



# Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

## TEST REPORT EN IEC 62311:2020

Report Reference No. : CTA25070801003

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Date of issue : Aug. 01, 2025

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Address : Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name : Guangzhou wangkong Ltd.

Address : Room 207, Building C, #3 Yangmeiling Street, KeMulang, Tianhe district, GuangZhou, China

Test specification :

Standard : EN IEC 62311:2020

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Test item description : indoor air quality transmitter

Trade Mark : MONIGEAR, WANGKONG

Manufacturer : Guangzhou wangkong Ltd.

Model/Type reference : MN-WTHM

List Model : MN-WCO2, MN-WVOC, MN-WAQM, MN-WGAS, MN-WENS

Ratings : Input: 5V === 0.5A

Result : PASS

## TEST REPORT

Equipment under Test : indoor air quality transmitter

Model /Type : MN-WTHM

Listed Models : MN-WCO2, MN-WVOC, MN-WAQM, MN-WGAS, MN-WENS

Model difference : The PCB board, circuit, structure and internal of these models are the same, Only model number is different for these model.

**Applicant** : **Guangzhou wangkong Ltd.**

**Address** : Room 207, Building C, #3 Yangmeiling Street, KeMulang, Tianhe district, GuangZhou, China

**Manufacturer** : **Guangzhou wangkong Ltd.**

**Address** : Room 207, Building C, #3 Yangmeiling Street, KeMulang, Tianhe district, GuangZhou, China

<b>Test Result</b>	<b>PASS</b>
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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# 1. SUMMARY

## 1.1. General Remarks

Date of receipt of test sample	:	Jul. 08, 2025
Testing commenced on	:	Jul. 08, 2025
Testing concluded on	:	Aug. 01, 2025

## 1.2. Product Description

Product Description:	indoor air quality transmitter
Model/Type reference:	MN-WTHM
Power supply:	Input: 5V --- 0.5A
Hardware Version:	V1.0
Software Version:	V1.0
Testing sample:	CTA250708010-1# (Engineer sample) CTA250708010-2# (Normal sample)
<b>2.4G WIFI :</b>	
WLAN	Supported 802.11b/802.11g/802.11n HT20/802.11n HT40
WLAN CE Operation frequency	IEEE 802.11b:2412-2472MHz IEEE 802.11g:2412-2472MHz IEEE 802.11n HT20:2412-2472MHz IEEE 802.11n HT40:2422-2462MHz
WLAN CE Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
Channel number:	13
Channel separation:	5MHz
Antenna Type:	PCB antenna
Antenna:	0.89 dBi

## 1.3. Equipment under Test

### Power supply system utilised

Refer to section 1.2

## 1.4. EUT operation mode

The EUT and test equipment were configured for testing While transmitting

## **2. TEST ENVIRONMENT**

### **2.1. Address of the test laboratory**

**Shenzhen CTA Testing Technology Co., Ltd.**

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

### **2.2. Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

**FCC-Registration No.: 517856    Designation Number: CN1318**

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

**A2LA-Lab Cert. No.: 6534.01**

Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

### **2.3. Environmental conditions**

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
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Humidity:	<u>30-60 %</u>
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Atmospheric pressure:	<u>950-1050mbar</u>
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## 2.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen CTA Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. Hereafter the best measurement capability for Shenzhen CTA Testing Technology Co., Ltd. :

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MHz	3.02 dB	(1)
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)
Output Peak power	30MHz~18GHz	0.55 dB	(1)
Power spectral density	/	0.57 dB	(1)
Spectrum bandwidth	/	1.1%	(1)
Radiated spurious emission (30MHz-1GHz)	30~1000MHz	4.10 dB	(1)
Radiated spurious emission (1GHz-18GHz)	1~18GHz	4.32 dB	(1)
Radiated spurious emission (18GHz-40GHz)	18-40GHz	5.54 dB	(1)

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



### 3. Method of measurement

#### 3.1. Applicable Standard

**EN IEC 62311:2020:** Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz to 300 GHz)

#### 3.2. Limit

Basic restriction for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	Magnetic flux density (mT)	Current density (mA/m <sup>2</sup> )	Whole body average SAR(W/kg)	Localised SAR (head and trunk)(W/kg)	Localised SAR (limbs) (W/kg)	Power density, S (W/m <sup>2</sup> )
0Hz	40	--	--	--	--	--
>0-1Hz	--	8	--	--	--	--
1-4Hz	--	8/f	--	--	--	--
4-1000Hz	--	2	--	--	--	--
1000Hz-100kHz	--	f/500	--	--	--	--
100kHz-10Mhz	--	f/500	0.08	2	4	--
10Mhz-10Ghz	--	--	0.08	2	4	--
10-300Ghz	--	--	--	--	--	10

Notes:

1. f is the frequency in Hz.
2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
3. Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1cm<sup>2</sup> perpendicular to the current direction.
4. For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by  $\sqrt{2}$ (=1.414). For pulses of duration  $t_p$  the equivalent frequency to apply in the basic restrictions should be calculated as  $f=1/(2t_p)$ .
5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
6. All SAR values are to be averaged over any six-minute period.
7. Localised SAR averaging mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognised that this concept can be used in computational dosimetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dosimetric quantities have conservation values relative to the exposure guidelines.
8. For pulses of duration  $t_p$  the equivalent frequency to apply in the basic restrictions should be calculated as  $f=1/(2t_p)$ . Additionally, for pulsed exposures, in the frequency range 0,3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoelastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg<sup>-1</sup> averaged over 10g of tissue.

Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (uT)	Equivalent plane wave power density $S_{eq}(W/m^2)$
0-1Hz	--	$3.2 \times 10^4$	$4 \times 10^4$	--
1-8Hz	10000	$3.2 \times 10^4 / f^2$	$4 \times 10^4 / f^2$	--
8-25Hz	10000	$4000/f$	$5000/f$	--
0.025-0.8KHz	$250/f$	$4/f$	$5/f$	--
0.8-3KHz	$250/f$	5	6.25	--
3-150KHz	87	5	6.25	--
0.15-1MHz	87	$0.73/f$	$0.92/f$	--
1-10MHz	$87/f^{1/2}$	$0.73/f$	$0.92/f$	--
10-400MHz	28	0.073	0.092	2
400-2000MHz	$1.375f^{1/2}$	$0.0037f^{1/2}$	$0.0046f^{1/2}$	$f/200$
2-300GHz	61	0.16	0.20	10

Notes: 1. As indicated in the frequency range column.

2. For frequencies between 100kHz and 10GHz,  $S_{eq}$ ,  $E^2$ ,  $H^2$  and  $B^2$  are to be averaged over any six-minute period.3. For frequencies exceeding 10GHz,  $S_{eq}$ ,  $E^2$ ,  $H^2$  and  $B^2$  are to be averaged over any  $68/f^{1.05}$ -minute period (.in GHz).

4. No E-field value is provided for frequencies &lt;1Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 20kV/m. Spark discharges causing stress or annoyance should be avoided.

**Occupational Exposure limit and action values for relectromahnetic fields**

Exposure limit values(Article3(1)).All conditions to be satisfied

Frequency range	Current density for head and trunk J (mA/m <sup>2</sup> ) (rms)	Whole body average SAR(W/kg)	Localised SAR (head and trunk)(W/kg)	Localised SAR (limbs) (W/kg)	Power density, S (W/m <sup>2</sup> )
Up to 1Hz	40	--	--	--	--
1-4Hz	$40/f$	--	--	--	--
4-1000Hz	10	--	--	--	--
1000Hz-100kHz	$f/100$	--	--	--	--
100kHz-10MHz	$f/100$	0.4	10	20	--
10MHz-10GHz	--	0.4	10	20	--
10-300GHz	--	--	--	--	50

Notes:

1. f is the frequency in Hz.

2. The exposure limit values on the current density are intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body. The exposure limit values in the frequency range 1Hz to 10MHz are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the exposure limit values for exposure of short duration. However, since the exposure limit values refer to adverse effects on the central nervous system, these exposure limit values may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.

3. Because of the electrical in homogeneity of the body, current densities should be calculated as averages over across-section of 1cm<sup>2</sup> perpendicular to the current direction.4. For frequencies up to 100kHz, peak current density values can be obtained by multiplying the rms value by  $(2)^{1/2}$ .5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate exposure limit value. For pulses of duration  $t_p$ , the equivalent frequency to apply for the exposure limit values should be calculated as  $f=1/(2t_p)$ .

6. All SAR values are to be averaged over any six-minute period.

7. Localised SAR averaging mass is any 10 g of contiguous tissue; the maximum SAR so obtained should be the value used for estimating exposure. These 10 g of tissue are intended to be a mass of contiguous tissue with nearly homo-geneous electrical properties. In specifying a contiguous mass of tissue, it is recognised that this concept can be used in computational dosimetry but may present difficulties for direct physical



measurements. As implegeometry such as cubict issue mass can be used providedth at the calculated dosimetric quantities have conservative values relative to the exposure guidelines.

8. For pulsed exposures in the frequency range 0.3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoelastic expansion,an additional exposure limit value is recommended.This is that the SA should not exceed10mJ/kg averaged over 10g of tissue.

9. Power densities are to be averaged over any 20cm<sup>2</sup> of exposed area and any 68/f<sup>1.05</sup>-minute period (where f is in GHz) to compensate for progressively shorter penetration depth as the frequency increases.Spatial maximum power densities averaged over 1cm<sup>2</sup> should not exceed 20 times the value of 50W/m<sup>2</sup>.

10. With regard to pulsed or transient electromagnetic fields,or generally with regard to simultaneous exposure to multiple frequency fields,appropriate methods of assessment,measurement and/or calculation capable of analysing the characteristics of the waveforms and nature of biological interactions have to be applied,taking account of European harmonised standards developed by Cenelec.

The action values referred to in Table are obtained from the exposure limit values according to the rationale used by the International Commission on Non-ionising Radiation Protection(ICNIRP) in its guidelines on limiting exposure to non-ionising radiation(ICNIRP7/99).

Action values (Article3(2))(unperturbed rms values)

Frequency range	Electric field strength, E(V/m)	Magnetic field strength, H(A/m)	Magnetic field strength, H(A/m)	Equivalent plane wave power density, Seq(W/m <sup>2</sup> )	Contact current, I <sub>c</sub> (mA)	Limb induced current, I <sub>L</sub> (mA)
0-1Hz	-	1.63x10 <sup>5</sup>	2x10 <sup>5</sup>	-	1.0	-
1-8Hz	20000	1.63x10 <sup>5</sup> /f <sup>2</sup>	2x10 <sup>5</sup> /f <sup>2</sup>	-	1.0	-
8-25Hz	20000	2x10 <sup>4</sup> /f	2.5x10 <sup>4</sup> /f	-	1.0	-
0.025-0.82kHz	50/f	20/f	25/f	-	1.0	-
0.82-2.5kHz	500/f	24.4	30.7	-	1.0	-
2.5-65kHz	610	24.4	30.7	-	0.4f	-
65-100kHz	610	1600/f	2000/f	-	0.4f	-
0.1-1MHz	610	1.6/f	2/f	-	40	-
1-10MHz	610/f	1.6/f	2/f	-	40	-
10-110MHz	61	0.16	0.2	10	40	100
110-400MHz	61	0.16	0.2	10	-	-
400-2000MHz	3f <sup>1/2</sup>	0.008f <sup>1/2</sup>	0.01f <sup>1/2</sup>	f/40	-	-
2-300GHz	137	0.36	0.45	50	-	-

Notes: 1. As indicated in the frequency range column.

2. For frequencies between100kHz and 10GHz, S<sub>eq</sub>, E, H, Band I<sub>L</sub> are to be averaged over any six-minute period.

3. For frequencies exceeding 10GHz, S<sub>eq</sub>, E, H and Bare to be averaged over any 68/f<sup>1.05</sup>-minute period(f in GHz)..

4. For frequencies up to 100kHz,peak action values for the field strength scan be obtained by multiplying the rms value by (2)<sup>1/2</sup>. For pulses of duration t<sub>p</sub>,the equivalent frequency to apply for the action values should be calculated as f=1/(2t<sub>p</sub>).

For frequencies between 100kHz and 10MHz,peak action values for the field strengths are calculated by multi-plying the relevant rms values by 10,where a=(0.665log(f/10)+0.176),finHz.

For frequencies between 10MHz and 300GHz, peak action values are calculated by multiplying the corresponding rms values by 32 for the field strengths and by 1000 for the equivalent planewave power density.

5. With regard to pulsed or transient electromagnetic fields,or generally with regard to simultaneous exposure to multiple frequency fields, appropriate methods of assessment, measurement and/or calculation capable of analysing the characteristics of the waveforms and nature of biological linter actions have to be applied, taking account of harmonised European standards developed by Cenelec.

6. For peak values of pulsed modulated electromagnetic fields, it is also suggested that, for carrier frequencies exceeding 10MHz, S<sub>eq</sub> as averaged over the pulse width should not exceed 1000 times the S<sub>eq</sub> action values or that the field strength should not exceed 32 times the field strength action values for the carrier frequency.

**3.3. EMF Assessment Method**

Predication of MPE limit at a given distance

Equation from page 51 of EN50383, Edition 2002

$$E = \frac{\sqrt{30PG}}{r}$$

Where: E= E-field strength (V/m)

P=power input to antenna(Watt)

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

r=distance to the center of radiation of the antenna

EIRP=PG(Watt)

As declared by the Applicant, the EUT transmits with the maximum source-based Duty Cycle of 100%-see the User manual, and the EUT is a wireless device used in a mobile application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum mobile separation distance, r =20cm, the RF power density can be obtained.

**4. Manufacturing tolerance**

2.4GWIFI (EIRP)	Maximum EIRP including tune up (dBm)
12.12	13.00

**5. Test Result**

Test Frequency (MHz)	Minimum Separation Distance (cm)	EIRP Tolerance dBm Max (dBm)	Output Power (W)	E-field Strength Limit (V/m)	E-field Strength At 20cm (V/m)
2.4GWIFI	20.0	13.00	0.019953	61.00	3.87

**Simultaneous Evaluation**

Not Applicable

**6. Conclusion**

The measurement results comply with the relevant limits for general exposure specified as reference levels in the Council Recommendation 2014/53/EU.

.....**End of Report**.....