FCC EMC Test Report

Applicant:	Hangzhou Roombanker Technology Co., Ltd.
Address of Applicant:	A#801 Wantong center, Hangzhou, China
Equipment Under Test (EUT)	
Product Name:	Indoor Nodle Miner
Model No.:	DSGW-210N
Trade Mark:	N/A
FCC ID:	2AUXBDSGW-210N
Applicable Standards:	FCC CFR Title 47 Part 15B
Date of Sample Receipt:	23 Mar., 2022
Date of Test:	24 Mar., to 11 Apr., 2022
Date of report Issued:	12 Apr., 2022
Test Result:	PASS *

Tested by:	Mike.ou ***Test Engineer***	***Date:***	*12 Apr., 2022*
Reviewed by:	Vivner Zhou ***Project Engineer***	***Date:***	*12 Apr., 2022*
Approved by:	***Manager***	***Date:***	*12 Apr., 2022*

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

2 Version

Version No.	Date	Description
00	*12 Apr., 2022*	*Original*

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4 General Information

4.1 Client Information

Applicant:	Hangzhou Roombanker Technology Co., Ltd.
Address:	A#801 Wantong center, Hangzhou, China
Manufacturer:	Hangzhou Roombanker Technology Co., Ltd.
Address:	A#801 Wantong center, Hangzhou, China

4.2 General Description of E.U.T.

Product Name:	Indoor Nodle Miner
Model No.:	DSGW-210N
AC Adapter:	Model: KA1501A-0503000US Input: AC100-240V, 50/60Hz, 0.55A MAX Output: DC 5.0V, 3000mA
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

4.3 Test Mode

Operating Mode	Detail Description
Working mode	Keep the EUT in Working mode(Worst case)
The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

4.4 Description of Support Units

Manufacturer	Description	Model	S/N	FCC ID/DoC
Lenovo	Laptop	ThinkPad T14 Gen 1	SL10Z47277	DoC

4.5 Description of Cable Used

Cable Type	Description	Length	From	To
Detached USB Cable	Shielding	1.0m	EUT	Adapter

4.6 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Conducted Emission for LISN (9kHz ~ 150kHz)	±3.11 dB
Conducted Emission for LISN (150kHz ~ 30MHz)	±2.62 dB
Radiated Emission (30MHz ~ 1GHz) (3m SAC)	±4.45 dB
Radiated Emission (1GHz ~ 18GHz) (3m SAC)	±5.34 dB
Radiated Emission (18GHz ~ 40GHz) (3m SAC)	±5.34 dB
Radiated Emission (30MHz ~ 1GHz) (10m SAC)	±4.32 dB
Note: *All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.*	

4.7 Additions to, Deviations, or Exclusions from the Method

No

4.8 Laboratory Facility

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

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

4.9 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

4.10 Test Instruments List

Radiated Emission(3m SAC):					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal.Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	ETS	9m*6m*6m	WXJ001-1	01-19-2021	01-18-2024
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	02-17-2022	02-16-2023
Biconical Antenna	Schwarzbeck	VUBA9117	WXJ002-1	06-20-2021	06-19-2022
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	02-17-2022	02-16-2023
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-3	06-18-2021	06-17-2022
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXG001-7	02-17-2022	02-16-2023
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXG001-3	02-17-2022	02-16-2023
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA-180400G45B	WXG001-9	02-17-2022	02-16-2023
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	02-17-2022	02-16-2023
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	04-06-2021	04-05-2022
				04-01-2022	03-31-2023
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA-180400G45B	WXG001-9	02-17-2022	02-16-2023
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	02-17-2022	02-16-2023
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG001-5	02-17-2022	02-16-2023
Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYT3M-1G-BB-5M	WXG001-6	02-17-2022	02-16-2023
Coaxial Cable (18GHz ~ 40GHz)	JYTSZ	JYT3M-40G-SS-8M	WXG001-7	02-17-2022	02-16-2023
Test Software	Tonscend	TS+	Version: 3.0.0.1		

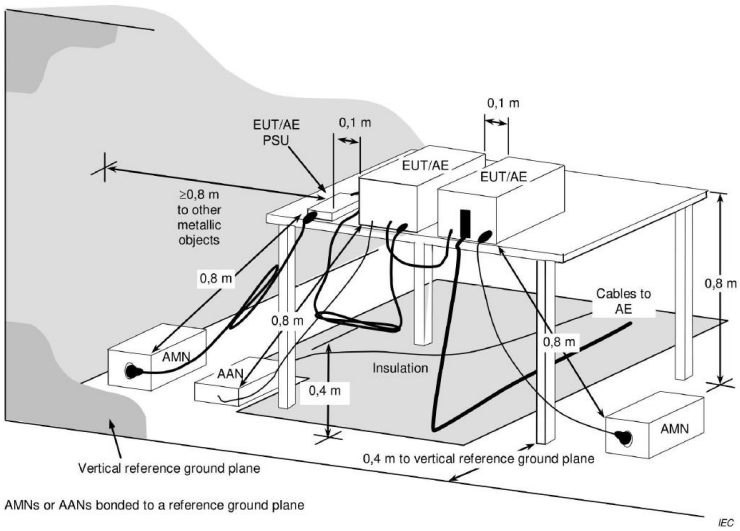
Radiated Emission(10m SAC):					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
10m SAC	ETS	RFSD-100-F/A	WXJ090	04-28-2021	04-27-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-1	04-02-2021	04-01-2022
				03-30-2022	03-29-2023
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-2	04-02-2021	04-01-2022
				03-30-2022	03-29-2023
EMI Test Receiver	R&S	ESR 3	WXJ090-3	04-08-2021	04-07-2022
				03-30-2022	03-29-2023
EMI Test Receiver	R&S	ESR 3	WXJ090-4	04-08-2021	04-07-2022
				03-30-2022	03-29-2023
Low Pre-amplifier	Bost	LNA 0920N	WXG002-3	04-06-2021	04-05-2022
				03-30-2022	03-29-2023
Low Pre-amplifier	Bost	LNA 0920N	WXG002-4	04-06-2021	04-05-2022
				03-30-2022	03-29-2023
Cable	Bost	JYT10M-1G-NN-10M	XG002-7	04-02-2021	04-01-2022
				03-30-2022	03-29-2023
Cable	Bost	JYT10M-1G-NN-10M	XG002-8	04-02-2021	04-01-2022
				03-30-2022	03-29-2023
Test Software	R&S	EMC32	Version: 10.50.40		

Conducted Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal.Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
EMI Test Receiver	Rohde & Schwarz	ESCI 3	WXJ003	02-17-2022	02-16-2023
RF Switch	TOP PRECISION	RSU0301	WXG003	02-17-2022	02-16-2023
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	02-17-2022	02-16-2023
LISN	Rohde & Schwarz	ESH3-Z5	WXJ005-1	06-18-2021	06-17-2022
LISN Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYTCE-1G-NN-2M	WXG003-1	02-17-2022	02-16-2023
Test Software	AUDIX	E3	Version: 6.110919b		

5 Measurement Setup and Procedure

5.1 Test Setup

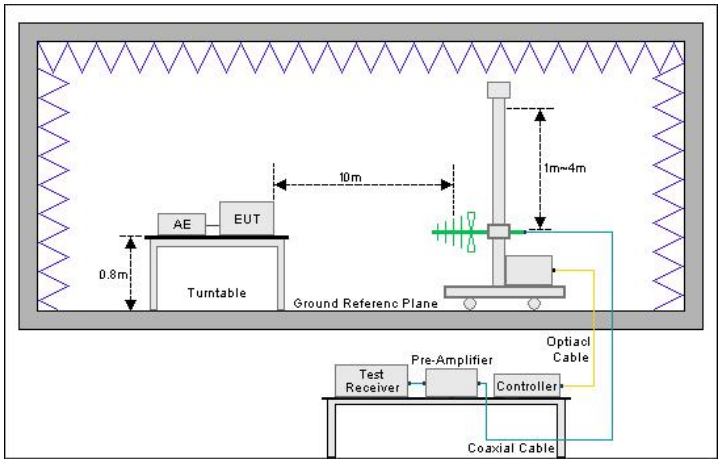
1) Conducted emission measurement:



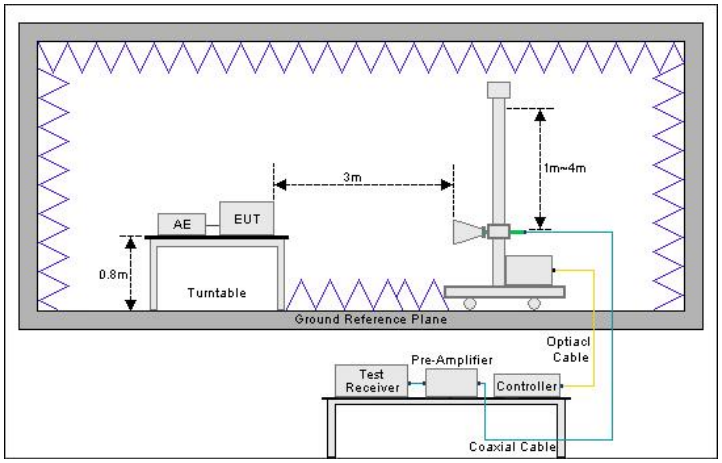
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

Below 1GHz (10m SAC)



Above 1GHz (3m SAC)



5.2 Test Procedure

Test method	Test step
Conducted emission	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 C63.4 on conducted measurement.
Radiated emission	**For below 1GHz:** 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 10 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 10 m. 2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data. **For above 1GHz:** 1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.

6 Test Results

6.1 Summary

6.1.1 Clause and data summary

Test items	Standard clause	Test data	Result
Conducted Emission	Part 15.107	See Section 6.2	Pass
Radiated Emission	Part 15.109	See Section 6.3	Pass

Remark:

1. *The EUT is a **Class B** digital device.*
2. *Pass: The EUT complies with the essential requirements in the standard.*
3. *N/A: Not Applicable.*

Test Method:	*ANSI C63.4:2014*

6.1.2 Test Limit

Test items: Conducted Emission

Limit

Frequency (MHz)	Class A Limit (dBµV)		Class B Limit (dBµV)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15 – 0.5	79	66	66 to 56 Note 1	56 to 46 Note 1
0.5 – 5	73	60	56	46
5 – 30	73	60	60	50

Note 1: The limit level in dBµV decreases linearly with the logarithm of frequency.
Note 2: The more stringent limit applies at transition frequencies.

Test items: Radiated Emission

Limit

Frequency (MHz)	Class A Limit (dBµV/m)		Class B Limit (dBµV/m)	
	Quasi-Peak @ 3m	Quasi-Peak @ 10m	Quasi-Peak @ 3m	Quasi-Peak @ 10m
30 – 88	49.0	39.0	40.0	30.0
88 – 216	53.5	43.5	43.5	33.5
216 – 960	56.0	46.0	46.0	36.0
960 – 1000	60.0	50.0	54.0	44.0

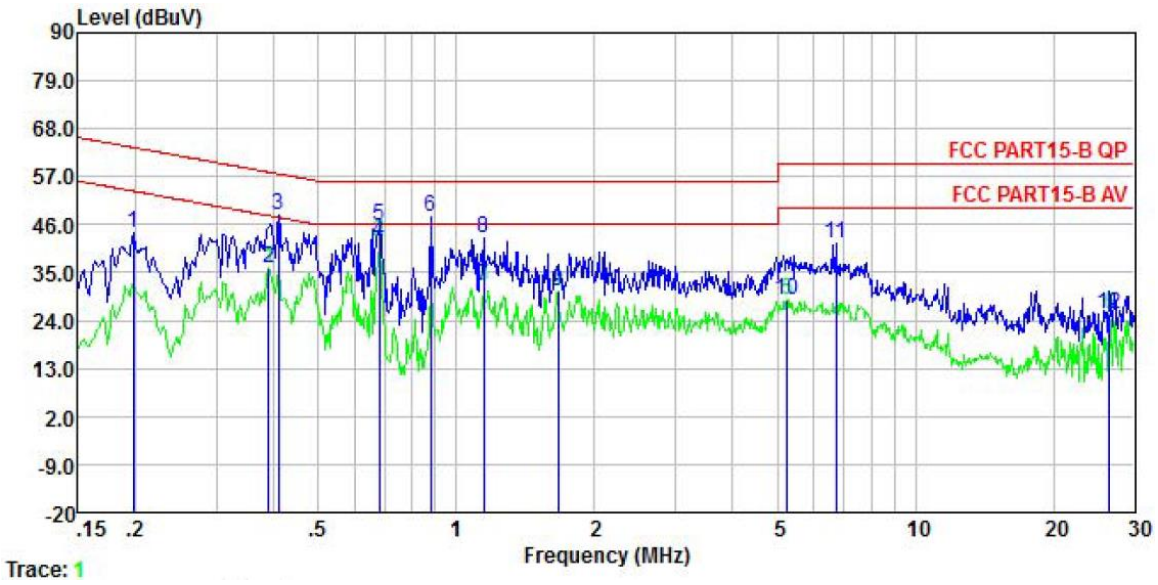
Note: The more stringent limit applies at transition frequencies.

Frequency	Class A Limit (dBµV/m) @ 3m		Class B Limit (dBµV/m) @ 3m	
	Average	Peake	Average	Peake
Above 1 GHz	60.0	80.0	54.0	74.0

Note: The measurement bandwidth shall be 1 MHz or greater.

6.2 Conducted Emission

Product name:	Indoor Nodle Miner	**Product model:**	DSGW-210N
Test by:	Mike	**Test mode:**	Working mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 120 V/60 Hz		

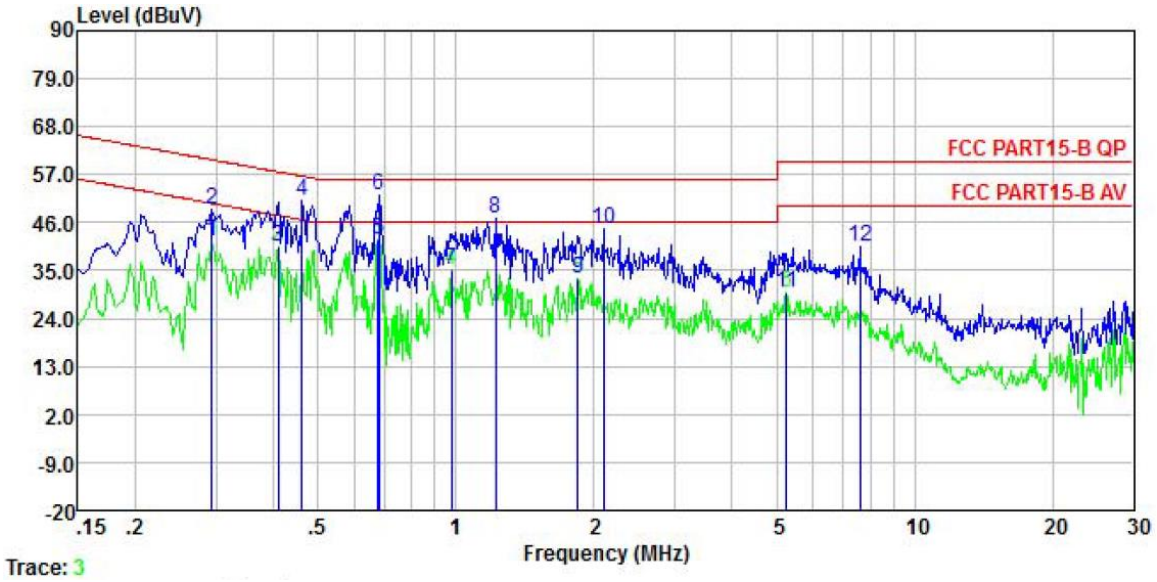


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.198	44.16	0.04	0.04	44.24	63.71	-19.47	QP
2	0.389	36.07	0.04	0.04	36.15	48.08	-11.93	Average
3	0.410	48.19	0.04	0.04	48.27	57.64	-9.37	QP
4	0.679	41.96	0.04	0.03	42.03	46.00	-3.97	Average
5	0.679	45.73	0.04	0.03	45.80	56.00	-10.20	QP
6	0.880	47.69	0.05	0.04	47.78	56.00	-8.22	QP
7	1.147	31.83	0.05	0.08	31.96	46.00	-14.04	Average
8	1.147	42.99	0.05	0.08	43.12	56.00	-12.88	QP
9	1.662	30.51	0.06	0.17	30.74	46.00	-15.26	Average
10	5.249	28.43	0.12	0.09	28.64	50.00	-21.36	Average
11	6.698	41.46	0.15	0.10	41.71	60.00	-18.29	QP
12	26.418	24.87	0.37	0.21	25.45	50.00	-24.55	Average

Remark:

1. Level = Read level + LISN Factor + Cable Loss.

Product name:	Indoor Nodle Miner	Product model:	DSGW-210N
Test by:	Mike	Test mode:	Working mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz		



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.294	41.50	0.04	0.03	41.57	50.41	-8.84	Average
2	0.294	49.11	0.04	0.03	49.18	60.41	-11.23	QP
3	0.410	40.33	0.04	0.04	40.41	47.64	-7.23	Average
4	0.461	51.06	0.04	0.03	51.13	56.67	-5.54	QP
5	0.675	41.88	0.04	0.03	41.95	46.00	-4.05	Average
6	0.679	52.01	0.04	0.03	52.08	56.00	-3.92	QP
7	0.979	35.03	0.05	0.05	35.13	46.00	-10.87	Average
8	1.223	46.99	0.05	0.10	47.14	56.00	-8.86	QP
9	1.848	32.73	0.06	0.19	32.98	46.00	-13.02	Average
10	2.099	44.15	0.06	0.19	44.40	56.00	-11.60	QP
11	5.249	29.74	0.11	0.09	29.94	50.00	-20.06	Average
12	7.606	40.29	0.15	0.10	40.54	60.00	-19.46	QP

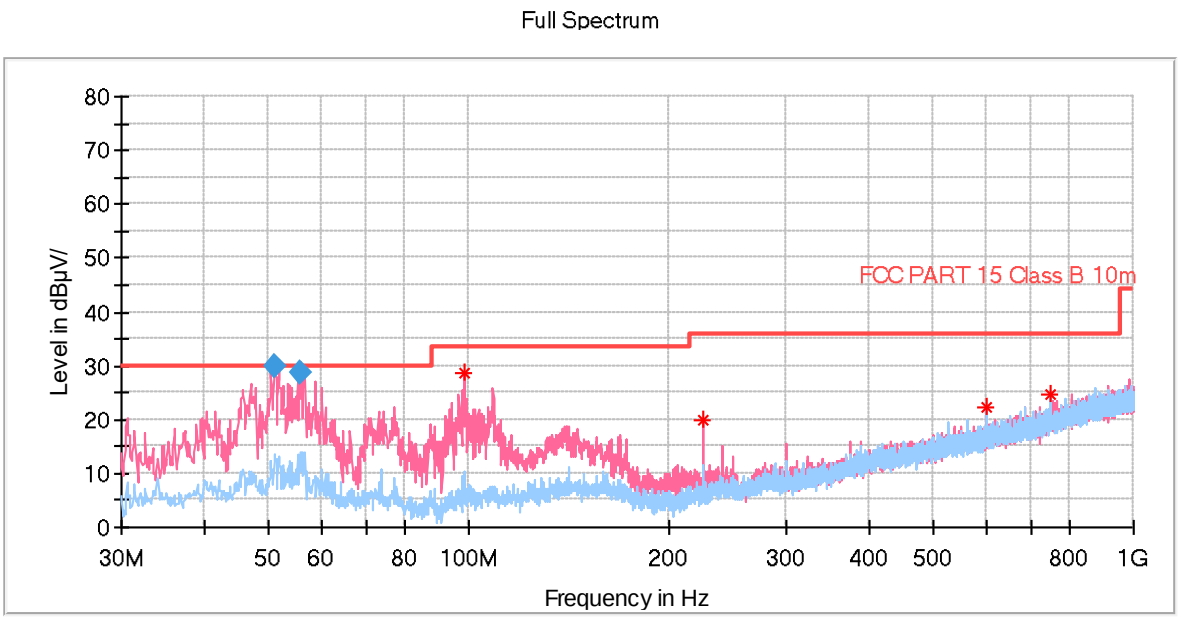
Remark:

1. Level = Read level + LISN Factor + Cable Loss.

6.3 Radiated Emission

Below 1GHz:

Product Name:	Indoor Nodle Miner	**Product Model:**	DSGW-210N
Test By:	Mike	**Test mode:**	Working mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical & Horizontal
Test Voltage:	AC 120/60Hz		



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
51.049000	30.10	30.00	-0.10	100.0	V	218.0	-15.8
55.802000	29.23	30.00	0.77	100.0	V	133.0	-16.1
98.385000	28.64	33.50	4.86	100.0	V	330.0	-19.0
224.970000	19.88	36.00	16.12	100.0	V	198.0	-16.7
599.972000	22.43	36.00	13.57	100.0	V	18.0	-6.7
749.934000	24.78	36.00	11.22	100.0	H	180.0	-3.7

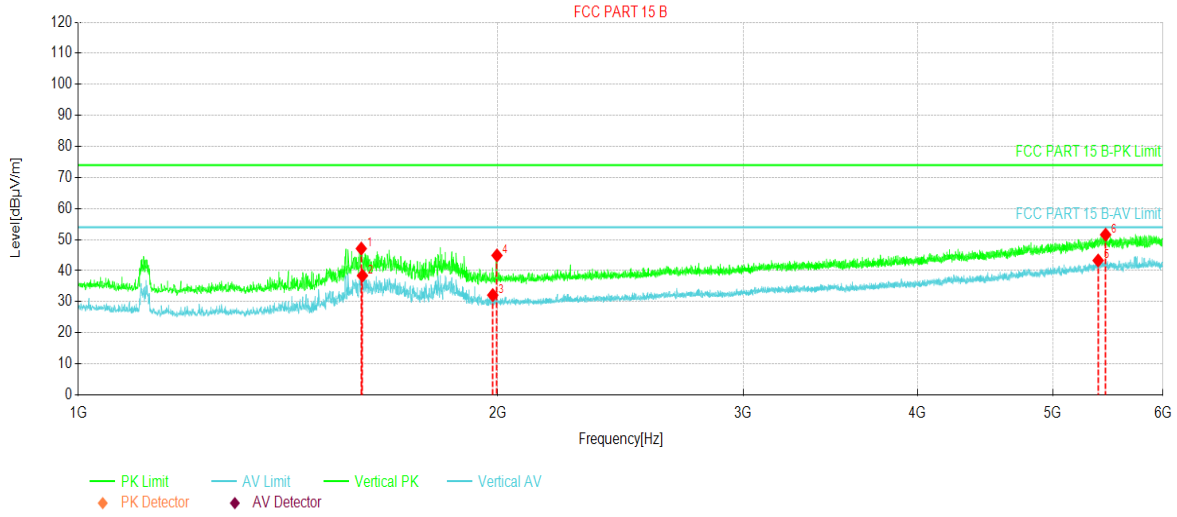
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµ	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
51.049000	29.70	30.00	0.30	108.0	V	216.0	-15.8
55.802000	28.47	30.00	1.53	112.0	V	135.0	-16.1

Remark:

1. Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

Above 1GHz:

Product Name:	Indoor Nodle Miner	**Product Model:**	DSGW-210N
Test By:	Mike	**Test mode:**	Working mode
Test Frequency:	1000 MHz ~ 6000 MHz	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz		

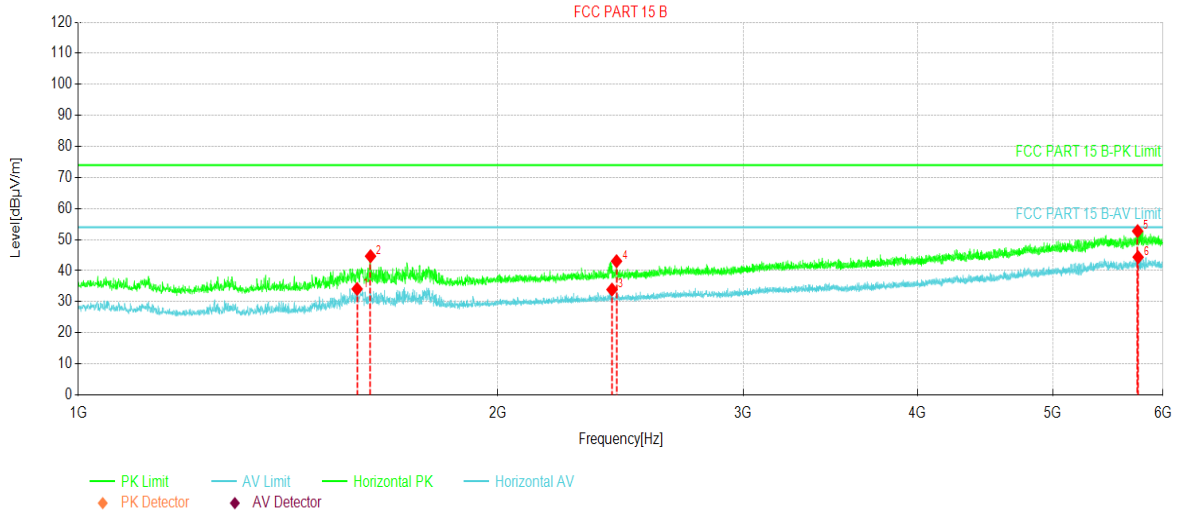


NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1596.05	69.38	47.11	-22.27	74.00	26.89	PK	Vertical
2	1599.05	60.65	38.40	-22.25	54.00	15.60	AV	Vertical
3	1983.09	52.38	32.12	-20.26	54.00	21.88	AV	Vertical
4	1997.09	65.05	44.90	-20.15	74.00	29.10	PK	Vertical
5	5390.43	49.27	43.27	-6.00	54.00	10.73	AV	Vertical
6	5457.44	57.61	51.59	-6.02	74.00	22.41	PK	Vertical

Remark:

1. Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

Product Name:	Indoor Nodle Miner	Product Model:	DSGW-210N
Test By:	Mike	Test mode:	Working mode
Test Frequency:	1000 MHz ~ 6000 MHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1585.05	56.41	34.10	-22.31	54.00	19.90	AV	Horizontal
2	1620.56	66.82	44.66	-22.16	74.00	29.34	PK	Horizontal
3	2414.64	52.67	33.91	-18.76	54.00	20.09	AV	Horizontal
4	2433.14	61.78	43.05	-18.73	74.00	30.95	PK	Horizontal
5	5753.47	57.96	52.75	-5.21	74.00	21.25	PK	Horizontal
6	5758.47	49.56	44.35	-5.21	54.00	9.65	AV	Horizontal

Remark:

1. Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

------End of report------