

**EMI - TEST REPORT**

- FCC Part 15.209 -

**Test Report No. :** T38382-00-00GK

30. September 2014

Date of issue

**Type / Model Name** : MP04016**Product Description** : Terminal Pro 125kHz ASK FSK**Applicant** : Y SOFT Corporation, a.s.

Address : Czech Technology Park, Podnikatelska 2902/4

612 00 BRNO, Czech Republic

**Manufacturer** : Y SOFT Corporation, a.s.

Address : Czech Technology Park, Podnikatelska 2902/4

612 00 BRNO, Czech Republic

**Licence holder** : Y SOFT Corporation, a.s.

Address : Czech Technology Park, Podnikatelska 2902/4

612 00 BRNO, Czech Republic

**Test Result** according to the standards listed in clause 1 test standards:**POSITIVE**

The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test  
results without the written permission of the test

# Contents

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b><u>TEST STANDARDS</u></b>                                      | <b>3</b>  |
| <b>2</b> | <b><u>SUMMARY</u></b>   | <b>4</b>  |
| <b>3</b> | <b><u>EQUIPMENT UNDER TEST</u></b>                                | <b>5</b>  |
| 3.1      | Photo documentation of the EUT – Detailed photos see Attachment A | 5         |
| 3.2      | Power supply system utilised                                      | 5         |
| 3.3      | Short description of the Equipment under Test (EUT)               | 5         |
| <b>4</b> | <b><u>TEST ENVIRONMENT</u></b>                                    | <b>6</b>  |
| 4.1      | Address of the test laboratory                                    | 6         |
| 4.2      | Statement regarding the usage of logos in test reports            | 6         |
| 4.3      | Environmental conditions  | 6         |
| 4.4      | Statement of the measurement uncertainty                          | 6         |
| 4.5      | Measurement Protocol for FCC, VCCI and AUSTEL                     | 7         |
| <b>5</b> | <b><u>TEST CONDITIONS AND RESULTS</u></b>                         | <b>8</b>  |
| 5.1      | Conducted emissions   | 8         |
| 5.2      | Field strength of the fundamental wave                            | 12        |
| 5.3      | Spurious emissions (magnetic field) 9 kHz – 30 MHz                | 14        |
| 5.4      | Emission Bandwidth  | 16        |
| <b>6</b> | <b><u>USED TEST EQUIPMENT AND ACCESSORIES</u></b>                 | <b>18</b> |

## 1 TEST STANDARDS

The tests were performed according to following standards:

### **FCC Rules and Regulations Part 15, Subpart A - General (September, 2013)**

|                                   |   |
|-----------------------------------|---|
| Part 15, Subpart A, Section 15.31 | Measurement standards                         |
| Part 15, Subpart A, Section 15.33 | Frequency range of radiated measurements      |
| Part 15, Subpart A, Section 15.35 | Measurement detector functions and bandwidths |

### **FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (September, 2013)**

|                                    |   |
|------------------------------------|---|
| Part 15, Subpart C, Section 15.203 | Antenna requirement   |
| Part 15, Subpart C, Section 15.204 | External radio frequency power amplifiers and antenna modifications |
| Part 15, Subpart C, Section 15.205 | Restricted bands of operation                                       |
| Part 15, Subpart C, Section 15.209 | Radiated emission limits, general requirements                      |

|                  |   |
|------------------|---|
| ANSI C63.4: 2003 | Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. |
|------------------|---|

|                 |  |
|-----------------|--|
| ANSI C95.1:1992 | IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz |
|-----------------|--|

|                    |                                |
|--------------------|--------------------------------|
| CISPR 16-4-2: 2003 | Uncertainty in EMC measurement |
|--------------------|--------------------------------|

## 2 SUMMARY

### GENERAL REMARKS:

The carrier frequency is 125.0 kHz.

### FINAL ASSESSMENT:

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 24. June 2014

Testing concluded on : 23. July 2014

Checked by:

Tested by:

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Klaus Gegenfurtner  
Teamleader Radio

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Konrad Graßl

### 3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EUT – Detailed photos see Attachment A

### 3.2 Power supply system utilised

Power supply voltage: : 100-240 V AC / 12.0 V DC / 50-60 Hz

### 3.3 Short description of the Equipment under Test (EUT)

The EuT is a card reading terminal for reading of authentication cards..

Number of tested samples: 1

Serial number: See photo documentation of the EuT in Attachment A

#### **EUT operation mode:**

The equipment under test was operated during the measurement under the following conditions:

- Continuous Tx mode at 125 kHz

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#### **EUT configuration:**

**The following peripheral devices and interface cables were connected during the measurements:**

- \_\_\_\_\_ Model : \_\_\_\_\_

- \_\_\_\_\_ Model : \_\_\_\_\_

- \_\_\_\_\_ Model : \_\_\_\_\_

- customer specific cables

- unscreened power cables

## **4 TEST ENVIRONMENT**

### **4.1 Address of the test laboratory**

**CSA Group Bayern GmbH  
Ohmstrasse 1-4  
94342 STRASSKIRCHEN  
GERMANY**

### **4.2 Statement regarding the usage of logos in test reports**

The accreditation and notification body logos displayed in this test report are only valid for standards listed in the accreditation or notification scope of CSA Group Bayern GmbH.

### **4.3 Environmental conditions**

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

### **4.4 Statement of the measurement uncertainty**

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor  $k = 2$ . The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 / 11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

## 4.5 Measurement Protocol for FCC, VCCI and AUSTEL

### 4.5.1 GENERAL INFORMATION

#### 4.5.1.1 Test Methodology

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

#### 4.5.1.2 Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

## **5 TEST CONDITIONS AND RESULTS**

### **5.1 Conducted emissions**

For test instruments and accessories used see section 6 Part A 4.

#### **5.1.1 Description of the test location**

Test location:               Shielded room S2

#### **5.1.2 Photo documentation of the test set-up**



#### **5.1.3 Applicable standard**

According to FCC Part 15, Section 15.207(a):

Except as shown in paragraphs (b) and (c) of this Section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

#### **5.1.4 Description of Measurement**

The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a line impedance stabilization network (LISN) with  $50\Omega/50\ \mu\text{H}$  (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.



**5.1.5 Test result**

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 7.2 dB at 0.426 MHz

| Frequency of Emission<br>(MHz) | Conducted Limit (dB $\mu$ V) |            |
|--------------------------------|------------------------------|------------|
|                                | Quasi-peak                   | Average    |
| 0.15-0.5                       | 66 to 56 *                   | 56 to 46 * |
| 0.5-5                          | 56                           | 46         |
| 5-30                           | 60                           | 50         |

\* Decreases with the logarithm of the frequency

The requirements are **FULFILLED**.**Remarks:** For detailed test result please refer to following test protocols.  

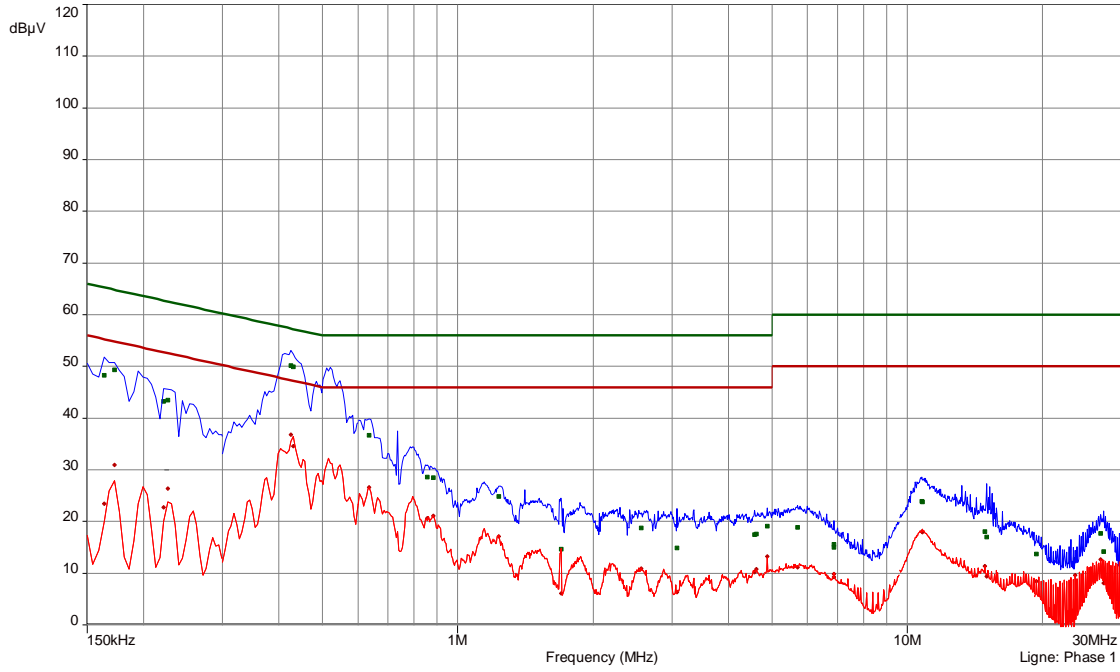
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**5.1.6 Test protocol**

Test point L1  
 Operation mode: Continuous Tx mode at 125 kHz  
 Remarks: 115V / 60Hz

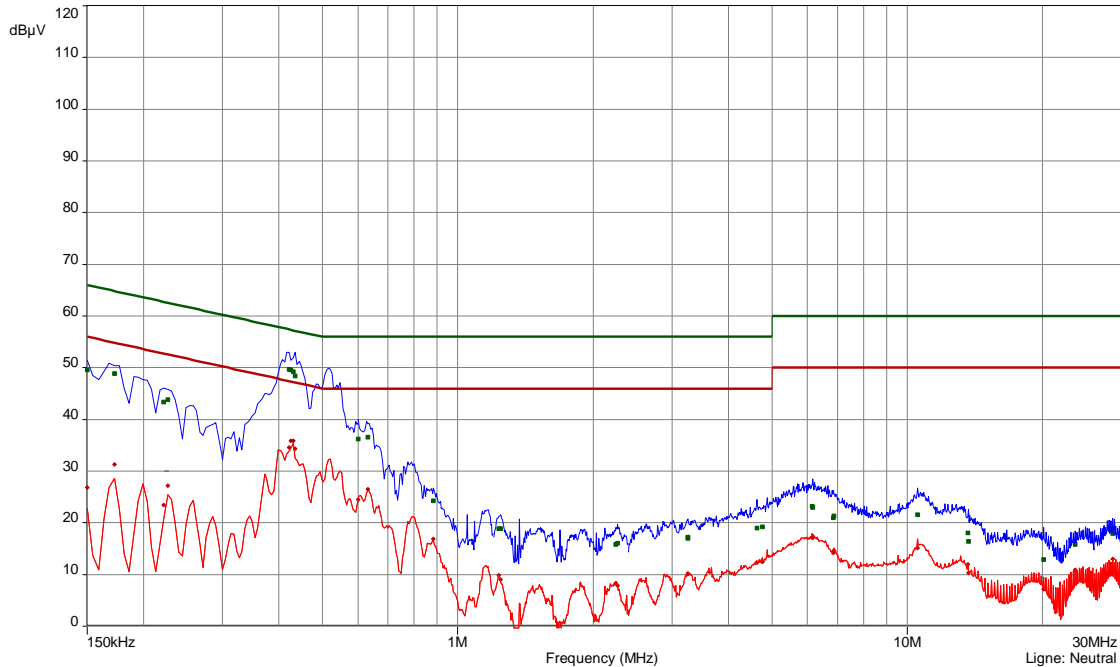
Result: Passed



| freq<br>MHz | SR | QP<br>dB(μV) | margin<br>dB | limit<br>dB | AV<br>dB(μV) | margin<br>dB | limit<br>dB | line    |
|-------------|----|--------------|--------------|-------------|--------------|--------------|-------------|---------|
| 0.1635      | 1  | 48.3         | 16.98        | 65.28       | 23.49        | 31.79        | 55.28       | Phase 1 |
| 0.1725      | 1  | 49.32        | 15.52        | 64.84       | 30.94        | 23.9         | 54.84       | Phase 1 |
| 0.222       | 1  | 43.24        | 19.5         | 62.74       | 22.73        | 30.01        | 52.74       | Phase 1 |
| 0.2265      | 1  | 43.5         | 19.08        | 62.58       | 26.4         | 26.18        | 52.58       | Phase 1 |
| 0.426       | 2  | 50.13        | 7.2          | 57.33       | 36.76        | 10.57        | 47.33       | Phase 1 |
| 0.4305      | 2  | 49.9         | 7.34         | 57.24       | 34.53        | 12.71        | 47.24       | Phase 1 |
| 0.636       | 3  | 36.66        | 19.34        | 56          | 26.6         | 19.4         | 46          | Phase 1 |
| 0.8565      | 3  | 28.63        | 27.37        | 56          | 20.67        | 25.33        | 46          | Phase 1 |
| 0.8835      | 3  | 28.49        | 27.51        | 56          | 21.09        | 24.91        | 46          | Phase 1 |
| 1.236       | 4  | 24.9         | 31.1         | 56          | 17.1         | 28.9         | 46          | Phase 1 |
| 1.6995      | 4  | 14.71        | 41.29        | 56          | 6.08         | 39.92        | 46          | Phase 1 |
| 2.562       | 5  | 18.7         | 37.3         | 56          | 10.96        | 35.04        | 46          | Phase 1 |
| 3.075       | 5  | 14.93        | 41.07        | 56          | 6.36         | 39.64        | 46          | Phase 1 |
| 4.5735      | 5  | 17.45        | 38.55        | 56          | 10.17        | 35.83        | 46          | Phase 1 |
| 4.623       | 5  | 17.61        | 38.39        | 56          | 10.81        | 35.19        | 46          | Phase 1 |
| 4.8855      | 6  | 19.06        | 36.94        | 56          | 13.24        | 32.76        | 46          | Phase 1 |
| 5.7         | 6  | 18.89        | 41.11        | 60          | 11.13        | 38.87        | 50          | Phase 1 |
| 6.87        | 6  | 15.04        | 44.96        | 60          | 9.25         | 40.75        | 50          | Phase 1 |
| 6.8745      | 6  | 15.56        | 44.44        | 60          | 9.8          | 40.2         | 50          | Phase 1 |
| 10.7745     | 7  | 23.86        | 36.14        | 60          | 18.02        | 31.98        | 50          | Phase 1 |
| 10.8105     | 7  | 23.82        | 36.18        | 60          | 17.95        | 32.05        | 50          | Phase 1 |
| 14.874      | 7  | 18.04        | 41.96        | 60          | 11.36        | 38.64        | 50          | Phase 1 |
| 15.0135     | 7  | 16.95        | 43.05        | 60          | 9.35         | 40.65        | 50          | Phase 1 |
| 19.371      | 8  | 13.68        | 46.32        | 60          | 8.41         | 41.59        | 50          | Phase 1 |
| 23.6235     | 8  | 12.68        | 47.32        | 60          | 9.63         | 40.37        | 50          | Phase 1 |
| 26.8725     | 8  | 17.7         | 42.3         | 60          | 12.7         | 37.3         | 50          | Phase 1 |
| 27.3        | 8  | 14.18        | 45.82        | 60          | 8.08         | 41.92        | 50          | Phase 1 |

Test point: N  
 Operation mode: Continuous Tx mode at 125 kHz  
 Remarks: 115 V/60Hz

Result: Passed



| freq<br>MHz | SR | QP<br>dB(µV) | margin<br>dB | limit<br>dB | AV<br>dB(µV) | margin<br>dB | limit<br>dB | line    |
|-------------|----|--------------|--------------|-------------|--------------|--------------|-------------|---------|
| 0.15        | 9  | 49.56        | 16.44        | 66          | 26.79        | 29.21        | 56          | Neutral |
| 0.1725      | 9  | 48.9         | 15.94        | 64.84       | 31.34        | 23.5         | 54.84       | Neutral |
| 0.222       | 9  | 43.42        | 19.32        | 62.74       | 23.47        | 29.27        | 52.74       | Neutral |
| 0.2265      | 9  | 43.78        | 18.8         | 62.58       | 27.21        | 25.37        | 52.58       | Neutral |
| 0.4215      | 10 | 49.71        | 7.71         | 57.42       | 34.55        | 12.87        | 47.42       | Neutral |
| 0.426       | 10 | 49.57        | 7.76         | 57.33       | 35.91        | 11.42        | 47.33       | Neutral |
| 0.4305      | 10 | 49.26        | 7.98         | 57.24       | 35.83        | 11.41        | 47.24       | Neutral |
| 0.435       | 10 | 48.44        | 8.71         | 57.16       | 34.39        | 12.76        | 47.16       | Neutral |
| 0.6         | 11 | 36.21        | 19.79        | 56          | 24.54        | 21.46        | 46          | Neutral |
| 0.6315      | 11 | 36.54        | 19.46        | 56          | 26.49        | 19.51        | 46          | Neutral |
| 0.8835      | 11 | 24.27        | 31.73        | 56          | 16.85        | 29.15        | 46          | Neutral |
| 1.236       | 12 | 18.85        | 37.15        | 56          | 9.88         | 36.12        | 46          | Neutral |
| 1.245       | 12 | 18.93        | 37.07        | 56          | 9.06         | 36.94        | 46          | Neutral |
| 2.244       | 12 | 15.84        | 40.16        | 56          | 8.34         | 37.66        | 46          | Neutral |
| 2.271       | 12 | 16.1         | 39.9         | 56          | 7.91         | 38.09        | 46          | Neutral |
| 3.2505      | 13 | 16.95        | 39.05        | 56          | 10.03        | 35.97        | 46          | Neutral |
| 3.255       | 13 | 17.25        | 38.75        | 56          | 10.15        | 35.85        | 46          | Neutral |
| 4.6275      | 13 | 18.97        | 37.03        | 56          | 12.31        | 33.69        | 46          | Neutral |
| 4.758       | 13 | 19.19        | 36.81        | 56          | 12.49        | 33.51        | 46          | Neutral |
| 6.15        | 14 | 23.2         | 36.8         | 60          | 17.12        | 32.88        | 50          | Neutral |
| 6.1545      | 14 | 23.02        | 36.98        | 60          | 17.17        | 32.83        | 50          | Neutral |
| 6.8565      | 14 | 20.96        | 39.04        | 60          | 14.23        | 35.77        | 50          | Neutral |
| 6.8745      | 14 | 21.29        | 38.71        | 60          | 14.71        | 35.29        | 50          | Neutral |
| 10.5405     | 15 | 21.52        | 38.48        | 60          | 15.15        | 34.85        | 50          | Neutral |
| 13.623      | 15 | 18           | 42           | 60          | 11.97        | 38.03        | 50          | Neutral |
| 13.6905     | 15 | 16.44        | 43.56        | 60          | 10.36        | 39.64        | 50          | Neutral |
| 20.0865     | 16 | 12.88        | 47.12        | 60          | 7.12         | 42.88        | 50          | Neutral |
| 23.6235     | 16 | 15.84        | 44.16        | 60          | 10.87        | 39.13        | 50          | Neutral |
| 28.623      | 16 | 17.9         | 42.1         | 60          | 13.02        | 36.98        | 50          | Neutral |

## 5.2 Field strength of the fundamental wave

For test instruments and accessories used see section 6 Part **CPR 1**.

### 5.2.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

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



### 5.2.1 Applicable standard

According to FCC Part 15C, Section 15.209:

The emissions from intentional radiators shall not exceed the effective field strength limits.

### 5.2.2 Description of Measurement

The spurious emissions of the EUT have to be measured at an open area test site in the frequency range from 9 kHz to 1000 MHz using a tuned EMI receiver. The set up of the equipment under test will be in accordance with ANSI C63.4. The measurement has been performed at 3 m. The results have been compared to the limits defined at 30 m or 300 m distances according to FCC Part 15C, Section 15.31(f)(2) using an inverse linear distance extrapolation factor of 40 dB/decade. The final measurement has been performed with the EMI receiver using Quasi peak detector except for the frequency bands 9 kHz to 90 kHz and 110 to 490 kHz where an average detector will be used, according to Section 15.209(d).

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz

150 kHz – 30 MHz: RBW: 9 kHz

Example:

|                    |                       |   |                |   |                         |   |                         |   |               |
|--------------------|-----------------------|---|----------------|---|-------------------------|---|-------------------------|---|---------------|
| Frequency<br>(MHz) | Level<br>(dB $\mu$ V) | + | Factor<br>(dB) | = | Level<br>dB( $\mu$ V/m) | - | Limit<br>dB( $\mu$ V/m) | = | Delta<br>(dB) |
| 1.705              | 5                     | + | 20             | = | 25                      | - | 30                      | = | -5            |

### 5.2.3 Test result

Measurement distance: 3 m

| Frequency<br>(MHz) | Level PK<br>(dB $\mu$ V) | Level AV<br>(dB $\mu$ V) | Level QP<br>(dB $\mu$ V) | Band-<br>width<br>(kHz) | Correct.<br>factor<br>(dB) | Corrected<br>Level PK<br>dB( $\mu$ V/m) | Corrected<br>Level AV<br>dB( $\mu$ V/m) | Corrected<br>Level QP<br>dB( $\mu$ V/m) | Limit AV<br>dB( $\mu$ V/m) | Delta<br>(dB) |
|--------------------|--------------------------|--------------------------|--------------------------|-------------------------|----------------------------|---|---|---|----------------------------|---------------|
| 0.125              | 69.3                     | 69.2                     | 69.1                     | 0.2                     | 20                         | 89.3                                    | 89.2                                    | 89.1                                    | 105.0                      | -15.8         |

Calculated value at distance: 300 m

| Frequency<br>(MHz) | Level PK<br>(dB $\mu$ V) | Level AV<br>(dB $\mu$ V) | Level QP<br>(dB $\mu$ V) | Band-<br>width<br>(kHz) | Correct.<br>factor<br>(dB) | Corrected<br>Level PK<br>dB( $\mu$ V/m) | Corrected<br>Level AV<br>dB( $\mu$ V/m) | Corrected<br>Level QP<br>dB( $\mu$ V/m) | Limit AV<br>dB( $\mu$ V/m) | Delta<br>(dB) |
|--------------------|--------------------------|--------------------------|--------------------------|-------------------------|----------------------------|---|---|---|----------------------------|---------------|
| 0.125              | -10.7                    | -10.8                    | -10.9                    | 0.2                     | 20                         | 9.3                                     | 9.2                                     | 9.1                                     | 25.0                       | -15.8         |

Limit according to FCC Part 15C, Section 15.209(a):

| Frequency<br>(MHz) | Field strength of fundamental wave<br>( $\mu$ V/m) | Field strength of fundamental wave<br>dB( $\mu$ V/m) | Measurement distance<br>(metres) |
|--------------------|--|--|----------------------------------|
| 0.009-0.490        | 2400/F(kHz)  | --   | 300                              |
| 0.490-1.705        | 24000/F (kHz)                                      | --   | 30                               |
| 1.705-30.0         | 30   | 29.5   | 30                               |

The requirements are **FULFILLED**.

Remarks:

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### 5.3 Spurious emissions (magnetic field) 9 kHz – 30 MHz

For test instruments and accessories used see section 6 Part SER 1.

#### 5.3.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

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





**5.3.3 Applicable standard**

According to FCC Part 15C, Section 15.209:

The emissions from intentional radiators shall not exceed the effective field strength limits.

**5.3.4 Description of Measurement**

The spurious emissions of the EUT have to be measured at an open area test site in the frequency range from 9 kHz to 1000 MHz using a tuned EMI receiver. The set up of the equipment under test will be in accordance with ANSI C63.4. The measurement has been performed at 3 m. The results have been compared to the limits defined at 30 m or 300 m distances according to FCC Part 15C, Section 15.31(f)(2) using an inverse linear distance extrapolation factor of 40 dB/decade. The final measurement has been performed with the EMI receiver using Quasi peak detector except for the frequency bands 9 kHz to 90 kHz and 110 to 490 kHz where an average detector will be used, according to Section 15.209(d).

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz  
 150 kHz – 30 MHz: RBW: 9 kHz

**5.3.5 Test result**

Measurement distance: 3 m

| Frequency (MHz) | Level PK (dB $\mu$ V) | Level AV (dB $\mu$ V) | Level QP (dB $\mu$ V) | Band-width (kHz) | Correct. factor (dB) | Corrected Level PK dB( $\mu$ V/m) | Corrected Level AV dB( $\mu$ V/m) | Corrected Level QP dB( $\mu$ V/m) | Limit AV dB( $\mu$ V/m) | Delta (dB) |
|-----------------|-----------------------|-----------------------|-----------------------|------------------|----------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|------------|
| 0.375           | 35.4                  | 33.3                  | 33.3                  | 9                | 20                   | 55.4                              | 53.3                              | 53.3                              | 95.5                    | -42.2      |

Calculated value at distance: 300m

| Frequency (MHz) | Level PK (dB $\mu$ V) | Level AV (dB $\mu$ V) | Level QP (dB $\mu$ V) | Band-width (kHz) | Correct. factor (dB) | Corrected Level PK dB( $\mu$ V/m) | Corrected Level AV dB( $\mu$ V/m) | Corrected Level QP dB( $\mu$ V/m) | Limit AV dB( $\mu$ V/m) | Delta (dB) |
|-----------------|-----------------------|-----------------------|-----------------------|------------------|----------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|------------|
| 0.375           | -44.6                 | -46.7                 | -46.7                 | 9                | 20                   | -24.6                             | -26.7                             | -26.7                             | 15.5                    | -42.2      |

Values at distance: 30m

| Frequency (MHz) | Level PK (dB $\mu$ V) | Level AV (dB $\mu$ V) | Level QP (dB $\mu$ V) | Band-width (kHz) | Correct. factor (dB) | Corrected Level PK dB( $\mu$ V/m) | Corrected Level AV dB( $\mu$ V/m) | Corrected Level QP dB( $\mu$ V/m) | Limit dB( $\mu$ V/m) | Delta (dB) |
|-----------------|-----------------------|-----------------------|-----------------------|------------------|----------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------|------------|
| 0.49 – 30.0     |                       |                       |                       | 9                | 20                   |                                   |                                   |                                   | 29.5                 | > 40       |

Limit according to FCC Part 15 Subpart 15.209(a):

| Frequency (MHz)    | Field strength of spurious emissions ( $\mu$ V/m) | Field strength of spurious emissions dB( $\mu$ V/m) | Measurement distance (metres) |
|--------------------|---|---|-------------------------------|
| <b>0.009-0.490</b> | <b>2400/F(kHz)</b>                                | --  | <b>300</b>                    |
| 0.490-1.705        | 24000/F (kHz)                                     | --  | 30                            |
| 1.705-30.0         | 30  | 29.5  | 30                            |

The requirements are **FULFILLED**.

**Remarks:** All other unwanted emissions in the frequency range from 9 kHz to 30 MHz were below < -10.5 dB $\mu$ V/m.

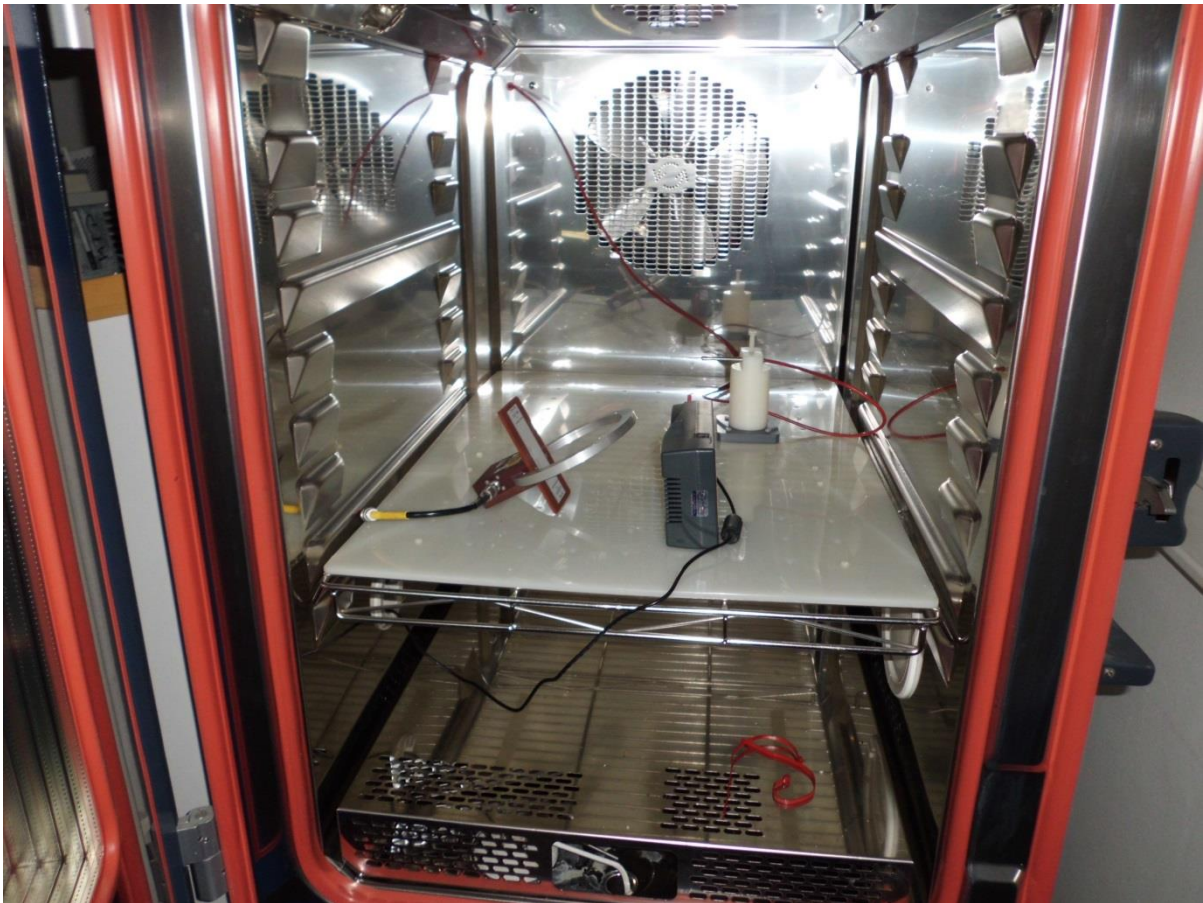
## 5.4 Emission Bandwidth

For test instruments and accessories used see section 6 Part MB.

### 5.4.1 Description of the test location

Test location: AREA4

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

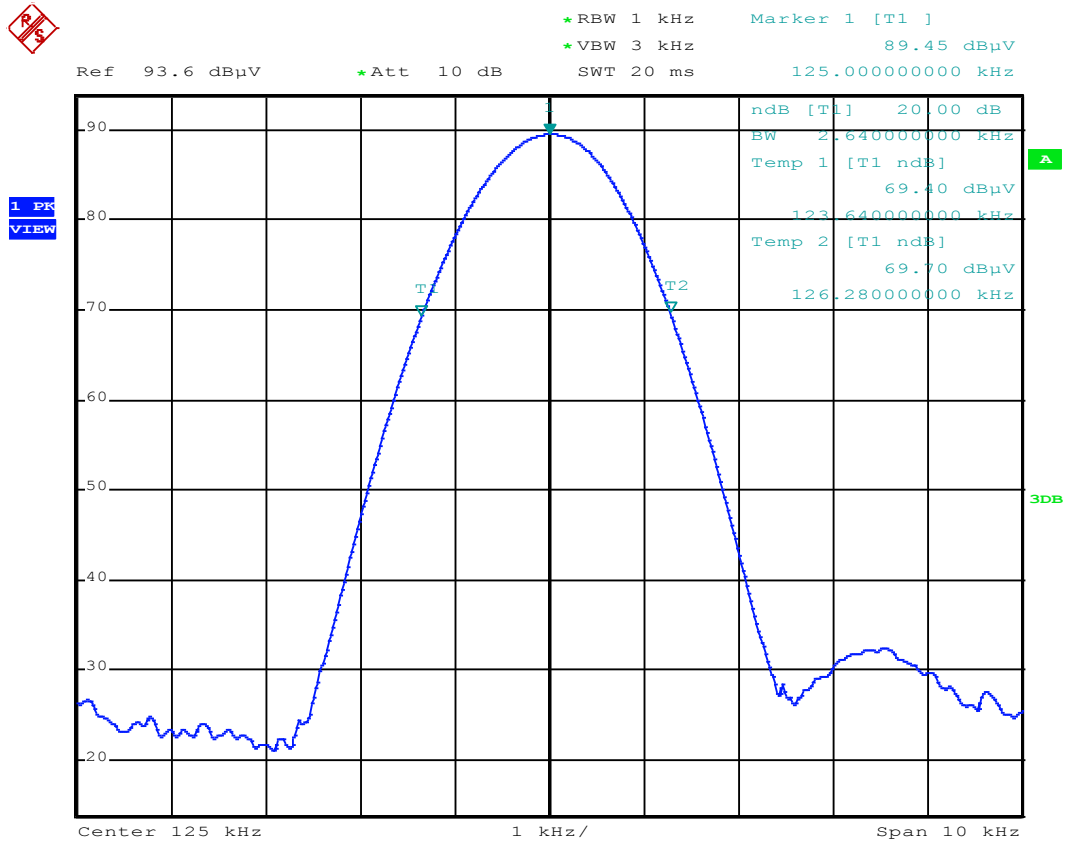


| Fundamental<br>[kHz]<br>See Plot 1 | 20dB<br>Bandwidth<br>F1 | 20dB<br>Bandwidth<br>F2 | Measured<br>Bandwidth<br>[kHz] |
|------------------------------------|-------------------------|-------------------------|--------------------------------|
| 125.00                             | 123.64                  | 126.28                  | 2.64                           |



5.4.3 Test protocol

Emission Bandwidth plots



## **6 USED TEST EQUIPMENT AND ACCESSORIES**

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

| <b>Test ID</b> | <b>Model Type</b> | <b>Kind of Equipment</b> | <b>Equipment No.</b> |
|----------------|-------------------|--------------------------|----------------------|
| A 4            | ESHS 30           | EMI Test Receiver        | 02-02/03-05-002      |
|                | ESH 2 - Z 5       | LISN                     | 02-02/20-05-004      |
|                | N-4000-BNC        | RF Cable                 | 02-02/50-05-138      |
|                | N-1500-N          | RF Cable                 | 02-02/50-05-140      |
|                | ESH 3 - Z 2       | Pulse Limiter            | 02-02/50-05-155      |
| CPR 1          | FMZB 1516         | Magnetic Field Antenna   | 01-02/24-01-018      |
|                | ESCI              | EMI Test Receiver        | 02-02/03-05-005      |
|                | S10162-B          | RF Cable 33 m            | 02-02/50-05-031      |
|                | KK-EF393-21N-16   | RF Cable 20 m            | 02-02/50-05-033      |
|                | NW-2000-NB        | RF Cable                 | 02-02/50-05-113      |
| MB             | FSP 30            | Spectrum Analyser        | 02-02/11-05-001      |
|                | HZ-10             | Magnetic Field Antenna   | 02-02/24-05-012      |
| SER 1          | FMZB 1516         | Magnetic Field Antenna   | 01-02/24-01-018      |
|                | ESCI              | EMI Test Receiver        | 02-02/03-05-005      |
|                | S10162-B          | RF Cable 33 m            | 02-02/50-05-031      |
|                | KK-EF393-21N-16   | RF Cable 20 m            | 02-02/50-05-033      |
|                | NW-2000-NB        | RF Cable                 | 02-02/50-05-113      |

| <b>Test ID</b> | <b>Model Type</b> | <b>Equipment No.</b> | <b>Next Calib.</b> | <b>Last Calib.</b> | <b>Next Verif.</b> | <b>Last Verif.</b> |
|----------------|-------------------|----------------------|--------------------|--------------------|--------------------|--------------------|
| A 4            | ESHS 30           | 02-02/03-05-002      | 17/07/2015         | 17/07/2014         |                    |                    |
|                | ESH 2 - Z 5       | 02-02/20-05-004      | 18/10/2014         | 18/10/2013         | 28/08/2014         | 28/02/2014         |
|                | N-4000-BNC        | 02-02/50-05-138      |                    |                    |                    |                    |
|                | N-1500-N          | 02-02/50-05-140      |                    |                    |                    |                    |
|                | ESH 3 - Z 2       | 02-02/50-05-155      |                    |                    | 10/10/2014         | 10/04/2014         |
| CPR 1          | FMZB 1516         | 01-02/24-01-018      |                    |                    | 13/02/2015         | 13/02/2014         |
|                | ESCI              | 02-02/03-05-005      | 12/12/2014         | 12/12/2013         |                    |                    |
|                | S10162-B          | 02-02/50-05-031      |                    |                    |                    |                    |
|                | KK-EF393-21N-16   | 02-02/50-05-033      |                    |                    |                    |                    |
|                | NW-2000-NB        | 02-02/50-05-113      |                    |                    |                    |                    |
| MB             | FSP 30            | 02-02/11-05-001      | 24/10/2014         | 24/10/2013         |                    |                    |
|                | HZ-10             | 02-02/24-05-012      |                    |                    |                    |                    |
| SER 1          | FMZB 1516         | 01-02/24-01-018      |                    |                    | 13/02/2015         | 13/02/2014         |
|                | ESCI              | 02-02/03-05-005      | 12/12/2014         | 12/12/2013         |                    |                    |
|                | S10162-B          | 02-02/50-05-031      |                    |                    |                    |                    |
|                | KK-EF393-21N-16   | 02-02/50-05-033      |                    |                    |                    |                    |
|                | NW-2000-NB        | 02-02/50-05-113      |                    |                    |                    |                    |