

The impact of GlobalStar use of 2483.5 to 2495MHz band on the BT/BLE and WLAN

Broadcom, CableLabs

Main Summary



- GlobalStar's usage of 2483.5 to 2495 MHz will have significant impact on BT/BLE and WI-FI in 2.4GHz ISM band
 - 4W max in small cells?
 - possibly 23dBm in handheld devices
- Impact on BLE ADVERTISING CHANNEL 2480
- BT Adaptive Frequency Hopping (AFH) is further restricted with available clean channels
- Coexistence with of BLE/BT and WiFi with LTE using 2483.6 to 2495MHz:
 - Only Time Domain coexistence available with a heavy impact on the available airtime for co-located technology.

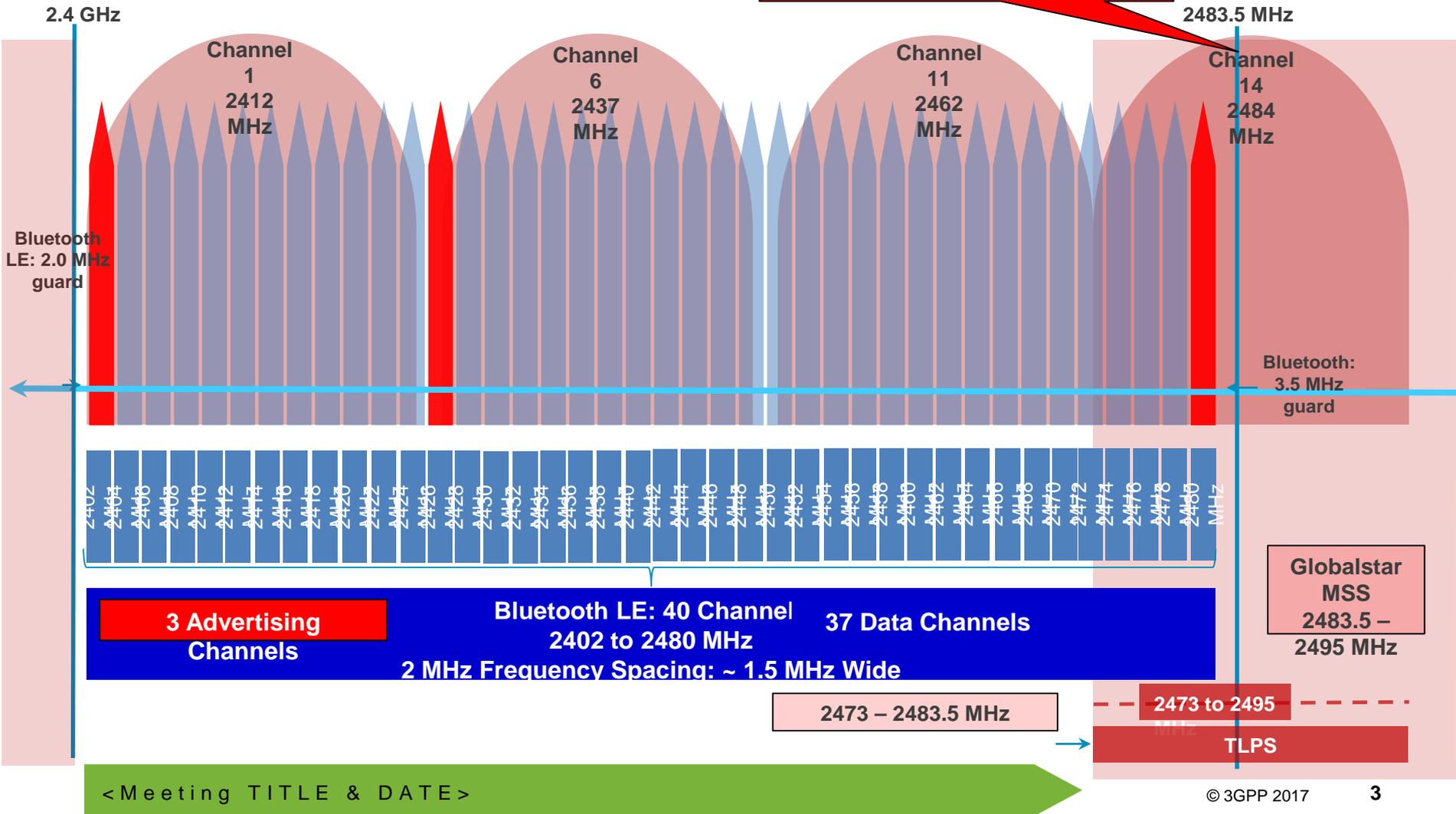
BT and LE channel usage

Should provide similar operational behavior as LTE operating in unlicensed spectrum in countries allowing use (by regulatory means) of Channel 14 of 2.4 GHz band.



A GLOBAL INITIATIVE

2.5 GHz



Current Best-in-Class Filters Incapable of Addressing In-Device Coexistence



- 📶 Present deployed filtering solutions supporting unlicensed operation in mobile devices pass channel 13 (2483 MHz) and provide rejection by either B41 (2496 MHz - 13 MHz away) or B7 (2500 MHz - 17 MHz away).
- 📶 Deployed filters would not prevent interference from Globalstar communication onto WiFi/BT, nor would they protect from WiFi interference in the Globalstar band.
- 📶 Desense of WiFi connections in a handset operating near a GlobalStar base station can occur due to spectral regrowth from the GlobalStar system. Such regrowth is within the passband of deployed WiFi LNAs and it is not rejected by deployed filters.
- 📶 The 0.5MHz spacing between WiFi Channel 13 and the GlobalStar band is too narrow for present technology to create a miniature filter that could provide a reasonable coexistence solution between WiFi Ch 13 and the GlobalStar band.

BT/BLE & TDD LTE 2483-2495 Operations in the Same Device will Clearly Harm User Experience



- TDD LTE transmitting at 23 dBm on a handset would lead to only ~20 dB in isolation between the BT/Wi-Fi antenna and LTE antenna
- 3 dBm excess energy will act as a significant jammer for BT or Wi-Fi
- BT/Wi-Fi RX would be limited to signal strengths greater than -30dBm
 - Rx signals typically below -70dBm
 - Simultaneous LTE TX and BT/WIFI RX is severely limited
- Only possible mitigation is TDD LTE coex signaling with BLE/BT/Wi-Fi, which as a best case leads to performance degradation

Conclusions

- 📶 We recommend RAN4 to take into account these findings:
 - There is severe harm on both BLE/BT and WiFi (2.4GHz) usage when these technologies are collocated with GlobalStar band. Only possible mitigation is TDD LTE coex signaling with BLE/BT/Wi-Fi which, as a best case, leads to performance degradation;
 - There is possible interference on the BLE/BT and WiFi devices operating in the proximity of a GlobalStar base station. This interference may not be able to be addressed through either filtering mechanisms or other time domain mitigation techniques.

- 📶 We propose the following:
 - This band shall not be approved for any country allowing (by regulatory means) use of Channel 14 of the 2.4 GHz band, due to its severe impact onto this channel.