

FCC TEST REPORT


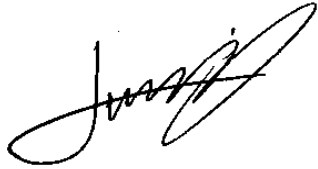
Applicant	Beijing Dhome Intelligent Technology Co., Ltd.
Address	18031, 15th floor, building 1, No.12 yard, Zhongguancun South Street, Haidian District, Beijing, China

Manufacturer or Supplier	Huizhou Leen Electronics Co., Ltd.
Address	3rd Floor, No. 10 Workshop, South 1st Road, Xinwu Group, Baigang Village, Xiaojinkou Street, Huicheng District, Huizhou City
Product	Speaker
Brand Name	HP
Model	DHS-2101
Additional Models & Model Difference	N/A
Date of tests	Sep. 26, 2021 ~ Dec. 20, 2021

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

☒ **FCC Part 15, Subpart B, Class B**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Andy Zhu Supervisor / EMC Department	Approved by Madison Luo Assistant Manager / EMC Department
	 Date: Feb. 17, 2022

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Test Report No.: FS2109WDG0266

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FS2109WDG0266	Original release	Feb. 17, 2022

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD			
Standard Section	Test Item	Result	Remark
FCC Part 15, Subpart B, Class B	Conducted test	PASS	Meets limits minimum passing margin is -3.19dB at 1.51125MHz
	Radiated Emission Test (30MHz ~ 1GHz)	PASS	Meets limits minimum passing margin is -12.24dB at 571.02MHz

Remark: Please refer to FCC part 2 2.1077 for compliance information requirement

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emission test	0.15MHz ~ 30MHz	+ /- 3.05dB
Radiated emissions	30MHz ~ 1GHz	+ /- 4.79dB



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Speaker
MODEL NO.	DHS-2101
FCC ID:	2A3IH2101
ADDITIONAL MODELS	N/A
POWER SUPPLY	DC 5V from USB Host Unit
CABLE SUPPLIED	Speaker Line: Unshielded ,Non-detachable 0.8m USB and AUX cable: Unshielded ,Non-detachable, 1.2m
THE HIGHEST OPERATING FREQUENCY	Below 108MHz

NOTES:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions, but only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 2109WDG0266) for detailed product photo.

2.2 DESCRIPTION OF TEST MODES

The EUT were tested under the following modes, the final worst mode was marked in boldface and recorded in this report.

CONDUCTED EMISSION TEST:

Description of Test Mode	Test Voltage
AUX INPUT	DC 5V from Notebook Input AC 120V 60Hz
AUX INPUT + Earphone	

RADIATED EMISSION TEST:

Description of Test Mode	Test Voltage
AUX INPUT	DC 5V from Notebook Input AC 120V 60Hz
AUX INPUT + Earphone	

2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	ALIENWARE	ALIENWARE 13 R2	2015AP3711	N/A
2	Printer	HP	hp LaserJet 1300	CNSJF75989	N/A
3	Printer	Lenovo	LJ2200L	LP02857415 48001408	N/A
4	Notebook	DELL	Inspiron 14 N4030	BF9WVP1	N/A
5	Earphone	NA	NA	NA	NA

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 0.8m; DC Line: Unshielded, Detachable 1.8m
2	AC Line: Unshielded, Detachable 1.8m; USB Line: Unshielded, Detachable 1.8m
3	AC Line: Unshielded, Detachable 1.5m; USB Line: Unshielded, Detachable 1.5m
4	AC Line: Unshielded, Detachable 0.8m; DC Line: Unshielded, Detachable 1.8m
5	Earphone Line: Unshielded, UnDetachable 1.0m



3 EMISSION TEST

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

- NOTES:** (1) The lower limit shall apply at the transition frequencies.
 (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	100666	July 04,22
Artificial Mains Network	Rohde&Schwarz	ENV216	102477	July 12,22
Artificial Mains Network	SCHWARZBECK	NSLK 8127	8127713	May 08,22
Voltage Probe	SCHWARZBECK	TK 9421	9421-0332	Aug. 22,22
Current Probe	Rohde&Schwarz	EZ-17		
Coaxial RF Cable	/	/	/	Jul. 27,22
Test software	ADT	ADT_Cond_V7.3.7	N/A	N/A

- NOTES:** 1. The test was performed in shielded room 553.
 2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

3.1.3 TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2014 amended as per ANSI C63.4a:2017.

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20dB) were not recorded.

NOTES:

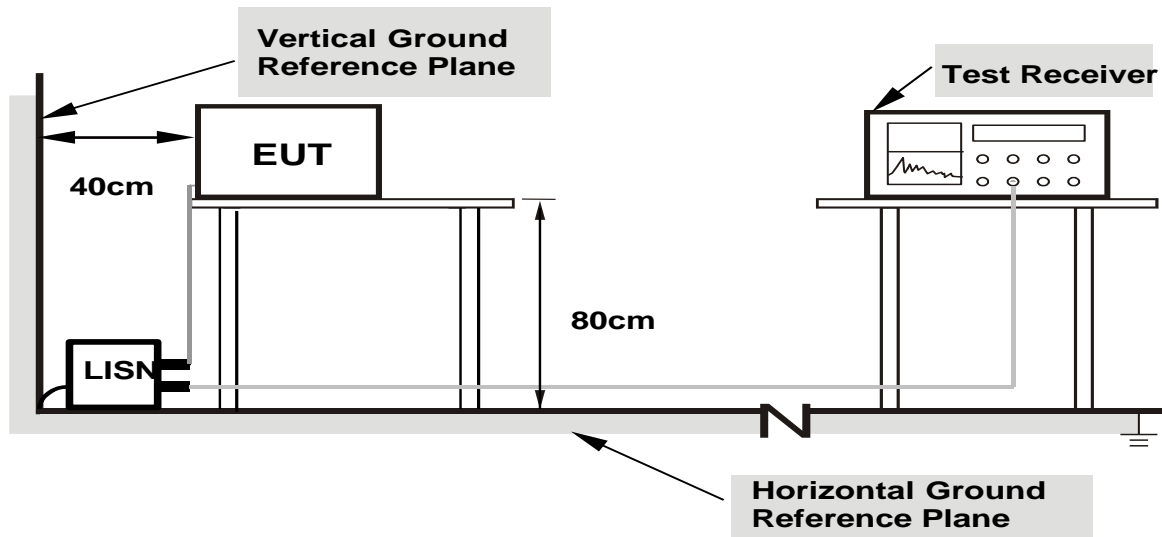
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.



3.1.5 TEST SETUP



- Note:**
- 1.Support units were connected to second LISN.
 - 2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

3.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power of all equipment.
- b. EUT was operated according to the type description in manufacturer's specifications or the User's Manual.

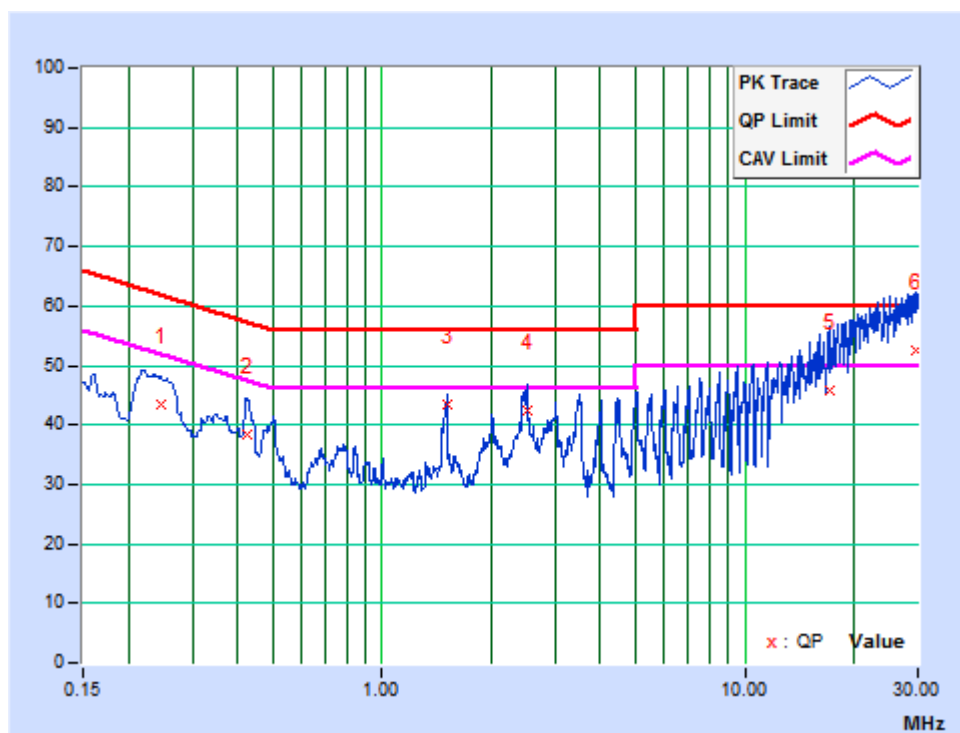


3.1.7 TEST RESULTS

TEST MODE	See section 2.2	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	See section 2.2	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 54%RH	TESTED BY	Ming Bai

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.24488	10.00	33.44	19.58	43.44	29.58	61.93	51.93	-18.49	-22.35
2	0.42298	9.98	28.32	24.99	38.30	34.97	57.39	47.39	-19.09	-12.42
3	1.51125	10.03	33.44	32.78	43.47	42.81	56.00	46.00	-12.53	-3.19
4	2.51700	10.04	32.42	25.31	42.46	35.35	56.00	46.00	-13.54	-10.65
5	17.07000	10.32	35.61	20.69	45.93	31.01	60.00	50.00	-14.07	-18.99
6	29.71275	10.68	41.69	29.44	52.37	40.12	60.00	50.00	-7.63	-9.88

REMARK: The emission levels of other frequencies were very low against the limit.

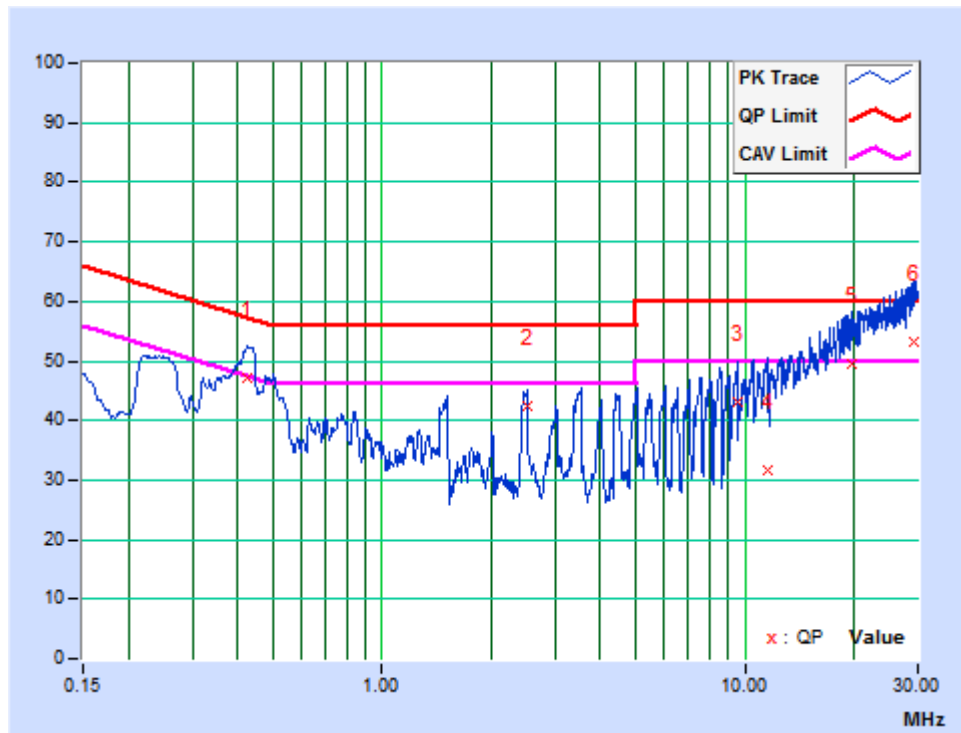




TEST MODE	See section 2.2	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	See section 2.2	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 54%RH	TESTED BY	Ming Bai

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.42298	9.92	37.18	22.34	47.10	32.26	57.39	47.39	-10.29	-15.13
2	2.52046	9.99	32.38	24.12	42.37	34.11	56.00	46.00	-13.63	-11.89
3	9.57750	10.11	32.82	18.61	42.93	28.72	60.00	50.00	-17.07	-21.28
4	11.60025	10.16	21.61	11.15	31.77	21.31	60.00	50.00	-28.23	-28.69
5	19.65750	10.38	39.08	27.19	49.46	37.57	60.00	50.00	-10.54	-12.43
6	29.18175	10.98	42.32	30.58	53.30	41.56	60.00	50.00	-6.70	-8.44

REMARK: The emission levels of other frequencies were very low against the limit.





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.109)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 10 meters (dBμV/m)				
Frequencies (MHz)	FCC 15B Class A	FCC 15B Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	39	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960			47	37
960-1000	49.5	43.5		

Radiated Emissions Limits at 3 meters (dB μ V/m)		
Frequencies (MHz)	FCC 15B, Class A	FCC 15B, Class B
30-88	49.5	40
88-216	54	43.5
216-230	56.9	46
230-960		
960-1000	60	54
1000-3000	Avg: 60 Peak: 80	Avg: 54 Peak: 74
Above 3000		



FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

- Notes: (1) The lower limit shall apply at the transition frequencies.
(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



3.2.2 TEST INSTRUMENTS

FREQUENCY RANGE BELOW 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU26	100005	Apr. 16, 22
EMI Test Receiver	Rohde&Schwarz	ESR7	101564	Mar. 07,22
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-555	Dec. 11, 22
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-554	Jan. 09, 22
Preamplifier	EMCI	EMC1135	980378	Mar. 13,22
Preamplifier	EMCI	EMC1135	980423	Mar. 13,22
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	Oct. 15,22
Coaxial RF Cable	/	/	/	Aug. 03,22
Coaxial RF Cable	/	/	/	Aug. 03,22
Test Software	ADT	ADT_Radiated_V8.7.07	N/A	N/A

- NOTES:** 1. The test was performed in 10m Chamber.
 2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GREGT/CHINA and NIM/CHINA.
 3. The FCC Site Registration No. is 749762.

FREQUENCY RANGE ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Horn Antenna	ETS-Lindgren	3117	00085519	Nov. 06, 22
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170147	May 14, 22
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101003	Feb. 24,22
Broadband Preamplifier (1~18GHz)	Rohde&Schwarz	SCU18	102265	Jun. 20,22
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Jan. 10,22
Coaxial RF Cable	/	/	C2310041DG	Apr. 14,22

- NOTES:** 1. The test was performed in 10m Chamber.
 2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GREGT/CHINA and NIM/CHINA.
 3. The FCC Site Registration No. is 749762.

3.2.3 TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2014 amended as per ANSI C63.4a:2017.

<Frequency Range below 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 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 1 meter to 4 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. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTES:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
3. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier)
4. $\text{Correction Factor (dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier)
5. $\text{Margin value} = \text{Emission level} - \text{Limit value}$

<Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 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. The height of antenna can be varied from one meter-to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. The bore sight should be used during the test above 1GHz.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test receiver/spectrum was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

NOTES:

1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
3. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier)
5. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
6. Margin value = Emission level – Limit value

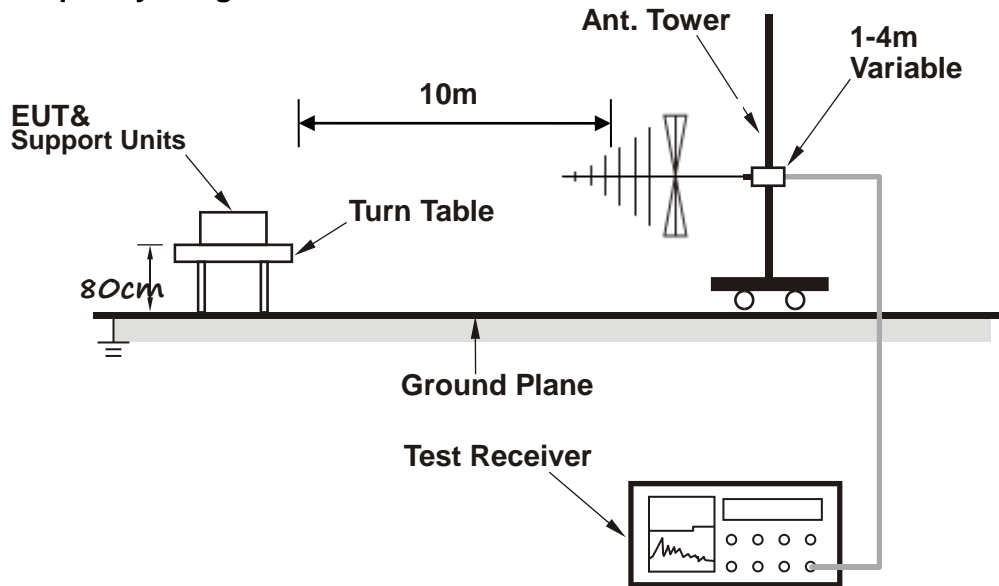
3.2.4 DEVIATION FROM TEST STANDARD

No deviation.

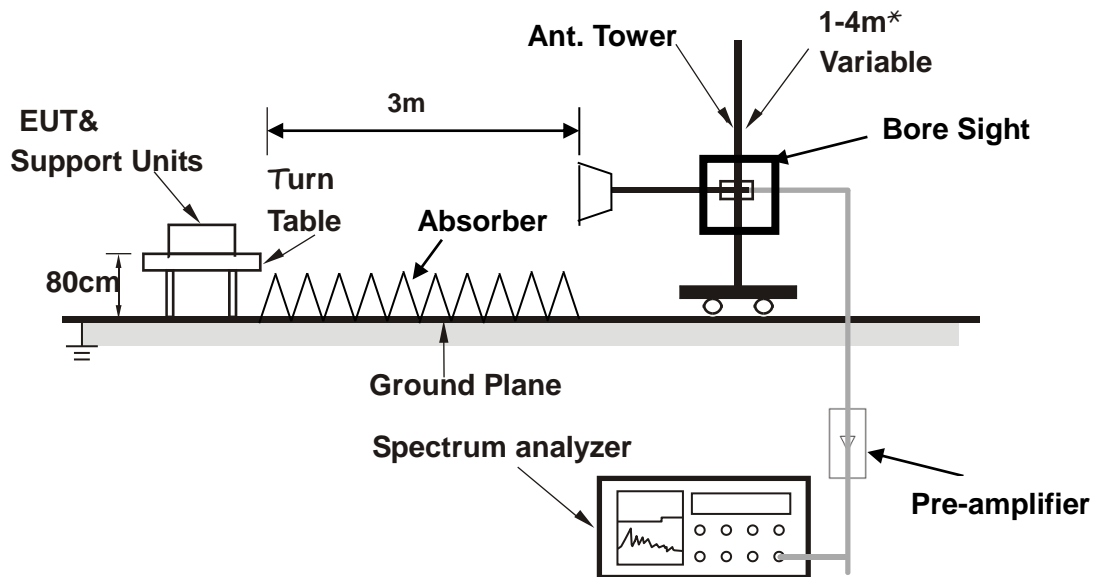


3.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



* : depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

3.2.6 EUT OPERATING CONDITIONS

See items 3.1.6.

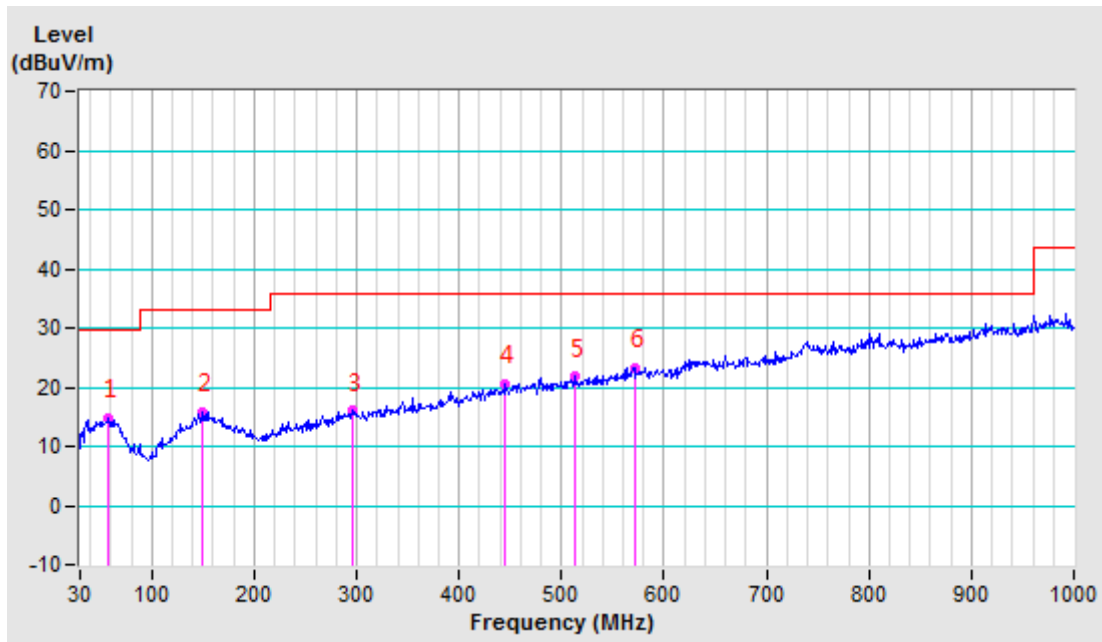


3.2.7 TEST RESULTS

TEST MODE	See section 2.2	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	See section 2.2	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	23deg. C, 54%RH	TESTED BY:	Alex

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	58.13	-16.63	31.36	14.73	29.50	-14.77	400	43
2	148.95	-14.95	30.71	15.76	33.10	-17.34	400	360
3	295.17	-14.56	30.51	15.95	35.60	-19.65	400	99
4	445.52	-10.63	31.06	20.43	35.60	-15.17	400	171
5	512.33	-9.41	31.14	21.73	35.60	-13.87	400	43
6	571.02	-8.12	31.48	23.36	35.60	-12.24	200	179

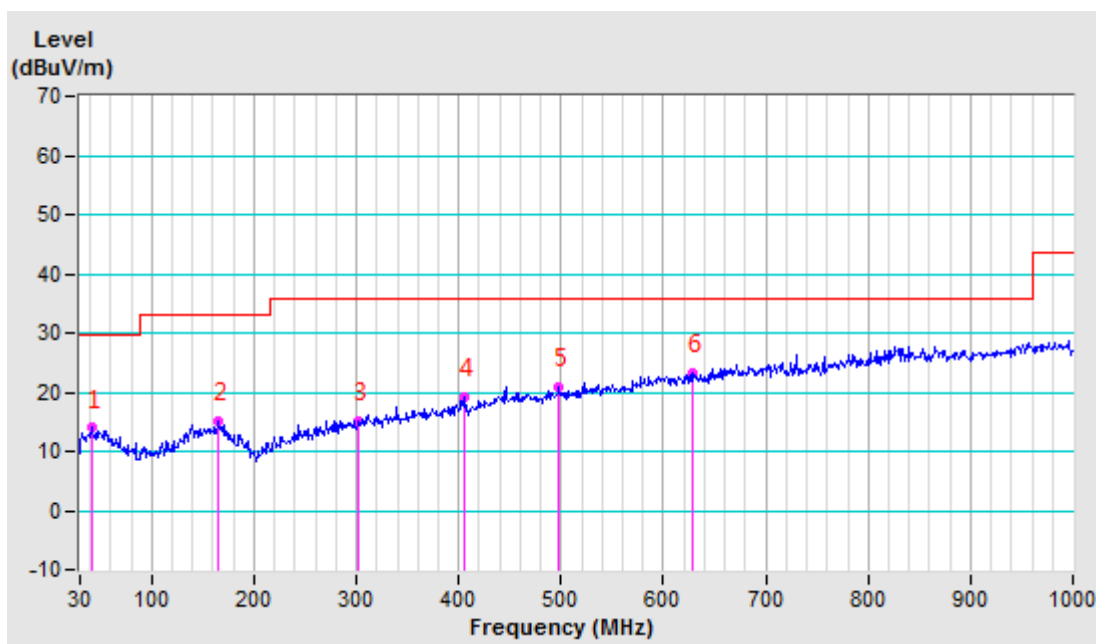
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.



TEST MODE	See section 2.2	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	See section 2.2	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	23deg. C, 54%RH	TESTED BY: Alex	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	40.86	-16.96	30.89	13.93	29.50	-15.57	100	292
2	164.89	-15.70	30.80	15.10	33.10	-18.00	100	324
3	301.95	-14.42	29.66	15.24	35.60	-20.36	300	312
4	405.02	-12.14	31.31	19.17	35.60	-16.43	300	124
5	498.15	-9.78	30.77	20.99	35.60	-14.61	300	352
6	628.57	-6.88	30.09	23.21	35.60	-12.39	300	80

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.





Test Report No.: FS2109WDG0266

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



Test Report No.: FS2109WDG0266

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---