



FCC ID: NXW-RF670

EMI -- TEST REPORT

- FCC Part 15.247 FHSS-

| | | |
|--------------------------|-----------------------|--------------------------------|
| Test Report No. : | T34331-00-00HU | 22. July 2010 Date of issue |
|--------------------------|-----------------------|--------------------------------|

Type / Model Name : RF670R

Product Description : RFID UHF Reader

Applicant : Kathrein Sachsen GmbH

Address : Lindenstraße 3, Gewerbegebiet
D-09241 Mühlau

Manufacturer : Kathrein Sachsen GmbH

Address : Lindenstraße 3, Gewerbegebiet
D-09241 Mühlau

Licence holder : Siemens AG

Address : Siemensstrasse 2-4
90766 Fuerth

| | |
|--|-----------------|
| Test Result according to the standards listed in clause 1 test standards: | POSITIVE |
|--|-----------------|



The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

Contents

| | | |
|----------|---|-----------|
| 1 | <u>TEST STANDARDS</u> | 3 |
| 2 | <u>SUMMARY</u> | 4 |
| 3 | <u>EQUIPMENT UNDER TEST</u> | 5 |
| 3.1 | Photo documentation of the EUT – Detailed photos see Attachment A | 5 |
| 3.2 | Test setup | 5 |
| 3.3 | Power supply system utilised | 5 |
| 3.4 | Short description of the EUT | 5 |
| 4 | <u>TEST ENVIRONMENT</u> | 7 |
| 4.1 | Address of the test laboratory | 7 |
| 4.2 | Environmental conditions | 7 |
| 4.3 | Statement of the measurement uncertainty | 7 |
| 4.4 | Measurement Protocol for FCC, VCCI and AUSTEL | 8 |
| 4.5 | Determination of worst case measurement conditions | 8 |
| 5 | <u>TEST CONDITIONS AND RESULTS</u> | 9 |
| 5.1 | Conducted emissions | 9 |
| 5.2 | 20 dB bandwidth | 15 |
| 5.3 | Maximum peak conducted output power | 20 |
| 5.4 | Spurious RF conducted emissions | 22 |
| 5.5 | Spurious radiated emissions in restricted bands | 28 |
| 5.6 | Hopping sequence | 33 |
| 5.7 | Equal hopping frequency use | 33 |
| 5.8 | Receiver input bandwidth | 33 |
| 5.9 | Dwell time | 34 |
| 5.10 | Channel separation | 37 |
| 5.11 | Quantity of hopping channels | 40 |
| 5.12 | Antenna application - Detailed photos see Attachment A | 43 |
| 5.13 | Receiver conducted disturbances | 44 |
| 5.14 | Receiver spurious emissions conducted | 45 |
| 5.15 | Maximum permissible exposure (MPE) | 46 |
| 6 | <u>USED TEST EQUIPMENT AND ACCESSORIES</u> | 48 |

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (October, 2009)

| | |
|-----------------------------------|---|
| Part 15, Subpart A, Section 15.31 | Measurement standards |
| Part 15, Subpart A, Section 15.33 | Frequency range of radiated measurements |
| Part 15, Subpart A, Section 15.35 | Measurement detector functions and bandwidths |

FCC Rules and Regulations Part 15, Subpart B - Unintentional Radiators (October, 2009)

| | | |
|------------------------------------|---|---------|
| Part 15, Subpart B, Section 15.107 | AC Line conducted emissions, | Class B |
| Part 15, Subpart B, Section 15.109 | Radiated emissions, general requirements, | Class B |

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (October, 2009)

| | |
|------------------------------------|---|
| Part 15, Subpart C, Section 15.203 | Antenna requirement |
| Part 15, Subpart C, Section 15.204 | External radio frequency power amplifiers and antenna modifications |
| Part 15, Subpart C, Section 15.205 | Restricted bands of operation |
| Part 15, Subpart C, Section 15.207 | Conducted limits |
| Part 15, Subpart C, Section 15.209 | Radiated emission limits, general requirements |
| Part 15, Subpart C, Section 15.247 | Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz |

FCC Rules and Regulations Part 1, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969

| | |
|-----------------------------------|---|
| Part 1, Subpart I, Section 1.1310 | Radiofrequency radiation exposure limits |
| Part 1, Subpart 2, Section 2.1093 | Radiofrequency radiation exposure evaluation: portable device |

OET Bulletin 65, 65A, 65B, 65C Edition 97-01, August 1997 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

| | |
|----------------------------------|---|
| ANSI C63.4: 2003 | Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. |
| ANSI C95.1:1992 | IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz |
| CISPR 16-4-2: 2003 | Uncertainty in EMC measurement |
| CISPR 22: 2005 EN 55022: 2006 | Information technology equipment |

2 SUMMARY

GENERAL REMARKS:

The frequency range was scanned from 9 kHz to 10 GHz.
All emissions not reported in this test report were more than 10 dB below the specified limit.
The EuT is a frequency hopping system using 52 channels in the frequency band from 902 to 928 MHz.

Following antennas are provided with the EuT:

- RF660A antenna: Type 60° - 75° CP (6.0 dBi)
- RF620A antenna: Horizontal plane: 130° and Vertical plane: 105° (-10 - -5 dBi)

Measurements have been made with power settings (30.0 dBm) and "Worst Case" Antenna RF660A.
The EuT is declared as Class B digital device.

It is not possible to set the EuT only in receiving mode.

FINAL ASSESSMENT:

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 01. July 2010

Testing concluded on : 12. July 2010

Checked by:

Tested by:

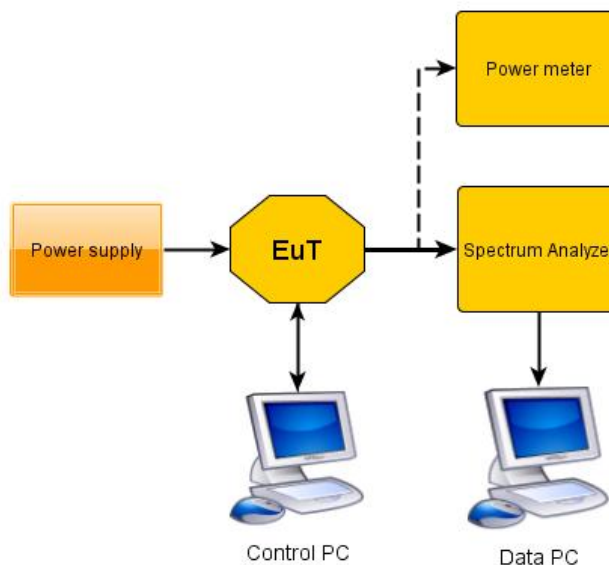
Klaus Gegenfurtner
Dipl.-Ing.(FH)
Manager: Radio Group

Markus Huber

3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EUT – Detailed photos see Attachment A

3.2 Test setup



3.3 Power supply system utilised

Power supply voltage: : 100-240 V / 50-60 Hz / 1 ϕ , 24 V DC

3.4 Short description of the EUT

The EuT RF670R is a RFID reader. It can read active and passive Tags in the frequency range from 902 to 928 MHz. It can read and write Tags using EPC Gen2 standard. 4 antenna connectors are available.

Number of tested samples: 1
 Serial number: see Photo documentation of the EuT / Equipment Under Test

EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- TAG reading mode supplying 30.0 dBm

- Standby mode

-

EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurements:

- AC-DC Adapter Model : Deutronic ETC45-24/2
- Data cable RJ 45 Model : Supplied by manufacturer
- Antenna Model : RF660A
- Antenna Model : RF620A
- _____ Model : _____
- _____ Model : _____
- customer specific cables



4 TEST ENVIRONMENT

4.1 Address of the test laboratory

mikes-testingpartners gmbh
Ohmstrasse 2-4
94342 Strasskirchen
Germany

4.2 Environmental conditions

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

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader may notice that tolerances within the calibration of the equipment and facilities may cause additional uncertainty. The measurement uncertainty is calculated for all measurements listed in this test report acc. to CISPR 16-4-2 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurement“ and documented in the mikes-testingpartners gmbh quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, mikes-testingpartners gmbh, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component diversity and modifications in production process of devices may result in additional deviation. If necessary, refer to the test lab for the actual measurement uncertainty for the specific test. The manufacturer has the sole responsibility of continued compliance of the EUT.

4.4 Measurement Protocol for FCC, VCCI and AUSTEL

4.4.1 GENERAL INFORMATION

4.4.1.1 Test Methodology

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

4.4.1.2 Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

4.5 Determination of worst case measurement conditions

5 TEST CONDITIONS AND RESULTS

5.1 Conducted emissions

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up



5.1.3 Applicable standard

According to FCC Part 15C, Section 15.207(a):

Except as shown in paragraphs (b) and (c) of this Section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of Emission (MHz) | Conducted Limit (dBµV) | |
|-----------------------------|------------------------|------------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency

5.1.4 Description of Measurement

The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a line impedance stabilization network (LISN) with 50 Ω/50 µH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded.

To convert between dBµV and µV, the following conversions apply:

$$\text{dB}\mu\text{V} = 20 \log \mu\text{V}$$

$$\mu\text{V} = 10^{(\text{dB}\mu\text{V}/20)}$$

5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 1.3 dB at 495 kHz

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocols.

5.1.6 Test protocol

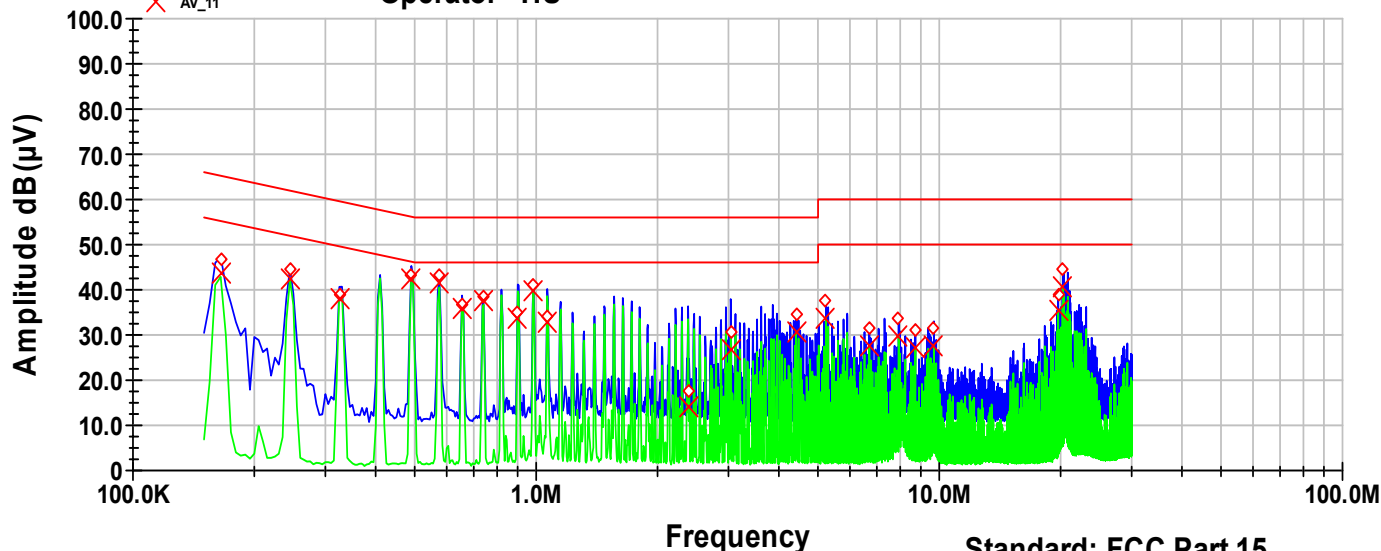
Test point: L1
 Operation mode: Tag reading mode supplying 30.0 dBm
 Remarks: Maximum transmit power mode

Result: Passed

— LmtAVVoltage
 — LmtQPVoltage
 — Peak_11
 — AVG_11
 ◇ QP_11
 × AV_11

Equipment - RF670R UHF Reader
 Serial No. - Prototype
 Op Mode 1 - Mod. Tx mode at 914.75 MHz
 Operator - HU

Peak Measurement
 See Table for QP and AV values
 L1 OM1



Standard: FCC Part 15
 File Number: T34331-00

| Frequency MHz | QP Level dB(µV) | QP Margin dB | QP Limit dB | AV Level dB(µV) | AV Margin dB | AV Limit dB |
|------------------|--------------------|-----------------|----------------|--------------------|-----------------|----------------|
| 0.165 | 46.8 | -18.4 | 65.2 | 43.5 | -11.7 | 55.2 |
| 0.245 | 44.4 | -17.5 | 61.9 | 42.3 | -9.6 | 51.9 |
| 0.325 | 38.8 | -20.8 | 59.6 | 37.9 | -11.6 | 49.6 |
| 0.49 | 43.5 | -12.7 | 56.2 | 42.6 | -3.6 | 46.2 |
| 0.575 | 43.3 | -12.7 | 56.0 | 41.5 | -4.5 | 46.0 |
| 0.655 | 36.7 | -19.3 | 56.0 | 35.9 | -10.1 | 46.0 |
| 0.74 | 38.3 | -17.7 | 56.0 | 37.6 | -8.4 | 46.0 |
| 0.9 | 34.8 | -21.2 | 56.0 | 33.8 | -12.2 | 46.0 |
| 0.985 | 40.9 | -15.1 | 56.0 | 39.9 | -6.1 | 46.0 |
| 1.065 | 34.2 | -21.8 | 56.0 | 33.0 | -13.0 | 46.0 |
| 2.38 | 17.5 | -38.5 | 56.0 | 14.1 | -31.9 | 46.0 |
| 3.035 | 30.6 | -25.4 | 56.0 | 26.8 | -19.2 | 46.0 |
| 4.41 | 34.5 | -21.5 | 56.0 | 30.7 | -15.3 | 46.0 |
| 5.235 | 37.7 | -22.3 | 60.0 | 33.8 | -16.2 | 50.0 |
| 6.7 | 31.5 | -28.5 | 60.0 | 27.6 | -22.4 | 50.0 |
| 7.92 | 33.5 | -26.5 | 60.0 | 29.7 | -20.3 | 50.0 |
| 8.715 | 31.2 | -28.8 | 60.0 | 27.3 | -22.7 | 50.0 |
| 9.69 | 31.5 | -28.5 | 60.0 | 27.7 | -22.3 | 50.0 |
| 19.705 | 39.0 | -21.0 | 60.0 | 35.4 | -14.6 | 50.0 |
| 20.255 | 44.4 | -15.6 | 60.0 | 40.7 | -9.3 | 50.0 |

FCC ID: NXW-RF670

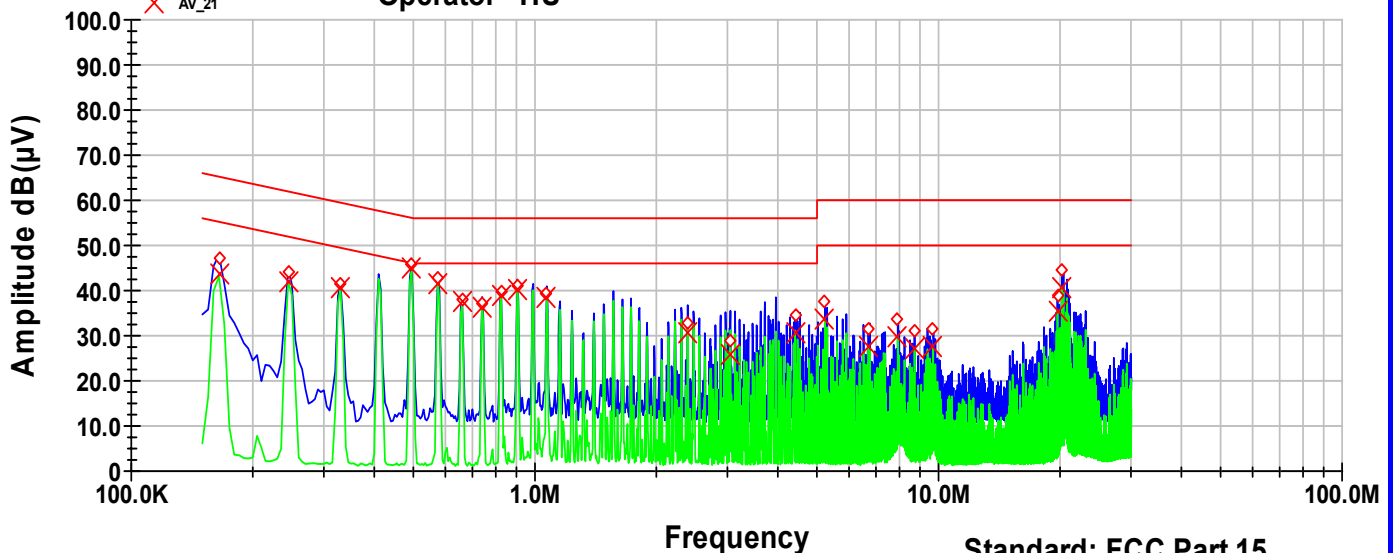
Test point: N
 Operation mode: Tag reading mode supplying 30.0 dBm
 Remarks: Maximum transmit power mode

Result: Passed

— LmtAVVoltage
 — LmtQPVoltage
 — Peak_21
 — AVG_21
 ◇ QP_21
 × AV_21

Equipment - RF670R UHF Reader
Serial No. - Prototype
Op Mode 1 - Mod. Tx mode at 914.75 MHz
Operator - HU

Peak Measurement
 See Table for QP and AV values
N OM1



Standard: FCC Part 15
 File Number: T34331-00

| Frequency MHz | QP Level dB(µV) | QP Margin dB | QP Limit dB | AV Level dB(µV) | AV Margin dB | AV Limit dB |
|------------------|--------------------|-----------------|----------------|--------------------|-----------------|----------------|
| 0.165 | 47.1 | -18.1 | 65.2 | 43.8 | -11.4 | 55.2 |
| 0.245 | 44.1 | -17.8 | 61.9 | 42.0 | -9.9 | 51.9 |
| 0.33 | 41.5 | -18.0 | 59.5 | 40.7 | -8.7 | 49.5 |
| 0.495 | 45.6 | -10.4 | 56.1 | 44.8 | -1.3 | 46.1 |
| 0.575 | 43.0 | -13.0 | 56.0 | 41.3 | -4.7 | 46.0 |
| 0.66 | 38.2 | -17.8 | 56.0 | 37.4 | -8.6 | 46.0 |
| 0.74 | 37.2 | -18.8 | 56.0 | 36.5 | -9.5 | 46.0 |
| 0.825 | 39.8 | -16.2 | 56.0 | 39.0 | -7.0 | 46.0 |
| 0.905 | 41.2 | -14.8 | 56.0 | 40.1 | -5.9 | 46.0 |
| 1.07 | 39.5 | -16.5 | 56.0 | 38.4 | -7.6 | 46.0 |
| 2.39 | 32.7 | -23.3 | 56.0 | 30.6 | -15.4 | 46.0 |
| 3.05 | 29.0 | -27.0 | 56.0 | 26.0 | -20.0 | 46.0 |
| 4.41 | 34.6 | -21.4 | 56.0 | 30.7 | -15.3 | 46.0 |
| 5.235 | 37.7 | -22.3 | 60.0 | 33.8 | -16.2 | 50.0 |
| 6.7 | 31.6 | -28.4 | 60.0 | 27.6 | -22.4 | 50.0 |
| 7.92 | 33.5 | -26.5 | 60.0 | 29.7 | -20.3 | 50.0 |
| 8.715 | 31.2 | -28.8 | 60.0 | 27.3 | -22.7 | 50.0 |
| 9.69 | 31.5 | -28.5 | 60.0 | 27.8 | -22.2 | 50.0 |
| 19.705 | 39.0 | -21.0 | 60.0 | 35.4 | -14.6 | 50.0 |
| 20.255 | 44.4 | -15.6 | 60.0 | 40.8 | -9.2 | 50.0 |

FCC ID: NXW-RF670

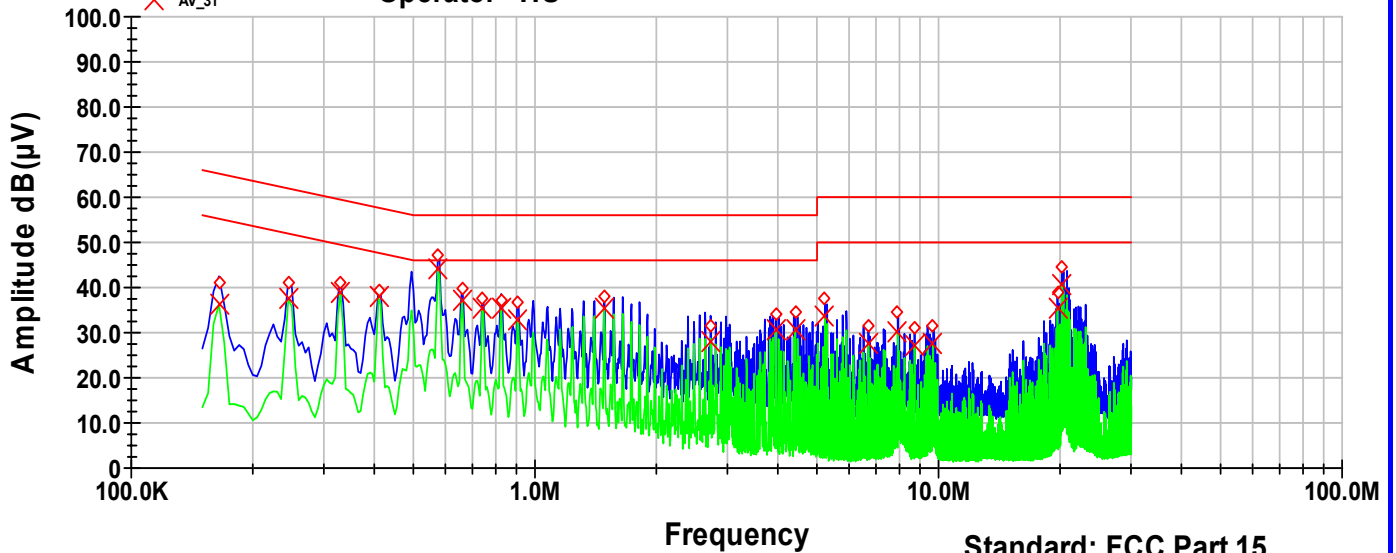
Test point: L1
Operation mode: Standby mode
Remarks: None

Result: Passed

— LmtAVVoltage
— LmtQPVoltage
— Peak_31
— AVG_31
◇ QP_31
× AV_31

Equipment - RF670R UHF Reader
Serial No. - Prototype
Op Mode 2 - Only LAN Connection
Operator - HU

Peak Measurement
See Table for QP and AV values
L1 OM2



Standard: FCC Part 15
File Number: T34331-00

| Frequency MHz | QP Level dB(µV) | QP Margin dB | QP Limit dB | AV Level dB(µV) | AV Margin dB | AV Limit dB |
|------------------|--------------------|-----------------|----------------|--------------------|-----------------|----------------|
| 0.165 | 41.0 | -24.2 | 65.2 | 36.2 | -19.0 | 55.2 |
| 0.245 | 41.3 | -20.7 | 61.9 | 37.6 | -14.3 | 51.9 |
| 0.33 | 41.2 | -18.3 | 59.5 | 38.7 | -10.7 | 49.5 |
| 0.41 | 39.2 | -18.4 | 57.6 | 37.8 | -9.8 | 47.6 |
| 0.575 | 47.1 | -8.9 | 56.0 | 44.0 | -2.0 | 46.0 |
| 0.66 | 39.7 | -16.3 | 56.0 | 37.0 | -9.0 | 46.0 |
| 0.74 | 37.5 | -18.5 | 56.0 | 35.6 | -10.4 | 46.0 |
| 0.825 | 37.3 | -18.7 | 56.0 | 35.5 | -10.5 | 46.0 |
| 0.905 | 36.6 | -19.4 | 56.0 | 32.8 | -13.2 | 46.0 |
| 1.485 | 38.1 | -17.9 | 56.0 | 35.4 | -10.6 | 46.0 |
| 2.725 | 31.5 | -24.5 | 56.0 | 27.9 | -18.1 | 46.0 |
| 3.955 | 34.3 | -21.7 | 56.0 | 30.5 | -15.5 | 46.0 |
| 4.41 | 34.6 | -21.4 | 56.0 | 30.7 | -15.3 | 46.0 |
| 5.235 | 37.7 | -22.3 | 60.0 | 33.8 | -16.2 | 50.0 |
| 6.7 | 31.5 | -28.5 | 60.0 | 27.6 | -22.4 | 50.0 |
| 7.92 | 34.4 | -25.6 | 60.0 | 30.1 | -19.9 | 50.0 |
| 8.715 | 31.2 | -28.8 | 60.0 | 27.3 | -22.7 | 50.0 |
| 9.69 | 31.5 | -28.5 | 60.0 | 27.8 | -22.2 | 50.0 |
| 19.705 | 39.1 | -20.9 | 60.0 | 35.5 | -14.5 | 50.0 |
| 20.255 | 44.4 | -15.6 | 60.0 | 40.8 | -9.2 | 50.0 |

FCC ID: NXW-RF670

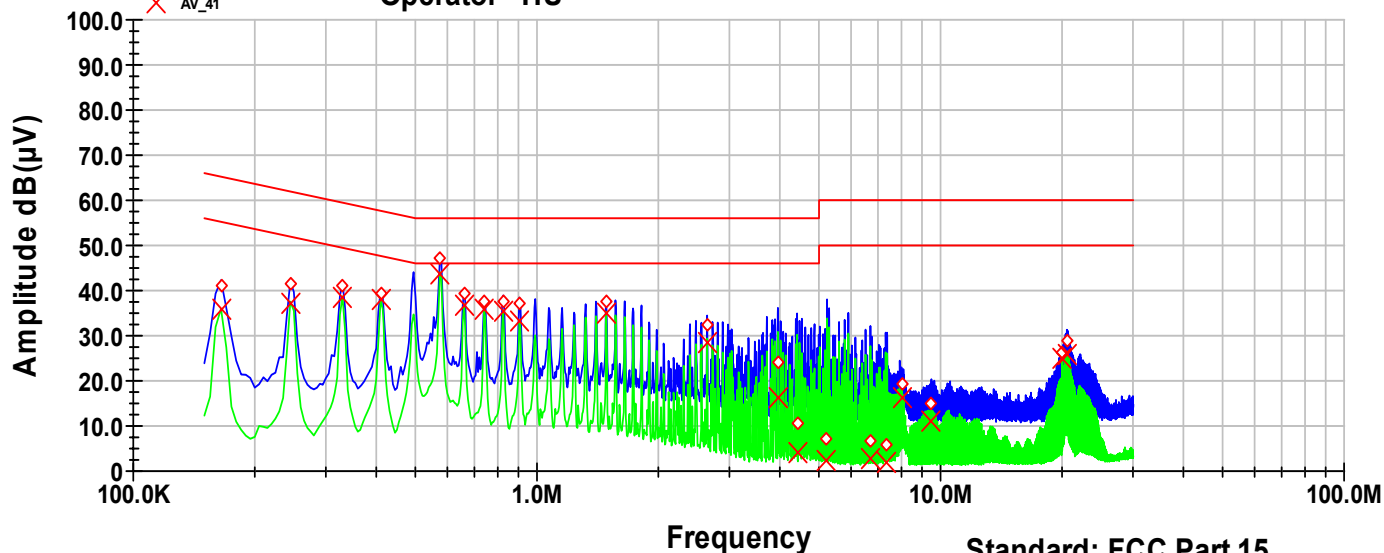
Test point: N
Operation mode: Standby mode
Remarks: None

Result: Passed

— LmtAVVoltage
— LmtQPVoltage
— Peak_41
— AVG_41
◇ QP_41
× AV_41

Equipment - RF670R UHF Reader
Serial No. - Prototype
Op Mode 2 - Only LAN Connection
Operator - HU

Peak Measurement
See Table for QP and AV values
N OM2



Standard: FCC Part 15
File Number: T34331-00

| Frequency MHz | QP Level dB(µV) | QP Margin dB | QP Limit dB | AV Level dB(µV) | AV Margin dB | AV Limit dB |
|------------------|--------------------|-----------------|----------------|--------------------|-----------------|----------------|
| 0.165 | 40.9 | -24.3 | 65.2 | 35.8 | -19.4 | 55.2 |
| 0.245 | 41.3 | -20.6 | 61.9 | 37.3 | -14.6 | 51.9 |
| 0.33 | 41.0 | -18.4 | 59.5 | 38.5 | -11.0 | 49.5 |
| 0.41 | 39.2 | -18.4 | 57.6 | 38.0 | -9.7 | 47.6 |
| 0.575 | 47.3 | -8.7 | 56.0 | 43.9 | -2.1 | 46.0 |
| 0.66 | 39.4 | -16.6 | 56.0 | 36.7 | -9.3 | 46.0 |
| 0.74 | 37.7 | -18.3 | 56.0 | 35.9 | -10.1 | 46.0 |
| 0.825 | 37.7 | -18.3 | 56.0 | 35.5 | -10.5 | 46.0 |
| 0.905 | 37.2 | -18.8 | 56.0 | 33.3 | -12.7 | 46.0 |
| 1.485 | 37.7 | -18.3 | 56.0 | 35.0 | -11.0 | 46.0 |
| 2.64 | 32.5 | -23.5 | 56.0 | 28.6 | -17.4 | 46.0 |
| 3.955 | 24.0 | -32.0 | 56.0 | 16.1 | -29.9 | 46.0 |
| 4.41 | 10.8 | -45.2 | 56.0 | 3.9 | -42.1 | 46.0 |
| 5.235 | 7.0 | -53.0 | 60.0 | 2.3 | -47.7 | 50.0 |
| 6.7 | 6.7 | -53.3 | 60.0 | 2.9 | -47.1 | 50.0 |
| 7.31 | 5.6 | -54.4 | 60.0 | 1.8 | -48.2 | 50.0 |
| 8.005 | 19.2 | -40.8 | 60.0 | 16.5 | -33.5 | 50.0 |
| 9.49 | 14.9 | -45.1 | 60.0 | 11.0 | -39.0 | 50.0 |
| 20 | 26.0 | -34.0 | 60.0 | 25.1 | -24.9 | 50.0 |
| 20.625 | 28.9 | -31.1 | 60.0 | 25.7 | -24.3 | 50.0 |

5.2 20 dB bandwidth

For test instruments and accessories used see section 6 Part MB.

5.2.1 Description of the test location

Test location: AREA4

5.2.2 Photo documentation of the test set-up



5.2.1 Applicable standard

According to FCC Part 15C, Section 15.247(a):

Frequency hopping systems shall have hopping carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.2.2 Description of Measurement

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio of -20 dB. The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or the first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

5.2.3 Test result

Power setting 30.0 dBm:

| Channel No. | -20 dB Bandwidth below peak (kHz) |
|--------------------|-----------------------------------|
| CH 1 (902.25 MHz) | 82.0 |
| CH 26 (914.75 MHz) | 83.0 |
| CH 52 (927.75 MHz) | 81.0 |

Bandwidth limit according to FCC Part15C, Section 15.247(a):

| Frequency (MHz) | Hopping channels | Limit -20 db bandwidth (kHz) |
|-----------------|------------------|------------------------------|
| 902-928 | ≥ 50 | < 250 |

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.

5.2.4 Test protocol

Channel 1
902.25 MHz

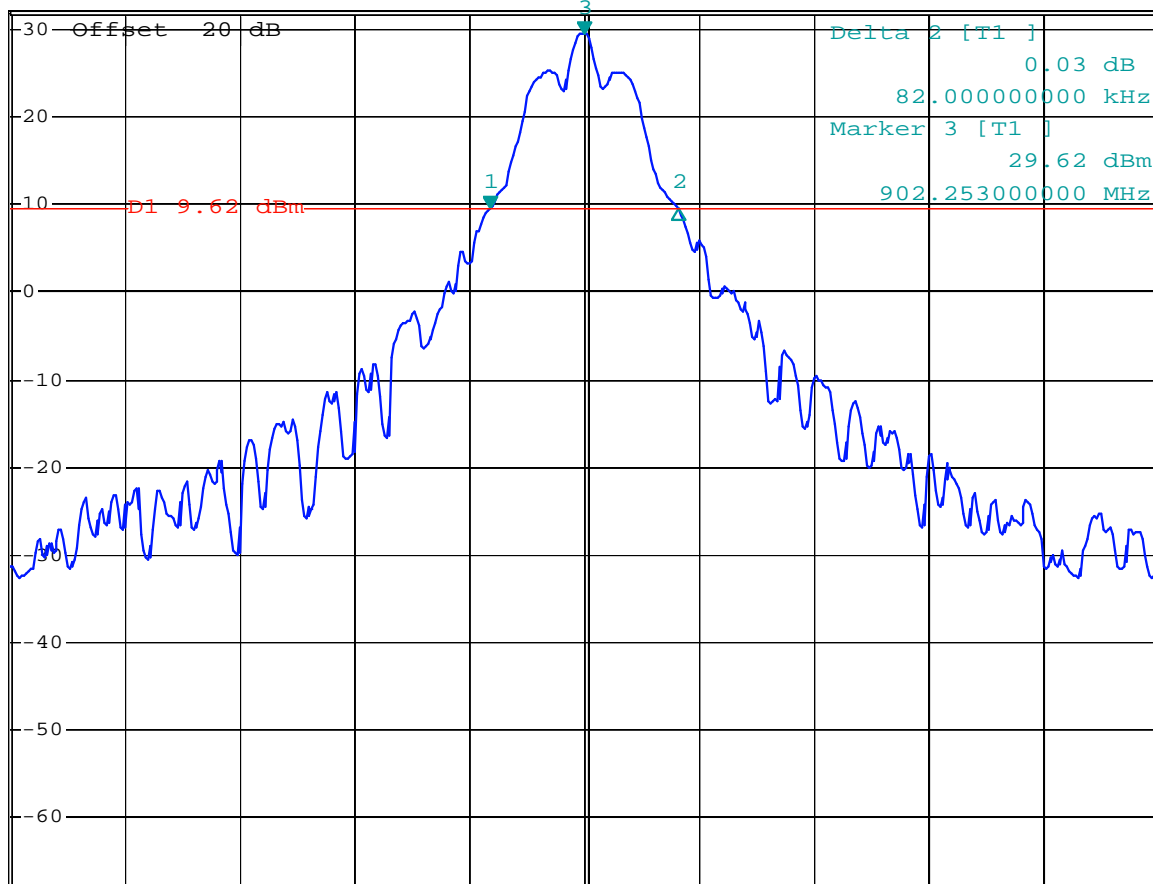


RBW 10 kHz Marker 1 [T1]
VBW 30 kHz 9.56 dBm
SWT 5 ms 902.212000000 MHz

Ref 32 dBm

Att 50 dB

1 PK
VIEW



Center 902.253 MHz

50 kHz/

Span 500 kHz

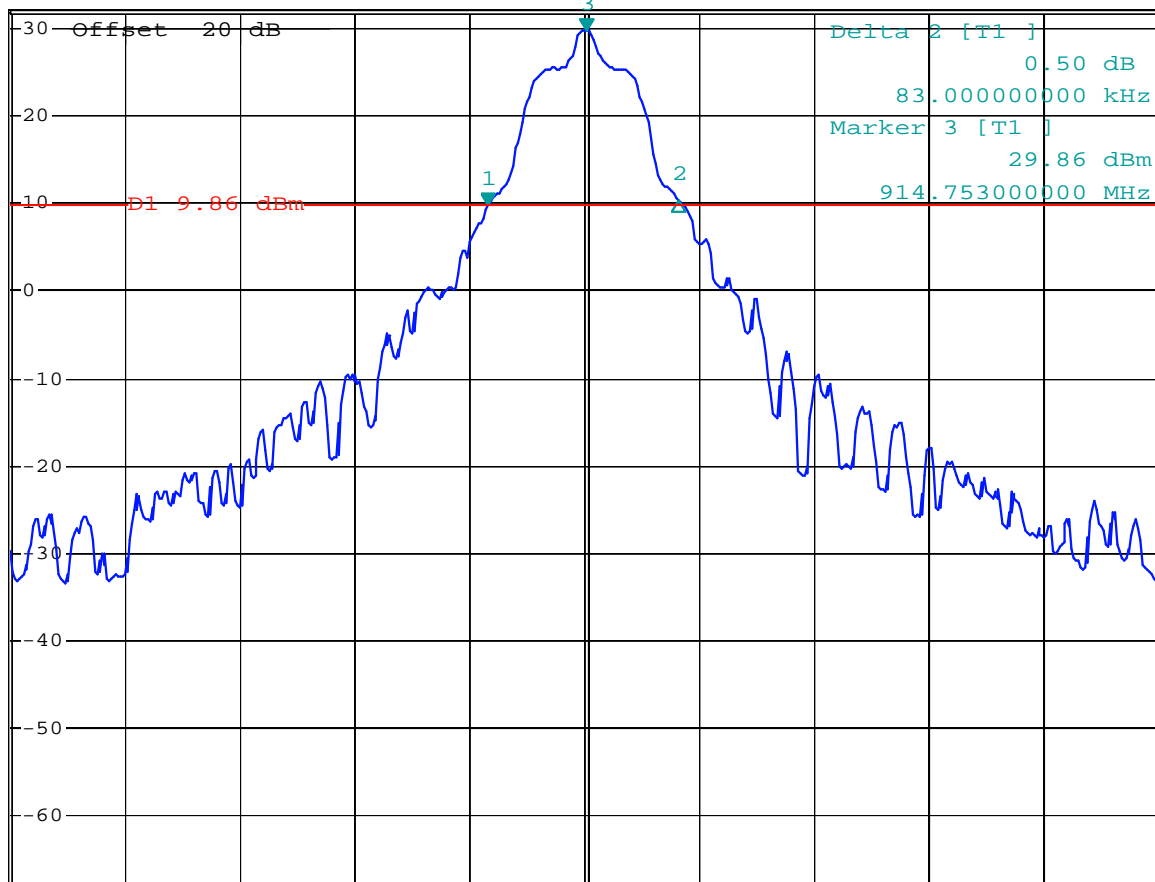
FCC ID: NXW-RF670

Channel 26
914.75 MHz



Ref 32 dBm Att 50 dB RBW 10 kHz Marker 1 [T1] 9.86 dBm
 VBW 30 kHz 914.710000000 MHz
 SWT 5 ms

1 PK
VIEW



Center 914.752 MHz 50 kHz/ Span 500 kHz

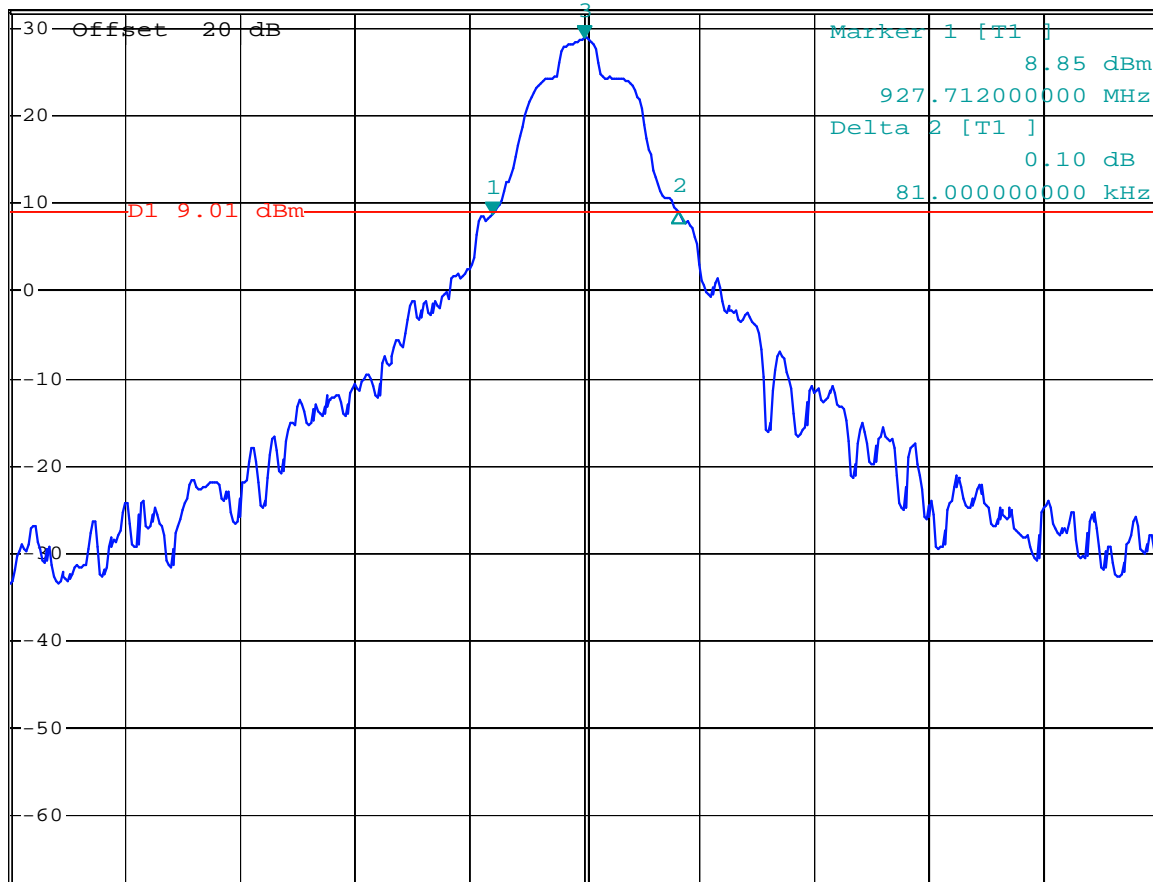
FCC ID: NXW-RF670

Channel 52
927.75 MHz



Ref 32 dBm Att 50 dB RBW 10 kHz Marker 3 [T1]
 VBW 30 kHz 29.01 dBm
 SWT 5 ms 927.752000000 MHz

1 PK
VIEW



Center 927.752 MHz 50 kHz/ Span 500 kHz

5.3 Maximum peak conducted output power

For test instruments and accessories used see section 6 Part CPC 2.

5.3.1 Description of the test location

Test location: AREA4

5.3.2 Photo documentation of the test set-up



5.3.3 Applicable standard

According to FCC Part 15C, Section 15.247(b)(2):

For frequency hopping systems operating in the 902-928 MHz band the maximum peak conducted output power shall not exceed the limit of 1 watt for systems employing at least 50 hopping channels.

5.3.4 Description of Measurement

A spectrum analyzer is connected to the output of the transmitter via a suitable attenuator while EUT was operating in transmit mode using the assigned frequency.

5.3.5 Test result

Power setting 30.0 dBm
Antenna gain: 6.0 dBic

| Channel | Frequency (MHz) | Peak Power (dBm) | Correction (dB) | Corr. Peak power (dBm) | Limit (dBm) | Delta (dB) |
|---------|-----------------|------------------|-----------------|------------------------|-------------|------------|
| 1 | 902.25 | 9.46 | 20 | 29.46 | 30.0 | -0.54 |
| 26 | 914.75 | 9.76 | 20 | 29.76 | 30.0 | -0.24 |
| 52 | 927.75 | 8.81 | 20 | 28.81 | 30.0 | -1.19 |

Note: Correction means fixed attenuation of 10 dB.
Test cable loss is included in the analyzer reading (Transducer factor).

Peak Power Limit according to FCC Part 15C, Section 15.247(b)(2):

| Frequency (MHz) | Hopping channels | Hop. CH carrier frequ. separation | Peak Power Limit | |
|-----------------|------------------|-----------------------------------|------------------|------------|
| | | | (dBm) | (W) |
| 902-928 | ≥ 50 | | 30 | 1.0 |

The requirements are **FULFILLED**.

Remarks:

5.4 Spurious RF conducted emissions

For test instruments and accessories used see section 6 Part SEC1, SEC2 and SEC3.

5.4.1 Description of the test location

Test location: AREA4

5.4.2 Photo documentation of the test set-up



5.4.3 Applicable standard

According to FCC Part 15C, Section 15.247(d):

In any 100 kHz bandwidth outside the frequency band 902 to 928 MHz, the digitally modulated radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or an radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limit specified in Section 15.209(a).

5.4.4 Description of Measurement

A spectrum analyzer is connected to the output of the transmitter via a suitable attenuator while EUT was operating in transmit mode at the assigned frequency.

5.4.5 Test result

Power setting 30.0 dBm

| Hopping frequency from 902.25 to 927.75 MHz, max. level 29.82 dBm | | | |
|---|--------------------|----------------------|------------|
| Frequency (MHz) | Peak power * (dBm) | Limit (-20 dB) (dBm) | Delta (dB) |
| 1000 | -73.28 | 9.82 | 83.1 |
| 1126 | -72.85 | 9.82 | 82.7 |
| 1810 | -54.22 | 9.82 | 64.0 |
| | | | |
| | | | |

* Fixed attenuation of 20 dB is included in the Peak power.

The requirements are **FULFILLED**.

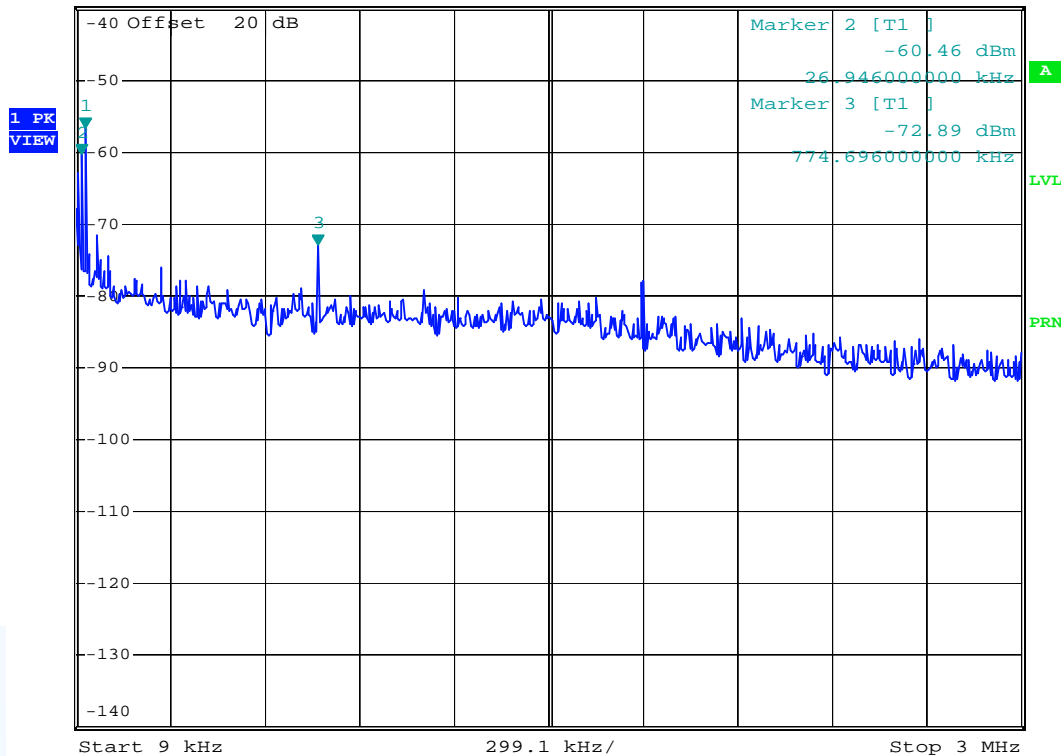
Remarks: All spurious emissions falling in restricted bands have been measured radiated.
For detailed results please refer to following test protocol.
In the frequency range from 9 kHz to 30 MHz no emissions could be measured.

FCC ID: NXW-RF670

Conducted RF emission from 9 kHz to 30 MHz



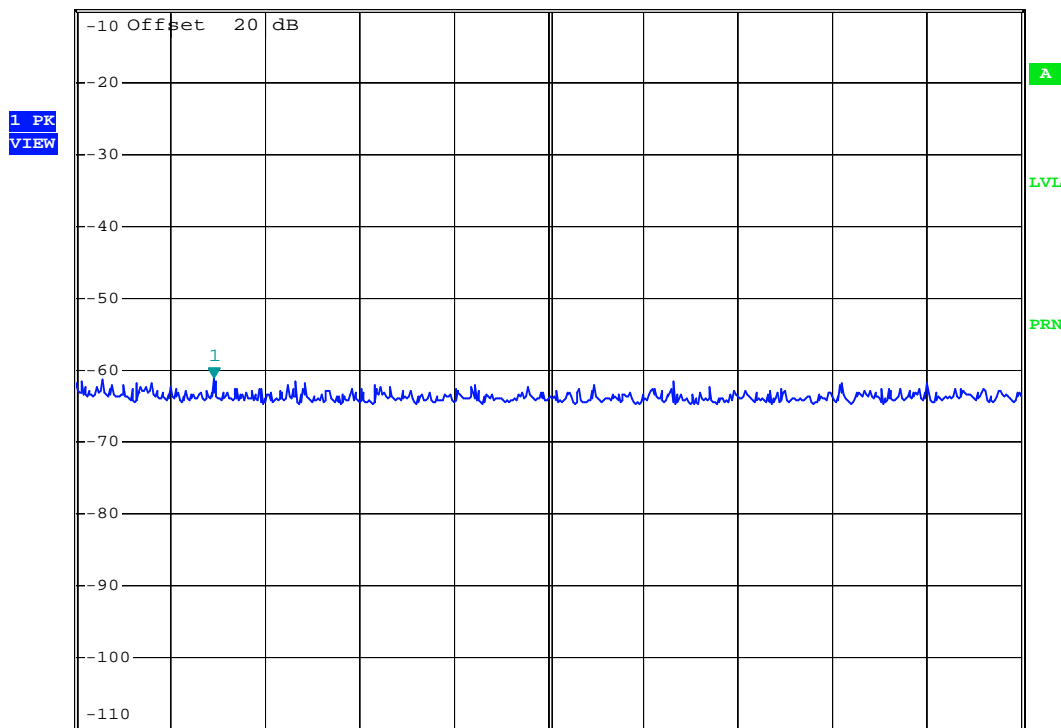
Ref -40 dBm Att 10 dB *RBW 300 Hz Marker 1 [T1]
 VBW 1 kHz -56.76 dBm
 SWT 34 s 38.91000000 kHz



Start 9 kHz 299.1 kHz/ Stop 3 MHz



Ref -10 dBm Att 10 dB *RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz -60.99 dBm
 SWT 5 ms 6.94200000 MHz



Start 3 MHz 2.7 MHz/ Stop 30 MHz

FCC ID: NXW-RF670

Conducted RF emission from 30 to 1000 MHz

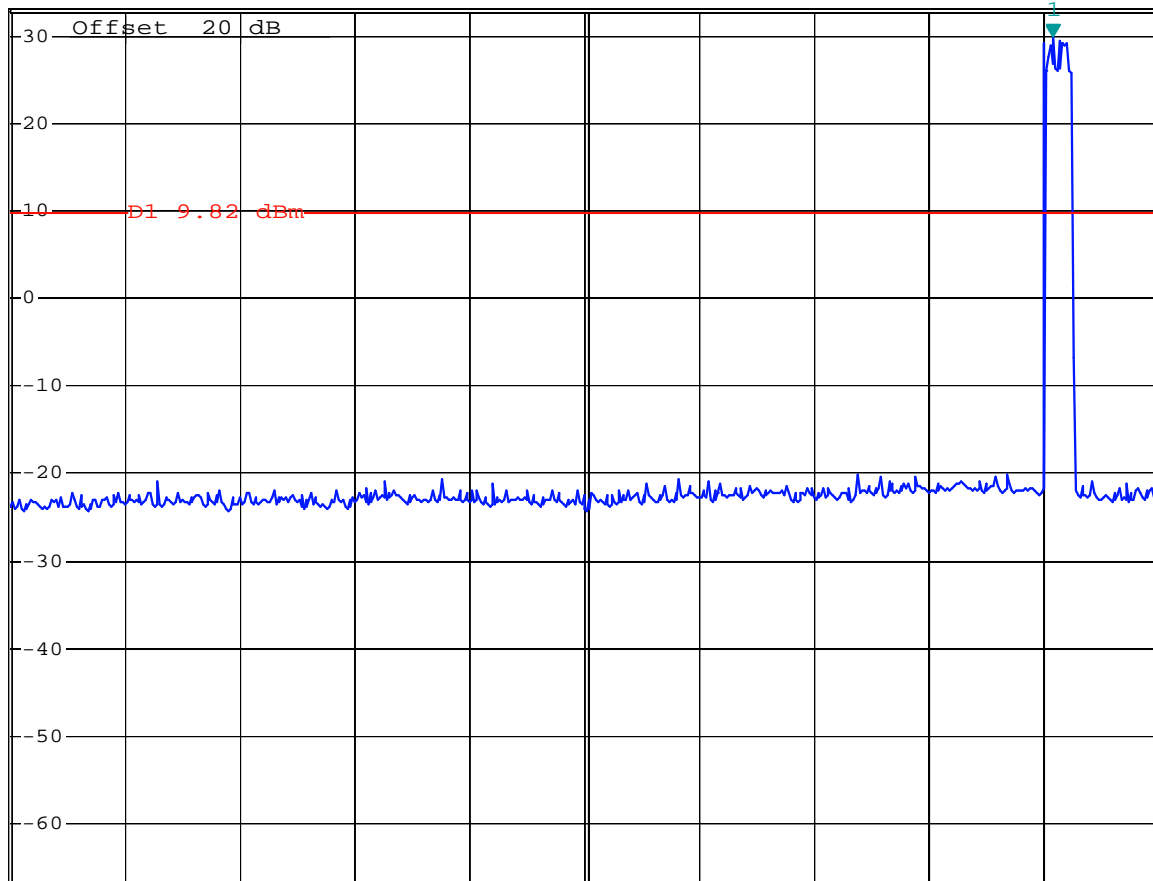


*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz 29.88 dBm
 SWT 100 ms 910.76000000 MHz

Ref 33 dBm

Att 50 dB

1 PK
VIEW



Start 30 MHz

97 MHz/

Stop 1 GHz

FCC ID: NXW-RF670

Conducted RF emission from 30 to 1000 MHz
(Band edge)

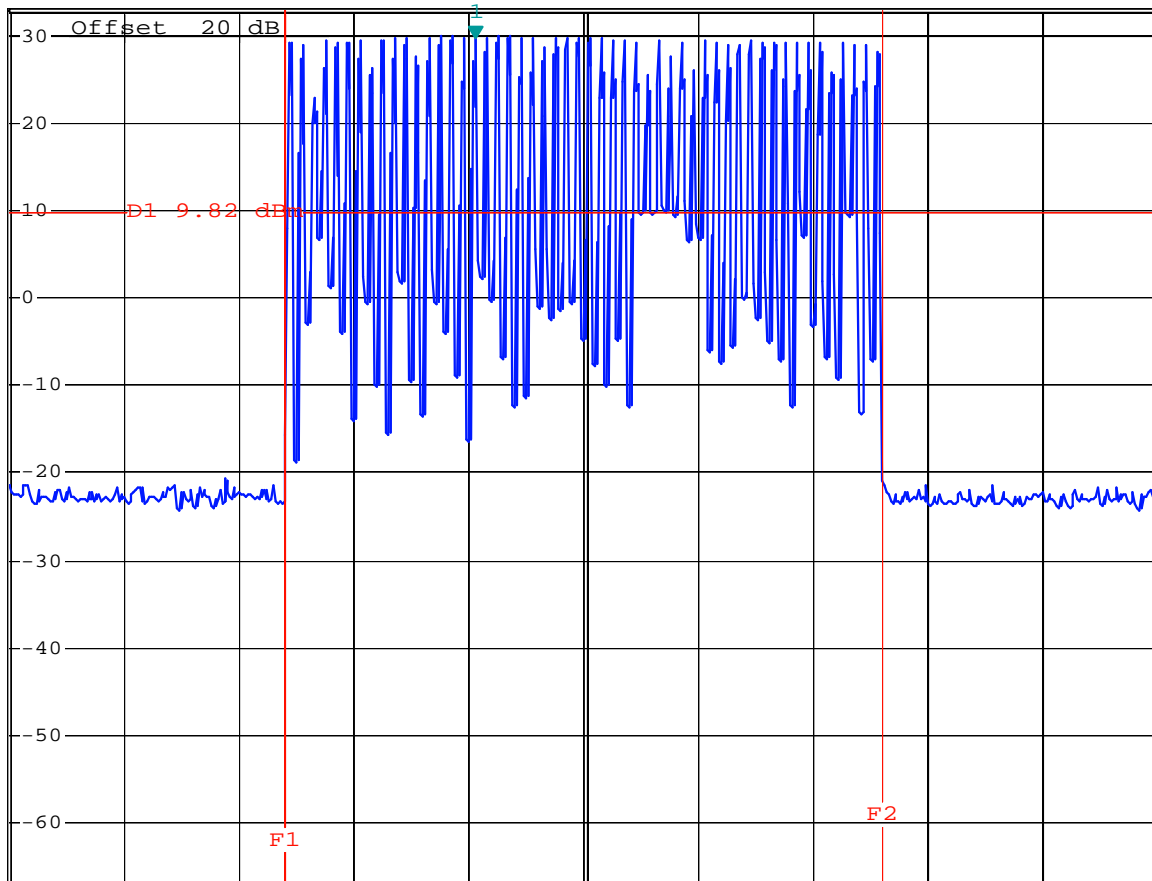


*RBW 100 kHz Marker 1 [T1]
VBW 300 kHz 29.82 dBm
SWT 5 ms 910.30000000 MHz

Ref 33 dBm

Att 50 dB

1 PK
VIEW



Center 915 MHz

5 MHz/

Span 50 MHz

5.5 Spurious radiated emissions in restricted bands

For test instruments and accessories used see section 6 Part SER 1, SER 2, SER 3.

5.5.1 Description of the test location

Test location: OATS1
Test distance: 3 metres

Test location: Anechoic Chamber A2
Test distance: 3 metres

5.5.2 Photo documentation of the test set-up

Open area test site



FCC ID: NXW-RF670

Anechoic chamber



5.5.3 Applicable standard

According to FCC Part 15, Section 15.247(d):

In any 100 kHz bandwidth outside the frequency bands 902 to 928 MHz, the digitally modulated radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or an radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limit specified in Section 15.209(a) (see Section 15.205(c)).

5.5.4 Description of Measurement

Radiated spurious emissions from the EUT are measured in the frequency range of 9 kHz to 1000 MHz using a tuned receiver and appropriate broadband linear polarized antennas. The measurements are made with 120 kHz bandwidth and quasi-peak detection (200 Hz, 9 kHz up to 30 MHz). The EUT was placed on a 1.0 X 1.5 metres non-conducting table 80 centimetres above the ground plane. The set up of the equipment under test will be in accordance to ANSI C63.4. The antenna was positioned 3 metres horizontally from the EUT. To locate maximum emissions from the EUT the antenna is shifted in height from 1 to 4 metres, after the EUT is rotated 360 degrees. The measurement scan is made in horizontal and vertical polarization of the antenna. The correction factors for antenna gain and cable loss are stored in the EMI receiver and automatically added to a measurement data to display the final level in dB μ V/m.

For the radiated measurement up from 1 GHz to maximum frequency as specified in Section 15.33, a spectrum analyzer and appropriate linear polarized antennas are used. The EUT is placed on a 1.0 X 1.5 metres non-conducting table 80 centimetres above the ground plane. The set up of the EUT will be in accordance to ANSI C63.4. The antenna was positioned 3 m horizontally from the EUT. To locate maximum emissions the EUT was rotated 360 degrees in the fully anechoic chamber. The measurement scan is made in horizontal and vertical polarization of the antenna. For testing above 1 GHz, if the emission level of the EUT in peak mode complies with the average limit is 20 dB lower, then testing will be stopped and peak values of the EUT will be reported, otherwise, the emission will be measured in average mode again and reported.

5.5.5 Test result

5.5.5.1 Radiated emission test f < 1 GHz

In the frequency range from 9 kHz to 30 MHz no radiated emissions could be measured.

In the frequency range from 30 MHz up to 1 GHz no radiated emissions could be measured.

5.5.5.2 Radiated emission test f > 1GHz

Power setting 30.0 dBm

Antenna gain 6.0 dBic

| Frequency (GHz) | L: PK (dB μ V) | Duty Cycle (dB) | L: AV (dB μ V) | Bandwidth (kHz) | Correct. (dB) | L: PK dB(μ V/m) | L: AV dB(μ V/m) | Limit AV dB(μ V/m) | Delta (dB) |
|-----------------|--------------------|-----------------|--------------------|-----------------|---------------|----------------------|----------------------|-------------------------|------------|
| 2.728 | 55.49 | 0 | 47.83 | 1000 | -9.2 | 46.3 | 38.6 | 54.0 | -15.4 |
| | | | | | | | | | |
| | | | | | | | | | |

*) Average values were measured with spectrum analyzer by the following settings

RBW: 1 MHz

VBW: 10 Hz

Sweep: Auto

Radiated limits according to FCC Part 15C, Section 15.209(a) for spurious emissions which fall in restricted bands:

| Frequency (MHz) | Field strength of spurious emissions | | Measurement distance (metres) |
|-----------------|--------------------------------------|----------------|-------------------------------|
| | (μ V/m) | dB(μ V/m) | |
| 0.009 - 0.490 | 2400/F(kHz) | | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | | 30 |
| 1.705 - 30 | 30 | 29,5 | 30 |
| 30 - 88 | 100 | 40 | 3 |
| 88 - 216 | 150 | 43.5 | 3 |
| 216 - 960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |

Restricted bands of operation:

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209:

| MHz | MHz | MHz | GHz |
|---------------------|-----------------------|-----------------|---------------|
| 0.090 – 0.110 | 16.42 – 16.423 | 399.9 – 410 | 4.5 – 5.15 |
| 0.495 – 0.505 | 16.69475 – 16.69525 | 608 – 614 | 5.35 – 5.46 |
| 2.1735 – 2.1905 | 16.80425 – 16.80475 | 960 – 1240 | 7.25 – 7.75 |
| 4.125 – 4.128 | 25.5 – 25.67 | 1300 – 1427 | 8.025 – 8.5 |
| 4.17725 – 4.17775 | 37.5 – 38.25 | 1435 – 1626.5 | 9.0 – 9.2 |
| 4.20725 – 4.20775 | 73 – 74.6 | 1645.5 – 1646.5 | 9.3 – 9.5 |
| 6.215 – 6.218 | 74.8 – 75.2 | 1660 – 1710 | 10.6 – 12.7 |
| 6.26775 – 6.26825 | 108 – 121.94 | 1718.8 – 1722.2 | 13.25 – 13.4 |
| 6.31175 – 6.31225 | 123 – 138 | 2200 – 2300 | 14.47 – 14.5 |
| 8.291 – 8.294 | 149.9 – 150.05 | 2310 – 2390 | 15.35 – 16.2 |
| 8.362 – 8.366 | 156.52475 – 156.52525 | 2483.5 – 2500 | 17.7 – 21.4 |
| 8.37625 – 8.38675 | 156.7 – 156.9 | 2690 – 2900 | 22.01 – 23.12 |
| 8.41425 – 8.41475 | 162.0125 – 167.17 | 3260 – 3267 | 23.6 – 24.0 |
| 12.29 – 12.293 | 167.72 – 173.2 | 3332 – 3339 | 31.2 – 31.8 |
| 12.51975 – 12.52025 | 240 – 285 | 3345.8 – 3358 | 36.43 – 36.5 |
| 12.57675 – 12.57725 | 322 – 335.4 | 3600 – 4400 | Above 38.6 |

The requirements are **FULFILLED**.

Remarks: During the test the EUT was set into TX continuous mode with normal modulation.
The measurement was performed up to the 10th harmonic (10000 MHz).

5.6 Hopping sequence

Requirement according to FCC Part 15C, Section 15.247(a):

The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies.

Remarks: The channel is represented by a pseudo-random hopping sequence hopping through the 52
RF-channels.

5.7 Equal hopping frequency use

Requirement according to FCC Part 15C, Section 15.247(a):

Each frequency must be used equally on the average by each transmitter.

Remarks: The device fulfills the requirement according to FCC Part 15C, Section 15.247(a).
The manufacturer declares in the system manual that this function is controlled via software.

5.8 Receiver input bandwidth

Requirement according to FCC Part 15C, Section 15.247(a):

The system receivers shall have input bandwidth that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signal.

Remarks: The receiver bandwidth is equal to the transmitter bandwidth in the 52 hopping channel mode.
(Declared by the manufacturer.)

5.9 Dwell time

For test instruments and accessories used see section 6 Part DC.

5.9.1 Description of the test location

Test location: AREA4

5.9.2 Photo documentation of the test set-up



5.9.3 Applicable standard

According to FCC Part 15, Section 15.247(a)(i):

Frequency hopping systems operating in the 902-928 MHz band: The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

5.9.4 Description of Measurement

The measurement was done using a spectrum analyser in time domain function and able to store the maximum time of a period. This time period has been stored an added up the appropriate time intervals the hopping system has applied this channel.

5.9.5 Test result

| Channel frequency (MHz) | Pulse Time (ms) | Number of Bursts (in 1 time period) | Dwell time (ms) |
|----------------------------|--------------------|--|--------------------|
| 914.75 | 360 | 1 | 360 |

Requirement according to FCC Part15C, Section 15.247(a):

| Frequency (MHz) | Hopping channels | time of one period (s) | Limit dwell time, AV (ms) |
|--------------------|------------------|---------------------------|------------------------------|
| 902-928 | ≥ 50 | 20 | < 400 |

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.

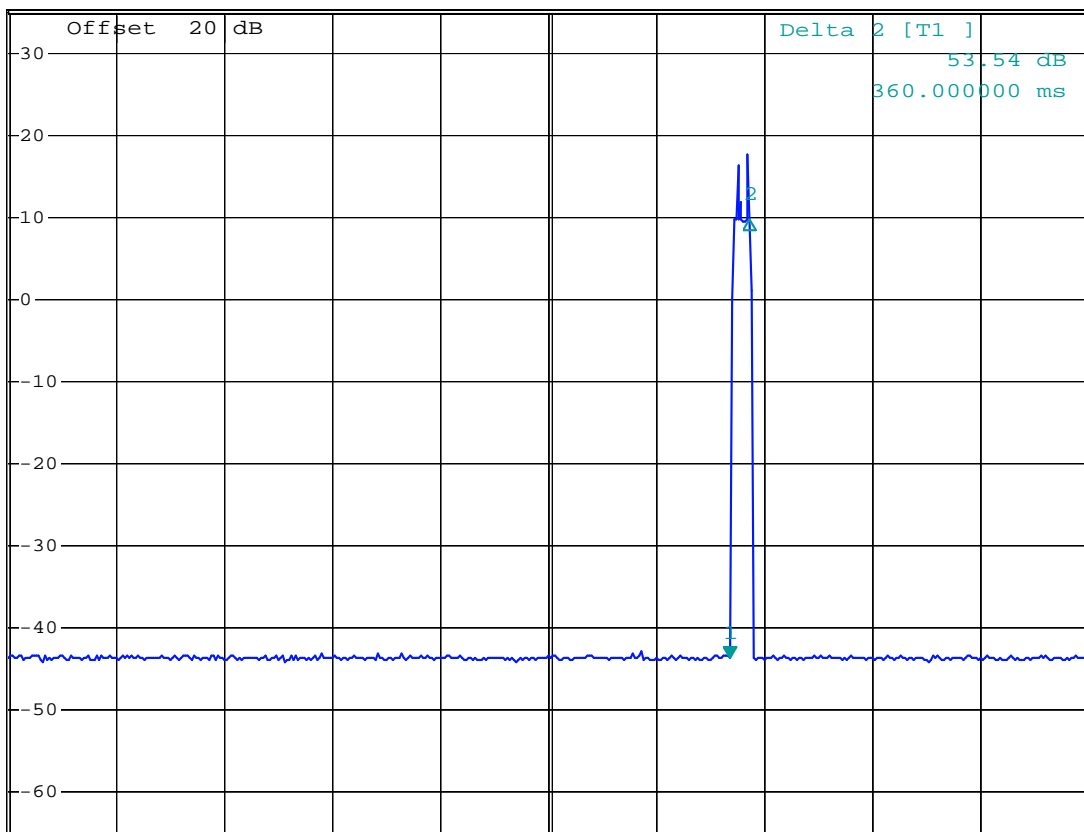
5.9.6 Test protocol

Time of occupancy (Dwell time)



Ref 35 dBm Att 50 dB RBW 10 kHz Marker 1 [T1]
VBW 100 kHz -43.74 dBm
SWT 20 s 13.360000 s

1 AV*
VIEW



Center 914.76 MHz 2 s/

5.10 Channel separation

For test instruments and accessories used see section 6 Part MB.

5.10.1 Description of the test location

Test location: AREA4

5.10.2 Photo documentation of the test set-up



5.10.3 Applicable standard

According to FCC Part 15, Section 15.247(a)(1):

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.10.4 Description of Measurement

This measurement was done by using a spectrum analyser. The Span of the analyzer was set wide enough to capture 2 frequencies. The result of the channel separation was compared with the 20 dB bandwidth and recorded.

5.10.5 Test result

| Channel 1 (MHz) | Channel 2 (MHz) | Channel separation (kHz) |
|--------------------|--------------------|-----------------------------|
| 902.25 | 902.75 | 500 |

Limit according to FCC Part 15C, Section 15.247(a):

| Frequency (MHz) | Hopping channels | Limit channel separation (kHz) |
|--------------------|------------------|--|
| All systems | | > 25 kHz or 20 dB bandwidth, which ever is greater |
| 2400-2483.5 | ≥ 15 | |

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.

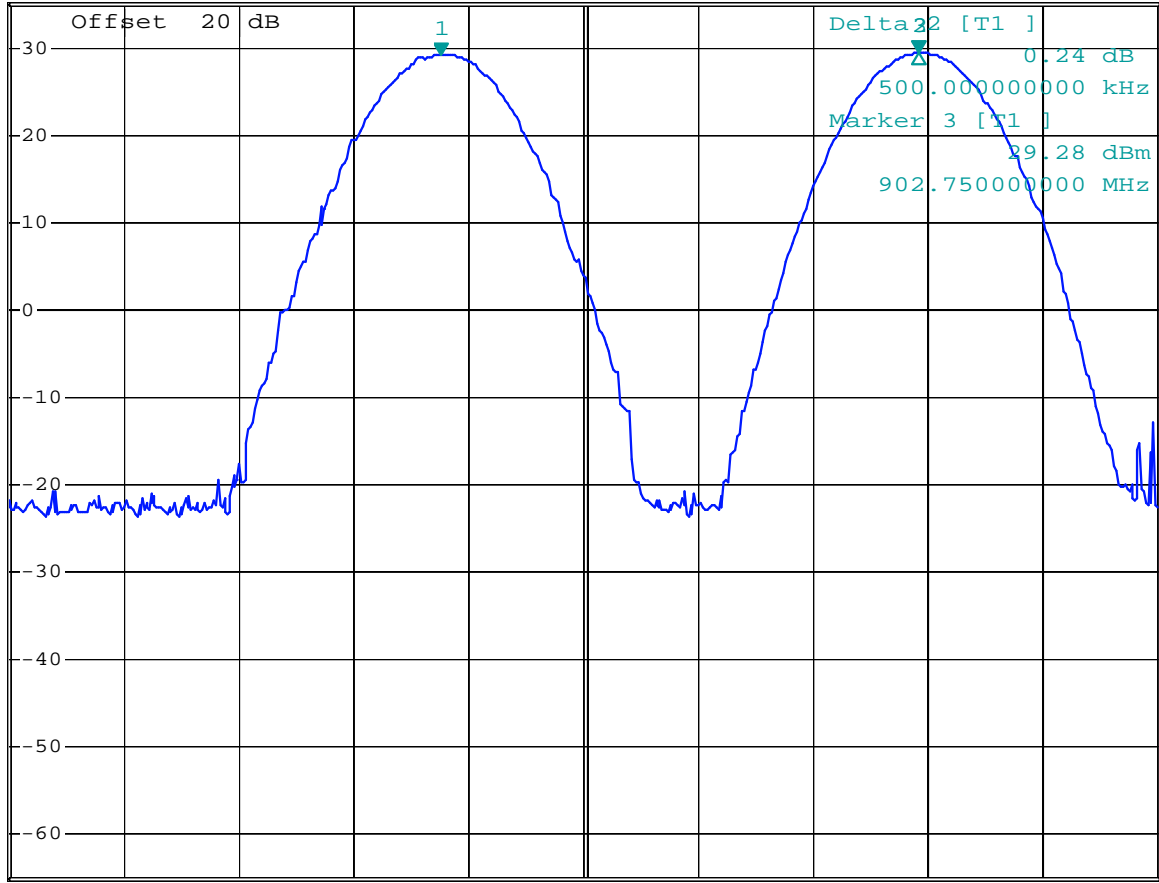
5.10.6 Test protocol

Channel separation



*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz 29.04 dBm
 Ref 35 dBm Att 50 dB SWT 2.5 ms 902.250000000 MHz

1 PK
VIEW



Start 901.8 MHz 120 kHz/ Stop 903 MHz

5.11 Quantity of hopping channels

For test instruments and accessories used see section 6 Part MB.

5.11.1 Description of the test location

Test location: AREA4

5.11.2 Photo documentation of the test set-up



5.11.3 Applicable standard

According to FCC Part 15, Section 15.247(a)(1)(i):

For frequency hopping systems operating in the 902-928 MHz band: If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies.

5.11.4 Description of Measurement

This measurement was done by using a spectrum analyser. The EuT was transmitting at its maximum data rate. The Span of the analyzer was set wide enough to capture the frequency band from 902-928 MHz.

5.11.5 Test result

| Hopping channel frequency range | Quantity of hopping channels value | Quantity of hopping channels minimum limit |
|---------------------------------|------------------------------------|--|
| 902-928 MHz | 52 | 50 |

Limit according to FCC Part 15C, Section 15.247(1):

| Frequency range (MHz) | LIMIT (Quantity of Hopping Channels) | | | |
|--------------------------|--------------------------------------|----------------------------|---------------------------|--------------------------|
| | 20dB Bandwidth < 250kHz | 20dB Bandwidth > 250kHz | 20dB Bandwidth < 1 MHz | 20dB Bandwidth > 1MHz |
| 902 - 928 | 50 | 25 | --- | --- |

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.



5.11.6 Test protocol

Quantity of hopping channel



*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz 29.30 dBm
 SWT 5 ms 915.75000000 MHz

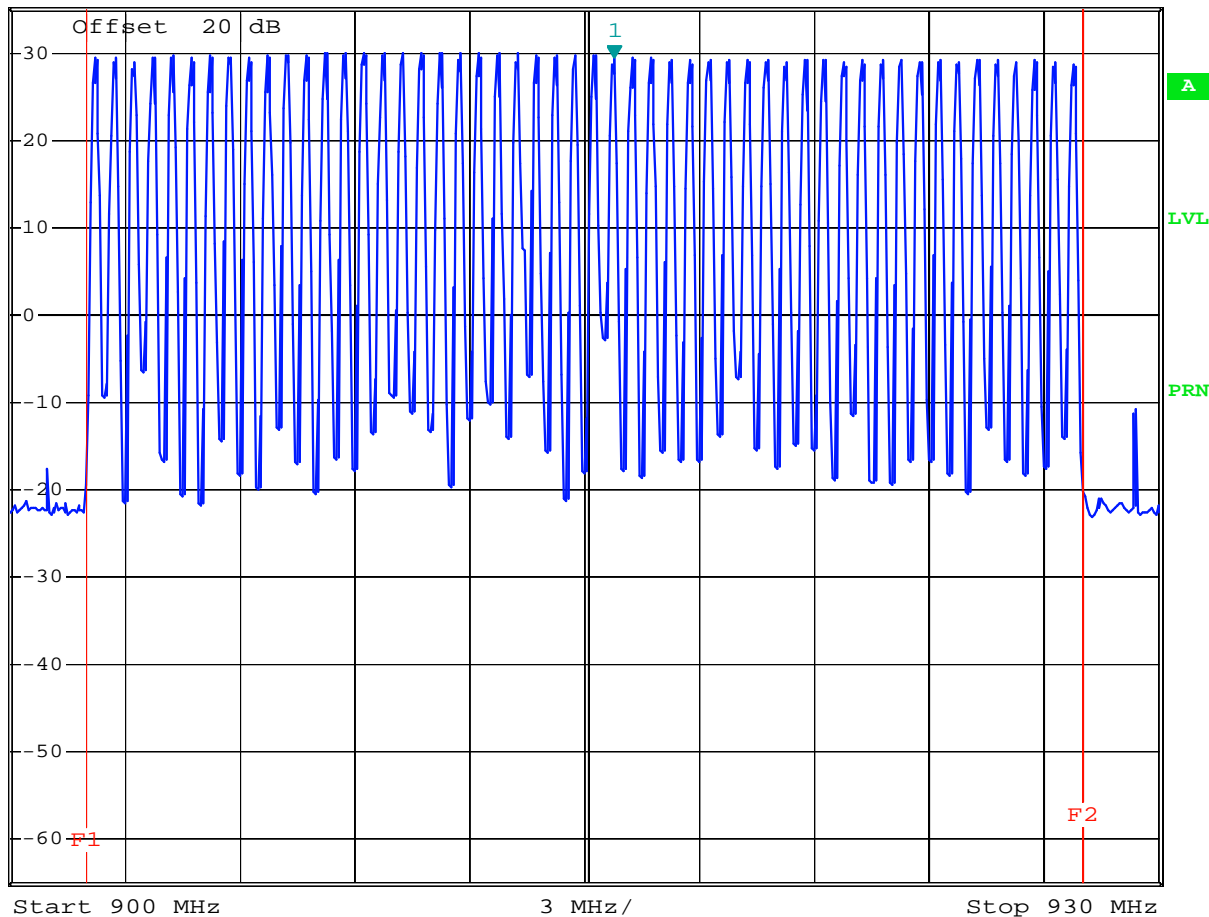
Ref 35 dBm

Att 50 dB

SWT 5 ms

915.75000000 MHz

1 PK
VIEW



5.12 Antenna application - Detailed photos see Attachment A

5.12.1 Applicable standard

According to FCC Part 15C, Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit that broken antennas can be replaced by the user, but the use of a standard antenna jack is prohibited.

The EUT has reverse TNC plugs to connect the defined antennas supplied by the manufacturer.
All supplied antennas meet the requirements of part 15.203 and 15.204.

5.12.2 Antenna requirements

According to FCC Part 15C, Section 15.247 (b)(4):

The conducted output power limit specified in paragraph (b) of 15.247 is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from intentional radiator shall be reduced below the stated values in paragraph (b)(1), (b)(2) and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

mikes

5.13 Receiver conducted disturbances

5.13.1 Description of the test location

Test location: None

5.13.2 Photo documentation of the test set-up

5.13.3 Applicable standard

According to FCC Part 15C, Section 15.107(a):

Except as shown in paragraphs (b) and (c) of this Section, for an unintentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of Emission (MHz) | Conducted Limit (dB μ V) | |
|-----------------------------|------------------------------|------------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency

Remarks: The measurement is not applicable, because the EuT don't have a receive mode.

5.14 Receiver spurious emissions conducted

For test instruments and accessories used see section 6 Part SEC 2 and SEC 3.

5.14.1 Description of the test location

Test location: None

5.14.2 Applicable standard

According to EN 300 328, clause 4.3.7:

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

Limit according to EN 300 328, clause 4.3.7.2

Narrowband spurious emission limits for receivers:

| | |
|--------------------|-----------------------|
| 30 MHz to 1000 MHz | 1000 MHz to 12750 MHz |
| 2.0nW (-57dBm) | 20.0nW (-47dBm) |

Wideband spurious emission limits for receivers:

| | |
|--------------------|-----------------------|
| 30 MHz to 1000 MHz | 1000 MHz to 12750 MHz |
| -107 dBm/Hz | -97 dBm/Hz |

Remarks: The measurement is not applicable, because the EuT don't have a receive mode.

5.15 Maximum permissible exposure (MPE)

For test instruments and accessories used see section 6 Part **CPC 2**.

5.15.1 Description of the test location

Test location: AREA4

5.15.2 Applicable standard

According to FCC Part 15, Section 15.247(i):

Systems operating under the provisions of this section shall be operated in a manner that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

The test methods used comply with ANSI/IEEE C95.1, "IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".

This test report shows the compliance with the limits for Maximum Permissible Exposure (MPE) specified in FCC Part 1, Section 1.1310 and the criteria to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in FCC Part 1, Section 1.1307(b).

5.15.3 Description of Measurement

The maximum total power input to the antenna has been measured conducted as described in clause 5.3 of this document. Through the Friis transmission formula, the known maximum gain of the antenna and the maximum power, the MPE can be calculated in a defined distance away from the product.

Friis transmission formula:
$$P_d = \frac{P_{out} * G}{4 * \Pi * r^2}$$

where

P_d = power density (mW/cm²)

P_{out} = output power to antenna (mW)

G = gain of antenna (linear scale)

r = distance between antenna and observation point (cm)

5.15.4 Test result

Power setting 30 dBm
Antenna gain 6.0 dBic (3 dBi)

| Channel No. | Frequency (MHz) | Max power output to antenna | | Antenna gain (dBi) | Cable loss (dB) | Power density (mW/cm ²) | Limit of power density (mW/cm ²) |
|-------------|-----------------|-----------------------------|--------|--------------------|-----------------|-------------------------------------|--|
| | | (dBm) | (mW) | | | | |
| 1 | 902.25 | 29.46 | 883.08 | 3.0 | 1.0 | 0.278 | 0.601 |
| 26 | 914.75 | 29.76 | 946.24 | 3.0 | 1.0 | 0.298 | 0.610 |
| 52 | 927.75 | 28.81 | 760.33 | 3.0 | 1.0 | 0.240 | 0.619 |

Limits for maximum permissible exposure (MPE):

| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm ²) | Averaging Time (minutes) |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (B) Limits for General Population / Uncontrolled Exposure | | | | |
| 0.3 – 3.0 | 614 | 1.63 | 100 | 30 |
| 3.0 – 30 | 824/f | 2.19/f | 180/ f ² | 30 |
| 30 - 300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | --- | --- | f/1500 | 30 |
| 1500-100000 | --- | --- | 1.0 | 30 |

f = Frequency (MHz)

According to FCC Rules 47CFR 2.1093(b) the EUT is not a portable device. The EUT is designed to be used that radiating structures are more than 20 cm outside of the body of the user. ($r = 20$ cm).

Note: The manufacturer shall state in the manual the minimum cable length for each antenna. Additionally this shall be stated on the label of the EuT.

The requirements are **FULFILLED**.

Remarks:

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

| Test ID | Model Type | Equipment No. | Next Calib. | Last Calib. | Next Verif. | Last Verif. |
|---------|------------------------|-----------------|-------------|-------------|-------------|-------------|
| A 4 | ESHS 30 | 02-02/03-05-002 | 18/06/2011 | 18/06/2010 | | |
| | NNLK 8129 | 02-02/20-05-001 | | | 17/12/2010 | 17/06/2010 |
| | ESH 2 - Z 5 | 02-02/20-05-004 | 13/03/2011 | 13/03/2008 | 11/12/2010 | 11/06/2010 |
| | N-4000-BNC | 02-02/50-05-138 | | | | |
| | N-1500-N | 02-02/50-05-140 | | | | |
| | ESH 3 - Z 2 | 02-02/50-05-155 | | | 07/10/2010 | 07/04/2010 |
| | SP 103 /3.5-60 | 02-02/50-05-182 | | | | |
| CPC 2 | FSP 30 | 02-02/11-05-001 | 04/05/2011 | 04/05/2010 | | |
| | Inmet 18N50W-20 dB | 02-02/50-10-001 | | | | |
| DC | FSP 30 | 02-02/11-05-001 | 04/05/2011 | 04/05/2010 | | |
| | Inmet 18N50W-20 dB | 02-02/50-10-001 | | | | |
| MB | FSP 30 | 02-02/11-05-001 | 04/05/2011 | 04/05/2010 | | |
| | Inmet 18N50W-20 dB | 02-02/50-10-001 | | | | |
| SEC 1-3 | FSP 30 | 02-02/11-05-001 | 04/05/2011 | 04/05/2010 | | |
| | WHJS 1000-10EE | 02-02/50-05-070 | | | | |
| | Inmet 18N50W-20 dB | 02-02/50-10-001 | | | | |
| SER 1 | FMZB 1516 | 01-02/24-01-018 | | | 15/02/2011 | 15/02/2010 |
| | ESCI | 02-02/03-05-005 | 10/11/2010 | 10/11/2009 | | |
| | S10162-B | 02-02/50-05-031 | | | | |
| | KK-EF393-21N-16 | 02-02/50-05-033 | | | | |
| | NW-2000-NB | 02-02/50-05-113 | | | | |
| SER 2 | ESVS 30 | 02-02/03-05-006 | 11/06/2011 | 11/06/2010 | | |
| | VULB 9168 | 02-02/24-05-005 | 06/05/2011 | 06/05/2008 | 01/10/2010 | 01/04/2010 |
| | S10162-B | 02-02/50-05-031 | | | | |
| | KK-EF393-21N-16 | 02-02/50-05-033 | | | | |
| | NW-2000-NB | 02-02/50-05-113 | | | | |
| SER 3 | FSP 30 | 02-02/11-05-001 | 04/05/2011 | 04/05/2010 | | |
| | AFS4-01000400-10-10P-4 | 02-02/17-05-003 | | | | |
| | AMF-4F-04001200-15-10P | 02-02/17-05-004 | | | | |
| | AFS5-12001800-18-10P-6 | 02-02/17-06-002 | | | | |
| | 3117 | 02-02/24-05-009 | 10/02/2011 | 10/02/2010 | | |
| | Sucoflex N-1600-SMA | 02-02/50-05-073 | | | | |
| | Sucoflex N-2000-SMA | 02-02/50-05-075 | | | | |