

FCC TEST REPORT

FCC ID: 2BGFV-SPF-PB-01-C

FOR

Shenzhen Kangchengtai Industrial Co., Ltd.

Microchip Pet Feeder

Test Model: SPF-PB-01-C

Prepared for Shenzhen Kangchengtai Industrial Co., Ltd.

Address No. 128, Dayang Road, Fuyong, Baoan District, Shenzhen, China

Prepared by Shenzhen LCS Compliance Testing Laboratory Ltd

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April 26, 2024 Date of receipt of test sample

2 Number of tested samples

A240425021-1, A240425021-2 Sample number

Prototype Sample number

April 26, 2024 ~ May 10, 2024 Date of Test

Date of Report May 11, 2024





FCC TEST REPORT FCC CFR 47 PART 15 C

Report Reference No.: LCSA04254014EA

Date of Issue.....: May 11, 2024

Testing Laboratory Name.....: Shenzhen LCS Compliance Testing Laboratory Ltd.

101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei,

Shajing Street, Baoan District, Shenzhen, 518000, China

Full application of Harmonised standards

Partial application of Harmonised standards Testing Location/ Procedure.....

Other standard testing method

Applicant's Name...... : Shenzhen Kangchengtai Industrial Co., Ltd.

Address......: No. 128, Dayang Road, Fuyong, Baoan District, Shenzhen, China

Test Specification

Standard.....: FCC CFR 47 PART 15 C / ANSI C63.10: 2013

Test Report Form No.....: LCSEMC-1.0

TRF Originator.....: Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF...... Dated 2011-03

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Test Item Description.....: Microchip Pet Feeder

Trade Mark.....: N/A

Test Model : SPF-PB-01-C

Ratings.....: Input: 5V-1000mA

Result: Positive

Compiled by:

Supervised by:

Cary Luo/ Technique principal

Approved by:

Report No.: LCSA04254014EA

Joker. Hu

Joker Hu/ Administrator

Gavin Liang/ Manager





Report No.: LCSA04254014EA

FCC -- TEST REPORT

May 11, 2024 Test Report No.: LCSA04254014EA Date of issue

Test Model..... : SPF-PB-01-C EUT..... : Microchip Pet Feeder Applicant..... : Shenzhen Kangchengtai Industrial Co., Ltd. : No. 128, Dayang Road, Fuyong, Baoan District, Shenzhen, China Address..... Telephone..... Fax..... : / : Shenzhen Kangchengtai Industrial Co., Ltd. Manufacturer..... Address..... : No. 128, Dayang Road, Fuyong, Baoan District, Shenzhen, China Telephone..... : Shenzhen Kangchengtai Industrial Co., Ltd. Factory..... : No. 128, Dayang Road, Fuyong, Baoan District, Shenzhen, China Address..... Telephone..... Fax..... : /

125 VI	175 VV	(25 °C)
Test Result	de la Principal de la de	Positive
	Traing "	

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.







Revision History

	Revision History		
Report Version	Issue Date	Revision Content	Revised By
000	May 11, 2024	Initial Issue	

Report No.: LCSA04254014EA







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1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : Microchip Pet Feeder

Test Model : SPF-PB-01-C

: Input: 5V=1000mA, DC 6.00V from 4*AA batteries Power Supply

Hardware Version :/

Software Version :/

125KHz

Operating Frequency : 125KHz

Channel Number : 1 channel

Modulation Type : ASK

Antenna Description : Internal Antenna, 0dBi (Max.)













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1.2. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
	Adapter			FCC

1.3. External I/O

I/O Port Description	Quantity Cable	
Type-C port	1	N/A

1.4. Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595. Test Firm Registration Number: 254912.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.5. 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 CISPR 16-4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS 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.



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1.6. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
		9KHz~30MHz	±3.10dB	(1)
		30MHz~200MHz	±2.96dB	(1)
Radiation Uncertainty	: [200MHz~1000MHz	±3.10dB	(1)
		1GHz~26.5GHz	±3.80dB	(1)
		26.5GHz~40GHz	±3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	±1.63dB	(1)
Power disturbance	:	30MHz~300MHz	±1.60dB	(1)
Occupied Channel Bandwidth	:	0.01MHz~26.5GHz	5%	(1)

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

1.7. Description of Test Modes

The EUT operates at 125 KHz. The following operating modes were applied for the related test items.

All test modes were tested, only the result of the worst case was recorded in the report. It was pre-tested on the positioned of each 3 axis. The worst case was found positioned on X-plane.

	Mode of Operations	Transmitting Frequency (KHz)		
Pina Lab	ASK	125		
	For Conduct	ed Emission		
	Test Mode	TX Mode		
	For Radiate	ed Emission		
	Test Mode	TX Mode		

Worst-case mode and channel used for 150 KHz-30 MHz power line conducted emissions was the mode and channel with the highest output power.

Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/50Hz, recorded worst case at AC 120V/60Hz.

***Note: Using a temporary antenna connector for the EUT when the conducted measurements are performed.



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2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen LCS Compliance Testing Laboratory Ltd.

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.201 under the FCC Rules Part 15 Subpart C.

2.3. General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013.



3. SYSTEM TEST CONFIGURATION

3.1. Justification

The system was configured for testing in a continuous transmits condition.

3.2. EUT Exercise Software

Powered on the EUT then the EUT will transmit at 125 KHz signal.

3.3. Special Accessories

N/A

3.4. Block Diagram/Schematics

Please refer to the related document

3.5. Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6. Test Setup

Please refer to the test setup photo.





4. SUMMARY OF TEST RESULTS

Applied Standard: FCC Part 15 Subpart C								
FCC Rules	Description of Test	Result	Remark					
§15.203	Antenna Requirements	Compliant	Note 1					
§15.207(a)	AC Conducted Emissions	Compliant	Note 1					
§15.201(a), §15.205(a), §15.209(a), §15.215(a)	Radiated Emissions Measurement	Compliant	Note 1					
§15.215	§15.215 99% and 20dB Bandwidth		Note 1					
§2.1091	RF Exposure	Compliant	Note 2					

Remark:

- 1. Note 1 Test results inside test report;
- 2. Note 2 Test results in other test report (RF Exposure Evaluation Report);





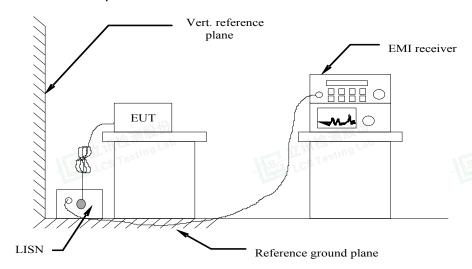
5. Power Line Conducted Emissions

5.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range	Limits (c	lΒμV)
(MHz)	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

5.2 Block Diagram of Test Setup



5.3 Disturbance Calculation

The AC mains conducted disturbance is calculated by adding the 10dB Pulse Limiter and Cable Factor and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

CD (dBuV) = RA (dBuV) + PL (dB) + CL (dB)

Where CD = Conducted Disturbance	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	PL = 10 dB Pulse Limiter Factor

5.4 Test Results

PASS.

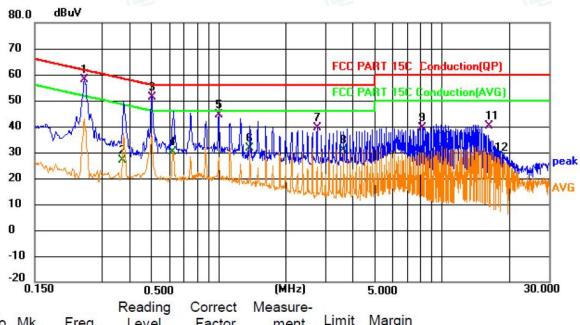
The test data please refer to following page.

Temperature	22.5 ℃	Humidity	53.7%	
Test Engineer	Paddi Chen	Configurations	Transmit	





AC Conducted Emission @ AC 120V/60Hz(worst case) Line



No.	Mk.	Freq.	Reading Level	Factor Factor	Measure- ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.249	38.49	19.72	58.21	61.79	-3.58	QP	
2		0.369	7.03	19.95	26.98	48.52	-21.54	AVG	
3	l.	0.501	31.56	19.84	51.40	56.00	-4.60	QP	
4		0.623	10.75	19.45	30.20	46.00	-15.80	AVG	
5		1.000	25.18	19.15	44.33	56.00	-11.67	QP	
6		1.374	12.70	19.07	31.77	46.00	-14.23	AVG	
7		2.751	20.45	19.17	39.62	56.00	-16.38	QP	
8		3.624	11.86	19.19	31.05	46.00	-14.95	AVG	
9		8.124	19.85	19.71	39.56	60.00	-20.44	QP	
10		10.001	12.75	19.43	32.18	50.00	-17.82	AVG	
11		16.251	20.62	19.73	40.35	60.00	-19.65	QP	
12		17.875	8.74	19.44	28.18	50.00	-21.82	AVG	



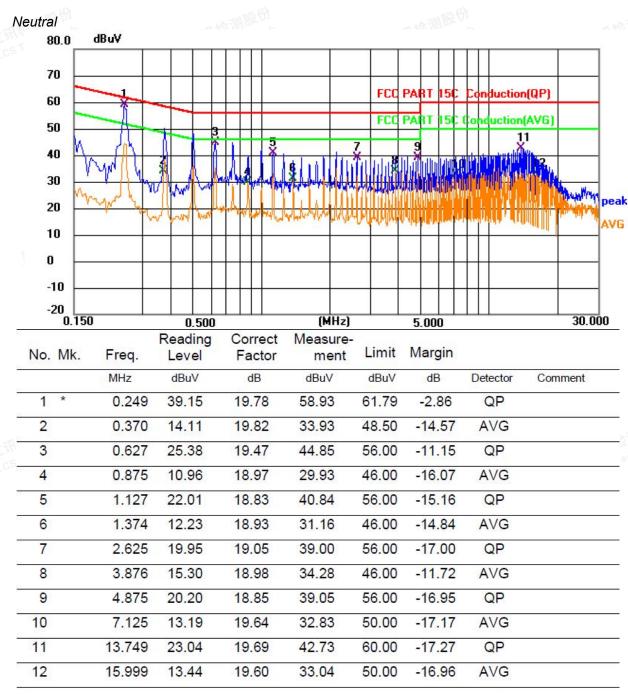








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^{***}Note:

- 1). Pre-scan all modes and recorded the worst case results in this report.
- 2). Measurement = Reading + Correct, Margin = Measurement Limit. Correct Factor = Lisn Factor + Cable Factor + Insertion loss of Pulse Limiter.













6. RADIATED EMISSION MEASUREMENT

6.1. Standard Applicable

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation. 20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) and 15.215 limit in the table below has to be followed.

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Fundamental Frequency	Field Strength of fundamental (millivolts/meter)	Field Strength of harmonics (microvolts/meter)
902-928MHz	50 编辑价	500
2400-2483.5MHz	50 (1) (2) (2)	500
5725-5875MHz	50 5 100	500
24.0-24.25GHz	250	2500

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolts/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	esting 3		
88~216	150	3		
216~960	200	3		
Above 960	500	3		

6.2. Instruments Setting

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver

TCCCIVCI.	
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10 th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP



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6.3. Test Procedure

1) Sequence of testing 9 kHz to 30 MHz

Setup:

- --- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- --- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- --- If the EUT is a floor standing device, it is placed on the ground.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna height is 1.0 meter.
- --- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

- --- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).
- --- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.
- --- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.



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2) Sequence of testing 30 MHz to 1 GHz

Setup:

- --- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- --- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- --- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna is polarized vertical and horizontal.
- --- The antenna height changes from 1 to 3 meter.
- --- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

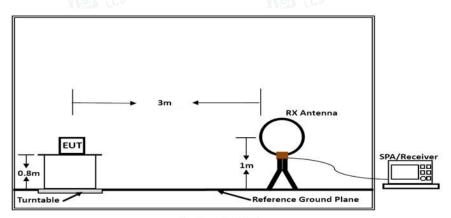
- --- The final measurement will be performed with minimum the six highest peaks.
- --- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.
- --- The final measurement will be done with QP detector with an EMI receiver.
- --- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.



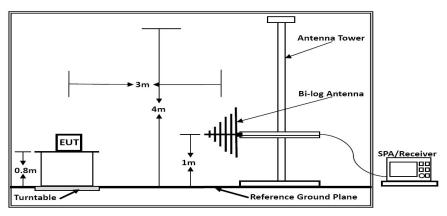
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6.4. Block Diagram of Test Setup



Below 30MHz



Below 1GHz

6.5. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS (dBuV/m) = RA (dBuV) + AF (dB/m) + CL (dB) - AG (dB)

The Lot	Where FS = Field Strength	CL = Cable Attenuation Factor
	-	(Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

6.6. Test Results

Results of Radiated Emissions (9 kHz~30MHz)

Temperature 23.6 ℃		Humidity	52.2%	
Test Engineer	Paddi Chen	Configurations	Transmit	



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Note:

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

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

Measured at both 90 degree and 0 degree, recorded worst case at 0 degree.



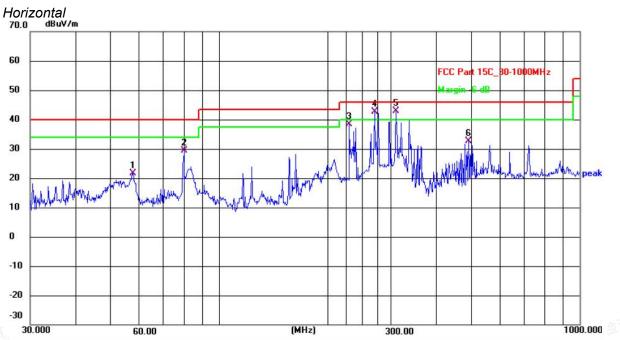
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Results of Radiated Emissions (30MHz~1GHz)

Temperature 23.8℃		Humidity	52.1%	
Test Engineer Paddi Chen		Configurations	Transmit	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	57.7962	40.12	-18.45	21.67	40.00	-18.33	QP
2	80.0806	49.34	-19.87	29.47	40.00	-10.53	QP
3	230.0985	54.93	-16.52	38.41	46.00	-7.59	QP
4	270.3748	57.97	-15.41	42.56	46.00	-3.44	QP
5	309.9977	57.86	-15.04	42.82	46.00	-3.18	QP
6	492.4685	46.12	-13.56	32.56	46.00	-13.44	QP



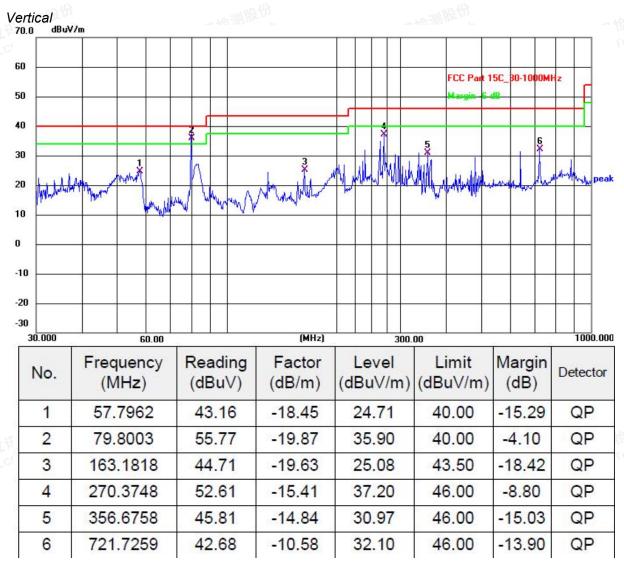












Note:

- 1). Pre-scan all modes and recorded the worst case results in this report.
- 2). Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3). Corrected Reading: Antenna Factor + Cable Loss + Read Level = Level.











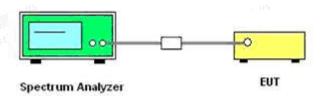


7. 99% and 20dB Bandwidth Measurement

7.1. Standard Applicable

According to §15.215, device must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

7.2. Block Diagram of Test Setup



7.3. Test Procedure

Use the following spectrum analyzer settings:

Span = 1 kHz

RBW = 3 Hz

VBW = 10 Hz

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

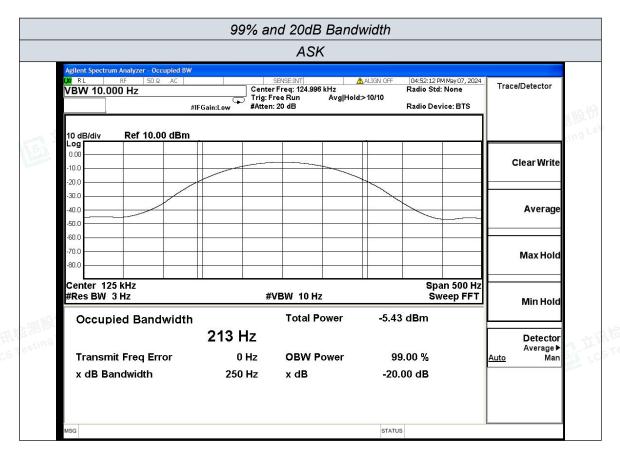


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7.4. Test Results

A 4 4 4 4 7	- TLW sing	- T. P. W. Stall Co.	31.7		
	99% and 20dB Bandwidth Measurement				
Test Frequency	20dB Bandwidth	Limit			
(KHz) (Hz)		(Hz)	(KHz)		
125 213		250	No Limit		



TEATH 在测度的

NSA 立流检测版份

IST 立语检测设验





VST 立流控測股份





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8. Antenna Requirements

8.1 Standard Applicable

According to antenna requirement of §15.203, 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 a broken antenna can be re-placed by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

8.2 Antenna Connected Construction

8.2.1. Standard Applicable

According to § 15.203, 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.

8.2.2. Antenna Connector Construction

The antenna used for transmitting is permanently attached and no consideration of replacement. Please see EUT photo for details.

8.3. Results: Compliance.



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9. LIST OF MEASURING EQUIPMENTS

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2023-10-18	2024-10-17
2	DC Power Supply	Agilent	E3642A	N/A	2023-10-18	2024-10-17
3	Temperature & Humidity Chamber	GUANGZHOU GOGNWEN	GDS-100	70932	2023-10-05	2024-10-04
4	EMI Test Software	AUDIX	E3	1	N/A	N/A
5	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2023-06-09	2024-06-08
6	Positioning Controller	Max-Full	MF7802BS	MF780208586	N/A	N/A
7	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2021-08-29	2024-08-28
8	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-09-12	2024-09-11
9	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
10	EMI Test Receiver	R&S	ESR 7	101181	2023-08-15	2024-08-14
11	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2023-07-17	2024-07-16
12	Low-frequency amplifier	SchwarzZBECK	BBV9745	00253	2023-10-18	2024-10-17
13	High-frequency amplifier	JS Denki Pte	PA0118-43	JSPA21009	2023-10-18	2024-10-17
14	EMI Test Receiver	R&S	ESPI	101940	2023-08-15	2024-08-14
15	Artificial Mains	R&S	ENV216	101288	2023-06-09	2024-06-08
16	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2023-06-09	2024-06-08
17	EMI Test Software	Farad	EZ	1 1	N/A	N/A
18	Antenna Mast	Max-Full	MFA-515BSN	1308572	N/A	N/A
19	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2021-08-29	2024-08-28
20	Broadband Preamplifier	SCHWARZBECK	BBV9719	9719-025	2023-06-16	2024-06-15
27	Pulse Limiter	R&S	ESH3-Z2	102750-NB	2023-08-15	2024-08-14







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10. TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

11. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

12. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

-----THE END OF TEST REPORT-----





