FCC CFR 47 PART 15 Subpart C

E.M.I. TEST REPORT

Test report No..... :	03SV001EM-R01	
Prepared by..... :	C. Carù	Signature .....
Approved by.....:	G. Baroni	Signature .....
Date of issue.....:	February 7, 2003	
Number of pages..... :	14	

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..... :	SEAV S.r.l.

Equipment under test

Model.....:	TXS 3 NEW
Family……... :	TXS (1 or 2 or 3) NEW and BE EASY TX
Serial Number.....:	0251
Trade Mark..... :	SEAV
Manufacturer.....:	SEAV S.r.l. Via S. Sabino, 34 60027 Osimo - (Ancona) Italy
Rating's.....:	12VDC - 25mA
Operating temperature range..... :	From -20°C to +70°C

Equipment information

Equipment category..... :	Transmitter of a control signal used for door openers.
Classification of the equipment..... :	Intentional Radiator
Tested for IT power system..... :	No

Test specification

Applicable standard..... :	FCC CFR 47 - Part 15 - Subpart C - § 15.231
Additional installation requirements :	No

Test results

Summary of test results.....:	**COMPLIANT**

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

SEAV S.r.l. Via S. Sabino, 34
60027 Osimo (Ancona) - Italy

Applicant for Certification

SEAV S.r.l. Via S. Sabino, 34
60027 Osimo (Ancona) - Italy

FCC ID

QUSTXSNEW

Official of the Responsible party for Certification

Name Guido Cerioni Research and Development Manager

Signature .....

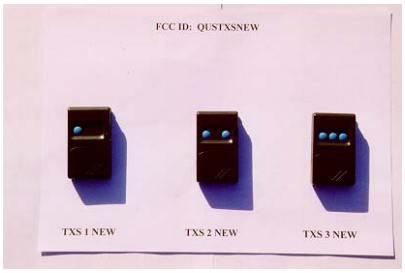
Description of the Appliance

The TXS 3 NEW device allows remote control of electric and electronic equipment, and it's mainly used for automatic entry control (e.g. door - gate opener applications) where remote control via a radio coded command is required.
The TXS 3 NEW remote control has to be considered the master model of the product series because it was designed first and in a complete way.
TXS 2 NEW, TXS 1 NEW e BE EASY TX models differ from master model just for some hardware level changes.
The products TXS 2 NEW, TXS 1 NEW e BEEASY TX are derivatives of the master model TXS 3 NEW.
This difference consists in the lack of push buttons for coded data transmission.
TXS 2 NEW e BE EASY TX models can just transmit two 12 bits codes.
TXS 1 NEW model can just transmit one 12 bits code.
The BE EASY TX derivative model is equal to TXS 2 NEW model except for plastic box.

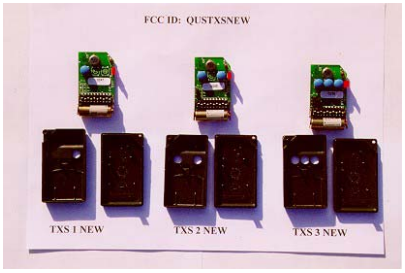
The appliance submitted to test (TXS 3 NEW) is the master model of a family of devices, the unit tested is equipped with three push buttons for coded data transmission, the other products (TXS 2 NEW and TXS 1 NEW) are equipped respectively with two and a single push buttons. The unit BE EASY TX use the same printed circuit board of the TXS 2 NEW mounted inside a different plastic box.

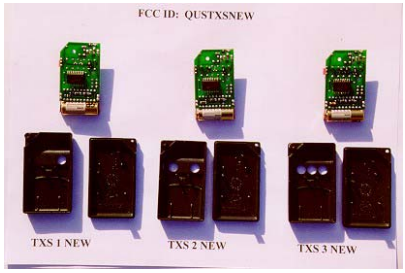
In the following pictures is possible to see the four units subject to certification.

The top side and the bottom side of TXS _ NEW units

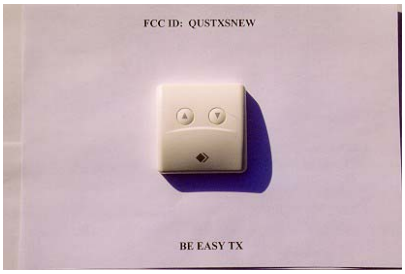


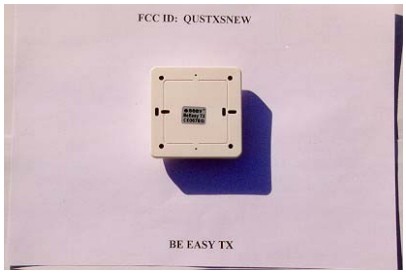
The three TXS _ NEW units opened, it is possible to see the electronic boards that are identical except the push buttons



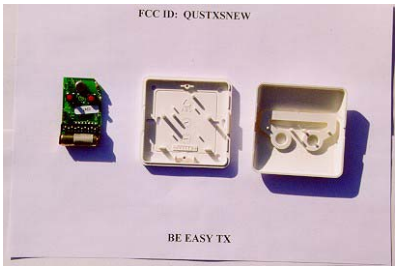


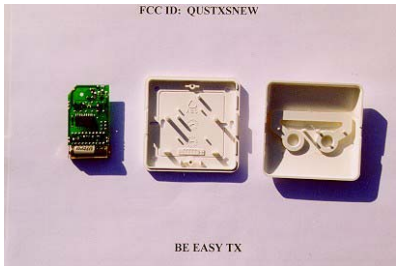
The top side and the bottom side of BE EASY TX





The BE EASY TX unit opened, it is possible to see the electronic board that is identical to TXS 2 NEW.





General Consideration of the Test

Subject of this test report is the master model of the family of equipments, all other models must be considered as a subset of the master model.
All the models

The appliance intentionally generate an RF signal at frequency of 433,908000MHz, because of this it is classified under the *Intentional Radiator Category* and in conformity to the requirements of FCC Part 15 Subpart A §15.201, it is subject to "CERTIFICATION" procedure.

As defined in FCC Part 15 Subpart C §15.207 (d) measurements to demonstrate compliance to conducted limits are not required for devices which only employ battery power for operation and which do not operate from AC power lines or contain provision for operation while connected to the AC power lines.
Being our apparatus powered by a 12VDC alkaline battery, this measurement does not apply.

The appliance generate the fundamental RF signal at 433,908000MHz so in accordance to FCC Part 15 Subpart A §15.33 (a)(1) the frequency range for radiated noise emission is from 30MHz to 4.34GHz.

Because of the characteristics of the RF transmitted signal, frequency of 433908000.000Hz, the application of the equipment, mainly used for automatic entry control as a door – gate opener and the possibility to activate transmission only manually by the pushing of its button and the automating deactivation of the RF signal when the button is released; it is possible to declare that the appliance is subject to the Additional Requirements of FCC Part 15 Subpart C §15.231.
The field strength of emission from intentional radiators with periodic operation in the band 40.66-40.70MHz and above 70MHz are defined in FCC Part 15 Subpart C §15.231(b) and must be in compliance with the following limits specified at a distance of 3m.

Frequency (MHz)	Field Strength of fundamental at a distance of 3m	Field Strength of spurious emission at a distance of 3m
30MHz ÷ 88MHz	30µV/m	20dbµV/m
88MHz ÷ 216MHz	50µV/m	23.5dbµV/m
216 MHz ÷1000 MHz	70µV/m	26dbµV/m

All the other emission of the intentional radiator shall not exceed the following field strength levels.
The limits defined in §15.209 at a distance of 3mt are reported in the following table:

Frequency	Limit in µV/m at a distance of 3m
30MHz ÷ 88MHz	100µV/m
88MHz ÷ 216MHz	150µV/m
216 MHz ÷960 MHz	200µV/m
Above 960 MHz	500µV/m

A unit of product "TXS 3 NEW" representative of the production was subjected to the test program.

Date of Test

The test started on February 5, 2003 and concluded on February 6, 2003.

Reference Documents

FCC CFR 47	Code of Federal Regulations, Title 47 Part 15 Radio Frequency Devices Subpart C, Intentional Radiators
CISPR 16-1	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1: Radio disturbance and immunity measuring apparatus.
CISPR 16-2	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2: Methods of measurement of disturbance and immunity.
ANSI C63.4	Methods of measurement of radio noise emission from low voltage electrical and electronic equipment in the range of 9KHz to 40GHz.

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

Test Laboratory Information

Radiated and conducted measurements were 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 Technologies 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 C63.4and it is recognized by FCC with the filing number 90470.

CiaoLab Technologies S.p.A. is also member of VCCI (Voluntary CONTROLS 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	Biconical Antenna	EMCO	3109	3105	August 26, 2002
N.1	Log Periodic 200-1GHz	EMCO	3146	4922	August 22, 2002
N.1	Log Periodic .02-5GHz	EMCO	3147	11966N	August 27, 2001
N.1	Active Loop Antenna	EMCO	6502	2218	August 27, 2001
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 **August 22, 2002**.

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 **August 22, 2002**.

Display Section	Rohde & Schwarz	844348/017
RF Section	Rohde & Schwarz	845658/002

Devices

- Antenna support
- CONTROLS panel
- Antenna tower
- Turntable

Environmental Conditions

	Radiated noise emission test
Temperature:	20ºC
Relative Humidity:	40%
Atmospheric Pressure	1009mbar

Operating Conditions

During the test the appliance was exercised in a manner similar to the typical usage.
One of the switch installed on the transmitter has been keep operated in order to continuously generate the RF signals.

EUT Test Setup

During the radiated noise measurements the EUT was installed over the free field turntable as specified in ANSI C63.4 Paragraph 6.2.1.

The transmitter was placed over a wooden table about 1m over the ground plane, in order to simulate the typical usage when the transmitter is keep into hand.

It is possible to see the pictures of radiated test setup in the picture paragraph.

E.M.I. Measurements Procedures

The EUT was installed in the Open Area Test Site in accordance to requirements of ANSI C63.4, 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 3m as specified in the FCC part 15 Subpart C §15.231 for the RF fundamental frequency and for the spurious emissions and §15.209 for all other frequencies from 150Khz to 4.5GHz.
The maximum radiated emissions are found by using the following step-by-step procedure:

- The EUT is installed and configured as specified in the standards ANSI C63.4 in the paragraph 8, dedicated to Radiated Emissions Testing.
- The whole frequency range (150KHz ÷ 9.33GHz) 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".

Over 1GHz the measurement proceeding is about the same as described above, with differences of the subranges extended to 20MHz and instead of final quasi peak measurements the average measurement has been performed.

Measurement Results

Radiated Emission Summary

EQUIPMENT UNDER TEST	FCC Part 15 Subpart C §15.231 Fundamental frequency
TXS 3 NEW	PASS

EQUIPMENT UNDER TEST	FCC Part 15 Subpart C §15.209 General requirements
TXS 3 NEW	PASS

The radiated emission measurement have been performed on the whole frequency range from 150KHz to 4.5GHz, no relevant emission have been found except the fundamental frequency and the spurious harmonics.

All the measured signals are reported in the following tables and graphics.

Radiated Emission Graphics and Tables

Measurement distance: **3m**
Polarization: **VERTICAL**

Average measurement results
Blue limit line: FCC CFR 47 Part 15 Subpart C - Requirements §15.231
Red bar graph: Average measured signals.

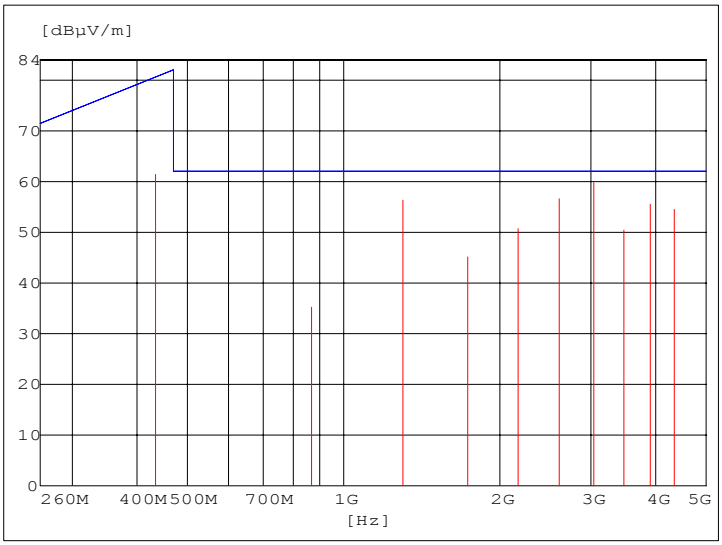


Table with Average measurements results **Vertical Polarization**

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	IFBW kHz	Height cm	Azi deg	Pol	Comment
433.907000	61.40	18.60	80.60	19.20	120	150.0	0.00	VER	
867.760000	35.20	24.50	62.00	26.80	120	250.0	0.00	VER	
1301.700000	56.30	28.60	62.00	5.70	1000	150.0	0.00	VER	
1735.600000	45.10	32.60	62.00	16.90	1000	200.0	0.00	VER	
2169.500000	50.70	35.50	62.00	11.30	1000	300.0	0.00	VER	
2603.400000	56.60	40.30	62.00	5.40	1000	200.0	0.00	VER	
3037.400000	59.80	42.00	62.00	2.20	1000	150.0	0.00	VER	
3471.300000	50.40	44.10	62.00	11.60	1000	350.0	0.00	VER	
3905.200000	55.50	46.70	62.00	6.50	1000	250.0	0.00	VER	
4339.100000	54.50	47.50	62.00	7.50	1000	200.0	0.00	VER	

Measurement distance: **3m**
Polarization: **HORIZONTAL**

Average measurement results

Blue limit line: FCC CFR 47 Part 15 Subpart C - Requirements §15.231
Red bar graph: Average measured signals.

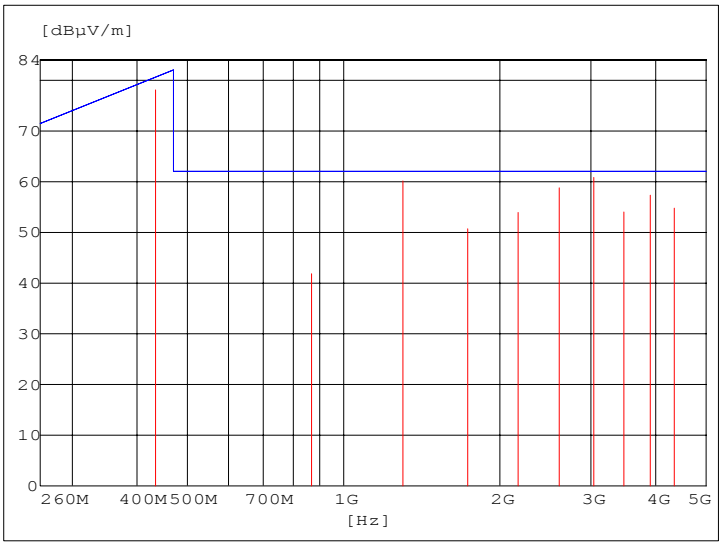


Table with Average measurements results **Horizontal Polarization**

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	IFBW kHz	Height cm	Azi deg	Pol	Comment
433.907000	78.10	18.60	80.60	2.50	120	200.0	0.00	HOR	
867.760000	41.80	24.50	62.00	20.20	120	300.0	0.00	HOR	
1301.700000	60.10	28.60	62.00	1.90	1000	350.0	0.00	HOR	
1735.600000	50.70	32.60	62.00	11.30	1000	350.0	0.00	HOR	
2169.500000	53.90	35.50	62.00	8.10	1000	200.0	0.00	HOR	
2603.400000	58.80	40.30	62.00	3.20	1000	300.0	0.00	HOR	
3037.400000	60.80	42.00	62.00	1.20	1000	400.0	0.00	HOR	
3471.300000	54.00	44.10	62.00	8.00	1000	250.0	0.00	HOR	
3905.200000	57.30	46.70	62.00	4.70	1000	350.0	0.00	HOR	
4339.100000	54.80	47.50	62.00	7.20	1000	150.0	0.00	HOR	

Frequency stability measurements

In accordance to the requirements of FCC CFR 47 Part 15 Subpart 2 §2.1055, the frequency stability of the RF generated signal has been measured from –30°C to +50°C, in the following table are reported the measurement results.

Temperature °C	Measured RF Frequency Hz
-30.000	433884000.000
-20.000	433886016.000
-10.000	433894016.000
0.000	433900000.000
10.000	433905984.000
20.000	433908000.000
30.000	433910016.000
40.000	433908000.000
50.000	433904000.000

Equipment Under Test Details

Manufacturer:	SEAV S.r.l.
Mark:	SEAV
Model number:	TXS 3 NEW
Serial number:	0251
Board code and product serial:	TXS2121

The appliance is composed by a plastic enclosure with inside an electronic board.

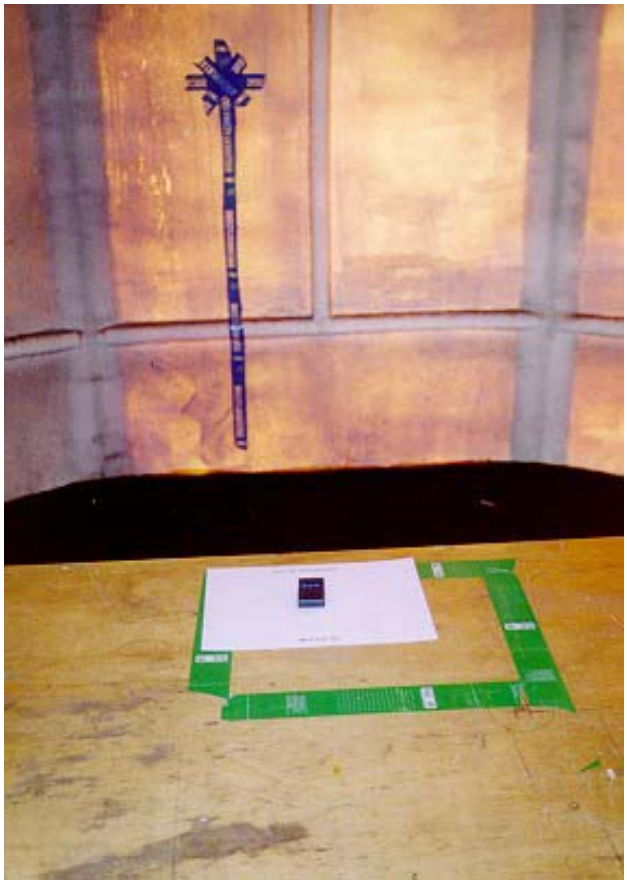
All the details regarding the appliance are contained in the file uploaded to FCC site for certification.

Antenna requirements

As requested in FCC CFR 47 Part 15 §15.203 the antenna of the transmitter is composed by a printed wire on the upper side of the printed circuit board, it is impossible that no antenna other than that mounted from the manufacturer shall be used with the device.

Pictures

Test setup



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