



FCC PART 15 SUBPART C FCC PART 15.231 TEST REPORT

FCC ID:2AILY-LAY-IC

Report No: CTSL2620120030ER

Product Name: Rechargeable remote (LAY)

Main Test Model: LAY-IC

Series Models: -

Applicant: JM Sunflower Limited.

EXECUTIVE SUMMARY

A sample of this product was tested and found to be in compliance with
FCC PART 15C, FCC PART 15 SUBPART C (15.231).

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applicable to presented Test sample.

CTSL Testing (Dongguan) Co., Ltd.

Main company address: Building 1, Houjie Road, Houjie Town, Guangdong Province
Dongguan City, China

Test Report**FCC ID:2AILY-LAY-IC**

Applicant Name	JM Sunflower Limited.				
Applicant Address	Rm 109-10, 1st Floor, Stag Building,148-150 Queen's Road Central, Hong Kong				
Manufacturer Name	JM Sunflower Limited.				
Manufacturer Address	Rm 109-10, 1st Floor, Stag Building,148-150 Queen's Road Central, Hong Kong				
Trade Mark	/				
Product name	Rechargeable remote (LAY)				
Main Test Mode	LAY-IC				
Series Models	-				
Standard	FCC Part 15 Subpart C (15.231) ANSI C63.10-2020				
Test Location	ISO/IEC 17025 by ILAC-MRA is A2LA 7556.01 CTSL Testing (Dongguan) Co., Ltd. Room 112, Building 1, No. 15, Jiaoyuansongshan Hetian Village, Houjie Town Dongguan City, Guangdong, People's Republic of China				
Receipt Date	2026.01.15	Test period	2026.01.15-2026.01.20	Issue Date	2026.01.20
Conclusion	The equipment under test was found to be compliance with the requirements of the standards applied.				
Performs Testing:	Ethan Zhao				
Test Report Reviewer:	Steve Qin				
Test Report Authorizer:	Alan Li				

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1. GENERAL INFORMATION

1.1. General Description of EUT (Equipment Under Test)

Product Information	
Product Name	: Rechargeable remote (LAY)
Main Test Model	: LAY-IC
Series Models	: -
Power supply	: Charging Input: DC 5V 0.05A, 0.185W by USB-C
Battery	: DC 3.7V by Internal battery Capacity: 50mAh
Software Version	: V3
Hardware Version	: V1
Equipment Under Test	
Testing sample ID	: CTSL2620120030-S1 (Engineer sample) CTSL2620120030-S2 (Normal sample)
Test supplied	: ☐ supplied by the manufacturer ☒ supplied by the lab (Auxiliary test supplied by test Lab)
Adapter information (Auxiliary test supplied by test Lab)	: Adapter Output: DC 5V;
Wireless Specification	
Modulation Type	: ASK
Operation frequency	: 433.962MHz
Number of channels	: 1
Field Strength of Fundamental	: 65.77dB μ V/m@3m
Antenna Gain& type	: Refer to Section 1.2 of the report.
Sample Type	: Prototype production
Type of Device	: ☒ Portable Device; ☐ Mobile Device; ☐ Modular Device

Note: For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

1.2. Antenna Information

Ant No.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	420-450MHz	/	PCB	/	0
Note: 1. The antenna gain is declared by the customer and the laboratory is not responsible for the accuracy of the antenna gain. 2. The test results of this report only apply to the sample as received.					

1.3. Information of RF Cable

Cable Loss(dB)	Provided by
1.0	JM Sunflower Limited
Note: 1. The customer declared the loss value of the RF Cable. and the test results of this report only apply to the sample as received. 2. The laboratory is not responsible for the accuracy of the cable loss.	

2.SUMMARY OF TEST

2.1.Test Standards

FCC Rules Part 15.231: Periodic operation in the band 40.66-40.70 MHz and above 70MHz.
ANSI C63.10-2020: American National Standard for Testing Unlicensed Wireless Devices

2.2.Summary of test result

No.	Description of Test Item	FCC Standard Section	Results
1	Field Strength of Fundamental	15.231(b)	PASS
2	Radiated Spurious Emissions	15.209 15.231(b)	PASS
3	20dB Bandwidth (Occupy Bandwidth)	15.231(c)	PASS
4	Duration Time (Dwell time)	15.231(a)(1)	PASS
5	AC Power Line Conducted Emissions	15.207	PASS
6	Antenna Requirement	15.203	PASS

Note: "N/A" denotes test is not applicable in this test report.

2.3. Test Facilities

EMC Lab :

A2LA Certificate Number: 7556.01;
CTSL Testing (Dongguan) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.
The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

FCC Designation Number: CN1425;
Test Firm Registration Number: 750639;
CTSL Testing (Dongguan) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

Industry Canada Registration Number. Is: 34801;
CAB identifier: CN0192;
CTSL Testing (Dongguan) Co., Ltd. The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

Name of Firm : CTSL Testing (Dongguan) Co., Ltd.

EMC test location/satellite location:
Room 112, Building 1, No. 15, Jiaoyuansongshan Hetian Village, Houjie Town Dongguan City, Guangdong, People's Republic of China City, Guangdong, China

2.4. Measurement uncertainty

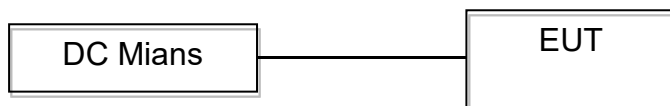
Test Item	Uncertainty
Uncertainty for Conduction emission test	$\pm 3.48\text{dB}$
Uncertainty for spurious emissions test (Below 30MHz)	$\pm 1.62\text{ dB}$
Uncertainty for spurious emissions test (30MHz-1GHz)	$\pm 4.60\text{ dB(Polarize: H)}$
	$\pm 4.68\text{ dB(Polarize: V)}$
Uncertainty for spurious emissions test (1GHz to 25GHz)	$\pm 4.96\text{dB}$
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	1.08dB
Uncertainty for Power density test	0.26dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately The 95% confidence level using a coverage factor of $k=2$.

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground. EUT was beset into Bluetooth test mode by software before test.

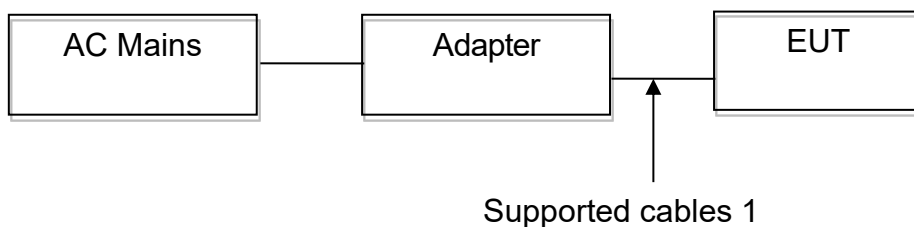
Connect EUT Antenna Terminal Test method:



DC Mians 1: DC 3.7V by Internal battery

DC Mians 2: DC 3.7V by DC source

AC Power Line Conducted Test:



(EUT: Rechargeable remote (LAY))

2.6. Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	FCC ID	Series No.
1	DC source (supplied by the Lab.)	-	MS605D	-	2018041781
2	ADAPTER (supplied by the Lab.)	-	VCB7CACH	-	C622503PB100 9774

Supported cables				
Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	0.8m	USB Extension Cable (supplied by the manufacturer)

2.7. Test mode

Combining all the rates, modulations, and packet types, the Pre-scans had been carried out. The worst-case test mode was selected for the final test as listed below.

Note: In radiated measurement, the EUT had been pre-scan on the positioned of each 3 axis (X, Y, Z), the worst case was found when positioned on **X-plane**.

Test Item	Test Mode	Test Frequency
Duty Cycle	TX	433.962MHz
Field Strength of Fundamental	TX	433.962MHz
Radiated Spurious Emissions	TX	433.962MHz
20dB Bandwidth (Occupy Bandwidth)	TX	433.962MHz
Duration Time (Dwell time)	TX	433.962MHz
AC Power Line Conducted Emissions	TX	433.962MHz

2.8. Channel List

Channel No.	Frequency (MHz)
01	433.962

2.9. Test Equipment

For Conducted Emission Test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI 3	AT005	GUANGZHOU NEM	May 16,25	May 15,26
LISN	Rohde & Schwarz	ENV216	AT006	LISAI	July 31,25	July 30,26
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	AT007	CCIC (Shenzhen)	July 10,25	July 09,26
CE Cable	Times Microwave	LMR195UF-N MNM-1.50M	AT041	GUANGZHOU NEM	May 16,25	May 15,26
Test Software	FARAD	EZ-EMC Ver.3A1.1+	N/A	N/A	N/A	N/A

For Radiated Emission Test (9kHz-30MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI TestReceiver	Rohde& Schwarz	ESCI 7	AT001	Ti Group	July 31,24	July 30,26
Active Loop Antenna	ZHINAN	ZN30900C	AT063	LISAI	Aug 03,24	Aug 02,26
Test Software	FARAD	EZ-EMC Ver.3A1.1+	N/A	N/A	N/A	N/A
9kHz-30MHz Cable	Times Microwave	LMR195UF-N MNM-9M	AT045	GUANGZHOU NEM	May 16,25	May 15,26

For Radiated Emissions Test (30MHz-1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde& Schwarz	ESCI 7	AT001	Ti Group	Jun 12,25	Jun 11,26
Trilog-Broadband Antenna	SCHWARZBEC K	VULB 9168	AT002	LISAI	Aug 03,24	Aug 02,26
Test Software	FARAD	EZ-EMC Ver.3A1.1+	N/A	N/A	May 16,25	May 15,26
30-1000MHz Cable	Times Microwave Systems	LMR195UF-N MRNMR-3.00 M+ LMR400UF-N MNM-3.00M+ LMR400UF-N MNM-3.00M	AT042+AT043+AT044	GUANGZHOU NEM	May 16,25	May 15,26

For Radiated Emission Test (Above 1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Horn Antenna 1-18G	SCHWARZBECK	BBHA 9120 D	AT003	Shenzhen Academy of Metrology & Quality Inspection	Sep 23,24	Sep 22,26
Horn Antenna 18-40GHz	XIBAO	XB-WDB18-40K	AT064	LISAI	Feb 25,25	Feb 24,26
Broadband Preamplifier	SCHWARZBECK	BBV 9718 D	AT004	CCIC (Shenzhen)	July 10,25	July 9,26
Low Noise Amplifier	MWRFTest	DLA8-18-40G-2078	AT065	GUANGZHOU NEM	July 10,25	July 9,26
Spectrum Analyzer 40G	Keysight	N9020B	AT066	GUANGZHOU NEM	May 13,25	May 12,26
Spectrum Analyzer 26.5G	Keysight	N9020A	AT050	GUANGZHOU NEM	Jun 12,25	Jun 11,26
Radio switching unit	TiGroup	SU319	AT055	N/A	N/A	N/A
Filtering unit	TiGroup	SU319F	AT056	N/A	N/A	N/A
Test Software	BL	BL410-E V25.5 en	N/A	N/A	N/A	N/A
Above 1GHz Cable	Times Microwave Systems	SFT205-NMN M-7.0M+ SFT205-NMN M-2.0M	AT057+ AT058	N/A	N/A	N/A

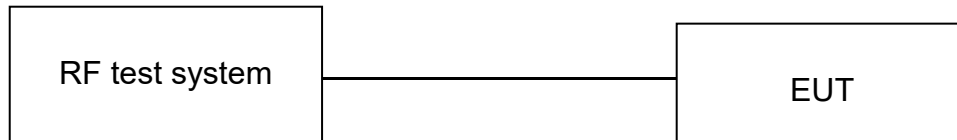
For Connect EUT Antenna Terminal Test (RF Test system)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Spectrum analyzer	Keysight	N9020A	AT050	GUANGZHOU NEM	Jun 12,25	Jun 11,26
Analog signal source	Keysight	N5173B	AT051	GUANGZHOU NEM	Jun 12,25	Jun 11,26
WIDEBAND RADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	AT052	GUANGZHOU NEM	Jun 12,25	Jun 11,26
Power probe unit	Ti Group	SU319P	AT053	GUANGZHOU NEM	Jun 12,25	Jun 11,26
Switch unit	Ti Group	SU319S	AT054	N/A	N/A	N/A
Test Software	BL	BL410R 3.5.2.621	N/A	N/A	N/A	N/A

3. DUTY CYCLE

3.1.Limit

N/A.

3.2.Test Setup



3.3.Spectrum Analyzer Setting

Spectrum Parameters	Setting
Center Frequency	Test Frequency
RBW	$\geq \text{OBW}$
VBW	$\geq \text{RBW}$
Span	Zero
Sweep Time	At least one period of the pulse train or over 100 ms
Detector	PEAK

3.4.Test Procedure

- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 3.3.
- Adjust and configure any EUT switches, controls, or input data streams to ensure that the EUT is transmitting or encoded to obtain the “worst-case” pulse ON time.
- If the pulse train is periodic (i.e., consists of a series of pulses that repeat in a characteristic pattern over a constant time period), and the period (T) is less than or equal to 100 ms, then:
 - Set the TRIGGER on the spectrum analyzer to capture at least one period of the pulse train, including any blanking intervals.
 - Determine the total maximum pulse “ON time” (t_{ON}) over one period of the pulse train, If the pulse train contains pulses of different widths, then t_{ON} is determined by summing the duration of all of the pulses within the pulse train [i.e., $t_{\text{ON}} = \Sigma(t_1 + t_2 + \dots t_n)$].
 - The duty cycle is then determined by dividing the total maximum “ON time” by the period of the pulse train (t_{ON}/T).
- If the pulse train is nonperiodic or is periodic with a period that exceeds 100 ms, or as an alternative to step d, then:
 - Set the TRIGGER on the spectrum analyzer to capture the greatest amount of pulse “ON time” over 100 ms.
 - Find the 100 ms period that contains the maximum “on time”; this may require summing the duration of multiple pulses as described in step d 2).

- 3) Determine the duty cycle by dividing the total maximum "ON time" by 100 ms ($t_{ON}/100$ ms).
- f. Determine the duty cycle correction factor by below Equation to the duty cycle determined in the preceding steps.
 - g. $\delta(\text{dB}) = 20\log(\Delta)$
- where
 δ is the duty cycle correction factor (dB)
 Δ is the duty cycle (dimensionless)
- h. Record the results in the test report.

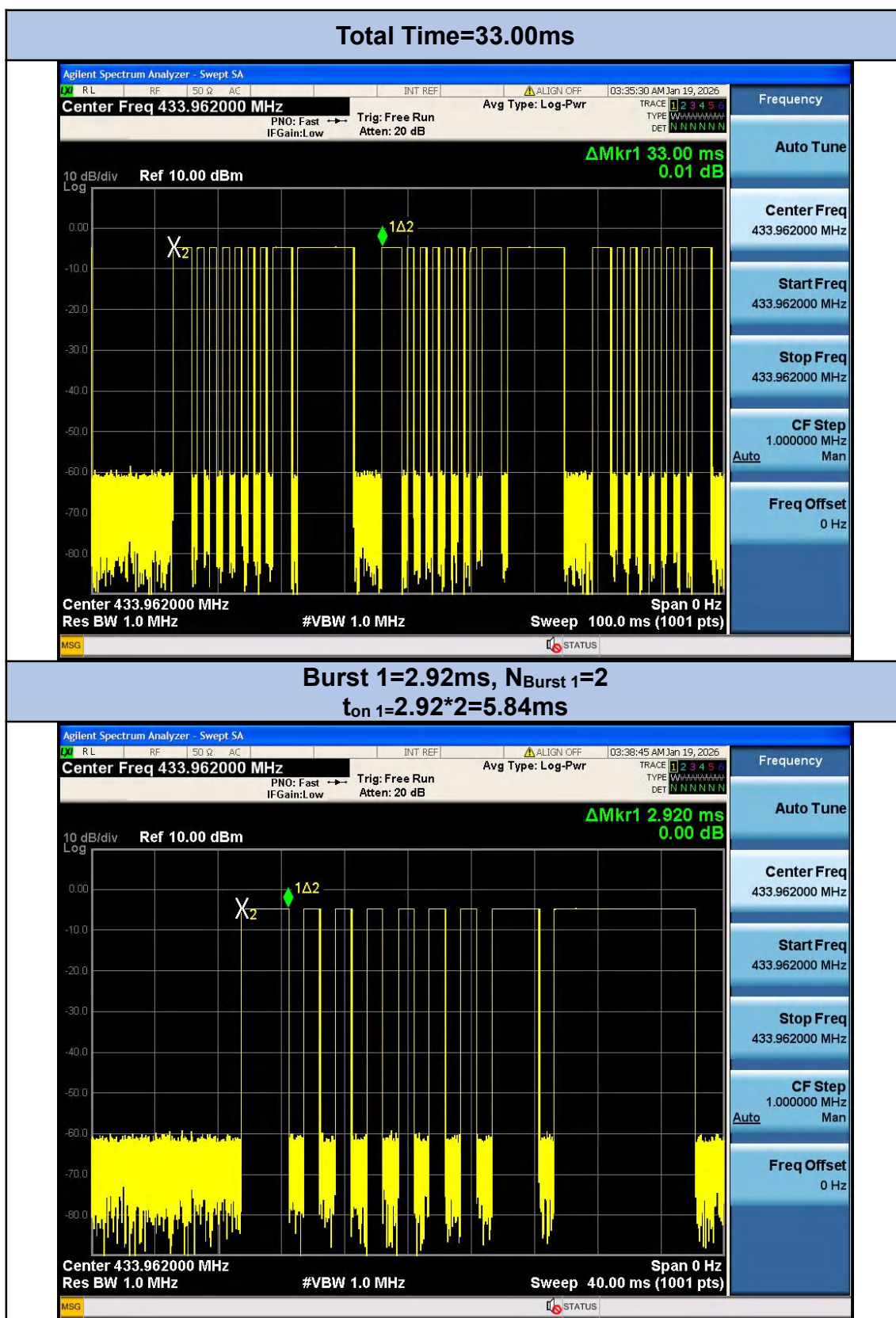
3.5. Test Result

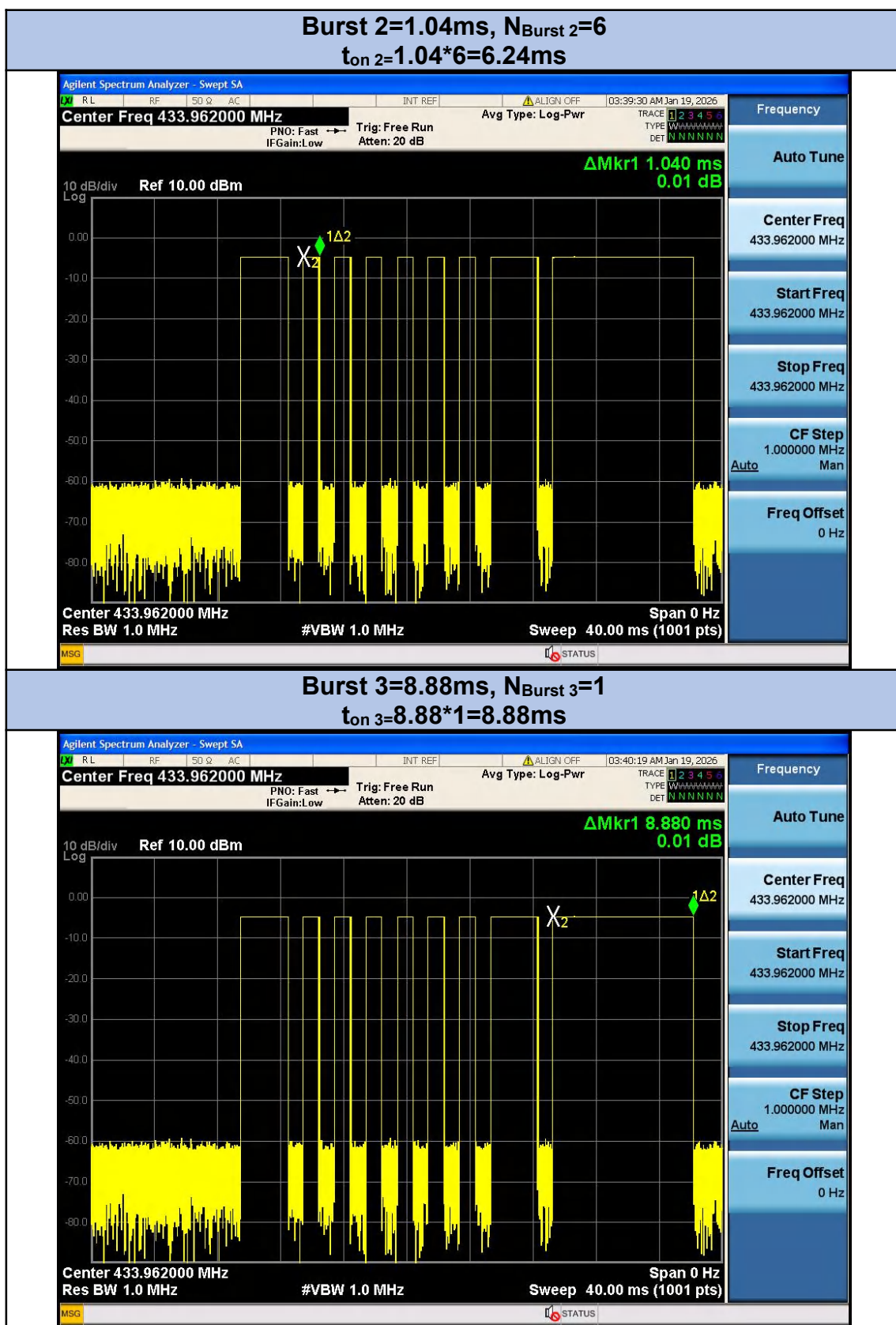
Test Frequency	On Time	Total Time	Duty Cycle	Duty Cycle Correction Factor
MHz	ms	ms	%	dB
433.962	20.96	33.00	63.52	-3.94

Note:

1. $T_{ON\ time} = t_{on\ 1} \times N_{Burst\ 1} + t_{on\ 2} \times N_{Burst\ 2} + t_{on\ n} \times N_{Burst\ n}$
 ($N_{Burst\ n}$ is the number of Burst n in one period or 100ms)
2. Duty Cycle = (On Time / Total Time) * 100%
3. Duty Cycle Correction Factor = $20 \times \text{LOG}(\text{Duty Cycle})$

3.6.Original Test Record





4. FIELD STRENGTH OF FUNDAMENTAL

4.1.Limit

Fundamental frequency (MHz)	Field strength of fundamental@3m (microvolts/meter)
40.66-40.70	2,250
70-130	1,250
130-174	¹ 1,250 to 3,750
174-260	3,750
260-470	¹ 3,750 to 12,500
Above 470	12,500
¹ Linear interpolations	

The EUT fundamental frequency is 433.962MHz, So the Average Limit& Peak Limit is show in below table:

Fundamental frequency (MHz)	Field strength of fundamental@3m (dBμV/m)	
	Average Limit	Peak Limit
433.962	80.83	100.83

Note:

1. According to ANSI C63.10:2020 section 7.6.2:

The effective limit at the frequency of interest is found by linearly interpolating using the familiar slope-intercept formula, $y = mx + b$, rewritten as in Equation:

$$\text{Limit}[\mu\text{V/m}] = \text{Lim}_{\text{lower}} + \Delta F [(\text{Lim}_{\text{upper}} - \text{Lim}_{\text{lower}}) / (f_{\text{upper}} - f_{\text{lower}})]$$

where

$\text{Lim}_{\text{lower}}$ --is the limit at the lower frequency of the intended band of operation

$\text{Lim}_{\text{upper}}$ --is the limit at the upper frequency of the intended band of operation

f_{lower} --is the lower frequency of the intended band of operation

f_{upper} --is the upper frequency of the intended band of operation

ΔF --equals $f_c - f_{\text{lower}}$

F_c --is the center frequency of the emission signal

For fundamental frequency 433.962MHz:

$$\text{Average Limit}(\mu\text{V/m}) = 3750 + (433.962 - 260) * [(12500 - 3750) / (470 - 260)] = 10998.41667.$$

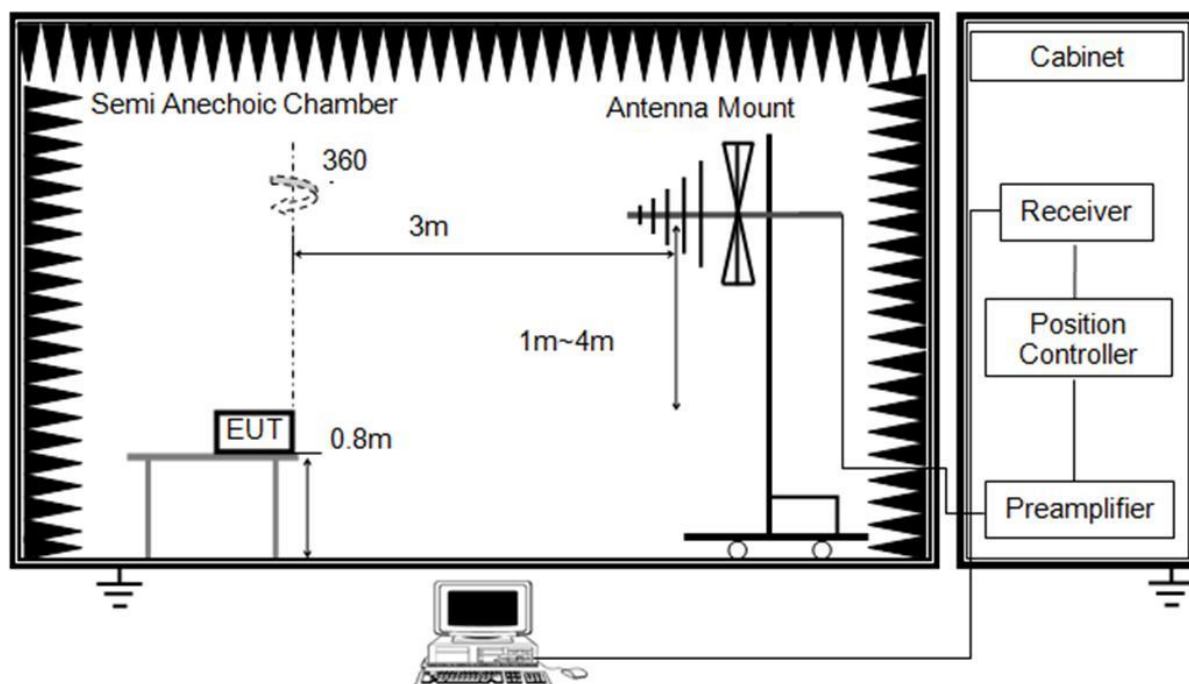
$$2. \text{ Average Limit (dB}\mu\text{V/m)} = 20 \times \text{LOG}[\text{Field Strength } (\mu\text{V/m})] = 20 \times \text{LOG}(10998.41667) = 80.83.$$

3. According to §15.35(b):

$$\text{Peak Limit (dB}\mu\text{V/m)} = \text{Average Limit (dB}\mu\text{V/m)} + 20\text{dB} = 80.83 + 20 = 100.83.$$

4.2. Test Setup

Below 1 GHz and above 30 MHz



4.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
Center Frequency	Test frequency
RBW	120KHz
VBW	300KHz
Sweep Time	Auto
Detector	PEAK
Trace Mode	Max Hold

4.4. Test Procedure

- EUT was placed on a turn table, which is 1.5 meter high above the ground.
- EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- Spectrum analyzer setting parameters in accordance with section 4.4.
- Set the EUT transmit continuously with maximum output power.
- The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test, record the peak value.
- Repeat above procedures until all channels were measured.
- Record the results in the test report.

4.5. Test Result

Field Strength of Fundamental								
Frequency MHz	Peak Level (dBuV/m)	Duty Cycle Factor (dB)	Average Level (dBuV/m)	Limit		Margin (dB)		Polarization
				PK	AV	PK	AV	
433.962	65.77	-3.94	61.83	100.83	80.83	-35.06	-19.00	Vertical
	62.72	-3.94	58.78			-38.11	-22.05	Horizontal

Note:

1. Avg Emission Level=Peak Emission Level+Duty Cycle Correction Factor.
2. Duty Cycle Correction Factor=**-3.94**.(refer to section 3 of this report)

4.6. Original Test Record

Note: Original Test data Record Please refer to Section 5 as Section 5.5.



5. RADIATED SPURIOUS EMISSIONS

5.1.Limit

The limits on the field strength of the spurious emissions in the below table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

Fundamental frequency (MHz)	Field strength of fundamental@3m (microvolts/meter)
40.66-40.70	2,25
70-130	1,25
130-174	¹ 1,25 to 3,75
174-260	3,75
260-470	¹ 3,75 to 12,50
Above 470	12,50
¹ Linear interpolations	

The EUT fundamental frequency is 433.962MHz, So the Average Limit& Peak Limit is show in below table:

Fundamental frequency (MHz)	Field strength of fundamental@3m (dBμV/m)	
	Average Limit	Peak Limit
433.962	60.83	80.83

Note:

1. According to ANSI C63.10:2020 section 7.6.2:

The effective limit at the frequency of interest is found by linearly interpolating using the familiarslope-intercept formula, $y = mx+b$, rewritten as in Equation:

$$\text{Limit}[\mu\text{V/m}] = \text{Lim}_{\text{lower}} + \Delta F[(\text{Lim}_{\text{upper}} - \text{Lim}_{\text{lower}}) / (f_{\text{upper}} - f_{\text{lower}})]$$

where

$\text{Lim}_{\text{lower}}$ --is the limit at the lower frequency of the intended band of operation

$\text{Lim}_{\text{upper}}$ --is the limit at the upper frequency of the intended band of operation

f_{lower} --is the lower frequency of the intended band of operation

f_{upper} --is the upper frequency of the intended band of operation

ΔF --equals $f_c - f_{\text{lower}}$

F_c --is the center frequency of the emission signal

For fundamental frequency 433.962MHz:

$$\text{Average Limit}(\mu\text{V/m}) = 3750 + (433.962 - 260)[(12500 - 3750) / (470 - 260)] = 10998.41667.$$

$$2. \text{ Average Limit (dB}\mu\text{V/m)} = 20 \times \text{LOG}[\text{Field Strength } (\mu\text{V/m})] = 20 \times \text{LOG}(10998.41667) = 60.83.$$

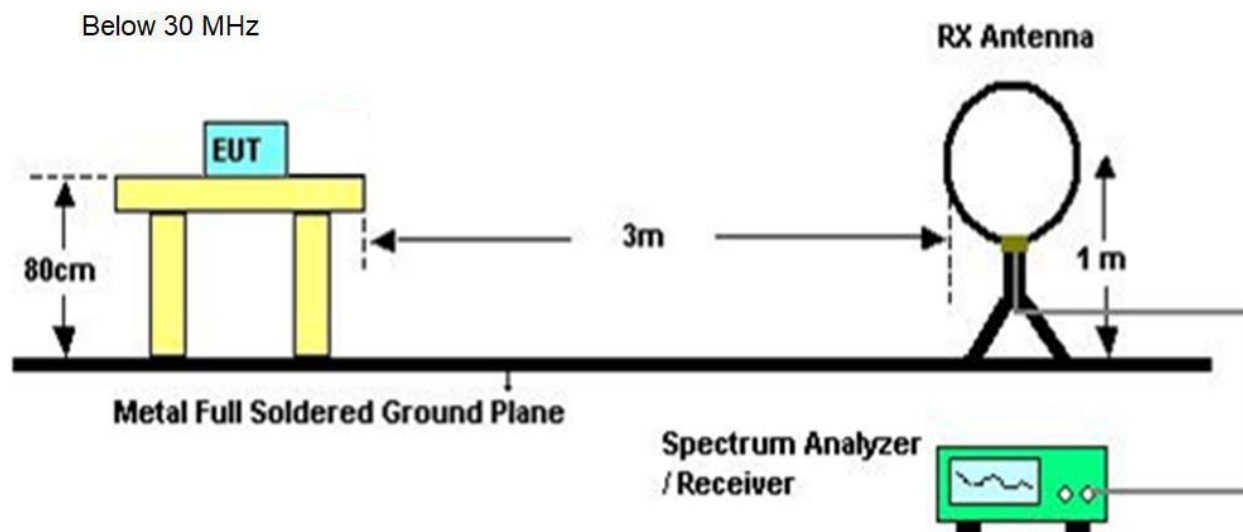
3. According to §15.35(b):

$$\text{Peak Limit (dB}\mu\text{V/m)} = \text{Average Limit (dB}\mu\text{V/m)} + 20\text{dB} = 60.83 + 20 = 80.83.$$

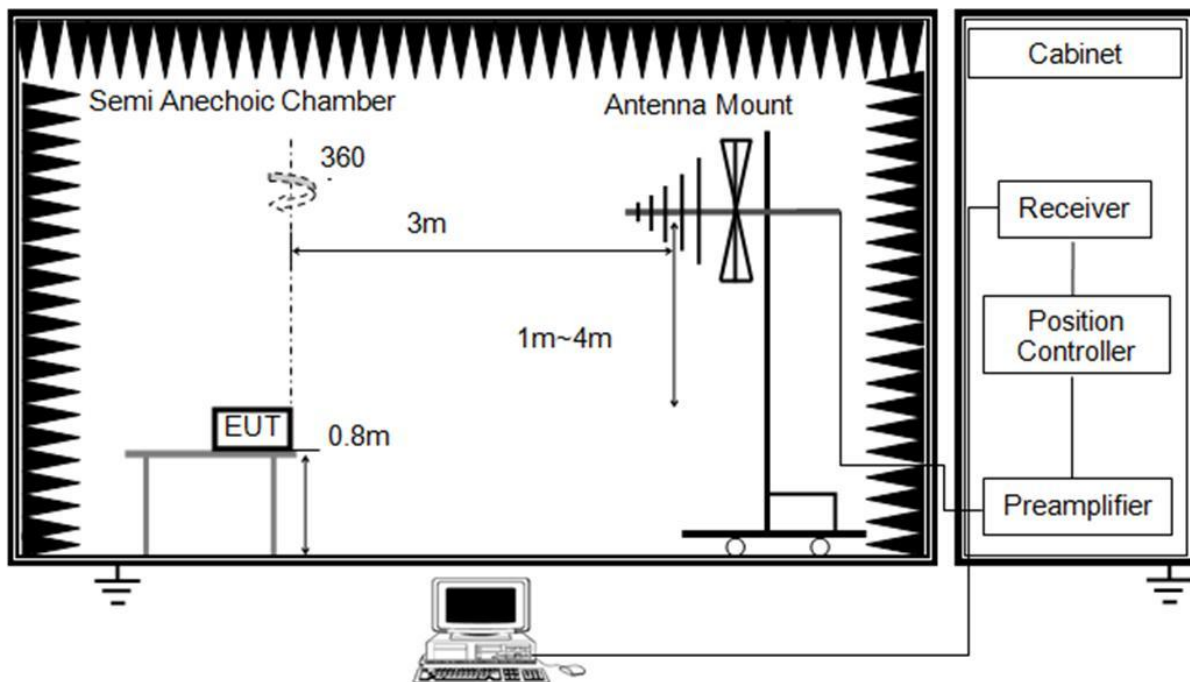
15.209 Radiated emission limits		
Frequency (MHz)	Field Strength($\mu\text{V/m}$)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

5.2.Test Setup

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz

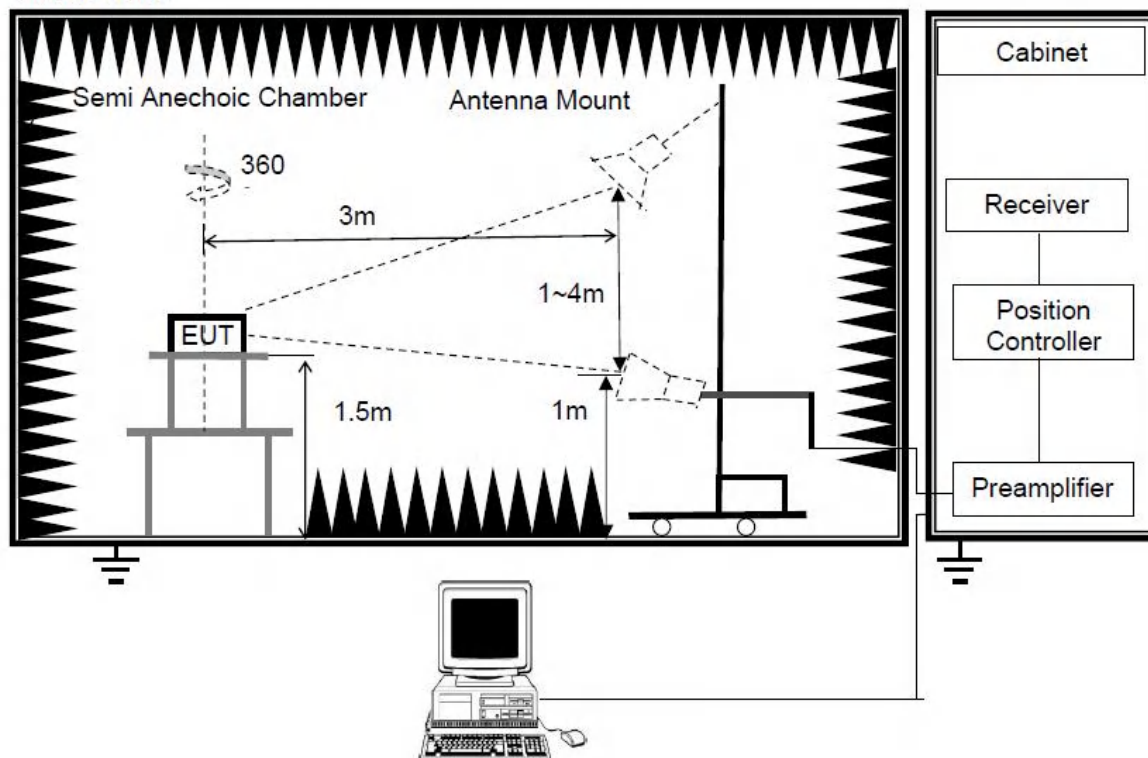


(B) Radiated Emission Test Set-Up, Frequency below 1000MHz
Below 1 GHz and above 30 MHz



(C) Radiated Emission Test Set-Up, Frequency above 1GHz

Above 1GHz



5.3. Spectrum Analyzer Setting

For 9KHz-150KHz	
Spectrum Parameters	Setting
RBW	300Hz (for Peak&AVG)/CISPR 200Hz (for QP)
VBW	300Hz (for Peak&AVG)/CISPR 200Hz (for QP)
Start frequency	9KHz
Stop frequency	150KHz
Sweep Time	Auto
Detector	PEAK/QP/AVG
Trace Mode	Max Hold

Note: For 9KHz-90KHz&110KHz-150KHz,the detector is average,other frequency is CISPR QP detector.

For 150KHz-30MHz	
Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

Note: For 150KHz-490KHz,the detector is average,other frequency is CISPR QP detector.

For 30MHz-1GHz	
Spectrum Parameters	Setting
RBW	120KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	1GHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

For Above 1GHz		
Spectrum Parameters	Setting	
RBW	1MHz	
VBW	PEAK Measurement	AVG Measurement
	3MHz	Duty cycle $\geq$ 98%, VBW=10Hz
		Duty cycle $<$ 98%, VBW $\geq$ 1/T
Start frequency	1GHz	
Stop frequency	40GHz	
Sweep Time	Auto	
Detector	PEAK	
Trace Mode	Max Hold	

Note: T is the on-time time of the duty cycle, when EUT transmit continuously with maximum output power, unit is seconds. reference section 3 for the on-time time.

5.4.Test Procedure

- EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
- EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- Set the EUT transmit continuously with maximum output power.
- Spectrum analyzer setting parameters in accordance with section 5.3.
- The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- Record the results in the test report.

5.5. Test Result&Original Test Record

Radiated Spurious Emission Below 30MHz

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported

Radiated Spurious Emission 30-1000MHz

EUT: Rechargeable remote (LAY)
M/N: LAY-IC
Test Voltage: Charging Input: DC 5V by USB-C Port
Ant. Pol.: Vertical
Test Mode: TX Mode
Note: CH01 433.962MHz
Detailed results are shown below



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	38.616	2.89	19.66	22.55	40.00	-17.45	QP			P	
2	56.001	2.60	19.02	21.62	40.00	-18.38	QP			P	
3	156.458	3.91	20.32	24.23	43.50	-19.27	QP			P	
4	181.920	5.21	17.39	22.60	43.50	-20.90	QP			P	
5	383.932	4.39	21.94	26.33	46.00	-19.67	QP			P	
6	433.962	42.34	23.43	65.77	100.83	-35.06	peak			P	
7 *	663.473	4.28	28.07	32.35	46.00	-13.65	QP			P	
8	867.924	10.99	29.86	40.85	80.83	-39.98	peak			P	

Remarks: 1). Level (dBuV/m) = Reading (dBuV/m) + Factor (dB/m)
2). Factor(dB/m) =Antenna Factor (dB/m) + Cable loss (dB)
3). Margin(dB) = Limit (dBuV/m) - Level (dBuV/m)

EUT: Rechargeable remote (LAY)
M/N: LAY-IC
Test Voltage: Charging Input: DC 5V by USB-C Port
Ant. Pol.: Horizontal
Test Mode: TX Mode
Note: CH01 433.962MHz
Detailed results are shown below



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	50.586	2.66	19.41	22.07	40.00	-17.93	QP			P	
2	85.898	3.41	15.92	19.33	40.00	-20.67	QP			P	
3	154.821	3.33	20.23	23.56	43.50	-19.94	QP			P	
4	214.514	3.35	17.92	21.27	43.50	-22.23	QP			P	
5	291.036	3.97	19.76	23.73	46.00	-22.27	QP			P	
6	433.962	39.29	23.43	62.72	100.83	-38.11	peak			P	
7 *	807.429	4.42	29.83	34.25	46.00	-11.75	QP			P	
8	867.924	9.79	29.86	39.65	80.83	-41.18	peak			P	

Remarks: 1). Level (dBμV/m) = Reading (dBμV/m) + Factor (dB/m)
2). Factor(dB/m) = Antenna Factor (dB/m) + Cable loss (dB)
3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

Radiated Spurious Emission (30-1000MHz of 2th harmonics)								
Frequency MHz	Peak Level dBuV/m	Duty Cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
867.924	40.85	-3.94	36.91	80.83	60.83	-39.98	-23.92	Vertical
	39.65	-3.94	35.71	80.83	60.83	-41.18	-25.12	Horizontal

Radiated Spurious Emission (1GHz to 10th harmonics)								
Frequency MHz	Peak Level dBuV/m	Duty Cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
1301.886	42.00	-3.94	38.06	74.00	54.00	-32.00	-15.94	Vertical
1735.848	56.59	-3.94	52.65	80.83	60.83	-24.24	-8.18	Vertical
2169.810	57.10	-3.94	53.16	80.83	60.83	-23.73	-7.67	Vertical
2603.772	51.51	-3.94	47.57	80.83	60.83	-29.32	-13.26	Vertical
3037.734	56.35	-3.94	52.41	80.83	60.83	-24.48	-8.42	Vertical
3471.696	48.10	-3.94	44.16	80.83	60.83	-32.73	-16.67	Vertical
3905.658	53.81	-3.94	49.87	74.00	54.00	-20.19	-4.13	Vertical
4339.620	47.38	-3.94	43.44	74.00	54.00	-26.62	-10.56	Vertical
1301.886	52.86	-3.94	48.92	74.00	54.00	-21.14	-5.08	Horizontal
1735.848	61.53	-3.94	57.59	80.83	60.83	-19.30	-3.24	Horizontal
2169.810	59.27	-3.94	55.33	80.83	60.83	-21.56	-5.50	Horizontal
2603.772	51.27	-3.94	47.33	80.83	60.83	-29.56	-13.50	Horizontal
3037.734	57.01	-3.94	53.07	80.83	60.83	-23.82	-7.76	Horizontal
3471.696	49.48	-3.94	45.54	80.83	60.83	-31.35	-15.29	Horizontal
3905.658	55.56	-3.94	51.62	74.00	54.00	-18.44	-2.38	Horizontal
4339.620	43.37	-3.94	39.43	74.00	54.00	-30.63	-14.57	Horizontal

Note:

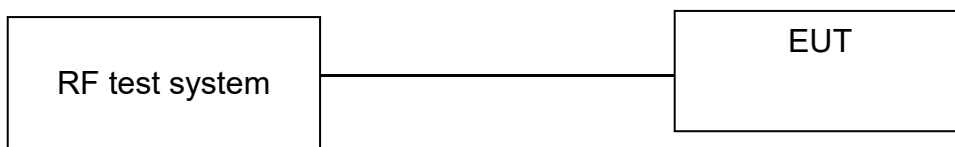
1. Avg Emission Level=Peak Emission Level+Duty Cycle Correction Factor
2. Duty Cycle Correction Factor=-3.94.(refer to section 3 of this report)

6. 20dB BANDWIDTH (OCCUPY BANDWIDTH)

6.1.Limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

6.2.Test Setup



6.3.Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	1%~5% OBW
VBW	3×RBW
Span	Two times and five times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

6.4.Test Procedure

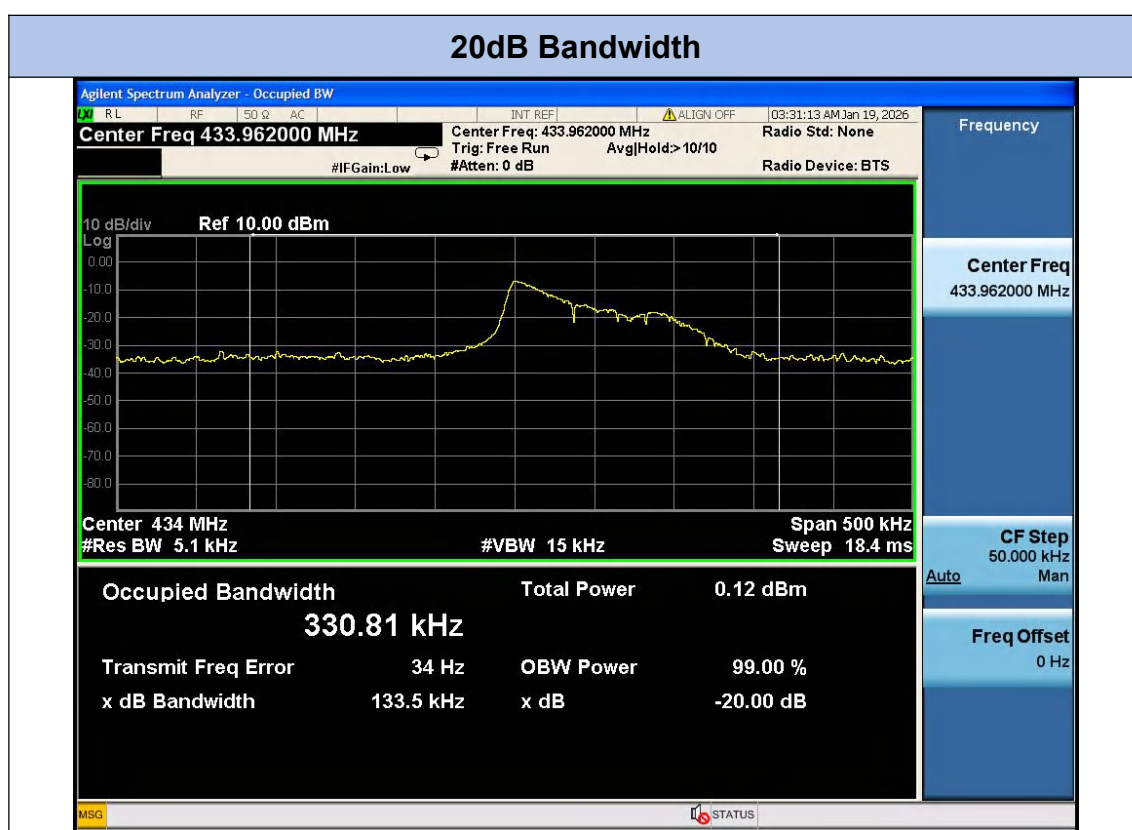
- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 6.3.
- Set the EUT transmit continuously with maximum output power.
- Allow trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.
- Record the results in the test report.

6.5. Test Result

Test Frequency	20dB Bandwidth	Limit	Result
MHz	MHz	MHz	
433.962	0.1335	≤ 1.084905	Pass

Note: Limit(MHz)=433.962×0.25%=1.0848

6.6. Original Test Record

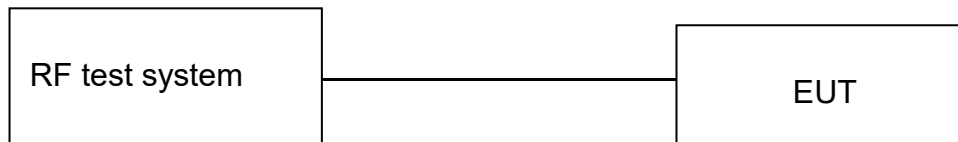


7. DURATION TIME (DWELL TIME)

7.1.Limit

- (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- (3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

7.2.Test Setup



7.3.Spectrum Analyzer Setting

Spectrum Parameters	Setting
Center Frequency	Test Frequency
RBW	$\geq$ OBW
VBW	$\geq$ RBW
Span	Zero
Sweep Time	At least one period of the pulse train
Detector	PEAK

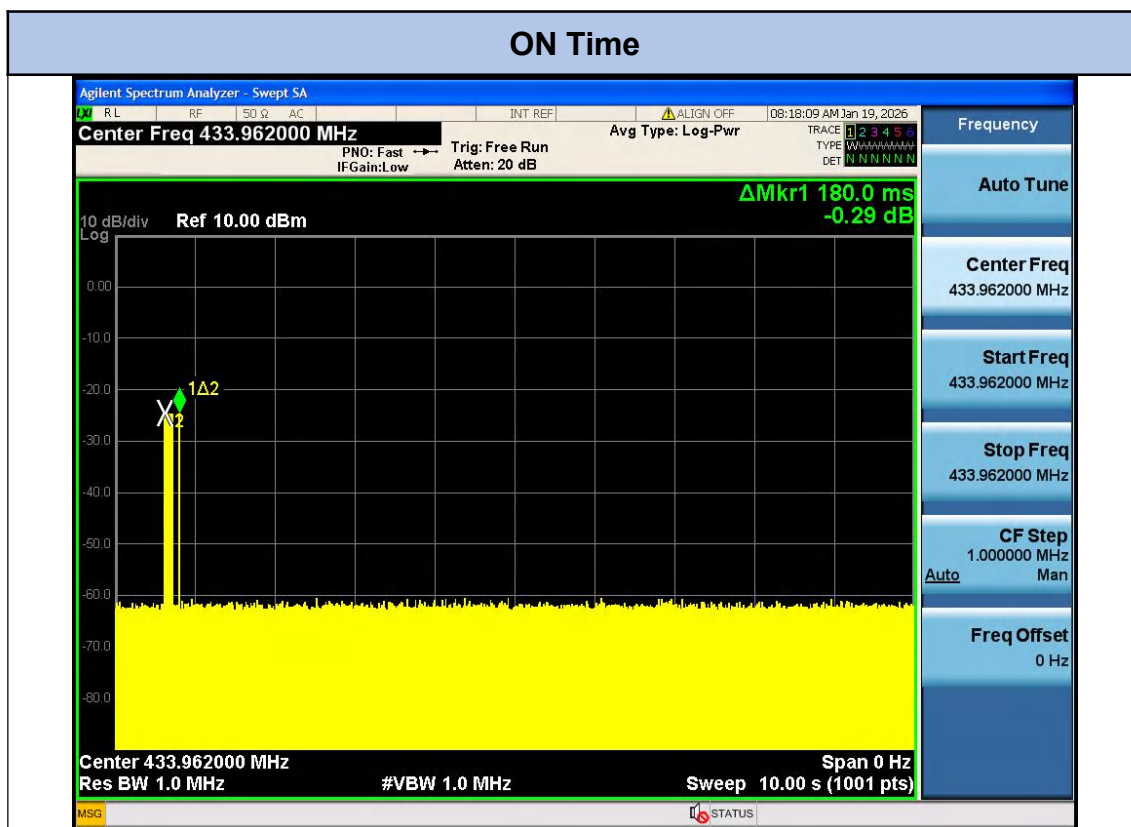
7.4.Test Procedure

- a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- b. Spectrum analyzer setting parameters in accordance with section 7.3.
- c. Set the EUT transmit in normal use.
- d. Adjust sweep time on the spectrum analyzer to capture at least one period of the pulse train of the EUT.
- e. Allow trace to stabilize, use the marker-delta function to measure the on time and off time of the signal.
- f. Record the results in the test report.

7.5. Test Result

Test Frequency	Packet	Limit	Result
MHz	s	s	
433.962	0.18	< 5	PASS

7.6. Original Test Record



8. AC POWER LINE CONDUCTED EMISSIONS

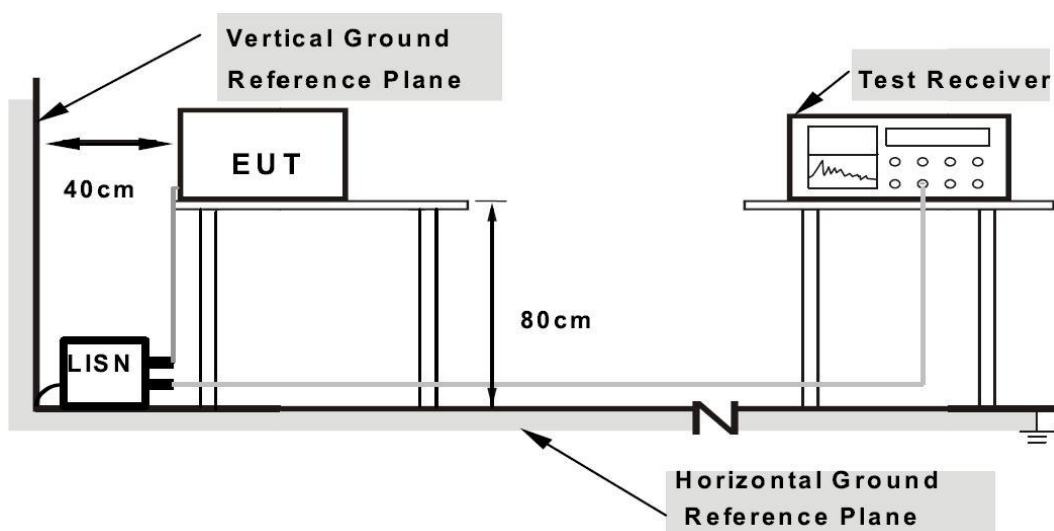
8.1. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note:

1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

8.2. Test Setup



8.3. Spectrum Analyzer Setting

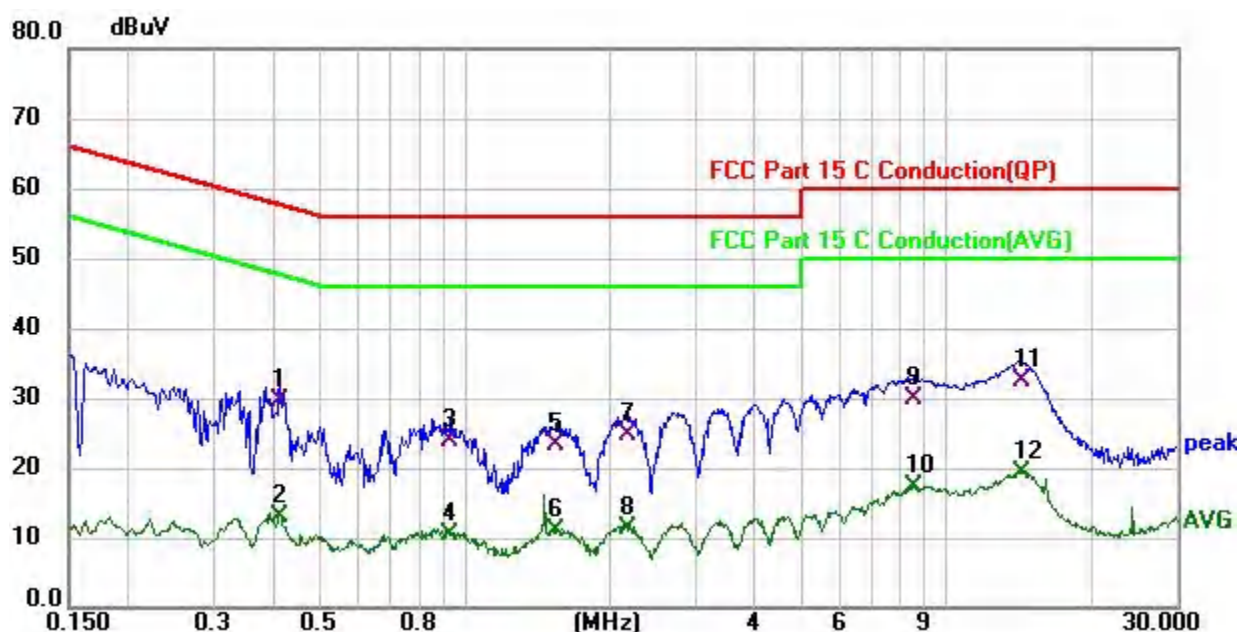
Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP/AVG
Trace Mode	Max Hold

8.4. Test Procedure

- a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
- b. The EUT Power connected to the power mains through a line impedance stabilization network.
- c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
- d. Set the EUT transmit continuously with maximum output power.
- e. Spectrum analyzer setting parameters in accordance with section 8.3.
- f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10-2020 on Conducted Emission Test.
- g. It was conducted under both AC 120V/60Hz and AC 240V/50Hz input voltages, there was no significant change in radiation emission. Only worse case mode with AC 120V/60Hz voltage is reported.

8.5. Test Result

EUT: Rechargeable remote (LAY)
M/N: LAY-IC
Test Voltage: Charging Input: DC 5V by USB-C Port
Phase: Live
Test Mode: TX Mode
Note: CH01 433.962MHz
Detailed results are shown below

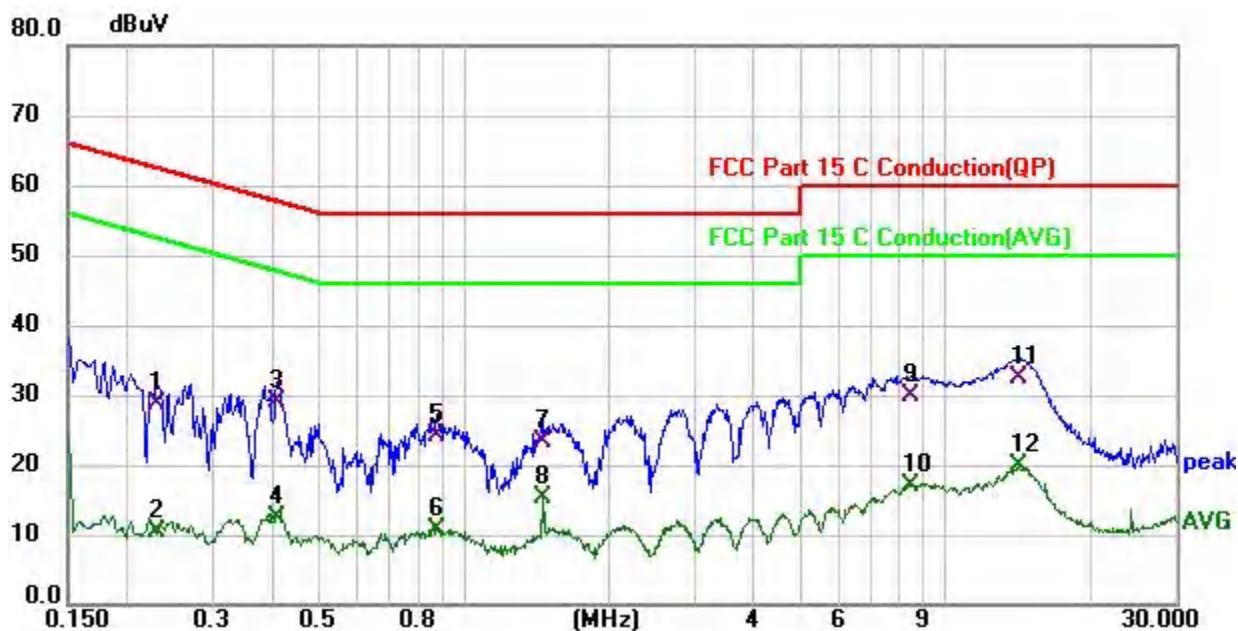


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.410	8.68	20.82	29.50	57.65	-28.15	QP	P	
2	0.410	-7.90	20.82	12.92	47.65	-34.73	AVG	P	
3	0.930	3.13	20.87	24.00	56.00	-32.00	QP	P	
4	0.930	-10.32	20.87	10.55	46.00	-35.45	AVG	P	
5	1.546	2.36	20.98	23.34	56.00	-32.66	QP	P	
6	1.546	-10.01	20.98	10.97	46.00	-35.03	AVG	P	
7	2.170	3.56	21.05	24.61	56.00	-31.39	QP	P	
8	2.170	-9.65	21.05	11.40	46.00	-34.60	AVG	P	
9	8.534	8.34	21.55	29.89	60.00	-30.11	QP	P	
10	8.534	-4.39	21.55	17.16	50.00	-32.84	AVG	P	
11 *	14.354	9.41	22.95	32.36	60.00	-27.64	QP	P	
12	14.354	-3.54	22.95	19.41	50.00	-30.59	AVG	P	

Remark: The test Result=Reading+ Lisn+ Cab L.

If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

EUT: Rechargeable remote (LAY)
M/N: LAY-IC
Test Voltage: Charging Input: DC 5V by USB-C Port
Phase: Neutral
Test Mode: TX Mode
Note: CH01 433.962MHz
Detailed results are shown below



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.230	7.93	20.66	28.59	62.45	-33.86	QP	P	
2	0.230	-10.36	20.66	10.30	52.45	-42.15	AVG	P	
3	0.406	8.33	20.66	28.99	57.73	-28.74	QP	P	
4	0.406	-8.29	20.66	12.37	47.73	-35.36	AVG	P	
5	0.878	3.53	20.67	24.20	56.00	-31.80	QP	P	
6	0.878	-10.01	20.67	10.66	46.00	-35.34	AVG	P	
7	1.462	2.55	20.69	23.24	56.00	-32.76	QP	P	
8	1.462	-5.47	20.69	15.22	46.00	-30.78	AVG	P	
9	8.442	8.36	21.47	29.83	60.00	-30.17	QP	P	
10	8.442	-4.50	21.47	16.97	50.00	-33.03	AVG	P	
11 *	14.158	9.34	23.09	32.43	60.00	-27.57	QP	P	
12	14.158	-3.26	23.09	19.83	50.00	-30.17	AVG	P	

Remark: The test Result=Reading+ Lisn+ Cab L.

If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

9. ANTENNA REQUIREMENTS

9.1. Limit

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 permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

9.2. Test Result

The antennas used for this product is PCB antenna, so compliance with antenna requirements. (Please refer to the Section **12. EUT INTERNAL PHOTOS** for details)

10. TEST SETUP PHOTOS

Photo 1 Test Setup Photos of AC Power Line Conducted Emissions

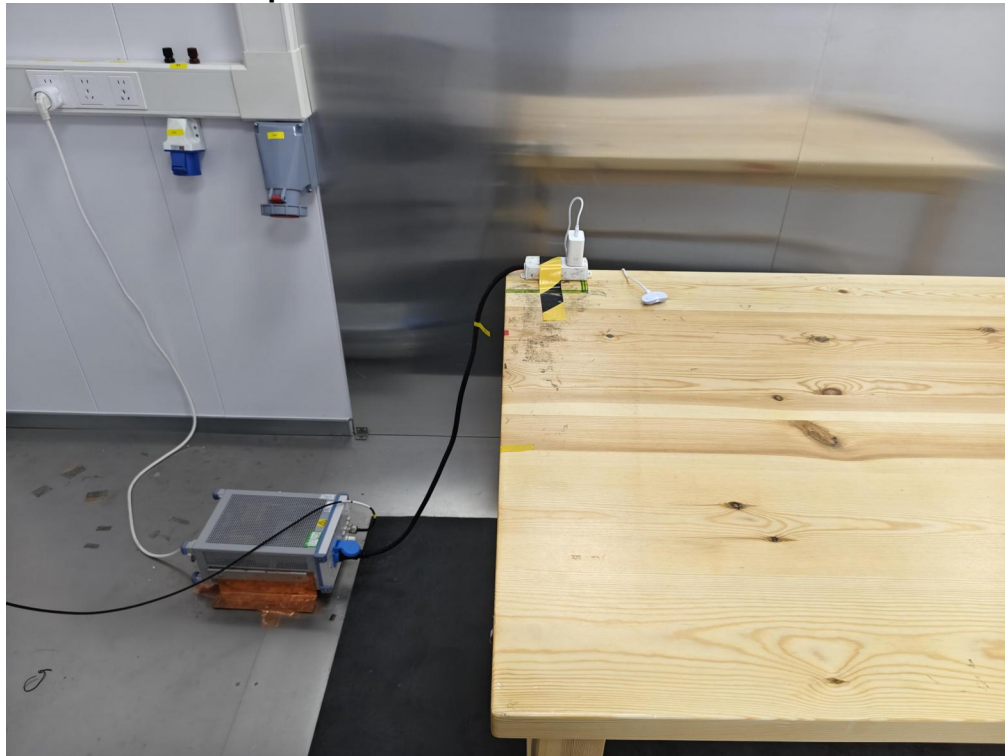


Photo 2 Test Setup Photos of Radiated Emission Test (30-1000MHz)

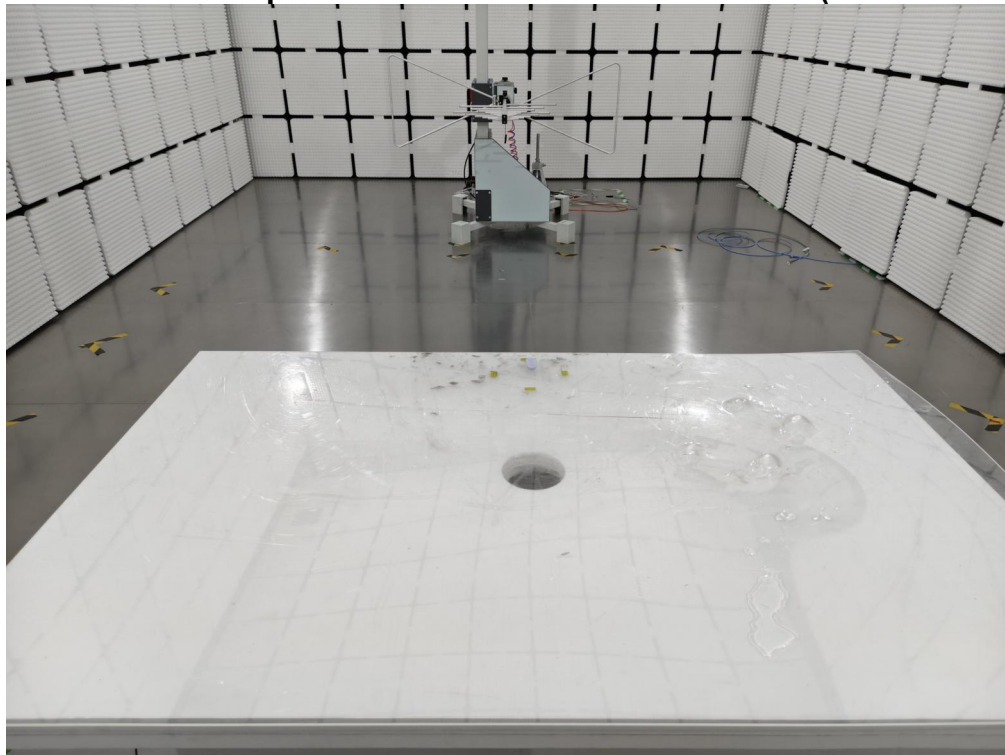


Photo 3 Test Setup Photos of Radiated Emission Test (Above 1GHz)



11. EUT EXTERNAL PHOTOS

Photo 1 External photos of EUT

Mian Test Model: LAY-IC

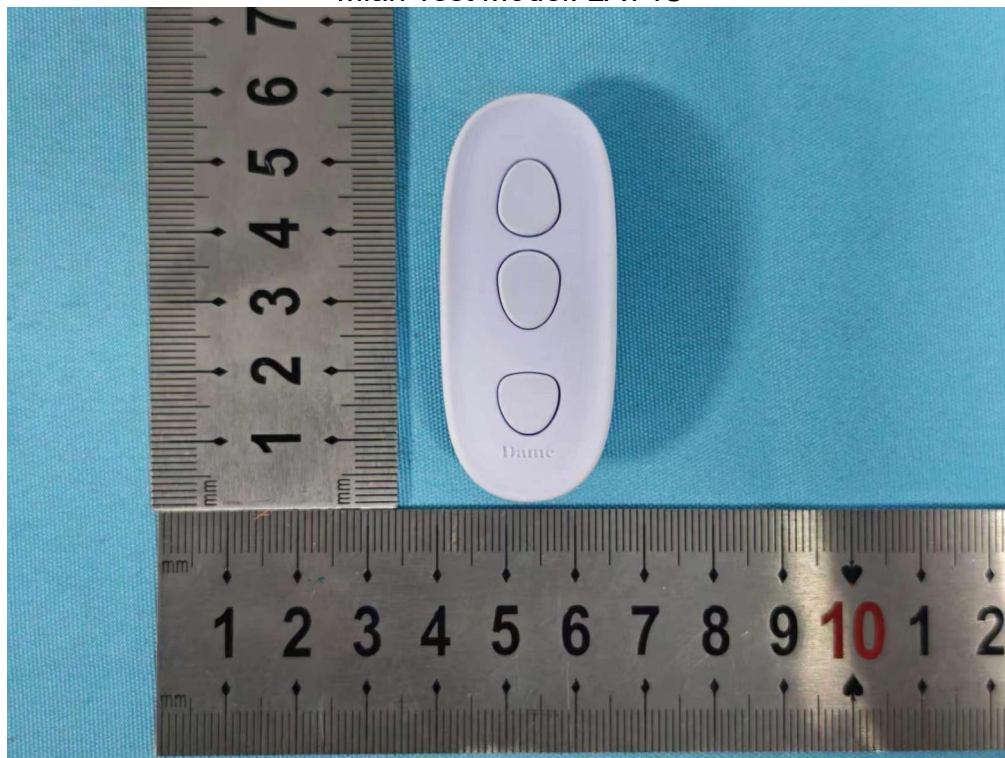


Photo 2 External photos of EUT

Mian Test Model: LAY-IC

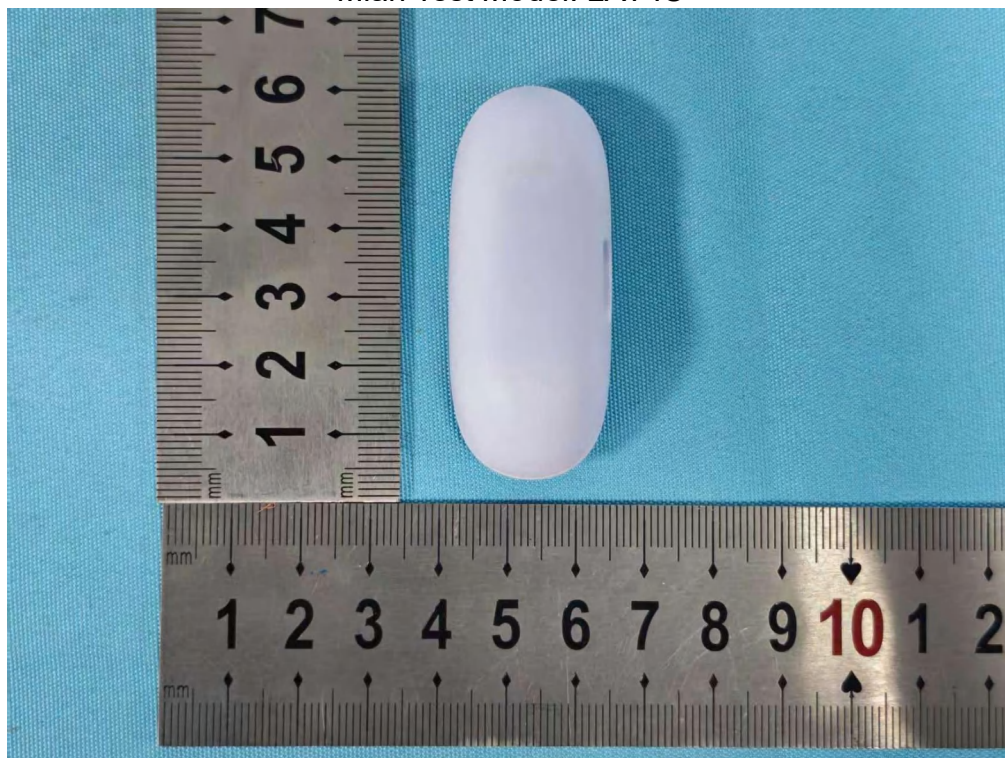


Photo 3 External photos of EUT
Mian Test Model: LAY-IC



Photo 4 External photos of EUT
Mian Test Model: LAY-IC



Photo 5 External photos of EUT
Mian Test Model: LAY-IC

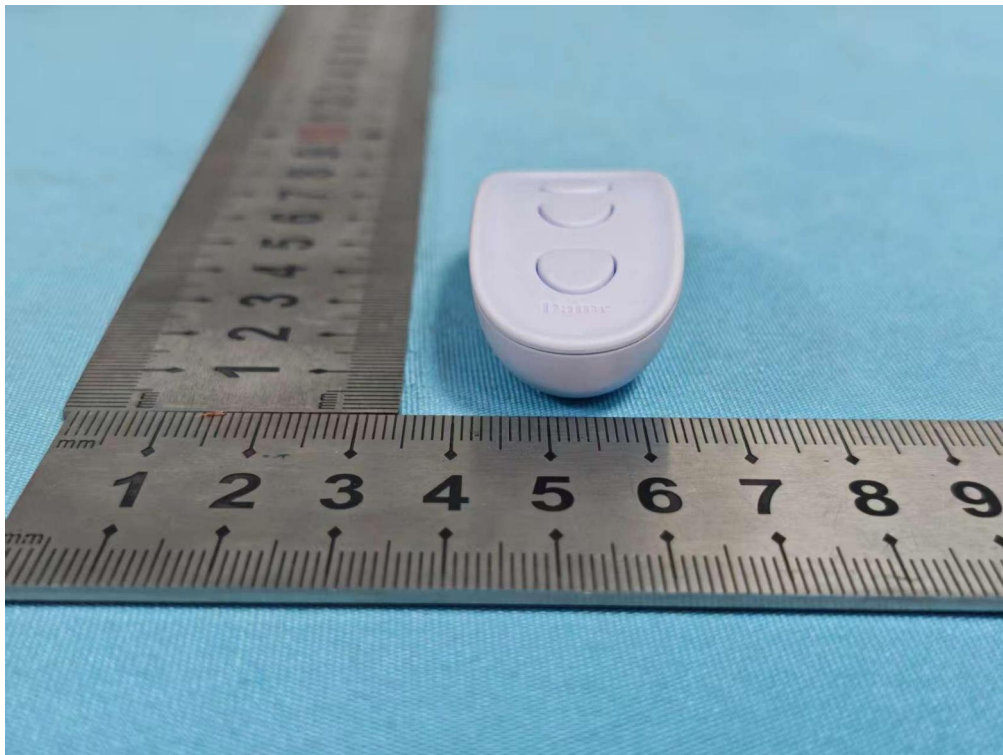


Photo 6 External photos of EUT
Mian Test Model: LAY-IC

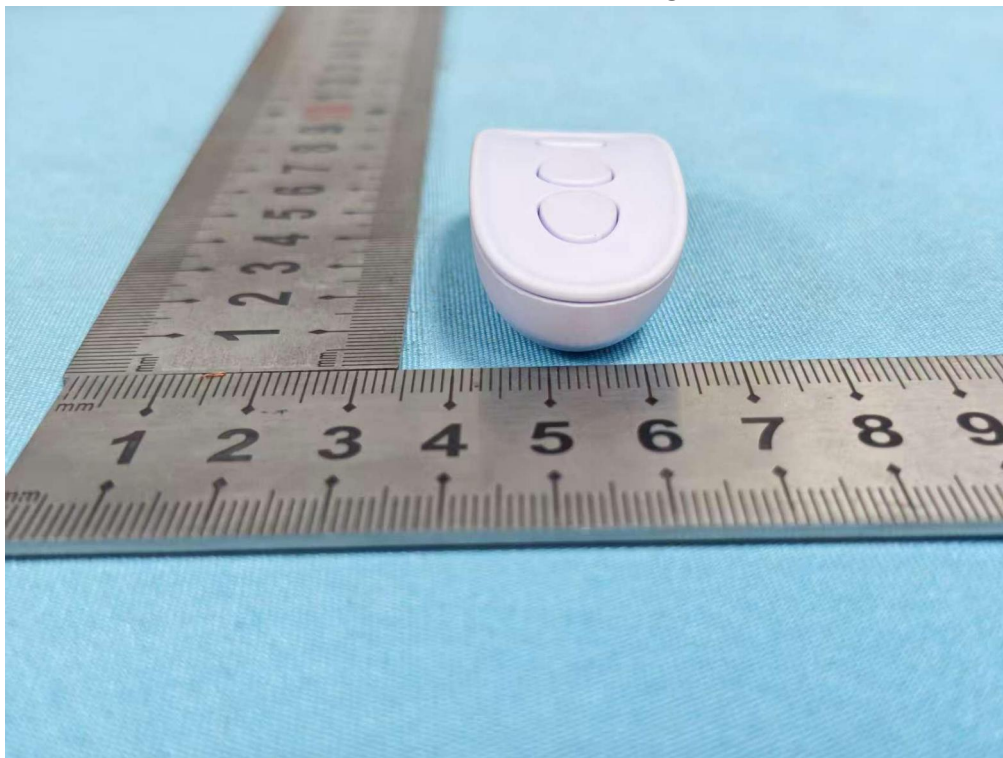


Photo 7 External photos of EUT
Mian Test Model: LAY-IC



Photo 8 External photos of EUT
Mian Test Model: LAY-IC



12. EUT INTERNAL PHOTOS

Photo 1 Internal photos of EUT
Mian Test Model: LAY-IC

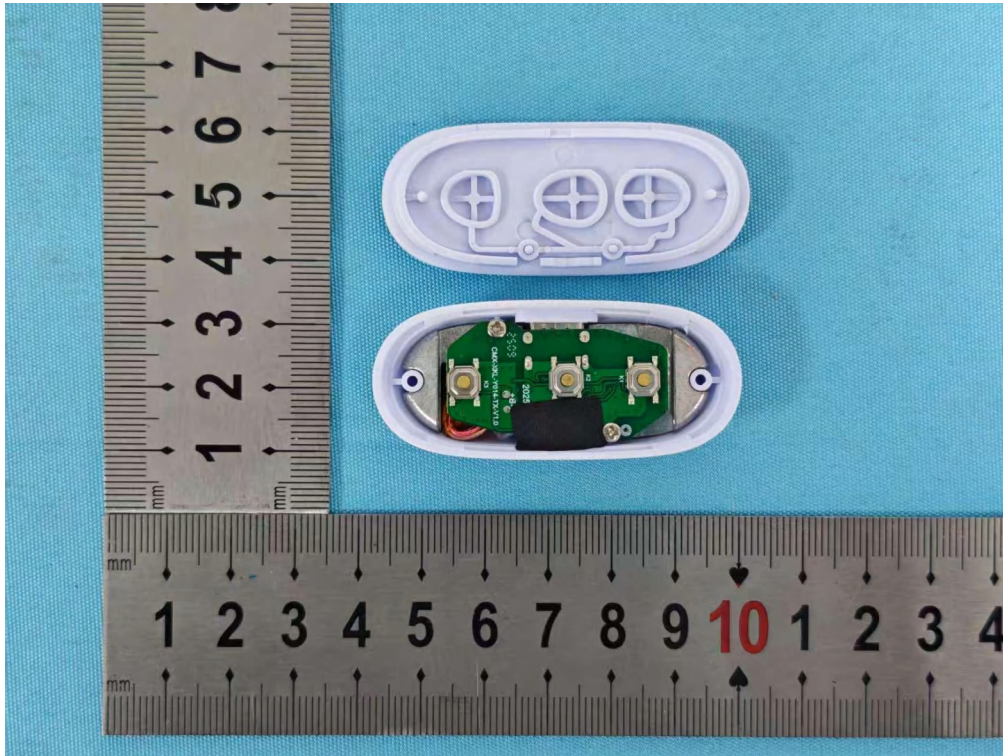


Photo 2 Internal photos of EUT
Mian Test Model: LAY-IC

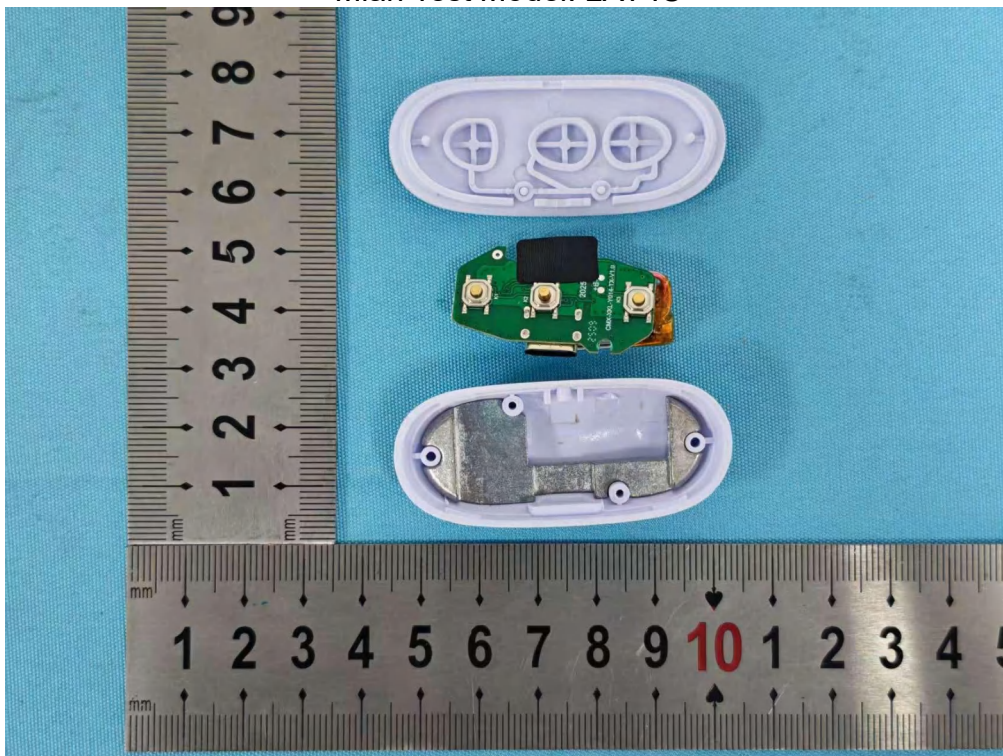


Photo 3 Internal photos of EUT
Mian Test Model: LAY-IC

Antenna position

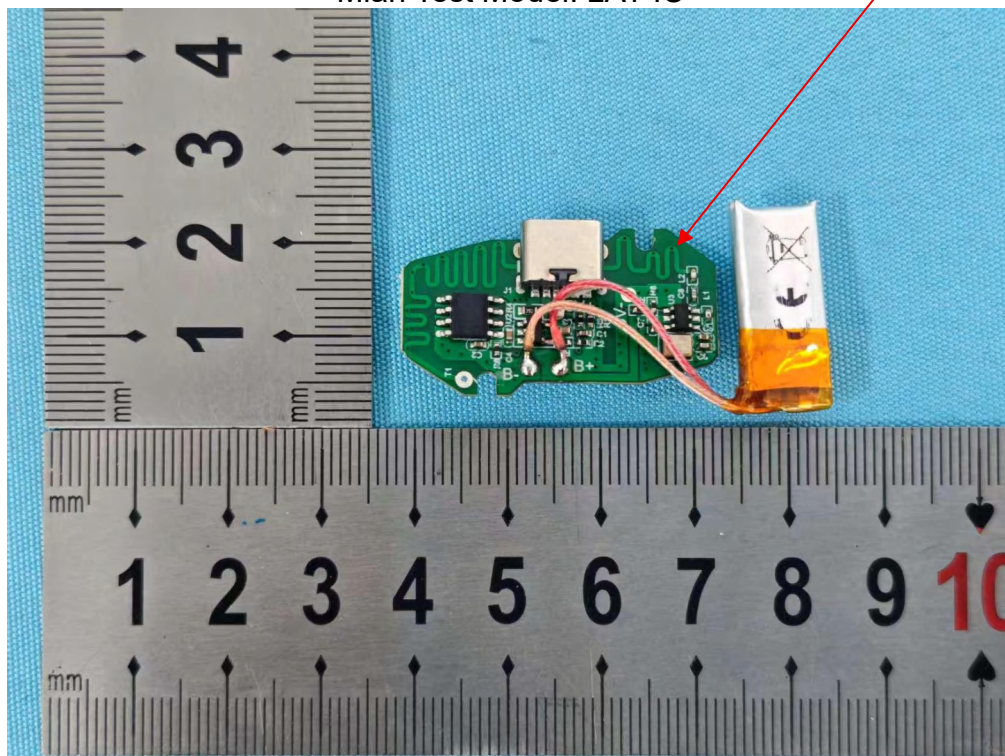
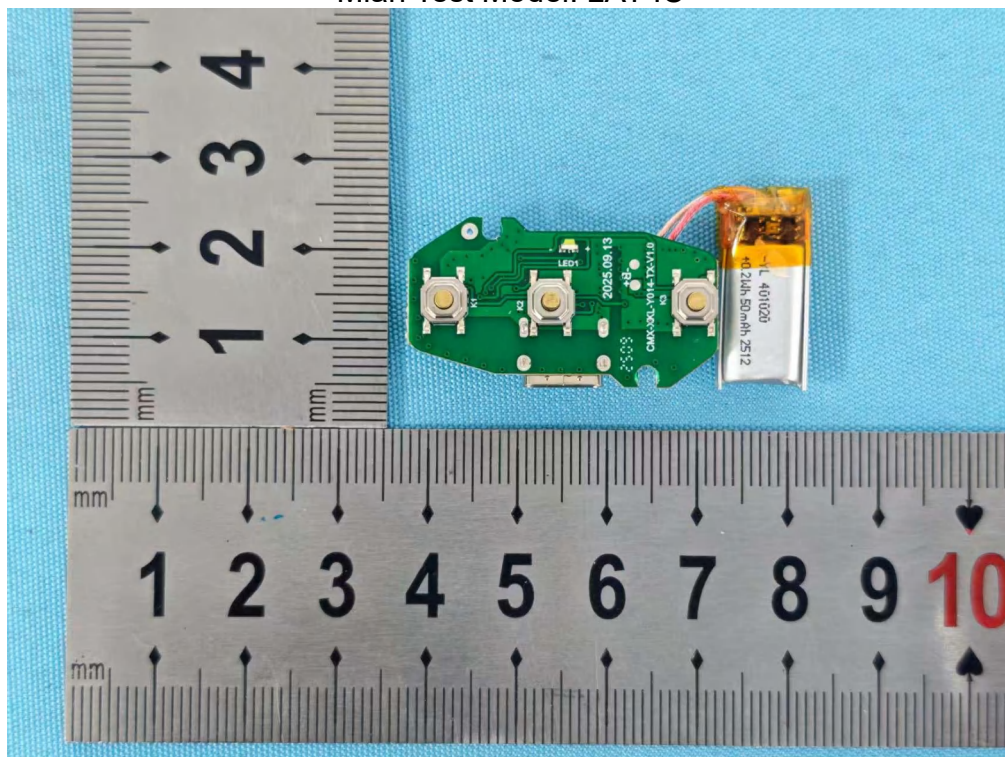


Photo 4 Internal photos of EUT
Mian Test Model: LAY-IC



-----End of Test Report-----