

FCC TEST REPORT

FCC ID:2AOVG-WK3

Report No..... : ZHT-250423135W02-1

Product..... : Multi-function wireless keypad

Trademark..... : /

Model(s)..... : WK3

Model Difference..... : /

Applicant..... : Hangzhou Sciener Smart Technology Co., Ltd.

Address..... : Rm 701, Bldg 3, Longzhou Rd 6#. Cangqian Street,Yuhang District,
Hangzhou City, Zhejiang Province

Manufacturer..... : Hangzhou Sciener Smart Technology Co., Ltd.

Address..... : Rm 701, Bldg 3, Longzhou Rd 6#. Cangqian Street,Yuhang District,
Hangzhou City, Zhejiang Province

Prepared by..... : Guangdong Zhonghan Testing Technology Co., Ltd.

Address..... : Room 104/201, Building 1. Yibaolai Industrial Park Qiaotou Community,
Fuhai Street. Bao'an District, Shenzhen, China

Date of Receipt..... : May. 03, 2025

Date of Test(s)..... : May. 03, 2025 to May. 07, 2025

Date of Issue..... : May. 07, 2025

Standard..... : FCC CFR Title 47 Part 15 Subpart C Section 15.247

Test procedure..... : KDB558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10:2013

In the configuration tested, the EUT complied with the standards specified above.

Prepared by

Reviewed by:

Approved by:

Leon Li

Baret Wu

Levi Lee

Leon Li/ Engineer

Baret Wu/ Director

Levi Lee/ Manager

Note: 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. This report shall not be reproduced except in full, without the written approval of ZHT, this document may be altered or revised by ZHT, personal only, and shall be noted in the revision of the document.

Table of Contents

Page

1.VERSION	4
2. SUMMARY OF TEST RESULTS	5
3. GENERAL INFORMATION	6
3.1 GENERAL DESCRIPTION OF EUT	6
3.2 DESCRIPTION OF TEST MODES	7
3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	7
3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	7
4. EQUIPMENTS LIST FOR ALL TEST ITEMS	8
4.1 TEST FACILITY	8
4.2 INSTRUMENT LIST FOR ALL TEST ITEMS	8
4.3 TESTING SOFTWARE	10
5. EMC EMISSION TEST	11
5.1 CONDUCTED EMISSION MEASUREMENT	11
5.1.1 POWER LINE CONDUCTED EMISSION Limits	11
5.1.2 TEST PROCEDURE	11
5.1.3 DEVIATION FROM TEST STANDARD	11
5.1.4 TEST SETUP	12
5.1.5 EUT OPERATING CONDITIONS	12
5.1.6 TEST RESULTS	12
4.3 RADIATED EMISSION MEASUREMENT	13
5.2.1 RADIATED EMISSION LIMITS	13
4.2.2 TEST PROCEDURE	13
5.2.3 DEVIATION FROM TEST STANDARD	14
5.2.4 TEST SETUP	14
4.2.5 EUT OPERATING CONDITIONS	15
6. FREQUENCY TOLERANCE	20
6.1 LIMIT	20
6.2 TEST PROCEDURE	20
6.3 DEVIATION FROM TEST STANDARD	20
6.4 TEST SETUP	20
6.5 TEST RESULT	20
7. CHANNEL BANDWIDTH	21
7.1 APPLIED PROCEDURES / LIMIT	21
7.2 TEST PROCEDURE	21
7.3 DEVIATION FROM STANDARD	21

Table of Contents	Page
7.4 TEST SETUP	21
7.5 EUT OPERATION CONDITIONS	21
7.6 TEST RESULT	22
8.ANTENNA REQUIREMENT	23
9. TEST SETUP PHOTO	24
10. EUT CONSTRUCTIONAL DETAILS	24



1.VERSION

Report No.	Version	Description	Approved
ZHT-250423135W02-1	Rev.01	Initial issue of report	May. 07, 2025



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



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Multi-function wireless keypad
Test Model No.:	WK3
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: DC 6 V (DC 1.5 V AAA Battery * 4)
Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Guangdong Zhonghan Testing Technology Co., Ltd. does not assume any responsibility.	



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



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.

4. EQUIPMENTS LIST FOR ALL TEST ITEMS

4.1 TEST FACILITY

Guangdong Zhonghan Testing Technology Co., Ltd.
Add.: Room 104/201, Building 1. Yibaolai Industrial Park Qiaotou Community, Fuhai Street. Bao'an District, Shenzhen, China

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

4.2 INSTRUMENT LIST FOR ALL TEST ITEMS

Radiation Test Instrument

Item	Equipment	Manufacturer	Model	Serial No.	Last Cal.	Next Cal.
1	Receiver	R&S	ESCI	100874	May 10, 2024	May 09, 2025
2	Loop antenna	EMCI	LAP600	272	May 10, 2024	May 09, 2025
3	Amplifier	Schwarzbeck	BBV 9743 B	00378	May 10, 2024	May 09, 2025
4	Amplifier	Schwarzbeck	BBV 9718 B	00040	May 10, 2024	May 09, 2025
5	Bilog Antenna	Schwarzbeck	VULB9162	00498	May 28, 2024	May 27, 2025
6	Horn Antenna	Schwarzbeck	BBHA9120D	02623	May 16, 2024	May 15, 2025
7	Horn Antenna	A.H.SYSTEMS	SAS574	588	May 10, 2024	May 09, 2025
8	Amplifier	AEROFLEX	100KHz-40GHz	097	May 10, 2024	May 09, 2025
9	Spectrum Analyzer	R&S	FSV40	101413	May 16, 2024	May 15, 2025
11	Spectrum Analyzer	KEYSIGHT	N9020A	MY53420208	May 10, 2024	May 09, 2025
12	WIDBAND RADIO COMMUNICATION TESTER	R&S	CMW500	109863	May 10, 2024	May 09, 2025
13	Single Generator	Agilent	N5182A	MY48180575	May 10, 2024	May 09, 2025
14	Power Sensor	MWRFTest	MW100-RFCB	/	May 10, 2024	May 09, 2025
16	CABLE	EMToni	DA800-NM-NM-11000MM	/	May 10, 2024	May 09, 2025



Conduction Test Instrument

Equipment	Manufacturer	Model	Serial No.	Last Cal.	Next Cal.
Receiver	R&S	ESCI	100874	May 10, 2024	May 09, 2025
LISN	R&S	ENV216	102794	May 10, 2024	May 09, 2025
ISN CAT 6	Schwarzbeck	NTFM 8158	00318	May 10, 2024	May 09, 2025
ISN CAT 5	Schwarzbeck	CAT5 8158	00343	May 10, 2024	May 09, 2025
Capacitive Voltage Probe	Schwarzbeck	CVP 9222 C	00101	May 10, 2024	May 09, 2025
Current Transformer Clamp	Schwarzbeck	SW 9605	SW9605 #209	May 10, 2024	May 09, 2025
CABLE	EMToni	G223-NM-BNCM-2000MM	/	May 10, 2024	May 09, 2025

Conducted Test Instrument

Item	Equipment	Manufacturer	Model	Serial No.	Last Cal.	Next Cal.
1	Spectrum Analyzer	R&S	FSV40	101413	May 10, 2024	May 09, 2025
2	Spectrum Analyzer	KEYSIGHT	N9020A	MY53420208	May 10, 2024	May 09, 2025
3	Power Sensor	MWRFTest	MW100-RFCB	/	May 10, 2024	May 09, 2025



4.3 TESTING SOFTWARE

Project	Software name	Edition
Radiated Emission	EZ-EMC	FA-03A2 RE+
RF Test	MTS 8310	2.0.0.0

4.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded 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	$\pm 1.38\text{dB}$
2	RF conducted power	$\pm 0.16\text{dB}$
3	Spurious emissions conducted	$\pm 0.21\text{dB}$
4	All radiated emissions (9k-30MHz)	$\pm 4.68\text{dB}$
5	All radiated emissions (<1G)	$\pm 4.68\text{dB}$
6	All radiated emissions (>1G)	$\pm 4.89\text{dB}$
7	Temperature	$\pm 0.5^{\circ}\text{C}$
8	Humidity	$\pm 2\%$
9	Occupied Bandwidth	$\pm 4.96\%$
10	Power Spectral Density	$\pm 0.71\text{dB}$

Decision Rule

- ☒ Uncertainty is not included
☐ Uncertainty is included

5. EMC EMISSION TEST

5.1 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

5.1.1 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.

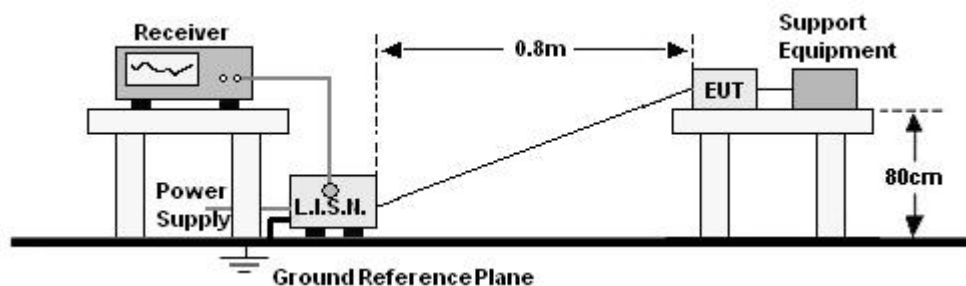
5.1.2 TEST PROCEDURE

- 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.1.3 DEVIATION FROM TEST STANDARD

No deviation

5.1.4 TEST SETUP



5.1.5 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.

5.1.6 TEST RESULTS

N/A

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



4.3 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:	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.

5.2.1 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:

- 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.
- 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

- 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.
- 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.
- 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:

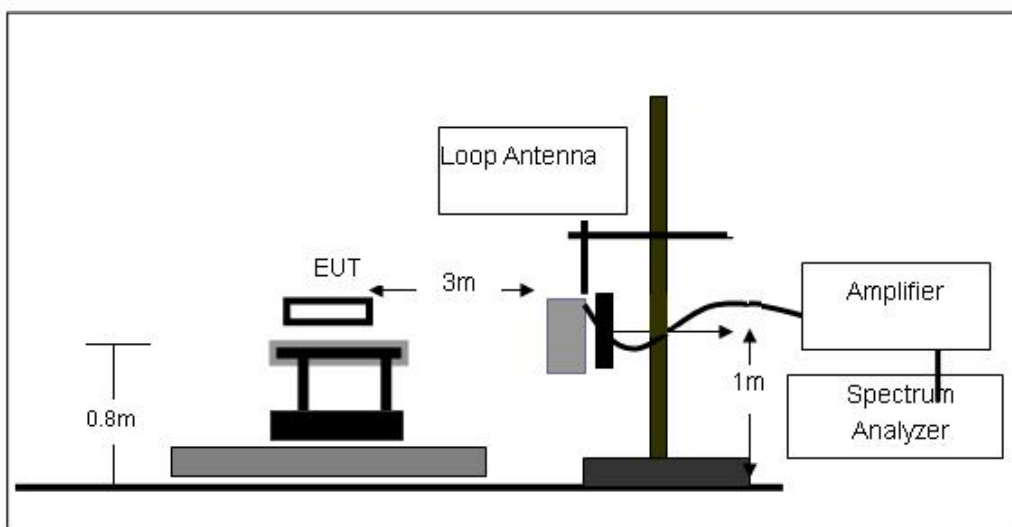
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

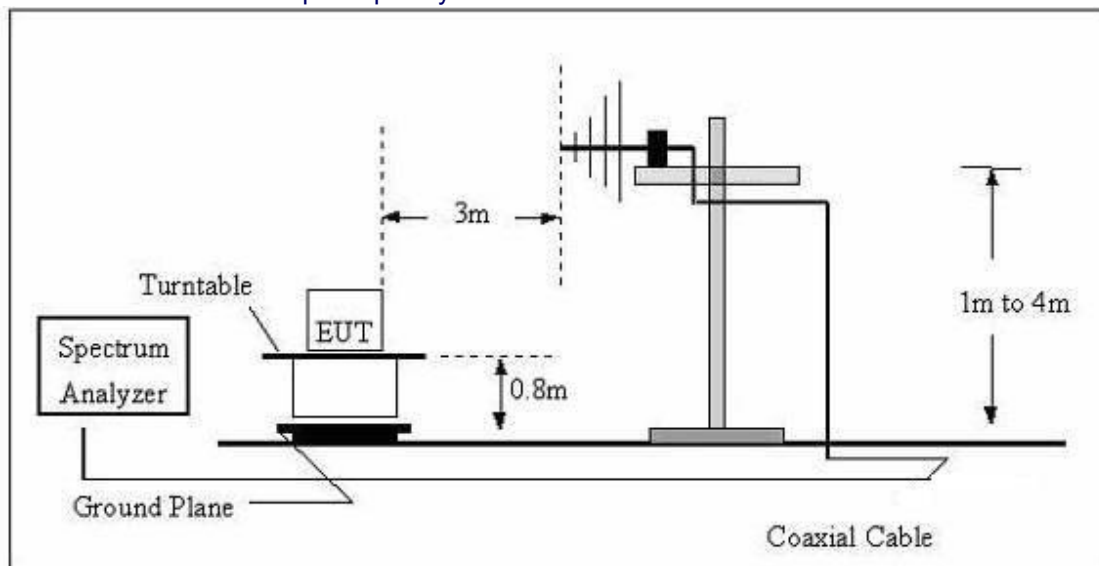
5.2.3 DEVIATION FROM TEST STANDARD

No deviation

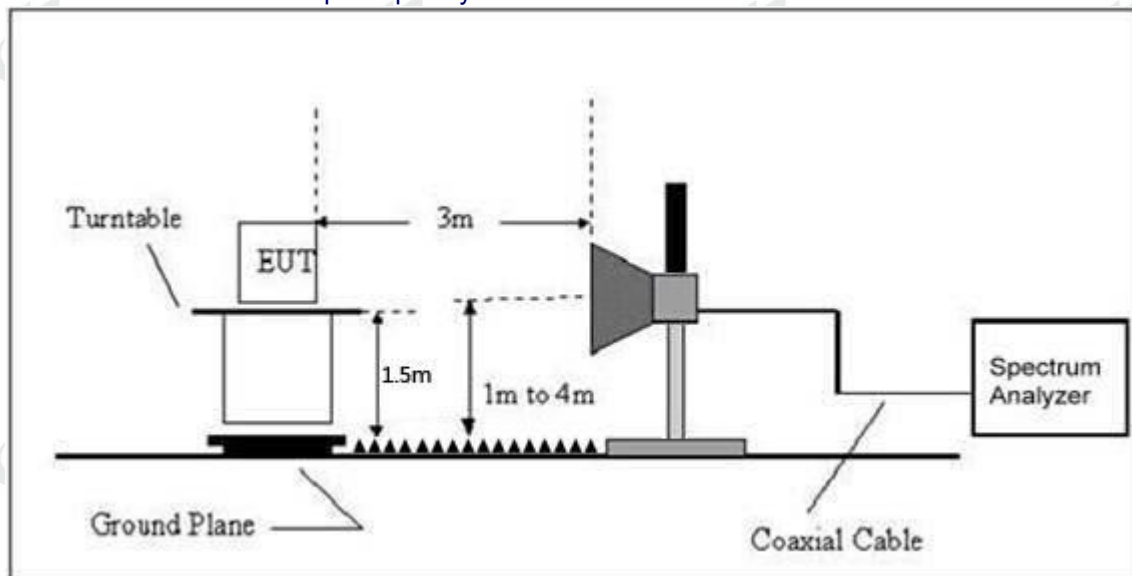
5.2.4 TEST SETUP

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





(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.



5.2.6 TEST RESULTS

Field Strength of Fundamental

Frequency (MHz)	Reading (dBuV/m)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar (H/V)	Detector
13.462	55.62	15.82	71.44	90.47	-19.03	H	QP
13.462	54.28	15.82	70.1	90.47	-20.37	V	QP
13.551	57.69	15.61	73.3	90.47	-17.17	H	QP
13.551	54.65	15.61	70.26	90.47	-20.21	V	QP
13.56	83.95	12.33	96.28	124	-27.72	H	Peak
13.56	91.02	12.33	103.35	124	-20.65	V	Peak
13.564	55.47	12.33	67.8	90.47	-22.67	H	QP
13.564	52.33	12.33	64.66	90.47	-25.81	V	QP
13.652	59.84	15.82	75.66	90.47	-14.81	H	QP
13.652	53.02	15.82	68.84	90.47	-21.63	V	QP



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)	
40.12	54.82	15.15	69.97	115.76	-45.79	AVG
85.21	50.34	15.2	65.54	108.75	-43.21	AVG
301.18	57.65	16.33	73.98	97.94	-23.96	AVG
1258.53	31.06	16.87	47.93	65.4	-17.47	QP
2423.28	29.86	17.62	47.48	69.54	-22.06	QP
4819.11	27.88	18.32	46.2	69.54	-23.34	QP
6313.34	21.32	18.64	39.96	69.54	-29.58	QP
8365.51	19.72	19.26	38.98	69.54	-30.56	QP
12558.38	14.63	19.32	33.95	69.54	-35.59	QP

Note:

Pre-scan in the all of mode, the worst case in of was recorded.

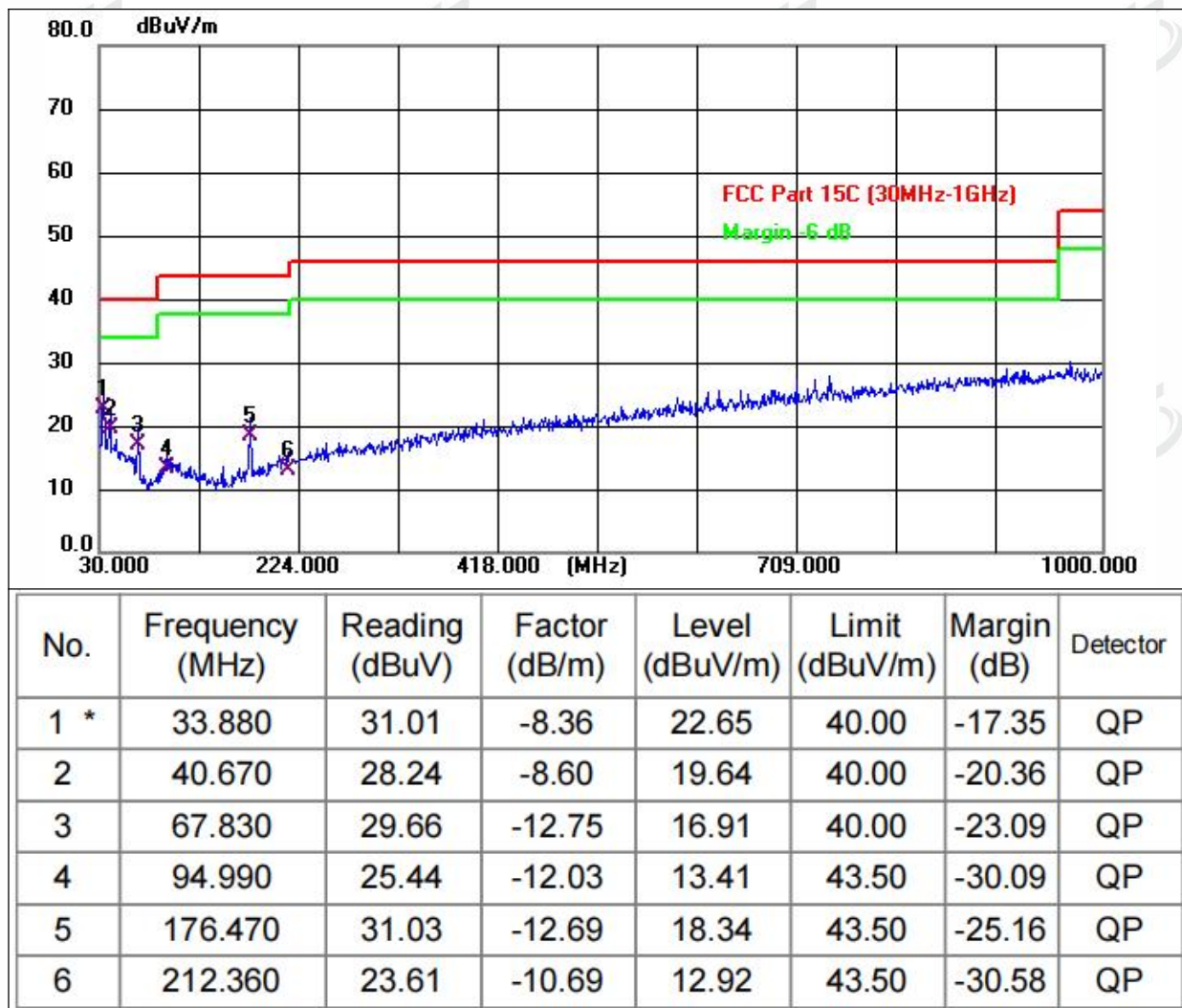
Factor = antenna factor + cable loss – pre-amplifier.

Margin = Emission Level- Limit.



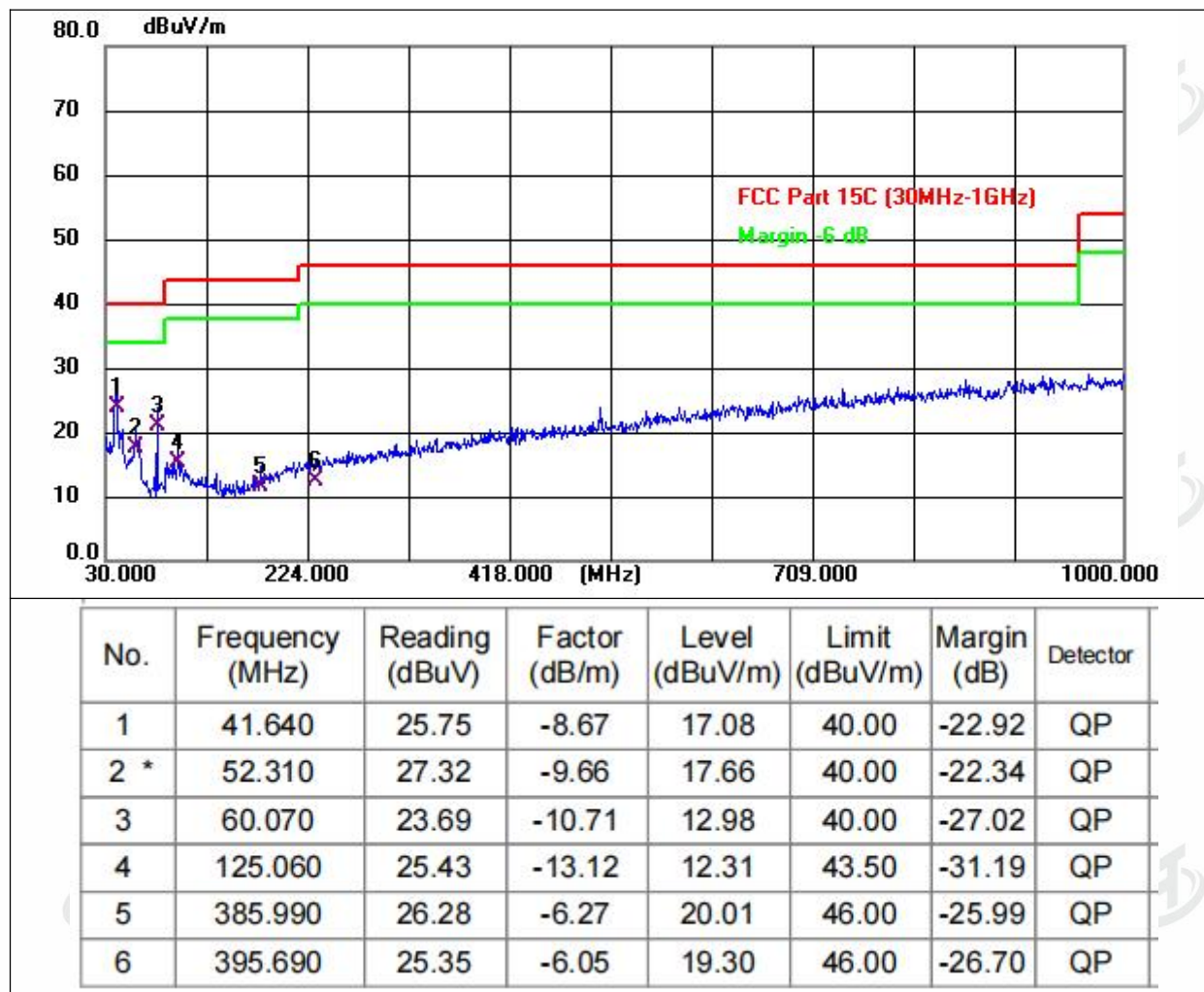
Between 30MHz – 1GHz

Temperature :	25.1℃	Relative Humidity :	50%
Pressure :	101kPa	Polarization :	Horizontal
Test Voltage :	DC 6V		





Temperature :	25.1℃	Relative Humidity :	50%
Pressure :	101kPa	Polarization :	Vertical
Test Voltage :	DC 6V		



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.



6. FREQUENCY TOLERANCE

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

6.1 LIMIT

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.

Limit: $\pm 0.01\%$ of 13.56MHz= ± 1356 Hz

6.2 TEST PROCEDURE

1. Set RBW = 10 kHz.
2. Set the video bandwidth (VBW) $\geq$ 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.

6.3 DEVIATION FROM TEST STANDARD

No deviation

6.4 TEST SETUP



6.5 TEST RESULT

Test Conditions			Frequency Deviation		Limit
Frequency MHz	Power(Vdc)	Temperature (°C)	Measured Freq. (MHz)	Deviation (%)	
13.56	Normal	-20	13.56125	0.009218	$\pm 0.01\%$
	Normal	-10	13.56048	0.003540	
	Normal	0	13.56054	0.003982	
	Normal	10	13.56117	0.008628	
	Normal	20	13.56117	0.008628	
	Normal	30	13.56018	0.001327	
	Normal	40	13.56047	0.003466	
	Normal	50	13.56078	0.005752	
	Normal*85%	20	13.56078	0.005752	
	Normal *115%	20	13.56087	0.006416	



7. CHANNEL BANDWIDTH

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

7.1 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 demonstrated by measuring the radiated emissions.

7.2 TEST PROCEDURE

1. Set RBW = 3 kHz.
2. Set the video bandwidth (VBW) $\geq$ 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.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

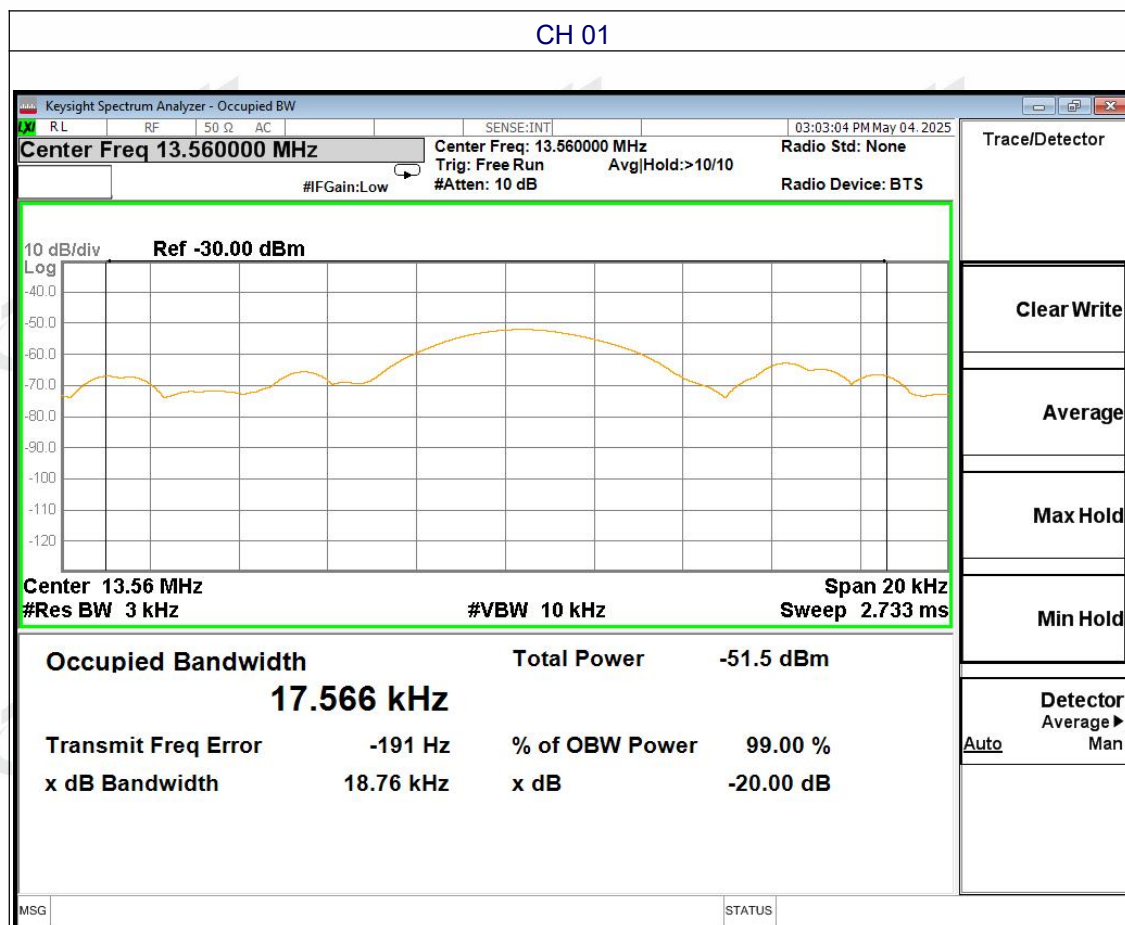
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



7.6 TEST RESULT

Temperature :	25.8°C	Relative Humidity :	52%
Test Mode :	ASK	Test Voltage :	DC 6V

Test channel	20dB Channel Bandwidth (KHz)	Result
1	17.566	Pass





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	



Reference to the appendix I for details.

10. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

***** END OF REPORT *****