



FCC CERTIFICATION TEST REPORT

Applicant	:	Lorenz High Definition LLC
Address of Applicant	:	230 Rt 206 STE 401, Flanders, New Jersey, United States
Manufacturer	:	Shenzhen ZVIDAR Technologies CO.,Ltd.
Address of Manufacturer	:	Room 468, Building F1, TCL Technologies Park, 1001, Zhongshanyuan Road, Shuguang Community, Xili Street Office, Nanshan District, Shenzhen City
Equipment under Test	:	LV XS Relay
Model No.	:	ZEN58 800LR
FCC ID	:	2AZ2V-ZEN58
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart C, ANSI C63.10:2013
Report No.	:	DDT-RE25041654-1E01
Issue Date	:	2025/06/04
Issue By	:	Guangdong Dongdian Testing Service Co., Ltd. Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

REPORT

Table of Contents

1.	Summary of Test Results	5
2.	General Test Information.....	6
2.1.	Description of EUT.....	6
2.2.	Accessories of EUT	6
2.3.	Block diagram of EUT configuration for test.....	6
2.4.	Decision of final test mode	7
2.5.	Deviations of test standard	7
2.6.	Test environment conditions.....	7
2.7.	Test laboratory	7
2.8.	Measurement uncertainty	8
3.	Radiated Emission.....	27
3.1.	Test equipment	27
3.2.	Block diagram of test setup	27
3.3.	Limits.....	28
3.4.	Assistant equipment used for test	30
3.5.	Test procedure.....	30
3.6.	Test result	31
3.7.	Test data	32
4.	Band Edge Compliance	38
4.1.	Test equipment	38
4.2.	Block diagram of test setup	39
4.3.	Limits.....	39
4.4.	Assistant equipment used for test	39
4.5.	Test procedure.....	39
4.6.	Test result	39
4.7.	Test data	40
5.	Power Line Conducted Emissions.....	44
5.1.	Test equipment	44
5.2.	Block diagram of test setup	44
5.3.	Limits.....	44
5.4.	Assistant equipment used for test	44
5.5.	Test procedure.....	45
5.6.	Test result	45
5.7.	Test data	46
6.	Test Setup Photograph.....	48
7.	Photos of the EUT	51

Test Report Declare

Applicant	:	Lorenz High Definition LLC
Address of Applicant	:	230 Rt 206 STE 401, Flanders, New Jersey, United States
Equipment under Test	:	LV XS Relay
Model No.	:	ZEN58 800LR
Manufacturer	:	Shenzhen ZVIDAR Technologies CO.,Ltd.
Address of Manufacturer	:	Room 468, Building F1, TCL Technologies Park, 1001, Zhongshanyuan Road, Shuguang Community, Xili Street Office, Nanshan District, Shenzhen City

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C,
ANSI C63.10:2013

We Declare:

The equipment described above is tested by Guangdong Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangdong Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

Report No.:	DDT-RE25041654-1E01		
Date of Receipt:	2025/04/24	Date of Test:	2025/04/24 - 2025/05/23

Created: Tiger Mo	Reviewed: Ella Gong	Approved: Damon Hu
		 <small>GUANGDONG DONGDIAN TESTING SERVICE CO., LTD.</small> <small>Certificate and Report Seal</small> <small>检验检测专用章</small>
2025/06/04	2025/06/04	2025/06/04

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Guangdong Dongdian Testing Service Co., Ltd.

Revision History

Version	Revision Content	Issue Date	Approved
---	Initial issue	2025/06/04	

1. Summary of Test Results

No.	Test Parameter	Clause No.	Condition	Result
1	6 dB Bandwidth and 99% Bandwidth	FCC Part 15: 15.247(a)(2)	/	Pass
2	Peak Output Power	FCC Part 15: 15.247(b)(3)	/	Pass
3	Power Spectral Density	FCC Part 15: 15.247(e)	/	Pass
4	RF Conducted Spurious Emissions	FCC Part 15: 15.247(d)	/	Pass
5	Radiated Emission	FCC Part 15: 15.205, FCC Part 15: 15.209, FCC Part 15: 15.247(d)	/	Pass
6	Band Edge Compliance	FCC Part 15: 15.205, FCC Part 15: 15.209, FCC Part 15: 15.247(d)	/	Pass
7	Antenna Requirement	FCC Part 15: 15.203	/	Pass
8	Power Line Conducted Emissions	FCC Part 15: 15.207(a)	/	Pass

Note: N/A is an abbreviation for Not Applicable, and means this item is not applicable for this device or no need to test according to standard.

2. General Test Information

2.1. Description of EUT

EUT Name	: LV XS Relay
Model Number	: ZEN58 800LR
Difference of model number	: /
EUT Function Description	: Please reference user manual of this device
Power Supply	: AC/DC 9~40V
Hardware Version	: B-MRL-DC-V1-V2.0
Software Version	: V1.03
Antenna Type	: Spring antenna
Max Antenna Gain(dBi)	: -2.62

Radio Specification	: SRD
Operation Frequency	: 912MHz, 920MHz
Modulation	: FSK

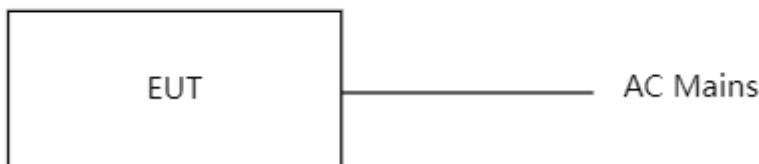
Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

“” means to be chosen or applicable; “” means don't to be chosen or not applicable; This note applies to entire report.

2.2. Accessories of EUT

Accessories	Manufacturer	Model number	Description
/	/	/	/

2.3. Block diagram of EUT configuration for test



2.4. Decision of final test mode

According pre-test, the worst test modes were reported as below:

Test software: putty.exe

The test software was used to control EUT work in Continuous Tx mode, and select test channel, wireless mode as below table:

The pathloss of external cable: 0.5dB (According to the manufacturer's claims)

Tested mode, channel, information		
Mode	Setting Tx Power	Frequency (MHz)
Tx mode	140	912
	140	920

2.5. Deviations of test standard

No deviation.

2.6. Test environment conditions

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

Temperature range:	+15°C to +35 °C
Humidity range:	20% to 75%
Pressure range:	86 kPa to106 kPa

Note: The specific temperature and humidity information of each test item refers to the temperature and humidity record in the corresponding test data.

2.7. Test laboratory

Guangdong Dongdian Testing Service Co., Ltd.

Add.: Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808.

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20240, G-20118

2.8. Measurement uncertainty

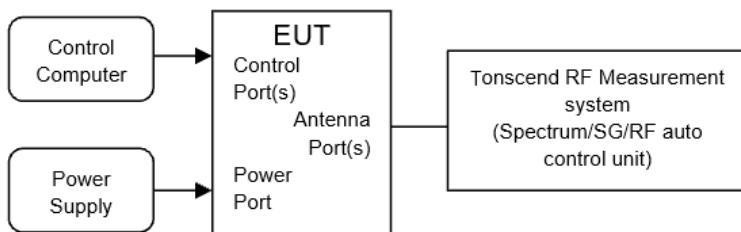
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB (10 MHz \leq f < 3.6 GHz); 1.38 dB (3.6 GHz \leq f < 8 GHz)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB (10 MHz \leq f < 3.6 GHz); 1.38 dB (3.6 GHz \leq f < 8 GHz)
Frequencies Stability	6.7×10^{-8} (Antenna couple method) 5.5×10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB (10 MHz \leq f < 3.6 GHz); 1.40 dB (3.6 GHz \leq f < 8 GHz) 1.66 dB (8 GHz \leq f < 26.5 GHz)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 °C
Humidity	2 %
Uncertainty for Radiation Emission test (9 kHz – 30 MHz)	3.44 dB
Uncertainty for Radiation Emission test (30 MHz - 1 GHz)	4.70 dB (Antenna Polarize: V) 4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1 GHz - 40 GHz)	4.10 dB (1 - 6 GHz) 4.40 dB (6 GHz - 18 GHz) 3.54 dB (18 GHz - 26 GHz) 4.30 dB (26 GHz - 40 GHz)
Uncertainty for Power line conduction emission test	3.34dB (150KHz-30MHz) 3.72dB (9KHz-150KHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3. Equipment Used During Conductive Test

Equipment	Manufacturer	Model No.	Serial Number	Due Date
<input checked="" type="checkbox"/> RF Connected Test (RF Measurement System 3#)				
SIGNAL ANALYZER	R&S	FSV40	101407	2025/07/08
Wideband Radio Communication Tester	R&S	CMW500	117491	2026/03/28
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY62153058	2025/07/08
MXG Vector Signal Generator	Agilent	N5182A	MY48180912	2026/03/28
RF Control Unit	Tonscend	JS0806-2	20C8060230	2026/03/28
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2026/03/28
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A

4. 6 dB Bandwidth

4.1. Block diagram of test setup



4.2. Limits

For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz

4.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 11.8.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously
- (4) Use the following spectrum analyzer settings for 6 dB Bandwidth:

RBW:	100 kHz
VBW:	$\geq [3 \times \text{RBW}]$
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

- (5) Allow the trace to stabilize, measure the 6 dB bandwidth of signal, and record the results in the report.

4.4. Test result

Test Engineer:	Zeng Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.2°C,40.8%RH	Test Date:	2025.04.28
Test Power Supply:	AC 40V	Sample Number:	S25041654-002

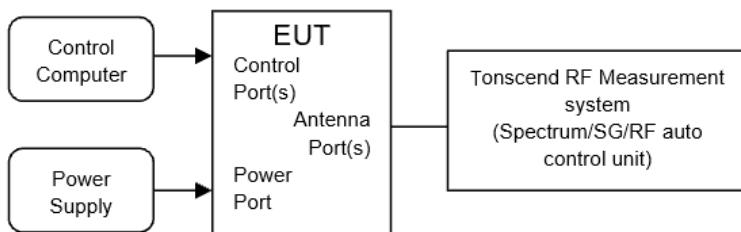
Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit [MHz]	Verdict
SRD	Ant1	912	0.61	911.70	912.31	0.5	PASS
		920	0.65	919.68	920.32	0.5	PASS

4.5. Test graphs



5. 99% Bandwidth

5.1. Block diagram of test setup



5.2. Limits

Just for Report.

5.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 6.9.3.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously
- (4) Use the following spectrum analyzer settings for the 99% Bandwidth:

RBW:	1% to 5% of the OBW
VBW:	approximately three times RBW
Span:	between 1.5 times and 5.0 times the OBW
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold
- (5) Allow the trace to stabilize, measure the 99% bandwidth of signal, and record the results in the report.

5.4. Test result

Test Engineer:	Zeng Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.2°C,40.8%RH	Test Date:	2025.04.28
Test Power Supply:	AC 40V	Sample Number:	S25041654-002

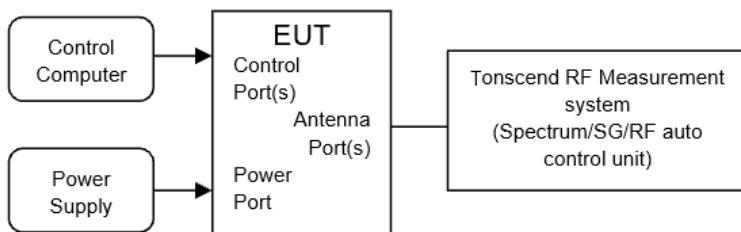
Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit [MHz]	Verdict
SRD	Ant1	912	0.915	911.5445	912.4595	---	---
		920	0.923	919.5365	920.4595	---	---

5.5. Test graphs



6. Maximum Peak Output Power

6.1. Block diagram of test setup



6.2. Limits

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi, the e.i.r.p shall not exceed 4W.

6.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 11.9.1.1.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
- (4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

RBW:	\geq DTS bandwidth
VBW:	\geq 3 x RBW
Span	\geq 3 x RBW
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

- (5) Allow the trace to stabilize, use peak marker function to determine the peak amplitude level.

6.4. Test result

Test Engineer:	Zeng Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.2°C,40.8%RH	Test Date:	2025.04.28
Test Power Supply:	AC 40V	Sample Number:	S25041654-002

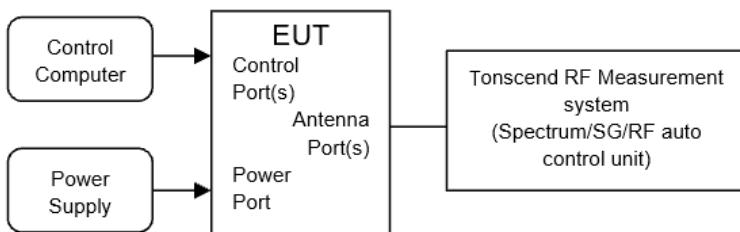
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
SRD	Ant1	912	7.27	≤30	PASS
		920	7.33	≤30	PASS

6.5. Test graphs



7. Power Spectral Density

7.1. Block diagram of test setup



7.2. Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

7.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 11.10.2.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
- (4) Use the following spectrum analyzer settings for Power Spectral Density measurement:

Center frequency	DTS Channel center frequency
RBW:	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW:	$\geq 3\text{RBW}$
Span	1.5 times the DTS bandwidth
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

- (5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.

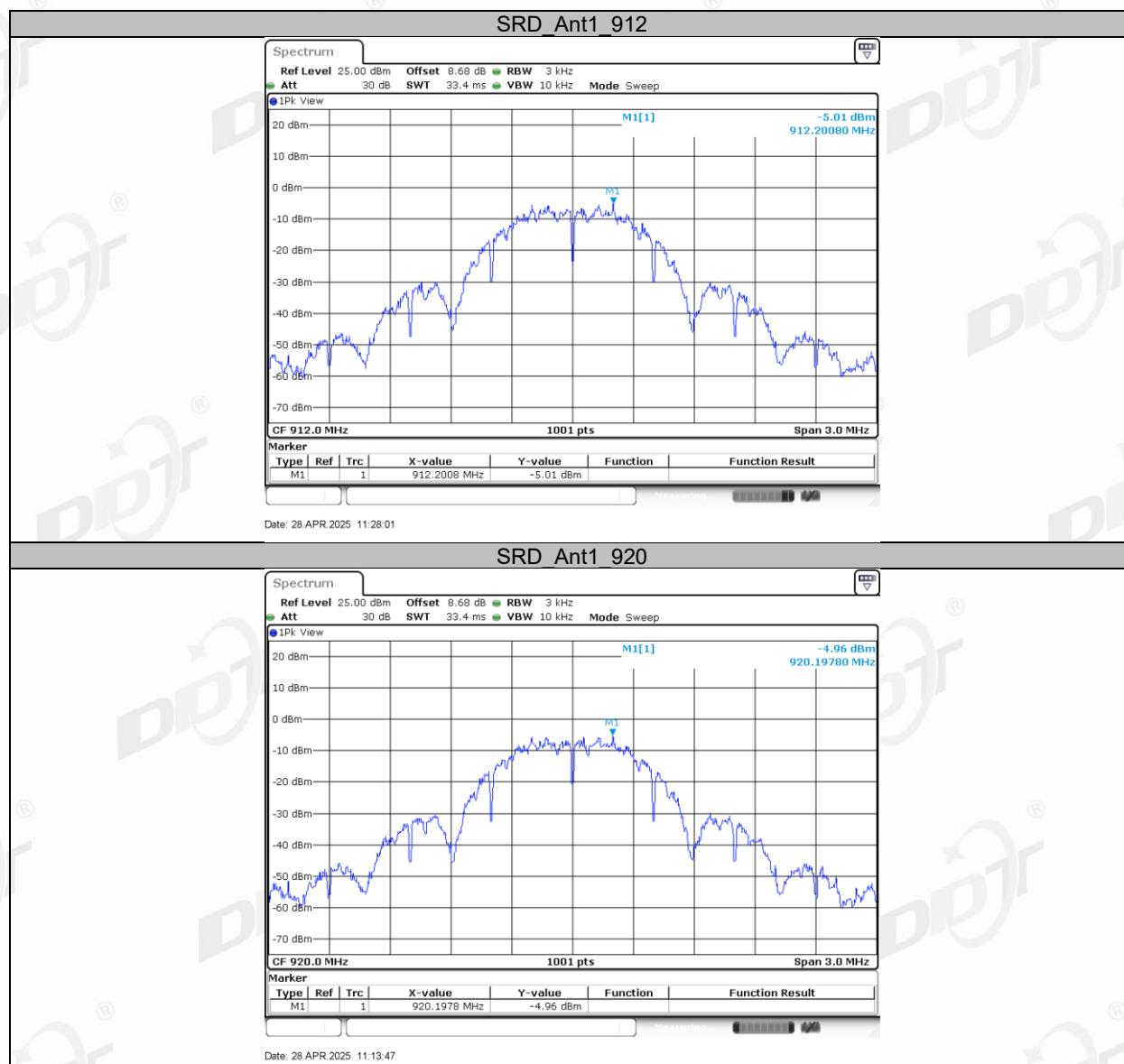
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

7.4. Test result

Test Engineer:	Zeng Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.2°C,40.8%RH	Test Date:	2025.04.28
Test Power Supply:	AC 40V	Sample Number:	S25041654-002

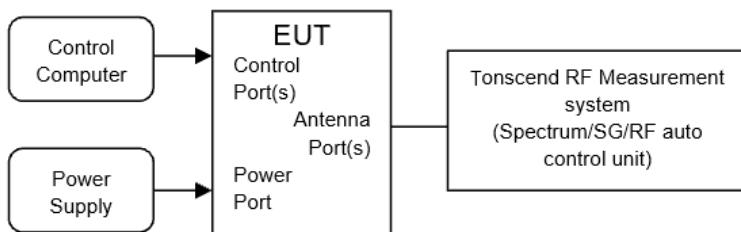
Test Mode	Antenna	Frequency [MHz]	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
SRD	Ant1	912	-5.01	≤8.00	PASS
		920	-4.96	≤8.00	PASS

7.5. Test graphs



8. Band Edge Compliance (Conducted Method)

8.1. Block diagram of test setup



8.2. Limits

In any 100 kHz bandwidth outside the frequency bands 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.

8.3. Test procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) Establish a reference level by using the following procedure:

RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

- (3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.
- (4) Then mark the maximum amplitude of all unwanted emissions outside of the authorized frequency band.

8.4. Test result

Test Engineer:	Zeng Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.2°C,40.8%RH	Test Date:	2025.04.28
Test Power Supply:	AC 40V	Sample Number:	S25041654-002

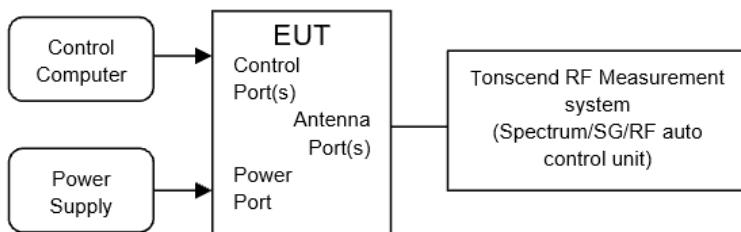
Frequency	Measured Range	Verdict
912 MHz	900 MHz - 930 MHz	Pass
920 MHz	900 MHz - 930 MHz	Pass

8.5. Test graphs



9. RF Conducted Spurious Emissions

9.1. Block diagram of test setup



9.2. Limits

In any 100 kHz bandwidth outside the frequency bands 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.

9.3. Test procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) Establish a reference level by using the following procedure:

Center frequency	Test frequency
RBW:	100 kHz
VBW:	300 kHz
Span	Wide enough to capture the peak level of the in-band emission
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

- (3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

- (4) Set the spectrum analyzer as follows:

RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Number of measurement points	\geq Span/RBW
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

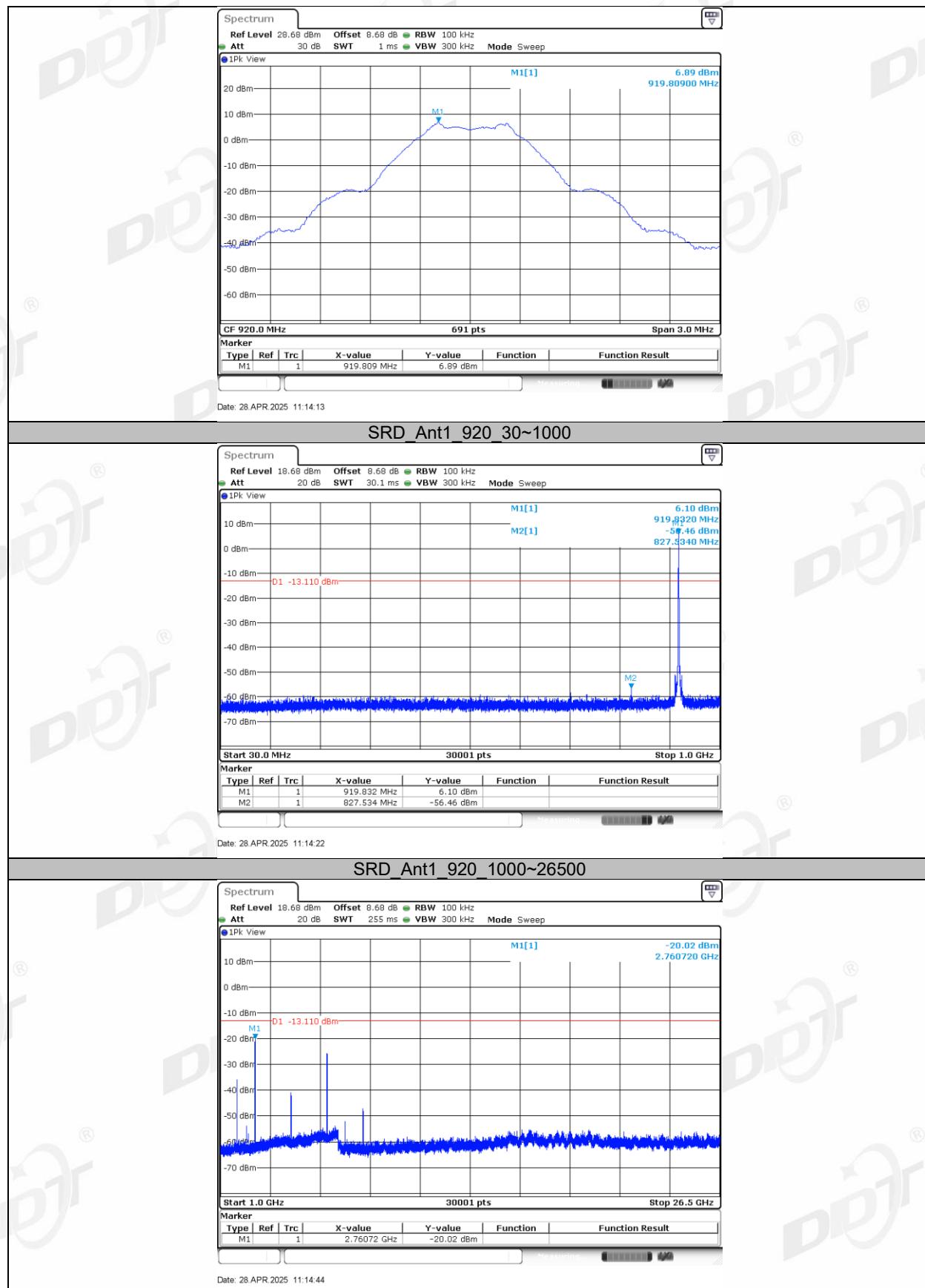
9.4. Test result

Test Engineer:	Zeng Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.2°C,40.8%RH	Test Date:	2025.04.28
Test Power Supply:	AC 40V	Sample Number:	S25041654-002

Frequency [MHz]	Verdict
912	Pass
920	Pass

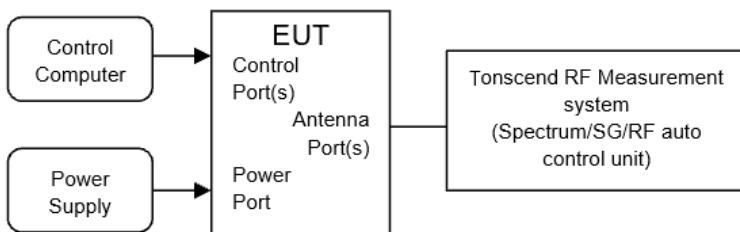
9.5. Test graphs





10. Duty Cycle

10.1. Block diagram of test setup



10.2. Limit

Just for Report.

10.3. Test procedure

- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, The cable loss and attenuator loss have been put into spectrum analyzer as amplitude offset.

set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the middle hopping channel.

Resolution BW: 10 MHz.

Video BW: 10 MHz.

Span: Zero span.

Detector: Peak.

Trace Mode: Clear Write.

Sweep: Video Trigger

- (2) When the trace is complete, measure the sending time of 1 burst and the duty cycle of 1 burst cycle.

- (3) Calculate dwell time follow below formula:

Duty cycle= Pulse's on time / Burst cycle

10.4. Test result

Test Engineer:	Zeng Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.2°C,40.8%RH	Test Date:	2025.04.28
Test Power Supply:	AC 40V	Sample Number:	S25041654-002

Frequency [MHz]	Antenna	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor [dB]
912	Ant1	6.377	100	6.377	-23.90
920	Ant1	6.377	100	6.377	-23.90

10.5. Test graphs



11. Antenna Requirements

11.1. Limit

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 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

11.2. Result

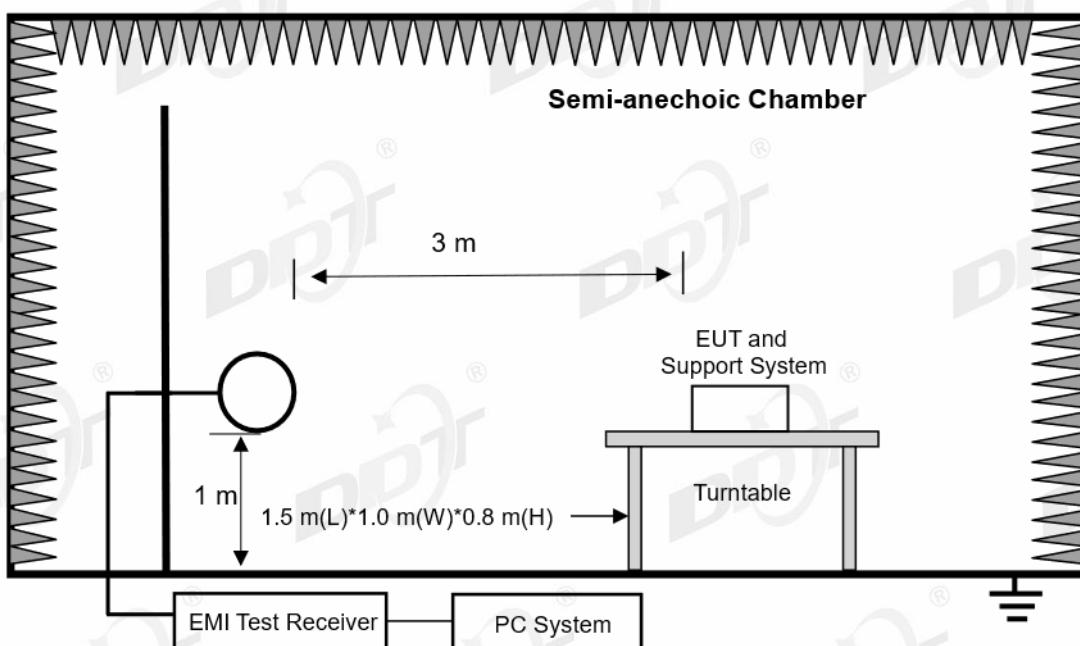
The antenna used for this product as Antenna information described in section 2.1 of the report, and there is no other antenna than that furnished by the responsible party shall be used with the device.

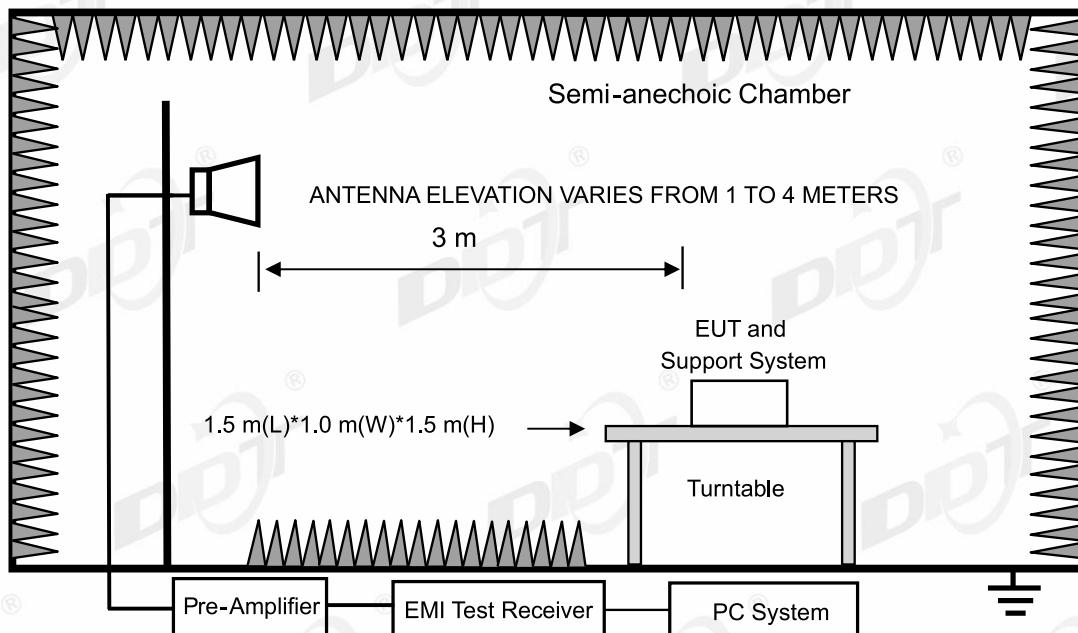
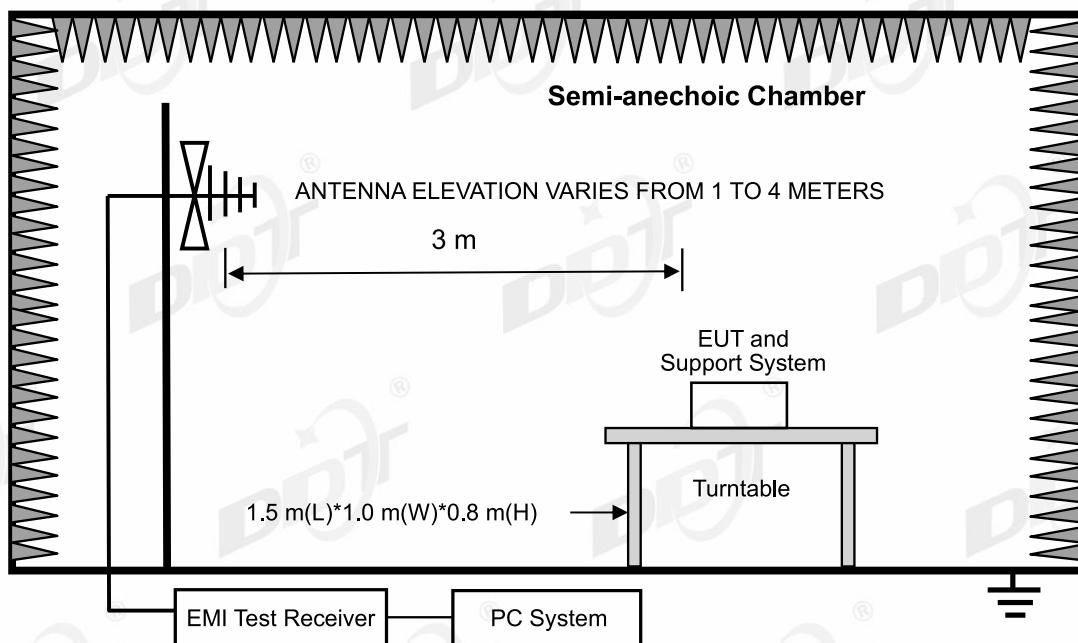
12. Radiated Emission

12.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To
RF cable	Yuhu Technology	JCTB810-NJ-NJ-9M	DDT-ZC02538	2026/03/28
Active Loop Antenna	Schwarzbeck	FMZB1519	DDT-ZC00524	2025/09/11
RF Cable	N/A	W24.02 HL-562	DDT-ZC04022	2026/03/28
Pre-amplifier	COM-POWER	PAM-840A	DDT-ZC01693	2026/03/28
RF cable	Yuhu Technology	ZT26S-SMAJ-SMAJ-1M	DDT-ZC02037	2026/03/28
High Pass filter	Xi'an Xingbo	XBLBQ-GTA67	DDT-ZC02179	2026/03/28
Hochgewinn-Hornantenne	SCHWARZBEC K	BBHA 9120 D	DDT-ZC02129	2025/09/18
High pass filter	Micro-Tronics	HPM50108	DDT-ZC00560	2026/03/28
Micro-Tronics filters	REBES	BRM50716	DDT-ZC03240	/
Micro-Tronics filters	REBES	BRM50702	DDT-ZC03242	/
High pass filter	Micro-Tronics	HPM50102	DDT-ZC00561	2026/03/28
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	DDT-ZC00506	2027/04/01
EMI TEST RECEIVER	R&S	ESU26	DDT-ZC01909	2026/03/28
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	DDT-ZC02050	2025/07/11
PSA Series Spectrum Analyzer	Agilent	E4447A	DDT-ZC00517	2026/03/28
RF Cable	N/A	W13.02 AP1-X2	DDT-ZC04023	2026/03/28
RF cable	Zhongke Junchuang	JCT26S-NJ-NJ-1.5M	DDT-ZC02762	2026/03/28
Pre-amplifier	COM-POWER	PAM-118A	DDT-ZC01293	2025/08/25

12.2. Block diagram of test setup





12.3. Limits

(1) FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.1772&4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.2072&4.20775	73-74.6	1645.5-1646.5	9.3-9.5

6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

1Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2Above 38.6

(2) FCC 15.209 Limit

FREQUENCY	DISTANCE	FIELD STRENGTHS LIMIT	
		uV/m	dBuV/m
0.009 ~ 0.490	300	2400/F(kHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(kHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0
Above 1000	3	74.0 dBuV/m(Peak)	
		54.0 dBuV/m(Average)	

Note:

(1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9 - 90 kHz, 110 - 490 kHz and above 1000 MHz, radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30 MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3m}(\text{dBuV/m}) = \text{Limit}_{30m}(\text{dBuV/m}) + 40\log(30m/3m)$$

(3) Limit for this EUT

The emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20 dB below the fundamental emissions or comply with 15.209 limits.

12.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

12.5. Test procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G and 150 cm above the ground plane inside a fully-anechoic chamber for above 1G.
- (2) Test antenna was located 3 m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used	Test antenna distance
9 kHz - 30 MHz	Active Loop antenna	3 m
30 MHz - 1 GHz	Trilog Broadband Antenna	3 m
1 GHz - 18 GHz	Double Ridged Horn Antenna(1 GHz-18 GHz)	3 m
18 GHz - 40 GHz	Horn Antenna(18 GHz-40 GHz)	1 m

According ANSI C63.10:2013 clause 6.4.6 and 6.5.3, for measurements below 30 MHz, Antenna was located 3 m from EUT, the loop antenna was positioned in three antenna orientations (parallel, perpendicular, and round-parallel), for each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable, and the lowest height of the magnetic antenna shall be 1 m above the ground. For measurement above 30MHz, the trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

- (3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 25 GHz:

- (a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1 m to 4 m (Except loop antenna, it's fixed 1 m above ground.)
- (b) Change work frequency or channel of device if practicable.
- (c) Change modulation type of device if practicable.
- (d) Change power supply range from 85% to 115% of the rated supply voltage
- (e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9 kHz to 25 GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18 GHz to 25 GHz, so below final test was performed with frequency range from 9 kHz to 18 GHz.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to ANSI C63.10:2013 on Radiated Emission test.

(5) The emissions from 9 kHz to 1 GHz were measured based on CISPR QP detector except for the frequency bands 9 - 90 kHz, 110 - 490 kHz, for emissions from 9 kHz - 90 kHz, 110 kHz - 490 kHz and above 1 GHz were measured based on average detector, for emissions above 1 GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9 kHz to 1 GHz, QP or average values were measured with EMI receiver with below RBW.

Frequency band	RBW
9 kHz - 150 kHz	200 Hz
150 kHz - 30 MHz	9 kHz
30 MHz - 1 GHz	120 kHz

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz, VBW is set at 3 MHz for Peak measure; According ANSI C63.10:2013 clause 4.1.4.2.2 procedure for average measure.

(8) For portable device, X axis, Y axis, Z axis are tested, and worse setup is reported.

(9) According exploratory test, the emission levels are 20 dB below the limit detected from 9 kHz to 30 MHz and 18 GHz to 25 GHz, so the final test was performed with frequency range from 30 MHz to 18 GHz and recorded in below.

(10) For 30 MHz ~ 25 GHz: (Scan with all mode, the worst case is reported)

(11) For emissions below 1 GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in worst mode.

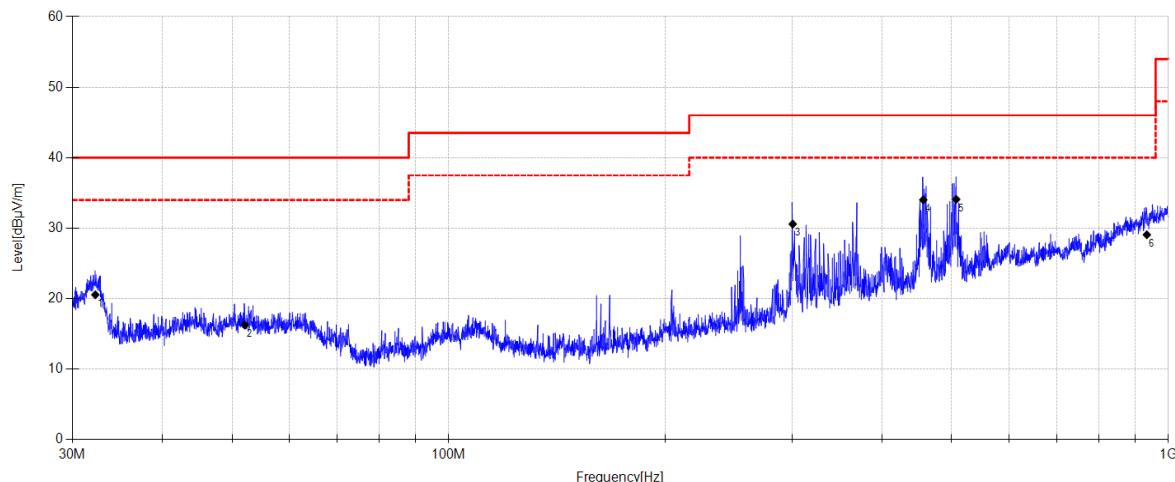
12.6. Test result

PASS. (See below detailed test result)

12.7. Test data

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-05-20 **Tested By:** Nan Zhong
EUT: LV XS Relay **Model Number:** ZEN58 800LR
Test Mode: TX Mode **Power Supply:** AC 40V/60Hz
Condition: Temp:23.9°C;Humi:54.9% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2025 report date\Q25041654-1E\FCC BELOW1G\20250520-015235_H
Memo: Sample Number:S25041654-005Power Setting:140



Final Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Antenna Factor [dB]	Cable Loss [dB]	Result [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Detector	Polarity
1	32.292	37.55	10.33	3.77	20.55	40.00	19.45	QP	Horizontal
2	52.092	30.49	12.96	3.90	16.25	40.00	23.75	QP	Horizontal
3	300.650	43.06	13.70	5.22	30.58	46.00	15.42	QP	Horizontal
4	456.617	43.69	15.97	5.84	34.02	46.00	11.98	QP	Horizontal
5	507.259	43.31	16.25	6.03	34.09	46.00	11.91	QP	Horizontal
6	933.593	30.25	21.93	7.29	29.06	46.00	16.94	QP	Horizontal

Note:

1. Result Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-05-20

Tested By: Nan Zhong

EUT: LV XS Relay

Model Number: ZEN58 800LR

Test Mode: TX Mode

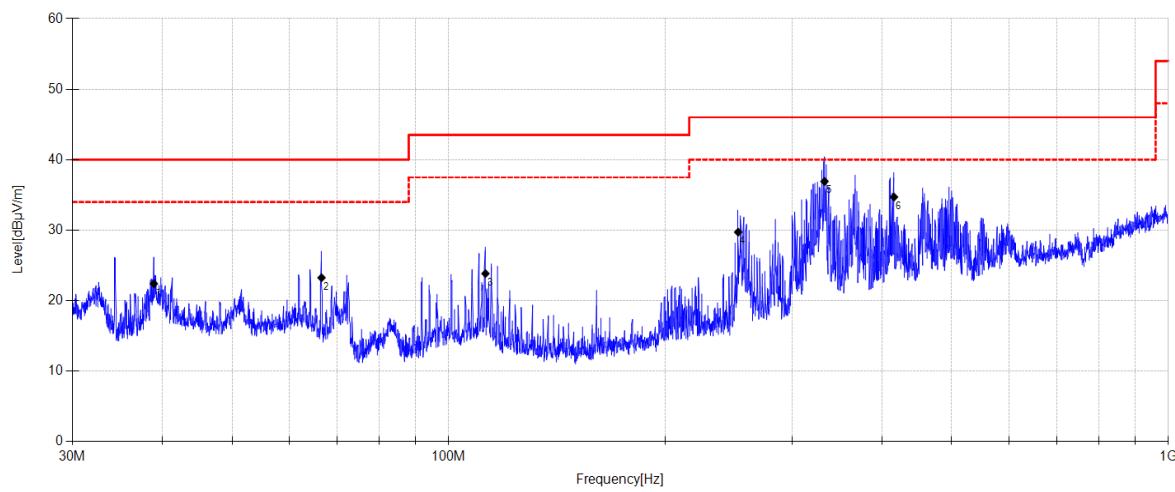
Power Supply: AC 40V/60Hz

Condition: Temp:23.9°C;Humi:54.9%

Test Site: DDT 3# Chamber

File Path: d:\ts\2025 report date\Q25041654-1E\FCC BELOW1G\20250520-015322_V

Memo: Sample Number:S25041654-005Power Setting:140



Final Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable Loss [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	38.940	38.2	11.49	3.81	22.40	40.00	17.60	QP	Vertical
2	66.582	39.71	10.64	4.00	23.25	40.00	16.75	QP	Vertical
3	112.495	39.16	11.50	4.29	23.84	43.50	19.66	QP	Vertical
4	252.486	44.27	11.75	5.00	29.72	46.00	16.28	QP	Vertical
5	332.825	48.52	14.47	5.35	36.92	46.00	9.08	QP	Vertical
6	415.669	45.53	14.95	5.68	34.70	46.00	11.30	QP	Vertical

Note:

1. Result Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-05-20

Tested By: Nan Zhong

EUT: LV XS Relay

Model Number: ZEN58 800LR

Test Mode: TX 912MHz Mode

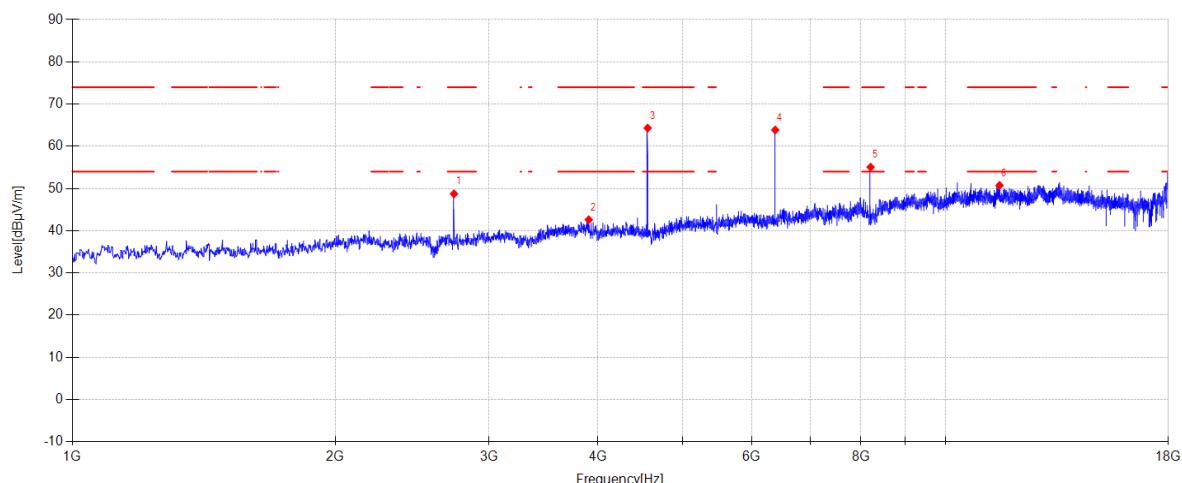
Power Supply: AC 40V/60Hz

Condition: Temp:23.9°C;Humi:54.9%

Test Site: DDT 3# Chamber

File Path: d:\ts\2025 report date\Q25041654-1E\FCC ABOVE1G\15

Memo: Sample Number:S25041654-005Power Setting:140



Suspected Data List										
NO .	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2735.700	55.22	27.57	5.05	-39.11	48.73	74.00	25.27	PK	Horizontal
2	3903.600	46.02	31.19	5.07	-39.66	42.62	74.00	31.38	PK	Horizontal
3	4559.800	66.67	31.90	5.39	-39.64	64.32	74.00	9.68	PK	Horizontal
4	6383.900	63.06	34.67	6.28	-40.14	63.87	-	-	PK	Horizontal
5	8208.000	50.74	37.12	7.04	-39.83	55.07	74.00	18.93	PK	Horizontal
6	11533.200	42.67	39.13	8.47	-39.53	50.74	74.00	23.26	PK	Horizontal

Suspected Data List										
NO .	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
3	4559.800	/	/	/	/	40.42	54	13.58	AV	Horizontal
5	8208.000	/	/	/	/	31.17	54	22.83	AV	Horizontal

Note:

1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. According to Section 11 of KDB 558074, Answer 3: $PK-20\log(\Delta) \text{ Factor}[dB]=AV$

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-05-20

Tested By: Nan Zhong

EUT: LV XS Relay

Model Number: ZEN58 800LR

Test Mode: TX 912MHz Mode

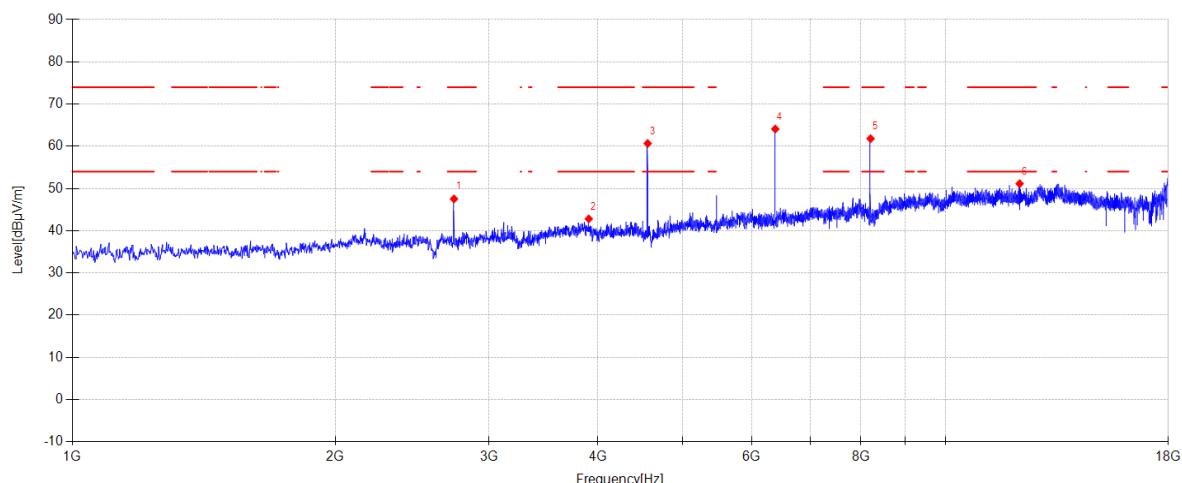
Power Supply: AC 40V/60Hz

Condition: Temp:23.9°C;Humi:54.9%

Test Site: DDT 3# Chamber

File Path: d:\ts\2025 report date\Q25041654-1E\FCC ABOVE1G\16

Memo: Sample Number:S25041654-005Power Setting:140



Suspected Data List											
NO .	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity	
1	2735.700	54.03	27.57	5.05	-39.11	47.54	74.00	26.46	PK	Vertical	
2	3903.600	46.21	31.19	5.07	-39.66	42.81	74.00	31.19	PK	Vertical	
3	4559.800	63.02	31.90	5.39	-39.64	60.67	74.00	13.33	PK	Vertical	
4	6383.900	63.29	34.67	6.28	-40.14	64.10	-	-	PK	Vertical	
5	8208.000	57.48	37.12	7.04	-39.83	61.81	74.00	12.19	PK	Vertical	
6	12160.500	42.97	39.30	8.84	-39.97	51.14	74.00	22.86	PK	Vertical	

Suspected Data List											
NO .	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity	
3	4559.800	/	/	/	/	36.77	54	17.23	AV	Vertical	
5	8208.000	/	/	/	/	37.91	54	16.09	AV	Vertical	

Note:

1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. According to Section 11 of KDB 558074, Answer 3: $PK-20\log(\Delta) \text{ Factor}[dB]=AV$

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-05-18

Tested By: Nan Zhong

EUT: LV XS Relay

Model Number: ZEN58 800LR

Test Mode: TX 920MHz Mode

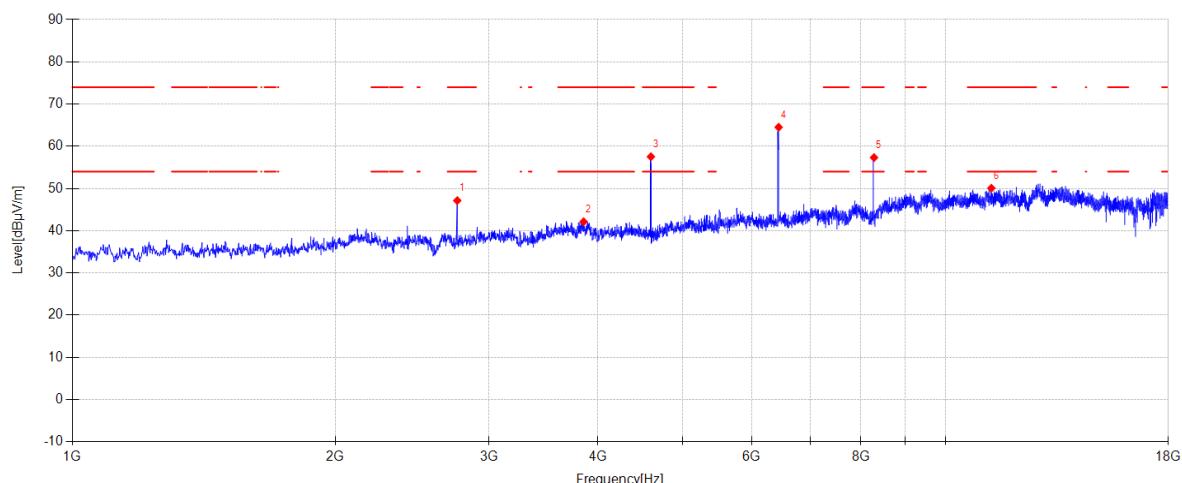
Power Supply: AC 40V/60Hz

Condition: Temp:23.9°C;Humi:54.9%

Test Site: DDT 3# Chamber

File Path: d:\ts\2025 report date\Q25041654-1E\FCC ABOVE1G\1

Memo: Sample Number:S25041654-005Power Setting:140



Suspected Data List										
NO .	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2759.500	53.65	27.56	5.07	-39.14	47.14	74.00	26.86	PK	Horizontal
2	3850.900	45.78	30.91	5.08	-39.64	42.13	74.00	31.87	PK	Horizontal
3	4598.900	59.85	31.90	5.41	-39.63	57.53	74.00	16.47	PK	Horizontal
4	6441.700	63.58	34.87	6.29	-40.22	64.52	-	-	PK	Horizontal
5	8282.800	52.73	37.27	7.06	-39.73	57.33	74.00	16.67	PK	Horizontal
6	11286.700	41.86	39.20	8.31	-39.29	50.08	74.00	23.92	PK	Horizontal

Suspected Data List										
NO .	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
3	4598.900	/	/	/	/	33.63	54	20.37	AV	Horizontal
5	8282.800	/	/	/	/	33.43	54	20.57	AV	Horizontal

Note:

1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. According to Section 11 of KDB 558074, Answer 3: $PK-20\log(\Delta) \text{ Factor}[dB]=AV$

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-05-18

Tested By: Nan Zhong

EUT: LV XS Relay

Model Number: ZEN58 800LR

Test Mode: TX 920MHz Mode

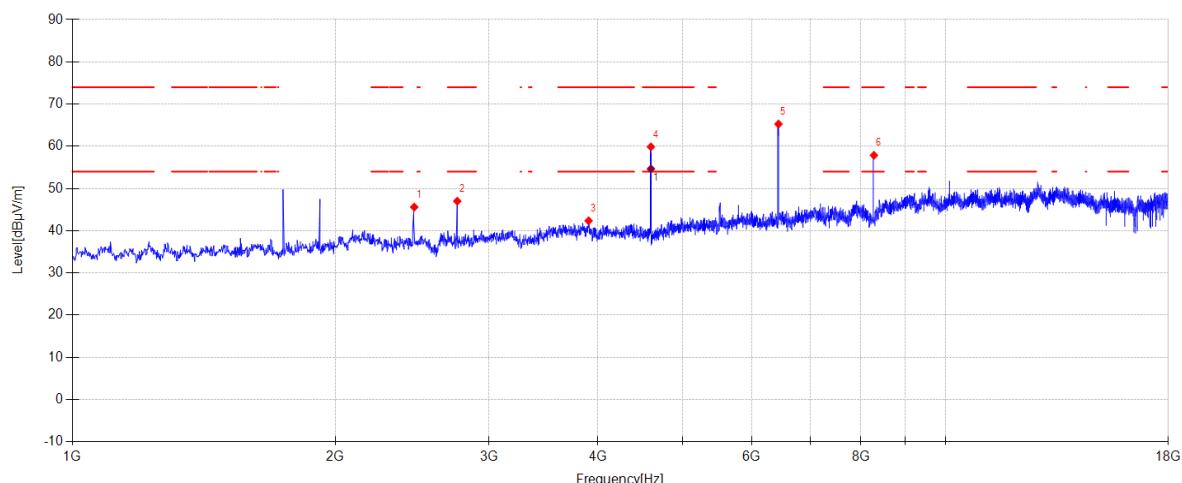
Power Supply: AC 40V/60Hz

Condition: Temp:23.9°C;Humi:54.9%

Test Site: DDT 3# Chamber

File Path: d:\ts\2025 report date\Q25041654-1E\FCC ABOVE1G\2

Memo: Sample Number:S25041654-005Power Setting:140



Suspected Data List										
NO .	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2463.700	52.03	27.45	4.88	-38.76	45.60	-	-	PK	Vertical
2	2759.500	53.51	27.56	5.07	-39.14	47.00	74.00	27.00	PK	Vertical
3	3901.900	45.75	31.20	5.07	-39.66	42.36	74.00	31.64	PK	Vertical
4	4598.900	62.20	31.90	5.41	-39.63	59.88	74.00	14.12	PK	Vertical
5	6438.300	64.34	34.85	6.29	-40.21	65.27	-	-	PK	Vertical
6	8281.100	53.28	37.26	7.06	-39.73	57.87	74.00	16.13	PK	Vertical

Suspected Data List										
NO .	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
4	4598.900	/	/	/	/	35.98	54	18.02	AV	Vertical
6	8281.100	/	/	/	/	33.97	54	20.03	AV	Vertical

Note:

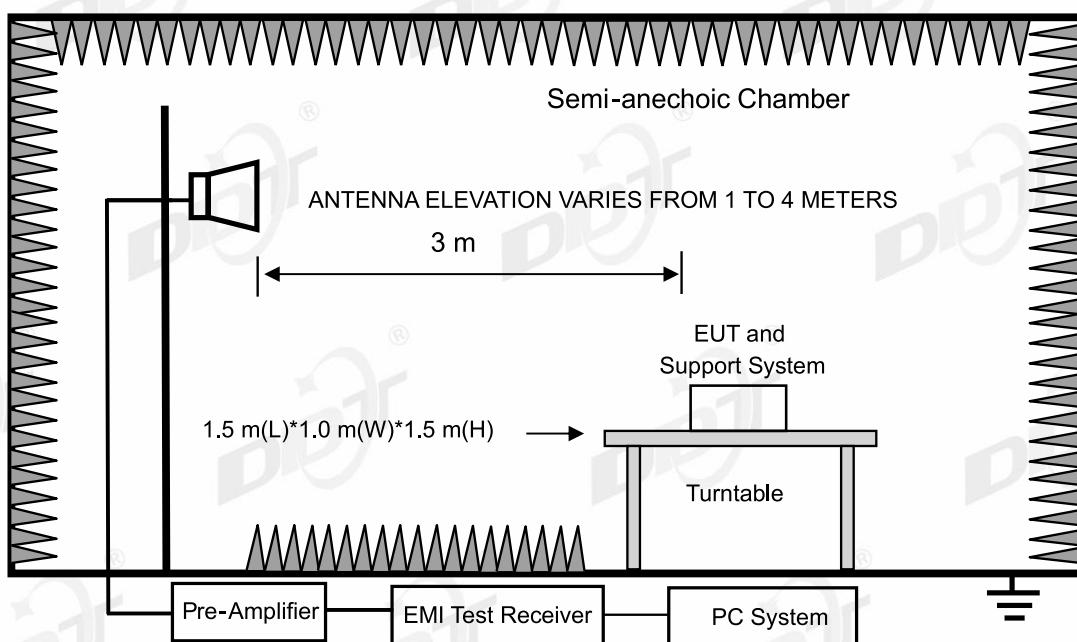
1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. According to Section 11 of KDB 558074, Answer 3: $PK-20\log(\Delta) \text{ Factor}[dB]=AV$

13. Band Edge Compliance

13.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To
RF Cable	N/A	W13.02 AP1-X2	DDT-ZC04023	2026/03/28
High pass filter	Micro-Tronics	HPM50102	DDT-ZC00561	2026/03/28
High Pass filter	Xi'an Xingbo	XBLBQ-GTA67	DDT-ZC02179	2026/03/28
High pass filter	Micro-Tronics	HPM50108	DDT-ZC00560	2026/03/28
EMI TEST RECEIVER	R&S	ESU26	DDT-ZC01909	2026/03/28
Active Loop Antenna	Schwarzbeck	FMZB1519	DDT-ZC00524	2025/09/11
RF cable	Yuhu Technology	JCTB810-NJ-NJ-9M	DDT-ZC02538	2026/03/28
RF Cable	N/A	W24.02 HL-562	DDT-ZC04022	2026/03/28
Micro-Tronics filters	REBES	BRM50716	DDT-ZC03240	/
Pre-amplifier	COM-POWER	PAM-840A	DDT-ZC01693	2026/03/28
Pre-amplifier	COM-POWER	PAM-118A	DDT-ZC01293	2025/08/25
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	DDT-ZC00506	2027/04/01
Hochgewinn-Hornantenne	SCHWARZBEC K	BBHA 9120 D	DDT-ZC02129	2025/09/18
PSA Series Spectrum Analyzer	Agilent	E4447A	DDT-ZC00517	2026/03/28
Micro-Tronics filters	REBES	BRM50702	DDT-ZC03242	/
RF cable	Yuhu Technology	ZT26S-SMAJ-SMAJ-1M	DDT-ZC02037	2026/03/28
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	DDT-ZC02050	2025/07/11
RF cable	Zhongke Junchuang	JCT26S-NJ-NJ-1.5M	DDT-ZC02762	2026/03/28

13.2. Block diagram of test setup



13.3. Limits

All restriction band should comply with 15.209 limits, other emission should be at least 20 dB below the fundamental.

13.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

13.5. Test procedure

Same with Radiated Emission except change investigated frequency range.

Remark: All restriction band have been tested, and only the worst case is shown in report.

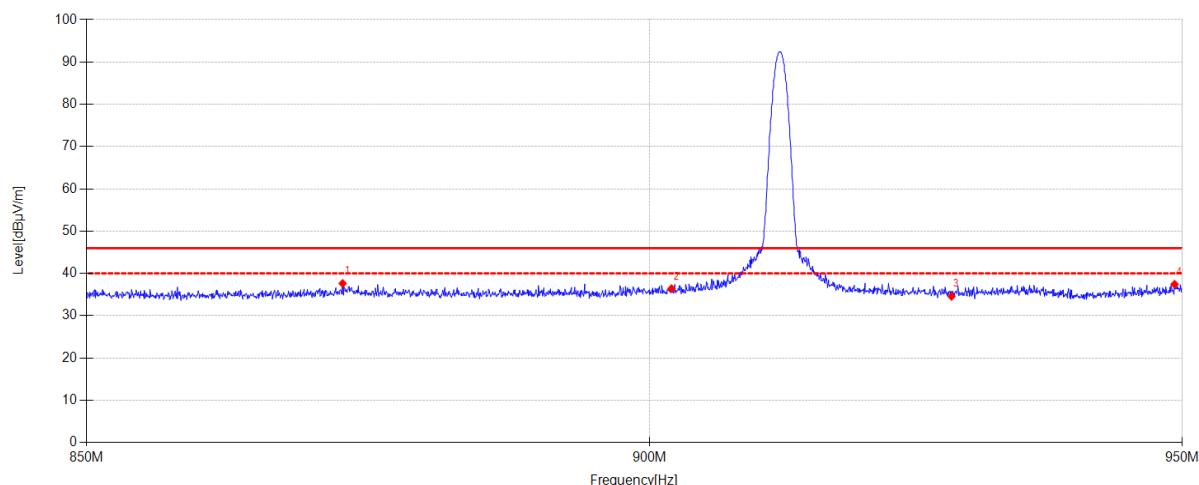
13.6. Test result

PASS. (See below detailed test result)

13.7. Test data

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-05-23 **Tested By:** Nan Zhong
EUT: LV XS Relay **Model Number:** ZEN58 800LR
Test Mode: TX 912MHz Mode **Power Supply:** AC 40V/60Hz
Condition: Temp:23.9°C;Humi:54.9% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2025 report date\Q25041654-1E\FCC BELOW1G\20250523-002235_H
Memo: Sample Number:S25041654-005Power Setting:140



Suspected Data List											
NO.	Freq. [MHz]	Reading [dB μ V/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Detector	Polarity	
1	872.40	39.76	21.45	7.13	-30.70	37.64	46.00	8.36	PK	Horizontal	
2	902.00	37.84	21.90	7.21	-30.56	36.39	46.00	9.61	PK	Horizontal	
3	928.00	36.21	21.54	7.27	-30.44	34.58	46.00	11.42	PK	Horizontal	
4	949.25	37.93	22.52	7.33	-30.34	37.44	46.00	8.56	PK	Horizontal	

Note:

1. Result Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-05-23

Tested By: Nan Zhong

EUT: LV XS Relay

Model Number: ZEN58 800LR

Test Mode: TX 912MHz Mode

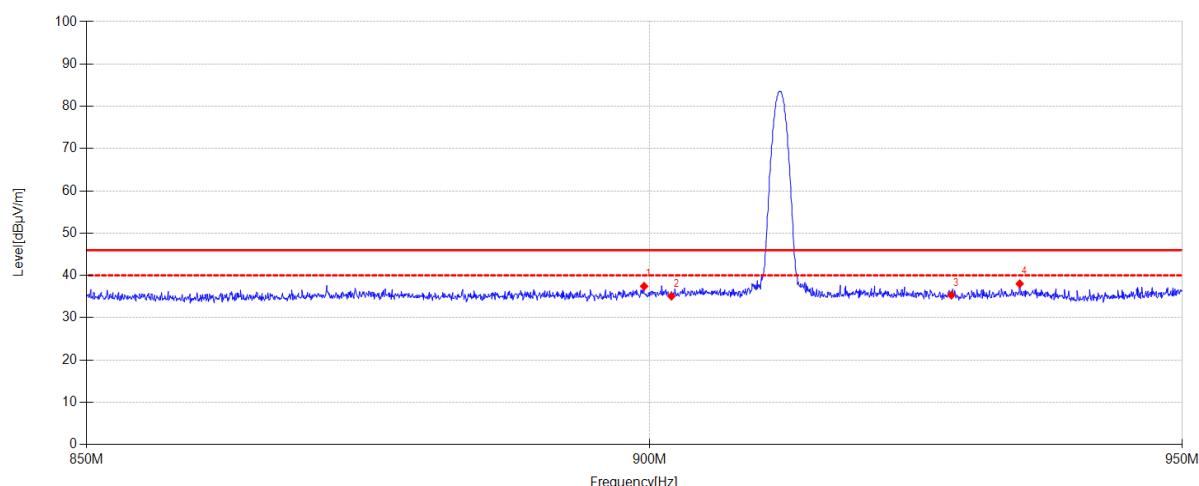
Power Supply: AC 40V/60Hz

Condition: Temp:23.9°C;Humi:54.9%

Test Site: DDT 3# Chamber

File Path: d:\ts\2025 report date\Q25041654-1E\FCC BELOW1G\20250523-002433_V

Memo: Sample Number:S25041654-005Power Setting:140



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	899.50	38.99	21.83	7.20	-30.57	37.45	46.00	8.55	PK	Vertical
2	902.00	36.54	21.90	7.21	-30.56	35.09	46.00	10.91	PK	Vertical
3	928.00	36.97	21.54	7.27	-30.44	35.34	46.00	10.66	PK	Vertical
4	934.45	39.13	22.03	7.29	-30.41	38.04	46.00	7.96	PK	Vertical

Note:

1. Result Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-05-23

Tested By: Nan Zhong

EUT: LV XS Relay

Model Number: ZEN58 800LR

Test Mode: TX 920MHz Mode

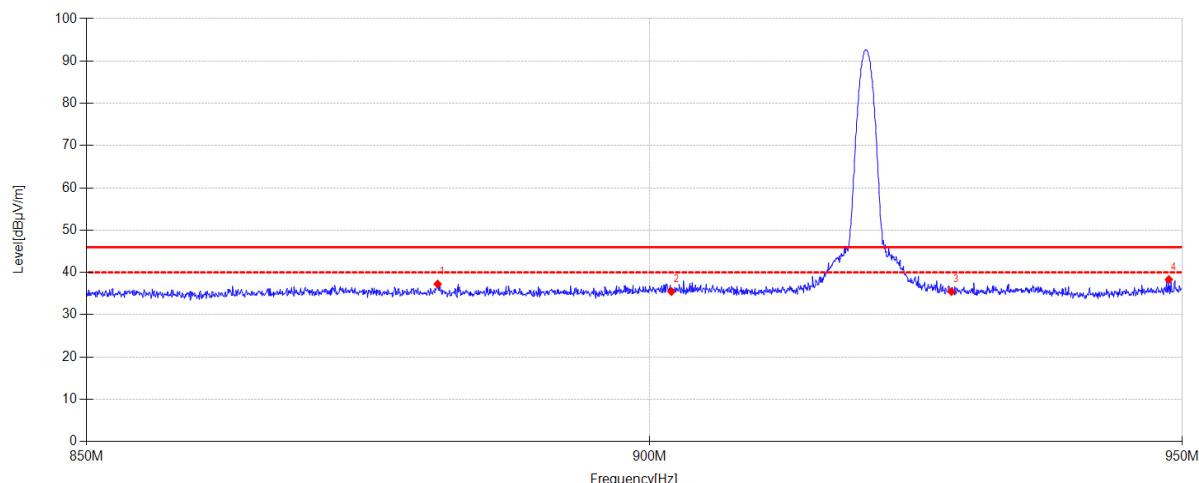
Power Supply: AC 40V/60Hz

Condition: Temp:23.9°C;Humi:54.9%

Test Site: DDT 3# Chamber

File Path: d:\ts\2025 report date\Q25041654-1E\FCC BELOW1G\20250523-002733_H

Memo: Sample Number:S25041654-005Power Setting:140



Suspected Data List											
NO.	Freq. [MHz]	Reading [dB μ V/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Detector	Polarity	
1	880.85	39.49	21.28	7.15	-30.66	37.26	46.00	8.74	PK	Horizontal	
2	902.00	36.93	21.90	7.21	-30.56	35.48	46.00	10.52	PK	Horizontal	
3	928.00	37.10	21.54	7.27	-30.44	35.47	46.00	10.53	PK	Horizontal	
4	948.70	38.96	22.39	7.33	-30.34	38.34	46.00	7.66	PK	Horizontal	

Note:

1. Result Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-05-23

Tested By: Nan Zhong

EUT: LV XS Relay

Model Number: ZEN58 800LR

Test Mode: TX 920MHz Mode

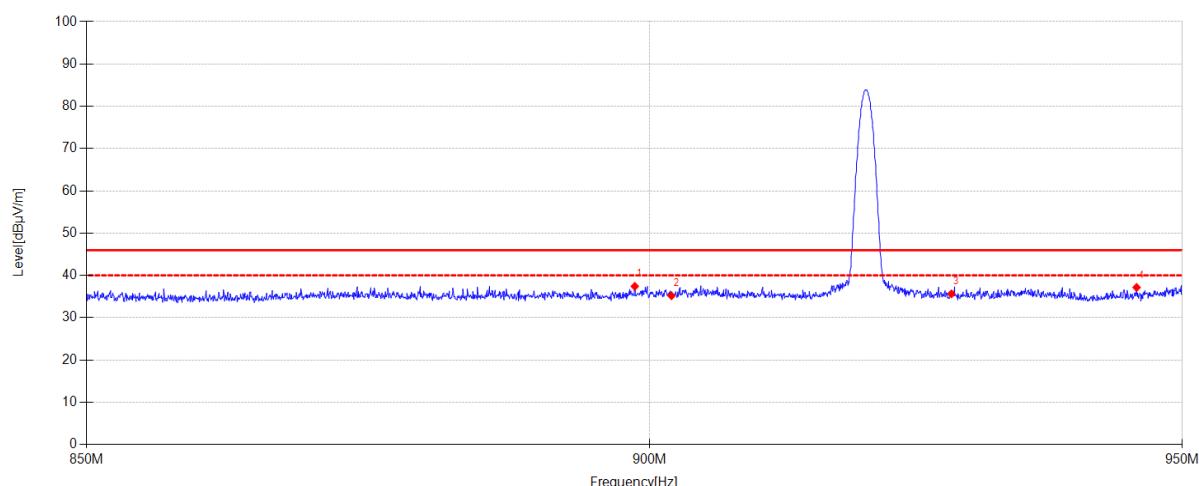
Power Supply: AC 40V/60Hz

Condition: Temp:23.9°C;Humi:54.9%

Test Site: DDT 3# Chamber

File Path: d:\ts\2025 report date\Q25041654-1E\FCC BELOW1G\20250523-002821_V

Memo: Sample Number:S25041654-005Power Setting:140



Suspected Data List

NO.	Freq. [MHz]	Reading [dB μ V/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Detector	Polarity
1	898.65	39.09	21.71	7.20	-30.57	37.43	46.00	8.57	PK	Vertical
2	902.00	36.64	21.90	7.21	-30.56	35.19	46.00	10.81	PK	Vertical
3	928.00	37.28	21.54	7.27	-30.44	35.65	46.00	10.35	PK	Vertical
4	945.60	38.56	21.64	7.32	-30.35	37.17	46.00	8.83	PK	Vertical

Note:

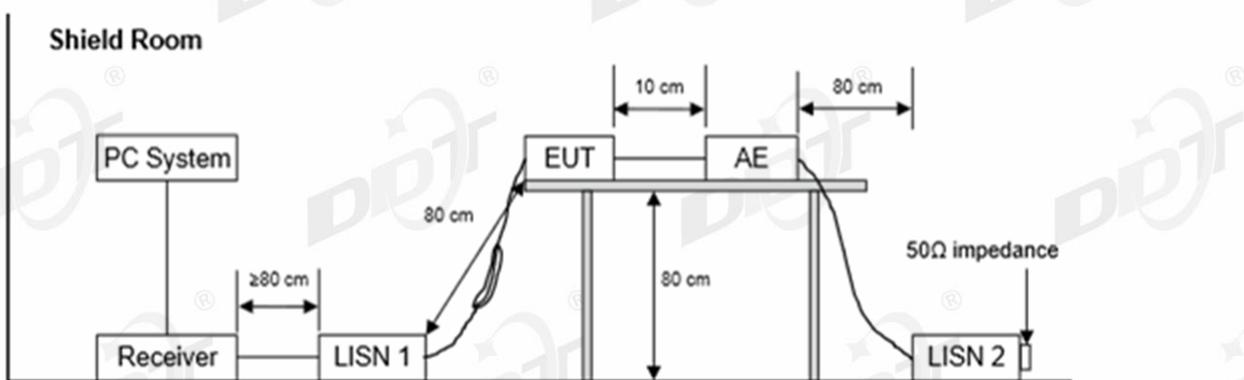
1. Result Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

14. Power Line Conducted Emissions

14.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To
Two Line V-Network	R&S	ENV216	DDT-ZC00535	2025/07/08
EMI Test Software	Audix/TW	e3	DDT-ZC01252	/
Artificial mains	R&S	ESH2-Z5	DDT-ZC00538	2025/07/08
EMI Test Receiver	R&S	ESCI	DDT-ZC00235	2025/07/08
Pulse Limiter	SCHWARZBEC K	ESH3-Z2	DDT-ZC00539	2025/07/08
CE Cable 1	R&S	ESU8/RF2	DDT-ZC00566	2025/07/08

14.2. Block diagram of test setup



14.3. Limits

Frequency	Quasi-Peak Level		Average Level dB(uV)
	dB(uV)		
150 kHz~500 kHz	66	~ 56*	56 ~ 46*
500 kHz~5 MHz	56		46
5 MHz~30 MHz	60		50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

14.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

14.5. Test procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

14.6. Test result

PASS. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

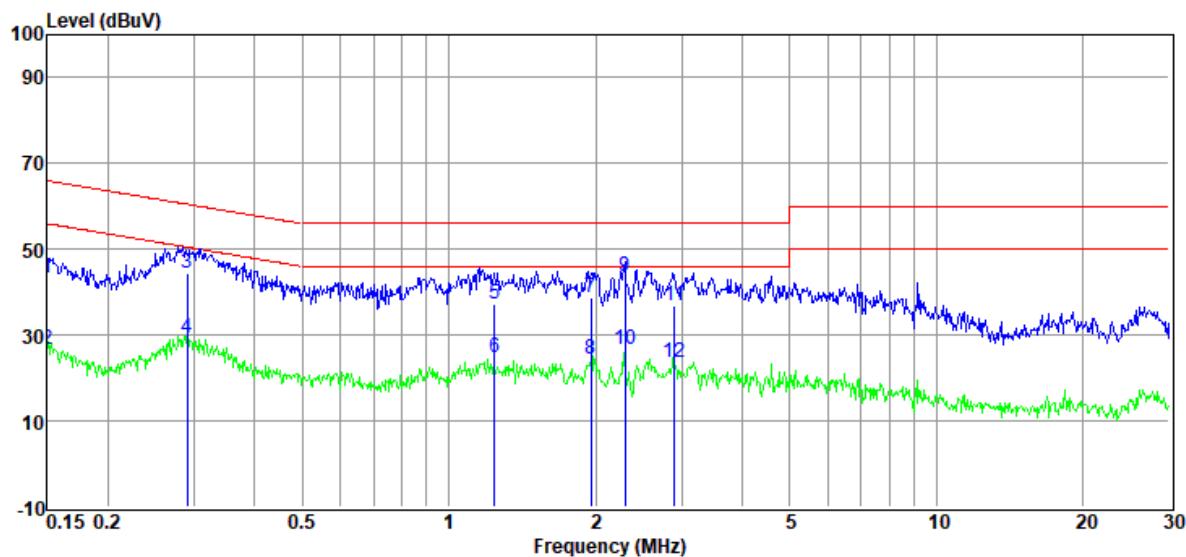
Note2: “—” means Peak detection; “—” means Average detection.

Note3: Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/50Hz, recorded the worst case.

14.7. Test data

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **Tested By** : Aaron Liu
Test Date : 2025-05-22 **Model Number** : ZEN58 800LR
EUT : LV XS Relay **Test Mode** : SRD mode
Power Supply : AC 40V/60Hz
Condition : TEMP:23.4°C, RH:61.2% **LISN** : 2024 1# ENV216/NEUTRAL
Memo :



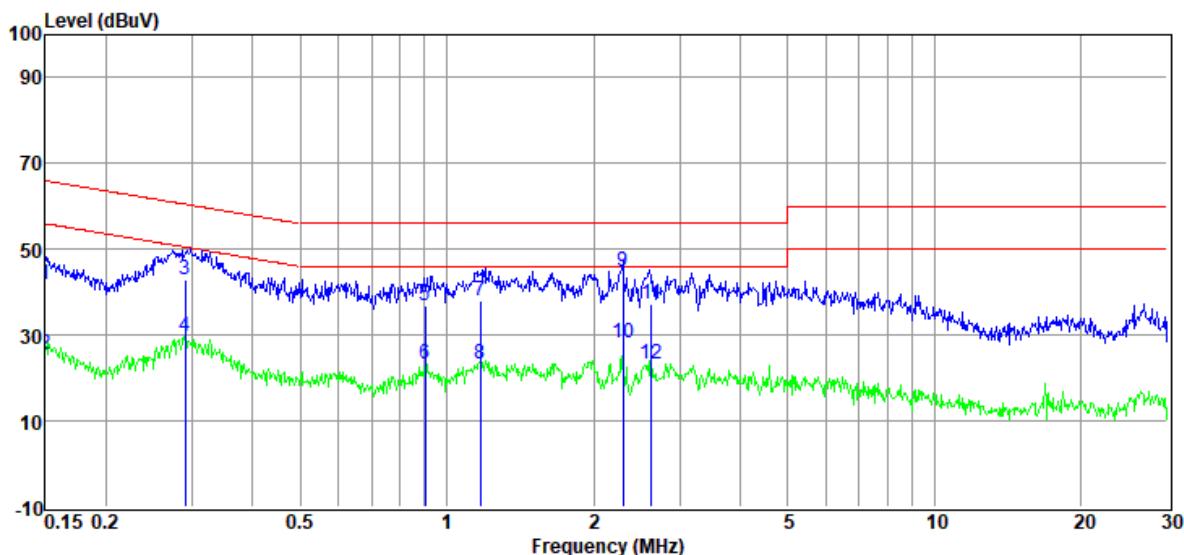
Item (Mark)	Freq. (MHz)	Read Level (dB μ V)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dB μ V)	Limit Line (dB μ V)	Over Limit (dB)	Detector	Phase
1	0.15	23.82	9.65	0.11	9.86	43.44	66.00	-22.56	QP	NEUTRAL
2	0.15	7.16	9.65	0.11	9.86	26.78	56.00	-29.22	Average	NEUTRAL
3	0.29	24.88	9.71	0.15	9.86	44.60	60.50	-15.90	QP	NEUTRAL
4	0.29	9.75	9.71	0.15	9.86	29.47	50.50	-21.03	Average	NEUTRAL
5	1.24	17.81	9.69	0.04	9.88	37.42	56.00	-18.58	QP	NEUTRAL
6	1.24	5.05	9.69	0.04	9.88	24.66	46.00	-21.34	Average	NEUTRAL
7	1.96	19.33	9.68	0.04	9.87	38.92	56.00	-17.08	QP	NEUTRAL
8	1.96	4.97	9.68	0.04	9.87	24.56	46.00	-21.44	Average	NEUTRAL
9	2.30	24.21	9.67	0.05	9.87	43.80	56.00	-12.20	QP	NEUTRAL
10	2.30	7.26	9.67	0.05	9.87	26.85	46.00	-19.15	Average	NEUTRAL
11	2.90	17.43	9.66	0.05	9.86	37.00	56.00	-19.00	QP	NEUTRAL
12	2.90	4.10	9.66	0.05	9.86	23.67	46.00	-22.33	Average	NEUTRAL

Note:

1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **Tested By** : Aaron Liu
Test Date : 2025-05-22 **Model Number** : ZEN58 800LR
EUT : LV XS Relay **Test Mode** : SRD mode
Power Supply : AC 40V/60Hz **LISN** : 2024 1# ENV216/LINE
Condition : TEMP:23.4°C, RH:61.2%
Memo :



Item (Mark)	Freq. (MHz)	Read Level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Detector	Phase
1	0.15	21.94	9.90	0.11	9.86	41.81	66.00	-24.19	QP	LINE
2	0.15	5.76	9.90	0.11	9.86	25.63	56.00	-30.37	Average	LINE
3	0.29	23.33	9.75	0.15	9.86	43.09	60.50	-17.41	QP	LINE
4	0.29	9.97	9.75	0.15	9.86	29.73	50.50	-20.77	Average	LINE
5	0.90	17.30	9.80	0.06	9.88	37.04	56.00	-18.96	QP	LINE
6	0.90	3.69	9.80	0.06	9.88	23.43	46.00	-22.57	Average	LINE
7	1.17	18.21	9.77	0.04	9.88	37.90	56.00	-18.10	QP	LINE
8	1.17	3.45	9.77	0.04	9.88	23.14	46.00	-22.86	Average	LINE
9	2.30	25.09	9.75	0.05	9.87	44.76	56.00	-11.24	QP	LINE
10	2.30	8.50	9.75	0.05	9.87	28.17	46.00	-17.83	Average	LINE
11	2.62	17.75	9.75	0.05	9.86	37.41	56.00	-18.59	QP	LINE
12	2.62	3.78	9.75	0.05	9.86	23.44	46.00	-22.56	Average	LINE

Note:

- Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.
- If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
- Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
- Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

16. Photos of the EUT

Please refer to DDT-Q25041654-1E appendix I

End Report
