

FCC ID: YMQ8047000

EMI - TEST REPORT

- FCC Part 15.225 -



| | | |
|--------------------------|----------------|-------------------------------|
| Test Report No. : | T35893-00-01KG | 16. May 2012 Date of issue |
|--------------------------|----------------|-------------------------------|

Type / Model Name : ASTUTE 140**Product Description** : Laboratory Equipment with RFID**Applicant** : LRE Medical GmbHAddress : Hofer Strasse 586720 Nördlingen, Germany**Manufacturer** : Astute Medical, Inc.Address : 3350 General Atomics Ct.San Diego, CA 92121, USA**Licence holder** : Astute Medical, Inc.Address : 3350 General Atomics Ct.San Diego, CA 92121, USA

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



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

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (September, 2011)

| | |
|-----------------------------------|---|
| Part 15, Subpart A, Section 15.31 | Measurement standards |
| Part 15, Subpart A, Section 15.33 | Frequency range of radiated measurements |
| Part 15, Subpart A, Section 15.35 | Measurement detector functions and bandwidths |
| Part 15, Subpart A, Section 15.38 | Incorporation by reference |

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (September, 2011)

| | |
|------------------------------------|---|
| Part 15, Subpart C, Section 15.203 | Antenna requirement |
| Part 15, Subpart C, Section 15.204 | External radio frequency power amplifiers and antenna modifications |
| Part 15, Subpart C, Section 15.205 | Restricted bands of operation |
| Part 15, Subpart C, Section 15.207 | Conducted limits |
| Part 15, Subpart C, Section 15.209 | Radiated emission limits, general requirements |
| Part 15, Subpart C, Section 15.215 | Additional provisions to the general radiated emission limitations |
| Part 15, Subpart C, Section 15.225 | Operation within the band 13.110 - 14.010 MHz |

FCC Rules and Regulations Part 1, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969

| | |
|-----------------------------------|---|
| Part 1, Subpart I, Section 1.1310 | Radiofrequency radiation exposure limits |
| Part 1, Subpart 2, Section 2.1093 | Radiofrequency radiation exposure evaluation: portable device |

OET Bulletin 65, 65A, 65B, 65C Edition 97-01, August 1997 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

| | |
|--------------------|---|
| ANSI C63.4: 2009 | Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. |
| ANSI C95.1:1992 | IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz |
| CISPR 16-4-2: 2003 | Uncertainty in EMC measurement |

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2 SUMMARY

GENERAL REMARKS:

The working frequency of the RFID-module is 13.56 MHz.

The receiver is permanently co-located within the transmitter. Therefore the receive mode is too short and was tested together with the transmitter in operating mode. There is no standby mode.

FINAL ASSESSMENT:

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

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

Testing commenced on : 21.March 2012

Testing concluded on : 29.March 2012

Checked by:



Thomas Weise
I confirm the correctness
and integrity of this
document
2012.05.23 11:24:17
+02'00'

Thomas Weise
Dipl. Ing.(FH)
Laboratory Manager

Tested by:



Klaus Gegenfurtner
I'm the author of this
document
2012.05.23 11:19:17
+02'00'

Klaus Gegenfurtner
Dipl.-Ing.(FH)

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3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EUT – See attachment A

3.2 Power supply system utilised

Power supply voltage : Battery 6.0 VDC
AC 115 V / 60 Hz / 1 ϕ

3.3 Short description of the equipment under test (EUT)

The ASTUTE reader is a portable fluorescence instrument for a laboratory setting. Each test cartridge includes an RFID tag that identifies relevant parameter for evaluating the test results.

Number of tested samples: 1
Serial number: 00001057

EUT operation mode:

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

- TX pulsed modulated at 13,56 MHz

EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

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

| | |
|------------|---------------------------|
| - RFID-TAG | Model : Customer specific |
| - | Model : |
| - | Model : |

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4 TEST ENVIRONMENT

4.1 Address of the test laboratory

mikes-testingpartners gmbh
Ohmstrasse 2-4
94342 STRASSKIRCHEN
GERMANY

4.2 Environmental conditions

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

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader may notice that tolerances within the calibration of the equipment and facilities may cause additional uncertainty. The measurement uncertainty is calculated for all measurements listed in this test report acc. to CISPR 16-4-2 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurement“ and documented in the mikes-testingpartners gmbh quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, mikes-testingpartners gmbh, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component diversity and modifications in production processes may result in additional deviation. If necessary, refer to the test lab for the actual measurement uncertainty for specific tests. The manufacturer has the sole responsibility of continued compliance of the EUT.

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4.1 Measurement Protocol for FCC, VCCI and AUSTEL

4.1.1 GENERAL INFORMATION

4.1.1.1 Test methodology

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

4.1.1.2 Justification

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

4.1.2 DETAILS OF TEST PROCEDURES

General Standard information

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

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5 TEST CONDITIONS AND RESULTS

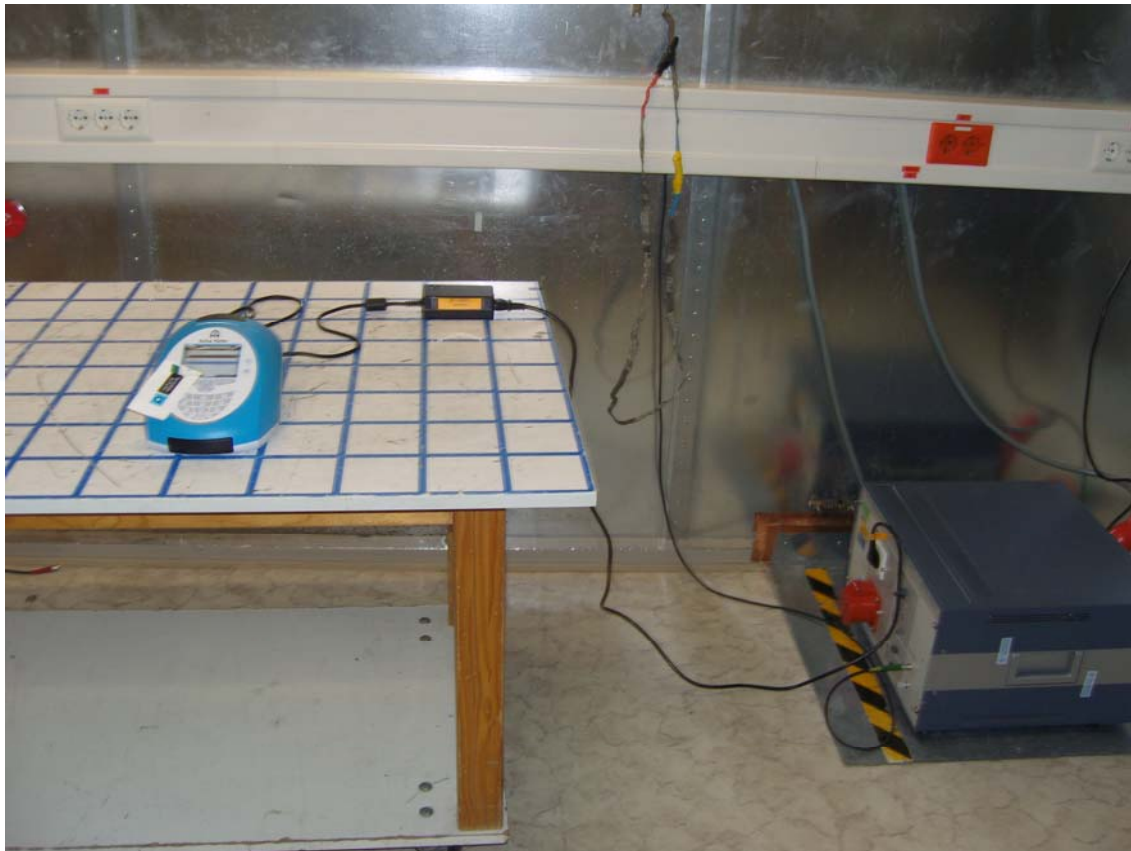
5.1 Conducted emissions

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

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up



5.1.3 Applicable standard

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

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

5.1.4 Description of Measurement

The measurements are performed following the procedures set out in ANSI C63.4 described under item 4.4.3. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

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Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 7.7 dB at 13.56 MHz

Limit according to FCC Part 15, Section 15.207(a):

| Frequency of Emission (MHz) | Conducted Limit (dB μ V) | |
|--------------------------------|------------------------------|------------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency

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

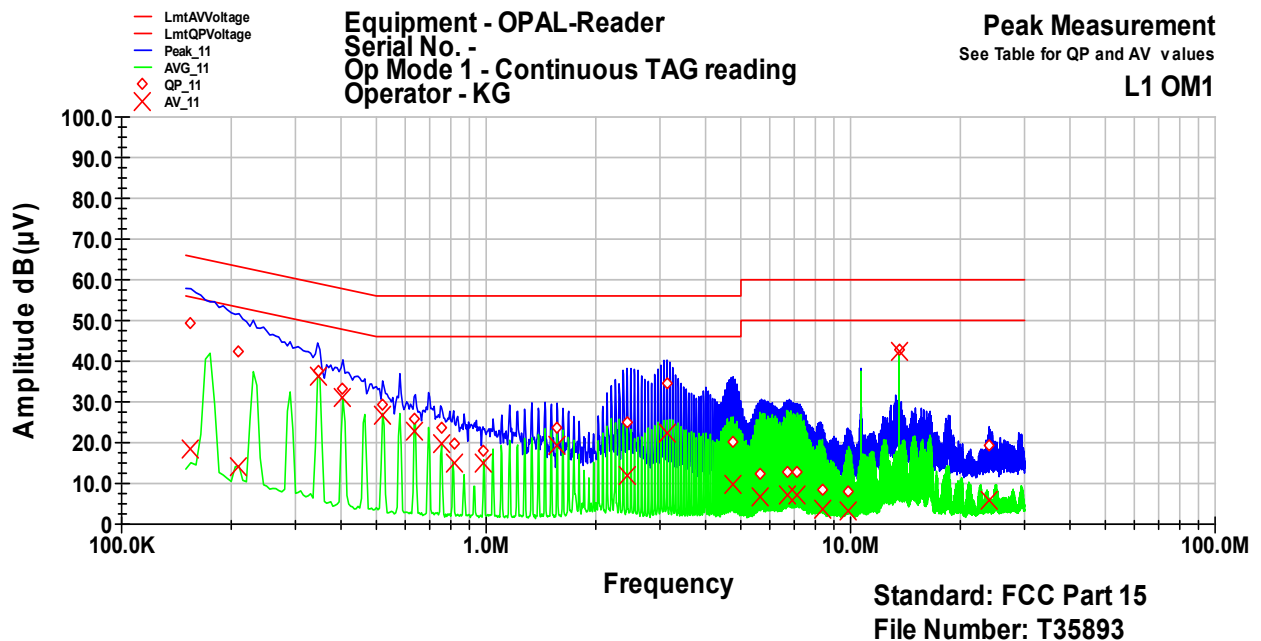
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5.1.6 Test protocol

Test point L1
Operation mode: TX pulsed modulated at 13,56 MHz
Remarks:

Result: passed

| Frequency MHz | QP Level dB(μV) | QP Margin dB | QP Limit dB | AV Level dB(μV) | AV Margin dB | AV Limit dB |
|------------------|--------------------|-----------------|----------------|--------------------|-----------------|----------------|
| 0.155 | 49.1 | -16.6 | 65.7 | 18.4 | -37.3 | 55.7 |
| 0.21 | 42.3 | -20.9 | 63.2 | 14.3 | -38.9 | 53.2 |
| 0.345 | 37.7 | -21.4 | 59.1 | 36.1 | -13.0 | 49.1 |
| 0.405 | 33.1 | -24.6 | 57.8 | 30.9 | -16.9 | 47.8 |
| 0.52 | 29.2 | -26.8 | 56.0 | 26.7 | -19.3 | 46.0 |
| 0.635 | 26.0 | -30.0 | 56.0 | 22.9 | -23.1 | 46.0 |
| 0.755 | 23.7 | -32.3 | 56.0 | 19.8 | -26.2 | 46.0 |
| 0.815 | 19.6 | -36.4 | 56.0 | 14.9 | -31.0 | 46.0 |
| 0.985 | 18.1 | -37.9 | 56.0 | 15.1 | -30.9 | 46.0 |
| 1.565 | 23.5 | -32.5 | 56.0 | 19.1 | -26.9 | 46.0 |
| 2.435 | 25.2 | -30.8 | 56.0 | 11.9 | -34.1 | 46.0 |
| 3.135 | 34.5 | -21.5 | 56.0 | 22.2 | -23.8 | 46.0 |
| 4.76 | 20.0 | -36.0 | 56.0 | 9.6 | -36.3 | 46.0 |
| 5.63 | 12.5 | -47.5 | 60.0 | 6.7 | -43.3 | 50.0 |
| 6.675 | 12.6 | -47.4 | 60.0 | 7.1 | -42.9 | 50.0 |
| 7.14 | 13.0 | -47.0 | 60.0 | 6.9 | -43.1 | 50.0 |
| 8.36 | 8.5 | -51.5 | 60.0 | 3.7 | -46.3 | 50.0 |
| 10.665 | 38.7 | -21.3 | 60.0 | 38.5 | -11.5 | 50.0 |
| 13.56 | 42.7 | -17.3 | 60.0 | 42.3 | -7.8 | 50.0 |
| 23.975 | 19.3 | -40.7 | 60.0 | 5.8 | -44.2 | 50.0 |

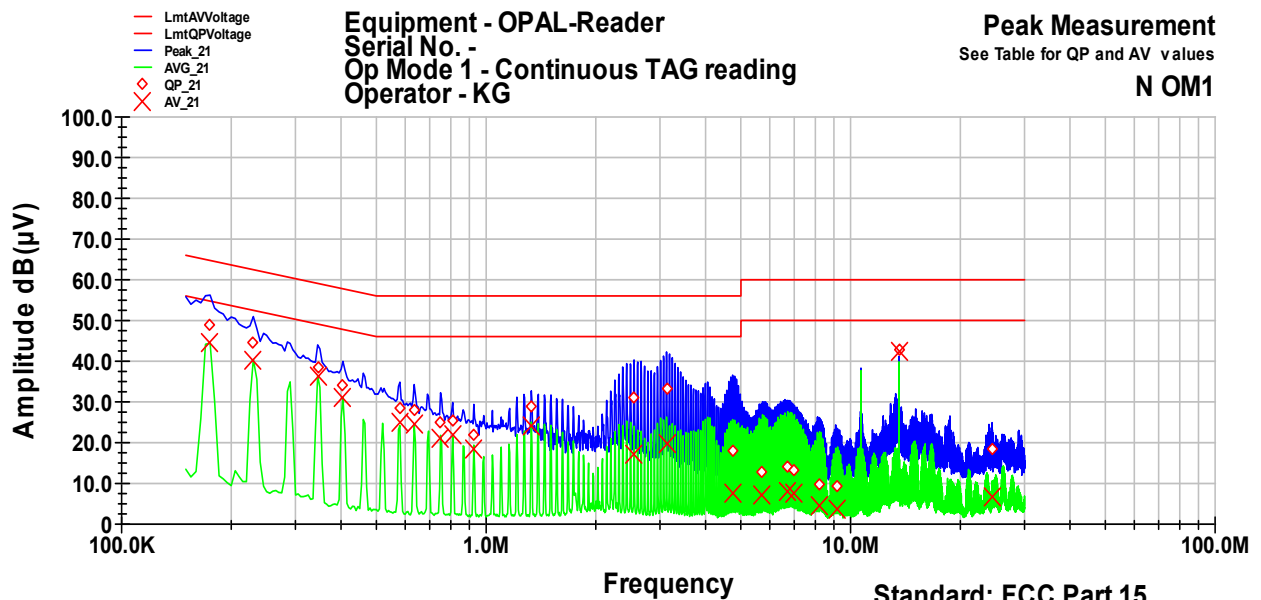


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Test point N
Operation mode: TX pulsed modulated at 13,56 MHz
Remarks:

Result: passed

| Frequency MHz | QP Level dB(μV) | QP Margin dB | QP Limit dB | AV Level dB(μV) | AV Margin dB | AV Limit dB |
|------------------|--------------------|-----------------|----------------|--------------------|-----------------|----------------|
| 0.175 | 49.1 | -15.6 | 64.7 | 44.5 | -10.2 | 54.7 |
| 0.23 | 44.4 | -18.1 | 62.4 | 40.3 | -12.1 | 52.4 |
| 0.345 | 38.6 | -20.5 | 59.1 | 36.5 | -12.6 | 49.1 |
| 0.405 | 34.2 | -23.6 | 57.8 | 31.3 | -16.5 | 47.8 |
| 0.58 | 28.4 | -27.6 | 56.0 | 25.1 | -20.9 | 46.0 |
| 0.635 | 28.0 | -28.0 | 56.0 | 24.4 | -21.6 | 46.0 |
| 0.75 | 25.1 | -30.9 | 56.0 | 21.1 | -24.9 | 46.0 |
| 0.81 | 25.5 | -30.5 | 56.0 | 21.9 | -24.1 | 46.0 |
| 0.925 | 21.9 | -34.1 | 56.0 | 18.6 | -27.4 | 46.0 |
| 1.33 | 28.8 | -27.2 | 56.0 | 24.0 | -22.0 | 46.0 |
| 2.545 | 31.1 | -24.9 | 56.0 | 17.3 | -28.7 | 46.0 |
| 3.125 | 33.4 | -22.6 | 56.0 | 19.5 | -26.5 | 46.0 |
| 4.745 | 17.8 | -38.2 | 56.0 | 7.6 | -38.4 | 46.0 |
| 5.73 | 13.0 | -47.0 | 60.0 | 7.1 | -42.9 | 50.0 |
| 6.715 | 14.1 | -45.9 | 60.0 | 8.1 | -41.9 | 50.0 |
| 7.005 | 13.4 | -46.6 | 60.0 | 7.5 | -42.5 | 50.0 |
| 8.22 | 9.9 | -50.1 | 60.0 | 4.7 | -45.3 | 50.0 |
| 10.665 | 38.4 | -21.6 | 60.0 | 37.8 | -12.2 | 50.0 |
| 13.56 | 42.7 | -17.3 | 60.0 | 42.3 | -7.7 | 50.0 |
| 24.4 | 18.6 | -41.4 | 60.0 | 6.6 | -43.4 | 50.0 |



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5.2 Field strength of the fundamental wave

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

5.2.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

5.2.2 Photo documentation of the test set-up



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5.2.3 Applicable standard

According to FCC Part 15, Section 15.225(a):

The field strength of any emission within the band 13.553 – 13.567 MHz shall not exceed 15848 $\mu\text{V/m}$ at 30 m.

5.2.4 Description of Measurement

The transmitted field strength of the EUT has to be measured at an open area test site using a tuned receiver and a shielded loop antenna. The set up of the equipment under test will be in accordance with ANSI C63.4. The measurement has been performed at 3 m. The results have been compared to the limits defined at 30 m distances according to FCC Part 15C, Section 15.31(f)(2) using an inverse linear distance extrapolation factor of 40 dB/decade. The final measurement has been performed with an EMI receiver using quasi peak detector and a resolution bandwidth of 9 kHz.

5.2.5 Test result

- a) Result at a measurement distance of 3m

| Frequency (MHz) | Level (dB μV) | Ant. factor (dB 1/m) | Field strength dB($\mu\text{V/m}$) |
|-----------------|---------------------------|----------------------|--------------------------------------|
| 13.56 | 37.0 | 20.0 | 57.0 |

- b) Result extrapolated to a distance of 30 m

| Frequency (MHz) | Level (dB μV) | Ant. factor (dB 1/m) | Field strength dB($\mu\text{V/m}$) | Limit dB($\mu\text{V/m}$) | Delta (dB) |
|-----------------|---------------------------|----------------------|--------------------------------------|-----------------------------|------------|
| 13.56 | -3.0 | 20.0 | 17.0 | 84.0 | -67.0 |

Limit according to FCC Part 15, Section 15.225(a):

| Frequency (MHz) | Field strength of fundamental wave | | Measurement distance (metres) |
|-----------------|------------------------------------|-----------------------|-------------------------------|
| | ($\mu\text{V/m}$) | dB($\mu\text{V/m}$) | |
| 13.553 - 13.567 | 15848 | 84.0 | 30 |

The requirements are **FULFILLED**.

Remarks:

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5.3 Spurious emissions

For test instruments and accessories used see section 6 Part SER 1, SER 2.

5.3.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

5.3.2 Photo documentation of the test set-up



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5.3.3 Applicable standard

According to FCC Part 15C, Section 15.209:

The emissions from an intentional radiator shall not exceed the field strength levels specified in the table below.

5.3.4 Description of Measurement

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

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz

150 kHz – 30 MHz: RBW: 9 kHz

30 MHz – 1000 MHz: RBW: 120 kHz

5.3.5 Test result

Results at a measurement distance of 3m

| Frequency (MHz) | Level AV (dBμV) | Level QP (dBμV) | Ant. factor (dB) | Field strength QP dB(μV/m) | Field strength AV dB(μV/m) | Limit dB(μV/m) | Delta (dB) |
|-----------------|-----------------|-----------------|------------------|----------------------------|----------------------------|----------------|------------|
| 0.009-0.090 | --- | | | | | | |
| 0.090-0.110 | | --- | | | | | |
| 0.110-0.490 | --- | | | | | | |
| 0.490 - 1.705 | | --- | | | | | |
| 1.705 - 30.0 | | --- | | | | | |
| 30 - 88 | | --- | | | | | |
| 88 - 216 | | --- | | | | | |

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

| Frequency (MHz) | Field strength of spurious emissions | | Measurement distance |
|-----------------|--------------------------------------|----------|----------------------|
| | (μV/m) | dB(μV/m) | (metres) |
| 0.009 - 0.490 | 2400/F(kHz) | -- | 300 |
| 0.490 - 1.705 | 24000/F (kHz) | -- | 30 |
| 1.705 - 30.0 | 30 | 29.5 | 30 |
| 30 - 88 | 100 | 40 | 3 |
| 88 - 216 | 150 | 43.5 | 3 |
| 216 - 960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |

The requirements are **FULFILLED**.

Remarks: Measurement has been performed up to the 10th harmonic (135,6 MHz).

No undesired emissions occurred in the frequency range from 9 kHz up to 135,6 MHz

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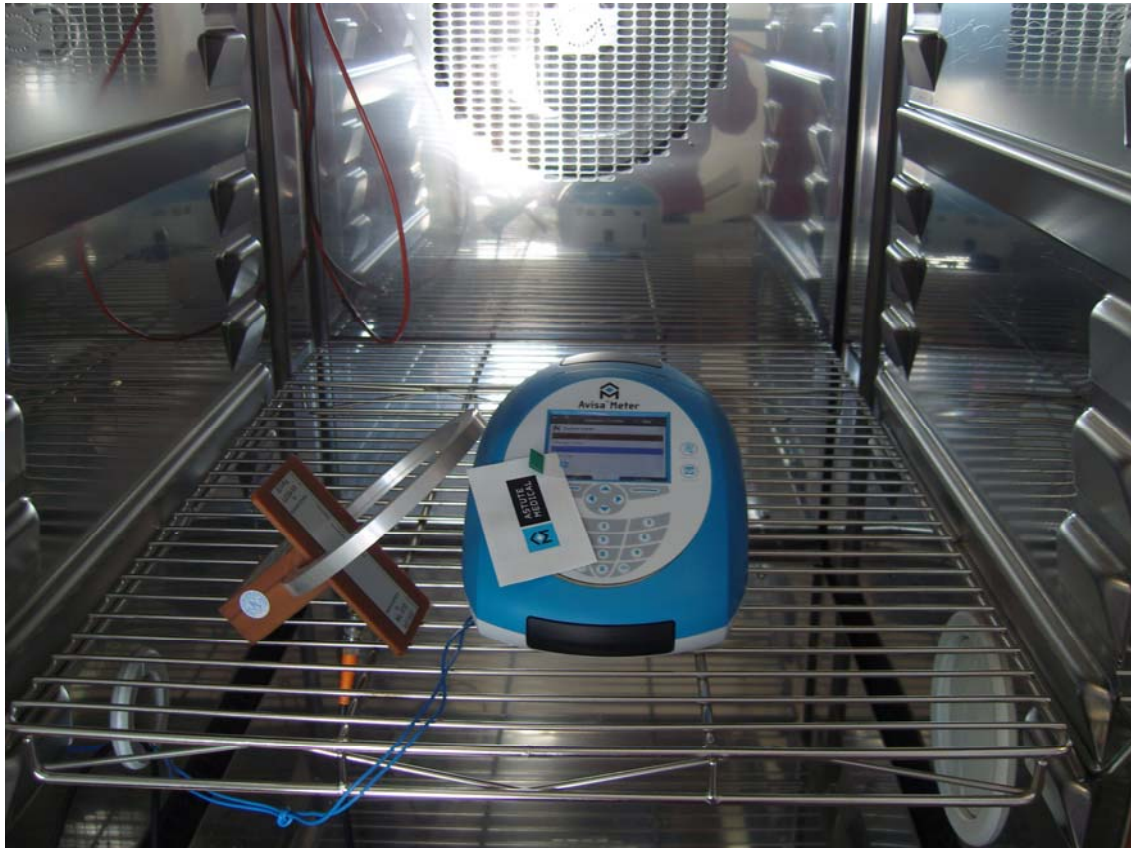
5.4 Frequency tolerance

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

5.4.1 Description of the test location

Test location: AREA4 (Climatic Chamber)

5.4.2 Photo documentation of the test set-up



5.4.3 Applicable standard

According to FCC Part 15, Section 15.225(e):

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature range of $-20\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ at normal supply voltage and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of $20\text{ }^{\circ}\text{C}$. For battery operated equipment, the measurement shall be performed using a new battery.

5.4.4 Description of Measurement

The frequency tolerance has been measured radiated using a spectrum analyser. The center frequency of the spectrum analyser has been set to the fundamental frequency. This is an alternative test method because the EuT can not be operated in un-modulated mode. The limit line was set to 10 dB below the carrier. The frequencies of the upper (f_U) and lower (f_L) points, where the displayed power envelope of the modulation including frequency drift is equal to the appropriate level, have been recorded. The centre frequency is calculated as $f_C = (f_U + f_L)/2$. The measurement has been performed at normal and extreme test conditions from $-20\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ in steps of 10 degrees (According to FCC Part 2.1055).

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5.4.5 Test result

| Test conditions | | Test result |
|---------------------------------|---------------------------|---------------------|
| | | Frequency (MHz) |
| $T_{min} (-20)^{\circ}\text{C}$ | $V_{min} (5.1 \text{ V})$ | 13.56254 |
| | $V_{max} (6.9 \text{ V})$ | 13.56254 |
| $T (-10)^{\circ}\text{C}$ | $V_{min} (5.1 \text{ V})$ | 13.56258 |
| | $V_{max} (6.9 \text{ V})$ | 13.56258 |
| $T (0)^{\circ}\text{C}$ | $V_{min} (5.1 \text{ V})$ | 13.56260 |
| | $V_{max} (6.9 \text{ V})$ | 13.56260 |
| $T (10)^{\circ}\text{C}$ | $V_{min} (5.1 \text{ V})$ | 13.56258 |
| | $V_{max} (6.9 \text{ V})$ | 13.56258 |
| $T_{nom} (20)^{\circ}\text{C}$ | $V_{min} (5.1 \text{ V})$ | 13.56252 |
| | $V_{nom} (6.0 \text{ V})$ | 13.56252 |
| | $V_{max} (6.9 \text{ V})$ | 13.56252 |
| $T (30)^{\circ}\text{C}$ | $V_{min} (5.1 \text{ V})$ | 13.56248 |
| | $V_{max} (6.9 \text{ V})$ | 13.56248 |
| $T (40)^{\circ}\text{C}$ | $V_{min} (5.1 \text{ V})$ | 13.56246 |
| | $V_{max} (6.9 \text{ V})$ | 13.56246 |
| $T_{max} (50)^{\circ}\text{C}$ | $V_{min} (5.1 \text{ V})$ | 13.56242 |
| | $V_{max} (6.9 \text{ V})$ | 13.56242 |
| Measurement uncertainty | | $\pm 10 \text{ Hz}$ |

Carrier frequency: $f_c = 13.56252 \text{ MHz}$
 Max. tolerance: $\pm 0.01 \% \text{ of } 13.56252 \text{ MHz} = \pm 1.356 \text{ kHz}$

Lowest frequency: $f_l = 13.56242 \text{ MHz}$
 Highest frequency: $f_h = 13.56260 \text{ MHz}$

Lowest tolerance: $f_l - f_c = -0.10 \text{ kHz} < -1.356 \text{ kHz}$
 Highest tolerance: $f_h - f_c = +0.08 \text{ kHz} < -1.356 \text{ kHz}$

Limit according to FCC Part 15, Section 15.225(e):

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01 \%$ of the operating frequency.

The requirements are **FULFILLED**.

Remarks:

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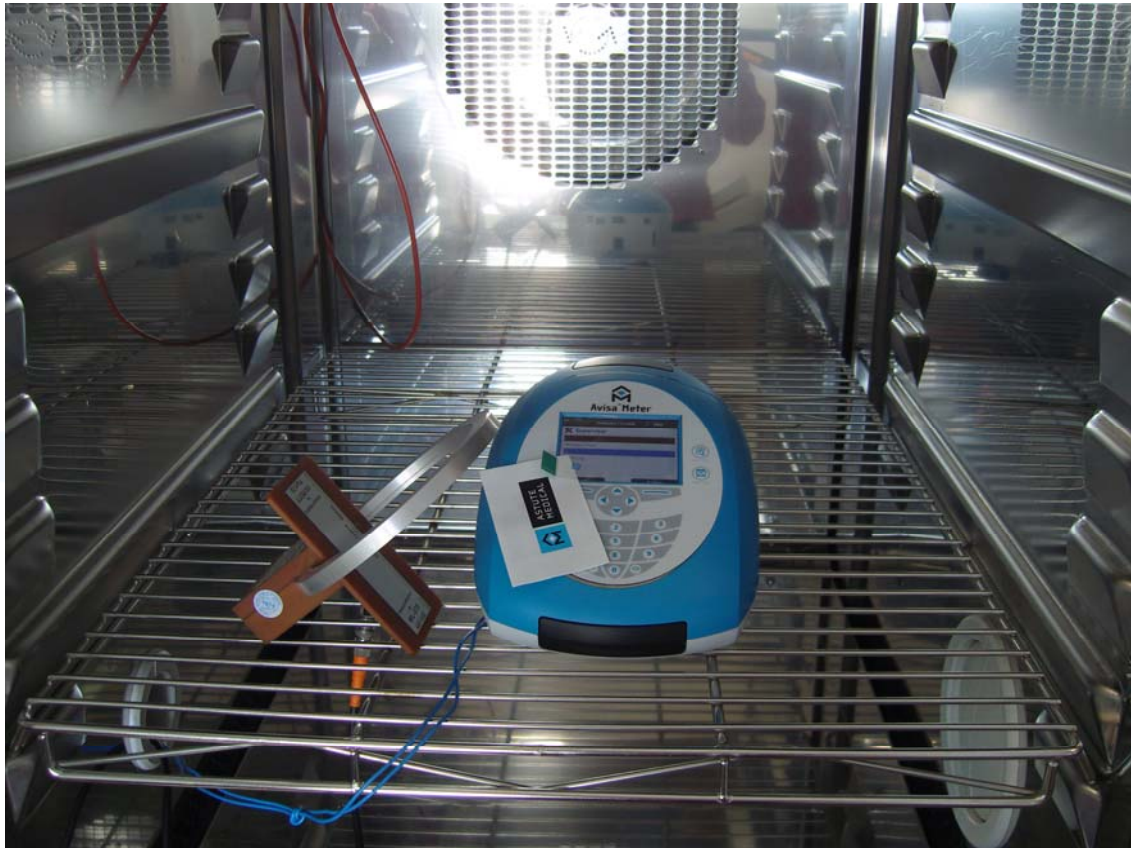
5.5 20 dB Bandwidth

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

5.5.1 Description of the test location

Test location: AREA4

5.5.2 Photo documentation of the test set-up



5.5.3 Applicable standard

According to FCC Part 15C, Section 15.215(c):

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in section 15.217 to 15.257, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed.

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5.5.4 Description of Measurement

The frequency range has been measured radiated using a test fixture and a spectrum analyser. The limit line is set to 20 dB below the carrier. The frequency of the upper (F_H) and lower (F_L) points, where the displayed power envelope of the modulation including frequency drift is equal to the appropriate level, is recorded as the modulation bandwidth. The measurement has been performed at normal and extreme test conditions in modulated transmitting mode.

Spectrum analyzer settings:

RBW: 1 kHz

VBW: 3 kHz

Detector Peak

5.5.5 Test result

| Carrier Frequency (MHz) | (F_L) (MHz) | (F_H) (MHz) | Bandwidth (kHz) | Limit (kHz) |
|-------------------------|-----------------|-----------------|-----------------|-------------|
| 13.56252 | 13.55914 | 13.56704 | 7.9 | 14.0 |

Limit according to FCC Part 15C, Section 15.215(c):

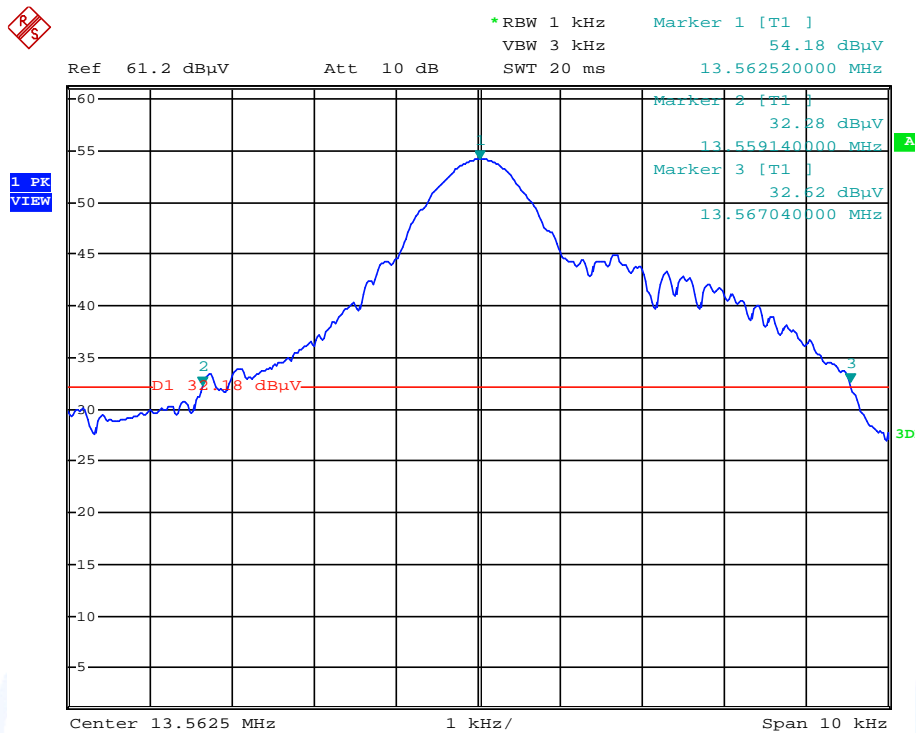
| Frequency band (MHz) | Limit 20 dB bandwidth (kHz) |
|----------------------|-----------------------------|
| 13.553 - 13.567 | 14.0 |

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.

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5.5.6 Test protocol



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5.6 Transmitter spectrum mask

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

5.6.1 Description of the test location

Test location: AREA4

5.6.2 Photo documentation of the test set-up



FCC ID: YMQ8047000

5.6.3 Applicable standard

According to FCC Part 15C, Section 15.225 (a-d):

The field strength of any emission shall not exceed the limits given in FCC Part 15C, Section 15.225 (a-d)

5.6.4 Description of Measurement

The spectrum mask is measured using a spectrum analyser. The profile of the spectrum mask is displayed on analyser and have to be adjusted to the reference level given as maximum output power measured in OATS. The marker is set up manually to the particular maximum level at the effective limit in the frequency range and recorded. The measurement was performed radiated.

5.6.5 Test result

| Frequency band (MHz) | Emission level (dBμV/m) | Limit (dBμV/m) |
|----------------------------|-------------------------|----------------|
| 13.110 – 13.410 | ≤-10 | 40.5 |
| 13.410 - 13.553 | 8.5 | 50.5 |
| 13.553 - 13.567 | 17.0 | 84.0 |
| 13.567 – 13.710 | 14.7 | 50.5 |
| 13.710 – 14.010 | ≤-10 | 40.5 |
| outside of 13.110 – 14.010 | ≤-10 | 29.5 |

Limits according to FCC Part 15C, Section 15.225(a-d):

The absolute levels of RF power at any frequency shall not exceed the limits defined in the following table:

| Frequency band (MHz) | Emission level limit at 30 m (μV/m) |
|----------------------------|-------------------------------------|
| 13.110 – 13.410 | 106 |
| 13.410 - 13.553 | 334 |
| 13.553 - 13.567 | 15,848 |
| 13.567 – 13.710 | 334 |
| 13.710 – 14.010 | 106 |
| outside of 13.110 – 14.010 | 30 |

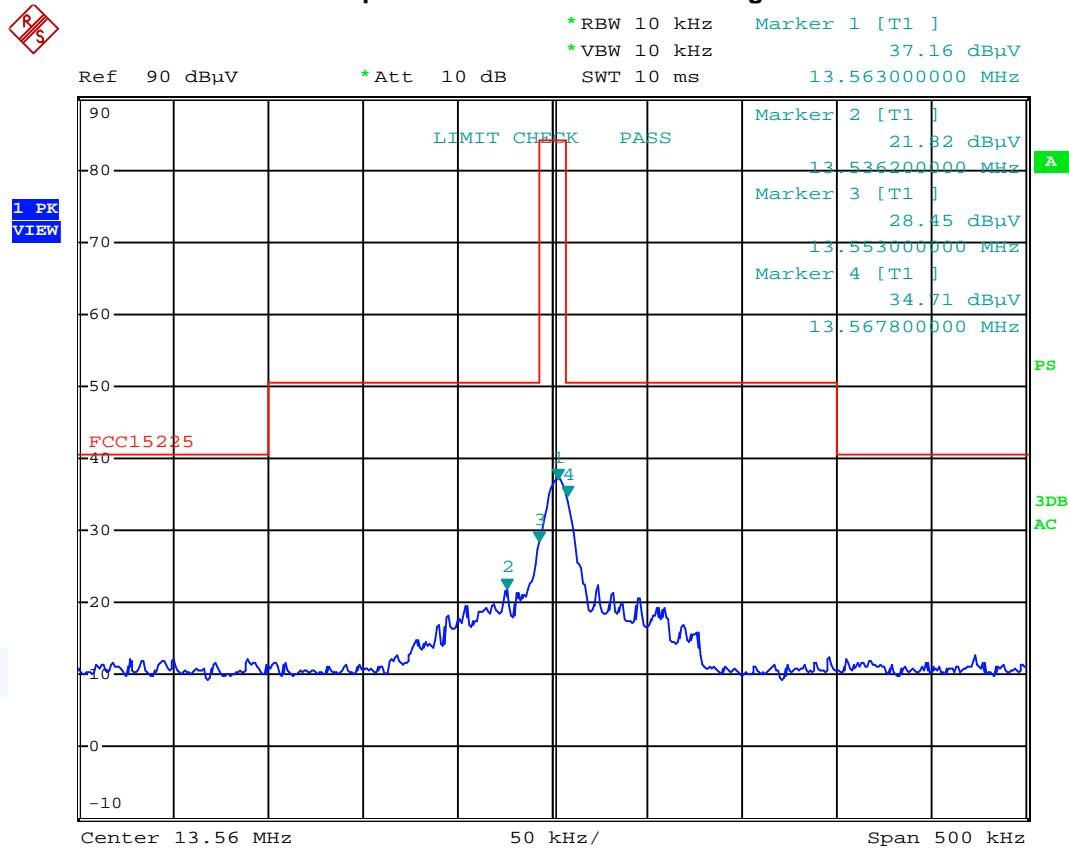
The requirements are **FULFILLED**.

Remarks:

FCC ID: YMQ8047000

5.6.6 Test protocol

Spectrum mask of modulated signal



The values of the plot are extrapolated to a measurement distance of 3 m.

FCC ID: YMQ8047000

5.7 Receiver radiated emissions

5.7.1 Description of the test location

Test location: None

5.7.2 Applicable standard

According to FCC Part 15, Section 15.109(a):

The emission of an unintentional radiator shall not exceed the specified field strength level at 3 m.

Remarks: This test is not applicable. The receive mode is too short to make an assessment.

mikes

FCC ID: YMQ8047000

6 USED TEST EQUIPMENT AND ACCESSORIES

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

| Test ID | Model Type | Equipment No. | Next Calib. | Last Calib. | Next Verif. | Next Verif. |
|---------|---|---|-------------|--|---|-------------|
| CPR 1 | FMZB 1516 ESCI | Magnetic Field Antenna EMI Test Receiver | | Schwarzbeck Mess-Elektronik Rohde & Schwarz München | 01-02/24-01-018 02-02/03-05-005 | |
| FE | FSP 30 THS730A HZ-10 WK-340/40 6543A | Spectrum Analyzer Handheld Scope Magnetic Field Antenna Climatic Chamber Power Supply | | Rohde & Schwarz München Tektronix GmbH Rohde & Schwarz München Weiss Umwelttechnik GmbH HP Hewlett-Packard | 02-02/11-05-001 02-02/13-05-001 02-02/24-05-012 02-02/45-05-001 02-02/50-05-157 | |
| MB | FSP 30 HZ-10 | Spectrum Analyzer Magnetic Field Antenna | | Rohde & Schwarz München Rohde & Schwarz München | 02-02/11-05-001 02-02/24-05-012 | |
| SER 1 | FMZB 1516 ESCI | Magnetic Field Antenna EMI Test Receiver | | Schwarzbeck Mess-Elektronik Rohde & Schwarz München | 01-02/24-01-018 02-02/03-05-005 | |
| SER 2 | ESVS 30 VULB 9168 S10162-B KK-EF393-21N-16 NW-2000-NB | EMI Test Receiver Trilog Broad Band Antenna RF Cable 33 m RF Cable 20 m RF Cable | | Rohde & Schwarz München Schwarzbeck Mess-Elektronik Huber + Suhner Huber + Suhner Huber + Suhner | 02-02/03-05-006 02-02/24-05-005 02-02/50-05-031 02-02/50-05-033 02-02/50-05-113 | |

| Test ID | Model Type | Equipment No. | Next Calib. | Last Calib. | Next Verif. | Last Verif. |
|---------|---|---|--------------------------|--------------------------|-------------|-------------|
| CPR 1 | FMZB 1516 ESCI | 01-02/24-01-018 02-02/03-05-005 | 21/11/2012 | 21/11/2011 | 16/02/2013 | 16/02/2012 |
| FE | FSP 30 THS730A HZ-10 WK-340/40 6543A | 02-02/11-05-001 02-02/13-05-001 02-02/24-05-012 02-02/45-05-001 02-02/50-05-157 | 05/10/2012 17/10/2012 | 05/10/2011 17/10/2011 | 22/06/2012 | 22/12/2011 |
| MB | FSP 30 HZ-10 | 02-02/11-05-001 02-02/24-05-012 | 05/10/2012 | 05/10/2011 | | |
| SER 1 | FMZB 1516 ESCI | 01-02/24-01-018 02-02/03-05-005 | 21/11/2012 | 21/11/2011 | 16/02/2013 | 16/02/2012 |
| SER 2 | ESVS 30 VULB 9168 S10162-B KK-EF393-21N-16 NW-2000-NB | 02-02/03-05-006 02-02/24-05-005 02-02/50-05-031 02-02/50-05-033 02-02/50-05-113 | 20/06/2012 16/03/2013 | 20/06/2011 16/03/2012 | 16/09/2012 | 16/03/2012 |