



Radio Test Report

Report No.: STS2604427W09

Issued for

Andover Audio LLC

55 Chase St., Methuen, MA 01844 USA

Product Name: Portable Stereo Hi-Fi Speaker

Brand Name:  andover

Model Name: FreePlay

Series Model(s): NOMAD, RONIN, WAYFARER, GOPLAY

FCC ID: 2AQL4-AAFP1

Test Standards: FCC Part 15 Subpart C

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.

**TEST REPORT**

Applicant's Name: Andover Audio LLC

Address: 55 Chase St., Methuen, MA 01844 USA

Manufacturer's Name: HUIZHOU CITY SOUNDTOUCH ELECTRONICS CO.,LTD

Address: 4#01, Liandong U Valley, No.1 Shuiqing Road, Shuikou Street,
Huicheng District, Huizhou City, Guangdong Province, P.R.China**Product Description**

Product Name: Portable Stereo Hi-Fi Speaker

Brand.....:  andover

Model Number.....: FreePlay

Series Model(s): NOMAD, RONIN, WAYFARER, GOPLAY

Test Standards.....: FCC Part 15 Subpart C

Test Procedure: ANSI C63.10-2020+Cor 1-2023

This device described above has been tested by STS and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

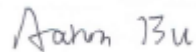
Date of receipt of test item.....: 28 Apr. 2026

Date (s) of performance of tests.: 28 Apr. 2026~21 May 2026

Date of Issue: 21 May 2026

Test Result: **Pass**

Testing Engineer : _____



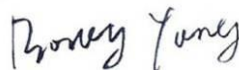
(Aaron Bu)

Technical Manager : _____



(Skylar Li)

Authorized Signatory : _____



(Bovey Yang)





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**Revision History**

Rev.	Issue Date	Report No.	Effect Page	Contents
00	21 May 2026	STS2604427W09	ALL	Initial Issue



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.209(a)	Radiated emission, Spurious Emission	PASS	
2.1049	20 dB Bandwidth	PASS	

1.1 TEST FACTORY

Shenzhen CTA Testing Technology Co., Ltd.
Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China
FCC test Firm Registration Number: 517856
IC test Firm Registration Number: 27890
A2LA Certificate No.: 6534.01
IC CAB ID: CN0127

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.751\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.888\text{dB}$
3	All emissions, radiated 9K-30MHz	$\pm 2.48\text{dB}$
4	All emissions, radiated 30M-1GHz	$\pm 2.52\text{dB}$
5	All emissions, radiated 1G-18GHz	$\pm 3.48\text{dB}$
6	All emissions, radiated >18GHz	$\pm 4.18\text{dB}$
7	Conducted Emission (9KHz-150KHz)	$\pm 2.48\text{dB}$
8	Conducted Emission (150KHz-30MHz)	$\pm 2.52\text{dB}$
9	Occupied Channel Bandwidth	$\pm 3.6\%$
10	Power Spectral Density, conducted	$\pm 1.214\text{dB}$
11	Duty Cycle	$\pm 3.2\%$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Portable Stereo Hi-Fi Speaker
Brand	 andover
Model Number	FreePlay
Series Model(s)	NOMAD, RONIN, WAYFARER, GOPLAY
Model Difference	Only the model and appearance color are different
Channel List	Please refer to the Note 2.
Antenna Type	Please refer to the Note 3.
Equipemnt Category	Non-ISM frequency
Operating frequency	110.5-205KHz
Modulation Type	ASK/FSK
Rating:	Input: 5V---3A,9V---3A,12V---3A,15V---3A,20V---2.25A 45W Max Output: Type-C 5V---3A,9V---3A,12V---3A,15V---3A,20V---2.25A 45W Max Wireless charging 5V---1A 5W
Adapter	Model: YM-PD045EX Brand: N/A Input: 100V-240V~ 50/60Hz 1.2A Output: USB-C 5V---3A 9V---3A,12V---3A,15V---3A,20V---2.25A
Battery	Model: ANDOVER 18650 3S3P 7800mAh 11.1V Brand:ZECA Rated Voltage: 11.1V Charge Limit Voltage: 12.6V Capacity: 7800mAh
Hardware version number	Rev:1.04
Software version number	V2.00
Sample Number	260427002-7
Connecting I/O Port(s)	Please refer to the Note 1.

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.
2. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	NOTE
1	 andover	FreePlay	Coil	N/A	Antenna



2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Type-c input+Wireless charging
Mode 2	Wireless charging (iphone)

For Conducted Emission	
Final Test Mode	Description
Mode 1	Type-c input+Wireless charging
Mode 2	Wireless charging (iphone)

For Radiated Emission	
Final Test Mode	Description
Mode 1	Type-c input+Wireless charging
Mode 2	Wireless charging (iphone)



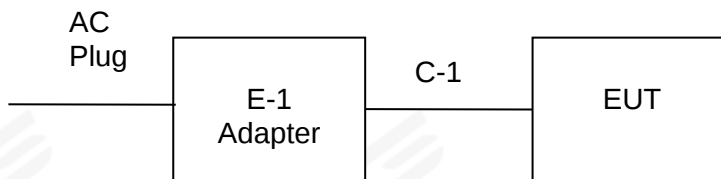
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

Radiated Emission Test



Conducted Emission Test





2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Note
E-1	Adapter	N/A	YM-PD045EX	N/A
C-1	USB Cable	MI	RYEW3A	N/A

Item	Equipment	Mfr/Brand	Length	Note
C-1	Shielded	NO	150cm	N/A

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (2) “YES” is means “with core”; “NO” is means “without core”.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test Equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
966 chamber	CHENYU	966 Room	966	2025.08.13	2028.08.12
Test Receiver	R&S	ESCI	101427	2025.09.25	2026.09.24
Signal Analyzer	R&S	FSV 40-N	101823	2025.09.26	2026.09.25
Active loop Antenna	ZHINAN	ZN30900C	16035	2025.02.25	2027.02.24
Bilog Antenna	TESEQ	CBL6111D	34678	2025.09.27	2027.09.26
RF Coaxial Cable	LEITAI M-WAVE	CA360	DC-18G	2025.09.26	2026.09.25
RF Coaxial Cable	LEITAI M-WAVE	CA360	DC-18G	2025.09.26	2026.09.25
RF Coaxial Cable	LEITAI M-WAVE	CA3507	DC-40G	2025.09.26	2026.09.25
RF Coaxial Cable	LEITAI M-WAVE	CA3507	DC-40G	2025.09.26	2026.09.25
Pre-Amplifier(0.1 M-3GHz)	EM	EM330	060665	2026.02.05	2027.02.04
Temperature & Humidity	TORIE	TP502V4-P	6700000124280	2025.10.13	2026.10.12
Conduction Test Equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2025.09.25	2026.09.24
Limiter	CYBERTEK	EM5010	N/A	2025.09.25	2026.09.24
LISN	R&S	ENV216	101242	2025.09.25	2026.09.24
LISN	EMCO	3810/2NM	23625	2025.09.25	2026.09.24
CE Cable	EASTSHEEP	C01	10057	2025.09.25	2026.09.24
Temperature & Humidity	TORIE	TP502V4-P	6700000422137	2025.08.26	2026.08.25
Test SW	EZ-EMC	Ver.STSLAB-03A1 CE			



3. CONDUCTED EMISSION TEST RESULT (SECTION 15.207)

3.1 POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of "*" marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

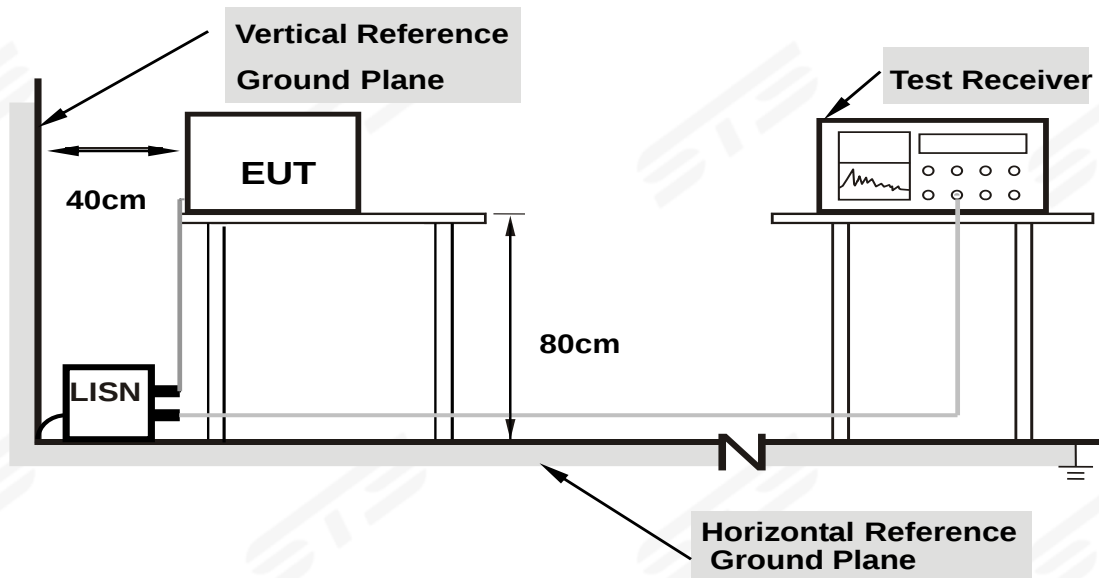
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.2 TEST PROCEDURE

- The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN is at least 80 cm from the nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

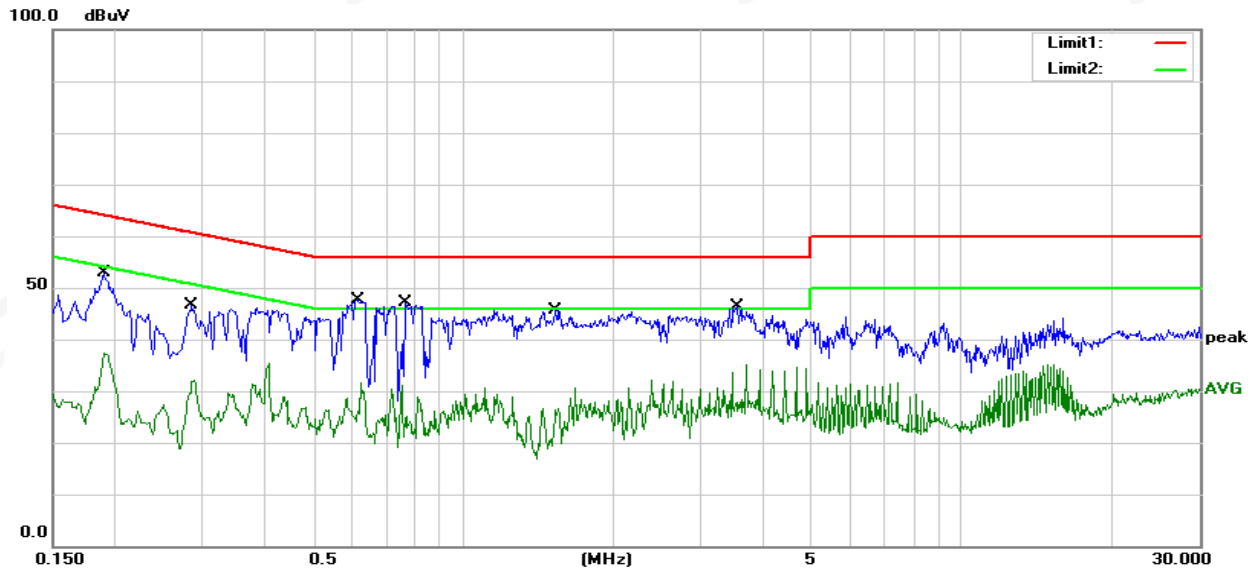
3.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



3.5 TEST RESULTS

Temperature:	25.1°C	Relative Humidity:	59%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 1		



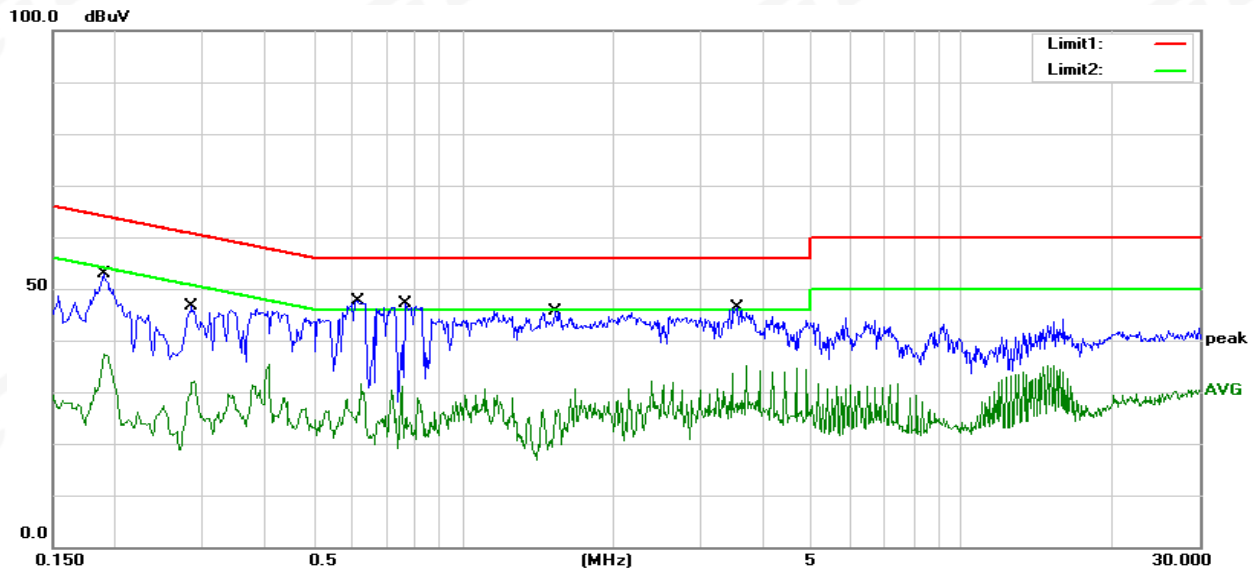
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1900	33.43	19.39	52.82	64.04	-11.22	QP
2	0.1900	17.65	19.39	37.04	54.04	-17.00	AVG
3	0.2860	27.21	19.37	46.58	60.64	-14.06	QP
4	0.2860	12.85	19.37	32.22	50.64	-18.42	AVG
5	0.6140	28.32	19.38	47.70	56.00	-8.30	QP
6	0.6140	9.18	19.38	28.56	46.00	-17.44	AVG
7	0.7660	27.79	19.37	47.16	56.00	-8.84	QP
8	0.7660	9.50	19.37	28.87	46.00	-17.13	AVG
9	1.5340	26.20	19.35	45.55	56.00	-10.45	QP
10	1.5340	7.24	19.35	26.59	46.00	-19.41	AVG
11	3.5620	26.87	19.41	46.28	56.00	-9.72	QP
12	3.5620	14.18	19.41	33.59	46.00	-12.41	AVG

Note:

- 1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
- 2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
- 3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
- 4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)
- 5). All modes have been tested, only show the worst case.



Temperature:	25.1°C	Relative Humidity:	59%
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 1		



No.	Frequency (MHz)	Reading (dBμV)	Correct Factor(dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark
1	0.1900	33.43	19.39	52.82	64.04	-11.22	QP
2	0.1900	17.65	19.39	37.04	54.04	-17.00	AVG
3	0.2860	27.21	19.37	46.58	60.64	-14.06	QP
4	0.2860	12.85	19.37	32.22	50.64	-18.42	AVG
5	0.6140	28.32	19.38	47.70	56.00	-8.30	QP
6	0.6140	9.18	19.38	28.56	46.00	-17.44	AVG
7	0.7660	27.79	19.37	47.16	56.00	-8.84	QP
8	0.7660	9.50	19.37	28.87	46.00	-17.13	AVG
9	1.5340	26.20	19.35	45.55	56.00	-10.45	QP
10	1.5340	7.24	19.35	26.59	46.00	-19.41	AVG
11	3.5620	26.87	19.41	46.28	56.00	-9.72	QP
12	3.5620	14.18	19.41	33.59	46.00	-12.41	AVG

Note:

- 1). QP Value (dBμV) = QP Reading (dBμV) + Factor (dB)
- 2). Factor (dB) = insertion loss of LISN (dB) + Cable loss (dB)
- 3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
- 4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)
- 5). All modes have been tested, only show the worst case.



4. RADIATED& FIELD EMISSION TEST RESULT (SECTION 15.209)

4.1 LIMIT

Frequency [MHz]	Field Strength [uV/m]	Measurement Distance [Meters]
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

§15.209(d) 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.

4.2 TEST PROCEDURE

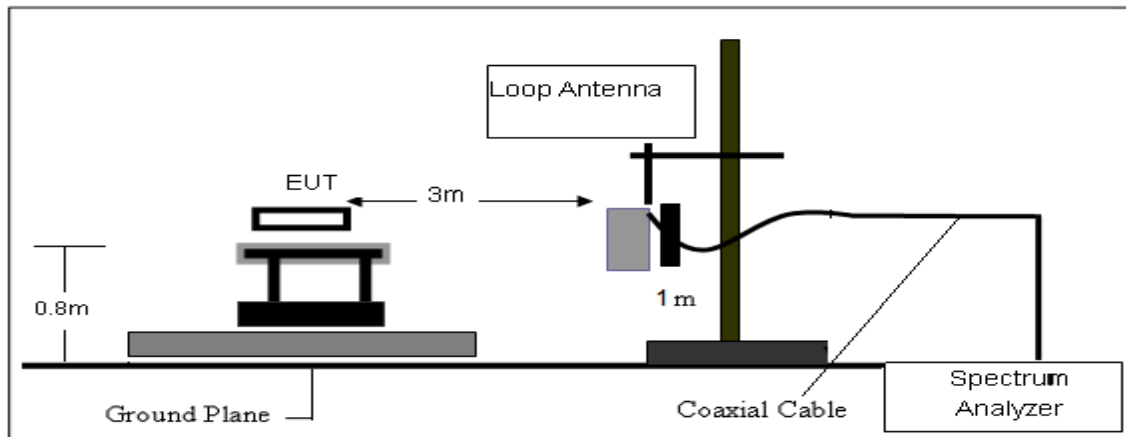
- a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. 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.
- d. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

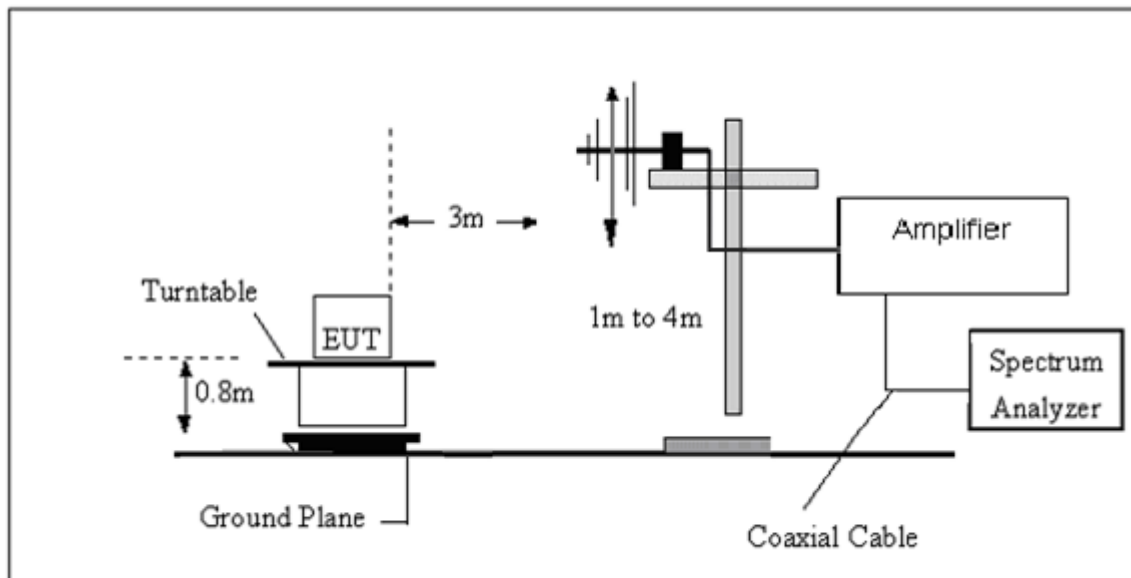
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

4.3 TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



4.4 TEST RESULTS

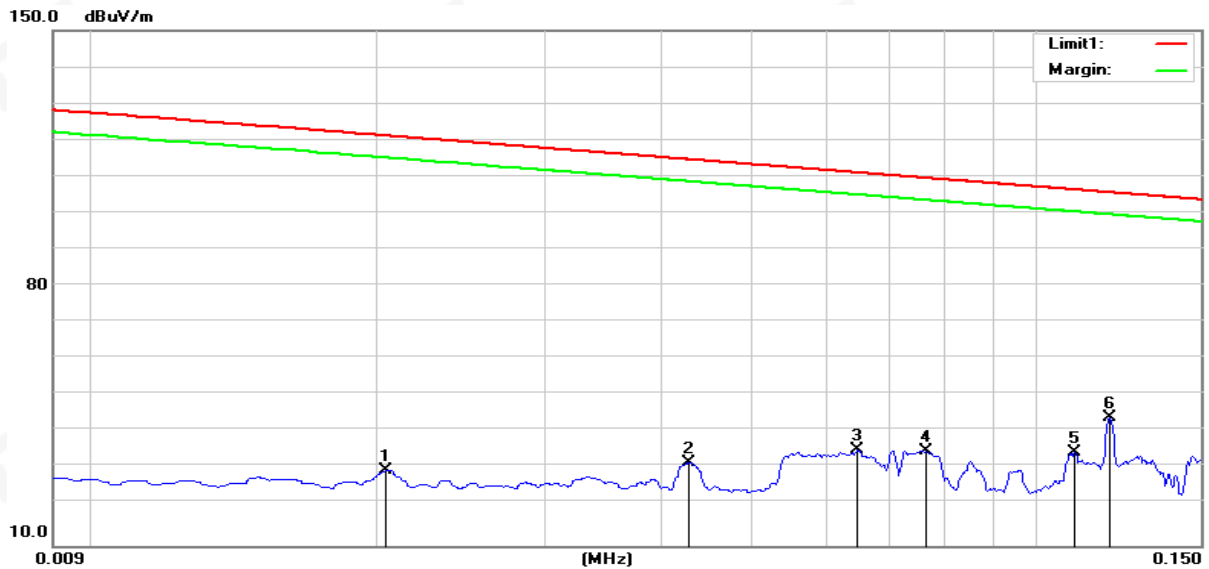
Temperature :	23.1℃	Relative Humidity :	60%
Test Voltage :	AC 120V/60Hz	Test Mode :	Mode 1



4.4.1 Spurious Radiated Emission Below 30 MHz

9KHz-150KHz

Coxial

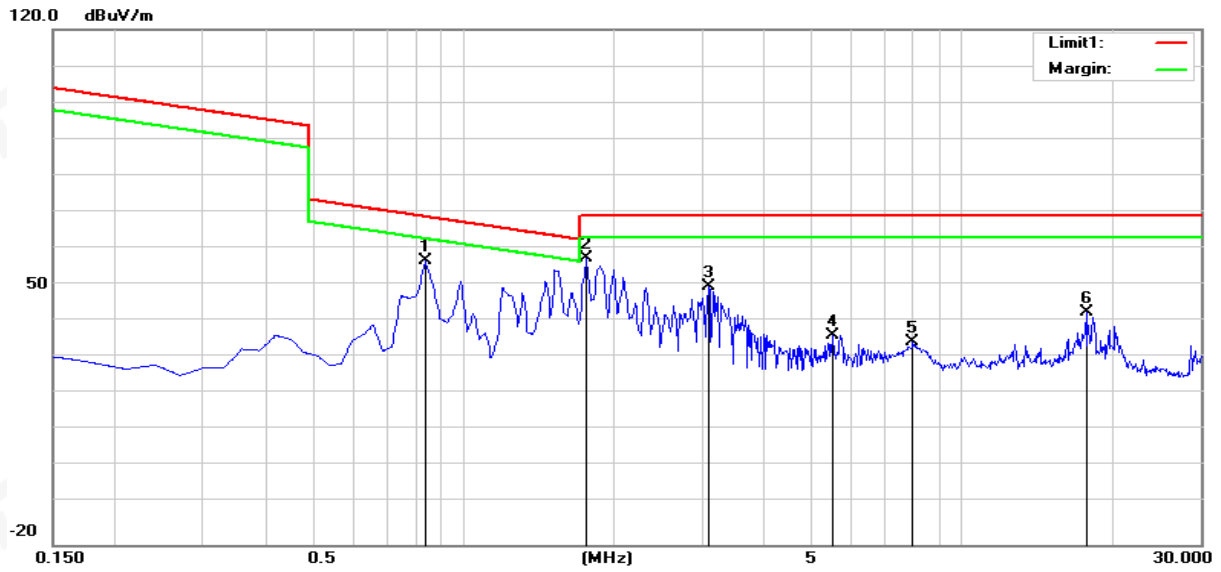


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.0204	10.47	20.09	30.56	121.41	-90.85	AVG
2	0.0428	13.00	19.64	32.64	114.98	-82.34	AVG
3	0.0646	16.93	19.09	36.02	111.40	-75.38	AVG
4	0.0765	17.03	18.73	35.76	109.93	-74.17	AVG
5	0.1101	17.70	17.58	35.28	106.77	-71.49	AVG
6	0.1198	27.29	17.56	44.85	106.04	-61.19	peak



150KHz-30MHz

Coxial



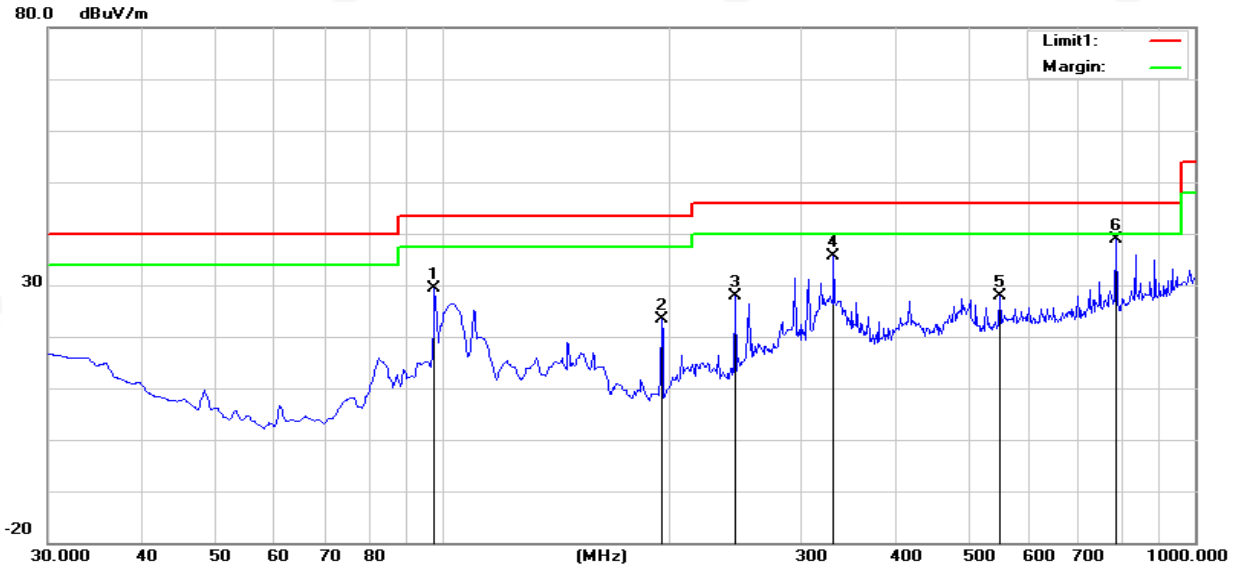
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.8366	36.92	20.27	57.19	69.15	-11.96	QP
2	1.7620	37.38	20.35	57.73	69.50	-11.77	QP
3	3.1052	29.89	20.13	50.02	69.50	-19.48	QP
4	5.4931	16.58	20.47	37.05	69.50	-32.45	QP
5	7.9707	14.76	20.32	35.08	69.50	-34.42	QP
6	17.7018	21.39	21.95	43.34	69.50	-26.16	QP

Note: Coplanar and Coxial are tested, only show the worst case in the report



4.4.2 Spurious Radiated Emission below 1 GHz

Temperature:	23.1℃	Relative Humidity:	60%
Test Voltage:	DC 11.1V	Phase:	Horizontal
Test Mode:	Mode 1		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	97.9000	49.94	-20.46	29.48	43.50	-14.02	QP
2	195.8700	44.48	-21.14	23.34	43.50	-20.16	QP
3	245.3400	44.76	-16.92	27.84	46.00	-18.16	QP
4	331.6700	49.19	-13.65	35.54	46.00	-10.46	QP
5	552.8300	33.55	-5.69	27.86	46.00	-18.14	QP
6	786.6000	40.93	-2.05	38.88	46.00	-7.12	QP

Note:1). Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

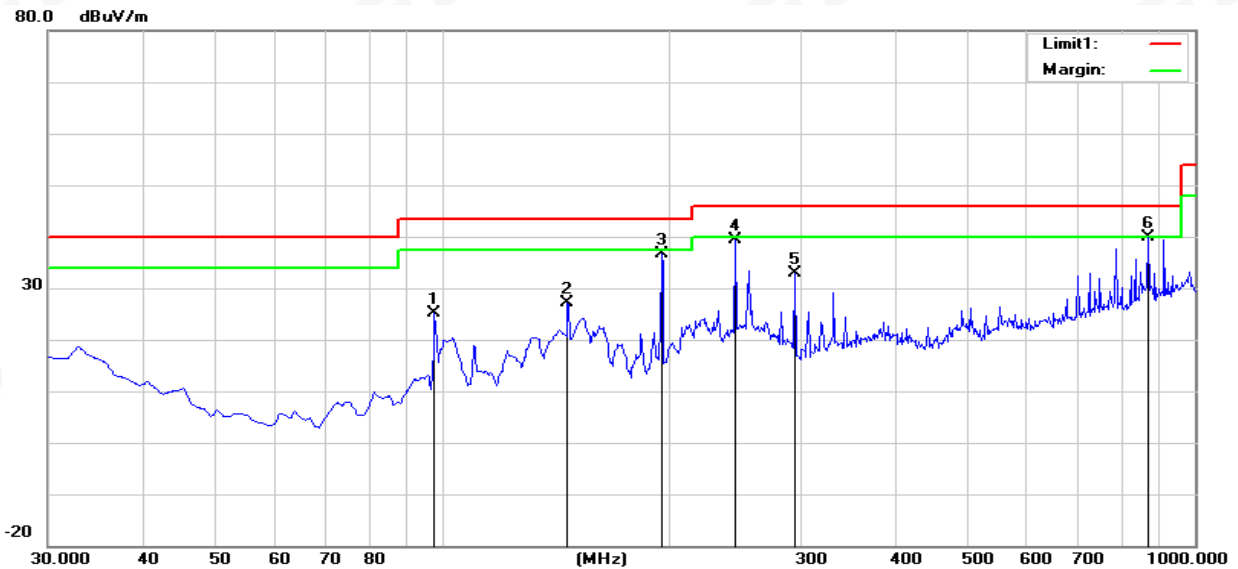
2). Factor(dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBuV/m) - Level (dBuV/m)

4). All modes have been tested, only show the worst case.



Temperature:	23.1℃	Relative Humidity:	60%
Test Voltage:	DC 11.1V	Phase:	Vertical
Test Mode:	Mode 1		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	97.9000	45.48	-20.46	25.02	43.50	-18.48	QP
2	147.3700	45.51	-18.42	27.09	43.50	-16.41	QP
3	195.8700	57.80	-21.14	36.66	43.50	-6.84	QP
4	245.3400	56.31	-16.92	39.39	46.00	-6.61	QP
5	294.8100	47.97	-14.98	32.99	46.00	-13.01	QP
6	869.0500	40.42	-0.52	39.90	46.00	-6.10	QP

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

4). All modes have been tested, only show the worst case.



5. 20 DB BANDWIDTH TEST

5.1 Limit

FCC Part 2.1049, Only applicable to report.

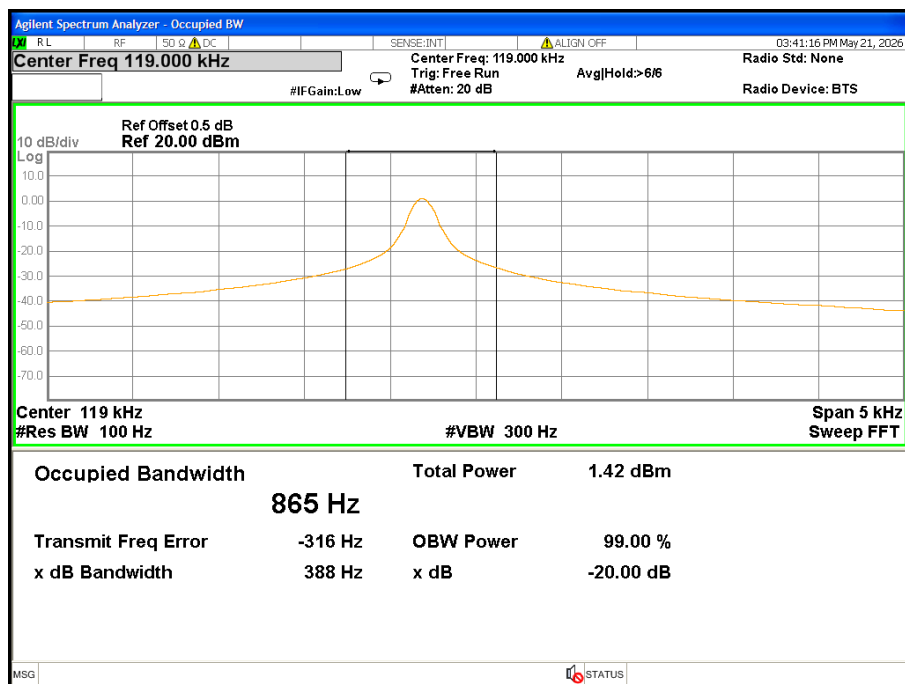
5.2 TEST SETUP

Spectrum Parameter	Setting
Span Frequency	approximately 2 to 3 times the 20 dB bandwidth
RB	greater than 1 % of the 20 dB bandwidth,
VB	equal to the RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

The test program and configuration, Refer to 4.2 and 4.3

5.3 TEST RESULTS

Operating Frequency (kHz)	20 dB Bandwidth (Hz)
119	388





APPENDIX-PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※