

EQUIPMENT UNDER TEST :
APPARECCHIO IN PROVA :

ENCODED TRANSMITTER MODULE

SERIES :
SERIE :

SETMC1C9V CH 433 Mhz

REFERENCE STANDARDS :
NORME DI RIFERIMENTO :

47 CFR Part 15C – Intentional Radiators

CUSTOMER:

RICHIEDENTE:

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Località esecuzione prove:

Date of test samples receipt: 22/12/2006
Data ricevimento campioni:

Date of start test: 22/12/2006
Data inizio prove:

Date of end test: 22/12/2006
Data fine prove:

Witness to the test:
Presenti alle prove:

Signature of the engineers:
Firma esecutore prove:

Signature of the Laboratory Director:
Firma Supervisore Laboratori:

Nobody / Nessuno

Andrea Bortolotti

Massimo Maltempi

The test results recorded in this Test Report are exclusively referred to the tested samples.

I risultati del presente rapporto di prova si riferiscono esclusivamente al campione sottoposto a prova.

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Release control record

Test report number	Reason of change	Date
FCC.TR.06.1814	Original release	22/12/2006
FCC.TR.06.1814-1	Editorial Change: Added FCC ID reference on page 3 Revised by: Ing. Giacomo Armellini	11/09/2014
FCC.TR.06.1814-2	Typing error correction of average limits on page 12 Revised by: Ing. Giacomo Armellini	07/01/2015

1. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

1.1 Identification

Series: SETMC1C9V
Manufacturer: ELPRO INNOTEK S.P.A.
Equipment : TRANSMITTER
Serial number : Not present
FCC ID : PWJ TMC1C9V
Country of manufacturer: ITALY

1.2 Technical data

FCC class: Intentional radiators,
Supply voltage: 9Vdc external battery type 9V
Maximum internal frequency generated by EUT 433,92 MHz
Typical usage : RF transmission of digital signal from pure contacts
EUT single or system: Single
EUT dimensions : 45x28x6 mm
Antenna : Wire
Range : 1000m (in open space)
Rated frequency tolerance : ± 100 kHz
Modulation : AM/ASK
Modulating signal frequency : 834 bit/sec
Channel width : > 25 kHz
Current consumption : 17 mA

1.3 Modifications incorporated in E.U.T.

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

- None

1.4 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 pressure
2	AC power input/output ports	Line not present	*****
3	DC power input/output ports	9Vdc external battery	By connector
4	Signals ports	Line not present	*****
<i>Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.</i>			

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 §15.203, §15.205, §15.207, §15.209, §15.231

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	<i>Continuous transmission</i>

2.2 Test overview

Sample tested is the main model of a complete set of 295 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 programmable telephone entry systems, anti-burglar systems and access control systems.

It is possible to declare that the appliance it is subject to additional requirements stated in §15.203, §15.205, §15.207, §15.209, §15.231

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

4. SUMMARY OF TEST RESULTS

4.1 Tests

Requirements	CFR Section	Test result
Antenna Requirements	15.203	Within the limit
Radiated Spurious Emission	15.209, 15.205(b)	Within the limit
Conducted Emission	15.207	Not applicable*
Periodic Operation Characteristics	15.231(a)	Within the limit
Field Strength Limits (Fundamental)	15.231(b)	Within the limit
20 dB Bandwidth	15.231(c)	Within the limit

* Not required, the EUT is battery powered.

5. TEST RESULTS

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**TEST
1.****ANTENNA REQUIREMENT****REFERENCE
DOCUMENT**

FCC CFR47,PART 15 subpart C

- **REGULATION:**

15.203 an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

- **RESULT:**

Antenna is permanently attached on the PCB.

The EUT is complied with this section.

**TEST
2.****RADIATED SPURIUS EMISSION AND FIELD STRENGTH
LIMITS (FUNDAMENTAL)****REFERENCE
DOCUMENT**

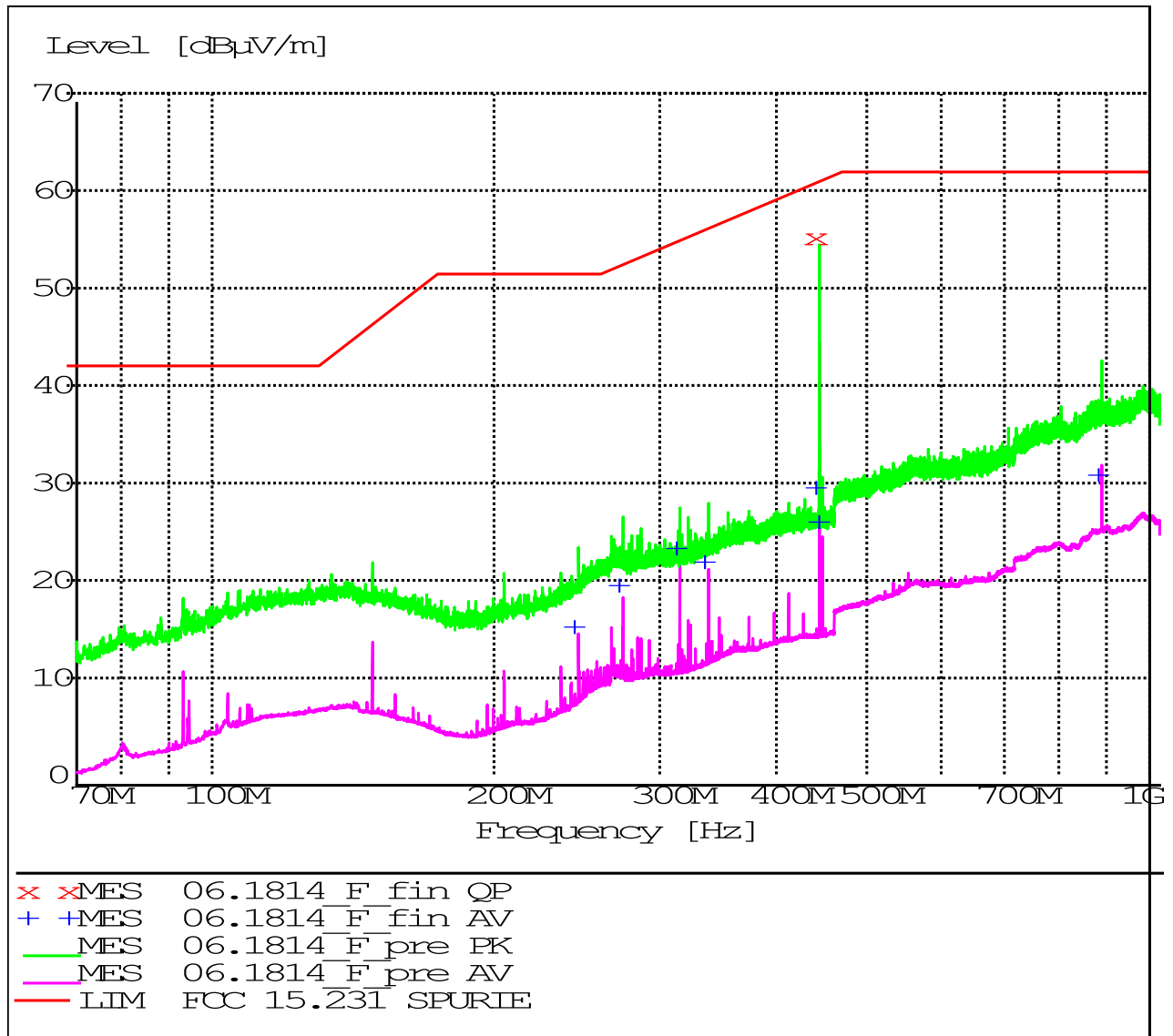
FCC CFR47,PART 15 subpart C
ANSI C 63.4

- **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
- **FREQUENCY RANGE:** 30 MHz ÷ 4,4 GHz
- **TEST DISTANCE:** 3 m
- **RESOLUTION BANDWIDTH:** 120 kHz (30 MHz ÷ 1 GHz)
1 MHz (1GHz ÷ 4,4GHz)
- **EMISSION LIMITS:** Acc. to Section 15.231(b) , 15.205, 15.209
- **UNCERTAINTY OF MEASURE:** Combined uncertainty = ± 1.75 dB
Total uncertainty = (k=2) ± 3.5 dB

TEST CONDITIONS:			MEASURED
Ambient temperature :	15 - 35 °C		24 $\pm$ 3 °C
Ambient humidity :	25 - 75 %rH		40 $\pm$ 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 $\pm$ 50 mbar
Voltage :	internal battery		9.0 Vdc

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

Reference 15.231:

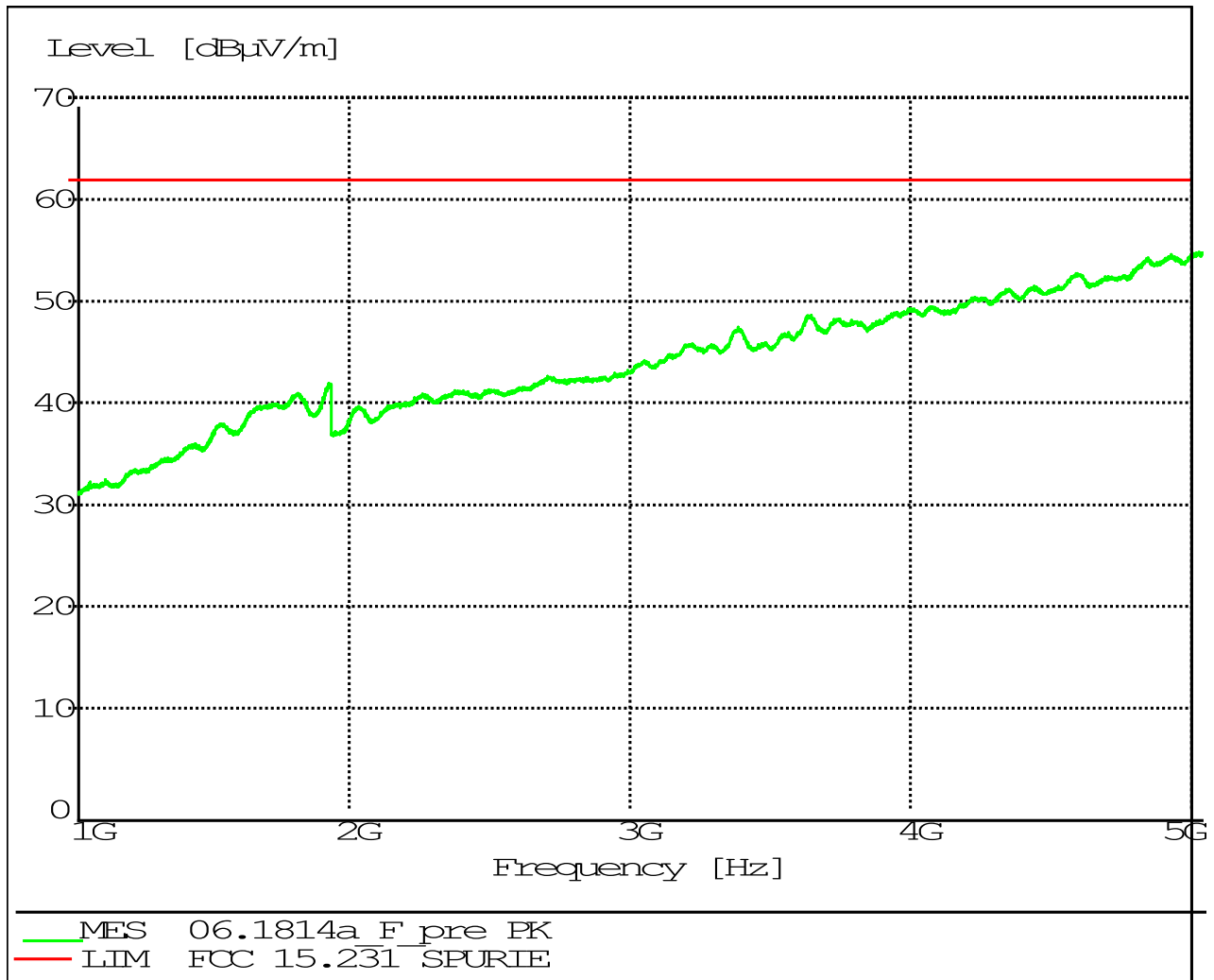


QP

Frequency	Level	Transd	Limit	Margin	Height	Azimuth	Polarisation
MHz	dBµV/m	dB	dBµV/m	dB	cm	deg	
433.920000	55.20	20.50	60.50	5.30	175.0	60.00	HORIZONTAL

AV

Frequency	Level	Transd	Limit	Margin	Height	Azimuth	Polarisation	Note
MHz	dBµV/m	dB	dBµV/m	dB	cm	deg		
239.960000	15.20	14.40	51.48	36.28	100.0	220.00	HORIZONTAL	Spurious Emissions
267.720000	19.50	15.90	52.20	32.70	259.0	135.00	VERTICAL	
307.840000	23.30	16.60	55.18	31.88	100.0	170.00	VERTICAL	
330.400000	21.90	17.60	56.50	34.60	100.0	173.00	HORIZONTAL	
433.920000	29.50	20.50	80.83	51.33	166.0	45.00	HORIZONTAL	Fundamental Emissions
437.200000	26.00	20.50	60.93	34.93	186.0	135.00	HORIZONTAL	Spurious Emissions
867.840000	30.80	27.80	61.94	31.14	107.0	314.00	HORIZONTAL	



• **RESULT:**

The EUT is complied with this section.

TEST
3.

CONDUCTED EMISSION TESTS

REFERENCE DOCUMENT

FCC CFR47,PART 15 subpart C
ANSI C 63.4

- **REGULATION:**

15.207(a) For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

15.207(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

- **RESULT:**

Not applicable.

The EUT is battery powered only.

TEST
4.

PERIODIC OPERATION CHARACTERISTICS

REFERENCE DOCUMENT

FCC CFR47,PART 15 subpart C

- **REGULATION:**

15.231(a) The provisions of this Section are restricted to periodic operation within the band 40.66 - 40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this Section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. The prohibition against data transmission does not preclude the use of recognition codes. Those codes are used to identify the sensor that is activated or to identify the particular component as being part of the system.

- **RESULT:**

The EUT is complied with this section.

- **REGULATION:**

15.231(a1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

- **RESULT:**

Transmitter ceases immediately after being released. *The EUT is complied with this section.*

- **REGULATION:**

15.231(a2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

- **RESULT:**

The EUT does not have automatic transmission.

- **REGULATION:**

15.231(a3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

- **RESULT:**

The EUT does not employ periodic transmission.

- **REGULATION:**

15.231(a4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

- **RESULT:**

Not applicable to the EUT

**TEST
5.****BANDWIDTH****REFERENCE
DOCUMENT**

FCC CFR47,PART 15 subpart C
ANSI C63.4

- **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

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	9.0 Vdc

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

- **REGULATION:**

15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

- **LIMIT:**

The 20 dB bandwidth limit = $0.0025 \times 433.92 \text{ MHz} = 1084,8 \text{ kHz}$

- **RESULT:**

The measured 20 dB bandwidth is : 236kHz

The EUT is complied with this section.

6. EUT TECHNICAL DOCUMENTATION

6.1 Wiring diagrams

	<i>Document reference (n., edition, date, ...)</i>
WIRING DIAGRAM	IS-TMC1C9V Date: 04/12/2006 Rev.0
PART LIST	IS-TMC1C9V Date: 04/12/2006 Rev.0

6.2 Technical manual

	<i>Document reference (n., edition, date, ...)</i>
	IS-TMC1C9V Date: 04/12/2006 Rev.0

Photographic documentation

PHOTO N° 1 – EQUIPMENT UNDER TEST IDENTIFICATION

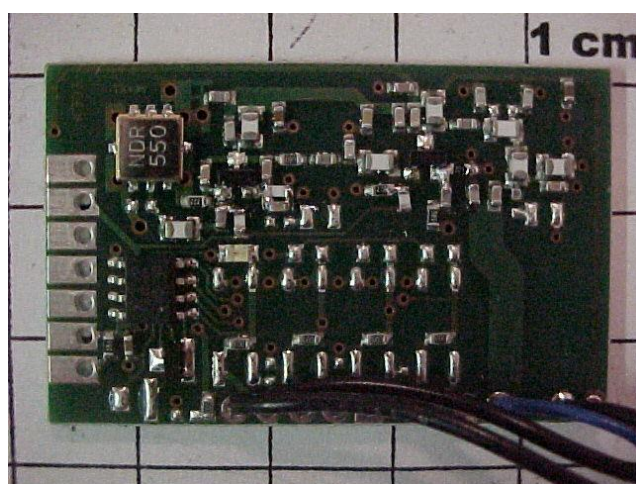
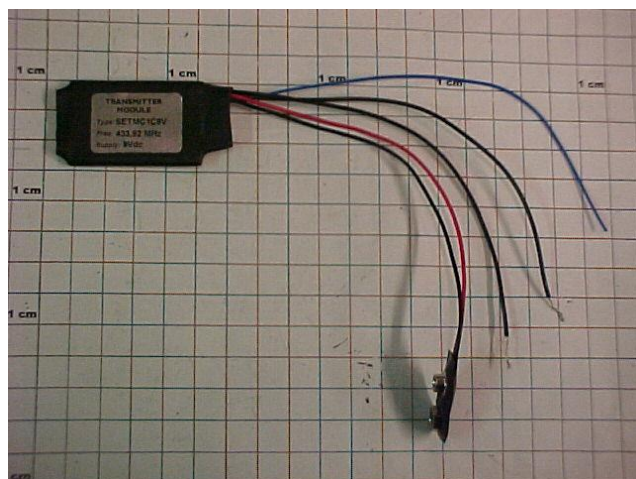


PHOTO N° 2 – SET-UP FOR EMISSION RADIATED TEST

