

Recognized by the
Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: 3463 (IC)
TCB ID:DE 0001



Accredited by the
German Accreditation Council
DAR-Registration Number
DAT-P-176/94-D1



Independent ETSI
compliance test house



Accredited Bluetooth[®] Test Facility (BQTF)

Test report no.	: 2-3997-01-02/05
Applicant	: B.E.A. Inc.
Type	: B.E.A. loop detector MATRIX family
Test Standard	: FCC Part 15 / RSS210
FCC ID	: G9B-MATRIX
Certification No. IC	: 4680A-MATRIX

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1 General information

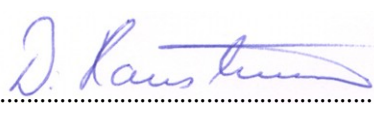
1.1 Administrative data of the test facility

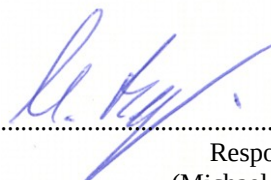
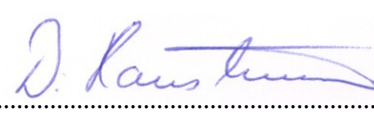
1.1.1 Identification of the testing laboratory

Company name:	Cetecom ICT Services GmbH
Address:	Untertürkheimerstr. 6-10 D-66117 Saarbruecken Germany
Laboratory accreditation:	DAR-Registration No. DAT-P-176/94-D1 Bluetooth Qualification Test Facility (BQTF) Federal Communications Commission (FCC)
Responsible for testing laboratory:	Identification/Registration No : 90462 Michael Berg Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de

1.2 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

 / 
.....
Responsible for testing laboratory
(Michael Berg / Dirk Hausknecht)

 / 
.....
Responsible for test report
(Michael Berg / Dirk Hausknecht)

1.3 Details of Applicant

Name : B.E.A. Inc.
Address : 100 Enterprise Drive, RIDC Park West
City : Pittsburgh, PA 15275
Country : U.S.A.
Phone : + 1 412 249 4100
Fax : + 1 412 249 4101

USA Contact : Mr Thomas Schluep
Phone : + 1 412 249 4100
Fax : + 1 412 249 4101
e-mail : tpschluep@beainc.com
Europe Contact : Mr Yves Borlez
Phone : + 32 4 361 68 68
Fax : + 32 4 361 28 68
e-mail : yves.borlez@bea.be

1.4 Application Details

Date of receipt of application : 2005-07-14
Date of receipt of test item : 2005-07-14
Date(s) of test : 2005-07-14
Date of report : 2005-07-14

CETECOM ICT Services GmbH

Untertürkheimer Str. 6-10, 66117 Saarbruecken
RSC-Laboratory

Phone: +49 (0) 681 598-0
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Fax: -9075
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Test report no.: 2-3997-01-02/05

Date: 2005-07-14

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1.5 Test Item

Type of equipment	:	inductive loop reader
Model name	:	B.E.A. loop detector MATRIX family, consists of : MATRIX-S-12-24 MATRIX-D-12-24 MATRIX-S-110 MATRIX-D-100 MATRIX-2-S-12-24 MATRIX-2-S-110 10MATRIXII-RH
Manufacturer	:	B.E.A. Inc.
Address	:	100 Enterprise Drive, RIDC Park West
City	:	Pittsburgh, PA 15275
Country	:	U.S.A.
Tested to Radio Standards Specification(RSS) No.	:	210 Issue 5
Open Area Test Site Industry Canada Number	:	3463
Frequency Range (or fixed frequency)	:	55 – 62 kHz
R F: Power in Watts	:	-/-
Field Strength (at what distance)	:	103 dBµV/m in 3m
Occupied Bandwidth (99% BW)	:	1 kHz
Type of Modulation	:	N0N (inductive loop)
Antenna Information	:	Loop antenna
Emission Designator	:	1k00N0N
Transmitter Spurious (worst case)	:	812µV/m in 3m
Receiver Spurious (worst case)	:	Not applicable
IC no.	:	4680A-MATRIX
FCC ID	:	G9B-MATRIX

ATTESTATION:

DECLARATION OF COMPLIANCE: I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Laboratory Manager :

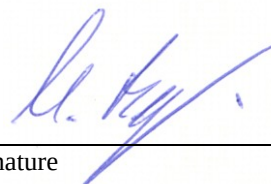
2005-07-14

Michael Berg

Date

Name

Signature



1.6 Test Setup

Hardware :
Software :

1.7 Test Specifications

FCC:	CFR Part 15.209
IC:	RSS 210, Issue 5

1.8 Additional informations

The Matrix familiy consists of three different type of readers.

1. The Matrix loop reader, powered either with low voltage from 12-24 V AC or DC (here used 15V DC) or main voltage 100-130 VAC (here used 117 VAC) or 220-240 VAC. All able to drive one or two loop antennas.
2. The Martix II loop reader, same as above, but different connectors.
3. The Matrix Rite-Hite loop reader, without housing , low voltage from 12-24V AC or DC, here 15V DC used, Single loop antenna only.

We tested the Matrix reader completely, the Matrix II and the Rite-Hite partional.

As the antenna size may vary, we tested the smallest loop with about 3m² and four turns of wire and the biggest one with about 10m² and two turns of wire.

The samples without transformator (12-24V AC/DC) were tested with a power supply from our house.

2 Statement of Compliance

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

2.1 Summary of Measurement Results

2.1.1 CFR 47 Part 15 Radio frequency devices

Section in this Report	Test Name / Section FCC Part 15	Test Name / Section RSS 210 Issue 5	applicable	Verdict
4.1	§ 15.35 (c) Timing of the transmitter (Duty cycle correction factor)	6.5 Pulsed Operation	NO	
4.2	§ 15.209 (a) FIELDSTRENGTH OF FUNDAMENTAL	6.2.1	YES	pass
4.3	§ 15.209 (a) FIELDSTRENGTH OF HARMONICS and SPURIOUS	6.2.1	YES	pass
4.4	§ 15.109 Receiver spurious emissions (radiated)	7.3 Receiver Spurious Emissions (Radiated)	NO	
4.5	§ 15.107 / 15.207 Conducted Limits	Section 6.6 , 7.4	YES	pass

3 Measurements and results

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber.

The receiving antennas are conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.

Antennas are conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.109 and 15.107

4 FCC Part 15 Subpart C

4.1 Timing of the transmitter

Not applicable

Reference

FCC:	CFR Part SUBCLAUSE § 15.35 (c)
IC:	RSS 210, ISSUE 5 6.5 Pulsed operation

Limits: § 15.35 (c)

(c) Unless otherwise specified, e.g. Section 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

4.2 Field strength of the fundamental

Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a)
IC:	RSS 210, Issue 5, 6.2.1

Maximum output power (quasi peak) - (radiated), measured at 3m and recalculated to 300m with 80dB according FCC-rules.

TEST CONDITIONS		MAXIMUM POWER (dB μ V/m, QP)		
Single loop, small antenna		Matrix	MatrixII	Rite-Hite
Frequency		55 kHz	55 kHz	55 kHz
T _{nom} +23 °C	V _{nom} 15V DC	97.6 dB μ V/m	98.3 dB μ V/m	97.3dB μ V/m
T _{nom} +23 °C	V _{nom} 117V AC	97.2 dB μ V/m	98.0 dB μ V/m	Not applicable
Measurement uncertainty		±3dB		

RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz,
1Mhz above 1 GHz

Limits

SUBCLAUSE § 15.209 (a)

Fundamental Frequency (MHz)	Field strength of Fundamental (μ V/m)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300 (112 dB μ V/m at 3m)
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30.0 – 88.0	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

CETECOM ICT Services GmbH

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Phone: +49 (0) 681 598-0
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Fax: -9075
Fax: -9075

Test report no.: 2-3997-01-02/05

Date: 2005-07-14

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TEST CONDITIONS		MAXIMUM POWER (dB μ V/m, QP)		
Double loop, small antenna		Matrix	MatrixII	Rite-Hite
Frequency 55 kHz			55 kHz	
T _{nom} +23 °C	V _{nom} 15V DC	Not tested	97.4 dB μ V/m	Not applicable
T _{nom} +23 °C	V _{nom} 117V AC	Not tested	97.9 dB μ V/m	Not applicable
Measurement uncertainty		± 3 dB		

RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz,
1Mhz above 1 GHz

Limits

SUBCLAUSE § 15.209 (a)

Fundamental Frequency (MHz)	Field strength of Fundamental (μ V/m)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300 (112 dB μ V/m at 3m)
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30.0 – 88.0	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

TEST CONDITIONS		MAXIMUM POWER (dB μ V/m, QP)		
Single loop, big antenna		Matrix	MatrixII	Rite-Hite
Frequency		62 kHz	62 kHz	62 kHz
T _{nom} +23 °C	V _{nom} 15V DC	99.4 dB μ V/m	101.2 dB μ V/m	99.1 dB μ V/m
T _{nom} +23 °C	V _{nom} 117V AC	99.7 dB μ V/m	102.9 dB μ V/m	Not applicable
Measurement uncertainty		±3dB		

RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz,
1Mhz above 1 GHz

Limits**SUBCLAUSE § 15.209 (a)**

Fundamental Frequency (MHz)	Field strength of Fundamental (μ V/m)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300 (112 dB μ V/m at 3m)
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30.0 – 88.0	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

TEST CONDITIONS		MAXIMUM POWER (dB μ V/m, QP)		
Double loop, big antenna		Matrix	MatrixII	Rite-Hite
Frequency			62 kHz	
T _{nom} +23 °C	V _{nom} 15V DC	Not tested	102.7 dB μ V/m	Not applicable
T _{nom} +23 °C	V _{nom} 117V AC	Not tested	102.9 dB μ V/m	Not applicable
Measurement uncertainty		± 3 dB		

RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz,
1Mhz above 1 GHz

Limits

SUBCLAUSE § 15.209 (a)

Fundamental Frequency (MHz)	Field strength of Fundamental (μ V/m)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300 (112 dB μ V/m at 3m)
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30.0 – 88.0	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

4.3 Field strength of the harmonics and the spurious

Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a)
IC:	RSS 210, Issue 5, 6.2.1

Small antenna

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dB μ V/m) QP	limit max. allowed emmission power dB μ V/m at 3m ,QP	actual attenuation below frequency of operation (dB)	results
0.055					Operating frequency
0.110		55.2	106.8		pass
0.165		56.9	103.3		pass
Measurement uncertainty			$\pm 3\text{dB}$		

RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz

Limits

SUBCLAUSE § 15.209 (a)

Fundamental Frequency (MHz)	Field strength of Fundamental (μ V/m)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30.0 – 88.0	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

big antenna

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dB μ V/m) Average/QP	limit max. allowed emmission power	actual attenuation below frequency of operation (dB)	results
0.062					Operating frequency
0.124		56.0	105.7		pass
0.186		57.2	102.2		pass
Measurement uncertainty			$\pm 3\text{dB}$		

RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz

Limits

SUBCLAUSE § 15.209 (a)

Fundamental Frequency (MHz)	Field strength of Fundamental ($\mu\text{V/m}$)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30.0 – 88.0	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

4.4 Plots of measurements

Part 15.209 Magnetics TX , Big antenna

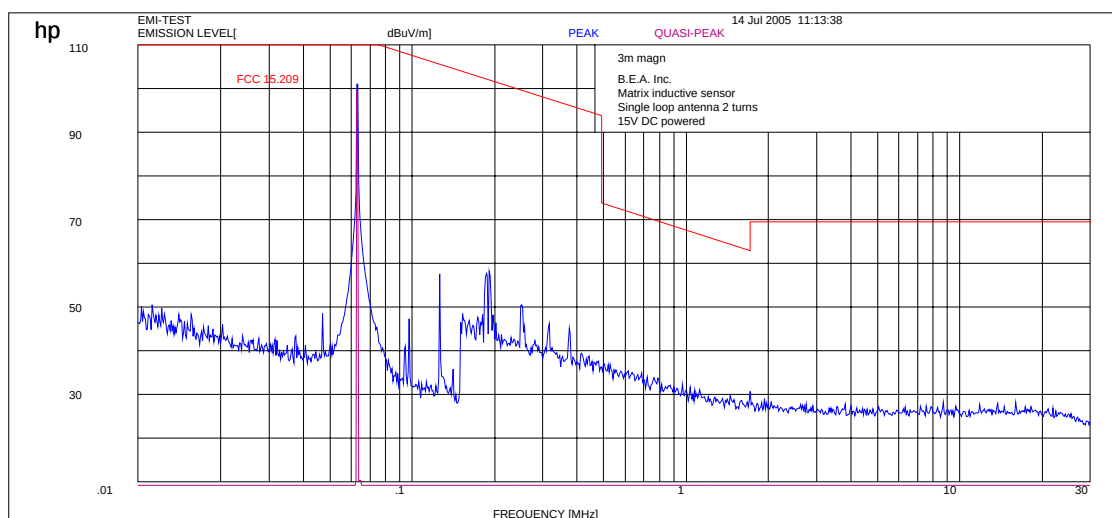
RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz,
1 Mhz above 1 GHz

(to convert the measuring distance from 10m to 30m and 30 to 300m a correction factor from 40 dB/decade was used. Here we use 80 dB to recalculate from 3m to 300m)

Measurement distance 3 m

This measurement was done in 3 planes, the plot shows the worst case

Plot 1: 9 kHz to 30 MHz, single loop, Matrix, 15V DC



Limits

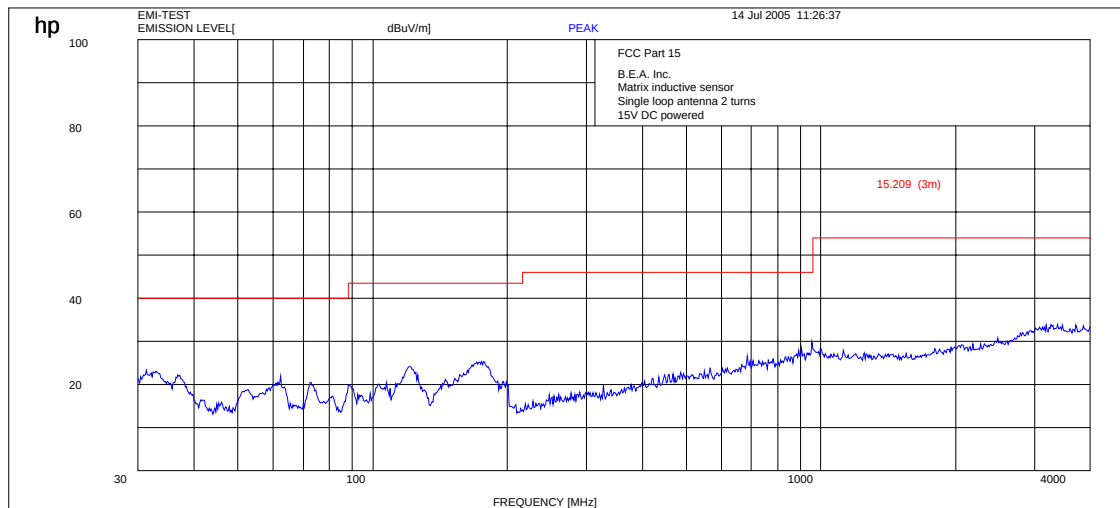
SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.0009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

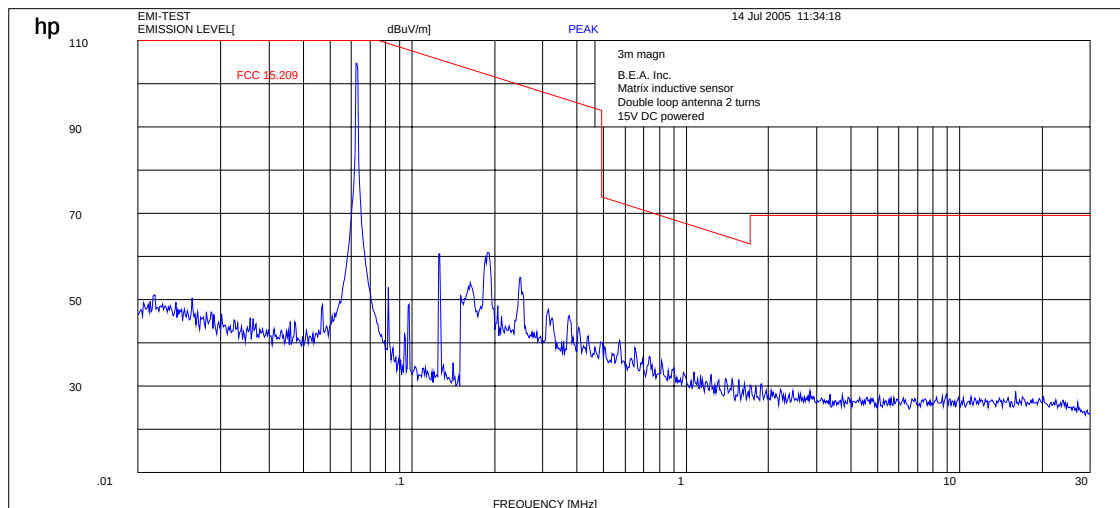
Plot 2:

30 MHz to 4 GHz, single loop, Matrix, 15V DC



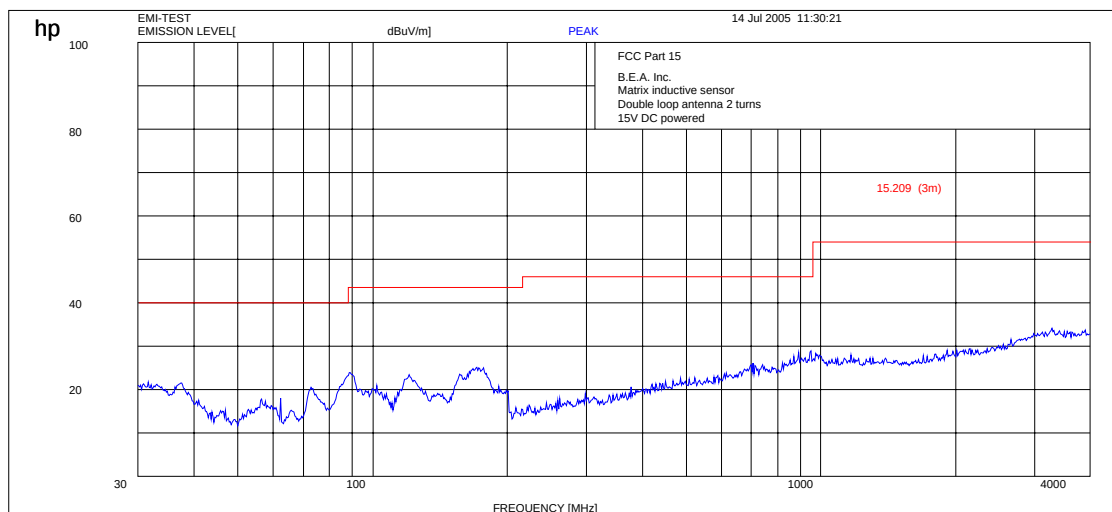
Plot 3:

9 kHz to 30 MHz, double loop, Matrix, 15V DC

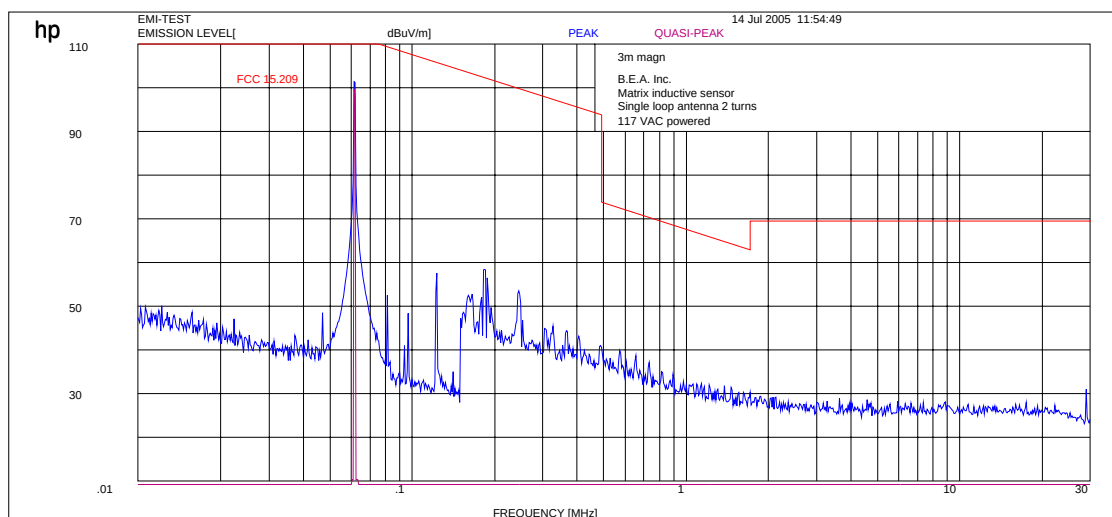


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 4: 30 MHz to 4 GHz, double loop, Matrix, 15V DC

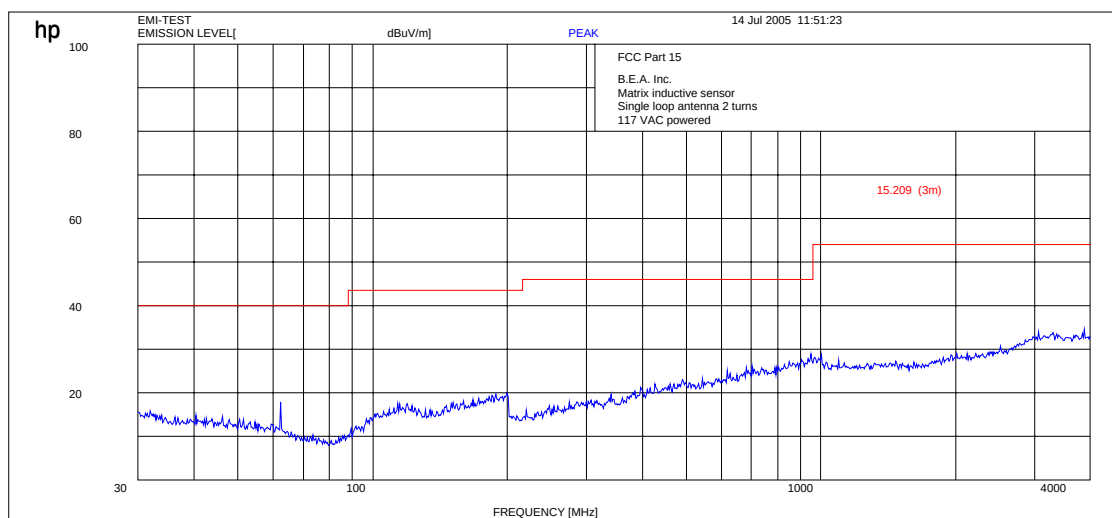


Plot 5: 9 kHz to 30 MHz, single loop, Matrix, 117V AC

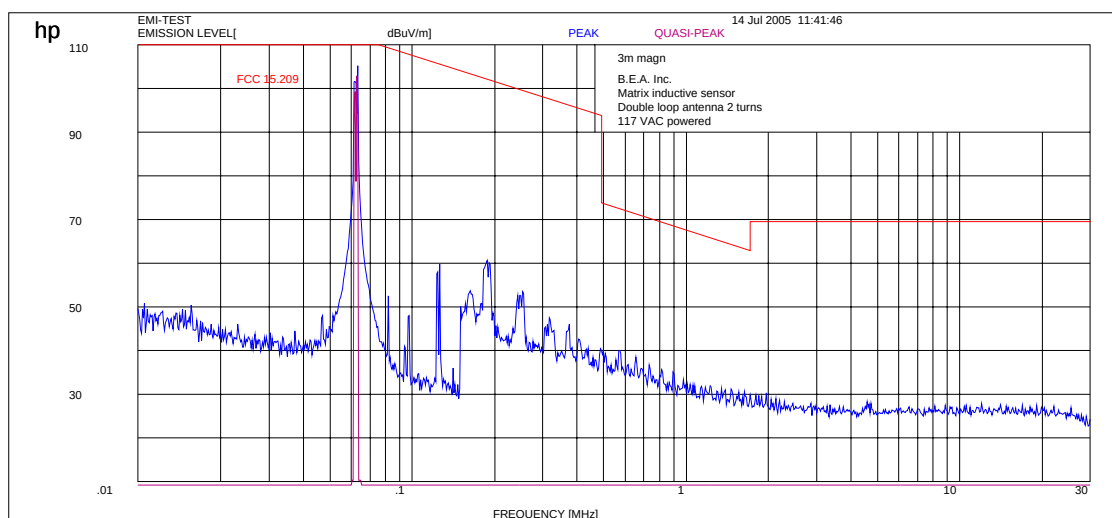


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 6: 30 MHz to 4 GHz, single loop, Matrix, 117V AC

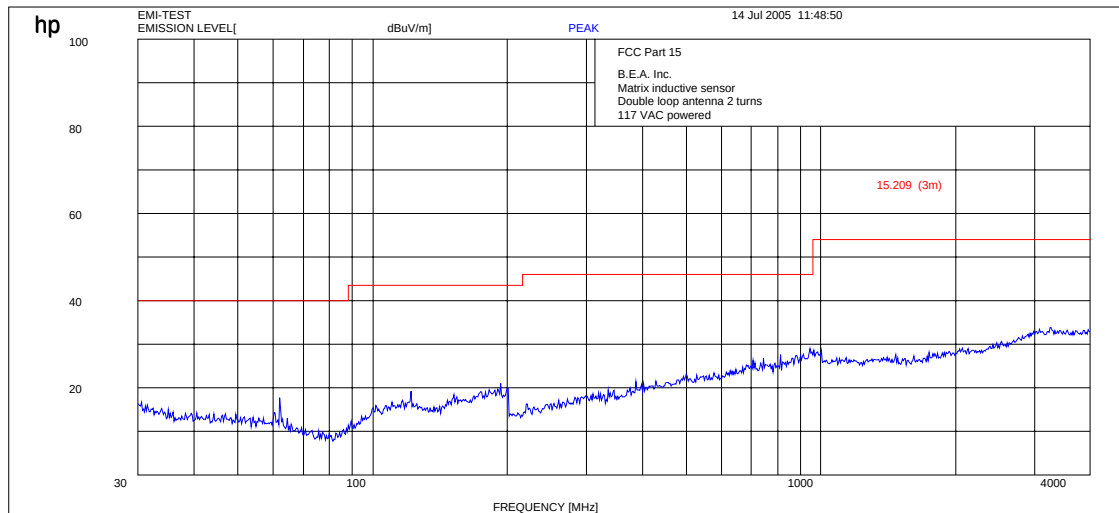


Plot 7: 9 kHz to 30 MHz, Double loop, Matrix, 117V AC

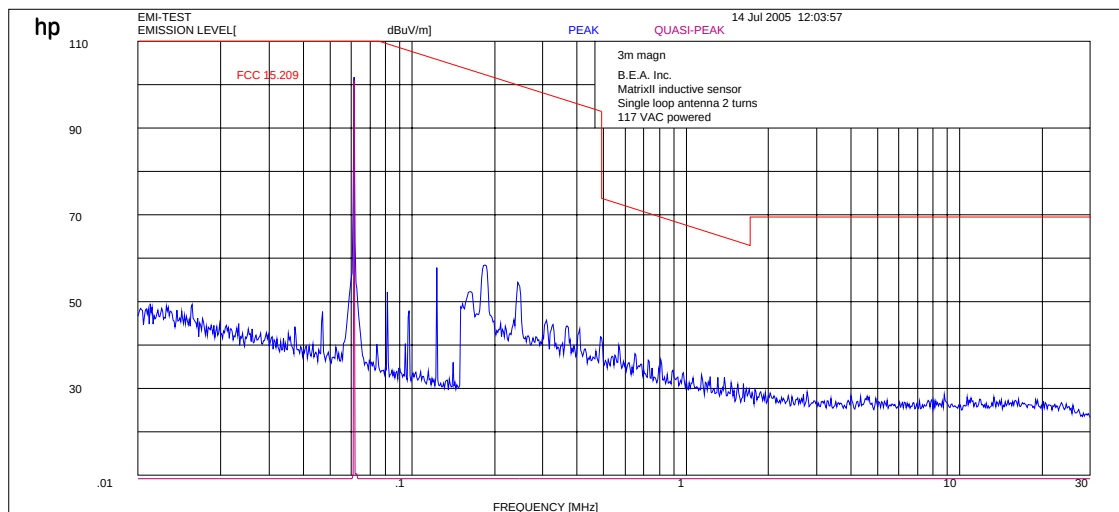


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 8: 30 MHz to 4 GHz, Double loop, Matrix, 117V AC

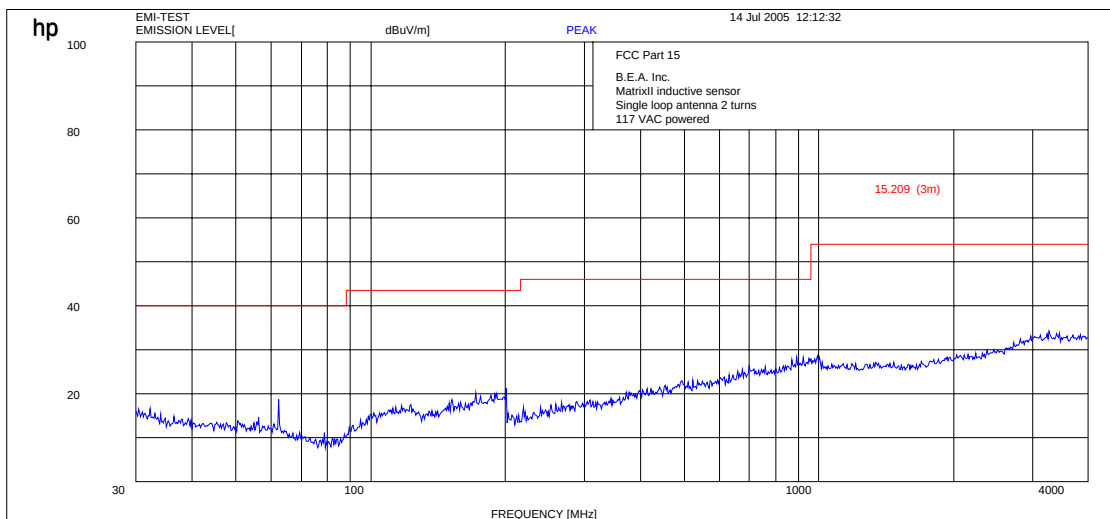


Plot 9: 9 kHz to 30 MHz, Matrix II, single loop, 117V AC

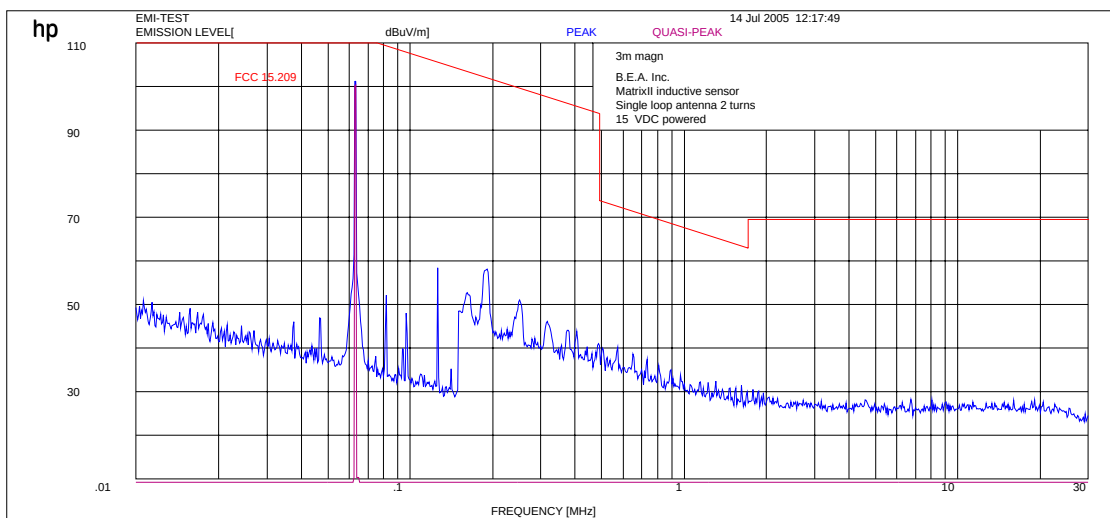


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 10: 30 MHz to 4 GHz, Matrix II, single loop, 117V AC

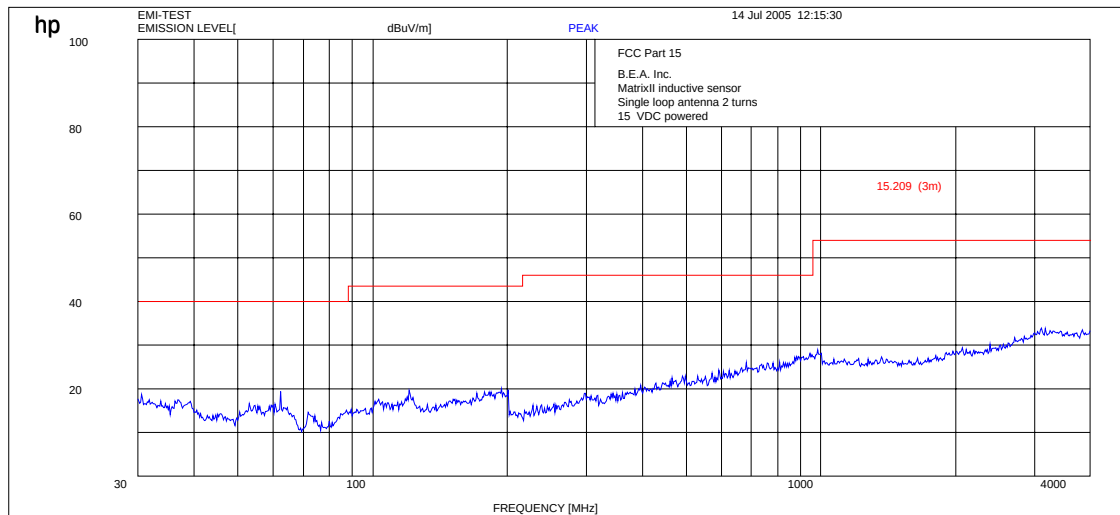


Plot 11: 9 kHz to 30 MHz, Matrix II, single loop, 15V DC

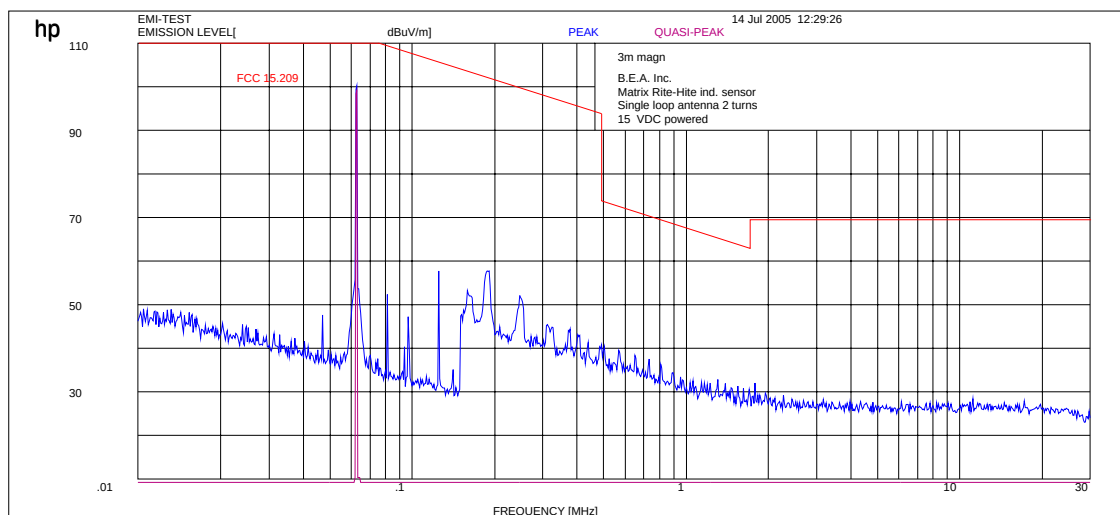


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 12: 30 MHz to 4 GHz, Matrix II, single loop, 15V DC

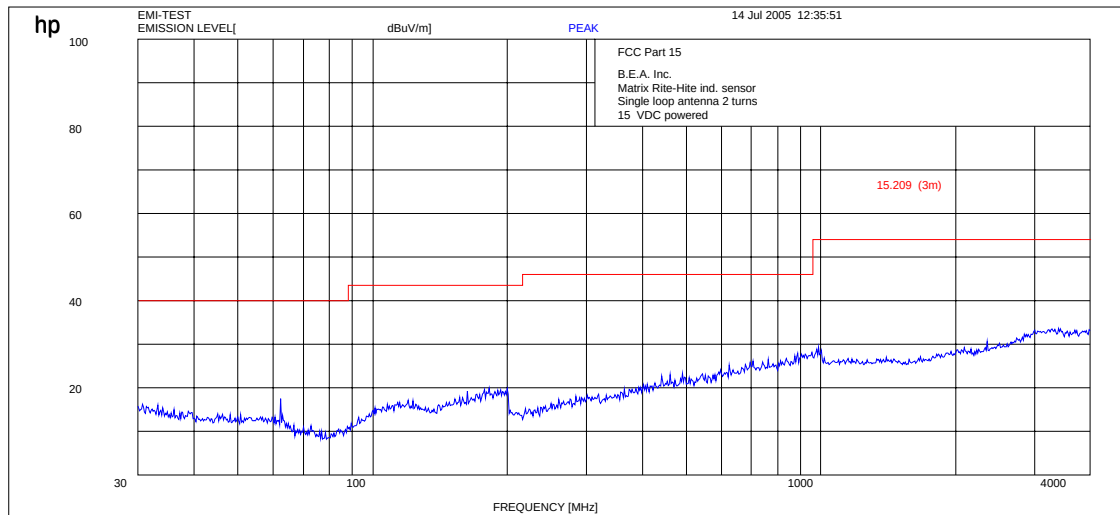


Plot 13: 9 kHz to 30 MHz, Matrix Rite-Hite, single loop, 15V DC



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 14: 30 MHz to 4 GHZ, Matrix Rite-Hite, single loop, 15V DC



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Part 15.209 Magnetics TX , small antenna antenna

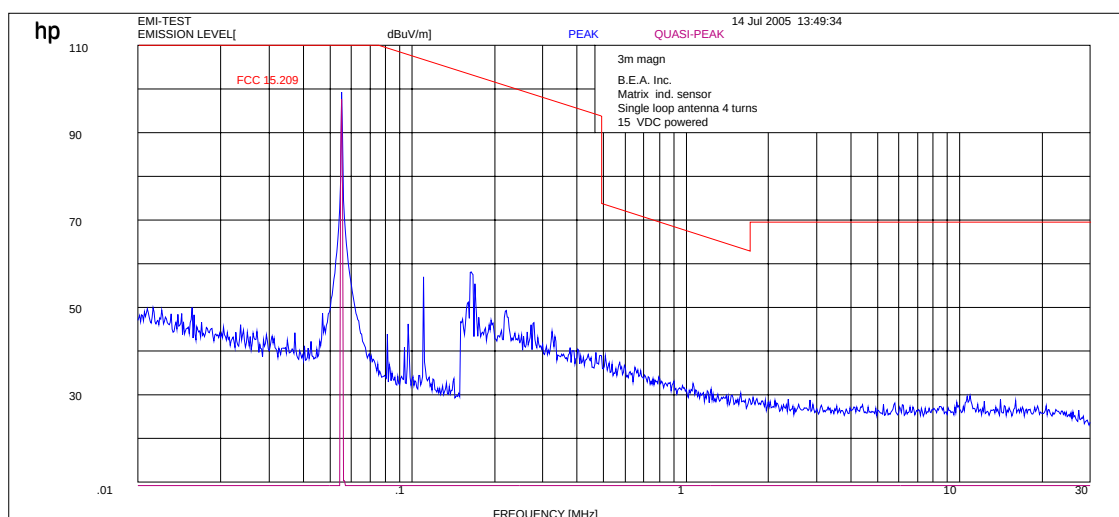
RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz,
1 Mhz above 1 GHz

(to convert the measuring distance from 10m to 30m and 30 to 300m a correction factor from 40 dB/decade was used. Here we use 80 dB to recalculate from 3m to 300m)

Measurement distance 3 m

This measurement was done in 3 planes, the plot shows the worst case

Plot 1: 9 kHz to 30 MHz, single loop, Matrix, 15V DC



Limits

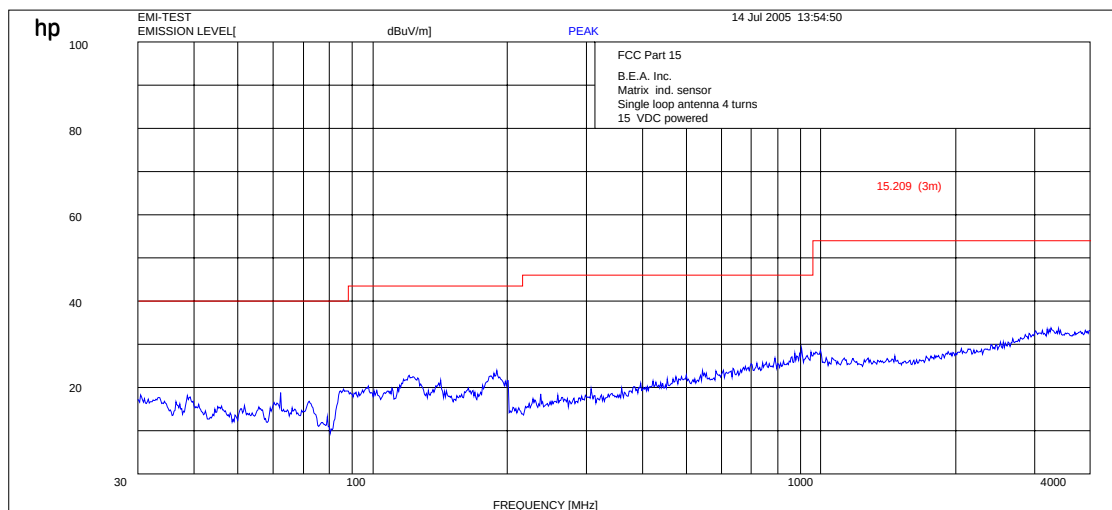
SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.0009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

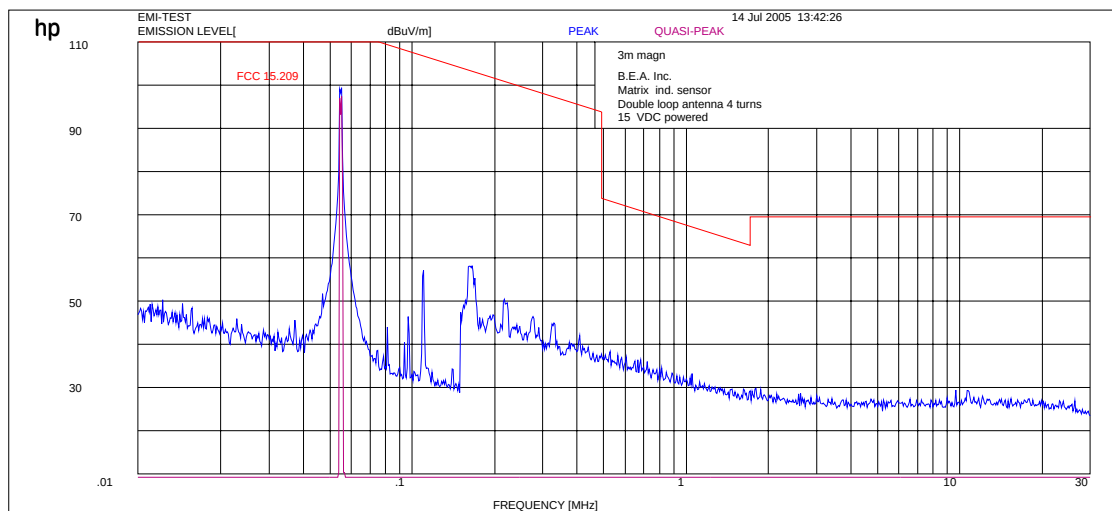
Plot 2:

30 MHz to 4 GHz, single loop, Matrix, 15V DC



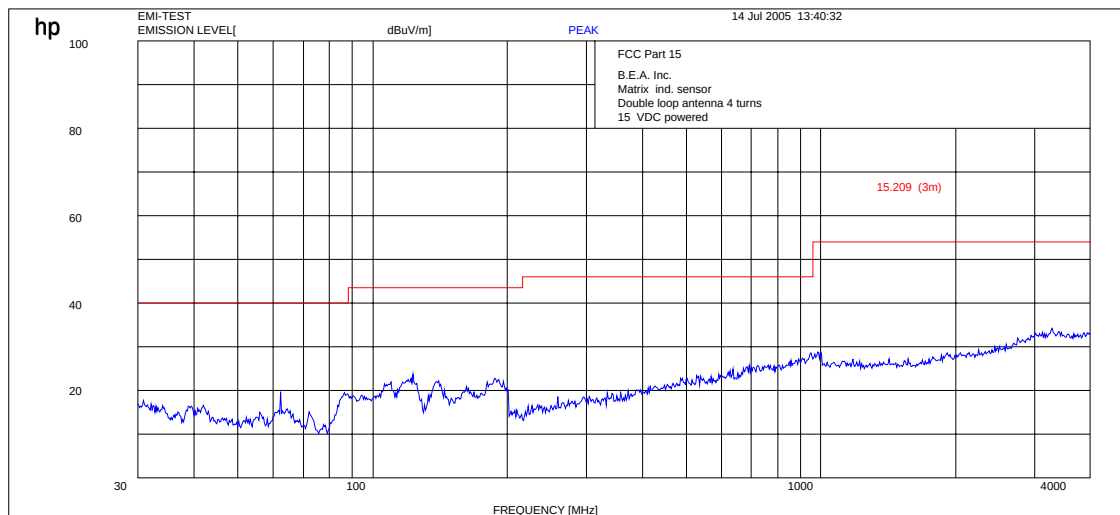
Plot 3:

9 kHz to 30 MHz, double loop, Matrix, 15V DC

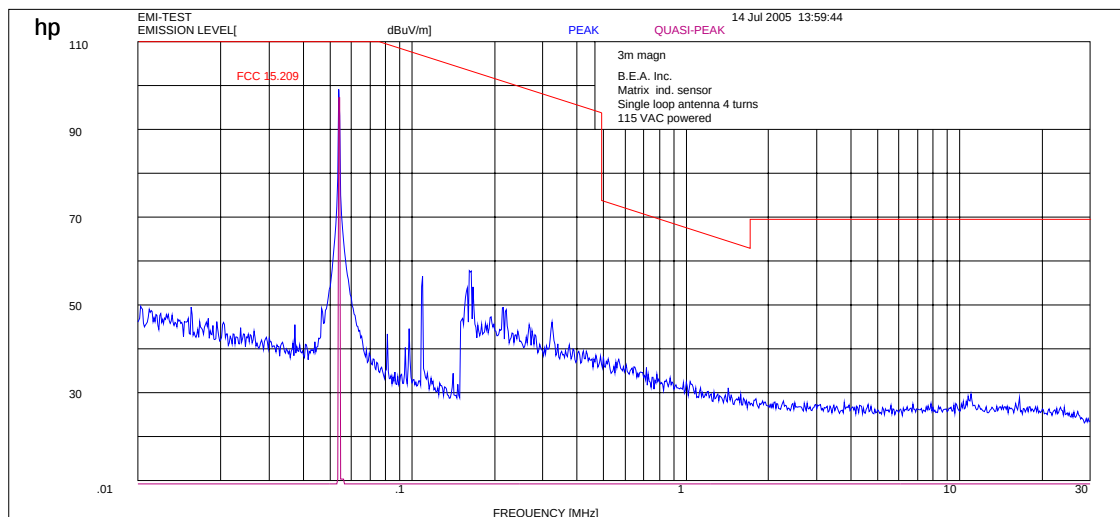


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 4: 30 MHz to 4 GHz, double loop, Matrix, 15V DC

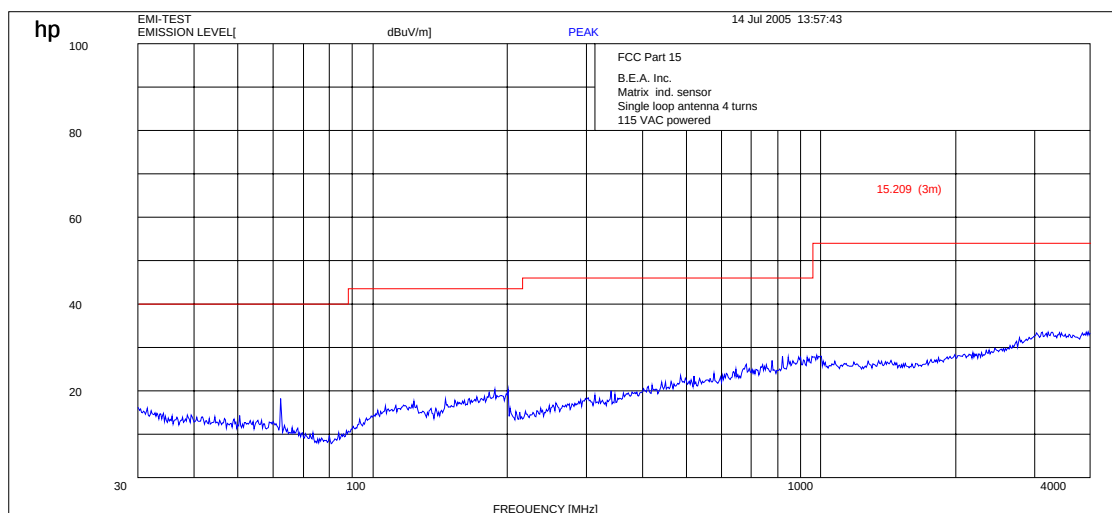


Plot 5: 9 kHz to 30 MHz, single loop, Matrix, 117V AC

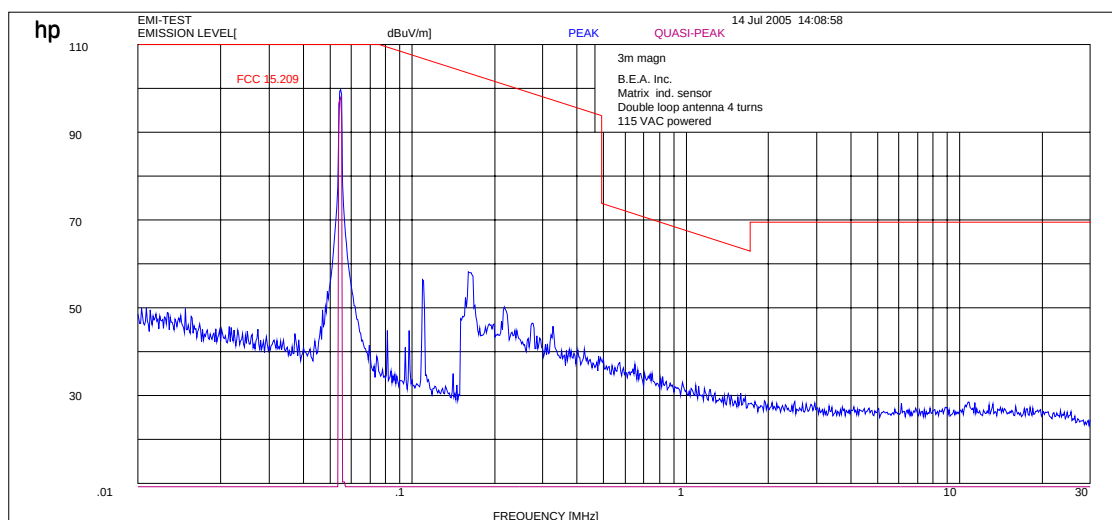


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 6: 30 MHz to 4 GHz, single loop, Matrix, 117V AC

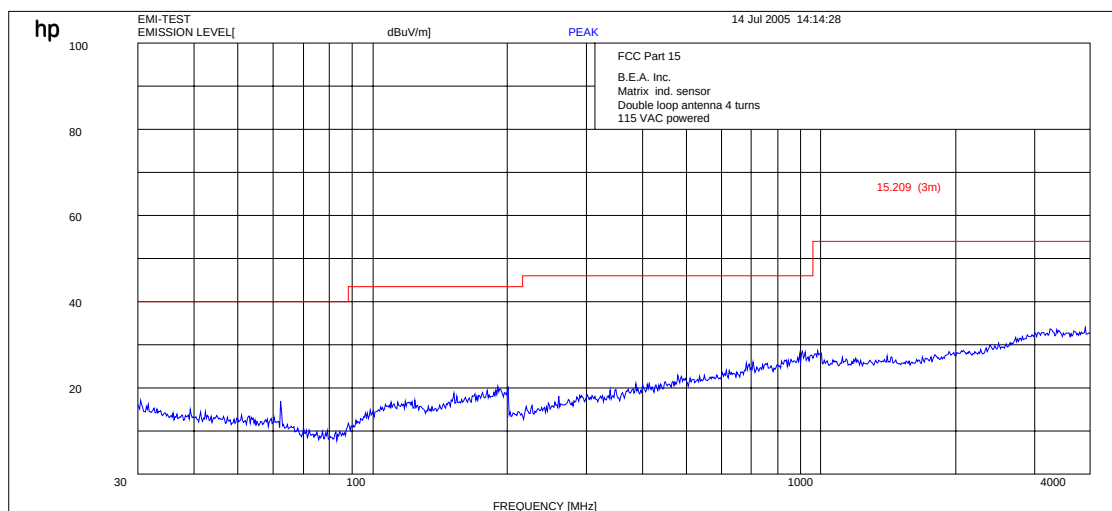


Plot 7: 9 kHz to 30 MHz, Double loop, Matrix, 117V AC

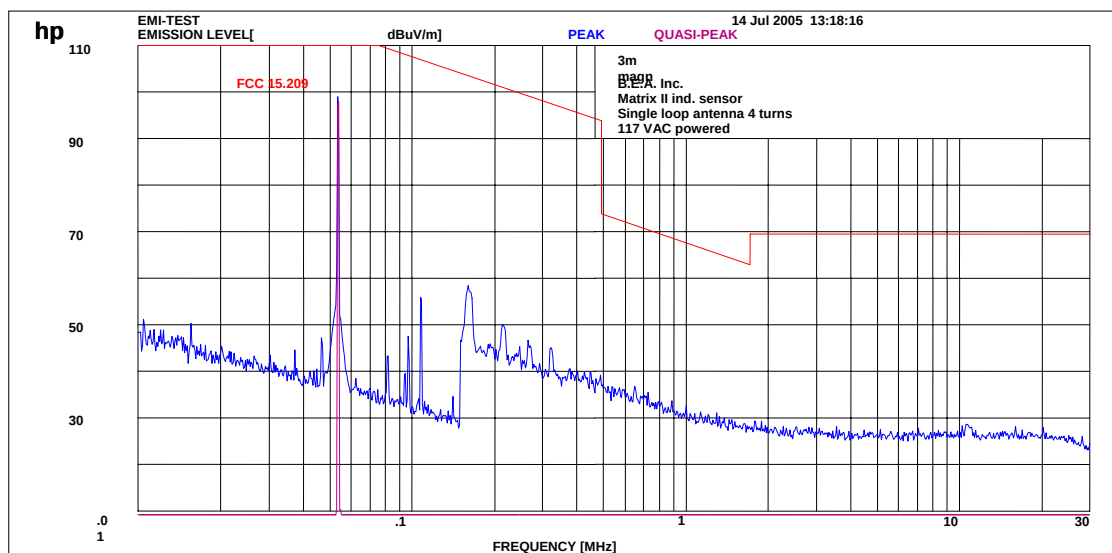


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 8: 30 MHz to 4 GHz, Double loop, Matrix, 117V AC

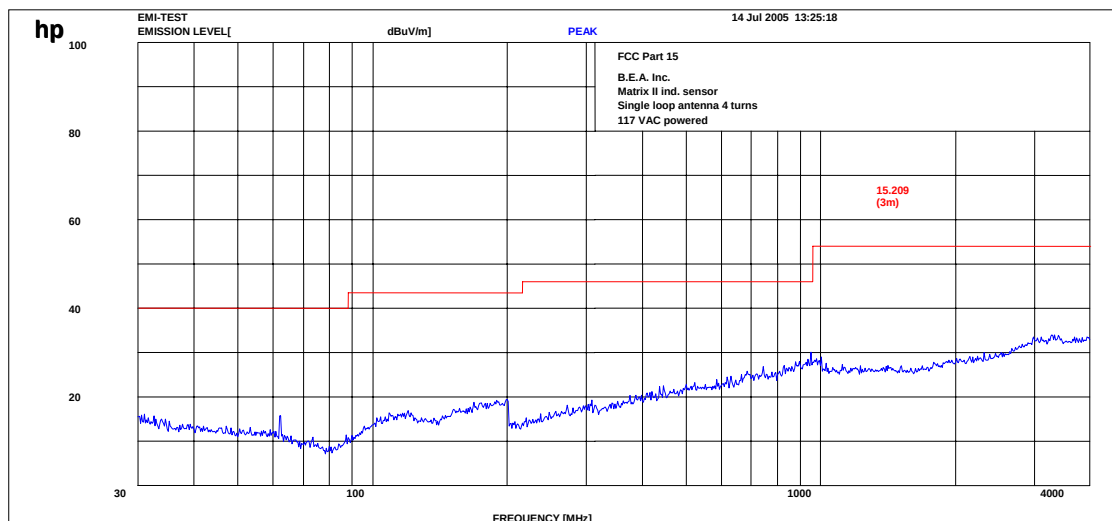


Plot 9: 9 kHz to 30 MHz, Matrix II, single loop, 117V AC

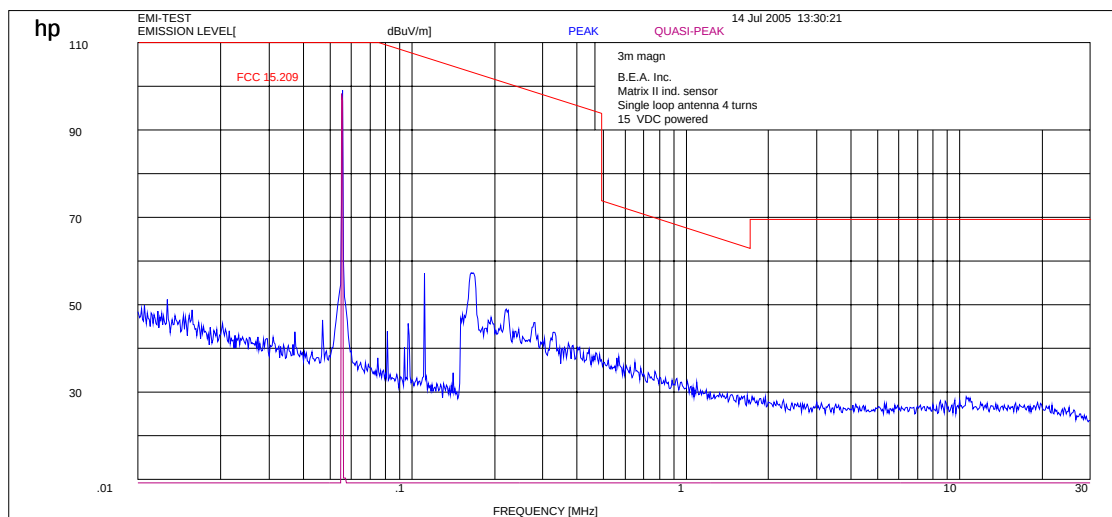


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 10: 30 MHz to 4 GHz, Matrix II, single loop, 117V AC

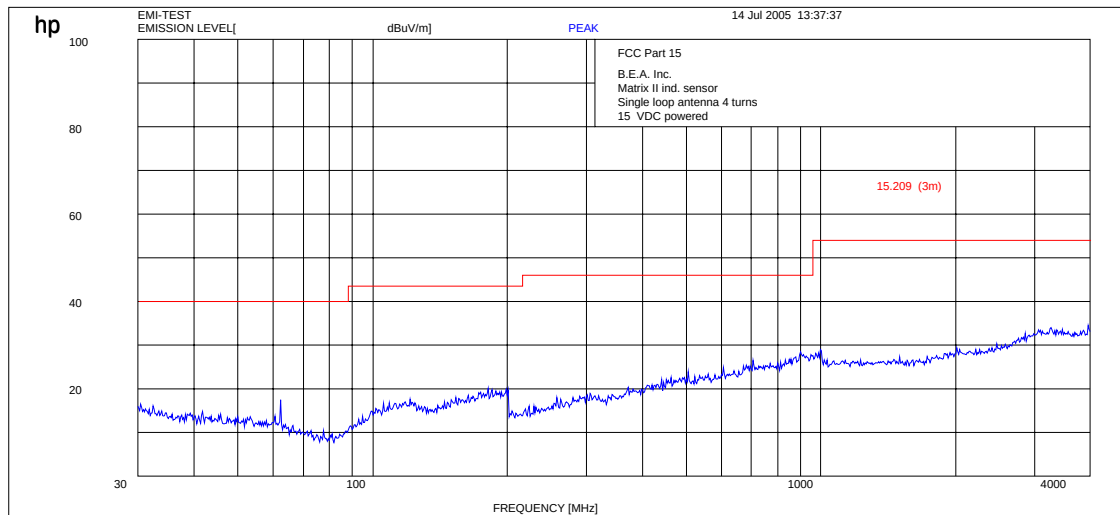


Plot 11: 9 kHz to 30 MHz, Matrix II, single loop, 15V DC

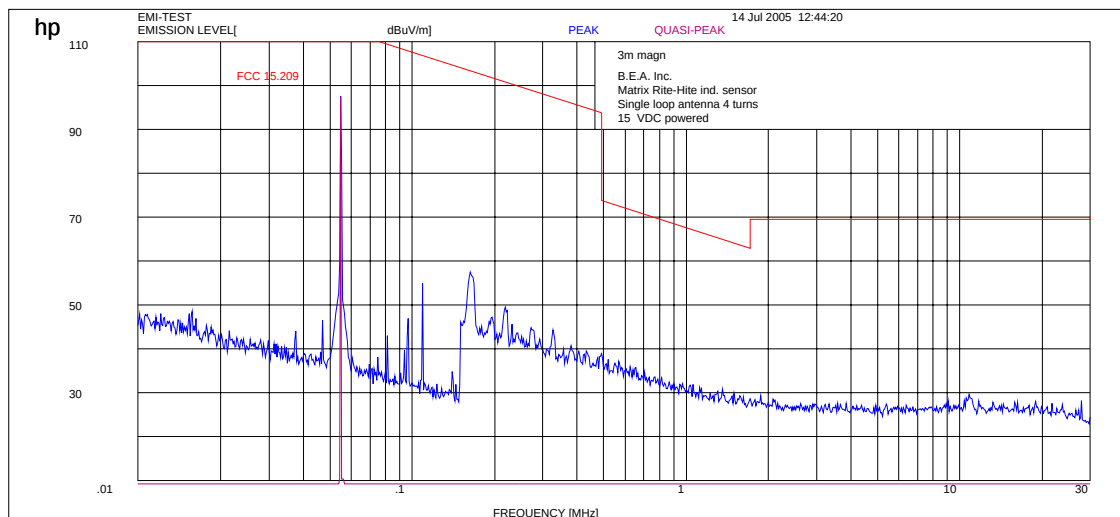


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 12: 30 MHz to 4 GHz, Matrix II, single loop, 15V DC

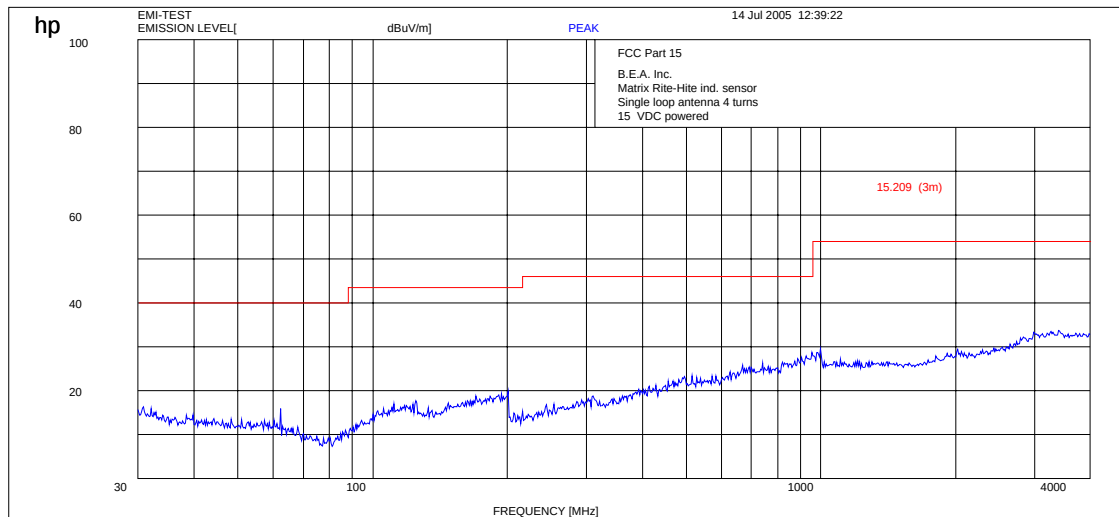


Plot 13: 9 kHz to 30 MHz, Matrix Rite-Hite, single loop, 15V DC



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 14: 30 MHz to 4 GHZ, Matrix Rite-Hite, single loop, 15V DC



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

4.5 Receiver spurious emission (radiated)

Not applicable

Reference

FCC:	CFR Part SUBCLAUSE § 15.109
IC:	RSS 210, Issue 5, Section 7.3 Receiver Spurious Emissions (Radiated)

SPURIOUS EMISSIONS LEVEL ($\mu\text{V/m}$)								
Low Channel			Middle Channel			High Channel		
MHz			MHz			MHz		
F [MHz]	Detector	Level [$\mu\text{V/m}$]	F [MHz]	Detector	Level [$\mu\text{V/m}$]	F [MHz]	Detector	Level [$\mu\text{V/m}$]
Measurement uncertainty			$\pm 3 \text{ dB}$					

$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

Limits

SUBCLAUSE § 15.109

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

4.6 Conducted Limits

Reference

FCC:	CFR Part 15.207, 15.107
IC:	RSS 210, Issue 4, Section 6.6 , 7.4

Operating Condition: Transmitting Mode
Test Site: CETECOM ICT Services Room 006
Test Specification: EN 55022 / CISPR 22
Power Supply: 117V AC

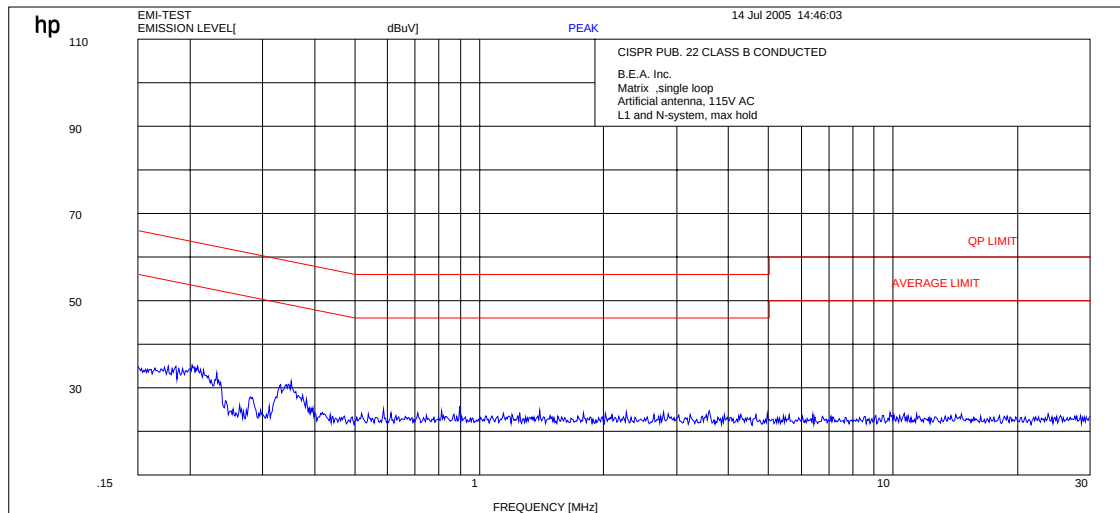
Limits: § 15.107 / 15.207

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

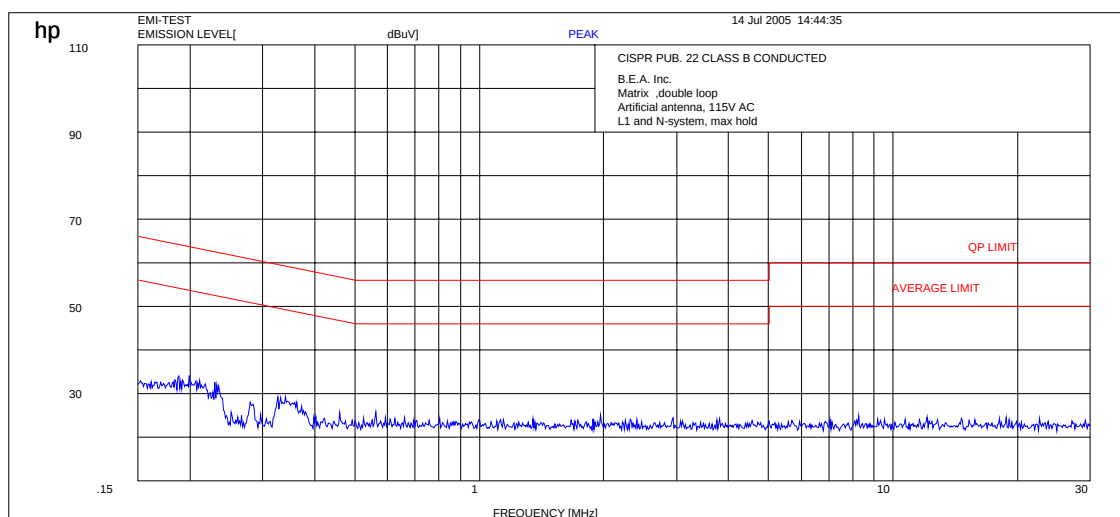
* Decreases with the logarithm of the frequency

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 1: Matrix, single loop, artificial antenna

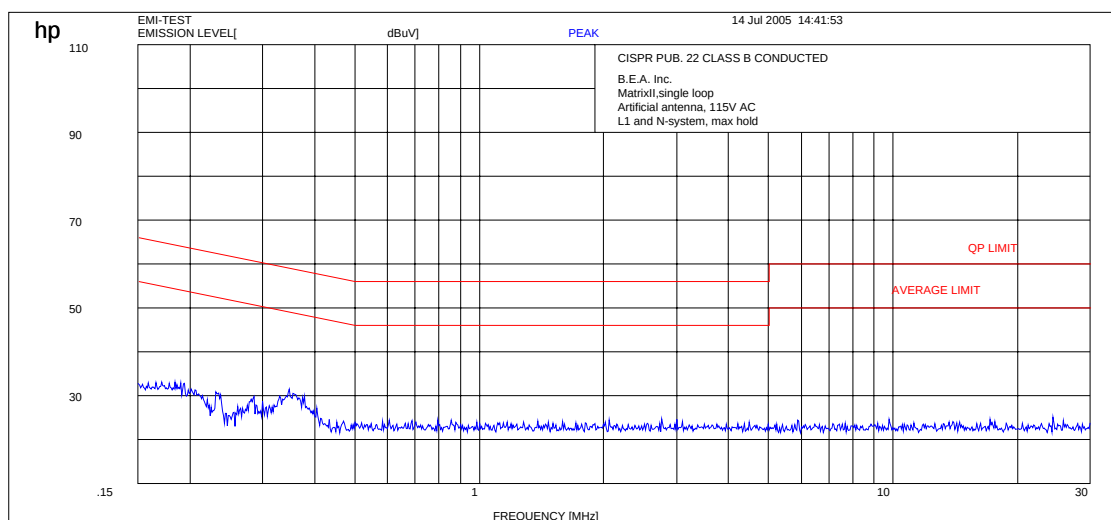


Plot 2: Matrix, double loop, artificial antenna

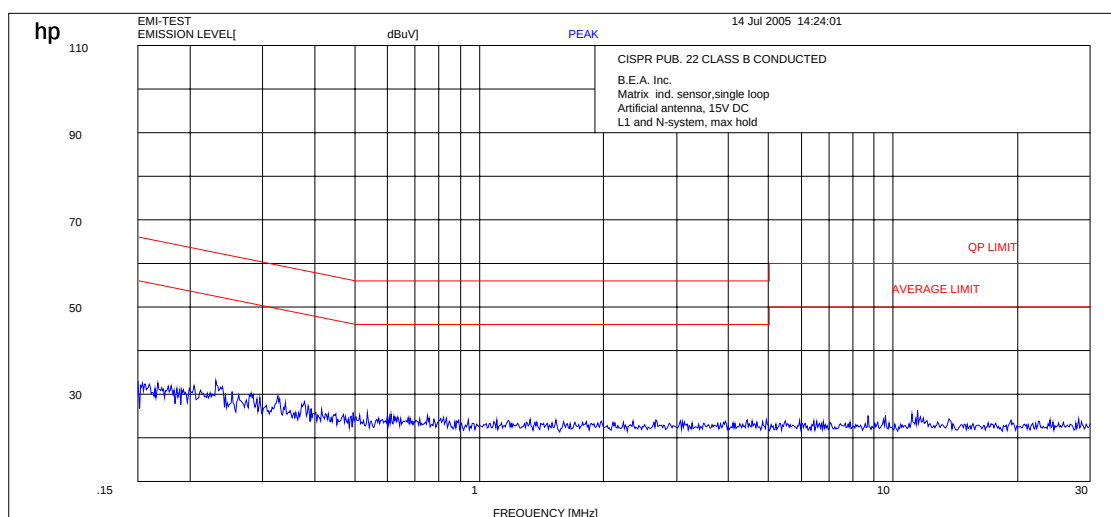


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 3: Matrix II, single loop, artificial antenna

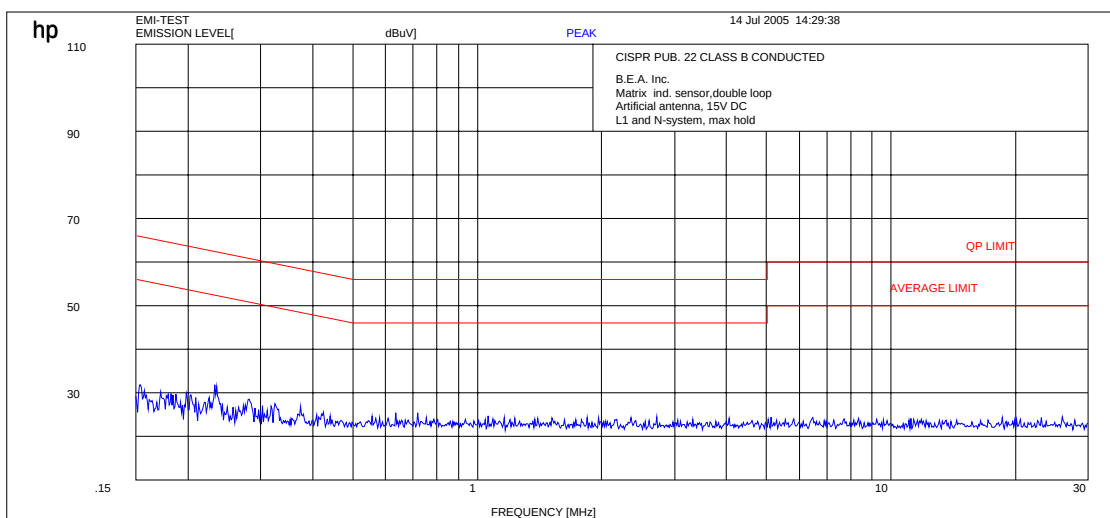


Plot 4: Matrix , single loop, artificial antenna, 15v DC via Power supply from our house

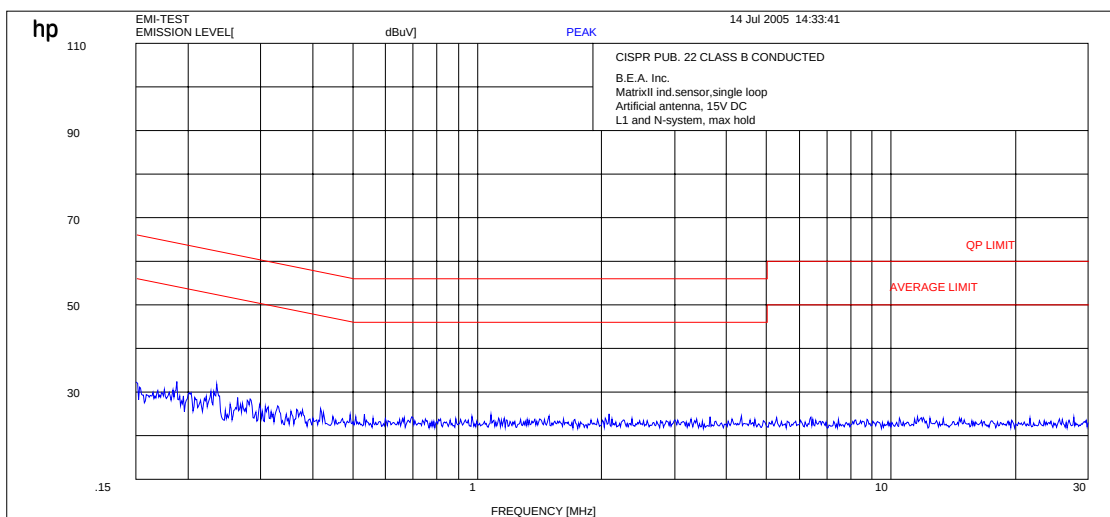


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 5: Matrix , double loop, artificial antenna, 15v DC via Power supply from our house

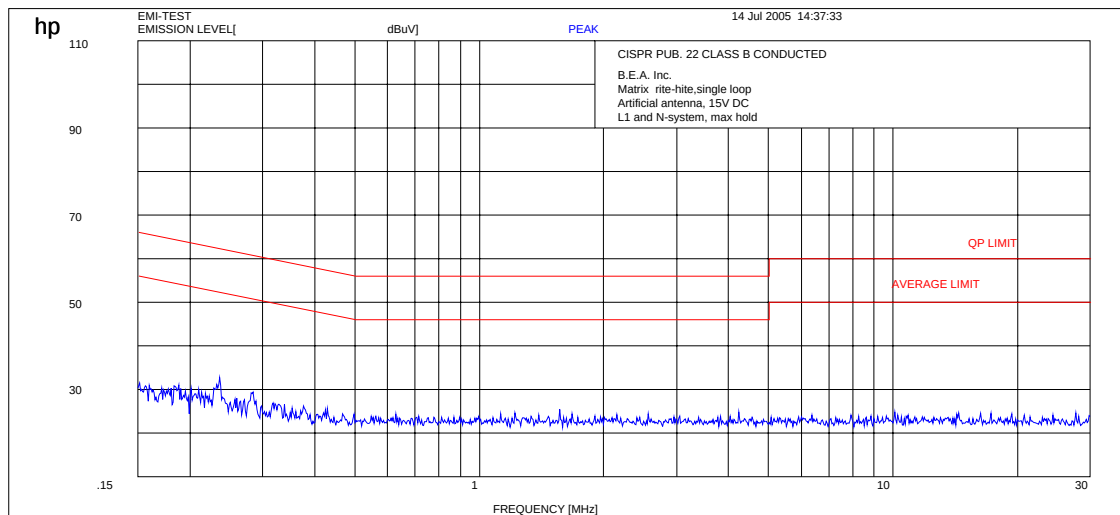


Plot 6: Matrix II, single loop, artificial antenna, 15v DC via Power supply from our house



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Plot 6: Matrix Rite-Hite, single loop, artificial antenna, 15v DC via Power supply from our house



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Used Testequipment

Device	Manufacturer	Type	S/N Number	Inv. No. Cetecom
Spektrum Analyser	HP	8566B	2747A05306	300001000
Spektrum Analyser Display	HP	85662A	2816A16541	300002297
Quasi-Peak-Adapter	HP	85650A	2811A01131	300000999
Power Dupply	HP	6032A	2818A03450	300001040
Power Attenuator	Byrd	8325	1530	300001595
Bikonical Antenna	EMCO	3104	3758	300001602
Log. Period. Antenna	EMCO	3146	2130	300001603
Double Ridged Antenna	EMCO	HP 3115P	3088	300001032
Active Loop Antenna	EMCO	6502	2210	300001015
Antenna VDE/FCC		HP11965B		300002298
SRM-Drive	HP	9144A	2823e46556	300001044
Software	HP	EMI		300000983
Busisolator	Kontron			300001056
Absorberhalle	MWB		87400/02	300000996
Salzsäule	Kontron			300001055
Antenna	R&S	HMO20	832211/003	300002243
Indukt.Tast Antenna	R&S	HFH 2 Z4	881468/026	300001464
System-Rack	HP I.V.	85900	*	300000222
Spectrum Analyzer	HP	8566B	2747A05275	300000219
Quasi-Peak-Adapter	HP	85650A	2811A01135	300000216
RF-Preselector	HP	85685A	2837A00779	300000218
Rahmen Antenne	R&S	HFH2-Z2	891847-35	300001169
Leitungsteiler	HP	11850C		300000997
Breitband-Hornantenne EMI	HP	35155P		300002300
PC	HP	Vectra VL		300001688
VHF Meßantenne	Schwarzbeck	VHA 9103		300001778
Spectrum Analyzer Display	HP	85662A	2816A16497	300001690
VHF Meßantenna	Schwarzbeck	VHA 9103		300001780
Biconical Antenna	EMCO	3104 C	9909-4868	300002590

SRD Laboratory:

Device	300001207	Type	S/N Number	Inv. No. Cetecom
Spectrum Analyzer	300001208	494AP	B010241	300000863
Spectrum Analyzer	HP	71210A (70000)	2731A02347	300000321
Spectrum Analyzer Display	HP	70206A	2840A01553	300002017
Reference Frequency	HP	70310A	2736A00707	300002018
Local Oscillator	HP	70900A	2842A02221	300002019
ZF-Modul 10Hz-300 kHz	HP	70902A	2840A02145	300002020
ZF-Modul 100 kHz-3 MHz	HP	70903A	2835A01069	300002021
HF-Teil für 71210A 100Hz- 22GHz	HP	70908A		300002022
Spectrum Analyzer 2	HP	85660B	3138A07614	
Spectrum Analyzer Display 2	HP	85662A	3144A20627	

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

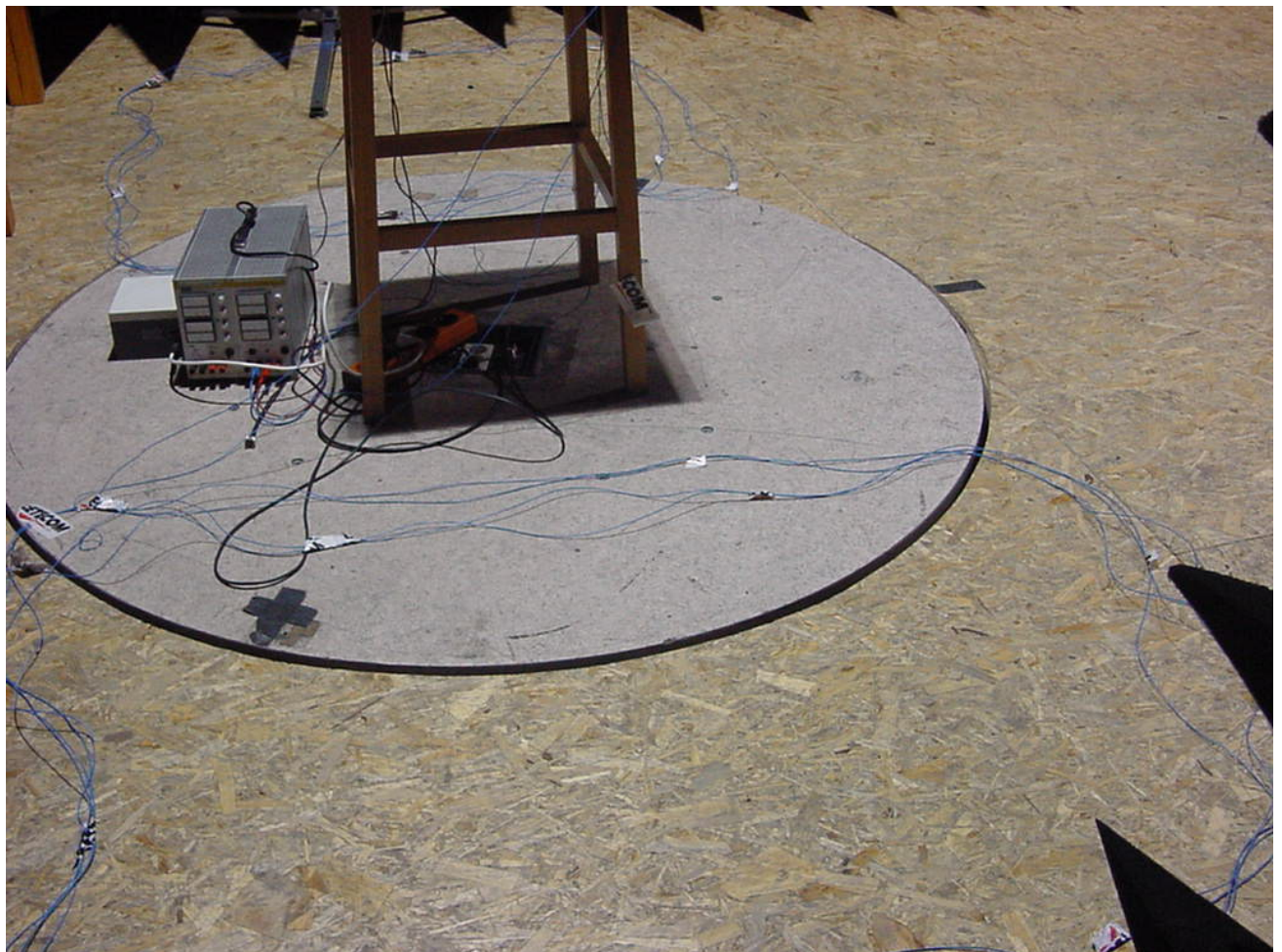
Signal Generator DC-600 KHz	HP	8904A	2822A01213	300001157
Signal Generator DC-600 KHz	HP	8904A	2822A01214	300001158
Powersupply	HP	6038A	3122A11097	300001204
Netznachbildung	R&S	ESH3-Z5	828576/020	300001210
Amplituden Controller	R&S	SMDU-Z2	871829/051	300002309
Trenntrafo	Erfi	913501		300001205
Trenntrafo	Grundig	RT5A	9242	300001627
Relais Matrix	HP	3488A	2719A15013	300001156
Multimeter	Siemens	Multizet		300001102
Peak Power Calibrator	HP	8900B		300001084
Schallgeber	Schomandl	SG 1	10159	300001209
Schallgeber	Schomandl	SG 2	10176	300002473
Filter	FSY Microwave			300001206
Attenuatorer	Pro Nova			300002476
Klimaschrank	Heraeus Voetsch	VUK04/500		300001012
Spectrum Analyzer 3	HP	8566A	1925A00257	300001098
Spectrum Analyzer Display 3	HP	85662	1925A00860	300002306
Oszilloscope	Tektronix	2432	110261	300001165
Radiocom. Analyzer	R&S	CMTA 54	894043/010	300001175
Powersupply	HP	6038A	2848A07027	300001174
Signal Generator 0.01-1280 MHz	HP	8662A	2224A01012	300001110
Signal Generator (Funktionen)	R&S	AFGU	862490/032	300001201
Trenntrafo	Erfi	MPL	91350	300001155
Relais Matrix	R&S	PSU	893285/020	300001173
Power Meter	HP	436A	2101A12378	300001136
Powersensor	HP	8484A	2237A10156	300001140
Powersensor	HP	8482A	2237A06016	300001139
Relais Matrix	R&S	PSU	282628/004	300001214
Powersupply	Zentro		2007	300001109
Oszilloscope	Tektronix	7633		300001111
Klimaschrank	Heraeus Voetsch	VUK04/500	32926	300001500
Quasi-Peak Adapter	HP	85650A	2811A01204	300002308
Radiocom. Analyzer	R&S	CMTA 84	894199/012	300001176
Oszilloscope	HP	54510A	3022A02062	300001202
Funkmeßplatz	Schomandl	FD1000	34982	300001115
Signal Generator	R&S	SMPC	882416/019	300001162
Frequency counter	HP	5340A	2116A08138	300001104
Power Meter	HP	436A	2031U01461	300001105
Powersensor	HP	8482A		300001106
Powersensor	HP	8484A		300001107
Powersensor	HP	8485A		300001108
Powersupply	HP	6038A	2752A04866	300001161
Reflectionsmeter	R&S	NAP	879191	300001132
Signal Generator NF	R&S	SPN	880139/068	300001142
Trenntrafo	Erfi	MPL	91350	300001151
Attenuator	JFW	30 db	1350h/104	300001703
Attenuator	JFW	10 db	1350h/103	300001704
Attenuator	JFW	20 db	1350h/106	300001705
Attenuator	JFW	20 db	1350h/105	300001766
Filter	Spinner	153755		300001791

Powersensor	HP	8484A	2237A10494	300001666
Powersupply	HP	6038A	3122A11097	300001204
Netznachbildung	R&S	ESH3-Z5	828576/020	300001210
Amplituden Controller	R&S	SMDU-Z2	871829/051	300002309
Trenntrafo	Erfi	913501		300001205
Trenntrafo	Grundig	RT5A	9242	300001627
Relais Matrix	HP	3488A	2719A15013	300001156
Multimeter	Siemens	Multizet		300001102
Peak Power Calibrator	HP	8900B		300001084
Schallgeber	Schomandl	SG 1	10159	300001209
Schallgeber	Schomandl	SG 2	10176	300002473
Filter	FSY Microwave			300001206
Attenuatorer	Pro Nova			300002476
Klimaschrank	Heraeus Voetsch	VUK04/500		300001012
Spectrum Analyzer 3	HP	8566A	1925A00257	300001098
Spectrum Analyzer Display 3	HP	85662	1925A00860	300002306
Oszilloscope	Tektronix	2432	110261	300001165
Radiocom. Analyzer	R&S	CMTA 54	894043/010	300001175
Powersupply	HP	6038A	2848A07027	300001174
Signal Generator 0.01-1280 MHz	HP	8662A	2224A01012	300001110
Signal Generator (Funktionen)	R&S	AFGU	862490/032	300001201
Trenntrafo	Erfi	MPL	91350	300001155
Relais Matrix	R&S	PSU	893285/020	300001173
Power Meter	HP	436A	2101A12378	300001136
Powersensor	HP	8484A	2237A10156	300001140
Powersensor	HP	8482A	2237A06016	300001139
Relais Matrix	R&S	PSU	282628/004	300001214
Powersupply	Zentro		2007	300001109
Oszilloscope	Tektronix	7633		300001111
Klimaschrank	Heraeus Voetsch	VUK04/500	32926	300001500
Quasi-Peak Adapter	HP	85650A	2811A01204	300002308
Radiocom. Analyzer	R&S	CMTA 84	894199/012	300001176
Oszilloscope	HP	54510A	3022A02062	300001202
Funkmeßplatz	Schomandl	FD1000	34982	300001115
Signal Generator	R&S	SMPC	882416/019	300001162
Frequency counter	HP	5340A	2116A08138	300001104
Power Meter	HP	436A	2031U01461	300001105
Powersensor	HP	8482A		300001106
Powersensor	HP	8484A		300001107
Powersensor	HP	8485A		300001108
Powersupply	HP	6038A	2752A04866	300001161
Reflectionsmeter	R&S	NAP	879191	300001132
Signal Generator NF	R&S	SPN	880139/068	300001142
Trenntrafo	Erfi	MPL	91350	300001151
Attenuator	JFW	30 db	1350h/104	300001703
Attenuator	JFW	10 db	1350h/103	300001704
Attenuator	JFW	20 db	1350h/106	300001705
Attenuator	JFW	20 db	1350h/105	300001766
Filter	Spinner	153755		300001791
Powersensor	HP	8484A	2237A10494	300001666

Powersensor	HP	8485A	2238A00849	300001668
Bandfilter	Telonic	TTF7255EE	20293-11	300001300
Bandfilter	Telonic	TTF12555EE	20292-6	300001302
Bandfilter	Telonic	TTF25055EE	20291-8	300001304
Bandfilter	Telonic	TTF50055EE	20290-7	300001305
Bandfilter	Telonic	TTF100055EE	20289-7	300001307
Bandfilter	Telonic	TTA300055EESN	20370-2	300001312
Bandstop	Telonic	TTR3753EE1	30013-1	300001314
Bandstop	Telonic	TTR723EE	20417-2	300001316
Bandstop	Telonic	TTR95-3EE	20372-4	300001318
Bandstop	Telonic	TTR1903EE	30036-4	300001320
Bandstop	Telonic	TTR3753EE	20369-5	300001321
Bandstop	Telonic	TTR750-3EE1	90177-1	300002387
Highpass	Pro Nova	HDP120-6GG	ohne	300001348
Highpass	Pro Nova	HMC500-6AA	HJ67-01?	300001350
Highpass	Narda	NHP 9000	0004	300001362
Highpass	Narda	HDP16-6GH	JV70-01	300001364
Highpass	RSD	HDP50-6GH, HDP200-6GG		300001371
Highpass	RSD	2099-02-01		300000370
Signal Generator 0.1-2060 MHz	HP	8657A	2838U00736	300001009
Radio Code Analyzer	Schlumberger	SL4922		300001038
Signal Analyzer	B&K	2033		300001047
Frequency counter	HP	5386A	2704A01243	300000998
Laufzeitelement	WR-Elektronik			300001036
Powersupply Stromversorgung	Syston	M5P 40/15A	828233	300001291
Powersupply	Heiden	1108-32	1701	300001392
Powersupply	Heiden	1108-32	1802	300001383
Powersupply	Heiden	1108-32	003202	300001187
Powersupply	Zentro	LA 2x30/5GB1	2011	300001276
Powersupply	Zentro	LA 2x30/5GB2	2012	300001275
Powersupply	Zentro	LA 30/5GA	2041,2042	300001287
Trenntrafo	Grundig	RT5A	8781	300001277
Trenntrafo	Grundig	RT5A	9242	300001263
Multimeter	Goerz Elektro	Unigor 6e P	911 355	300001625
Multimeter	Goerz Elektro	Unigor 6e P	911 391	300001281
Climatic Box	Heraeus Voetsch	VUK04/500	32679	300000299
Powersensor + Att.	HP	8482B	2703A02586	300001492
Attenuator 30 dB	HP	8498A	1801A02445	300001475
Signal Generator NF	HP		2822A01203	300001004
Attenuator	Spinner	BN 534171 D	51881	300001516
Attenuator coaxial	Bird	8325	2429	300001513
Impulsbegrenzer	R&S	ESH 3 Z2		300001460
4Port Box	R&S	4Port Box	860457/005	300001472
Signal Generator 0.1-4200 MHz	HP	8665A	2833A0011	300002299
NF-Spektrumanalyzer	B&K	2033A		300002301
Swissphone Freifeld-Messbox	Swissphone Schweiz			300002302
Trenntrafo regelbar	Grundig	RT5H	9242	300001628
Signal Generator	HP	8111A	2215G00867	300001117

5 Annex B: Photographs of Test site

Photo 1 (Radiated Emissions):



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 2 (Radiated Emissions):



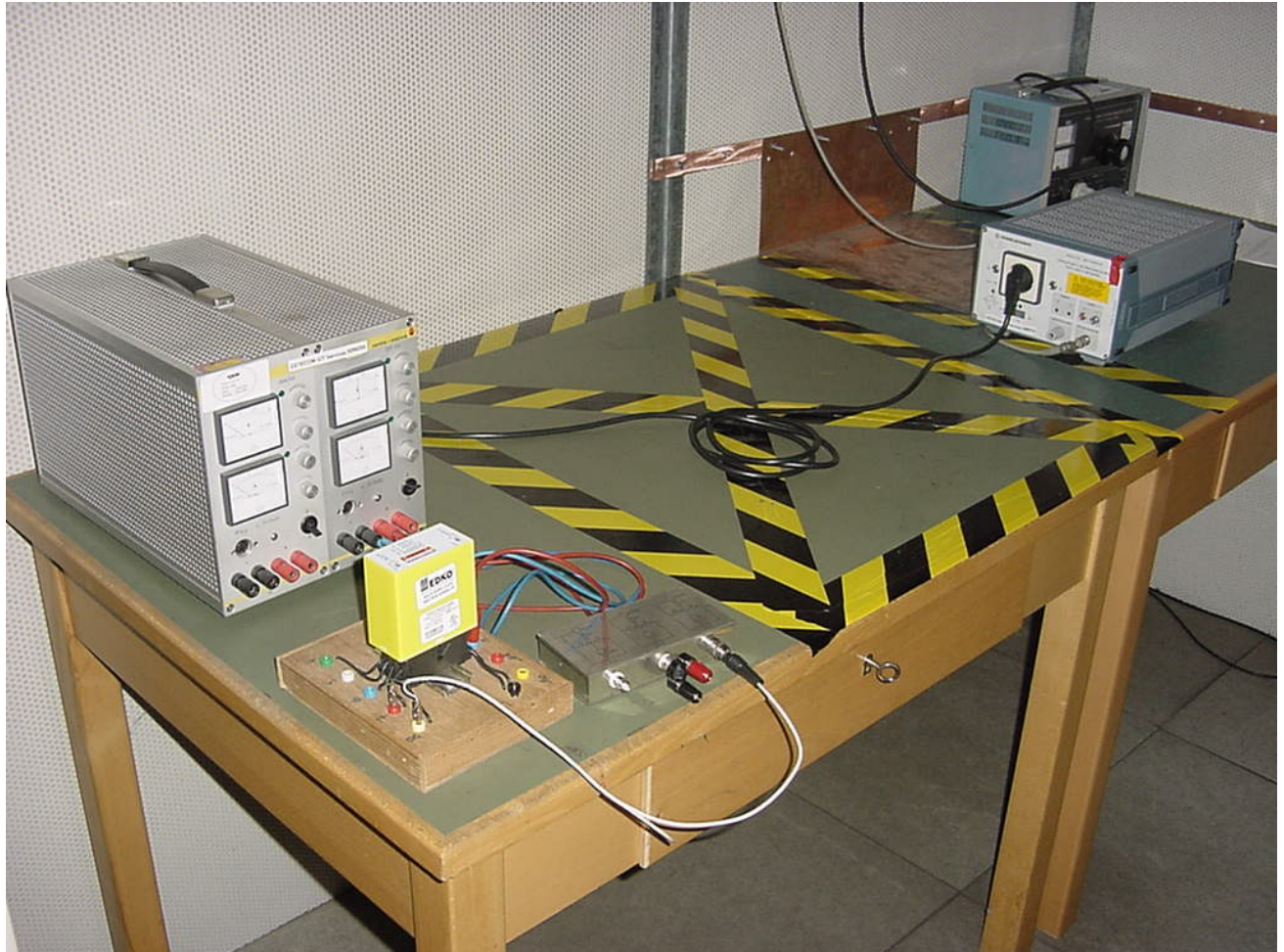
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 3 (Conducted Emissions):



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 4(Conducted Emissions):



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 5 (Conducted Emissions):



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 6 (Conducted Emissions):



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

6 Annex C: External Photographs of the Equipment

Photo 1: Matrix



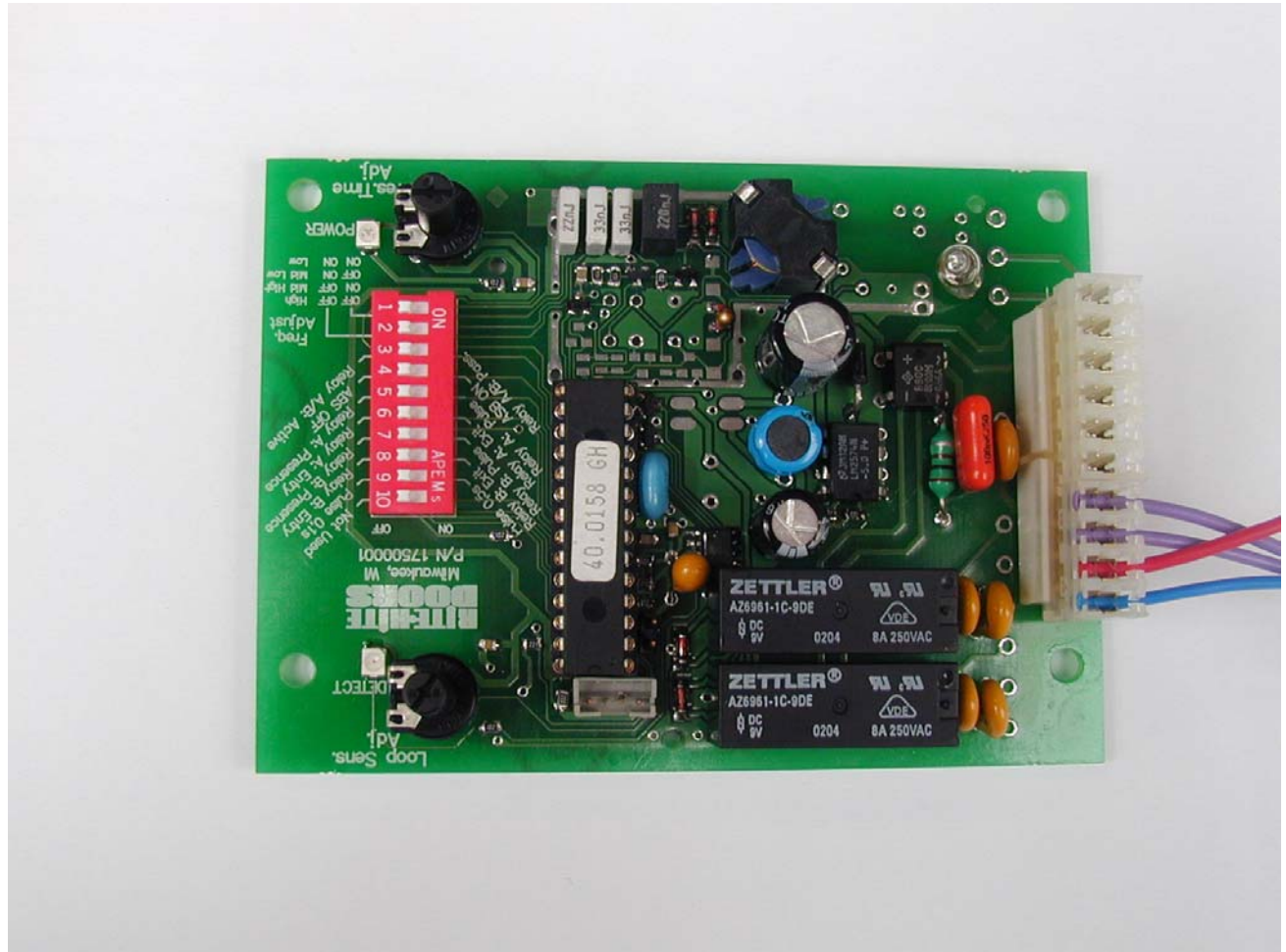
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 2: Matrix II



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

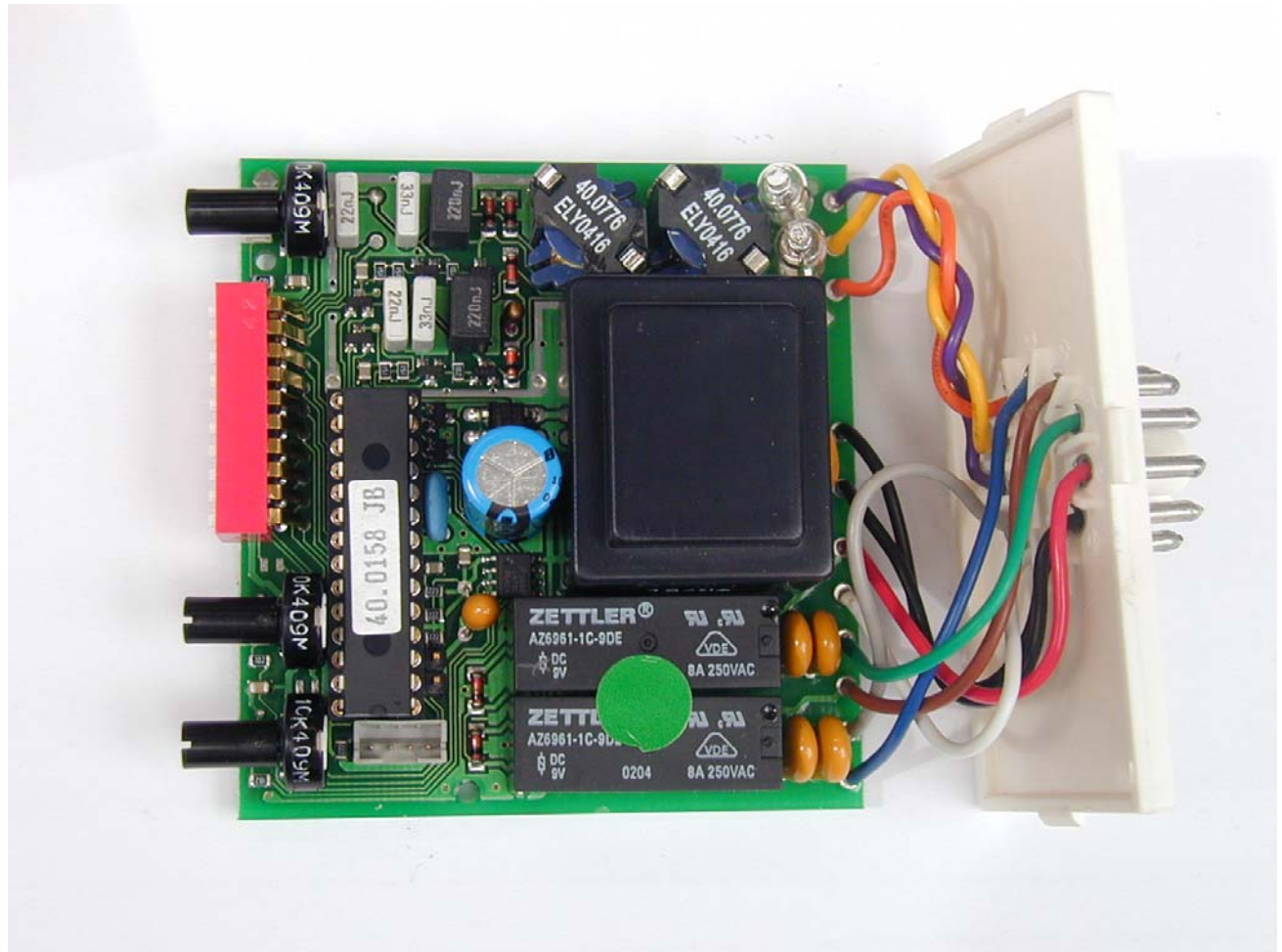
Photo 3: Matrix Rite-Hite



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

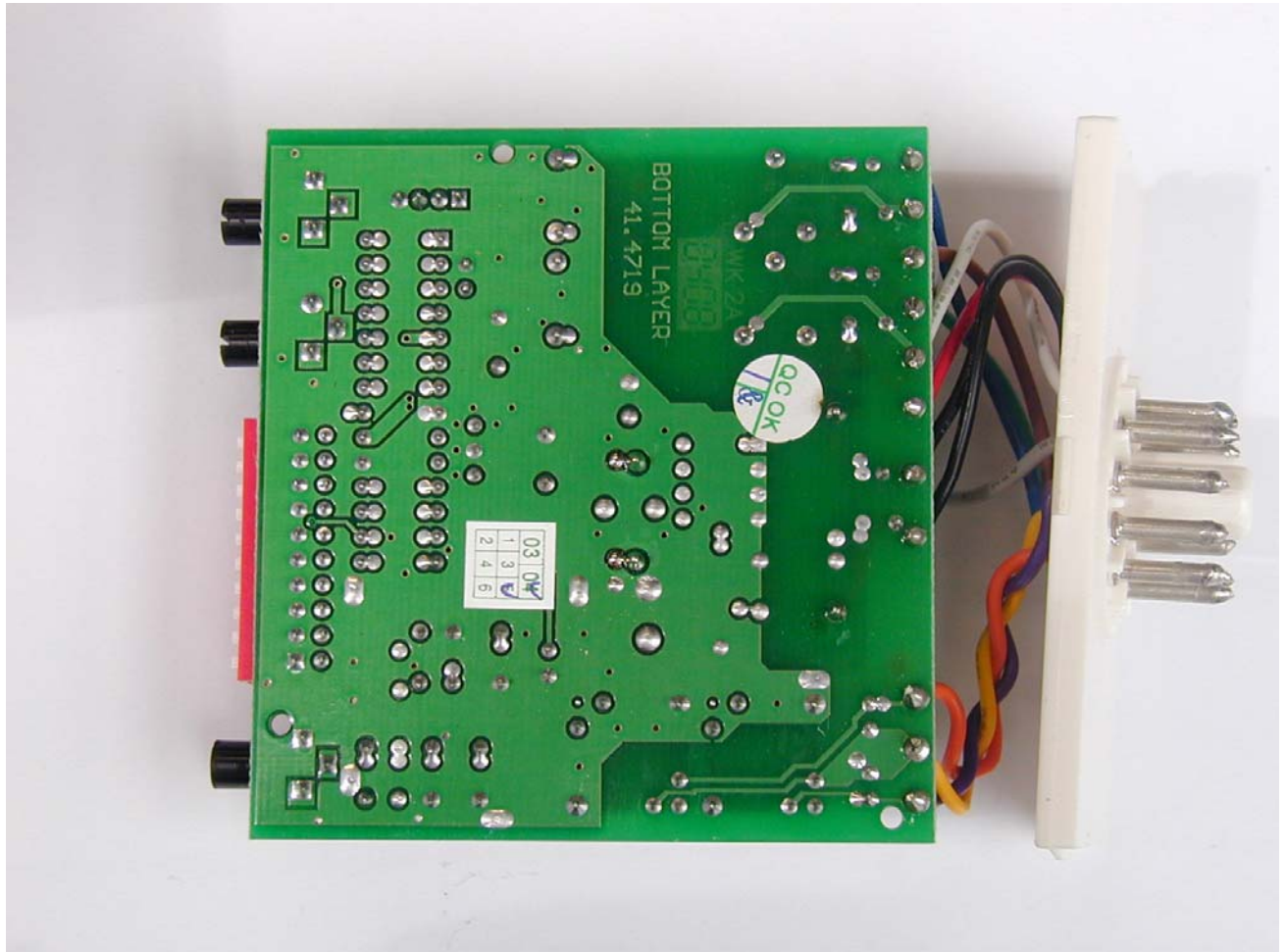
7 Annex D: INTERNAL PHOTOGRAPHS OF THE EQUIPMENT

Photo 4: Matrix with transformer



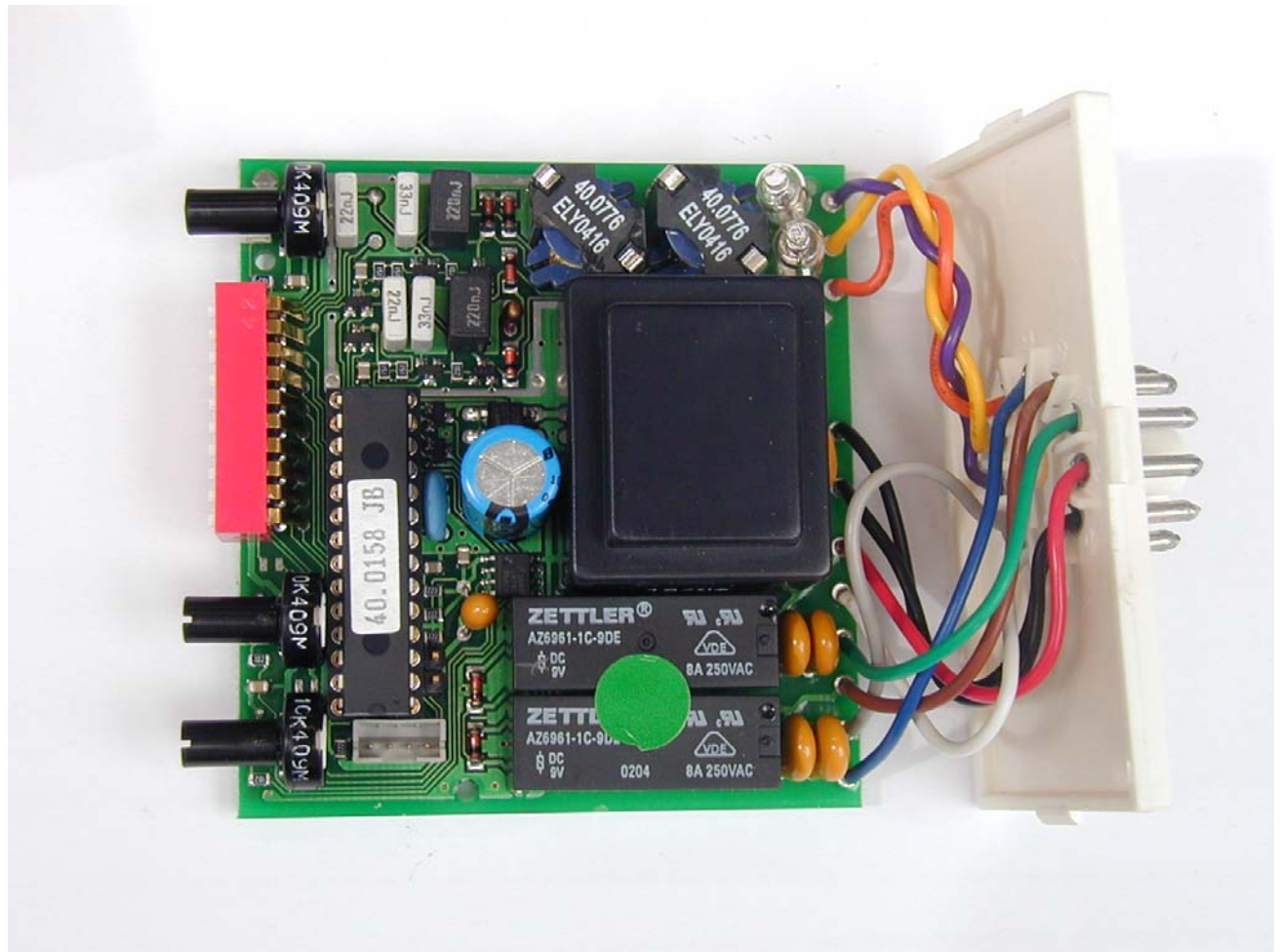
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 5: Matrix with transformer



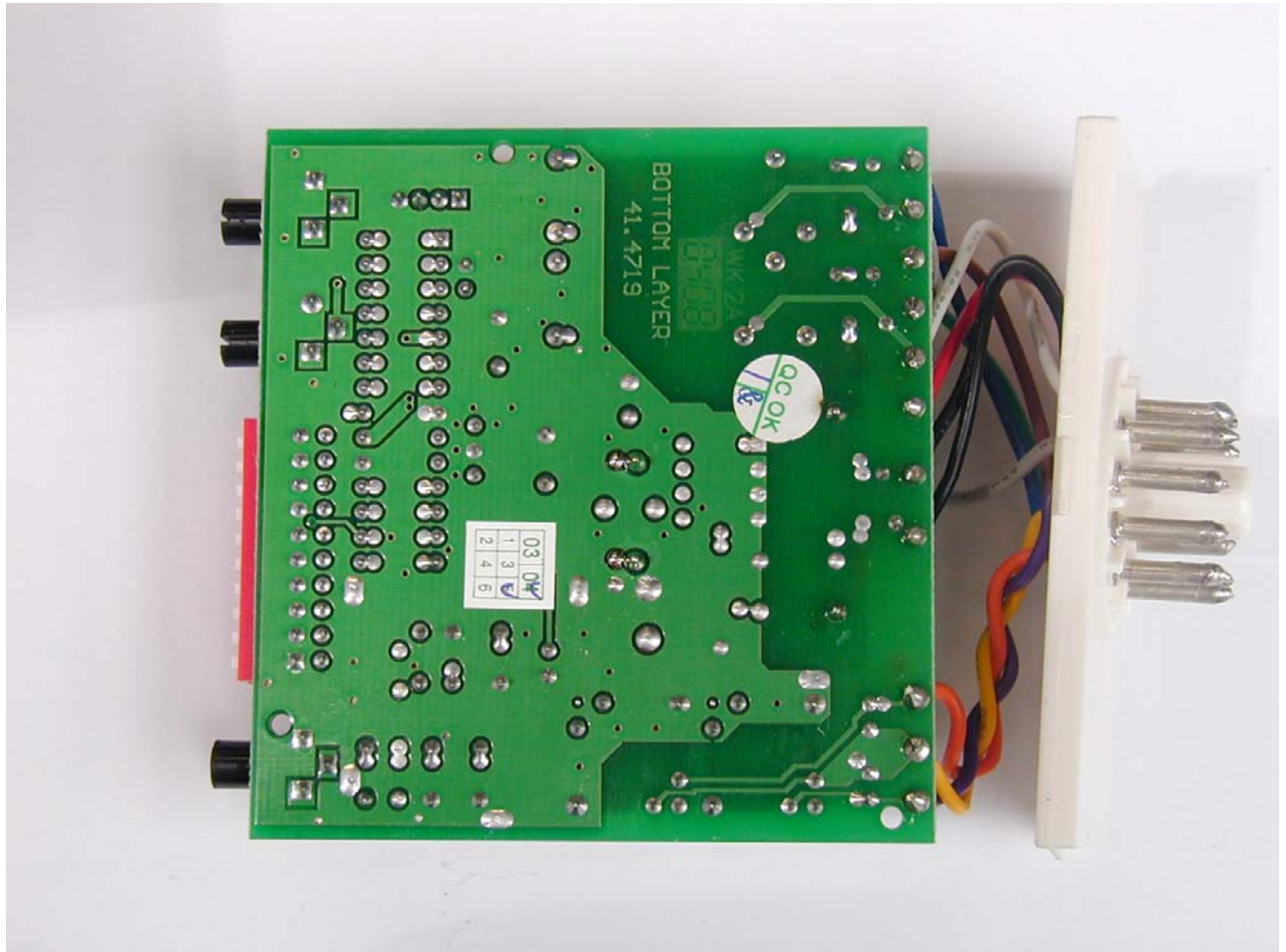
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 4: Matrix with transformer



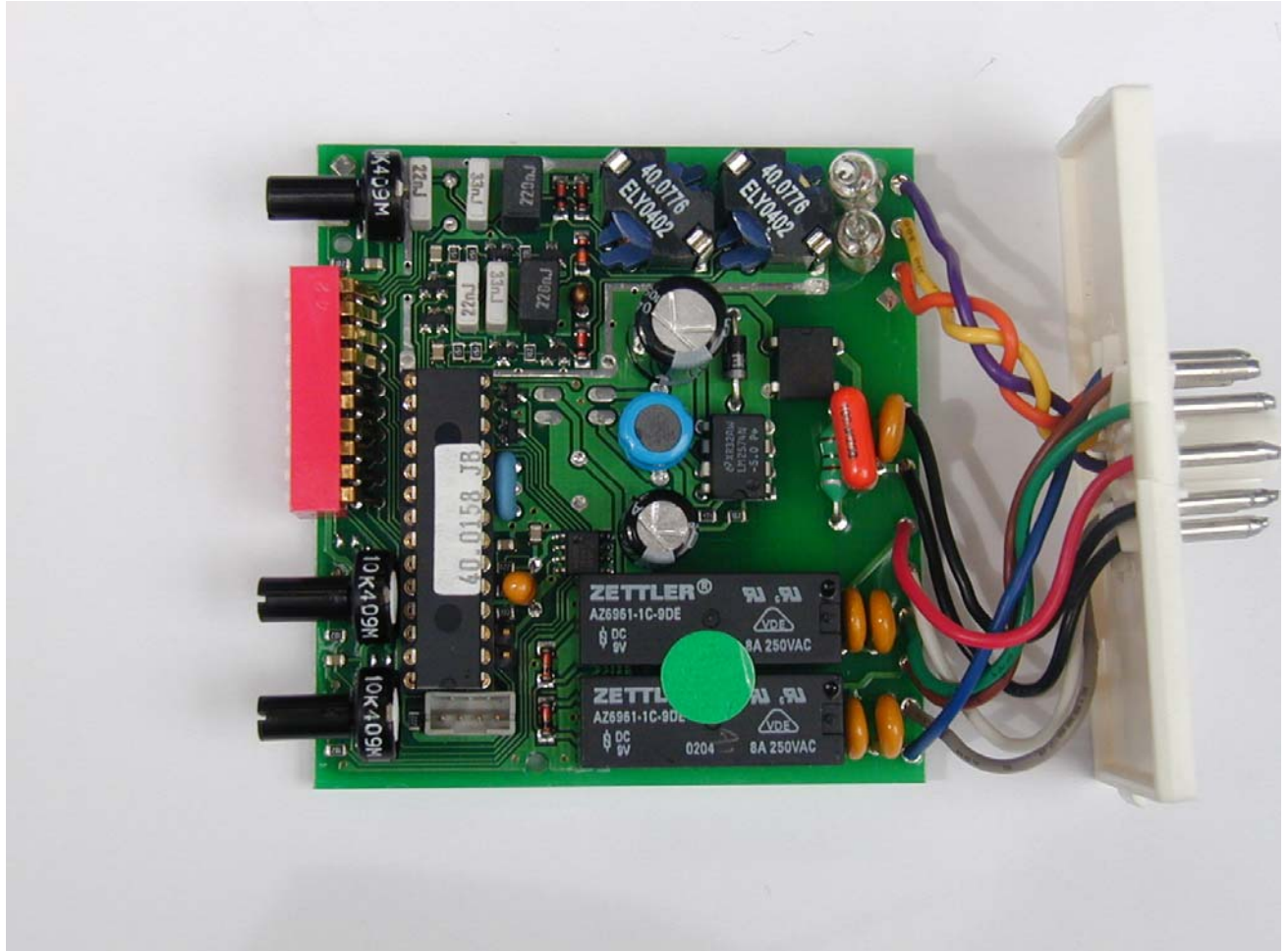
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 5: Matrix with transformer



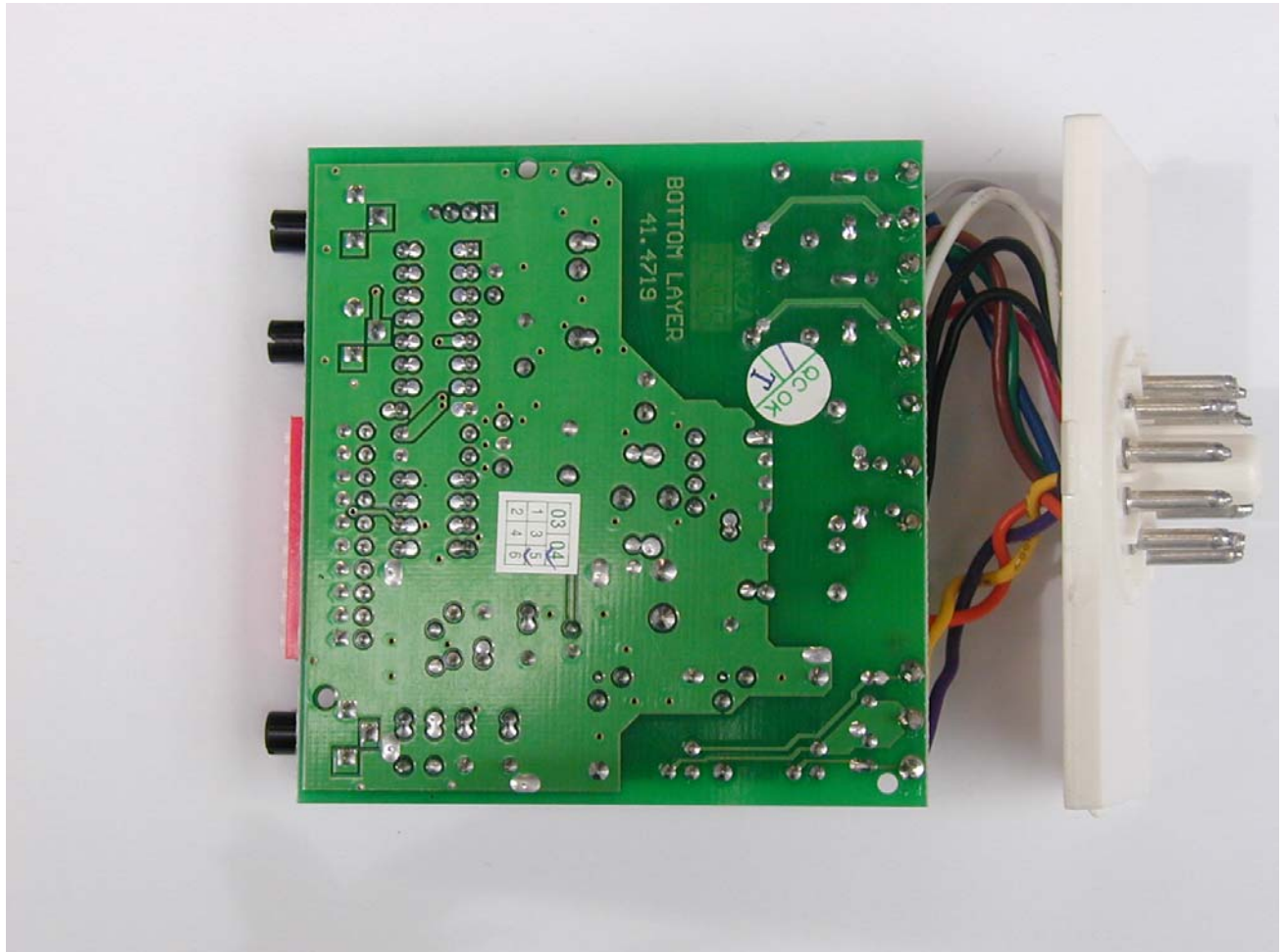
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 6: Matrix without transformer



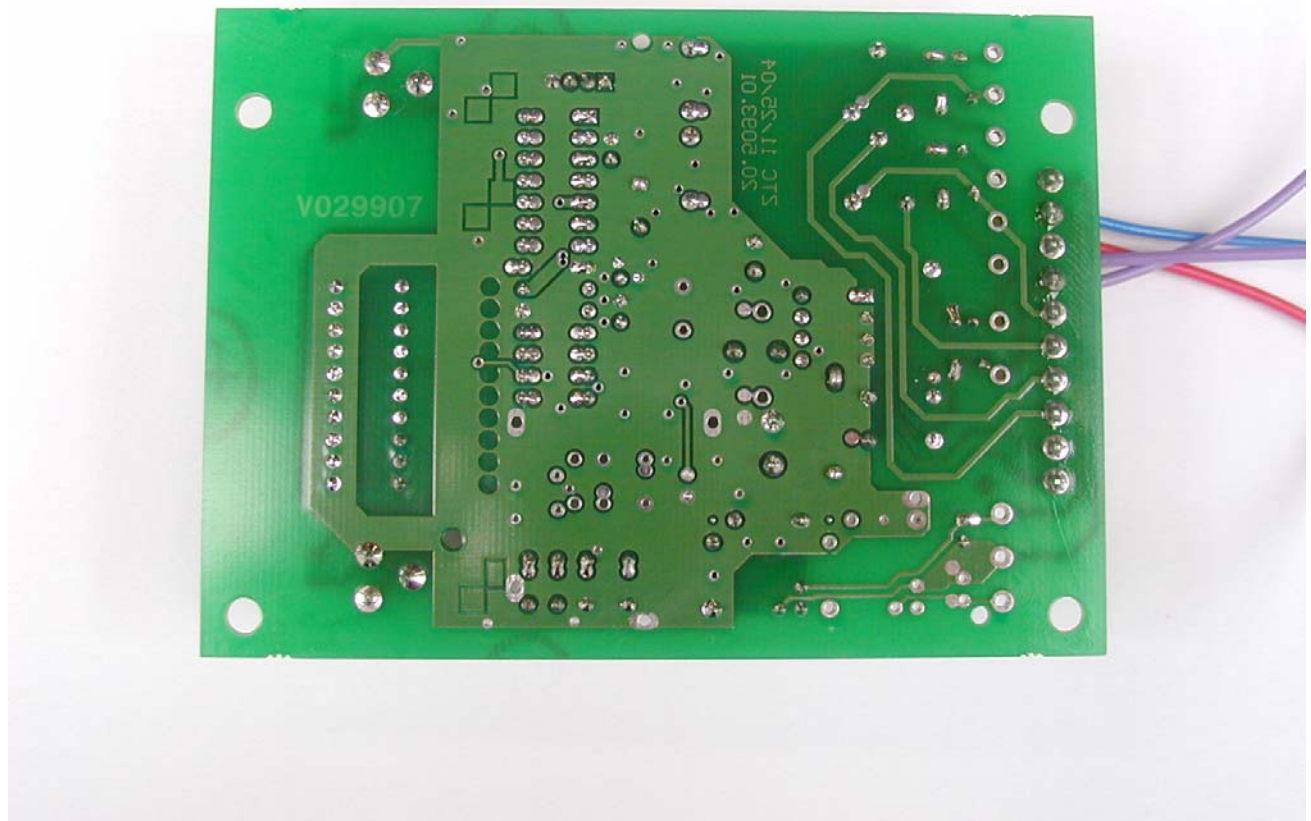
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 7: Matrix without transformer



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 8: Matrix Rite-Hite backsite



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)

Photo 9: Matrix connector system



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED :
(see test equipment listing)