

Test Report

Report No.: MTi170816E120

Date of issue: Aug. 16, 2017

Sample Description: Vogue fabric speaker and powerbank

Model(s): P326.842

Applicant: _____

Address: _____

Date of Test: Aug. 10, 2017 to Aug. 16, 2017

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>



Table of Contents

| | |
|---|-----------|
| Table of Contents | 2 |
| 1 General description | 5 |
| 1.1 Feature of equipment under test (EUT)..... | 5 |
| 1.2 Operation channel list..... | 5 |
| 1.3 Test frequency channel..... | 5 |
| 1.4 EUT operation mode | 5 |
| 1.5 EUT test setup..... | 6 |
| 1.6 Test conditions..... | 6 |
| 1.7 Ancillary equipment list..... | 6 |
| 1.8 Measurement uncertainty | 7 |
| 2 Testing site | 7 |
| 3 List of test equipment | 8 |
| 4 Test Result | 9 |
| 4.1 RF output power | 9 |
| 4.2 Accumulated Transmit time, Frequency Occupation & Hopping Sequence..... | 10 |
| 4.3 Hopping Frequency Separation..... | 17 |
| 4.4 Occupied Channel Bandwidth | 19 |
| 4.5 Transmitter unwanted emissions in the out-of-band domain | 23 |
| 4.6 Transmitter unwanted emissions in the spurious domain | 24 |
| 4.7 Receiver spurious emissions..... | 26 |
| Photographs of the Test Setup | 27 |
| Photographs of the EUT | 28 |
| Annex A Information for testing | 29 |

| Test Result Certification | |
|----------------------------|------------------------------------|
| | |
| Applicant's name: | |
| Address: | |
| Manufacture's Name: | |
| Address: | |
| | |
| Product name: | Vogue fabric speaker and powerbank |
| Trademark: | N/A |
| Model name: | P326.842 |
| Standards: | EN 300 328 V2.1.1 (2016-11) |

This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the Radio equipment requirements. And it is applicable only to the tested sample identified in the report.

Tested by:

Amy Lu

Amy Lu

Aug. 16, 2017

Reviewed by:

Smith Chen

Smith Chen

Aug. 16, 2017

Approved by:

Tom Xue

Tom Xue

Aug. 16, 2017

Summary of Test Result

| Item | Description of Test | Result |
|------|--|--------|
| 1 | RF Output Power | Pass |
| 2 | Accumulated Transmit time, Frequency Occupation & Hopping Sequence | Pass |
| 3 | Hopping Frequency Separation | Pass |
| 4 | Occupied Channel Bandwidth | Pass |
| 5 | Transmitter unwanted emissions in the OOB domain | Pass |
| 6 | Transmitter unwanted emissions in the spurious domain | Pass |
| 7 | Receiver spurious emissions | Pass |
| 8 | Adaptivity | N/A* |
| 9 | Receiver Blocking | N/A* |
| 10 | Geo-location capability | N/A* |

* Not applicable (the RF output power of EUT is less than 10dBm e.i.r.p.)

** Not applicable (the EUT has no geo-location capability)

1 General description

1.1 Feature of equipment under test (EUT)

| | |
|----------------------------|---------------------------------------|
| Product name: | Vogue fabric speaker and powerbank |
| Model name: | P326.842 |
| Operating frequency range: | Tx/Rx: 2402MHz~2480MHz |
| Power source: | DC 3.7V by Li-ion battery |
| Bluetooth version: | V4.2 |
| Modulation type: | GFSK, $\pi/4$ -DQPSK, 8DPSK |
| Antenna designation: | PCBA antenna (Antenna Gain: -0.68dBi) |

1.2 Operation channel list

| Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|---------|-----------|
| 0 | 2402MHz | 20 | 2422MHz | 40 | 2442MHz |
| 1 | 2403MHz | 21 | 2423MHz | 41 | 2443MHz |
| --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- |
| 18 | 2420MHz | 38 | 2440MHz | 77 | 2479MHz |
| 19 | 2421MHz | 39 | 2441MHz | 78 | 2480MHz |

1.3 Test frequency channel

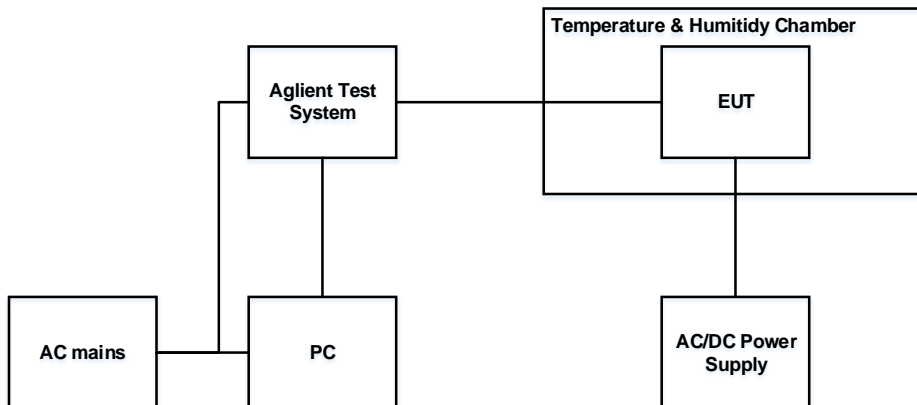
| | |
|--------|---------|
| Low | 2402MHz |
| Middle | 2441MHz |
| High | 2480MHz |

1.4 EUT operation mode

During testing, the EUT is programed (provided by the manufacture) to control the Tx/Rx operation followed the test requirement.

1.5 EUT test setup

For RF Conducted test:



For Radiated test:



See photographs of the test setup in the report for the actual setup for test.

1.6 Test conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 20°C~30°C
- Humidity: 30%~70%
- Atmospheric pressure: 98kPa~101kPa

| Test Conditions | Normal | N.V.L.T. | N.V.H.T. |
|--------------------|--------|----------|----------|
| Temperature (°C) | 25 | -10 | 40 |
| Power supply (Vdc) | 3.7 | 3.7 | 3.7 |

Note1: the extreme ambient temperatures are declared by manufacture.

Note2: N.V.L.T. is the abbreviation of normal voltage lowest temperature; N.V.H.T. is the abbreviation of normal voltage highest temperature.

1.7 Ancillary equipment list

| Equipment | Model | S/N | Manufacturer |
|-----------|-------|-----|--------------|
| / | / | / | / |

1.8 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2xUc(y)$

| Parameter | Uncertainty Criterion | Measurement Uncertainty |
|-----------------------------------|-----------------------|-------------------------|
| Occupied Channel Bandwidth | ±5% | 0.4% |
| RF output power, conducted | ±1.5dB | ±1.13dB |
| Power Spectral Density, conducted | ±3dB | ±2.35dB |
| Unwanted Emissions, conducted | ±3dB | ±2.39dB |
| All emissions, radiated | ±6dB | ±5.04dB |
| Temperature | ±3°C | ±0.8°C |
| Supply voltages | ±3% | ±1% |
| Time | ±5% | ±1% |

2 Testing site

| | |
|------------------------|---|
| Test laboratory: | Shenzhen Microtest Co., Ltd. |
| Laboratory location: | No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China |
| CNAS Registration No.: | L5868 |
| Telephone: | (86-755)88850135 |
| Fax: | (86-755)88850136 |

3 List of test equipment

For RF conducted test:

| Equipment | Manufacturer | Model | Serial No. | Calibration Due |
|--|--------------|-----------|------------|-----------------|
| Signal Analyzer | Agilent | N9010A | MY48030494 | 2017/11/4 |
| 4 Ch. Simultaneous Sampling 14 Bits 2 MS/s | Agilent | U2531A | TW54063513 | 2017/11/4 |
| X-series USB Peak and Average Power Sensor | Agilent | U2021XA | MY54080019 | 2017/11/4 |
| vector Signal Generator | Agilent | E4438C | US44271917 | 2017/11/4 |
| vector Signal Generator | Agilent | E4438C | MY49070163 | 2017/11/4 |
| Dc Power Supply | GW | GPR-6030D | / | 2017/11/4 |
| Temperature & Humidity Chamber | GIANT FORCE | GTH-056P | GF-94454-1 | 2017/11/4 |

For Radiated test:

| Equipment | Manufacturer | Model | Serial No. | Calibration Due |
|--------------------------|--------------|-------------|------------|-----------------|
| Broadband TRILOG Antenna | Schwarzbeck | VULB9163 | 9163-872 | 2017/11/14 |
| Horn Antenna | Schwarzbeck | BBHA 9120 D | 9120D-1145 | 2017/11/14 |
| Amplifier | HP | 8447D | 3113A06150 | 2017/11/4 |
| Amplifier | Agilent | 8449B | 3008A02400 | 2018/7/4 |
| Test Receiver | Schwarzbeck | ESPI7 | 100314 | 2017/11/4 |
| Spectrum analyzer | Agilent | E4407B | MY41441082 | 2017/11/4 |
| Spectrum analyzer | Agilent | N9020A | MY49100060 | 2018/03/03 |
| Signal Generator | R&S | SMT 06 | 832080/007 | 2017/11/4 |

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

4 Test Result

4.1 RF output power

4.1.1 Definition

The RF output power is defined as the mean equivalent isotropically radiated power (e.i.r.p.) of the equipment during a transmission burst.

4.1.2 Limits

The maximum RF output power for adaptive Frequency Hopping equipment shall be equal to or less than 20 dBm

This limit shall apply for any combination of power level and intended antenna assembly.

4.1.3 Test Procedures

Follow the test procedure as described in EN 300 328 V2.1.1 Clause 5.4.2 to measure the RF output power at normal and extreme conditions.

4.1.4 Test Result

| Test conditions | Max. burst power (dBm) | | | RF output power – e.i.r.p. (dBm) | | |
|---------------------------------|------------------------|----------------|-----------|----------------------------------|----------------|--------|
| | GFSK | $\pi/4$ -DQPSK | 8DPSK | GFSK | $\pi/4$ -DQPSK | 8DPSK |
| Normal | -2.361 | -2.213 | -2.356 | -3.041 | -2.893 | -3.036 |
| N.V.L.T. | -2.462 | -2.561 | -2.612 | -3.142 | -3.241 | -3.292 |
| N.V.H.T. | -2.532 | -2.632 | -2.616 | -3.212 | -3.312 | -3.296 |
| Max. RF output power – e.i.r.p. | | | -2.893dBm | | | |
| Limit | | | 20dBm | | | |
| Result | | | Pass | | | |

Remark: At least 30 bursts are captured for each mode.

Note: the antenna gain on EUT is -0.68dBi; e.i.r.p. = Max. burst power + antenna gain.

4.2 Accumulated Transmit time, Frequency Occupation & Hopping Sequence

4.2.1 Definition

The Accumulated Transmit Time is the total of the transmitter 'on' times, during an observation period, on a particular hopping frequency.

The Frequency Occupation is the number of times that each hopping frequency is occupied within a given period. A hopping frequency is considered to be occupied when the equipment selects that frequency from the hopping sequence. The equipment may be transmitting, receiving or stay idle during the Dwell Time spent on that hopping frequency.

The Hopping Sequence of frequency hopping equipment is the unrepeated pattern of the hopping frequencies used by the equipment.

4.2.2 Limits

Adaptive frequency hopping equipment

Adaptive Frequency Hopping systems shall be capable of operating over a minimum of 70% of the band.

The Accumulated Transmit Time on any hopping frequency shall not be greater than 400ms within any observation period of 400ms multiplied by the minimum number of hopping frequencies (N) that have to be used.

In order for the equipment to comply with the Frequency Occupation requirement, it shall meet either of the following two options:

Option 1: Each hopping frequency of the hopping sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use.

Option 2: The occupation probability for each frequency shall be between $((1 / U) \times 25 \%)$ and 77 % where U is the number of hopping frequencies in use.

The hopping sequence(s) shall contain at least N hopping frequencies at all times, where N is 15 or 15 divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.

4.2.3 Test Procedures

Follow the test procedure as described in EN 300 328 V2.1.1 Clause 5.4.4 to measure the Accumulated Transmit time, Frequency Occupation & Hopping Sequence at normal condition.

4.2.4 Test Result

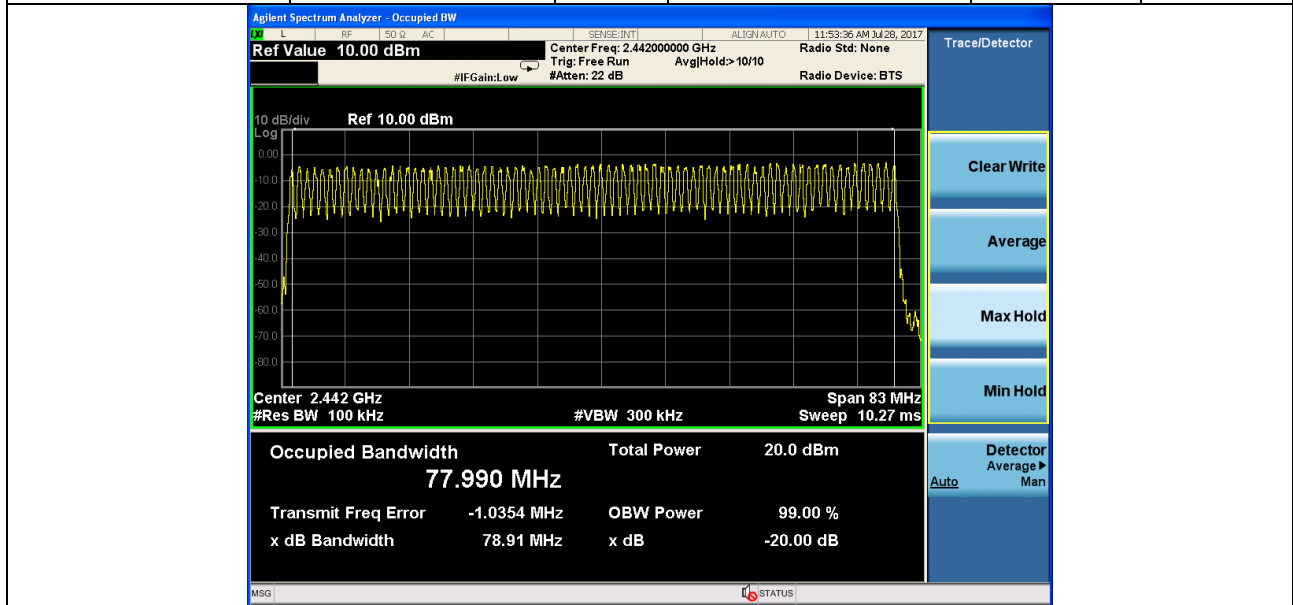
| BT mode | | Pulse width (ms) | Accumulated transmit time (ms) | Accumulated transmit time limit (ms) | Frequency occupation time (ms) | Frequency occupation time min. Limit (ms) | Result |
|----------------------|---------|------------------|--------------------------------|--------------------------------------|--------------------------------|---|--------|
| GFSK (DH5) | 2402MHz | 2.940 | 308.7 | 400 | 8.52 | 2.940 | Pass |
| | 2480MHz | 2.908 | 308.248 | 400 | 8.41 | 2.908 | |
| $\pi/4$ -DQPSK (DH5) | 2402MHz | 2.964 | 311.22 | 400 | 8.73 | 2.964 | Pass |
| | 2480MHz | 2.908 | 308.248 | 400 | 9.25 | 2.908 | |
| 8DPSK (DH5) | 2402MHz | 2.948 | 309.54 | 400 | 8.71 | 2.948 | Pass |
| | 2480MHz | 2.924 | 309.944 | 400 | 8.63 | 2.924 | |

Accumulated Transmit time - GFSK mode:

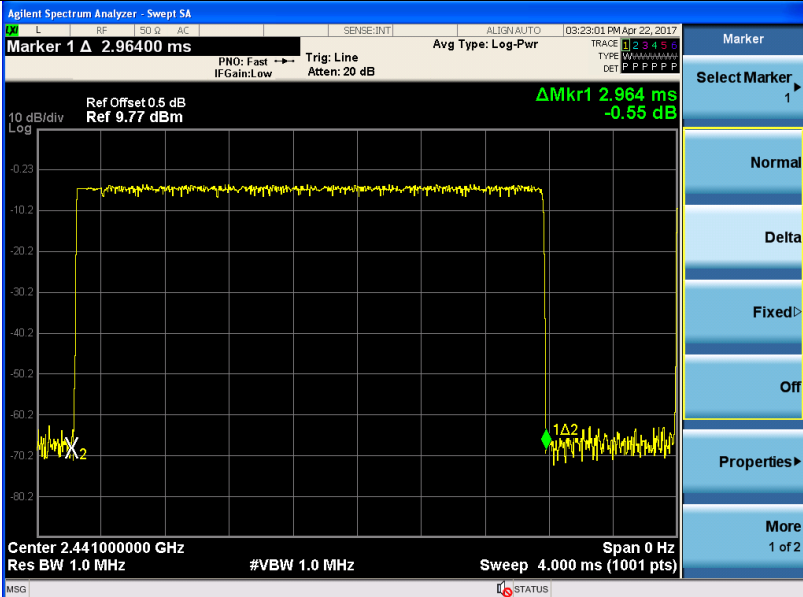
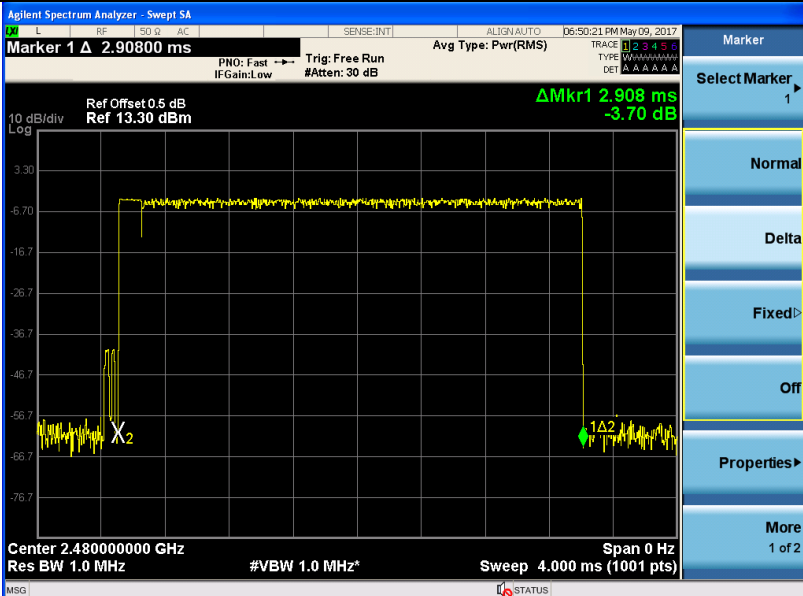
| Frequency (MHz) | Accumulated Transmit time (ms) | Limit (ms) | Measure Time (ms) | Burst Number | Result |
|-----------------|--------------------------------|------------|-------------------|--------------|--------|
| 2402 | 308.7 | <=400 | 31600 | 105 | Pass |
| | | | | | |
| Frequency (MHz) | Accumulated Dwell Time (ms) | Limit (ms) | Measure Time (ms) | Burst Number | Result |
| 2480 | 308.248 | <=400 | 31600 | 106 | Pass |
| | | | | | |

Hopping Sequence:

| BT mode | Hopping number | Limit | Band allocation (%) | Limit (%) | Result |
|----------|----------------|-------|---------------------|-----------|--------|
| GFSK-DH5 | 79 | >=15 | 92.8% | >=70 | Pass |

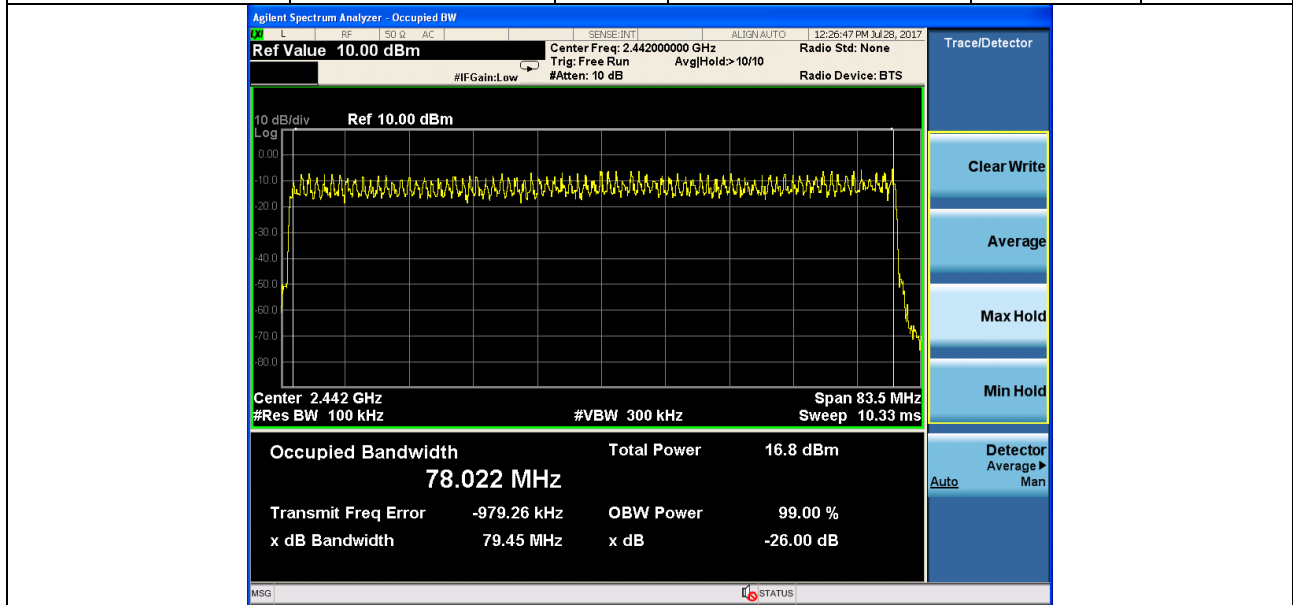


Accumulated Transmit time – $\pi/4$ -DQPSK:

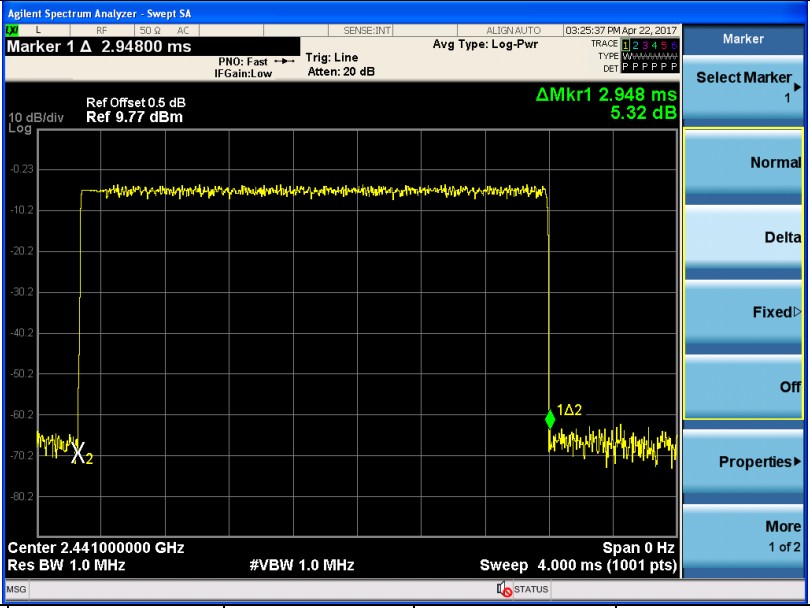
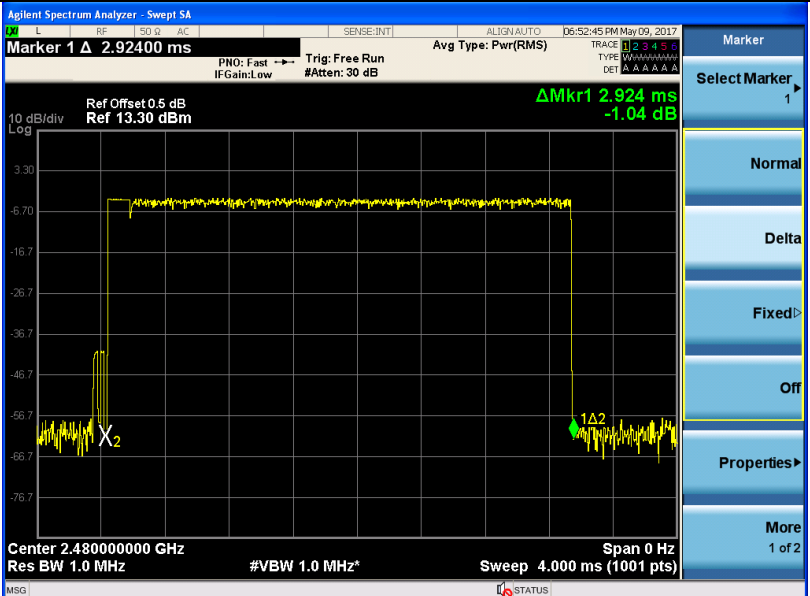
| Frequency (MHz) | Accumulated Transmit time (ms) | Limit (ms) | Measure Time (ms) | Burst Number | Result |
|--|--------------------------------|------------|-------------------|--------------|--------|
| 2402 | 311.22 | <=400 | 31600 | 105 | Pass |
|  | | | | | |
| Frequency (MHz) | Accumulated Dwell Time (ms) | Limit (ms) | Measure Time (ms) | Burst Number | Result |
| 2480 | 308.248 | <=400 | 31600 | 106 | Pass |
|  | | | | | |

Hopping Sequence:

| BT mode | Hopping number | Limit | Band allocation (%) | Limit (%) | Result |
|--------------------|----------------|-----------|---------------------|-----------|--------|
| π /4-DQPSK-DH5 | 79 | ≥ 15 | 92.88% | ≥ 70 | Pass |

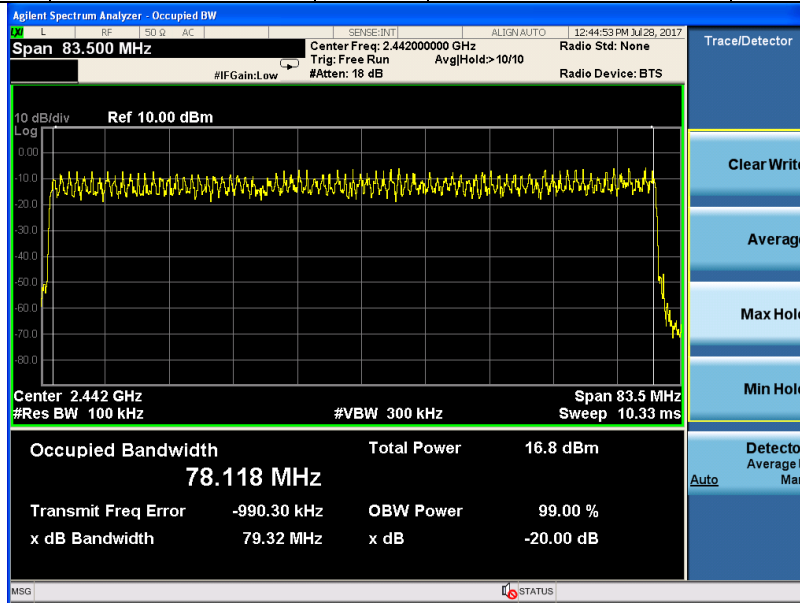


Accumulated Transmit time – 8DPSK mode:

| Frequency (MHz) | Accumulated Transmit time (ms) | Limit (ms) | Measure Time (ms) | Burst Number | Result |
|--|--------------------------------|------------|-------------------|--------------|--------|
| 2402 | 309.54 | <=400 | 31600 | 105 | Pass |
|  | | | | | |
| Frequency (MHz) | Accumulated Dwell Time (ms) | Limit (ms) | Measure Time (ms) | Burst Number | Result |
| 2480 | 309.944 | <=400 | 31600 | 106 | Pass |
|  | | | | | |

Hopping Sequence:

| BT mode | Hopping number | Limit | Band allocation (%) | Limit (%) | Result |
|------------|----------------|-------|---------------------|-----------|--------|
| 8DPSK -DH5 | 79 | >=15 | 93.0% | >=70 | Pass |



4.3 Hopping Frequency Separation

4.3.1 Definition

The Hopping Frequency Separation is the frequency separation between two adjacent hopping frequencies

4.3.2 Limits

Adaptive frequency hopping systems:

The minimum Hopping Frequency Separation shall be 100 kHz.

4.3.3 Test Procedures

Follow the test procedure as described in EN 300 328 V2.1.1 Clause 5.4.5 to measure the hopping frequency separation at normal condition.

4.3.4 Test Result

Hopping frequency Separation:

| BT mode | Hopping frequency separation (MHz) | Limit (MHz) | Result |
|----------------|------------------------------------|-------------|--------|
| GFSK | 1.002 | ≥ 0.1 | Pass |
| | | | |
| BT mode | Hopping frequency separation (MHz) | Limit (MHz) | Result |
| $\pi/4$ -DQPSK | 1.014 | ≥ 0.1 | Pass |
| | | | |
| BT mode | Hopping frequency separation (MHz) | Limit (MHz) | Result |
| 8DPSK | 1.050 | ≥ 0.1 | Pass |
| | | | |

4.4 Occupied Channel Bandwidth

4.4.1 Definition

The Occupied Channel Bandwidth is the bandwidth that contains 99 % of the power of the signal hopping frequency.

4.4.2 Limits

The Occupied Channel Bandwidth for each hopping frequency shall fall completely within the specified band.

4.4.3 Test Procedures

Follow the test procedure as described in EN 300 328 V2.1.1 Clause 5.4.7 to measure the occupied channel bandwidth at normal condition.

4.4.4 Test Result

Occupied Channel Bandwidth: GFSK mode:

| Frequency (MHz) | OBW (MHz) | Result |
|--|-----------|--------|
| 2402 | 0.8339 | Pass |
| <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz Center Freq: 2.402000000 GHz Radio Std: None</p> <p>Trig: Free Run AvgHld: > 10/10</p> <p>#IFGain: Low #Atten: 30 dB Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 2.402 GHz Span 2 MHz</p> <p>#Res BW 30 kHz #VBW 100 kHz Sweep 2.733 ms</p> <p>Occupied Bandwidth 833.90 kHz Total Power 1.91 dBm</p> <p>Transmit Freq Error -47.890 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 908.0 kHz x dB -20.00 dB</p> | | |
| Frequency (MHz) | OBW (MHz) | Result |
| 2480 | 0.8354 | Pass |
| <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.48000000 GHz Center Freq: 2.480000000 GHz Radio Std: None</p> <p>Trig: Free Run AvgHld: > 10/10</p> <p>#IFGain: Low #Atten: 30 dB Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 2.48 GHz Span 2 MHz</p> <p>#Res BW 30 kHz #VBW 100 kHz Sweep 2.733 ms</p> <p>Occupied Bandwidth 835.42 kHz Total Power 4.67 dBm</p> <p>Transmit Freq Error -59.391 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 879.4 kHz x dB -20.00 dB</p> | | |

Occupied Channel Bandwidth: $\pi/4$ - DQPSK mode:

| Frequency (MHz) | OBW (MHz) | Result |
|--|-----------|--------|
| 2402 | 1.1562 | Pass |
| <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz Center Freq: 2.402000000 GHz Radio Std: None</p> <p>Trig: Free Run AvgHld: >10/10</p> <p>#IFGain: Low #Atten: 30 dB Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 2.402 GHz Span 2 MHz</p> <p>#Res BW 30 kHz #VBW 100 kHz Sweep 2.733 ms</p> <p>Occupied Bandwidth 1.1562 MHz</p> <p>Total Power -1.56 dBm</p> <p>Transmit Freq Error -53.295 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 1.214 MHz x dB -20.00 dB</p> | | |
| Frequency (MHz) | OBW (MHz) | Result |
| 2480 | 1.1585 | Pass |
| <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.48000000 GHz Center Freq: 2.480000000 GHz Radio Std: None</p> <p>Trig: Free Run AvgHld: >10/10</p> <p>#IFGain: Low #Atten: 30 dB Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 2.48 GHz Span 2 MHz</p> <p>#Res BW 30 kHz #VBW 100 kHz Sweep 2.733 ms</p> <p>Occupied Bandwidth 1.1585 MHz</p> <p>Total Power 1.93 dBm</p> <p>Transmit Freq Error -63.044 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 1.218 MHz x dB -20.00 dB</p> | | |

Occupied Channel Bandwidth: 8DPSK mode:

| Frequency (MHz) | OBW (MHz) | Result |
|--|-----------|--------|
| 2402 | 1.1432 | Pass |
| <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz Center Freq: 2.402000000 GHz Radio Std: None</p> <p>Trig: Free Run AvgHld: >10/10</p> <p>#IFGain: Low #Atten: 30 dB Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 2.402 GHz Span 2 MHz</p> <p>#Res BW 30 kHz #VBW 100 kHz Sweep 2.733 ms</p> <p>Occupied Bandwidth 1.1432 MHz</p> <p>Total Power -1.22 dBm</p> <p>Transmit Freq Error -39.272 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 1.206 MHz x dB -20.00 dB</p> <p>Frequency 2.402000000 GHz</p> <p>CF Step 200.000 kHz</p> <p>Freq Offset 0 Hz</p> | | |
| 2480 | 1.1399 | Pass |
| <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Radio Std: None</p> <p>Trig: Free Run AvgHld: >10/10</p> <p>#IFGain: Low #Atten: 30 dB Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 2.48 GHz Span 2 MHz</p> <p>#Res BW 30 kHz #VBW 100 kHz Sweep 2.733 ms</p> <p>Occupied Bandwidth 1.1399 MHz</p> <p>Total Power 2.28 dBm</p> <p>Transmit Freq Error -50.236 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 1.208 MHz x dB -20.00 dB</p> <p>Frequency 2.480000000 GHz</p> <p>CF Step 200.000 kHz</p> <p>Freq Offset 0 Hz</p> | | |

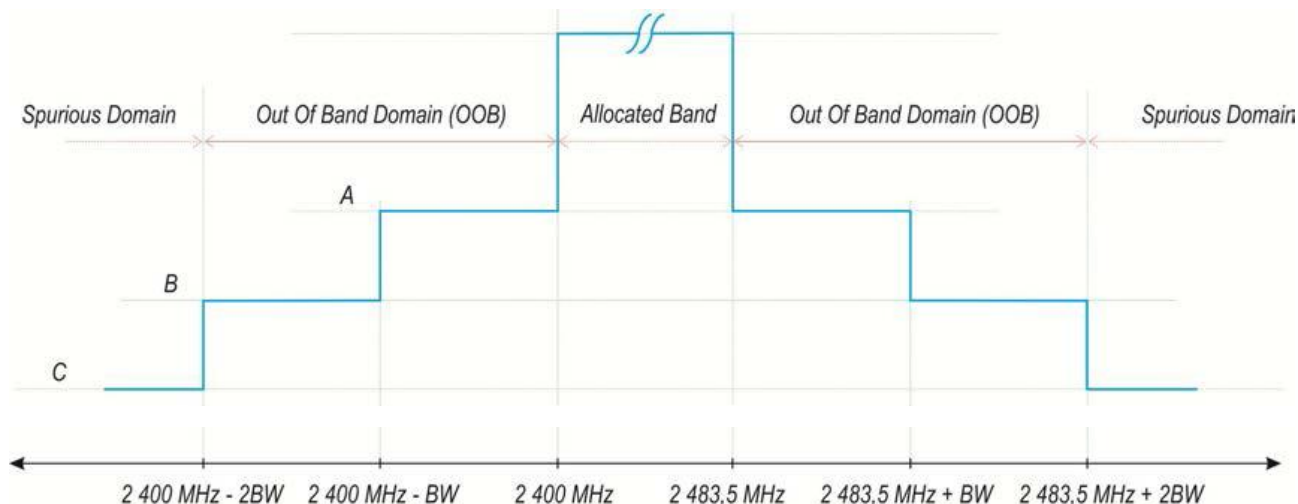
4.5 Transmitter unwanted emissions in the out-of-band domain

4.5.1 Definition

Transmitter unwanted emissions in the out-of-band domain are emissions when the equipment is in Transmit mode, on frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions.

4.5.2 Limits

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in figure below.



A: -10 dBm/MHz e.i.r.p.
B: -20 dBm/MHz e.i.r.p.
C: Spurious Domain limits

BW = Occupied Channel Bandwidth in MHz or 1 MHz whichever is greater

4.5.3 Test Procedures

Follow the test procedure as described in EN 300 328 V2.1.1 Clause 5.4.8 to measure the transmitter unwanted emissions in the out-of-band domain at normal condition.

4.5.4 Test Result

| BT mode | Transmitter unwanted emissions in the out-of-band domain (dBm/MHz e.i.r.p.) | | | |
|-------------------------|--|-------------|--------------|---------------|
| | 2400MHz-BW | 2400MHz-2BW | 2483.5MHz+BW | 2483.5MHz+2BW |
| GFSK | -55.14 | -55.945 | -64.231 | -65.303 |
| $\pi/4$ -DQPSK | -59.306 | -60.667 | -65.891 | -66.056 |
| 8DPSK | -58.77 | -60.458 | -65.335 | -67.068 |
| Limit | -10 | -20 | -10 | -20 |
| Max. Unwanted emission: | -55.14dBm/MHz | | | |
| Result | Pass | | | |

4.6 Transmitter unwanted emissions in the spurious domain

4.6.1 Definition

Transmitter unwanted emissions in the spurious domain are emissions outside the allocated band and outside the out-of-band domain as the specified band when the equipment is in Transmit mode.

4.6.2 Limit

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in table below.

| Frequency range | Maximum power e.i.p. ($\leq 1\text{GHz}$) e.i.r.p. ($> 1\text{GHz}$) | Bandwidth |
|-------------------|--|-----------|
| 30MHz to 47MHz | -36dBm | 100kHz |
| 47MHz to 74MHz | -54dBm | 100kHz |
| 74MHz to 87.5MHz | -36dBm | 100kHz |
| 87.5MHz to 118MHz | -54dBm | 100kHz |
| 118MHz to 174MHz | -36dBm | 100kHz |
| 174MHz to 230MHz | -54dBm | 100kHz |
| 230MHz to 470MHz | -36dBm | 100kHz |
| 470MHz to 862MHz | -54dBm | 100kHz |
| 862MHz to 1GHz | -36dBm | 100kHz |
| 1GHz to 12.75GHz | -30dBm | 1MHz |

4.6.3 Test procedures

Follow the test procedure as described in EN 300 328 V2.1.1 Clause 5.4.9 to measure the transmitter unwanted emissions in the spurious domain at normal condition.

4.6.4 Test result

TX frequency: 2402MHz

| Frequency | Ant. Polarization | Measurement | Limits | Result |
|-----------|-------------------|-------------|--------|--------|
| (MHz) | H / V | (dBm) | (dBm) | |
| 189.17 | H | -66.37 | -54 | Pass |
| 4804 | H | -54.82 | -30 | |
| 189.17 | V | -61.04 | -54 | |
| 4804 | V | -51.68 | -30 | |
| | | | | |

TX frequency: 2480MHz

| Frequency | Ant. Polarization | Measurement | Limits | Result |
|-----------|-------------------|-------------|--------|--------|
| (MHz) | H / V | (dBm) | (dBm) | |
| 189.17 | H | -63.95 | -54 | Pass |
| 4960 | H | -53.61 | -30 | |
| 189.17 | V | -65.82 | -54 | |
| 4960 | V | -50.38 | -30 | |
| | | | | |

Note 1: Test Range: 30MHz~12.75GHz

4.7 Receiver spurious emissions

4.7.1 Definition

Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.

4.7.2 Limits

The spurious emissions of the receiver shall not exceed the values given in table below.

| Frequency range | Maximum power | Bandwidth |
|------------------|---------------|-----------|
| 30MHz to 1GHz | -57dBm | 100kHz |
| 1GHz to 12.75GHz | -47dBm | 1MHz |

4.7.3 Test procedures

Follow the test procedure as described in EN 300 328 V2.1.1 Clause 5.3.11 to measure the receiver spurious emissions at normal condition.

4.7.4 Test result

RX frequency: 2402MHz

| Frequency (MHz) | Ant. Polarization H / V | Measurement (dBm) | Limits (dBm) | Result |
|--------------------|-------------------------------|----------------------|-----------------|--------|
| 213.57 | H | -65.87 | -57 | Pass |
| 1233.49 | H | -62.52 | -47 | |
| 213.57 | V | -63.91 | -57 | |
| 1233.49 | V | -62.84 | -47 | |

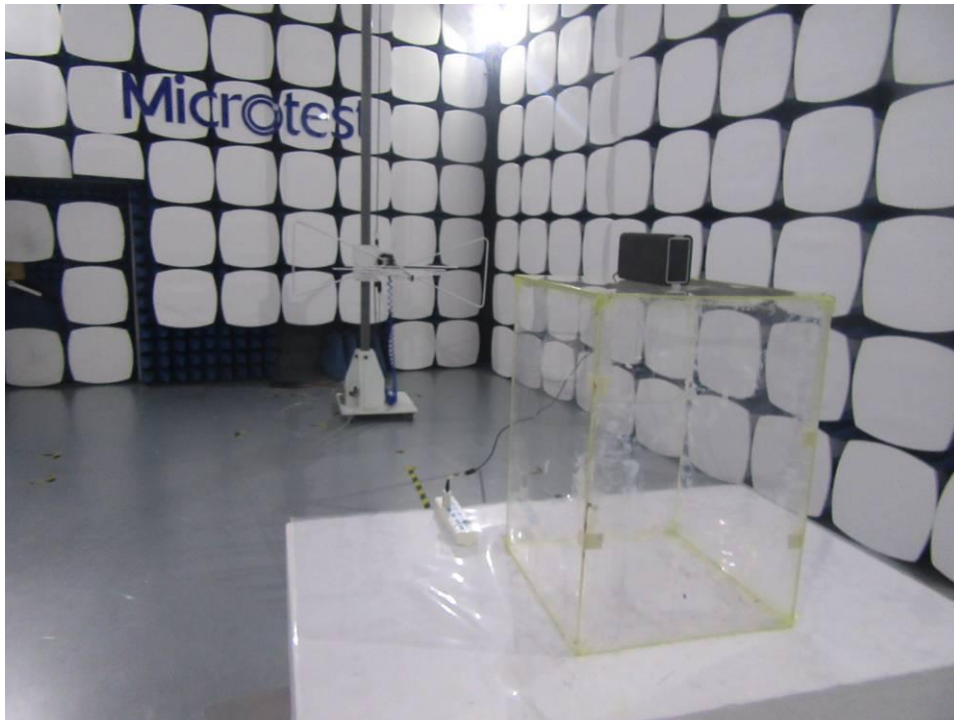
RX frequency: 2480MHz

| Frequency (MHz) | Ant. Polarization H / V | Measurement (dBm) | Limits (dBm) | Result |
|--------------------|-------------------------------|----------------------|-----------------|--------|
| 213.57 | H | -63.81 | -57 | Pass |
| 1233.49 | H | -62.17 | -47 | |
| 213.57 | V | -62.25 | -57 | |
| 1233.49 | V | -61.38 | -47 | |

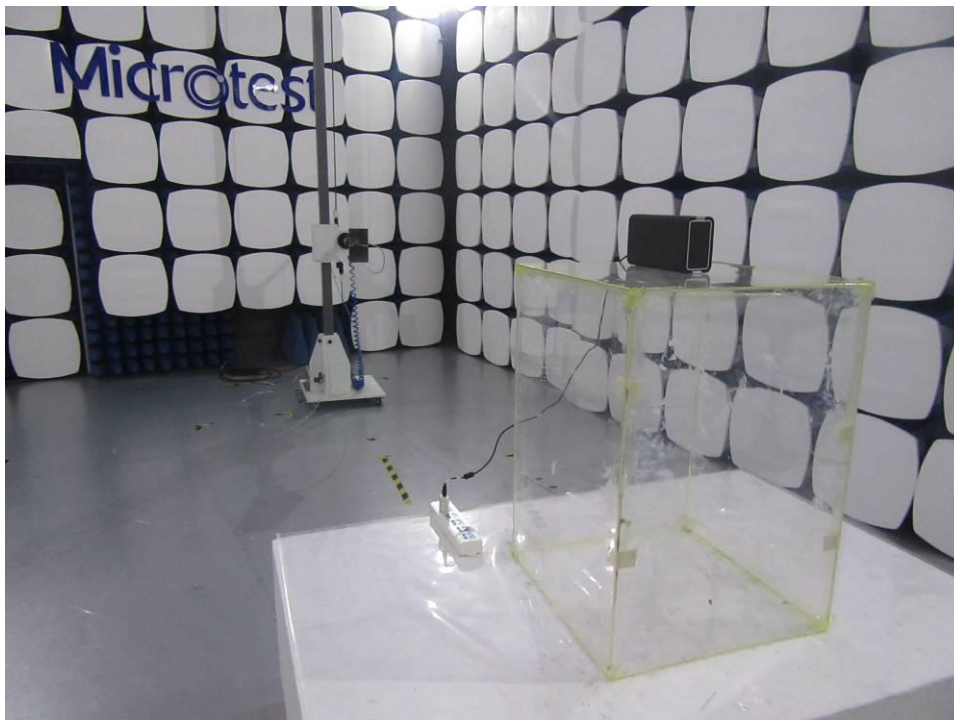
Note 1: Test Range: 30MHz~12.75GHz

Photographs of the Test Setup

Radiated emission – below 1GHz



Radiated emission – above 1GHz



Photographs of the EUT

See the photographs of EUT in the report No.: MTi170816E121.

Annex A Information for testing

a) The type of modulation used by the equipment:

- FHSS
- Other forms of modulation

b) In case of FHSS modulation:

- In case of non-Adaptive Frequency Hopping equipment:

The number of Hopping Frequencies:

- In case of Adaptive Frequency Hopping Equipment:

The maximum number of Hopping Frequencies: 79

The minimum number of Hopping Frequencies: 79

- The Dwell Time: ms
- The Minimum Channel Occupation Time: 8.41
- The (average) Dwell Time: ms

c) Adaptive / non-adaptive equipment:

- non-adaptive Equipment
- adaptive Equipment without the possibility to switch to a non-adaptive mode
- adaptive Equipment which can also operate in a non-adaptive mode

d) In case of adaptive equipment:

The Channel Occupancy Time implemented by the equipment:

- The equipment has implemented an LBT based DAA mechanism
 - In case of equipment using modulation different from FHSS:
 - The equipment is Frame Based equipment
 - The equipment is Load Based equipment
 - The equipment can switch dynamically between Frame Based and Load Based equipment

The CCA time implemented by the equipment:

- The equipment has implemented an non-LBT based DAA mechanism
- The equipment can operate in more than one adaptive mode

e) In case of non-adaptive Equipment:

The maximum RF Output Power (e.i.r.p.): dBm

The maximum (corresponding) Duty Cycle: %

Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared):

f) The worst case operational mode for each of the following tests:

- RF Output Power: -2.893dBm
- Power Spectral Density: dBm/MHz
- Duty cycle, Tx-Sequence, Tx-gap:
- Dwell time, Minimum Frequency Occupation & Hopping Sequence (only for FHSS equipment): 308.248ms, 2.908ms, 92.8%
- Hopping Frequency Separation (only for FHSS equipment): 1.05MHz
- Medium Utilisation:
- Adaptivity & Receiver Blocking:
- Occupied Channel Bandwidth: 1.1585MHz
- Transmitter unwanted emissions in the OOB domain: -55.14dBm/MHz
- Transmitter unwanted emissions in the spurious domain: -50.38dBm
- Receiver spurious emissions: -61.38dBm

g) The different transmit operating modes (tick all that apply):

- Operating mode 1: Single Antenna Equipment
 - Equipment with only 1 antenna
 - Equipment with 2 diversity antennas but only 1 antenna active at any moment in time
 - Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)
- Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming
 - Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)
 - High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
 - High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

NOTE: Add more lines if more channel bandwidths are supported.

- Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming
 - Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
 - High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
 - High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

NOTE: Add more lines if more channel bandwidths are supported.

h) In case of Smart Antenna Systems:

- The number of Receive chains:

- The number of Transmit chains:
 - symmetrical power distribution
 - asymmetrical power distribution

In case of beam forming, the maximum beam forming gain:

NOTE: Beam forming gain does not include the basic gain of a single antenna.

i) Operating Frequency Range(s) of the equipment:

- Operating Frequency Range 1: 2402MHz to 2480MHz
- Operating Frequency Range 2: MHz to MHz

NOTE: Add more lines if more Frequency Ranges are supported.

j) Occupied Channel Bandwidth(s):

- Occupied Channel Bandwidth 1: 0.8354MHz
- Occupied Channel Bandwidth 2: 1.1585MHz
- Occupied Channel Bandwidth 3: 1.1432MHz

NOTE: Add more lines if more channel bandwidths are supported.

k) Type of Equipment (stand-alone, combined, plug-in radio device, etc.):

- Stand-alone
- Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)
- Plug-in radio device (Equipment intended for a variety of host systems)
- Other

l) The extreme operating conditions that apply to the equipment:

Operating temperature range: -10° C to 40° C

- Details provided are for the: stand-alone equipment
- combined (or host) equipment
 - test jig

m) The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels:

- Antenna Type:
 - Integral Antenna
- Antenna Gain: -0.68dBi

If applicable, additional beamforming gain (excluding basic antenna gain):
dB

- Temporary RF connector provided
- No temporary RF connector provided
- Dedicated Antennas (equipment with antenna connector)
 - Single power level with corresponding antenna(s)
 - Multiple power settings and corresponding antenna(s)

Number of different Power Levels:

Power Level 1: dBm

Power Level 2: dBm

Power Level 3: dBm

NOTE 1: Add more lines in case the equipment has more power levels.

NOTE 2: These power levels are conducted power levels (at antenna connector).

- For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable

Power Level 1: dBm

Number of antenna assemblies provided for this power level:

| Assembly # | Gain (dBi) | e.i.r.p. (dBm) | Part number or model name |
|------------|------------|----------------|---------------------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

NOTE: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 2: dBm

Number of antenna assemblies provided for this power level:

| Assembly # | Gain (dBi) | e.i.r.p. (dBm) | Part number or model name |
|------------|------------|----------------|---------------------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

NOTE: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 3: dBm

Number of antenna assemblies provided for this power level:

| Assembly # | Gain (dBi) | e.i.r.p. (dBm) | Part number or model name |
|------------|------------|----------------|---------------------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

NOTE: Add more rows in case more antenna assemblies are supported for this power level.

n) **The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:**

Details provided are for the: stand-alone equipment
 combined (or host) equipment
 test jig

Supply Voltage AC mains State AC voltage V
 DC State DC voltage 3.7V

In case of DC, indicate the type of power source

Internal Power Supply
 External Power Supply or AC/DC adapter
 Battery
 Other:

o) **Describe the test modes available which can facilitate testing:**

M1

p) **The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], proprietary, etc.):**

Bluetooth®

q) **Geo-location capability supported by the equipment:**

Yes
 The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user.
 No

----END OF REPORT----