

FCC REPORT

Applicant: Billion Electric Co., Ltd.
Address of Applicant: 8F., No.192, Sec. 2, Zhongxing Road, Xindian Dist., New Taipei City 231, Taiwan

Equipment Under Test (EUT)

Product Name: 4G/LTE Mobile Hotspot

Model No.: BEC 430M

Trade mark: BEC

FCC ID: QI3BIL-BEC430M

Applicable standards: FCC CFR Title 47 Part 15 Subpart B

Date of sample receipt: 02 Nov., 2017

Date of Test: 02 Nov., to 29 Nov., 2017

Date of report issued: 30 Nov., 2017

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.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	30 Nov., 2017	Original

Tested by:

Mike.ou

Date:

30 Nov., 2017

Test Engineer

Reviewed by:

Ryan.Lee

Date:

30 Nov., 2017

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part 15.107	Pass
Radiated Emission	Part 15.109	Pass

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

5 General Information

5.1 Client Information

Applicant:	Billion Electric Co., Ltd.
Address of Applicant:	8F., No.192, Sec. 2, Zhongxing Road, Xindian Dist., New Taipei City 231, Taiwan
Manufacturer/Factory:	Billion Electric Co., Ltd.
Address of Manufacturer/Factory:	8F., No.192, Sec. 2, Zhongxing Road, Xindian Dist., New Taipei City 231, Taiwan

5.2 General Description of E.U.T.

Product Name:	4G/LTE Mobile Hotspot
Model No.:	BEC 430M
Power supply:	Rechargeable Li-ion Battery DC3.7V-2300mAh

5.3 Test Mode

Operating mode	Detail description
PC mode	Keep the EUT in Downloading mode(Worst case)
<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>	

5.4 Measurement Uncertainty

Items	Expanded Uncertainty (Confidence of 95%)
Conducted Emission (9kHz ~ 30MHz)	2.14 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	4.24 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	4.35 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	4.44 dB (k=2)
Radiated Emission (18GHz ~ 26.5GHz)	4.56 dB (k=2)

5.5 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
DELL	PC	OPTIPLEX745	N/A	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC
HP	Printer	CB495A	05257893	DoC

5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

5.7 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>

5.8 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:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	07-22-2017	07-21-2020
2	BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	02-25-2017	02-24-2018
3	Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	02-25-2017	02-24-2018
4	Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	02-25-2017	02-24-2018
5	Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	02-25-2017	02-24-2018
6	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	02-25-2017	02-24-2018
7	EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	02-25-2017	02-24-2018
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	N/A	N/A	CCIS0018	02-25-2017	02-24-2018
10	Coaxial Cable	N/A	N/A	CCIS0020	02-25-2017	02-24-2018

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	07-22-2017	07-21-2020
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	02-25-2017	02-24-2018
3	LISN	CHASE	MN2050D	CCIS0074	02-25-2017	02-24-2018
4	Coaxial Cable	CCIS	N/A	CCIS0086	02-25-2017	02-24-2018
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

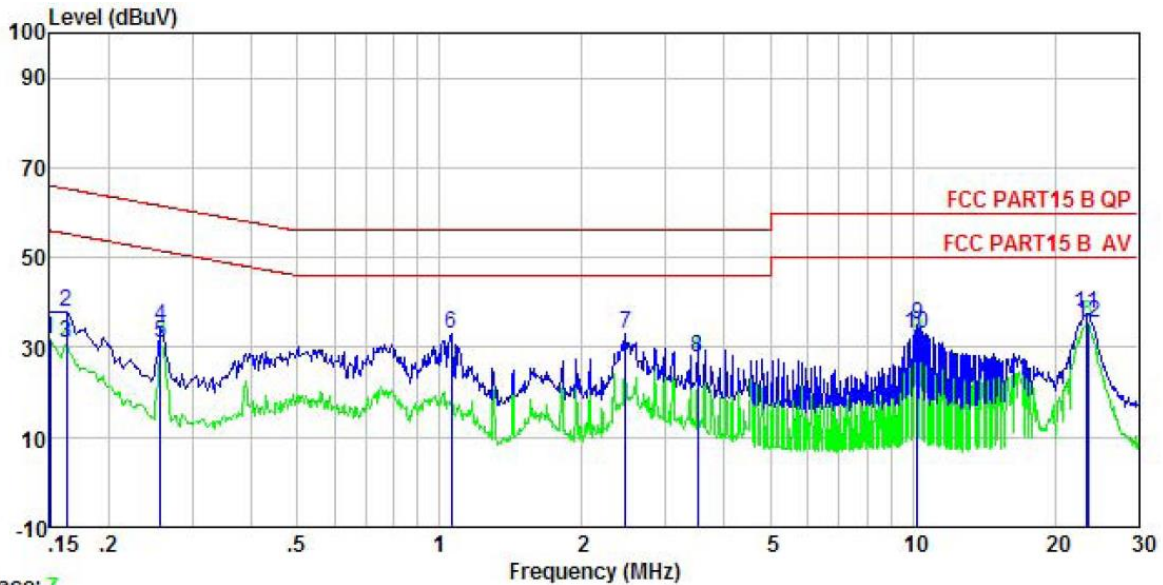
6 Test results and Measurement Data

6.1 Conducted Emission

Test Requirement:	FCC Part 15 B Section 15.107		
Test Method:	ANSI C63.4:2014		
Test Frequency Range:	150kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dB μ V)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	0.5-30	60	50
* Decreases with the logarithm of the frequency.			
Test setup:	<p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>		
Test procedure	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The 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 refers to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement. 		
Test environment:	Temp.:	23 °C	Humid.: 56% Press.: 101kPa
Test Instruments:	Refer to section 5.9 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

Measurement data:

Test Polarization: Line



Trace: 7

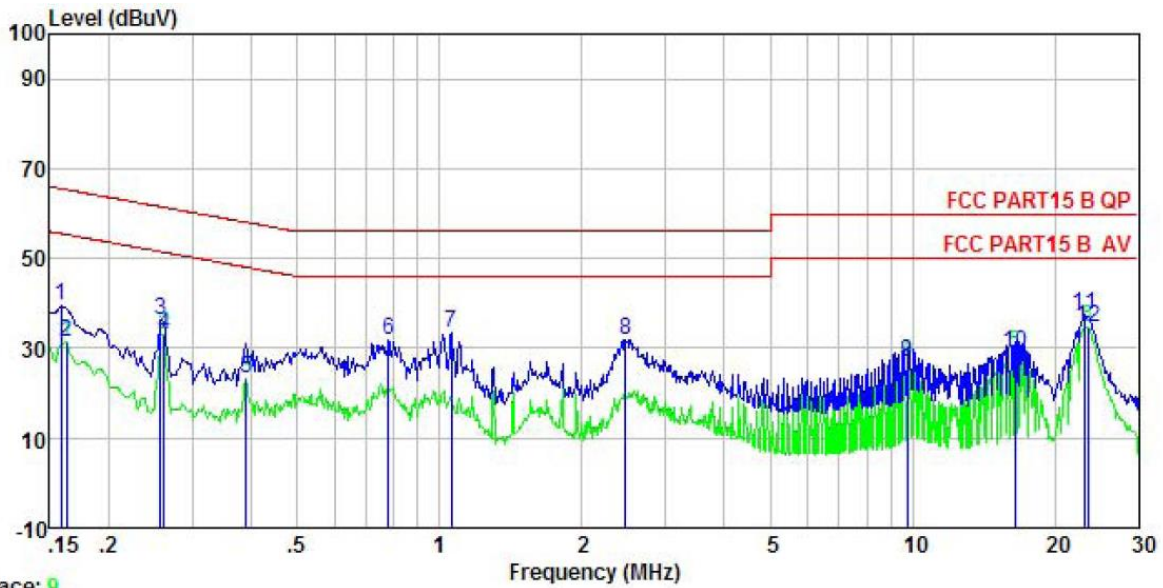
Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN LINE
 EUT : 4G/LTE Mobile Hotspot
 Model : BEC 430M
 Test Mode : PC Mode
 Power Rating : AC 120V/60 Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Mike
 Remark :

	Read	LISN	Cable	Limit	Over	
Freq	Level	Factor	Loss	Level	Line	Limit Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB
1	0.150	21.69	-0.56	10.78	31.91	56.00 -24.09 Average
2	0.162	27.72	-0.55	10.77	37.94	65.34 -27.40 QP
3	0.162	20.64	-0.55	10.77	30.86	55.34 -24.48 Average
4	0.258	24.25	-0.51	10.75	34.49	61.51 -27.02 QP
5	0.258	20.76	-0.51	10.75	31.00	51.51 -20.51 Average
6	1.060	22.69	-0.49	10.88	33.08	56.00 -22.92 QP
7	2.474	22.51	-0.44	10.94	33.01	56.00 -22.99 QP
8	3.509	17.28	-0.36	10.90	27.82	46.00 -18.18 Average
9	10.233	23.83	0.09	10.94	34.86	60.00 -25.14 QP
10	10.233	21.94	0.09	10.94	32.97	50.00 -17.03 Average
11	23.387	27.28	-0.62	10.89	37.55	60.00 -22.45 QP
12	23.511	25.16	-0.63	10.89	35.42	50.00 -14.58 Average

Notes:

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

Test Polarization: Neutral



Trace: 9
 Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN NEUTRAL
 EUT : 4G/LTE Mobile Hotspot
 Model : BEC 430M
 Test Mode : PC Mode
 Power Rating : AC 120V/60 Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Mike
 Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.158	29.04	-0.37	10.77	39.44	65.56	-26.12	QP
2	0.162	20.94	-0.37	10.77	31.34	55.34	-24.00	Average
3	0.258	25.80	-0.33	10.75	36.22	61.51	-25.29	QP
4	0.262	22.49	-0.33	10.75	32.91	51.38	-18.47	Average
5	0.389	12.80	-0.32	10.72	23.20	48.08	-24.88	Average
6	0.779	21.46	-0.30	10.80	31.96	56.00	-24.04	QP
7	1.060	22.96	-0.29	10.88	33.55	56.00	-22.45	QP
8	2.474	21.26	-0.23	10.94	31.97	56.00	-24.03	QP
9	9.757	15.83	0.31	10.93	27.07	50.00	-22.93	Average
10	16.486	18.29	-0.37	10.91	28.83	50.00	-21.17	Average
11	23.140	27.17	-0.66	10.89	37.40	60.00	-22.60	QP
12	23.511	24.59	-0.68	10.89	34.80	50.00	-15.20	Average

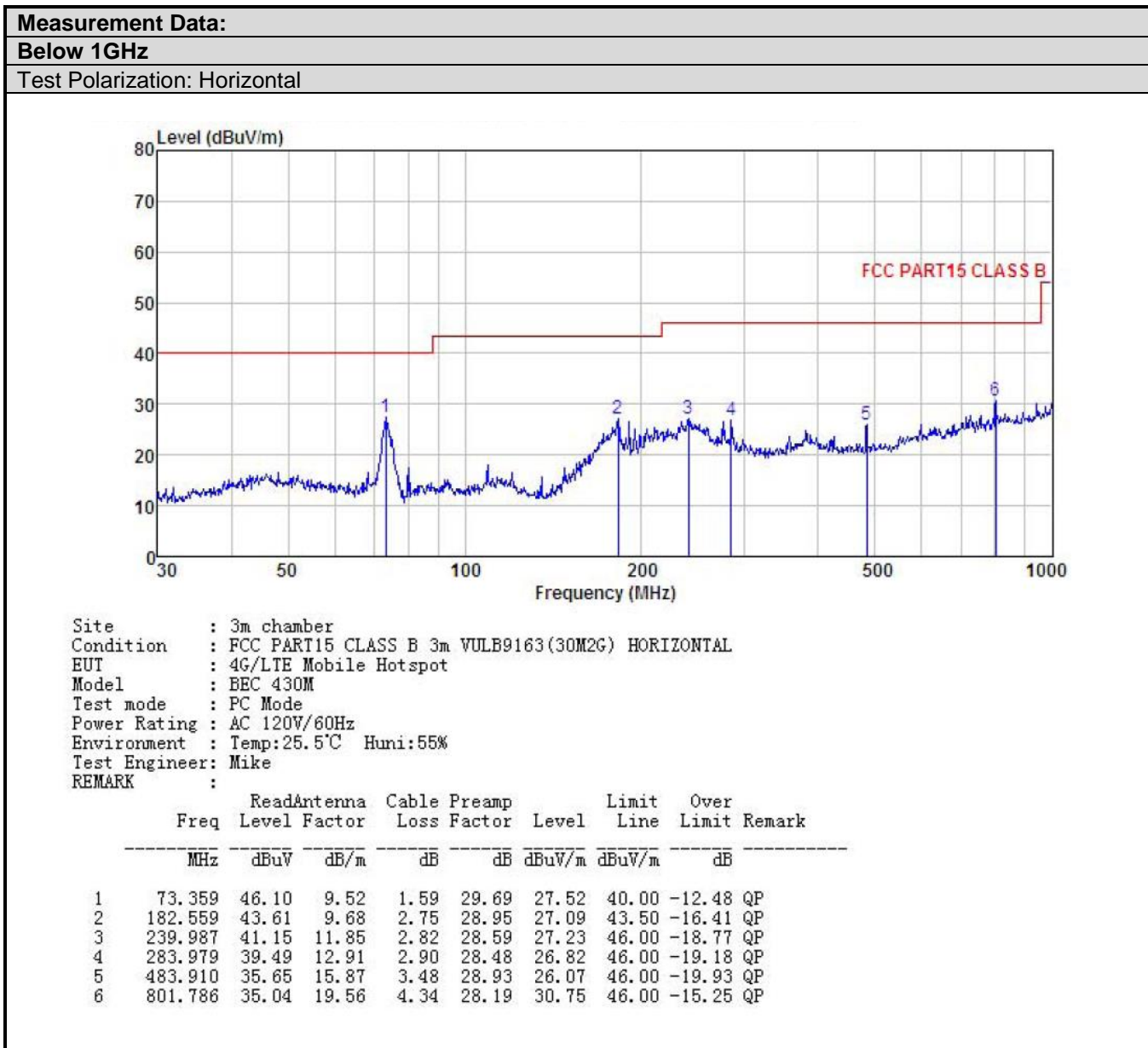
Notes:

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

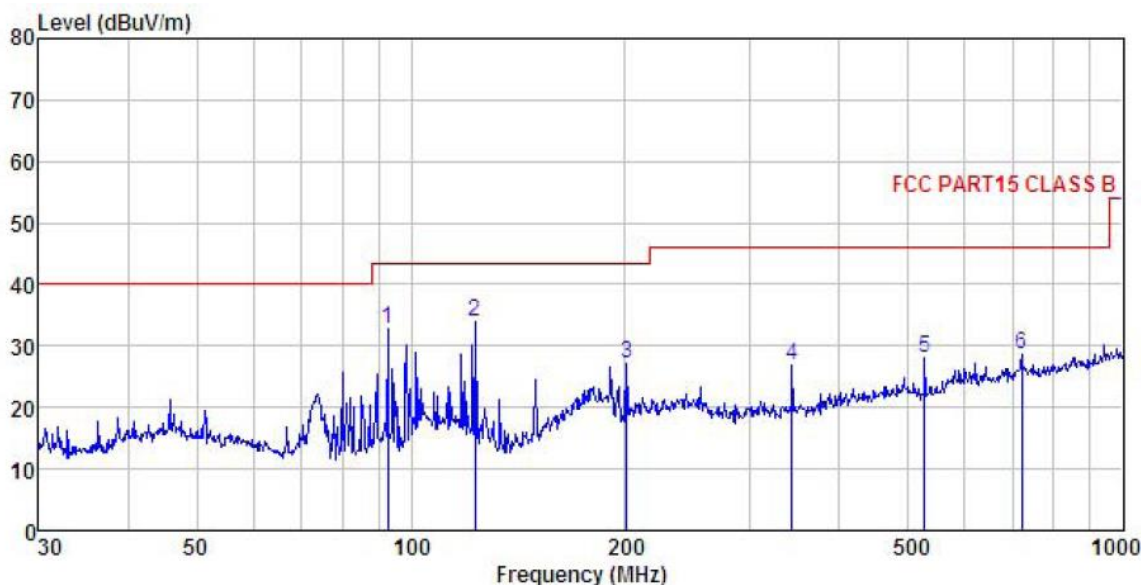
6.2 Radiated Emission

Test Requirement:	FCC Part 15 B Section 15.109				
Test Method:	ANSI C63.4:2014				
Test Frequency Range:	30MHz to 6000MHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak RMS	1MHz 1MHz	3MHz 3MHz	Peak Value Average Value
Limit:	Frequency	Limit (dBuV/m @3m)			Remark
	30MHz-88MHz	40.0			Quasi-peak Value
	88MHz-216MHz	43.5			Quasi-peak Value
	216MHz-960MHz	46.0			Quasi-peak Value
	960MHz-1GHz	54.0			Quasi-peak Value
Above 1GHz	54.0			Average Value	
	74.0			Peak Value	
Test setup:	Below 1GHz				
Test setup:	Above 1GHz				

<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 						
<p>Test environment:</p>	<table border="1"> <tr> <td>Temp.:</td> <td>25 °C</td> <td>Humid.:</td> <td>55%</td> <td>Press.:</td> <td>1 01kPa</td> </tr> </table>	Temp.:	25 °C	Humid.:	55%	Press.:	1 01kPa
Temp.:	25 °C	Humid.:	55%	Press.:	1 01kPa		
<p>Test Instruments:</p>	<p>Refer to section 5.9 for 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>	<p>All of the observed value above 6GHz were the noise floor , which were no recorded</p>						



Test Polarization: Vertical



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) VERTICAL
 EUT : 4G/LTE Mobile Hotspot
 Model : BEC 430M
 Test mode : PC Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Mike
 REMARK :

	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	92.787	49.20	11.13	2.03	29.56	32.80	43.50	-10.70	QP
2	122.834	51.07	9.96	2.20	29.37	33.86	43.50	-9.64	QP
3	200.688	41.69	11.30	2.87	28.83	27.03	43.50	-16.47	QP
4	343.180	37.90	14.50	3.08	28.55	26.93	46.00	-19.07	QP
5	526.397	36.64	16.73	3.76	29.03	28.10	46.00	-17.90	QP
6	721.726	33.35	19.58	4.26	28.58	28.61	46.00	-17.39	QP

