PHOENIX TESTLAB

Königswinkel 10
32825 Blomberg
Germany
Phone +49 5235 9500-0
Fax +49 5235 9500-10

TEST REPORT

Test Report Number: F123762E3

Applicant:
NT-ware Systemprogrammierung GmbH

Manufacturer:
NT-ware Systemprogrammierung GmbH

Equipment under Test:
MiCard V3 / USB RF-Cardreader Version 1.00

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] **RSS-210 Issue 8 (December 2010)** Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

[4] **RSS-Gen Issue 3 (December 2010)** General Requirements and Information for the Certification of Radiocommunication Equipment

[5] **ICES-003 Issue 5 (February 2012)** Spectrum Management and Telecommunication Policy Interference Causing Equipment Standard – Digital Apparatus

TEST RESULT

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.

	Name	Signature	Date
Test engineer:	Michael DINTER		2 November 2012
Authorized reviewer:	Raimund BLASK		6 November 2012

RESERVATION

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Contents: **Page**

1 IDENTIFICATION

1.1 APPLICANT

Name:	NTware Systemprogrammierung GmbH
Address:	Niedersachenstraße 6 49186 Bad Iburg
Country:	Germany
Name for contact purposes:	Mr H. Bauszus
Tel:	+49-(0)-5403-7243-220
Fax:	+49-(0)-5403-780103
e-mail address:	hbauszus@nt-ware.com

1.2 MANUFACTURER

Name:	NTware Systemprogrammierung GmbH
Address:	Niedersachenstraße 6 49186 Bad Iburg
Country:	Germany
Name for contact purposes:	Mr H. Bauszus
Tel:	+49-(0)-5403-7243-220
Fax:	+49-(0)-5403-780103
e-mail address:	hbauszus@nt-ware.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:	USB RF-Card reader device for access control
Type designation / model name:	MiCard V3 Multi
Serial No.:	312150376E46FF7C
FCC ID:	WG7MICARDLM03
IC:	7900A-MICARDLM03
Lowest internal frequency:	12MHz
Highest internal frequency:	96MHz
Antenna type:	Loop antenna

1.5 TECHNICAL DATA OF EQUIPMENT

Power supply	AC Mains AC Adapter of a Laptop PC
Supply voltage:	120 VAC 60 Hz
Highest internal Frequency: *	Below 108 MHz

* as declared by the applicant

Ports/Connectors

Ports/Connectors

Cable	Length	Shielding	Connector
USB cable	1.80 m	Yes	USB Type A
-	-	-	-

1.6 DATES

Date of receipt of test sample:	17 September 2012
Start of test:	24 September 2012
End of test:	24 September 2012

2 OPERATIONAL STATES AND PHYSICAL BOUNDARIES

All tests were carried out with an unmodified test sample, which operates with a test-software. This software sets the EUT in continuous reading transponder mode and displays the transponder data on the computers display.

The conducted emission measurement on the power supply line was carried out on the AC/DC adapter of the used laptop PC, because the EUT normally will be supplied via an USB port of a printer. The AC/DC adapter was powered by an AC-mains network with 120 V AC / 60 Hz.

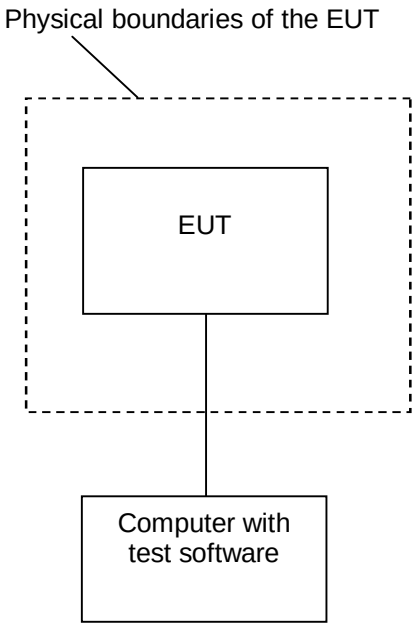
During all tests the TAG information was permanently checked with the help of the test-software. The TAG information was displayed on the PC display and was checked manually by the test engineer.

No spurious emission measurement of the receiver was carried out, because the co located transmitter transmits continuously.

All tests were carried out with the 1.8m USB-Cable (worst case).

During the tests, the EUT was labelled with a FCC-label.

The physical boundaries of the EUT are shown below.



3 ADDITIONAL INFORMATION

The following Laptop PC was used for the measurements.
Medion MD96500
Model No.:WIM 2040 Notebook PC
With AC Adapter FSP065-AAC

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.
Radiated emissions	0.009-1,000	15.109(a)	ICES 003 [5]	Passed	11 et seq.
Conducted emissions on supply line	0.15 - 30	15.107 (a)	ICES 003 [5]	Passed	8 et seq.
99 % bandwidth	13.56 MHz	-	4.6.1 [4]	Passed	Annex D

5 TEST RESULTS

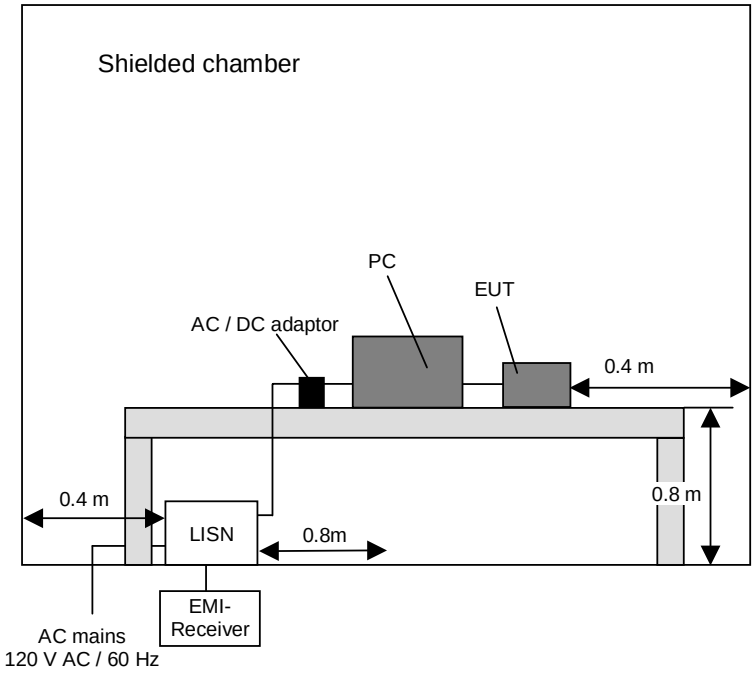
5.1 CONDUCTED EMISSION MEASUREMENT ON AC MAINS (150 kHz to 30 MHz)

5.1.1 METHOD OF MEASUREMENT (CONDUCTED EMISSION MEASUREMENT ON AC MAINS (150 kHz to 30 MHz))

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 appropriable 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 TEST RESTULTS (CONDUCTED EMISSION MEASUREMENT ON AC MAINS)

Ambient temperature:	20 °C	Relative humidity:	45 %

Position of EUT: The EUT was set-up on a wooden table of a height of 0.8 m.

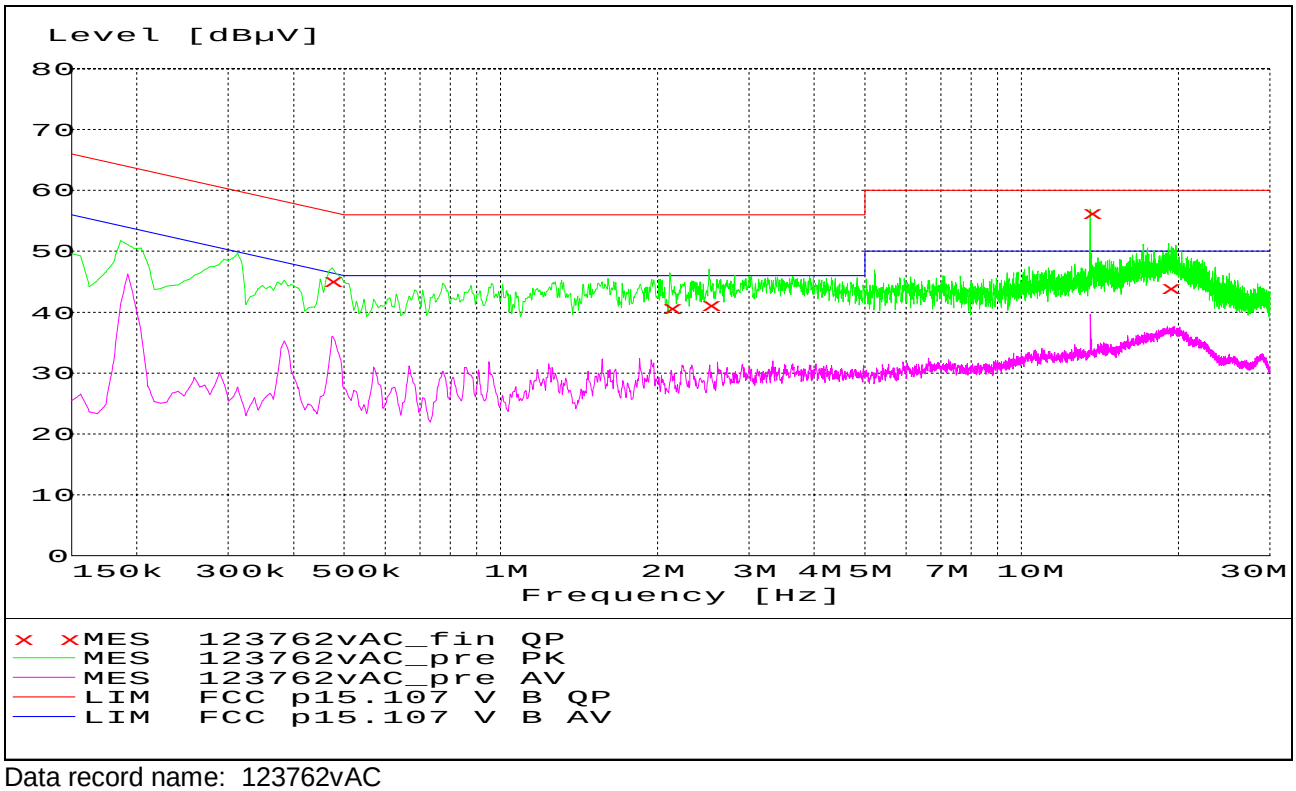
Cable guide: The cable of the EUT was fixed on the wooden table. For further information of the cable guide refer to the pictures in annex A of this test report.

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 this test the EUT was powered via USB by a laptop PC from an AC-mains network with 120 V AC / 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 “x” and the average measured points by “+”.



Data record name: 123762vAC

Result measured with the quasipeak detector (marked by x):

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.473100	45.10	0.9	56.5	11.4	N	GND
2.112900	40.70	0.8	56.0	15.3	N	FLO
2.513400	41.20	0.8	56.0	14.8	N	GND
13.560000	56.30	1.8	60.0	3.7	L1	GND
19.192200	44.00	2.3	60.0	16.0	L1	GND

Test: Passed

TEST EQUIPMENT USED:

1 - 3, 5, 6

5.2 RADIATED EMISSIONS

5.2.1 METHOD OF MEASUREMENT (RADIATED EMISSIONS)

The radiated emission measurement is subdivided into five 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 outdoor test side without reflecting ground plane and a fixed antenna height in the frequency range 9 kHz to 30 MHz.
- A final measurement carried out on an open area test side with reflecting ground plane and various antenna height in the frequency range 30 MHz to 1 GHz.
- A preliminary measurement carried out in a fully anechoic chamber with a variable antenna distance and height in the frequency range 1 GHz to 110 GHz.
- A final measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 1 GHz to 110 GHz.

All measurements will be carried out with the EUT working on the middle and upper and lower edge of the assigned frequency band.

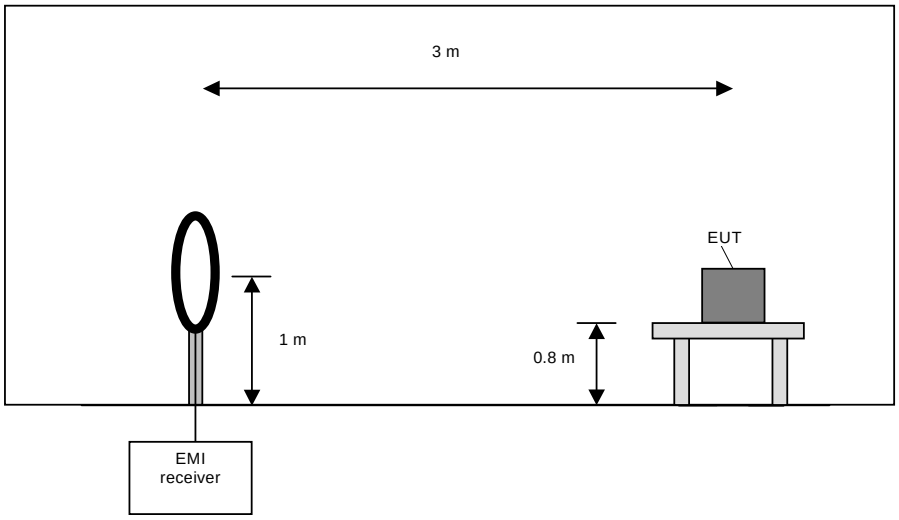
Preliminary measurement (9 kHz to 30 MHz):

In the first stage a preliminary measurement will be performed in a shielded room with a measuring distance of 3 meters. Tabletop devices will 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 C63.4-2009 [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).

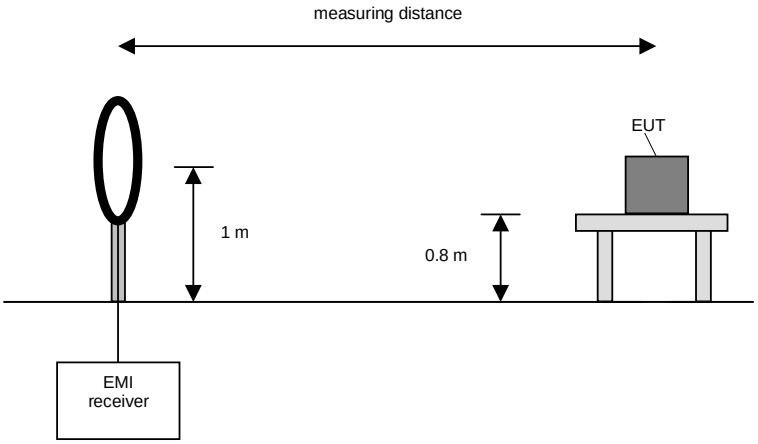
Final measurement (9 kHz to 30 MHz):

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).

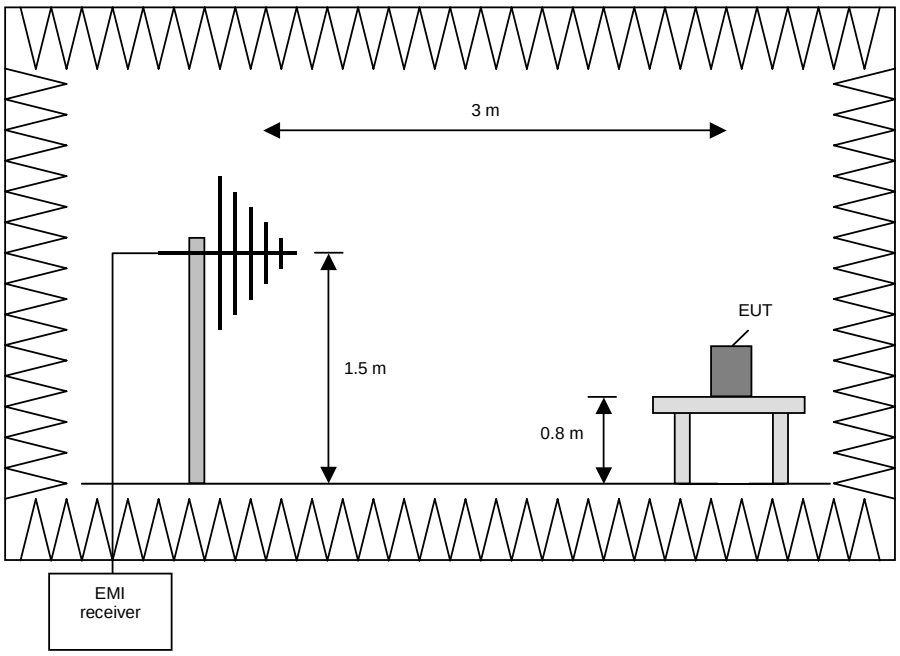
Preliminary measurement (30 MHz to 1 GHz)

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 C63.4-2009 [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 100 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 230 MHz	100 kHz
230 MHz to 1 GHz	100 kHz



Procedure preliminary measurement:

Prescans were performed in the frequency range 30 MHz to 230 MHz and 230 MHz to 1 GHz.
The following procedure will be used:

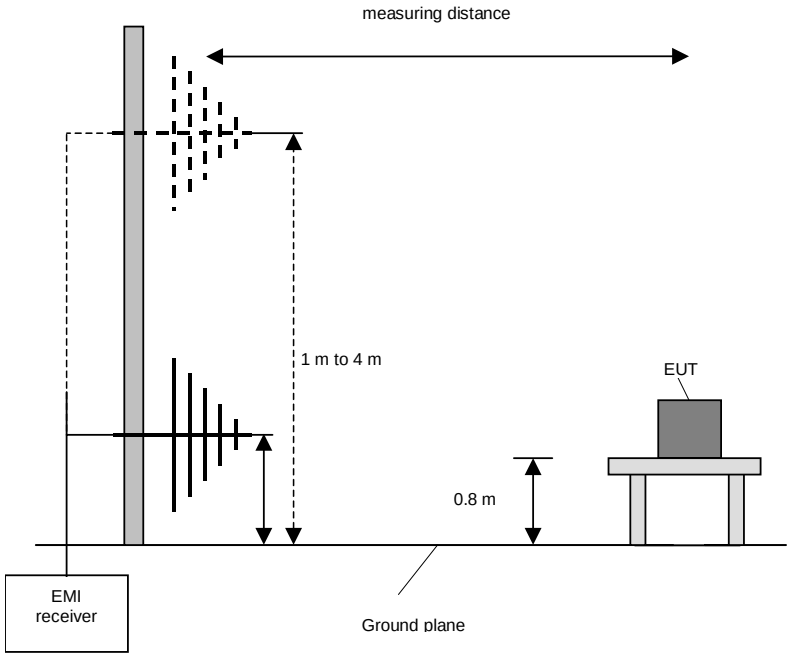
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2. Manipulate the system cables within the range to produce the maximum level of emission.
3. Rotate the EUT by 360 ° to maximize the detected signals.
4. Make a hardcopy of the spectrum.
5. Measure the frequency of the 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 (because of EUT is a module and might be used in a handheld equipment application).
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 (because of EUT is a module and might be used in a handheld equipment application).

Preliminary and final measurement (1 GHz to 110 GHz)

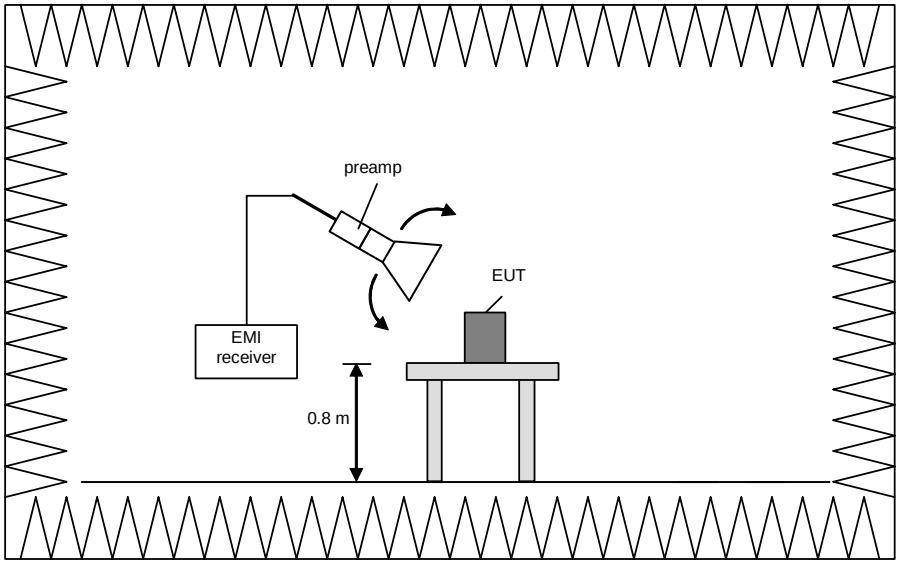
This measurement will be performed in a fully anechoic chamber. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance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

Preliminary measurement (1 GHz to 110 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.

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

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	100 kHz
4 GHz to 12 GHz	100 kHz
12 GHz to 18 GHz	100 kHz
18 GHz to 26.5 GHz	100 kHz
26.5 GHz to 40 GHz	100 kHz
40 GHz to 60 GHz	100 kHz
50 GHz to 75 GHz	100 kHz
75 GHz to 110 GHz	100 kHz

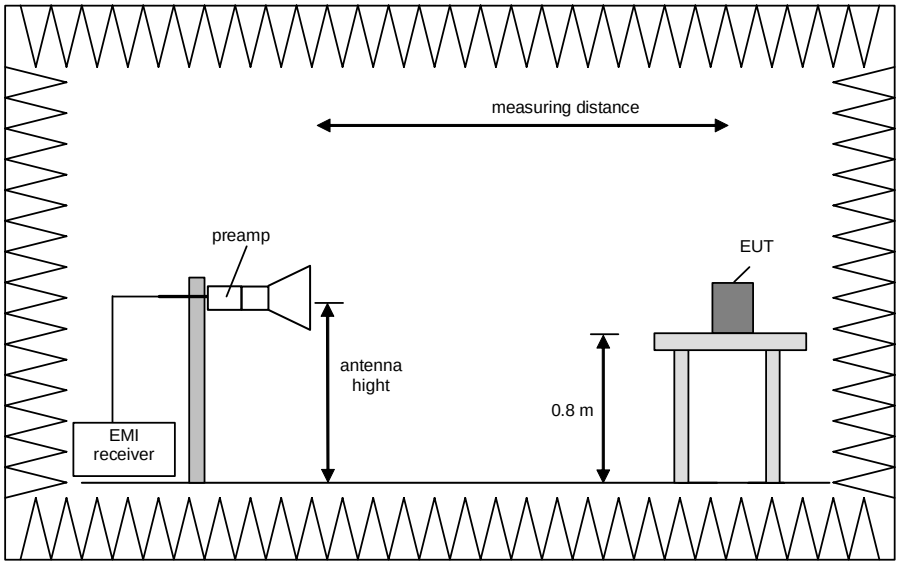


Final measurement (1 GHz to 110 GHz)

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.

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

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	1 MHz
4 GHz to 12 GHz	1 MHz
12 GHz to 18 GHz	1 MHz
18 GHz to 26.5 GHz	1 MHz
26.5 GHz to 40 GHz	1 MHz
40 GHz to 60 GHz	1 MHz
50 GHz to 75 GHz	1 MHz
75 GHz to 110 GHz	1 MHz



Procedure of measurement:

The measurements were performed in the frequency range 1 GHz to 4 GHz, 4 GHz to 12 GHz, 12 GHz to 18 GHz, 18 GHz to 26.5 GHz, 26.5 GHz to 40 GHz, 40 GHz to 60 GHz, 60 GHz to 75 GHz and 75 GHz to 110 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 beamwidth.

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

5.2.2 PRELIMINARY RADIATED EMISSION TEST (9 kHz to 1 GHz)

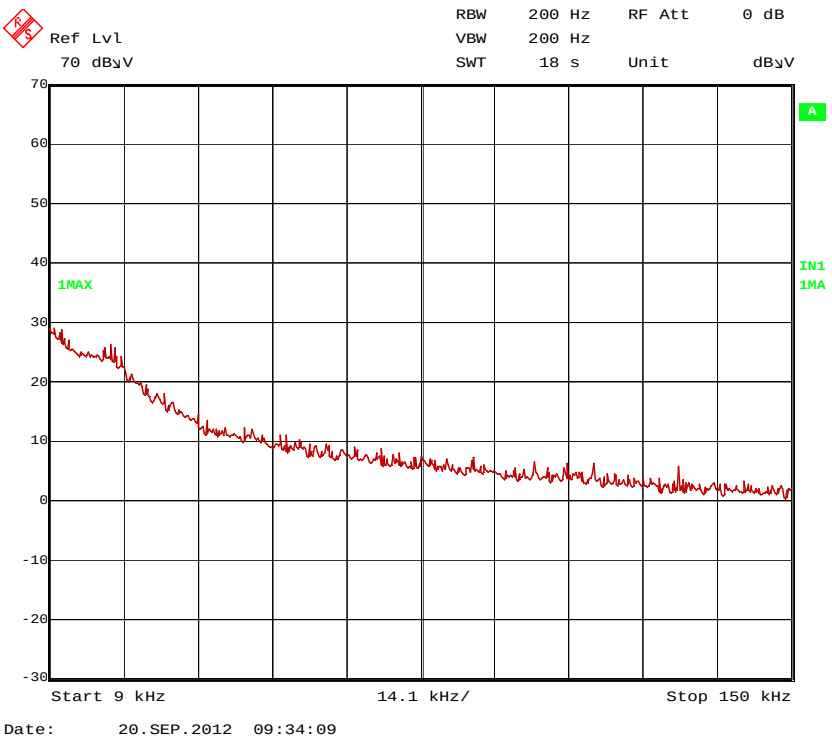
Ambient temperature:	20 °C	Relative humidity:	45 %

Position of EUT: The EUT was set-up on a wooden table of a height of 0.8 m.

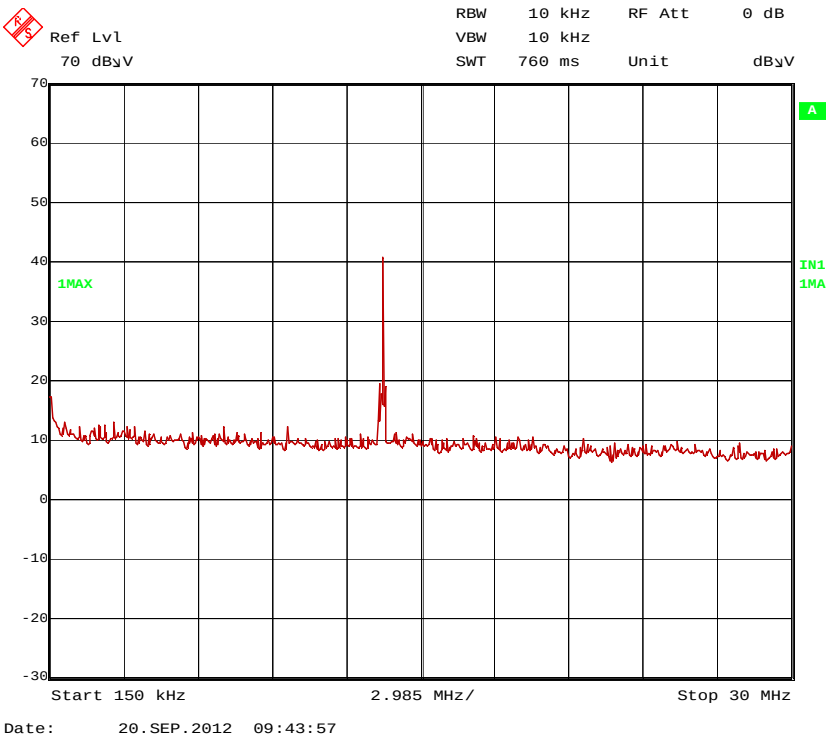
Cable guide: The cable of the EUT was fixed on the wooden table. For further information of the cable guide refer to the pictures in annex A of this test report.

Test record: The test was carried out in normal operation mode of the EUT(reading a TAG).
All results are shown in the following.

Power supply: During this test the EUT was powered via USB by a laptop PC from an AC-mains network with 120 V AC / 60 Hz.



123762tx1a.wmf: Spurious emissions from 9 kHz to 150 kHz



123762tx2a.wmf: Spurious emissions from 150 kHz to 30 MHz

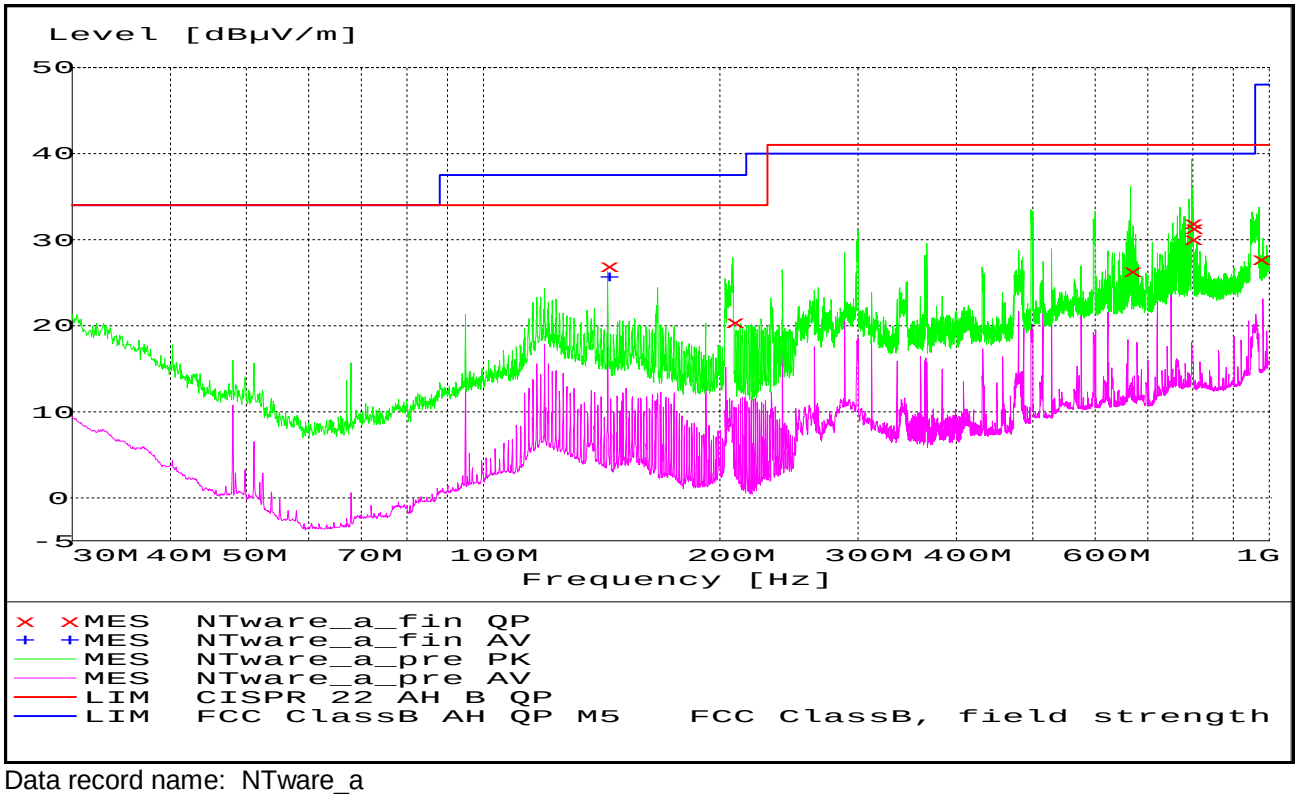
The following emission was found according to FCC 47 CFR Part 15 section 15.209 (a).

13.560 MHz (wanted signal)

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

Title:	Preliminary emission measurement according CFR 47 Part15.109
EUT:	MiCard V3
Manufacturer:	NTware
Operating Condition:	Continuous operation mode
Test site:	fully anechoic chamber M20; PHOENIX TEST LAB GmbH
Operator:	With Medion laptop MD96500
Test Specification:	120V/60Hz

The limit line and measurement curve shown in the diagram below refer to the preliminary measurements. Here, it must be noted that because of the reduced measuring distance and because of the floor absorbers, the measured values do not comply with the values of the above mentioned standard; they only serve as orientation in determining which frequencies must be measured on the open area test site.
The limit line is achieved with the applied standard by converting to a 3m measurement distance (+10 dB) and the correction for the free space in which in the "worst case" the reflected floor wave is missing entirely (-6dB). Therefore 4dB is added to the limit line of the standard concerned.
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 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: NTware_a

The following frequencies were found during the preliminary radiated emission test:

Frequency MHz
143.988000
149.160000
176.280000
203.000000
207.636000
300.000000
480.000000
528.000000
666.084000
796.320000

The following frequency was found inside the restricted bands:

Frequency MHz
119.680000
135.600000
969.720000

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

TEST EQUIPMENT USED THE TEST:

29, 31 – 33, 43, 54, 56

5.2.3 FINAL RADIATED EMISSION TEST (9 kHz to 30 MHz)

Ambient temperature:	15 °C	Relative humidity:	56 %

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 this test the EUT was powered via USB by a laptop PC from an AC-mains network with 120 V AC / 60 Hz.

Test results: The test results were calculated with the following formula:

Result [dBµV/m] = reading [dBµV] + antenna factor [dB/m]

Results with measuring distance of 3 m						
Frequency	Result dBµV/m	Limit(* dBµV/m	Margin dB	Detector	Readings dBµV	Antenna factor * dB/m
13.560	58	70.0	12	QP	38	20.0
Results with measuring distance of 10 m						
Frequency MHz	Result dBµV/m	Limit(* dBµV/m	Margin dB	Detector	Readings dBµV	Antenna factor * dB/m
13.560	41	50.0	9	QP	21	20.0
	Signal was below the noise floor of the measuring system					
Measurement uncertainty		+2.2 dB / -3.6 dB				

*: Cable loss included
(*:Limits according to 15.209

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

56 – 57

5.2.4 FINAL RADIATED EMISSION TEST (30 MHz to 1 GHz)

Ambient temperature:	20 °C	Relative humidity:	47 %

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.

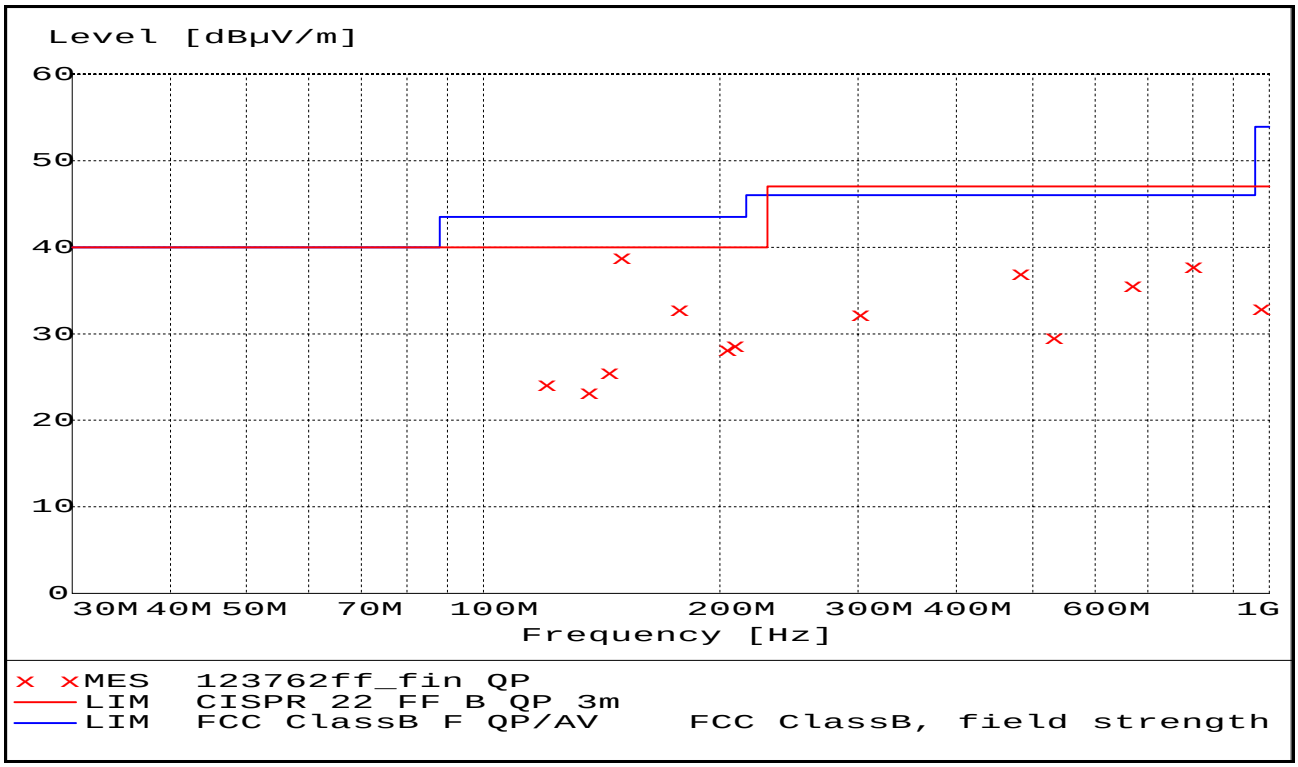
Test record: The test was carried out in normal operation mode of the EUT(awaiting a TAG). All results are shown in the following.

Power supply: During this test the EUT was powered via USB by a laptop PC from an AC-mains network with 120 V AC / 60 Hz.

Test results: The test results were calculated with the following formula:

Result [dBµV/m] = reading [dBµV] + cable loss [dB] + antenna factor [dB/m]

The measured points and the limit line in the following diagram refer to the standard measurement of the emitted interference in compliance with the above mentioned standard. The measured points marked with x are the measured results of the standard subsequent measurement on the open area test site.



Data record name: 123762ff

The results of the standard subsequent measurement on the open area test site are indicated in the table below. The limits as well as the measured results (levels) refer to the above mentioned standard while taking account of the specified requirements for a 3 m measuring distance.

Result measured with the quasipeak detector:

(These values are marked in the above diagram by x)

Spurious emissions in restricted bands									
Frequency	Result	Limit	Margin	Readings	Antenna factor	Cable loss	Height	Azimuth	Pol.
MHz	dBµV/m	dBµV/m	dB	dBµV	dB/m	dB	cm	deg	
119,680	24	43,5	19,5	10,4	12,4	1,2	100	1	vertical
135,600	23,1	43,5	20,4	9,9	11,9	1,3	110	271	vertical
969,720	32,8	54,0	21,2	5,5	23,8	3,5	231	334	vertical
Spurious emissions outside restricted bands									
Frequency	Result	Limit	Margin	Readings	Antenna factor	Cable loss	Height	Azimuth	Pol.
MHz	dBµV/m	dBµV/m	dB	dBµV	dB/m	dB	cm	deg	
143,988	25,4	43,5	18,1	12,3	11,8	1,3	216	90	horizontal
149,160	38,7	43,5	4,8	25,7	11,7	1,3	257	91	horizontal
176,280	32,7	43,5	10,8	21,4	9,8	1,5	200	345	horizontal
203,000	28	43,5	15,5	17,4	9,1	1,5	148	255	horizontal
207,636	28,5	43,5	15,0	17,7	9,3	1,5	141	82	horizontal
300,000	32,2	46,0	13,8	17,3	13,0	1,9	105	77	horizontal
480,000	36,9	46,0	9,1	17,5	17,0	2,4	100	181	vertical
528,000	29,5	46,0	16,5	9,0	17,9	2,6	206	225	horizontal
666,084	35,4	46,0	10,6	12,8	19,7	2,9	106	25	vertical
796,320	37,6	46,0	8,4	13,1	21,3	3,2	100	36	vertical
Measurement uncertainty				+2.2 dB / -3.6 dB					

The test results were calculated with the following formula:

Result [dBµV/m] = reading [dBµV] + cable loss [dB] + antenna factor [dB/m]

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

14 – 20

6 REPORT HISTORY

Report Number	Date	Comment
F123762E3	30 October 2012	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	09/03/2012	03/2014
3	LISN	NSLK8128	Schwarzbeck	8128155	480058	04/05/2012	05/2014
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	ESIB7	Rohde & Schwarz	100304	480521	15/02/2012	02/2014
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	-	-
29	Fully anechoic chamber M20	-	Albatross Projects	B83107-E2439-T232	480303	Weekly verification (system cal.)	
31	Measuring receiver	ESI 40	Rohde & Schwarz	100064	480355	13/02/2012	02/2014
32	Controller	HD100	Deisel	100/670	480326	-	-
33	Turntable	DS420HE	Deisel	420/620/80	480315	-	-
34	Antenna support	AS615P	Deisel	615/310	480187	-	-
35	Antenna	CBL6112 B	Chase	2688	480328	21/04/2011	04/2014
43	RF-cable No. 30	RTK 081	Rosenberger	-	410141	Weekly verification (system cal.)	
56	Loop antenna	HFH2-Z2	Rohde & Schwarz	832609/014	480059	16/02/2012	02/2014
57	EMI test receiver	ESPC	Rohde & Schwarz	843756/006	480150	09/02/2012	02/2014
58	Loop Antenna ∅ = 225 mm	-	Phoenix Test-Lab	-	410085	Weekly verification	
59	RF-cable No. 10	RG223	Phoenix-Test-Lab	-	410102	Weekly verification	

8 LIST OF ANNEXES

ANNEX A	**PHOTOGRAPHS OF THE TEST SET-UPS**:	**5 pages**
	Test set-up preliminary radiated emissions (H-Field)	123762fcc1.jpg
	Test set-up preliminary radiated emissions (E-Field)	123762fcc2.jpg
	Test set-up final radiated emissions (E-Field)	123762fcc3.jpg
	Test set-up outdoor test site	123762fcc4.jpg
	Test set-up conducted emissions	123762fcc5.jpg
ANNEX B	**EXTERNAL PHOTOGRAPHS OF THE TEST SAMPLE**:	**3 pages**
	MiCard V3 Multi, 3-D front view	123762eut1.jpg
	MiCard V3 Multi, 3-D rear view	123762eut2.jpg
	MiCard V3 Multi, Type plate	123762eut6.jpg
ANNEX C	**INTERNAL PHOTOGRAPHS OF THE TEST SAMPLE**:	**2 pages**
	MiCard V3 Multi, inside view	123762eut3.jpg
	MiCard V3 Multi, PCB top view	123762eut4.jpg
	MiCard V3 Multi, PCB rear view	123762eut5.jpg
ANNEX D	**ADDITIONAL MEASURMENT RESULTS FOR INDUSTY CANADA**:	**2 pages**