



# Ameba Release Note

---

SDK release note

## Table of Contents

1	Release v9.0 .....	3
1.1	v9.0a.....	3
1.2	v9.0b.....	3
2	Release v9.1 .....	3
2.1	v9.1a.....	3
3	Release v9.2 .....	3
3.1	v9.2a.....	3
3.2	v9.2b.....	3
4	Release v9.3 .....	4
4.1	v9.3a.....	4
5	Release v9.4 .....	5
5.1	v9.4a.....	5
5.2	v9.4b.....	6
6	Release v9.5 .....	8
6.1	v9.5a.....	8
6.2	v9.5b.....	9
6.3	v9.5c.....	10
7	Release v9.6 .....	12
7.1	v9.6a.....	12

# 1 Release v9.0

## 1.1 v9.0a

- First release for 8735b

## 1.2 v9.0b

- VOE FW upgrade to v0.4.0.4
- Support sensor ps5258
- Support build on Linux

# 2 Release v9.1

## 2.1 v9.1a

- Update base BSP
- Add posix api
- New structure for all example
- Add BT Simple Config
- Add BT coexist PTA mode
- Support sensor gc4653
- Add power save API
- Add sys\_reset api
- Add QR code example
- Add kvs\_webrtc\_plus\_producer\_mmf

# 3 Release v9.2

## 3.1 v9.2a

- Update base BSP

## 3.2 v9.2b

- Support asdk 10.3.0
- Add at-command of isp
- Add fileloader module and filesaver module of NN
- Add mic type choose in audio examples

- 
- BT config support pro2 5G scan
  - Add baremetal modules and example of NN
  - Upgrade to VOE 0.7.0.0
  - support wowlan and keep alive
  - Add Nand flash example
  - Set char as signed char
  - Update power save example
  - Support OTA
  - Update secure storage example
  - Support sensor mis2008
  - Update kvs webrtc to support aws-iot credential
  - Support fast connect at Nand flash

## 4 Release v9.3

### 4.1 v9.3a

- [wlan]add wifi\_get\_sta\_max\_data\_rate api
- [nn] support model store in SNAND
- [flash]Sync ftl and std example
- [nn] add fwfs to merged application
- [wlan]add set mac address without writing efue api
- [video] upgrade to VOE 1.0.0.0
- enable ota checksum in default
- [wlan] increase the lwipopt.h buffer setting
- [isp] add osd2 and example
- [wlan] wowlan tcp and mqttssl keep alive
- [nn] add yolov4-tiny and support mbnetssd store in SNAND
- [mmf] add support data channel for kvs webrtc
- [wlan] user data flash layout and add normal driver power by rate and fine tune RX spur level
- [wlan] Reverse workaround 2.4G/5G LNA\_LDO / TIA\_LDO and thermal trim and PA Bias K new method
- [bt:ble] fix address error in bt power on
- [isp] add sensor imx307 on voe 1.0.0.0
- [wlan] Fixed 5G 40M throughput problem due to pro2 without vht
- [wlan] thermal trim and PA Bias K new method for new lead frame RL6601B BD1031

- 
- [video] Support g711 format for mp4
  - [file] Support VFS function
  - [isp] add motion detection and example
  - [sdk] add ftl nand verify code
  - [bt:ble] Fix hardfault while WiFi power off after bt deinit

## 5 Release v9.4

### 5.1 v9.4a

- [sdk] support trust zone
- [video] upgrade VOE version to 1.2.2.0
- [wlan] upgrade FW version to 1007
- [wlan] Fixed 5G 40M throughput problem due to pro2 without vht
- [wlan] increase the lwipopt.h MBOX size and udp tx skb unavailable
- [nn] update nn fwfs for new nand spare definition
- [isp] add motion detection and example
- [wlan] fixed ping failure when some packet size given
- [mmf] kvs producer module support g711 audio format
- [nn] draw nn results with osd
- [mmf] Support g711 format for mp4
- [mmf] Fixed the problem linker module block when pause input
- [file] Support VFS function
- [mmf] add demuxer module and modify the related examples
- [sdk] add ftl nand verify code and fix ftl bug
- [mmf] webrtc module using VFS for reading certs
- [nn] model yamnet
- [mmf] kvs producer support resolution change
- [sdk] add api to enable backtrace
- [pwr] update power save api
- [video] Support multi sensor and FCS
- [nn] set nn rgb channel resolution according to model input size
- [nn] yamnet smoke small model
- [wlan] fix wowlan block issue
- [mmf] webrtc stability improvement
- [wlan:coex] add coex driver code
- [mmf] modify the audio setting and add EQ api

- 
- [sdk] configSTACK\_DEPTH\_TYPE to uint32\_t for pthread max stack size
  - [wlan] add rtlk\_wlan\_get\_bandwidth function
  - [mmf] adjust display roi according to isp resize method
  - [wlan] add rtlk\_wlan\_get\_thermal function and errno bug fixed and power limit by rate table
  - [mmf] support fmp4
  - [sdk][ota] update NN model by fwfs ota method
  - [mmf] add file cache feature for webrtc to speedup the connection
  - [wlan] fix audio noise due to beacon mode and fix ATBp hardfault in tz project
  - [file] Muxer driver support vfs

## 5.2 v9.4b

- [video] Reduce the multi sensor setup procedure
- [mmf] webrtc add flexible media source layer
- [video] Add the AE and AWB for fcs mode
- [wlan] fixed RA bug due to wireless\_band setting
- [wlan] wowlan dtim setting
- [isp] add motion detect trigger nn example
- [usb:cdc] Support usb cdc function
- [sdk] fix c++ list crash issue
- [sdk] modify nand mutex lock/unlock behavior
- [isp] osd2 update
- [wlan] fix mqtt wowlan wake up fail issue
- [file] Add the mp4 example without mmf
- [mmf] webrtc support opus and add rtw\_create\_secure\_context
- [wlan] add wowlan wake up pattern dump
- [mbedtls] sync net\_would\_block from mbedtls-3.0.0
- [wlan] add wifi/bt address api and get ap dtim info api
- [lwip] fix lwip 2.1.2 dhcp renew and rebind
- [isp] replace hal\_video\_obj\_region with osd draw
- [sdk] modify link file for DDR size
- [isp] add motion detect after AE stable mode
- [mmf] fix the choppy audio issue while using g711 streaming framesize large than 160
- [mbedtls] mbedtls-3.0.0 use bignum rom codes
- [mbedtls] mbedtls-2.16.6 use bignum rom codes
- [nn] yolo decode for multi-layer output
- [mmf] webrtc sync amazon deadlock fix

- 
- [isp] add condition check for safe OSD operation
  - [sdk] fix strdup error
  - [mmf] add howling suppression function based on AECM
  - [sdk] sync VOE1.2.4.0
  - [wlan] fix audio noise due to beacon mode and fix fast connect hardfault
  - [bt:hci] Add BT vendor command to send cut version to BT FW
  - [bt:ble] Add privacy module for ble peripheral & scatternet
  - [wlan:bbrf] phydm/halrf from phydm trunk for rtl8735b V28 (RF v23)
  - [sdk] change DDR to no\_dss and 1t cmd setting
  - [wlan] add rx ring count to avoid rx fifo overflow
  - [mmf] add rtsp,video,NN,audio and SD joint test and fix some error for video examples
  - [isp] fixed osd hide function fail issue and add stroke function of osd
  - [video] Support OSD and snapshot for fcs mode
  - [mmf] adjust the clock rate for rtsp AAC
  - [video] Check the bad block status for FCS mode
  - [mbedtls] use std snprintf in mbedtls-2.16.6, sync from 3.0.0
  - [video] Modify AE/AWB setup for fcs mode
  - [wlan] add adjustable buffer size for wakeup pattern packet
  - [mmf] webrtc sync amazon: change all the strcpy to strncpy
  - [sdk] sync VOE1.2.5.0
  - [wlan] fix hardfault in example\_wlan\_scenario
  - [flash] Set flash default speed to 62.5MHz
  - [sdk] fix crash when generating fwfs nn binary on linux
  - [wlan:coex] add wifi change mode for Pro2
  - [sdk] sync VOE1.2.6.0
  - [mmf] fix the audio play slow and update Readme
  - [wlan:bbrf] sync phydm for rtl8735b V29 RX DCK flow to fix BT RX deadzone
  - [nn] remove unnecessary model
  - [i2s] update i2s example
  - [video] Support day/night mode and drop frame for FCS mode
  - [eco:awsiot] update user guide of aws-iot
  - [usb] Fixed the low voltage problem for USB
  - [isp] update sensor driver(voe1260)
  - [wlan] add 0x6E wakeup for segmented mqtt packet, resample and decode the packet data
  - [nn] default insert 2 models

---

## 6 Release v9.5

### 6.1 v9.5a

- [sdk] fix \_malloc\_r style api wrap
- [nn] add viplite driver 1.8.0
- [isp] add iq timestamp information
- [nn] yolo support int8 and f32 tensor decode
- [nn] object detection + face recognition with muti-source osd\_draw
- [wlan] upgrade wowlan FW to V010B
- [video] Support different channel for fcs mode
- [isp] add hw-md method
- [sdk] upgrade VOE1.3.1.0
- [nn] update nn file operation layer for loading model from sd card
- [sdk] embedded fcs\_sensor\_iq firmware to ota firmware
- [usbd:dfu] Add the usb dfu ota example
- [nn] update yolov4\_tiny model
- [file] Support thread-safe for littlefs
- [gpio] Update IRQ registration process AON and PON GPIO via ROM patch
- [bt] Update pro2 & lite upper stack & bt normal patch to enable handshake
- [sdk] upgrade BSP to 2022/08/04
- [freertos] fix pthread\_attr\_t size
- [mmf] audio\_test\_tool\_improved, fix DMIC stereo audio and modify AEC api
- [sdk][ethernet] support ethernet\_mii & add example
- [wlan] add wowlan new feature, smartdtim
- [nn] support yolov7-tiny
- [mmf] modify AGC api, module\_audio parameters and related examples
- [wlan] Support antenna diversity and NCC power limit table and OTP speed up and fix RA FW rate up
- [usbd:uvc] Support fcs mode for UVC
- [gpio] Fix AON GPIO/PON GPIO multiple interrupt triggers when used as wakeup pins when system exits Standby Mode and GPIO IRQ is reinitialized and re-enabled; Added missing return statements for value-returning function calls
- [sdk][ota] add the cert type



---

## 6.2 v9.5b

- [wlan] add RTW\_SECURITY\_WPA\_AES\_PSK/RTW\_SECURITY\_WPA2\_TKIP\_PSK security for fast connect
- [video] fix stop stream block issue
- [nn] add image process api for nn resize and rotate
- [video] Support to load sensor and IQ from SD card
- [nn] add md to video joint test
- [mmf] update viplite driver and nn video example
- [flash] Modify Flash HAL to support flash size > 128Mbit
- [nn] replace memcpy with dma multiblk memcpy to release cpu
- [file] Compatible with different partition table
- [wlan] add wlan resume api
- [wlan] add tcp resume codes
- [nn] update the gdma\_cb\_para in img\_dma\_copy
- [wlan] Add wowlan new feature: add arp request keep alive, add gpio wdt
- [video] Add the mpu config for video
- [usb:storage] Support nor flash of USB mass storage
- [pwr] add retention example
- [mmf] add data group for sharing input data for several modules
- [nn] scrfd face detection
- [mmf] fix crash after setting customized taskname in simo and mimo
- [wlan:coex][bt] Update bt fw to fix mailbox function
- [filesystem:fwfs] use flash api instead of using directly memory access on NOR flash
- [log\_service] support console io redirect
- [nn] add scrfd 16:9 version
- [wlan] fixed fast connect crash bug
- [usb:cdc] Support log service from CDC-ACM
- [mmf] T2FF av sync and clear the use of different AEC library
- [wlan] TX power is too low due to PA protection mechanism
- [eco:awskvs] add kvsDoWorkEx api to support sending end of frames
- [video] Add the user buffer for FCS mode
- [wlan:coex] Fix wifi state update date while using WPA ap
- [wlan] add api to set antenna diversity
- [wlan] set ips/lps mode while using concurrent
- [nn] add nn model decryption implementation
- [wlan] add atcmd to flush system or disable antoreconnect
- [wlan] update disconn\_reason\_code for wrong password

- 
- [video] Add the sensor select API
  - [Video] upgrade VOE 1.3.4.0
  - [sdk] console applications – xmodem
  - [nn] set nn viplite driver to 1.8.0
  - [nn] add mutex protect when access NN engine
  - [eco:awskvs] webrtc reduce buffer and update media queue
  - [video] Add the httpfs example for MP4 record
  - [wlan] fixed system hang up issue because enter ips to write mac reg
  - [eco:awskvs] add api to get AppConfiguration in module
  - [isp] move md api into libispfeature & modify nn osd api
  - [isp] fix md row, col adjust bug
  - [wlan] Fix addba response and mqtt keepalive send error in wowlan
  - [wlan]Fix puback error in wowlan
  - [wlan]Fix arp packet encryption error in wowlan
  - [wlan] add server keep alive in wowlan
  - [wlan] add mqtt puback in wowlan keep alive
  - [video] Load relative position for video FW
  - [wlan:coex] fix register setting to close tx req in STA mode
  - [bt] Support BT LO resolution calibration
  - [sdk] turn off stdout internal buffer
  - [wlan] reduce TBTT rxbeaconlimit to 2ms
  - [mmf] Fix the av timestamp not sync in not fcs boot
  - [isp] fix osd cannot draw last row and last col
  - [sd] Add mutex protect and card detect API
  - [video] Add the meta data feature
  - [mmf] add removing stream id from id bitmap when streaming is close
  - [wlan] Support TX report from FW

## **6.3 v9.5c**

- [wlan] wowlan add ssl counter report function
- [wlan] wowlan add pattern match range function
- [wlan] wowlan add mqtt ping response keep alive timer
- [wlan] update ssl resume codes to wlan tcp resume
- [wlan] Support 2 way group key for wlan resume
- [wlan] Add setting RA start rate and max rate
- [wlan] Lower CCK current for D cut
- [wlan] Change the length for memcpy to prevent overflow in coap\_send

- 
- [wlan] Add mbedtls wrapper for coap usage
  - [wlan] fixed wlan resume security mode: wep/tkip failure issue
  - [wlan] fixed wps scan error due to fast connect and auto-reconnect conflict
  - [wlan] modified the rltk\_wlan\_get\_sta\_max\_data\_rate to get fixed rate value
  - [video] upgrade VOE to 1.3.6.1
    1. add private mask API
    2. extend osd block num: 6→24
    3. add awb statis r/g/b mean for meta data and change meta data timing after statis
    4. update 3Alib for 120fps support
  - [isp] Fix md row, col setting problem
  - [wdt] Fix compile error, add aon wdt nsc function for TZ build
  - [flash] Support QSPI mode NOR Flash
  - [flash] Add weak function for NOR Flash spic bit mode select by customer assign
  - [rtc] Initializes the RTC device with 32k calibration setting
  - [boot] Init for NS ROM debug level before NS log UART init. To avoid standby resume system hang due to system access non-init UART
  - [sdk] remove duplicate version setting of lwip, freertos, mbedtls in CMakeLists.txt
  - [filesystem] Fix error in reading and writing return value at virtual
  - [sdk] Update the whole firmware upgrade example
  - [sd] Add the mutex protect when using the OTP api
  - [sd] Disable force 3.3v setup
  - [boot] Fix the read user data failed problem for 32MB NOR flash
  - [nn] add scrfd and mbfacenet to amebapro2\_fwfs\_nn\_models.json as default
  - [nn] adjust partition table otherwise nn model will destroy flash file system and user data region
  - [isp] fix osd include header miss problem
  - [isp] remove unsupported md code
  - [mmf] fix the potential memory leak error in module\_array
  - [audio] fix the AGC gain curve and AEC work not well
  - [audio] fix the AEC parameter check function and correct the setting parameters
  - [audio] adjust the AGC attack/release time from 20 ~ 1000 (interval 20) to 0~ 500 (interval 1)
  - [audio] allocate a memory for Tx NS processing parameters to prevent NS process error
  - [sdk] fix stdin/stdout/stderr in vfs wrapper bootloader force using rom printf, fix resume time too long cause by feeding buffer in to strchr without '\0'
  - [nn] change embedded name in nb files
  - [nn] fix module vipnn reinit fail problem

- 
- [coex] Close send null frame while using SoftAP and BLE scan
  - [coex] Add concurrent handle while BT on
  - [bt] Fix long run stack overflow error after ATBO
  - [bt] Fix BT config lack of secure context problem
  - [isp] Fix md row, col setting problem

## 7 Release v9.6

### 7.1 v9.6a

- [mbedtls] add mbedtls-2.28.1
- [video] Store the snapshot from VFS
- [mmf] update the consilient VQE library for correcting AGC attack/release time and NS memory size
- [freertos] support tick count initial value based on dwt cycle counter
- [ota] Modify the download procedure of DFU upgrade FW for nor flash
- [sd] Fixed the return code fail and support to modify the timing parameter
- [video] Add the time information for fcs mode
- [sqlite] add sqlite as a light-weighted database engine
- [video] upgrade voe to 1.3.7.2
- [sdk] add \_realloc\_r wrapper
- [wlan] wlan tcp resume support gpio wakeup
- [wlan] wowlan add wdt gpio pull ctrl setting
- [sdk] NOR Flash spic bit mode select by customer assign
- [video] add the encoder setup parameters, Support to setup the level, profile and cavlc parameters for h264 and hevc
- [md] md sensitivity improvement
- [sdk] fix errno re-entrance
- [wlan] wowlan keep alive packet receive optimization
- [sdk] solve multitask message interleaving
- [mmf] add mmf example to grab bayer image
- [isp] add isp feature private-mask
- [wlan] wlan resume and wlan phy parameter optimization
- [usb] Add the the new usb architecture and relative example
- [rtsp] reset the rtp timestamp to zero at the begin
- [mmf] mmf av timestamp sync
- [md] fix md bug & separate md into new lib

- 
- [sdk] printf message interleaving issue fix
  - [mmf] add choice for AGC to detect on RMS or peak value
  - [mmf] fix sweep tone erase by NS algorithm in some case
  - [wlan] Get wlan RSSI in MP mode
  - [md] modify md adaptive threshold
  - [sdk] use sys/errno.h instead of lwip built-in
  - [vfs]fix the memory leak for readdir function.
  - [video]add get buffer info api.
  - [isp]add log message to trace status when dumping iq-data.
  - [audio]fix the loss block of the wav file header using in audio test tool.
  - [wlan]add division zero error handle.
  - [audio]smooth the NS transition band to prevent sound change dramatically.
  - [sdk]fixed to read nor flash error at boot loader.
  - [isp]dynamically decide OSD bitmap size.
  - [audio]move audio trx start after cache queue create.
  - [wlan]support arp resume.
  - [usb]fix the high cpu utilization problem and add the hotplug event for usb ethernet.
  - [usb]support bootloader update at dfu mode.
  - [sdk]disable AON WDT in DSLP and Standby.
  - [video]adjust hal\_voe\_send2voe timeout limit and return proper status when close video.
  - [lwip]update dhcp resume.
  - [mbedtls]ssl resume support to fix in\_ctr.
  - [wlan]add Wi-Fi roaming example.
  - [usb]add the test pattern to measure the USB eye.
  - [isp]add API to modify customized iq address.
  - [video]add the roi feature for fcs mode.
  - [wlan]increase wowlan keepalive compatibility.
  - [lwip]fix tcp resume when zero seqno and ackno.
  - [wlan]wlan API requirements and default setting for acura.
  - [wlan]MP wlan API requirements and default setting for acura.
  - [sdk]fix error if re-include errno.h.
  - [sdk]support telnet console.
  - [audio]fix the aec loss convergence.
  - [mmf]change the handle task priority when doing mmf ctrl and increasing mmf ctrl timeout.
  - [mmf]fix the danger of module\_audio using mm\_ctrl while creating module.
  - [lwip]tcp resume support to not queue first out-of-sequence packet

- 
- [lwip]fix arp retain.
  - [usb]modify the lwip process to assign the initial data for usb ethernet dongle.
  - [usb]modify the transfer packet size to speed up the download process with dfu mode.
  - [nn]add crc32 check for face feature validity.
  - [video]MMF support to get sps/pps info.
  - [bt]support BT UART bridge by USB CDC.
  - [audio]fix the error of getting the stereo mic data and add parameters to clarify the setting of the new version AGC.
  - [wlan]add TBTT shift adjust
  - [md]add md stop, start command and fix MD calculate issue
  - [md]increase md time filter interval and auto WDR update
  - [usb]support to change the serial number with dfu driver.
  - [audio]add rx, tx start, stop control in module for user to operate mic and speaker audio process separately.
  - [sdk]fixed the gpio e4 conflict with fcs mode.
  - [video]modified hal\_voe\_send2voe timeout customized settings amd add customized timeout handle.
  - [audio]move the audio mixing process before DRC/AGC in speaker path.
  - [aduio]change the mix method from the averaging to the adding and clipping the 4 channels audio data.
  - [audio]remove the mix input num 2, only remain mix 4 channels.
  - [audio]add audio mix mode example mmf2\_example\_2way\_audio\_g711\_doorbell\_init
  - [audio]support opus array and add opus array rtsp example.
  - [video]update the voe 1.42.1 version and it need to refer hal\_video\_release\_note.txt.
  - [video]support private mask for fcs mode.
  - [video]force 16 alignment of encoder's input width and crop to desired width as output
  - [video]add sync mode video streaming example with face detection.
  - [video]add sync mode jpeg snapshot example with face detection.
  - [video]add external mode jpeg HW encode example.
  - [sdk]add NSC functions for Ethernet.
  - [wlan]Update wlan API.
  - [nn]add codec type NV12 and NV16 for nn input.
  - [nn]set face recognition module param in related examples and add null check for input param in module\_vipnn.c
  - [nn]add result argument for post-processing and modify vipnn to support new model structure
  - [wlan]wlan scan done state update

- 
- [nn]set result size and result max count for nn related examples.
  - [wlan]update wowlan TBTT shift adjust.
  - [sdk]support to get the version from library.
  - [usb]cdc supports image transfer example.
  - [audio]modify the AGC 0 dBFS not attenuating correctly.
  - [isp]support SW-ALS function.
  - [isp]merge the production line calibration iq data to default iq.
  - [mmf]change the mmf module's timestamp api and set the mmf time stamp referring to system timer by default
  - [nn] pc nn post-process simulation tool
  - correct\_the\_eq\_setting\_process\_(v01)
  - wowlan\_bcn\_tracking\_(v08)
  - wowlan\_bcn\_tracking\_(v07)
  - fix\_sei\_nal\_type\_error\_(v01)
  - wlan\_resume\_tx\_seq\_(v01)
  - wowlan\_bcn\_tracking\_(v06)
  - wowlan\_bcn\_tracking\_(v05)
  - wifi\_debug\_enabled\_(v01)
  - md\_update\_(v06)
  - add\_private\_mask\_example\_(v01)
  - enable\_api\_for\_setting\_manual\_sensor\_(v02)
  - wowlan\_bcn\_tracking\_(v04)
  - enable\_api\_for\_setting\_manual\_sensor\_(v01)
  - fix\_hided\_or\_deleted\_task\_utilization\_(v01)
  - usb\_device\_reset\_procedure\_(v01)
  - wowlan\_fix\_wakeup\_fail\_issue\_(v01)
  - rtw\_ignore\_security\_(v01)
  - wowlan\_modify\_arp\_request\_target\_(v01)
  - wowlan\_add\_ntp\_offload\_(v01)
  - correct\_avsync\_flag\_reset\_and\_remove\_the\_irq\_print\_(v01)
  - opus\_encode\_usage\_optimization\_(v01)
  - fix\_the\_macro\_of\_usbd\_and\_add\_ramdisk\_data\_play\_in\_audio\_tool\_(v01)
  - modify\_isp\_init\_flow\_(v01)
  - console\_auth\_warm\_boot\_feature\_(v01)
  - vfs\_init\_issue\_(v01)
  - wifi\_join\_status\_indicate\_to\_global\_(v01)
  - support\_BT\_power\_adjust\_(v01)

- 
- voe\_1440\_(v01)
  - fix\_insufficient\_pre-wake\_time\_(v01)
  - dispaly\_task\_id\_for\_top\_command\_(v01)
  - sw\_als\_(v02)
  - wowlan\_fix\_rx\_stuck\_on\_(v01)
  - ps5270\_bringup\_rotate\_(v05)
  - sort\_and\_limit\_display\_items\_for\_top\_command\_(v01)
  - isp\_default\_init\_params\_(v01)
  - ps5420\_bringup\_rotate\_(v10)
  - wowlan\_bcn\_tracking\_(v03)
  - wowlan\_bcn\_tracking\_(v02)
  - clear\_the\_aec\_tx\_buffer\_when\_audio\_tx\_mute\_or\_stop\_(v01)
  - md\_update\_(v05)
  - modify\_and\_clea\_the\_printf\_information\_when\_doing\_ASP\_setting\_(v01)
  - add\_array\_task\_priority\_control\_command\_(v01)
  - ps5270\_bringup\_rotate\_(v04)
  - update\_flash\_QE\_bit\_setting\_(v01)
  - add\_DRAM\_info\_api\_(v01)
  - support\_fcs\_disable\_(v01)
  - ps5270\_bringup\_rotate\_(v03)
  - fix\_the\_opus\_buffer\_problem\_in\_mmf\_modules\_and\_examples\_(v01)
  - ignore\_open\_wep\_(v01)
  - dfu\_support\_to\_setup\_serial\_number\_(v01)
  - wowlan\_bcn\_tracking\_(v01)
  - update\_BT\_stack\_(v01)
  - iq\_robin\_sc2333\_g34218b\_update\_(V09)
  - ota\_verify\_flash\_signature\_api\_(v01)
  - add\_console\_password\_authentication\_(v1)
  - fix\_block\_count\_when\_size\_larger\_than\_6M\_(v01)
  - fix\_the\_danger\_for\_aac\_aad\_and\_opus\_modules\_(v01)
  - remove\_sensor\_define\_uvc\_(v01)
  - add\_aon\_timer\_clear\_function\_(v01)
  - fix\_sensor\_define\_(v02)
  - fix\_sensor\_define\_(v01)
  - md\_update\_(v04)
  - fix\_ch4\_release\_problem\_(v01)
  - wlan\_single\_fw\_(v01)



- 
- voe\_1.4.3.0\_update\_(v01)
  - driver\_gc4023\_bringup\_rotate\_(v03)
  - driver\_ps5420\_bringup\_rotate\_(v09)
  - md\_update\_(v03)
  - fast\_osd\_(v01)
  - fix\_tbt\_incorrect\_issue\_(v01)
  - move\_fcs\_start\_time\_record\_location\_(v01)
  - add\_audio\_mic\_pcm\_data\_cb\_function\_and\_example\_(v01)
  - fix\_the\_video\_time\_offset\_problem\_(v01)
  - fix\_get\_wake\_reason\_function\_(v01)
  - support\_sei\_nal\_type\_for\_rtsp\_(v01)
  - support\_the\_hevc\_codec\_and\_sei\_at\_fcs\_mode\_(v01)
  - save fault and backtrace message for debug\_(v01)
  - support fcs mode of auto rate control mechanism\_(v01)
  - add\_version\_info\_(v02)
  - rearrange\_the\_location\_for\_rtsp\_cb\_function\_(v01)
  - add\_sps\_in\_hevc\_streaming\_(v01)
  - add\_mmf\_timestamp\_offset\_automatically\_(v01)
  - ps5270\_bringup\_rotate\_(v02)
  - modify\_meta\_data\_sps\_struct\_and\_add\_fcs\_cost\_time\_(v01)
  - modify\_and\_add\_some\_function\_in\_fcs\_process\_(v01)
  - tcp\_protocol\_layer\_keep\_alive\_(v03)
  - add\_connection\_status\_for\_application\_layer\_(v01)
  - tcp\_protocol\_layer\_keep\_alive\_(v02)
  - support\_encoder\_align\_then\_crop\_in\_fcs\_(v01)
  - add\_AEC\_ConvergenceTime\_PPLevel\_adjustment\_(v01)
  - tcp\_protocol\_layer\_keep\_alive\_(v01)
  - ps5420\_bringup\_rotate\_(v08)
  - add\_version\_info\_(v01)
  - modify\_the\_hot\_plug\_procedure\_cdc-ecm\_(v01)
  - tinyssh\_(v01)
  - modify\_mmf\_queue\_clear\_and\_turn\_off\_opusc\_module\_extra\_printf\_(v01)
  - modify\_audio\_dummy\_frame\_could\_reset\_after\_reset\_(v01)
  - example\_for\_isp\_mode\_change\_(v01)
  - update\_sensor(voe1421)\_(v01)
  - add\_libVQE\_get\_version\_in\_libVQE\_(v02)
  - wlan\_rtw\_ignore\_wpa\_tkip\_wpa2\_tkip\_(v01)

- 
- [nn] add ftp loader to nn file tester
  - [nn] add nanodet object detection model
  - [video] add return value check of vfs registering
  - [md] increase md queue size
  - [flash] remove flash\_resource\_lock
  - [nn] adjust task priority in nn joint test video/audio example
  - [sdk] rodata protection by mpu\_protect.c
  - [wlan] fix wps pin issue to join wpa2/wpa3 ap
  - [nn] reduce the cpu usage of face recognition model
  - [video] add md and nn to fcs joint test example
  - [sdk] fix wlan\_scenario example show unknown security
  - [wlan] store the BSSID info to wlan\_fast\_reconnect
  - [wlan] provide bssid and crc for fast connection structure
  - [wlan] add atcmd to enable/disable reconnection
  - [video] modify video parameter setting of video examples for auto sensor parameter
  - [mp4] add the append header config
  - [vfs] fix access return error
  - [isp] add osd render task deinit in example
  - [isp] add description at fcs mode
  - [lwip] add dns resume
  - [wlan] add bandsteering example for roaming plus
  - [ethernet] Add ethernet\_detect\_phy\_state for Ethernet
  - [lwip] refine arp resume
  - [lwip] check expire for dns resume
  - [isp] add ir\_control initial in video example flow
  - [flash] Support GD new flash type
  - [isp] fix osd render task skip update
  - [isp] modify sw-als function
  - [video] add dcache clean before HW jpeg encoding
  - [video] support scaling up in ch0
  - [sdk] gdma busy issue fix
  - [otp] support jtag fixed key
  - [nn] set viplite driver version to 1.12.0
  - [isp] fixe secure-fault of bayercap\_rtsp\_init
  - [isp] update for tuning tool
  - [isp] isp control update: reorganize isp control list

- 
- [wlan] add wifi\_get\_sta\_current\_data\_rate api to avoid confusing client and support dhcp renew 1 minute