FCC REPORT
(BLE)

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

Equipment Under Test (EUT)

Product Name:	KDC180 Bluetooth Barcode Scanner
Model No.:	KDC180
Trade mark:	KOAMTAC
FCC ID:	VH9KDC180
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	06 Nov., 2019
Date of Test:	07 Nov., 2019 to 19 Mar., 2020
Date of report issued:	20 Mar., 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	*20 Mar., 2020*	*Original*

Tested by: Yoyo Wu ***Date:*** *20 Mar., 2020*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *20 Mar., 2020*

Project Engineer

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4 Test Summary

Test Items	Section in CFR 47	Result
Antenna requirement	15.203 & 15.247 (b)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247 (d)	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 C63.10-2013* *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:	KDC180 Bluetooth Barcode Scanner
Model No.:	KDC180
Operation Frequency:	2402-2480 MHz
Channel numbers:	40
Channel separation:	2 MHz
Modulation technology:	GFSK
Data speed :	1Mbps
Antenna Type:	Internal Antenna
Antenna gain:	-2.19 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 each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test. Channel No. 0, 20 & 39 were selected as Lowest, Middle and Highest channel.

5.3 Test environment and test mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode	Keep the EUT in continuous transmitting with modulation
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, 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. Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.	

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
XIAOMI	Adapter	MDY-03-EB	151000912998	/

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
				03-18-2020	03-17-2021
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2019	03-17-2020
				03-18-2020	03-17-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020
				03-18-2020	03-17-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
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
				03-18-2020	03-17-2021
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020
				03-18-2020	03-17-2021
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020
				03-18-2020	03-17-2021
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
				03-18-2020	03-17-2021
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2019	03-17-2020
				03-18-2020	03-17-2021
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020
				03-18-2020	03-17-2021
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020
				03-18-2020	03-17-2021
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
				03-18-2020	03-17-2021
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-18-2019	03-17-2020
				03-18-2020	03-17-2021
LISN	CHASE	MN2050D	1447	03-18-2019	03-17-2020
				03-18-2020	03-17-2021
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2018	07-20-2021
Cable	HP	10503A	N/A	03-18-2019	03-17-2020
				03-18-2020	03-17-2021
EMI Test Software	AUDIX	E3	Version: 6.110919b		

6 Test results and Measurement Data

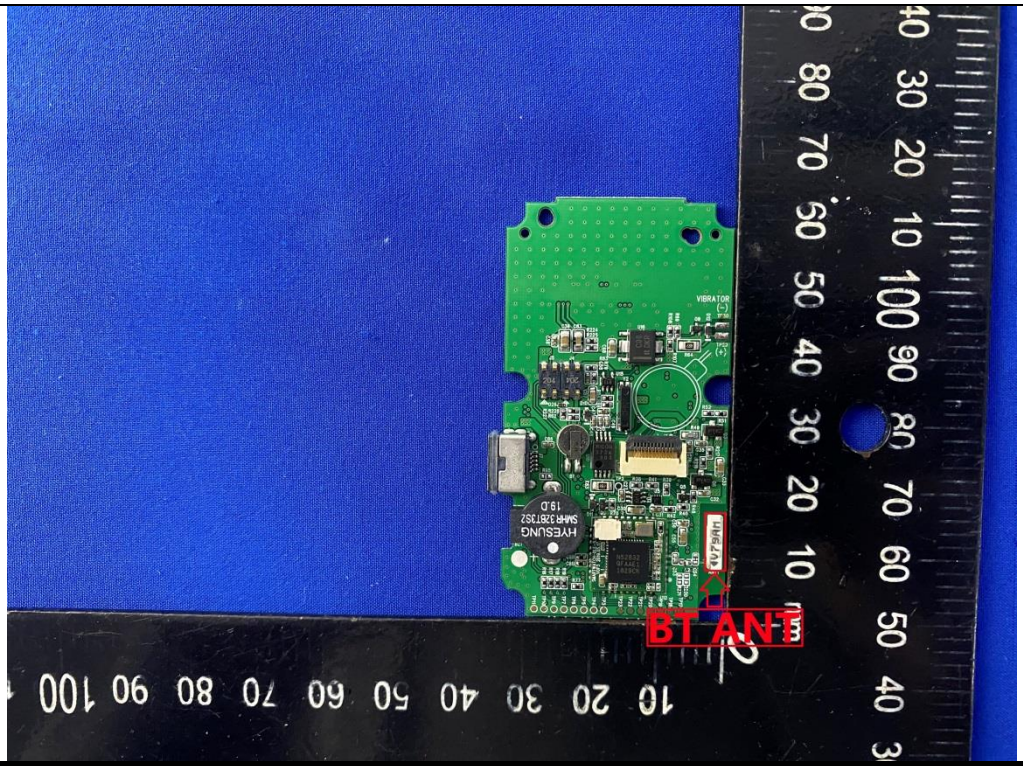
6.1 Antenna requirement:

Standard requirement:	FCC Part 15 C Section 15.203 /247(b)

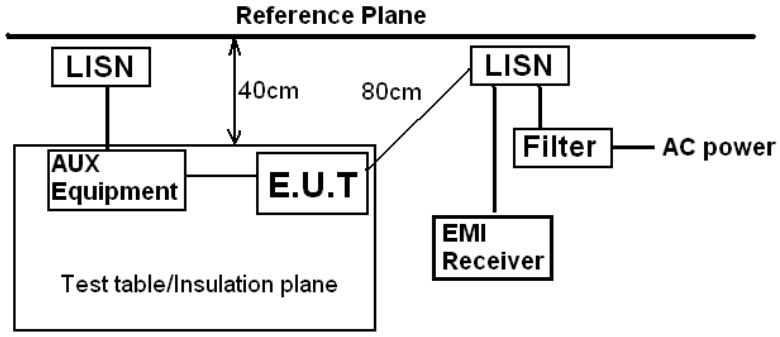
15.203 requirement:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer 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(b) (4) requirement:
(4) 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.

E.U.T Antenna:	

The BLE antenna is an Internal antenna which cannot replace by end-user, the best-case gain of the antenna is -2.19 dBi.

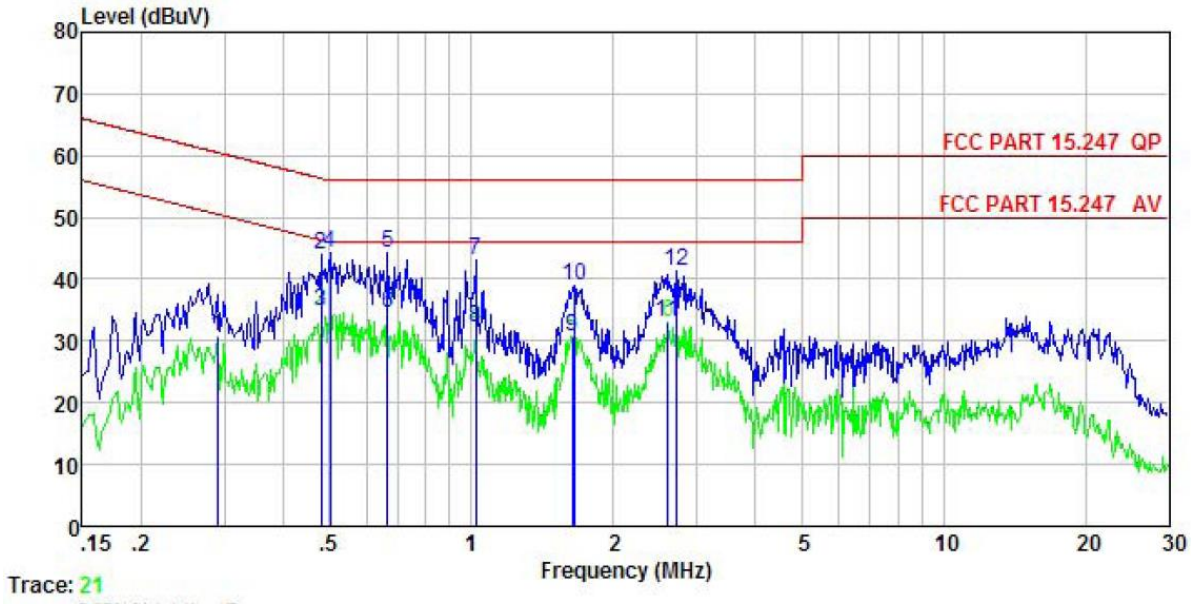


6.2 Conducted Emission

Test Requirement:	FCC Part 15 C Section 15.207		
Test Frequency Range:	150 kHz to 30 MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
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 procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which 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 C63.10(latest version) on conducted measurement.		
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*		
Test Instruments:	Refer to section 5.9 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Passed		

Measurement Data:

Product name:	KDC180 Bluetooth Barcode Scanner	Product model:	KDC180
Test by:	Yaro	Test mode:	BLE Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 22.5℃ Huni: 55%

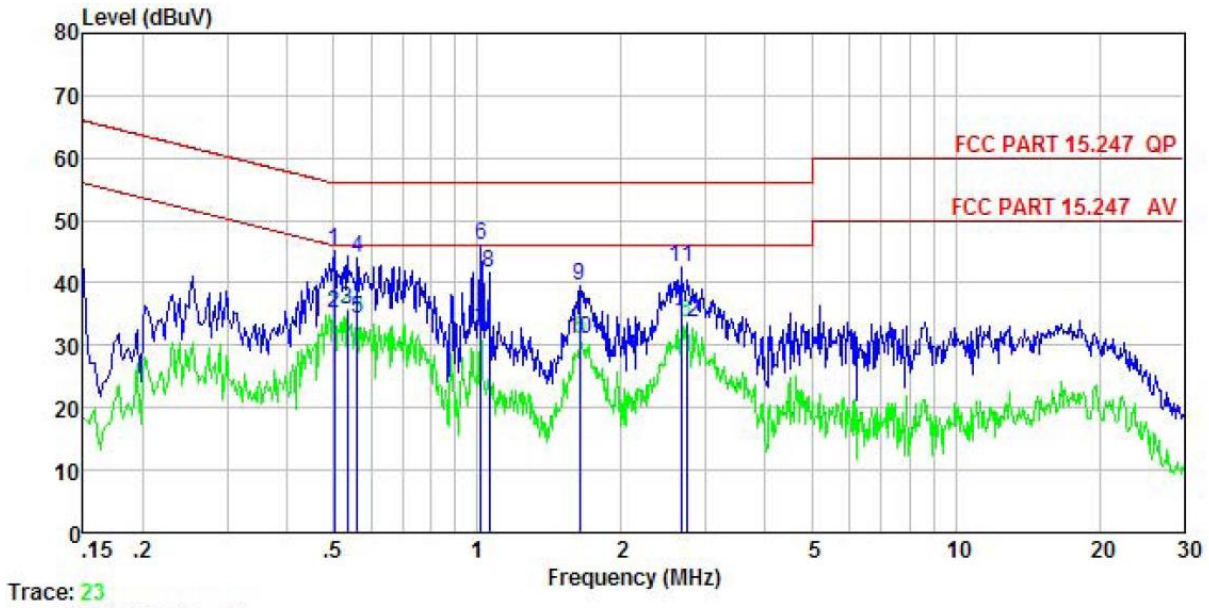


	Freq	Read Level	LISN Factor	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.289	20.64	-0.39	-0.25	10.74	30.74	50.54	-19.80	Average
2	0.481	33.78	-0.39	-0.24	10.75	43.90	56.32	-12.42	QP
3	0.481	24.62	-0.39	-0.24	10.75	34.74	46.32	-11.58	Average
4	0.502	34.13	-0.39	-0.35	10.76	44.15	56.00	-11.85	QP
5	0.665	34.20	-0.38	-0.39	10.77	44.20	56.00	-11.80	QP
6	0.665	24.44	-0.38	-0.39	10.77	34.44	46.00	-11.56	Average
7	1.021	32.09	-0.38	0.44	10.87	43.02	56.00	-12.98	QP
8	1.021	21.24	-0.38	0.44	10.87	32.17	46.00	-13.83	Average
9	1.636	20.33	-0.40	-0.09	10.93	30.77	46.00	-15.23	Average
10	1.654	28.56	-0.40	-0.11	10.94	38.99	56.00	-17.01	QP
11	2.608	22.74	-0.43	-0.25	10.93	32.99	46.00	-13.01	Average
12	2.721	31.04	-0.43	-0.24	10.93	41.30	56.00	-14.70	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 + Aux Factor + Cable Loss.*

Product name:	KDC180 Bluetooth Barcode Scanner	Product model:	KDC180
Test by:	Yaro	Test mode:	BLE Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 22.5℃ Huni: 55%

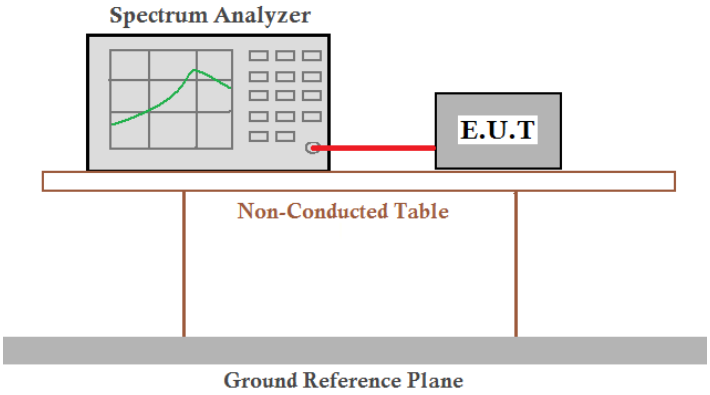


	Freq	Read Level	LISN Factor	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.502	34.89	-0.65	0.03	10.76	45.03	56.00	-10.97	QP
2	0.502	25.03	-0.65	0.03	10.76	35.17	46.00	-10.83	Average
3	0.535	25.61	-0.65	0.03	10.76	35.75	46.00	-10.25	Average
4	0.561	33.87	-0.65	0.03	10.76	44.01	56.00	-11.99	QP
5	0.561	24.08	-0.65	0.03	10.76	34.22	46.00	-11.78	Average
6	1.016	35.60	-0.63	0.08	10.87	45.92	56.00	-10.08	QP
7	1.016	21.82	-0.63	0.08	10.87	32.14	46.00	-13.86	Average
8	1.060	31.27	-0.63	0.09	10.88	41.61	56.00	-14.39	QP
9	1.636	29.19	-0.66	0.14	10.93	39.60	56.00	-16.40	QP
10	1.645	20.55	-0.66	0.14	10.93	30.96	46.00	-15.04	Average
11	2.664	31.94	-0.67	0.27	10.93	42.47	56.00	-13.53	QP
12	2.736	23.18	-0.67	0.28	10.93	33.72	46.00	-12.28	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 + Aux Factor + Cable Loss.*

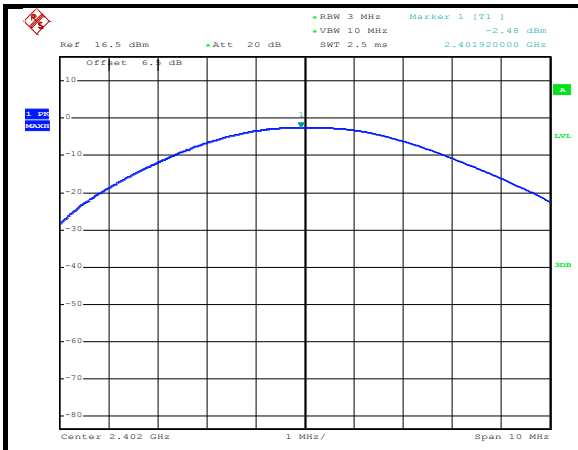
6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

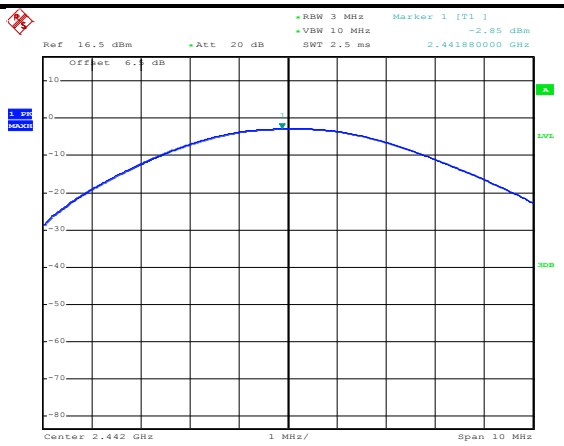
Test CH	Maximum Conducted Output Power (dBm)	Limit(dBm)	Result
Lowest	-2.48	30.00	Pass
Middle	-2.85		
Highest	-3.28		

Test plot as follows:



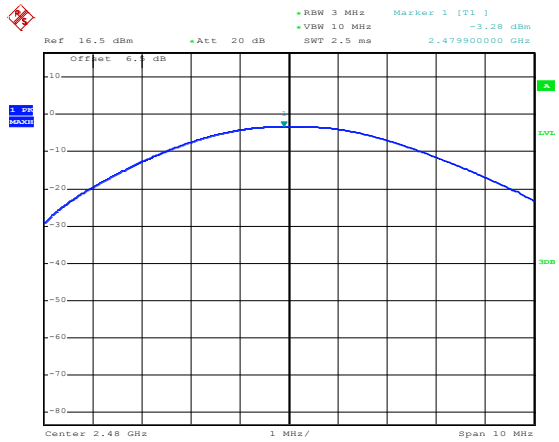
Date: 25.NOV.2019 13:13:09

Lowest channel



Date: 25.NOV.2019 13:12:56

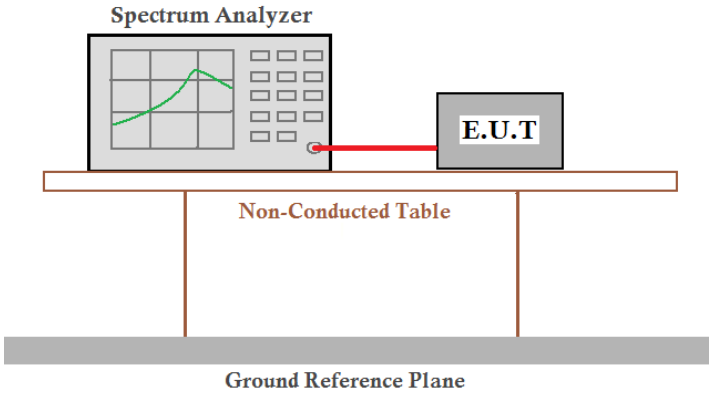
Middle channel



Date: 25.NOV.2019 13:13:24

Highest channel

6.4 Occupy Bandwidth

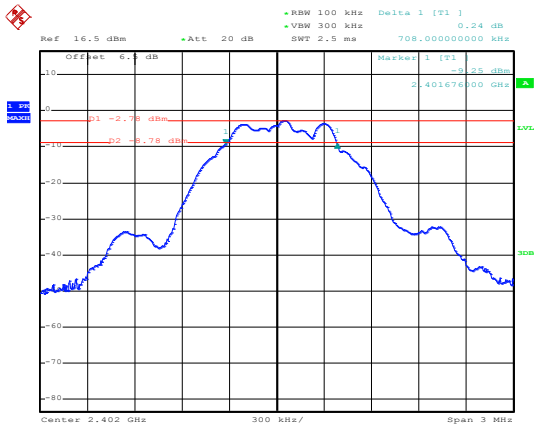
Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)
Limit:	>500kHz
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Test CH	6dB Emission Bandwidth (MHz)	Limit(kHz)	Result
Lowest	0.708	>500	Pass
Middle	0.708		
Highest	0.702		
Test CH	99% Occupy Bandwidth (MHz)	Limit(kHz)	Result
Lowest	1.032	N/A	N/A
Middle	1.044		
Highest	1.044		

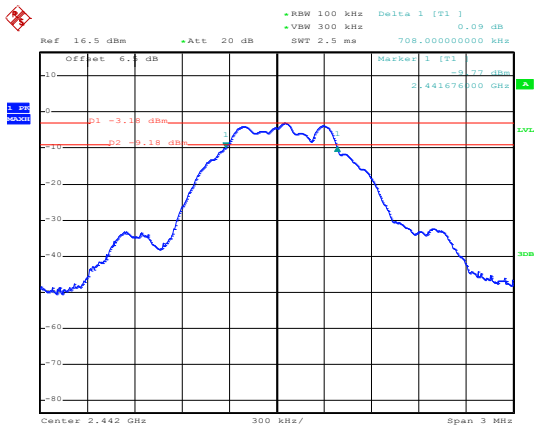
Test plot as follows:

6dB EBW



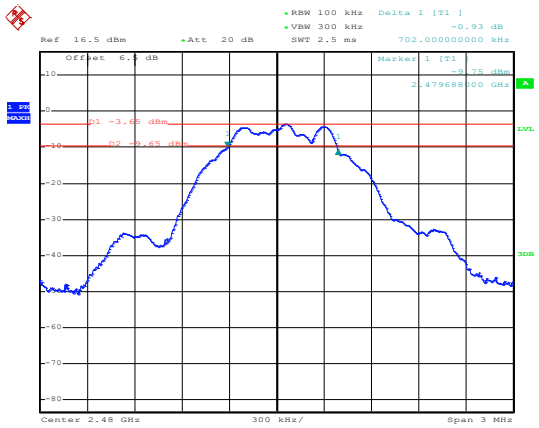
Date: 25.NOV.2019 13:19:23

Lowest channel



Date: 25.NOV.2019 13:17:37

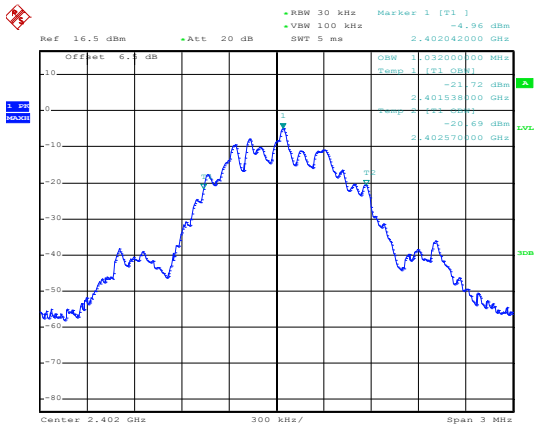
Middle channel



Date: 25.NOV.2019 13:16:50

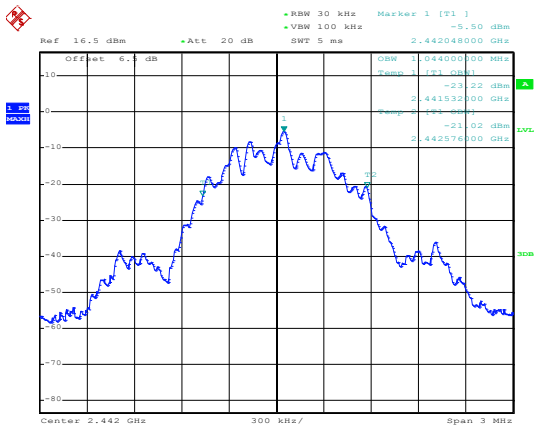
Highest channel

99% OBW



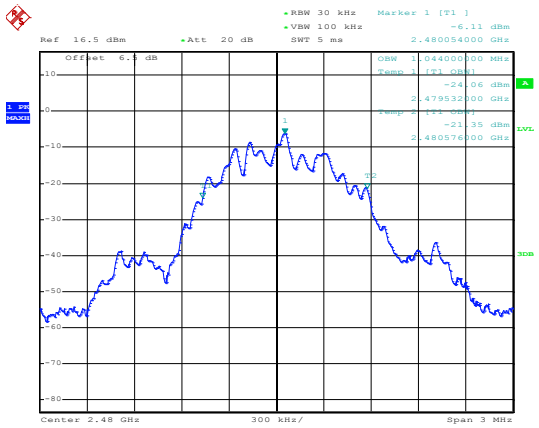
Date: 25.NOV.2019 13:18:33

Lowest channel



Date: 25.NOV.2019 13:18:11

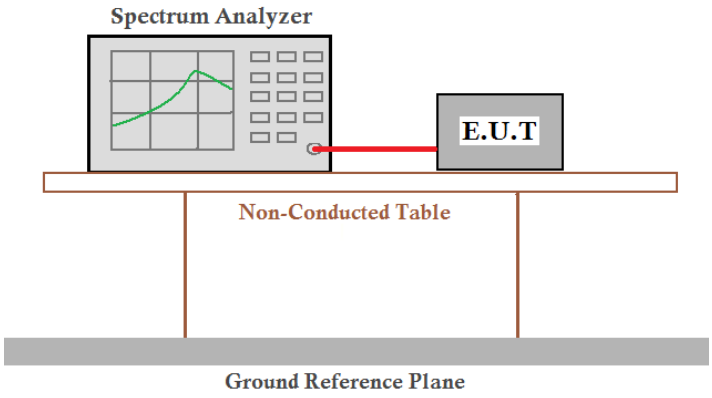
Middle channel



Date: 25.NOV.2019 13:16:04

Highest channel

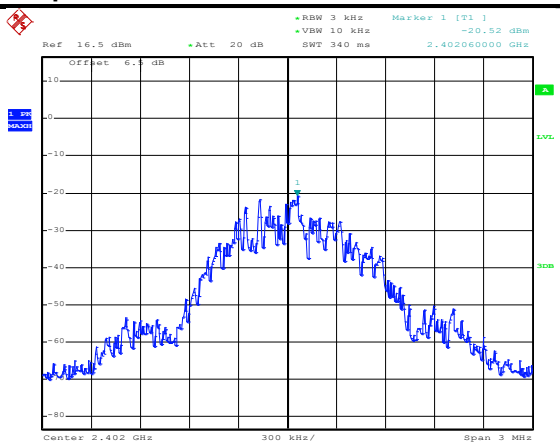
6.5 Power Spectral Density

Test Requirement:	FCC Part 15 C Section 15.247 (e)
Limit:	8 dBm/3KHz
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

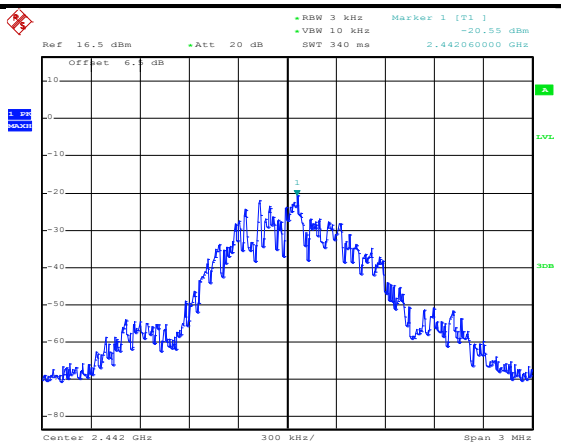
Measurement Data:

Test CH	Power Spectral Density (dBm/3KHz)	Limit(dBm/3KHz)	Result
Lowest	-20.52	8.00	Pass
Middle	-20.55		
Highest	-20.81		

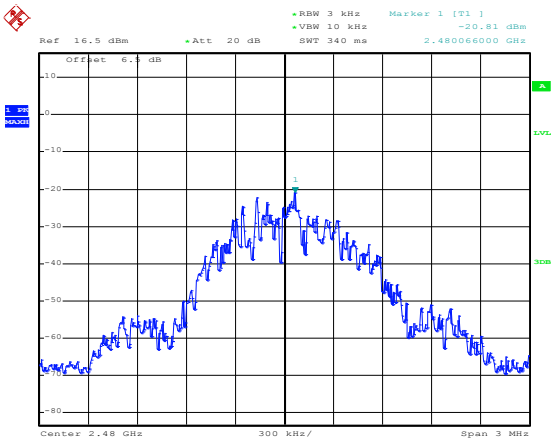
Test plots as follow:



Lowest channel



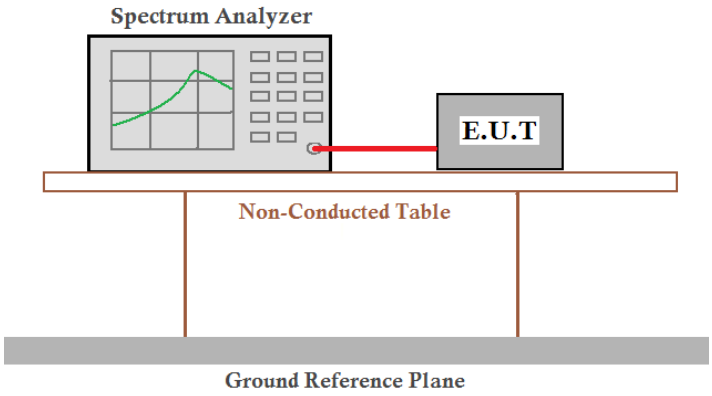
Middle channel



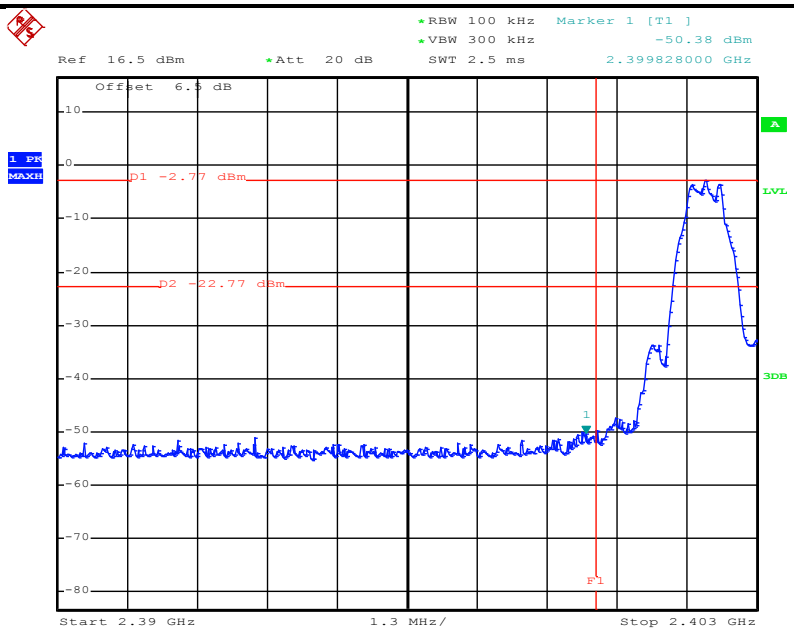
Highest channel

6.6 Band Edge

6.6.1 Conducted Emission Method

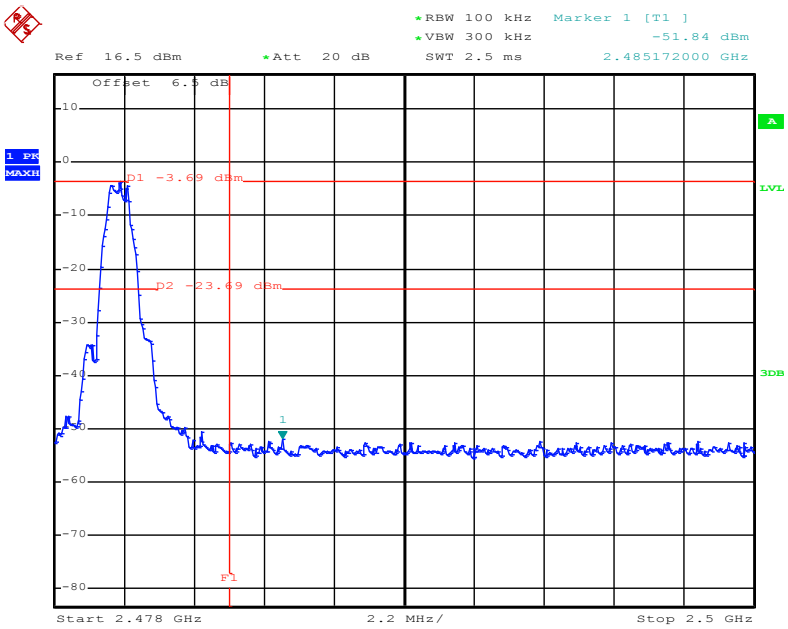
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth 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:	Refer to section 5.3 for details
Test results:	Passed

Test plots as follow:



Date: 25.NOV.2019 13:20:09

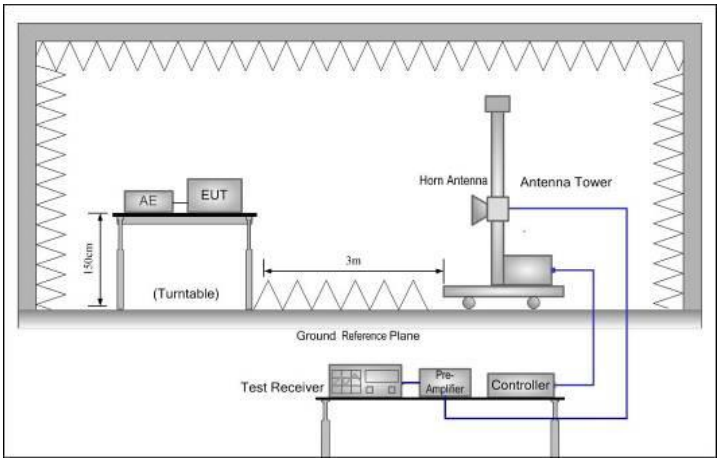
Lowest channel



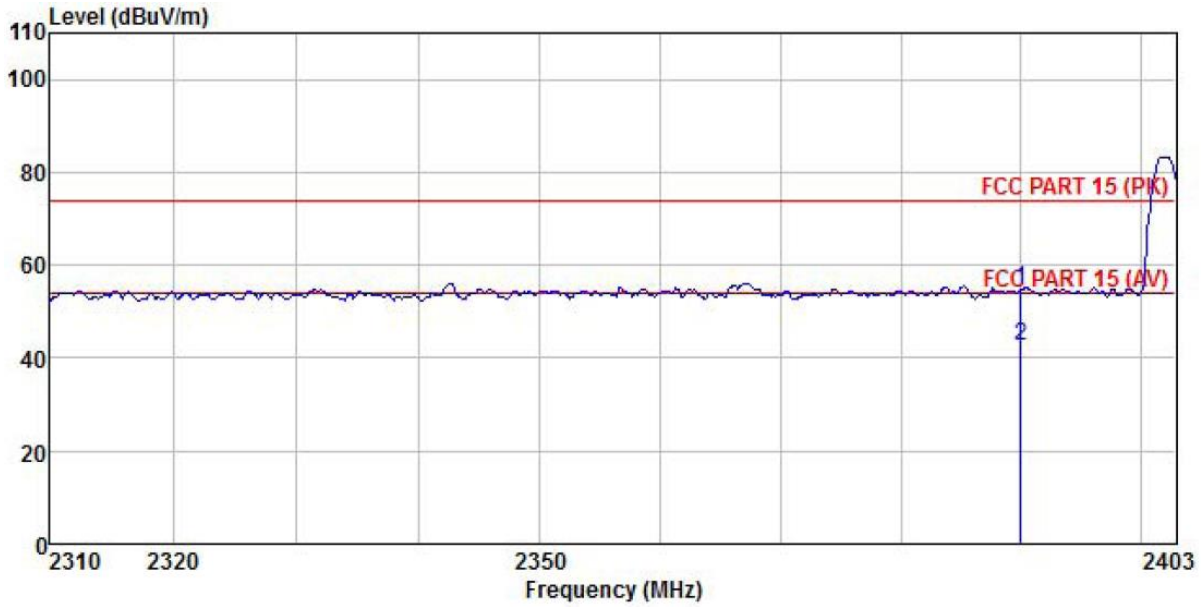
Date: 25.NOV.2019 13:20:58

Highest channel

6.6.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part 15 C Section 15.205 and 15.209</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">2.3GHz to 2.5GHz</td></tr>
<tr><td>Test Distance:</td><td colspan="5">3m</td></tr>
<tr><td>Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td rowspan="2"></td><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
<tr><td>Limit:</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">54.00</td><td>Average Value</td></tr>
<tr><td colspan="2">74.00</td><td>Peak Value</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">1. The EUT was placed on the top of a rotating table 1.5 meters 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 10 dB 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 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test setup:</td><td colspan="5"> 
</td></tr>
<tr><td>Test Instruments:</td><td colspan="5">Refer to section 5.9 for details</td></tr>
<tr><td>Test mode:</td><td colspan="5">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="5">Passed</td></tr>
</table>

Product Name:	KDC180 Bluetooth Barcode Scanner	Product Model:	KDC180
Test By:	Yaro	Test mode:	BLE Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz	Environment:	Temp: 24℃ Huni: 57%

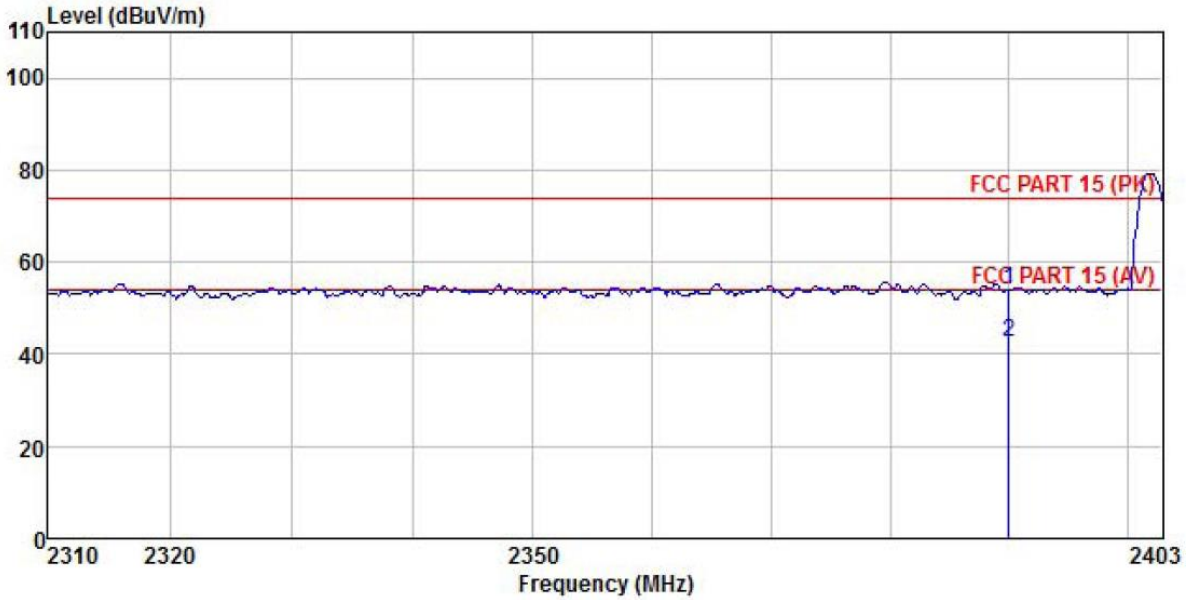


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	21.32	27.07	4.69	0.00	54.76	74.00	-19.24	Peak
2	2390.000	9.04	27.07	4.69	0.00	42.48	54.00	-11.52	Average

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:	KDC180 Bluetooth Barcode Scanner	Product Model:	KDC180
Test By:	Yaro	Test mode:	BLE Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz	Environment:	Temp: 24℃ Huni: 57%

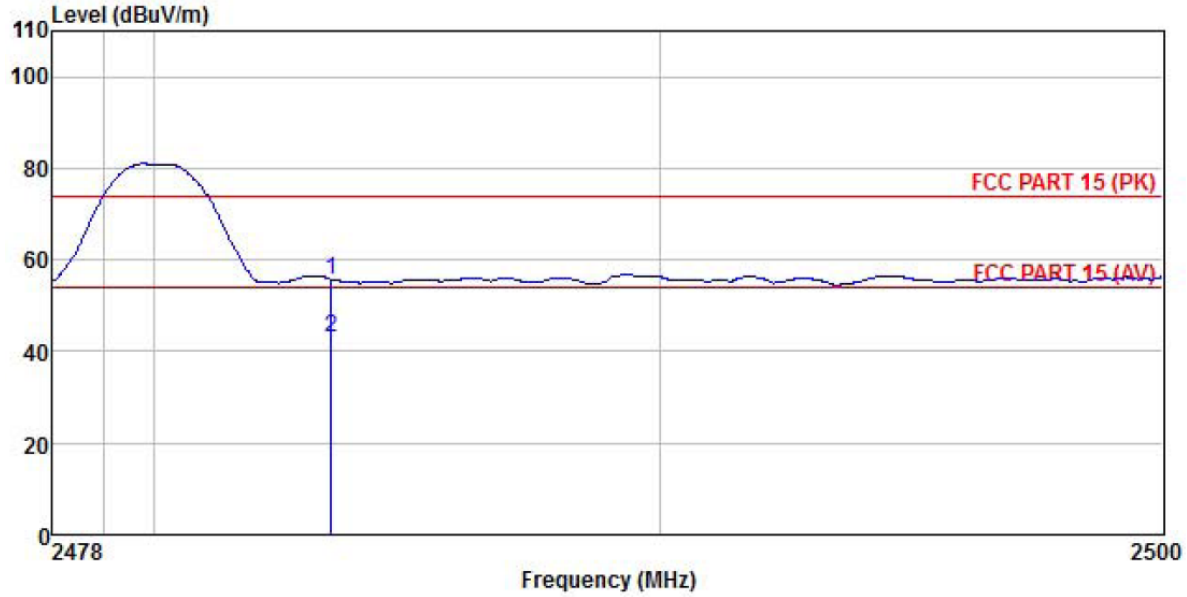


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	20.68	27.08	4.69	0.00	54.13	74.00	-19.87	Peak
2	2390.000	9.00	27.08	4.69	0.00	42.45	54.00	-11.55	Average

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:	KDC180 Bluetooth Barcode Scanner	Product Model:	KDC180
Test By:	Yaro	Test mode:	BLE Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz	Environment:	Temp: 24℃ Huni: 57%

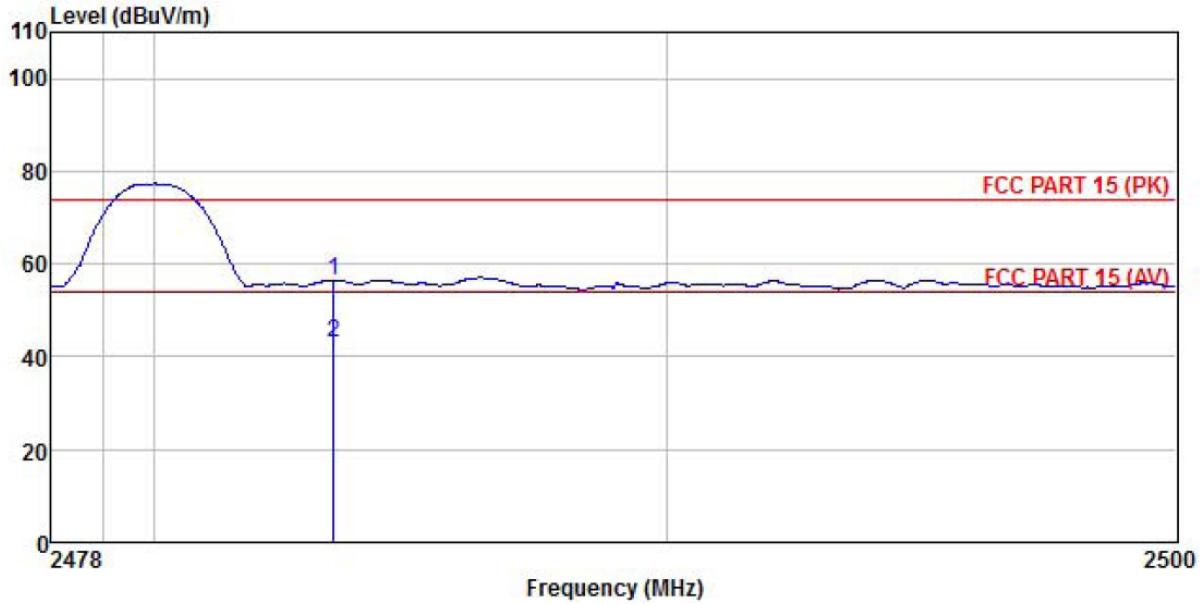


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	21.89	27.36	4.81	0.00	55.76	74.00	-18.24	Peak
2	2483.500	9.14	27.36	4.81	0.00	43.01	54.00	-10.99	Average

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:	KDC180 Bluetooth Barcode Scanner	Product Model:	KDC180
Test By:	Yaro	Test mode:	BLE Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz	Environment:	Temp: 24℃ Huni: 57%



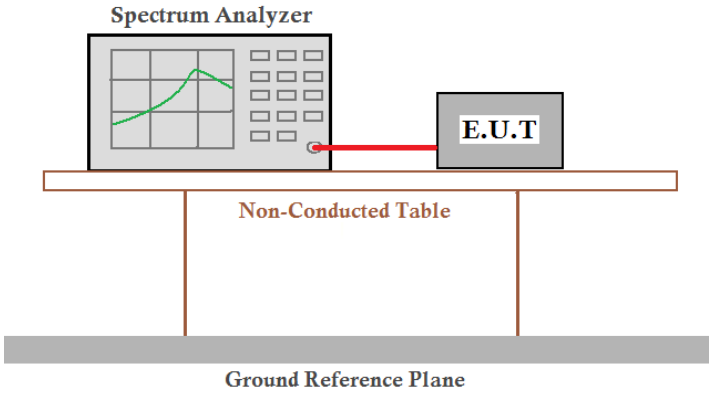
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	22.60	27.35	4.81	0.00	56.46	74.00	-17.54	Peak
2	2483.500	9.24	27.35	4.81	0.00	43.10	54.00	-10.90	Average

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.*

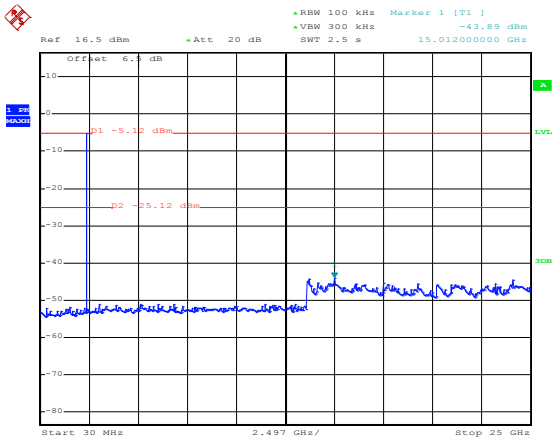
6.7 Spurious Emission

6.7.1 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:	Refer to section 5.3 for details
Test results:	Passed

Test plot as follows:

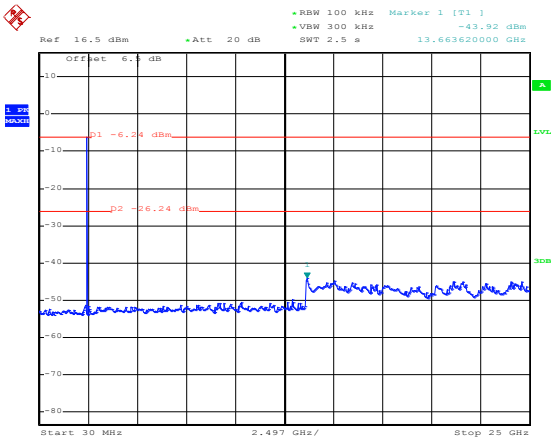
Lowest channel



Date: 25.NOV.2019 13:25:15

30MHz~25GHz

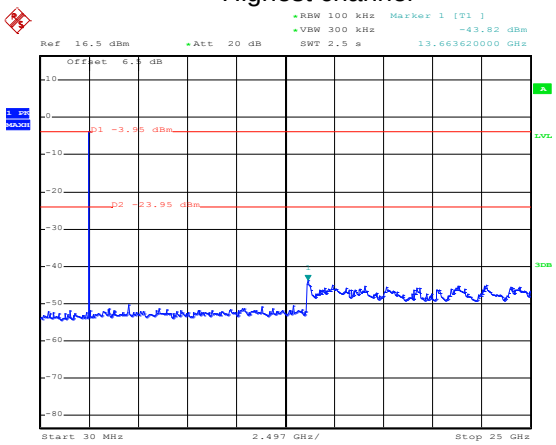
Middle channel



Date: 25.NOV.2019 13:26:24

30MHz~25GHz

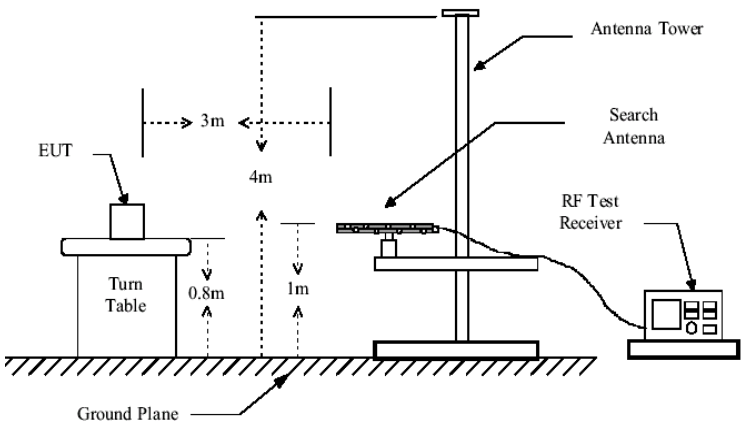
Highest channel



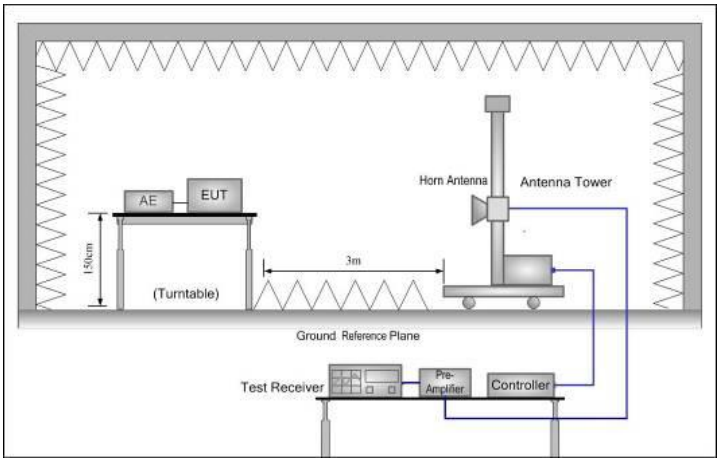
Date: 25.NOV.2019 13:27:07

30MHz~25GHz

6.7.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part 15 C Section 15.205 and 15.209</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">9kHz to 25GHz</td></tr>
<tr><td>Test Distance:</td><td colspan="5">3m</td></tr>
<tr><td>Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td></td><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td></td><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
<tr><td>Limit:</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td></td><td colspan="2">30MHz-88MHz</td><td colspan="2">40.0</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">88MHz-216MHz</td><td colspan="2">43.5</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">216MHz-960MHz</td><td colspan="2">46.0</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">960MHz-1GHz</td><td colspan="2">54.0</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">54.0</td><td>Average Value</td></tr>
<tr><td></td><td colspan="2">74.0</td><td>Peak Value</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">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 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 10 dB 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 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test setup:</td><td colspan="5">Below 1GHz
 

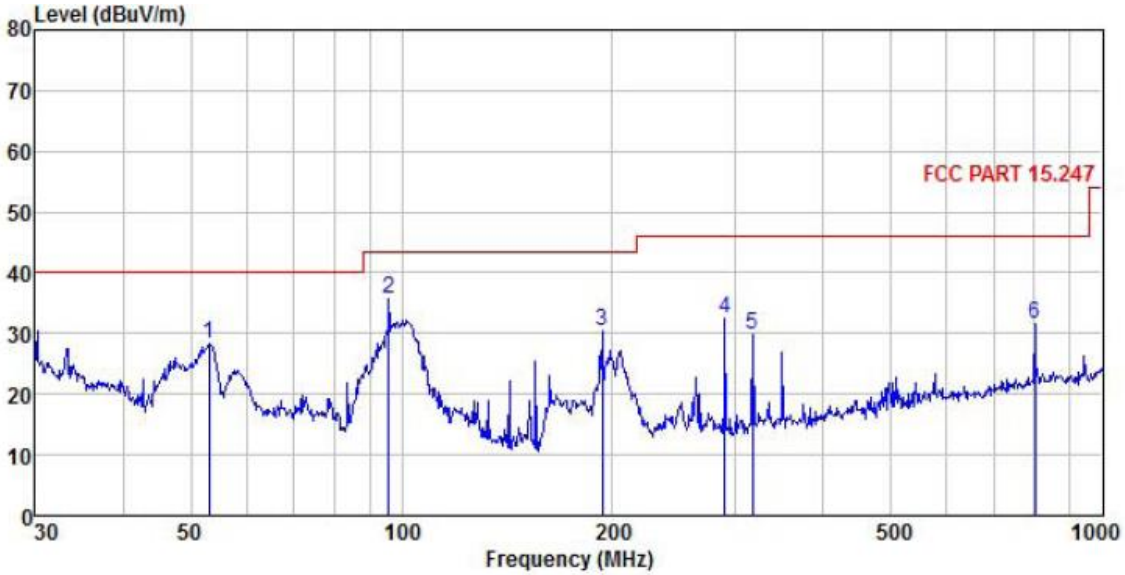
Above 1GHz</td></tr>
</table>

	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
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 30MHz is too low, so only shows the data of above 30MHz in this report.

Measurement Data (worst case):

Below 1GHz:

Product Name:	KDC180 Bluetooth Barcode Scanner	**Product Model:**	KDC180
Test By:	Yaro	**Test mode:**	BLE Tx mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	AC 120V/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

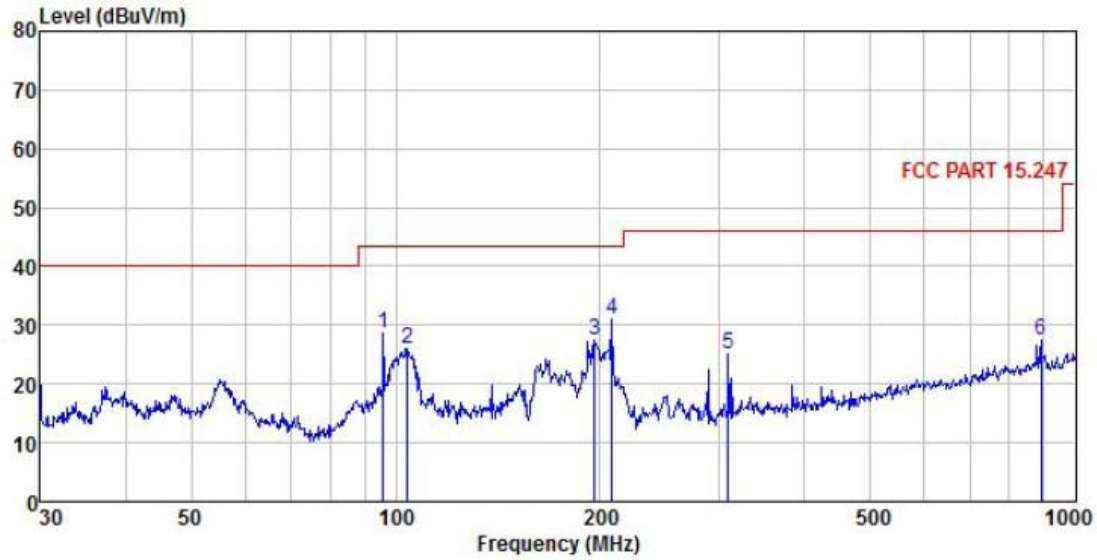


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	53.131	41.65	15.17	1.32	29.81	28.33	40.00	-11.67	QP
2	95.762	48.34	14.95	2.01	29.55	35.75	43.50	-7.75	QP
3	193.095	45.20	11.31	2.82	28.88	30.45	43.50	-13.05	QP
4	289.002	45.76	12.34	2.91	28.47	32.54	46.00	-13.46	QP
5	316.589	42.63	12.55	2.99	28.49	29.68	46.00	-16.32	QP
6	801.786	37.71	17.59	4.34	28.19	31.45	46.00	-14.55	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.*

Product Name:	KDC180 Bluetooth Barcode Scanner	Product Model:	KDC180
Test By:	Yaro	Test mode:	BLE Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120V/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	95.762	41.29	14.95	2.01	29.55	28.70	43.50	-14.80	QP
2	104.170	38.67	14.84	1.99	29.50	26.00	43.50	-17.50	QP
3	196.510	41.96	11.46	2.84	28.85	27.41	43.50	-16.09	QP
4	207.850	45.52	11.53	2.86	28.78	31.13	43.50	-12.37	QP
5	308.913	38.11	12.52	2.97	28.47	25.13	46.00	-20.87	QP
6	890.728	33.25	18.42	3.80	27.90	27.57	46.00	-18.43	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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	47.69	31.02	6.80	41.81	43.70	74.00	-30.30	Vertical
4804.00	48.52	31.02	6.80	41.81	44.53	74.00	-29.47	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	38.29	31.02	6.80	41.81	34.30	54.00	-19.70	Vertical
4804.00	39.96	31.02	6.80	41.81	35.97	54.00	-18.03	Horizontal
Test channel: Middle channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	47.86	31.17	6.86	41.84	44.05	74.00	-29.95	Vertical
4884.00	48.64	31.17	6.86	41.84	44.83	74.00	-29.17	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	38.39	31.17	6.86	41.84	34.58	54.00	-19.42	Vertical
4884.00	39.94	31.17	6.86	41.84	36.13	54.00	-17.87	Horizontal
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	47.56	31.32	6.91	41.87	43.92	74.00	-30.08	Vertical
4960.00	48.35	31.32	6.91	41.87	44.71	74.00	-29.29	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	38.41	31.32	6.91	41.87	34.77	54.00	-19.23	Vertical
4960.00	39.97	31.32	6.91	41.87	36.33	54.00	-17.67	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.*