

# TEST REPORT

<b>Product Name</b>	:	Animal tag reader
<b>Brand Mark</b>	:	SYCREADER
<b>Model No.</b>	:	W90
		W90A, W90B, W90C, W90D, W90H, W91A, W91B, W91C, W91D, W91H, W70, W80, W81, W82, W86, R16, R17, R58B, R58C, R58D, R58BC, R58BD, R58H, S10, S20, U1, U2, U3, U4, U6, U8, U10, V1, V2, V3, V4, V5, V6, V8, V10
<b>Extension model</b>	:	
<b>FCC ID</b>	:	2A5HC-W90
<b>Report Number</b>	:	BLA-EMC-202203-A7604
<b>Date of Sample Receipt</b>	:	2022/3/21
<b>Date of Test</b>	:	2022/3/21 to 2022/4/20
<b>Date of Issue</b>	:	2022/4/20
<b>Test Standard</b>	:	47 CFR Part 15, Subpart C 15.249
<b>Test Result</b>	:	Pass

Prepared for:

**Sycreader Guangzhou Co., Ltd.**

**Room 502, Building 15, Xincheng Venture Center, Zengcheng  
Low-Carbon Headquarters Park, 400 Xincheng Avenue, Zengcheng  
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Prepared by:

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2022/4/20  




**REPORT REVISE RECORD**

Version No.	Date	Description
00	2022/4/20	Original

BlueAsia

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## 1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

## 2 GENERAL INFORMATION

<b>Applicant</b>	Sycreader Guangzhou Co., Ltd.
<b>Address</b>	Room 502, Building 15, Xincheng Venture Center, Zengcheng Low-Carbon Headquarters Park, 400 Xincheng Avenue, Zengcheng District, Guangzhou
<b>Manufacturer</b>	Sycreader Guangzhou Co., Ltd.
<b>Address</b>	Room 502, Building 15, Xincheng Venture Center, Zengcheng Low-Carbon Headquarters Park, 400 Xincheng Avenue, Zengcheng District, Guangzhou
<b>Factory</b>	Sycreader Guangzhou Co., Ltd.
<b>Address</b>	Room 502, Building 15, Xincheng Venture Center, Zengcheng Low-Carbon Headquarters Park, 400 Xincheng Avenue, Zengcheng District, Guangzhou
<b>Product Name</b>	Animal tag reader
<b>Test Model No.</b>	W90
<b>Extension model</b>	W90A, W90B, W90C, W90D, W90H, W91A, W91B, W91C, W91D, W91H, W70, W80, W81, W82, W86, R16, R17, R58B, R58C, R58D, R58BC, R58BD, R58H, S10, S20, U1, U2, U3, U4, U6, U8, U10, V1, V2, V3, V4, V5, V6, V8, V10
<b>Note</b>	All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are model name for commercial purpose.

## 3 GENERAL DESCRIPTION OF E.U.T.

<b>Hardware Version</b>	N/A
<b>Software Version</b>	N/A
Channel Spacing:	1MHz
Frequency Range:	2408MHz~2473MHz
Modulation Type:	GFSK
Number of Channels:	66(declared by the client)
Antenna Type:	Internal ANT
Antenna Gain:	3dBi(Provided by the applicant)
Power Supply:	DC3.7V

#### 4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25°C	DC3.7V

#### 5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
TX	Keep the EUT in transmitting mode

Remark: Only the data of the worst mode would be recorded in this report.

#### 6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30MHz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

## 7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
AC Adapter (UGREEN)	UGREEN	CD112	N/A	N/A

## 8 LABORATORY LOCATION

All tests were performed at:  
BlueAsia of Technical Services(Shenzhen) Co., Ltd.  
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province,  
China  
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673  
No tests were sub-contracted.

## 9 TEST INSTRUMENTS LIST

Test Equipment Of Radiated Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

Test Equipment Of Restricted Band Around Fundamental Frequency					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

<b>Test Equipment Of Field Strength of the Fundamental Signal (15.249(a))</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>S/N</b>	<b>Cal.Date</b>	<b>Cal.Due</b>
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

<b>Test Equipment Of 20dB Bandwidth</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>S/N</b>	<b>Cal.Date</b>	<b>Cal.Due</b>
Shield room	SKET	833	N/A	25/11/2020	24/11/2023
Receiver	R&S	ESPI3	101082	24/9/2021	23/9/2022
LISN	R&S	ENV216	3560.6550.15	24/9/2021	23/9/2022
LISN	AT	AT166-2	AKK1806000003	26/9/2021	25/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A

<b>Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>S/N</b>	<b>Cal.Date</b>	<b>Cal.Due</b>
Shield room	SKET	833	N/A	25/11/2020	24/11/2023
Receiver	R&S	ESPI3	101082	24/9/2021	23/9/2022

LISN	R&S	ENV216	3560.6550.15	24/9/2021	23/9/2022
LISN	AT	AT166-2	AKK1806000003	26/9/2021	25/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A

BlueAsia

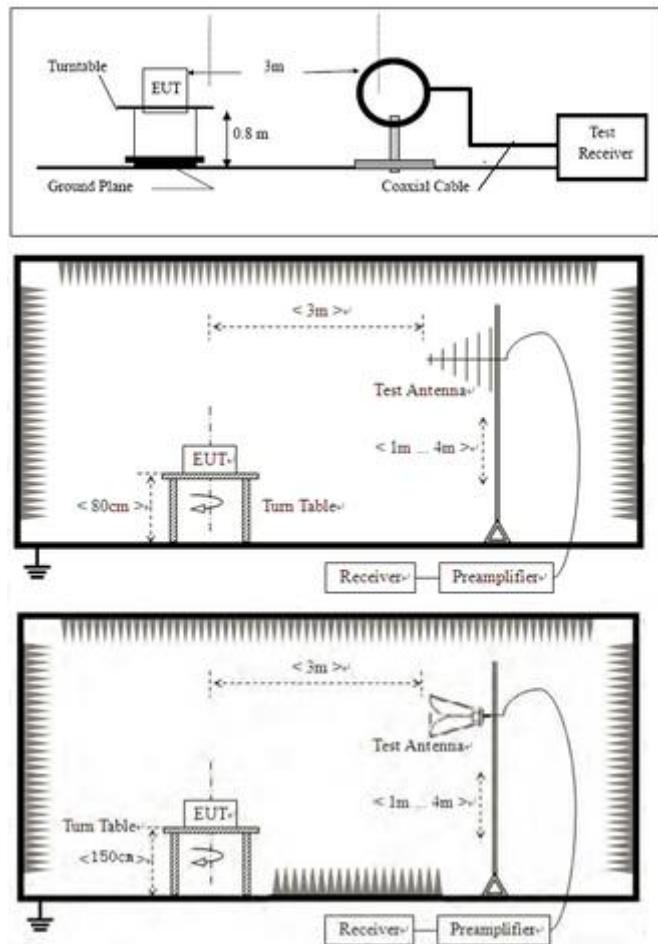
## 10 RADIATED EMISSIONS

<b>Test Standard</b>	47 CFR Part 15, Subpart C 15.249
<b>Test Method</b>	ANSI C63.10 (2013) Section 6.4&6.5&6.6
<b>Test Mode (Pre-Scan)</b>	TX
<b>Test Mode (Final Test)</b>	TX
<b>Tester</b>	Jozu
<b>Temperature</b>	25 °C
<b>Humidity</b>	60%

### 10.1 LIMITS

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3

## 10.2 BLOCK DIAGRAM OF TEST SETUP



## 10.1 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark:

1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

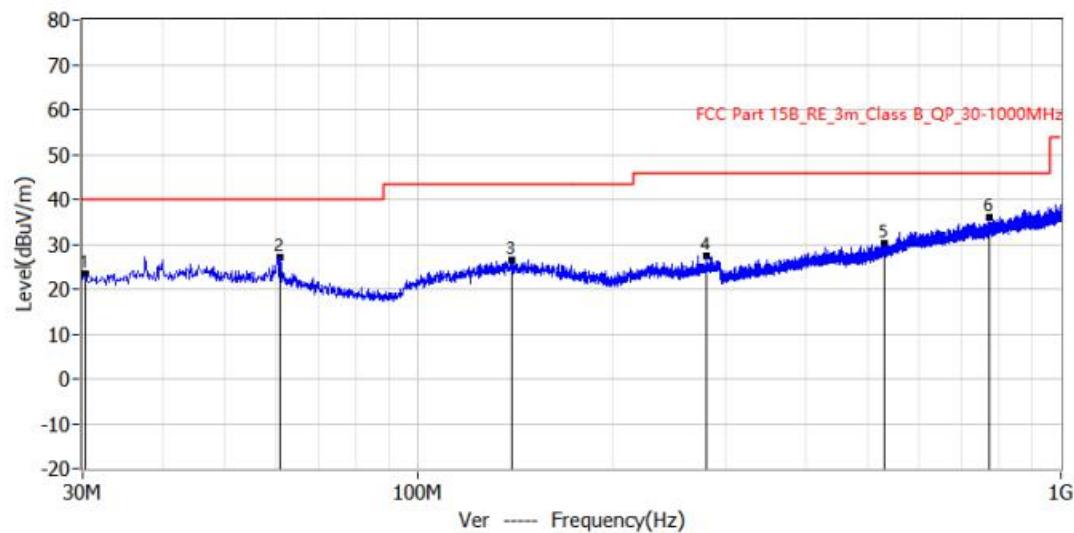
3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. fundamental frequency is blocked by filter, and only spurious emission is shown.

4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

## 10.2 TEST DATA

[TestMode: TX below 1G]; [Polarity: Vertical]

Test Lab: BlueAsia EMC Lab ( RE #1 )	Project: BLA-EMC-202203-A76
EUT: Animal tag reader	Test Engineer: York
M/N: W90A	Temperature:
S/N:	Humidity:
Test Mode: 2.4G mode	Test Voltage:
Note:	Test Data: 2022-04-19 19:49:07

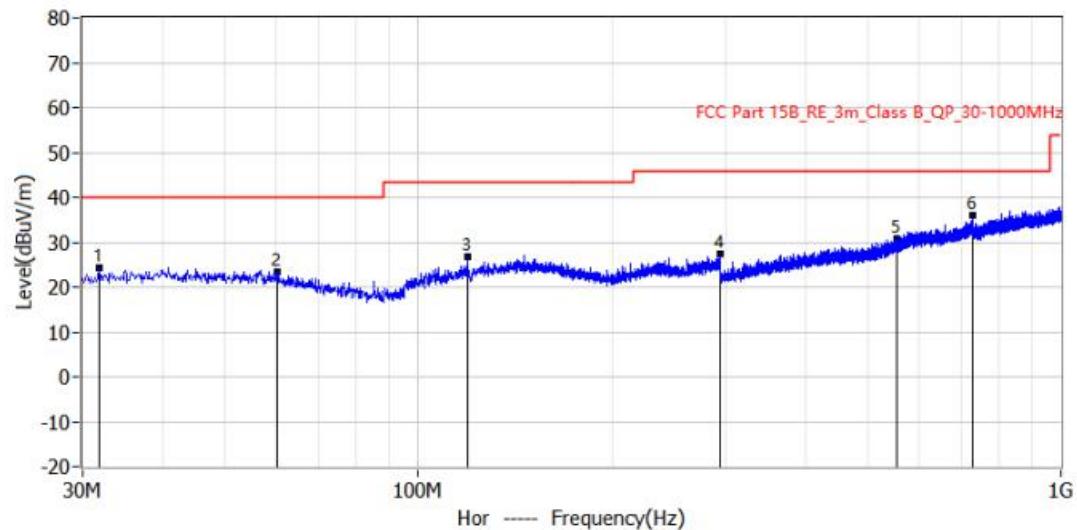


No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor Test Lab	Detector	Polar	Height cm	Angle deg
1*	30.364MHz	40.0	23.5	-16.5	1.2	22.3	QP	Ver	100.0	62.0
2*	60.919MHz	40.0	27.2	-12.8	3.9	23.3	QP	Ver	100.0	239.0
3*	139.974MHz	43.5	26.4	-17.1	2.7	23.7	QP	Ver	100.0	6.0
4*	281.109MHz	46.0	27.4	-18.6	3.8	23.6	QP	Ver	100.0	239.0
5*	530.884MHz	46.0	30.3	-15.7	1.0	29.3	QP	Ver	100.0	0.0
6*	772.293MHz	46.0	36.1	-9.9	2.5	33.6	QP	Ver	100.0	311.0

**Test Result: Pass**

[TestMode: TX below 1G]; [Polarity: Horizontal]

Test Lab: BlueAsia EMC Lab ( RE #1 )	Project: BLA-EMC-202203-A76
EUT: Animal tag reader	Test Engineer: York
M/N: W90A	Temperature:
S/N:	Humidity:
Test Mode: 2.4G mode	Test Voltage:
Note:	Test Data: 2022-04-19 19:51:07



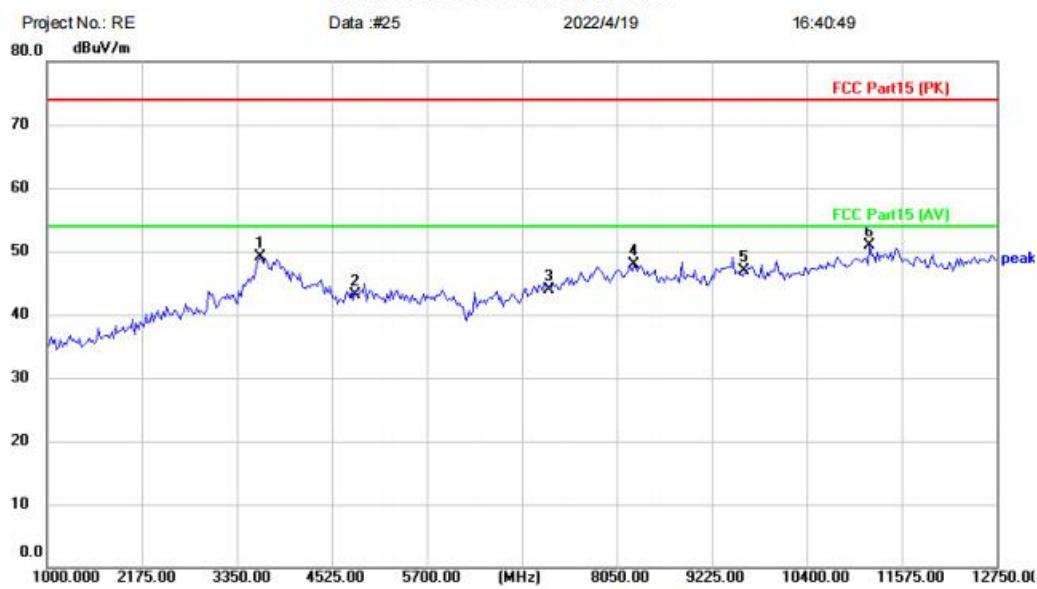
No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	31.819MHz	40.0	24.4	-15.6	1.7	22.7	QP	Hor	100.0	30.0
2*	60.191MHz	40.0	23.3	-16.7	-0.2	23.5	QP	Hor	100.0	271.0
3*	118.998MHz	43.5	26.7	-16.8	4.1	22.6	QP	Hor	100.0	206.0
4*	294.689MHz	46.0	27.5	-18.5	3.6	23.9	QP	Hor	100.0	188.0
5*	555.376MHz	46.0	30.8	-15.2	0.8	30.0	QP	Hor	100.0	263.0
6*	728.036MHz	46.0	35.9	-10.1	3.3	32.6	QP	Hor	100.0	197.0

**Test Result: Pass**

Above 1GHz:

[TestMode: TX low channel]; [Polarity: Vertical]

#### Radiated Emission Measurement



Site

Polarization: **Vertical**

Temperature: (C)

Limit: FCC Part15 (PK)

Power:

Humidity: %RH

EUT: Animal tag reader

M/N: W90A

Mode: 2.4GTX-L

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	m				
		MHz	dBuV	dB/m		dBuV/m	dB		
1		3632.000	41.27	7.77	49.04	74.00	-24.96	peak	
2		4816.000	39.47	3.66	43.13	74.00	-30.87	peak	
3		7224.000	37.96	6.03	43.99	74.00	-30.01	peak	
4		8261.500	39.76	8.23	47.99	74.00	-26.01	peak	
5		9632.000	37.55	9.34	46.89	74.00	-27.11	peak	
6	*	11175.500	38.91	12.03	50.94	74.00	-23.06	peak	

\*:Maximum data    x:Over limit    !:over margin

(Reference Only)

**Test Result: Pass**

[TestMode: TX low channel]; [Polarity: Horizontal]

### Radiated Emission Measurement

Project No.: RE

Data :#26

2022/4/19

16:42:19



### Site

Polarization: **Horizontal**

Temperature: (C)

Limit: FCC Part15 (PK)

Power:

Humidity: %RH

## EUT: Animal tag reader

M/N: W90A

Mode: 2.4GTX-L

### Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
			Level	Factor	ment			
		MHz	dBuV	dB/m	dBuV/m	dB	Detector	Comment
1		3679.000	41.98	7.73	49.71	74.00	-24.29	peak
2		4816.000	40.34	3.66	44.00	74.00	-30.00	peak
3		7224.000	38.90	6.03	44.93	74.00	-29.07	peak
4		8026.500	40.30	7.98	48.28	74.00	-25.72	peak
5		9632.000	37.38	9.34	46.72	74.00	-27.28	peak
6	*	11410.500	39.09	11.78	50.87	74.00	-23.13	peak

\*:Maximum data    x:Over limit    !:over margin

(Reference Only

## Test Result: Pass

[TestMode: TX mid channel]; [Polarity: Vertical]

## Radiated Emission Measurement

Project No.: RE

Data :#27

2022/4/19

16:45:01



## Site

Polarization: *Horizontal*

Temperature: (C)

Limit: FCC Part15 (PK)

## Power:

Humidity: %RH

### EUT: Animal tag reader

M/N: W90A

Mode: 2.4GTX-M

**Note:-**

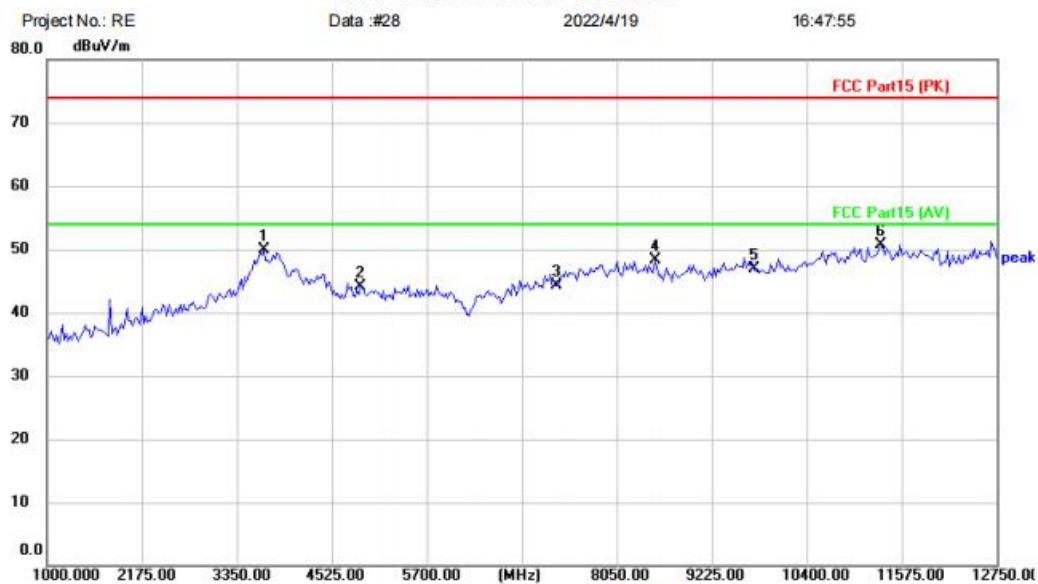
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
			Level	Factor	ment			
		MHz	dBuV	dB/m	dBuV/m	dB	Detector	Comment
1	*	3726.000	44.55	7.70	52.25	74.00	-21.75	peak
2		4854.000	43.86	3.48	47.34	74.00	-26.66	peak
3		7320.000	38.34	6.41	44.75	74.00	-29.25	peak
4		8261.500	40.47	8.23	48.70	74.00	-25.30	peak
5		9760.000	38.57	9.62	48.19	74.00	-25.81	peak
6		10917.000	39.54	11.91	51.45	74.00	-22.55	peak

\*:Maximum data x:Over limit !:over margin

Reference Only

## Test Result: Pass

[TestMode: TX mid channel]; [Polarity: Horizontal]

**Radiated Emission Measurement**


Site

Polarization: **Vertical**

Temperature: (C)

Limit: FCC Part15 (PK)

Power:

Humidity: %RH

EUT: Animal tag reader

M/N: W90A

Mode: 2.4GTX-M

Note:

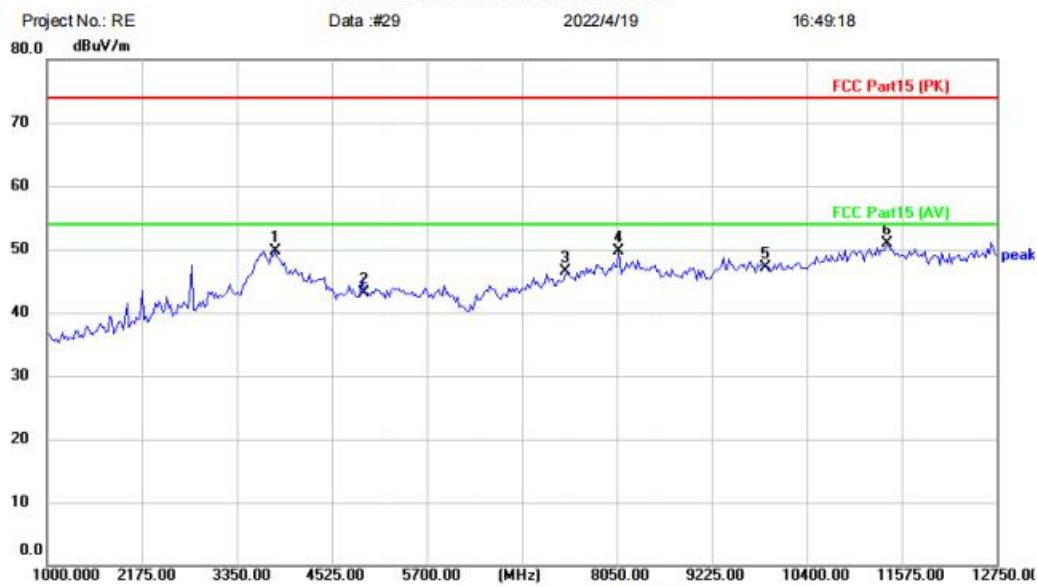
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	m				
		MHz	dBuV	dB/m		dBuV/m	dB		
1		3679.000	42.21	7.73	49.94	74.00	-24.06	peak	
2		4880.000	40.65	3.36	44.01	74.00	-29.99	peak	
3		7320.000	37.99	6.41	44.40	74.00	-29.60	peak	
4		8520.000	40.10	8.11	48.21	74.00	-25.79	peak	
5		9760.000	37.20	9.62	46.82	74.00	-27.18	peak	
6	*	11316.500	38.90	11.88	50.78	74.00	-23.22	peak	

\*:Maximum data   x:Over limit   !:over margin

(Reference Only)

**Test Result: Pass**

[TestMethod: TX high channel]; [Polarity: Horizontal]

**Radiated Emission Measurement**


Site      Polarization: **Vertical**      Temperature: (C)  
Limit: FCC Part15 (PK)      Power:      Humidity: %RH  
EUT: Animal tag reader  
M/N: W90A  
Mode: 2.4GTX-H  
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB	Detector	Comment
1		3820.000	42.37	7.41	49.78	74.00	-24.22	peak
2		4946.000	39.37	3.64	43.01	74.00	-30.99	peak
3		7419.000	39.66	6.80	46.46	74.00	-27.54	peak
4		8073.500	41.62	8.04	49.66	74.00	-24.34	peak
5		9892.000	37.15	10.05	47.20	74.00	-26.80	peak
6	*	11387.000	39.05	11.78	50.83	74.00	-23.17	peak

\*:Maximum data   x:Over limit   !:over margin

(Reference Only)

**Test Result: Pass**

[TestMode: TX high channel]; [Polarity: Vertical]

### Radiated Emission Measurement

Project No.: RE

Data : 30

2022/4/19

16:51:13



## Site

Polarization: *Horizontal*

Temperature: (C)

Limit: FCC Part15 (PK)

## Power:

Humidity: %RH

## EUT: Animal tag reader

M/N: W90A

Mode: 2.4GTX-H

Note:-

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
			Level	Factor	ment				
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3632.000	41.58	7.77	49.35	74.00	-24.65	peak	
2		4946.000	40.33	3.64	43.97	74.00	-30.03	peak	
3		7419.000	39.01	6.80	45.81	74.00	-28.19	peak	
4		8238.000	40.86	8.22	49.08	74.00	-24.92	peak	
5		9892.000	36.67	10.05	46.72	74.00	-27.28	peak	
6	*	11387.000	39.63	11.78	51.41	74.00	-22.59	peak	

\*:Maximum data x:Over limit !:over margin

Reference Only

## Test Result: Pass

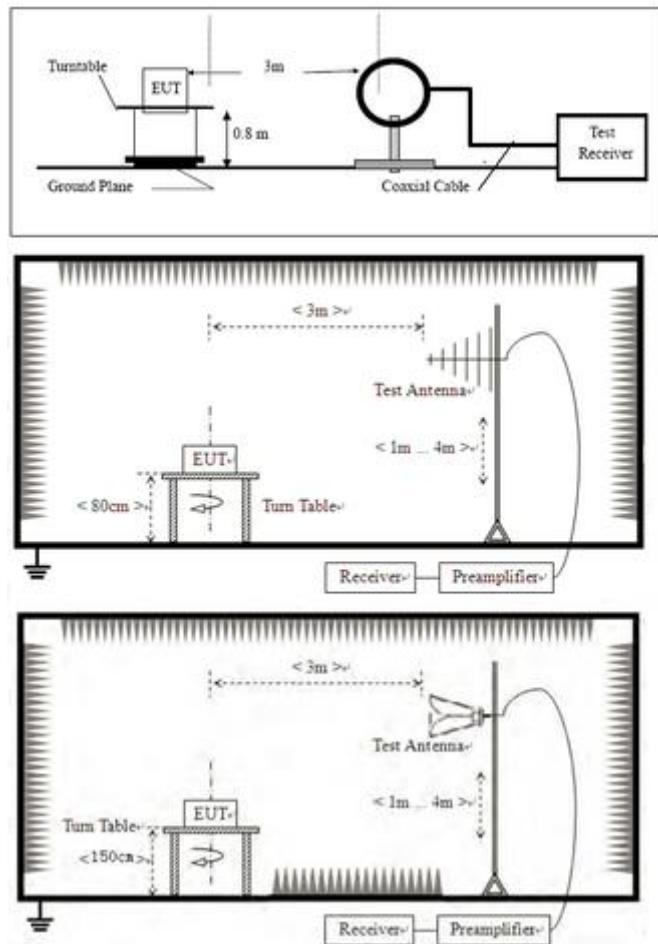
## 11 RESTRICTED BAND AROUND FUNDAMENTAL FREQUENCY

<b>Test Standard</b>	47 CFR Part 15, Subpart C 15.249
<b>Test Method</b>	ANSI C63.10 (2013) Section 6.4&6.5&6.6
<b>Test Mode (Pre-Scan)</b>	TX
<b>Test Mode (Final Test)</b>	TX
<b>Tester</b>	Jozu
<b>Temperature</b>	25 °C
<b>Humidity</b>	60%

### 11.1 LIMITS

Frequency	Limit (dB $\mu$ V/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

## 11.2 BLOCK DIAGRAM OF TEST SETUP



## 11.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

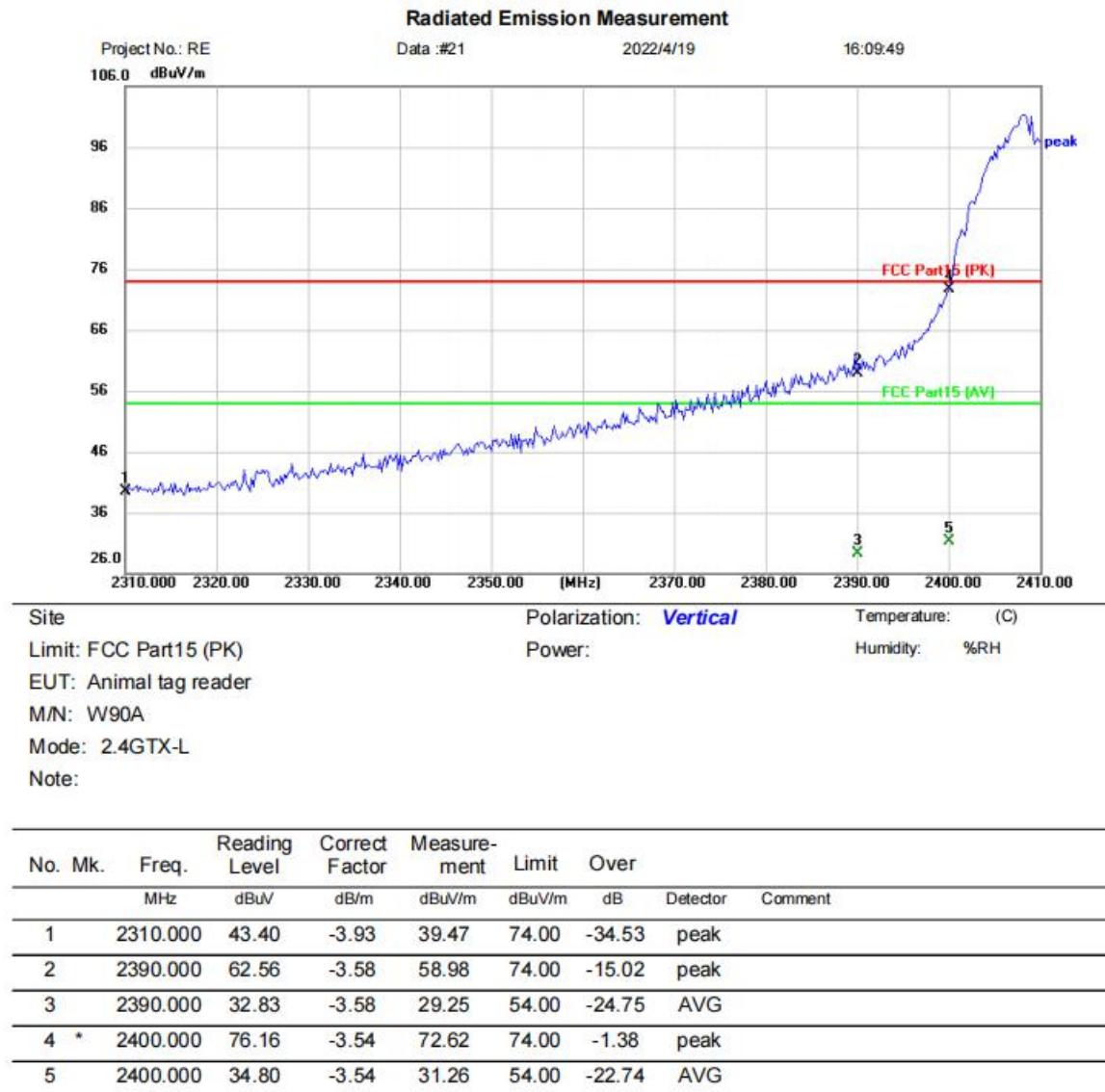
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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## 11.4 TEST DATA

[TestMode: TX low channel]; [Polarity: Vertical]



\*:Maximum data    x:Over limit    !:over margin

(Reference Only)

**Test Result: Pass**

[TestMode: TX low channel]; [Polarity: Horizontal]

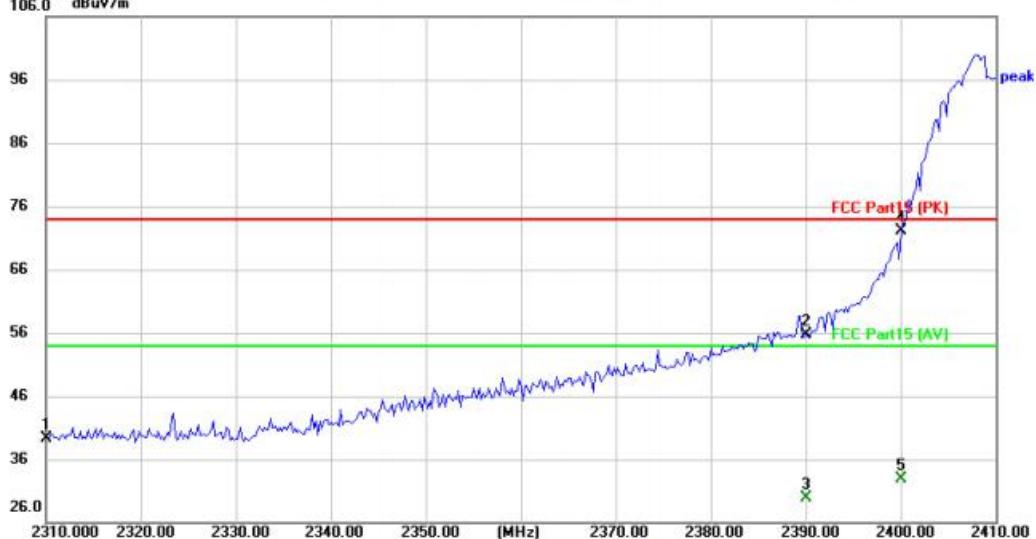
### Radiated Emission Measurement

Project No.: RE

Data :#22

2022/4/19

16:13:00



## Site

Polarization: *Horizontal*

Temperature: (C)

Limit: FCC Part15 (PK)

## Power:

Humidity: %RH

### EUT: Animal tag reader

M/N: W90A

Mode: 2.4GTX-L

### Note:-

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
			Level	Factor	ment				
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	43.29	-3.93	39.36	74.00	-34.64	peak	
2		2390.000	59.32	-3.58	55.74	74.00	-18.26	peak	
3		2390.000	33.46	-3.58	29.88	54.00	-24.12	AVG	
4	*	2400.000	75.60	-3.54	72.06	74.00	-1.94	peak	
5		2400.000	36.52	-3.54	32.98	54.00	-21.02	AVG	

\*:Maximum data    x:Over limit    !:over margin

(Reference Only

## Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]

### Radiated Emission Measurement



## Site

Polarization: **Vertical**

Temperature: (C)

Limit: FCC Part15 (PK)

### Power:

Humidity: %RH

## EUT: Animal tag reader

M/N: W90A

Mode: 2.4GTX-H

**Note:-**

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
			Level	Factor	ment		dBuV/m	dB	Detector
1	*	2483.500	71.22	-3.14	68.08	74.00	-5.92	peak	
2		2483.500	35.17	-3.14	32.03	54.00	-21.97	AVG	
3		2500.000	56.65	-3.08	53.57	74.00	-20.43	peak	
4		2500.000	31.33	-3.08	28.25	54.00	-25.75	AVG	

\*:Maximum data    x:Over limit    !:over margin

(Reference Only

## Test Result: Pass

[TestMethod: TX high channel]; [Polarity: Horizontal]

**Radiated Emission Measurement**


Site

Polarization: **Horizontal**

Temperature: (C)

Limit: FCC Part15 (PK)

Power:

Humidity: %RH

EUT: Animal tag reader

M/N: W90A

Mode: 2.4GTX-H

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
			MHz	dBuV	dB/m	dBuV/m	dB		
1	*	2483.500	70.52	-3.14	67.38	74.00	-6.62	peak	
2		2483.500	32.46	-3.14	29.32	54.00	-24.68	AVG	
3		2500.000	57.79	-3.08	54.71	74.00	-19.29	peak	
4		2500.000	35.33	-3.08	32.25	54.00	-21.75	AVG	

\*:Maximum data   x:Over limit   !:over margin

(Reference Only)

**Test Result: Pass**

## 12 FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL (15.249(A))

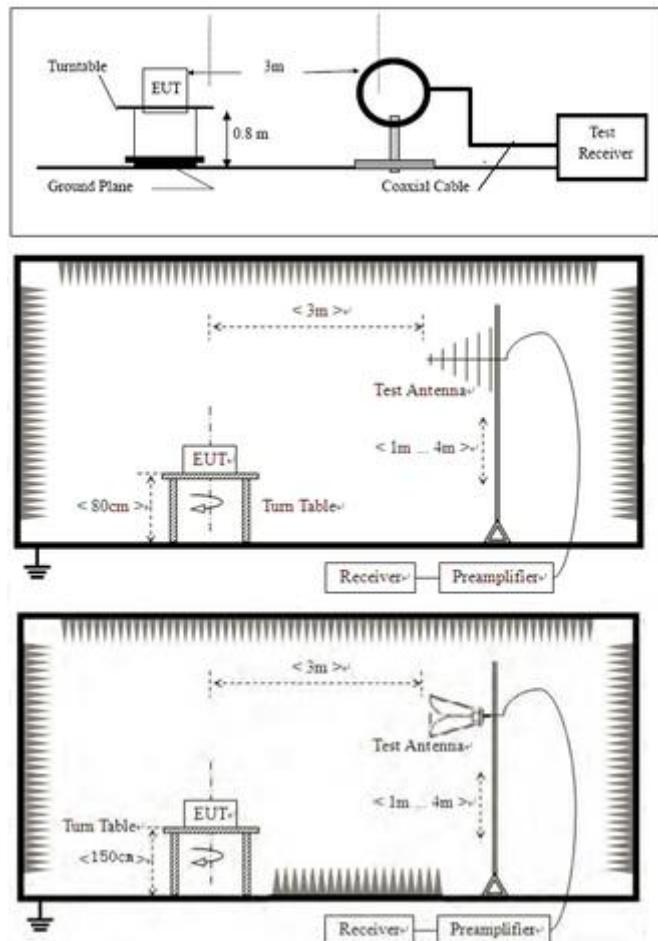
<b>Test Standard</b>	47 CFR Part 15, Subpart C 15.249
<b>Test Method</b>	ANSI C63.10 (2013) Section 6.5&6.6
<b>Test Mode (Pre-Scan)</b>	TX
<b>Test Mode (Final Test)</b>	TX
<b>Tester</b>	Jozu
<b>Temperature</b>	25 °C
<b>Humidity</b>	60%

### 12.1 LIMITS

<b>Fundamental frequency(MHz)</b>	<b>Field strength of fundamental(microvolts/meter)</b>	<b>Field strength of harmonics(microvolts/meter)</b>
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

Remark: The frequencies above 1000MHz are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

## 12.2 BLOCK DIAGRAM OF TEST SETUP



## 12.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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## 12.4 TEST DATA

Peak value:

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Over Limit (dB)	Antenna Polaxis
2408	105.07	-3.51	101.56	114.00	-12.44	H
2408	103.96	-3.51	100.45	114.00	-13.55	V
2440	107.58	-3.34	104.24	114.00	-9.76	H
2440	107.95	-3.34	104.61	114.00	-9.39	V
2473	106.99	-3.17	103.82	114.00	-10.18	H
2473	104.54	-3.17	101.37	114.00	-12.63	V

Average value:

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Over Limit (dB)	Antenna Polaxis
2408	67.85	-3.51	64.34	94.00	-29.66	H
2408	69.74	-3.51	66.23	94.00	-27.77	V
2440	70.56	-3.34	67.22	94.00	-26.78	H
2440	68.79	-3.34	65.45	94.00	-28.55	V
2473	66.96	-3.17	63.79	94.00	-30.21	H
2473	68.93	-3.17	65.76	94.00	-28.24	V

NOTE: RBW 3MHz VBW 10MHz · PK detector is for PK value ,RMS detector is for AV value.

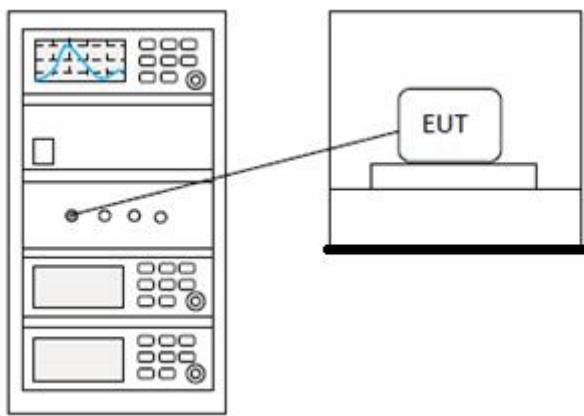
## 13 20DB BANDWIDTH

<b>Test Standard</b>	47 CFR Part 15, Subpart C 15.249
<b>Test Method</b>	ANSI C63.10 (2013) Section 6.9
<b>Test Mode (Pre-Scan)</b>	TX
<b>Test Mode (Final Test)</b>	TX
<b>Tester</b>	Jozu
<b>Temperature</b>	25 °C
<b>Humidity</b>	60%

### 13.1 LIMITS

**Limit:** N/A

### 13.2 BLOCK DIAGRAM OF TEST SETUP



### 13.3 TEST DATA

**Pass: Please Refer To Appendix: Appendix1 For Details**

## 14 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

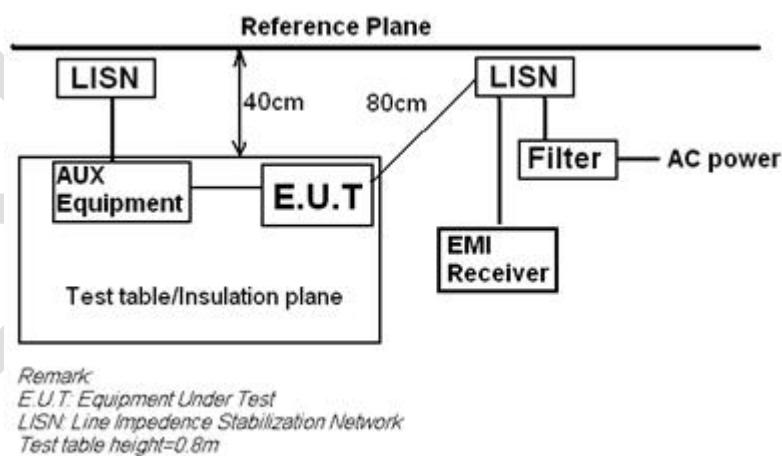
<b>Test Standard</b>	47 CFR Part 15, Subpart C 15.249
<b>Test Method</b>	ANSI C63.10 (2013) Section 6.2
<b>Test Mode (Pre-Scan)</b>	TX
<b>Test Mode (Final Test)</b>	TX
<b>Tester</b>	Jozu
<b>Temperature</b>	25°C
<b>Humidity</b>	60%

### 14.1 LIMITS

Frequency of emission(MHz)	Conducted limit(dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

### 14.2 BLOCK DIAGRAM OF TEST SETUP



### 14.3 PROCEDURE

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

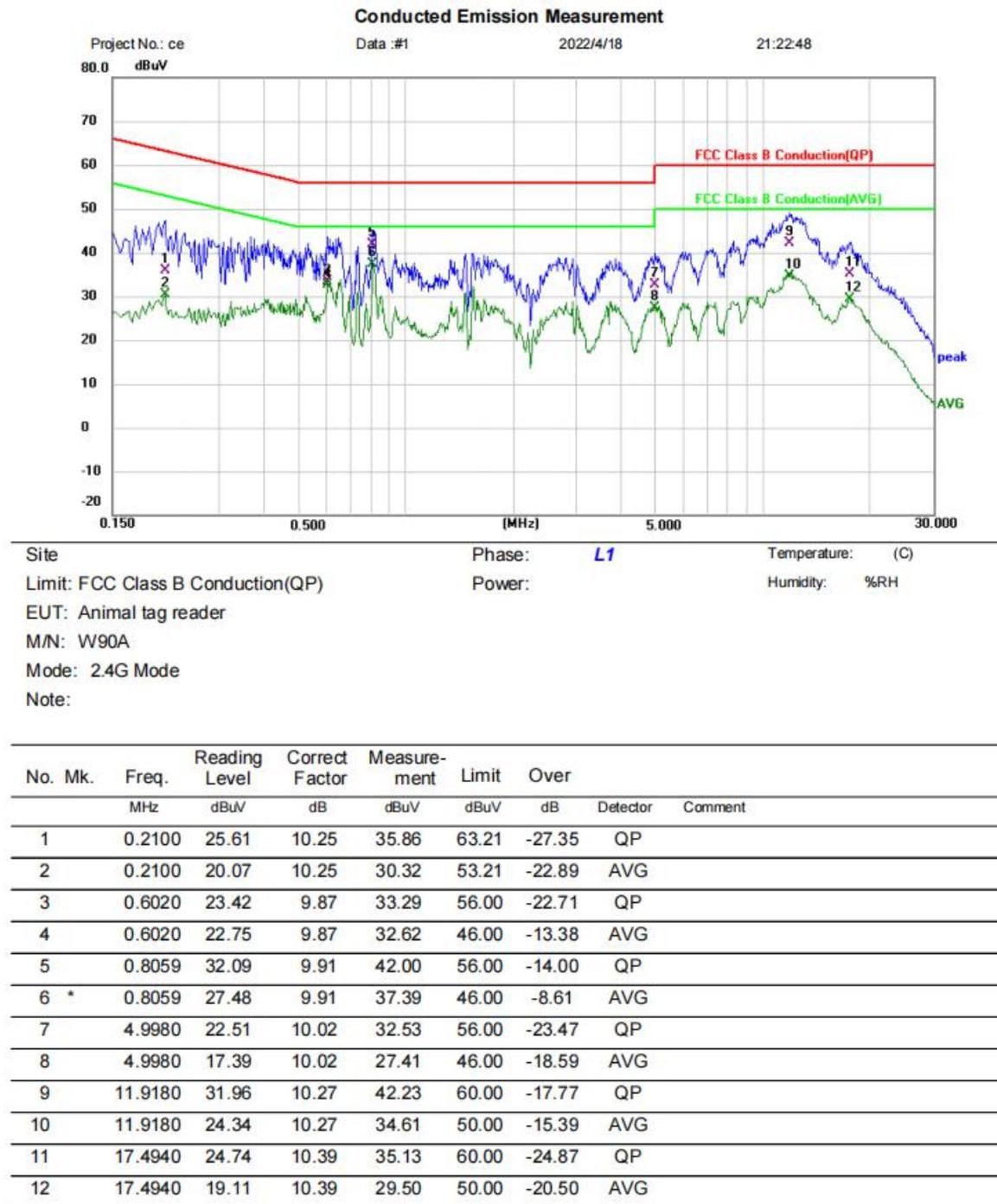
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

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#### 14.4 TEST DATA

[TestMode: TX]; [Line: Line] ;[Power:AC120V/60Hz]



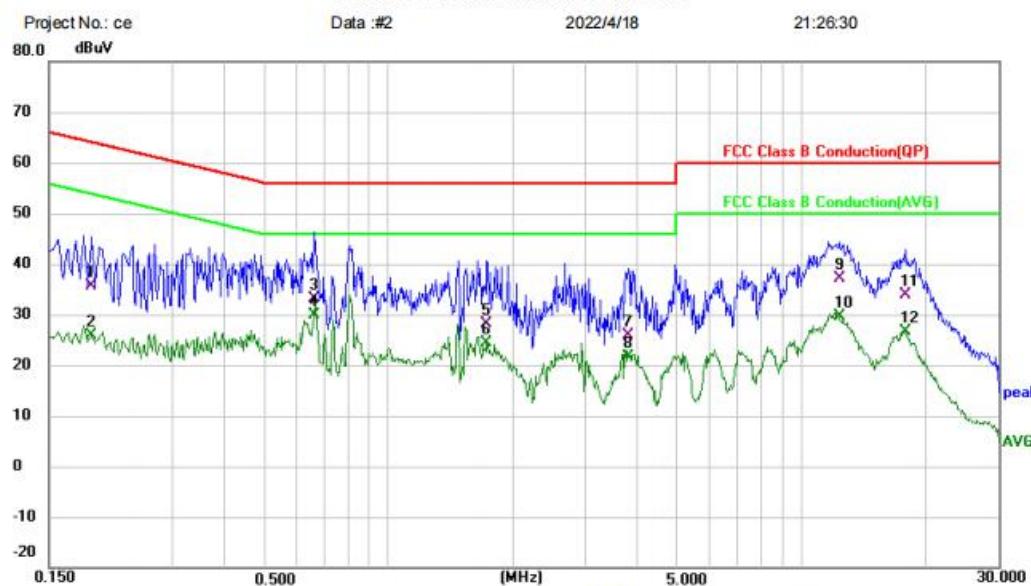
\*:Maximum data    x:Over limit    !:over margin

(Reference Only)

**Test Result: Pass**

[TestMode: TX]; [Line: Nutral] ;[Power:AC120V/60Hz]

## Conducted Emission Measurement



Site: Phase: **N** Temperature: (C)  
 Limit: FCC Class B Conduction(QP) Power: Humidity: %RH  
 EUT: Animal tag reader  
 M/N: W90A  
 Mode: 2.4G Mode  
 Note:

No.	Mk.	Freq. MHz	Reading Level	Correct Factor	Measure- ment	Limit	Over	Detector	Comment
			dBuV	dB	dBuV	dB			
1		0.1900	25.62	10.13	35.75	64.04	-28.29	QP	
2		0.1900	15.70	10.13	25.83	54.04	-28.21	AVG	
3		0.6580	23.38	9.82	33.20	56.00	-22.80	QP	
4 *		0.6580	20.13	9.82	29.95	46.00	-16.05	AVG	
5		1.7340	18.18	9.85	28.03	56.00	-27.97	QP	
6		1.7340	14.59	9.85	24.44	46.00	-21.56	AVG	
7		3.8100	15.87	9.90	25.77	56.00	-30.23	QP	
8		3.8100	11.66	9.90	21.56	46.00	-24.44	AVG	
9		12.3220	26.99	10.24	37.23	60.00	-22.77	QP	
10		12.3220	19.31	10.24	29.55	50.00	-20.45	AVG	
11		17.9140	23.45	10.38	33.83	60.00	-26.17	QP	
12		17.9140	16.24	10.38	26.62	50.00	-23.38	AVG	

\*:Maximum data x:Over limit !:over margin

(Reference Only)

**Test Result: Pass**

## 15 ANTENNA REQUIREMENT

<b>Test Standard</b>	47 CFR Part 15, Subpart C 15.249
<b>Test Method</b>	N/A

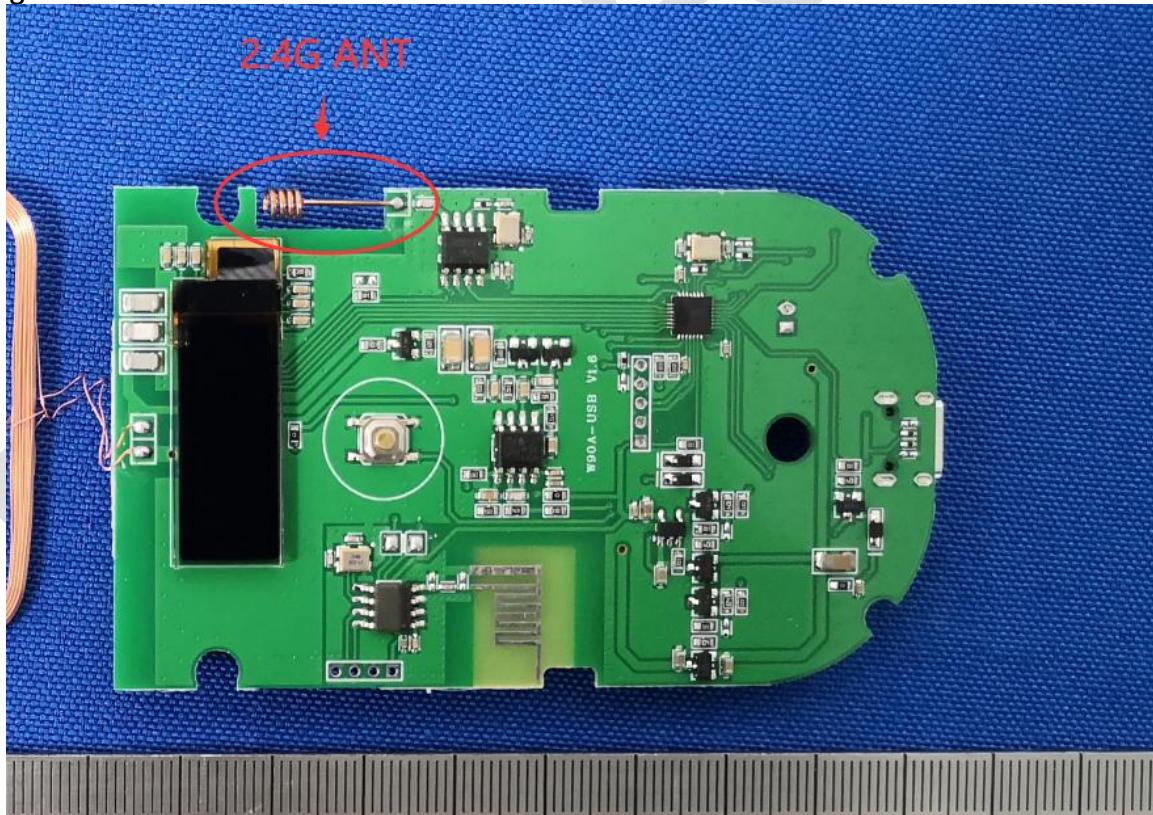
### 15.1 CONCLUSION

#### Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3dBi.

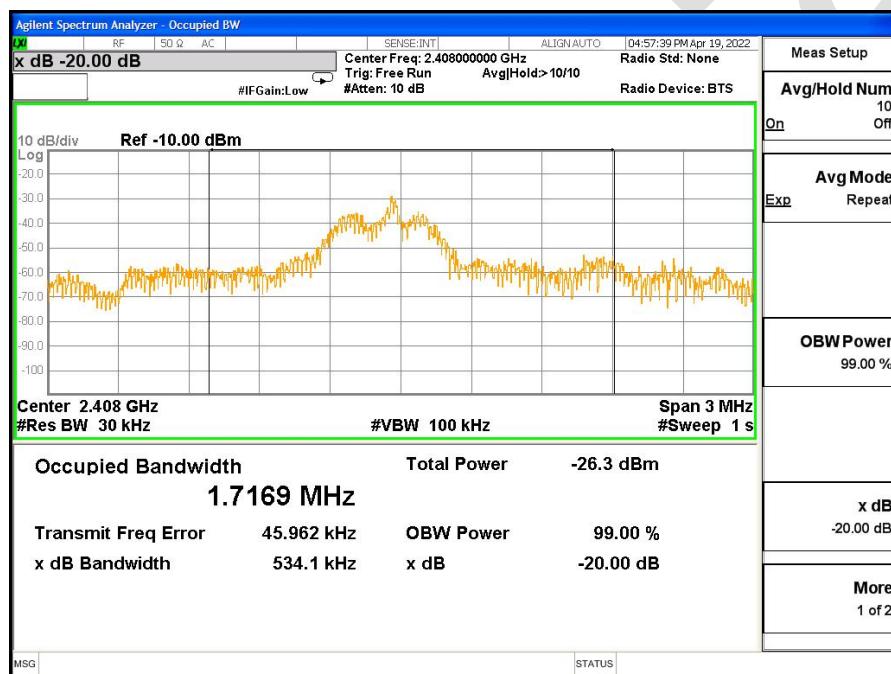


## 16 APPENDIX

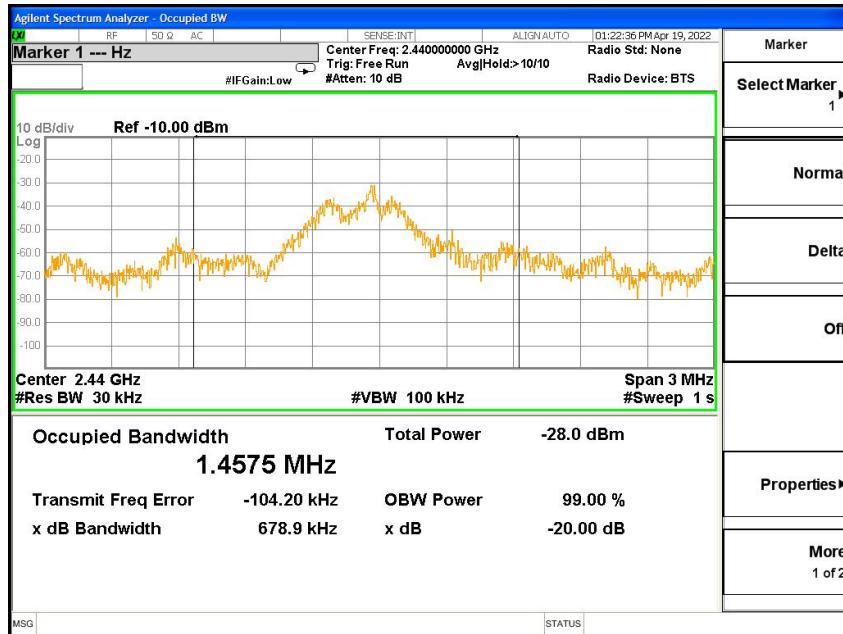
### -20dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	GFSK	2408	Ant1	0.534	N/A	Pass
NVNT	GFSK	2440	Ant1	0.678	N/A	Pass
NVNT	GFSK	2473	Ant1	0.547	N/A	Pass

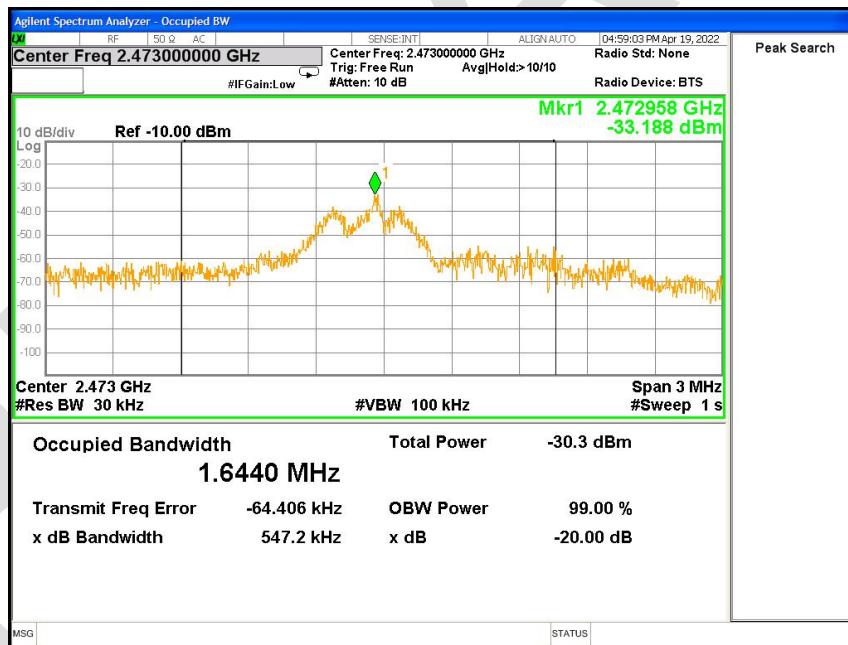
### -20dB Bandwidth NVNT GFSK 2408MHz Ant1



## -20dB Bandwidth NVNT GFSK 2440MHz Ant1

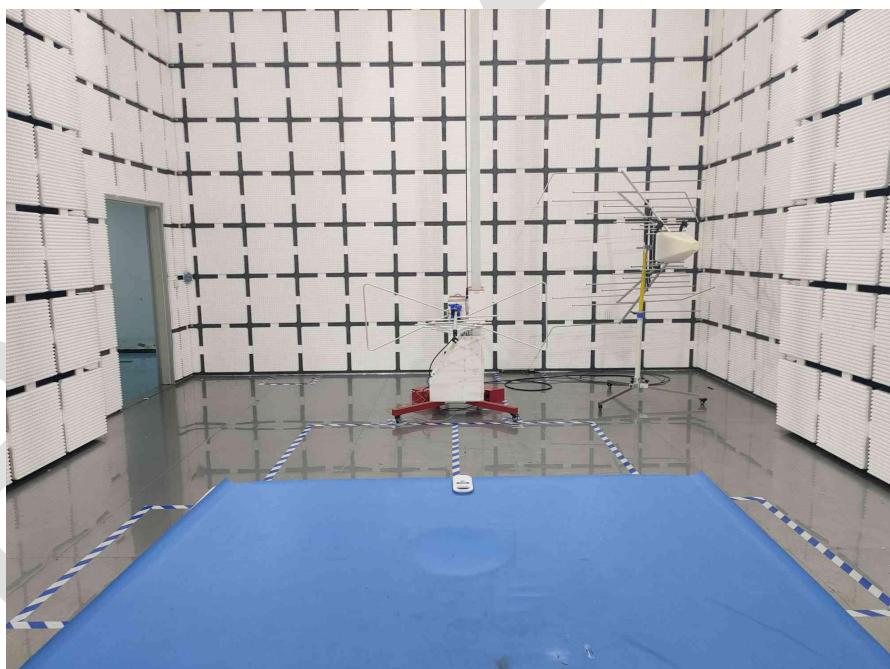
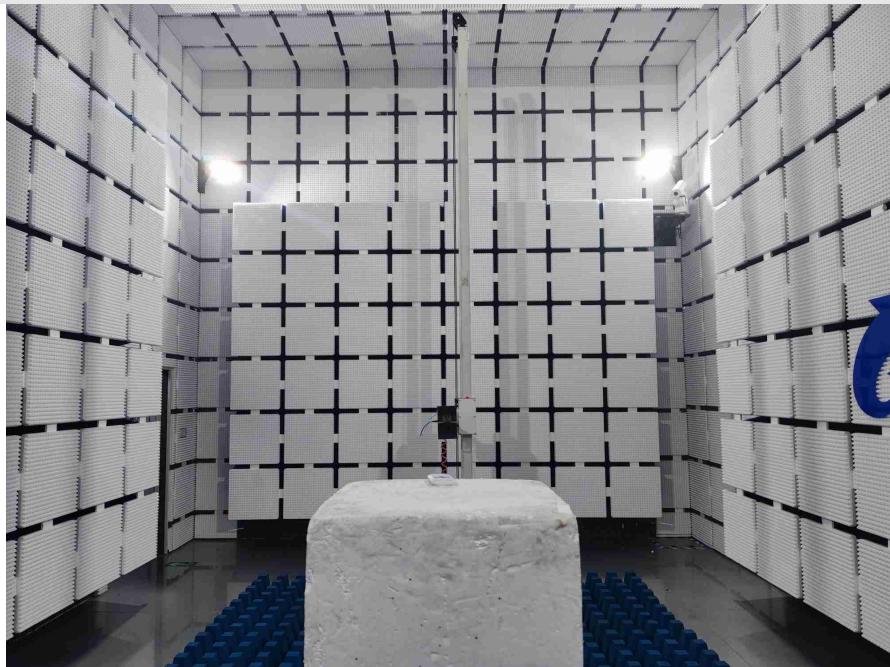


## -20dB Bandwidth NVNT GFSK 2473MHz Ant1



## APPENDIX A: PHOTOGRAPHS OF TEST SETUP

### Radiated Emissions



**Conducted Emissions at AC Power Line (150kHz-30MHz)**



## APPENDIX B: PHOTOGRAPHS OF EUT

Reference to the test report No. BLA-EMC-202203-A7601

----END OF REPORT----

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