



# EMC TEST REPORT

**Report No.:** 20240617G10086X -W1

**Product Name:** Finder Series Thermal Imaging Monocular

**FCC ID:** 2AY3N-26-00

**Main Model No. :** FH50R V2

**Series Model No. :** FH35R V2

**Trade Name:** InfiRay

**Applicant:** InfiRay Technologies Co., Ltd.

**Address:** Room 301, Building C3, Hefei Innovation Industrial Park, NO.800  
Wangjiang West Road, Hefei National High-tech Industry Development  
District, Anhui, P.R.China

**Received Date:** 2024.06.06

**Dates of Testing:** 2024.06.06-2024.06.14

**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

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Wangjiang West Road, Hefei National High-tech Industry  
Development District, Anhui, P.R.China

**Test Standards** ..... 47 CFR Part 15 Subpart B

**Test Result**..... PASS

**Tested by** ..... Sun Jiaohui  
Sun Jiaohui, Test Engineer 2024.07.16

**Reviewed by**..... Chris You  
Chris You, Senior Engineer 2024.07.16

**Approved by** ..... Yang Fan  
Yang Fan, Manager 2024.07.16



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Change History		
Issue	Date	Reason for change
1.0	2024.07.16	First edition



## 1. GENERAL INFORMATION

### 1.1 EUT Description

EUT Name	Finder Series Thermal Imaging Monocular
Hardware Version	V60D
Software Version	3.18.05
Power supply	Battery Model No.: IBP-2 Capacitance: 3100mAh Rated Voltage: 3.6V Manufacturer: SAMSUNG SDI Co., LTD.  AC Adapter Model No.: LX050240E I/P: 100-240V~50/60Hz, 0.35A O/P: 5.0V 0.01-2.4A, 12.0W MAX Manufacturer: Shenzhen LvXiangYuan Technology Co., LTD.

*Note 1:* The EUT is a Finder Series Thermal Imaging Monocular; It could support the following operating mode and frequency band: 2.4G WIFI;

*Note 2:* The EUT have the following typical setups during the test:

Setup1: 2.4G WIFI + Charger + HDMI (Display);

Setup2: 2.4G WIFI + Battery + HDMI (Display);

Setup3: Idle + Charger;

*Note 3:* The FH35R V2 have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction, with FH50R V2. The difference lies only in lens focal length of the different models.

*Note 4:* All the patterns have been tested and only the worst results are recorded in the report.

*Note 5:* 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 A. 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):	86kPa-106kPa

#### 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: (30MHz~1GHz)	Uc = 5.8 dB (k=2)
Uncertainty of Radiated Emission: (1~6GHz)	Uc = 5.1 dB (k=2)
Uncertainty of Radiated Emission: (6~18GHz)	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
Display	/	/	/	/

#### Support Cable:

Description	Shield Type	Ferrite Core	Length
/	/	/	/

### 2.2 Test Mode

The EUT have the following typical setups during the test:

Setup1: 2.4G WIFI + Charger + HDMI (Display);

Setup2: 2.4G WIFI + Battery + HDMI (Display);

Setup3: Bluetooth + Charger + HDMI (Display);

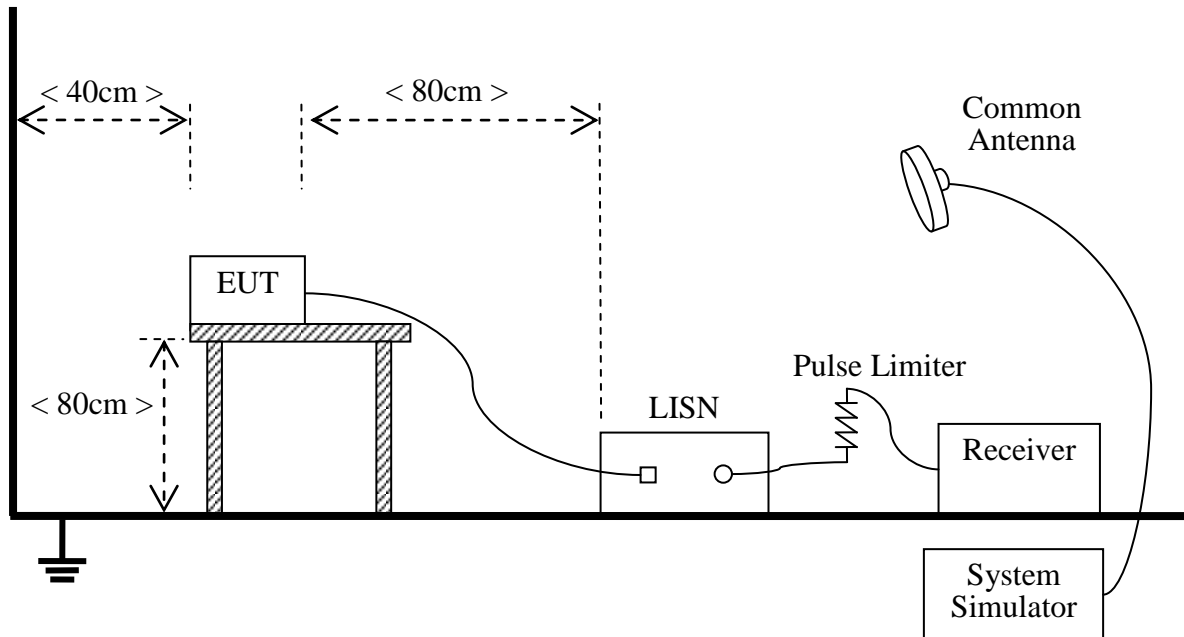
Setup4: Bluetooth + Battery + HDMI (Display);

Setup5: Idle + Charger;

## 2.3 Test Setup and Equipments List

### 2.3.1 Conducted Emission

#### A. Test Setup:



The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m 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:

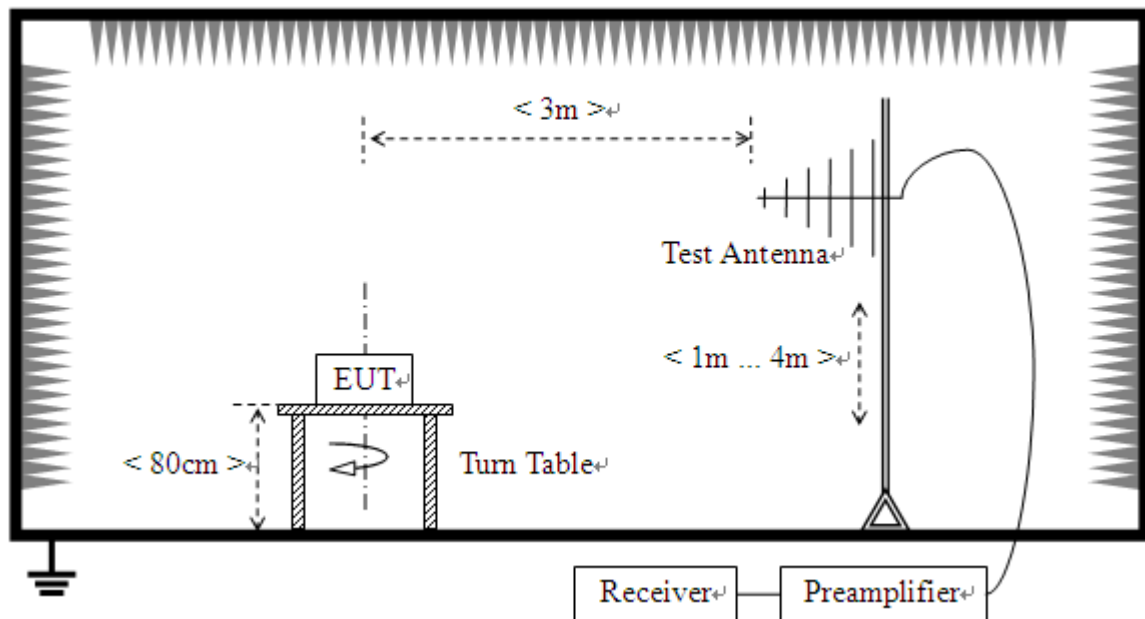
Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due. Date
Test Receiver	KEYSIGHT	N9038A	A141202036	2024.06.05	2025.06.04
LISN	ROHDE&SCHWARZ	ENV216	A140701847	2024.05.23	2025.05.22
Cable	MATCHING PAD	W7	/	2023.07.02	2024.07.02



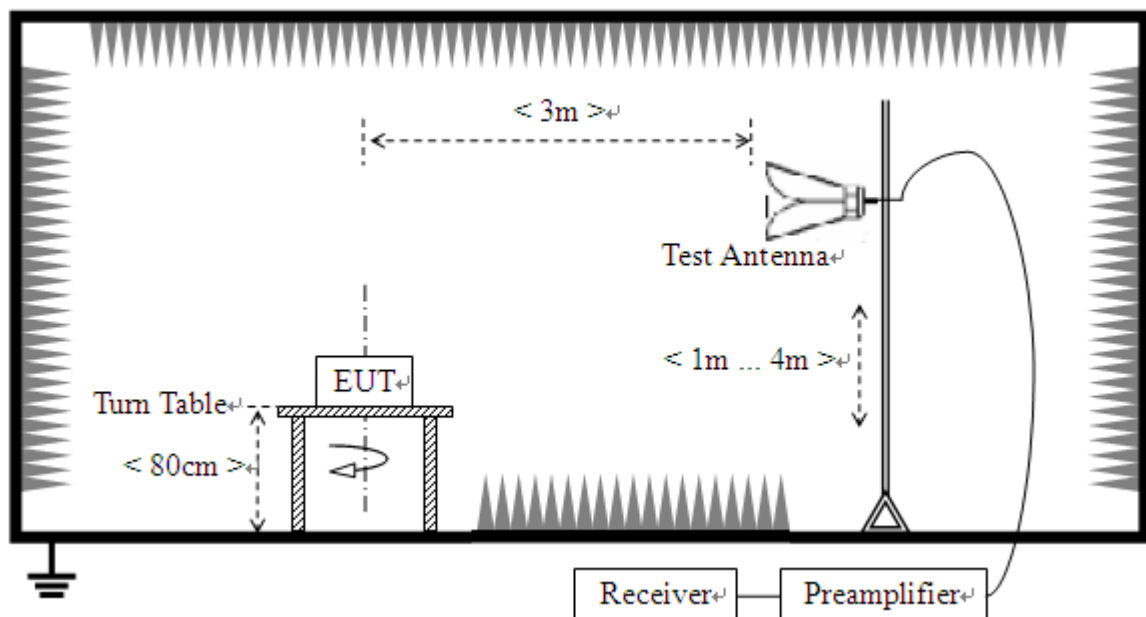
### 2.3.2 Radiated Emission

#### A. Test Setup:

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



- 2) For radiated emissions above 1GHz



**B. Test Procedure**

The test is performed in a 3m 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 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower.

For the test Antenna:

- 1) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m 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	2024.01.19	2025.01.18
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 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.50	79	66
0.50 - 30	73	60

**Note:**

- a) The limit subjects to the Class A digital device.
- b) The lower limit shall apply at the band edges.
- c) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

##### 3.1.2 Test Description

See section 2.3.1 of this report.

##### 3.1.3 Test Result

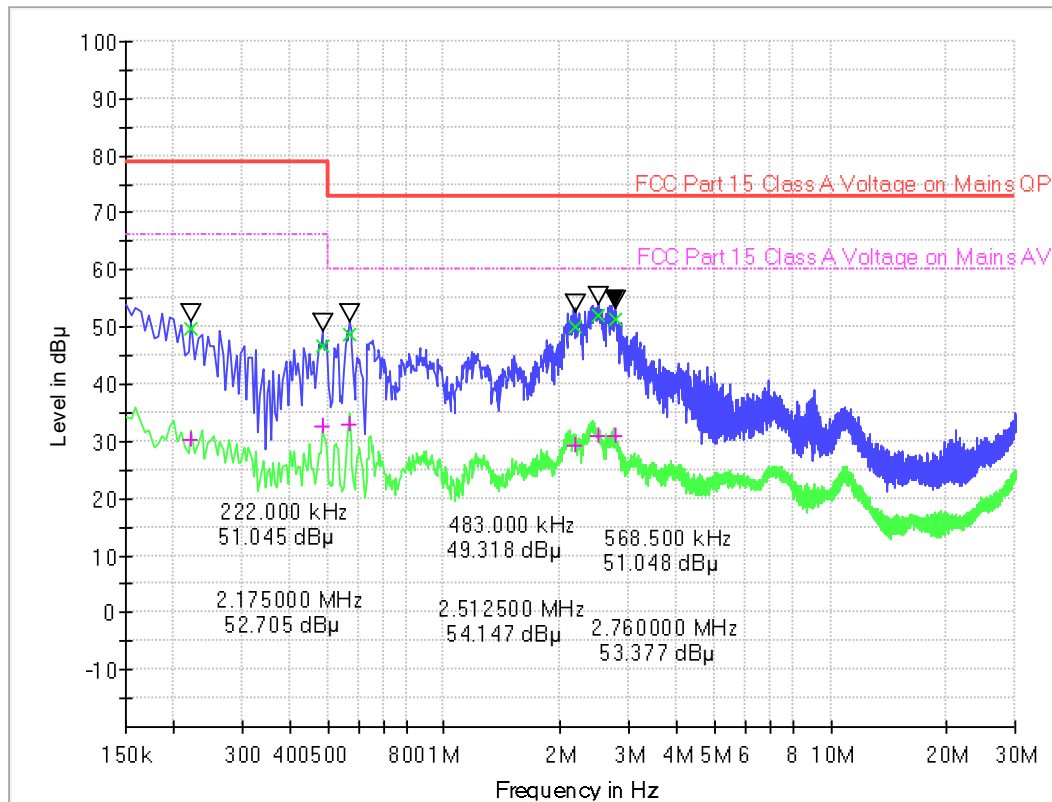
The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines 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 230V AC, 50/60Hz) 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 (230V AC, 60Hz)

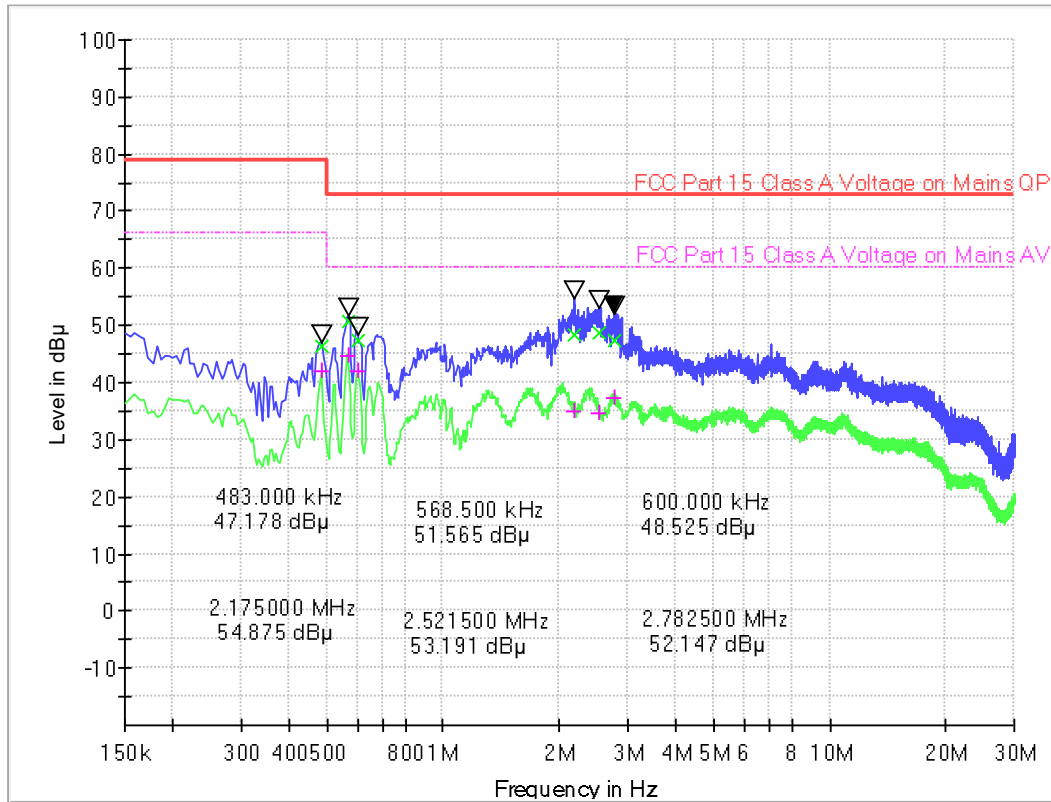
### A. Mains terminal disturbance voltage, L phase, Setup 1



(Plot A: L Phase)

Frequency (MHz)	QuasiPea k	CAverage (dB μ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB μ V)
0.222000	49.81	30.44	0.1	10.1	29.19	79.0	35.56	66.0
0.483000	46.78	32.49	0.1	10.1	32.22	79.0	33.51	66.0
0.568500	48.80	33.09	0.1	10.1	24.20	73.0	26.91	60.0
2.175000	50.18	29.15	0.2	10.2	22.82	73.0	30.85	60.0
2.512500	52.07	31.06	0.2	10.2	20.93	73.0	28.94	60.0
2.760000	51.45	30.94	0.2	10.2	21.55	73.0	29.06	60.0

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



(Plot B: N Phase)

Frequency (MHz)	QuasiPea k	CAverage (dB μ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB μ V)
0.483000	46.53	42.10	0.1	10.1	32.47	79.0	23.90	66.0
0.568500	50.67	44.80	0.1	10.1	22.33	73.0	15.20	60.0
0.600000	47.31	41.87	0.1	10.1	25.69	73.0	18.13	60.0
2.175000	48.50	35.11	0.2	10.2	24.50	73.0	24.89	60.0
2.521500	48.73	34.76	0.2	10.2	24.27	73.0	25.24	60.0
2.782500	47.33	37.23	0.2	10.2	25.67	73.0	22.77	60.0

## 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 3m Measurement Dist	
	$\mu\text{V/m}$	Dist	( $\mu\text{V/m}$ )	( $\text{dBuV/m}$ )
30.0 - 88.0	100	3m	100	$20\log 100$
88.0 - 216.0	150	3m	150	$20\log 150$
216.0 - 960.0	200	3m	200	$20\log 200$
Above 960.0	500	3m	500	$20\log 500$

- For frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB 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 3m away from the EUT. Test Antenna height is varied from 1m to 4m 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 1MHz, VBW 3MHz for PK value; AV detector RBW 1MHz, VBW 10Hz for AV value.

#### Note:

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

Example:

F.S Limit at 30m distance is  $30\mu\text{V/m}$ , then F.S Limitation at 3m 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.

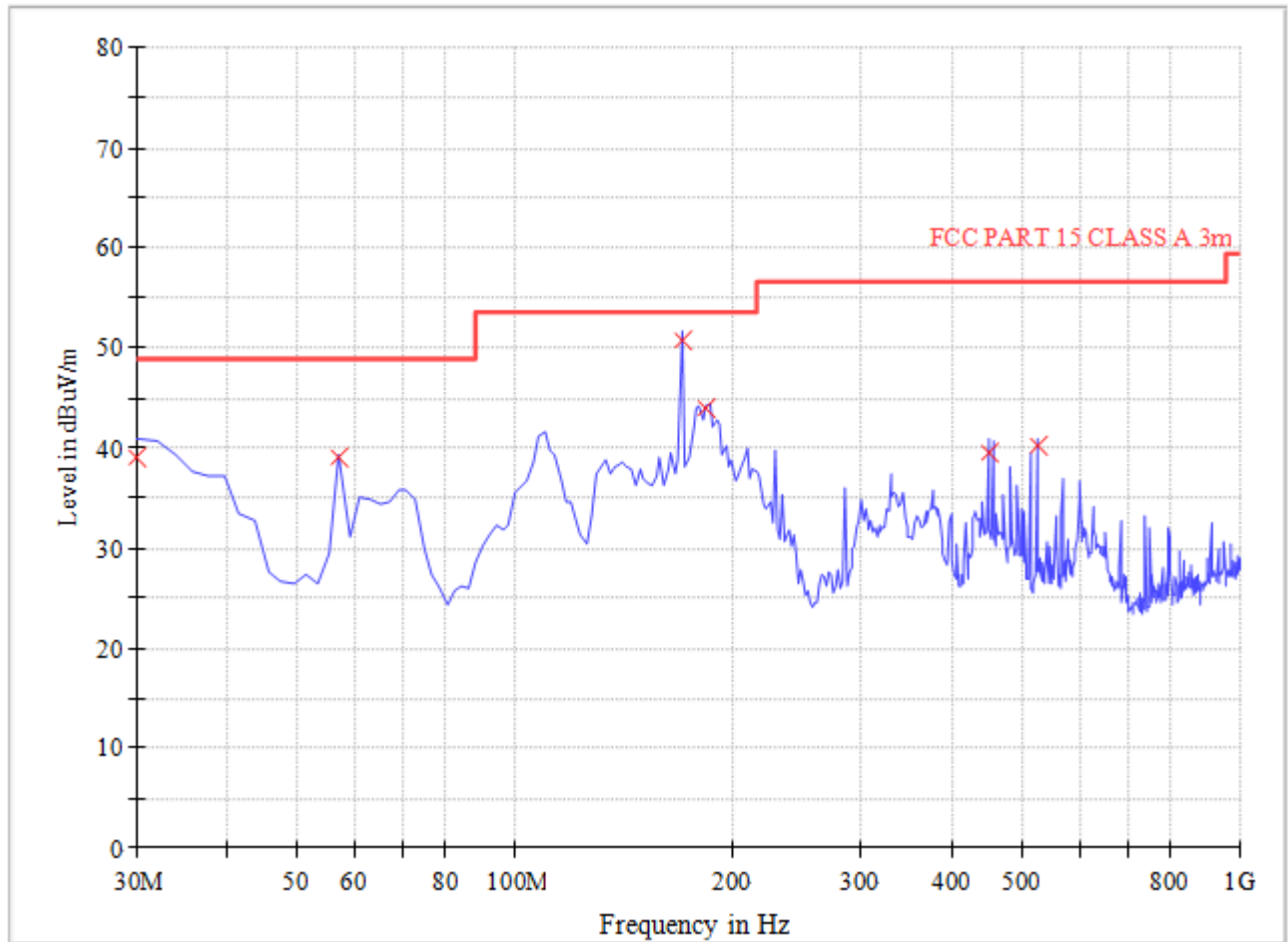
### **3.2.3 Test Result**

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

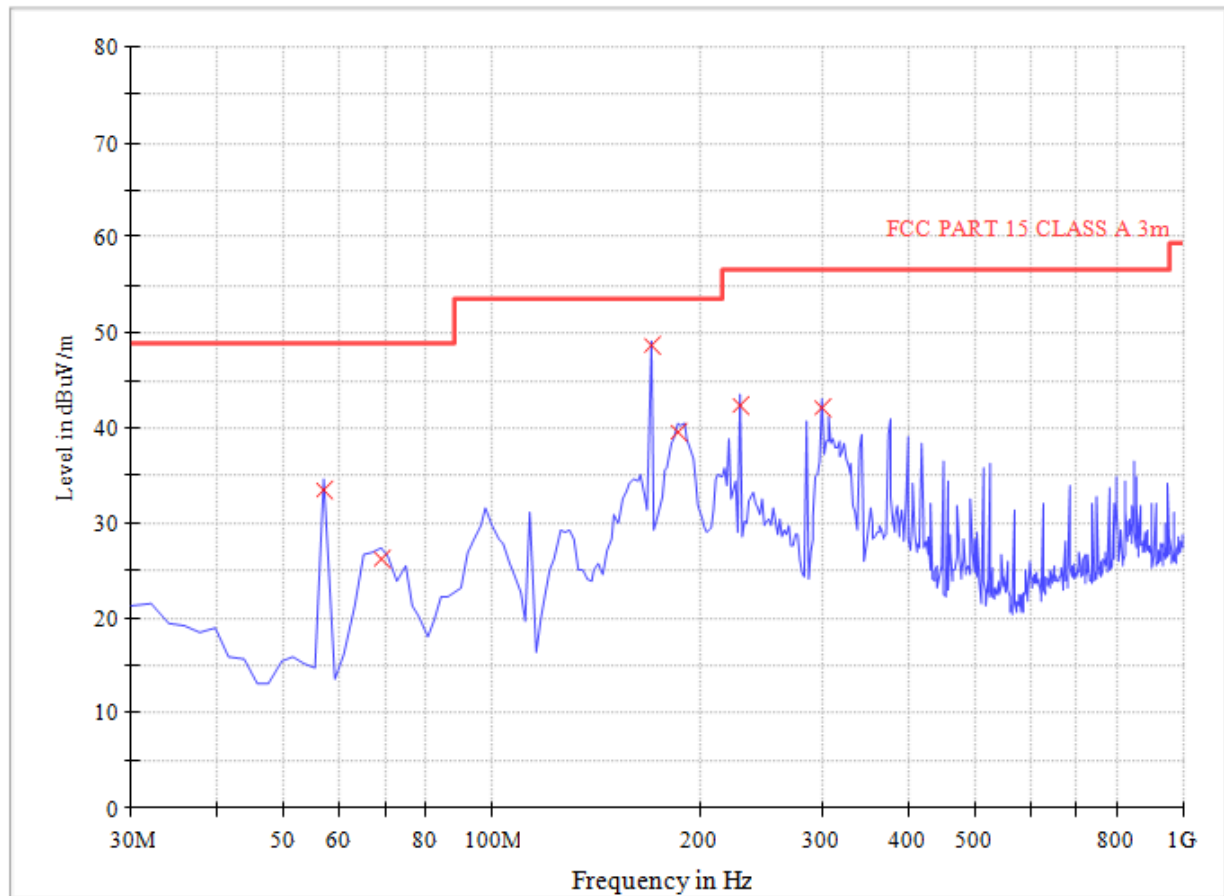


(Plot C: Test Antenna Vertical 30M - 1G)

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna	Cable Loss(dB)	ANT. Factor(dB )	Verdict
30.00	39.08	120.000	106	49.0	9.92	Vertical	0.5	18.8	Pass
57.20	38.97	120.000	103	49.0	10.03	Vertical	0.7	5.9	Pass
169.96	50.40	120.000	102	53.5	3.10	Vertical	1.2	10.8	Pass
183.56	43.95	120.000	104	53.5	9.55	Vertical	1.2	10.2	Pass
449.88	39.42	120.000	107	56.5	17.08	Vertical	1.5	17.3	Pass
525.68	40.34	120.000	102	56.5	16.16	Vertical	1.5	18.3	Pass



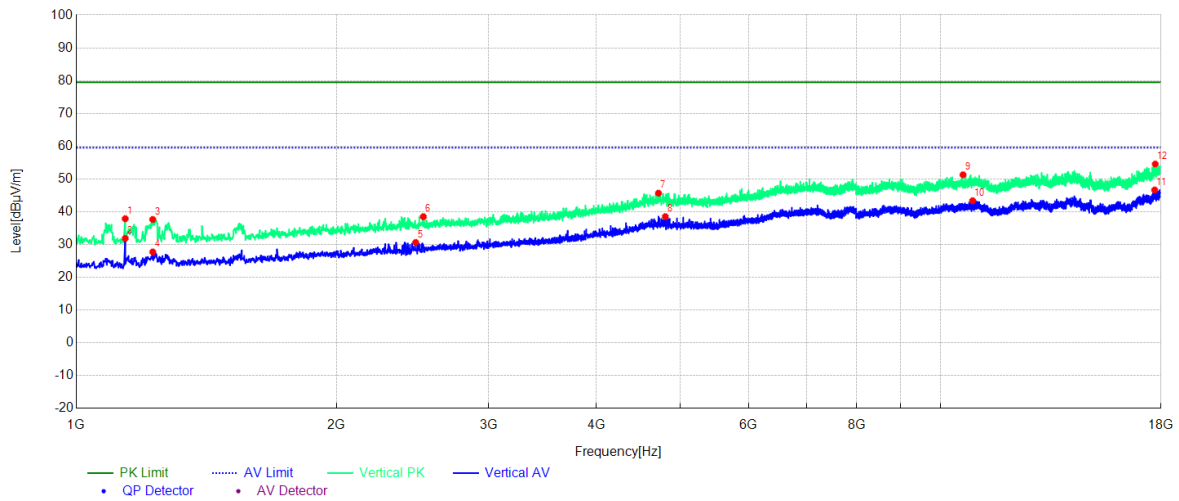
## B. Radiation disturbances, antenna polarization: Horizontal, Setup1



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

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna	Cable Loss(dB)	ANT. Factor(dB)	Verdict
57.20	33.36	120.000	103	49.0	15.64	Horizontal	0.7	5.8	Pass
68.88	26.29	120.000	105	49.0	22.71	Horizontal	0.8	5.9	Pass
169.96	48.70	120.000	102	53.5	4.80	Horizontal	1.2	10.8	Pass
185.52	39.62	120.000	108	53.5	13.88	Horizontal	1.2	10.3	Pass
228.28	42.36	120.000	101	56.5	14.14	Horizontal	1.2	10.6	Pass
300.20	42.19	120.000	104	56.5	14.31	Horizontal	1.4	14.3	Pass

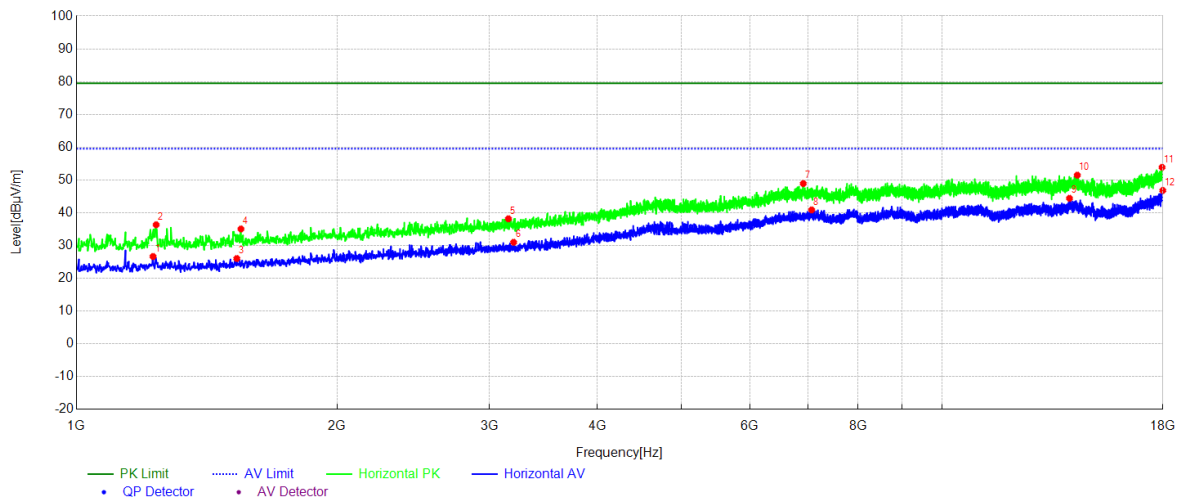
## A. Radiation disturbances, antenna polarization: Vertical, Setup1



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

NO	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin[dB μV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1139.41	37.89	-15.15	79.50	41.61	PK	107	142	Vertical
2	1139.41	31.89	-15.15	59.50	27.61	AV	104	106	Vertical
3	1226.12	37.65	-14.94	79.50	41.85	PK	102	353	Vertical
4	1226.12	27.75	-14.94	59.50	31.75	AV	105	32	Vertical
5	2470.65	30.64	-10.36	59.50	28.86	AV	102	354	Vertical
6	2521.65	38.49	-10.18	79.50	41.01	PK	103	72	Vertical
7	4718.27	45.67	-1.04	79.50	33.83	PK	108	34	Vertical
8	4804.98	38.51	-0.86	59.50	20.99	AV	101	211	Vertical
9	10621.26	51.27	6.38	79.50	28.23	PK	102	204	Vertical
10	10896.69	43.35	6.59	59.50	16.15	AV	105	245	Vertical
11	17699.07	46.63	13.68	59.50	12.87	AV	103	332	Vertical
12	17726.27	54.55	13.64	79.50	24.95	PK	104	34	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[dB μV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1226.12	26.66	-14.94	59.50	32.84	AV	104	44	Horizontal
2	1236.32	36.34	-14.91	79.50	43.16	PK	103	333	Horizontal
3	1532.15	26.04	-13.91	59.50	33.46	AV	101	91	Horizontal
4	1549.15	35.06	-13.83	79.50	44.44	PK	105	317	Horizontal
5	3155.82	38.16	-8.10	79.50	41.34	PK	109	114	Horizontal
6	3200.02	31.00	-7.96	59.50	28.50	AV	106	62	Horizontal
7	6914.89	48.91	3.21	79.50	30.59	PK	103	195	Horizontal
8	7071.31	40.87	3.41	59.50	18.63	AV	104	283	Horizontal
9	14040.30	44.41	9.39	59.50	15.09	AV	106	162	Horizontal
10	14334.43	51.46	9.65	79.50	28.04	PK	102	200	Horizontal
11	17959.20	53.86	14.78	79.50	25.64	PK	103	307	Horizontal
12	17996.60	46.80	14.85	59.50	12.70	AV	105	72	Horizontal

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