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User Manual

MSA-210

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

Manual Version:
V1.3

SAFETY NOTES

Before using the product please read carefully the following.

MPB works to provide its customers with the best safety conditions available, complying with the current safety standards. The instrumentation described in this manual has been produced and tested in conditions that fully comply with the European standards. To maintain these conditions please carefully follow this manual. This product is intended for industrial environments and laboratories and should be used by authorized personnel only. MPB disclaims any responsibility for different uses of the device.

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

(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 (undated reference, applies to all editions)
EMC: EN 61326-1 (undated reference, applies to all editions)

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

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1. General Information

1.1. Description

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

MSA-210 Metal antenna with P-0003 protection network and insulating rod from NMR-01 tripod

1.2. System Composition

- Test Head (Van Der Hoofden) with soft bag

- P-0003 Protection network

- 30 cm connection cable (with M3 screw)

- P-0003 Calibration Certificate
- USB key including user manual and P-0008 calculation program

If the shipping container has been damaged, please 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. Please check that the instrumentation is complete according to the list above.

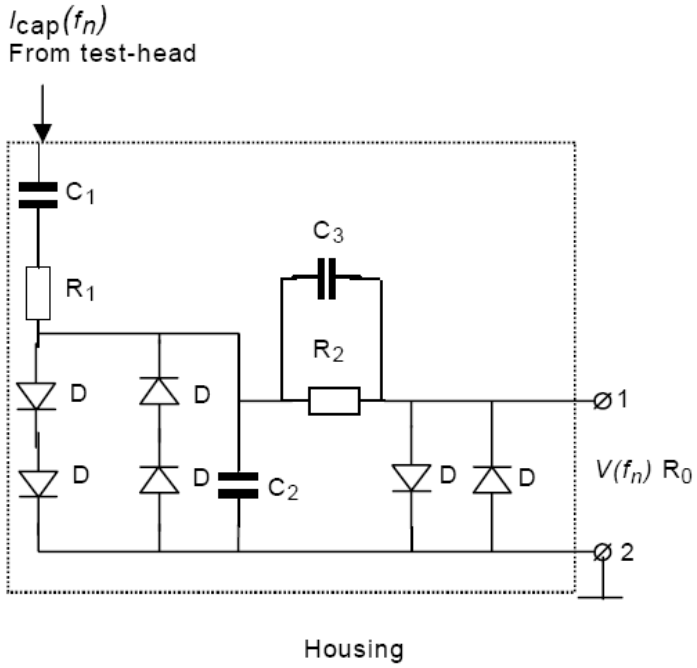
1.3. Optional Accessories

P-0007 Support for horizontal position with a “T” junction (including: 79 cm telescopic rod, NMR-BLK, NMR-ARJ)

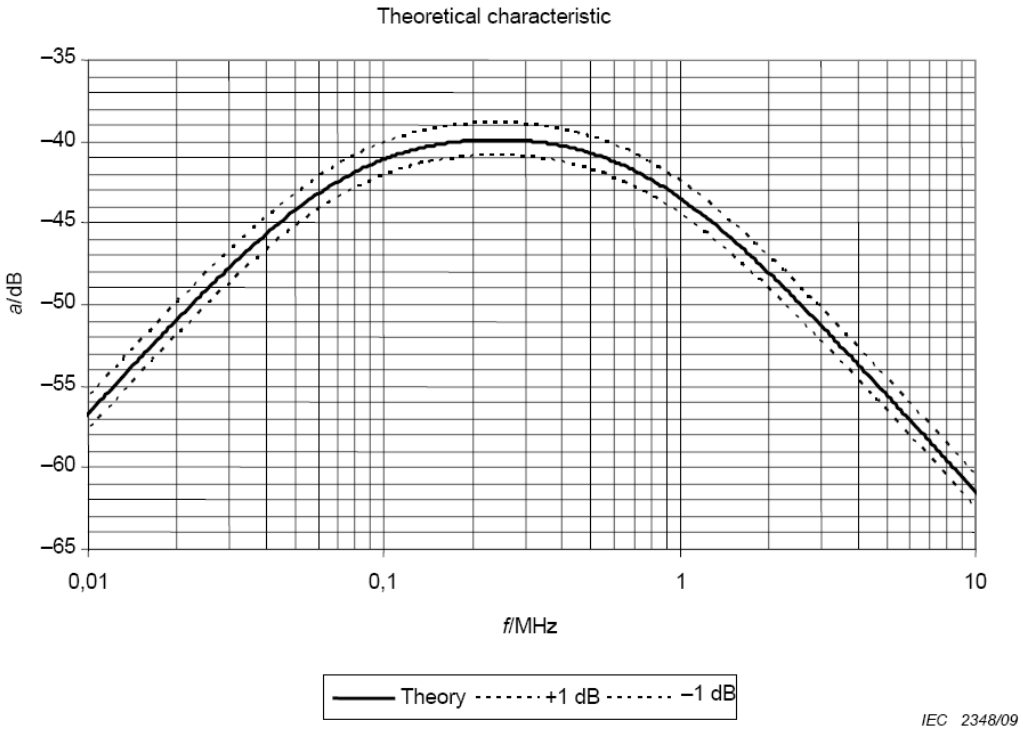
NMR-01 Height adjustable non-magnetic and non-reflective fiberglass tripod complete with soft bag

1.4. Protection Network model P-0003

The protection network complies with IEC 62493:



Where: C1=470 pF; C2=10 nF; C3= chosen 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 tripod (for vertical measurements) or to the telescopic rod with a “T” junction mod. P-0007 (for horizontal measurements).

Attach the 30cm 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 M3 screw 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

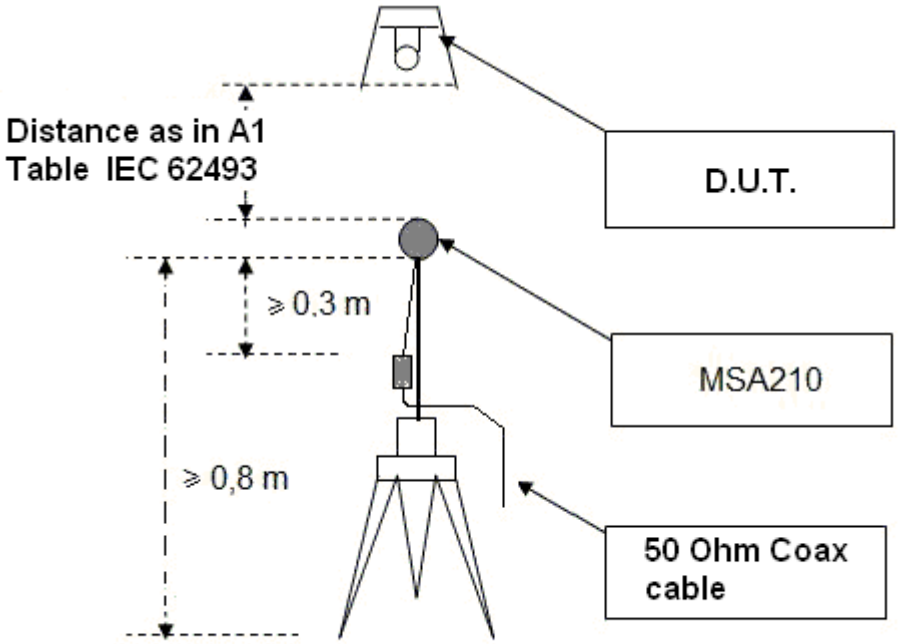
R.O.S. Receiver port	1,0 ± 0,2
Test head connector side	N female
Receiver connector side	N female
Operating temperature	-10…+50 °C

Technical specifications are subject to change without notice

2. Use and Operation of the System

2.1. Vertical Measurements

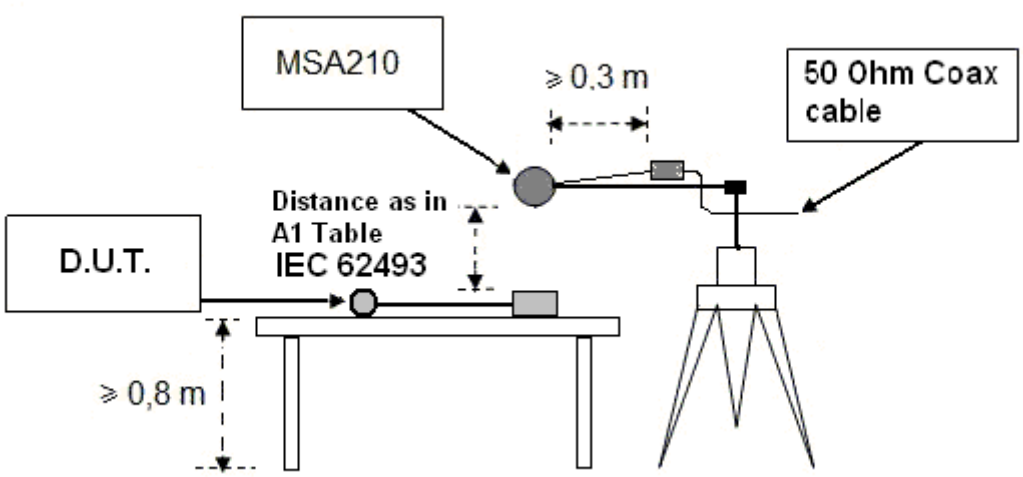
Mount the MSA-210 on a tripod and align the test head vertically to the device that has to be tested according to the IEC 62493 regulation.



E.g.: distance for an instrument recessed into the ceiling with a 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.

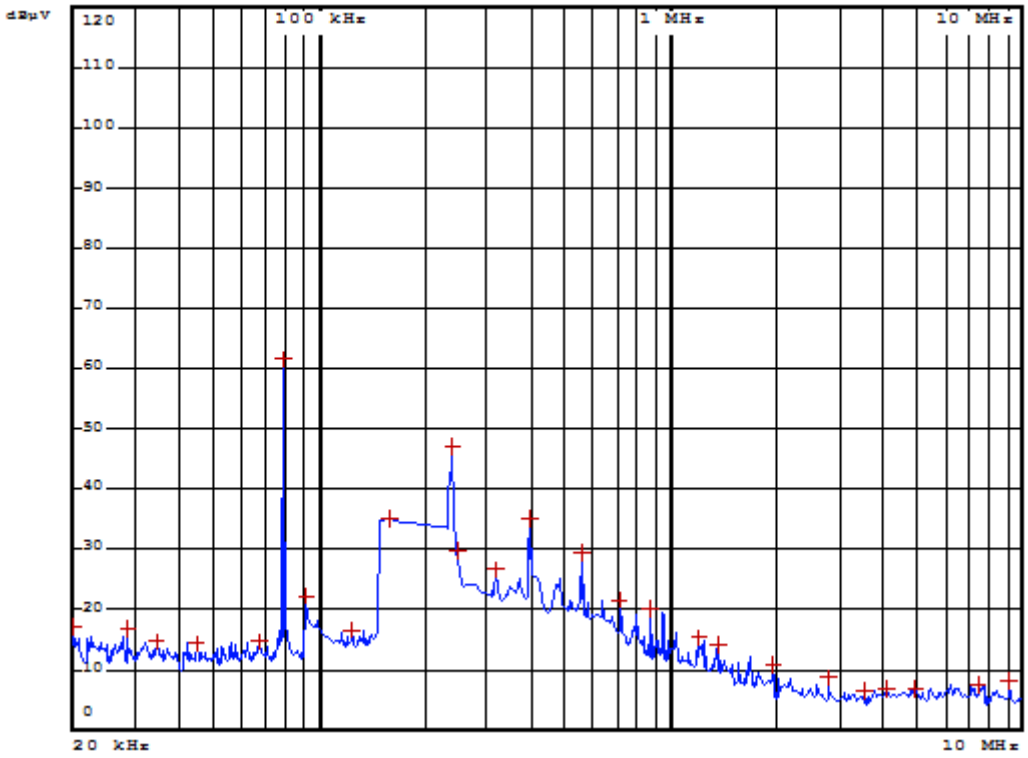


E.g.: distance for a table lighting instrument = 30 cm.

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



The 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 kHz	V dBμV	V(fn) V	g(fn)	Jcap(fn)	Jlim(fn) Hz	Σ
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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