

# Test report

**Number:** T251-0283/16      **Project file:** C20151867  
**Date:** 2016-03-07      **Pages:** 59

**Product:** Electronic Lock

**Type reference:** Electronic Lock RFID ISO ST

**Ratings:** 12 Vdc (powered via Metra EasyWire)

**Trademark:** METRA EASY WIRE

**Applicant:** METRA INŽENIRING d.o.o.  
Špruha 19, SI-1236 Trzin, Slovenia

**Manufacturer:** METRA INŽENIRING d.o.o.  
Špruha 19, SI-1236 Trzin, Slovenia

**Place of manufacture:** METRA INŽENIRING d.o.o.  
Špruha 19, SI-1236 Trzin, Slovenia

## Summary of testing

**Testing method:** FCC Part 15, Subpart C

**Testing location:** SIQ Ljubljana, Trpinčeva ulica 37 A, SI-1000 Ljubljana, Slovenia

**Remarks:**  
Date of receipt of test items: 2015-08-25  
Number of items tested: 1  
Date of performance of tests: 2015-09-10 - 2016-01-22  
The test results presented in this report relate only to the items tested.  
The product complies with the requirements of the testing methods.

Tested by: Andrej Škof



Approved by: Marjan Mak



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## 1 GENERAL

| History sheet |              |                             |          |
|---------------|--------------|-----------------------------|----------|
| Date          | Report No.   | Change                      | Revision |
| 2016-03-07    | T251-0283/16 | Initial Test Report issued. | --       |

**Environmental conditions:**

Ambient temperature: 15°C to 35°C

Relative humidity: 30% to 60%

Atmospheric pressure: 860 mbar to 1060 mbar

### 1.1 Equipment under test

**Electronic Lock**

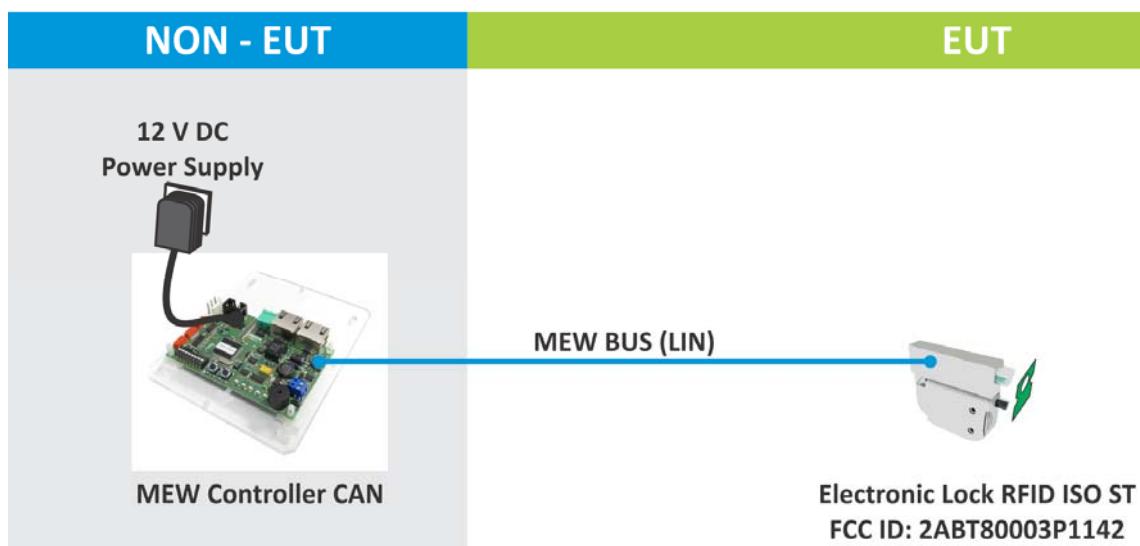
Type: Electronic Lock RFID ISO ST

FCC ID: 2ABT80003P1142

Hardware Version: MEWSLC1\_ISOV4 (Electronic Lock RFID ISO)

Software Version: MEWSLC1\_ISO\_RGB\_LINprofile\_7\_6.hex

Tested SIQ sample number: S20154653



### 1.1.1 General product information

Electronic Lock RFID ISO and Door RFID Antenna form complete operational product named Electronic Lock RFID ISO ST.

Electronic Lock RFID ISO emits RF field 13,56 MHz that is transmitted through air gap between it and Door RFID Antenna. This air gap is well defined by construction of both parts. Door RFID Antenna acts as passive antenna booster tuned to operating frequency of 13,56 MHz.

The Electronic Lock RFID ISO transmits RF energy only when the Metal Locker Door is closed and Door RFID Antenna is in its defined position. Positioning of the Door RFID Antenna in relation to Electronic Lock RFID ISO is provided by passive plastic part called Door Strike.

**Processor Used:**

NXP1225 Cortex-M0, Internal RC oscillator 12 MHz +-1% internally multiplied by PLL VCO to 192 MHz then divided to operating frequency 48 MHz

**LIN communication:**

19200 Baud

**RFID Interface:**

NXP Reader chip - CLRC 663 13,56 MHz  
Quarz oscillator 27,12 MHz used by CLRC663

**RFID Antenna Name:** Door RFID Antenna

**Antenna Type:** PCB RFID Antenna Tuned to 13,56 MHz used for non-metal door.



Picture of Electronic Lock RFID ISO and Door RFID Antenna



Trade Mark: Metra MEW System

Model/Type ref.: Electronic Lock RFID ISO ST

Part Number: 1142

FCC ID: 2ABT80003P1142

Type label

## 1.2 ANSI C63.4 Subpart selection

### *Subpart C: Intentional Radiators*

## 1.3 Class statement requirements

- The Class A statement cautions that operation of the device in a residential area is likely to cause harmful interference.
- The Class B statement offers several suggestions for minimizing interference to radio or TV receivers, including reorienting the receiving antenna and moving the Class B device farther away from the receiver.

## 1.4 List of measurements performed

| PART 15 section | Test name                 |
|-----------------|---------------------------|
| 15.207          | Conducted emission        |
| 15.209          | Radiated emission         |
| 15.215          | Bandwidth of the emission |
| 15.225          | Radiated emission         |

## 1.5 Occupied bandwidth measurement

| Fundamental frequency | Minimum resolution bandwidth |
|-----------------------|------------------------------|
| 9 kHz to 30 MHz       | 1 kHz                        |
| 30 to 1000 MHz        | 10 kHz                       |
| 1000 MHz to 40 GHz    | 100 kHz                      |

## 1.6 Quasi-peak detector

| Frequency range   | Bandwidth (-6dB)      |
|-------------------|-----------------------|
| 10 Hz to 20 kHz   | Full range (wideband) |
| 10 kHz to 150 kHz | 200 Hz                |
| 150 kHz to 30 MHz | 9 kHz                 |
| 30 MHz to 1 GHz   | 120 kHz               |

## 1.7 Peak, rms, and average detectors

| Frequency range   | Bandwidth (-6dB)    |
|-------------------|---------------------|
| 10 Hz to 20 kHz   | 10, 100, 1000 Hz    |
| 10 kHz to 150 kHz | 1 and 10 kHz        |
| 150 kHz to 30 MHz | 1 and 10 kHz        |
| 30 MHz to 1 GHz   | 10 and 100 kHz      |
| 1 GHz to 40 GHz   | 0.1, 1.0 and 10 MHz |

## 2 LIMITS FOR ALL SUBPARTS

### Subpart C: Intentional Radiators

#### 2.1.1 Conducted emission limits:

##### Limits:

| Frequency Range<br>(MHz) | Limits (dB $\mu$ V) |          |
|--------------------------|---------------------|----------|
|                          | Quasi-peak          | Average  |
| 0.15 to 0.5              | 66 – 56*            | 56 – 46* |
| 0.5 to 5.0               | 56                  | 46       |
| 5.0 to 30.0              | 60                  | 50       |

\* Decreases with the logarithm of the frequency.

The shown limits in table shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

- For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.
- For all other carrier current systems: 1000  $\mu$ V within the frequency band 535-1705 kHz, as measured using a 50  $\mu$ H/50 ohms LISN.
- Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as appropriate.

#### 2.1.2 Radiated emission limits:

##### Limits:

| Frequency Range<br>(MHz) | Limits (dB $\mu$ V/m)         |                               | Test distance<br>(m) |
|--------------------------|-------------------------------|-------------------------------|----------------------|
|                          | VERTICAL                      | HORIZONTAL                    |                      |
| 0,009 to 0,490           | $20*\log(2400/F(\text{kHz}))$ | $20*\log(2400/F(\text{kHz}))$ | 300                  |
| 0,490 to 1,705           | $20*\log(2400/F(\text{kHz}))$ | $20*\log(2400/F(\text{kHz}))$ | 30                   |
| 1,705 to 30,0            | 30                            | 30                            | 30                   |
| 30 to 88                 | 40**                          | 40**                          | 3                    |
| 88 to 216                | 43.5**                        | 43.5**                        | 3                    |
| 216 to 960               | 46**                          | 46**                          | 3                    |
| Above 960                | 54                            | 54                            | 3                    |

\*\* Except as provided in paragraph below, fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz.

Perimeter protection systems may operate in the 54-72 MHz and 76-88 MHz bands under the provisions of this section. The use of such perimeter protection systems is limited to industrial, business and commercial applications.

##### Additional FCC requirements per clause 15.215.

Intentional radiators operating under the alternative provisions to the general emission limits must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

**Additional FCC requirements per clause 15.225.**

| Fundamental Frequency (MHz)     | Field strength of fundamental ( $\mu$ V/m) | Test distance (m) |
|---------------------------------|--|-------------------|
| 13.553-13.567                   | 15,848                                     | 30                |
| 13.410-13.553 and 13.567-13.710 | 334  | 30                |
| 13.110-13.410 and 13.710-14.010 | 106  | 30                |
| Outside band 13.110-14.010      | As per clause 15.209                       | 30                |

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of -20 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

### 3 ALL TEST EQUIPMENT AND THEIR DESCRIPTION

#### 3.1 General information

| Description                                       | Model No. | SIQ No. | Last calibration | Calibrated until | Calibration period | Used |
|---|-----------|---------|------------------|------------------|--------------------|------|
| Rohde-Schwarz,<br>RFI receiver                    | ESU8      | 105187  | 2015-11          | 2017-11          | 24 months          | X    |
| Rohde-Schwarz,<br>RFI receiver                    | ESU26     | 100428  | 2015-12          | 2017-12          | 24 months          | /    |
| Rohde &<br>Schwarz, Artificial<br>main network    | ESH2-Z5   | 106899  | 2015-05          | 2017-05          | 24 months          | X    |
| ETS, Anechoic<br>chamber                          | 3m        | 103949  | 2014-11          | 2016-11          | 24 months          | X    |
| R&S, Antenna                                      | HFH2-Z2   | /       | 2015-09          | 2017-09          | 24 months          | X    |
| EMCO, Antenna                                     | 3142B     | 104351  | 2015-09          | 2017-09          | 24 months          | X    |
| EMCO, Antenna                                     | 3115      | 103002  | 2015-09          | 2017-09          | 24 months          | /    |
| Heinrich Deisel,<br>Turn table                    | DS 420.00 | 103337  | N/A              | N/A              | N/A                | X    |
| Antenna tower                                     | /         | /       | N/A              | N/A              | N/A                | X    |
| Controller for turn<br>table and antenna<br>tower | /         | /       | N/A              | N/A              | N/A                | X    |

### 3.2 Other instrument information and auxiliary equipment

| Description                               | Model No. | Bandwidth                 | Detector functions    | Antenna factors  | Cable loss       | Range            |
|---|-----------|---------------------------|-----------------------|------------------|------------------|------------------|
| Rohde-Schwarz, AMN                        | ENV216    | /                         | /                     | /                | /                | 9 kHz do 30 MHz  |
| Rohde-Schwarz, RFI receiver               | ESU8      | 200Hz, 9kHz, 120kHz, 1MHz | Peak, Q-peak, Average | /                | /                | 20 Hz – 8 GHz    |
| Rohde-Schwarz, RFI receiver               | ESU26     | 200Hz, 9kHz, 120kHz, 1MHz | Peak, Q-peak, Average | /                | /                | 20 Hz – 26.5 GHz |
| Hewlett Packard, RF Spectrum Analyzer     | 8593E     | 200Hz, 9kHz, 120kHz, 1MHz | Peak, Q-peak, Average | /                | /                | 9 kHz – 26.5 GHz |
| Rohde & Schwarz, Artificial main network  | ESH 2-Z5  | /                         | /                     | /                | /                | 9 kHz – 30 MHz   |
| ETS, Anechoic chamber                     | 3m        | /                         | /                     | /                | /                | 30 MHz – 18 GHz  |
| EMCO, Antenna                             | 3142B     | /                         | /                     | See tables below | /                | 26 MHz – 2 GHz   |
| EMCO, Antenna                             | 3115      | /                         | /                     | See tables below | /                | 1 GHz – 18 GHz   |
| Schwarzbeck Mess-Elektronik, Horn antenna | BBHA9120E | /                         | /                     | See tables below | /                | 450 MHz – 6 GHz  |
| SIQ, Conducted emission cable             | SIQ       | /                         | /                     | /                | See tables below | /                |
| SIQ, Radiated emission cable              | SIQ       | /                         | /                     | /                | See tables below | /                |

### 3.2.1 Cable loss and attenuation of radiated emission

#### 3.2.1.1 Conducted emission cable (SIQ-K024)

| Point | Frequency (9kHz-30MHz) | Cable length (meters) | Loss (dBm) |
|-------|------------------------|-----------------------|------------|
| 1     | 190 kHz                | 1                     | 0,4        |
| 2     | 530 kHz                | 1                     | 0,26       |
| 3     | 2,53 MHz               | 1                     | 0,16       |
| 4     | 5,19 MHz               | 1                     | 0,07       |
| 5     | 11,05 MHz              | 1                     | 0,03       |
| 6     | 22,01 MHz              | 1                     | 0,06       |
| 7     | 24,03 MHz              | 1                     | 0,04       |

#### 3.2.1.2 Radiated emission attenuation

| Point | Frequency (30 MHz – 26,5 GHz) | Attenuation (dBm) |
|-------|-------------------------------|-------------------|
| 1     | 30 MHz                        | 0,501             |
| 2     | 150 MHz                       | 1,174             |
| 3     | 400 MHz                       | 2,034             |
| 4     | 800 MHz                       | 2,995             |
| 5     | 1 GHz                         | 3,416             |
| 6     | 1,363                         | 1,666667          |
| 7     | 2,686                         | 3,58333           |
| 8     | 5,332                         | 5,25              |
| 9     | 7,978                         | 6,25              |
| 10    | 10,624                        | 7,5               |
| 11    | 13,27                         | 8,333333          |
| 12    | 15,916                        | 9,166666          |
| 13    | 18,562                        | 9,833333          |
| 14    | 21,208                        | 10,66667          |
| 15    | 23,854                        | 11,5              |
| 16    | 26,5                          | 12,16667          |

#### 4 CONVERSION FACTORS AND ALL OTHER FORMULAS

| Unit       | Conversion unit | Formula of conversion                   |
|------------|-----------------|---|
| dB $\mu$ V | dB $\mu$ V/m    | $dB\mu V/m = dB\mu V + AF$              |
| $\mu$ V/m  | dB $\mu$ V/m    | $dB\mu V/m = 20\log(X(\mu V/m)/1\mu V)$ |

|         | Test distance stated in standard | Test distance of measurement | Conversion factor |
|---------|----------------------------------|------------------------------|-------------------|
| Class B | 3 m                              | 3 m                          | /                 |
| Class A | 10 m                             | 3 m                          | 20dB/decade       |

## 5 GENERAL AND SPECIAL CONDITIONS DESCRIPTION

### 5.1 General condition description

#### Interconnect and power cabling (or wiring)

##### 5.1.1 Test arrangement for conducted emissions

Interconnecting cables that hang closer than 40 cm to the ground-plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in  $50 \Omega$ . LISN can be placed on top of, or immediately beneath, reference ground-plane.

All other equipment powered from additional LISN(s).

Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

LISN at least 80 cm from nearest part of EUT chassis.

Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

Non-EUT components of EUT system being tested.

Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground-plane.

##### 5.1.2 Test arrangement for conducted emissions- floor-standing equipment

Excess I/O cables shall be bundled in the center. If bundling is not possible, the cables shall be arranged in serpentine fashion. Bundling shall not exceed 40 cm in length.

Excess power cords shall be bundled in the center or shortened to appropriate length.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. If bundling is not possible, the cable shall be arranged in serpentine fashion.

EUT and all cables shall be insulated, if required, from the ground-plane by up to 12 mm of insulating material.

EUT connected to one LISN. LISN can be placed on top of, or immediately beneath, the ground-plane.

All other equipment powered from a second LISN or additional LISN(s).

Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

### 5.1.3 Test arrangement for radiated emissions tabletop equipment

Interconnecting cables that hang closer than 40 cm to the ground-plane shall be folded back and forth in the center, forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated if required using the correct terminating impedance. The total length shall not exceed 1 m.

If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground-plane with the receptacle flush with the ground-plane.

Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

Non-EUT components of EUT system being tested.

Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

No vertical conducting plane used.

Power cords drape to the floor and are routed over to receptacle.

### 5.1.4 Test arrangement for radiated emissions floor-standing equipment

Excess I/O cables shall be bundled in center. If bundling is not possible, the cables shall be arranged in serpentine fashion. Bundling not to exceed 40 cm in length.

Excess power cords shall be bundled in the center or shortened to appropriate length.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. If bundling is not possible, the cable shall be arranged in a serpentine fashion.

EUT and all cables shall be insulated, if required, from the ground-plane by up to 12 mm of insulating material.

If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground-plane with the receptacle flush with the ground plane.

## Overhead cable trays and suspended ceilings

### 5.1.5 Test arrangement for floor-standing equipment

Only one vertical riser may be used where typical of system under test.

Excess power cord shall be bundled in the center or shortened to appropriate length.

EUT and cables shall be insulated from ground-plane by up to 12 mm. Where the manual has specified or there exists a code of practice for installation of the EUT, the test arrangement shall allow the use of this practice for the tests.

Power cords being measured connected to one LISN. All other system power cords powered through other LISN(s). A multiple receptacle strip may be used for other power cords.

For *conducted* tests, the LISNs may be placed on top of or immediately beneath and bonded directly to the ground-plane. For *radiated* tests, the LISN(s), if used, should be installed under, with the receptacle flush with the ground-plane.

### 5.1.6 Placement and manipulation of interconnect cabling (or wiring) of tabletop equipment

LISN(s) may have to be positioned to the side of the table to meet the criterion that the LISN receptacle shall be 80 cm away from the EUT. LISN(s) may be above ground-plane only for conducted emission measurements.

Accessories, such as ac power adapter, if typically table-mounted, shall occupy peripheral positions as is applicable.

Accessories, which are typically floor-mounted, shall occupy a floor position directly below the portion of the EUT to which they are typically connected. T

Table length may be extended beyond 1.5 m with peripherals aligned with the back edge. The table depth may be extended beyond 1 m. The 40 cm distance to the vertical conducting plane shall be maintained for conducted emission testing.

## Placement of wall-mounted equipment

### 5.1.7 Test configuration/arrangement for combination floor-standing and tabletop equipment

Interconnecting cables that hang closer than 40 cm to the ground-plane shall be folded back and forth in the center, forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated if required using the correct terminating impedance.

If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground-plane with the receptacle flush with the ground-plane.

Cables of hand-operated devices, such as keyboards, mice, etc., have to be placed as for normal use.

Non-EUT components of EUT system being tested.

I/O cable to floor-standing unit drapes to the ground-plane and shortened or excess bundled. Cables not reaching the metal ground-plane are draped to the height of the connector or 40 cm, whichever is lower.

Power cords and signal cables shall drape to the floor. No extension cords shall be used to the power receptacles.

The floor-standing unit can be placed under the table if its height permits.

## 5.2 Special condition description

If for some reason the above measurement conditions can't be met, the description below should be used as an appropriate measurement condition and placement.

**(Description is written additionally as the measurements differ – all is within test procedure)**

## 6 TEST SUMMARY

| STANDARDS (details on first page)       | Tested<br>yes                       | Tested<br>no             | Sample<br>pass                      | Sample<br>not pass       |
|---|-------------------------------------|--------------------------|-------------------------------------|--------------------------|
| ANSI C63.4-2014; FCC Part 15, Subpart C | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

| Test               | Section within the report | Class | Conclusion |
|--------------------|---------------------------|-------|------------|
| Conducted emission | 7.1                       | B     | PASS       |
| Radiated emission  | 7.2                       | B     | PASS       |

### 6.1 Operating voltages/frequencies used for testing

| Section. | Test               | Operating conditions              |
|----------|--------------------|-----------------------------------|
| 7.1      | Conducted emission | 12 Vdc powered via Metra EasyWire |
| 7.2      | Radiated emission  | 12 Vdc powered via Metra EasyWire |

## 7 EMISSION TESTS

### 7.1 Conducted emission measurement (intentional radiator)

#### Section 15.207 Conducted limits

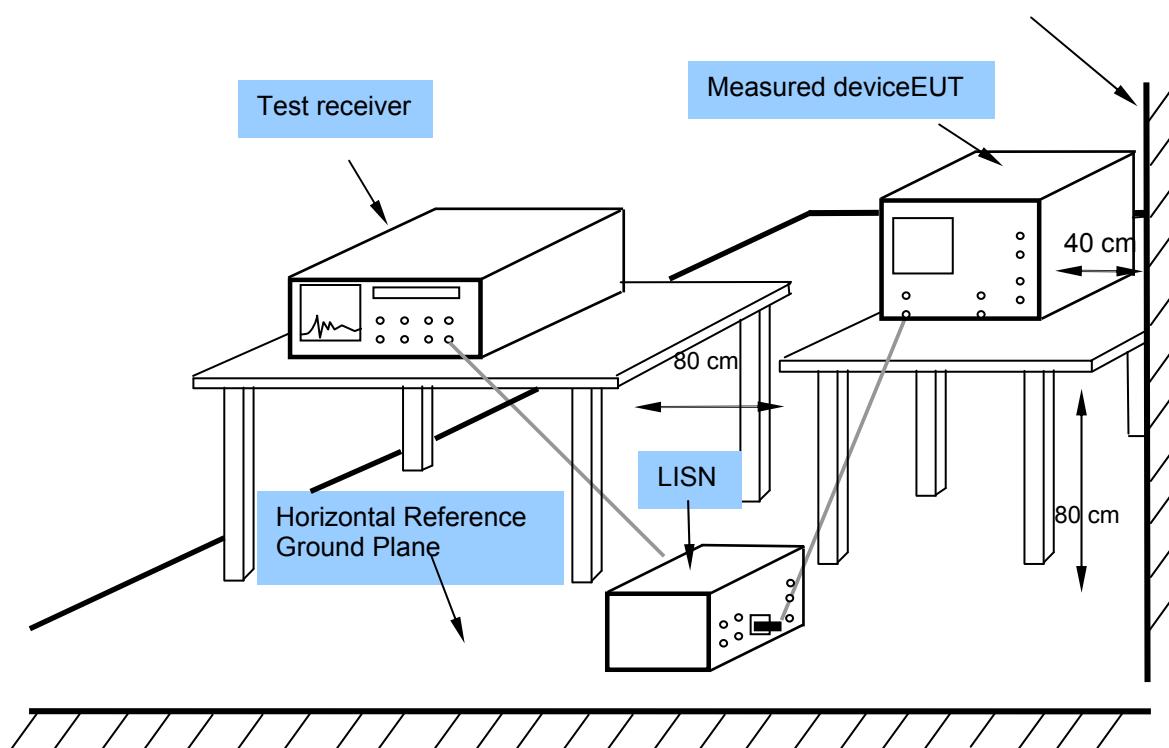
##### 7.1.1 Test instruments

| Description                                    | Model No. | SIQ No. | Last calibration | Calibrated until | Calibration period | Used |
|--|-----------|---------|------------------|------------------|--------------------|------|
| Rohde-Schwarz,<br>RFI receiver                 | ESU8      | 105187  | 2015-11          | 2017-11          | 24 months          | X    |
| Rohde & Schwarz,<br>Artificial main<br>network | ESH2-Z5   | 100406  | 2015-05          | 2017-05          | 24 months          | X    |

##### 7.1.2 Test procedure

- The EUT is placed on a non-conductive 0.8 meters high table, 0.4 meters from the vertical conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). LISN provide 50 Ohm / 50  $\mu$ H + 5 Ohm of coupling impedance for the measuring instrument.
- Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.
- AC power lines of EUT are checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz is searched using PEAK, QUASI-PEAK and AVERAGE function of the receiver. Bandwidth is set to 9kHz.
- If applicable functions are changed (data transfer speed, clock speed,...)

### 7.1.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

**7.1.4 Test results (15.207)****Device passed the requirements stated in ANSI C63.4, FCC Part 15, Subpart C.**

27.11.2015 10:02:51

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** PHASE, Uin: 120 V, 60 Hz

**Settings**

|            |                   |                 |            |
|------------|-------------------|-----------------|------------|
| Scan Start | 150.000000000 kHz | Preamp State    | Off        |
| Scan Stop  | 30.000000000 MHz  | Preamp Value    | 0.0 dB     |
| RBW        | 9.0 kHz           | Input Selection | INP2       |
| IF RBW     | 10.0 kHz          | Input Coupling  | DC         |
| Meas Time  | 1.0 s             | Scan Type       | TD Scan    |
| RF Att     | 10.0 dB           | Transducer      | ENV216.TDF |

**Scan Table**

Scan Start 150.000000000 kHz  
Scan Stop 30.000000000 MHz  
Scan Type TD Scan  
Transducer ENV216.TDF

Detector Trace 1: Max Peak Trace 2: Average

| Start Frequency | Stop Frequency | Step Size | RBW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|---------|-----------|----------|--------|--------|
| 150.000 kHz     | 30.000 MHz     | 2.250 kHz | 9.0 kHz | 30.0 ms   | 10.0 dB  | 0.0 dB | INPUT2 |

**Peak List**

Margin 15.0 dB  
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector      | Delta Limit/dB |
|-------|-------------------|--------------------|-------|---------------|----------------|
| 1     | 399.750000000 kHz | 50.97              |       | Positive Peak | -6.89          |
| 2     | 415.500000000 kHz | 38.51              |       | Average       | -9.03          |
| 2     | 485.250000000 kHz | 32.13              |       | Average       | -14.12         |
| 1     | 13.560000000 MHz  | 61.59              |       | Positive Peak | 1.59           |
| 2     | 13.560000000 MHz  | 60.10              |       | Average       | 10.10          |

**Final Results**

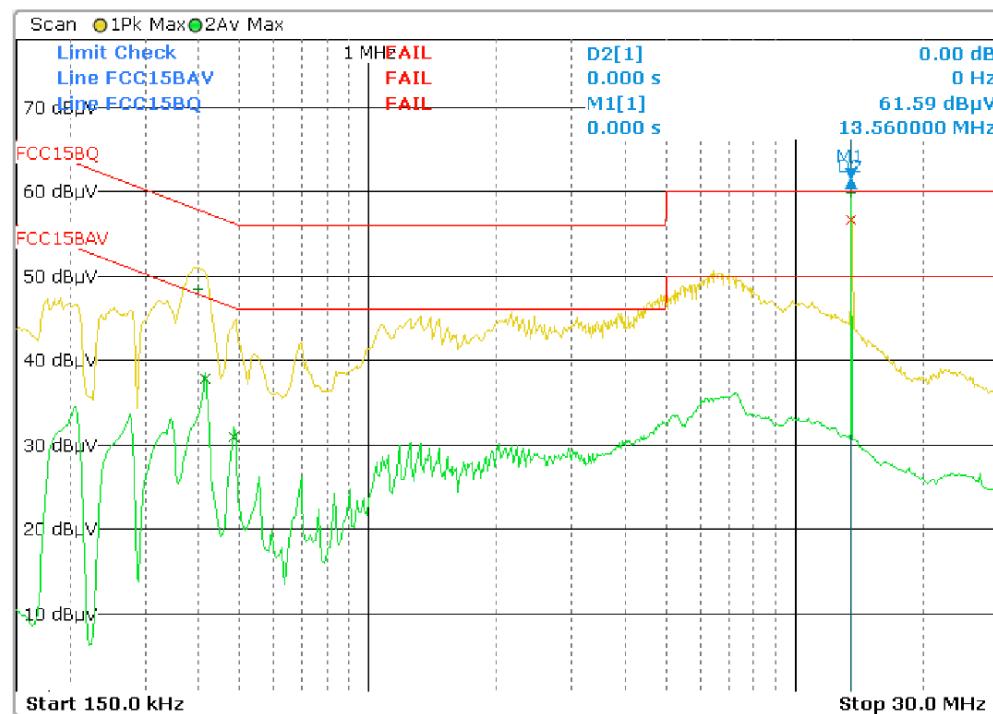
Meas Time 1.0 s  
Margin 15.0 dB  
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector   | Delta Limit/dB |
|-------|-------------------|--------------------|-------|------------|----------------|
| 2     | 13.560000000 MHz  | 56.68              |       | CISPR AV   | 6.68           |
| 1     | 13.560000000 MHz  | 59.90              |       | Quasi Peak | -0.10          |
| 1     | 399.750000000 kHz | 48.38              |       | Quasi Peak | -9.48          |
| 2     | 415.500000000 kHz | 37.77              |       | CISPR AV   | -9.77          |
| 2     | 485.250000000 kHz | 30.86              |       | CISPR AV   | -15.39         |

27.11.2015 10:02:51

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** PHASE, Uin: 120 V, 60 Hz

### Scan Diagram



27.11.2015 10:01:29

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** NEUTRAL, Uin: 120 V, 60 Hz

**Settings**

|            |                   |                 |            |
|------------|-------------------|-----------------|------------|
| Scan Start | 150.000000000 kHz | Preamp State    | Off        |
| Scan Stop  | 30.000000000 MHz  | Preamp Value    | 0.0 dB     |
| RBW        | 9.0 kHz           | Input Selection | INP2       |
| IF RBW     | 10.0 kHz          | Input Coupling  | DC         |
| Meas Time  | 1.0 s             | Scan Type       | TD Scan    |
| RF Att     | 10.0 dB           | Transducer      | ENV216.TDF |

**Scan Table**

|            |                   |
|------------|-------------------|
| Scan Start | 150.000000000 kHz |
| Scan Stop  | 30.000000000 MHz  |
| Scan Type  | TD Scan           |
| Transducer | ENV216.TDF        |

Detector Trace 1: Max Peak Trace 2: Average

| Start Frequency | Stop Frequency | Step Size | RBW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|---------|-----------|----------|--------|--------|
| 150.000 kHz     | 30.000 MHz     | 2.250 kHz | 9.0 kHz | 30.0 ms   | 10.0 dB  | 0.0 dB | INPUT2 |

**Peak List**

Margin 15.0 dB

Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector      | Delta Limit/dB |
|-------|-------------------|--------------------|-------|---------------|----------------|
| 1     | 179.250000000 kHz | 50.99              |       | Positive Peak | -13.53         |
| 1     | 255.750000000 kHz | 47.61              |       | Positive Peak | -13.96         |
| 2     | 345.750000000 kHz | 35.64              |       | Average       | -13.42         |
| 1     | 379.500000000 kHz | 50.50              |       | Positive Peak | -7.79          |
| 2     | 624.750000000 kHz | 31.31              |       | Average       | -14.69         |
| 1     | 13.560000000 MHz  | 60.69              |       | Positive Peak | 0.69           |
| 2     | 13.560000000 MHz  | 59.07              |       | Average       | 9.07           |

**Final Results**

Meas Time 1.0 s

Margin 15.0 dB

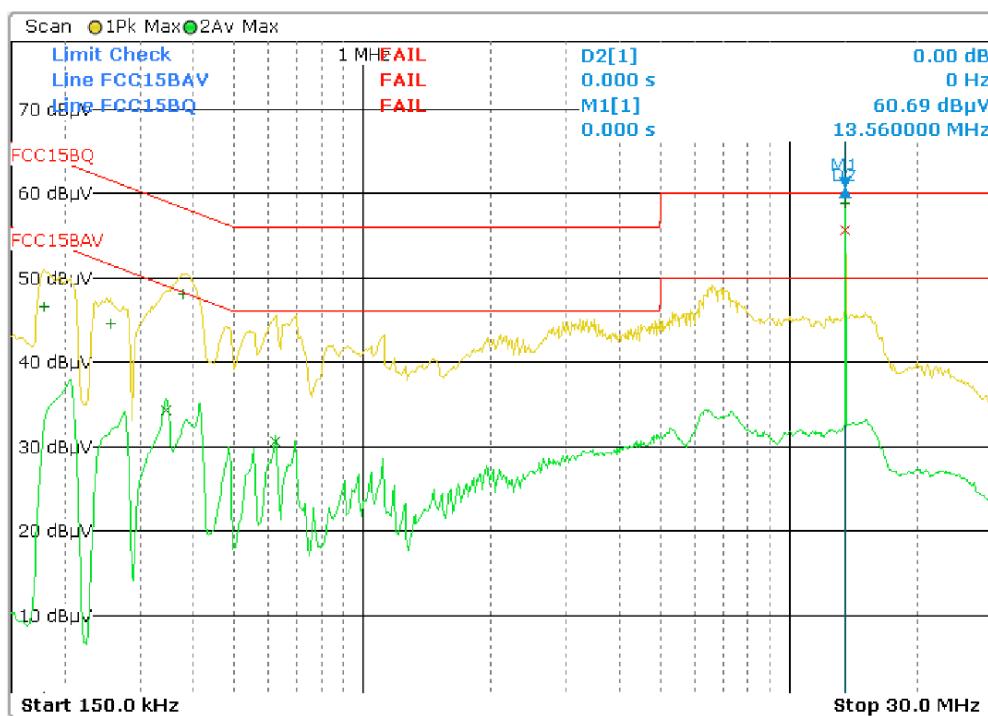
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector   | Delta Limit/dB |
|-------|-------------------|--------------------|-------|------------|----------------|
| 2     | 13.560000000 MHz  | 55.70              |       | CISPR AV   | 5.70           |
| 1     | 13.560000000 MHz  | 58.91              |       | Quasi Peak | -1.09          |
| 1     | 379.500000000 kHz | 48.13              |       | Quasi Peak | -10.16         |
| 2     | 345.750000000 kHz | 34.23              |       | CISPR AV   | -14.83         |
| 2     | 624.750000000 kHz | 30.61              |       | CISPR AV   | -15.39         |
| 1     | 255.750000000 kHz | 44.55              |       | Quasi Peak | -17.02         |
| 1     | 179.250000000 kHz | 46.57              |       | Quasi Peak | -17.95         |

27.11.2015 10:01:29

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** NEUTRAL, Uin: 120 V, 60 Hz

### Scan Diagram



27.11.2015 09:57:54

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** PHASE, Uin: 120 V, 60 Hz

**Settings**

|            |                   |                 |            |
|------------|-------------------|-----------------|------------|
| Scan Start | 150.000000000 kHz | Preamp State    | Off        |
| Scan Stop  | 30.000000000 MHz  | Preamp Value    | 0.0 dB     |
| RBW        | 9.0 kHz           | Input Selection | INP2       |
| IF RBW     | 10.0 kHz          | Input Coupling  | DC         |
| Meas Time  | 1.0 s             | Scan Type       | TD Scan    |
| RF Att     | 10.0 dB           | Transducer      | ENV216.TDF |

**Scan Table**

|            |                   |
|------------|-------------------|
| Scan Start | 150.000000000 kHz |
| Scan Stop  | 30.000000000 MHz  |
| Scan Type  | TD Scan           |
| Transducer | ENV216.TDF        |

Detector Trace 1: Max Peak Trace 2: Average

| Start Frequency | Stop Frequency | Step Size | RBW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|---------|-----------|----------|--------|--------|
| 150.000 kHz     | 30.000 MHz     | 2.250 kHz | 9.0 kHz | 30.0 ms   | 10.0 dB  | 0.0 dB | INPUT2 |

**Peak List**

Margin 15.0 dB  
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector      | Delta Limit/dB |
|-------|-------------------|--------------------|-------|---------------|----------------|
| 1     | 280.500000000 kHz | 46.10              |       | Positive Peak | -14.70         |
| 1     | 399.750000000 kHz | 51.01              |       | Positive Peak | -6.85          |
| 2     | 415.500000000 kHz | 38.35              |       | Average       | -9.19          |
| 2     | 485.250000000 kHz | 32.41              |       | Average       | -13.84         |
| 1     | 13.560000000 MHz  | 63.21              |       | Positive Peak | 3.21           |
| 2     | 13.560000000 MHz  | 61.79              |       | Average       | 11.79          |

**Final Results**

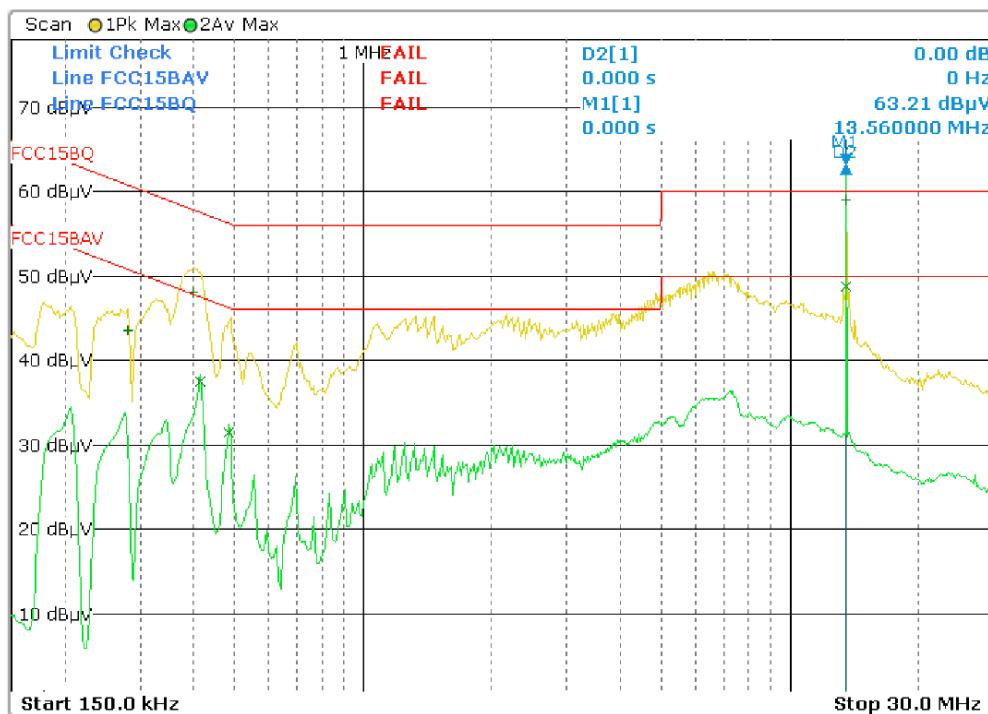
Meas Time 1.0 s  
Margin 15.0 dB  
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector   | Delta Limit/dB |
|-------|-------------------|--------------------|-------|------------|----------------|
| 1     | 13.560000000 MHz  | 59.08              |       | Quasi Peak | -0.92          |
| 2     | 13.560000000 MHz  | 48.83              |       | CISPR AV   | -1.17          |
| 1     | 399.750000000 kHz | 48.08              |       | Quasi Peak | -9.78          |
| 2     | 415.500000000 kHz | 37.51              |       | CISPR AV   | -10.03         |
| 2     | 485.250000000 kHz | 31.51              |       | CISPR AV   | -14.74         |
| 1     | 280.500000000 kHz | 43.63              |       | Quasi Peak | -17.17         |

27.11.2015 09:57:54

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** PHASE, Uin: 120 V, 60 Hz

### Scan Diagram



27.11.2015 10:00:00

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** NEUTRAL, Uin: 120 V, 60 Hz

**Settings**

|            |                   |                 |            |
|------------|-------------------|-----------------|------------|
| Scan Start | 150.000000000 kHz | Preamp State    | Off        |
| Scan Stop  | 30.000000000 MHz  | Preamp Value    | 0.0 dB     |
| RBW        | 9.0 kHz           | Input Selection | INP2       |
| IF RBW     | 10.0 kHz          | Input Coupling  | DC         |
| Meas Time  | 1.0 s             | Scan Type       | TD Scan    |
| RF Att     | 10.0 dB           | Transducer      | ENV216.TDF |

**Scan Table**

Scan Start 150.000000000 kHz  
Scan Stop 30.000000000 MHz  
Scan Type TD Scan  
Transducer ENV216.TDF

Detector Trace 1: Max Peak Trace 2: Average

| Start Frequency | Stop Frequency | Step Size | RBW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|---------|-----------|----------|--------|--------|
| 150.000 kHz     | 30.000 MHz     | 2.250 kHz | 9.0 kHz | 30.0 ms   | 10.0 dB  | 0.0 dB | INPUT2 |

**Peak List**

Margin 15.0 dB

Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector      | Delta Limit/dB |
|-------|-------------------|--------------------|-------|---------------|----------------|
| 1     | 181.500000000 kHz | 51.09              |       | Positive Peak | -13.33         |
| 1     | 246.750000000 kHz | 48.17              |       | Positive Peak | -13.70         |
| 2     | 345.750000000 kHz | 35.79              |       | Average       | -13.27         |
| 1     | 381.750000000 kHz | 50.64              |       | Positive Peak | -7.60          |
| 2     | 627.000000000 kHz | 31.24              |       | Average       | -14.76         |
| 1     | 13.560000000 MHz  | 65.21              |       | Positive Peak | 5.21           |
| 2     | 13.560000000 MHz  | 63.82              |       | Average       | 13.82          |

**Final Results**

Meas Time 1.0 s

Margin 15.0 dB

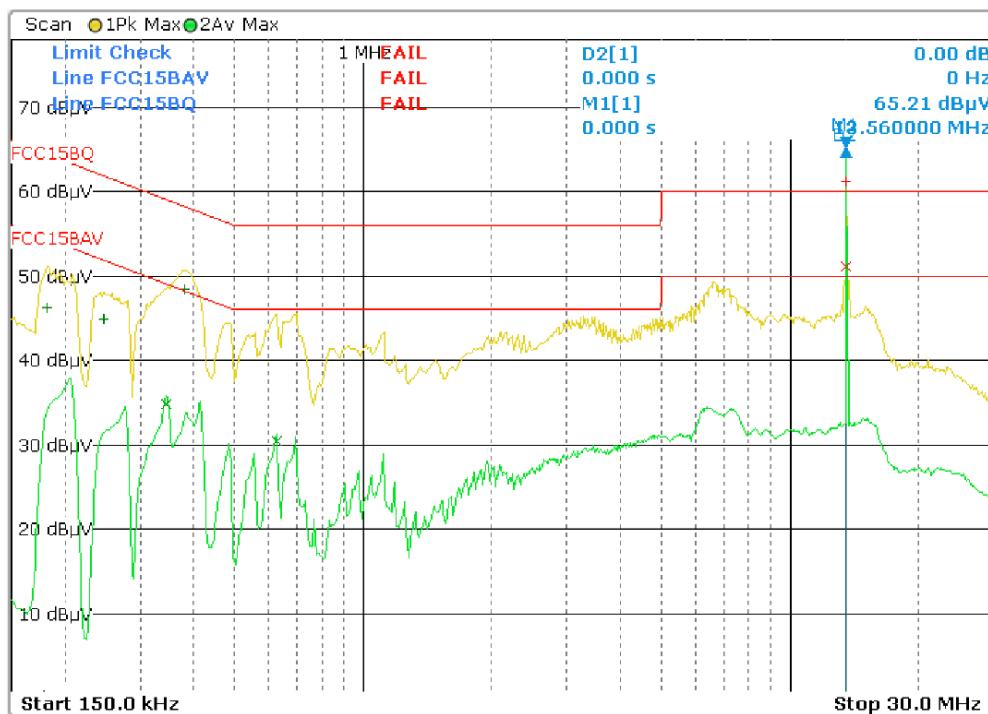
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector   | Delta Limit/dB |
|-------|-------------------|--------------------|-------|------------|----------------|
| 1     | 13.560000000 MHz  | 61.14              |       | Quasi Peak | 1.14           |
| 2     | 13.560000000 MHz  | 51.10              |       | CISPR AV   | 1.10           |
| 1     | 381.750000000 kHz | 48.43              |       | Quasi Peak | -9.81          |
| 2     | 345.750000000 kHz | 34.88              |       | CISPR AV   | -14.18         |
| 2     | 627.000000000 kHz | 30.40              |       | CISPR AV   | -15.60         |
| 1     | 246.750000000 kHz | 44.86              |       | Quasi Peak | -17.01         |
| 1     | 181.500000000 kHz | 46.21              |       | Quasi Peak | -18.21         |

27.11.2015 10:00:00

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** NEUTRAL, Uin: 120 V, 60 Hz

### Scan Diagram



27.11.2015 09:43:56

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** PHASE, Uin: 240 V, 50 Hz

**Settings**

|            |                   |                 |            |
|------------|-------------------|-----------------|------------|
| Scan Start | 150.000000000 kHz | Preamp State    | Off        |
| Scan Stop  | 30.000000000 MHz  | Preamp Value    | 0.0 dB     |
| RBW        | 9.0 kHz           | Input Selection | INP2       |
| IF RBW     | 10.0 kHz          | Input Coupling  | DC         |
| Meas Time  | 1.0 s             | Scan Type       | TD Scan    |
| RF Att     | 10.0 dB           | Transducer      | ENV216.TDF |

**Scan Table**

|            |                   |
|------------|-------------------|
| Scan Start | 150.000000000 kHz |
| Scan Stop  | 30.000000000 MHz  |
| Scan Type  | TD Scan           |
| Transducer | ENV216.TDF        |

Detector Trace 1: Max Peak Trace 2: Average

| Start Frequency | Stop Frequency | Step Size | RBW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|---------|-----------|----------|--------|--------|
| 150.000 kHz     | 30.000 MHz     | 2.250 kHz | 9.0 kHz | 30.0 ms   | 10.0 dB  | 0.0 dB | INPUT2 |

**Peak List**

Margin 15.0 dB  
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector      | Delta Limit/dB |
|-------|-------------------|--------------------|-------|---------------|----------------|
| 1     | 267.000000000 kHz | 46.70              |       | Positive Peak | -14.51         |
| 2     | 415.500000000 kHz | 40.03              |       | Average       | -7.51          |
| 1     | 417.750000000 kHz | 52.55              |       | Positive Peak | -4.94          |
| 2     | 906.000000000 kHz | 31.78              |       | Average       | -14.22         |
| 1     | 6.9270000000 MHz  | 51.73              |       | Positive Peak | -8.27          |
| 1     | 13.5600000000 MHz | 61.56              |       | Positive Peak | 1.56           |
| 2     | 13.5600000000 MHz | 59.70              |       | Average       | 9.70           |

**Final Results**

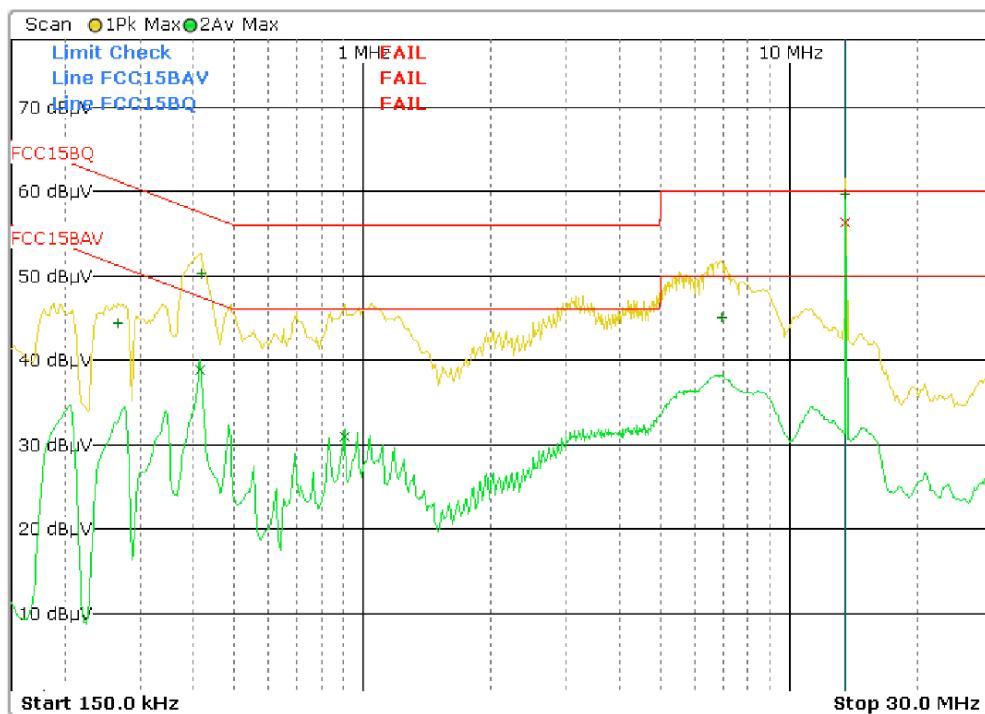
Meas Time 1.0 s  
Margin 15.0 dB  
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector   | Delta Limit/dB |
|-------|-------------------|--------------------|-------|------------|----------------|
| 2     | 13.5600000000 MHz | 56.32              |       | CISPR AV   | 6.32           |
| 1     | 13.5600000000 MHz | 59.74              |       | Quasi Peak | -0.26          |
| 1     | 417.750000000 kHz | 50.19              |       | Quasi Peak | -7.30          |
| 2     | 415.500000000 kHz | 38.88              |       | CISPR AV   | -8.66          |
| 1     | 6.9270000000 MHz  | 45.11              |       | Quasi Peak | -14.89         |
| 2     | 906.000000000 kHz | 30.91              |       | CISPR AV   | -15.09         |
| 1     | 267.000000000 kHz | 44.33              |       | Quasi Peak | -16.88         |

27.11.2015 09:43:56

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** PHASE, Uin: 240 V, 50 Hz

### Scan Diagram



27.11.2015 09:45:49

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** NEUTRAL, Uin: 240 V, 50 Hz

**Settings**

|            |                   |                 |            |
|------------|-------------------|-----------------|------------|
| Scan Start | 150.000000000 kHz | Preamp State    | Off        |
| Scan Stop  | 30.000000000 MHz  | Preamp Value    | 0.0 dB     |
| RBW        | 9.0 kHz           | Input Selection | INP2       |
| IF RBW     | 10.0 kHz          | Input Coupling  | DC         |
| Meas Time  | 1.0 s             | Scan Type       | TD Scan    |
| RF Att     | 10.0 dB           | Transducer      | ENV216.TDF |

**Scan Table**

|            |                   |
|------------|-------------------|
| Scan Start | 150.000000000 kHz |
| Scan Stop  | 30.000000000 MHz  |
| Scan Type  | TD Scan           |
| Transducer | ENV216.TDF        |

Detector Trace 1: Max Peak Trace 2: Average

| Start Frequency | Stop Frequency | Step Size | RBW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|---------|-----------|----------|--------|--------|
| 150.000 kHz     | 30.000 MHz     | 2.250 kHz | 9.0 kHz | 30.0 ms   | 10.0 dB  | 0.0 dB | INPUT2 |

**Peak List**

Margin 15.0 dB

Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector      | Delta Limit/dB |
|-------|-------------------|--------------------|-------|---------------|----------------|
| 1     | 190.500000000 kHz | 50.95              |       | Positive Peak | -13.06         |
| 1     | 267.000000000 kHz | 48.18              |       | Positive Peak | -13.03         |
| 1     | 399.750000000 kHz | 51.01              |       | Positive Peak | -6.85          |
| 2     | 415.500000000 kHz | 38.65              |       | Average       | -8.89          |
| 2     | 694.500000000 kHz | 33.00              |       | Average       | -13.00         |
| 1     | 699.000000000 kHz | 48.91              |       | Positive Peak | -7.09          |
| 1     | 13.560000000 MHz  | 60.88              |       | Positive Peak | 0.88           |
| 2     | 13.560000000 MHz  | 58.69              |       | Average       | 8.69           |

**Final Results**

Meas Time 1.0 s

Margin 15.0 dB

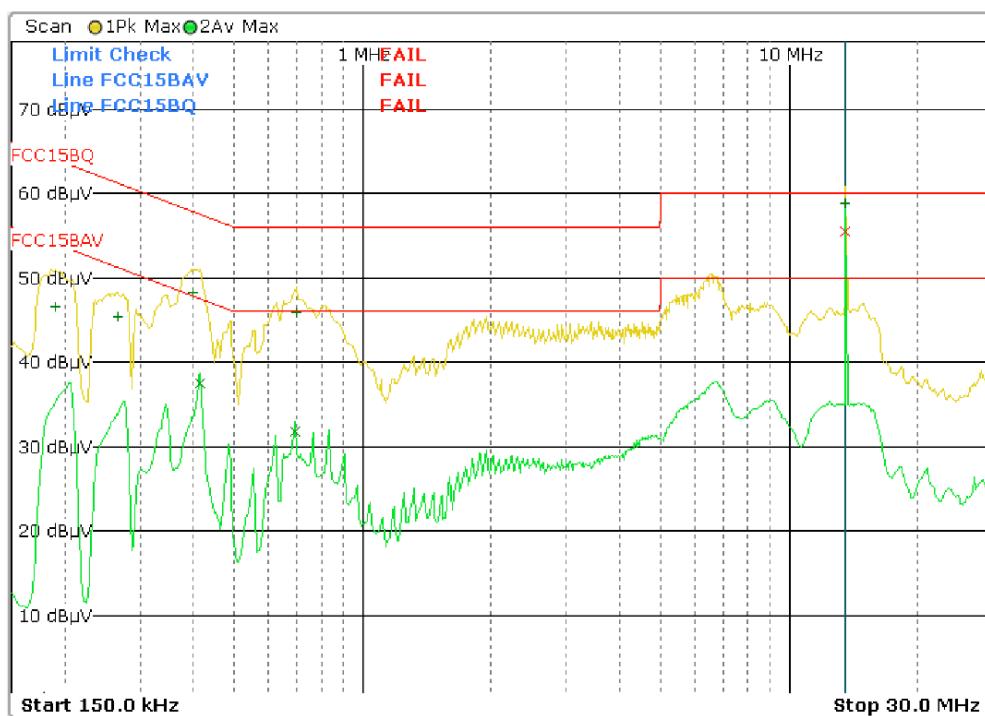
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector   | Delta Limit/dB |
|-------|-------------------|--------------------|-------|------------|----------------|
| 2     | 13.560000000 MHz  | 55.42              |       | CISPR AV   | 5.42           |
| 1     | 13.560000000 MHz  | 58.82              |       | Quasi Peak | -1.18          |
| 1     | 399.750000000 kHz | 48.26              |       | Quasi Peak | -9.60          |
| 2     | 415.500000000 kHz | 37.53              |       | CISPR AV   | -10.01         |
| 1     | 699.000000000 kHz | 45.96              |       | Quasi Peak | -10.04         |
| 2     | 694.500000000 kHz | 31.78              |       | CISPR AV   | -14.22         |
| 1     | 267.000000000 kHz | 45.44              |       | Quasi Peak | -15.77         |
| 1     | 190.500000000 kHz | 46.58              |       | Quasi Peak | -17.43         |

27.11.2015 09:45:49

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** NEUTRAL, Uin: 240 V, 50 Hz

### Scan Diagram



27.11.2015 09:53:58

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** PHASE, Uin: 240 V, 50 Hz

**Settings**

|            |                   |                 |            |
|------------|-------------------|-----------------|------------|
| Scan Start | 150.000000000 kHz | Preamp State    | Off        |
| Scan Stop  | 30.000000000 MHz  | Preamp Value    | 0.0 dB     |
| RBW        | 9.0 kHz           | Input Selection | INP2       |
| IF RBW     | 10.0 kHz          | Input Coupling  | DC         |
| Meas Time  | 1.0 s             | Scan Type       | TD Scan    |
| RF Att     | 10.0 dB           | Transducer      | ENV216.TDF |

**Scan Table**

|            |                   |
|------------|-------------------|
| Scan Start | 150.000000000 kHz |
| Scan Stop  | 30.000000000 MHz  |
| Scan Type  | TD Scan           |
| Transducer | ENV216.TDF        |

Detector Trace 1: Max Peak Trace 2: Average

| Start Frequency | Stop Frequency | Step Size | RBW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|---------|-----------|----------|--------|--------|
| 150.000 kHz     | 30.000 MHz     | 2.250 kHz | 9.0 kHz | 30.0 ms   | 10.0 dB  | 0.0 dB | INPUT2 |

**Peak List**

Margin 15.0 dB

Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector      | Delta Limit/dB |
|-------|-------------------|--------------------|-------|---------------|----------------|
| 2     | 415.500000000 kHz | 39.57              |       | Average       | -7.97          |
| 1     | 417.750000000 kHz | 52.66              |       | Positive Peak | -4.83          |
| 2     | 901.500000000 kHz | 32.31              |       | Average       | -13.69         |
| 2     | 6.751500000 MHz   | 39.08              |       | Average       | -10.92         |
| 1     | 6.760500000 MHz   | 52.36              |       | Positive Peak | -7.64          |
| 1     | 13.560000000 MHz  | 63.58              |       | Positive Peak | 3.58           |
| 2     | 13.560000000 MHz  | 61.96              |       | Average       | 11.96          |

**Final Results**

Meas Time 1.0 s

Margin 15.0 dB

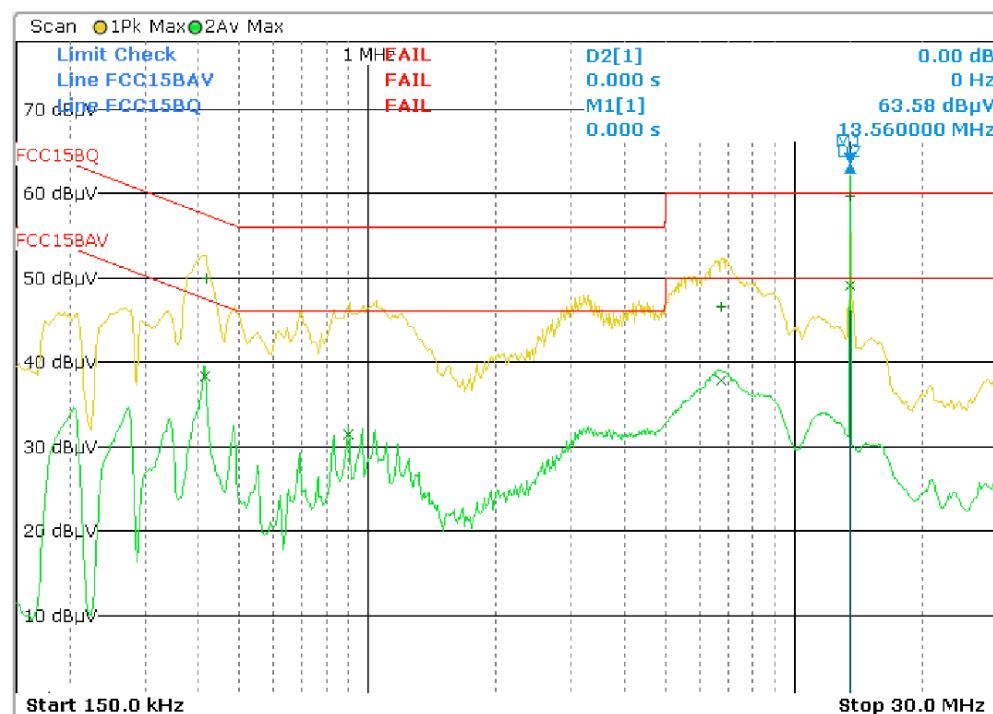
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector   | Delta Limit/dB |
|-------|-------------------|--------------------|-------|------------|----------------|
| 1     | 13.560000000 MHz  | 59.69              |       | Quasi Peak | -0.31          |
| 2     | 13.560000000 MHz  | 49.01              |       | CISPR AV   | -0.99          |
| 1     | 417.750000000 kHz | 49.94              |       | Quasi Peak | -7.55          |
| 2     | 415.500000000 kHz | 38.40              |       | CISPR AV   | -9.14          |
| 2     | 6.751500000 MHz   | 37.77              |       | CISPR AV   | -12.23         |
| 1     | 6.760500000 MHz   | 46.64              |       | Quasi Peak | -13.36         |
| 2     | 901.500000000 kHz | 31.45              |       | CISPR AV   | -14.55         |

27.11.2015 09:53:58

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** PHASE, Uin: 240 V, 50 Hz

### Scan Diagram



27.11.2015 09:48:41

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** NEUTRAL, Uin: 240 V, 50 Hz

**Settings**

|            |                   |                 |            |
|------------|-------------------|-----------------|------------|
| Scan Start | 150.000000000 kHz | Preamp State    | Off        |
| Scan Stop  | 30.000000000 MHz  | Preamp Value    | 0.0 dB     |
| RBW        | 9.0 kHz           | Input Selection | INP2       |
| IF RBW     | 10.0 kHz          | Input Coupling  | DC         |
| Meas Time  | 1.0 s             | Scan Type       | TD Scan    |
| RF Att     | 10.0 dB           | Transducer      | ENV216.TDF |

**Scan Table**

|            |                   |
|------------|-------------------|
| Scan Start | 150.000000000 kHz |
| Scan Stop  | 30.000000000 MHz  |
| Scan Type  | TD Scan           |
| Transducer | ENV216.TDF        |

Detector Trace 1: Max Peak Trace 2: Average

| Start Frequency | Stop Frequency | Step Size | RBW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|---------|-----------|----------|--------|--------|
| 150.000 kHz     | 30.000 MHz     | 2.250 kHz | 9.0 kHz | 30.0 ms   | 10.0 dB  | 0.0 dB | INPUT2 |

**Peak List**

Margin 15.0 dB  
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector      | Delta Limit/dB |
|-------|-------------------|--------------------|-------|---------------|----------------|
| 1     | 183.750000000 kHz | 50.48              |       | Positive Peak | -13.83         |
| 1     | 262.500000000 kHz | 47.89              |       | Positive Peak | -13.46         |
| 1     | 406.500000000 kHz | 51.10              |       | Positive Peak | -6.62          |
| 2     | 415.500000000 kHz | 38.62              |       | Average       | -8.92          |
| 2     | 694.500000000 kHz | 33.52              |       | Average       | -12.48         |
| 1     | 696.750000000 kHz | 48.99              |       | Positive Peak | -7.01          |
| 1     | 6.560250000 MHz   | 50.52              |       | Positive Peak | -9.48          |
| 1     | 13.560000000 MHz  | 63.56              |       | Positive Peak | 3.56           |
| 2     | 13.560000000 MHz  | 61.99              |       | Average       | 11.99          |

**Final Results**

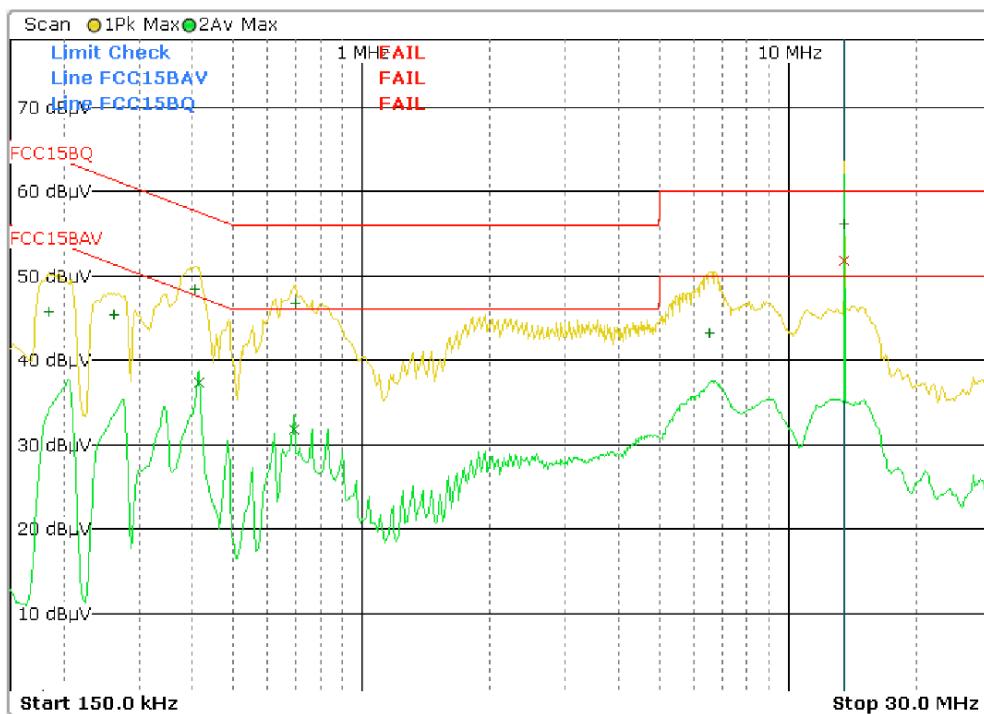
Meas Time 1.0 s  
Margin 15.0 dB  
Peaks 10

| Trace | Frequency         | Level (dB $\mu$ V) | Phase | Detector   | Delta Limit/dB |
|-------|-------------------|--------------------|-------|------------|----------------|
| 2     | 13.560000000 MHz  | 51.75              |       | CISPR AV   | 1.75           |
| 1     | 13.560000000 MHz  | 56.23              |       | Quasi Peak | -3.77          |
| 1     | 696.750000000 kHz | 46.80              |       | Quasi Peak | -9.20          |
| 1     | 406.500000000 kHz | 48.50              |       | Quasi Peak | -9.22          |
| 2     | 415.500000000 kHz | 37.38              |       | CISPR AV   | -10.16         |
| 2     | 694.500000000 kHz | 31.73              |       | CISPR AV   | -14.27         |
| 1     | 262.500000000 kHz | 45.38              |       | Quasi Peak | -15.97         |
| 1     | 6.560250000 MHz   | 43.26              |       | Quasi Peak | -16.74         |
| 1     | 183.750000000 kHz | 45.67              |       | Quasi Peak | -18.64         |

27.11.2015 09:48:41

**Heading** C20151867  
**Meas Type** CONDUCTED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A TAG  
**Operator** ANDREJ SKOF  
**Test Spec** NEUTRAL, Uin: 240 V, 50 Hz

### Scan Diagram



## 7.2 Radiated emission measurement (intentional radiator)

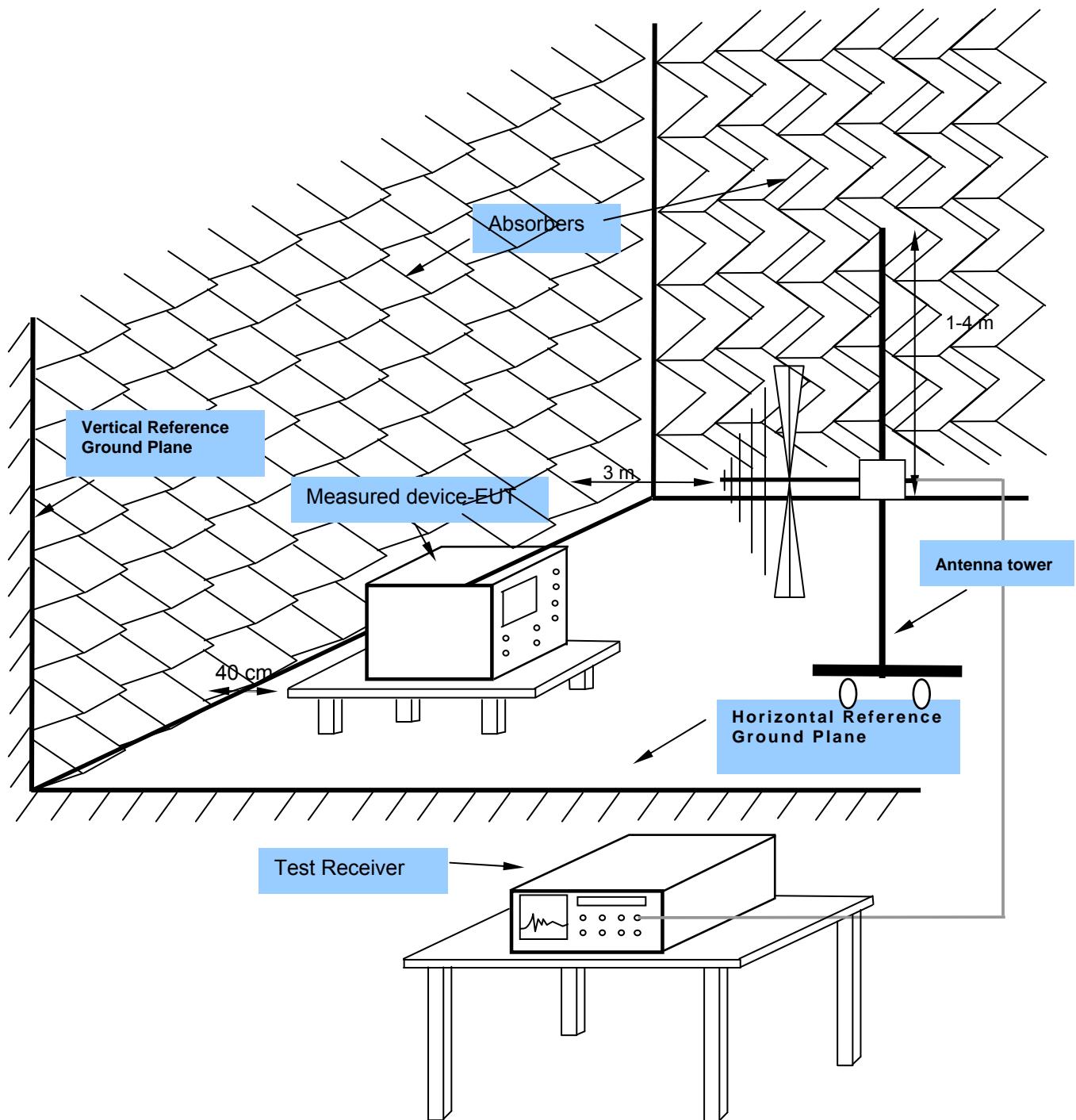
### 7.2.1 Test instruments

| Description & Manufacturer                  | Model No. | SIQ No. | Last calibration | Calibrated until | Calibration period | Used |
|---|-----------|---------|------------------|------------------|--------------------|------|
| ETS, Anechoic chamber                       | 3m        | 103949  | 2014-11          | 2016-11          | 24 months          | X    |
| Rohde-Schwarz, RFI receiver                 | ESU8      | 105187  | 2015-11          | 2017-11          | 24 months          | X    |
| Rohde-Schwarz, RFI receiver                 | ESU26     | 100428  | 2015-12          | 2017-12          | 24 months          | /    |
| R&S, Antenna                                | HFH2-Z2   | /       | 2015-09          | 2017-09          | 24 months          | X    |
| EMCO, Antenna                               | 3142B     | 104351  | 2015-09          | 2017-09          | 24 months          | X    |
| EMCO, Antenna                               | 3115      | 103002  | 2015-09          | 2017-09          | 24 months          | /    |
| Heinrich Deisel, Turn table                 | DS 420.00 | 103337  | N/A              | N/A              | N/A                | X    |
| Antenna tower                               | /         | /       | N/A              | N/A              | N/A                | X    |
| Controller for turn table and antenna tower | /         | /       | N/A              | N/A              | N/A                | X    |

### 7.2.2 Test procedure

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground in an Anechoic Chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 m and 10 m away from the interference-receiving antenna, which was mounted on the top of variable-height antenna tower. Highest peaks were recalculated to proper distance requirement.
3. The antenna is a loop and a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to PEAK and QUAS-PEAK Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The highest points would be re-tested one by one using the quasi-peak method.

### 7.2.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 7.2.4 Test result (15.209)

Device passed the requirements stated in ANSI C63.4, FCC Part 15, Subpart C.

Preliminary measurement at 3 m in SAC:

**C20151867**

30.Sep 15 06:49

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** Metra inzeniring d.o.o.  
**OP Condition** Waiting a card  
**Operator** Andrej Skof

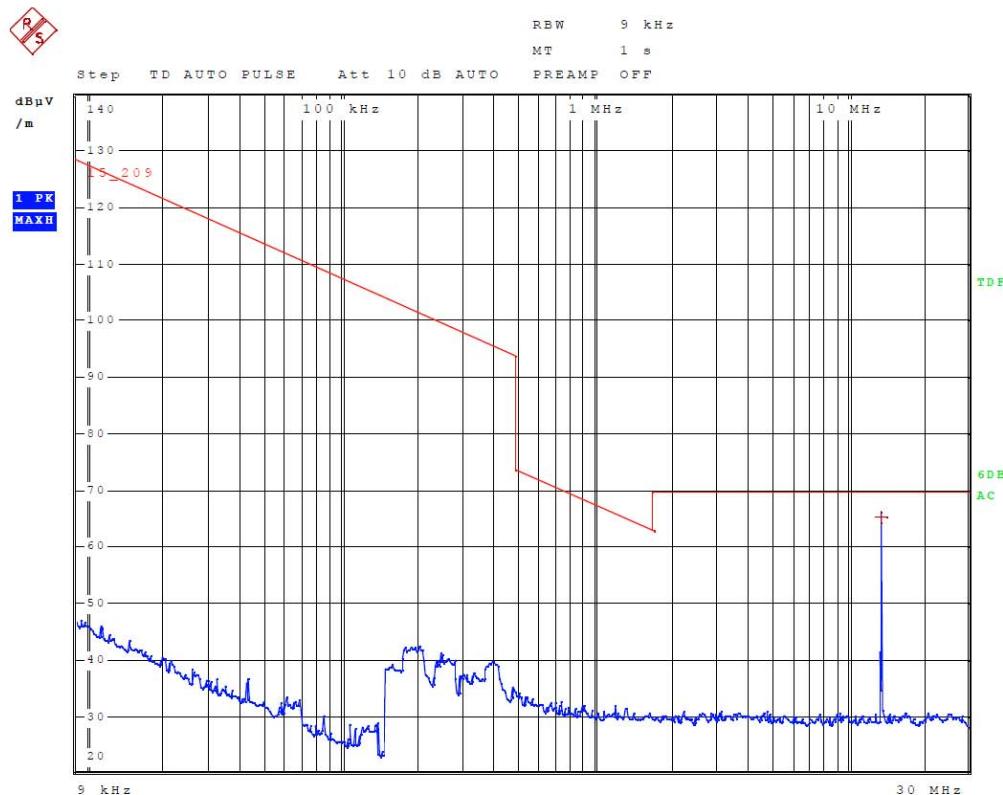
**Test Spec**

Antenna: 20 deg, Sample: 345 deg

**Time Domain Scan (2 Ranges)**

Scan Start: 9 kHz  
Scan Stop: 30 MHz  
Detector: Trace 1: MAX PEAK  
Transducer: HFH2-Z2V

| Start Frequency | Stop Frequency | Step Size | Meas BW   | RF Time | Atten | Preamp | Input  |
|-----------------|----------------|-----------|-----------|---------|-------|--------|--------|
| 9.000000 kHz    | 149.950000 kHz | 50.00 Hz  | 200.00 Hz | 200 ms  | Auto  | 0 dB   | INPUT2 |
| 150.000000 kHz  | 30.000000 MHz  | 2.25 kHz  | 9.00 kHz  | 30 ms   | Auto  | 0 dB   | INPUT2 |



C20151867

30.Sep 15 06:49

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** Metra inzeniring d.o.o.  
**OP Condition** Waiting a card  
**Operator** Andrej Skof  
**Test Spec**  
Antenna: 20 deg, Sample: 345 deg

**Final Measurement**

Meas Time: 1 s  
Margin: 20 dB  
Peaks: 1

| Trace | Frequency        | Level (dB $\mu$ V/m) | Detector   | Delta Limit/dB |
|-------|------------------|----------------------|------------|----------------|
| 1     | 13.560000000 MHz | 65.28                | Quasi Peak | -4.22          |

**C20151867**

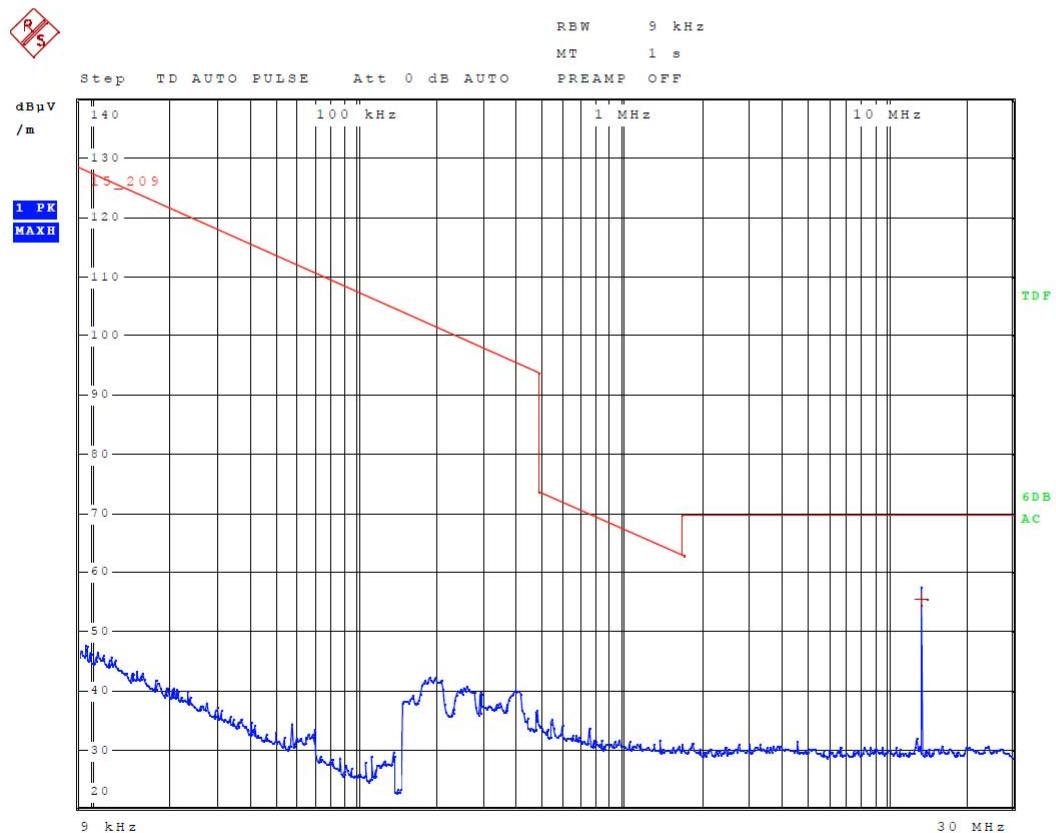
30.Sep 15 06:51

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** Metra inzeniring d.o.o.  
**OP Condition** Reading a card  
**Operator** Andrej Skof  
**Test Spec**  
Antenna: 20 deg, Sample: 345 deg

**Time Domain Scan (2 Ranges)**

Scan Start: 9 kHz  
Scan Stop: 30 MHz  
Detector: Trace 1: MAX PEAK  
Transducer: HFH2-Z2V

| Start Frequency | Stop Frequency | Step Size | Res BW    | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|-----------|-----------|----------|--------|--------|
| 9.000000 kHz    | 149.950000 kHz | 50.00 Hz  | 200.00 Hz | 200 ms    | Auto     | 0 dB   | INPUT2 |
| 150.000000 kHz  | 30.000000 MHz  | 2.25 kHz  | 9.00 kHz  | 30 ms     | Auto     | 0 dB   | INPUT2 |



C20151867

30.Sep 15 06:51

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** Metra inzeniring d.o.o.  
**OP Condition** Reading a card  
**Operator** Andrej Skof  
**Test Spec**  
Antenna: 20 deg, Sample: 345 deg

**Final Measurement**

Meas Time: 1 s  
Margin: 20 dB  
Peaks: 1

| Trace | Frequency        | Level (dB $\mu$ V/m) | Detector   | Delta Limit/dB |
|-------|------------------|----------------------|------------|----------------|
| 1     | 13.560000000 MHz | 55.50                | Quasi Peak | -14.00         |

**Final measurement at 10 m in OATS**

| <b>Results with measuring distance of 10 m</b> |                        |   |                                      |                    |
|--|------------------------|---|--------------------------------------|--------------------|
| <b>Mode</b>                                    | <b>Frequency (MHz)</b> | <b>Measured value (dB<math>\mu</math>V/m)</b> | <b>Limit (dB<math>\mu</math>V/m)</b> | <b>Margin (dB)</b> |
| Reading a card                                 | 13.56                  | 43.37   | 104.00                               | - 60.63            |
| Waiting for a card                             | 13.56                  | 51.36   | 104.00                               | - 52.64            |

| <b>Calculated value from 10 m to 30 m</b> |                        |   |   |   |  |                    |
|---|------------------------|---|---|---|--|--------------------|
| <b>Mode</b>                               | <b>Frequency (MHz)</b> | <b>Measured value at 10 m (dB<math>\mu</math>V/m)</b> | <b>Correction factor from 10 m to 30 m (dB)</b> | <b>Calculated value at 30 m (dB<math>\mu</math>V/m)</b> | <b>Limit at 30 m (dB<math>\mu</math>V/m)</b> | <b>Margin (dB)</b> |
| Reading a card                            | 13.56                  | 43.37   | 20  | 23.37   | 84.00  | - 60.63            |
| Waiting for a card                        | 13.56                  | 51.36   | 20  | 31.36   | 84.00  | - 52.64            |

**NOTE:** Antenna factor and cable loss are already included in measurement correction.

C20151867

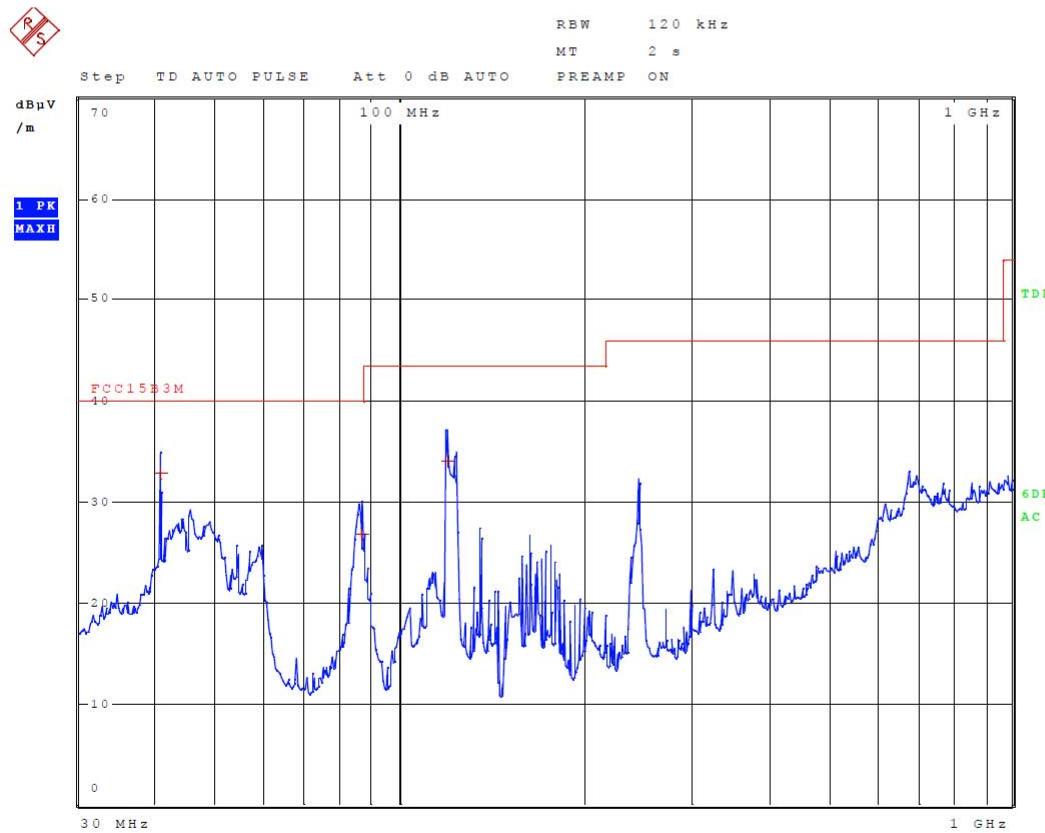
22.Jan 16 14:20

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING FOR A CARD  
**Operator** Andrej Skof  
**Test Spec**  
 VERTICAL 100 cm, 0 deg

**Time Domain Scan (1 Range)**

Scan Start: 30 MHz  
 Scan Stop: 1 GHz  
 Detector: Trace 1: MAX PEAK  
 Transducer: 3142B3m

| Start Frequency | Stop Frequency | Step Size | Res BW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|------------|-----------|----------|--------|--------|
| 30.000000 MHz   | 1.000000 GHz   | 30.00 kHz | 120.00 kHz | 1 ms      | Auto     | 20 dB  | INPUT2 |



C20151867

22.Jan 16 14:20

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING FOR A CARD  
**Operator** Andrej Skof  
**Test Spec**  
VERTICAL 100 cm, 0 deg

**Final Measurement**

Meas Time: 2 s  
Margin: 10 dB  
Peaks: 3

| Trace | Frequency         | Level (dB $\mu$ V/m) | Detector   | Delta Limit/dB |
|-------|-------------------|----------------------|------------|----------------|
| 1     | 40.680000000 MHz  | 32.91                | Quasi Peak | -7.09          |
| 1     | 119.220000000 MHz | 34.05                | Quasi Peak | -9.45          |
| 1     | 86.580000000 MHz  | 26.82                | Quasi Peak | -13.18         |

C20151867

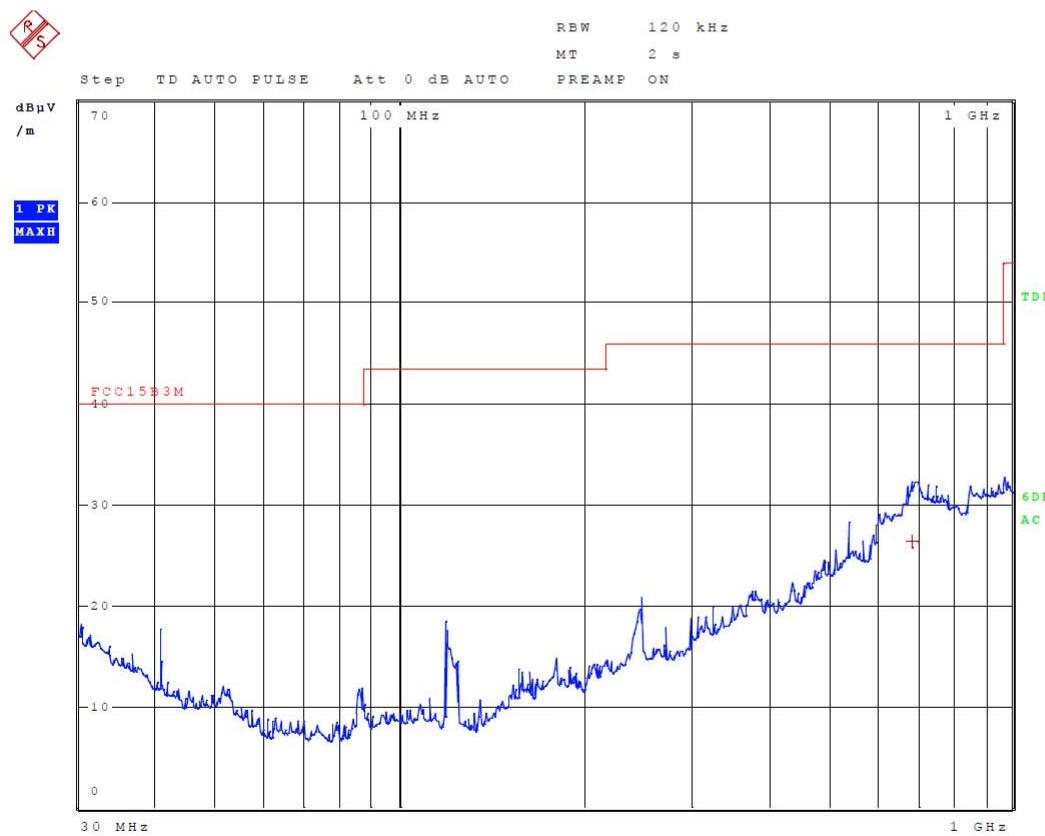
22.Jan 16 14:21

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING FOR A CARD  
**Operator** Andrej Skof  
**Test Spec**  
 HORIZONTAL 100 cm, 0 deg

#### Time Domain Scan (1 Range)

Scan Start: 30 MHz  
 Scan Stop: 1 GHz  
 Detector: Trace 1: MAX PEAK  
 Transducer: 3142B3m

| Start Frequency | Stop Frequency | Step Size | Res BW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|------------|-----------|----------|--------|--------|
| 30.000000 MHz   | 1.000000 GHz   | 30.00 kHz | 120.00 kHz | 1 ms      | Auto     | 20 dB  | INPUT2 |



**C20151867**

22.Jan 16 14:21

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** WAITING FOR A CARD  
**Operator** Andrej Skof  
**Test Spec**  
HORIZONTAL 100 cm, 0 deg

**Final Measurement**

Meas Time: 2 s  
Margin: 15 dB  
Peaks: 1

| Trace | Frequency         | Level (dB $\mu$ V/m) | Detector   | Delta Limit/dB |
|-------|-------------------|----------------------|------------|----------------|
| 1     | 686.520000000 MHz | 26.42                | Quasi Peak | -19.58         |

C20151867

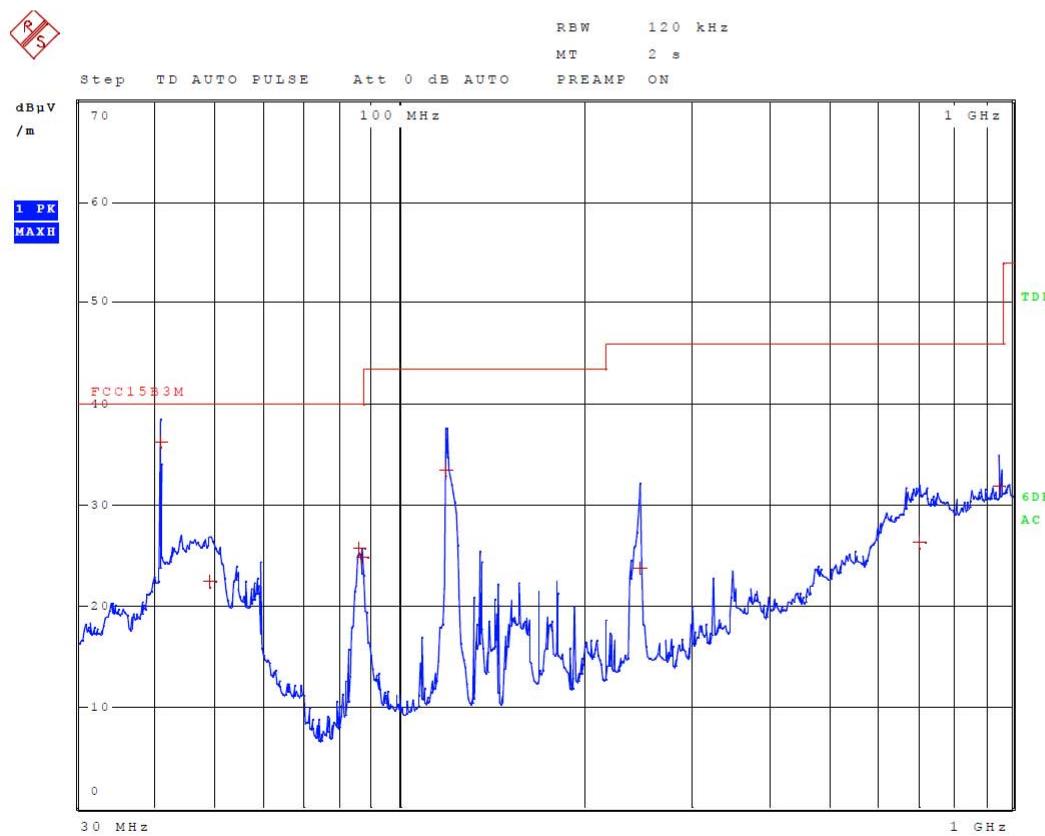
22.Jan 16 14:32

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A CARD  
**Operator** Andrej Skof  
**Test Spec**  
 VERTICAL 100 cm, 0 deg

**Time Domain Scan (1 Range)**

Scan Start: 30 MHz  
 Scan Stop: 1 GHz  
 Detector: Trace 1: MAX PEAK  
 Transducer: 3142B3m

| Start Frequency | Stop Frequency | Step Size | Res BW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|------------|-----------|----------|--------|--------|
| 30.000000 MHz   | 1.000000 GHz   | 30.00 kHz | 120.00 kHz | 1 ms      | Auto     | 20 dB  | INPUT2 |



**C20151867**

22.Jan 16 14:32

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A CARD  
**Operator** Andrej Skof  
**Test Spec**  
VERTICAL 100 cm, 0 deg

**Final Measurement**

Meas Time: 2 s  
Margin: 15 dB  
Peaks: 8

| Trace | Frequency         | Level (dB $\mu$ V/m) | Detector   | Delta Limit/dB |
|-------|-------------------|----------------------|------------|----------------|
| 1     | 40.680000000 MHz  | 36.18                | Quasi Peak | -3.82          |
| 1     | 119.160000000 MHz | 33.50                | Quasi Peak | -10.00         |
| 1     | 949.200000000 MHz | 31.88                | Quasi Peak | -14.12         |
| 1     | 85.620000000 MHz  | 25.60                | Quasi Peak | -14.40         |
| 1     | 86.520000000 MHz  | 24.73                | Quasi Peak | -15.27         |
| 1     | 48.810000000 MHz  | 22.44                | Quasi Peak | -17.56         |
| 1     | 705.990000000 MHz | 26.18                | Quasi Peak | -19.82         |
| 1     | 246.300000000 MHz | 23.68                | Quasi Peak | -22.32         |

C20151867

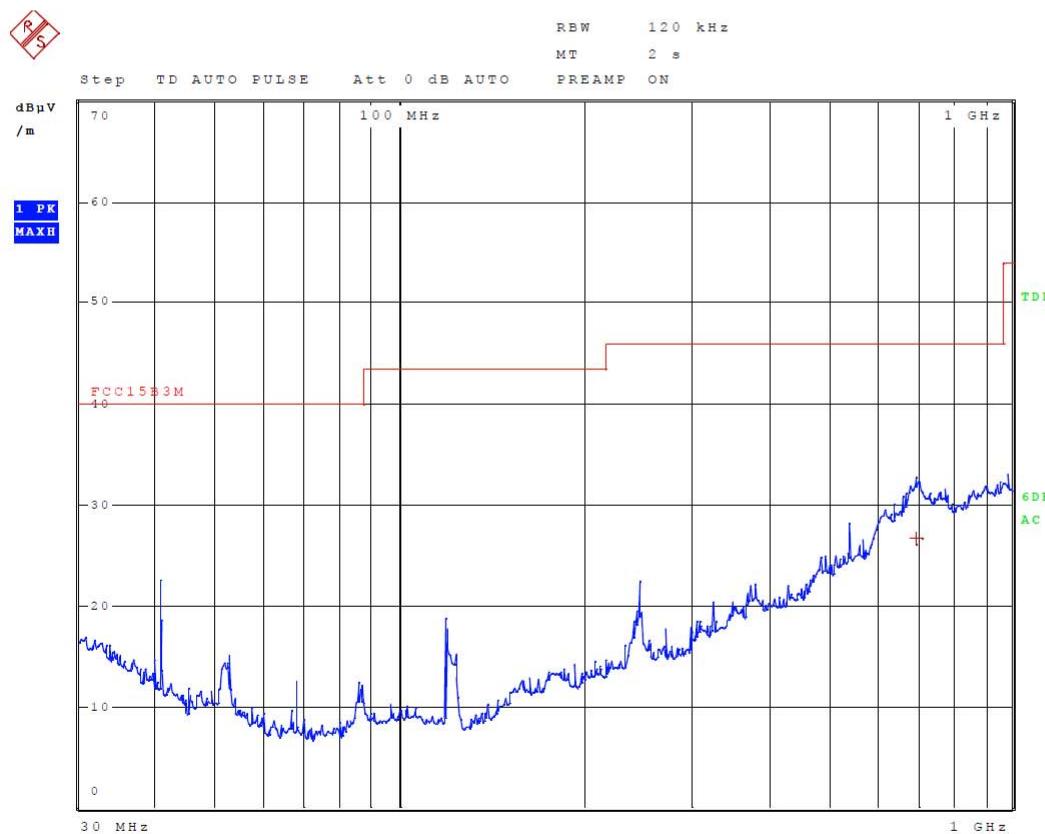
22.Jan 16 14:31

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A CARD  
**Operator** Andrej Skof  
**Test Spec**  
 HORIZONTAL 100 cm, 0 deg

#### Time Domain Scan (1 Range)

Scan Start: 30 MHz  
 Scan Stop: 1 GHz  
 Detector: Trace 1: MAX PEAK  
 Transducer: 3142B3m

| Start Frequency | Stop Frequency | Step Size | Res BW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|------------|-----------|----------|--------|--------|
| 30.000000 MHz   | 1.000000 GHz   | 30.00 kHz | 120.00 kHz | 1 ms      | Auto     | 20 dB  | INPUT2 |



**C20151867**

22.Jan 16 14:31

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A CARD  
**Operator** Andrej Skof  
**Test Spec**  
HORIZONTAL 100 cm, 0 deg

**Final Measurement**

Meas Time: 2 s  
Margin: 15 dB  
Peaks: 1

| Trace | Frequency         | Level (dB $\mu$ V/m) | Detector   | Delta Limit/dB |
|-------|-------------------|----------------------|------------|----------------|
| 1     | 698.730000000 MHz | 26.68                | Quasi Peak | -19.32         |

**Worst case measurement:****C20151867**

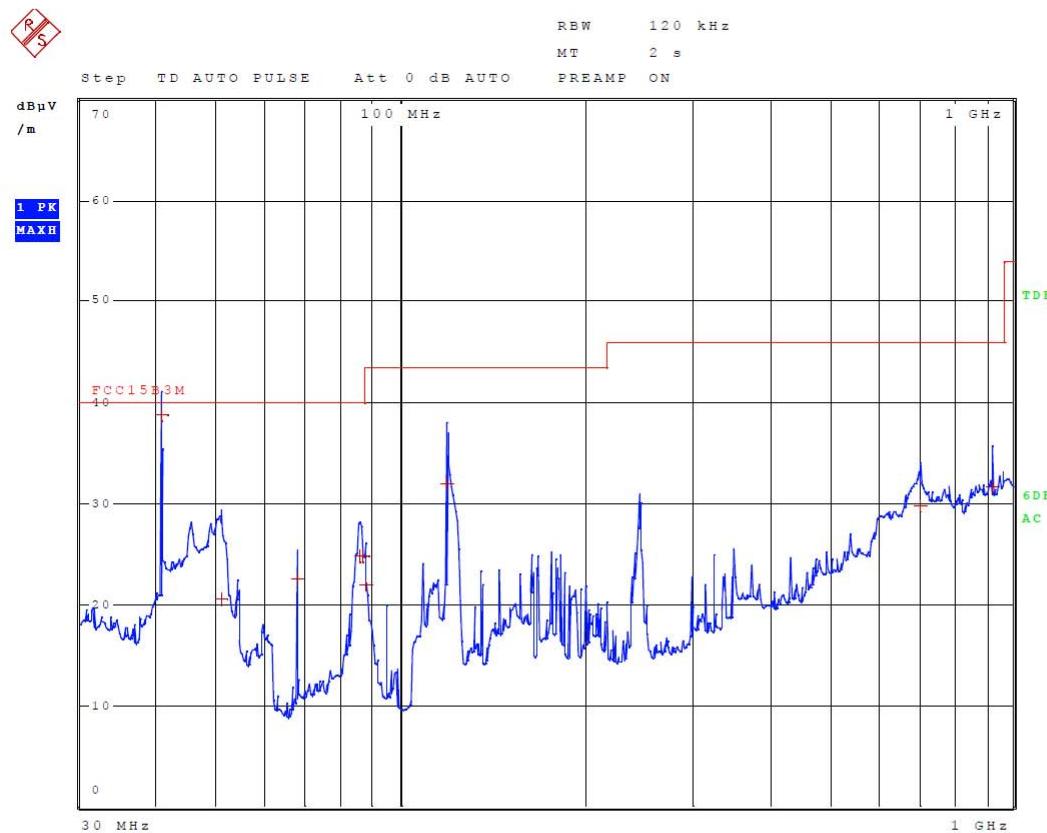
22.Jan 16 14:48

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A CARD  
**Operator** Andrej Skof  
**Test Spec**  
 VERTICAL 100 cm, 80 deg

**Time Domain Scan (1 Range)**

Scan Start: 30 MHz  
 Scan Stop: 1 GHz  
 Detector: Trace 1: MAX PEAK  
 Transducer: 3142B3m

| Start Frequency | Stop Frequency | Step Size | Res BW     | Meas Time | RF Atten | Preamp | Input  |
|-----------------|----------------|-----------|------------|-----------|----------|--------|--------|
| 30.000000 MHz   | 1.000000 GHz   | 30.00 kHz | 120.00 kHz | 1 ms      | Auto     | 20 dB  | INPUT2 |



**C20151867**

22.Jan 16 14:48

**Meas Type** RADIATED EMISSION  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** METRA INZENIRING D.O.O.  
**OP Condition** READING A CARD  
**Operator** Andrej Skof  
**Test Spec**  
VERTICAL 100 cm, 80 deg

**Final Measurement**

Meas Time: 2 s  
Margin: 15 dB  
Peaks: 9

| Trace | Frequency         | Level (dB $\mu$ V/m) | Detector   | Delta Limit/dB |
|-------|-------------------|----------------------|------------|----------------|
| 1     | 40.680000000 MHz  | 38.68                | Quasi Peak | -1.32          |
| 1     | 119.070000000 MHz | 31.99                | Quasi Peak | -11.51         |
| 1     | 922.080000000 MHz | 31.65                | Quasi Peak | -14.35         |
| 1     | 86.520000000 MHz  | 24.84                | Quasi Peak | -15.16         |
| 1     | 85.560000000 MHz  | 24.71                | Quasi Peak | -15.29         |
| 1     | 705.120000000 MHz | 29.83                | Quasi Peak | -16.17         |
| 1     | 67.800000000 MHz  | 22.62                | Quasi Peak | -17.38         |
| 1     | 87.510000000 MHz  | 22.01                | Quasi Peak | -17.99         |
| 1     | 50.850000000 MHz  | 20.50                | Quasi Peak | -19.50         |

### 7.3 Bandwidth of the emission (intentional radiator)

#### Section 15.215 Additional provisions to the general radiated emission limitations

##### 7.3.1 Test instruments

| Description & Manufacturer                         | Model No.     | SIQ No.  | Last calibration | Calibrated until | Calibration period | Used |
|--|---------------|----------|------------------|------------------|--------------------|------|
| ETS, Anechoic chamber                              | 3m            | 103949   | 2014-11          | 2016-11          | 24 months          | X    |
| Rohde-Schwarz, RFI receiver                        | ESU8          | 105187   | 2015-11          | 2017-11          | 24 months          | X    |
| EMCO, Antenna Rohde & Schwarz, Active loop antenna | 3142B HFH2-Z2 | 06/068 / | 2015-09          | 2017-09          | 24 months          |      |
| Heinrich Deisel, Turn table                        | DS 420.00     | 103337   | NA               | NA               | NA                 | X    |
| ETS, Antenna tower                                 | /             | /        | NA               | NA               | NA                 | X    |
| ETS, Controller for turn table and antenna tower   | /             | /        | NA               | NA               | NA                 | X    |

##### 7.3.2 Test procedure

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground in an Anechoic Chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 m away from the interference-receiving antenna.
3. Resolution bandwidth is set to a value greater than 5% of the allowed bandwidth. If no bandwidth specifications are given, the guidelines in Section 1.4 are used

### 7.3.3 Test results (15.215)

Device passed the requirements stated in ANSI C63.4, FCC Part 15, Subpart C.

**C20151867**

30.Sep 15 07:08

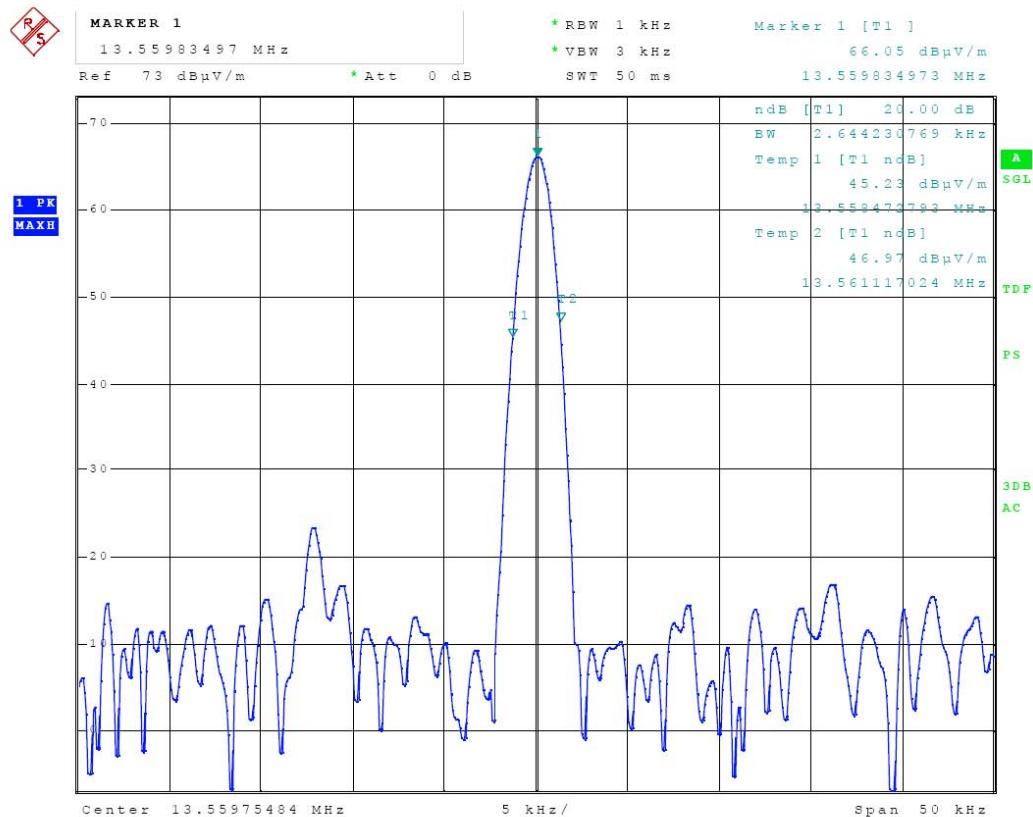
**Meas Type** OCCUPIED BANDWIDTH  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** Metra inzeniring d.o.o.  
**OP Condition** Waiting a card  
**Operator** Andrej Skof

**Test Spec**

Antenna: 20 deg, Sample: 345 deg

**Sweep Settings** **Screen A**

|                  |               |                  |                     |
|------------------|---------------|------------------|---------------------|
| Center Frequency | 13.559755 MHz | Ref Level        | 73.000 dB $\mu$ V/m |
| Frequency Offset | 0.000000 Hz   | Ref Level Offset | 0.000 dB            |
| Span             | 50.000000 kHz | Ref Position     | 100.000 %           |
| Start Frequency  | 13.534755 MHz | Level Range      | 80.000 dB           |
| Stop Frequency   | 13.584755 MHz | RF Att           | 0.000 dB            |
| RBW              | 1.000000 kHz  |                  |                     |
| VBW              | 3.000000 kHz  | X-Axis           | LIN                 |
| Sweep Time       | 50.00 ms      | Y-Axis           | LOG                 |





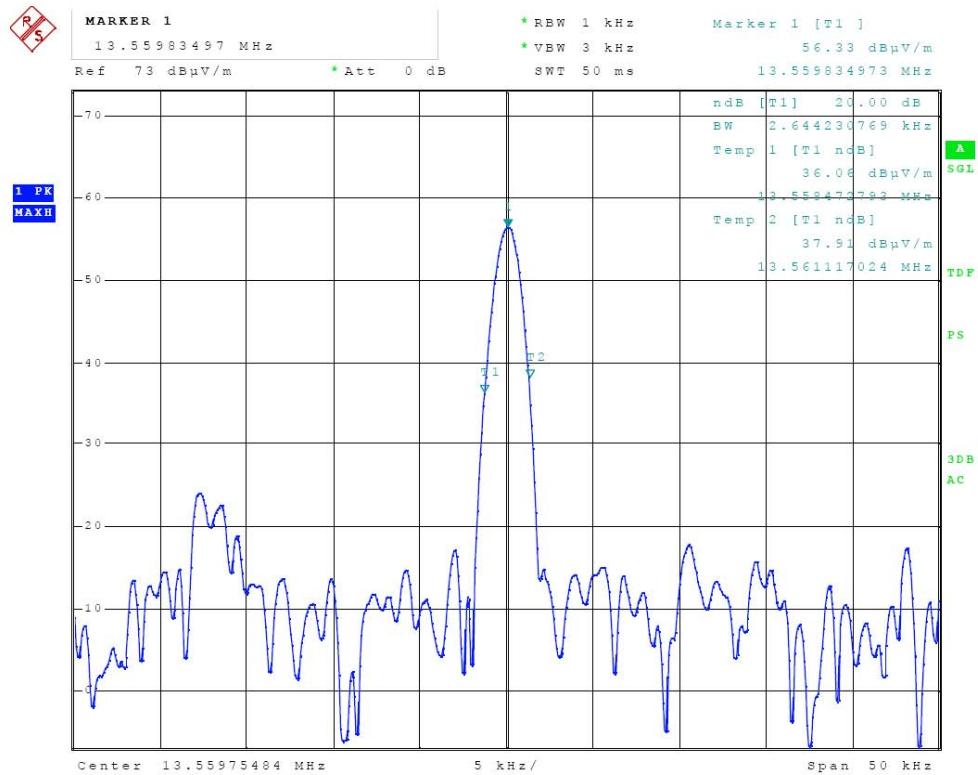
C20151867

30.Sep 15 07:09

**Meas Type** OCCUPIED BANDWIDTH  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** Metra inzeniring d.o.o.  
**OP Condition** Reading a card  
**Operator** Andrej Skof  
**Test Spec**  
 Antenna: 20 deg, Sample: 345 deg

**Sweep Settings** **Screen A**

|                  |               |                  |                     |
|------------------|---------------|------------------|---------------------|
| Center Frequency | 13.559755 MHz | Ref Level        | 73.000 dB $\mu$ V/m |
| Frequency Offset | 0.000000 Hz   | Ref Level Offset | 0.000 dB            |
| Span             | 50.000000 kHz | Ref Position     | 100.000 %           |
| Start Frequency  | 13.534755 MHz | Level Range      | 80.000 dB           |
| Stop Frequency   | 13.584755 MHz | RF Att           | 0.000 dB            |
| RBW              | 1.000000 kHz  |                  |                     |
| VBW              | 3.000000 kHz  | X-Axis           | LIN                 |
| Sweep Time       | 50.00 ms      | Y-Axis           | LOG                 |



| Frequency (MHz) | Permitted frequency band (MHz) | 20 dB bandwidth (kHz) | PASS/FAIL |
|-----------------|--------------------------------|-----------------------|-----------|
| 13.56           | 13.110 – 14.010                | 2.64                  | PASS      |

## 7.4 Spectrum mask (intentional radiator)

### Section 15.225 Operation within the band 13.110 – 14.010 MHz – clause a – clause d

#### 7.4.1 Test instruments

| Description & Manufacturer                       | Model No. | SIQ No. | Last calibration | Calibrated until | Calibration period | Used |
|--|-----------|---------|------------------|------------------|--------------------|------|
| ETS, Anechoic chamber                            | 3m        | 103949  | 2014-11          | 2016-11          | 24 months          | X    |
| Rohde-Schwarz, RFI receiver                      | ESU26     | 106897  | 2015-12          | 2017-12          | 24 months          | X    |
| EMCO, Antenna                                    | 3142B     | 06/068  | 2015-09          | 2017-09          | 24 months          |      |
| Rohde & Schwarz, Active loop antenna             | HFH2-Z2   | /       | 2015-09          | 2017-09          | 24 months          | X    |
| Heinrich Deisel, Turn table                      | DS 420.00 | 103337  | NA               | NA               | NA                 | X    |
| ETS, Antenna tower                               | /         | /       | NA               | NA               | NA                 | X    |
| ETS, Controller for turn table and antenna tower | /         | /       | NA               | NA               | NA                 | X    |

#### 7.4.2 Test procedure

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground in an Anechoic Chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 m away from the interference-receiving antenna.
3. Frequencies with maximum emission were retested on OATS.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.

### 7.4.3 Test results (15.225)

Device passed the requirements stated in ANSI C63.4, FCC Part 15, Subpart C.



C20151867

30.Sep 15 07:14

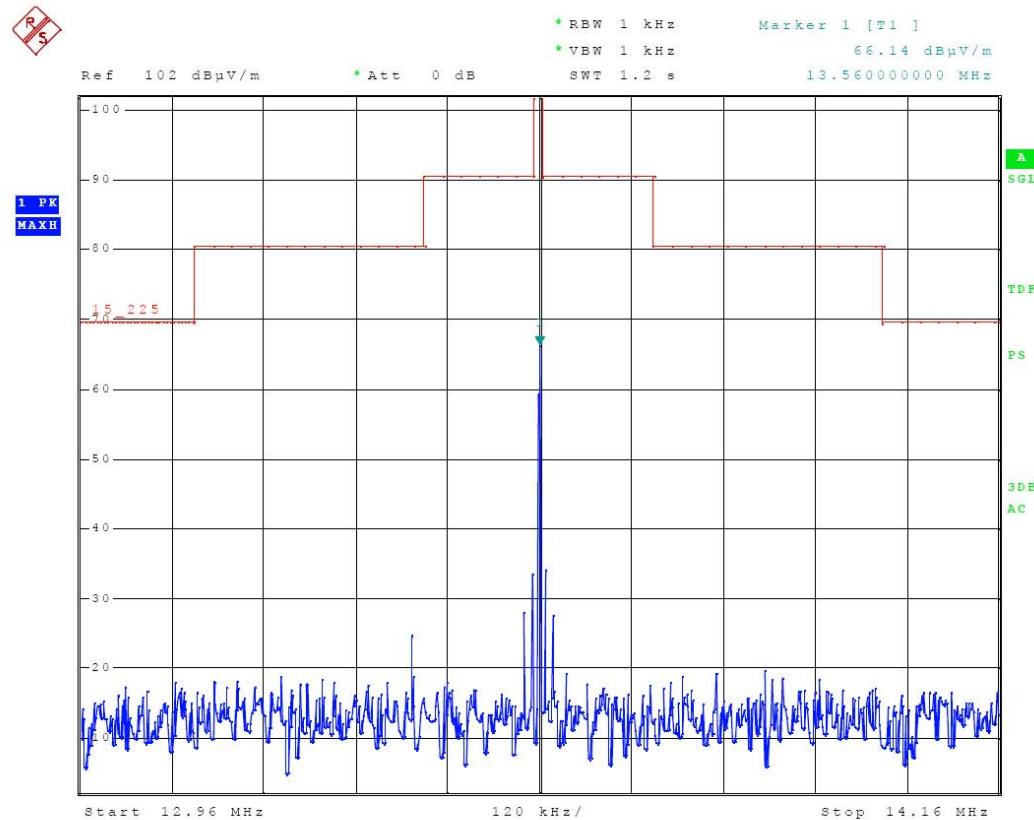
**Meas Type** SPECTRUM MASK  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** Metra inzeniring d.o.o.  
**OP Condition** Waiting a card  
**Operator** Andrej Skof

**Test Spec**

Antenna: 20 deg, Sample: 345 deg

**Sweep Settings** **Screen A**

|                  |               |                  |                      |
|------------------|---------------|------------------|----------------------|
| Center Frequency | 13.560000 MHz | Ref Level        | 102.000 dB $\mu$ V/m |
| Frequency Offset | 0.000000 Hz   | Ref Level Offset | 0.000 dB             |
| Span             | 1.200000 MHz  | Ref Position     | 100.000 %            |
| Start Frequency  | 12.960000 MHz | Level Range      | 100.000 dB           |
| Stop Frequency   | 14.160000 MHz | RF Att           | 0.000 dB             |
| RBW              | 1.000000 kHz  | X-Axis           | LIN                  |
| VBW              | 1.000000 kHz  | Y-Axis           | LOG                  |
| Sweep Time       | 1.20 s        |                  |                      |



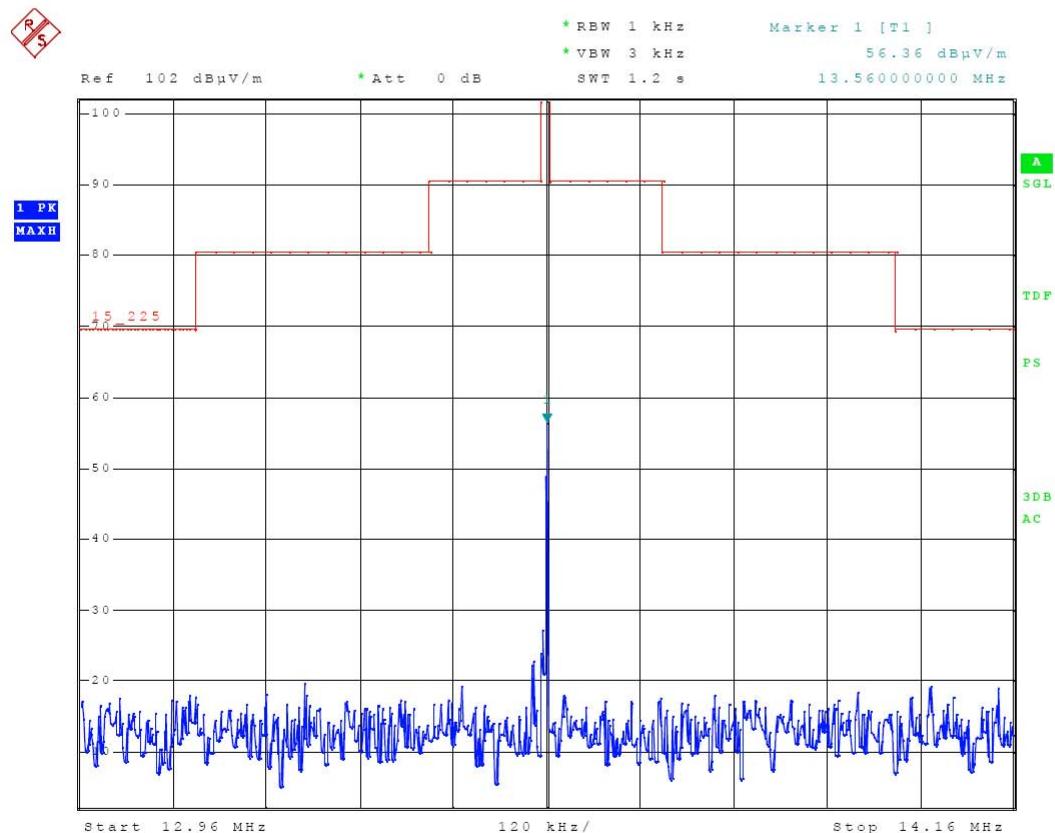
**C20151867**

30.Sep 15 07:11

**Meas Type** SPECTRUM MASK  
**Equipment under Test** Electronic Lock RFID ISO ST  
**Manufacturer** Metra inzeniring d.o.o.  
**OP Condition** Reading a card  
**Operator** Andrej Skof  
**Test Spec**  
Antenna: 20 deg, Sample: 345 deg

**Sweep Settings** **Screen A**

|                  |               |                  |                      |
|------------------|---------------|------------------|----------------------|
| Center Frequency | 13.560000 MHz | Ref Level        | 102.000 dB $\mu$ V/m |
| Frequency Offset | 0.000000 Hz   | Ref Level Offset | 0.000 dB             |
| Span             | 1.200000 MHz  | Ref Position     | 100.000 %            |
| Start Frequency  | 12.960000 MHz | Level Range      | 100.000 dB           |
| Stop Frequency   | 14.160000 MHz | RF Att           | 0.000 dB             |
| RBW              | 1.000000 kHz  | X-Axis           | LIN                  |
| VBW              | 3.000000 kHz  | Y-Axis           | LOG                  |
| Sweep Time       | 1.20 s        |                  |                      |



## 7.5 Frequency tolerance of the carrier signal

### Section 15.225 Operation within the band 13.110 – 14.010 MHz

#### 7.5.1 Test instruments:

| Description & Manufacturer           | Model No. | SIQ No. | Last calibration | Calibrated until | Calibration period | Used |
|--------------------------------------|-----------|---------|------------------|------------------|--------------------|------|
| Rohde-Schwarz, RFI receiver          | ESU8      | 105187  | 2015-11          | 2017-11          | 24 months          | X    |
| Rohde & Schwarz, Active loop antenna | HFH2-Z2   | /       | 2015-09          | 2017-09          | 24 months          | X    |
| Fluke, Digital Multimeter            | 179       | 106728  | 2015-07          | 2016-07          | 12 months          | X    |
| Kambič, Temperature chamber          | I-190 CK  | 107298  | Na               | Na               | /                  | X    |

#### 7.5.2 Test requirements:

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

### 7.5.3 Test results (15.225)

Device passed the requirements stated in ANSI C63.4, FCC Part 15, Subpart C.

| Temperature (°C) | Supply voltage (V) | Minutes after switch on | Measured Frequency (MHz) | Allowed tolerance | Measured tolerance (kHz) | RESULT |
|------------------|--------------------|-------------------------|--------------------------|-------------------|--------------------------|--------|
| 50               | 12,00              | 0                       | 13,559783000             | Fref±1.356 kHz    | -0,043                   | PASS   |
|                  | 12,00              | 2                       | 13,559783000             | Fref±1.356 kHz    | -0,043                   | PASS   |
|                  | 12,00              | 5                       | 13,559768000             | Fref±1.356 kHz    | -0,058                   | PASS   |
|                  | 12,00              | 10                      | 13,559768000             | Fref±1.356 kHz    | -0,058                   | PASS   |
| 40               | 12,00              | 0                       | 13,559812000             | Fref±1.356 kHz    | -0,014                   | PASS   |
|                  | 12,00              | 2                       | 13,559797000             | Fref±1.356 kHz    | -0,029                   | PASS   |
|                  | 12,00              | 5                       | 13,559797000             | Fref±1.356 kHz    | -0,029                   | PASS   |
|                  | 12,00              | 10                      | 13,559783000             | Fref±1.356 kHz    | -0,043                   | PASS   |
| 30               | 12,00              | 0                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 12,00              | 2                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 12,00              | 5                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 12,00              | 10                      | 13,559812000             | Fref±1.356 kHz    | -0,014                   | PASS   |
| 20               | 10,20              | 0                       | 13,559841000             | Fref±1.356 kHz    | 0,015                    | PASS   |
|                  | 10,20              | 2                       | 13,559841000             | Fref±1.356 kHz    | 0,015                    | PASS   |
|                  | 10,20              | 5                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 10,20              | 10                      | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
| 20               | 12,00              | 0                       | 13,559841000             | Fref±1.356 kHz    | 0,015                    | PASS   |
|                  | 12,00              | 2                       | 13,559841000             | Fref±1.356 kHz    | 0,015                    | PASS   |
|                  | 12,00              | 5                       | 13,559841000             | Fref±1.356 kHz    | 0,015                    | PASS   |
|                  | 12,00              | 10                      | <b>13,559826000</b>      | <b>Fref</b>       | 0,000                    | PASS   |
| 20               | 13,80              | 0                       | 13,559841000             | Fref±1.356 kHz    | 0,015                    | PASS   |
|                  | 13,80              | 2                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 13,80              | 5                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 13,80              | 10                      | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
| 10               | 12,00              | 0                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 12,00              | 2                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 12,00              | 5                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 12,00              | 10                      | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
| 0                | 12,00              | 0                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 12,00              | 2                       | 13,559841000             | Fref±1.356 kHz    | 0,015                    | PASS   |
|                  | 12,00              | 5                       | 13,559841000             | Fref±1.356 kHz    | 0,015                    | PASS   |
|                  | 12,00              | 10                      | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
| -10              | 12,00              | 0                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 12,00              | 2                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 12,00              | 5                       | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
|                  | 12,00              | 10                      | 13,559826000             | Fref±1.356 kHz    | 0,000                    | PASS   |
| -20              | 12,00              | 0                       | 13,559738064             | Fref±1.356 kHz    | -0,088                   | PASS   |
|                  | 12,00              | 2                       | 13,559781333             | Fref±1.356 kHz    | -0,045                   | PASS   |
|                  | 12,00              | 5                       | 13,559790949             | Fref±1.356 kHz    | -0,035                   | PASS   |
|                  | 12,00              | 10                      | 13,559790949             | Fref±1.356 kHz    | -0,035                   | PASS   |