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User's Manual

MSA-210

Spherical metal antenna for the evaluation of human exposure to electromagnetic fields.

SAFETY NOTES

Before using the product please read carefully the following.

MPB Srl makes its best to produce and sell products following the latest safety standards in order to offer its customers products with the highest safety level possible. The instrumentation described below has been produced and tested according to European standards and left the production department complying the safety standards. In order to maintain these conditions follow carefully what is described in this manual.This product has been designed to be used by qualified personnel and only in industrial environment and in laboratories. MPB disclaims any responsibility for a different use of the product from the one for which it was designed.

Disposal

When this product will become obsolete it must be disposed according to local regulations. This product complies with the European WEEE (2002/96/EC) and belongs to the category number 9 (monitoring and control instruments). Disposal should be made in an appropriate place or in a local waste collection center.

Declaration of Conformity

CE

(according to EMC 89/336/EEC directives and low voltage 73/23/EEC)

This document certificates that the metal antenna mod. MSA-210 with P-0003 protection network:

They comply with the following European standards:
Safety: CEI EN 61010-1 (2001)
Electromagnetic compatibility: EN 61326-1 (2007)

This product complies with the 2006/95/CE Low voltage directive requirements and with EMC 2004/108/CE directive

MPB S.r.l.

Index

1. General Information

1.1. Description

MSA-210 is a system that complies with IEC 62493 regulation for the evaluation of lighting appliances regarding the human exposure to electromagnetic fields

MSA-210 Metal antenna with P-0003 protection network

1.2. System Composition

- Spherical metal Antenna (Van Der Hoofden)

- Support rod of insulating material

- P-0003 Protection network

- N male wired connector with cable and eyelet

- M3 screw, washer

- Operations manual and P-0008 calculation program

If the shipping container has been damaged, immediately notify the problem to the courier and keep all the parts of the package as a proof of your claim. If you find signs of damage on the equipment , do not proceed with the installation because it has to be returned to MPB or to its agent. Check that the instrumentation is complete according to the list above.

1.3. Optional Accessories

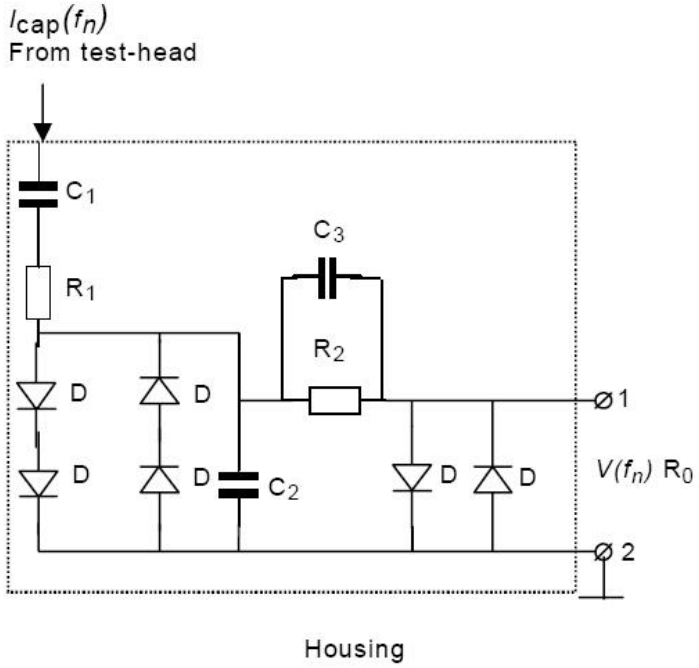
P-0007 Support rod of insulating material with an internal wooden reinforcement (500 mm) and with a "T" junction

TR-02-A Height adjustable wooden tripod

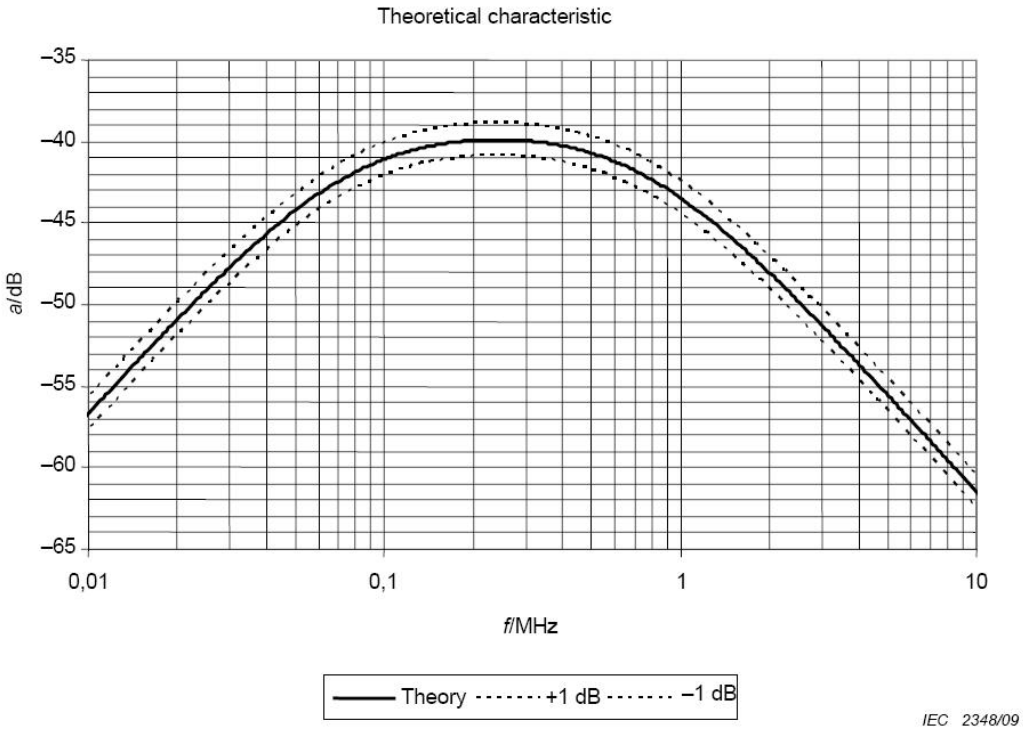
P-0008 Calculation software for the evaluation of " F" parameter.

1.4. Protection Network model P-0003

The protection network complies with the IEC 62493:



Where: C1=470 pF; C2=10 nF; C3= choosen in calibration; R1=470 Ω; R2=150 Ω; D=diodi schottky.
The protection network has the following characteristic curve



1.5. Mounting and Connection to the EMI Receiver

Screw the test head to the telescopic rod of the wooden tripod (for vertical measurements) or to the telescopic rod with the internal wooden reinforcement and with a T junction mod. P-0007 (for horizontal measurements).

Attach the N-male wired connector with a cable to the protection network, on the "TEST HEAD" side

Attach the protection network to the support rod, with slight pressure on the elastic hook.

Fix the eyelet to the N-male wired connector with the supplied screw and washer to the metal support of the test head.

1.6. Example of Mounting the Test Head in Vertical Position

1.7. Example of Mounting the Test Head in Horizontal Position

Caution: in order to avoid the overturning of the tripod given to the weight of the test head, make sure that the two first extension elements of the legs are open and that the T junction mod. P-0007 is mounted as in the picture.

1.8. Technical Specifications

MSA-210 Test Head

Frequency	20 kHz – 10 MHz
Test head size	210 ± 5 mm
Weight	2,2 kg
Telescopic rod attachment	¼"

Protection Network P-0003

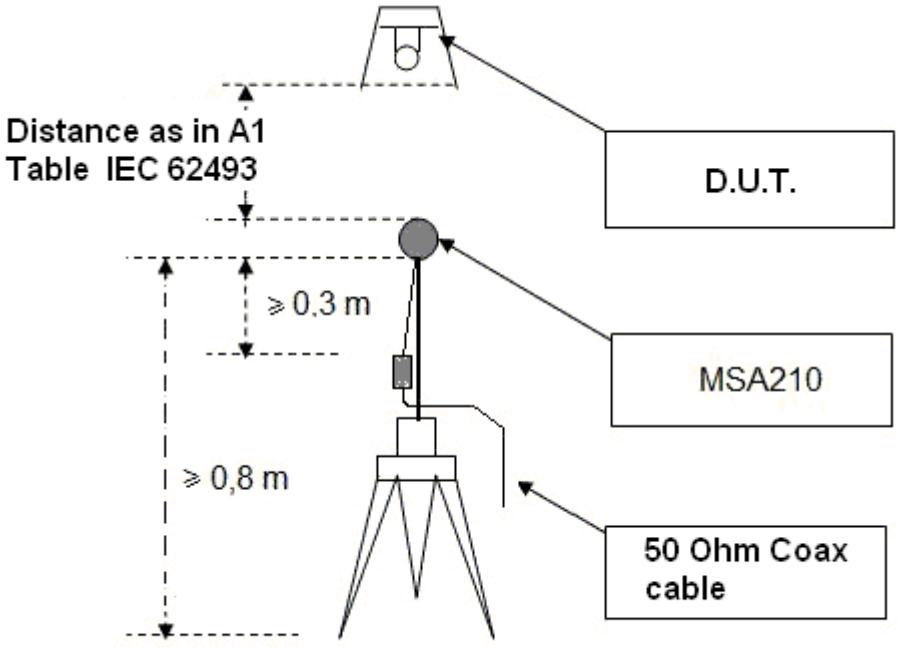
R.O.S. Test head port	1,5 ± 0,2
R.O.S. Receiver port	1,0 ± 0,2
Test head connector side	N female
Receiver connector side	N female
Operating temperature	-10…+50 °C

Technical specifications are subject to change without notice

2. Use and Operation of the System

2.1. Vertical Measurements

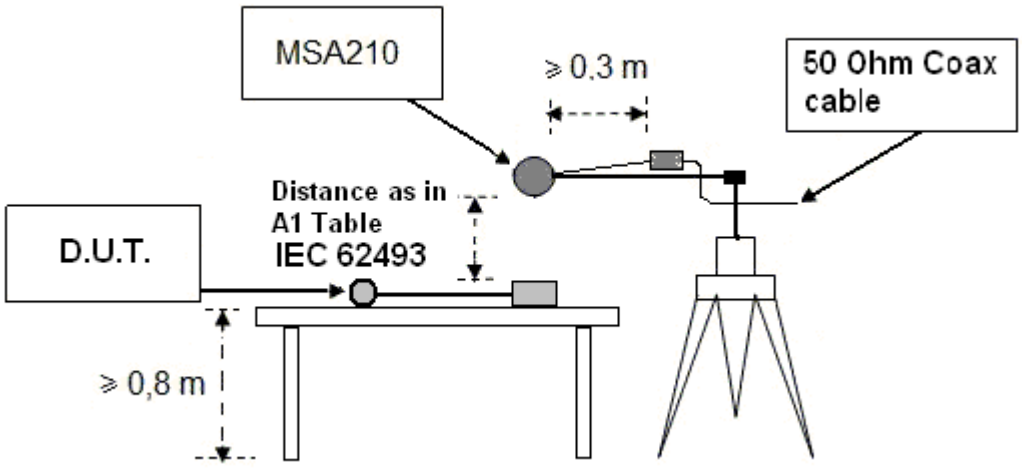
Mount the MSA-210 on a tripod and align the test head vertically to the device that has to be tested according to IEC 62493 regulation.



E.g.: distance for an instrument recessed into the ceiling with fluorescent lamp and power ≤180 W = 50 cm.

2.2. Horizontal Measurements

Align the metal test head vertically to the device that has to be tested according to the IEC 62493 regulation.

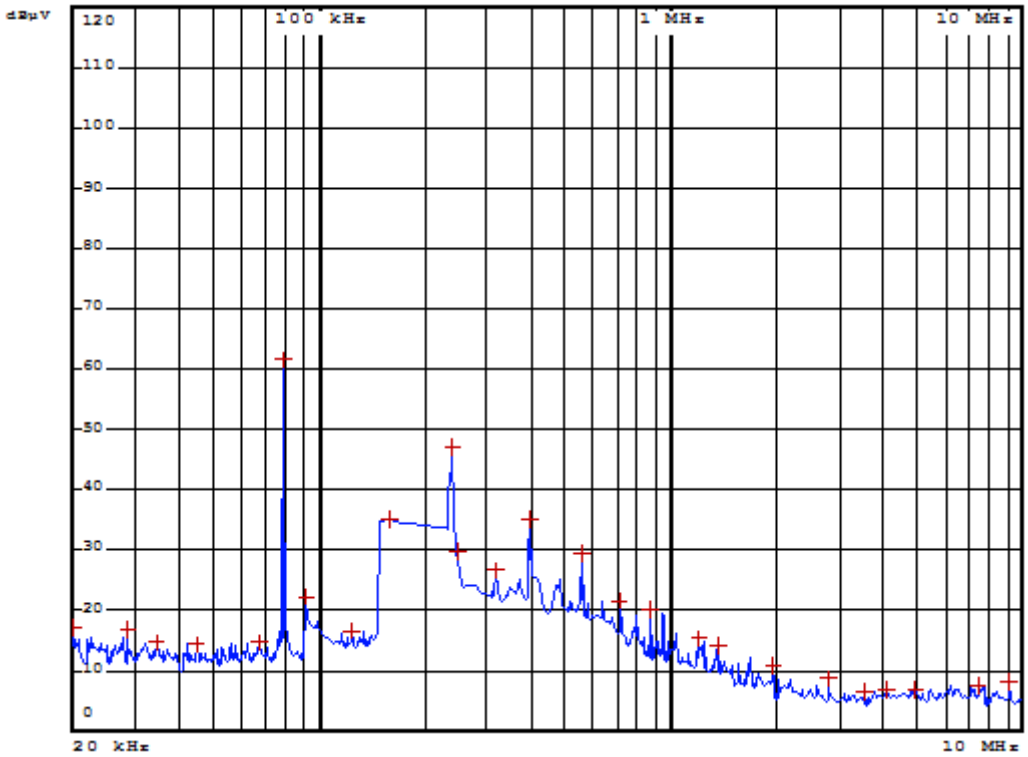


E.g.: distance for a table lighting instrument = 30 cm.

2.3. EMI Receiver Measurements

Connect the MSA-210 measurement system to the EMI receiver using a coaxial cable according to the IEC 62493. Set the EMI receiver for a measurement of peak voltage (dBµV):

Frequency	B6 second CISPR 16-1-1	Measuring time	F step	sensor
9kHz – 150kHz	200Hz	100 ms	222Hz	Peak
150kHz – 10MHz	9kHz	20 ms	10kHz	Peak



MSA-210 equipment is used for the measurement of the current density induced by the electromagnetic field emitted by the device that is being tested. Follow the verification method specified in IEC 62493 D and E appendices; The device under test complies with IEC 62493 if F≤0,85 where F is represented by the formula E.4

$$F = \sum_{fn=20\,kHz}^{10MHz} \frac{\mathrm{Jcap(fn)}}{\mathrm{Jlim(fn)}}$$

3. Use and Operation of the Software

3.1. Calculation Software model P-0008

Use the calculation program for a simple and quick evaluation of the parameter F :

- Insert the general data and the conditions of the test in the first page.
- Insert in the column f= the frequency values (Hz) of the measurement made with the receiver.
- Insert in the column V the voltage values (dBµV) of the measurement made with the receiver.
- You can repeat the previous operations for two more measurements (in case of different positions of the antenna).
- Calculations in accordance with IEC 62493:2009. In the column marked with F (first page) will appear the value of the F parameter: if F≤0,85 the result will be "POSITIVE" if F>0,85 the result will be "NEGATIVE".

E.g.:

F =	Limite	Risultato
0,171	0,85	*POSITIVO*

fn	V	V(fn)	g(fn)	Jcap(fn)	Jlim(fn)	Σ
Hz	dBµV	V			Hz	
0,02	17,24	7,28E-06	48,493402	1,58002E-05	0,04	0,000395005
0,02396	14,42	5,26E-06	47,878941	1,15665E-05	0,04792	0,00024137
0,02836	16,8	6,92E-06	47,101122	1,54637E-05	0,05672	0,000272632
0,03188	14,35	5,22E-06	46,417224	1,18349E-05	0,06376	0,000185617
0,03452	14,76	5,47E-06	45,873799	1,25539E-05	0,06904	0,000181836
0,04178	14,42	5,26E-06	44,274326	1,25081E-05	0,08356	0,000149691
0,04464	14,24	5,15E-06	43,612682	1,24375E-05	0,08928	0,000139309
0,05278	13,73	4,86E-06	41,6745	1,22737E-05	0,10556	0,000116272
0,05586	14,24	5,15E-06	40,930775	1,32524E-05	0,11172	0,000118622
0,06774	14,59	5,36E-06	38,081657	1,48296E-05	0,13548	0,00010946
0,07764	16,66	6,81E-06	35,797173	2,00215E-05	0,15528	0,000128938
0,007984	61,56	1,20E-03	49,750483	0,00253249	0,015968	0,158597796
0,0926	22,21	1,29E-05	32,597688	4,16541E-05	0,1852	0,000224914
0,10316	16,48	6,67E-06	30,549135	2,29798E-05	0,20632	0,000111379
0,12384	16,69	6,83E-06	27,039419	2,65979E-05	0,24768	0,000107388
0,13374	16,52	6,70E-06	25,576729	2,7574E-05	0,26748	0,000103088
0,16	35,1	5,69E-05	22,275102	0,000268859	0,32	0,000840186
0,18	34,63	5,39E-05	20,225821	0,000280504	0,36	0,000779177
0,19	34,34	5,21E-05	19,324034	0,000283953	0,38	0,000747246
0,24	47,02	2,24E-04	15,743361	0,00150054	0,48	0,003126125
0,25	29,76	3,08E-05	15,172708	0,000213443	0,5	0,000426886
0,28	24,23	1,63E-05	13,675358	0,000125287	0,56	0,000223727
0,32	26,56	2,13E-05	12,072235	0,000185591	0,64	0,000289986
0,37	24,89	1,76E-05	10,518401	0,00017575	0,74	0,0002375
0,4	35,1	5,69E-05	9,760753	0,000613567	0,8	0,000766958
0,49	25,18	1,82E-05	8,0191003	0,000238352	0,98	0,000243217
0,56	29,43	2,96E-05	7,0379597	0,000442994	1,12	0,000395531
0,64	21,56	1,20E-05	6,1725632	0,000204117	1,28	0,000159466
0,72	21,44	1,18E-05	5,4955187	0,000226119	1,44	0,000157027
0,8	18,91	8,82E-06	4,9516528	0,00018754	1,6	0,000117213
0,88	20,05	1,01E-05	4,5053385	0,000235027	1,76	0,000133538
0,96	19,34	9,27E-06	4,1325741	0,000236115	1,92	0,000122977
1,19	13,02	4,48E-06	3,3378248	0,000141215	2,38	5,93341E-05
1,22	15,33	5,84E-06	3,2560996	0,000188863	2,44	7,74029E-05
1,38	13,89	4,95E-06	2,8799151	0,000180911	2,76	6,55475E-05
1,7	12,07	4,01E-06	2,3391371	0,00018063	3,4	5,31264E-05
1,98	10,77	3,46E-06	2,0089279	0,000181084	3,96	4,57283E-05
2,02	8,45	2,65E-06	1,9692095	0,000141434	4,04	3,50084E-05
2,36	6,89	2,21E-06	1,6858594	0,000138046	4,72	2,9247E-05
2,8	8,66	2,71E-06	1,4211726	0,00020077	5,6	3,58517E-05
3,15	6,23	2,05E-06	1,2633717	0,000170732	6,3	2,71002E-05
3,56	6,36	2,08E-06	1,1179485	0,00019585	7,12	2,7507E-05
4,13	6,63	2,15E-06	0,9637172	0,000234366	8,26	2,83737E-05
4,61	6,36	2,08E-06	0,8634052	0,000253589	9,22	2,75042E-05
4,98	6,9	2,21E-06	0,7992737	0,000291507	9,96	2,92678E-05
5,51	6,71	2,17E-06	0,7224095	0,000315545	11,02	2,86339E-05
6,27	7,41	2,35E-06	0,6348598	0,000389195	12,54	3,10363E-05
7,54	7,52	2,38E-06	0,5279403	0,00047398	15,08	3,1431E-05
7,98	7,11	2,27E-06	0,4988338	0,000478508	15,96	2,99817E-05
9,1	7,88	2,48E-06	0,4374439	0,000596242	18,2	3,27606E-05
10	7,13	2,27E-06	0,3980766	0,000601005	20	3,00503E-05

data from the EMI receiver

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