FCC REPORT

Applicant:	Beijing Changba Technology Co. Ltd.
Address of Applicant:	Room 260, 3C, 5th floor, No.9 Wangjing Street, Chaoyang District, Beijing

Equipment Under Test (EUT)

Product Name:	CALF Speaker Microphone
Model No.:	M1
Trade mark:	CALF
FCC ID:	2AWERM1
Applicable standards:	FCC CFR Title 47 Part 15 Subpart B
Date of sample receipt:	02 Aug., 2021
Date of Test:	03 Aug., to 25 Aug., 2021
Date of report issued:	25 Aug., 2021
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 JYT 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	*25 Aug., 2021*	*Original*

Tested by: Mike.ou ***Date:*** *25 Aug., 2021*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *25 Aug., 2021*

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

Remark:

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

2. N/A: The EUT not applicable of the test item.

Test Method:	*ANSI C63.4:2014*

5 General Information

5.1 Client Information

Applicant:	Beijing Changba Technology Co. Ltd.
Address:	Room 260, 3C, 5th floor, No.9 Wangjing Street, Chaoyang District, Beijing
Manufacturer:	Beijing Changba Technology Co. Ltd.
Address:	Room 260, 3C, 5th floor, No.9 Wangjing Street, Chaoyang District, Beijing
Factory:	Ningbo Yinzhou Shengke Electronics Co., Ltd
Address:	NO.111, Yunmo East Road, Yunlong Town, Yinzhou, Ningbo, 315137 Zhejiang, P.R. China

5.2 General Description of E.U.T.

Product Name:	CALF Speaker Microphone
Model No.:	M1
Power supply:	Rechargeable Li-ion Battery DC3.7V, 2000mAh
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

5.3 Test Mode

Operating mode	Detail description
Charging+Playing mode	Keep the EUT in Charging+Playing mode(Worst case)
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.	

5.4 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)	±5.16 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.20 dB (k=2)

5.5 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
Redmi	Smart phone	Redmi K40	fc3dae81	DoC
TECNO	Adapter	U180TSA	N/A	DoC

5.6 Related Submittal(s) / Grant (s)

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

5.7 Description of Cable Used

Cable Type	Description	Length	From	To
Detached USB Cable	Un-shielding	1.0m	EUT	Adapter

5.8 Additions to, deviations, or exclusions from the method

No

5.9 Laboratory Facility

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

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

JianYan Testing Group Shenzhen 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 JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

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

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 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

5.10 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://www.ccis-cb.com

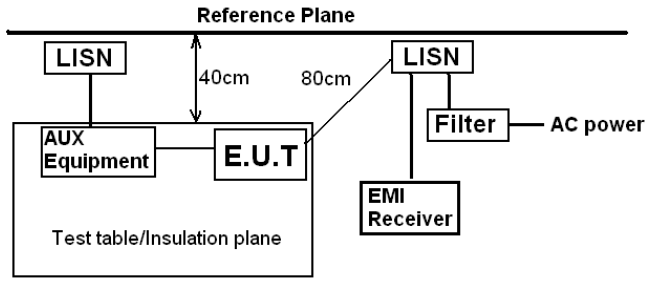
5.11 Test Instruments list

Radiated Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	ETS	9m*6m*6m	966	01-19-2021	01-18-2024
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-07-2021	03-06-2022
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-03-2021	03-02-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-03-2021	03-02-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-18-2021	06-17-2022
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-18-2020	11-17-2021
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-03-2021	03-02-2022
Pre-amplifier	CD	PAP-1G18	11804	03-03-2021	03-02-2022
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-03-2021	03-02-2022
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-18-2020	11-17-2021
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-03-2021	03-02-2022
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-03-2021	03-02-2022
Cable	MICRO-COAX	MFR64639	K10742-5	03-03-2021	03-02-2022
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-03-2021	03-02-2022
10m SAC	ETS	RFSD-100-F/A	Q2005	03-31-2021	04-01-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	1249	03-31-2021	04-01-2022
BiConiLog Antenna	SCHWARZBECK	VULB 9168	1250	03-31-2021	04-01-2022
EMI Test Receiver	R&S	ESR 3	102800	04-06-2021	04-07-2022
EMI Test Receiver	R&S	ESR 3	102802	04-06-2021	04-07-2022
Pre-amplifier	Bost	LNA 0920N	2016	04-06-2021	04-07-2022
Pre-amplifier	Bost	LNA 0920N	2019	04-06-2021	04-07-2022
Test Software	R&S	EMC32	Version: 10.50.40		

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	03-03-2021	03-02-2022
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-03-2021	03-02-2022
LISN	CHASE	MN2050D	1447	03-03-2021	03-02-2022
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	06-18-2021	06-17-2022
Cable	HP	10503A	N/A	03-03-2021	03-02-2022
EMI Test Software	AUDIX	E3	Version: 6.110919b		

6 Test results and Measurement Data

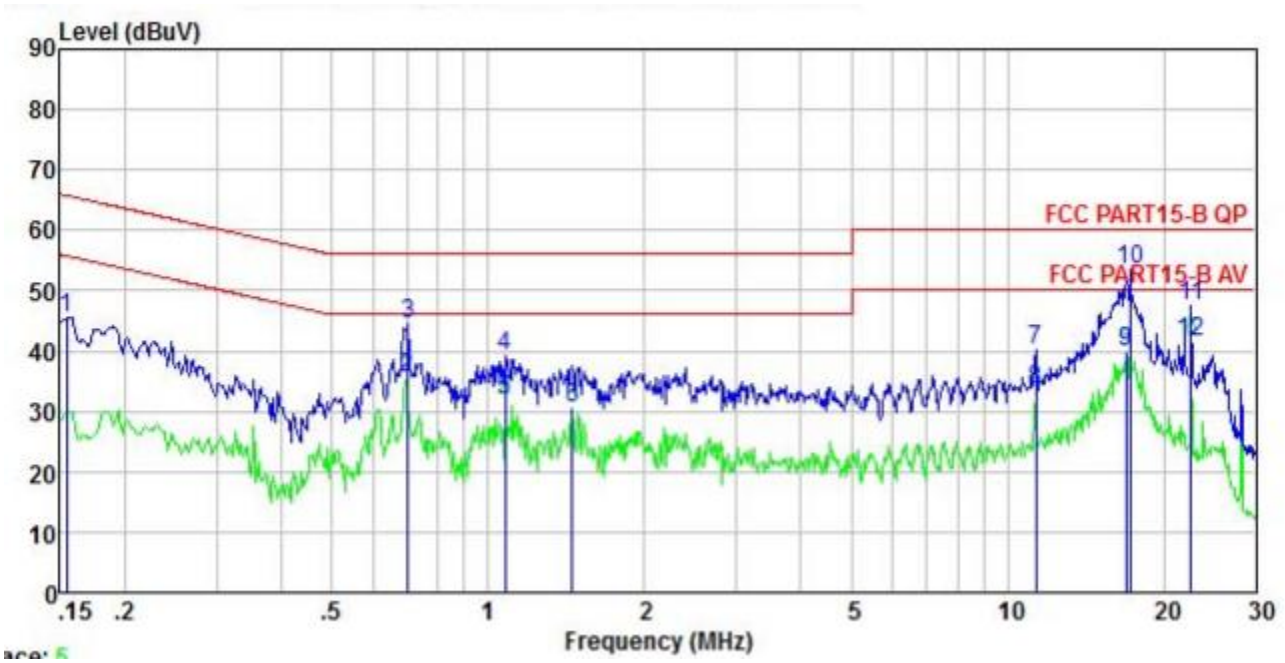
6.1 Conducted Emission

<table>
<tr><td>Test Requirement:</td><td colspan="3">FCC Part 15 B Section 15.107</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="3">150kHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="3">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="3">RBW=9kHz, VBW=30kHz</td></tr>
<tr><td>Limit:</td><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></td><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td></td><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td></td><td>0.5-30</td><td>60</td><td>50</td></tr>
<tr><td></td><td colspan="3">* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test setup:</td><td colspan="3"> 

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="3">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(latest version) on conducted measurement.</td></tr>
<tr><td>Test Instruments:</td><td colspan="3">Refer to section 5.11 for details</td></tr>
<tr><td>Test mode:</td><td colspan="3">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="3">Pass</td></tr>
</table>

Measurement data:

Product name:	CALF Speaker Microphone	**Product model:**	M1
Test by:	Mike	**Test mode:**	Charging+Playing mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 120 V/60 Hz	**Environment:**	Temp: 22.5℃ Huni: 55%

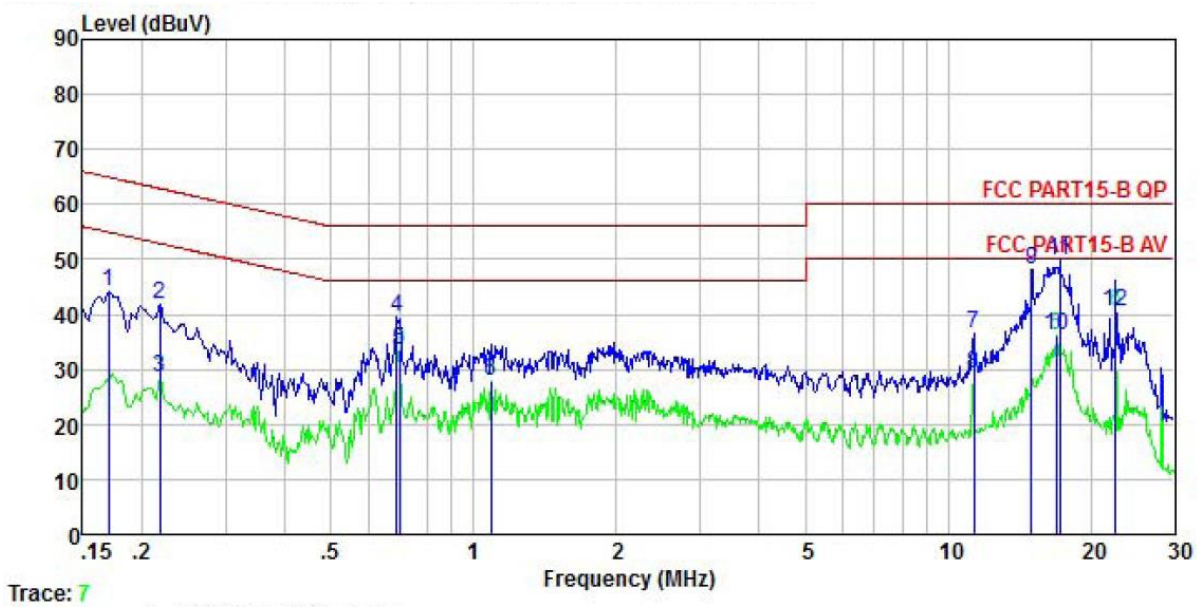


	Freq	Read Level	LISN Factor	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.154	35.41	10.12	-0.06	0.01	45.48	65.78	-20.30	QP
2	0.697	25.46	10.41	-0.40	0.03	35.50	46.00	-10.50	Average
3	0.701	34.37	10.41	-0.40	0.03	44.41	56.00	-11.59	QP
4	1.077	28.16	10.49	0.38	0.07	39.10	56.00	-16.90	QP
5	1.077	21.04	10.49	0.38	0.07	31.98	46.00	-14.02	Average
6	1.449	19.73	10.51	0.05	0.13	30.42	46.00	-15.58	Average
7	11.317	26.75	10.89	2.45	0.11	40.20	60.00	-19.80	QP
8	11.317	20.18	10.89	2.45	0.11	33.63	50.00	-16.37	Average
9	16.928	26.03	11.10	2.52	0.16	39.81	50.00	-10.19	Average
10	17.199	39.85	11.11	2.37	0.15	53.48	60.00	-6.52	QP
11	22.535	35.05	11.23	0.94	0.16	47.38	60.00	-12.62	QP
12	22.535	29.22	11.23	0.94	0.16	41.55	50.00	-8.45	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.*

Product name:	CALF Speaker Microphone	Product model:	M1
Test by:	Mike	Test mode:	Charging+Playing mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 22.5℃ Huni: 55%

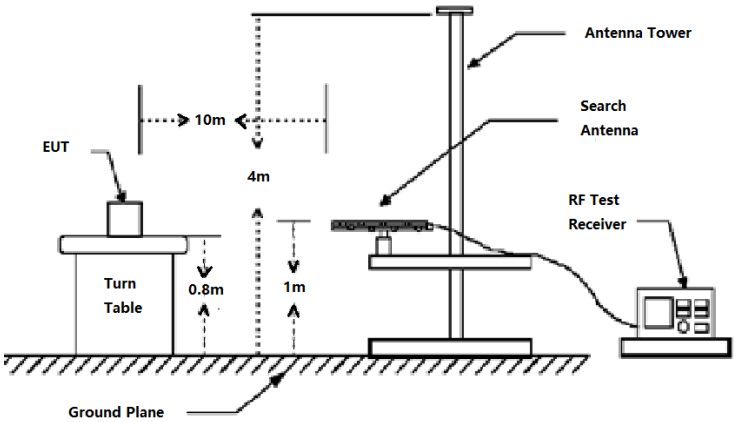


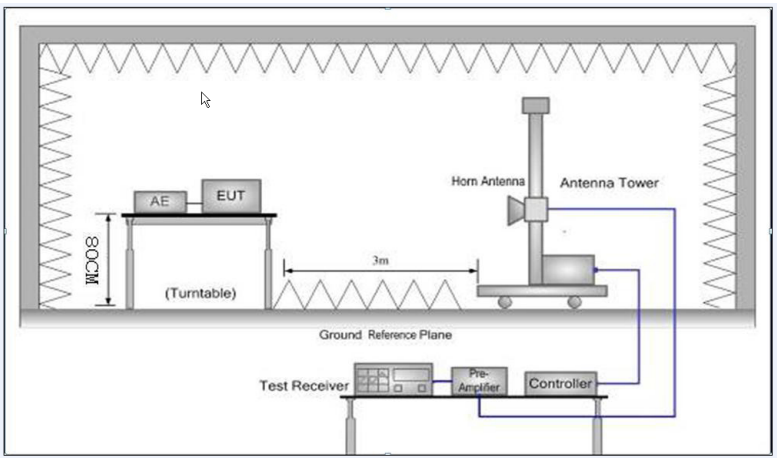
	Freq	Read Level	LISN Factor	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.170	34.25	9.90	0.01	0.01	44.17	64.94	-20.77	QP
2	0.219	31.78	9.94	0.00	0.03	41.75	62.88	-21.13	QP
3	0.219	18.68	9.94	0.00	0.03	28.65	52.88	-24.23	Average
4	0.690	29.01	10.36	0.04	0.03	39.44	56.00	-16.56	QP
5	0.697	23.06	10.37	0.04	0.03	33.50	46.00	-12.50	Average
6	1.088	17.06	10.59	0.09	0.07	27.81	46.00	-18.19	Average
7	11.317	23.38	11.28	1.92	0.11	36.69	60.00	-23.31	QP
8	11.317	15.90	11.28	1.92	0.11	29.21	50.00	-20.79	Average
9	14.986	33.64	11.39	3.09	0.14	48.26	60.00	-11.74	QP
10	16.928	22.50	11.49	1.96	0.16	36.11	50.00	-13.89	Average
11	17.199	36.45	11.50	1.80	0.15	49.90	60.00	-10.10	QP
12	22.535	28.19	11.68	0.50	0.16	40.53	50.00	-9.47	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

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part 15 B Section 15.109</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">30MHz to 6000MHz</td></tr>
<tr><td>Test site:</td><td colspan="5">Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)</td></tr>
<tr><td rowspan="5">Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</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 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></td><td colspan="3"></td></tr>
<tr><td rowspan="10">Limit:</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @10m)</td><td>Remark</td></tr>
<tr><td colspan="2">30MHz-88MHz</td><td colspan="2">30.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">88MHz-216MHz</td><td colspan="2">33.5</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">216MHz-960MHz</td><td colspan="2">36.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">960MHz-1GHz</td><td colspan="2">44.0</td><td>Quasi-peak Value</td></tr>
<tr><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">54.0</td><td>Average Value</td></tr>
<tr><td colspan="2">74.0</td><td>Peak Value</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Test setup:</td><td colspan="5">Below 1GHz
 

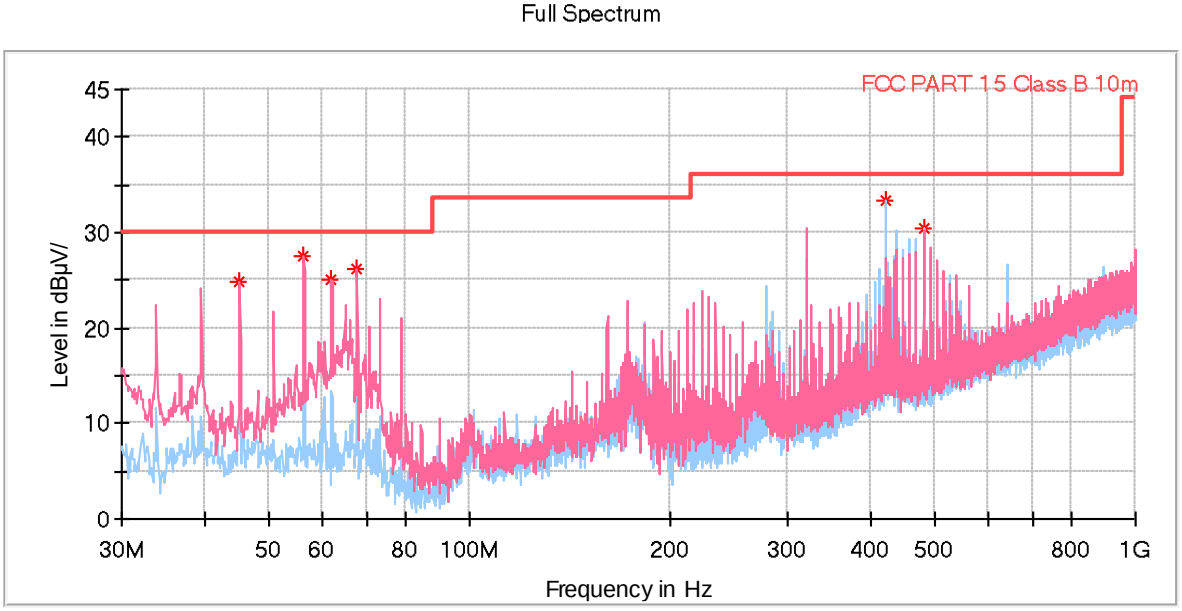
Above 1GHz
 
</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter chamber (below 1GHz)or 3 meter chamber(above 1GHz). The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 10 meters(below 1GHz) or 3 meters(above 1GHz) away from the interference-receiving antenna, which was mounted on</td></tr>
</table>

	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.
Test Instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	All of the observed value above 6GHz ware the niose floor , which were no recorded

Measurement Data:

Below 1GHz:

Product Name:	CALF Speaker Microphone	**Product Model:**	M1
Test By:	Mike	**Test mode:**	Charging+Playing mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical & Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



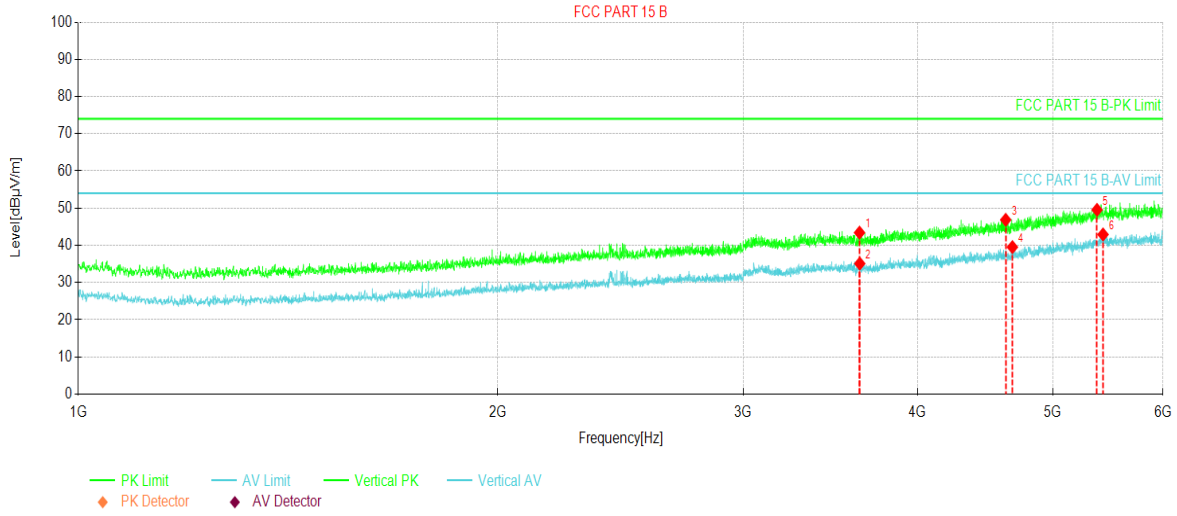
Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.132000	24.95	30.00	5.05	100.0	V	201.0	-15.7
56.384000	27.52	30.00	2.48	100.0	V	229.0	-16.1
62.010000	25.12	30.00	4.88	100.0	V	250.0	-16.7
67.733000	26.17	30.00	3.83	100.0	V	78.0	-17.8
421.395000	33.27	36.00	2.73	100.0	H	78.0	-11.1
479.983000	30.47	36.00	5.53	100.0	H	294.0	-9.7

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.*
3. *The Aux Factor is a notch filter switch box loss, this item is not used.*

Above 1GHz:

Product Name:	CALF Speaker Microphone	**Product Model:**	M1
Test By:	Mike	**Test mode:**	Charging+Playing mode
Test Frequency:	1 GHz ~ 6 GHz	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

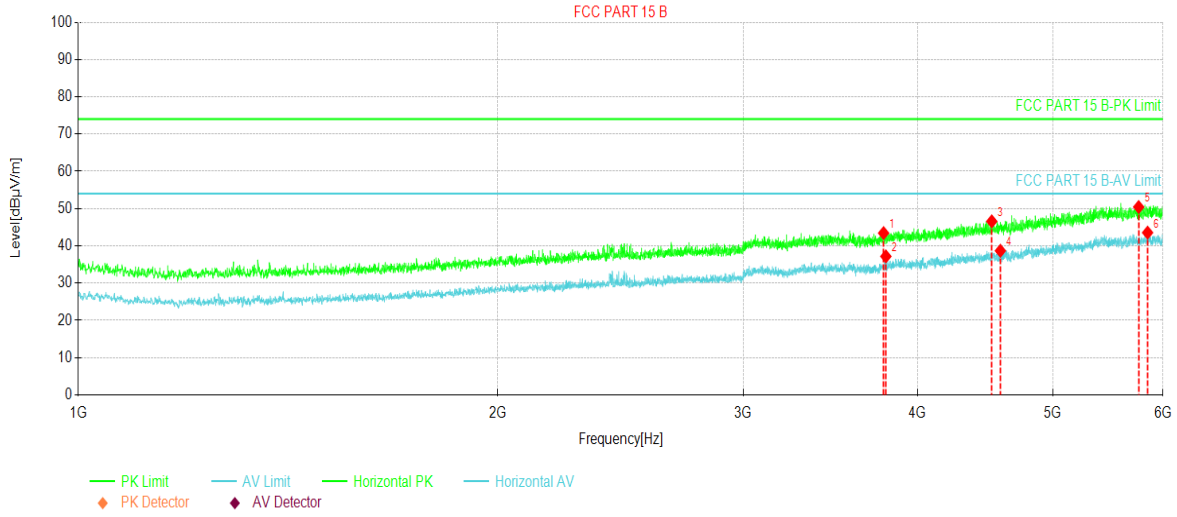


NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	3634.37	58.17	43.41	-14.76	74.00	30.59	PK	Vertical
2	3636.25	49.84	35.09	-14.75	54.00	18.91	AV	Vertical
3	4627.50	57.04	46.86	-10.18	74.00	27.14	PK	Vertical
4	4678.75	49.38	39.52	-9.86	54.00	14.48	AV	Vertical
5	5380.62	55.62	49.55	-6.07	74.00	24.45	PK	Vertical
6	5434.37	48.90	42.92	-5.98	54.00	11.08	AV	Vertical

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:	CALF Speaker Microphone	Product Model:	M1
Test By:	Mike	Test mode:	Charging+Playing mode
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24℃ Huni: 57%



NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	3781.87	57.40	43.41	-13.99	74.00	30.59	PK	Horizontal
2	3796.25	51.07	37.17	-13.90	54.00	16.83	AV	Horizontal
3	4521.87	57.28	46.57	-10.71	74.00	27.43	PK	Horizontal
4	4586.87	49.09	38.67	-10.42	54.00	15.33	AV	Horizontal
5	5763.75	55.62	50.41	-5.21	74.00	23.59	PK	Horizontal
6	5849.37	48.55	43.55	-5.00	54.00	10.45	AV	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.*