



**Telecommunications & Telematics
for Transports Lab.**

TEST REPORT

Ref. No. ARSE00056/fcc

Date: 2004.12.12

Measurements performed in accordance with:



**FCC Rules : Code of Federal Regulations (CFR) no. 47 -
PART 15 – RADIO FREQUENCY DEVICES**

PRODUCT : **Electronic Parking System with remote receiver**

TESTED MODEL : **EPS4003-RF9**

MANUFACTURER : **LASERLINE S.p.A. – Via Don Locatelli, 51 – I-20040 Roncello**

TRADEMARK : **LASERLINE S.p.A. – Via Don Locatelli, 51 – I-20040 Roncello**

SERIES :

OTHER INFORMATION Testing dates : 2004-10-01

 Tested samples No.: 1

 Testing site : IMQ S.p.A. Via Quintiliano, 43 I-20138 MILANO

Tested by Ing. C. Cantaluppi

Checked by: Ing. V. La Fragola
(Telecommunications Lab Head)

Revision Sheet

Release No.	Date	Revision Description
Rev. 1	2004-05-09	Improvement of test results recording for field strength (radiated) emission test for transmitter unit

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1 GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST

1.1 APPLICANT

NAME	LASERLINE S.p.A
ADDRESS	Via Don Locatelli, 51 – I-20040 Roncello
COUNTRY	ITALY

1.2 MANUFACTURER

NAME	LASERLINE S.p.A
ADDRESS	Via Don Locatelli, 51 – I-20040 Roncello
COUNTRY	ITALY

1.3 EQUIPMENT CLASSIFICATION

According to the definition 15.3 (o) EUT is a **Intentional Radiator operating within the bands 902-928 MHz** so it shall fulfil provisions of 47CFR Part 15 Subpart C – Intentional radiators – and Section 15.249.

1.4 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Parameters	Value
Type of equipment :	▪ Transmitter ▪ Receiver
Model :	▪ EPS4003-RF9
FCC ID. :	▪ SP4EPS4003RF
Trade Name	▪ Electronic parking system with remote receiver
Power supply type :	▪ 12/24 Vdc Battery car power supply
DC power input cable :	▪ Transmitter : 2-wire max 235 cm long ▪ Receiver : cigarette light plug
Dimensions	▪ Transmitter : 154.8 ×5.5 × 2.4 cm ▪ Receiver : See Technical documentation

1.5 FEATURE OF EQUIPMENT UNDER TEST

Parameters	Value
Nominal Supply Voltage:	12V_{dc} , 24V_{dc}
Type of power source:	external power source (Battery car power supply)
Operating frequency:	915 MHz
Frequency Band:	902 – 928 MHz
Channel separation:	Wide band
Maximum RF output power:	10 Mw
Antenna type:	- Integrated for receiver - Integrated for transmitter
Maximum sensitivity:	Not supplied by manufacturer
Type of modulation	OOK Amplitude modulation
Duty cycle:	< 1% (declared by manufacturer)
Transmitter board identification	SL0EPSR
Receiver board identification	SL0CBS-4RF
Ultrasonic Sensor board	US3

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TEST CONFIGURATION OF EQUIPMENT UNDER TEST

2.1 ENVIRONMENTAL CONDITIONS

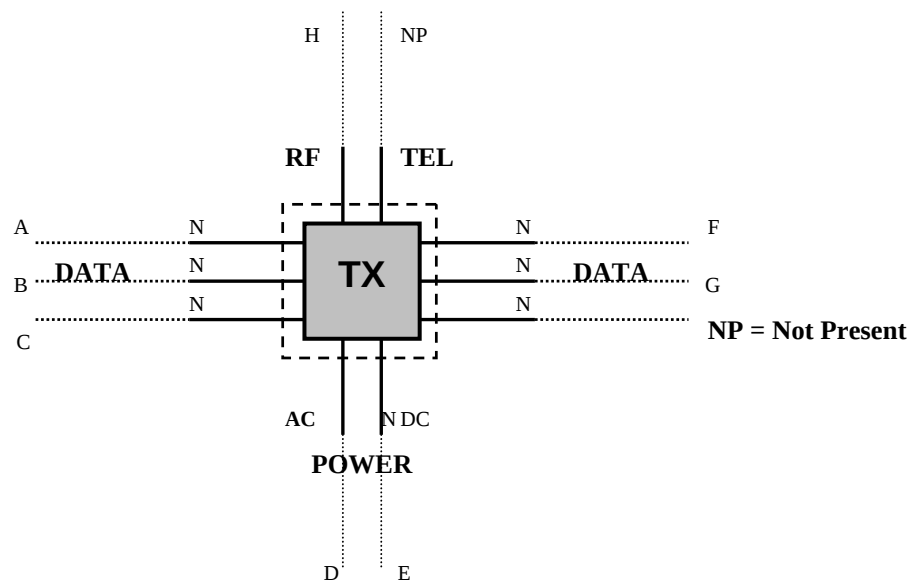
TEST CONDITIONS	MEASURED
Ambient Temperature	20 ÷ 25 °C
Relative Humidity	50 ÷ 60 %
Atmospheric Pressure	900 ÷ 1000 mbar

2.2 DESCRIPTION OF SUPPORT EQUIPMENT

No specific support equipment has been used during test

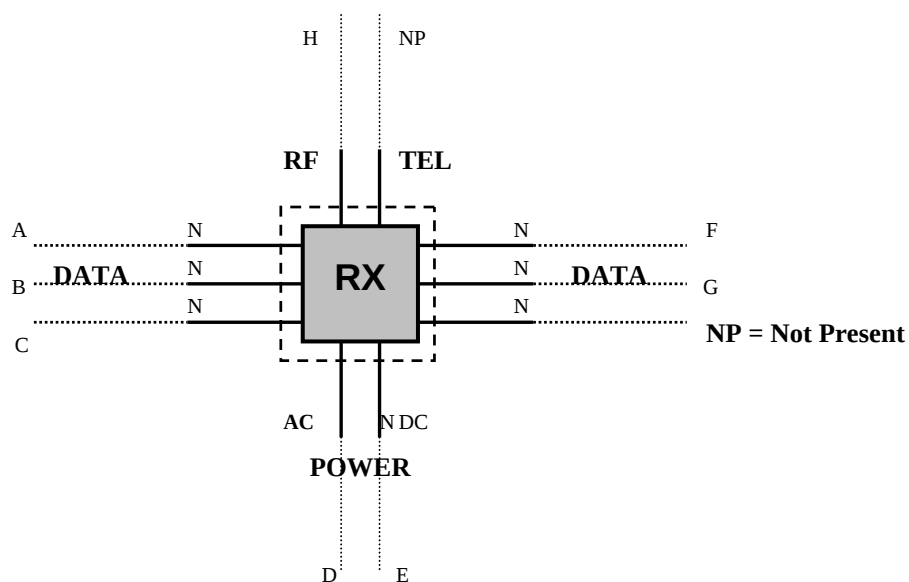
2.3 Interface Identification and Connection Diagram of Test System

Transmission unit



#	Interface	Description	Maximum length	Ref. Document
1	Enclosure	Plastic case	-	EPS4003-RF-01 [17-09-04]
2	DC power input/output port	2-wire 1 mm ²	max 235 cm l	
3	AC mains power input/output port	Port not present ²	-	
4	Signals and control ports	Port not present ²	-	
5	Telecommunication ports	Port not present ²	-	
6	Antenna port (RF)	Integrated	-	

Receiver unit



#	Interface	Description	Maximum length	Ref. Document
1	Enclosure	Plastic case	-	EPS4003-RF-01 [17-09-04]
2	DC power input/output port	Cigarette Lighter plug	-	
3	AC mains power input/output port	Port not present ²	-	
4	Signals and control ports	Port not present ²	-	
5	Telecommunication ports	Port not present ²	-	
6	Antenna port (RF)	Integrated	-	

3 OPERATION OF EQUIPMENT UNDER TEST

3.1 OPERATING TEST CONDITIONS

Ref.	Description
#1	Continuos transmission
#2	The receiver is powered-on (ready to receive)
#3	Stand-by

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TESTS IDENTIFICATION AND RESULTS

CFR47 Part 15 Section	Title	Operating condition	Result	Test data
15.207	Conducted Emission	Not applicable		
15.249 (a)	Field strength emission		PASS	1
15.249(b)	Fixed, point-to-point operation requirements	Not applicable		
15.249 (d)	Radiated emissions outside of the specified frequency bands, except for harmonics		PASS	1
15.249(e) (15.35 (b))	Radiated emissions above 1000 MHz – average limits		PASS	1
15.203	Antenna Requirements	Integrated antenna	PASS	-
15.31 (e)	Variation of the radiated signal level of the fundamental frequency under supply voltage (85 – 115%)		PASS ¹	-

Table 1 : Summary of tests

¹ Both devices under test (TX and RX) are equipped with a voltage regulator circuit so fundamental frequency o Local oscillator level do not have significative variations

4.1 Methods of Measurement

All compliance measurements have been carried out using the procedures described in the standard ANSI C63.4-2003 (excluding sub-par. 4.1.5.2, 5.7 9 and 14) and Section 15.31 of CFR47 Part 15 – Subpart A (General).

Additional test requirements have been adopted according to the reference Section indicated in the Test Table

4.2 Frequency Range Investigated

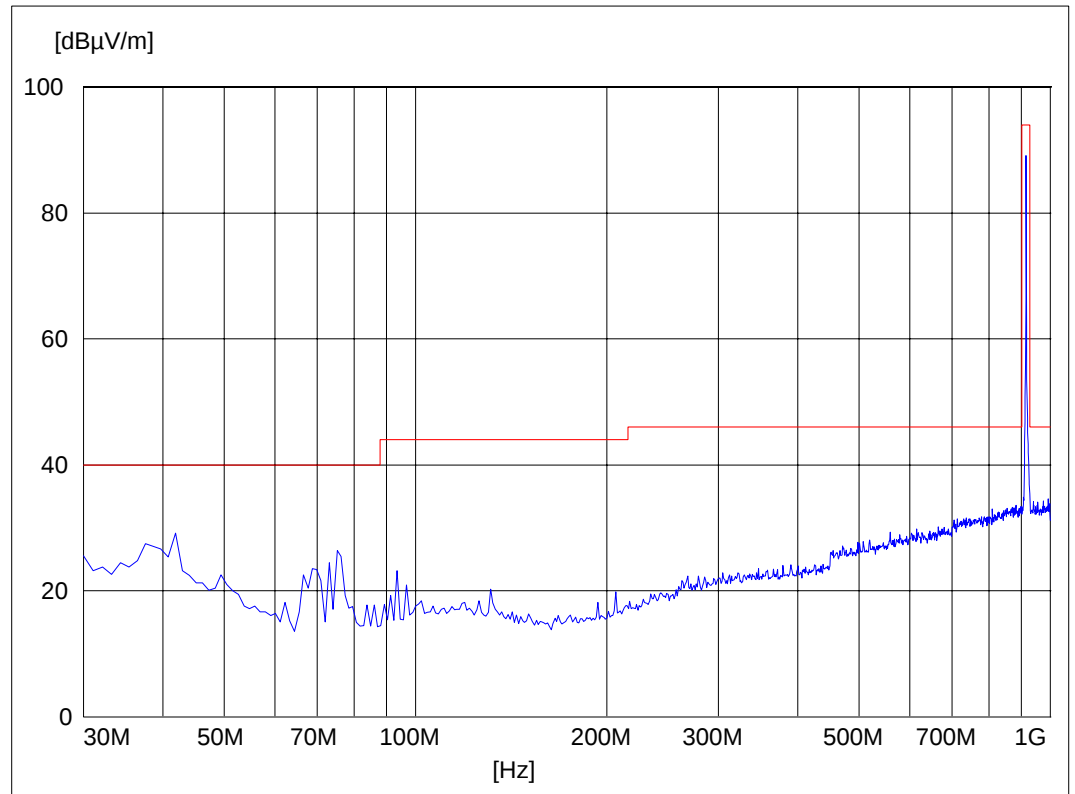
- a. Radiated emission tests : from 30 MHz to 10.000MHz

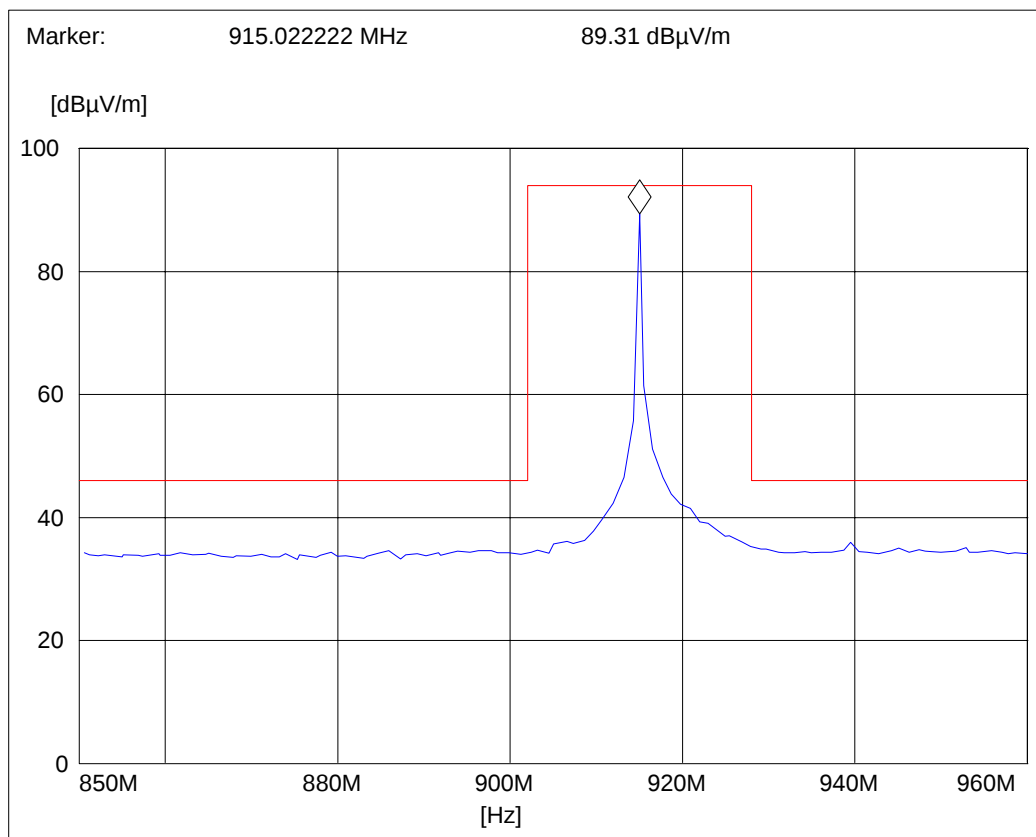
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MEASUREMENTS AND TESTS DATA

TEST No. 1	Title “Field strength (Radiated) Emissions”		47CFR Part 15 Ref. Section
			15.249
TEST SET-UP & REQUIREMENTS	Test distance	3 m	
	Antenna (1)	Log periodical (30 – 1000 MHz)	
	Antenna (2)	Double ridged horn (1 – 10 GHz)	
	Test procedure	ANSI C63.4–2003	
	Receiver settings		
	Resolution (or IF) Bandwidth (RBW)	100 kHz for f < 1 GHz 1 MHz for f ≥ 1 GHz,	
	Video (or Average) Bandwidth (VBW)	≥ RBW	
	Sweep time	Auto	
	Detector function	Peak for 30 – 1000 MHz frequency range Peak + Average above 1 GHz	
	Trace	Max hold	
	Attenuator	10 dB	
	LIMIT	50 mV/m (93,98 dBµV/m) : Fundamental 0,5 mV/m (53,98 dBµV/m) : Harmonics	

Transmitter unit - Frequency range : 30 - 1000 MHz





Field strength emission level				
Frequency (MHz)	Transmitter state: Operating #1			
	Fundamental frequency			
	915.022 MHz			
	Bandwidth	Polarization	Limit [dB μ V/m] Peak	Measured level [dB μ V/m] Peak
915,933	100 kHz	H	93,98	89,31
Measurement uncertainty	< $\pm$ 2.5 dB			



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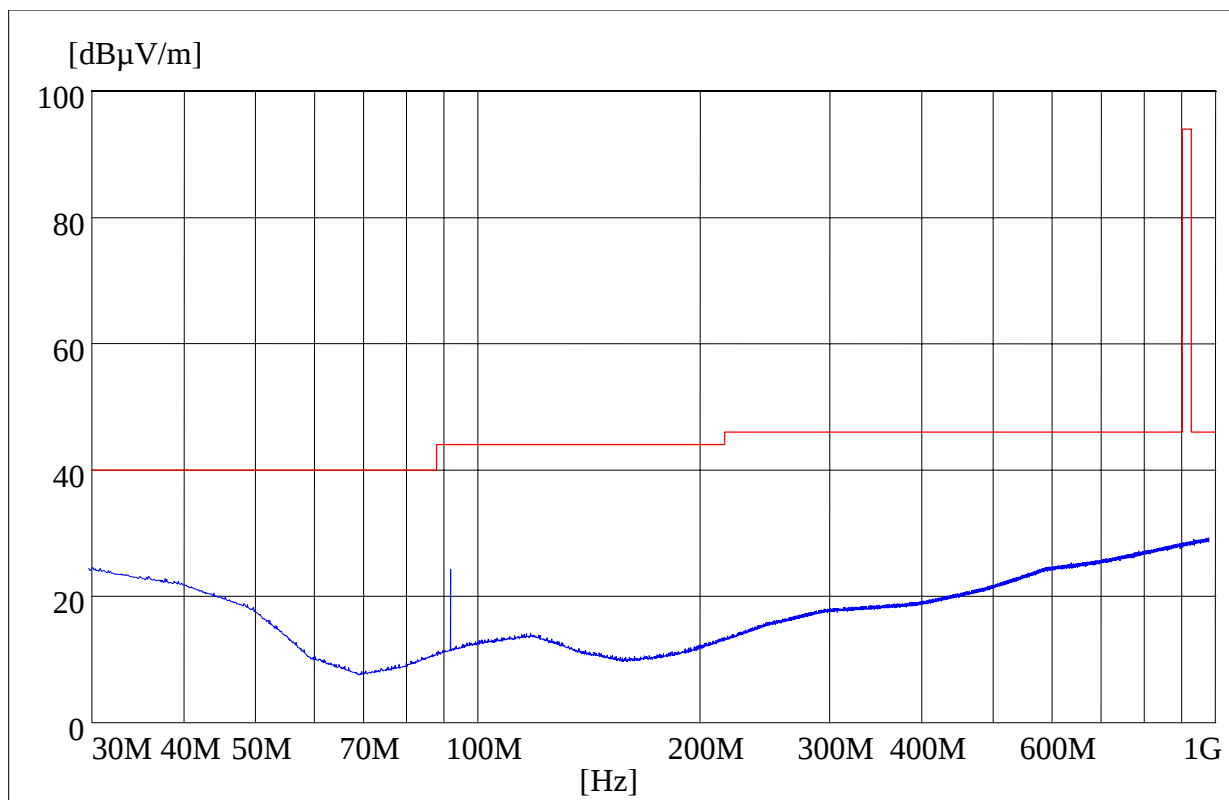
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Transmitter unit - Frequency range : 1 - 10 GHz

Field strength emission level					
Frequency (MHz)	Transmitter state: Operating condition #1				
	Fundamental frequency				
	915.05 MHz				
	Bandwidth	Polarization	Limit [dB μ V/m] Average / Peak	Measured level [dB μ V/m] Peak	Measured level [dB μ V/m] Average
1830,08	1 MHz	H	53,98 / 73,98	26,70	
> 2000	1 MHz	H + V	53,98 / 73,98	< 25	< 25
Measurement uncertainty	< $\pm$ 2.5 dB				

Receiver unit - Frequency range : 30 - 1000 MHz



Receiver unit - Frequency range : 1 - 10 GHz

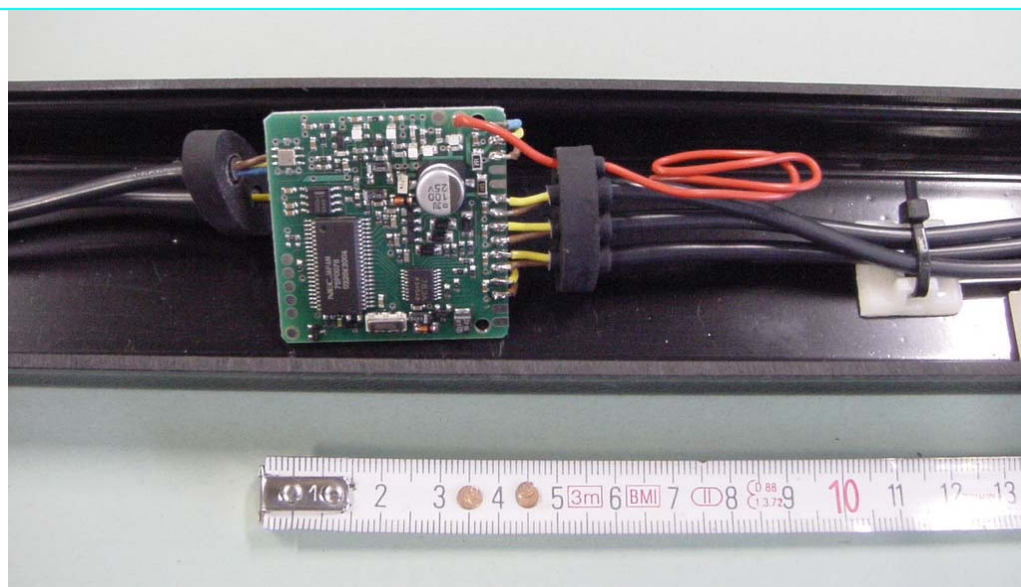
Spurious radiation level	
Frequency (MHz)	Receiver state: Operating Condition #2
1000 - 10000 MHz	< 30 dBμV/m
Measurement uncertainty	< ± 2.5 dB

6 TECHNICAL DOCUMENTATION

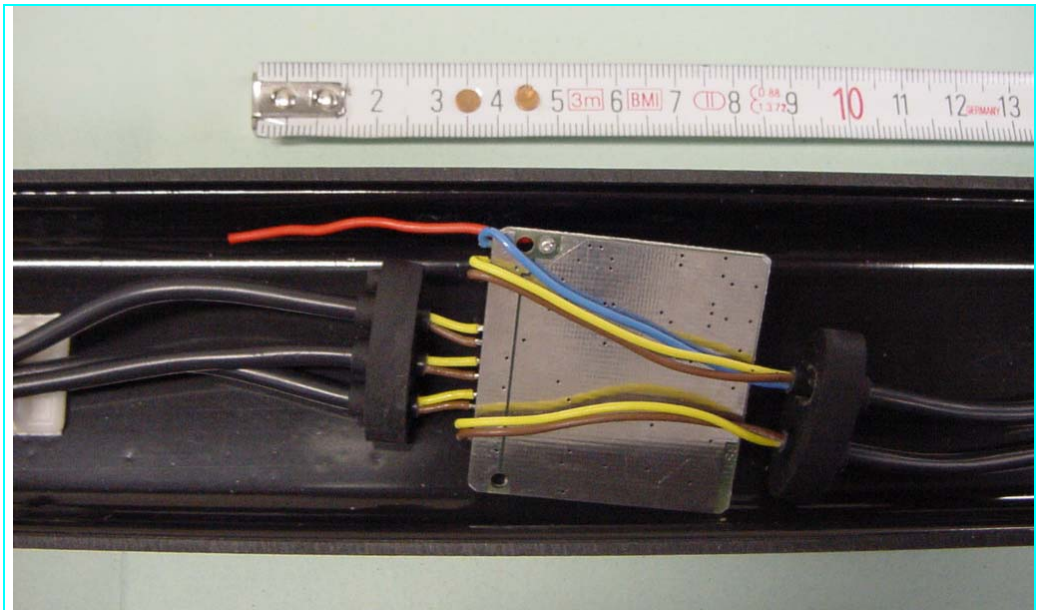
TITLE	REFERENCE
EPS4003-RF Technical Documentation	EPS4003-RF-01-[17-09-04]

7 PHOTOGRAPHIC DOCUMENTATION

EUT IDENTIFICATION



A. Transmitter unit – Internal view – Front side



B. Transmitter unit – Internal view – Rear side

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MEASUREMENT AND TEST EQUIPMENT INSTRUMENTATION

INSTRUMENTS	MANUFACTURER	MODEL	IMQ SERIAL NUMBER	Ref. TEST
Antenna ridged horn	Schwarzbeck	BBHA9120D	S03464	1
Antenna log-periodic	ARA	LPB-2513	S02385	
Receiver (Spectrum analyzer)	Rohde&Schwarz	ESMI	S02349	All tests
PC and software for test automation				All tests