FCC TEST REPORT
FCC ID:2AH4J-PANEL420

Report Number	ZHT-240416040E
Date of Test	Apr. 16, 2024 to May 28, 2024
Date of issue	May 28, 2024
Test Result	PASS
Testing Laboratory	Guangdong Zhonghan Testing Technology Co., Ltd
Address	Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Applicant's name	Consumer 2.0
Address	6300 Wilshire Blvd Suite 620, Los Angeles, CA 90048,United States
Manufacturer's name	Consumer 2.0
Address	6300 Wilshire Blvd Suite 620, Los Angeles, CA 90048,United States
Standard	FCC CFR Title 47 Part 15 Subpart C Section 15.225 ANSI C63.10:2013

This device described above has been tested by ZHT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Product name	Rently Access Panel with Intercom
Trademark	/
Model/Type reference	PANEL420
Model difference	/
Ratings	Input: DC12 V-24V ⎓ 2 A

Testing procedure and testing location:

Testing Laboratory.....:	**Guangdong Zhonghan Testing Technology Co., Ltd**
Address.....:	Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Tested by (name + signature).....:	Leon Li
Reviewer (name + signature).....:	Baret Wu
Approved (name + signature).....:	Levi Lee

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1.VERSION

Report No.	Version	Description	Approved
ZHT-23081014E	Rev.01	Initial issue of report	May 28, 2024

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.225) , Subpart C			
Standard Section	Test Item	Judgment	Remark
FCC part 15.203	Antenna requirement	PASS	
FCC part 15.207	AC Power Line Conducted Emission	N/A	
FCC part 15.225(a)(b)(c)(d)	Fundamental &Radiated Spurious Emission Measurement	PASS	
FCC part 15.215	Channel Bandwidth	PASS	
FCC part 15.225(e)	Frequency Tolerance	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

2.1 TEST FACILITY

Guangdong Zhonghan Testing Technology Co., Ltd.
Add. : Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District Shenzhen, Guangdong, China

FCC Registration Number:255941
Designation Number: CN0325
IC Registered No.: 29832
CAB identifier: CN0143

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U · where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2 · providing a level of confidence of approximately 95 % 。

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF conducted power	±0.16dB
3	Conducted spurious emissions	±0.21dB
4	All radiated emissions (9k-30MHz)	±4.68dB
5	All radiated emissions (<1G)	±4.68dB
6	All radiated emissions (>1G)	±4.89dB
7	Temperature	±0.5°C
8	Humidity	±2%
9	Occupied Bandwidth	±4.96dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

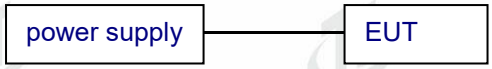
Product Name:	Rently Access Panel with Intercom
Model No.:	PANEL420
Model Different:	/
Hardware Version:	V1.0
Software Version:	V1.0
Sample(s) Status:	Engineer sample
Operation Frequency:	13.56MHz
Channel Numbers:	1
Channel Separation:	N/A
Modulation Type:	ASK
Antenna Type:	PCB antenna
Antenna gain:	0dBi
Power supply:	Input: DC12 V-24V ⎓ 2 A

3.2 DESCRIPTION OF TEST MODES

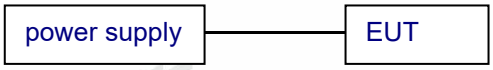
Transmitting mode	Keep the EUT in continuously transmitting NFC mode
Remark: EUT use new battery during the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Emission



Conducted Spurious



3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Equipment	Manufacturer	Model	Last Cal.	Next Cal.
1	Receiver	R&S	ESCI	May 10, 2024	May 09, 2025
2	Loop antenna	EMCI	LAP600	May 10, 2024	May 09, 2025
3	Amplifier	Schwarzbeck	BBV 9743 B	May 10, 2024	May 09, 2025
4	Amplifier	Schwarzbeck	BBV 9718 B	May 10, 2024	May 09, 2025
5	Bilog Antenna	Schwarzbeck	VULB9168	Aug. 04, 2024	Aug. 03, 2025
6	Horn Antenna	Schwarzbeck	BBHA9120D	May 16, 2024	May 15, 2025
7	Horn Antenna	A.H.SYSTEMS	SAS574	May 10, 2024	May 09, 2025
8	Amplifier	AEROFLEX	100KHz-40GHz	May 10, 2024	May 09, 2025
9	Spectrum Analyzer	R&S	FSV40	May 16, 2024	May 15, 2025
10	966 Anechoic Chamber	EMToni	9m6m6m	Nov. 25, 2021	Nov. 24, 2024
11	Spectrum Analyzer	KEYSIGHT	N9020A	May 10, 2024	May 09, 2025
12	WIDBAND RADIO COMMUNICATION TESTER	R&S	CMW500	May 10, 2024	May 09, 2025
13	Single Generator	Agilent	N5182A	May 10, 2024	May 09, 2025
14	Power Sensor	MWRFtest	MW100-RFCB	May 10, 2024	May 09, 2025
15	Audio analyzer	R&S	UPL	May 10, 2024	May 09, 2025
16	Single Generator	R&S	SMB100A	May 10, 2024	May 09, 2025
17	Power Amplifier Shielding Room	EMToni	2m3m3m	Nov. 25, 2021	Nov. 24, 2024

Conduction Test equipment

Equipment	Manufacturer	Model	Last Cal.	Next Cal.
Receiver	R&S	ESCI	May 10, 2024	May 09, 2025
LISN	R&S	ENV216	May 10, 2024	May 09, 2025
ISN CAT 6	Schwarzbeck	NTFM 8158	May 10, 2024	May 09, 2025
ISN CAT 5	Schwarzbeck	CAT5 8158	May 10, 2024	May 09, 2025
Capacitive Voltage Probe	Schwarzbeck	CVP 9222 C	May 10, 2024	May 09, 2025
Current Transformer Clamp	Schwarzbeck	SW 9605	May 10, 2024	May 09, 2025
CE Shielding Room	EMToni	9m4m3m	Nov. 25, 2021	Nov. 24, 2024

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quas-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

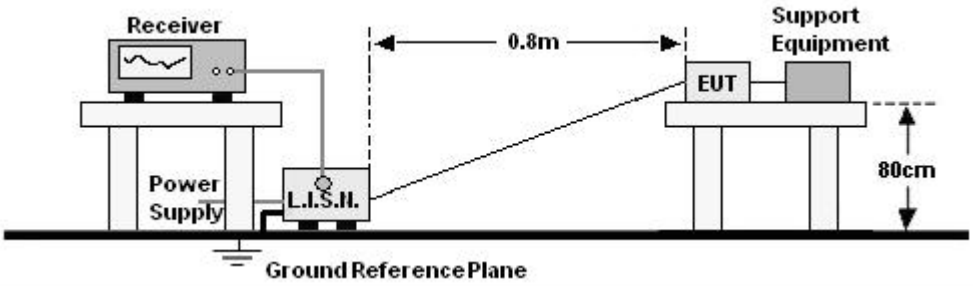
4.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

4.1.6 TEST RESULTS

The Product is powered by the DC only, the test item is not applicable.

4.2 RADIATED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 1GHz
Test site:	Measurement Distance: 3m
Receiver setup:	See table below

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Note: According to §15.209, the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

4.2.1 RADIATED EMISSION LIMITS

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Field Strength of Fundamental Limit:
a. The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters. 15,848 microvolts/meter at 3 meters=124 dBuV/m.
b. Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters. 334 microvolts/meter at 3 meters=90.47 dBuV/m.

4.2.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.
g. For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.
The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
Note:

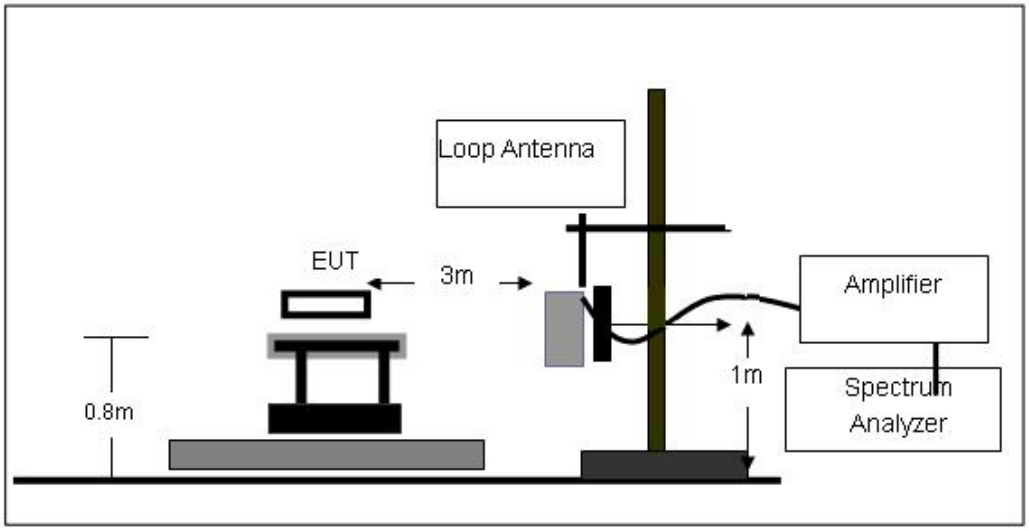
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

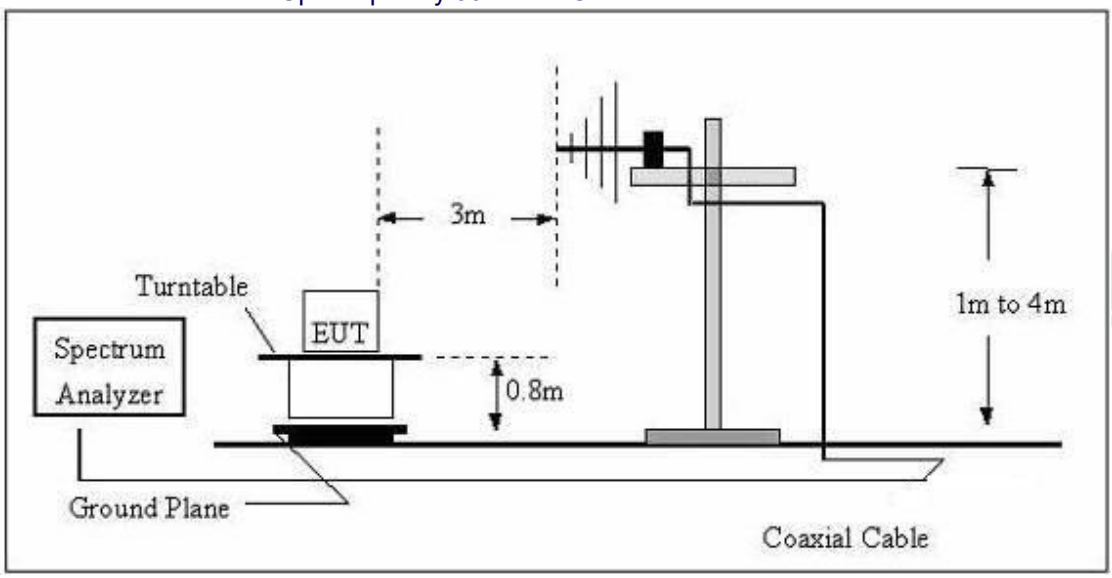
No deviation

4.2.4 TEST SETUP

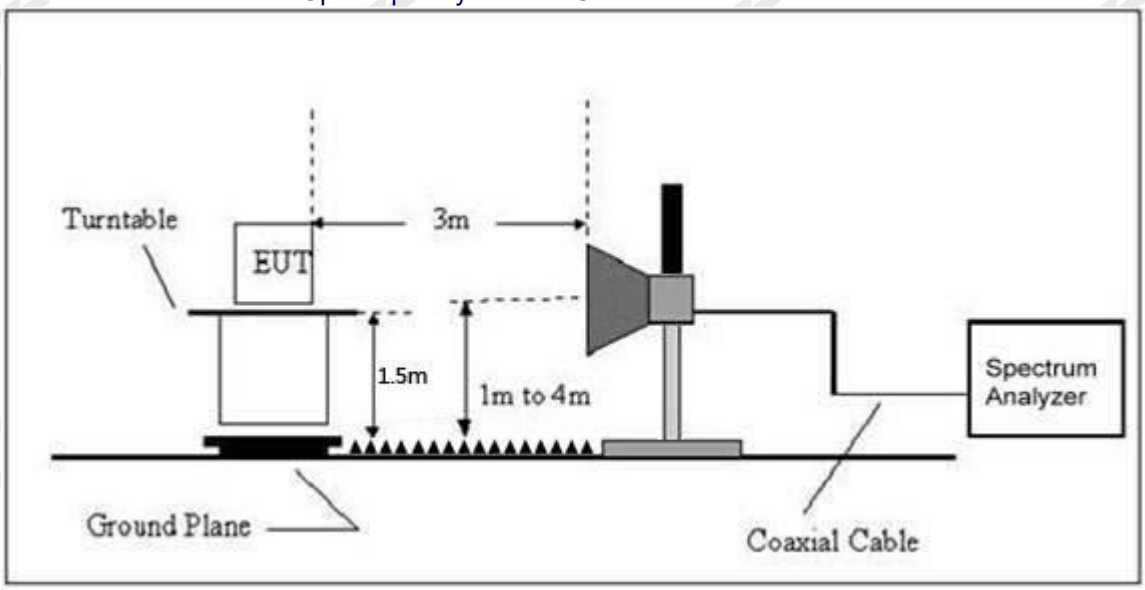
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz

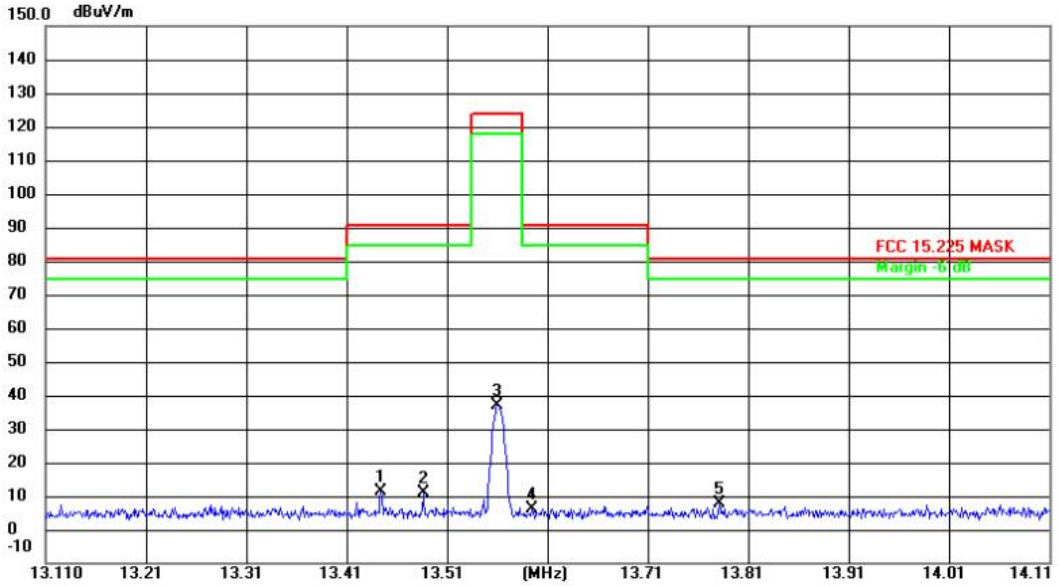


4.2.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

4.2.6 TEST RESULTS

Field Strength of Fundamental



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	13.4440	-9.09	20.66	11.57	90.50	-78.93	peak
2	13.4860	-9.64	20.75	11.11	90.50	-79.39	peak
3	13.5600	16.00	20.86	36.86	124.00	-87.14	peak
4	13.5940	-14.61	20.91	6.30	90.50	-84.20	peak
5 *	13.7810	-13.40	21.24	7.84	80.50	-72.66	peak

Between 9KHz – 30 MHz

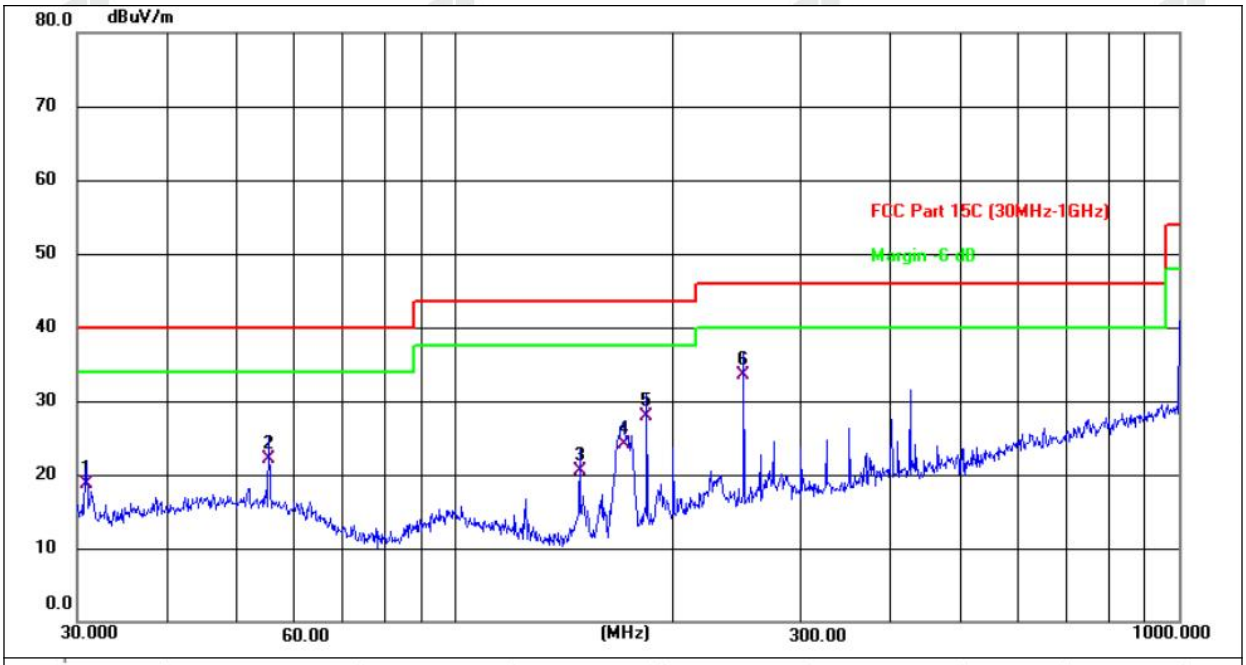
Note: Limit dBuV/m @3m = Limit dBuV/m @300m+ 80
Limit dBuV/m @3m = Limit dBuV/m @30m + 40
9 kHz~30 MHz

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(kHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
40.03	56.37	15.15	71.52	115.76	-44.24	AVG
85.15	52.22	15.2	67.42	108.75	-41.33	AVG
303.14	55.07	16.33	71.4	97.94	-26.54	AVG
1249.20	32.67	16.87	49.54	65.4	-15.86	QP
2425.11	27.17	17.62	44.79	69.54	-24.75	QP
4818.62	25.15	18.32	43.47	69.54	-26.07	QP
6318.17	20.82	18.64	39.46	69.54	-30.08	QP
8365.66	18.61	19.26	37.87	69.54	-31.67	QP
12558.78	18.54	19.32	37.86	69.54	-31.68	QP

Note:
Pre-scan in the all of mode, the worst case in of was recorded.
Factor = antenna factor + cable loss – pre-amplifier.
Margin = Emission Level- Limit.

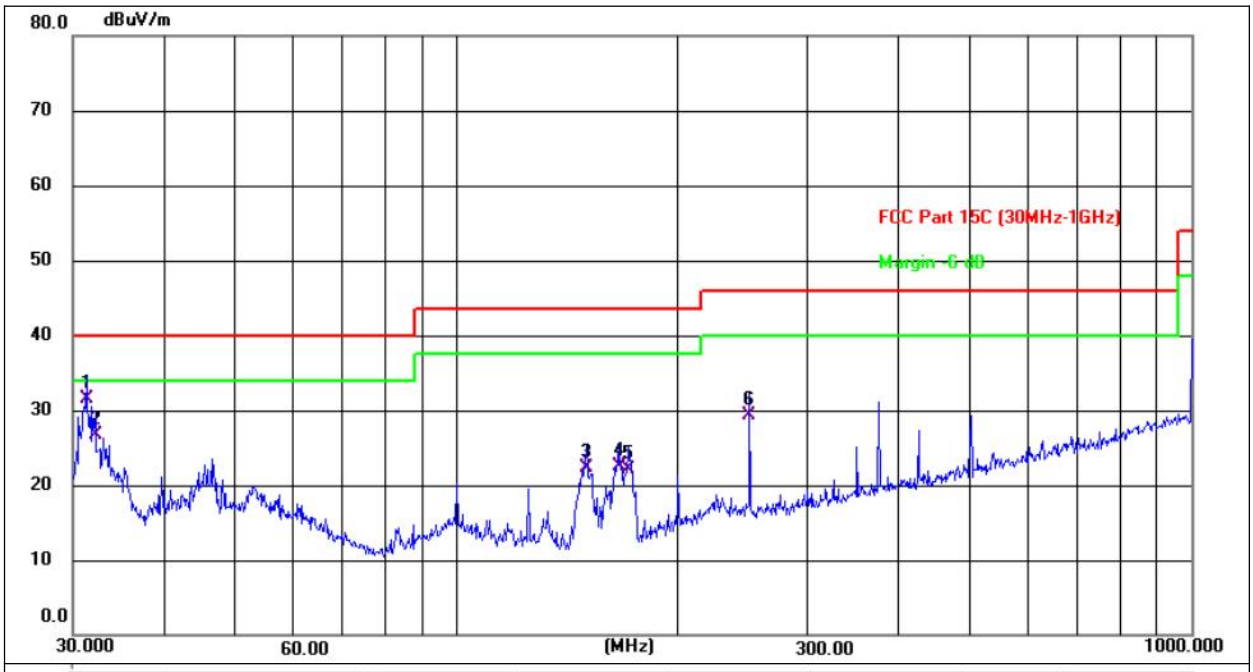
Between 30MHz – 1GHz

Temperature：	25.1℃	Relative Humidity：	50%
Pressure：	101kPa	Polarization：	Horizontal
Test Voltage ：	DC 12V		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.9618	30.07	-11.28	18.79	40.00	-21.21	QP
2	55.2207	31.32	-9.31	22.01	40.00	-17.99	QP
3	148.4410	34.53	-13.95	20.58	43.50	-22.92	QP
4	170.7923	36.98	-12.85	24.13	43.50	-19.37	QP
5	183.8440	39.91	-12.05	27.86	43.50	-15.64	QP
6 *	250.3010	42.59	-9.06	33.53	46.00	-12.47	QP

Temperature :	25.1℃	Relative Humidity :	50%
Pressure :	101kPa	Polarization :	Vertical
Test Voltage :	DC 12V		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	31.2892	42.73	-11.23	31.50	40.00	-8.50	QP
2	32.1794	37.70	-11.07	26.63	40.00	-13.37	QP
3	150.0107	36.32	-14.01	22.31	43.50	-21.19	QP
4	166.0680	35.60	-13.11	22.49	43.50	-21.01	QP
5	171.3925	34.89	-12.82	22.07	43.50	-21.43	QP
6	250.3010	38.29	-9.06	29.23	46.00	-16.77	QP

Remarks:
1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2.The emission levels of other frequencies are very lower than the limit and not show in test report.

5. FREQUENCY TOLERANCE

Test Requirement:	FCC Part15 C Section 15.225(e)
Test Method:	ANSI C63.10:2013

5.1 LIMIT

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment,
the equipment tests shall be performed using a new battery.

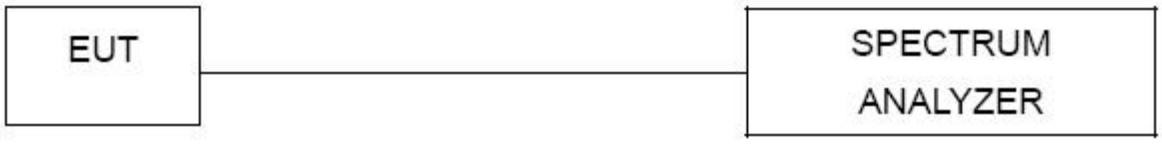
Limit: ±0.01% of 13.56MHz=±1356Hz

5.2 TEST PROCEDURE

1. Set RBW = 10 kHz.
2. Set the video bandwidth (VBW) ≥RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. The transmitter output (antenna port) was connected to the spectrum analyzer.

5.3 DEVIATION FROM TEST STANDARD
No deviation

5.4 TEST SETUP



5.5 TEST RESULT

Test Conditions			Frequency Deviation		Limit
Frequency MHz	Power(Vdc)	Temperature (℃)	Measured Freq. (MHz)	Deviation (%)	
13.56	Normal	-20	13.56110	0.00082	±0.01%
	Normal	-10	13.56105	0.00079	
	Normal	0	13.56103	0.00077	
	Normal	10	13.56106	0.00077	
	Normal	20	13.56015	0.00035	
	Normal	30	13.56068	0.00005	
	Normal	40	13.56114	0.00080	
	Normal	50	13.56093	0.00069	
	Normal*85%	20	13.56076	0.00064	
	Normal *115%	20	13.56105	0.00074	

6. CHANNEL BANDWIDTH

Test Requirement:	FCC Part15 C Section 15.215
Test Method:	ANSI C63.10: 2013

6.1 APPLIED PROCEDURES / LIMIT

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equip compliance with the 20dB attenuation specification may base on measurement at the intentional radiator's antenna output terminal unless the intentional radiator uses a permanently attached antenna, in which case compliance shall be deomonstrated by measuring the radiated emissions.

6.2 TEST PROCEDURE

1. Set RBW = 3 kHz.
2. Set the video bandwidth (VBW) ≥RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP

6.5 EUT OPERATION CONDITIONS

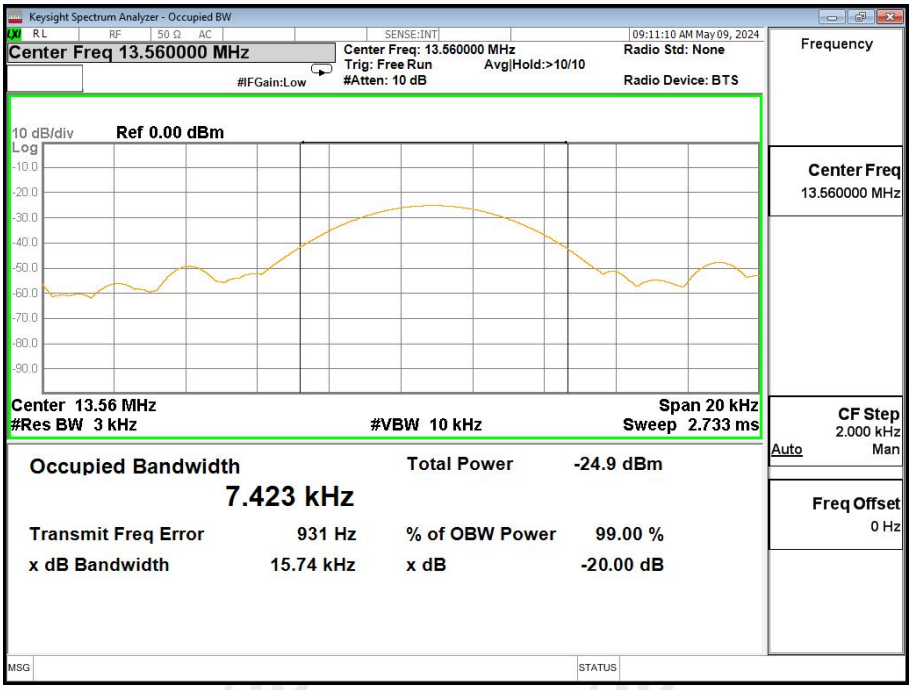
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULT

Temperature：	25.8℃	Relative Humidity：	52%
Test Mode ：	ASK	Test Voltage ：	DC 12V

Test channel	20dB Channel Bandwidth (KHz)	Result
1	15.74	Pass

CH 01



7.ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203
15.203 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 permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.	
EUT Antenna:	
The antennas is PCB antenna, the best case gain of the antennas is 0dBi, reference to the appendix II for details	

8. TEST SETUP PHOTO

Reference to the appendix I for details.

9. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

※※※※※ **END OF REPORT** ※※※※※