



RADIO TEST REPORT

Applicant	:	Guangdong Hiway Integrated Circuit Technology Co., Ltd.
Address of Applicant	:	No.1 Headquarters, Songshan Lake High Technology Industrial Park, Dongguan City, Guangdong Province, Peoples republic of China
Manufacturer	:	Guangdong Hiway Integrated Circuit Technology Co., Ltd.
Address of Manufacturer	:	No.1 Headquarters, Songshan Lake High Technology Industrial Park, Dongguan City, Guangdong Province, Peoples republic of China
Equipment under Test	:	GY Sensor 2.0
Model No.	:	HW48414-SGY-110
FCC ID	:	2BLDF- HW48414
IC	:	34713-HW48414
HVIN	:	HW48414-SGY-110
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart C, RSS-210 Issue 11 June 25, 2024, ANSI C63.10:2020, RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021)
Report No.	:	DDT-RE25070219-1E01
Issue Date	:	2025/11/17
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

Applicant	:	Guangdong Hiway Integrated Circuit Technology Co., Ltd.
Address of Applicant	:	No.1 Headquarters, Songshan Lake High Technology Industrial Park, Dongguan City, Guangdong Province, Peoples republic of China
Equipment under Test	:	GY Sensor 2.0
Model No.	:	HW48414-SGY-110
Manufacturer	:	Guangdong Hiway Integrated Circuit Technology Co., Ltd.
Address of Manufacturer	:	No.1 Headquarters, Songshan Lake High Technology Industrial Park, Dongguan City, Guangdong Province, Peoples republic of China

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C, RSS-210 Issue 11 June 25, 2024, ANSI C63.10:2020, 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-RE25070219-1E01		
Date of Receipt:	2025/08/13	Date of Test:	2025/08/13~2025/09/27

Created: Jacky Huang	Reviewed: Johnson Huang	Approved: Ella Gong
		
2025/09/28	2025/11/17	2025/11/17

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
V0	Initial issue	2025/11/17	Ella Gong

1. Summary of Test Results

No.	Test Parameter	Clause No.	Condition	Result
1	On Time and Duty Cycle	FCC Rules and Regulations Part 15 Subpart C, RSS-210 Issue 11 June 25, 2024	/	Pass
2	20dB Bandwidth and 99% Bandwidth	FCC Part 15: 15.215, ANSI C63.10:2020, RSS-210 Issue 11 June 25, 2024, RSS-Gen Issue 5	/	Pass
3	Stop Transmitting Time Test	FCC Part 15C: 15.231(a)(1), RSS-210 Issue 11 June 25, 2024	/	Pass
4	Radiated Emission	FCC Part 15: 15.209, FCC Part 15: 15.231(b), ANSI C63.10:2020, RSS-210 Issue 11 June 25, 2024, RSS-Gen Issue 5	/	Pass
5	Field Strength Of The Fundamental Signal	FCC Part 15: 15.209, FCC Part 15: 15.231(b), ANSI C63.10:2020, RSS-210 Issue 11 June 25, 2024, RSS-Gen Issue 5	/	Pass
6	Power Line Conducted Emissions	FCC Part 15: 15.207, ANSI C63.10:2020, RSS-210 Issue 11 June 25, 2024, RSS-Gen Issue 5	/	N/A
7	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	: GY Sensor 2.0
Model Number	: HW48414-SGY-110
EUT Function Description	: Please reference user manual of this device
Power Supply	: Button cell 3V
Operation frequency	: 433.92MHz
Modulation	: FSK
Antenna Type	: Steel sheet antenna
Max Antenna Gain (dBi)	: 2.15

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.

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

Tested mode, channel information		
Mode	Channel	Frequency (MHz)
TX mode	1	434.92

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

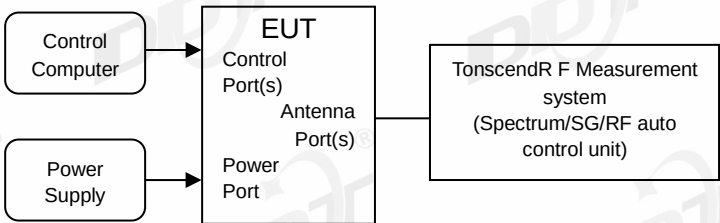
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB (10 MHz $\leq$ f < 3.6 GHz);
	1.38 dB (3.6 GHz $\leq$ f < 8 GHz)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB (10 MHz $\leq$ f < 3.6 GHz);
	1.38 dB (3.6 GHz $\leq$ f < 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
☐ RF Connected Test (RF Measurement System 1#)				
SIGNAL ANALYZER	R&S	FSQ26	101272	2026/03/28
Wideband Radio Communication Tester	R&S	CMW500	120259	2026/03/28
MXG Vector Signal Generator	KEYSIGHT	N5182B	MY59100192	2026/03/28
MXG Vector Signal Generator	Agilent	N5182A	MY19060405	2026/03/28
RF Control Unit	Tonscend	JS0806-2	158060010	2026/03/28
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDDS-150L	ZX170110-A	2026/03/28
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A
☒ RF Connected Test (RF Measurement System 2#)				
SPECTRUM ANALYZER	R&S	FSU26	201124	2026/04/08
Power Sensor	R&S	NRP-Z22	101254	2026/04/08
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A
☐ RF Connected Test (RF Measurement System 3#)				
SIGNAL ANALYZER	R&S	FSV40	101407	2026/04/08
Wideband Radio Communication Tester	R&S	CMW500	117491	2026/03/28
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY62153058	2026/04/08
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	ZXGDDS-150L	ZX170110-A	2026/03/28
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A
☐ RF Connected Test (RF Measurement System 4#)				
Signal & Spectrum Analyzer	R&S	FSV3044	101173	2026/03/28
Wideband Radio Communication Tester	R&S	CMW500	168801	2026/03/28
MXG Vector Signal Generator	Agilent	N5182A	MY48180737	2026/03/28
PSG Vector Signal Generator	Agilent	E8267D	US49060192	2025/08/25
RF Control Unit	Tonscend	JS0806-2	2118060485	2026/03/28
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDDS-150L	ZX170110-A	2026/03/28
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A

4. On Time and Duty Cycle

4.1. Block diagram of test setup



4.2. Limits

Just for report.

4.3. Test procedure

Set the Centre frequency of the spectrum analyzer to the transmitting frequency;

Set the span=0MHz, RBW=10MHz, VBW=10MHz, Sweep time=5s;

Trace mode = Single hold.

4.4. Test result

Test Engineer:	Huang Yanwen	Test Site:	RF Measurement System 2#
Ambient Condition:	23.5 °C, 55%RH	Test Date:	2025/8/28 - 2025/9/27
Test Power Supply:	Battery	Sample Number:	S25070219-001

Centre Frequency [MHz]	On time [ms]	Total time [ms]	Duty cycle [%]	20 log(duty cycle)
433.92	20.05	12067	0.2	-54

Note 1: The transmitter duty cycle was measured using a spectrum analyser in the time domain and calculated by below Equation:

$\delta(\text{dB}) = 20\log(\Delta) = 20\log(1.16/100) = -35.92\text{ dB}$

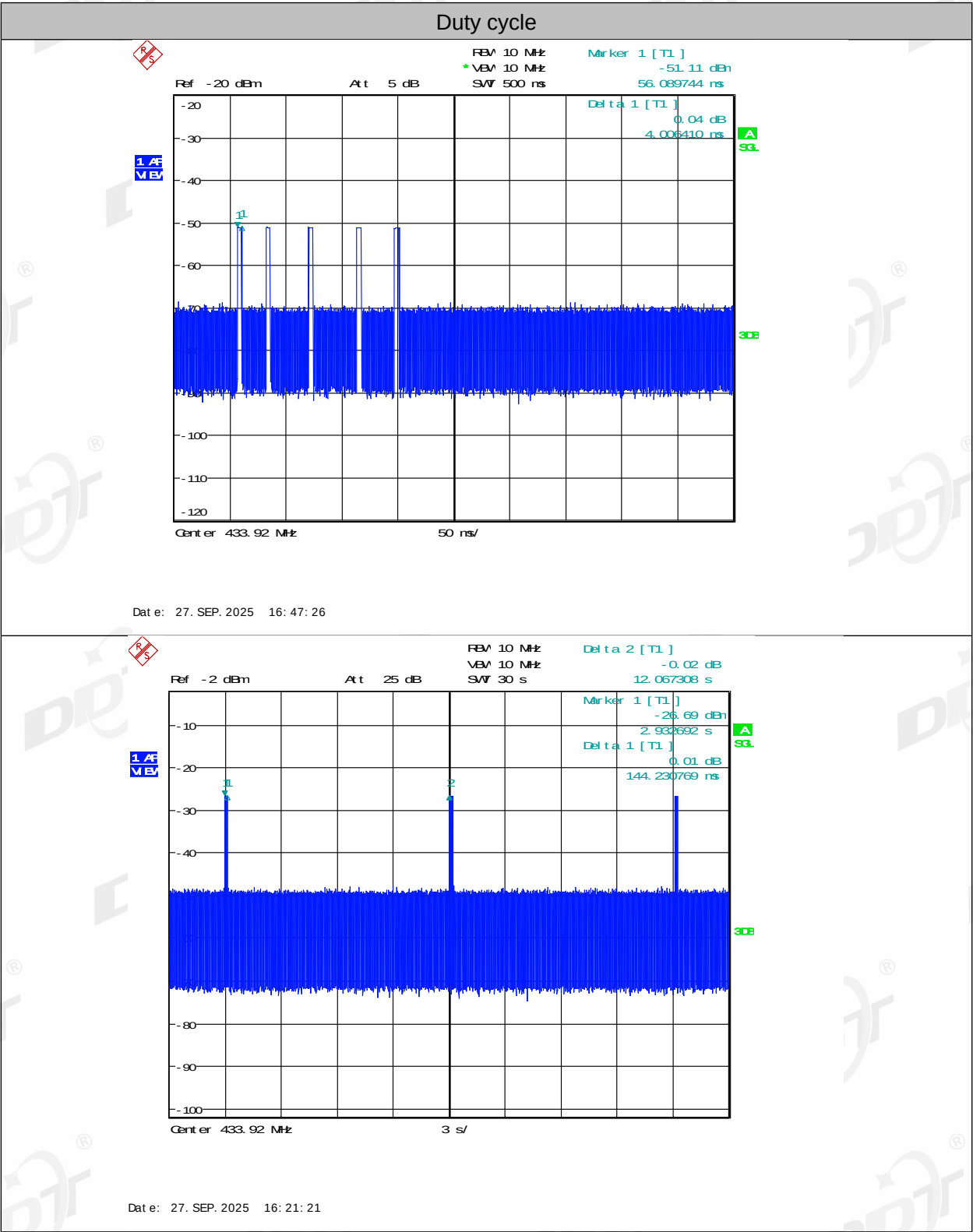
δ is the duty cycle correction factor (dB)

Δ is the duty cycle (dimensionless)

Note 2: In cases where the pulse train exceeds 0.1 s, the measured field strength shall be determined during a 0.1 s interval

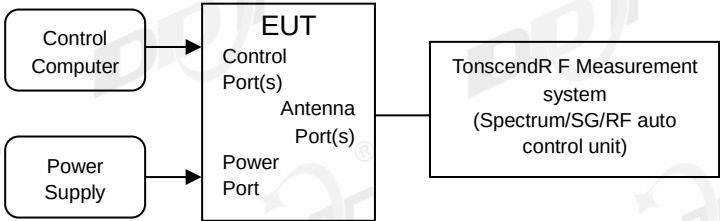
Note: On time=4.01*5=20.05ms

4.5. Test graphs



5. 20dB Bandwidth and 99% Bandwidth

5.1. Block diagram of test setup



5.2. Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency of devices operation above 70MHz and below 900MHz.

5.3. Test procedure

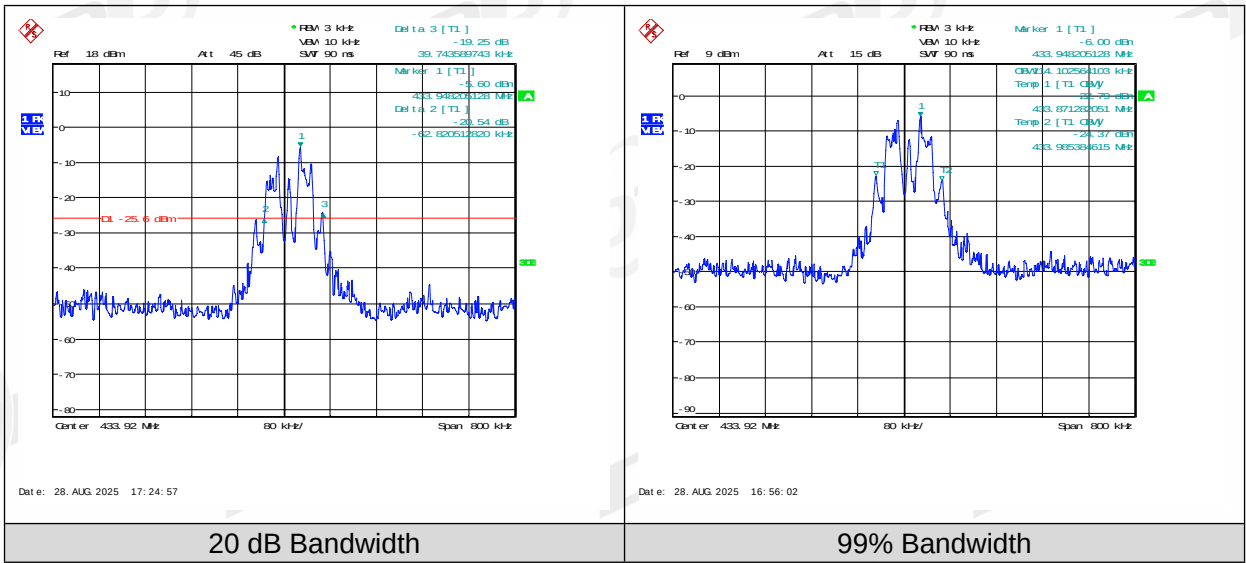
- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 Hz RBW and 300 Hz VBW. Use the 99% bandwidth function of the spectrum analyzer to measure the occupied bandwidth of the EUT.

5.4. Test result

Test Engineer:	Huang Yanwen	Test Site:	RF Measurement System 2#	
Ambient Condition:	23.5 °C, 55%RH	Test Date:	2025/8/28 - 2025/8/28	
Test Power Supply:	Battery	Sample Number:	S25070219-001	

Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limit (MHz): No wider than 0.25% of the center frequency	Conclusion
FSK	102.564	114.1025	433.92*0.25%=1.0848MHz	PASS

5.5. Test graphs



6. Transmitting Time and Stop Transmitting Time Test

6.1. Block diagram of test setup

6.2. Limits

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

6.3. Test procedure

- (1) The EUT's RF signal was coupled to spectrum analyzer by antenna connected to spectrum analyzer.
- (2) Set the spectrum to zero span mode, and centered of EUT frequency.
- (3) Measure the transmitting time and stop transmitting time.

6.4. Test result

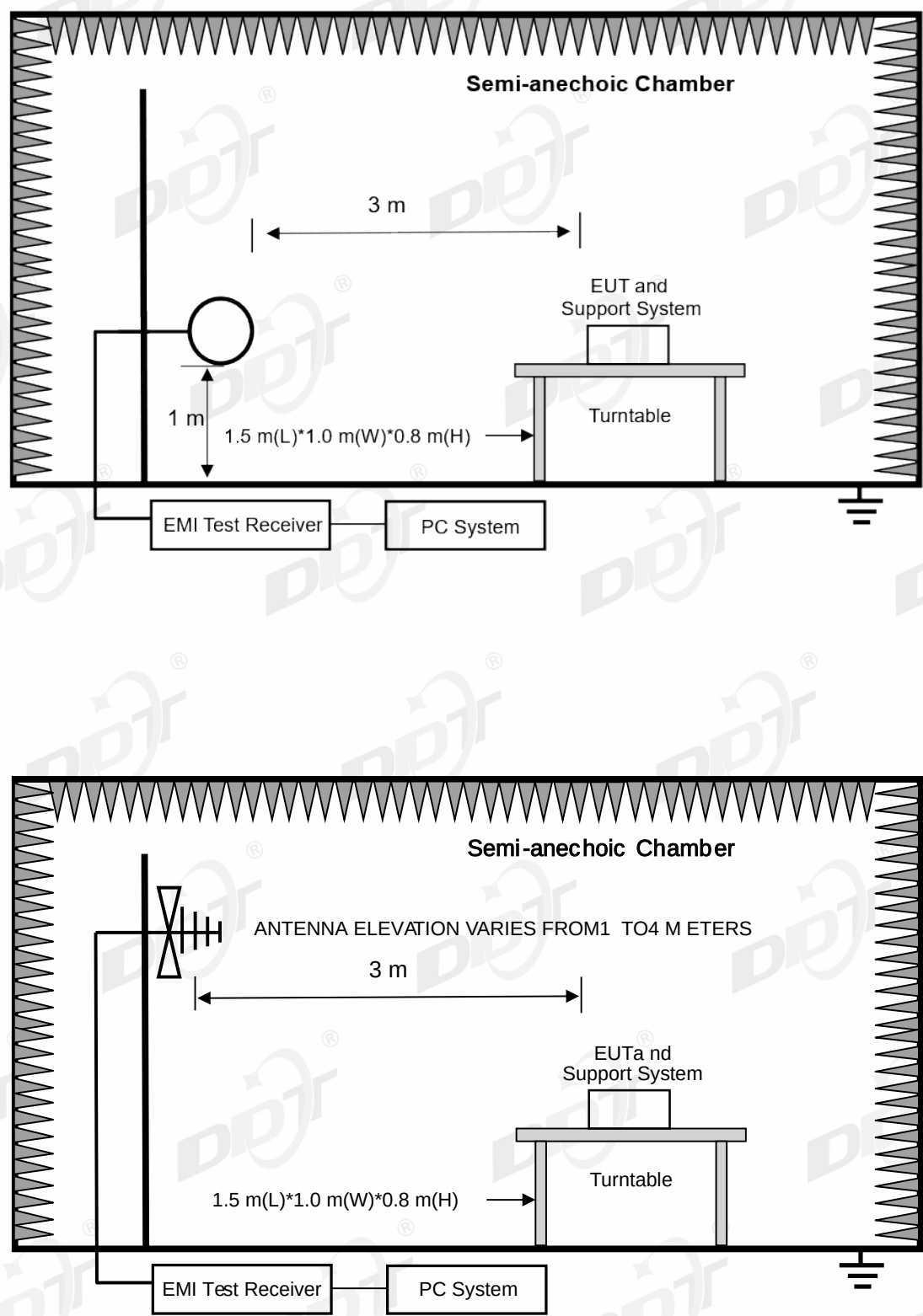
Pass. Refer to section 4, easily find that the transmitting time is 200ms and the stop transmitting time in no case less than 10s, longer than 30 times the duration of the transmission.

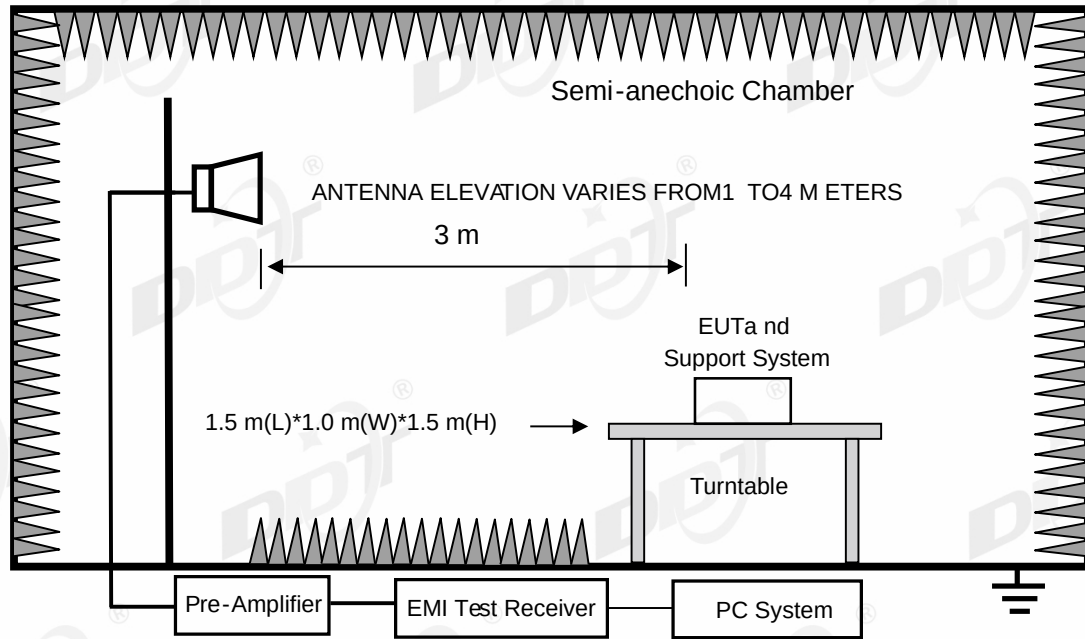
7. Radiated Emission

7.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To	Cal. Interval
Micro-Tronics filters	REBES	BRM50702	DDT-ZC03242	/	/
RF Cable	N/A	W24.02 HL-562	DDT-ZC04022	2026/03/28	1 Year
RF cable	Yuhu Technology	JCTB810-NJ-NJ-9M	DDT-ZC02538	2026/03/28	1 Year
RF cable	Zhongke Junchuang	JCT26S-NJ-NJ-1.5M	DDT-ZC02762	2026/03/28	1 Year
RF cable	Yuhu Technology	ZT26S-SMAJ-SMAJ-1M	DDT-ZC02037	2026/03/28	1 Year
RF Cable	N/A	W13.02 AP1-X2	DDT-ZC04023	2026/03/28	1 Year
Pre-amplifier	COM-POWER	PAM-840A	DDT-ZC01693	2026/03/28	1 Year
Pre-amplifier	COM-POWER	PAM-118A	DDT-ZC01293	2026/08/10	1 Year
High pass filter	Micro-Tronics	HPM50102	DDT-ZC00561	2026/03/28	1 Year
EMI TEST RECEIVER	R&S	ESU26	DDT-ZC01909	2026/03/28	1 Year
High pass filter	Micro-Tronics	HPM50108	DDT-ZC00560	2026/03/28	1 Year
High Pass filter	Xi'an Xingbo	XBLBQ-GTA67	DDT-ZC02179	2026/03/28	1 Year
Micro-Tronics filters	REBES	BRM50716	DDT-ZC03240	/	/
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	DDT-ZC00506	2026/04/01	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	DDT-ZC02050	2026/07/25	1 Year
Hochgewinn-Hornantenne	SCHWARZBECK	BBHA 9120 D	DDT-ZC02129	2025/09/18	1 Year
Active Loop Antenna	Schwarzbeck	FMZB1519	DDT-ZC00524	2025/09/11	1 Year
PSA Series Spectrum Analyzer	Agilent	E4447A	DDT-ZC00517	2026/03/28	1 Year

7.2. Block diagram of test setup





7.3. 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	23.6-24.6
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			

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.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		uV/m	dB(uV)/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(uV)/m (Peak) 54.0 dB(uV)/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 9-90kHz, 110-490kHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

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

$$\text{Limit}_{3m}(\text{dBuV/m}) = \text{Limit}_{300m}(\text{dBuV/m}) + 40\text{Log}(300m/3m) = \text{Limit}_{300m}(\text{dBuV/m}) + 80$$

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

(3) Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions include fundamental emission shall not exceed FCC 15.231 section (e) limit of comply with FCC 15.209 limit which permit higher emission level.

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(b) exceed 11,000 $\mu\text{V/m}$ measured at 3 m with an average detector. The peak level of any emission within this specified frequency band shall not exceed 55,000 $\mu\text{V/m}$ measured at 3 m; and

(c) The field strength of emissions on any frequencies outside this specified band shall not exceed the general field strength limits specified in RSS-Gen.

7.4. Test procedure

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

(2) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used	Test antenna distance
30MHz-1GHz	Trilog Broadband Antenna	3m

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:

(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 1m to 4m(Except loop antenna, it's fixed 1m 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.

(4) For final emissions measurements at each frequency of interest, the EUT was 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 equipments and all of the interface cables were changed according to ANSI C63.10:2020 on Radiated Emission test.

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

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

Frequency band	RBW
30MHz-1GHz	120kHz

(7) X axis, Y axis, Z axis are tested, and worse setup X axis is reported

(8) 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 18 GHz and recorded in below.

7.5. Test result

PASS. (See below detailed test result)

7.6. Test data

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-08-22

Tested By:

Lin Guoyuan

EUT:

GY Sensor 2.0

Model Number:

HW48414-SGY-110

Test Mode:

TX 433MHz Mode

Power Supply:

Battery

Condition:

Temp:22.0°C;Humi:58.9%

Test Site:

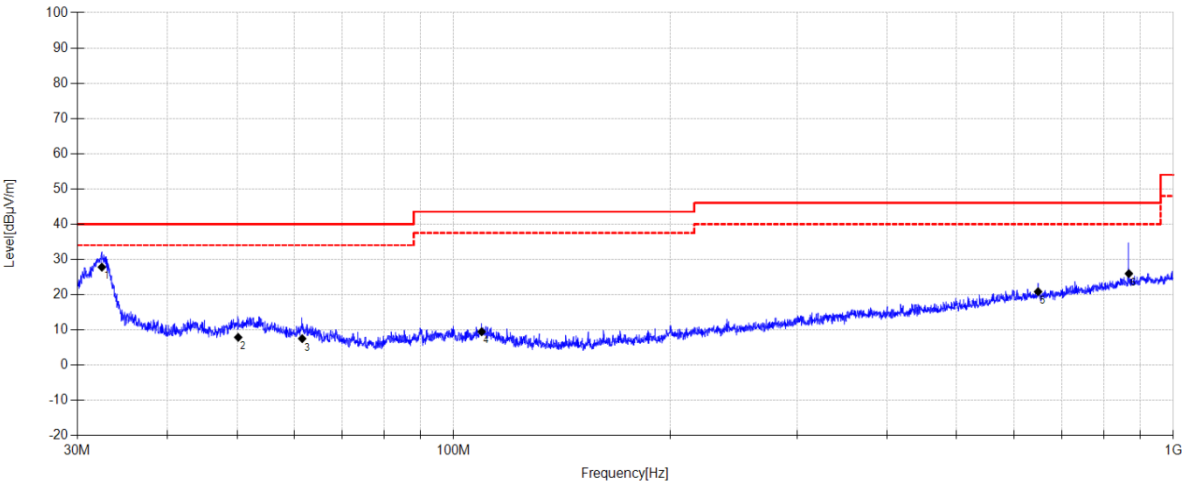
DDT 3# Chamber

File Path:

d:\ts\2025 report date\Q25070219-1E\FCC Below 1G\1

Memo:

Sample Numbel:S25070219-003



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	32.451	45.45	10.90	3.74	27.79	40.00	12.21	QP	Horizontal
2	50.192	22.98	13.32	3.88	7.88	40.00	32.12	QP	Horizontal
3	61.596	23.33	12.52	3.96	7.51	40.00	32.49	QP	Horizontal
4	109.383	25.47	12.09	4.22	9.47	43.50	34.03	QP	Horizontal
5	648.805	28.07	19.31	6.43	20.84	46.00	25.16	QP	Horizontal
6	867.328	29.68	21.38	7.00	25.96	46.00	20.04	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:

2025-08-22

Tested By:

Lin Guoyuan

EUT:

GY Sensor 2.0

Model Number:

HW48414-SGY-110

Test Mode:

TX 433MHz Mode

Power Supply:

Battery

Condition:

Temp:22.0°C;Humi:58.9%

Test Site:

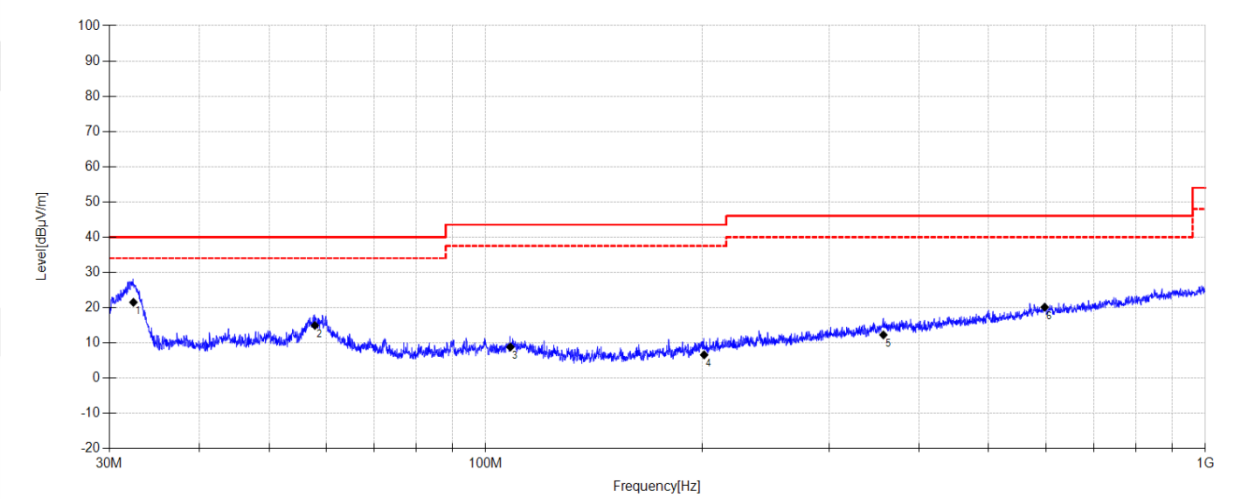
DDT 3# Chamber

File Path:

d:\ts\2025 report date\Q25070219-1E\FCC Below 1G\2

Memo:

Sample Numbler:S25070219-003



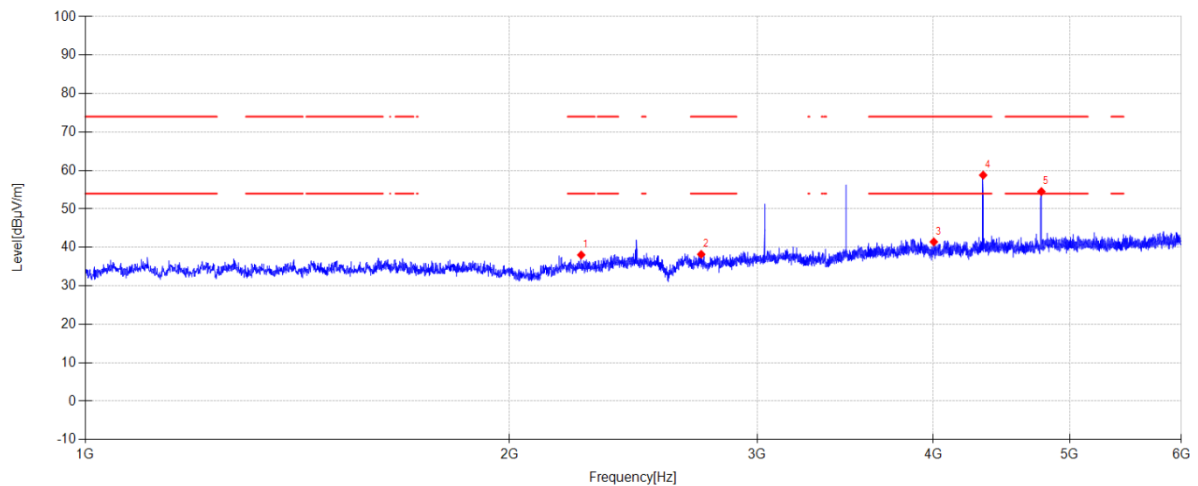
Final Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable Loss [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	32.405	39.17	10.90	3.74	21.51	40.00	18.49	QP	Vertical
2	57.910	30.33	12.97	3.94	14.94	40.00	25.06	QP	Vertical
3	108.239	25.24	11.67	4.21	8.81	43.50	34.69	QP	Vertical
4	201.175	23.36	11.16	4.48	6.60	43.50	36.90	QP	Vertical
5	357.000	24.18	15.16	5.38	12.26	46.00	33.74	QP	Vertical
6	598.123	27.35	19.35	6.27	20.12	46.00	25.88	QP	Vertical

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: 2025-08-22 **Tested By:** Lin Guoyuan
EUT: GY Sensor 2.0 **Model Number:** HW48414-SGY-110
Test Mode: TX 433MHz Mode **Power Supply:** Battery
Condition: Temp:22.0°C;Humi:58.9% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2025 report date\Q25070219-1E\FCC Above 1G\1
Memo: Sample Numbler:S25070219-003



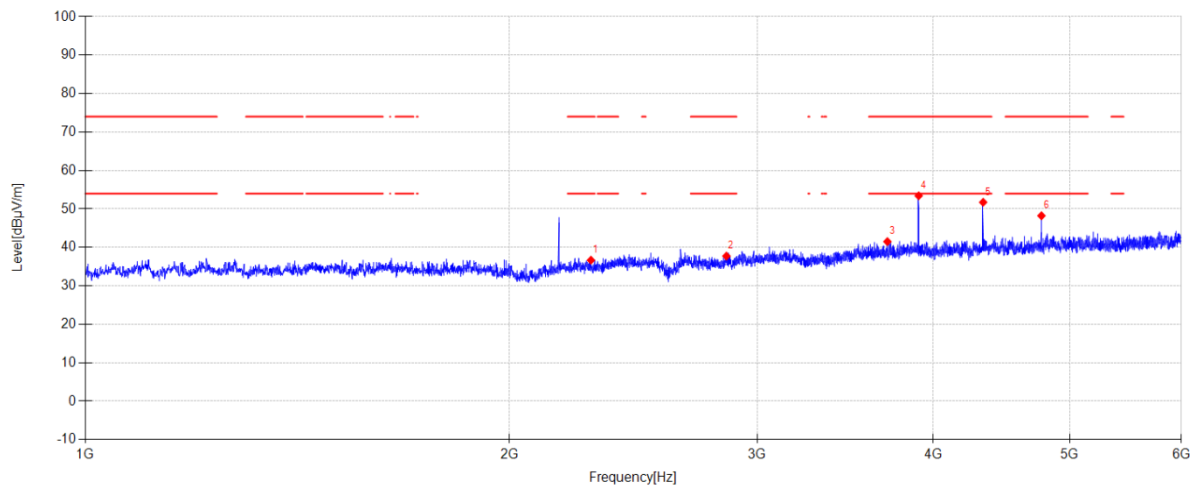
Suspected Data List										
NO.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2249.500	46.21	27.31	2.99	-38.49	38.02	74.00	35.98	PK	Horizontal
2	2737.000	46.63	27.57	3.10	-39.11	38.19	74.00	35.81	PK	Horizontal
3	4003.000	46.73	30.91	3.47	-39.68	41.43	74.00	32.57	PK	Horizontal
4	4339.500	63.18	31.60	3.66	-39.65	58.79	74.00	15.21	PK	Horizontal
						4.79	54.00	49.21	AV	Horizontal
5	4773.000	57.86	32.39	3.90	-39.62	54.53	74.00	19.47	PK	Horizontal
						0.53	54.00	53.47	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.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-08-22 **Tested By:** Lin Guoyuan
EUT: GY Sensor 2.0 **Model Number:** HW48414-SGY-110
Test Mode: TX 433MHz Mode **Power Supply:** Battery
Condition: Temp:22.0°C;Humi:58.9% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2025 report date\Q25070219-1E\FCC Above 1G\2
Memo: Sample Numbler:S25070219-003

**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	2285.500	45.27	26.95	3.00	-38.54	36.68	74.00	37.32	PK	Vertical
2	2852.000	46.03	27.82	3.13	-39.25	37.73	74.00	36.27	PK	Vertical
3	3710.500	47.31	30.42	3.38	-39.61	41.50	74.00	32.50	PK	Vertical
4	3905.500	58.45	31.19	3.44	-39.66	53.42	74.00	20.58	PK	Vertical
5	4339.500	56.13	31.60	3.66	-39.65	51.74	74.00	22.26	PK	Vertical
6	4773.500	51.56	32.39	3.90	-39.62	48.23	74.00	25.77	PK	Vertical

Note:

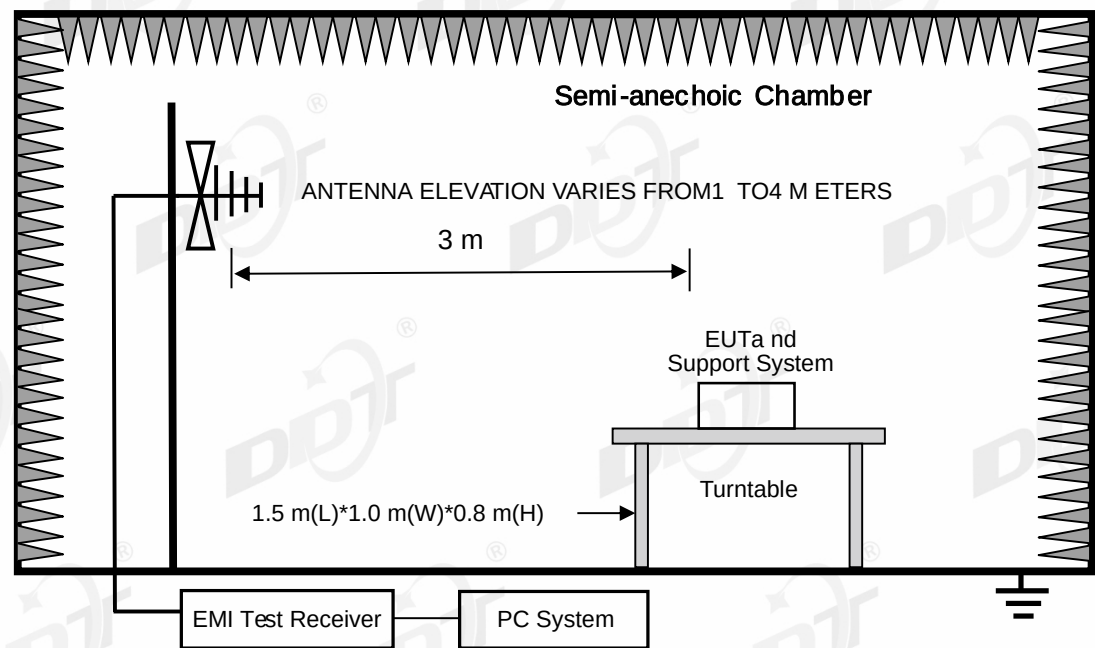
1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

8. Field Strength Of The Fundamental Signal

8.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To	Cal. Interval
Micro-Tronics filters	REBES	BRM50702	DDT-ZC03242	/	/
RF Cable	N/A	W24.02 HL-562	DDT-ZC04022	2026/03/28	1 Year
RF cable	Yuhu Technology	JCTB810-NJ-NJ-9M	DDT-ZC02538	2026/03/28	1 Year
RF cable	Zhongke Junchuang	JCT26S-NJ-NJ-1.5M	DDT-ZC02762	2026/03/28	1 Year
RF cable	Yuhu Technology	ZT26S-SMAJ-SMAJ-1M	DDT-ZC02037	2026/03/28	1 Year
RF Cable	N/A	W13.02 AP1-X2	DDT-ZC04023	2026/03/28	1 Year
Pre-amplifier	COM-POWER	PAM-840A	DDT-ZC01693	2026/03/28	1 Year
Pre-amplifier	COM-POWER	PAM-118A	DDT-ZC01293	2026/08/10	1 Year
High pass filter	Micro-Tronics	HPM50102	DDT-ZC00561	2026/03/28	1 Year
EMI TEST RECEIVER	R&S	ESU26	DDT-ZC01909	2026/03/28	1 Year
High pass filter	Micro-Tronics	HPM50108	DDT-ZC00560	2026/03/28	1 Year
High Pass filter	Xi'an Xingbo	XBLBQ-GTA67	DDT-ZC02179	2026/03/28	1 Year
Micro-Tronics filters	REBES	BRM50716	DDT-ZC03240	/	/
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	DDT-ZC00506	2026/04/01	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	DDT-ZC02050	2026/07/25	1 Year
Hochgewinn-Hornantenne	SCHWARZBECK	BBHA 9120 D	DDT-ZC02129	2025/09/18	1 Year
Active Loop Antenna	Schwarzbeck	FMZB1519	DDT-ZC00524	2025/09/11	1 Year
PSA Series Spectrum Analyzer	Agilent	E4447A	DDT-ZC00517	2026/03/28	1 Year

8.2. Block diagram of test setup



8.3. Limits

FCC 15.231 section (a) limit

Fundamental Frequency (MHz)	Field Strength of Fundamental
433.92	AV: 72.87 dB μ V/m @3m PK: 92.87 dB μ V/m @3m

8.4. Test procedure

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

Test frequency range	Test antenna used	Test antenna distance
30MHz-1GHz	Trilog Broadband Antenna	3m

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:

(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 1m to 4m(Except loop antenna, it's fixed 1m 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.

(4) For final emissions measurements at each frequency of interest, the EUT was 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 equipments and all of the interface cables were changed according to ANSI C63.10:2020 on Radiated Emission test.

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

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

Frequency band	RBW
30MHz-1GHz	120kHz

(7) X axis, Y axis, Z axis are tested, and worse setup X axis is reported.

8.5. Test result

Test Site: 3#3m chamber	Test Date: 2025/08/21
Condition: 23.4°C,53.1%	Test Engineer: Guoyuan Lin
Memo: /	

EUT Name: GY Sensor 2.0	EUT Model: HW48414-SGY-110
Sample No.: S25070219-003	Test Mode: TX mode
Power supply: Button cell 3V	Memo: /

Frequency (MHz)	PK Level (dB μ V/m)	PK Limit Line (dB μ V/m)	Over Limit (dB)	Polarization
433.92	75.08	92.87	-17.79	Horizontal
433.92	81.78	92.87	-11.09	Vertical

Frequency (MHz)	AV Level (dB μ V/m)	AV Limit Line (dB μ V/m)	Over Limit (dB)	Polarization
433.92	21.08	72.87	-51.79	Horizontal
433.92	27.78	72.87	-45.09	Vertical

Note: AV Level= PK Level+ Duty factor

9. Power Line Conducted Emissions

9.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To
/	/	/	/	/

9.2. Block diagram of test setup

9.3. Limits

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

9.4. Assistant equipment used for test

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

9.5. 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.

9.6. Test result

Not applicable. The product is DC powered.

10. Antenna Requirement

10.1. Limits

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

10.2. Assess result

The antenna used for this product is steel sheet antenna and that no antenna other than that furnished by the responsible party shall be used with the device.

12. Photos of the EUT

Please refer to DDT-Q25070219-2E appendix I

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