TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: GE Security
ActiveKEY

To: FCC Part 22: 2006 (Subpart H) and FCC Part 24: 2006 (Subpart E)

Test Report Serial No:
RFI/RPTE1/RP72510JD03B

This Test Report Is Issued Under The Authority Of Michael Derby, Wireless Radio Performance Group Leader: 	
Tested By: Richelieu Quoi 	**Checked By: Michael Derby** 
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1. Client Information

Company Name:	GE Security
Address:	4001 Fairview Industrial Drive Salem OR 97302 USA
Contact Name:	Mr J Speir

2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification of Equipment Under Test (EUT)

Description:	Real Estate Key with GPRS data modem
Brand Name:	ActiveKey
Model Name or Number:	ActiveKey
Serial Number:	1059096-08 (Test Sample 1)
IMEI Number:	01100200
FCC ID Number:	MIVMLG0208
Country of Manufacture:	USA
Date of Receipt:	26 June 2007

2.2. Accessories

The following accessories were supplied with the EUT:

Description:	Rechargeable Batteries
Brand Name:	ActiveKey Battery
Type:	LP694659
Serial Number:	None
Cable Length and Type:	Not Applicable
Connected to Port	Positive and Negative Contact Pin

2.3. Description of EUT

The equipment under test is a Dual-Band mobile module station, operating at GSM850 and PCS1900 band.

2.4. Modifications Incorporated in EUT

During the course of testing the EUT was not modified.

2.5. Additional Information Related to Testing

Equipment Category	GSM850 / PCS1900		
Type of Unit	Portable (Standalone battery powered device)		
Intended Operating Environment:	Within GSM coverage		
Transmitter Maximum Output Power Declared:	GSM850: 33 dBm		
	PCS1900: 30 dBm		
Transmitter Maximum Output Power Measured:	GSM850: 30.8 dBm		
	PCS1900: 25.8 dBm		
Transmitter Frequency Range:	GSM850: 824 MHz to 849 MHz		
	PCS1900: 1850 MHz to 1910 MHz		
Transmitter Frequency Allocation of EUT When Under Test:	**Channel Number**	**Channel Description**	**Frequency (MHz)**
	189	Middle	836.4
	660	Middle	1879.8
Antenna Type:	Internal		
Power Supply Requirement:	Internal Battery Supply 3.6 V DC		
Battery Type(s):	Li-ion		

2.6. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Laptop
Brand Name:	Dell
Model Name or Number:	Latitude D600
Serial Number:	BFYSM51
Cable Length and Type:	1 meter, multicore
Connected to Port:	Com port 1 (Detached After Configuration)
Test Software Name:	HyperTerminal
Test Software Version:	v5.1

3. Test Specification, Methods and Procedures

Reference:	FCC Part 22: 2006 Subpart H (Cellular Radiotelephone Service)
Title:	Code of Federal Regulations, Part 22 (47CFR22) Personal Communication Services.

Reference:	FCC Part 24: 2006 Subpart E (Broadband PCS)
Title:	Code of Federal Regulations, Part 24 (47CFR24) Personal Communication Services.

3.1. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003
Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)
Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2003)
Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)
Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)
Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)
Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods.
Part 1: Radio Disturbance and Immunity Measuring Apparatus.

3.2. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures Section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

At the request of GE Security; the EUT was tested at the middle channel only, as the EUT only operates in the middle channel of the GSM850 and PCS1900 bands.

5. Operation of the EUT during Testing

5.1. Operating Modes

The EUT was tested in the following operating mode(s) unless otherwise stated:

GSM850 Test Mode: fully powered in transmit mode at the middle channel only.
PCS1900 Test Mode: fully powered in transmit mode at the middle channel only.

The reason for choosing this configuration was that it has been defined by the customer as being typical of normal use and likely to be worst case.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration(s) unless otherwise stated:

Standalone, battery powered by a fully charged battery.

6. Summary of Test Results

FCC Part 22

Range of Measurements	Specification Reference	Port Type	Compliancy Status
Transmitter Effective Radiated Power (ERP)	C.F.R. 47 FCC Part 22: 2006 Section 22.913(a)	Antenna	Complied

FCC Part 24

Range of Measurements	Specification Reference	Port Type	Compliancy Status
Transmitter Equivalent Isotropic Radiated Power (EIRP)	C.F.R. 47 FCC Part 24: 2006 Section 24.232	Antenna	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of
RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, UK.

7. Measurements, Examinations and Derived Results

7.1. General Comments

This Section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to Section 8 for details of measurement uncertainties.

7.2. Test Results – FCC Part 22 (Subpart H)

7.2.1. Transmitter Effective Radiated Power (ERP): Section 22.913(a)

The EUT was configured for effective radiated power, as described in Section 9 of this report.

Tests were performed to identify the maximum effective radiated power (ERP).

Results:

7.2.2. ERP Measurement – GSM850

Channel	Frequency (MHz)	TX Power before Test (dBm)
Middle	836.4	30.8

7.3. Test Results – FCC Part 24 (Subpart E)

7.3.1. Transmitter Equivalent Isotropic Radiated Power (EIRP): Section 24.232

The EUT was configured for equivalent isotropic radiated power, as described in Section 9 of this report.

Tests were performed to identify the maximum effective isotropic radiated power (EIRP).

Results:

7.3.2. EIRP Measurement – PCS1900

Channel	Frequency (MHz)	TX Power before Test (dBm)
Middle	1879.8	25.8

8. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
EIRP and ERP	Not applicable	95%	±2.54 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

9. Measurement Methods

9.1. Effective Radiated Power (ERP) – FCC Part 22

ERP measurements were performed in accordance with the standard, against appropriate limits.

The ERP was measured with the EUT arranged on a non-conducting turntable on a standard test site compliant with ANSI C63.4 – 2003 Clause 5.4. The transmitter was fitted with an integral antenna; as such all radiated tests were performed with the unit operating into the integral antenna.

The level of the ERP was measured using a spectrum analyser.

The test antenna was positioned in the horizontal plane. The EUT was oriented in the X plane. The test antenna was then raised and lowered until a maximum peak was observed. The turntable was then rotated through 360 degrees and the maximum peak reading obtained. The height search was then repeated to take into consideration the new angular position of the turntable. The maximum reading observed was then recorded. This procedure was then repeated with the EUT oriented in the Y and Z planes. The highest reading taken in all 3 planes was recorded. The entire procedure was then repeated with the test antenna set in the vertical polarity.

Once the final amplitude (maximised) had been obtained, the EUT was substituted with a substitution antenna. For ERP measurements a dipole antenna was used. The centre of the substitution antenna was set to approximately the same centre location as the EUT. The substitution antenna was set to the horizontal polarity. The substitution antenna was matched into a signal generator using a 6 dB or greater attenuator. The signal generator was tuned to the EUT's frequency under test.

The test antenna was then raised and lowered to obtain a maximum reading on the spectrum analyser. The level of the signal generator output was then adjusted until the maximum recorded EUT level was observed. The signal generator level was noted. This procedure was repeated with both test antenna and substitution antenna vertically polarised. The ERP was calculated as:-

ERP = Signal Generator Level - Cable Loss + Antenna Gain

Effective Radiated Power (ERP) (Continued)

Circumstances where the signal generator could not produce the desired power, substitutions were performed with the signal generator set to 0 dBm. The radiated signal was maximised as previously described. The level indicated on the measuring receiver was noted. The delta between this level and the maximum level for the EUT was calculated and also noted. The ERP of the signal generator was calculated using the above formulae. The recorded delta was added to the calculated ERP to obtain the substituted EUT ERP.

Delta (dB) = EUT – SG

Where:

EUT = spectrum analyser indicated EUT raw level

SG = spectrum analyser indicated signal generator raw level

The signal generator actual ERP is calculated as:

ERP SG= Signal Generator Level - Cable Loss + Antenna Gain

The EUT ERP is calculated as:

ERP EUT = ERP SG + Delta.

The test equipment settings for ERP measurements were as follows:

Receiver Function	Setting
Detector Type:	Peak
Mode:	Not applicable
Bandwidth:	≥ Emission Bandwidth
Amplitude Range:	100 dB
Sweep Time:	Coupled

9.2. Equivalent Isotropic Radiated Power (EIRP) – FCC Part 24

EIRP measurements were performed in accordance with the standard, against appropriate limits.

The EIRP was measured with the EUT arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2003 Clause 5.4. The transmitter was fitted with an integral antenna; therefore all radiated tests were performed with the unit operating into the integral antenna.

The level of the EIRP was measured using a spectrum analyser.

The test antenna was positioned in the horizontal plane. The EUT was oriented in the X plane. The test antenna was then raised and lowered until a maximum peak was observed. The turntable was then rotated through 360 degrees and the maximum peak reading obtained. The height search was then repeated to take into consideration the new angular position of the turntable. The maximum reading observed was then recorded. This procedure was then repeated with the EUT oriented in the Y and Z planes. The highest reading taken in all 3 planes was recorded. The entire procedure was then repeated with the test antenna set in the vertical polarity.

Once the final amplitude (maximised) had been obtained, the EUT was substituted with a substitution antenna. For EIRP measurements a Horn antenna whose gain was based on an isotropic antenna was used, ERP measurements were done using a dipole. The centre of the substitution antenna was set to approximately the same centre location as the EUT. The substitution antenna was set to the horizontal polarity. The substitution antenna was matched into a signal generator using a 6 dB or greater attenuator. The signal generator was tuned to the EUT's frequency under test.

The test antenna was then raised and lowered to obtain a maximum reading on the spectrum analyser. The level of the signal generator output was then adjusted until the maximum recorded EUT level was observed. The signal generator level was noted. This procedure was repeated with both test antenna and substitution antenna vertically polarised. The EIRP was calculated as:-

EIRP = Signal Generator Level - Cable Loss + Antenna Gain

All measurements were performed using broadband Horn antennas.

Equivalent Isotropic Radiated Power (EIRP) (Continued)

Circumstances where the signal generator could not produce the desired power, substitutions were performed with the signal generator set to 0 dBm. The radiated signal was maximised as previously described. The level indicated on the measuring receiver was noted. The delta between this level and the maximum level for the EUT was calculated and also noted. The EIRP of the signal generator was calculated using the above formulae. The recorded delta was added to the calculated EIRP to obtain the substituted EUT EIRP.

Delta (dB) = EUT – SG

Where:

EUT = spectrum analyser indicated EUT raw level

SG = spectrum analyser indicated signal generator raw level

The signal generator actual EIRP is calculated as:

EIRP SG= Signal Generator Level - Cable Loss + Antenna Gain

The EUT EIRP is calculated as:

EIRP EUT = EIRP SG + Delta.

The test equipment settings for EIRP measurements were as follows:

Receiver Function	Setting
Detector Type:	Peak
Mode:	Not applicable
Bandwidth:	1 MHz
Amplitude Range:	100 dB
Sweep Time:	Coupled

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A059	Log Periodic Antenna	EMCO	3146	8902-2378	09 May 2007	12
A028	Horn Antenna	Eaton	91888-2	304	17 Jun 2006	36
C1065	Cable	Rosenberger	UFA210-1-7872	0985	17 Nov 2006	12
M1242	Spectrum Analyser	Rohde & Schwarz, Inc	FSEM30	845986_022	08 Sep 2006	12
M1264	Thermo Hygrometer	RS	212-124	0	19 Apr 2007	12
S202	Site 2	RFI Global Services Ltd	Site 2	N/A	17 Nov 2006	12
S503	Antenna Mast	EMCO	1051-25	9205 1670	Not calibrated	-

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.