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FCC WIRELESS EQUIPMENT TEST&MEASUREMENT REPORT

On Model Name: UHF Long Range Reader

Model Numbers: BU-900R-K

Brand Name: BlueCard

FCC ID Number: SMABLUECARD900

Prepared for Bluecard Software Technology Co., Ltd.

Test Specification: FCC Part 15, Subpart C

Test Report #: BEI-1211-10910-FCC ID

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Engineer Company Name

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Senior Engineer Company Name

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Test Report Released by: Swall Zhang April 18th, 2013
Swall Zhang Date

List of Attached Files

<i>Exhibit Type</i>	<i>File Description</i>	<i>File Name</i>
<i>Test Report</i>	<i>Test Report</i>	SMABLUECARD900 _ Test report.pdf
<i>Operation Description</i>	<i>Technical Description</i>	SMABLUECARD900 _ Operation Description.pdf
<i>External Photos</i>	<i>External Photos</i>	SMABLUECARD900 _ External Photos.pdf
<i>Internal Photos</i>	<i>Internal Photos</i>	SMABLUECARD900 _ Internal Photos.pdf
<i>Block Diagram</i>	<i>Block Diagram</i>	SMABLUECARD900 _ Block Diagram.pdf
<i>Schematics</i>	<i>Circuit Diagram</i>	SMABLUECARD900 _ Schematics.pdf
<i>ID Label/Location</i>	<i>Label and Location</i>	SMABLUECARD900 _ Label & Location.pdf
<i>User Manual</i>	<i>User Manual</i>	SMABLUECARD900 _ User Manual.pdf
<i>Test Setup Photos</i>	<i>Test Setup Photos</i>	SMABLUECARD900 _ Test Set-up Photos.pdf

Test Location

Tests performed in a Certified ANSI Semi-Anechoic Chamber and Shielded Room.

Test Site Location : **Galanz**
*25 South Ronggui Rd., Shunde,
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Tel : (86)-757-23612785

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Test Facility

The test facility was recognized, certified, or accredited by the following organizations:

- **CNAL - LAB Code: L2244**

Galanz EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **FCC - Registration No.: 580210**

Galanz EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC was maintained in our files.

List of Test and Measurement Instruments

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model No.</i>	<i>Serial No.</i>	<i>Calibrated Until</i>
<i>Spectrum Analyzer</i>	R&S	FSP30	100755	2013-11-30
<i>EMI Receiver #1</i>	SCHAFFNER	SMR4503	11725	2013-11-30
<i>EMI Receiver #2</i>	HP	85462A	3650A00363	2013-11-30
<i>LISN</i>	ETS	4825/2	1161	2013-11-30
<i>Coaxial Cable</i>	ATC	N/A	N/A	2013-11-30
<i>Double-ridged Waveguide horn</i>	ETS	3115	6587	2013-11-30
<i>3116C Double-Ridged Waveguide Horn</i>	ETS-Lindgren	3116C	6587/01	2013-11-30
<i>Amplifier</i>	Agilent	83017A	MY39500438	2013-11-30
<i>Band filter</i>	ASI	82346	S06389	2013-11-30
<i>Biconilog Antenna</i>	ETS	3142C	00042672	2013-11-30
<i>Semi-anechoic Chamber</i>	ETS	N/A	N/A	2013-11-30

Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.

Table of Contents

DISCLAIMER NOTICE	1
REPRODUCTION CLAUSE	1
OPINIONS AND INTERPRETATIONS	1
STATEMENT OF MEASUREMENT UNCERTAINTY	1
ADMINISTRATIVE DATA	2
EUT DESCRIPTION	3
TEST REFERENCES	4
TEST SUMMARY	4
TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	5
EUT EXERCISE SOFTWARE	6
EQUIPMENT MODIFICATION	6
TEST SYSTEM DETAILS	7
CONFIGURATION OF TESTED SYSTEM	9
ATTACHMENT 1 - ANTENNA REQUIREMENTS	10
ATTACHMENT 2 - CONDUCTED EMISSION TEST	12
ATTACHMENT 3- RADIATED EMISSION TEST	15
ATTACHMENT 4 -20 DB BANDWIDTH	26
ATTACHMENT 5- MAXIMUM PEAK OUTPUT POWER	29
ATTACHMENT 6 - CONDUCTED SPURIOUS TEST AT ANTENNA TERMINALS	33
ATTACHMENT 7 - NUMBER OF HOPPING CHANNELS	38
ATTACHMENT 8 - FREQUENCY SEPARATION	40
ATTACHMENT 9 - AVERAGE TIME OF OCCUPANCY	42
TEST SET UP PHOTOGRAPHS	46

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Opinions and Interpretations

This test report relates to the abovementioned equipment under test (EU T). Without the permission of ECMG Electronic Technical Testing Corp (Shenzhen). Test Lab this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products. The manufacturer has sole responsibility of continued compliance of the device.

Statement of Measurement Uncertainty

The data and results referenced in the document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

Administrative Data

Test Sample : UHF Long Range Reader

Model Name : BU-900R-K

Model Tested : BU-900R-K

Date of Receipt : March 3rd, 2013

Date Tested : March 10th to March 29th, 2013

Applicant : Bluecard Software Technology Co., Ltd

Address : D-801 Shangdi Science Building No. 8 Shangdi West Road Haidian District Beijing, China

Telephone : (86)-10-58859090

Fax : (86)-10-58859191

Manufacturer : Bluecard Software Technology Co., Ltd

Address : D-801 Shangdi Science Building No. 8 Shangdi West Road Haidian District Beijing, China

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Factory : Bluecard Software Technology Co., Ltd

Address : D-801 Shangdi Science Building No. 8 Shangdi West Road Haidian District Beijing, China

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EUT Description

Bluecard Software Technology Co., Ltd., model tested BU-900R-K (referred to as the EUT in this report) is an UHF Long Range Reader.

The EUT is an UHF Long Range Reader which operates in 902-928MHz band. Main technical specifications of the EUT are as belows:

Parameter	Range
Rating(s)	
Rated voltage	DC 9-12V
Rated Current	$\leq 5A$
Specification of Wireless & Antenna	Operating band
	902-928MHz
	Modulation Type
	ASK
	Wireless power
	Max. 30dBm at the end of cable
	Frequency of Number
	50 channels with 500 kHz channel spacing
	Antenna gain
	8dBi
Communications Interface	Polarization
	Horizontal
	Antenna type
	1 integrated, Linear Horizontal Polarization
	VSWR
	<1.5
	Input impedance
	50 (Ω)
	Antenna Beamwidth
	$\leq 90^\circ$
Power Jack	12V DC Power connector
Power adapter information	Input :100-240VAC,50/60Hz
	Output: 12VDC,3.8A
	Model: GFP451DA-1238-1
	Brand name: GME

NOTE: For more detailed informations or features please refer to user's manual of EUT.

Test Report #: BEI-1211-10910-FCC ID

Prepared for Bluecard Software Technology Co., Ltd.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

Page 3 of 48

Test References

Tests for radiated and conducted (at antenna terminal) emissions were performed. All measurements were performed in accordance FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

Test Summary

The Electromagnetic Compatibility requirements on tested model BU-900R-K for this test is stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment Under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up.

Tested model BU-900R-K has been tested to conform to the following parts of the Part 15, Subpart C as detailed below:

FCC Rules	Requirement	Result	Remark
§15.247(b)(4); §15.203	Antenna Requirement	Compliant	Attachment 1
§15.207	Conducted Emission	Compliant	Attachment 2
§15.205(a); §15.209(a)	Radiated Emission	Compliant	Attachment 3
§15.247(b)	Maximum Peak Output Power	Compliant	Attachment 4
§15.247(a)(1)(i)	20dB Bandwidth	Compliant	Attachment 5
§15.247(d)	Conducted spurious at Antenna Terminals	Compliant	Attachment 6
§15.247(a)(1)(i)	Number of Hopping channels	Compliant	Attachment 7
§15.247(a)(1)	Frequency separation	Compliant	Attachment 8
§15.247(a)(1)(i)	Average Time of Occupancy	Compliant	Attachment 9

Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rate and antenna diversity(if any).

According to 15.31(e), regards to the frequency band over 10MHz, the lowest, middle and highest frequency of channel were selected to perform the test, and then shown on this report.

The following mode& channels were chosen for final test as listed belows.

<i>Carried Frequency (MHz)</i>	<i>Channel Type& Number</i>	<i>Operation mode</i>	<i>Data Rate (Mbps)</i>
902.75	Lowest	<i>Continuous transmission mode or FHSS mode as tested purpose</i>	<i>Max. data rate</i>
915.25	Middle		
927.25	Highest		

EUT Exercise Software

During testing an exercise software which “Impinj IndyTool” was provided by Bluecard Software Technology Co., Ltd., runs on windows XP system and control the EUT operating on a continuous transmission mode and receiving mode.

Equipment Modification

Any modifications installed previous to testing by Bluecard Software Technology Co., Ltd., will be incorporated in each production model sold or leased in United States.

There were no modifications for this EUT intended for grant.

Test System Details

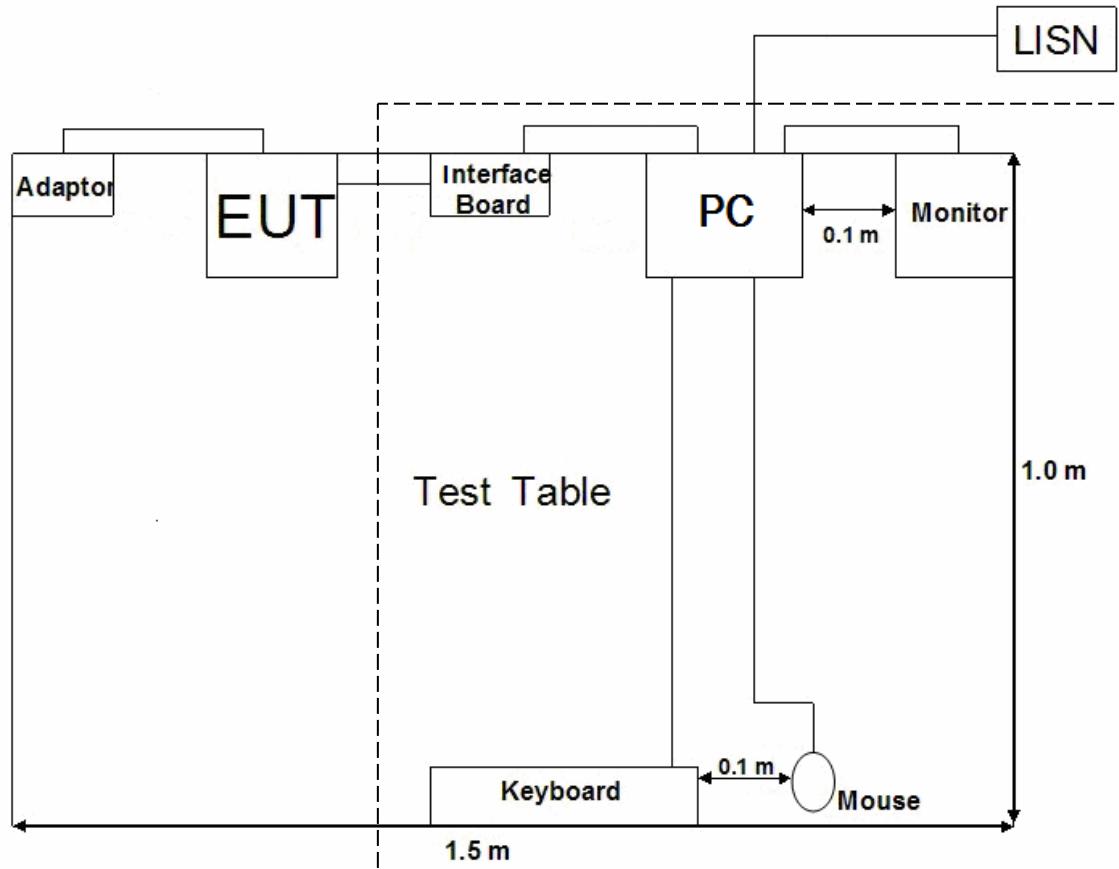
EUT			
<i>Model Number:</i>	<i>BU-900R-K</i>		
<i>Description:</i>	<i>UHF Long Range Reader</i>		
<i>Manufacturer:</i>	<i>Bluecard Software Technology Co., Ltd</i>		
<i>Input Voltage:</i>	<i>DC 12V</i>		
Support Equipment			
<i>Description</i>	<i>Model Number</i>	<i>Serial Number Or Certification</i>	<i>Manufacturer</i>
PC	M2700	Doc	Lenovo
PC Monitor	TFT1780PS	Doc	AOC
Interface board	---	---	Impinj.Inc
Keyboard	JME7053	Doc	Lenovo
Mouse	MO32B0	Doc	HP

Cable Description					
Description	From	To	Length (Meters)	Shielded (Y/N)	Ferrite (Y/N)
Power Cord Of PC	Plug	PC	1.4	N	Y
Power Cord Of PC Monitor	Plug	PC Monitor	1.2	N	Y
RS232 Cord	Interface board	PC	1.2	Y	Y
Mouse Cord	Mouse	PC	1.2	N	Y
Keyboard Cord	Keyboard	PC	1.2	N	Y
Power Adapter of EUT	EUT	Plug	2.4	N	N

Note: The "EUT" means "UHF Long Range Reader".

NOTE: The EUT has been tested as an independent unit together with other necessary accessories or support units. The above support units or accessories were used to form a representative test configuration during the test tests.

Configuration of Tested System



Note : Dashed border devices shown are a support computer and interface board, which sends commands to the EUT to exercise the intended functionalities.

ATTACHMENT 1 - Antenna Requirements

§15.203 Requirements:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

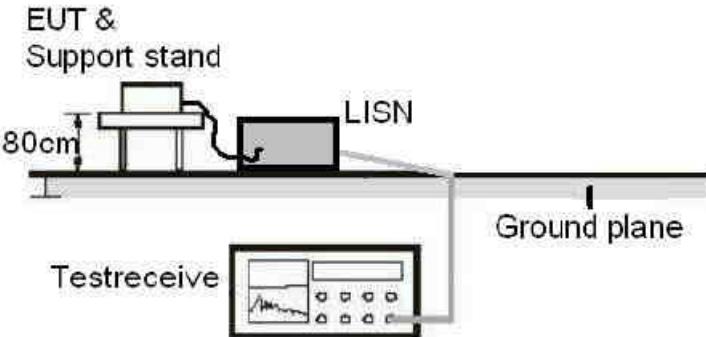
§15.247(b)(4) Requirements:

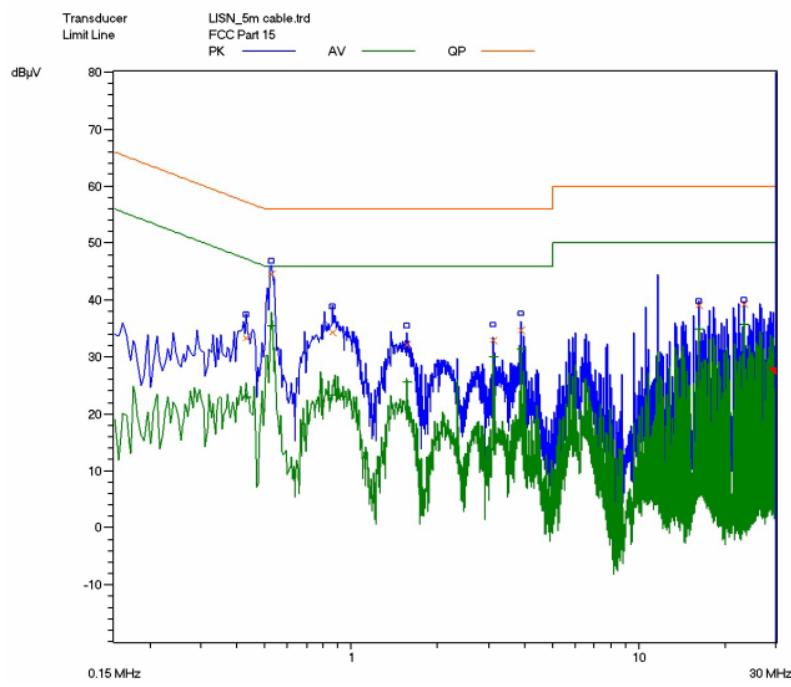
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

FCC Section	FCC Rules	Conclusion
§15.203& §15.247 (b) (4)	<p><i>Described how the EUT complies with the requirements that either its antenna is permanently attached, or that it employ a unique antenna connector, for every antenna proposed for use with the EUT.</i></p> <p><i>The exception is in those cases where EUT must be professionally installed. In order to demonstrate that professional installation is required, the following 3 points must be addressed:</i></p> <ol style="list-style-type: none"> 1. <i>The application (or intended use) of the EUT.</i> 2. <i>The installation requirements of the EUT.</i> 3. <i>The method by which the EUT will be marketed.</i> 	<p><i>The EUT uses reverse-polarity TNC female connectors for its antenna ports. The reverse-polarity connector is a non-standard RF connector type. The use of these connectors prohibits connection to an RF antenna with standard RF connectors (e.g. N-type). The reader is designated for professional installation only and can use only specified antenna and cable combinations. The maximal gain of the antenna is 8.0 dBi.</i></p> <p><i>So the unit do meet requirement.</i></p>

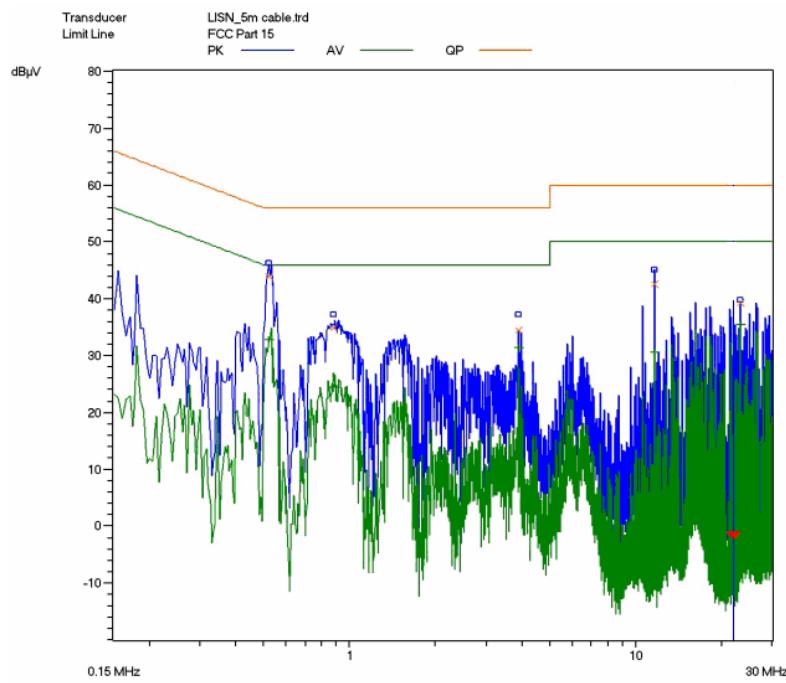
Note: The antenna must be professionally installed. Only one integrated, Linear Horizontal Polarization Antenna described in the EUT description will be used with the reader. Professional installers will be provided with antenna installation instructions.

ATTACHMENT 2 - Conducted Emission Test

CLIENT:	BLUECARD SOFTWARE TECHNOLOGY CO., LTD.	TEST STANDERD:	Section 15.207
MODEL NUMBERS:	BU-900R-K	PRODUCT:	UHF Long Range Reader
EUT MODEL:	BU-900R-K	EUT DESIGNATION:	UHF RFID Device
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Sewen Guo	DATE OF TEST:	March 20 th , 2013
TEST REFERENCE:	ANSI C63.4: 2003		
TEST PROCEDURE:	The EUT was set up according to the guidelines of ANSI C63.4:2003 for conducted emissions. It is located in the back edge of the test table, all its ports are being exercised. It is being powered by an AC/DC converter. The measurement was using a AMN on each line and an EMI receiver peak scan was made at the frequency measurement range. The six highest significant peaks were then marked, and these signals were then quasi-peaked and averaged.		
TEST SETUP:			
DESCRIPTIONS OF TEST MODE:	The EUT is connected to a PC through an interface board to control EUT operating in a continuous transmission mode. The power is set to 24dBm, the lowest channel was chosen for the final testing.		
TESTED RANGE:	150kHz to 30MHz		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	The EUT meet the requirements of test reference for conducted missions at AC input port. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		



Line L Conducted Emission Graph



Line N Conducted Emission Graph

Test Data:

Lines	Frequenc y (MHz)	Corrected QP Level (dBuV)	Limits QP (dBuV)	Margin QP (dB)	Frequenc y (MHz)	Corrected AVE Level (dBuV)	Limits AVE (dBuV)	Margin AVE (dB)
L	0.430	33.4	57.3	-23.9	0.430	22.8	47.3	-24.5
L	0.525	44.6	56.0	-11.4	0.525	35.6	46.0	-10.4
L	0.860	34.4	56.0	-21.6	0.860	23.4	46.0	-22.6
N	0.520	44.0	56.0	-12.0	0.520	32.7	46.0	-13.3
N	0.880	34.9	56.0	-21.1	0.880	24.6	46.0	-21.4
N	3.905	34.5	56.0	-21.5	3.905	31.4	46.0	-14.6

Note :

1. QP and AVE are abbreviations of the quasi-peak and average individually.
2. The emission levels recorded above is the larger ones of both L phase and N phase.
3. Other emission levels are too low against the official limit that are not reported.

ATTACHMENT 3- *Radiated Emission Test*

CLIENT:	BLUECARD SOFTWARE TECHNOLOGY CO., LTD.	TEST STANDERD:	Section 15.209(a), Section 15.205(a)
MODEL NUMBERS:	BU-900R-K	PRODUCT:	UHF Long Range Reader
EUT MODEL:	BU-900R-K	EUT DESIGNATION:	UHF RFID Device
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Sewen	DATE OF TEST:	March 20 th , 2013
TEST REFERENCE:	ANSI C63.4: 2003		
TEST PROCEDURE:	<p>The EUT was set up according to the guidelines of ANSI C63.4: 2003 for radiated emissions. An EMI receiver peak scan was made at the frequency measurement range (pre-scan) in an Anechoic chamber. Test procedure as follow:</p> <ul style="list-style-type: none"> a) The EUT is placed on a turntable, which is 0.8 m above ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. b) The EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. c) Maximum procedure was performed on the six highest emissions to ensure EUT compliance. d) And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. e) Repeat above procedures until the measurements for all frequencies are complete. 		
DESCRIPTION OF TEST MODE:	<p>The EUT was connected to a PC through an interface board controlling EUT operating in a continuous transmission mode with the max. data rate.</p> <p><i>For below 1GHz:</i></p> <p>Pre-scan has been conducted at the highest, middle and the lowest three channels, and found the lowest channel is worst-case. So it was chosen for the final testing and recorded in report.</p> <p><i>For above 1GHz:</i></p> <p>The highest, middle and lowest three channels were selected for the final testing and recorded in report.</p>		

MEASUREMENT SETUP:	<i>Measurement receiver shall be set as below:</i>								
	Frequency (MHz)	Receive detector	RBW	VBW	Value				
	30-1000	Quasi-peak	120KHz	300KHz	Quasi-peak				
	Above 1000	Peak	1MHz	1MHz	Peak				
	Above 1000	Peak	1MHz	10Hz	average				
LIMITS:	<i>Section 15.209 limits as below:</i>								
	<i>Other Frequency (MHz)</i>		<i>Field strength (uV/meter) dB uV/meter</i>						
	30-88		100		40.0				
	88-216		150		43.5				
	216-960		200		46.0				
	Above 960		500		54.0				
NOTE:									
1) <i>Field Strength (dBmV/m) = 20log Field Strength (mV/m).</i>									
2) <i>In the emission tables above, the tighter limit applies at the band edge.</i>									
TESTED RANGE:	30MHz to 18GHz								
TEST VOLTAGE:	120VAC/60Hz								
RESULTS:	According to the data in the following, the EUT complied with the FCC Part 15.209 &15.205. The test results relate only to the equipment under test provided by client.								

	<p>Figure 1 : Frequencies measured below 1 GHz configuration</p>
TEST SETUP:	<p>Figure 2 : Frequencies measured above 1 GHz configuration</p>
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7} \times$ Center Freq., Amp ± 2.6 dB

**Test Data at Below 1GHz:
Lowest Channel:**

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Preamp Factor (dB)	Reading Level QP (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Horizontal							
31.440	0.02	16.7	/	15.88	32.6	40	-7.4
36.060	0.02	18.4	/	12.68	31.1	40	-8.9
228.240	0.12	10.1	/	29.38	39.6	46	-6.4
234.660	0.12	10.6	/	35.08	45.8	46	-0.2
672.000	0.36	20.1	/	19.24	39.7	46	-6.3
915.240	0.44	23.3	/	20.46	44.2	46	-1.8
Vertical							
36.060	0.02	18.4	/	17.78	36.2	40	-3.8
84.120	0.02	6.1	/	32.38	38.5	40	-1.5
180.180	0.02	5.8	/	34.28	40.1	43.5	-3.4
204.240	0.12	7.2	/	32.98	40.3	43.5	-3.2
805.980	0.42	22.1	/	21.88	44.4	46	-1.6
937.080	0.44	23.8	/	21.06	45.3	46	-0.7

Note:

1. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level =Reading Level + Antenna Factor + Cable Loss -Preamplifier Factor.
2. Other emission levels are too low against official limits that are not recorded.

**Test Data at Above 1GHz:
Lowest channel: 902.75MHz**

Frequency (GHz)	Cable Loss (dB)	Antenna Factor (dB)	Preamp Factor (dB)	Reading Level (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization (H/V)
Peak Measurement								
1.809	2.01	28	33	59.54	56.55	74	-17.45	H
3.612	2.67	32.2	32.1	56.26	59.03	74	-14.97	H
8.650	5.7	36.7	29.9	49.26	61.76	74	-12.24	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
1.072	1.39	23.9	33.6	53.71	45.40	74	-28.60	V
1.825	2.01	28	33	52.68	49.69	74	-24.31	V
4.975	3.5	32.9	31.6	48.06	52.86	74	-21.14	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V

Frequency (GHz)	Cable Loss(dB)	Antenna Factor (dB)	Preamp Factor (dB)	Reading Level (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization (H/V)
Average Measurement								
1.809	2.01	28	33	39.44	36.45	54	-17.55	H
3.612	2.67	32.2	32.1	33.16	35.93	54	-18.07	H
8.650	5.7	36.7	29.9	23.96	36.46	54	-17.54	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
1.072	1.39	23.9	33.6	31.41	23.10	54	-30.90	V
1.825	2.01	28	33	29.48	26.49	54	-27.51	V
4.975	3.5	32.9	31.6	21.66	26.46	54	-27.54	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V

Mid Channel: 915.25MHz

Frequency (GHz)	Cable Loss (dB)	Antenna Factor (dB)	Preamp Factor (dB)	Reading Level (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization (H/V)
Peak Measurement								
1.809	2.01	28	33	58.72	55.73	74	-18.27	H
3.612	2.67	32.2	32.1	58.23	61.00	74	-13.00	H
8.650	5.7	36.7	29.9	45.17	57.67	74	-16.33	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
1.072	1.39	23.9	33.6	55.83	47.52	74	-26.48	V
1.825	2.01	28	33	49.26	46.27	74	-27.73	V
4.975	3.5	32.9	31.6	46.09	50.89	74	-23.11	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V

Frequency (GHz)	Cable Loss(dB)	Antenna Factor (dB)	Preamp Factor (dB)	Reading Level (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization (H/V)
Average Measurement								
1.809	2.01	28	33	42.47	39.48	54	-14.52	H
3.612	2.67	32.2	32.1	32.64	35.41	54	-18.59	H
8.650	5.7	36.7	29.9	24.02	36.52	54	-17.48	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
1.072	1.39	23.9	33.6	31.52	23.21	54	-30.79	V
1.825	2.01	28	33	28.47	25.48	54	-28.52	V
4.975	3.5	32.9	31.6	22.61	27.41	54	-26.59	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V

Highest Channel: 927.25MHz

Frequency (GHz)	Cable Loss (dB)	Antenna Factor (dB)	Preamp Factor (dB)	Reading Level (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization (H/V)
Peak Measurement								
1.809	2.01	28	33	60.50	57.51	74	-16.49	H
3.612	2.67	32.2	32.1	55.53	58.30	74	-15.70	H
8.650	5.7	36.7	29.9	44.95	57.45	74	-16.55	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
1.072	1.39	23.9	33.6	55.82	47.51	74	-26.49	V
1.825	2.01	28	33	51.29	48.30	74	-25.70	V
4.975	3.5	32.9	31.6	47.31	52.11	74	-21.89	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V

Frequency (GHz)	Cable Loss(dB)	Antenna Factor (dB)	Preamp Factor (dB)	Reading Level (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization (H/V)
Average Measurement								
1.809	2.01	28	33	41.08	38.09	54	-15.91	H
3.612	2.67	32.2	32.1	33.35	36.12	54	-17.88	H
8.650	5.7	36.7	29.9	25.75	38.25	54	-15.75	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
/	/	/	/	/	/	/	/	H
1.072	1.39	23.9	33.6	32.40	24.09	54	-29.91	V
1.825	2.01	28	33	27.96	24.97	54	-29.03	V
4.975	3.5	32.9	31.6	24.36	29.16	54	-24.84	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V
/	/	/	/	/	/	/	/	V

Note:

1. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level =Reading Level + Antenna Factor + Cable Loss -Preamplifier Factor.
2. According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.Hence there no other emissions have been reported.
3. As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
4. The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

§15.205(a) Requirement:

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

Conclusions:

The fundamental is not in a restricted band, and spurious emission in the restricted bands comply with the general emission limits of 15.209.

ATTACHMENT 4 -20 dB Bandwidth

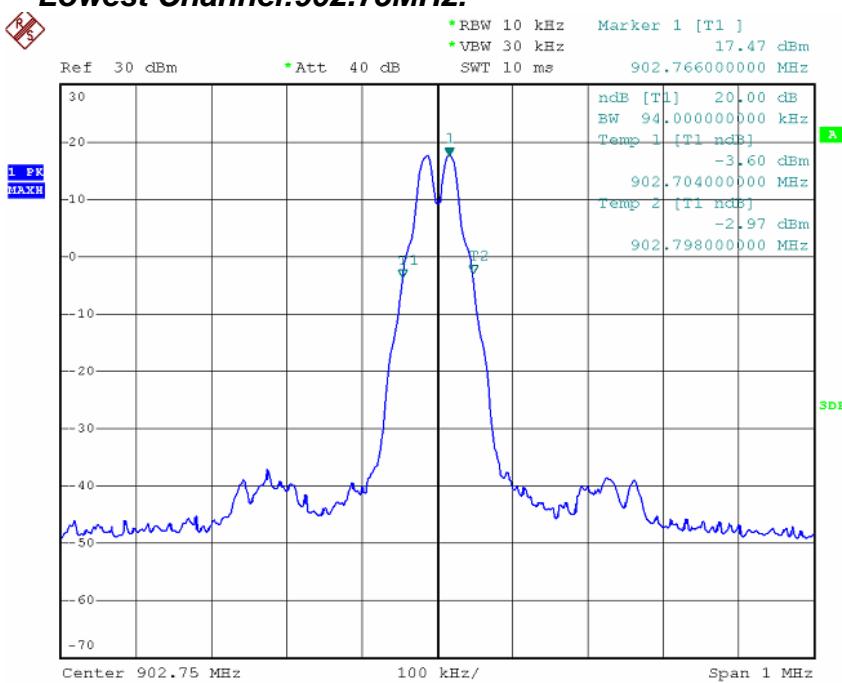
CLIENT:	BLUECARD SOFTWARE TECHNOLOGY CO., LTD.	TEST STANDERD:	Section 15.247(a)(1)(i)
MODEL NUMBERS:	BU-900R-K	PRODUCT:	UHF Long Range Reader
EUT MODEL:	BU-900R-K	EUT DESIGNATION:	UHF RFID Device
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Sewen	DATE OF TEST:	March 11 st , 2013
TEST REFERENCE:	ANSI C63.4:2003		
REQUIREMENT :	According to FCC 15.247 (a) (1) (i), For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.		
TEST PROCEDURE:	The transmitter output was connected to the spectrum analyzer through an attenuator and is transmitting at maximum rate. Spectrum Analyser is on max hold, marker-to-peak function is set on the peak of each channel (lowest, mid, highest), and then the marker will be positioned 20dB below the peak on one side and then on the other side. The separation between those two is the 20dB bandwidth.		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	The EUT meet the requirements of test reference for occupied bandwidth. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

Test Data:

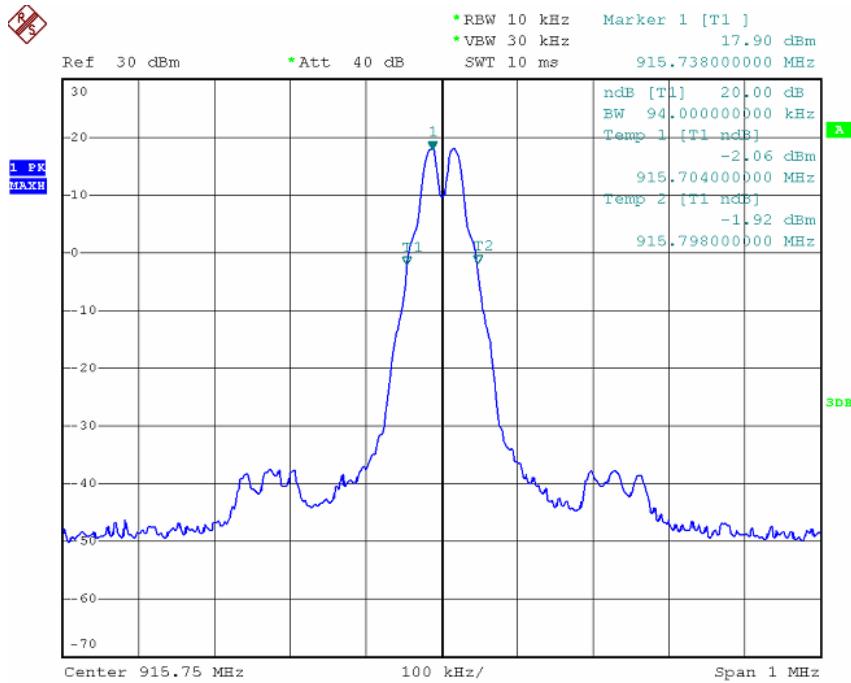
Channel	Frequency (MHz)	20dB Bandwidth (KHz)	Limit (KHz)	Pass/Fail
Lowest	902.75	94.00	500	Pass
Middle	915.25	94.00	500	Pass
Highest	927.25	94.00	500	Pass

Test Plot of 20dB bandwidth:

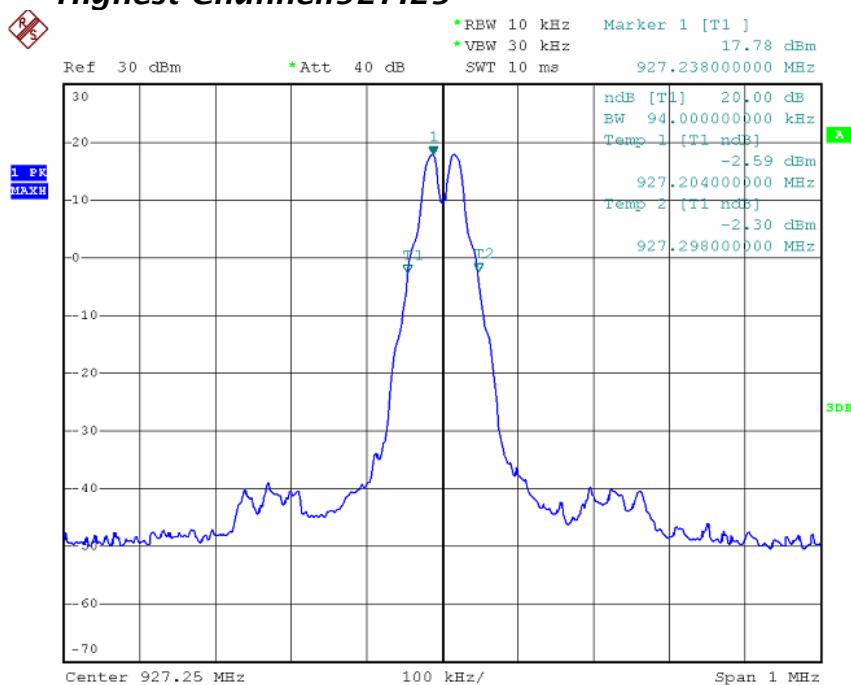
Lowest Channel:902.75MHz:



Middle Channel:915.25MHz:



Highest Channel:927.25



ATTACHMENT 5- Maximum Peak Output Power

CLIENT:	BLUECARD SOFTWARE TECHNOLOGY CO., LTD.	TEST STANDERD:	Section 15.247(b)(2)								
MODEL NUMBERS:	BU-900R-K	PRODUCT:	UHF Long Range Reader								
EUT MODEL:	BU-900R-K	EUT DESIGNATION:	UHF RFID Device								
TEMPERATURE:	23°C	HUMIDITY:	47%RH								
ATM PRESSURE:	101.0kPa	GROUNDING:	None								
TESTED BY:	Sewen	DATE OF TEST:	March 11 st , 2013								
TEST REFERENCE:	ANSI C63.4:2003 & FCC Public Notice DA 00-705,										
TEST PROCEDURE:	<p>According to FCC Public Notice DA 00-705, The test procedure as below:</p> <ol style="list-style-type: none"> 1. The EUT will be in transmitting mode throughout the test in the Lowest, Medium and Highest channel. support computer sends commands to the EUT to exercise the intended functionalities. Power setting = 24 dBm 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. 3. Record the max. reading. 4. Repeat above procedures until all frequency measured were complete. 										
DESCRIPTIONS OF TEST MODE:	<p>The EUT will be in transmitting mode throughout the test in the Lowest, Medium and Highest channel. support computer sends commands to the EUT to exercise the intended functionalities. Operating Frequency range = 902 - 928MHz; Frequency under test = 902.75, 915.25 & 927.25</p>										
MEASUREMENT EQUIPMENT SET	<p>Spectrum analyzer was set as below:</p> <table border="1"> <tr> <td>Equipment Mode</td> <td>Spectrum Analyzer</td> </tr> <tr> <td>Detector Function</td> <td>Peak</td> </tr> <tr> <td>RBW</td> <td>1MHz</td> </tr> <tr> <td>VBW</td> <td>1MHz</td> </tr> </table>			Equipment Mode	Spectrum Analyzer	Detector Function	Peak	RBW	1MHz	VBW	1MHz
Equipment Mode	Spectrum Analyzer										
Detector Function	Peak										
RBW	1MHz										
VBW	1MHz										
TESTED RANGE:	N/A										
TEST VOLTAGE:	120VAC/60Hz										
RESULTS:	The EUT meet the requirements of test reference for maximum peak output power. The test results relate only to the equipment under test provided by client.										
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.										
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB.										

Test Report #: BEI-1211-10910-FCC ID

Prepared for Bluecard Software Technology Co., Ltd.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

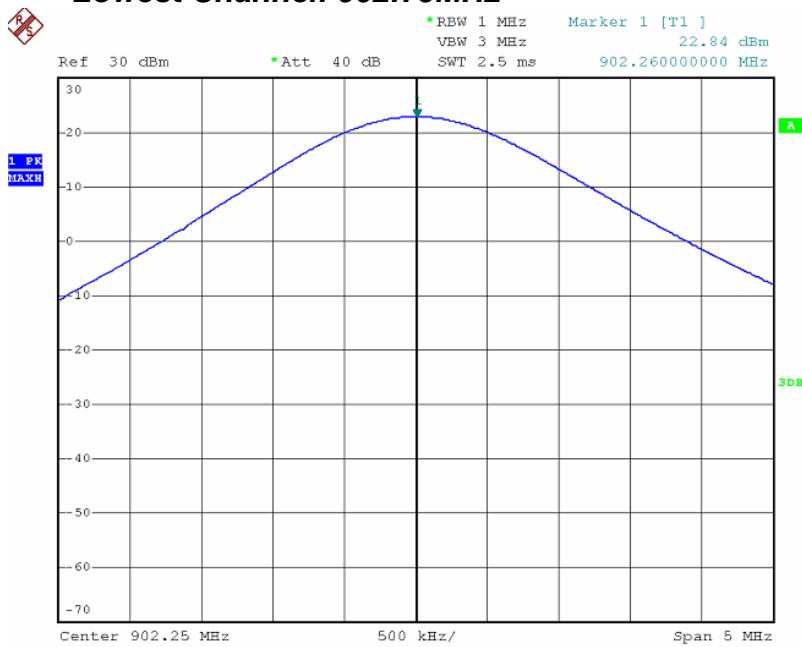
Page 29 of 48

Test Data:

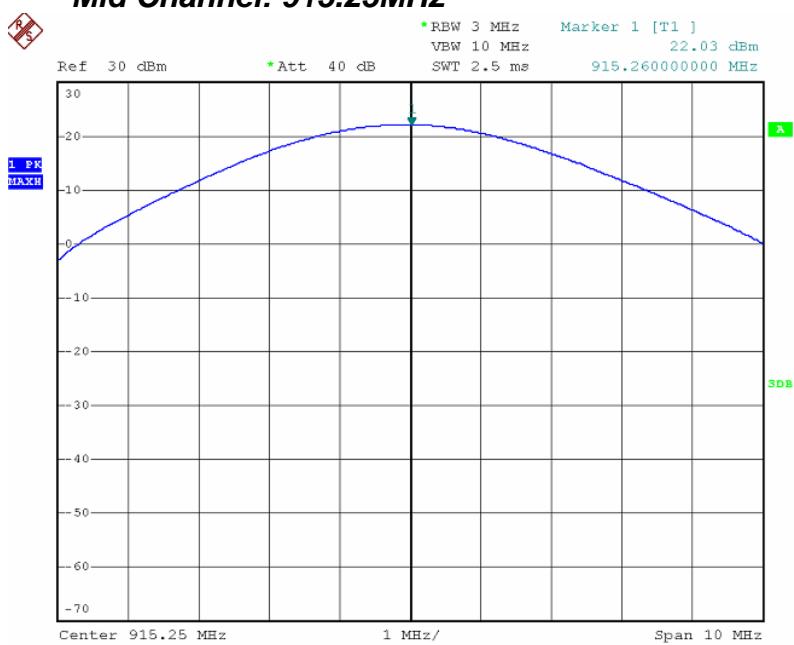
<i>Channel Frequency (MHz)</i>	<i>Peak Output Power(dBm)</i>	<i>Cable Loss (dB)</i>	<i>Power Level (dBm)</i>	<i>Limit</i>	<i>Margin</i>
902.75	22.84	1.00	23.84	28.00	-4.16
915.25	22.03	1.00	23.03	28.00	-4.97
927.25	21.24	1.00	22.24	28.00	-5.76

Test Plot of Peak Output power:

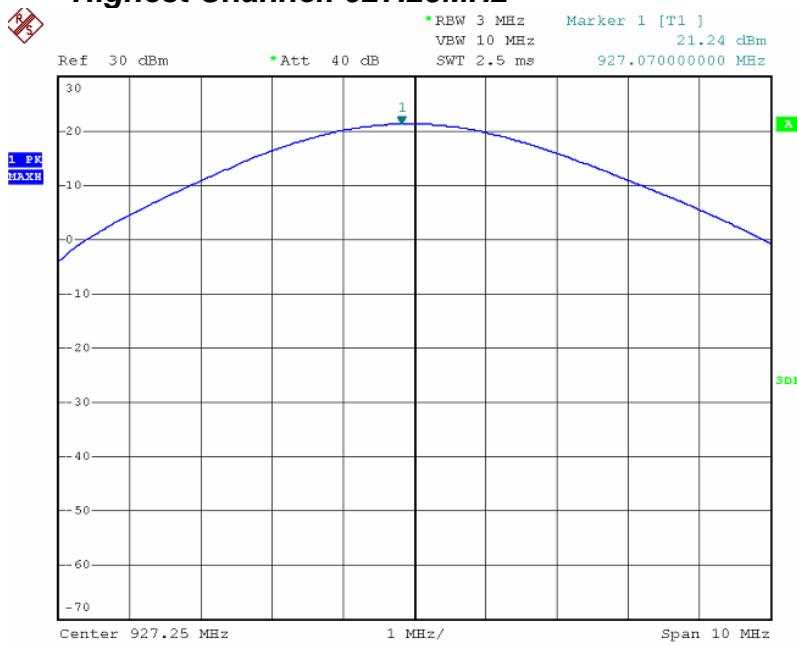
Lowest Channel: 902.75MHz



Mid Channel: 915.25MHz



Highest Channel: 927.25MHz



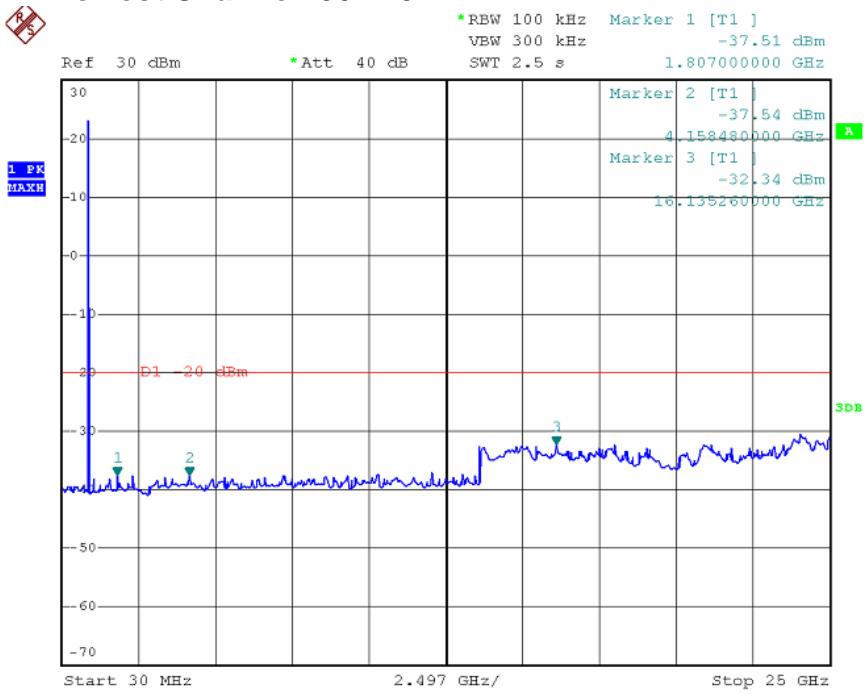
ATTACHMENT 6 - Conducted Spurious Test At Antenna Terminals

CLIENT:	BLUECARD SOFTWARE TECHNOLOGY CO., LTD.	TEST STANDERD:	§15.247(d); § 2.1051
MODEL NUMBERS:	BU-900R-K	PRODUCT:	UHF Long Range Reader
EUT MODEL:	BU-900R-K	EUT DESIGNATION:	UHF RFID Device
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Sewen	DATE OF TEST:	March 21 st , 2013
TEST REFERENCE:	ANSI C63.4:2003		
REQUIREMENT:	15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below what in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.		
TEST PROCEDURE:	<p>According to FCC Public Notice DA 00-705, The test procedure as below:</p> <p>1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.</p> <p>2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.</p> <p>3. Use the following spectrum analyzer settings: Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.</p> <p>RBW = 100 kHz ; VBW \geq RBW; Sweep = Auto; Detector function = peak; Trace = max hold.</p> <p>4. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. Plot the result on the screen of spectrum analyzer.</p> <p>5. Repeat above procedures until all measured frequencies were complete.</p>		

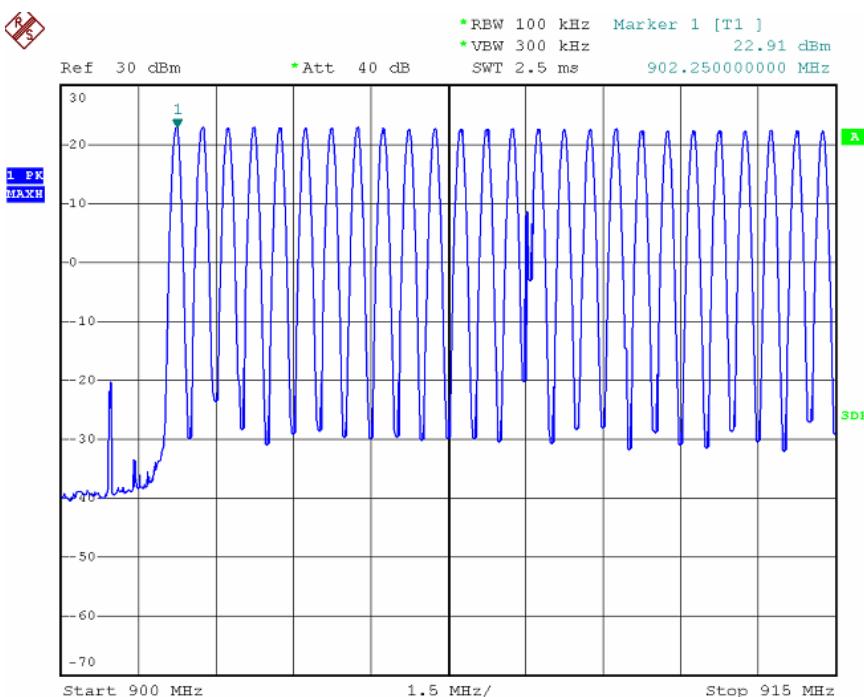
DESCRIPTIONS OF TEST MODE:	The measurements will be taken from the RF port. The EUT will be in transmitting mode throughout the test in the lowest, middle and highest three channels. The amplitude of the EUT carrier frequency was measured to determine the emissions limit (20 dB below the carrier frequency amplitude). The emissions outside of the allocated frequency band were then scanned from 30 MHz up to the tenth harmonic of the carrier.
TEST VOLTAGE:	120VAC/60Hz
RESULTS:	All emissions are attenuated more than 20dB from the carrier. The test results relate only to the equipment under test provided by client.
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB.

Test Plot of Conducted Spurious Emission:

Lowest Channel: 902.75MHz

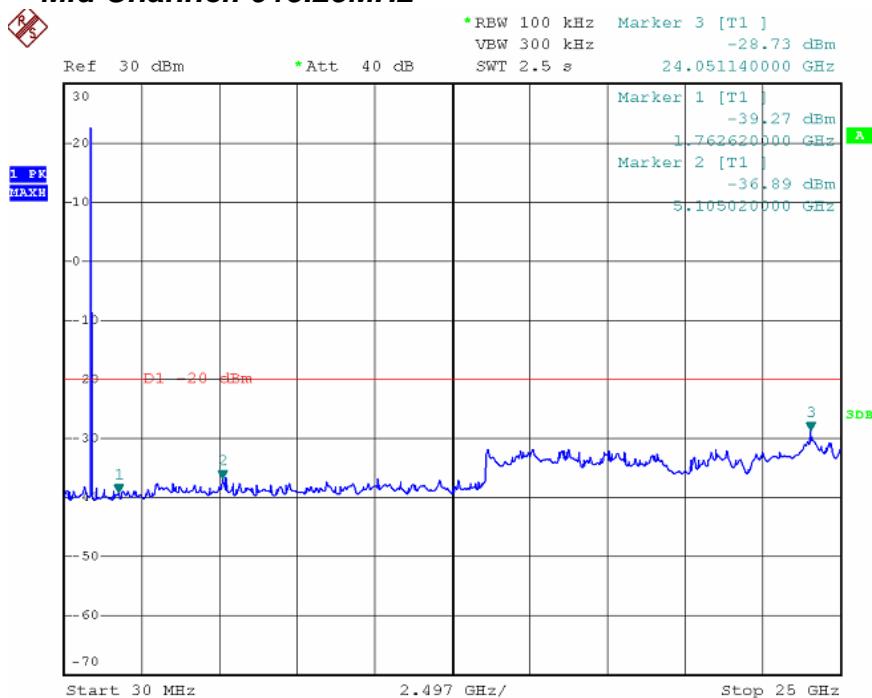


Conducted Spurious Emissions(30MHz - 25GHz)



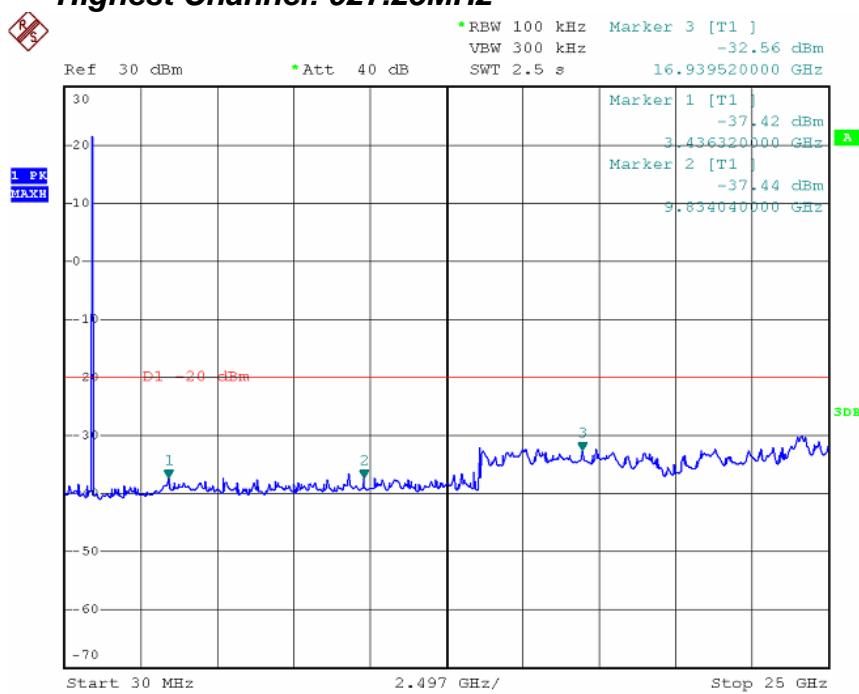
Band Edge Plot, Lowest Channel TX @902.25MHz

Mid Channel: 915.25MHz

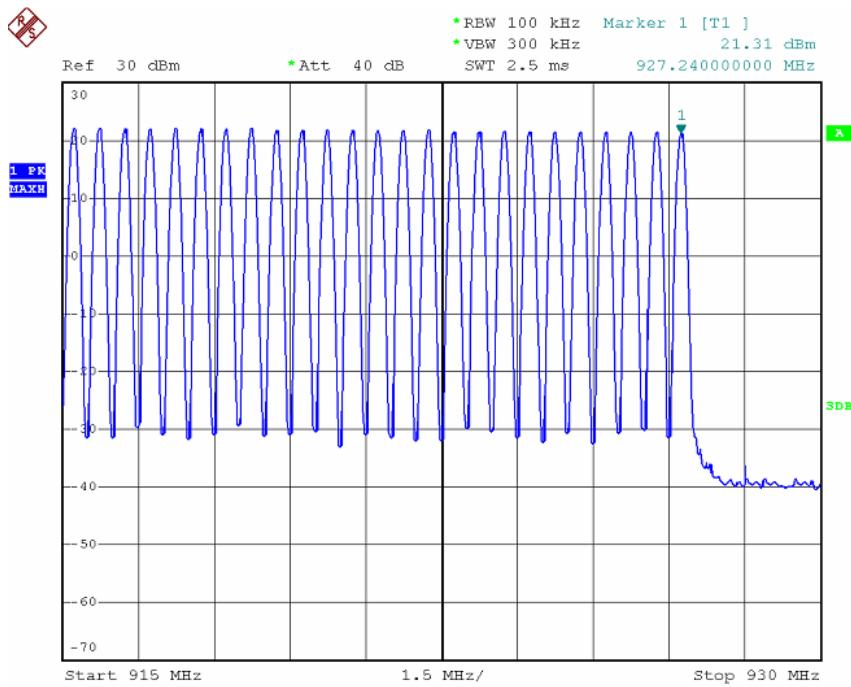


Conducted Spurious Emissions(30MHz - 25GHz)

Highest Channel: 927.25MHz



Conducted Spurious Emissions(30MHz - 25GHz)



Band Edge Plot, Highest Channel TX @927.25MHz

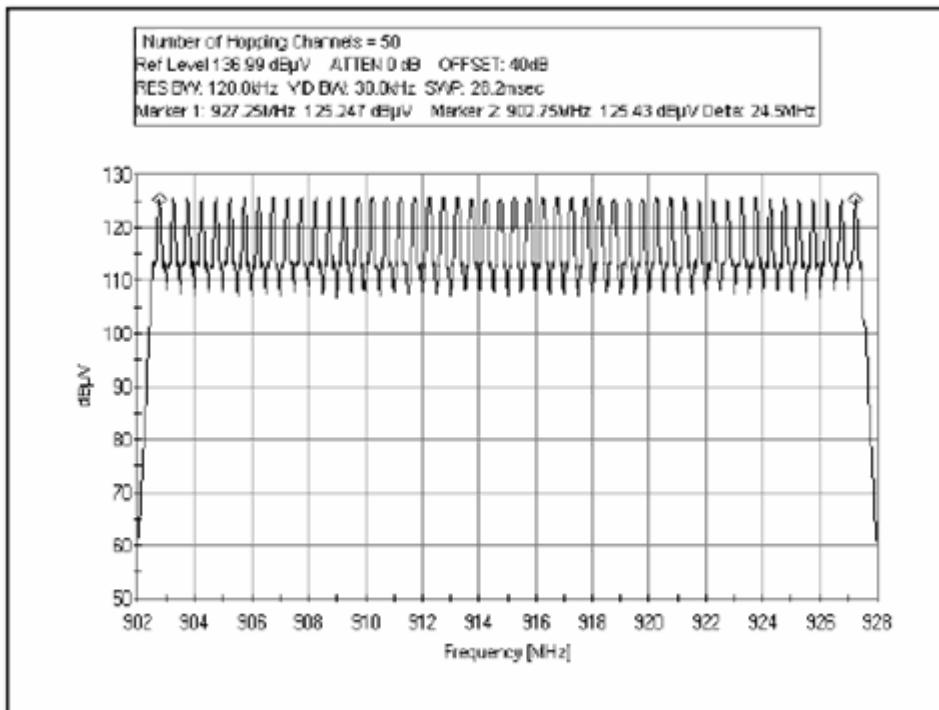
ATTACHMENT 7 – Number Of Hopping Channels

CLIENT:	BLUECARD SOFTWARE TECHNOLOGY CO., LTD.	TEST STANDERD:	Section 15.247(b)(2)
MODEL NUMBERS:	BU-900R-K	PRODUCT:	UHF Long Range Reader
EUT MODEL:	BU-900R-K	EUT DESIGNATION:	UHF RFID Device
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Sewen	DATE OF TEST:	March 20 th , 2013
TEST REFERENCE:	ANSI C63.4:2003		
REQUIREMENT:	<p>According to 15.247(b)(2) :</p> <p>For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.</p>		
TEST PROCEDURE:	<p>According to FCC Public Notice DA 00-705, The test procedure as below:</p> <ol style="list-style-type: none"> 1. Enable hopping function for the EUT; 2. Set the analyzer's span = 901- 929MHz; 3. Set RBW=100KHz, VBW = RBW, Max. peak hold. 		
DESCRIPTIONS OF TEST MODE:	The EUT is transmitting with the Hopping function enabled at maximum rate, Spectrum Analyser is on max hold and the span is wide enough to capture all the channels (902-928MHz at least). All the signals within the screen are the number of hopping channels.		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	Results = 50 Channels. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB.		

Test Data:

Frequency Band	Number of Hopping Channels
902-928	50

Test Plot Of Hopping Channels:

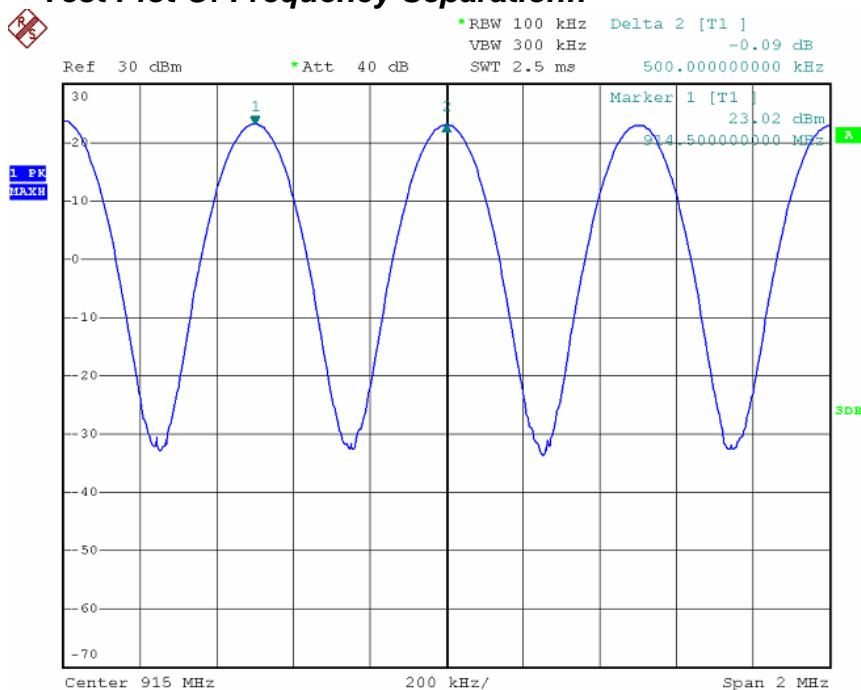


ATTACHMENT 8 - Frequency Separation

CLIENT:	BLUECARD SOFTWARE TECHNOLOGY CO., LTD.	TEST STANDERD:	Section 15.247(a)(1)
MODEL NUMBERS:	BU-900R-K	PRODUCT:	UHF Long Range Reader
EUT MODEL:	BU-900R-K	EUT DESIGNATION:	UHF RFID Device
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Sewen	DATE OF TEST:	March 15 th , 2013
TEST REFERENCE:	ANSI C63.4:2003		
REQUIREMENT:	<p>According to 15.247(a)(1):</p> <p>Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.</p>		
TEST PROCEDURE:	<p>According to FCC Public Notice DA 00-705, The test procedure as below:</p> <ol style="list-style-type: none"> 1. Enable the hopping function for the EUT. 2. Set analyzer's span wide enough to capture the peaks of two adjacent channels. 3. Set RBW =100KHz, VBW = RBW, Max peak hold. 4. Using the Delta Marker function to determine the separation between the peaks of the adjacent channels. 		
DESCRIPTIONS OF TEST MODE:	The EUT is transmitting with the Hopping function enabled at maximum rate, Spectrum Analyser is on max hold and the span is wide enough to capture two adjacent signals. Two markers are positioned in the peak of each signal and the delta of those two markers is the frequency separation between signals.		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	The EUT meet requirement of frequency separation in section 15.247(a).The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7} \times$ Center Freq., Amp ± 2.6 dB.		

Test Data:

Hopping Frequency Separation(KHz)	25KHz or 20dB Bandwidth(KHz)	Result
500	94	Pass

Test Plot Of Frequency Separation::

ATTACHMENT 9 - Average Time of Occupancy

CLIENT:	BLUECARD SOFTWARE TECHNOLOGY CO., LTD.	TEST STANDERD:	Section 15.247(a)(1)(i)
MODEL NUMBERS:	BU-900R-K	PRODUCT:	UHF Long Range Reader
EUT MODEL:	BU-900R-K	EUT DESIGNATION:	UHF RFID Device
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Sewen	DATE OF TEST:	March 15 th , 2013
TEST REFERENCE:	ANSI C63.4:2003		
REQUIREMENT:	According to 15.247(a)(1)(i) : if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20dB bandwidth of the hopping channel is 250 kHz or greater.		
TEST PROCEDURE:	<p>According to FCC Public Notice DA 00-705, The test procedure as below:</p> <ol style="list-style-type: none"> 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. 2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. The EUT must have its hopping function enabled. 3. Use the following settings: Span = zero span, centered on a hopping channel RBW = 1 MHz, VBW >= RBW, Sweep = as necessary to capture the entire dwell time per hopping channel Detector function = peak Trace = max hold. 4. Use the marker-delta function to determine the dwell time. Plot the result on the screen of spectrum analyzer. 5. Repeat above procedures until all frequencies measured were complete. 		
DESCRIPTIONS OF TEST MODE:	The EUT is transmitting with the Hopping function enabled at maximum rate, SPECTRUM ANALYSER is on max hold and the span is wide enough to capture two adjacent signals. Two markers are positioned in the peak of each signal and the delta of those two markers is the frequency separation between signals.		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	The EUT meet requirement of time of occupy in section 15.247(a)(1)(i).The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB.		

Test Report #: BEI-1211-10910-FCC ID

Prepared for Bluecard Software Technology Co., Ltd.

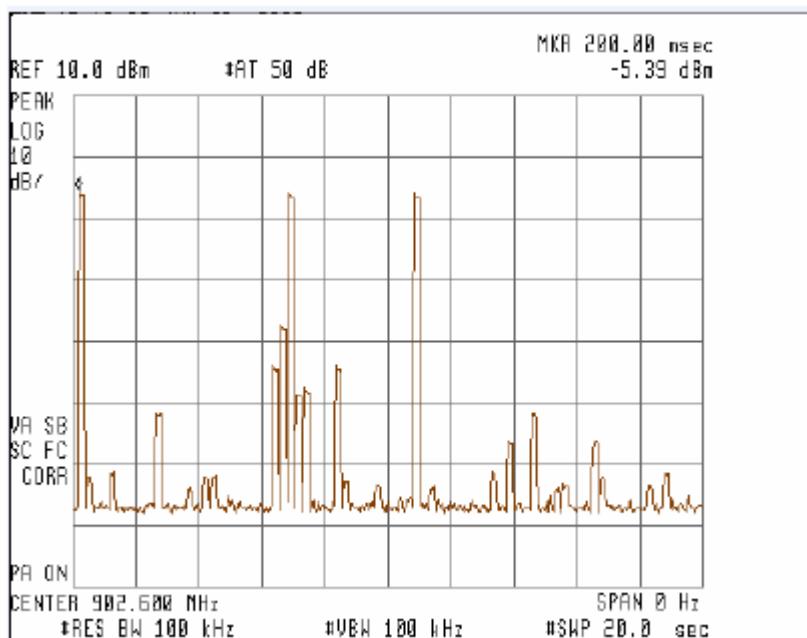
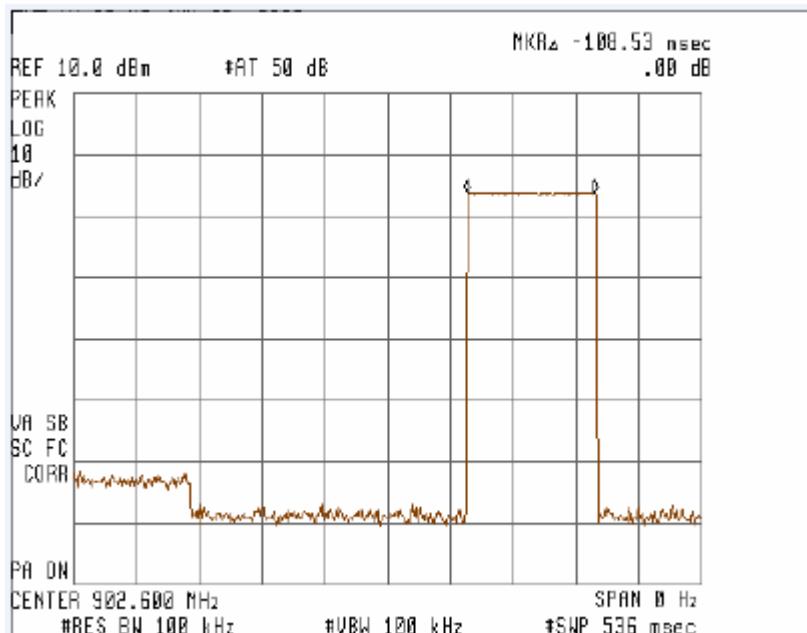
Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

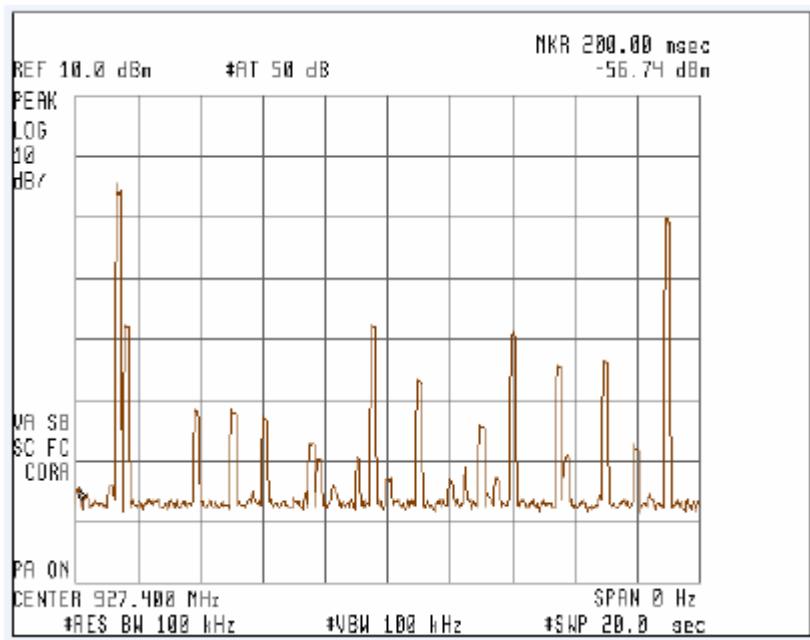
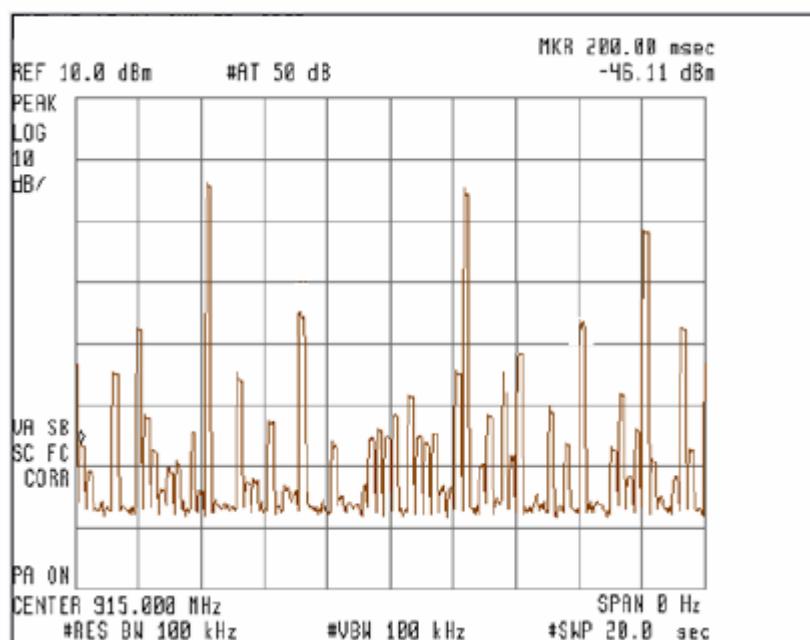
Page 42 of 48

Test Data:

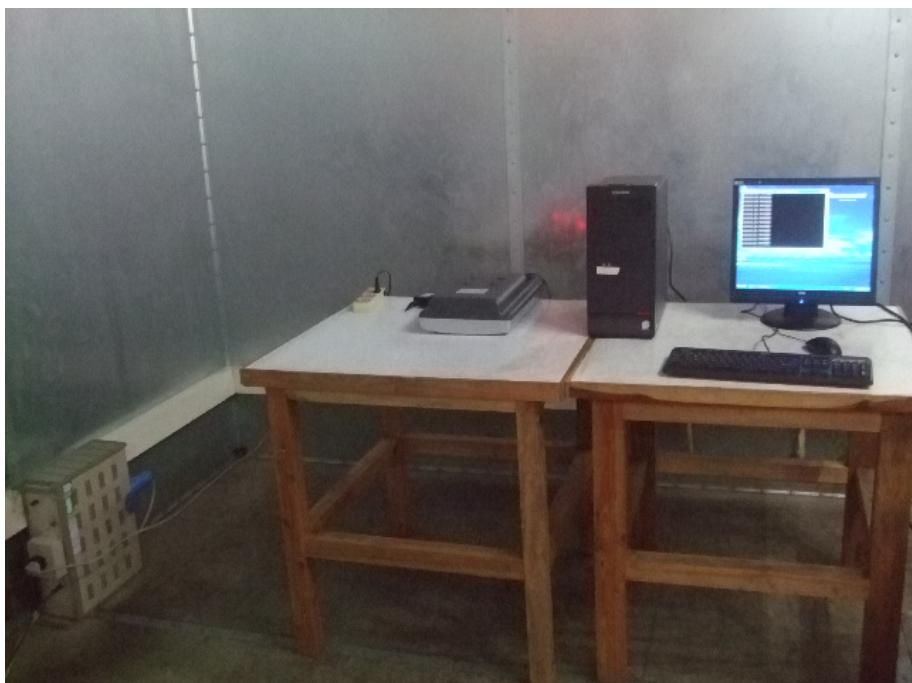
<i>Channel</i>	<i>Time of Occupancy</i>	<i>Limit</i>	<i>Result</i>
<i>Lowest</i>	$108.53\text{ms} \times 3 = 325.59\text{ms}$	400ms	<i>Pass</i>
<i>Middle</i>	$108.53\text{ms} \times 3 = 325.59\text{ms}$	400ms	<i>Pass</i>
<i>Highest</i>	$108.53\text{ms} \times 2 = 217.06\text{ms}$	400ms	<i>Pass</i>

Test Plot Of Time of Occupancy:





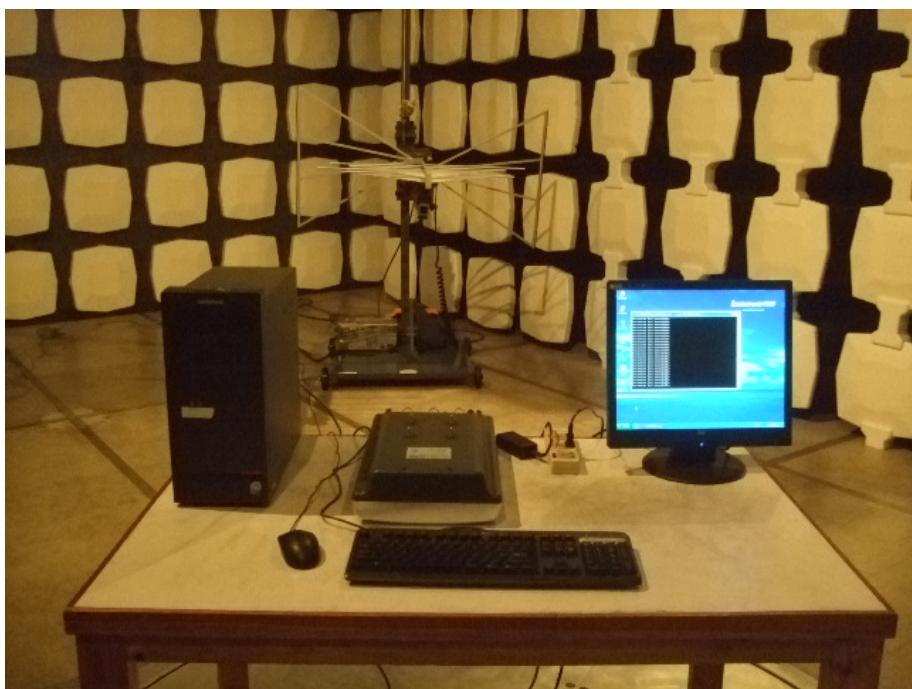
Test Set up Photographs



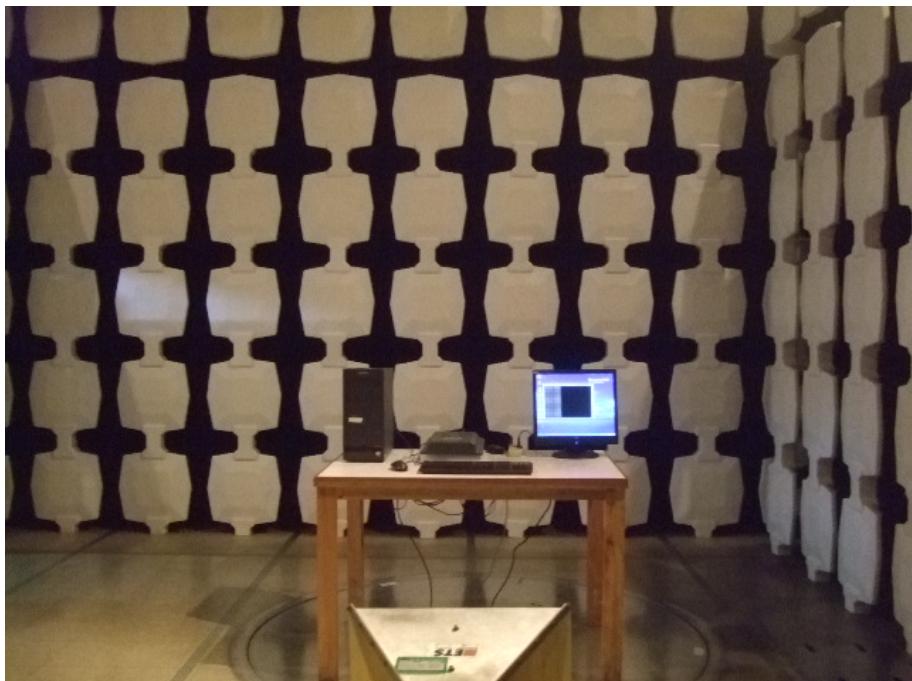
Conducted Emission Test Set-up-Front View



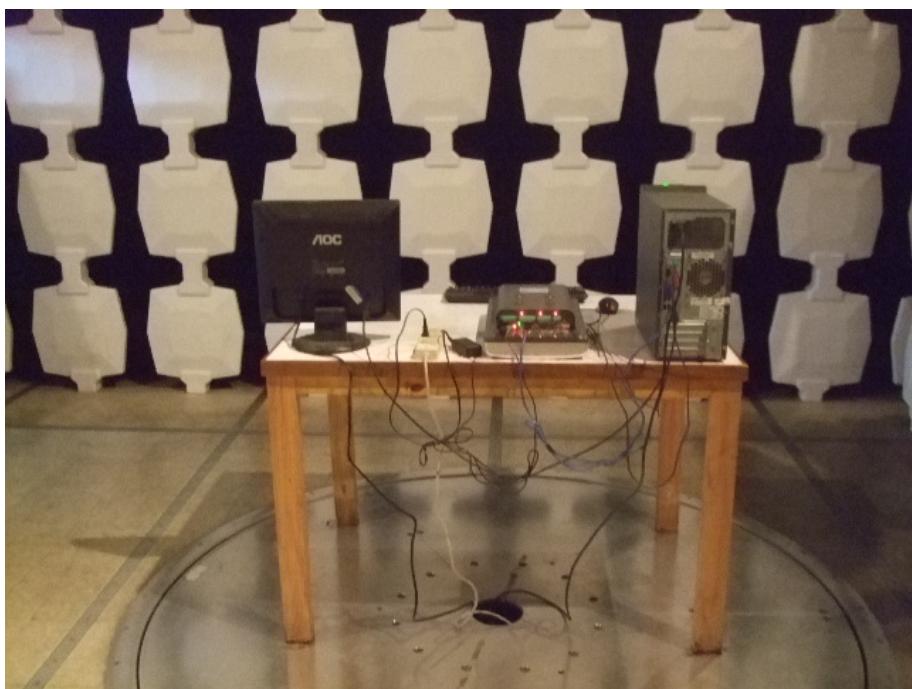
Conducted Emission Test Set-up-Rear View



Radiated Emission Test Set-up -below 1GHz



Radiated Emission Test Set-up - Above 1GHz



Radiated Emission Test Set-up – Rear View