# TEST REPORT

## Title 47-Telecommunication

Chapter I - Federal Communications Commission
Subchapter A - General
Part 15 - Radio Frequency Devices
Subpart B - Unintentional Radiators

| | | |
|---|---|---|
| **Report Reference No.** .....: | 326494-3TRFFCC | |
| Tested by (name, function and signature) .....: | P. Barbieri | (project handler) |
| Approved by (name, function and signature) .....: | G. Curioni | (verifier) |
| Date of issue .....: | 2017-03-23 | |
| **Testing Laboratory** .....: | **Nemko Spa** | |
| Address.....: | Via del Carroccio, 4 – 20853 Biassono (MB) – Italy | |
| Testing location | Nemko Spa | |
| Address.....: | Via del Carroccio, 4 – 20853 Biassono (MB) – Italy | |
| Registration number: | 481407 | |
| **Applicant's name** .....: | **Paradox Engineering SA** | |
| Address.....: | Via Passeggiata, 7 – CH-6883 Novazzano – Switzerland | |
| **Test specification:** | | |
| Standard .....: | FCC CFR 47 Part 15 Subpart B | |
| | §15.107 – Conducted limits | ☒ |
| | §15.109 – Radiated emission limits | ☒ |
| | §15.111 – Antenna power conduction limits for receivers | ☒ |
| Test procedure.....: | Nemko WM L0077, WM L0177 and WM L1002 | |
| **Test Report Form No.** .....: | FCCTRF | |
| TRF Originator .....: | Nemko Spa | |
| Master TRF.....: | 2014-03 | |

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| | |
|---|---|
| **Test item description ..... :** | **Gateway** |
| Trade Mark .....: | PARADOX ENGINEERING |
| Manufacturer.....: | Paradox Engineering SA |
| Address of manufacturer .....: | Via Passeggiata, 7 – CH-6883 Novazzano – Switzerland |
| Model .....: | PE.AMI-GW920 |
| Ratings.....: | 100-240 V ~ 50/60 Hz |

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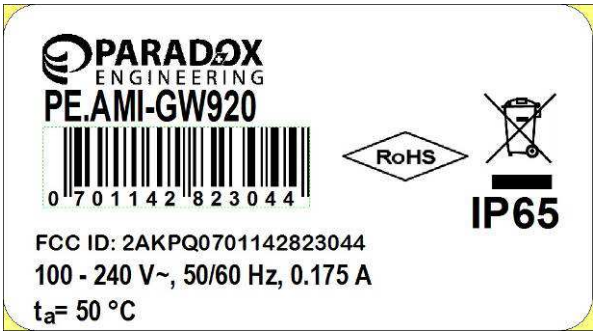
*The test report merely corresponds to the tested sample.*
*The phase of sampling / collection of equipment under test is carried out by the customer.*

This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

| Test Report No. : | 326494-3TRFFCC | 2017-03-23<br>Date of issue |
|---|---|---|

| Short description of the EuT | Copy of marking plate |
|---|---|
| The EUT is a gateway equipped with following radio modules:<br>1) ELB-PED-0077 (radio narrowband 902-928 MHz)<br>2) WLE600VX (Wi-Fi cards 2412-2472 MHz and 5745-5825 MHz)<br>The EUT is also provided with the following antennas:<br>1) MEGWX-1551SAAX-920 (902-928 MHz)<br>2) OM24580703 (2412-2472 MHz)<br>3) MT-485001 (5745-5825 MHz) |  |

| | |
|---|---|
| Number of tested samples: | 1 |
| Serial number: | 1704PE000030 |
| Internal operating frequency: | < 1 GHz with the Wi-Fi module switched off |
| Class: | B |
| Device type: | Pale Mounting |
| Accessories and detachable parts included: | The EUT is composed by a single unit with three antennas |
| Other options included: | - |
| **Testing** | |
| Date of receipt of test sample: | 2017-03-17 |
| Testing commenced on: | 2017-03-20 |
| Testing concluded on: | 2017-03-23 |
| **Possible test case verdicts:** | |
| test case does not apply to the test object: | N (Not applicable) |
| test object does meet the requirement: | P (Pass) |
| test object does not meet the requirement: | F (Fail) |

**Symbols used in this test report**

☒ The crossed square indicates that the listed condition or equipment is applicable for this report.

☐ The empty square indicates that the listed condition or equipment is not applicable for this report.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

| **Verdict** according to the standards listed at page 5: | **Pass** |
|---|---|

| PROJECT HISTORY | | |
|---|---|---|
| **Report number** | **Modification to the report / comments** | **Date** |
| 326494-3TRFFCC | First release | 2017-03-23 |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |
| **REMARKS** | | |
| | | |

| PRODUCT VARIANTS | | |
|---|---|---|
| **Variant model** | **Difference against the main model** | **Additional test performed** |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |
| **REMARKS** | | |
| | | |

# Contents


1 TEST STANDARDS 5

2 SUMMARY OF TEST RESULTS 5

3 EQUIPMENT UNDER TEST 6

3.1 POWER SUPPLY SYSTEM UTILISED 6
3.2 EUT OPERATION MODES 6
3.3 EUT CONFIGURATION MODES 6
3.4 INPUT/OUTPUT PORTS 7
3.5 EQUIPMENT USED DURING TEST 7
3.6 SOFTWARE USED DURING TEST 7

4 TEST ENVIRONMENT 8

4.1 ADDRESS OF THE TEST LABORATORY 8
4.2 ENVIRONMENTAL CONDITIONS 8
4.3 TEST EQUIPMENT USED FOR THE MONITORING OF THE ENVIRONMENTAL CONDITIONS 8
4.4 STATEMENT OF THE MEASUREMENT UNCERTAINTY 9

5 TEST CONDITIONS AND RESULTS 10

5.1 CLAUSE 15.107 – CONDUCTED LIMITS 10
5.2 CLAUSE 15.109 – RADIATED EMISSIONS LIMIT 14
5.3 CLAUSE 15.111 – ANTENNA POWER CONDUCTION LIMITS FOR RECEIVERS 31

6 EUT PHOTOS 38

# 1 TEST STANDARDS

The tests were performed according to following standards and procedures.

**NEMKO WM L0177:** General routines for using instruments at Nemko

**NEMKO WM L1002:** Measurement Uncertainty - Policy and Statement

**NEMKO WM L0077:** General routines to perform EMC tests

**FCC CFR 47 Part 15 Subpart B**
Code of Federal Regulations – Title 47 – Part 15 Radio Frequency Devices – Subpart B Unintentional radiation

The main standard above contains references to other standards, which are listed below.

**ANSI C63.4 (2014)**
American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

# 2 SUMMARY OF TEST RESULTS

| FCC Part 15 Subpart B requirements | | | |
|---|---|---|---|
| **Part** | **Test description** | **Frequency range** | **Verdict** |
| §15.107 | Conducted emission | 150 kHz to 30 MHz | P |
| §15.109 | Radiated emission | 30 MHz to 5000 MHz | P |
| §15.111 | Antenna power conduction limits for receivers | 30 MHz to 5000 MHz | P |
| | | | |
| **GENERAL REMARKS** | | | |
| | | | |

# 3 EQUIPMENT UNDER TEST

## 3.1 Power supply system utilised

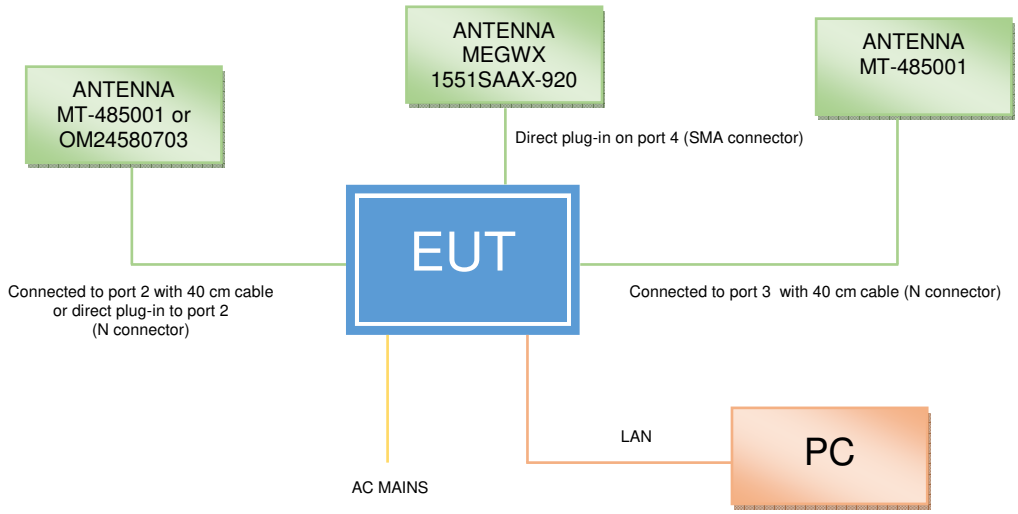
| | | | | |
|---|---|---|---|---|
| Power supply voltage: | ☐ | 230V/50 Hz / 1ϕ | ☒ | 115V/60Hz / 1ϕ |
| | ☐ | 400V/50 Hz 3PE | ☐ | 400V/50 Hz 3NPE |
| | ☐ | 12 VDC | ☐ | 24 VDC |

## 3.2 EuT operation modes

| Mode | Description |
|---|---|
| 1 | Normal working with the radio modules in RX mode and with traffic on Ethernet line |

## 3.3 EuT configuration modes

The EuT was configured to measure its highest possible radiation level. The test modes selected are according to EuT instruction manual.

| Mode | Description |
|---|---|
| 1 |  |

## 3.4 Input/Output Ports

| Port | Name | Type* | Cable Max. >3m | Cable Shielded | Description |
|---|---|---|---|---|---|
| 0 | ENCLOSURE | N/E | — | — | — |
| 1 | AC MAINS | AC | ☐ | ☐ | Three wires cable |
| 2 | LAN | TP | ☒ | ☐ | Standard cable with RJ 45 connector |
| 3 | ANTENNA PORT 2 | ANT | ☒ | ☒ | Coaxial cable or direct plug-in (N connector) |
| 4 | ANTENNA PORT 3 | ANT | ☒ | ☒ | Coaxial cable (N connector) |
| 5 | ANTENNA PORT 4 | ANT | ☐ | ☐ | Direct plug-in (SMA connector) |

*Note:

AC = AC Power Port DC = DC Power Port N/E = Non-Electrical

I/O = Signal/Control Input or Output Port TP = Telecommunication Port ANT = Antenna Port

## 3.5 Equipment Used During Test

| Use* | Product Type | Manufacturer | Model | Comments |
|---|---|---|---|---|
| AE | PC | HP | Compaq 6510b | — |

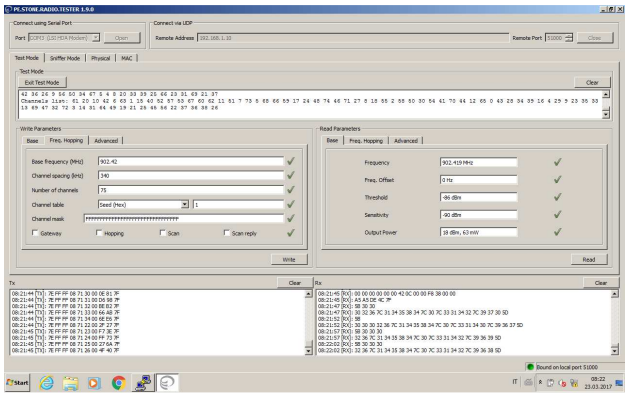
Note: * Use

EUT - Equipment Under Test

AE - Auxiliary/Associated Equipment (Not Subjected to Test)

SIM - Simulator (Not Subjected to Test)

## 3.6 Software Used During Test



The tx power parameter has been set to 18 for ELB-PED-0077 radio module, to 18 for WLE600VX radio module at 5 GHz and to 23 for radio module at 2.4 GHz, according to applicant's request.

# 4 TEST ENVIRONMENT

## 4.1 Address of the test laboratory

Nemko Spa
Via del Carroccio, 4
20853 Biassono (MB) - Italy

Tests site/benches are in accordance with applicable standard/s, and have been utilized by Nemko Spa testing engineer(s).

## 4.2 Environmental conditions

Unless different values are declared in the test case, following ambient conditions apply for the tests:

Ambient temperature: 18÷33 °C

Relative Humidity: 30÷60 %

Atmospheric pressure: 980÷1060 hPa

## 4.3 Test equipment used for the monitoring of the environmental conditions

| Equipment | Manufacturer | Model | Serial N° | Due Date |
|---|---|---|---|---|
| Thermohygrometer data loggers | Testo | 175-H2 | 20012380/305 | 2018-12 |
| Barometer | MSR | MSR145B | 330080 | 2018-03 |

## 4.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16-4-2 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the Nemko Spa Technical Procedure WML1002. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. Hereafter the best measurement capability for Nemko Spa laboratory is reported:

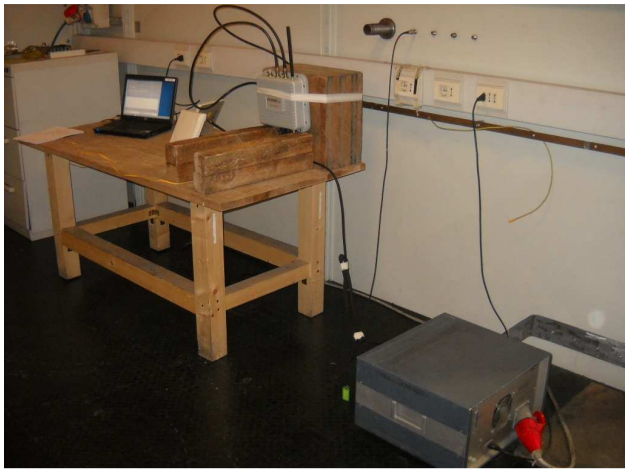
| Test | Range | Measurement Uncertainty | Notes |
|---|---|---|---|
| Radiated Disturbance 3m, 10m Chamber | Antenna distance 1m, 3m, 10m (30÷200) MHz | 5.0 dB | (1) |
| | Antenna distance 1m, 3m, 10m (0.2÷6) GHz | 5.2 dB | (1) |
| | Antenna distance 1m, 3m (6÷18) GHz | 5.8 dB | (1) |
| | Antenna distance 1m, 3m (18÷40) GHz | 7.2 dB | (1) |
| Conducted Disturbance | 9 kHz ÷ 150 kHz with AMN | 3.8 dB | (1) |
| | 150 kHz ÷ 30 MHz with AMN | 3.4 dB | (1) |
| | 150 kHz ÷ 30 MHz with AAN | 4.6 dB | (1) |
| | 9 kHz ÷ 30 MHz with voltage probe | 2.9 dB | (1) |
| | 9 kHz ÷ 30 MHz with current probe | 2.9 dB | (1) |

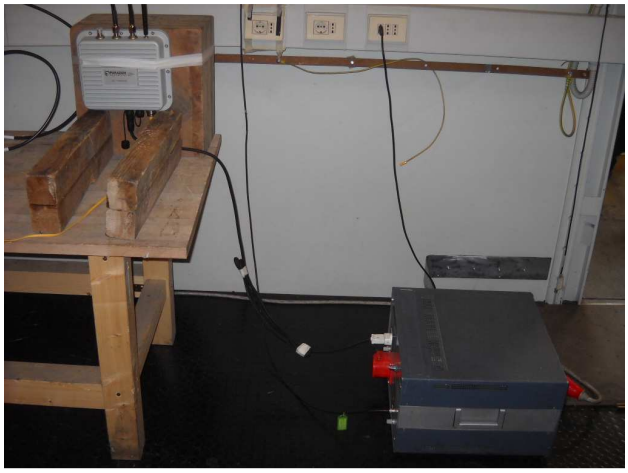
NOTES:
(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2 which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %;

# 5 TEST CONDITIONS AND RESULTS

## 5.1 Clause 15.107 – Conducted limits

### 5.1.1 Photo documentation of the test set-up





### 5.1.2 Test method

Measurements were made on a ground plane that extends 1-meter minimum beyond all sides of the system under test. All power was connected to the system through Line Impedance Stabilization Networks (LISN). Conducted voltage measurements on mains lines were made at the output of the LISN.

### 5.1.3 Limits for AC mains port

Except for Class A digital devices, for equipment 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, as measured using a 50µH/50ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

| Frequency of emission (MHz) | Conducted limit (dBµV) | |
|---|---|---|
| | Quasi-Peak | Average |
| 0.15 to 0.50 | 66 to 56* | 59 to 46* |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

*The limits decrease linearly with the logarithm of the frequency

For a Class A digital device 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, as measured using a 50 µH/50 ohms LISN. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency of emission (MHz) | Conducted limit (dBµV) | |
|---|---|---|
| | Quasi-Peak | Average |
| 0.15 to 0.50 | 79 | 66 |
| 0.50 to 30 | 73 | 60 |

### 5.1.4 Test result

| | |
|---|---|
| Verdict: | ☒ P ☐ F ☐ N |
| Frequency range: | 0.15MHz - 30MHz |
| Kind of test site: | Shielded room |
| Remarks: | |

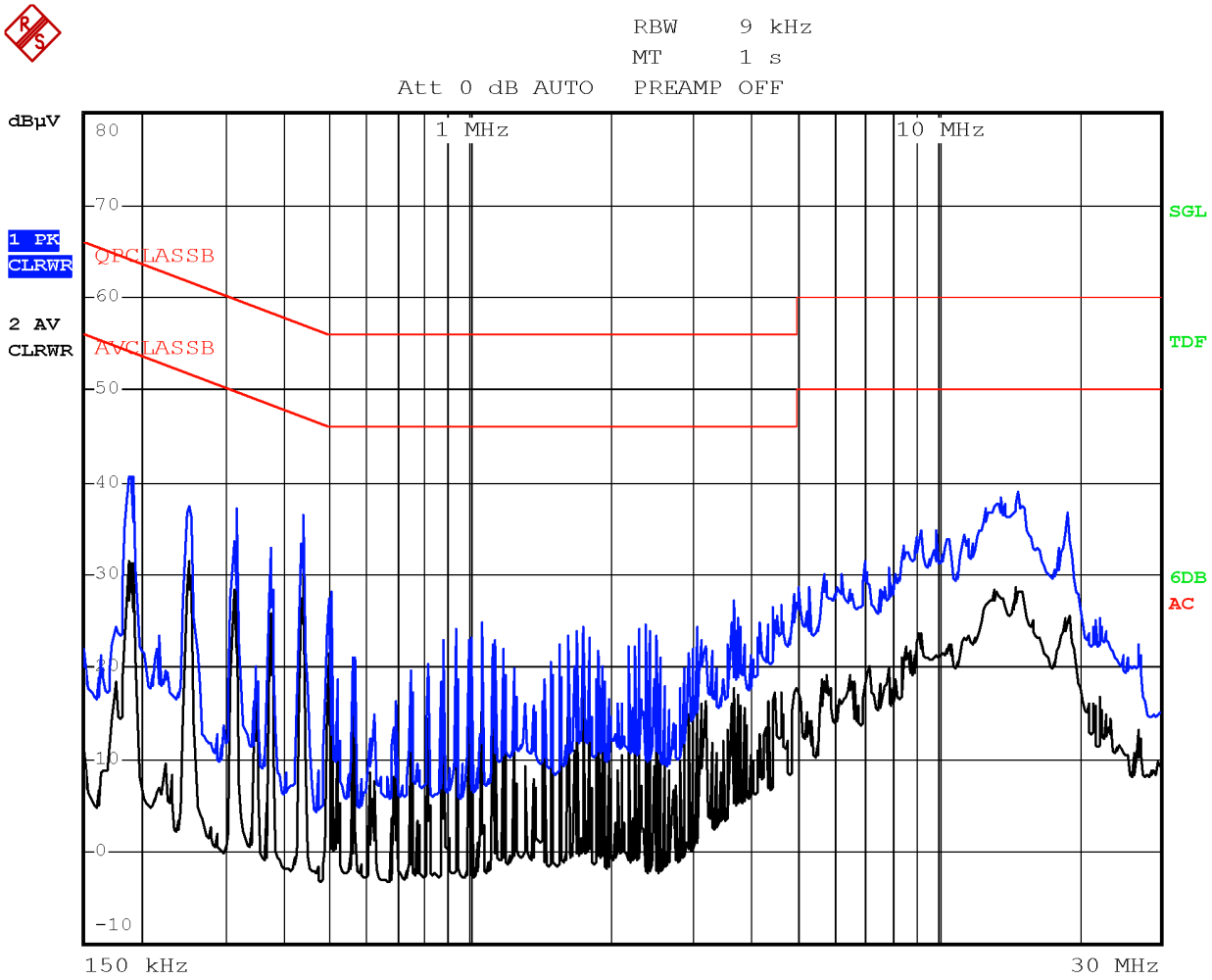
### 5.1.5 Test equipment used

| Equipment | Manufacturer | Model | Serial N° | Due Date |
|---|---|---|---|---|
| EMI receiver 20 Hz ÷ 8 GHz | R&S | ESU8 | 100202 | 2017-09 |
| LISN 9 kHz ÷ 30 MHz | R&S | ESH2-Z5 | 872 460/041 | 2017-11 |
| Shielded room | Siemens | Conducted emission test room | 1862 | NCR |

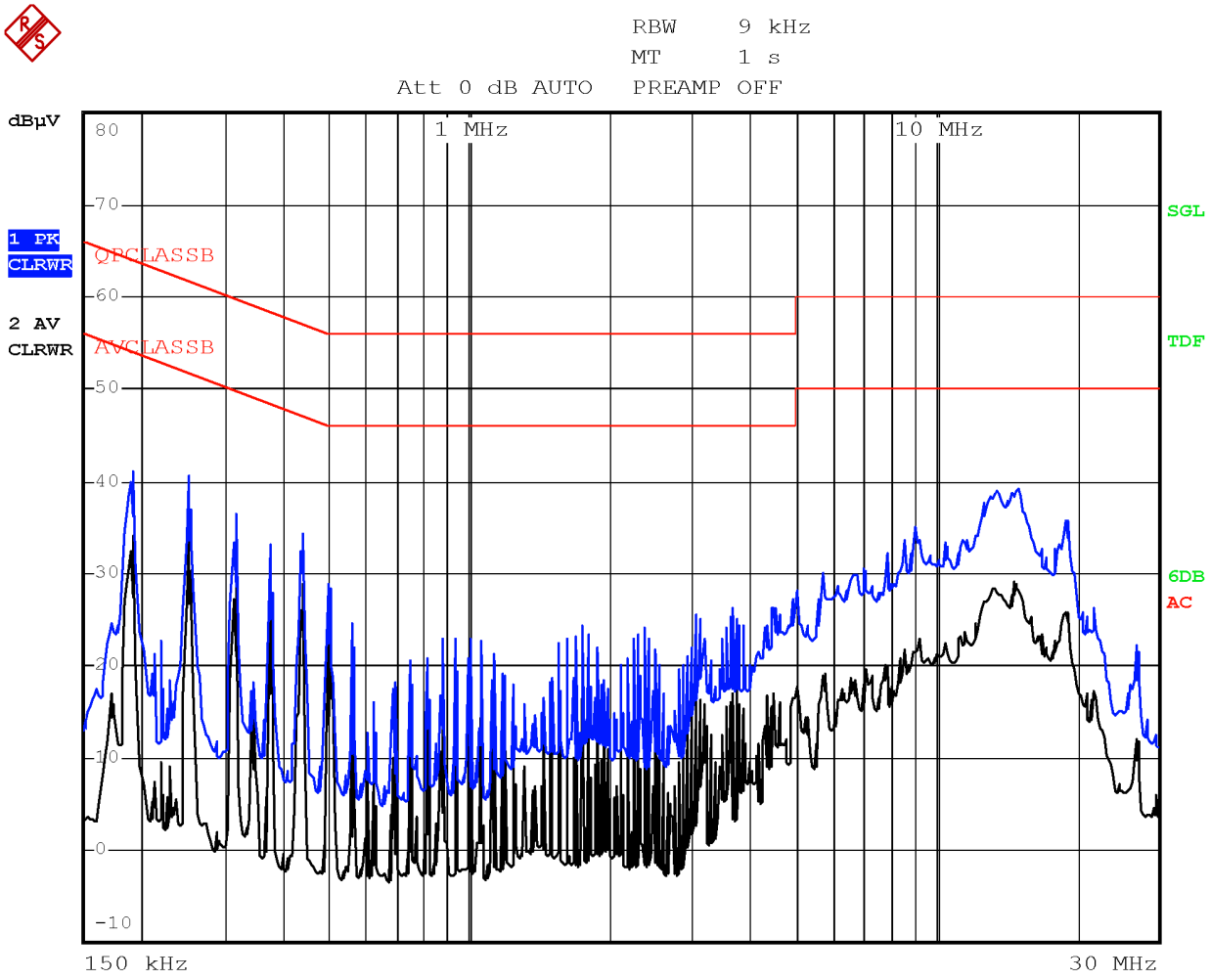
NCR = no calibration required

### 5.1.6 Test protocol

Test point: Phase line Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: -

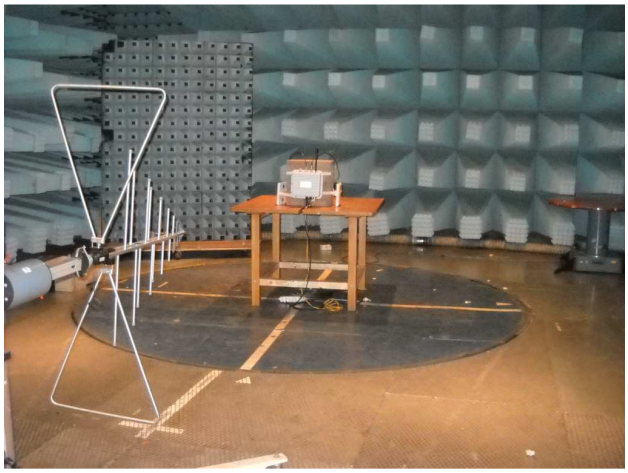


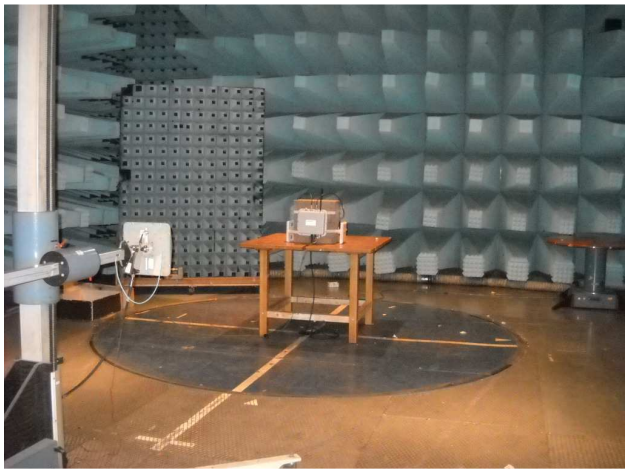
Test point: Neutral line Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: -



## 5.2 Clause 15.109 – Radiated emissions limit

### 5.2.1 Photo documentation of the test set-up





### 5.2.2 Test method

Measurements were made on a semi anechoic chamber. Preliminary measurements were performed at an antenna to EUT separation distance of 3 or 10 meters with the receive antenna located at a fixed height (from 1 to 4 meter) in both horizontal and vertical polarities. Final measurements were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

### 5.2.3 Limits for enclosure

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency of emission (MHz) | Field strength (µV/m) | Field strength (dBµV/m) |
|---|---|---|
| 30–88 | 100 | 40.0 |
| 88–216 | 150 | 43.5 |
| 216–960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

| Frequency of emission (MHz) | Field strength (µV/m) | Field strength (dBµV/m) |
|---|---|---|
| 30–88 | 90 | 39.0 |
| 88–216 | 150 | 43.5 |
| 216–960 | 210 | 46.4 |
| Above 960 | 300 | 49.5 |

### 5.2.4 Test result

| | |
|---|---|
| Verdict: | ☒ P ☐ F ☐ N |
| Frequency range: | 30MHz - 5000MHz |
| Kind of test site: | Semi anechoic chamber |
| Measurement distance: | 3 m |

Remarks: for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown as follow:

If the intentional radiator operates at frequency upper than 1.705 MHz and lowers than 108 MHz the upper frequency of measurement range is 1000 MHz.

If the intentional radiator operates at frequency upper than 108 MHz and lowers than 500 MHz the upper frequency of measurement range is 2000 MHz.

If the intentional radiator operates at frequency upper than 500 MHz and lowers than 1000 MHz the upper frequency of measurement range is 5000 MHz.

If the intentional radiator operates at frequency above 1000 MHz the upper frequency of measurement range is 5th harmonic of the highest frequency or 40 GHz, whichever is lower.

If the intentional radiator operates at or above 10 GHz and below 30 GHz to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

If the intentional radiator operates at or above 30 GHz to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

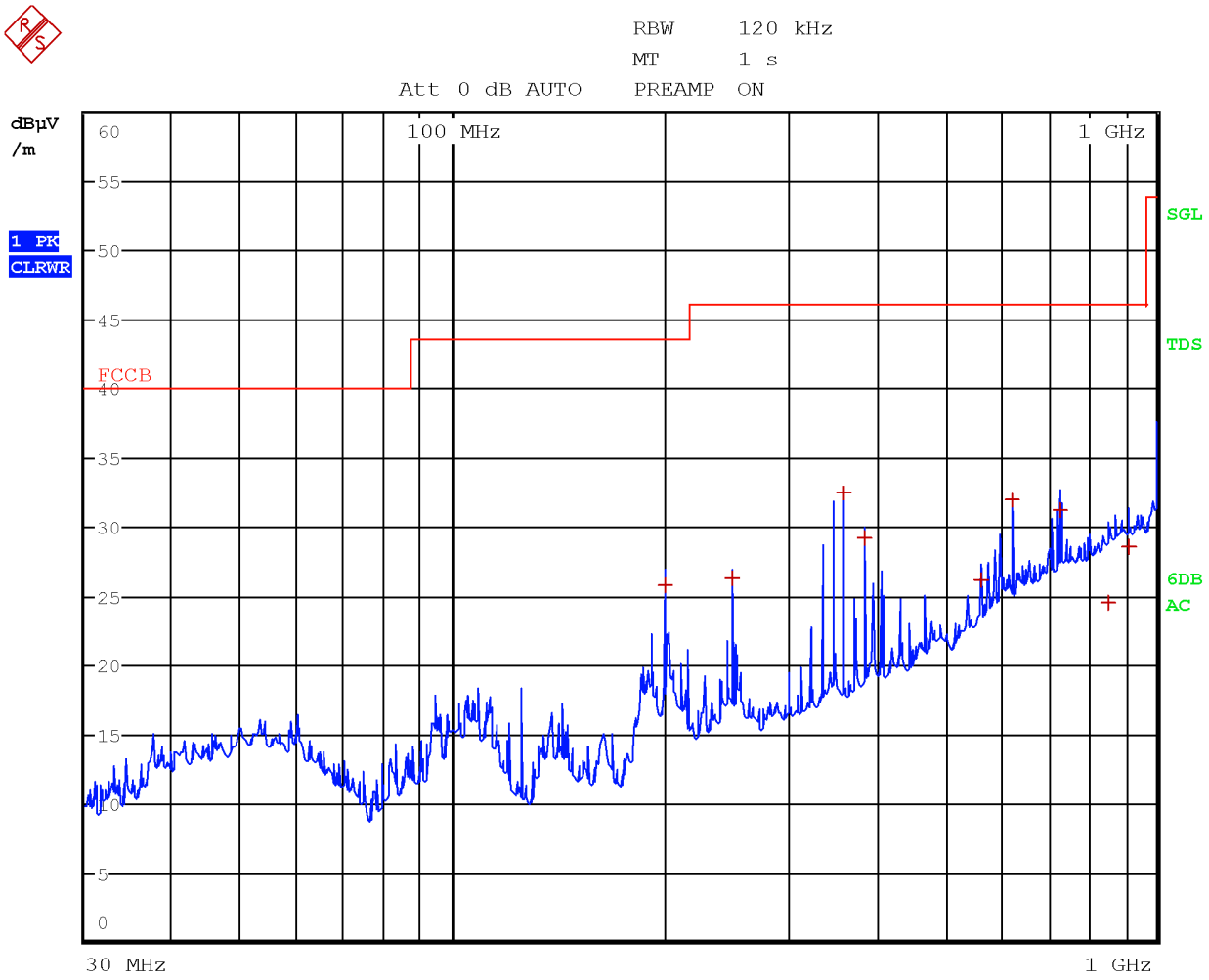
### 5.2.5 Test equipment used

| Equipment | Manufacturer | Model | Serial N° | Due Date |
|---|---|---|---|---|
| Trilog Broadband Antenna 25 ÷ 8000 MHz | Schwarzbeck | VULB 9162 | 9162-025 | 2018-07 |
| Bilog antenna 1 ÷ 18 GHz | Schwarzbeck | STLP 9148-123 | 123 | 2018-06 |
| Broadband preamplifier | Schwarzbeck | BBV 9718 | 9718-137 | 2017-12 |
| EMI receiver 20 Hz ÷ 8 GHz | R&S | ESU8 | 100202 | 2017-09 |
| Hydraulic revolving platform | Nemko | RTPL 01 | 4.233 | NCR |
| Antenna mast | R&S | HCM | 836 529/05 | NCR |
| Controller | R&S | HCC | 836 620/7 | NCR |
| Semi-anechoic chamber | Nemko | 10m semi-anechoic chamber | 530 | 2018-10 |
| Shielded room | Siemens | 10m control room | 1947 | NCR |

NCR = no calibration required

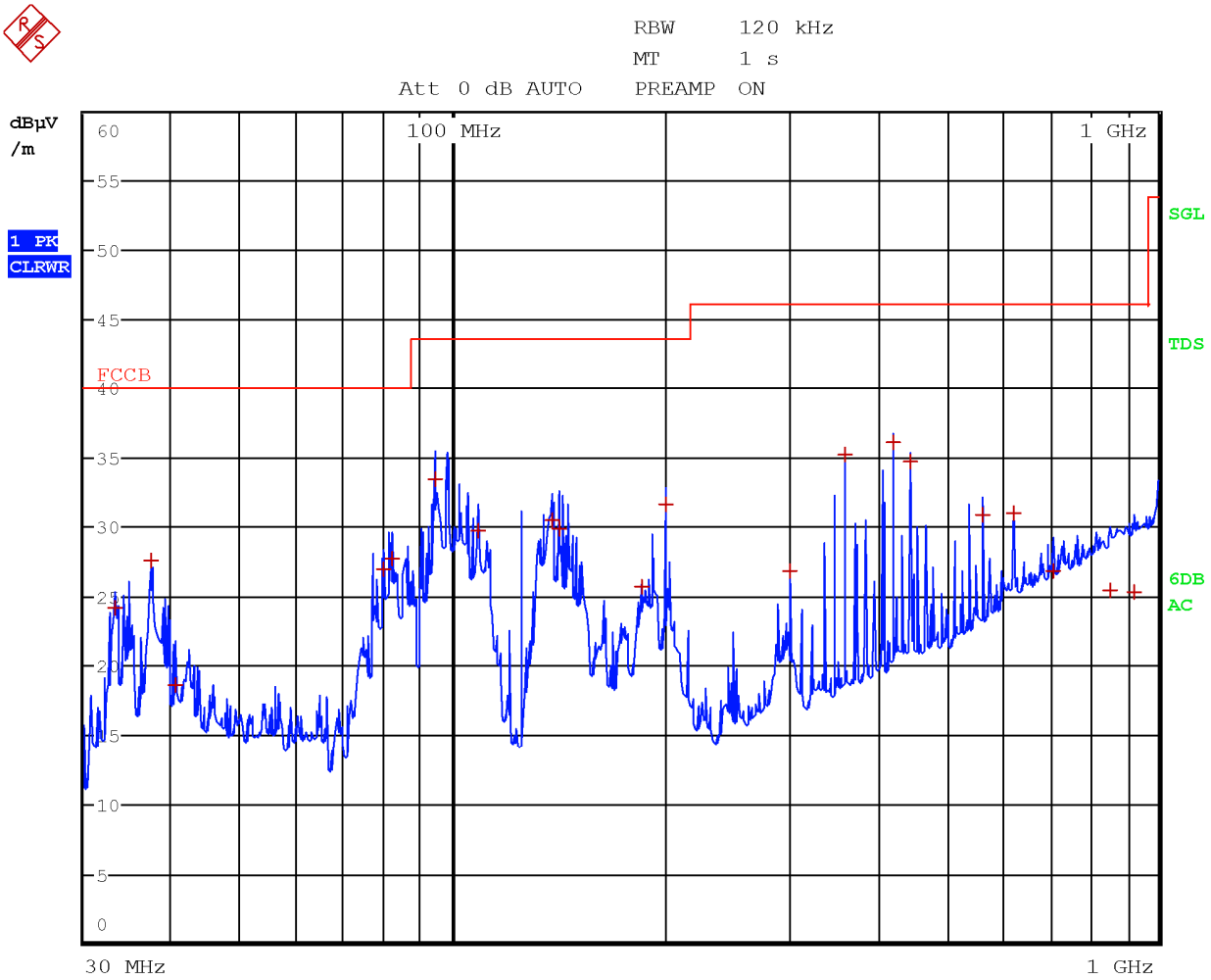
### 5.2.6 Test protocol

Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 902.42 MHz
Remarks: Frequency range: 30 to 1000 MHz



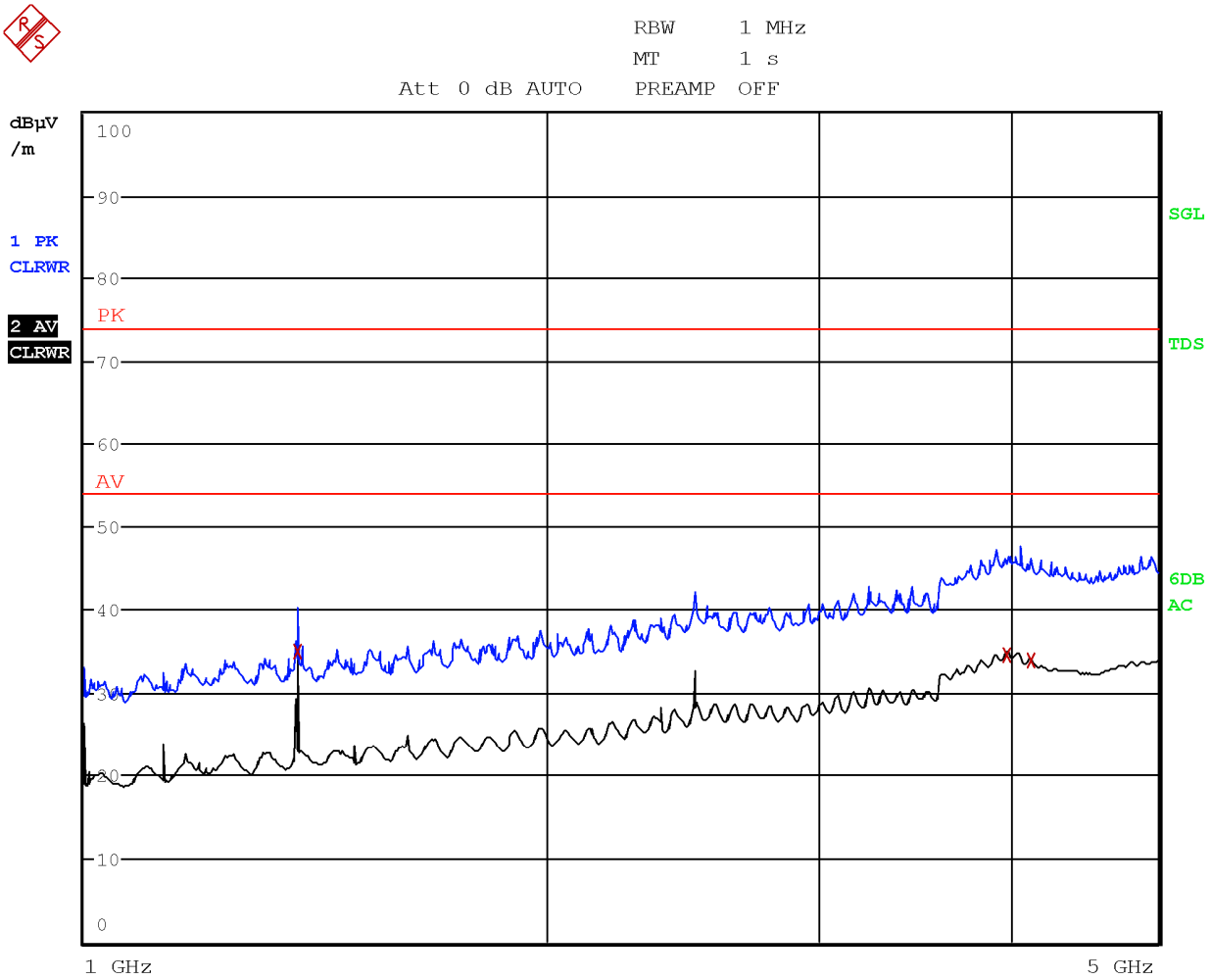

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 199.9800 | 25.8 | 43.5 | -17.7 | QP |
| 249.9900 | 26.2 | 46.0 | -19.8 | QP |
| 360.0300 | 32.4 | 46.0 | -13.6 | QP |
| 384.0000 | 29.2 | 46.0 | -16.8 | QP |
| 564.0300 | 26.2 | 46.0 | -19.9 | QP |
| 624.9900 | 31.9 | 46.0 | -14.1 | QP |
| 732.0300 | 31.2 | 46.0 | -14.8 | QP |
| 853.1100 | 24.6 | 46.0 | -21.5 | QP |
| 912.0300 | 28.5 | 46.0 | -17.5 | QP |

Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 902.42 MHz
Remarks: Frequency range: 30 to 1000 MHz



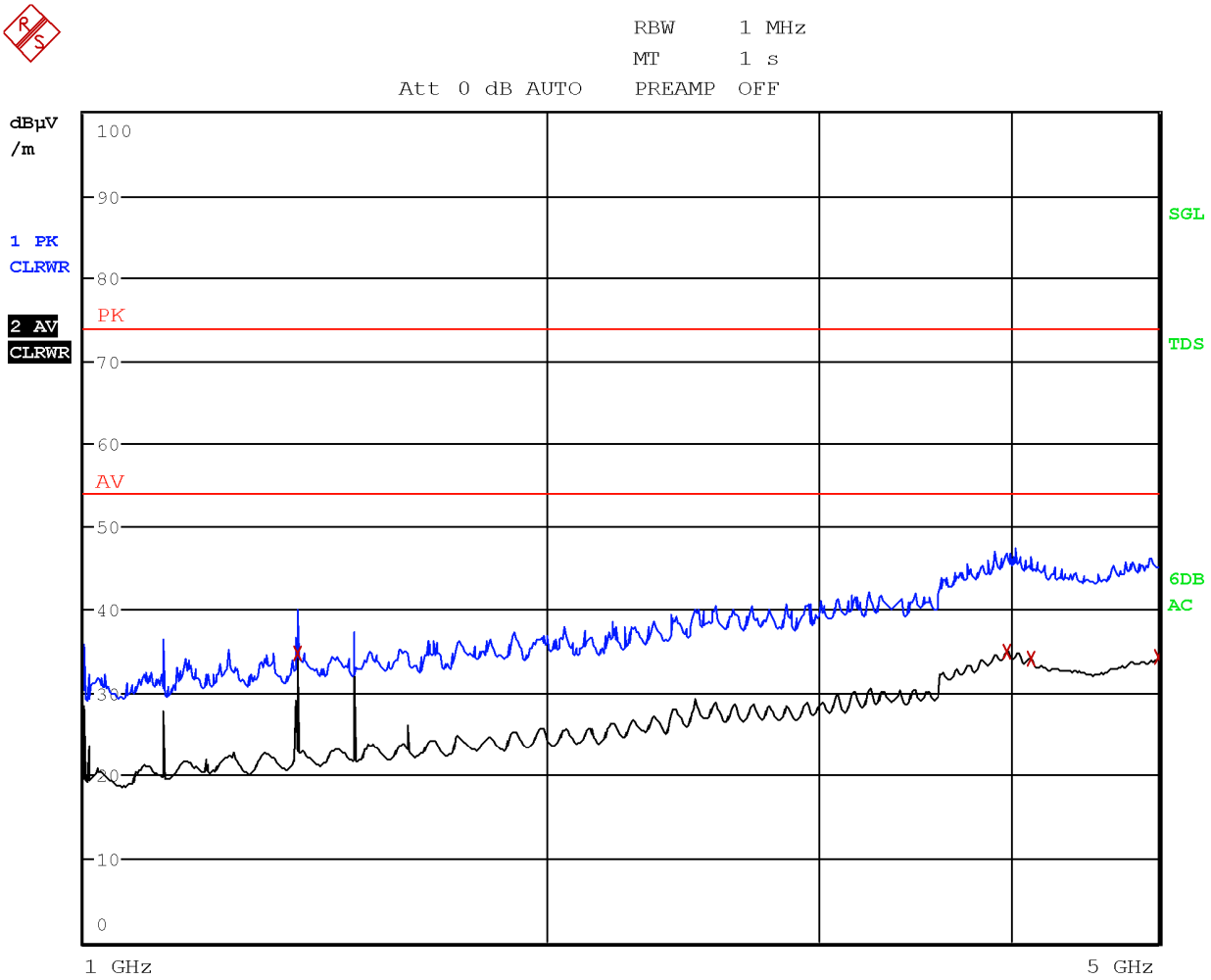
| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 33.1800 | 24.1 | 40.0 | -15.9 | QP |
| 37.3500 | 27.6 | 40.0 | -12.4 | QP |
| 40.3200 | 18.6 | 40.0 | -21.4 | QP |
| 79.7400 | 26.9 | 40.0 | -13.1 | QP |
| 82.0500 | 27.6 | 40.0 | -12.4 | QP |
| 94.3800 | 33.5 | 43.5 | -10.0 | QP |
| 108.8100 | 29.7 | 43.5 | -13.8 | QP |
| 138.4200 | 30.5 | 43.5 | -13.0 | QP |
| 141.1800 | 29.8 | 43.5 | -13.7 | QP |
| 185.2200 | 25.7 | 43.5 | -17.9 | QP |
| 200.0100 | 31.6 | 43.5 | -12.0 | QP |
| 300.0300 | 26.7 | 46.0 | -19.3 | QP |
| 360.0300 | 35.2 | 46.0 | -10.8 | QP |
| 420.0300 | 36.2 | 46.0 | -9.9 | QP |
| 444.0300 | 34.8 | 46.0 | -11.2 | QP |
| 564.0300 | 30.9 | 46.0 | -15.1 | QP |
| 624.9900 | 31.0 | 46.0 | -15.0 | QP |
| 708.0000 | 26.8 | 46.0 | -19.3 | QP |
| 852.0900 | 25.4 | 46.0 | -20.7 | QP |
| 924.2400 | 25.3 | 46.0 | -20.7 | QP |

Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 902.42 MHz
Remarks: Frequency range: 1000 to 5000 MHz



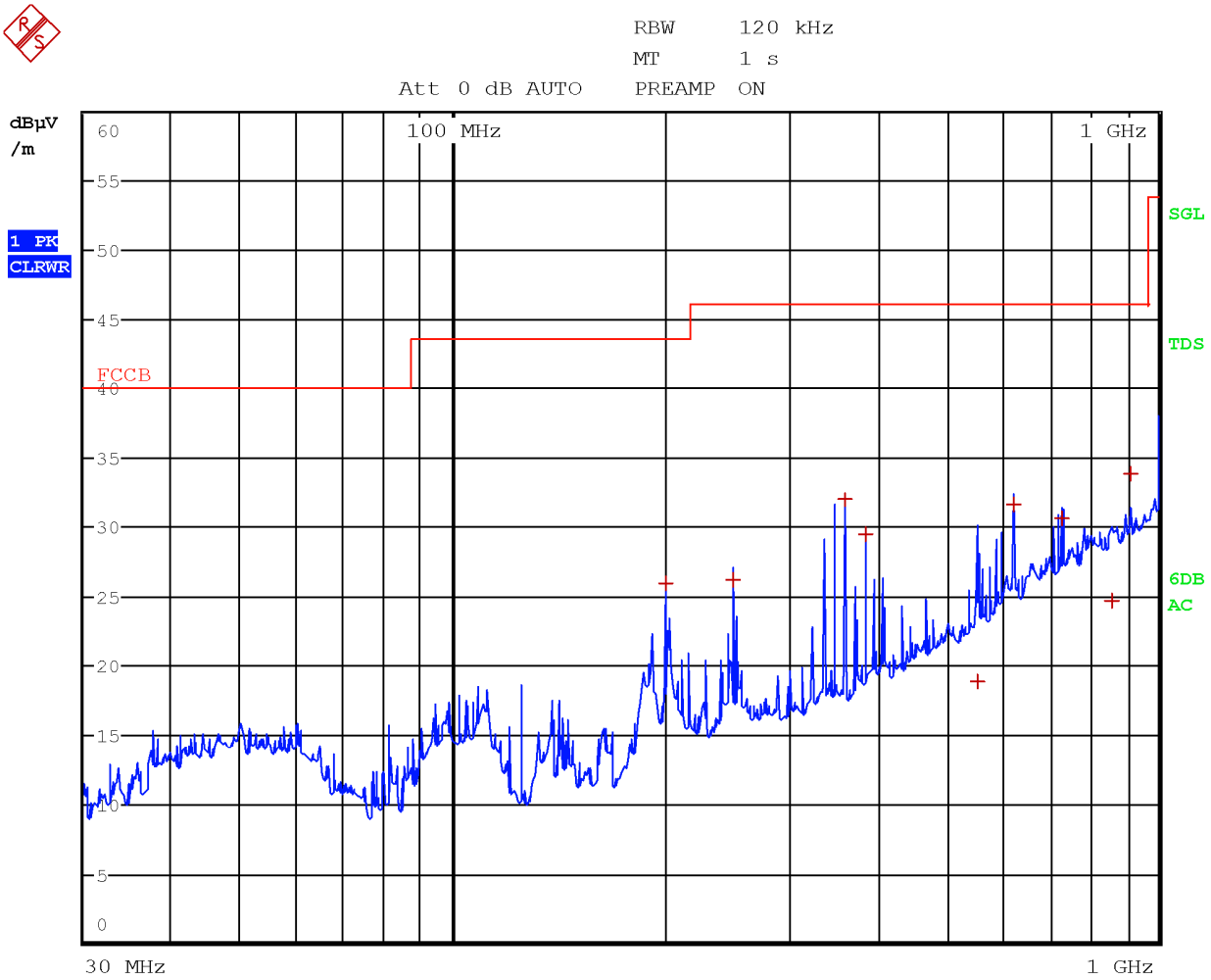

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 1375.0000 | 35.0 | 54.0 | -19.0 | AV |
| 3980.0000 | 34.7 | 54.0 | -19.3 | AV |
| 4126.0000 | 33.9 | 54.0 | -20.1 | AV |

Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 902.42 MHz
Remarks: Frequency range: 1000 to 5000 MHz



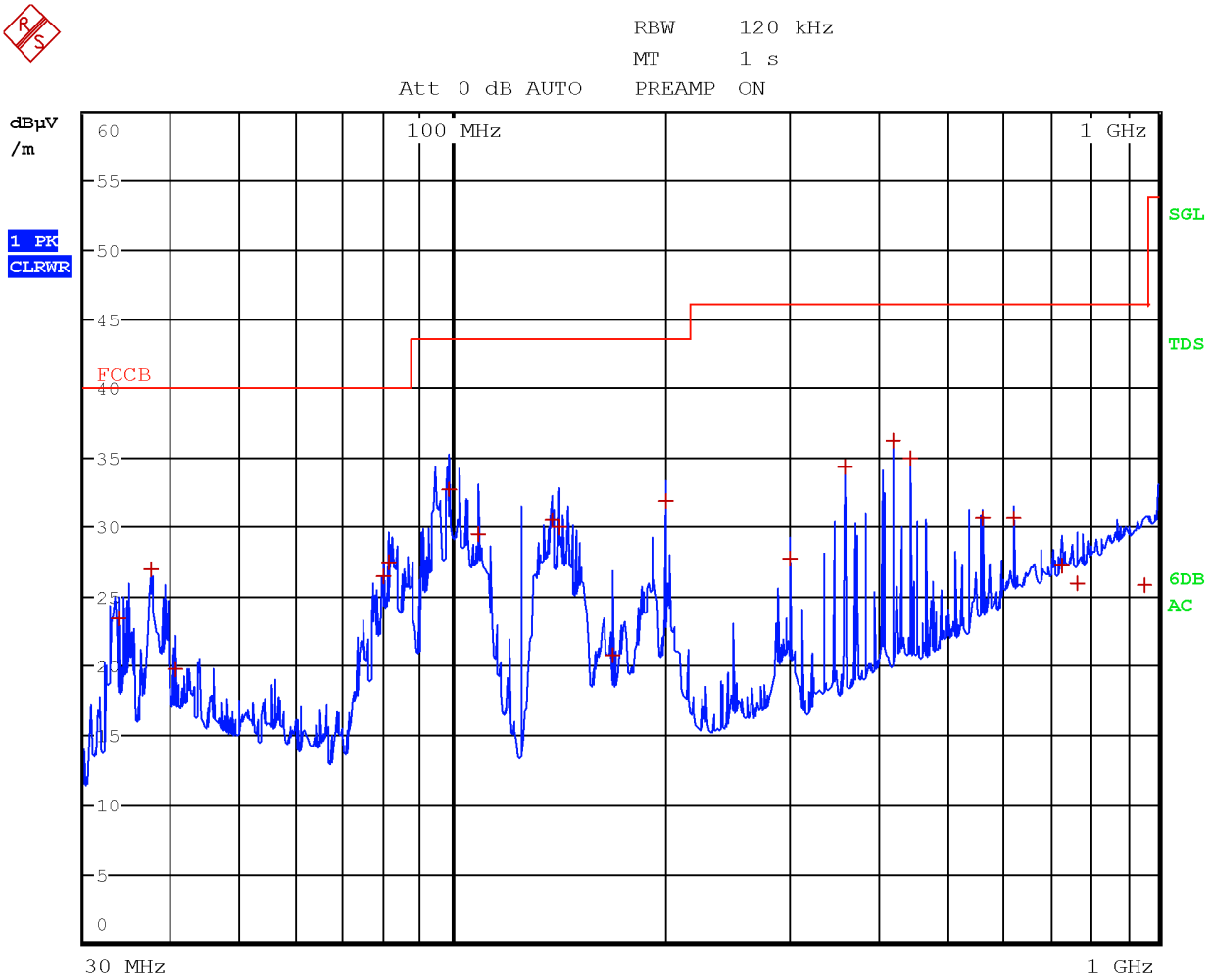

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 1375.0000 | 34.9 | 54.0 | -19.1 | AV |
| 3983.0000 | 35.0 | 54.0 | -19.0 | AV |
| 4130.5000 | 34.1 | 54.0 | -19.9 | AV |
| 5000.0000 | 34.3 | 54.0 | -19.7 | AV |

Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 915 MHz
Remarks: Frequency range: 30 to 1000 MHz



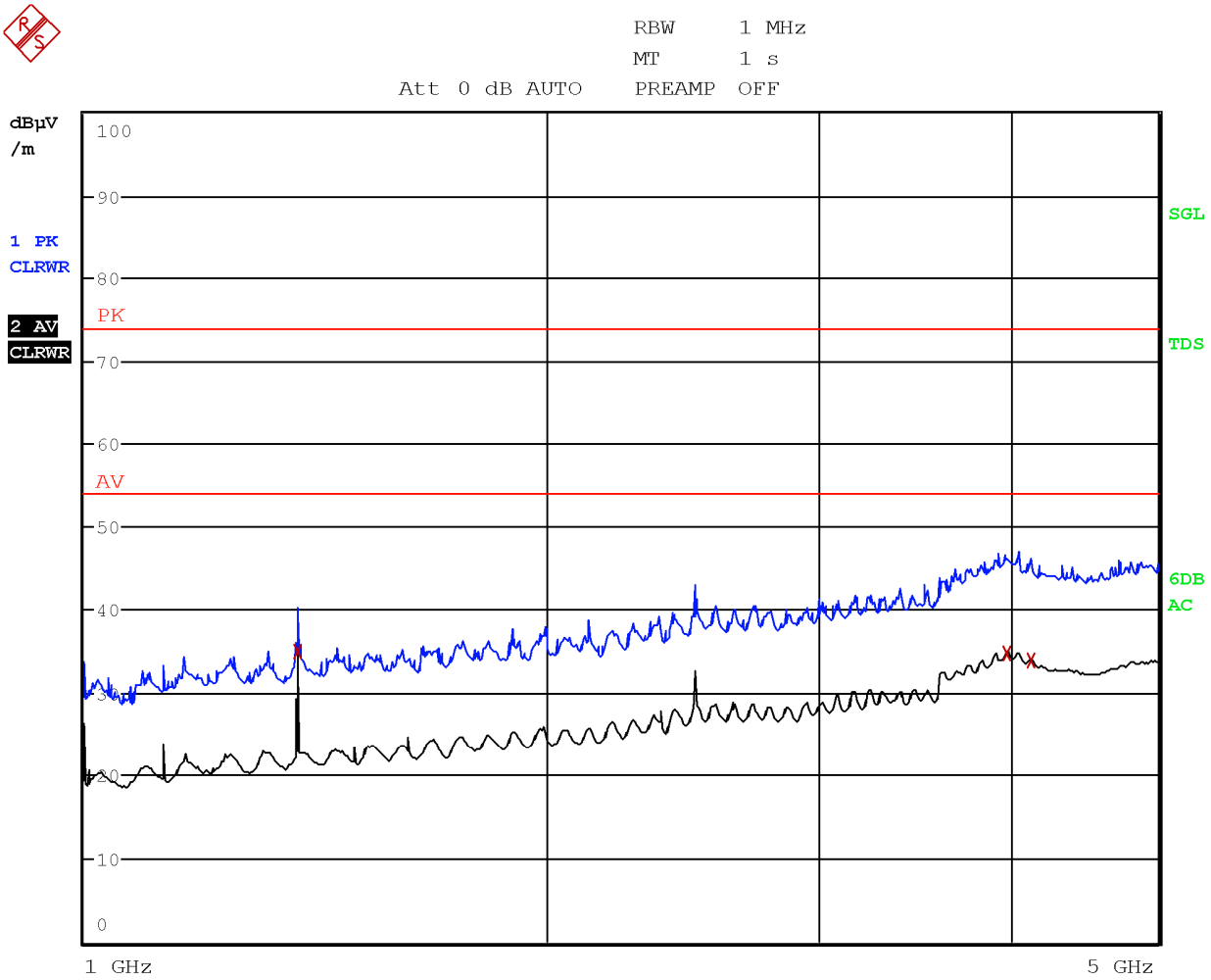

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 199.9800 | 25.9 | 43.5 | -17.6 | QP |
| 249.9900 | 26.1 | 46.0 | -19.9 | QP |
| 360.0300 | 32.0 | 46.0 | -14.1 | QP |
| 384.0300 | 29.5 | 46.0 | -16.6 | QP |
| 554.6400 | 18.8 | 46.0 | -27.2 | QP |
| 624.9900 | 31.6 | 46.0 | -14.4 | QP |
| 732.0300 | 30.5 | 46.0 | -15.5 | QP |
| 857.1900 | 24.7 | 46.0 | -21.3 | QP |
| 912.0900 | 33.8 | 46.0 | -12.2 | QP |

Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 915 MHz
Remarks: Frequency range: 30 to 1000 MHz



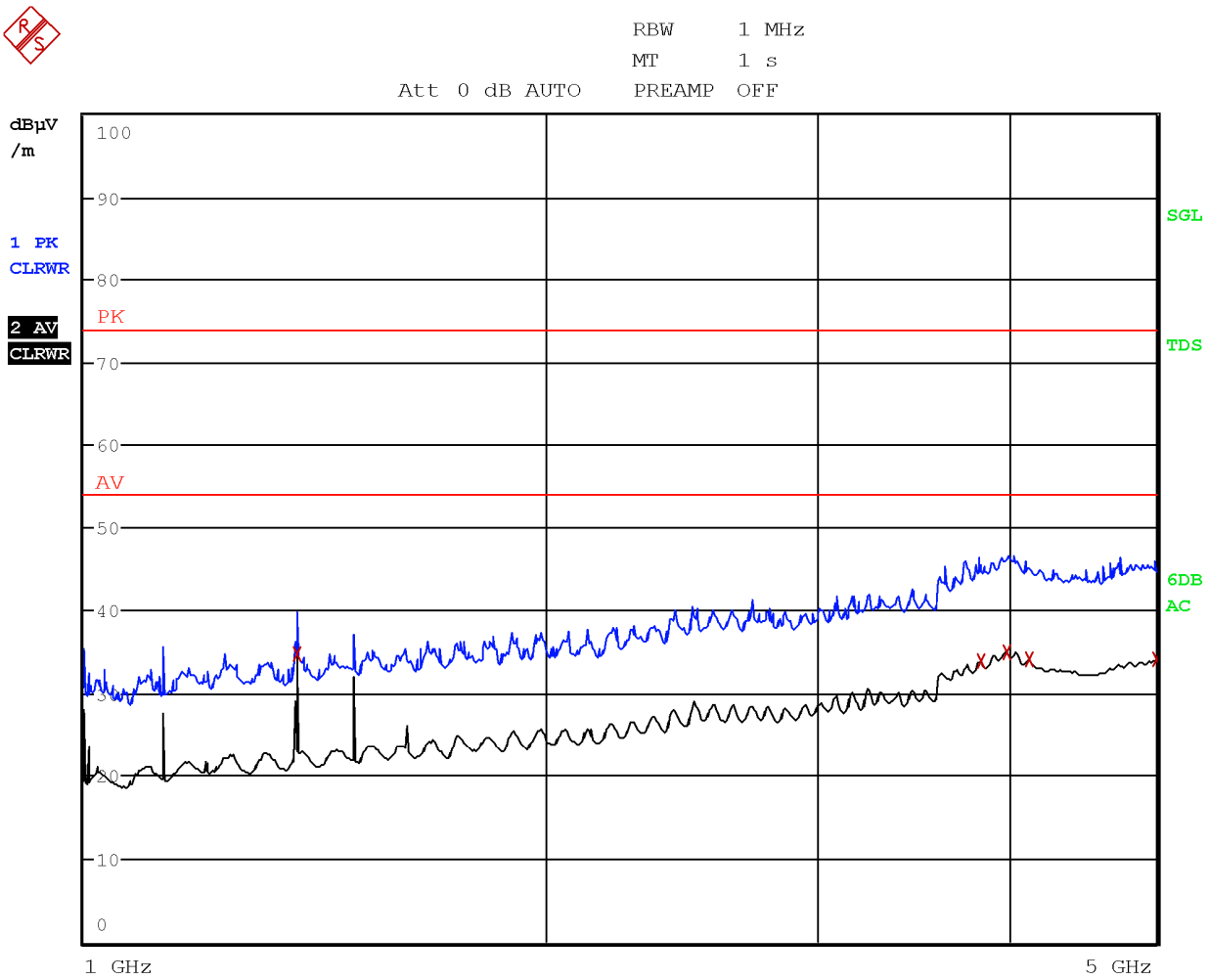
| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 33.4500 | 23.3 | 40.0 | -16.7 | QP |
| 37.3800 | 26.9 | 40.0 | -13.1 | QP |
| 40.3500 | 19.7 | 40.0 | -20.3 | QP |
| 79.7400 | 26.4 | 40.0 | -13.6 | QP |
| 81.2100 | 27.4 | 40.0 | -12.6 | QP |
| 98.4600 | 32.7 | 43.5 | -10.8 | QP |
| 108.8100 | 29.5 | 43.5 | -14.0 | QP |
| 138.4200 | 30.5 | 43.5 | -13.1 | QP |
| 141.1800 | 29.9 | 43.5 | -13.6 | QP |
| 167.9700 | 20.7 | 43.5 | -22.8 | QP |
| 200.0100 | 31.9 | 43.5 | -11.7 | QP |
| 300.0000 | 27.7 | 46.0 | -18.3 | QP |
| 360.0300 | 34.3 | 46.0 | -11.7 | QP |
| 420.0300 | 36.3 | 46.0 | -9.8 | QP |
| 444.0300 | 35.0 | 46.0 | -11.0 | QP |
| 564.0300 | 30.6 | 46.0 | -15.4 | QP |
| 624.9900 | 30.5 | 46.0 | -15.5 | QP |
| 732.0300 | 27.2 | 46.0 | -18.9 | QP |
| 768.0000 | 25.9 | 46.0 | -20.2 | QP |
| 956.0400 | 25.7 | 46.0 | -20.3 | QP |

Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 915 MHz
Remarks: Frequency range: 1000 to 5000 MHz



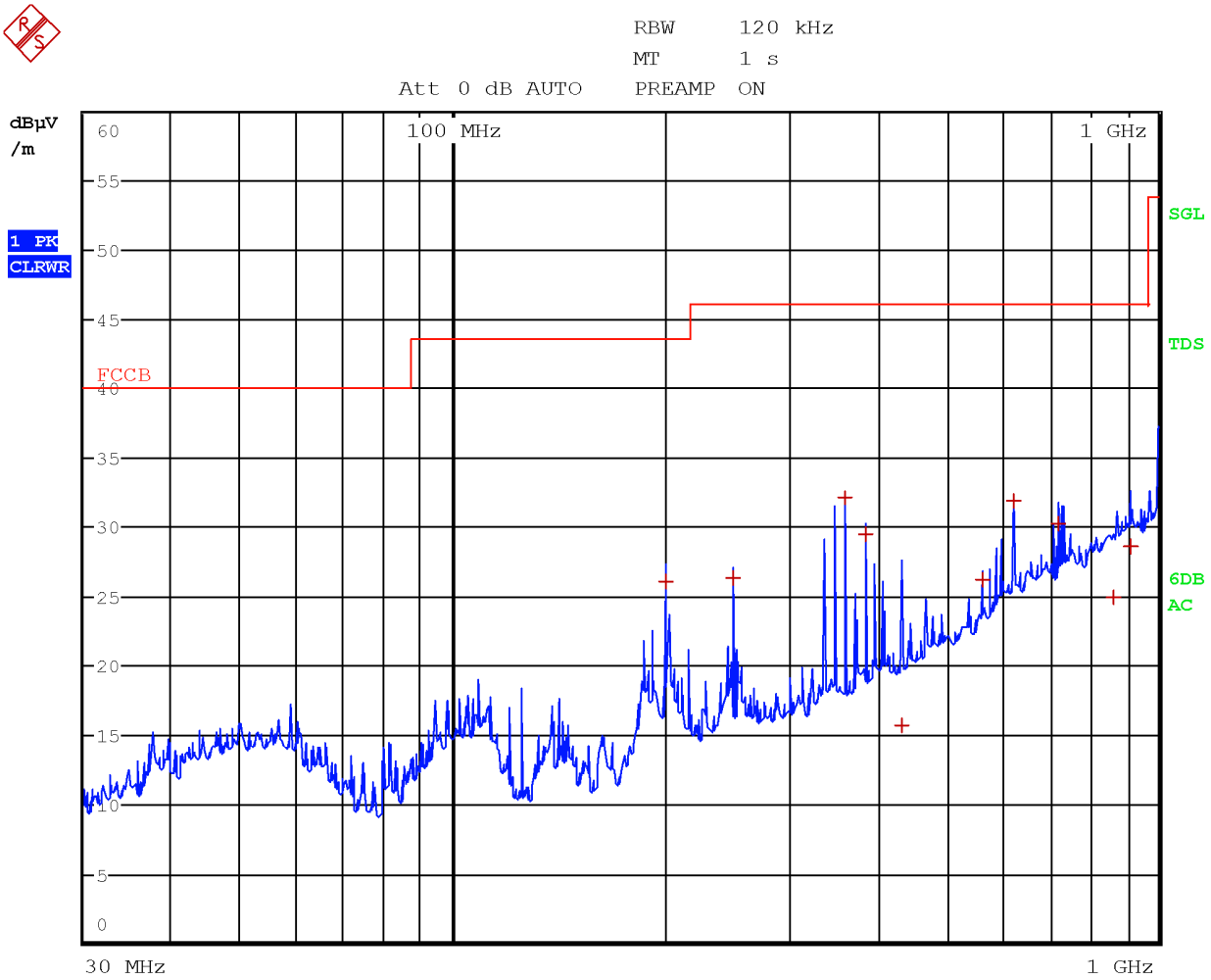

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 1375.0000 | 35.0 | 54.0 | -19.0 | AV |
| 3984.0000 | 34.7 | 54.0 | -19.3 | AV |
| 4127.0000 | 33.9 | 54.0 | -20.1 | AV |

Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 915 MHz
Remarks: Frequency range: 1000 to 5000 MHz



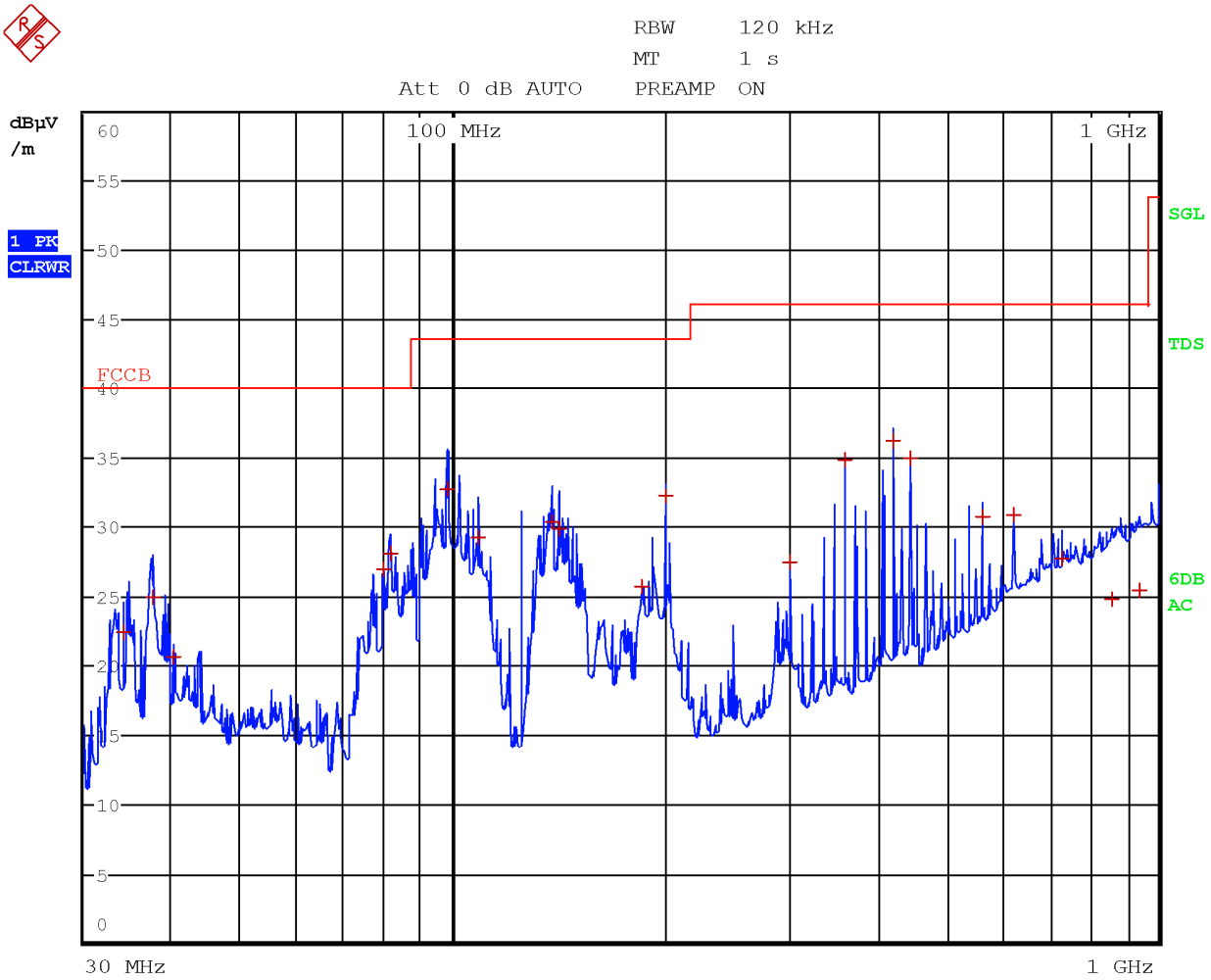

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 1375.0000 | 34.7 | 54.0 | -19.3 | AV |
| 3838.0000 | 34.0 | 54.0 | -20.0 | AV |
| 3989.5000 | 35.0 | 54.0 | -19.0 | AV |
| 4130.0000 | 34.2 | 54.0 | -19.8 | AV |
| 5000.0000 | 34.2 | 54.0 | -19.8 | AV |

Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 927.58 MHz
Remarks: Frequency range: 30 to 1000 MHz



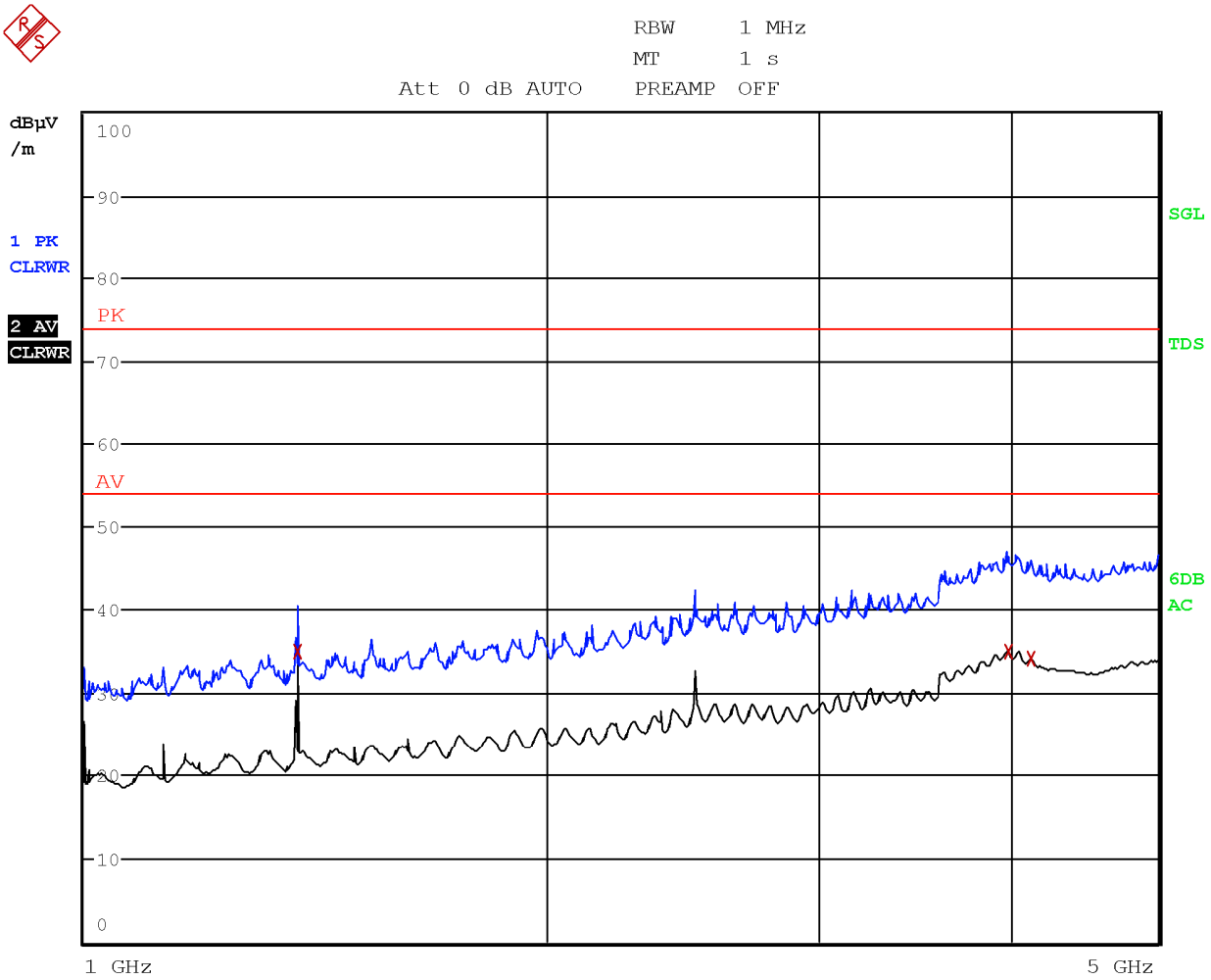

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 199.9800 | 26.0 | 43.5 | -17.5 | QP |
| 249.9900 | 26.3 | 46.0 | -19.7 | QP |
| 360.0000 | 32.1 | 46.0 | -14.0 | QP |
| 384.0300 | 29.4 | 46.0 | -16.6 | QP |
| 432.2100 | 15.7 | 46.0 | -30.3 | QP |
| 564.0300 | 26.1 | 46.0 | -19.9 | QP |
| 624.9900 | 31.8 | 46.0 | -14.2 | QP |
| 720.0300 | 30.2 | 46.0 | -15.8 | QP |
| 863.9100 | 24.9 | 46.0 | -21.1 | QP |
| 912.0300 | 28.5 | 46.0 | -17.5 | QP |

Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 927.58 MHz
Remarks: Frequency range: 30 to 1000 MHz



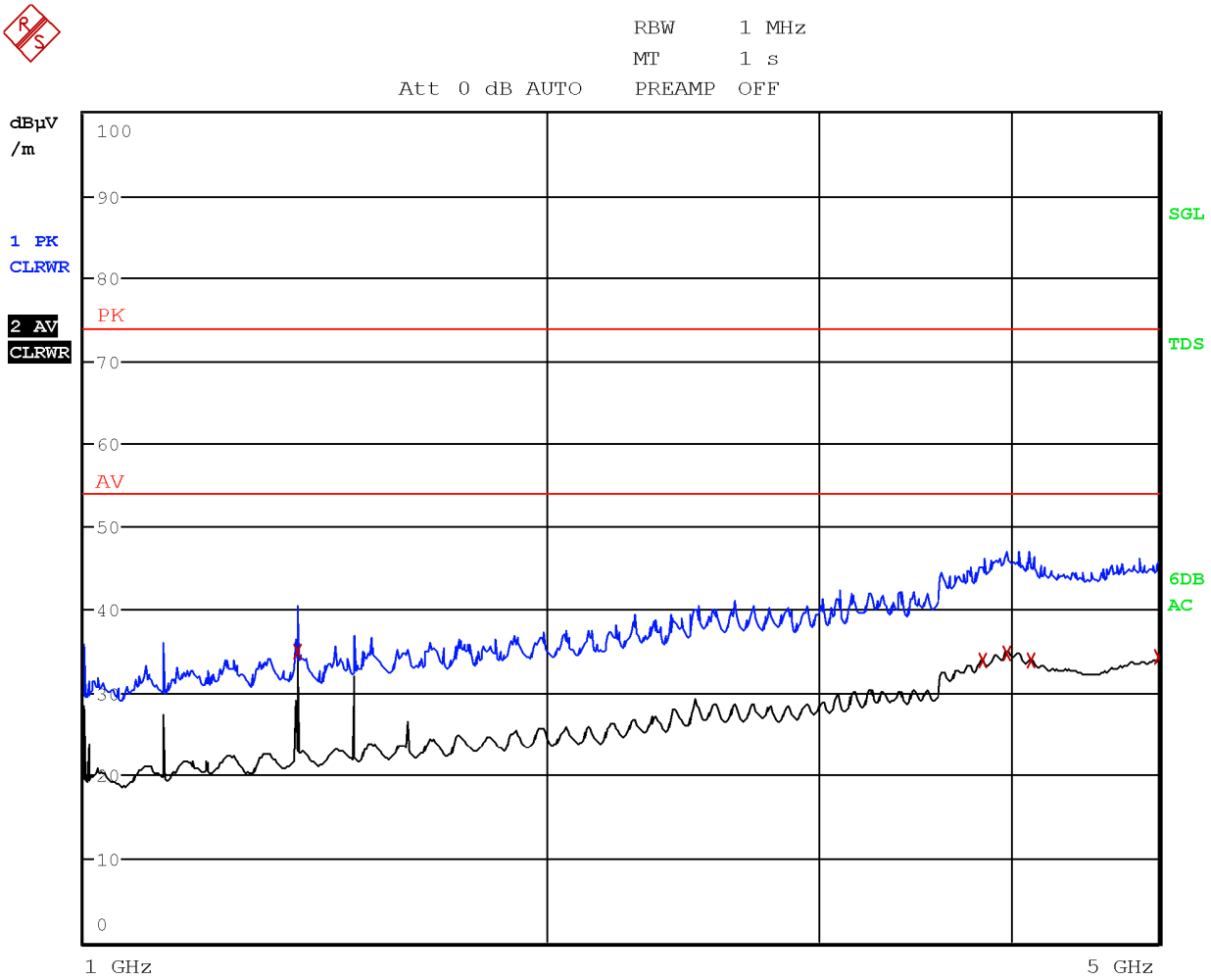
| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 34.1100 | 22.3 | 40.0 | -17.7 | QP |
| 37.5000 | 24.9 | 40.0 | -15.1 | QP |
| 40.1100 | 20.5 | 40.0 | -19.5 | QP |
| 79.7400 | 26.9 | 40.0 | -13.1 | QP |
| 81.4800 | 28.1 | 40.0 | -11.9 | QP |
| 98.4300 | 32.7 | 43.5 | -10.8 | QP |
| 108.8100 | 29.2 | 43.5 | -14.3 | QP |
| 138.4200 | 30.3 | 43.5 | -13.2 | QP |
| 141.1800 | 29.8 | 43.5 | -13.7 | QP |
| 185.2200 | 25.6 | 43.5 | -17.9 | QP |
| 199.9800 | 32.2 | 43.5 | -11.3 | QP |
| 300.0000 | 27.4 | 46.0 | -18.7 | QP |
| 360.0300 | 34.8 | 46.0 | -11.2 | QP |
| 420.0300 | 36.2 | 46.0 | -9.8 | QP |
| 444.0300 | 34.9 | 46.0 | -11.1 | QP |
| 564.0300 | 30.7 | 46.0 | -15.3 | QP |
| 624.9900 | 30.8 | 46.0 | -15.2 | QP |
| 732.0300 | 27.7 | 46.0 | -18.3 | QP |
| 858.1500 | 24.7 | 46.0 | -21.3 | QP |
| 938.1900 | 25.4 | 46.0 | -20.6 | QP |

Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 927.58 MHz
Remarks: Frequency range: 1000 to 5000 MHz




| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 1375.0000 | 35.0 | 54.0 | -19.0 | AV |
| 3992.5000 | 35.0 | 54.0 | -19.0 | AV |
| 4133.0000 | 34.1 | 54.0 | -19.9 | AV |

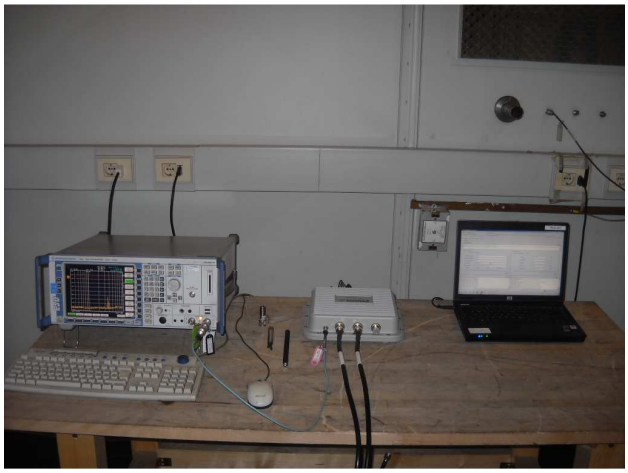
Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 927.58 MHz
Remarks: Frequency range: 1000 to 5000 MHz

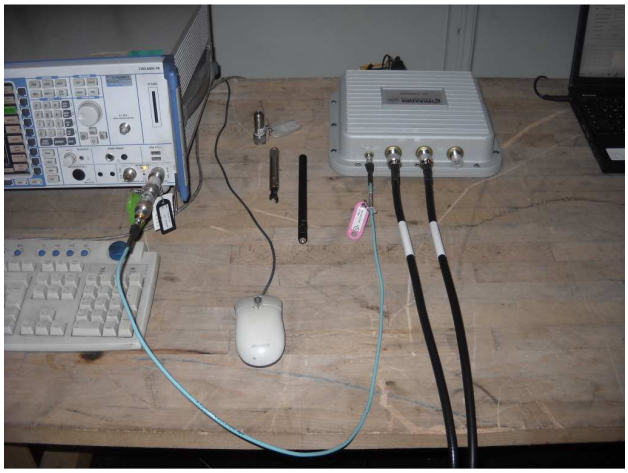



| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|---|---|---|---|---|
| 1375.0000 | 35.0 | 54.0 | -19.0 | AV |
| 3840.5000 | 33.8 | 54.0 | -20.2 | AV |
| 3989.0000 | 34.8 | 54.0 | -19.2 | AV |
| 4136.0000 | 34.0 | 54.0 | -20.0 | AV |
| 4999.5000 | 34.3 | 54.0 | -19.7 | AV |

## 5.3 Clause 15.111 – Antenna power conduction limits for receivers

### 5.3.1 Photo documentation of the test set-up





### 5.3.2 Test method

In addition to the radiated emission limits, receivers that operate (tune) in the frequency range 30 to 960 MHz and CB receivers that provide terminals for the connection of an external receiving antenna may be tested to demonstrate compliance with the provisions of §15.109 with the antenna terminals shielded and terminated with a resistive termination equal to the impedance specified for the antenna, provided these receivers also comply with the following: With the receiver antenna terminal connected to a resistive termination equal to the impedance specified or employed for the antenna, the power at the antenna terminal at any frequency within the range of measurements specified above shall not exceed 2.0 nanowatts.

### 5.3.3 Limits for Antenna port

| Frequency of emission MHz | Power at the antenna terminal |
|---|---|
| 30–960 | 2 nW (-57 dBm) |
| Above 960 | 2 nW (-57 dBm) |

### 5.3.4 Test result

| | |
|---|---|
| Verdict: | ☒ P ☐ F ☐ N |
| Frequency range: | 30MHz - 5000MHz |
| Kind of test site: | Shielded room |
| Remarks: | |

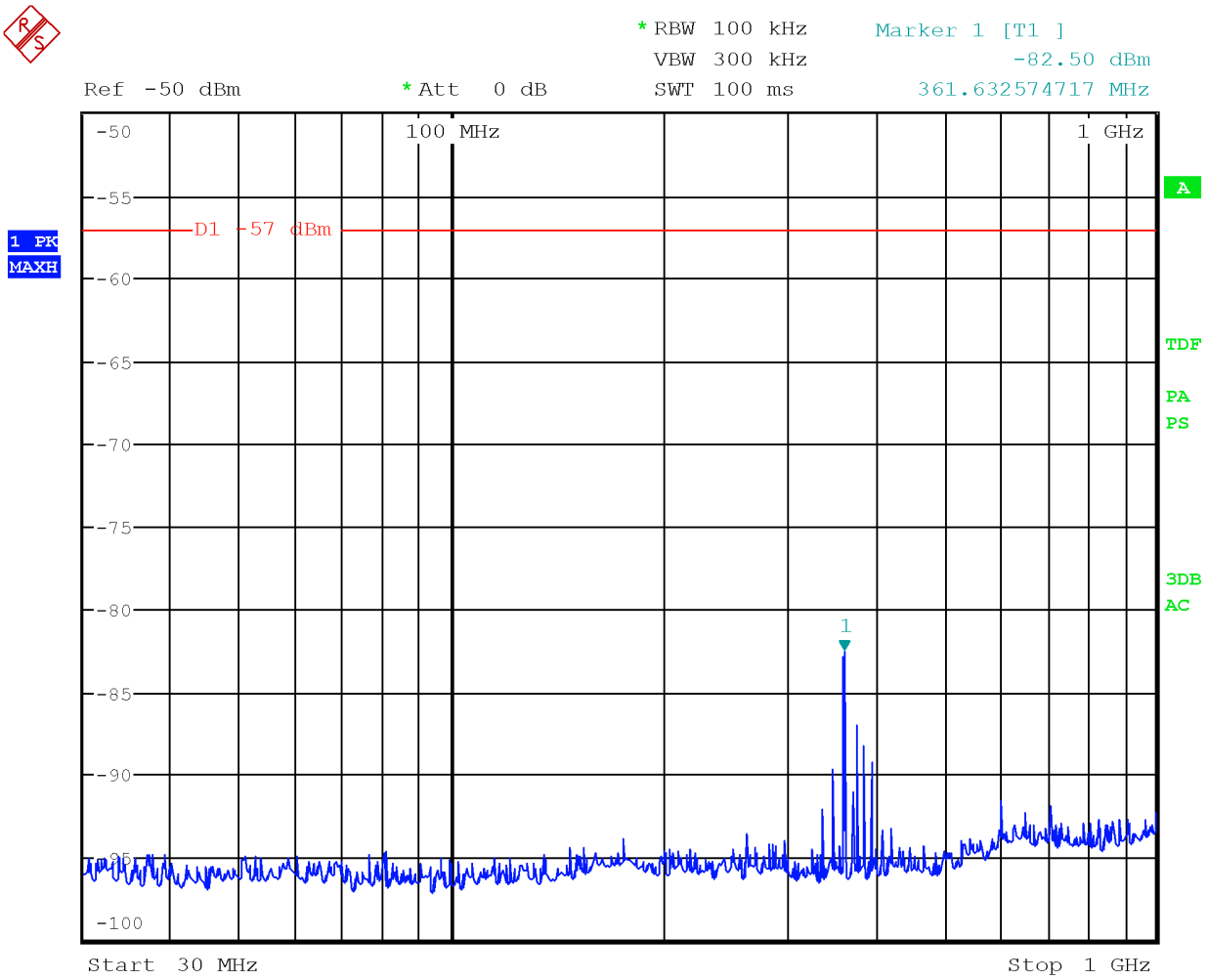
### 5.3.5 Test equipment used

| Equipment | Manufacturer | Model | Serial N° | Due Date |
|---|---|---|---|---|
| EMI receiver 20 Hz ÷ 8 GHz | R&S | ESU8 | 100202 | 2017-09 |
| Shielded room | Siemens | Conducted emission test room | 1862 | NCR |

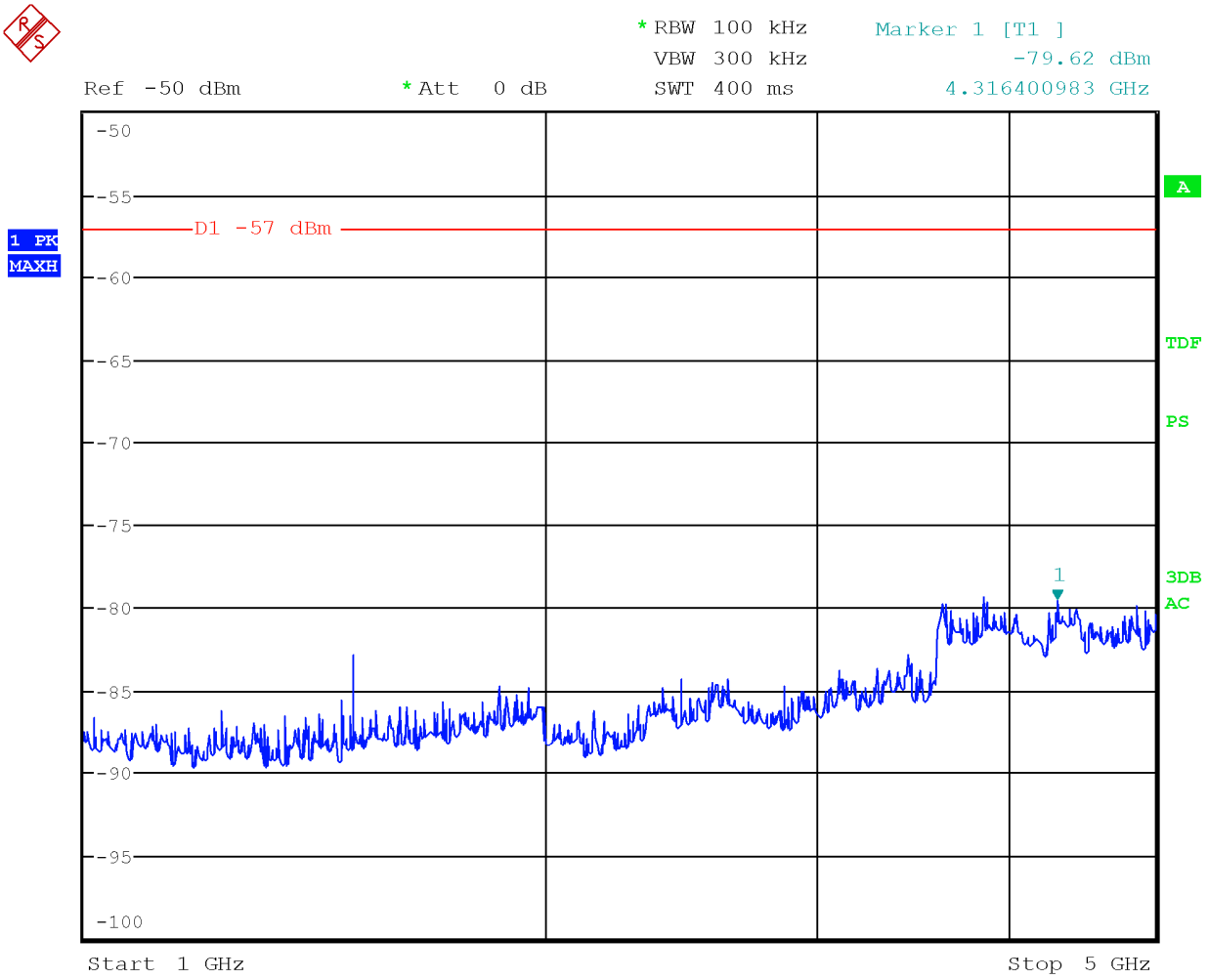
NCR = no calibration required

### 5.3.6 Test protocol

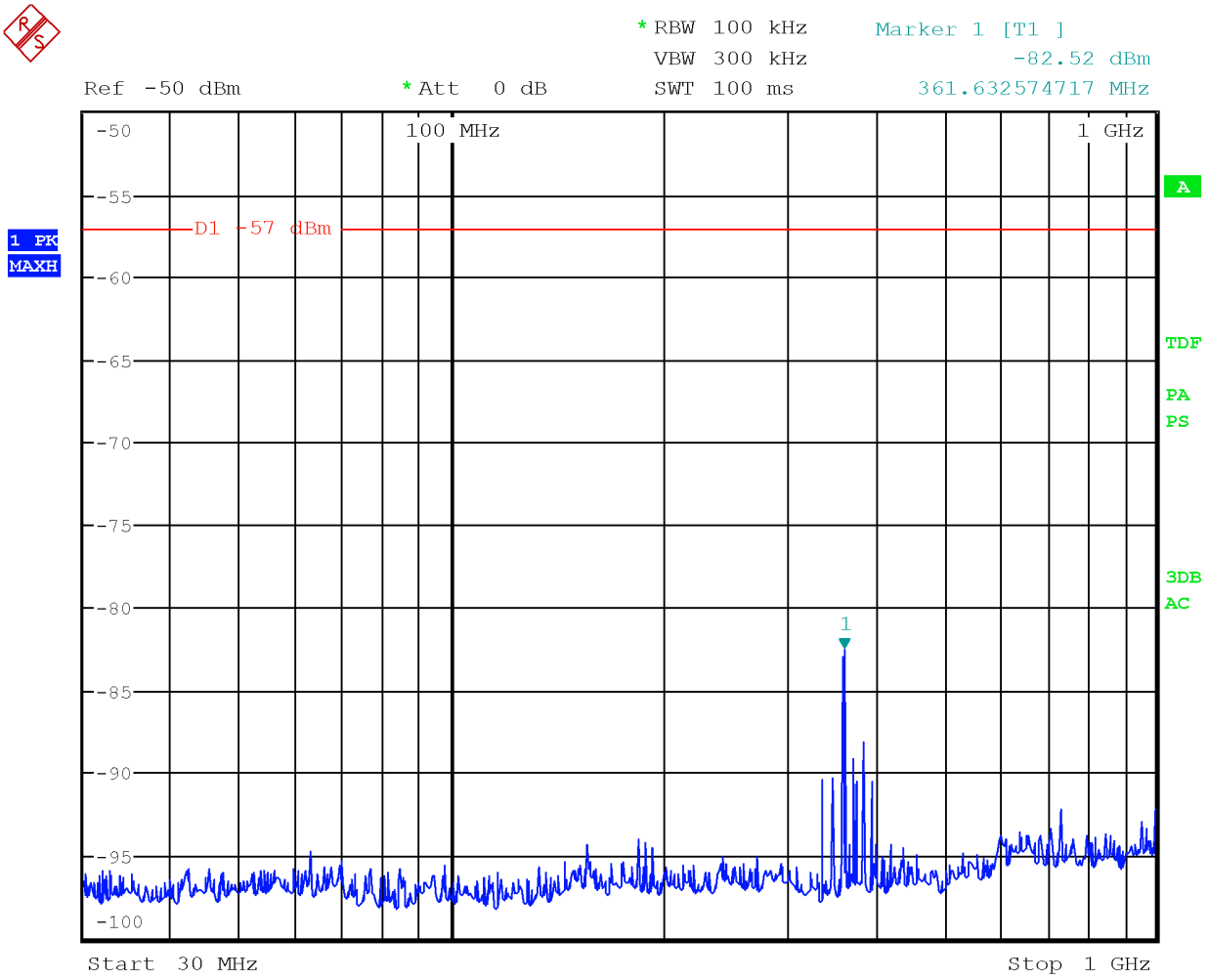
Test point: Antenna port 4 Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 902.42 MHz
Remarks: Frequency range: 30 to 1000 MHz



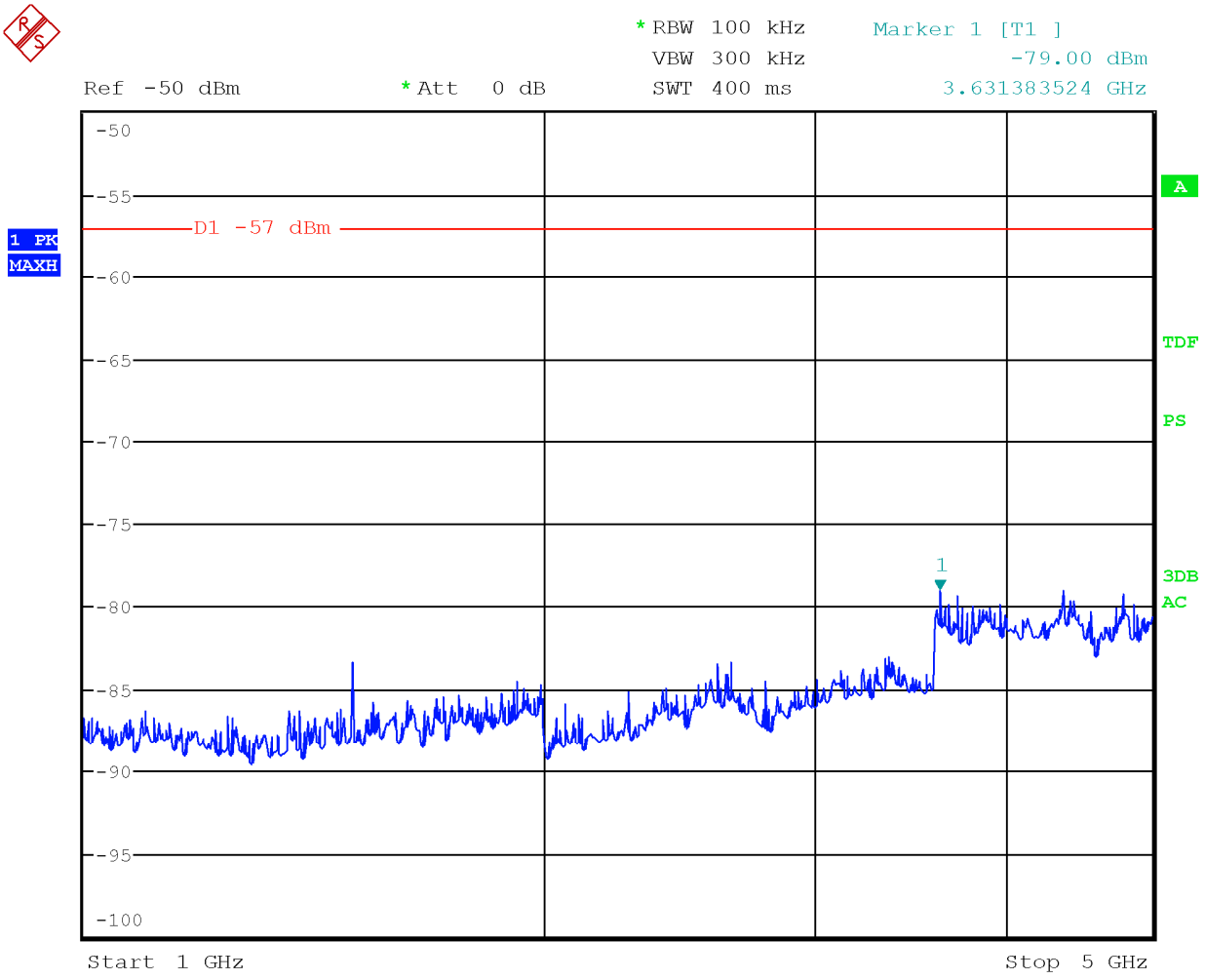
Test point: Antenna port 4 Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 902.42 MHz
Remarks: Frequency range: 1000 to 5000 MHz



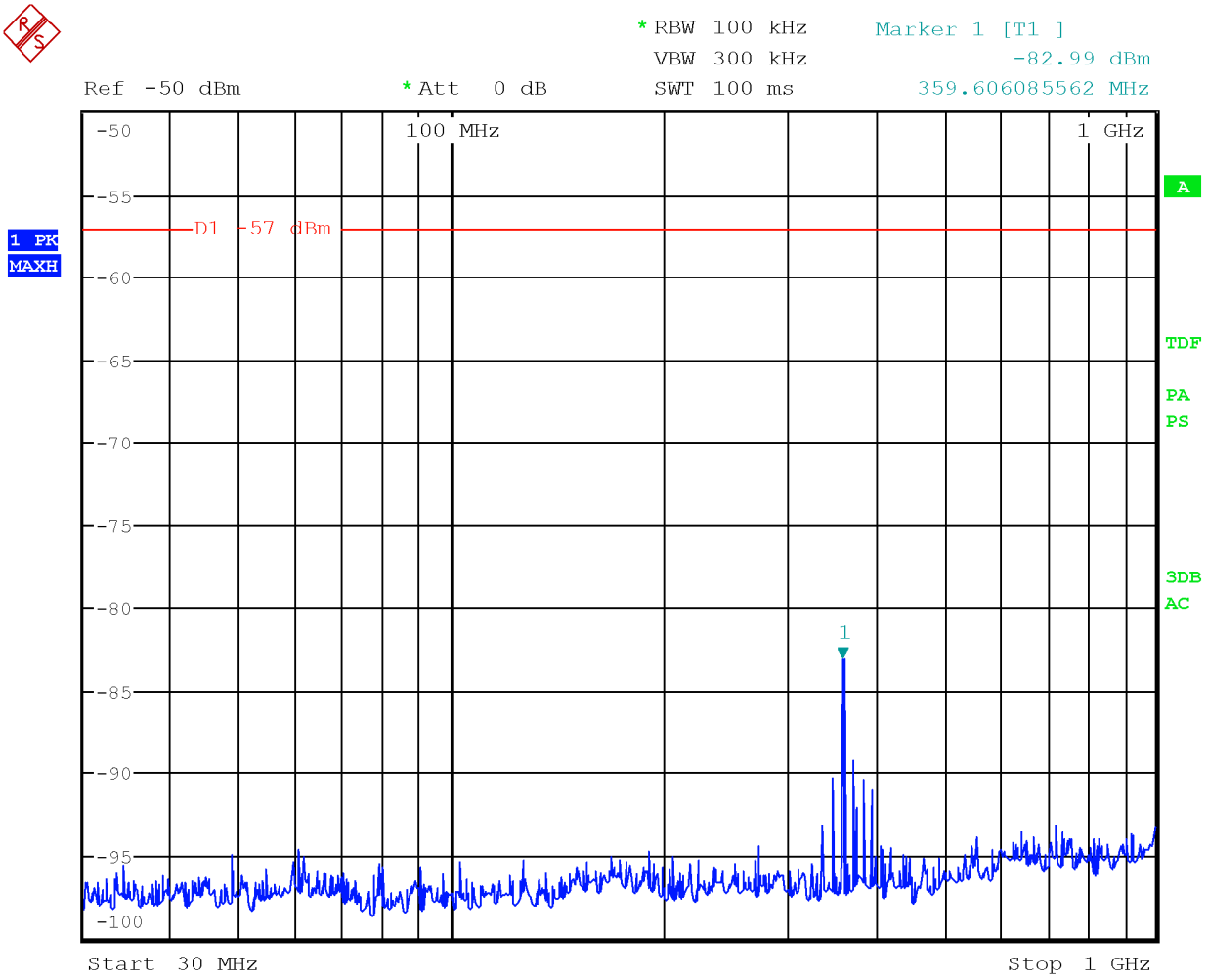
Test point: Antenna port 4 Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 915 MHz
Remarks: Frequency range: 30 to 1000 MHz



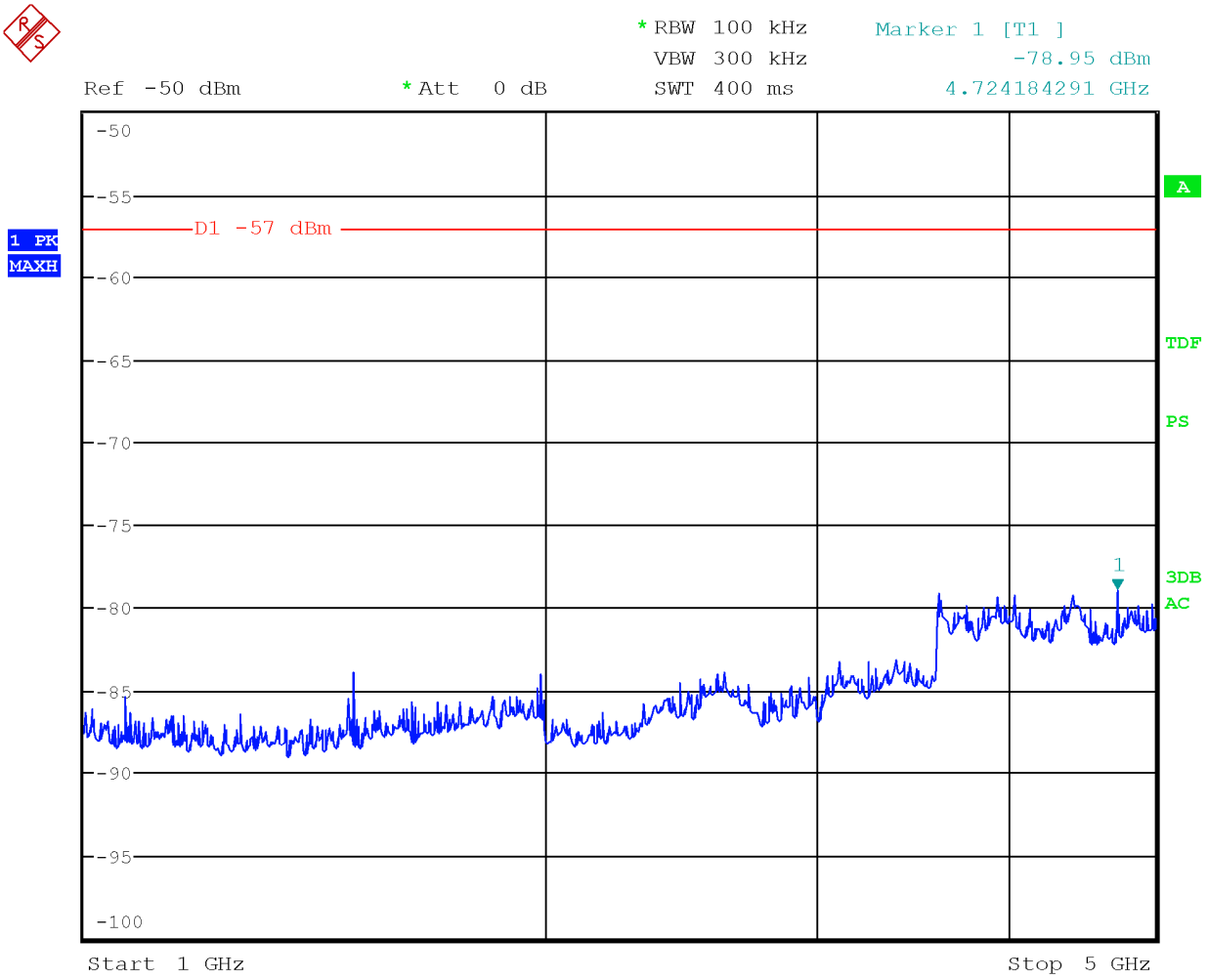
Test point: Antenna port 4 Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 915 MHz
Remarks: Frequency range: 1000 to 5000 MHz



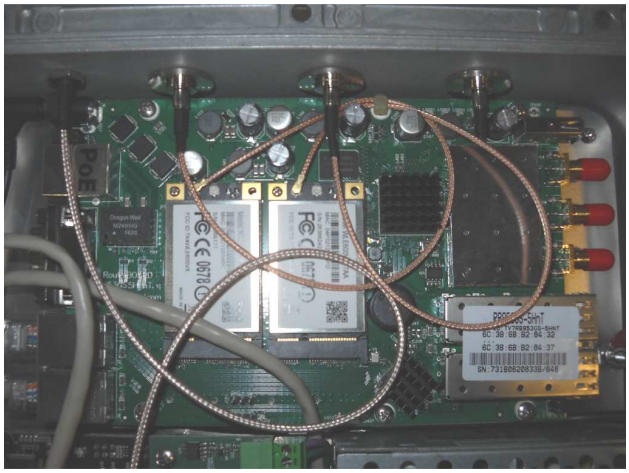
Test point: Antenna port 4 Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 927.58 MHz
Remarks: Frequency range: 30 to 1000 MHz



Test point: Antenna port 4 Verdict: Pass
Operation mode: 1
Configuration mode: 1
Channel frequency: 927.58 MHz
Remarks: Frequency range: 1000 to 5000 MHz



# 6 EUT PHOTOS



End of report