



| RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-210 Operation within the 13.110 – 14.010 MHz band | |
|---|--|
| Report Reference No | G0M-1709-6886-TFC225RI-V01 |
| Testing Laboratory | Eurofins Product Service GmbH |
| Address | Storkower Str. 38c 15526 Reichenwalde Germany |
| Accreditation |  <p>A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Test Firm Designation Number: DE0008 IC Testing Laboratory site: 3470A-2</p> |
| Applicant | Wincor Nixdorf Manufacturing GmbH |
| Address | Rohrdamm 7, Haus 16 13629 Berlin GERMANY |
| Test Specification | According to FCC/ISED rules |
| Standard | 47 CFR Part 15C RSS-210, Issue 9, 2016-08 |
| Non-Standard Test Method | None |
| Test Scope | Full compliance test |
| Equipment under Test (EUT): | |
| Product Description | NFC Reader |
| Model(s) | KIT-NFC-KIOSK |
| Additional Model(s) | None |
| Brand Name(s) | Wincor Nixdorf |
| Hardware Version(s) | Rev. A |
| Software Version(s) | 01.02 |
| FCC-ID | 2AO4D-01750304421 |
| IC | 23654-01750304421 |
| Test Result | PASSED |

| | | |
|--|------------------|---|
| Possible test case verdicts: | | |
| required by standard but not tested | N/T | |
| not required by standard | N/R | |
| test object does meet the requirement | P(PASS) | |
| test object does not meet the requirement | F(FAIL) | |
| Testing: | | |
| Test Lab Temperature | 20 - 23 °C | |
| Test Lab Humidity | 32 – 38 % | |
| Date of receipt of test item | 2017-11-27 | |
| Report: | | |
| Compiled by | Sebastian Suckow | |
| Tested by (+ signature) (Responsible for Test) | Sebastian Suckow |  |
| Approved by (+ signature) (Deputy Head of Lab) | Toralf Jahn |  |
| Date of Issue | 2018-03-12 | |
| Total number of pages | 30 | |
| General Remarks: | | |
| <p>The test results presented in this report relate only to the object tested.</p> <p>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.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p> | | |
| Additional Comments: | | |
| | | |

VERSION HISTORY

| Version History | | | |
|-----------------|------------|-----------------|------------|
| Version | Issue Date | Remarks | Revised By |
| 01 | 2018-03-12 | Initial Release | |

ABBREVIATIONS AND ACRONYMS

| Acronyms | |
|------------------|---|
| Acronym | Description |
| EUT | Equipment Under Test |
| FCC | Federal Communications Commission |
| ISED | Innovation, Science and Economic Development Canada |
| RBW | Resolution bandwidth |
| RFID | Radio Frequency Identification |
| RMS | Root mean square |
| VBW | Video bandwidth |
| V _{NOM} | Nominal supply voltage |

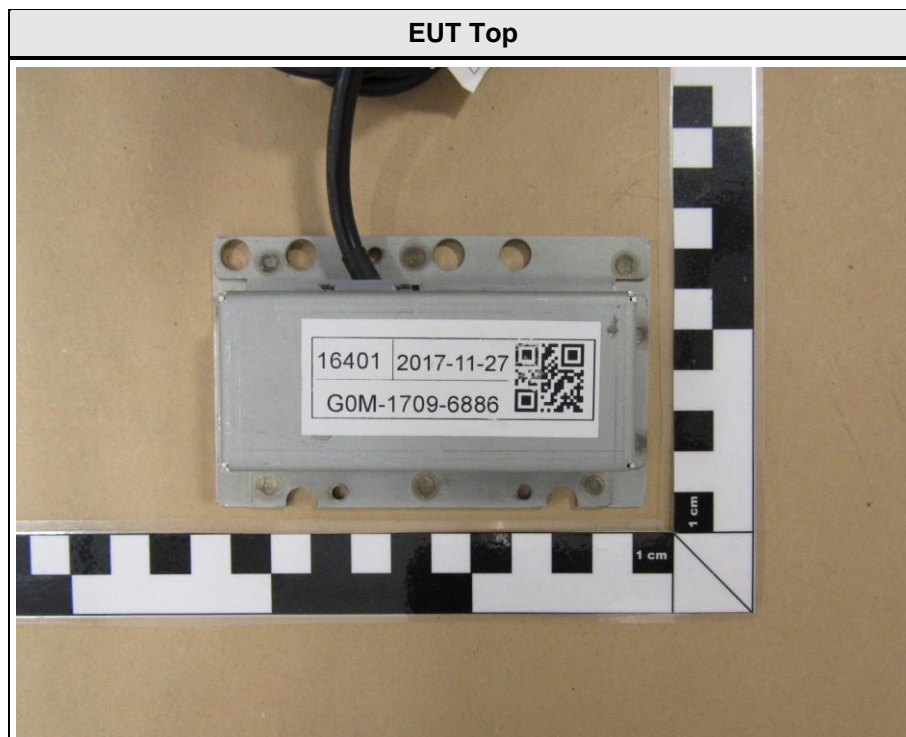
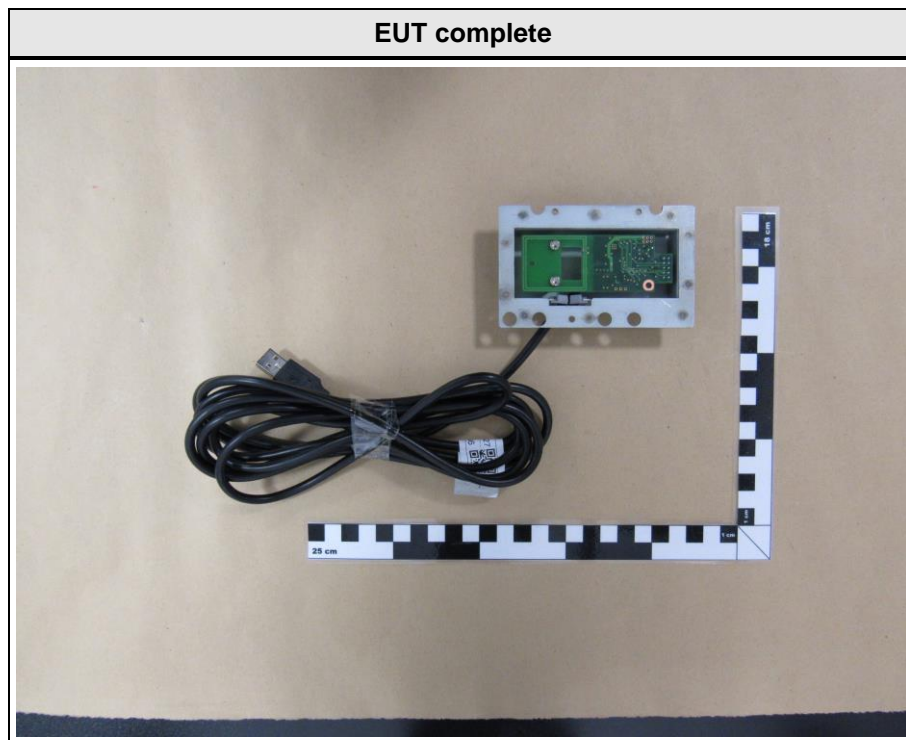
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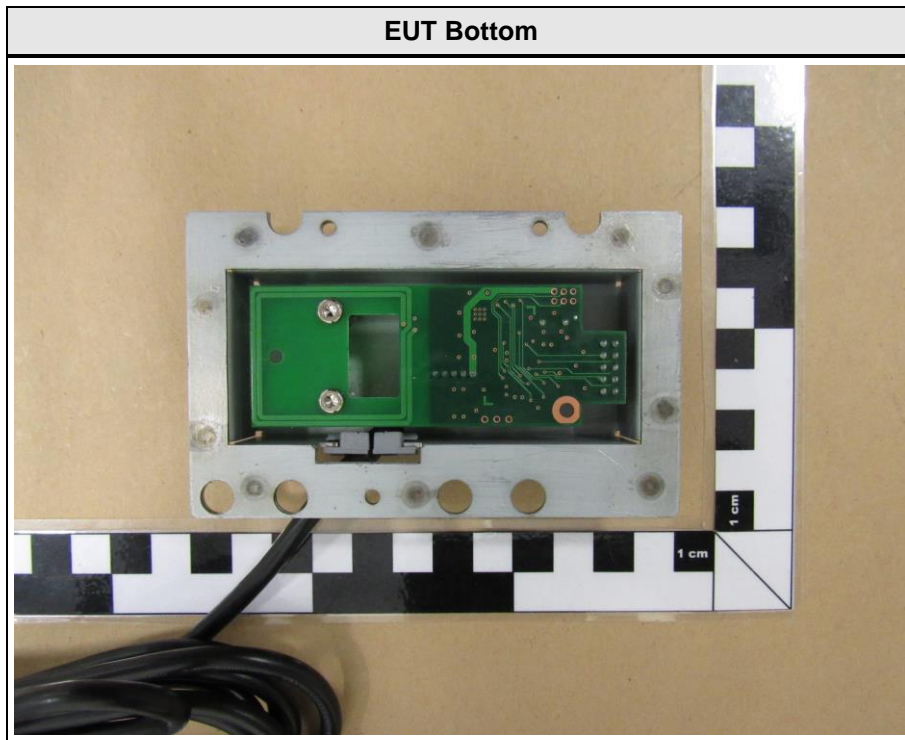
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1 Equipment (Test Item) Under Test

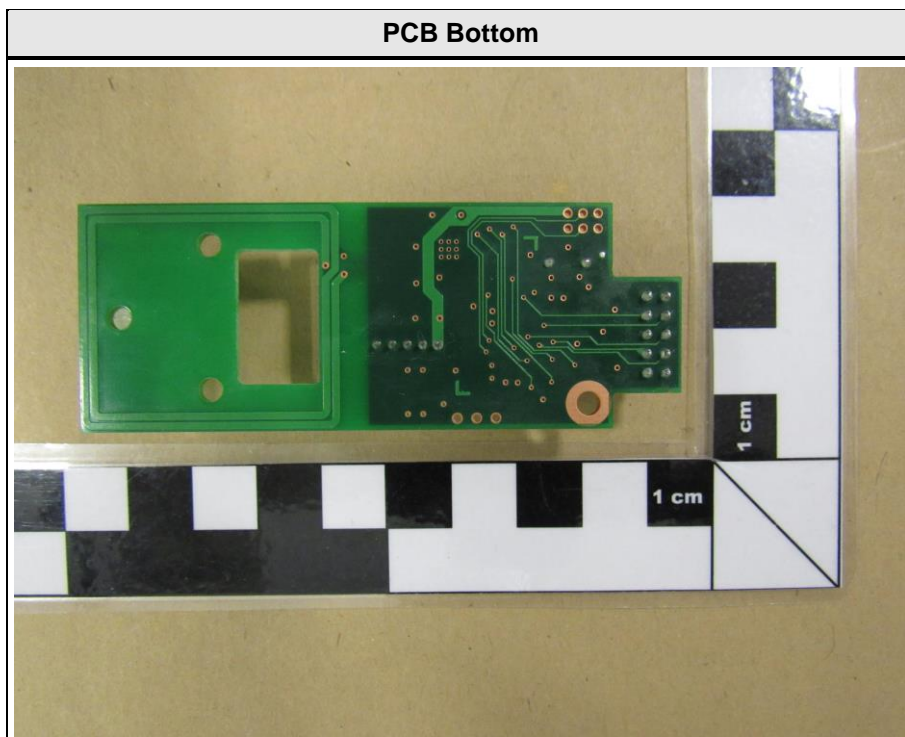
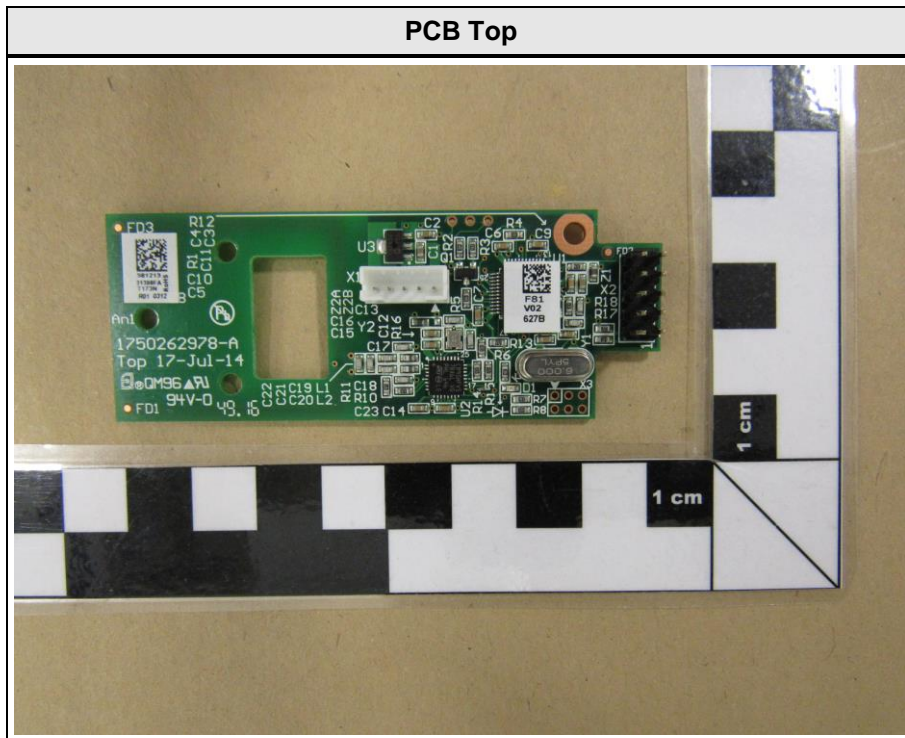
| | | |
|-------------------------|---|-------------|
| Description | NFC Reader | |
| Model | KIT-NFC-KIOSK | |
| Additional Model(s) | None | |
| Brand Name(s) | Wincor Nixdorf | |
| Serial Number(s) | None | |
| Hardware Version(s) | Rev. A | |
| Software Version(s) | 01.02 | |
| PMN | Diebold Nixdorf | |
| HVIN | KIT-NFC-KIOSK | |
| FVIN | N/A | |
| HMN | N/A | |
| FCC-ID | 2AO4D-01750304421 | |
| IC | 23654-01750304421 | |
| Equipment type | Radio Module | |
| Radio type | Transceiver | |
| Assigned frequency band | 13.553 - 13.567 MHz | |
| Radio technology | RFID | |
| Modulation | ASK | |
| Antenna | Type | Integrated |
| | Model | Unspecified |
| | Manufacturer | Unspecified |
| | Gain | Unspecified |
| Supply Voltage | V _{NOM} | 5.0 VDC |
| | V _{MIN} | 4.5 VDC |
| | V _{MAX} | 5.5 VDC |
| Operating Temperature | T _{NOM} | 25 °C |
| Manufacturer | Wincor Nixdorf Manufacturing GmbH Rohrdamm 7, Haus 16 13629 Berlin GERMANY | |

1.1 Photos – Equipment External

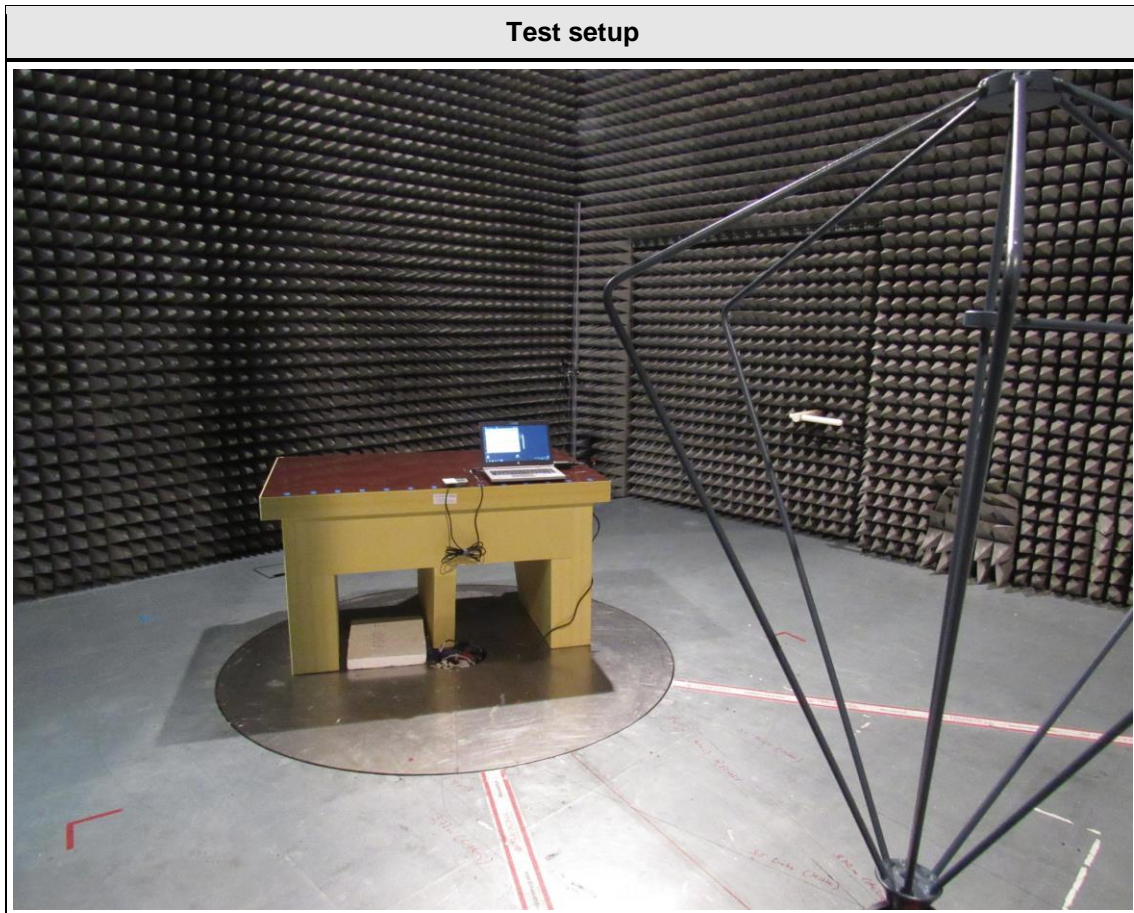




1.2 Photos – Equipment Internal



1.3 Photos – Test Setup



1.4 Support Equipment

| Product Type | Device | Manufacturer | Model | Comment |
|--------------|---------------------|--------------|-----------------------------|-------------------------------------|
| AE | Customer Notebook | HP | eLitebook SN: CZC2067NCN | Used for signaling and power supply |
| Description: | | | | |
| AE | Auxillary Equipment | | | |
| SIM | Simulator | | | |
| CBL | Connecting Cable | | | |
| Comment: | | | | |

1.5 Test Modes

| Mode | Description |
|----------|---|
| Transmit | Mode = Transmit Modulation = ASK Duty cycle = 100 % |
| Comment: | |

1.6 Test Frequencies

| Designator | Mode | Channel | Frequency [MHz] |
|------------|---------|---------|-----------------|
| F1 | Tx / Rx | N/A | 13.56 |

2 Result Summary

| FCC 47 CFR Part 15C, ISED RSS-210 | | | | |
|--|--|------------------|--------|--------------------|
| Product Standard Reference | Requirement | Reference Method | Result | Remarks |
| RSS-Gen 6.6 | Occupied Bandwidth | ANSI C63.10 | N/R | Informational only |
| FCC 15.225(a-c) ISED RSS-210 A2.6(a-c) | Fundamental in-band field strength emissions | ANSI C63.10 | PASS | |
| FCC 15.225(d) FCC 15.209 ISED RSS-210 A2.6(d) | Emission radiated outside the specified frequency band | ANSI C63.10 | PASS | |
| FCC 15.225(e) ISED RSS-210 A2.6 | Frequency stability | ANSI C63.10 | PASS | |
| ISED RSS-Gen 4.10 ISED RSS-Gen 7.1 | Receiver radiated spurious emissions | ANSI C63.10 | N/A | |
| 47 CFR 15.207 RSS-Gen 8.8 | AC power line conducted emissions | ANSI C63.10 | PASS | |
| Comment: | | | | |

| Possible Test Case Verdicts | |
|-----------------------------|--|
| PASS | Test object does meet the requirements |
| FAIL | Test object does not meet the requirements |
| N/T | Required by standard but not tested |
| N/R | Not required by standard for the test object |

3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

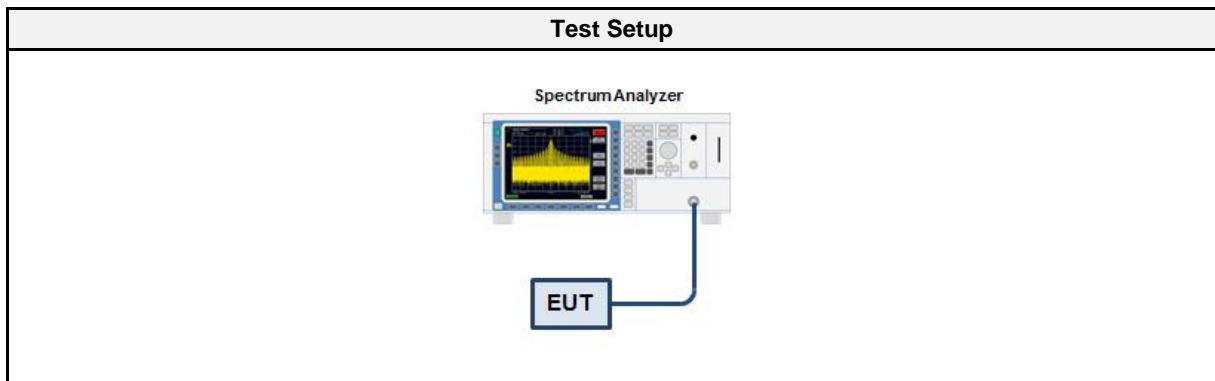
3.1.1 Information

| Test Information | |
|--------------------|------------------|
| Reference | ISED RSS-Gen 6.6 |
| Measurement Method | Conducted |

3.1.2 Limits

| Limits |
|---------------------------|
| None (Informational only) |

3.1.3 Setup



3.1.4 Equipment

| Test Equipment | | | | | |
|-------------------|--------------|--------|------------|-----------|----------|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum Analyzer | R&S | FSU 26 | EF01003 | 2017-07 | 2018-07 |

3.1.5 Procedure

| Test Procedure |
|--|
| <ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set to at least twice the emission spectrum 3. Resolution bandwidth set to 1 % of span 4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function |

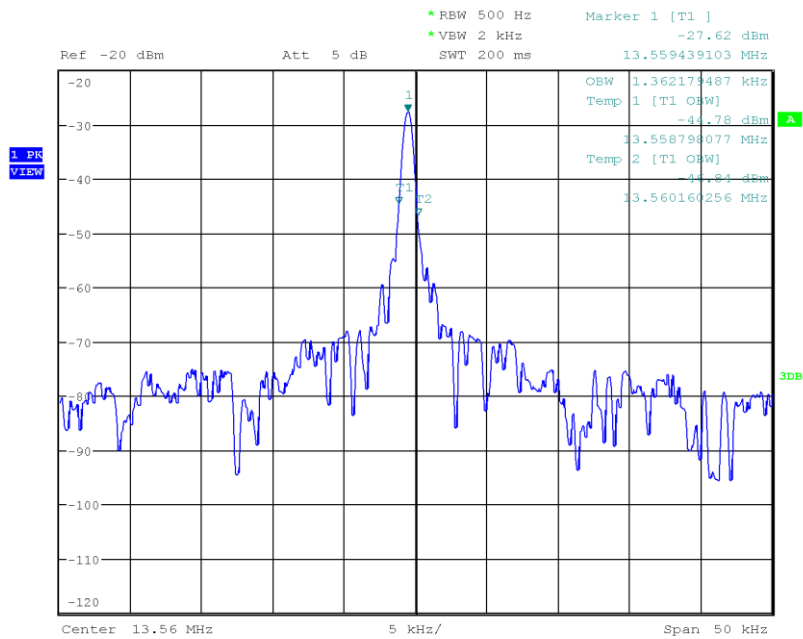
3.1.6 Results

| Test Results | |
|---------------|-----------------|
| Channel [MHz] | Bandwidth [kHz] |
| 13.56 | 1.362 |

Occupied bandwidth

Occupied Bandwidth

Project Number: G0M-1709-6886
 Applicant: Wincor Nixdorf International GmbH
 Model Description: NFC Reader
 Model: KIT-NFC-KIOSK
 Test Sample ID: 16401
 Operator: S. Suckow
 Test Site: Eurofins Product Service GmbH
 Test Date: 2017-11-27
 Note 1: RFID 13.56 MHz ASK



Date: 27.NOV.2017 10:42:37

3.2 Test Conditions and Results - Fundamental in-band field strength emissions

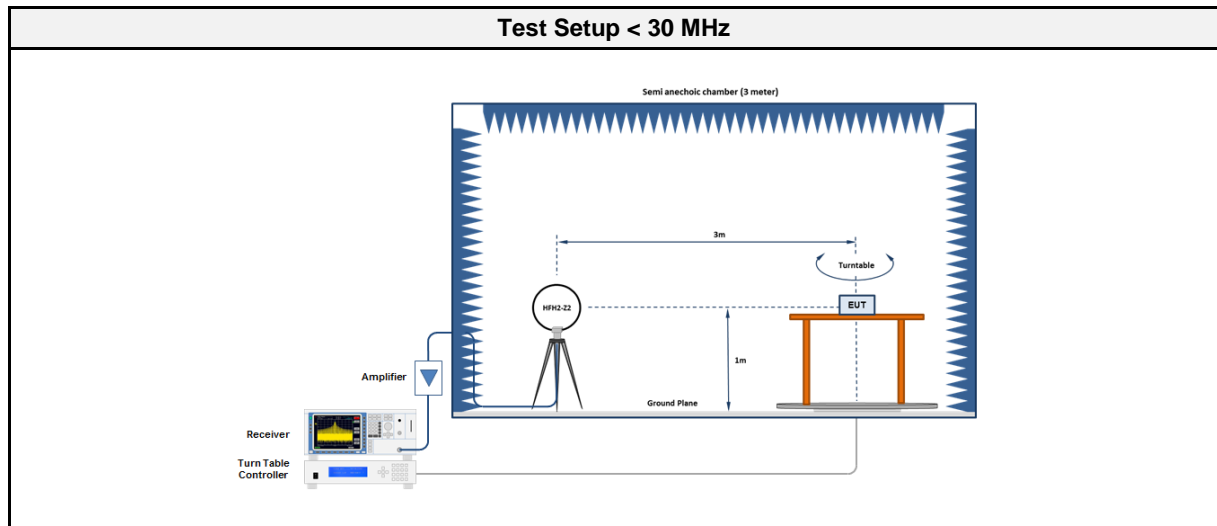
3.2.1 Information

| Test Information | |
|--------------------|--|
| Reference | FCC 15.225(a-c) / ISED RSS-210 A2.6(a-c) |
| Measurement Method | Radiated |

3.2.2 Limits

| Limits | | | |
|------------------------------------|----------------------------------|---|--------------------|
| Frequency range [MHz] | Limit [$\mu\text{V}/\text{m}$] | Limit [$\text{dB}\mu\text{V}/\text{m}$] | Limit Distance [m] |
| 13.553 - 13.567 | 15848 | 84 | 30 |
| 13.410 - 13.553 13.567 - 13.710 | 334 | 50.5 | 30 |
| 13.110 - 13.410 13.710 - 14.010 | 106 | 40.5 | 30 |

3.2.3 Setup



3.2.4 Equipment

| Test Equipment | | | | | |
|-----------------------|--------------|----------------|------------|-----------|----------|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Semi-Anechoic Chamber | Frankonia | AC1 | EF00062 | - | - |
| Measurement Receiver | R&S | N9038A-526/WXP | EF01070 | 2017-08 | 2018-08 |
| Antenna | R&S | HFH2-Z2 | EF00184 | 2017-12 | 2019-12 |

3.2.5 Procedure

| Test Procedure | |
|--|--|
| 1. EUT set to test mode 2. Span it set according to measurement range 3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector 4. Below 30MHz an extrapolation according ANSI 63.10; 6.4.4.2 is used. | |

3.2.6 Results

| Test Results | | | | | | |
|---------------------|----------------|-----------------------------|----------|--------------|-----------------------------|--------|
| Channel [MHz] | Emission [MHz] | Level @ 30 m [dB μ V/m] | Detector | Polarization | Limit @ 30 m [dB μ V/m] | Margin |
| 13.56 | 13.561 | 03.70 | pk | N/A | 84 | -80.30 |

3.3 Test Conditions and Results - Emissions radiated outside the specified frequency band

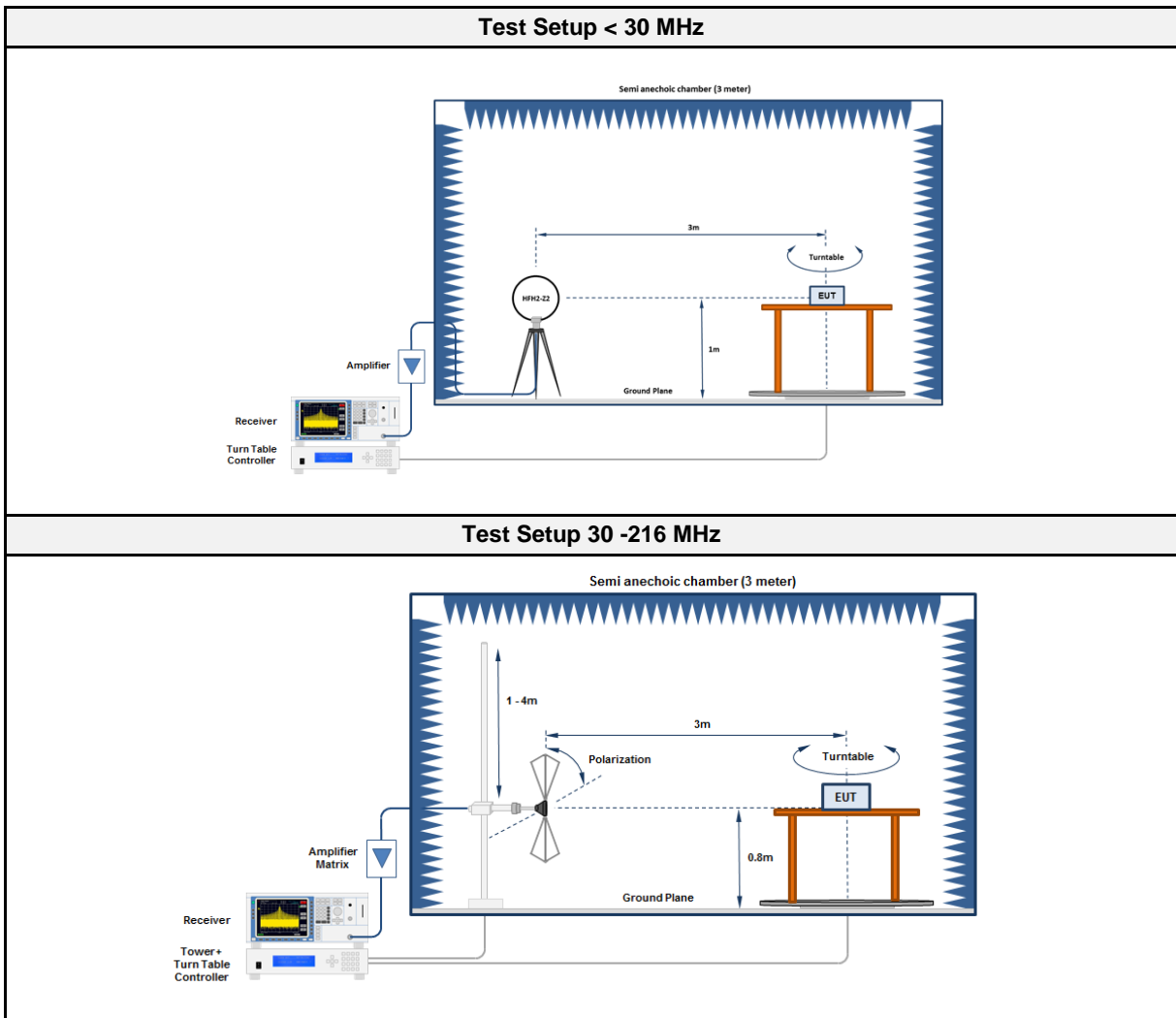
3.3.1 Information

| Test Information | |
|--------------------|---------------------------------------|
| Reference | FCC 15.225(d) / ISED RSS-210 A2.6 (d) |
| Measurement Method | Radiated |

3.3.2 Limits

| Limits | | | | |
|-----------------------|------------|----------------------------------|---|--------------------|
| Frequency range [MHz] | Detector | Limit [$\mu\text{V}/\text{m}$] | Limit [$\text{dB}\mu\text{V}/\text{m}$] | Limit Distance [m] |
| 0.009 - 0.490 | Quasi-Peak | $2400/F[\text{kHz}]$ | 48.5 - 13.8 | 300 |
| 0.490 - 1.705 | Quasi-Peak | $2400/F[\text{kHz}]$ | 13.8 - 2.97 | 30 |
| 1.705 -30 | Quasi-Peak | 30 | 29.5 | 30 |
| 30 - 88 | Quasi-Peak | 100 | 40 | 3 |
| 88 -216 | Quasi-Peak | 150 | 43.5 | 3 |

3.3.3 Setup



3.3.4 Equipment

| Test Equipment < 30 MHz | | | | | |
|-----------------------------|--------------|----------------|------------|-----------|----------|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Anechoic Chamber | Frankonia | AC1 | EF00062 | - | - |
| Loop Antenna | R&S | HFH2-Z2 | EF00184 | 2017-12 | 2019-12 |
| Measurement Receiver | R&S | N9038A-526/WXP | EF01070 | 2017-08 | 2018-08 |
| Test Equipment 30 - 216 MHz | | | | | |
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Anechoic Chamber | Frankonia | AC1 | EF00062 | - | - |
| Measurement Receiver | R&S | N9038A-526/WXP | EF01070 | 2017-08 | 2018-08 |
| Antenna | R&S | HK116 | EF00203 | 2016-17 | 2018-06 |

3.3.5 Procedure

| Test Procedure |
|---|
| <ol style="list-style-type: none"> 1. EUT set to test mode 2. Span it set according to measurement range 3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz 4. Below 30MHz an extrapolation according ANSI 63.10; 6.4.4.2 is used. 5. Markers are set to maximum emission levels |

3.3.6 Results

| Test Results | | | | | | | |
|---------------|----------------|----------------------|----------|--------------|----------------------|--------------------|-------------|
| Channel [MHz] | Emission [MHz] | Level [dB μ V/m] | Detector | Polarization | Limit [dB μ V/m] | Limit distance [m] | Margin [dB] |
| 13.56 | 114.122 | 34.80 | pk | ver | 43.50 | 3 | -08.70 |
| 13.56 | 99.771 | 21.35 | pk | hor | 43.50 | 3 | -22.15 |

3.4 Test Conditions and Results - Frequency stability

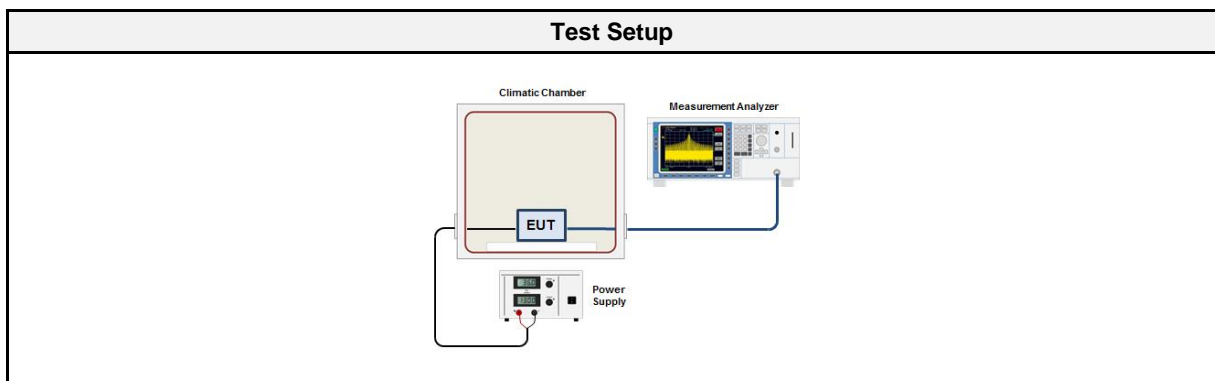
3.4.1 Information

| Test Information | |
|--------------------|-----------------------------------|
| Reference | FCC 15.225(e) / ISED RSS-210 A2.6 |
| Measurement Method | Conducted |

3.4.2 Limits

| Limits |
|-----------------------|
| Frequency error limit |
| ±0.01% (±100ppm) |

3.4.3 Setup



3.4.4 Equipment

| Test Equipment | | | | | |
|-------------------|--------------|--------|------------|-----------|----------|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum Analyzer | R&S | FSU 26 | EF01003 | 2017-07 | 2018-07 |

3.4.5 Procedure

| Test Procedure |
|---|
| <ol style="list-style-type: none"> 1. EUT set to test mode 2. The ambient temperature and supply voltage is set according to measurement conditions 3. Span is set to capture fundamental emission 4. Frequency error is measured with frequency counter measurement function |

3.4.6 Results

| Test Results | | | | |
|---------------|-----------------|-------------|--------------------------|-------------|
| Channel [MHz] | Temperatur [°C] | Voltage [V] | Measured Frequency [MHz] | Error [ppm] |
| 13.56 | 25 | 5.0 | 13.560000 | 0 |
| 13.56 | 25 | 4.5 | 13.560201 | 14.82 |
| 13.56 | 25 | 5.5 | 13.560201 | 14.82 |
| 13.56 | 5 | 5.0 | 13.559202 | -58.85 |
| 13.56 | 10 | 5.0 | 13.559901 | -7.30 |
| 13.56 | 20 | 5.0 | 13.560000 | 0 |
| 13.56 | 30 | 5.0 | 13.560698 | 51.46 |
| 13.56 | 40 | 5.0 | 13.560602 | 44.38 |

3.5 Test Conditions and Results - AC power line conducted emissions

3.5.1 Information

| Test Information | |
|------------------|-------------|
| Reference | ANSI C63.10 |

3.5.2 Limits

| Limits and results | | | | |
|--|---------------------------|--------|------------------------|--------|
| Frequency [MHz] | Quasi-Peak [dB μ V/m] | Result | Average [dB μ V/m] | Result |
| 0.15 to 5 | 66 to 56* | PASS | 56 to 46* | PASS |
| 0.5 to 5 | 56 | PASS | 46 | PASS |
| 5 to 30 | 60 | PASS | 50 | PASS |
| Comments: * Limit decreases linearly with the logarithm of the frequency. | | | | |

AC power line conducted emissions

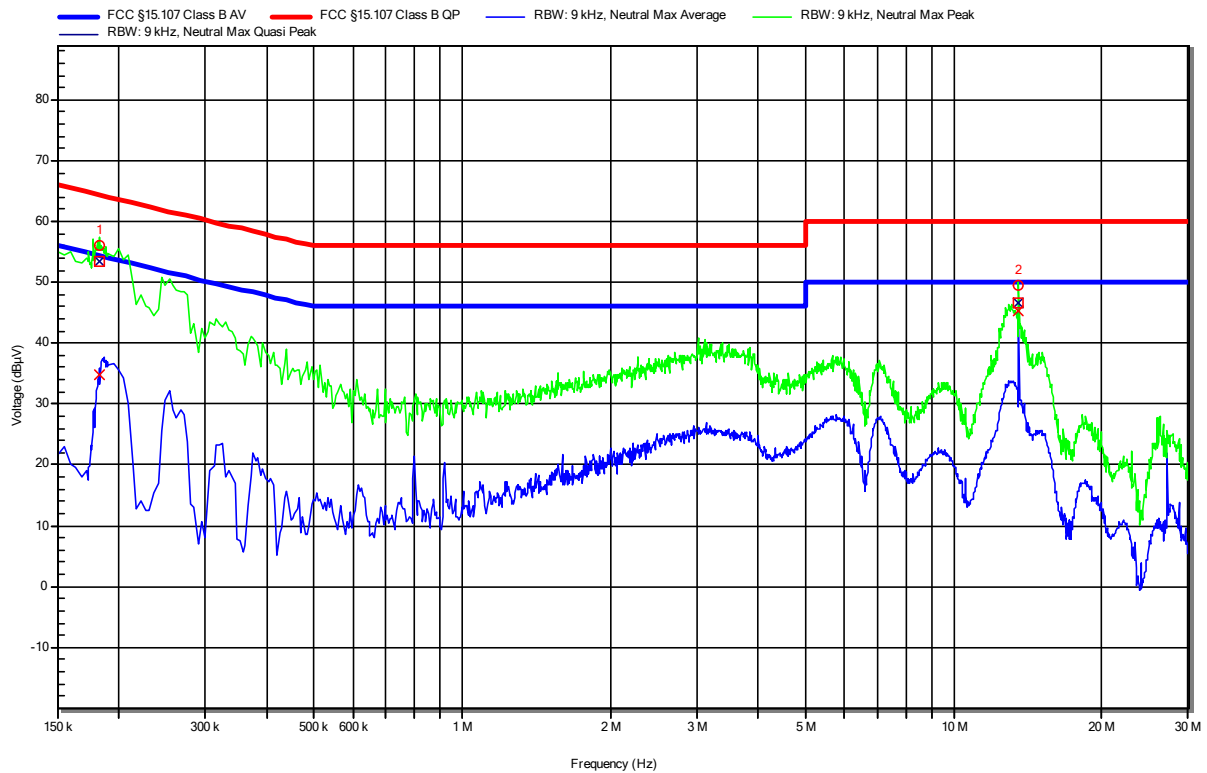
EMI voltage test in the ac-mains according to FCC 15 Part B

Project number: G0M-1709-6886

Applicant: Wincor Nixdorf Manufacturing GmbH
 EUT Name: NFC Reader
 Model: KIT-NFC-KIOSK
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Suckow
 Test Conditions: Tnom: 24°C, Unom: 5 VDC
 LISN: ESH2-Z5 N
 Mode: RFID 13.56 MHz
 Test Date: 2017-11-27
 Note:

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RadiMation



| Peak Number | Frequency | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status |
|-------------|-----------|------------|------------------|-----------------------|-------------------|
| 1 | 182.4 kHz | 53.42 dBµV | 64.38 dBµV | -10.95 dB | Pass |
| 2 | 13.56 MHz | 46.58 dBµV | 60 dBµV | -13.42 dB | Pass |

| Peak Number | Frequency | Average | Average Limit | Average Difference | Average Status |
|-------------|-----------|------------|---------------|--------------------|----------------|
| 1 | 182.4 kHz | 34.94 dBµV | 54.38 dBµV | -19.44 dB | Pass |
| 2 | 13.56 MHz | 45.34 dBµV | 50 dBµV | -4.66 dB | Pass |

AC power line conducted emissions

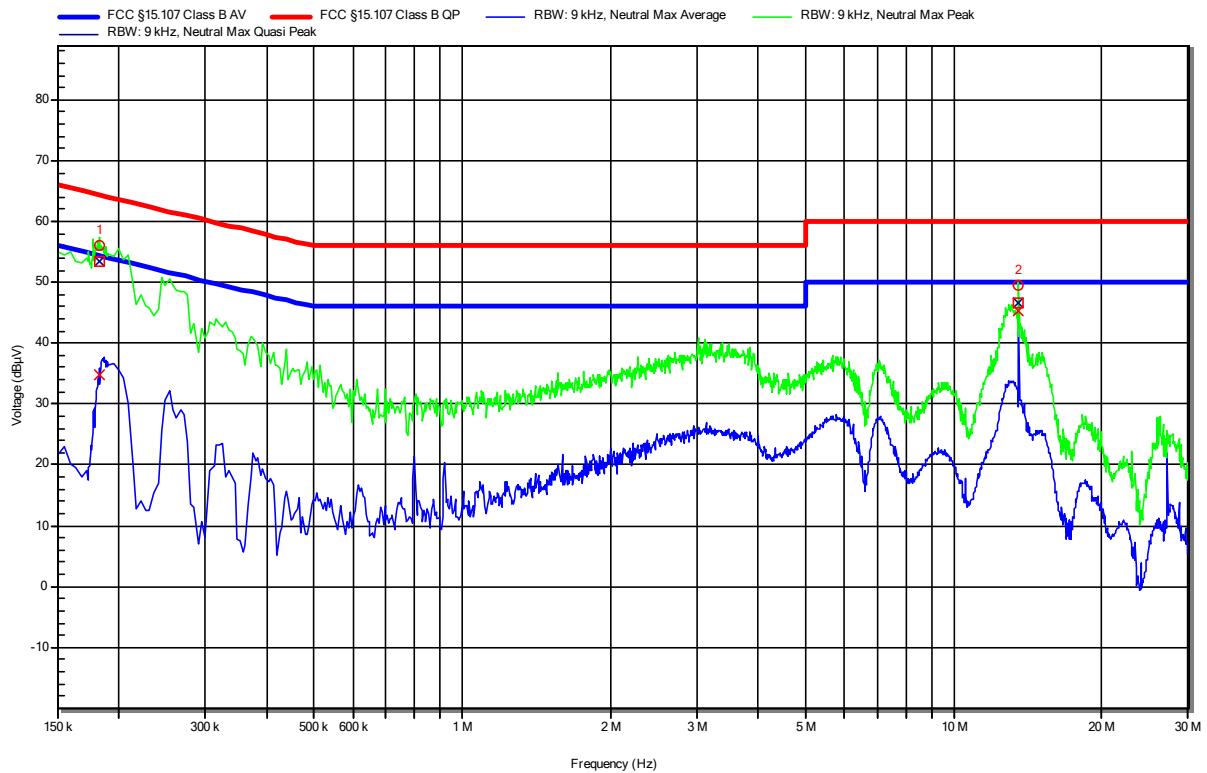
EMI voltage test in the ac-mains according to FCC 15 Part B

Project number: G0M-1709-6886

Applicant: Wincor Nixdorf Manufacturing GmbH
 EUT Name: NFC Reader
 Model: KIT-NFC-KIOSK
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Suckow
 Test Conditions: Tnom: 24°C, Unom: 5 VDC
 LISN: ESH2-Z5 N
 Mode: RFID 13.56 MHz
 Test Date: 2017-11-27
 Note:

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RadiMation



| Peak Number | Frequency | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status |
|-------------|-----------|------------|------------------|-----------------------|-------------------|
| 1 | 182.4 kHz | 53.42 dBµV | 64.38 dBµV | -10.95 dB | Pass |
| 2 | 13.56 MHz | 46.58 dBµV | 60 dBµV | -13.42 dB | Pass |

| Peak Number | Frequency | Average | Average Limit | Average Difference | Average Status |
|-------------|-----------|------------|---------------|--------------------|----------------|
| 1 | 182.4 kHz | 34.94 dBµV | 54.38 dBµV | -19.44 dB | Pass |
| 2 | 13.56 MHz | 45.34 dBµV | 50 dBµV | -4.66 dB | Pass |

ANNEX A Transmitter in-band emissions

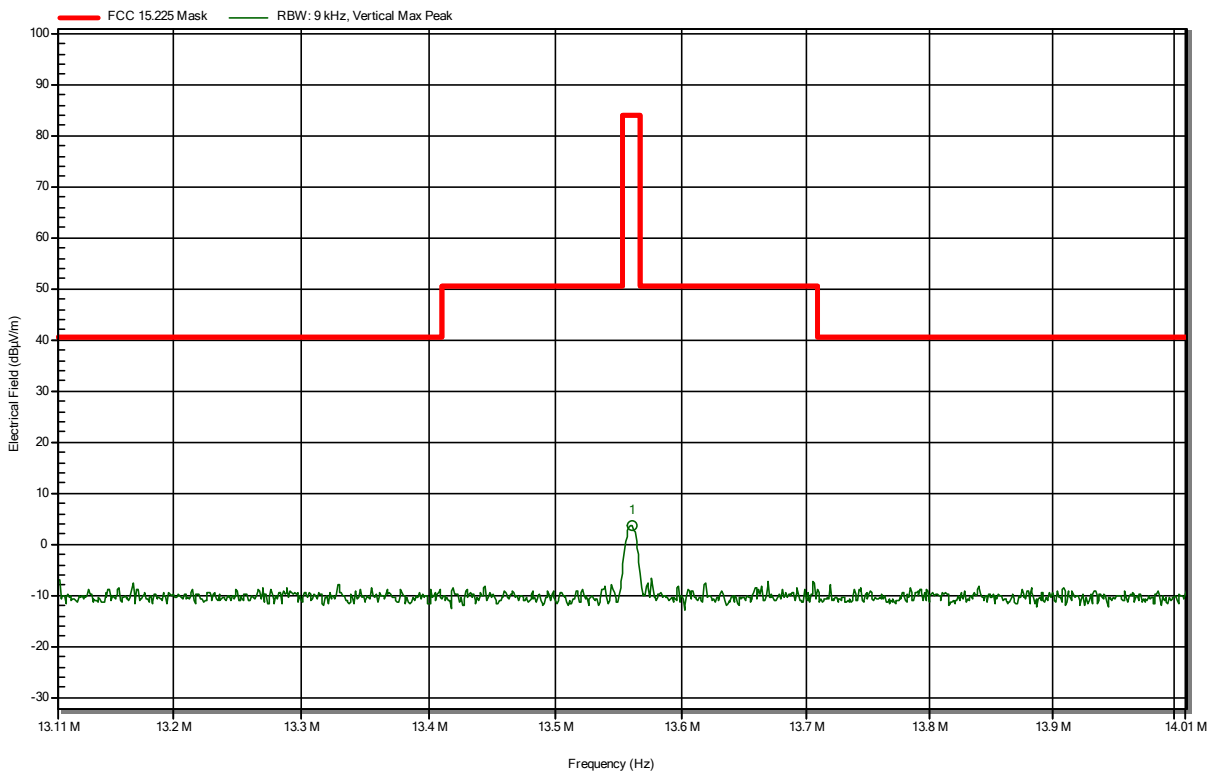
Spurious emissions according to FCC 15.225

Project number: G0M-1709-6886

Applicant: Wincor Nixdorf Manufacturing GmbH
 EUT Name: NFC Reader
 Model: KIT-NFC-KIOSK
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Suckow
 Test Conditions: Tnom: 23°C, Vnom: 5.0 VDC
 Antenna: Rohde & Schwarz HFH 2-Z2
 Measurement distance: 3 m converted to 30 m
 Mode: TX; RFID 13.56 MHz ASK
 Test Date: 2017-11-27
 Note:

Index 4

RadiMation



Frequency
13.561 MHz

Peak
3.7 dBµV/m

ANNEX B Transmitter radiated spurious emissions

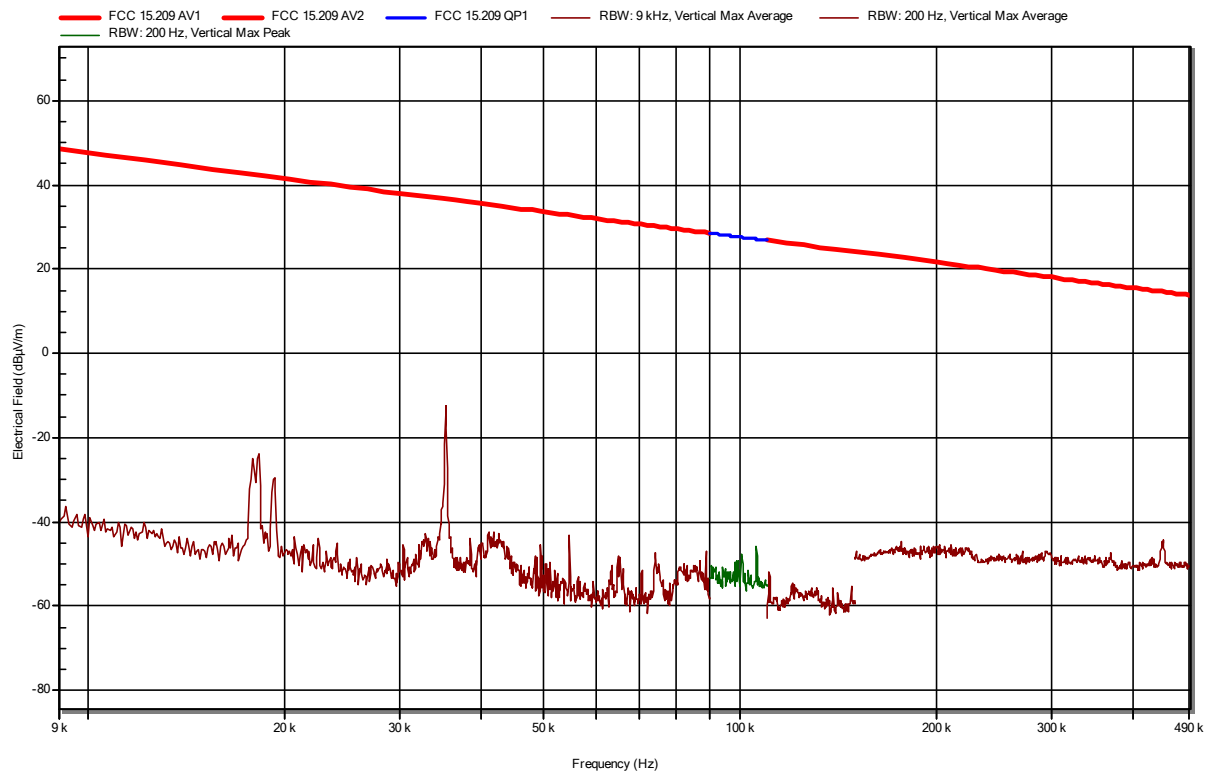
Spurious emissions according to FCC 15.225

Project number: G0M-1709-6886

Applicant: Wincor Nixdorf Manufacturing GmbH
 EUT Name: NFC Reader
 Model: KIT-NFC-KIOSK
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Suckow
 Test Conditions: Tnom: 23°C, Vnom: 5.0 VDC
 Antenna: Rohde & Schwarz HFH 2-Z2
 Measurement distance: 3 m converted to 300 m
 Mode: TX; RFID 13.56 MHz ASK
 Test Date: 2017-11-27
 Note:

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RadiMation



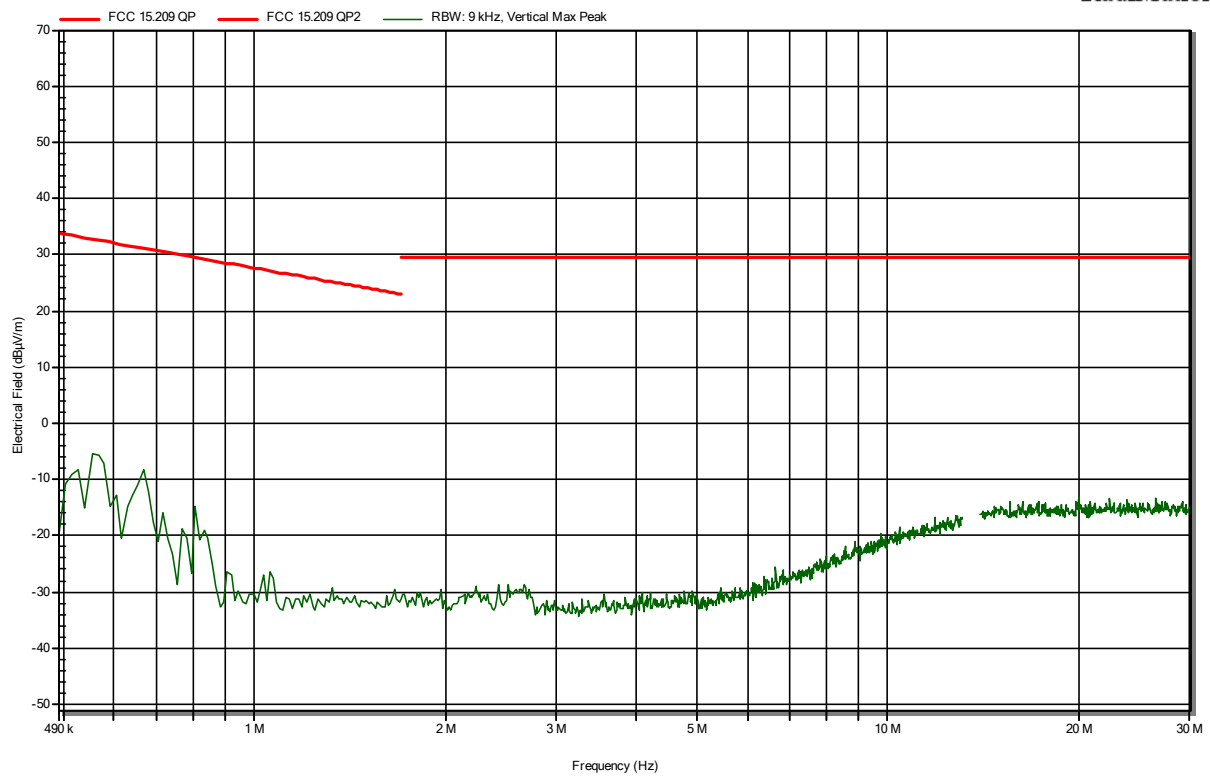
Spurious emissions according to FCC 15.225

Project number: G0M-1709-6886

Applicant: Wincor Nixdorf Manufacturing GmbH
 EUT Name: NFC Reader
 Model: KIT-NFC-KIOSK
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Suckow
 Test Conditions: Tnom: 23°C, Vnom: 5.0 VDC
 Antenna: Rohde & Schwarz HFH 2-Z2
 Measurement distance: 3 m converted to 30 m
 Mode: TX; RFID 13.56 MHz ASK
 Test Date: 2017-11-27
 Note:

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RadiMation



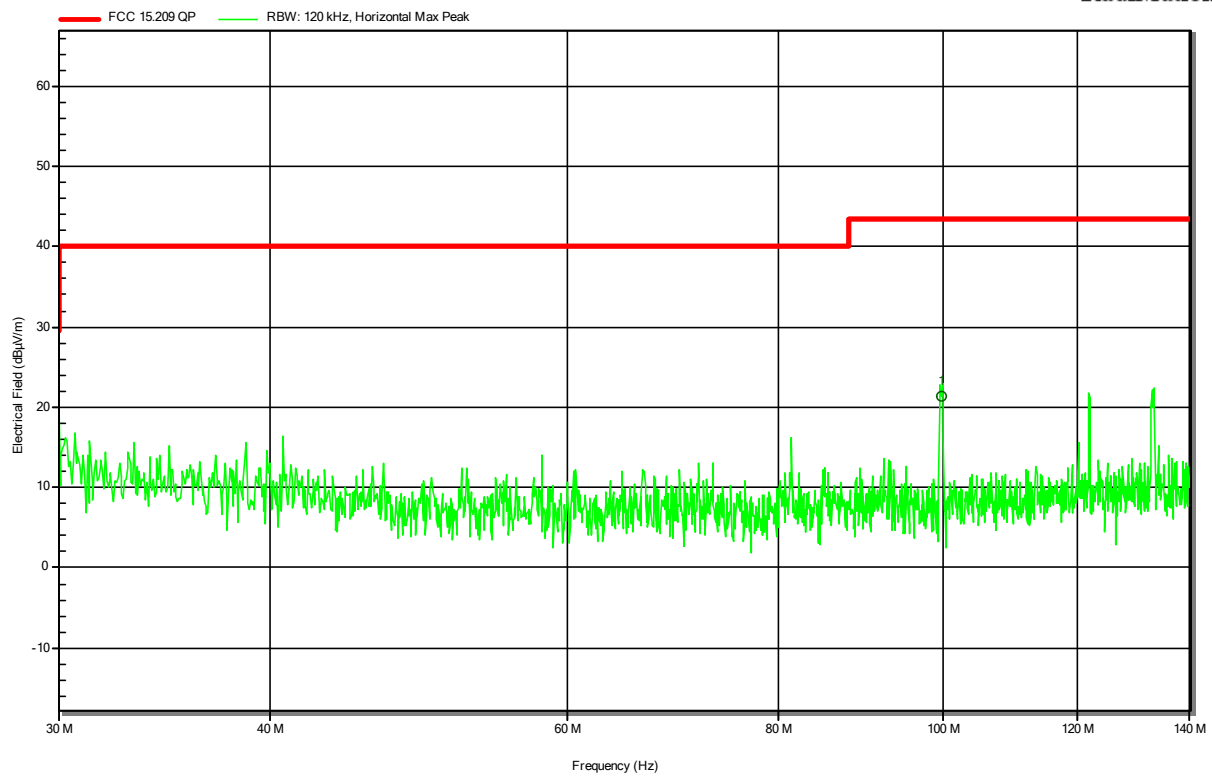
Radiated emissions under normal conditions according to FCC 15.225

Project number: G0M-1709-6886

Applicant: Wincor Nixdorf Manufacturing GmbH
 EUT Name: NFC Reader
 Model: KIT-NFC-KIOSK
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Suckow
 Test Conditions: Tnom: 21°C, Unom: 5.0 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Mode: RFID 13.56 MHz ASK
 Test Date: 2017-11-28
 Note:

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RadiMation



| Peak Number | Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Angle | Height |
|-------------|------------|--------------|-------------|-----------------|-------------|----------|--------|
| 1 | 99.771 MHz | 21.35 dBµV/m | 43.5 dBµV/m | -22.15 dB | Pass | 0 Degree | 1 m |

| Peak Number | Frequency | Angle | Height |
|-------------|------------|----------|--------|
| 1 | 99.771 MHz | 0 Degree | 1 m |

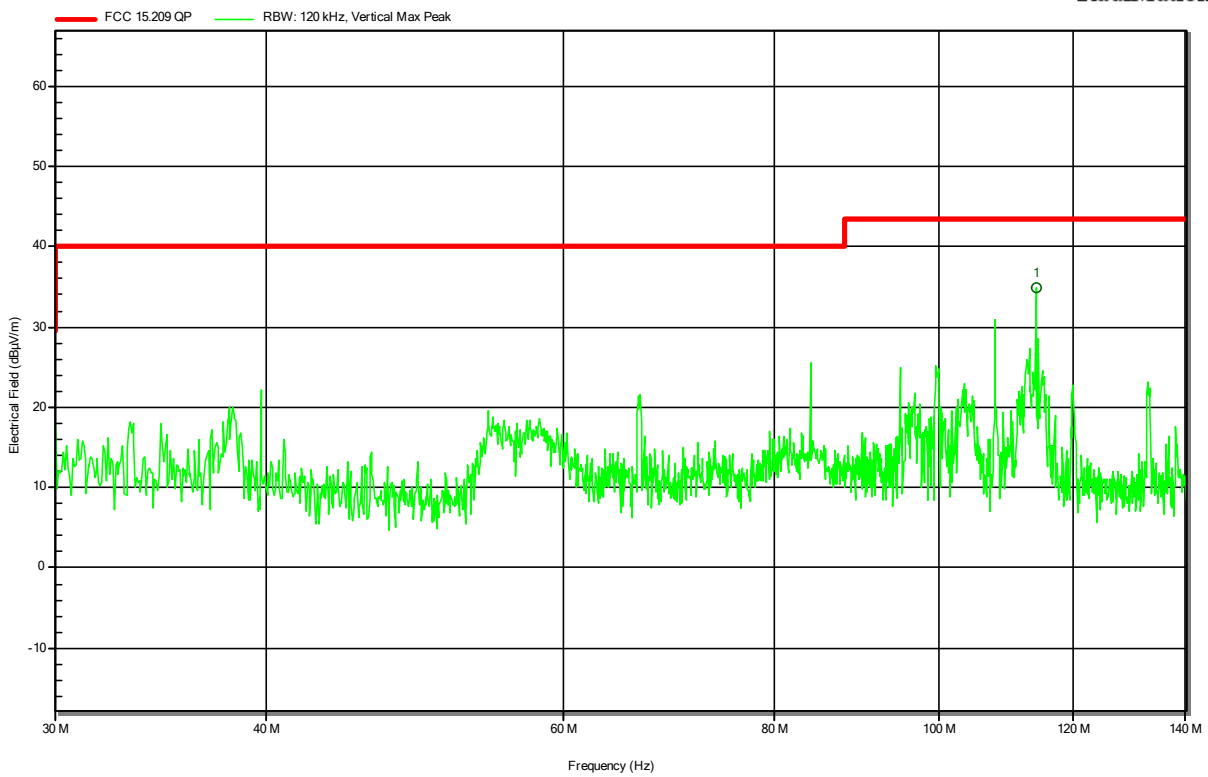
Radiated emissions under normal conditions according to FCC 15.225

Project number: G0M-1709-6886

Applicant: Wincor Nixdorf Manufacturing GmbH
 EUT Name: NFC Reader
 Model: KIT-NFC-KIOSK
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Suckow
 Test Conditions: Tnom: 21°C, Unom: 5.0 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Mode: RFID 13.56 MHz ASK
 Test Date: 2017-11-28
 Note:

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RadiMation



| Peak Number | Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Angle | Height |
|-------------|-------------|-------------|-------------|-----------------|-------------|----------|--------|
| 1 | 114.122 MHz | 34.8 dBµV/m | 43.5 dBµV/m | -8.7 dB | Pass | 0 Degree | 1 m |

| Peak Number | Frequency | Angle | Height |
|-------------|-------------|----------|--------|
| 1 | 114.122 MHz | 0 Degree | 1 m |