WLAN and Bluetooth hardware component
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1 Article purpose

The purpose of this article is to:

- list the WLAN/BT hardware components that might be integrated in the different boards
- link these components to the corresponding software framework(s)
- point to the datasheet(s) of these components

2 Software frameworks

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<th>Cortex-M4</th>
<th>Cortex-A7 Non-secure (Linux)</th>
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3 Murata 1DX

The Type 1DX\(^1\) module is an ultra-small module that includes 2.4 GHz WLAN and Bluetooth functionality. Based on the Cypress CYW4343W (previously Broadcom BCM4343W), the module provides high-efficiency RF front end circuits. The module is designed to fit into small spaces and is smaller than a dime. Minimal external circuitry is required to complete a radio design; add an antenna, a power source, clocks, processor, and associated interface hardware, and the radio hardware design is complete. To ease Wi-Fi certification, the Type 1DX module complies with IEEE 802.11b/g/n and Bluetooth Version 4.1 plus EDR, Power Class 1 (10 dBm max) + BLE.

3.1 Linux driver

Bindings: Documentation/devicetree/bindings/net/wireless/brcm.bcm43xx-fmac.txt
Documentation/devicetree/bindings/net/broadcom-bluetooth.txt

Sources: drivers/net/wireless/broadcom/brcm80211/brcmfmac/of.c
drivers/bluetooth/hci_bcm.c

3.1.1 Pre requisite

1DX chipset needs 2 pieces of firmware to work:

3.1.1.1 Bluetooth

The ST Yocto delivery includes the following recipe:
- meta-st/meta-st-stm32mp/recipes-kernel/linux-firmware/linux-firmware-bluetooth-bcm4343.bb
that includes the CYW4343W Firmware which is needed by the driver: CYW43430A1.1DX.hcd (firmware)

If the newest firmware versions are requested, they can be retrieved as described below:
Clone bluetooth firmware from the Murata git repository:

```
PC $>git clone https://github.com/murata-wireless/cyw-bt-patch
```

Copy/Rename CYW43430A1.1DX.hcd file in the target (rename needed to be compliant with the broadcom driver):

```
PC $>cp CYW43430A1.1DX.hcd $target/rootfs/lib/firmware/brcm/BCM43430A1.hcd
```

3.1.1.2 WLAN

The ST Yocto delivery includes the following recipes:
- openembedded-core/meta/recipes-kernel/linux-firmware/linux-firmware_git.bb
- meta-st/meta-st-stm32mp/recipes-kernel/linux-firmware/linux-firmware_bcm4343.bbappend

These provide the CYW4343W firmware and calibration data needed by the wlan driver: brcmfmac43430-sdio.bin (firmware), and brcmfmac43430-sdio.txt (calibration data file)
If the newest firmware versions are requested, they can be retrieved as described below:

Clone bcm firmware from kernel.org git repository:

```
PC $> git clone git://git.kernel.org/pub/scm/linux/kernel/git/firmware/linux-firmware.git
```

Firmware is available in the linux-firmware/brcm folder:

```
PC $> cp linux-firmware/brcm/brcmfmac43430-sdio.* $target/rootfs/lib/firmware/brcm/
```

- At startup, the MURATA 1DX module is loaded and you should see the following dmesg output:

```
[ 67.306154] brcmfmac: brcmf_c_preinit_dcmds: Firmware version = wl0: Aug 6 2017 23:19:25 version 7.45.98.30 (r666241 CY) FWID 01-f0b000
[ 67.676323] brcmfmac: brcmf_cfg80211_reg_notifier: not a ISO3166 code (0x30 0x30)
```

4 References

- [1], 1DX
- Kernel.org wiki


BlueTooth

Open Portable Trusted Execution Environment technology for wireless local area networking with devices based on the IEEE 802.11 standards

Bluetooth Low Energy, Bluetooth LE, marketed as Bluetooth Smart is a wireless personal area network technology designed and marketed by the Bluetooth Special Interest Group aimed at novel applications in the healthcare, fitness, beacons, security, and home entertainment industries.

Application programming interface