

Test Report

Product: Remote Dog Training Collar

Trade Mark: -

Model Number: TZ-926

FCC ID: 2AY3ETZ-926

Prepared for

TIZE INTERNATIONAL CO., LIMITED

3/F, Building 1, TianKou Industrial Area, Huang Tian, Xixiang, BaoAn
District, ShenZhen, GuangDong Province, China

Prepared by

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TEST RESULT CERTIFICATION

Applicant's Name..... : TIZE INTERNATIONAL CO., LIMITED
Address : 3/F, Building 1, TianKou Industrial Area, Huang Tian, Xixiang,
BaoAn District, ShenZhen, Guangdong Province, China
Manufacturer's Name : ShenZhen TIZE Technology Co., Ltd
205. Building 18, Jiatiangang Industrial Zone, Huangtian
Address : Community, Hangcheng Street, Bao'an District, Shenzhen,
China

Product description

Product name : Remote Dog Training Collar
Model Number : TZ-926
Standards..... : FCC Part 15.231(a)
Test procedure..... : IEEE/ANSI C63.10-2020

This device described above has been tested by Shenzhen HongBiao Certification& Testing Co., Ltd and the test results show that the equipment under test (EUT) is in compliance with the EMC requirements. And it is applicable only to the tested sample identified in the report.

Date of Test

Date (s) of performance of tests..... : September 04, 2023~September 26, 2023
Test Result..... : **Pass**

Testing Engineer :

Zoe Su

(Z o e S u)

Technical Manager :

Gary Lu

(G a r y L u)

Authorized Signatory :

Leo

(L e o S u)



[illegible]

1 General Description

1.1 Description of EUT

Product name:	Remote Dog Training Collar
Model name:	TZ-926
Series Model:	TZ-920, TZ-921, TZ-922, TZ-923, TZ-925, TZ-927, TZ-928, TZ-929, TZ-930, TZ-931, TZ-932, TZ-933, TZ-935
Different of series model:	The color of appearance and model name of series models listed are different from the main model, but the circuit and the electronic construction are the same, declared by the manufacturer.
Operation frequency:	433.92MHz
Modulation type:	FSK
Antenna type:	Integral Antenna
Antenna gain:	0dBi
Hardware version:	V1.0
Software version:	V1.0
Battery:	DC 3.7V/500mAh
Power supply:	DC 3.7V by battery, USB 5V charging
Adapter information:	Input: AC 100-240V, 50/60Hz, Output: DC 5V/2A

1.2 Test Mode

Test Mode	Channel	Frequency (MHz)
1	1	433.92MHz
2	/	/
3	/	/

1.3 Operation Channel list

Channel	Frequency
1	433.92MHz

1.4 Test Setup

See photographs of the test setup in the report for the actual setup and connections between EUT and support equipment.

1.5 Ancillary Equipment

Equipment	Model	S/N	Manufacturer
/	/	/	/

2 Summary of Test Result

No.	Standard Section	Test Item	Result	Remark
1	15.203	Antenna requirement	Pass	
2	15.207	AC power line conducted emission	Pass	
3	15.231(b)	Field strength of fundamental and harmonic emissions	Pass	
4	15.205 and 15.209	Radiated emission and bandedge	Pass	
5	15.215	Occupied Bandwidth	Pass	
6	15.231(a)	Release time	Pass	

3 Test Facilities and Accreditations

3.1 Test Laboratory

Test Site	Shenzhen HongBiao Certification& Testing Co., Ltd
Test Site Location	Room 102, 201, Building 2, Yuanwanggu RFID Industrial Park, Tongguan Road, Tianliao Community, Yutang Street, Guangming District, Shenzhen, China
Telephone:	(86-755) 2998 9321
Fax:	(86-755) 2998 5110
FCC Registration No.:	CN1341
A2LA Certificate No.:	6765.01

3.2 Environmental Conditions

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

Temperature:	15°C~35°C
Relative Humidity:	20%~75%
Air Pressure:	98kPa~101kPa

3.3 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

The data and results quoted in this document are true and accurate values, and uncertainties are not involved in the calculations.

In addition, components and mass production processes that are similar to testing equipment may introduce additional deviations, and the manufacturer is solely responsible for the continued compliance of the equipment.

Measurement Frequency Range	U, (dB)	Note
RF frequency	2×10^{-5}	
RF power, conducted	± 0.57 dB	
Conducted emission(150kHz~30MHz)	± 2.5 dB	
Radiated emission(30MHz~1GHz)	± 4.2 dB	
Radiated emission (above 1GHz)	± 4.7 dB	
Temperature	± 1 degree	
Humidity	± 5 %	

3.4 Test Software

Software name	Manufacturer	Model	Version
EMI Measurement	Farad	EZ-EMC	V1.1.4.2
Conducted test system	MWRF-test	MTS 8310	V2.0.0

4 List of Test Equipment

Radiation emission							
Item	Equipment No.	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	HB-E001	Horn Antenna	Schwarzbeck	BBHA 9120D	02592	2022-04-02	2024-04-01
2	HB-E002	Biconical log-periodic composite antenna	Schwarzbeck	VULB 9168	01340	2022-04-06	2024-04-05
3	HB-E003	SHF-EHF Horn	Schwarzbeck	BBHA 91270	01193	2022-04-02	2024-04-01
4	HB-E004	Preamplifier	Noyetec	LAN-0910	NYCM1420101	2023-05-11	2024-05-10
5	HB-E005	Preamplifier	Noyetec	LAN-0118	NYCM1420102	2023-05-12	2024-05-11
6	HB-E006	Preamplifier	Noyetec	LAN-1840	NYCM1420103	2023-06-11	2024-06-10
7	HB-E007	EMI TEST RECEIVER	R&S	ESR7	102520	2023-05-12	2024-05-11
8	HB-E009	POSITINAL COTROLLE R	Noyetec	N/A	N/A	/	/
9	HB-E013	RF switch	Noyetec	NY-RF4	NY0CM1420204	/	/
10	HB-E066	Illuminance Tester	TASI	TA8121	N/A	2023-05-11	2024-05-10
11	HB-E075	Active loop antenna	Schwarzbeck	FMZB 1519B	1519B-245	2022-07-24	2024-07-23
Conduction emission							
Item	Equipment No.	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	HB-E014	4 Path V-LISN	Schwarzbeck	NNLK 8121	00770	2023-05-12	2024-05-11
2	HB-E015	Pulse Limiter	Schwarzbeck	VTSD 9561-F	00949	2023-05-12	2024-05-11
3	HB-E016	ZN23201	Noyetec	ZN23201	N/A	2023-05-11	2024-05-10
4	HB-E059	Attenuator	Xianghua	TS2-6-1	220215166	2023-05-12	2024-05-11
5	HB-E069	EMI TEST RECEIVER	R&S	ESCI	N/A	2023-05-12	2024-05-11
RF							
Item	Equipment No.	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	HB-E041	MXG AnaioG Signal Generator	Agilent	N5181A	MY47070421	2023-05-11	2024-05-10
2	HB-E042	WIDEBAND RADIO COMMUNICA	R&S	CMW500	132108	2023-05-11	2024-05-10

		TION TESTER					
3	HB-E043	MXG Anaio Signal Generator	Agilent	N5182A	US46240335	2023-05-11	2024-05-10
4	HB-E044	Signal& spectrum Analyzer	R&S	FSV3044	101264	2023-05-11	2024-05-10
5	HB-E045	RF Control Box	Noyetec	NY100-R FCB	N/A	/	/
6	HB-E058	Thermometer Clock Humidity Monitor	N/A	HTC-1	N/A	/	/
7	HB-E077	PXA Signal Analyzer	Agilent	N9030A	N/A	2023-05-11	2024-05-10

Note: the calibration interval of the above test instruments is 12&24 months and the calibrations are traceable to international system unit (SI).

5 Test Item And Results

5.1 Antenna Requirement

5.1.1 Standard Requirement

15.203 requirement: For intentional device, according to 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

5.1.2 Test Result

The EUT antenna is Intergral Antenna. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

5.2 AC Power Line Conducted Emission

5.2.1 Limits

Limits – Class B		
Frequency (MHz)	Limit (dBμV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Note:

- the tighter limit applies at the band edges.
- the limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

5.2.2 Test Procedures

a) EUT Operating Conditions

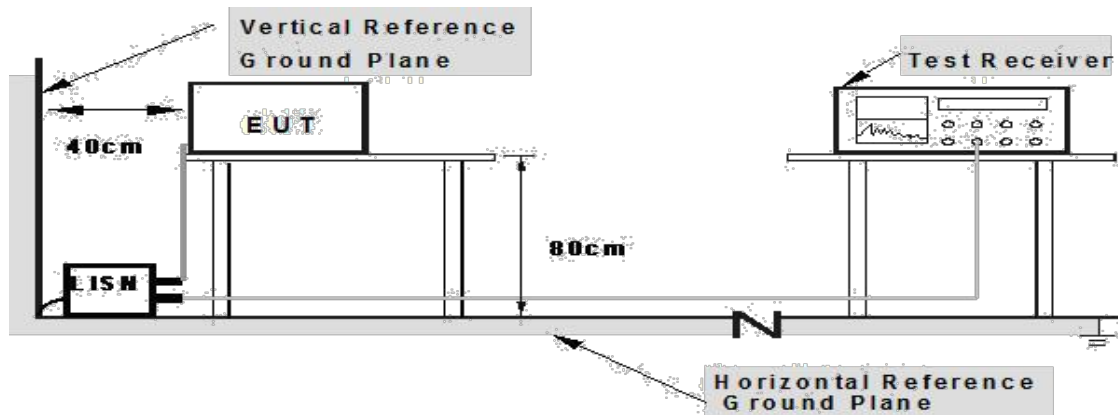
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

b) The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

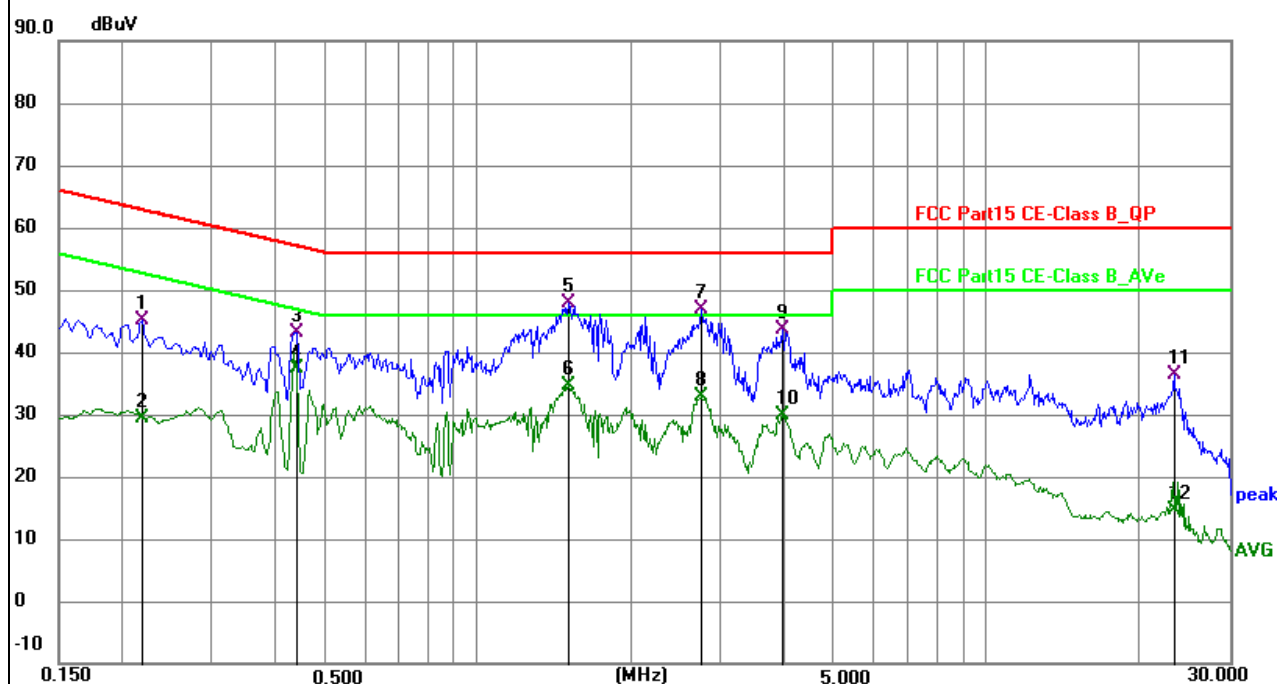
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN is at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item – photographs of the test setup.

5.2.3 Test Setup



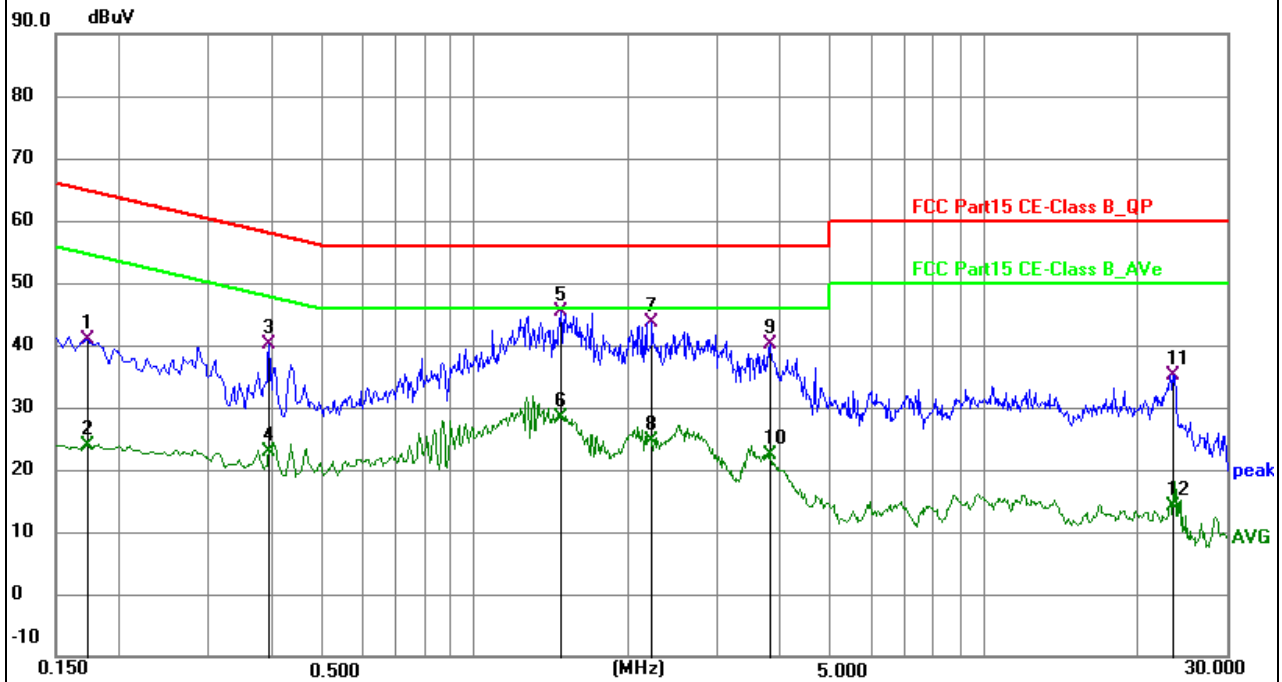
5.2.4 Test Result

EUT:	Remote Dog Training Collar	Model Name:	TZ-926
Test Mode:	TM1	Phase :	L
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2175	35.31	9.76	45.07	62.91	-17.84	QP	P	
2	0.2175	19.73	9.76	29.49	52.91	-23.42	AVG	P	
3	0.4380	33.18	9.99	43.17	57.10	-13.93	QP	P	
4	0.4380	27.42	9.99	37.41	47.10	-9.69	AVG	P	
5 *	1.5045	37.53	10.27	47.80	56.00	-8.20	QP	P	
6	1.5045	24.30	10.27	34.57	46.00	-11.43	AVG	P	
7	2.7510	36.40	10.48	46.88	56.00	-9.12	QP	P	
8	2.7510	22.44	10.48	32.92	46.00	-13.08	AVG	P	
9	3.9795	32.97	10.71	43.68	56.00	-12.32	QP	P	
10	3.9795	19.06	10.71	29.77	46.00	-16.23	AVG	P	
11	23.2665	24.22	12.18	36.40	60.00	-23.60	QP	P	
12	23.2665	2.56	12.18	14.74	50.00	-35.26	AVG	P	

EUT:	Remote Dog Training Collar	Model Name:	TZ-926
Test Mode:	TM1	Phase :	N
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1725	31.33	9.64	40.97	64.84	-23.87	QP	P	
2	0.1725	14.22	9.64	23.86	54.84	-30.98	AVG	P	
3	0.3930	30.16	9.91	40.07	58.00	-17.93	QP	P	
4	0.3930	12.96	9.91	22.87	48.00	-25.13	AVG	P	
5 *	1.4775	35.17	10.24	45.41	56.00	-10.59	QP	P	
6	1.4775	18.05	10.24	28.29	46.00	-17.71	AVG	P	
7	2.2335	33.29	10.40	43.69	56.00	-12.31	QP	P	
8	2.2335	14.14	10.40	24.54	46.00	-21.46	AVG	P	
9	3.7995	29.48	10.61	40.09	56.00	-15.91	QP	P	
10	3.7995	11.70	10.61	22.31	46.00	-23.69	AVG	P	
11	23.5275	23.15	12.01	35.16	60.00	-24.84	QP	P	
12	23.5275	2.22	12.01	14.23	50.00	-35.77	AVG	P	

5.3 Radiated Emission Field Strength of Fundamental and Harmonic Emissions

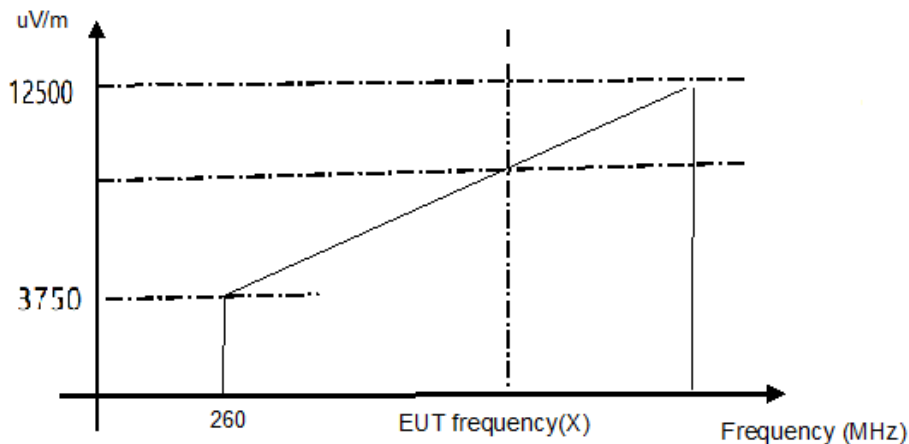
5.3.1 Limits

In addition to the provisions of § 15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3750	150
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹Linear interpolations.

For example for 433.92MHz



The Field Strength of Fundamental Emissions (Operating Frequency) is:

$$3750 \text{ uV/m} = 20 \cdot \log(3750) \text{ dBuV/m} = 71.48 \text{ dBuV/m}$$

$$12500 \text{ uV/m} = 20 \cdot \log(12500) \text{ dBuV/m} = 81.94 \text{ dBuV/m}$$

For example the Fundamental emission is 433.925MHz, the limit is X.

$$(433.92-260)/(470-260)=(X-3750)/(12500-3750)$$

$$173.92/210=(X-3750)/8750$$

$$X = 10996.67 \text{ uV/m}$$

$$\text{AV Limit} = 20 \cdot \log(10996.67) \text{ dBuV/m} = 80.8 \text{ dBuV/m}$$

$$\text{PK Limit} = 100.8 \text{ dBuV/m}$$

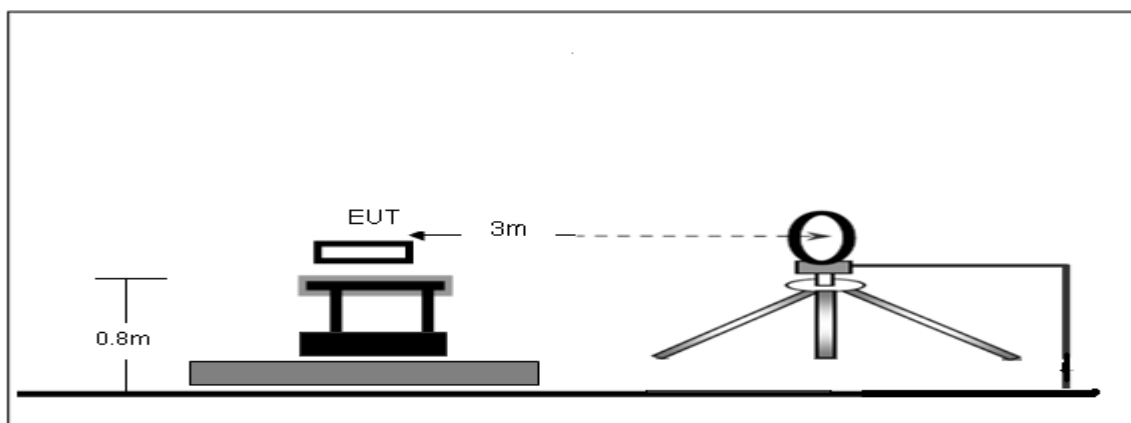
Test Procedures

1. The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range below 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

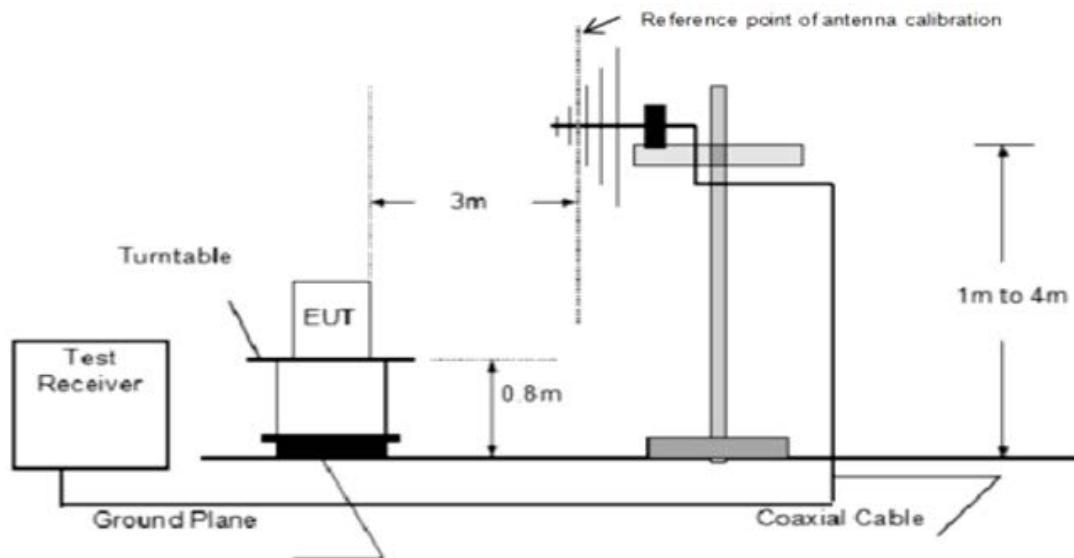
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured
 - RBW = 1 MHz for $f \geq 1\text{GHz}$
 - RBW = 100 kHz for $f < 1\text{GHz}$
 - VBW $\geq$ RBW
 - Sweep = Auto
 - Detector function = Peak
 - Trace = max hold
4. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. The peak level, once corrected, must comply with the limit specified in Section 15.209.
 - Set the spectrum to
 - RBW = 1MHz
 - VBW = 10Hz
 - Detector = PK for AV value, while maintaining all of the other instrument settings

5.3.2 Test Setup

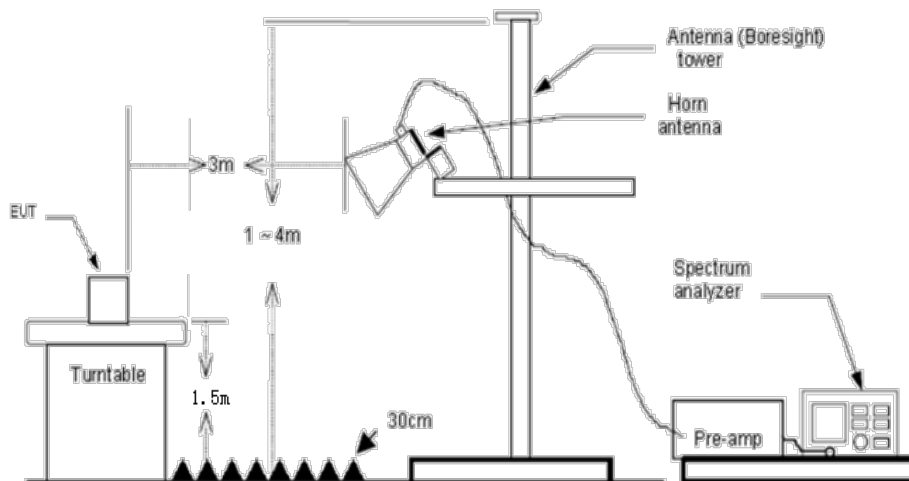
Radiated Emission Test-Up Frequency Below 30MHz



Radiated Emission Test-Up Frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz



5.3.3 Test Result

Operating Frequency (MHz)	Field Strength (dBuV/m)	Detector	Limit @3m (dBuV/m)	Margin (dB)	Antenna
433.92	74.16	QP	100.8	26.64	Vertical
	74.16	AV	80.8	6.64	Vertical
	79.13	QP	100.8	21.67	Horizontal
	79.13	AV	80.8	1.67	Horizontal
867.84	43.38	QP	80.8	37.42	Vertical
	43.38	AV	60.8	17.42	Vertical
	56.01	QP	80.8	24.79	Horizontal
	56.01	AV	60.8	4.79	Horizontal

Notes: 1. Average emission Level = QP Level + Duty cycle factor
2. Duty cycle factor is 0dB.

5.4 Radiated Emission and Band Edge Spurious Emission

5.4.1 Limit

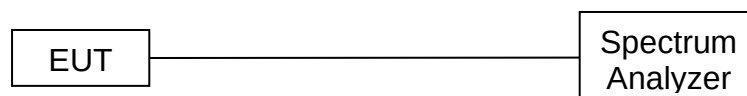
Emissions radiated outside of the specified frequency bands, except for harmonic emissions, (b) shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in FCC Part 15.209, whichever is less stringent.

Frequency (MHz)	Field strength $\mu\text{V/m}$	Field strength $\text{dB}\mu\text{V/m}$	Detector	Measurement distance
30-88	100	40	QP	3m
88-216	150	43.5	QP	
216-960	200	46	QP	
960-1000	500	54	QP	
Above 1000	500	54	AV	
Above 1000	5000	74	PK	

5.4.2 Test Procedure

- The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range below 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.
- EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured
 - RBW = 1 MHz for $f \geq 1\text{GHz}$
 - 100 kHz for $f < 1\text{GHz}$, VBW $\geq$ RBW
 - Sweep = auto
 - Detector function = peak
 - Trace = max hold
- Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

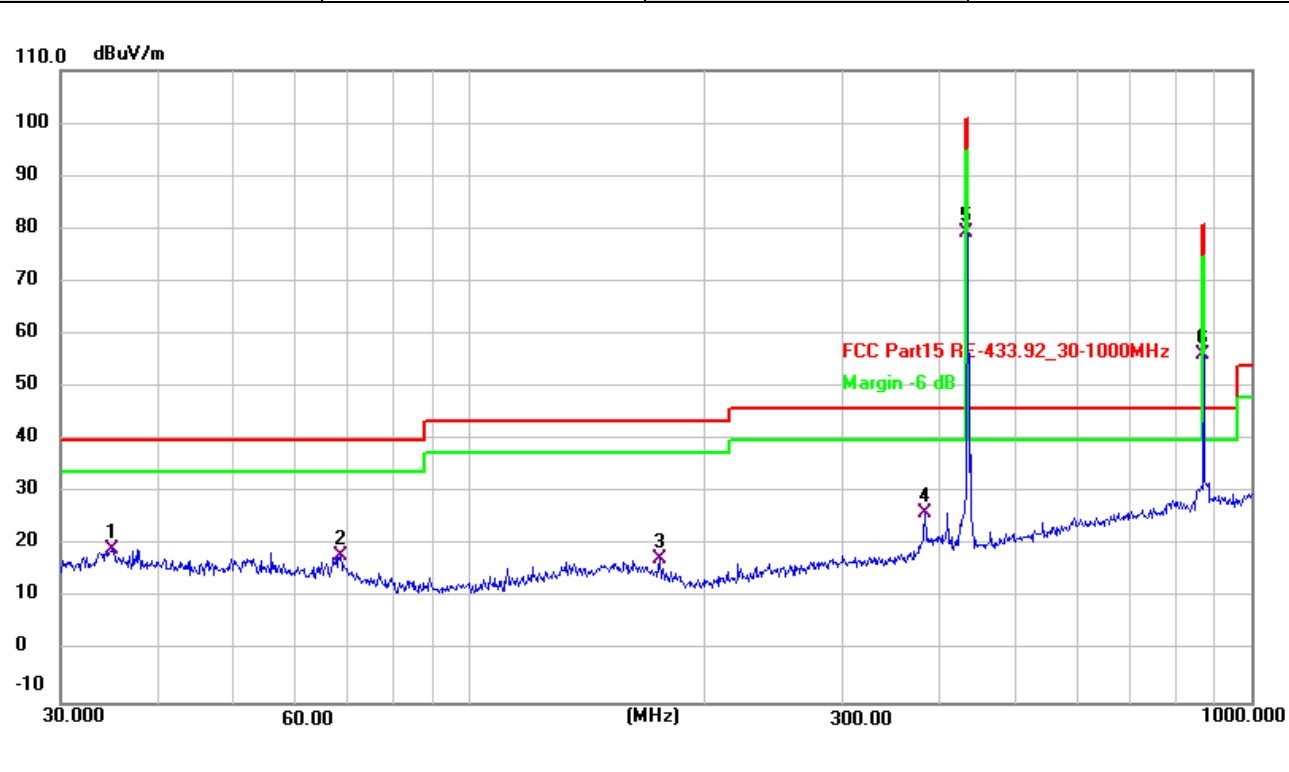
5.4.3 Test Setup



5.4.4 Test Results

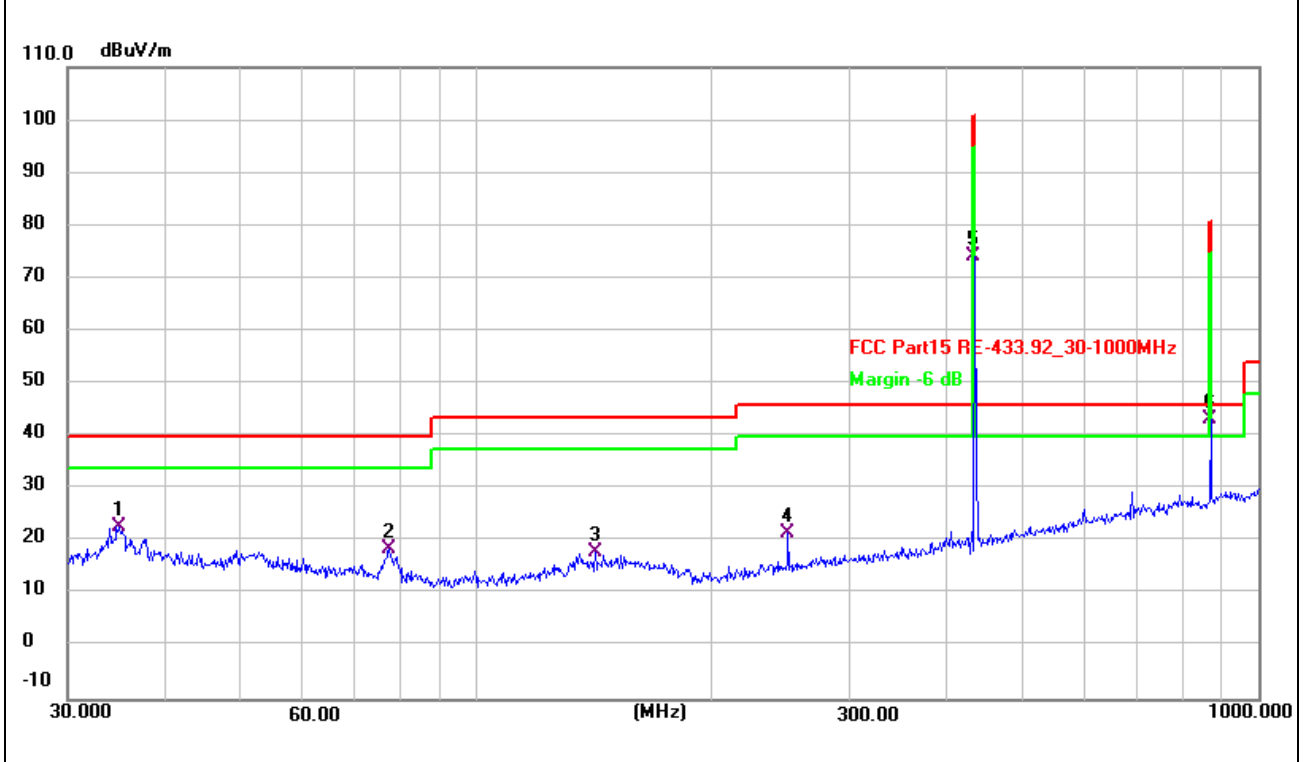
Between (30MHz – 1GHz)

EUT:	Remote Dog Training Collar	Model Name :	TZ-926
Pressure:	1010 hPa	Phase:	H
Test Mode :	TX	Test Voltage:	DC 3.7V



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	34.8823	28.05	-8.90	19.15	40.00	-20.85	QP	100	338	P	
2	68.3908	28.75	-10.77	17.98	40.00	-22.02	QP	100	328	P	
3	175.0368	27.75	-10.20	17.55	43.50	-25.95	QP	100	89	P	
4 *	382.5879	32.70	-6.58	26.12	46.00	-19.88	QP	100	287	P	
5	433.9200	84.50	-5.37	79.13	100.80	-21.67	QP	100	318	P	
6	867.8400	53.42	2.59	56.01	80.80	-24.79	QP	100	277	P	

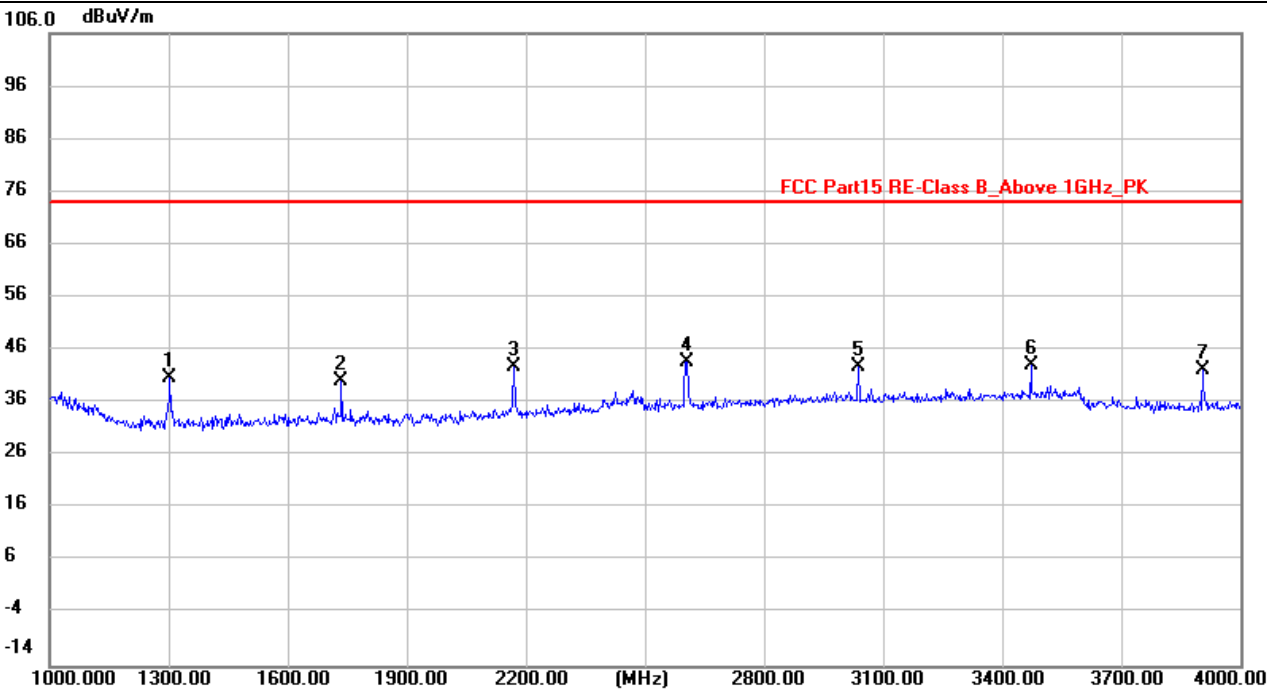
EUT:	Remote Dog Training Collar	Model Name :	TZ-926
Pressure:	1010 hPa	Phase:	V
Test Mode :	TX	Test Voltage:	DC 3.7V



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	34.8823	31.88	-8.90	22.98	40.00	-17.02	QP	100	11	P	
2	77.3212	31.25	-12.73	18.52	40.00	-21.48	QP	100	53	P	
3	141.8262	27.15	-9.24	17.91	43.50	-25.59	QP	100	248	P	
4	250.3012	31.36	-9.79	21.57	46.00	-24.43	QP	100	280	P	
5	433.9200	79.53	-5.37	74.16	100.80	-26.64	QP	100	341	P	
6	867.8400	40.79	2.59	43.38	80.80	-37.42	QP	100	187	P	

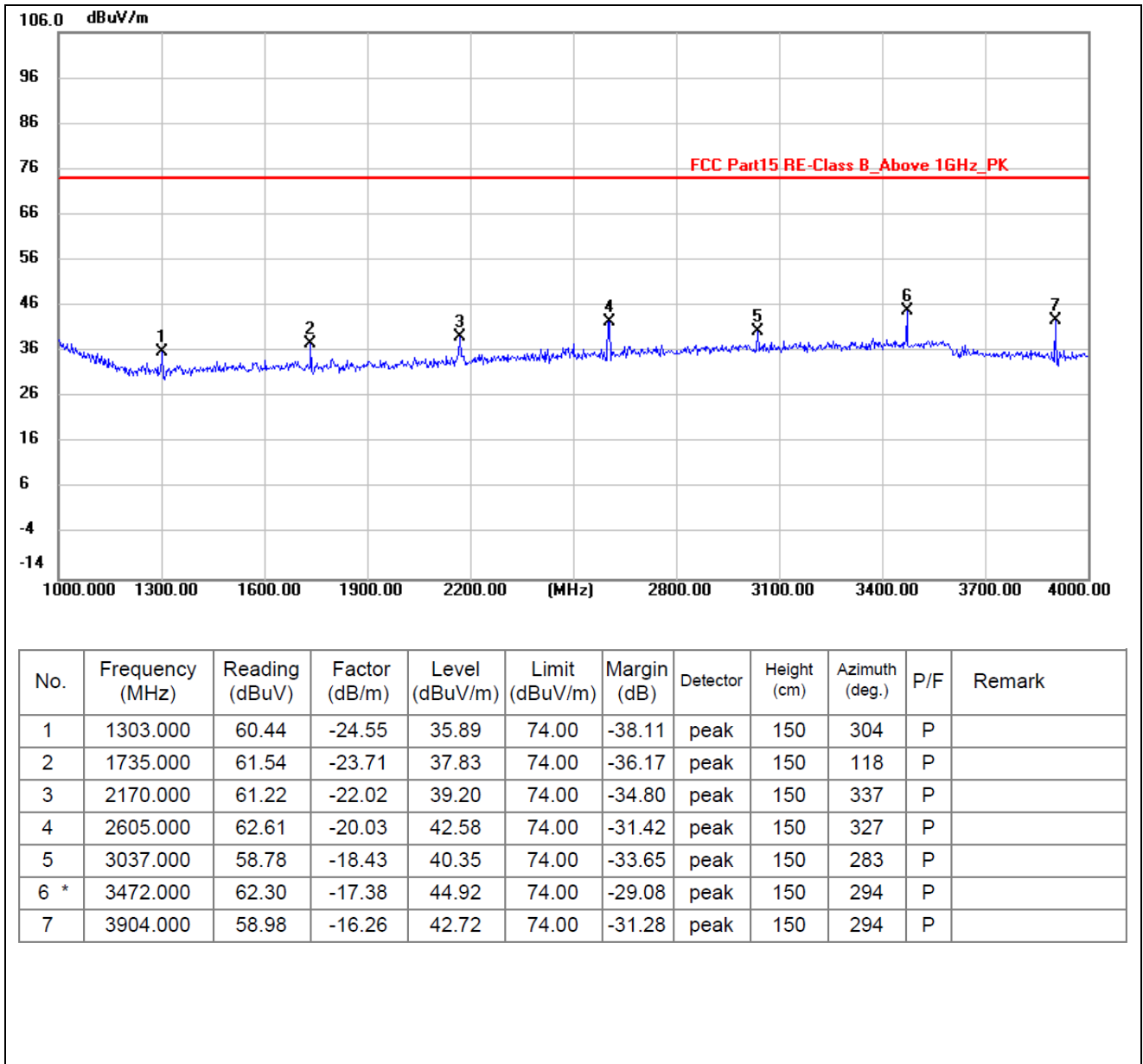
Between (1GHz-4GHz)

EUT:	Remote Dog Training Collar	Model Name :	TZ-926
Pressure:	1010 hPa	Phase:	H
Test Mode :	TX	Test Voltage:	DC 3.7V



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1303.000	65.36	-24.55	40.81	74.00	-33.19	peak	150	262	P	
2	1735.000	63.86	-23.71	40.15	74.00	-33.85	peak	150	329	P	
3	2170.000	64.97	-22.02	42.95	74.00	-31.05	peak	150	347	P	
4 *	2605.000	63.91	-20.03	43.88	74.00	-30.12	peak	150	230	P	
5	3037.000	61.37	-18.43	42.94	74.00	-31.06	peak	150	273	P	
6	3472.000	60.55	-17.38	43.17	74.00	-30.83	peak	150	347	P	
7	3904.000	58.49	-16.26	42.23	74.00	-31.77	peak	150	347	P	

EUT:	Remote Dog Training Collar	Model Name :	TZ-926
Pressure:	1010 hPa	Phase:	V
Test Mode :	TX	Test Voltage:	DC 3.7V



Note:

1. Absolute Level = Reading Level+ Factor, Margin= Absolute Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. The peak value is less than the AV value, AV value is not required Factor added by measurement software automatically.

5.5 Occupied Bandwidth

5.5.1 Limit

No requirement.

5.5.2 Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW $\geq 1\%$ of the 20 dB bandwidth

VBW $\geq$ RBW

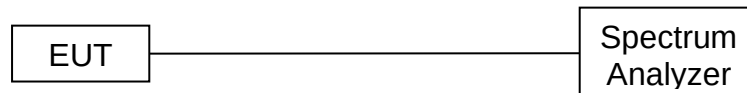
Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth and 99% occupied bandwidth of the emission.

5.5.3 Test Setup

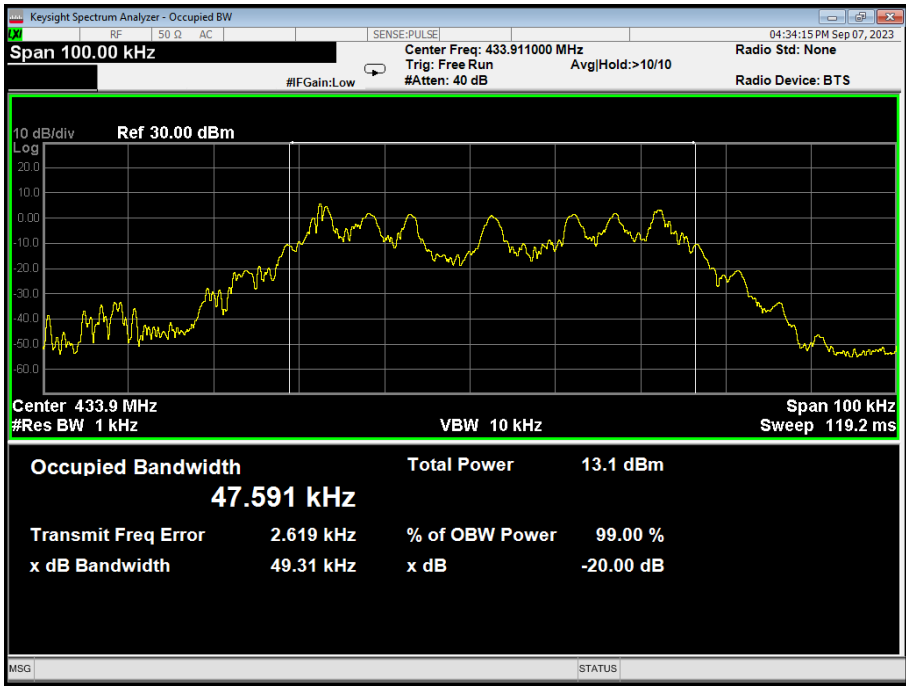


5.5.4 Test Results

Frequency (MHz)	20dB emission bandwidth (kHz)	99% occupied bandwidth (kHz)
433.92	49.31	47.591

Test plots

433.92MHz



5.6 Release time

5.6.1 Limit

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

5.6.2 Test Procedure

Setup the EUT as show in the block diagram above.

Set Spectrum Analyzer

Centre Frequency= Fundamental Frequency

RBW=1MHz, VBW= 3MHz

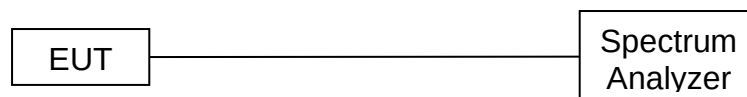
Span= 0 Hz

Sweep Time= 1 Seconds.

Setup the EUT as normal operation and press Transmitter button

Release the button, use Delta Mark function to test the time.

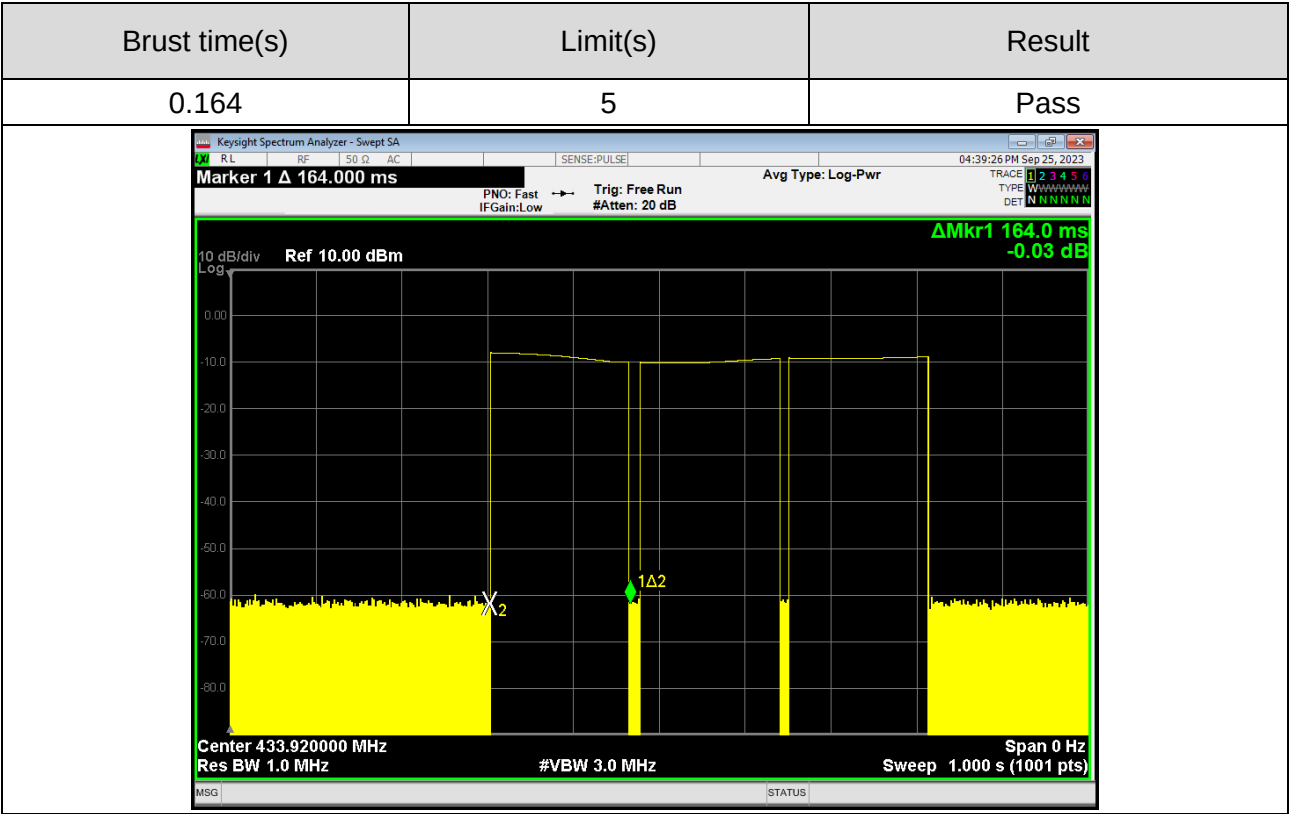
5.6.3 Test Setup



5.6.4 Test Results

Duty Cycle=100%

The averaging factor is found by $20\log 1 = 0\text{dB}$



6 Photographs of the Test Setup

Reference to the appendix Test Setup Photos for details.

7 Photographs of the EUT

Reference to the appendix External Photos and Internal Photos for details.

******* END OF REPORT *******