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TEST REPORT

Report No.: 20119RET

TEST NAME: FCC PART 15.231 TESTING FOR EQUIPMENT WITH PERIODIC OPERATION IN THE BAND 40.66 – 40.70 MHz AND ABOVE 70 MHz

Product : REMOTE CONTROL EQUIPMENT IN THE 433 MHz FREQUENCY BAND
Trade Mark : COPRECI
Model/type Ref. : MMB-22600
Manufacturer : COPRECI S. COOP.
Requested by : COPRECI S. COOP.
Other identification of the product : FCC ID: R7BMMB22600
Standard(s) : USA FCC Part 15.231, 15.205, 15.209

This test report includes 2 annexes and therefore the total number of pages is 24.

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Date: 2004-06-11	Test operator A. Llamas	Revised by: Date: 15-June-2004 A. Rojas EMC Manager	Approved by: Date: June 15 th 2004 F. Broissin Division Director	Page: 1 of 8
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ANNEX A. TEST RESULTS

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1. COMPETENCE AND GUARANTEES

Centro de Tecnología de las Comunicaciones (CETECOM), S.A. is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 905266.

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In order to assure the traceability to other national and international laboratories, CETECOM has a calibration and maintenance programme for its measuring equipment.

CETECOM guarantees the reliability of the data presented in this report, which is the result of measurements and tests performed to the item under test on the date and under the conditions stated on the report and is based on the knowledge and technical facilities available at CETECOM at the time of execution of the test.

CETECOM is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the item under test and the results of the test.

2. GENERAL CONDITIONS

1. This report only refers to the item that has undergone the test.
2. This report does not constitute or imply by its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without written approval of CETECOM.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of CETECOM and the Accreditation Bodies.

3. CHARACTERISTICS OF THE TEST

3.1 TEST REQUESTED

Measurements for equipment with periodic operation in the band 40.66 – 40.70 MHz and above 70 MHz, according to FCC Part 15.231.

3.2 REQUIREMENTS AND METHOD

The test has been carried out according to FCC parts 15.33, 15.35, 15.205, 15.209 and 15.231.

The testing was performed according to the procedure in ANSI C63.4 (1992). Radiated testing was performed in Cetecom's semi-anechoic chamber. This site has been fully described in a report submitted to the FCC and was accepted in a letter dated July 25, 2002.

The instrumentation used to perform the testing is listed below:

1. Semianechoic Absorber Lined Chamber IR 11. BS.
2. Control Chamber IR 12.BC.
3. Spectrum Analyzer HP 8566 B.
4. RF Preselector HP 85685A.
5. Quasi-peak adaptor HP 85650A.
6. RF linear amplifier HP 8447.F
7. Antenna mast EM 1072 NMT.
8. Rotating table EM 1084-4. ON.
9. Mast controller EM 1053-22.
10. Rotating table controller EM 1064-4023.
11. Process controller HP 98581C.
12. Harddisk HP 9153.
13. Peripheral unit HP 9153 C.
14. Measurement software HP 85879A.
15. 3 dB attenuator HP 8491A.
16. Bilog antenna CHASE CBL6111.
17. Bilog antenna CHASE CBL6111.
18. Antenna tripod EMCO 11968C.
19. Double-ridge Guide Horn antenna 1-18 GHz HP 11966E.
20. EMI Test Receiver R&S ESIB26.

4. IDENTIFICATION DATA SUPPLIED BY THE APPLICANT

Identification data in this section has been supplied by the client.

4.1 APPLICANT

Name or Company: COPRECI S. COOP.

V.A.T.: F-20025474

Address: Avda. de Alava, 3

City: Aretxabaleta (Guipúzcoa)

Postal code: 20550

Country: SPAIN

Telephone: +34 943719499

Fax: +34 943792349

4.2 REPRESENTATIVE

Name: Georgia Theodorou

4.3 TEST SAMPLES SUPPLIER

Name or Company: Same as indicated in point 4.1.

Samples undergoing test have been selected by: **the client.**

4.4 IDENTIFICATION OF ITEM/ITEMS TESTED

Product: REMOTE CONTROL EQUIPMENT IN THE 433 MHz FREQUENCY BAND

Trade mark: COPRECI

Model: MMB-22600

Manufacturer: COPRECI S. COOP.

Country of manufacture: SPAIN

Manufacture site: Avda. de Alava, 3, Aretxabaleta (Guipúzcoa) SPAIN

Description: Combination control incorporating an automatic thermoelectric safety shut-off valve and a low-med-high setting motorized automatic valve commanded by remote control.

5. USAGE OF SAMPLES, PERIOD OF TESTING AND ENVIRONMENTAL CONDITIONS

5.1 USAGE OF SAMPLES

Sample M/01 is formed by the following elements:

<u>Control No.</u>	<u>Description</u>	<u>Model</u>	<u>Serial No.</u>	<u>Date of reception</u>
20119/01	Remote control transmitter	MMB-22600	Prototype	22/04/04

Sample M/02 is formed by the following elements:

<u>Control No.</u>	<u>Description</u>	<u>Model</u>	<u>Serial No.</u>	<u>Date of reception</u>
20119/02	Remote control transmitter with antenna connector	MMB-22600	Prototype	22/04/04

1. Sample M/01 has undergone following test(s).
Radiated measurements indicated in annex A.
2. Sample M/02 has undergone following test(s).
All tests indicated in annex A, except radiated measurements.

5.2 PERIOD OF TESTING

The performed test started on 2004-04-26 and finished on 2004-04-27.

The tests as detailed in this report have been performed at CETECOM.

5.3 ENVIROMENTAL CONDITIONS

In the control chamber the following limits were not exceeded during the test:

Temperature	Min. = 21 °C Max. = 22 °C
Relative humidity	Min. = 47 % Max. = 48 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 k Ω
Reference resistance to earth	< 0,5 Ω

In the semianechoic chamber (21 meters x 11 meters x 8 meters) the following limits were not exceeded during the test.

Temperature	Min. = 24 °C Max. = 24 °C
Relative humidity	Min. = 44 % Max. = 44 %
Air pressure	Min. = 1008 mbar Max. = 1010 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

In the chamber for conducted measurements the following limits were not exceeded during the test:

Temperature	Min. = 26 °C Max. = 27 °C
Relative humidity	Min. = 52 % Max. = 53 %
Air pressure	Min. = 1010 mbar Max. = 1012 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

6. TEST RESULTS

Abbreviations used in the VERDICT column of the following tables are:

P	Pass
F	Fail
NA	not applicable
NM	not measured

FCC PART 15 PARAGRAPH	VERDICT			
	NA	P	F	NM
15.231 Subclause (a) (e). Manual, automatic and periodic operation		P		
15.231 Subclause (c). Emission bandwidth		P		
15.231 Subclause (b) (e). Field strength of emissions		P		

7. REMARKS AND COMMENTS

None.

8. SUMMARY

Based on the results of the performed test, stated in annex A the item under test is **IN COMPLIANCE** with the specifications listed in section 3.1 “TEST REQUESTED”.

NOTE: The results presented in this Test Report apply only to the particular item under test declared in section 4.4 “IDENTIFICATION OF ITEM/ITEMS TESTED” of this document, as presented for test on the date(s) declared in section 5, “USAGE OF SAMPLES, PERIOD OF TESTING AND ENVIRONMENTAL CONDITIONS”.

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ANNEX A TEST RESULTS

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Annex A

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TEST CONDITIONS

Power supply (V):

$$V_{\text{nominal}} = 4.5 \text{ Vdc}$$

Type of power supply = 3 x type AAA LR03 batteries

Type of antenna = Integral antenna

TEST FREQUENCIES:

The equipment transmits at the nominal frequency of 433.93 MHz.

The test set-up and procedure was made in accordance to the general provisions of ANSI C63.4-1992.

CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is directly connected to the spectrum analyser via the connector (BNC type) provided with the test sample.

For measurement of occupied bandwidth, the sample is prepared so that transmits continuously when the batteries are connected.

RADIATED MEASUREMENTS

The equipment under test was scanned in the frequency range 30 to 5000 MHz.

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-1000 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 1m for the frequency range 1 GHz-5 GHz (1 GHz-18 GHz Double ridge horn antenna).

For radiated emissions in the range 1 GHz-5 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance. The sample is prepared so that transmits continuously when the batteries are connected

The equipment under test was set up on a non-conductive (wooden) platform one meter above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

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Section 15.231 Subclause (a) (1) (2) and Subclause (e). Transmitter deactivation.

SPECIFICATION

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

A transmitter activated automatically shall cease transmission within 5 seconds after activation.

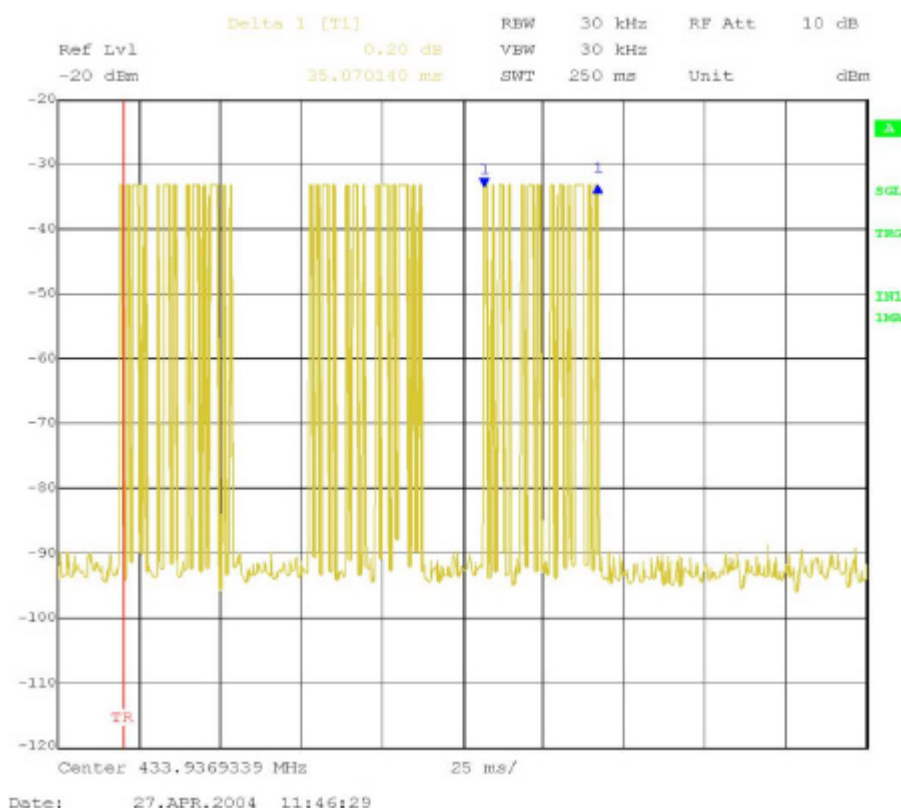
Intentional radiators which operates at predetermined intervals (periodic transmissions) shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

RESULTS

The equipment can operate in two modes: Manual mode and automatic mode.

-In manual mode, the transmission is activated by pressing a button and ceases after 148 milliseconds, although the button is continuously pressed.

The transmitted signal consists of 3 bursts of 36 ms (see next plot).



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Annex A

-In automatic mode, the above indicated transmission scheme is repeated periodically every 6 minutes.

Verdict: Pass

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Section 15.231 Subclause (c). 20 dB Emission Bandwidth

SPECIFICATION

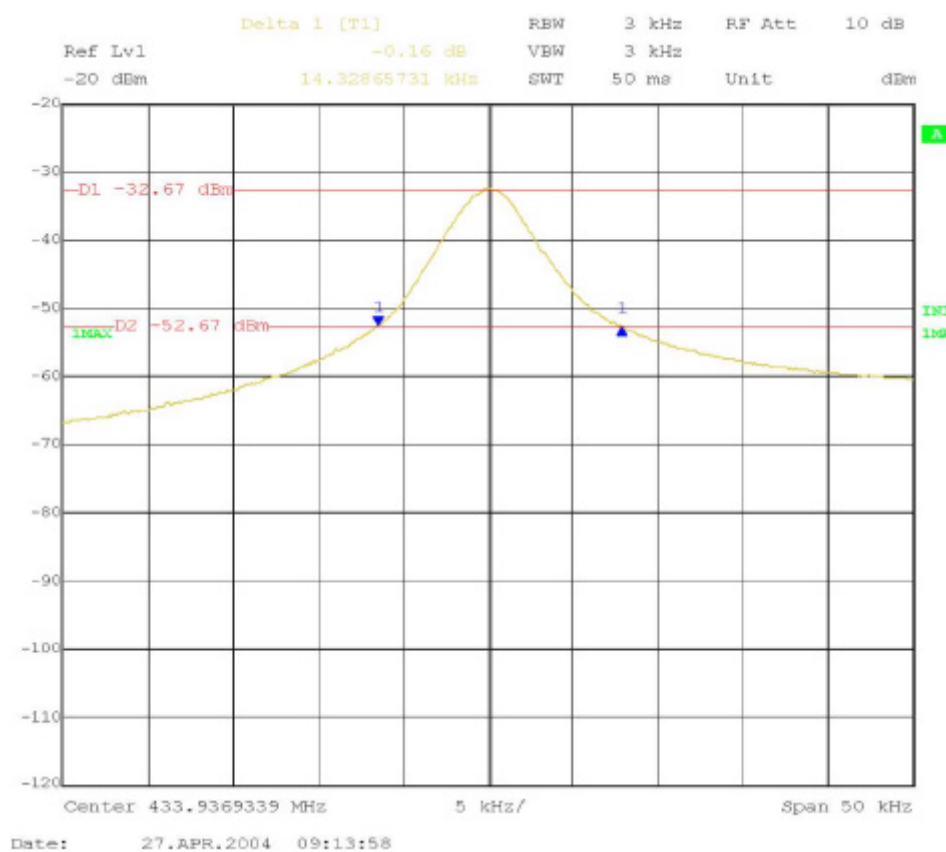
The bandwidth of the emission shall be no wider than 0.25 % of the centre frequency for devices operating above 70 MHz and below 900 MHz.

RESULTS

Nominal centre frequency = 433.93 MHz

Limit of spectrum bandwidth = 0.25 % of 433.93 MHz = 1084.82 kHz

Measured 20 dB Bandwidth (see next plot) = 14.33 kHz.



Verdict: Pass

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Section 15.231 Subclause (e)/15.209. Field strength and Emission limitations radiated (Transmitter)**SPECIFICATION**

The field strength of emissions from intentional radiators shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental ($\mu\text{V/m}$)	Field strength of spurious emissions ($\mu\text{V/m}$)
40.66 – 40.70	1000	100
70 – 130	500	50
130 - 174	500 to 1500 **	50 to 150 **
174 - 260	1500	150
260 - 470	1500 to 5000 **	150 to 500 **
Above 470	5000	500

** : Linear Interpolations. The maximum permitted unwanted emission level is 20dB below the maximum permitted fundamental level.

Spurious emissions shall be attenuated to the limits shown in the above table or to the general limits shown in Section 15.209, whichever limit permits a higher field strength.

RESULTS:

The field strength is calculated by adding correction factor to the measured level from the spectrum analyser. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

The equipment transmits continuously in the selected channel so it is not necessary a duty cycle correction factor.

Frequency range 30 MHz-1000 MHz (see next plots).

Frequency (MHz)	Polarization	Detector	Emission Level ($\mu\text{V/m}$)	Limits ($\mu\text{V/m}$) 15.231 (e) / 15.209
433.957 (Fundamental)	V	Quasi-peak	966.05	4399.3 / ---
867.929	H	Quasi-peak	61.66	439.93 / 200

Measurement uncertainty (dB): ± 3.8 dB

Frequency range 1 GHz-5 GHz (see next plots).

No spurious signals were found in all the range.

Verdict: PASS.

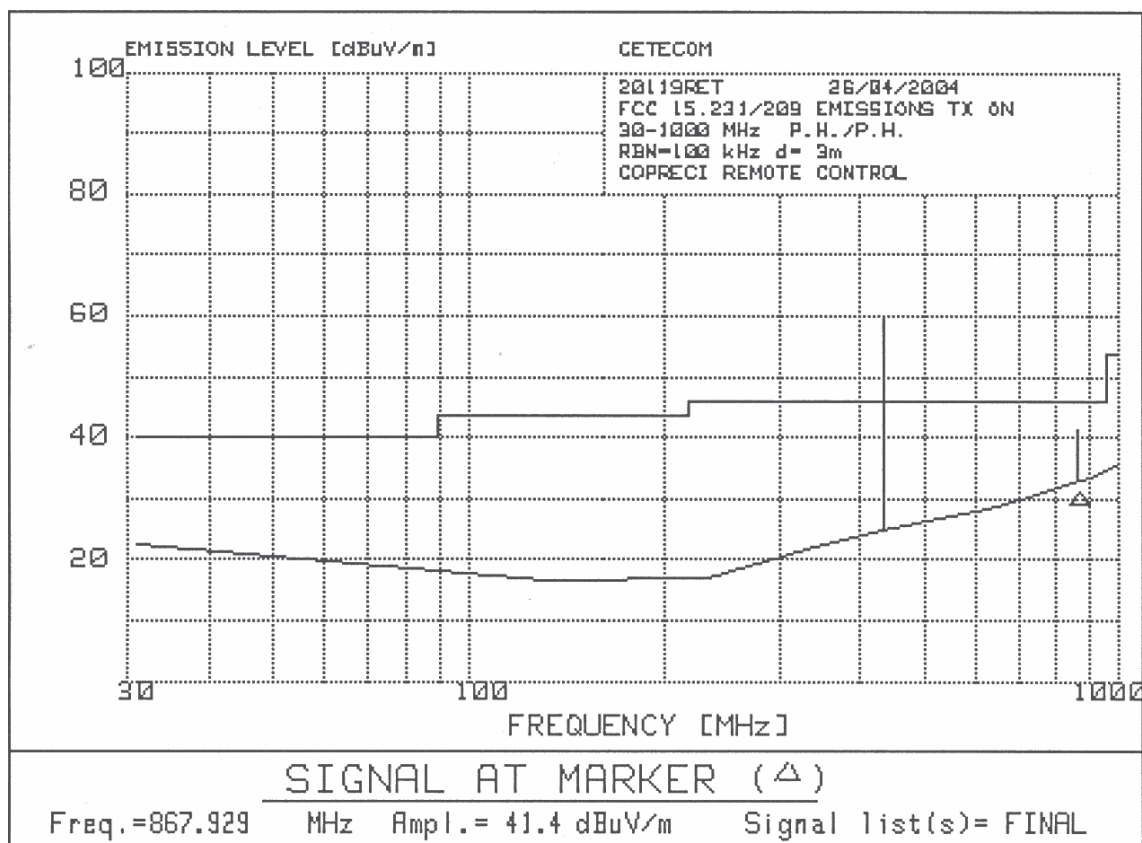
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Annex A

FREQUENCY RANGE 30 MHz-1000 MHz.



Note: The peak above the limit is the fundamental frequency.

Resolution bandwidth = 100 kHz.

Video bandwidth = 100 kHz.

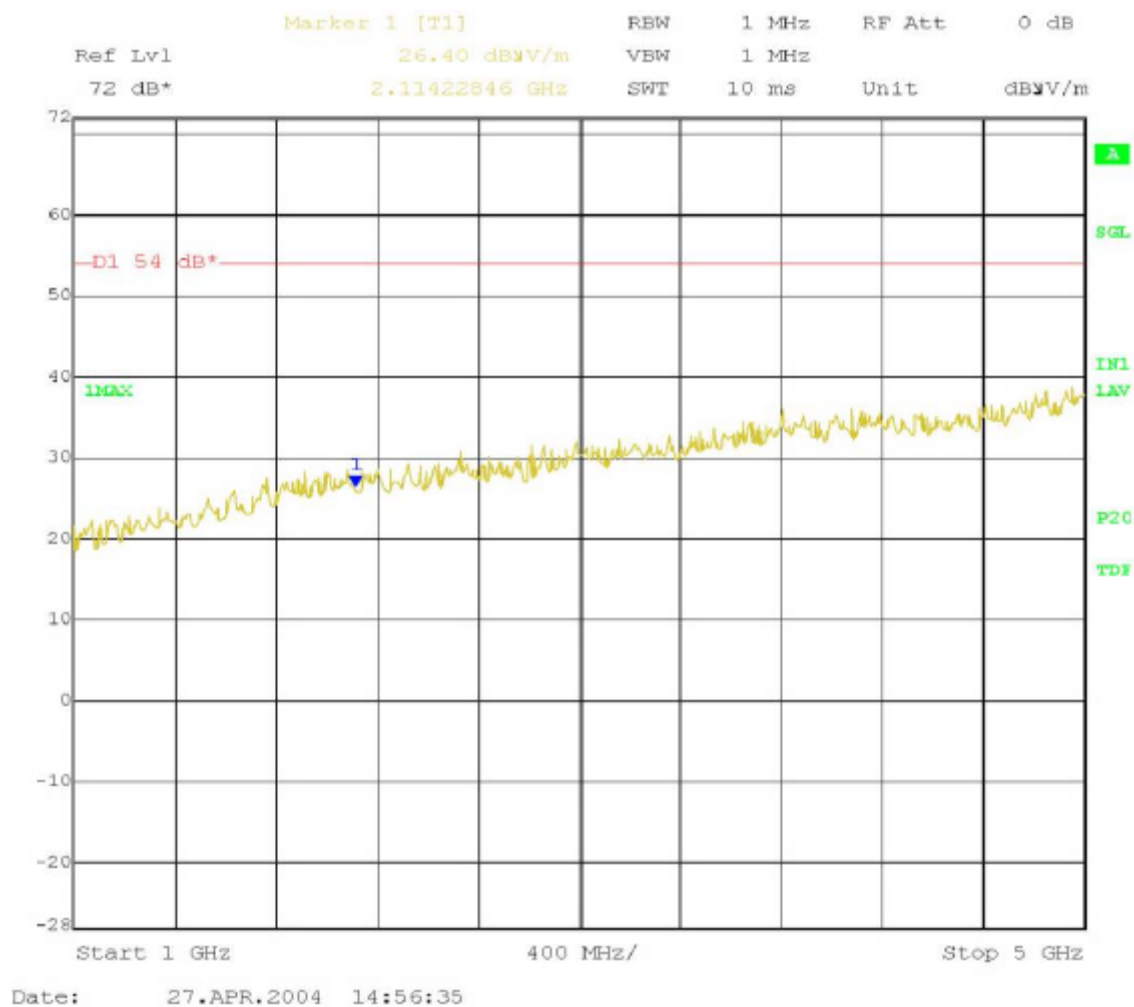
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Annex A

FREQUENCY RANGE 1 GHz to 5 GHz.



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ANNEX B

PHOTOGRAPHS **(Number of photographs: 5)**

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Annex B

1. Equipment under test for radiated measurements



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2. Equipment under test for conducted measurements.



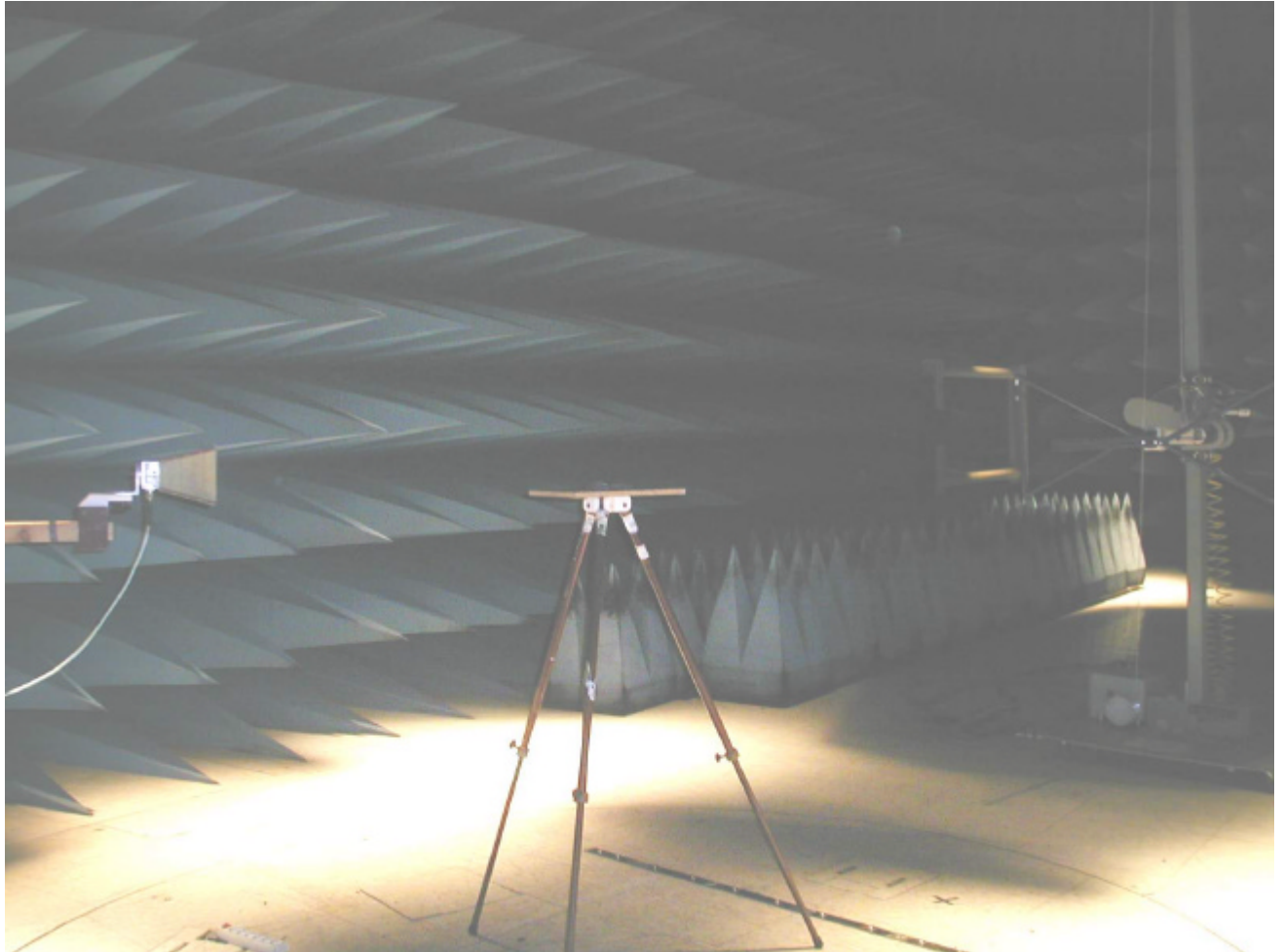
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Annex B

3. General test set-up for radiated measurements.



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4. Test set-up for radiated measurements below 1 GHz.



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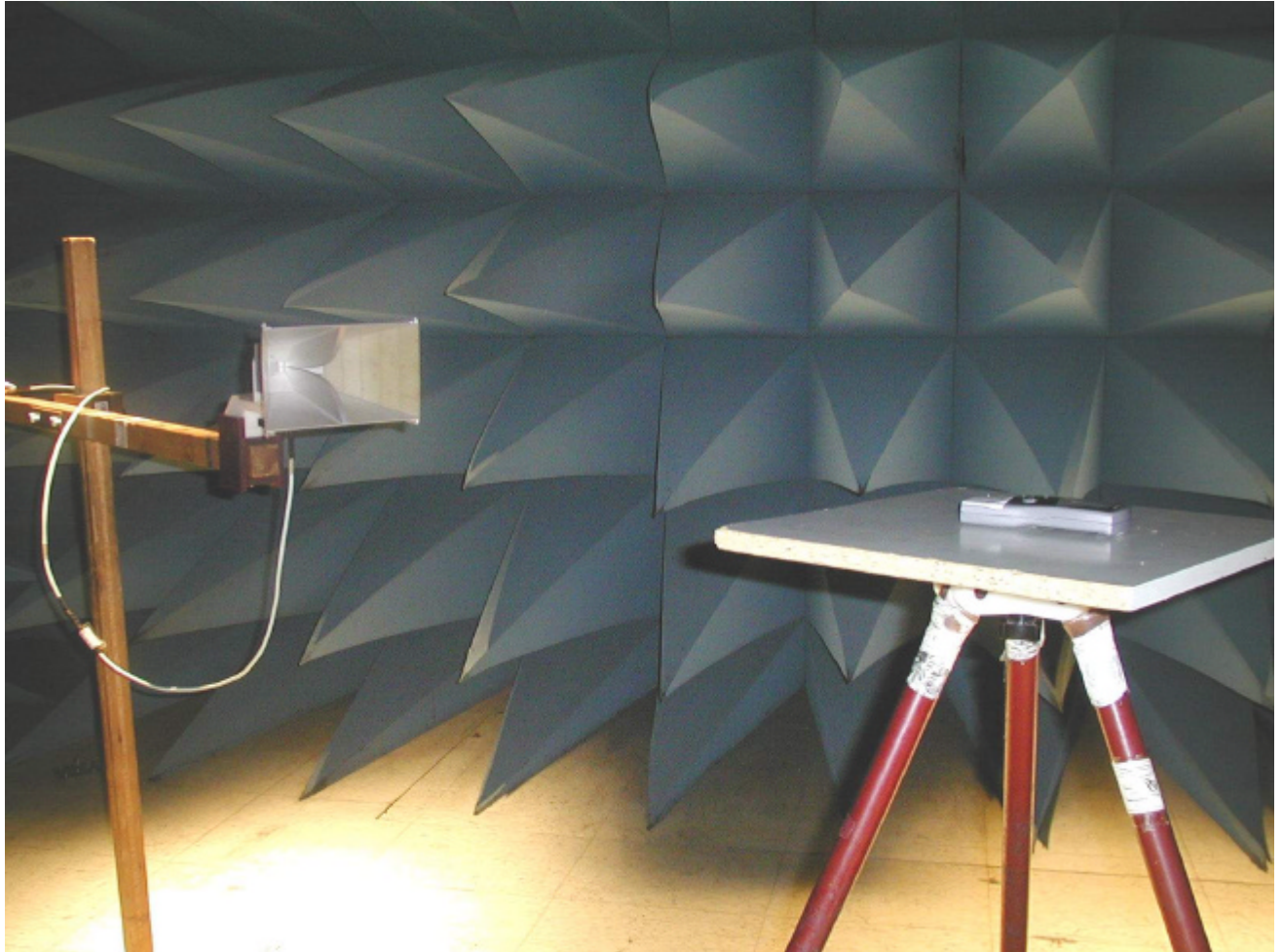
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5. Test set-up for radiated measurements above 1 GHz.



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