



FCC Test Report

APPLICANT : OnePlus Technology (Shenzhen) Co., Ltd.
EQUIPMENT : Pencil
BRAND NAME : ONEPLUS
MODEL NAME : OPN2405
FCC ID : 2ABZ2-OPN2405
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification
TEST DATE(S) : Aug. 29, 2024 ~ Aug. 30, 2024

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

Approved by: Jason Jia



Sporton International Inc. (ShenZhen)

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People's Republic of China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC480202	Rev. 01	Initial issue of report	Oct. 29, 2024

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.107	AC Conducted Emission	< 15.107 limits	Not Applicable	EUT not connect to AC Mains
3.1	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 14.35 dB at 955.38 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	Pencil
Brand Name	ONEPLUS
Model Name	OPN2405
FCC ID	2ABZ2-OPN2405
EUT supports Radios application	Bluetooth LE / WPT / Specific RF technology
SN Code	Radiation: M621679000014E862JMN
HW Version	V4.0.9
SW Version	V0.2
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The EUT is only used with the designated tablet through software control, and the operating frequency is 356.34 kHz.
3. The device supports WPT Rx only (EUT wireless charging from Tablet PC).

1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	Bluetooth: 2400 MHz ~ 2483.5 MHz Specific RF technology: 111 kHz~ 489 kHz
Rx Frequency	Bluetooth: 2400 MHz ~ 2483.5 MHz Specific RF technology: 111 kHz~ 489 kHz WPT : 111 kHz~ 205 kHz
Antenna Type	Bluetooth : ceramic Antenna WPT: Coil Antenna Specific RF technology: Coil Antenna
Type of Modulation	Bluetooth LE : GFSK WPT: ASK Specific RF technology: BPSK

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.

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	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		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH05-SZ	CN1256	421272

1.7. Test Software

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



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

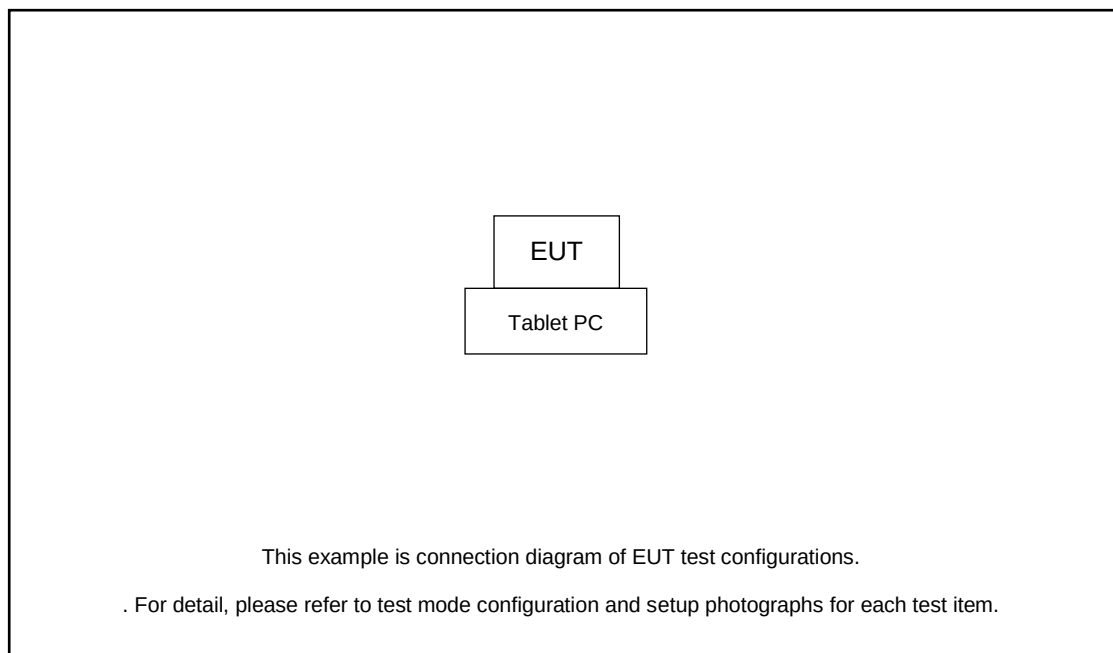
2.1. Test Mode

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: radiation emission (30MHz to the 5th harmonic of the highest frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
Radiated Emissions	Mode 1: BT Link with Tablet PC + Specific RF technology Link with Tablet PC + Battery Mode 2: BT Idle + Specific RF technology Idle + Wireless charging from Tablet PC(WPT) + Battery
Remark: The worst case of RE is mode 2; only the test data of this mode is reported.	

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.	Tablet PC	N/A	N/A	N/A	N/A	N/A

2.4. EUT Operation Test Setup

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

1. EUT BT Link/Specific RF technology Link with Tablet PC.
2. EUT wireless charging from Tablet PC.

3. Test Result

3.1. Test of Radiated Emission Measurement

3.1.1. 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

3.1.2. Measuring Instruments

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

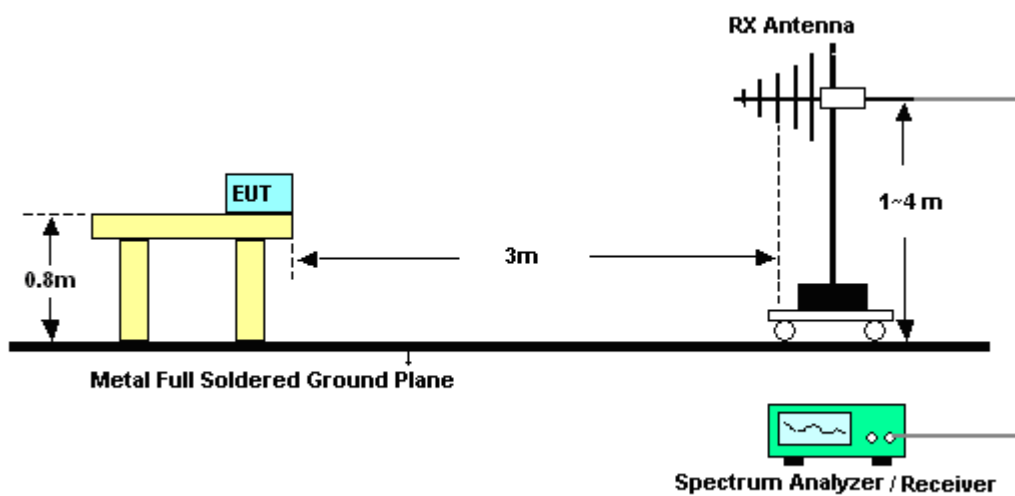
3.1.3. Test Procedures

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.

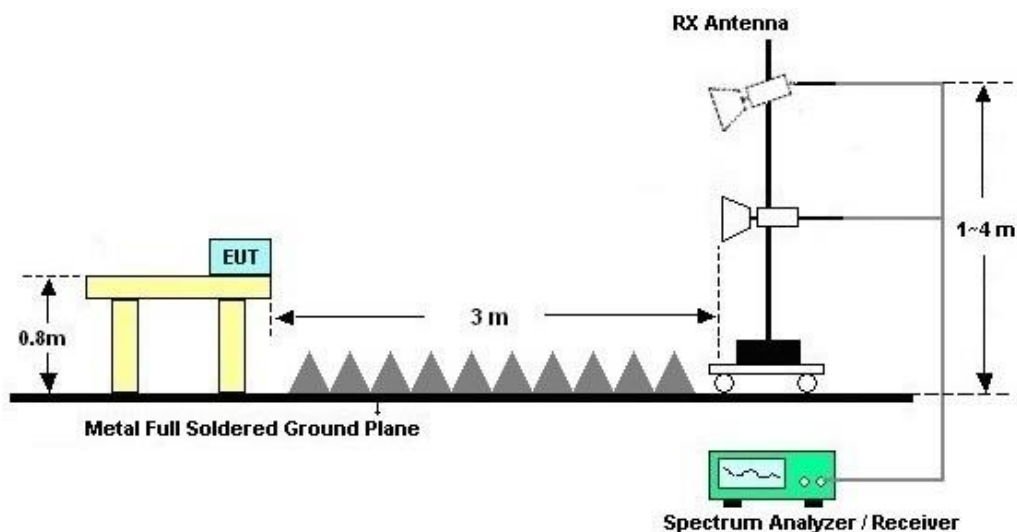
8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamplifier Factor = Level
10. Exploratory radiated emissions testing of handheld and/or body-worn devices shall include rotation of the EUT through three orthogonal axes (X/Y/Z Plane) to determine the orientation (attitude) that maximizes the emissions.

3.1.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz

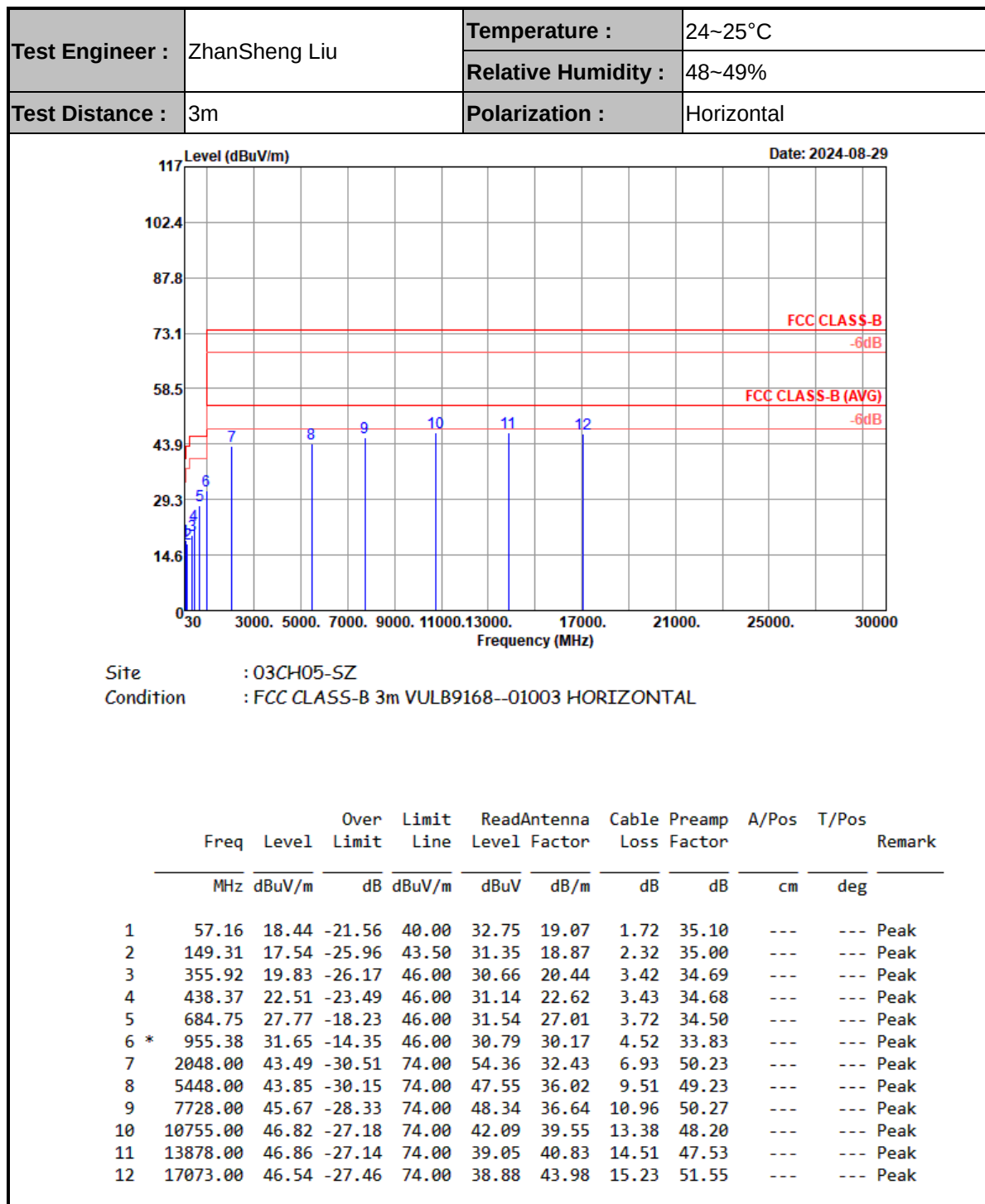


For radiated emissions above 1GHz



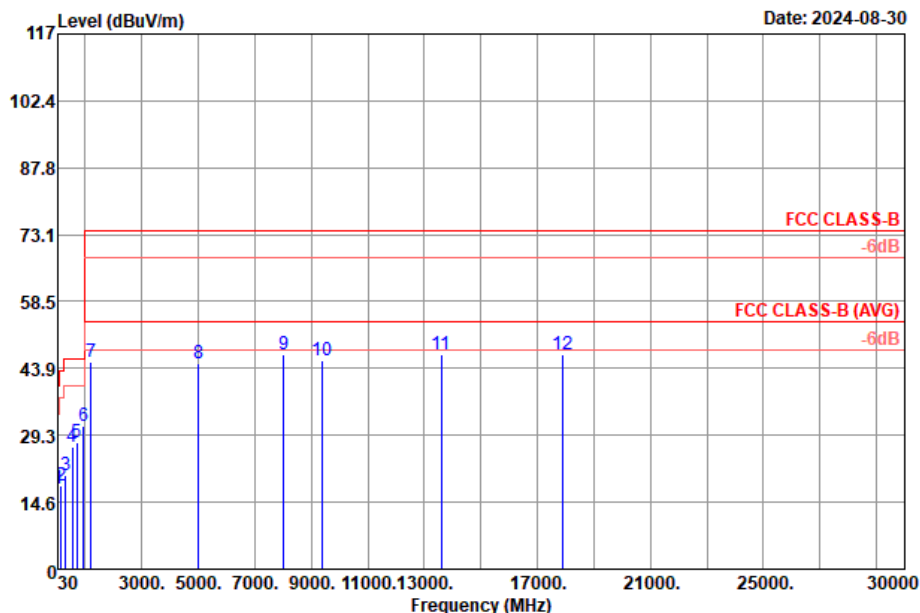


3.1.5. Test Result of Radiated Emission





Test Engineer :	ZhanSheng Liu	Temperature :	24~25°C
		Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Vertical



Site : 03CH05-SZ

Condition : FCC CLASS-B 3m VULB9168--01003 VERTICAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	45.52	17.68	-22.32	40.00	31.58	19.56	1.60	35.06	---	---	Peak
2	143.49	18.23	-25.27	43.50	32.53	18.42	2.29	35.01	---	---	Peak
3	320.03	20.51	-25.49	46.00	32.32	19.71	3.30	34.82	---	---	Peak
4	553.80	26.61	-19.39	46.00	33.20	24.49	3.51	34.59	---	---	Peak
5	713.85	27.82	-18.18	46.00	31.10	27.42	3.74	34.44	---	---	Peak
6 *	937.92	31.39	-14.61	46.00	30.96	29.84	4.49	33.90	---	---	Peak
7	1200.00	45.23	-28.77	74.00	60.92	29.08	5.17	49.94	---	---	Peak
8	5000.00	45.09	-28.91	74.00	48.91	36.20	9.48	49.50	---	---	Peak
9	8024.00	46.94	-27.06	74.00	47.81	37.61	11.51	49.99	---	---	Peak
10	9387.00	45.55	-28.45	74.00	43.30	38.83	12.77	49.35	---	---	Peak
11	13590.00	46.94	-27.06	74.00	39.01	40.66	14.40	47.13	---	---	Peak
12	17883.00	46.94	-27.06	74.00	39.64	44.88	15.28	52.86	---	---	Peak

Note:

- Level(dBuV/m) = Read Level(dBuV) + Antenna Factor(dB/m) + Cable Loss(dB) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBuV/m) - Limit Line(dBuV/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	Aug. 29, 2024~ Aug. 30, 2024	Apr. 08, 2025	Radiation (03CH05-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY59071191	10Hz~44GHz	Apr. 09, 2024	Aug. 29, 2024~ Aug. 30, 2024	Apr. 08, 2025	Radiation (03CH05-SZ)
Log-periodic Antenna	SCHWARZBECK	VULB 9168	01001	20MHz~1.5GHz	Jul. 08, 2024	Aug. 29, 2024~ Aug. 30, 2024	Jul. 07, 2025	Radiation (03CH05-SZ)
Amplifier	EM Electronics	EM330	060756	0.01Hz ~3000MHz	Apr. 09, 2024	Aug. 29, 2024~ Aug. 30, 2024	Apr. 08, 2025	Radiation (03CH05-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-2206	1GHz~18GHz	Apr. 09, 2024	Aug. 29, 2024~ Aug. 30, 2024	Apr. 08, 2025	Radiation (03CH05-SZ)
HF Amplifier	EM Electronics	EM01G18GA	060781	1GHz~18GHz	Apr. 09, 2024	Aug. 29, 2024~ Aug. 30, 2024	Apr. 08, 2025	Radiation (03CH05-SZ)
HF Amplifier	EM Electronics	EM18G40G	060778	18GHz~40GHz	Apr. 09, 2024	Aug. 29, 2024~ Aug. 30, 2024	Apr. 08, 2025	Radiation (03CH05-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	00983	15GHz~40GHz	Apr. 09, 2024	Aug. 29, 2024~ Aug. 30, 2024	Apr. 08, 2025	Radiation (03CH05-SZ)
AC Power Source	APC	AFV-S-600	F119050013	N/A	Oct. 18, 2023	Aug. 29, 2024~ Aug. 30, 2024	Oct. 17, 2024	Radiation (03CH05-SZ)
Turn Table	EMEC	T-200-S-1	060925-T	0~360 degree	NCR	Aug. 29, 2024~ Aug. 30, 2024	NCR	Radiation (03CH05-SZ)
Antenna Mast	EMEC	MBS-400-1	060927	1 m~4 m	NCR	Aug. 29, 2024~ Aug. 30, 2024	NCR	Radiation (03CH05-SZ)

NCR: No Calibration Required



5. Measurement Uncertainty

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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----- THE END -----