



TEST REPORT

Test report
On Behalf of

SHENZHEN SANAN TECHNOLOGY CO., LTD.

For

On-board monitor kit

Model No.: SA-KC55P, See page 7 for series models

FCC ID: 2ANJW-SA-KC55P

Prepared For : SHENZHEN SANAN TECHNOLOGY CO., LTD.
5F Building 2, Fei Lai Te Industrial Park, No. 88 North Education Road, Pingdi
Street, Longgang District, Shenzhen, Guangdong, China

Prepared By : Shenzhen HUAKE Testing Technology Co., Ltd.
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping,
Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Date of Test: Dec. 22, 2023 ~ Jan. 04, 2024

Date of Report: Jan. 04, 2024

Report Number: HK2312256311-2E

**TEST RESULT CERTIFICATION**

Applicant's name : SHENZHEN SANAN TECHNOLOGY CO., LTD.

Address..... : 5F Building 2, Fei Lai Te Industrial Park, No. 88 North Education Road, Pingdi Street, Longgang District, Shenzhen, Guangdong, China

Manufacture's Name : SHENZHEN SANAN TECHNOLOGY CO., LTD.

Address..... : 5F Building 2, Fei Lai Te Industrial Park, No. 88 North Education Road, Pingdi Street, Longgang District, Shenzhen, Guangdong, China

Product description

Trade Mark : SANAN

Product name..... : On-board monitor kit

Model and/or type reference : SA-KC55P, See page 7 for series models

Standards : FCC CFR 47 PART 15.239

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Date of Test :

Date (s) of performance of tests..... : Dec. 22, 2023 ~ Jan. 04, 2024

Date of Issue : Jan. 04, 2024

Test Result..... : Pass

Prepared by:

Len Liao

Project Engineer

Reviewed by:

Sliver Wan

Project Supervisor

Approved by:

Jason Zhou

Technical Director



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**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Jan. 04, 2024	Jason Zhou



1 TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

Requirement	CFR 47 Section	Result
Conducted Emission	15.207(a)	N/A
Occupied Bandwidth Emission	15.239(a)	PASS
Radiated Spurious Emission	15.239(b)	PASS
Antenna requirement	15.203	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

1.2 TEST FACILITY

Information of the Test Laboratory

Shenzhen HUAKE Testing Technology Co., Ltd.

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping,
Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization :

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.



1.3 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	MU
1	Conducted Emission	$\pm 2.20\text{dB}$
2	Spurious emissions, conducted	$\pm 0.11\text{dB}$
3	All emissions, radiated(<1G)	$\pm 3.90\text{dB}$
4	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
5	Temperature	$\pm 0.1^{\circ}\text{C}$
6	Humidity	$\pm 1.0\%$



2 GENERAL INFORMATION

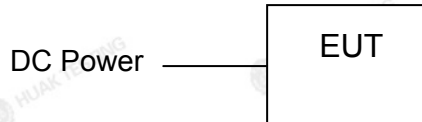
2.1 GENERAL DESCRIPTION OF EUT

Equipment	On-board monitor kit
Model Name	SA-KC55P
Series Model:	SA-KC55LP, SA-KC022Y, SA-KCX1PP, SA-KCX5PP, SA-KC022i, SA-KC44D, SA-KC44DP, SA-KC60TP, SA-KC60TP2M, SA-KC06X, SA-KC580F, SA-KC022i-S, SA-KC022Y-S, SA-KC44DP-S, SA-KC44-S, SA-KCX1PP-S, SA-KCX5PP-S, SA-MA20P06, SA-J149, SA-MR16T
Model Difference	All model's the function, software and electric circuit are the same, only with model named different. Test sample model: SA-KC55P.
Trade Mark	SANAN
Hardware Version	V2.0
Software Version	V2.0
Operation frequency	88-108MHz
Antenna Type	Internal Antenna
Antenna Gain	0dBi
Modulation Type	FM
Power Source	DC9-36V



2.3 DESCRIPTION OF TEST SETUP

Operation of EUT during Radiation testing:



The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) 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. The worst case is X position.



2.4 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.

Item	Equipment	Trade Mark	Model/Type No.	Specification	Note
1	On-board monitor kit	SANAN	SA-KC55P	N/A	EUT

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

**2.5 MEASUREMENT INSTRUMENTS LIST**

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Feb. 17, 2023	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Feb. 17, 2023	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Feb. 17, 2023	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Feb. 17, 2023	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Feb. 17, 2023	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Feb. 17, 2023	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519B	HKE-014	Feb. 17, 2023	1 Year
10.	Horn Antenna	Schwarzbeck	9120D	HKE-013	Feb. 17, 2023	1 Year
11.	Pre-amplifier	EMCI	EMC051845SE	HKE-015	Feb. 17, 2023	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Feb. 17, 2023	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	N/A	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Feb. 17, 2023	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Feb. 17, 2023	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Feb. 17, 2023	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 09, 2021	3 Year
19.	Power Meter	R&S	NRVD	SEL0069	Feb. 17, 2023	1 Year
20.	Horn Antenna	Schwarzbeck	BBHA 9170	HKE-017	Feb. 17, 2023	1 Year
21.	10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	Feb. 17, 2023	1 Year



3 TEST RESULTS AND MEASUREMENT DATA

3.1 CONDUCTED EMISSIONS TEST

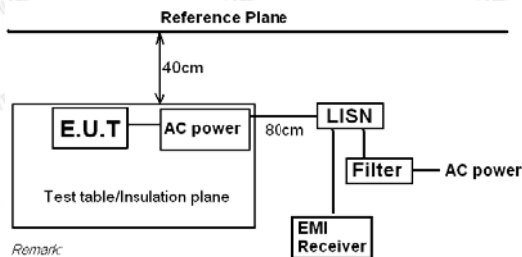
LIMIT

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207, AC Power Line Conducted Emissions Limits for License-Exempt Radio Apparatus as below:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

TEST CONFIGURATION



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedance Stabilization Network
Test table height=0.8m

TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.



TEST RESULTS

Not applicable

Note: Since EUT is only for on-car use, so this test item not applicable.



3.2 RADIATED EMISSION TEST

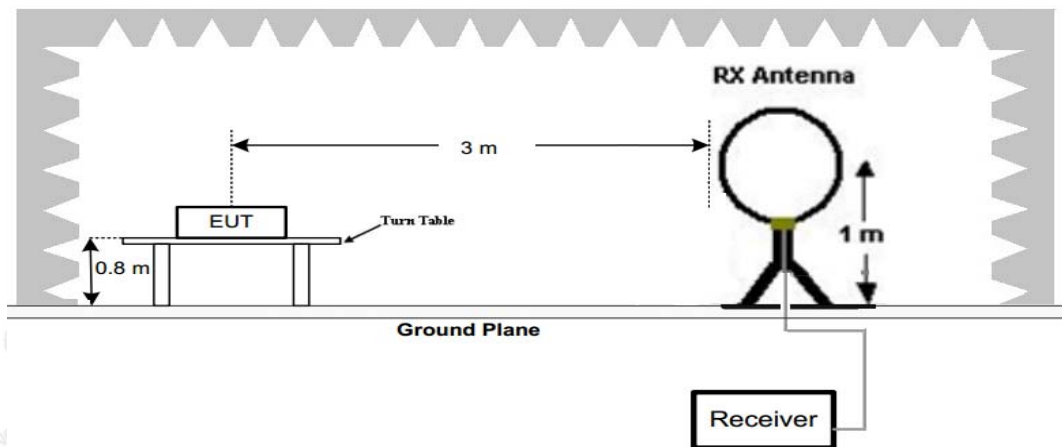
Limit

The field strength of any emissions within the authorized bandwidth shall not exceed $250 \mu\text{V/m}$ measured at 3 m with an average meter.

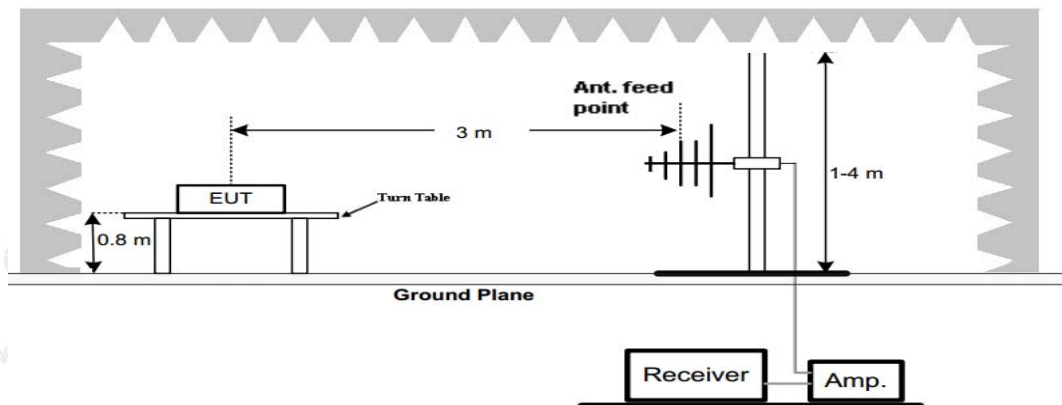
The field strength of any emissions outside the 200 kHz authorized bandwidth or outside the band 88-108 MHz shall not exceed the general field strength limits specified in §15.239(b).

TEST CONFIGURATION

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

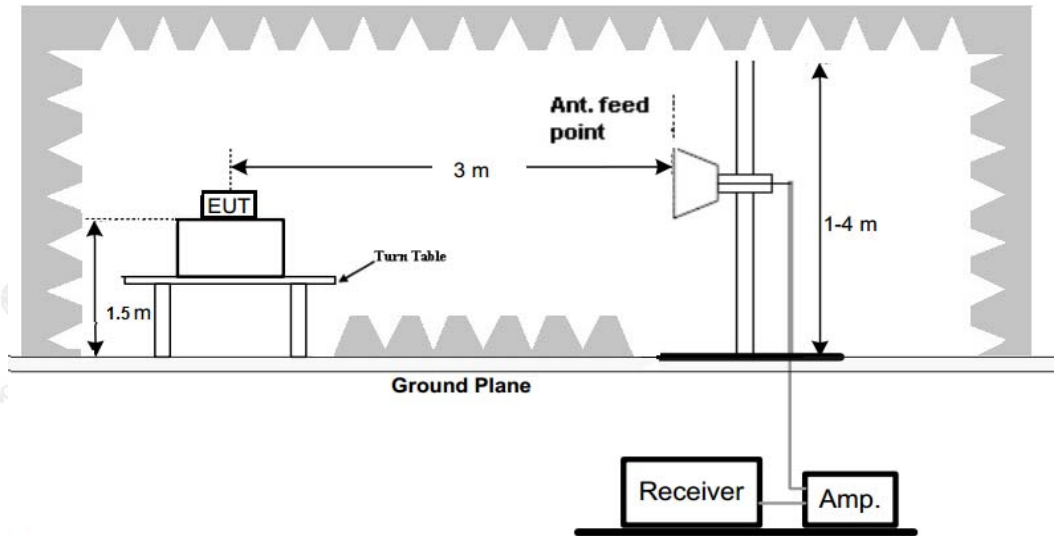


(B) Radiated Emission Test Set-Up, Frequency below 1000MHz.





(C) Radiated Emission Test Set-Up, Frequency above 1000MHz.



Test Procedure

1. The EUT was placed on turn table which is 0.8m above ground plane for below 1GHz test, and on a low permittivity and low loss tangent turn table which is 1.5m above ground plane for above 1GHz test.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

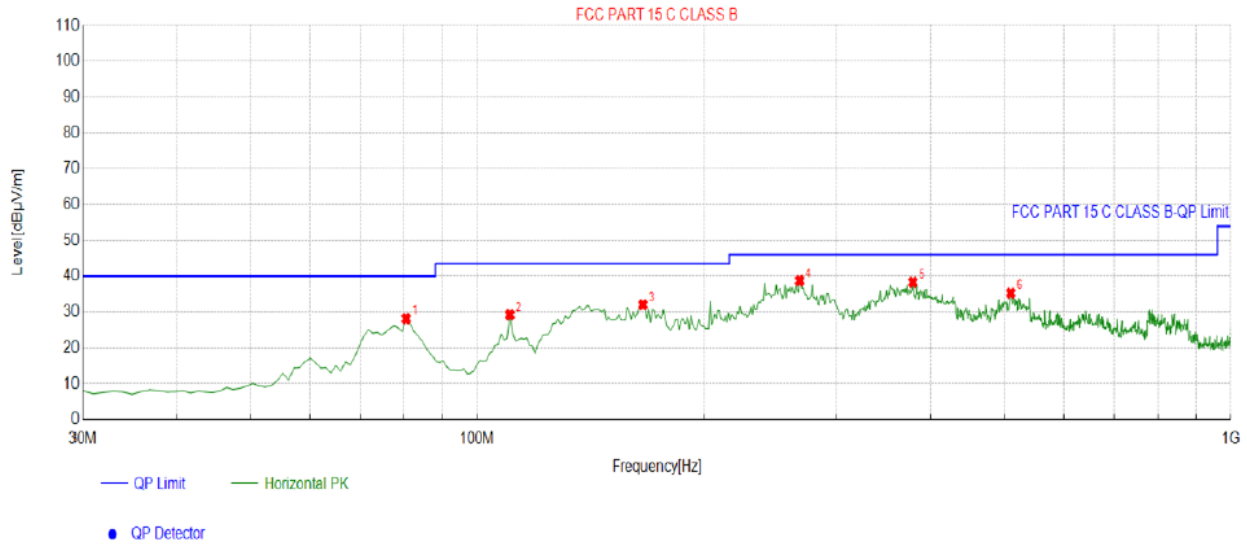


TEST RESULTS

All modes have been tested, and only the worst mode is recorded.

Below 1GHz Test Results:

Antenna polarity: H

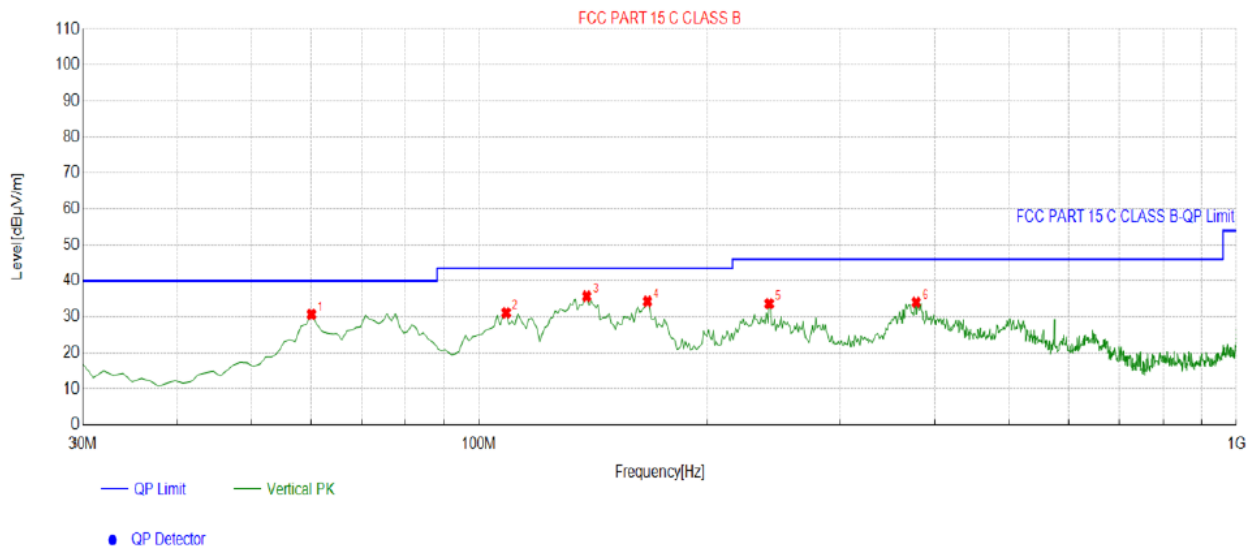


Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	80.4905	-17.44	45.60	28.16	40.00	11.84	100	360	Horizontal
2	110.5906	-14.98	44.21	29.23	43.50	14.27	100	322	Horizontal
3	165.9359	-17.21	49.27	32.06	43.50	11.44	100	297	Horizontal
4	267.8879	-12.70	51.47	38.77	46.00	7.23	100	176	Horizontal
5	378.5786	-10.69	49.04	38.35	46.00	7.65	100	160	Horizontal
6	510.6306	-7.16	42.50	35.34	46.00	10.66	100	121	Horizontal

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



Antenna polarity: V



Suspected List

NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	60.1001	-14.37	45.04	30.67	40.00	9.33	100	104	Vertical
2	108.6486	-14.62	45.76	31.14	43.50	12.36	100	87	Vertical
3	138.7487	-17.81	53.55	35.74	43.50	7.76	100	29	Vertical
4	166.9069	-16.93	51.25	34.32	43.50	9.18	100	184	Vertical
5	241.6717	-13.29	47.00	33.71	46.00	12.29	100	296	Vertical
6	377.6076	-10.74	44.83	34.09	46.00	11.91	100	220	Vertical

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Frequency Range (9 kHz-30MHz)

The EUT was pre-scanned the frequency band (9KHz~30MHz), found the radiated level lower than the limit, so don't show on the report.

Frequency (MHz)	Level@3m (dBμV/m)		Limit@3m (dBμV/m)	
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--

Note: 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement.

**Field Strength**

Frequency	Reading	Corr.	Result	Limit	Margin	Remark
MHz	dBuV/m	Factor (dB)	dBuV/m	dBuV/m	dB	
88.1	37.46	12.33	49.79	68	-18.21	PK
	22.31	12.33	34.64	48	-13.36	AVG
98	36.74	15.82	52.56	68	-15.44	PK
	21.47	15.82	37.29	48	-10.71	AVG
107.9	38.79	16.56	55.35	68	-12.65	PK
	21.02	16.56	37.58	48	-10.42	AVG

Remark: Result = Reading + Corr.Factor; Margin = Result - Limit.

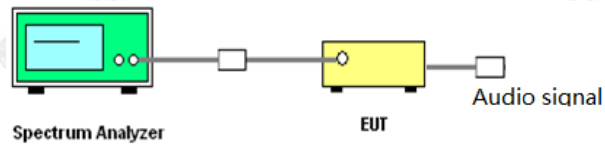


3.3 20DB BANDWIDTH

Limit

According to 915 239 (a) Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108MHz.

TEST CONFIGURATION

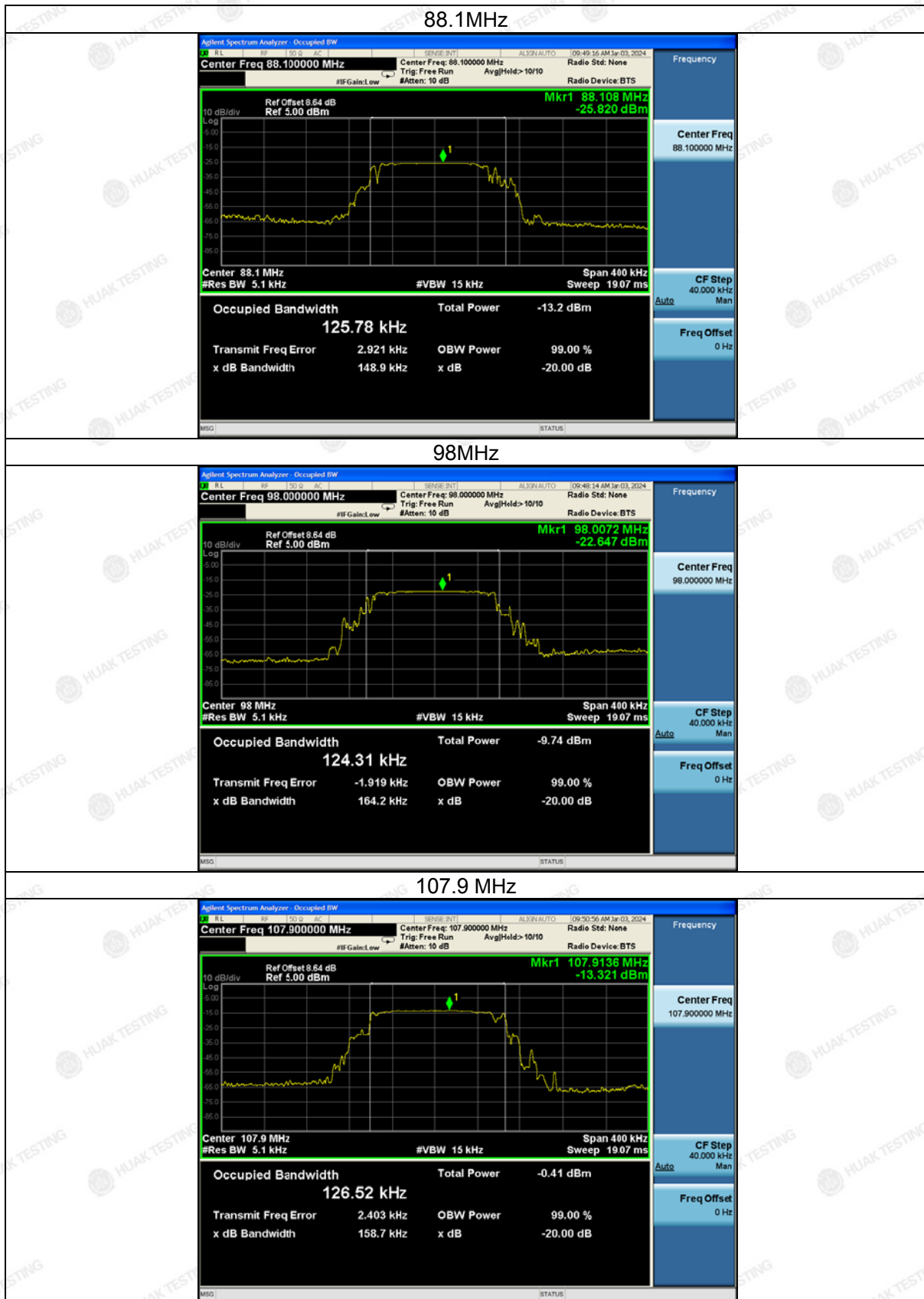


Test Procedure:

- 1) The transmitter shall be operated at its maximum carrier power measured under normal test conditions
- 2) The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- 3) The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.
- 4) Detector function = peak.
- 5) Trace = max hold.

Test Results:

Frequency (MHz)	20dB Bandwidth (KHz)	99% Bandwidth (KHz)	Limit (KHz)	Result
88.1	148.9	125.78	200	PASS
98	164.2	124.31		PASS
107.9	158.7	126.52		PASS



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



3.4. ANTENNA REQUIREMENT

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

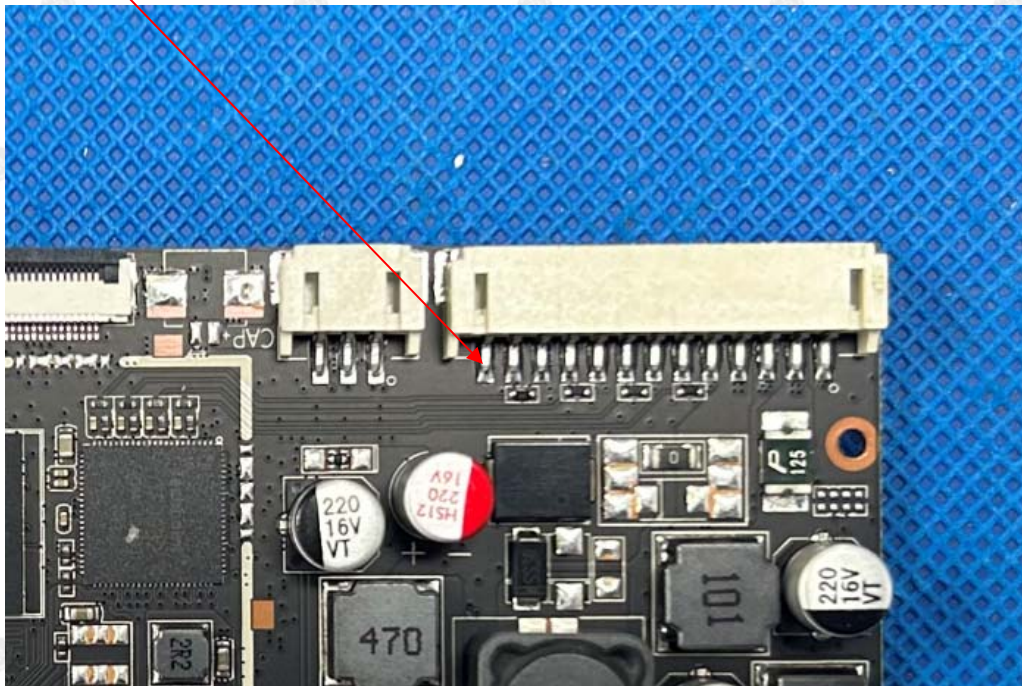
Refer to Statement Below For Compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

This product uses USB ground pin as antenna. The directional gains of antenna used for transmitting is 0dBi.

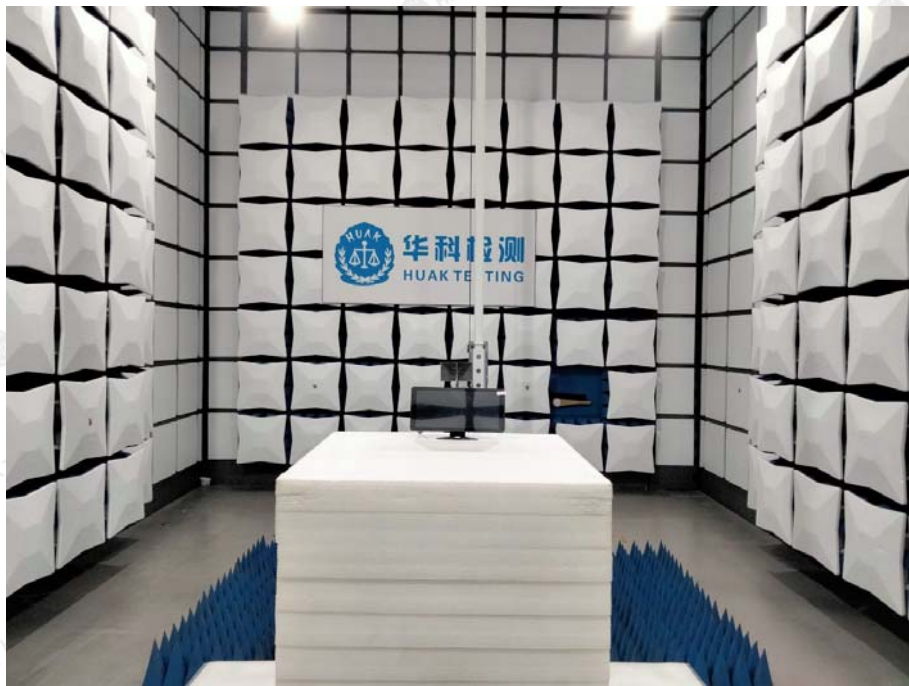
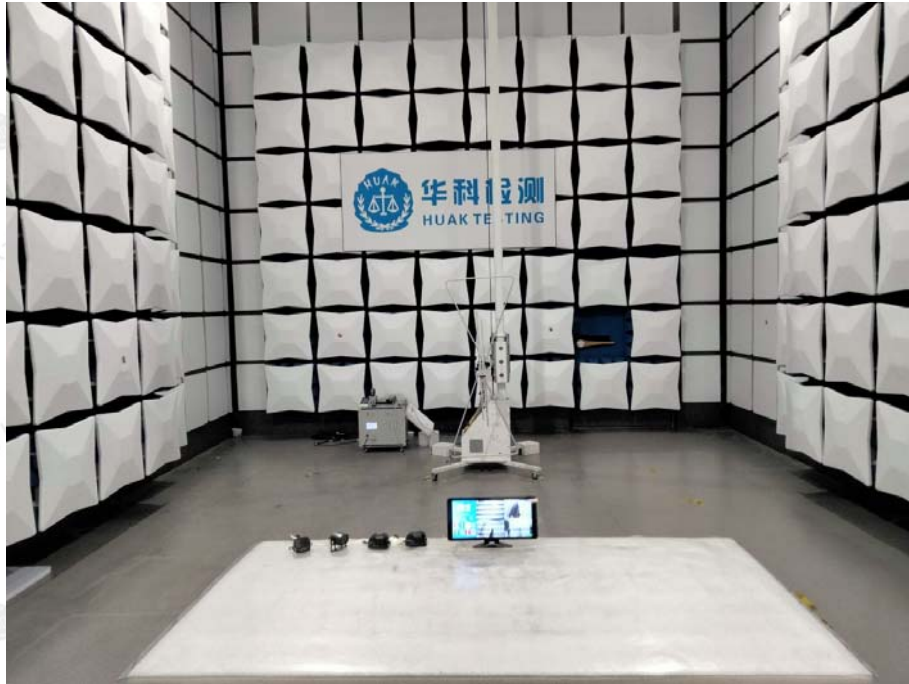
ANTENNA





4 PHOTOGRAPH OF TEST

Radiated Emission



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5 PHOTOGRAPH OF EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos.

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

