TEST REPORT

Secondo i seguenti Standard / *According to following Standards*

Test specification	FCC Part 1 Subpart I Section 1.1307: 2015 Test plan:TP-15LA00198/01_151008_REGATE-10-11-16	
RF exposure evaluation, FCC section 1.1307 (b)(1) and section 2.1091		**Conforme/*Compliant***
Richiedente/ *Applicant's name* ..... :	Eurotech Spa	
Indirizzo / *Address* ..... :	Via F.lli Solari 3/A – 33020 Amaro (UD) - Italy	
Produttore / *Manufacturer* ..... :	Eurotech Spa	
Indirizzo / *Address* ..... :	Via F.lli Solari 3/A – 33020 Amaro (UD) - Italy	
Dispositivo sottoposto ai test/ *Device Under Test* ..... :	ReliaGATE 10-11-16	
Data di emissione/ *Date of issue*	23rd February 2016	
Validità/ *Validity*	Vedi sezione 1.1 / *See section 1.1*	
Test report redatto da/ *Author of Test report*	Loris Fruch	
Tecnico/i di prova *Engineer/s*.....	Loris Fruch Responsabile di prova/*Test manager*: Giovanni Solari	
Approvato da (+ firma) *Approved by (+ signature)*.....	Silvano Chialina Responsabile del laboratorio/ *Head of the Laboratory*	Firmato digitalmente da **SILVANO CHIALINA** O = non presente C = IT .....
Laboratorio / *Testing Laboratory* . :	EmilabSrl	
Indirizzo / *Address* ..... :	Via F.lli Solari 5/A – 33020 Amaro (UD) - Italy	

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1. Informazioni Generali / *General Information*

1.0 Laboratorio / Testing Laboratory

Luogo di Prova e partecipanti/ *Testing location and participants:*	
Testing Laboratory:	
Testing location/ address.....:	EmilabSrl Via F.lli Solari 5/A – 33020 Amaro (UD) – Italy Tel +39 0433 468625 Fax +39 0433 494739 Email: info@emilab.it
Partecipanti / *Participants*:	Loris Fruch, Pierluigi Pollano (Eurotech Spa), Pierluigi Driusso (Eurotech Spa)

1.1 Campionamento e Documentazione / *Sampling and Documentation*

I campioni sono stati consegnati dal Cliente. I risultati dei test contenuti in questo documento si riferiscono esclusivamente al modello e numero di serie provato. E' responsabilità del costruttore assicurare che la produzione dei modelli in serie rispetti i requisiti del presente documento. Questo documento non può essere riprodotto in parte senza il consenso scritto del responsabile del laboratorio EMILAB.

EMILAB non si assume nessuna responsabilità per danni derivanti da interpretazioni che esulano dal contesto e dall'applicazione del presente documento.

The samples was delivered by customer. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. This report shall not be reproduced, except in full, without the written approval of the Issuing testing Emilab laboratory.

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1.2 Specifiche del test / *Test specifications*

Test performed according to:	
Test plan	TP-15LA00198/01_151008_REGATE-10-11-16 Date:08/10/2015 Author: Stefano Zanolin - Eurotech S.p.A.
Test specification	RF exposure evaluation, FCC section 1.1307 (b)(1) and section 2.1091
Basic Specifications	FCC KDB447498-RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES v.06 2015-10

1.3 Svolgimento dei test e condizioni generali / *Test scheduling and general condition*

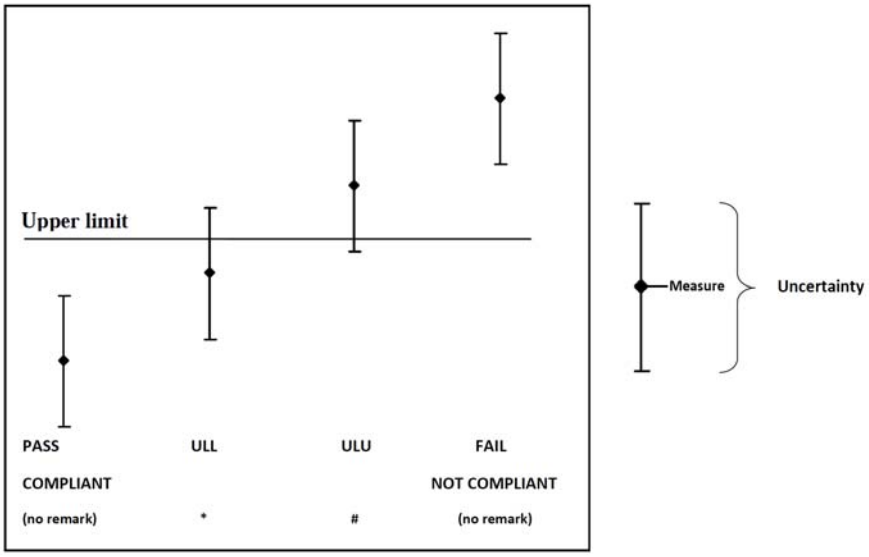
Svolgimento dei test/ *Scheduling* ..... :	
Data ricezione EUT	
Date of receipt of EUT ..... :	29/10/2015
Data esecuzione test	
Date (s) of performance of tests ..... :	04/11/2015 – 14/12/2015
Condizioni ambientali / *Environment Conditions*	Se non diversamente specificato / *If not otherwise specified:* Temperature: 18-28°C Humidity: 20-90% Pressure: 87-108.56 kPa
Intervallo delle tarature/ *Calibration Interval*	Minimum 1 year

1.4 Espressione dei risultati finali / *Test case of final verdicts*

I GIUDIZI NON SONO SOGGETTI AD ACCREDITAMENTO

/VERDICTS ARE NOT SUBJECT TO ACCREDITATION

- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	Compliant or PASS
- test object does not meet the requirement ..... :	Not Compliant or FAIL



Results marked with a NOT COMPLIANT or FAIL do not meet specifications with a probability of >95%, the total uncertainty interval is located outside the specified limits.
Measurement results are marked with an "" or "#" (uncertain) if the uncertainty interval is partly within and partly out of the specified limits. A clear compliance statement is not possible.*

All results not marked are located within the specified limits even when extended by the uncertainty interval

1.5 Incertezza / *Uncertainty*

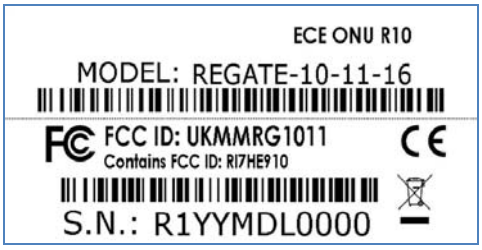
L'incertezza estesa riportata è espressa come l'incertezza tipo moltiplicata per il fattore di copertura k = 2, che per una distribuzione normale corrisponde ad una probabilità di copertura di circa il 95 %.

The reported expanded uncertainty of measurements is stated as the standard uncertainty of measurement, multiplied by the coverage factor k=2, which for a normal distribution corresponding to a coverage probability of approximately 95%.

1.6 Termini, Definizioni e Acronimi / *Terms, definitions and abbreviations*

AC	Alternating Current
ACK	Acknowledgement
AFH	Adaptive Frequency Hopping
AM	Amplitude modulation
AVE det	Average Detector
BIT	Burst Interval Time
CAC	Channel Availability Check
BW	BandWidth
CCA	Clear Channel Assessment
CW	Continuous Wave
DAA	Detect And Avoid
DC	Duty CycleDFS
DFS	Dynamic Frequency Selection
DSSS	Direct Sequence Spread Spectrum
DUT	Device Under Test
e.i.r.p.	equivalent isotropically radiated power
e.r.p.	effective radiated power
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under test
FAR	Fully Anechoic Room
FHSS	Frequency Hopping Spread Spectrum
HT20 High	Throughput in a 20 MHz channel
HT40 High	Throughput in a 40 MHz channel
ISM	Industrial, Scientific and Medical
LBT	Listen Before Talk
LPDA	Logarithmic Periodic Dipole Antenna
MCS	Modulation Coding Scheme
MIMO	Multiple Input, Multiple Output
MU	Medium Utilisation
MS/s	Mega-Samples per second
NACK	Not Acknowledged
OATS	Open Air Test Site
OFDM	Orthogonal Frequency Division Multiplexing
OM	Operating Modes
OOB	Out Of Band
PK det	Peak Detector
PM	pulse modulation
Ppm	parts per million
PPS	Pulses Per Second
PRF	Pulse Repetition Frequency
RBW	Resolution BandWidth
RE	Radiated Emission
RLAN	Radio Local Area Network
RMS	Root Mean Square
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
Rx	Receiver
SAC	Semi Anechoic Chamber
TEM	transverse electromagnetic
TL	Threshold Level
TPC	Transmit Power Control
Tx	Transmitter
VBW	Video BandWidth
VSWR	voltage standing wave ratio
WLAN	Wireless Local Area Network
BT	Bluetooth
BLE	Bluetooth Low Energy

2.0 Apparecchiatura sottoposta a test/ *Device Under Test*

Descrizione/ *Description*.....:	The ReliaGATE 10-11-16 is a compact and lightweight IoT gateway based on the powerful TI AM 335X microprocessor. It integrates 4 GB of eMMC storage that can be expanded using the MicroSD card slot available behind the Service panel.
Marchio commercial / *Trade Mark* .....:	
Produttore / *Manufacturer*.....:	Eurotech Spa
Modello / *Model/Type reference* .....:	REGATE-10-11-16
Voltage/Current.....:	9÷36Vdc (nominal 24Vdc) / 0.1A
Frequency .....:	/
Power.....:	2.5W
Numero EUT / *EUT Number*.....:	15LA00198/01
Serial Number .....:	R1YYMDL0000
Numero di campioni testati / *Number of samples tested*.....:	1
Hardware stage/level .....:	1.0
Software stage/level .....:	1.0
Modification stage.....:	/
Operating Mode .....:	/
Wiring harness.....:	Power supply Harness (2mt length); Ethernet line (2mt length), Digital I/O, CAN and RS232 lines (2mt length); Multi band antenna (GSM, WLAN and Bluetooth) 3 x coaxial cables (4mt lenght); All signal cables are shielded.
Monitoring .....:	/

Info:

Other Emilab reports related to the same product: (WLAN:15-02125, BLE: 16-02235, BT:16-02234)

The test results collected in this report are confirmed in all the voltage range of EUT power supply (9÷36V dc).

DUT Hardware features
Processor: TI AM335X, 800 MHz, 1 core, RAM: 512MB DDR3, Embedded storage: 4GB eMMC, Additional storage Micro SD card slot available behind the Service panel
Wired Interfaces:

- Ethernet: 1 x Fast Ethernet port (external)
- CAN: 2 x CAN ports (Version 2 Parts A and B)
- USB: 2 x USB 2.0 host port, 1x USB 2.0 client port
- Serial: 1x TTL for OS console (available behind the Service panel) 2x RS232/485 configurable
- Digital I/0: 2 x insulated digital inputs and 2x insulated digital outputs

Wireless Interfaces:

- Cellular: 3G global, Telit HE910 DG
- Wi-Fi: 802.11 b/g/n
- Bluetooth: 4.0
- GPS: 28-channel GPS integrated in Cellular
- RF output connectors: 1 x SMA for Cellular, 1x SMA for GPS, 1x SMA for Wi-Fi/Bluetooth

GSM dotation: Telit HE910 FCC ID: RI7HE910

Antenna:

- Multi band antenna Mobile Mark, model SMW-UMB-3C3C3C with integral RF coaxial cables L=4mt;

ESA modifications at manufacturer's care:

- Before of the tests a ferrite model "Fair-rite 0431164281" was placed with one turn on the EUT power supply cable near to its case;

Auxiliary equipment for tests supplied by the applicant:

- Personal Computer Acer, model Travelmate C300;
- Access Point Intellinet, model 524704;
- Multi band antenna Mobile Mark, model SMW-UMB-3C3C3C with integral RF coaxial cables l=4mt;

2.1 Channel List

Wi-Fi

Frequency band [MHz] 802.11 b / g / n HT20 – HT40	
Channel	**Frequency [MHz]**
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

Bluetooth

Frequency band [MHz]: 2400 – 2483.5							
Channel	**Frequency [MHz]**	**Channel**	**Frequency [MHz]**	**Channel**	**Frequency [MHz]**	**Channel**	**Frequency [MHz]**
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	-	-

3.0 Valutazione dell'esposizione dell'operatore/RF exposure evaluation

Technician	Loris Fruch	
Table No.	TEST: RF exposure evaluation	\
Method	Section 1.1307 (b)(1) Section 2.1091 FCC KDB447498 (Mobile device)	\

Parameters required prior to the test	Laboratory Ambient Temperature	18 to 28 °C
	Relative Humidity	20 to 90 %
Parameters recorded during the test	Laboratory Ambient Temperature	/
	Relative Humidity	/

Supplementary information:

- FCC Requirement: System operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines section 1.1307 (b) (1) of FCC Rules: 47 CFR Part 1 Subpart I;

- EUT Classification: mobile device; The antennas of this product, under normal use condition, are at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance from the antenna should be included in the User Manual. The distance from DUT to evaluation point was selected on the basis of par FCC Rules: 47 CFR Part 2 Subpart J: section 2.1091.

- Applicable limit: Maximum Permissible Exposure (MPE) according to section 1.1310 of FCC Rules: 47 CFR Part 1 Subpart I;

- Field density at given distance from antenna is evaluated by means of the far field formula:
  $S = (PG) / 4\pi R^2$
  S = Power Density (mW/cm^2)
  P = Power of transmitter (in mW)
  G = Gain of antenna (linear scale)
  R = 20cm

- Total density of multiple frequency device is calculated adding contributes: ($S_{tot}=S_1+S_2+S_3$):
  TX power at GSM integral antenna input: max rated power + 1.5dB tolerance
  TX power at WLAN antenna input: max rated power + 1.5dB tolerance
  TX power at Bluetooth antenna input: max rated power + 1.5dB tolerance

- Antenna in use: One single multi band antenna ; type= Mobile Mark, model SMW-UMB-3C3C3C with integral RF coaxial cables L=4mt.Gain of EUT external antenna has been extracted from manufacturers data (Max value).
  The attenuation of the antenna cables were not taken into account (conservative approach).

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)
Limits for Occupational / controlled Exposures			
300 - 1500	--	--	f/300
1500 – 100000	--	--	5.0
Limits for General population / Uncontrolled Exposure			
300 - 1500	--	--	f/1500
1500 – 100000	--	--	1.0

where f = Frequency in MHz

3.1 Risultati del test / *Test Results* - RF exposure evaluation

GSM antenna, power density calculation

Band	Channel Frequency (MHz)	Output Power to Antenna + tolerance (dBm)	Output Power to Antenna (mW)	Max Antenna Gain (dB_i)	distance at evaluation point (cm)	Power Density (mW/cm^2)
GSM 900	800-1000	34,5	2818,4	2	20	**0,889**
DCS1800 / PCS1900	1710-1880 / 1850-1990	31,5	1412,5	5	20	**0,889**
					MAX=	**0,889**

WLAN antenna, power density calculation

802.11 Protocol	Channel Frequency (MHz)	RMS Output Power to Antenna + tolerance (dBm)	Output Power to Antenna (mW)	Max Antenna Gain (dB_i)	distance from DUT at evaluation point (cm)	Power Density (mW/cm^2)
worst case	2412 -2462	18,5	70,8	5	20	0,045

Bluetooth antenna, power density calculation

802.11 Protocol	Channel Frequency (MHz)	Output Power to Antenna +tolerance (dBm)	Output Power to Antenna (mW)	Max Antenna Gain (dB_i)	distance from DUT at evaluation point (cm)	Power Density (mW/cm^2)
worst case (BR)	2402-2480	14,20	26,3	5	20	0,017

Total power density calculation

GSM power density [mW/cm^2]	WLAN power density [mW/cm2]	Bluetooth power density [mW/cm^2]	Total power density (*) [mW/cm^2]	Limit [mW/cm^2]
0,89	0,045	0,017	**0,95**	1,00

(*) conservative value to be reduced due to antenna cables attenuation (not taken into account).
Note: General public exposure limit was applied.