



EMC TEST REPORT

Report No.: 20241117G23472X-W1

Product Name: Pulse Oximeter

FCC ID: 2ABOGCMS50SP

Main Model No.: CMS50S+

Series Model No.: CMS50S

Trade Name: **CONTEC**

Applicant: Contec Medical Systems Co., Ltd.

Address: No.112 Qinhuang West Street, Economic & Technical Development Zone, Qinhuangdao, Hebei Province, PEOPLE'S REPUBLIC OF CHINA

Received Date: 2024.11.12

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Issued by: CCIC Southern Testing Co., Ltd.

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Test Report

Product Name Pulse Oximeter

Model No. CMS50S+

Applicant Contec Medical Systems Co., Ltd.

Applicant Address No.112 Qinhuang West Street, Economic & Technical Development Zone, Qinhuangdao, Hebei Province, PEOPLE`S REPUBLIC OF CHINA

Manufacturer Contec Medical Systems Co., Ltd.

Manufacturer Address No.112 Qinhuang West Street, Economic & Technical Development Zone, Qinhuangdao, Hebei Province, PEOPLE`S REPUBLIC OF CHINA

Test Standards 47 CFR Part 15 Subpart B

Test Result PASS

Tested by

Deng Shanfei

Deng Shanfei, Test Engineer

2025.05.14

Reviewed by

Sun Jiaohui

Sun Jiaohui, Senior Engineer

2025.05.14

Approved by

Chris You

Chris You, Manager

2025.05.14



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Change History		
Issue	Date	Reason for change
1.0	2025.05.14	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Name	Pulse Oximeter
Power supply	Battery Nominal Voltage: 3.7V Capacitance: 250mAh/0.925Wh
	Adapter (AC 120V)

Note 1: The EUT is a Pulse Oximeter;

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 3: Models: CMS50S+ and CMS50S. Both models are the same in intended use, features, principles of operation, mode of operation and performance index, except for the differences listed in the table below.

Difference	CMS50S	CMS50S+
Display	No screen, the indicator is displayed	color display

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

CCIC-SET Lab 1

Address: Electronic Testing Building, No.43, Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China

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.

ISED Registration: 11185A, CAB number: CN0064

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.

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.

CNAS L1659

CCIC Southern Testing Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

CCIC-SET Lab 4

Address: No.125, Hongmei Section, Wangsha Road, Hongmei Town, Dongguan City, Guangdong Province, China

CNAS L1659

CCIC Southern Testing Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

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
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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:	$U_c = 3.2 \text{ dB (k=2)}$
Uncertainty of Radiated Emission: (30MHz~1GHz)	$U_c = 5.8 \text{ dB (k=2)}$
Uncertainty of Radiated Emission: (1~6GHz)	$U_c = 5.1 \text{ dB (k=2)}$
Uncertainty of Radiated Emission: (6~18GHz)	$U_c = 5.5 \text{ dB (k=2)}$

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	/	VC56JBCH	/	/
Notebook	Lenovo	ThinkPad E14 Gen 2	/	/

Support Cable:

Description	Shield Type	Ferrite Core	Length
/	/	/	/

2.2 Test Mode

Note 4: The EUT is a Pulse Oximeter; It could support the following operating mode and frequency band: Bluetooth.

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

Setup 1: Bluetooth + Adapter + Charger;

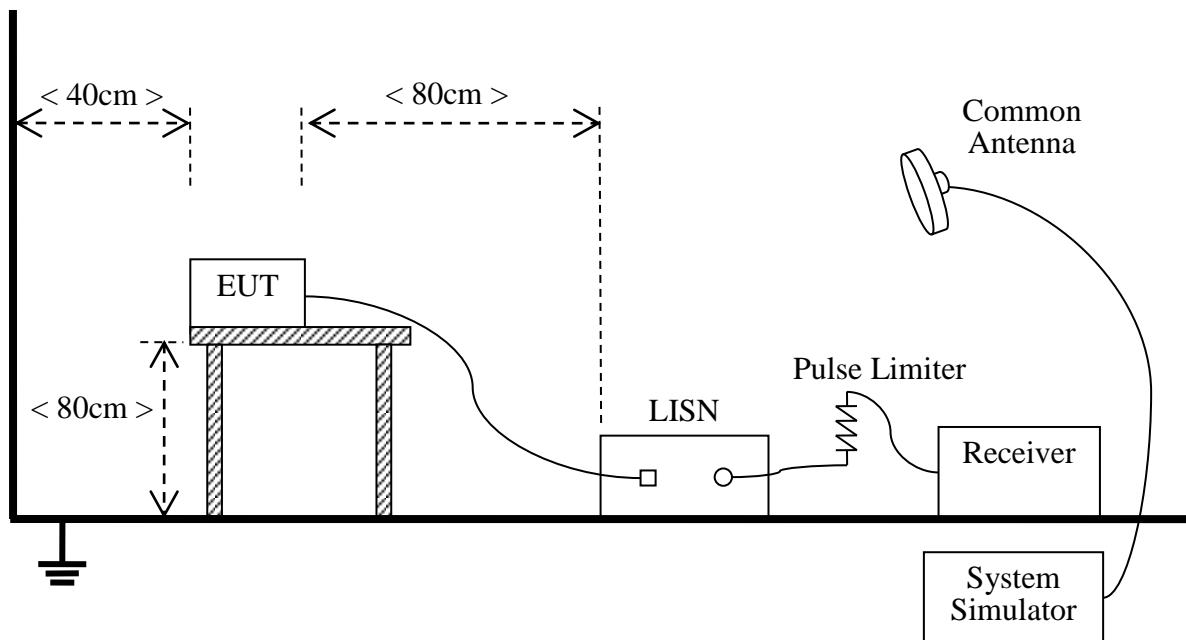
Setup 2: EUT + Notebook PC + DATA;

Note 6: All the patterns have been tested and only the worst results are recorded in the report.

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	2025.04.15	2026.04.14
Cable	MATCHING PAD	W7	/	2024.08.02	2025.08.01

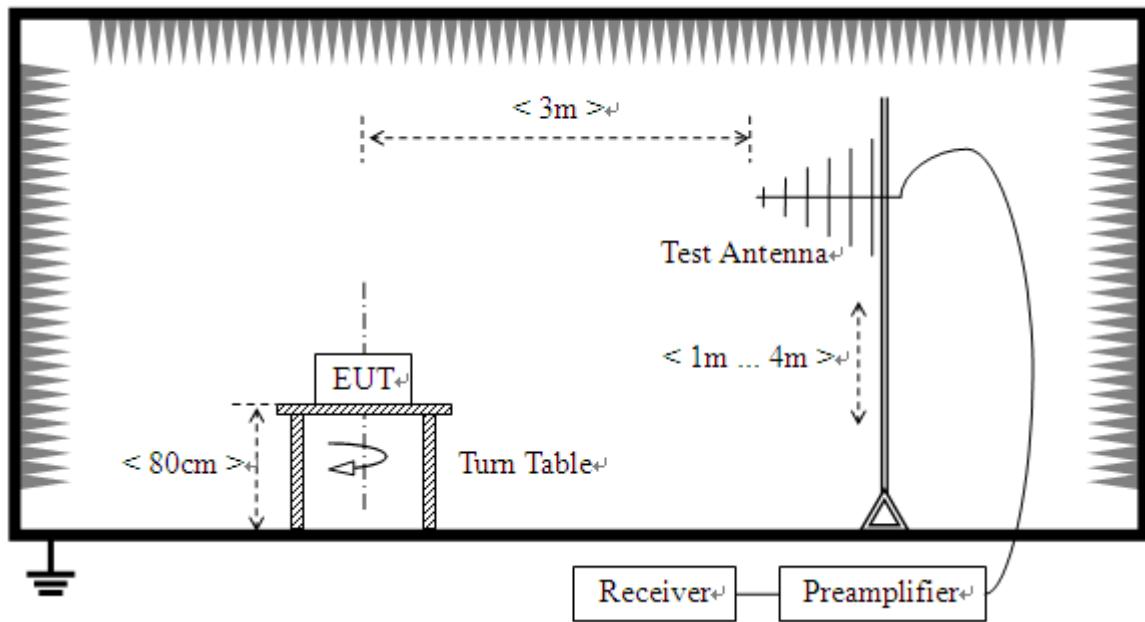
Test Software

NO.	Type	Software Version
1	Conducted Emission	Version 9.26.01

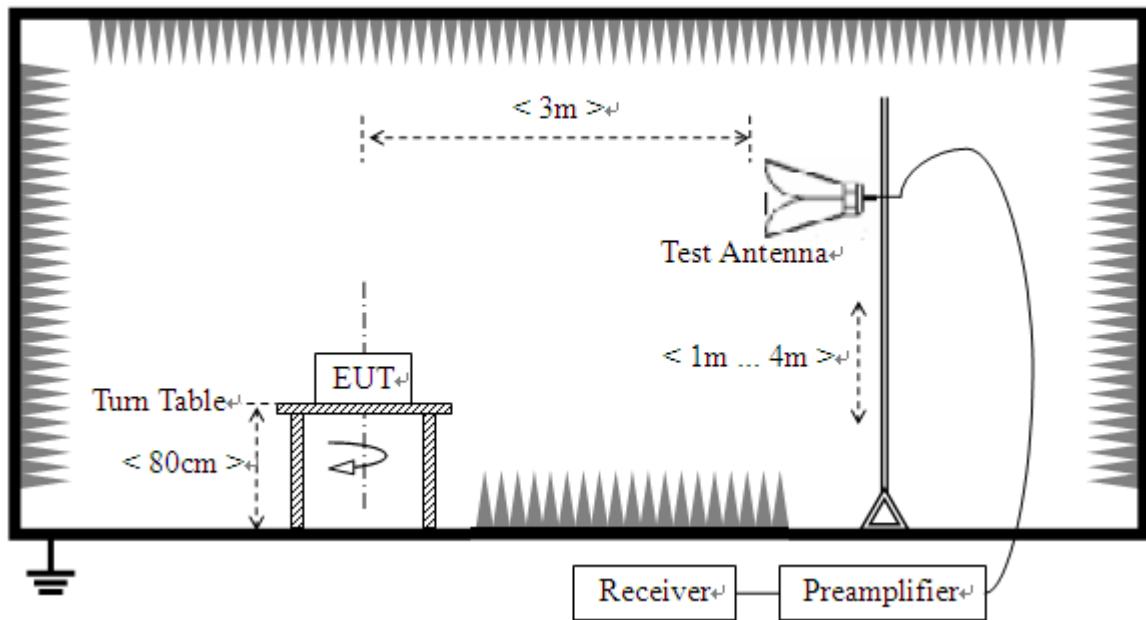
2.3.2 Radiated Emission

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	2025.01.13	2026.01.12
Broadband Ant.	ETC	MCTD2786	A150402239	2025.04.27	2026.04.26
3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2024.02.27	2027.02.27
EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2025.04.25	2026.04.24
5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2024.08.02	2026.08.01
EMI Horn Ant.	ROHDE&SCHWARZ	HF906	A0304225	2024.04.02	2027.04.01

Test Software

NO.	Type	Software Version
1	Radiated Emission	Version 10.35.10

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:

- a) The limit subjects to the Class B 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

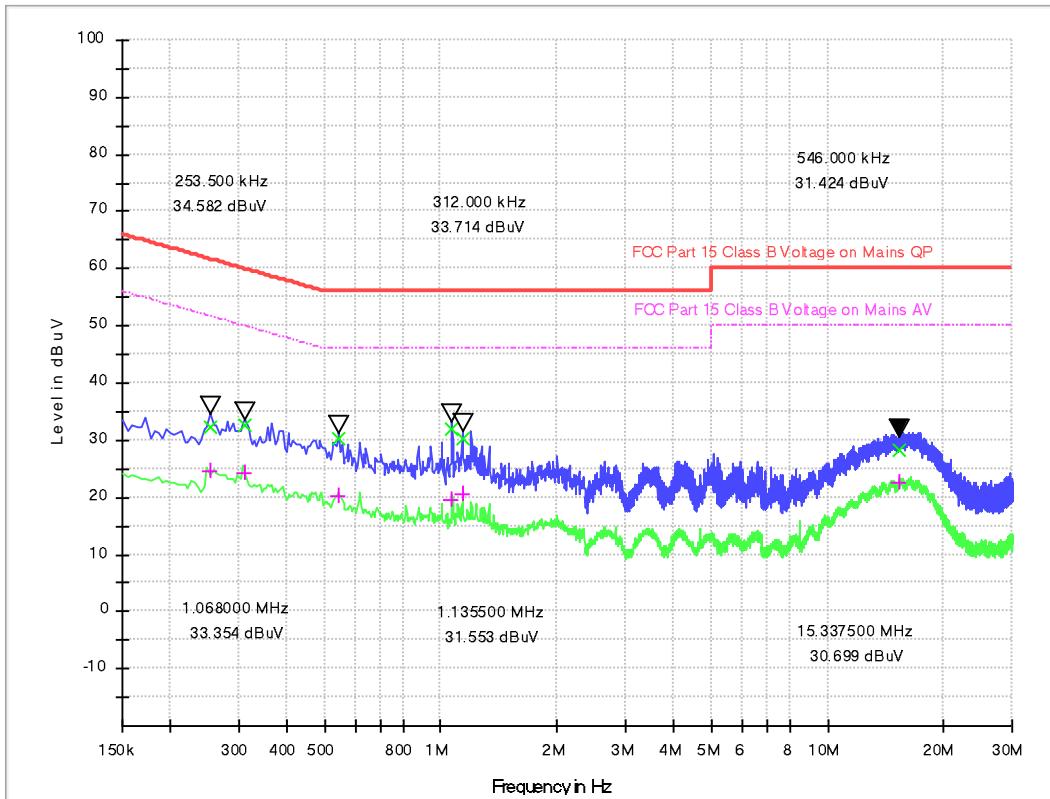
The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines 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 120V 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 (120V AC, 60Hz)

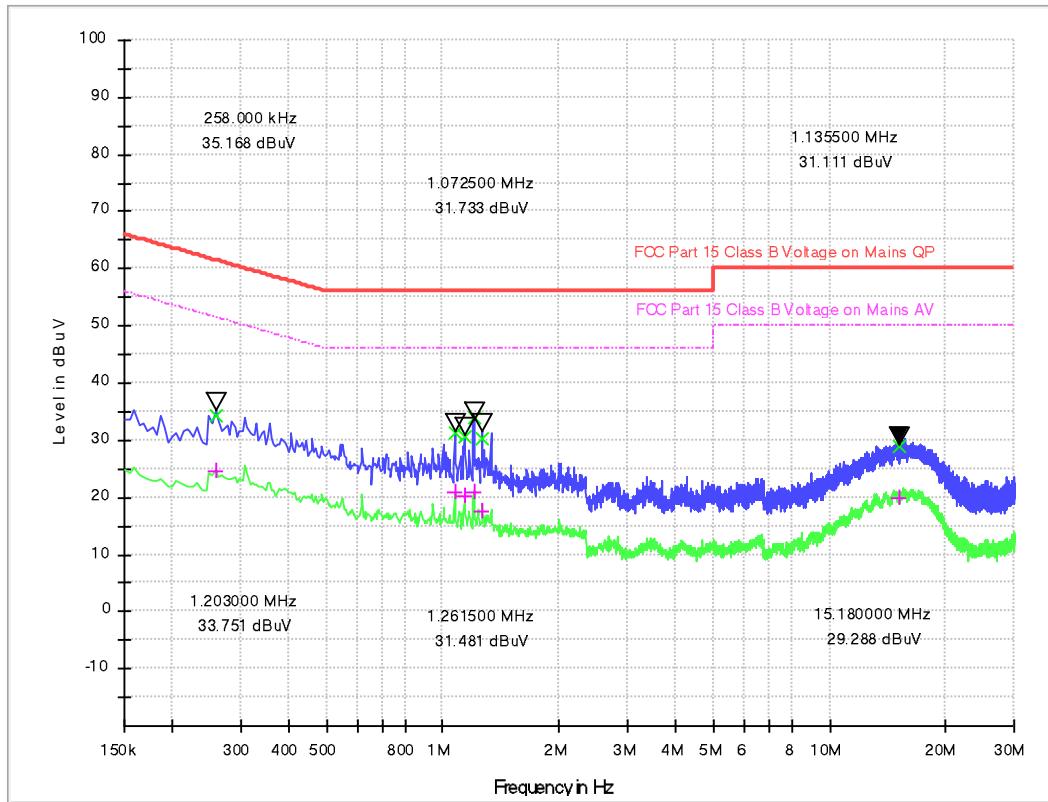
A. Mains terminal disturbance voltage, L phase, Setup 2



(Plot A: L Phase)

Frequency (MHz)	QuasiPeak (dB μV)	Limit - QPK (dB μV)	Margin - QPK (dB)	CAverage (dB μV)	Limit - AV (dB μV)	Margin - AV (dB)
0.253500	32.38	61.64	29.27	24.64	51.64	27.00
0.312000	32.67	59.92	27.25	24.32	49.92	25.60
0.546000	30.20	56.00	25.80	20.39	46.00	25.61
1.068000	32.02	56.00	23.98	19.58	46.00	26.42
1.135500	30.27	56.00	25.73	20.40	46.00	25.60
15.337500	28.35	60.00	31.65	22.40	50.00	27.60

B. Mains terminal disturbance voltage, N phase, Setup 2



(Plot B: N Phase)

Frequency (MHz)	QuasiPeak (dB μ V)	Limit - QPK (dB μ V)	Margin - QPK (dB)	CAverage (dB μ V)	Limit - AV (dB μ V)	Margin - AV (dB)
0.258000	34.26	61.50	27.24	24.45	51.50	27.04
1.072500	31.45	56.00	24.55	20.78	46.00	25.22
1.135500	30.63	56.00	25.37	20.20	46.00	25.80
1.203000	33.83	56.00	22.17	20.81	46.00	25.19
1.261500	30.42	56.00	25.58	17.57	46.00	28.43
15.180000	28.87	60.00	31.13	19.80	50.00	30.20

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	
	μV/m	Dist	(uV/m)	(dBuV/m)
30.0 - 88.0	100	3m	100	20log 100
88.0 - 216.0	150	3m	150	20log 150
216.0 - 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

- a) 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.
- b) 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.
- c) 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:

- 1) The tighter limit shall apply at the boundary between two frequency range.
- 2) Limitation expressed in dBuV/m is calculated by 20log Emission Level(uV/m).
- 3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of $Ld1 = Ld2 * (d2/d1)^2$

Example:

F.S Limit at 30m distance is 30uV/m, then F.S Limitation at 3m distance is adjusted as
 $Ld1 = L1 = 30uV/m * (10)^2 = 100 * 30uV/m$.

3.2.2 Test Description

See section 2.3.2 of this report.

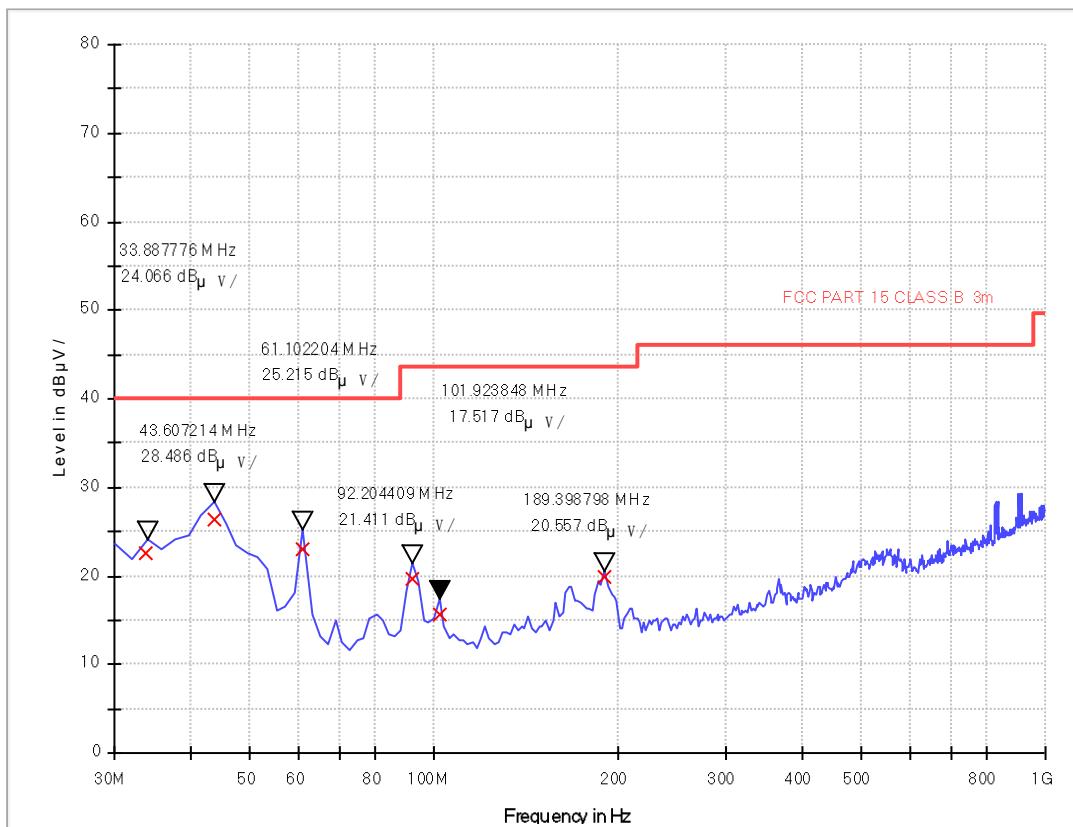
3.2.3 Test Result

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.

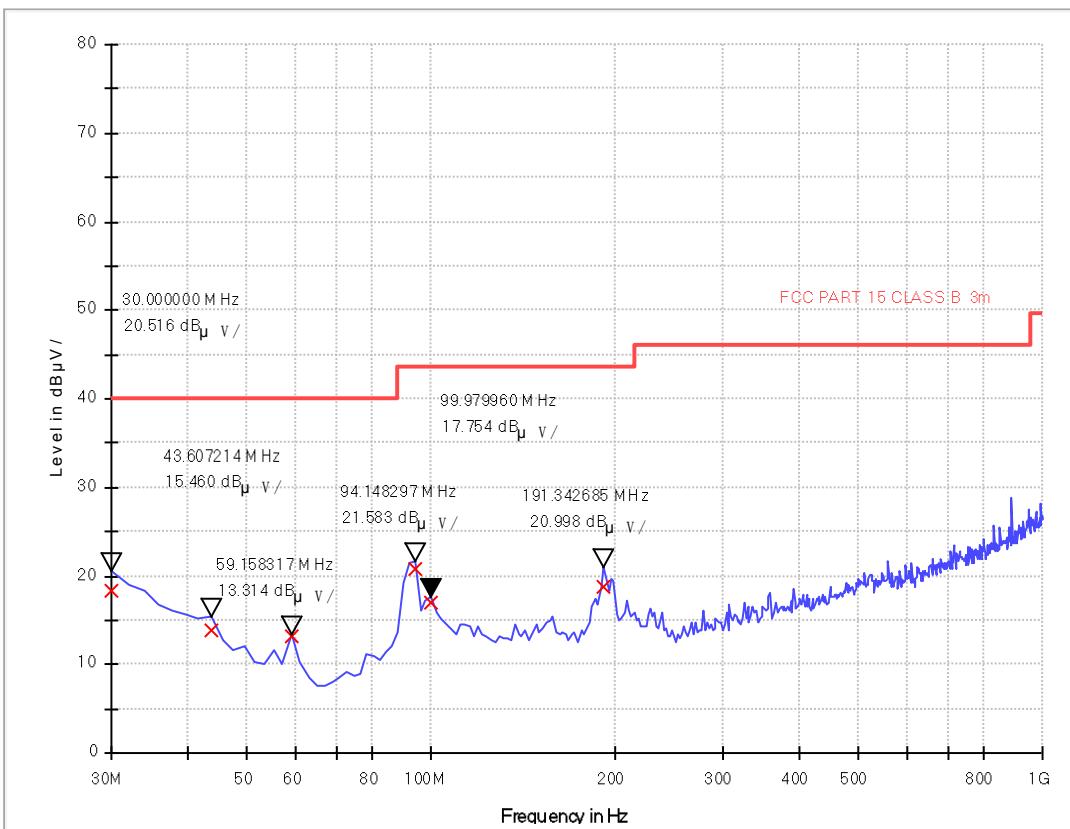
Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.

A. Radiation disturbances, antenna polarization: Vertical, Setup 2



Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (m)	Limit (dB μ V/m)	Margin (dB)	Antenna	Verdict
33.88	22.54	120.000	1.00	40.0	17.46	Vertical	Pass
43.60	26.37	120.000	1.00	40.0	13.63	Vertical	Pass
61.12	23.02	120.000	1.00	40.0	16.98	Vertical	Pass
92.20	19.59	120.000	1.00	43.5	23.91	Vertical	Pass
101.92	15.75	120.000	1.00	43.5	27.75	Vertical	Pass
189.40	19.88	120.000	1.00	43.5	23.62	Vertical	Pass

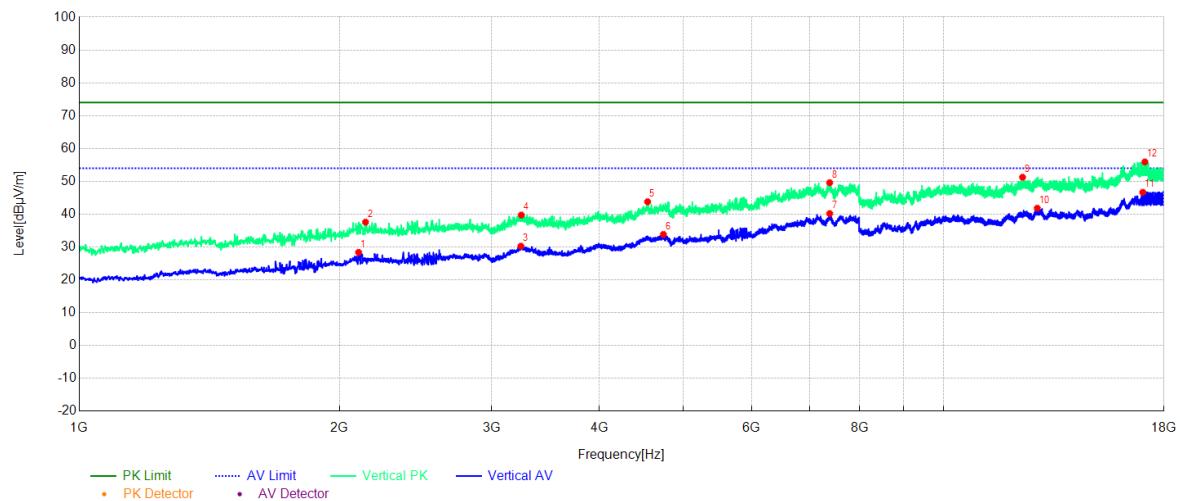
B. Radiation disturbances, antenna polarization: Horizontal, Setup 2



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

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (m)	Limit (dB μ V/m)	Margin (dB)	Antenna	Verdict
30.00	18.42	120.000	1.00	40.0	21.58	Vertical	Pass
43.60	13.93	120.000	1.00	40.0	26.07	Vertical	Pass
59.16	13.24	120.000	1.00	40.0	26.76	Vertical	Pass
94.16	20.74	120.000	1.00	43.5	22.76	Vertical	Pass
99.96	16.90	120.000	1.00	43.5	26.60	Vertical	Pass
191.36	18.86	120.000	1.00	43.5	24.64	Vertical	Pass

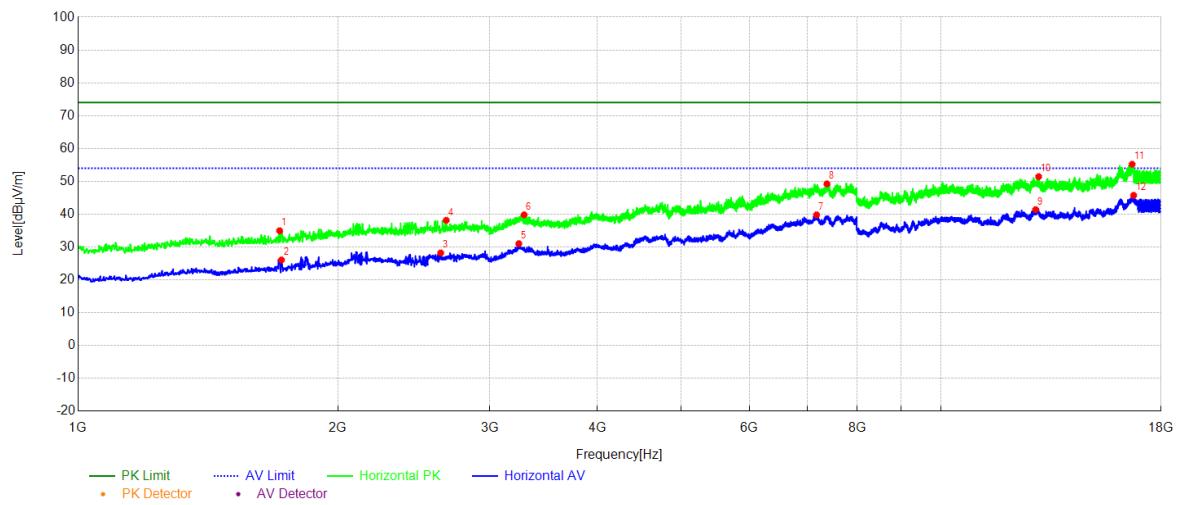
A. Radiation disturbances, antenna polarization: Vertical, Setup 2



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

NO.	Freq. [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dBμV/m]	Trace	Height [m]	Angle [°]	Polarity
1	2144.21	37.58	74.00	36.42	PK	1.00	350	Vertical
2	3247.62	39.73	74.00	34.27	PK	1.00	20	Vertical
3	4546.55	43.79	74.00	30.21	PK	1.00	80	Vertical
4	7385.84	49.60	74.00	24.40	PK	1.00	210	Vertical
5	12348.63	51.25	74.00	22.75	PK	1.00	140	Vertical
6	17105.71	55.91	74.00	18.09	PK	1.00	40	Vertical
NO.	Freq. [MHz]	CAV Level [dBμV/m]	CAV Limit [dBμV/m]	CAV Margin [dBμV/m]	Trace	Height [m]	Angle [°]	Polarity
7	2105.11	28.37	54.00	25.63	AV	1.00	120	Vertical
8	3244.22	30.26	54.00	23.74	AV	1.00	80	Vertical
9	4742.07	33.84	54.00	20.16	AV	1.00	60	Vertical
10	7385.84	40.20	54.00	13.80	AV	1.00	30	Vertical
11	12843.38	41.81	54.00	12.19	AV	1.00	120	Vertical
12	17010.50	46.67	54.00	7.33	AV	1.00	310	Vertical

B. Radiation disturbances, antenna polarization: Horizontal, Setup 2



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

NO.	Freq. [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB μ V/m]	Trace	Height [m]	Angle [°]	Polarity
1	1712.37	34.96	74.00	39.04	PK	1.00	140	Horizont
2	2671.27	38.14	74.00	35.86	PK	1.00	200	Horizont
3	3288.43	39.82	74.00	34.18	PK	1.00	250	Horizont
4	7379.04	49.23	74.00	24.77	PK	1.00	90	Horizont
5	12982.80	51.43	74.00	22.57	PK	1.00	60	Horizont
6	16661.97	55.21	74.00	18.79	PK	1.00	310	Horizont
NO.	Freq. [MHz]	CAV Level [dB μ V/m]	CAV Limit [dB μ V/m]	CAV Margin [dB μ V/m]	Trace	Height [m]	Angle [°]	Polarity
7	1720.87	26.06	54.00	27.94	AV	1.00	90	Horizont
8	2632.16	28.19	54.00	25.81	AV	1.00	150	Horizont
9	3242.52	31.02	54.00	22.98	AV	1.00	50	Horizont
10	7178.42	39.80	54.00	14.20	AV	1.00	230	Horizont
11	12879.09	41.39	54.00	12.61	AV	1.00	210	Horizont
12	16729.97	45.74	54.00	8.26	AV	1.00	180	Horizont

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