



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	:	2AZ2V-ZEN58
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart C, ANSI C63.10:2013
Report No.	:	DDT-RE25041654-1E02
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

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Test Report Declare

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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-RE25041654-1E02		
Date of Receipt:	2025/04/24	Date of Test:	2025/04/24~2025/05/23

Created: Tiger Mo	Reviewed: Ella Gong	Approved: Damon Hu
		
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

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	Standard	Results
20 dB Bandwidth	FCC Part 15: 15.215 ANSI C63.10:2013	Pass
Radiated Emission	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.249 ANSI C63.10:2013	Pass
Power Line Conducted Emission	FCC Part 15: 15.207 ANSI C63.10:2013	Pass
Antenna requirement	FCC Part 15: 15.203	Pass

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

Radio Technology	: SRD
Operation frequency	: 908.40 MHz, 908.42 MHz, 916 MHz
Modulation	: FSK

Channel information	
Channel	Frequency (MHz)
1	908.40
2	908.42
3	916

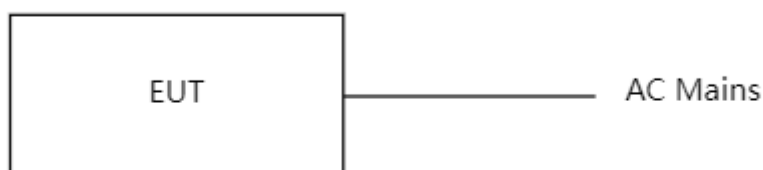
Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's 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

Test software: putty.exe

According pre-test, the worst test modes were reported as below, 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	100	908.40
	100	908.42
	100	916.00

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:	21-25 °C
Humidity range:	40-75%
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

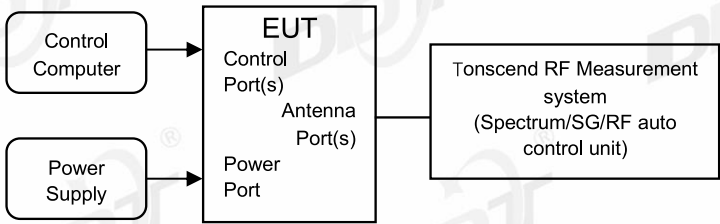
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Frequencies Stability	6.7×10^{-8} (Antenna couple method)
	5.5×10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.40 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
	1.66 dB ($8 \text{ GHz} \leq f < 26.5 \text{ GHz}$)
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. 20 dB Bandwidth

3.1. Test equipment

Equipment	Manufacturer	Model No.	Serial Number	Due Date
☑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

3.2. Block diagram of test setup



3.3. Limits

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

3.4. Assistant equipment used for test

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

3.5. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows:

RBW: 3 kHz

VBW: 10 kHz

Detector Mode: Peak

Sweep time: auto

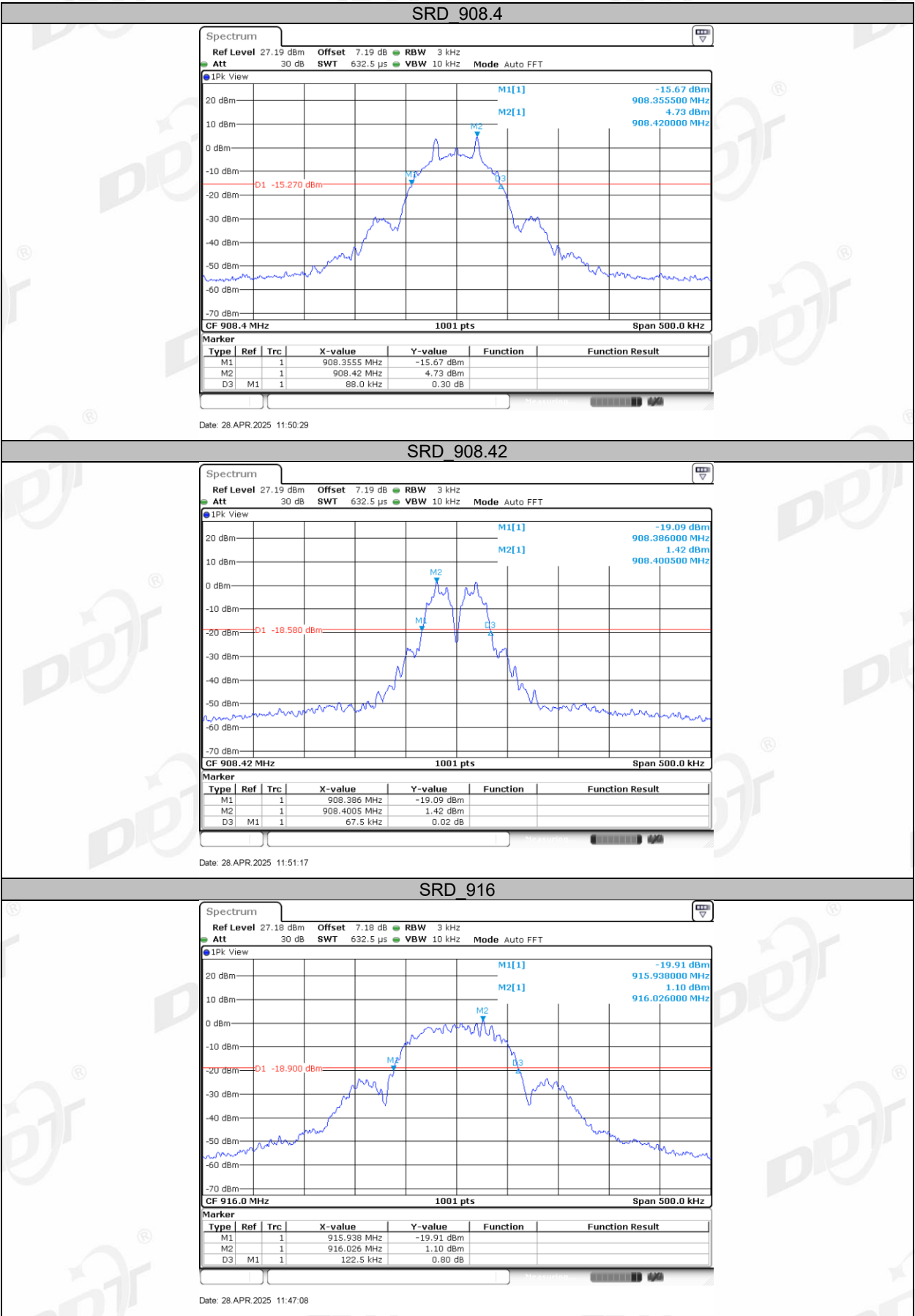
Trace mode Max hold

(3) Allow the trace to stabilize, measure the 20 dB bandwidth of signal.

3.6. Test result

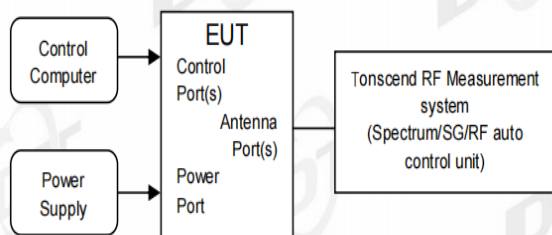
Frequency (MHz)	20 dB bandwidth Result (kHz)	Limit (kHz)	Conclusion
908.4	88.0	/	Pass
908.42	67.5	/	Pass
916	122.5	/	Pass

3.7. Test graphs



4. Duty cycle

4.1. Block diagram of test setup



4.2. Limit

Just for Report and determining the average value of pulsed emissions.

4.3. 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: 3 MHz.

Video BW: 3 MHz.

Span: Zero span.

Detector: Peak.

Trace Mode: Max Hold.

Sweep: Video Trigger

Sweep time: 100 ms

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

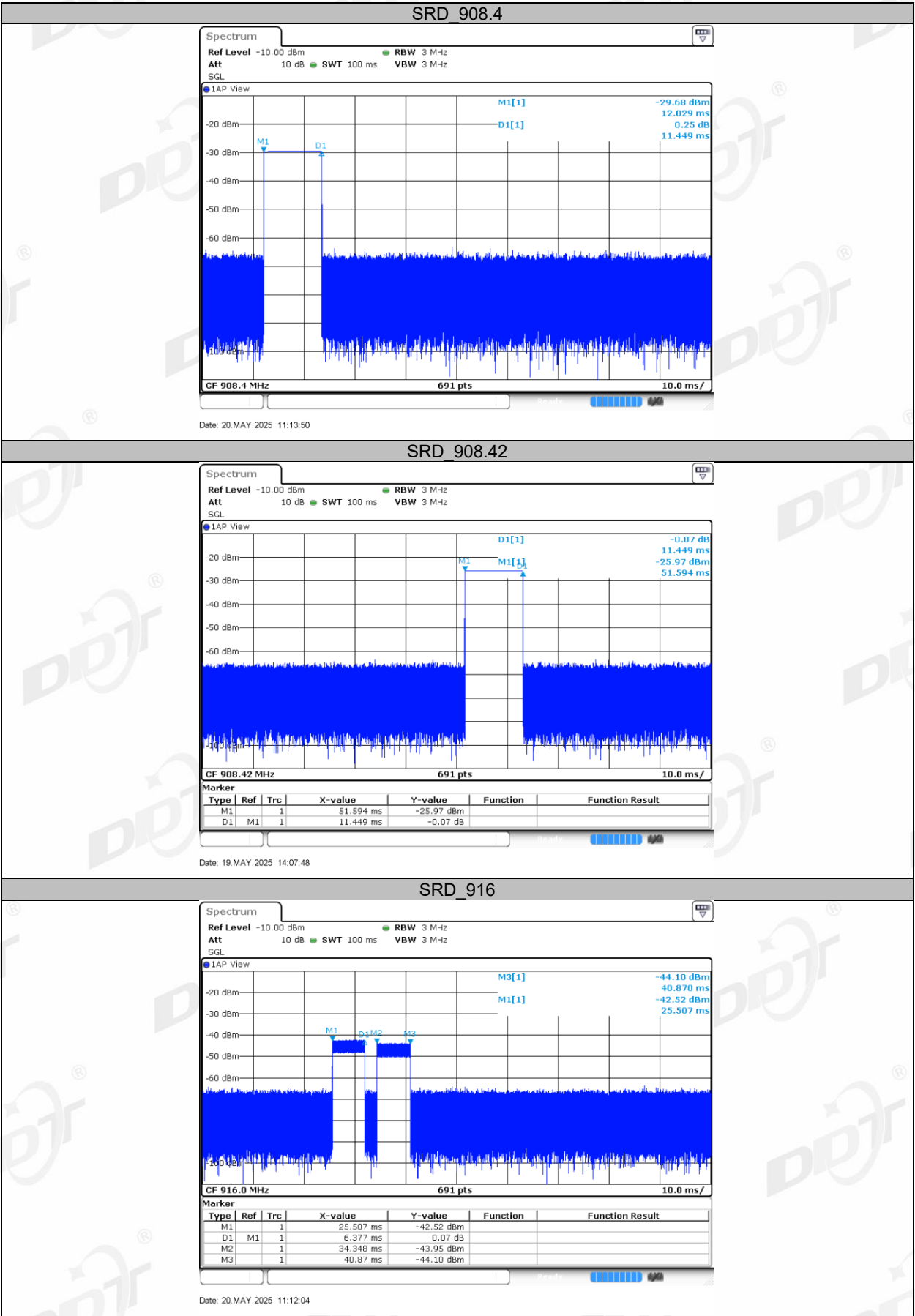
(3) Calculate dwell time follow below formula:

Duty cycle= Pulse's on time / Burst cycle

4.4. Test result

Frequency [MHz]	Antenna	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor [dB]
908.4	Ant1	12.029	100	12.029	-18.39
908.42	Ant1	11.449	100	11.449	-18.82
916	Ant1	12.899	100	12.899	-17.78

4.5. Test graphs

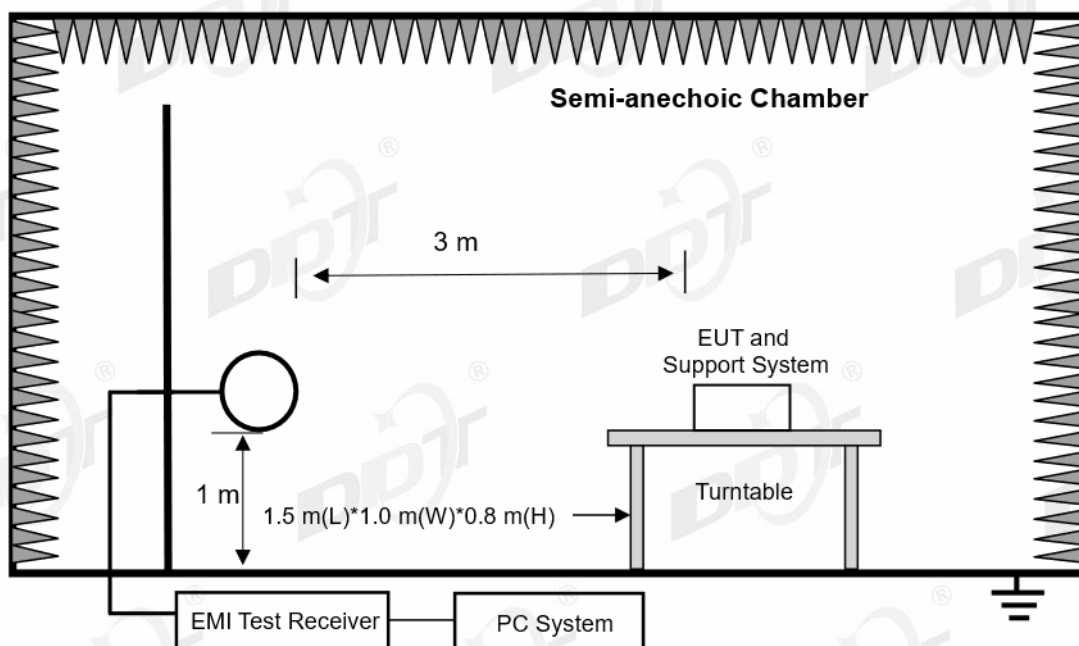


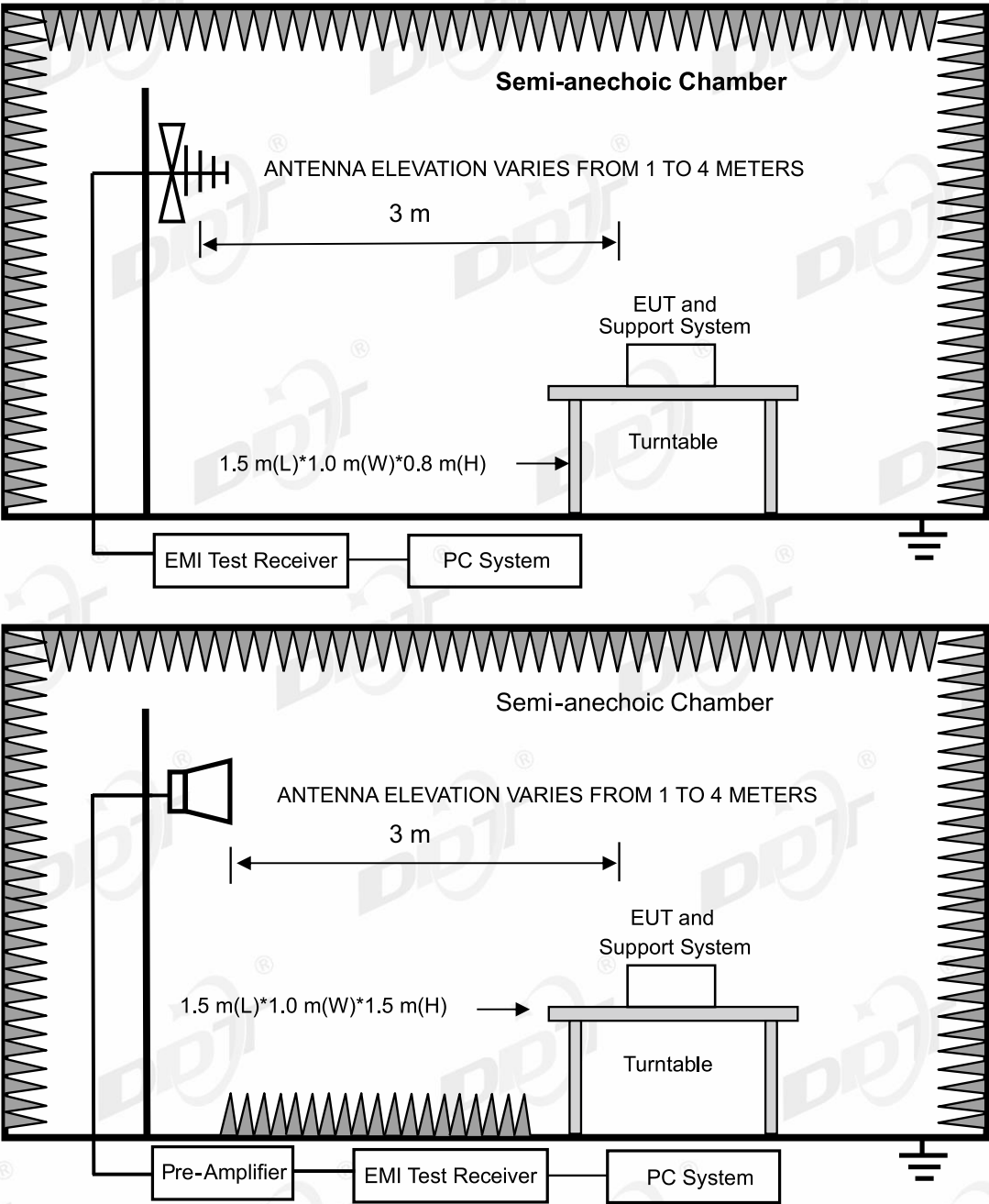
5. Radiated Emission

5.1. Test equipment

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

5.2. Block diagram of test setup





5.3. 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 (MHz)	Distance (Meters)	Field strengths limit	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
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 MHz	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	
Field Strength of Fundamental emission for 902 MHz - 928 MHz	3	94.0 dB(μV)/m (QP)	
Field Strength of Harmonics	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark:

(1) Emission level $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V}/\text{m}$

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

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

5.4. Test procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.

(2) Setup EUT and assistant system according clause 2.4

(3) Test antenna was located 3 m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.

(a) Change work frequency or channel of device if practicable.

(b) Change modulation type of device if practicable.

(c) Change power supply range from 85% to 115% of the rated supply voltage

(d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions

(4) Spectrum frequency from 9 kHz to 10 GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9 kHz to 30 MHz, so below final test was performed with frequency range from 30 MHz to 10 GHz.

(5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m 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.

(6) For emissions from 30 MHz to 1 GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 kHz.

(7) For emissions above 1 GHz, 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 procedure for average measure.

(8) For fundamental frequency test, set spectrum analyzer's RBW = 100 kHz, VBW = 300 kHz. Peak detector for pre-test, then read the QP Level in spectrum analyzer and record.

5.5. Test result

Pass. (See below detailed test result)

All the emissions except fundamental emission from 9 kHz to 10 GHz were comply with 15.209 limit.

Note1: According exploratory test, the emission levels are 20 dB below the limit detected from 9 kHz to 30 MHz, so the final test was performed with frequency range from 30 MHz to 10 GHz and recorded in below.

Note2: For emissions above 1 GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

Field Strength of the Fundamental Signal

Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
908.40	93.80	21.56	7.22	-30.53	92.05	114	21.95	PK	Horizontal
908.40	\	\	\	\	74.27	94	19.73	AV	Horizontal
908.40	88.99	21.56	7.22	-30.53	87.24	114	26.76	PK	Vertical
908.40	\	\	\	\	69.46	94	24.54	AV	Vertical
908.42	93.77	21.56	7.22	-30.53	92.02	114	21.98	PK	Horizontal
908.42	\	\	\	\	74.24	94	19.76	AV	Horizontal
908.42	88.93	21.56	7.22	-30.53	87.18	114	26.82	PK	Vertical
908.42	\	\	\	\	69.4	94	24.6	AV	Vertical
916.00	92.30	21.26	7.24	-30.49	90.31	114	23.69	PK	Horizontal
916.00	\	\	\	\	72.53	94	21.47	AV	Horizontal
916.00	88.08	21.26	7.24	-30.49	86.09	114	27.91	PK	Vertical
916.00	\	\	\	\	68.31	94	25.69	AV	Vertical

5.6. 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:

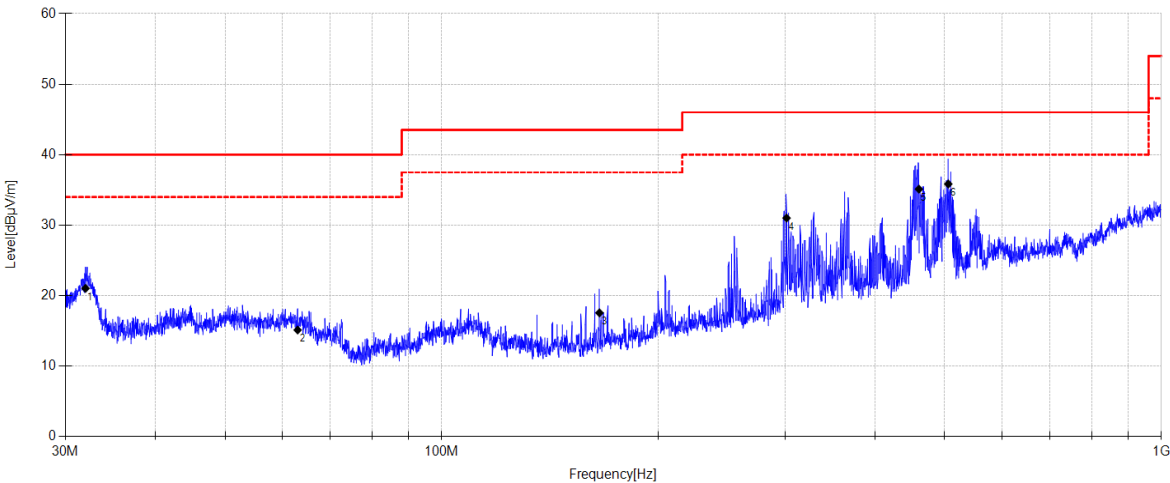
DDT 3# Chamber

File Path:

d:\ts\2025 report date\Q25041654-1E\FCC BELOW1G\20250520-015630_H

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	31.999	38.26	10.10	3.77	21.03	40.00	18.97	QP	Horizontal
2	63.082	29.85	12.39	3.98	15.12	40.00	24.88	QP	Horizontal
3	165.662	35.49	8.67	4.57	17.56	43.50	25.94	QP	Horizontal
4	301.495	43.48	13.70	5.23	31.01	46.00	14.99	QP	Horizontal
5	460.476	44.84	15.90	5.85	35.11	46.00	10.89	QP	Horizontal
6	505.838	44.79	16.53	6.02	35.84	46.00	10.16	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:

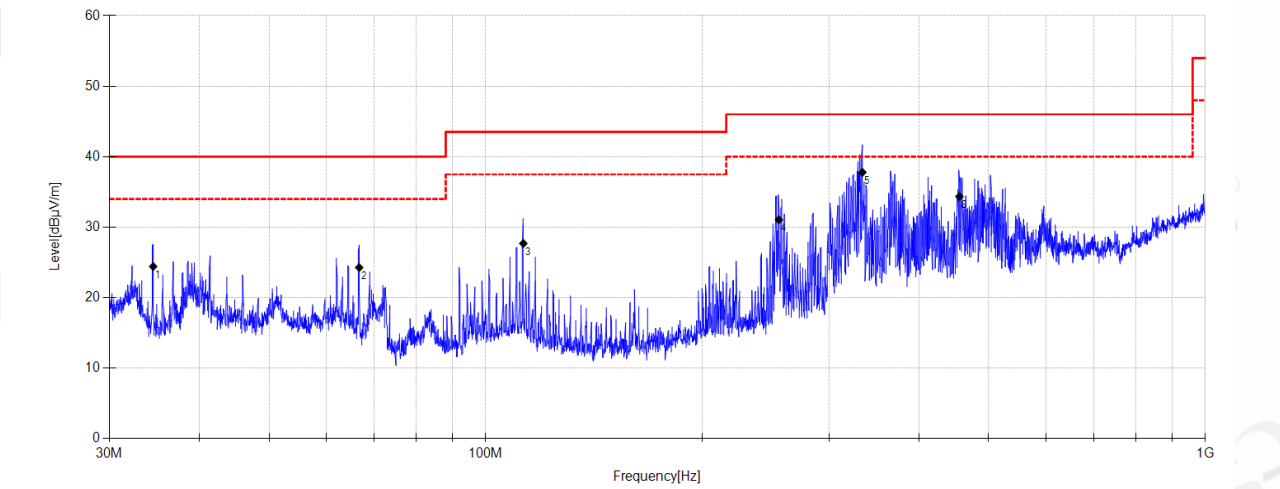
DDT 3# Chamber

File Path:

d:\ts\2025 report date\Q25041654-1E\FCC BELOW1G\20250520-015717_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	34.516	40.14	11.58	3.79	24.41	40.00	15.59	QP	Vertical
2	66.722	40.91	10.46	4.00	24.27	40.00	15.73	QP	Vertical
3	112.811	43.13	11.38	4.29	27.69	43.50	15.81	QP	Vertical
4	255.514	45.57	11.77	5.02	31.05	46.00	14.95	QP	Vertical
5	333.760	49.31	14.53	5.36	37.78	46.00	8.22	QP	Vertical
6	455.338	44.01	15.99	5.83	34.35	46.00	11.65	QP	Vertical

Note:

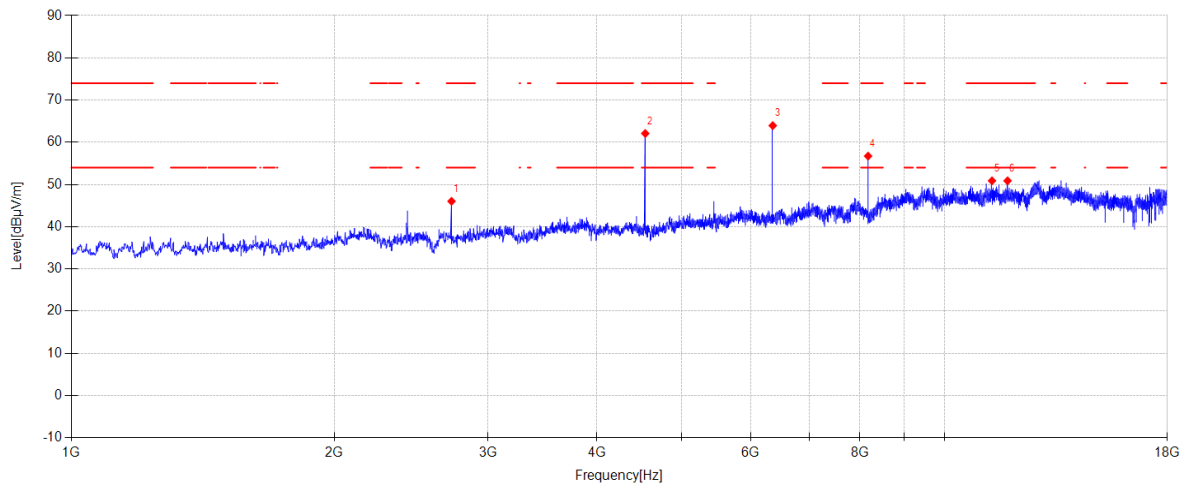
1. Result Level = Reading + Cable loss + Antenna Factor + AMP

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: 2025-05-18 **Tested By:** Nan Zhong
EUT: LV XS Relay **Model Number:** ZEN58 800LR
Test Mode: TX 908.4MHz 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\5
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	2725.500	52.52	27.55	5.05	-39.09	46.03	94.00	47.97	PK	Horizontal
2	4542.800	64.46	31.89	5.38	-39.64	62.09	94.00	31.91	PK	Horizontal
3	6358.400	63.16	34.62	6.27	-40.10	63.95	94.00	30.05	PK	Horizontal
4	8175.700	52.42	37.15	7.03	-39.87	56.73	94.00	37.27	PK	Horizontal
5	11336.000	42.65	39.24	8.34	-39.34	50.89	74.00	23.11	PK	Horizontal
6	11810.300	43.15	38.90	8.64	-39.81	50.88	94.00	43.12	PK	Horizontal

Suspected Data List

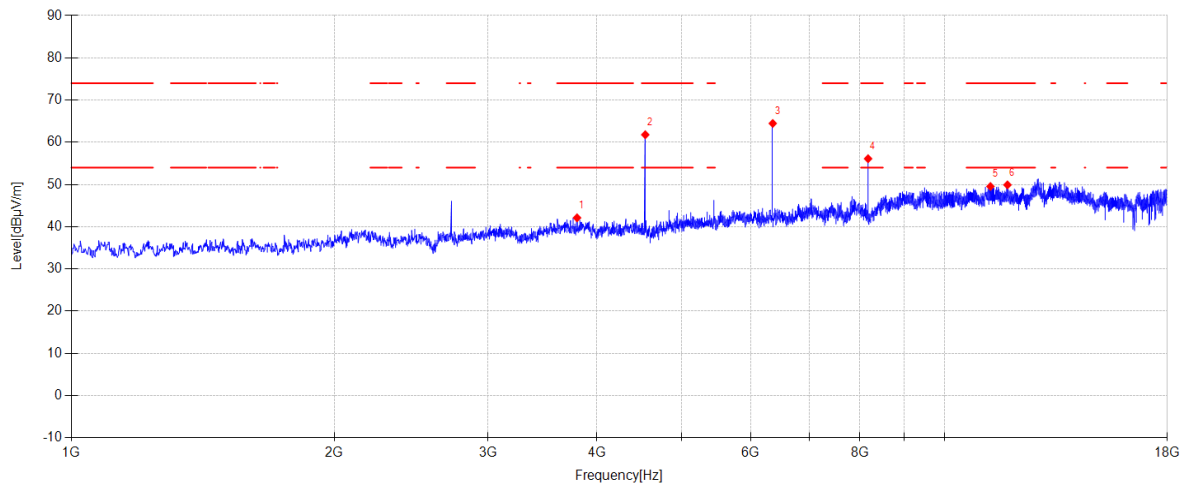
NO	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
2	4542.800	/	/	/	/	44.31	74.00	29.69	AV	Horizontal
3	6358.400	/	/	/	/	46.17	74.00	27.83	AV	Horizontal
4	8175.700	/	/	/	/	38.95	74.00	35.05	AV	Horizontal

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. PK-20log(Δ) 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 908.4MHz 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\6
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	3794.800	45.98	30.68	5.08	-39.63	42.11	74.00	31.89	PK	Vertical
2	4542.800	64.16	31.89	5.38	-39.64	61.79	94.00	32.21	PK	Vertical
3	6358.400	63.68	34.62	6.27	-40.10	64.47	94.00	29.53	PK	Vertical
4	8175.700	51.80	37.15	7.03	-39.87	56.11	94.00	37.89	PK	Vertical
5	11290.100	41.32	39.20	8.31	-39.29	49.54	74.00	24.46	PK	Vertical
6	11808.600	42.18	38.90	8.64	-39.81	49.91	94.00	44.09	PK	Vertical

Suspected Data List

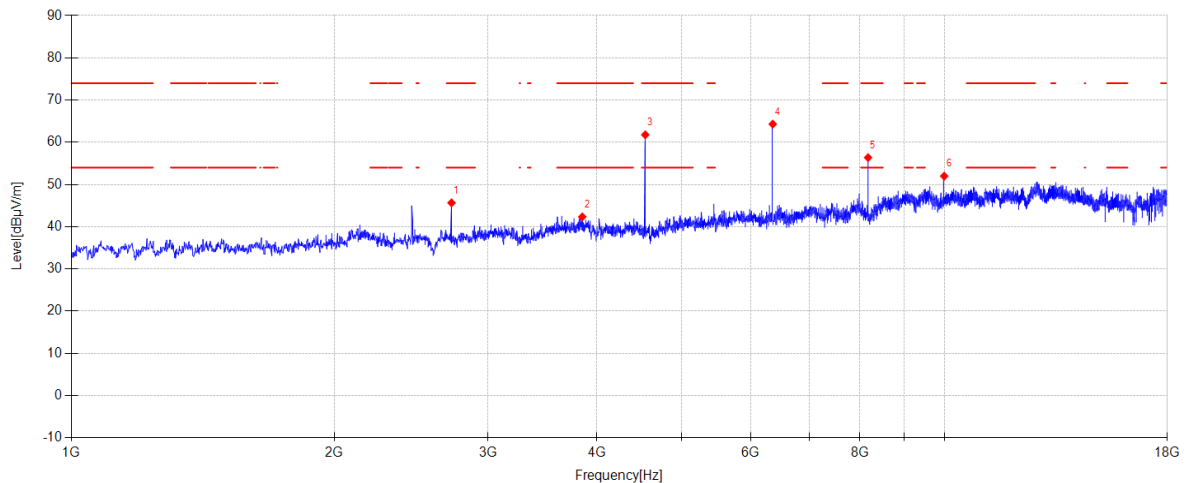
NO	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
2	4542.800	/	/	/	/	44.01	74.00	29.99	AV	Vertical
3	6358.400	/	/	/	/	46.69	74.00	27.31	AV	Vertical
4	8175.700	/	/	/	/	38.33	74.00	35.67	AV	Vertical

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. PK-20log(Δ) 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 908.42MHz 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\7
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	2725.500	52.15	27.55	5.05	-39.09	45.66	94.00	48.34	PK	Horizontal
2	3847.500	46.01	30.89	5.08	-39.64	42.34	74.00	31.66	PK	Horizontal
3	4542.800	64.15	31.89	5.38	-39.64	61.78	94.00	32.22	PK	Horizontal
4	6358.400	63.52	34.62	6.27	-40.10	64.31	94.00	29.69	PK	Horizontal
5	8175.700	52.07	37.15	7.03	-39.87	56.38	94.00	37.62	PK	Horizontal
6	9993.000	45.36	38.59	7.63	-39.59	51.99	94.00	42.01	PK	Horizontal

Suspected Data List

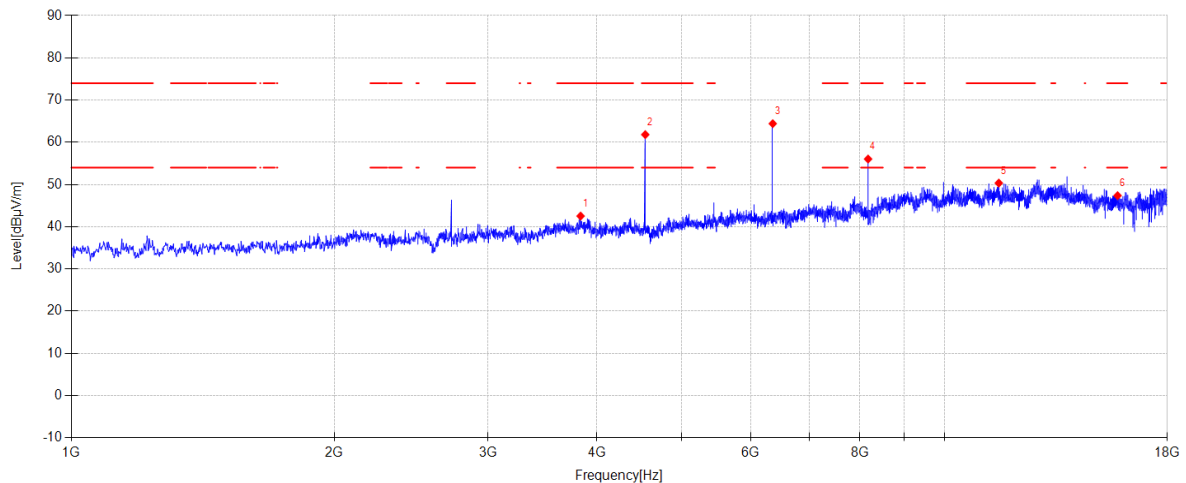
NO	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
3	4542.800	/	/	/	/	44.00	74.00	30.00	AV	Horizontal
4	6358.400	/	/	/	/	46.53	74.00	27.47	AV	Horizontal
5	8175.700	/	/	/	/	38.60	74.00	35.40	AV	Horizontal

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. PK-20log(Δ) 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 908.42MHz 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\8
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	3830.500	46.27	30.82	5.08	-39.64	42.53	74.00	31.47	PK	Vertical
2	4542.800	64.19	31.89	5.38	-39.64	61.82	94.00	32.18	PK	Vertical
3	6358.400	63.63	34.62	6.27	-40.10	64.42	94.00	29.58	PK	Vertical
4	8175.700	51.73	37.15	7.03	-39.87	56.04	94.00	37.96	PK	Vertical
5	11541.700	42.29	39.12	8.47	-39.54	50.34	94.00	43.66	PK	Vertical
6	15784.900	38.43	38.33	10.01	-39.40	47.37	74.00	26.63	PK	Vertical

Suspected Data List

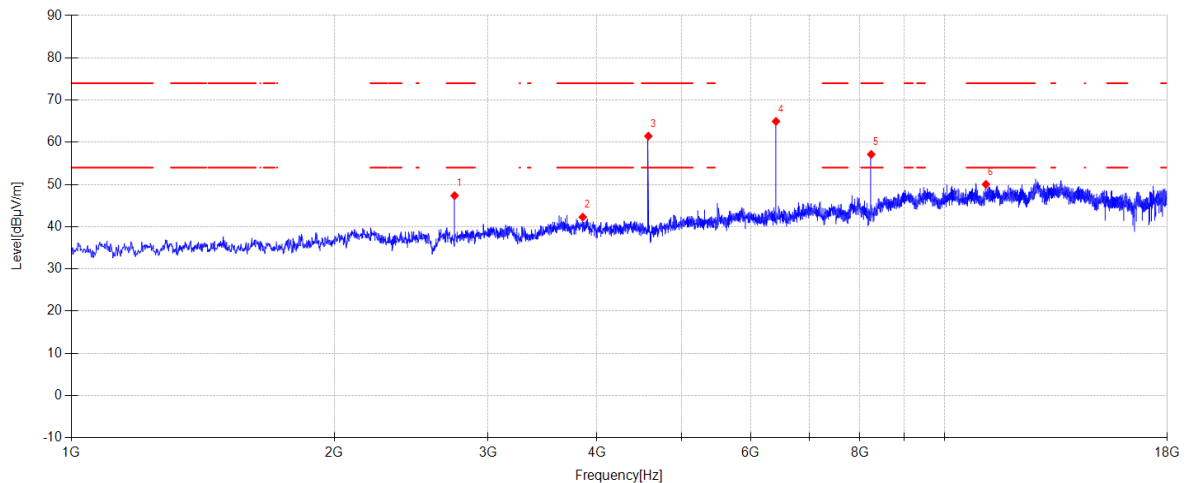
NO	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
2	4542.800	/	/	/	/	44.04	74.00	29.96	AV	Vertical
3	6358.400	/	/	/	/	46.64	74.00	27.36	AV	Vertical
4	8175.700	/	/	/	/	38.26	74.00	35.74	AV	Vertical

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. PK-20log(Δ) 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 916MHz 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\3
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	2747.600	53.83	27.60	5.06	-39.12	47.37	94.00	46.63	PK	Horizontal
2	3852.600	45.93	30.92	5.08	-39.64	42.29	74.00	31.71	PK	Horizontal
3	4580.200	63.79	31.90	5.40	-39.63	61.46	94.00	32.54	PK	Horizontal
4	6412.800	64.09	34.75	6.29	-40.18	64.95	94.00	29.05	PK	Horizontal
5	8243.700	52.68	37.19	7.05	-39.78	57.14	94.00	36.86	PK	Horizontal
6	11155.800	41.73	39.24	8.23	-39.16	50.04	74.00	23.96	PK	Horizontal

Suspected Data List

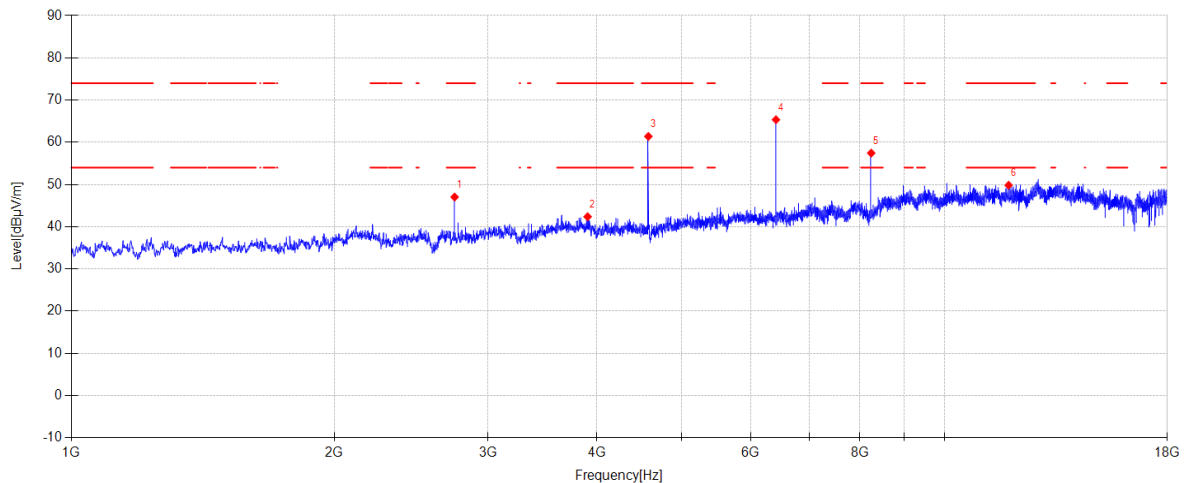
NO	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
3	4580.200	/	/	/	/	43.68	74.00	30.32	AV	Horizontal
4	6412.800	/	/	/	/	47.17	74.00	26.83	AV	Horizontal
5	8243.700	/	/	/	/	39.36	74.00	34.64	AV	Horizontal

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. PK-20log(Δ) 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 916MHz 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\4
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	2747.600	53.49	27.60	5.06	-39.12	47.03	94.00	46.97	PK	Vertical
2	3901.900	45.77	31.20	5.07	-39.66	42.38	74.00	31.62	PK	Vertical
3	4580.200	63.72	31.90	5.40	-39.63	61.39	94.00	32.61	PK	Vertical
4	6412.800	64.49	34.75	6.29	-40.18	65.35	94.00	28.65	PK	Vertical
5	8243.700	52.98	37.19	7.05	-39.78	57.44	94.00	36.56	PK	Vertical
6	11844.300	42.11	38.90	8.66	-39.84	49.83	74.00	24.17	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	4580.200	/	/	/	/	43.61	74.00	30.39	AV	Vertical
4	6412.800	/	/	/	/	47.57	74.00	26.43	AV	Vertical
5	8243.700	/	/	/	/	39.66	74.00	34.34	AV	Vertical

Note:

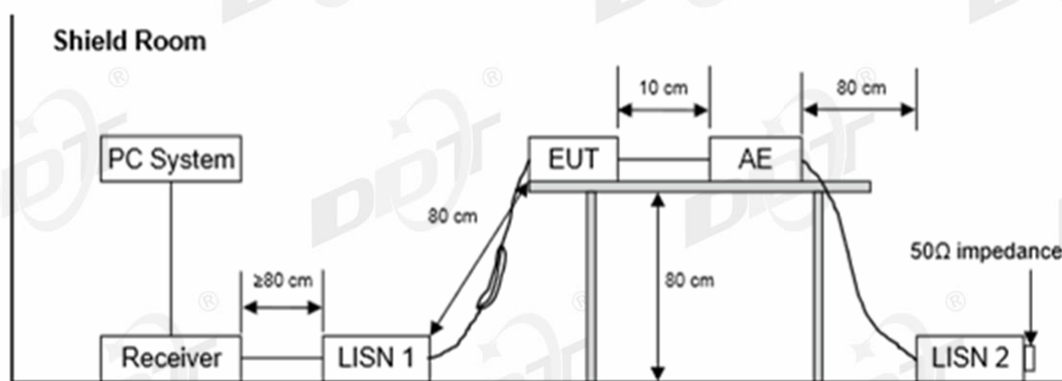
1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. PK-20log(Δ) Factor[dB]=AV

6. Power Line Conducted Emissions

6.1. Test equipment

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

6.2. Block diagram of test setup



6.3. Limits

Frequency	Quasi-Peak Level dB(uV)	Average Level 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.

6.4. Assistant equipment used for test

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

6.5. 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.

6.6. Test result

PASS. (See below detailed test result)

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

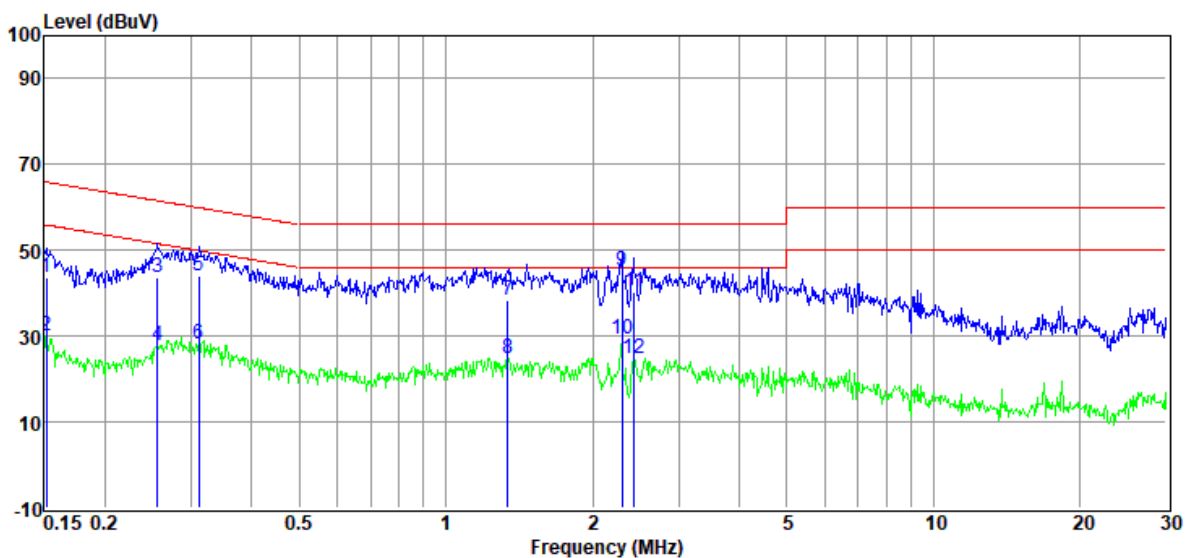
Note2: “----” means Peak detection; “-----” means Average detection.

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

6.7. Test data

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room D:\2025 CE report data\Q25041654-1E\0522 CE.EM6
Test Date : 2025-05-22 Tested By : Aaron Liu
EUT : LV XS Relay Model Number : ZEN58 800LR
Power Supply : AC 40V/60Hz Test Mode : SRD mode
Condition : TEMP:23.4°C, RH:61.2% LISN : 2024 1# ENV216/LINE
Memo :



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector	Phase
1	0.15	23.99	9.90	0.11	9.86	43.86	65.91	-22.05	QP	LINE
2	0.15	10.34	9.90	0.11	9.86	30.21	55.91	-25.70	Average	LINE
3	0.26	23.87	9.74	0.14	9.86	43.61	61.56	-17.95	QP	LINE
4	0.26	8.14	9.74	0.14	9.86	27.88	51.56	-23.68	Average	LINE
5	0.31	24.14	9.76	0.14	9.86	43.90	59.93	-16.03	QP	LINE
6	0.31	8.48	9.76	0.14	9.86	28.24	49.93	-21.69	Average	LINE
7	1.34	18.55	9.77	0.04	9.88	38.24	56.00	-17.76	QP	LINE
8	1.34	5.01	9.77	0.04	9.88	24.70	46.00	-21.30	Average	LINE
9	2.30	25.69	9.75	0.05	9.87	45.36	56.00	-10.64	QP	LINE
10	2.30	9.62	9.75	0.05	9.87	29.29	46.00	-16.71	Average	LINE
11	2.44	20.49	9.75	0.05	9.87	40.16	56.00	-15.84	QP	LINE
12	2.44	5.22	9.75	0.05	9.87	24.89	46.00	-21.11	Average	LINE

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

Test Date : 2025-05-22

EUT : LV XS Relay

Power Supply : AC 40V/60Hz

Condition : TEMP:23.4°C, RH:61.2%

Memo :

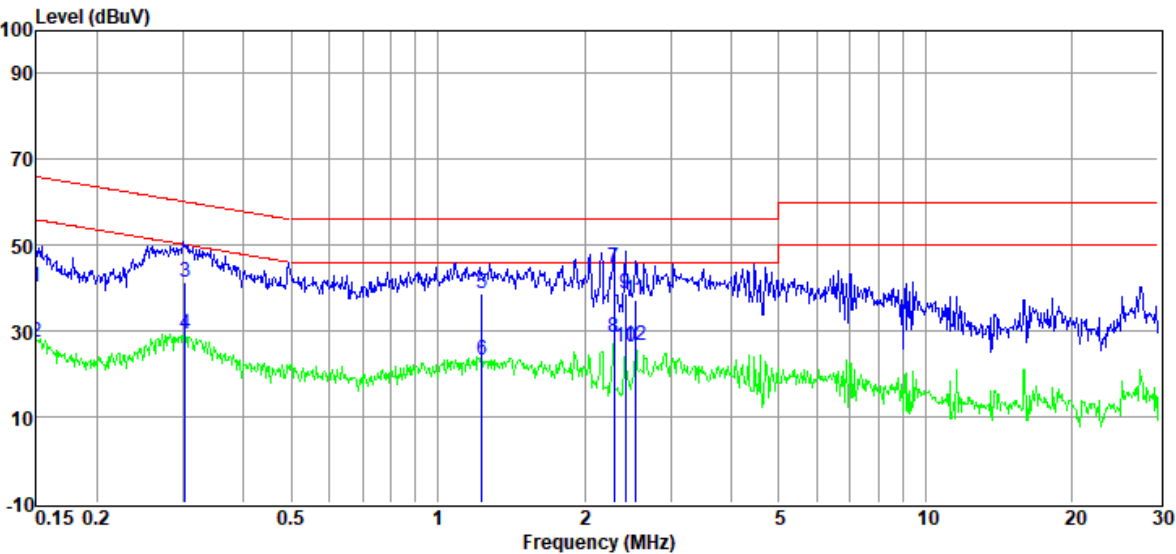
D:\2025 CE report data\Q25041654-1E\0522 CE.EM6

Tested By : Aaron Liu

Model Number : ZEN58 800LR

Test Mode : SRD mode

LISN : 2024 1# ENV216/NEUTRAL



Item	Freq.	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.15	20.70	9.65	0.11	9.86	40.32	66.00	-25.68	QP	NEUTRAL
2	0.15	7.84	9.65	0.11	9.86	27.46	56.00	-28.54	Average	NEUTRAL
3	0.30	21.63	9.71	0.15	9.86	41.35	60.15	-18.80	QP	NEUTRAL
4	0.30	9.45	9.71	0.15	9.86	29.17	50.15	-20.98	Average	NEUTRAL
5	1.23	19.03	9.69	0.04	9.88	38.64	56.00	-17.36	QP	NEUTRAL
6	1.23	3.76	9.69	0.04	9.88	23.37	46.00	-22.63	Average	NEUTRAL
7	2.30	25.31	9.67	0.05	9.87	44.90	56.00	-11.10	QP	NEUTRAL
8	2.30	9.02	9.67	0.05	9.87	28.61	46.00	-17.39	Average	NEUTRAL
9	2.42	19.33	9.67	0.05	9.87	38.92	56.00	-17.08	QP	NEUTRAL
10	2.42	6.81	9.67	0.05	9.87	26.40	46.00	-19.60	Average	NEUTRAL
11	2.54	17.70	9.67	0.05	9.86	37.28	56.00	-18.72	QP	NEUTRAL
12	2.54	7.12	9.67	0.05	9.86	26.70	46.00	-19.30	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.

8. Photos of the EUT

Please refer to DDT-Q25041654-1E appendix I

-----End Report-----