FCC REPORT

Applicant:	Telecell Mobile (H.K). Ltd
Address of Applicant:	RM 1, 8/F Metro Centre 2, 21 Lam Hing Street. Kln Bay. Hong Kong
Equipment Under Test (EUT)	
Product Name:	Wi-Fi device
Model No.:	T50R
FCC ID:	2ADX3T50R
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.225
Date of sample receipt:	09 Mar., 2018
Date of Test:	09 Mar., to 03 Apr., 2018
Date of report issue:	03 Apr., 2018
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	*03 Apr., 2018*	*Original*

Tested by:  ***Date:*** *03 Apr., 2018*

Test Engineer

Reviewed by:  ***Date:*** *03 Apr., 2018*

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Field strength of the fundamental signal	15.225 (a)	Pass
Spurious emissions	15.225(d)& 15.209	Pass
20dB Bandwidth	15.215(c)	Pass
Frequency tolerance	15.225 (e)	Pass
Conducted Emission	15.207	Pass

Remarks:

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

5 General Information

5.1 Client Information

Applicant:	Telecell Mobile (H.K). Ltd
Address:	RM 1, 8/F Metro Centre 2, 21 Lam Hing Street. Kln Bay. Hong Kong
Manufacturer/ Factory:	Telecell Mobile (H.K). Ltd
Address:	RM 1, 8/F Metro Centre 2, 21 Lam Hing Street. Kln Bay. Hong Kong

5.2 General Description of E.U.T.

Product Name:	Wi-Fi device
Model No.:	T50R
Operation Frequency:	13.56MHz
Channel numbers:	1
Modulation type:	ASK
Antenna Type:	Internal Antenna
Antenna gain:	0dBi
Power supply:	Rechargeable Li-ion polymer Battery DC3.8V, 4100mAh
AC adapter:	Model No.: N8C Input: AC110-240V 50/60Hz 0.3 A Output: DC 5.0V, 2.0A

5.3 Test mode

Transmitting mode:	Keep the EUT in transmitting mode with modulation

Pre-Test Mode:

CCIS has verified the construction and function in typical operation,The EUT was placed on three different polar directions;i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	49.33	49.42	49.21

Final Test Mode:

According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup”: Y axis (see the test setup photo).

5.4 Description of Support Units

N/A

5.5 Laboratory Facility

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

- **FCC - Registration No.: 727551**

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

- **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.

- **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

5.6 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

5.7 Test Instrumentslist

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	02-25-2018	02-24-2019
2	Loop Antenna	Com-power	AL-130	CCS078	02-25-2018	02-24-2019
2	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	02-25-2018	02-24-2019
3	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	02-25-2018	02-24-2019
4	Amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	02-25-2018	02-24-2019
5	Amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	02-25-2018	02-24-2019
6	Spectrum analyzer	Rohde & Schwarz	FSP30	CCIS0023	02-25-2018	02-24-2019

Conducted Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Date (mm-dd-yy)**
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	07-22-2017	07-21-2020
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	02-25-2018	02-24-2019
3	LISN	CHASE	MN2050D	CCIS0074	02-25-2018	02-24-2019
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203

15.203 requirement:

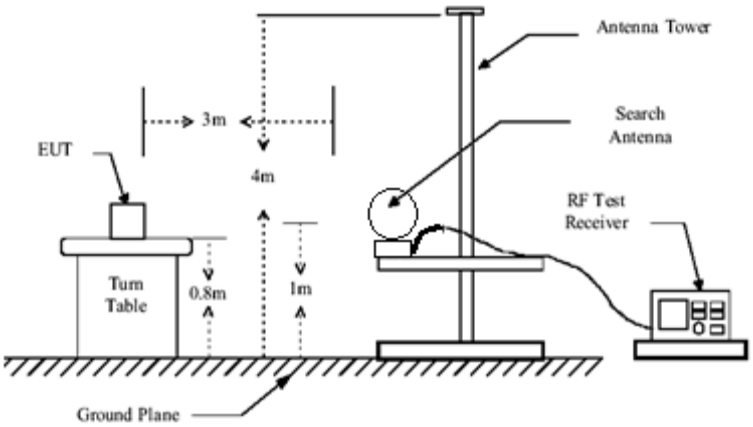
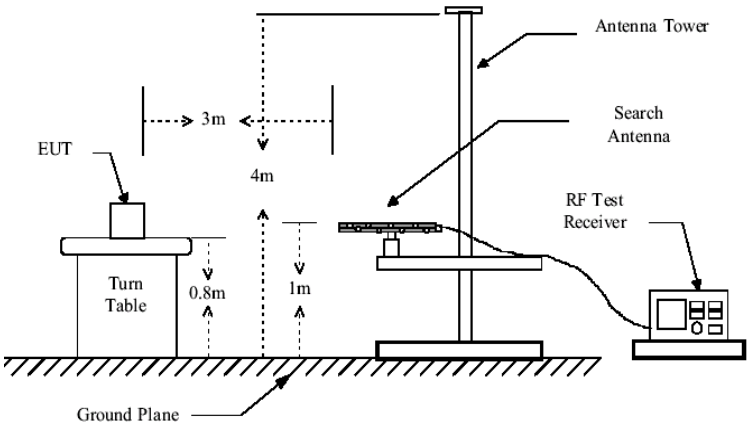
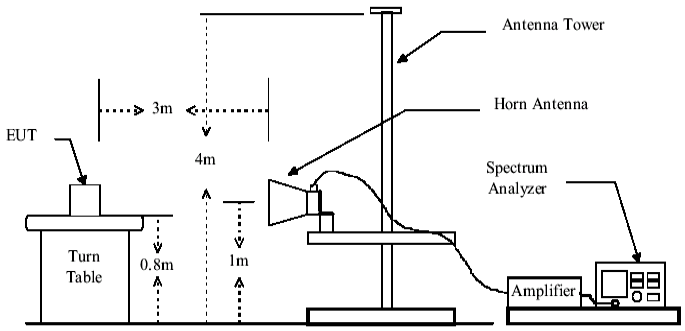
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

E.U.T Antenna:	

The EUT make use of an integrated antenna, The typical gain of the antenna is 0dBi.

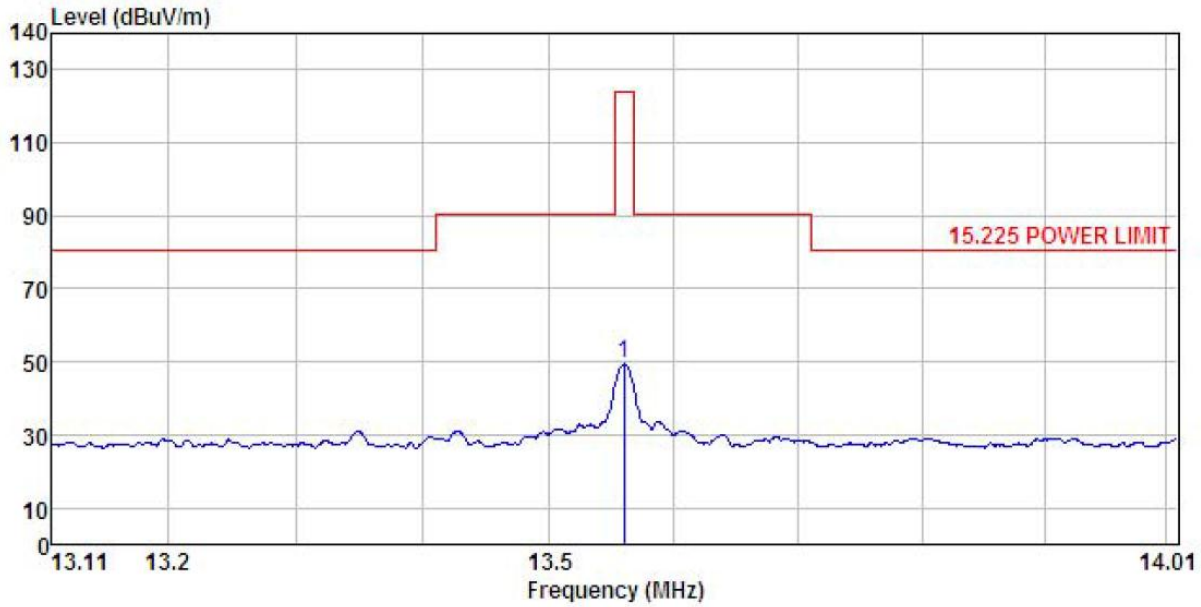
6.2 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.225(a) and 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9 kHz to 1000MHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m(Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>9kHz-150kHz</td><td>Quasi-peak</td><td>200Hz</td><td>600Hz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Field strength of the fundamental signal)</td><td>
<table>
<tr><td>Frequency</td><td>Limit (uV/m @30m)</td><td>Limit (dBuV/m @3m)</td></tr>
<tr><td>13.553MHz-13.567MHz</td><td>15848</td><td>124.0</td></tr>
<tr><td>13.410MHz-13.553MHz & 13.567MHz-13.710MHz</td><td>334</td><td>90.5</td></tr>
<tr><td>13.110MHz-13.410MHz & 13.710MHz-14.010MHz</td><td>106</td><td>80.5</td></tr>
<tr><td colspan="3">Remark: Per FCC part 15.31, when performingmeasurements at a closer distancethan specified, the results shallbe extrapolated to the specified distanceby either making measurementsat a minimum of two distances on atleast one radial to determine the properextrapolation factor or by using thesquare of an inverse linear distance extrapolationfactor (40 dB/decade).</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Spurious Emissions)</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Limit (uV/m @3m)</td><td>Distance (m)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100</td><td>3</td></tr>
<tr><td>88-216</td><td>150</td><td>3</td></tr>
<tr><td>216-960</td><td>200</td><td>3</td></tr>
<tr><td>Above 1GHz</td><td>500</td><td>3</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>
a. The EUT was placed on the top of a rotating table 0.8 meters above the groundat a 3 meter semi-anechoic camber. The table was rotated 360 degrees todetermine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.
c. 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.
d. For each suspected emission, the EUT was arranged to its worst case and thenthe antenna was tuned to heights from 1 meter to 4 meters and the rotatabletable was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limitspecified, then testing could be stopped and the peak values of the EUT wouldbe reported. Otherwise the emissions that did not have 10dB margin would bere-tested one by one using peak, quasi-peak or average method as specified andthen reported in a data sheet.
</td></tr>
</table>

Test setup:	9kHz-30MHz  30MHz-1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Measurement Record:	Uncertainty:±4.88 dB
Test results:	Pass
Remark:	The emission levels of 9 kHz~30 MHz are background noise and very lower than the limit, not show in test report.

Measurement Data:

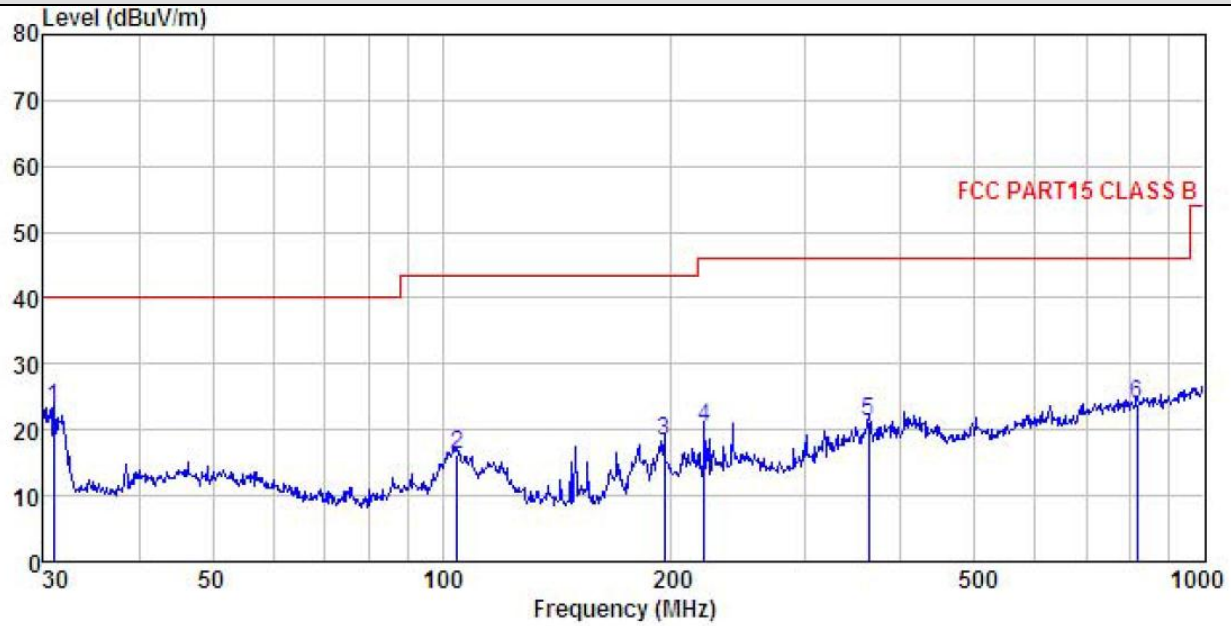
Field Strength Of The Fundamental Signal



Site : 3m chamber
Condition : 15.225 POWER LIMIT 3m LOOP-FMZB 1519B VERTICAL
EUT : Wi-Fi device
Model : T50R
Test mode : NFC Mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5℃ Huni:55% 101KPa
Test Engineer: YT
REMARK :

	Freq	ReadAntenna 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	13.560	29.36	19.42	0.64	0.00	49.42	124.00	-74.58	

Spurious Emissions
Test frequency range: 30MHz-1000MHz
Test Polarization: Horizontal



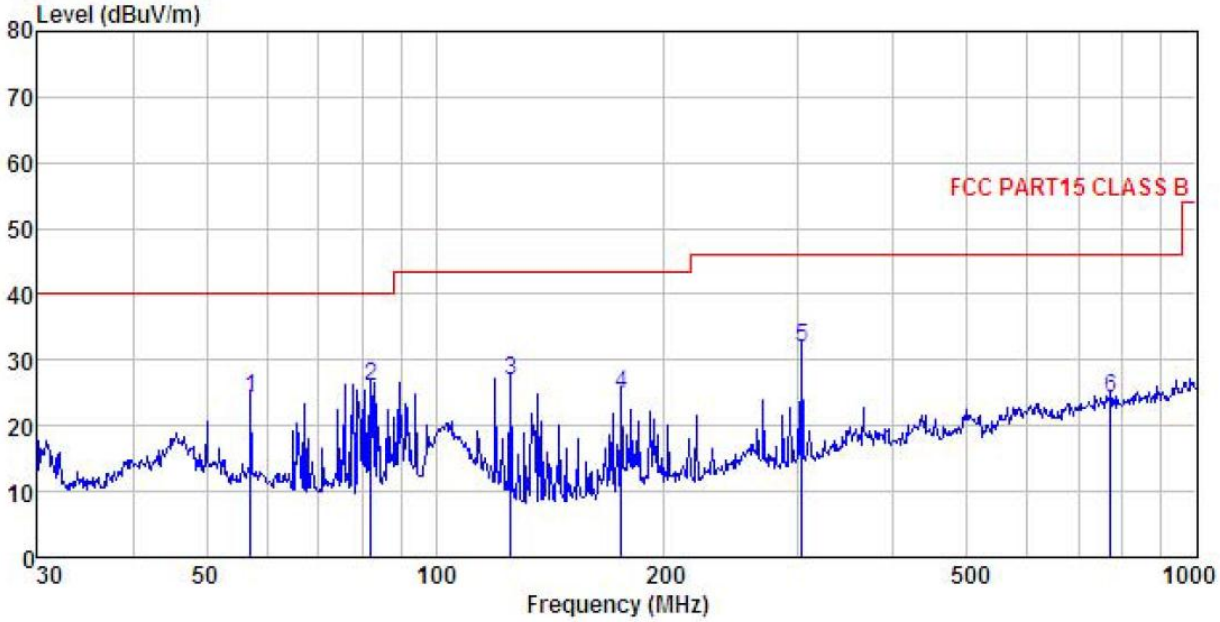
Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) HORIZONTAL
EUT : Wi-Fi device
Model : T50R
Test mode : NFC Mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5'C Huni:55% 101KPa
Test Engineer: YT
REMARK :

	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	30.962	41.26	11.20	0.78	29.97	23.27	40.00	-16.73	QP
2	104.536	31.56	12.12	1.99	29.50	16.17	43.50	-27.33	QP
3	195.822	33.26	10.94	2.84	28.86	18.18	43.50	-25.32	QP
4	220.617	34.79	11.30	2.85	28.70	20.24	46.00	-25.76	QP
5	362.985	32.04	14.61	3.09	28.62	21.12	46.00	-24.88	QP
6	815.968	27.80	19.99	4.30	28.13	23.96	46.00	-22.04	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.*

Test Polarization: Vertical



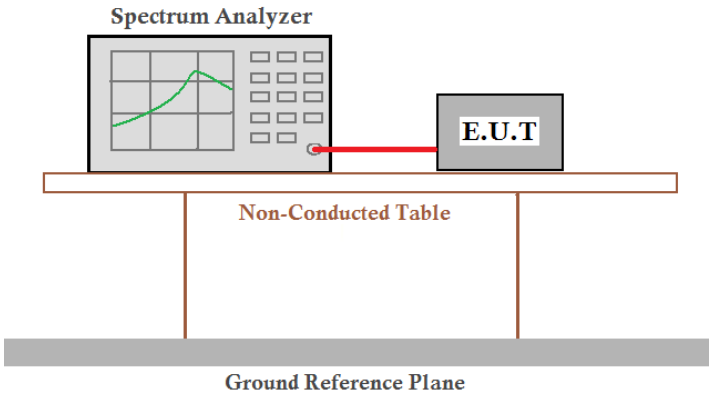
Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) VERTICAL
EUT : Wi-Fi device
Model : T50R
Test mode : NFC Mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5℃ Huni:55% 101KPa
Test Engineer: YT
REMARK :

	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	57.191	39.65	13.12	1.37	29.79	24.35	40.00	-15.65	QP
2	82.359	44.39	9.34	1.76	29.62	25.87	40.00	-14.13	QP
3	125.446	44.25	9.62	2.24	29.36	26.75	43.50	-16.75	QP
4	175.652	41.85	9.30	2.70	29.01	24.84	43.50	-18.66	QP
5	303.544	44.02	13.43	2.95	28.46	31.94	46.00	-14.06	QP
6	771.449	28.65	19.58	4.36	28.36	24.23	46.00	-21.77	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.*

6.3 20dB Bandwidth

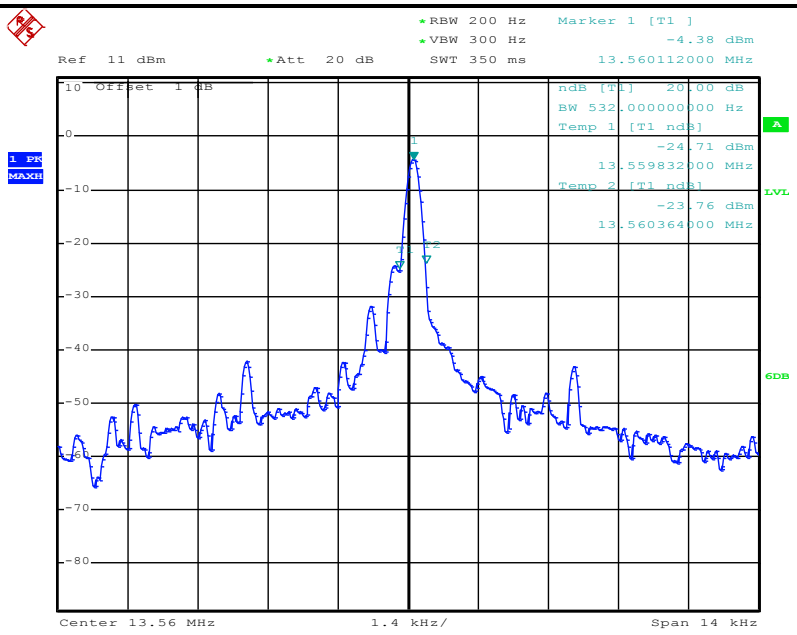
Test Requirement:	FCC Part15 C Section 15.215 (c)
Test Method:	ANSI C63.4:2014
Receiver setup:	RBW=200Hz, VBW=300Hz, detector: Peak
Limit:	The fundamental emission be kept within atleast the central 80% of the permitted band
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set the EUT to proper test channel. 3. Max hold the radiated emissions, mark the peak power frequency point and the -20dB upper and lower frequency points. 4. Read 20dB bandwidth.
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

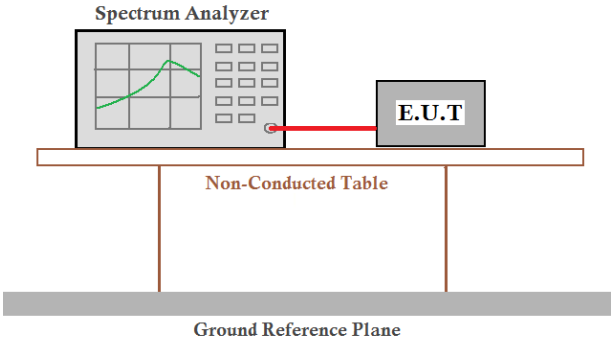
20dB bandwidth (kHz)	Limit (kHz)	Results
0.532	11.2	Passed

Note: For 13.56MHz, permitted Band is 14 kHz, so the Limit is 11.2 kHz.

Test plot as follows:



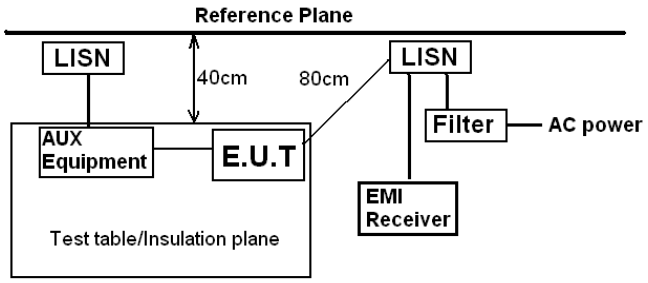
6.4 Frequency Tolerance

Test Requirement:	FCC Part15 C Section 15.225 (e)
Test Method:	ANSI C63.10: 2013
Receiver setup:	RBW=200Hz, VBW=300Hz, span=14kHz, detector: Peak
Limit:	±0.01% of the operating frequency
Test mode:	Transmitting mode
Test Procedure:	**Frequency stability V.S. Temperature measurement** 1. The equipment under test was powered by a fresh battery. 2. RF output was connected to spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20℃ operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached **Frequency stability V.S. Voltage measurement** 1. Set chamber temperature to 20℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

Temperature (℃)	Voltage (Vdc)	Frequency Tolerance (MHz)	Frequency Error (%)	Limit (%)
-20	3.80	13.56011	0.001	±0.01
+50	3.80	13.56010	0.001	±0.01
+20	3.50	13.56007	0.001	±0.01
+20	4.20	13.56009	0.001	±0.01

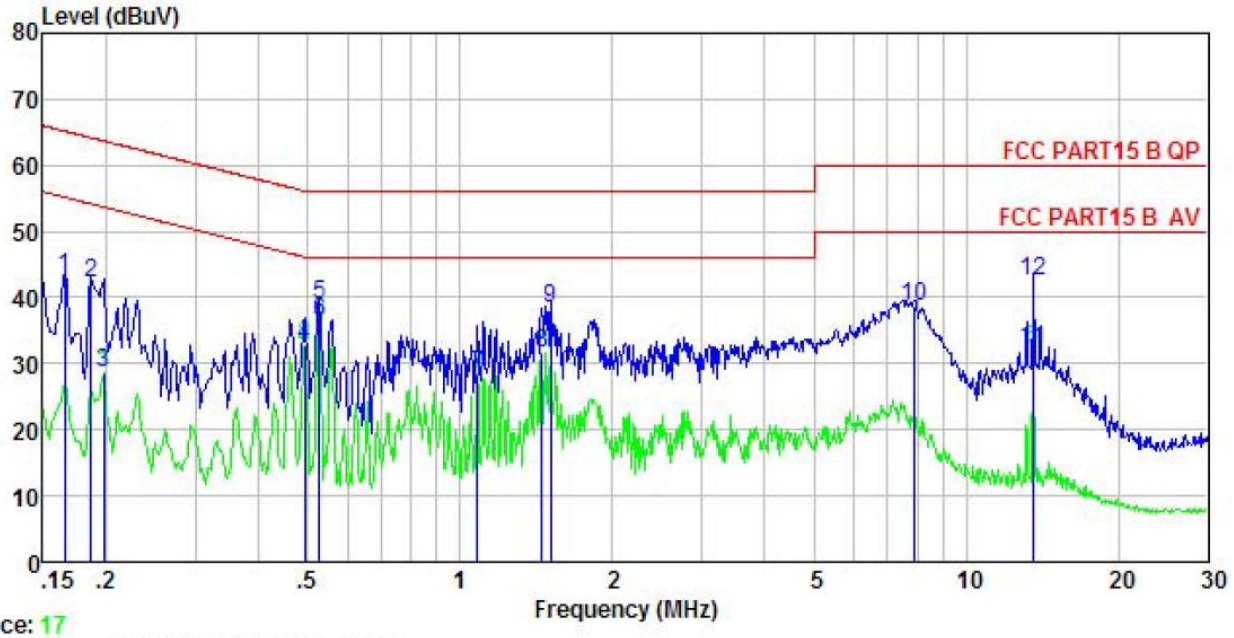
6.5 Conducted Emission

<table>
<tr><td>Test Requirement:</td><td colspan="6">FCC Part15 B Section 15.207</td></tr>
<tr><td>Test Method:</td><td colspan="6">ANSI C63.4:2014</td></tr>
<tr><td>TestFrequencyRange:</td><td colspan="6">150kHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="6">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="6">RBW=9kHz, VBW=30kHz</td></tr>
<tr><td>Limit:</td><td colspan="6"><table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBµV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>0.5-30</td><td>60</td><td>50</td></tr>
<tr><td colspan="3">* Decreases with the logarithm of the frequency.</td></tr>
</table></td></tr>
<tr><td>Test setup:</td><td colspan="6"> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test procedure</td><td colspan="6">1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.).It provide 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: 2003 on conducted measurement.</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>23°C</td><td>Humid.:</td><td>56%</td><td>Press.:</td><td>101kPa</td></tr>
<tr><td>Measurement Record:</td><td colspan="6">Uncertainty: 3.28dB</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 5.7 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
</table>

Measurement Data:

Line:

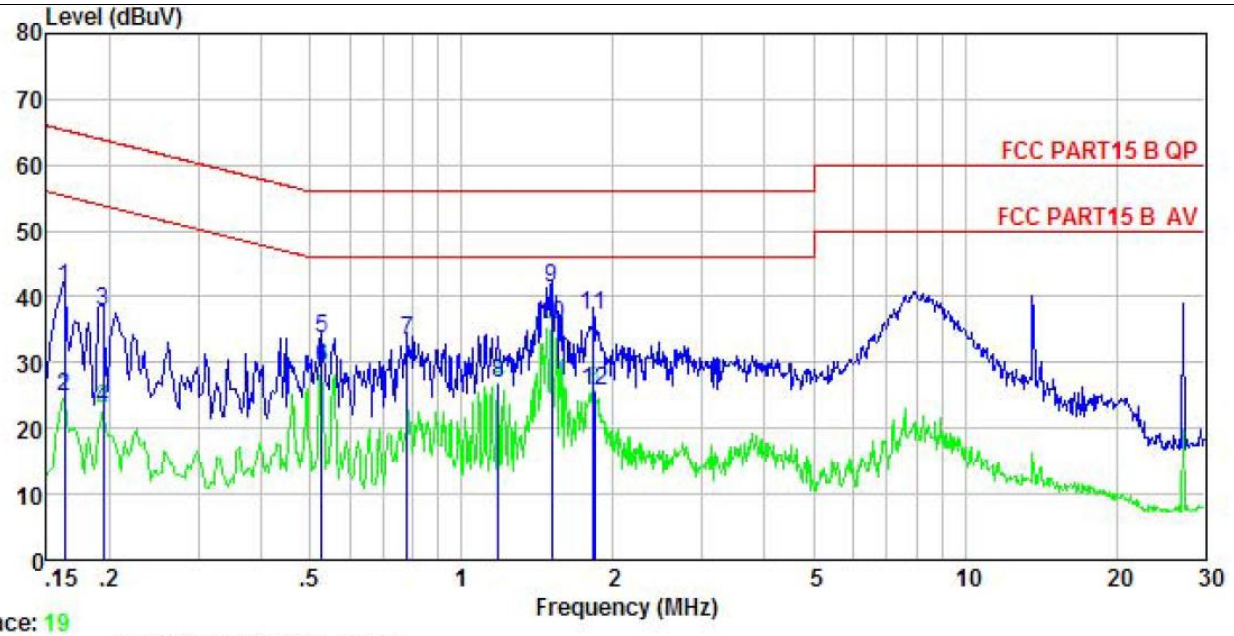


Trace: 17

Site : CCIS Shielding Room
Condition : FCC PART15 B QP LISN(RS) LINE
EUT : Wifi Device
Model : T50R
Test Mode : NFC mode
Power Rating : AC 120V/60Hz
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: YT
Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.166	31.60	0.71	10.77	43.08	65.16	-22.08	QP
2	0.186	30.63	0.73	10.76	42.12	64.20	-22.08	QP
3	0.198	17.14	0.73	10.76	28.63	53.71	-25.08	Average
4	0.494	21.37	0.76	10.76	32.89	46.10	-13.21	Average
5	0.527	27.46	0.76	10.76	38.98	56.00	-17.02	QP
6	0.527	24.93	0.76	10.76	36.45	46.00	-9.55	Average
7	1.082	16.58	0.78	10.88	28.24	46.00	-17.76	Average
8	1.449	20.00	0.78	10.92	31.70	46.00	-14.30	Average
9	1.511	26.75	0.78	10.92	38.45	56.00	-17.55	QP
10	7.893	27.13	0.73	10.84	38.70	60.00	-21.30	QP
11	13.551	20.69	0.71	10.91	32.31	50.00	-17.69	Average
12	13.623	30.96	0.71	10.91	42.58	60.00	-17.42	QP

Neutral:



Trace: 19

Site : CCIS Shielding Room
Condition : FCC PART15 B QP LISN(RS) NEUTRAL
EUT : Wifi Device
Model : T50R
Test Mode : NFC mode
Power Rating : AC 120V/60Hz
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: YT
Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.162	29.93	0.70	10.77	41.40	65.34	-23.94	QP
2	0.162	13.38	0.70	10.77	24.85	55.34	-30.49	Average
3	0.194	26.37	0.66	10.76	37.79	63.84	-26.05	QP
4	0.194	11.53	0.66	10.76	22.95	53.84	-30.89	Average
5	0.527	22.27	0.61	10.76	33.64	56.00	-22.36	QP
6	0.527	17.79	0.61	10.76	29.16	46.00	-16.84	Average
7	0.779	22.03	0.65	10.80	33.48	56.00	-22.52	QP
8	1.184	15.44	0.67	10.89	27.00	46.00	-19.00	Average
9	1.511	29.82	0.67	10.92	41.41	56.00	-14.59	QP
10	1.511	24.20	0.67	10.92	35.79	46.00	-10.21	Average
11	1.829	25.72	0.67	10.95	37.34	56.00	-18.66	QP
12	1.839	14.02	0.67	10.95	25.64	46.00	-20.36	Average