



EMC TEST REPORT

Report No.: 20250117G01666X-W1

Product Name: KEY TOOL MIDI

FCC ID: 2AI4T-XDKMD

Model No. : XDKMD

Trade Name: Xhorse

Applicant: Shenzhen Xhorse Electronics Co., Ltd.

Address: Floor 28, Block A, Building NO.6, International Innovation Valley,
Nanshan District, Shenzhen

Received Date: 2025.01.24

Dates of Testing: 2025.02.07–2025.02.11

Issued by: CCIC Southern Testing Co., Ltd.

Lab Location: Electronic Testing Building, No.43, Shahe Road, Xili Street, Nanshan
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Test Report

Product Name KEY TOOL MIDI

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Applicant Address Floor 28, Block A, Building NO.6, International Innovation Valley,
Nanshan District, Shenzhen

Manufacturer..... Shenzhen Xhorse Electronics Co., Ltd.

Manufacturer Address Floor 28, Block A, Building NO.6, International Innovation Valley,
Nanshan District, Shenzhen

Test Standards 47 CFR Part 15 Subpart B

Test Result..... PASS

Tested by Deng Shanfei

Deng Shanfei, Test Engineer

2025.02.11

Sun Jiaohui

Reviewed by _____

Sun Jiaohui, Senior Engineer

2025.02.11

Chris You

Approved by _____

Chris You, Manager

2025.02.11

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Change History		
Issue	Date	Reason for change
1.0	2025.02.11	First edition



1. GENERAL INFORMATION

1.1 EUT Description

EUT Name	KEY TOOL MIDI
Power supply	Battery Model No: L1359 Rated Capacity: 6760 mAh Manufacturer: EVE Energy Co., Ltd.
	AC Adapter Model No: TYPE-C30IC I/P: 100–240 VAC, 50/60 Hz, 0.8 A O/P: 5.0 V 3.0 A/9.0 V 3.0 A/12.0 V 2.5 A/15.0 V 2.0 A/20.0 V 1.5 A MAX: 30.0 W Manufacturer: Shenzhen Shi Ying Yuan Electronics Co., Ltd.

Note 1: The EUT is a KEY TOOL MIDI.

Note 2: All the patterns have been tested and only the worst results are recorded in the report.

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart B:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart B	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	15.107	Conducted Emission	PASS
2	15.109	Radiated Emission	PASS

NOTE:

- (1) The EUT has been tested according to 47 CFR Part 15 Subpart B, CLASS B. The test procedure is according to ANSI C63.4:2014.



1.3 Facilities and Accreditations

1.3.1 Facilities

FCC-Registration No.: CN1283

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until Jun.30, 2025.

ISED Registration: 11185A-1

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Jun.30, 2025.

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01.

1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 °C – 35 °C
Relative Humidity (%):	25% –75%
Atmospheric Pressure (kPa):	86 kPa-106 kPa

1.3.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in Measurement” (GUM) published by ISO.

Uncertainty of Conducted Emission:	Uc = 3.2 dB (k = 2)
Uncertainty of Radiated Emission: (30 MHz–1 GHz)	Uc = 5.8 dB (k = 2)
Uncertainty of Radiated Emission: (1–6 GHz)	Uc = 5.1 dB (k = 2)
Uncertainty of Radiated Emission: (6–18 GHz)	Uc = 5.5 dB (k = 2)

2. TEST CONDITIONS SETTING

2.1 Test Peripherals

The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

Support Equipment:

Description	Brand name	Model	Serial No.	FCCID
/	/	/	/	/

Support Cable:

Description	Shield Type	Ferrite Core	Length
AC Power Cable	/	/	0. 6 m

2.2 Test Mode

Note 4: The EUT is a KEY TOOL MIDI; It could support the following operating mode and frequency band: 2.4G/5G WIFI; Bluetooth; NFC; 125&22 KHz; 433&315 MHz

Note 5: The EUT have the following typical setups during the test:

Setup 1: 2.4G WIFI + EUT working + Charger;

Setup 2: 5G WIFI + EUT working + Charger;

Setup 3: Bluetooth + EUT working + Charger;

Setup 4: NFC + EUT working + Charger;

Setup 5: 125&22 KHz TX + EUT working + Charger;

Setup 6: 433&315 MHz TX + EUT working + Charger;

Setup 7: 2.4G WIFI + EUT working + Battery;

Setup 8: 5G WIFI + EUT working + Battery;

Setup 9: Bluetooth + EUT working + Battery;

Setup 10: NFC + EUT working + Battery;

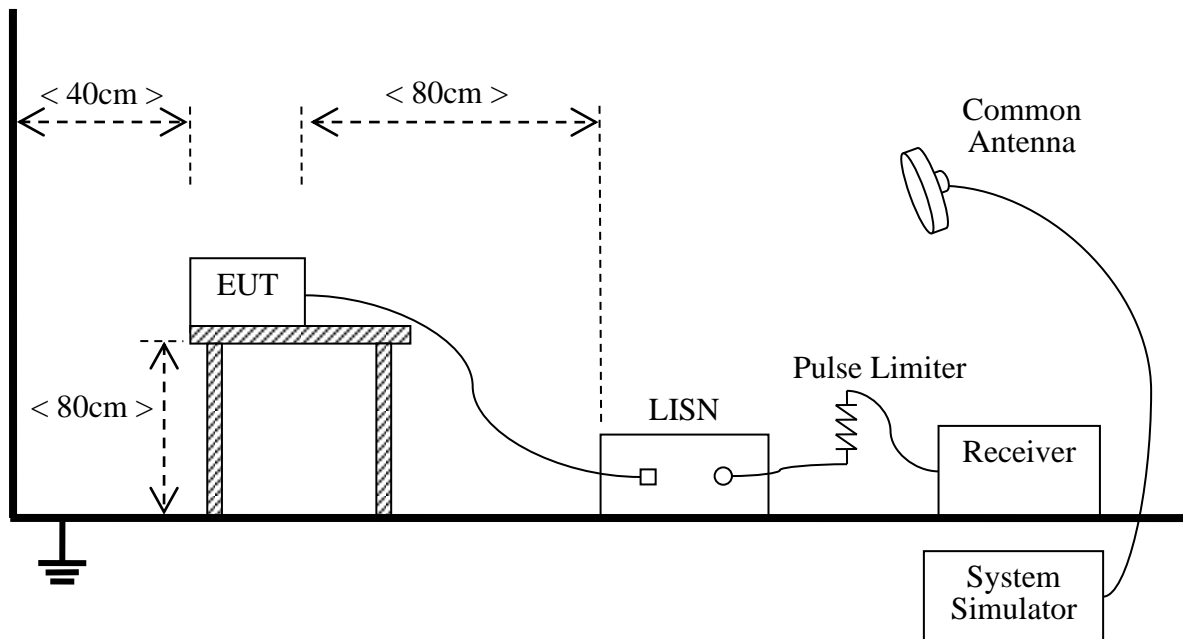
Setup 11: 125&22 KHz TX + EUT working + Battery;

Setup 12: 433&315 MHz TX + EUT working + Battery;

2.3 Test Setup and Equipments List

2.3.1 Conducted Emission

A. Test Setup:



The EUT is placed on a 0.8 m high insulating table, which stands on the grounded conducting floor, and keeps 0.4 m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides $50\ \Omega/50\ \mu\text{H}$ of coupling impedance for the measuring instrument. The Common Antenna is used for the call between the EUT and the System Simulator (SS). A Pulse Limiter is used to protect the measuring instrument. The factors of the whole test system are calibrated to correct the reading.

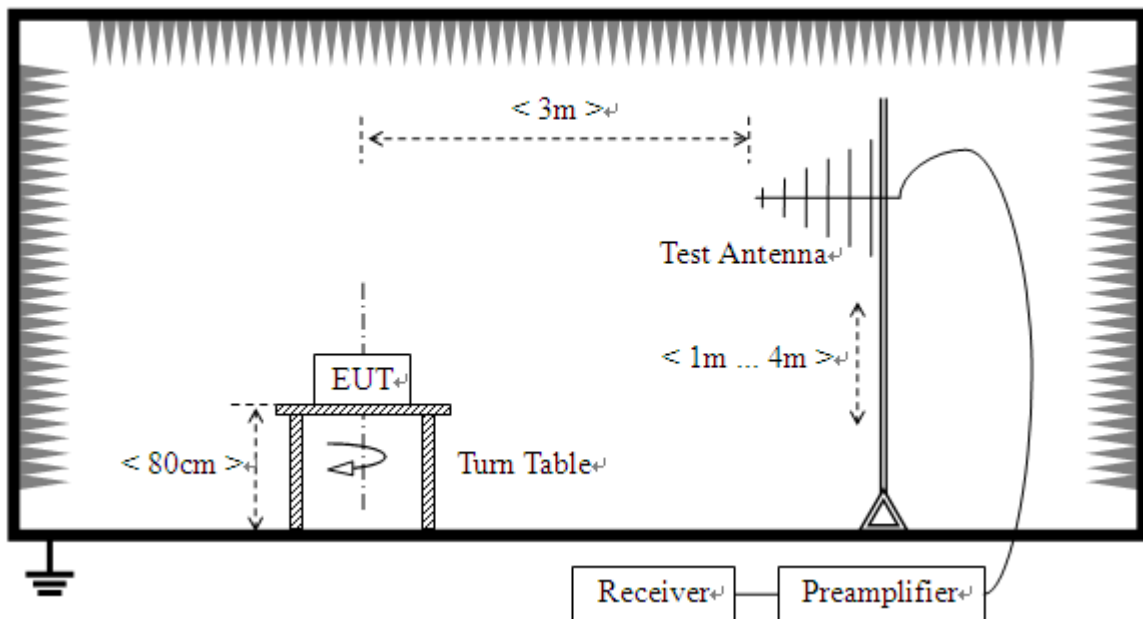
B. Equipments List:

Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due. Date
Test Receiver	KEYSIGHT	N9038A	A141202036	2024.06.05	2025.06.04
LISN	ROHDE&SCHWARZ	ENV216	A140701847	2024.05.23	2025.05.22
Cable	MATCHING PAD	W7	/	2024.08.02	2025.08.01

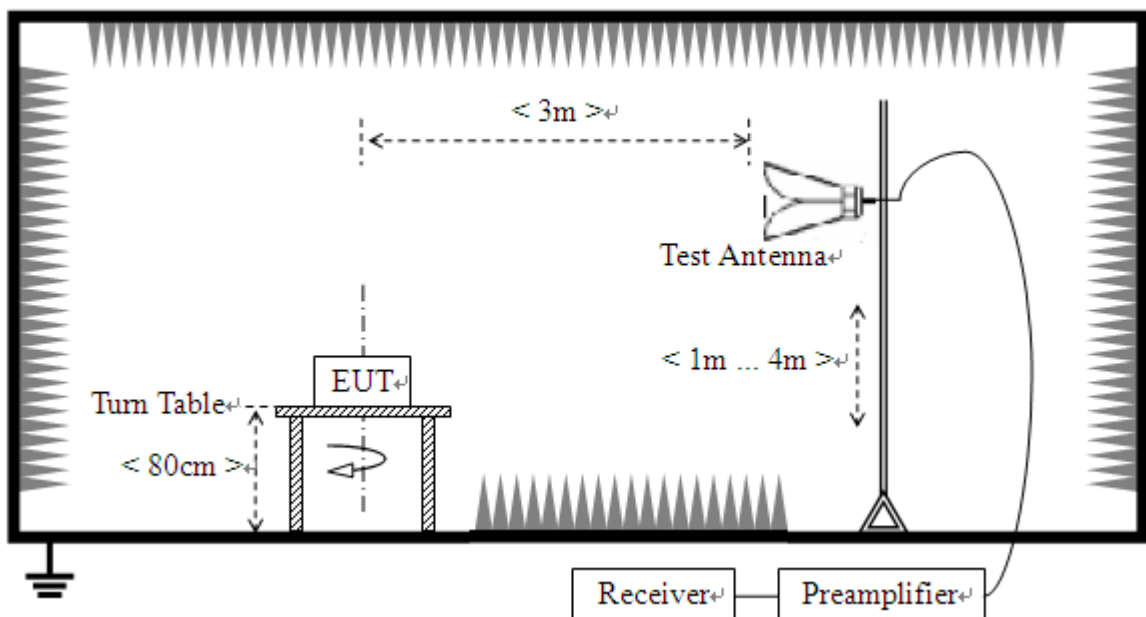
2.3.2 Radiated Emission

A. Test Setup:

- 1) For radiated emissions from 30 MHz to 1 GHz



- 2) For radiated emissions above 1 GHz



**B. Test Procedure**

The test is performed in a 3 m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8 m high insulating Turn Table, and keeps 3 m away from the Test Antenna, which is mounted on a variable-height antenna master tower.

For the test Antenna:

In the frequency range above 30 MHz, Bi-Log Test Antenna (30 MHz to 1 GHz) and Horn Test Antenna (above 1 GHz) are used. Test Antenna is 3 m away from the EUT. Test Antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

C. Equipments List:

Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due. Date
EMI Test Receiver	ROHDE&SCHWARZ	ESIB7	A0501375	2024.02.28	2025.02.27
Broadband Ant.	ETC	MCTD2786	A150402239	2024.06.01	2025.05.31
3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2024.02.27	2027.02.27
EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2024.05.24	2025.05.23
5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2022.03.25	2025.06.07
EMI Horn Ant.	ROHDE&SCHWARZ	HF906	A0304225	2022.04.12	2025.04.11

3. 47 CFR PART 15B REQUIREMENTS

3.1 Conducted Emission

3.1.1 Requirement

According to FCC section 15.107, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 – 0.50	66 to 56	56 to 46
0.50 – 5	56	46
5 – 30	60	50

Note:

- The limit subjects to the Class B digital device.
- The lower limit shall apply at the band edges.
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 – 0.50 MHz.

3.1.2 Test Description

See section 2.3.1 of this report.

3.1.3 Test Result

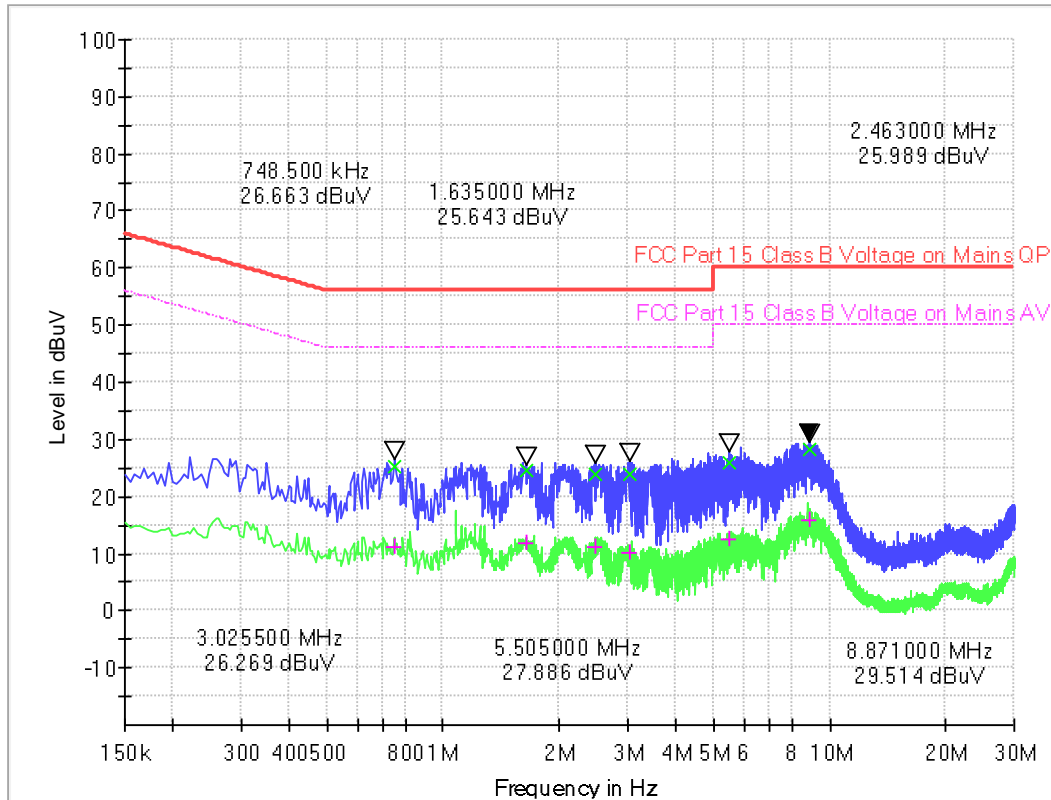
The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. All test modes are considered, refer to recorded points and plots below.

Note:

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a Nominal 120 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

Test voltage and frequency (120 VAC, 60 Hz)

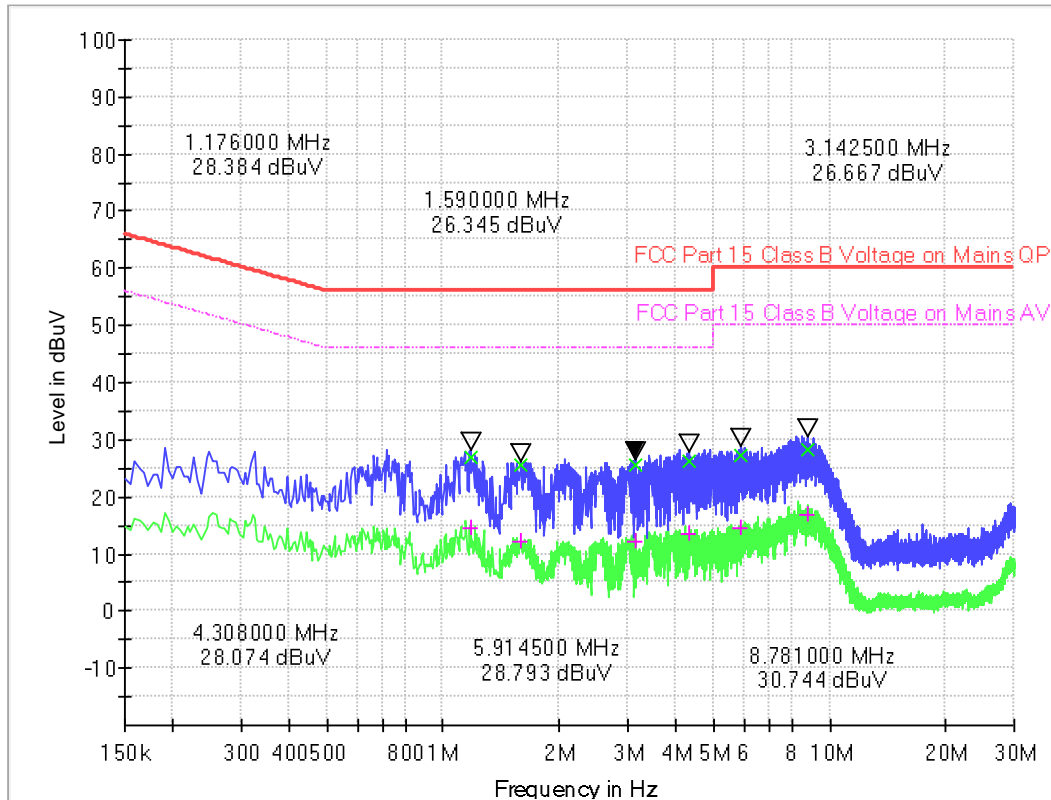
A. Mains terminal disturbance voltage, L phase, Setup 1



(Plot A: L Phase)

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB μ V)	Margin - AV (dB)	Limit - AV (dB μ V)
0.748500	25.31	11.15	0.1	10.1	30.69	56.0	34.85	46.0
1.635000	24.69	11.81	0.2	10.2	31.31	56.0	34.19	46.0
2.463000	23.82	11.06	0.2	10.2	32.18	56.0	34.94	46.0
3.025500	23.85	10.03	0.3	10.3	32.15	56.0	35.97	46.0
5.505000	25.85	12.47	0.5	10.5	34.15	60.0	37.53	50.0
8.871000	28.20	16.02	0.5	10.5	31.80	60.0	33.98	50.0

B. Mains terminal disturbance voltage, N phase, Setup 1



(Plot B: N Phase)

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB μ V)	Margin - AV (dB)	Limit - AV (dB μ V)
1.176000	26.86	14.59	0.2	10.2	29.14	56.0	31.41	46.0
1.590000	25.55	12.03	0.2	10.2	30.45	56.0	33.97	46.0
3.142500	25.47	12.22	0.3	10.3	30.53	56.0	33.78	46.0
4.308000	26.18	13.59	0.5	10.5	29.82	56.0	32.41	46.0
5.914500	27.32	14.55	0.5	10.5	32.68	60.0	35.45	50.0
8.781000	28.33	16.79	0.5	10.5	31.67	60.0	33.21	50.0

3.2 Radiated Emission

3.2.1 Requirement

According to FCC section 15.109, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency range (MHz)	Field Strength		Field Strength Limitation at 3 m Measurement Dist	
	$\mu\text{V/m}$	Dist	($\mu\text{V/m}$)	(dBuV/m)
30.0 – 88.0	100	3 m	100	$20\log 100$
88.0 – 216.0	150	3 m	150	$20\log 150$
216.0 – 960.0	200	3 m	200	$20\log 200$
Above 960.0	500	3 m	500	$20\log 500$

- For frequencies above 1000 MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.
- Test Antenna is 3 m away from the EUT. Test Antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength.
- For below 1G: QP detector RBW 120 kHz, VBW 300 kHz.

For Above 1G: PK detector RBW 1 MHz, VBW 3 MHz for PK value; AV detector RBW 1 MHz, VBW 10 Hz for AV value.

Note:

- The tighter limit shall apply at the boundary between two frequency range.
- Limitation expressed in dBuV/m is calculated by $20\log \text{Emission Level}(\mu\text{V/m})$.
- If measurement is made at 3 m distance, then F.S Limitation at 3 m distance is adjusted by using the formula of $L_{d1} = L_{d2} * (d_2/d_1)^2$.

Example:

F.S Limit at 30 m distance is 30 $\mu\text{V/m}$, then F.S Limitation at 3 m distance is adjusted as $L_{d1} = L_1 = 30 \mu\text{V/m} * (10)^2 = 100 * 30 \mu\text{V/m}$.



3.2.2 Test Description

See section 2.3.2 of this report.

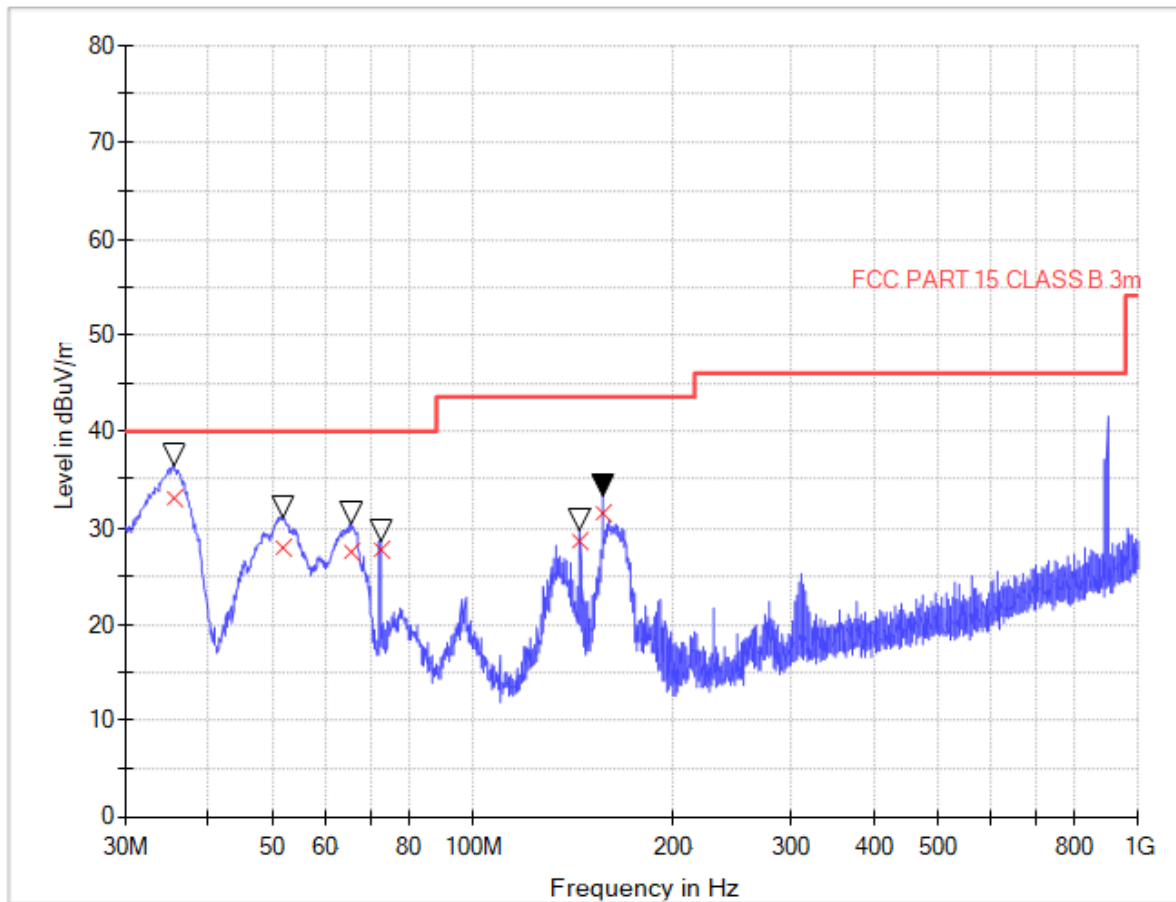
3.2.3 Test Result

The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.

A. Radiation disturbances, antenna polarization: Vertical, Setup1



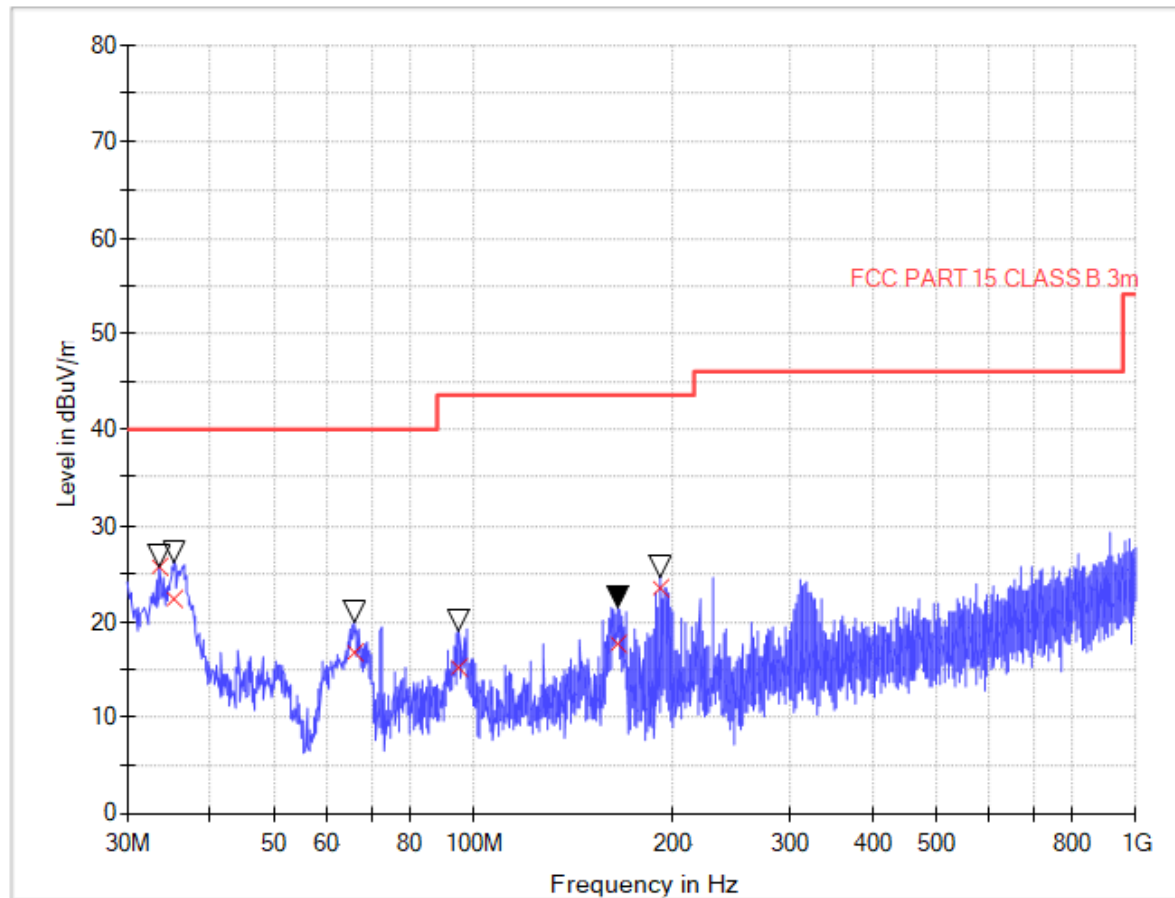
(Plot C: Test Antenna Vertical 30 M – 1 G)

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Corr. (dB)	Verdict
35.45	33.14	120.000	106	40.0	6.86	Vertical	16.4	Pass
51.94	27.97	120.000	103	40.0	12.03	Vertical	8.2	Pass
65.40	27.41	120.000	102	40.0	12.59	Vertical	5.9	Pass
72.55	27.80	120.000	107	40.0	12.20	Vertical	6.8	Pass
145.06	28.71	120.000	101	43.5	14.79	Vertical	11.9	Pass
157.07	31.53	120.000	105	43.5	11.97	Vertical	12.0	Pass

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB).
3. Margin value = Limit value–Emission Level.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Only the antenna height (from 1m to 4m) at maximum reading are recorded.

B. Radiation disturbances, antenna polarization: Horizontal, Setup1



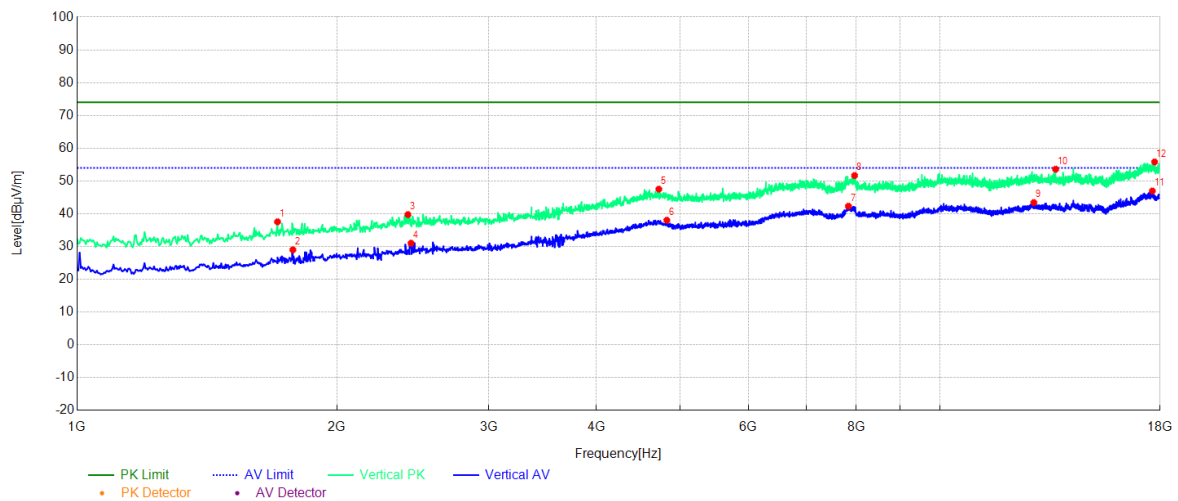
(Plot D: Test Antenna Horizontal 30M – 1G)

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Corr. (dB)	Verdict
33.52	25.78	120.000	104	40.0	14.22	Horizont	17.4	Pass
35.32	22.36	120.000	102	40.0	17.64	Horizont	16.5	Pass
66.12	16.71	120.000	109	40.0	23.29	Horizont	6.0	Pass
95.24	15.25	120.000	103	43.5	28.25	Horizont	9.6	Pass
164.96	17.60	120.000	106	43.5	25.90	Horizont	12.0	Pass
191.88	23.51	120.000	102	43.5	19.99	Horizont	11.8	Pass

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB).
3. Margin value = Limit value–Emission Level.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Only the antenna height (from 1m to 4m) at maximum reading are recorded.

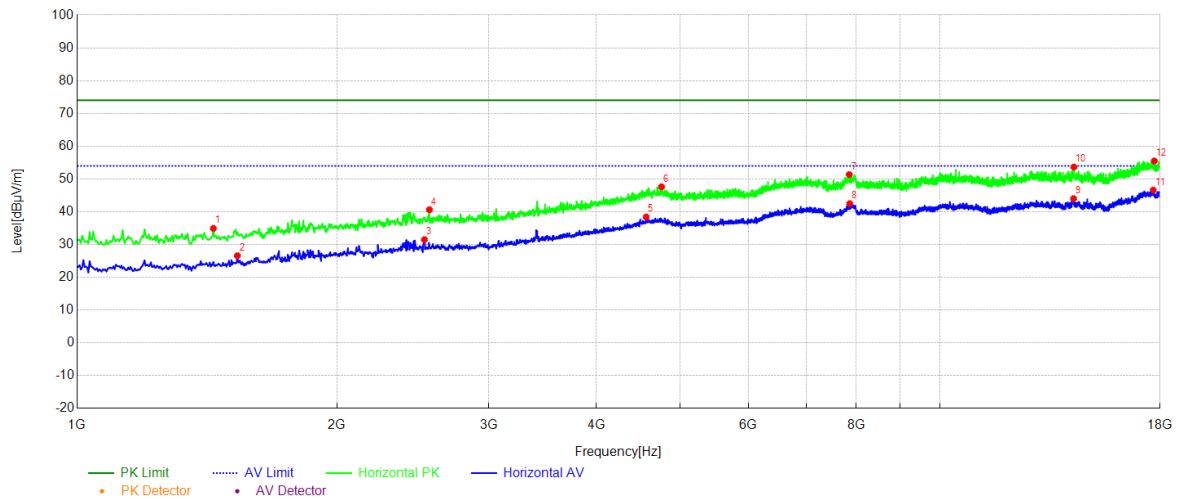
A. Radiation disturbances, antenna polarization: Vertical, Setup1



(Plot M: Test Antenna Vertical 1G – 18G)

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dBμV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1707.34	37.55	-12.78	74.00	36.45	PK	103	333	Vertical
2	1778.76	29.00	-12.32	54.00	25.00	AV	107	87	Vertical
3	2418.08	39.74	-9.70	74.00	34.26	PK	102	106	Vertical
4	2438.49	31.03	-9.62	54.00	22.97	AV	106	354	Vertical
5	4723.74	47.50	0.37	74.00	26.50	PK	105	221	Vertical
6	4825.77	38.03	0.22	54.00	15.97	AV	101	335	Vertical
7	7835.37	42.30	5.00	54.00	11.70	AV	103	248	Vertical
8	7964.59	51.65	5.39	74.00	22.35	PK	107	253	Vertical
9	12851.3	43.42	8.63	54.00	10.58	AV	108	36	Vertical
10	13619.9	53.58	9.61	74.00	20.42	PK	102	112	Vertical
11	17632.7	46.95	14.60	54.00	7.05	AV	105	317	Vertical
12	17738.1	55.81	14.63	74.00	18.19	PK	104	204	Vertical

B. Radiation disturbances, antenna polarization: Horizontal, Setup1



(Plot N: Test Antenna Horizontal 1G – 18G)

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dBμV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1438.69	34.92	-14.05	74.00	39.08	PK	105	123	Horizontal
2	1533.91	26.60	-13.66	54.00	27.40	AV	102	127	Horizontal
3	2526.91	31.51	-9.32	54.00	22.49	AV	107	342	Horizontal
4	2560.91	40.63	-9.28	74.00	33.37	PK	106	25	Horizontal
5	4567.31	38.42	-0.10	54.00	15.58	AV	105	283	Horizontal
6	4757.75	47.60	0.40	74.00	26.40	PK	101	147	Horizontal
7	7852.37	51.33	5.08	74.00	22.67	PK	108	301	Horizontal
8	7862.57	42.48	5.12	54.00	11.52	AV	103	116	Horizontal
9	14289.8	44.00	10.18	54.00	10.00	AV	104	334	Horizontal
10	14300.0	53.64	10.23	74.00	20.36	PK	106	28	Horizontal
11	17673.5	46.60	14.77	54.00	7.40	AV	102	152	Horizontal
12	17724.5	55.49	14.72	74.00	18.51	PK	109	204	Horizontal

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