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Project No.: 12CA42753  
File No.: TC9191  
Report No.: 12CA42753-4-FCC  
Date: September 5, 2012  
Model No.: SPP-R400  
FCC ID.: U5MSPP-R400

## **FCC Maximum Permissible Exposure Report**

**in accordance with  
FCC Part 1 Subpart I §1.1307(b) & §1.1310**

**for**

### **Mobile Printer**

**BIXOLON CO.,LTD.**

**7<sup>th</sup>~8<sup>th</sup> FL, Miraeasset Venture Tower, 685, Sampyeong-dong,  
Bundang-gu, Seongnam-si, Korea**

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Only those products bearing the UL Mark should be considered as being covered by UL.

### **Summary of Test Results:**

The following tests were performed on a sample submitted for evaluation of compliance with FCC Part 1 Subpart I Section 1.1307(b) & 1.1310

No	Reference Clause No.	Conformance Requirements	Result Verdict	Remark
1	1.1307(b)(1) 1.1310	Maximum Permissible Exposure (Exposure of Humans to RF Fields)	Complied	

### **Conclusion:**

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by UL Korea Ltd. in accordance with the procedures stated in each test requirement and specification. The test list was determined by the Applicant as being applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.



Tested by  
Kyung Duk Ko, WiSE Project Engineer  
UL Verification Services- 3014ASEO  
UL Korea Ltd.  
September 5, 2012



Tested by  
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UL Korea Ltd.  
September 5, 2012

Project Number: 12CA42753  
Model Number: SPP-R400

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## **Test Report Details**

Witnessed By: UL Korea Ltd.  
33<sup>rd</sup> FL. GFC Center, 737 Yeoksam-dong, Gangnam-gu, Seoul, 135-984, Korea


Test Site: ONETECH Corp.  
301-14 Daessangryeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do,  
464-862 Korea

Applicant: BIXOLON CO.,LTD.  
7<sup>th</sup>~8<sup>th</sup> FL, Miraeasset Venture Tower, 685, Sampyeong-dong,  
Bundang-gu, Seongnam-si, Korea

Applicant Contact: Son, Hyunsuk  
Title: QM Manager  
Phone: +82 31 218 5582  
E-mail: hs@bixolon.com

Product Type: Mobile Printer

Model Number: SPP-R400

Trademark 

Sample Serial Number: N/A

Test standards: FCC Part 1 Subpart I Section 1.1307(b) & 1.1310  
Maximum Permissible Exposure (Exposure of Humans to RF Fields)

Sample Serial Number: August 13, 2012

Sample Receive Date: August 13, 2012

Testing Date: August 31, 2012

**Overall Results:** **Pass**

UL Korea Ltd. reports apply only to the specific test samples and test results submitted for UL's review. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. UL Korea Ltd. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from UL Korea Ltd. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or any agency of the National Authorities. This report may contain test results that are not covered by the NVLAP or KOLAS accreditation.

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## 1. General Product Information

### 1.1. Equipment Description

15.247(g): In accordance with the Bluetooth Industry Standard, the system is designed to comply with all of the regulations in Section 15.247 when the transmitter is presented with a continuous data (or information) system.

15.247(h): In accordance with the Bluetooth Industry Standard, the system does not coordinate its channels selection/hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

### 1.2. Details of Test Equipment (EUT)

- Equipment Type : Mobile Printer
- Model No. : SPP-R400
- Trade name : BIXOLON
- Type of test Equipment : Portable type
- Operating characteristic : Short range wireless device operating in the 2400 – 2483.5 ISM frequency band
- Factory : EVERINT Co., Ltd.  
129, Chungjusandan 13(sipsam)-ro, Chungju-si,  
Chungcheongbuk-do, Korea
- 

### 1.3. Equipment Configuration

The EUT is consisted of the following component provided by the manufacturer.

Use*	Product Type	Factory	Model	Comments
EUT	Mobile Printer	EVERINT Co., Ltd.	SPP-R400	-
<b>Note:</b> Use = EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment. SIM - Simulator (Not Subjected to Test)				

### 1.4. Technical Data

Item	Type of Mobile Printer
Frequency Ranges	2400 – 2483.5 MHz
Output power	Max. 4.0 dBm e.i.r.p , Typical : 1.0 dBm
Kind of modulation (s)	1Mbps(GFSK) , 2Mbps( $\pi/4$ -DQPSK) , 3Mbps(8DPSK)
Emission Designator	F1D, G1D
Hopping Channel	79 channel, 1600 hops/sec
Antenna Gain	-0.22 dBi
Antenna information	Integral antenna (Chip Antenna)
Working temperature	-20 ~ 70 °C
Supply Voltage	DC 7.4 V

Note ;

1. All the technical data described above were provided by the manufacturer.

### 1.5. Antenna Information

Antenna Model Name : KNC-1  
Antenna Type : Chip Antenna  
Manufacturer : Nice Korea Components Co., Ltd  
Transmit Gain dBi : Max. -0.22 dBi  
Azimuth Beam Pattern : Linear vertical

### 1.6. Equipment Type :

- ☐ Radio and ancillary equipment for fixed or semi-fixed use  
☐ Radio and ancillary equipment for vehicular mounted use  
☐ Radio and ancillary equipment for portable or handheld use
- ☒ Stand alone    ☐ Host connected    ☐ Host connected
- ☐ Self contained single unit    ☒ Module with associated connection or interface

### 1.7. Technical descriptions and documents

- ☐ Radio and ancillary equipment for fixed or semi-fixed use  
☐ Radio and ancillary equipment for vehicular mounted use  
☒ Radio and ancillary equipment for portable or handheld use
- ☒ Stand alone    ☐ Host connected    ☐ Host connected
- ☐ Self contained single unit    ☒ Module with associated connection or interface

### 1.8. Technical descriptions and documents

The following documents was provided by the manufacturer.

No.	Document Title and Description
1	User Manual
2	APPROVAL SHEET / NKC-1

## 2. Test Specification

The following test specifications and standards have been applied and used for testing.

KDB 447498 D01 : Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

### 3. Test Conditions

#### 3.1. Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	Mobile Printer	EVERINT Co., Ltd.	SPP-R400	-
AE	Note PC	LG	R510	-
<b>Note:</b> Use = EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment. SIM - Simulator (Not Subjected to Test)				

#### 3.2. Input/Output Ports

No	Port Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
1	Power Input	DC	N	N	Connected to DC Power supply
2	Radio Antenna	I/O	N	Y	-
<b>Note:</b> *AC = AC Power Port      DC = DC Power Port      N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports					

#### 3.3. Power Interface

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	7.40 V	-	-	DC	-	Normal operating voltage

#### 3.4. Operating Frequencies

Mode #	Frequency tested
1	- Low : 2402 MHz / CH = 1 - Mid : 2441 MHz / CH = 39 - Top : 2480 MHz / CH = 78

#### 3.5. Operation Modes

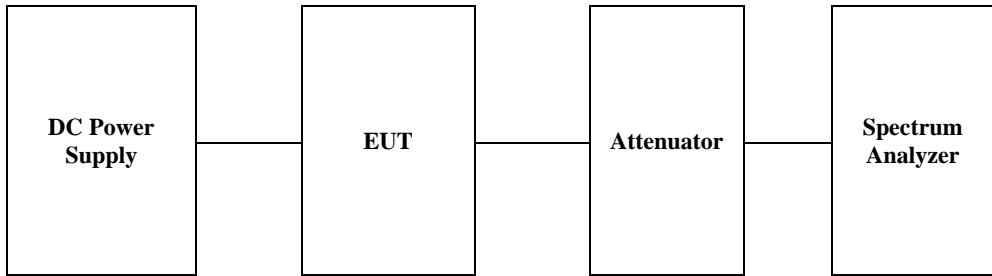
Mode #	Description
1	Carrier on mode: Signal from the Mobile Printer was generated continuously for the representative channels (Low, Mid, High) by the test program incorporated
<b>Note :</b> 1. The worst-case condition is determined by the baseline measurement of RF output power out of various modulations and data rates. Therefore all applicable requirements were tested to the two type of higher output power modulation (GFSK and 8DPSK )	



### 3.6. Environment Conditions

Parameters	Normal condition
Temperature	+ 15°C ~ +35°C
Humidity	20% ~ 75%
Supply voltage	7.40 Vdc (Rated nominal voltage)
Note ; - The operating condition for humidity requirement has not been declared in the manufacturer's specification. - Test has been carried out for three frequencies specified above under the normal.	

### 3.7. Test Configurations

Mode #	Description
1	

### 3.8. List of Test Equipment

No	Description	Manufacturer	Model	Identifier	Cal. Due
1	Signal Analyzer	Rohde & Schwarz	FSV30	101372	2013.05.31
2	DC Power Supply	Digital Electronics	DRP-305DN	4030191	2013.09.13

## 4. Test Results of RF Exposure Evaluation

TEST: RF Exposure Evaluation		
Method	<p>RF Exposure Evaluation of the EUT were measured according to the dictates in KDB 447498</p> <p>Pd the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.</p> <p><b>Friis transmission formula: <math>P_d = (P_{out} * G) / (4 * \pi * R^2)</math></b></p> <p>Where <math>P_d</math> = power density in mW/cm<sup>2</sup></p> <p><math>P_{out}</math> = output power to antenna in mW</p> <p>G = gain of antenna in linear scale</p> <p><math>\pi</math> = 3.1416</p> <p>R = distance between observation point and center of the radiator in cm</p> <p><b>General SAR test exclusion guidance</b></p> <p>The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at <i>test separation distances</i> ≤ 50 mm are determined by:</p> <p><math>[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f_{\text{GHz}}}] \leq 3.0</math> for 1-g SAR and <math>\leq 7.5</math> for 10-g extremity SAR, where</p> <p><math>f_{\text{GHz}}</math> is the RF channel transmit frequency in GHz</p> <p>Power and distance are rounded to the nearest mW and mm before calculation<sup>17</sup></p> <p>The result is rounded to one decimal place for comparison</p> <p>When the minimum <i>test separation distance</i> is &lt; 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.</p>	
Reference Clause	Part I Section 1.1307(b) & 1.1310	
Parameters recorded during the test	Laboratory Ambient Temperature	22 °C
	Relative Humidity	36 %
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	2 402 MHz – 2 480 MHz	Antenna port

### Configuration Settings

Power Interface Mode # (See Section 3.3)	EUT Operation Mode # (See Section 3.5)	Test Configurations Mode # (See Section 3.7)
Rated	1	1
Supplementary information: None		

## **Limits**

### **Environmental evaluation and exposure limit according to FCC Part 1, Subpart I, Section 1.1307(b) & 1.1310**

According to Section 1.1310, The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

Frequency Range (MHz)	Electric Field Strength(V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time
(A) Limits for Occupational /Control Exposures				
300 – 1 500	--	--	F/300	6
1 500 – 100 000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300 – 1 500	--	--	F/1500	6
<b><u>1 500 – 100 000</u></b>	<b><u>--</u></b>	<b><u>--</u></b>	<b><u>1</u></b>	<b><u>30</u></b>

## 4.1. Output Power into Antenna & RF Exposure Evaluation Distance

### 4.1.1. Evaluation at 20 cm for Portable mode without Belt clip

Operation Mode	Data Rate (Mbps)	Channel	Channel Frequency (MHz)	Output Peak Power (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	Power Density at 20 cm (mW/cm <sup>2</sup> )	LIMITS (mW/cm <sup>2</sup> )
BDR	1	Low	2402	-8.57	100	-0.22	0.000 026	1
		Middle	2441	-7.50	100	-0.22	0.000 034	
		High	2480	-7.19	100	-0.22	0.000 036	
EDR	3	Low	2402	-8.10	100	-0.22	0.000 029	
		Middle	2441	-7.49	100	-0.22	0.000 034	
		High	2480	-7.58	100	-0.22	0.000 033	

### 4.1.2. Evaluation of Exclusion of SAR testing for Belt Clip mode

- For Belt clip mode, the distance from EUT to human body can be below 5 mm so a distance of 5 mm is applied to determine SAR testing exclusion.
- -7.19 dBm(0.19 mW) at 2480 MHz is the highest power level and it is applied for evaluation

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})]*[\sqrt{f(\text{GHz})}]$$

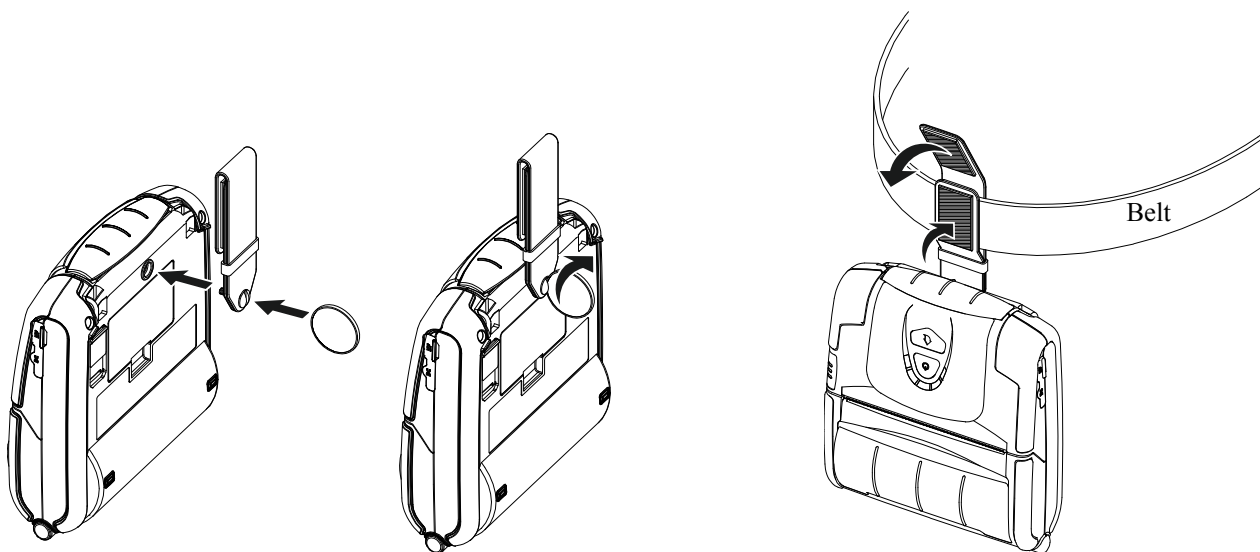
$$= (0.19 / 5) * \sqrt{2.48} = 0.06$$

The evaluation 0.06 is lower than 3.0 for 1-g SAR and SAR test is excluded.

Note :

1. The power density at a distance of 20 cm calculated from the friis transmission formula is far below each limits.

**Figure 1.Description of Belt clip mode**



## APPENDIX A. Accreditations and Authorizations

ONETECH Corp. has been accredited / filed / authorized by the agencies listed in the following table;

Certificate	Nation	Agency	Code	Mark
Accreditation	Korea	KOLAS	No. 85	ISO/IEC 17025
Site Filing	USA	FCC	KR0013	Test Facility list & NSA Data
	Japan	VCCI	C-940 R-906 T-1842	Test Facility list & NSA Data
Certification	Korea	KC	KR0013	Test Facility list & NSA Data

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competent of calibration and testing laboratory”.