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# Test Report

Report Number: F101523E2

Applicant:

**metraTec GmbH**

Manufacturer:

**metraTec GmbH**

Equipment under Test (EUT):

**13.56 MHz RFID Reader**

**QR15-HL**



Laboratory accredited by  
DGA Deutsche Gesellschaft für Akkreditierung mbH  
in compliance with DIN EN ISO/IEC 17025

## References

- [1] **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 to 40 GHz.
- [2] **FCC 47 CFR Part 2** General Rules and Regulations
- [3] **FCC 47 CFR Part 15** Radio Frequency Devices (Subpart B)
- [4] **RSS-210 Issue 7** Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment
- [5] **RSS-Gen Issue 2** General Requirements and Information for the Certification of Radiocommunication Equipment
- [6] **ICES-003 Issue 4** Spectrum Management and Telecommunications Policy. Interference-Causing Equipment Standard. Digital Apparatus

## Test results

The requirements of the tests performed as shown in the overview (chapter 4 of this test report) were fulfilled by the equipment under test.  
The complete test results are presented in the following.

Test engineer:	Michael DINTER		07 October 2010
	Name	Signature	Date
Authorized reviewer:	Bernd SELCK		07 October 2010
	Name	Signature	Date

## Reservation

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# 1 Identification

## 1.1 Applicant

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## 1.2 Manufacturer

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Country:	Germany
Name for contact purposes:	Dr. Tobias MEYER
Tel:	+49-(0)-391 251906-21
Fax:	+49-(0)-391 251906-01
e-mail address:	meyer@metratec.com

## 1.3 Test laboratory

The tests were carried out at: **PHOENIX TESTLAB GmbH**  
**Königswinkel 10**  
**32825 Blomberg**  
**Germany**

accredited by DGA Deutsche Gesellschaft für Akkreditierung mbH in compliance with  
DIN EN ISO/IEC 17025 under Reg. No. DGA-PL-105/99-22  
Industry Canada Test site registration 3469A-1 recognized by Bundesnetzagentur under the  
Reg.-No. BNetzA-CAB-02/21-104/3, CAB Designation Number DE0004,  
listed by FCC 31040/SIT1300F2 FCC Test site registration number 90877

#### 1.4 EUT (Equipment under test)

Type of equipment:	13.56 MHz-RFID-Transponder
Type designation / model name:	QR15-HL
Order No.:	22000010
FCC ID:	YUH-QR15HL
IC:	9278A-QR15HL
Lowest internal frequency:	115 kHz
Highest internal frequency:	13.567 MHz
Antenna type:	Integral antenna, antenna size 0.002209 m <sup>2</sup>
Hardware version:	1-7
Softwareversion:	1-6
Printed circuit designation:	QR15HL_r1-7

\*: Declared by the applicant.

#### 1.5 Technical data of equipment

Supply voltage:	5 V DC via Battery pack
Highest internal Frequency: *	13.567 MHz

\* as declared by the applicant

##### 1.5.1 External I/O:

Connector (Type)	Cable	Length / m	Shielding (Yes / No)
customized	2 wire	0.05 m	No

##### 1.5.2 Periphery devices

The ancillary equipment mentioned below was in use:

Only for the conducted measurement the development carrier board with AC/DC adapter (Touch Electronic Co. Model:SA07H1724) was used.

#### 1.6 Dates

Date of receipt of test sample:	30 August 2010
Start of test:	30 August 2010
End of test:	06 October 2010

## 2 Operational states

The EUT is a 13.56 MHz-RFID-Reader.

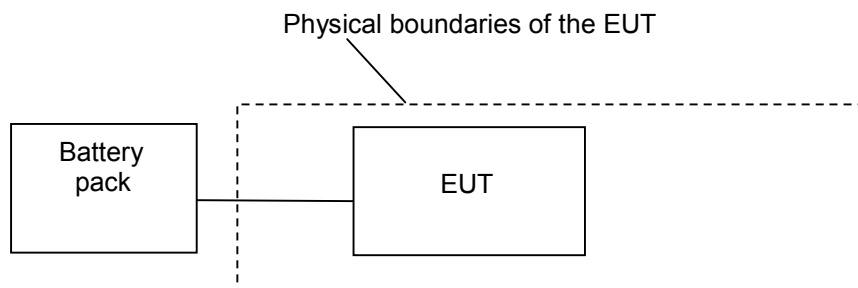
All tests were carried out with an unmodified test sample, which operates in continuous reading operation mode without a TAG.

During the radiated measurements the EUT was supplied via a 5 V DC Battery Pack.  
During the conducted measurements the EUT was supplied with 120 V AC 60Hz via the development carrier board with AC/DC adapter (Touch Electronic Co. Model:SA07H1724) delivered by the applicant.

The radiation measurement of the receiver was not carried out, because the co located transmitter transmits continuously.

In the frequency range from 9 kHz to 30 MHz a preliminary measurement was carried out in a fully anechoic chamber with a measuring distance of 3 m to determine the frequencies of the spurious emissions. The level of the found spurious emissions was measured on an outdoor test site without reflecting ground plane.

The physical boundaries of the EUT are shown below.



## 3 Additional informations

- The EUT was not laded with FCC or IC ID.
- All tests were carried out without housing.

## 4 Overview

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section [2]	RSS 210, Issue 7 [3] or RSS-Gen, Issue 2 [4]	Status	Refer page
Radiated emissions	0.009 - 1,000	15.205 (a) 15.209 (a)	2.6 [3]	Passed	11 et seq.
Conducted emissions on supply line	0.15 - 30	15.207 (a)	7.2.2 [4]	Passed	8 et seq.
Frequency stability	13.56 MHz	15.225(e)	7.2.4 [4]	Passed	25
Field strength of fundamental	13.56 MHz	15.225(a - c)	A2.6 [3]	Passed	26
99 % bandwidth	13.56 MHz	-	4.6.1 [4]	Passed	Annex D

## 5 Results

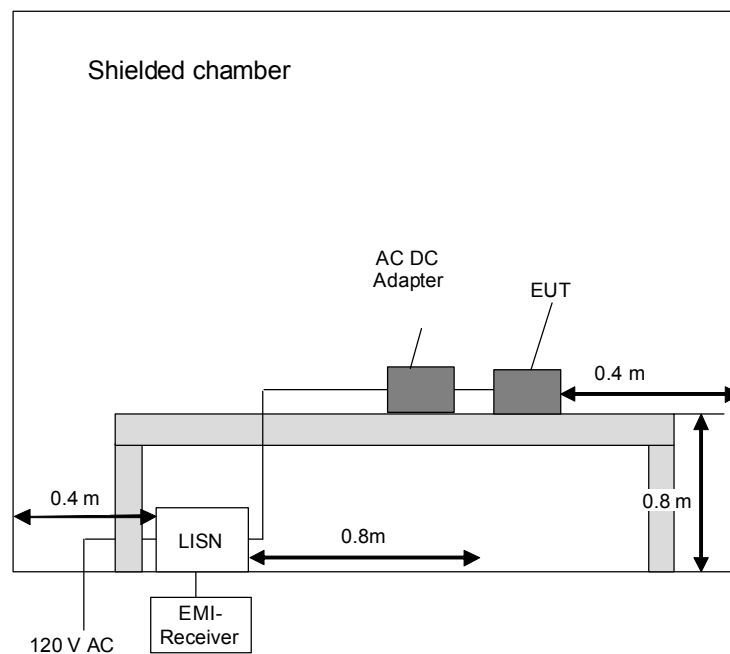
### 5.1 Conducted emissions on power supply lines

#### 5.1.1 Testmethode

This test will be carried out in a shielded chamber. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm above the ground plane. Floor-standing devices will be placed directly on the ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2009 [1].

The frequency range 150 kHz to 30 MHz will be measured with an EMI Receiver set to MAX Hold mode with peak and average detector and a resolution bandwidth of 9 kHz. A scan will be carried out on the phase (or plus pole in case of DC powered devices) of the AC mains network. If levels detected 10 dB below the appropriate limit, this emission will be measured with the average and quasi-peak detector on all lines.

Frequency range	Resolution bandwidth
150 kHz to 30 MHz	9 kHz





### 5.1.2 Results conducted emission measurement on AC mains

Ambient temperature:	20 °C	Relative humidity:	45 %
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Position of EUT: The EUT was set-up on a wooden table of a height of 0.8 m.

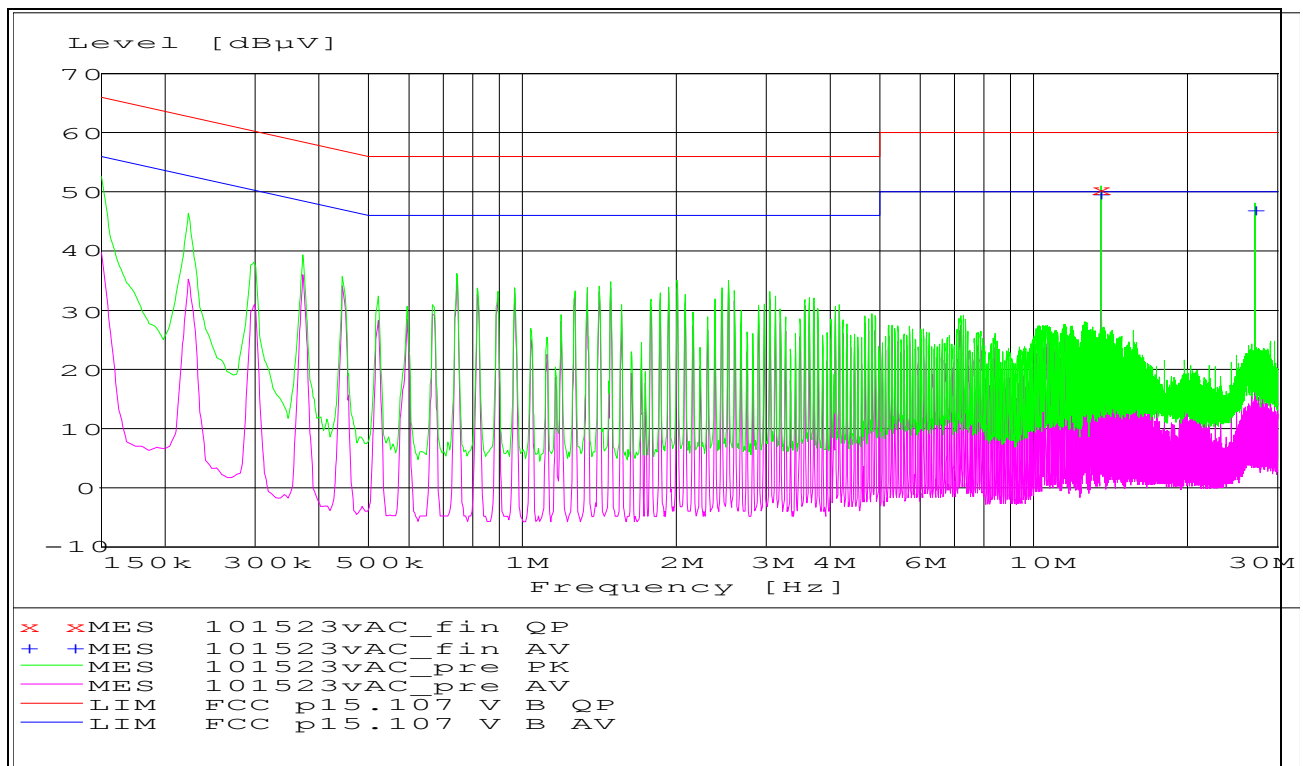
Cable guide: The cables of the EUT were fixed on the wooden table. For further information of the cable guide refer to the pictures in annex C of this test report.

Test record: As described in chapter 5.1.1

Power supply: During all measurements the EUT was supplied with 120 V<sub>AC</sub> 60 Hz.

Operation states: As described in chapter 2.

The curves in the diagram only represent for each frequency point the maximum measured value of all preliminary measurements which were made for each power supply line. The top measured curve represents the peak measurement and the bottom measured curve the average measurement. The quasi-peak measured points are marked by an x and the average measured points by an +.



Data record name: 101523vAC

**Result measured with the quasipeak detector:  
(These values are marked in the above diagram by x)**

Frequency MHz	Level dB $\mu$ V	Transducer dB	Limit dB $\mu$ V	Margin dB	Line	PE
13.560900	50.50	1.9	60.0	9.5	N	GND

Data record name: 101523vAC\_fin QP

**Result measured with the average detector:  
(These values are marked in the above diagram by +)**

Frequency MHz	Level dB $\mu$ V	Transducer dB	Limit dB $\mu$ V	Margin dB	Line	PE
13.560900	49.70	1.9	50.0	0.3	N	GND
27.121200	46.90	3.0	50.0	3.1	N	GND

Data record name: 101523vAC\_fin AV

Test: Passed

**TEST EQUIPMENT USED:**

1-3, 5, 6

## 5.2 Radiated measurements

### 5.2.1 Testmethod

The radiated emission measurement is subdivided into four stages.

- A preliminary measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 9 kHz to 1 GHz.
- A final measurement carried out on an open area test site with reflecting ground plane and various antenna heights in the frequency range 30 MHz to 1 GHz.
- A preliminary measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 1 GHz to 12.75 GHz.
- A final measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 1 GHz to 12.75 GHz.

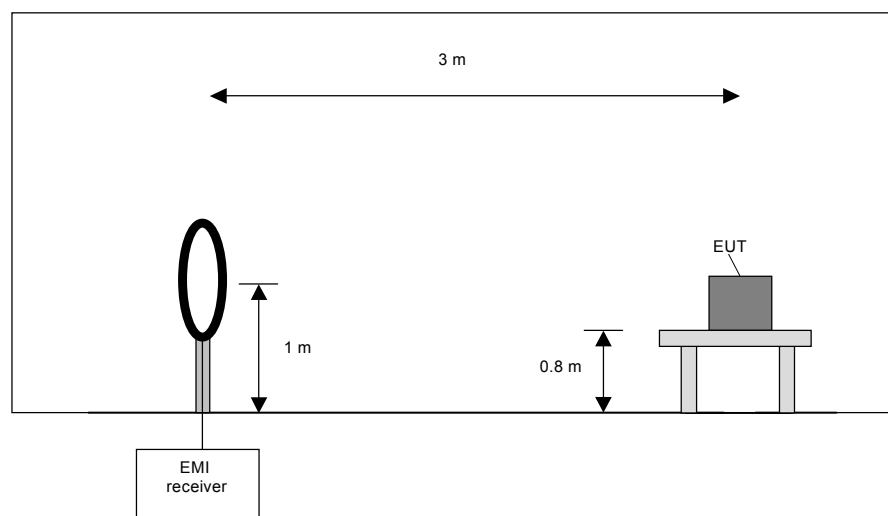
#### Preliminary measurement (9 kHz to 30 MHz):

In the first stage a preliminary measurement will be performed in a shielded room with a measuring distance of 3 meters. Tabletop devices will be set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

The frequency range 9 kHz to 30 MHz will be monitored with a spectrum analyser while the system and its cables will be manipulated to find out the configuration with the maximum emission levels if applicable. The EMI Receiver will be set to MAX Hold mode. The EUT and the measuring antenna will be rotated around their vertical axis to found the maximum emissions.

The resolution bandwidth of the spectrum analyser will be set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	10 kHz



Preliminary measurement procedure:

Prescans were performed in the frequency range 9 kHz to 150 kHz and 150 kHz to 30 MHz.

The following procedure will be used:

- 1) Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
- 2) Manipulate the system cables within the range to produce the maximum level of emission.
- 3) Rotate the EUT by 360 ° to maximize the detected signals.
- 4) Make a hardcopy of the spectrum.
- 5) Measure the frequencies of highest detected emission with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
- 6) Repeat steps 1) to 5) with the other orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).
- 7) Rotate the measuring antenna and repeat steps 1) to 5).

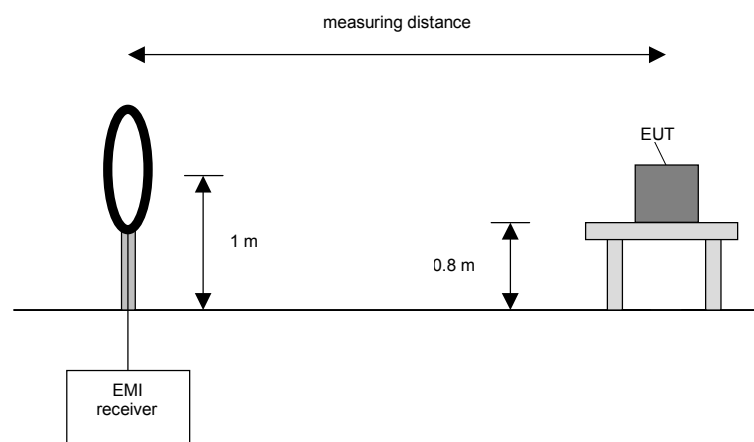
**Final measurement (9 kHz to 30 MHz):**

In the second stage a final measurement will be performed on an open area test site with no conducting ground plane in a measuring distances of 3 m, 10 m and 30 m. In the case where larger measuring distances are required the results will be extrapolated based on the values measured on the closer distances according to Section 15.31 (f) (2) [2]. The final measurement will be performed with a EMI Receiver set to Quasi Peak detector except for the frequency bands 9 kHz to 90 kHz and 110 kHz to 490 kHz where an average detector will be used according Section 15.209 (d) [2].

On the during the preliminary measurement detected frequencies the final measurement will be performed while rotating the EUT and the measuring antenna in the range of 0 ° to 360 ° around their vertical axis until the maximum value is found.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz



Final measurement procedure:

The following procedure will be used:

- 1) Monitor the frequency range with the measuring antenna at vertical orientation parallel to the EUT at an azimuth of 0 °.
- 2) Rotate the EUT by 360 ° to maximize the detected signals and note the azimuth and orientation.
- 3) Rotate the measuring antenna to find the maximum and note the value.
- 4) Rotate the measuring antenna and repeat steps 1) to 3) until the maximum value is found.
- 5) Repeat steps 1) to 4) with the other orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).

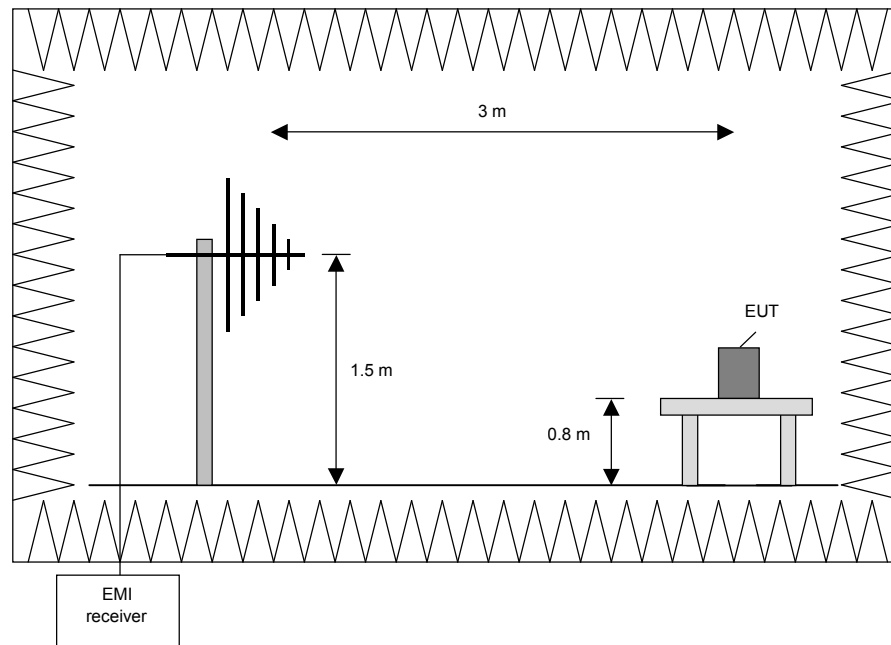
**Preliminary measurement (30 MHz to 1 GHz)**

In the first stage a preliminary measurement will be performed in a fully anechoic chamber with a measuring distance of 3 meter. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

The frequency range 30 MHz to 1 GHz will be measured with an EMI Receiver set to MAX Hold mode and a resolution bandwidth of 120 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 1 GHz	120 kHz



Procedure preliminary measurement:

Prescans were performed in the frequency range 30 MHz to 1 GHz.

The following procedure will be used:

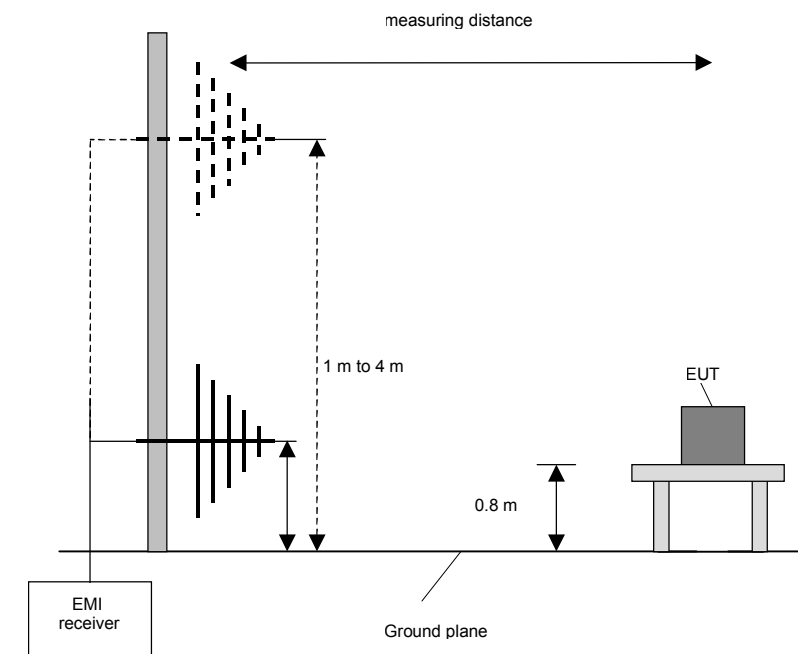
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2. Manipulate the system cables within the range to produce the maximum level of emission.
3. Rotate the EUT by 360 ° to maximize the detected signals.
4. Make a hardcopy of the spectrum.
5. Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
6. Repeat 1) to 4) with the other orthogonal axes of the EUT if handheld equipment.
7. Repeat 1) to 5) with the vertical polarisation of the measuring antenna.

**Final measurement (30 MHz to 1 GHz)**

A final measurement on an open area test site will be performed on selected frequencies found in the preliminary measurement. During this test the EUT will be rotated in the range of 0 ° to 360 °, the measuring antenna will be set to horizontal and vertical polarisation and raised and lowered in the range from 1 m to 4 m to find the maximum level of emissions.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 1 GHz	120 kHz



**Procedure final measurement:**

The following procedure will be used:

- 1) Measure on the selected frequencies at an antenna height of 1 m and a EUT azimuth of 23 °.
- 2) Move the antenna from 1 m to 4 m and note the maximum value at each frequency.
- 3) Rotate the EUT by 45 ° and repeat 2) until an azimuth of 337 ° is reached.
- 4) Repeat 1) to 3) for the other orthogonal antenna polarization.
- 5) Move the antenna and the turntable to the position where the maximum value is detected.
- 6) Measure while moving the antenna slowly +/- 1 m.
- 7) Set the antenna to the position where the maximum value is found.
- 8) Measure while moving the turntable +/- 45 °.
- 9) Set the turntable to the azimuth where the maximum value is found.
- 10) Measure with Final detector (QP and AV) and note the value.
- 11) Repeat 5) to 10) for each frequency.
- 12) Repeat 1) to 11) for each orthogonal axes of the EUT if handheld equipment.

**Preliminary and final measurement (1 GHz to 12.75 GHz)**

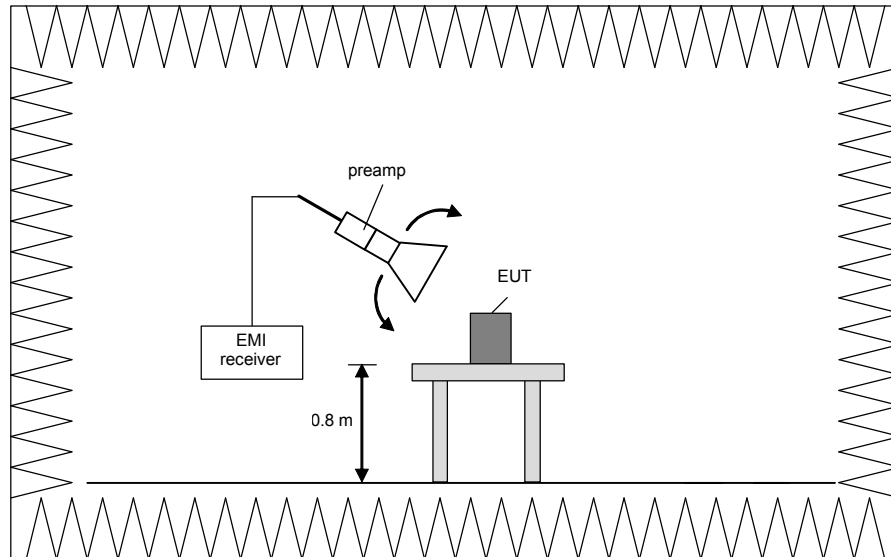
This measurement will be performed in a fully anechoic chamber. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth (preliminary)	Resolution bandwidth (final)
1 GHz to 12.75 GHz	100 kHz	1 MHz

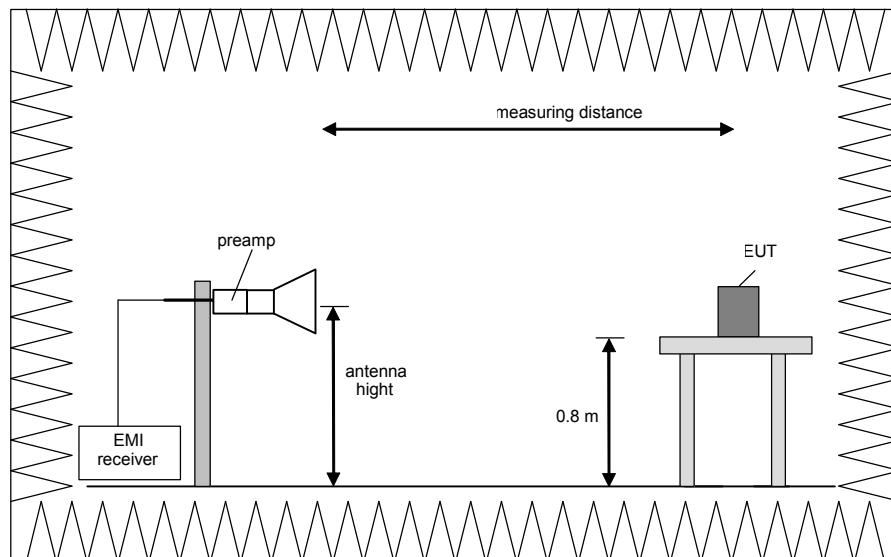
**Preliminary measurement (1 GHz to 12.75 GHz)**

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The spectrum analyser set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna, the antenna close to the EUT and while moving the antenna over all sides of the EUT. With the spectrum analyser in CLEAR / WRITE mode the cone of the emission should be found and than the measuring distance will be set to 3 m with the receiving antenna moving in this cone of emission. At this position the final measurement will be carried out.



### **Final measurement (1 GHz to 12.75 GHz)**

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1 MHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 ° in order to have the antenna inside the cone of radiation.





Procedure of measurement:

The measurements were performed in the frequency range 1 to 12.75 GHz.

The following procedure will be used:

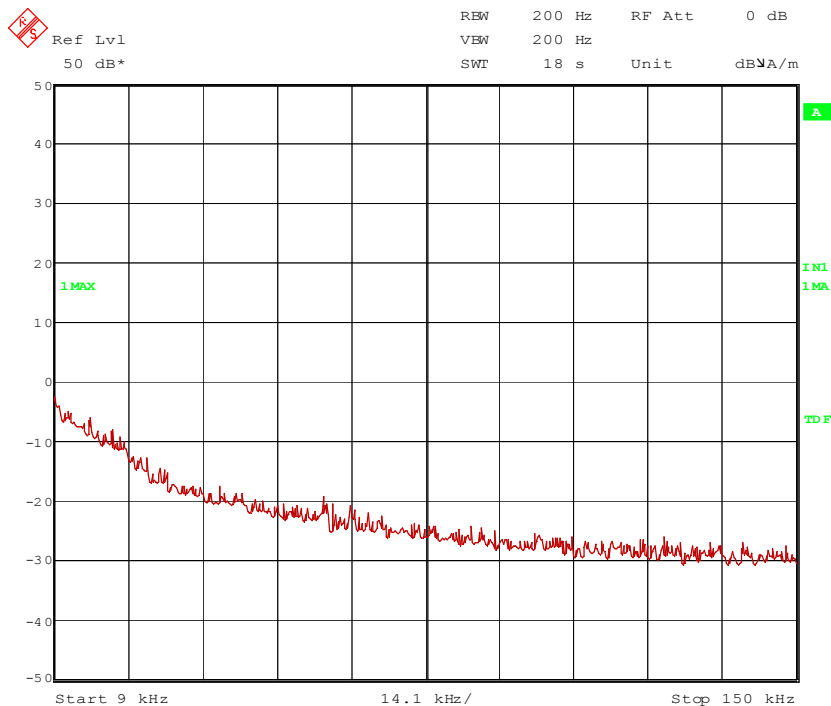
- 1) Monitor the frequency range at horizontal polarisation and move the antenna over all sides of the EUT (if necessary move the EUT to another orthogonal axis).
- 2) Change the antenna polarisation and repeat 1) with vertical polarisation.
- 3) Make a hardcopy of the spectrum.
- 4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
- 5) Change the analyser mode to Clear / Write and found the cone of emission.
- 6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3 m and the antenna will be still inside the cone of emission.
- 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarisation and azimuth and the peak and average detector, which causes the maximum emission.
- 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beam width.

Step 1) to 6) are defined as preliminary measurement.

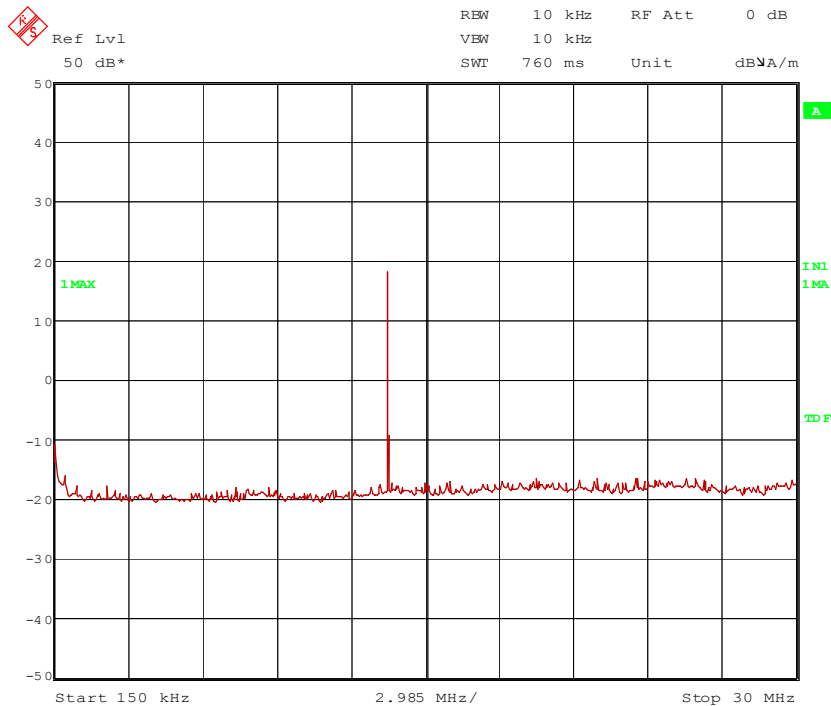
### 5.2.2 Result preliminary measurement 9 kHz to 1 GHz

Ambient temperature:	20 °C	Relative humidity:	45 %
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- Position of EUT: The EUT was set-up on a wooden table of a height of 0.8 m.
- Cable guide: The cable of the EUT was fixed on the wooden table. For further information of the cable guide refer to the pictures in annex A of this test report.
- Test record: The test was carried out in normal operation mode of the EUT(awaiting a TAG). All results are shown in the following.
- Power supply: During the measurements the EUT was supplied with 5 V<sub>DC</sub>.



101523FCC1.wmf: Spurious emissions from 9 kHz to 150 kHz



101523FCC2.wmf: Spurious emissions from 150 kHz to 30 MHz

The following emission was found according to FCC 47 CFR Part 15 section 15.209 (a).

13.560 MHz (wanted frequency)

This frequency has to be measured on the outdoor test site. The results were presented in the following.

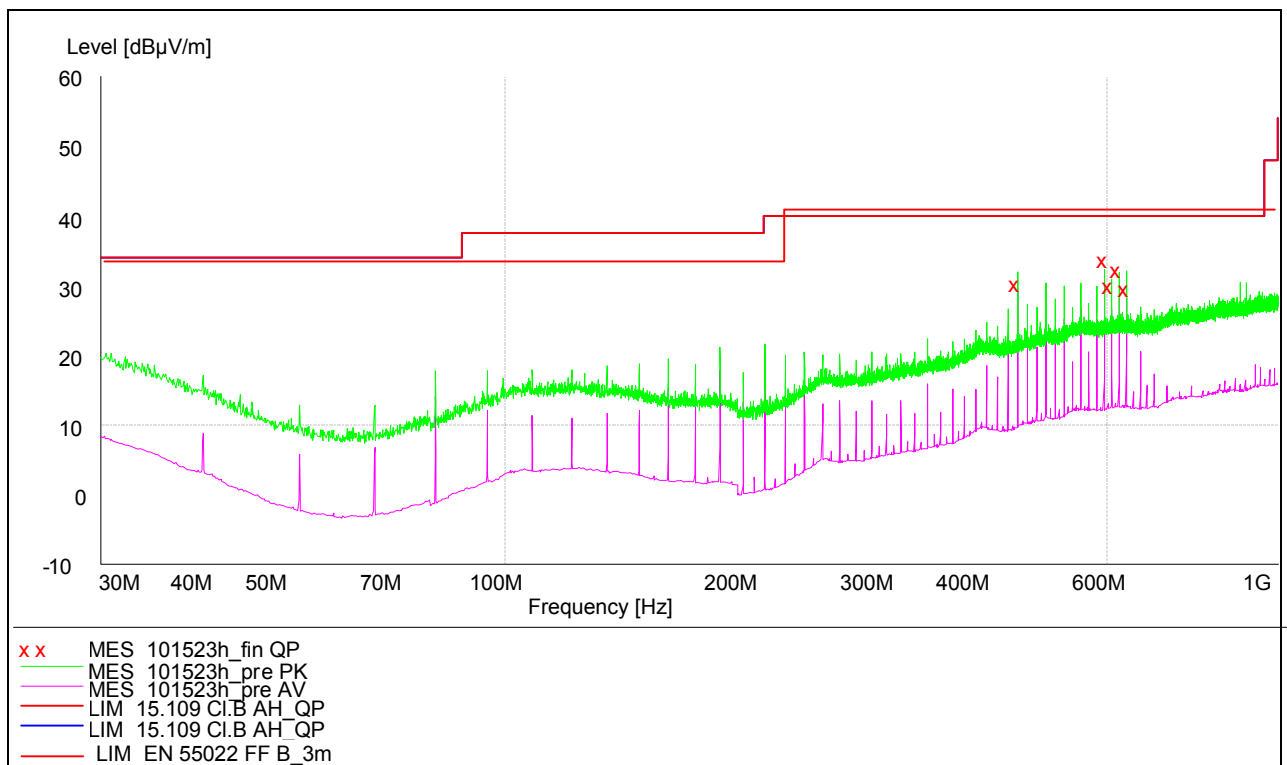
TEST EQUIPMENT USED FOR THE TEST:

30, 32-34, 50 - 51

Ambient temperature	20 °C	Relative humidity	45 %
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- Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.
- Cable guide: The cable of the EUT was fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex C of this test report.
- Test record: As described in chapter 5.2.1
- Power supply: During the measurements the EUT was supplied with 5 V<sub>DC</sub>.
- Operation states: As described in chapter 2.

The curves in the diagram only represent the maximum measured value for each frequency point of all preliminary measurements, which were carried out with the EUT in various positions. The top measured curve represents the peak measurement. The measured points marked with an x are frequency points for which later measurements with a quasi-peak detector were carried out. These values are indicated in the following table. The bottom measured curve represents average values, which are only required for control purposes.



Data record name: 101523h

Frequency MHz
461.056
501.760
596.668
610.240
623.788
637.348

These frequencies had to be measured on the open area test site. The results are presented in the following.

TEST EQUIPMENT USED FOR THE TEST:

30 - 35

### 5.2.3 Result final measurement

Ambient temperature:	15 °C	Relative humidity:	56 %
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- Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m, 10 m and 30 m.
- Cable guide: The cable of the EUT was fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex A of this test report.
- Test record: The test was carried out in normal operation mode of the EUT (without reading a TAG). All results are shown in the following.
- Power supply: During the measurements the EUT was supplied with 5 V<sub>DC</sub>.
- Test results: The test results were calculated with the following formula:  

$$\text{Result [dB}\mu\text{V/m]} = \text{reading [dB}\mu\text{V]} + \text{antenna factor [dB/m]}$$

Results with measuring distance of 3 m						
Frequency	Result dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Detector	Readings dB $\mu$ V	Antenna factor * dB/m
13.560	68.5	104.0	35.5	QP	48.5	20.0
Results with measuring distance of 10 m						
Frequency MHz	Result dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Detector	Readings dB $\mu$ V	Antenna factor * dB/m
13.560	55.7	94.0	38.3	QP	35.7	20.0
Results with measuring distance of 30 m						
Frequency MHz	Result dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Detector	Readings dB $\mu$ V	Antenna factor * dB/m
13.560	44.8	84.0	39.2	QP	24.8	20.0
Measurement uncertainty			+2.2 dB / -3.6 dB			

\*: Cable loss included

Test: Passed

#### TEST EQUIPMENT USED FOR THE TEST:

50 – 51

Ambient temperature:	21 °C	Relative humidity:	41 %
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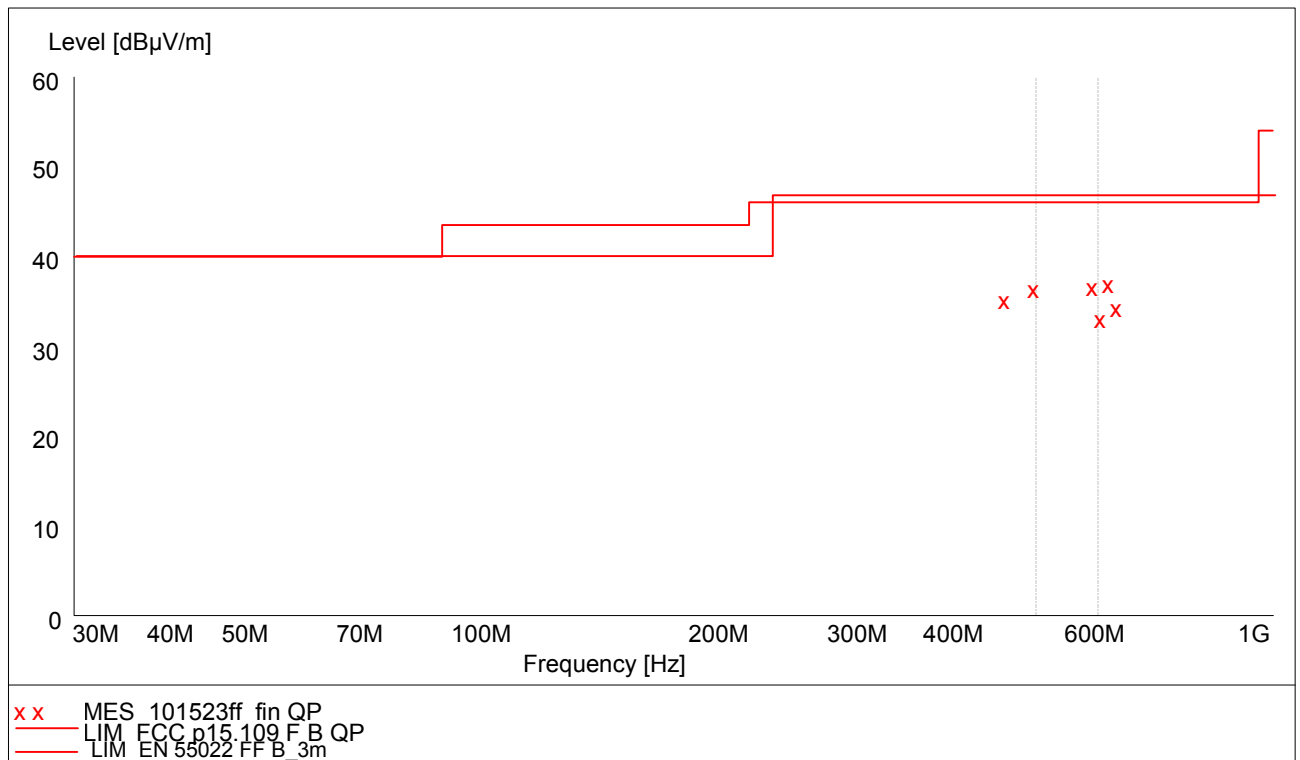
Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

Cable guide: The cable of the EUT was fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex C of this test report.

Test record: As described in chapter 5.2.1

Power supply: During all measurements the EUT was supplied with 5 V<sub>DC</sub>.

Operation states: As described in chapter 2.



Data record name: 101523ff

**Result measured with the quasipeak detector according to FCC 47 CFR Part 15 class B:  
(These values are marked in the above diagram by an x)**

Frequency MHz	Level dB $\mu$ V/m	Transducer dB	Limit dB $\mu$ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
461.056000	35.50	21.5	46.0	10.5	112.0	300.00	VERTICAL
501.760000	36.70	22.5	46.0	9.3	100.0	42.00	VERTICAL
596.668000	37.10	24.2	46.0	8.9	100.0	110.00	VERTICAL
610.240000	33.60	24.5	46.0	12.4	100.0	62.00	VERTICAL
623.788000	37.40	24.8	46.0	8.6	100.0	305.00	VERTICAL
637.348000	34.60	25.0	46.0	11.4	100.0	241.00	VERTICAL
Measurement uncertainty			+2.2 dB / -3.6 dB				

Data record name: 101523ff\_fin QP

**Result measured with the quasipeak detector according to ICES-003 Issue 4 class B:  
(These values are marked in the above diagram by an x)**

Frequency MHz	Level dB $\mu$ V/m	Transducer dB	Limit dB $\mu$ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
461.056000	35.50	21.5	47.0	9.5	112.0	300.00	VERTICAL
501.760000	36.70	22.5	47.0	8.3	100.0	42.00	VERTICAL
596.668000	37.10	24.2	47.0	7.9	100.0	110.00	VERTICAL
610.240000	33.60	24.5	47.0	11.4	100.0	62.00	VERTICAL
623.788000	37.40	24.8	47.0	7.6	100.0	305.00	VERTICAL
637.348000	34.60	25.0	47.0	10.4	100.0	241.00	VERTICAL
Measurement uncertainty			+2.2 dB / -3.6 dB				

Data record name: 101523ff\_fin QP

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:
14 – 20



#### 5.2.4 Frequency stability

Ambient temperature	20 °C	Relative humidity	45 %
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Test record: The test was carried out in normal operation mode of the EUT(awaiting a TAG). All results are shown in the following.

TEST CONDITION		Frequency	Frequency stability
Temp.	Voltage	MHz	Hz
T <sub>nom</sub> (+20 °C)	U <sub>nom</sub> (5 V DC)	13.560650	0
T <sub>min</sub> (-20 °C)	U <sub>min</sub> (4.7 V DC)	13.560721	+ 71
	U <sub>max</sub> (5.3 V DC)	13.560716	+ 66
T <sub>max</sub> (+70 °C)	U <sub>min</sub> (4.7 V DC)	13.560494	- 56
	U <sub>max</sub> (5.3 V DC)	13.560485	- 65
Measurement uncertainty		<10 <sup>-7</sup>	

Test: Passed

#### TEST EQUIPMENT USED FOR THE TEST:

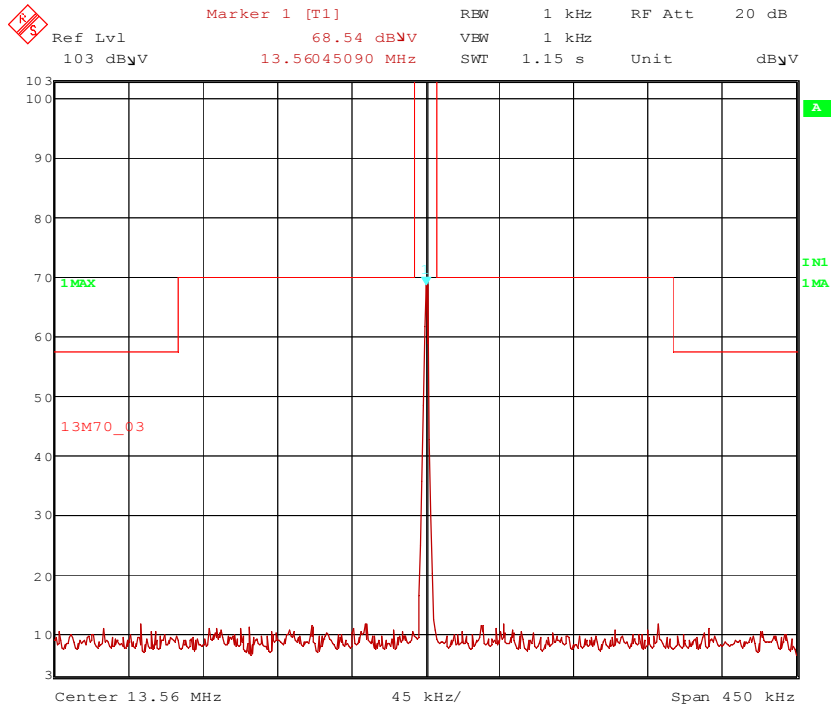
31, 52 – 54

### 5.2.5 Field strength of fundamental

Ambient temperature: 21 °C

Relative humidity: 41 %

Power supply: During all measurements the EUT was supplied with 5 V<sub>DC</sub>.



101523SpFCC.wmf: Spectrum mask

Test: Passed

#### TEST EQUIPMENT USED FOR THE TEST:

31, 52 – 53

## 6 Report history

Report Number	Date	Comment
F101523E2	07 October 2010	Document created

## 7 Test equipment and ancillaries used for tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal. due
1	Shielded chamber M4	-	Siemens	B83117S1-X158	480088	Weekly verification (system cal.)	
2	Measuring receiver	ESIB 26	Rohde & Schwarz	100292	481182	08/02/2010	02/2012
3	LISN	NSLK8128	Schwarzbeck	8128155	480058	08/07/2009	08/2010
5	AC-filter	B84299-D87-E3	Siemens	930262292	480097	Weekly verification (system cal.)	
6	EMI-Software	ES-K1	Rohde & Schwarz	-	480111	-	
14	Open area test site	-	Phoenix Test-Lab	-	480085	Weekly verification (system cal.)	
15	Measuring receiver	ESIB 7	Rohde & Schwarz	100304	480521	03/15/2010	03/2012
16	Controller	HD100	Deisel	100/670	480139	-	-
17	Turntable	DS420HE	Deisel	420/620/80	480087	-	-
18	Antenna support	AS615P	Deisel	615/310	480086	-	-
19	Antenna	CBL6111 D	Chase	25761	480894	18/09/2008	09/2013
20	EMI Software	ES-K1	Rohde & Schwarz	-	480111	-	
30	Fully anechoic chamber M20	-	Albatross Projects	B83107-E2439-T232	480303	Weekly verification (system cal.)	
31	Measuring receiver	ESI 40	Rohde & Schwarz	100064	480355	03/17/2010	03/2012
32	Controller	MCU	Maturo	MCU/043/971107	480832	-	
33	Turntable	DS420HE	Deisel	420/620/80	480315	-	
34	Antenna support	AS615P	Deisel	615/310	480187	-	
35	Antenna	CBL6112 B	Chase	2688	480328	10/11/2005	10/2010
50	Loop antenna	HFH2-Z2	Rohde & Schwarz	832609/014	480059	03/15/2006	03/2011
51	EMI test receiver	ESPC	Rohde & Schwarz	843756/006	480150	12/03/2010	03/2012
52	Loop Antenna Ø = 225 mm	-	Phoenix Test-Lab	-	410085	Weekly verification	
53	RF-cable No. 10	RG223	Phoenix-Test-Lab	-	410102	Weekly verification	
54	Climatic chamber	MK 240	BINDER	05-79022	48046	01/07/2009	01/2011

## 8 List of annexes

<b>ANNEX A</b>	<b>PHOTOGRAPHS OF THE TEST SET-UPS:</b>	<b>6 pages</b>
	Test set-up preliminary radiated emissions (H-Field)	101523mag1.jpg
	Test set-up preliminary radiated emissions (E-Field)	101523emi1.jpg
	Test set-up final radiated emissions (E-Field)	101523emiff1.jpg
	Test set-up outdoor test site	101523magff3.jpg
	Test set-up conducted emissions	101523emic1.jpg
	Test set-up climatic test site	101523clima1.jpg
<b>ANNEX B</b>	<b>EXTERNAL PHOTOGRAPHS OF THE TEST SAMPLE:</b>	<b>0 pages</b>
	EUT has no housing	
<b>ANNEX C</b>	<b>INTERNAL PHOTOGRAPHS OF THE TEST SAMPLE:</b>	<b>2 pages</b>
	QR15HL, PCB top view	91053eut1.jpg
	QR15HL, PCB rear view	91053eut2.jpg
<b>ANNEX D</b>	<b>ADDITIONAL MEASUREMENT RESULTS FOR INDUSTRY CANADA:</b>	<b>2 pages</b>