

Apollo2blue FCC, DTM and Sensitivity Test

FCC Test

(Federal Communications Commission)



FCC Test Environment Setup-1

- Based on Apollo2blue EVB
- Tools:
 - Agilent, E4405B, Spectrum Analyzer
 - SMA connector line





FCC Test Environment Setup-2

- TX power is set to the max(+6.2dBm)
- Load C:\AmbiqMicro\AmbiqSuite\boards\apollo2_blue_evb\examples\cordio_fcc_test to Apollo2blue evk.

| SEGGER J-Link SWO Viewer V6.12a | x |
|---|---|
| File Edit Help | |
| Data from stimulus port(s): 3124 2316 158 7 |] |
| Stay on top Clear Stop Paus | е |
| Apollo2 Cordio FCC Test Example HciDrvRadioBoot complete Usage as below: Short press Button 1 to go through different test modes TX power is set to +6.2 dBm (max) 01 26 FC 01 11 Received EM_ActiveStateEntered Event 04 0E 05 01 26 FC 00 11 | |
| 4 | - |
| Device: APOLLO512 CPUFreq: 1000 kHz SWOFreq: 1000 kHz 258 bytes | |



Modulated Wave Test-3

Modulated Wave: 2402 MHz

| SEGGER J-Link SWO Viewer V6.12a |
|--|
| File Edit Help |
| Data from stimulus port(s): 7 0 |
| Stay on top Clear Stop Pause |
| 01 12 FC 00 |
| Continuous Modulation on Channel 2402 MHz 04 0E 06 01 12 FC 00 00 00 |
| 01 11 FC 04 01 00 00 00 |
| 04 0E 04 01 11 FC 00 |
| |
| Device: APOLLO512 CPUFreq: 1000 kHz SWOFreq: 1000 kHz 858 bytes |

| Measured | Tx power | Frequency Spurious(dBuV) | | |
|--------------------|----------|--------------------------|------------------|--|
| Frequency (MHz) | (dBm) | Twice Frequency | Triple Frequency | |
| 2402.15 | 4.385 | 58.38 | 36.65 | |





Modulated Wave Test-3

• Modulated Wave: 2440 MHz

| 🔝 SEGGER J-Link SWO Viewer V6.12a |
|--|
| File Edit Help |
| Data from stimulus port(s):24 2316 158 7 |
| Clear Stop Pause |
| 01 12 FC 00 |
| Continuous Modulation on Channel 2440 MHz |
| 04 0E 06 01 12 FC 00 00 00 |
| 01 11 FC 04 01 13 00 00 |
| 04 0E 04 01 11 FC 00 |
| ۲ |
| Device: APOLLO512 CPUFreq: 1000 kHz SWOFreq: 1000 kHz 1009 bytes |

| Measured | Tx power | Frequency Sp | urious(dBuV) | |
|--------------------|----------|--------------|--------------|--|
| Frequency (MHz) | (dBm) | Twice | Triple | |
| 2440.15 | 4.29 | 46.28 | 35.64 | |





Modulated Wave Test-4

• Modulated Wave: 2480 MHz

| SEGGER J-Link SWO Viewer V6.12a | | | |
|--------------------------------------|-------------------|-------------------|------------|
| File Edit Help | | | |
| Data from stimulus port(s): 31 24 23 | | | |
| 🔲 Stay on top | | Clear | Stop Pause |
| 01 12 FC 00 | | | <u>^</u> |
| Continuous Modulation on Channel 24 | 80 MHz | | |
| 0Ê 06 01 12 FC 00 00 00 | | | |
| 01 11 FC 04 01 27 00 00 | | | |
| 04 0E 04 01 11 FC 00 | | | E |
| • | | | Þ |
| Device: APOLLO512 | CPUFreq: 1000 kHz | SWOFreq: 1000 kHz | 1160 bytes |

| Measured | Tx power | Frequency Sp | urious(dBuV) | |
|--------------------|----------|--------------|--------------|--|
| Frequency (MHz) | (dBm) | Twice | Triple | |
| 2402.15 | 4.385 | 58.38 | 36.65 | |





Continuous Wave Test-1

Continuous Wave(Carrier Wave): 2402 MHz

| SEGGER J-Link SWO Viewer V6.12a | | _ _ × |
|--|--------------------------------|------------------|
| File Edit Help | | |
| Data from stimulus port(s): | | 70 |
| 🗖 🗖 Stay on top | | Clear Stop Pause |
| 01 12 FC 00 | | ^ |
| Continuous Wave on Channel 2402 MHz 04 0E 04 01 12 FC 12 | | |
| 01 11 FC 04 04 00 00 00 | | E |
| 04 0E 04 01 11 FC 00 | | - |
| | | 4 |
| Device: APOLLO512 | CPUFreq: 1000 kHz SWOFreq: 100 | 00 kHz 417 bytes |

| Measured Frequency (MHz) | Tx power (dBm) |
|--------------------------------|-------------------|
| 2401.9 | 4.41 |



Continuous Wave Test-2

Continuous Wave(Carrier Wave): 2440 MHz

| SEGGER J-Link SWO Viewer V6.12a | _ _ X |
|--|--------------|
| File Edit Help | |
| Data from stimulus port(s): 31 24 23 16 15 8 7 | |
| Clear | Stop Pause |
| 01 12 FC 00 | * |
| Continuous Wave on Channel 2440 MHz 04 0E 06 01 12 FC 00 00 00 | |
| 01 11 FC 04 04 13 00 00 | E |
| 04 0E 04 01 11 FC 00 | - |
| Device: APOLLO512 CPUFreq: 1000 kHz SWOFreq: 1000 kHz | 562 bytes |

| Measured Frequency (MHz) | Tx power (dBm) |
|--------------------------------|-------------------|
| 2439.5 | 4.222 |





Continuous Wave Test-3

Continuous Wave(Carrier Wave): 2480 MHz

| SEGGER J-Link SWO Viewer V6.12a | | | | X |
|--|-------------------|-------------------|-----------|-------|
| File Edit Help | | | | |
| Data from stimulus port(s): | | | | |
| 🗖 Stay on top | | Clear | Stop | Pause |
| 01 12 FC 00 | | | | ^ |
| Continuous Wave on Channel 2480 MHz 04 0E 06 01 12 FC 00 00 00 | | | | |
| 01 11 FC 04 04 27 00 00 | | | | |
| 04 0E 04 01 11 FC 00 | | | | • |
| | | | | F |
| Device: APOLLO512 | CPUFreq: 1000 kHz | SWOFreq: 1000 kHz | 707 bytes | 11. |

| Measured Frequency (MHz) | Tx power (dBm) |
|--------------------------------|-------------------|
| 2479.95 | 4.062 |



DTM(Direct Test Mode) and Sensitivity Test



Environment setup-1

- Based on Apollo2blue EVB
- Tools:
 - ANRITSU MT8852B, Bluetooth Test Set
 - SMA connector line





Environment setup-2

• Load

C:\AmbiqMicro\AmbiqSuite_Hotfix2\boards\apollo2_blue_evb\examples\em9 304_test_bridge to Apollo2blue evk.





DTM-Test Result



ambiq micro

Sensitivity Test Result

- -87dBm in customer's office;
- -90dBm in customer's OTA lab;





Thank You!