TEST REPORT

Applicant: **Address:**	**FIRLAKE LLC** **30 N Gould St Ste N, Sheridan, Wyoming 82801 USA**	
Manufacturer: **Address:**	**FIRLAKE LLC** **30 N Gould St Ste N, Sheridan, Wyoming 82801 USA**	
Factory: **Address:**	**FIRLAKE LLC** **30 N Gould St Ste N, Sheridan, Wyoming 82801 USA**	
E.U.T.:	**Bed-patient activity monitoring system**	
Model Number:	**HUB2, HUB2 Lite, HUB2 Pro, HUB2 Max, HUB2 Plus, HUB2 Ultra**	
Trade Name:	**N/A**	
FCC ID:	**2BNH8-HUB2**	
Date of Receipt:	**2025-1-6**	**Date of Test: 2025-1-6 to 2025-1-18**
Test Specification:	**FCC 47 CFR Part 15, Subpart C**	
Equipment Rule:	**The equipment under test was found to be compliance with the requirements of the standards applied.**	

Prepared by:

Jerry Hu/ Engineer

Date: 2025-1-15

Approved & Authorized Signer:

Frank Shen/ Manager

Issue Date: 2025-1-22

Other Aspects: None

Abbreviations: N/A=not applicable E.U.T.=equipment under tested

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Dongguan Lepont Service Co., Ltd.

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Revision History of This Test Report		
Report Number	Description	Issued Date
LP24100150C01-01	Initial Issue	2025-1-22

1. GENERAL PRODUCT INFORMATION

1.1 PRODUCT FUNCTION

Refer to Technical Construction Form and User Manual.

1.2 TEST DESCRIPTION OF DEVICE (EUT)

Product Name:	Bed-patient activity monitoring system
Model No.:	HUB2, HUB2 Lite, HUB2 Pro, HUB2 Max, HUB2 Plus, HUB2 Ultra
Test Model No:	HUB2
Difference:	The schematics and PCB Layout and modules of all models are the same, only the product size, weight, and whether the receiver accessories have screens are different
Serial No.:	N/A
Test sample(s) ID:	LP24100150C01-S001
Sample(s) Status	Engineer sample
Hardware:	N/A
Software:	N/A
Modulation :	OOK
Operating Frequency:	433.92MHz
Antenna Type :	Helical Antenna
Antenna Gain :	-3.63dBi
Power Supply:	☒DC 3V form Battery （Supplied by “AAA” Battery) ☐AC IP: N/A
Note: for more details, please refer to the User’s manual of the EUT.	

1.3 DESCRIPTION OF TEST MODES AND SOFTWARE

For All Emission	
Final Test Mode	Description
A	Keep the EUT in continuously transmitting mode
B	Keep the EUT Normal transmitting mode

Note: The EUT has been tested under its typical operating condition.
The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Software	Description
/	/

2. TEST STANDARDS AND SITES

2.1 DESCRIPTION OF STANDARDS AND RESULTS

The EUT have been tested according to the applicable standards as referenced below.

FCC Part Clause	Test Parameter	Verdict	Remark
15.231(c)	20dB Emission Bandwidth	PASS	
15.209 & 15.231(b)	Radiated Emissions	PASS	
15.203	Antenna Requirement	PASS	
15.207	Conducted Emission	N/A	
15.231(a)	Transmission Time	PASS	
NOTE1: N/A (Not Applicable)			

2.2 LIST OF TEST AND MEASUREMENT INSTRUMENTS

For RF test							
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	Lab No.	Remark
Spectrum analyzer	Rohde & Schwarz	FSV40	101412	Jan. 24, 2024	1 Year	LEP-E076	☑
Spectrum analyzer	Agilent	N9020A	MY49100060	Jan. 24, 2024	1 Year	LEP-E020	☑
Vector source	Agilent	N5182A	MY47420382	Jan. 24, 2024	1 Year	LEP-E021	☑
Analog signal source	Agilent	N5171B	MY51350292	Jan. 24, 2024	1 Year	LEP-E022	☑
All instrument	Rohde & Schwarz	CMW 500	1201.002K50	Jan. 24, 2024	1 Year	LEP-E019	☑
High and low temperature chamber	Math-mart	MT-1202-40	LEP-E041	Jan. 24, 2024	1 Year	LEP-E041	☑
control unit	Tonscend	JS0806-2	10165	Jan. 24, 2024	1 Year	LEP-E034	☑
Testing software	Tonscend	JSTS1120-3	Ver 2.6.77.0518	N/A	N/A	N/A	☑
For radiated(9K-30M) emission test(966 Chamber 1)							
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	Lab No.	Remark
EMI Test Receiver	Rohde & Schwarz	ESR 3	101849	Jan. 31, 2024	1 Year	LEP-E006	☑
Active Loop Antenna	Schwarzbeck	FMZB 1519C	00008	Feb. 02, 2024	3 Year	LEP-E068	☑
966 Chamber 1	MR	MR-L02	LEP-E051	Nov. 17, 2022	3 Year	LEP-E051	☑
Test software	EZ-EMC	Fala	EMEC-3A1	N/A	N/A	N/A	☑
For radiated(30M-1G) emission test(966 Chamber 1)							
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	Lab No.	Remark
EMI Test Receiver	Rohde & Schwarz	ESR 3	101849	Jan. 31, 2024	1 Year	LEP-E006	☑
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	743	Nov. 20, 2022	3 Year	LEP-E005	☑
Signal Amplifier	HP	8447D	1726A01222	Jan. 24, 2024	1 Year	LEP-E007	☐
6dB Attenuator	RswTech	5W 6dB	LEP-E084	Jan. 24, 2024	1 Year	LEP-E084	☐
966 Chamber 1	MR	MR-L02	LEP-E051	Nov. 17, 2022	3 Year	LEP-E051	☑
Test software	EZ-EMC	Fala	EMEC-3A1	N/A	N/A	N/A	☑

For radiated(1-18G) emission test(966 Chamber 1)							
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	Lab No.	Remark
Spectrum analyzer	Rohde & Schwarz	FSV40	101412	Jan. 24, 2024	1 Year	LEP-E076	☐
Spectrum analyzer	Agilent	N9020A	MY49100060	Jan. 24, 2024	1 Year	LEP-E020	☑
Horn antenna	Schwarzbeck	BBHA 9120D	01875	Nov. 20, 2022	3 Year	LEP-E024	☑
Preamplifier	Schwarzbeck	BBN 9718B	00010	Jan. 24, 2024	1 Year	LEP-E025	☑
966 Chamber 1	MR	MR-L02	LEP-E051	Nov. 17, 2022	3 Year	LEP-E051	☑
Test software	EZ-EMC	Fala	EMEC-3A1	N/A	N/A	N/A	☑

2.3 MEASUREMENT UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	±1x10^-5
Maximum Peak Output Power Test	±1.0%
Conducted Emissions Test	±3.08dB
Radiated Emission Test	±4.60dB
Power Density	±0.9%
Occupied Bandwidth Test	±2.3%
Band Edge Test	±1.2%
Antenna Port Emission	±3dB
Temperature	±3.2%
Humidity	±2.5%
Measurement Uncertainty for a level of Confidence of 95%	

2.4 TEST FACILITY

EMC Lab. : The Laboratory has been assessed and proved to be in compliance with CNAS/CL01
The Certificate Registration Number is L10100.
The Laboratory has been assessed and proved to be in compliance with A2LA
The Certificate Registration Number is 6901.01

FCC Designation No.: CN1351
Test Firm Registration No.: 397428

ISED CAB identifier: CN0151
Test Firm Registration No.: 20133

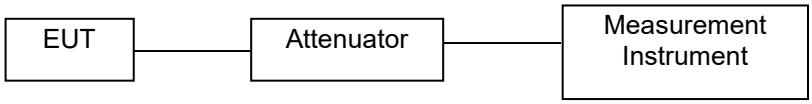
Test Location (Others) : Dongguan Lepont Testing Service Co., Ltd.

Address : Room 102, Building 11, No.7, Houjie Science And Technology Avenue, Houjie, Dongguan, Guangdong, China

3. SETUP OF EQUIPMENT UNDER TEST

3.1 RADIO FREQUENCY TEST SETUP 1

The component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



3.2 RADIO FREQUENCY TEST SETUP 2

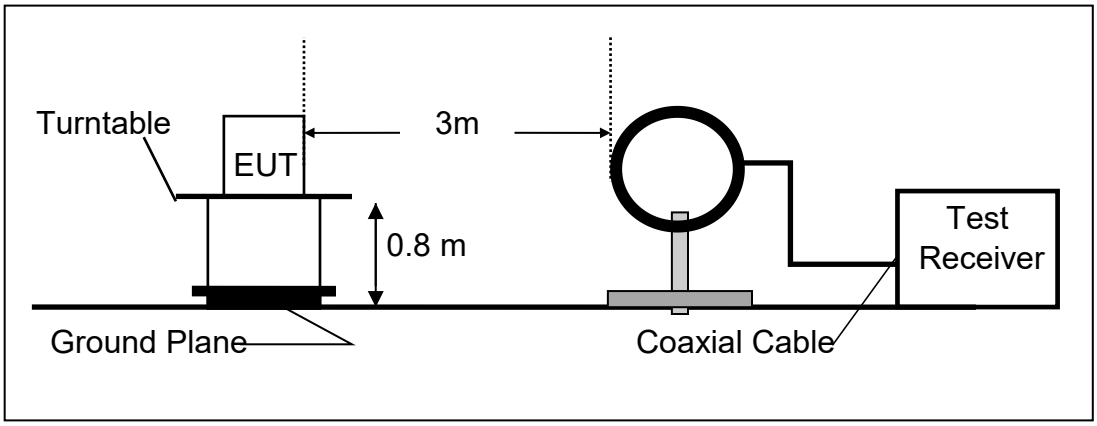
The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 32.

Below 30MHz：
The EUT is placed on a turntable 0.8meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

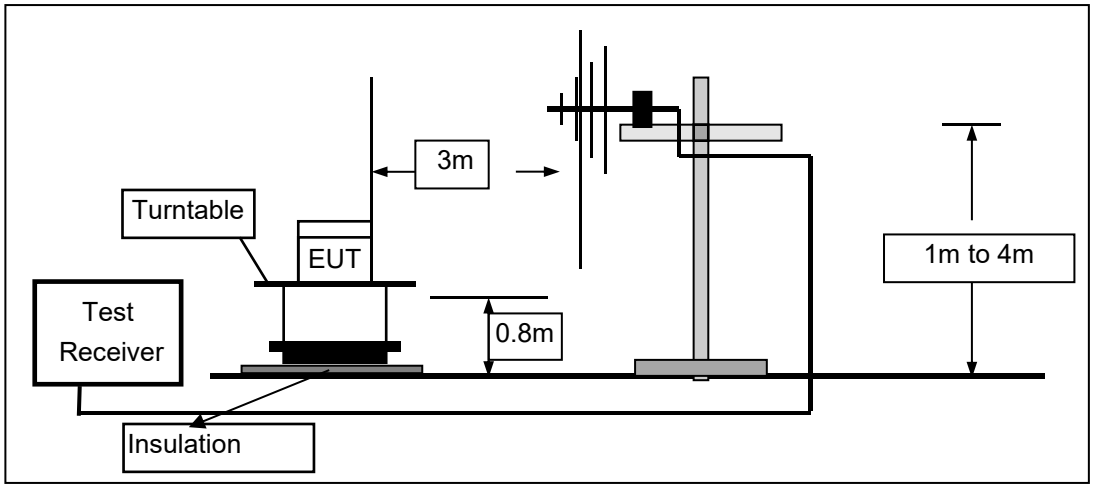
Above 30MHz：
The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Above 1GHz:
(Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.)
The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

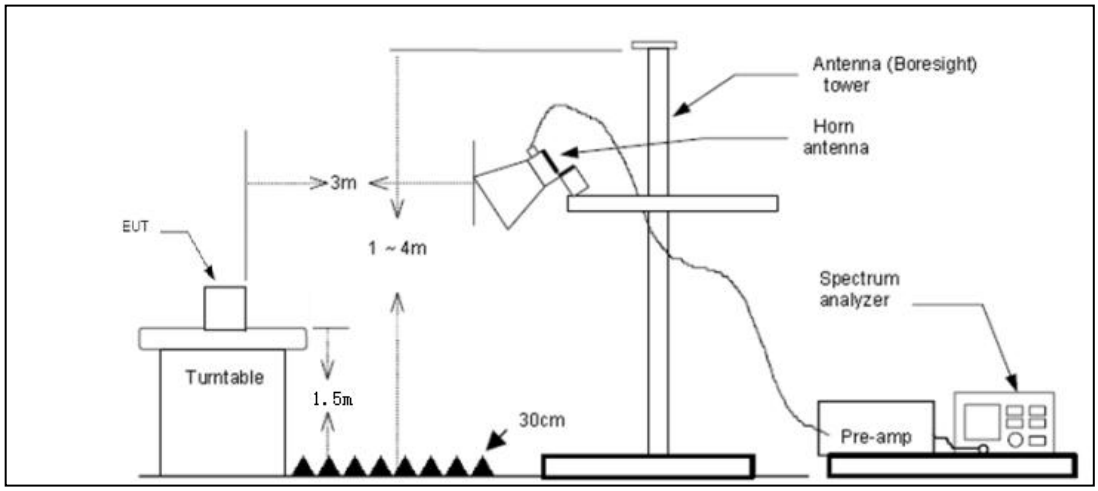
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz

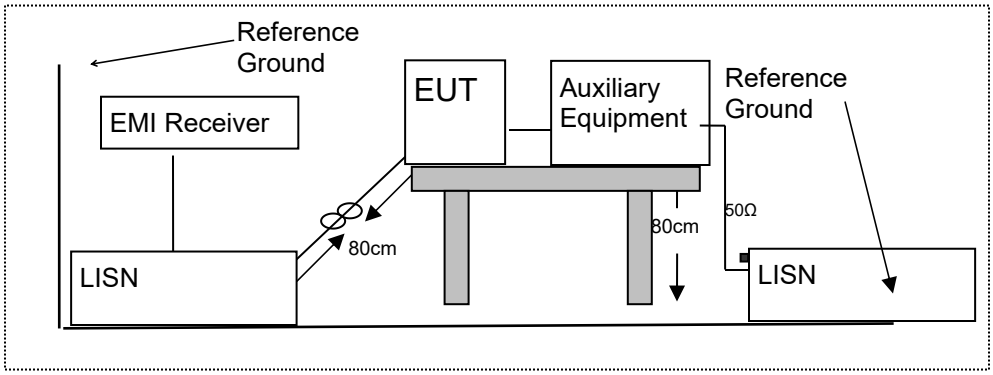


(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

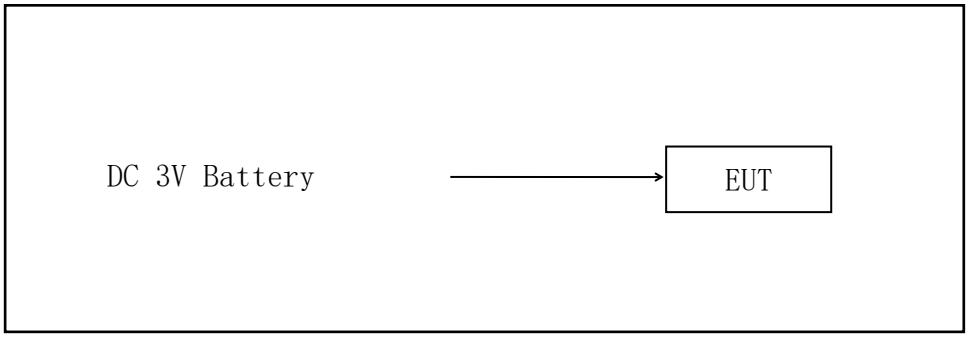


3.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.
Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.8 m.
According to the requirements in ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



3.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



3.5 SUPPORT EQUIPMENT

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite

Auxiliary Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Laptop computer	Lenovo	Xiaoxin Pro IA5HR	PF490VB0
AC Load	/	3000W	/

Notes:

1.All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2.Grounding was established in accordance with the manufacturer’s requirements and conditions for the intended use.

4. TEST REQUIREMENTS

4.1 20DB EMISSION BANDWIDTH

4.1.1 Applicable Standard

According to FCC part 15.231(c)

4.1.2 Conformance 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.

4.1.3 Test Configuration

Test according to clause 3.1 radio frequency test setup 1

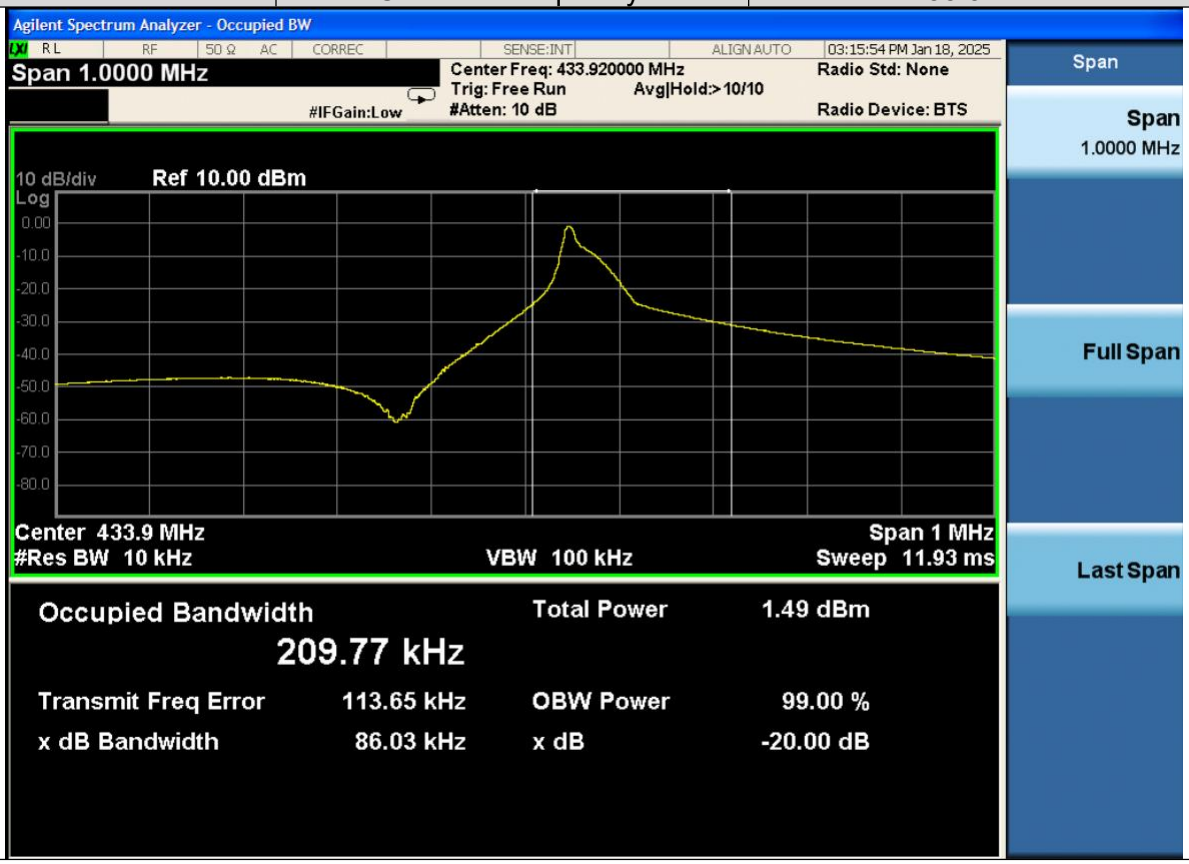
4.1.4 Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
Set to the maximum power setting and enable the EUT transmit continuously
Set RBW = 1-5%OBW.
Set the video bandwidth (VBW) = ≥RBW.
Set Span= > Measurement Bandwidth or Channel Separation(approximately 2 to 3 times the 20 dB bandwidth)
Set Detector = Peak.
Set Trace mode = max hold.
Set Sweep = auto couple.
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.
If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.
Measure and record the results in the test report.

Test Results

Modulation Mode	Channel Number	Channel Frequency (MHz)	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
OOK	1	433.92	253.79	≤1084.8	PASS
Note: Limit=0.5% of the center frequency=433.92MHz * 0.25% = 1084.8KHz					

Test Model	20dB EMISSION BANDWIDTH	
	Modulation:	OOK
	Channel Frequency:	433.92MHz



Note: The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.
Note: Because the measured signal is CW-like, adjusting the RBW per C63.10 would not be practical since measurement bandwidth will always follow the RBW. The RBW is set to 10Hz to perform the occupied bandwidth test.

4.2 TRANSMISSION CEASE TIME

4.1.1 Applicable Standard

According to FCC part 15.231(a)

4.1.2 Conformance Limit

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

4.1.3 Test Configuration

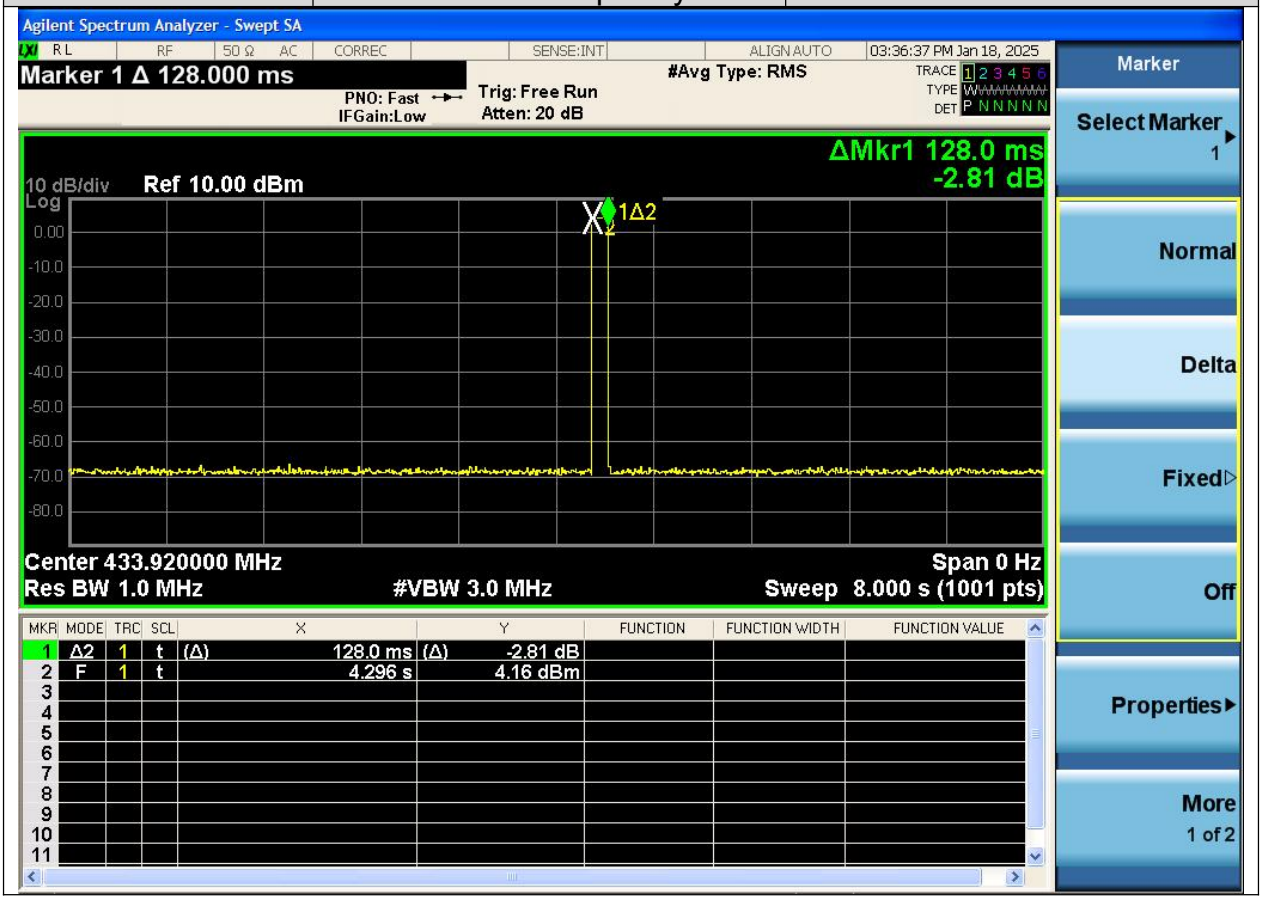
Test according to clause 3.1 radio frequency test setup

4.1.4 Test Procedures

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the transmission duration was measured and recorded.

Frequency MHz	Transmission Cease Time	Limit	Result
433.92	0.128S	5s	Pass

Test Model	Transmission Cease Time	
	Modulation:	OOK
	Channel Frequency:	433.92MHz



4.3 CALCULATION OF AVERAGE FACTOR

The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span at 1000kHz resolution bandwidth.

Averaging factor in dB =20log (duty cycle)

The duration of one cycle =25.32ms

The duty cycle is simply the on-time divided the duration of one cycle

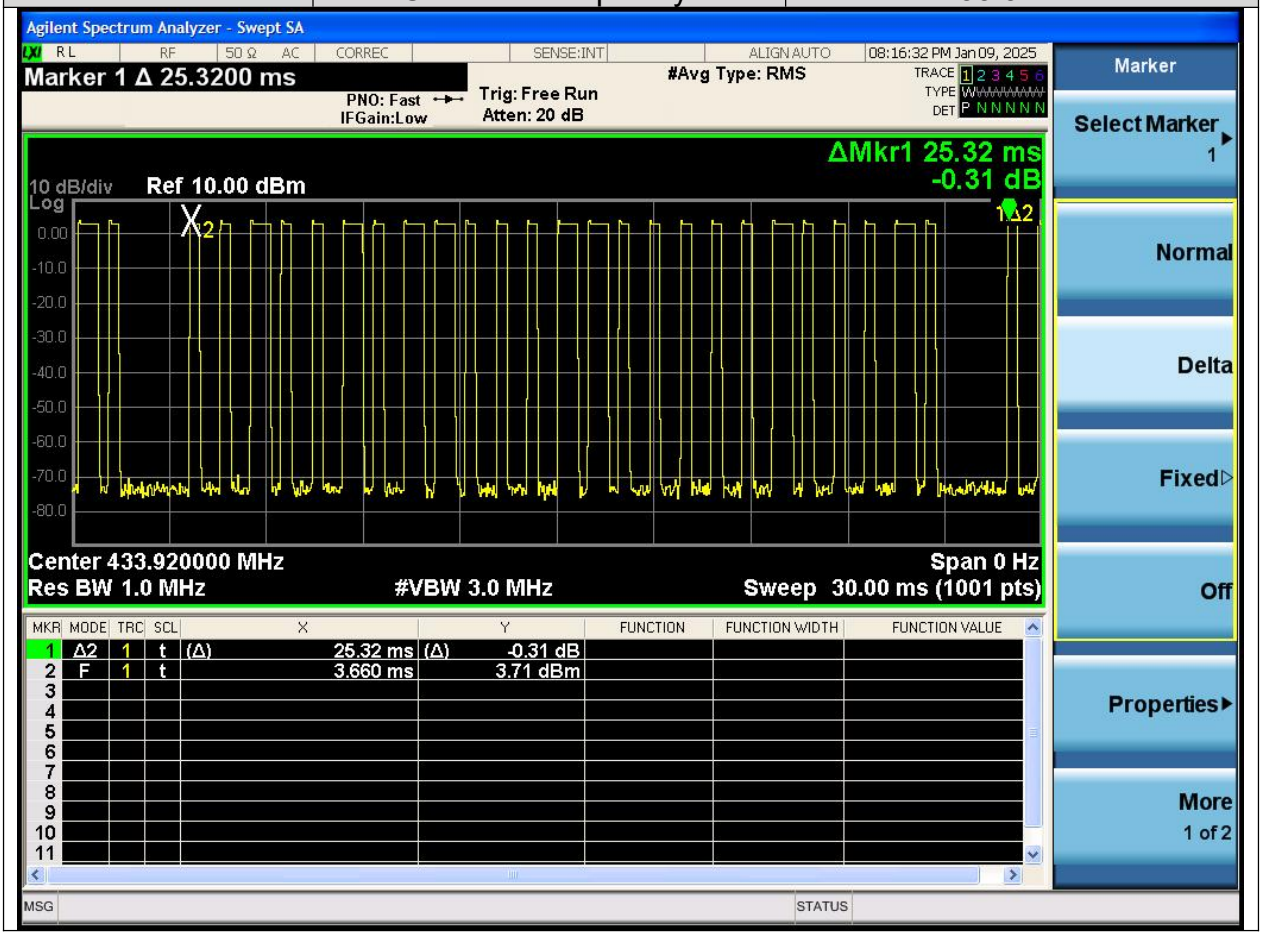
Duty Cycle = (0.27*17+0.6*8)ms/25.32=9.39ms/25.32ms=0.3709

Therefore, the averaging factor is found by 20log0.3709= -8.614dB

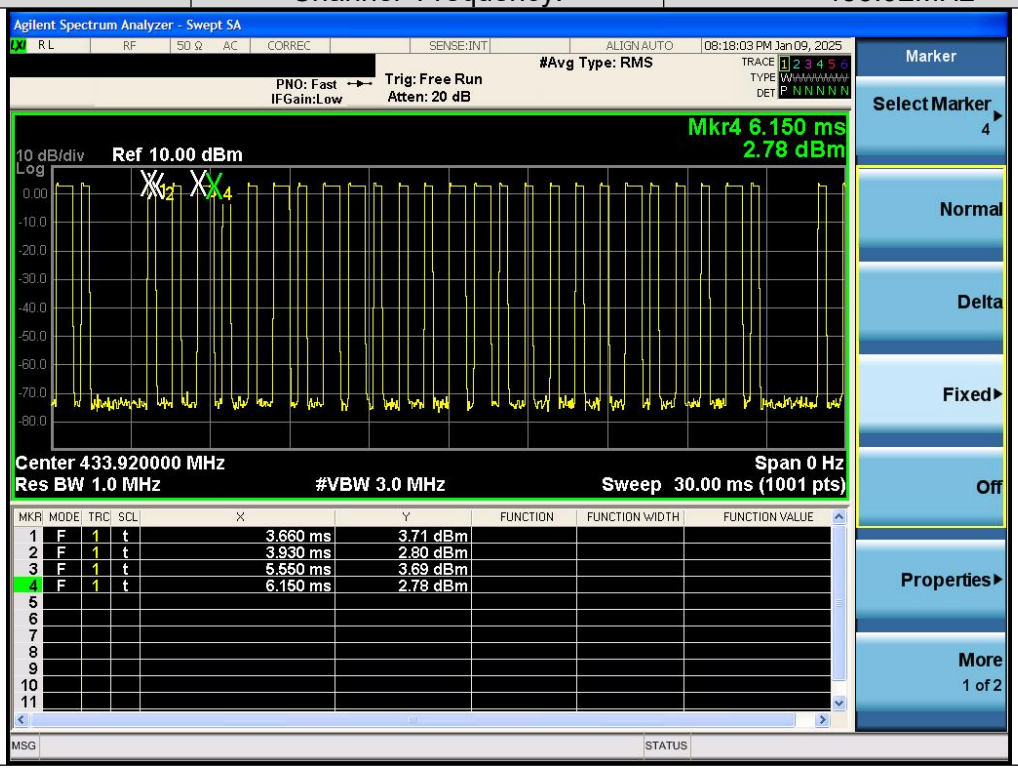
Test Result

Duty Cycle：	(0.27*17+0.6*8)ms/25.32=9.39ms/25.32ms=0.3709
Duty Cycle Correction Factor：	20lg(0.3709)=-8.614

Test Model	Duty Cycle	
	Modulation:	OOK
	Channel Frequency:	433.92MHz



Test Model	On Time	
	Modulation:	OOK
	Channel Frequency:	433.92MHz



4.4 RADIATED SPURIOUS EMISSION

4.1.1 Applicable Standard

According to FCC Part 15.231(b) and 15.209

4.1.2 Conformance Limit

Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following:
According to FCC Part 15.231 the field strength Limited

Frequencies (MHz)	Field strength of fundamental @3m	
	(Microvolts /meter)	(Microvolts /meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750**	125 to 375**
174-260	3750	375
260-470	**3750 to 12500***	**375 to 1250***
Above 470	12500	1250
[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, μV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]		

FCC Part15 (15.231) , Subpart C		
Fundamental Frequency	Field Strength Of Fundamental	Field Strength of Spurious Emissions
433.92MHz	AV:80.82 dBuV/m at 3m distance	AV:54 dBuV/m at 3m distance
	PK:100.82dBuV/m at 3m distance	PK:74 dBuV/m at 3m distance

According to FCC Part15.205, Restricted bands

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
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	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	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	300	See the remark
0.490~1.705	24000/F(KHz)	30	
1.705~30.0	30	30	
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remark :1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

4.1.3 Test Configuration

Test according to clause 6.2 radio frequency test setup 2

4.1.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 100 kHz for f < 1 GHz(30MHz to 1GHz), 200Hz for f<150KHz(9KHz to 150KHz), 9KHz for f<30MHz(150KHz to 30MHz),1MHz for f<5GHz

VBW ≥ RBW Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

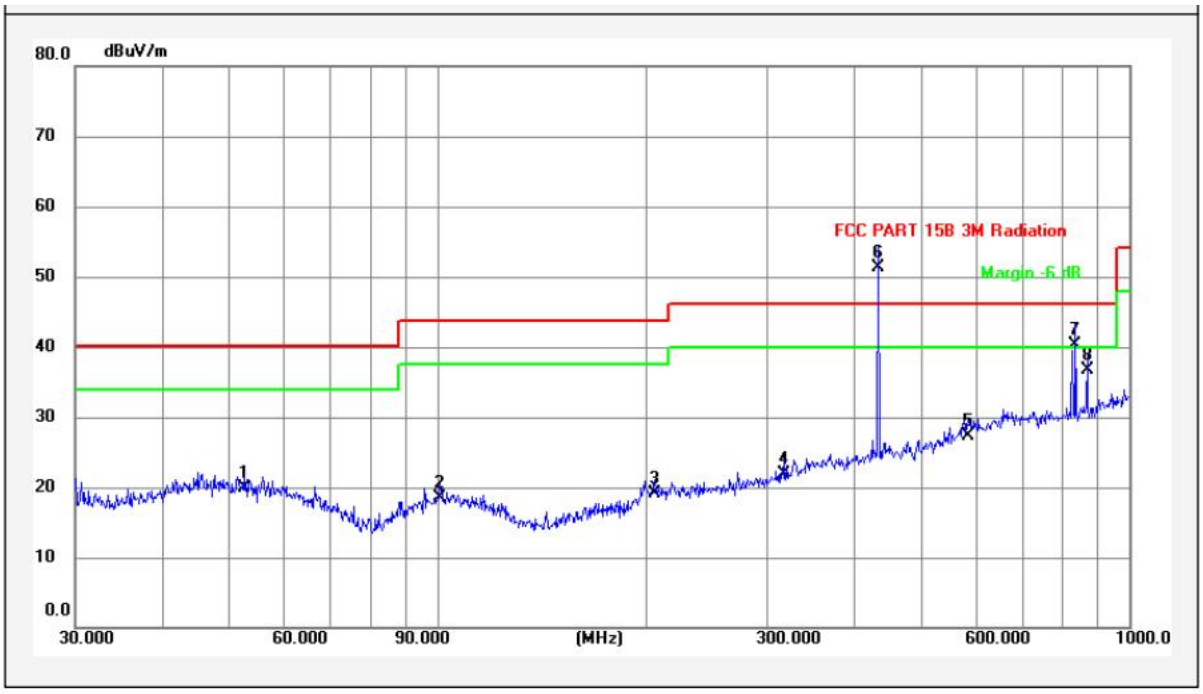
■ Spurious Emission below 30MHz (9KHz to 30MHz)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor

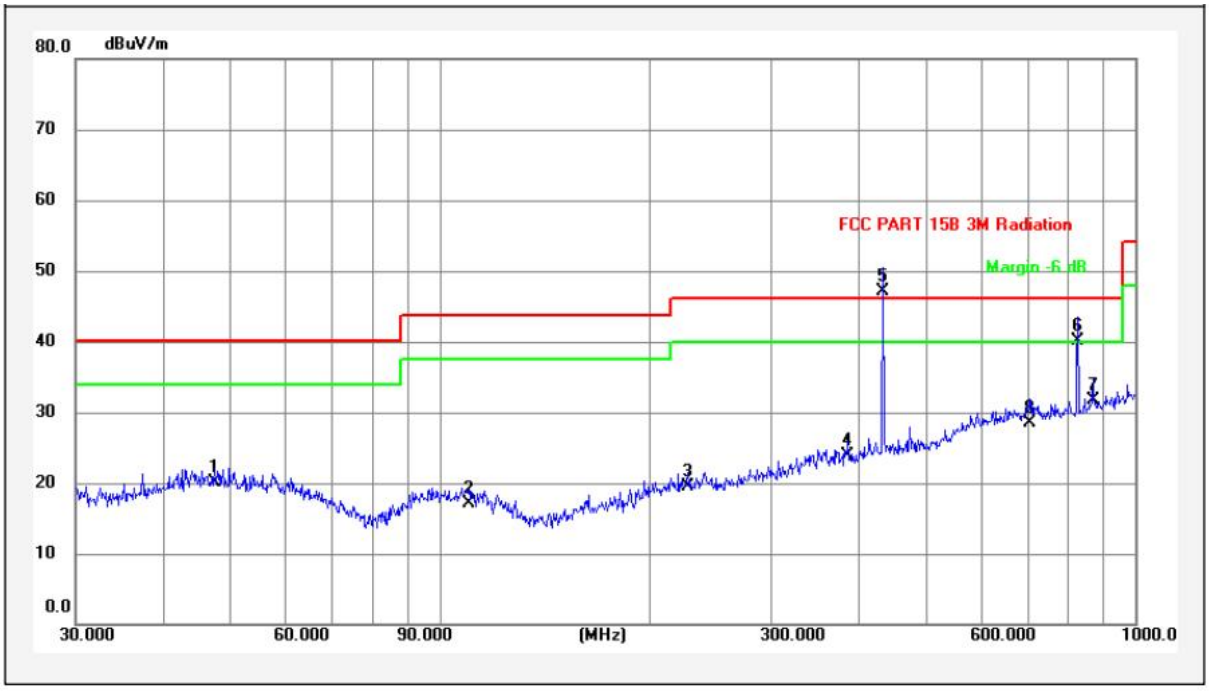
■ Spurious Emission below 1GHz (30MHz to 1GHz)

Test Model:	HUB2	TX	Test Voltage:	DC 3V
Temperature:	21.3℃		Phase:	Vertical
Relative Humidity:	42%		Pressure:	101.4KPa



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	MK.	Remark
1	52.5752	12.14	7.78	19.92	40.00	-20.08	QP		
2	100.9338	10.54	7.93	18.47	43.50	-25.03	QP		
3	206.3975	10.85	8.30	19.15	43.50	-24.35	QP		
4	316.5889	13.14	8.79	21.93	46.00	-24.07	QP		
5	584.7894	18.44	8.96	27.40	46.00	-18.60	QP		
6	433.9200	15.36	35.94	51.30	46.00	5.30	QP	*	
7	836.2441	21.06	19.24	40.30	46.00	-5.70	QP	!	
8	867.8400	21.39	15.41	36.80	46.00	-9.20	QP		

Test Model:	HUB2	TX	Test Voltage:	DC 3V
Temperature:	21.3℃		Phase:	Horizontal
Relative Humidity:	42%		Pressure:	101.4KPa



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	MK.	Remark
1	47.4917	12.59	7.57	20.16	40.00	-19.84	QP		
2	110.1816	9.94	7.20	17.14	43.50	-26.36	QP		
3	227.6904	11.01	8.54	19.55	46.00	-26.45	QP		
4	386.6338	14.63	9.32	23.95	46.00	-22.05	QP		
5	433.9200	15.36	31.84	47.20	46.00	1.20	QP	*	
6	827.4932	20.97	19.13	40.10	46.00	-5.90	QP	!	
7	867.8400	21.39	10.31	31.70	46.00	-14.30	QP		
8	706.6997	20.05	8.55	28.60	46.00	-17.40	QP		

■ For Fundamental radiation, Harmonic radiation：

Test model:	HUB2			TX			
Frequency	Peak Emission Level	Duty cycle factor	AV Emission Level	Limits	Margin	Detector Type	Ant. Pol.
(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
433.92	51.3	-0.3709	50.929	100.82	49.891	peak	H
867.84	36.8	-0.3709	36.429	100.82	64.391	peak	H
433.92	47.2	-0.3709	46.829	80.82	33.991	peak	V
867.84	31.7	-0.3709	31.329	80.82	49.491	peak	V

Notes: 1. Average emission Level = Peak Level + Duty cycle factor

2. Duty cycle level please see clause 6.

■ Spurious Emission Above 1GHz

Test mode:	TX

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
2173	51.14	-5.64	45.5	74	-28.5	peak	V
2190	38.31	-5.59	32.72	54	-21.28	AVG	V
2411	66.87	-4.74	62.13	74	-11.87	peak	V
2428	54.17	-4.68	49.49	54	-4.51	AVG	V
3040	66.66	-2.45	64.21	74	-9.79	peak	V
3057	52.5	-2.42	50.08	54	-3.92	AVG	V
3465	51.8	-1.68	50.12	74	-23.88	peak	V
3482	31.21	-1.65	29.56	54	-24.44	AVG	V

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
2190	58.53	-5.59	52.94	74	-21.06	peak	H
2190	46.56	-5.59	40.97	54	-13.03	AVG	H
2428	66.03	-4.68	61.35	74	-12.65	peak	H
2428	53.43	-4.68	48.75	54	-5.25	AVG	H
3057	71.86	-2.42	69.44	74	-4.56	peak	H
3057	52.21	-2.42	49.79	54	-4.21	AVG	H
3924	62.47	-0.95	61.52	74	-12.48	peak	H
3924	50.24	-0.95	49.29	54	-4.71	AVG	H

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4.5 CONDUCTED EMISSION TEST

4.1.1 Applicable Standard

According to FCC Part 15.207(a)

4.1.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50
Note: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

4.1.3 Test Configuration

Test according to clause 7.3 conducted emission test setup

4.1.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

Test Results

Note: EUT power supply by battery, so the test not applicable.

5. ANTENNA APPLICATION

5.1 ANTENNA REQUIREMENT

Standard	Requirement
FCC CRF Part 15.203	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, or §15.221. 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.

For intentional device, according to FCC 47 CFR Section 15.203, 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.2 RESULT

PASS.

The EUT has 1 antenna: a Helical Antenna for OOK model, the gain is -3.63 dBi;

☒ Antenna use a permanently attached antenna which is not replaceable.
☐ Not using a standard antenna jack or electrical connector for antenna replacement
☐ The antenna has to be professionally installed (please provide method of installation)

Note: which in accordance to section 15.203, please refer to the internal photos.

--------- END OF REPORT --------