

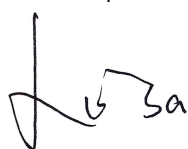
# RADIO TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results, data evaluation, test procedures, and equipment of configurations shown in this report were made in accordance with the RED directive 2014/53/EU.

Applicant : SHENZHEN FENDA TECHNOLOGY CO., LTD.  
Address : Fenda Hi-Tech Park, Zhoushi Road, Shiyan Town, Baoan District, Shenzhen City, Guangdong, China  
Manufacturer /Factory : SHENZHEN FENDA TECHNOLOGY CO., LTD.  
Address : Fenda Hi-Tech Park, Zhoushi Road, Shiyan Town, Baoan District, Shenzhen City, Guangdong, China  
E.U.T. : 2.0 Computer Multimedia Speaker  
Brand Name : F&D  
Model No. : T-30X, T-35X, T-35BT, T-40X, T-40BT, T-45X, R50BT, R55BT  
(For model difference refer to section 1)  
Measurement Standard : ETSI EN 303 345-1 V1.1.1: 2019  
Draft ETSI EN 303 345-3 V1.1.0: 2019  
Date of Receiver : December 30, 2019  
Date of Test : January 02, 2020 to March 25, 2020  
Date of Report : April 02, 2020

This Test Report is Issued Under the Authority of :

Prepared by



Louisa Huang / Engineer

Approved & Authorized Signer



Iori Fan / Authorized Signatory

This test report is for the customer shown above and their specific product only. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

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Revision History of This Test Report

Report Number	Description	Issued Date
NTC1912349EV00	Initial Issue	2020-04-02

## 1. GENERAL INFORMATION

### PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST

E.U.T. : 2.0 Computer Multimedia Speaker

Main Model Name : T-35X

Additional Model Name : T-30X, T-35BT, T-40X, T-40BT, T-45X, R50BT, R55BT

Brand Name : F&D

Rating : AC 100-240V 50/60Hz, DC1.5A

Adapter : N/A

Test Voltage : AC 230V 50Hz, AC 100V 60Hz  
(Only the worst case was recorded in the report)

Cable : AC Mains: 1.5m unshielded  
Speaker Line: 2.4m unshielded  
Audio Line 1 to 1: 1.52m unshielded  
Audio Line 2 to 2: 1.54m unshielded

Hardware Version : V1.0

Software Version : V1.0

Operating Temperature Range : 0°C to 35°C (Declaration by manufacturer)

Description of Model Difference : These models have the same circuit schematic, construction and critical components. The difference in model number only due to trading purpose.

Note : According to the model difference, all tests were performed on model T-35X.

Technical Specification:				
		Frequency Range	Modulation Type	Antenna Type
Type	FM	87.5-108MHz	Analogue	Built-in antenna

SUMMARY OF TEST RESULTS		
Section (ETSI EN 303 345-3)	Description of Test	TEST RESULT
4.2	Sensitivity	Compliant
4.3	Receiver adjacent channel selectivity and blocking	Compliant

## 2. DESCRIPTION OF TEST MODES

The EUT has been tested under Normal Operating condition.

## 3. TEST METHODOLOGY

All measurements contained in this report were conducted with ETSI EN 303 345-1 V1.1.1: 2019 and Draft ETSI EN 303 345-3 V1.1.0: 2019

## 4. TEST FACILITY

### Site Description

EMC Lab : Listed by CNAS, August 13, 2018  
The certificate is valid until August 13, 2024  
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01  
The Certificate Registration Number is L5795.

Listed by A2LA, November 01, 2017  
The certificate is valid until December 31, 2021  
The Laboratory has been assessed and proved to be in compliance with ISO17025  
The Certificate Registration Number is 4429.01

Listed by FCC, November 06, 2017  
The Designation Number is CN1214  
Test Firm Registration Number: 907417

Listed by Industry Canada, June 08, 2017  
The Certificate Registration Number. Is 46405-9743A

Name of Firm : Dongguan Nore Testing Center Co., Ltd.  
(Dongguan NTC Co., Ltd.)

Site Location : Building D, Gaosheng Science and Technology park,  
Hongtu road, Nancheng district, Dongguan city,  
Guangdong province, China

## 5. SUPPORT EQUIPMENT

FM : Manufacturer: LEADER  
Signal Generator M/N: 3214  
S/N: 1100164

Mobile Phone 1 : Manufacturer: HUAWEI  
M/N: JKM-AL00b  
S/N: 2PFNW19530010902

Mobile Phone 2 : Manufacturer: HUAWEI  
M/N: HMA-AL00  
S/N: HJS5T19417000376

Mobile Phone 3 : Manufacturer: Apple  
M/N: MWND2CH/A  
S/N: F4GZJE32N745

## 6. MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Uncertainty in conducted measurements	$\pm 2.52\text{dB}$
Uncertainty in radiated measurements	$\pm 4.60\text{dB}$
Spurious emissions	$\pm 4.60\text{dB}$

## 7. DEVIATIONS AND ABNORMALITIES FROM STANDARD CONDITIONS

No additions, deviations and exclusions from the standard.

## 8. Sensitivity

### 8.1 Limits:

#### Sensitivity requirements

Test	De-modulation	Tuned frequency band	Wanted signal centre frequency (MHz)	Required sensitivity limit	
				Conducted (dBm)	Radiated (dBuV/m)
1	FM	VHF band II	98	-90	50(note 1)
2	DAB	VHF band III	202,928	-94	37(note2)
3	AM (note 3)	LF	0,216	-65	74
		MF	0,999	-65	66
		HF	9,650	-65	60
Note 1: For products with an integral antenna, the requirement is relaxed to 67 dBµV/m. Note 2: For products with an integral antenna, the requirement is relaxed to 50 dBµV/m. Note 3: If the receiver cannot be tuned to 9,650 MHz, the wanted signal centre frequency shall be set to the closest alternate from the following list: 3,980 MHz, 6,050 MHz, 7,330 MHz, 11,850 MHz, 13,720 MHz, 15,450 MHz, 17,690 MHz, 18,960 MHz, 21,650 MHz, 25,890 MHz.					

#### Impairment criteria for sensitivity tests

Demodulation	Impairment criteria
FM	SNR $\geq$ 40dBQ ref $\pm$ 60,8 kHz deviation; clean audio (see note 1)
DAB	Clean audio (see note 2)
AM	SNR $\geq$ 22 dBQ ref 40% AM
<p>Note 1: Clean audio is defined as 10 seconds of audio with no subjective impairments (e.g. clicks resulting from FM threshold effects).</p> <p>Note 2: Clean audio is defined as 10 seconds of audio with no subjective impairments (e.g. muting, clicks, warbles or squeaks).</p>	



## 8.2 Test Signal configurations:

### FM configuration

Parameter	FM signals		AM signal
	Wanted	Unwanted	Blocking
Audio modulation	1 kHz tone	Weighted noise Recommendation ITU-R BS.559-2 [3], clause 1, band-limited to 15 kHz (see note 1)	1 kHz tone
Other modulation parameters	$\pm 60,8$ kHz peak deviation	15,9 kHz RMS deviation (see note 2)	80% depth
Pilot tone	None	None	
<p>Note 1: The filter shall have a cut-off frequency of 15 kHz and a minimum roll-off of 60 dB/octave.</p> <p>Note 2: This is equivalent to a quasi-peak deviation of 34,8 kHz and has pre-emphasis enabled. The quasi-peak level measurement is defined by Recommendation ITU-R BS.641 [i.5], clause 5; with pre-emphasis disabled the quasi-peak deviation is 32 kHz (14,5 kHz RMS)</p>			

### DAB configuration

Parameter	DAB signal		AM signal
	Wanted	Unwanted	Blocking
Audio modulation	Service label: "Sine+" 1 kHz tone at a level of -3 dBFS mono, 128 kbit/s AAC, EEP-3A	Any DAB ensemble without the "Sine+" service	1 kHz tone
Other modulation parameters	DAB signal to ETSI EN 300 401 [2], clause 15	DAB signal to ETSI EN 300 401 [2], clause 15	80% depth
Note: Level is defined in accordance with AES17 [i.5].			

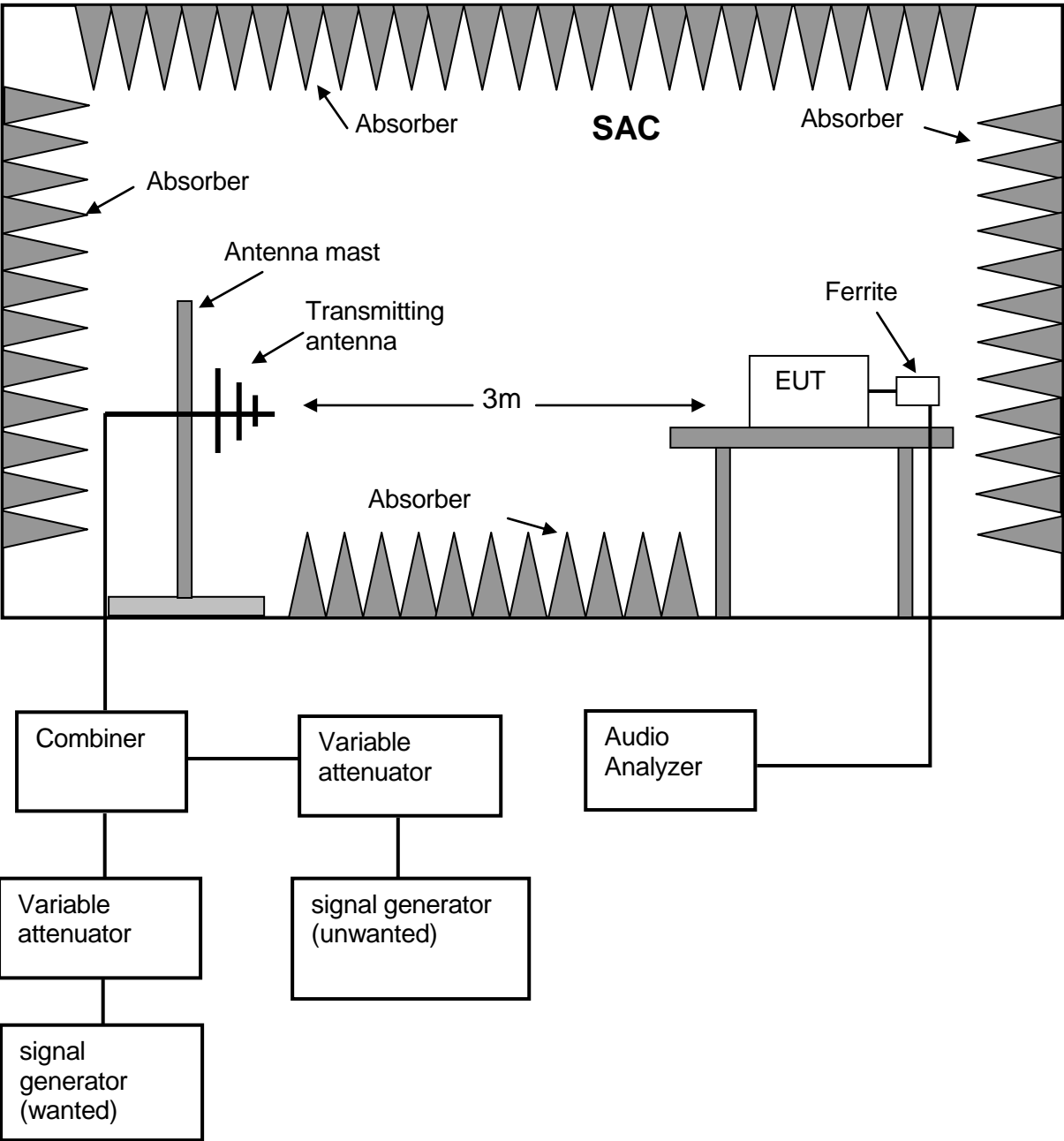
## AM configuration

Parameter	AM signals		
	Wanted	Unwanted	Blocking
Audio modulation	1 kHz tone	Weighted noise Recommendation ITU-R BS.559-2 [3], clause 1, band-limited to 4,5 kHz (see note 1)	1 kHz tone
Other modulation parameters	40 % depth	22,8 % RMS depth (see note 2)	80 % depth
<p>Note 1: The filter shall have a cut-off frequency of 4,5 kHz and a minimum roll-off of 60 dB/octave.</p> <p>Note 2: This is equivalent to a quasi-peak modulation depth of 50 %. The demodulated audio level will have the same quasi-peak value as that of a carrier with 50 % AM modulation depth modulated with a 1 kHz sinusoid.</p>			

### 8.3 Test procedures:

- 1) The EUT is placed in semi anechoic chamber (SAC). The field strength generated by the signal generator applying to the EUT at 3 meters distance from the antenna is pre-calibrated before testing.
- 2) The 'unwanted' signal generator remains switched off for the duration of the test.
- 3) The 'wanted' signal generator is set to the required modulation method and test configuration and to the frequency specified. The signal level is adjusted to provide the level, as measured at ©, specified in plus 30 dB.
- 4) The EUT is tuned to the frequency of the 'wanted' signal generator. For a receiver without a digital frequency display, the receiver shall be tuned for optimum THD+N. The receiver's audio level shall be set so as to provide clean 1 kHz audio tone at the audio output (that is less than 10 % total harmonic distortion) but of sufficient level to drive the measurement device.
- 5) The level of the 'wanted' signal generator is adjusted to provide the level, as measured at ©.
- 6) The 'unwanted' signal generator remains switched off for the duration of the test.
- 7) The modulating audio signal for the 'wanted' signal generator is removed. The audio output, measured using the measurement device, is recorded as the noise level, N.
- 8) If the impairment criteria given are met then the receiver has passed the test.

8.4 Test Configuration:



## 8.5 Test Results:

Test Data:	2020-01-06	Humidity :	53 %			
Test By:	Lee	Temperature :	21 °C			
Test Voltage:	AC 230V 50Hz	Test Mode:	FM Mode			
FM (Built-in antenna)						
VHF band II 98MHz						
Wanted Signal Level at © (dBuV/m)	Total Harmonic Distortion (%)	S (mV)	N (mV)	SNR (dBQ)	SNR Limit (dBQ)	Result
50	0.54	458.4	2	47.20	≥40	Pass

Note:  $SNR (dBQ) = 20\log(S/N)$

## 9. Adjacent Channel Selectivity and Blocking

### 9.1 Limits:

#### FM Channel spacing for adjacent channel selectivity and blocking

Demodulation	Tuned frequency band	Unwanted frequency (N = 2, 3, 4)	Unwanted frequency (blocking)
FM	VHF band II	$\pm N \times 100 \text{ kHz}$	$\pm 800 \text{ kHz}$

#### DAB Channel spacing for adjacent channel selectivity and blocking

Demodulation	Tuned frequency band	Unwanted frequency (N = 1, 2, 3)	Unwanted frequency (blocking)
DAB	VHF band III	$\pm N \times 1\,712 \text{ kHz}$	$\pm 12 \text{ MHz}$

#### AM Channel spacing for adjacent channel selectivity and blocking

Demodulation	Tuned frequency band	Unwanted frequency (N = 1, 2, 3)	Unwanted frequency (blocking)
AM	LF	$\pm N \times 9 \text{ kHz}$	$\pm 90 \text{ kHz}$
	MF	$\pm N \times 9 \text{ kHz}$	$\pm 90 \text{ kHz}$
	HF	$\pm N \times 10 \text{ kHz}$	$\pm 100 \text{ kHz}$

## FM Adjacent channel selectivity and blocking requirements

De-modulation (see note 1)	Tuned frequency band	C Wanted signal centre frequency (MHz)	C Wanted signal level		Required I/C ratio (see notes 2 and 3)			
			Conducted (dBm)	Radiated (dBuV/m)	N = 2 (dB)	N = 3 (dB)	N = 4 (dB)	Blocking (dB)
FM (built-in or integral antenna)	VHF band II	98	n/a	56 (see note 4)	-15	-3	8	20
FM (external antenna)	VHF band II	98	-84	n/a	3	17	30	30

Note 1: The ACS and blocking requirements are currently separated into different limits for radiated and conducted testing methods. These limits are likely to be unified in a future revision of the present document. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.

Note 2: The frequency of the interferer shall be calculated using the channel spacing data in table 3 for each of the 6 defined adjacent channels  $N = \{-4, -3, -2, +2, +3, +4\}$  and the two blocking offsets. Each row of table 4 thus defines 8 individual tests.

Note 3: The minimum level of I for the relevant level of impairment is calculated by adding the I/C ratio to the wanted C level.

Note 4: The wanted signal level for receivers with integral antenna is 73 dBuV/m.

## DAB Adjacent channel selectivity and blocking requirements

De-modulation	Tuned frequency band	C Wanted signal centre frequency (MHz)	C Wanted signal level		Required I/C ratio (see notes 1 and 2)			
			Conducted (dBm)	Radiated (dBuV/m)	N = 1 (dB)	N = 2 (dB)	N = 3 (dB)	Blocking (dB)
DAB	VHF band III	202,928	-70	61	35	40	45	40

Note 1: The frequency of the interferer shall be calculated using the channel spacing data in table 3 for each of the 6 defined adjacent channels  $N = \{-3, -2, -1, +1, +2, +3\}$  and the two blocking offsets. Each row of table 4 thus defines 8 individual tests.

Note 2: The minimum level of I for the relevant level of impairment is calculated by adding the I/C ratio to the wanted C level.

## AM Adjacent channel selectivity and blocking requirements

De-modulation (see note 1)	Tuned frequency band	C Wanted signal centre frequency (MHz) (see note 4)	C Wanted signal level		Required I/C ratio (see notes 2 and 3)			
			Conducted (dBm)	Radiated (dBµV/m)	N = 1 (dB)	N = 2 (dB)	N = 3 (dB)	Blocking (dB)
AM (built-in or integral antenna)	LF	0,216	n/a	80	-20	10	20	20
	MF	0,999	n/a	72	-20	10	20	20
	HF	9,650	n/a	66	-20	10	20	20
AM (external antenna)	LF	0,216	-59	n/a	-5	25	35	40
	MF	0,999	-59	n/a	-5	25	35	40
	HF	9,650	-59	n/a	-5	25	35	40

Note 1: The ACS and blocking requirements are currently separated into different limits for radiated and conducted testing methods. These limits are likely to be unified in a future revision of the present document. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.

Note 2: The frequency of the interferer shall be calculated using the channel spacing data in table 3 for each of the 6 defined adjacent channels  $N = \{-3, -2, -1, +1, +2, +3\}$  and the two blocking offsets. Each row of table 4 thus defines 8 individual tests.

Note 3: The minimum level of I for the relevant level of impairment is calculated by adding the I/C ratio to the wanted C level. NOTE 4: If the receiver cannot be tuned to 9,650 MHz, the wanted signal centre frequency shall be set to the closest alternate from the following list: 3,980 MHz, 6,050 MHz, 7,330 MHz, 11,850 MHz, 13,720 MHz, 15,450 MHz, 17,690 MHz, 18,960 MHz, 21,650 MHz, 25,890 MHz.

## Impairment criteria for adjacent channel selectivity and blocking tests

Demodulation	Impairment criteria
FM	SNR ≥ 40dBQ ref ±60,8 kHz deviation; clean audio (see note 1)
DAB	Clean audio (see note 2)
AM	SNR ≥ 22 dBQ ref 40% AM
Note 1: Clean audio is defined as 10 seconds of audio with no subjective impairments (e.g. clicks resulting from FM threshold effects).	
Note 2: Clean audio is defined as 10 seconds of audio with no subjective impairments (e.g. muting, clicks, warbles or squeaks).	

## 9.2 Test procedures:

- 1) The EUT is placed in semi anechoic chamber (SAC). The field strength generated by the signal generator applying to the EUT at 3 meters distance from the antenna is pre-calibrated before testing.
- 2) The 'wanted' signal generator is set to the required modulation method and test configuration as specified, and to the frequency specified. The signal level is adjusted to provide the level, as measured at ©, specified at above table, with the 'unwanted' generator switched off.
- 3) The 'unwanted' signal generator is set to the required modulation method and test configuration as specified, and to the frequency calculated from the wanted signal centre frequency and the required offset specified. The signal level is adjusted to provide the level, as measured at ©, specified in clause 4.2.5, with the 'wanted' generator switched off. For the blocking test only, the audio modulation of the 'unwanted' signal shall be removed whilst measuring the level at ©.
- 4) The 'wanted' signal generator is switched back on.
- 5) The receiver is tuned to the frequency of the 'wanted' signal generator. For a receiver without a digital frequency display, the receiver shall be tuned for optimum THD+N (i.e. as it would be tuned by a user for best quality). The receiver's audio level shall be set so as to provide clean 1 kHz audio tone at the audio output (that is less than 10 % total harmonic distortion) but of sufficient level to drive the measurement device.
- 6) The audio output, measured using the measurement device, is recorded as the signal level, S.
- 7) The modulating audio signal for the 'wanted' signal generator is removed. The audio output, measured using the measurement device, is recorded as the noise level, N.
- 8) If the impairment criteria given in above table are met then the receiver has passed the test.

## 9.3 Test Configuration:

Same as section 8.4 of this report.



## 9.4 Test Result:

Test Data:		2020-01-06		Humidity :		53 %		
Test By:		Lee		Temperature :		21 °C		
Test Voltage:		AC 230V 50Hz		Test Mode:		FM Mode		
FM (Built-in antenna) VHF band II 98MHz								
Adjacency	C Wanted signal level at © (dBuV/m)	I Unwanted signal level at © (dBuV/m)	Required I/C ratio (dB)	S (mV)	N (mV)	SNR (dBQ)	SNR Limit (dBQ)	Result
N = -2 97.8 MHz	56	41	-15	458.2	1.8	48.12	≥40	Pass
N = -3 97.7 MHz	56	53	-3	457.8	2.1	46.77	≥40	Pass
N = -4 97.6 MHz	56	64	8	458.4	2.1	46.78	≥40	Pass
N = 2 98.2 MHz	56	41	-15	458.1	1.9	47.64	≥40	Pass
N = 3 98.3 MHz	56	53	-3	457.9	2	47.19	≥40	Pass
N = 4 98.4 MHz	56	64	8	458.5	2.2	46.38	≥40	Pass
Blocking 97.2 MHz	56	76	20	458.4	2.1	46.78	≥40	Pass
Blocking 98.8 MHz	56	76	20	458.1	1.8	48.11	≥40	Pass
NOTE 1 : S= Measured audio level when wanted signal on and modulation on; unwanted signal on and modulation on. For blocking signal, the unwanted signal modulation is off. N= Measured audio level when wanted signal on but modulation off; unwanted signal on and modulation on. For blocking signal, the unwanted signal modulation is off. NOTE 2: Measured I/C ratio (dB) = Unwanted Field Level (dBuV/m) - Wanted Field Level (dBuV/m) SNR (dBQ) = 20log (S/N)								

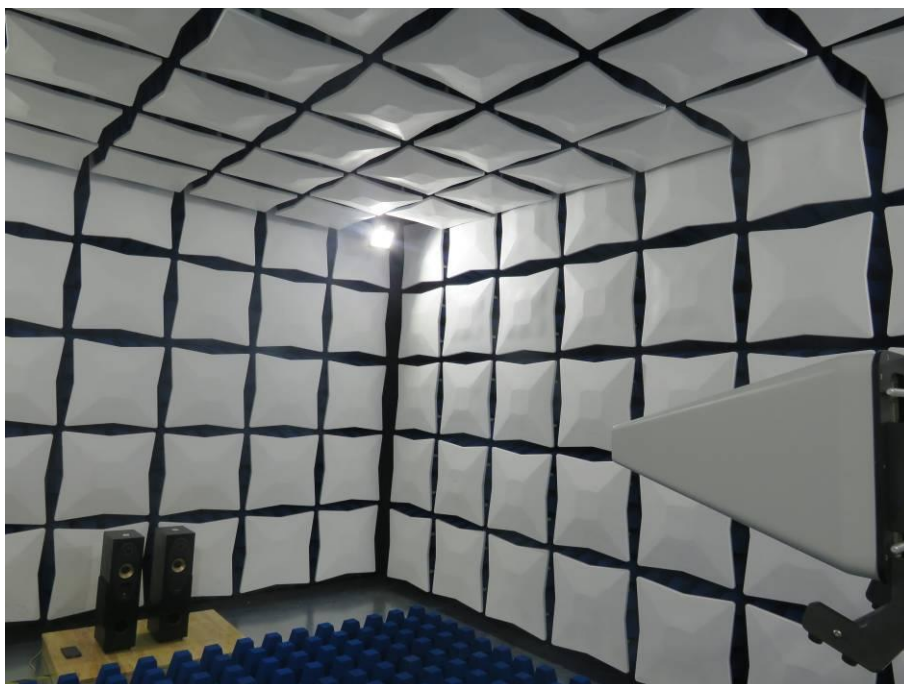
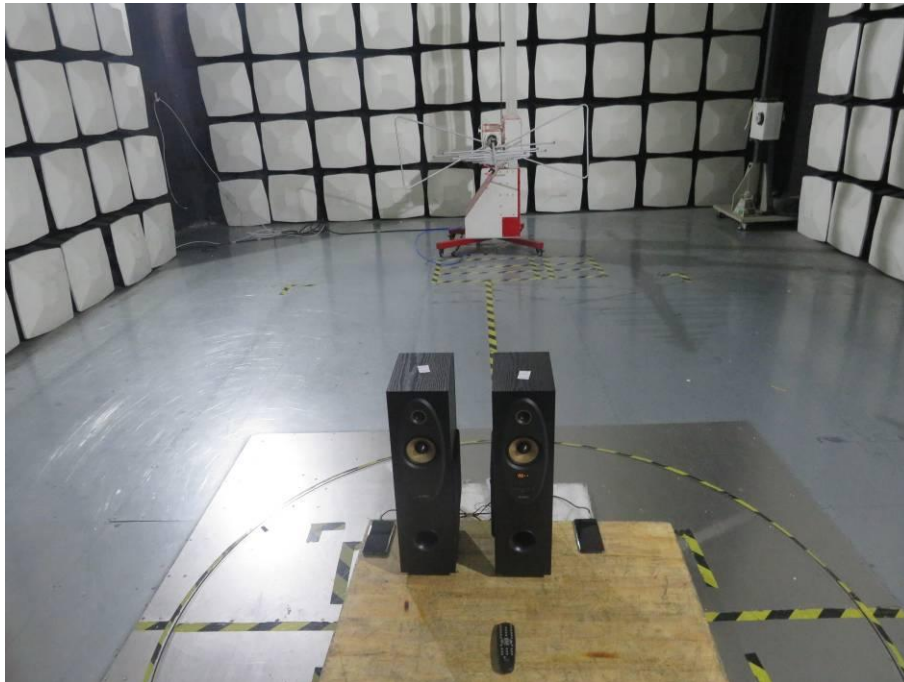
## 10. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 14, 2020	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 23, 2020	1 Year
3.	Loop Antenna	DAZE	ZA30900A	0708	Mar. 23, 2020	1 Year
4.	Signal generator	Agilent	E4421B	MY41000708	Mar. 14, 2020	1 Year
5.	Signal generator	Agilent	N5182A	MY48180739	Mar. 14, 2020	1 Year
6.	Signal generator	TELEVIEW	TVB593	23.36.20.10.1 2.00.00.05	N/A	N/A
7.	Signal generator	TELEVIEW	DTV800	D800-598170 62667	N/A	N/A
8..	Horn Antenna	COM-Power	AH-118	071078	Mar. 23, 2020	1 Year
9.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 14, 2020	1 Year
10.	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 14, 2020	1 Year
11.	Audio Analyzer	Rohde & Schwarz	UPV	100894	Mar. 23, 2020	1 Year
12.	Test Software	EZ	EZ_EMC	N/A	N/A	N/A

## **APPENDIX 1**

### **PHOTOGRAPHS OF TEST SETUP**

## RADIATED EMISSION TEST



---End---