

FCC TEST REPORT

FCC ID:2BMGC-SLK-24-SW-153

Report No..... : ZHT-241010019E

Product..... : Wireless charger for smartphone

Trademark..... : Shelllang

Model(s)..... : SLK-24-SW-153
SLK-153-02, SLK-153-03, SLK-153-04, SLK-153-05, SLK-153-06,
SLK-153-07

Model difference..... : SLK-24-SW-153 is the test model, while other models are derivative
models. These models are the same on the circuit, with only different
model names and appearance colors. Therefore, the test data of
SLK-24-SW-153 can represent the remaining models.

Applicant..... : SHELLLANG KOREA

Address..... : Room B101, 110, Yulgok-ro, Jongno-gu, Seoul, Korea

Manufacturer..... : SHELLLANG KOREA

Address..... : Room B101, 110, Yulgok-ro, Jongno-gu, Seoul, Korea

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

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

Date of Receipt..... : Oct. 10, 2024

Date of Test(s)..... : Oct. 10, 2024 to Nov. 29, 2024

Date of Issue..... : Dec. 9, 2024

Test Standard(s)..... : FCC CFR Title 47 Part 15 Subpart C

Test procedure..... : ANSI C63.10:2013

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

Tested by:

Reviewed by:

Approved by:

Kimi Lu

Kimi Lu/ Engineer

Baret Wu

Baret Wu/ Director

Levi Lee

Levi Lee/ Manager

Note: The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report shall not be reproduced except in full, without prior written approval of ZHT. This document may be altered or revised by ZHT, personnel only, and shall be noted in the revision of the document.



TABLE OF CONTENT

1.VERSION	3
2.TEST SUMMARY	4
3.GENERAL INFORMATION	5
3.1 GENERAL DESCRIPTION OF EUT	5
3.2 Test mode	5
3.3 Block Diagram of EUT Configuration	5
3.4 Test Conditions	6
3.5 Description Of Support Unit (Conducted Mode)	6
4. TEST FACILITY AND TEST INSTRUMENT USED	7
4.1 Test Facility	7
4.2 Instrument List For All Test Items	7
4.3 Testing Software	8
4.4 Measurement Uncertainty	9
5. CONDUCTED EMISSION TEST	10
5.1 CONDUCTED EMISSION MEASUREMENT	10
5.1.1 POWER LINE CONDUCTED EMISSION Limi/	10
5.1.2 TEST PROCEDURE	10
5.1.3 DEVIATION FROM TEST STANDARD	10
5.1.4 TEST SETUP	11
5.1.5 EUT OPERATING CONDITIONS	11
5.1.6 Test Result	12
6.RADIATED EMISSION MEASUREMENT	14
6.1 Radiated Emission Limit	14
6.2 Anechoic Chamber Test Setup Diagram	15
6.3 Test Procedure	15
6.4 DEVIATION FROM TEST STANDARD	15
6.5 Test Result	16
7.BANDWIDTH TEST	19
8.ANTENNA REQUIREMENT	21
9.TEST SETUP PHOTO	22
10.EUT CONSTRUCTIONAL DETAILS	22

1.VERSION

Report No.	Version	Description	Approved
ZHT-241010019E	Rev.01	Initial issue of report	Dec. 9, 2024

2.TEST SUMMARY

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Spurious Emission	15.209(a)(f)	Pass
20dB Bandwidth	15.215	Pass

NOTE:

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

3.GENERAL INFORMATION

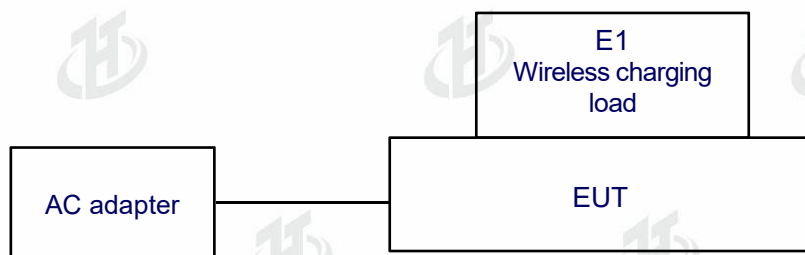
3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Wireless charger for smartphone
Test Model No:	SLK-24-SW-153
Hardware version:	V1.0
Software version:	V1.0
Operation Frequency:	110.1-205kHz
Modulation type:	MSK
Antenna Type:	Coil Antenna
Antenna gain:	0dBi
Power supply:	Input: DC 9 V/2 A Wireless Output:15 W /10 W /7.5 W / 5 W
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.	

3.2 Test mode

Test Modes	
Mode 1	AC adapter + wireless charging(5W)
Mode 2	AC adapter + wireless charging(7.5W)
Mode 3	AC adapter + wireless charging(10W)
Mode 4	AC adapter + wireless charging(15W)
Note: 1.All full load, half load, and no-load tests have been conducted in each mode, only the worst-case was recorded in the report. Mode 4 full load is the worst mode. 2.The EUT not supports portable use.	

3.3 Block Diagram of EUT Configuration



3.4 Test Conditions

Temperature: 23~26℃

Relative Humidity: 54~63 %

3.5 Description Of Support Unit (Conducted Mode)

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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Wireless charging load	N/A	EESON	N/A	AE
E-2	AC adapter	N/A	CHG-WALL-PD-45W	N/A	AE

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) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

4. TEST FACILITY AND TEST INSTRUMENT USED

4.1 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

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
10	Spectrum Analyzer	KEYSIGHT	N9020A	MY53420208	May 10, 2024	May 09, 2025
11	WIDBAND RADIO COMMUNICATION TESTER	R&S	CMW500	109863	May 10, 2024	May 09, 2025
12	Single Generator	Agilent	N5182A	MY48180575	May 10, 2024	May 09, 2025
13	Power Sensor	MWRFTest	MW100-RFCB	/	May 10, 2024	May 09, 2025
14	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-BNC M-2000MM	/	May 10, 2024	May 09, 2025

4.3 Testing Software

Project	Software name	Edition
RF Conducted	MTS 8310	2.0.0.0
Conducted Emission	EZ-EMC	EMC-CON 3A1.1+
Radiated Emission	EZ-EMC	FA-03A2 RE+

4.4 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	Conducted spurious emissions	$\pm 0.21\text{dB}$
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	$\pm 4.96\text{dB}$

Decision Rule

- ☒ Uncertainty is not included
☐ Uncertainty is included

5. CONDUCTED 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 Limi/

FREQUENCY (MHz)	Limit (dBuV)		Standard
	QP	AVG	
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.

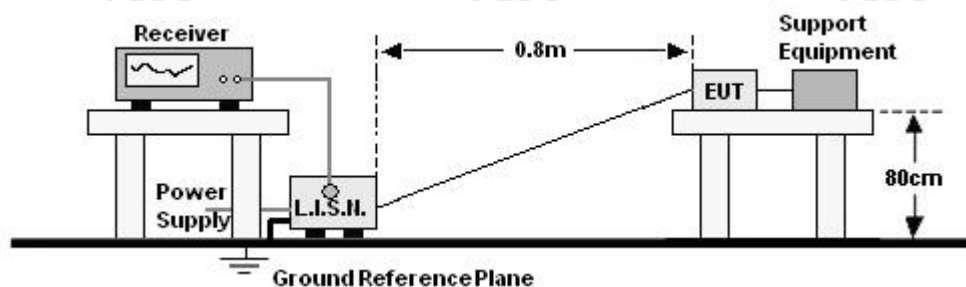
5.1.2 TEST PROCEDURE

- 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 equipment/ 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

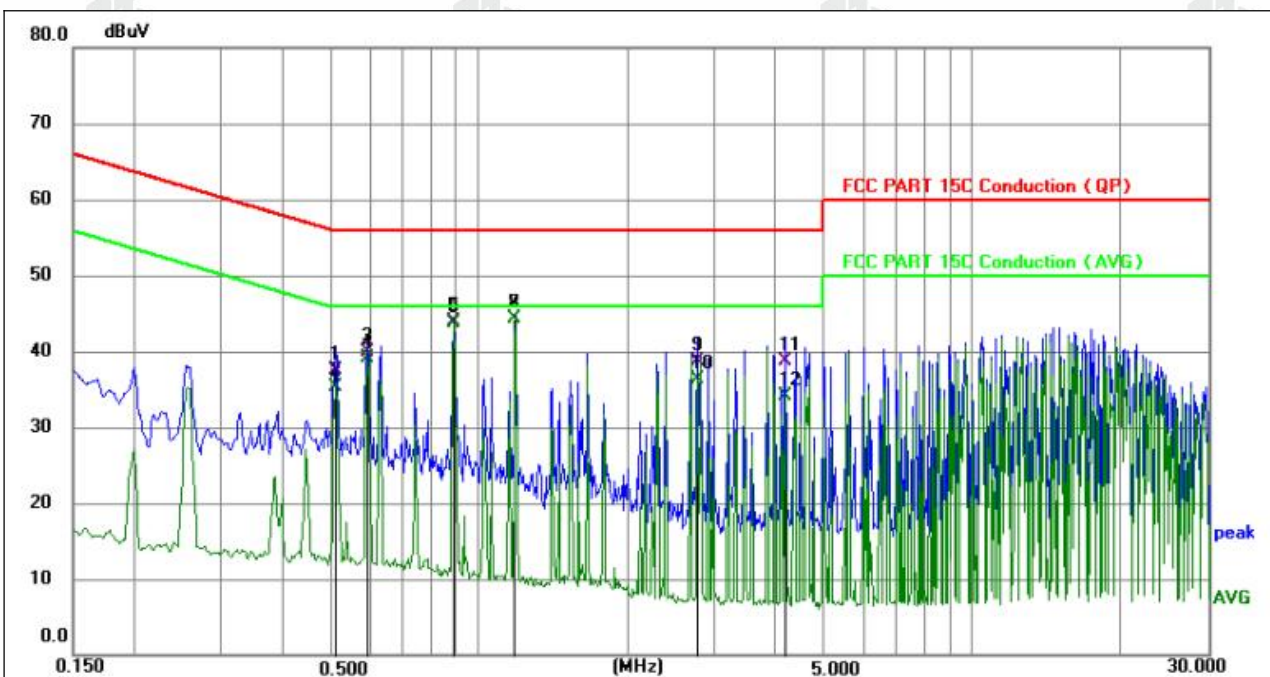


5.1.5 EUT OPERATING CONDITIONS

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 Result

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	L
Test Voltage:	AC 120V/60Hz		



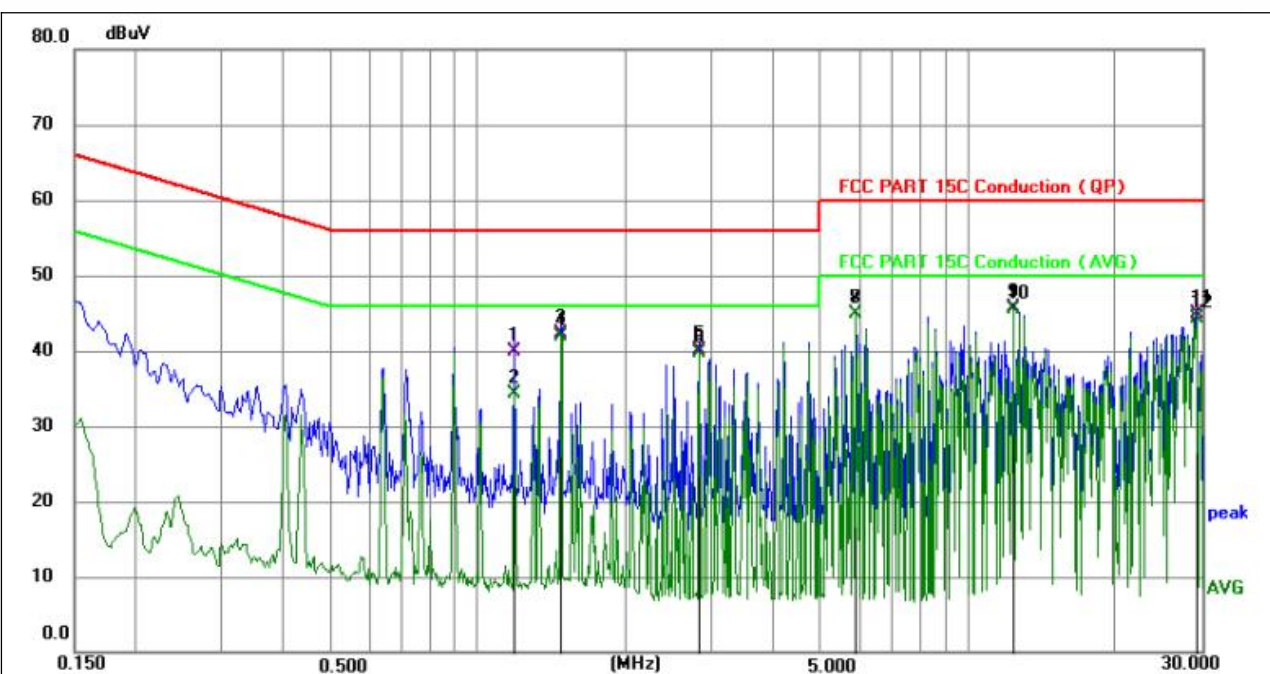
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5100	27.53	10.02	37.55	56.00	-18.45	QP	P	
2	0.5100	25.29	10.02	35.31	46.00	-10.69	AVG	P	
3	0.5910	29.97	10.03	40.00	56.00	-16.00	QP	P	
4	0.5910	29.12	10.03	39.15	46.00	-6.85	AVG	P	
5	0.8880	33.85	10.05	43.90	56.00	-12.10	QP	P	
6	0.8880	33.57	10.05	43.62	46.00	-2.38	AVG	P	
7	1.1849	34.34	10.06	44.40	56.00	-11.60	QP	P	
8 *	1.1849	34.19	10.06	44.25	46.00	-1.75	AVG	P	
9	2.7734	28.61	10.07	38.68	56.00	-17.32	QP	P	
10	2.7734	26.27	10.07	36.34	46.00	-9.66	AVG	P	
11	4.1730	28.64	10.10	38.74	56.00	-17.26	QP	P	
12	4.1730	24.05	10.10	34.15	46.00	-11.85	AVG	P	

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Phase :	N
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	1.1895	29.77	10.06	39.83	56.00	-16.17	QP	P	
2	1.1895	24.31	10.06	34.37	46.00	-11.63	AVG	P	
3	1.4775	32.33	10.07	42.40	56.00	-13.60	QP	P	
4 *	1.4775	31.81	10.07	41.88	46.00	-4.12	AVG	P	
5	2.8275	30.13	10.07	40.20	56.00	-15.80	QP	P	
6	2.8275	29.54	10.07	39.61	46.00	-6.39	AVG	P	
7	5.9190	34.89	10.11	45.00	60.00	-15.00	QP	P	
8	5.9190	34.81	10.11	44.92	50.00	-5.08	AVG	P	
9	12.4305	35.71	10.09	45.80	60.00	-14.20	QP	P	
10	12.4305	35.44	10.09	45.53	50.00	-4.47	AVG	P	
11	29.3054	34.63	10.37	45.00	60.00	-15.00	QP	P	
12	29.3054	33.93	10.37	44.30	50.00	-5.70	AVG	P	

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor

6.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

6.1 Radiated Emission Limit

Limi/ for frequency below 30MHz

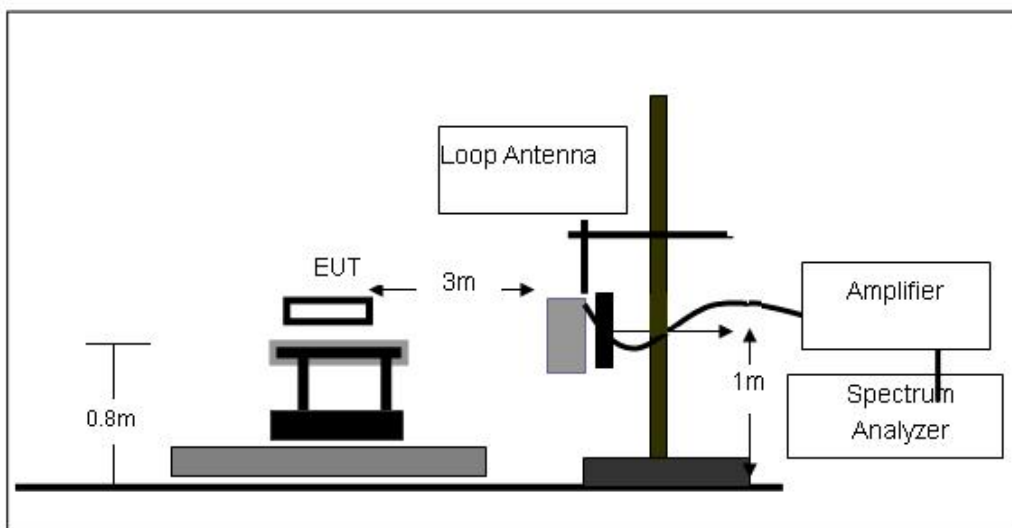
Frequency	Limit (uV/m)	Measurement Distance(m)	Remark
0.009-0.490	2400/F(kHz)	300	Peak Value
0.490-1.705	24000/F(kHz)	30	Quasi-peak Value
1.705-30	30	30	Quasi-peak Value

Limi/ for frequency Above 30MHz

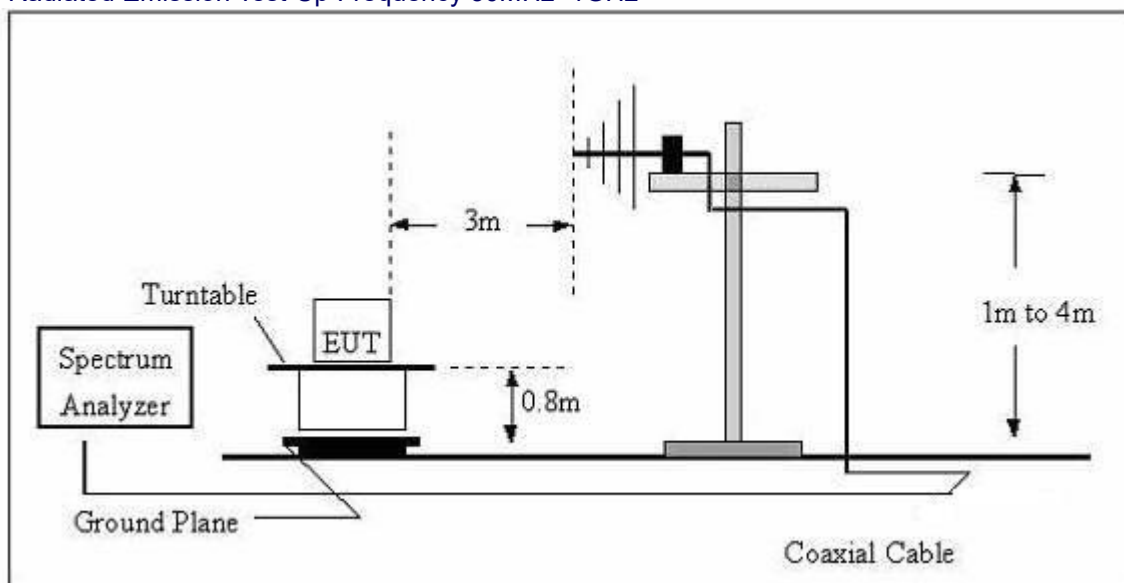
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.00	Quasi-peak Value
88MHz-216MHz	43.50	Quasi-peak Value
216MHz-960MHz	46.00	Quasi-peak Value
960MHz-1GHz	54.00	Quasi-peak Value
Above 1GHz	54.00	Average Value
	74.00	Peak Value

6.2 Anechoic Chamber Test Setup Diagram

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



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



The radiated emission test were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.205 limit.

6.3 Test Procedure

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna (calibrated by dipole antenna) are used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on measurement.

6.4 DEVIATION FROM TEST STANDARD

No deviation



6.5 Test Result

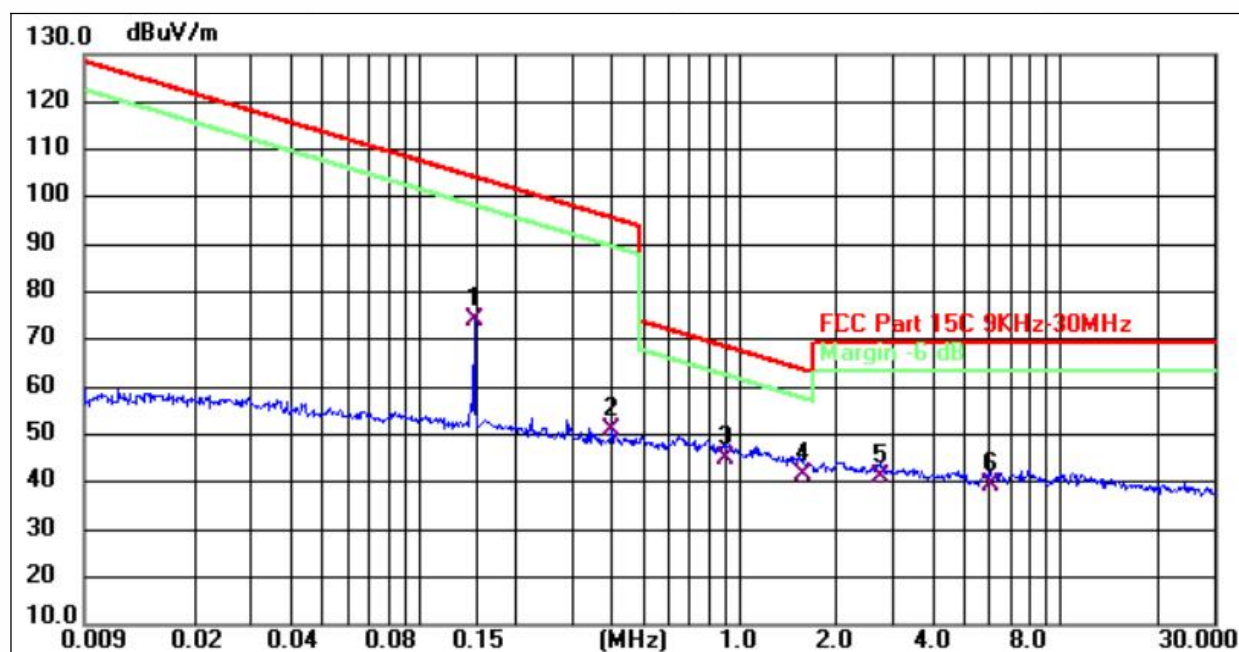
Measurement data:

Note: Limit dBuV/m @3m = Limit dBuV/m @300m+ 80

Limit dBuV/m @3m = Limit dBuV/m @30m + 40

9 kHz~30 MHz

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	coaxial
Test Voltage:	AC 120V/60Hz	Test Modes:	Mode 4



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.148	73.81	0.16	73.97	104.20	-30.23	Peak
2	0.398	50.22	0.92	51.14	95.61	-44.47	Peak
3	0.895	42.99	1.91	44.90	68.57	-23.67	QP
4 *	1.579	38.11	3.30	41.41	63.64	-22.23	QP
5	2.719	35.39	5.63	41.02	69.54	-28.52	QP
6	6.020	27.19	12.35	39.54	69.54	-30.00	QP

Note:

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

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

Emission Level = Meter Reading - Factor

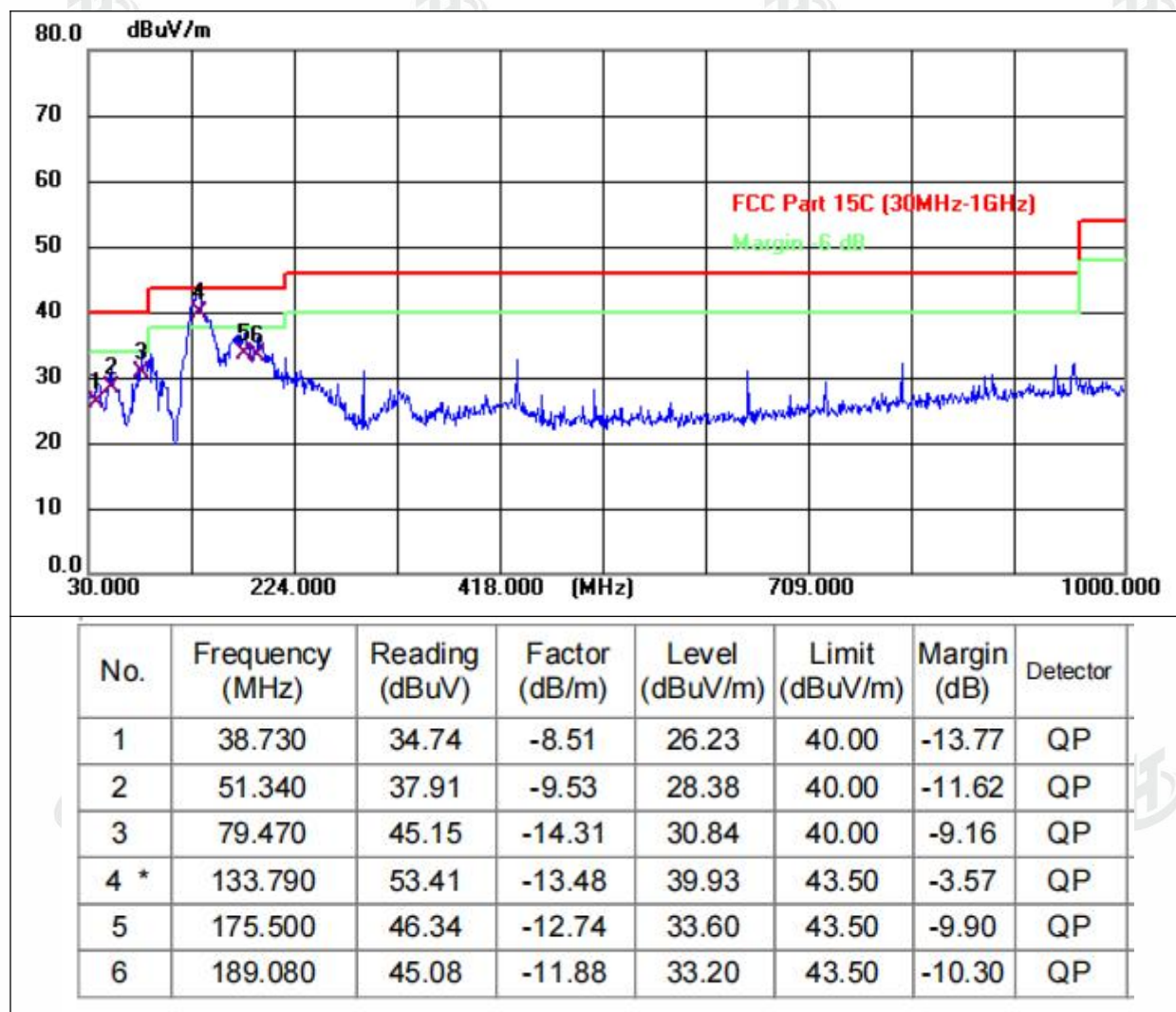
Margin = Emission Level- Limit.

The amplitude of emissions which are attenuated by more than 20db below the permissible value has no need to be reported.



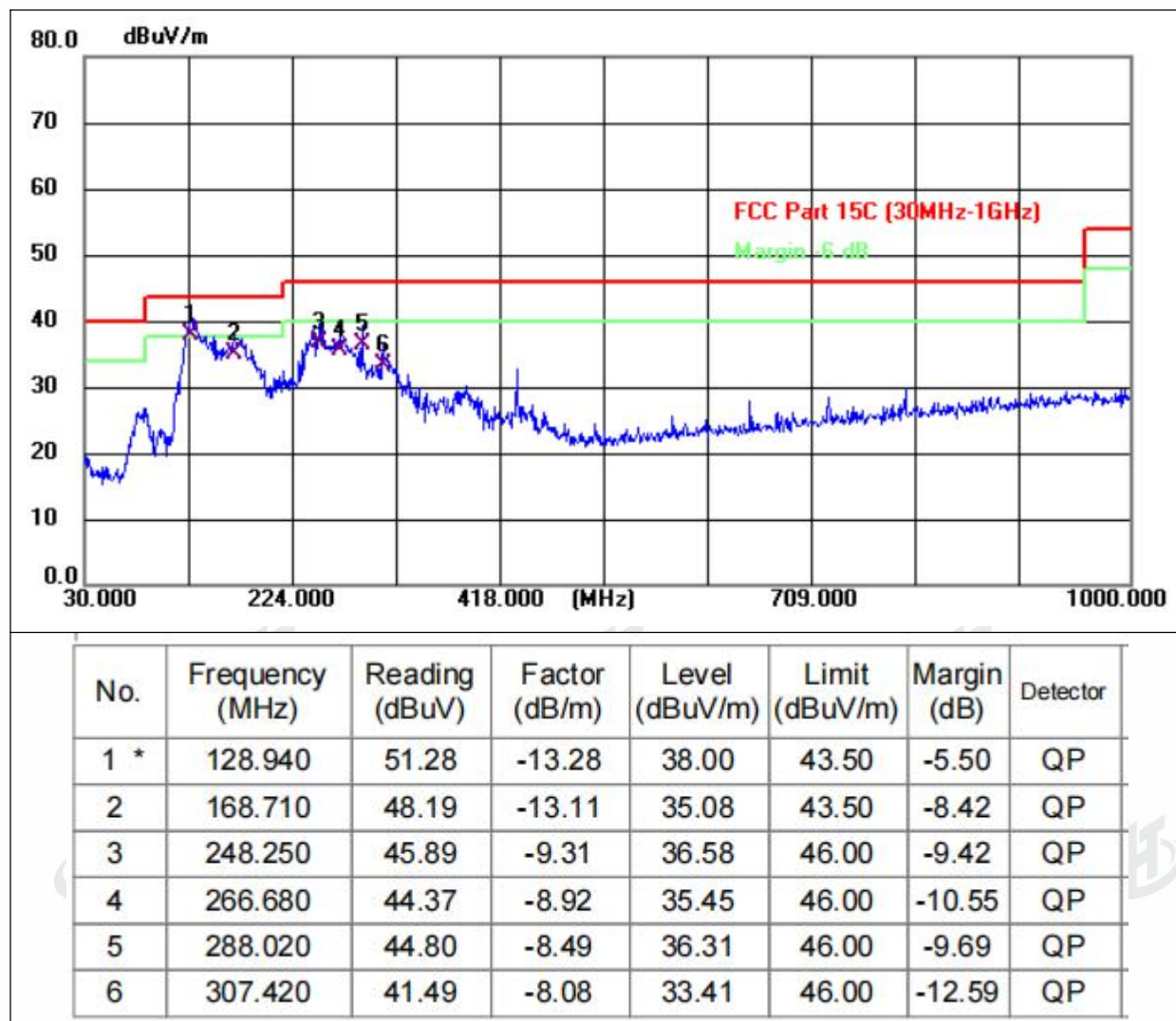
30MHz-1GHz

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz	Test Modes:	Mode 4





Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz	Test Modes:	Mode 4



Remarks:

1. Factor = Antenna Factor + Cable Loss – Preamplifier Factor
2. Level = Reading + Factor
3. Margin = Emission Level- Limit.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.



7.BANDWIDTH TEST

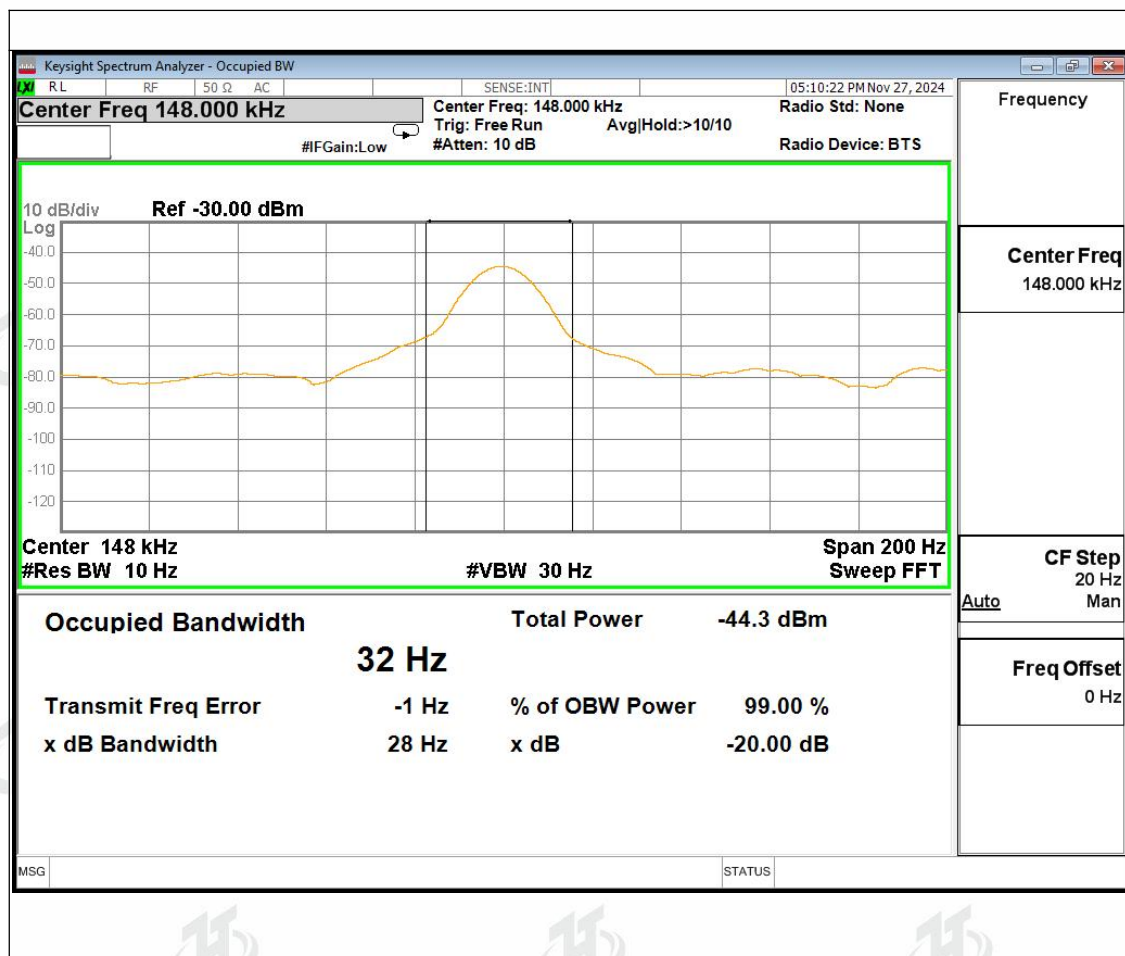
1. Set RBW = 10 Hz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude point (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP



Temperature:	25.0 °C	Relative Humidity:	54.1%
Pressure:	101kPa		

Frequency (KHz)	20dB bandwidth (KHz)	Result
148	0.028	Pass



8.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 antenna is Coil Antenna, the best case gain of the antennas is 0dBi, reference to the appendix II for details	

9.TEST SETUP PHOTO

Reference to the appendix I for details.

10.EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

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