



Certificate #6613.01

RADIO TEST REPORT (FCC Part 15 Subpart C)

Applicant:	Unplugged Technologies Ltd.
Address:	3 Hakidma St., Yokneam 2066731, Israel

Manufacturer:	Unplugged Technologies Ltd.	
Address:	3 Hakidma St., Yokneam 2066731, Israel	
Product:	UP Phone 1	
Brand Name:	UP Phone	
Model Name:	UP01	
FCC ID:	2BBBCUP01	
Date of tests:	Jul. 03, 2023 ~ Sep. 28, 2023	

The tests have been carried out according to the requirements of the following standard:

□ Part 15 Subpart C §15. 225

☑ ANSI C63.10-2013

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Chao Wu	Approved by Peibo Sun
Engineer / Mobile Department	Manager / Mobile Department

Chao Wu Date: Sep. 28, 2023

Date: Sep. 28, 2023

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REPORT REVISE RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-QSU2306120115RF02	Original release	Sep. 28, 2023



SUMMARY OF TEST RESULT

FCC Rule	Description	Limit	Result	Remark
-	- 99% Bandwidth		Pass	-
15.225(a)(b)(c)	Field Strength of Fundamental Emissions		Pass	-
15.215	20dB Spectrum Bandwidth	15.215	Pass	-
15.225(d) 15.209	Radiated Emission	15.225(d) & 15.209	Pass	-
15.207	AC Conducted Emission	15.207(a)	Note	See note 1
15.225(e)	Frequency Stability	< ±100 ppm	Pass	-
15.203 Antenna Requirement		N/A	Pass	-

Note:

1. Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.



1 GENERAL DESCRIPTION

1.1 GENERAL DESCRIPTION OF EUT

Items	Description
Tx/Rx Frequency Range	13.553MHz ~ 13.567MHz
Channel Number	1
20dBW	2.554 kHz
99%OBW	2.264 kHz
Antenna Type	Loop Antenna
Type of Modulation	ASK

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

List of Accessory:

ACCESSORIES	Brand	MODEL / SPECIFICATION	
CPU	MediaTek	MT6893	
eMMC 1 (=ROM 1)	Sandisk	SDINFDK4-256G	
eMMC 2 (=ROM 2)	Samsung	KLUEG4RHGB-B0E1	
eMMC 3 (=ROM 3)	Samsung	KLUEG4RHGB-B0E1	
eMMC 4 (=ROM 4)	Samsung	KLUEG4RHGB-B0E1	
RAM 1	Hynix	H9HKNNNFBMAVAR-NEH	
RAM 2	Samsung	K3UH7H70BM-AGCL	
BT/WLAN Module	MediaTek	1	
NFC chipset	ST	1	
Battery	1	Power Rating: 16.98Wh	



1.2 MODIFICATION OF EUT

No modifications are made to the EUT during all test items.

1.3 APPLICABLE STANDARDS

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.225
- ANSI C63.10-2013



2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

2.1 DESCRIPTIONS OF TEST MODE

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

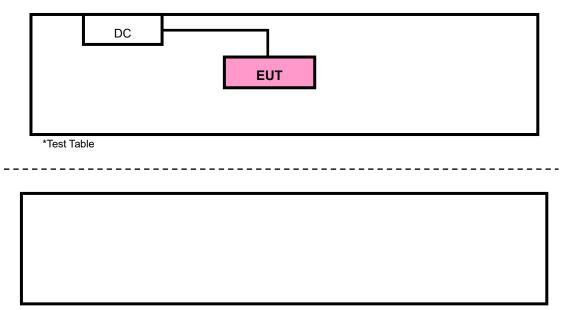
	Test Items				
AC Power Line Conducted Emissions		Field Strength of Fundamental Emissions			
20	0dB Spectrum Bandwidth	Frequency Stability			
R	Radiated Emissions 9kHz~30MHz Radiated Emissions 30MHz~1GHz				
No	Note:				
1.	The EUT was programmed to be in continuously transmitting mode.				
2.	. The ancillary equipment, NFC card, is used to make the EUT (NFC) continuously transmit a				
	13.56MHz and is placed around 3 cm gap to the EUT.				
3.	3. Pre-Scan has been conducted to determine the worst-case mode from all possible combination				
	between available modulations, work in modes and data rates. Selected for the final test as listed				
	below.				

Frequency	Work in Modes	Туре	Data Rate (Kbps)		
	Card Emulation	ПА	□ 106		
13.56 MHz		□в	₹ 212		
13.30 1/11 12	Reader/Writer	₽ _F	□ ₄₂₄		
	Peer-to-Peer	\square_{V}	□ 848		
Remark:					
The mark" [▼] " means is chosen for testing;					
The mark" means is not chosen for testing.					



2.2 TEST CONFIGURATIONS

< For Fundamental Emissions and Mask and Radiated Emissions Measurement >



^{*} Kept in a remote area



2.3 SUPPORT EQUIPMENT

FOR All TESTS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC Source	HYELEC	HY3010B	551016	N/A

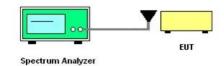
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 0.6m

2.4 TEST SETUP

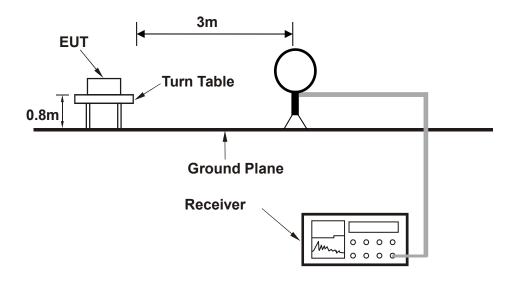
The EUT is continuously communicating during the tests.

EUT was set in the Hidden menu mode to enable NFC communications.

Setup diagram for Conducted Test

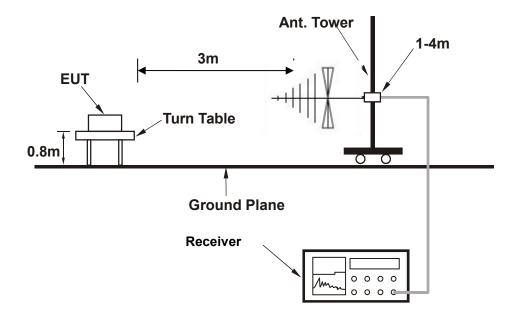


Setup diagram for Radiation(9KHz~30MHz) Test





Setup diagram for Radiation (Below 1G) Test



2.5 MEASUREMENT RESULTS EXPLANATION EXAMPLE

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5 dB and 10dB attenuator.

$$Offset(dB) = RF \ cable \ loss(dB) + attenuator \ factor(dB).$$

= 5 + 10 = 15 (dB)



3 TEST RESULT

3.1 20DB AND 99% BANDWIDTH MEASUREMENT

3.1.1 LIMIT OF 20DB AND 99% BANDWIDTH

Intentional radiators must be designed to ensure that the 20dB and 99% emission bandwidth in the specific band 13.553~13.567MHz.

3.1.2 TEST PROCEDURES

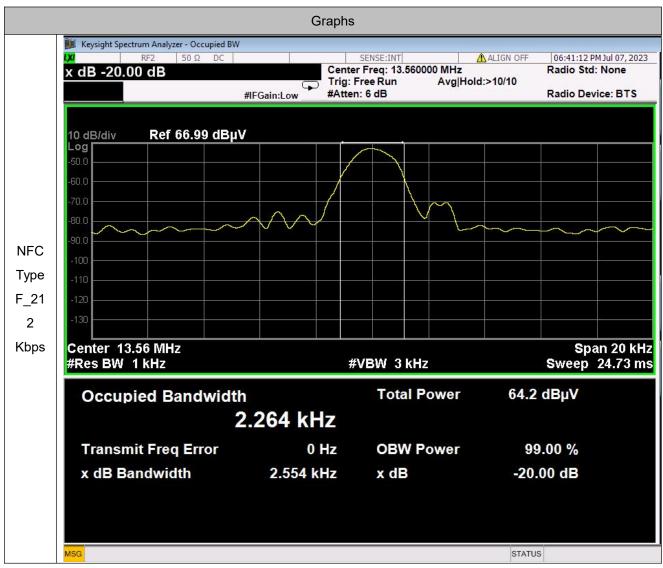
- The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max hold mode.
- The resolution bandwidth of 1 kHz and the video bandwidth of 3 kHz were used. (Since the signal being measured is CW or CW-like, it is impractical to adjust RBW according to C63.10 because the bandwidth measured will always follow RBW and the result will be approximately twice as large as RBW.)
- 3. Measured the spectrum width with power higher than 20dB below carrier.
- 4. Measured the 99% OBW.



3.1.3 TEST RESULT OF 20DB AND 99% BANDWIDTH

Test Mode :	NFC		Temperature :		23 ℃	
Test Engineer :	Chao Wu		Relative Humi	dity:	50%	
Mode	Frequency	20dB Ban	20dB Bandwidth [kHz]		% OBW [kHz]	Verdict
NFC Type F_212 Kbps	13.56MHz	2.	.554		2.264	PASS

20dB Bandwidth & 99% Bandwidth Plot





3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMIT OF FREQUENCY STABILITY

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) 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.

3.2.2 TEST PROCEDURES

- 1. The spectrum analyzer connected via a receive antenna placed near the EUT.
- 2. EUT have transmitted signal and fixed channelize.
- 3. Set the spectrum analyzer span to view the entire emissions bandwidth.
- 4. Set RBW = 1 kHz, VBW = 3 kHz with peak detector and maxhold settings.
- The fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10⁶ ppm and the limit is less than ±100ppm.
- 6. Extreme temperature rule is -20°C~50°C.

3.2.3 TEST RESULT OF FREQUENCY STABILITY

The NFC Type F 212 Kbps is the worst case, Only report worst mode data



NFC Type F_212 Kbps

Voltage (Vde)	Temperature	Measurement	Frequency	Limit(nnm)	Result
Voltage (Vdc)	(°C)	Frequency (MHz)	Tolerance(ppm)	Limit(ppm)	Result
3.6	20	13.55996	-2.95		Pass
4.45	20	13.56024	17.70		Pass
	-20	13.56024	17.70		Pass
	-10	13.56022	16.22		Pass
	0	13.55981	-14.01	1400	Pass
3.87	10	13.55986	-10.32	±100	Pass
3.67	20	13.55999	-0.74		Pass
	30	13.55982	-13.27		Pass
	40	13.55989	-8.11		Pass
	50	13.56029	21.39		Pass



3.3 FIELD STRENGTH OF FUNDAMENTAL EMISSIONS AND MASK MEASUREMENT

3.3.1 LIMIT OF FIELD STRENGTH OF FUNDAMENTAL EMISSIONS AND MASK

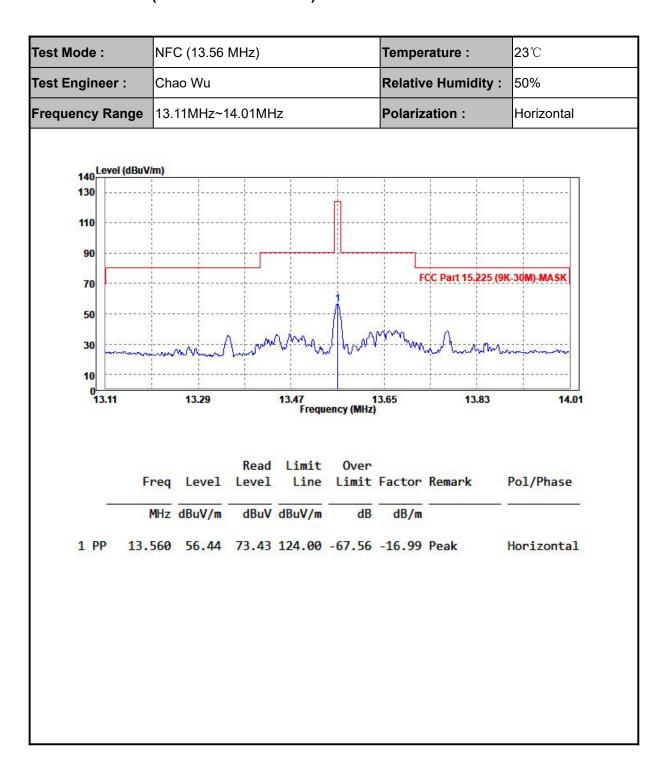
Rules and specifications	FCC CFR 47 Part 15 section 15.225						
Description	Compliance with the spectrum mask is tested with RBW set to 9kHz.						
From of Francisco (MIII-)	Field Strength	Field Strength	Field Strength	Field Strength			
Freq. of Emission (MHz)	(µV/m) at 30m	(dBµV/m) at 30m	(dBµV/m) at 10m	(dBµV/m) at 3m			
1.705~13.110	30	29.5	48.58	69.5			
13.110~13.410	106	40.5	59.58	80.5			
13.410~13.553	334	50.5	69.58	90.5			
13.553~13.567	15848	84.0	103.08	124.0			
13.567~13.710	334	50.5	69.58	90.5			
13.710~14.010	106	40.5	59.58	80.5			
14.010~30.000	30	29.5	48.58	69.5			

3.3.2 TEST PROCEDURES

- Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.
- Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.
- 4. For Fundamental emissions, use the receiver to measure QP reading.
- 5. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
- 6. Compliance with the spectrum mask is tested with RBW set to 9kHz.

Note: Emission level ($dB\mu V/m$) = 20 log Emission level ($\mu V/m$).

3.3.3 TEST RESULTS OF FIELD STRENGTH OF FUNDAMENTAL EMISSIONS AND MASK (1.705 MHZ ~ 30 MHZ)





est Mode :	NFC	NFC (13.56 MHz)					ature :	23 ℃
est Engineer	: Cha	o Wu				Relative	Humidity :	50%
requency Rar	13.1	1MHz~14	1.01MHz	<u> </u>		Polarization :		Vertical
140 Level 130 110 90 70 50	(dBuV/m)	Α		Manga	- Anna	FCC	Part 15.225 (9K-3	(dM)_MASK
10	- many	washin a	man, Mar	100	man.	Wind.	J hallandarbanan	
13.11		13.29	1	3.47	13.	65	13.83	14.01
				Frequen	cy (MHz)			
	- 1	Level	Read Level		Over Limit	Factor	Remark	Pol/Phase
1 PP	13,560	53.61	70.60	124.00	-70.39	-16.99	Peak	Vertical



3.4 RADIATED EMISSIONS MEASUREMENT

3.4.1 LIMIT

The field strength of any emissions which appear outside of 13.110 ~14.010MHz band shall not exceed the general radiated emissions limits.

Frequencies	Field Strength	Measurement Distance
(MHz)	(μV/m)	(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

3.4.2 MEASURING INSTRUMENT SETTING

The following table is the setting of receiver.

Receiver Parameter	Setting
Attenuation	Auto
Frequency Range: 9kHz~150kHz	RBW 200Hz for QP
Frequency Range: 150kHz~30MHz	RBW 9kHz for QP
Frequency Range: 30MHz~1000MHz	RBW 120kHz for Peak

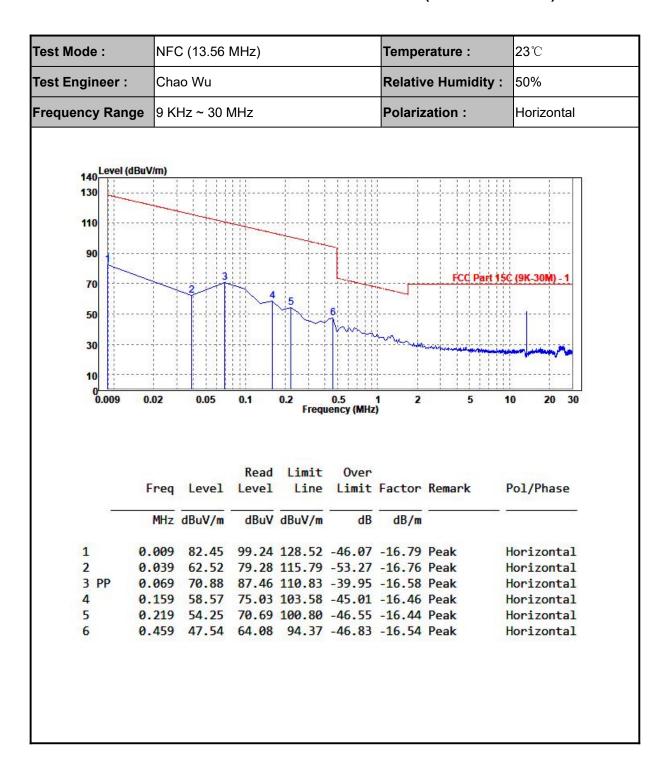
Note: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.



3.4.3 TEST PROCEDURES

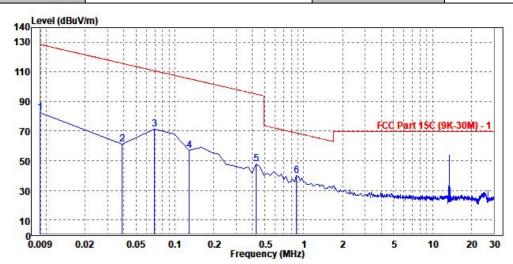
- Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
- In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver.

3.4.4 TEST RESULTS OF RADIATED EMISSIONS (9 KHZ ~ 30 MHZ)



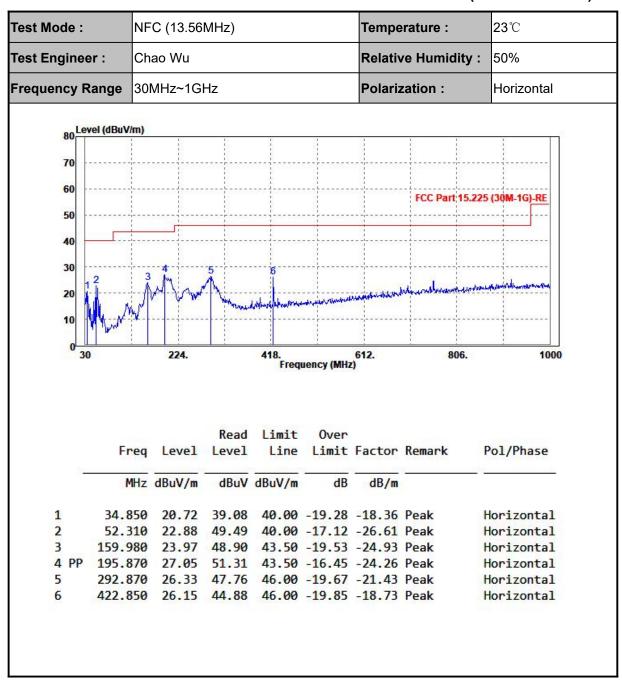


Test Mode :	NFC (13.56 MHz)	Temperature :	23 ℃
Test Engineer :	Chao Wu	Relative Humidity :	50%
Frequency Range	9 KHz ~ 30 MHz	Polarization :	Vertical



	Freq	Level	Read Level	1300000		Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		- -
1	0.009	82.32	99.11	128.52	-46.20	-16.79	Peak	Vertical
2	0.039	61.44	78.20	115.79	-54.35	-16.76	Peak	Vertical
3	0.069	71.53	88.11	110.83	-39.30	-16.58	Peak	Vertical
4	0.129	57.17	73.63	105.39	-48.22	-16.46	Peak	Vertical
5	0.429	47.92	64.44	94.96	-47.04	-16.52	Peak	Vertical
6 PP	0.879	39.96	56.33	68.73	-28.77	-16.37	Peak	Vertical

3.4.5 TEST RESULT OF RADIATED SPURIOUS EMISSION (30MHZ ~ 1GHZ)





Mode:	NFC (13.56MHz)					Temper	ature :	23℃ 50%	
Engineer :	Cha	Chao Wu				Relative	e Humidity :		
iency Range	30MHz~1GHz				Polarization :		Vertical		
80 Level (dBu	V/m)								
80	1	į	i	1	1	į.			
70									
60					. [
00	-	1	į		1		FCC Part 15.225	(30M-1G)-RE	
50					- Process				
40									
		1	1			i			
30	3			1					
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10	N	V	Marie and the state of the stat						
III JIWI	M	224.	Mary Mary Mary Mary Mary Mary Mary Mary	418. Freque	ency (MHz)	612.	806.	1000	
0 30	Freq			Freque	ency (MHz) Over				
0 30	- M	Level	Level	Limit Line	Over Limit	Factor	Remark	1000 Pol/Phase	
0 30	- M		Level	Freque	Over Limit	Factor	Remark		
30	MHz	Level dBu V /m	Level dBuV	Limit Line dBuV/m	Over Limit	Factor dB/m	Remark	Pol/Phase	
10 0 30	MHz 6	Level	dBuV	Limit Line dBuV/m	Over Limit dB	Factor dB/m	Remark Peak		
1 PP 34 2 58	MHz	Level dBuV/m 29.63 17.85	dBuV 48.77 45.55	Limit Line dBuV/m 40.00	Over Limit dB -10.37 -22.15	Factor dB/m	Remark Peak Peak	Pol/Phase Vertical	
1 PP 34 2 58 3 182	MHz .850	Level dBuV/m 29.63 17.85	dBuV 48.77 45.55	Limit Line dBuV/m 40.00 40.00 43.50	Over Limit dB -10.37 -22.15 -20.52	Factor dB/m -19.14 -27.70	Remark Peak Peak Peak	Pol/Phase Vertical Vertical	
1 PP 34 2 58 3 182 4 292	MHz .850 .130 .290 .870	Level dBuV/m 29.63 17.85 22.98	dBuV 48.77 45.55 47.43 41.22	Limit Line dBuV/m 40.00 40.00 43.50 46.00	Over Limit dB -10.37 -22.15 -20.52 -26.34	Factor dB/m -19.14 -27.70 -24.45	Remark Peak Peak Peak Peak	Pol/Phase Vertical Vertical Vertical	



3.5 AC CONDUCTED EMISSION MEASUREMENT

3.5.1 LIMIT OF AC CONDUCTED EMISSION

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission	Conducted I	Limit (dΒμV)
(MHz)	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

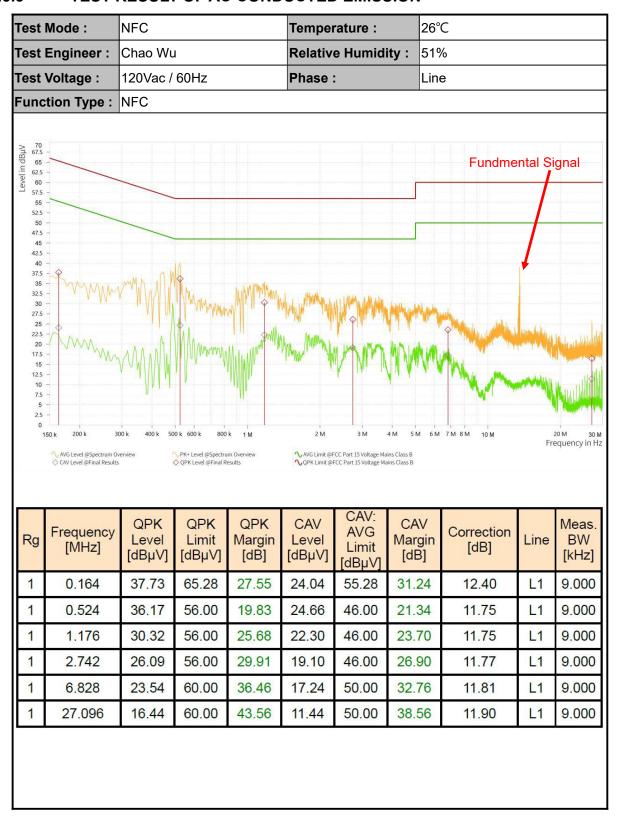
^{*}Decreases with the logarithm of the frequency.

3.5.2 TEST PROCEDURES

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
- 2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- 3. All the support units are connecting to the other LISN.
- 4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- 5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- 6. Both sides of AC line were checked for maximum conducted interference.
- 7. The frequency range from 150 kHz to 30 MHz was searched.
- 8.Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.



3.5.3 TEST RESULT OF AC CONDUCTED EMISSION







3.6 ANTENNA REQUIREMENTS

3.6.1 STANDARD APPLICABLE

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.6.2 ANTENNA CONNECTED CONSTRUCTION

An Loop Antenna design is used.

3.6.3 ANTENNA GAIN

The antenna peak gain of EUT is less than 6 dBi.



4 LIST OF MEASURING EQUIPMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
WIDEBANDRADIO					
COMMUNICATION	Rohde&Schwarz	CMW500	169399	Jun.27,22	Jun.26,24
TESTER					
3m Semi-anechoic	TDK	9m*6m*6m	HRSW-SZ-EMC-0	Nov.24,22	Nov.23,25
Chamber			2Chamber		
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.28,22	Feb.27,24
Loop Antenna	R&S	HFH2-Z2/Z2 E	100976	Feb.23,22	Feb.22,24
Antenna Power Supply	RS	N/A	N/A	N/A	N/A
EMI Test Receiver	R&S	ESW44	101973	Feb.25,22	Feb.24,24
Measurement Software	R&S	ELEKTRA	N/A	N/A	N/A
Pre-Amplifier	R&S	SCU08F1	101028	Sep.16,22	Sep.15,24
CABLE	R&S	W13.01	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	W13.02	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	W12.14	N/A	Apr.28,23	Oct.27,23

NOTE: 1. The calibration interval of the above test instruments is 6 months or 24 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

- 2. The test was performed in 3m Chamber.
- 3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.



5 UNCERTAINTY OF EVALUATION

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY		
AC Power Conducted emissions	±2.70dB		
Radiated emissions (9KHz~30MHz)	±2.68dB		
Radiated emissions (30MHz~1GHz)	±4.98dB		
Occupied Channel Bandwidth	±43.58KHz		
Frequency Stability	±76.97Hz		

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