

CETECOM ICT Services is now

**CTC** | **advanced**  
member of RWTÜV group

## TEST REPORT

Test report no.: 1-1119/16-01-09-B



Deutsche  
Akkreditierungsstelle  
D-PL-12076-01-01

### Testing laboratory

#### CTC advanced GmbH

Untertuerkheimer Strasse 6 – 10

66117 Saarbruecken / Germany

Phone: + 49 681 5 98 - 0

Fax: + 49 681 5 98 - 9075

Internet: <http://www.ctcadvanced.com>

e-mail: [mail@ctcadvanced.com](mailto:mail@ctcadvanced.com)

#### Accredited Testing Laboratory:

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

The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01

### Applicant

#### Sivantos GmbH

Henri-Dunant-Straße 100

91058 Erlangen / GERMANY

Phone: -/-

Fax: -/-

Contact: Lars Johansen

e-mail: [lars.johansen@sivantos.com](mailto:lars.johansen@sivantos.com)

Phone: +49 (9131) 308-3569

### Manufacturer

#### Hi-P Electronics Technology Co Ltd, (Suzhou)

No. 86, Liufeng Road, Hedong Industrial Park, Guoxiang Avenue, Wuzhong District.

215128, Suzhou City / CHINA

### Test standard/s

|                   |                                                                                                                                                           |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 47 CFR Part 15    | Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices                                                                 |
| RSS - 210 Issue 9 | Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment                           |
| RSS - Gen Issue 4 | Spectrum Management and Telecommunications Radio Standards Specifications - General Requirements and Information for the Certification of Radio Apparatus |

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

### Test Item

|                    |                             |
|--------------------|-----------------------------|
| Kind of test item: | Remote Controller           |
| Model name:        | easyTek                     |
| FCC ID:            | SGI-WL402                   |
| IC:                | 267AB-WL402                 |
| Frequency:         | 3.28 MHz                    |
| Technology tested: | Magnetic coupling           |
| Antenna:           | External loop neck antenna  |
| Power supply:      | 3.70 V DC by Li-ion battery |
| Temperature range: | 22 °C                       |



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

### Test report authorized:

cn=Christoph Schneider, o=CTC advanced GmbH, ou=SND-161128, email=Christoph.Schneider@ctcadvanced.com, c=DE  
2017.05.17 13:42:22 +02'00'

Christoph Schneider  
Lab Manager  
Radio Communications & EMC

### Test performed:

p.o.  
Tobias Wittenmeier  
Testing Manager  
Radio Communications & EMC

cn=Marco Bertolino, o=CTC advanced GmbH, ou=BTL-161128, email=Marco.Bertolino@ctcadvanced.com, c=DE  
2017.04.27 15:06:16 +02'00'

## 1 Table of contents

|         |                                                             |    |
|---------|-------------------------------------------------------------|----|
| 1       | Table of contents .....                                     | 2  |
| 2       | General information .....                                   | 3  |
| 2.1     | Notes and disclaimer .....                                  | 3  |
| 2.2     | Application details .....                                   | 3  |
| 2.3     | Test laboratories sub-contracted .....                      | 3  |
| 3       | Test standard/s and references .....                        | 4  |
| 4       | Test environment.....                                       | 5  |
| 5       | Test item .....                                             | 5  |
| 5.1     | General description .....                                   | 5  |
| 5.2     | Additional information .....                                | 5  |
| 6       | Description of the test setup .....                         | 6  |
| 6.1     | Shielded semi anechoic chamber .....                        | 7  |
| 6.2     | Shielded fully anechoic chamber .....                       | 8  |
| 6.3     | Test setup for normalized measurement configurations .....  | 9  |
| 7       | Sequence of testing .....                                   | 10 |
| 7.1     | Sequence of testing radiated spurious 9 kHz to 30 MHz.....  | 10 |
| 7.2     | Sequence of testing radiated spurious 30 MHz to 1 GHz ..... | 11 |
| 8       | Measurement uncertainty .....                               | 12 |
| 9       | Summary of measurement results .....                        | 13 |
| 10      | Additional comments .....                                   | 13 |
| 11      | Measurement results .....                                   | 14 |
| 11.1    | Occupied bandwidth.....                                     | 14 |
| 11.2    | Field strength of the fundamental .....                     | 16 |
| 11.3    | Field strength of the harmonics and spurious .....          | 17 |
| 11.4    | Receiver spurious emissions and cabinet radiations.....     | 20 |
| 12      | Observations .....                                          | 22 |
| Annex A | Document history .....                                      | 23 |
| Annex B | Further information.....                                    | 23 |
| Annex C | Accreditation Certificate .....                             | 24 |

## 2 General information

### 2.1 Notes and disclaimer

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

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CTC advanced GmbH.

The testing service provided by CTC advanced GmbH has been rendered under the current "General Terms and Conditions for CTC advanced GmbH".

CTC advanced GmbH will not be liable for any loss or damage resulting from false, inaccurate, inappropriate or incomplete product information provided by the customer.

Under no circumstances does the CTC advanced GmbH test report include any endorsement or warranty regarding the functionality, quality or performance of any other product or service provided.

Under no circumstances does the CTC advanced GmbH test report include or imply any product or service warranties from CTC advanced GmbH, including, without limitation, any implied warranties of merchantability, fitness for purpose, or non-infringement, all of which are expressly disclaimed by CTC advanced GmbH.

All rights and remedies regarding vendor's products and services for which CTC advanced GmbH has prepared this test report shall be provided by the party offering such products or services and not by CTC advanced GmbH. In no case this test report can be considered as a Letter of Approval.

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

**This test report replaces the test report with the number 1-1119/16-01-09-A and dated 2017-04-12**

### 2.2 Application details

|                                    |            |
|------------------------------------|------------|
| Date of receipt of order:          | 2017-01-26 |
| Date of receipt of test item:      | 2017-01-30 |
| Start of test:                     | 2017-02-03 |
| End of test:                       | 2017-03-24 |
| Person(s) present during the test: | -/-        |

### 2.3 Test laboratories sub-contracted

None

### 3 Test standard/s and references

| Test standard     | Date          | Description                                                                                                                                               |
|-------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 47 CFR Part 15    |               | Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices                                                                 |
| RSS - 210 Issue 9 | August 2016   | Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment                           |
| RSS - Gen Issue 4 | November 2014 | Spectrum Management and Telecommunications Radio Standards Specifications - General Requirements and Information for the Certification of Radio Apparatus |

| Guidance         | Version | Description                                                                                                                                                         |
|------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANSI C63.4-2014  | -/-     | American national standard for methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz |
| ANSI C63.10-2013 | -/-     | American national standard of procedures for compliance testing of unlicensed wireless devices                                                                      |

#### 4 Test environment

|                           |   |                                                          |                                                                                                                                  |
|---------------------------|---|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Temperature               | : | T <sub>nom</sub><br>T <sub>max</sub><br>T <sub>min</sub> | +22 °C during room temperature tests<br>No tests under extreme conditions required<br>No tests under extreme conditions required |
| Relative humidity content | : |                                                          | 55 %                                                                                                                             |
| Barometric pressure       | : |                                                          | 1021 hpa                                                                                                                         |
| Power supply              | : | V <sub>nom</sub><br>V <sub>max</sub><br>V <sub>min</sub> | 3.70 V DC by Li-ion battery<br>No tests under extreme conditions required<br>No tests under extreme conditions required          |

#### 5 Test item

##### 5.1 General description

|                            |   |                             |
|----------------------------|---|-----------------------------|
| Kind of test item          | : | Remote Controller           |
| Type identification        | : | easyTek                     |
| HMN                        | : | -/-                         |
| PMN                        | : | EasyTek B                   |
| HVIN                       | : | EasyTek B                   |
| FVIN                       | : | -/-                         |
| S/N serial number          | : | ZN00020                     |
| HW hardware status         | : | P1                          |
| FW firmware status         | : | 5.0                         |
| Frequency band             | : | 3.28 MHz                    |
| Type of radio transmission | : | Modulated carrier           |
| Use of frequency spectrum  | : |                             |
| Type of modulation         | : | ASK                         |
| Number of channels         | : | 1                           |
| Antenna                    | : | External loop neck antenna  |
| Power supply               | : | 3.70 V DC by Li-ion battery |
| Temperature range          | : | 22 °C                       |

##### 5.2 Additional information

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

Test setup- and EUT-photos are included in test report:      1-1119/16-01-01\_AnnexA  
                                                                                                  1-1119/16-01-01\_AnnexB  
                                                                                                  1-1119/16-01-01\_AnnexD

## 6 Description of the test setup

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

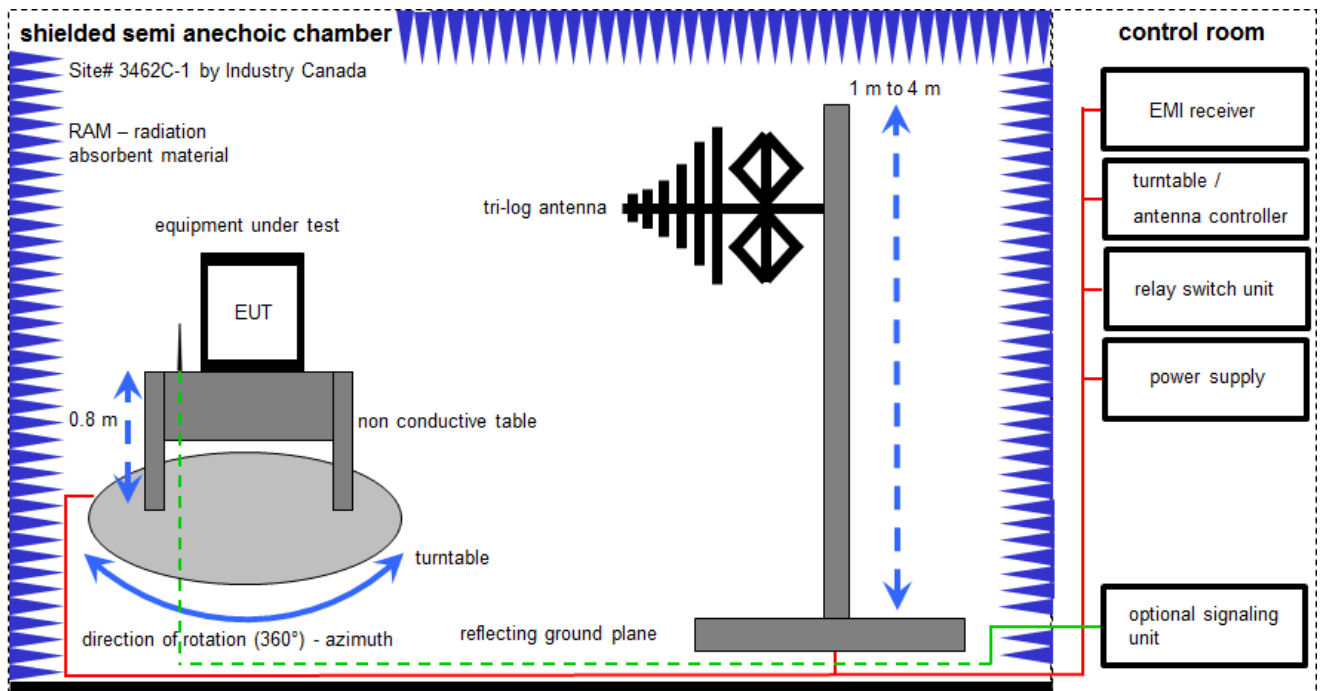
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

**Agenda:** Kind of Calibration

|      |                                            |     |                                                      |
|------|--------------------------------------------|-----|------------------------------------------------------|
| k    | calibration / calibrated                   | EK  | limited calibration                                  |
| ne   | not required (k, ev, izw, zw not required) | zw  | cyclical maintenance (external cyclical maintenance) |
| ev   | periodic self verification                 | izw | internal cyclical maintenance                        |
| Ve   | long-term stability recognized             | g   | blocked for accredited testing                       |
| vlk! | Attention: extended calibration interval   |     |                                                      |
| NK!  | Attention: not calibrated                  | *)  | next calibration ordered / currently in progress     |

## 6.1 Shielded semi anechoic chamber

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



Measurement distance: tri-log antenna 10 meter

$$FS = UR + CL + AF$$

(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

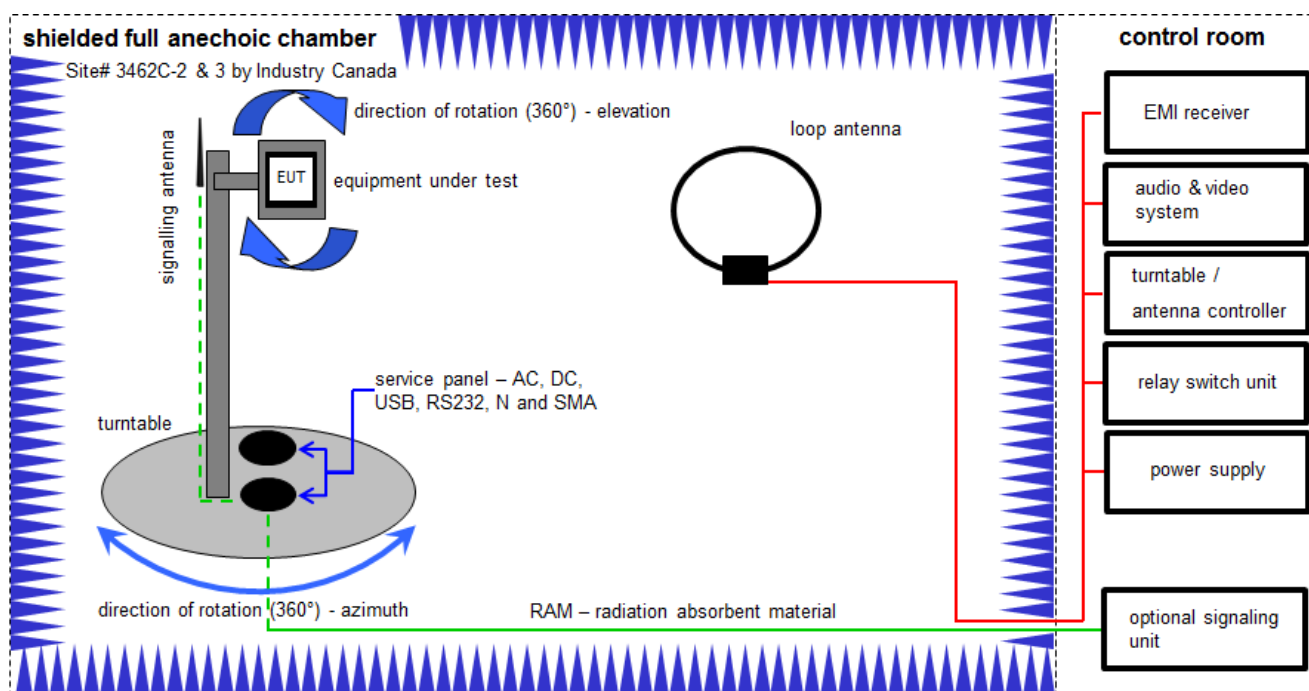
Example calculation:

$$FS [dB\mu V/m] = 12.35 [dB\mu V/m] + 1.90 [dB] + 16.80 [dB/m] = 31.05 [dB\mu V/m] (35.69 \mu V/m)$$

### Equipment table:

| No. | Lab / Item | Equipment                                         | Type         | Manufact.    | Serial No.      | INV. No.  | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|---------------------------------------------------|--------------|--------------|-----------------|-----------|---------------------|------------------|------------------|
| 1   | A          | Switch-Unit                                       | 3488A        | HP           | 2719A14505      | 300000368 | ev                  | -/-              | -/-              |
| 2   | A          | EMI Test Receiver                                 | ESCI 3       | R&S          | 100083          | 300003312 | k                   | 08.03.2016       | 08.03.2017       |
| 3   | A          | Analyzer-Reference-System (Harmonics and Flicker) | ARS 16/1     | SPS          | A3509 07/0 0205 | 300003314 | Ve                  | 02.02.2016       | 02.02.2018       |
| 4   | A          | Antenna Tower                                     | Model 2175   | ETS-Lindgren | 64762           | 300003745 | izw                 | -/-              | -/-              |
| 5   | A          | Positioning Controller                            | Model 2090   | ETS-Lindgren | 64672           | 300003746 | izw                 | -/-              | -/-              |
| 6   | A          | Turntable Interface-Box                           | Model 105637 | ETS-Lindgren | 44583           | 300003747 | izw                 | -/-              | -/-              |
| 7   | A          | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz      | VULB9163     | Schwarzbeck  | 295             | 300003787 | k                   | 25.04.2016       | 25.04.2018       |
| 8   | A          | Spectrum-Analyzer                                 | FSU26        | R&S          | 200809          | 300003874 | k                   | 31.01.2017       | 30.01.2018       |

## 6.2 Shielded fully anechoic chamber



Measurement distance: loop antenna 3 meter

$$FS = UR + CA + AF$$

(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

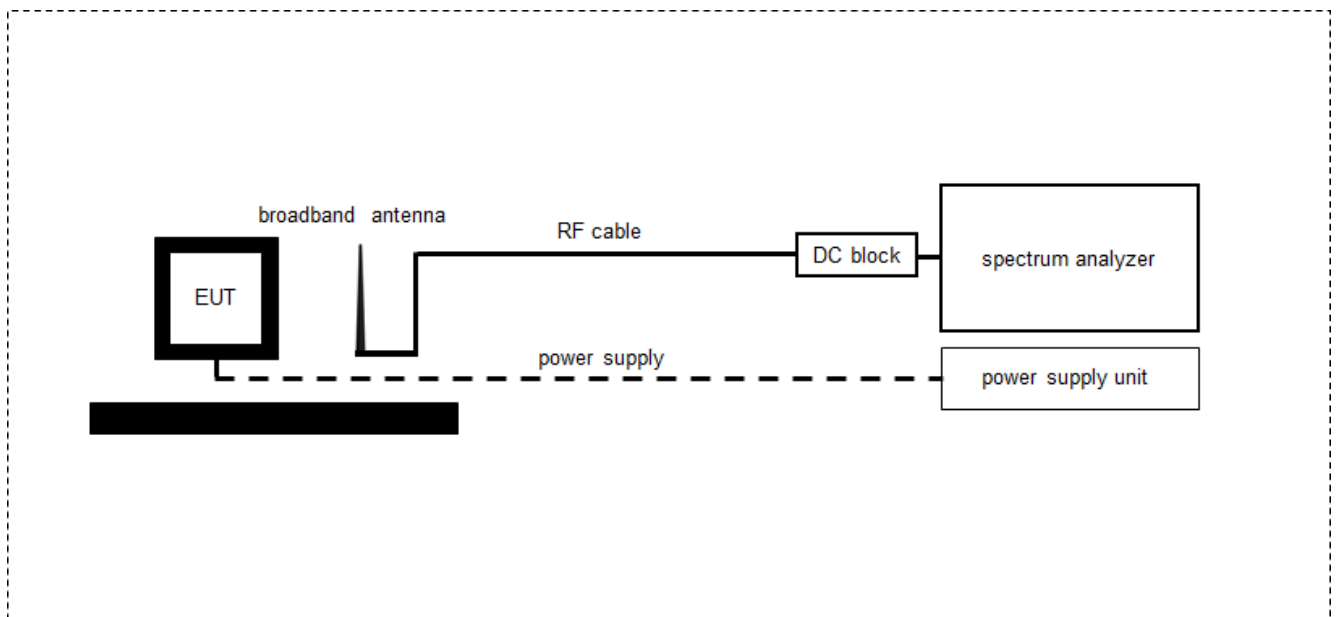
Example calculation:

$$FS \text{ [dB}\mu\text{V/m]} = 40.0 \text{ [dB}\mu\text{V/m]} + (-35.8) \text{ [dB]} + 32.9 \text{ [dB/m]} = 37.1 \text{ [dB}\mu\text{V/m]} \text{ (71.61 } \mu\text{V/m)}$$

### Equipment table:

| No. | Lab / Item | Equipment                               | Type     | Manufact.            | Serial No. | INV. No.  | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|-----------------------------------------|----------|----------------------|------------|-----------|---------------------|------------------|------------------|
| 1   | A          | Anechoic chamber                        | FAC 3/5m | MWB / TDK            | 87400/02   | 300000996 | ev                  | -/-              | -/-              |
| 2   | A          | Switch / Control Unit                   | 3488A    | HP                   | *          | 300000199 | ne                  | -/-              | -/-              |
| 3   | A          | Active Loop Antenna<br>10 kHz to 30 MHz | 6502     | EMCO/2               | 8905-2342  | 300000256 | k                   | 24.06.2015       | 24.06.2017       |
| 4   | A          | EMI Test Receiver<br>20Hz- 26,5GHz      | ESU26    | R&S                  | 100037     | 300003555 | k                   | 31.01.2017       | 30.01.2018       |
| 5   | A          | 4U RF Switch Platform                   | L4491A   | Agilent Technologies | MY50000037 | 300004509 | ne                  | -/-              | -/-              |

### 6.3 Test setup for normalized measurement configurations



$$FS = UR + CA + AF$$

(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

Example calculation:

$$FS [dB\mu V/m] = 40.0 [dB\mu V/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dB\mu V/m] (71.61 \mu V/m)$$

#### Equipment table:

| No. | Lab / Item | Equipment                                         | Type             | Manufact.        | Serial No. | INV. No.  | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|---------------------------------------------------|------------------|------------------|------------|-----------|---------------------|------------------|------------------|
| 1   | A          | HF-Cable 1 m                                      | BPS-1551-394-BPS | Insulated Wire   | 080492     | 300001713 | g                   | -/-              | -/-              |
| 2   | A          | EMI Test Receiver 9 kHz - 3 GHz incl. Preselector | ESPI3            | R&S              | 101713     | 300004059 | k                   | 27.01.2017       | 26.01.2018       |
| 3   | A          | Loop Antenna                                      | ESPI3            | ZEG TS Steinfurt | 101713     | 400001208 | ev                  | -/-              | -/-              |

## 7 Sequence of testing

### 7.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

#### Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

#### Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1.5 m.
- At each turntable position the analyzer sweeps with positive-peak detector to find the maximum of all emissions.

#### Final measurement

- Identified emissions during the premeasurement are maximized by the software by rotating the turntable from 0° to 360°. In case of the 2-axis positioner is used the elevation axis is also rotated from 0° to 360°.
- The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.

## 7.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

### Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 10 m or 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

### Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 m to 3 m.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

### Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable position  $\pm 45^\circ$  and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

## 8 Measurement uncertainty

| Measurement uncertainty                            |             |
|----------------------------------------------------|-------------|
| Test case                                          | Uncertainty |
| Occupied bandwidth                                 | ± used RBW  |
| Field strength of the fundamental                  | ± 3 dB      |
| Field strength of the harmonics and spurious       | ± 3 dB      |
| Receiver spurious emissions and cabinet radiations | ± 3 dB      |
| Conducted limits                                   | ± 2.6 dB    |

## 9 Summary of measurement results

|                                     |                                                                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | No deviations from the technical specifications were ascertained                                                      |
| <input type="checkbox"/>            | There were deviations from the technical specifications ascertained                                                   |
| <input type="checkbox"/>            | This test report is only a partial test report. The content and verdict of the performed test cases are listed below. |

| TC Identifier | Description                                       | Verdict    | Date       | Remark |
|---------------|---------------------------------------------------|------------|------------|--------|
| RF-Testing    | CFR Part 15<br>RSS 210 Issue 9<br>RSS Gen Issue 4 | See table! | 2017-04-27 | -/-    |

| Test specification clause          | Test case                                          | Temperature conditions | Power source conditions | C                                   | NC                       | NA                                  | NP                       | Remark                                               |
|------------------------------------|----------------------------------------------------|------------------------|-------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|------------------------------------------------------|
| RSS Gen Issue 4 (6.6)              | Occupied bandwidth                                 | Nominal                | Nominal                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                                                  |
| § 15.209                           | Field strength of the fundamental                  | Nominal                | Nominal                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                                                  |
| § 15.209<br>RSS Gen Issue 4 (6.13) | Field strength of the harmonics and spurious       | Nominal                | Nominal                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                                                  |
| § 15.109                           | Receiver spurious emissions and cabinet radiations | Nominal                | Nominal                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                                                  |
| §15.107<br>§15.207                 | Conducted limits                                   | Nominal                | Nominal                 | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | EUT ceases transmitting after connecting the charger |

**Note:** NA = Not applicable; NP = Not performed; C = Compliant; NC = Not compliant

## 10 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

## 11 Measurement results

### 11.1 Occupied bandwidth

#### Measurement:

The emission bandwidth (x dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated x dB below the maximum in-band spectral density of the modulated signal.

| Measurement parameters   |                                     |
|--------------------------|-------------------------------------|
| Detector:                | Peak                                |
| Resolution bandwidth:    | 1 % – 5 % of the occupied bandwidth |
| Video bandwidth:         | ≥ 3x RBW                            |
| Trace mode:              | Max hold                            |
| Analyser function:       | 99 % / 75 % power function          |
| Used test setup:         | See sub clause 6.3A                 |
| Measurement uncertainty: | See sub clause 8                    |

#### Limit:

| IC                                      |
|-----------------------------------------|
| for RSP-100 test report coversheet only |

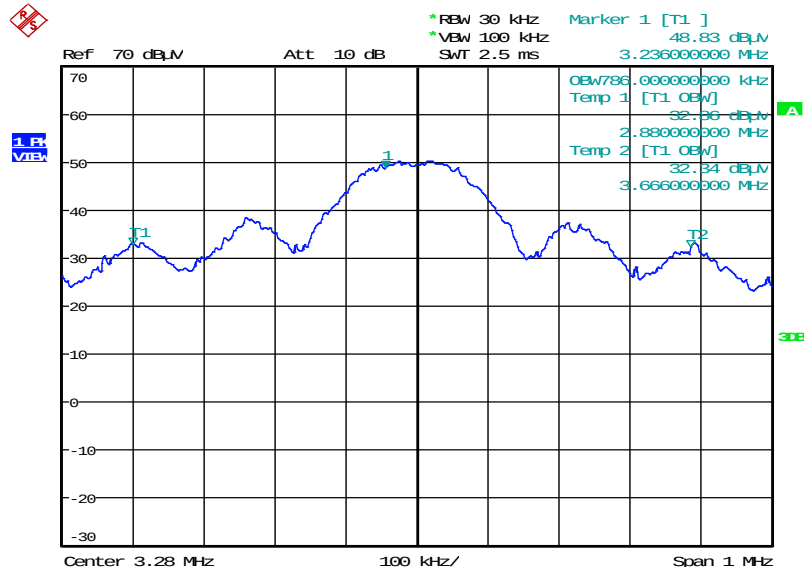
#### Result:

| 99% emission bandwidth |
|------------------------|
| 786 kHz                |

| 75% emission bandwidth |
|------------------------|
| 146 kHz                |

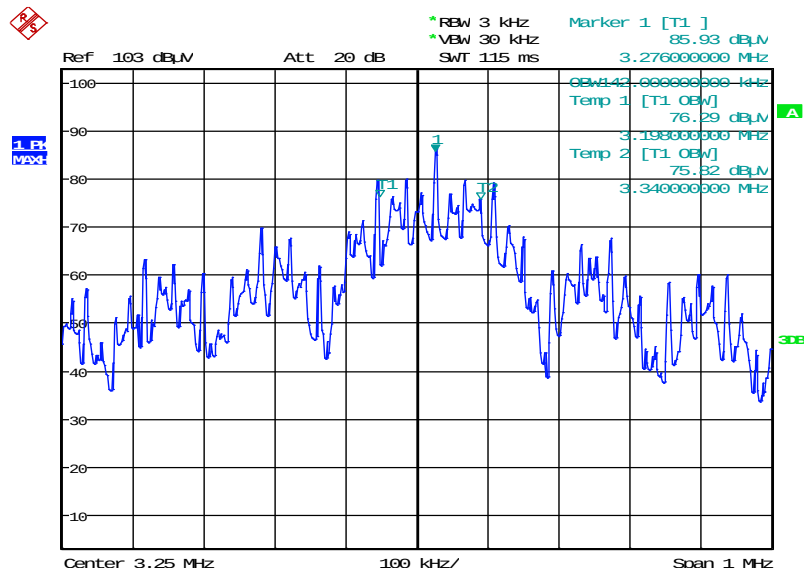
**Plot:**

**Plot 1: 99 % emission bandwidth**



Date: 25.JAN.2017 10:40:07

**Plot 2: 75 % emission bandwidth**



Date: 24.MAR.2017 11:07:39

## 11.2 Field strength of the fundamental

### Measurement:

The maximum detected field strength for the carrier signal.

| Measurement parameters   |                                |
|--------------------------|--------------------------------|
| Detector:                | Quasi peak / peak (worst case) |
| Resolution bandwidth:    | 9 kHz                          |
| Video bandwidth:         | ≥ 3x RBW                       |
| Trace mode:              | Max hold                       |
| Used test setup          | See sub clause 6.2A            |
| Measurement uncertainty: | See sub clause 8               |

### Limit:

| FCC & IC        |                         |                          |
|-----------------|-------------------------|--------------------------|
| Frequency (MHz) | Field strength (dBμV/m) | Measurement distance (m) |
| 1.705 – 30.0    | 29.5                    | 30                       |

### Recalculation:

| According to ANSI C63.10 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Frequency                | Formula                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Correction value    |
| 3.28 MHz                 | $FS_{limit} = FS_{max} - 40 \log \left( \frac{d_{nearfield}}{d_{measure}} \right) - 20 \log \left( \frac{d_{limit}}{d_{nearfield}} \right)$ <p> <math>FS_{limit}</math> is the calculation of field strength at the limit distance, expressed in dBμV/m<br/> <math>FS_{max}</math> is the measured field strength, expressed in dBμV/m<br/> <math>d_{nearfield}</math> is the <math>\lambda/2\pi</math> distance<br/> <math>d_{measure}</math> is the distance of the measurement point from EUT<br/> <math>d_{limit}</math> is the reference limit distance         </p> | -33.72 (3m to 30 m) |

### Result:

| Field strength of the fundamental              |             |             |
|------------------------------------------------|-------------|-------------|
| Frequency                                      | 3.28 MHz    |             |
| Distance                                       | @ 3 m       | @ 30 m      |
| Measured / calculated value (peak measurement) | 45.1 dBμV/m | 11.4 dBμV/m |
| Measured / calculated value (QP measurement)   | 42.2 dBμV/m | 8.5 dBμV/m  |

### 11.3 Field strength of the harmonics and spurious

#### Measurement:

The maximum detected field strength for the harmonics and spurious.

| Measurement parameters   |                                                                                    |
|--------------------------|------------------------------------------------------------------------------------|
| Detector:                | Quasi peak / average or peak (worst case – pre-scan)                               |
| Resolution bandwidth:    | F < 150 kHz: 200 Hz<br>150 kHz < F < 30 MHz: 9 kHz<br>30 MHz < F < 1 GHz: 120 kHz  |
| Video bandwidth:         | F < 150 kHz: 1 kHz<br>150 kHz < F < 30 MHz: 100 kHz<br>30 MHz < F < 1 GHz: 300 kHz |
| Trace mode:              | Max hold                                                                           |
| Used test setup:         | 9 kHz to 30 MHz: see sub clause 6.2A<br>30 MHz to 1 GHz: see sub clause 6.1A       |
| Measurement uncertainty: | See sub clause 8                                                                   |

#### Limit:

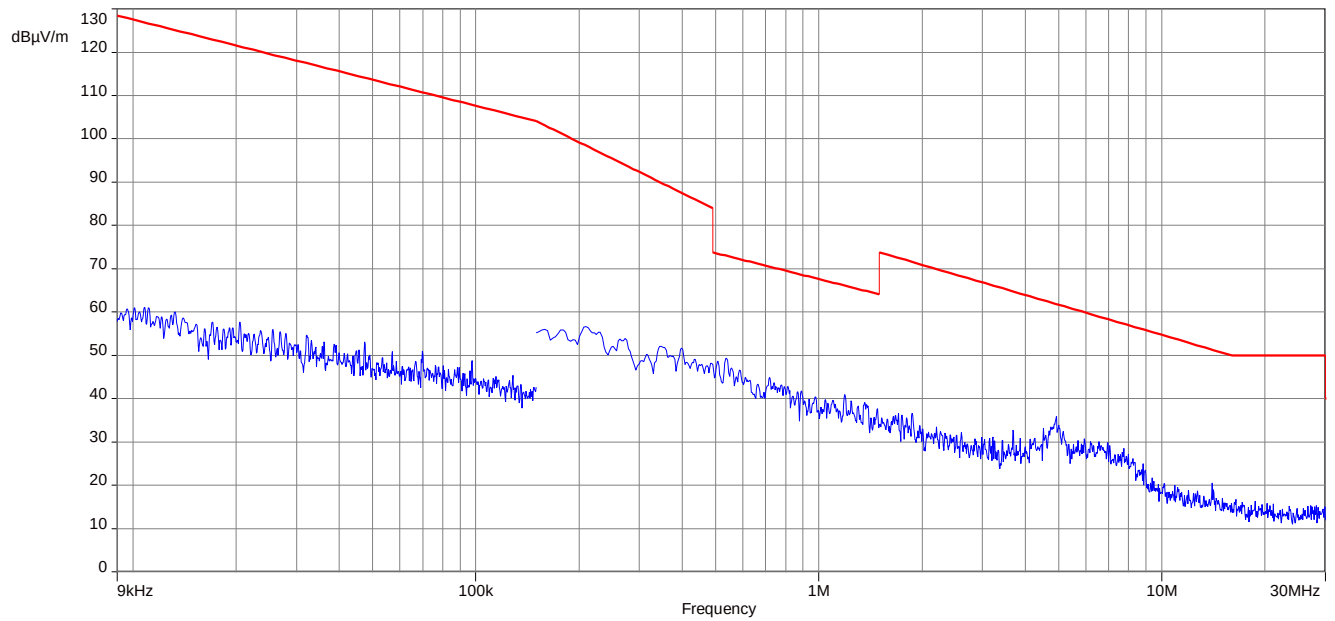
| FCC & IC        |                         |                          |
|-----------------|-------------------------|--------------------------|
| Frequency (MHz) | Field strength (dBµV/m) | Measurement distance (m) |
| 0.009 – 0.490   | 2400/F(kHz)             | 300                      |
| 0.490 – 1.705   | 24000/F(kHz)            | 30                       |
| 1.705 – 30      | 30 (29.5 dBµV/m)        | 30                       |
| 30 – 88         | 100 (40 dBµV/m)         | 3                        |
| 88 – 216        | 150 (43.5 dBµV/m)       | 3                        |
| 216 – 960       | 200 (46 dBµV/m)         | 3                        |

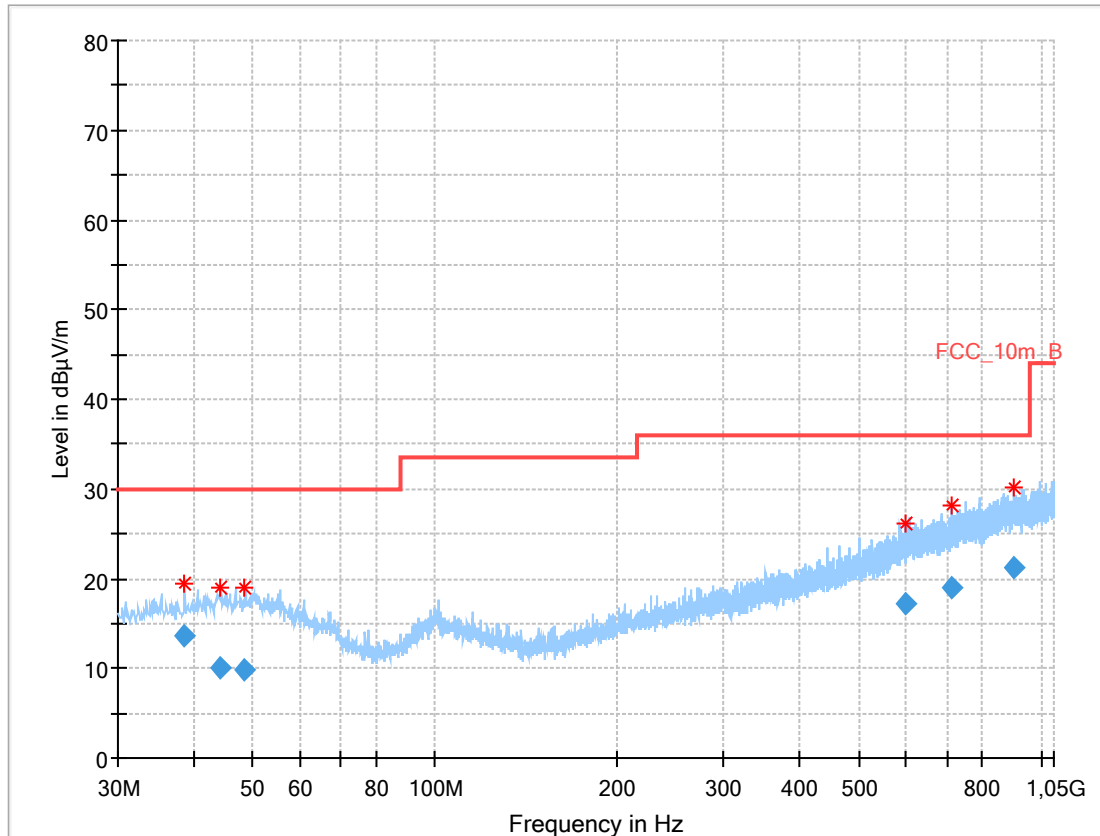
#### Result:

| Detected emissions                                  |          |                            |                |
|-----------------------------------------------------|----------|----------------------------|----------------|
| Frequency (MHz)                                     | Detector | Resolution bandwidth (kHz) | Detected value |
| All emissions were more than 10 dB below the limit. |          |                            |                |
|                                                     |          |                            |                |
|                                                     |          |                            |                |

**Plots:**

**Plot 1:** 9 kHz – 30 MHz, magnetic emissions



**Plot 2:** 30 MHz – 1 GHz, vertical and horizontal polarisation**Final\_Result**

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 38.714250       | 13.55              | 30.00          | 16.45       | 1000.0          | 120.000         | 185.0       | V   | 0.0           | 13.1       |
| 44.401500       | 9.96               | 30.00          | 20.04       | 1000.0          | 120.000         | 101.0       | H   | 314.0         | 13.6       |
| 48.448500       | 9.77               | 30.00          | 20.23       | 1000.0          | 120.000         | 101.0       | V   | 129.0         | 13.7       |
| 596.321250      | 17.27              | 36.00          | 18.73       | 1000.0          | 120.000         | 185.0       | V   | 326.0         | 20.6       |
| 709.492950      | 19.04              | 36.00          | 16.96       | 1000.0          | 120.000         | 100.0       | V   | 349.0         | 21.8       |
| 898.944750      | 21.29              | 36.00          | 14.71       | 1000.0          | 120.000         | 185.0       | V   | 81.0          | 24.2       |

## 11.4 Receiver spurious emissions and cabinet radiations

### Measurement:

The maximum detected field strength for the spurious.

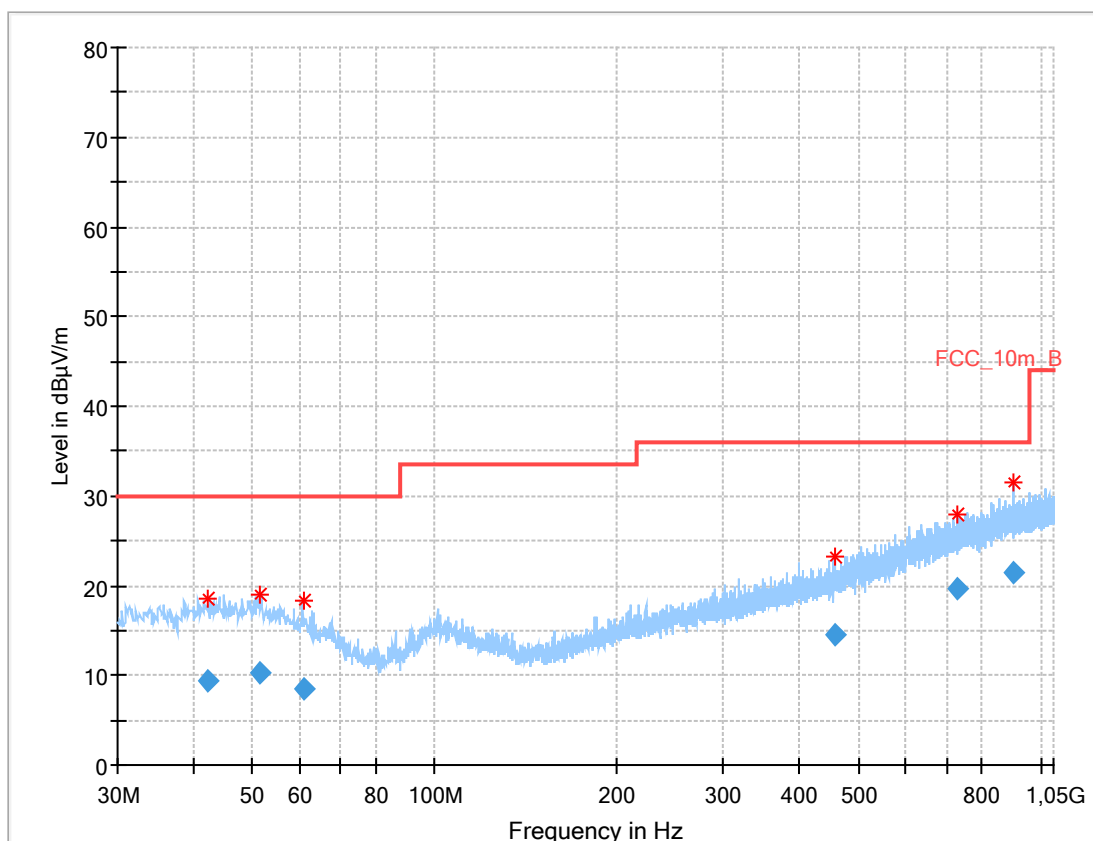
| Measurement parameters   |                                                                                    |
|--------------------------|------------------------------------------------------------------------------------|
| Detector:                | Quasi peak / average or peak (worst case – pre-scan)                               |
| Resolution bandwidth:    | F < 150 kHz: 200 Hz<br>150 kHz < F < 30 MHz: 9 kHz<br>30 MHz < F < 1 GHz: 120 kHz  |
| Video bandwidth:         | F < 150 kHz: 1 kHz<br>150 kHz < F < 30 MHz: 100 kHz<br>30 MHz < F < 1 GHz: 300 kHz |
| Trace mode:              | Max hold                                                                           |
| Used test setup          | See sub clause 7.1A                                                                |
| Measurement uncertainty: | See sub clause 8                                                                   |

### Limit:

| FCC & IC        |                               |                          |
|-----------------|-------------------------------|--------------------------|
| Frequency (MHz) | Field strength (dB $\mu$ V/m) | Measurement distance (m) |
| 30 – 88         | 100 (40 dB $\mu$ V/m)         | 3                        |
| 88 – 216        | 150 (43.5 dB $\mu$ V/m)       | 3                        |
| 216 – 960       | 200 (46 dB $\mu$ V/m)         | 3                        |

### Result:

| Detected emissions               |          |                            |                |
|----------------------------------|----------|----------------------------|----------------|
| Frequency (MHz)                  | Detector | Resolution bandwidth (kHz) | Detected value |
| See result table below the plot. |          |                            |                |
|                                  |          |                            |                |
|                                  |          |                            |                |

**Plots:****Plot 1:** 30 MHz – 1 GHz, vertical and horizontal polarisation**Final\_Result**

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 42.345600       | 9.36               | 30.00          | 20.64       | 1000.0          | 120.000         | 101.0       | H   | 163.0         | 13.4       |
| 51.537450       | 10.26              | 30.00          | 19.74       | 1000.0          | 120.000         | 98.0        | V   | 215.0         | 13.5       |
| 60.685050       | 8.46               | 30.00          | 21.54       | 1000.0          | 120.000         | 98.0        | H   | 236.0         | 11.7       |
| 458.098800      | 14.54              | 36.00          | 21.46       | 1000.0          | 120.000         | 185.0       | H   | 121.0         | 17.8       |
| 727.591950      | 19.57              | 36.00          | 16.43       | 1000.0          | 120.000         | 185.0       | V   | 94.0          | 22.2       |
| 903.662550      | 21.35              | 36.00          | 14.65       | 1000.0          | 120.000         | 100.0       | V   | 153.0         | 24.2       |

## 12 Observations

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

## Annex A Document history

| Version | Applied changes                    | Date of release |
|---------|------------------------------------|-----------------|
|         | Initial release                    | 2017-03-24      |
| A       | Correction of HMN, PMN, HVIN, FVIN | 2017-04-12      |
| B       | Correction of HMN, PMN, HVIN, FVIN | 2017-04-27      |

## Annex B Further information

### Glossary

|          |   |                                                |
|----------|---|------------------------------------------------|
| AVG      | - | Average                                        |
| DUT      | - | Device under test                              |
| EMC      | - | Electromagnetic Compatibility                  |
| EN       | - | European Standard                              |
| EUT      | - | Equipment under test                           |
| ETSI     | - | European Telecommunications Standard Institute |
| FCC      | - | Federal Communication Commission               |
| FCC ID   | - | Company Identifier at FCC                      |
| HW       | - | Hardware                                       |
| IC       | - | Industry Canada                                |
| Inv. No. | - | Inventory number                               |
| N/A      | - | Not applicable                                 |
| PP       | - | Positive peak                                  |
| QP       | - | Quasi peak                                     |
| S/N      | - | Serial number                                  |
| SW       | - | Software                                       |
| PMN      | - | Product marketing name                         |
| HMN      | - | Host marketing name                            |
| HVIN     | - | Hardware version identification number         |
| FVIN     | - | Firmware version identification number         |
| OBW      |   | Occupied Bandwidth                             |
| OC       |   | Operating Channel                              |
| OCW      |   | Operating Channel Bandwidth                    |
| OOB      |   | Out Of Band                                    |

## Annex C Accreditation Certificate

first page

last page



Deutsche Akkreditierungsstelle GmbH

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

### Akkreditierung



Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

**CTC advanced GmbH**  
Untertürkheimer Straße 6-10, 66117 Saarbrücken

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

**Funk**  
Mobilfunk (GSM / DCS) + OTA  
Elektromagnetische Verträglichkeit (EMV)  
Produktsicherheit  
SAR / EMF  
Umwelt  
Smart Card Technology  
Bluetooth®  
Automotive  
Wi-Fi-Services  
Kansadische Anforderungen  
US-Anforderungen  
Akustik  
Near Field Communication (NFC)

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 25.11.2016 mit der Akkreditierungsnummer D-PL-12076-01 und ist gültig bis 17.01.2018. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 63 Seiten.

Registrierungsnummer der Urkunde: D-PL-12076-01-01

Frankfurt, 25.11.2016

Stelle Minister auf der Rückseite

Im Auftrag Dipl.-Ing. Gert Ralf Eigner  
Abteilungsleiter

Deutsche Akkreditierungsstelle GmbH

Standort Berlin  
Spittelmarkt 10  
10117 Berlin

Standort Frankfurt am Main  
Europa-Allee 52  
60327 Frankfurt am Main

Standort Braunschweig  
Bundesallee 100  
38116 Braunschweig

Die auszugsweise Veröffentlichung der Akkreditierungsurkunde bedarf der vorherigen schriftlichen Zustimmung der Deutsche Akkreditierungsstelle GmbH (DAKKS). Ausgenommen davon ist die separate Weiterverbreitung des Deckblattes durch die umseitig genannte Konformitätsbewertungsstelle in unveränderter Form.

Es darf nicht der Anschein erweckt werden, dass sich die Akkreditierung auch auf Bereiche erstreckt, die über den durch die DAKKS bestätigten Akkreditierungsbereich hinausgehen.

Die Akkreditierung erfolgte gemäß des Gesetzes über die Akkreditierungsstelle (AkkStelleG) vom 31. Juli 2009 (BGBl. I S. 2625) sowie der Verordnung (EG) Nr. 765/2008 des Europäischen Parlaments und des Rates vom 9. Juli 2008 über die Vorschriften für die Akkreditierung und Marktüberwachung im Zusammenhang mit der Vermarktung von Produkten (Abi. L 218 vom 9. Juli 2008, S. 30). Die DAKKS ist Unterzeichnerin der Multilateralen Abkommen zur gegenseitigen Anerkennung der European co-operation for Accreditation (EA), des International Accreditation Forum (IAF) und der International Laboratory Accreditation Cooperation (ILAC). Die Unterzeichner dieser Abkommen erkennen ihre Akkreditierungen gegenseitig an.

Der aktuelle Stand der Mitgliedschaft kann folgenden Webseiten entnommen werden:  
EA: [www.european-accreditation.org](http://www.european-accreditation.org)  
ILAC: [www.ilac.org](http://www.ilac.org)  
IAF: [www.iaf.nu](http://www.iaf.nu)

### Note:

The current certificate including annex can be received on request.