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Nemko Spa

Via del Carroccio, 4 – I 20046 Biassono (MB)

Report number: **154942-1TRFWL**

Apparatus: Radio Frequency Identification Device for Sample carriers

Applicant: INPECO S.p.A.
Via G.Di Vittorio 11, 20090 Segrate (MI)

FCC ID: Y2KCANBUSGWO271

Test specification:

Title 47 - Telecommunication
Chapter I - Federal Communications Commission
Subchapter A - General
Part 15 - Radio Frequency Devices
Subpart C - Intentional Radiators

Tested by:

Signature

Daniele Guarnone, Wireless/EMC Specialist

2011-03-21

Date

Reviewed by:

Signature

Gabriele Curioni, Wireless/EMC Specialist

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Section 1: Report summary

This report contains an assessment of apparatus against specifications based upon tests carried out on samples submitted at Nemko S.p.A.

Test specification:
FCC Part 15 Subpart C
Operation within the band 125 kHz


Compliance status:	Complies
Exclusions:	None
Non-compliances:	None
Report release history:	Original release
Test location:	Nemko Spa Via del Carroccio, 4 – I 20046 Biassono (MB)
Registration number:	(10 m Semi anechoic chamber), P3O001691

The date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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Section 2: Equipment under test

2.1 Identification of equipment under test (EUT)

The following information identifies the EUT under test:

Type of equipment:	Radio Frequency Identification Device for Sample carriers
Product marketing name:	
Model :	CANBUS ANTENNA
Serial number:	0630259
Nemko sample number:	154942
FCC ID:	Y2KCANBUSGWO271
Date of receipt:	2010-10-22

2.2 Accessories and support equipment

The following information identifies accessories used to exercise the EUT during testing:

Item # 1. none



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Section 2: Equipment under test

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Section 2: Equipment under test, continued

2.3 EUT description

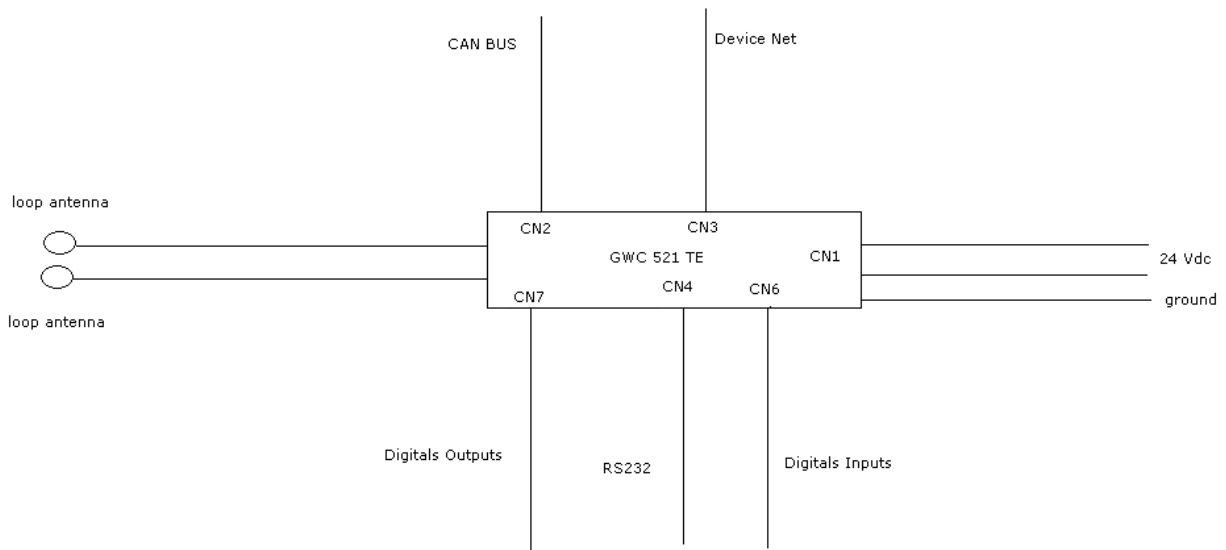
Radio Frequency Identification Device for Sample carriers

2.4 Technical specifications of the EUT

Operating frequency:	125 kHz
Modulation type:	ASK
Occupied bandwidth:	0.560 kHz
Emission designator:	560HM1D
Antenna data:	Two loop coils antenna with area <math><0.05\text{ cm}^2</math>
Antenna type:	<p>Field generating coils: $L_{125\text{kHz}} = 129\ \mu\text{H}$ (each coil) $Q_{125\text{kHz}} > 20$ (each coil) $f_{\text{RES, COIL}} > 500\ \text{kHz}$ Number of turns: 32 (each coil) Diameter of wire: 0.3 mm</p> <p>Sensing/reference coils: $L = 2.26\ \text{mH}$ (each coil) $Q_{125\text{kHz}} > 30$ (each coil) $f_{\text{RES, COIL}} > 500\ \text{kHz}$ number of turns: 227 diameter of wire: 0.08 mm</p> <p>With no transponder in the field the reference coils must be adjusted such that the oscilloscope input voltage is minimum.</p>
Power source	24Vdc

Section 2: Equipment under test, continued

2.5 EUT setup diagram



Remarks: RS232, digital outputs, digital inputs, Can Bus, Device Net shielded cables(160 cm lenght)

2.6 Operation of the EUT during testing

Reading the tags

2.7 Modifications incorporated in the EUT

Ferrite Fair Rite 046117645 Bin H4 on transponder cables.

Section 3: Test conditions

3.1 Deviations from laboratory tests procedures

No deviations were made from laboratory test procedures.

3.2 Test conditions, power source and ambient temperatures

Normal temperature, humidity and air pressure test conditions	Temperature: 15–30 °C Relative humidity: 20–75 % Air pressure: 860–1060 hPa When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.
Power supply range:	The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

Section 3: Test conditions, continued

3.3 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16-4-2 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements” and is documented in the Nemko Spa Technical Procedure WML1002. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device

3.4 Test equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next cal.
Emi Test Receiver 20 Hz ÷ 5 GHz	R&S	ESBI	828038/003	08/2011
Spectrum Analyzer 9 KHz ÷ 40 GHz	R&S	FSEK	848255/005	09/2011
Trilog Broad Band Antenna 25 MHz÷2 GHz	Schwarzbeck	VULB 9168	VULB 9168-242	08/2013
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530	08/2013
Shielded room	Siemens	10m control room	1947	08/2013
Broadband preamplifier	Schwarzbeck	BBV 9718	9718-137	05/2011
Bilog antenna 1 ÷18 GHz	Schwarzbeck	STLP 9148-123	123	09/2011
Climatic Chamber	Votsch	VC7150	5956603838001 0	03/2012
Loop antenna	HFH2-Z2	R&S	831247/011	03/2012

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use



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Section 4: Result summary

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Section 4: Result summary

4.1 FCC Part 15 Subpart C: Test results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N	No : not applicable / not relevant.
Y	Yes : Mandatory i.e. the apparatus shall conform to these tests.
N/T	Not Tested, mandatory but not assessed. (See report summary)

Part	Test description	Required	Result
General requirements for FCC Part 15			
§15.31(e)	Variation of power source	Y	P
§15.203	Antenna requirement	Y	P
§15.207(a)	Conducted limits	Y	P
§15.215(c)	20 dB bandwidth	Y	P
Specific requirements for FCC Part 15 Subpart C			
§15.209(c)	Radiated emission limits, general requirements	Y	P
Notes: None			



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Appendix A: Test results

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Appendix A: Test results

Clause 15.31(e) Variation of the power source

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85 % and 115 % of the nominal rated supply voltage. For battery-operated equipment, the equipment tests shall be performed using a new battery.

Test date: 2011-03-4

Test results: Pass

Test data

Transmit output power was measured while supply voltage was varied from 20.4Vdc to 27.6 Vdc (85 % to 115 % of the nominal rated supply voltage). No change in transmit output power was observed.

Clause 15.203 Antenna requirement

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

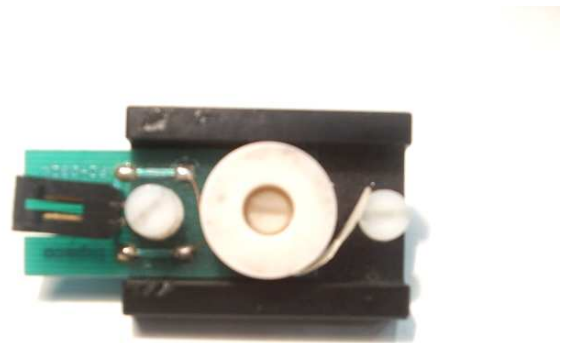
Test date: 2011-03-04

Test results: Pass

Test data

- EUT is designed so that the end user may replace a broken antenna.
- The EUT is professionally installed.

Detailed photo of RF connector





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Appendix A: Test results

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Clause 15.207(a) Conducted limits

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 limits in the following table, as measured using a 50 μH/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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.

Test date: 2011-03-04

Test results: Pass

Special notes

Port under test: DC power supply (measure performed on AC mains of typical power supply)

Preview measurements:

0.15 MHz to 30 MHz

Receiver settings:

- Peak and average detector
- 9 kHz RBW

Final measurement:

0.15 MHz to 30 MHz

Receiver settings:

- Q-Peak and average detector
- 9 kHz RBW

- Spectral plots have been corrected for transducer factors; cable loss, LISN, and attenuators.
- Emissions detected within 6 dB of limit were re-measured with a quasi peak or average detector for a final measurement.



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Appendix A: Test results

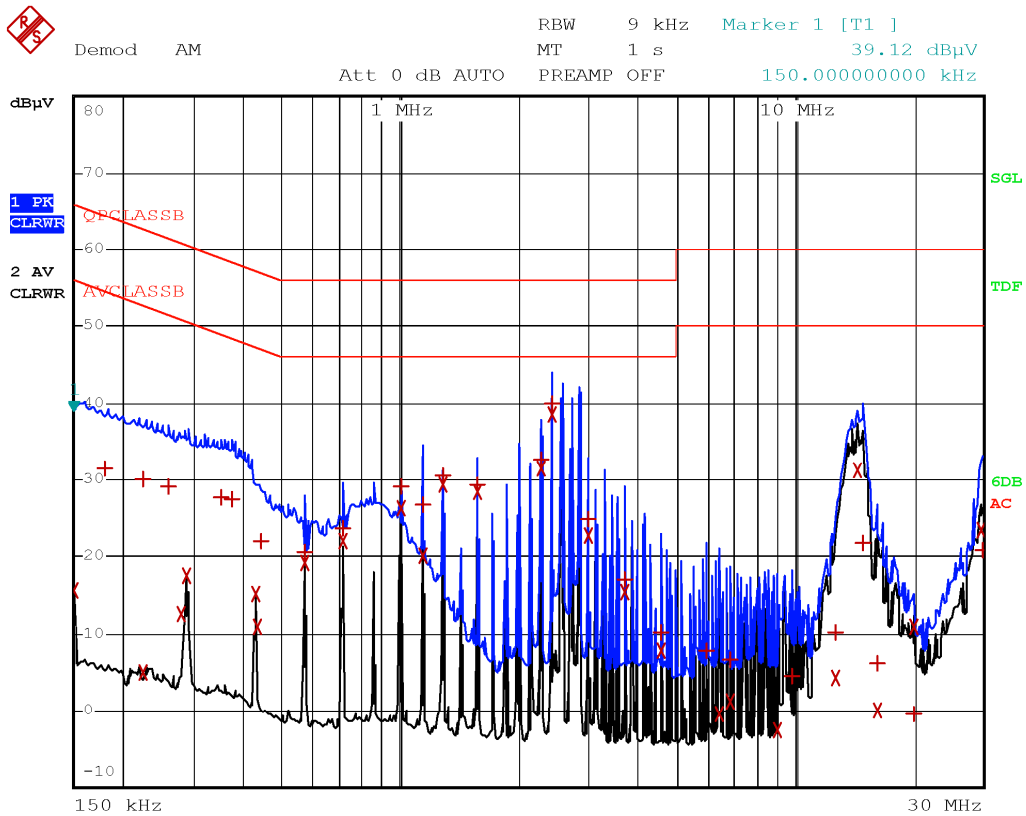
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Clause 15.207(a) Conducted limits, continued

Test data

Phase line



Date: 4.MAR.2011 17:15:23

Clause 15.207(a) Conducted limits, continued

Tabular data

Frequency (MHz)	Quasi Peak result (dBµV)	Meas. time (ms)	Bandwidth (kHz)	Filter	Conductor	Correction (dB)	Margin (dB)	Limit (dBµV)
0.18200	31.4	1000	120		Phase	10	-33.0	64.4
0.22600	30.0	1000	120		Phase	10	-32.6	62.6
0.25800	29.0	1000	120		Phase	10	-32.5	61.5
0.35000	27.7	1000	120		Phase	10	-31.3	59.0
0.37400	27.3	1000	120		Phase	10	-31.1	58.4
0.44200	22.1	1000	120		Phase	10	-34.9	57.0
0.57400	20.6	1000	120		Phase	10	-35.4	56.0
0.71800	23.7	1000	120		Phase	10	-32.3	56.0
1.00200	29.0	1000	120		Phase	10	-27.0	56.0
1.14600	26.8	1000	120		Phase	10	-29.2	56.0
1.29000	30.6	1000	120		Phase	10	-25.4	56.0
1.57400	29.4	1000	120		Phase	10	-26.6	56.0
2.29000	32.7	1000	120		Phase	10	-23.3	56.0
2.43400	40.0	1000	120		Phase	10	-16.0	56.0
3.00600	24.8	1000	120		Phase	10	-31.2	56.0
3.72200	17.0	1000	120		Phase	10	-39.0	56.0
4.58200	10.2	1000	120		Phase	10	-45.8	56.0
6.01400	7.8	1000	120		Phase	10	-52.2	60.0
6.87400	6.6	1000	120		Phase	10	-53.4	60.0
9.87800	4.6	1000	120		Phase	10	-55.4	60.0
12.74600	10.1	1000	120		Phase	10	-49.9	60.0
14.89400	21.8	1000	120		Phase	10	-38.2	60.0
16.18600	6.2	1000	120		Phase	10	-53.8	60.0
20.05000	-0.4	1000	120		Phase	10	-60.4	60.0
29.93400	20.8	1000	120		Phase	10	-39.2	60.0

Note: Correction factor includes cable loss, LISN, and attenuator.

Clause 15.207(a) Conducted limits, continued

Frequency (MHz)	Average result (dBµV)	Meas. time (ms)	Bandwidth (kHz)	Filter	Conductor	Correction (dB)	Margin (dB)	Limit (dBµV)
0.15000	15.7	1000	120		Phase	10	-40.3	56.0
0.22600	4.9	1000	120		Phase	10	-47.7	52.6
0.28200	12.5	1000	120		Phase	10	-38.2	50.8
0.28560	17.6	1000	120		Phase	10	-33.0	50.7
0.43000	15.1	1000	120		Phase	10	-32.2	47.3
0.43400	10.8	1000	120		Phase	10	-36.3	47.2
0.57400	19.1	1000	120		Phase	10	-26.9	46.0
0.71800	21.9	1000	120		Phase	10	-24.1	46.0
1.00400	26.2	1000	120		Phase	10	-19.8	46.0
1.14600	20.2	1000	120		Phase	10	-25.8	46.0
1.29000	29.3	1000	120		Phase	10	-16.7	46.0
1.57400	28.5	1000	120		Phase	10	-17.5	46.0
2.29000	31.5	1000	120		Phase	10	-14.5	46.0
2.43400	38.6	1000	120		Phase	10	-7.4	46.0
3.00600	22.8	1000	120		Phase	10	-23.2	46.0
3.72200	15.4	1000	120		Phase	10	-30.6	46.0
4.58200	7.8	1000	120		Phase	10	-38.2	46.0
6.44200	-0.3	1000	120		Phase	10	-50.3	50.0
6.87400	1.2	1000	120		Phase	10	-48.8	50.0
9.02200	-2.5	1000	120		Phase	10	-52.5	50.0
12.74600	4.3	1000	120		Phase	10	-45.7	50.0
14.48000	31.2	1000	120		Phase	10	-18.8	50.0
16.18600	0.1	1000	120		Phase	10	-49.9	50.0
20.00200	10.9	1000	120		Phase	10	-39.1	50.0
29.84000	23.5	1000	120		Phase	10	-26.5	50.0

Note: Correction factor includes cable loss, LISN, and attenuator.

Clause 15.207(a) Conducted limits, continued

Tabular data

Frequency (MHz)	Quasi Peak result (dBµV)	Meas. time (ms)	Bandwidth (kHz)	Filter	Conductor	Correction (dB)	Margin (dB)	Limit (dBµV)
0.17400	29.5	1000	120		Neutral	10	-35.2	64.8
0.19800	28.3	1000	120		Neutral	10	-35.4	63.7
0.28200	22.9	1000	120		Neutral	10	-37.9	60.8
0.28600	23.3	1000	120		Neutral	10	-37.4	60.6
0.43000	23.6	1000	120		Neutral	10	-33.7	57.3
0.43400	23.1	1000	120		Neutral	10	-34.1	57.2
0.57400	22.5	1000	120		Neutral	10	-33.5	56.0
0.71800	25.4	1000	120		Neutral	10	-30.6	56.0
1.00600	22.4	1000	120		Neutral	10	-33.6	56.0
1.14600	26.5	1000	120		Neutral	10	-29.5	56.0
1.29000	28.2	1000	120		Neutral	10	-27.8	56.0
1.57800	26.5	1000	120		Neutral	10	-29.5	56.0
2.29400	16.5	1000	120		Neutral	10	-39.5	56.0
2.43800	19.0	1000	120		Neutral	10	-37.0	56.0
3.01400	9.4	1000	120		Neutral	10	-46.6	56.0
3.73000	11.1	1000	120		Neutral	10	-44.9	56.0
4.59000	5.5	1000	120		Neutral	10	-50.5	56.0
5.59400	1.5	1000	120		Neutral	10	-58.5	60.0
8.03400	2.3	1000	120		Neutral	10	-57.7	60.0
9.75400	16.4	1000	120		Neutral	10	-43.6	60.0
12.77000	25.3	1000	120		Neutral	10	-34.7	60.0
14.77800	12.0	1000	120		Neutral	10	-48.0	60.0
16.07000	2.4	1000	120		Neutral	10	-57.6	60.0
24.25400	13.1	1000	120		Neutral	10	-46.9	60.0
29.13000	22.2	1000	120		Neutral	10	-37.8	60.0

Note: Correction factor includes cable loss, LISN, and attenuator.

Clause 15.207(a) Conducted limits, continued


Frequency (MHz)	Average result (dBµV)	Meas. time (ms)	Bandwidth (kHz)	Filter	Conductor	Correction (dB)	Margin (dB)	Limit (dBµV)
0.15000	8.3	1000	120		Neutral	10	-47.7	56.0
0.21840	2.8	1000	120		Neutral	10	-50.1	52.9
0.28290	14.0	1000	120		Neutral	10	-36.8	50.7
0.28600	17.1	1000	120		Neutral	10	-33.5	50.6
0.43000	17.5	1000	120		Neutral	10	-29.8	47.3
0.43340	13.2	1000	120		Neutral	10	-34.0	47.2
0.57490	21.2	1000	120		Neutral	10	-24.8	46.0
0.71820	23.6	1000	120		Neutral	10	-22.4	46.0
1.00600	21.6	1000	120		Neutral	10	-24.4	46.0
1.14600	23.6	1000	120		Neutral	10	-22.4	46.0
1.29000	28.1	1000	120		Neutral	10	-17.9	46.0
1.57800	26.3	1000	120		Neutral	10	-19.7	46.0
2.29400	15.8	1000	120		Neutral	10	-30.2	46.0
2.43800	18.5	1000	120		Neutral	10	-27.5	46.0
3.01400	8.2	1000	120		Neutral	10	-37.8	46.0
3.73000	10.0	1000	120		Neutral	10	-36.0	46.0
4.59000	3.9	1000	120		Neutral	10	-42.1	46.0
5.59400	-1.3	1000	120		Neutral	10	-51.3	50.0
8.03400	-3.4	1000	120		Neutral	10	-53.4	50.0
9.32600	2.5	1000	120		Neutral	10	-47.5	50.0
12.77000	18.3	1000	120		Neutral	10	-31.7	50.0
14.77800	5.6	1000	120		Neutral	10	-44.4	50.0
16.07000	-2.7	1000	120		Neutral	10	-52.7	50.0
24.25000	9.0	1000	120		Neutral	10	-41.0	50.0
29.13000	19.1	1000	120		Neutral	10	-30.9	50.0

Note: Correction factor includes cable loss, LISN, and attenuator.

Clause 15.207(a) Conducted limits, continued

Set up photo



 Nemko Spa Via del Carroccio, 4 – I 20046 Biassono (MB)	Appendix A: Test results
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	Specification: FCC 15 subpart C

Clause 15.215(c) 20 dB bandwidth

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, 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 as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80 % of the permitted band in order to minimize the possibility of out-of-band operation.

Test date:2011-03-03
Test results: Pass

Special notes
None



Nemko Spa Via del Carroccio, 4 – I 20046 Biassono (MB)

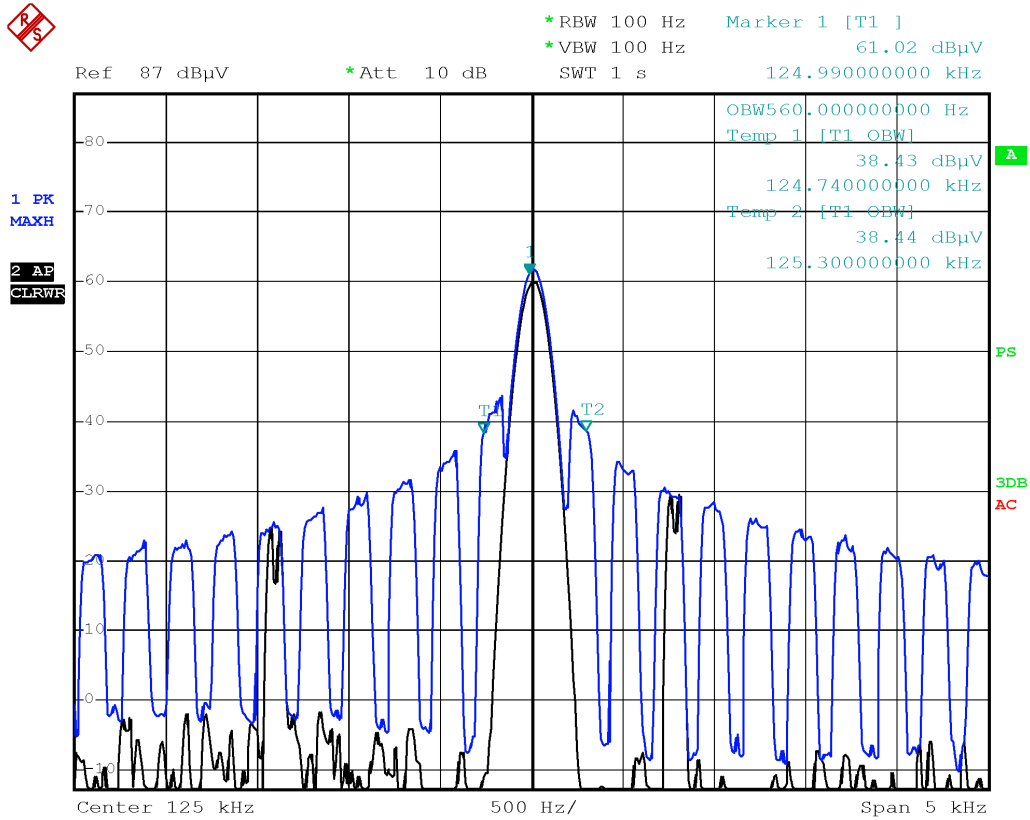
Appendix A: Test results

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Test data

Measured results:



Date: 3.MAR.2011 15:01:39

20 dB bandwidth (Hz)	Limit (Hz)	Margin (Hz)
560	21000	20400



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Appendix A: Test results

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Clause 15.209() Field Strength of any emissions

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength		Measurement distance (m)
	(μ V/m)	(dB μ V/m)	
0.009–0.490	2400/F	67.6–20log(F)	300
0.490–1.705	24000/F	87.6–20log(F)	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes:

- F = frequency in kHz
- In the emission table above, the tighter limit applies at the band edges.
- For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

Test date: 2011-03-04

Test results: Pass

Clause 15. 209 Field Strength of any emissions continued

Special notes

- The spectrum was searched from 9 kHz to the 10th harmonic.
- The EUT was measured on three orthogonal axis.
- All measurements were performed at a distance of 10 m (9 kHz to 30 MHz) and 3 m (30 MHz to 6 GHz)
- All measurements were performed:
 - below 30 MHz: using a quasi-peak detector with 9 kHz/30 kHz RBW/VBW,
 - within 30–1000 MHz range: using a quasi-peak detector with 120 kHz/300 kHz RBW/VBW,
 - above 1 GHz: using peak detector with 1 MHz/3 MHz RBW/VBW for peak results
 - and using averagedetector with 1 MHz/10 Hz RBW/VBW for average results
 - Only the worst data presented in the test report.

§ 15.205 Restricted bands of operation.

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			



Nemko Spa Via del Carroccio, 4 – I 20046 Biassono (MB)

Appendix A: Test results

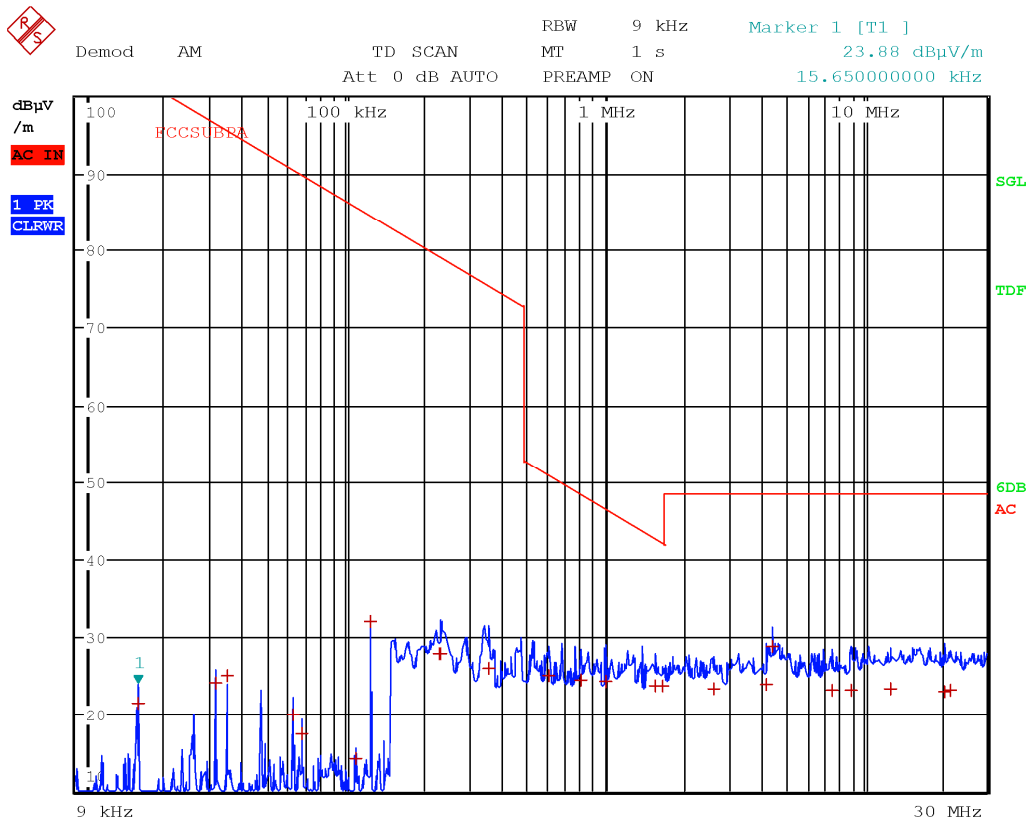
Report Number: 154942-1TRFWL

Specification: FCC 15 subpart C

Clause 15. 209 Field Strength of any emissions

Test data, continued

Blue curve: peak detector



Date: 3.MAR.2011 12:54:33

NB: measurement distance 10 m



Nemko Spa Via del Carroccio, 4 – I 20046 Biassono (MB)

Appendix A: Test results

Report Number: 154942-1TRFWL

Specification: FCC 15 subpart C

Clause 15. 209 Field Strength of any emissions, continued

Test data, continued

Tabular data

Freq. (MHz)	Pol. V/H	Quasi peak field strength (dBµV/m)	Correction (dB)	Quasi Peak limit (dBµV/m)	margin (dB)	Duty cycle corr. (dB)	Avg field strength (dBµV/m)	Avg limit (dBµV/m)	Avg margin (dB)
0.01565	-	21.5	20.0	102.8	-81.3	-	-	-	-
0.03125	-	24.1	20.0	96.8	-72.7	-	-	-	-
0.03470	-	25.0	20.0	95.9	-70.9	-	-	-	-
0.06250	-	19.8	20.0	90.8	-70.9	-	-	-	-
0.06720	-	17.4	20.0	90.1	-72.7	-	-	-	-
0.10940	-	14.2	20.0	85.9	-71.7	-	-	-	-
0.12500	-	33.1 (*)	20.0	84.8	-52.6	-	-	-	-
0.22875	-	27.9	20.1	79.5	-51.6	-	-	-	-
0.23100	-	27.9	20.1	79.4	-51.5	-	-	-	-
0.35475	-	26.0	20.1	75.7	-49.7	-	-	-	-
0.60225	-	25.0	20.1	51.1	-26.2	-	-	-	-
0.80475	-	24.4	20.2	48.6	-24.2	-	-	-	-
1.00050	-	24.3	20.2	46.7	-22.4	-	-	-	-
1.56525	-	23.7	20.2	42.8	-19.2	-	-	-	-
1.67550	-	23.6	20.2	42.3	-18.6	-	-	-	-
2.62500	-	23.3	20.3	48.6	-25.3	-	-	-	-
4.19550	-	23.8	20.4	48.6	-24.8	-	-	-	-
4.43625	-	28.8	20.5	48.6	-19.8	-	-	-	-
7.57950	-	23.1	20.7	48.6	-25.5	-	-	-	-
8.98350	-	23.2	20.7	48.6	-25.4	-	-	-	-
12.77700	-	23.4	20.7	48.6	-25.2	-	-	-	-
20.64525	-	22.9	20.7	48.6	-25.7	-	-	-	-
21.72525	-	23.2	20.7	48.6	-25.4	-	-	-	-

Note: Correction factor includes antenna, cable loss, amplifier, and attenuators.
 (*) Level of fundamental frequency



Nemko Spa Via del Carroccio, 4 – I 20046 Biassono (MB)

Appendix A: Test results

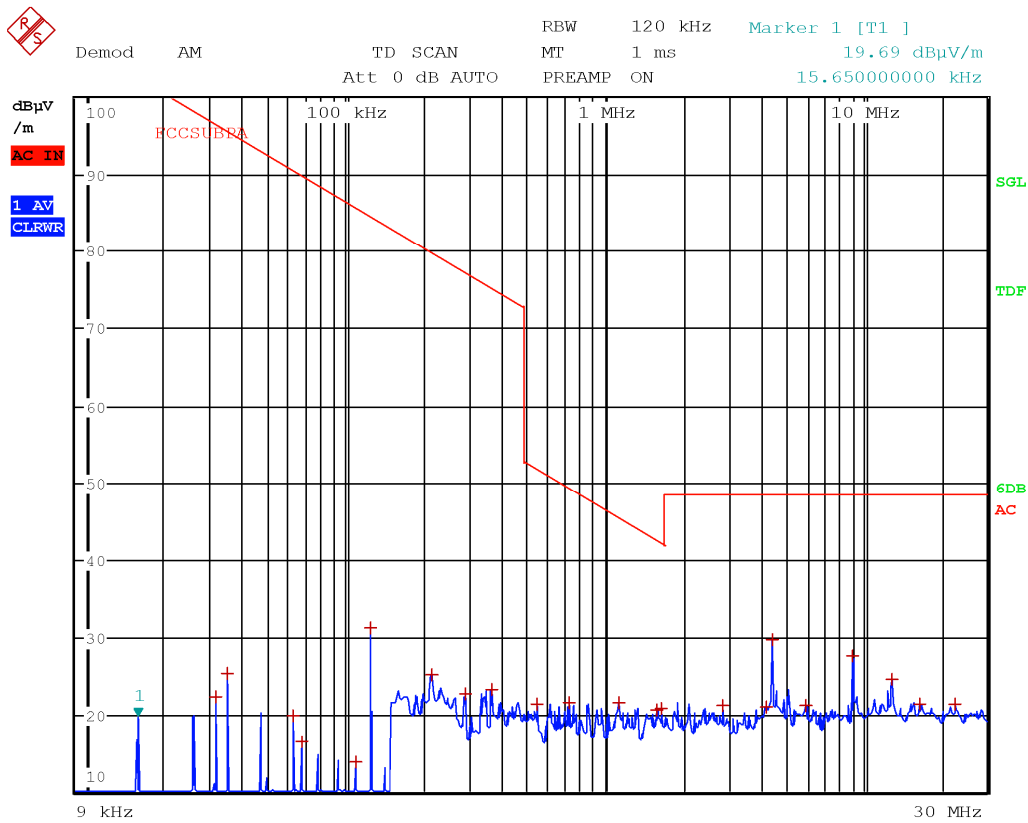
Report Number: 154942-1TRFWL

Specification: FCC 15 subpart C

Clause 15. 209 Field Strength of any emissions

Test data, continued

average detector:



Date: 3.MAR.2011 12:55:45

NB: measurement distance 10 m



Nemko Spa Via del Carroccio, 4 – I 20046 Biassono (MB)

Appendix A: Test results

Report Number: 154942-1TRFWL

Specification: FCC 15 subpart C

Clause 15. 209 Field Strength of any emissions, continued

Test data, continued

Tabular data

Freq. (MHz)	Pol. V/H	Quasi peak field strength (dB μ V/m)	Correction (dB)	Quasi Peak limit (dB μ V/m)	margin (dB)	Duty cycle corr. (dB)	Avg field strength (dB μ V/m)	Avg limit (dB μ V/m)	Avg margin (dB)
0.03125	-		20.0			-	22.3	96.8	-74.5
0.03475	-		20.0			-	25.3	95.9	-70.5
0.06250	-		20.0			-	19.9	90.8	-70.9
0.06720	-		20.0			-	16.5	90.1	-73.7
0.10935	-		20.0			-	13.8	85.9	-72.1
0.12500	-		20.0			-	32.2 (*)	84.8	-53.5
0.21300	-		20.0			-	25.2	80.1	-55.0
0.28725	-		20.1			-	22.9	77.5	-54.7
0.36150	-		20.1			-	23.3	75.5	-52.2
0.54600	-		20.1			-	21.4	52.0	-30.5
0.72375	-		20.1			-	21.7	49.5	-27.8
1.12650	-		20.2			-	21.7	45.7	-24.0
1.59450	-		20.2			-	20.6	42.7	-22.1
1.65075	-		20.2			-	20.9	42.4	-21.5
2.83425	-		20.2			-	21.3	48.6	-27.3
4.22925	-		20.3			-	21.1	48.6	-27.5
4.43400	-		20.4			-	29.7	48.6	-18.9
6.02025	-		20.5			-	21.2	48.6	-27.4
9.04425	-		20.7			-	27.6	48.6	-21.0
12.86025	-		20.7			-	24.7	48.6	-23.9
16.54575	-		20.7			-	21.4	48.6	-27.2
22.45425	-		20.7			-	21.5	48.6	-27.1

Note: Correction factor includes antenna, cable loss, amplifier, and attenuators.

(*) Level of fundamental frequency



Nemko Spa Via del Carroccio, 4 - I 20046 Biassono (MB)

Appendix A: Test results

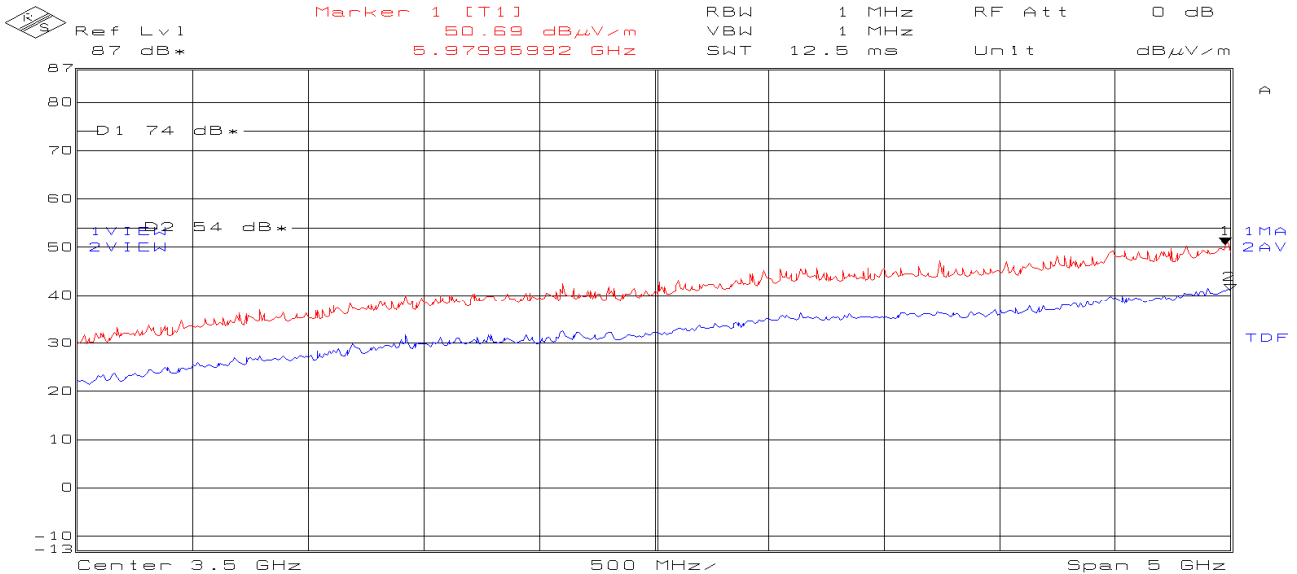
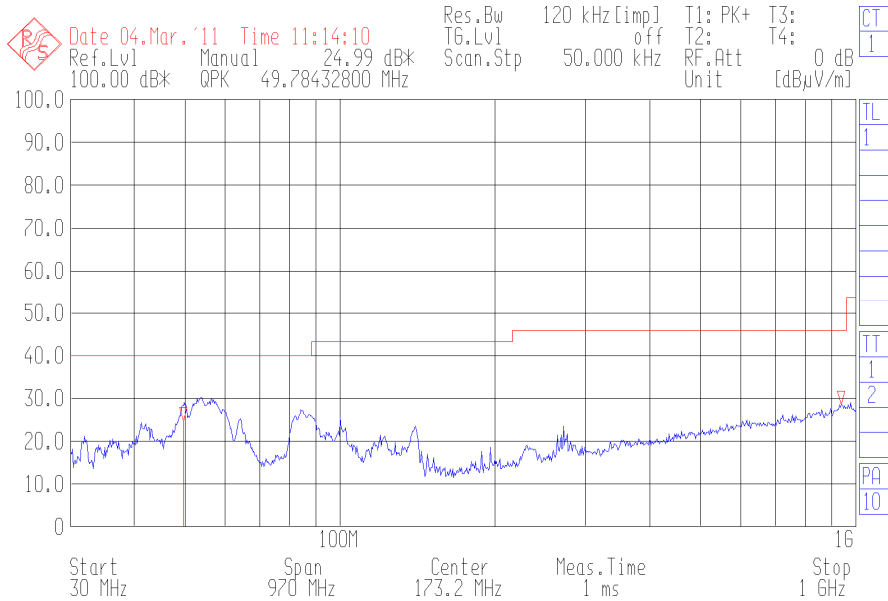
Report Number: 154942-1TRFWL

Specification: FCC 15 subpart C

Clause 15. 209 Strength of any emissions

Test data, continued

Vertical polarization



Date: 04.MAR.2011 15:26:07

NB: measurement distance 3 m



Nemko Spa Via del Carroccio, 4 – I 20046 Biassono (MB)

Appendix A: Test results

Report Number: 154942-1TRFWL

Specification: FCC 15 subpart C

Clause 15. 209 Field Strength continued ..

Test data, continued

Tabular data

Freq. (MHz)	Pol. V/H	Quasi peak field strength (dBµV/m)	Correction (dB)	Quasi Peak limit (dBµV/m)	margin (dB)	Duty cycle corr. (dB)	Avg field strength (dBµV/m)	Avg limit (dBµV/m)	Avg margin (dB)
49.784328	v	24.6	13.8	40.0	-15.4	-	-	-	-
52.780556	v	26.3	13.8	40.0	-13.7	-	-	-	-
53.609560	v	27.8	13.7	40.0	-12.3	-	-	-	-
55.306860	v	26.7	13.7	40.0	-13.3	-	-	-	-
55.739512	v	27.0	13.7	40.0	-13.0	-	-	-	-
56.175552	v	27.2	13.7	40.0	-12.8	-	-	-	-
56.836012	v	26.4	13.7	40.0	-13.6	-	-	-	-
57.280628	v	26.9	13.4	40.0	-13.1	-	-	-	-

Note: Correction factor includes antenna, cable loss, amplifier, and attenuators.



Nemko Spa Via del Carroccio, 4 - I 20046 Biassono (MB)

Appendix A: Test results

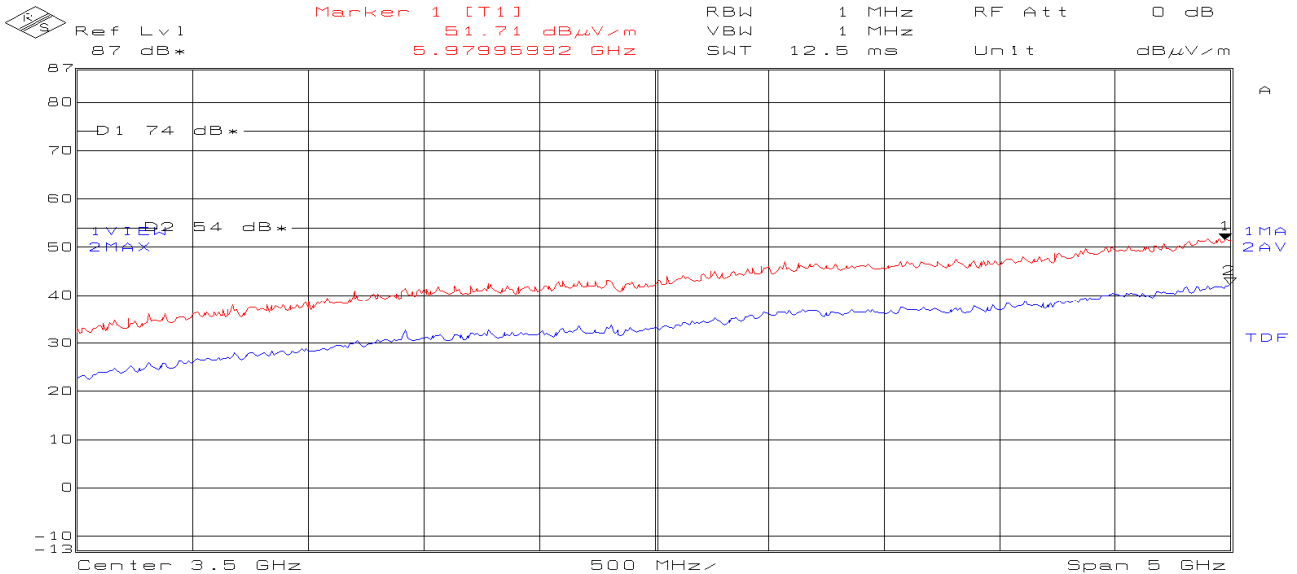
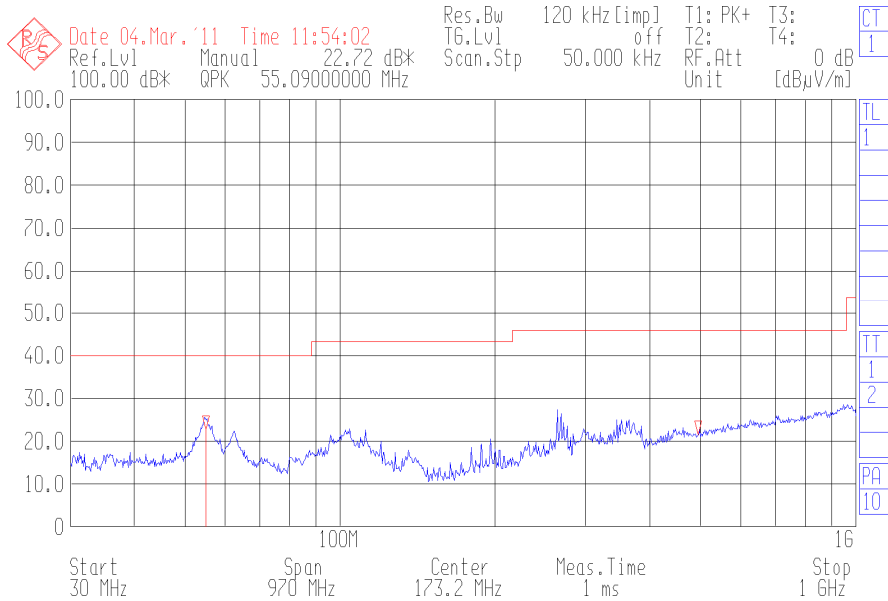
Report Number: 154942-1TRFWL

Specification: FCC 15 subpart C

Clause 15. 209 Field Strength of any emissions

Test data, continued

Horizontal polarization



Date: 04.MAR.2011 15:14:53

NB: measurement distance 3m



Nemko Spa Via del Carroccio, 4 – I 20046 Biassono (MB)

Appendix A: Test results

Report Number: 154942-1TRFWL

Specification: FCC 15 subpart C

Clause 15. 209 Field Strength, continued

Test data, continued

Tabular data

Freq. (MHz)	Pol. V/H	Quasi peak field strength (dBµV/m)	Correction (dB)	Quasi Peak limit (dBµV/m)	margin (dB)	Duty cycle corr. (dB)	Avg field strength (dBµV/m)	Avg limit (dBµV/m)	Avg margin (dB)
55.09179	h	22.0	13.7	40.0	-18.0	-	-	-	-
55.73951	h	19.8	13.7	40.0	-20.2	-	-	-	-
103.56311	h	16.8	13.8	43.5	-26.7	-	-	-	-
263.81899	h	17.8	13.4	46.0	-28.2	-	-	-	-
267.96275	h	21.3	13.4	46.0	-24.7				
347.89187	h	19.5	15.6	46.0	-26.5				
462.34547	h	16.9	17.5	46.0	-29.1				

Note: Correction factor includes antenna, cable loss, amplifier, and attenuators.

Clause 15. 209 Field Strength, continued

Set up photo



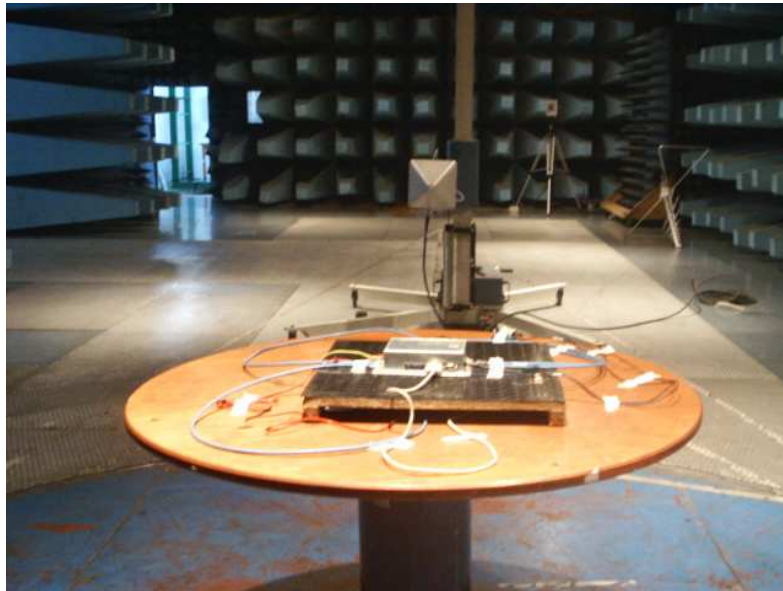
Loop antenna (9 kHz ÷ 30 MHz)
measurement distance: 10 m



Log periodic antenna (30MHz ÷ 1000 MHz)
measurement distance: 3 m

Clause 15. 209 Field Strength, continued

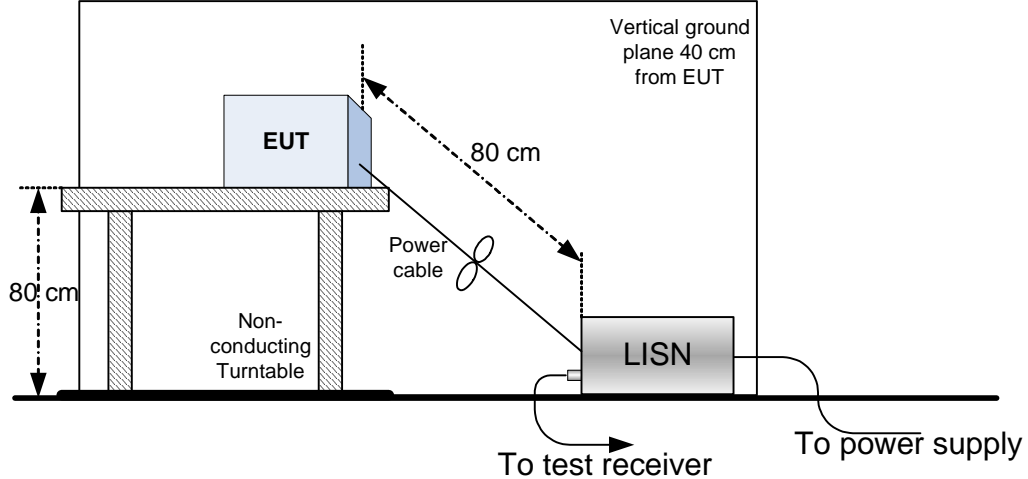
Set up photo



Log periodic antenna (1000 MHz ÷ 6000 MHz)
measurement distance: 3 m

Block diagram, continued

Conducted emissions set-up



Frequency stability set-up

