TEST REPORT

APPLICANT:	POLITEC S.R.L. Via Adda,66/68 20040 BELLUSCO (MB) TEL. 039 39 6883019 FAX. 039 -------- E-mail: info@politecsrl.it
EUT DESCRIPTION	Radio Anti intrusion detector
EUT TRADEMARK	POLITEC
EUT MODEL	MANA MW
REFERENCE STANDARDS :	EN 300 440-1 V1.4.1 (2010-05) EN 300 440-2 V1.4.1 (2010-08)
TEST REPORT NUMBER	ETSTR_ 111363
TEST REPORT ISSUE DATE	14/11/2011; REV.1 12/12/2011
TESTING LABORATORY	Prima Ricerca & Sviluppo S.r.l. Via Campagna, 92 -22020 Faloppio (Co) –Italy
TESTING LOCATION	As Above
DATE OF TEST SAMPLE RECEIPT	14/11/2011
DATE OF TEST	14/11/2011
TESTED BY	Massimo Maltempi
APPROVED BY	Giovanni Molteni

The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have be obtained.
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ETSTR_111363-1 replace ETSTR_111363-0 issued 14/11/2011

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1. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

Versione dell'EUT :	Come ricevuto
Version of EUT :	As received
Numero di unità :	1
No of units :	
Numero di varianti :	----
No of variants :	
Categoria dell'apparecchiatura :	ERC Recommendation 70/03 annex 6
Equipment category :	Short Range Device (SRD)
	Radio determination applications
Tipo di unità :	Equipment for Detecting Movement and Alert
Type of unit :	
Nome o codice del modello:	
Model name :	
Nome o codice del derivato:	-----
Derivate Model name :	
Numero di serie:	----
Serial number :	
Note :	-----
Paese di origine:	Italia
Country of manufacturer :	Italy

1.1 Equipment identification (Manufacturer)

Additional information shall be included in the users' manual:

Classificazione del ricevitore Receiver classification, see clause 4.1.1;	Class III
Duty cycle del trasmettitore Transmitter duty cycle, see clause 8.10; or	50% (100%)
Uso del protocollo Listen Before Talk LBT if used, see clause 8.11.	No

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Receiver category	Relevant receiver clauses	Risk assessment of receiver performance
I	8.1, 8.2 and 8.3	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person).
II	8.2 and 8.3	Medium reliable SRD communication media e.g. causing Inconvenience to persons, which cannot simply be overcome by other means.
III	8.3	Non-critical SRD communication media whose failure to operate correctly causes loss of function which can be overcome by parallel means.
If receiver category 1 or 2 is selected, this shall be stated in both the test report and in the user's manual for the equipment.		

Manufacturer Declaration

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1.2 Technical data

Sorgente di alimentazione : Power source :	230 Vac 50Hz
Tensione di alimentazione nominale : Power supply nominal voltage:	5Vdc
Potenza o Corrente nominale: Nominal power or absorbing current :	<25 mA

5.4.2 Extreme test source voltages
5.4.2.1 Mains voltage
The extreme test voltages for equipment to be connected to an ac mains source shall be the nominal mains voltage ±10 %. For equipment that operates over a range of mains voltages clause 5.4.2.4 applies.
5.4.2.2 Regulated lead-acid battery power sources
When the radio equipment is intended for operation from the usual type of regulated lead-acid battery power sources the extreme test voltages shall be 1,3 and 0,9 multiplied by the nominal voltage of the battery (6 V, 12 V, etc.).
For float charge applications using "gel-cell" type batteries the extreme voltage shall be 1,15 and 0,85 multiplied by the nominal voltage of the declared battery voltage.
5.4.2.3 Power sources using other types of batteries
The lower extreme test voltages for equipment with power sources using batteries shall be as follows:
- for equipment with a battery indicator, the end point voltage as indicated;
- for equipment without a battery indicator the following end point voltages shall be used:
- for the Leclanché or the lithium type of battery:
- 0,85 multiplied by the nominal voltage of the battery;
- for the nickel-cadmium type of battery:
- 0,9 multiplied the nominal voltage of the battery;
- for other types of battery or equipment, the lower extreme test voltage for the discharged condition shall be
declared by the equipment provider.
The nominal voltage is considered to be the upper extreme test voltage in this case.
5.4.2.4 Other power sources
For equipment using other power sources, or capable of being operated from a variety of power sources, the extreme test voltages shall be those agreed between the equipment provider and the test laboratory. This shall be recorded in the test report.

Tensioni estreme : Extreme Voltages :	inferiore / Lower : 208 Vac Superiore / Upper : 253 Vac

Table 3: Extreme temperature ranges/ Estremo range di Temperatura

Gamma temperature estreme : Extreme temperature range :	☒ Category I : -20°C to +55 °C (general use) ☐ Category II : -10°C to +55 °C (portable equip.) ☐ Category III : +5°C to +35 °C (Equipment for normal indoor use)

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2. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

2.1 Technical data

Porte, connettori / Ports, connectors			
	Porta Port	Massima lunghezza del cavo (m) Max. cable length (m)	Osservazioni Remarks
☒	Power input :	230 Vac 50 Hz	
☒	Antenna connector :	Integrated	
☐	Power output :	--	
☐	Data input / output :	---	
☐	Others :	--	

2.2 Tranmitter data

TRANSMITTER

- Carrier Frequency : 24,135 GHz
- Frequency Range of Operation : 24,00 – 24,25 GHz
- Output Power : 19,26 dBm
- Channels Bandwidth : 20 MHz
- Modulation type: Pulse
- Channel spacing : -----
- Antenna Type: Integral
- Antenna Gain : ----------
- ITU Designation :: ----------
- EUT Dimension See manufacturer declaration
- Input voltage : 5 Vdc

RECEIVER

- Test Frequency (centre of band) : 24,135 GHz
- Frequency Range of Operation : 24,00 – 24,25 GHz
- Sensibility : -85dBm
- EUT Dimension L57.9 x W16.3 x H44.4(mm)

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2.3 Modifications incorporated in E.U.T.

Le seguenti modifiche sono state introdotte nell'apparecchio in prova :

- Nessuna modifica relativa alle prove radio

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

- No modification for radio test are executed

2.4 Auxiliary equipment

Nessuna

None

3. CONDITIONS DURING TESTING

3.1 Operating test modes and test conditions

Le condizioni operative adottate durante le varie prove sono elencate nella tabella che segue e contrassegnate da un identificatore (#..) a cui fa riferimento la voce "Condizione operativa dell'apparecchio in prova" delle schede tecniche relative ai risultati di prova (vedi Sezione 4).

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	Descrizione	Description
#1	TX in trasmissione	Operating Mode
#3	Receiver	Receiver mode

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4. REFERENCE STANDARD FOR PERFORMED TESTS

Riferimento di norma : Reference standard :	TItolo : Title :
EN 300 440-2 V1.3.1 (2009-03)	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive
EN 300 440-1 V1.5.1 (2009-03)	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 1: Technical characteristics andte st methods
EN 50371 (2002-03)	Generic standard to demonstrate the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (10 MHz- 300 GHz) – General public

Risultati : Results :	I risultati di prova sono nei limiti stabiliti dalla norma di riferimento The test results are in the limits stated by the reference standard

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5. SUMMARY OF TEST RESULTS

Essential transmitter test suites EN 300 440-2

SUMMARY OF TEST RESULTS			
§	Test	Test results	
TRANSMITTER PARAMETERS (TX)			
5.3.1	Equivalent isotropically radiated power	Nei limiti / Within the limit	☐ N.A
5.3.2	Permitted range of operation frequencies	Nei limiti / Within the limit	☐ N.A
5.3.3	Unwanted emissions in the spurious domain	Nei limiti / Within the limit	☐ N.A
Note : NA = Non applicabile, NR = Non Richiesto dal cliente Abbreviations/Symbols : NA = Not Applicable, NR = Not Requested by the Client			

PARAMETRI DEL RICEVITORE / RECEIVER PARAMETERS (RX)			
SUMMARY OF TEST RESULTS			
§	Prova / Test	Risultati / Test results	
5.4.1	Adjacent channel selectivity		☒ N.A
5.4.2	Blocking or desensitization		☒ N.A
5.4.3	Spurious radiations	Nei limiti / Within the limit	☐ N.A
Note : NA = Non applicabile, NR = Non Richiesto dal cliente Abbreviations/Symbols : NA = Not Applicable, NR = Not Requested by the Client			

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6. RISULTATI DI MISURA MEASUREMENT RESULTS

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TEST 1.	***TX - EQUIVALENT ISOTROPICALLY RADIATED POWER***

REFERENCE DOCUMENT ETSI EN 300 440-1 V1.6.1

- **TEST SETUP:** In according to manufacturer specifications
- **TEST LOCATION:** Radio test area
- **TEST EQUIPMENT USED FOR TEST:**
  - Spectrum Analyzer Rohde&Schwarz mod. FSP40
  - Test Fixture Prima Ricerca&Sviluppo
  - Climatic Chamber MAZZALI mod. Climatest
  - Power meter

TEST CONDITIONS:			**MEASURED**
Ambient temperature :	23°C ± 5°C		**22 °C**
Ambient humidity :	25 - 75 %rH		**45%**
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	**960 mbar**
The measurement shall be performed using normal operation of the equipment with the test modulation (see clause 6.1) applied.			

OPERATING CONDITION (Rif. Section. 3) : *#1*

Risultato di prova :	**Test result :**
☒ ***Entro i limiti***	☒***Within the limits***
☐ ***Fuori dai limiti***	☐***Out of limits***

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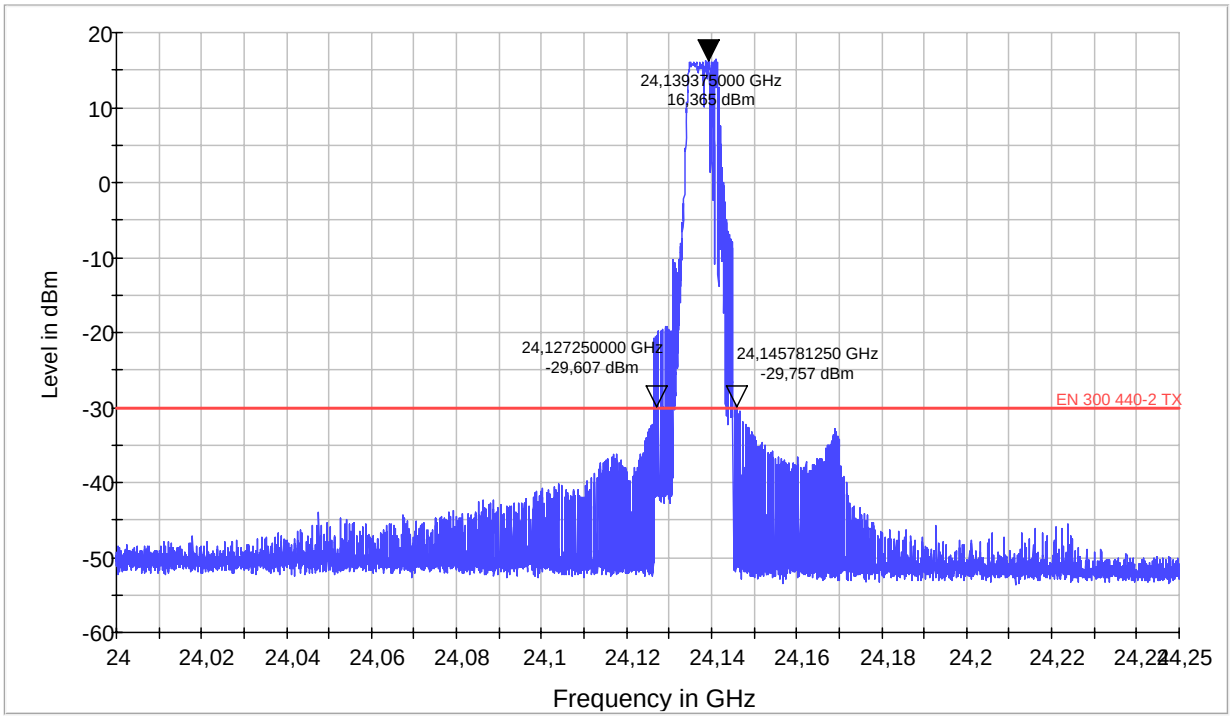
MEASUREMENT RESULTS (band 24,000- 24,250 GHz)

TEST CONDITIONS Bandwidth 56Mhz		Effective radiated power (mW) Single Channel
		24.13937 Ghz
T_{nom} :+ 25 °C	V_{nom} : 230 Vac	16,365 (calculated 19,635)
Measurement Uncertainty : +/- 1 dB		

EMI Sweep_FSP40_carrier24



Result max e.i.r.p. power	
The e.i.r.p. shall be calculated from the above measured power output A, the observed duty cycle x, and the applicable antenna assembly gain "G" in dBi, according to the formula:	
P = A + G + 10 log (1/x); where	**dBm**
A+G= max radiated measured power=	**16,365 dBm**
Duty cycle=50%= 10 log (1/2) =	**3**
Limit = 20dBm maximum antenna gain G =	**19,635 dBi**

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LIMIT			
The equivalent isotropically radiated power, as defined in EN 300 440-1 [1], clause 7.1.1, shall not exceed the limits in EN 300 440-1 [1], clause 7.1.3, table 4			
Frequency Bands	Power	Application	Notes
2 400 MHz to 2 483,5 MHz	10 mW e.i.r.p.	Generic use	
2 400 MHz to 2 483,5 MHz	25 mW e.i.r.p.	Detection, movement and alert applications	
(a) 2 446 MHz to 2 454 MHz	500 mW e.i.r.p.	RFID	See also table 6 and annex C
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	RFID	See also table 6 and annex C
5 725 MHz to 5 875 MHz	25 mW e.i.r.p.	Generic use	
9 200 MHz to 9 500 MHz	25 mW e.i.r.p.	Radiodetermination: radar, detection, movement and alert applications	
9 500 MHz to 9 975 MHz	25 mW e.i.r.p.	Radiodetermination: Radar, detection, movement and alert applications	
	500 mW e.i.r.p.	Radiodetermination: Radar, detection, movement and alert applications	
13,4 GHz to 14,0 GHz	25 mW e.i.r.p.	Radiodetermination: Radar, detection, movement and alert applications	
17,1 GHz to 17,3 GHz	400 mW e.i.r.p.	Radiodetermination: GBSAR detection, movement and alert applications	See annex E
24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Generic use and Radiodetermination: radar, detection, movement and alert applications	

Wideband Data Transmission systems

Frequency Band	Power	Spectrum access and mitigation requirement	Channel spacing	Notes
a 2400.0–2483.5 MHz	100 mW e.i.r.p.	See note 1	No spacing	For wide band modulations other than FHSS , the maximum e.i.r.p. density is limited to 10 mW/MHz
b 5150–5350 MHz	200 mW mean e.i.r.p. See note 3	See notes 1 and 2	No spacing	Restricted to indoor use. The maximum mean e.i.r.p. density shall be limited to 10 mW/MHz in any 1 MHz band.
c 5470–5725 MHz	1 W mean e.i.r.p. See note 3	See notes 1 and 2	No spacing	Indoor as well as outdoor use allowed. The maximum mean e.i.r.p. density shall be limited to 50 mW/MHz in any 1 MHz band.
d 17.1–17.3 GHz	100 mW e.i.r.p.	No requirement	No spacing	
e 57–66 GHz	40 dBm mean e.i.r.p	See note 1	No spacing	Fixed outdoor installations are not allowed. The maximum mean e.i.r.p density is limited to 13 dBm/MHz

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TEST 2.	***TX - PERMITTED RANGE OF OPERATION FREQUENCY***

REFERENCE DOCUMENT ETSI EN 300 440-1 V1.6.1

- **TEST SETUP:** In according to manufacturer specifications
- **TEST LOCATION:** Radio test area
- **TEST EQUIPMENT USED FOR TEST:**
  - Spectrum Analyzer Rohde&Schwarz mod. FSP40
  - Test Fixture Prima Ricerca&Sviluppo
  - Climatic Chamber MAZZALI mod. Climatest

TEST CONDITIONS:			**MEASURED**
Ambient temperature :	23°C ± 5°C		**24 °C**
Ambient humidity :	25 - 75 %rH		**45%**
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	**960 mbar**

OPERATING CONDITION (Rif. Section. 3) : *#1*

Risultato di prova :	**Test result :**
☒ ***Entro i limiti***	☒ ***Within the limits***
☐ ***Fuori dai limiti***	☐ ***Out of limits***

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MEASUREMENT RESULTS

TEST CONDITIONS Bandwidth 56MHz		Range of operating frequencies	
		F_{low}	F_{high}
T_{nom} : + 25 °C	V_{nom} : 230Vac	24.1272500	24.1457812
T_{min} : - 20 °C	V_{min} : 207Vac	24.1277040	24.1458860
	V_{max} : 253Vac	24.1278100	24.1458420
T_{max} : + 55 °C	V_{min} : 207Vac	24.1265800	24.1465440
	V_{max} : 253Vac	24.1266240	24.1465360
Incertezza di misura / Measurement Uncertainty : ± 1 Hz			

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TEST 3.	TX – UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

REFERENCE DOCUMENT ETSI EN 300 440-1 V1.6.1 _ 7.3.2 - cabinet spurious radiation

- **TEST SETUP:** In acc. To reference standard
- **TEST LOCATION:** Semi-anechoic chamber (CISPR 16-1 :1993)
  Siemens+Matsushita type B84117-D6019-T232
  Measure distance 3 meters
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESU40
  Spectrum Analyzer Rohde & Schwarz Mod. FSP40
  Spectrum Analyzer HP Mod. 8565E
  External mixerHP mod 11970 V
  Chase Antenna Mod. CBL 6111 A
  Rohde & Schwarz Antenna HL50
  Preamplifier Bonn mod BLMA 0118-M
  Preamplifier Bonn with integrated antenna mod BLMA 1840-1A
  Signal generator Rohde & Schwarz Mod. SMP40
  Horn antenna Electro-Metrics EM-6961
  Horn antenna Schwarzbeck BBHA 9170

TEST CONDITIONS:			**MEASURED**
Ambient temperature :	23°C ± 5°C		**24 °C**
Ambient humidity :	25 - 75 %rH		**45%**
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	**960 mbar**
Voltage :			**230 Vac**

OPERATING CONDITION (Rif. Section 3) : *#1*

Risultato di prova :	**Test result :**
☒ ***Entro i limiti***	☒***Within the limits***
☐ ***Fuori dai limiti***	☐***Out of limits***

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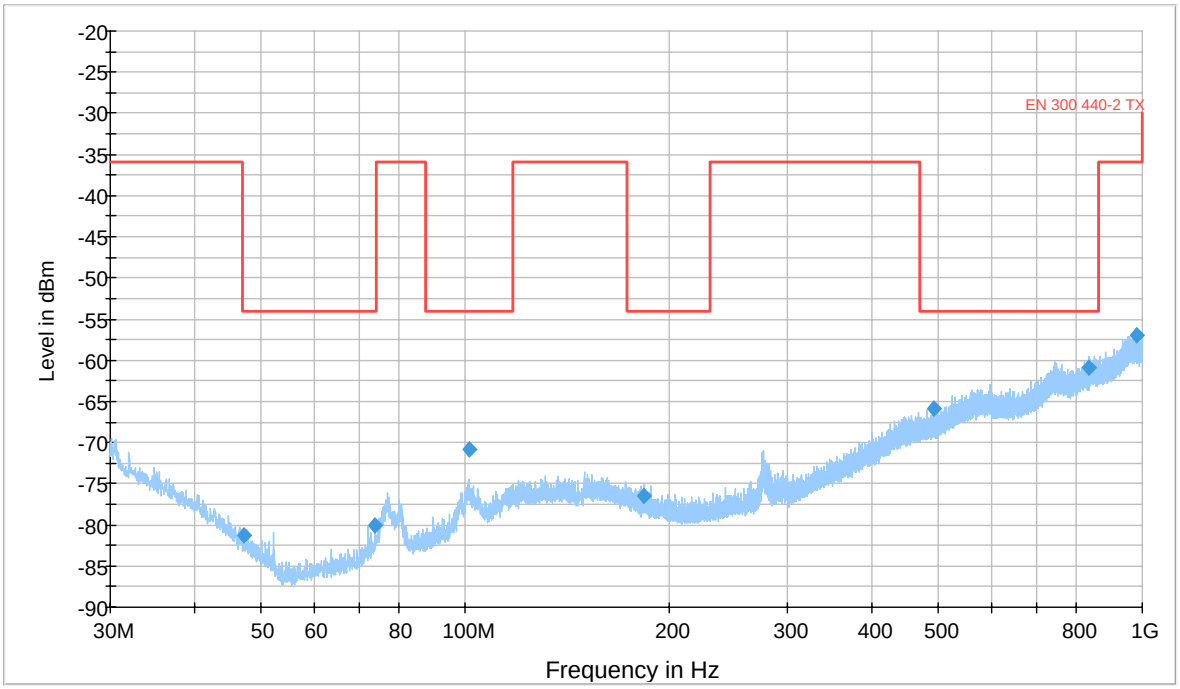
Spurious emission dBm_OSP



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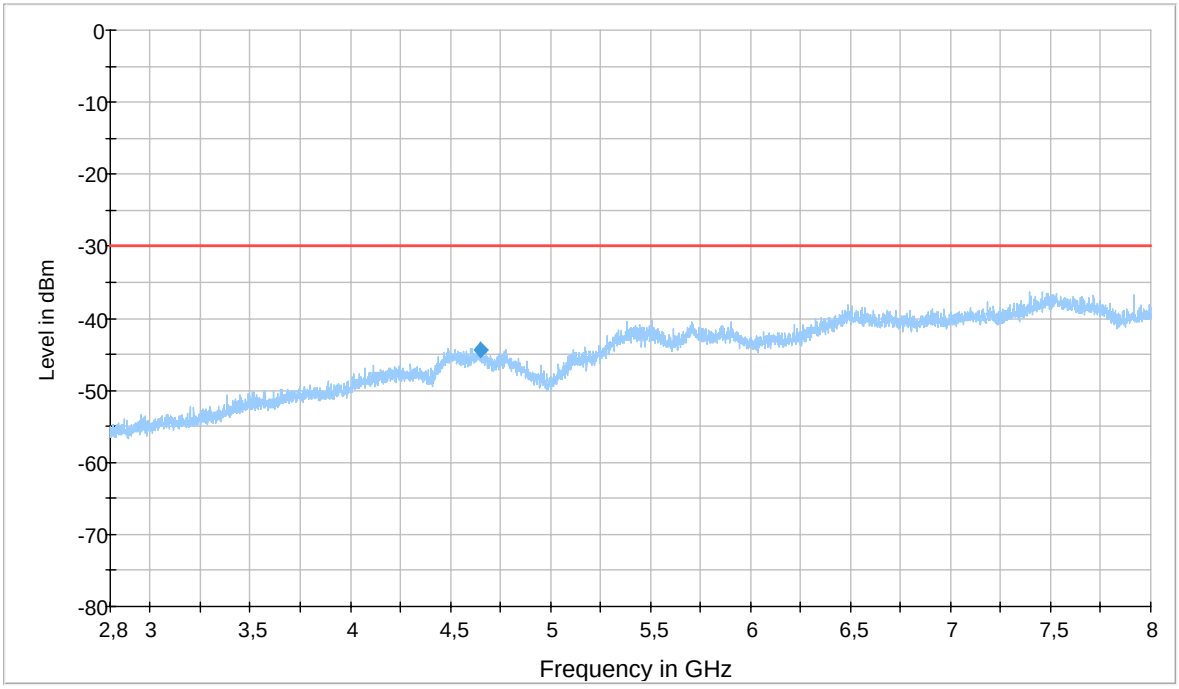
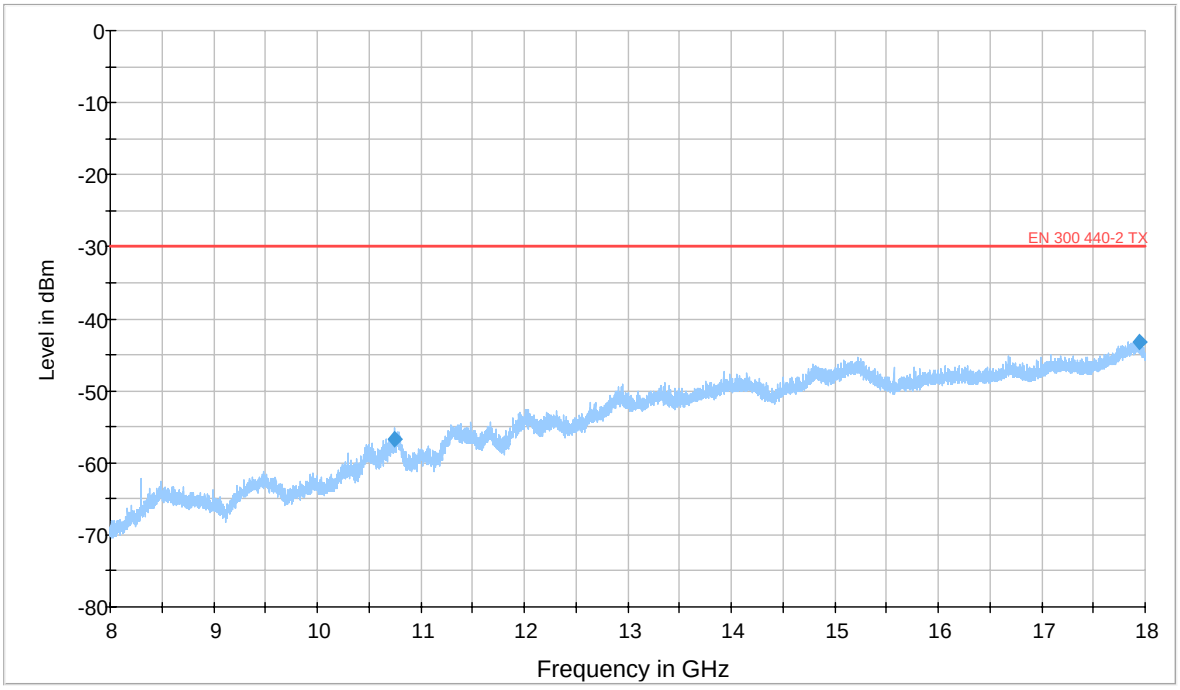
Spurious emission 300_220



Spurious emission 300_220



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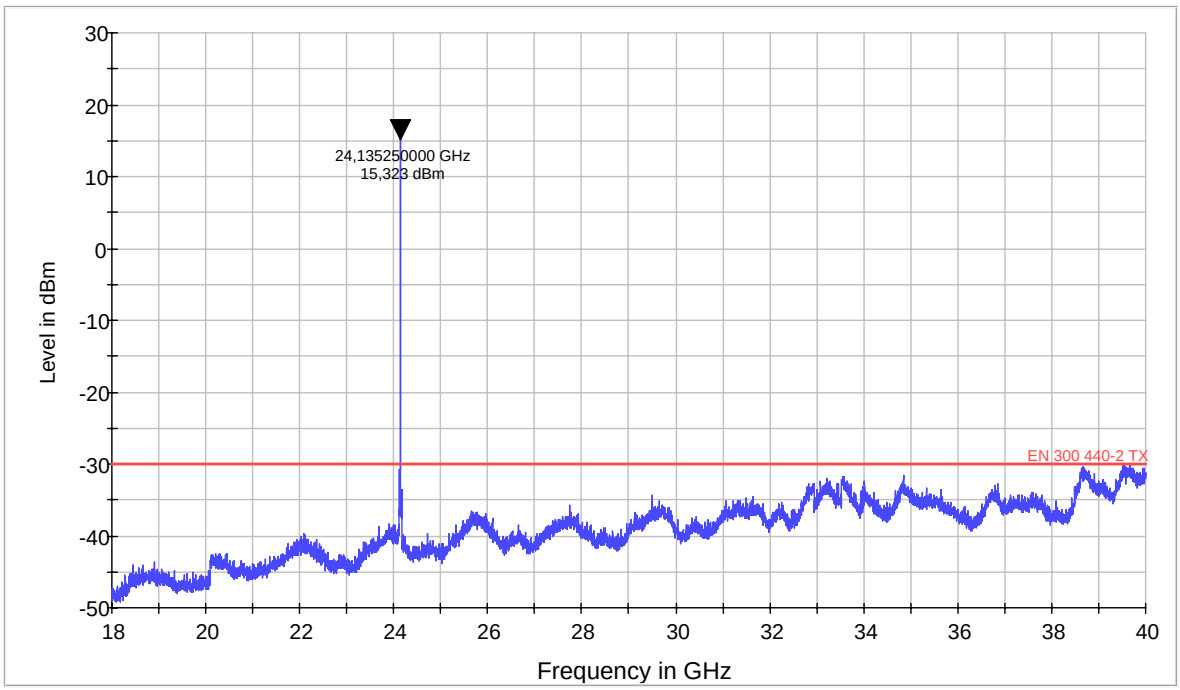
MEASURE between 18 to 40GHz

cabinet spurious radiation		
f [MHz]	Bandwidth (MHz)	Level [dBm]
		TX ON
24135,250	1	Carrier frequency
18000- 40000.0	1	Θ
Incertezza di misura / Measurement Uncertainty : +/- 3 dB Θ = No signal above noise level (-60 dBm) in Range 30 – 2000 MHz Θ = No signal above noise level (-40 dBm) in Range 2000 – 18000 MHz		

EMI Sweep_FSP40_40GHz



The peak near the limit regarding system measurement noise floor, investigation in <6db from limit not show relevant spurious emission

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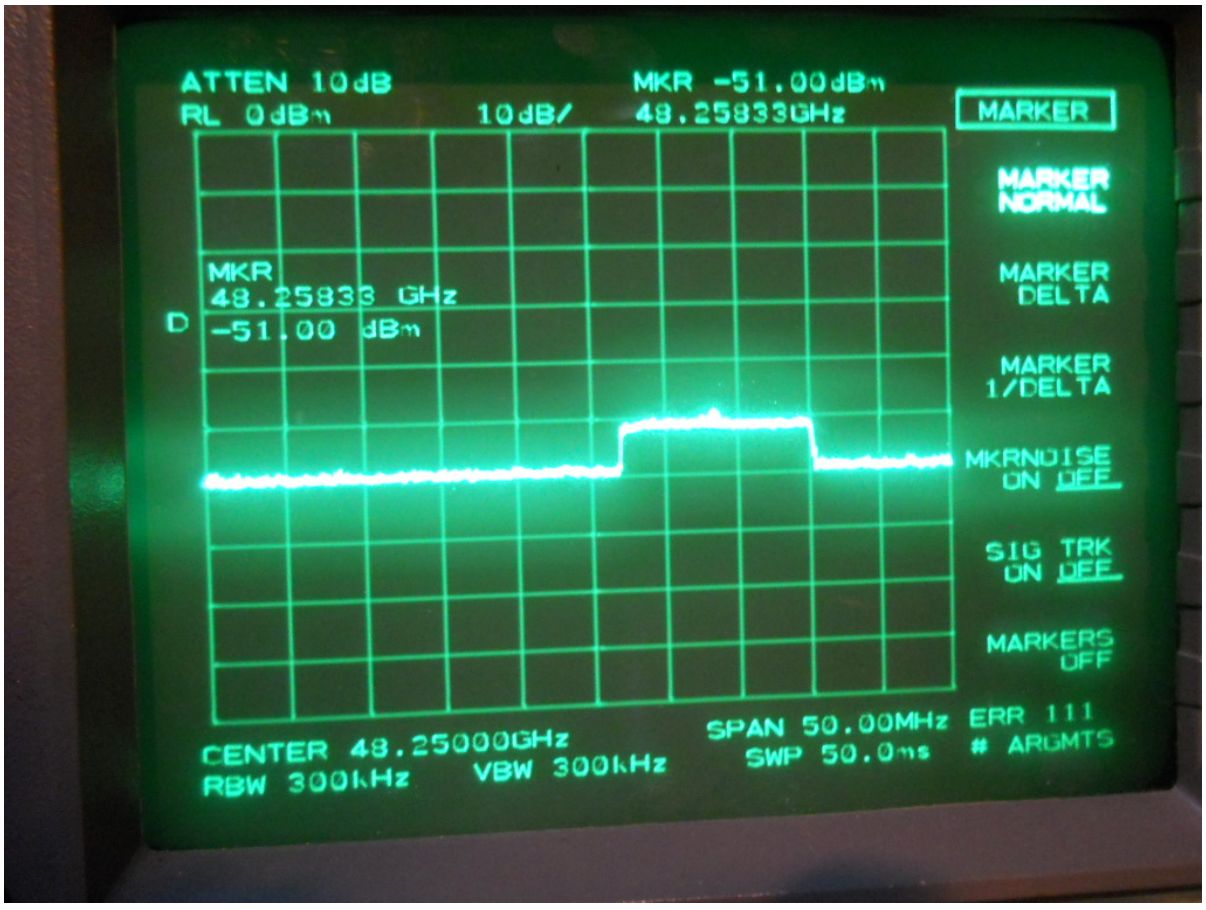
MEASURE between 18 to 40GHz

cabinet spurious radiation		
f [MHz]	Bandwidth (MHz)	Level [dBm]
		TX ON
48258, 330	1	2 Harmonic
40000- 66000.0	1	Θ
Incertezza di misura / Measurement Uncertainty : +/- 3 dB Θ = No signal above noise level (-40 dBm) in Range 2000 – 18000 MHz		



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TEST 4.	***RECEIVER SPURIOUS EMISSION***

REFERENCE DOCUMENT ETSI EN 300 440-1 V1.6.1

- **TEST SETUP:** In according to Ref. Doc. Specifications
- **TEST LOCATION:** Semi-anechoic chamber (CISPR 16-1 :1993)
  Siemens+Matsushita type B84117-D6019-T232
  Measure distance 3 meters
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESU40
  Spectrum Analyzer Rohde & Schwarz Mod. FSP40
  Spectrum Analyzer HP Mod. 8565E
  External mixerHP mod 11970 V
  Chase Antenna Mod. CBL 6111 A
  Rohde & Schwarz Antenna HL50
  Preamplifier Bonn mod BLMA 0118-M
  Preamplifier Bonn with integrated antenna mod BLMA 1840-1A
  Signal generator Rohde & Schwarz Mod. SMP40
  Horn antenna Electro-Metrics EM-6961
  Horn antenna Schwarzbeck BBHA 9170

TEST CONDITIONS:			**MEASURED**
Ambient temperature :	23°C ± 5°C		**24 °C**
Ambient humidity :	25 - 75 %rH		**45%**
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	**960 mbar**
Voltage :			**230 Vac**

OPERATING CONDITION (Rif. Section 3) : *#2*

Risultato di prova :	**Test result :**
☒ ***Entro i limiti***	☒***Within the limits***
☐ ***Fuori dai limiti***	☐***Out of limits***

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RISULTATI DI MISURA / *MEASUREMENT RESULTS*

Livello delle emissioni spurie / *Spurious emissions level (nW)*					
CH1			CH2		
f [MHz]	Bandwidth (kHz)	Level [nW]	f [MHz]	Bandwidth (kHz)	Level [nW]
25 - 1000	1MHz	Θ			
1000 - 10000	1MHz	Θ			
10000-18000	1MHz	Θ			
18GHz–50GHz	1MHz	Θ			
Incertezza di misura / Measurement Uncertainty : +/- 3 dB Θ = No signal above noise level (-55 dBm)					

LIMITI / LIMITS	
Frequenze ≤1 GHz *Frequencies ≤1 GHz*	*Frequenze > 26 GHz* *Frequencies > 26 GHz*
Measurement bandwidth: 100KHz	Measurement bandwidth: 1MHz
-57dBm	-47dBm

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7. EUT TECHNICAL DOCUMENTATION

7.1 Wiring diagrams / Schemi elettrici

	Document reference (n., edition, date, ...) Rintracciabilità (n., edizione, data, ...)
WIRING DIAGRAM Schema elettrico	See manufacturer document
PARTS LIST Lista componenti	See manufacturer document

7.2 Technical manual / Manuale Tecnico d'uso

	Document reference (n., edition, date, ...) Rintracciabilità (n., edizione, data, ...)
(Title) (Titolo)	See manufacturer document

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7.3 Photographic documentation / Documentazione fotografica

Photo n. 1 – EUT identification

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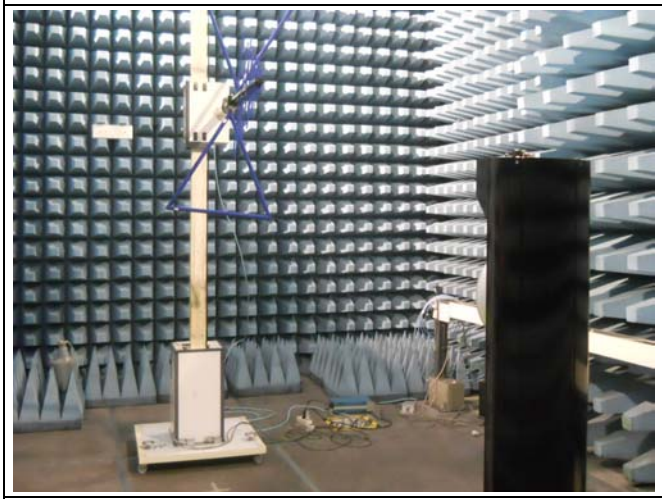
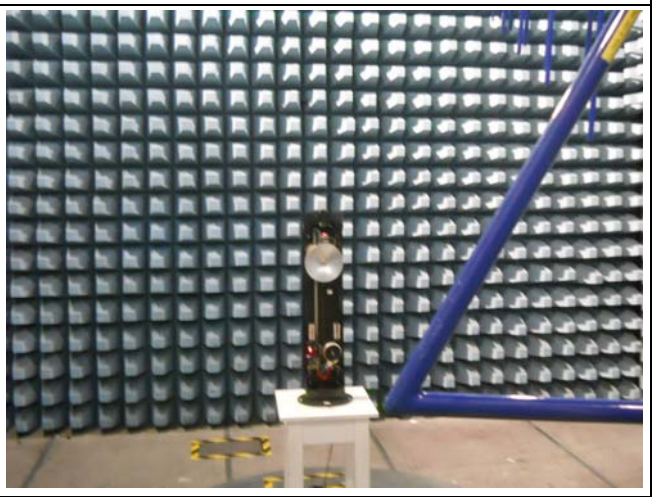
Photo n. 2 – SETUP SPURIOUS EMISSION	
	

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