TEST REPORT

ELECTROMAGNETIC COMPATIBILITY TEST

EMC.TR. 05.455

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

EQUIPMENT UNDER TEST : TRANSMITTER at 433.92 MHz
APPARECCHIO IN PROVA :

Model: TOP 432NA

REFERENCE STANDARDS : FCC 47CFR Part 15
NORME DI RIFERIMENTO :

CUSTOMER:
RICHIEDENTE:

- **Dept. / Firm :** CAME CANCELLI AUTOMATICI S.P.A.
  Ente / Società':
- **Mr.:** RAMOTI
  Sig.ra.:
- **Address:** VIA MARTIRI DELLA LIBERTA', 15 – 31030 DOSSON DI CASIER (TV) - ITALY
  Indirizzo:

Tel. : +39 0422490960 **Telefax:** +39 0422490944 • **E-mail:** mramoti@came.it
Telefono : *Fax :*

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

Date of test samples receipt: 18/04/2005
Data ricevimento campioni:

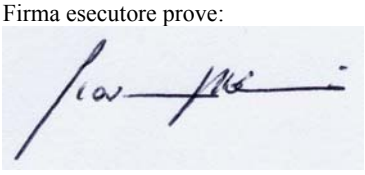
Date of start test: 18/04/2005
Data inizio prove:

Date of end test: 19/04/2005
Data fine prove:

Witness to the test:
Presenti alle prove:

Nobody / Nessuno
…….....

Signature of the engineers:
Firma esecutore prove:



.....
G. Molteni

Signature of the Laboratory Director:
Firma Direttore Laboratori:

.....
R. Furfari

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

0 CONTENTS

	Page	Rev	Date
0. CONTENTS	2	0	19/04/05
1. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)	3	0	19/04/05
1.1 Identification	3	0	19/04/05
1.2 EUT Classification	3	0	19/04/05
1.3 Modifications incorporated in E.U.T	3	0	19/04/05
1.4 Ports identification.	4	0	19/04/05
1.5 Operating test modes and test Conditions	5	0	19/04/05
2. TEST CONDITIONS	6	0	19/04/05
2.1 Operating test modes and test conditions	6	0	19/04/05
3. REFERENCE STANDARD FOR PERFORMED TESTS	6	0	19/04/05
4. Summary of test results	7	0	19/04/05
4.1 Emission Tests	7	0	19/04/05
4.2 Emission limits	7	0	19/04/05
5. TEST RESULTS	8	0	19/04/05
6. EUT TECHNICAL DOCUMENTATION	17	0	19/04/05
6.1 Wiring diagrams	17	0	19/04/05
6.2 Technical manual	17	0	19/04/05
6.3 Photographic documentation	18	0	19/04/05

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

1 TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

1.1 E.U.T. identification

Brand name:	CAME
Manufacturer :	CAME CANCELLI AUTOMATICI S.P.A.
Model name or No. :	TOP 432NA
Part number / Serial No.:	Not present
Country of manufacturer:	ITALY

1.2 E.U.T. classification

R&TTE category :	Transmitter 433,92 MHz in AM/ASK
Supply voltage:	3 Vdc internal battery type Lithium CR2016
Input Power / Current :	12 mA
Single or Multiple Unit :	Single
EUT Dimensions :	68 x 32 x 16 mm
Indoor / outdoor cables	No cables
FCC i.d.	M48TOP-NA

1.3 Modifications incorporated in E.U.T.

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

- None

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

1.4 Ports identification

This section contains descriptions of all signal ports and AC/DC power input/output ports, the maximum 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	Maximum length	Connection	Ancillaries / Modules / Support Equipment
1	Enclosure	Plastic case	----	snap in	----
2	AC power input/output ports	Not present	********	********	None
3	DC power input/output ports	3 Vdc by internal power supply	> 3 meter	Bipolar Connector	None
4	Signals Ports	Not present	********	********	None

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

1.5 Operating test modes and test Conditions

EUT was tested under the Standard operating conditions and normal loads indicated in the reference standards applied and in directions for use supplied by the manufacturer. In particular, the equipment shall be tested under normal test conditions contained in the relevant product and basic standard or in the information accompanying the equipment.

Table 1: Each operating condition adopted for the execution of the test (setting of the controls and/or mode(s) of operation) has been identified by an indicator (**#**.):

Operating condition (#)	*Description of the mode of operation*
(#1)	Transmission mode

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

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 15.209 and 15.249

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*

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

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

4 SUMMARY OF TEST RESULTS

4.1 EMISSION 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

4.2 Emission limits

Acc. to §15.231 for intentional radiator operated within the frequency 925 MHz

Frequency (MHz)	Field Strength of fundamental at a distance of 3m	Field Strength of spurious emission at a distance of 3m (μV/m)
433.92	**80.79 dBμV/m**	**60.79 dBμV/m**

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

Frequency (MHz)	Field Strength at a distance of 3m (μV/m)
30 - 88	**100 ****
88 – 216	**150 ****
216 – 960	**200 ****
Above 960	**500**

** 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., §§ 15.231 and 15.241.

[1] Ref. Tab. of Section 2
[2] Not applicable: port not present in acc. To §15.207 (d)

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

5 TEST RESULTS

TX – RADIATED FIELD 30 - 1000 MHz 9

TX – SPURIOUS EMISSION 1 - 10 GHz 12

TX – RANGE OF MODULATION BANDWIDTH 15

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

TEST 1.

TX – RADIATED FIELD 30 - 1000 MHZ

REFERENCE DOCUMENT: FCC47CFR Part 15

- **TEST SETUP:** According to reference standard
- **TEST LOCATION:** Semi-anechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESMI
  Biconical Antenna Rohde & Schwarz Mod. HK116
  Log-periodic Antenna Rohde & Schwarz Mod. HL223
  Log-periodic Antenna Rohde & Schwarz Mod. HL025

- **TESTED PORT:** Enclosure
- **FREQUENCY RANGE:** 30 - 1000 MHz
- **EMISSION LIMITS:** Acc. to Section 15.209 + 15.231 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 :			3 Vdc (internal battery)

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

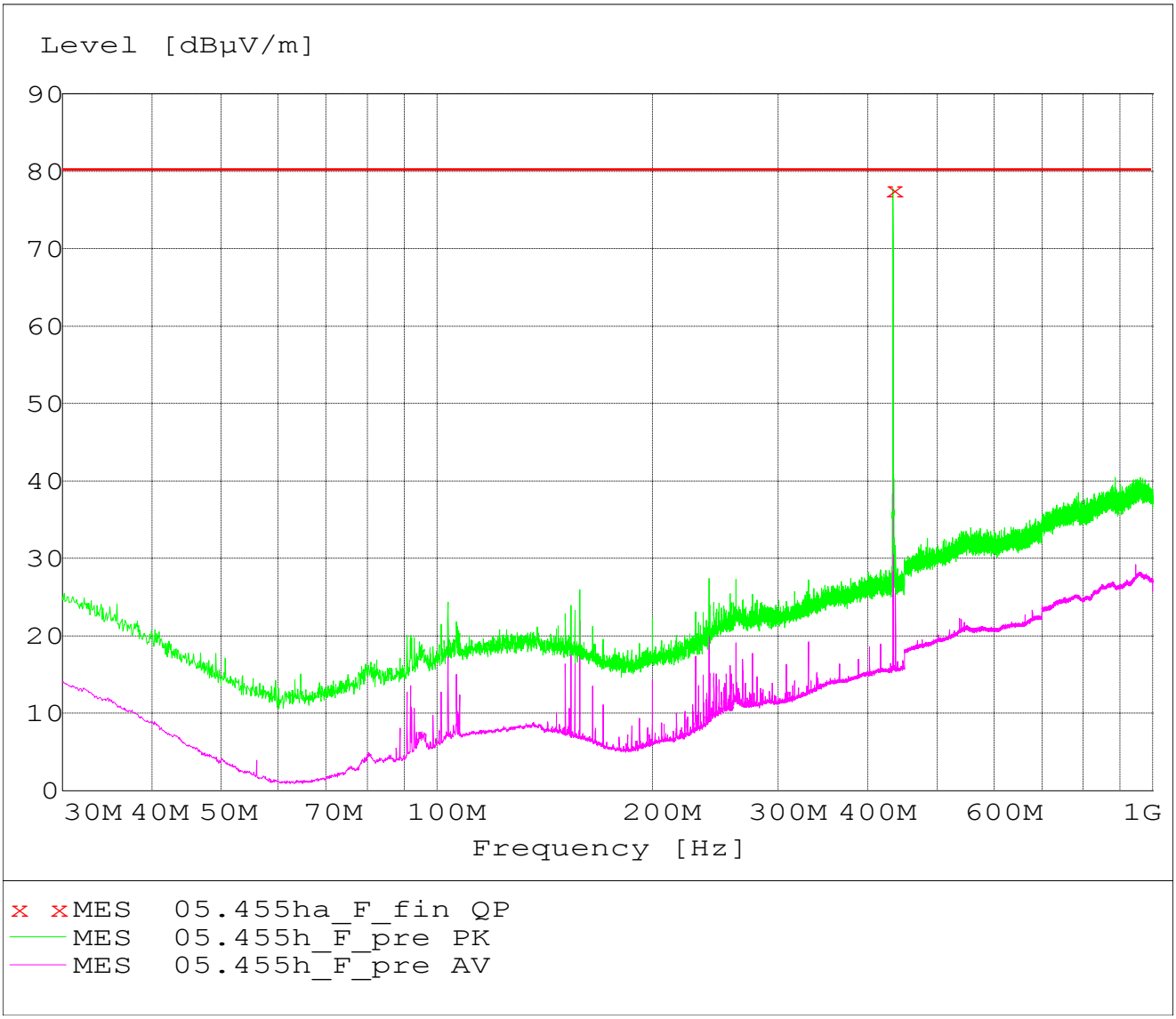
RESULT: WITHIN THE LIMIT

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

SCAN TABLE : "Radiated Emission"

Unit:	dBµV/m		
	Detector : Mode:		
Curve1:	Max Peak ClearWrite		
Curve2:	Avg ClearWrite		
Subrange:			
Start Frequency:	30.0 MHz	Step Size:	80 kHz
Stop Frequency:	1000.0 MHz	IF Bandwidth:	120 kHz
Measure Time:	10 ms		
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:	On	Stop Mark:	On
		Stop Message:	On
		Text:	Connect antenna

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309



Frequency	Field Strength of fundamental at a distance of 3m	Field Strength of spurious emission at a distance of 3m (µV/m)
433.92 MHz	**80.79 dBµV/m**	**60.79 dBµV/m**

MEASUREMENT RESULT – QUASI PEAK detector

Frequency	Level	Transd	Limit	Margin	Height	Azimuth	Polarisation
MHz	dBµV/m	dB	dBµV/m	dB	cm	deg	
433.920000	77.60	20.50	80.79	-4.19	100.0	0.00	HORIZONTAL

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

TEST 2.

TX – SPURIOUS EMISSION 1 - 5 GHz

REFERENCE DOCUMENT: FCC PART 15 subpart C

- **TEST LOCATION:** Semi-anechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** Spectrum Analyzer Rohde & Schwarz Mod. FSP (9kHz-40GHz)
  Log-periodica Broadband Antenna mod. HL025
- **TESTED PORT:** Enclosure
- **EMISSION LIMITS:** Acc. to Section 15.209 of reference document
- **FREQUENCY BAND :** Fundamental Frequency to 10th harmonics acc. to §15.33 (a)
- **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 lithium battery		3.0 Vdc

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

RESULT: WITHIN THE LIMIT

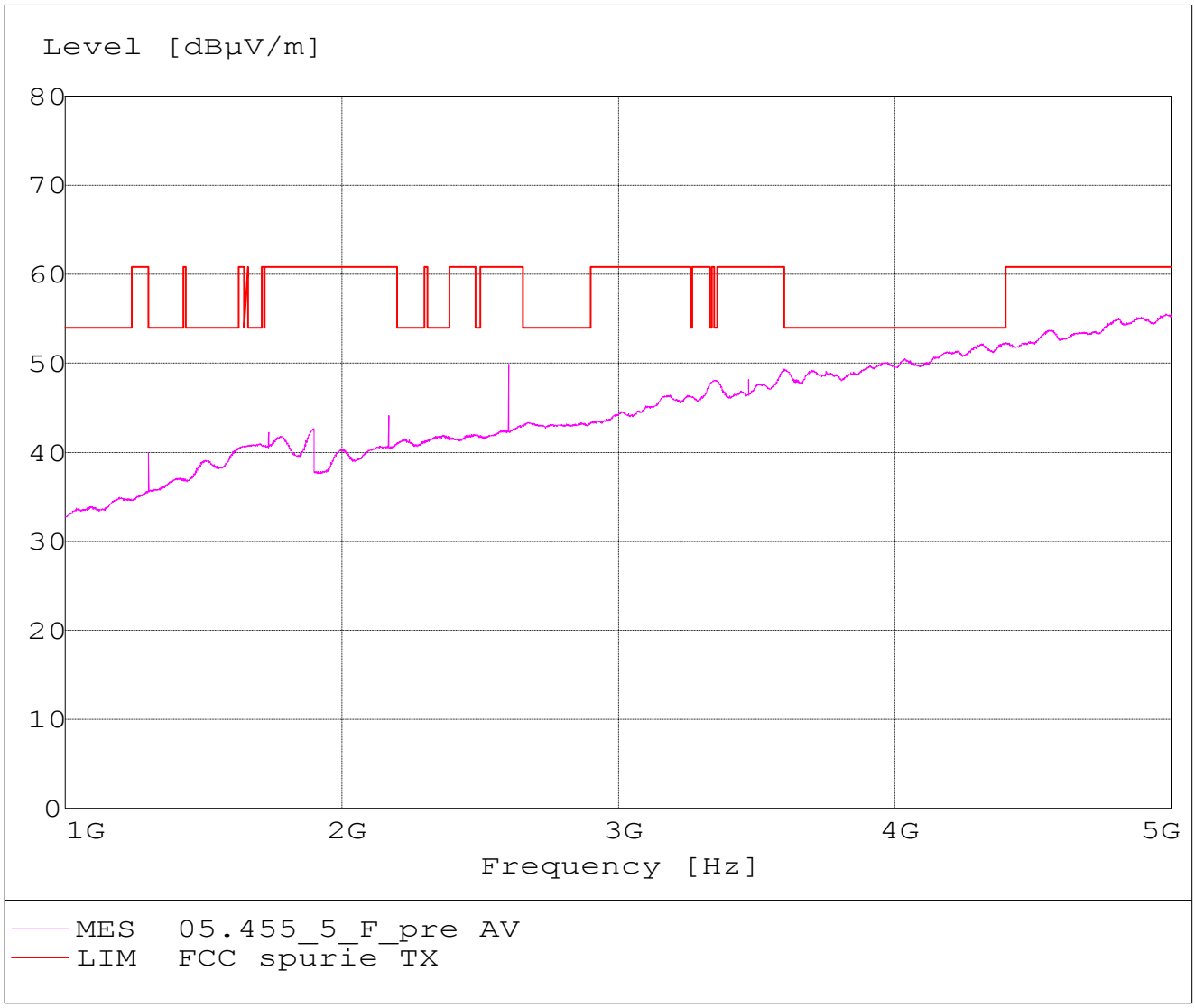
Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

SCAN TABLE : "Radiated Emission"

Unit:	dBµV/m		
	Detector : Mode:		
Curve1:	Max Peak ClearWrite		
Curve2:	-- ClearWrite		
Subrange:			
Start Frequency:	1000.0 MHz	Step Size:	600 kHz
Stop Frequency:	10000.0 MHz	Probe Transducer:	HL025
Measure Time:	100 ms		
IF Bandwidth:	1 MHz		
Receiver:	FSP		
Signal Path:	Path 4	System Transducer:	RFin2-CP1/X11
Scan Mode:	Lin	Add. Transducer:	W71.01
Tracking Gen.:	Off		
Input:	1		
Preamplifier:	0 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
	dBµV/m		
	Detector : Mode:		
Curve1:	MaxPeak ClearWrite		
Curve2:	Average ClearWrite		
Subrange1:			
Start Frequency:	1 GHz	Step Size:	600 kHz
Stop Frequency:	5 GHz	IF Bandwidth:	1 MHz
Measure Time:	0.01 sec.		
Receiver:	ESXI	Probe Transducer:	HL025
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:	On	Stop Mark:	On
		Stop Message:	On
		Text:	Connect antenna

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

Limit in acc. to provisions of §15.231 for frequencies above 470 MHz related to field strength of spurious emissions.
With a average detector used for measuring the spurious emissions level the limit is 60.80 dBµV/m
In addiction to the limits over mentioned, in according to Section 15.205 for restricted bands, the limit applied is 54 dBµV/m



Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

TEST 3.

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. FSP
- **TESTED PORT:** 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 lithium battery	3.0 Vdc

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

RESULT: WITHIN THE LIMIT

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

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	433,9050	433.9255	433.9415
Bandwidth =		***40 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
Permitted operating frequency range
• 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

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

6 EUT TECHNICAL DOCUMENTATION

6.1 Wiring diagrams

	Document reference (n., edition, date, ...)
WIRING DIAGRAM	27560
PART LIST	Dis27560
TECHNICAL CONSTRUCTION FILE	Not included

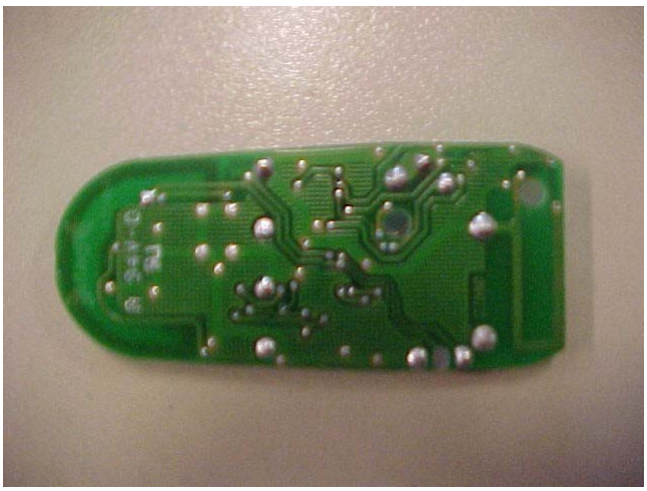
6.2 Technical manual

	Document reference (n., edition, date, ...)
USER MANUAL	119rs702

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

6.3 Photographic documentation

PHOTO N°1 – E.U.T. IDENTIFICATION



Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

PHOTO N°2 – SET-UP EMISSION TESTS