



FCC AND ISCED CERTIFICATION TEST REPORT

Applicant	:	Guangdong A-OK TechnologyGrand Development Co., Ltd.
Address of Applicant	:	Hexing Road South Side Sanhe Economic Development Zone, Huiyang Huizhou, GuangdongPEOPLE'S REPUBLIC OF CHINA
Manufacturer	:	Guangdong A-OK TechnologyGrand Development Co., Ltd.
Address of Manufacturer	:	Hexing Road South Side Sanhe Economic Development Zone, Huiyang Huizhou, GuangdongPEOPLE'S REPUBLIC OF CHINA
Equipment under Test	:	DC tubular motor
FCC Model No.	:	AM35-6/18-ES-E-Z, AM35-10/18-ES-D, AM35-10/18-R-ES-D, AM35-10/18-R-ES-Z, AM35-10/18-R-ES, AM35-10/18-ES-E-Z, AM35-10/18-R-ES-E, AM35-10/18-R-ES-M, AM35-3/25-ES-D, AM35-3/25-ES-E, AM35-10/13-ES-D, AM35-10/13-R-ES-D, AM35-10/13-R-ES-Z, AM35-10/13-R-ES, AM35-10/13-ES-E-Z, AM35-10/13-R-ES-E, AM35-10/13-R-ES-E-M, AM35-6/18-ES-D, AM35-6/18-R-ES-D, AM35-6/18-R-ES-Z, AM35-6/18-R-ES, AM35-6/18-R-ES-E, AM35-6/18-R-ES-E-MT, AM35-6/2-ES-D, AM35-6/20-R-ES-D, AM35-10/12-R-ES-Z, AM35-6/20-R-ES, AM35-6/20-ES-E-Z, AM35-6/20-R-ES-E, AM35-6/20-R-ES-E-MT, AM35-15/12-R-ES, AM45-15/12-R-ES-E, AM45-15/12-R-ES-Z, AM45-15/12-R-ES-D, AM45-15/12-R-ES-EZ, AM45-15/12-R-ES-E-MT, AM45-15/12-ZS-ES-E-MT, AM45-15/12-Z-ES-EZ, AM45-15/12-ES-E-Z, AM45-20/12-R-ES, AM45-20/12-R-ES-E, AM45-20/12-R-ES-Z, AM45-20/12-R-ES-D, AM45-20/12-R-ES-EZ, AM45-20/12-R-ES-E-MT, AM45-20/12-ZS-ES-E-MT, AM45-20/12-ZS-ES-E-Z, AM45-20/12-ES-E-Z, AM45-50/6-ES-E, AM45-30/12-CA-ES-E-Z, AM45-50/8-CA-ES-E-Z, AM35-10/13-ES-E, AM35-6/18-ES-E, AM45-20/12-R-ES-EZ, AM45-20/12-ZS-ES-EZ, AM45-15/12-ZS-ES-EZ,

REPORT

		AM45-20/12-ZS-ES-EB, AM45-15/12-ZS-ES-EB, AM45-20/12-ZS-ES-E, AM45-15/12-ZS-ES-E, AM45-20/12-ZS-ES-E-MT, AM45-15/12-ZS-ES-E-MT
IC Model No.	:	AM35-6/18-ES-E-Z, AM45-20/12-R-ES-EZ
FCC ID	:	2AVVD-AMGZDJ
IC	:	26127-AMGZDJ
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 3 August 2023, ANSI C63.10:2013, RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021)
Report No.	:	DDT-RE23090402-1E01
Issue Date	:	2024/07/02
Issue By	:	Guangdong Dongdian Testing Service Co., Ltd. Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

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Test Report Declare

Applicant	:	Guangdong A-OK TechnologyGrand Development Co., Ltd.
Address of Applicant	:	Hexing Road South Side Sanhe Economic Development Zone, Huiyang Huizhou, GuangdongPEOPLE'S REPUBLIC OF CHINA
Equipment under Test	:	DC tubular motor
FCC Model No.	:	AM35-6/18-ES-E-Z, AM35-10/18-ES-D, AM35-10/18-R-ES-D, AM35-10/18-R-ES-Z, AM35-10/18-R-ES, AM35-10/18-ES-E-Z, AM35-10/18-R-ES-E, AM35-10/18-R-ES-M, AM35-3/25-ES-D, AM35-3/25-ES-E, AM35-10/13-ES-D, AM35-10/13-R-ES-D, AM35-10/13-R-ES-Z, AM35-10/13-R-ES, AM35-10/13-ES-E-Z, AM35-10/13-R-ES-E, AM35-10/13-R-ES-E-M, AM35-6/18-ES-D, AM35-6/18-R-ES-D, AM35-6/18-R-ES-Z, AM35-6/18-R-ES, AM35-6/18-R-ES-E, AM35-6/18-R-ES-E-MT, AM35-6/2-ES-D, AM35-6/20-R-ES-D, AM35-10/12-R-ES-Z, AM35-6/20-R-ES, AM35-6/20-ES-E-Z, AM35-6/20-R-ES-E, AM35-6/20-R-ES-E-MT, AM35-15/12-R-ES, AM45-15/12-R-ES-E, AM45-15/12-R-ES-Z, AM45-15/12-R-ES-D, AM45-15/12-R-ES-EZ, AM45-15/12-R-ES-E-MT, AM45-15/12-ZS-ES-E-MT, AM45-15/12-Z-ES-EZ, AM45-15/12-ES-E-Z, AM45-20/12-R-ES, AM45-20/12-R-ES-E, AM45-20/12-R-ES-Z, AM45-20/12-R-ES-D, AM45-20/12-R-ES-EZ, AM45-20/12-R-ES-E-MT, AM45-20/12-ZS-ES-E-MT, AM45-20/12-ZS-ES-E-Z, AM45-20/12-ES-E-Z, AM45-50/6-ES-E, AM45-30/12-CA-ES-E-Z, AM45-50/8-CA-ES-E-Z, AM35-10/13-ES-E, AM35-6/18-ES-E, AM45-20/12-R-ES-EZ, AM45-20/12-ZS-ES-EZ, AM45-15/12-ZS-ES-EZ, AM45-20/12-ZS-ES-EB, AM45-15/12-ZS-ES-EB, AM45-20/12-ZS-ES-E, AM45-15/12-ZS-ES-E, AM45-20/12-ZS-ES-E-MT, AM45-15/12-ZS-ES-E-MT
IC Model No.	:	AM35-6/18-ES-E-Z, AM45-20/12-R-ES-EZ
Manufacturer	:	Guangdong A-OK TechnologyGrand Development Co., Ltd.
Address of Manufacturer	:	Hexing Road South Side Sanhe Economic Development Zone, Huiyang Huizhou, GuangdongPEOPLE'S REPUBLIC OF CHINA

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C,
RSS-247 Issue 3 August 2023,
ANSI C63.10:2013,
RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021)

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-RE23090402-1E01		
Date of Receipt:	2024/06/24	Date of Test:	2024/06/24~2024/07/02

Prepared By:

Tiger Mo

Tiger Mo/Engineer

Approved By:

Damon Hu

Damon Hu/EMC Manager

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

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	2024/07/02	

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), RSS-247 Issue 3 clause 5.2(a), RSS-Gen Issue 5 clause 6.7	/	Pass
2	Peak Output Power	FCC Part 15: 15.247(b)(3), RSS-247 Issue 3 clause 5.4(d)	/	Pass
3	Power Spectral Density	FCC Part 15:15.247(e), RSS-247 Issue 3 clause 5.2(b)	/	Pass
4	RF Conducted Spurious Emissions	FCC Part 15: 15.247(d), RSS-247 Issue 3 clause 5.5	/	Pass
5	Radiated Emission	FCC Part 15: 15.205, FCC Part 15: 15.209, FCC Part 15: 15.247(d), RSS-247 Issue 3 clause 5.5, RSS-Gen Issue 5 clause 8.9, RSS-Gen Issue 5 clause 8.10	/	Pass
6	Band Edge Compliance	FCC Part 15: 15.205, FCC Part 15: 15.209, FCC Part 15: 15.247(d), RSS-247 Issue 3 clause 5.5, RSS-Gen Issue 5 clause 8.9, RSS-Gen Issue 5 clause 8.10	/	Pass
7	Power Line Conducted Emissions	FCC Part 15: 15.207(a), RSS-Gen Issue 5 clause 8.8	/	Pass
8	Antenna Requirement	FCC Part 15: 15.203, RSS-Gen Issue 5 clause 6.8	/	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	: DC tubular motor
FCC Model No.	: AM35-6/18-ES-E-Z, AM35-10/18-ES-D, AM35-10/18-R-ES-D, AM35-10/18-R-ES-Z, AM35-10/18-R-ES, AM35-10/18-ES-E-Z, AM35-10/18-R-ES-E, AM35-10/18-R-ES-M, AM35-3/25-ES-D, AM35-3/25-ES-E, AM35-10/13-ES-D, AM35-10/13-R-ES-D, AM35-10/13-R-ES-Z, AM35-10/13-R-ES, AM35-10/13-ES-E-Z, AM35-10/13-R-ES-E, AM35-10/13-R-ES-E-M, AM35-6/18-ES-D, AM35-6/18-R-ES-D, AM35-6/18-R-ES-Z, AM35-6/18-R-ES, AM35-6/18-R-ES-E, AM35-6/18-R-ES-E-MT, AM35-6/2-ES-D, AM35-6/20-R-ES-D, AM35-10/12-R-ES-Z, AM35-6/20-R-ES, AM35-6/20-ES-E-Z, AM35-6/20-R-ES-E, AM35-6/20-R-ES-E-MT, AM35-15/12-R-ES, AM45-15/12-R-ES-E, AM45-15/12-R-ES-Z, AM45-15/12-R-ES-D, AM45-15/12-R-ES-EZ, AM45-15/12-R-ES-E-MT, AM45-15/12-ZS-ES-E-MT, AM45-15/12-Z-ES-EZ, AM45-15/12-ES-E-Z, AM45-20/12-R-ES, AM45-20/12-R-ES-E, AM45-20/12-R-ES-Z, AM45-20/12-R-ES-D, AM45-20/12-R-ES-EZ, AM45-20/12-R-ES-E-MT, AM45-20/12-ZS-ES-E-MT, AM45-20/12-ZS-ES-E-Z, AM45-20/12-ES-E-Z, AM45-50/6-ES-E, AM45-30/12-CA-ES-E-Z, AM45-50/8-CA-ES-E-Z, AM35-10/13-ES-E, AM35-6/18-ES-E, AM45-20/12-R-ES-EZ, AM45-20/12-ZS-ES-EZ, AM45-15/12-ZS-ES-EZ, AM45-20/12-ZS-ES-EB, AM45-15/12-ZS-ES-EB, AM45-20/12-ZS-ES-E, AM45-15/12-ZS-ES-E, AM45-20/12-ZS-ES-E-MT, AM45-15/12-ZS-ES-E-MT
IC Model No.	: AM35-6/18-ES-E-Z, AM45-20/12-R-ES-EZ
Difference of models	: Above models are identical in schematic and structure, only the Model Number, Pipe diameter, Pipe length and appearance colour are different for all the models, After the pre-test, and only the worst case is shown in report.
EUT Function Description	: Please reference user manual of this device
Power Supply	: DC 12V from NIMH battery

Radio Specification	: Zigbee
Operation Frequency	: 2405 MHz-2480 MHz
Modulation	: O-QPSK

Antenna information	
Antenna Type	: External antenna
Max Antenna Gain(dBi)	: 3.3

Zigbee Channel information:					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
11	2405	17	2435	23	2465
12	2410	18	2440	24	2470

13	2415	19	2445	25	2475
14	2420	20	2450	26	2480
15	2425	21	2455		
16	2430	22	2460		

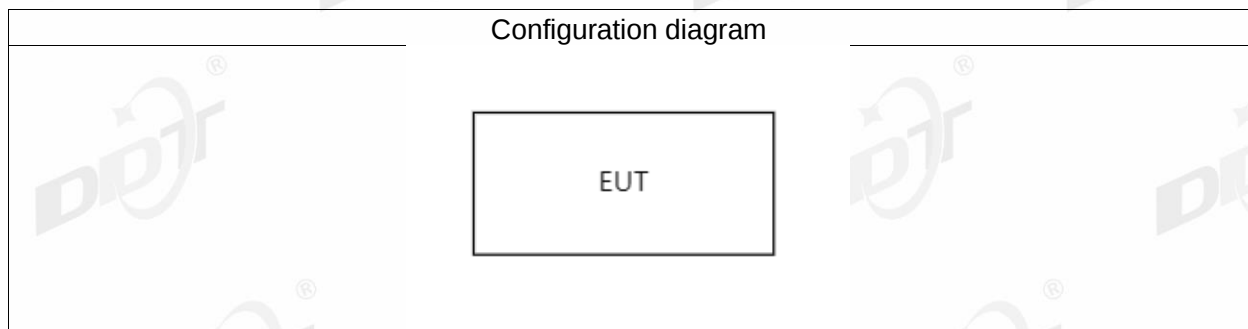
Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's 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
NIMN Battery	/	SC	12V DC 4000mAh

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: sscom5.13.1.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	Channel	Frequency (MHz)
Tx mode	6	CH11	2405
	6	CH19	2440
	6	CH26	2480

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℃ to +35 ℃
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-20155, G-20118

2.8. Measurement uncertainty

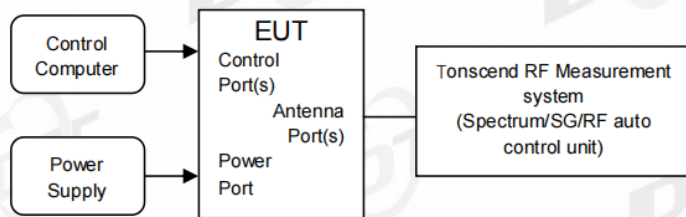
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$); 1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$); 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. Equipment Used During Test

Equipment	Manufacturer	Model No.	Serial Number	Due Date
☑RF Connected Test (RF Measurement System 3#)				
SIGNAL ANALYZER	R&S	FSV40	101407	2024/07/11
Wideband Radio Communication Tester	R&S	CMW500	117491	2025/03/31
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY62153058	2024/07/11
MXG Vector Signal Generator	Agilent	N5182A	MY48180912	2025/03/31
RF Control Unit	Tonscend	JS0806-2	20C8060230	2025/03/31
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2025/04/22
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

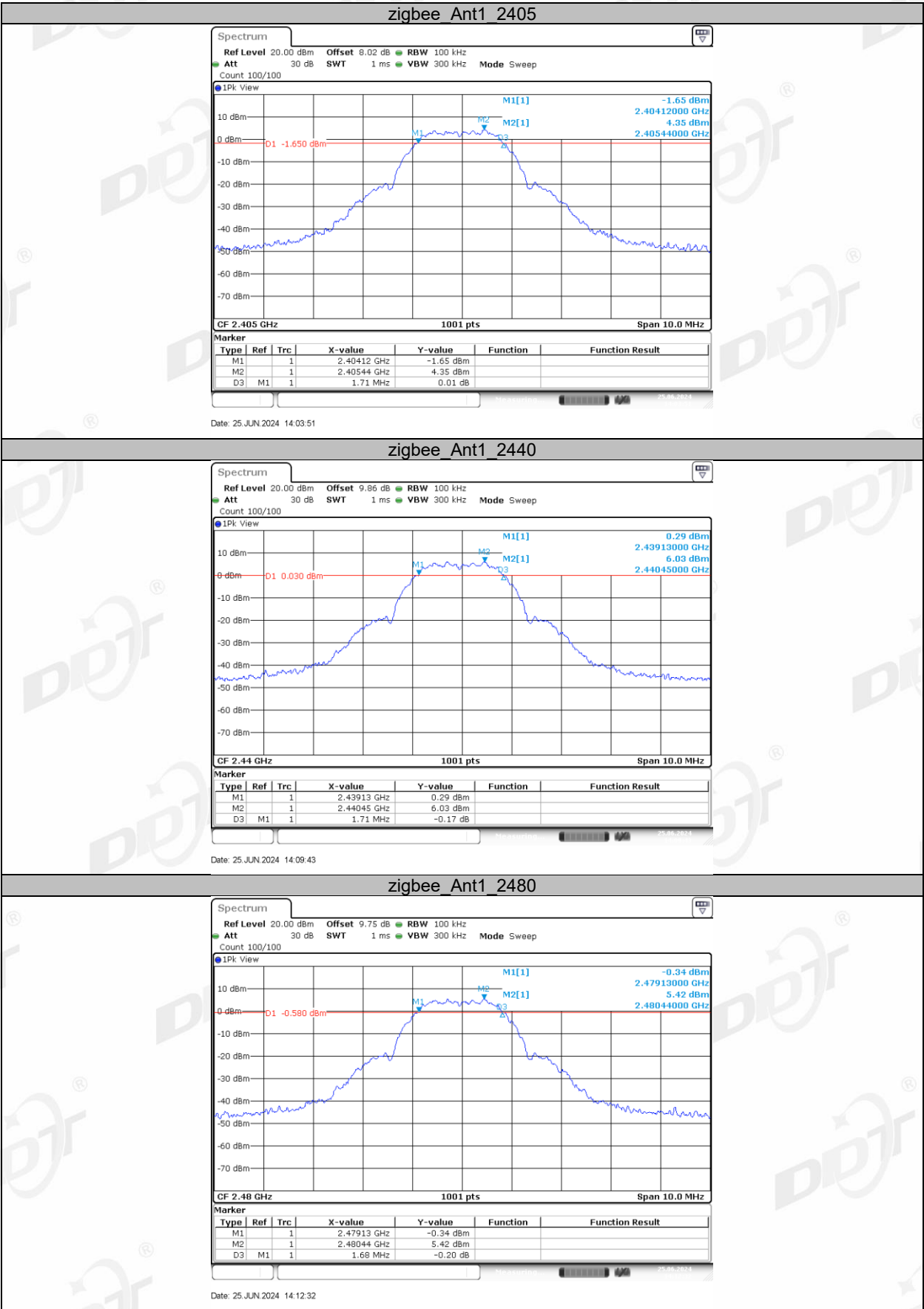
Allow the trace to stabilize, measure the 6 dB bandwidth of signal, and record the results in the report.

4.4. Test Result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	25.3℃,60.6%RH	Test Date:	2024.06.25-2024.06.26
Test Power Supply:	DC 12V from NIMH battery	Sample Number:	S23090402-01

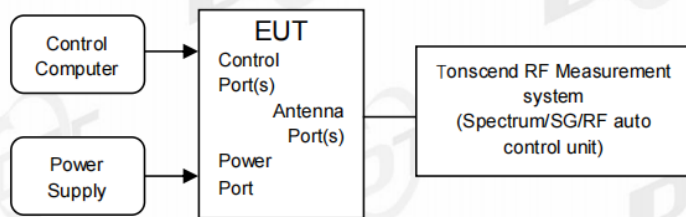
TestMode	Antenna	Frequenc y[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
Zigbee	Ant1	2405	1.71	2404.12	2405.83	0.5	PASS
		2440	1.71	2439.13	2440.84	0.5	PASS
		2480	1.68	2479.13	2480.81	0.5	PASS

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:

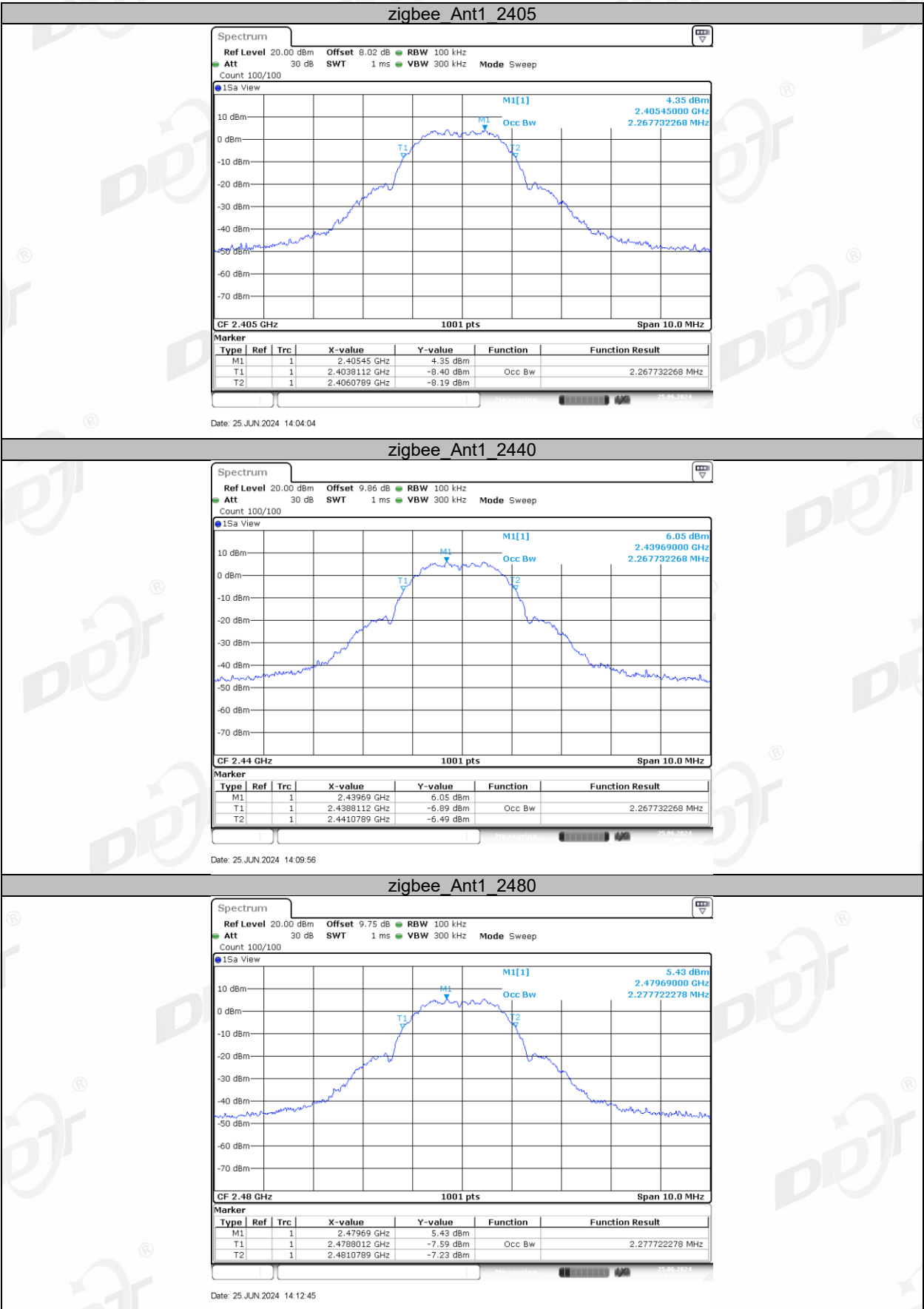
RBW:	1% to 5% of the OBW
VBW:	approximately three times RBW
Span:	between 1.5 times and 5.0 times the OBW
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold
- (5) Allow the trace to stabilize, measure the 99% bandwidth of signal, and record the results in the report.

5.4. Test Result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	25.3℃,60.6%RH	Test Date:	2024.06.25-2024.06.26
Test Power Supply:	DC 12V from NIMH battery	Sample Number:	S23090402-01

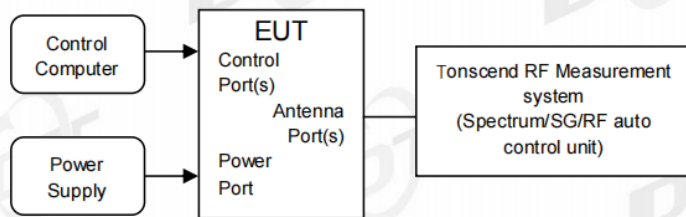
TestMode	Antenna	Frequenc y[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
zigbee	Ant1	2405	2.268	2403.8112	2406.0789	---	---
		2440	2.268	2438.8112	2441.0789	---	---
		2480	2.278	2478.8012	2481.0789	---	---

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:	≥DTS bandwidth
VBW:	≥3 x RBW
Span	≥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.

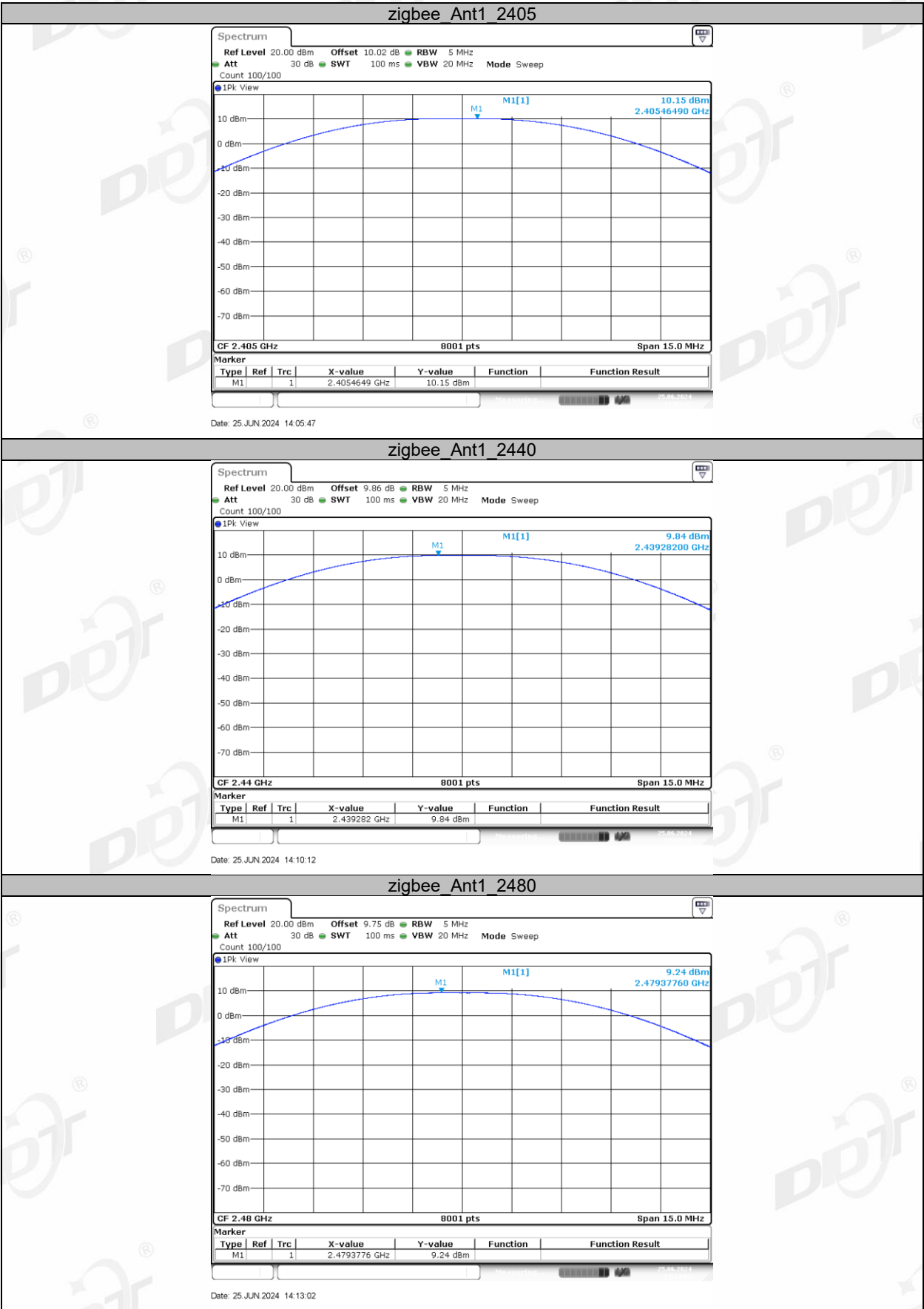
Appendix

6.4. Test Result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	25.3℃,60.6%RH	Test Date:	2024.06.25-2024.06.26
Test Power Supply:	DC 12V from NIMH battery	Sample Number:	S23090402-01

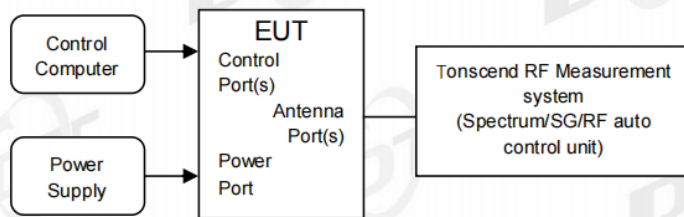
TestMode	Antenna	Frequency[M Hz]	Result[dBm]	EIRP[dBm]	Limit[dBm]	Verdict
zigbee	Ant1	2405	10.15	13.45	≤30	PASS
		2440	9.84	13.14	≤30	PASS
		2480	9.24	12.54	≤30	PASS

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.

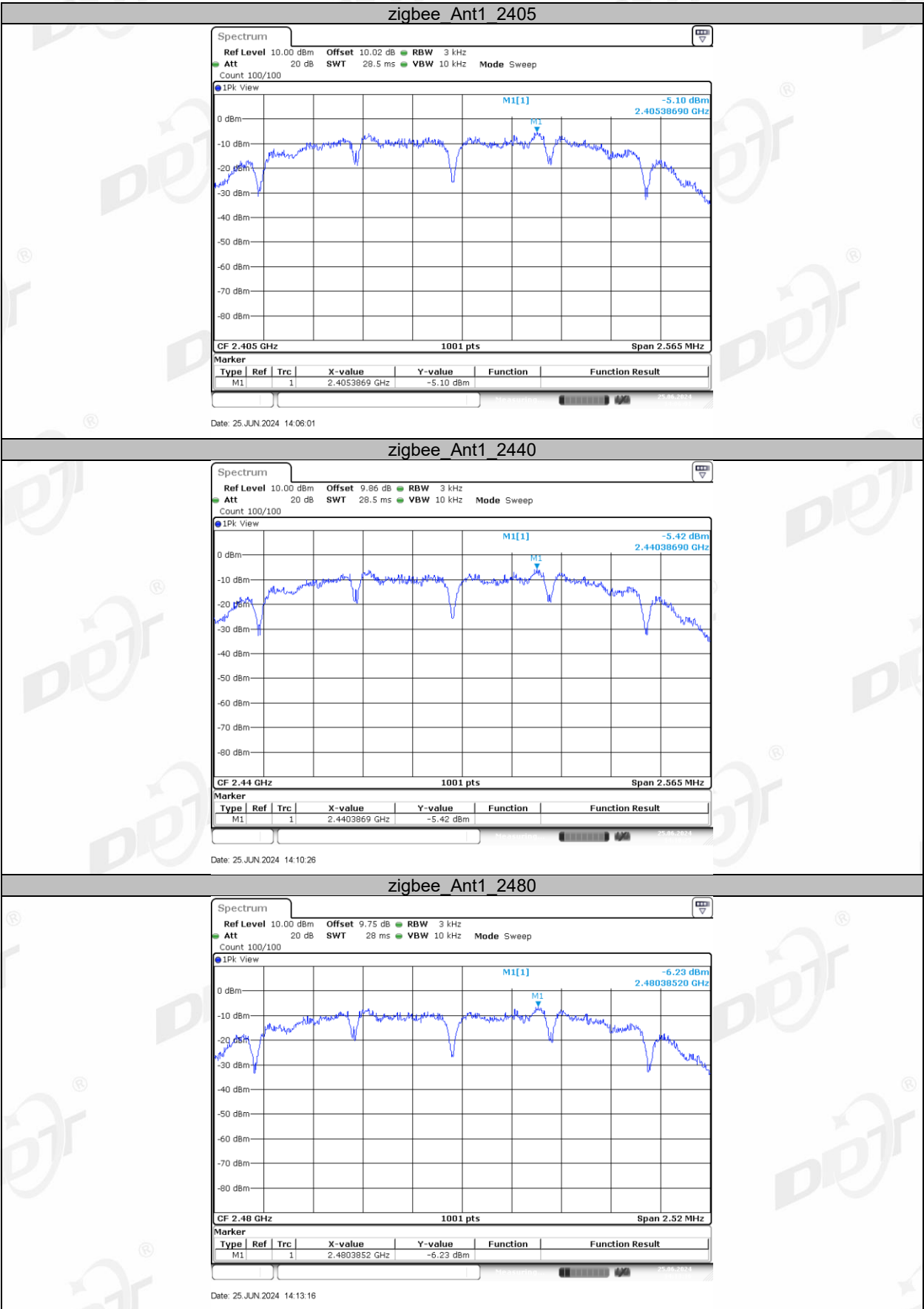
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

7.4. Test Result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	25.3℃,60.6%RH	Test Date:	2024.06.25-2024.06.26
Test Power Supply:	DC 12V from NIMH battery	Sample Number:	S23090402-01

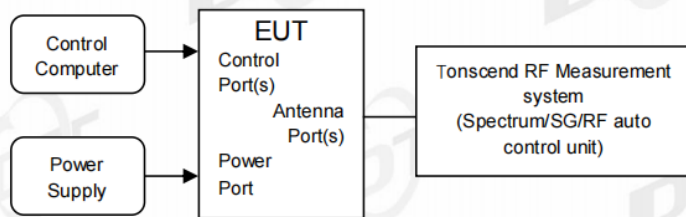
TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3 kHz]	Verdict
zigbee	Ant1	2405	-5.10	≤8.00	PASS
		2440	-5.42	≤8.00	PASS
		2480	-6.23	≤8.00	PASS

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

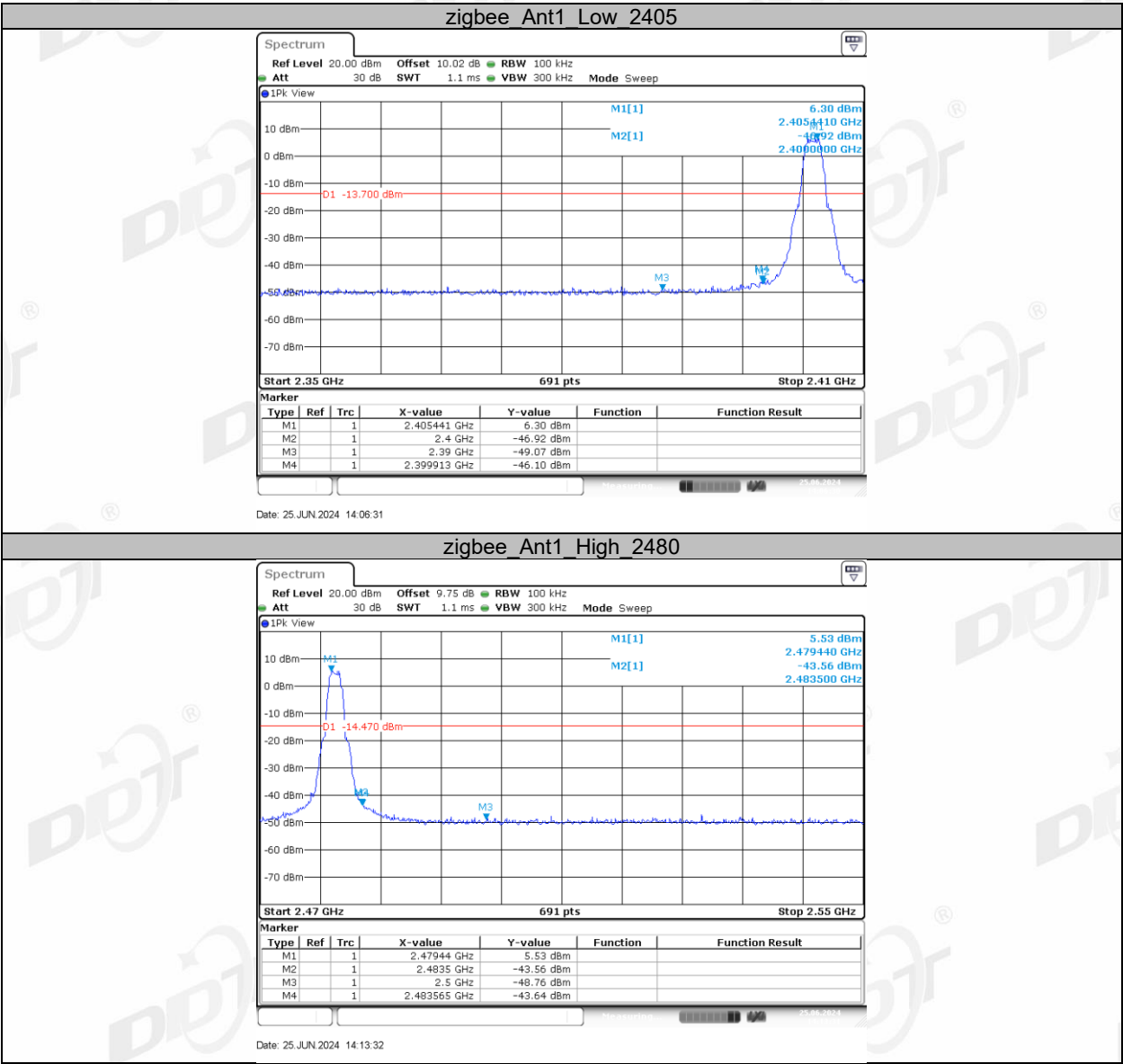
- (3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.
- (4) Then mark the maximum amplitude of all unwanted emissions outside of the authorized frequency band.

8.4. Test Result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	25.3℃,60.6%RH	Test Date:	2024.06.25-2024.06.26
Test Power Supply:	DC 12V from NIMH battery	Sample Number:	S23090402-01

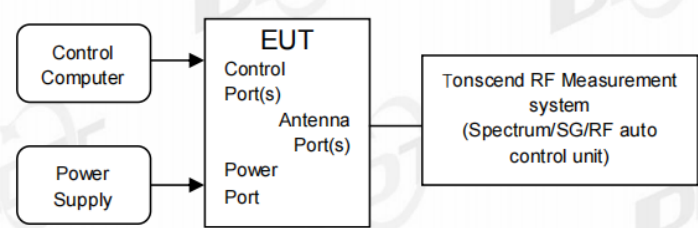
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
zigbee	Ant1	Low	2405	6.30	-46.1	≤-13.70	PASS
		High	2480	5.53	-43.64	≤-14.47	PASS

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	$\geq \text{Span} / \text{RBW}$
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

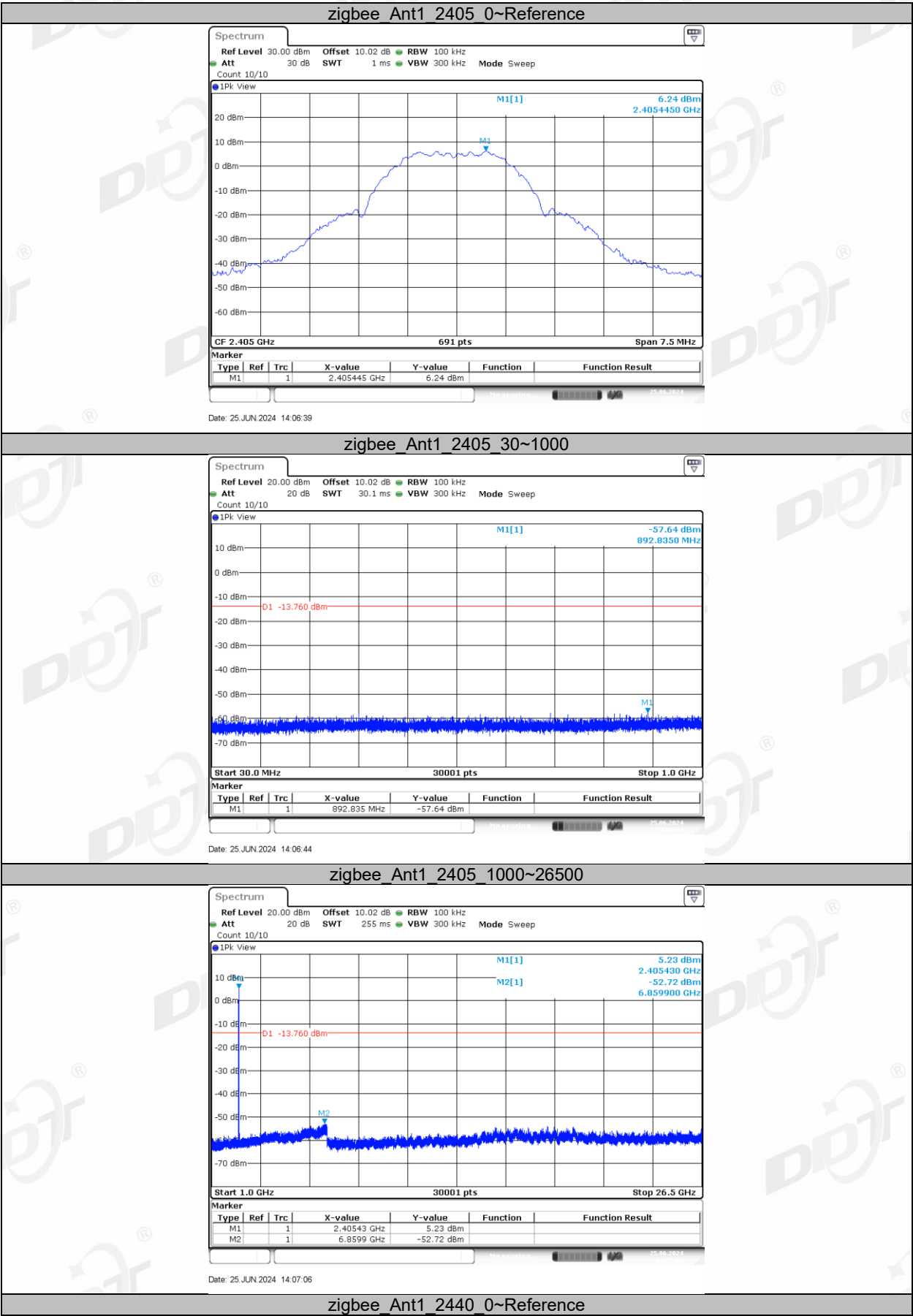
Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

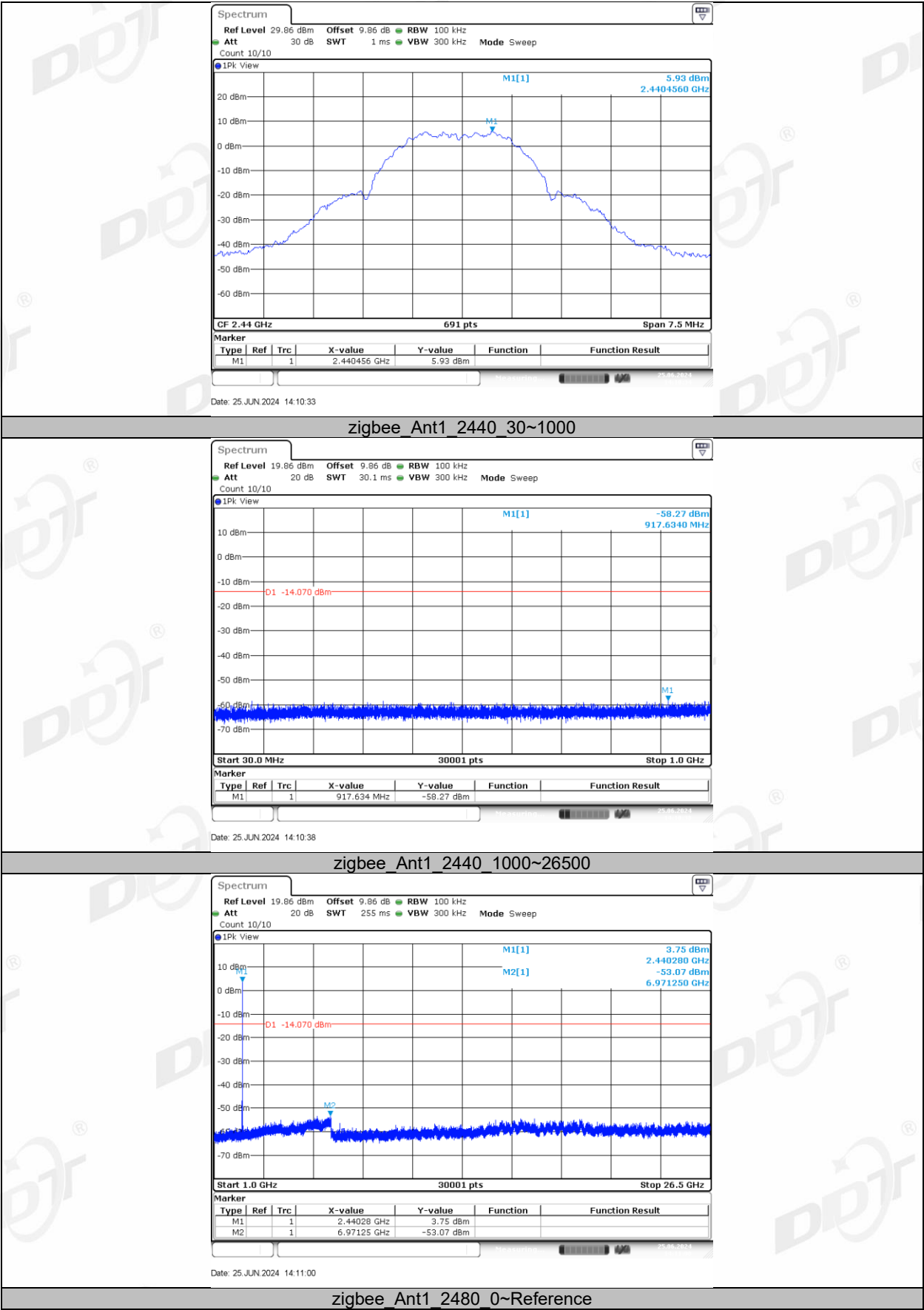
9.4. Test Result

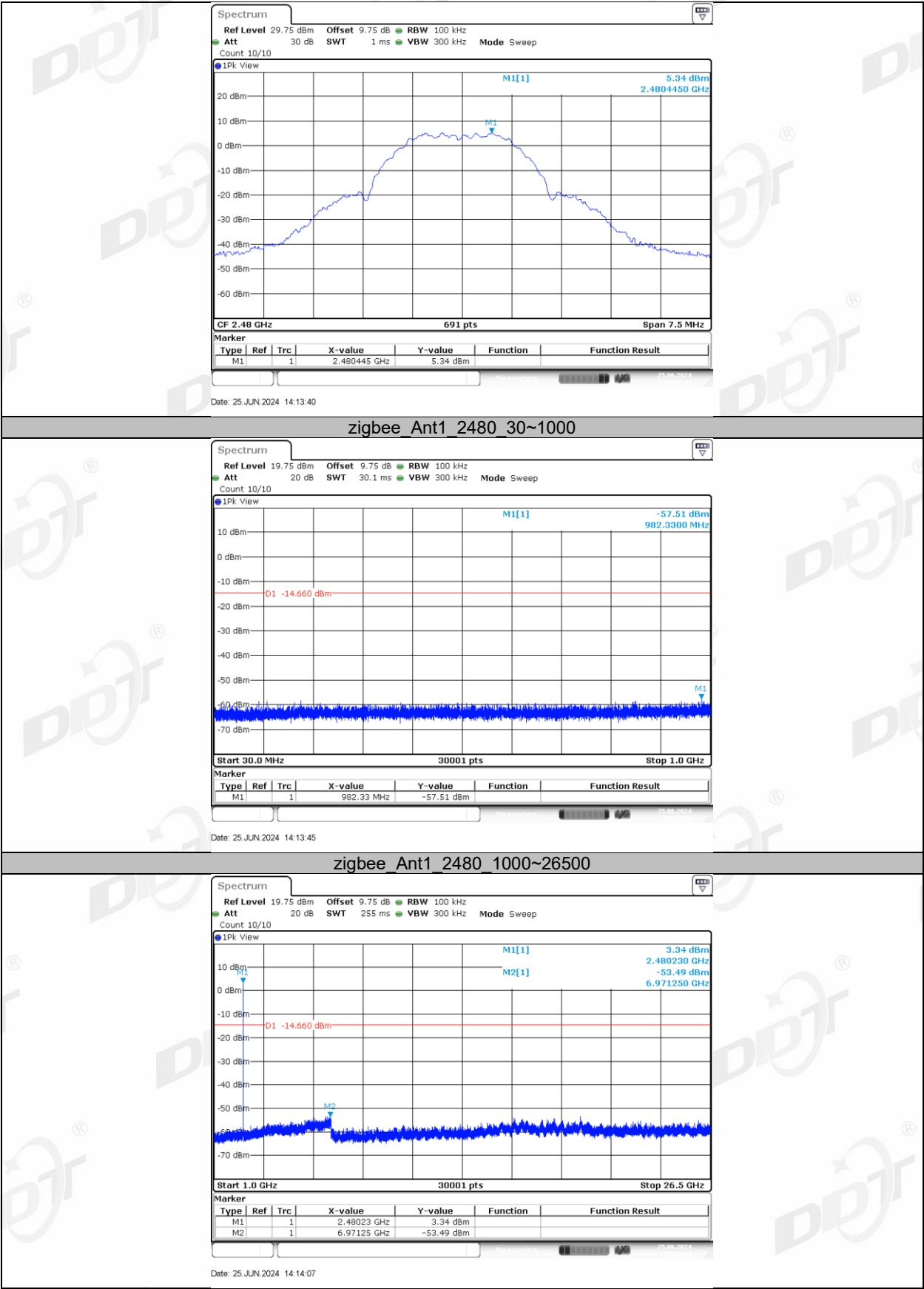
Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	25.3℃,60.6%RH	Test Date:	2024.06.25-2024.06.26
Test Power Supply:	DC 12V from NIMH battery	Sample Number:	S23090402-01

TestMode	Antenna	Frequenc y[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
zigbee	Ant1	2405	Reference	6.24	6.24	---	PASS
			30~1000	6.24	-57.64	≤-13.76	PASS
			1000~26500	6.24	-52.72	≤-13.76	PASS
		2440	Reference	5.93	5.93	---	PASS
			30~1000	5.93	-58.27	≤-14.07	PASS
			1000~26500	5.93	-53.07	≤-14.07	PASS
		2480	Reference	5.34	5.34	---	PASS
			30~1000	5.34	-57.51	≤-14.66	PASS
			1000~26500	5.34	-53.49	≤-14.66	PASS

9.5. Test Graphs

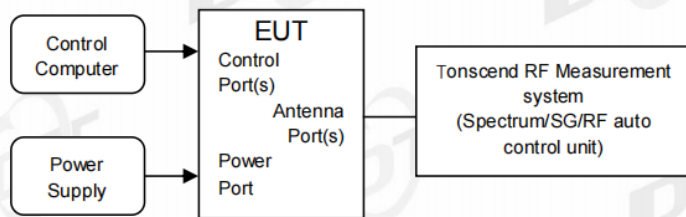






10. Duty Cycle

10.1. Block diagram of test setup



10.2. Limit

Just for Report.

10.3. Test procedure

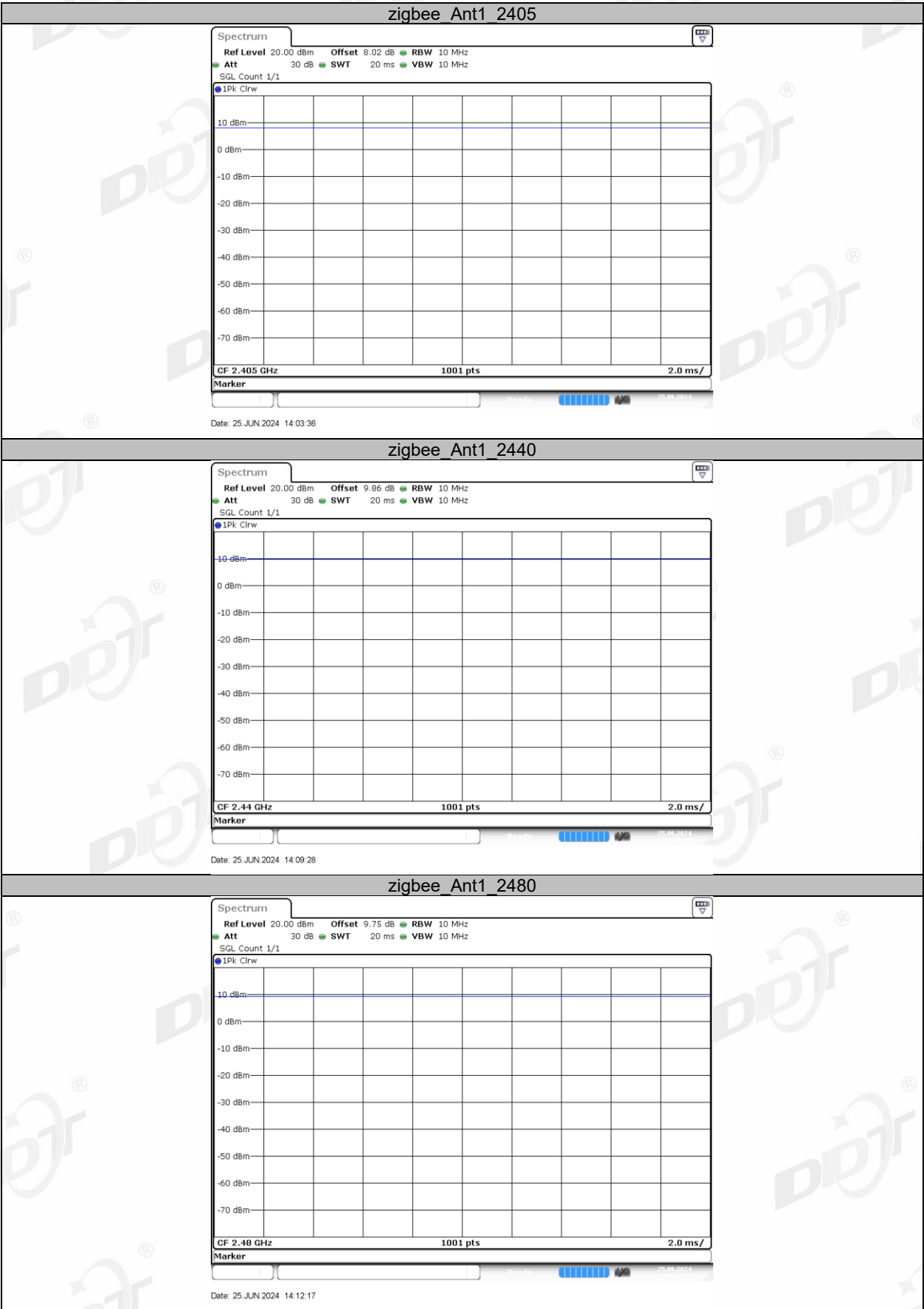
- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, The cable loss and attenuator loss have been put into spectrum analyzer as amplitude offset.
set the Spectrum Analyzer as below:
 - Centre Frequency: The centre frequency of the middle hopping channel.
 - Resolution 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: $\text{Duty cycle} = \text{Pulse's on time} / \text{Burst cycle}$

10.4. Test Result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	25.3℃,60.6%RH	Test Date:	2024.06.25-2024.06.26
Test Power Supply:	DC 12V from NIMH battery	Sample Number:	S23090402-01

TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
zigbee	Ant1	2405	20.00	20.00	100
		2440	20.00	20.00	100
		2480	20.00	20.00	100

10.5. Test Graphs

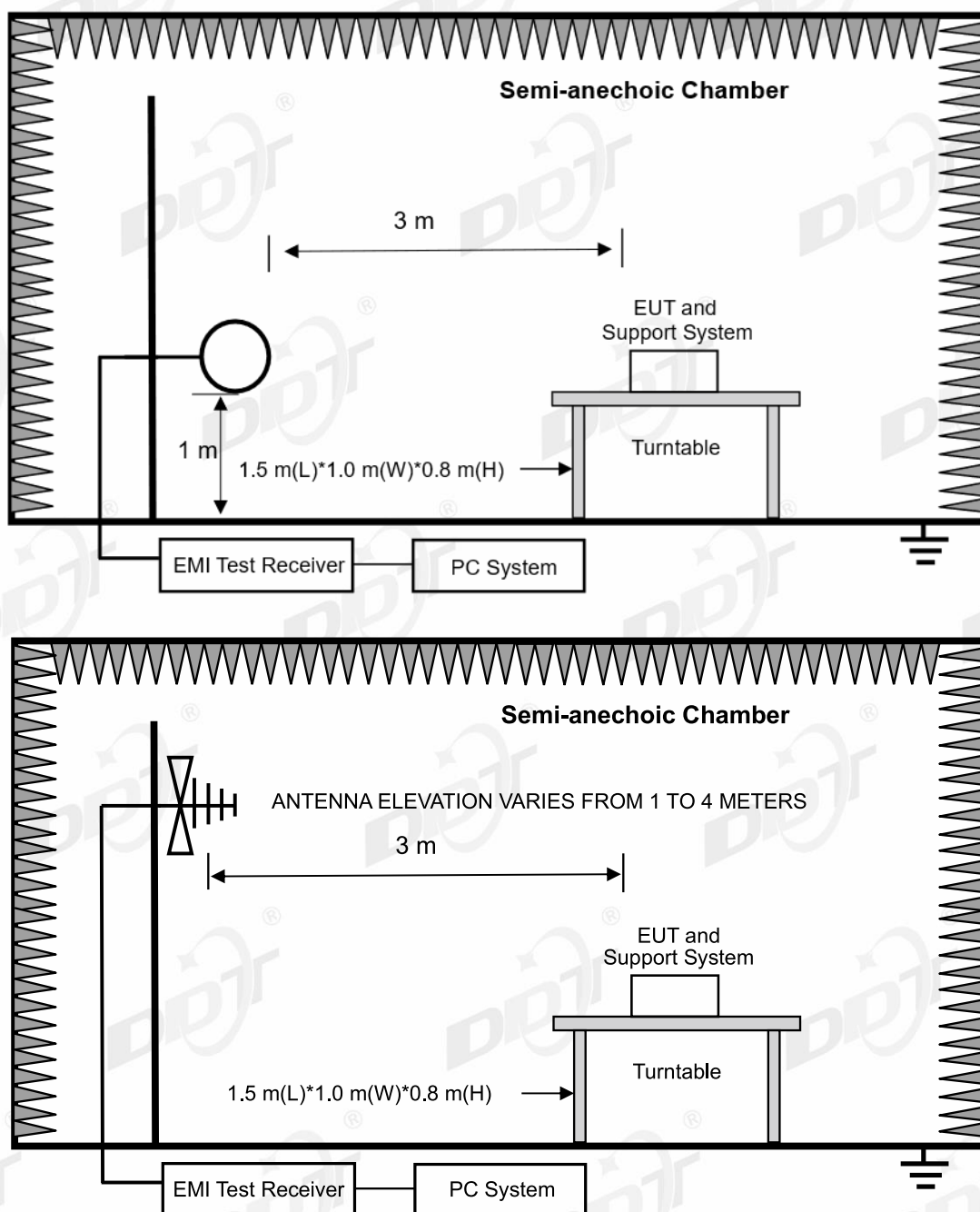


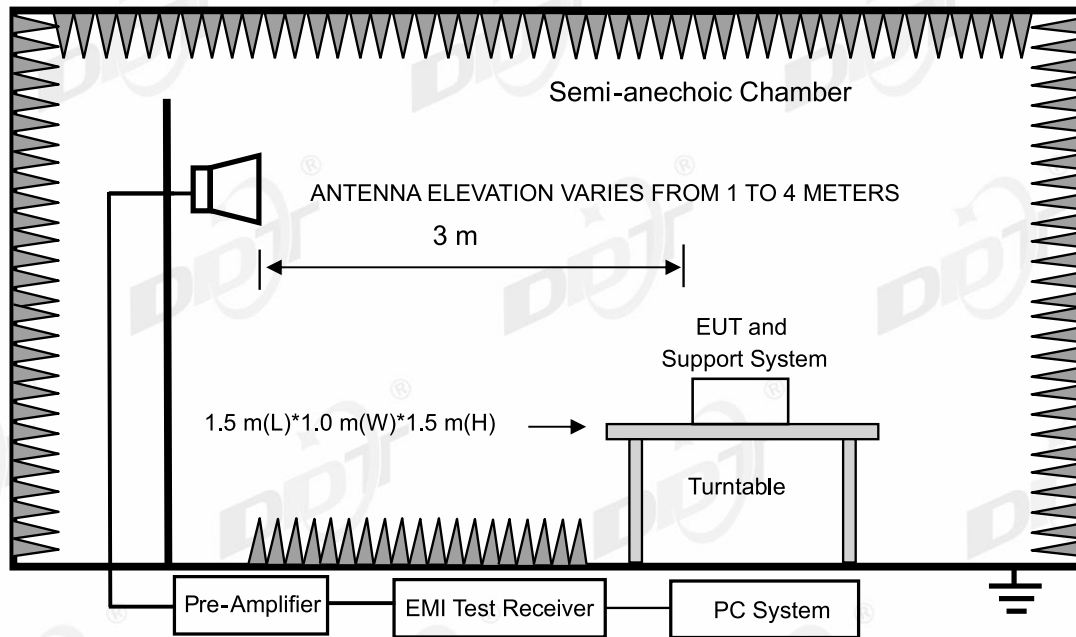
11.Radiated Emission

11.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To
Micro-Tronics filters	REBES	BRM50702	DDT-ZC03242	/
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	DDT-ZC00506	2025/04/26
Pre-amplifier	COM-POWER	PAM-840A	DDT-ZC01693	2025/03/31
High pass filter	Micro-Tronics	HPM50108	DDT-ZC00560	2025/04/22
RF Cable	N/A	W24.02 HL-562	DDT-ZC04022	2025/03/31
RF cable	Yuhu Technology	JCTB810-NJ-NJ-9M	DDT-ZC02538	2025/03/31
ELECTRIC AND MAGNETIC FIELD ANALYZER	Narda	EHP-200A	DDT-ZC01401	2024/09/20
PSA Series Spectrum Analyzer	Agilent	E4447A	DDT-ZC00517	2025/03/31
High pass filter	Micro-Tronics	HPM50102	DDT-ZC00561	2025/04/22
Pre-amplifier	COM-POWER	PAM-118A	DDT-ZC01293	2024/07/14
EMI TEST RECEIVER	R&S	ESU26	DDT-ZC01909	2025/03/31
Hochgewinn-Hornantenne	SCHWARZBECK	BBHA 9120 D	DDT-ZC02129	2025/09/18
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	DDT-ZC02050	2024/07/11
High Pass filter	Xi'an Xingbo	XBLBQ-GTA67	DDT-ZC02179	2025/04/22
RF Cable	N/A	W13.02 AP1-X2	DDT-ZC04023	2025/03/31
RF cable	Yuhu Technology	ZT26S-SMAJ-SMAJ-1M	DDT-ZC02037	2025/03/31
Active Loop Antenna	Schwarzbeck	FMZB1519	DDT-ZC00524	2025/09/11
Micro-Tronics filters	REBES	BRM50716	DDT-ZC03240	/
RF cable	Zhongke Junchuang	JCT26S-NJ-NJ-1.5M	DDT-ZC02762	2025/03/31

11.2. Block diagram of test setup





11.3. 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
¹ 0.495-0.505	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

RSS-Gen section 8.10 Restricted frequency bands*

MHz	MHz	MHz	GHz
0.090-0.110	12.51975-12.52025	240-285	3.5-4.4
0.495-0.505	12.57675-12.57725	322-335.4	4.5-5.15
2.1735-2.1905	13.36-13.41	399.9-410	5.35-5.46
3.020-3.026	16.42-16.423	608-614	7.25-7.75
4.125-4.128	16.69475-16.69525	960-1427	8.025-8.5
4.1772&4.17775	16.80425-16.80475	1435-1626.5	9.0-9.2
4.2072&4.20775	25.5-25.67	1645.5-1646.5	9.3-9.5
5.677-5.683	37.5-38.25	1660-1710	10.6-12.7
6.215-6.218	73-74.6	1718.8-1722.2	13.25-13.4
6.26775-6.26825	74.8-75.2	2200-2300	14.47-14.5
6.31175-6.31225	108-138	2310-2390	15.35-16.2
8.291-8.294	149.9-150.05	2483.5-2500	17.7-21.4
8.362-8.366	156.52475-156.52525	2655-2900	22.01-23.12
8.37625-8.38675	156.7-156.9	3260-3267	23.6-24.0
8.41425-8.41475	162.0125-167.17	3332-3339	31.2-31.8
12.29-12.293	167.72-173.2	3345.8-3358	36.43-36.5
			Above 38.6

* Certain frequency bands listed in table and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

(2) FCC 15.209 Limit & RSS-Gen section 8.9 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		mV/m	dB(mV)/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 dB(mV)/m (Peak) 54.0 dB(mV)/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:

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

(3) Limit for this EUT

The emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, and the emissions appearing within RSS-Gen section 8.10 Restricted frequency bands shall not exceed the limits shown in RSS-Gen section 8.9, all the other emissions shall be at least 20 dB below the fundamental emissions or comply with 15.209 limits and RSS-Gen section 8.9 limits.

11.4. Assistant equipment used for test

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

11.5. 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 through 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.

11.6. Test result

PASS. (See below detailed test result)

11.7. Test data

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-01

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

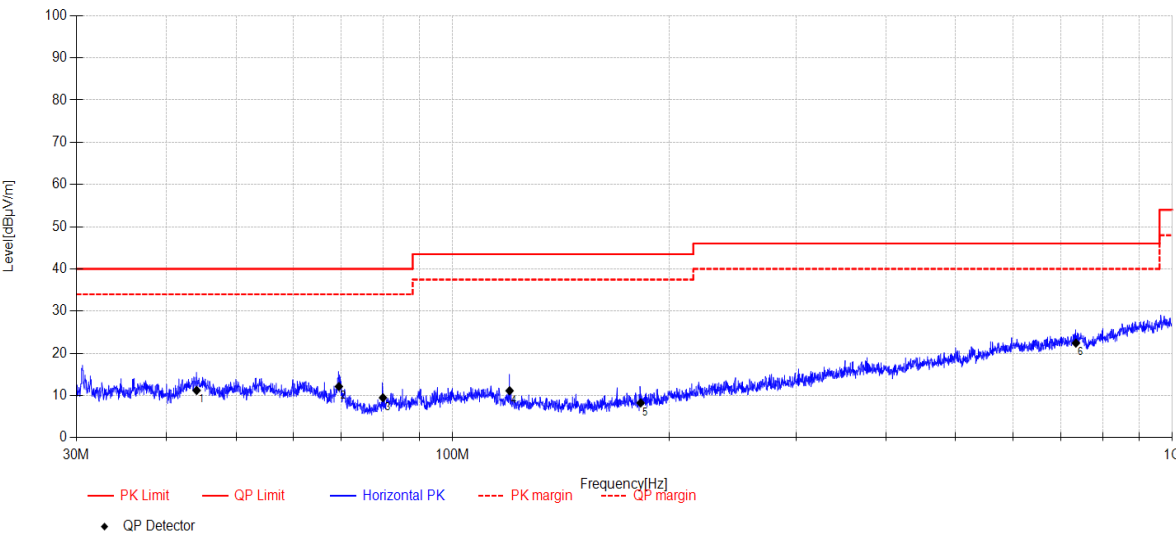
DDT 3# Chamber

File Path:

d:\ts\2024 report data\Q23090402-1E\FCC BELOW 1G\20240701-193041_H

Memo:

Sample Number:S23090402-04 Power Setting:NA



Data List										
NO.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable Loss [dB]	AMP [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	44.086	25.15	13.02	3.84	-30.79	11.22	40.00	28.78	QP	Horizontal
2	69.491	28.53	10.16	4.02	-30.57	12.14	40.00	27.86	QP	Horizontal
3	80.009	27.2	8.70	4.09	-30.50	9.49	40.00	30.51	QP	Horizontal
4	119.991	27.65	10.00	4.33	-30.84	11.14	43.50	32.36	QP	Horizontal
5	182.493	24.78	9.45	4.67	-30.65	8.25	43.50	35.25	QP	Horizontal
6	734.537	25.56	19.99	6.78	-29.90	22.43	46.00	23.57	QP	Horizontal

Note:

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

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-01

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

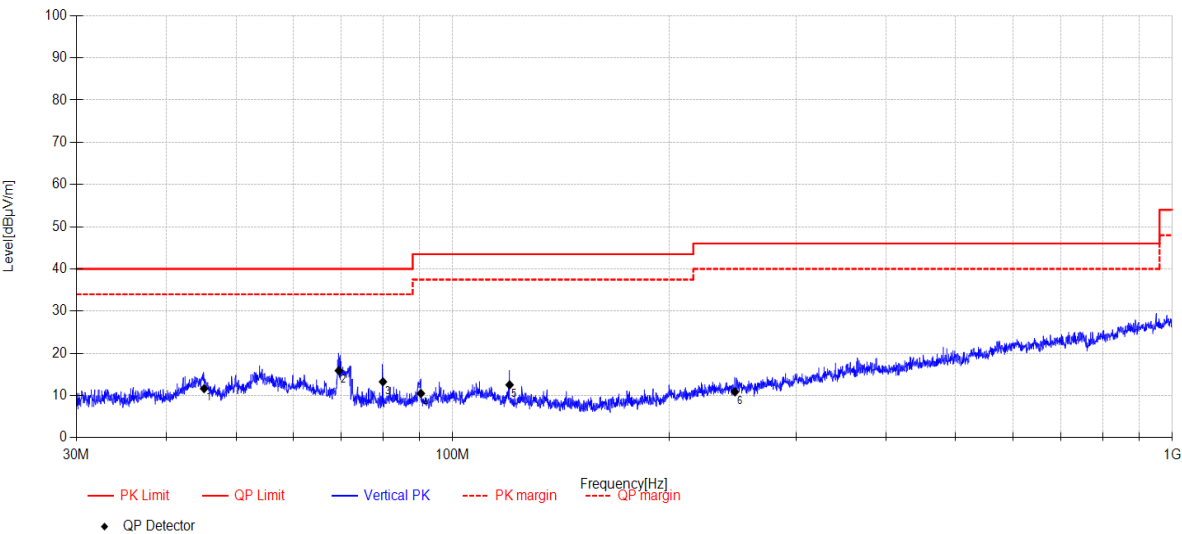
DDT 3# Chamber

File Path:

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Memo:

Sample Number:S23090402-04 Power Setting:NA



Data List										
NO.	Freq. [MHz]	Reading [dBµV/m]	Antenna Factor [dB]	Cable Loss [dB]	AMP [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	45.150	25.5	13.07	3.85	-30.77	11.65	40.00	28.35	QP	Vertical
2	69.491	32.3	10.16	4.02	-30.57	15.91	40.00	24.09	QP	Vertical
3	80.009	30.98	8.70	4.09	-30.50	13.27	40.00	26.73	QP	Vertical
4	90.327	27.57	9.50	4.15	-30.71	10.51	43.50	32.99	QP	Vertical
5	119.991	29.05	10.00	4.33	-30.84	12.54	43.50	30.96	QP	Vertical
6	246.711	24.8	11.57	4.97	-30.46	10.88	46.00	35.12	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:

2024-07-02

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee 2405MHz TX mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

DDT 3# Chamber

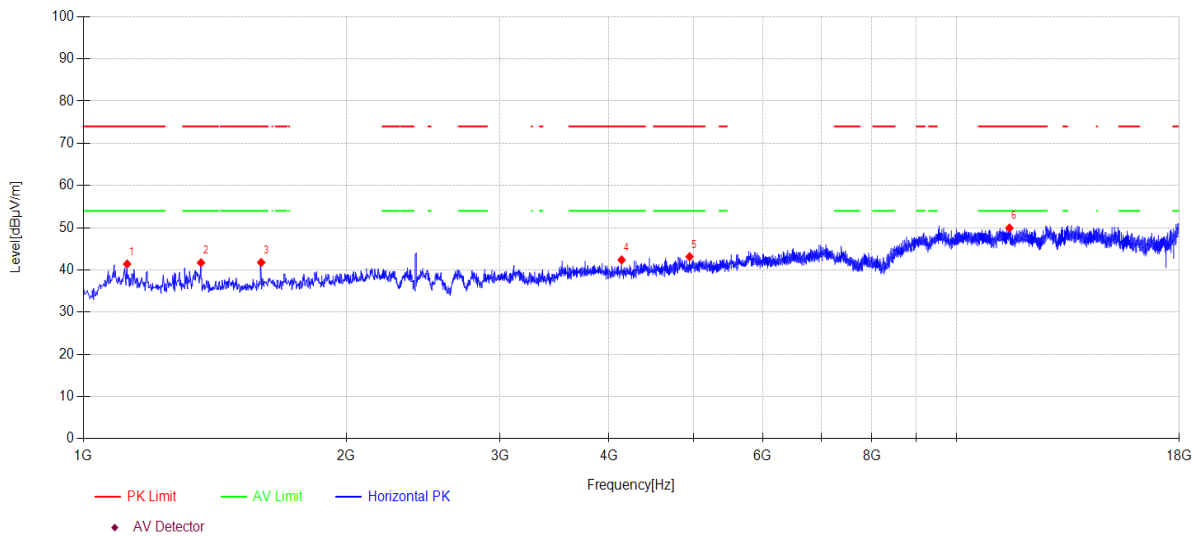
File Path:

d:\ts\2024 report data\Q23090402-1E\FCC ABOVE 1G\1

Memo:

Sample Number:S23090402-04 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	1122.400	50.58	24.63	3.08	-36.90	41.39	74.00	32.61	PK	Horizontal
2	1363.800	50.26	24.88	3.50	-36.93	41.71	74.00	32.29	PK	Horizontal
3	1598.400	49.26	25.57	3.90	-36.96	41.77	74.00	32.23	PK	Horizontal
4	4134.800	46.48	31.17	5.13	-40.40	42.38	74.00	31.62	PK	Horizontal
5	4947.400	44.53	33.09	5.62	-40.10	43.14	74.00	30.86	PK	Horizontal
6	11499.200	41.61	39.20	8.44	-39.32	49.93	74.00	24.07	PK	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.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-02

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee 2405MHz TX mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

DDT 3# Chamber

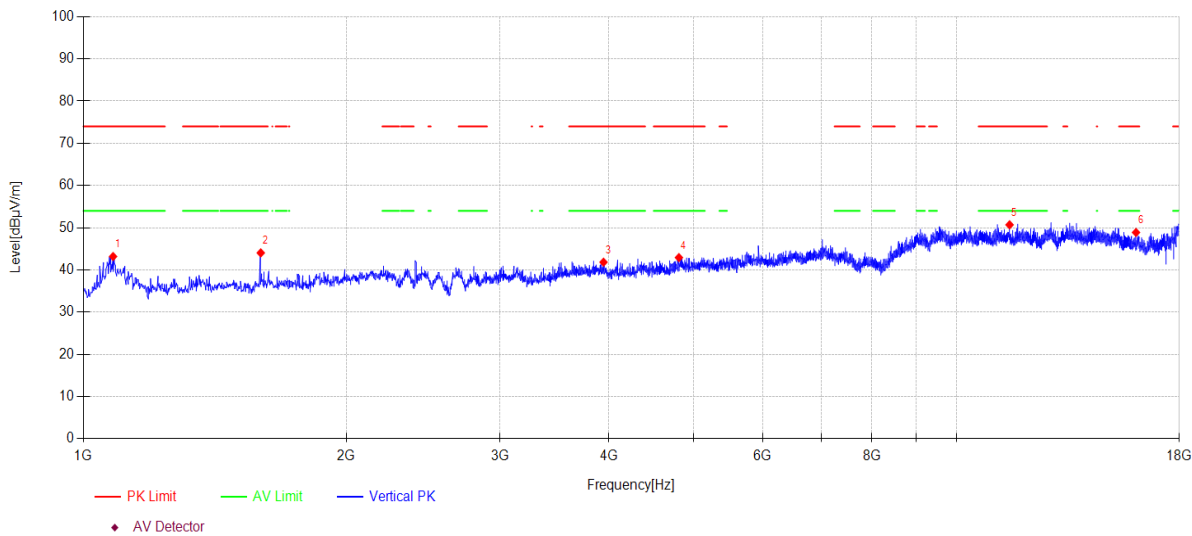
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d:\ts\2024 report data\Q23090402-1E\FCC ABOVE 1G\2

Memo:

Sample Number:S23090402-04 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	1081.600	52.60	24.46	3.01	-36.89	43.18	74.00	30.82	PK	Vertical
2	1596.700	51.55	25.55	3.90	-36.96	44.04	74.00	29.96	PK	Vertical
3	3942.700	46.09	31.11	5.06	-40.42	41.84	74.00	32.16	PK	Vertical
4	4809.700	44.79	32.75	5.54	-40.15	42.93	74.00	31.07	PK	Vertical
5	11502.600	42.38	39.19	8.45	-39.33	50.69	74.00	23.31	PK	Vertical
6	16056.900	40.19	37.94	10.16	-39.41	48.88	74.00	25.12	PK	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.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-02

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee 2440MHz TX mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

DDT 3# Chamber

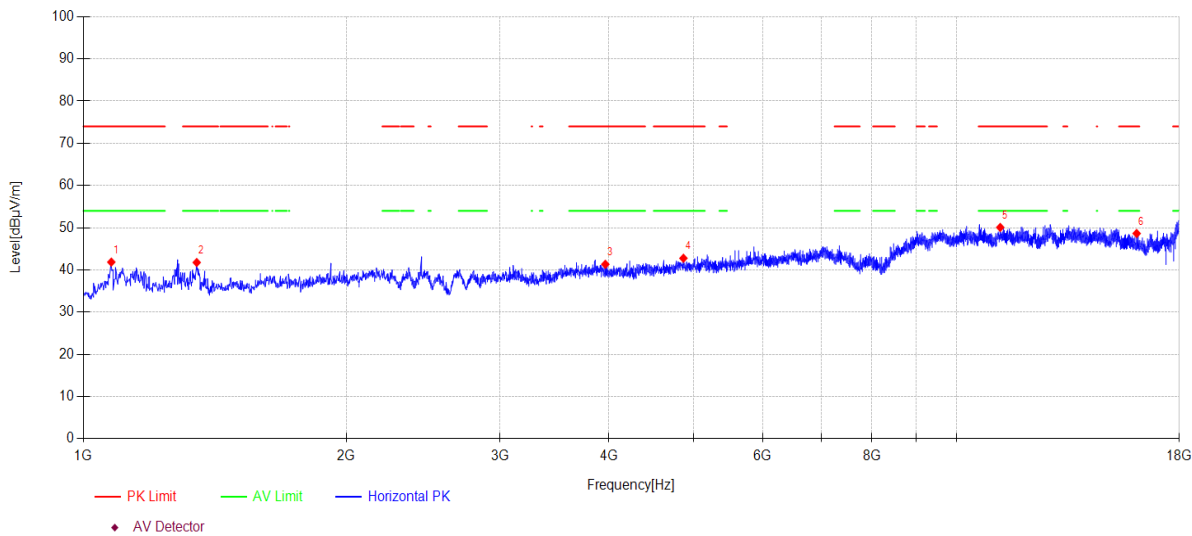
File Path:

d:\ts\2024 report data\Q23090402-1E\FCC ABOVE 1G\9

Memo:

Sample Number:S23090402-04 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBµV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	1076.500	51.30	24.45	3.00	-36.89	41.86	74.00	32.14	PK	Horizontal
2	1348.500	50.44	24.79	3.47	-36.93	41.77	74.00	32.23	PK	Horizontal
3	3961.400	45.65	31.05	5.06	-40.43	41.33	74.00	32.67	PK	Horizontal
4	4867.500	43.81	33.52	5.57	-40.13	42.77	74.00	31.23	PK	Horizontal
5	11223.800	41.81	39.20	8.27	-39.20	50.08	74.00	23.92	PK	Horizontal
6	16084.100	39.98	37.92	10.17	-39.43	48.64	74.00	25.36	PK	Horizontal

Note:

- Level = Reading + Cable loss + Antenna Factor + AMP
- If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-02

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee 2440MHz TX mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

DDT 3# Chamber

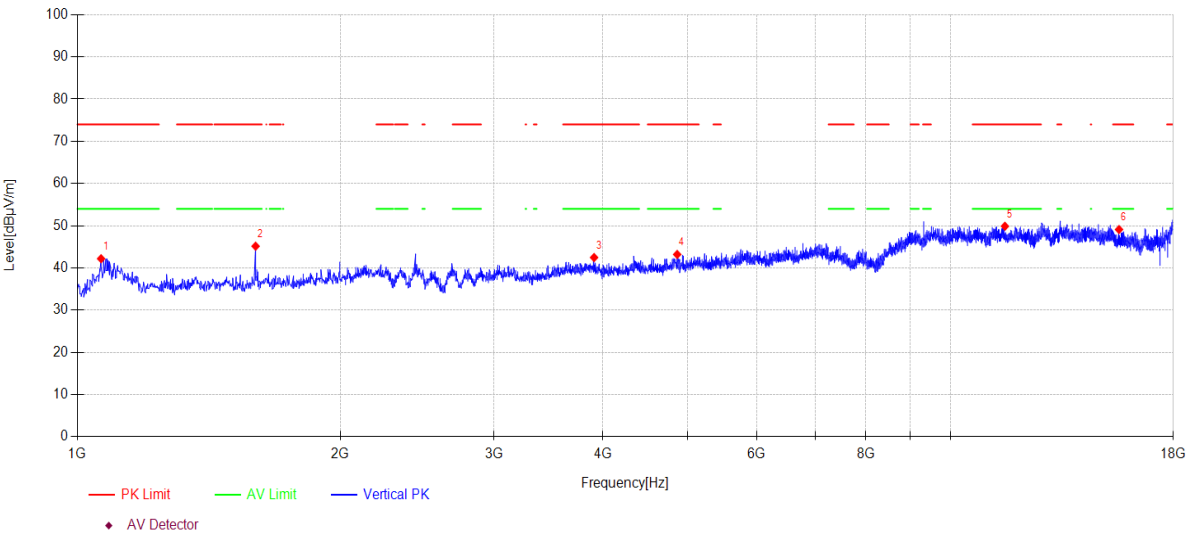
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d:\ts\2024 report data\Q23090402-1E\FCC ABOVE 1G\10

Memo:

Sample Number:S23090402-04 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBµV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	1064.600	51.67	24.43	2.98	-36.89	42.19	74.00	31.81	PK	Vertical
2	1600.100	52.61	25.60	3.90	-36.96	45.15	74.00	28.85	PK	Vertical
3	3907.000	46.60	31.19	5.07	-40.39	42.47	74.00	31.53	PK	Vertical
4	4864.100	44.18	33.57	5.57	-40.13	43.19	74.00	30.81	PK	Vertical
5	11545.100	41.65	39.11	8.47	-39.35	49.88	74.00	24.12	PK	Vertical
6	15597.900	39.74	38.60	9.88	-39.12	49.10	74.00	24.90	PK	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.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-02

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee 2480MHz TX mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

DDT 3# Chamber

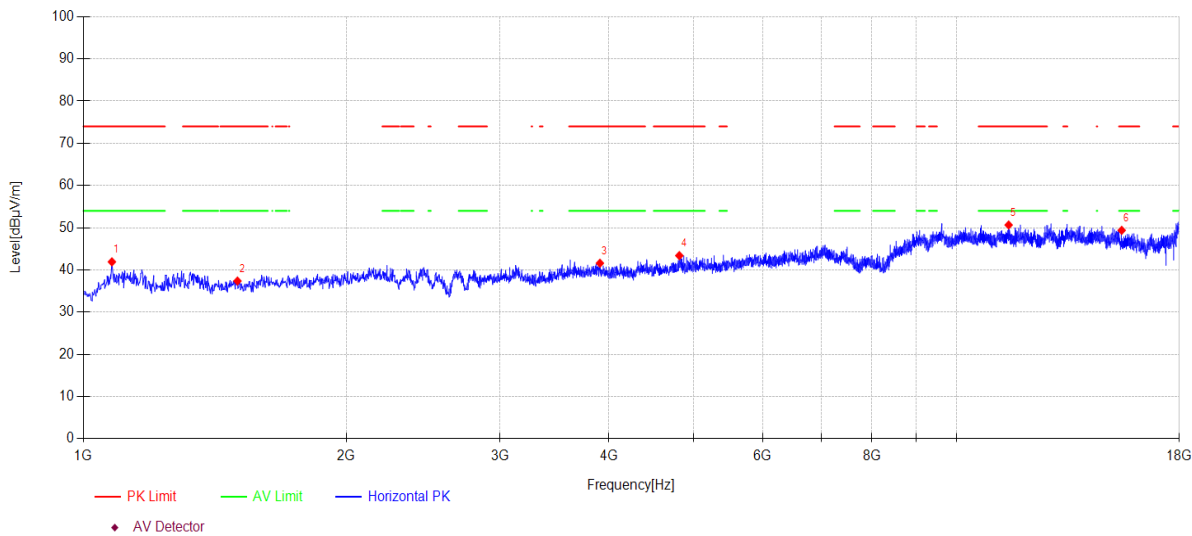
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d:\ts\2024 report data\Q23090402-1E\FCC ABOVE 1G\5

Memo:

Sample Number:S23090402-04 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBµV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	1078.200	51.34	24.46	3.00	-36.89	41.91	74.00	32.09	PK	Horizontal
2	1501.500	45.11	25.48	3.73	-36.95	37.37	74.00	36.63	PK	Horizontal
3	3905.300	45.73	31.19	5.07	-40.39	41.60	74.00	32.40	PK	Horizontal
4	4814.800	45.12	32.88	5.54	-40.15	43.39	74.00	30.61	PK	Horizontal
5	11475.400	42.31	39.22	8.43	-39.31	50.65	74.00	23.35	PK	Horizontal
6	15461.900	39.76	38.88	9.79	-39.04	49.39	74.00	24.61	PK	Horizontal

Note:

- Level = Reading + Cable loss + Antenna Factor + AMP
- If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-02

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee 2480MHz TX mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

DDT 3# Chamber

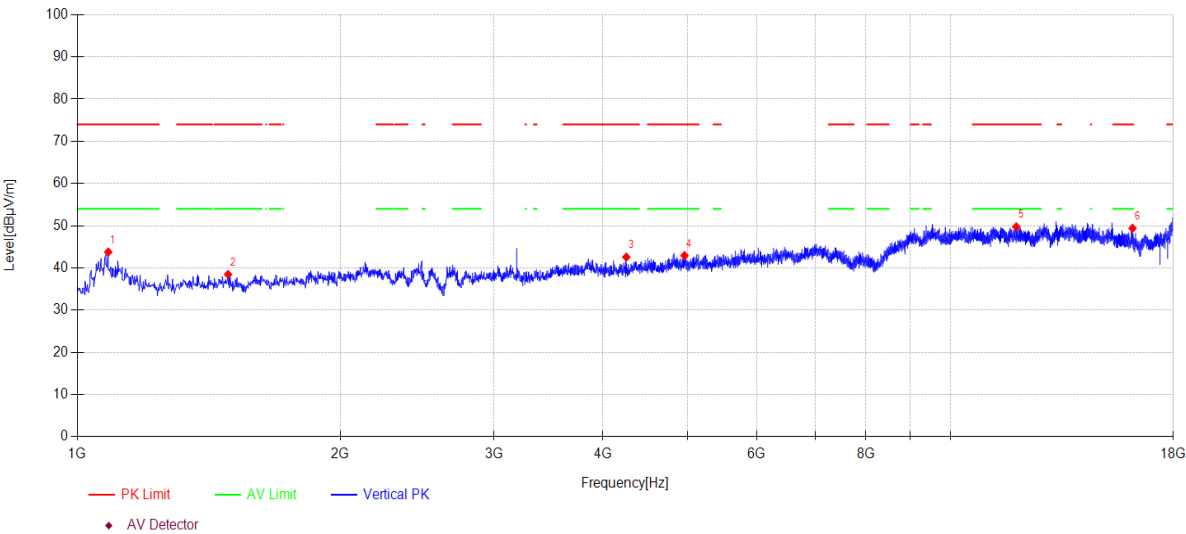
File Path:

d:\ts\2024 report data\Q23090402-1E\FCC ABOVE 1G\6

Memo:

Sample Number:S23090402-04 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	1085.000	53.16	24.47	3.02	-36.89	43.76	74.00	30.24	PK	Vertical
2	1487.900	46.25	25.45	3.71	-36.94	38.47	74.00	35.53	PK	Vertical
3	4253.800	46.32	31.42	5.20	-40.36	42.58	74.00	31.42	PK	Vertical
4	4959.300	44.28	33.12	5.63	-40.10	42.93	74.00	31.07	PK	Vertical
5	11895.300	41.66	38.90	8.69	-39.51	49.74	74.00	24.26	PK	Vertical
6	16165.700	40.87	37.83	10.18	-39.49	49.39	74.00	24.61	PK	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.

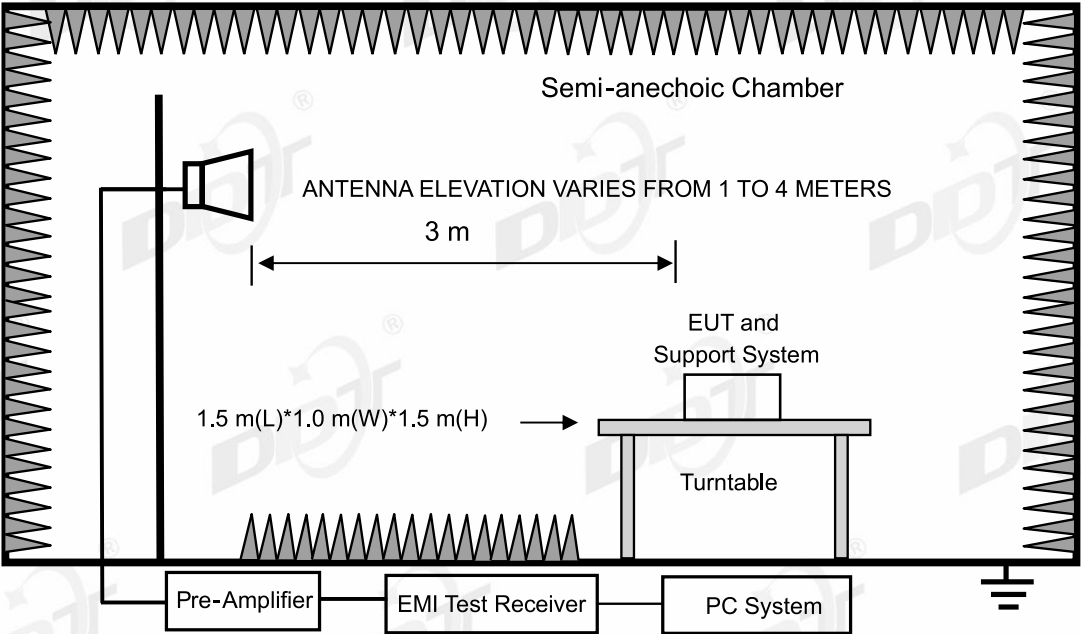
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

12.Band Edge Compliance

12.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To
Micro-Tronics filters	REBES	BRM50702	DDT-ZC03242	/
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	DDT-ZC00506	2025/04/26
Pre-amplifier	COM-POWER	PAM-840A	DDT-ZC01693	2025/03/31
High pass filter	Micro-Tronics	HPM50108	DDT-ZC00560	2025/04/22
RF Cable	N/A	W24.02 HL-562	DDT-ZC04022	2025/03/31
RF cable	Yuhu Technology	JCTB810-NJ-NJ-9M	DDT-ZC02538	2025/03/31
ELECTRIC AND MAGNETIC FIELD ANALYZER	Narda	EHP-200A	DDT-ZC01401	2024/09/20
PSA Series Spectrum Analyzer	Agilent	E4447A	DDT-ZC00517	2025/03/31
High pass filter	Micro-Tronics	HPM50102	DDT-ZC00561	2025/04/22
Pre-amplifier	COM-POWER	PAM-118A	DDT-ZC01293	2024/07/14
EMI TEST RECEIVER	R&S	ESU26	DDT-ZC01909	2025/03/31
Hochgewinn-Hornantenne	SCHWARZBECK	BBHA 9120 D	DDT-ZC02129	2025/09/18
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	DDT-ZC02050	2024/07/11
High Pass filter	Xi'an Xingbo	XBLBQ-GTA67	DDT-ZC02179	2025/04/22
RF Cable	N/A	W13.02 AP1-X2	DDT-ZC04023	2025/03/31
RF cable	Yuhu Technology	ZT26S-SMAJ-SMAJ-1M	DDT-ZC02037	2025/03/31
Active Loop Antenna	Schwarzbeck	FMZB1519	DDT-ZC00524	2025/09/11
Micro-Tronics filters	REBES	BRM50716	DDT-ZC03240	/
RF cable	Zhongke Junchuang	JCT26S-NJ-NJ-1.5M	DDT-ZC02762	2025/03/31

12.2. Block diagram of test setup



12.3. Limits

All restriction band should comply with 15.209 and RSS-Gen section 8.9 limits, other emission should be at least 20 dB below the fundamental.

12.4. Assistant equipment used for test

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

12.5. 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.

12.6. Test result

PASS. (See below detailed test result)

12.7. Test data

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-02

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee 2405MHz TX mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

DDT 3# Chamber

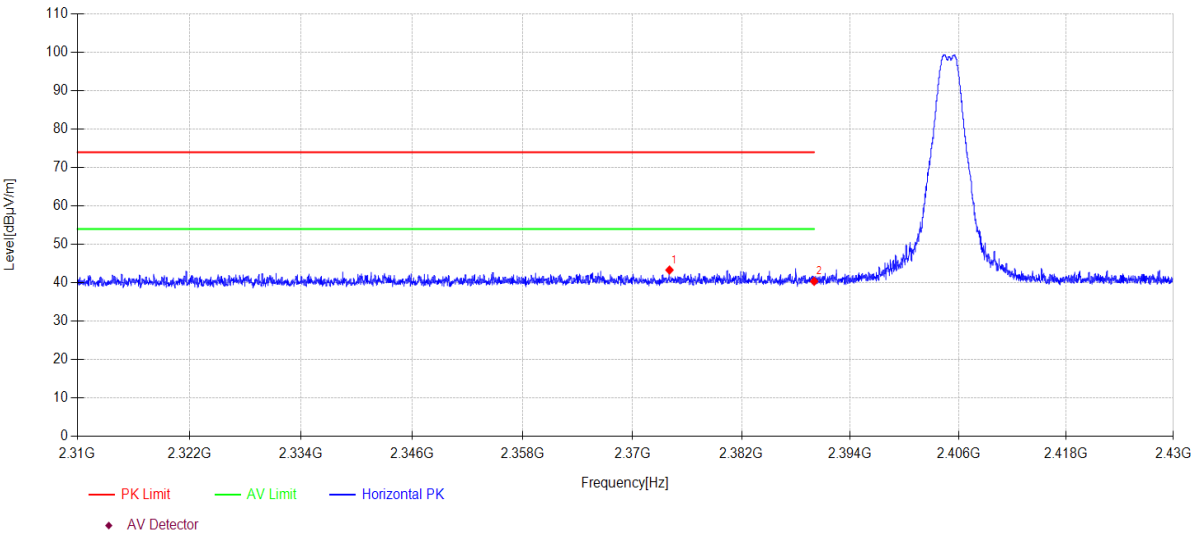
File Path:

d:\ts\2024 report data\Q23090402-1E\FCC ABOVE 1G\3

Memo:

Sample Number:S23090402-04 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2374.080	12.57	27.20	3.56	0.00	43.33	74.00	30.67	PK	Horizontal
2	2390.000	9.57	27.26	3.57	0.00	40.40	74.00	33.60	PK	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.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-02

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee 2405MHz TX mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

DDT 3# Chamber

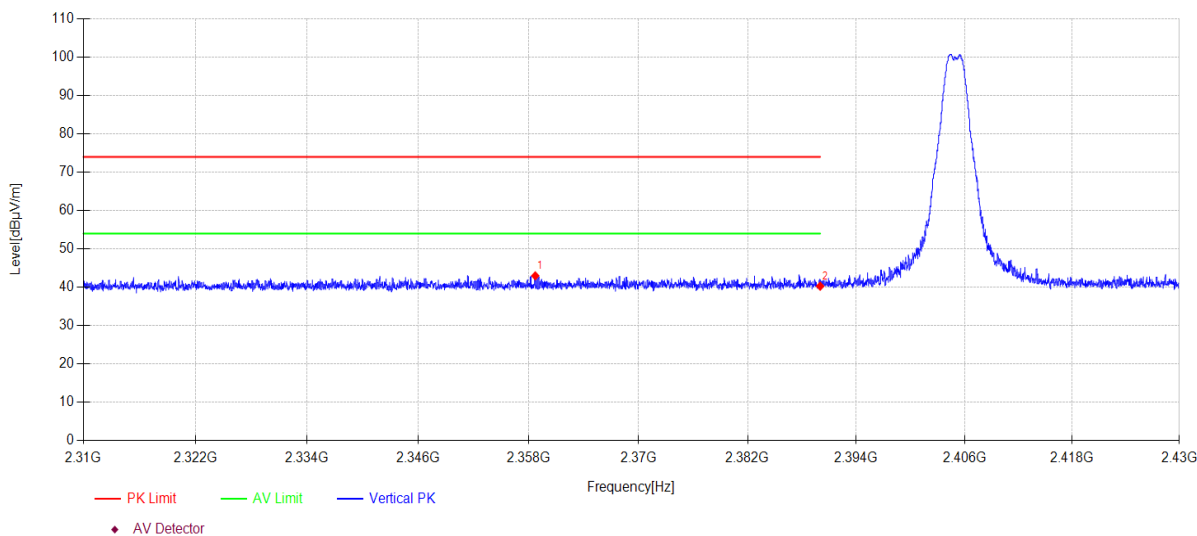
File Path:

d:\ts\2024 report data\Q23090402-1E\FCC ABOVE 1G\4

Memo:

Sample Number:S23090402-04 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBµV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	2358.744	12.30	27.13	3.55	0.00	42.98	74.00	31.02	PK	Vertical
2	2390.000	9.46	27.26	3.57	0.00	40.29	74.00	33.71	PK	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.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-02

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee 2480MHz TX mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

DDT 3# Chamber

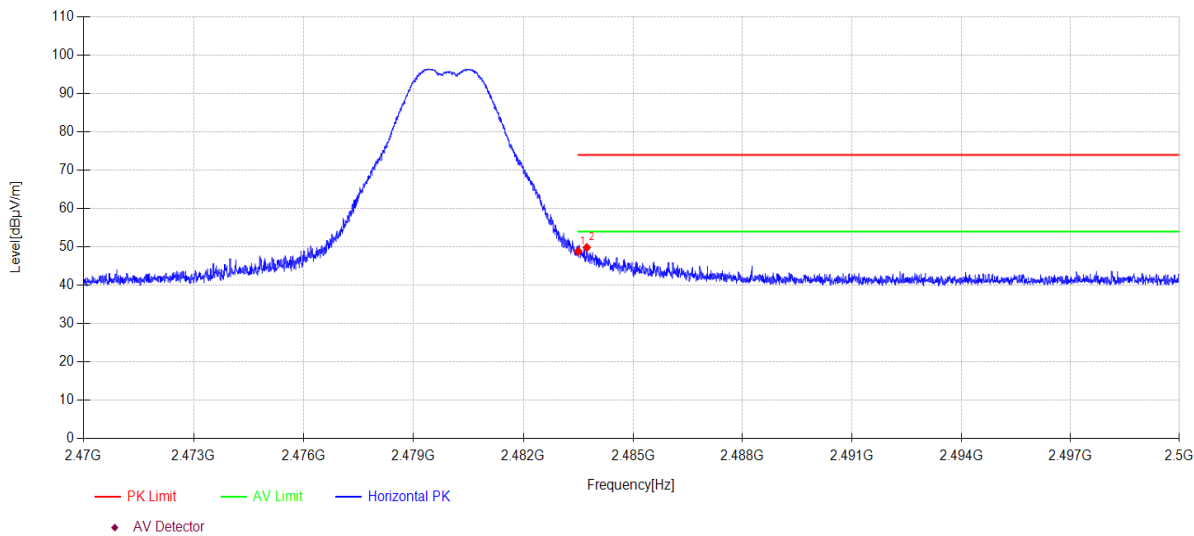
File Path:

d:\ts\2024 report data\Q23090402-1E\FCC ABOVE 1G\7

Memo:

Sample Number:S23090402-04 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2483.500	17.70	27.53	3.62	0.00	48.85	74.00	25.15	PK	Horizontal
2	2483.737	18.70	27.53	3.62	0.00	49.85	74.00	24.15	PK	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.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-07-02

Tested By:

Johnson Huang

EUT:

DC tubular motor

Model Number:

AM35-6/18-ES-E-Z

Test Mode:

Zigbee 2480MHz TX mode

Power Supply:

battery

Condition:

Temp:22.5°C;Humi:56.3%

Test Site:

DDT 3# Chamber

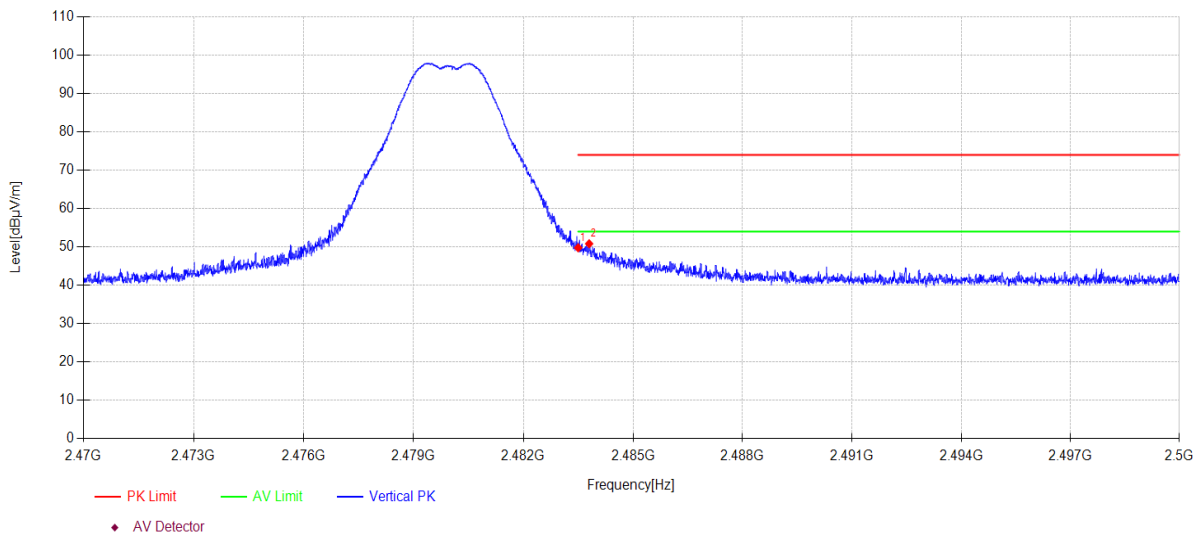
File Path:

d:\ts\2024 report data\Q23090402-1E\FCC ABOVE 1G\8

Memo:

Sample Number:S23090402-04 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2483.500	18.63	27.53	3.62	0.00	49.78	74.00	24.22	PK	Vertical
2	2483.800	19.67	27.54	3.62	0.00	50.83	74.00	23.17	PK	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.

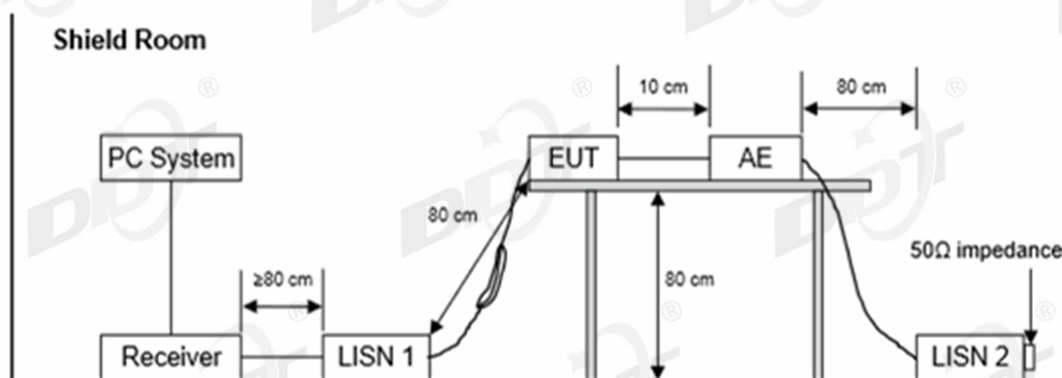
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

13.Power Line Conducted Emissions

13.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To
Δ-shaped artificial power network	SCHWARZBEC K	PVDC 8301	DDT-ZC03939	2025/04/01
Pulse Limiter	SCHWARZBEC K	VTSD 9561	DDT-ZC02128	2024/07/14
EMI Test Receiver	R&S	ESCI/E3	DDT-ZC01297	2024/07/11
Conected Radiated Software	Audix	E3	DDT-ZC00562	/
Two Line V-Network	R&S	ENV216	DDT-ZC02056	2024/07/11
RF Cable	Yuhu Technology	Z806-NJ-NJ-6M	DDT-ZC02004	2024/07/14
Three-phase artificial power network	SCHWARZBEC K	NSLK 8163	DDT-ZC01572	2024/07/11
Two Line V-Network	R&S	ENV216	DDT-ZC02059	2024/07/11

13.2. Block diagram of test setup



13.3. Limits

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

13.4. Assistant equipment used for test

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

13.5. 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.

13.6. Test result

N/A

Measurements to demonstrate compliance with the conducted limits are not required for devices which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

15. Photos of the EUT

Please refer to DDT-Q23090402-1E appendix I

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