



FCC AND ISCED CERTIFICATION TEST REPORT

Applicant	:	Harman International Industries, Inc.
Address of Applicant	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Manufacturer	:	Harman International Industries, Inc.
Address of Manufacturer	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	WIRELESS SPEAKER
Model No.	:	AURA STUDIO 3
FCC ID	:	APIHKAURAST3
IC	:	6132A-HKAURAST3
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 3 August 2023, ANSI C63.10:2020, RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021)
Report No.	:	DDT-RE24050924-2E01
Issue Date	:	2024/05/29
Issue By	:	Guangdong Dongdian Testing Service Co., Ltd. Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

REPORT

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Test Report Declare

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Model No.	:	AURA STUDIO 3
Manufacturer	:	Harman International Industries, Inc.
Address of Manufacturer	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C,

RSS-247 Issue 3 August 2023,

ANSI C63.10:2020,

RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021)

We Declare:

The equipment described above is tested by Guangdong Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangdong Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

Report No.:	DDT-RE24050924-2E01		
Date of Receipt:	2024/05/17	Date of Test:	2024/05/20~2024/05/29

Prepared By:**Jacky Huang/Engineer****Approved By:****Damon Hu/EMC Manager**

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Guangdong Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	2024/05/29	

1. Summary of Test Results

No.	Test Parameter	Clause No.	Condition	Result
1	Radiated Emission	FCC Part 15: 15.205, FCC Part 15: 15.209, FCC Part 15: 15.247(d), RSS-247 Issue 3 clause 5.5, RSS-Gen Issue 5 clause 8.9, RSS-Gen Issue 5 clause 8.10	/	Pass
2	Power Line Conducted Emissions	FCC Part 15: 15.207(a), RSS-Gen Issue 5 clause 8.8	/	Pass

Note 1: This report changes the touch board IC and PCB Layout, on the basis of the report “”. This change based on engineering judgment, only Radiated Emission (below 1 GHz) and Power Line Conducted Emissions need to be tested.

Note 2: This report needs to be used in conjunction with the original report.

2. General Test Information

2.1. Description of EUT

EUT Name	: WIRELESS SPEAKER
Model Number	: AURA STUDIO 3
EUT Function Description	: Please reference user manual of this device
Power Supply	: AC 100-240V, 50/60Hz
Hardware Version	: /
Software Version	: /

Note: This EUT support Bluetooth BR/EDR, this report only for Bluetooth BR/EDR.

Radio Specification	: Bluetooth BR/EDR
Operation Frequency	: 2402 MHz-2480 MHz
Modulation	: GFSK, $\pi/4$ -DQPSK, 8DPSK

Antenna information	
Antenna Type	: Dedicated FPCB antenna
Max Antenna Gain (dBi)	: 2.58

Channel information					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	27	2429	54	2456
1	2403	28	2430	55	2457
2	2404	29	2431	56	2458
3	2405	30	2432	57	2459
4	2406	31	2433	58	2460
5	2407	32	2434	59	2461
6	2408	33	2435	60	2462
7	2409	34	2436	61	2463
8	2410	35	2437	62	2464
9	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475

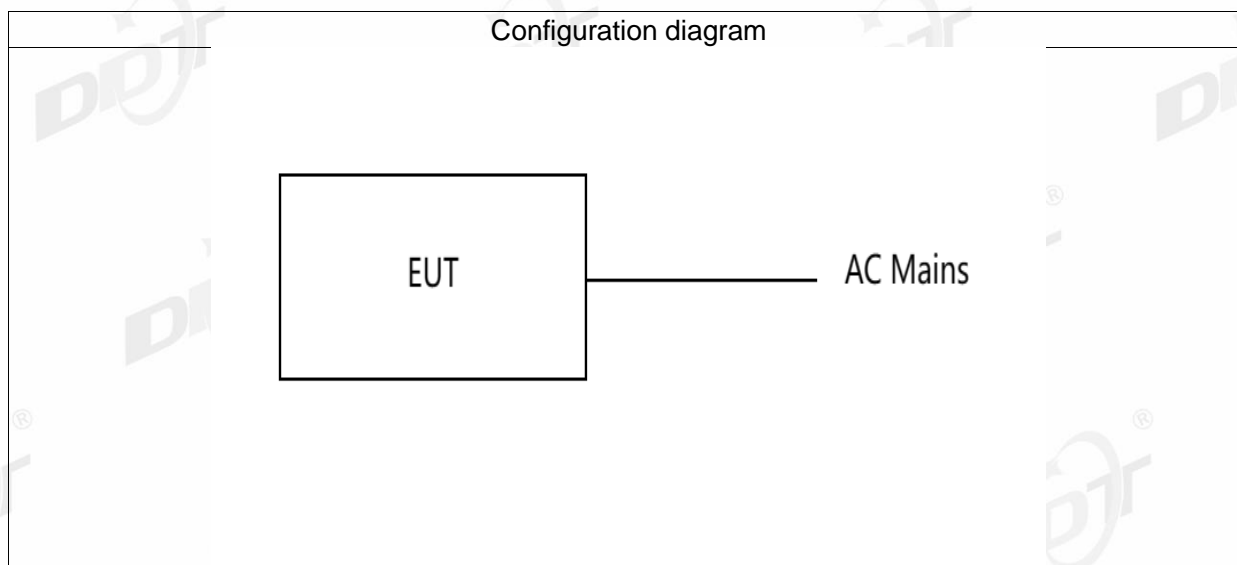
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
AC cable	Harman	N/A	Length: 1.5m, unshielded	N/A

2.3. Block diagram of EUT configuration for test



2.4. Decision of final test mode

According pre-test, the worst test modes were reported as below:

Test software: ASTTestTool.EXE.exe

The test software was used to control EUT work in Continuous Tx mode, and select test channel, wireless mode as below table.

The pathloss of external cable: 0.5 dB (According to the manufacturer's claims)

Tested mode, channel, information			
Mode	Setting Tx Power	Channel	Frequency (MHz)
GFSK hopping on Tx mode	Default	CH0 to CH78	2402 to 2480
p/4-DQPSK hopping on Tx mode	Default	CH0 to CH78	2402 to 2480
8DPSK hopping on Tx mode	Default	CH0 to CH78	2402 to 2480
GFSK hopping off Tx mode	Default	CH0	2402
	Default	CH39	2441
	Default	CH78	2480
p/4-DQPSK hopping off Tx mode	Default	CH0	2402
	Default	CH39	2441
	Default	CH78	2480
8DPSK hopping off Tx mode	Default	CH0	2402
	Default	CH39	2441
	Default	CH78	2480
Worst-case data rates were: GFSK mode: DH5, p/4-DQPSK mode: 2DH5, 8DPSK mode: 3DH5			

2.5. Deviations of test standard

No deviation.

2.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	+15℃ to +35 ℃
Humidity range:	20% to 75%
Pressure range:	86 kPa to 106 kPa

Note: The specific temperature and humidity information of each test item refers to the temperature and humidity record in the corresponding test data.

2.7. Test laboratory

Guangdong Dongdian Testing Service Co., Ltd.

Add.: Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808.

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

2.8. Measurement uncertainty

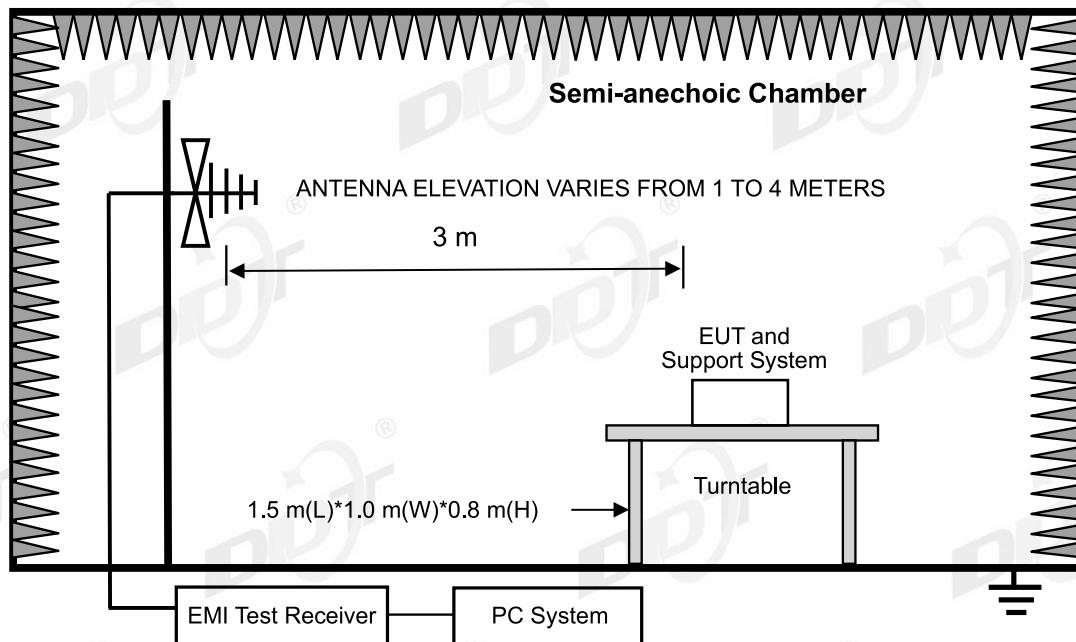
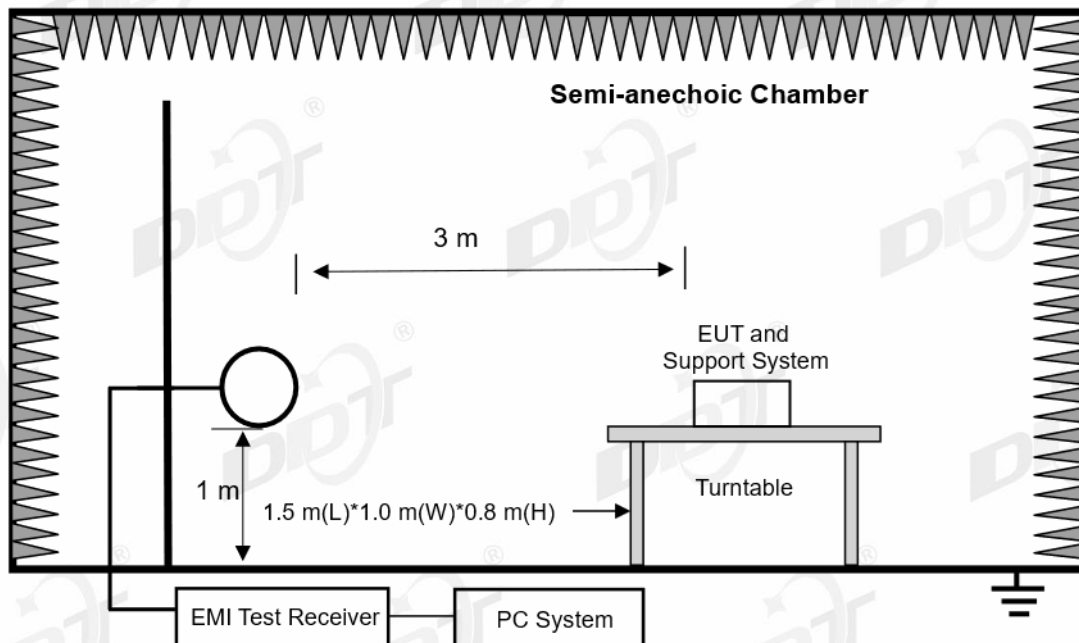
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$); 1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$); 1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Frequencies Stability	6.7×10^{-8} (Antenna couple method) 5.5×10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$); 1.40 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$) 1.66 dB ($8 \text{ GHz} \leq f < 26.5 \text{ GHz}$)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 °C
Humidity	2 %
Uncertainty for Radiation Emission test (9 kHz – 30 MHz)	3.44 dB
Uncertainty for Radiation Emission test (30 MHz - 1 GHz)	4.70 dB (Antenna Polarize: V) 4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1 GHz - 40 GHz)	4.10 dB (1 - 6 GHz) 4.40 dB (6 GHz - 18 GHz) 3.54 dB (18 GHz - 26 GHz) 4.30 dB (26 GHz - 40 GHz)
Uncertainty for Power line conduction emission test	3.34dB (150KHz-30MHz) 3.72dB (9KHz-150KHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

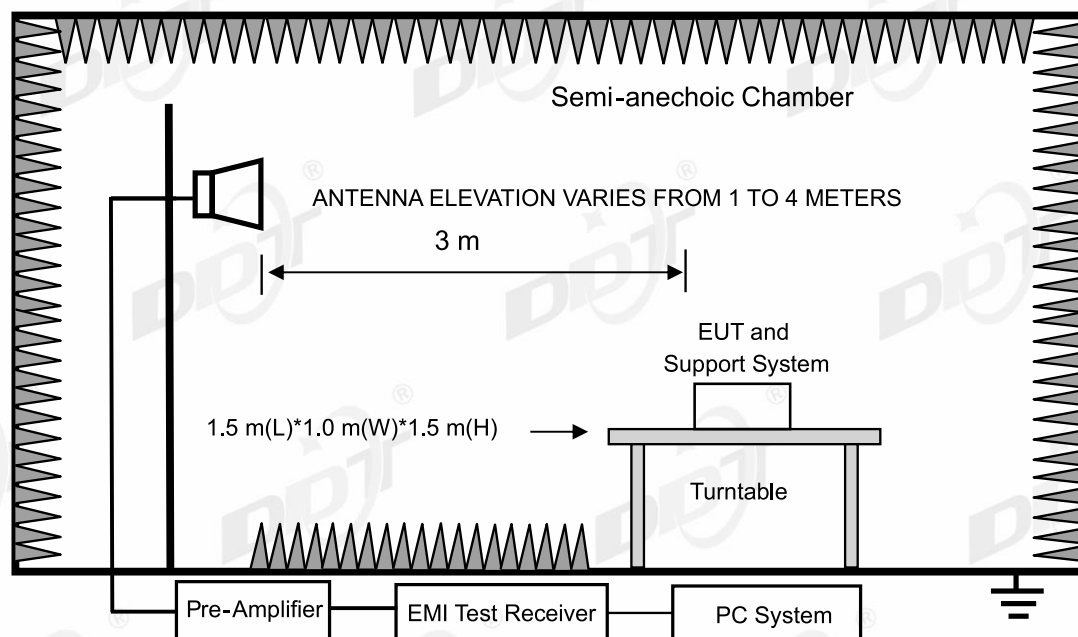
3. Radiated Emission

3.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To	Cal. Interval
ELECTRIC AND MAGNETIC FIELD ANALYZER	Narda	EHP-200A	DDT-ZC01401	2024/09/21	1 Year
PSA Series Spectrum Analyzer	Agilent	E4447A	DDT-ZC00517	2025/04/01	1 Year
Hochgewinn-Hornantenne	SCHWARZBECK	BBHA 9120 D	DDT-ZC02129	2025/09/18	2 Year
RF cable	Yuhu Technology	ZT26S-SMAJ-SMAJ-1M	DDT-ZC02037	2025/04/01	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	DDT-ZC02050	2024/07/12	1 Year
Micro-Tronics filters	REBES	BRM50716	DDT-ZC03240	/	/
High Pass filter	Xi'an Xingbo	XBLBQ-GTA67	DDT-ZC02179	2025/04/23	1 Year
EMI TEST RECEIVER	R&S	ESU26	DDT-ZC01909	2025/04/01	1 Year
Active Loop Antenna	Schwarzbeck	FMZB1519	DDT-ZC00524	2025/09/11	2 Year
Micro-Tronics filters	REBES	BRM50702	DDT-ZC03242	/	/
High pass filter	Micro-Tronics	HPM50102	DDT-ZC00561	2025/04/23	1 Year
RF cable	Zhongke Junchuang	JCT26S-NJ-NJ-1.5M	DDT-ZC02762	2025/04/01	1 Year
RF cable	Yuhu Technology	JCTB810-NJ-NJ-9M	DDT-ZC02538	2025/04/01	1 Year
Pre-amplifier	COM-POWER	PAM-840A	DDT-ZC01693	2025/04/01	1 Year
RF Cable	N/A	W13.02 AP1-X2	DDT-ZC04023	2025/04/01	1 Year
High pass filter	Micro-Tronics	HPM50108	DDT-ZC00560	2025/04/23	1 Year
Pre-amplifier	COM-POWER	PAM-118A	DDT-ZC01293	2024/07/15	1 Year
RF Cable	N/A	W24.02 HL-562	DDT-ZC04022	2025/04/01	1 Year
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	DDT-ZC00506	2025/04/26	1 Year

3.2. Block diagram of test setup





3.3. Limits

(1) FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.1772&4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.2072&4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

²Above 38.6

RSS-Gen section 8.10 Restricted frequency bands*

MHz	MHz	MHz	GHz
0.090-0.110	12.51975-12.52025	240-285	3.5-4.4
0.495-0.505	12.57675-12.57725	322-335.4	4.5-5.15
2.1735-2.1905	13.36-13.41	399.9-410	5.35-5.46
3.020-3.026	16.42-16.423	608-614	7.25-7.75
4.125-4.128	16.69475-16.69525	960-1427	8.025-8.5
4.1772&4.17775	16.80425-16.80475	1435-1626.5	9.0-9.2
4.2072&4.20775	25.5-25.67	1645.5-1646.5	9.3-9.5
5.677-5.683	37.5-38.25	1660-1710	10.6-12.7
6.215-6.218	73-74.6	1718.8-1722.2	13.25-13.4
6.26775-6.26825	74.8-75.2	2200-2300	14.47-14.5
6.31175-6.31225	108-138	2310-2390	15.35-16.2
8.291-8.294	149.9-150.05	2483.5-2500	17.7-21.4
8.362-8.366	156.52475-156.52525	2655-2900	22.01-23.12
8.37625-8.38675	156.7-156.9	3260-3267	23.6-24.0
8.41425-8.41475	162.0125-167.17	3332-3339	31.2-31.8
12.29-12.293	167.72-173.2	3345.8-3358	36.43-36.5
			Above 38.6

* Certain frequency bands listed in table and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

(2) FCC 15.209 Limit & RSS-Gen section 8.9 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		mV/m	dB(mV)/m
0.009 ~ 0.490	300	2400/F(kHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(kHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(mV)/m (Peak) 54.0 dB(mV)/m (Average)	

Note:

(1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9 - 90 kHz, 110 - 490 kHz and above 1000 MHz, radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30 MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3\text{m}}(\text{dBuV/m}) = \text{Limit}_{30\text{m}}(\text{dBuV/m}) + 40\log(30\text{m}/3\text{m})$$

(3) Limit for this EUT

The emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, and the emissions appearing within RSS-Gen section 8.10 Restricted frequency bands shall not exceed the limits shown in RSS-Gen section 8.9, all the other emissions shall be at least 20 dB below the fundamental emissions or comply with 15.209 limits and RSS-Gen section 8.9 limits.

3.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description
Laptop	Lenovo	00425-00000-00002-AA135	NA

3.5. Test procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G and 150 cm above the ground plane inside a fully-anechoic chamber for above 1G.

(2) Test antenna was located 3 m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used	Test antenna distance
9 kHz - 30 MHz	Active Loop antenna	3 m
30 MHz - 1 GHz	Trilog Broadband Antenna	3 m
1 GHz - 18 GHz	Double Ridged Horn Antenna (1 GHz-18 GHz)	3 m
18 GHz - 40 GHz	Horn Antenna (18 GHz-40 GHz)	1 m

According ANSI C63.10:2020 clause 6.4.6 and 6.5.3, for measurements below 30 MHz, Antenna was located 3 m from EUT, the loop antenna was positioned in three antenna orientations (parallel, perpendicular, and round-parallel), for each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable, and the lowest height of the magnetic antenna shall be 1 m above the ground. For measurement above 30MHz, the trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 25 GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1 m to 4 m (Except loop antenna, it's fixed 1 m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT through three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9 kHz to 25 GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18 GHz to 25 GHz, so below final test was performed with frequency range from 9 kHz to 18 GHz.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to ANSI C63.10:2020 on Radiated Emission test.

(5) The emissions from 9 kHz to 1 GHz were measured based on CISPR QP detector except for the frequency bands 9 - 90 kHz, 110 - 490 kHz, for emissions from 9 kHz - 90 kHz, 110 kHz - 490 kHz and above 1 GHz were measured based on average detector, for emissions above 1 GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9 kHz to 1 GHz, QP or average values were measured with EMI receiver with below RBW.

Frequency band	RBW
9 kHz - 150 kHz	200 Hz
150 kHz - 30 MHz	9 kHz
30 MHz - 1 GHz	120 kHz

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz, VBW is set at 3 MHz for Peak measure; According ANSI C63.10:2020 clause 4.1.4.2.2 procedure for average measure.

(8) For portable device, X axis, Y axis, Z axis are tested, and worse setup is reported.

(9) According exploratory test, the emission levels are 20 dB below the limit detected from 9 kHz to 30 MHz and 18 GHz to 25 GHz, so the final test was performed with frequency range from 30 MHz to 18 GHz and recorded in below.

(10) For 30 MHz ~ 25 GHz: (Scan with GFSK, p/4-DQPSK and 8DPSK, the worst case is record and reported)

(11) For emissions below 1 GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in worst mode.

3.6. Test result

PASS. (See below detailed test result)

Note: EUT changes the touch board IC and PCB Layout, on the basis of toriginal certification. This change based on engineering judgment, only Radiated Emission (below 1 GHz) needs to test.

3.7. Test data

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-05-22

Tested By:

Junchang Du

EUT:

WIRELESS SPEAKER

Model Number:

AURA STUDIO3

Test Mode:

DH5 TX

Power Supply:

AC 120V/60Hz

Condition:

Temp:23.2°C;Humi:64.6%

Test Site:

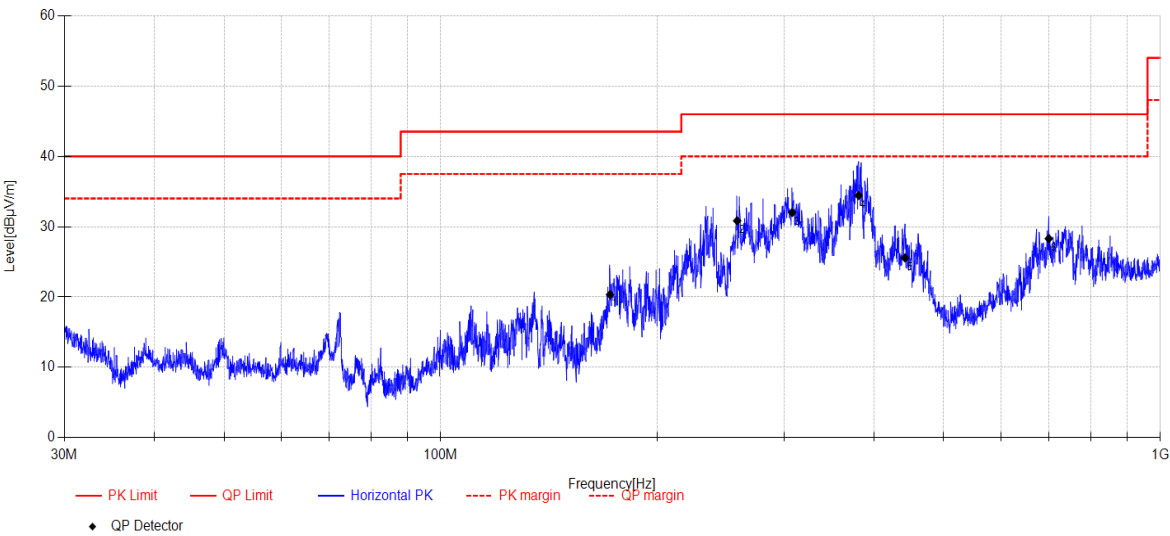
DDT 3# Chamber

File Path:

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Memo:

Sample Number:S24050924-001 Power Setting:NA



Data List										
NO.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable Loss [dB]	AMP [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	171.935	38.73	9.23	4.61	-32.22	20.35	43.50	23.15	QP	Horizontal
2	258.215	46.43	11.61	5.03	-32.23	30.84	46.00	15.16	QP	Horizontal
3	307.904	45.61	13.47	5.25	-32.32	32.01	46.00	13.99	QP	Horizontal
4	380.788	45.78	15.47	5.54	-32.35	34.44	46.00	11.56	QP	Horizontal
5	441.815	36.23	15.99	5.78	-32.43	25.57	46.00	20.43	QP	Horizontal
6	699.845	34.88	19.60	6.69	-32.86	28.31	46.00	17.69	QP	Horizontal

Note:

- Result Level = Reading + Cable loss + Antenna Factor + AMP
- If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
- Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-05-22

Tested By:

Junchang Du

EUT:

WIRELESS SPEAKER

Model Number:

AURA STUDIO3

Test Mode:

DH5 TX

Power Supply:

AC 120V/60Hz

Condition:

Temp:23.2°C;Humi:64.6%

Test Site:

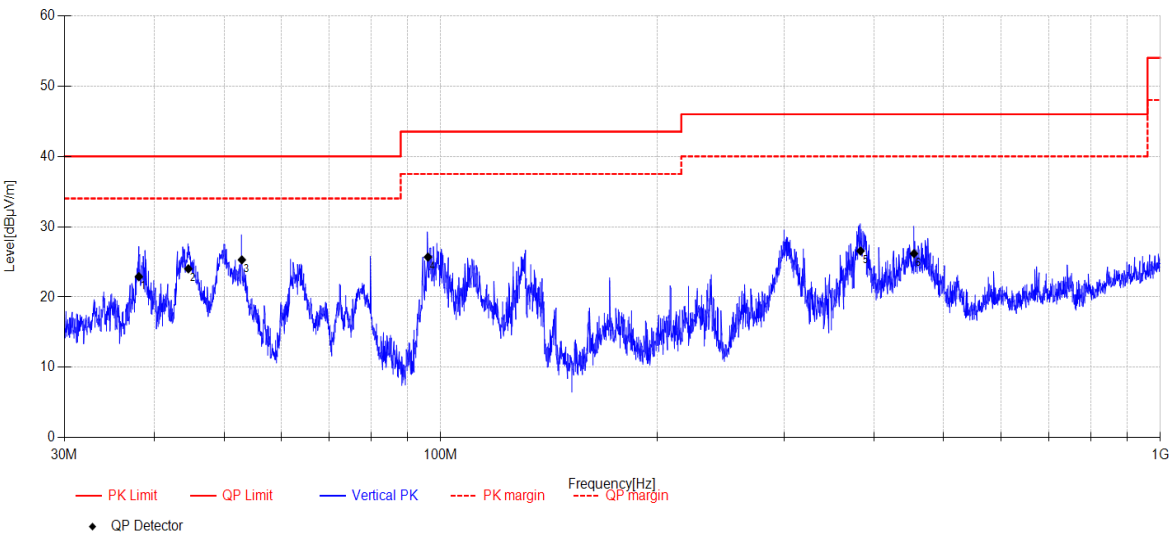
DDT 3# Chamber

File Path:

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Memo:

Sample Number:S24050924-001 Power Setting:NA



Data List										
NO.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable Loss [dB]	AMP [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	38.076	39.97	11.41	3.81	-32.29	22.90	40.00	17.10	QP	Vertical
2	44.615	39.33	13.12	3.85	-32.28	24.02	40.00	15.98	QP	Vertical
3	52.939	40.11	13.56	3.90	-32.28	25.29	40.00	14.71	QP	Vertical
4	96.009	42.94	10.80	4.19	-32.24	25.69	43.50	17.81	QP	Vertical
5	383.198	37.98	15.37	5.55	-32.35	26.55	46.00	19.45	QP	Vertical
6	454.700	36.81	15.99	5.83	-32.45	26.18	46.00	19.82	QP	Vertical

Note:

1. Result Level = Reading + Cable loss + Antenna Factor + AMP

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

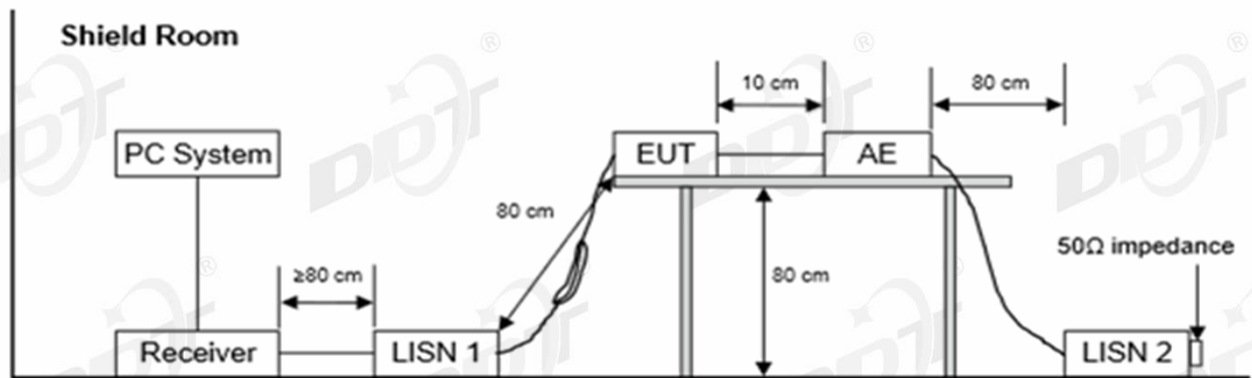
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

4. Power Line Conducted Emissions

4.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To	Cal. Interval
EMI Test Receiver	R&S	ESCI	DDT-ZC00235	2024/07/11	1 Year
CE Cable 1	R&S	ESU8/RF2	DDT-ZC00566	2024/07/15	1 Year
Two Line V-Network	R&S	ENV216	DDT-ZC00535	2024/07/11	1 Year
Artificial mains	R&S	ESH2-Z5	DDT-ZC00538	2024/07/12	1 Year
Pulse Limiter	SCHWARZBECK	ESH3-Z2	DDT-ZC00539	2024/07/15	1 Year
EMI Test Software	Audix/TW	e3 (Ver:6.111111b)	DDT-ZC01252	/	/

4.2. Block diagram of test setup



4.3. Limits

Frequency	Quasi-Peak Level dB(mV)	Average Level dB(mV)
150 kHz~500 kHz	66 ~ 56*	56 ~ 46*
500 kHz~5 MHz	56	46
5 MHz~30 MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

4.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

4.5. Test procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

4.6. Test result

PASS. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

Note2: “----” means Peak detection; “-----” means Average detection.

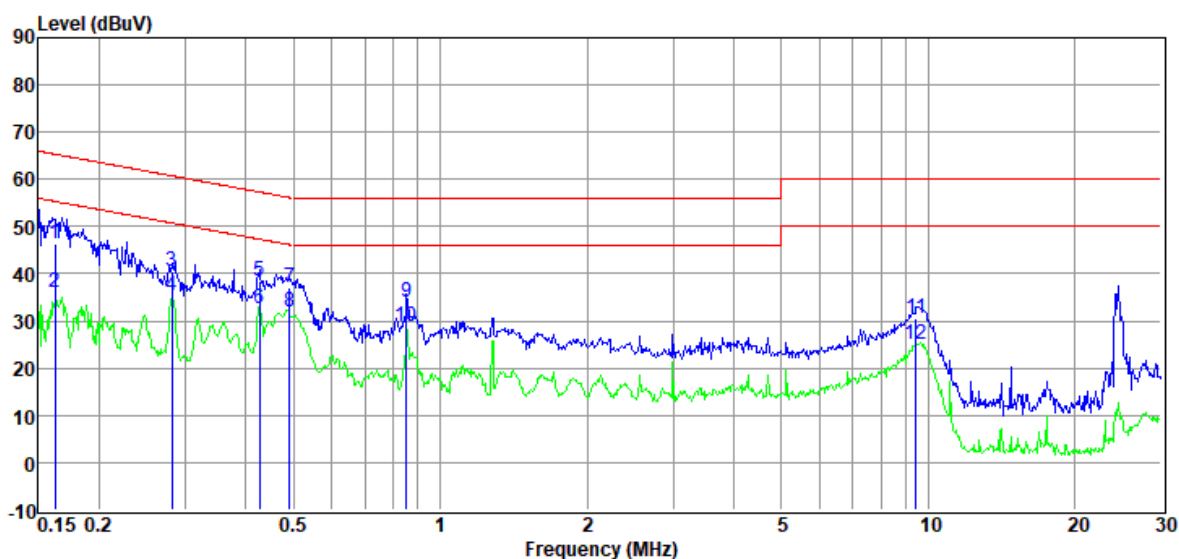
Note3: Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/50Hz, recorded the worst case.

4.7. Test data

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room D:\2024 CE report data\Q24050924-2E\CE.EM6
Test Date : 2024-05-29 Tested By : Chunchieh Huang
EUT : WIRELESS SPEAKER Model Number : AURA STUDIO 3
Power Supply : AC 120V/60Hz Test Mode : Bluetooth mode
Condition : TEMP:21.5°C, RH:53.6% LISN : 2023 1# ENV216/LINE
Memo :

Data: 2



Item	Freq.	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.16	26.06	9.78	0.92	9.68	46.44	65.34	-18.90	QP	LINE
2	0.16	15.72	9.78	0.92	9.68	36.10	55.34	-19.24	Average	LINE
3	0.28	20.00	9.81	0.88	9.70	40.39	60.76	-20.37	QP	LINE
4	0.28	14.97	9.81	0.88	9.70	35.36	50.76	-15.40	Average	LINE
5	0.43	18.03	9.77	0.85	9.71	38.36	57.33	-18.97	QP	LINE
6	0.43	12.35	9.77	0.85	9.71	32.68	47.33	-14.65	Average	LINE
7	0.49	16.77	9.81	0.86	9.71	37.15	56.14	-18.99	QP	LINE
8	0.49	11.38	9.81	0.86	9.71	31.76	46.14	-14.38	Average	LINE
9	0.85	13.73	9.70	0.71	9.73	33.87	56.00	-22.13	QP	LINE
10	0.85	8.63	9.70	0.71	9.73	28.77	46.00	-17.23	Average	LINE
11	9.45	10.85	9.80	0.24	9.82	30.71	60.00	-29.29	QP	LINE
12	9.45	5.28	9.80	0.24	9.82	25.14	50.00	-24.86	Average	LINE

Note:

1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site

: DDT 1# Shield Room

Test Date

: 2024-05-29

EUT

: WIRELESS SPEAKER

Power Supply

: AC 120V/60Hz

Condition

: TEMP:21.5°C, RH:53.6%

Memo

:

D:\2024 CE report data\Q24050924-2E\CE.EM6

Tested By

: Chunchieh Huang

Model Number

: AURA STUDIO 3

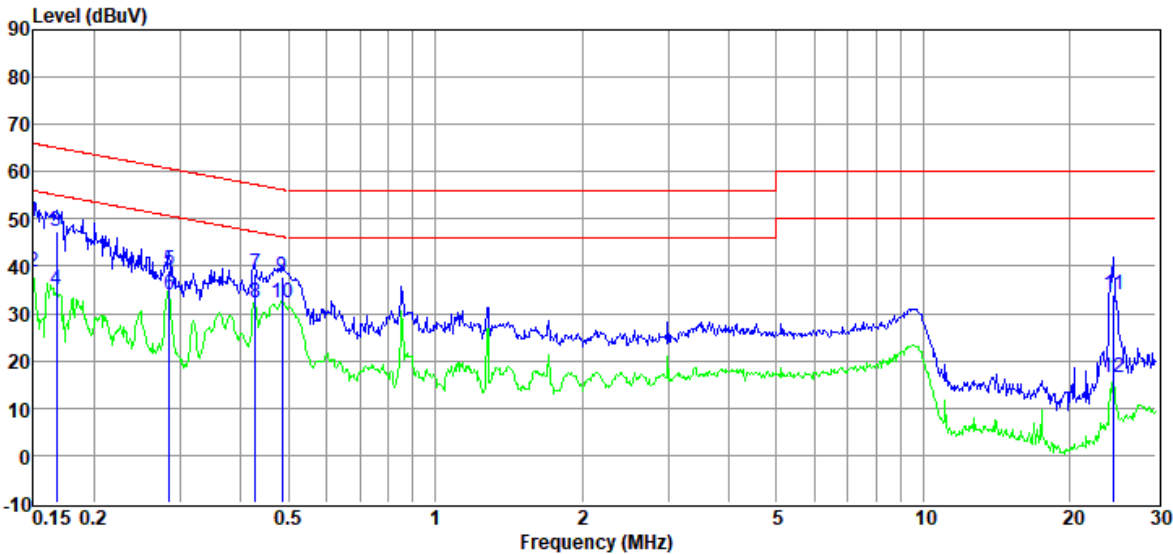
Test Mode

: Bluetooth mode

LISN

: 2023 1# ENV216/NEUTRAL

Data: 4



Item	Freq.	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.15	29.14	9.83	0.92	9.68	49.57	66.00	-16.43	QP	NEUTRAL
2	0.15	18.24	9.83	0.92	9.68	38.67	56.00	-17.33	Average	NEUTRAL
3	0.17	26.94	9.88	0.92	9.68	47.42	65.08	-17.66	QP	NEUTRAL
4	0.17	14.56	9.88	0.92	9.68	35.04	55.08	-20.04	Average	NEUTRAL
5	0.28	18.86	9.72	0.88	9.70	39.16	60.68	-21.52	QP	NEUTRAL
6	0.28	13.72	9.72	0.88	9.70	34.02	50.68	-16.66	Average	NEUTRAL
7	0.43	18.21	9.74	0.85	9.71	38.51	57.29	-18.78	QP	NEUTRAL
8	0.43	11.84	9.74	0.85	9.71	32.14	47.29	-15.15	Average	NEUTRAL
9	0.49	17.46	9.79	0.86	9.71	37.82	56.23	-18.41	QP	NEUTRAL
10	0.49	11.97	9.79	0.86	9.71	32.33	46.23	-13.90	Average	NEUTRAL
11	24.53	13.55	10.01	0.46	9.91	33.93	60.00	-26.07	QP	NEUTRAL
12	24.53	-3.83	10.01	0.46	9.91	16.55	50.00	-33.45	Average	NEUTRAL

- Note:
- Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
 - If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
 - Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
 - Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

6. Photos of the EUT

Please refer to DDT-Q24050924-1E appendix I.

-----End Report-----