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EQUIPMENT UNDER TEST : FERRARI R/C SCALE 1:43 Freq 27.145 MHz
APPARECCHIO IN PROVA :

REFERENCE STANDARDS : 47 CFR Part 15C – Intentional Radiators
NORME DI RIFERIMENTO :

Customer:

RICHIEDENTE:

- **Dept. / Firm :** *Ente / Società':* Grani & Partners S.p.a.
- **Mr.:** *Sig.:* Sig.ra Daniela Dazzo
- **Address:** *Indirizzo:* Via Dell'Artigianato, 25 – 41030 Bastiglia (MO)
- **Tel.** : *Telefono :* +39 059 816411
- **Telefax** *Fax :* +39 059 904509
- **E-mail:** info@graniepartners.com

Site of test execution: Via Campagna, 92 - 22020 Gaggino Faloppio (CO) - Italy
Località esecuzione prove:

Date of test samples receipt: **06/11/06** **Date of start test:** **06/11/06**
Data ricevimento campioni: *Data inizio prove:*

Date of end test **06/11/06**
Data fine prove:

Witness to the test:
Presenti alle prove:

Nobody / Nessuno
…….

Signature of the engineers:
Firma esecutore prove:

……
Luca Casiraghi

Signature of the Laboratory Director:
Firma Direttore Laboratori:

……
Massimo Maltempi

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0. CONTENTS

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1. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

1.1 Identification

Brand name:	GRANI & PARTNERS S.P.A.
Manufacturer:	GRANI & PARTNERS S.P.A.
Equipment :	GAME
Model name or No. :	FERRARI R/C SCALE 1:43 Freq 27.145 MHz
FCC ID:	UR6FERRARIRC-27M
Serial number :	Not present
Country of manufacturer:	ITALY

1.2 Technical data

FCC class:	Intentional radiators, Class B
Supply voltage:	2x1.5V (LR6, AA)
Maximum internal frequency generated by EUT	27.145 MHz
Typical usage :	GAME
EUT single or system:	Single

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1.3 Transmitter technical data

TRANSMITTER	
• Working Frequency :	27.145 MHz
• Frequency Range of Operation :	26.96 - 27.28 MHz
• Antenna type :	Stilo

1.4 Modifications incorporated in E.U.T.

The following items are the modifications introduced in the equipment under test :

- None

1.5 Ports identification

This section contains descriptions of all signal ports and AC/DC power input/output ports, the length and the type of the cable provided by manufacturer needed for the tests.

Moreover it is specified if the ports are ever or optionally connected.

Port		Description	Connection
1	Enclosure	Plastic surface	By screws
2	AC power input/output ports	Line not present	********
3	DC power input/output ports	Transmitter: Battery 2x1.5V (LR6, AA)	Internal Battery support
4	Signals ports	Line not present	********
Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.			

1.6 Auxiliary equipment

No auxiliary equipment

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2. TEST CONDITIONS

2.1 Operating test modes and test conditions

The equipment has been tested according to the operative conditions described in the user/installation manual provided by the manufacturer and by following reference standards :

Reference Standard:

FCC Part 15, Subpart C, Section 15.227 and 15.209

In the following table there are the operating conditions adopted during tests identified by an indicator (#..) at which has been referred the item “Operating condition of the equipment under test” of all technical sheets of the tests (see Section 4)

Operating condition	Description
#1	Continuous transmission

2.2 Test overview

Sample tested is the main model of a complete set of 27.145 MHz RF transmitters.

The appliance is classified as “*intentional radiator”* in conformity to FCC Part 15 Sub. A §15.201, and it is subject to “*Certification*” procedure.

The application is mainly used for game system.

It is possible to declare that the appliance it is subject to additional requirements stated in §15.227, §15.209

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3. REFERENCE STANDARD FOR PERFORMED TESTS

Reference standard :	*Title :*
FCC Part 15 part A	Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC)
FCC Part 15 part C	Code of Regulations Part 15 (Radio Frequency Devices), Subpart C (Intentional Radiators) of the Federal Communication Commission (FCC)
ANSI C63.4	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz

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4. Summary of test results

4.1 Tests

	Port	Phenomena	Operating condition[1]	Result
1	Enclosure	Radiated emission	#1	Within the limit
		Frequency stability	Not applicable	
2	AC mains Input ports	RF Disturbance voltage: • continuous	Not applicable[2]	
		Bandwidth of emission	Not applicable[2]	
3	DC Power supply and Battery	Bandwidth of emission	#1	Within the limit

[1] Ref. Tab. of Section 2

[2] Not applicable: port not present in acc. To §15.207 (d)

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4.2 Emission limits

Acc. to §15.227 for intentional radiator operated within the frequency 27.145 MHz

Section 15.227 Operation within the band 26.96 - 27.28 MHz.

(a) The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

(b) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

According to §15.209 all the other emission of the appliance shall not exceed the following levels:

Section 15.209 Radiated emission limits, general requirements.

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency	Field Strength (microvolts/meter)	Measurement Distance (MHz) (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

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5. TEST RESULTS

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TEST 1.

RADIATED SPURIUS EMISSION AND FIELD STRENGTH LIMITS (FUNDAMENTAL)

REFERENCE DOCUMENT FCC PART 15 subpart C

- **TEST LOCATION:** Semi-anechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESMI
  Chase Antenna Mod. CBL 6111 A
  Rohde & Schwarz loop antenna HFH2-Z2
- **TESTED PORT:** Enclosure
- **EMISSION LIMITS:** Acc. to Section 15.209 + 15.227 of reference document
- **UNCERTAINTY OF MEASURE:** Combined uncertainty = ± 1.75 dB
  Total uncertainty = (k=2) ± 3.5 dB

TEST CONDITIONS:		**MEASURED**
Ambient temperature :	15 - 35 °C	24 ± 3 °C
Ambient humidity :	25 - 75 %rH	40 ± 5 %rH
Pressure :	85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :	internal battery	Transmitter: Battery 2x1.5V (LR6, AA)

OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMIT

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SCAN TABLE : field Loop Antenna

Unit :	dBµV	
	Detector :	Mode :
Curve 1:	MaxPeak	ClearWrite
Curve 2:	Average	ClearWrite

Start Frequency :	150.0 kHz		
Stop Frequency :	30.0 MHz	IF Bandwidth :	9 kHz
Measure Time :	10.0 ms	Step size :	6 kHz

Receiver :	*ESMI*	***Transducer :***	*HFH2-Z2 dBµV/m GLOBE*
Signal Path :	*Path spurie*	***System Transducer :***	*PathSpurie*
Meas. Mode :	*Lin*	***Add. Transd. 1 :***	*None*
Tracking Generator :	*Off*	***Add. Transd. 2 :***	*None*
Input :	*2DC*	***Add. Transd. 3 :***	*None*
Preamplifier :	*10 dB*	***Demodulation :***	*FM Broad*
RF Att. :	*Coupled*	***Volume :***	*0 %*
Ref. Level :	*-50.0 dBm*	***Squelch :***	*--*
Min. RF Att. :	*0 dB*	***Option :***	*None*
IF Att. :	*--*		
Autorange :	*On*		
Curve 1 :	*On*	***Repetition :***	*Single*
Curve 2 :	*On*	***Stop Mark :***	*On*
		Stop Message :	*On*
		Stop Message :	*Connect antenna*

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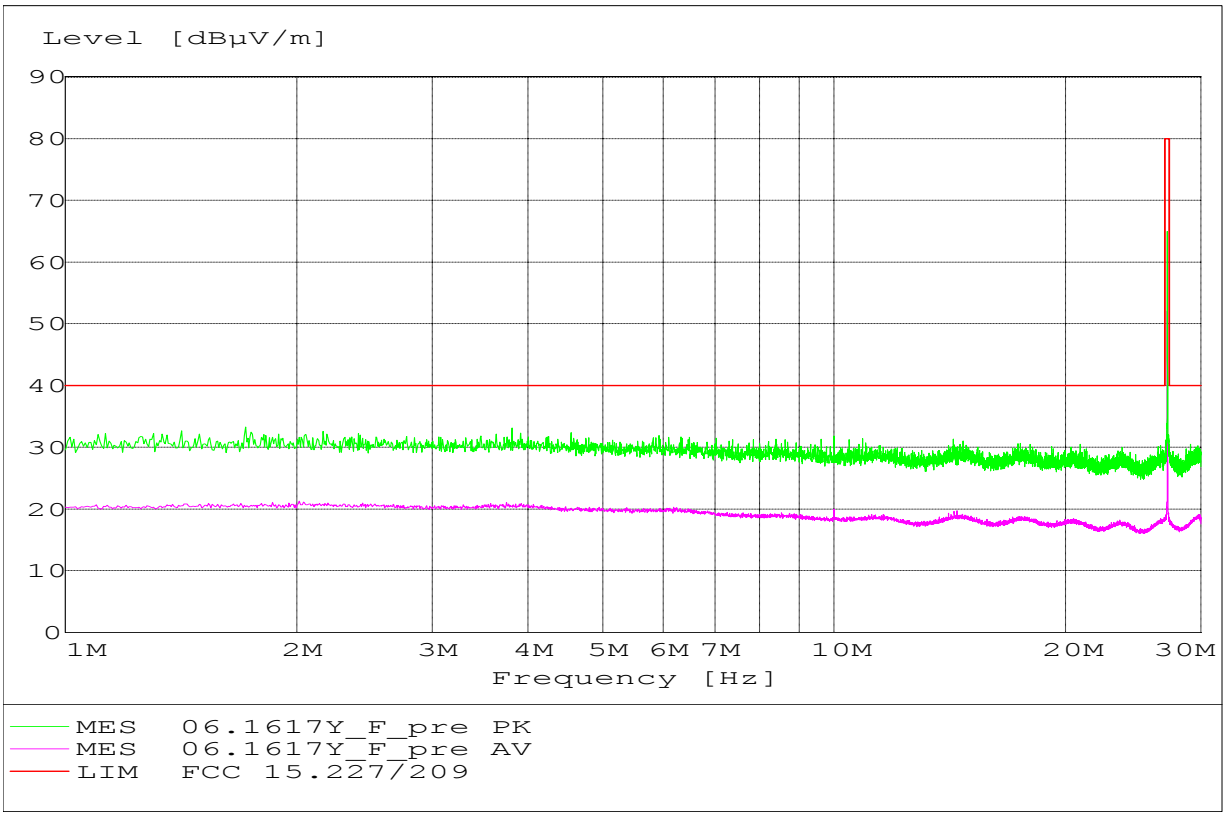

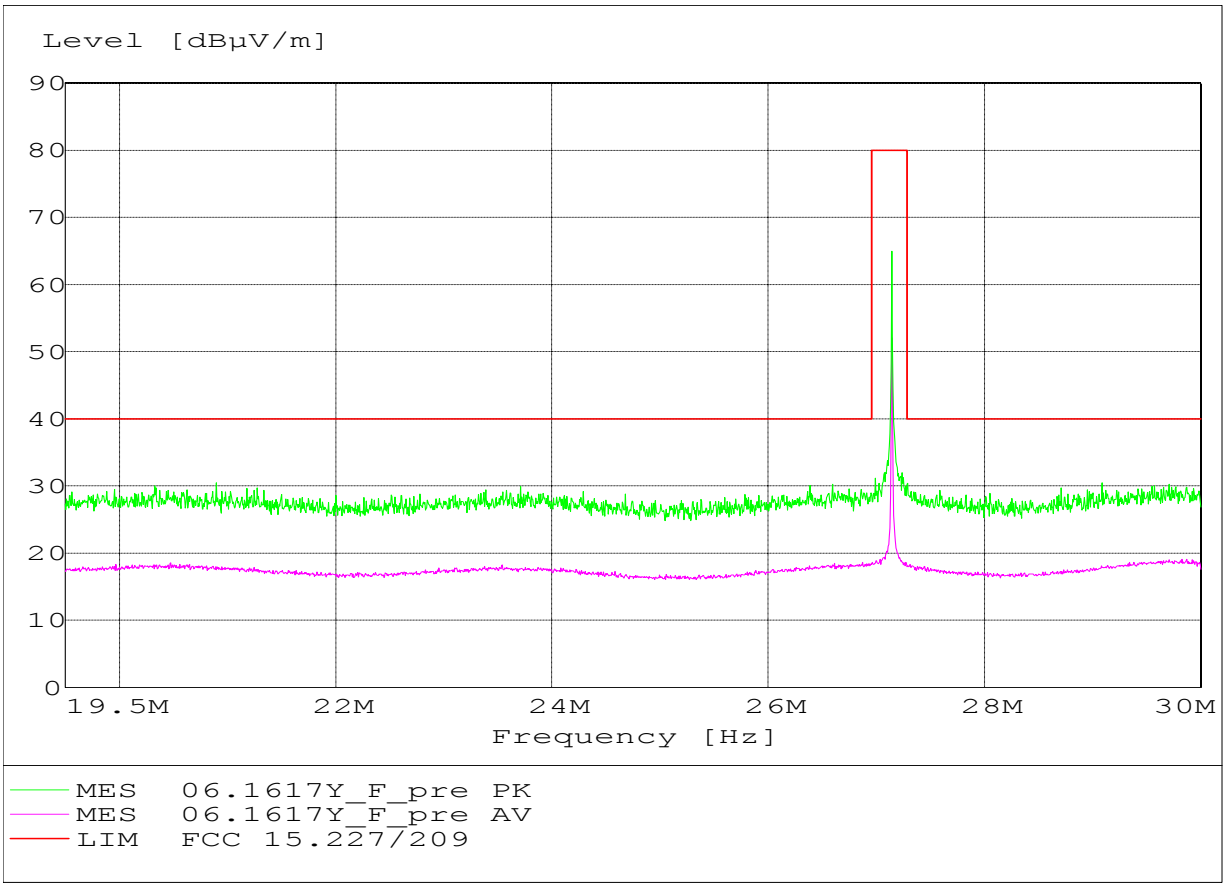

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SCAN TABLE : "Radiated Emission"

Unit:	dBμV/m		
	Detector : Mode:		
Curve1:	MaxPeak ClearWrite		
Curve2:	-- ClearWrite		
Subrange1:			
Start Frequency:	30.0 MHz	Step Size:	80 kHz
Stop Frequency:	1000.0 MHz		
Measure Time:	0.01 sec.		
IF Bandwidth:	120 kHz		
Receiver:	ESXI	Probe Transducer:	CHASE_6111_PRC
Signal Path:	Path 4	System Transducer:	RFin2-CP1/X11
Scan Mode:	Lin	Add. Transducer:	W71.01
Tracking Gen.:	Off		
Input:	2 DC		
Preamplifier:	10 dB	Demodulation:	FM Broad
RF att.:	Coupled	Volume:	0.0%
Ref. Level:	-50 dBm	Squelch:	--
Min. RF att.:	0 dBm	Option:	None
Autorange:	On		
Curve 1:	On	Repetition:	Single
Curve 2:	Off	Stop Mark:	On
		Stop Message:	On
		Text:	Connect antenna

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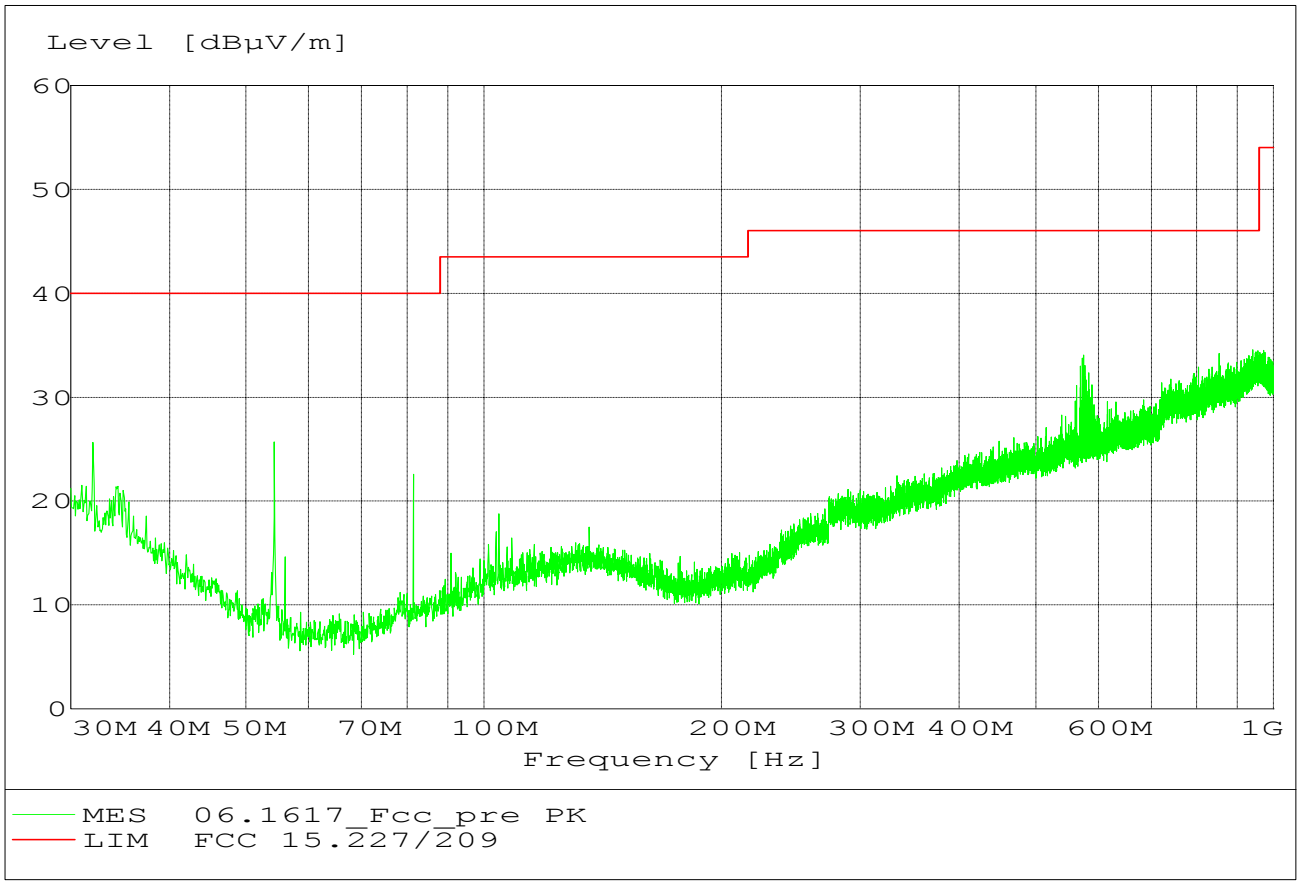

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Reference 15.227:

No	Emission Frequency	Level	Limit	Margin	Polarization
1	27.145 MHz	65.5 dBμV/m	80 dBμV/m	14.5 dB	Vertical

Reference 15.209:

No	Emission Frequency	Level	Limit	Margin	Polarization
1	54.290000 MHz	25.7 dBμV/m	40.0 dBμV/m	14.3 dB	Vertical
2	81.435000 MHz	22.6 dBμV/m	40.0 dBμV/m	17.4 dB	Vertical

- ***RESULT:***

The EUT is complied with this section.

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TEST 2.

TX – RANGE OF MODULATION BANDWIDTH

REFERENCE DOCUMENT FCC PART 15 subpart C

- **TEST LOCATION:** Control room
- **TEST EQUIPMENT USED FOR TEST:** Spectrum Analyzer Rohde & Schwarz Mod. FSP40

- **TESTED PORT:** AC Mains, DC Port and Battery
- **EMISSION LIMITS:** Acc. to Section 15.215 c) of reference document

TEST CONDITIONS:			**MEASURED**
Ambient temperature :	15 - 35 °C		24 ± 3 °C
Ambient humidity :	25 - 75 %rH		40 ± 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :	internal battery		Transmitter: Battery 2x1.5V (LR6, AA)

OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMIT

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MEASUREMENT RESULTS

TEST CONDITIONS		Occupied frequency range (at 20 dB point)		
		f_L [MHz]	F_C [MHz]	f_H [MHz]
T_{amb} : + 24 °C	V_{nom} : 3.0 Vdc	27,122	27.1452	27.168
Bandwidth = *(Measured at 10KHz Bandwidth)*		***46.0 kHz***		
Incertezza di misura / Measurement Uncertainty : ± 0.1 kHz				
Legenda / Abbreviations : f_L : Lowest frequency at 20dB point F_C : Central frequency f_H : Highest frequency at 20dB point				

LIMITS
• Limit for Section 15.227 within the band 26.96 - 27.28 MHz.
• For device operating above 70 MHz and below 900 MHz = 0.25% of the center frequency
• For device operating above 900 MHz = 0.5% of the center frequency

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6. EUT TECHNICAL DOCUMENTATION

6.1 Wiring diagrams

	Document reference (n., edition, date, ...)
WIRING DIAGRAM	No document
PART LIST	No document

6.2 Technical manual

	Document reference (n., edition, date, ...)
TCF	No document

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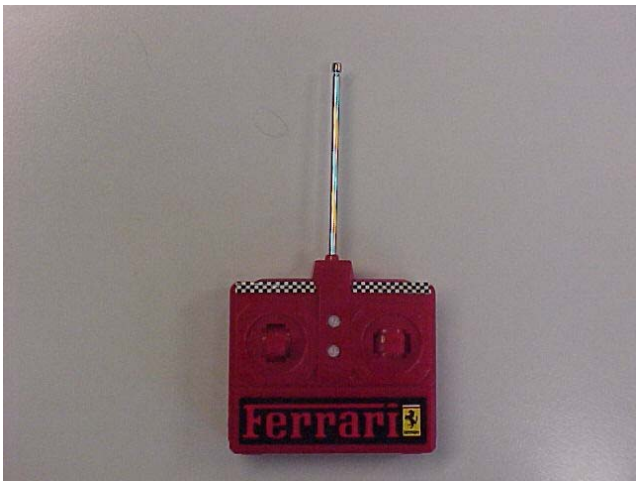
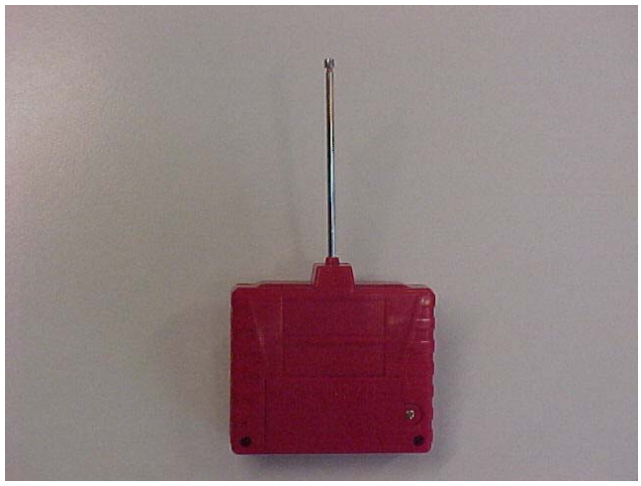
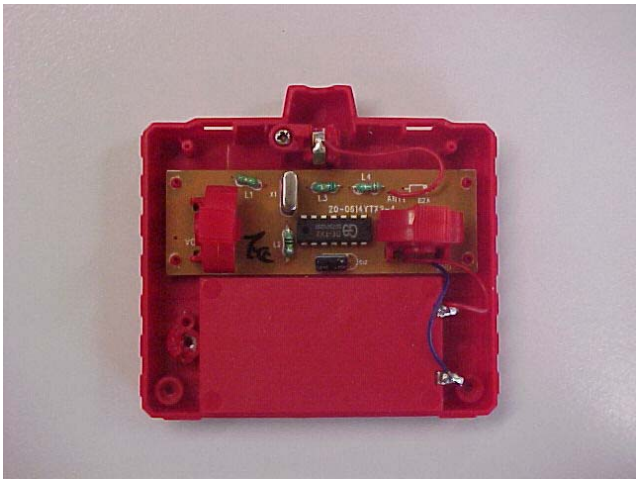
Photographic documentation

PHOTO N° 1 – EQUIPMENT UNDER TEST IDENTIFICATION







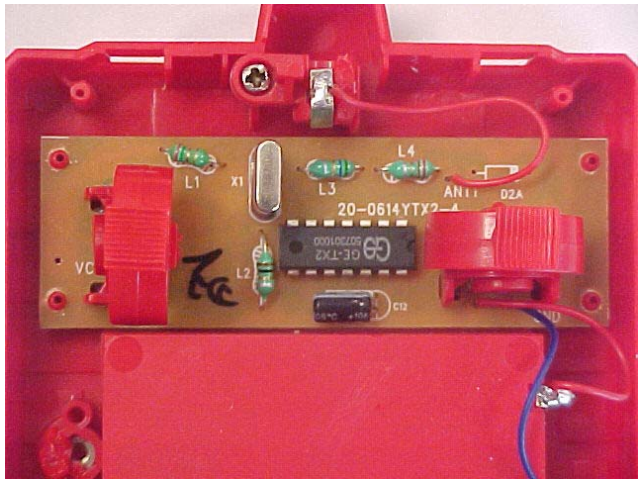


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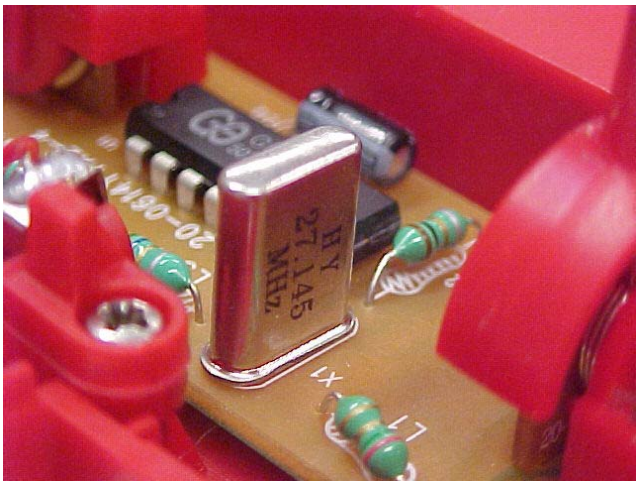
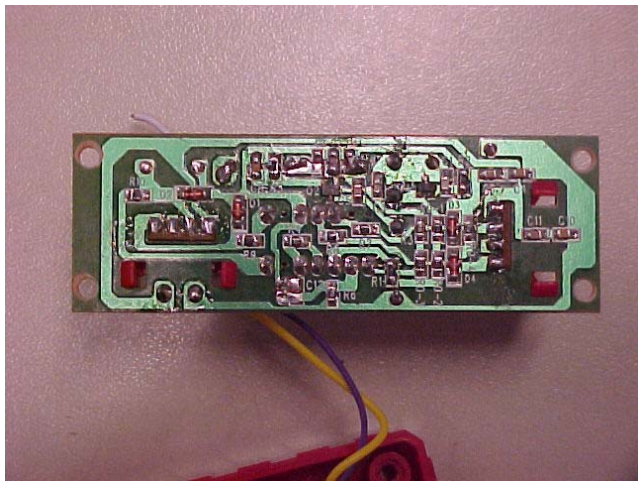
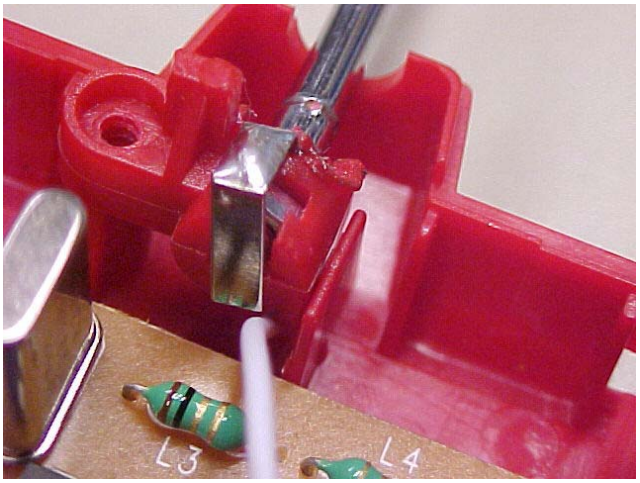
PHOTO N° 2 – EQUIPMENT UNDER TEST IDENTIFICATION







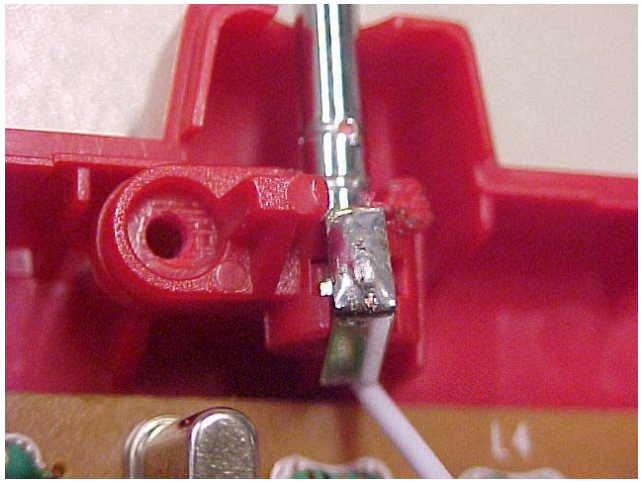


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PHOTO N° 4 – SET-UP RADIATED EMISSION TEST