







## **TEST REPORT**

Test report no.: 1-7669/14-01-05-A



#### **Testing laboratory**

#### **CETECOM ICT Services GmbH**

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#### **Accredited Testing Laboratory:**

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the

Deutsche Akkreditierungsstelle GmbH (DAkkS)

The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with

the registration number: D-PL-12076-01-00

## **Applicant**

#### **Mobotix AG**

Kaiserstraße

67722 Langmeil / GERMANY
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#### **Manufacturer**

#### **Mobotix AG**

Kaiserstraße

67722 Langmeil / GERMANY

#### Test standard/s

47 CFR Part 15 Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency

devices

RSS - 210 Issue 8 Spectrum Management and Telecommunications Radio Standards Specification -

Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

For further applied test standards please refer to section 3 of this test report.

**Test Item** 

Kind of test item:

Model name:

MX-Display

MX-Display

YYRDISPA

IC:

9357A-DISPA

Frequency:

13.56 MHz

Technology tested:

RFID

Antenna: Integrated loop coil antenna

Power supply: 48.0V DC by POE
Temperature range: -30°C to +50°C



This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

| Test report authorised:          | Test performed:                   |
|----------------------------------|-----------------------------------|
|                                  |                                   |
| Andreas Luckenbill<br>Specialist | Tobias Wittenmeier<br>Experienced |
| Radio Communications & EMC       | Radio Communications & EMC        |



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#### 2 General information

#### 2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

#### 2.2 Application details

Date of receipt of order: 2014-02-26
Date of receipt of test item: 2014-08-11
Start of test: 2014-08-28
End of test: 2014-08-28

Person(s) present during the test: -/-

#### 3 Test standard/s

| Test standard     | Date       | Test standard description   |
|-------------------|------------|---|
| 47 CFR Part 15    | -/-        | Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices   |
| RSS - 210 Issue 8 | 01.12.2010 | Spectrum Management and Telecommunications Radio<br>Standards Specification - Licence-exempt Radio Apparatus (All<br>Frequency Bands): Category I Equipment |



#### 4 Test environment

 $T_{nom}$  +22 °C during room temperature tests Temperature: +50 °C during high temperature tests

T<sub>min</sub> -30 °C during low temperature tests

Relative humidity content: 55 %

Barometric pressure: not relevant for this kind of testing

V<sub>nom</sub> 48.0 V DC by POE

Power supply:  $V_{max}$  60 V

 $V_{min}$  24 V

#### 5 Test item

| Vind of toot item          |   | Diamley                      |
|----------------------------|---|------------------------------|
| Kind of test item          | : | Display                      |
| Type identification        | : | MX-Display                   |
|                            |   |                              |
| S/N serial number          | : | 10.7.2.131                   |
| HW hardware status         | : | 1V4                          |
| SW software status         | : | 0.0.4.20                     |
| Frequency band [MHz]       | : | 13.56 MHz                    |
| Type of radio transmission | : | aingle covies                |
| Use of frequency spectrum  | : | single carrier               |
| Type of modulation         | : | ASK                          |
| Number of channels         | : | 1                            |
| Antenna                    | : | Integrated loop coil antenna |
| Power supply               | : | 48.0 V DC by POE             |
| Temperature range          | : | -30°C to +50°C               |

### 5.1 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup- and EUT-photos are included in test report: 1-7669/14-01-01\_AnnexA

1-7669/14-01-01\_AnnexB 1-7669/14-01-01\_AnnexD

### 6 Test laboratories sub-contracted

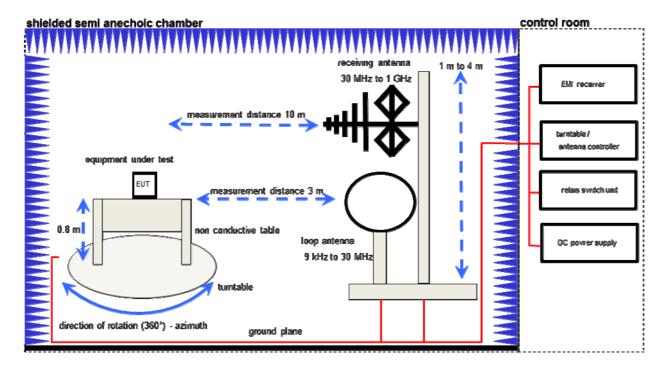
None



### 7 Description of the test setup

### 7.1 Radiated measurements

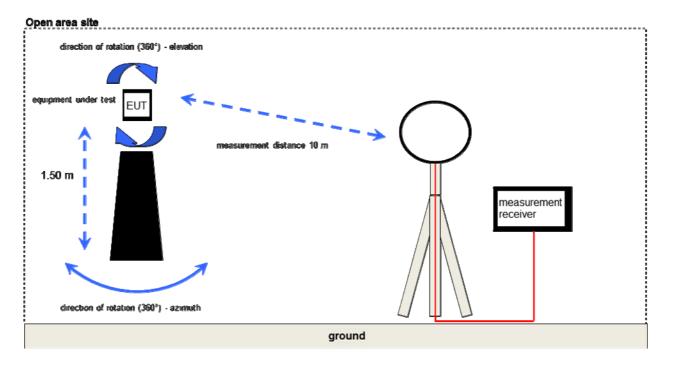
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



| Equipment  | Туре                 | Manufacturer  | Serial No.    | INV. No Cetecom |
|--|----------------------|---------------|---------------|-----------------|
| Software   | EMC32<br>V.  9.12.05 | R&S           | -/-           | -/-             |
| Switch-Unit  | 3488A                | HP Meßtechnik | 2719A14505    | 300000368       |
| DC power supply, 60Vdc,<br>50A, 1200 W               | 6032A                | HP Meßtechnik | 2920A04466    | 300000580       |
| EMI Test Receiver                                    | ESCI 3               | R&S           | 100083        | 300003312       |
| Amplifier  | JS42-00502650-28-5A  | MITEQ         | 1084532       | 300003379       |
| Antenna Tower  | Model 2175           | ETS-LINDGREN  | 64762         | 300003745       |
| Positioning Controller                               | Model 2090           | ETS-LINDGREN  | 64672         | 300003746       |
| Turntable Interface-Box                              | Model 105637         | ETS-LINDGREN  | 44583         | 300003747       |
| TRILOG Broadband Test-<br>Antenna 30 MHz - 3 GHz     | VULB9163             | Schwarzbeck   | 295 300003787 |                 |
| Test Receiver  | ESH2                 | R&S           | 871921/095    | 300002505       |
| Loop Antenna 9 KHz - 30<br>MHz                       | HFH2-Z2              | R&S           | 872096/61     | 300001824       |
| EMI Test Receiver 9 kHz - 3<br>GHz incl. Preselector | ESPI3                | R&S           | 101713        | 300004059       |



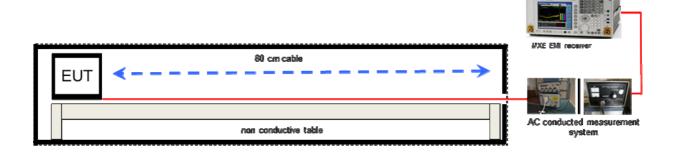
# 7.2 Open area site



| Equipment                      | Туре    | Manufacturer | Serial No. | INV. No Cetecom |
|--------------------------------|---------|--------------|------------|-----------------|
| Test Receiver                  | ESH2    | R&S          | 871921/095 | 300002505       |
| Loop Antenna 9 KHz - 30<br>MHz | HFH2-Z2 | R&S          | 872096/61  | 300001824       |



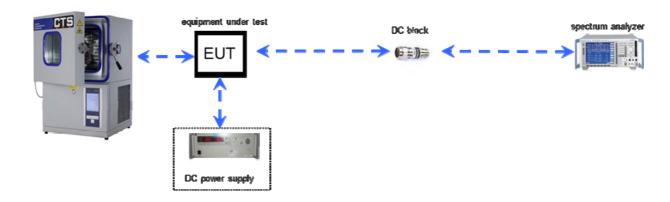
## 7.3 AC conducted



| Equipment                              | Туре                              | Manufacturer         | Serial No. | INV. No Cetecom |  |
|--|-----------------------------------|----------------------|------------|-----------------|--|
| MXE EMI Receiver 20 Hz<br>bis 26,5 GHz | N9038A                            | Agilent Technologies | MY51210197 | 300004405       |  |
| Isolating Transformer                  | MPL IEC625 Bus<br>Regeltrenntravo | Erfi                 | 91350      | 300001155       |  |
| Switch / Control Unit                  | 3488A                             | HP Meßtechnik        | *          | 300000199       |  |
| Switch / Control Unit                  | 3488A                             | HP Meßtechnik        | 2719A15013 | 300001168       |  |
| Artificial Mains 9 kHz to 30 MHz       | ESH3-Z5                           | R&S                  | 828576/020 | 300001210       |  |



## 7.4 Conducted measurements



| Equipment                        | Туре    | Manufacturer | Serial No. | INV. No Cetecom |  |
|----------------------------------|---------|--------------|------------|-----------------|--|
| DC Power Supply 0 – 32V          | 1108-32 | Heiden       | 001802     | 300001383       |  |
| Temperature Test Chamber         | T-40/50 | CTS GmbH     | 064023     | 300003540       |  |
| Spectrum Analyzer 20 Hz - 50 GHz | FSU50   | R&S          | 200012     | 300003443       |  |



# 8 Summary of measurement results

| No deviations from the technical specifications were ascertained    |
|---|
| There were deviations from the technical specifications ascertained |

| TC Identifier | Description                                | Verdict | Date       | Remark |
|---------------|--|---------|------------|--------|
| RF-Testing    | CFR Part 15<br>RSS 210, Issue 8, Annex 2.6 | Passed  | 2014-11-12 | -/-    |

| Test<br>Specification<br>Clause               | Test Case  | Temperature Conditions | Power<br>Source<br>Voltages | Pass        | Fail | NA | NP | Remark   |
|---|--|------------------------|-----------------------------|-------------|------|----|----|----------|
| § 15.35 (c)/<br>RSS-GEN Issue 3               | Timing of the transmitter (Duty cycle correction factor) | Nominal                | Nominal                     | $\boxtimes$ |      |    |    | complies |
| RSS-GEN Issue 3                               | 99 % emission<br>bandwidth                               | Nominal                | Nominal                     |             |      |    |    | complies |
| § 15.225 (a)/<br>RSS-210 Issue 8<br>Annex 2.6 | Fieldstrength of<br>Fundamental                          | Nominal                | Nominal                     | $\boxtimes$ |      |    |    | complies |
| § 15.209/<br>RSS-210 Issue 8<br>Annex 2.6     | Fieldstrength of harmonics and spurious                  | Nominal                | Nominal                     | $\boxtimes$ |      |    |    | complies |
| § 15.225 (e)/                                 | Fraguency telerones                                      | Nominal                | Extreme                     | $\boxtimes$ |      |    |    | complice |
| RSS-210 Issue 8<br>Annex 2.6                  | Frequency tolerance                                      | Extreme                | Nominal                     |             |      |    |    | complies |
| §15.107<br>§15.207                            | Conducted emissions<br>< 30 MHz                          | Nominal                | Nominal                     |             |      |    |    | complies |

Note: NA = Not Applicable; NP = Not Performed



## 9 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None



#### 10 Measurement results

### 10.1 Timing of the transmitter

#### **Measurement:**

| Measurement parameter |               |  |  |
|-----------------------|---------------|--|--|
| Detector:             | Positive peak |  |  |
| Sweep time:           | 100 ms        |  |  |
| Resolution bandwidth: | 100 kHz       |  |  |
| Video bandwidth:      | 300 kHz       |  |  |
| Span:                 | Zero span     |  |  |
| Trace-Mode:           | Single sweep  |  |  |

#### Limits:

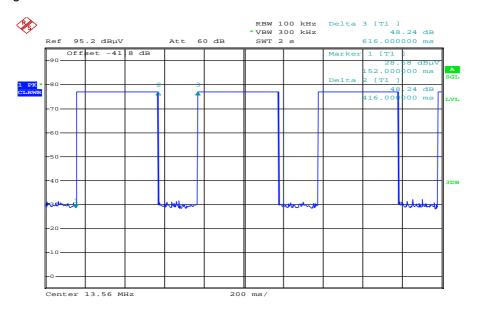
| FCC                       | IC |  |  |  |
|---------------------------|----|--|--|--|
| Timing of the transmitter |    |  |  |  |

(c) Unless otherwise specified, e.g. Section 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.



### Result:

Plot 1: Timing of the Transmitter



Date: 28.AUG.2014 14:25:08

Transmit time (Tx on) = 416 ms (Plot 1) Tx on + Tx off = 616 ms (Plot 1)

The peak-to-average correction factor is calculated with 20Log [Tx on/(Tx on + Tx off)]. Hereby the peak-to-average correction factor is -3.4 dB.

**Result:** passed



# 10.2 Field strength of the fundamental

## **Measurement:**

| Measurement parameter |   |  |  |
|-----------------------|---|--|--|
| Detector: Quasi Peak  |   |  |  |
| Resolution bandwidth: | 200 Hz up to 150 kHz,<br>9 kHz up to 30 MHz,<br>120 kHz up to 1 GHz |  |  |
| Video bandwidth:      | ≥ RBW   |  |  |
| Trace-Mode:           | Max Hold  |  |  |

## Limits:

| FCC                         |   | IC         |   |
|-----------------------------|---|------------|---|
| Fundamental Frequency (MHz) | Field strength of Fundamental (μV/m / dΒμV/m) |            | Measurement distance (m)                          |
|                             | 15848 μV/m (                                  | 84 dBµV/m) | 30  |
| 13.553 to 13.567            | 158489<br>(104 dB                             | •          | 10<br>(Recalculated acc. to FCC<br>part15.31 (f2) |

## Result:

| TEST CO                 | NDITIONS         | MAXIMUM POV | VER (dBμV/m)    |
|-------------------------|------------------|-------------|-----------------|
| Frequ                   | uency            | 13.56 MHz   | 13.56 MHz       |
| Mo                      | Mode             |             | @ 30 m distance |
| T <sub>nom</sub>        | V <sub>nom</sub> | 69.1        | 29.1*           |
| Measurement uncertainty |                  | ±30         | dB              |

<sup>\*</sup> Limits recalculated from 10m to 30m with 40 dB/decade according to FCC 15.31 (f2).

Result: passed



## 10.3 99 % emission bandwidth

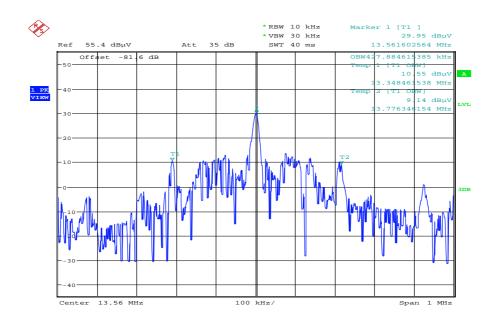
## **Measurement:**

| Measurement parameter |            |  |
|-----------------------|------------|--|
| Detector:             | Peak       |  |
| Resolution bandwidth: | > 1 % span |  |
| Video bandwidth:      | ≥ RBW      |  |
| Trace-Mode:           | Max Hold   |  |

## Results:

| TEST CONDITIONS         |                  | 99 % emission bandwidth (kHz) |
|-------------------------|------------------|-------------------------------|
| Frequency               |                  | 13.56 MHz                     |
| T <sub>nom</sub>        | V <sub>nom</sub> | 427.88                        |
| Measurement uncertainty |                  | ± RBW                         |

### Plot:



Date: 28.AUG.2014 09:13:51



## 10.4 Field strength of the harmonics and spurious

### **Measurement:**

| Measurement parameter |  |  |  |
|-----------------------|--|--|--|
| Detector:             | Quasi Peak / Average   |  |  |
| Sweep time:           | Auto   |  |  |
| Resolution bandwidth: | F < 150 kHz: 200 Hz<br>150 kHz > F > 30 MHz: 9 kHz<br>F > 30 MHz: 120 kHz  |  |  |
| Video bandwidth:      | F < 150 kHz: 1 kHz<br>150 kHz > F > 30 MHz: 100 kHz<br>F > 30 MHz: 300 kHz |  |  |
| Span:                 | See plots!   |  |  |
| Trace-Mode:           | Max hold   |  |  |

## **Limits:**

| FCC                     |                   |                  | IC                       |
|-------------------------|-------------------|------------------|--------------------------|
| Field strength of the h |                   | ermonics and spu | irious.                  |
| Frequency (MHz)         | Field streng      | jth (μV/m)       | Measurement distance (m) |
| 0.009 - 0.490           | 2400/F            | (kHz)            | 300                      |
| 0.490 - 1.705           | 24000/F           | (kHz)            | 30                       |
| 1.705 – 30              | 30 (29.5 c        | lBμV/m)          | 30                       |
| 30 – 88                 | 100 (40 d         | BμV/m)           | 3                        |
| 88 – 216                | 150 (43.5 dBµV/m) |                  | 3                        |
| 216 – 960               | 200 (46 d         | BμV/m)           | 3                        |

### Result:

|            | EMISSION LIMITATIONS    |                                   |                                |         |  |
|------------|-------------------------|-----------------------------------|--------------------------------|---------|--|
| f<br>[MHz] | Detector                | Limit<br>max. allowed<br>[dBµV/m] | Amplitude of emission [dBμV/m] | Results |  |
|            | See 30 MHz – 1 GHz plot |                                   |                                |         |  |
|            |                         |                                   |                                |         |  |
|            |                         |                                   |                                |         |  |

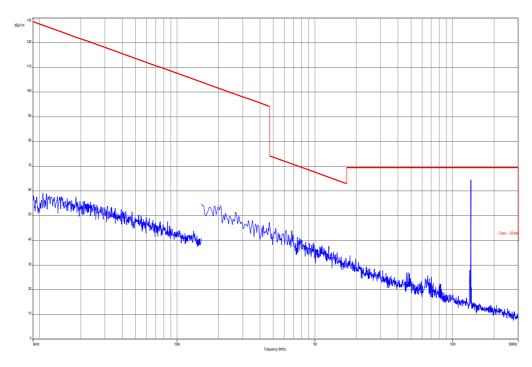
Result: passed

**Note:** The limit was recalculated with 20 dB / decade (Part 15.31) for all radiated spurious emissions 30 MHz to 1 GHz from 3 meter limit to a 10 meter distance. (40dB/decade for emissions < 30MHz)



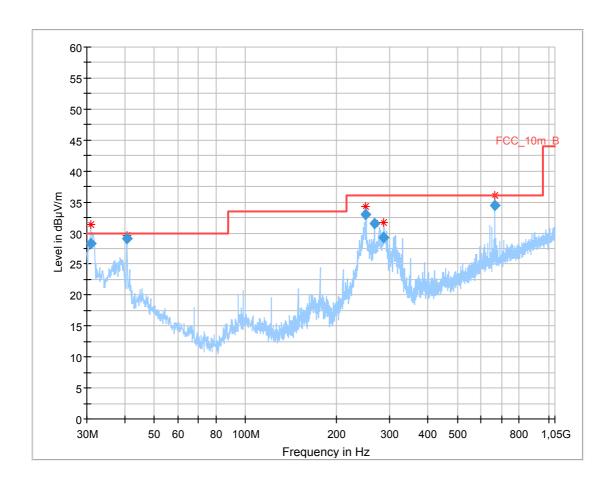
## Plots of the measurements:

**Plot 1:** 9 kHz – 30 MHz





Plot 2: 30 MHz – 1000 MHz, vertical & horizontal polarization

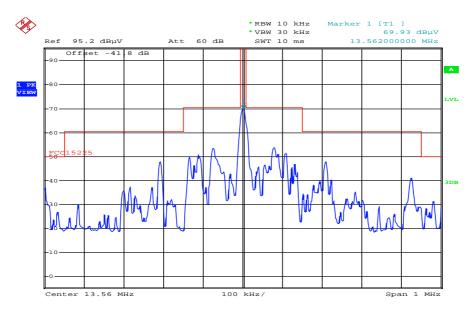


## Final\_Result

| Frequency<br>(MHz) | QuasiPeak<br>(dBµV/m) | Limit<br>(dBµV/m) | Margin<br>(dB) | Meas.<br>Time<br>(ms) | Bandwidth<br>(kHz) | Height<br>(cm) | Pol | Azimuth<br>(deg) | Corr.<br>(dB) |
|--------------------|-----------------------|-------------------|----------------|-----------------------|--------------------|----------------|-----|------------------|---------------|
| 30.959400          | 28.27                 | 30.00             | 1.73           | 1000.0                | 120.000            | 103.0          | ٧   | -5               | 13.4          |
| 40.667700          | 29.11                 | 30.00             | 0.89           | 1000.0                | 120.000            | 98.0           | ٧   | 95               | 14.0          |
| 249.995400         | 32.97                 | 36.00             | 3.03           | 1000.0                | 120.000            | 98.0           | ٧   | 81               | 13.3          |
| 266.018400         | 31.58                 | 36.00             | 4.42           | 1000.0                | 120.000            | 101.0          | ٧   | 85               | 13.7          |
| 286.631400         | 29.31                 | 36.00             | 6.69           | 1000.0                | 120.000            | 275.0          | Н   | 261              | 14.2          |
| 664.980450         | 34.52                 | 36.00             | 1.48           | 1000.0                | 120.000            | 103.0          | Н   | 282              | 21.2          |



Plot 3: Spectrum mask



Date: 28.AUG.2014 09:51:03

Limits recalculated from 30 m to 10 m with 40 dB/decade according to FCC 15.31 (f2)



## 10.5 Frequency tolerance

### **Measurement:**

| Measurement parameter |               |  |  |
|-----------------------|---------------|--|--|
| Detector:             | Positive peak |  |  |
| Sweep time:           | Auto          |  |  |
| Resolution bandwidth: | 10 Hz         |  |  |
| Video bandwidth:      | 1 MHz         |  |  |
| Span:                 | 1 kHz         |  |  |
| Trace-Mode:           | Clear – write |  |  |

### **Limits:**

| ECC | IC   |
|-----|------|
| FCC | IC . |

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.

### Result:

| Frequency tolerance        |                    |                        |                        |        |  |
|----------------------------|--------------------|------------------------|------------------------|--------|--|
| Over temperature variation |                    | Over voltage variation |                        |        |  |
|                            | Limit is +/- 1.356 | kHz                    | Limit is +/- 1.356 kHz |        |  |
| T [°C]                     | Frequency<br>[MHz] | Power voltage          | Frequency<br>[MHz]     | result |  |
| -30°                       | 13.560056          | 24V                    | 13.560054              | Pass   |  |
| -20°                       | 13.560076          | 30V                    | 13.560054              | Pass   |  |
| -10°                       | 13.560102          | 35V                    | 13.560054              | Pass   |  |
| 0°                         | 13.560142          | 40V                    | 13.560054              | Pass   |  |
| 10°                        | 13.560152          | 45V                    | 13.560054              | Pass   |  |
| 20°                        | 13.560118          | 50V                    | 13.560054              | Pass   |  |
| 30°                        | 13.560082          | 55V                    | 13.560054              | Pass   |  |
| 40°                        | 13.560052          | 60V                    | 13.560054              | Pass   |  |
| 50°                        | 13.560040          |                        |                        | Pass   |  |
| Measurement uncertainty    |                    | ±100 Hz                |                        |        |  |

Result: passed



## 10.6 AC line conducted

## **Measurement:**

| Measurement parameter |                             |  |  |  |
|-----------------------|-----------------------------|--|--|--|
| Detector:             | Peak / Quasi peak / Average |  |  |  |
| Sweep time:           | Auto                        |  |  |  |
| Resolution bandwidth: | F < 150 kHz: 200 Hz         |  |  |  |
| Resolution bandwidth. | F > 150 kHz: 9 kHz          |  |  |  |
| Video bandwidth:      | F < 150 kHz: 1 kHz          |  |  |  |
| video baridwidtii.    | F > 150 kHz: 100 kHz        |  |  |  |
| Span:                 | 9 kHz to 30 MHz             |  |  |  |
| Trace-Mode:           | Max hold                    |  |  |  |

## Limits:

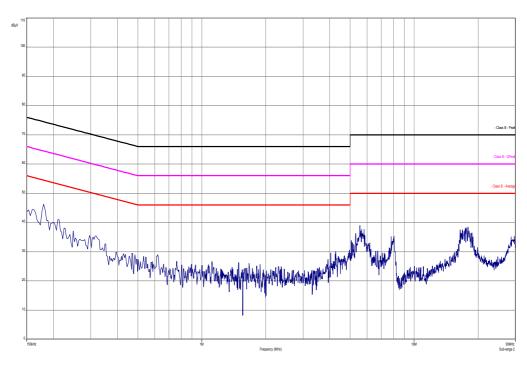
| FCC                         | IC                     |            |  |  |
|-----------------------------|------------------------|------------|--|--|
| Frequency of Emission (MHz) | Conducted Limit (dBµV) |            |  |  |
|                             | Quasi-peak             | Average    |  |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

Result: passed

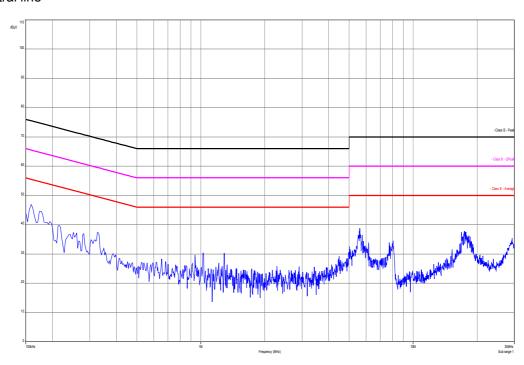


## Plots:

Plot 1: phase line



Plot 2: neutral line





### 11 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

| No. | Lab /<br>Item | Equipment  | Туре                                | Manufact.            | Serial No.             | INV. No<br>Cetecom | Kind of<br>Calibration | Last<br>Calibration | Next<br>Calibration |
|-----|---------------|--|-------------------------------------|----------------------|------------------------|--------------------|------------------------|---------------------|---------------------|
| 1   | ECT-<br>0002  | Temperature and Climatic Test Chamber                    | VUK04/1500                          | Heraeus Voetsch      | 31098                  | 300001507          | g                      | 20.09.2011          |                     |
| 2   | n. a.         | Power Supply   | LA30/5GA                            | Zentro Elektronik    | 2046                   | 300000711          | NK!                    |                     |                     |
| 3   | n. a.         | Spectrum Analyzer<br>20 Hz - 50 GHz                      | FSU50                               | R&S                  | 200012                 | 300003443          | Ve                     | 02.07.2014          | 02.07.2016          |
| 4   | n. a.         | Anechoic chamber   | FAC 3/5m                            | MWB / TDK            | 87400/02               | 300000996          | ev                     |                     |                     |
| 5   | n. a.         | Switch / Control Unit                                    | 3488A                               | HP Meßtechnik        | *                      | 300000199          | ne                     |                     |                     |
| 6   | 9             | Artificial Mains 9 kHz to 30 MHz                         | ESH3-Z5                             | R&S                  | 828576/020             | 300001210          | Ve                     | 30.01.2014          | 30.01.2016          |
| 7   | 9             | Isolating<br>Transformer                                 | MPL IEC625 Bus<br>Regeltrenntravo   | Erfi                 | 91350                  | 300001155          | ne                     |                     |                     |
| 8   | 90            | Active Loop Antenna<br>10 kHz to 30 MHz                  | 6502                                | Kontron Psychotech   | 8905-2342              | 300000256          | k                      | 13.06.2013          | 13.06.2015          |
| 9   | n. a.         | Amplifier  | js42-00502650-28-<br>5a             | Parzich GMBH         | 928979                 | 300003143          | ne                     |                     |                     |
| 10  | n. a.         | Band Reject filter                                       | WRCG1855/1910-<br>1835/1925-40/8SS  | Wainwright           | 7                      | 300003350          | ev                     |                     |                     |
| 11  | n. a.         | Band Reject filter                                       | WRCG2400/2483-<br>2375/2505-50/10SS | Wainwright           | 11                     | 300003351          | ev                     |                     |                     |
| 12  | n. a.         | Highpass Filter  | WHKX7.0/18G-8SS                     | Wainwright           | 18                     | 300003789          | ne                     |                     |                     |
| 13  | n. a.         | MXE EMI Receiver<br>20 Hz bis 26,5 GHz                   | N9038A                              | Agilent Technologies | MY51210197             | 300004405          | k                      | 13.03.2014          | 13.03.2015          |
| 14  | n. a.         | 4U RF Switch<br>Platform                                 | L4491A                              | Agilent Technologies | MY50000037             | 300004509          | ne                     |                     |                     |
| 15  | 45            | Switch-Unit  | 3488A                               | HP Meßtechnik        | 2719A14505             | 300000368          | g                      |                     |                     |
| 16  | n. a.         | software   | SPS_PHE 1.4f                        | Spitzberger & Spieß  | B5981;<br>5D1081;B5979 | 300000210          | ne                     |                     |                     |
| 17  | n. a.         | EMI Test Receiver  | ESCI 3                              | R&S                  | 100083                 | 300003312          | k                      | 27.01.2014          | 27.01.2015          |
| 18  | n. a.         | Analyzer-Reference-<br>System (Harmonics<br>and Flicker) | ARS 16/1                            | SPS                  | A3509 07/0<br>0205     | 300003314          | Ve                     | 11.02.2014          | 14.01.2015          |
| 19  | n. a.         | Amplifier  | JS42-00502650-28-<br>5A             | MITEQ                | 1084532                | 300003379          | ev                     |                     |                     |
| 20  | n. a.         | Antenna Tower  | Model 2175                          | ETS-LINDGREN         | 64762                  | 300003745          | izw                    |                     |                     |
| 21  | n. a.         | Positioning<br>Controller                                | Model 2090                          | ETS-LINDGREN         | 64672                  | 300003746          | izw                    |                     |                     |
| 22  | n. a.         | Turntable Interface-<br>Box                              | Model 105637                        | ETS-LINDGREN         | 44583                  | 300003747          | izw                    |                     |                     |
| 23  | n. a.         | TRILOG Broadband<br>Test-Antenna 30<br>MHz - 3 GHz       | VULB9163                            | Schwarzbeck          | 295                    | 300003787          | k                      | 22.04.2014          | 22.04.2016          |
| 24  | n. a.         | Spectrum-Analyzer  | FSU26                               | R&S                  | 200809                 | 300003874          | k                      | 22.01.2014          | 22.01.2015          |

### Agenda: Kind of Calibration

k calibration / calibrated EK limited calibration
ne not required (k, ev, izw, zw not required) zw cyclical maintenance (external cyclical maintenance)

ev periodic self verification izw internal cyclical maintenance
Ve long-term stability recognized g blocked for accredited testing

vlkl! Attention: extended calibration interval
NK! Attention: not calibrated \*) next calibration ordered / currently in progress



## 12 Observations

No observations except those reported with the single test cases have been made.



## Annex A Document history

| Version | Applied changes             | Date of release |  |
|---------|-----------------------------|-----------------|--|
|         | Initial release             | 2014-09-16      |  |
| -A      | Correction of FCC/IC number | 2014-11-12      |  |

## Annex B Further information

#### **Glossary**

AVG - Average

DUT - Device under test

EMC - Electromagnetic Compatibility

EN - European Standard EUT - Equipment under test

ETSI - European Telecommunications Standard Institute

FCC - Federal Communication Commission

FCC ID - Company Identifier at FCC

HW - Hardware
IC - Industry Canada
Inv. No. - Inventory number
N/A - Not applicable
PP - Positive peak

QP - Quasi peak S/N - Serial number SW - Software



#### Annex C **Accreditation Certificate**

Front side of certificate

Back side of certificate

( DAkkS

Deutsche Akkreditierungsstelle GmbH

Bellehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV Unterzeichnerin der Multilateralen Abkommen von EA, ILAC und IAF zur gegunseitigen Anerkennung

Akkreditierung



Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

**CETECOM ICT Services GmbH** Untertürkheimer Straße 6-10, 66117 Saarbrücken

dir Kampetanz nach DIN EN ISO/IEC 17025;2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

Drahtgebundene Kommunikation einschließlich xDSL VolP und DECT Akustik Akustik

Funk einschließlich WLAN
Short Range Devices (SRD)

RFID

WIMAx und Richtfunk
Mobilfunk (SBM) / DCS, Over the Air (OTA) Performance)
Elektromagnetische Verträglichkeit (EMV) einschließlich Auto
Produktsicherheit

SAR und Hearing Aid Compatibility (HAC)
Umweltsimulation
Smart Card Terminals
Bluetooth

WI-FI- Services

Die Aldreditierungsurkunde gilt nur in Verbindung mit dem Bescheld vom 07.03.2014 mit der Akkreditierungsnurmen D-PI-12076-01 und ist gillig 17.01.2018. Sie besteht aus diesem Deckblatt, de Rückseite des Deckblatts und der folgenden Anlage mit Insgesamt 77 Seiten.

Frankfurt am Main, 07.03.2014

Deutsche Akkreditierungsstelle GmbH

Standort Berlin Spittelmarkt 10 10117 Berlin

Standort Frankfurt am Main Gartenstraße 6 60594 Frankfurt am Main

38116 Braunschweig

Die Akkreditierung erfolgte gemößt der Gesetzes über die Akkreditierungsstelle (AkkfelleG) vom 31. Juli 2009 (BGRI, I.S. 2025) soeie der Veronfrung (GG) Nr. 755/2008 des Europäitschen Parlaments und des Bates vom 9. Juli 2008 über die Verschriften für die Akkreditierung und Marktüberwachung im Zusammenstallung mich der Veranstung von 9. Juli 2008, So. 30. Die DAKS ist Untwerderheitung und Marktüberwachung der European ein der Veranstung von 9. Juli 2008, So. 30. Die DAKS ist Untwerderheitung der Auffaltenban Abkammen um gegenseitigen Anselwennung der European ein geleiche Ausgeber der Julia der International Accreditation Fort m (MJ) und der mehrmional Laberature Aerzeitlation Geographien (ILAC). Die Unterraeither eilbeier Abkammen erkennen ihre Akkreditierungen gegenseitig un.

Der üktue le Stund der Wilgliedschaft kann folgenden Webseiten entnommen werden: FA: www.nuropean-accred fation.org HAC: www.life.org IAR: www.life.org

#### Note:

The current certificate including annex is published on our website (see link below) or may be received from CETECOM ICT Services on request.

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