

FCC Test Report

Report No.: RWAZ202300129M

Applicant: Shenzhen Youmi Intelligent Technology Co., Ltd.

Address: 406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China

Product Name: Smart phone

Product Model: PG2311GBA

Multiple Models: N/A

Trade Mark: UMIDIGI

FCC ID: 2ATZ4-G6

Standards: FCC CFR Title 47 Part 15C (§15.225)

Test Date: 2024/01/25~2024/03/14

Test Result: Complied

Report Date: 2024/03/19

Reviewed by:

Abel Chen

Approved by:

Jacob Kong

Abel Chen
Project Engineer

Jacob Kong
Manager

Prepared by:

World Alliance Testing and Certification (Shenzhen) Co., Ltd

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Revision History

Version No.	Issued Date	Description
00	19, Mar, 2024	<i>Original</i>

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1 General Information

1.1 Client Information

Applicant:	Shenzhen Youmi Intelligent Technology Co., Ltd.
Address:	406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China
Manufacturer:	Shenzhen Youmi Intelligent Technology Co., Ltd.
Address:	406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China

1.2 Product Description of EUT

The EUT is a Smart phone that contains Classic Bluetooth, BLE, 2.4G and 5G WLAN, GSM/GPRS/EGPRS, WCDMA, LTE, NFC radios, this report covers the full testing of the NFC radios.

Sample Serial Number	2X-5 for CE&RE test (assigned by WATC)
Sample Received Date	2023-12-05
Sample Status	Good Condition
Frequency Range	13.56MHz
Maximum E-field Strength:	66.49dBuV/m@3m
Modulation Technology	NFC(ASK)
Antenna Gain [#]	0.98dBi
Spatial Streams [#]	1TX, 1RX
Power Supply	DC 3.87V from battery or DC 5V from USB Port
Operating temperature [#]	-30 deg.C to +50deg.C
Adapter Information	Adapter 1 Model: HF-0502000U Input: AC100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2A Adapter 2 Model: HJ-0502000W2-US Input: AC100-240V, 50/60Hz, 0.3A Output: DC 5V, 2A
Modification	Sample No Modification by the test lab

1.3 Antenna information

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.

Device Antenna information:

The antenna is an internal antenna which cannot replace by end-user. Please see product internal photos for details.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15, Subpart E, Equipment Class: NII, FCC ID: 2ATZ4-G6
 FCC Part 15, Subpart C, Equipment Class: DSS, FCC ID: 2ATZ4-G6
 FCC Part 15, Subpart C, Equipment Class: DTS, FCC ID: 2ATZ4-G6
 FCC Part 22, Subpart H/Part 24, Subpart E/Part 27, Equipment Class: PCE, FCC ID: 2ATZ4-G6

1.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
AC Power Lines Conducted Emissions	±3.14dB
Emissions, Radiated	Below 30MHz
	Below 1GHz
	Above 1GHz
Bandwidth	0.34%
Frequency Error	150Hz

Note 1: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Note 2: The Decision Rule is based on simple acceptance with ISO Guide 98-4:2012 Clause 8.2 (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

1.6 Laboratory Location

World Alliance Testing and Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: qa@watc.com.cn

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

1.7 Test Methodology

FCC CFR 47 Part 2

FCC CFR 47 Part 15

ANSI C63.10-2020

2 Description of Measurement

2.1 Test Configuration

Operating channels:					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
/	13.56	/	/	/	/
According to ANSI C63.10-2020 chapter 5.6.1 Table 11 requirement, the above frequency listed above was tested.					

Test Mode:			
Transmitting mode:	Keep the EUT in continuous transmitting with modulation		
Exercise software [#] :	Engineering model		
Mode:	NFC	Power Level Setting [#] :	Default
The exercise software and the maximum power setting that provided by manufacturer.			

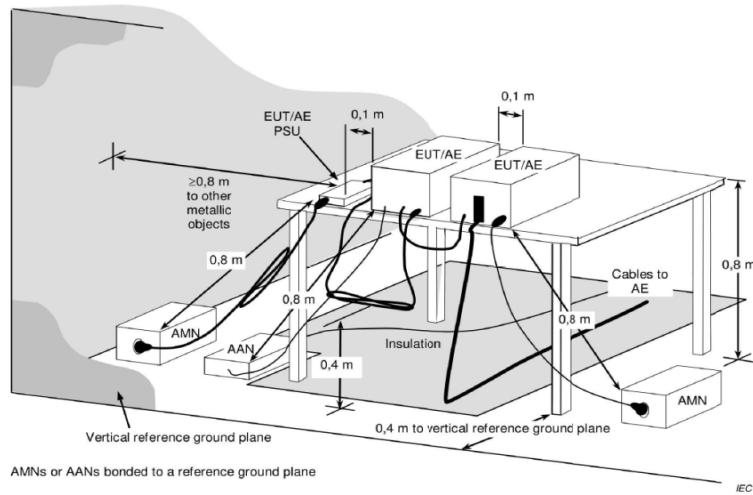
Worst-Case Configuration:			
For radiated emissions, EUT was investigated in three orthogonal orientation, the worst-case orientation was recorded in report			
For the adapter 1 and adapter 2, the adapter 1 was the worse one of radiated spurious emission below 1GHz in the DSS report. So only adapter 1 was chosen for the full test in this report.			
For radiated emission 9kHz-30MHz, investigation was done on the three antenna orientations (parallel, perpendicular, ground-parallel), the worst-case antenna orientation is parallel which was recorded in report.			

2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
/	/	/	/

2.3 Test Setup

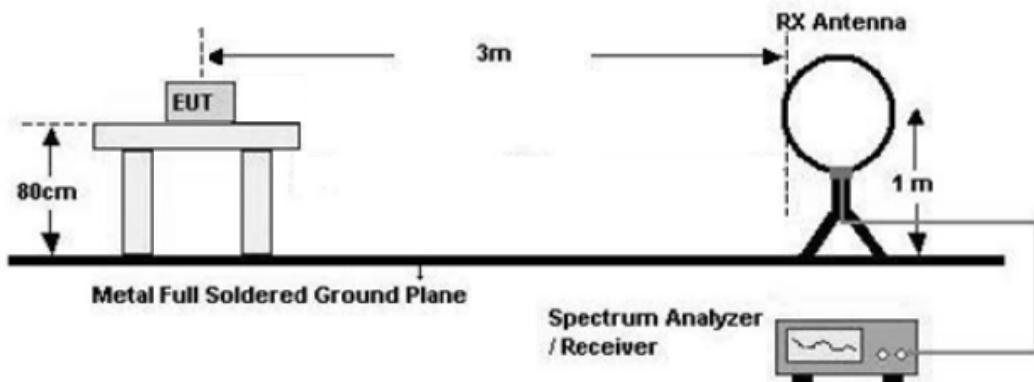
1) Conducted emission measurement:



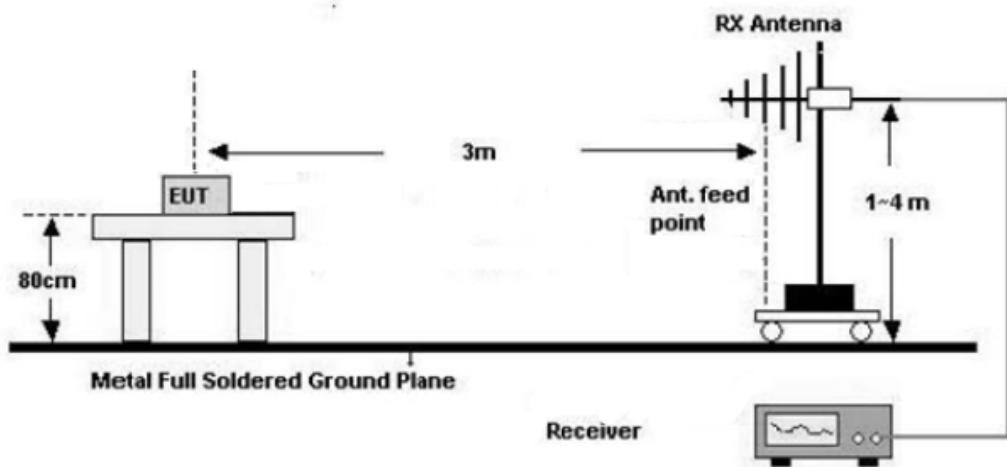
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

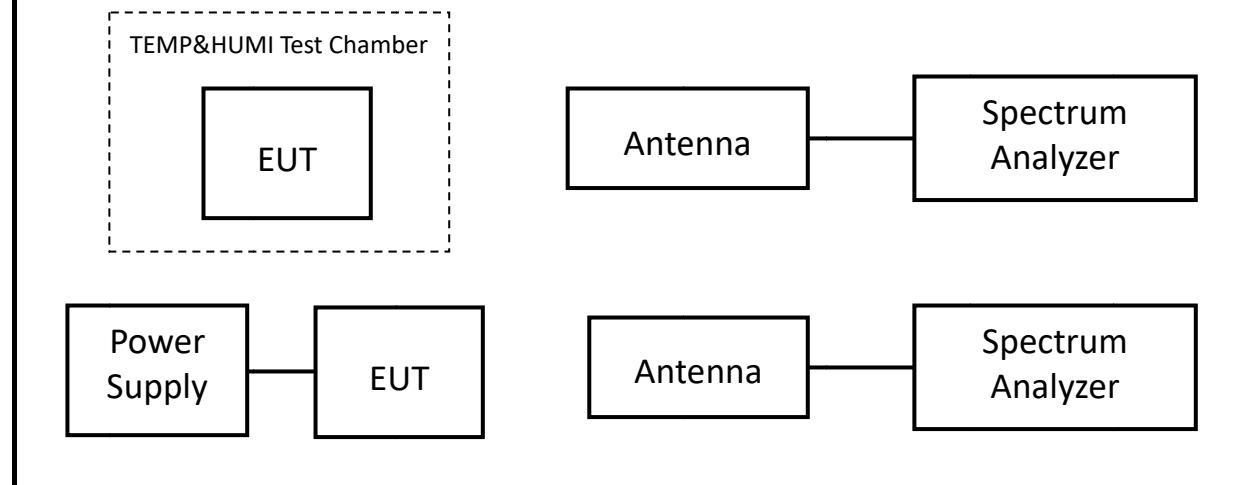
Below 30MHz (3m SAC)



30MHz-1GHz (3m SAC)



3) Frequency Stability Measurement



2.4 Test Procedure

Conducted emission:

1. The E.U.T is placed on a non-conducting table 40cm from the vertical ground plane and 80cm above the horizontal ground plane (Please refer to the block diagram of the test setup and photographs).
2. Both sides of A.C. line are checked for maximum conducted interference. 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.
3. Line conducted data is recorded for both Line and Neutral

Radiated Emission Procedure:

a) For below 30MHz

1. All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz- 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were $40 * \log(\text{test distance} / \text{specification distance})$.
2. Loop antenna use, investigation was done on the three antenna orientations (parallel, perpendicular, ground-parallel)

b) For 30MHz-1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

c) For above 1GHz:

1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m (1-18GHz) and 1.5 m (above 18GHz).
2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.
3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
4. Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

Bandwidth Test:

1. Use the same setup for radiated 9kHz ~30MHz, found the maximum fundamental level.

2. Change the spectrum analyzer setting for bandwidth testing
3. Test the bandwidth and record the result

Frequency Stability VS temperature Test:

1. The EUT was supply power with normal voltage and placed in the center of the environmental chamber
2. Adjust the location of the measurement antenna to obtain a suitable signal level in measurement instrument
3. Turn off the EUT and set the temperature control on the chamber to the highest specified in the regulatory requirements and allow the chamber temperature to stabilize.
4. While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency
5. Switch OFF the EUT, Lower the chamber temperature by not more than 10 °C, and allow the temperature inside the chamber to stabilize
6. Repeat step 4 and step 5 down to the lowest specified temperature

Frequency Stability VS Voltage Test:

1. EUT was placed at ambient room temperature (+15 °C to +25 °C) and connect to a power source which can varying supply voltage
2. Adjust the location of the measurement antenna to obtain a suitable signal level in measurement instrument
3. Varying the supply voltage at 85% and 115% of the nominal supply voltage, record the operating frequency

2.5 Measurement Method

Description of Test	Measurement Method
AC Line Conducted Emissions	ANSI C63.10-2020 Section 6.2
Field strength of fundamental and Radiated emission	ANSI C63.10-2020 Section 6.3&6.4&6.5
20dB Emission Bandwidth	ANSI C63.10-2020 Section 6.9.2
Frequency Stability	ANSI C63.10-2020 Section 6.8

2.6 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
ROHDE & SCHWARZ	EMI TEST RECEIVER	ESR	101817	2023/7/3	2024/7/2
R&S	LISN	ENV216	101748	2023/8/1	2024/7/30
N/A	Coaxial Cable	NO.12	N/A	2023/7/3	2024/7/2
Farad	Test Software	EZ-EMC	Ver. EMEC-3A1	/	/
Radiated Emission Test					
R&S	EMI test receiver	ESR3	102758	2023/7/3	2024/7/2
SONOMA INSTRUMENT	Low frequency amplifier	310	186014	2023/7/12	2024/7/11
ETS	Passive Loop Antenna	6512	29604	2023/7/7	2024/7/6
SCHWARZBECK	Log - periodic wideband antenna	VULB 9163	9163-872	2023/7/7	2024/7/6
N/A	Coaxial Cable	NO.9	N/A	2023/8/8	2024/8/7
N/A	Coaxial Cable	NO.10	N/A	2023/8/8	2024/8/7
Audix	Test Software	E3	191218 V9	/	/
Frequency Stability					
R&S	EMI test receiver	ESR3	102758	2023/7/3	2024/7/2
ETS	Passive Loop Antenna	6512	29604	2023/7/7	2024/7/6
志高/CHIGO	Temperature & Humidity Meter	HTC-1S	NA	2023/7/3	2024/7/2
FLUKE	Digital Multimeter	15B+	N/A	2023/7/12	2024/7/11

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 Test Results

3.1 Test Summary

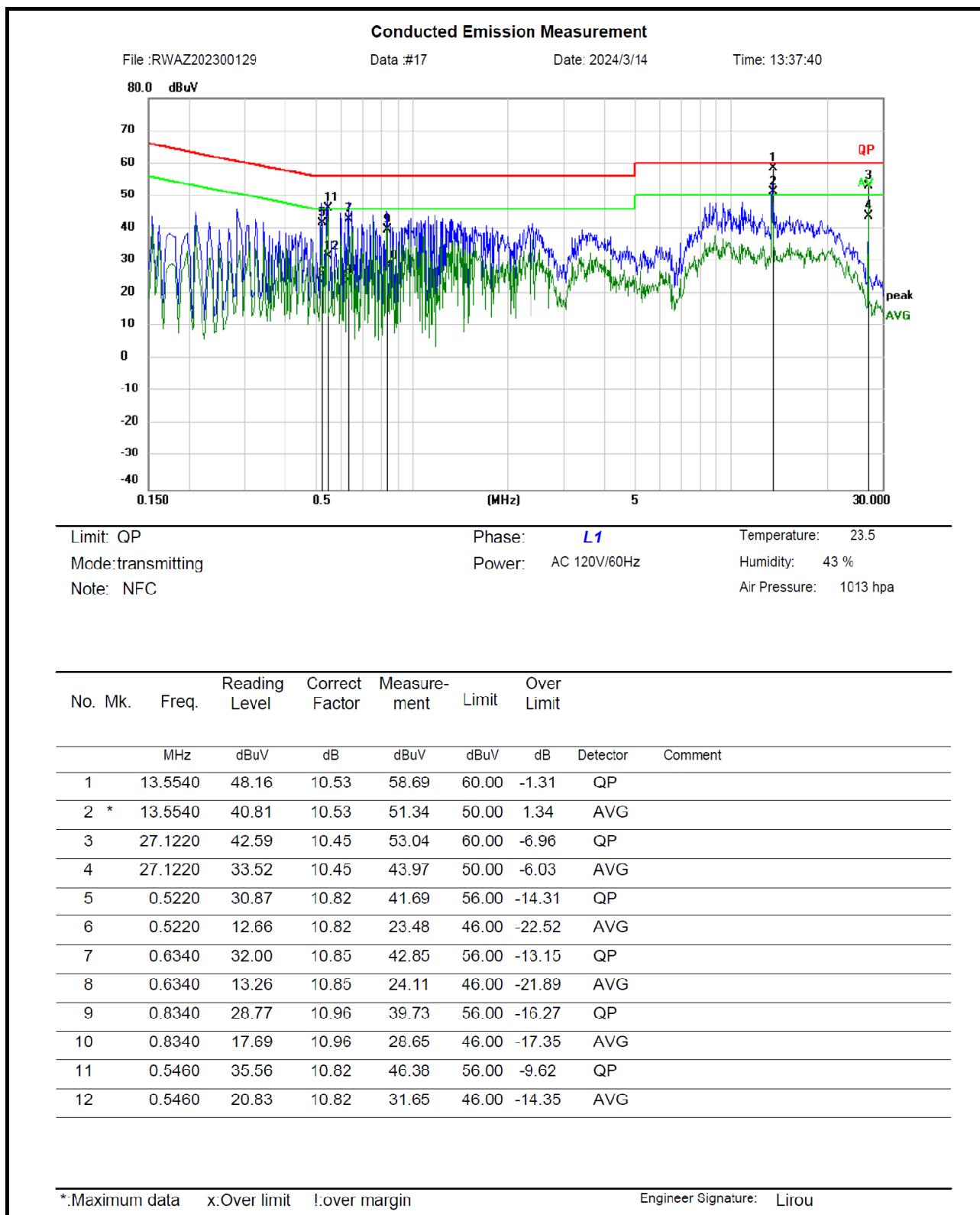
FCC Rules	Description of Test	Result
FCC §15.203	Antenna Requirement	Compliance
FCC §15.207(a)	AC Line Conducted Emissions	Compliance
FCC §15.205, §15.209, §15.225	Field strength of fundamental and Radiated emission	Compliance
§15.225(e)	Frequency Stability	Compliance
FCC §15.215(c)	20dB Emission Bandwidth	Compliance

3.2 Limit

Test items	Limit
AC Line Conducted Emissions	See details §15.207 (a)
Field strength of fundamental and Radiated emission	(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. (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. (c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters. (d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.
Frequency Stability	The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ 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.
20dB Emission Bandwidth	contained within the frequency band designated

3.3 AC Line Conducted Emissions Test Data

Test Date:	2024-3-14	Test By:	Lirou Li
Environment condition:	Temperature: 23.5°C; Relative Humidity:43%; ATM Pressure: 101.3kPa		



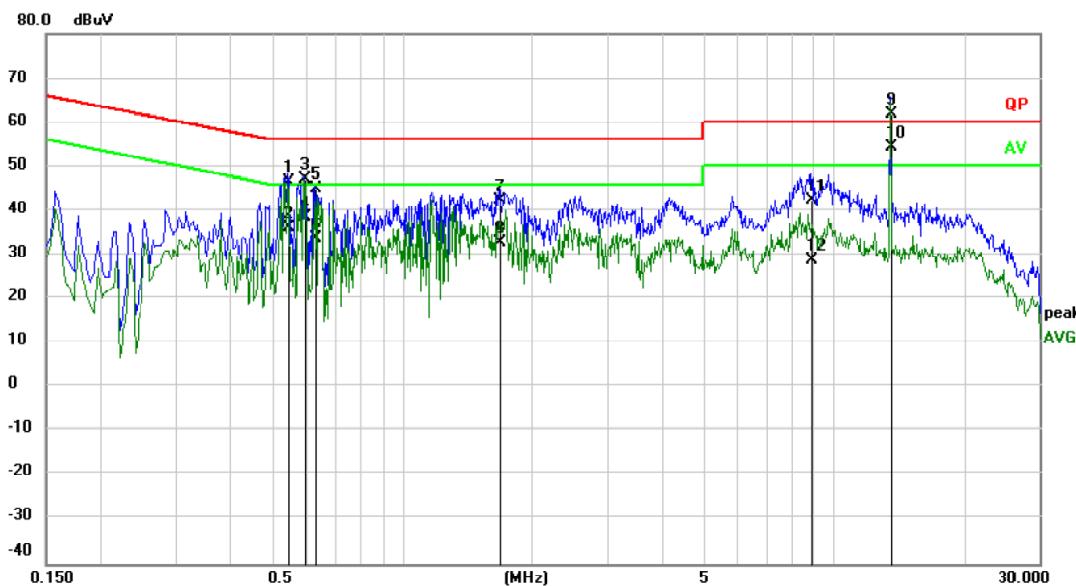
Conducted Emission Measurement

File :RWAZ202300129

Data :#16

Date: 2024/3/14

Time: 13:35:40



Limit: QP

Phase: **N**

Temperature: 23.5

Mode:transmitting

Power: AC 120V/60Hz

Humidity: 43 %

Note: NFC

Air Pressure: 1013 hpa

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over Limit	
		MHz	dBuV	dB	dBuV	dB	Detector	Comment
1		0.5460	35.86	10.67	46.53	56.00	-9.47	QP
2		0.5460	25.49	10.67	36.16	46.00	-9.84	AVG
3		0.5940	36.46	10.65	47.11	56.00	-8.89	QP
4		0.5940	27.94	10.65	38.59	46.00	-7.41	AVG
5		0.6300	34.46	10.61	45.07	56.00	-10.93	QP
6		0.6300	22.98	10.61	33.59	46.00	-12.41	AVG
7		1.6860	31.54	10.68	42.22	56.00	-13.78	QP
8		1.6860	22.12	10.68	32.80	46.00	-13.20	AVG
9	X	13.5580	51.15	10.83	61.98	60.00	1.98	QP
10	*	13.5580	43.49	10.83	54.32	50.00	4.32	AVG
11		8.9060	31.53	10.73	42.26	60.00	-17.74	QP
12		8.9060	18.20	10.73	28.93	50.00	-21.07	AVG

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

Engineer Signature: Lirou

Remark:

Measurement (dBuV) = Reading Level (dBuV) + Correct Factor(dB)

Correct Factor (dB) = LISN Voltage Division Factor (dB)+ Cable loss(dB)

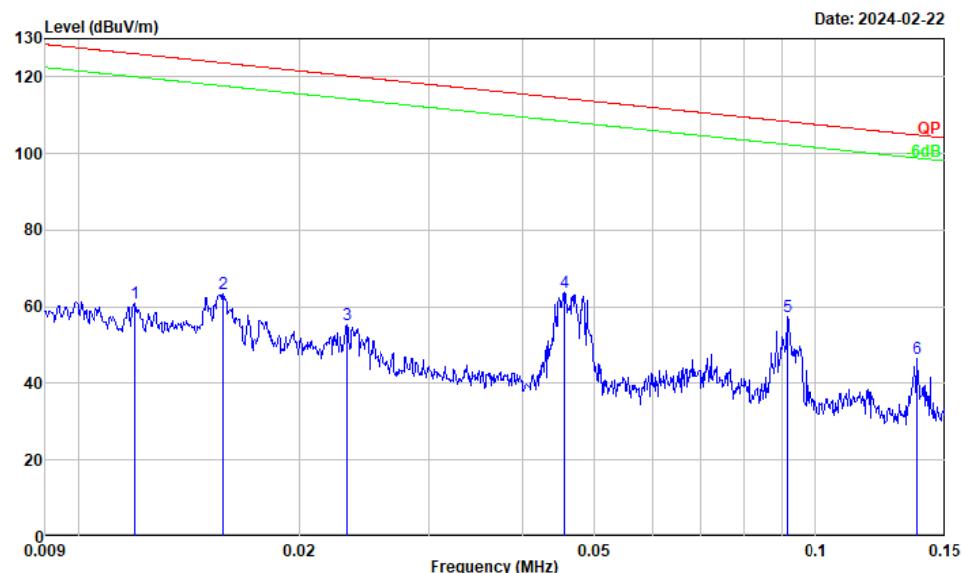
Over = Measurement – Limit

* It is the NFC fundamental.

3.4 Radiated emission Test Data

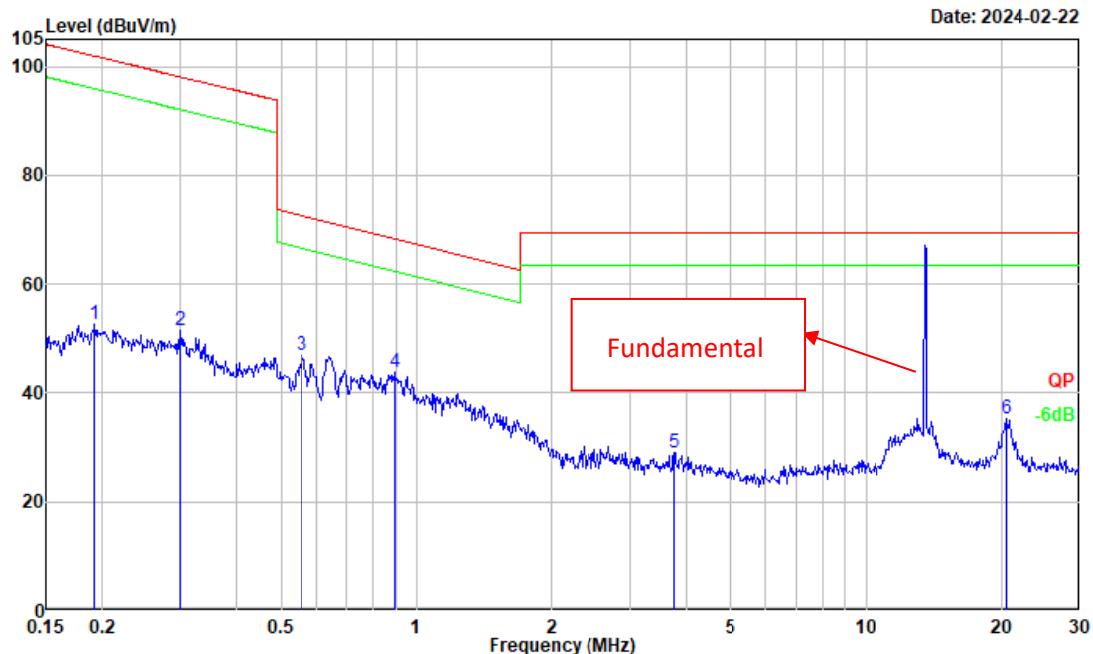
9 kHz-30MHz:

Test Date:	2024-02-22	Test By:	Luke Li
Environment condition:	Temperature: 22.4°C; Relative Humidity:70%; ATM Pressure: 101kPa		



--No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Over Limit (dB)	Detector
1	0.012	24.82	36.28	61.10	126.08	-64.98	Peak
2	0.016	29.42	33.87	63.29	123.68	-60.39	Peak
3	0.023	26.28	29.14	55.42	120.31	-64.89	Peak
4	0.046	42.16	21.60	63.76	114.42	-50.66	Peak
5	0.091	41.79	15.76	57.55	108.38	-50.83	Peak
6	0.137	32.50	14.15	46.65	104.84	-58.19	Peak

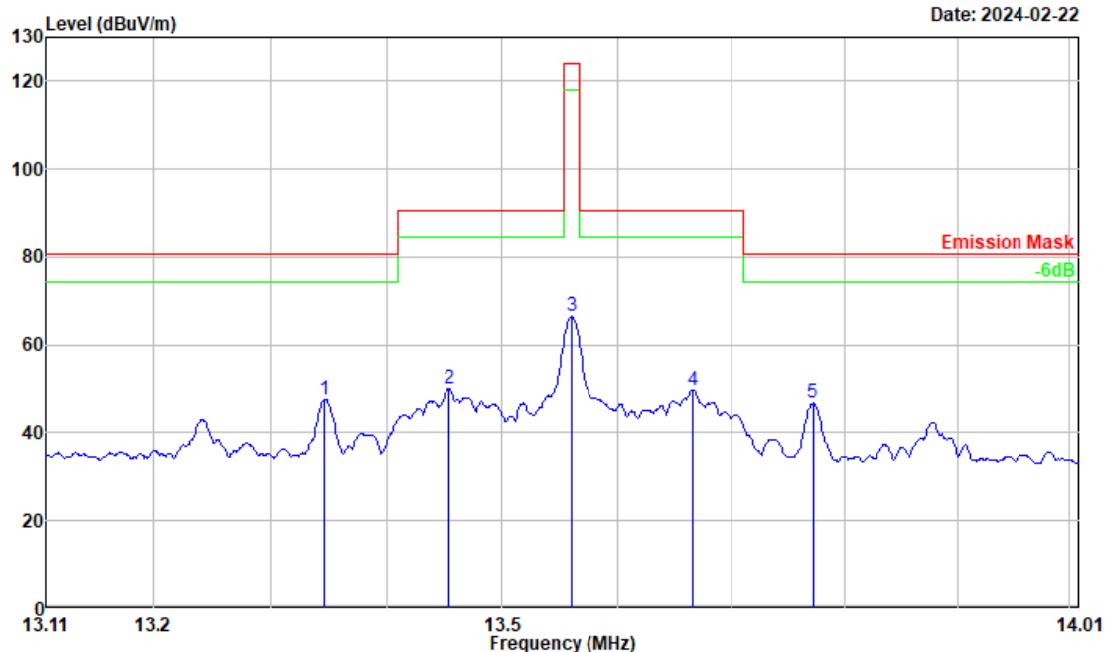
Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : RWAZ202300129
 Test Mode : Transmitting
 Test Voltage : AC 120V/60Hz
 Environment : 22.4°C/70%R.H./101.0kPa
 Tested by : Luke Li
 Polarization : Parallel
 Remark : /

--No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Over Limit (dB)	Detector
1	0.192	40.09	12.61	52.70	101.92	-49.22	Peak
2	0.299	41.87	9.64	51.51	98.10	-46.59	Peak
3	0.558	41.67	5.18	46.85	72.65	-25.80	Peak
4	0.894	42.16	1.66	43.82	68.46	-24.64	Peak
5	3.740	32.55	-3.58	28.97	69.54	-40.57	Peak
6	20.486	38.44	-3.25	35.19	69.54	-34.35	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain



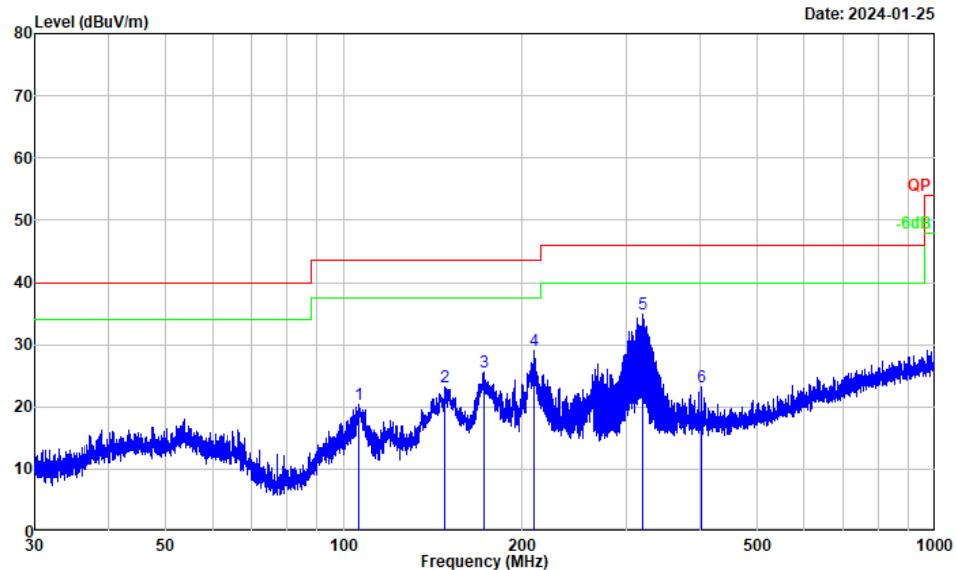
Project No. : RWAZ202300129
 Test Mode : Transmitting
 Test Voltage : AC 120V/60Hz
 Environment : 22.4°C/70%R.H./101.0kPa
 Tested by : Luke Li
 Polarization : Parallel
 Remark : /

--No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Over Limit (dB)	Detector
1	13.348	51.19	-3.50	47.69	80.51	-32.82	Peak
2	13.454	53.62	-3.52	50.10	90.47	-40.37	Peak
3	13.560	70.02	-3.53	66.49	124.00	-57.51	Peak
4	13.666	53.31	-3.55	49.76	90.47	-40.71	Peak
5	13.772	50.32	-3.57	46.75	80.51	-33.76	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

30MHz-1GHz:

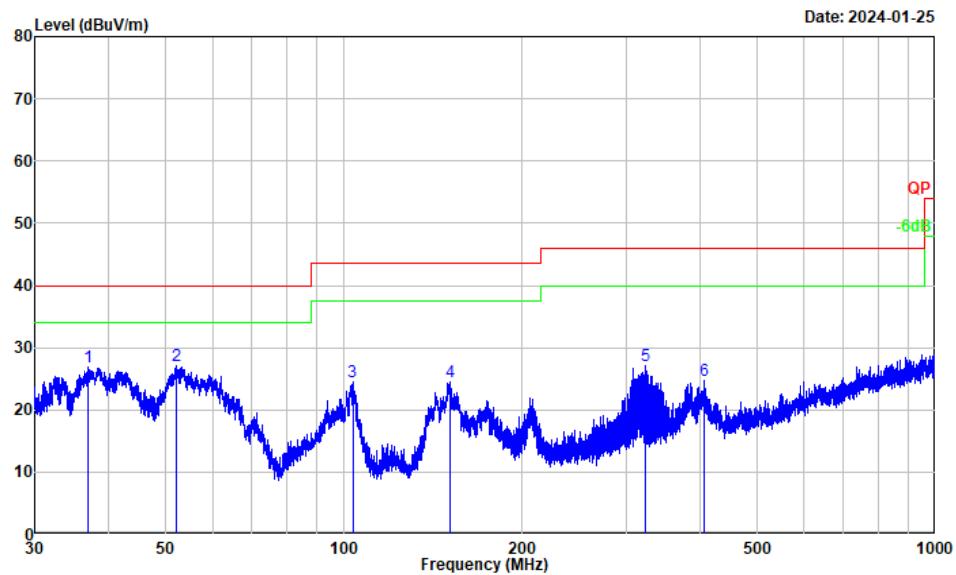
Test Date:	2024-01-25	Test By:	Bard Huang
Environment condition:	Temperature: 22.1°C; Relative Humidity: 27%; ATM Pressure: 102.3kPa		



Project No. : RWAZ202300129
 Test Mode : Transmitting
 Test Voltage : AC 120V/60Hz
 Environment : 22.1°C/27%R.H./102.3kPa
 Tested by : Bard Huang
 Polarization : horizontal
 Remark : 2X-4

--No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Over Limit (dB)	Detector
1	105.873	34.30	-13.95	20.35	43.50	-23.15	Peak
2	148.116	40.66	-17.57	23.09	43.50	-20.41	Peak
3	173.053	41.90	-16.22	25.68	43.50	-17.82	Peak
4	209.497	42.94	-13.91	29.03	43.50	-14.47	Peak
5	320.358	45.65	-10.82	34.83	46.00	-11.17	Peak
6	402.367	31.64	-8.52	23.12	46.00	-22.88	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : RWAZ202300129
 Test Mode : Transmitting
 Test Voltage : AC 120V/60Hz
 Environment : 22.1°C/27%R.H./102.3kPa
 Tested by : Bard Huang
 Polarization : vertical
 Remark : 2X-4

--No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Over Limit (dB)	Detector
1	37.009	40.84	-14.05	26.79	40.00	-13.21	Peak
2	52.048	39.35	-12.28	27.07	40.00	-12.93	Peak
3	103.488	38.52	-14.02	24.50	43.50	-19.00	Peak
4	151.199	41.91	-17.36	24.55	43.50	-18.95	Peak
5	323.462	37.70	-10.69	27.01	46.00	-18.99	Peak
6	406.801	33.11	-8.48	24.63	46.00	-21.37	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Remark:

Result = Reading + Factor

Factor = Antenna factor + Cable loss - Amplifier gain

Over Limit = Result - Limit

3.5 Frequency Stability Test Data

Test Date:	2024-02-22	Test By:	Luke Li
Environment condition:	Temperature: 22.4°C; Relative Humidity:70%; ATM Pressure: 101kPa		

$f_o = 13.56 \text{ MHz}$				
Temperature	Power Supplied	Measured frequency	Frequency Error	Limit
°C	V _{DC}	MHz	Hz	Hz
-20	3.87	13.559936	-64	±1356
-10		13.560094	94	±1356
0		13.559838	-162	±1356
10		13.560065	65	±1356
20		13.560020	20	±1356
25		13.559974	-26	±1356
30		13.560140	140	±1356
40		13.560112	112	±1356
50		13.560179	179	±1356
20	3.5	13.559976	-24	±1356
20	4.4	13.560052	52	±1356

Note: For the limit is $\pm 0.01\%$ of center frequency

Center frequency is 13.56MHz, so limit=13.56MHz*(±0.01%)= ±1356Hz

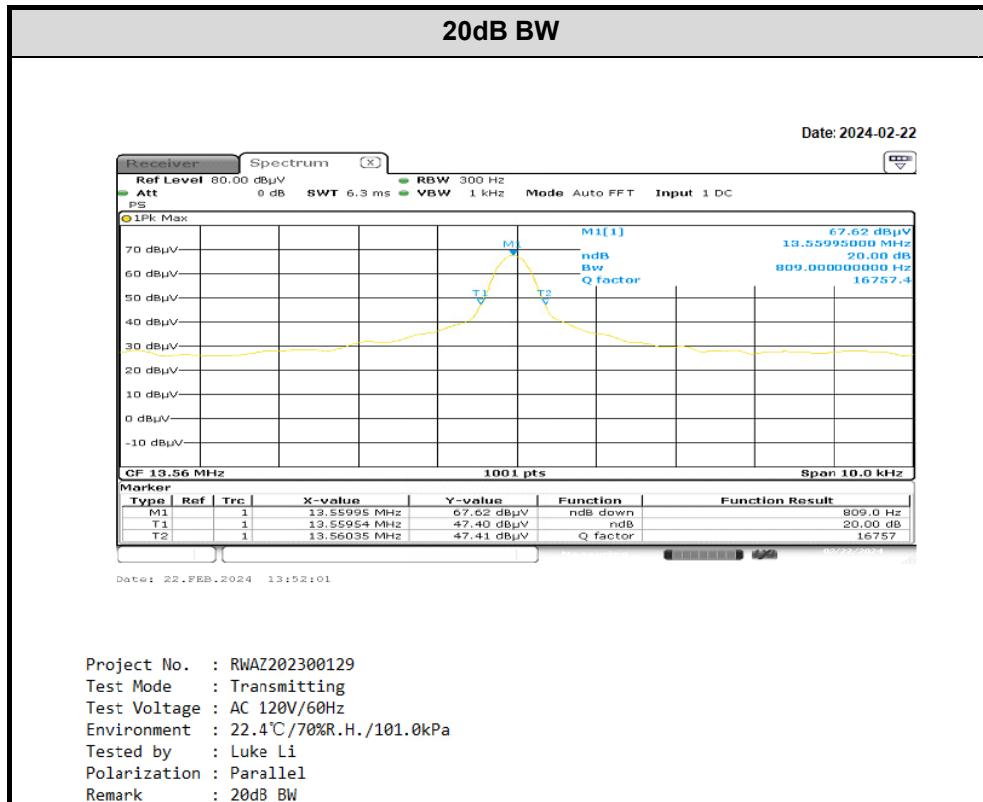
3.6 Bandwidth Test Data

Test Date:	2024-02-22	Test By:	Luke Li
Environment condition:	Temperature: 22.4°C; Relative Humidity:70%; ATM Pressure: 101kPa		

Channel Frequency [MHz]	20dB BW [kHz]
13.56	0.809

Note: the 20dB Bandwidth fall within 13.110~14.010MHz range

Test Plots:



4 Test Setup Photo

Please refer to the attachment RWAZ202300129M test setup photo.

5 E.U.T Photo

Please refer to the attachment RWAZ202300129 external photo and RWAZ202300129 internal photo.

---End of Report---