

FCC REPORT (WIFI)

Applicant: HUNG WAI PRODUCTS LIMITED

Address of Applicant: Unit 11, 12/F., New Commerce Centre, 19 On Sum Street,
Shatin, Hong Kong

Equipment Under Test (EUT)

Product Name: 15.6" Android non-touch LCD Media

Model No.: DT156-AS4-720, 502-1569ATM

FCC ID: 2AB6Z-DT156-AS4

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: 22 Jul., 2015

Date of Test: 23 Jul., to 17 Aug., 2015

Date of report issued: 17 Aug., 2015

Test Result: PASS*

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

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	17 Aug., 2015	Android player Main board with wireless module (FCC ID: 2AB6Z-1859ATMB) and same antenna were used by the device, only conducted emission and Radiated emission were re-tested.

Prepared by:

Luna Gao

Date:

17 Aug., 2015

Report Clerk

Reviewed by:

Carey Chen

Date:

17 Aug., 2015

Project Engineer

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4 Test Summary

Test Item	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)(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

Pass: The EUT complies with the essential requirements in the standard.

Pass: The test data refer to FCC ID: 2AB6Z-1859ATMB.*

Remark : Test according to ANSI C63.4:2009

5 General Information

5.1 Client Information

Applicant:	HUNG WAI PRODUCTS LIMITED
Address of Applicant:	Unit 11, 12/F., New Commerce Centre, 19 On Sum Street, Shatin, Hong Kong
Manufacturer:	HUNG WAI ELECTRONICS (HUIZHOU) LTD.
Address of Manufacturer:	3 rd floor, NO. 3, Minfeng Road, Huinan High and New Technology Industry Park, Huiao Avenue, Huizhou City, Guangdong, China

5.2 General Description of E.U.T.

Product Name:	15.6" Android non-touch LCD Media
Model No.:	DT156-AS4-720, 502-1569ATM
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(H20)) 2422MHz~2452MHz (802.11n(H40))
Channel numbers:	11 for 802.11b/802.11g/802.11(H20) 7 for 802.11n(H40)
Channel separation:	5MHz
Modulation technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)
Modulation technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps
Data speed (IEEE 802.11n):	Up to 150Mbps
Antenna Type:	Omni-directional
Antenna gain:	2.5 dBi
Power supply:	AC 120V/ 60Hz
AC Adapter:	MODEL: PS24A120K2000UD Input: AC 100-240V 50/60Hz 1.0A Output: DC 12V, 2000mA
Remark:	Model No.: DT156-AS4-720, 502-1569ATM were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being different model number for customer and for HUNG WAI.

Operation Frequency each of channel For 802.11b/g/n(H20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Operation Frequency each of channel For 802.11n(H40)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
		4	2427MHz	7	2442MHz		
		5	2432MHz	8	2447MHz		
3	2422MHz	6	2437MHz	9	2452MHz		

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, and the selected channel see below:

802.11b/802.11g/802.11n (H20)

Channel	Frequency
The lowest channel	2412MHz
The middle channel	2437MHz
The Highest channel	2462MHz

802.11n (H40)

Channel	Frequency
The lowest channel	2422MHz
The middle channel	2437MHz
The Highest channel	2452MHz

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Operation mode	Keep the EUT in continuous transmitting with modulation
<p>The sample was placed 0.8m 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.</p>	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(H20)	6.5Mbps
802.11n(H40)	13.5Mbps

Final Test Mode:

According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup” 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n(H20) and 13.5 Mbps for 802.11n(H40). Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.

5.4 Laboratory Facility

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

- **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 817957, February 27, 2012.

- **IC - Registration No.: 10106A-1**

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.

5.5 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


5.6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
2	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	03-28-2015	03-28-2016
3	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	03-28-2015	03-28-2016
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
5	Amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2015	03-31-2016
6	Amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	04-01-2015	03-31-2016
7	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	04-01-2015	03-31-2016
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	04-01-2015	03-31-2016
9	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A
10	Positioning Controller	UC	UC3000	CCIS0015	N/A	N/A
11	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP	CCIS0023	03-28-2015	03-28-2016
12	EMI Test Receiver	Rohde & Schwarz	ESPI	CCIS0022	03-28-2015	03-28-2016
13	Loop antenna	Laplace instrument	RF300	EMC0701	04-01-2015	03-31-2016
14	Universal radio communication tester	Rhode & Schwarz	CMU200	CCIS0069	03-28-2015	03-28-2016
15	Signal Analyzer	Rohde & Schwarz	FSIQ3	CCIS0088	04-08-2015	04-08-2016

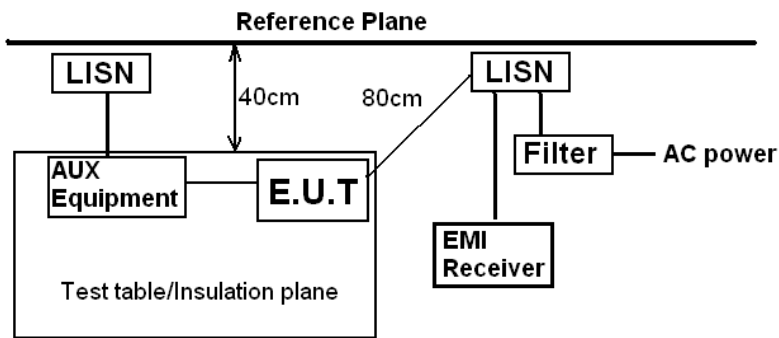
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	11-10-2012	11-09-2015
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-28-2015	03-28-2016
3	LISN	CHASE	MN2050D	CCIS0074	03-28-2015	03-28-2016
4	Coaxial Cable	CCIS	N/A	CCIS0086	04-01-2015	03-31-2016
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement:

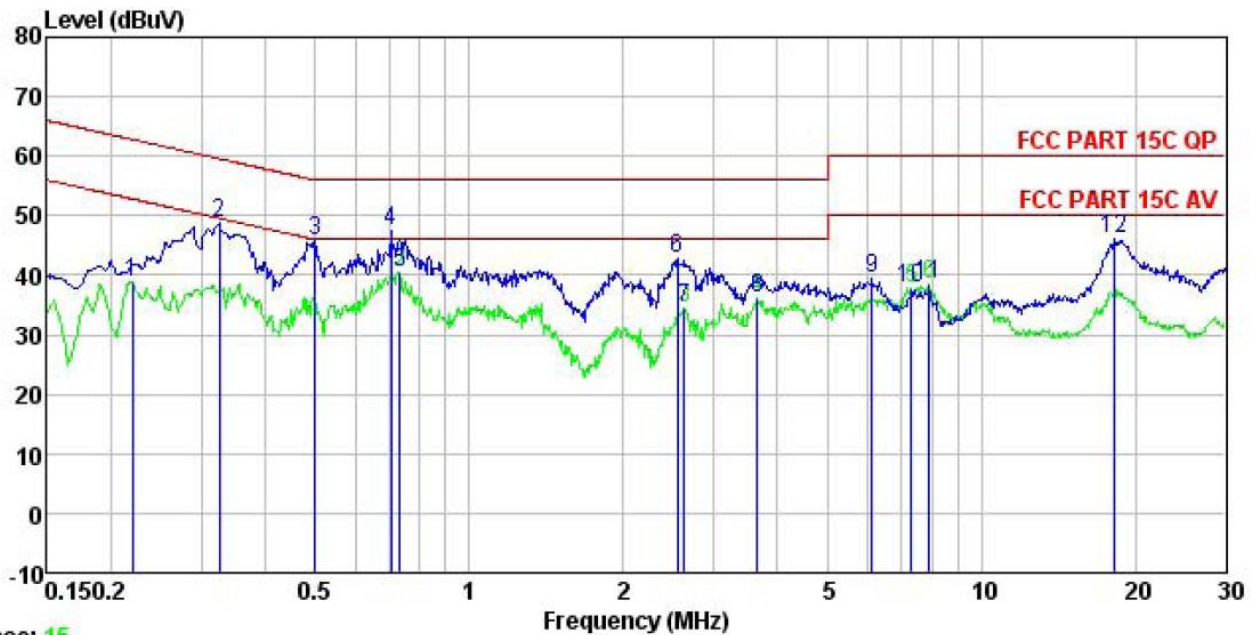
Standard requirement:	FCC Part 15 C Section 15.203 /247(c)
<p><i>15.203 requirement:</i> <i>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna 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.</i></p> <p><i>15.247(c) (1)(i) requirement:</i> <i>(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.</i></p>	
E.U.T Antenna:	
<p>The antenna of EUT is a reverse-SMA connector, which cannot be replaced by end-user. And the antenna gain is 2.5 dBi.</p> 	

6.2 Conducted Emission

Test Requirement:	FCC Part 15 C Section 15.207		
Test Method:	ANSI C63.4: 2009		
Test Frequency Range:	150 kHz to 30 MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9 kHz, VBW=30 kHz		
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	<ol style="list-style-type: none"> 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. 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). 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: 2009 on conducted measurement. 		
Test setup:	 <p>Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>		
Test Instruments:	Refer to section 5.6 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Passed		

Measurement Data

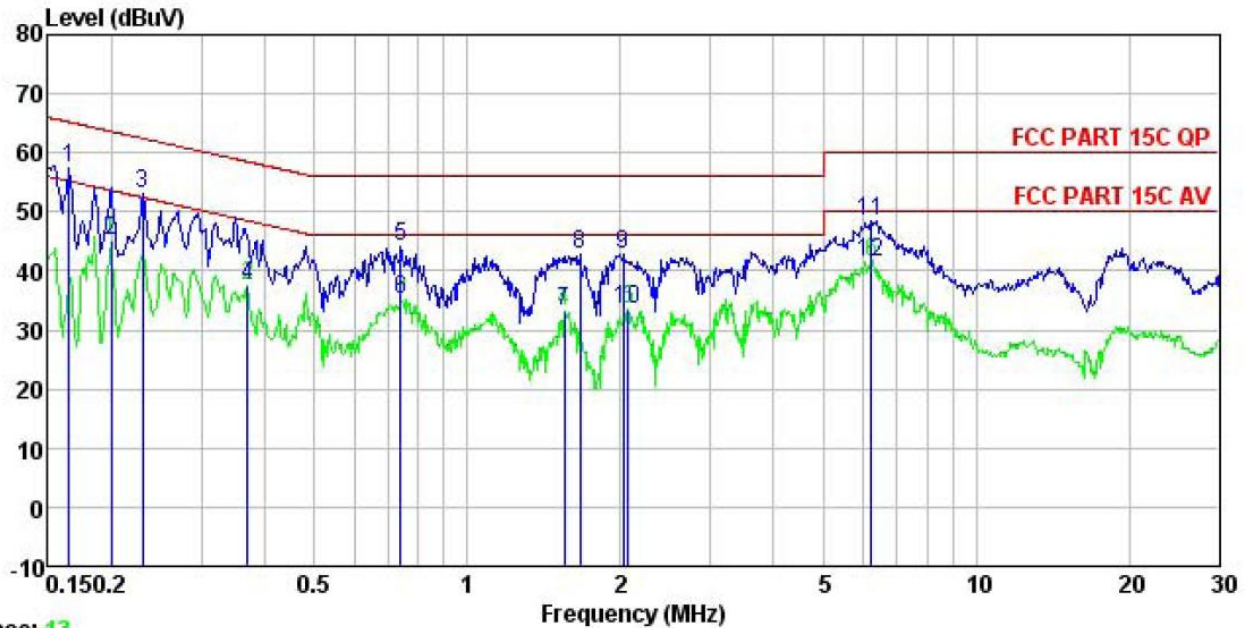
Neutral:



Site : CCIS Shielding Room
 Condition : FCC PART 15C QP LISN NEUTRAL
 EUT : 15.6" Android non-touch LCD Media player
 Model : DT156-AS4-720
 Test Mode : WIFI mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Viki
 Remark :

	Read	LISN	Cable		Limit	Over	
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.220	27.95	0.25	10.76	38.96	52.83	-13.87 Average
2	0.325	37.85	0.26	10.73	48.84	59.57	-10.73 QP
3	0.499	34.72	0.29	10.76	45.77	56.01	-10.24 QP
4	0.705	36.62	0.18	10.77	47.57	56.00	-8.43 QP
5	0.731	29.62	0.18	10.78	40.58	46.00	-5.42 Average
6	2.554	31.71	0.29	10.94	42.94	56.00	-13.06 QP
7	2.636	23.30	0.29	10.93	34.52	46.00	-11.48 Average
8	3.661	24.81	0.29	10.90	36.00	46.00	-10.00 Average
9	6.121	28.23	0.27	10.82	39.32	60.00	-20.68 QP
10	7.290	26.84	0.26	10.82	37.92	50.00	-12.08 Average
11	7.893	27.34	0.26	10.84	38.44	50.00	-11.56 Average
12	18.232	34.97	0.26	10.91	46.14	60.00	-13.86 QP

Line:



Trace: 13

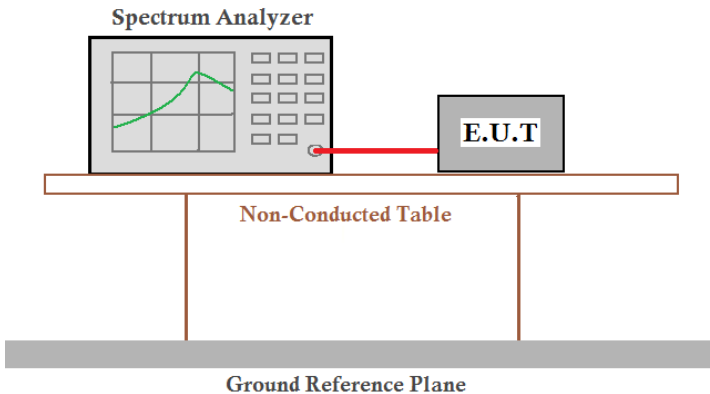
Site : CCIS Shielding Room
 Condition : FCC PART 15C QP LISN LINE
 EUT : 15.6" Android non-touch LCD Media player
 Model : DT156-AS4-720
 Test Mode : WIFI mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Viki
 Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.165	46.31	0.27	10.77	57.35	65.21	-7.86	QP
2	0.200	34.24	0.28	10.76	45.28	53.62	-8.34	Average
3	0.230	41.94	0.27	10.75	52.96	62.44	-9.48	QP
4	0.369	26.48	0.27	10.73	37.48	48.52	-11.04	Average
5	0.739	33.22	0.22	10.79	44.23	56.00	-11.77	QP
6	0.739	24.21	0.22	10.79	35.22	46.00	-10.78	Average
7	1.552	21.83	0.26	10.93	33.02	46.00	-12.98	Average
8	1.662	31.60	0.26	10.94	42.80	56.00	-13.20	QP
9	2.023	31.61	0.26	10.96	42.83	56.00	-13.17	QP
10	2.066	22.30	0.26	10.96	33.52	46.00	-12.48	Average
11	6.186	37.25	0.31	10.82	48.38	60.00	-11.62	QP
12	6.219	30.46	0.31	10.82	41.59	50.00	-8.41	Average

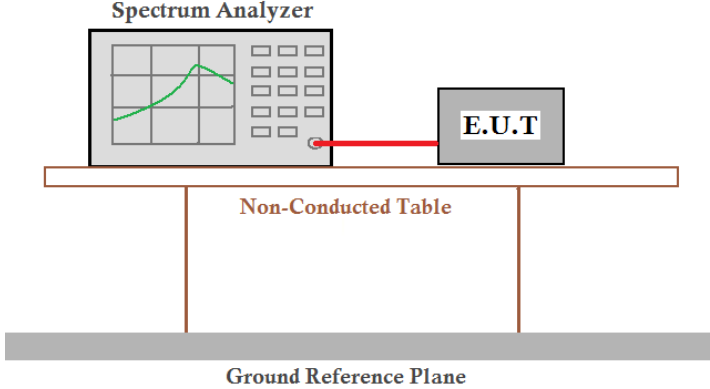
Notes:

1. An initial pre-scan was performed on the live 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

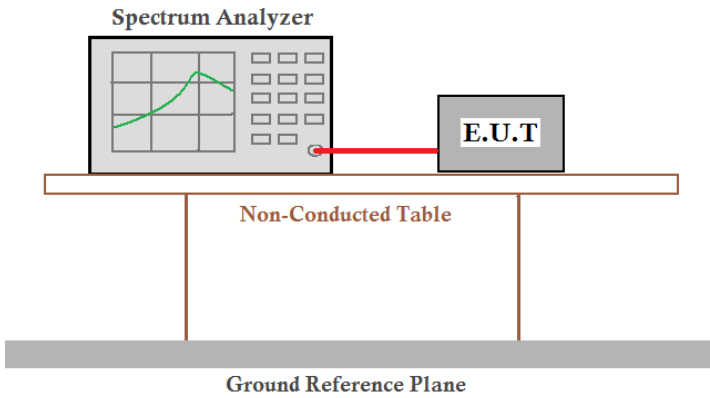
6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.4:2009 and KDB558074
Limit:	30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs and is positioned above a Ground Reference Plane, which is represented by a thick gray bar at the bottom.</p>
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Refer to FCC ID: 2AB6Z-1859ATMB
Remark:	Test method refer to KDB558074 (DTS Measure Guidance) section 8.2, option 1.

6.4 Occupy Bandwidth

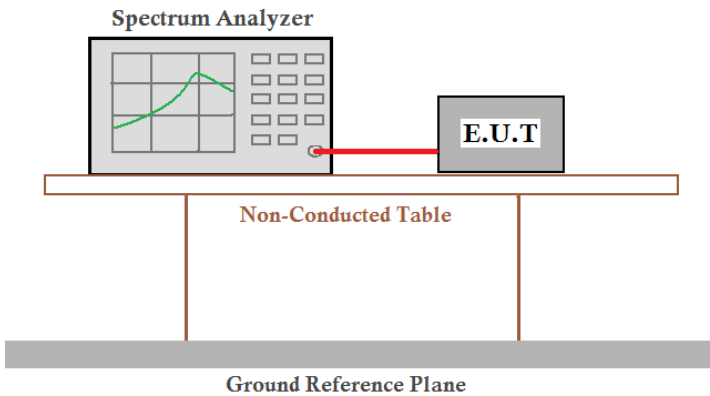
Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.4:2009 and KDB558074
Limit:	>500kHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green curve on its screen, is connected to an E.U.T (Equipment Under Test) by a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a table labeled 'Non-Conducted Table'. Below this table is a thick grey bar representing the 'Ground Reference Plane'.</p>
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Refer to FCC ID: 2AB6Z-1859ATMB

6.5 Power Spectral Density

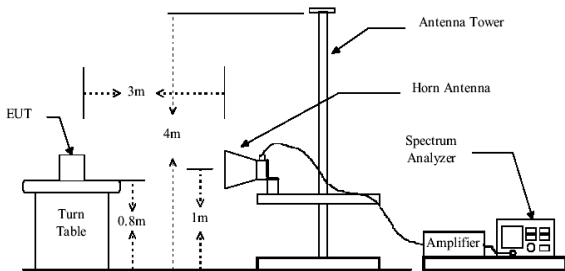
Test Requirement:	FCC Part 15 C Section 15.247 (e)
Test Method:	ANSI C63.4:2009 and KDB558074
Limit:	8dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Refer to FCC ID: 2AB6Z-1859ATMB

6.6 Band Edge

6.6.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2009 and KDB558074
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 30 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:	 <p>The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Refer to FCC ID: 2AB6Z-1859ATMB

6.6.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.4: 2009				
Test Frequency Range:	2.3GHz to 2.5GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:					
	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	3MHz	Average Value
Limit:					
	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Test Procedure:	<div>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>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.</div>				
Test setup:	<div></div>				
Test Instruments:	Refer to section 5.6 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				

Measurement Data:

Test mode: 802.11b			Test channel: Lowest			Remark: Peak		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
2390.00	21.84	27.58	6.63	0.00	56.05	74.00	-17.95	Vertical
2390.00	21.36	27.58	6.63	0.00	55.57	74.00	-18.43	Horizontal
Test mode: 802.11b			Test channel: Lowest			Remark: Average		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
2390.00	10.47	27.58	6.63	0.00	44.68	54.00	-9.32	Vertical
2390.00	10.36	27.58	6.63	0.00	44.57	54.00	-9.43	Horizontal

Test mode: 802.11b			Test channel: Highest			Remark: Peak		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
2483.50	21.98	27.52	6.85	0.00	56.35	74.00	-17.65	Vertical
2483.50	21.36	27.52	6.85	0.00	55.73	74.00	-18.27	Horizontal
Test mode: 802.11b			Test channel: Highest			Remark: Average		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
2483.50	10.21	27.52	6.85	0.00	44.58	54.00	-9.42	Vertical
2483.50	10.66	27.52	6.85	0.00	45.03	54.00	-8.97	Horizontal

Test mode: 802.11g			Test channel: Lowest			Remark: Peak		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
2390.00	28.66	27.58	6.63	0.00	62.87	74.00	-11.13	Vertical
2390.00	28.33	27.58	6.63	0.00	62.54	74.00	-11.46	Horizontal
Test mode: 802.11g			Test channel: Lowest			Remark: Average		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
2390.00	12.87	27.58	6.63	0.00	47.08	54.00	-6.92	Vertical
2390.00	12.36	27.58	6.63	0.00	46.57	54.00	-7.43	Horizontal

Test mode: 802.11g			Test channel: Highest			Remark: Peak		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
2483.50	22.38	27.52	6.85	0.00	56.75	74.00	-17.25	Vertical
2483.50	21.69	27.52	6.85	0.00	56.06	74.00	-17.94	Horizontal
Test mode: 802.11g			Test channel: Highest			Remark: Average		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
2483.50	10.55	27.52	6.85	0.00	44.92	54.00	-9.08	Vertical
2483.50	10.36	27.52	6.85	0.00	44.73	54.00	-9.27	Horizontal

Remark:

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

Test mode: 802.11n-HT20			Test channel: Lowest			Remark: Peak		
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)	Polar.
2390.00	30.78	27.58	6.63	0.00	64.99	74.00	-9.01	Vertical
2390.00	30.18	27.58	6.63	0.00	64.39	74.00	-9.61	Horizontal
Test mode: 802.11n-HT20			Test channel: Lowest			Remark: Average		
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)	Polar.
2390.00	10.39	27.58	6.63	0.00	44.60	54.00	-9.40	Vertical
2390.00	11.36	27.58	6.63	0.00	45.57	54.00	-8.43	Horizontal

Test mode: 802.11n-HT20			Test channel: Highest			Remark: Peak		
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)	Polar.
2483.50	21.39	27.52	6.85	0.00	55.76	74.00	-18.24	Vertical
2483.50	21.18	27.52	6.85	0.00	55.55	74.00	-18.45	Horizontal
Test mode: 802.11n-HT20			Test channel: Highest			Remark: Average		
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)	Polar.
2483.50	10.85	27.52	6.85	0.00	45.22	54.00	-8.78	Vertical
2483.50	10.45	27.52	6.85	0.00	44.82	54.00	-9.18	Horizontal

Test mode: 802.11n-HT40			Test channel: Lowest			Remark: Peak		
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)	Polar.
2390.00	21.55	27.58	6.63	0.00	55.76	74.00	-18.24	Vertical
2390.00	21.36	27.58	6.63	0.00	55.57	74.00	-18.43	Horizontal
Test mode: 802.11n-HT40			Test channel: Lowest			Remark: Average		
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)	Polar.
2390.00	10.78	27.58	6.63	0.00	44.99	54.00	-9.01	Vertical
2390.00	10.98	27.58	6.63	0.00	45.19	54.00	-8.81	Horizontal

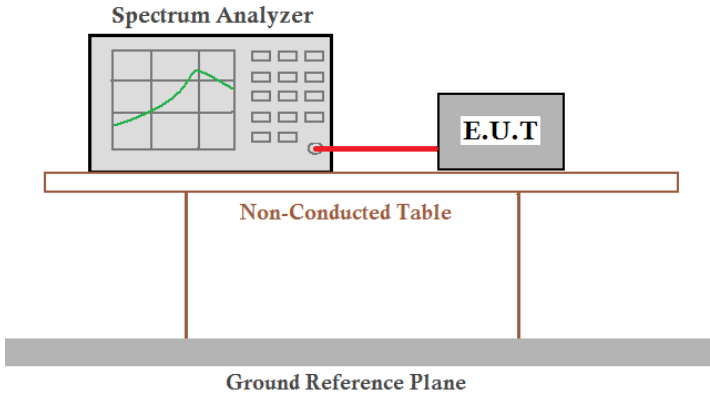
Test mode: 802.11n-HT40			Test channel: Highest			Remark: Peak		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
2483.50	22.34	27.52	6.85	0.00	56.71	74.00	-17.29	Vertical
2483.50	21.39	27.52	6.85	0.00	55.76	74.00	-18.24	Horizontal
Test mode: 802.11n-HT40			Test channel: Highest			Remark: Average		
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)	Polar.
2483.50	10.78	27.52	6.85	0.00	45.15	54.00	-8.85	Vertical
2483.50	10.45	27.52	6.85	0.00	44.82	54.00	-9.18	Horizontal

Remark:

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

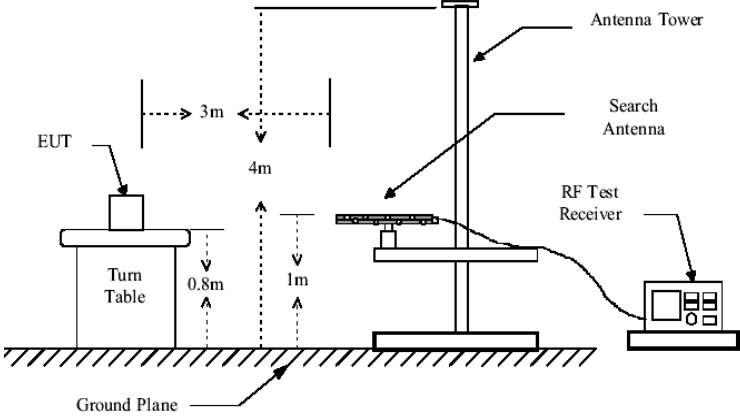
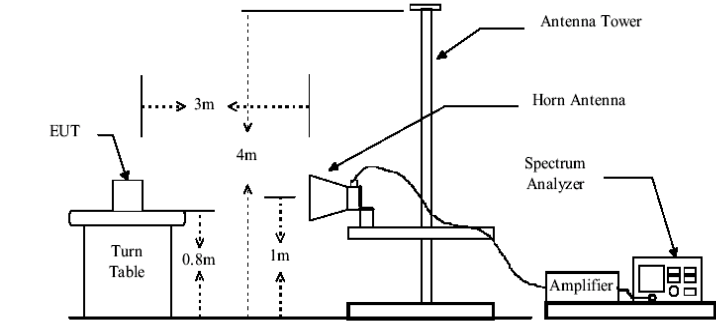
6.7 Spurious Emission

6.7.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2009 and KDB558074
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:	 <p>The diagram illustrates the test setup for conducted emission measurements. A Spectrum Analyzer is connected to the Equipment Under Test (E.U.T.) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Refer to FCC ID: 2AB6Z-1859ATMB

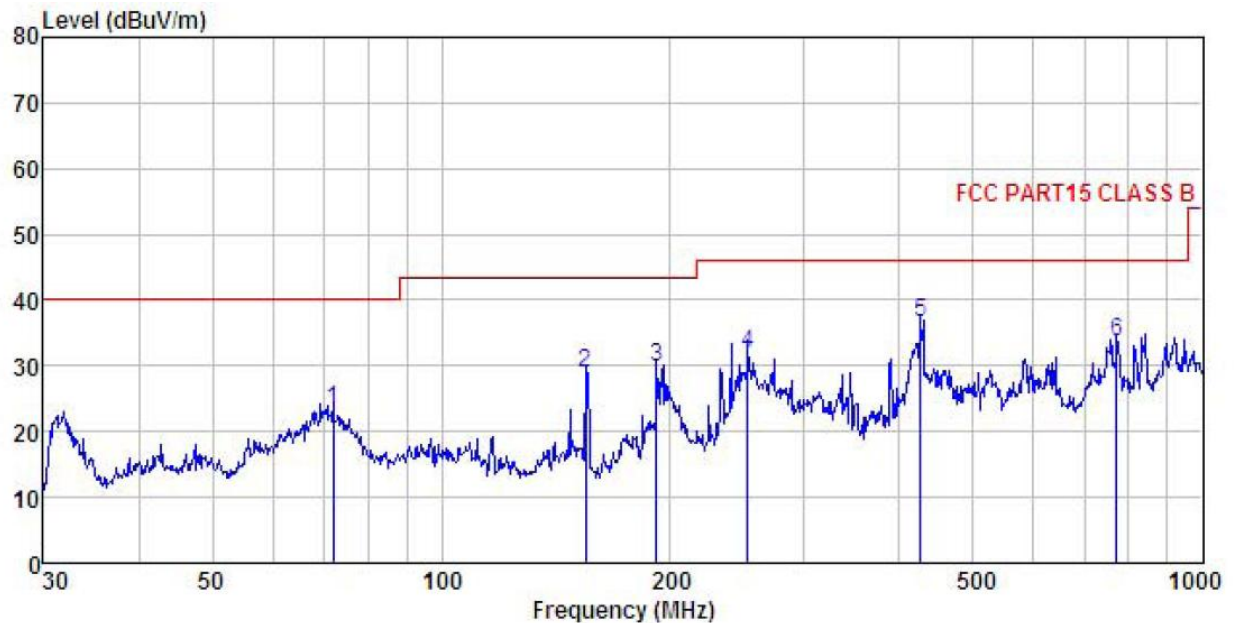
6.7.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.4:2009				
Test Frequency Range:	9KHz to 25GHz				
Test site:	Measurement 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
		Peak	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 Procedure:	<div>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber.The table was rotated 360 degrees to determine the position of the highest radiation.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>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.</div>				

<p>Test setup:</p>	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
<p>Test Instruments:</p>	<p>Refer to section 5.6for details</p>
<p>Test mode:</p>	<p>Refer to section 5.3 for details</p>
<p>Test results:</p>	<p>Passed</p>
<p>Remark:</p>	<ol style="list-style-type: none"> 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.

Below 1GHz

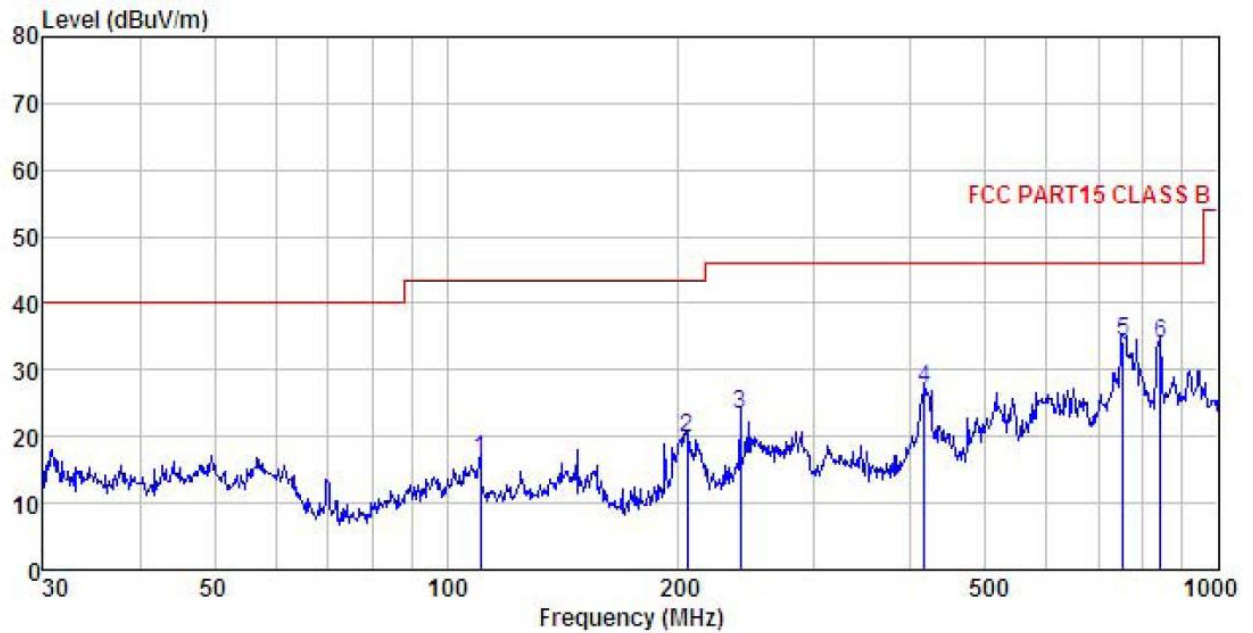
Horizontal :



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) HORIZONTAL
 EUT : 15.6" Android non-touch LCD Media Player
 Model : DT156-AS4-720
 Test mode : WIFI mode
 Power Rating : AC120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: Viki
 REMARK :

	Freq	ReadAntenna	Cable	Preamp	Limit	Over	
		Level	Factor	Loss	Factor	Level	Line
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	72.084	44.03	8.26	0.80	29.70	23.39	40.00
2	154.821	48.39	8.45	1.33	29.18	28.99	43.50
3	191.745	46.81	10.56	1.37	28.89	29.85	43.50
4	252.948	46.76	12.06	1.63	28.53	31.92	46.00
5	426.521	47.70	15.50	2.19	28.83	36.56	46.00
6	771.449	39.15	19.72	3.10	28.36	33.61	46.00

Vertical :



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) VERTICAL
 EUT : 15.6" Android non-touch LCD Media Player
 Model : DT156-AS4-720
 Test mode : WIFI mode
 Power Rating : AC120V/60Hz
 Environment : Temp:25.5°C Humi:55% 101KPa
 Test Engineer: Viki
 REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	110.569	32.80	12.15	1.05	29.45	16.55	43.50	-26.95	QP
2	204.955	36.56	10.74	1.41	28.80	19.91	43.50	-23.59	QP
3	239.987	38.20	12.09	1.58	28.59	23.28	46.00	-22.72	QP
4	416.179	38.30	15.39	2.16	28.81	27.04	46.00	-18.96	QP
5	752.743	40.28	19.48	3.05	28.46	34.35	46.00	-11.65	QP
6	842.130	38.32	20.51	3.24	28.03	34.04	46.00	-11.96	QP

Above 1GHz

Test mode: 802.11b			Test channel: Lowest			Remark: Peak		
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)	Polar.
4824.00	46.53	31.54	10.58	40.22	48.43	74.00	-25.57	Vertical
4824.00	44.82	31.54	10.58	40.22	46.72	74.00	-27.28	Horizontal
Test mode: 802.11b			Test channel: Lowest			Remark: Average		
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)	Polar.
4824.00	37.95	31.54	10.58	40.22	39.85	54.00	-14.15	Vertical
4824.00	35.61	31.54	10.58	40.22	37.51	54.00	-16.49	Horizontal

Test mode: 802.11b			Test channel: Middle			Remark: Peak		
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)	Polar.
4874.00	46.15	31.57	10.64	40.15	48.21	74.00	-25.79	Vertical
4874.00	46.23	31.57	10.64	40.15	48.29	74.00	-25.71	Horizontal
Test mode: 802.11b			Test channel: Middle			Remark: Average		
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)	Polar.
4874.00	37.60	31.57	10.64	40.15	39.66	54.00	-14.34	Vertical
4874.00	37.83	31.57	10.64	40.15	39.89	54.00	-14.11	Horizontal

Test mode: 802.11b			Test channel: Highest			Remark: Peak		
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)	Polar.
4924.00	44.53	31.61	10.70	40.08	46.76	74.00	-27.24	Vertical
4924.00	44.71	31.61	10.70	40.08	46.94	74.00	-27.06	Horizontal
Test mode: 802.11b			Test channel: Highest			Remark: Average		
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)	Polar.
4924.00	36.69	31.61	10.70	40.08	38.92	54.00	-15.08	Vertical
4924.00	35.64	31.61	10.70	40.08	37.87	54.00	-16.13	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 mode: 802.11g			Test channel: Lowest			Remark: Peak		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
4824.00	46.39	31.54	10.58	40.22	48.29	74.00	-25.71	Vertical
4824.00	45.00	31.54	10.58	40.22	46.90	74.00	-27.10	Horizontal
Test mode: 802.11g			Test channel: Lowest			Remark: Average		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
4824.00	36.63	31.54	10.58	40.22	38.53	54.00	-15.47	Vertical
4824.00	35.51	31.54	10.58	40.22	37.41	54.00	-16.59	Horizontal

Test mode: 802.11g			Test channel: Middle			Remark: Peak		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
4874.00	46.52	31.57	10.64	40.15	48.58	74.00	-25.42	Vertical
4874.00	47.00	31.57	10.64	40.15	49.06	74.00	-24.94	Horizontal
Test mode: 802.11g			Test channel: Middle			Remark: Average		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
4874.00	37.06	31.57	10.64	40.15	39.12	54.00	-14.88	Vertical
4874.00	36.32	31.57	10.64	40.15	38.38	54.00	-15.62	Horizontal

Test mode: 802.11g			Test channel: Highest			Remark: Peak		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
4924.00	45.09	31.61	10.70	40.08	47.32	74.00	-26.68	Vertical
4924.00	44.83	31.61	10.70	40.08	47.06	74.00	-26.94	Horizontal
Test mode: 802.11g			Test channel: Highest			Remark: Average		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polar.
4924.00	35.68	31.61	10.70	40.08	37.91	54.00	-16.09	Vertical
4924.00	35.83	31.61	10.70	40.08	38.06	54.00	-15.94	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 mode: 802.11n(H20)			Test channel: Lowest			Remark: Peak		
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)	Polar.
4824.00	46.29	31.54	10.58	40.22	48.19	74.00	-25.81	Vertical
4824.00	45.67	31.54	10.58	40.22	47.57	74.00	-26.43	Horizontal
Test mode: 802.11n(H20)			Test channel: Lowest			Remark: Average		
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)	Polar.
4824.00	37.15	31.54	10.58	40.22	39.05	54.00	-14.95	Vertical
4824.00	36.67	31.54	10.58	40.22	38.57	54.00	-15.43	Horizontal

Test mode: 802.11n(H20)			Test channel: Middle			Remark: Peak		
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)	Polar.
4874.00	46.26	31.57	10.64	40.15	48.32	74.00	-25.68	Vertical
4874.00	46.68	31.57	10.64	40.15	48.74	74.00	-25.26	Horizontal
Test mode: 802.11n(H20)			Test channel: Middle			Remark: Average		
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)	Polar.
4874.00	36.65	31.57	10.64	40.15	38.71	54.00	-15.29	Vertical
4874.00	37.18	31.57	10.64	40.15	39.24	54.00	-14.76	Horizontal

Test mode: 802.11n(H20)			Test channel: Highest			Remark: Peak		
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)	Polar.
4924.00	46.33	31.61	10.70	40.08	48.56	74.00	-25.44	Vertical
4924.00	45.25	31.61	10.70	40.08	47.48	74.00	-26.52	Horizontal
Test mode: 802.11n(H20)			Test channel: Highest			Remark: Average		
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)	Polar.
4924.00	37.59	31.61	10.70	40.08	39.82	54.00	-14.18	Vertical
4924.00	35.17	31.61	10.70	40.08	37.40	54.00	-16.60	Horizontal

Remark:

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

Test mode: 802.11n(H40)			Test channel: Lowest			Remark: Peak		
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)	Polar.
4844.00	45.89	31.55	10.61	40.19	47.86	74.00	-26.14	Vertical
4844.00	46.05	31.55	10.61	40.19	48.02	74.00	-25.98	Horizontal
Test mode: 802.11n(H40)			Test channel: Lowest			Remark: Average		
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)	Polar.
4844.00	35.93	31.55	10.61	40.19	37.90	54.00	-16.10	Vertical
4844.00	36.65	31.55	10.61	40.19	38.62	54.00	-15.38	Horizontal

Test mode: 802.11n(H40)			Test channel: Middle			Remark: Peak		
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)	Polar.
4874.00	46.39	31.57	10.64	40.15	48.45	74.00	-25.55	Vertical
4874.00	47.16	31.57	10.64	40.15	49.22	74.00	-24.78	Horizontal
Test mode: 802.11n(H40)			Test channel: Middle			Remark: Average		
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)	Polar.
4874.00	36.91	31.57	10.64	40.15	38.97	54.00	-15.03	Vertical
4874.00	37.85	31.57	10.64	40.15	39.91	54.00	-14.09	Horizontal

Test mode: 802.11n(H40)			Test channel: Highest			Remark: Peak		
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)	Polar.
4904.00	46.37	31.59	10.67	40.10	48.53	74.00	-25.47	Vertical
4904.00	46.25	31.59	10.67	40.10	48.41	74.00	-25.59	Horizontal
Test mode: 802.11n(H40)			Test channel: Highest			Remark: Average		
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)	Polar.
4904.00	36.63	31.59	10.67	40.10	38.79	54.00	-15.21	Vertical
4904.00	37.06	31.59	10.67	40.10	39.22	54.00	-14.78	Horizontal

Remark:

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