



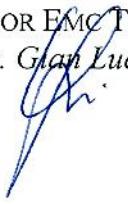



|  |  |  |  |
|--|--|--|--|
|   <b>CE MARKING</b><br>ELECTROMAGNETIC COMPATIBILITY<br>ELECTRICAL SAFETY<br>LASER SPECTROSCOPY<br>ENVIRONMENTAL PHYSIC  |  |  www.tuv.com<br>TÜVRheinland<br>ID: 9105021519 | Organizzazione con Sistema<br>di Gestione certificato<br>Company with Management<br>System certified<br>ISO 9001:2008<br> |
| <b>G.S.D. Srl</b><br><b>PISA - Italy</b>   |  | <b>Test Report n. FCC-12009</b>  |  |
|  |  | Rev. 01  |  |
|  |  |  |  |
| <b>Manufacturer</b>  |  | <b>TERTIUM Technology S.r.l.</b>   |  |
| Address  |  | Via G. B. Picotti, 8<br>56124 Pisa<br>Italy  |  |
|  |  |  |  |
|  |  |  |  |
| <b>Test Family Name</b>  |  | <b>BlueBerry HF</b>  |  |
|  |  |  |  |
|  |  |  |  |
| <b>Testing Laboratory Name</b>   |  | <b>G.S.D. S.r.l.</b>   |  |
| Address  |  | Via Marmiceto, 8<br>56121 Ospedaletto Pisa (PI)<br>Italy   |  |
| Tel/Fax  |  | +39 050 984254 / +39 050 984262  |  |
| P.IVA/VAT  |  | 01343950505  |  |
| http – e-mail  |  | <a href="http://www.gsd.it">www.gsd.it</a> - <a href="mailto:info@gsd.it">info@gsd.it</a>  |  |
|  |  | FCC Listed: Registration Number: 424037  |  |
|  |  |  |  |
| <b>Location and Date of Issue</b>  |  | Pisa, 2011 July 18   |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| <div style="text-align: center;"> <b>G.S.D. s.r.l.</b><br/>         Via Marmiceto, 8<br/>         56121 OSPEDALETTO - PISA<br/>         Tel. 050.984254 - Fax 050.984262<br/>         P. IVA 01343950505       </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;">         SENIOR EMC TEST MANAGER<br/>         Dr. Gian Luca Genovesi<br/>  </div> <div style="width: 45%;">         QUALITY MANAGER<br/>         Dr. David Pelliccia<br/>  </div> </div> |  |  |  |

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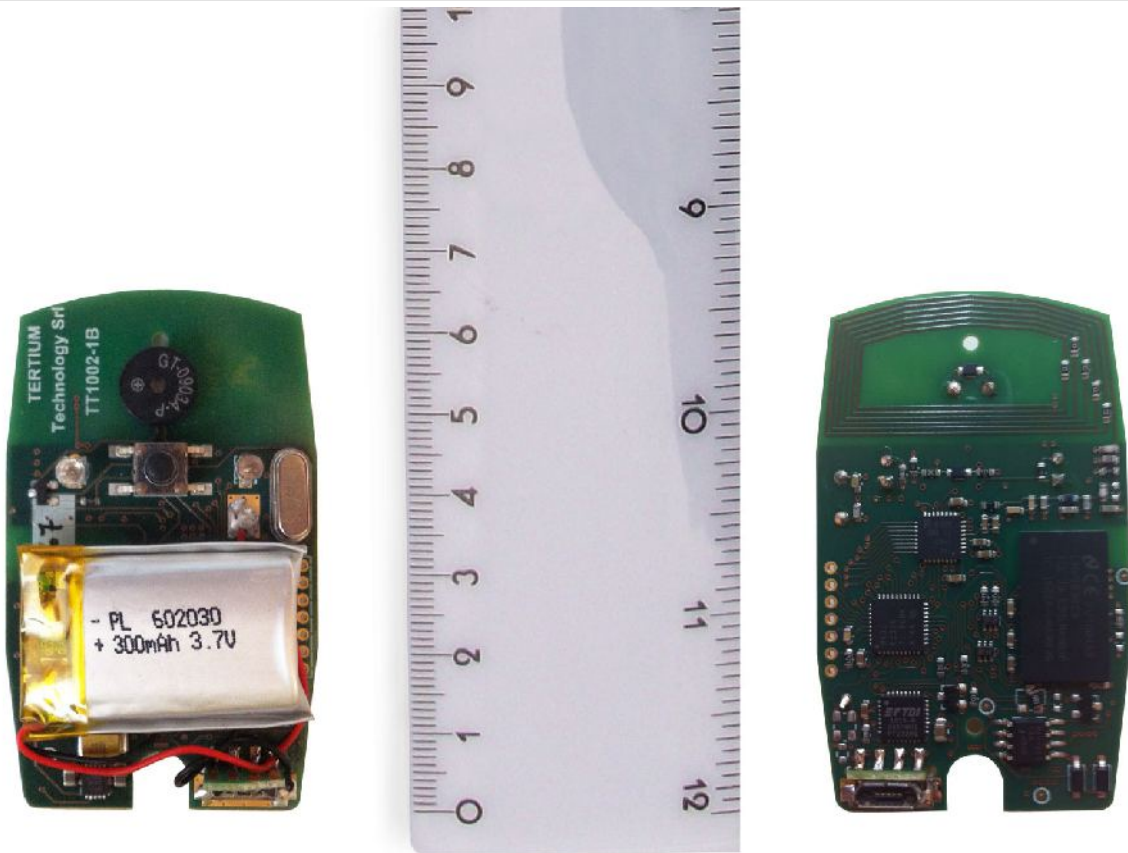
|   |  |
|---|--|
| <b>1. MANUFACTURER AND EUT IDENTIFICATION<sup>1</sup></b> |  |
| <b>Manufacturer</b>                                       | <b>TERTIUM Technology S.r.l..</b>                                    |
| Address   | Via G. B. Picotti, 8<br>56124 Pisa<br>Italy                          |
|   |  |
|   |  |
| <b>Test Family Name</b>                                   | <b>BlueBerry HF</b>  |
|   |  |
|   |  |
| Date of reception   | <b>2012 May 08</b>   |
|   |  |
| Sampling  | <b>Laboratory sample for certification</b>                           |
|   |  |
| Test Item Description                                     | <b>RFID Device</b>   |
|   |  |
| Nominal Input Voltage                                     | <b>3,7 Vdc Li-ion Batteries rechargeable batteries via micro USB</b> |
|   |  |
| EUT Dimensions  | <b>7.5cm x 4.0cm</b>   |
|   |  |
| FCC ID  | <b>Y6D-BBHF-RW020</b>  |
|   |  |

<sup>1</sup>A detailed documentation is preserved in the internal fascicle.



*Fig. 1.1  
Equipment Photo*

*Fig. 1.2*  
*Equipment Internal Photo*



## 2. REFERENCE STANDARDS

Tests and measurements are performed accordingly to the reference standards given in the table below:

| <i>TEST</i>   | <i>STANDARD</i>  |
|---|--|
| Emissions: Conducted and Radiated –<br>Sections 15.207 and 15.209<br>and<br>Section 15.107 and 15.109 | FCC Rules and Regulations, Title 47 (2008) Part 15 –<br>Sub part B<br><br>ANSI C63.4 – American National Standard for<br>Methods of Measuring of Radio-Noise Emissions<br>from Low Voltage Electrical and Electronic<br>Equipment in the Range of 9 kHz – 40 GHz |
| Operation within the band 13.110-14.010<br>MHz:<br>Section 15.225                                     | FCC Rules and Regulations, Title 47 (2008) Part 15 –<br>Sub part B<br><br>ANSI C63.4 – American National Standard for<br>Methods of Measuring of Radio-Noise Emissions<br>from Low Voltage Electrical and Electronic<br>Equipment in the Range of 9 kHz – 40 GHz |
|   |  |
|   |  |

**3. RESULT, CONDITION, MEASUREMENT UNCERTAINTY**Summary of Test Results

| <i>TEST</i>  | <i>RESULT</i> |
|--|---------------|
| <i>Emissions: conducted<br/>Section 15.207</i>     | <i>Pass</i>   |
| <i>Emissions: radiated<br/>Section 15.209</i>      | <i>Pass</i>   |
| <i>Operation within the band 13.110-14.010 MHz</i> | <i>Pass</i>   |

Measurement uncertainty

| <i>TEST</i>   | <i>EXPANDED UNCERTAINTY</i> |
|---|-----------------------------|
| Conducted Emission – 50Ω/50μH AMN (150 kHz - 30 MHz)      | ± 3.5 dB                    |
| Radiated Emission – (Semianechoic Room) (30 MHz - 18 GHz) | ± 4.7 dB                    |

Climatic Conditions

| <i>PARAMETER</i>  | <i>VALUE</i> |
|-------------------|--------------|
| Temperature       | (293 ± 3) K  |
| Relative humidity | (50 ± 5) %   |

Extensions

The results refer only to the sampled EUT and under the specified conditions.

Test Software:

TT RFID Configurator

Test Conditions:

For 15.107 and 15.109 tests equipment was connected to a PC with data exchange but not for 15.207 and 15.209 tests.





**4. RADIATED EMISSIONS §15.209 AND §15.109**

In the following table you can find the limits established by the reference standard:

| <b>FREQUENCY RANGE<br/>(MHz)</b> | <b>Field Strenght<br/>QUASI-PEAK LIMITS<br/>[dB (V/m)]</b> |
|----------------------------------|--|
| 30 88                            | 40   |
| 88 216                           | 43,5   |
| 216 960                          | 46   |
| Above 960                        | 54   |

Test Equipment

| <b>EQUIPMENT</b>            | <b>MANUFACTURER</b> | <b>MODEL</b> | <b>CAL. DUE</b> |
|-----------------------------|---------------------|--------------|-----------------|
| EMI Receiver                | HP                  | HP8546A      | 01/2013         |
| EMI Receiver Filter Section | HP                  | HP85460A     | 01/2013         |
| Anechoic Chamber            | Comtest             | CSA01        | 01/2013         |
| Bilog Antenna               | Schaffner           | CBL6112B     | 01/2013         |
| Horn Antenna                | EMCO                | 3115         | 01/2013         |
| Controllor                  | Deisel              | HD100        | 01/2013         |
| Turn Table                  | Deisel              | MA240        | 01/2013         |
| LISN                        | GSD                 | NTW06        | 01/2013         |

Test procedure: RE22R02

Tests performed with equipment stand-alone and conncted to a Personal Computer.

Notes

Azimuth position EUT-Antenna corresponding to 0° identifies the rotating table orientation (TT) in which the instrument to be tested shows the front part turned towards the antenna. Positive grades individuate clockwise rotations of TT when this one is observed from the top. For negative degrees, TT rotation is anticlockwise.

Antenna height respect to the mass plane is conventionally individuated with: MA=XXX where XXX indicates the height (always positive for e>100) expressed in cm.

Antenna horizontal polarisation is indicated by POL=H.

Antenna vertical polarisation is indicated by POL=V.

EUT was tested in the three ortogonal planes.

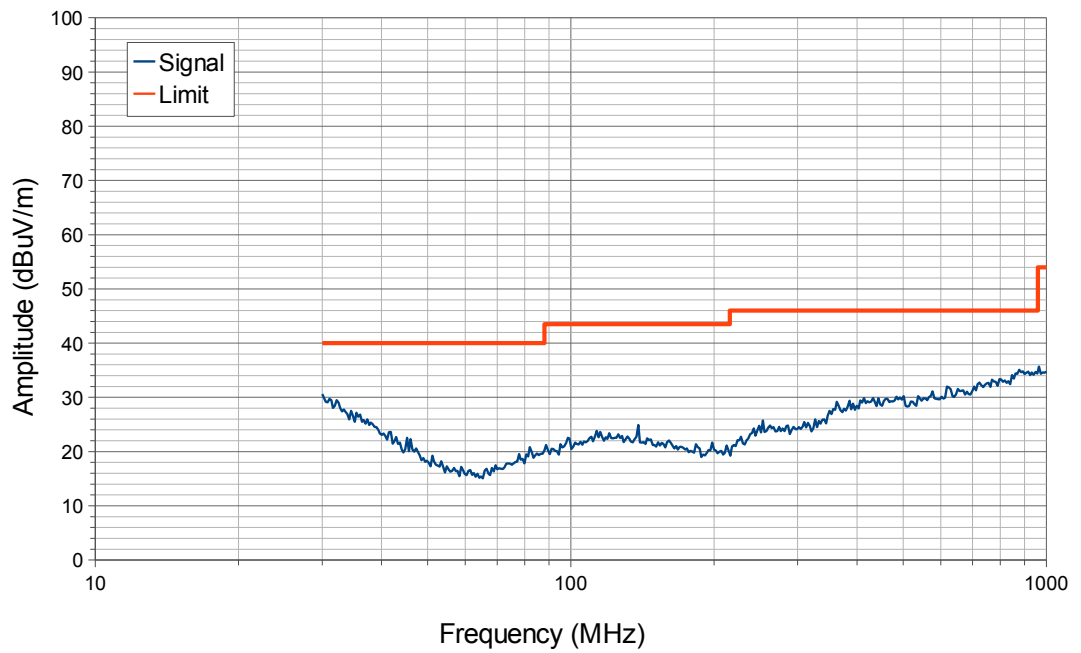
Results and conclusions

In all the operative conditions, equipment complied with the standard limits. Graphics in following figures show the most significant registrations of the performed measurements.

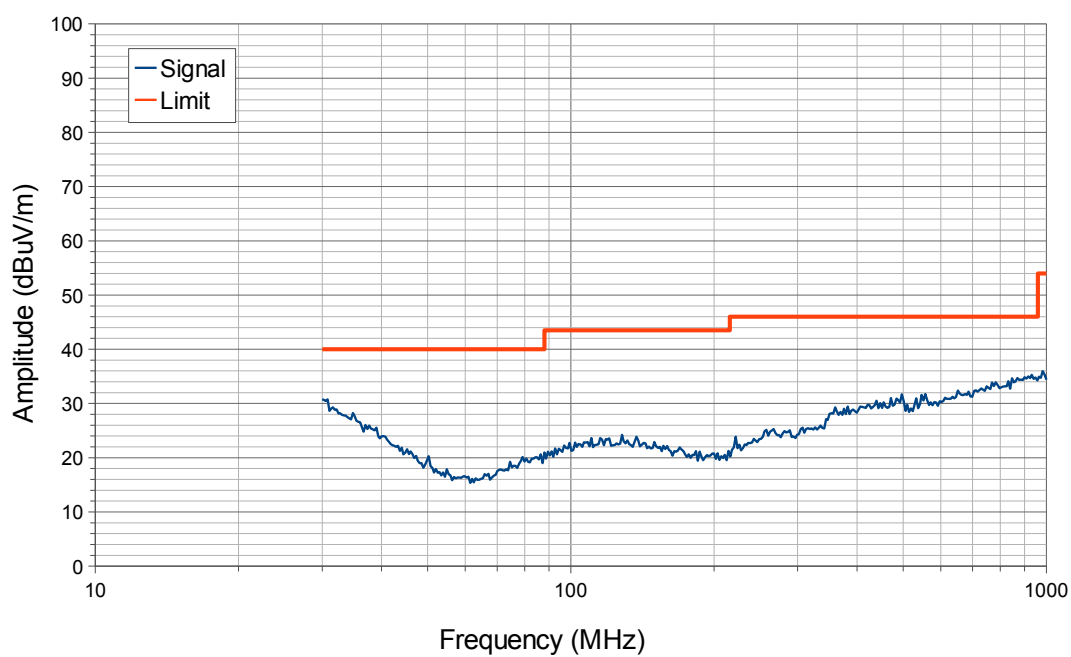
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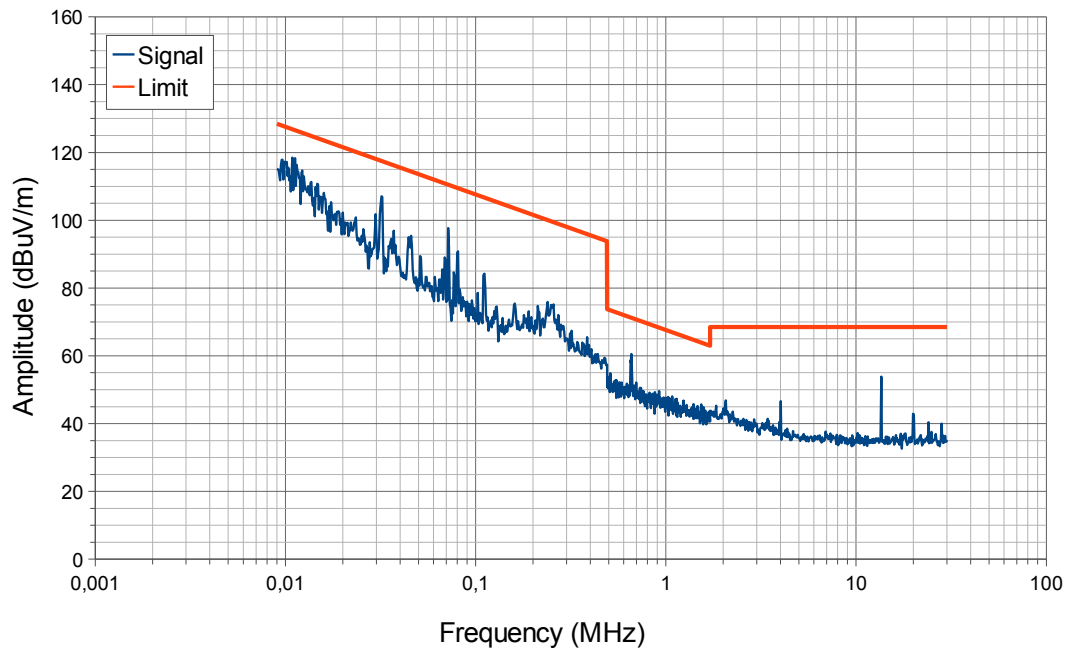
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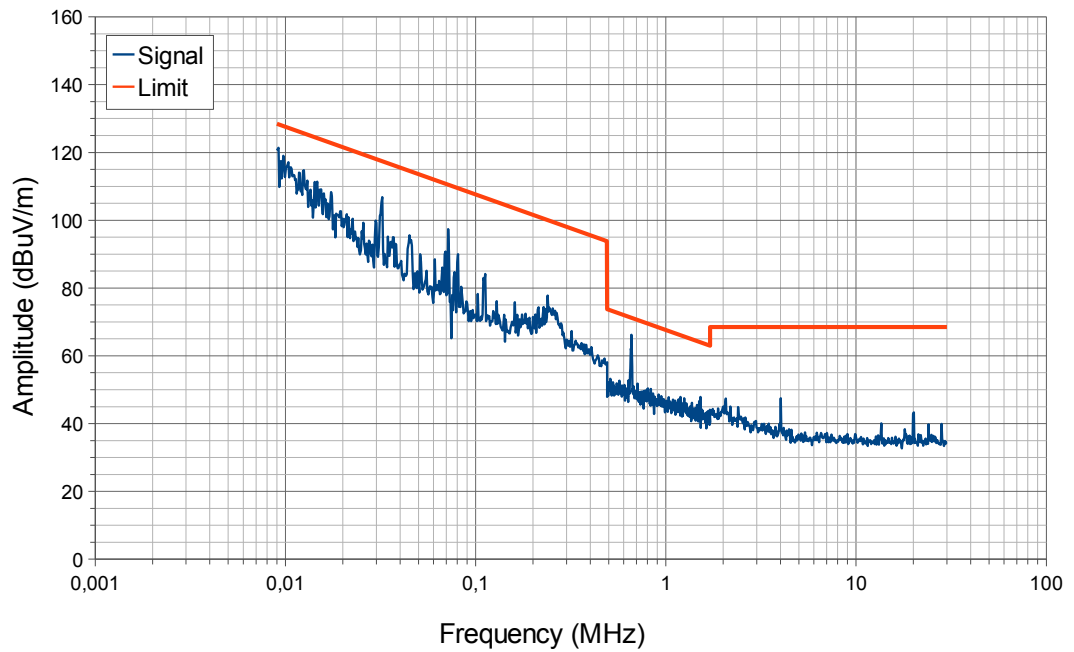
Notes:  
Pol. = V  
TT = 0°  
MA = 100 cm  
EUT mode: operative



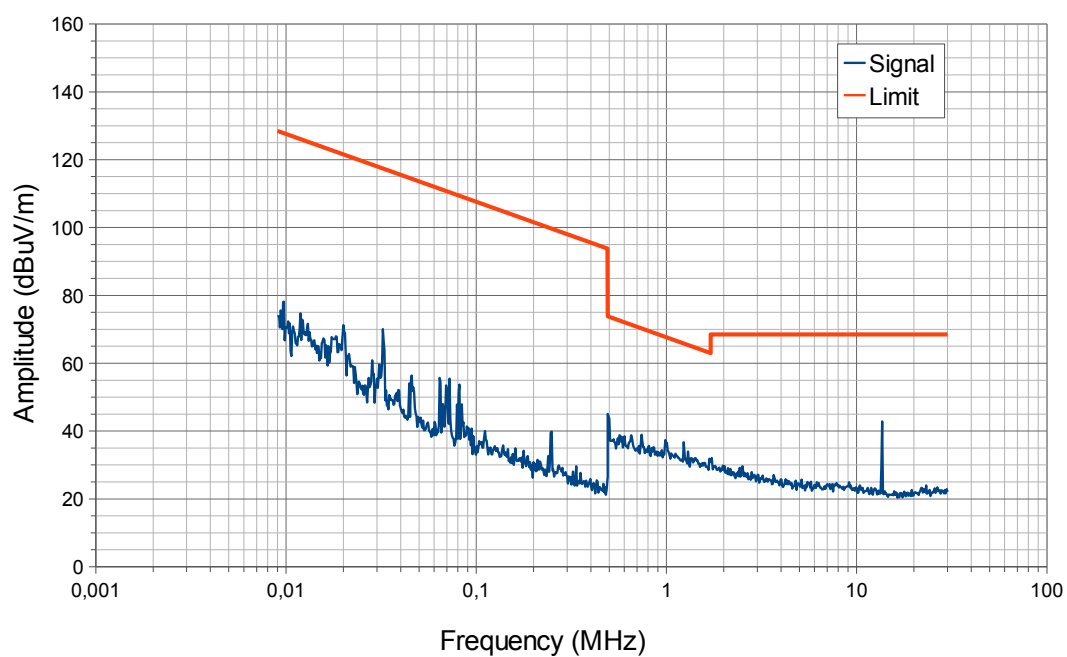
Notes:  
Pol. = H  
TT = 0°  
MA = 100 cm  
EUT mode: operative



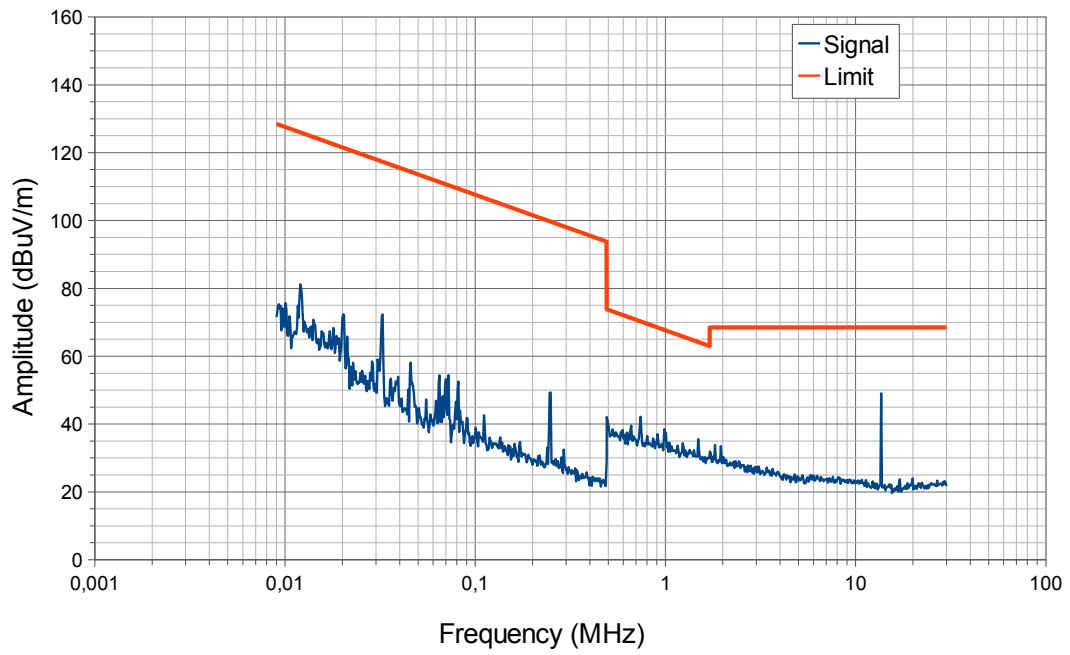
Notes:  
Loop Antenna  
Pol. = Parallel  
TT = 0°  
MA = 100 cm  
EUT mode: operative



Notes:  
Loop Antenna  
Pol. = Orthogonal  
TT = 0°  
MA = 100 cm  
EUT mode: operative



Notes:  
Loop Antenna  
Pol. = Orthogonal  
TT = 0°  
MA = 100 cm  
EUT mode: operative connected to PC



Notes:

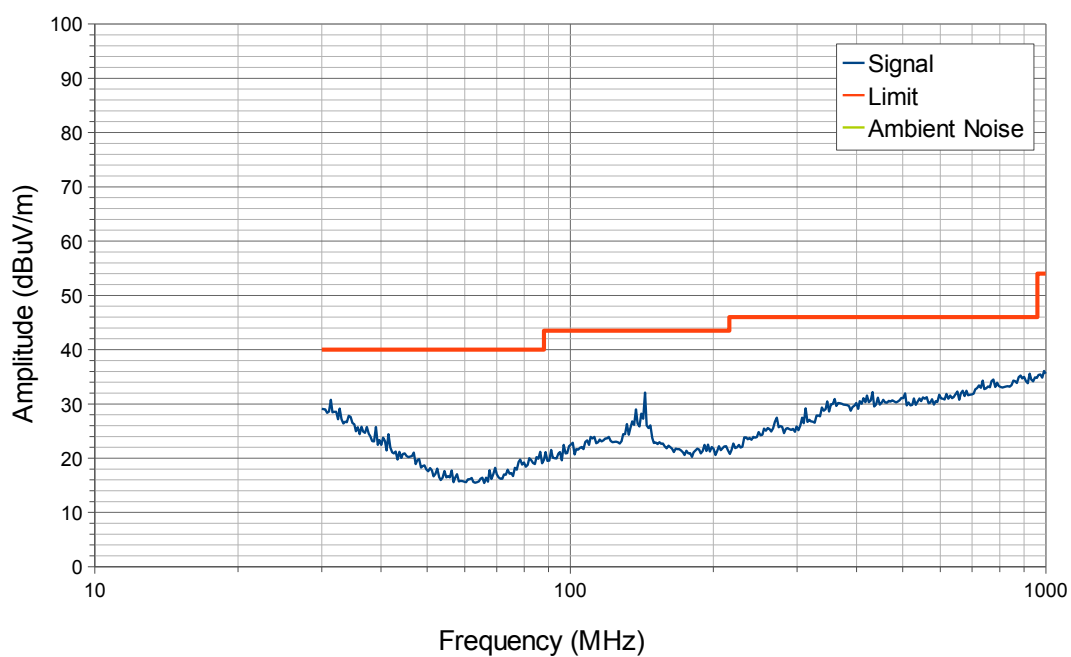
Loop Antenna

Pol. = Parallel

TT = 0°

MA = 100 cm

EUT mode: operative connected to PC



Notes:

Pol. = H

TT = 0°

MA = 100 cm

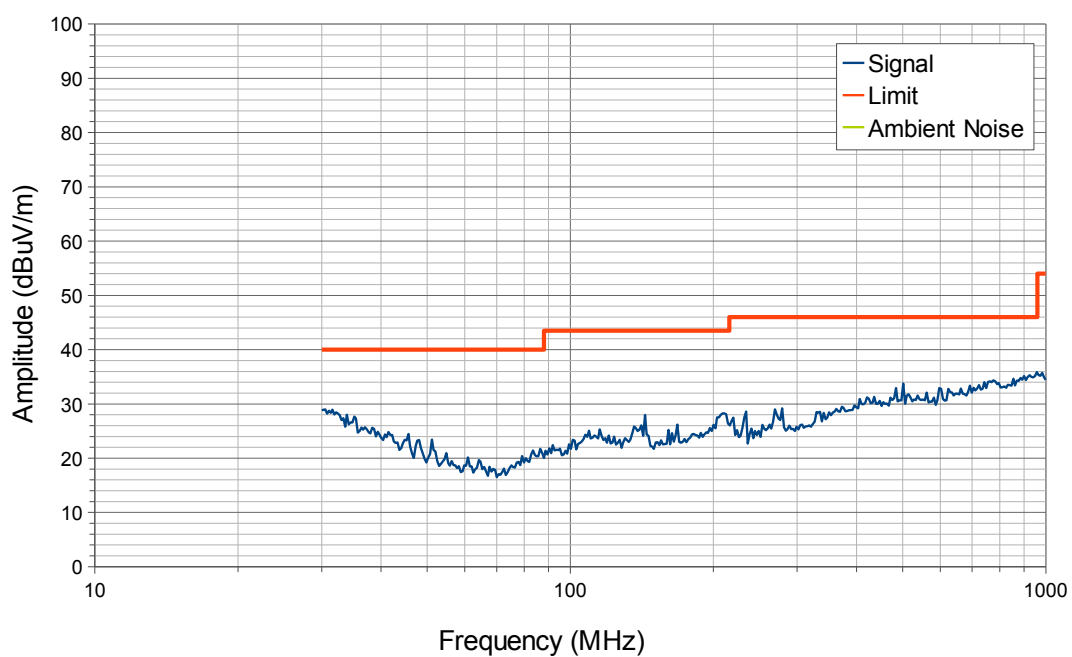
EUT mode: operative and connected to PC

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Notes:

Pol. = V

TT = 0°

MA = 100 cm

EUT mode: operative and connected to PC

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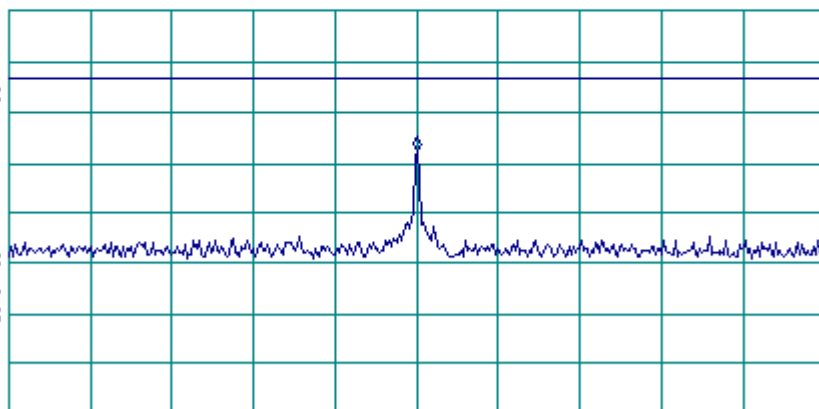


ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 13.566 MHz  
54.11 dB $\mu$ V/m

LOO REF 82.0 dB $\mu$ V/m

10  
dB/  
ATN  
10 dB

MA SB  
SC FS  
ACORR



CENTER 13.566 MHz

SPAN 2.500 MHz

RL #1F BW 9.0 kHz

AVG BW 30 kHz

SWP 200 msec

Loop Antenna

Range: Center=13.56 MHz; span=2.5 MHz

Pol. = parallel

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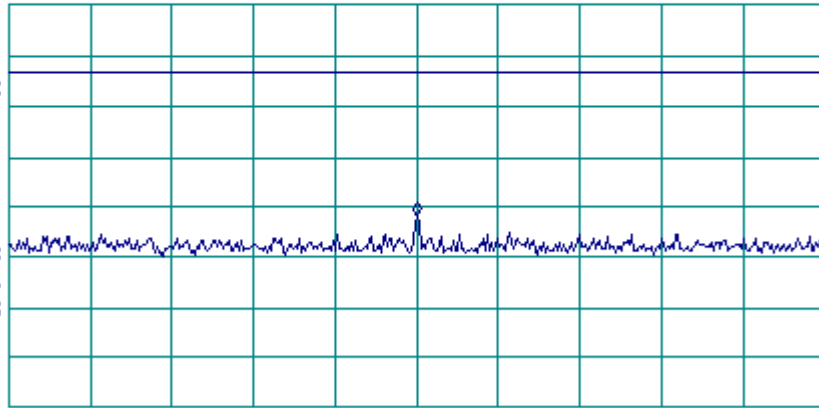
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ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 13.566 MHz  
40.00 dB $\mu$ V/m

LOO REF 82.0 dB $\mu$ V/m

10  
dB/  
ATN  
10 dB



CENTER 13.566 MHz

SPAN 2.500 MHz

RL #1F BW 9.0 kHz

AVG BW 30 kHz

SWP 200 msec

Loop Antenna  
Range: Center=13.56 MHz; span=2.5 MHz  
Pol. = Orthogonal

Table of fundamental frequency results

| Frequency (MHz) | Intensity (dBuV/m) | Polarization |
|-----------------|--------------------|--------------|
| 13,56           | 54,11              | Parallel     |
| 13,56           | 40                 | Orthogonal   |

Table of worst case results:

| Frequency (MHz) | Intensity (dBuV/m) | Polarization |
|-----------------|--------------------|--------------|
| 0,016           | 81,3               | Parallel     |
| 0,021           | 72,7               | Parallel     |
| 0,032           | 73,8               | Parallel     |
| 0,046           | 58,3               | Parallel     |
| 0,253           | 48,3               | Parallel     |
| 13,560          | 54,11              | Parallel     |

**5. POWERLINE CONDUCTED EMISSIONS §15.207 AND §15.107**

Equipment shall meet the limits below when using a CISPR16 quasi-peak and average detector receivers.

FCC, 15.107, Class B Limit

| <b>FREQUENCY RANGE</b><br>(MHz) | <b>QUASI-PEAK LIMIT</b><br>[dB (V)] | <b>AVERAGE LIMIT</b><br>[dB (V)] |
|---------------------------------|-------------------------------------|----------------------------------|
| 0.15 0.50                       | 66 56 <sup>(*)</sup>                | 56 46 <sup>(*)</sup>             |
| 0.50 5                          | 56                                  | 46                               |
| 5 30                            | 60                                  | 50                               |

<sup>(\*)</sup> Limit decreasing linearly with logarithm of frequency

**Test Equipment**

| <b>EQUIPMENT</b>            | <b>MANUFACTURER</b> | <b>MODEL</b> | <b>CAL. DUE</b> |
|-----------------------------|---------------------|--------------|-----------------|
| EMI Receiver                | HP                  | HP8546A      |                 |
| EMI Receiver Filter Section | HP                  | HP85460A     |                 |
| Screened Room               | GSD                 | CSC01        |                 |
| Transient Limiter           | HP                  | 11947A       | 01/2013         |
| LISN                        | GSD                 | GSDA01       | 01/2013         |

**Test procedure: CE22R01**

The EUT power cable was connected to a LISN and the monitored output of the LISN was connected to a spectrum analyzer by a transient limiter. The conducted emissions from 150 kHz to 30 MHz were monitored and compared to the specification limits

**Test method**

Test method was in accordance with the reference standard.

EUT modes of operations were tested in order to achieve the maximum level of emission.

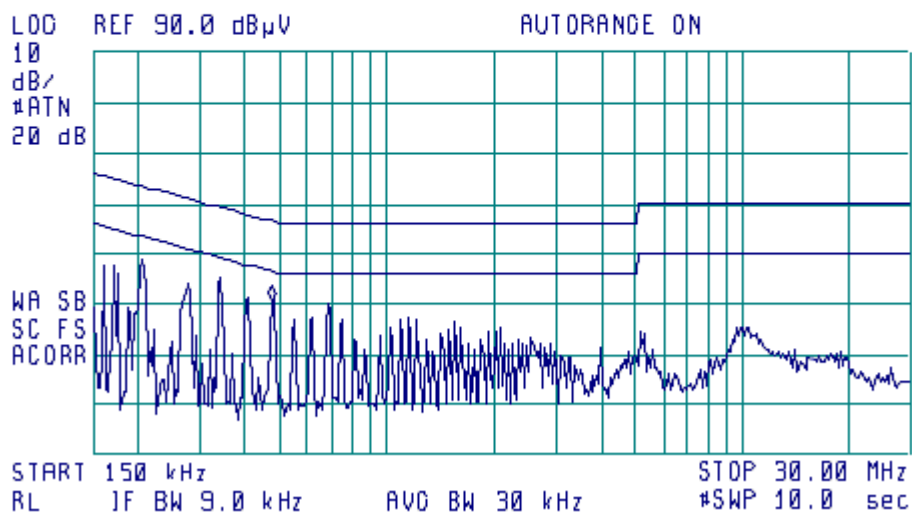
**Results**

Equipment complied with the test specification limits.

Graphics in following figures show some registrations of the frequency spectrum of the conducted emissions.



ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 480 kHz  
40.60 dBμV



Notes:

Phase: 2

EUT on USB connection

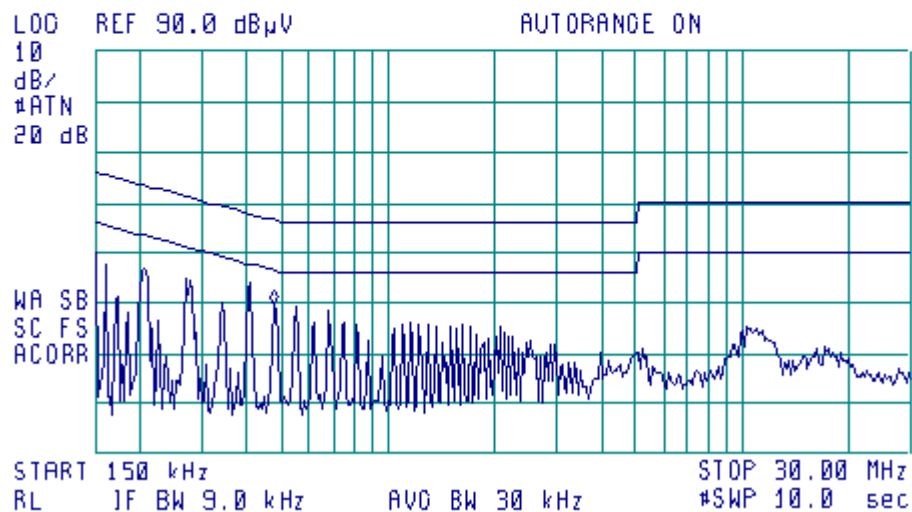
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ACTV DET: PEAK  
MEAS DET: PEAK OP AVG  
MKR 400 kHz  
39.69 dBμV



Notes:

Phase: 1

EUT on USB connection

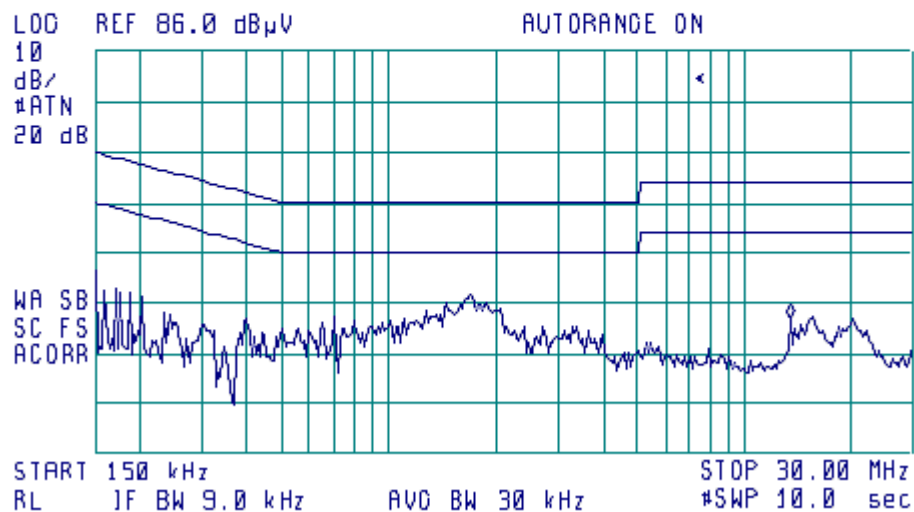
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ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 13.53 MHz  
32.94 dBμV



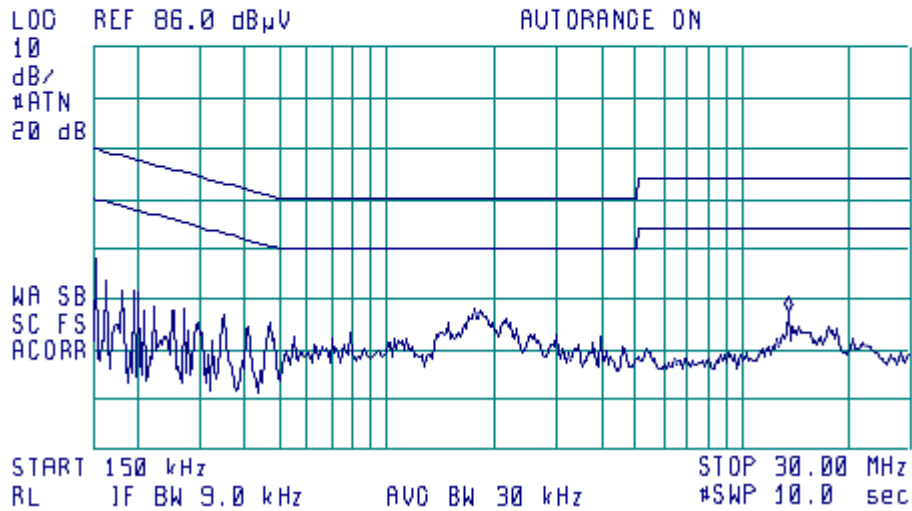
Notes:

Phase: 1

EUT on USB connection during data exchange



ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 13.53 MHz  
33.45 dBμV



Notes:  
Phase: 2  
EUT on USB connection during data exchange

Table of worst-case emissions (\*)

| Frequency (MHz) | Peak (dBuV) | Quasi-peak (dBuV) | Limit Quasi-peak (dBuV) | Average (dBuV) | Limit Average (dBuV) |
|-----------------|-------------|-------------------|-------------------------|----------------|----------------------|
| 0,18            | 38,1        |                   | 56                      |                | 46                   |
| 0,21            | 35,7        |                   | 56                      |                | 46                   |
| 0,28            | 37,8        |                   | 63,6                    |                | 53,6                 |
| 0,34            | 38,4        |                   | 64,5                    |                | 54,5                 |
| 0,41            | 39,3        |                   | 65                      |                | 55                   |
| 0,48            | 39          |                   | 65,5                    |                | 55,5                 |



**6. OPERATION WITHIN THE BAND 13.100-14.010 MHz.**

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

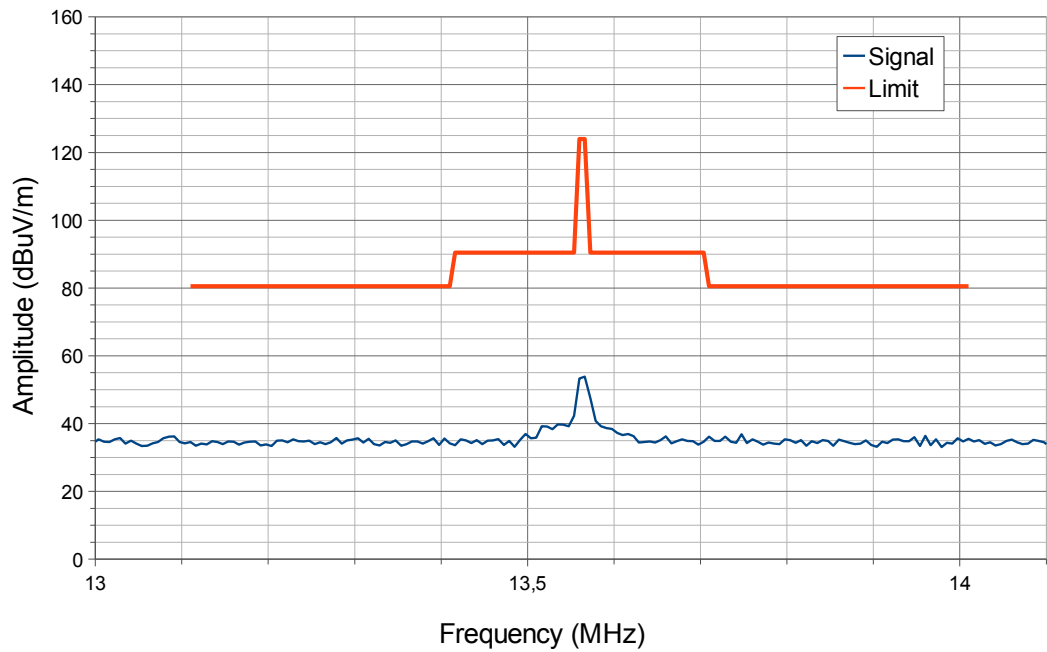
(e) The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of  $-20$  degrees to  $+50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply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

**Test Equipment**

| EQUIPMENT                   | MANUFACTURER | MODEL    | CAL. DUE |
|-----------------------------|--------------|----------|----------|
| EMI Receiver                | HP           | HP8546A  | 01/2013  |
| EMI Receiver Filter Section | HP           | HP85460A | 01/2013  |
| Anechoic Chamber            | Comtest      | CSA01    | 01/2013  |
| Bilog Antenna               | Schaffner    | CBL6112B | 01/2013  |
| Horn Antenna                | EMCO         | 3115     | 01/2013  |
| Controller                  | Deisel       | HD100    | 01/2013  |
| Turn Table                  | Deisel       | MA240    | 01/2013  |
| LISN                        | GSD          | NTW06    | 01/2013  |

**Test procedure: CE22R01**

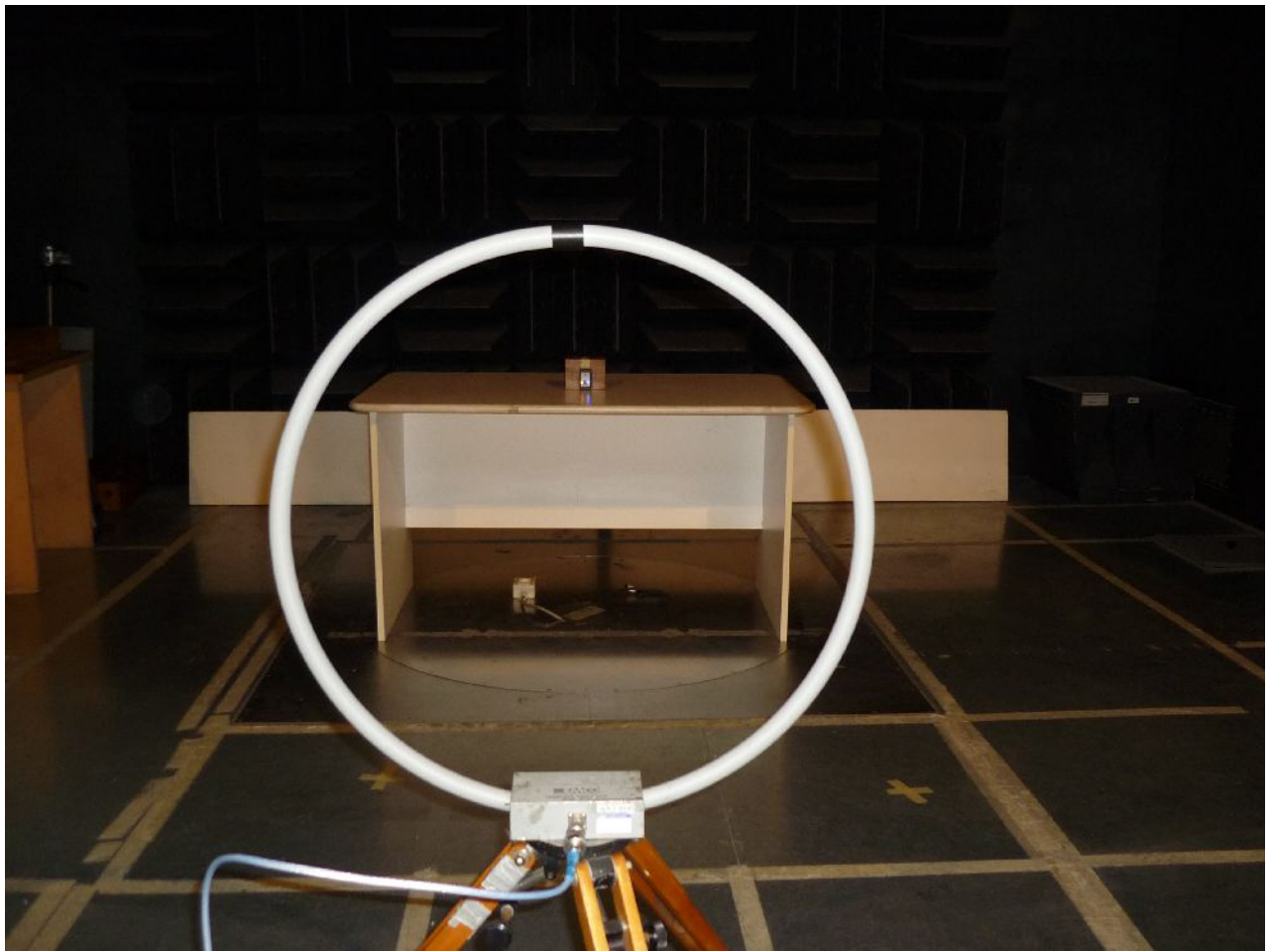
### Carrier at 13.56 MHz- Radiated magnetic field



Notes:  
Range: 13 – 14,1 MHz  
Loop Antenna  
Pol. = Parallel  
Maxhold measure  
EUT mode: operative

| FREQUENCY ERROR OR FREQUENCY DRIFT OF <b>13.56 MHz</b> CARRIER |             |                      |                       |                |                |         |                  |
|--|-------------|----------------------|-----------------------|----------------|----------------|---------|------------------|
|  |             |                      |                       |                |                |         |                  |
|  |             |                      |                       |                |                |         |                  |
| T<br>(°C)  | V<br>(VOLT) | F<br>NORMAL<br>(MHz) | F<br>EXTREME<br>(MHz) | ERROR<br>(PPM) | LIMIT<br>(PPM) | REMARKS | PASS<br>(YES/NO) |
| 20,0   | 3,7         | 13,56128             |                       |                |                |         |                  |
| 20,0   | 3,1         | 13,56128             | 13,56123              | -5             | 100            |         | YES              |
| 20,0   | 4,2         | 13,56128             | 13,56125              | -3             | 100            |         | YES              |
| -20,0  | 3,7         | 13,56128             | 13,56118              | -10            | 100            |         | YES              |
| -10,0  | 3,7         | 13,56128             | 13,56115              | -13            | 100            |         | YES              |
| 0,0  | 3,7         | 13,56128             | 13,56117              | -11            | 100            |         | YES              |
| 10,0   | 3,7         | 13,56128             | 13,56113              | -15            | 100            |         | YES              |
| 30,0   | 3,7         | 13,56128             | 13,56122              | -14            | 100            |         | YES              |
| 40,0   | 3,7         | 13,56128             | 13,56120              | -8             | 100            |         | YES              |
| 50,0   | 3,7         | 13,56128             | 13,56119              | -9             | 100            |         | YES              |
|  |             |                      |                       |                |                |         |                  |
|  |             |                      |                       |                |                |         |                  |

**7. PHOTO**



*Radiated Emissions with PC Test Set-up*



*Conducted Emissions with PC Test Set-up*





*Frequency Error Test Set-up*