

# NB-IoT Functional and Performance Report

3GPP and Qualcomm Based Tests

Classification: Confidential

Doc. Type: Report

Revision: Rev. 02

Date: 10/28/2024

Code: Tests, Report, Performance

Report Info

Operator: admin

DUT: HTNB32L-0XX

Batch: NBITT07-07-Z00-RETEST

Testplan: ['Yield\_Platform\_for\_Production\_1.0\_PCB2\_CMW500.ini']

Plat SW Ver.: Yield-Alpha 0.1

Plat HW Ver.: 1.0 ID1

Summary

Test Start Time: 10/28/2024 15:37:41

Test End Time: 10/28/2024 15:40:47

Total Test Time: 0:03:06

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       | 10.2      | 213.8    | 330.0     | kΩ   | PASS |
| Firmware Flash   | 5   | -         | -         | -         | -        | -         | -    | PASS |
| Interleaved      | 22  | -         | -         | -         | -        | -         | -    | PASS |
| Peripherals      | 11  | -         | -         | -         | -        | -         | -    | PASS |
| DeepSleep        | 4   | 0.4       | 25.0      | 1.0       | 6.1      | 13.5      | μA   | PASS |
| Calibration      | 4   | -         | -         | -         | -        | -         | -    | PASS |
| Max_Output 00@00 | 5   | 21.0      | 24.2      | 22.1      | 22.2     | 22.5      | dBm  | PASS |
| Max_Output 03@00 | 5   | 19.8      | 22.3      | 21.1      | 21.5     | 22.0      | dBm  | PASS |
| EVM              | 10  | -         | 17.5      | 0.2       | 2.2      | 7.3       | %    | PASS |
| Freq Error       | 10  | -         | 195.0     | 0.7       | 3.1      | 5.97      | Hz   | PASS |
| OBW              | 10  | -         | 200.0     | 141.56    | 157.7    | 182.81    | Hz   | PASS |
| ACLR             | 10  | -         | -36.2     | -56.6     | -54.6    | -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   | 10.2   | 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   | 39.7   | kΩ   | PASS      |
| ESIM_VCC    | 8     | 340   | 56.8   | kΩ   | PASS      |
| IO_1833_SEL | 8     | 340   | 262.7  | kΩ   | PASS      |
| USIM_IO     | 8     | 340   | 44.6   | 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   | 55.8   | 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   | 1.0    | μA   | PASS      |
| HIB1       | 2.0   | 4.0   | 3.0    | μA   | PASS      |
| SLEEP2     | 5.0   | 10.0  | 6.8    | μA   | PASS      |
| SLEEP1     | 10.0  | 25.0  | 13.5   | 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  | 22.1   | dBm  | PASS      |
| 01   | 1950.0    | 03@00     | 19.8  | 22.3  | 21.1   | dBm  | PASS      |
| 03   | 1747.5    | 00@00     | 21.0  | 24.2  | 22.1   | dBm  | PASS      |
| 03   | 1747.5    | 03@00     | 19.8  | 22.3  | 21.4   | dBm  | PASS      |
| 05   | 836.5     | 00@00     | 21.0  | 24.2  | 22.3   | dBm  | PASS      |
| 05   | 836.5     | 03@00     | 19.8  | 22.3  | 21.6   | dBm  | PASS      |
| 08   | 897.5     | 00@00     | 21.0  | 24.2  | 22.2   | dBm  | PASS      |
| 08   | 897.5     | 03@00     | 19.8  | 22.3  | 21.5   | dBm  | PASS      |
| 28   | 725.5     | 00@00     | 21.0  | 24.2  | 22.5   | dBm  | PASS      |
| 28   | 725.5     | 03@00     | 19.8  | 22.3  | 22.0   | 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  | 0.2    | %    | PASS      |
| 01   | 1950.0    | 03@00     | -     | 17.5  | 7.3    | %    | PASS      |
| 03   | 1747.5    | 00@00     | -     | 17.5  | 0.6    | %    | PASS      |
| 03   | 1747.5    | 03@00     | -     | 17.5  | 3.7    | %    | PASS      |
| 05   | 836.5     | 00@00     | -     | 17.5  | 0.3    | %    | PASS      |
| 05   | 836.5     | 03@00     | -     | 17.5  | 2.6    | %    | PASS      |
| 08   | 897.5     | 00@00     | -     | 17.5  | 0.4    | %    | PASS      |
| 08   | 897.5     | 03@00     | -     | 17.5  | 4.3    | %    | PASS      |
| 28   | 725.5     | 00@00     | -     | 17.5  | 0.4    | %    | PASS      |
| 28   | 725.5     | 03@00     | -     | 17.5  | 2.5    | %    | 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  | 2.85   | Hz   | PASS      |
| 01   | 1950.0    | 03@00     | -     | 195.0  | 0.7    | Hz   | PASS      |
| 03   | 1747.5    | 00@00     | -     | 174.75 | 5.97   | Hz   | PASS      |
| 03   | 1747.5    | 03@00     | -     | 174.75 | 3.16   | Hz   | PASS      |
| 05   | 836.5     | 00@00     | -     | 167.3  | 4.77   | Hz   | PASS      |
| 05   | 836.5     | 03@00     | -     | 167.3  | 0.88   | Hz   | PASS      |
| 08   | 897.5     | 00@00     | -     | 179.5  | 4.73   | Hz   | PASS      |
| 08   | 897.5     | 03@00     | -     | 179.5  | 4.19   | Hz   | PASS      |
| 28   | 725.5     | 00@00     | -     | 145.1  | 2.79   | Hz   | PASS      |
| 28   | 725.5     | 03@00     | -     | 145.1  | 1.39   | 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 | 148.12 | Hz   | PASS      |
| 01   | 1950.0    | 03@00     | -     | 200.0 | 182.81 | Hz   | PASS      |
| 03   | 1747.5    | 00@00     | -     | 200.0 | 143.44 | 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 | 144.38 | Hz   | PASS      |
| 08   | 897.5     | 03@00     | -     | 200.0 | 168.75 | Hz   | PASS      |
| 28   | 725.5     | 00@00     | -     | 200.0 | 141.56 | 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 | -54.6  | dBc  | PASS      |
| 01   | 1950.0    | 03@00     | -     | -36.2 | -51.6  | dBc  | PASS      |
| 03   | 1747.5    | 00@00     | -     | -36.2 | -54.6  | dBc  | PASS      |
| 03   | 1747.5    | 03@00     | -     | -36.2 | -53.2  | dBc  | PASS      |
| 05   | 836.5     | 00@00     | -     | -36.2 | -56.1  | dBc  | PASS      |
| 05   | 836.5     | 03@00     | -     | -36.2 | -54.1  | dBc  | PASS      |
| 08   | 897.5     | 00@00     | -     | -36.2 | -56.2  | dBc  | PASS      |
| 08   | 897.5     | 03@00     | -     | -36.2 | -53.5  | dBc  | PASS      |
| 28   | 725.5     | 00@00     | -     | -36.2 | -56.6  | dBc  | PASS      |
| 28   | 725.5     | 03@00     | -     | -36.2 | -55.6  | 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      |