



TEST REPORT

On Behalf of

ShenZhen litian technology Co.,Ltd

Rm209, #2 Zonghe Bldg, Bao yun da center, Xixiang St, Bao an District, Shenzhen, China

FCC ID: 2AYZG-DS2203

Model: DS2203, DS2203A, DS2203B, DS223C

June 24, 2024

This Report Concerns:

☒ Original Report

Equipment Type:

Wireless Charging Alarm Clock

Test Engineer:

LBi Li / *LBi Li*

Report Number:

QCT24FR-1692E-01

Test Date:

June 6, 2024 ~ June 24, 2024

Reviewed By:

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Approved By:

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Revision History of This Test Report

[illegible]



1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Description	Wireless Charging Alarm Clock
Model No.	DS2203, DS2203A, DS2203B, DS223C
Model Difference:	All models in each series have similar construction with the same diagram circuit and PCB layout, but different from model names. All tests were conducted on the models (DS2203) and the test result was passed.
Tested Model	DS2203
Sample(s) Status	Engineer sample
Operation Frequency:	110.5kHz~205kHz
Modulation type:	ASK
Antenna Type:	Inductive loop coil Antenna
Antenna gain*1:	0dBi (Max)
Input voltage:	DC 5V (Powered by adapter), DC 3V (2*1.5V AAA battery)
Adaptor Information:	Model: YMK-18W050210A Input: 100-120V~,50/60Hz, 0.4A Max Output: 5VDC 2100mA
WPT Output Power:	10W
Trade Mark:	N/A
Applicant	ShenZhen litian technology Co.,Ltd
Address	Rm209, #2 Zonghe Bldg, Bao yun da center, Xixiang St, Bao anDistrict, Shenzhen, China
Manufacturer	ShenZhen litian technology Co.,Ltd
Address	Rm209, #2 Zonghe Bldg, Bao yun da center, Xixiang St, Bao anDistrict, Shenzhen, China
Sample No.	Y24F1692E01YN (Model:DS2203)

Note: *1This information provided by Manufacturer, SZ QC Lab is not responsible for the accuracy of this information.



1.2 System Test Configuration

1.2.1 Support Equipment

Manufacturer	Description	Model	Serial Number
EESON	Wireless charger load	2S	/

1.2.2 Test mode

Test Mode	Description
Mode 1	Charging with 10 W wireless charging load (Full Load)
Mode 2	Charging with 10 W wireless charging load (Half Load)
Mode 3	Charging with 10 W wireless charging load (No Load)

Note: All the modes had been tested, but only the worst data was recorded in the report (Mode 1).



1.3 Test Facility

Test Firm : Shenzhen QC Testing Laboratory Co., Ltd.

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS – Registration No.: L8464

The EMC Laboratory has been accredited by CNAS, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

A2LA Certificate Number: 6759.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 561109

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 29628

CAB identifier: CN0141

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.

1.4 Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	$\pm 1.42 \times 10^{-4}\%$
RF output power, conducted	$\pm 1.06\text{dB}$
Power Spectral Density, conducted	$\pm 1.06\text{dB}$
Unwanted Emissions, conducted	$\pm 2.51\text{dB}$
AC Power Line Conducted Emission	$\pm 1.80\text{dB}$
Radiated Spurious Emission test (9kHz-30MHz)	$\pm 2.66\text{dB}$
Radiated Spurious Emission test (30MHz-1000MHz)	$\pm 4.04\text{dB}$
Radiated Spurious Emission test (1000MHz-18000MHz)	$\pm 4.70\text{ dB}$
Radiated Spurious Emission test (18GHz-40GHz)	$\pm 4.80\text{dB}$
Temperature	$\pm 0.8^{\circ}\text{C}$
Humidity	$\pm 3.2\%$
DC and low frequency voltages	$\pm 0.1\%$
Time	$\pm 5\%$
Duty cycle	$\pm 5\%$

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$



2. Summary of Test Results

Test Item	Section	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Spurious Emission	15.209(a)(f)	Pass
20dB Bandwidth	15.215	Pass

Note: 1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10:2013
3.. All indications of Pass/Fail in this report are opinions expressed by Shenzhen QC Testing Laboratory Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.



3. List of Test and Measurement Instruments

3.1 Conducted Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Test Receiver	R&S	ESIB 7	2277573376	2024.03.14	2025.03.13
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	101820	2023.08.21	2024.08.20
3	Artificial Mains Network	SCHWARZBECK	NSLK8126	8126200	2024.03.14	2025.03.13
4	PULSE LIMITER	R&S	ESH3-Z2	100058	2024.03.14	2025.03.13

Conducted Emission Measurement Software: TS

3.2 Radiated Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	Spectrum Analyzer	ROHDE&SCHWARZ	FSV 40	101458	2024.03.14	2025.03.13
2.	Loop Antenna	EMCO	6502	2133	2022.07.23	2024.07.22
3.	Logarithmic compound broadband Antenna	SCKWARZBECK	VULB9168	VULB9168-1-588	2023.04.01	2025.03.31
4.	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB 7	2277573376	2024.03.14	2025.03.13
5.	EMI Test Receiver	R&S	ESPI	101131	2024.03.14	2025.03.13
6.	Horn Antenna	SCHWARZBECK	BBHA9120D	02069	2023.04.01	2025.03.31
7.	Horn Antenna	COM-MW	ZLB7-18-40 G -950	12221225	2023.01.12	2025.01.09
8.	Amplifier	R&S	BBV9721	9721-031	2024.03.14	2025.03.13
9.	Amplifier	MITEQ	TTA1800-30-H G	2063644	2024.03.30	2025.03.29
10.	Pre-amplifier	COM-MW	DLAN-18000 -40000-02	10229104	2024.03.14	2025.03.13
11.	966 Chamber	ZhongYu Electron	9*6*6	/	2022.07.25	2025.07.24

Radiated Emission Measurement Software: EZ_EMC



3.3 RF Conducted test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	Wideband Radio Communication Tester	Rohde & Schwarz	CW500	151583	2024.03.14	2025.03.13
2.	Spectrum Analyzer	ROHDE&SCHWARZ	FSV 40	101458	2024.03.14	2025.03.13
3.	Signal Generator	Agilent	N5182A	MY50141563	2024.03.14	2025.03.13
4.	RF Automatic Test System	MW	MW100-RFCB/ MW100-PSB	MW2007004	2024.03.14	2025.03.13
RF Conducted Measurement Software: MTS 8310						



4. Antenna requirement

Standard requirement: FCC Part15 C Section 15.203

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna: The Ant is Inductive loop coil Antenna, the best case gain of the antenna is 0dBi, reference to the Internal photo for details.

5. Conducted Emissions

5.1 Applicable Standard

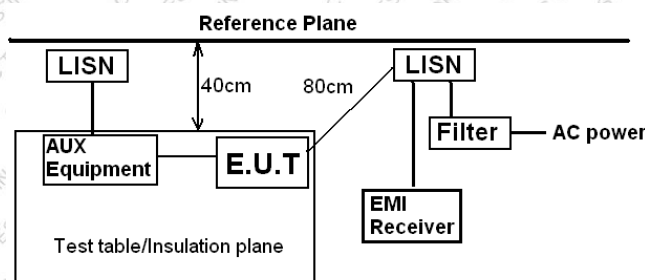
FCC Part15 C Section 15.207

5.2 Limit

Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

Note *: The level decreases linearly with the logarithm of the frequency.

5.3 Test setup



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedance Stabilization Network
Test table height=0.8m

5.4 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.
RBW=9 kHz, VBW=30 kHz, Sweep time=auto

5.5 Test procedure

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

5.6 Test Data

Temperature	25 °C	Humidity	52%
ATM Pressure	101.1kPa	Antenna Gain	0dBi
Test by	LBi Li	Test result	PASS

Test voltage: AC 120V/60Hz

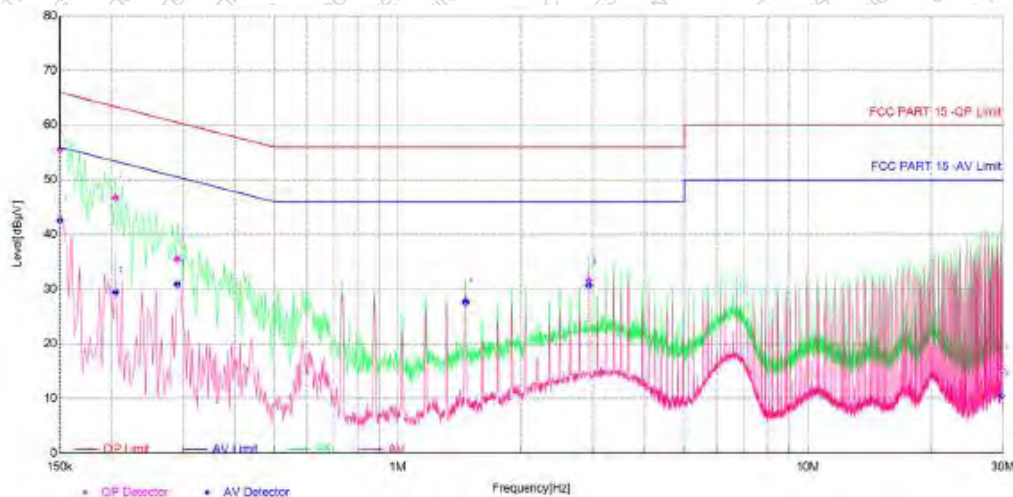


Measurement data:

Mode 1 Charging with 10 W wireless charging load (Full Load)

Note: All the modes had been tested, but only the worst data was recorded in the report (Mode 1).

Line: (Model: DS2203)

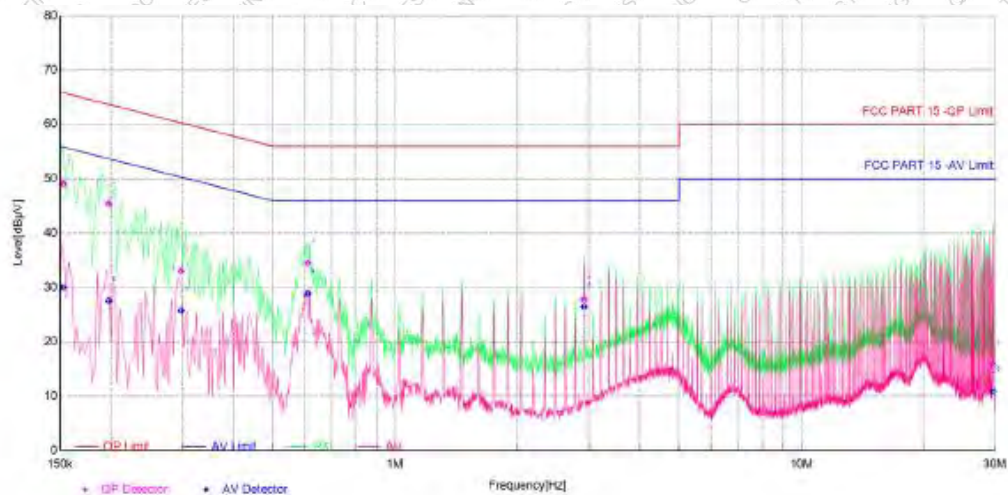


Final Data List

NO.	Freq. [MHz]	Factor[dB]	QP Value [dBuV]	QP Limit [dBuV]	QP Margin [dB]	AV Value [dBuV]	AV Limit [dBuV]	AV Margin [dB]	Phase	Verdict
1	0.1500	10.46	55.57	66.00	10.43	42.58	56.00	13.42	L	PASS
2	0.2050	10.66	46.71	63.41	16.70	29.42	53.41	23.99	L	PASS
3	0.2900	10.67	35.43	60.52	25.09	30.89	50.52	19.63	L	PASS
4	1.4650	10.63	27.75	56.00	28.25	27.56	46.00	18.44	L	PASS
5	2.9270	10.68	31.54	56.00	24.46	30.72	46.00	15.28	L	PASS
6	29.6975	10.95	15.36	60.00	44.64	10.48	50.00	39.52	L	PASS



Neutral: (Model: DS2203)



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]	Phase	Verdict
1	0.1525	10.37	49.08	65.86	16.78	30.05	55.86	25.81	N	PASS
2	0.1975	10.48	45.41	63.72	18.31	27.55	53.72	26.17	N	PASS
3	0.2975	10.82	33.04	60.31	27.27	25.72	50.31	24.59	N	PASS
4	0.6100	10.64	34.46	56.00	21.54	28.88	46.00	17.12	N	PASS
5	2.9225	10.64	27.76	56.00	28.24	26.43	46.00	19.57	N	PASS
6	29.6435	10.92	15.70	60.00	44.30	10.92	50.00	39.08	N	PASS

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

6. Spurious Emission

6.1 Applicable Standard

FCC Part15 C Section 15.209

6.2 Limit

Limits for frequency below 30MHz

Frequency	Limit (uV/m)	Measurement Distance(m)	Remark
0.009-0.490	2400/F(kHz)	300	Quasi-peak Value
0.490-1.705	24000/F(kHz)	30	Quasi-peak Value
1.705-30	30	30	Quasi-peak Value

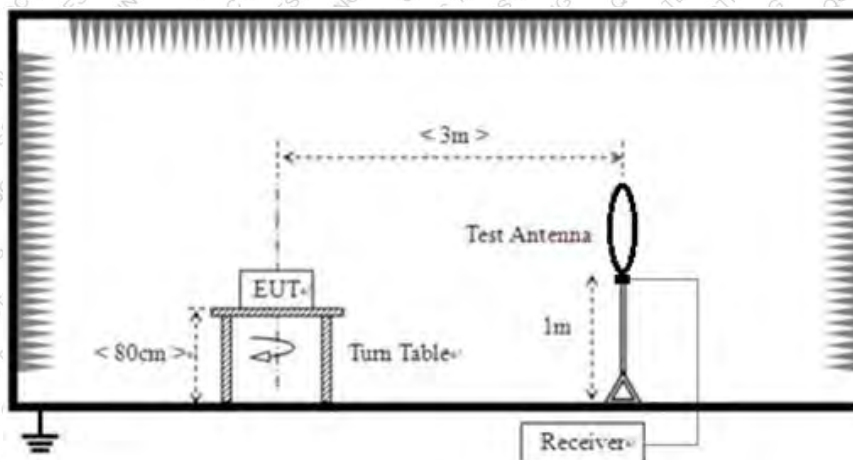
Limits for frequency Above 30MHz

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.00	Quasi-peak Value
88MHz-216MHz	43.50	Quasi-peak Value
216MHz-960MHz	46.00	Quasi-peak Value
960MHz-1GHz	54.00	Quasi-peak Value
Above 1GHz	54.00	Average Value
	74.00	Peak Value

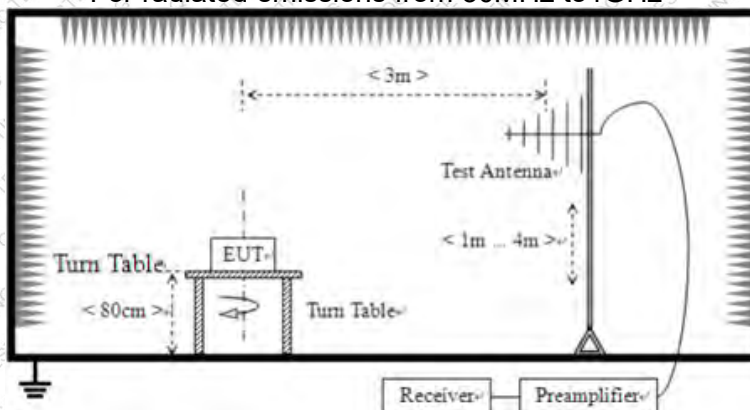
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

6.3 Test setup

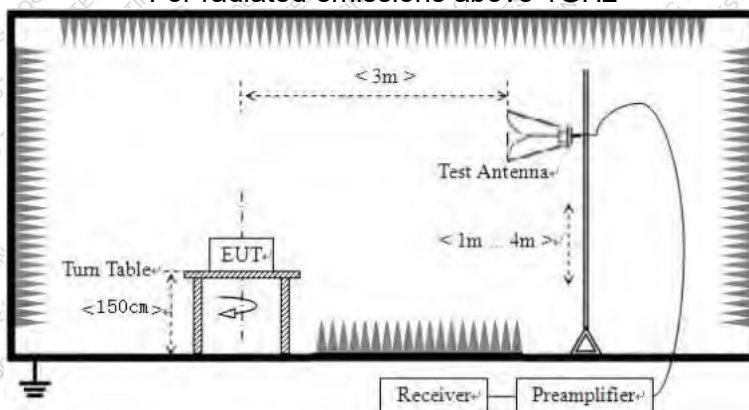
For radiated emissions from Below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



6.4 EMI Test Receiver Setup

Frequency	Detector	RBW	VBW	Remark
9kHz- 30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	10Hz	Average Value

Remark: For the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission test in these three bands are based on measurements employing an average detector.

6.5 Test procedure

- The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height 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.
- 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

6.1 Test Data

Temperature	26 °C	Humidity	54%
ATM Pressure	101.1kPa	Antenna Gain	0dBi
Test by	LBi Li	Test result	PASS

Test voltage: AC 120V/60Hz

Mode 1 Charging with 10 W wireless charging load (Full Load)

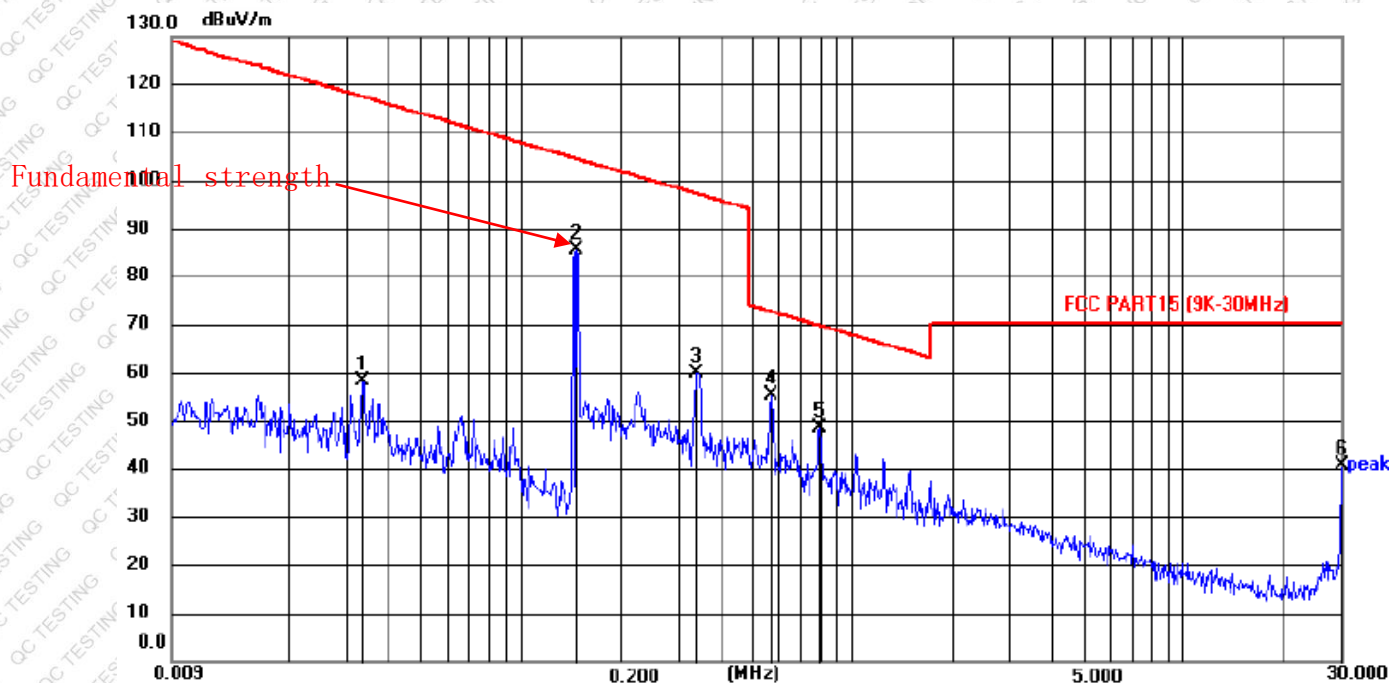
Note: All the modes had been tested, but only the worst data was recorded in the report (Mode 1).

Measurement data:

Note: Limit dBuV/m @3m = Limit dBuV/m @300m+ 80

Limit dBuV/m @3m = Limit dBuV/m @30m + 40

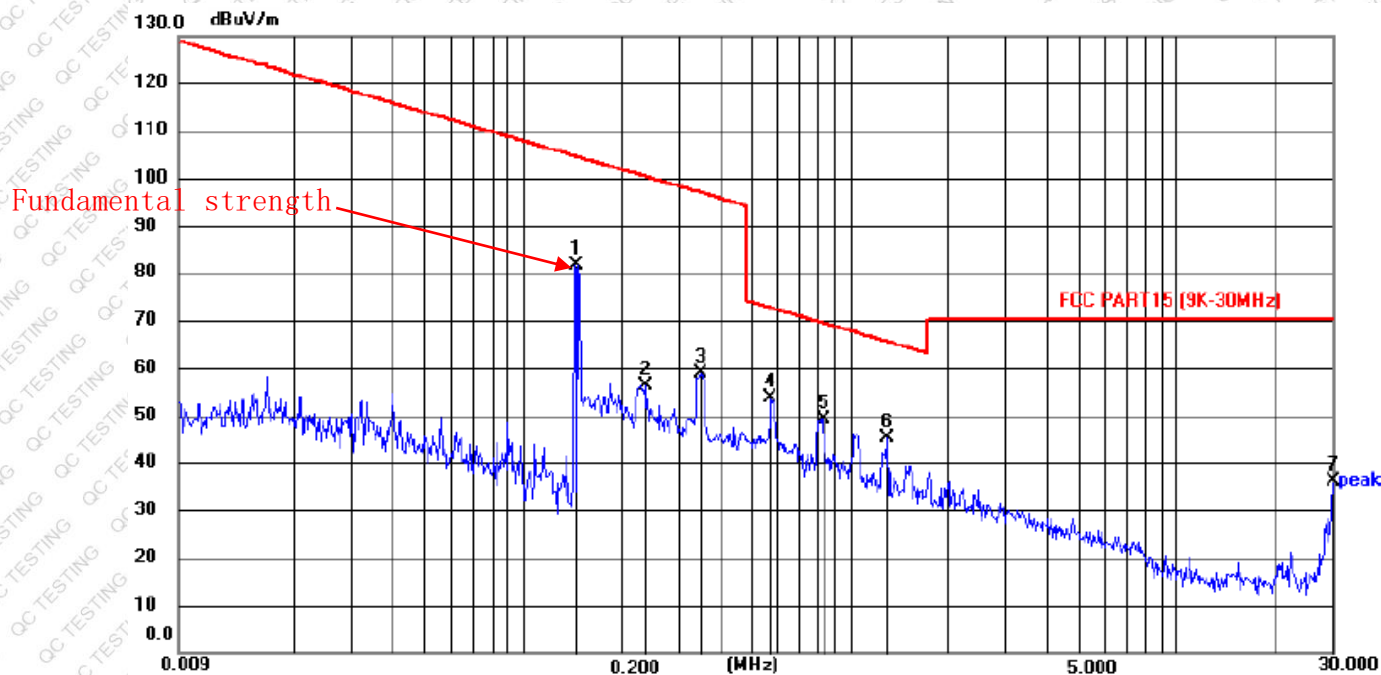
9 kHz~30 MHz (X Axis) (Model: DS2203)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.0333	46.40	12.07	58.47	117.16	58.69	AVG
2	0.1462	75.18	10.31	85.49	104.31	18.82	AVG
3	0.3407	49.62	10.48	60.10	96.96	36.86	AVG
4 *	0.5668	44.73	10.65	55.38	72.54	17.16	QP
5	0.7960	37.92	10.64	48.56	69.59	21.03	QP
6	30.0000	31.69	8.94	40.63	70.00	29.37	QP



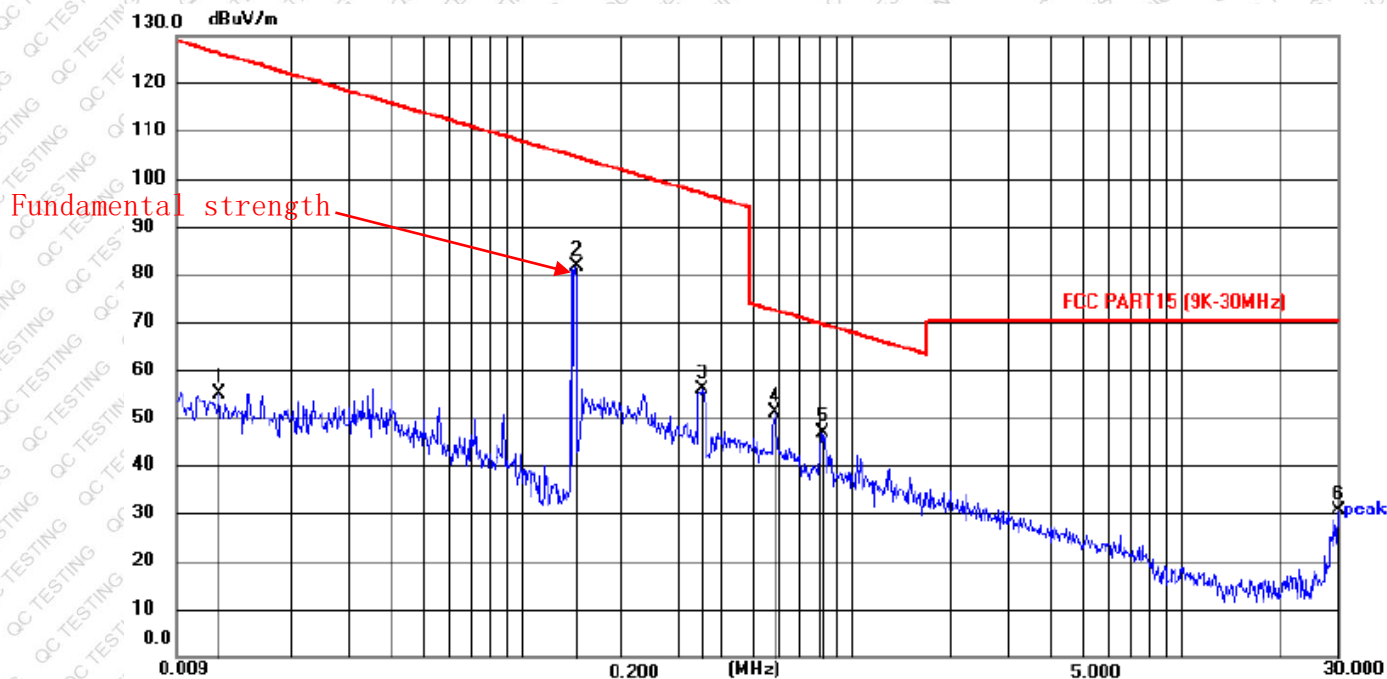
9 kHz~30 MHz (Y Axis) (Model: DS2203)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.1461	71.39	10.31	81.70	104.31	22.61	AVG
2	0.2353	45.99	10.37	56.36	100.17	43.81	AVG
3	0.3482	48.36	10.49	58.85	96.77	37.92	AVG
4 *	0.5700	43.13	10.65	53.78	72.49	18.71	QP
5	0.8216	38.64	10.65	49.29	69.31	20.02	QP
6	1.2960	34.49	10.71	45.20	65.35	20.15	QP
7	30.0000	27.33	8.94	36.27	70.00	33.73	QP



9 kHz~30 MHz (Z Axis) (Model: DS2203)

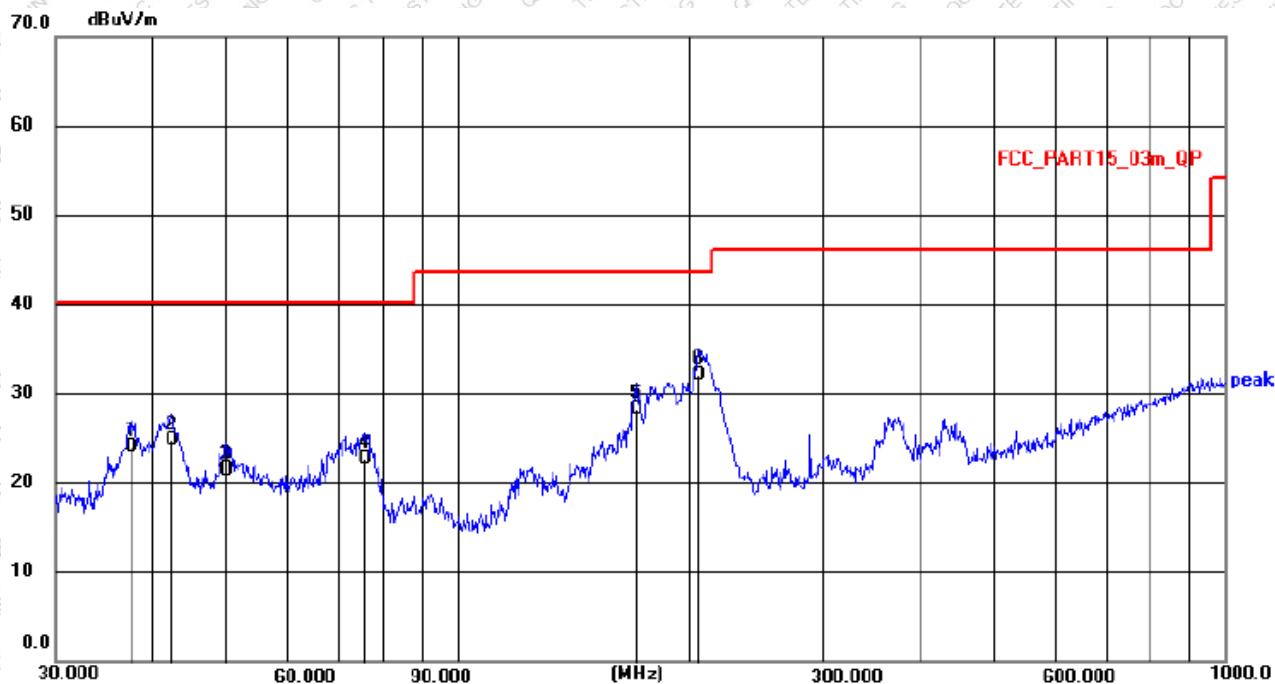


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.0120	39.23	15.86	55.09	126.02	70.93	AVG
2	0.1461	71.31	10.31	81.62	104.31	22.69	AVG
3	0.3501	45.42	10.49	55.91	96.72	40.81	AVG
4 *	0.5854	40.45	10.65	51.10	72.25	21.15	QP
5	0.8085	36.24	10.65	46.89	69.45	22.56	QP
6	30.0000	21.91	8.94	30.85	70.00	39.15	QP



30MHz~1GHz

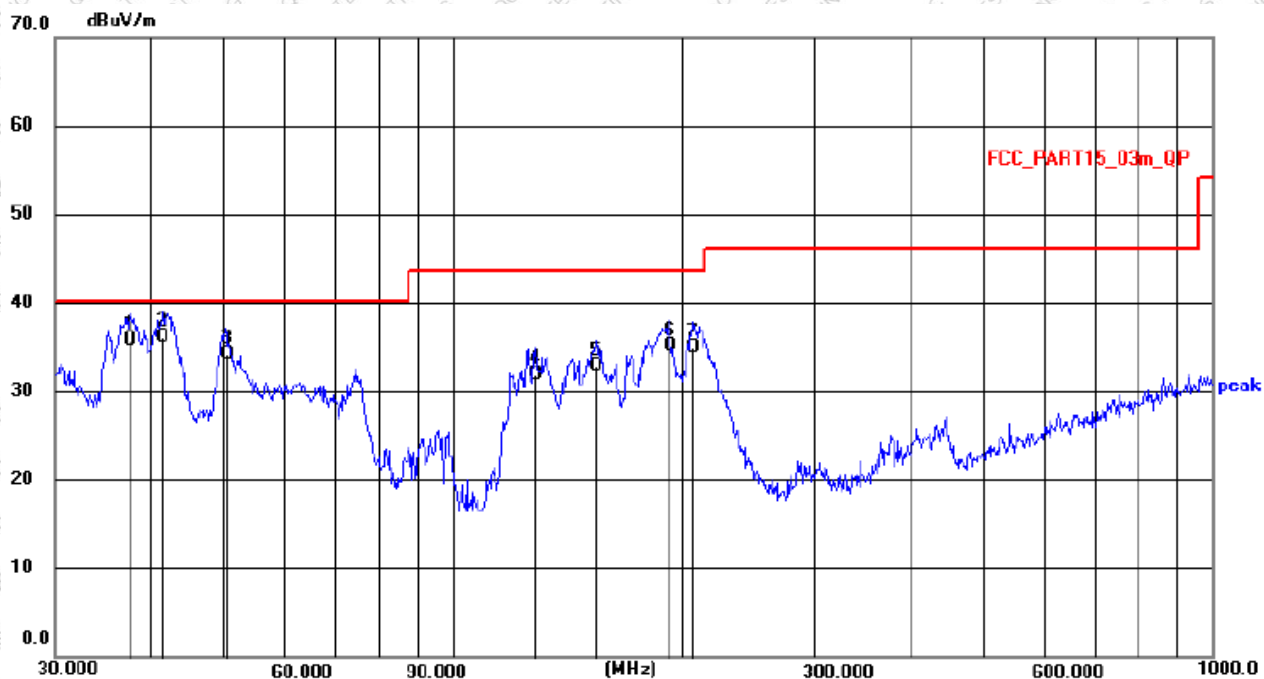
Horizontal (Model: DS2203)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	37.5478	9.78	14.21	23.99	40.00	16.01	QP
2	42.4508	10.02	14.76	24.78	40.00	15.22	QP
3	50.0566	6.80	14.63	21.43	40.00	18.57	QP
4	75.7113	11.47	11.23	22.70	40.00	17.30	QP
5	170.7926	14.74	13.48	28.22	43.50	15.28	QP
6 *	206.3975	20.50	11.65	32.15	43.50	11.35	QP



Vertical (Model: DS2203)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	37.5478	21.82	14.01	35.83	40.00	4.17	QP
2 *	41.5670	21.53	14.56	36.09	40.00	3.91	QP
3	50.2324	19.76	14.42	34.18	40.00	5.82	QP
4	128.5629	18.35	13.62	31.97	43.50	11.53	QP
5	154.2785	18.35	14.39	32.74	43.50	10.76	QP
6	192.4185	23.58	11.45	35.03	43.50	8.47	QP
7	207.1225	23.54	11.42	34.96	43.50	8.54	QP

Remarks:

1. Level = Reading + Factor

7. 20dB Occupy Bandwidth

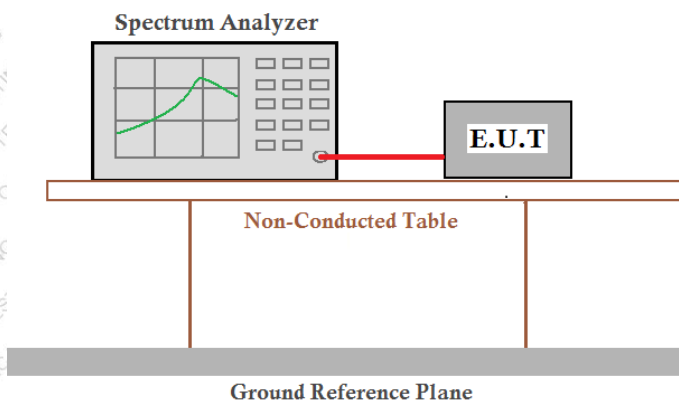
7.1 Applicable Standard

FCC Part15 C Section 15.215

7.2 Limit

N/A

7.3 Test setup

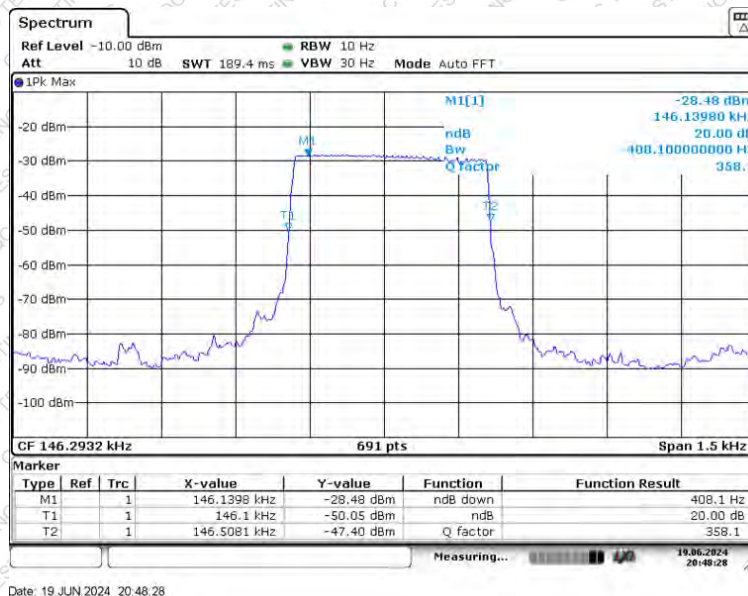


7.4 Test Method

ANSI C63.10:2013

7.5 Test Data

Temperature	22 °C	Humidity	53%
ATM Pressure	101.1kPa	Antenna Gain	0dBi
Test by	LBi Li	Test result	PASS



146.1398kHz: 20dB BW=408.1Hz

----- THE END OF TEST REPORT -----