RF Test Report

Report No.:AGC03739230301EE14

PRODUCT DESIGNATION	:	Dual Band Digital Two Way Radio
BRAND NAME	:	VITAI, JUENTAI, ZASTONE
TEST MODEL	:	VDG-UV008, JD-UV008, ZT-UV008
APPLICANT	:	VITAI ELECTRONICS CO., LIMITED
DATE OF ISSUE	:	Apr. 13, 2023
STANDARD(S)	:	ETSI EN 303 345-1 V1.1.1: 2019-06 ETSI EN 303 345-3 V1.1.1: 2021-06
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd.

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Apr. 13, 2023	Valid	Initial release

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1. TEST RESULT CERTIFICATION

Applicant	VITAI ELECTRONICS CO., LIMITED
Address	Room 1901 Buiding 1, Zhongjun Tianfeng,Jiangbinbei Road,Quanzhou,Fujian Province ,China
Manufacturer	VITAI ELECTRONICS CO., LIMITED
Address	Room 1901 Buiding 1, Zhongjun Tianfeng,Jiangbinbei Road,Quanzhou,Fujian Province ,China
Factory	VITAI ELECTRONICS CO., LIMITED
Address	Room 1901 Buiding 1, Zhongjun Tianfeng,Jiangbinbei Road,Quanzhou,Fujian Province ,China
Product Designation	Dual Band Digital Two Way Radio
Brand Name	VITAI, JUENTAI, ZASTONE
Test Model	VDG-UV008
Series Model	JD-UV008, ZT-UV008
Difference Description	Only the model name & brand name are different.
Date of receipt of test item	Mar. 24, 2023
Date of Test	Mar. 24, 2023~Apr. 13, 2023
Deviation	None
Test Result	Pass

The above equipment was tested by ATTESTATION OF GLOBAL COMPLIANCE (SHENZHEN) CO., LTD. for compliance with the requirements set forth in the European Standard ETSI EN 303 345-3. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Prepared By

Bibo Zhang
(Project Engineer) Apr. 13, 2023

Reviewed By

Calvin Liu
(Reviewer) Apr. 13, 2023

Approved By

Max Zhang
Authorized Officer Apr. 13, 2023

2. TECHNICAL INFORMATION

2.1. EUT DESCRIPTION

Details of technical specification refer to the description in follows:

Hardware Version	LD8800DF697
Software Version	V1.02.03.1007
Modulation method	Frequency modulation (FM)
Frequency band	VHF band II: 87.5 MHz to 108 MHz
Antenna Type	External antenna
Power Supply	DC 7.4V, 2500mAh by battery, Charger DC 8.4V, 0.5A
Adapter Parameter	INPUT: AC 100-240V 50/60Hz, 0.2A OUTPUT: DC 12V 0.5A
Charger Parameter	INPUT:DC 12V 0.5A OUTPUT:DC 8.4V 500mA

NOTE: *For more information, please refer to User's Manual.*

2.2. OBJECTIVE

Perform Radio Spectrum tests for CE Marking according to the provisions of article 3.2 of the Radio Equipment Directive (2014/53/EU) for the BT function of the EUT.

2.3. TEST SIGNAL CONFIGURATIONS

The generated FM signals (wanted and unwanted) and the blocking signal shall be in accordance with table The configuration is based on Recommendation ITU-R BS.641 [i.6].

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	±60,8 kHz peak deviation	15,9 kHz RMS deviation (see note 2)	80 % depth
Pilot tone	None	None	None
NOTE 1: The filter shall have a cut-off frequency of 15 kHz and a minimum roll-off of 60 dB/octave. 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).			

2.4. TEST ITEMS AND THE RESULTS

Test items and the results are as bellow:

Basic Standard	Test Type	Result
EN 303 345-3 Clause 4.2	Sensitivity	Pass
EN 303 345-3 Clause 4.3	Adjacent channel selectivity and blocking	Pass
EN 303 345-3 Clause 4.4	Unwanted emissions in the spurious domain	Pass

2.5. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	FM receiving mode at 98MHz

2.6. ENVIRONMENTAL CONDITIONS

- Temperature: 15-35ºC
-Relative Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

3. TEST FACILITY

Test Site:	Attestation of Global Compliance (Shenzhen) Co., Ltd.
Address:	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

4. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by ISO.

- Uncertainty of Sensitivity, Uc = ±3.8dB
- Uncertainty of Adjacent channel selectivity and blocking, Uc = ±3.8dB

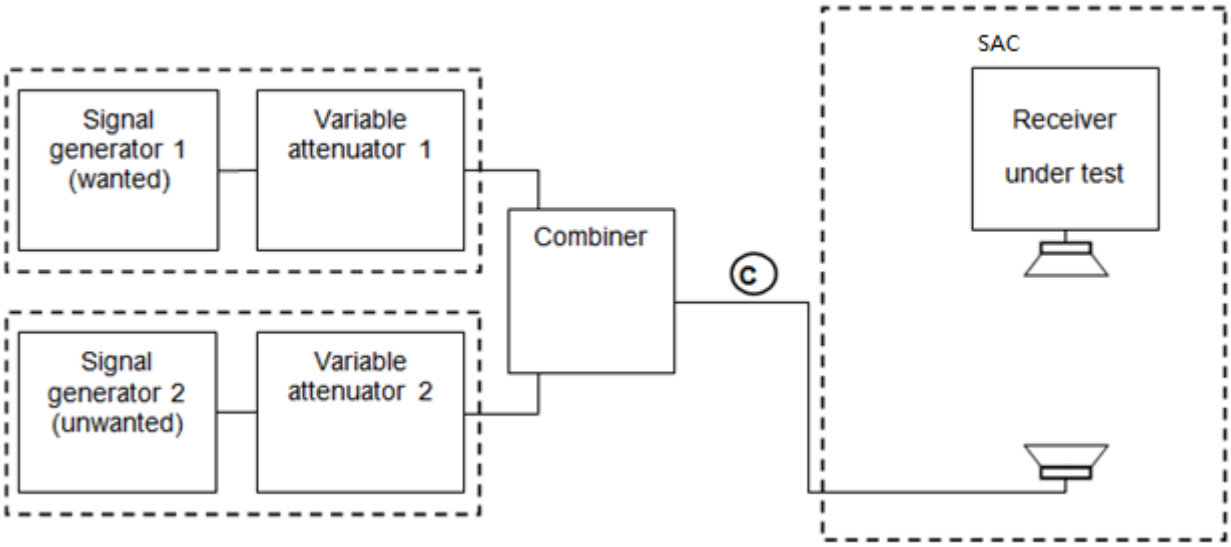
5. TECHNICAL REQUIREMENTS

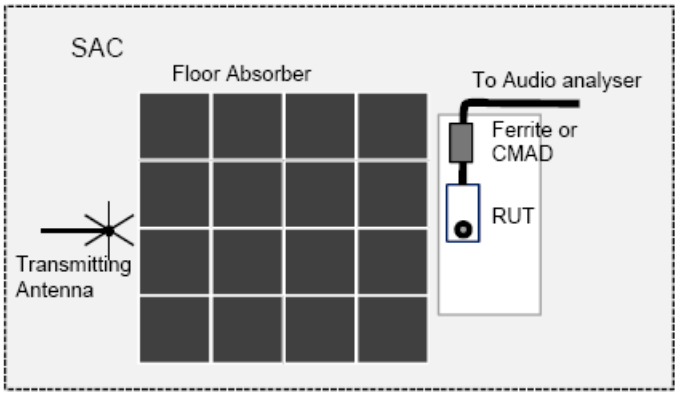
5.1 SENSITIVITY

5.1.1 MEASUREMENT EQUIPMENT USED:

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
MXG X-Series Vector Signal Generator	Agilent	N5182B	MY53050647	Aug. 03, 2022	Aug. 02, 2023
MXG X-Series Vector Signal Generator	Agilent	N5182A	MY50140530	Aug. 03, 2022	Aug. 02, 2023
Audio Analyzer	R&S	UPV	101349	Aug. 30, 2021	Aug. 29, 2023
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 05, 2023	Jan. 04, 2025
UNIVERSAL RADIO COMMUMICATION	HP	8920B	US35010161	Aug. 03, 2022	Aug. 02, 2023
Directional Coupler	Werlatone	C5571-10	99463	Mar. 10, 2022	Mar. 09, 2024

5.1.2 TEST SETUP:





5.1.3 TEST LIMITS:

The limits for sensitivity specified in the table shall apply. Each figure quoted is the required level of wanted signal which provides a given level of audio quality. The audio impairment criteria relevant for these tests is that the audio SNR ⩾ 40 dBQ ref ±60,8 kHz deviation, and that there shall be 10 seconds of audio with no subjective impairments (e.g. clicks resulting from FM threshold effects).

FM sensitivity requirements

De-modulation	Tuned frequency band	Wanted signal Centre frequency (MHz)	Required sensitivity limit	
			Conducted (dBm)	Radiated (dB μ V/m)
FM	VHF band II	98	-90	50 (see note)
NOTE: For products with an integral antenna, the requirement is relaxed to 67 dBμV/m.				

5.1.4 TEST PROCEDURE:

1. For radiated testing, 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 as specified, and to the frequency specified. The signal level is adjusted to provide the level, as measured at ©, specified plus 30 dB.

4. The receiver (EUT) is tuned to the frequency of the 'wanted' signal generator. The 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 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 are met then the receiver has passed the test.

5.1.5 TEST RESULTS:

Wanted FM signal: 1KHz tone, ±60,8 kHz peak deviation							
EUT Mode	Wanted signal frequency (MHz)	Wanted level (dBm)	Actual Signal Generator Level (Note) (dBm)	Measured S (dBQ)	Measured N (dBQ)	SNR (dB)	Clean Audio
FM	98	-90	-78.60	1.38	-41.58	42.96	Clean Audio
Impairment Criteria : SNR ≥ 40 dBQ ref ±60,8 kHz deviation; clean audio							
Conclusion: PASS							
Note: According pre-calibration,under the same test environment and setup, this level of the wanted signal generator's output can produce the wanted level at the EUT's antenna port.							

5.2 ADJACENT CHANNEL SELECTIVITY AND BLOCKING

5.2.1 MEASUREMENT EQUIPMENT USED:

Same as 5.1.1

5.2.2 TEST SETUP:

Same as 5.1.2

5.2.3 TEST LIMITS:

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	±N × 100 kHz	±800 kHz

Adjacent channel selectivity and blocking requirements

Demodulation (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 (dB μ V/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 dB μ V/m.

5.2.4 TEST PROCEDURE:

1. For radiated testing, 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 in above table, with the 'unwanted' generator switched off

3. The receiver (EUT) is tuned to the frequency of the 'wanted' signal generator. The 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.

4. 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 in above Table. The signal level is adjusted to provide the level, as measured at ©, specified in above Table, 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 ©.

5. The 'wanted' signal generator is switched back on.

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 are met then the receiver has passed the test.

5.2.5 TEST RESULTS:

Wanted Signal and Level: 1KHz tone, ±60,8 kHz peak deviation, 98MHz, -84dBm and Actual Signal Generator Level is **-71.6dBm** according pre-calibration.						
Unwanted Signal: FM modulated signal with weighted noise and 32 kHz quasi-peak deviation						
Unwanted Frequency (MHz)	Unwanted Level (dBm)	Actual Unwanted Signal Generator Level(Note) (dBm)	Measured S (dBQ)	Measured N (dBQ)	SNR (dB)	Clean Audio
97.8	-83	-65.6	1.15	-43.25	44.40	Clean Audio
97.7	-68	-55.6	1.16	-42.31	43.47	Clean Audio
97.6	-55	-42.6	1.13	-43.16	44.29	Clean Audio
98.2	-80	-69.6	1.14	-42.33	43.47	Clean Audio
98.3	-66	-53.6	1.12	-41.52	42.64	Clean Audio
98.4	-52	-42.6	1.15	-42.38	43.53	Clean Audio
Impairment Criteria : SNR ≥ 40 dBQ ref ±60,8 kHz deviation; clean audio						
Conclusion: PASS						
Note: According pre-calibration, under the same test environment and setup, this level of the unwanted signal generator's output can produce the unwanted level at the EUT's antenna port.						

Wanted Signal and Level: 1KHz tone, ±60,8 kHz peak deviation, 98MHz, -84dBm and Actual Signal Generator Level is **-71.6dBm** according pre-calibration.						
Unwanted Signal: AM signal 1 kHz tone 80 % depth						
Unwanted Frequency (MHz)	Unwanted Level (dBm)	Actual Unwanted Signal Generator Level(Note) (dBm)	Measured S (dBQ)	Measured N (dBQ)	SNR (dB)	Clean Audio
97.2	-54	-41.6	1.16	-42.25	43.41	Clean Audio
98.8	-54	-41.6	1.17	-42.42	43.59	Clean Audio
Impairment Criteria : SNR ≥ 40 dBQ ref ±60,8 kHz deviation; clean audio						
Conclusion: PASS						
Note: According pre-calibration,under the same test environment and setup, this level of the unwanted signal generator's output can produce the unwanted level at the EUT's antenna port.						

5.3 UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

5.3.1 TEST LIMITS:

Limits for radiated emission 30MHz to 1 GHz at a measurement distance of 3 m

Frequency range (MHz)	Class B limits dB(μV/m)
30 to 230	40
230 to 1000	47

Limits for radiated emission above 1 GHz at a measurement distance of 3 m

Frequency (MHz)	Class B limits dB(μV/m)	
	Peak	Average
1000 to 3000	70	50
3000 to 6000	74	54

Limits for radiated emission from FM receivers at a measurement distance of 3 m

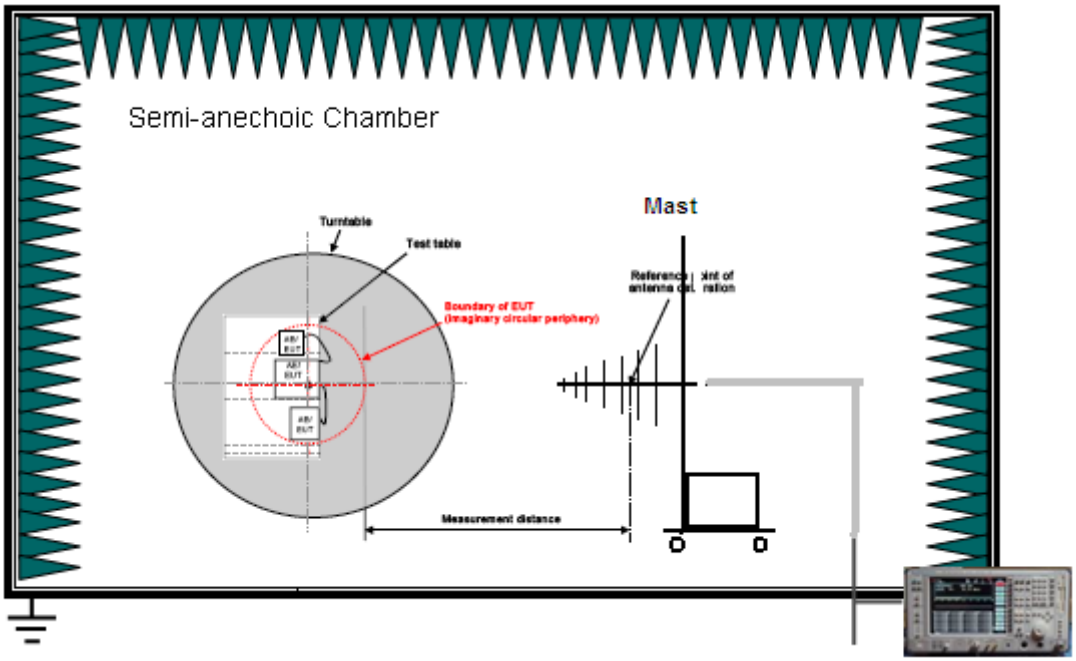
Frequency (MHz)	Class B limits dB(μV/m)	
	Fundamental	Harmonics
30 to 230	60	52
230 to 300		52
300 to 1 000		56
Note: These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the LO. Signals at all other frequencies shall be compliant with the limits given in the above tables.		

5.3.2 MEASUREMENT EQUIPMENT USED:

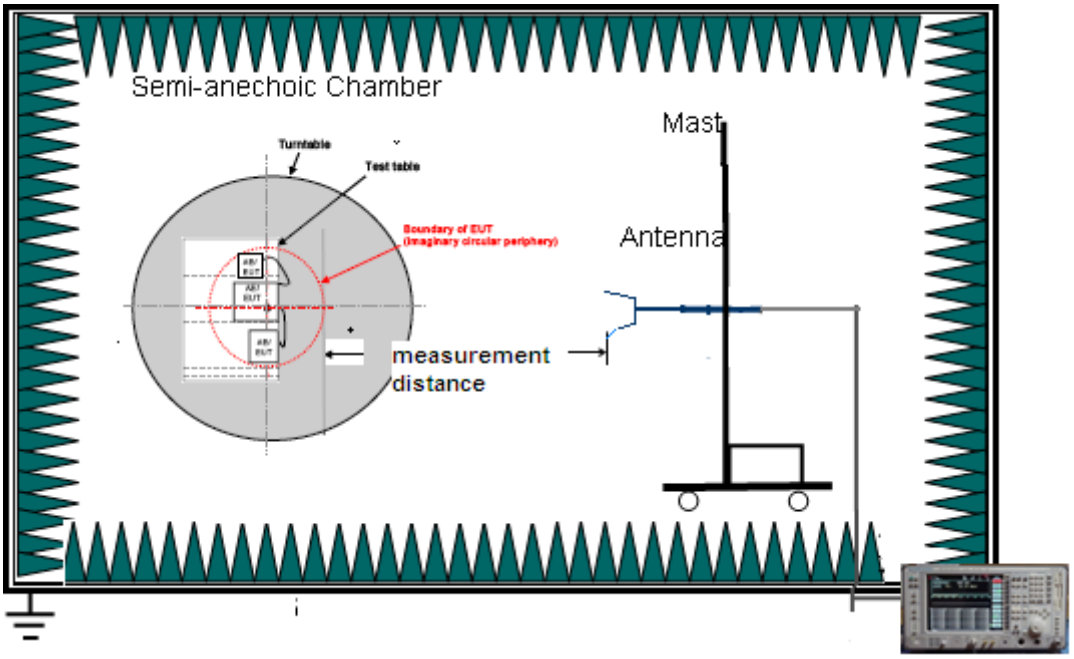
Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Aug. 04, 2022	Aug. 03, 2023
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Broadband Preamplifier	ETS-LINDGREN	3117PA	00225134	Sep. 01, 2022	Aug. 31, 2023
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 05, 2023	Jan. 04, 2025

5.3.3 TEST SETUP:

Radiated emission below 1GHz



Radiated emission Above 1GHz



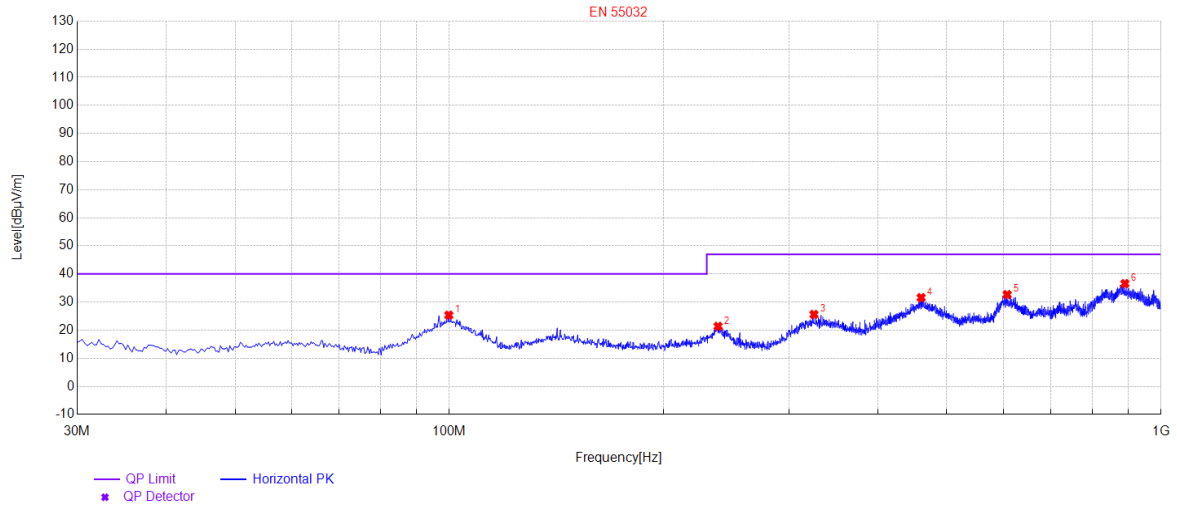
5.3.4 TEST PROCEDURE:

(1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10cm non-conductive covering to insulate the EUT from the ground plane.
(2) Support equipment, if needed, was placed as per EN 55032.
(3) All I/O cables were positioned to simulate typical actual usage as per EN 55032.
(4) The EUT was operated in the selected mode(s) while the ports are exercised in accordance with Clause 2.
(5) The antenna was placed at 3 meters away from the EUT as stated in EN 55032. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
(6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
(7) The test mode(s) were scanned during the test:
(8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

5.3.5 TEST RESULTS:

Test graph and data for Radiated Emission below 1GHz

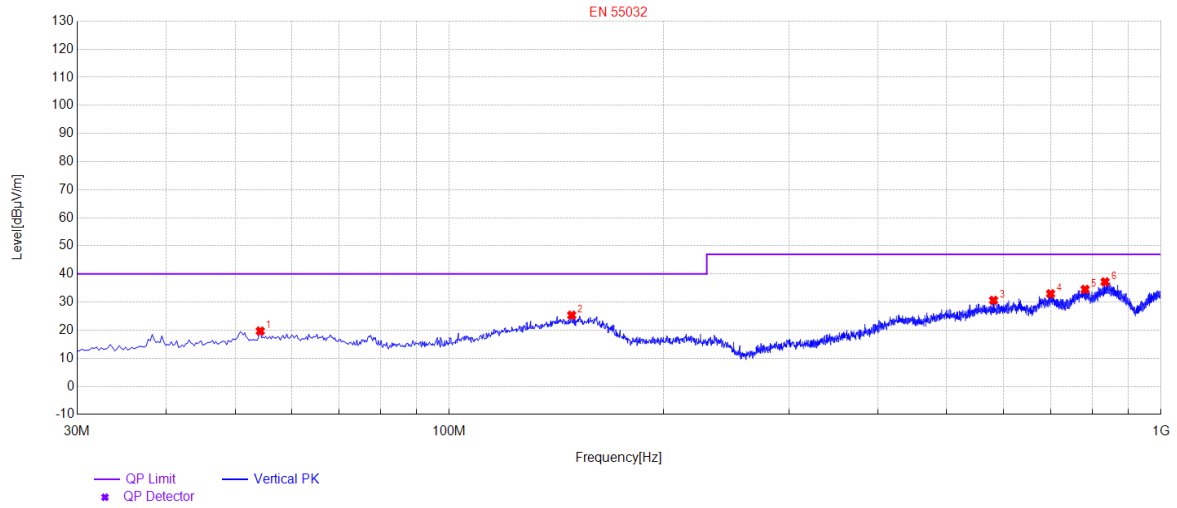
Test Mode: Mode 1



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	99.84	25.33	21.38	40.00	14.67	100	50	Horizontal
2	238.55	21.36	17.30	47.00	25.64	100	180	Horizontal
3	325.365	25.61	21.20	47.00	21.39	100	320	Horizontal
4	460.195	31.58	27.63	47.00	15.42	100	270	Horizontal
5	607.8775	32.66	28.43	47.00	14.34	100	80	Horizontal
6	889.6625	36.56	32.53	47.00	10.44	100	180	Horizontal

Test graph and data for Radiated Emission below 1GHz

Test Mode: Mode 1



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	54.25	19.68	14.00	40.00	20.32	100	310	Vertical
2	148.5825	25.32	20.74	40.00	14.68	100	140	Vertical
3	581.6875	30.60	25.66	47.00	16.40	100	260	Vertical
4	699.5425	32.95	29.03	47.00	14.05	100	70	Vertical
5	782.235	34.50	30.80	47.00	12.50	100	300	Vertical
6	834.3725	37.17	32.26	47.00	9.83	100	280	Vertical

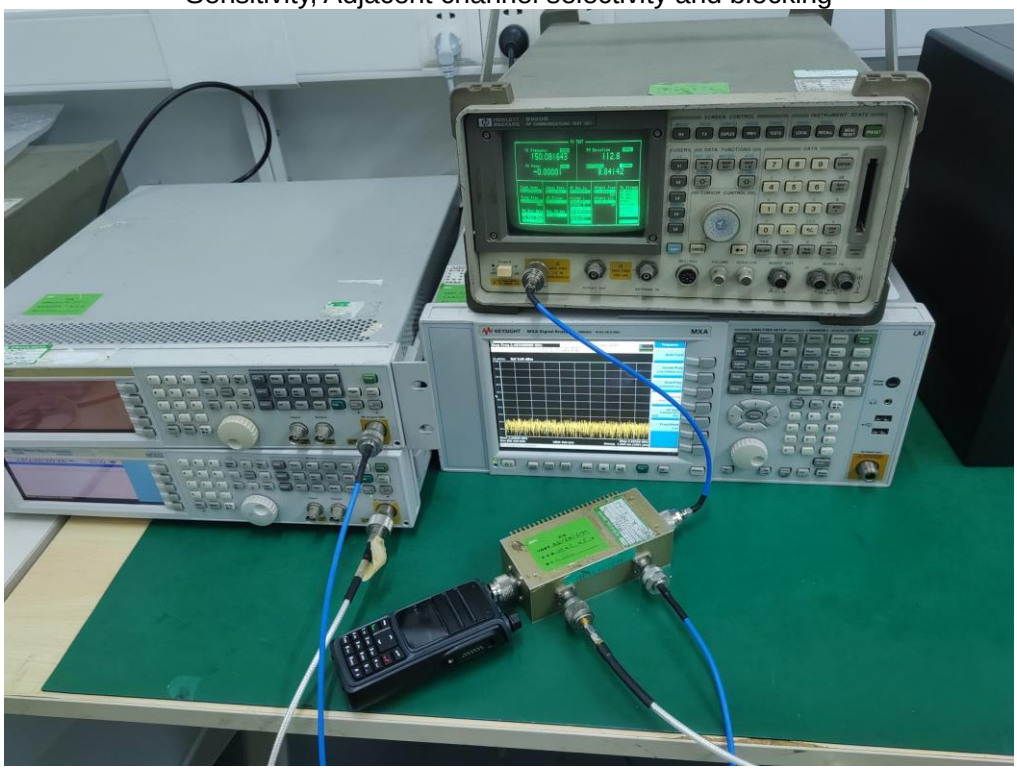
Result: Pass

Note:

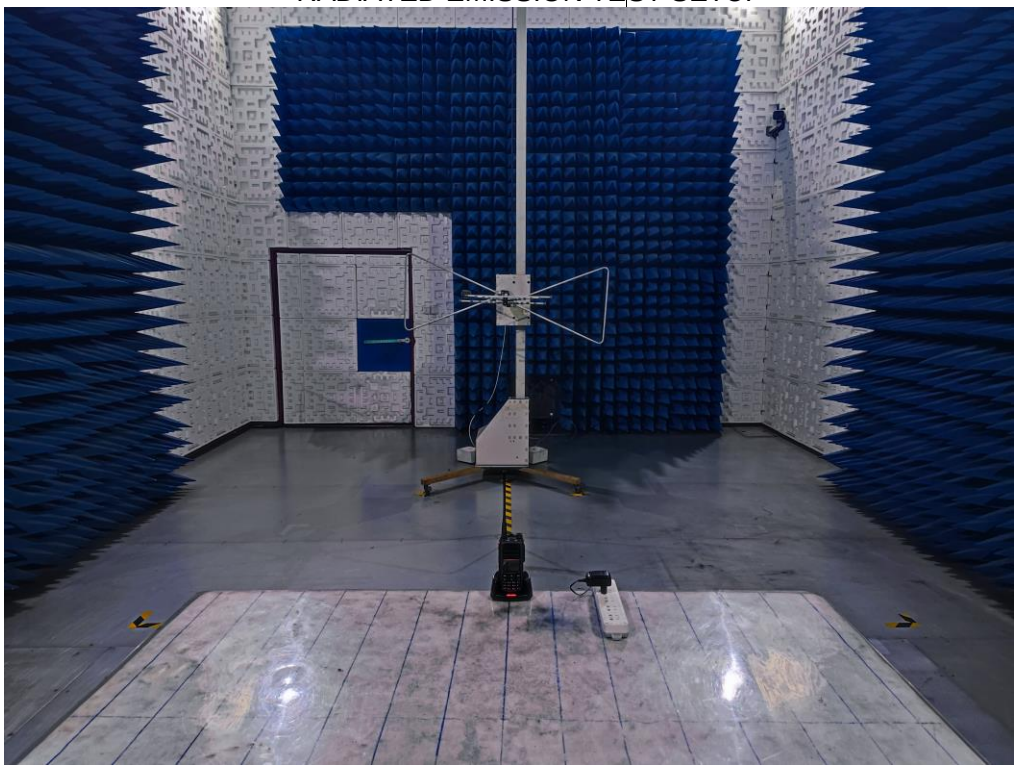
1. Margin = Limit-Level ; Factor = Cable Loss + Antenna Factor.
2. The highest internal frequency of EUT is not more than 108MHz, so the highest measured frequency is 1GHz for radiated emission.

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Sensitivity, Adjacent channel selectivity and blocking



RADIATED EMISSION TEST SETUP



----END OF REPORT----

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.