FCC CFR 47 PART 18 Subpart C RF Lightning Devices

E.M.I. TEST REPORT

Test report No..... :	01NM001EM-R01	
Prepared by..... :	C. Carù	Signature .....
Approved by..... :	G. Baroni	Signature .....
Date of issue..... :	March 26, 2001	
Number of pages..... :	23	

Test Laboratory

Name..... :	CiaoLAB Technologies S.p.A. - Standard Compliance Services
Address..... :	Via ai Laboratori Olivetti, 79 - 20010 Pregnana Milanese (MI) - I

Applicant for the test

Name..... :	OSRAM S.p.A.

Equipment under test

Model..... :	CF30EL/CIRC/830/MED
Serial Number..... :	001_Proto
Trade Mark..... :	OSRAM SYLVANIA
Manufacturer.....	: OSRAM SUD S.p.A. Via delle Ortensie,16 70026 Modugno (Bari) -Italy-
Rating's..... :	120 VAC / 60Hz
Operating temperature range..... :	From 0°C to +40°C

Equipment information

Equipment category..... :	RF Lightning Devices
Classification of the equipment..... :	Consumer Equipment
Weight..... :	218g
Tested for IT power system..... :	No

Test specification

Applicable standard..... :	FCC CFR 47 - Part 18 - Subpart C
Additional installation requirements :	No

Test results

Summary of test results..... :	**COMPLIANT**
Legend:..... :	NA: Not Applicable - P: Pass - F: Fail

General Remarks

The test results presented in this report related only to the item tested.

This test report shall not be reproduced except in full without the written approval of the testing laboratory.

As stated in FCC §2.902:
Verification attaches to all items subsequently marketed by the manufacturer or importer which are identical as defined in §2.908 to the sample tested and found acceptable by the manufacturer.

In order to clarify the identical concept the §2.908 states:
As used in this subpart the term *identical* means identical within the variation that can be expected to arise as a result of quantity production techniques.

General Information of the Appliance

Manufacturer

OSRAM S.p.A. Via Castagnole, 65/A
31100 Treviso - Italy -

Applicant for Certification

OSRAM SUD S.p.A. Via delle Ortensie, 16
70026 Modugno (Bari) - Italy -

FCC ID

PKFEB329924A

Official of the Responsible Party for Certification

Name Lorenzo Baldo Product Development Engineer

Signature .....

Description of the Appliance

The appliance is a ballast forcircular fluorescent lamp, the power is 30W and it is powered from the standard 120V / 60Hz AC mains, due to its characteristics it is sold to the general public.

The appliance is shown in the following pictures

General Consideration of the Test

The appliance is classified under the FCC Part 18 INDUSTRIAL, SCIENTIFIC AND MEDICAL EQUIPMENT - Subpart C - RF Lightning Devices - *Consumer Equipment*, and in conformity to the requirements of the table reported in FCC Part 18 Subpart B §18.203, it is subject to "CERTIFICATION" procedure.

As defined in FCC Part 18 Subpart C §18.307 the frequency range for conducted noise measurement is from 450KHz to 30MHz and the Maximum RF line voltage measured specified for RF Lightning Devices - Consumer Equipment is reported in the following table.

0.45MHz ÷ 2.51MHz	250µV	48dbµV
2.51MHz ÷ 3MHz	3000µV	69.5dbµV
3MHz ÷ 30MHz	250µV	48dbµV

In accordance to FCC Part 18 Subpart C §18.305 the limits for RF Lightning Devices classified as Consumer Equipment are reported in the following table:

Frequency	Limit in µV/m at a distance of 30m	Limit in dbµV/m at a distance of 30m	Limit in dbµV/m at a distance of 10m
30MHz ÷ 88MHz	30µV/m	20dbµV/m	29.5dbµV/m
88MHz ÷ 216MHz	50µV/m	23.5dbµV/m	33dbµV/m
216 MHz ÷1000 MHz	70µV/m	26dbµV/m	35.5dbµV/m

The measurement have been performed at a distance of 10m due to the extremely low signals generated from the EUT and according to NOTE 2 of §18.305 the field strength limits have been adjusted using the attenuation factor of 1/d

A unit of product "CF30EL/CIRC/830/MED" representative of the production was subjected to the test program.

During the radiated and conducted emission test, the appliance was powered from a standard 120V / 60Hz AC main.

Date of Test

The test started on January 30, 2001 and concluded on February1, 2001.

Reference Documents

FCC CFR 47 Code of Federal Regulations, Title 47 Part 18, Subpart C, RF Lightning Devices, Consumer Equipments.

FCC/OST MP-5 FCC Methods of measurement of radio noise emission from Industrial, Scientific and Medical Equipment

EMC Test Site N.2 description report Code QRD-RQ-0660.

Test Laboratory Information

Radiated and conducted measurements was performed at the CiaoLAB Technologies EMI Measurement Test Site (Open Area Test Site and Shielded Room) denominated "EMC Test Site N. 2" and located at the following address:

CiaoLab eTechnologies S.p.A.
Via ai Laboratori Olivetti, 79
20010 Pregnana Milanese
Milano - ITALY

The "EMC Test Site N. 2" is compliant with the requirements of section 9.248 of the FCC rules.
The CiaoLAB test facility is in the Commission's list whose measurement data will be accepted in conjunction with application for certification or notification under part 15 and 18 of the FCC Rules.
The "EMC Test Site N. 2" complies also with the radiated and AC line conducted test site criteria described in ANSI C63.4-1992 and it is recognized by FCC with the filing number 31040/SIT.

CiaoLAB Technologies S.p.A. is also member of VCCI (Voluntary Control Council for Interference of ITE) in Japan.
The "EMC Test Site N. 2" (Shielded Room) has obtained the approval from VCCI Conference with the registration number C-813.
The "EMC Test Site N. 2" (Free Field) has obtained the approval from VCCI Conference with the registration number R-777.

Test Equipment List

	Instrument Type	Manufacturer	Model number	Serial Number	Cal./ Ver. Date
N.1	Artificial Main Network	Schwarzbeck	NNLK8121	8121170	January 26, 2001
N.1	Biconical Antenna	EMCO	3109	3105	March 2000
N.1	Log Periodic 200-1GHz	EMCO	3146	4922	March 2000
N. 1	EMI RECEIVER	Hewlett Packard	HP 8574B		
The system is composed by four parts and it is yearly calibrated from Hewlett Packard, the date of the last calibration is **Feb 17, 2000**.					
	RF Preselector	Hewlett Packard	HP 85685A	2602A00237	
	Spectrum Analyzer RF	Hewlett Packard	HP 85680A	2634A02785	
	Spectrum Analyzer IF	Hewlett Packard	HP 85662A	2542A12241	
	Quasi peak Adapter	Hewlett Packard	HP 85650A	2521A00799	
N.1	EMI TEST RECEIVER	Rohde & Schwarz	ESBI		
The system is composed by two parts and it is yearly calibrated from Rohde & Schwarz, the date of the last calibration is **Feb. 21, 2000**.					
	Display Section	Rohde & Schwarz		844348/017	
	RF Section	Rohde & Schwarz		845658/002	

Devices

Antenna support
Control panel
Antenna tower
Turntable

Environmental Conditions

AC Main: Voltage: 120V
Frequency: 60Hz

	Conducted noise emission test	Radiated noise emission test
Temperature:	19ºC	20ºC
Relative Humidity:	55%	61%
Atmospheric Pressure	1008mbar	1010mbar

Operating Conditions

During the test the appliance was switched ON, a warm up time of few minutes was respected before to start the noise emission measurements.

EUT Test Setup

During radiated noise emission measurements according to FCC/OST MP-5 Par. 5.4 the appliance was placed on a wooden table 80cm high over the ground plane, the radiated noise emission measurements were performed in free field at antenna to EUT distance of 10mt.

During conducted noise measurements according to FCC/OST MP-5 Par. 7.1 the appliance was installed inside the shielded room and placed on a wooden table 40 high over the ground plane. A distance of 80cm have been kept from any other earthed conducting surface.

It is possible to see the pictures of the radiated and conducted test setups in the pictures paragraph.

E.M.I. Measurements Procedures

The EUT was installed in the Open Area Test Site and inside the shielded room in accordance to requirements of FCC/OST MP-5, the system setup is prepared in order to maximize the emissions.

The radiated noise emission measurements were performed in the Open Area Test Site and the EUT to antenna distance was 10m as specified in the FCC part 18 Subpart C for RF Lightning Devices - Consumer Equipment §18.305 Note 2.
The maximum radiated emissions are found by using the following step-by-step procedure:

- The whole frequency range (30MHz ÷ 1GHz) is divided in sub-ranges of about 7 - 8MHz up to 1GHz.
- For all the sub ranges a peak measurement is performed at fixed antenna high (1m for the Vertical polarization and 3.5m for the Horizontal Polarization), and rotating of 360° the turntable, holding the Spectrum Analyzer in max. hold conditions.
- The highest peaks are corrected with the antenna factors and cable losses from the software, and they are added to a list called "Suspect List".
- Now I have the availability of two different lists, the first one for the vertical polarization and the second one for the horizontal polarization.
- For each one of the Suspect list all the signals with less then 10db of margins from the specific limit are remeasured in Quasi Peak Mode as follows:
  - The test receiver is tuned on the highest point of the signal.
  - The Quasi Peak Detector is activated to store the maximum value.
  - The turntable is rotated of 360°, and the azimuth of maximum emission is found.
  - The turntable is stopped on the angle of maximum emission.
  - The antenna high is varied from 1m to 4m, and the antenna is stopped on the high of maximum emission.
  - The turntable is rotated of 360°, and the new maximum emission is found.
  - The system cables are manipulated to produce the highest amplitude signal.
  - A new scan changing the antenna height and rotating the turntable as described before is performed.
  - The Quasi Peak maximum value is corrected with cable's losses and antenna factors, and it is added to a list called "Final List".

The conducted noise emission measurements were performed in the shielded room.
The maximum conducted emissions were found by using the following step-by-step procedure:

- A peak scan of the full range of measurement is automatically performed by the measuring software.
- The peak measurement is automatically plotted on a graphics with the specific limit.
- The twenty highest signals are automatically chosen from the measurement software and re-measured with the quasi peak detector.
- The measured signal are reported in a list called “Final List”.

Measurement Results

Conducted Emission Summary

EQUIPMENT UNDER TEST	FCC Part 18 Subpart C RF Lightning Devices Consumer Equipments 120v - 60Hz	
	PHASE L1	**NEUTRAL N**
CF30EL/CIRC/830/MED	PASS	PASS

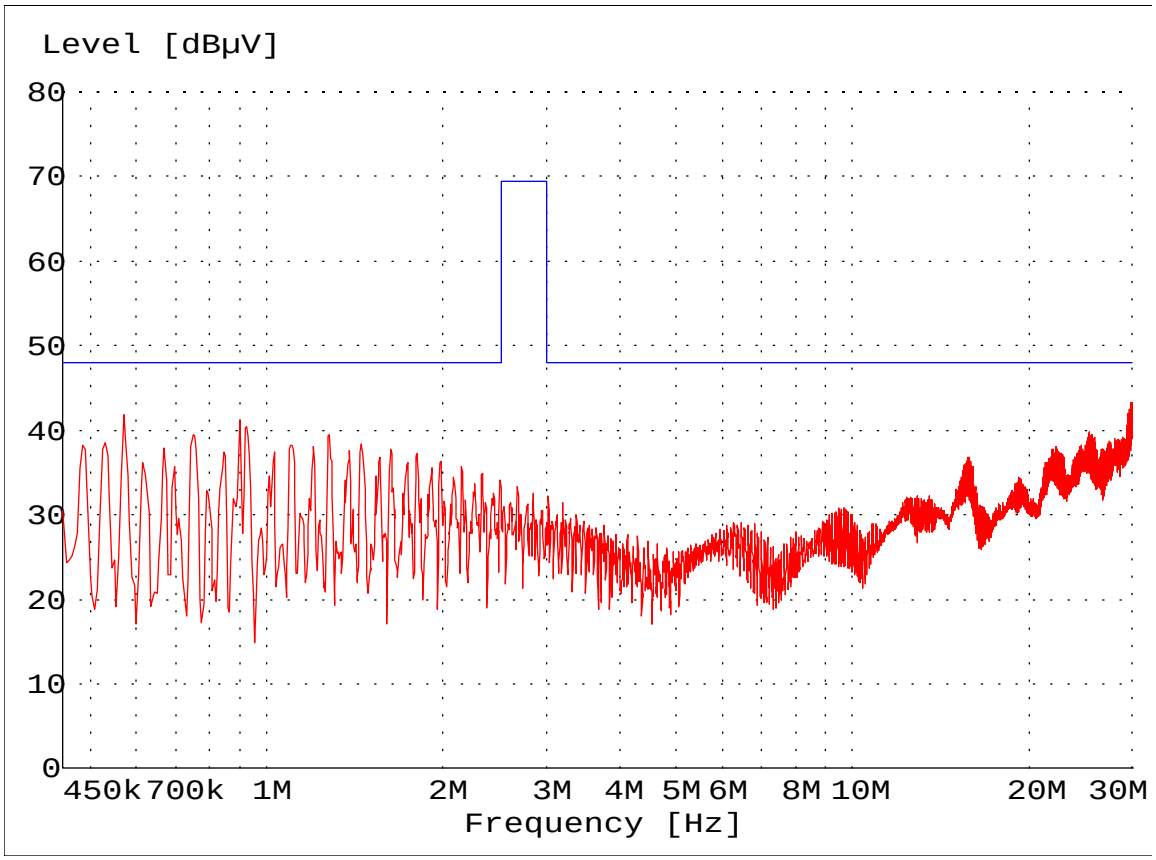
Radiated Emission Summary

EQUIPMENT UNDER TEST	FCC Part 18 Subpart C RF Lightning Devices Consumer Equipments 120v - 60Hz
CF30EL/CIRC/830/MED	PASS

Conducted Emission Graphics and Tables

Supply Voltage: **120V**
Frequency: **60Hz**
Noise measured on: **N**

Red line: Peak measurement results
Blue limit line: FCC CFR 47 Part 18 Subpart C - RF Lightning Devices - Consumer Equipment



Quasi Peak measurement results Phase N

Red line: Quasi Peak measurement results
Blue limit line: FCC CFR 47 Part 18 Subpart C - RF Lightning Devices - Consumer Equipment

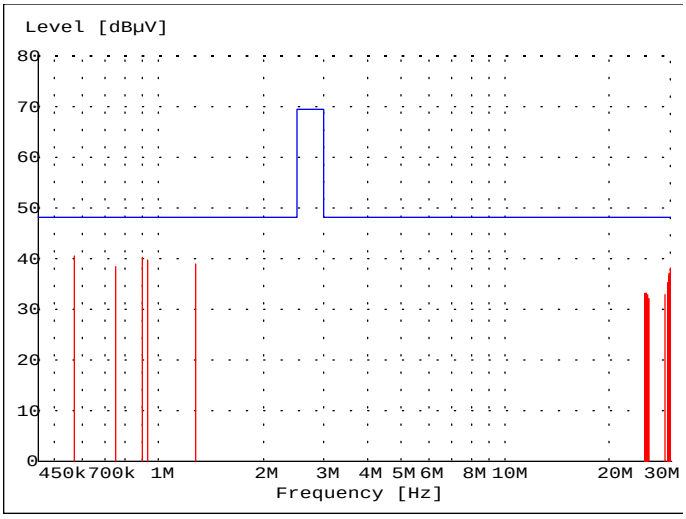
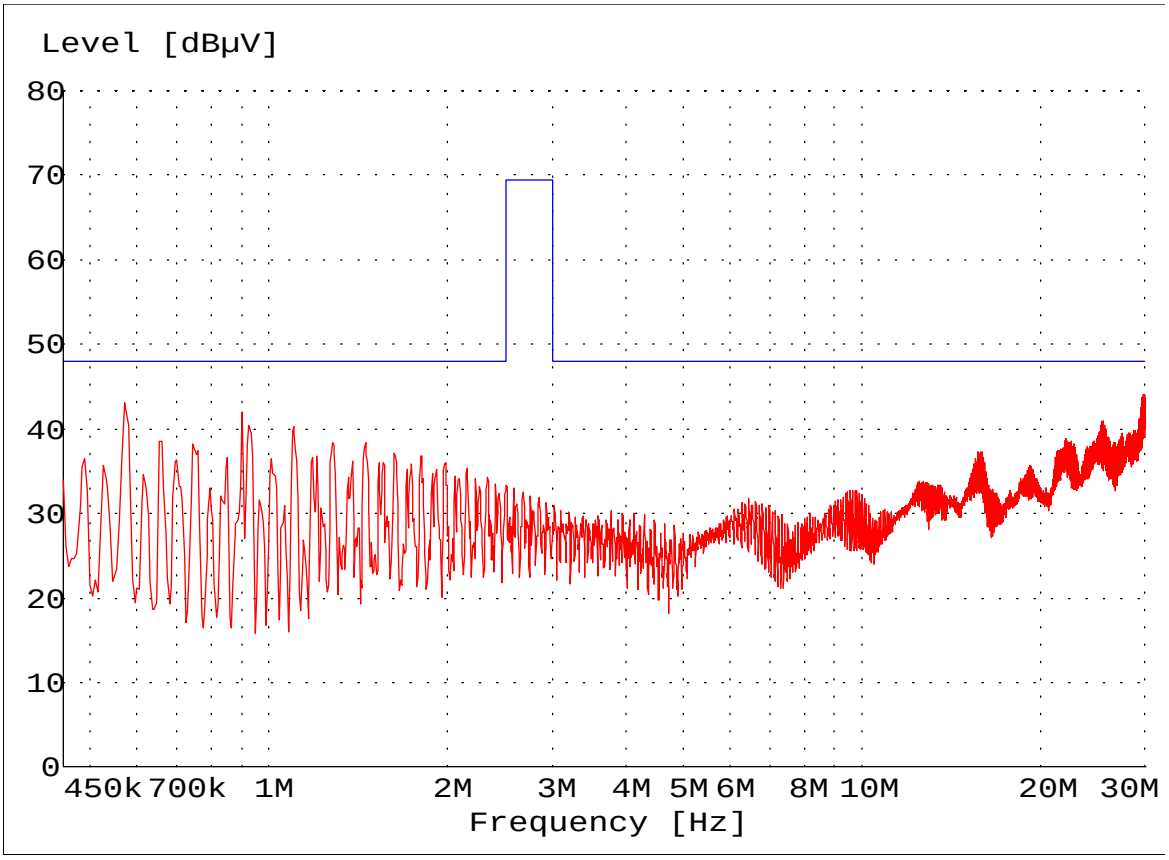


Table with the Quasi Peak measurements results

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.570000	40.60	0.30	48.00	7.40	N	GND
0.750000	38.50	0.40	48.00	9.50	N	GND
0.900000	40.20	0.40	48.00	7.80	N	GND
0.925000	39.70	0.40	48.00	8.30	N	GND
1.280000	38.80	0.50	48.00	9.20	N	GND
25.220000	32.90	1.40	48.00	15.10	N	GND
25.310000	33.10	1.40	48.00	14.90	N	GND
25.400000	33.10	1.40	48.00	14.90	N	GND
25.485000	33.20	1.40	48.00	14.80	N	GND
25.570000	33.10	1.40	48.00	14.90	N	GND
25.660000	32.80	1.40	48.00	15.20	N	GND
25.835000	32.00	1.40	48.00	16.00	N	GND
28.910000	32.80	1.60	48.00	15.20	N	GND
29.380000	34.70	1.60	48.00	13.30	N	GND
29.470000	35.20	1.60	48.00	12.80	N	GND
29.560000	36.50	1.60	48.00	11.50	N	GND
29.650000	37.10	1.60	48.00	10.90	N	GND
29.735000	36.40	1.60	48.00	11.60	N	GND
29.830000	38.00	1.60	48.00	10.00	N	GND
29.915000	36.90	1.60	48.00	11.10	N	GND

Supply Voltage: **120V**
Frequency: **60Hz**
Noise measured on: **L1**

Red line: Peak measurement results
Blue limit line: FCC CFR 47 Part 18 Subpart C - RF Lightning Devices - Consumer Equipment



Quasi Peak measurement results Phase L1

Red line: Quasi Peak measurement results
Blue limit line: FCC CFR 47 Part 18 Subpart C - RF Lightning Devices - Consumer Equipment

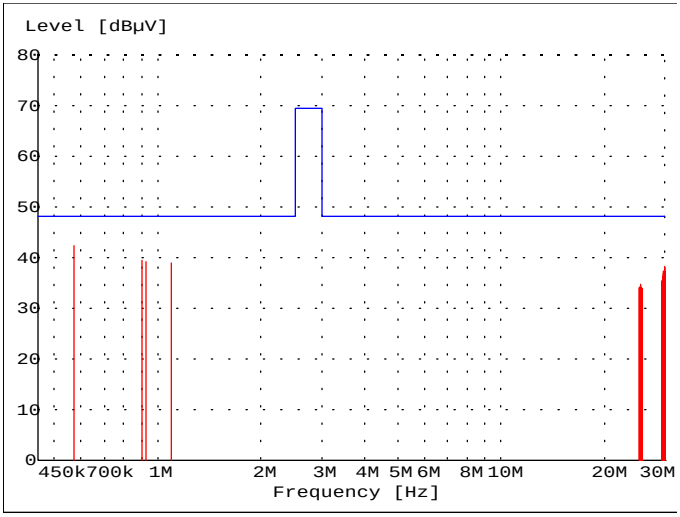


Table with the Quasi Peak measurements results

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.570000	42.30	0.30	48.00	5.70	L1	GND
0.900000	39.40	0.40	48.00	8.60	L1	GND
0.925000	39.20	0.40	48.00	8.80	L1	GND
1.100000	38.80	0.40	48.00	9.20	L1	GND
25.215000	33.90	1.40	48.00	14.10	L1	GND
25.305000	34.10	1.40	48.00	13.90	L1	GND
25.385000	34.70	1.40	48.00	13.30	L1	GND
25.480000	34.30	1.40	48.00	13.70	L1	GND
25.565000	34.30	1.40	48.00	13.70	L1	GND
25.655000	33.90	1.40	48.00	14.10	L1	GND
25.735000	34.00	1.40	48.00	14.00	L1	GND
29.370000	34.90	1.60	48.00	13.10	L1	GND
29.415000	35.20	1.60	48.00	12.80	L1	GND
29.460000	35.40	1.60	48.00	12.60	L1	GND
29.550000	36.30	1.60	48.00	11.70	L1	GND
29.640000	36.90	1.60	48.00	11.10	L1	GND
29.730000	37.40	1.60	48.00	10.60	L1	GND
29.820000	38.00	1.60	48.00	10.00	L1	GND
29.910000	38.00	1.60	48.00	10.00	L1	GND
29.995000	37.20	1.60	48.00	10.80	L1	GND

Radiated Emission Graphics and Tables

Supply Voltage: **120V**
Frequency: **60Hz**
Measurement distance: **10m**
Polarization: **VERTICAL**

Quasi Peak measurement results

Blue limit line: FCC CFR 47 Part 18 Subpart C - RF Lightning Devices - Consumer Equipment
Red bar graph: Quasi Peak measured signals.

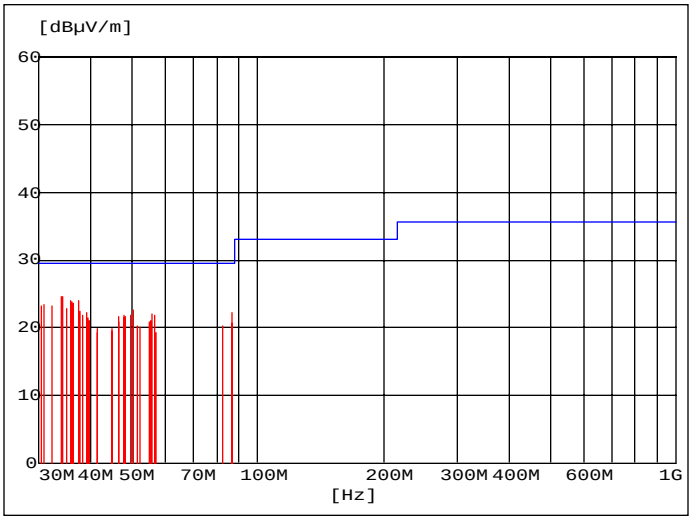


Table with Quasi Peak measurements results **Vertical Polarization**

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	IFBW kHz	Height cm	Azi deg	Pol	Comment
30.376000	23.20	14.50	29.50	6.30	120	100.0	0.00	VER	
30.794000	23.30	14.40	29.50	6.20	120	100.0	0.00	VER	
32.218000	23.10	14.30	29.50	6.40	120	100.0	0.00	VER	
33.932000	24.50	14.10	29.50	5.00	120	100.0	0.00	VER	
34.067000	24.50	14.10	29.50	5.00	120	100.0	0.00	VER	
35.066000	22.90	13.90	29.50	6.60	120	100.0	0.00	VER	
35.707000	23.90	13.90	29.50	5.60	120	100.0	0.00	VER	
35.886000	23.80	13.90	29.50	5.70	120	100.0	0.00	VER	
36.124000	23.40	13.80	29.50	6.10	120	100.0	0.00	VER	
36.370000	23.50	13.80	29.50	6.00	120	100.0	0.00	VER	
37.362000	24.00	13.70	29.50	5.50	120	100.0	0.00	VER	
37.766000	22.40	13.60	29.50	7.10	120	100.0	0.00	VER	
38.214000	21.90	13.60	29.50	7.60	120	100.0	0.00	VER	
39.110000	22.20	13.50	29.50	7.30	120	100.0	0.00	VER	
39.392000	21.40	13.50	29.50	8.10	120	100.0	0.00	VER	
39.595000	21.00	13.40	29.50	8.50	120	100.0	0.00	VER	
41.235000	19.30	13.20	29.50	10.20	120	100.0	0.00	VER	
41.337000	19.90	13.20	29.50	9.60	120	100.0	0.00	VER	
44.737000	19.40	12.70	29.50	10.10	120	100.0	0.00	VER	
44.875000	19.90	12.70	29.50	9.60	120	100.0	0.00	VER	
46.537000	20.70	12.40	29.50	8.80	120	100.0	0.00	VER	
46.653000	21.60	12.40	29.50	7.90	120	100.0	0.00	VER	
47.780000	21.90	12.20	29.50	7.60	120	100.0	0.00	VER	
47.982000	21.50	12.20	29.50	8.00	120	100.0	0.00	VER	
48.134000	21.70	12.20	29.50	7.80	120	100.0	0.00	VER	
49.796000	21.90	11.90	29.50	7.60	120	100.0	0.00	VER	
50.302000	22.70	11.80	29.50	6.80	120	100.0	0.00	VER	
51.542000	20.30	11.60	29.50	9.20	120	100.0	0.00	VER	
52.236000	20.10	11.40	29.50	9.40	120	100.0	0.00	VER	
55.033000	20.70	10.80	29.50	8.80	120	100.0	0.00	VER	
55.553000	21.00	10.70	29.50	8.50	120	100.0	0.00	VER	
55.727000	22.00	10.70	29.50	7.50	120	100.0	0.00	VER	
56.558000	21.90	10.50	29.50	7.60	120	100.0	0.00	VER	
57.180000	19.30	10.40	29.50	10.20	120	100.0	0.00	VER	
82.559000	20.20	8.90	29.50	9.30	120	100.0	0.00	VER	
86.676000	20.60	9.30	29.50	8.90	120	100.0	0.00	VER	
86.927000	22.20	9.40	29.50	7.30	120	100.0	0.00	VER	

Supply Voltage: **120V**
Frequency: **60Hz**
Measurement distance: **10m**
Polarization: **HORIZONTAL**

Quasi Peak measurement results

Blue limit line: FCC CFR 47 Part 18 Subpart C - RF Lightning Devices - Consumer Equipment
Red bar graph: Quasi Peak measured signals.

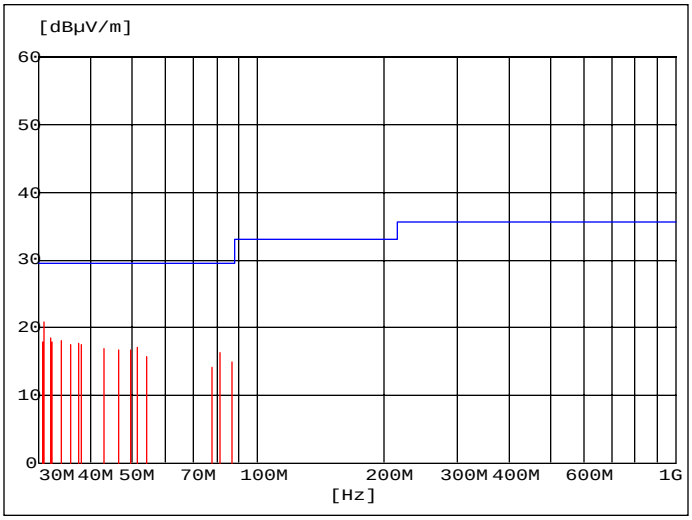
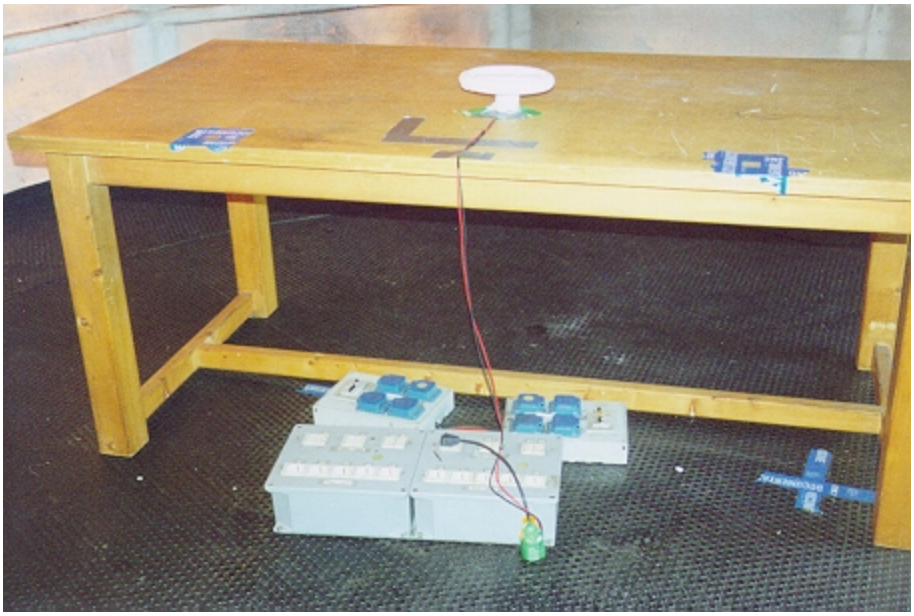


Table with Quasi Peak measurements results **Horizontal Polarization**

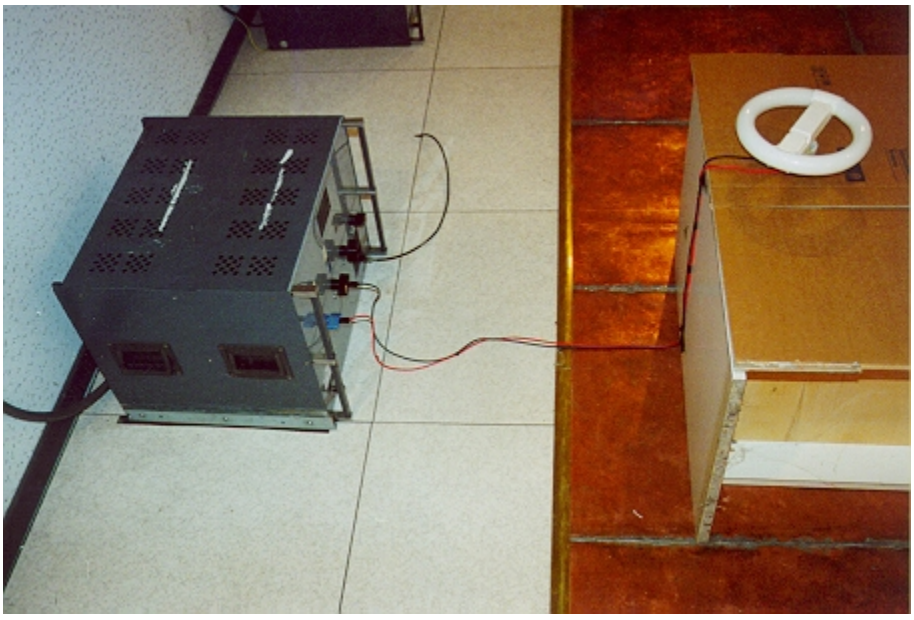
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	IFBW kHz	Height cm	Azi deg	Pol	Comment
30.563000	17.80	14.40	29.50	11.70	120	350.0	0.00	HOR	
30.839000	20.70	14.40	29.50	8.80	120	350.0	0.00	HOR	
31.942000	18.50	14.30	29.50	11.00	120	350.0	0.00	HOR	
32.337000	17.90	14.20	29.50	11.60	120	350.0	0.00	HOR	
33.940000	18.10	14.10	29.50	11.40	120	350.0	0.00	HOR	
35.833000	17.50	13.90	29.50	12.00	120	350.0	0.00	HOR	
37.361000	17.60	13.70	29.50	11.90	120	350.0	0.00	HOR	
37.918000	17.40	13.60	29.50	12.10	120	350.0	0.00	HOR	
42.948000	16.90	13.00	29.50	12.60	120	350.0	0.00	HOR	
46.609000	16.60	12.40	29.50	12.90	120	350.0	0.00	HOR	
49.796000	16.70	11.90	29.50	12.80	120	350.0	0.00	HOR	
51.578000	17.00	11.60	29.50	12.50	120	350.0	0.00	HOR	
54.377000	15.80	11.00	29.50	13.70	120	350.0	0.00	HOR	
77.587000	14.10	9.00	29.50	15.40	120	350.0	0.00	HOR	
81.063000	16.30	8.70	29.50	13.20	120	350.0	0.00	HOR	
86.936000	15.00	9.40	29.50	14.50	120	350.0	0.00	HOR	

Pictures

Radiated test setup



Conducted test setup



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