# DÜRR DENTAL SE
# TEST REPORT

**SCOPE OF WORK**
RADIO TESTING FCC – VISTASCAN NANO EASY

**REPORT NUMBER**
2232515KAU-012

**ISSUE DATE**

**26-July-2018**

**PAGES**
29

**DOCUMENT CONTROL NUMBER**
R_FCC 15-225_18-01 (25-January-2018)
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# EMF TEST REPORT

| | |
|---|---|
| **TYPE:** | VistaScan Nano Easy |
| **DESCRIPTION:** | **Image plate scanner** |
| **SERIAL NO:** | **K380344001** |

All measurement results refer to the equipment which was tested

| | |
|---|---|
| **MANUFACTURER:** | DÜRR DENTAL SE |
| **CUSTOMER NAME:** | DÜRR DENTAL SE |
| **ADDRESS (CUSTOMER):** | Höpfigheimer Str. 17<br>74321 Bietigheim-Bissingen<br>Germany |
| **REPORT NO:** | 2232515KAU-012 |
| **TEST RESULT:** | The equipment comply to 47 CFR Part 15, Subpart C, Intentional radiators, section 15.225 / RSS-210, Issue 9 and RSS-GEN, Issue 5 (Referring to the operating modes specified in this report). |
| **TEST LABORATORY:** | Intertek Deutschland GmbH<br>Innovapark 20, 87600 Kaufbeuren<br>Germany |
| **FCC DESIGNATION NUMBER:** | DE0014 |
| **FCC TEST FIRM REGISTRATION NUMBER.** | 359260 |
| **INDUSTRY CANADA REGISTRATION.** | 8882A-1; 8882A-2 |
| **TEST ENGINEER:** | U. Gronert<br>Senior Project Engineer |
| **REVIEWER:** | R. Dressler<br>Technical Manager EMC/ Radio |

# Details about Accreditations/Acceptances

**EMC / Radio National**

| | |
|---|---|
| DAkkS Deutsche Akkreditierungsstelle D-PL-12085-01-01 | The Intertek Deutschland EMC-Lab is accredited by the Deutsche Akkreditierungsstelle GmbH (DAkkS)<br>Registration Number (EMC general): **D-PL-12085-01-01**<br>Registration Number (EMC Med): **D-PL-12085-01-03** |

**International**

| | |
|---|---|
| IECEE CB SCHEME | The Intertek Deutschland EMC-Lab is accepted to participate in the IECEE (IEC Conformity assessment for Electrotechnical Equipment and Components) CB-Scheme<br>CB Test Laboratory: **TL118** |
| FCC Federal Communications Commission | The Intertek Deutschland EMC-Lab is listed at the Federal Communications Commission (FCC)<br>Designation Number: **DE0014**<br>Test Firm Registration Number: **359260** |
| Bundesnetzagentur<br>BNetzA-CAB-16/21-10 | The *Bundesnetzagentur* recognizes Intertek Deutschland GmbH as Conformity Assessment Body in the sector electromagnetic compatibility (EMC). |
| Industrie Canada Industry Canada Canada | The Intertek Deutschland EMC-Lab is listed at Industry Canada<br>No.**8882A-1** (OATS) and **8882A-2** (3 m alternative test site) |

**Automotive**

| | |
|---|---|
| KBA Anerkennungsstelle<br>Anerkannt unter KBA-P 00046-03 | The Intertek Deutschland EMC-Lab is recognized as technical service of the Kraftfahrt-Bundesamt (KBA)<br>Registration Number: **KBA-P 00046-03** |

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## SECTION 2
## MEASUREMENT AND TEST SPECIFICATION

47 CFR Part 15, Subpart C, Intentional radiators, section 15.225 /
RSS-210, Issue 9 and RSS-GEN, Issue 4

Test methods in:

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

No additions, deviations or exclusions have been made from standards and accreditation.

The test results detailed in this report apply only to the VistaScan Nano Easy with the test setup described. Any modification such as a change, addition to or inclusion of another device into this product will require an additional evaluation.
The support equipment listed as part of the emission tests is required to properly exercise and test the device under test.

## SECTION 3
## GENERAL INFORMATION

| | | |
|---|---|---|
| Possible test case verdicts: | | |
| Test case does not apply to the test object: | N/A (Not Applicable) | |
| Test object does meet the requirement: | P (Pass) | |
| Test object does not meet the requirements: | F (Fail) | |
| Samples arrived: | 2018-06-20 | |
| Testing: | 2018-06-21 to 2018-07-25 | |
| Decimal separator: | ☒ Point | ☐ Comma |
| Environmental conditions during testing: | Temperature: | 15 °C - 35 °C |
| | Humidity: | 20 % - 60 % |
| | Atmospheric pressure: | 900 mbar - 1000 mbar |
| | If explicitly required by a basic standard the measured climatic conditions are documented in the corresponding test section. | |

Test sites:

| Measurement Chamber | Type of chamber | IC Site filing # |
|---|---|---|
| ANECHOIC CHAMBER 1 | Semi-anechoic 3 m | 8882A-2 |

# SECTION 4
# SUMMARY OF TESTING

## 4.1 General annotation

The tests were performed in the order of the right column in the “Test Results – Overview” table.

## 4.2 Measurement uncertainty

For each test method, an uncertainty evaluation was carried out. The results of the evaluation can be provided upon request from Intertek Deutschland GmbH.

## 4.3 Identical types

Professional judgement:
All measurement results exclusively refer to the equipment type VistaScan Nano Easy which was tested.

The manufacturer/customer declared the following type(s) identical to the tested type:
ScanX Edge

The differences are according to the manufacturer/customer:
- shape of the top housing
- color of housing parts

## 4.4 Document History

| REVISION | DATE | REPORT | CHANGES | AUTHOR |
|---|---|---|---|---|
| Initial release | 2018-07-26 | 2232515KAU-012 | Initial issue | UGR |

## SECTION 5
## TEST RESULTS – OVERVIEW

| **EMISSION** | VERDICT | DATE | NO |
|---|---|---|---|
| Conducted emission<br>150 kHz – 30 MHz) | P | 2018-06-25 | 6 |
| Field strength<br>(13.110 MHz – 14.010 MHz) | P | 2018-06-21 | 1 |
| Radiated emissions<br>(< 30 MHz) | P | 2018-06-21 | 2 |
| Radiated emissions<br>(30 MHz - 1 GHz) | P | 2018-06-21 | 3 |
| Frequency Stability Test | P | 2018-07-10<br>to<br>2018-07-12 | 5 |
| Occupied bandwidth test | P | 2018-07-10 | 4 |

# SECTION 6
# INFORMATION ABOUT THE EUT

## 6.1 Description of the EUT

| | | | |
|---|---|---|---|
| ☒ table-top EUT | | ☐ floor-standing EUT | |
| Dimensions: | Height: | Width: | Length: |
| Dimensions: | Height: | Width: | Length: |
| | 23 cm | 20 cm | 15 cm |
| Software version: | 1.0.0.2611 | | |
| Prototype or Product version: | Prototype | | |

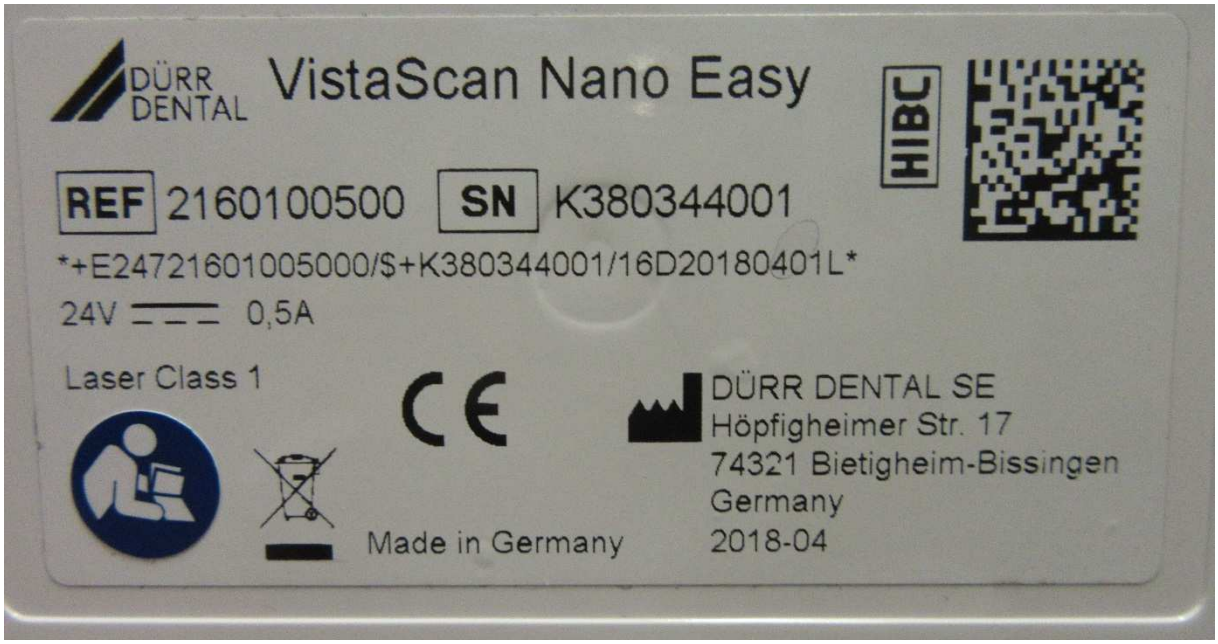
Description:
VistaScan Nano Easy is a dental image plate scanner. The scanning of the image plate is performed with a 635 nm laser. The image signal is measured with an optical sensor and digitalized. The data is transferred to a PC via network connection. Before the image plate is ejected, the remaining image data is deleted via LEDs.
The device included a 13.56 MHz RFID reader

Transmitter frequency range: 13.56 MHz

| | | |
|---|---|---|
| Frequency agile or hopping: | ☐ Yes | ☒ No |
| Antenna: | ☒ Internal antenna | ☐ External antenna |
| Antenna connector: | ☒ None, internal antenna | ☐ Yes, type |
| EUT - Temperature range: | 0°C to +35°C | |
| Transmitter stand by mode supported: | ☒ Yes | ☐ No |

### 6.1.1 Photo/ Sketch of the rating plate

**EUT:**




**AC-Adaptor:**



## 6.2 Power interface

| MODE | VOLTAGE (V) | FREQUENCY (Hz) | COMMENT |
|---|---|---|---|
| 1 | 120 | 60 | 4 quadrant amplifier |

**Power sources/associated test equipment**

| DEVICE | MANUFACTURER | TYPE | SN | ASSET NO. |
|---|---|---|---|---|
| 4 quadrant amplifier | Spitzenberger & Spies | PAS 5000 | 826149/005 | PM KF 2555 |

## 6.3 Configuration mode

| MODE | DESCRIPTION |
|---|---|
| 1 | EUT powered by power supply 1<br>AC-adapter: TEchnology ATM012T-W240V<br>EUT connected via Ethernet to Notebook |
| 2 | EUT powered by power supply 1<br>AC-adapter: UES12LCP-240050SPA<br>EUT connected via Ethernet to Notebook |

## 6.4 Operation mode

| MODE | DESCRIPTION |
|---|---|
| 1 | Standby mode, RFID transmitter off |
| 2 | Standby mode, RFID transmitter on |

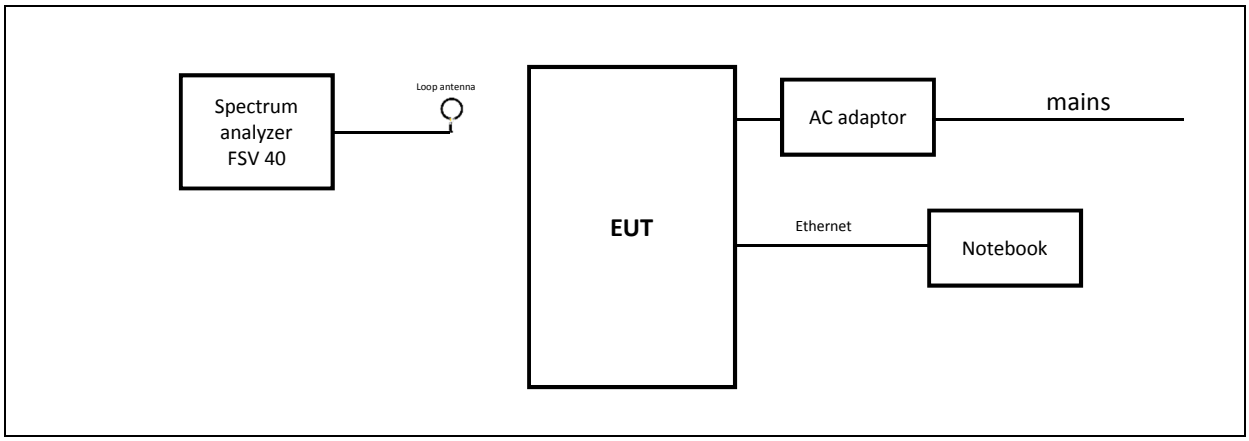
## 6.5 Peripheral devices used for testing

| PRODUCT TYPE | MANUFACTURER/MODEL |
|---|---|
| Notebook | Lenovo / E540 |
| Magnet loop antenna | R&S / HZ-10 |
| Spectrum analyzer | R&S / FSV 40 |

## 6.6 Supply and interconnecting cables used for testing

| LINE | LENGTH (cm) | SHIELDING |
|---|---|---|
| Mains | 150 | N |
| Ethernet | various | Y |

## 6.7 Block diagram of the test setup



# SECTION 7

## 7.1 Conducted emissions

| NORMATIVE REFERENCES | | | RESULT |
|---|---|---|---|
| Limits according to Product Standard: | **FCC §15.207**<br>**RSS-Gen 6.13, 8.8** | | **P** |
| Methods of measurement according to: | **ANSI C63.10, section 6.2**<br>**RSS-Gen 6.13, 8.8** | | |
| Equipment mode | Power interface | 1 | |
| | EUT configuration mode | 1 and 2 | |
| | Operation mode | 2 | |
| | Artificial hand applied? | --- | |
| | Position of artificial hand | --- | |
| Test requirements | Frequency range | 150 kHz - 30 MHz | |

**Test equipment**

| DESCRIPTION | MANUFACTURER | TYPE | SN | ASSET NO. | CALIBRATION |
|---|---|---|---|---|---|
| Shielded cabin | ETS LINDGREN | RFSD 100 | 3598 | PM KF 2955-2 | - |
| Pulse Limiter 10 dB 9 kHz - 200 MHz | Schwarzbeck | VTSD 9561-F N | 9561-F N242 | PM KF 3059 | 2018-02 (1 year) |
| Receiver 10 Hz - 7 GHz | Rohde & Schwarz | ESR7 | 101095 | PM KF 2441 | 2017-10 (1 year) |
| V-Artificial mains-network, 2 Line | Rohde & Schwarz | ESH3-Z5 | 863367/018 | PM KF 0142 | 2017-10 (2 years) |
| Test software | Rohde & Schwarz | EMC 32 V.8.54 | - | PM KF 2983 | - |

Comment
In the following diagram the N and L line are merged.

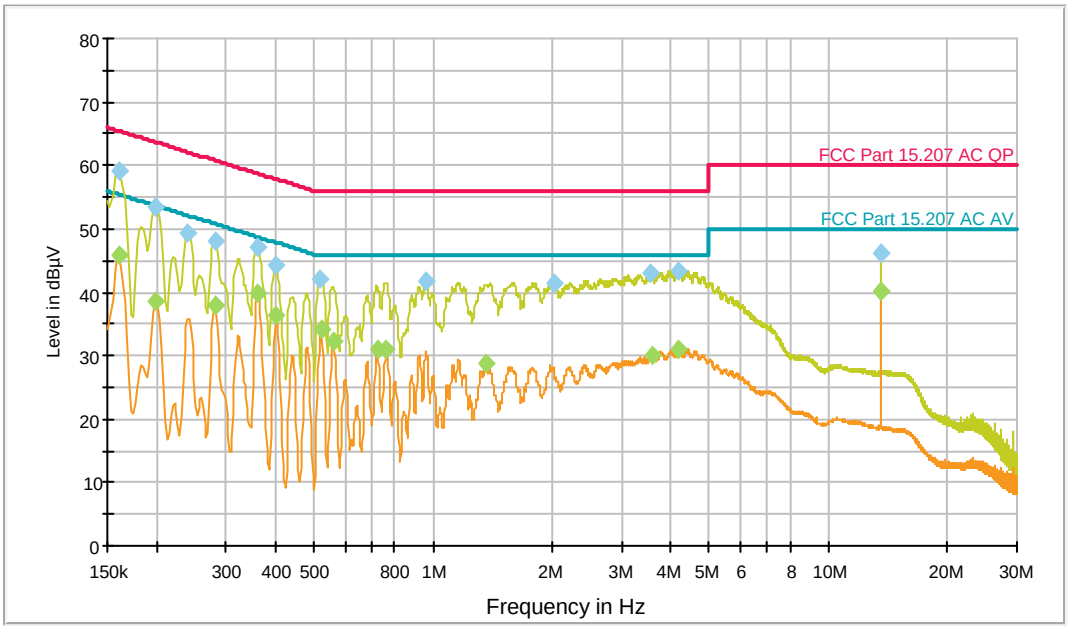
**Measurement results**
**Conducted emissions AC port, AC adaptor: TEchnology ATM012T-W240V**

# Intertek Test Report

## Common Information

| | |
|---|---|
| EUT: | VistaScan Nano Easy, power supply "Adapter TEchnology ATM012T-W240V" |
| Project No.: | 32515 |
| Test description: | Conducted Emissions |
| Test standard: | FCC Part 15.207 |
| Tested port: | Mains |
| Test verdict: | Passed |
| Operating conditions: | 120 V, 60 Hz / RFID transmitter on / EUT standby |
| Operator name: | UGR |
| Date of testing: | 2018-07-25 |

EN-CE-R32-LN01




FCC Part 15.207 AC QP [..\EMI conducted\FCC Part 15 Subpart C\]
FCC Part 15.207 AC AV [..\EMI conducted\FCC Part 15 Subpart C\]
Preview Result 1-QPK [Preview Result 1.Result:1]
Preview Result 2-CAV [Preview Result 2.Result:2]
Final Result 1-QPK [Final Result 1.Result:1]
Final Result 2-CAV [Final Result 2.Result:1]

# Final Result 1

| Frequency (MHz) | QuasiPeak-ClearWrite (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|
| 0.161250 | 59.3 | GN | L1 | 10.2 | 6.1 | 65.4 | |
| 0.199500 | 53.5 | GN | L1 | 10.1 | 10.1 | 63.6 | |
| 0.240000 | 49.4 | GN | L1 | 10.2 | 12.7 | 62.1 | |
| 0.280500 | 48.1 | GN | L1 | 10.2 | 12.7 | 60.8 | |
| 0.359250 | 47.1 | GN | L1 | 10.2 | 11.6 | 58.7 | |
| 0.402000 | 44.1 | GN | L1 | 10.2 | 13.7 | 57.8 | |
| 0.519000 | 42.1 | GN | L1 | 10.2 | 13.9 | 56.0 | |
| 0.957750 | 41.7 | GN | L1 | 10.2 | 14.3 | 56.0 | |
| 2.015250 | 41.5 | GN | L1 | 10.3 | 14.5 | 56.0 | |
| 3.543000 | 43.0 | GN | L1 | 10.3 | 13.0 | 56.0 | |
| 4.177500 | 43.5 | GN | L1 | 10.3 | 12.5 | 56.0 | |
| 13.560000 | 46.1 | GN | L1 | 10.9 | 13.9 | 60.0 | |

# Final Result 2

| Frequency (MHz) | CAverage-ClearWrite (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|
| 0.161250 | 45.7 | GN | L1 | 10.2 | 9.6 | 55.4 | |
| 0.199500 | 38.6 | GN | L1 | 10.1 | 15.0 | 53.6 | |
| 0.280500 | 38.0 | GN | L1 | 10.2 | 12.8 | 50.8 | |
| 0.361500 | 39.9 | GN | L1 | 10.2 | 8.8 | 48.7 | |
| 0.402000 | 36.3 | GN | L1 | 10.2 | 11.5 | 47.8 | |
| 0.521250 | 34.3 | GN | L1 | 10.2 | 11.7 | 46.0 | |
| 0.559500 | 32.2 | GN | L1 | 10.2 | 13.8 | 46.0 | |
| 0.721500 | 31.0 | GN | L1 | 10.2 | 15.0 | 46.0 | |
| 0.762000 | 31.0 | GN | L1 | 10.2 | 15.0 | 46.0 | |
| 1.362750 | 28.8 | GN | L1 | 10.2 | 17.2 | 46.0 | |
| 3.574500 | 30.1 | GN | L1 | 10.3 | 15.9 | 46.0 | |
| 4.188750 | 31.0 | GN | L1 | 10.3 | 15.0 | 46.0 | |
| 13.560000 | 40.2 | GN | L1 | 10.9 | 9.8 | 50.0 | |

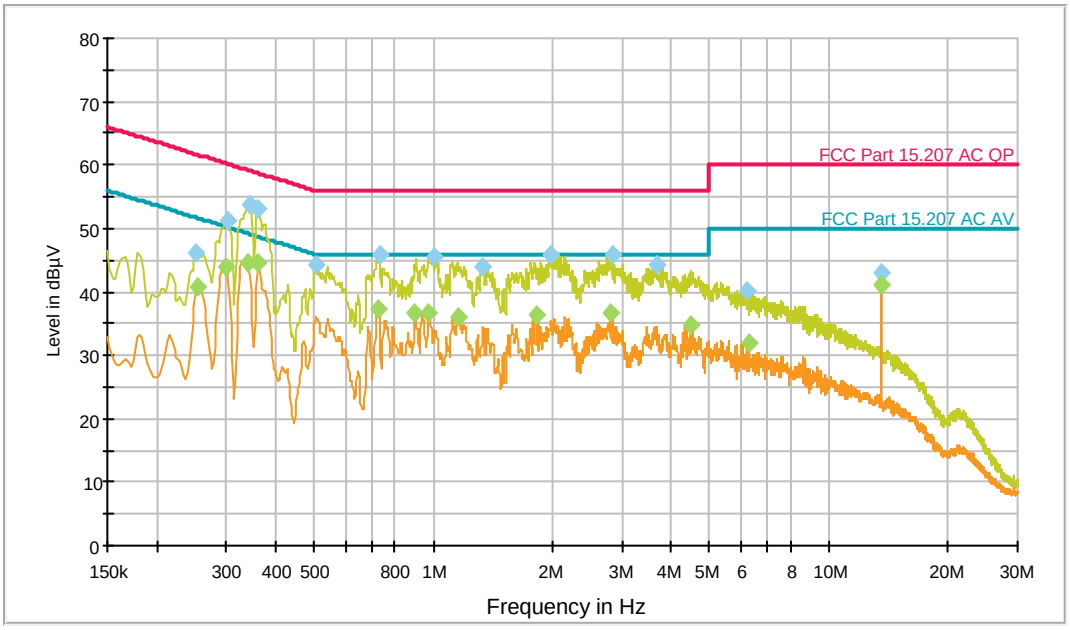
**Conducted emissions AC port, AC adaptor: UES12LCP-240050SPA**

# Intertek Test Report

## Common Information

| | |
|---|---|
| EUT: | VistaScan Nano Easy, power supply "UES12LCP-240050SPA" |
| Project No.: | 32515 |
| Test description: | Conducted Emissions |
| Test standard: | FCC Part 15.207 |
| Tested port: | Mains |
| Test verdict: | Passed |
| Operating conditions: | 120 V, 60 Hz / RFID transmitter on / EUT standby |
| Operator name: | UGR |
| Date of testing: | 2018-07-25 |

EN-CE-R32-LN01




FCC Part 15.207 AC QP [..\EMI conducted\FCC Part 15 Subpart C\]
FCC Part 15.207 AC AV [..\EMI conducted\FCC Part 15 Subpart C\]
Preview Result 1-QPK [Preview Result 1.Result:1]
Preview Result 2-CAV [Preview Result 2.Result:2]
Final Result 1-QPK [Final Result 1.Result:1]
Final Result 2-CAV [Final Result 2.Result:1]

# Final Result 1

| Frequency (MHz) | QuasiPeak-ClearWrite (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|
| 0.251250 | 46.3 | GN | N | 10.2 | 15.4 | 61.7 | |
| 0.300750 | 51.4 | GN | N | 10.2 | 8.8 | 60.2 | |
| 0.343500 | 53.7 | GN | L1 | 10.2 | 5.5 | 59.1 | |
| 0.359250 | 53.1 | GN | N | 10.2 | 5.7 | 58.7 | |
| 0.503250 | 44.4 | GN | N | 10.2 | 11.6 | 56.0 | |
| 0.732750 | 45.8 | GN | L1 | 10.2 | 10.2 | 56.0 | |
| 1.000500 | 45.5 | GN | L1 | 10.2 | 10.5 | 56.0 | |
| 1.335750 | 44.0 | GN | N | 10.2 | 12.0 | 56.0 | |
| 1.983750 | 45.9 | GN | L1 | 10.3 | 10.1 | 56.0 | |
| 2.847750 | 46.0 | GN | L1 | 10.3 | 10.0 | 56.0 | |
| 3.666750 | 44.2 | GN | L1 | 10.3 | 11.8 | 56.0 | |
| 6.222750 | 40.2 | GN | L1 | 10.4 | 19.8 | 60.0 | |
| 13.560000 | 43.1 | GN | L1 | 10.9 | 16.9 | 60.0 | |

# Final Result 2

| Frequency (MHz) | CAverage-ClearWrite (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|
| 0.253500 | 40.8 | GN | N | 10.2 | 10.8 | 51.6 | |
| 0.298500 | 43.9 | GN | N | 10.2 | 6.4 | 50.3 | |
| 0.339000 | 44.7 | GN | L1 | 10.2 | 4.5 | 49.2 | |
| 0.361500 | 44.6 | GN | N | 10.2 | 4.0 | 48.7 | |
| 0.721500 | 37.2 | GN | L1 | 10.2 | 8.8 | 46.0 | |
| 0.899250 | 36.7 | GN | L1 | 10.2 | 9.3 | 46.0 | |
| 0.975750 | 36.8 | GN | L1 | 10.2 | 9.2 | 46.0 | |
| 1.151250 | 36.1 | GN | L1 | 10.2 | 9.9 | 46.0 | |
| 1.830750 | 36.4 | GN | L1 | 10.2 | 9.6 | 46.0 | |
| 2.802750 | 36.6 | GN | L1 | 10.3 | 9.4 | 46.0 | |
| 4.494750 | 34.7 | GN | L1 | 10.4 | 11.3 | 46.0 | |
| 6.258750 | 31.8 | GN | L1 | 10.5 | 18.2 | 50.0 | |
| 13.560000 | 41.2 | GN | L1 | 10.9 | 8.8 | 50.0 | |

## 7.2 Field strength 13.110 MHz – 14.010 MHz (Emission Mask)

| NORMATIVE REFERENCES | | | RESULT |
|---|---|---|---|
| Limits according to: | **FCC §15.225 (a) – (c)**<br>**RSS-210, Issue 9, section B4** | | **P** |
| Methods of measurement according to: | **ANSI C63.10, section 6.3, 6.4**<br>**RSS-Gen 6.13, 8.9** | | |
| Equipment mode | Power interface | 1 | |
| | EUT configuration mode | 1 | |
| | Operation mode | 2 | |
| Test requirements | Frequency range | 13.110 MHz – 14.010 MHz | |
| | Measurement time | 1000 ms | |
| | Antenna height | 1 m | |

**Limits**

The limits below 30 MHz are given for different measurement distances. The limits below 30 MHz are converted to 3 m by using the extrapolation factor 40 dB/decade (according to §15.31).

| Frequency (MHz) | Field strength (µV/m) | Field strength (dBµV/m) | Measurement distance (m) | Field strength (dBµV/m) | Measurement distance (m) |
|---|---|---|---|---|---|
| 13.110 - 13.410 | 106 | 40.5 | 30 | 80.5 | 3 |
| 13.410 - 13.553 | 334 | 50.5 | 30 | 90.5 | 3 |
| 13.553 - 13.567 | 15848 | 84.0 | 30 | 124.0 | 3 |
| 13.567 - 13.710 | 334 | 50.5 | 30 | 90.5 | 3 |
| 13.710 - 14.010 | 106 | 40.5 | 30 | 80.5 | 3 |

**Test setup details**

Compliance with the spectrum mask is tested using a spectrum analyzer with resolution bandwidth set to 10 kHz or 9 kHz CISPR. The video bandwidth shall be at least three times greater than the resolution bandwidth.
The test was carried out automatically by the test receiver.
The EUT is a table-top EUT and was standing on a table made of Styrodur with a Pertinax plate on top and the dimensions 1.6 m x 1.0 m x 0.8 m (Length x Width x Height).
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector.

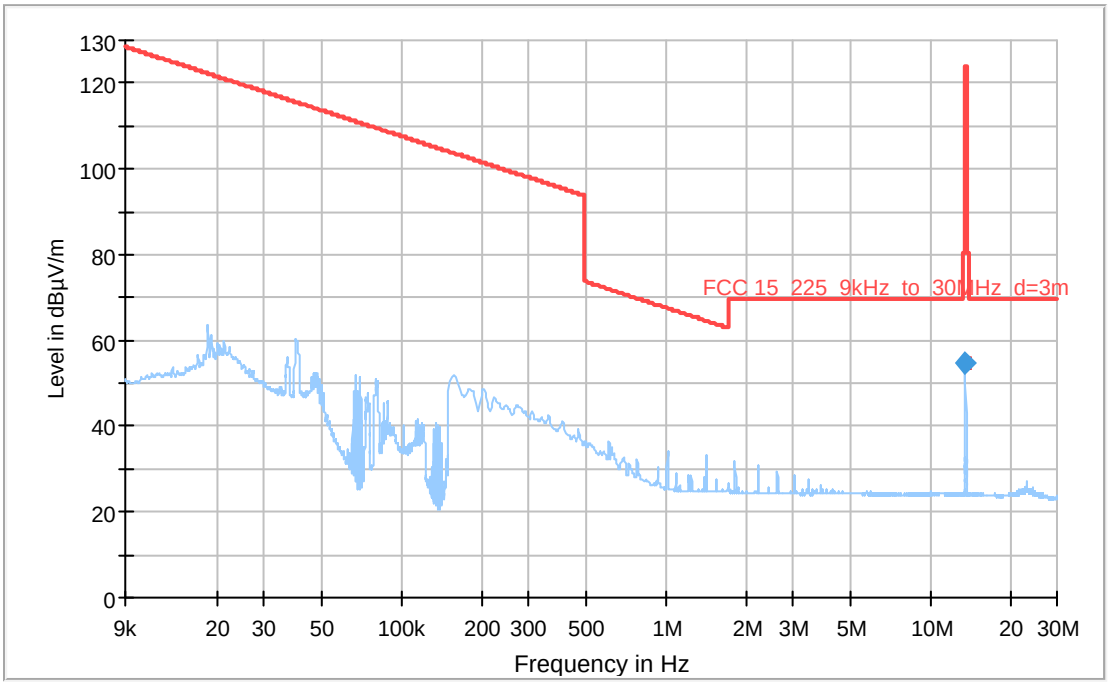
**Test equipment**

| DESCRIPTION | MANUFACTURER | TYPE | SN | ASSET NO. | CALIBRATION |
|---|---|---|---|---|---|
| Semi-Anechoic chamber | Siepel | REF W460SLB | - | PM KF 1150-01 | 2016-12 (3 years) |
| Turntable | Inn-Co | - | - | PM KF 2949-04 | - |
| Receiver 10 Hz - 7 GHz | Rohde & Schwarz | ESR7 | 101095 | PM KF 2441 | 2017-10 (1 year) |
| Loop antenna 9 kHz- 30 MHz | Rohde & Schwarz | HFH2-Z2 | 881058/48 | PM KF 1401 | 2017-10 (2 years) |
| Test software | Rohde & Schwarz | EMC 32 V.10.01.00 | - | PM KF 2983-2 | - |

# Radiated Emissions Test Report

## Common Information

| | |
|---|---|
| EUT: | VistaScan Nano Easy |
| Test Verdict: | Passed |
| Test Description: | Radiated emissions FCC Part 15C, 9 kHz to 30 MHz, TX |
| Operating Conditions: | RFID transmitter on |
| Operator Name: | UGR |
| Project Number: | 32515 |
| Date | 09.07.2018 |
| Comment: | |




Preview Result 1-QPK [Preview Result 1.Result:1]
Critical_Freqs AVG [Critical_Freqs.Result:5]
Critical_Freqs QPK [Critical_Freqs.Result:4]
FCC 15_225_9kHz_to_30MHz_d=3m [..\zF radiated\FCC Part 15C\]
Final_Result QPK [Final_Result.Result:4]
Final_Result AVG [Final_Result.Result:5]

## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Azimuth (deg) | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 13.560000 | 54.87 | --- | 124.00 | 69.13 | 1000 | 9 | H | 352.0 | 19.7 |

**(continuation of the "Final_Result" table from column 15 ...)**

| Frequency (MHz) | Comment |
|---|---|
| 13.560000 | Peak: 55,8 dBµV/m |

## 7.3 Radiated emissions < 30 MHz

| NORMATIVE REFERENCES | | | RESULT |
|---|---|---|---|
| Limits according to: | **FCC §15.225 (d), §15.209<br>RSS-210, Issue 9, section B4** | | **P** |
| Methods of measurement according to: | **ANSI C63.10, section 6.3, 6.4<br>RSS-Gen 6.13, 8.9** | | |
| Equipment mode | Power interface | 1 | |
| | EUT configuration mode | 1 | |
| | Operation mode | 2 and 1 | |
| Test requirements | Frequency range | 9 kHz - 30 MHz | |
| | Antenna height | 1 m | |

**Limits**

The limits below 30 MHz are given for different measurement distances. The limits below 30 MHz are converted to 3 m by using the extrapolation factor 40 dB/decade (according to §15.31).

| Frequency (MHz) | Field strength (µV/m) | Field strength (dBµV/m) | Measurement distance (m) |
|---|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) | 67.6 - 20 · log(F(kHz)) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 87.6 - 20 ·log(F(kHz)) | 30 |
| 1.705 - 13.110 | 30 | 29.5 | 30 |
| 14.010 - 30.000 | 30 | 29.5 | 30 |
| Additionally, the level of any unwanted emissions shall not exceed the level of the fundamental emission. | | | |

**Test setup details**

Compliance with the spectrum mask is tested using a spectrum analyzer with resolution bandwidth set to 10 kHz or 9 kHz CISPR. The video bandwidth shall be at least three times greater than the resolution bandwidth.
The test was carried out automatically by the test receiver.
The EUT is a table-top EUT and was standing on a table made of Styrodur with a Pertinax plate on top and the dimensions 1.6 m x 1.0 m x 0.8 m (Length x Width x Height).
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

**Test equipment**

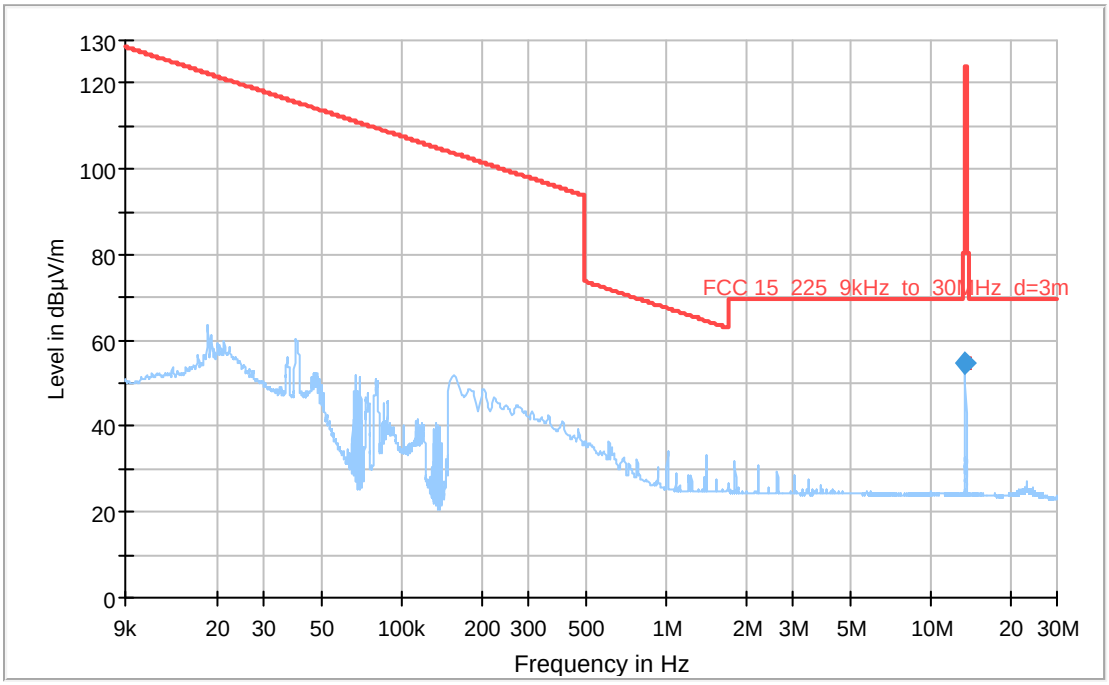
| DESCRIPTION | MANUFACTURER | TYPE | SN | ASSET NO. | CALIBRATION |
|---|---|---|---|---|---|
| Semi-Anechoic chamber | Siepel | REF W460SLB | - | PM KF 1150-01 | 2016-12 (3 years) |
| Turntable | Inn-Co | - | - | PM KF 2949-04 | - |
| Receiver 10 Hz - 7 GHz | Rohde & Schwarz | ESR7 | 101095 | PM KF 2441 | 2017-10 (1 year) |
| Loop antenna 9 kHz- 30 MHz | Rohde & Schwarz | HFH2-Z2 | 881058/48 | PM KF 1401 | 2017-10 (2 years) |
| Test software | Rohde & Schwarz | EMC 32 V.10.01.00 | - | PM KF 2983-2 | - |

**Measurement results – Radiated emissions < 30 MHz:**

# Radiated Emissions Test Report

## Common Information

| | |
|---|---|
| EUT: | VistaScan Nano Easy |
| Test Verdict: | Passed |
| Test Description: | Radiated emissions FCC Part 15C, 9 kHz to 30 MHz, TX |
| Operating Conditions: | RFID transmitter on |
| Operator Name: | UGR |
| Project Number: | 32515 |
| Date | 09.07.2018 |
| Comment: | |




Preview Result 1-QPK [Preview Result 1.Result:1]
Critical_Freqs AVG [Critical_Freqs.Result:5]
Critical_Freqs QPK [Critical_Freqs.Result:4]
FCC 15_225_9kHz_to_30MHz_d=3m [..\zF radiated\FCC Part 15C\]
Final_Result QPK [Final_Result.Result:4]
Final_Result AVG [Final_Result.Result:5]

## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Azimuth (deg) | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 13.560000 | 54.87 | --- | 124.00 | 69.13 | 1000 | 9 | H | 352.0 | 19.7 |

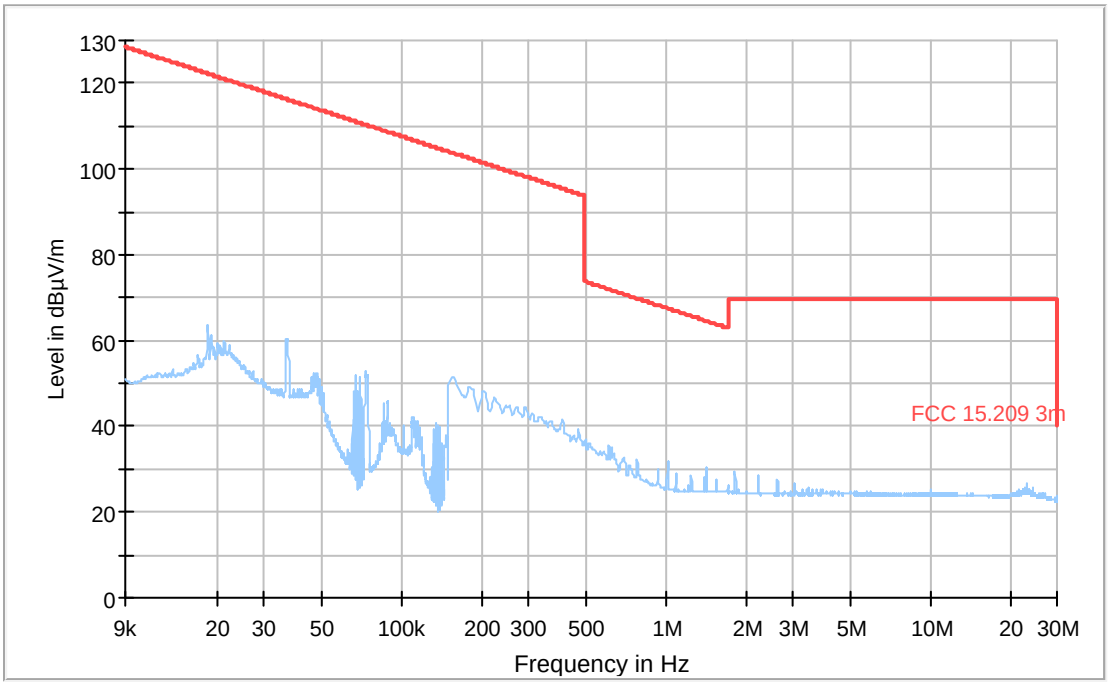
**(continuation of the "Final_Result" table from column 15 ...)**

| Frequency (MHz) | Comment |
|---|---|
| 13.560000 | Peak: 55,8 dBµV/m |

# Radiated Emissions Test Report

## Common Information

| | |
|---|---|
| EUT: | VistaScan Nano Easy |
| Test Verdict: | Passed |
| Test Description: | Radiated emissions FCC Part 15C, 9 kHz to 30 MHz, Standby |
| Operating Conditions: | RFID transmitter off (standby) |
| Operator Name: | UGR |
| Project Number: | 32515 |
| Date | 09.07.2018 |
| Comment: | |




Preview Result 1-QPK [Preview Result 1.Result:1]
Critical_Freqs AVG [Critical_Freqs.Result:5]
Critical_Freqs QPK [Critical_Freqs.Result:4]
FCC 15.209 3m [..\zF radiated\FCC Part 15C\]
Final_Result QPK [Final_Result.Result:4]
Final_Result AVG [Final_Result.Result:5]

## 7.4 Radiated emissions 30 MHz to 1 GHz

| NORMATIVE REFERENCES | | | RESULT |
|---|---|---|---|
| Limits according to: | **FCC §15.225 (d), §15.209<br>RSS-210, Issue 9, section B4** | | **P*** |
| Methods of measurement according to: | **ANSI C63.10, section 6.3, 6.5<br>RSS-Gen 6.13, 8.9** | | |
| Equipment mode | Power interface | 1 | |
| | EUT configuration mode | 1 | |
| | Operation mode | 2 and 1 | |
| Test requirements | Frequency range | 30 MHz – 1 GHz | |
| | Antenna height | 1 m | |

*Pass with modification explained in section 8

**Limits**

| Frequency (MHz) | Field strength (µV/m) | Field strength (dBµV/m) | Measurement distance (m) |
|---|---|---|---|
| 30 – 88 | 100 | 40.0 | 3 |
| 88 – 216 | 150 | 43.5 | 3 |
| 216 – 960 | 200 | 46.0 | 3 |
| Above 960 | 500 | 54.0 | 3 |

**Test setup details**

The EUT is a table-top EUT and was standing on a table made of Styrodur with a Pertinax plate on top and the dimensions 1.6 m x 1.0 m x 0.8 m (Length x Width x Height).
Overview sweeps performed with peak detectors and final measurement with quasi-peak detectors.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector.

**Test equipment**

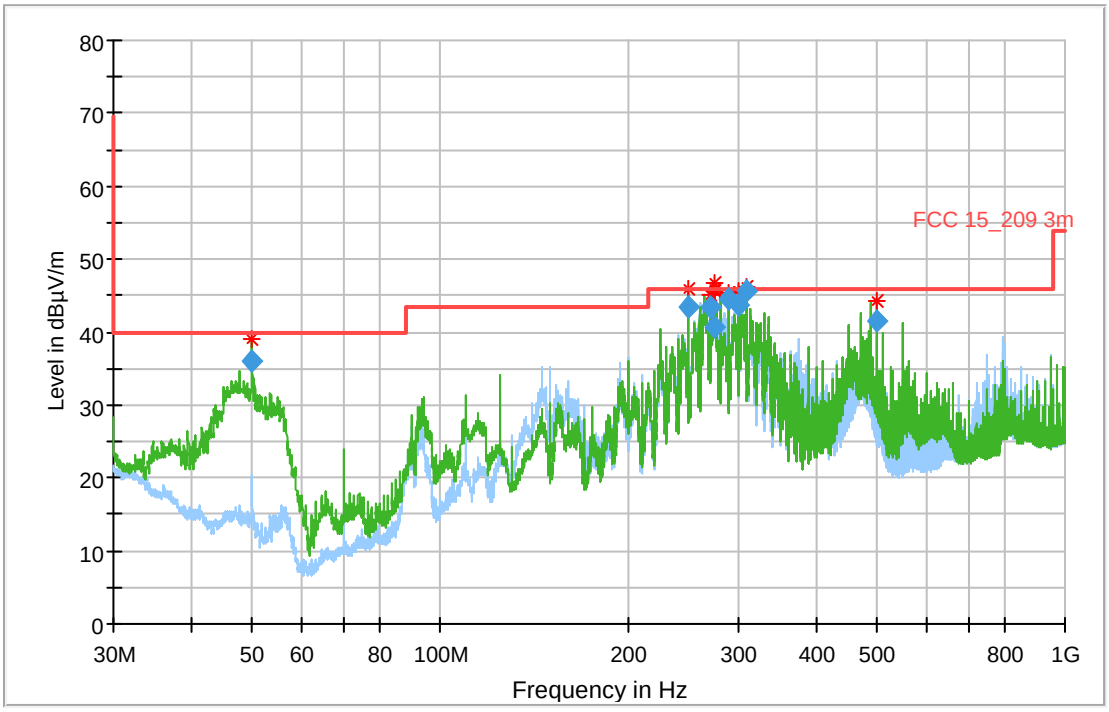
| DESCRIPTION | MANUFACTURER | TYPE | SN | ASSET NO. | CALIBRATION |
|---|---|---|---|---|---|
| Semi-Anechoic chamber | Siepel | REF W460SLB | - | PM KF 1150-01 | 2016-12 (3 years) |
| Turntable | Inn-Co | - | - | PM KF 2949-04 | - |
| Receiver 10 Hz - 7 GHz | Rohde & Schwarz | ESR7 | 101095 | PM KF 2441 | 2017-10 (1 year) |
| Antenna 30 MHz - 3GHz | Rohde & Schwarz | HL 562 | 100354 | PM KF 1123 | 2018-03 (2 years) |
| Test software | Rohde & Schwarz | EMC 32 V.10.01.00 | - | PM KF 2983-2 | - |

**Measurement results – Radiated emissions 30 MHz to 1 GHz:**

# Radiated Emissions Test Report

## Common Information

| | |
|---|---|
| EUT: | VistaScan Nano Easy |
| Test Verdict: | pass |
| Test Description: | Spurious emission radiated |
| Operating Conditions: | RFID transmitter on |
| Operator Name: | UGR |
| Project Number: | 32515 |
| Date | 2018-06-21 |
| Comment: | AC power supply ATM012T-W240 |




Preview Result 1H-PK+ [Preview Result 1H.Result:2]
Preview Result 1V-PK+ [Preview Result 1V.Result:2]
Critical_Freqs PK+ [Critical_Freqs.Result:4]
FCC 15_209 3m [..\EMI radiated\FCC Part 15C\]
Final_Result QPK [Final_Result.Result:4]

**All final results are emissions of the basic unit and not of the RFID module and are to be evaluated according to FCC §15.109**

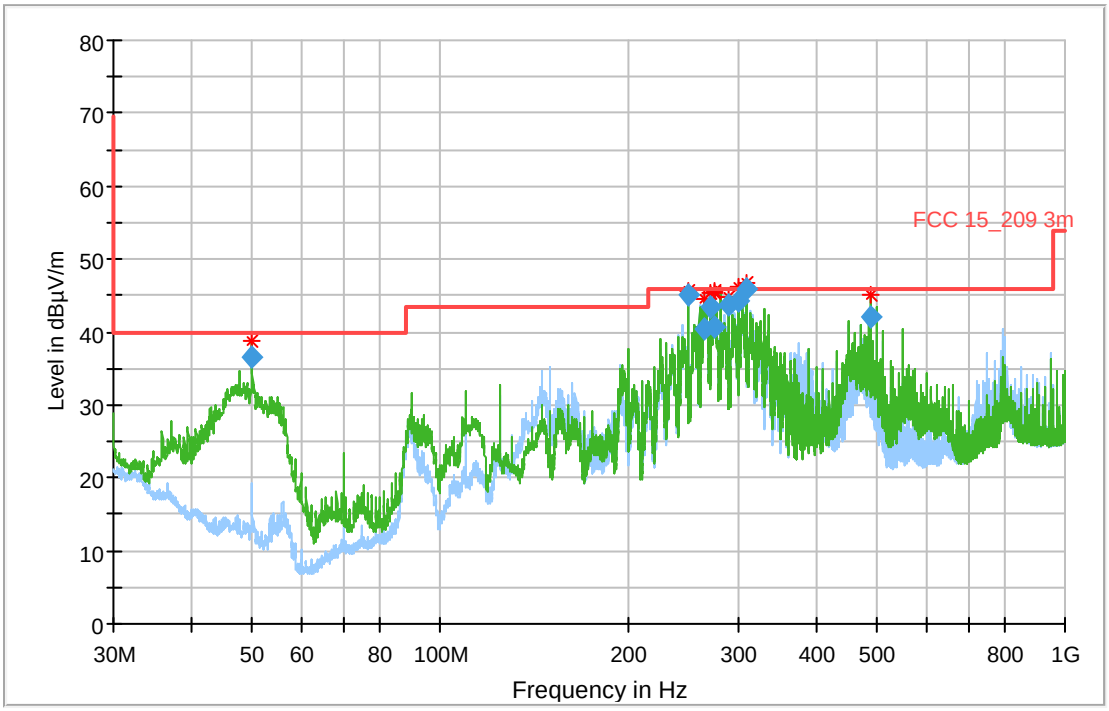
## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 50.010000 | 36.15 | 40.00 | 3.85 | 1000.0 | 120.000 | 100.0 | V | 323.0 | 8.0 |
| 250.020000 | 43.38 | 46.02 | 2.64 | 1000.0 | 120.000 | 100.0 | V | 26.0 | 11.8 |
| 270.000000 | 43.50 | 46.02 | 2.52 | 1000.0 | 120.000 | 181.0 | V | 174.0 | 12.3 |
| 275.010000 | 40.72 | 46.02 | 5.30 | 1000.0 | 120.000 | 104.0 | H | 96.0 | 12.4 |
| 290.010000 | 44.62 | 46.02 | 1.40 | 1000.0 | 120.000 | 187.0 | V | 37.0 | 12.9 |
| 300.000000 | 43.79 | 46.02 | 2.23 | 1000.0 | 120.000 | 99.0 | H | 50.0 | 13.1 |
| 309.990000 | 45.60 | 46.02 | 0.42 | 1000.0 | 120.000 | 162.0 | V | 222.0 | 13.5 |
| 500.010000 | 41.45 | 46.02 | 4.57 | 1000.0 | 120.000 | 108.0 | V | 257.0 | 17.6 |

# Radiated Emissions Test Report

## Common Information

| | |
|---|---|
| EUT: | VistaScan Nano Easy |
| Test Verdict: | pass |
| Test Description: | Spurious emission radiated |
| Operating Conditions: | RFID transmitter off (standby) |
| Operator Name: | UGR |
| Project Number: | 32515 |
| Date | 2018-06-21 |
| Comment: | AC power supply ATM012T-W240 |




Preview Result 1H-PK+ [Preview Result 1H.Result:2]
Preview Result 1V-PK+ [Preview Result 1V.Result:2]
Critical_Freqs PK+ [Critical_Freqs.Result:4]
FCC 15_209 3m [..\EMI radiated\FCC Part 15C\]
Final_Result QPK [Final_Result.Result:4]

**All final results are emissions of the basic unit and not of the RFID module and are to be evaluated according to FCC §15.109.**

## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 50.010000 | 36.52 | 40.00 | 3.48 | 1000.0 | 120.000 | 99.0 | V | 345.0 | 8.0 |
| 250.020000 | 45.09 | 46.02 | 0.93 | 1000.0 | 120.000 | 99.0 | V | 21.0 | 11.8 |
| 265.590000 | 40.37 | 46.02 | 5.65 | 1000.0 | 120.000 | 117.0 | H | 335.0 | 12.1 |
| 270.000000 | 43.54 | 46.02 | 2.48 | 1000.0 | 120.000 | 160.0 | V | 183.0 | 12.3 |
| 275.010000 | 40.67 | 46.02 | 5.35 | 1000.0 | 120.000 | 104.0 | H | 101.0 | 12.4 |
| 290.010000 | 43.71 | 46.02 | 2.31 | 1000.0 | 120.000 | 165.0 | V | 143.0 | 12.9 |
| 300.000000 | 44.23 | 46.02 | 1.79 | 1000.0 | 120.000 | 121.0 | H | 52.0 | 13.1 |
| 309.990000 | 46.02 | 46.02 | 0.00 | 1000.0 | 120.000 | 159.0 | V | 226.0 | 13.5 |
| 489.990000 | 42.11 | 46.02 | 3.91 | 1000.0 | 120.000 | 104.0 | V | 269.0 | 17.5 |

## 7.5 Frequency stability measurement

| NORMATIVE REFERENCES | | | RESULT |
|---|---|---|---|
| Limits according to: | **FCC §15.225 (e)**<br>**RSS-210, Issue 9, section B6**<br>**RSS-Gen Issue 4, section 6.11** | | **P** |
| Methods of measurement according to: | **ANSI C63.10, section 9.14** | | |
| Equipment mode | Power interface | 1 | |
| | EUT configuration mode | 1 | |
| | Operation mode | 1 | |

**Limits**

| | |
|---|---|
| Limit: | The frequency tolerance of the carrier signal shall be maintained within ± 0.01 % (±100 ppm) of the carrier frequency under nominal conditions. |
| EUT temperature range: | 0°C to +35°C |
| Test temperature range: | -30°C to +55°C |

**Test equipment**

| DESCRIPTION | MANUFACTURER | TYPE | SN | ASSET NO. | CALIBRATION |
|---|---|---|---|---|---|
| Temperature chamber | Heraeus-Vötsch | HT4010 | 45021 | PM KF 1402 | 2018-02 (1 year) |
| Spectrum analyser | Rohde & Schwarz | FSV40 | 837356/012 | PM KF 2783 | 2017-09 (1 year) |
| Near field probes | EMCO | EMCO 7405 | 1405 | PM KF 0139 | 2017-12 (1 year) |

**Measurement results – Frequency stability measurement:**

| Temperature °C | Carrier MHz | Upper limit: 13,561356 MHz<br>Lower limit: 13,558644 MHz<br>Measured value under temperature influence: |
|---|---|---|
| +55 | 13.560 | 13.56048 |
| +50 | 13.560 | 13.56046 |
| +40 | 13.560 | 13.56044 |
| +30 | 13.560 | 13.56043 |
| +20 | 13.560 | 13.56046 |
| +10 | 13.560 | 13.56051 |
| 0 | 13.560 | 13.56054 |
| -10 | 13.560 | 13.56059 |
| -20 | 13.560 | 13.56059 |
| -30 | 13.560 | 13.56060 |

**Comment**

The variation of the AC voltage from 100 to 240 V at a temperature of 20°C had no influence on the frequency of the carrier.

## 7.6 Occupied bandwidth

| NORMATIVE REFERENCES | | | RESULT |
|---|---|---|---|
| Limits according to: | **RSS-Gen, Issue 4, 6.6** | | **P** |
| Methods of measurement according to: | **RSS-Gen, Issue 4, 6.6** | | |
| Equipment mode | Power interface | 1 | |
| | EUT configuration mode | 1 | |
| | Operation mode | 1 | |

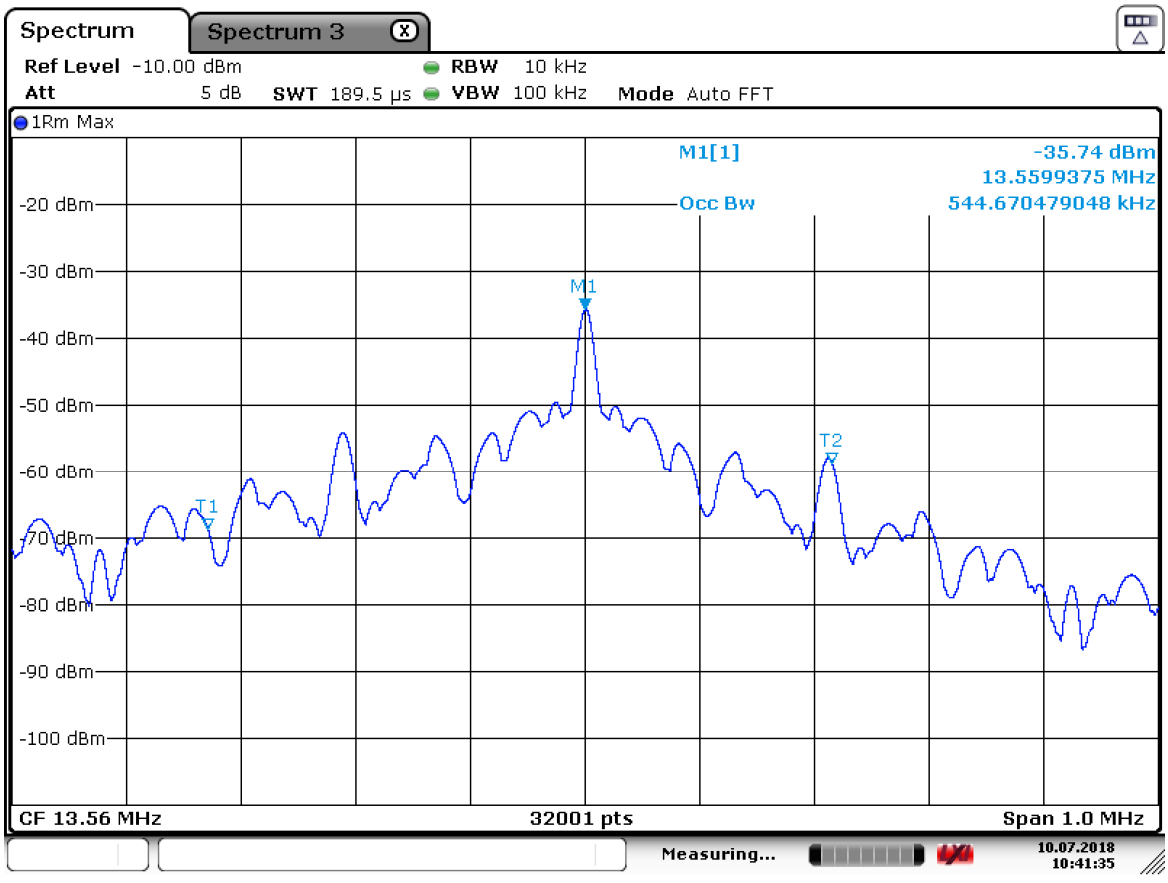
**Test equipment**

| DESCRIPTION | MANUFACTURER | TYPE | SN | ASSET NO. | CALIBRATION |
|---|---|---|---|---|---|
| Spectrum analyser | Rohde & Schwarz | FSV40 | 837356/012 | PM KF 2783 | 2017-09 (1 year) |
| Near field probes | EMCO | EMCO 7405 | 1405 | PM KF 0139 | 2017-12 (1 year) |

**Comment**

The 99% occupied bandwidth is 544.67 kHz.

**Measurement results – 99% occupied bandwidth:**

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## SECTION 8
## MEASUREMENT UNCERTAINTY EVALUATION

| | |
|---|---|
| Measurement uncertainty for radiated magnetic field, 9 kHz – 30 MHz | ± 3.2 dB |
| Measurement uncertainty for radiated emission, 30 MHz - 1000 MHz | |
| Uncertainty for the frequency range 30 to 300 MHz using a biconical or a combination antenna at 3 m | ± 4.9 dB |
| Uncertainty for the frequency range 300 to 1000 MHz using a logperiodic or a combination antenna at 3 m | ± 4.7 dB |
| Measurement uncertainty for radiated emission 1 to 26 GHz | |
| Uncertainty for the frequency range 1 to 18 GHz | ± 6.1 dB |
| Uncertainty for the frequency range 18 to 26,5 GHz | ± 6.5 dB |
| Measurement uncertainty for conducted disturbances at the antenna port on radio equipment | |
| Frequency range 9 kHz - 1 GHz | ± 1.9 dB |
| Frequency range 1 GHz - 18 GHz | ± 3.0 dB |
| Frequency range 18 GHz -26,5 GHz | ± 3.6 dB |
| Measurement uncertainty for Frequency error | ± 1 x $10^{-8}$ |
| Measurement uncertainty for Output power (Conducted), 9 kHz - 18 GHz | ± 1.0 dB |
| Measurement uncertainty for RF Power density | |
| Frequency range 9 kHz - 1 GHz | ± 1.9 dB |
| Frequency range 1 GHz - 18 GHz | ± 3.0 dB |
| Frequency range 18 GHz -26,5 GHz | ± 3.6 dB |
| Measurement uncertainty for humidity | ± 4 % |
| Measurement uncertainty for temperature | ± 0.5 $^{0}$C |
| Measurement uncertainty for voltage | |
| DC | ± 0.1 % |
| AC up to 10 kHz | ± 1.8 % |
| Measurement uncertainty for time | ± 0.058 % |
| Measurement uncertainty for conducted emissions, LISN, 150 kHz -30 MHz | ± 2.3 dB |
| Measurement uncertainty for OBW | ± 4.3 % |
| 601 points resolution (Spectrum analyzer) | ± 0.83 % |
| 30000 points resolution (Spectrum analyzer) | ± 0.016 % |

# End of test report