Certificate # 2861.01

Test Report

Verified code: 827527

Report No.: E20240129370001-28

Customer:	Lumi United Technology Co., Ltd
Address:	B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China
Sample Name:	Aqara Keypad
Sample Model:	KP-X01D
Receive Sample Date:	Feb.01,2024
Test Date:	Apr.16,2024 ~ Apr.25,2024
Reference Document:	47 CFR, FCC Part 15 Subpart C RADIO FREQUENCY DEVICES:Subpart C—Intentional Radiators
Test Result:	Pass

Prepared by: Chen Xiaocong — Chen Xiaocong

Reviewed by: Jiang Tao — Jiang Tao

Approved by: Xiao Liang — Xiao Liang

GRG METROLOGY&TEST GROUP CO.,LTD. GRGTEST APPROVED(03)

GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2024-04-26

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Statement

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2. The sample information is provided by the client and responsible for its authenticity; The content of the report is only valid for the samples sent this time.

3. When there are reports in both Chinese and English, the Chinese version will prevail when the language problems are inconsistent.

4. If there is any objection concerning the report, please inform us within 15 days from the date of receiving the report.

5. Without the agreement of the laboratory, the client is not authorized to use the test results for unapproved propaganda.

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20240129370001-28	Original Issue	2024-04-25

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1. TEST RESULT SUMMARY

Technical Requirements		
47 CFR, FCC Part 15 Subpart C, ANSI C63.10:2020		
Item	**Limit / Severity**	**Result**
Antenna requirements	§15.203	Pass
Radiated Spurious Emissions	§15.225(a),(b),(c),(d) & §15.209& §15.205	Pass
20dB Bandwidth	§15.215	Pass
Frequency Stability Tolerance	§15.225(e)	Pass
AC Conducted Emission	§15.207	Pass

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2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name:	Lumi United Technology Co., Ltd
Address:	B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.2 MANUFACTURER

Name:	Lumi United Technology Co., Ltd
Address:	B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment:	Aqara Keypad
Model No.:	KP-X01D
Adding Model:	/
Model Differences:	/
Trade Name:	Aqara
FCC ID:	2AKIT-KPX01D
Power supply:	4 LR3 AAA 1.5V Batteries(DC 6V) DC 12-24V,0.5A AC 12-24V,0.5A
Frequency Range:	13.56MHz
Modulation type:	ASK
Antenna Specification:	Coil Antenna with 1dBi gain (Max.)
Temperature Range:	-15 ℃~66 ℃
Hardware Version:	V2.1
Software Version:	V0019
Sample No:	E20240129370001-0015
Note:	The EUT antenna gain is provided by the applicant. This report is made solely on the basis of such data and/or information. We accept no responsibility for the authenticity and completeness of the above data and information and the validity of the results and/or conclusions.

2.4 TEST OPERATION MODE

Test Item	Mode 1	Mode 2	Test Frequency
Conducted Spurious Emission	Continuously Transmitting	Intermittent Transmitting	13.56MHz
Radiated Spurious Emission	Continuously Transmitting	Intermittent Transmitting	13.56MHz
20dB Bandwidth	Continuously Transmitting	Intermittent Transmitting	13.56MHz
Frequency Stability Tolerance	Continuously Transmitting	Intermittent Transmitting	13.56MHz

NOTE: 1.Mode 1 is the EUT continuous transmitting; Mode 2 is the EUT intermittent transmitting.

2.5 LOCAL SUPPORTIVE

Name of Equipment	Manufacturer	Model	Serial Number	Note
Adapter	XIAO ER DUO	HMQ-Z24T-24C	/	/
AC power converter	JS	JS-AC2410	/	/

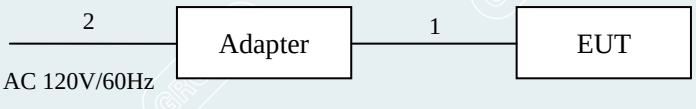
No.	Cable Type	Qty.	Shielded Type	Ferrite Core(Qty.)	Length
1	DC cable	1	No	0	0.4m
2	AC cable	1	No	0	0.7m

2.6 CONFIGURATION OF SYSTEM UNDER TEST

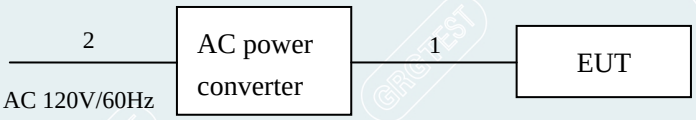
Mode 1&Mode2:

Power supply: 4 LR3 AAA 1.5V Batteries

Power supply: DC 24V power by Adapter



Power supply: AC 24V power by AC power converter



3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.

Add	:	Address: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen, 518110, People's Republic of China
P.C.	:	518110
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Fax	:	0755-61180008

3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to GB/T 27025(ISO/IEC 17025:2017)

USA	A2LA(Certificate #2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	ISED (Company Number: 24897，CAB identifier:CN0069)
USA	FCC (Registration Number: 759402，Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site, http://www.grgtest.com

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4. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		Frequency	Uncertainty
Radiated Emission	X	9kHz～30MHz	4.4dB
	Y	9kHz～30MHz	4.4dB
	Z	9kHz～30MHz	4.4dB
	Horizontal	30MHz～200MHz	4.6dB
		200MHz～1000MHz	4.8dB
	Vertical	30MHz～200MHz	4.7dB
		200MHz～1000MHz	4.7dB
Conduction Emission		150kHz～30MHz	3.3dB

Measurement	Uncertainty
RF frequency	6.0×10^{-6}
Occupied channel bandwidth	0.4 dB
Humidity	6.0 %
Temperature	2.0℃

Note: This uncertainty represents an expanded uncertainty factor of *k*=2. This uncertainty represents an expanded uncertainty expressed at approximately the 95%.

5. LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Radiated Spurious Emission				
Test S/W	FARAD	EZ	CCS-03A1	/
Spectrum Analyzer	R&S	FSV30	MY52221469	2024/10/13
Bi-log Antenna	Schwarzbeck	VULB9160	VULB9160-3402	2024/10/06
Loop Antenna	Schwarzbeck	FMZB 1513-60	1513-60-56	2024/07/15
Receiver	R&S	ESR26	101758	2024/09/22
Amplifier	Tonscend	TAP01018048	AP20E8060075	2025/03/01
Amplifier	Tonscend	DLNA-30M1G-G41	20200928002	2024/10/24
Test S/W	Tonscend	JS32-RE		
20dB Bandwidth &Frequency Stability Tolerance				
Spectrum Analyzer	R&S	FSV30	MY52221469	2024/10/13
Programmable constant temperature and humidity test chamber	FUTEST	FPHC-23AW-40	FD202306015	2024/09/10
DC power source	KEYSIGHT	E36131A	MY59001135	2024/09/22
Conduction Emission				
EZ-EMC	FARAD	EZ_EMC	CCS-3A1-CE	/
EMI Receiver	R&S	ESCI	100783	2024/08/11
LISN(EUT)	R&S	ENV216	101543	2024/09/10

Note: The calibration cycle of the above instruments is 12 months.

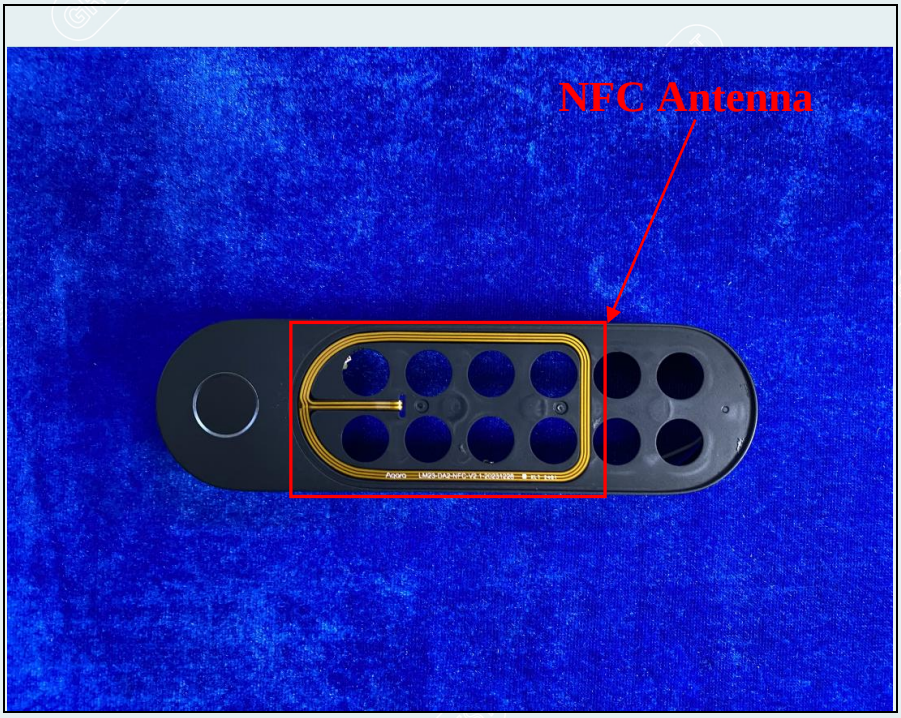
6. ANTENNA REQUIREMENTS

6.1 LIMIT

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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

6.2 TEST RESULT

The antenna is PCB antenna, so compliance with antenna requirements.



7. CONDUCTED EMISSION MEASUREMENT

7.1 LIMITS

Frequency range	Limits (dBμV)	
	Quasi-peak	Average
150kHz～0.5MHz	66～56	56～46
0.5MHz～5MHz	56	46
5MHz～30MHz	60	50

NOTE: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the range of 150 kHz to 0.5MHz.

7.2 TEST PROCEDURES

Procedure of Preliminary Test

Test procedures follow ANSI C63.10:2020.

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

– Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:

1) place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or

2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;

– All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;

– The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;

– Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.

– I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

– Use serial board or connecting line to make EUT and notebook to communicate, according to the actual need to make EUT send constant frequency signal continuously.

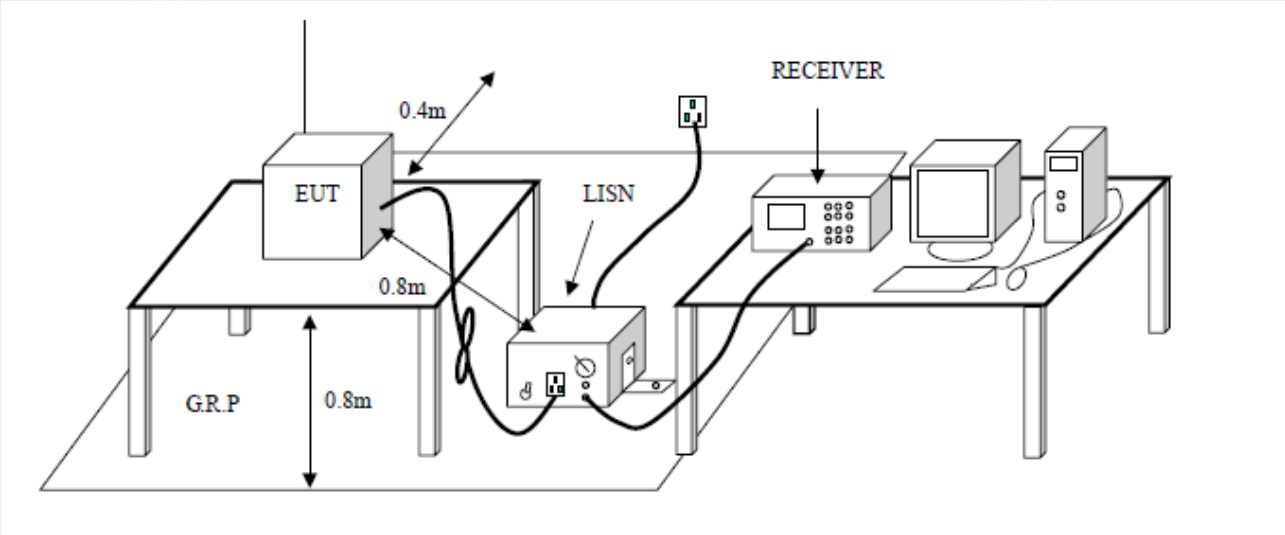
The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level.The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was

recorded.

7.3 TEST SETUP



7.4 DATA SAMPLE

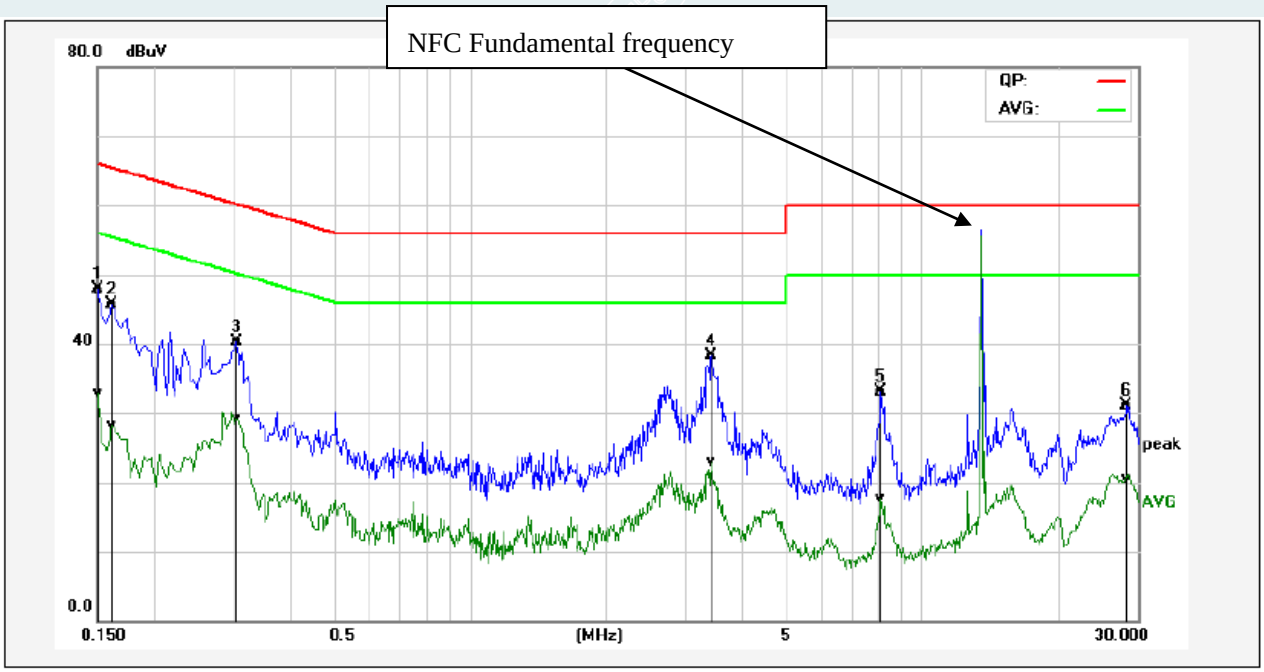
Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62	Pass

Factor = Insertion loss of LISN + Cable Loss
Result = Quasi-peak Reading/ Average Reading + Factor
Limit = Limit stated in standard
Margin = Result (dBuV) – Limit (dBuV)

7.5 TEST RESULTS

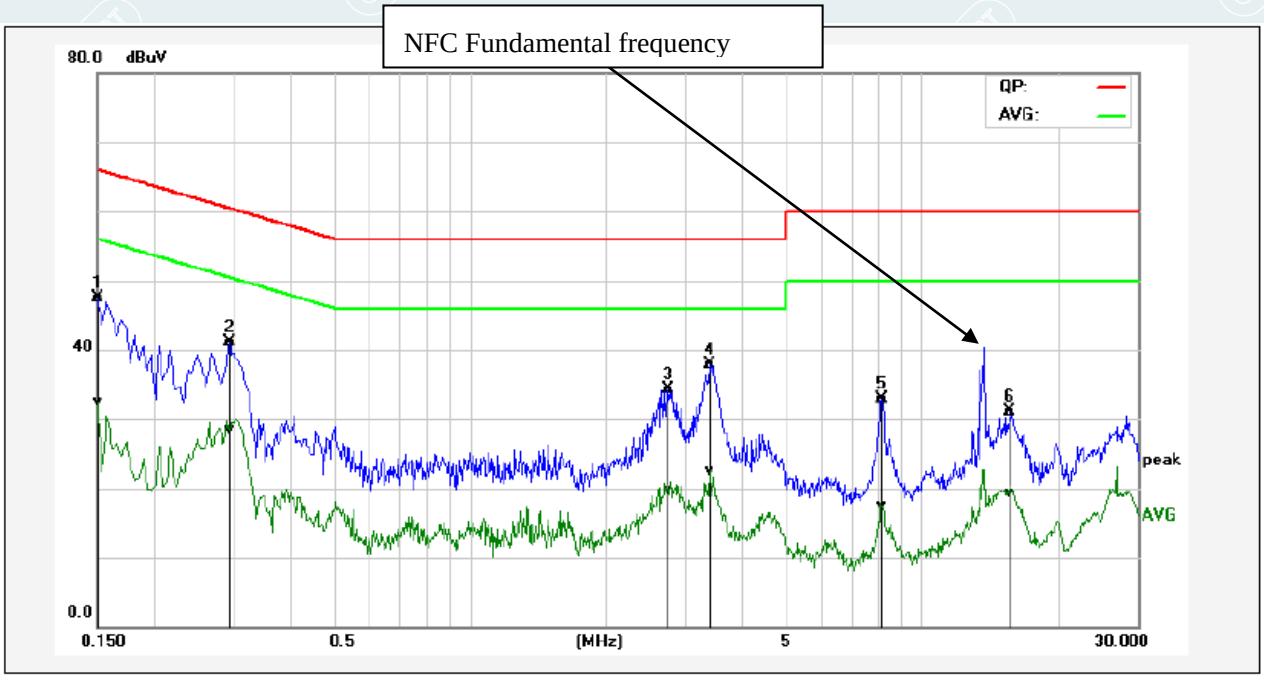
Power supply: DC 24V power by Adapter

Project No	Aqara Keypad	Test Mode:	Mode 1
Model:	KP-X01D	Sample No:	E20240129370001-0015
Test Frequency:	13.56MHz	Voltage:	AC 120V/60Hz
Environment:	21.0℃/45%RH/101.0kPa	Engineer:	Yin Xiaogang
Test Date:	2024-04-17	Line	L



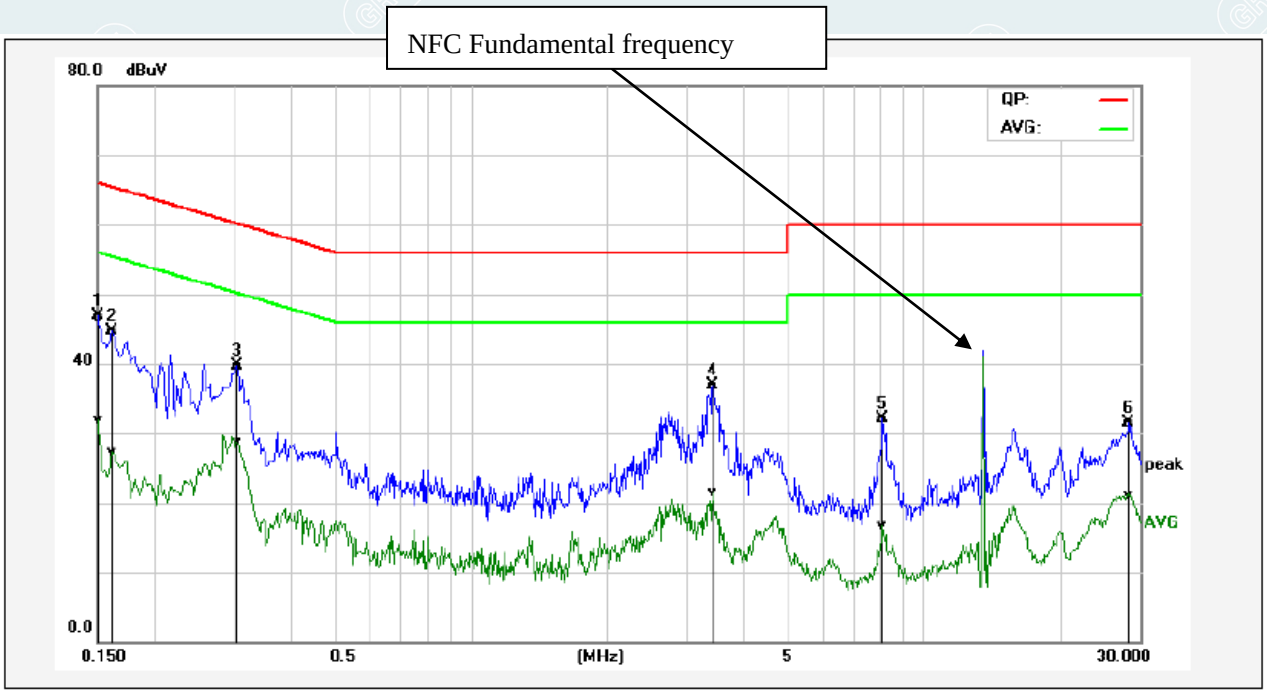
No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1500	38.05	23.14	9.75	47.80	32.89	65.99	56.00	-18.19	-23.11	Pass
2	0.1620	35.99	18.55	9.71	45.70	28.26	65.36	55.36	-19.66	-27.10	Pass
3	0.3060	30.54	19.48	9.68	40.22	29.16	60.08	50.08	-19.86	-20.92	Pass
4*	3.4340	28.49	13.06	9.90	38.39	22.96	56.00	46.00	-17.61	-23.04	Pass
5	8.1260	23.21	7.99	9.80	33.01	17.79	60.00	50.00	-26.99	-32.21	Pass
6	28.3820	20.80	10.36	10.24	31.04	20.60	60.00	50.00	-28.96	-29.40	Pass

Project No	Aqara Keypad	Test Mode:	Mode 1
Model:	KP-X01D	Sample No:	E20240129370001-0011
Mode:	13.56MHz TX	Voltage:	AC 120V/60Hz
Environment:	21.0℃/45%RH/101.0kPa	Engineer:	Yin Xiaogang
Test Date:	2024-04-17	Line	N



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1500	37.73	22.84	9.70	47.43	32.54	65.99	56.00	-18.56	-23.46	Pass
2	0.2940	31.40	18.82	9.68	41.08	28.50	60.41	50.41	-19.33	-21.91	Pass
3	2.7540	24.32	9.90	9.90	34.22	19.80	56.00	46.00	-21.78	-26.20	Pass
4*	3.3940	27.95	12.57	9.89	37.84	22.46	56.00	46.00	-18.16	-23.54	Pass
5	8.1860	23.01	7.71	9.84	32.85	17.55	60.00	50.00	-27.15	-32.45	Pass
6	15.6900	21.09	9.16	10.07	31.16	19.23	60.00	50.00	-28.84	-30.77	Pass

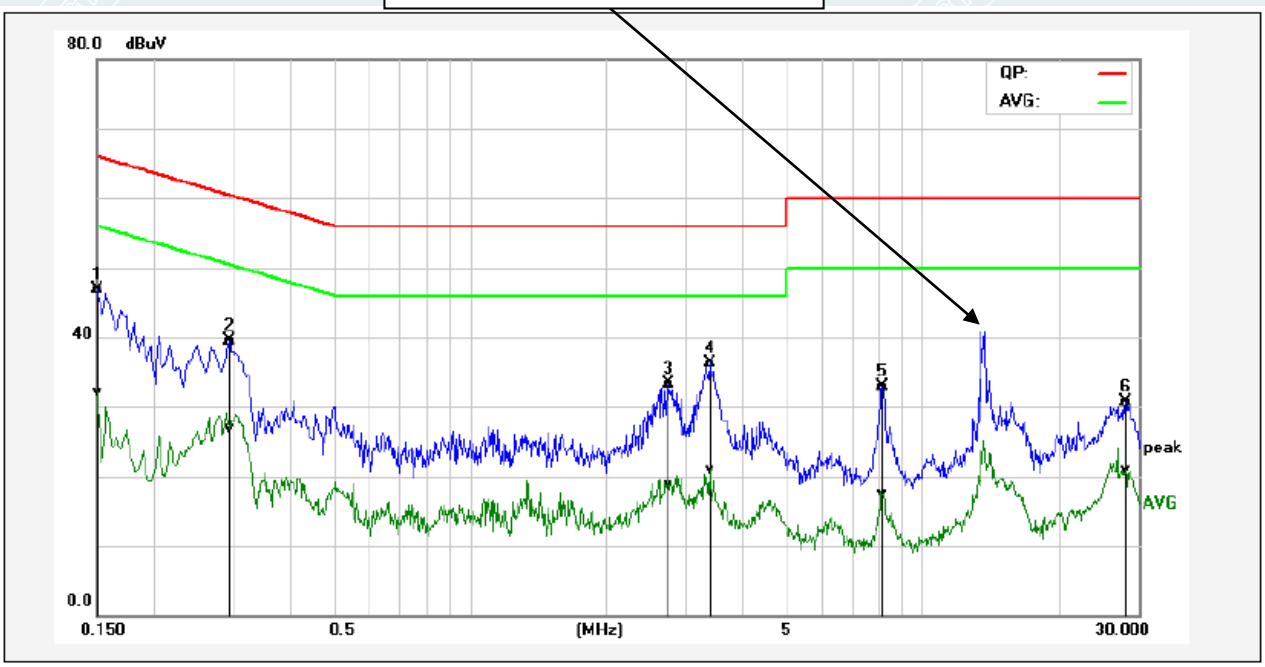
Project No	Aqara Keypad	Test Mode:	Mode 2
Model:	KP-X01D	Sample No:	E20240129370001-0015
Test Frequency:	13.56MHz	Voltage:	AC 120V/60Hz
Environment:	21.0℃/45%RH/101.0kPa	Engineer:	Yin Xiaogang
Test Date:	2024-04-17	Line	L



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1500	37.05	22.14	9.75	46.80	31.89	65.99	56.00	-19.19	-24.11	Pass
2	0.1620	34.99	17.55	9.71	44.70	27.26	65.36	55.36	-20.66	-28.10	Pass
3	0.3060	30.04	18.98	9.68	39.72	28.66	60.08	50.08	-20.36	-21.42	Pass
4*	3.4340	26.99	11.56	9.90	36.89	21.46	56.00	46.00	-19.11	-24.54	Pass
5	8.1260	22.21	6.99	9.80	32.01	16.79	60.00	50.00	-27.99	-33.21	Pass
6	28.3820	21.30	10.86	10.24	31.54	21.10	60.00	50.00	-28.46	-28.90	Pass

Project No	Aqara Keypad	Test Mode:	Mode 2
Model:	KP-X01D	Sample No:	E20240129370001-0011
Mode:	13.56MHz TX	Voltage:	AC 120V/60Hz
Environment:	21.0℃/45%RH/101.0kPa	Engineer:	Yin Xiaogang
Test Date:	2024-04-17	Line	N

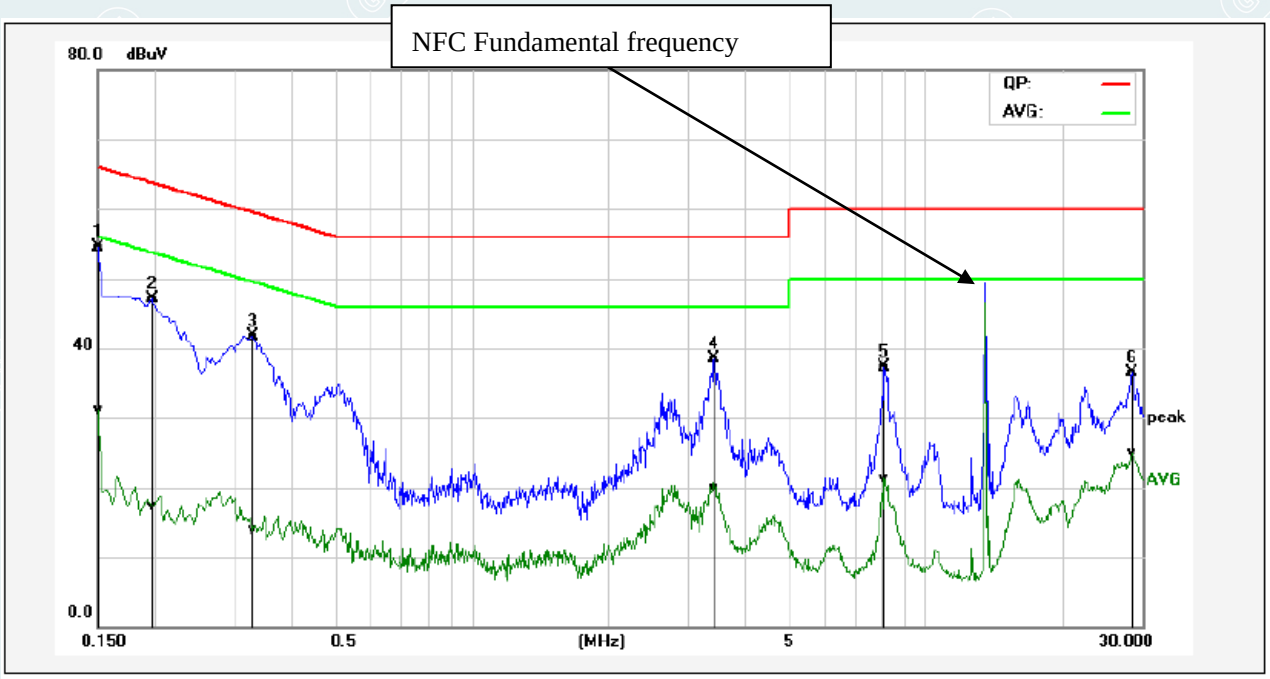
NFC Fundamental frequency



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.1500	37.23	22.34	9.70	46.93	32.04	65.99	56.00	-19.06	-23.96	Pass
2	0.2940	29.90	17.32	9.68	39.58	27.00	60.41	50.41	-20.83	-23.41	Pass
3	2.7540	23.32	8.90	9.90	33.22	18.80	56.00	46.00	-22.78	-27.20	Pass
4	3.3940	26.45	11.07	9.89	36.34	20.96	56.00	46.00	-19.66	-25.04	Pass
5	8.1860	23.01	7.71	9.84	32.85	17.55	60.00	50.00	-27.15	-32.45	Pass
6	28.1300	20.36	10.51	10.30	30.66	20.81	60.00	50.00	-29.34	-29.19	Pass

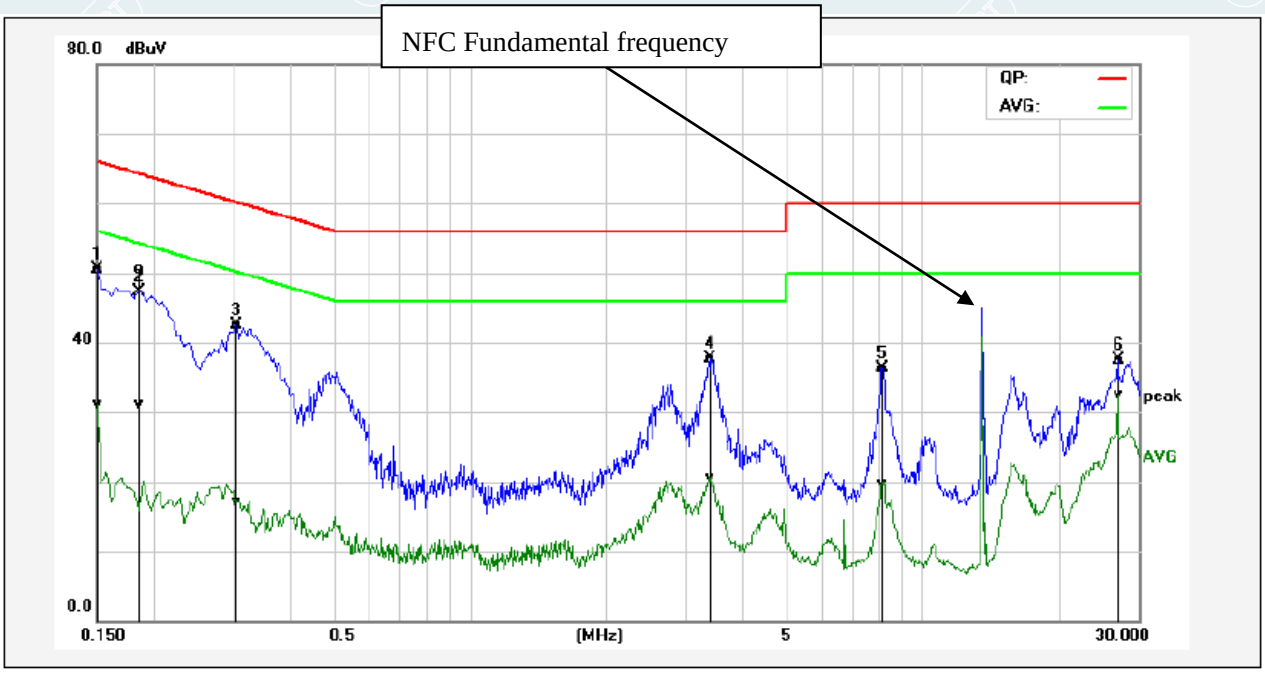
Power supply: AC 24V power by Adapter

Project No	Aqara Keypad	Test Mode:	Mode 1
Model:	KP-X01D	Sample No:	E20240129370001-0015
Mode:	13.56MHz TX	Voltage:	AC 120V/60Hz
Environment:	21.0℃/45%RH/101.0kPa	Engineer:	Yin Xiaogang
Test Date:	2024-04-17	Line	L



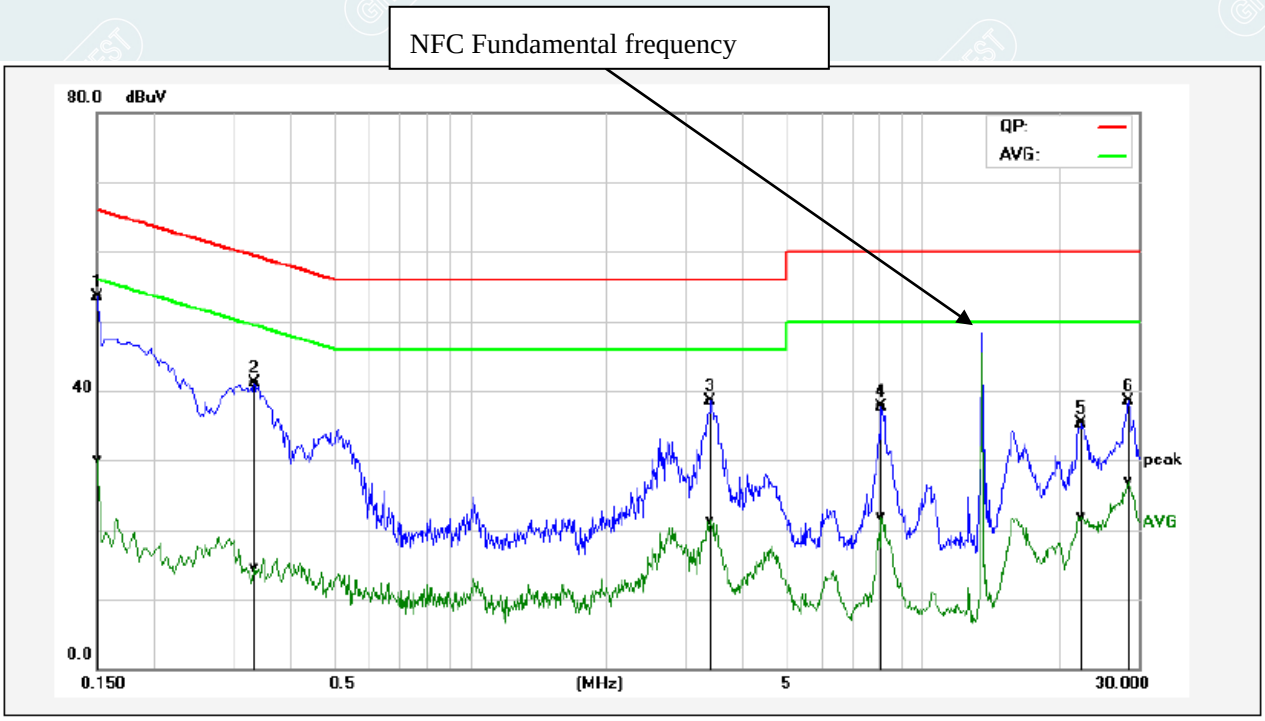
No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.1500	44.83	21.34	9.75	54.58	31.09	65.99	56.00	-11.41	-24.91	Pass
2	0.1980	37.39	7.55	9.69	47.08	17.24	63.69	53.69	-16.61	-36.45	Pass
3	0.3300	32.08	4.21	9.68	41.76	13.89	59.45	49.45	-17.69	-35.56	Pass
4	3.4260	28.53	10.03	9.91	38.44	19.94	56.00	46.00	-17.56	-26.06	Pass
5	8.1260	27.47	11.55	9.80	37.27	21.35	60.00	50.00	-22.73	-28.65	Pass
6	28.4940	26.32	14.62	10.24	36.56	24.86	60.00	50.00	-23.44	-25.14	Pass

Project No	Aqara Keypad	Test Mode:	Mode 1
Model:	KP-X01D	Sample No:	E20240129370001-0011
Mode:	13.56MHz TX	Voltage:	AC 120V/60Hz
Environment:	21.0℃/45%RH/101.0kPa	Engineer:	Yin Xiaogang
Test Date:	2024-04-17	Line	N



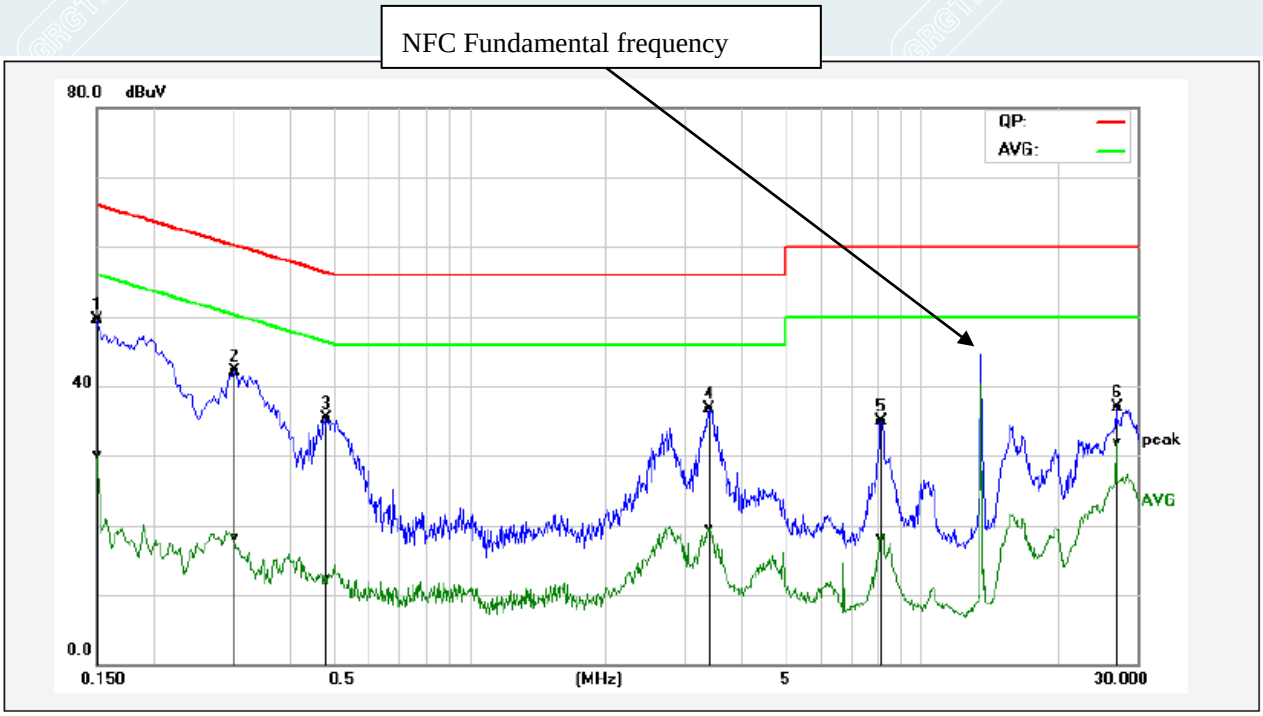
No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1500	40.72	21.46	9.70	50.42	31.16	65.99	56.00	-15.57	-24.84	Pass
2*	0.1864	40.75	21.49	9.67	50.42	31.16	64.19	54.20	-13.77	-23.04	Pass
3	0.3060	32.84	7.43	9.68	42.52	17.11	60.08	50.08	-17.56	-32.97	Pass
4	3.4060	27.91	10.69	9.88	37.79	20.57	56.00	46.00	-18.21	-25.43	Pass
5	8.1820	26.56	9.78	9.84	36.40	19.62	60.00	50.00	-23.60	-30.38	Pass
6	27.1220	27.15	22.15	10.29	37.44	32.44	60.00	50.00	-22.56	-17.56	Pass

Project No	Aqara Keypad	Test Mode:	Mode 2
Model:	KP-X01D	Sample No:	E20240129370001-0015
Mode:	13.56MHz TX	Voltage:	AC 120V/60Hz
Environment:	21.0℃/45%RH/101.0kPa	Engineer:	Yin Xiaogang
Test Date:	2024-04-17	Line	L



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.1500	43.83	20.34	9.75	53.58	30.09	65.99	56.00	-12.41	-25.91	Pass
2	0.3339	31.47	4.84	9.68	41.15	14.52	59.35	49.35	-18.20	-34.83	Pass
3	3.4140	28.61	11.38	9.91	38.52	21.29	56.00	46.00	-17.48	-24.71	Pass
4	8.1260	27.97	12.05	9.80	37.77	21.85	60.00	50.00	-22.23	-28.15	Pass
5	22.4980	25.12	11.77	10.15	35.27	21.92	60.00	50.00	-24.73	-28.08	Pass
6	28.4940	28.32	16.62	10.24	38.56	26.86	60.00	50.00	-21.44	-23.14	Pass

Project No	Aqara Keypad	Test Mode:	Mode 2
Model:	KP-X01D	Sample No:	E20240129370001-0011
Mode:	13.56MHz TX	Voltage:	AC 120V/60Hz
Environment:	21.0℃/45%RH/101.0kPa	Engineer:	Yin Xiaogang
Test Date:	2024-04-17	Line	N



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.1500	39.72	20.46	9.70	49.42	30.16	65.99	56.00	-16.57	-25.84	Pass
2	0.3034	32.38	8.44	9.68	42.06	18.12	60.15	50.15	-18.09	-32.03	Pass
3	0.4860	25.66	2.38	9.68	35.34	12.06	56.24	46.24	-20.90	-34.18	Pass
4	3.4060	26.91	9.69	9.88	36.79	19.57	56.00	46.00	-19.21	-26.43	Pass
5	8.1820	25.06	8.28	9.84	34.90	18.12	60.00	50.00	-25.10	-31.88	Pass
6	27.1220	26.65	21.65	10.29	36.94	31.94	60.00	50.00	-23.06	-18.06	Pass

8. RADIATED SPURIOUS EMISSIONS

8.1 LIMITS

IN BAND SPURIOUS EMISSIONS

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

OUT BAND RADIATED SPURIOUS EMISSIONS

Frequency (MHz)	Quasi-peak(μV/m)	Measurement distance(m)	Quasi-peak(dBμV/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5~93.8
0.490-1.705	24000/F(kHz)	30	73.8~63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

NOTE: (1) The lower limit shall apply at the transition frequencies.

8.2 TEST PROCEDURES

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0 °to 360 °.

--- The antenna height is 1.0 meter.

--- The antenna is polarized X,Y and Z.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the pre measurement the software maximizes by rotating the turntable position (0 °to 360 °) and by rotating the elevation axes (0 °to 360 °).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QP detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0 °to 360 °.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 4 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of pre measurement the software maximize the peaks by changing turntable position (0 °to 360 °) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

Remark: Pre-scan all modes, mode 1 is the worst mode. Therefore, only the data of mode 1 is recorded in the report.

8.3 MEASURING INSTRUMENTS SETTING

Frequency (MHz)	Instrument	Detector	Resolution Bandwidth	Video Bandwidth
0.009 to 30	Receiver	QP	200Hz: 0.009 to 0.15MHz 10kHz: 0.15 to 30MHz	3*RBW
30 to 1000	Receiver	QP	120kHz	3*RBW

8.4 TEST SETUP

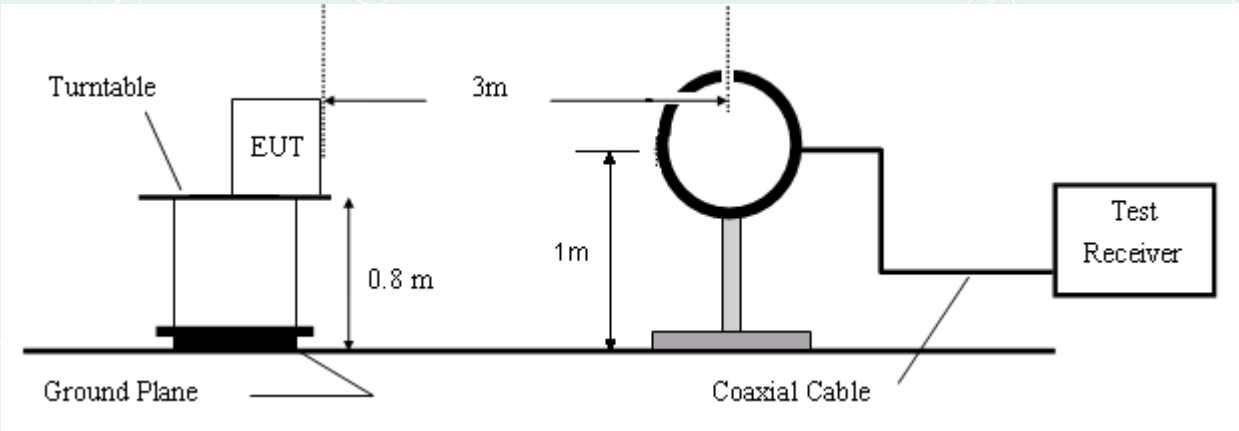


Figure 1. 9kHz to 30MHz radiated emissions test configuration

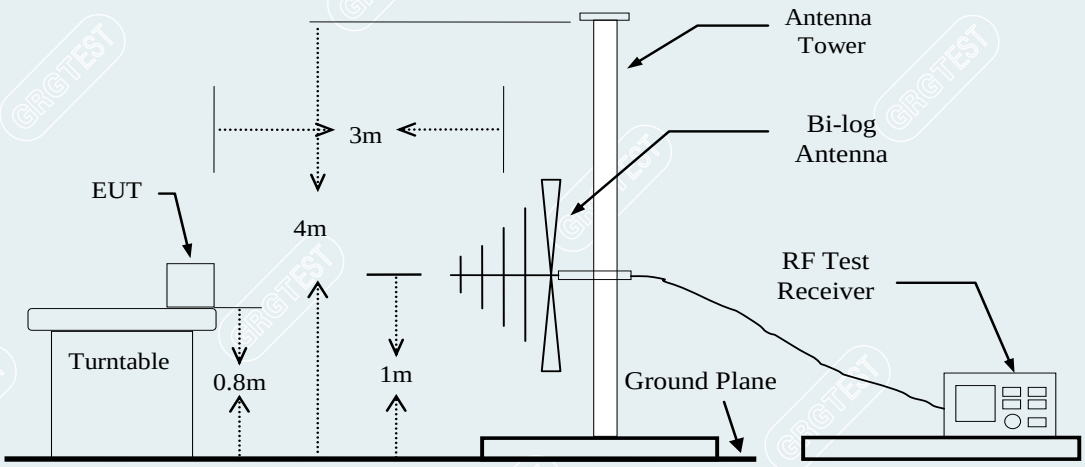


Figure 2. 30MHz to 1GHz radiated emissions test configuration

8.5 DATA SAMPLE

0.009MHz to 30MHz

No.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.5597	42.14	63.29	21.15	123.99	60.70	100	282	X

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV/m) = Uncorrected Analyzer / Receiver reading
Factor (dB) = Antenna factor + Cable loss – Amplifier gain
Level (dBuV/m) = Reading (dBuV/m) + Factor (dB)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Limit (dBuV/m) – Level (dBuV/m)
Polarity = Antenna polarization

30MHz to 1GHz

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Heigh (cm)	Detectortype
XXX.XXXX	48.49	-9.91	38.58	47.00	-8.42	100	108	QP

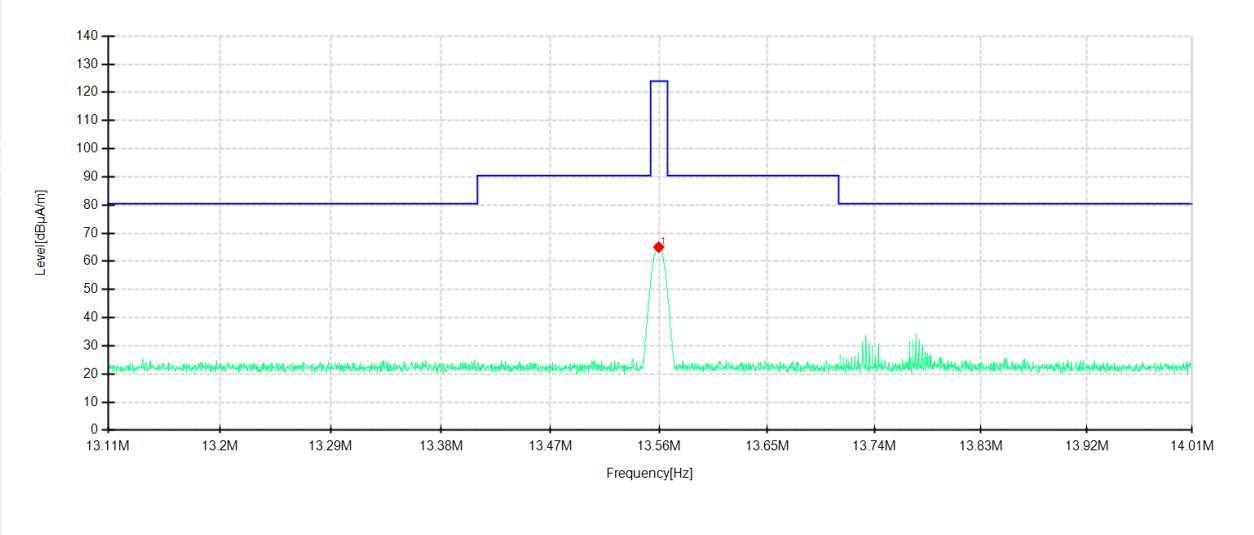
Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correct Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Correct Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m)-Limit (dBuV/m)
Peak = Peak Reading
QP = Quasi-peak Reading

8.6 TEST RESULTS

8.6.1 IN BAND RADIATED SPURIOUS EMISSIONS

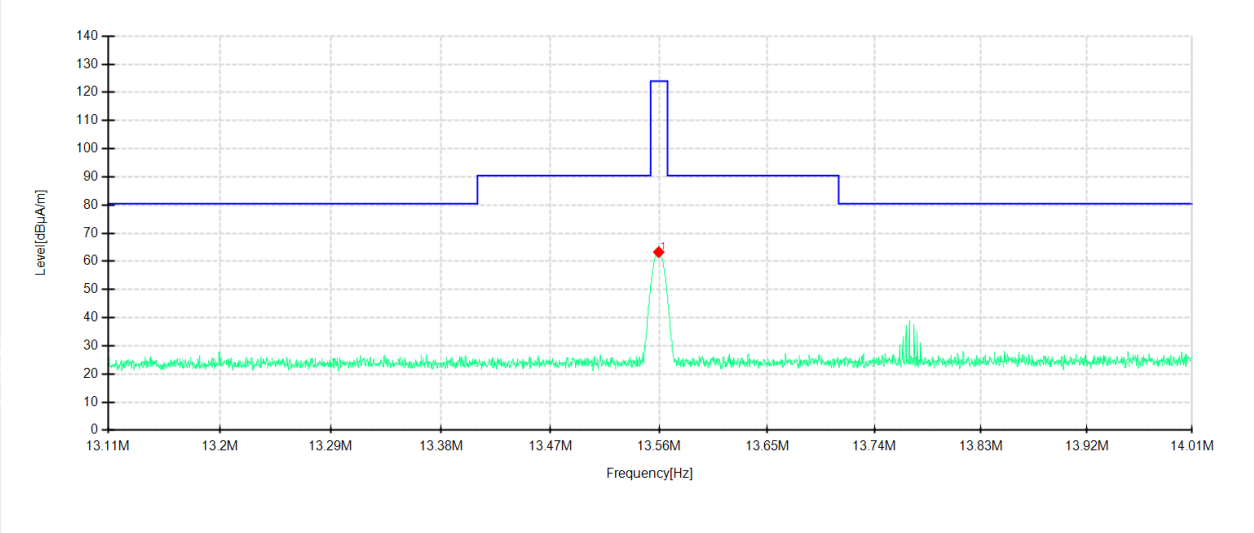
Pre-scan all modes, the worst power supply is 4 LR3 AAA 1.5V Batteries. In the three power supply modes(4 LR3 AAA 1.5V Batteries, DC 24V power by Adapter and AC 24V power by AC power converter), only the worst power supply mode is recorded in this report.

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	DC 6V
Environment:	22.5℃/52%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-18	/	/



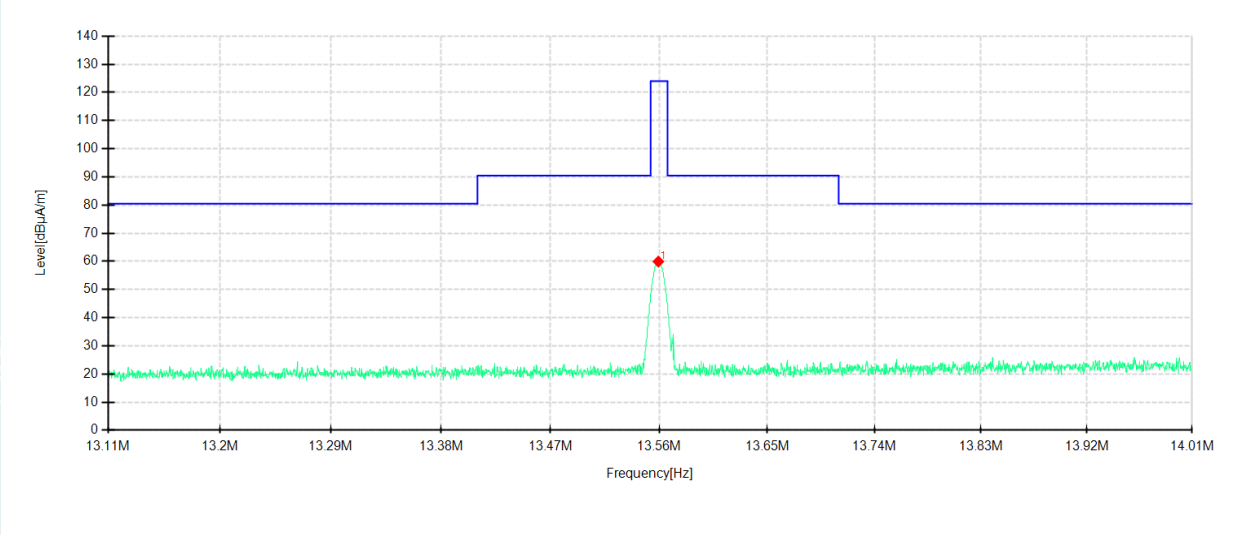
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.5597	35.12	65.05	21.15	124.00	58.95	100	21	X

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	DC 6V
Environment:	22.5℃/52%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-18	/	/



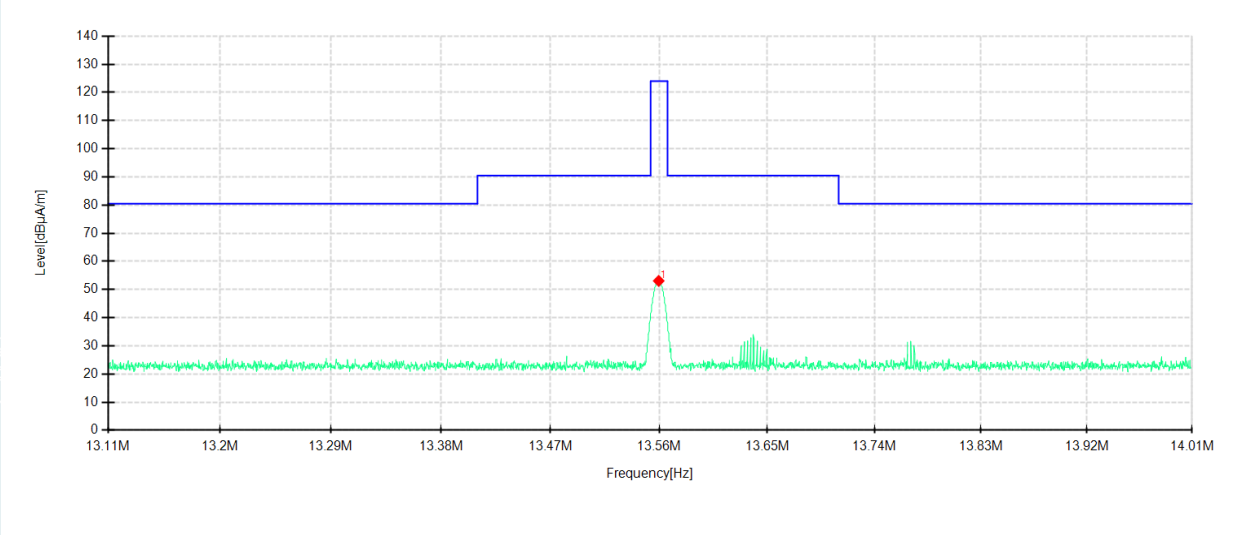
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.5597	42.14	63.29	21.15	124.00	60.71	100	282	Y

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	DC 6V
Environment:	22.5℃/52%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-18	/	/



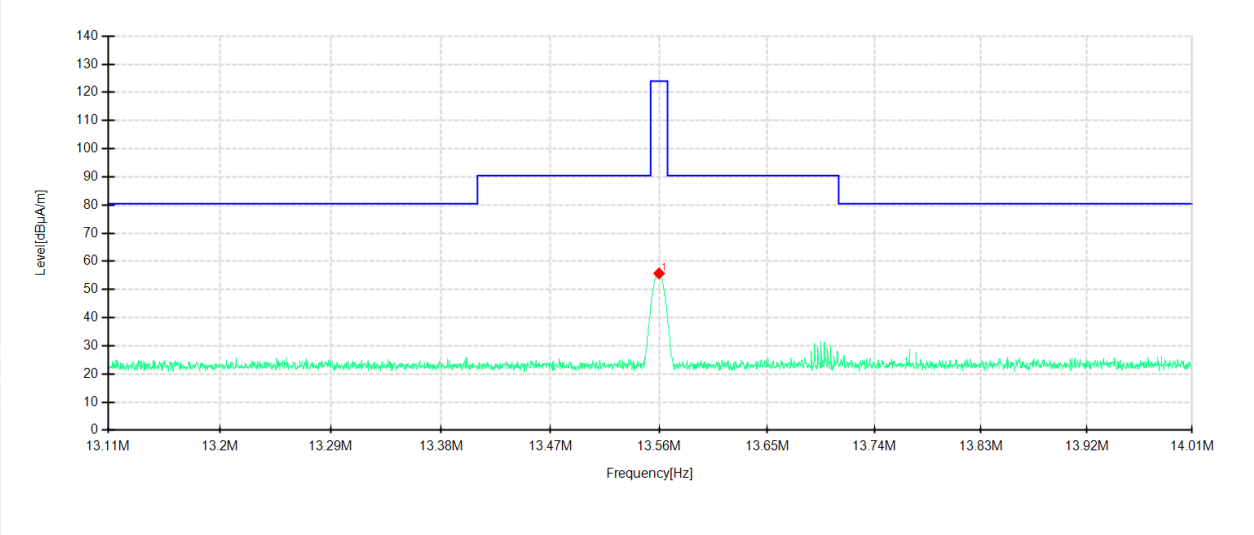
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.5597	38.79	59.94	21.15	124.00	64.06	100	76	Z

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	DC 6V
Environment:	25.0℃/60%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/



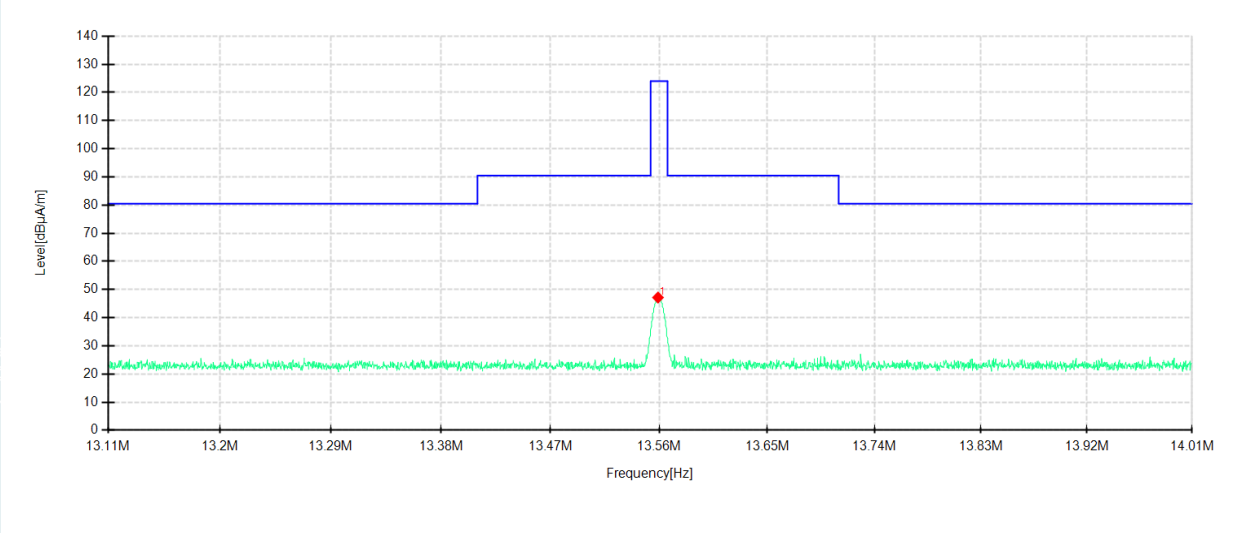
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.5597	31.91	53.06	21.15	124.00	70.94	100	351	X

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	DC 6V
Environment:	25.0℃/60%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.5600	34.57	55.72	21.15	124.00	68.28	100	268	Y

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	DC 6V
Environment:	25.0℃/60%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/

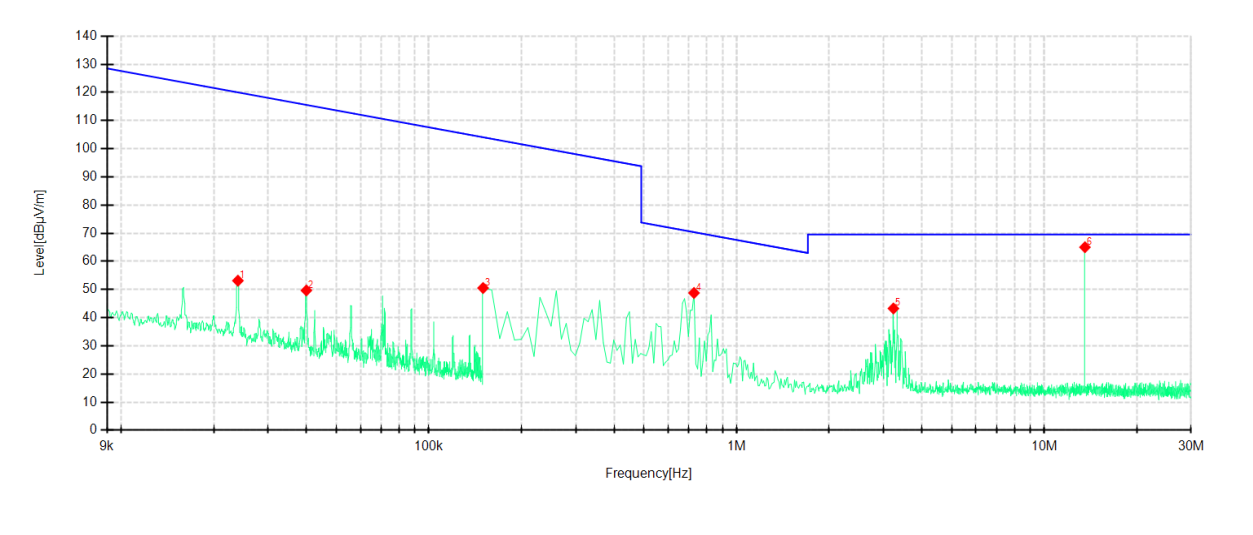


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.5591	26.00	47.15	21.15	124.00	76.85	100	358	Z

8.6.2 OUT BAND RADIATED SPURIOUS EMISSIONS

9kHz-30MHz
Pre-scan all modes, the worst power supply is DC 24V. In the three power supply modes(4 LR3 AAA 1.5V Batteries, DC 24V power by Adapter and AC 24V power by AC power converter), only the worst power supply mode is recorded in this report.

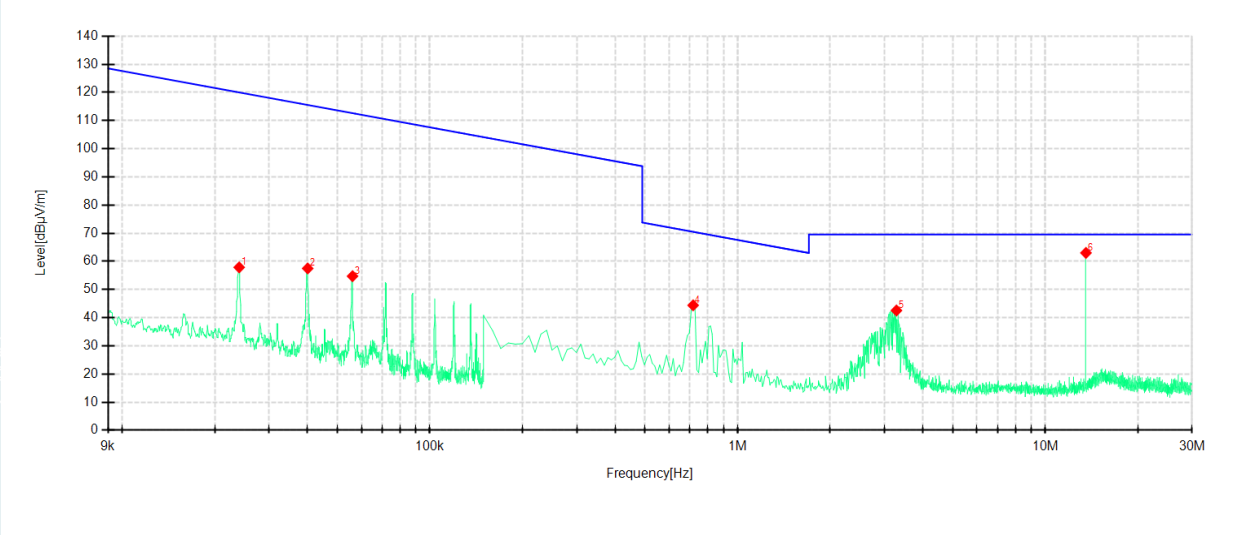
Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	DC 24V
Environment:	22.5℃/52%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-18	/	/



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.0239	33.42	53.13	19.71	120.02	66.89	100	60	X
2	0.0400	30.18	49.68	19.50	115.57	65.89	100	282	X
3	0.1500	30.53	50.54	20.01	104.08	53.54	100	218	X
4	0.7271	28.45	48.78	20.33	70.37	21.59	100	20	X
5	3.2345	22.87	43.27	20.40	69.54	26.27	100	183	X
6	13.562	43.87	65.02	21.15	69.54	4.52	100	20	X

Note:NO.6 is the fundamental frequency point.

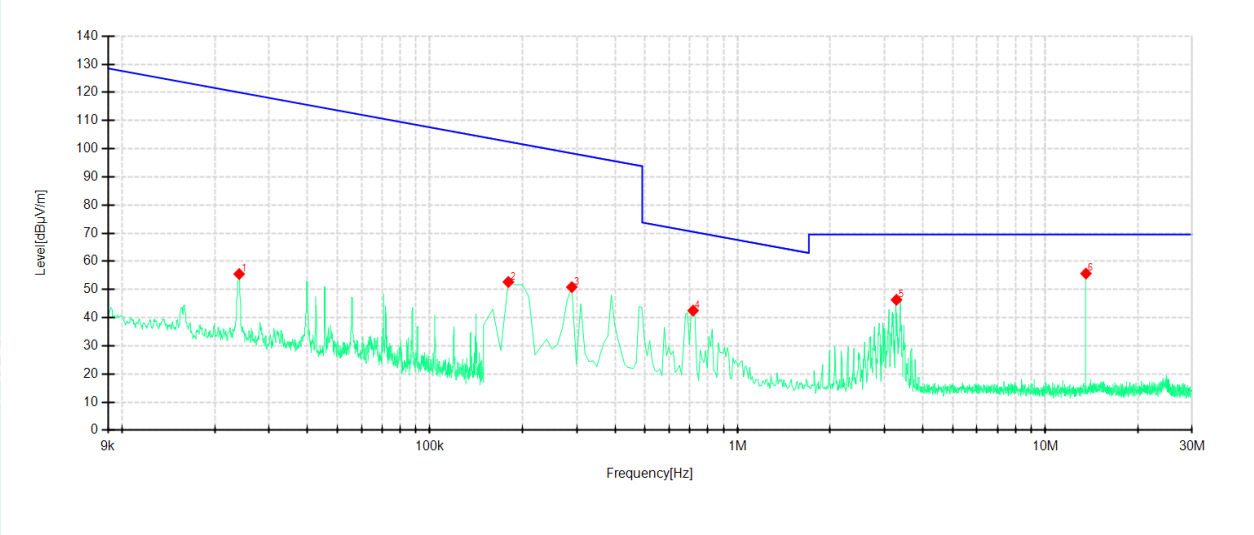
Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	DC 24V
Environment:	22.5℃/52%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-18	/	/



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.0240	38.16	57.87	19.71	120.00	62.13	100	283	Y
2	0.0401	37.99	57.49	19.50	115.55	58.06	100	249	Y
3	0.0560	35.18	54.74	19.56	112.63	57.89	100	236	Y
4	0.7172	24.05	44.39	20.34	70.49	26.10	100	252	Y
5	3.2843	22.14	42.55	20.41	69.54	26.99	100	32	Y
6	13.562	41.86	63.01	21.15	69.54	6.53	100	275	Y

Note:NO.6 is the fundamental frequency point.

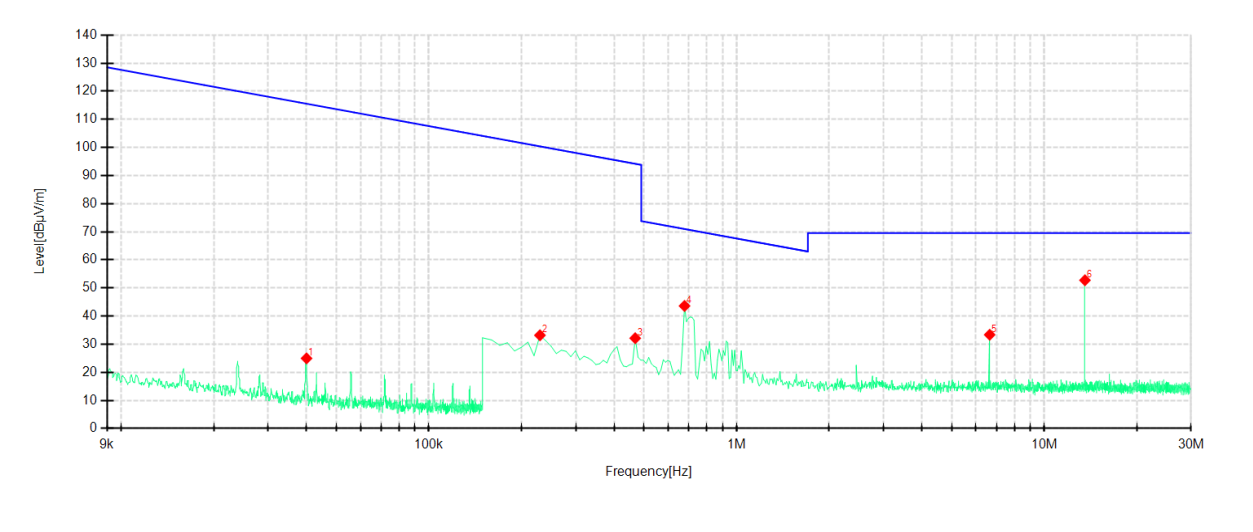
Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	DC 24V
Environment:	22.5℃/52%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-18	/	/



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.0240	35.80	55.51	19.71	120.00	64.49	100	282	Z
2	0.1799	32.52	52.67	20.15	102.51	49.84	100	22	Z
3	0.2893	30.29	50.85	20.56	98.38	47.53	100	22	Z
4	0.7172	22.16	42.50	20.34	70.49	27.99	100	68	Z
5	3.2843	25.94	46.35	20.41	69.54	23.19	100	32	Z
6	13.562	34.52	55.67	21.15	69.54	13.87	100	22	Z

Note:NO.6 is the fundamental frequency point.

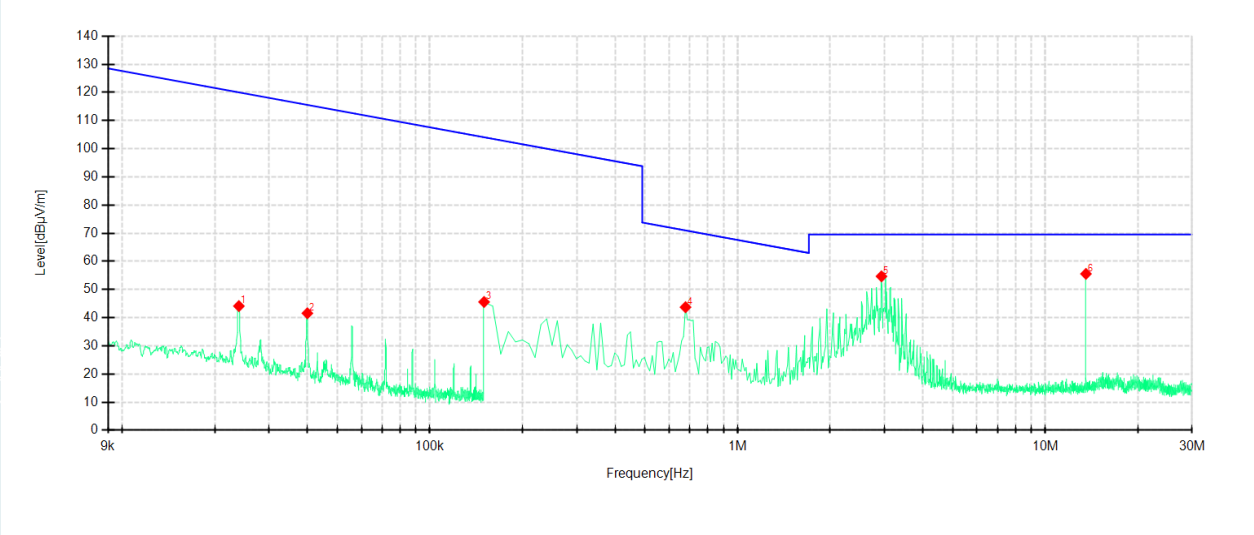
Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	DC 24V
Environment:	25.0℃/50%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.0400	5.46	24.96	19.50	115.56	90.60	100	137	X
2	0.2296	12.82	33.17	20.35	100.38	67.21	100	85	X
3	0.4684	11.71	32.12	20.41	94.19	62.07	100	85	X
4	0.6774	23.26	43.60	20.34	70.99	27.39	100	278	X
5	6.6474	12.61	33.36	20.75	69.54	36.18	100	114	X
6	13.562	31.61	52.76	21.15	69.54	16.78	100	358	X

Note:NO.6 is the fundamental frequency point.

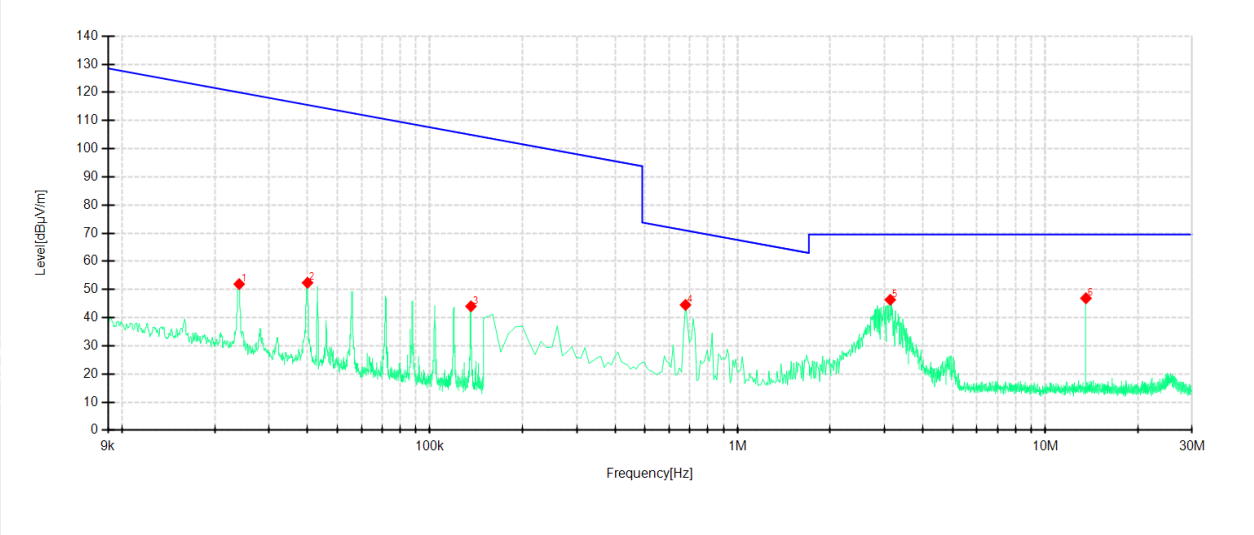
Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	DC 24V
Environment:	25.0℃/50%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.0239	24.40	44.11	19.71	120.02	75.91	100	349	Y
2	0.0400	22.06	41.56	19.50	115.57	74.01	100	291	Y
3	0.1500	25.58	45.59	20.01	104.08	58.49	100	204	Y
4	0.6774	23.38	43.72	20.34	70.99	27.27	100	175	Y
5	2.9360	34.31	54.68	20.37	69.54	14.86	100	225	Y
6	13.562	34.41	55.56	21.15	69.54	13.98	100	96	Y

Note:NO.6 is the fundamental frequency point.

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	DC 24V
Environment:	25.0℃/50%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/



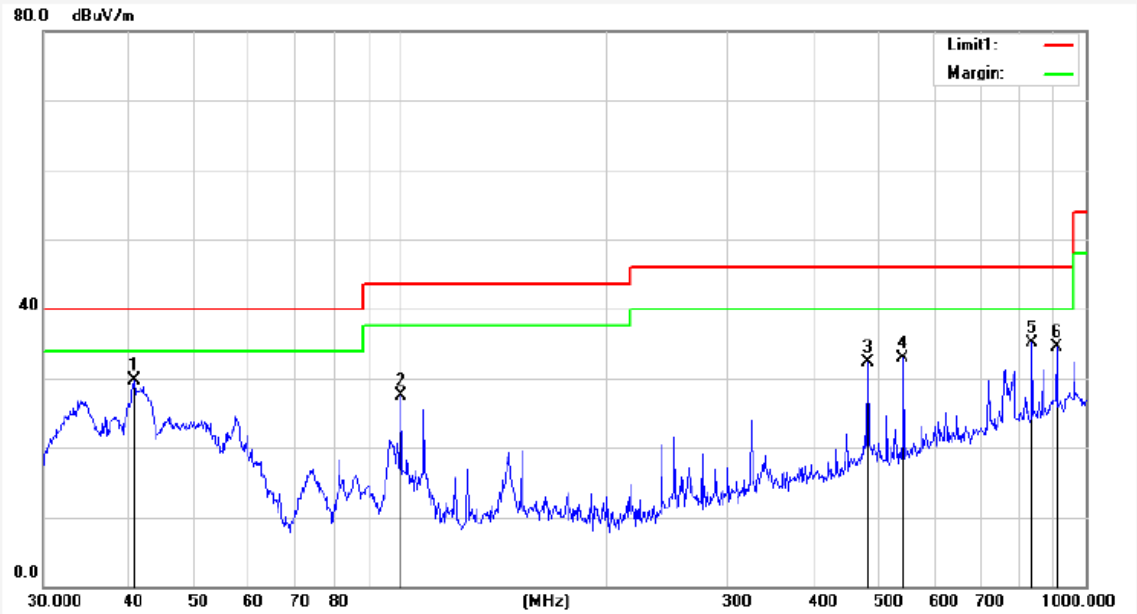
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.0240	32.21	51.92	19.71	120.00	68.08	100	9	Z
2	0.0400	32.89	52.39	19.50	115.56	63.17	100	9	Z
3	0.1360	24.08	44.03	19.95	104.93	60.90	100	23	Z
4	0.6774	24.19	44.53	20.34	70.99	26.46	100	134	Z
5	3.1350	25.95	46.35	20.40	69.54	23.19	100	329	Z
6	13.562	25.74	46.89	21.15	69.54	22.65	100	358	Z

Note:NO.6 is the fundamental frequency point.

30MHz-1GHz
Power supply: 4 LR3 AAA 1.5V Batteries

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	DC 6V
Environment:	23.2℃/49%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-16	/	/

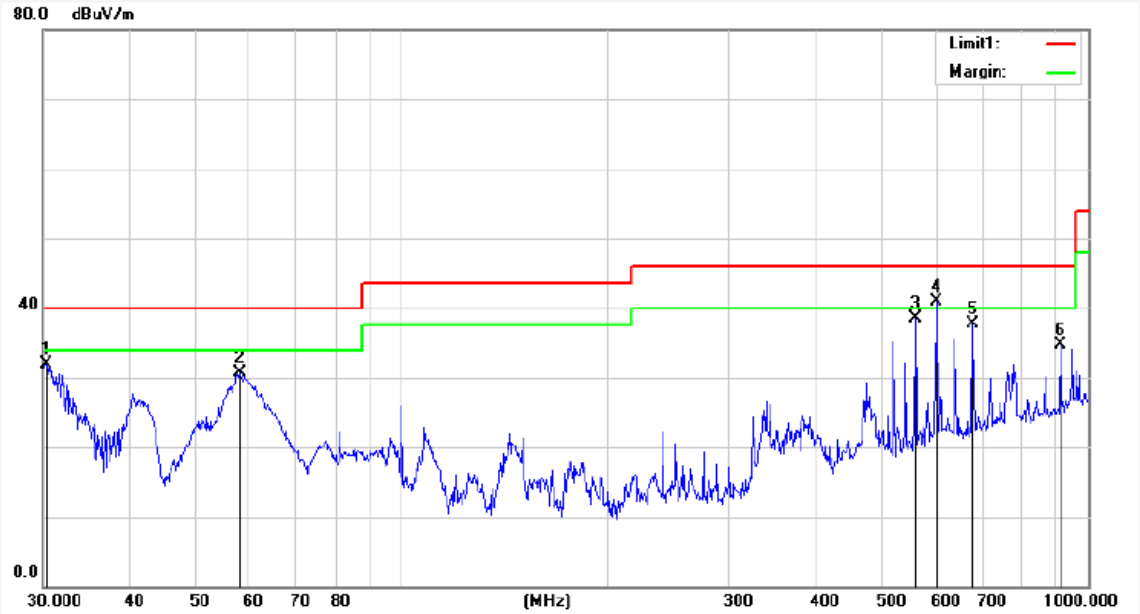
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1*	40.7016	58.55	-28.82	29.73	40.00	-10.27	130	200	QP
2	99.8777	59.10	-31.60	27.50	43.50	-16.00	266	100	QP
3	480.5276	53.81	-21.59	32.22	46.00	-13.78	330	100	QP
4	541.3725	53.52	-20.57	32.95	46.00	-13.05	256	200	QP
5	836.2443	51.33	-16.17	35.16	46.00	-10.84	1	100	QP
6	906.4824	49.84	-15.31	34.53	46.00	-11.47	137	100	QP

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	DC 6V
Environment:	23.2℃/49%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-16	/	/

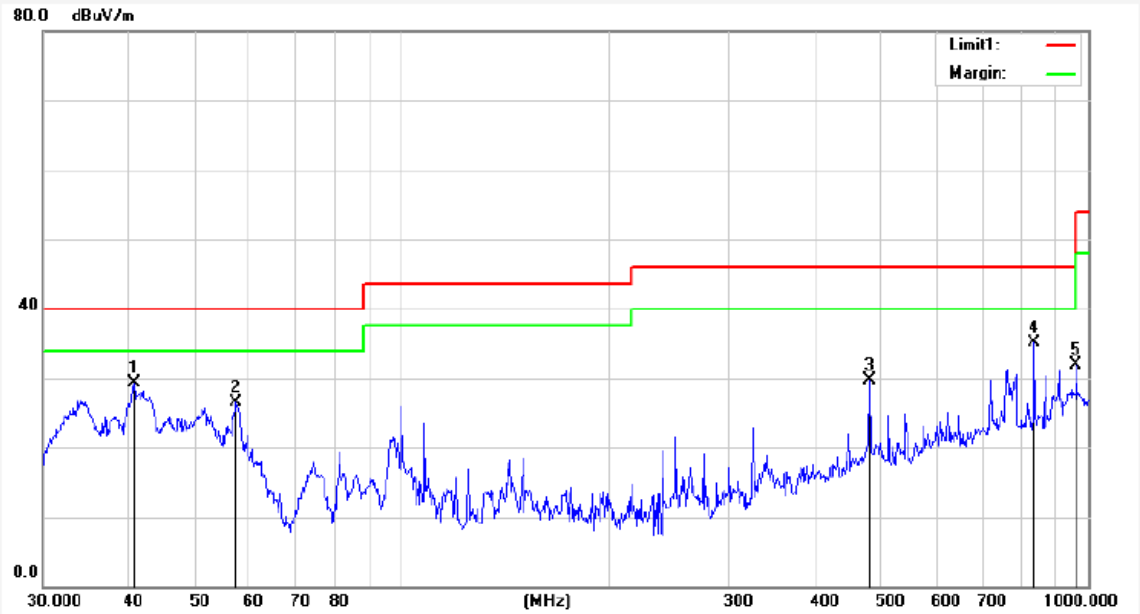
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	30.3173	61.48	-29.59	31.89	40.00	-8.11	129	100	QP
2	57.9993	59.57	-28.87	30.70	40.00	-9.30	191	100	QP
3	560.6928	58.55	-20.06	38.49	46.00	-7.51	310	200	QP
4*	601.4265	59.77	-18.96	40.81	46.00	-5.19	203	100	QP
5	679.9600	55.82	-18.14	37.68	46.00	-8.32	360	187	QP
6	912.8620	49.86	-15.19	34.67	46.00	-11.33	66	200	QP

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	DC 6V
Environment:	25.0℃/60%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/

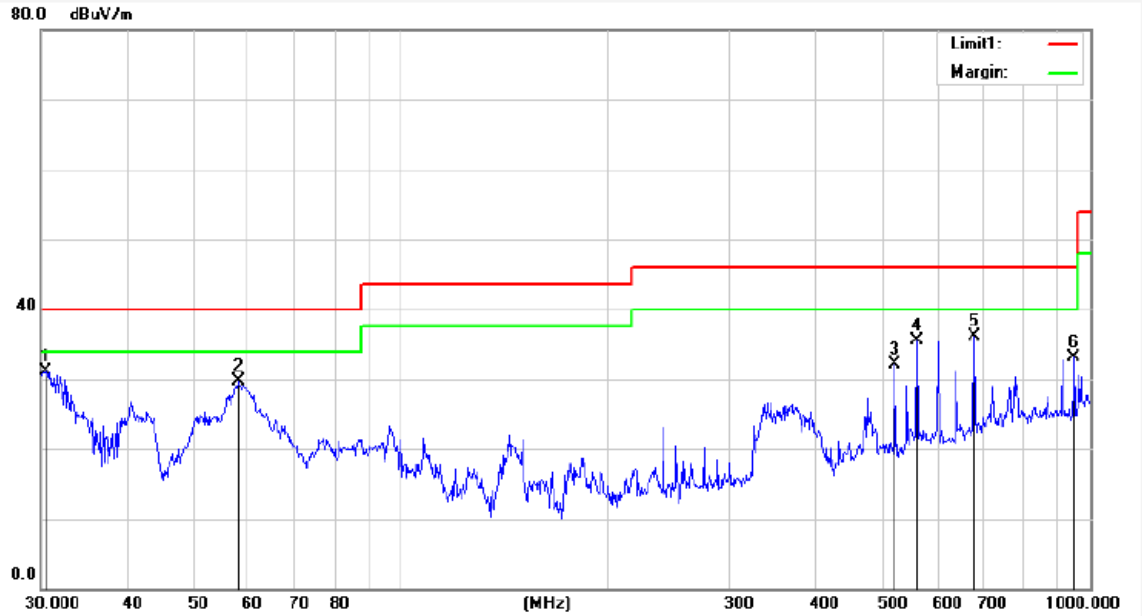
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1*	40.7014	58.05	-28.82	29.23	40.00	-10.77	25	200	QP
2	57.3922	55.32	-28.83	26.49	40.00	-13.51	124	200	QP
3	480.5276	51.31	-21.59	29.72	46.00	-16.28	26	100	QP
4	836.2441	51.33	-16.17	35.16	46.00	-10.84	302	100	QP
5	962.1621	46.43	-14.60	31.83	54.00	-22.17	100	100	QP

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	DC 6V
Environment:	25.0℃/60%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/

Polarity: Vertical

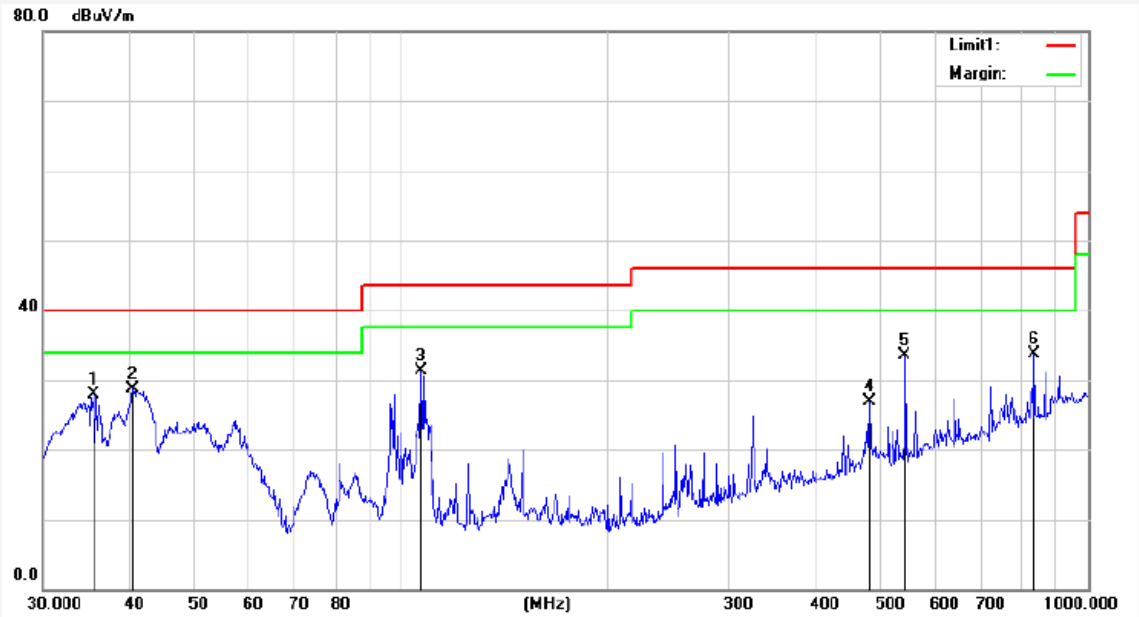


No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1*	30.4237	60.72	-29.58	31.14	40.00	-8.86	102	100	QP
2	57.9992	58.57	-28.87	29.70	40.00	-10.30	300	100	QP
3	520.8881	52.97	-20.90	32.07	46.00	-13.93	200	100	QP
4	560.6928	55.55	-20.06	35.49	46.00	-10.51	157	200	QP
5	679.9600	54.32	-18.14	36.18	46.00	-9.82	55	100	QP
6	948.7610	47.73	-14.67	33.06	46.00	-12.94	110	200	QP

Power supply: DC 24V power by Adapter

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	DC 24V
Environment:	23.2℃/49%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-16	/	/

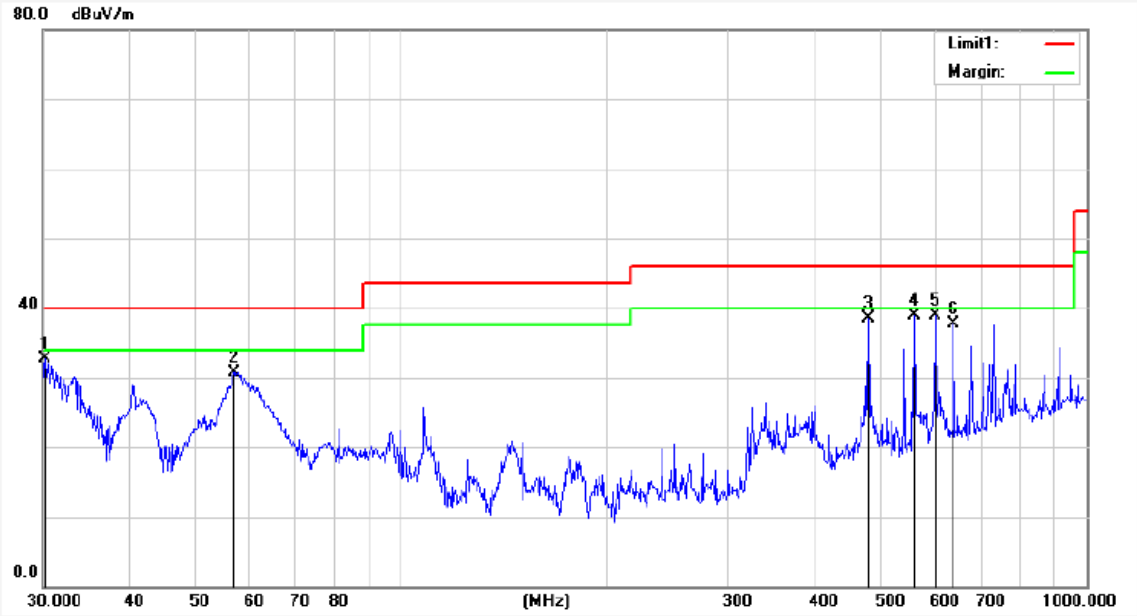
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	35.6240	57.06	-29.19	27.87	40.00	-12.13	360	130	QP
2*	40.5591	57.56	-28.83	28.73	40.00	-11.27	46	200	QP
3	106.7587	62.01	-30.65	31.36	43.50	-12.14	253	200	QP
4	480.5276	48.50	-21.59	26.91	46.00	-19.09	330	100	QP
5	541.3725	54.16	-20.57	33.59	46.00	-12.41	325	200	QP
6	836.2443	49.88	-16.17	33.71	46.00	-12.29	238	100	QP

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	DC 24V
Environment:	23.2℃/49%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-16	/	/

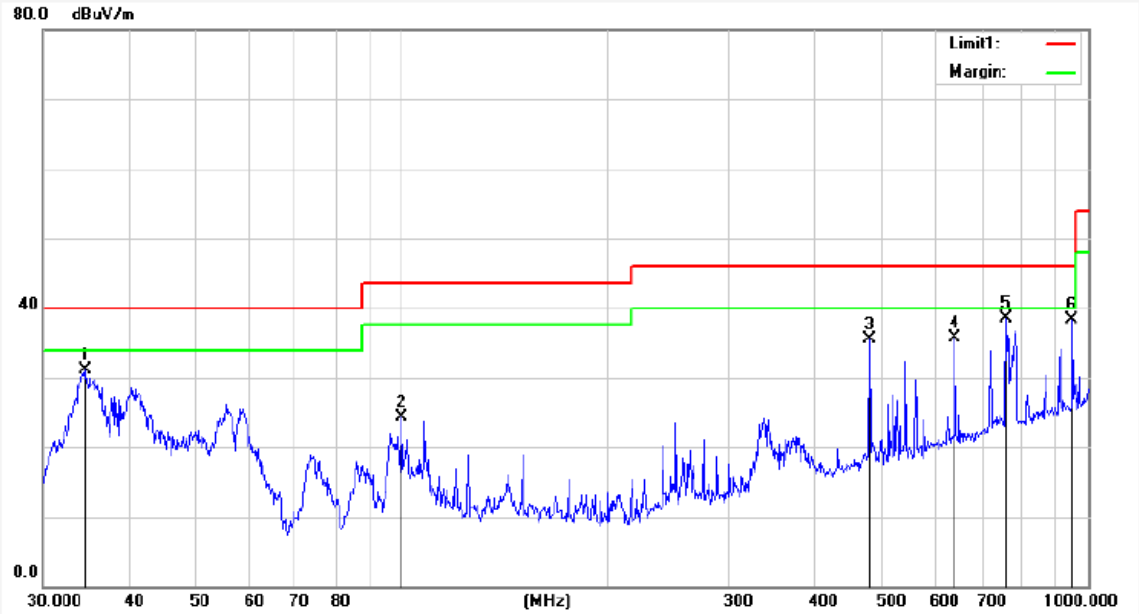
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	30.2111	62.26	-29.61	32.65	40.00	-7.35	98	100	QP
2	56.9912	59.47	-28.80	30.67	40.00	-9.33	161	100	QP
3	480.5276	60.15	-21.59	38.56	46.00	-7.44	301	100	QP
4	560.6928	58.98	-20.06	38.92	46.00	-7.08	23	100	QP
5*	601.4265	57.91	-18.96	38.95	46.00	-7.05	117	100	QP
6	640.6110	56.43	-18.69	37.74	46.00	-8.26	328	100	QP

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	DC 24V
Environment:	25.0℃/60%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/

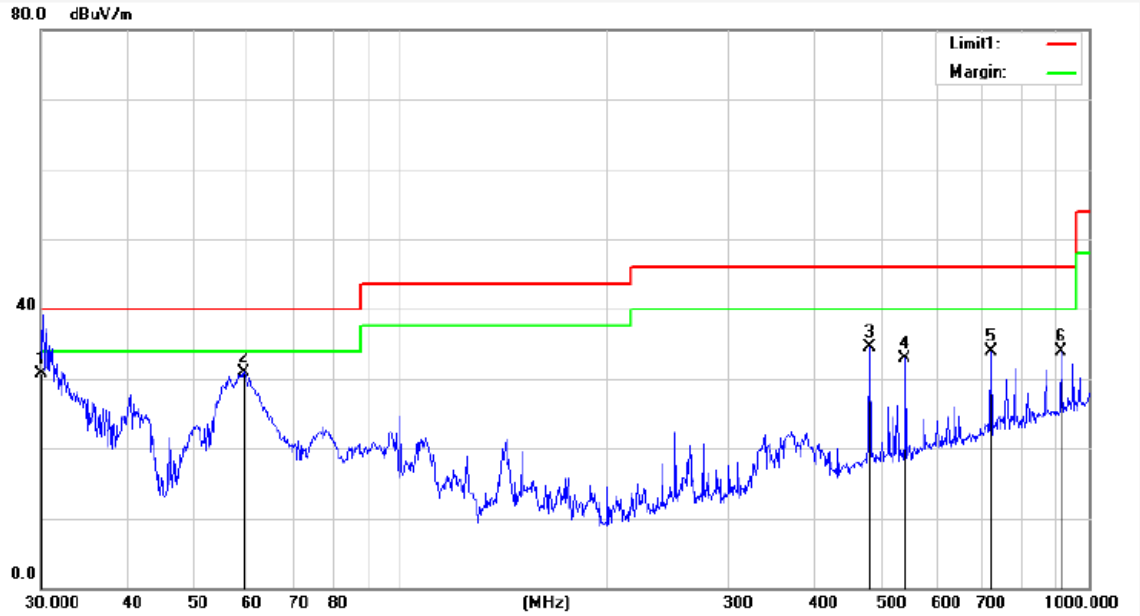
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	34.5173	59.65	-28.50	31.15	40.00	-8.85	212	100	QP
2	99.8777	55.14	-30.80	24.34	43.50	-19.16	360	152	QP
3	480.5276	56.95	-21.49	35.46	46.00	-10.54	120	200	QP
4	640.6110	54.31	-18.58	35.73	46.00	-10.27	51	100	QP
5*	760.7036	55.35	-16.83	38.52	46.00	-7.48	252	100	QP
6	948.7610	53.02	-14.78	38.24	46.00	-7.76	99	100	QP

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	DC 24V
Environment:	25.0℃/60%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/

Polarity: Vertical

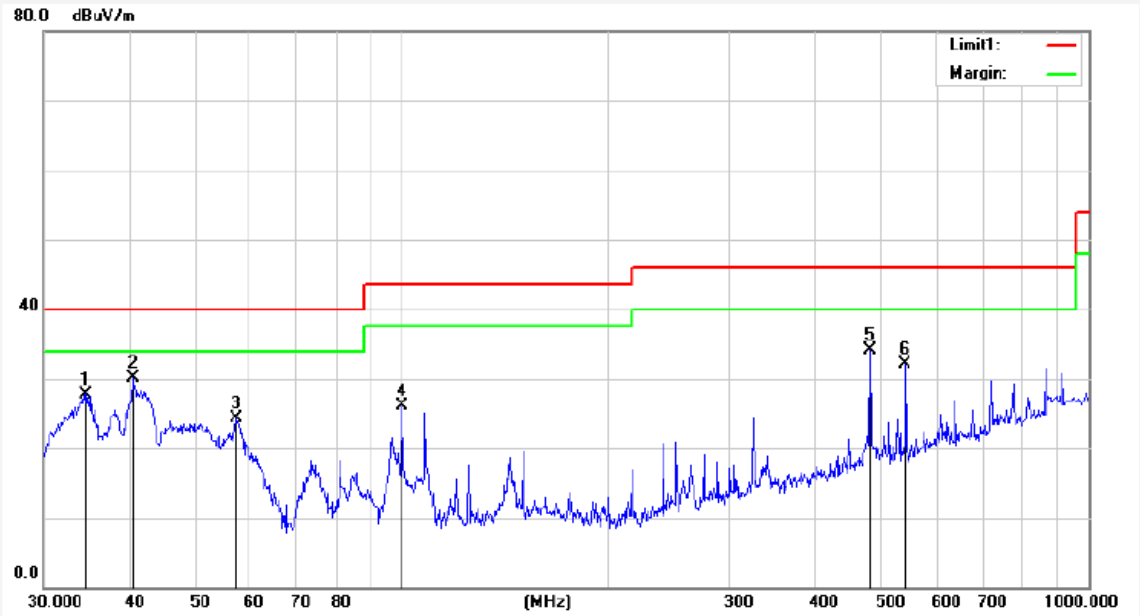


No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	30.0428	59.30	-28.52	30.78	40.00	-9.22	0	101	QP
2*	59.2325	59.62	-28.68	30.94	40.00	-9.06	232	100	QP
3	480.5276	56.05	-21.49	34.56	46.00	-11.44	279	200	QP
4	541.3725	53.32	-20.36	32.96	46.00	-13.04	222	100	QP
5	721.7260	51.41	-17.45	33.96	46.00	-12.04	359	100	QP
6	912.8620	49.06	-15.22	33.84	46.00	-12.16	1	200	QP

Power supply: AC 24V power by AC power converter

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	AC 24V
Environment:	23.2℃/49%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-16	/	/

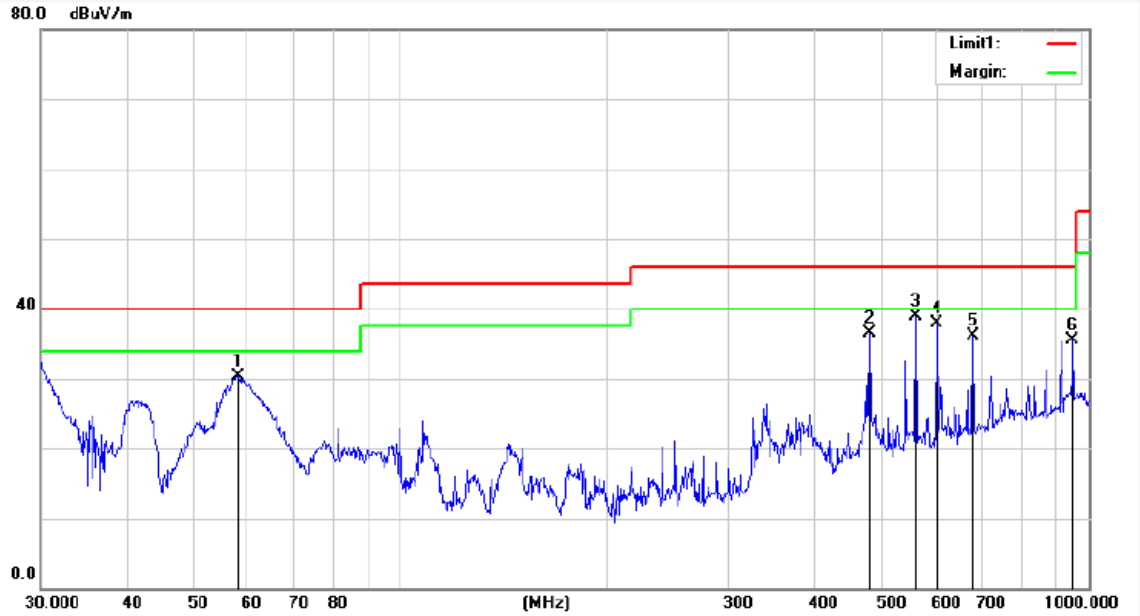
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	34.6385	57.07	-29.27	27.80	40.00	-12.20	360	121	QP
2*	40.5591	59.03	-28.83	30.20	40.00	-9.80	114	200	QP
3	57.3923	53.16	-28.83	24.33	40.00	-15.67	126	100	QP
4	99.8777	57.72	-31.60	26.12	43.50	-17.38	355	100	QP
5	480.5276	55.76	-21.59	34.17	46.00	-11.83	244	200	QP
6	541.3725	52.63	-20.57	32.06	46.00	-13.94	0	100	QP

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 1	Voltage:	AC 24V
Environment:	23.2℃/49%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-16	/	/

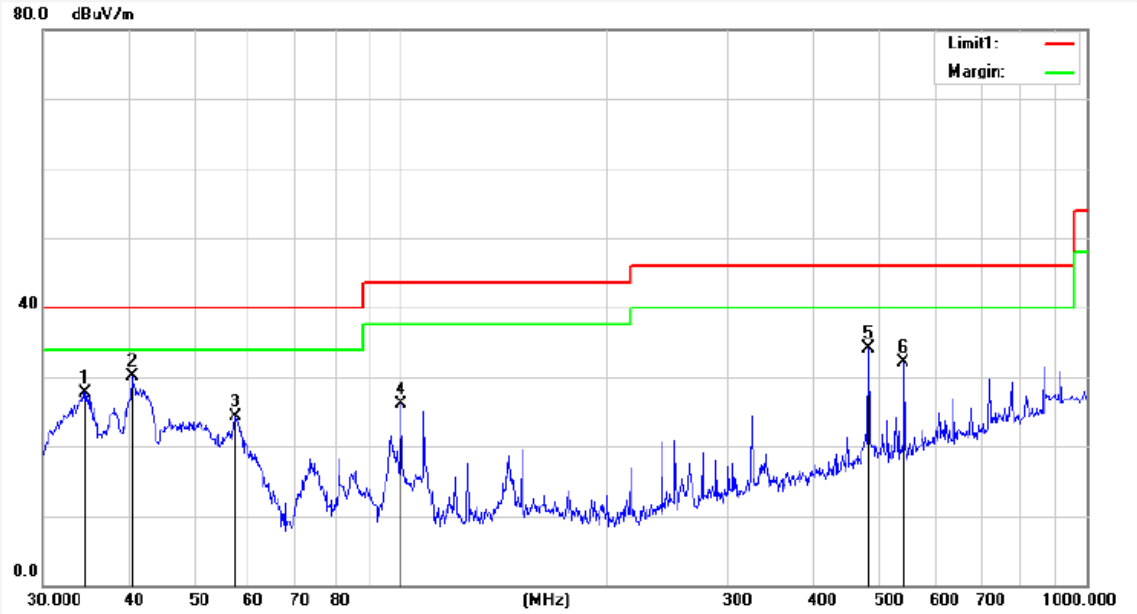
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	57.9993	59.15	-28.87	30.28	40.00	-9.72	210	100	QP
2	480.5276	58.04	-21.59	36.45	46.00	-9.55	71	200	QP
3*	560.6928	58.91	-20.06	38.85	46.00	-7.15	356	100	QP
4	601.4265	56.80	-18.96	37.84	46.00	-8.16	360	100	QP
5	679.9600	54.20	-18.14	36.06	46.00	-9.94	166	100	QP
6	948.7610	50.23	-14.67	35.56	46.00	-10.44	219	100	QP

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	AC 24V
Environment:	25.0℃/60%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/

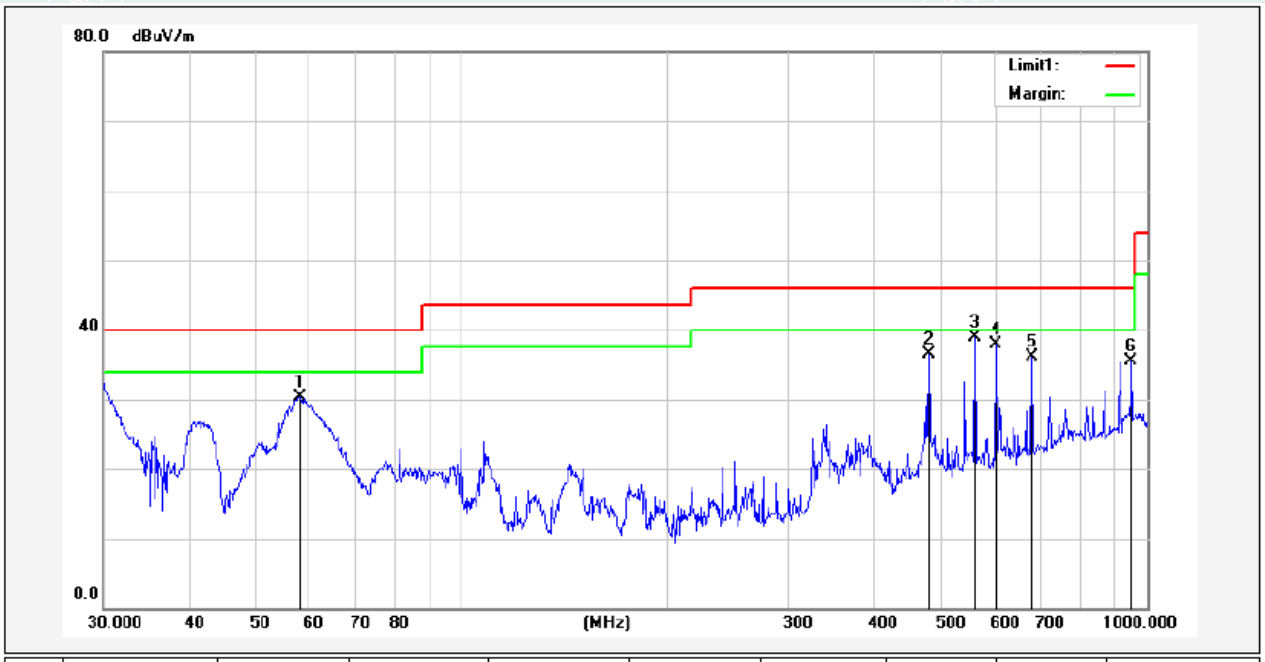
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	34.6385	57.07	-29.27	27.80	40.00	-12.20	360	121	QP
2*	40.5591	59.03	-28.83	30.20	40.00	-9.80	114	200	QP
3	57.3923	53.16	-28.83	24.33	40.00	-15.67	126	100	QP
4	99.8777	57.72	-31.60	26.12	43.50	-17.38	355	100	QP
5	480.5276	55.76	-21.59	34.17	46.00	-11.83	244	200	QP
6	541.3725	52.63	-20.57	32.06	46.00	-13.94	0	100	QP

Project Information			
Application No.:	E20240129370001	EUT:	Aqara Keypad
Model:	KP-X01D	SN:	E20240129370001-0015
Mode:	Mode 2	Voltage:	AC 24V
Environment:	25.0℃/60%RH/101.0kPa	Engineer:	Zhang Zishan
Test date:	2024-04-25	/	/

Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	57.9993	59.15	-28.87	30.28	40.00	-9.72	210	100	QP
2	480.5276	58.04	-21.59	36.45	46.00	-9.55	71	200	QP
3*	560.6928	58.91	-20.06	38.85	46.00	-7.15	356	100	QP
4	601.4265	56.80	-18.96	37.84	46.00	-8.16	360	100	QP
5	679.9600	54.20	-18.14	36.06	46.00	-9.94	166	100	QP
6	948.7610	50.23	-14.67	35.56	46.00	-10.44	219	100	QP

9. 20dB BANDWIDTH

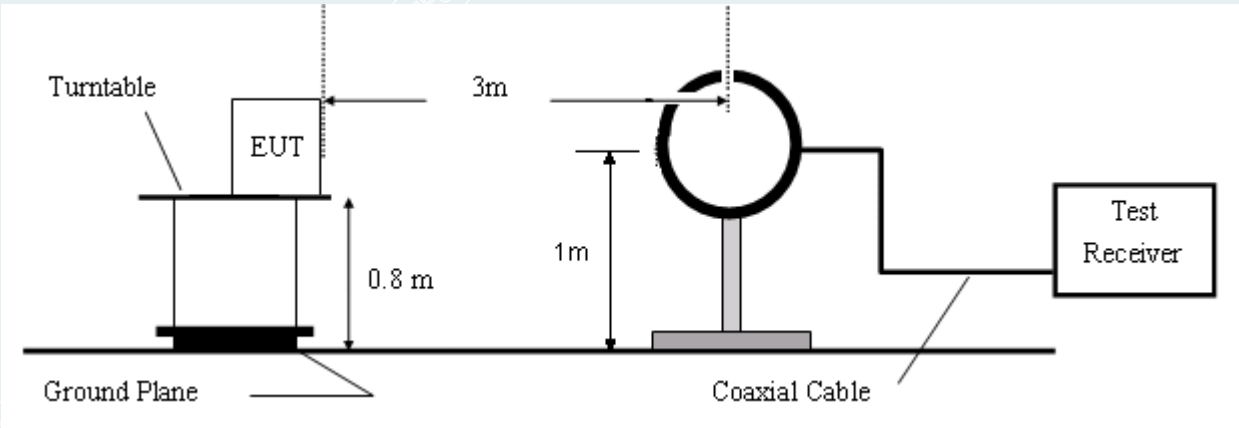
9.1 LIMITS

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

9.2 TEST PROCEDURES

1) The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
2) If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
3) If the EUT is a floor standing device, it is placed on the ground.
4) Auxiliary equipment and cables were positioned to simulate normal operation conditions.
5) The measurement distance is 3 meter.
6) The EUT was set into operation.
7) Adjust the test instrument for the following setting
   RBW: 1% to 5% of the Necessary bandwidth
   VBW: at least 3 times of the RBW
   Detector: Peak
   Sweep time: Auto
   Trace Mode: Max hold
8) Allow trace to fully stabilize

9.3 TEST SETUP



9.4 TEST RESULTS

Pre-scan all modes, the worst power supply is DC 24V. In the three power supply modes(4 LR3 AAA 1.5V Batteries, DC 24V power by Adapter and AC 24V power by AC power converter), only the worst power supply mode is recorded in this report. Among the X, Y and Z axes, the worst Y axis data is recorded in this report.

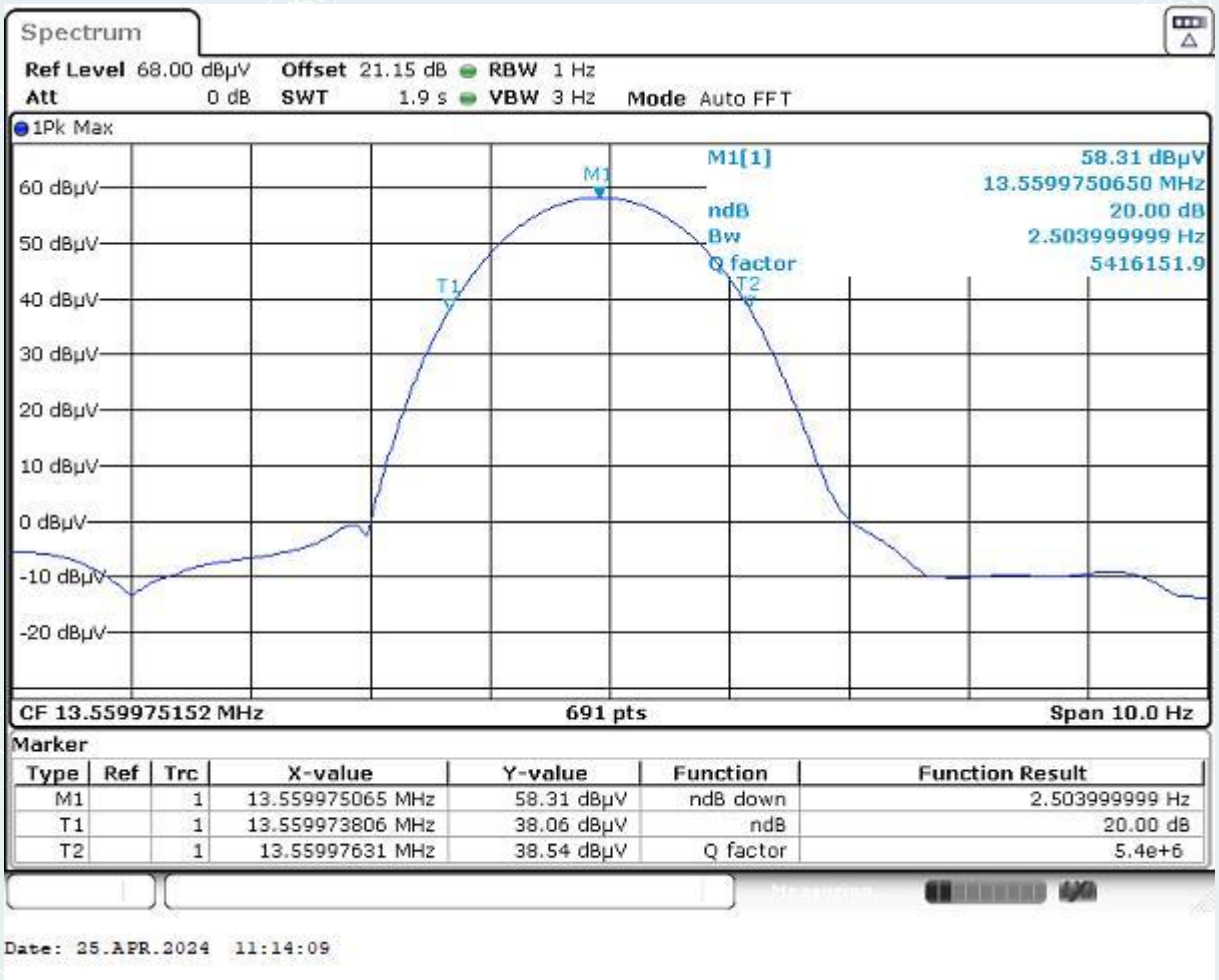
Test environment: Normal condition: 25.0℃/60%RH/101.0kPa

Engineer: Zhang Zishan

Test date: 2024-04-25

Frequency (MHz)	20dB Bandwidth (Hz)	Limit(kHz)	Test Result
13.56	2.503	11.2	Complied

Note: Limit=0.8*(13.567-13.553)MHz=0.0112MHz=11.2kHz.



Mode 1

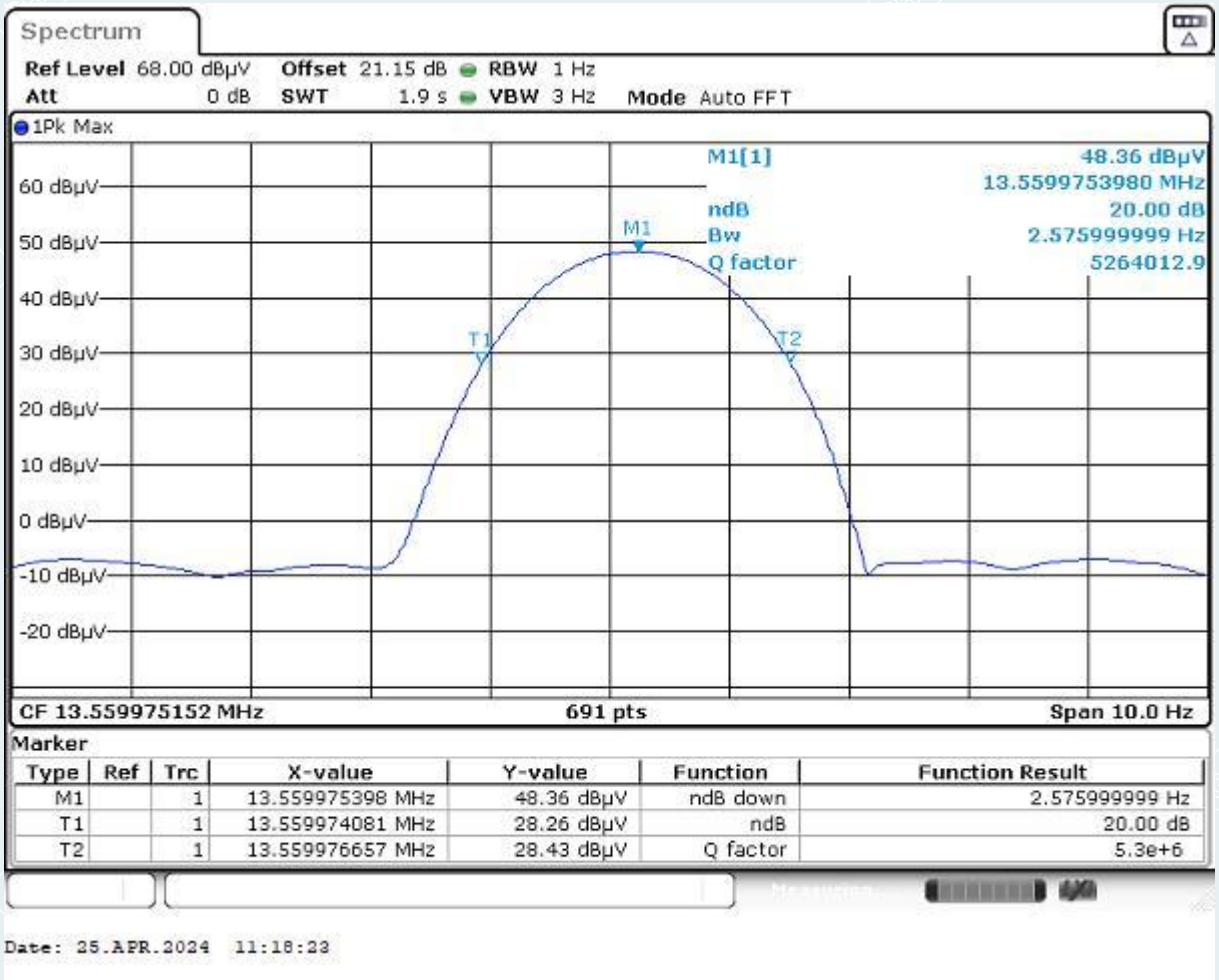
Test environment: Normal condition: 25.0℃/60%RH/101.0kPa

Engineer: Zhang Zishan

Test date: 2024-04-25

Frequency (MHz)	20dB Bandwidth (Hz)	Limit(kHz)	Test Result
13.56	2.576	11.2	Complied

Note: Limit=0.8*(13.567-13.553)MHz=0.0112MHz=11.2kHz.



Mode 2

10. FREQUENCY TOLERANCE (TEMPERATURE VARIATION AND VOLTAGE VARIATION)

10.1 LIMITS

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of operating frequency over a temperature variation of -20degrees to +50 degrees C at normal supply voltage , and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

10.2 TEST PROCEDURES

Frequency tolerance (Temperature variation)

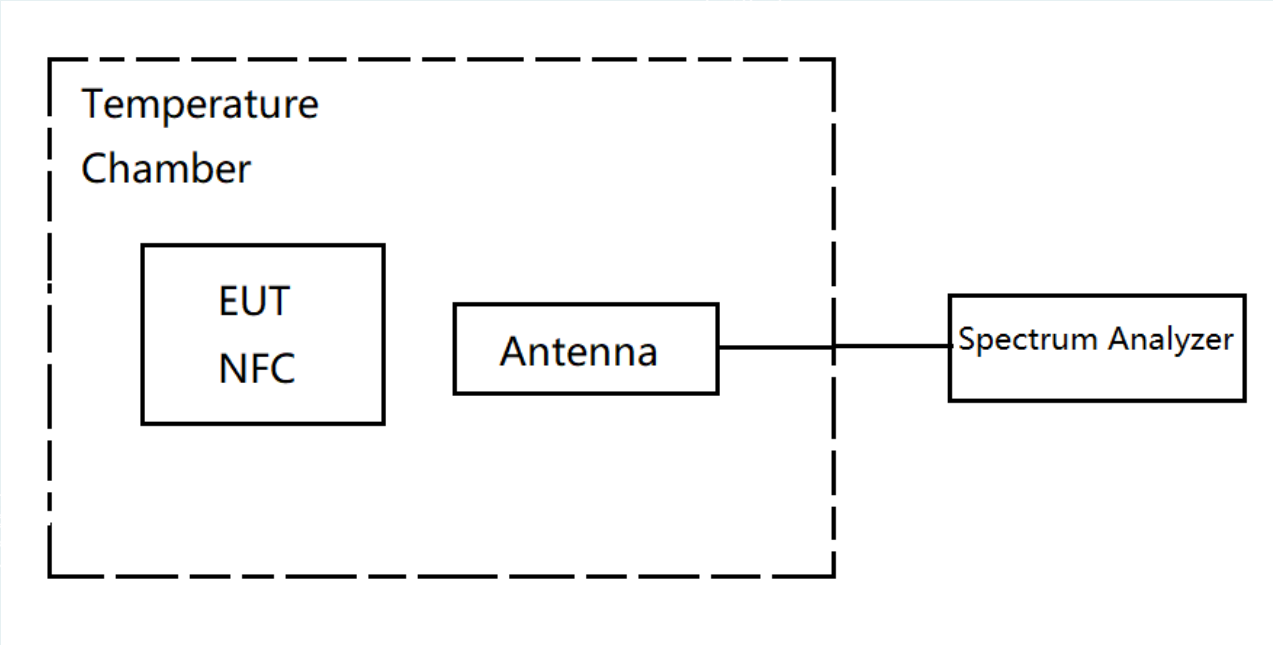
1) The EUT and test equipment were setup as shown on the following page.
2) Set the temperature -20 degrees C.
3) Leave the EUT for 1 hour after it become the temperature that was setup.
4) Setup the EUT to transmitting.
5) Measure the transmitting frequency (startup, 2min, 5min and 10min).
6) Set the temperature -20 degrees C to +50 degrees C.
7) Repeat test procedure the step 4 to 6, and record the test data after the testing finished.

Frequency tolerance (Voltage variation)

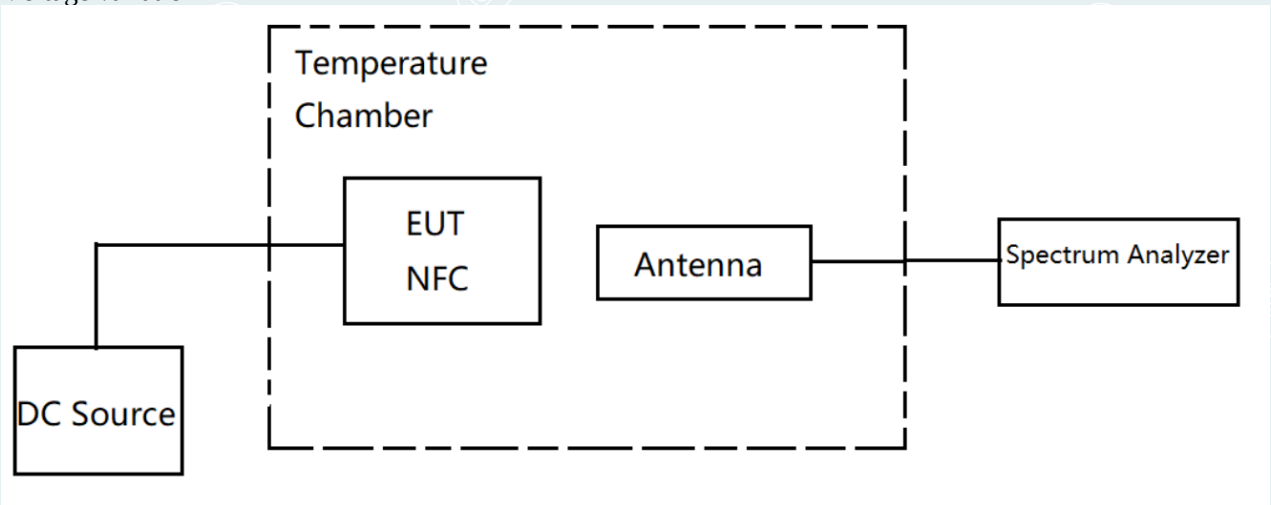
1) The EUT and test equipment (set the supply voltage 100%) were setup as shown on the following page.
2) Set the temperature 20 degrees C.
3) Leave the EUT for 1 hour after it become the temperature that was setup.
4) Setup the EUT to transmitting.
5) Measure the transmitting frequency.
6) Set the supply voltage 85% and 115%
7) Repeat test procedure the step 4 to 6, and record the test data after the testing finished.

10.3 TEST SETUP

Temperature Variation



Voltage variation



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10.4 TEST RESULTS

Test environment: Normal condition: 25.0℃/60%RH/101.0kPa

Engineer: Zhang Zishan

Test date: 2024-04-25

Pre-scan all modes, the worst power supply is 4 LR3 AAA 1.5V Batteries. In the three power supply modes(4 LR3 AAA 1.5V Batteries, DC 24V power by Adapter and AC 24V power by AC power converter), only the worst case(Mode 1) in the worst power supply is recorded in this report.

Power supply: 4 LR3 AAA 1.5V Batteries(DC 6V)
Test mode: Mode 1
Temperature Variation

startup

Transmitting Frequency (MHz)	Temperature (Degree C)	Voltage (V)	Frequency (MHz)	Deviation(%)	Limit(±) (%)
13.56	-20	6.0	13.559969	0.000229	0.01
	-10	6.0	13.559970	0.000221	0.01
	0	6.0	13.559968	0.000236	0.01
	10	6.0	13.559969	0.000229	0.01
	20	6.0	13.559969	0.000229	0.01
	30	6.0	13.559969	0.000229	0.01
	40	6.0	13.559969	0.000229	0.01
	50	6.0	13.559970	0.000221	0.01

2min

Transmitting Frequency (MHz)	Temperature (Degree C)	Voltage (V)	Frequency (MHz)	Deviation(%)	Limit(±) (%)
13.56	-20	6.0	13.559969	0.000229	0.01
	-10	6.0	13.559969	0.000229	0.01
	0	6.0	13.559969	0.000229	0.01
	10	6.0	13.559969	0.000229	0.01
	20	6.0	13.559970	0.000221	0.01
	30	6.0	13.559970	0.000221	0.01
	40	6.0	13.559971	0.000214	0.01
	50	6.0	13.559970	0.000221	0.01

5min

Transmitting Frequency (MHz)	Temperature (Degree C)	Voltage (V)	Frequency (MHz)	Deviation(%)	Limit(±) (%)
13.56	-20	6.0	13.559968	0.000236	0.01
	-10	6.0	13.559971	0.000214	0.01
	0	6.0	13.559969	0.000229	0.01
	10	6.0	13.559969	0.000229	0.01
	20	6.0	13.559969	0.000229	0.01
	30	6.0	13.559971	0.000214	0.01
	40	6.0	13.559969	0.000229	0.01
	50	6.0	13.559970	0.000221	0.01

10min

Transmitting Frequency (MHz)	Temperature (Degree C)	Voltage (V)	Frequency (MHz)	Deviation(%)	Limit(±) (%)
13.56	-20	6.0	13.559970	0.000221	0.01
	-10	6.0	13.559970	0.000221	0.01
	0	6.0	13.559969	0.000229	0.01
	10	6.0	13.559969	0.000229	0.01
	20	6.0	13.559968	0.000236	0.01
	30	6.0	13.559971	0.000214	0.01
	40	6.0	13.559960	0.000295	0.01
	50	6.0	13.559970	0.000221	0.01

Frequency tolerance (Voltage variation)

Transmitting Frequency (MHz)	Temperature (Degree C)	Voltage (V)	Frequency (MHz)	Deviation(%)	Limit(±) (%)
13.56	20	5.10	13.559970	0.000221	0.01
	20	6.00	13.559970	0.000221	0.01
	20	6.90	13.559969	0.000229	0.01

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APPENDIX A. PHOTOGRAPH OF THE TEST CONNECTION DIAGRAM

Please refer to the attached document E20240129370001-26 FCC ISED-Test Photo.

APPENDIX B. PHOTOGRAPH OF THE EUT

Please refer to the attached document E20240129370001-27 EUT photo.

---------- End of Report ----------