

SPECTRUM REPORT

(BLE)

Applicant: UAB 8Devices

Address of Applicant: Antakalnio 17, Vilnius, LT-10312, Lithuania

Equipment Under Test (EUT)

Product Name: Komikan

Model No.: Komikan

Applicable standards: ETSI EN 300 328 V2.2.2 (2019-07)

Date of sample receipt: 24 Mar., 2020

Date of Test: 25 Mar., to 12 Jun., 2020

Date of report issue: 15 Jun., 2020

Test Result: PASS*

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2014/53/EU are considered.



Bruce Zhang
Laboratory Manager



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

| Version No. | Date | Description |
|-------------|---------------|-------------|
| 00 | 15 Jun., 2020 | Original |
| | | |
| | | |
| | | |
| | | |

Tested by: Mike.ou
Test Engineer

Date: 15 Jun., 2020

Reviewed by: Winner Zhang
Project Engineer

Date: 15 Jun., 2020

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4 Test Summary

| Test Items | Test Requirement | Test method | Limit/Severity | Result |
|--|------------------|--------------------|-------------------|--------|
| Radio Spectrum Matter (RSM) Part of Tx | | | | |
| RF Output Power | Clause 4.3.2.2 | Clause 5.4.2.2.1.2 | Clause 4.3.2.2.3 | PASS |
| Power Spectral Density | Clause 4.3.2.3 | Clause 5.4.3 | Clause 4.3.2.3.3 | PASS |
| Duty Cycle, Tx-sequence, Tx-gap | Clause 4.3.2.4 | Clause 5.4.2.2.1.3 | Clause 4.3.2.4.3 | N/A |
| Medium Utilisation (MU) factor | Clause 4.3.2.5 | Clause 5.4.2.2.1.4 | Clause 4.3.4.5.3 | N/A |
| Adaptivity (Adaptive Equipment using Modulations Other Than FHSS) | Clause 4.3.2.6 | Clause 5.4.6.2 | Clause 4.3.2.6 | N/A |
| Occupied Channel Bandwidth | Clause 4.3.2.7 | Clause 5.4.7.2 | Clause 4.3.2.7.3 | PASS |
| Transmitter unwanted emissions in the out-of-band domain | Clause 4.3.2.8 | Clause 5.4.8.2 | Clause 4.3.2.8.3 | PASS |
| Transmitter unwanted emissions in the spurious domain | Clause 4.3.2.9 | Clause 5.4.9.2 | Clause 4.3.2.9.3 | PASS |
| Radio Spectrum Matter (RSM) Part of Rx | | | | |
| Receiver spurious emissions | Clause 4.3.2.10 | Clause 5.4.10.2 | Clause 4.3.2.10.3 | PASS |
| Receiver Blocking | Clause 4.3.2.11 | Clause 5.4.11.2 | Clause 4.3.2.11.4 | PASS |
| Remark: | | | | |
| <ol style="list-style-type: none"> 1. Tx: In this whole report Tx (or tx) means Transmitter. 2. Rx: In this whole report Rx (or rx) means Receiver. 3. Pass: Meet the requirement. 4. N/A: Not Applicable for Non-adaptive equipment. 5. The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer). | | | | |

5 General Information

5.1 Client Information

| | |
|------------------------|---|
| Applicant: | UAB 8Devices |
| Address: | Antakalnio 17, Vilnius, LT-10312, Lithuania |
| Manufacturer/ Factory: | UAB 8Devices |
| Address: | Antakalnio 17, Vilnius, LT-10312, Lithuania |

5.2 General Description of E.U.T.

| | |
|------------------------|---|
| Product Name: | Komikan |
| Model No.: | Komikan |
| Hardware version: | 04 |
| Software version: | 1.0 |
| Operation Frequency: | 2402MHz ~ 2480MHz |
| Channel number: | 40 |
| Channel separation: | 2MHz |
| Modulation type: | other forms of modulation |
| Equipment Type: | Adaptive equipment |
| Modulation Technology: | GFSK |
| Max. E.I.R.P Power: | Ceramic Antenna: GFSK: 7.70 dBm Flex Antenna: GFSK: 8.82 dBm Whip Antenna: GFSK: 9.62 dBm |
| Antenna Type: | Ceramic Antenna, Flex Antenna, Whip Antenna |
| Antenna gain: | Ceramic Antenna: 2.09 dBi Flex Antenna: 3.20 dBi Whip Antenna: 4.00 dBi |
| Power supply: | DC 3.3V |

5.3 Test environment and mode

| | |
|--|---|
| Operating Environment: | |
| Temperature: | Normal: 15°C ~ 35°C, Extreme: -20°C ~ +55°C |
| Humidity: | 52 % RH |
| Atmospheric Pressure: | 1008 mbar |
| Voltage: | Nominal: 3.3Vdc, Extreme: Low 3.0Vdc, High 3.6Vdc |
| Test mode: | |
| Transmitting mode: | Keep the EUT in continuously transmitting mode with modulation. |
| Receiving mode: | Keep the EUT in receiving mode. |
| We have verified the construction and function in typical operation. All the test items were carried out with the EUT in above test modes. | |

5.4 Description of Support Units

| Manufacturer | Description | Model | Serial Number | FCC ID/DoC |
|--------------|-------------|--------------|---------------|------------|
| DELL | PC | OPTIPLEX7070 | 2J8XSZ2 | DoC |
| DELL | MONITOR | SE2018HR | 3M7QPY2 | DoC |
| DELL | KEYBOARD | KB216d | N/A | DoC |
| DELL | MOUSE | MS116t1 | N/A | DoC |
| LENOVO | Laptop | SL510 | 2847A65 | DoC |
| UAB 8Devices | Test suite | Komikan | / | / |

5.5 Measurement Uncertainty

| Parameter | Expanded Uncertainty (Confidence of 95%) |
|-------------------------------------|--|
| Occupied Channel Bandwidth | ±5% |
| RF output power, conducted | ±1.5 dB |
| Power Spectral Density, conducted | ±3.0 dB |
| Unwanted Emissions, conducted | ±3.0 dB |
| Temperature | ±3 °C |
| Supply voltages | ±3 % |
| Time | ±5% |
| Radiated Emission (30MHz ~ 1000MHz) | ±4.32 dB |
| Radiated Emission (1GHz ~ 18GHz) | ±5.16 dB |

5.6 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC - Designation No.: CN1211**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

● **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

5.7 Laboratory Location

Shenzhen ZhongjianNanfang Testing Co.,Ltd.

Address: No.110~116, Building B, Jinyuan Business Building, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755-23118282, Fax:+86-755-23116366

Email: info@ccis-cb.com, Website: <http://www.ccis-cb.com>

5.8 Test Instruments list

| Radiated Emission: | | | | | |
|--------------------|-----------------|---------------|--------------------|---------------------|--------------------------|
| Test Equipment | Manufacturer | Model No. | Serial No. | Cal.Date (mm-dd-yy) | Cal. Due date (mm-dd-yy) |
| 3m SAC | SAEMC | 9m*6m*6m | 966 | 07-22-2017 | 07-21-2020 |
| BiConiLog Antenna | SCHWARZBECK | VULB9163 | 497 | 03-07-2020 | 03-06-2021 |
| Biconical Antenna | SCHWARZBECK | VUBA9117 | 359 | 06-22-2017 | 06-21-2020 |
| Horn Antenna | SCHWARZBECK | BBHA9120D | 916 | 03-07-2020 | 03-06-2021 |
| Horn Antenna | SCHWARZBECK | BBHA9120D | 1805 | 06-22-2017 | 06-21-2020 |
| EMI Test Software | AUDIX | E3 | Version: 6.110919b | | |
| Pre-amplifier | HP | 8447D | 2944A09358 | 03-07-2020 | 03-06-2021 |
| Pre-amplifier | CD | PAP-1G18 | 11804 | 03-07-2020 | 03-06-2021 |
| Spectrum analyzer | Rohde & Schwarz | FSP30 | 101454 | 03-05-2020 | 03-04-2021 |
| EMI Test Receiver | Rohde & Schwarz | ESRP7 | 101070 | 03-05-2020 | 03-04-2021 |
| Signal Generator | Rohde & Schwarz | SMX | 835454/016 | 03-05-2020 | 03-04-2021 |
| Signal Generator | R&S | SMR20 | 1008100050 | 03-05-2020 | 03-04-2021 |
| Cable | ZDECL | Z108-NJ-NJ-81 | 1608458 | 03-07-2020 | 03-06-2021 |
| Cable | MICRO-COAX | MFR64639 | K10742-5 | 03-07-2020 | 03-06-2021 |
| Cable | SUHNER | SUCOFLEX100 | 58193/4PE | 03-07-2020 | 03-06-2021 |
| RF Switch Unit | MWRFTTEST | MW200 | N/A | N/A | N/A |
| Test Software | MWRFTTEST | MTS8200 | Version: 2.0.0.0 | | |

| Conducted method: | | | | | |
|------------------------------|--------------|------------|------------------|----------------------|--------------------------|
| Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date (mm-dd-yy) | Cal. Due date (mm-dd-yy) |
| Spectrum Analyzer | Agilent | N9020A | MY50510123 | 11-18-2019 | 11-17-2020 |
| Vector Signal Generator | Agilent | N5182A | MY49060014 | 11-18-2019 | 11-17-2020 |
| Signal Generator | R&S | SMR20 | 1008100050 | 03-05-2020 | 03-04-2021 |
| Power Sensor | D.A.R.E | RPR3006W | 15I00041SNO12 | 11-25-2019 | 11-24-2020 |
| Power Sensor | D.A.R.E | RPR3006W | 15I00041SNO54 | 11-25-2019 | 11-24-2020 |
| Power Sensor | D.A.R.E | RPR3006W | 17I00015SNO27 | 11-25-2019 | 11-24-2020 |
| Power Sensor | D.A.R.E | RPR3006W | 17I00015SNO28 | 11-25-2019 | 11-24-2020 |
| RF Switch Unit | Ascentest | AT890-RFB | N/A | N/A | N/A |
| Test Software | MWRFTTEST | MTS 8310 | Version: 2.0.0.0 | | |
| DC Power Supply | XinNuoEr | WYK-10020K | 1409050110020 | 09-25-2019 | 09-24-2020 |
| Temperature Humidity Chamber | HengPu | HPGDS-500 | 20140828008 | 11-01-2019 | 10-31-2020 |

6 Radio Technical Specification in ETSI EN 300 328

6.1 Justification

The EUT and test equipment were configured for testing according to ETSI EN 300 328 V2.2.2 (2019-07). The EUT was tested in the normal operating mode to represent worst-case results during the final qualification test.

6.2 Test Configuration of EUT

| Operation Frequency each of channel | | | | | | | |
|-------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 0 | 2402MHz | 10 | 2422MHz | 20 | 2442MHz | 30 | 2462MHz |
| 1 | 2404MHz | 11 | 2424MHz | 21 | 2444MHz | 31 | 2464MHz |
| 2 | 2406MHz | 12 | 2426MHz | 22 | 2446MHz | 32 | 2466MHz |
| 3 | 2408MHz | 13 | 2428MHz | 23 | 2448MHz | 33 | 2468MHz |
| 4 | 2410MHz | 14 | 2430MHz | 24 | 2450MHz | 34 | 2470MHz |
| 5 | 2412MHz | 15 | 2432MHz | 25 | 2452MHz | 35 | 2472MHz |
| 6 | 2414MHz | 16 | 2434MHz | 26 | 2454MHz | 36 | 2474MHz |
| 7 | 2416MHz | 17 | 2436MHz | 27 | 2456MHz | 37 | 2476MHz |
| 8 | 2418MHz | 18 | 2438MHz | 28 | 2458MHz | 38 | 2478MHz |
| 9 | 2420MHz | 19 | 2440MHz | 29 | 2460MHz | 39 | 2480MHz |

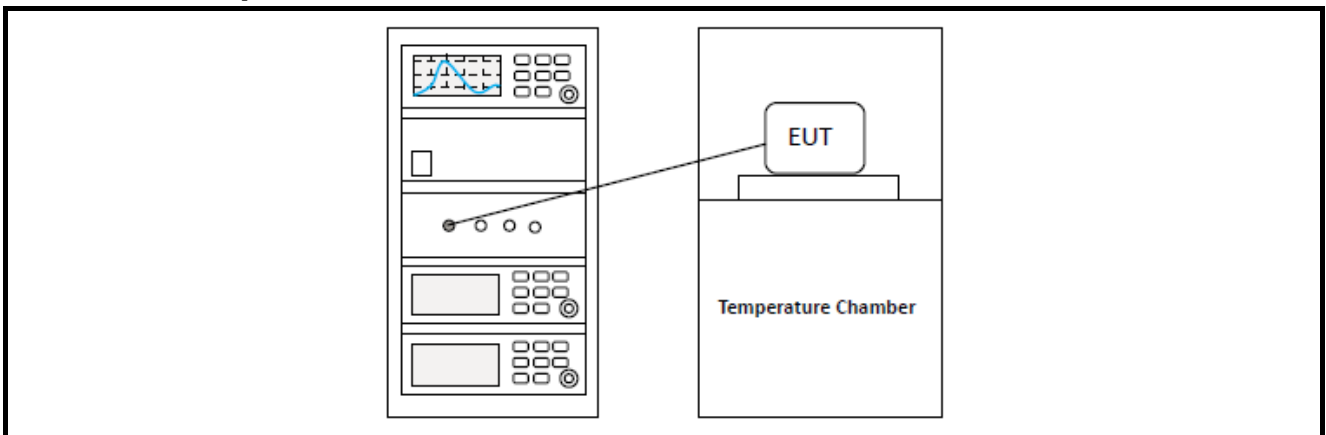
Remark: The EUT operation in above frequency list, and used test software to control the EUT for staying in continuous transmitting and receiving mode. Channel 0, 20 and 39 of BLE were chosen for testing.

| Clause No. | Test Conditions | | | Test Channel | | | Modulation | Test mode | | |
|------------|-----------------|------|------|--------------|--------|------|------------|-----------|----|--------|
| | NVNT | NVLT | NVHT | Low | Middle | High | GFSK | Tx | Rx | Normal |
| 4.3.2.2 | √ | √ | √ | √ | √ | √ | √ | √ | | |
| 4.3.2.3 | √ | | | √ | √ | √ | √ | √ | | |
| 4.3.2.4 | | | | | | | | | | |
| 4.3.2.5 | | | | | | | | | | |
| 4.3.2.6 | | | | | | | | | | |
| 4.3.2.7 | √ | | | √ | | √ | √ | √ | | |
| 4.3.2.8 | √ | √ | √ | √ | | √ | √ | √ | | |
| 4.3.2.9 | √ | | | √ | | √ | √ | √ | | |
| 4.3.2.10 | √ | | | √ | | √ | √ | | √ | |
| 4.3.2.11 | √ | | | √ | | √ | √ | | √ | |

Note:

1. "√" means that this configuration is chosen for test.
2. "NVNT" means Normal Voltage Normal Temperature, "NVLT" means Normal Voltage Low Temperature, "NVHT" means Normal Voltage High Temperature.

6.3 Test Setup Block



6.4 Test Results

6.4.1 Test Result Summary

| Clause No. | Modulation | Test Condition | Test Data | Verdict |
|---|------------|----------------|-------------------|---------|
| 4.3.2.2 | GFSK | NVNT | Appendix A – BLE | Pass |
| | | NVLT | | |
| | | NVHT | | |
| 4.3.2.3 | GFSK | NVNT | Appendix A – BLE | Pass |
| 4.3.2.4 | N/A | N/A | N/A | N/A |
| 4.3.2.5 | N/A | N/A | N/A | N/A |
| 4.3.2.6 | N/A | N/A | N/A | N/A |
| 4.3.2.7 | GFSK | NVNT | Appendix A – BLE | Pass |
| 4.3.2.8 | GFSK | NVNT | Appendix A – BLE | Pass |
| | | NVLT | | |
| | | NVHT | | |
| 4.3.2.9 | GFSK | NVNT | See Section 6.4.2 | Pass |
| 4.3.2.10 | GFSK | NVNT | See Section 6.4.3 | Pass |
| 4.3.2.11 | GFSK | NVNT | See Section 6.4.4 | Pass |
| Note: “NVNT” means Normal Voltage Normal Temperature, “NVLT” means Normal Voltage Low Temperature, “NVHT” means Normal Voltage High Temperature. | | | | |

6.4.2 Transmitter unwanted emissions in the spurious domain

ceramic antenna:

| The lowest channel | | | | |
|---------------------|-------------------|-------------|-------------|-------------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level (dBm) | | |
| 72.85 | Vertical | -64.32 | -54.00 | Pass |
| 501.18 | V | -66.89 | | |
| 77.59 | V | -60.51 | -36.00 | |
| 250.30 | V | -61.07 | | |
| 4804.00 | V | -46.23 | -30.00 | |
| 107.51 | Horizontal | -71.18 | -54.00 | |
| 501.18 | H | -64.78 | | |
| 35.50 | H | -66.17 | -36.00 | |
| 942.13 | H | -60.79 | | |
| 4804.00 | H | -47.00 | -30.00 | |
| The highest channel | | | | |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level (dBm) | | |
| 72.85 | Vertical | -64.01 | -54.00 | Pass |
| 501.18 | V | -67.22 | | |
| 77.59 | V | -60.87 | -36.00 | |
| 250.30 | V | -61.51 | | |
| 4960.00 | V | -46.39 | -30.00 | |
| 107.51 | Horizontal | -71.13 | -54.00 | |
| 501.18 | H | -65.28 | | |
| 35.50 | H | -66.02 | -36.00 | |
| 942.13 | H | -60.45 | | |
| 4960.00 | H | -47.47 | -30.00 | |

Flex antenna:

| The lowest channel | | | | |
|---------------------|-------------------|-------------|-------------|-------------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level (dBm) | | |
| 72.85 | Vertical | -64.32 | -54.00 | Pass |
| 501.18 | V | -66.55 | | |
| 77.59 | V | -60.53 | -36.00 | |
| 250.30 | V | -61.46 | | |
| 4804.00 | V | -46.93 | -30.00 | |
| 107.51 | Horizontal | -71.24 | -54.00 | |
| 501.18 | H | -65.24 | | |
| 35.50 | H | -66.16 | -36.00 | |
| 942.13 | H | -60.17 | | |
| 4804.00 | H | -47.74 | -30.00 | |
| The highest channel | | | | |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level (dBm) | | |
| 72.85 | Vertical | -64.69 | -54.00 | Pass |
| 501.18 | V | -66.34 | | |
| 77.59 | V | -60.83 | -36.00 | |
| 250.30 | V | -61.68 | | |
| 4960.00 | V | -47.06 | -30.00 | |
| 107.51 | Horizontal | -71.13 | -54.00 | |
| 501.18 | H | -64.91 | | |
| 35.50 | H | -66.53 | -36.00 | |
| 942.13 | H | -59.95 | | |
| 4960.00 | H | -47.81 | -30.00 | |

Whip antenna:

| The lowest channel | | | | |
|---------------------|-------------------|-------------|-------------|-------------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level (dBm) | | |
| 72.85 | Vertical | -64.43 | -54.00 | Pass |
| 501.18 | V | -66.42 | | |
| 77.59 | V | -60.82 | -36.00 | |
| 250.30 | V | -61.11 | | |
| 4804.00 | V | -44.68 | -30.00 | |
| 107.51 | Horizontal | -71.08 | -54.00 | |
| 501.18 | H | -65.19 | | |
| 35.50 | H | -66.28 | -36.00 | |
| 942.13 | H | -60.60 | | |
| 4804.00 | H | -46.88 | -30.00 | |
| The highest channel | | | | |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level (dBm) | | |
| 72.85 | Vertical | -64.36 | -54.00 | Pass |
| 501.18 | V | -67.17 | | |
| 77.59 | V | -60.03 | -36.00 | |
| 250.30 | V | -60.61 | | |
| 4960.00 | V | -44.62 | -30.00 | |
| 107.51 | Horizontal | -71.48 | -54.00 | |
| 501.18 | H | -64.97 | | |
| 35.50 | H | -66.18 | -36.00 | |
| 942.13 | H | -60.56 | | |
| 4960.00 | H | -46.94 | -30.00 | |

6.4.3 Receiver spurious emissions

Ceramic antenna:

| The lowest channel | | | | |
|---------------------|-------------------|------------|-------------|-------------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level(dBm) | | |
| 77.59 | Vertical | -61.51 | -57.00 | Pass |
| 250.30 | V | -62.07 | | |
| 4804.00 | V | -59.86 | -47.00 | |
| 836.24 | Horizontal | -65.83 | -57.00 | |
| 942.13 | H | -62.79 | | |
| 4804.00 | H | -60.01 | -47.00 | |
| The highest channel | | | | |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level(dBm) | | |
| 77.59 | Vertical | -61.48 | -57.00 | Pass |
| 250.30 | V | -61.95 | | |
| 4960.00 | V | -59.44 | -47.00 | |
| 836.24 | Horizontal | -65.56 | -57.00 | |
| 942.13 | H | -62.50 | | |
| 4960.00 | H | -60.51 | -47.00 | |

Flex antenna:

| The lowest channel | | | | |
|---------------------|-------------------|------------|-------------|-------------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level(dBm) | | |
| 77.59 | Vertical | -61.11 | -57.00 | Pass |
| 250.30 | V | -62.72 | | |
| 4804.00 | V | -60.27 | -47.00 | |
| 836.24 | Horizontal | -66.42 | -57.00 | |
| 942.13 | H | -63.29 | | |
| 4804.00 | H | -59.95 | -47.00 | |
| The highest channel | | | | |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level(dBm) | | |
| 77.59 | Vertical | -60.84 | -57.00 | Pass |
| 250.30 | V | -62.34 | | |
| 4960.00 | V | -60.09 | -47.00 | |
| 836.24 | Horizontal | -65.88 | -57.00 | |
| 942.13 | H | -61.94 | | |
| 4960.00 | H | -59.86 | -47.00 | |

Whip antenna:

| The lowest channel | | | | |
|---------------------|-------------------|------------|-------------|-------------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level(dBm) | | |
| 77.59 | Vertical | -61.47 | -57.00 | Pass |
| 250.30 | V | -62.62 | | |
| 4804.00 | V | -59.81 | -47.00 | |
| 836.24 | Horizontal | -66.33 | -57.00 | |
| 942.13 | H | -62.86 | | |
| 4804.00 | H | -60.05 | -47.00 | |
| The highest channel | | | | |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Test Result |
| | Polarization | Level(dBm) | | |
| 77.59 | Vertical | -61.32 | -57.00 | Pass |
| 250.30 | V | -62.37 | | |
| 4960.00 | V | -59.76 | -47.00 | |
| 836.24 | Horizontal | -65.91 | -57.00 | |
| 942.13 | H | -62.36 | | |
| 4960.00 | H | -60.07 | -47.00 | |

6.4.4 Receiver Blocking (worst case mode)

| Test Channel | Wanted signal mean power from companion device (dBm) | Blocking signal frequency (MHz) | Blocking signal Power (dBm) | PER measurement level (%) | PER Limit (%) | Results |
|----------------|--|---------------------------------|-----------------------------|---------------------------|---------------|---------|
| Lowest Channel | -68.94 | 2380 | -34 | 3 | 10 | Pass |
| | | 2504 | | 4 | | |
| | | 2300 | | 4 | | Pass |
| | | 2584 | | 5 | | |

NOTE:

- (1) The minimum performance criterion shall be PER less than or equal to 10 %.
- (2) The EUT belongs to receiver category 2 equipment.
- (3) Conducted measurements.

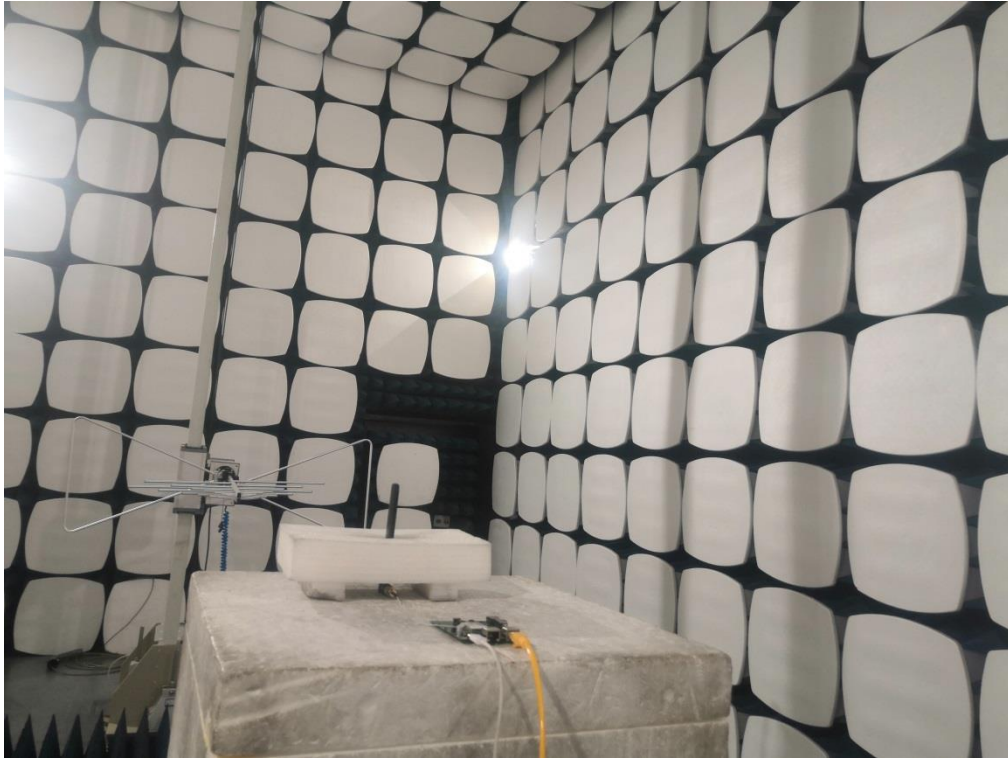
| Test Channel | Wanted signal mean power from companion device (dBm) | Blocking signal frequency (MHz) | Blocking signal Power (dBm) | PER measurement level (%) | PER Limit (%) | Results |
|-----------------|--|---------------------------------|-----------------------------|---------------------------|---------------|---------|
| Highest Channel | -68.82 | 2380 | -34 | 3 | 10 | Pass |
| | | 2504 | | 3 | | |
| | | 2300 | | 4 | | Pass |
| | | 2584 | | 3 | | |

NOTE:

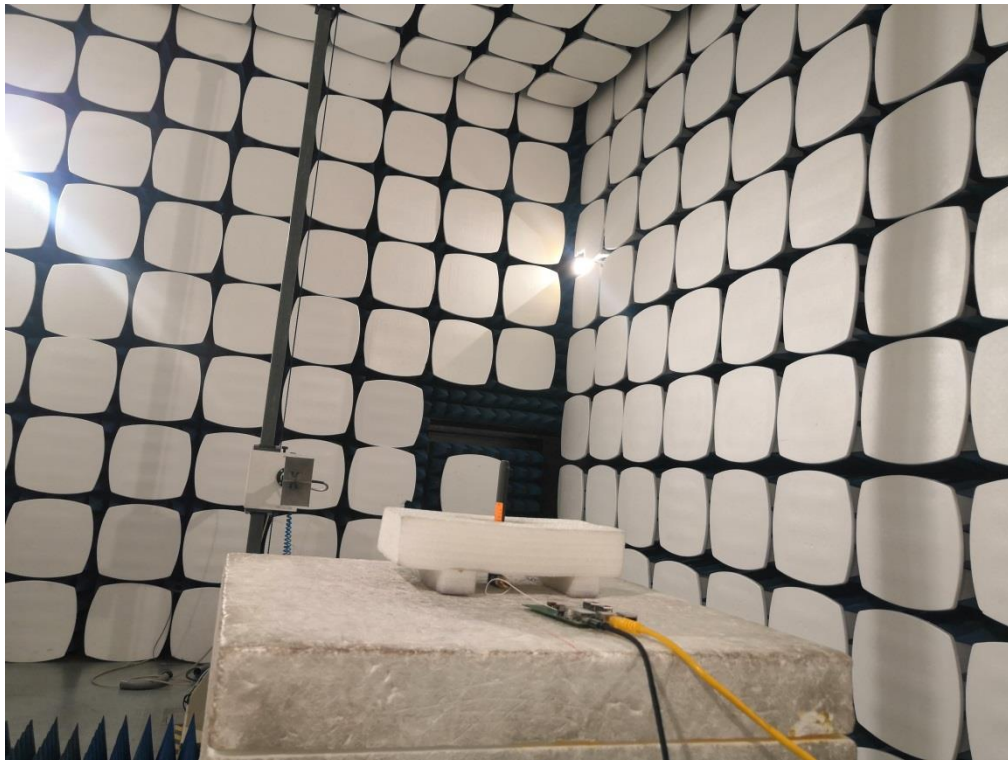
- (1) The minimum performance criterion shall be PER less than or equal to 10 %.
- (2) The EUT belongs to receiver category 2 equipment.
- (3) Conducted measurements.

7 Test setup photo

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



8 EUT Constructional Details

Reference to the test report No. CCISE200307901.

ANNEX Application form for testing

In accordance with EN 300 328 V2.2.2, clause 5.4.1, the following information is provided by the supplier.

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: ...
The minimum number of Hopping Frequencies: ...
- The Dwell Time: ...
- The Minimum Channel Occupation Time: ...

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: ____ ms

- 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: ____ μ s
The value q as referred to in clause 4.3.2.5.2.2.2:
- The equipment has implemented a 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 GFSK
- Power Spectral Density GFSK
- Duty cycle, Tx-Sequence, Tx-gap ...
- Dwell time, Minimum Frequency Occupation & Hopping Sequence (only for FHSS equipment)
...
- Hopping Frequency Separation (only for FHSS equipment) ...
- Medium Utilisation ...
- Adaptivity & Receiver Blocking GFSK
- Occupied Channel Bandwidth GFSK
- Transmitter unwanted emissions in the OOB domain GFSK
- Transmitter unwanted emissions in the spurious domain GFSK
- Receiver spurious emissions GFSK

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: 2402 MHz to 2480 MHz

- 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: 1.049 MHz

- Occupied Channel Bandwidth 2: MHz

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: -20 ° C to +55 ° C

Operating voltage range: 3.0 V to 3.6 V AC DC

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

Ceramic Antenna: 2.09 dBi, Flex antenna: 3.2 dBi, whip antenna: 4.0 dBi

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 | | | |

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 | | | |

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 | | | |

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 3.3 V

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:

Continuous transmitting mode control in engineer mode.

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

Configuration for testing

From all combinations of conducted power settings and intended antenna assembly(ies) specified in clause 5.4.1 m), specify the combination resulting in the highest e.i.r.p. for the radio equipment.

Unless otherwise specified in EN 300 328, this power setting is to be used for testing against the requirements of EN 300 328. In case there is more than one such conducted power setting resulting in the same (highest) e.i.r.p. level, the highest power setting is to be used for testing. See also EN 300 328, clause 5.3.2.3.

Highest overall e.i.r.p. value: 9.62 dBm

Corresponding Antenna assembly gain: 4.0 dBi

Antenna Assembly #: 1

Corresponding conducted power setting: 5.62 dBm
(also the power level to be used for testing)

Listed as Power Setting #: 7

Additional information provided by the applicant

Modulation:

ITU Class(es) of emission: DSSS

Can the transmitter operate unmodulated? yes no

Duty Cycle

The transmitter is intended for:

Continuous duty

Intermittent duty

Continuous operation possible for testing purposes

About the UUT

The equipment submitted are representative production models

If not, the equipment submitted are pre-production models?

If pre-production equipment are submitted, the final production equipment will be identical in all respects with the equipment tested

If not, supply full details

.....

The equipment submitted is CE marked

In addition to the CE mark, the Class-II identifier (Alert Sign) is affixed.

Additional items and/or supporting equipment provided

Spare batteries (e.g. for portable equipment)

Battery charging device

External Power Supply or AC/DC adapter

Test Jig or interface box

RF test fixture (for equipment with integrated antennas)

Host System Manufacturer:

Model #:

Model name:

Combined equipment Manufacturer:

Model #:

Model name:

User Manual

Technical documentation (Handbook and circuit diagrams)

-----End of report-----