



EMC TEST REPORT

Report No.: 20240117G00146X-W1

Product Name: Cycle Computer

FCC ID: 2BERX-LSEC

Model No. : BCM 401

Applicant: Lishun Electric & Communication Co., Ltd.

Address: 4th Floor, C33 (Xinghui) Sci-Tech Park, Bao'an District, Shenzhen, China.

Received Date: 2024.01.04

Dates of Testing: 2024.01.05 ~2024.01.10

Issued by: CCIC Southern Testing Co., Ltd.

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Test Report

Product Name..... Cycle Computer

Model No. BCM 401

Trade name..... N.A

Applicant..... Lishun Electric & Communication Co., Ltd.

Applicant Address..... 4th Floor, C33 (Xinghui) Sci-Tech Park, Bao'an District,
Shenzhen, China.

Manufacturer Lishun Electric & Communication Co., Ltd.

Manufacturer Address 4th Floor, C33 (Xinghui) Sci-Tech Park, Bao'an District,
Shenzhen, China.

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

Test Result..... PASS

Tested by Sun Jiaohui

Jiaohui Sun Test Engineer

2024.02.22

Reviewed by Chris You

Chris You Senior Engineer

2024.02.22

Approved by Yang Fan

Yang Fan, Manager

2024.02.22



TABLE OF CONTENTS

1.	GENERAL INFORMATION	4
1.1	EUT Description	4
1.2	Test Standards and Results	5
	Facilities and Accreditations	6
1.2.1	Facilities	6
1.2.2	Test Environment Conditions	6
1.2.3	Measurement Uncertainty	6
2.	TEST CONDITIONS SETTING	7
2.1	Test Peripherals	7
2.2	Test Mode	7
2.3	Test Setup and Equipments List.....	8
2.3.1	Conducted Emission	8
2.3.2	Radiated Emission.....	9
3.	47 CFR PART 15B REQUIREMENTS	11
3.1	Conducted Emission	11
3.1.1	Requirement	11
3.1.2	Test Description	11
3.1.3	Test Result	11
3.2	Radiated Emission	14
3.2.1	Requirement	14
3.2.2	Test Description	15
3.2.3	Test Result	15

Change History		
Issue	Date	Reason for change
1.0	2024.02.22	First edition



1. GENERAL INFORMATION

1.1 EUT Description

EUT Name : Cycle Computer

Trade Name..... : N.A

Brand Name..... : Link-S

Hardware Version..... : L901_VER_H

Software Version..... : 1.1.0/1.0.1

Note 1: *Note1:*The EUT is a **Cycle Computer**; It could support the following operating mode and frequency band:

Bluetooth;

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

Setup1: Bluetooth + Charger;

Setup2: Idle + Charger;

Setup3: Bluetooth + Battery + Charger;

Note 3: The same structure and electrical principles between models, only the model name (nameplate), appearance color are different.

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,. The test procedure is according to ANSI C63.4:2014.



Facilities and Accreditations

1.2.1 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 Sep.30, 2023.

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 Sep.30, 2023.

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.

1.2.2 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

1.2.3 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
Adapter	/	LX10B-050200E	/	/

Support Cable:

Description	Shield Type	Ferrite Core	Length
/	/	/	/

2.2 Test Mode

The EUT have the following typical setups during the test:

Setup1: Bluetooth + Charger;

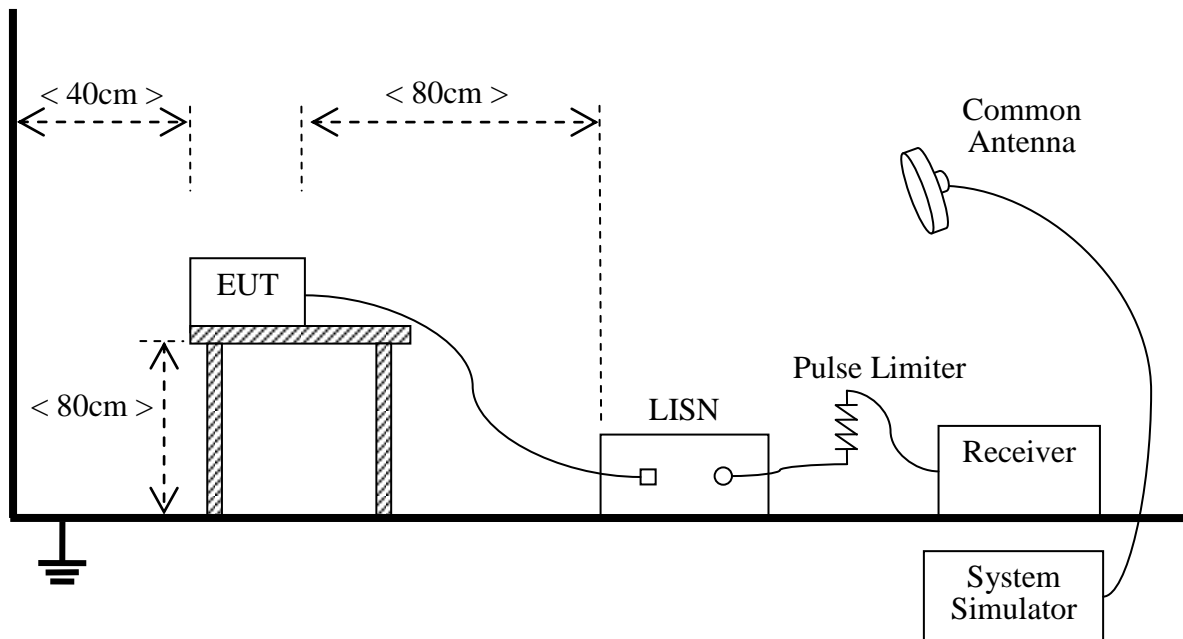
Setup2: Idle + Charger;

Setup3: Bluetooth + Battery + 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.

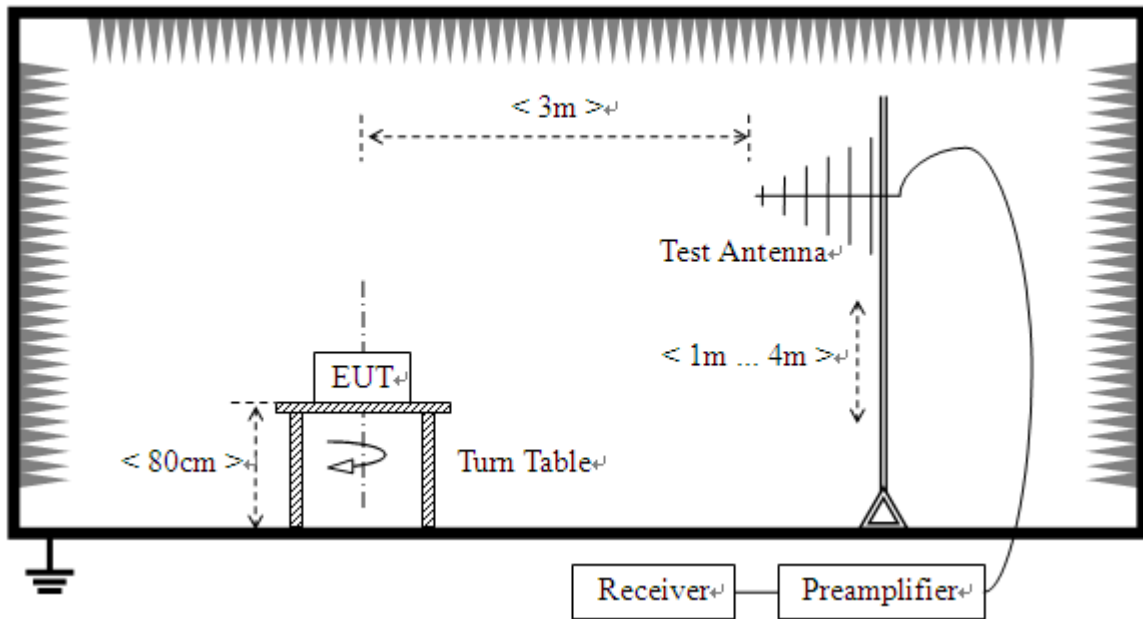
B. Equipments List:

Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due. Date
Test Receiver	KEYSIGHT	N9038A	A141202036	2023.06.12	2024.06.11
LISN	ROHDE&SCHWARZ	ENV216	A140701847	2023.06.08	2024.06.07
Cable	MATCHING PAD	W7	/	2023.07.02	2024.07.02

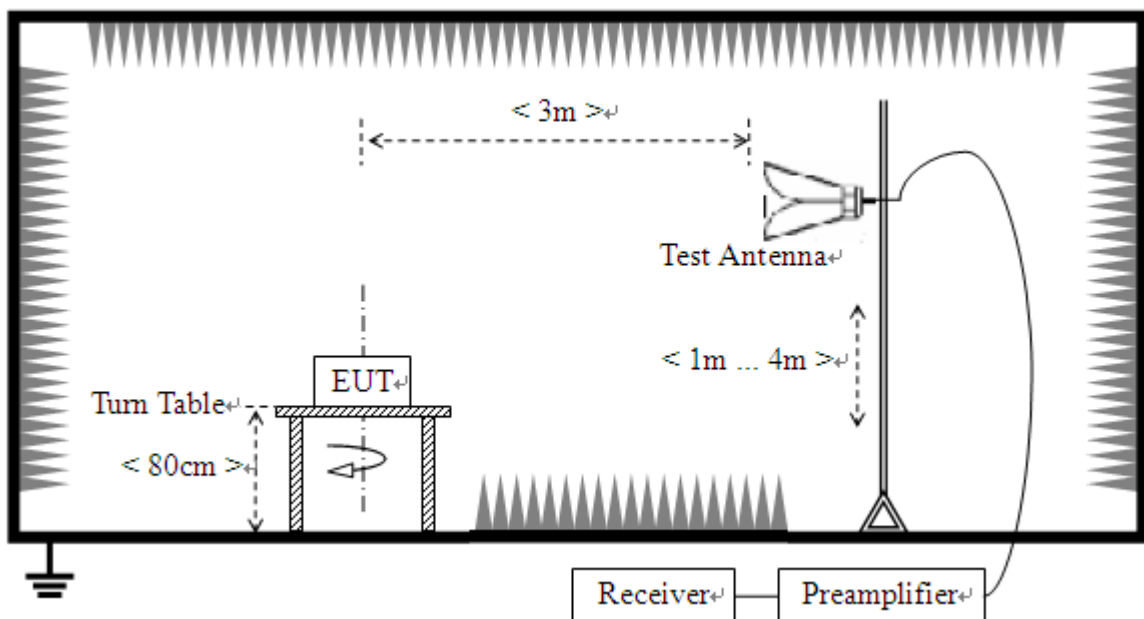
2.3.2 Radiated Emission

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	2023.03.16	2024.03.15
Broadband Ant.	2786	ETC	A150402239	2021.09.16	2024.03.03
3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2021.03.26	2024.03.25
EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2023.06.06	2024.06.07
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 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 - 0.50MHz.

3.1.2 Test Description

See section 2.3.1 of this report.

3.1.3 Test Result

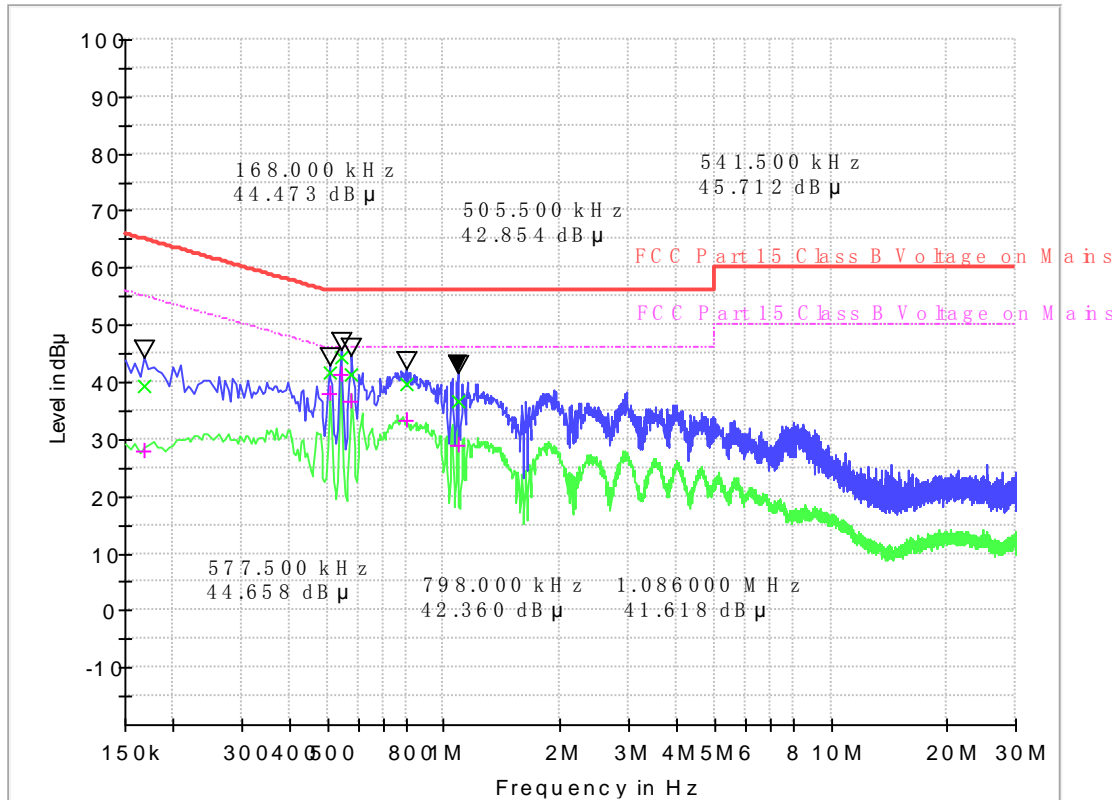
The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines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

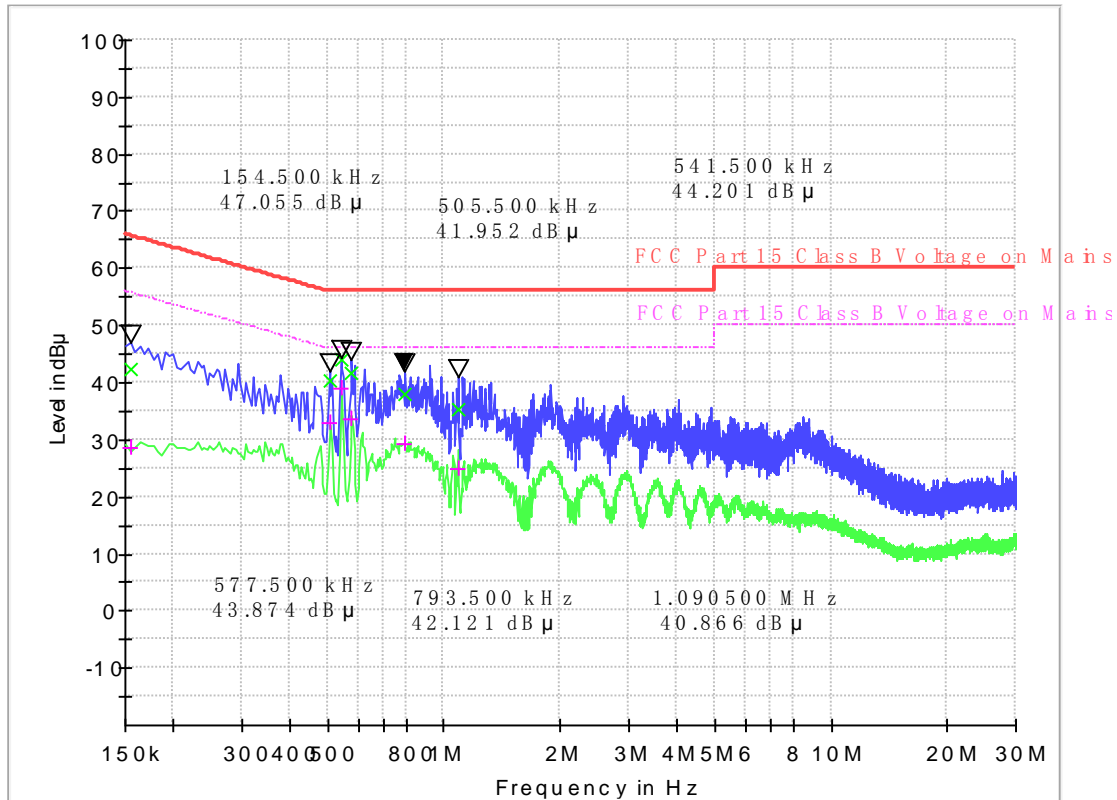
A. Mains terminal disturbance voltage, L phase,Setup 3



(Plot A: L Phase)

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB μ V)
0.168000	39.22	28.02	0.1	10.1	25.84	65.06	27.04	55.06
0.505500	41.58	38.01	0.1	10.1	14.42	56.00	7.99	46.00
0.541500	44.39	41.31	0.1	10.1	11.61	56.00	4.69	46.00
0.577500	41.40	36.79	0.1	10.1	14.60	56.00	9.21	46.00
0.798000	39.72	33.34	0.1	10.1	16.28	56.00	12.66	46.00
1.086000	36.55	28.92	0.2	10.2	19.45	56.00	17.08	46.00

B. Mains terminal disturbance voltage, N phase, Setup 3



(Plot B: N Phase)

Frequency (MHz)	QuasiPeak (dB μV)	CAverage (dB μV)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB μV)
0.154500	42.49	28.63	0.1	10.1	23.26	65.75	27.12	55.75
0.505500	40.47	33.00	0.1	10.1	15.53	56.00	13.00	46.00
0.541500	44.15	38.91	0.1	10.1	11.85	56.00	7.09	46.00
0.577500	41.55	33.75	0.1	10.1	14.45	56.00	12.25	46.00
0.793500	37.85	29.32	0.1	10.1	18.15	56.00	16.68	46.00
1.090500	35.39	25.06	0.2	10.2	20.61	56.00	20.94	46.00

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	($\mu\text{V/m}$)	(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 120kHz ,VBW 300kHz.

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 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.

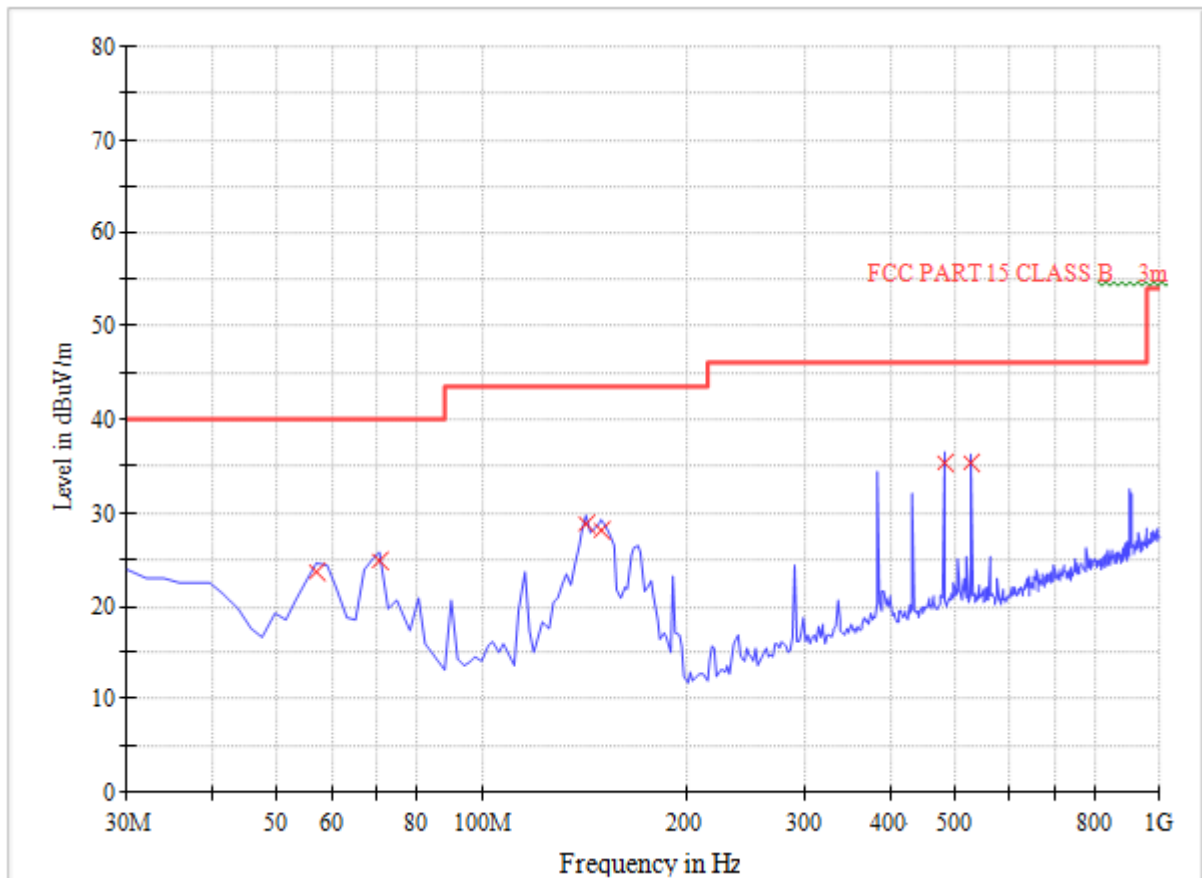
3.2.3 Test Result

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.

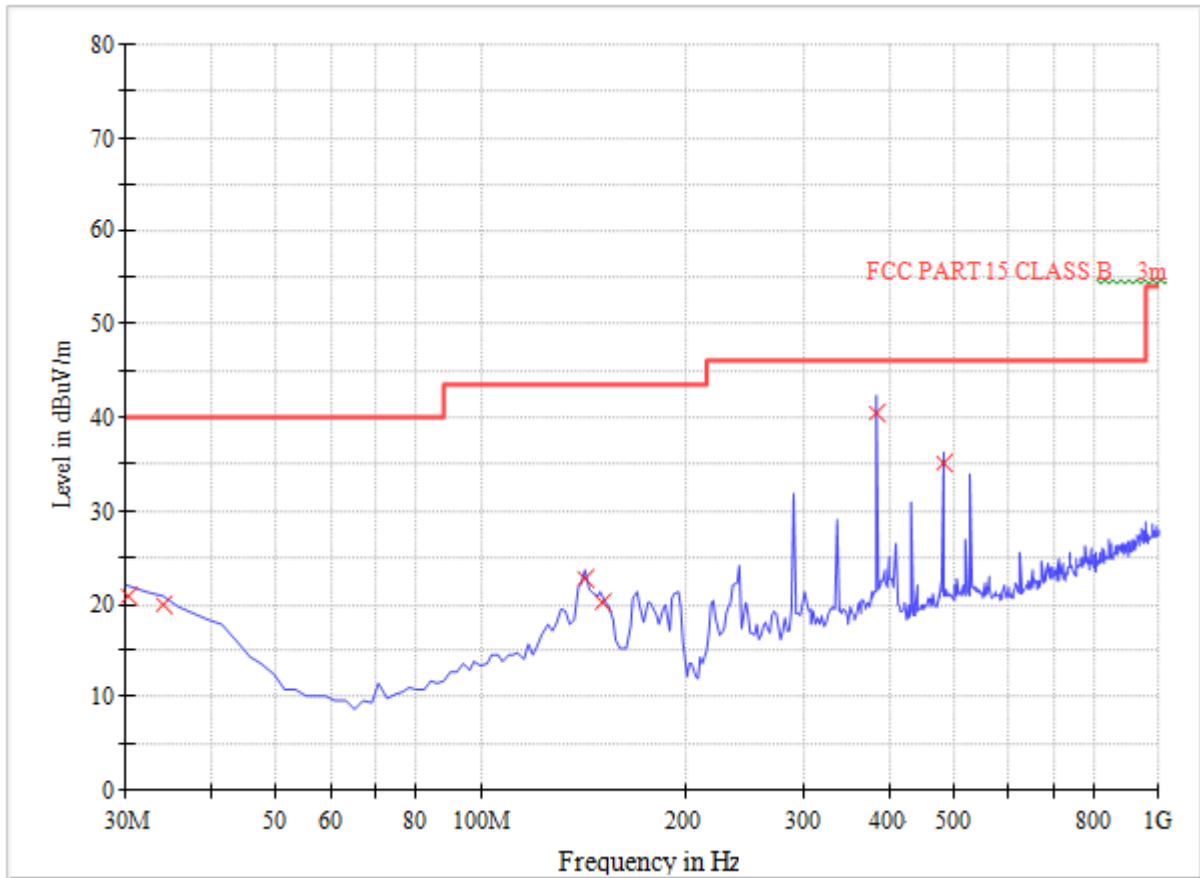
A.Radiation disturbances, antenna polarization:Vertical,Setup3



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

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Cable Loss(dB)	ANT. Factor(dB)	Verdict
57.20	23.52	120.000	105	40.00	16.48	Vertical	0.6	7.4	Pass
70.88	24.81	120.000	103	40.00	15.19	Vertical	0.8	7.0	Pass
142.80	28.66	120.000	106	43.50	14.84	Vertical	1.0	12.5	Pass
150.48	28.13	120.000	102	43.50	15.37	Vertical	1.0	12.4	Pass
481.04	35.43	120.000	105	46.00	10.57	Vertical	1.5	19.3	Pass
527.64	35.25	120.000	107	46.00	10.75	Vertical	1.5	19.7	Pass

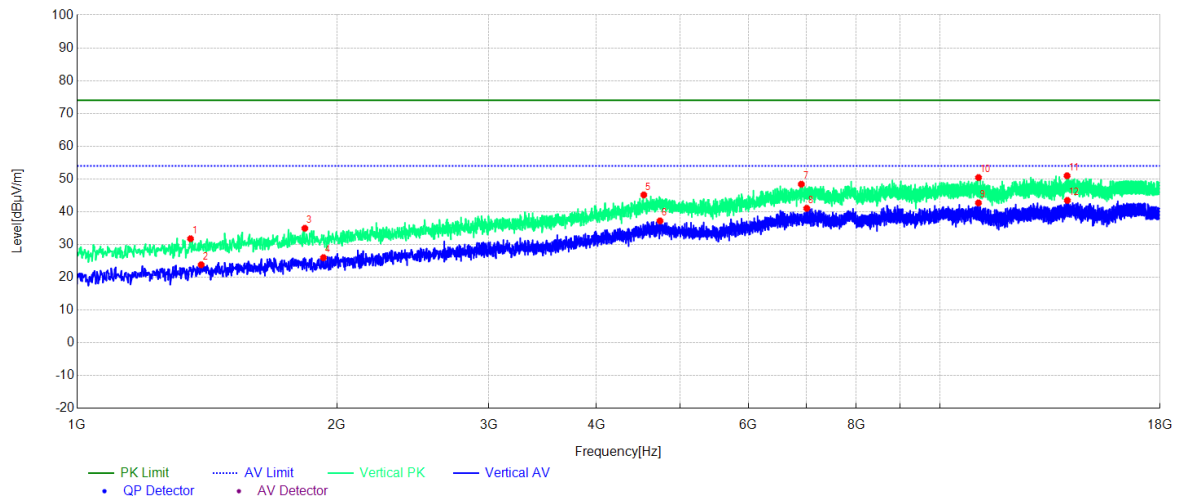
B.Radiation disturbances, antenna polarization: Horizontal,Setup3



(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	Cable Loss(dB)	ANT. Factor(dB)	Verdict
30.12	20.88	120.000	102	40.00	19.12	Horizontal	0.5	18.7	Pass
33.92	19.84	120.000	105	40.00	20.16	Horizontal	0.5	18.1	Pass
142.72	22.58	120.000	107	43.50	20.92	Horizontal	1.0	11.5	Pass
150.56	20.21	120.000	103	43.50	23.29	Horizontal	1.0	11.4	Pass
383.80	40.53	120.000	104	46.00	5.47	Horizontal	1.4	15.9	Pass
480.96	35.19	120.000	101	46.00	10.81	Horizontal	1.5	17.6	Pass

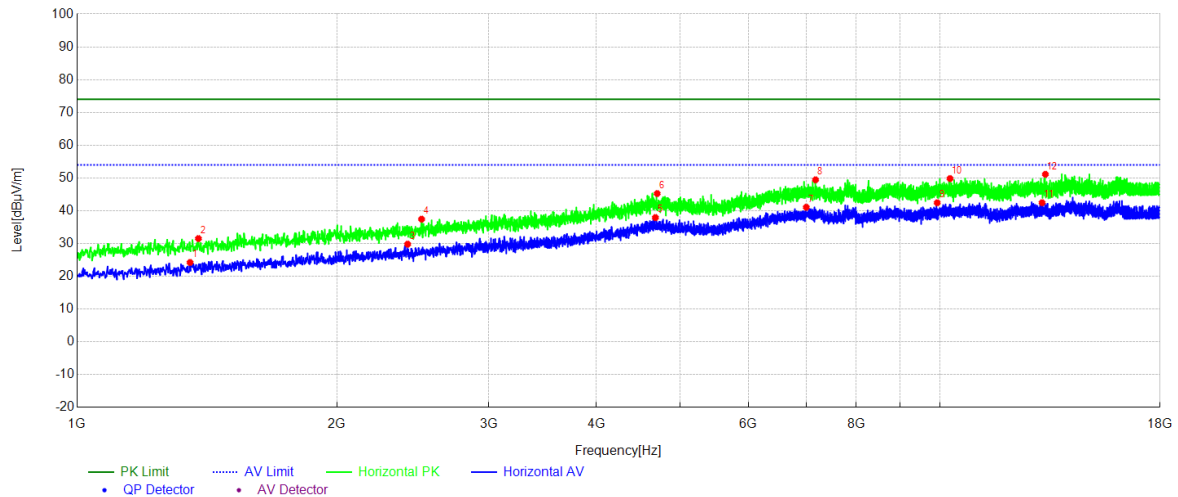
A.Radiation disturbances, antenna polarization: Vertical,Setup1



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

N O .	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin[dB μV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1353.635	31.77	-14.68	74.00	42.23	PK	105	142	Vertical
2	1392.739	23.83	-14.46	54.00	30.17	AV	102	15	Vertical
3	1836.483	34.97	-12.61	74.00	39.03	PK	106	24	Vertical
4	1929.993	26.00	-12.24	54.00	28.00	AV	107	67	Vertical
5	4538.053	45.14	-1.53	74.00	28.86	PK	103	166	Vertical
6	4738.673	37.21	-0.73	54.00	16.79	AV	101	234	Vertical
7	6909.791	48.40	3.26	74.00	25.60	PK	108	44	Vertical
8	7010.101	41.04	3.45	54.00	12.96	AV	102	124	Vertical
9	11085.40	42.71	6.69	54.00	11.29	AV	104	312	Vertical
1	11087.10	50.44	6.69	74.00	23.56	PK	105	102	Vertical
1	14043.70	50.98	9.21	74.00	23.02	PK	101	256	Vertical
1	14053.90	43.47	9.19	54.00	10.53	AV	102	325	Vertical

B.Radiation disturbances, antenna polarization: Horizontal,Setup1



(Plot N: 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	1351.935	24.24	-14.68	54.00	29.76	AV	105	24	Horizont
2	1382.538	31.52	-14.50	74.00	42.48	PK	103	267	Horizont
3	2416.241	29.81	-10.61	54.00	24.19	AV	102	134	Horizont
4	2508.050	37.43	-10.21	74.00	36.57	PK	107	16	Horizont
5	4680.868	37.93	-0.86	54.00	16.07	AV	104	213	Horizont
6	4702.970	45.25	-0.78	74.00	28.75	PK	105	312	Horizont
7	7001.600	41.07	3.44	54.00	12.93	AV	103	14	Horizont
8	7176.717	49.44	3.50	74.00	24.56	PK	101	278	Horizont
9	9929.292	42.44	5.54	54.00	11.56	AV	106	135	Horizont
10	10276.12	49.81	5.84	74.00	24.19	PK	108	102	Horizont
11	13137.51	42.46	7.76	54.00	11.54	AV	103	250	Horizont
12	13253.12	51.12	7.79	74.00	22.88	PK	102	25	Horizont

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