



# FCC Test Report

APPLICANT : OnePlus Technology (Shenzhen) Co., Ltd.  
EQUIPMENT : keyboard  
BRAND NAME : ONEPLUS  
MODEL NAME : OPK2413  
FCC ID : 2ABZ2-OPK2413  
STANDARD : 47 CFR Part 15 Subpart B  
CLASSIFICATION : Certification  
TEST DATE(S) : Feb. 28, 2025 ~ Mar. 18, 2025

We, Sporton International Inc. (ShenZhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (ShenZhen), the test report shall not be reproduced except in full.

Jason Jia

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Approved by: Jason Jia



**Sporton International Inc. (ShenZhen)**

**1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055**

**People's Republic of China**



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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC511614	Rev. 01	Initial issue of report	Mar. 27, 2025

## SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.2	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 8.94 dB at 0.16 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 14.36 dB at 801.150 MHz

**Conformity Assessment Condition:**

The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account. Please refer to each test results in the section "Measurement Uncertainty".

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

## 1. General Description

### 1.1. Applicant

**OnePlus Technology (Shenzhen) Co., Ltd.**

18C02, 18C03, 18C04, and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, P.R. China

### 1.2. Manufacturer

**OnePlus Technology (Shenzhen) Co., Ltd.**

18C02, 18C03, 18C04, and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, P.R. China

### 1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	keyboard
Brand Name	ONEPLUS
Model Name	OPK2413
FCC ID	2ABZ2-OPK2413
EUT supports Radios application	Bluetooth LE NFC
S/N Code	Radiation: JS2451817613 Conduction: T621675000007ECL0017
HW Version	V0.30
SW Version	KA030_B_1.1.0
EUT Stage	Production Unit

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

### 1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	Bluetooth: 2400 MHz ~ 2483.5 MHz
Rx Frequency	Bluetooth: 2400 MHz ~ 2483.5 MHz NFC: 13.56 MHz
Antenna Type	Bluetooth : PCB Antenna NFC: FPC + ferrite Antenna
Type of Modulation	Bluetooth LE : GFSK NFC: ASK

Note: The device supports NFC RX only.

## 1.5. Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6. Test Location

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

<b>Test Firm</b>	Sporton International Inc. (Shenzhen)		
<b>Test Site Location</b>	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Designation No.</b>	<b>FCC Test Firm Registration No.</b>
	03CH05-SZ CO02-SZ	CN1256	421272

## 1.7. Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH05-SZ	AUDIX	E3	6.2009-8-24
2.	CO02-SZ	AUDIX	E3	6.120613b

## 1.8. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart B
- ANSI C63.4-2014

**Remark:** All test items were verified and recorded according to the standards and without any deviation during the test.

## 2. Test Configuration of Equipment Under Test

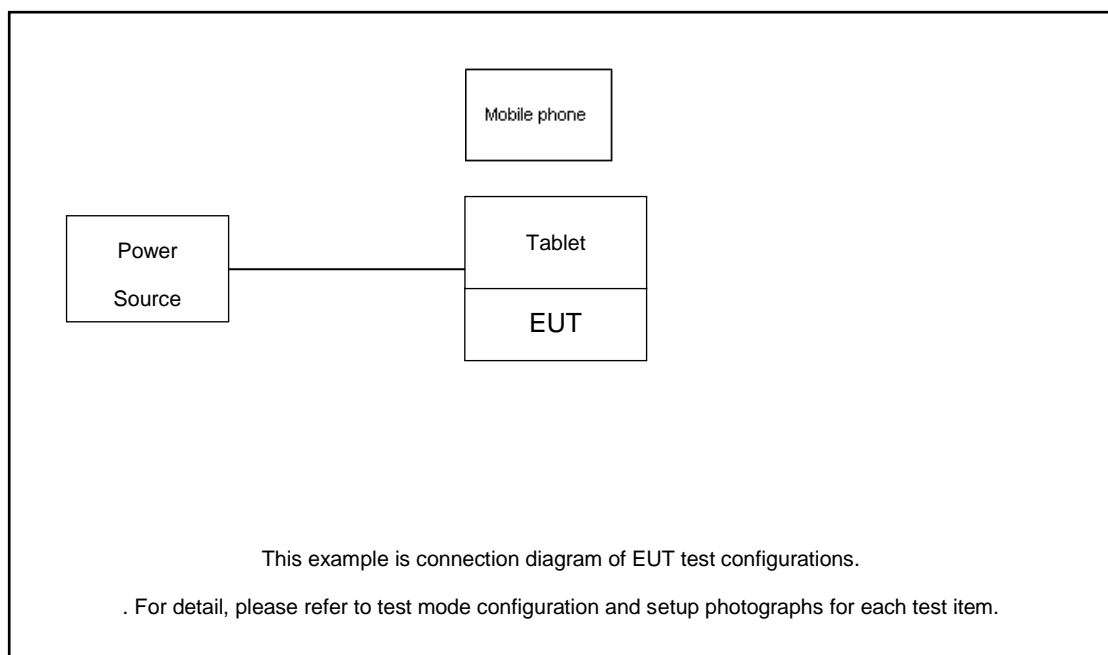
### 2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
AC Conducted Emission	Mode 1 : Bluetooth Link + NFC ON + Battery + Powered from Tablet
Radiated Emissions	Mode 1 : Bluetooth Link + NFC ON + Battery + Powered from Tablet

### 2.2.Connection Diagram of Test System



The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application

## 2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Adapter	NA	NA	NA	NA	NA
2.	Phone	Oneplus	N/A	N/A	N/A	N/A
3.	USB Cable	NA	NA	NA	NA	NA
4.	Tablet	NA	NA	NA	NA	NA

## 2.4. EUT Operation Test Setup

The following programs installed in the EUT were programmed during the test.

1. Turn on NFC function
2. Turn on BLE function



### 3. Test Result

#### 3.1. Test of AC Conducted Emission Measurement

##### 3.1.1 Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

**<Class B Limit>**

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

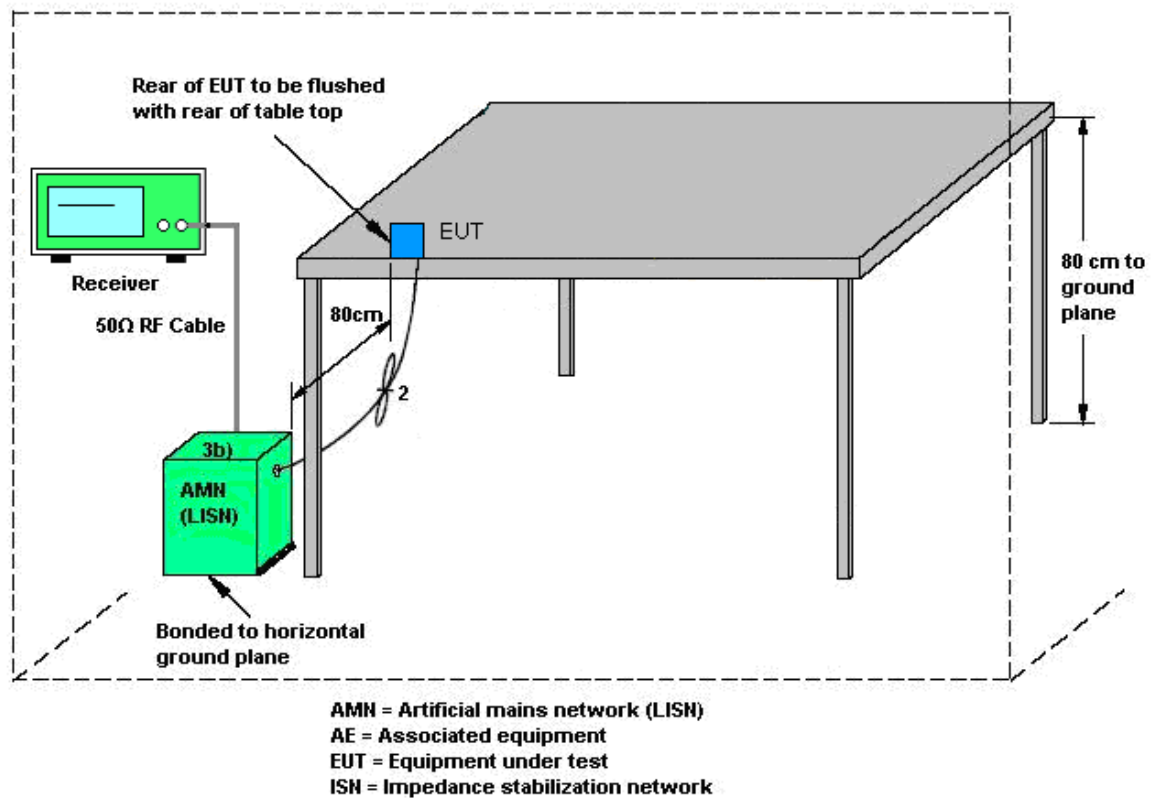
##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

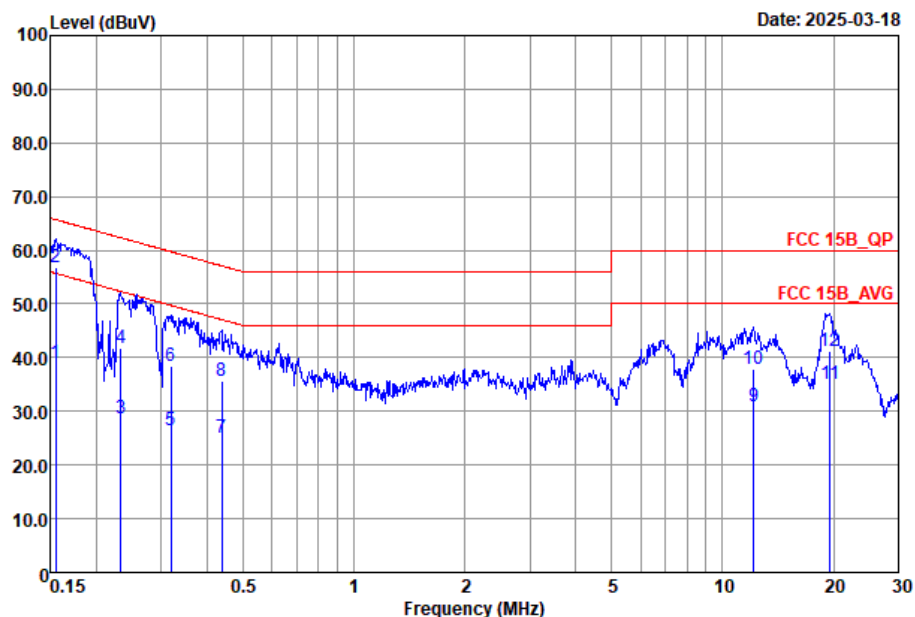
### 3.1.4 Test Setup





## 3.1.5 Test Result of AC Conducted Emission

Test Engineer :	Nathon	Temperature :	22~24°C
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

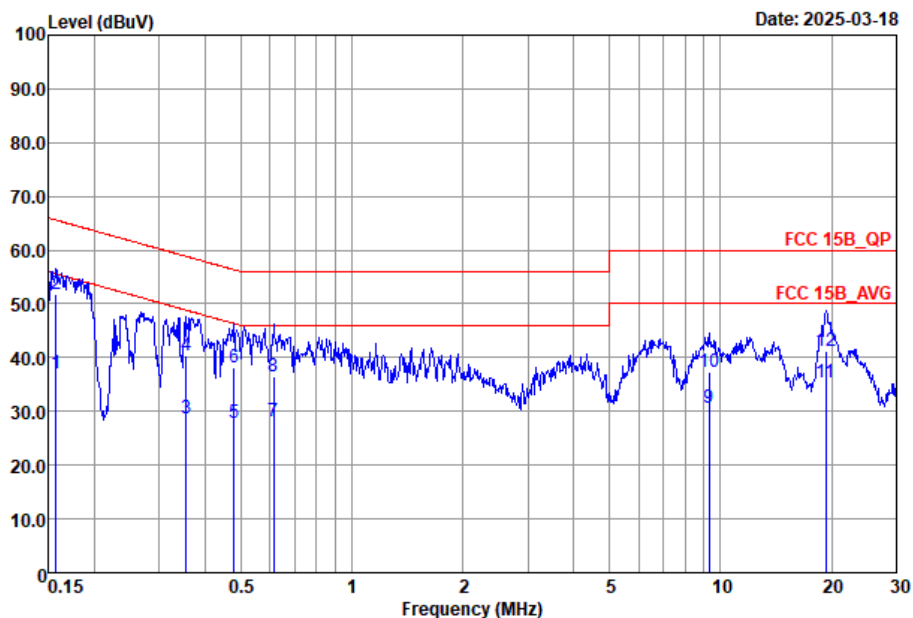


Site : CO02-SZ  
Condition : FCC 15B\_QP LISN\_2025-L LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.16	39.05	-16.64	55.69	19.19	9.67	10.19	Average
2 *	0.16	56.75	-8.94	65.69	36.89	9.67	10.19	QP
3	0.23	28.81	-23.54	52.35	8.90	9.72	10.19	Average
4	0.23	41.71	-20.64	62.35	21.80	9.72	10.19	QP
5	0.32	26.56	-23.19	49.75	6.60	9.75	10.21	Average
6	0.32	38.56	-21.19	59.75	18.60	9.75	10.21	QP
7	0.44	25.13	-21.98	47.11	5.20	9.70	10.23	Average
8	0.44	35.73	-21.38	57.11	15.80	9.70	10.23	QP
9	12.12	30.86	-19.14	50.00	11.00	9.64	10.22	Average
10	12.12	37.96	-22.04	60.00	18.10	9.64	10.22	QP
11	19.53	35.14	-14.86	50.00	15.00	9.69	10.45	Average
12	19.53	41.24	-18.76	60.00	21.10	9.69	10.45	QP



Test Engineer :	Nathon	Temperature :	22~24°C
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO02-SZ  
Condition : FCC 15B\_QP LISN\_2025-N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.16	37.02	-18.58	55.60	17.20	9.63	10.19	Average
2 *	0.16	51.92	-13.68	65.60	32.10	9.63	10.19	QP
3	0.36	28.62	-20.21	48.83	8.80	9.60	10.22	Average
4	0.36	40.52	-18.31	58.83	20.70	9.60	10.22	QP
5	0.48	27.87	-18.49	46.36	7.59	10.04	10.24	Average
6	0.48	38.07	-18.29	56.36	17.79	10.04	10.24	QP
7	0.61	28.09	-17.91	46.00	8.20	9.65	10.24	Average
8	0.61	36.59	-19.41	56.00	16.70	9.65	10.24	QP
9	9.30	30.54	-19.46	50.00	10.70	9.65	10.19	Average
10	9.30	37.24	-22.76	60.00	17.40	9.65	10.19	QP
11	19.33	35.32	-14.68	50.00	15.10	9.77	10.45	Average
12	19.33	41.32	-18.68	60.00	21.10	9.77	10.45	QP

Note:

- Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
- Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

## 3.2. Test of Radiated Emission Measurement

### 3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

**<Class B Limit>**

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

### 3.2.2. Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

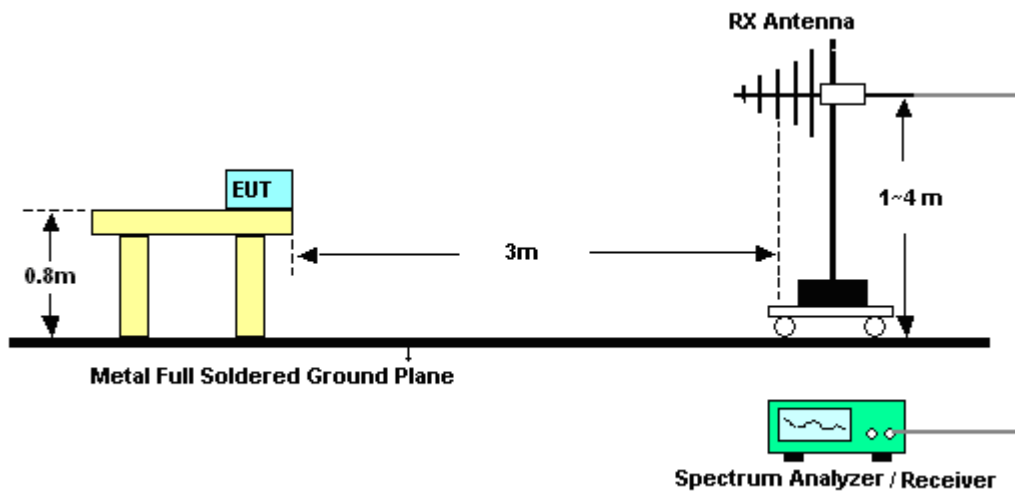
### 3.2.3. Test Procedures

1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dBμV/m) = 20 log Emission level (μV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

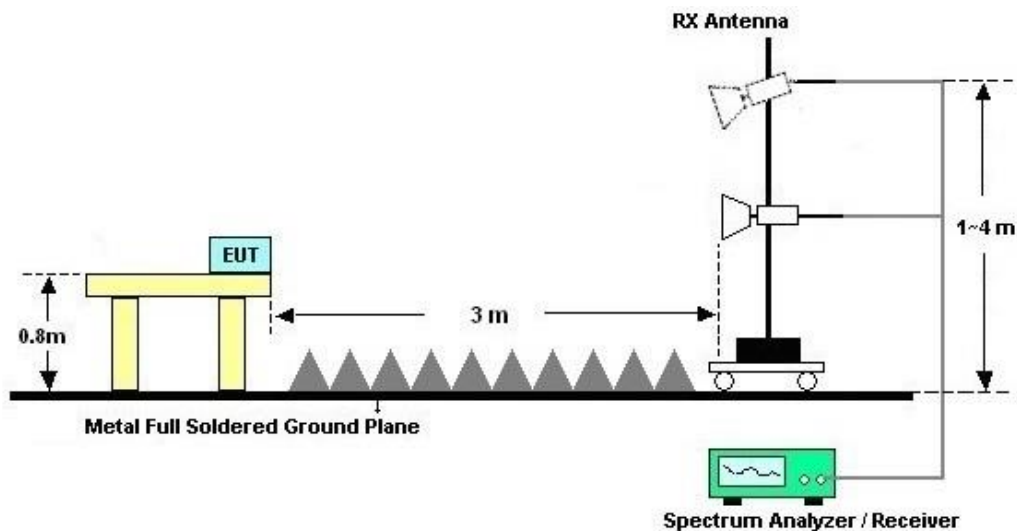
10. Exploratory radiated emissions testing of handheld and/or body-worn devices shall include rotation of the EUT through three orthogonal axes (X/Y/Z Plane) to determine the orientation (attitude) that maximizes the emissions.

### 3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz

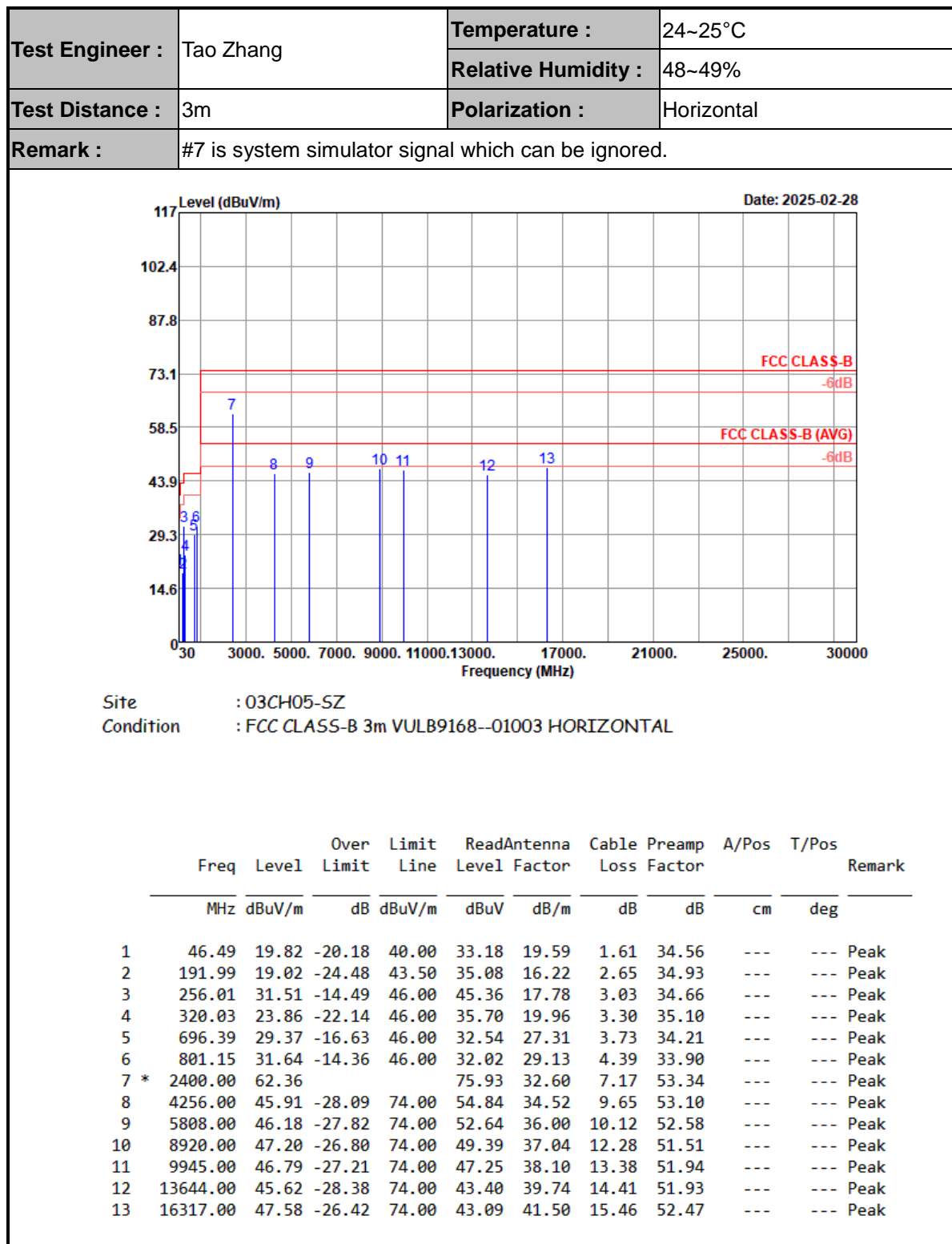


For radiated emissions above 1GHz



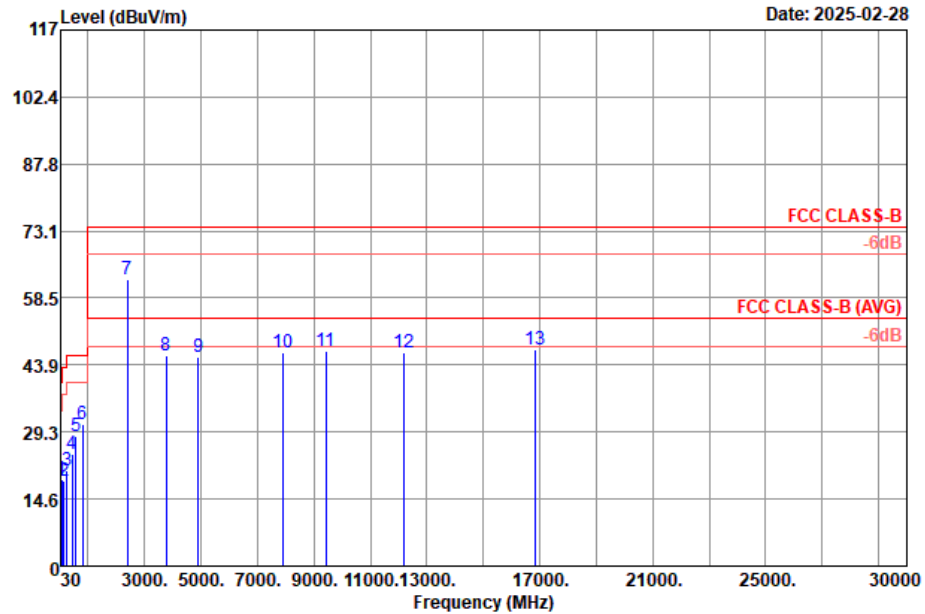


## 3.2.5. Test Result of Radiated Emission





Test Engineer :	Tao Zhang	Temperature :	24~25°C
		Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Vertical
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH05-SZ  
Condition : FCC CLASS-B 3m VULB9168--01003 VERTICAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Preamp	A/Pos	T/Pos			
					Factor	Loss	Factor		Remark		
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	57.16	18.90	-21.10	40.00	33.03	19.09	1.72	34.94	---	---	Peak
2	144.46	18.45	-25.05	43.50	32.47	18.78	2.29	35.09	---	---	Peak
3	256.01	20.70	-25.30	46.00	34.55	17.78	3.03	34.66	---	---	Peak
4	446.13	24.51	-21.49	46.00	32.59	22.88	3.46	34.42	---	---	Peak
5	574.17	28.29	-17.71	46.00	33.56	25.64	3.54	34.45	---	---	Peak
6	798.24	31.03	-14.97	46.00	31.47	29.10	4.37	33.91	---	---	Peak
7 *	2400.00	62.48			76.05	32.60	7.17	53.34	---	---	Peak
8	3776.00	45.82	-28.18	74.00	56.71	34.05	8.24	53.18	---	---	Peak
9	4912.00	45.72	-28.28	74.00	54.00	35.15	9.44	52.87	---	---	Peak
10	7928.00	46.48	-27.52	74.00	50.97	36.66	11.45	52.60	---	---	Peak
11	9432.00	46.83	-27.17	74.00	47.92	37.56	12.84	51.49	---	---	Peak
12	12213.00	46.75	-27.25	74.00	45.57	39.01	13.81	51.64	---	---	Peak
13	16839.00	47.10	-26.90	74.00	42.95	41.88	15.28	53.01	---	---	Peak

Note:

- Level(dBμV/m) = Read Level(dBμV) + Antenna Factor(dB/m) + Cable Loss(dB) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)





## 4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESR7	102261	9kHz~7GHz	Apr. 09, 2024	Feb. 28, 2025	Apr. 08, 2025	Radiation (03CH05-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY59071191	10Hz~44GHz	Apr. 09, 2024	Feb. 28, 2025	Apr. 08, 2025	Radiation (03CH05-SZ)
Log-periodic Antenna	SCHWARZBECK	VULB 9168	01001	20MHz~1.5GHz	Jul. 08, 2024	Feb. 28, 2025	Jul. 07, 2025	Radiation (03CH05-SZ)
Amplifier	EM Electronics	EM330	060756	0.01Hz~3000MHz	Apr. 09, 2024	Feb. 28, 2025	Apr. 08, 2025	Radiation (03CH05-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-2206	1GHz~18GHz	Apr. 09, 2024	Feb. 28, 2025	Apr. 08, 2025	Radiation (03CH05-SZ)
HF Amplifier	EM Electronics	EM01G18GA	060781	1GHz~18GHz	Apr. 09, 2024	Feb. 28, 2025	Apr. 08, 2025	Radiation (03CH05-SZ)
HF Amplifier	EM Electronics	EM18G40G	060778	18GHz~40GHz	Apr. 09, 2024	Feb. 28, 2025	Apr. 08, 2025	Radiation (03CH05-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	00983	15GHz~40GHz	Apr. 09, 2024	Feb. 28, 2025	Apr. 08, 2025	Radiation (03CH05-SZ)
AC Power Source	APC	AFV-S-600	F119050013	N/A	Oct. 14, 2024	Feb. 28, 2025	Oct. 13, 2025	Radiation (03CH05-SZ)
Turn Table	EMEC	T-200-S-1	060925-T	0~360 degree	NCR	Feb. 28, 2025	NCR	Radiation (03CH05-SZ)
Antenna Mast	EMEC	MBS-400-1	060927	1 m~4 m	NCR	Feb. 28, 2025	NCR	Radiation (03CH05-SZ)
EMI Receiver	R&S	ESR7	102297	9kHz~7GHz;	Jul. 03, 2024	Mar. 18, 2025	Jul. 02, 2025	Conduction (CO02-SZ)
AC LISN	R&S	ENV216	101499	9kHz~30MHz	Jul. 03, 2024	Mar. 18, 2025	Jul. 02, 2025	Conduction (CO02-SZ)
AC Power Source	CHROMA	61601	616010002470	100Vac~250Vac	Dec.25, 2024	Mar. 18, 2025	Dec. 24, 2025	Conduction (CO02-SZ)

NCR: No Calibration Required

## 5. Measurement Uncertainty

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.5 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.2 dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.1 dB
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.1 dB
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