

FCC Test Report

Application No.: DNT2504110249R3504-04126

Applicant: SHENZHEN ZEALOT DIGITAL TECHNOLOGY CO., LTD

Address of Applicant: 401,501,building 3,NO.8,Yong Tai Road,east District,BaiShi xia

Community,Fu Yong street,BaoAn District,ShenZhen China

EUT Description: WIRELESS SPEAKER

Model No.: ZEALOT-ZE01

FCC ID: 2AFKR-ZE01

Input:DC 5V;

Power Supply:

DC 11.1V From 24000mAh rechargeable lithium-ion battery

Trade Mark: ZEALOT

47 CFR FCC Part 2, Subpart J

Standards: 47 CFR Part 15, Subpart C

ANSI C63.10: 2013

Date of Receipt: 2025/4/10

Date of Test: 2025/4/11 to 2025/4/22

Date of Issue: 2025/4/29

Test Result: PASS

Prepared By: Wanne Jon (Testing Engineer)

Reviewed By: (Project Engineer)

Approved By: (Manager)

Note: If there is any objection to the results in this report, please submit a written inquiry to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp, and is issued by the company in accordance with the requirements of the "Conditions of Issuance of Test Reports" printed in the attached page. Unless otherwise stated, the results presented in this report only apply to the samples tested this time. Partial reproduction of this report is not allowed unless approved by the company in writing.



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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0		Apr.29, 2025	Valid	Original Report



1 Test Summary

1 Cot Gairminary				
Test Item	Test Requirement	Test Method	Test Result	Result
Antenna Requirement	15.203/247(b)	<u> </u>	Clause 3.1	PASS
20dB Emission Bandwidth	15.247 (a)(1)	ANSI C63.10: 2013	Clause 3.2	PASS
Conducted Peak Output Power	15.247 (b)(1)	ANSI C63.10: 2013	Clause 3.3	PASS
Carrier Frequencies Separation	15.247 (a)(1)	ANSI C63.10: 2013	Clause 3.4	PASS
Dwell Time	15.247 (a)(1)	ANSI C63.10: 2013	Clause 3.5	PASS
Hopping Channel Number	15.247 (a)(1)	ANSI C63.10: 2013	Clause 3.6	PASS
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10: 2013	Clause 3.7	PASS
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10: 2013	Clause 3.8	PASS
Radiated Spurious	15.247(d);	ANSI C63.10: 2013	Clause 3.9	PASS
emissions	15.205/15.209	ANSI C03. 10. 2013	Clause 3.9	FAGG
Restricted bands around fundamental frequency (Radiated Emission)	15.247(d); 15.205/15.209	ANSI C63.10: 2013	Clause 3.10	PASS
AC Power Line Conducted Emission	15.207	ANSI C63.10: 2013	Clause 3.11	PASS

Note:

1. "N/A" denotes test is not applicable in this test report.



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2 General Information

2.1 Test Location

Company:	Dongguan DN Testing Co., Ltd
Address:	No. 1, West Fourth Street, South Xinfa Road, Wusha Liwu, Chang ' an Town, Dongguan City, Guangdong P.R.China
Test engineer:	Wayne Lin



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2.2 General Description of EUT

Manufacturer:	SHENZHEN ZEALOT DIGITAL TECHNOLOGY CO.,LTD				
Address of Manufacturer:	401,501,building 3,NO.8,Yong Tai Road,east District,BaiShi xia Community,Fu Yong street,BaoAn District,ShenZhen China				
Test EUT Description:	WIRELESS SPEAKER				
Model No.:	ZEALOT-ZE01				
Additional Model(s):					
Chip Type:	ATS2835K				
Serial number:	PR2504110246R3504				
Power Supply	Input:DC 5V; DC 11.1V From 24000mAh rechargeable lithium-ion battery				
Trade Mark:	ZEALOT				
Hardware Version:	V1.0				
Software Version:	V1.0				
Operation Frequency:	2402 MHz to 2480 MHz				
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)				
Type of Modulation:	GFSK,π/4-DQPSK,8DPSK				
Sample Type:					
Antenna Type:	☐ External, ☑ Integrated				
Antenna Ports:					
Antenna Gain*:	⊠ Provided by applicant				
Antenna Gain .	-0.58dBi				
	⊠ Provided by applicant				
RF Cable*:	0.5dB(0.6~1GHz); 0.8dB(1.4~2GHz); 1.0dB(2.1~2.7GHz); 1.5dB(3~4GHz); 1.8dB(4.4~6GHz);				

Remark:

^{*}All models are just color differences, motherboard, PCB circuit board, chip, electronic components, appearance is all the same.

^{*}Since the above data and/or information is provided by the applicant relevant results or conclusions of this report are only made for these data and/or information , DNT is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.



2.3 Channel List

	Operation Frequency of each channel						
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz
6	2408MHz	26	2428MHz	46	2448MHz	66	2468MHz
7	2409MHz	27	2429MHz	47	2449MHz	67	2469MHz
8	2410MHz	28	2430MHz	48	2450MHz	68	2470MHz
9	2411MHz	29	2431MHz	49	2451MHz	69	2471MHz
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
_ 12	2414MHz	32	2434MHz	52	2454MHz	72	2474MHz
13	2415MHz	33	2435MHz	53	2455MHz	73	2475MHz
14	2416MHz	34	2436MHz	54	2456MHz	74	2476MHz
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		

Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel		Frequency
	The Lowest channel	2402MHz
	The Middle channel	2441MHz
	The Highest channel	2480MHz



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2.4 5Test Environment and Mode

Operating Environment:	
Temperature:	20~25.0 °C
Humidity:	45~56 % RH
Atmospheric Pressure:	101.0~101.30 KPa
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.



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2.5 Power Setting of Test Software

Software Name	FC	CC_Tool_V3.0 (for ZS283F	M)
Frequency(MHz)	2402	2441	2480
GFSK Setting	0	0	0
π/4-DQPSK Setting	0	0	0
8DPSK	0	0	0

2.6 Description of Support Units

The EUT has been tested independent unit.

2.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

Lab A:

• FCC, USA

Designation Number: CN1348

• A2LA (Certificate No. 7050.01)

DONGGUAN DN TESTING CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 7050.01.

• Innovation, Science and Economic Development Canada

DONGGUAN DN TESTING CO., LTD. EMC Laboratory has been recognized by ISED as an accredited testing laboratory. CAB identifier is CN0149.

IC#: 30755.



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2.8 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty		
1	20dB Emission Bandwidth	±0.0196%		
2	Carrier Frequency Separation	±1.9%		
3	Number of Hopping Channel	±1.9%		
4	Time of Occupancy	±0.028%		
5	Max Peak Conducted Output Power	±0.743 dB		
6	Band-edge Spurious Emission	±1.328 dB		
7	0.14.185045.14	9KHz-1GHz:±0.746dB		
	Conducted RF Spurious Emission	1GHz-26GHz:±1.328dB		

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No.	Item	Measurement Uncertainty		
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)		
	0, 0, 0, 0, 0,	± 4.8dB (Below 1GHz)		
0	Dedicted Environmen	± 4.8dB (1GHz to 6GHz)		
2	Radiated Emission	± 4.5dB (6GHz to 18GHz)		
	of of of of	± 5.02dB (Above 18GHz)		



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2.9 Equipment List

For Connect EUT Antenna Terminal Test							
Description	Manufacturer	Model	Serial Number	Cal date	Due date		
Signal Generator	Keysight	N5181A-6G	MY48180415	2024-10-23	2025-10-22		
Signal Generator	Keysight	N5182B	MY57300617	2024-10-23	2025-10-22		
Power supply	Keysight	E3640A	ZB2022656	2024-10-23	2025-10-22		
Radio Communication Tester	R&S	CMW500	105082	2024-10-23	2025-10-22		
Spectrum Analyzer	Aglient	N9010A	MY52221458	2024-10-23	2025-10-22		
BT/WIFI Test Software	Tonscend	JS1120 V3.1.83	NA	NA	NA		
RF Control Unit	Tonscend	JS0806-2	22F8060581	NA	NA		
Power Sensor	Anritsu	ML2495A	2129005	2024-10-23	2025-10-22		
Pulse Power Sensor	Anritsu	MA2411B	1911397	2024-10-23	2025-10-22		
temperature and humidity box	SCOTEK	SCD-C40-80PRO	6866682020008	2024-10-23	2025-10-22		

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	Test Equipment for Conducted Emission						
Description	Description Manufacturer Model Serial Number Cal Date D						
Receiver	R&S	ESCI3	101152	2024-10-23	2025-10-22		
LISN	R&S	ENV216	102874	2024-10-23	2025-10-22		
ISN	R&S	ENY81-CA6	1309.8590.03	2024-10-23	2025-10-22		

Test Ed	quipment for F	Radiated Emis	sion(30MHz	-1000MHz	<u>z)</u>
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Receiver	R&S	ESR7	102497	2024-10-23	2025-10-22
Test Software	ETS-LINDGREN	TiLE-FULL	NA	NA	NA
RF Cable	ETS-LINDGREN	RFC-NMS-100- NMS-350-IN	NA	2024-10-23	2025-10-22
Log periodic antenna	ETS-LINDGREN	VULB 9168	01475	2022-11-28	2025-11-27
Pre-amplifier	Schwarzbeck	BBV9743B	00423	2024-10-23	2025-10-22

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Test E	quipment for I	Radiated Emi	ssion(Above	1000MHz	
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Frequency analyser	Keysight	N9010A	MY52221458	2024-10-23	2025-10-22
RF Cable	ETS-LINDGREN	RFC-NMS-100- NMS-350-IN	NA	2024-10-23	2025-10-22
Horn Antenna	ETS-LINDGREN	3117	00252567	2022-11-28	2025-11-27
Double ridged waveguide antenna	ETS-LINDGREN	3116C	00251780	2022-11-28	2025-11-27
Test Software	ETS-LINDGREN	TiLE-FULL	NA	NA	NA
Pre-amplifier	ETS-LINDGREN	3117-PA	252567	2024-10-23	2025-10-22
Pre-amplifier	ETS-LINDGREN	3116C-PA	251780	2024-10-23	2025-10-22

2.10 Assistant equipment used for test

Code	Equipment	Manufacturer	Model No.	Equipment No.
1	Computer	acer	N22C8	EMC notebook01
2	Adapter	HUAWEI	HW-100225C00	NA



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3 Test results and Measurement Data

3.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203 /247(c)

15.203 requirement:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

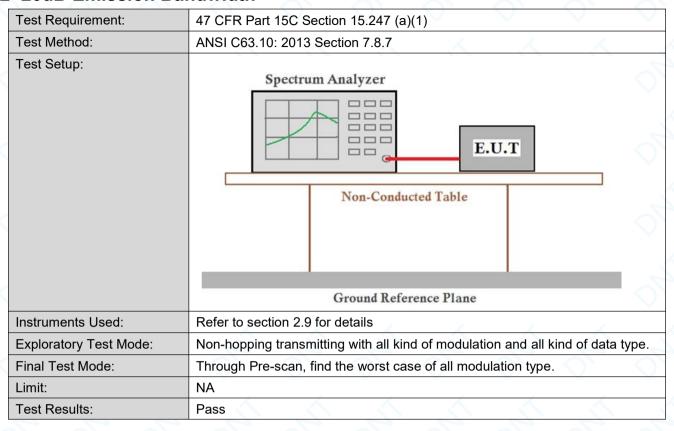
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -0.58dBi.



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3.2 20dB Emission Bandwidth

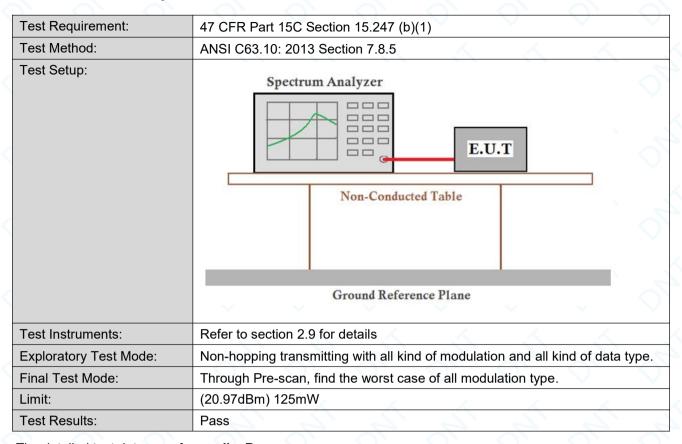


The detailed test data see: Appendix A



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3.3 Conducted Output Power

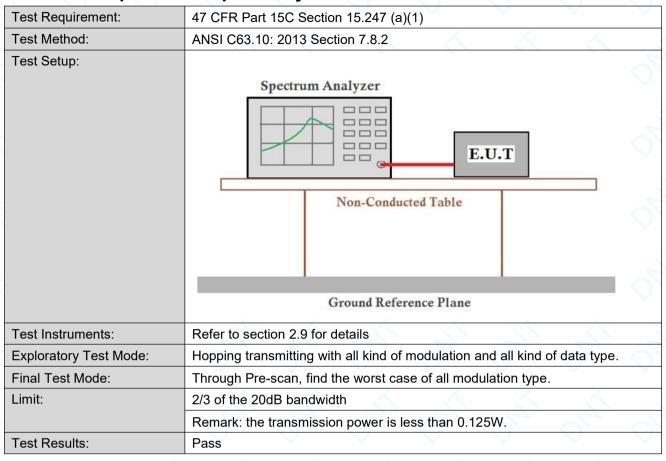


The detailed test data see: Appendix B



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3.4 Carrier Frequencies Separationy

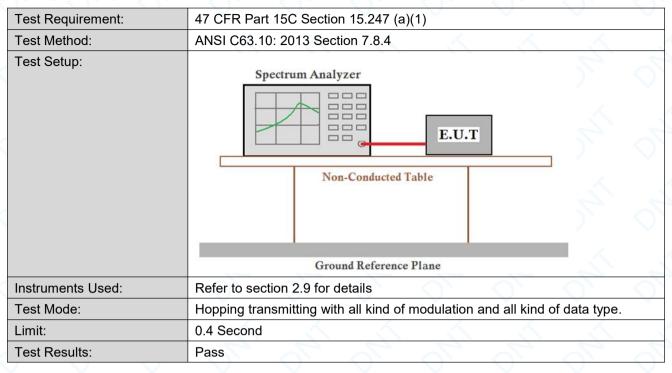


The detailed test data see: Appendix C



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3.5 Dwell Time

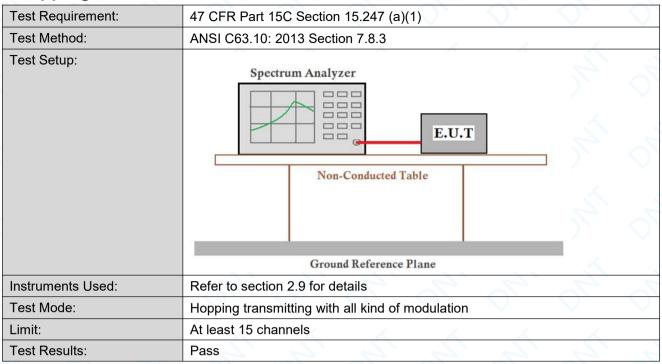


The detailed test data see: Appendix D



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3.6 Hopping Channel Number

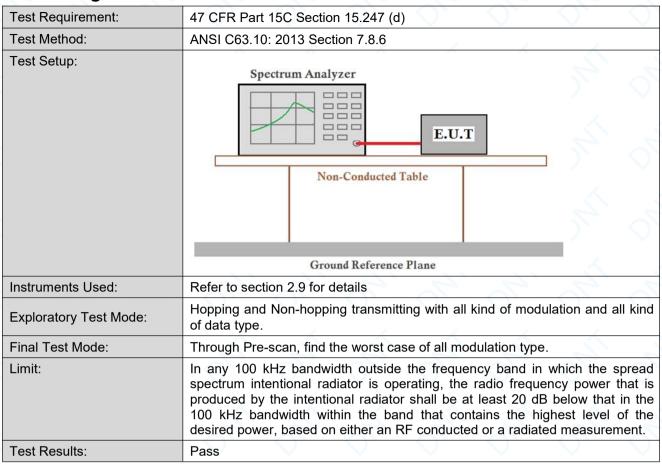


The detailed test data see: Appendix E



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3.7 Band-edge for RF Conducted Emissions



The detailed test data see: Appendix F



3.8 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.11
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane
Instruments Used:	Refer to section 2.9 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the worst case of all modulation type.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Results:	Pass

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The detailed test data see: Appendix G



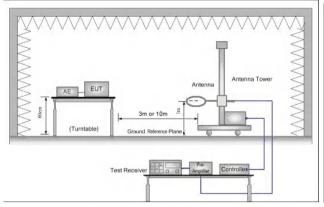
3.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205						
Test Method:	ANSI C63.10: 2013 Section 11.12						
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)						
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark		
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak		
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average		
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak		
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak		
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average		
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak		
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak		
	_	Peak	1MHz	3MHz	Peak		
	Above 1GHz	Peak	1MHz	10Hz (DC≥0.98)	Average		
				≥1/T (DC<0.98)			
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)		
	0.009MHz-0.490MHz	2400/F(kHz)	- <	_<	300		
	0.490MHz-1.705MHz	24000/F(kHz)	-	6-7	30		
	1.705MHz-30MHz	30	<u></u>	<u> </u>	30		
	30MHz-88MHz	100	40.0	Quasi-peak	3		
	88MHz-216MHz	150	43.5	Quasi-peak	3		
	216MHz-960MHz	200	46.0	Quasi-peak	3		
	960MHz-1GHz	500	54.0	Quasi-peak	3		
	Above 1GHz	500	54.0	Average	3		
	Remark: 15.35(b),Unless emissions is 20dB above applicable to the equipm emission level radiated b	e the maximum per ent under test. This	mitted avera	ge emission lir	nit		

S No Section 1

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Test Setup:



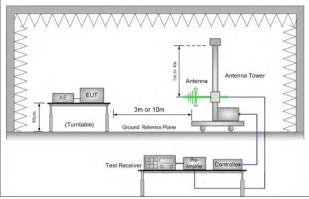


Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz

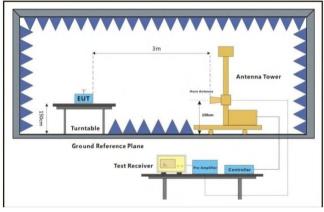


Figure 3. Above 1 GHz

Test Procedure:

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel ,the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.
- . Repeat above procedures until all frequencies measured was complete.

Dongguan DN Testing Co., Ltd.