



EUROFINS ELECTRICAL TESTING SERVICE (SHENZHEN) CO., LTD.

RADIO TEST - REPORT

FCC Compliance Test Report for

Product name: Magentic & Wireless Powerbank

Model name: A003

FCC ID: 2A47R-A003

Test Report Number: EFGX22090351-IE-01-E01

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1 General Information

1.1 Notes

The results of this test report relate exclusively to the item tested as specified in chapter "Description of test item" and are not transferable to any other test items.

Eurofins Electrical Testing Service (Shenzhen) Co., Ltd. is not responsible for any generalisations and conclusions drawn from this report. Any modification of the test item can lead to invalidity of test results and this test report may therefore be not applicable to the modified test item.

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Operator:

2022-12-15

Bruce Zheng / Project Engineer



Date

Eurofins-Lab.

Name / Title

Signature

Technical responsibility for area of testing:

2022-12-15

Albert Xu / Lab Manager

Date

Eurofins

Name / Title

Signature

1.2 Testing laboratory

Eurofins Electrical Testing Service (Shenzhen) Co., Ltd.

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The Laboratory has passed the Accreditation by the American Association for Laboratory Accreditation (A2LA). The Accreditation number is 5376.01

The Laboratory has been listed by industry Canada to perform electromagnetic emission measurements, The CAB identifier is CN0088

1.3 Details of applicant

Name : Shenzhen Minyao Technology Co., Ltd.
Address : 1502, Building 8, Xinyi Lingyu R&D Center, No.26, Honglang North 2nd Road, No.69 Xingdong community, Xin'an area, Bao'an District, Shenzhen, China
Telephone : ./.
Fax : ./.

1.4 Details of manufacturer

Name : Fab-Chain Service Co., Ltd.
Address : 5th Floor, Building A, ChuangJian industrial Park, Yingrenshi, ShiYan BaoAn, Shenzhen, Guangdong, P.R.China
Telephone : ./.
Fax : ./.

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.



or

The deviations as specified were ascertained in the course of the tests performed.



2.2 Test environment

Ac line conducted

Enviroment Parameter	Temperature	Relative Humidity
101.2 kPa	24.2°C	57.3%

Radiated

Enviroment Parameter	Temperature	Relative Humidity
101.2 kPa	24.3°C	52.7%

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.

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty in conducted measurements	1.96dB
Uncertainty for Radiated Emission 9KHz-30MHz	4.56dB
Uncertainty for Radiated Emission 30MHz-3000MHz	Horizontal: 4.46dB; Vertical: 4.54dB;

2.4 Test mode

Test item	Operating Mode	Descriptions
Radiated Emissions	Standby	EUT Alone powered by AC/DC adapter
	Operating (With & Without 3mm gap)	EUT and Load powered by AC/DC adapter
AC Power Line Conducted Emission	Standby	EUT Alone powered by AC/DC adapter
	Operating (With & Without 3mm gap)	EUT and Load powered by AC/DC adapter

2.5 Test equipment utilized

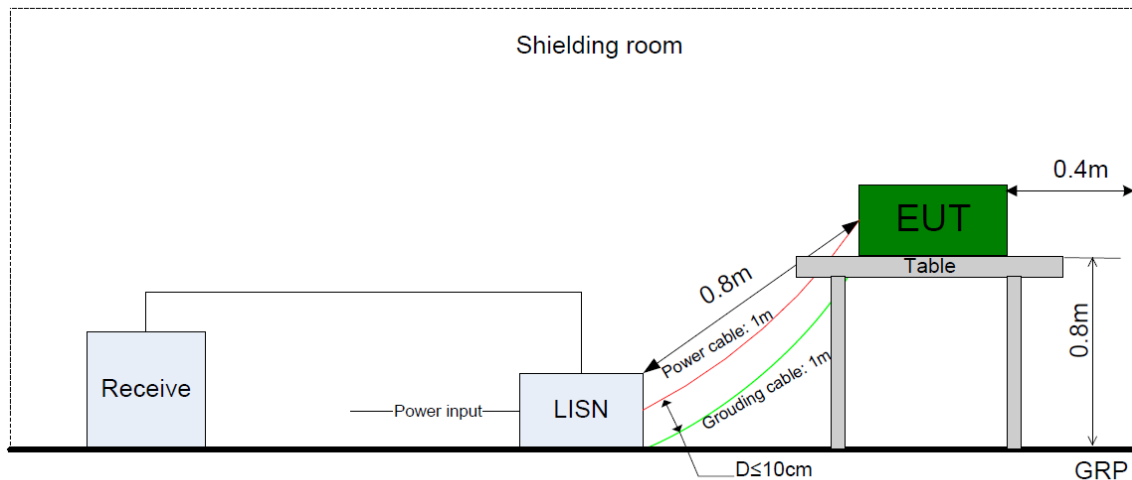
EQUIPMENT ID	EQUIPMENT NAME	MODEL NO.	CAL. DUE DATE
23-2-10-63	Temperature & Humidity Meter	COS-03	2023-03-27
23-2-10-65	Barometer	Baro	2023-03-23
23-2-13-12	Signal Analyzer	N9010B-544	2023-03-15
23-2-10-43	Switch and Control Unit	ERIT-E-JS0806-2	2023-06-17
23-2-10-44	DC power supply	E3642A	2023-07-03
23-2-10-45	Temperature test chamber	SG-80-CC-2	2023-03-15
23-2-10-50	Temperature & Humidity Meter	COS-03	2023-03-27
23-2-10-66	Barometer	Baro	2023-03-23
23-2-13-01	EMI Test Receiver	ESR7	2023-03-15
23-2-13-02	Signal Analyzer	N9020B-544	2023-03-15
23-2-12-01	Active Loop Antenna	FMZB 1519B	2024-05-29
23-2-12-02	TRILOG Broadband Antenna	VULB9168	2024-05-29

2.6 Auxiliary Equipment Used during Test:

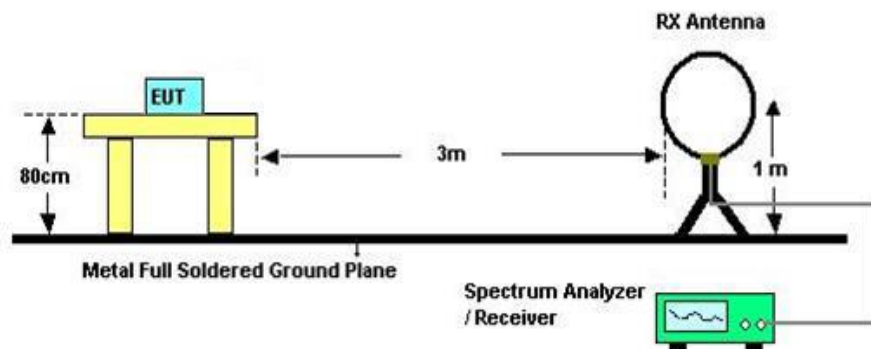
DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Wireless charging load	---	---	---

2.7 Test setup

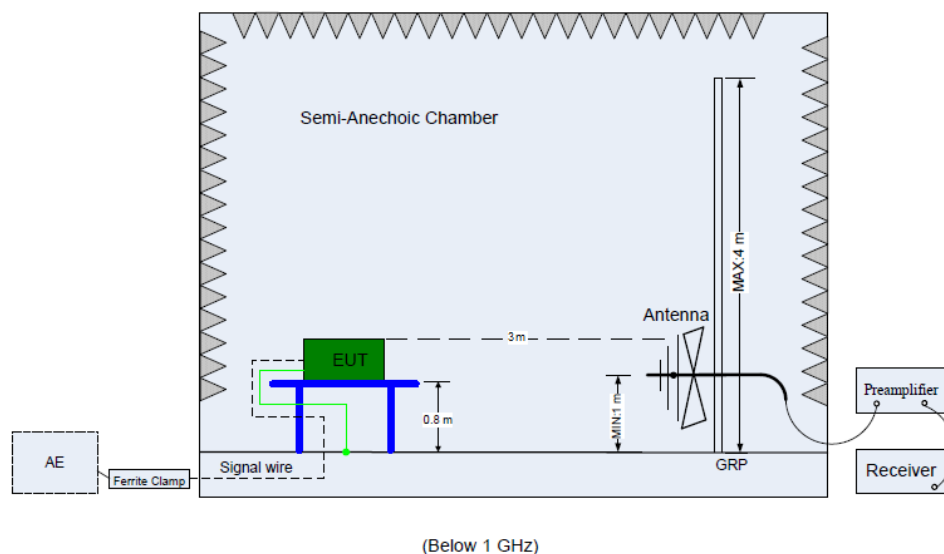
AC line conducted



Radiated tests below 30MHz



Radiated tests below 1GHz



2.8 Test results

☒ 1st test

☐ test after modification

☐ production test

Technical Requirements				
FCC Part 15 Subpart C				
Test Condition		Test Result	Verdict	Test Site
§15.207	Conducted emission AC power port	See Page 11	Pass	Site 1
§15.209	Radiated Emission	See page 17	Pass	Site 1
§15.215 (c)	20dB Occupied bandwidth	See page 26	Pass	Site 1
§15.203	Antenna requirement	See note 1	Pass	--

Note 1: No antenna connector is used.

3 Technical Requirement

3.1 Conducted emission AC power port

Test Method:

The test method was referred to the subclause 6.2 of ANSI C63.10-2013.

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

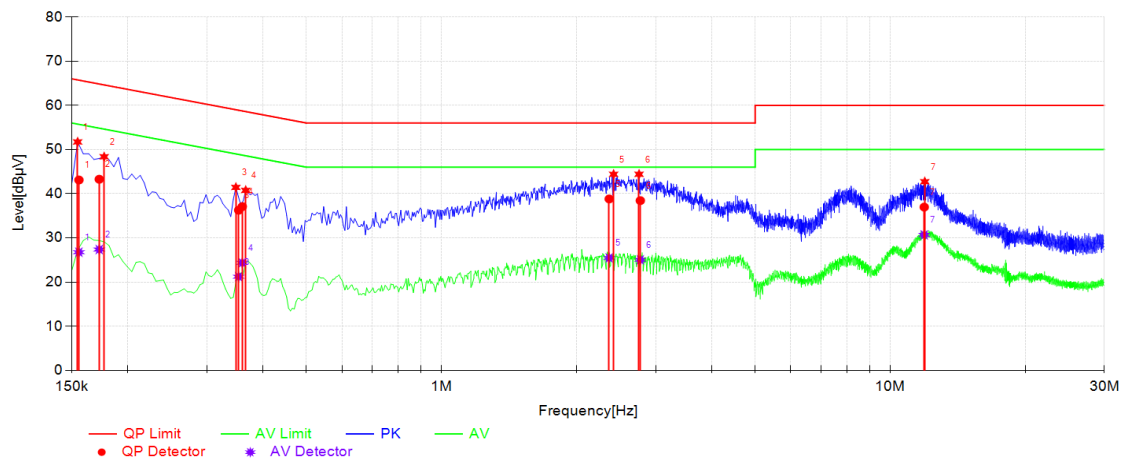
Line conducted data is recorded for both Neutral and Live lines.

Limit:

FCC §15.207 (a)

Frequency	QP Limit	AV Limit
MHz	dB μ V	dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

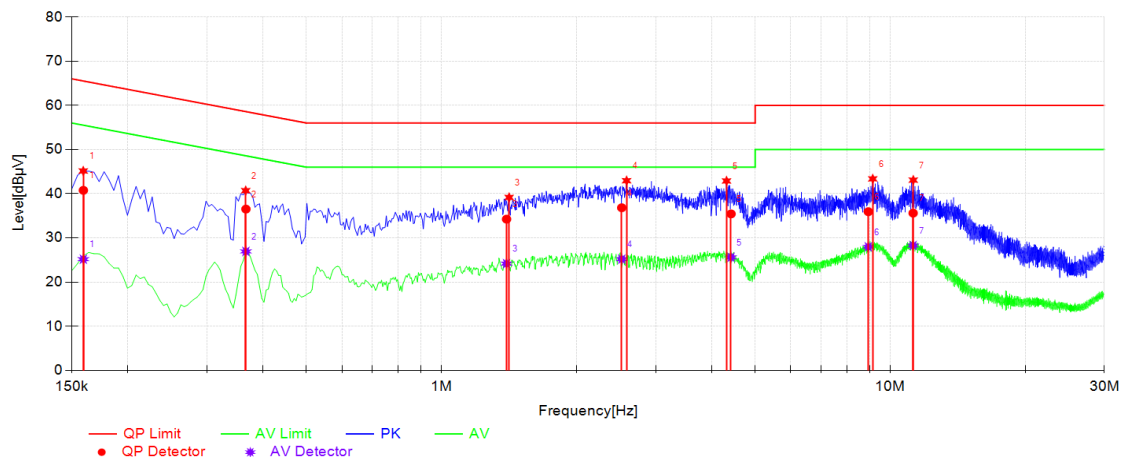
Decreasing linear.

Test Result:
Standby L


Final Data List										
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type	Verdict
1	0.1555	10.26	43.11	65.70	22.59	26.77	55.70	28.93	L1	PASS
2	0.1726	10.26	43.28	64.83	21.55	27.37	54.83	27.46	L1	PASS
3	0.3530	10.27	36.28	58.89	22.61	21.22	48.89	27.67	L1	PASS
4	0.3596	10.26	37.09	58.74	21.65	24.36	48.74	24.38	L1	PASS
5	2.3638	10.29	38.82	56.00	17.18	25.47	46.00	20.53	L1	PASS
6	2.7729	10.30	38.45	56.00	17.55	25.04	46.00	20.96	L1	PASS
7	11.9065	10.48	36.98	60.00	23.02	30.69	50.00	19.31	L1	PASS

Note1: Corrector factor = Attenuator loss + Cable Loss

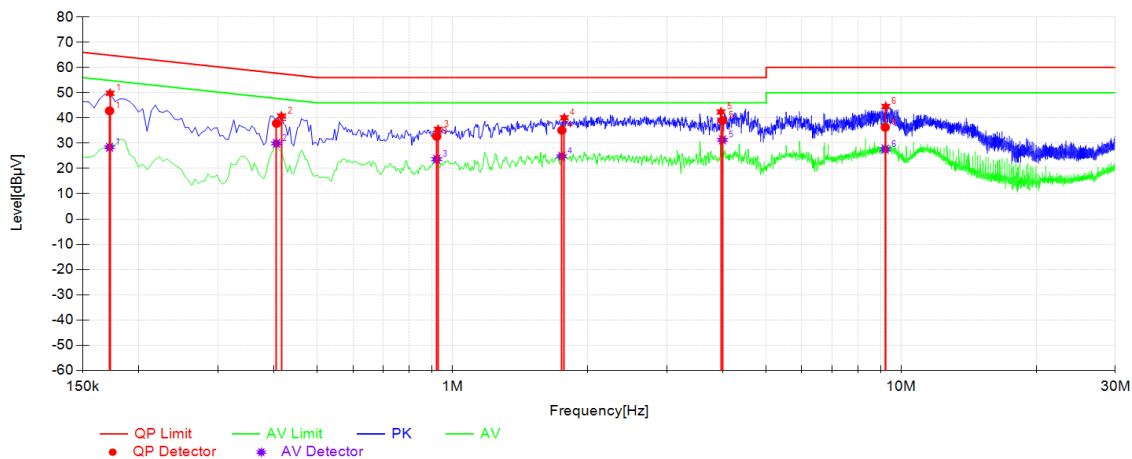
Standby N



Final Data List										
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type	Verdict
1	0.1591	10.26	40.78	65.51	24.73	25.18	55.51	30.33	N	PASS
2	0.3664	10.26	36.53	58.58	22.05	26.94	48.58	21.64	N	PASS
3	1.3958	10.28	34.25	56.00	21.75	24.18	46.00	21.82	N	PASS
4	2.5211	10.33	36.83	56.00	19.17	25.19	46.00	20.81	N	PASS
5	4.4177	10.41	35.44	56.00	20.56	25.61	46.00	20.39	N	PASS
6	8.9362	10.43	35.94	60.00	24.06	27.98	50.00	22.02	N	PASS
7	11.2463	10.46	35.61	60.00	24.39	28.28	50.00	21.72	N	PASS

Note1: Corrector factor = Attenuator loss + Cable Loss

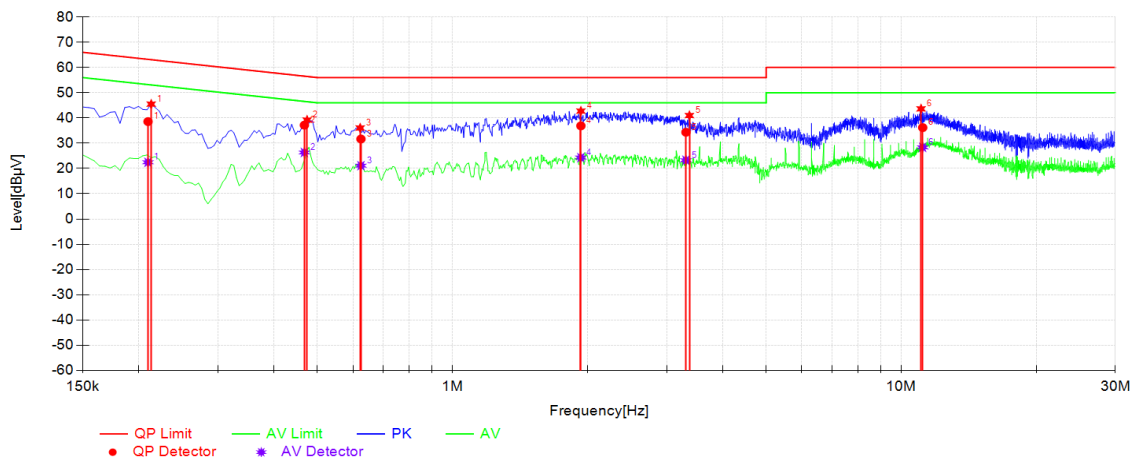
Operating L



Final Data List										
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type	Verdict
1	0.1720	10.26	42.84	64.86	22.02	28.39	54.86	26.47	L1	PASS
2	0.4052	10.26	37.84	57.75	19.91	29.95	47.75	17.80	L1	PASS
3	0.9221	10.28	32.71	56.00	23.29	23.66	46.00	22.34	L1	PASS
4	1.7522	10.29	35.15	56.00	20.85	24.80	46.00	21.20	L1	PASS
5	3.9968	10.31	39.04	56.00	16.96	31.34	46.00	14.66	L1	PASS
6	9.2097	10.43	36.32	60.00	23.68	27.61	50.00	22.39	L1	PASS

Note1: Corrector factor = Attenuator loss + Cable Loss

Operating N



Final Data List										
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type	Verdict
1	0.2095	10.26	38.59	63.23	24.64	22.44	53.23	30.79	N	PASS
2	0.4674	10.27	37.17	56.56	19.39	26.34	46.56	20.22	N	PASS
3	0.6249	10.27	31.67	56.00	24.33	21.12	46.00	24.88	N	PASS
4	1.9317	10.29	36.90	56.00	19.10	24.31	46.00	21.69	N	PASS
5	3.3123	10.37	34.35	56.00	21.65	23.27	46.00	22.73	N	PASS
6	11.1633	10.46	36.20	60.00	23.80	28.37	50.00	21.63	N	PASS

Note1: Corrector factor = Attenuator loss + Cable Loss

3.2 Radiated emissions

Test Method:

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

Radiated Spurious Emissions 30-1000MHz: ANSI C63.10-2013 Section 6.3 and 6.5

[For 9 kHz ~ 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

Note:

- a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- b. All modes of operation were investigated and the worst-case emissions are reported.

Limit:

FCC §15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

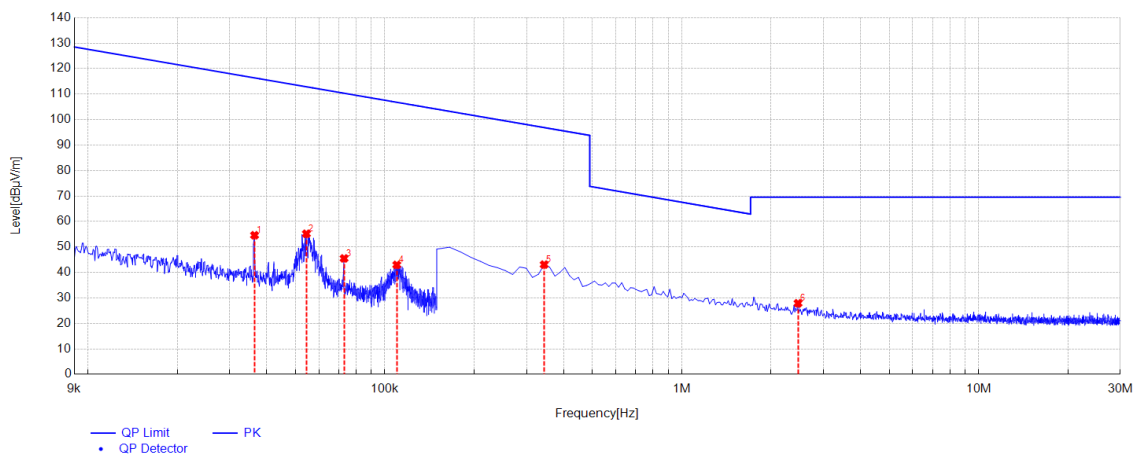
Test Result:

After pre-scan, the worst emission data was recorded.

Standby

0.009-30MHz

Parallel

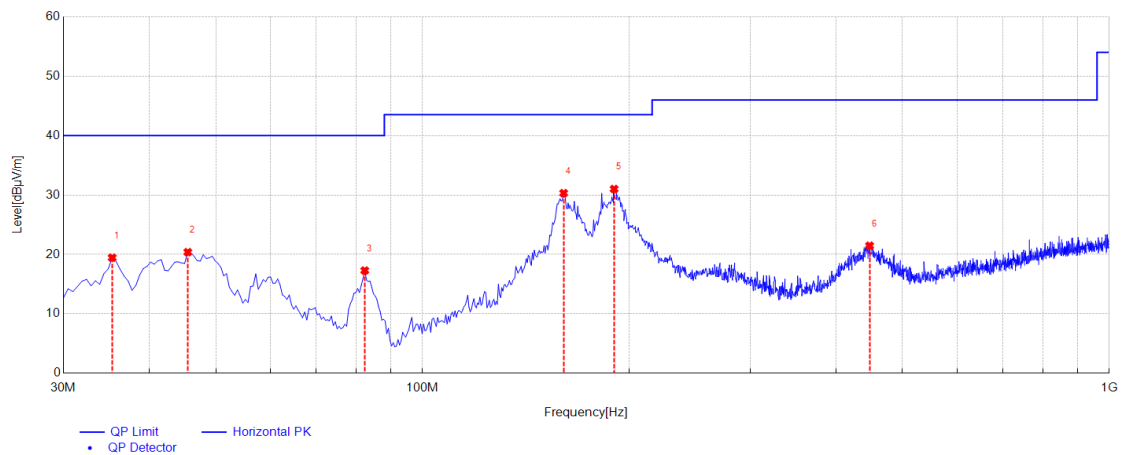


NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Verdict
1	0.0364	54.61	-11.09	116.36	61.75	100	159	PASS
2	0.0544	55.19	-11.40	112.88	57.69	100	86	PASS
3	0.0729	45.51	-11.59	110.34	64.83	100	16	PASS
4	0.1097	42.99	-11.79	106.79	63.80	100	126	PASS
5	0.3441	43.09	-11.82	96.87	53.78	100	100	PASS
6	2.4645	27.90	-11.41	69.50	41.60	100	267	PASS

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. The other emission levels were very low against the limit.
5. "*" : Fundamental Frequency.

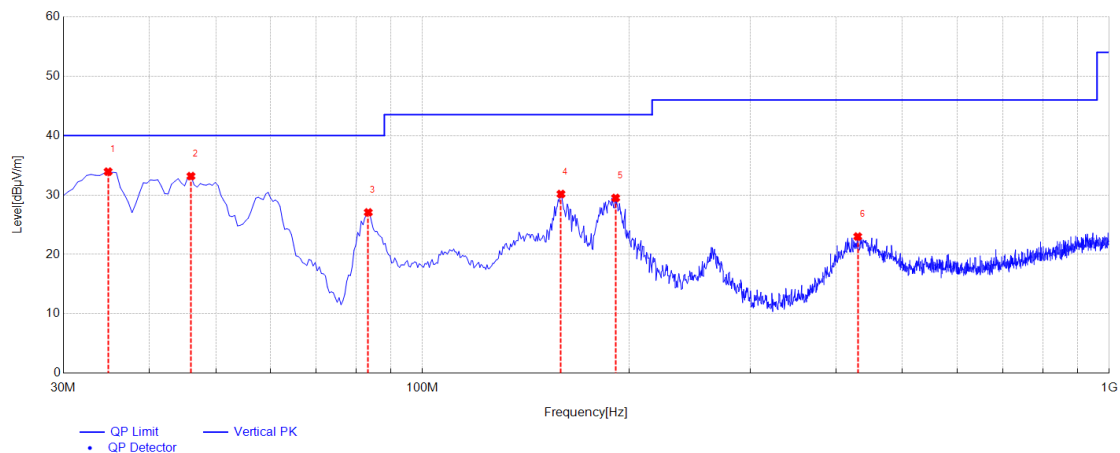
30-1000MHz



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	35.3377	19.46	-16.59	40.00	20.54	100	350	Horizontal	PASS
2	45.5278	20.39	-15.62	40.00	19.61	100	309	Horizontal	PASS
3	82.4062	17.30	-20.78	40.00	22.70	100	136	Horizontal	PASS
4	160.530	30.32	-15.64	43.50	13.18	100	350	Horizontal	PASS
5	190.130	31.01	-18.18	43.50	12.49	100	95	Horizontal	PASS
6	447.793	21.48	-12.55	46.00	24.52	100	318	Horizontal	PASS

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamplifier Factor (dB).



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	34.8524	33.93	-16.67	40.00	6.07	100	158	Vertical	PASS
2	46.013	33.18	-15.61	40.00	6.82	100	20	Vertical	PASS
3	83.3767	27.08	-20.86	40.00	12.92	100	92	Vertical	PASS
4	159.074	30.17	-15.62	43.50	13.33	100	10	Vertical	PASS
5	191.100	29.51	-18.25	43.50	13.99	100	10	Vertical	PASS
6	430.325	23.02	-12.92	46.00	22.98	100	233	Vertical	PASS

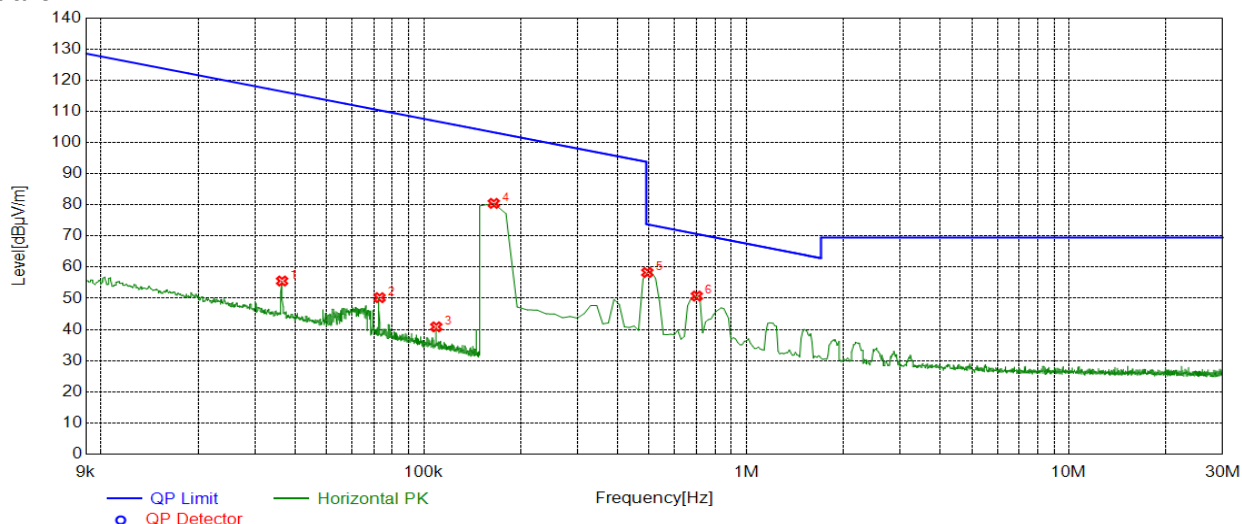
Remarks:

1. Result value (dBμV/m) = Reading value (dBμV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBμV/m) - Limit value (dBμV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBμV/m) + Cable Loss (dB) - Preamplifier Factor (dB).

Operating

0.009-30MHz

Parallel

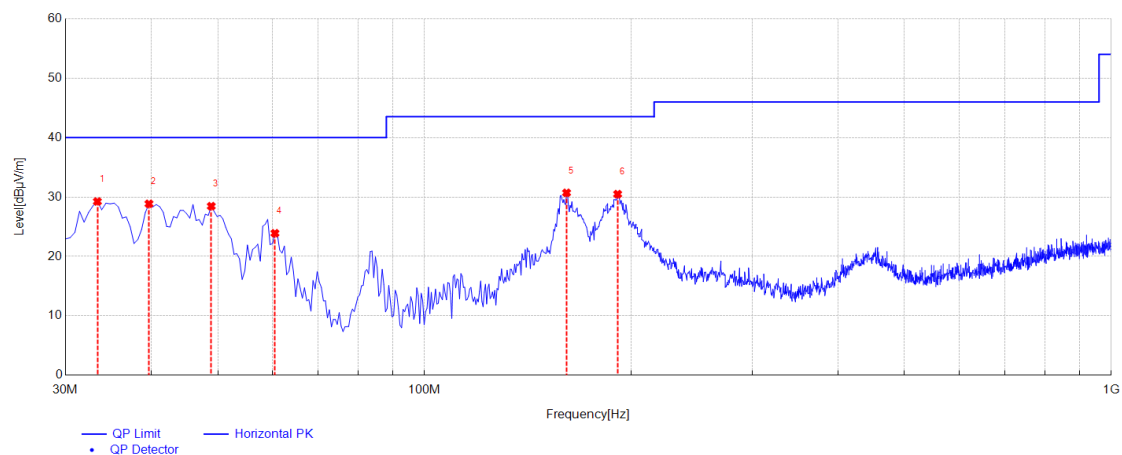


NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.0364	55.56	-11.09	116.36	60.80	100	204	Parallel
2	0.0730	50.22	-11.58	110.33	60.11	100	253	Parallel
3	0.1094	40.85	-11.79	106.81	65.96	100	64	Parallel
4	0.1649	80.46	-11.81	103.25	22.79	100	55	Parallel
5	0.4934	58.28	-11.79	73.74	15.46	100	71	Parallel
6	0.7025	50.73	-11.70	70.65	19.92	100	166	Parallel

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamplifier Factor (dB).
4. The other emission levels were very low against the limit.
5. "*" : Fundamental Frequency.

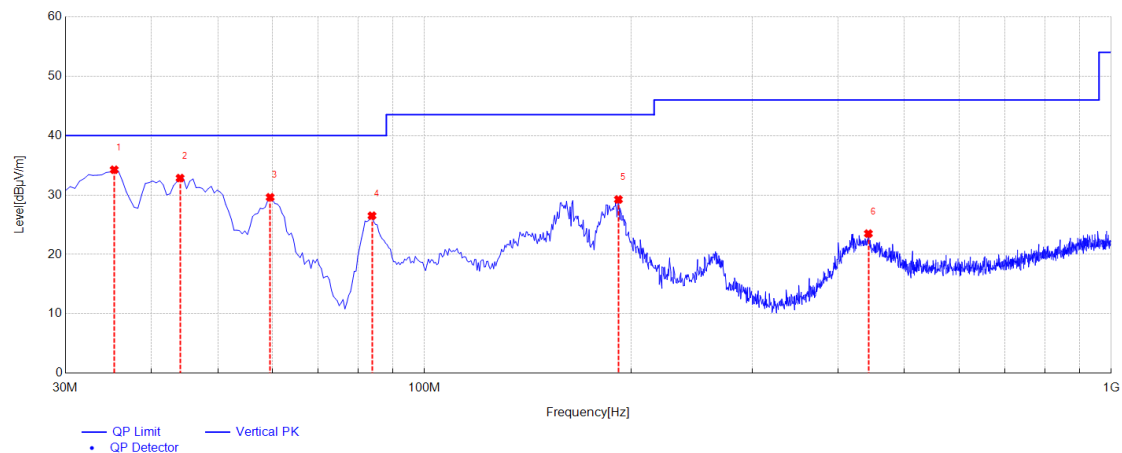
30-1000MHz



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	33.3967	29.25	-16.91	40.00	10.75	100	350	Horizontal	PASS
2	39.7049	28.86	-15.87	40.00	11.14	100	350	Horizontal	PASS
3	48.9245	28.46	-15.51	40.00	11.54	100	350	Horizontal	PASS
4	60.5703	23.91	-16.35	40.00	16.09	100	350	Horizontal	PASS
5	161.015	30.71	-15.68	43.50	12.79	100	329	Horizontal	PASS
6	191.100	30.49	-18.25	43.50	13.01	100	232	Horizontal	PASS

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamplifier Factor (dB).



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	35.3377	34.25	-16.59	40.00	5.75	100	94	Vertical	PASS
2	44.072	32.85	-15.68	40.00	7.15	100	360	Vertical	PASS
3	59.5998	29.62	-16.22	40.00	10.38	100	43	Vertical	PASS
4	83.8619	26.52	-20.90	40.00	13.48	100	112	Vertical	PASS
5	191.585	29.25	-18.29	43.50	14.25	100	10	Vertical	PASS
6	442.941	23.51	-12.66	46.00	22.49	100	254	Vertical	PASS

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamplifier Factor (dB).

3.3 20dB Occupied bandwidth

Test Method:

The test method was referred to the subclause 6.9.2 of ANSI C63.10-2013.

The occupied bandwidth is measured as the width of the spectral envelope of the modulated signal, at an amplitude level reduced from a reference value by a specified ratio (or in decibels, a specified number of dB down from the reference value). Typical ratios, expressed in dB, are -6 dB, -20 dB, and -26 dB, corresponding to 6 dB BW, 20 dB BW, and 26 dB BW, respectively. In this subclause, the ratio is designated by “-xx dB.” The reference value is either the level of the unmodulated carrier or the highest level of the spectral envelope of the modulated signal, as stated by the applicable requirement. Some requirements might specify a specific maximum or minimum value for the “-xx dB” bandwidth; other requirements might specify that the “-xx dB” bandwidth be entirely contained within the authorized or designated frequency band.

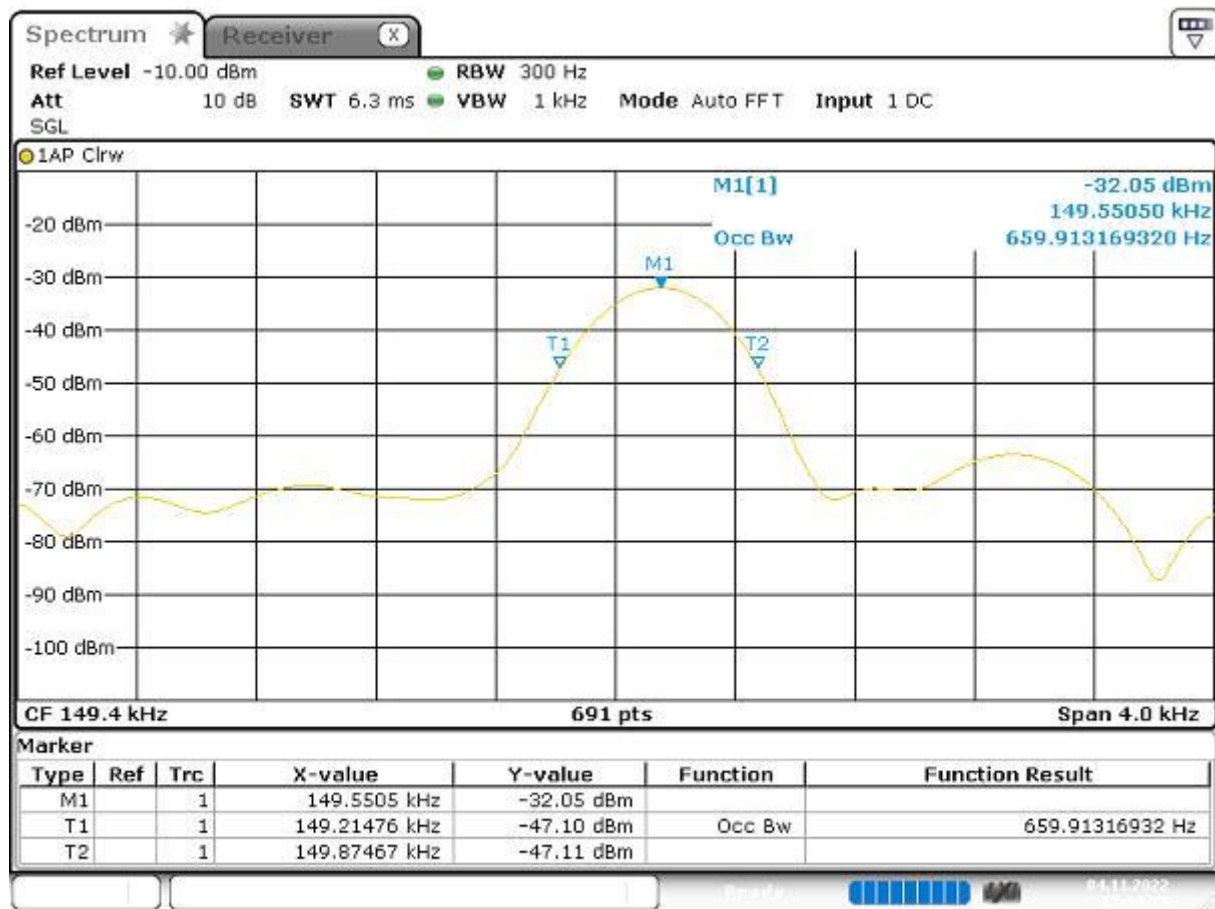
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (OBW/RBW)]$ below the reference level. Specific guidance is given in 4.1.5.2.
- d) Steps a) through c) might require iteration to adjust within the specified tolerances.
- e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
- f) Set detection mode to peak and trace mode to max hold.
- g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
- h) Determine the “-xx dB down amplitude” using $[(\text{reference value}) - xx]$. Alternatively, this calculation may be made by using the marker-delta function of the instrument.
- i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).
- j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “ixx dB down amplitude” determined in step h). If a marker is below this “-xx dB down amplitude” value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the “ixx dB down amplitude” determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.
- k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Limit:

The field strength of any emissions appearing between the band edges and out of band shall be attenuated at least 20 dB below the level of the unmodulated carrier or to the general limits in Section 15.209.

Test Result:

Frequency (kHz)	20dB Bandwidth (kHz)
149.55	0.65991



Date: 4.NOV.2022 07:07:59

-End of report-