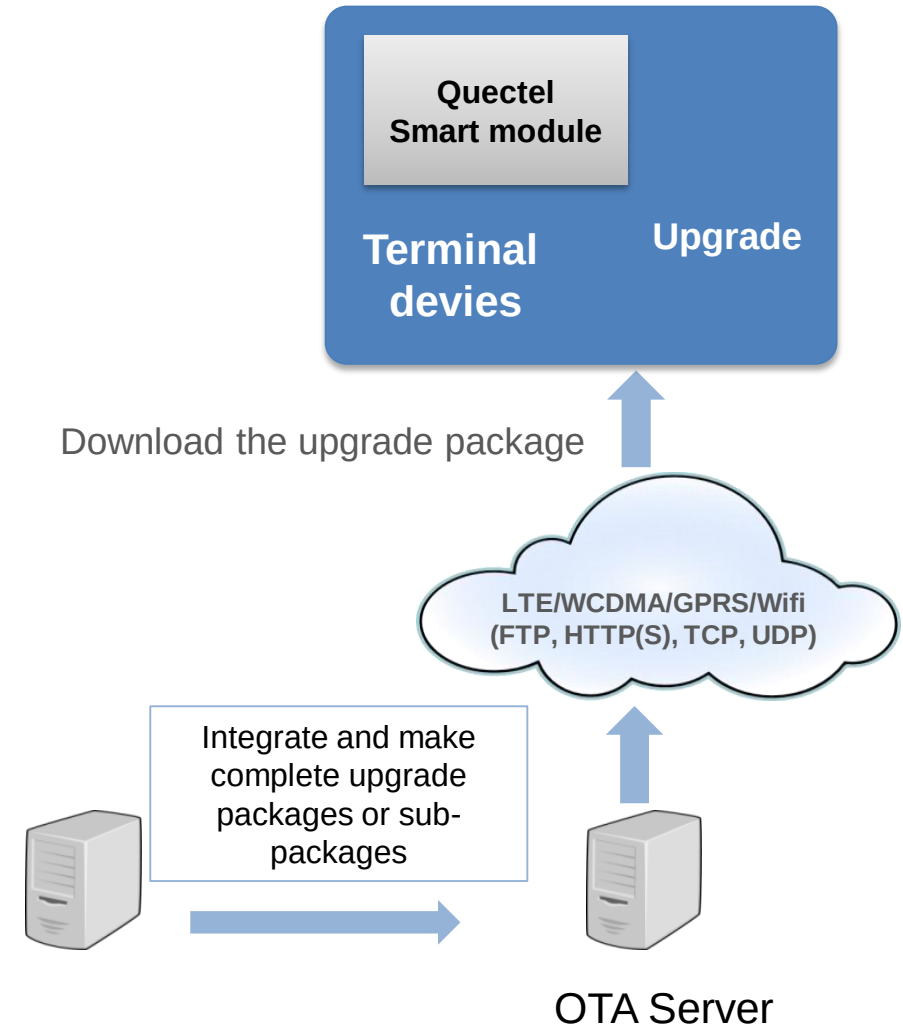
Hardware Design Diagram of Converting USB 3.0 to 10/100/1000M Ethernet

OTA Upgrade

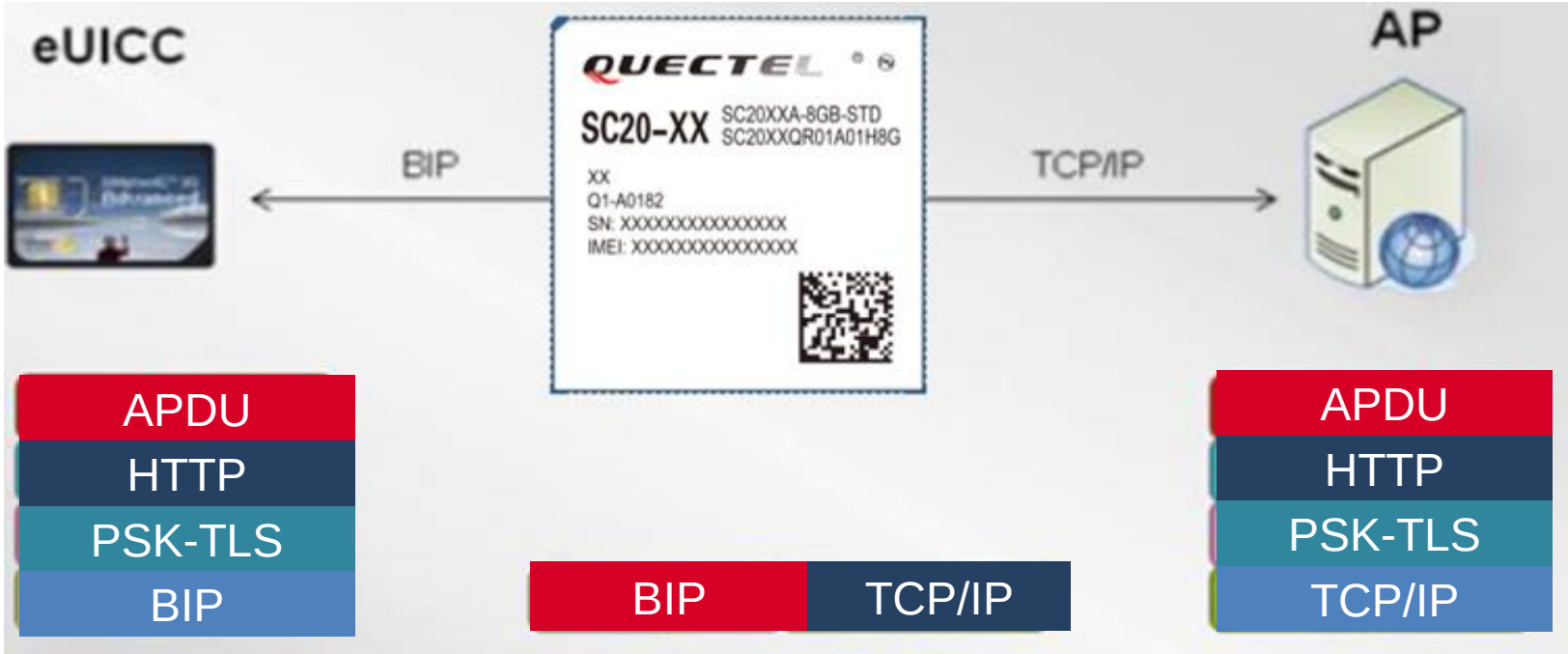
Through OTA upgrade, customers can update modem firmware and Android firmware remotely, SC20/SC600/SC66 supports all firmware updates and differential firmware updates.

The basic OTA upgrade process

- Get the firmware from Quectel(if there is update)
- Get the customers' Android firmware ready
- Integrate and make complete upgrade packages or sub-packages, and put them on the client designated server.
- Remote control client terminal device download upgrade package and finish the upgrade.



eSIM/eUICC



SC20/SC600/SC66 supports eSIM(SGP.02)

WiFi probe technology

- SC20/SC600/SC66 supports STA and AP modes and can connect to other routing devices and provide Wi-Fi hotspots.
- SC20/SC600/SC66 supports enhanced Wi-Fi probe function, even if there is no Wi-Fi connection, it can detect the signals of other surrounding Wi-Fi devices and check the MAC addresses of other Wi-Fi devices.



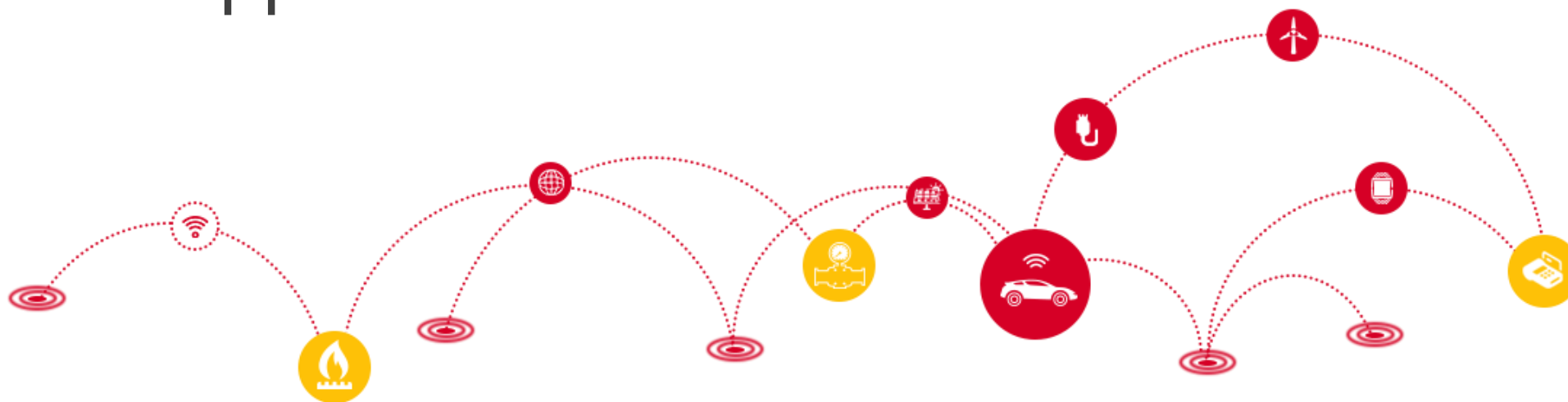
Smart Module Roadmap

Smart Solution Overview

Specifications

Applications

Customer Support



Target Applications

Wireless POS

Support Magnetic Stripe Cards, Contact Smart Cards, and Bill Printing



Government Agency

ID Card Verification
Fingerprint Capturing
Parking Ticket Printing



Mobile Devices

Phone
PAD



Smart City

Event Data Recorder
Digital Advertising
Vending Machine
Smart Home



Express Delivery Industry

Barcode Scanning
RFID



Public Utilities/ Petrochemical/ Medical/Tobacco

Infrared Meter Reading
HD Camera



Smart POS



Cash Register

- Support dual LCDs for independent display
- Dual touch panels supported



In-car Mirror ,Video Streaming and Entertainment



Industrial PDA , Tablets & PTT



Electricity
Industry



HealthCare
Industry



Logistics
Industry



Positioning & Mapping
Industry



PTT

Police and Law Enforcement Equipment



Surveillance Equipment



Surveillance Equipment

Smart speaker

Smart speaker



Smart Home Gateways



Smart Home Gateways

Others



Vending Machine



Logistics Cabinet



Advertising Machine



Self-service
Payment

Face/Behavior Recognition(SC600/SC66)



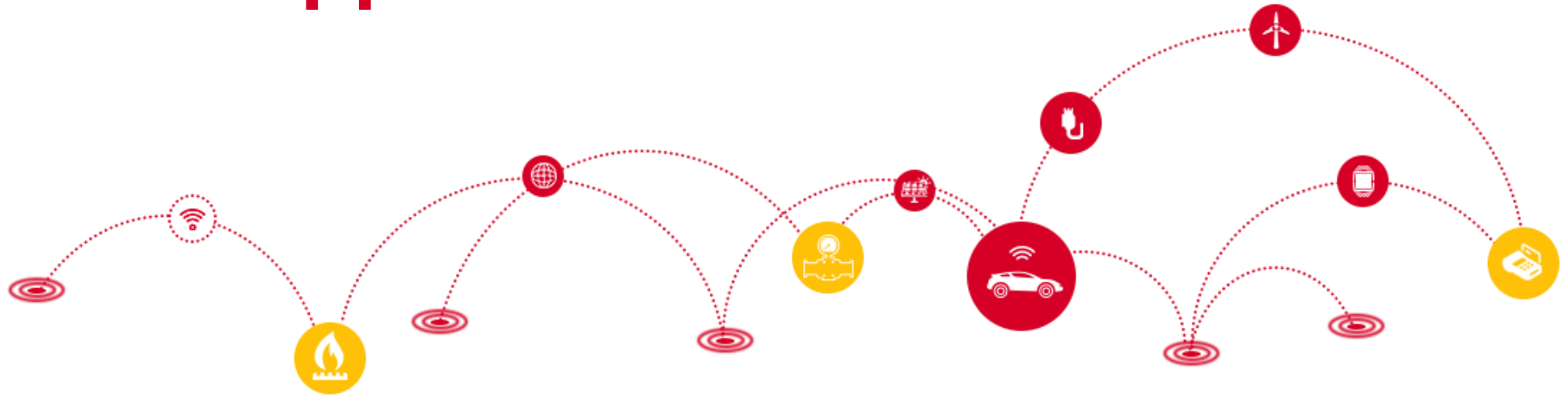
Smart Module Roadmap

Smart Solution Overview

Specifications

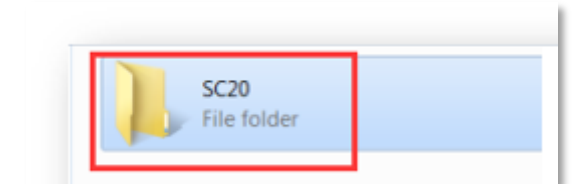
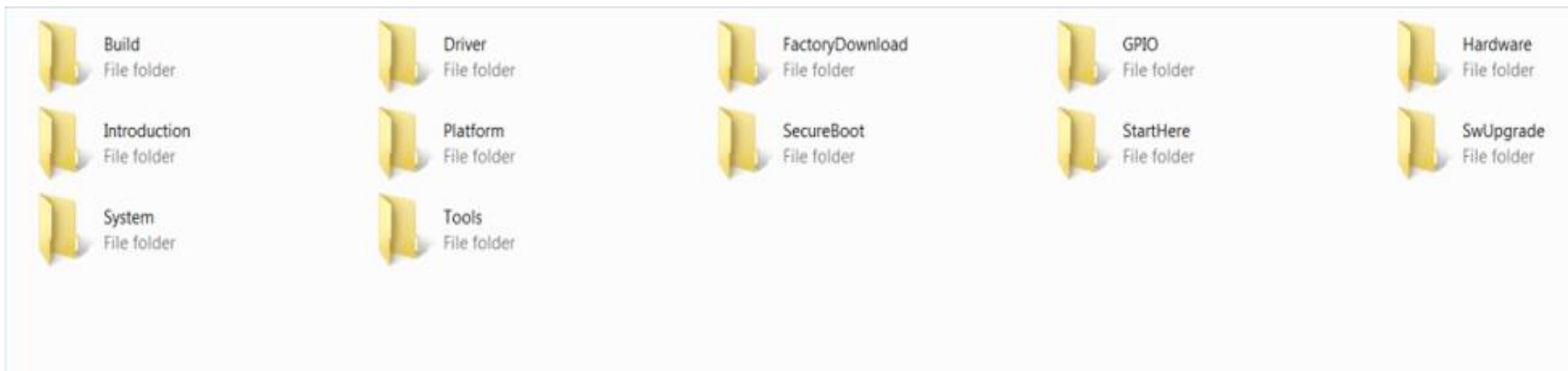
Applications

Customer Support

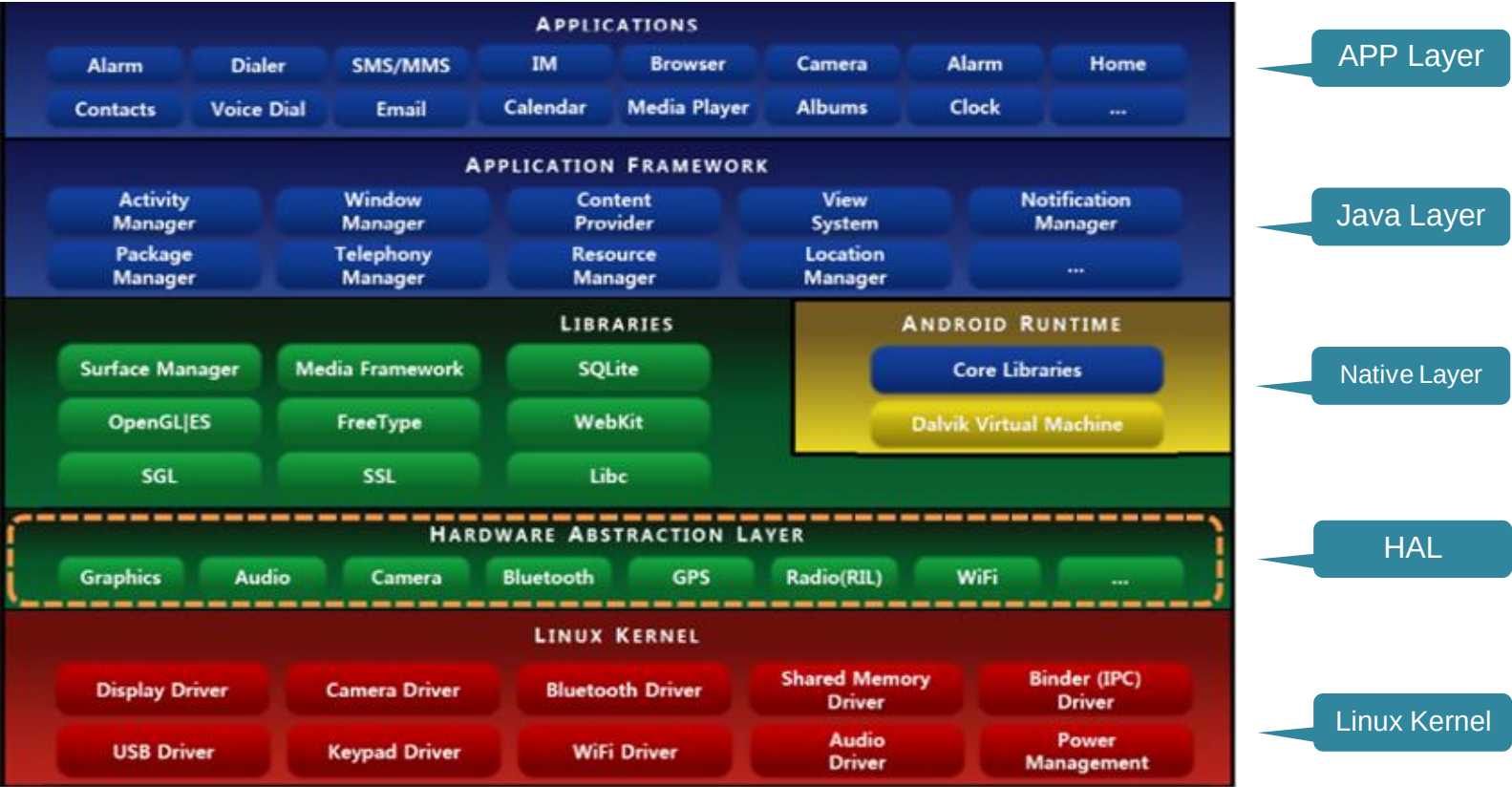
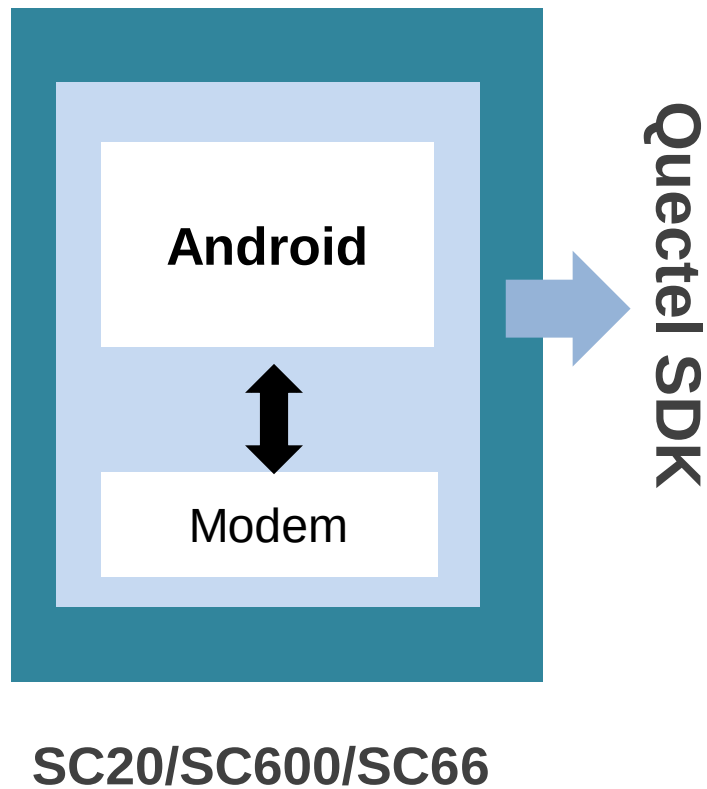


Smart Module Customer Support

- Evaluate requirements to help select the most suitable module model
- Provide SharePoint accounts for customers to download module documents and Android SDK source code
- Peripheral selection recommendation & customers' hardware design review
- Supports & assistance in driver debugging and problem analysis
- On-site supports available when necessary

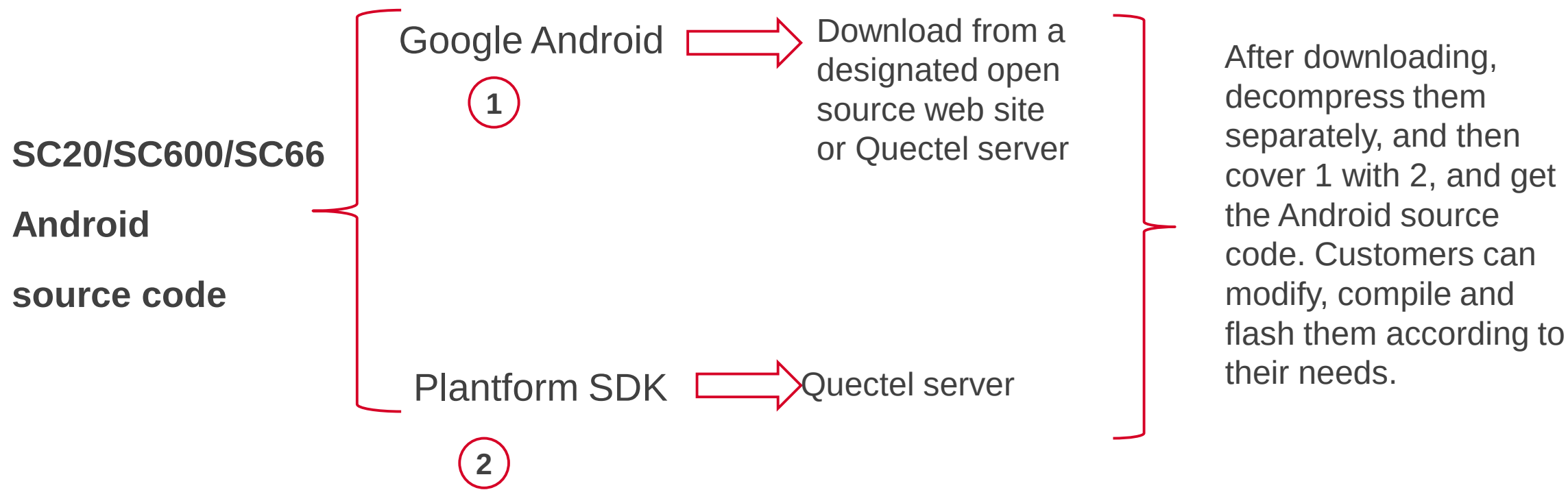


Smart Module Software provision



- Open Android, Linux Kernel, framework and App
- Customers can customize their own system and App
- Quectel will provide technical support

Smart Module source code management



Smart Module code compilation(Example)

Smart Modules (SC20/SC600/SC66)	Android code compilation		
	Code Size	Compiler Environment	A full compilation time
SC20(Android 7.1) (For example)	>30GB	PC: CPU: Intel(R) Core(TM) i7-4790 CPU @ 3.60GHz DDR: 16G Hard Disk: 500G Operating system: 64bit Ubuntu 12.04.5 LTS	1.5 Hours
		Server: DELL R930 CPU: E5-2650V3*2 DDR: 128G Hard Disk: 40TB Operating system: 64bit Ubuntu 12.04.5 LTS	30 Minutes

Customers can choose the right Android compilation machine according to their own project needs.

Thank you!

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 https://twitter.com/Quectel_IoT