KBA-180912011610

Boot temperature check for critical high or low limit

Applicable platform:

SDM660,SDM710,MSM8953,MSM8998,SDM660,SDM630,SDM450 / Generic

Issue/problem description:

Sometimes, you may encounter boot up failure case by temperature check, which makes device shut down or reset. Critical high/low limit was set in UEFI to make boot up sequence stop. Also, there might be different boot temperature spec in different regions. Briefly introduce the SW control flow here and you could customize if needed.

Issue Analysis:

1. Battery temperature out of operation range, system reset.

Example log:

```
2, ChargerLib::ChargerLib_GetBatteryTempStatus BatteryTemp out-of-range = 125 C
2, ChargerLib:: ChargerLib_GetBatteryTempStatus BatteryTemp = 125 C, Operational Range lower limit = -20, upper limit = 60
2, ChargerLib:: ChargerLib_GetErrors ERROR: Battery temperature out of operational range
2, PmicDxe:: PmicFgCommon_ReadBattTemp: BATT_Temp = 125
2, PmicDxe:: PmicFgCommon_ReadBattTemp: BATT_Temp = 125
2, QcomChargerDxe::ChargerPlatform_TakeAction Critical Error occurred. Shutting down
2, ChargerLib:: ChargerLib_ForceSysShutdown Disable chrging ShtDwn Type = 2
……
2, ChargerLib:: ChargerLibTarget_ForceSysShutdown CHGAPP_RESET_AFP.
```

Definition:

UEFI charger APP config setting by chipset:

```
boot_images/QcomPkg/Drivers/QcomChargerDxe/QcomChargerConfig_SocTh_SDMXXX.cfg

# Configure limits for Battery Temperature (For negative values, use negative
sign. Ex: -30)
JeitaCriticalTempLowLimit = -20
JeitaCriticalTempHighLimit = 60
```

SW code flow:

EFI_STATUS **ChargerLib_GetBatteryTempStatus**(CHARGERLIB_BATT_TEMP_STATUS ***pBattTempStatus**)

```
1729    if(( BatteryStatus.BatteryTemperature <
gChargerLibCfgData.fg_cfg_data.HwJeitaThreshold.JeitaCriticalTempLowLimit) ||
1730       ( BatteryStatus.BatteryTemperature >
gChargerLibCfgData.fg_cfg_data.HwJeitaThreshold.JeitaCriticalTempHighLimit))
1731    {
1732      CHARGER_DEBUG((EFI_D_WARN, "ChargerLib:: %a BatteryTemp = %d C, Operational
Range lower limit = %d, upper limit = %d \r\n",
1733                     __FUNCTION__, BatteryStatus.BatteryTemperature,
gChargerLibCfgData.fg_cfg_data.HwJeitaThreshold.JeitaCriticalTempLowLimit,
1734                     gChargerLibCfgData.fg_cfg_data.HwJeitaThreshold.JeitaCriticalTe
mpHighLimit));
1735
1736      *pBattTempStatus = ChargerLib_Batt_Temp_OutsideOperationalRange;
1737  }
```

Once battery temperature out of above operational range, device can't boot up fail.

2. Tsens temperature check, system reset.

Call flow as below:

sbl1_hw_init(sbl1_hw.c)

=>boot_check_device_temp(boot_thermal_management.c)

=>boot_BootTempCheck(boot_extern_tsensor_interface.c)

=>BootTempCheck(BootTempCheck.c)

Example definition:

boot_images/QcomPkg/SDM845Pkg/Settings/BootTempCheck/BootTempCheckBsp.c

```
const BootTempCheckBspType BootTempCheckBsp[] =

{

  {

    .nUpperThresholdDegC      = 150,

    .nLowerThresholdDegC      = -150,

    .uMaxNumIterations        = 40,

    .uWaitPerIterationMicroSec = 500000,

    .uSensor                  = 0

  }
```

};

As you could know, there is one section “boot thermal management” in (chipset) thermal overview doc to simply show the customization temperature path. For more info about BTM UFEI control, please refer to **KBA-170815073838.**