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LAB N° 0168

Independent Testing Laboratory
Accredited by ACCREDIA according to UNI CEI EN ISO/IEC 17025 cert. nr. 0168

# TEST REPORT nr. R15182802

## Federal Communication Commission (FCC)

**Test item**

Description .....: RADIOBAND TRANSMITTER WITH TWO INPUTS
Trademark .....: JCM TECHNOLOGIES
Model/Type .....: RB3 T916
FCC ID .....: U5Z-RB3T916

**Test Specification**

Standard .....: FCC Rules & Regulations, Title 47:2014
Part 15 paragraph(s): 203, 204, 207, 209 and 231

**Client's name** .....: JCM TECHNOLOGIES S.A.
Address .....: Bisbe Morgades, 46 (Baixos) – 08500 Vic – SPAIN

**Manufacturer's name** : Same as client
Address .....: --

**Report**

Tested by .....: A. Bertezzolo – *Technician*

Approved by .....: R. Beghetto – *Laboratory Manager*

Date of issue .....: 22.02.16
Contents .....: 44 pages

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**ANNEX 1:** photographs of test setup

# 1. Summary

*Standard:*

FCC Rules & Regulations, Title 47:2014
Part 15 paragraph(s): 203, 204, 207, 209 and 231

| *Test specifications* | *Environmental Phenomena* | *Tests sequence* | *Result* |
|---|---|---|---|
| Part 15.203 | Antenna requirements | 1 | Complies |
| Part 15.207 | Conducted emissions | -- | N.A. (+) |
| Part 15.209 | Radiated emissions | 2 | Complies |
| Part 15.209 and 15.231(b) | Fundamental and spurious emissions (≤ 1 GHz) | 3 | Complies |
| Part 15.209 and 15.231 | Spurious emissions (> 1 GHz) | 4 | Complies |
| Part 15.231(c) | Occupied channel bandwidth | 5 | Complies |
| Part 15.231(a3) | Periodic operation characteristics | 6 | Complies |

(+) Devices which only employ battery power. See FCC Part 15.207 (c)

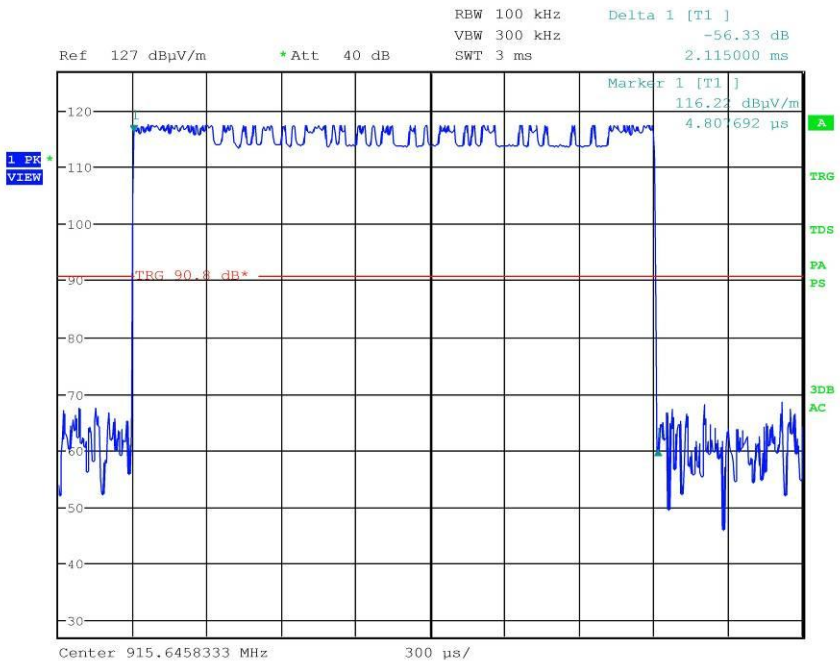
*The Test Report was given to the Client representatives for necessary documentation of ratification of the tested equipment and it is valid for the FCC certification*

## 2. Description of Equipment under test (EUT)

| | | |
|---|---|---|
| Power supply | : | 3,6 Vdc from battery |
| Serial Number | : | -- |
| Type of equipment | : | ☑ Transmitter Unit |
| | | ☑ Receiver Unit |
| Type of station | : | ❑ Fixed station |
| | | ❑ Portable station |
| | | ☑ Mobile station |
| Nominal frequency | : | 902,30 MHz |
| | | 915,65 MHz |
| | | 927,70 MHz |
| Duty cycle evaluation | : | 2,1 ms |
| | | Evaluation has been performed in agreement with FCC Part 15.35c. This transmission is intended as a train of pulses of 2,1 ms ON and 97,9 ms OFF on 100 ms evaluation. No other "ON" after the first 100 ms on a single transmission. See also graph G15182810 |
| Delta (dB) for the performing of tests | : | 20log (2,1 ms /100 ms) = -33,56 dB |

G15182810

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182810 |
| **Test Spec** | |



## 2.1 Test Site

| | | |
|---|---|---|
| Company | : | CMC Centro Misure Compatibilità S.r.l. |
| Address | : | Via dell'Elettronica, 12/C<br>36016 Thiene (VI) – ITALY |
| Test site facility's FCC registration number | : | 271947 |

## 3. Testing and sampling

| | | |
|---|---|---|
| Date of receipt of test item | : | 22.09.15 |
| Testing start date | : | 27.10.15 |
| Testing end date | : | 10.11.15 |
| Samples tested nr. | : | 1 |
| Sampling procedure. | : | Equipment used for testing was picked up by the manufacturer, at the end of the production process with random criterion |
| Internal identification | : | adhesive label with the product number P151026 |

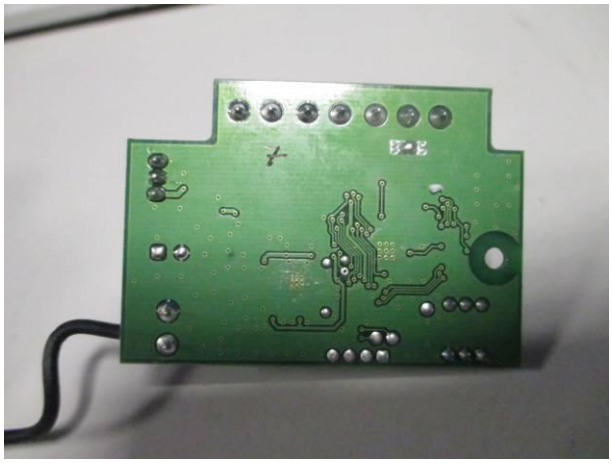
## 4. Operative conditions

| | | |
|---|---|---|
| EUT exercising | : | EUT in continuous transmission at the maximum power on each operating frequency |

# 5. Photograph(s) of EUT

## 5.1 Photograph(s) of EUT



## 6. Equipment list

| *Id. number* | *Manufacturer* | *Model* | *Description* | *Serial number* | *Last calibration* | *Due date calibration* |
|---|---|---|---|---|---|---|
| CMC S010 | Rohde & Schwarz | ESH3-Z2 | Impulses Limiting Device | - - - | January '15 | January '16 |
| CMC S108 | EMCO | 3115 | Horn Antenna | 9811-5622 | May '13 | May '16 |
| CMC S127 | Schaffner | HLA6120 | Loop Antenna | 1191 | January '13 | January '16 |
| CMC S136 | Schwarzbeck | VULB 9163 | Broadband Antenna | 9136-205 | May '13 | May '16 |
| CMC S164 | Rohde & Schwarz | ESU26 | EMC interference receiver | 100052 | January '15 | January '16 |
| CMC S200 | Schwarzbeck | NSLK 8128 | V-LISN | 8128-273 | January '15 | January '16 |
| CMC S227 | Rohde & Schwarz | ESR7 | EMI Test Receiver 7GHz | 101121 | January '15 | January '16 |

# 7. Measurement uncertainty

| *Test* | Expanded Uncertainty | note |
|---|---|---|
| **Conducted Emission** | | |
| (50Ω/50µH AMN) - (9 kHz – 150 kHz) | ±3.6 dB | 1 |
| (50Ω/50µH AMN) - (150 kHz – 30 MHz) | ±3.0 dB | 1 |
| (Voltage probe) - (150 kHz – 30 MHz) | ±2.8 dB | 1 |
| (50Ω/5µH AMN) - (150 kHz – 108 MHz) | ±2.6 dB | 1 |
| **Discontinuous Conducted Emission** | | |
| Conducted Emission (50Ω/50µH AMN) - (150 kHz – 30 MHz) | ±3.0 dB | 1 |
| | | |
| **Disturbance Power** (30 MHz – 300 MHz) | ±3.7 dB | 1 |
| **Radiated Emission** | | |
| (0,150 MHz – 30 MHz) | ±4.0 dB | 1 |
| (30 MHz – 1000 MHz) | ±4.3 dB | 1 |
| (1 GHz – 6 GHz) | ±4.5 dB | 1 |
| | | |
| **Electromagnetic field EMF** | ±10.5 % | 1 |
| | | |
| **Harmonic current emissions test** | ±1.8 % | 1 |
| **Voltage fluctuation and flicker test** | ±2.6 % | 1 |
| | | |
| **Insertion loss test** | ±2.0 dB | 1 |
| **Radiated electromagnetic disturbance test (loop antenna)** | ±2.1 dB | 1 |
| | | |
| **Radiated electromagnetic field immunity test** | 0.81 V/m at 3V/m | 1 |
| **Pulse modulated radiated electromagnetic field immunity test** | 0.81 V/m at 3V/m | 1 |
| **Injected currents immunity test** | 0.45 V at 3V | 1 |
| **Bulk current** | 3.7 mA at 60 mA | 1 |
| **Power frequency magnetic field immunity test** | 0.1 A/m at 10 A/m | 1 |
| | | |
| **Effective radiated power (F < 1GHz)** | ±4.3 dB | 1 |
| **Effective radiated power (F > 1GHz)** | ±3.7 dB | 1 |
| **Frequency error** | < 1x10-7 | 1 |
| **Modulation bandwidth** | < 1x10-7 | 1 |
| **Conducted RF power and spurious emission** | ±0.7 dB | 1 |
| **Adjacent channel power** | ±1.2 dB | 1 |
| **Blocking** | ±1.2 dB | 1 |
| | | |
| **Electrostatic discharge immunity test** | | 2 |
| **Electrical fast transients / burst immunity test** | | 2 |
| **Surge immunity test** | | 2 |
| **Pulse magnetic field immunity test** | | 2 |
| **Damped oscillatory magnetic field immunity test** | | 2 |
| **Short interruption immunity test** | | 2 |
| | | |
| **Voltage transient emission test** | ±2.2 % | 1 |
| **Transient immunity test** | | 2 |
| *Rev_15_01 date 04/05/2015* | | |

*Note 1:*
The expanded uncertainty reported according to EN55016-4-2:2011 is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of p = 95%

*Note 2:*

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence, covering factor k = 2.

# 8. Reference documents

| *Reference no.* | *Description* |
|---|---|
| FCC Rules and Regulation Title 47 part 15:2014 | -- |
| ANSI C63.4:2009 | American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz |
| Internal Procedure PM001 rev. 2.0 (Quality Manual) | Measure Procedure |
| Internal procedure INC_M rev. 8.2 (Quality Manual) | Measurement uncertainty calculation |

## 9. Deviation from test specification

In agreement with the client, emission tests were performed with peak detector.

At the frequencies where the measures exceed the limit or within 6 dB from it, the test was repeated with quasi-peak detector and/or average detector.

## 10. Test case verdicts

Test case does not apply to the test object ..... : N.A.

Test item does meet the requirement ..... : Complies

Test item does not meet the requirement..... : Does not comply

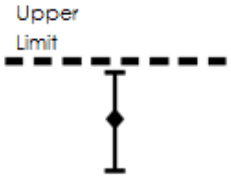
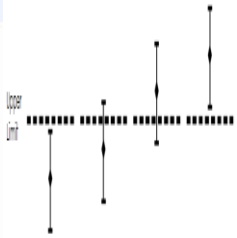
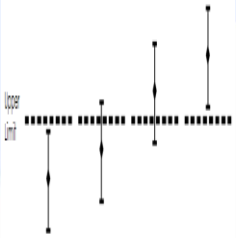
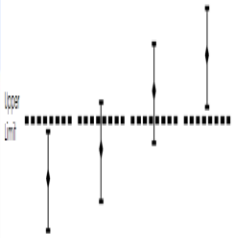
Test not performed ..... : N.E.

## 11. Results

In this clause tests results are reported.

Measurement uncertainty is in accordance with document CMC INC_M rev. 8.2.

*Judgement of compliance:*

| Case 1 | Case 2 | Case 3 | Case 4 |
|---|---|---|---|
|  |  |  |  |
| The sample complies with the requirement.<br><br>The measurement results is within the specification limit when the measurement uncertainty is taken into account. | The sample complies with the requirement.<br><br>It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty although the measurement result is below the limit. | The sample does not comply with the requirement.<br><br>It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty also the measurement result is upper the limit. | The sample does not comply with the requirement.<br><br>The measurement results is outside the specification limit when the measurement uncertainty is taken into account. |

In agreement with ILAC-G8: 03/2009 Guidelines on the Reporting of Compliance with Specification.

## 11.1 Antenna requirements

### Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.203 and 15.204
- Internal procedure PM001
- See clause 4 of this test report
- Test date: 27 October 2015
- Technician: A. Bertezzolo

### Test configuration and test method

*Test site:*
Laboratory

*Auxiliary equipment:*
See clause 4 of this test report

### EUT exercising

See clause 4 of this test report

### Test equipment used

--
Measurement uncertainty: See clause 7 of this test report

### Test specification

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded

### Environmental conditions

| *Temperature (°C)* | *Atmospheric pressure (kPa)* | *Relative humidity (%)* |
|---|---|---|
| 22 | 101 | 45 |

### Result

| *Antenna Type* | *External R.F. power amplifier* | *Gain* | *Remarks* | *Results* |
|---|---|---|---|---|
| Wire connected to terminal | Not Present | -- | -- | Complies |

**Result:** The requirements are met

## 11.2 Radiated emissions

### Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part. 15.209
- Internal procedure PM001
- See clause 4 of this test report
- Test date: 06 November 2015
- Technician: A. Bertezzolo

### Test configuration and test method

*Test site:*
Semi-anechoic chamber

*Auxiliary equipment:*
See clause 4 of this test report

### EUT exercising

See clause 4 of this test report

### Test equipment used

CMC S108, CMC S127, CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

### Test specification

Port: Enclosure
Frequency range: 0,009 MHz – 1000 MHz
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 3 m

### Environmental conditions

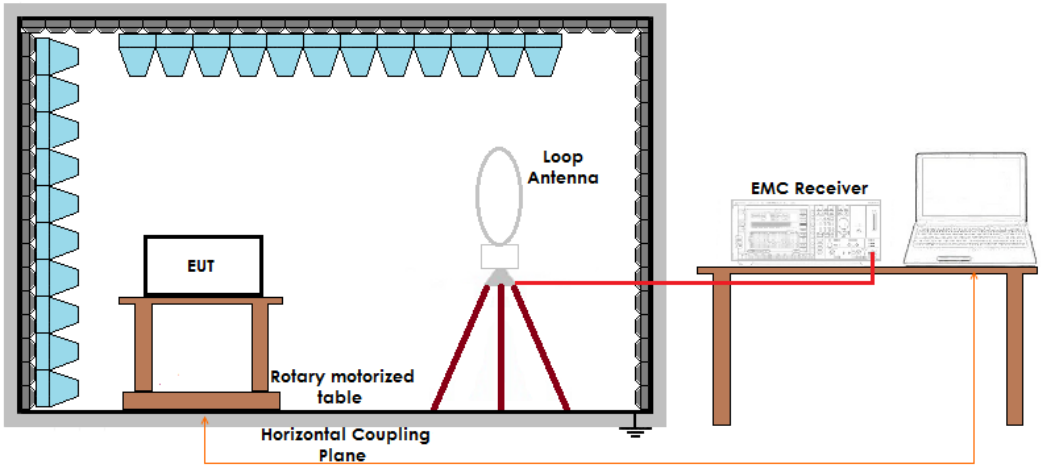
| *Temperature (°C)* | *Atmospheric pressure (kPa)* | *Relative humidity (%)* |
|---|---|---|
| 22 | 100 | 45 |

### Acceptance limits

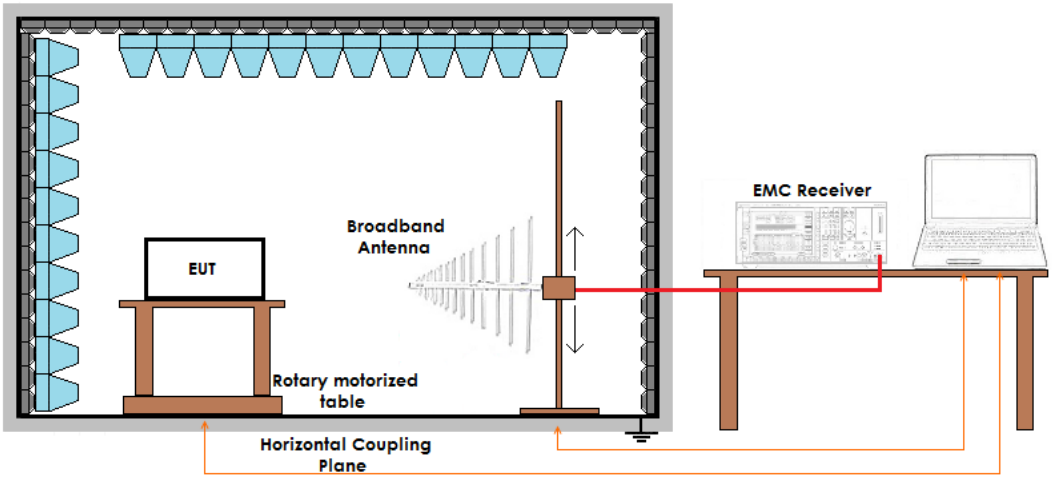
| *Frequency range (MHz)* | *Limits [dB(µV/m)]* |
|---|---|
| 0,009 to 0,490 | 128,51 to 93,80 |
| 0,490 to 1,705 | 73,80 to 62,97 |
| 1,705 to 30 | 69,54 |
| 30 to 88 | 40 |
| 88 to 216 | 43,52 |
| 216 to 960 | 46,02 |
| Above 960 | 53,98 |
| **Remarks:** The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. | |

## Setup

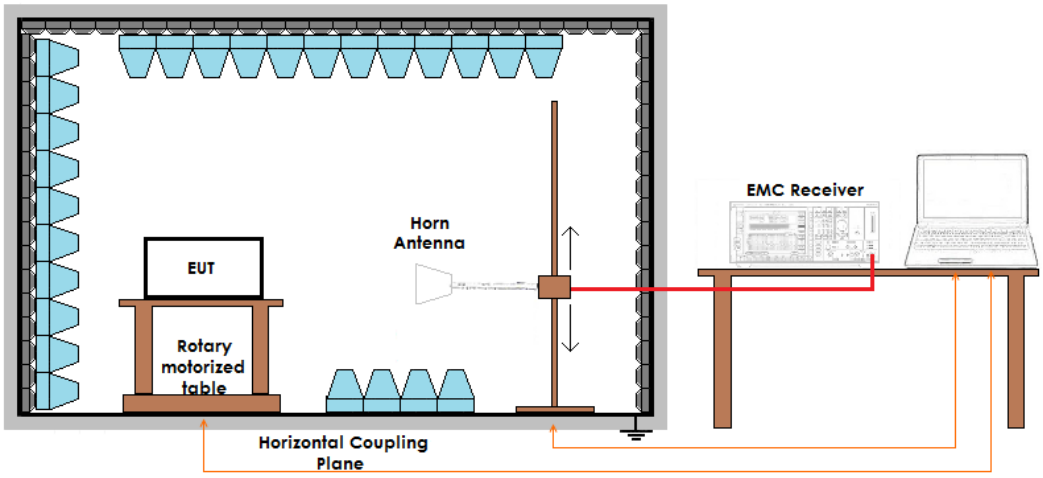
### Frequency ≤ 30 MHz




### Frequency ≤ 1 GHz




### Frequency > 1 GHz



## Result

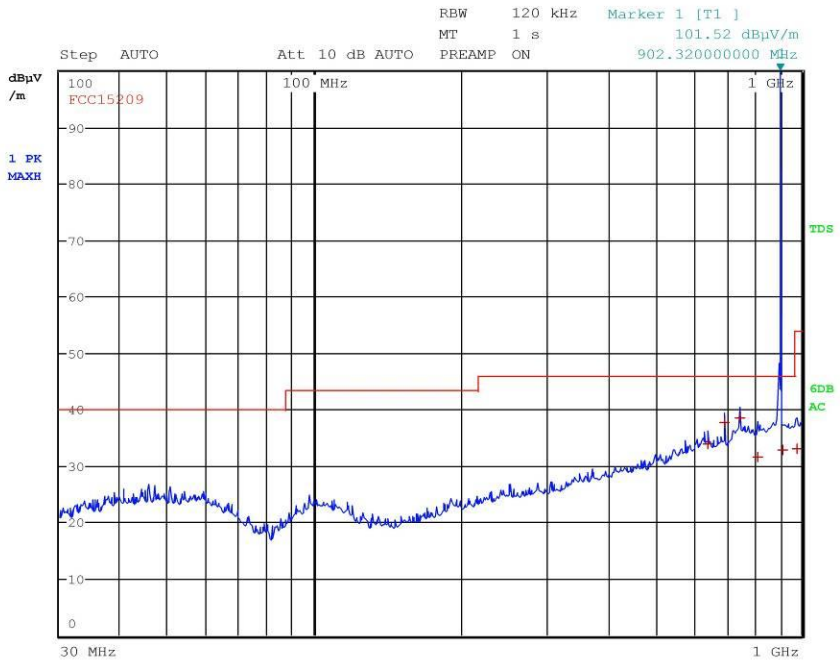
| *Polarization* | *Frequency Range (MHz)* | *Graphs* | *Remarks* | *Result* |
|---|---|---|---|---|
| Loop | 0,009 – 30 | G15182841 | Worst case | Complies |
| V | 30 – 1000 | G15182830 | 902 MHz frequency | Complies |
| H | 30 – 1000 | G15182829 | 902 MHz frequency | Complies |
| V | 30 – 1000 | G15182831 | 915 MHz frequency | Complies |
| H | 30 – 1000 | G15182832 | 915 MHz frequency | Complies |
| V | 30 – 1000 | G15182834 | 927 MHz frequency | Complies |
| H | 30 – 1000 | G15182833 | 927 MHz frequency | Complies |
| V | 1000 – 10000 | G15182844 | Worst case | Complies |
| H | 1000 – 10000 | G15182845 | Worst case | Complies |
| **Remarks:** | EUT in transmission.<br>Peaks above the limits are caused by the nominal transmitting frequency | | | |

*Graphs Legend*
PK: Peak; QP [1s] (quasi-peak at 1 second) values are marked with a +
AV: Average; AV [1s] (average at 1 second) values are marked with a x

## Graphs

G15182829

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182829 |
| **Test Spec** | |



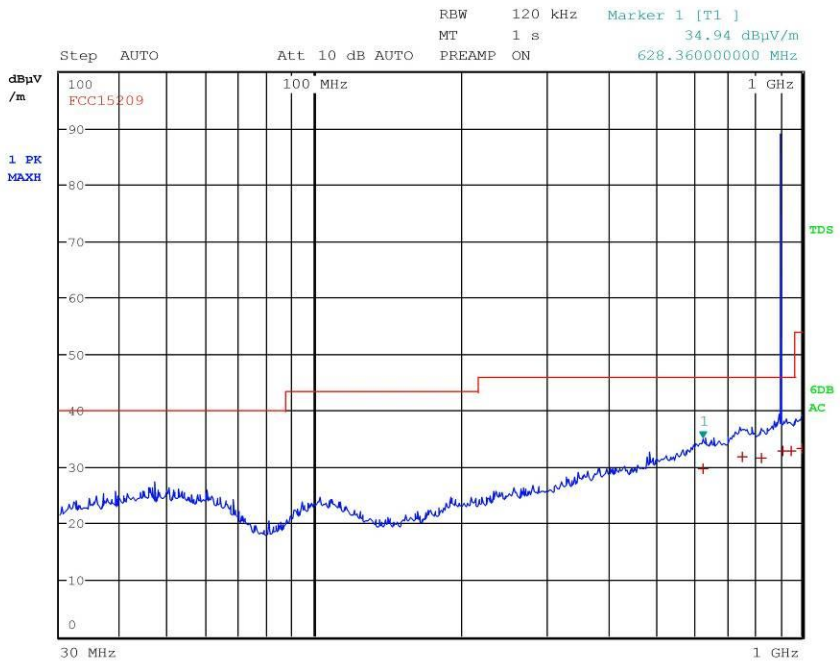

### Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 6

| Trace | Frequency | Level (dBµV/m) | Detector | Delta Limit/dB |
|---|---|---|---|---|
| 1 | 642.240000000 MHz | 33.85 | Quasi Peak | -12.17 |
| 1 | 694.320000000 MHz | 37.69 | Quasi Peak | -8.33 |
| 1 | 746.320000000 MHz | 38.59 | Quasi Peak | -7.43 |
| 1 | 811.760000000 MHz | 31.66 | Quasi Peak | -14.36 |
| 1 | 915.000000000 MHz | 32.86 | Quasi Peak | -13.16 |
| 1 | 979.280000000 MHz | 33.08 | Quasi Peak | -20.90 |

G15182830

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182830 |
| **Test Spec** | |



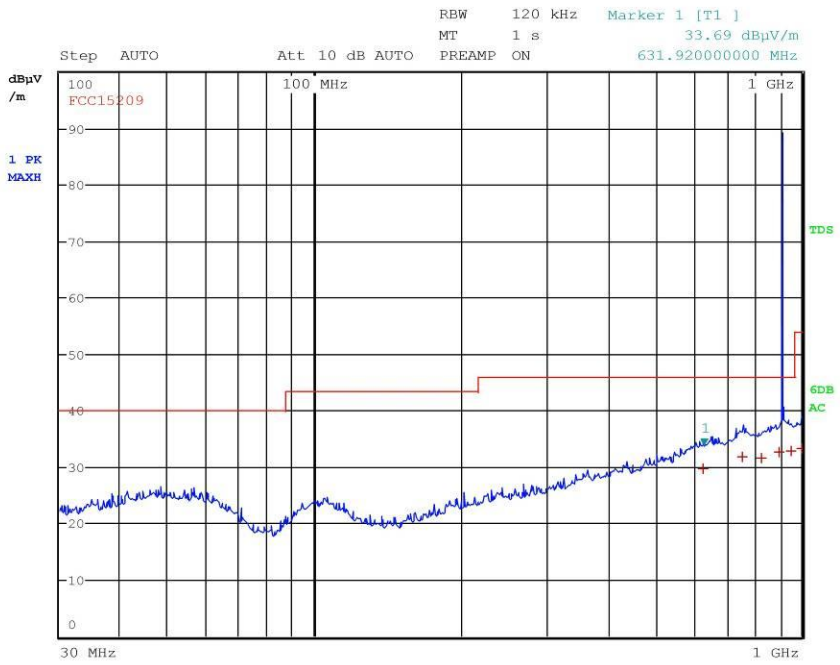

## Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 6

| Trace | Frequency | Level (dBµV/m) | Detector | Delta Limit/dB |
|---|---|---|---|---|
| 1 | 628.360000000 MHz | 29.68 | Quasi Peak | -16.34 |
| 1 | 755.800000000 MHz | 31.90 | Quasi Peak | -14.12 |
| 1 | 825.160000000 MHz | 31.58 | Quasi Peak | -14.44 |
| 1 | 915.000000000 MHz | 32.84 | Quasi Peak | -13.18 |
| 1 | 952.880000000 MHz | 32.78 | Quasi Peak | -13.24 |
| 1 | 999.200000000 MHz | 33.34 | Quasi Peak | -20.64 |

G15182831

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182831 |
| **Test Spec** | |



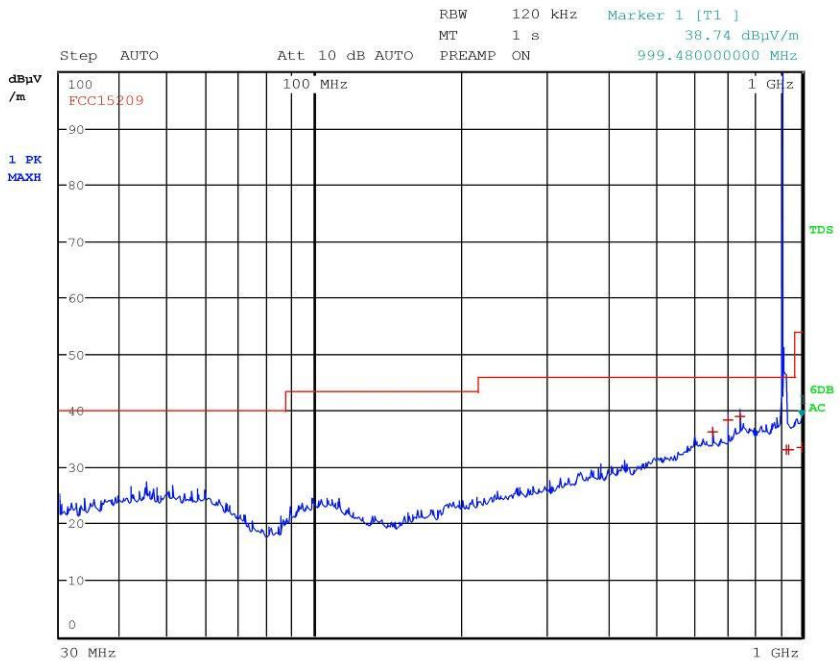

## Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 6

| Trace | Frequency | Level (dBµV/m) | Detector | Delta Limit/dB |
|---|---|---|---|---|
| 1 | 628.360000000 MHz | 29.68 | Quasi Peak | -16.34 |
| 1 | 755.800000000 MHz | 31.91 | Quasi Peak | -14.11 |
| 1 | 825.160000000 MHz | 31.62 | Quasi Peak | -14.40 |
| 1 | 902.000000000 MHz | 32.77 | Quasi Peak | -13.25 |
| 1 | 952.880000000 MHz | 32.78 | Quasi Peak | -13.24 |
| 1 | 999.200000000 MHz | 33.32 | Quasi Peak | -20.66 |

G15182832

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182832 |
| **Test Spec** | |



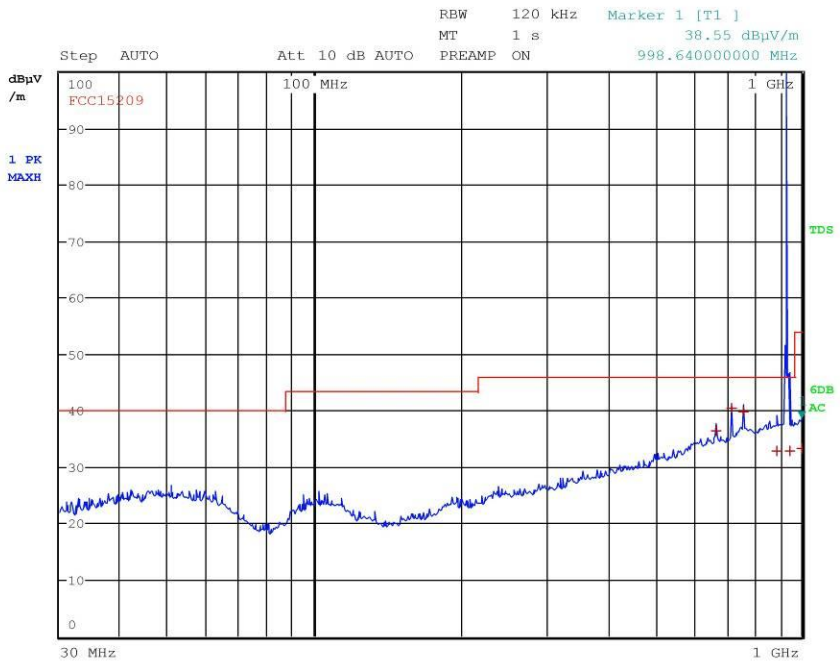

## Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 6

| Trace | Frequency | Level (dBµV/m) | Detector | Delta Limit/dB |
|---|---|---|---|---|
| 1 | 655.640000000 MHz | 36.24 | Quasi Peak | -9.78 |
| 1 | 707.680000000 MHz | 38.40 | Quasi Peak | -7.62 |
| 1 | 746.640000000 MHz | 39.04 | Quasi Peak | -6.98 |
| 1 | 931.040000000 MHz | 33.18 | Quasi Peak | -12.84 |
| 1 | 940.200000000 MHz | 33.01 | Quasi Peak | -13.01 |
| 1 | 999.480000000 MHz | 33.43 | Quasi Peak | -20.55 |

G15182833

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182833 |
| **Test Spec** | |



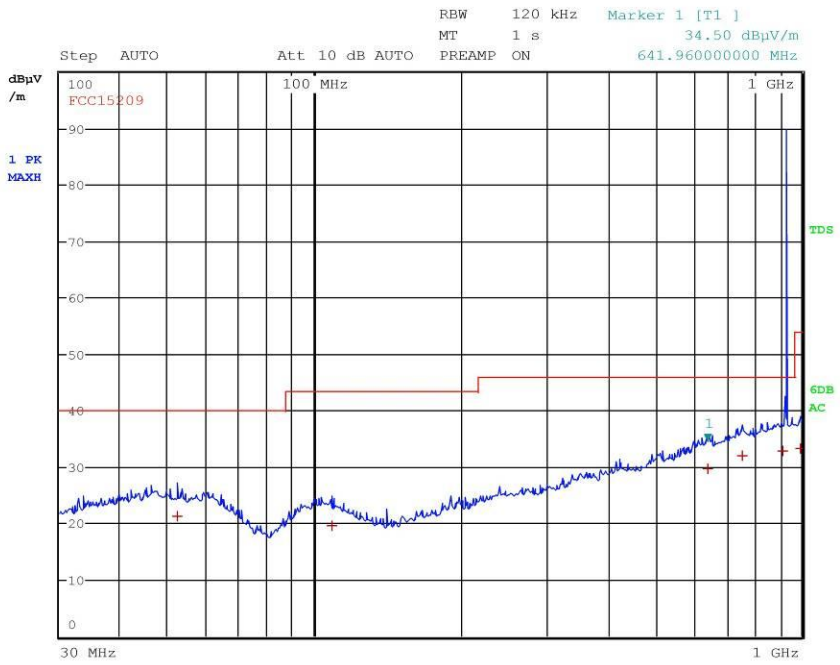

## Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 6

| Trace | Frequency | Level (dBµV/m) | Detector | Delta Limit/dB |
|---|---|---|---|---|
| 1 | 667.640000000 MHz | 36.41 | Quasi Peak | -9.61 |
| 1 | 719.680000000 MHz | 40.54 | Quasi Peak | -5.48 |
| 1 | 758.680000000 MHz | 39.80 | Quasi Peak | -6.22 |
| 1 | 888.120000000 MHz | 32.93 | Quasi Peak | -13.09 |
| 1 | 947.720000000 MHz | 32.78 | Quasi Peak | -13.24 |
| 1 | 998.640000000 MHz | 33.39 | Quasi Peak | -20.59 |

G15182834

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182834 |
| **Test Spec** | |



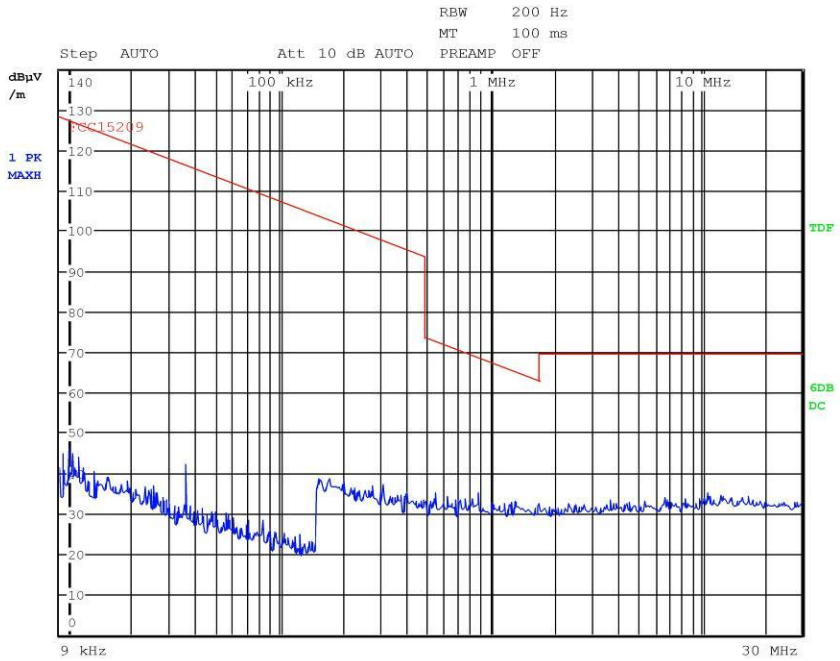

## Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 6

| Trace | Frequency | Level (dBµV/m) | Detector | Delta Limit/dB |
|---|---|---|---|---|
| 1 | 52.200000000 MHz | 21.34 | Quasi Peak | -18.66 |
| 1 | 108.600000000 MHz | 19.65 | Quasi Peak | -23.87 |
| 1 | 641.960000000 MHz | 29.73 | Quasi Peak | -16.29 |
| 1 | 755.920000000 MHz | 31.94 | Quasi Peak | -14.08 |
| 1 | 915.000000000 MHz | 32.88 | Quasi Peak | -13.14 |
| 1 | 993.160000000 MHz | 33.28 | Quasi Peak | -20.70 |

G15182841

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182841 |
| **Test Spec** | |

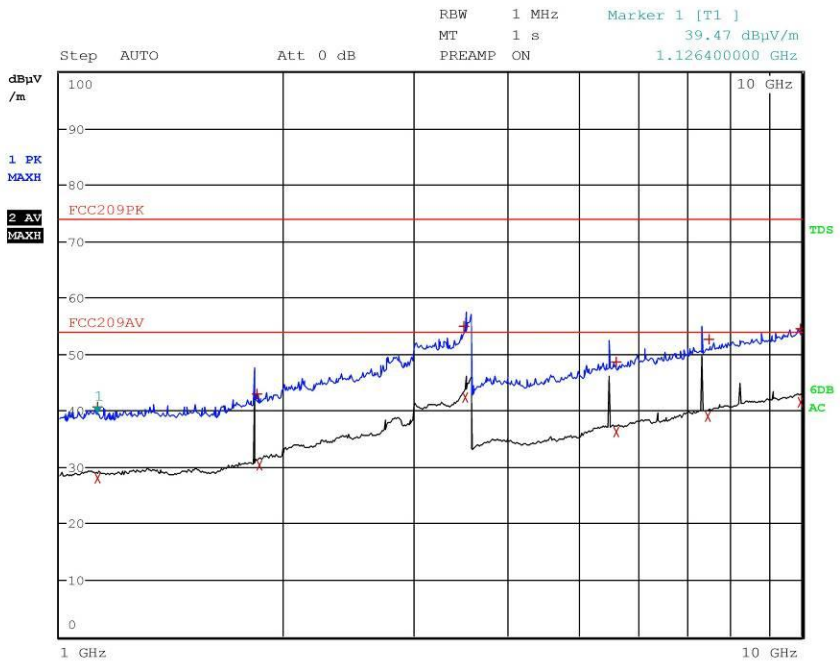



## Final Measurement

| | |
|---|---|
| Meas Time: | 1 s |
| Margin: | 20 dB |
| Peaks: | 0 |

G15182844

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182844 |
| **Test Spec** | |



| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182844 |
| **Test Spec** | |

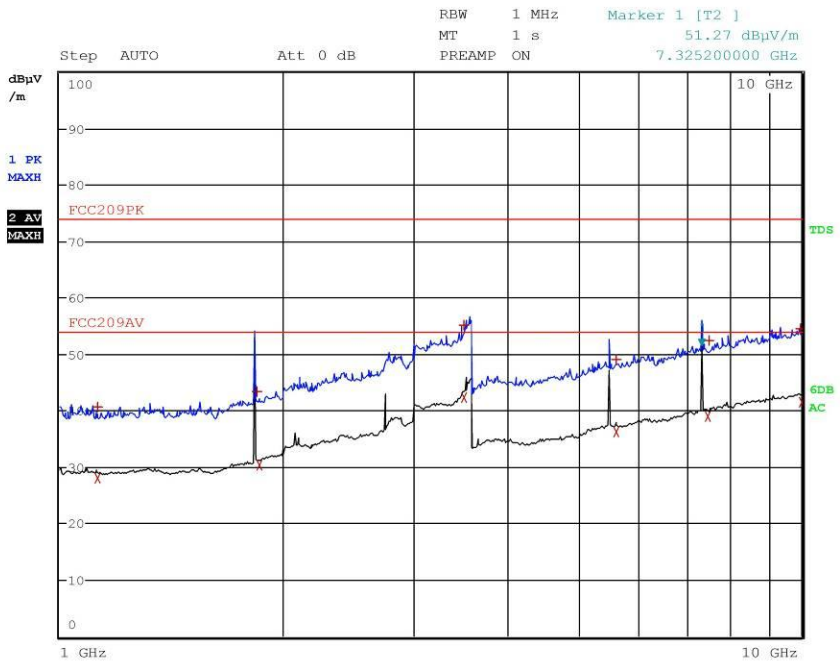
## Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 12

| Trace | Frequency | Level (dBµV/m) | Detector | Delta Limit/dB |
|---|---|---|---|---|
| 2 | 1.124800000 GHz | 28.11 | Average | -25.89 |
| 1 | 1.126400000 GHz | 40.69 | Max Peak | -33.31 |
| 1 | 1.842000000 GHz | 42.98 | Max Peak | -31.02 |
| 2 | 1.859600000 GHz | 30.29 | Average | -23.71 |
| 1 | 3.506800000 GHz | 54.95 | Max Peak | -19.05 |
| 2 | 3.514800000 GHz | 42.29 | Average | -11.71 |
| 2 | 5.618800000 GHz | 36.25 | Average | -17.75 |
| 1 | 5.624000000 GHz | 48.56 | Max Peak | -25.44 |
| 2 | 7.461600000 GHz | 38.94 | Average | -15.06 |
| 1 | 7.510000000 GHz | 52.62 | Max Peak | -21.38 |
| 1 | 9.954400000 GHz | 54.48 | Max Peak | -19.52 |
| 2 | 9.972000000 GHz | 41.54 | Average | -12.46 |

G15182845

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182845 |
| **Test Spec** | |



| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182845 |
| **Test Spec** | |

## Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 12

| Trace | Frequency | Level (dBµV/m) | Detector | Delta Limit/dB |
|---|---|---|---|---|
| 2 | 1.124800000 GHz | 28.10 | Average | -25.90 |
| 1 | 1.126400000 GHz | 40.75 | Max Peak | -33.25 |
| 1 | 1.842000000 GHz | 43.35 | Max Peak | -30.65 |
| 2 | 1.859600000 GHz | 30.29 | Average | -23.71 |
| 1 | 3.506800000 GHz | 55.19 | Max Peak | -18.81 |
| 2 | 3.514800000 GHz | 42.29 | Average | -11.71 |
| 2 | 5.618800000 GHz | 36.24 | Average | -17.76 |
| 1 | 5.624000000 GHz | 49.10 | Max Peak | -24.90 |
| 2 | 7.461600000 GHz | 38.93 | Average | -15.07 |
| 1 | 7.510000000 GHz | 52.34 | Max Peak | -21.66 |
| 1 | 9.954400000 GHz | 54.48 | Max Peak | -19.52 |
| 2 | 9.972000000 GHz | 41.53 | Average | -12.47 |

**Result:** The requirements are met

## 11.3 Fundamental and Spurious Emission (≤ 1 GHz)

### Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209 and Part 15.231(b)
- Internal procedure PM001
- See clause 4 of this test report
- Test date: 05 November 2015
- Technician: A. Bertezzolo

### Test configuration and test method

*Test site:*
Semi-anechoic chamber

*Auxiliary equipment:*
See clause 4 of this test report

### EUT exercising

See clause 4 of this test report

### Test equipment used

CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

### Test specification

Port: Enclosure
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 3 m
Detector CISPR quasi-peak

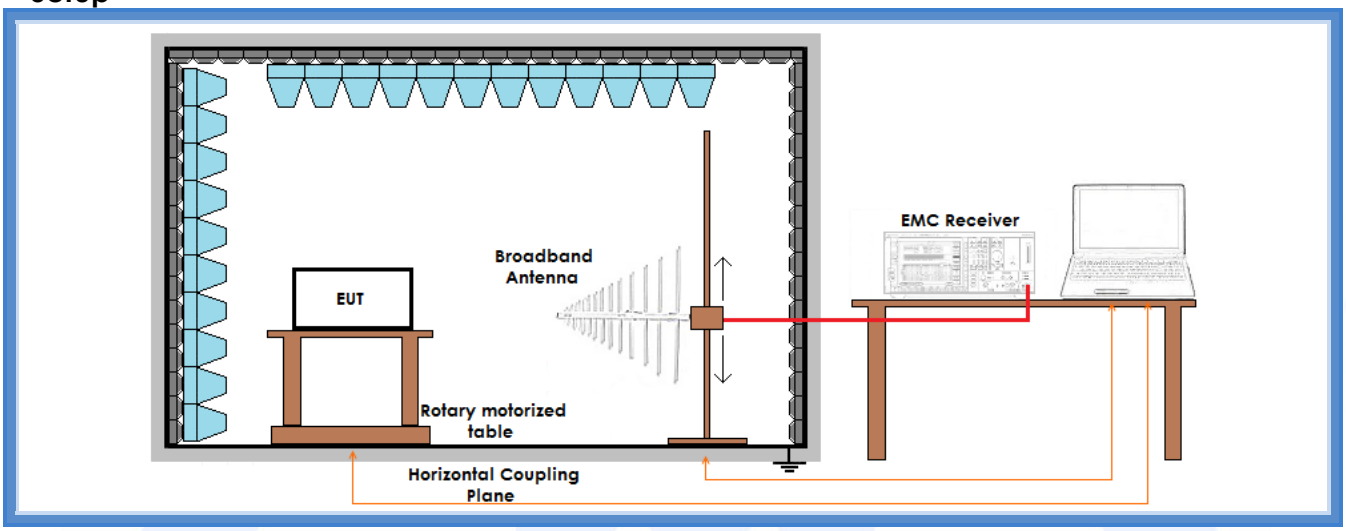
### Environmental conditions

| *Temperature (°C)* | *Atmospheric pressure (kPa)* | *Relative humidity (%)* |
|---|---|---|
| 23 | 100 | 45 |

### Acceptance limits

| ***FCC Part 15.231 (b)*** | | |
|---|---|---|
| *Fundamental frequency (MHz)* | *Field strength of fundamental [dB(µV/m)]* | *Field strength of spurious emissions [dB(µV/m)]* |
| 40,66 to 40,70 | 67,04 | 47,04 |
| 70 to 130 | 61,94 | 41,94 |
| 130 to 174 | 61,94 to 71,48 | 41,94 to 51,48 |
| 174 to 260 | 71,48 | 51,48 |
| 260 to 470 | 71,48 to 81,94 | 51,48 to 61,94 |
| Above 470 | 81,94 | 61,94 |

## Setup




## Result – Field strength of fundamental

| *Frequency (MHz)* | *Graphs* | *Limits (dBµV/m)* | *Peak level (dBµV/m)* | *Duty cycle (dB)* | *Level (dBµV/m)* | *Results* |
|---|---|---|---|---|---|---|
| 902,246 | G15182820 | 81,94 | 101,29 | -33,56 | 67,73 | Complies |
| 915,662 | G15182823 | 81,94 | 100,67 | -33,56 | 67,11 | Complies |
| 927,714 | G15182826 | 81,94 | 101,18 | -33,56 | 67,62 | Complies |

**Remarks:** EUT was tested in 3 orthogonal planes. The results in this table show the highest value.

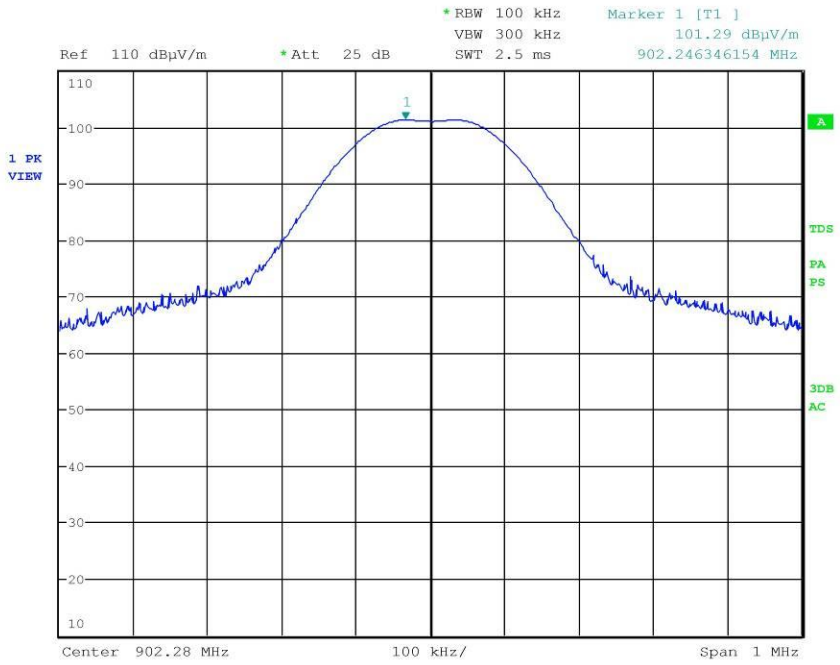
Duty cycle value has been obtained using the following formula:

Duty cycle = 20log (2,1 ms /100 ms) = -33,56 dB, see also the duty cycle evaluation of cl. 2 of this Test Report

## Graphs

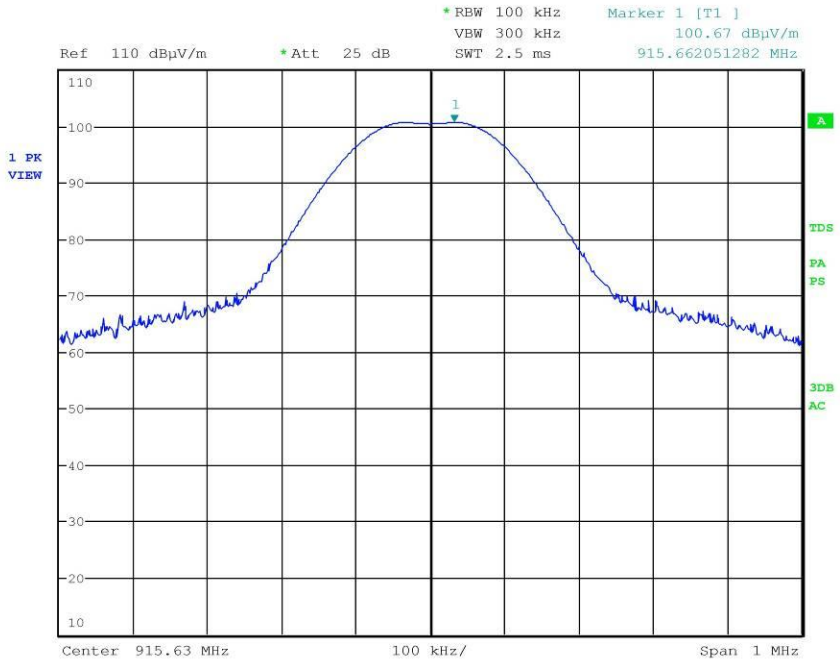
G15182820

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182820 |
| **Test Spec** | |



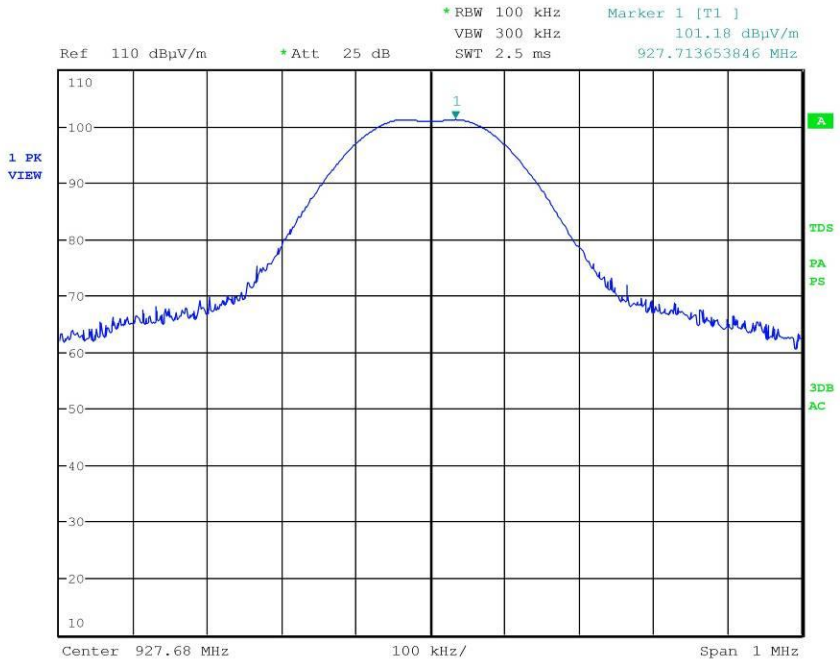
G15182823

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182823 |
| **Test Spec** | |



G15182826

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182826 |
| **Test Spec** | |




**Result:** The requirements are met

## 11.4 Spurious Emission (> 1 GHz)

### Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209 and Part 15.231
- Internal procedure PM001
- See clause 4 of this test report
- Test date: 10 November 2015
- Technician: A. Bertezzolo

### Test configuration and test method

*Test site:*
Semi-anechoic chamber

*Auxiliary equipment:*
See clause 4 of this test report

### EUT exercising

See clause 4 of this test report

### Test equipment used

CMC S108, CMC S164
Measurement uncertainty: See clause 7 of this test report

### Test specification

Port: Enclosure
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 3 m
Detector AV + Peak

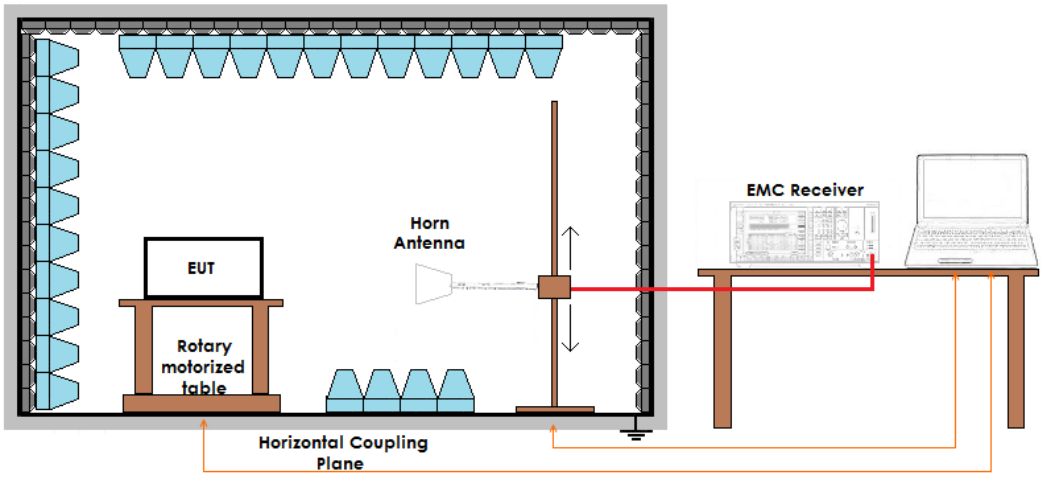
### Environmental conditions

| *Temperature (°C)* | *Atmospheric pressure (kPa)* | *Relative humidity (%)* |
|---|---|---|
| 23 | 100 | 45 |

### Acceptance limits

| *Frequency (MHz)* | *AV limits [dB(µV/m)]* | *Peak limits [dB(µV/m)]* |
|---|---|---|
| > 1000 | 54 | 74 |

## Setup




## Result – AV detector

| *Frequency band (MHz)* | *Frequency (MHz)* | *Limits (dBµV/m)* | *Measured Level (dBµV/m)* | *Duty cycle (dB)* | *Level (dBµV/m)* | *Results* |
|---|---|---|---|---|---|---|
| 902,200 | 1804,4 | 61,94 | 52,8 | -33,56 | 19,24 | Complies |
| 902,200 | 2706,6* | 54,00 | 42,8 | -33,56 | 9,24 | Complies |
| 902,200 | 5413,2* | 54,00 | 48,3 | -33,56 | 14,74 | Complies |
| 902,200 | 7217,6 | 61,94 | 53,7 | -33,56 | 20,14 | Complies |
| 915,600 | 1831,2 | 61,94 | 53,2 | -33,56 | 19,64 | Complies |
| 915,600 | 2476,8* | 54,00 | 43,0 | -33,56 | 9,44 | Complies |
| 915,600 | 5493,6 | 61,94 | 48,8 | -33,56 | 15,24 | Complies |
| 915,600 | 7324,8* | 54,00 | 53,6 | -33,56 | 20,04 | Complies |
| 927,600 | 1855,2 | 61,94 | 52,5 | -33,56 | 18,94 | Complies |
| 927,600 | 2782,8* | 54,00 | 43,3 | -33,56 | 9,74 | Complies |
| 927,600 | 5565,6 | 61,94 | 47,7 | -33,56 | 14,14 | Complies |
| 927,600 | 7420,8* | 54,00 | 55,2 | -33,56 | 21,64 | Complies |

**Remarks:** EUT was tested in 3 orthogonal planes. The results in this table show the highest value.

*: these frequencies are inside a restricted band

Duty cycle value has been obtained using the following formula:

Duty cycle = 20log (2,1 ms /100 ms) = -33,56 dB, see also the duty cycle evaluation of cl. 2 of this Test Report

## Result – Peak detector

| *Frequency band (MHz)* | *Frequency (MHz)* | *Limits (dBµV/m)* | *Measured Level (dBµV/m)* | *Duty cycle (dB)* | *Level (dBµV/m)* | *Results* |
|---|---|---|---|---|---|---|
| 902,200 | 1804,4 | 74,00 | 55,6 | -33,56 | 22,04 | Complies |
| 902,200 | 2706,6* | 74,00 | 50,0 | -33,56 | 16,44 | Complies |
| 902,200 | 5413,2* | 74,00 | 50,2 | -33,56 | 16,64 | Complies |
| 902,200 | 7217,6 | 74,00 | 56,3 | -33,56 | 22,74 | Complies |
| 915,600 | 1831,2 | 74,00 | 53,8 | -33,56 | 20,24 | Complies |
| 915,600 | 2476,8* | 74,00 | 50,9 | -33,56 | 17,34 | Complies |
| 915,600 | 5493,6 | 74,00 | 53,0 | -33,56 | 19,44 | Complies |
| 915,600 | 7324,8* | 74,00 | 55,0 | -33,56 | 21,44 | Complies |
| 927,600 | 1855,2 | 74,00 | 54,2 | -33,56 | 20,64 | Complies |
| 927,600 | 2782,8* | 74,00 | 52,5 | -33,56 | 18,94 | Complies |
| 927,600 | 5565,6 | 74,00 | 52,2 | -33,56 | 18,64 | Complies |
| 927,600 | 7420,8* | 74,00 | 57,9 | -33,56 | 24,34 | Complies |

**Remarks:** EUT was tested in 3 orthogonal planes. The results in this table show the highest value.

*: these frequencies are inside a restricted band

Duty cycle value has been obtained using the following formula:

Duty cycle = 20log (2,1 ms /100 ms) = -33,56 dB, see also the duty cycle evaluation of cl. 2 of this Test Report

**Result:** The requirements are met

## 11.5 Occupied channel bandwidth

### Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.231 (c)
- Internal procedure PM001
- See clause 4 of this test report
- Test date: 05 November 2015
- Technician: A. Bertezzolo

### Test configuration and test method

*Test site:*
Laboratory

*Auxiliary equipment:*
See clause 4 of this test report

### EUT exercising

See clause 4 of this test report

### Test equipment used

CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

### Test specification

The bandwidth of the emission shall be no wider than 0,25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0,5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier

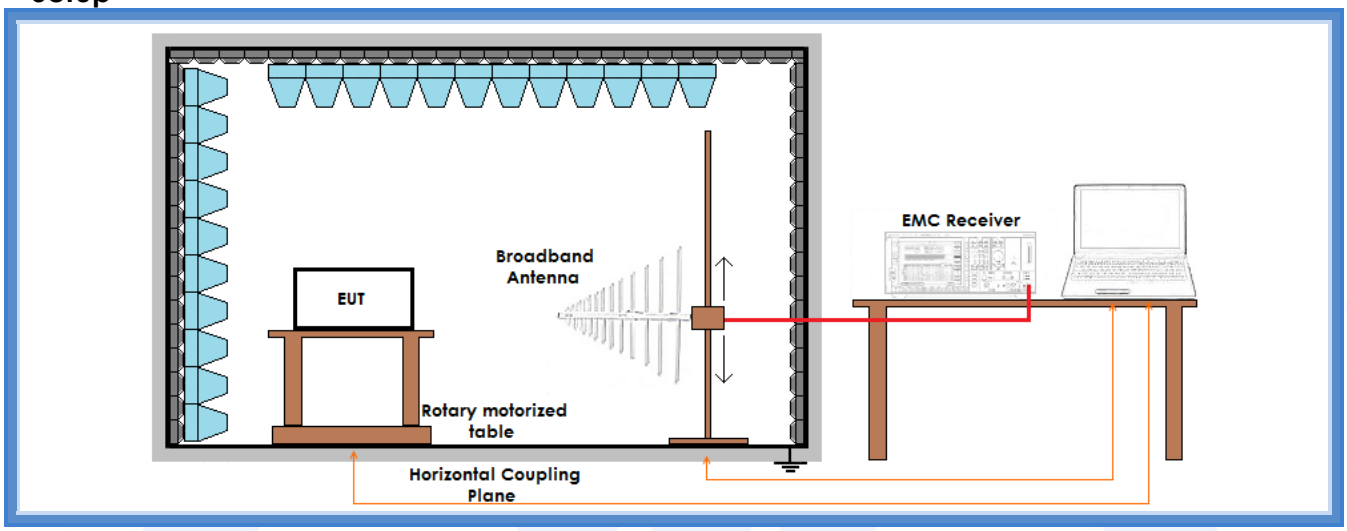
### Environmental conditions

| *Temperature (°C)* | *Atmospheric pressure (kPa)* | *Relative humidity (%)* |
|---|---|---|
| 23 | 100 | 45 |

### Acceptance limits

| ***Limits*** | |
|---|---|
| ***Devices operating above 70 MHz and below 900 MHz*** | ***Devices operating above 900 MHz*** |
| 0,25% of the center frequency | 0,5% of the center frequency |

## Setup



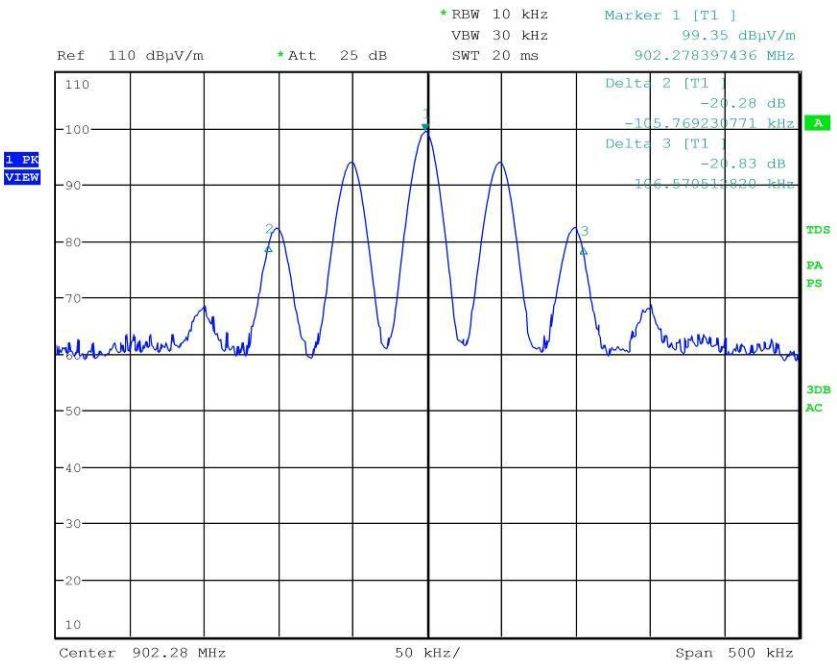

## Result

| *Frequency (MHz)* | *Limit (kHz)* | *20 dB bandwidth (kHz)* | *Graphs* | *Results* |
|---|---|---|---|---|
| 902,28 | 4511,40 | 212,339 | G15182821 | Complies |
| 915,63 | 4578,15 | 211,538 | G15182824 | Complies |
| 927,68 | 4638,40 | 212,339 | G15182827 | Complies |

## Graphs

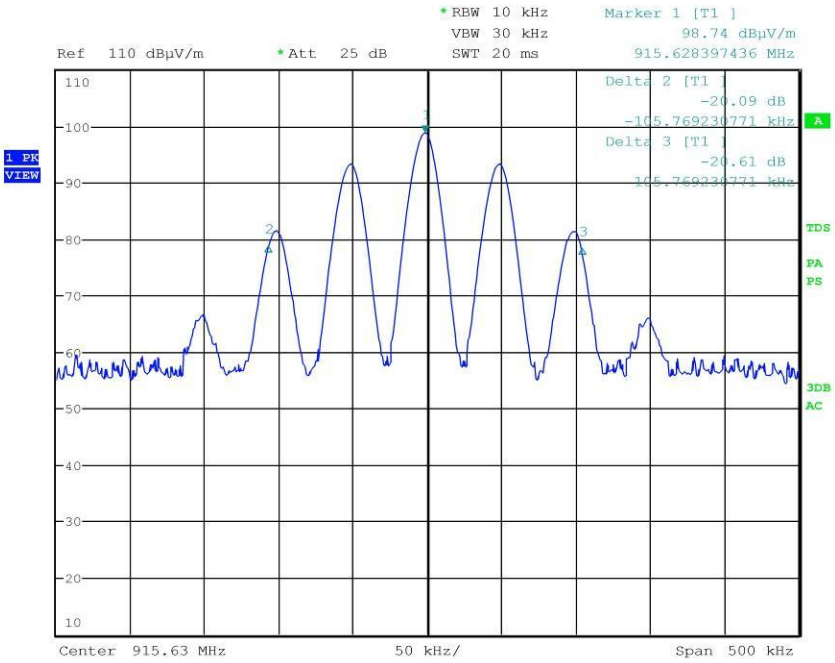
G15182821

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182821 |
| **Test Spec** | |



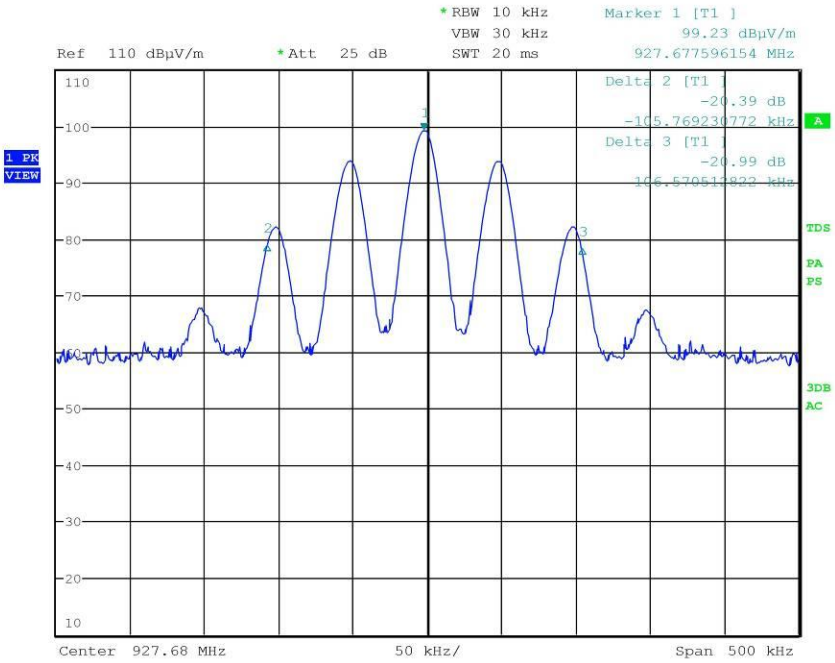
G15182824

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182824 |
| **Test Spec** | |



G15182827

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182827 |
| **Test Spec** | |




**Result:** The requirements are met

## 11.6 Periodic Operation Characteristics

### Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.231 (a)
- Internal procedure PM001
- See clause 4 of this test report
- Test date: 05 November 2015
- Technician: A. Bertezzolo

### Test configuration and test method

*Test site:*
Laboratory

*Auxiliary equipment:*
See clause 4 of this test report

### EUT exercising

See clause 4 of this test report

### Test equipment used

CMC S164
Measurement uncertainty: See clause 7 of this test report

### Test specification

❑ Manually operated transmitter
☑ Transmitter activated automatically

Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

### Environmental conditions

| *Temperature (°C)* | *Atmospheric pressure (kPa)* | *Relative humidity (%)* |
|---|---|---|
| 23 | 100 | 45 |

15.231(a1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released

**Result:** N.A.

15.231(a2) A transmitter activated automatically shall cease transmission within 5 seconds after activation

**Result:** N.A.

15.231(a3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour

| *Parameter* | *Transmission time during 1 hour* | *Number of transmissions during 1 hour* | *Graphs* | *Results* |
|---|---|---|---|---|
| Automatic transmission | 378 ms (maximum allowed 2 s) | 5 (maximum allowed 180) | G15173504 and G15173510 | Complies |

15.231(a4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

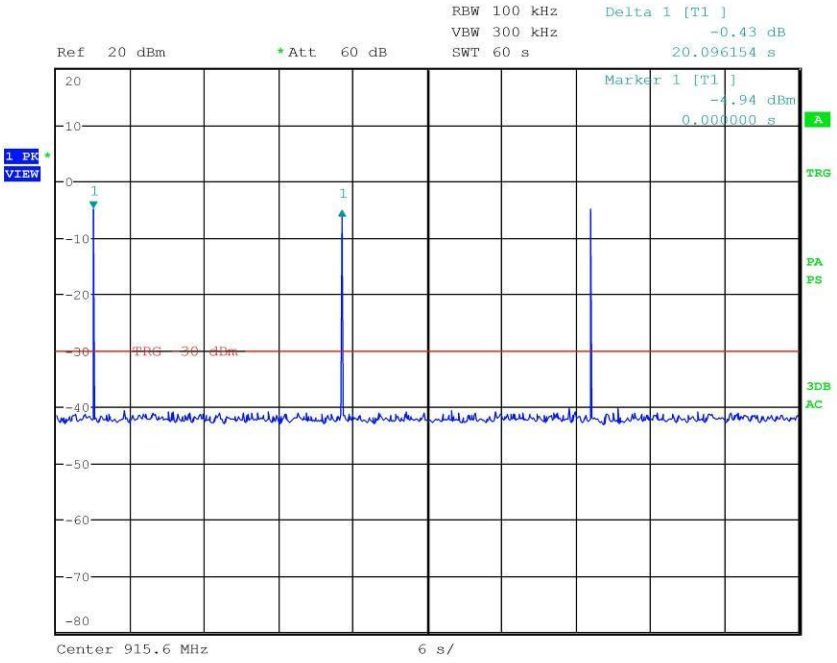
**Result:** N.A.

15.231(a5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data

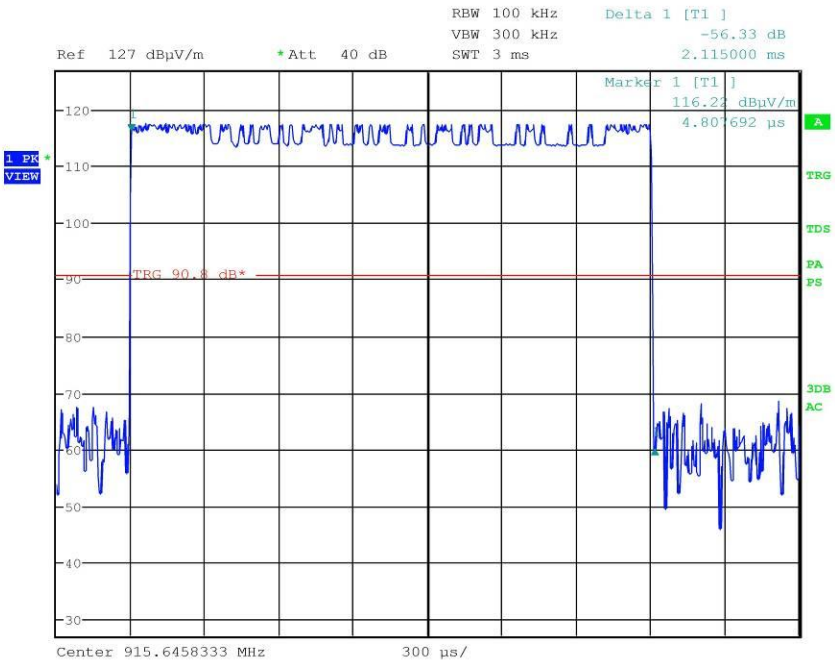
**Result:** N.A.

## Graphs

| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182804 |
| **Test Spec** | |



| | |
|---|---|
| **Meas Type** | Emission |
| **Equipment under Test** | |
| **Manufacturer** | |
| **OP Condition** | |
| **Operator** | Bertezzolo 15182810 |
| **Test Spec** | |




**Result:** The requirements are met

# ANNEX 1 of document nr. R15182802

Tests setup photographs for Test Report nr. R15182802