



Bundesnetzagentur

BNetzA-CAB-14/21-09



Deutsche  
Akkreditierungsstelle  
D-PL-11020-03-01

## SGS Germany GmbH

### Test Report No.: K2N10006

**Order No.:** K2N1

**Pages:** 37

**Client:** Océ Printing Systems GmbH & Co. KG  
R&D2 DSED 4

**Equipment Under Test:** S29311-D2626-V11

**Manufacturer / Importer:** Océ Printing Systems GmbH & Co. KG

**Task:** Compliance with the requirements mentioned below:

**Test Specification(s):**  
[covered by accreditation]

- FCC 47 CFR Part 15
- RSS-210 Issue 9

**Result:** The EUT complies with the requirements of the test specifications.

The results relate only to the items tested as described in this test report.

**approved by:**

**Date**

**Signature**

Bauer  
Lab Manager EMC

May 03, 2017

*Josef Bauer*

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This document was signed electronically.

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MEDICAL DEVICE TESTING BATTERY TESTING PRODUCT SAFETY TELECOM CONFORMANCE TESTS

Phone +49 89-787475-100, Fax +49 89-787475-114, Internet [www.sgs-cqe.de](http://www.sgs-cqe.de)

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## 1 Result Summary

The measurements described in this report were conducted pursuant to 47 CFR § 2.947 and § 2.1041 for the US. All applicable paragraphs of the 47 CFR Part 15 of the most current version of the rules were considered.

The measurements described in this report were also conducted pursuant to RSS Gen and RSS-210 for Canada. All applicable paragraphs of the RSS Gen and RSS-210 of the most current version of the rules were considered.

The following test program was performed according to the FCC/IC rules to assess the ability of the tested sample(s) to successfully satisfy the FCC/IC requirements listed in section 2.1 Specification(s) of this test report:

| Test No. | Measurement         | FCC/IC Rules                                                                        | Page Number of this Report | Result           |
|----------|---------------------|-------------------------------------------------------------------------------------|----------------------------|------------------|
| 1        | Conducted Emissions | § 15.207<br>RSS Gen, 8.8                                                            | 17                         | N/A <sup>1</sup> |
| 2        | Occupied Bandwidth  | § 15.215(c)<br>RSS Gen, 6.6                                                         | 18                         | compliant        |
| 3        | Radiated Emissions  | § 15.205,<br>§ 15.209,<br>§ 15.225(a-d)<br>RSS Gen, 8.9, 8.10<br>RSS-210, B.6 (a-d) | 20                         | compliant        |
| 4        | Frequency Stability | § 15.225(e)<br>RSS Gen, 8.11<br>RSS-210, B.6                                        | 26                         | compliant        |

**Table 1-1: Results – Summary**

In accordance with the FCC Rule §15.3 (o) the equipment was tested with the limits that are valid for an *intentional radiator*.

<sup>1</sup> N/A (Not Applicable). The EUT is foreseen solely for professional printers which are not designed to be connected to the public (AC) power line.

## 2 References

### 2.1 Specification(s)

- [1] FCC 47 CFR Part 15:  
Code of Federal Regulations.  
Title 47: Telecommunication Part 15: Radio Frequency Devices
- [2] ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
- [3] FCC Public Notice DA 09-2478; Nov 25, 2009; Office of Engineering and Technology Clarifies Use of Recently Published ASC C63®  
Measurement Standards for Compliance Testing of Intentional and Unintentional Radiators under Part 15
- [4] KDB174176 D01 Line Conducted
- [5] RSS-210 Issue 9, August 2016; License-exempt Radio Apparatus: Category I Equipment.

### 2.2 Glossary

|      |                                      |
|------|--------------------------------------|
| AC   | Alternating Current                  |
| AMN  | Artificial Mains Network             |
| AV   | Average Detector                     |
| DC   | Direct Current                       |
| EMC  | Electromagnetic Compatibility        |
| EUT  | Equipment Under Test                 |
| HW   | Hardware                             |
| LISN | Line Impedance Stabilization Network |
| N/A  | Not Applicable                       |
| QP   | Quasi Peak Detector                  |

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### 3 General Information

#### 3.1 Identification of Client

Océ Printing Systems GmbH & Co. KG  
R&D2 EHS3  
Siemensallee 2  
85586 Poing  
Martin Eibl

#### 3.2 Test Laboratory

SGS Germany GmbH  
Hofmannstraße 50  
81379 München

#### 3.3 Time Schedule

| Test No.:      | 1   | 2            | 3            | 4            |
|----------------|-----|--------------|--------------|--------------|
| Start of Test: | N/A | Dec 15, 2015 | Oct 30, 2015 | Nov 27, 2015 |
| End of Test:   | N/A | Dec 15, 2015 | Nov 2, 2015  | Nov 30, 2015 |

#### 3.4 Participants

| Name                   | Function                   |
|------------------------|----------------------------|
| André Stéphane Nakpane | Accredited testing, Editor |
| Reinhold Böhm          | Accredited testing, Editor |
| Martin Eibl            | Operating of EUT           |

#### 3.5 Environmental conditions

During the measurement, if not otherwise specified, the environmental conditions were within the listed ranges:

Temperature: 20 - 26 °C

Humidity: 30 - 60 %

## 4 Equipment Under Test

**Test item description .....**: S29311-D2626-V11  
**Trade Mark .....**:  
**Manufacturer / Importer .....**: Océ Printing Systems GmbH & Co. KG  
**Model/Type .....**: S29311-D2626-V11  
**Number of tested samples.:** 2  
**Serial Number(s) .....**: S29311-D2626-V11 / Sample Nr. M8.x  
**Ratings.....**: DC 24 V  $\pm$  10%  
**Primary functions of EUT....**: RFID  
**Type of modulation .....**: ASK 100% according to ISO 15693  
**Operating frequency bands:** 13.110 – 14.010 MHz  
**Environment in which EUT is intended to be used .....**: Indoor 0°C to +35°C  
**Primary Function Type .....**: I  
**Device Type.....**: 3

The EUT is a Multi-Standard fully integrated 13,56MHz Analog-front-end Data-Framing Reader RFID System for fixed use, operating according to ISO 15693. The antenna is a magnetic loop antenna with a rectangular shape. The EUT uses amplitude shift keying (ASK). The antenna is matched to 50 ohms at 13.56 MHz.

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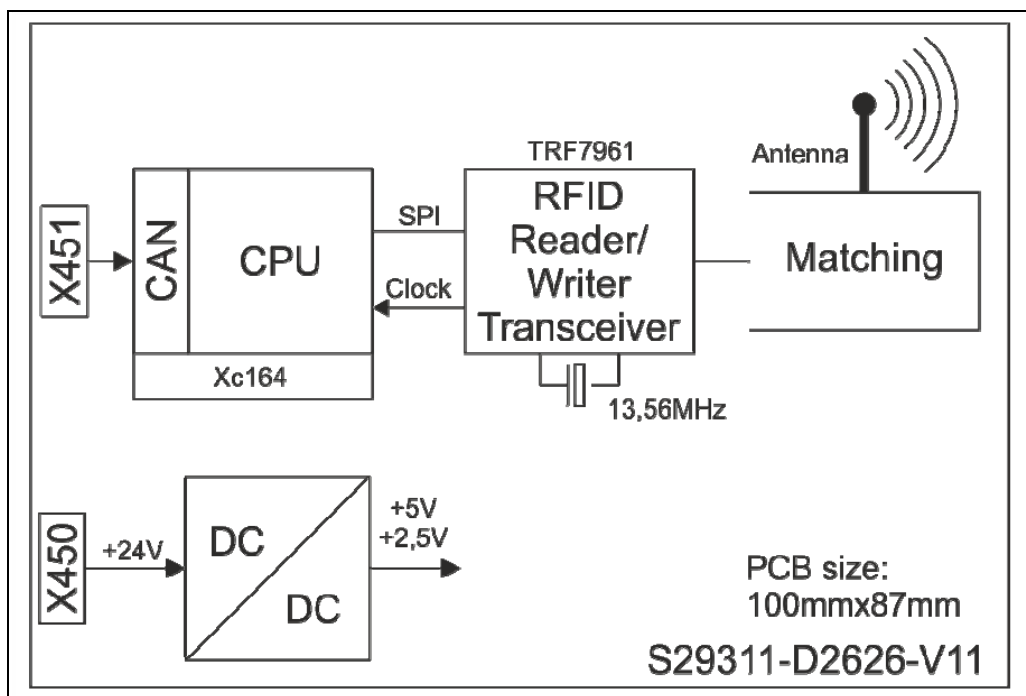


Figure 4-1: Block diagram of RFID device D2626-V11 with antenna on board

## 4.1 Operational conditions

### 4.1.1 Software

Software necessary for operating, controlling and monitoring the EUT:

| Name              | Identification Code/Issue | Task                                                   |
|-------------------|---------------------------|--------------------------------------------------------|
| Peak CAN Explorer | -                         | Control of Reader and monitoring of the Communication. |

### 4.1.2 Radio parameters

The tested radio equipment was qualified acc. the following conditions:

|                                               |                       |
|-----------------------------------------------|-----------------------|
| <b>Permitted Frequency Range</b>              | 13.553 ... 13.567 MHz |
| <b>Frequency Separation</b>                   | n/a                   |
| <b>Number of Channels</b>                     | 1                     |
| <b>Test Frequencies:</b>                      |                       |
| <b>Transmitter</b>                            | 13.56 MHz             |
| <b>Receiver</b>                               | 13.56 MHz             |
| <b>Transmitter: Rated Output Power (Prat)</b> | 23 dBm                |
| <b>Modulation: Type</b>                       | ASK, 100%, ISO 15693  |
| <b>Operation w/o modulation</b>               | No                    |
| <b>Antenna: Type</b>                          | Integral              |
| <b>Number of Antenna Ports</b>                | --                    |
| <b>Power Src.: Type</b>                       | DC Supply             |
| <b>Battery type (if applicable)</b>           | N/A                   |
| <b>Voltage nominal</b>                        | 24V                   |
| <b>minimal</b>                                | 20.4V                 |
| <b>maximum:</b>                               | 27.6V                 |

Table 4-1: Overview of EUT radio parameters

## 4.1.3 Operation Modes

If not stated otherwise, the following standard setup procedure for the EUT was used:

- ☒ Normal operation: EUT is power on and a continuous CAN communication established with the HF TAG stuck on EUT for testing purpose to have a two way communication.

The EUT was supplied with 24 V DC

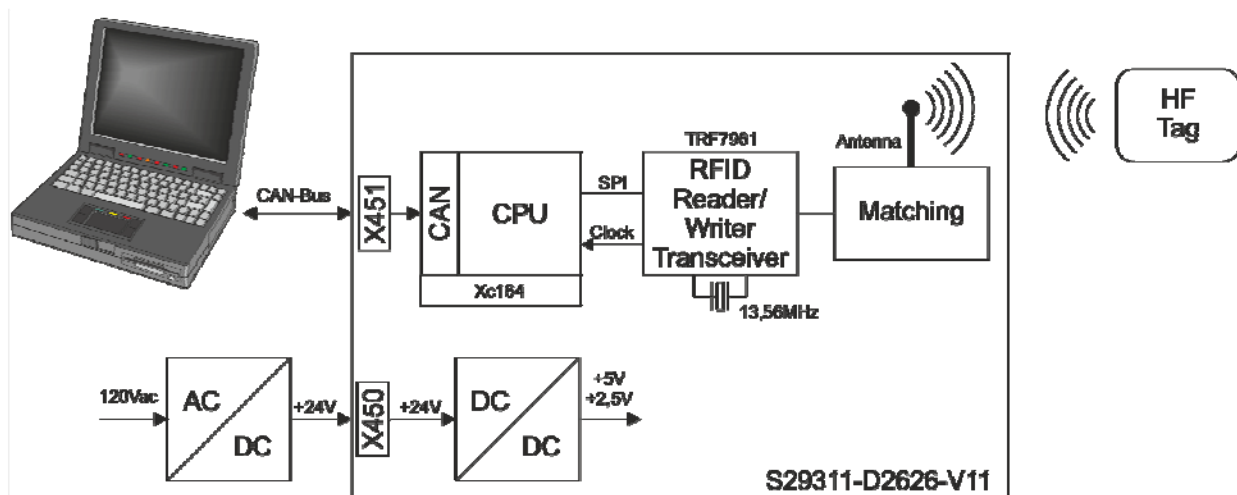


Figure 4-2: Configuration mode for test

## 4.2 Hardware Configuration

### 4.2.1 Components of the EUT

| Name      | Identification<br>Code/Issue/Serial Number | Interface type | Quantity |
|-----------|--------------------------------------------|----------------|----------|
| D2626-V11 | S29311-D2626-V11 / Sample Nr. M8.x         | Induction loop | 1        |
| HF Tag    | --                                         | Induction loop | 2        |

### 4.2.2 Interface description

All interfaces are identified independent whether they are tested or not.

#### 4.2.2.1 Power supply port

| Type (AC, DC, battery) | Voltage | Frequency | Current | Power | Connection / plug type |
|------------------------|---------|-----------|---------|-------|------------------------|
| DC                     | 24 V    | --        |         |       | EPS-                   |

#### 4.2.2.2 Earthing and Grounding connections <sup>2</sup>

| Type | Task | Connected to | Test<br>E/I/NA |
|------|------|--------------|----------------|
|      |      |              |                |

#### 4.2.2.3 Communication <sup>3</sup> and signal <sup>4</sup> ports

| Type    | Bit rate/frequency/<br>Signal | Task                                          | Connected to |
|---------|-------------------------------|-----------------------------------------------|--------------|
| CAN BUS |                               | Configuration and monitoring of communication | PC           |

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<sup>2</sup> Safety ground, functional earth, specific ground connections

<sup>3</sup> Connections to communication networks, analog, Ethernet, antenna, wireless, GPS,

<sup>4</sup> Signaling, monitoring and control ports

#### 4.2.3 Cabling

| Name    | Identification Code/Issue/Serial Number | shield | Description of Connection / plug type         | length | Quantity |
|---------|-----------------------------------------|--------|-----------------------------------------------|--------|----------|
| CAN BUS |                                         | yes    | Configuration and monitoring of communication | ≤ 10m  | 1        |

#### 4.2.4 Clock frequencies of the EUT resulting in determination of frequency range

| System / Subsystem | Highest clock frequency |
|--------------------|-------------------------|
| S29311-D2626-V11   | 13.56 MHz               |

The result of the table above with the highest frequency of internal source is basis of the determination of the necessity of measurement above 1 GHz. The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes.

See **FCC §15.33 a)** for relevant frequency range of **intentional radiators**.  
See **FCC §15.33 b)** for relevant frequency range of **unintentional radiators**.

See e.g. the following table taken from FCC §15.33 b) 1)

| Highest frequency generated or used in the device or on which the device operates or tunes (MHz) | Upper frequency of measurement range (MHz)                          |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Below 1.705                                                                                      | 30                                                                  |
| 1.705-108                                                                                        | 1000                                                                |
| 108-500                                                                                          | 2000                                                                |
| 500-1000                                                                                         | 5000                                                                |
| Above 1000                                                                                       | 5th harmonic of the highest frequency or 40 GHz, whichever is lower |

#### 4.2.5 External protection devices or measures

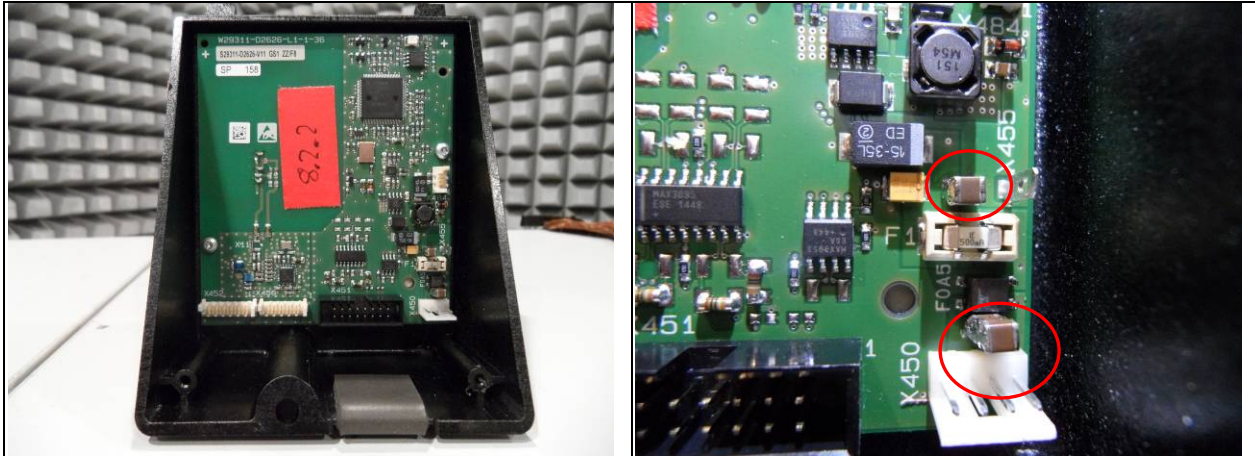
EMC relevant external protection devices or measures specified in the user's manual (e.g. over-voltage, shielding, bonding and grounding).

For test of the EUT S29311-D2626-V11 the CAN-Bus was shielded and terminated with terminator PCB S29311-D1085-V1. The shield was connected to ground. This setup is according to the assembly instructions specified by the manufacturer

The tests have been applied with the external protection devices and measures in place

#### 4.2.6 Modifications during the test

Modification for passing conducted emission:



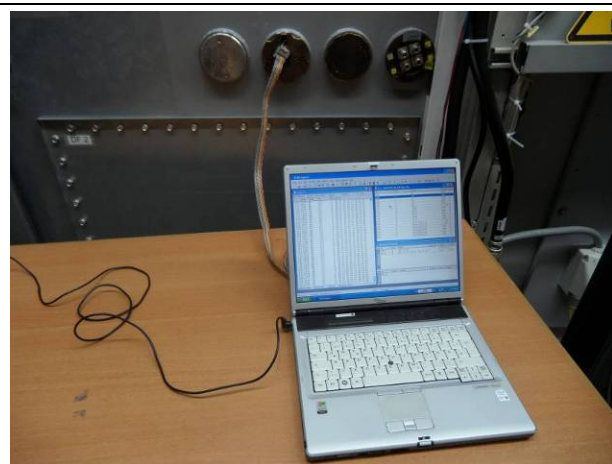
Additional capacitors:  
Parallel to R89: 3 x 10  $\mu$ F (35 V)  
Parallel to C46: 2 x 10  $\mu$ F (35 V)

All tests have been conducted with the modifications in place

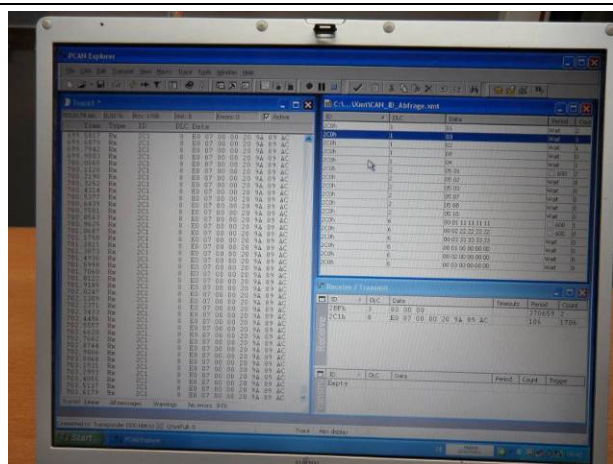
The client is responsible for and stated that the product will have all of this modifications incorporated when manufactured and placed on the market.

## 4.2.7 Operation and monitoring equipment

| Name / Identification           | Task                                                   | Availability <sup>5</sup><br>C/L |
|---------------------------------|--------------------------------------------------------|----------------------------------|
| Peak CAN Explorer running on PC | Control of Reader and monitoring of the Communication. | C                                |



Notebook located outside anechoic chamber



Observation of communication

Figure 4-3: Operation and monitoring equipment

## 4.3 Deviations from Standard

Since the EUT is designed to be integrated in printed device providing a control DC source to the EUT, the conducted emission has been tested only on the DC port with AC requirements. Of course the host has been tested with the EUT in place.

<sup>5</sup> C: Provided by the customer, L: Available at laboratory

## 5 Test Equipment

### 5.1 Test Facility

The EMC-tests are carried out in the EMC-laboratory of SGS Germany, Consumer Testing Services, Hofmannstraße 50, 81379 München, Germany.

| Chamber                | 1                                                                                                                                                                                                     | 2                                                                                                                                                                                                    | 3                                                                                                                                                                                                    | 4 / 5                 | 6                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------|
| Dimensions (net)       | 17.7 * 10.8 * 6.8 m                                                                                                                                                                                   | 9.6 * 8.5 * 5.3 m                                                                                                                                                                                    | 7.4 * 6.6 * 5.2 m                                                                                                                                                                                    | 4.1 * 3.5 * 3.5m      | 6.4 * 4.3 * 4.3m                                          |
| Max. Door Exit (w x h) | 2.9 * 3.86 m                                                                                                                                                                                          | 3.9 * 4.0 m                                                                                                                                                                                          | 2.0 * 2.7 m                                                                                                                                                                                          | 0.9 * 2.25 m          | 1.8 * 3.0 m                                               |
| Shielding material     | Sheet steel (Thickness: 1.5mm on floor, 1.0 mm on walls and ceiling)                                                                                                                                  | Sheet steel                                                                                                                                                                                          | Sheet steel                                                                                                                                                                                          | Sheet steel           | Sheet steel                                               |
| Absorbers              | Hybrid absorbers on walls and ceiling (TDK), length 1 m                                                                                                                                               | Hybrid absorbers on walls and ceiling (E+C), length 0.5 m                                                                                                                                            | Hybrid absorbers on walls and ceiling (E+C), length 0.3 m                                                                                                                                            | Without absorbers     | Without absorbers                                         |
| Floor                  | Metallic ground plane floor load: 12 t/m <sup>2</sup>                                                                                                                                                 | Metallic ground plane floor load: 1.5 t/m <sup>2</sup>                                                                                                                                               | Metallic ground plane floor load: 1 t/m <sup>2</sup>                                                                                                                                                 | Metallic ground plane | Metallic ground plane                                     |
| Turntable              | Ø 4 m / 7 t                                                                                                                                                                                           | Ø 3.2 m / 1.5 t                                                                                                                                                                                      | Ø 2.0 m / 1 t                                                                                                                                                                                        |                       |                                                           |
| Listings               | FCC-listed until Nov. 2017, Reg. No.: 90932<br><br>Industry Canada listed until June 2018<br>Reg. No. 9058A-1                                                                                         | FCC-listed until Nov. 2017, Reg. No.: 97242<br><br>Industry Canada listed until June 2018<br>Reg. No. 9058A-2<br><br>VCCI-listed until Oct. 2016, Reg. No. R-2623, G-266                             | FCC-listed until Nov. 2017, Reg. No.: 299569<br><br>Industry Canada listed until June 2018<br>Reg. No. 9058A-3                                                                                       |                       | VCCI-listed until Oct. 2016, Reg. No. C-2866 & No. T-1942 |
| Specials               | <b>Emission:</b><br><b>30 – 1000 MHz (d = 10 m)</b><br>- NSA acc. to:<br>• EN 55022<br>• CISPR 16-1-4<br>• ANSI C63.4<br><br><b>1 – 18 GHz (d = 3 m)</b><br>Site VSWR 1 – 18 GHz acc. to CISPR 16-1-4 | <b>Emission:</b><br><b>30 – 1000 MHz (d = 3 m)</b><br>- NSA acc. to:<br>• EN 55022<br>• CISPR 16-1-4<br>• ANSI C63.4<br><br><b>1 – 18 GHz (d = 3 m)</b><br>Site VSWR 1 – 18 GHz acc. to CISPR 16-1-4 | <b>Emission:</b><br><b>30 – 1000 MHz (d = 3 m)</b><br>- NSA acc. to:<br>• EN 55022<br>• CISPR 16-1-4<br>• ANSI C63.4<br><br><b>1 – 18 GHz (d = 3 m)</b><br>Site VSWR 1 – 18 GHz acc. to CISPR 16-1-4 |                       |                                                           |
|                        | <b>Immunity:</b><br>Field uniformity<br>27 – 6000 MHz acc.<br>EN 61000-4-3                                                                                                                            | <b>Immunity:</b><br>Field uniformity<br>80 – 6000 MHz acc.<br>EN 61000-4-3                                                                                                                           | <b>Immunity:</b><br>Field uniformity<br>80 – 6000 MHz acc.<br>EN 61000-4-3                                                                                                                           |                       |                                                           |

**FCC** (Federal Communication Commission): Accreditation by Bundesministerium für Wirtschaft und Arbeit (BMWA; BNetzA-CAB-14/21-09) and Designation as **CAB (Conformity Assessment Body)**: Designation Number DE0013; Test firm Registration #: 366296

Designation **KBA (Kraftfahrt-Bundesamt)** as Technical Service category A and D. Registration Number: KBA-P 00083-97

**CB** Testing Laboratory under the responsibility of SGS CEBEC as National Certification Body and to carry out testing within the **IECEE CB Scheme**.

## 5.2 Calibration of the Test Equipment

All relevant test equipment has a valid calibration. Additionally the used signal analyzers have a built-in self-calibration procedure. This calibration procedure was activated prior to the measurements so that the analyzer is deemed to be accurate. High quality cables were used to connect the measurement equipment. The actual loss of the attenuators and the cables was measured with a high precision network analyzer and taken into account for all measurements.

## 5.3 Measurement Uncertainty

As far as the underlying standards include requirements concerning the uncertainty of measuring instruments or measuring methods, they are met.

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The expanded measurement uncertainty of the measuring chain was calculated for all tests according to the "ISO Guide to the expression of uncertainty in measurement (GUM)". The results are documented in an "internal controlled document".

The measuring accuracy for all measuring devices is given in their technical description. The measuring instruments, including any accessories, are calibrated respectively verified to ensure the necessary accuracy. Depending on the kind of measuring equipment it is checked within regular intervals or directly before the measurement is performed. Adjustments are made and correction factors applied to measured data in accordance with the specifications of the specific instrument.

The expanded measurement instrumentation uncertainty of our Test Laboratory meets the requirements of IEC CISPR 16-4-2 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modeling – Uncertainty in EMC measurements" and the relevant basic standards for all listed Tests.

## 6 Test Conditions and Results

### 6.1 Test No. 1: Conducted Emissions (§ 15.207)

#### 6.1.1 Purpose

The AC power-line conducted emissions caused by the EUT via the power lines were measured pursuant to [4] KDB174176 in the frequency range from 150 kHz to 30 MHz.

#### 6.1.2 Limits

Following conducted emission limits are specified by [1] § 15.207:

| Frequency of Emission [MHz] | Conducted Limit [dBµV] |          |
|-----------------------------|------------------------|----------|
|                             | Quasi-peak             | Average  |
| 0.15-0.5                    | 66 to 56               | 56 to 46 |
| 0.5-5.0                     | 56                     | 46       |
| 5.0-30.0                    | 60                     | 50       |

Table 6-1: Limits – Conducted Emissions

#### 6.1.3 Test Procedure and Results

Measured levels of power-line conducted emission are the radio-noise voltage levels across the 50 Ω LISN port (to which the EUT is connected) terminated into a 50 Ω EMI receiver. All radio-noise voltage measurements are made on each current carrying conductor at the plug end of the EUT power cord. The measurement is performed using a receiver with peak and average detector.

Only if the measured peak value is near or above the quasi-peak limit the detector function is changed to quasi-peak for final measurement of the highest voltage levels.

Exploratory emission measurements are to be performed considering operation states and cable arrangement to evaluate configuration with highest emission levels (C63.10-2013, Clause 6.2.4).

Acc. C63.10-2013 Annex B.2.8.3 AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s).

EMC-Test-SW: EMC32 version 9.21 (R&S)

#### **Result:**

|          |                  |
|----------|------------------|
| verdict: | N/A <sup>1</sup> |
|----------|------------------|

## 6.2 Test No. 2: Occupied Bandwidth (§ 15.215c)

### 6.2.1 Purpose

The occupied bandwidth of the EUT was measured pursuant to [2] ANSI 63.10 Clause 6.9.2. The measurement was performed to verify the 20 dB bandwidth of the emission.

### 6.2.2 Limits

According to § 15.215 intentional radiators operating under the alternative provisions to the general emission limits, as contained in [1] § 15.217 through § 15.257 and in Subpart E of this part, 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.

### 6.2.3 EUT Operating Condition

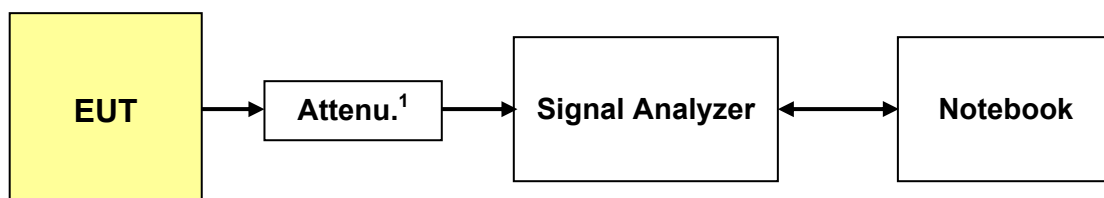
The standard setup procedure as described in section 4.1.3 of this report was used.

#### Climatic condition during test

Temperature (°C): 22.4

Rel. Humidity (%): 32.9

### 6.2.4 Test Configuration



1) Attenuator (if applicable)

Figure 6-1: Test Configuration – Occupied Bandwidth

Photographs of the EUT setup for occupied bandwidth measurement are shown on page 31 of this report.

## 6.2.5 Test instruments and accessories

| ID    | Measuring Instrument                                       | Specification                                                                                             | Status | Calibration due |
|-------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------|-----------------|
| P1845 | Spectrum Analyzer                                          | 20 Hz bis 26,5 GHz; Linearität: 0,1 dB (0 dB bis -70 dB)                                                  | cal    | Feb 2016        |
| P1740 | Frequency Standard                                         |                                                                                                           | cal    | Feb 2016        |
| P0861 | attenuator 30dB                                            | 30dB, nur bis max 1 GHz                                                                                   | chk    | Jun 2016        |
| P0076 | antenna (inductive surface antenna)                        |                                                                                                           | ind    |                 |
| P1809 | multimeter, digital (MZ01)                                 | 60 mV...600V, 60mA...10A, 600Ohm...40MOhm, 0.1Hz...1kHz, -50,0 °C ...+400,0°C                             | cal    | Jun 2016        |
| P1911 | Data logger for pressure, humidity and temperature (Spibe) | 0...100%rF/ 0...100%rH; -20...+ 70°C/ -4... + 158°Ftd; 6000...1100mbar                                    | chk    | Dec 2016        |
| P1596 | Multimeter / True RMS                                      | 1000 V(DC), 1000 V(AC), 10 A(DC), 10 A(AC), 500 MOhm, 50 nS, 50000 µF, 1 MHz, -200 °C/+1350 °C, -52/60 dB | cal    | Jun 2016        |
| P0394 | power supply                                               | 32 V / 1.5 A                                                                                              | ind    |                 |

cal = Calibration, car = Calibration restricted use, chk = Check, chr = Check restricted use, cpu = Check prior to use, calchk = Calibration and check, ind = for indication only, cnn = Calibration not necessary

## 6.2.6 Test Procedure and Results

The 20 dB bandwidth of the carrier emission is measured using a spectrum analyzer. In order to measure the modulated signal properly, a resolution bandwidth that is small compared with the bandwidth required by the procuring or regulatory agency shall be used on the measuring instrument. However, the resolution bandwidth of the measuring instrument shall be set to a value within 1 % to 5% of the signal bandwidth requirements.

Screenshots of the measurements are included on pages 28 of this report.  
The following table summarizes the results:

**The occupied bandwidth was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.**

### Result:

| Carrier Frequency        | Occupied Bandwidth | Result    |
|--------------------------|--------------------|-----------|
| [MHz]                    | [kHz]              |           |
| 13.56                    | 144.23             | compliant |
| Measurement Uncertainty: |                    | ±48kHz    |

Table 6-2: Results – Occupied Bandwidth

### 6.3 Test No. 3: Radiated Emissions (§ 15.205, § 15.209, § 15.225a-d)

#### 6.3.1 Purpose

The radiated emissions of the EUT were measured pursuant to [2] ANSI 63.10 Clause 6.4 and 6.5. The measurement was performed to verify that emissions radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements are attenuated below the specified limits.

#### 6.3.2 Limits

According to § 15.205, only spurious emissions are permitted in restricted band of operation.

According to § 15.209 and 15.225(a-d), the radiated emissions of an intentional radiator must not exceed following field strength levels:

| Frequency of Emission [MHz] | Field strength [ $\mu\text{V/m}$ ] | Meas. Distance [m] |
|-----------------------------|------------------------------------|--------------------|
| 0.009-0.490                 | 2400/F [kHz]                       | 300                |
| 0.490-1.705                 | 24000/F [kHz]                      | 30                 |
| 1.705-13.110                | 30                                 | 30                 |
| 13.110-13.410               | 106                                | 30                 |
| 13.410-13.553               | 334                                | 30                 |
| 13.553-13.567               | 15848                              | 30                 |
| 13.567-13.710               | 334                                | 30                 |
| 13.710-14.010               | 106                                | 30                 |
| 14.010-30.00                | 30                                 | 30                 |
| 30-88                       | 100                                | 3                  |
| 88-216                      | 150                                | 3                  |
| 216-960                     | 200                                | 3                  |
| Above 960                   | 500                                | 3                  |

Table 6-3: Limits – Radiated Emissions

#### 6.3.3 EUT Operating Condition

The standard setup procedure as described in section 4.1.3 of this report was used.

## 6.3.4 Test Configuration

The measurements were performed in an anechoic chamber. The radiated test site complies with the site attenuation requirements listed in ANSI C63.4 and is listed with the FCC.

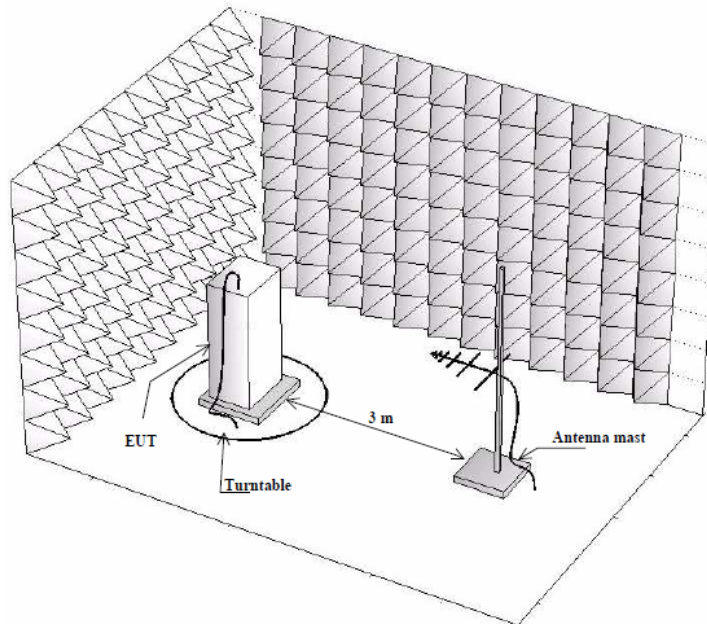


Figure 6-2: Test Configuration – Radiated Emissions 30 MHz to 1 GHz

Photographs of the EUT in the anechoic chamber are shown on page 31 of this report.

## 6.3.5 Test Procedure and Results

### 6.3.5.1 Radiated emissions - 30 MHz to 1000 MHz (§ 15.205, § 15.209)

| Phenomena                        | Reference                  | Frequency Range            | Criteria | Verdict |
|----------------------------------|----------------------------|----------------------------|----------|---------|
| Radio Disturbance Electric Field | FCC 47 CFR Part 15 §15.209 | 30 MHz - 1 GHz distance 3m | Class A  | P       |
| Radio Disturbance Electric Field | ICES-003                   | 30 MHz - 1 GHz distance 3m | Class A  | P       |

(The radiated emission limits < 1 GHz of FCC 47 CFR Part 15 §15.209 Class A/B are identical with ICES-003 class A/B.)

#### Test procedure:

Radiated measurements are performed in a semi-anechoic chamber meeting the normalized site attenuation of ANSI C63.4 and listed with the FCC. The applicable frequency spectrum is scanned with a calibrated RF measuring system using an appropriate broadband antenna and an EMI-receiver/spectrum analyzer and compared to the required limits. The measuring instrument performs the field strength calculations automatically. The measuring software provides resident AF and CF figures for individual antennas and cables. The receiver/analyzer is set to "peak" mode from 30 MHz to 1 GHz. On any emission of concern, the receiver is set to quasi-peak mode.

“Maximization” of each suspect frequency is accomplished by a combination of a 360° azimuth search using a turntable and varying the antenna to ground plane height from 1 m to 4 m. Also, both the vertical and horizontal polarization is scanned in the required frequency range per ANSI C63.10.

Maximization of emission results starts at 0° of the turn table with antenna in horizontal polarization is set to 1 m. While the turntable slowly moves to 360°, the spectrum analyzer is sweeping from 30 to 1000 MHz and maximum data is recorded. Antenna is set to 2 m and turntable slowly moves back to 0° while the spectrum analyzer is sweeping again. This is repeated until the antenna height of 4 m is reached.

The antenna polarization is set to vertical and the procedure described above is repeated.

For each frequency the measuring software stores the maximum level as well as the corresponding settings of turntable and antenna. An azimuth resolution of about 3° is realized using this method.

At least the six highest frequencies are selected automatically by the software for performing the final measurements.

At each of these frequencies the turntable as well as the antenna is set to the corresponding settings. Then the antenna is slowly moved 50 cm down/up related to initial position while the receiver is measuring at this frequency. The highest emission level and the corresponding height are recorded. At this final position, the measurement is performed with quasi-peak detector.

Exploratory emission measurements are to be performed considering operation states and cable arrangement to evaluate configuration with highest emission levels (C63.10-2013, Clause 6.6.4.2).

Test location: semi anechoic chamber No. 3

EMC-Test-SW: EMC32 version 9.21 (R&S)

#### Instruments and accessories

| ID    | Measuring Instrument | Specification                                                 | Status | Calibration due |
|-------|----------------------|---------------------------------------------------------------|--------|-----------------|
| P0311 | antenna              | 30 - 1000 MHz E                                               | cal    | Apr 2018        |
| P0338 | test chamber 3       | 7.4 x 6.6 x 5.2 m (net), 0.4 m hybrid absorbers               | chk    | Feb 2016        |
| P1303 | Mast                 | 1 - 4m, hor./vert.                                            | cnn    |                 |
| P1304 | Controller           |                                                               | cnn    |                 |
| P1326 | EMI receiver         | 20Hz - 26.5GHz, FFT-Scan, Preamplifier 100kHz - 26.5GHz, 30dB | cal    | Jul 2016        |
| P1567 | power supply         |                                                               | cnn    |                 |

cal = Calibration, car = Calibration restricted use, chk = Check, chr = Check restricted use, cpu = Check prior to use, calchk = Calibration and check, ind = for indication only, cnn = Calibration not necessary

**Result:**

|          |                  |
|----------|------------------|
| verdict: | <b>compliant</b> |
|----------|------------------|

The following table shows the measured radiated emissions. Plots of the measurements are included on pages 29 of this report.

**Result table:**

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 122.004500      | 16.70              | 54.00          | 37.30       | 2000.0          | 120.000         | 140.0       | H   | 226.0         | 13.2       |
| 379.976000      | 44.19              | 56.90          | 12.71       | 2000.0          | 120.000         | 100.0       | H   | 137.0         | 17.4       |
| 390.015500      | 46.08              | 56.90          | 10.82       | 2000.0          | 120.000         | 100.0       | H   | 137.0         | 17.8       |
| 400.006500      | 46.53              | 56.90          | 10.37       | 2000.0          | 120.000         | 100.0       | H   | 145.0         | 18.1       |
| 409.949000      | 43.24              | 56.90          | 13.66       | 2000.0          | 120.000         | 103.0       | H   | 145.0         | 18.5       |
| 419.988500      | 45.26              | 56.90          | 11.64       | 2000.0          | 120.000         | 104.0       | H   | 145.0         | 18.8       |

**6.3.5.2 Radiated Emissions – 9 kHz to 30 MHz (§ 15.225a-d, §15.209)**

| Phenomena                        | Reference                        | Test Specification            | Criteria | Verdict <sup>6</sup> |
|----------------------------------|----------------------------------|-------------------------------|----------|----------------------|
| Radio Disturbance Magnetic Field | FCC 47 CFR Part 15<br>§15.225a-d | 9 kHz -30 MHz<br>Distance 3 m | Class B  | P                    |

Climatic condition during test

Temperature (°C): 22.7 – 23.6

Rel. Humidity (%): 34.4 – 34.8

Test procedure:

Radiated measurements are performed in a semi-anechoic chamber listed with the FCC. The applicable frequency spectrum is scanned with a calibrated RF measuring system using an appropriate loop antenna and an EMI-receiver/spectrum analyzer and compared to the required limits. The measuring instrument performs the field strength calculations automatically. The measuring software provides resident AF and CF figures for individual antennas and cables. The receiver/analyzer is set to "peak" mode from 9 kHz to 30 MHz. For the RFID Maskfrequency range is limited from 12.66 MHz to 14.46 MHz.

"Maximization" is accomplished by a combination of a 360° azimuth search using a turntable. Also, both the vertical and horizontal polarization is scanned in the required frequency range per ANSI C63.10.

Limits:

Compliance with § 15.225a-d requires that the field strength of any emissions shall not exceed limits given in µV/m at 30 meters.

The magnetic field measurements have been performed using a loop antenna at a measuring distance of 3 meters. Thus FCC compliance limits need to be extrapolated at different limit distance (300m, 30 m) to the used measuring distance of 3 meters by calculation as given in Annex A.

The following table shows the measured radiated emissions. Plots of the measurements are included on page 29 of this report.

Test location: semi anechoic chamber No. 2

EMC-Test-SW: EMC32 version 9.21 (R&S)

<sup>6</sup> P (Pass): test object meets the requirement; F (Fail): test object does not meet the requirement;  
N/A: test case does not apply to the test object; NR: test case is not requested by the client. FCC requires radiated emission testing up to the 5<sup>th</sup> harmonic of the highest clock rate of the tested system.

## Instruments and accessories

| ID    | Measuring Instrument                           | Specification                                                                                                                                         | Status | Calibration due |
|-------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------------|
| P1284 | Controller                                     |                                                                                                                                                       | cnn    |                 |
| P1367 | video camera MZ2                               |                                                                                                                                                       | ind    |                 |
| P1327 | EMI receiver                                   | 20Hz - 40GHz, FFT-Scan, Preamplifier 100kHz - 40GHz, 30dB                                                                                             | cal    | Jul 2017        |
| P0073 | antenna                                        | 0.01 - 30 MHz                                                                                                                                         | chk    | Jun 2017        |
| P1913 | Data logger for humidity and temperature (MZ2) | Sensortyp NTC: -20...+ 70°C, Auflösung: 0.1 °C; Genauigkeit: +/- 0.4 °C; Feuchtesensor kapazitiv: 0 ... 100 %rF; Genauigkeit: +/- 2 %rF bei 25 °C; Au | cal    | Dec 2015        |
| P1567 | power supply                                   |                                                                                                                                                       | cnn    |                 |
| P1558 | multimeter, digital                            | 60 mV...600V, 60mA...10A, 600Ohm...40MOhm, 0.1Hz...1kHz, -50,0 °C ...+400,0°C                                                                         | cal    | Apr 2016        |
| P0337 | test chamber 2                                 | 9.6 x 8.5 x 5.3 m (net), 0.5 m hybrid absorbers                                                                                                       | chk    | Feb 2016        |

cal = Calibration, car = Calibration restricted use, chk = Check, chr = Check restricted use, cpu = Check prior to use, calchk = Calibration and check, ind = for indication only, cnn = Calibration not necessary

## Result:

|          |                  |
|----------|------------------|
| verdict: | <b>compliant</b> |
|----------|------------------|

## Final result (Quasipeak) according to §15.225a-c

| Frequency (MHz)          | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Azimuth (deg)     | Corr. (dB) |
|--------------------------|--------------------|----------------|-------------|-----------------|-----------------|-----|-------------------|------------|
| 13.064300                | 26.06              | 50.94          | 24.88       | 1000.0          | 9.000           | V   | 270.0             | 20.3       |
| 13.134300                | 31.39              | 61.90          | 30.51       | 1000.0          | 9.000           | H   | 44.0              | 20.3       |
| 13.217700                | 27.70              | 61.90          | 34.20       | 1000.0          | 9.000           | H   | 0.0               | 20.3       |
| 13.484600                | 37.97              | 71.87          | 33.90       | 1000.0          | 9.000           | H   | 0.0               | 20.3       |
| 13.558200                | 63.76              | 105.39         | 41.63       | 1000.0          | 9.000           | H   | 44.0              | 20.3       |
| 13.559000                | 66.22              | 105.39         | 39.17       | 1000.0          | 9.000           | H   | 0.0               | 20.3       |
| 13.560100                | 64.50              | 105.39         | 40.89       | 1000.0          | 9.000           | H   | 44.0              | 20.3       |
| 13.560300                | 64.45              | 105.39         | 40.94       | 1000.0          | 9.000           | H   | 44.0              | 20.3       |
| 13.635600                | 33.40              | 71.87          | 38.47       | 1000.0          | 9.000           | V   | 224.0             | 20.3       |
| 13.882000                | 25.47              | 61.90          | 36.43       | 1000.0          | 9.000           | H   | 0.0               | 20.3       |
| 13.986200                | 32.30              | 61.90          | 29.60       | 1000.0          | 9.000           | H   | 0.0               | 20.3       |
| 13.986300                | 32.47              | 61.90          | 29.43       | 1000.0          | 9.000           | H   | 0.0               | 20.3       |
| Measurement Uncertainty: |                    |                |             |                 |                 |     | +3.1 dB / -3.9 dB |            |

## Final result (Quasipeak) according to §15.225d and §15.209

| Frequency (MHz)          | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Azimuth (deg)     | Corr. (dB) |
|--------------------------|--------------------|----------------|-------------|-----------------|-----------------|-----|-------------------|------------|
| None                     | --                 | --             | --          | --              | --              | --  | --                | --         |
| Measurement Uncertainty: |                    |                |             |                 |                 |     | +3.1 dB / -3.9 dB |            |

The measured emission levels were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

## 6.4 Test No. 4: Frequency Stability (§ 15.225e)

### 6.4.1 Purpose

The frequency stability of the EUT was measured pursuant to [2] ANSI 63.10 Clause 6.8. The measurement was performed to verify that the frequency deviation of the emission stays within the assigned frequency block under extreme temperature conditions (-20°C to +50°C) and supply voltage conditions according to § 15.225(e).

### 6.4.2 Limits

According to § 15.225(e), the carrier frequency of the EUT shall be maintained within 0.01 percent (100 ppm) of the operating frequency, independent of the ambient temperature (-20°C to 50°C) and the primary supply voltage (85% to 115% of the rated voltage).

### 6.4.3 EUT Operating Condition

The standard setup procedure as described in section 4.1.3 of this report was used.

### 6.4.4 Test Configuration

Frequency Stability with Temperature Variation:

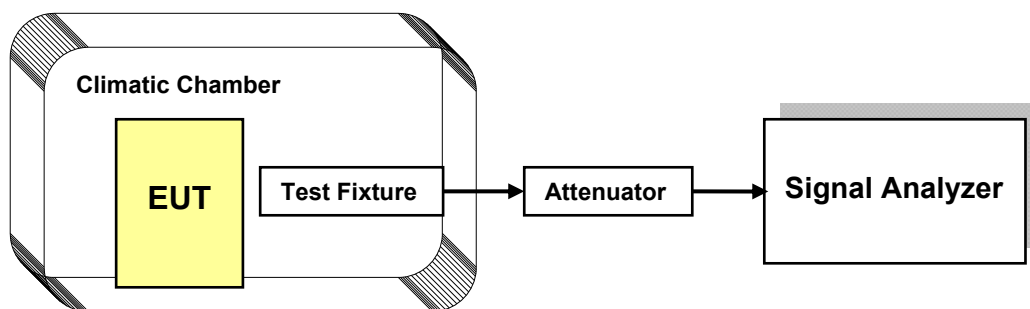


Figure 6-3: Test Configuration – Frequency Stability with temperature variation

Frequency Stability with Voltage Variation:

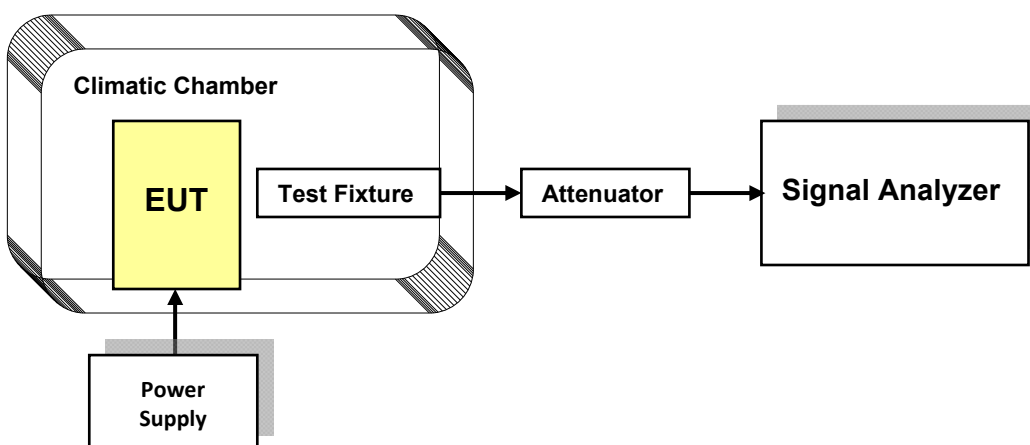


Figure 6-4: Test Configuration – Frequency Stability with voltage variation

## 6.4.5 Test Procedure and Results

### Frequency Stability with Temperature Variation:

The primary supply voltage to the EUT was set to the rated voltage and the temperature of the environmental chamber is varied in 10 degree steps from -20 degrees celsius to +50 degrees celsius. The EUT is allowed to stabilize at each temperature and the frequency error is measured.

| Carrier Frequency: 13.56 MHz |                     |                     |        |                           |         |           |
|------------------------------|---------------------|---------------------|--------|---------------------------|---------|-----------|
| Supply Voltage (DC)          | Ambient Temperature | Frequency Deviation |        | Maximum allowed Deviation |         | Result    |
| [V]                          | [°C]                | [Hz]                | [ppm]  | [Hz]                      | [ppm]   |           |
| 24V                          | -20                 | -79.1               | -5.83  | ±1356                     | ±100    | compliant |
|                              | -10                 | -447.1              | -32.97 | ±1356                     | ±100    | compliant |
|                              | 0                   | -6.9                | -0.51  | ±1356                     | ±100    | compliant |
|                              | +10                 | -733.1              | -54.06 | ±1356                     | ±100    | compliant |
|                              | +20                 | -7.2                | -0.53  | ±1356                     | ±100    | compliant |
|                              | +30                 | -371.9              | -27.43 | ±1356                     | ±100    | compliant |
|                              | +40                 | -422.2              | -31.14 | ±1356                     | ±100    | compliant |
|                              | +50                 | -69.4               | -5.12  | ±1356                     | ±100    | compliant |
| Measurement Uncertainty:     |                     |                     |        |                           | ±3.6 Hz |           |

Table 6-4: Results – Frequency Stability with temp. variation for DC Supply

### Frequency Stability with Voltage Variation:

The EUT is placed in an environmental chamber and allowed to stabilize at +20 degrees celsius for at least 15 minutes. With the voltage input to the EUT set to 85% of the rated supply voltage, the frequency error is measure. This procedure is repeated at 100% and 115% of the rated supply voltage.

| Carrier Frequency: 13.56 MHz |                     |                           |         |                           |         |           |
|------------------------------|---------------------|---------------------------|---------|---------------------------|---------|-----------|
| Supply Voltage (DC)          | Ambient Temperature | Frequency Deviation [ppm] |         | Maximum allowed Deviation |         | Result    |
| [V]                          | [°C]                | [Hz]                      | [ppm]   | [Hz]                      | [ppm]   |           |
| 20.4                         | +20                 | -7.3                      | -0.538  | ±1356                     | ±100    | compliant |
| 24.0                         |                     | +362.4                    | +26.726 | ±1356                     | ±100    | compliant |
| 27.6                         |                     | -7.3                      | -0.538  | ±1356                     | ±100    | compliant |
| Measurement Uncertainty:     |                     |                           |         |                           | ±3.6 Hz |           |

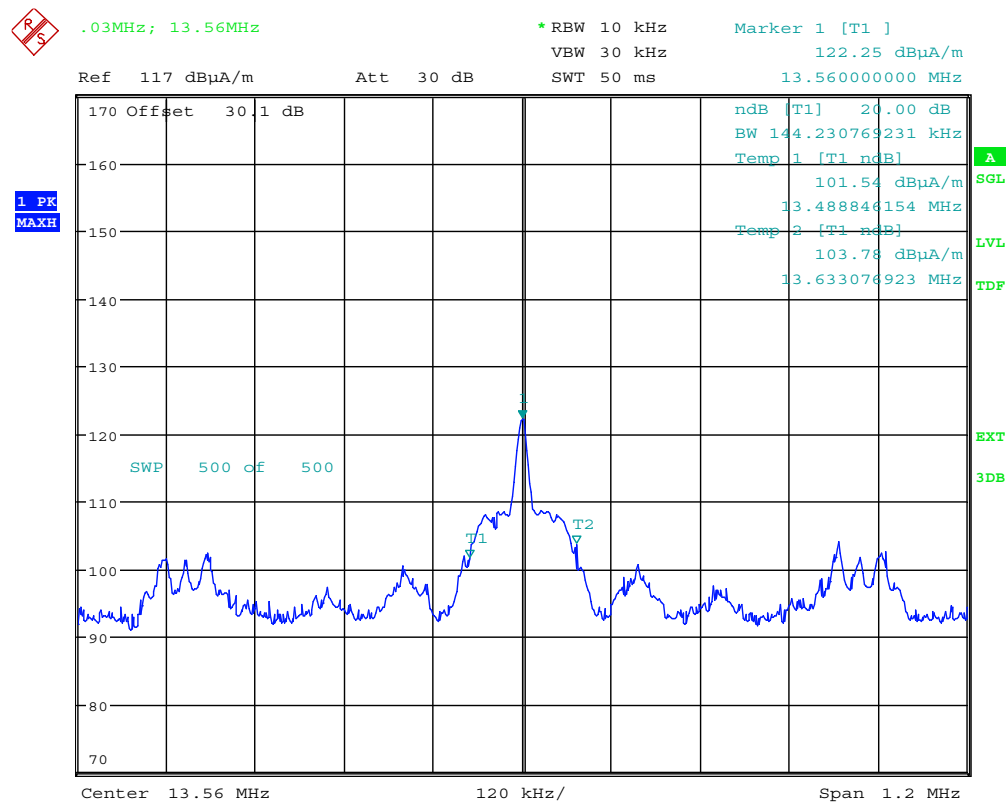
Table 6-5: Results – Frequency Stability with voltage variation for DC Supply

The measured frequency stability was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

## 7 Test Data and Screenshots

### 7.1 Spectral Plots

#### 7.1.1 Test No. 2: Occupied Bandwidth (§ 15.215c)



Occupied bandwidth Measurement  
 With respect to reference level: 20dB  
 Date: 14.DEC.2015 14:48:53

Figure 7-1: Occupied Bandwidth (Carrier Frequency 13.56 MHz)

## 7.1.2 Test No. 3: Radiated Emissions (§ 15.205, § 15.209, § 15.225a-d)

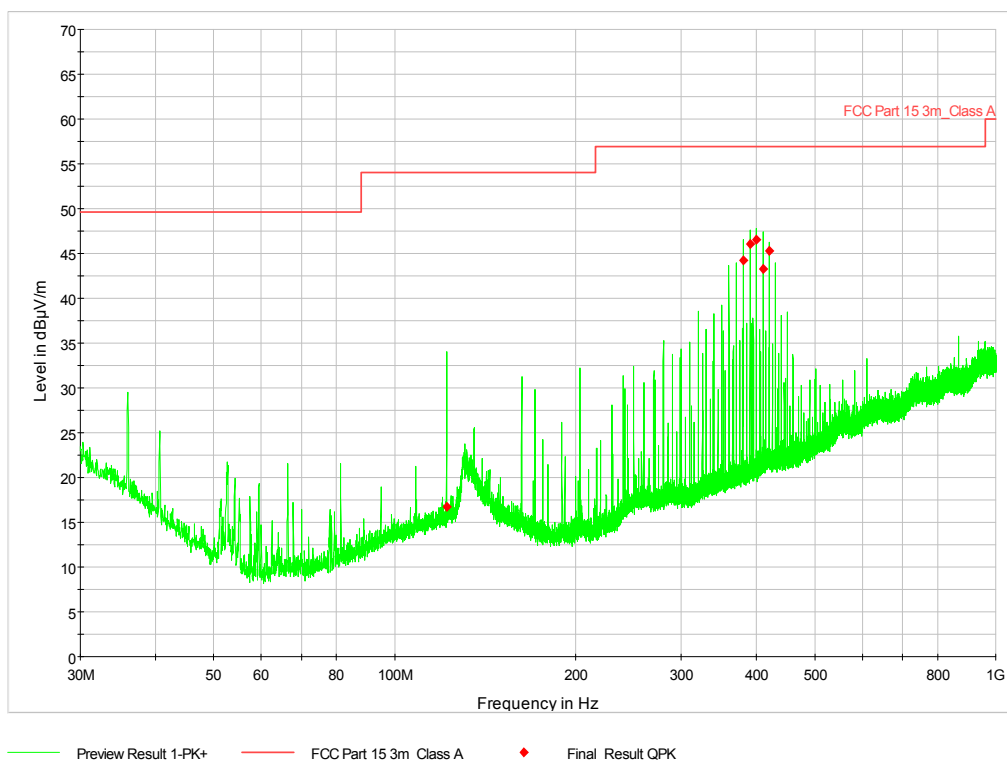


Figure 7-2: Radiated Emissions - 30 MHz to 1 GHz (§ 15.205, 15.209)

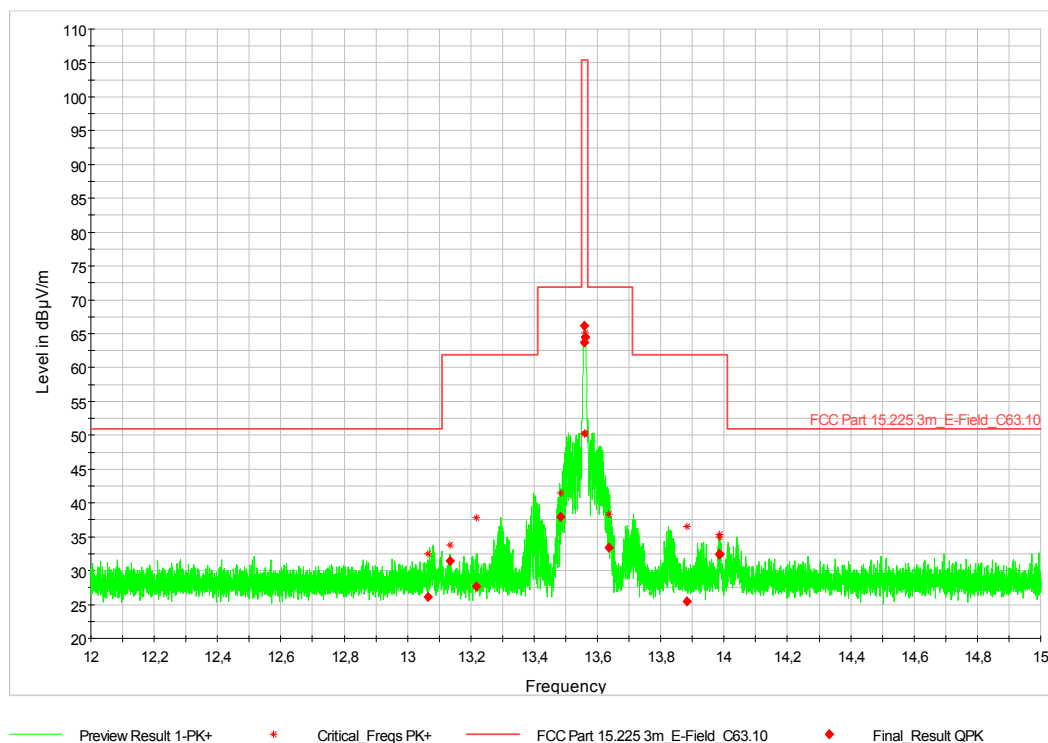


Figure 7-3: Radiated Emissions – 13.110 MHz to 14.010 MHz (§ 15.225a-c)

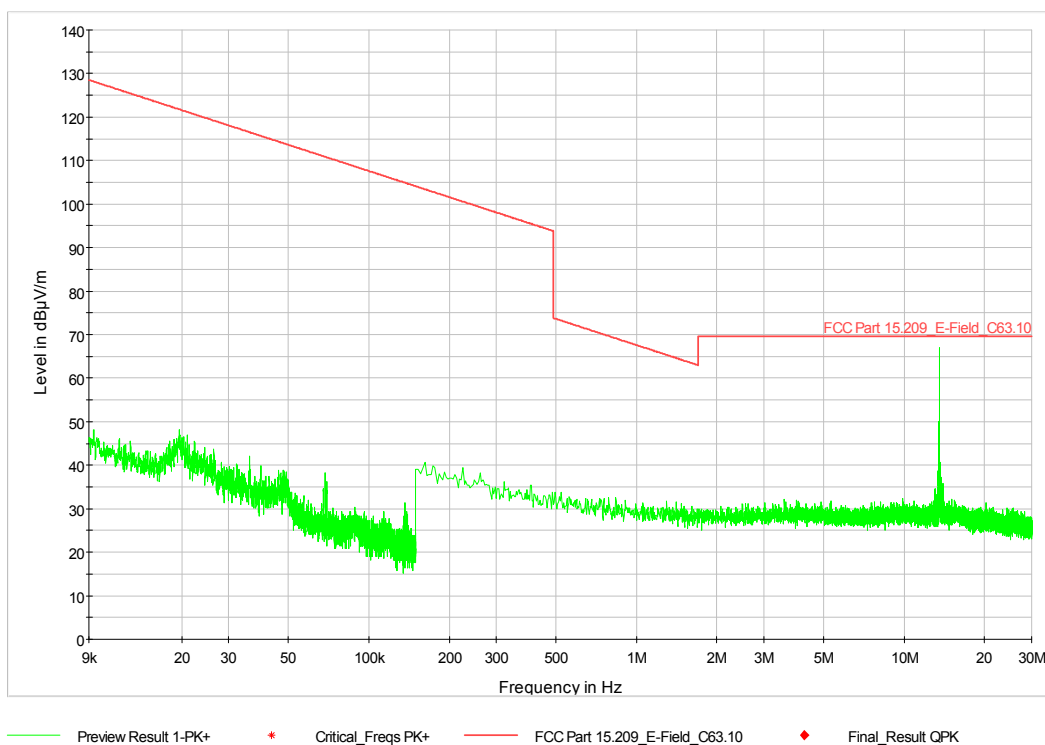
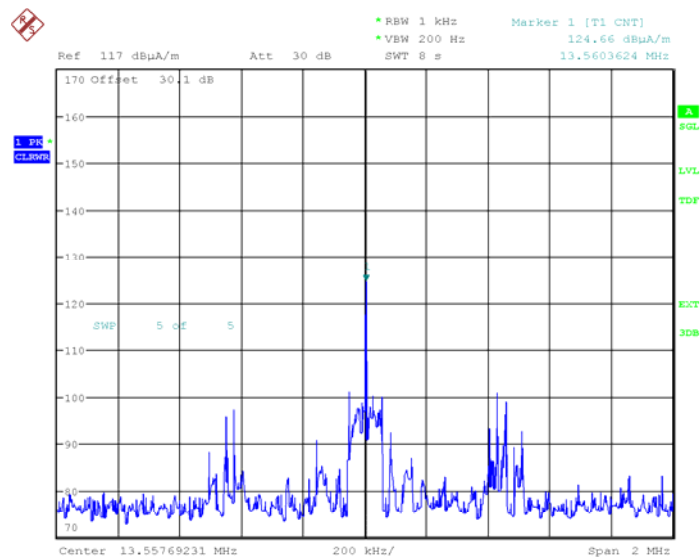


Figure 7-4: Radiated Emissions – 9 kHz to 30 MHz (§ 15.225d)

## 7.1.3 Test No. 4: Frequency Stability (§ 15.225e)



Frequency stability Measurement  
Stability with respect to ambient temperature at Startup  
Temperature: High°C  
Date: 27.NOV.2015 11:50:44

Figure 7-5: Frequency statibilty – 20°C/24V at startup

## 7.2 Test Setups

### 7.2.1 Test No. 2: Occupied Bandwidth (§ 15.215c)

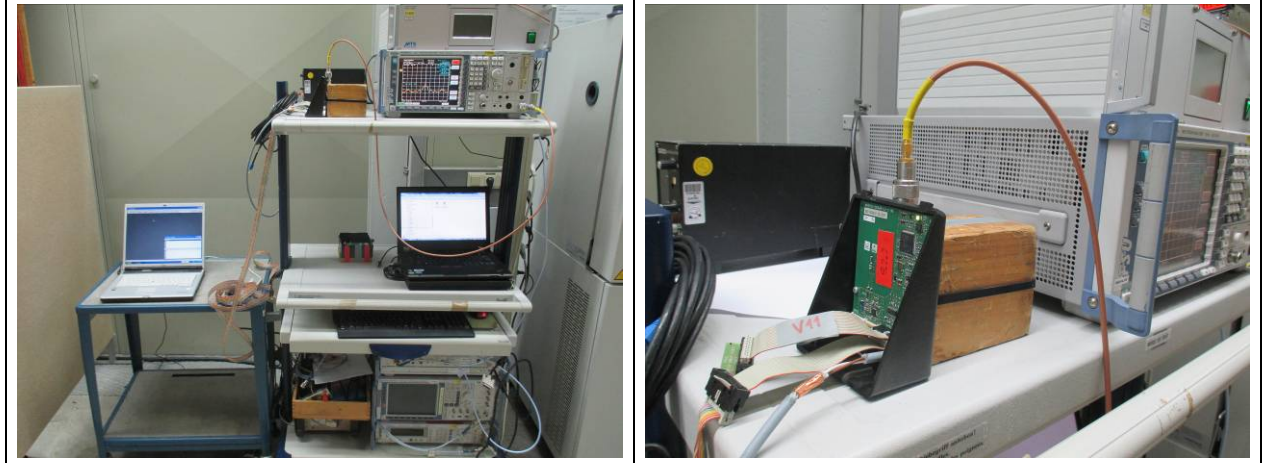


Figure 7-6: Test Setup Occupied Bandwidth

### 7.2.2 Test No. 3: Radiated Emissions (§ 15.205, § 15.209, § 15.225a-d)

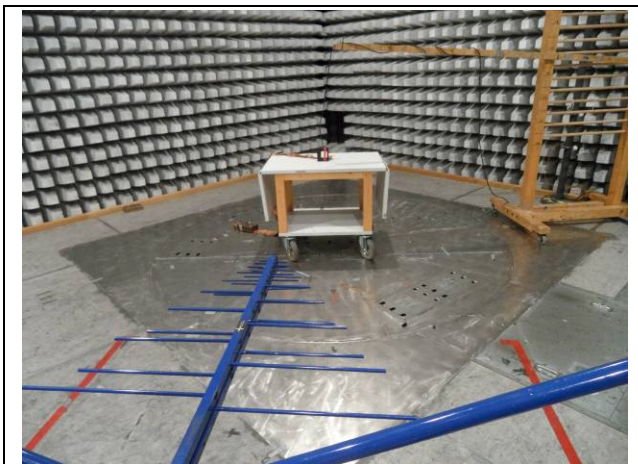
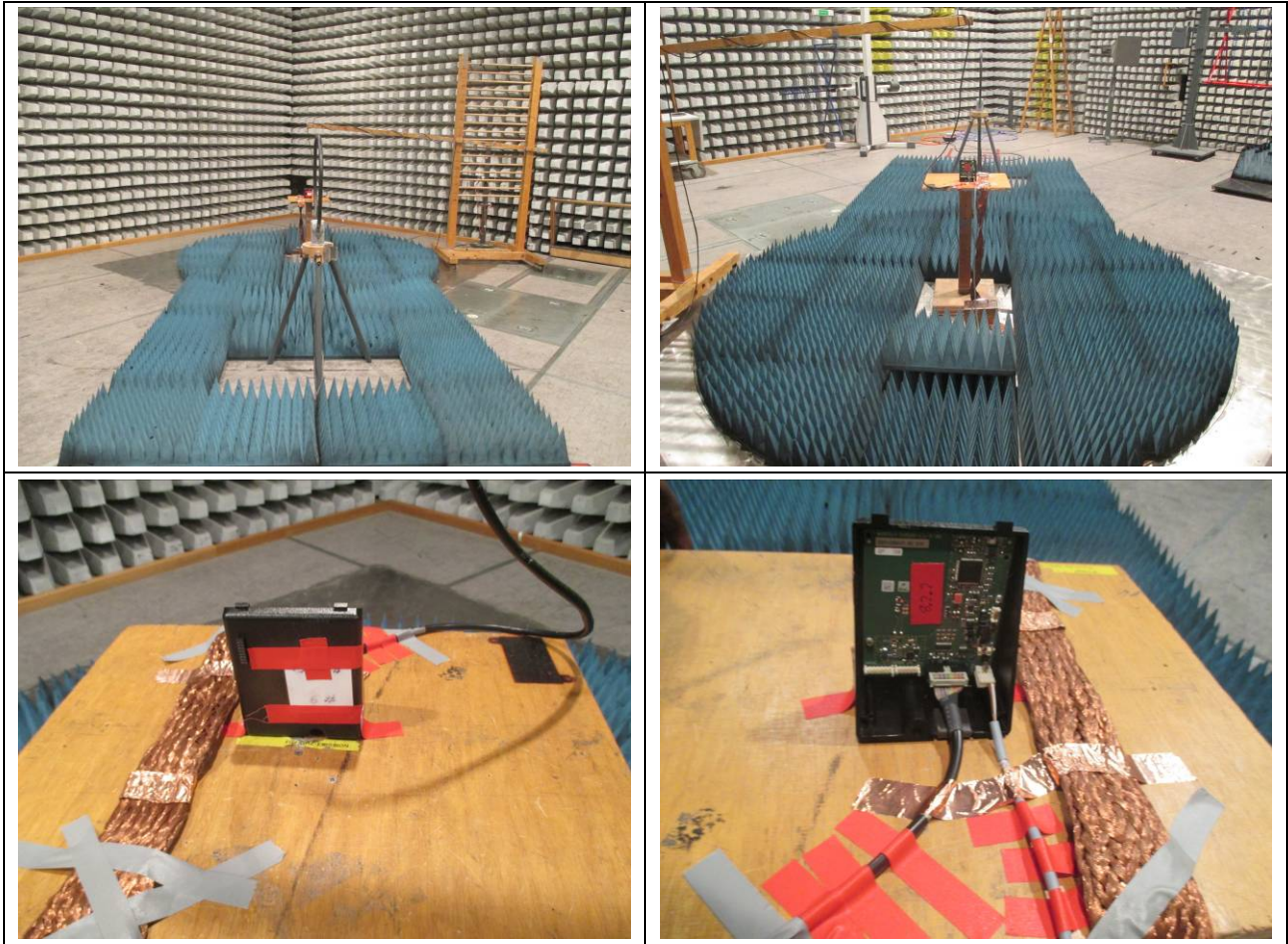


Figure 7-7: Test Setup Radiated Emission 30 MHz – 1 GHz



**Figure 7-8: Test Setup Radiated Emission 9 kHz – 30 MHz**

## 7.2.3 Test No. 4: Frequency Stability (§ 15.225e)



Figure 7-9: Test Setup – Frequency Stability with voltage or Temperature variation

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### 7.3 Photographs of EUT and accessories



Figure 7-10: S29311-D2626-V11 with antenna on board

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## 7.4 Annex A

Compliance with § 15.225a-d and § 15.225 requires that the field strength of any emissions shall not exceed limits given in  $\mu\text{V/m}$  at a specified limit distances.

Since measurement has been made with a loop antenna at a measurement distance of 3 meters the compliance limit was extrapolated from the respective limit distances to 3 meters by calculation according to C63.10-2013 chapter 6.6.4.2.

|                                                                   |                                                                |
|-------------------------------------------------------------------|----------------------------------------------------------------|
| FCC Electric fields limit [ $\mu\text{V/m}$ ]:                    | $L_{\mu\text{V/m}}$                                            |
| Converted FCC Electric fields limit [ $\text{dB}\mu\text{V/m}$ ]: | $\text{FS}_{\text{limit}} = 20 \log (L_{\mu\text{V/m}}) + 120$ |
| Reference limit distance [m]:                                     | $d_{\text{limit}}$                                             |
| distance of the measurement point [m]:                            | $d_{\text{measure}}$                                           |
| Nearfield distance [m] :                                          | $d_{\text{nearfield}} = 47.77/f_{\text{MHz}}$                  |

If the single point measured closer to the EUT than  $\lambda/2\pi$  and limit distance greater than  $\lambda/2\pi$  following equation has been used

$$\text{FS}_{\text{max}}[\text{dB}\mu\text{V/m}] = \text{FS}_{\text{limit}} + 40\log(d_{\text{nearfield}}/d_{\text{measure}}) + 20\log(d_{\text{limit}}/d_{\text{nearfield}})$$

If the single point measured greater than  $\lambda/2\pi$  following equation has been used

$$\text{FS}_{\text{max}}[\text{dB}\mu\text{V/m}] = \text{FS}_{\text{limit}} + 20\log(d_{\text{limit}}/d_{\text{measure}})$$

If both the single point and the limit distance are equal or closer to the EUT than  $\lambda/2\pi$  following equation has been used

$$\text{FS}_{\text{max}}[\text{dB}\mu\text{V/m}] = \text{FS}_{\text{limit}} + 40\log(d_{\text{limit}}/d_{\text{measure}})$$

Using the equations above appropriately yield following conversion table

| Frequency Ranges [MHz] | L [ $\mu\text{V/m}$ ] | $d_{\text{limit}}$ [m] | $\text{FS}_{\text{limit}}$ [ $\text{dB}\mu\text{V/m}$ ] | $\text{FS}_{\text{max}}$ [m] [ $\text{dB}\mu\text{V/m}$ ] | $d_{\text{measure}}$ [m] |
|------------------------|-----------------------|------------------------|---------------------------------------------------------|-----------------------------------------------------------|--------------------------|
| 12.660                 | 30                    | 30                     | 29.54                                                   | 50.94                                                     | 3                        |
| 13.110                 | 30                    | 30                     | 29.54                                                   | 50.94                                                     | 3                        |
| 13.110                 | 106                   | 30                     | 40.51                                                   | 61.90                                                     | 3                        |
| 13.410                 | 106                   | 30                     | 40.51                                                   | 61.90                                                     | 3                        |
| 13.410                 | 334                   | 30                     | 50.47                                                   | 71.87                                                     | 3                        |
| 13.553                 | 334                   | 30                     | 50.47                                                   | 71.87                                                     | 3                        |
| 13.553                 | 15848                 | 30                     | 84.00                                                   | 105.39                                                    | 3                        |
| 13.567                 | 15848                 | 30                     | 83.00                                                   | 105.39                                                    | 3                        |
| 13.567                 | 334                   | 30                     | 50.47                                                   | 71.87                                                     | 3                        |
| 13.710                 | 334                   | 30                     | 50.47                                                   | 71.87                                                     | 3                        |
| 13.710                 | 106                   | 30                     | 40.51                                                   | 61.90                                                     | 3                        |
| 14.010                 | 106                   | 30                     | 40.51                                                   | 61.90                                                     | 3                        |
| 14.010                 | 30                    | 30                     | 29.54                                                   | 50.94                                                     | 3                        |
| 14.460                 | 30                    | 30                     | 29.54                                                   | 50.94                                                     | 3                        |

Table 7-1: Conversion table for radiated emissions limits § 15.225a-c

| Frequency<br>Ranges<br>[MHz] | L<br>[μV/m] | d <sub>limit</sub><br>[m] | FS <sub>limit</sub><br>[dBμV/m] | FS <sub>max</sub> [m<br>[dBμV/m] | d <sub>measure</sub><br>[m] |
|------------------------------|-------------|---------------------------|---------------------------------|----------------------------------|-----------------------------|
| 0.009                        | 266.67      | 300                       | 48.52                           | 128.52                           | 3                           |
| 0.490                        | 4.90        | 300                       | 13.80                           | 93.80                            | 3                           |
| 0.490                        | 48.98       | 30                        | 33.80                           | 73.80                            | 3                           |
| 1.705                        | 14.08       | 30                        | 22.97                           | 62.97                            | 3                           |
| 1.705                        | 30.00       | 30                        | 29.54                           | 69.54                            | 3                           |
| 30.0                         | 30.00       | 30                        | 29.54                           | 69.54                            | 3                           |

Table 7-2: Conversion table for radiated emissions limits § 15.225d

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