

NB-IoT Functional and Performance Report

3GPP and Qualcomm Based Tests

Classification: Confidential

Doc. Type: Report

Revision: Rev. 02

Date: 09/10/2024

Code: Tests, Report, Performance

Report Info

Operator: Sergio
DUT: HTNB32L-0XX
Batch: NB2PT07-02-1
Testplan: ['Yield_Platform_for_Production_1.0.ini']
Plat SW Ver.: Yield-Alpha 0.1
Plat HW Ver.: 1.0 ID1

Summary

Test Start Time: 09/10/2024 10:04:43
Test End Time: 09/10/2024 10:07:41
Total Test Time: 0:02:58
Test Items Passed: 124
Test Items Failed: 0
Number of Test Items: 124

Tests Resume

| Test item | Qty | Set Lower | Set Upper | Res Lower | Res Mean | Res Upper | Unit | Judg |
|------------------|-----|-----------|-----------|-----------|----------|-----------|------|------|
| Short Open | 13 | 8 | 340 | 9.7 | 214.0 | 330.0 | kΩ | PASS |
| Firmware Flash | 5 | - | - | - | - | - | - | PASS |
| Interleaved | 22 | - | - | - | - | - | - | PASS |
| Peripherals | 11 | - | - | - | - | - | - | PASS |
| DeepSleep | 4 | 0.4 | 25.0 | 0.8 | 5.9 | 13.6 | μA | PASS |
| Calibration | 4 | - | - | - | - | - | - | PASS |
| Max_Output 00@00 | 5 | 21.0 | 24.2 | 21.1 | 21.8 | 22.4 | dBm | PASS |
| Max_Output 03@00 | 5 | 19.8 | 22.3 | 20.9 | 21.5 | 21.7 | dBm | PASS |
| EVM | 10 | - | 17.5 | 0.3 | 1.8 | 4.4 | % | PASS |
| Freq Error | 10 | - | 195.0 | 0.59 | 3.6 | 6.56 | Hz | PASS |
| OBW | 10 | - | 200.0 | 141.56 | 155.2 | 168.75 | Hz | PASS |
| ACLR | 10 | - | -36.2 | -57.0 | -55.0 | -51.6 | dBc | PASS |
| SEM | 10 | - | 0.0 | 0.0 | 0.0 | 0.0 | % | PASS |
| BLER | 5 | - | 5.0 | 0.0 | 0.0 | 0.0 | % | PASS |

Tests Details #01

Test HT criteria - ShortOpen in Default configuration

| Pin Name | Lower | Upper | Result | Unit | Judgement |
|-------------|-------|-------|--------|------|-----------|
| VCC | 8 | 340 | 9.7 | kΩ | PASS |
| NRST | 8 | 340 | 330.0 | kΩ | PASS |
| BOOT | 8 | 340 | 330.0 | kΩ | PASS |
| UART1_TX | 8 | 340 | 330.0 | kΩ | PASS |
| UART1_RX | 8 | 340 | 330.0 | kΩ | PASS |
| USIM_VCC | 8 | 340 | 36.9 | kΩ | PASS |
| ESIM_VCC | 8 | 340 | 56.2 | kΩ | PASS |
| IO_1833_SEL | 8 | 340 | 260.3 | kΩ | PASS |
| USIM_IO | 8 | 340 | 54.2 | kΩ | PASS |
| ESIM_IO | 8 | 340 | 330.0 | kΩ | PASS |
| USIM_CLK | 8 | 340 | 330.0 | kΩ | PASS |
| ESIM_CLK | 8 | 340 | 330.0 | kΩ | PASS |
| SIM_NRST | 8 | 340 | 54.2 | kΩ | PASS |

Tests Details #01

Test HT criteria - Firmware Flash in Default configuration

| ID | Lower | Upper | Result | Unit | Judgement |
|------------------|-------|-------|--------|------|-----------|
| Erase | - | - | PASS | - | PASS |
| Bootload | - | - | PASS | - | PASS |
| App Data | - | - | PASS | - | PASS |
| Merge RF Table 1 | - | - | PASS | - | PASS |
| Merge RF Table 2 | - | - | PASS | - | PASS |

Tests Details #01

Test HT criteria - Interleaved in Default configuration

| ID | Lower | Upper | Result | Unit | Judgement |
|-----------------|-------|-------|--------|------|-----------|
| GPIO2 [Int0] | 0 | - | 0 | - | PASS |
| GPIO3 [Int0] | 0 | - | 0 | - | PASS |
| GPIO5 [Int0] | 0 | - | 0 | - | PASS |
| SWD_CLK [Int0] | 0 | - | 0 | - | PASS |
| GPIO6 [Int0] | 0 | - | 0 | - | PASS |
| GPIO10 [Int0] | 0 | - | 0 | - | PASS |
| GPIO7 [Int0] | 0 | - | 0 | - | PASS |
| GPIO1 [Int0] | - | 1 | 1 | - | PASS |
| GPIO4 [Int0] | - | 1 | 1 | - | PASS |
| SWD_IO [Int0] | - | 1 | 1 | - | PASS |
| AON_GPIO [Int0] | - | 1 | 1 | - | PASS |
| GPIO2 [Int1] | - | 1 | 1 | - | PASS |
| GPIO3 [Int1] | - | 1 | 1 | - | PASS |
| GPIO5 [Int1] | - | 1 | 1 | - | PASS |
| SWD_CLK [Int1] | - | 1 | 1 | - | PASS |
| GPIO6 [Int1] | - | 1 | 1 | - | PASS |
| GPIO10 [Int1] | - | 1 | 1 | - | PASS |
| GPIO7 [Int1] | - | 1 | 1 | - | PASS |
| GPIO1 [Int1] | 0 | - | 0 | - | PASS |
| GPIO4 [Int1] | 0 | - | 0 | - | PASS |
| SWD_IO [Int1] | 0 | - | 0 | - | PASS |
| AON_GPIO [Int1] | 0 | - | 0 | - | PASS |

Tests Details #01

Test HT criteria - Peripherals in Default configuration

| ID | Lower | Upper | Result | Unit | Judgement |
|----------|-------|-------|--------|------|-----------|
| UART0 TX | - | - | PASS | - | PASS |
| UART0 RX | - | - | PASS | - | PASS |
| UART2 TX | - | - | PASS | - | PASS |
| UART2 RX | - | - | PASS | - | PASS |
| I2C0 TX | - | - | PASS | - | PASS |
| I2C0 RX | - | - | PASS | - | PASS |
| I2C1 TX | - | - | PASS | - | PASS |
| I2C1 RX | - | - | PASS | - | PASS |
| SPI1 TX | - | - | PASS | - | PASS |
| SPI1 RX | - | - | PASS | - | PASS |
| USIM | - | - | PASS | - | PASS |

Tests Details #01

Test HT criteria - DeepSleep in Default configuration

| Sleep Mode | Lower | Upper | Result | Unit | Judgement |
|------------|-------|-------|--------|------|-----------|
| HIB2 | 0.4 | 1.5 | 0.8 | μA | PASS |
| HIB1 | 2.0 | 4.0 | 2.8 | μA | PASS |
| SLEEP2 | 5.0 | 10.0 | 6.4 | μA | PASS |
| SLEEP1 | 10.0 | 25.0 | 13.6 | μA | PASS |

Tests Details #01

Test Qualcomm criteria - Calibration in Default configuration

| ID | Lower | Upper | Result | Unit | Judgement |
|-----|-------|-------|--------|------|-----------|
| AFC | - | - | PASS | - | PASS |
| AGC | - | - | PASS | - | PASS |
| APC | - | - | PASS | - | PASS |
| DPD | - | - | PASS | - | PASS |

Tests Details #01

Test 6.2.2F - UE maximum output power in Default configuration

| Band | Frequency | Test item | Lower | Upper | Result | Unit | Judgement |
|------|-----------|-----------|-------|-------|--------|------|-----------|
| 01 | 1950.0 | 00@00 | 21.0 | 24.2 | 21.2 | dBm | PASS |
| 01 | 1950.0 | 03@00 | 19.8 | 22.3 | 21.6 | dBm | PASS |
| 03 | 1747.5 | 00@00 | 21.0 | 24.2 | 21.1 | dBm | PASS |
| 03 | 1747.5 | 03@00 | 19.8 | 22.3 | 20.9 | dBm | PASS |
| 05 | 836.5 | 00@00 | 21.0 | 24.2 | 22.2 | dBm | PASS |
| 05 | 836.5 | 03@00 | 19.8 | 22.3 | 21.5 | dBm | PASS |
| 08 | 897.5 | 00@00 | 21.0 | 24.2 | 22.2 | dBm | PASS |
| 08 | 897.5 | 03@00 | 19.8 | 22.3 | 21.7 | dBm | PASS |
| 28 | 725.5 | 00@00 | 21.0 | 24.2 | 22.4 | dBm | PASS |
| 28 | 725.5 | 03@00 | 19.8 | 22.3 | 21.6 | dBm | PASS |

Tests Details #01

Test 6.5.2.1F.1 - Error vector magnitude (EVM) in Default configuration

| Band | Frequency | Test item | Lower | Upper | Result | Unit | Judgement |
|------|-----------|-----------|-------|-------|--------|------|-----------|
| 01 | 1950.0 | 00@00 | - | 17.5 | 0.4 | % | PASS |
| 01 | 1950.0 | 03@00 | - | 17.5 | 3.0 | % | PASS |
| 03 | 1747.5 | 00@00 | - | 17.5 | 0.4 | % | PASS |
| 03 | 1747.5 | 03@00 | - | 17.5 | 3.9 | % | PASS |
| 05 | 836.5 | 00@00 | - | 17.5 | 0.3 | % | PASS |
| 05 | 836.5 | 03@00 | - | 17.5 | 2.4 | % | PASS |
| 08 | 897.5 | 00@00 | - | 17.5 | 0.4 | % | PASS |
| 08 | 897.5 | 03@00 | - | 17.5 | 1.9 | % | PASS |
| 28 | 725.5 | 00@00 | - | 17.5 | 0.4 | % | PASS |
| 28 | 725.5 | 03@00 | - | 17.5 | 4.4 | % | PASS |

Tests Details #01

Test 6.5.1F - Frequency Error in Default configuration

| Band | Frequency | Test item | Lower | Upper | Result | Unit | Judgement |
|------|-----------|-----------|-------|--------|--------|------|-----------|
| 01 | 1950.0 | 00@00 | - | 195.0 | 6.56 | Hz | PASS |
| 01 | 1950.0 | 03@00 | - | 195.0 | 4.71 | Hz | PASS |
| 03 | 1747.5 | 00@00 | - | 174.75 | 4.66 | Hz | PASS |
| 03 | 1747.5 | 03@00 | - | 174.75 | 5.05 | Hz | PASS |
| 05 | 836.5 | 00@00 | - | 167.3 | 2.68 | Hz | PASS |
| 05 | 836.5 | 03@00 | - | 167.3 | 3.49 | Hz | PASS |
| 08 | 897.5 | 00@00 | - | 179.5 | 2.2 | Hz | PASS |
| 08 | 897.5 | 03@00 | - | 179.5 | 3.64 | Hz | PASS |
| 28 | 725.5 | 00@00 | - | 145.1 | 2.26 | Hz | PASS |
| 28 | 725.5 | 03@00 | - | 145.1 | 0.59 | Hz | PASS |

Tests Details #01

Test 6.6.1F - Occupied bandwidth (OBW) in Default configuration

| Band | Frequency | Test item | Lower | Upper | Result | Unit | Judgement |
|------|-----------|-----------|-------|-------|--------|------|-----------|
| 01 | 1950.0 | 00@00 | - | 200.0 | 141.56 | Hz | PASS |
| 01 | 1950.0 | 03@00 | - | 200.0 | 168.75 | Hz | PASS |
| 03 | 1747.5 | 00@00 | - | 200.0 | 141.56 | Hz | PASS |
| 03 | 1747.5 | 03@00 | - | 200.0 | 168.75 | Hz | PASS |
| 05 | 836.5 | 00@00 | - | 200.0 | 141.56 | Hz | PASS |
| 05 | 836.5 | 03@00 | - | 200.0 | 168.75 | Hz | PASS |
| 08 | 897.5 | 00@00 | - | 200.0 | 141.56 | Hz | PASS |
| 08 | 897.5 | 03@00 | - | 200.0 | 168.75 | Hz | PASS |
| 28 | 725.5 | 00@00 | - | 200.0 | 142.5 | Hz | PASS |
| 28 | 725.5 | 03@00 | - | 200.0 | 168.75 | Hz | PASS |

Tests Details #01

Test 6.6.2.3F - ACLR in Default configuration

| Band | Frequency | Test item | Lower | Upper | Result | Unit | Judgement |
|------|-----------|-----------|-------|-------|--------|------|-----------|
| 01 | 1950.0 | 00@00 | - | -36.2 | -54.1 | dBc | PASS |
| 01 | 1950.0 | 03@00 | - | -36.2 | -54.3 | dBc | PASS |
| 03 | 1747.5 | 00@00 | - | -36.2 | -54.6 | dBc | PASS |
| 03 | 1747.5 | 03@00 | - | -36.2 | -51.6 | dBc | PASS |
| 05 | 836.5 | 00@00 | - | -36.2 | -56.7 | dBc | PASS |
| 05 | 836.5 | 03@00 | - | -36.2 | -54.9 | dBc | PASS |
| 08 | 897.5 | 00@00 | - | -36.2 | -56.6 | dBc | PASS |
| 08 | 897.5 | 03@00 | - | -36.2 | -55.4 | dBc | PASS |
| 28 | 725.5 | 00@00 | - | -36.2 | -57.0 | dBc | PASS |
| 28 | 725.5 | 03@00 | - | -36.2 | -55.1 | dBc | PASS |

Tests Details #01

Test 6.6.2.1F - Spectrum Emission Mask (SEM) in Default configuration

| Band | Frequency | Test item | Lower | Upper | Result | Unit | Judgement |
|------|-----------|-----------|-------|-------|--------|------|-----------|
| 01 | 1950.0 | 00@00 | - | 0.0 | 0.0 | % | PASS |
| 01 | 1950.0 | 03@00 | - | 0.0 | 0.0 | % | PASS |
| 03 | 1747.5 | 00@00 | - | 0.0 | 0.0 | % | PASS |
| 03 | 1747.5 | 03@00 | - | 0.0 | 0.0 | % | PASS |
| 05 | 836.5 | 00@00 | - | 0.0 | 0.0 | % | PASS |
| 05 | 836.5 | 03@00 | - | 0.0 | 0.0 | % | PASS |
| 08 | 897.5 | 00@00 | - | 0.0 | 0.0 | % | PASS |
| 08 | 897.5 | 03@00 | - | 0.0 | 0.0 | % | PASS |
| 28 | 725.5 | 00@00 | - | 0.0 | 0.0 | % | PASS |
| 28 | 725.5 | 03@00 | - | 0.0 | 0.0 | % | PASS |

Tests Details #01

Test HT criteria - BLER in Default configuration

| Band | DIChannel | CellLevel | Lower | Upper | Result | Unit | Judgement |
|------|-----------|-----------|-------|-------|--------|------|-----------|
| 01 | 300 | -100 | - | 5.0 | 0.0 | % | PASS |
| 03 | 1400 | -100 | - | 5.0 | 0.0 | % | PASS |
| 05 | 2525 | -100 | - | 5.0 | 0.0 | % | PASS |
| 08 | 3625 | -100 | - | 5.0 | 0.0 | % | PASS |
| 28 | 9435 | -100 | - | 5.0 | 0.0 | % | PASS |