FCC REPORT

Applicant:	AISolution Co., Ltd.
Address of Applicant:	28-4, Samyang-ro 29-gil, Gangbuk-gu, Seoul, South Korea

Equipment Under Test (EUT)

Product Name:	KDC180U Bluetooth Barcode Scanner and UHF reader
Model No.:	KDC180U
Trade mark:	KOLMTAC
FCC ID:	VH9KDC180U
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	19 Dec., 2019
Date of Test:	20 Dec., 2019 to 13 Apr., 2020
Date of report issued:	14 Apr., 2020
Test Result:	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*23 Mar., 2020*	*Original*
01	*09 Apr., 2020*	*1. Updated EUT antenna information on page 8.* *2. Updated hopping sequence information on page16.* *3. Added AC conducted emission setup photo.*
02	*13 Apr., 2020*	*1. Updated radiated emission data below 1G on page 26/27.*
03	*14 Apr., 2020*	*2. Updated radiated emission data below 1G on page 26/27.*

Tested by: Janet Wei ***Date:*** *14 Apr., 2020*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *14 Apr., 2020*

Project Engineer

3 Contents

Page

4 Test Summary

Test Items	Section in CFR 47	Result
Antenna Requirement	15.203 & 15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(2)	Pass
20dB Occupied Bandwidth	15.247 (a)(1) (i)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(1) (i)	Pass
Dwell Time	15.247 (a)(1) (i)	Pass
Spurious Emission	15.205 & 15.209	Pass

Remark:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not Applicable.*
3. *The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).*

Test Method:	*ANSI C63.4-2014* *ANSI C63.10-2013* *KDB 558074 D01 15.247 Meas Guidance v05r02*

5 General Information

5.1 Client Information

Applicant:	AISolution Co., Ltd.
Address:	28-4, Samyang-ro 29-gil, Gangbuk-gu, Seoul, South Korea
Manufacturer/Factory:	AISolution Co., Ltd.
Address:	28-4, Samyang-ro 29-gil, Gangbuk-gu, Seoul, South Korea

5.2 General Description of E.U.T.

Product Name:	KDC180U Bluetooth Barcode Scanner and UHF reader
Model No.:	KDC180U
Operation Frequency:	917.10 MHz~926.90 MHz
Number of channel:	50
Modulation type:	ASK
Modulation technology:	FHSS
Antenna Type:	Internal Antenna
Antenna gain:	0 dBi
Power supply:	Rechargeable Li-ion Battery DC3.7V-1010mAh
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	917.1 MHz	14	919.7 MHz	27	922.3 MHz	40	924.9 MHz
2	917.3 MHz	15	919.9 MHz	28	922.5 MHz	41	925.1 MHz
3	917.5 MHz	16	920.1 MHz	29	922.7 MHz	42	925.3 MHz
4	917.7 MHz	17	920.3 MHz	30	922.9 MHz	43	925.5 MHz
5	917.9 MHz	18	920.5 MHz	31	923.1 MHz	44	925.7 MHz
6	918.1 MHz	19	920.7 MHz	32	923.3 MHz	45	925.9 MHz
7	918.3 MHz	20	920.9 MHz	33	923.5 MHz	46	926.1 MHz
8	918.5 MHz	21	921.1 MHz	34	923.7 MHz	47	926.3 MHz
9	918.7 MHz	22	921.3 MHz	35	923.9 MHz	48	926.5 MHz
10	918.9 MHz	23	921.5 MHz	36	924.1 MHz	49	926.7 MHz
11	919.1 MHz	24	921.7 MHz	37	924.3 MHz	50	926.9 MHz
12	919.3 MHz	25	921.9 MHz	38	924.5 MHz		
13	919.5 MHz	26	922.1 MHz	39	924.7 MHz		
Remark: Channel 1, 25 &50 selected for ASK							

5.3 Test environment and test mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Modes:	
Non-hopping mode:	Keep the EUT in continuous transmitting mode with worst case data rate.
Hopping mode:	Keep the EUT in hopping mode.

The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working with a fresh battery, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.38 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.36 dB (k=2)

5.6 Additions to, deviations, or exclusions from the method

No

5.7 Laboratory Facility

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

- **FCC - Designation No.: CN1211**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.9 Test Instruments list

Radiated Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-18-2019	03-17-2020
				03-17-2020	03-16-2021
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2019	03-17-2020
				03-17-2020	03-16-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020
				03-17-2020	03-16-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
				03-17-2020	03-16-2021
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-18-2019	11-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-18-2019	03-17-2020
				03-17-2020	03-16-2021
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020
				03-17-2020	03-16-2021
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020
				03-17-2020	03-16-2021
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-18-2019	11-17-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2019	03-17-2020
				03-17-2020	03-16-2021
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2019	03-17-2020
				03-17-2020	03-16-2021
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020
				03-17-2020	03-16-2021
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020
				03-17-2020	03-16-2021
RF Switch Unit	MWRFTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTEST	MTS8200	Version: 2.0.0.0		

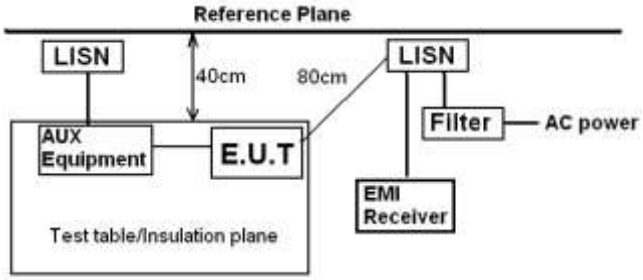
Conducted Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-18-2019	03-17-2020
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-18-2019	03-17-2020
LISN	CHASE	MN2050D	1447	03-18-2019	03-17-2020
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2018	07-20-2021
Cable	HP	10503A	N/A	03-18-2019	03-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		

6 Test results and measurement data

6.1 Antenna Requirement

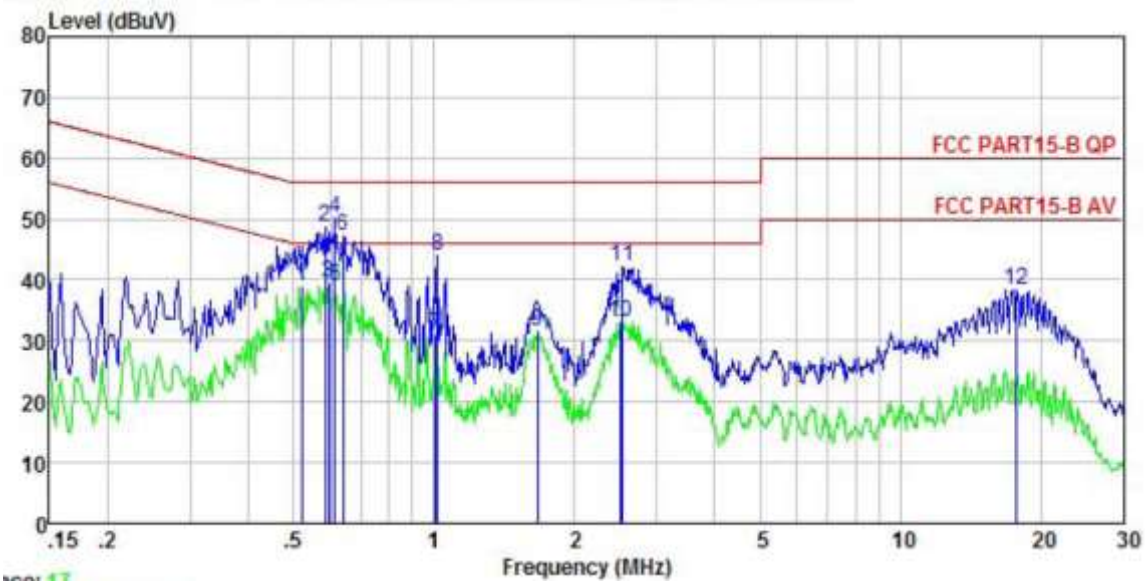
Standard requirement:	FCC Part 15 C Section 15.203 & 247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
E.U.T Antenna:	
The antenna is an internal antenna which permanently attached, and the best case gain of the antenna is 0 dBi. The detailed ANT photo please refers to the internal photo.	

6.2 Conducted Emissions

Test Requirement:	FCC Part 15 C Section 15.207		
Test Frequency Range:	150 kHz to 30 MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	* Decreases with the logarithm of the frequency.		
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*		
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4-2014 on conducted measurement.		
Test Instruments:	Refer to section 5.9 for details		
Test mode:	Hopping mode		
Test results:	Pass		

Measurement Data:

Product name:	KDC180U Bluetooth Barcode Scanner and UHF reader	**Product model:**	KDC180U
Test by:	Janet	**Test mode:**	RFID Tx mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 120 V/60 Hz	**Environment:**	Temp: 22.5℃ Huni: 55%

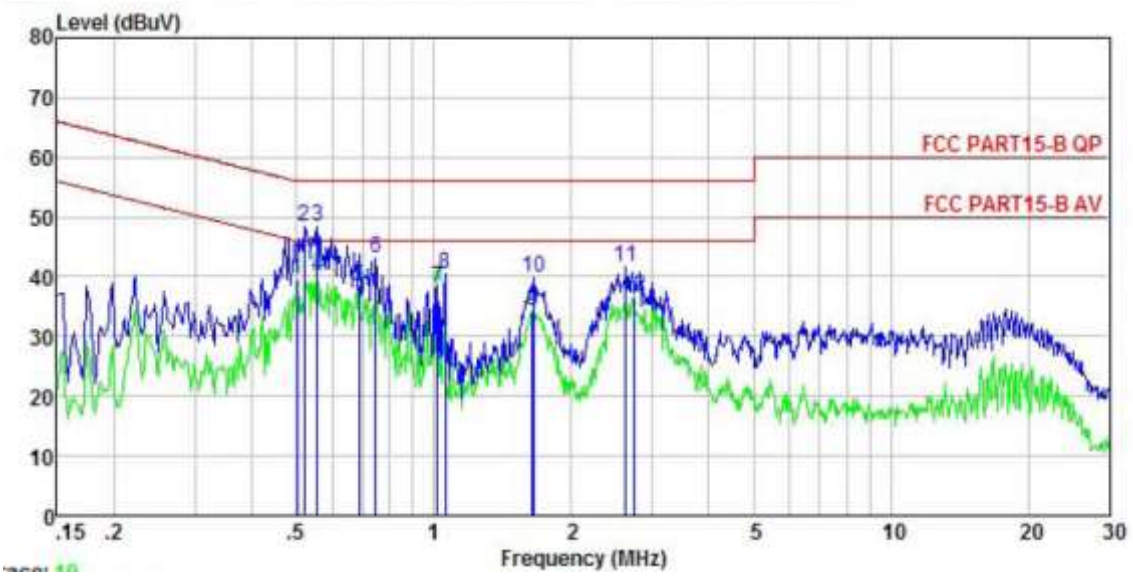


	Freq	Read Level	LISN Factor	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.521	29.07	-0.39	-0.36	10.76	39.08	46.00	-6.92	Average
2	0.585	38.70	-0.39	-0.37	10.76	48.70	56.00	-7.30	QP
3	0.595	29.64	-0.38	-0.38	10.77	39.65	46.00	-6.35	Average
4	0.614	40.26	-0.38	-0.38	10.77	50.27	56.00	-5.73	QP
5	0.614	28.89	-0.38	-0.38	10.77	38.90	46.00	-7.10	Average
6	0.637	37.31	-0.38	-0.39	10.77	47.31	56.00	-8.69	QP
7	1.010	20.10	-0.38	0.45	10.87	31.04	46.00	-14.96	Average
8	1.016	33.19	-0.38	0.44	10.87	44.12	56.00	-11.88	QP
9	1.662	21.14	-0.40	-0.11	10.94	31.57	46.00	-14.43	Average
10	2.500	22.74	-0.43	-0.26	10.94	32.99	46.00	-13.01	Average
11	2.540	32.08	-0.43	-0.25	10.94	42.34	56.00	-13.66	QP
12	17.755	26.34	-0.85	2.06	10.92	38.47	60.00	-21.53	QP

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Product name:	KDC180U Bluetooth Barcode Scanner and UHF reader	Product model:	KDC180U
Test by:	Janet	Test mode:	RFID Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 22.5℃ Huni: 55%

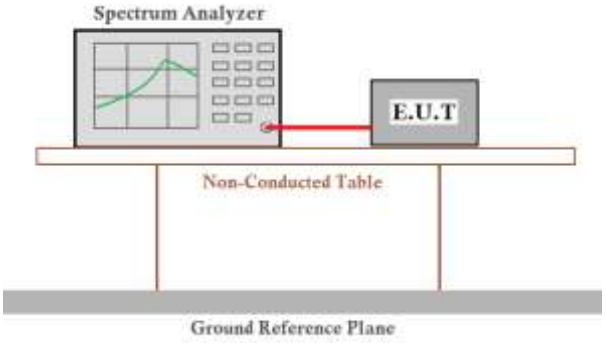


	Freq	Read Level	LISN Factor	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.502	29.48	-0.65	0.03	10.76	39.62	46.00	-6.38	Average
2	0.521	38.16	-0.65	0.03	10.76	48.30	56.00	-7.70	QP
3	0.555	38.18	-0.65	0.03	10.76	48.32	56.00	-7.68	QP
4	0.555	29.87	-0.65	0.03	10.76	40.01	46.00	-5.99	Average
5	0.686	28.17	-0.64	0.04	10.77	38.34	46.00	-7.66	Average
6	0.747	32.76	-0.64	0.05	10.79	42.96	56.00	-13.04	QP
7	1.016	27.65	-0.63	0.08	10.87	37.97	46.00	-8.03	Average
8	1.060	29.97	-0.63	0.09	10.88	40.31	56.00	-15.69	QP
9	1.645	23.90	-0.66	0.14	10.93	34.31	46.00	-11.69	Average
10	1.654	29.28	-0.66	0.15	10.94	39.71	56.00	-16.29	QP
11	2.636	31.08	-0.67	0.27	10.93	41.61	56.00	-14.39	QP
12	2.736	26.14	-0.67	0.28	10.93	36.68	46.00	-9.32	Average

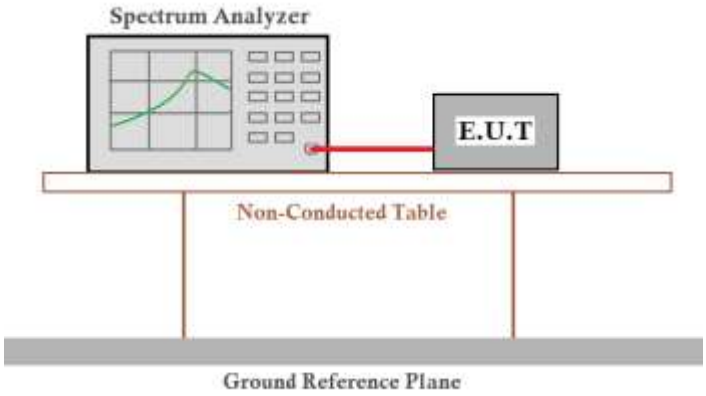
Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

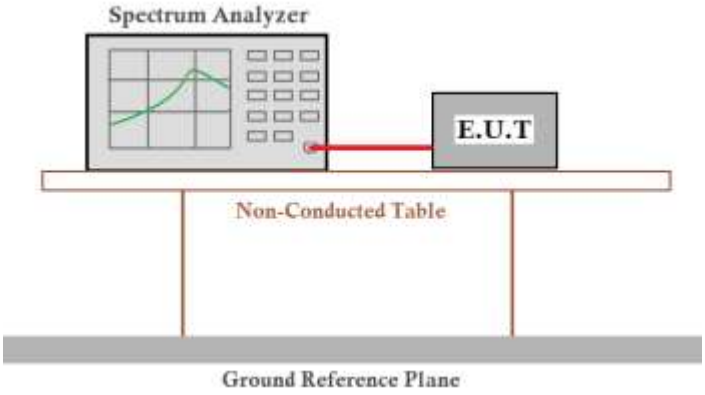
6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(2)
Receiver setup:	RBW=1MHz, VBW=3MHz, Detector=Peak
Limit:	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.
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode
Test results:	Pass
Remark:	Refer to FCC ID: Y3D-RED4S, Report No.: DRTFCC1802-0038

6.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)(i)
Receiver setup:	RBW=30 kHz, VBW=100 kHz, detector=Peak
Limit:	< 250KHz
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode
Test results:	Pass
Remark:	Refer to FCC ID: Y3D-RED4S, Report No.: DRTFCC1802-0038

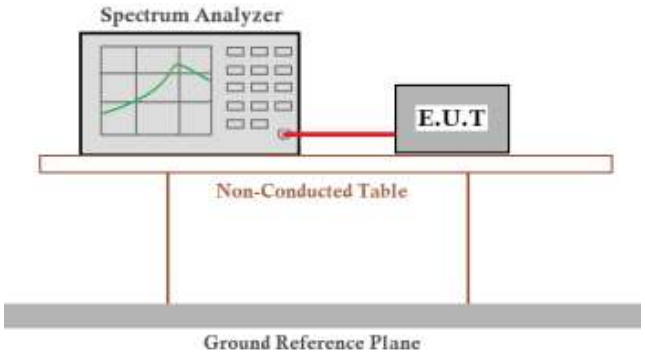
6.5 Carrier Frequencies Separation

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Receiver setup:	RBW=100 kHz, VBW=300 kHz, detector=Peak
Limit:	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
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Hopping mode
Test results:	Pass
Remark:	Refer to FCC ID: Y3D-RED4S, Report No.: DRTFCC1802-0038

Authorized Signature:

Bruce Zhang
Laboratory Manager

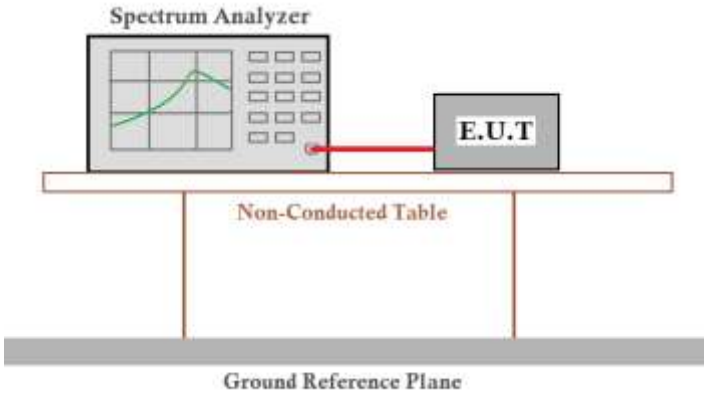
6.6 Hopping Channel Number

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)(i)
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Detector=Peak
Limit:	25 channels
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Hopping mode
Test results:	Pass
Remark:	Refer to FCC ID: Y3D-RED4S, Report No.: DRTFCC1802-0038

Authorized Signature:

Bruce Zhang
Laboratory Manager

6.7 Dwell Time

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)(i)
Receiver setup:	RBW=1 MHz, VBW=1 MHz, Span=0 Hz, Detector=Peak
Limit:	Occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Hopping mode
Test results:	Pass
Remark:	Refer to FCC ID: Y3D-RED4S, Report No.: DRTFCC1802-0038

Authorized Signature:

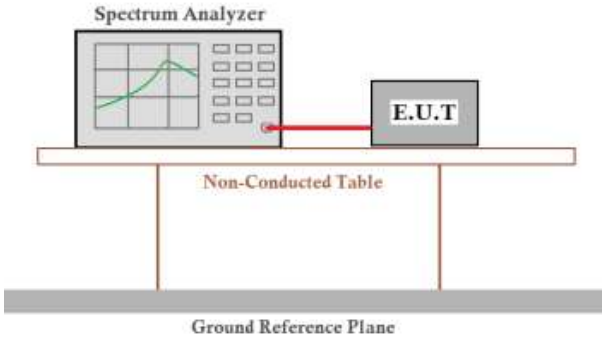
Bruce Zhang
Laboratory Manager

6.8 Pseudorandom Frequency Hopping Sequence

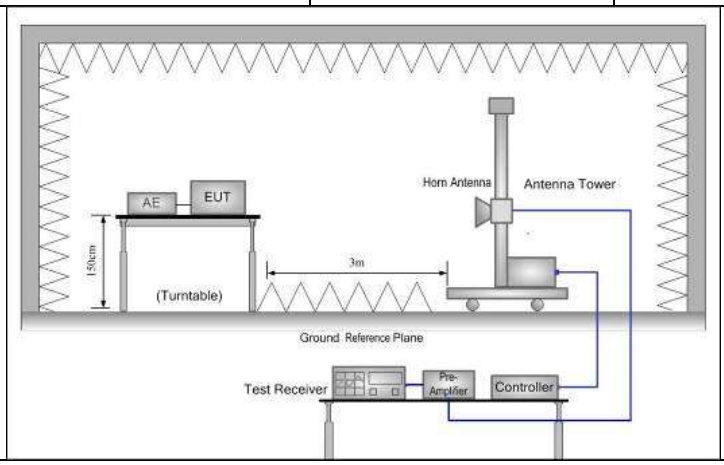
Test Requirement:	FCC Part 15 C Section 15.247 (a)(1) requirement:
For frequency hopping systems operating in the 917-927 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.	
EUT Pseudorandom Frequency Hopping Sequence	
An example of Pseudorandom Frequency Hopping Sequence as follow: 5 3 9 ……. 15 … 36 .. 14 …....1 4 48 7 …11 50 28 39 … 47 28 12 Each frequency used equally on the average by each transmitter. The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.	

6.9 Band Edge

6.9.1 Conducted Emission Method

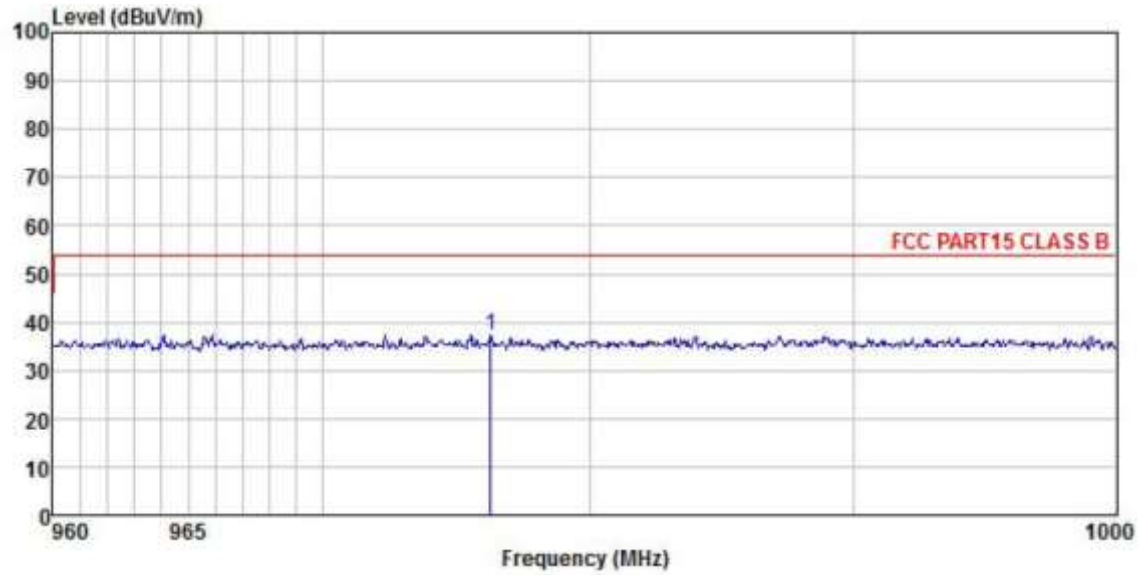
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that 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 setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode and hopping mode
Test results:	Pass
Remark:	Refer to FCC ID: Y3D-RED4S, Report No.: DRTFCC1802-0038

6.9.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Frequency Range:	960MHz to1240MHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Test setup:					
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				
Test Instruments:	Refer to section 5.9 for details				
Test mode:	Non-hopping mode				
Test results:	Passed				

Below 1GHz:

Product Name:	KDC180U Bluetooth Barcode Scanner and UHF reader	**Product Model:**	KDC180U
Test By:	Janet	**Test mode:**	Tx mode
Test Channel:	Highest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

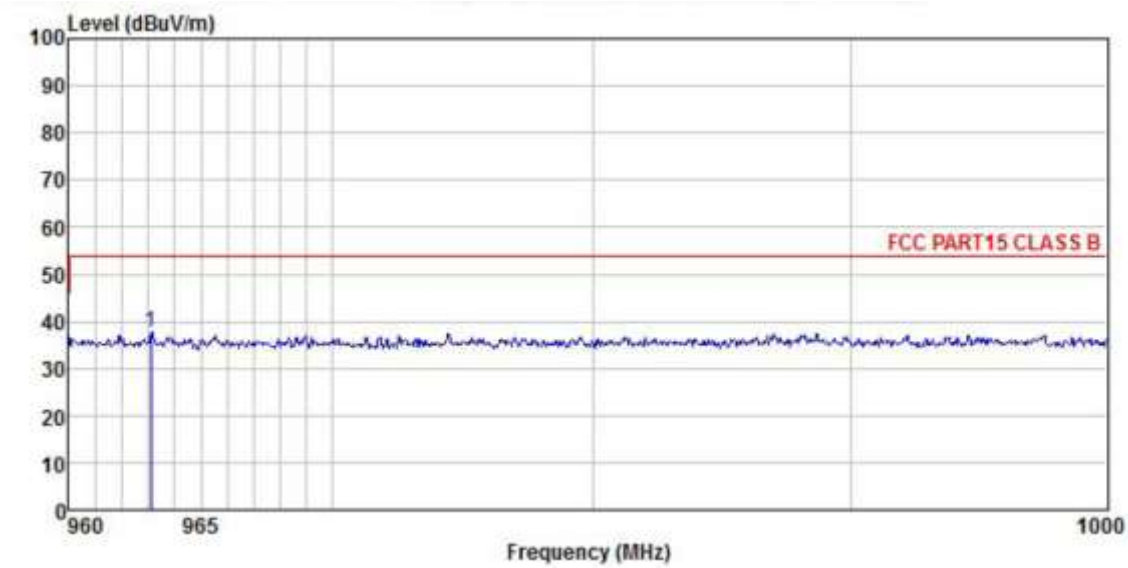


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	976.283	10.30	22.75	4.35	0.00	37.40	54.00	-16.60	

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	KDC180U Bluetooth Barcode Scanner and UHF reader	Product Model:	KDC180U
Test By:	Janet	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24℃ Huni: 57%



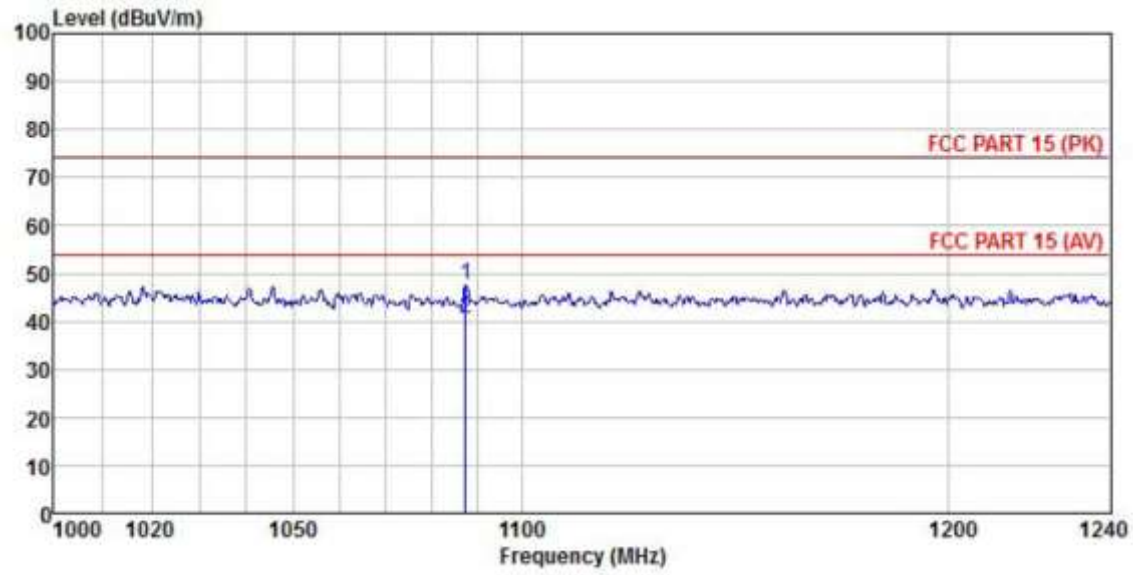
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	963.101	10.73	22.73	4.28	0.00	37.74	54.00	-16.26	

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Above 1GHz:

Product Name:	KDC180U Bluetooth Barcode Scanner and UHF reader	**Product Model:**	KDC180U
Test By:	Janet	**Test mode:**	Tx mode
Test Channel:	Highest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

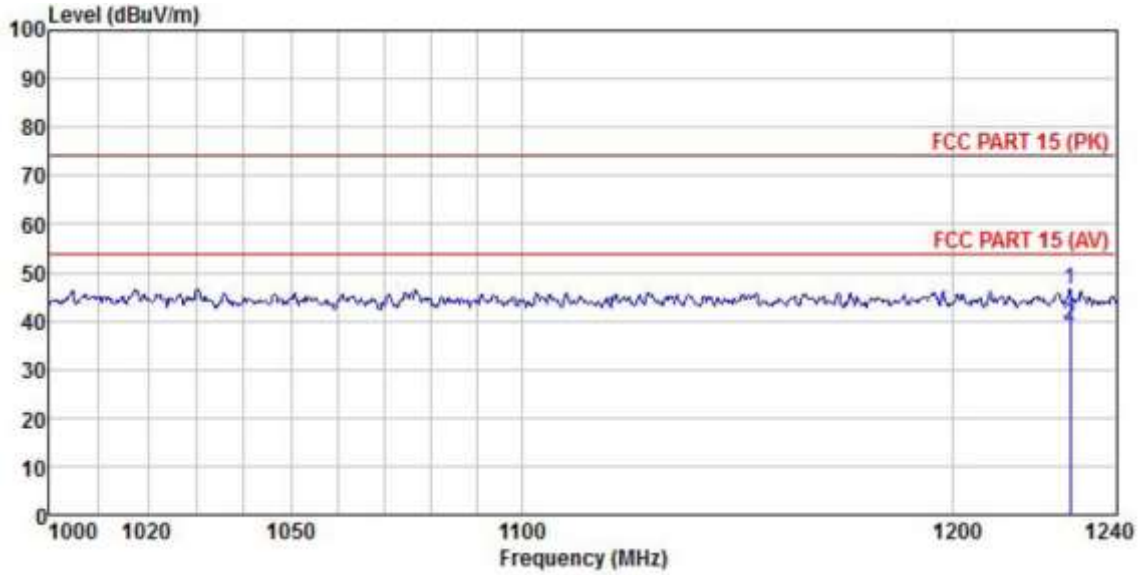


	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1087.513	20.02	24.44	3.15	0.00	47.61	74.00	-26.39	Peak
2	1087.513	13.11	24.44	3.15	0.00	40.70	54.00	-13.30	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	KDC180U Bluetooth Barcode Scanner and UHF reader	Product Model:	KDC180U
Test By:	Janet	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24℃ Huni: 57%



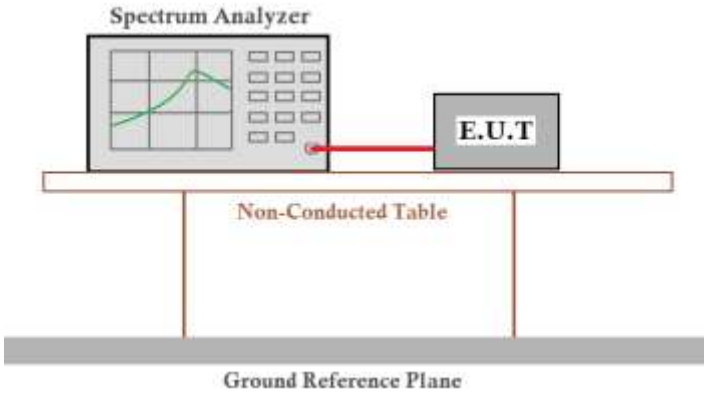
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1228.583	18.43	24.63	3.36	0.00	46.42	74.00	-27.58	Peak
2	1228.583	11.03	24.63	3.36	0.00	39.02	54.00	-14.98	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.10 Spurious Emission

6.10.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	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 that 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 setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode
Test results:	Pass
Remark:	Refer to FCC ID: Y3D-RED4S, Report No.: DRTFCC1802-0038

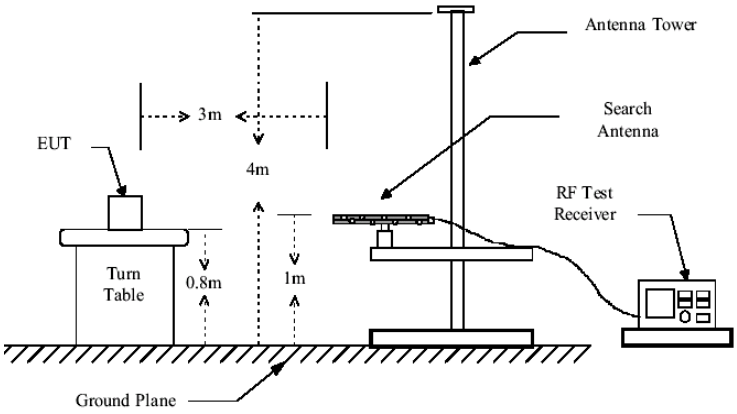
6.10.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209				
Test Frequency Range:	9 kHz to 10 GHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value

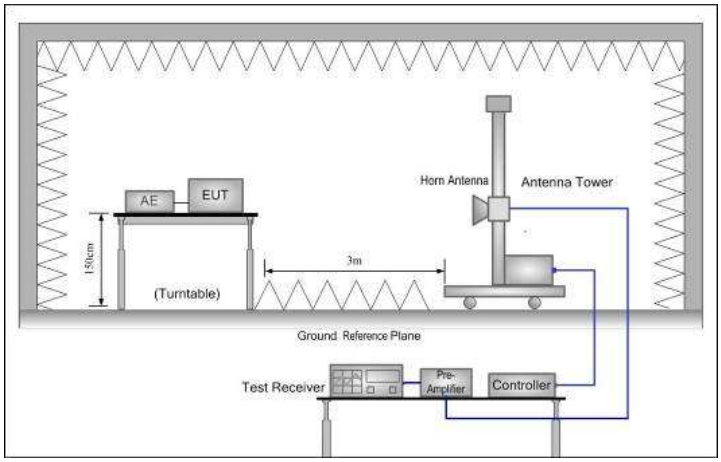
Limit:	Frequency	Limit (dBuV/m @3m)	Remark
	30MHz-88MHz	40.0	Quasi-peak Value
	88MHz-216MHz	43.5	Quasi-peak Value
	216MHz-960MHz	46.0	Quasi-peak Value
	960MHz-1GHz	54.0	Quasi-peak Value
	Above 1GHz	54.0	Average Value
		74.0	Peak Value

Test setup:

Below 1GHz



Above 1GHz



Test Procedure:

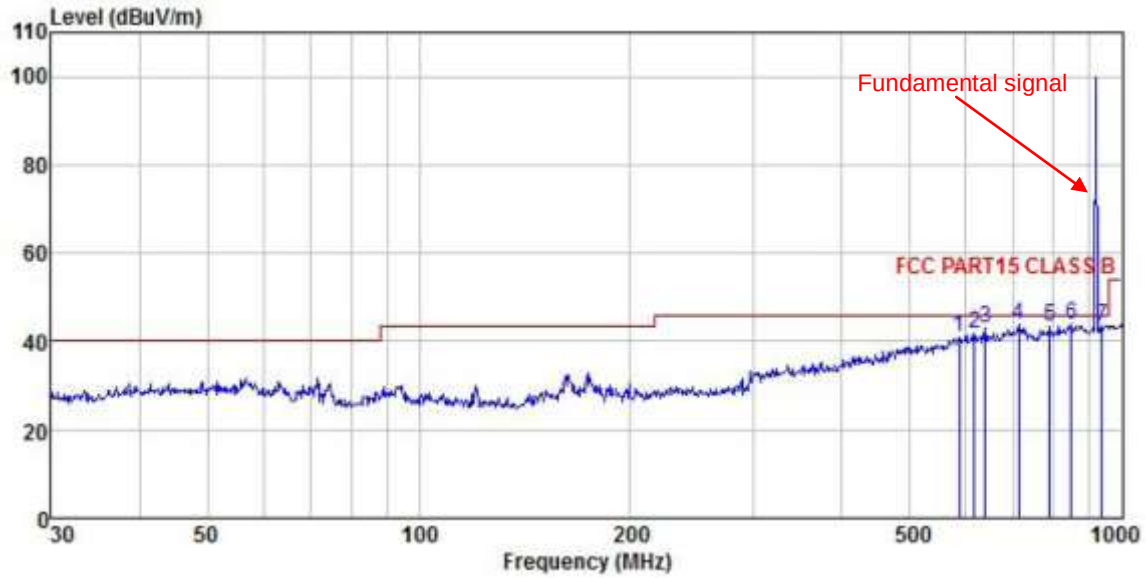
1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz) /1.5m(above 1GHz) above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving

	antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode
Test results:	Pass
Remark:	1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 2. 9 kHz to 30 MHz is noise floor, so only shows the data of above 30MHz in this report.

Measurement Data (worst case):

Below 1GHz:

Product Name:	KDC180U Bluetooth Barcode Scanner and UHF reader	**Product Model:**	KDC180U
Test By:	Janet	**Test mode:**	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

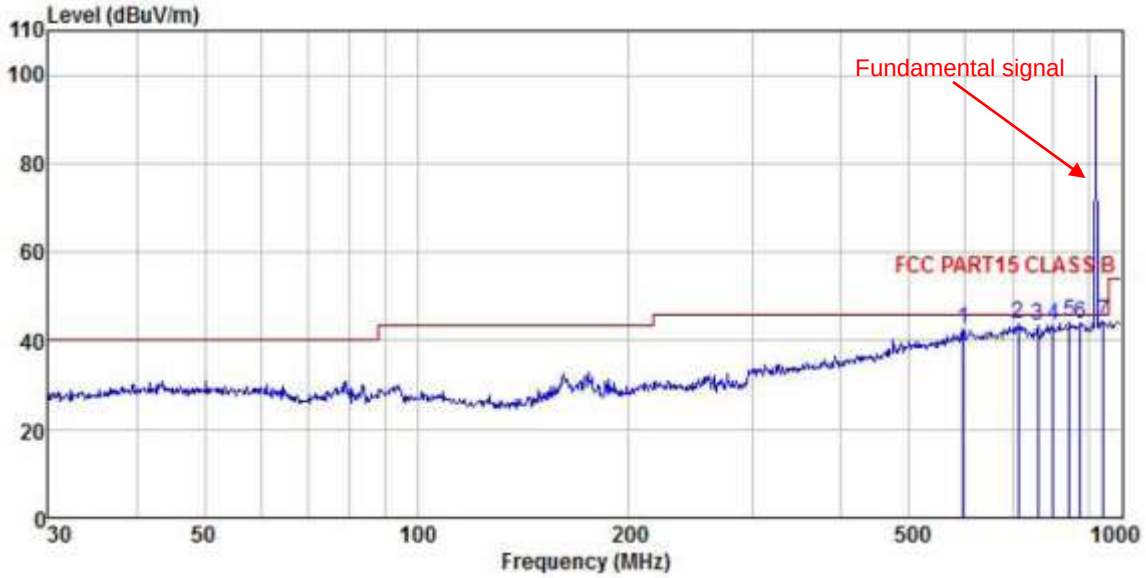


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	586.844	18.02	19.23	3.93	0.00	41.18	46.00	-4.82	
2	616.372	18.46	19.57	3.91	0.00	41.94	46.00	-4.06	
3	638.369	19.28	19.66	3.88	0.00	42.82	46.00	-3.18	
4	711.674	18.98	20.45	4.22	0.00	43.65	46.00	-2.35	
5	790.619	17.56	21.33	4.35	0.00	43.24	46.00	-2.76	
6	848.056	17.20	22.60	4.20	0.00	44.00	46.00	-2.00	
7	935.546	16.79	22.64	4.06	0.00	43.49	46.00	-2.51	

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	KDC180U Bluetooth Barcode Scanner and UHF reader	Product Model:	KDC180U
Test By:	Janet	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24℃ Huni: 57%



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	595.133	19.32	19.39	3.94	0.00	42.65	46.00	-3.35	QP
2	711.674	19.02	20.45	4.22	0.00	43.69	46.00	-2.31	QP
3	760.704	18.17	20.83	4.36	0.00	43.36	46.00	-2.64	QP
4	798.980	17.61	21.50	4.35	0.00	43.46	46.00	-2.54	QP
5	842.130	17.40	22.44	4.22	0.00	44.06	46.00	-1.94	QP
6	872.183	17.38	22.56	3.97	0.00	43.91	46.00	-2.09	QP
7	942.131	17.43	22.67	4.13	0.00	44.23	46.00	-1.77	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Above 1GHz:

Test channel: Lowest channel									
Detector: Peak Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1834.20	58.47	25.98	4.12	2.37	41.22	47.35	74.00	-26.65	Vertical
2751.30	59.76	28.04	5.05	2.87	41.76	51.09	74.00	-22.91	Vertical
3668.40	53.42	29.21	5.90	2.97	41.55	46.98	74.00	-27.02	Vertical
4585.50	51.77	31.13	6.82	3.54	42.07	47.65	74.00	-26.35	Vertical
5502.60	52.81	32.32	7.13	3.89	41.86	50.40	74.00	-23.60	Vertical
1834.20	53.77	25.98	4.12	2.37	41.22	42.65	74.00	-31.35	Horizontal
2751.30	54.16	28.04	5.05	2.87	41.76	45.49	74.00	-28.51	Horizontal
3668.40	55.79	29.21	5.90	2.97	41.55	49.35	74.00	-24.65	Horizontal
4585.50	50.13	31.13	6.82	3.54	42.07	46.01	74.00	-27.99	Horizontal
5502.60	51.03	32.32	7.13	3.89	41.86	48.62	74.00	-25.38	Horizontal
Detector: Average Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1834.20	47.91	25.98	4.12	2.37	41.22	36.79	54.00	-17.21	Vertical
2751.30	48.76	28.04	5.05	2.87	41.76	40.09	54.00	-13.91	Vertical
3668.40	42.68	29.21	5.90	2.97	41.55	36.24	54.00	-17.76	Vertical
4585.50	40.31	31.13	6.82	3.54	42.07	36.19	54.00	-17.81	Vertical
5502.60	41.86	32.32	7.13	3.89	41.86	39.45	54.00	-14.55	Vertical
1834.20	42.77	25.98	4.12	2.37	41.22	31.65	54.00	-22.35	Horizontal
2751.30	43.08	28.04	5.05	2.87	41.76	34.41	54.00	-19.59	Horizontal
3668.40	44.73	29.21	5.90	2.97	41.55	38.29	54.00	-15.71	Horizontal
4585.50	39.46	31.13	6.82	3.54	42.07	35.34	54.00	-18.66	Horizontal
5502.60	40.38	32.32	7.13	3.89	41.86	37.97	54.00	-16.03	Horizontal

Remark:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test channel: Middle channel									
Detector: Peak Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1843.80	57.19	26.02	4.15	2.41	41.27	46.09	74.00	-27.91	Vertical
2765.70	59.66	28.12	5.08	2.88	41.72	51.14	74.00	-22.86	Vertical
3687.60	56.31	29.34	5.95	2.97	41.62	49.98	74.00	-24.02	Vertical
4609.50	50.28	31.23	6.87	3.57	42.12	46.26	74.00	-27.74	Vertical
5531.40	52.03	32.39	7.20	3.91	41.83	49.79	74.00	-24.21	Vertical
1843.80	54.63	26.02	4.15	2.41	41.27	43.53	74.00	-30.47	Horizontal
2765.70	55.87	28.12	5.08	2.88	41.72	47.35	74.00	-26.65	Horizontal
3687.60	58.19	29.34	5.95	2.97	41.62	51.86	74.00	-22.14	Horizontal
4609.50	52.71	31.23	6.87	3.57	42.12	36.48	74.00	-37.52	Horizontal
5531.40	54.05	32.39	7.20	3.91	41.83	51.81	74.00	-22.19	Horizontal
Detector: Average Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1843.80	46.20	26.02	4.15	2.40	41.27	35.10	54.00	-18.90	Vertical
2765.70	48.34	28.12	5.08	2.88	41.72	39.82	54.00	-14.18	Vertical
3687.60	45.77	29.34	5.95	2.97	41.62	39.44	54.00	-14.56	Vertical
4609.50	39.85	31.23	6.87	3.47	42.12	35.83	54.00	-18.17	Vertical
5531.40	41.13	32.39	7.20	3.92	41.83	38.89	54.00	-15.11	Vertical
1843.80	43.70	26.02	4.15	2.40	41.27	32.60	54.00	-21.40	Horizontal
2765.70	44.65	28.12	5.08	2.88	41.72	36.13	54.00	-17.87	Horizontal
3687.60	47.30	29.34	5.95	2.97	41.62	40.97	54.00	-13.03	Horizontal
4609.50	41.28	31.23	6.87	3.47	42.12	37.26	54.00	-16.74	Horizontal
5531.40	43.16	32.39	7.20	3.92	41.83	40.92	54.00	-13.08	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Test channel: Highest channel									
Detector: Peak Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1853.80	55.40	26.08	4.17	2.41	41.32	44.33	74.00	-29.67	Vertical
2780.70	57.16	28.19	5.12	2.88	41.68	48.79	74.00	-25.21	Vertical
3707.60	62.44	29.47	6.00	2.97	41.68	56.23	74.00	-17.77	Vertical
4634.50	52.31	31.32	6.88	3.57	42.07	48.44	74.00	-25.56	Vertical
5561.40	49.61	32.52	7.27	3.91	41.80	47.60	74.00	-26.40	Vertical
1853.80	51.81	26.08	4.17	2.41	41.32	40.74	74.00	-33.26	Horizontal
2780.70	54.08	28.19	5.12	2.88	41.68	45.71	74.00	-28.29	Horizontal
3707.60	57.34	29.47	6.00	2.97	41.68	51.13	74.00	-22.87	Horizontal
4634.50	48.76	31.32	6.88	3.57	42.07	44.89	74.00	-29.11	Horizontal
5561.40	53.11	32.52	7.27	3.91	41.80	51.10	74.00	-22.90	Horizontal
Detector: Average Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	AUX Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1853.80	44.66	26.08	4.17	2.41	41.32	33.59	54.00	-20.41	Vertical
2780.70	45.87	28.19	5.12	2.88	41.68	37.50	54.00	-16.50	Vertical
3707.60	51.35	29.47	6.00	2.97	41.68	45.14	54.00	-8.86	Vertical
4634.50	41.80	31.32	6.88	3.57	42.07	37.93	54.00	-16.07	Vertical
5561.40	47.62	32.52	7.27	3.91	41.80	45.61	54.00	-8.39	Vertical
1853.80	40.77	26.08	4.17	2.41	41.32	29.70	54.00	-24.30	Horizontal
2780.70	53.02	28.19	5.12	2.88	41.68	44.65	54.00	-9.35	Horizontal
3707.60	56.33	29.47	6.00	2.97	41.68	50.12	54.00	-3.88	Horizontal
4634.50	37.25	31.32	6.88	3.57	42.07	33.38	54.00	-20.62	Horizontal
5561.40	52.19	32.52	7.27	3.91	41.80	50.18	54.00	-3.82	Horizontal

Remark:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.