

# **FCC Test Report**

Report No.: AGC01924240101FR02

FCC ID	:	2AMBA-T92
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Bluetooth FM Transmitter
BRAND NAME	:	N/A
MODEL NAME	:	T92, T81, T71, T72, T73, T74, T75, T76, T77, T78, T79, T80, T82, T83, T84, T85, T86, T87, T88, T89, T90, T91, T93, T94, T95, T96, T97, T98, T99, T100, T101, T102, T103, T104, T105, T106, T107, T108, T109, T110, T111, T66, RM170, RM180, RM140, RM130, RM150
APPLICANT	:	Dongguan Pinmi Electronic Technology Co., Ltd
DATE OF ISSUE	:	Mar. 19, 2024
STANDARD(S)	:	FCC Part 15.239
REPORT VERSION	:	V1.0 Compliance Grandhen) Co.
<u>Attestation of <b>G</b></u>	<u>lo</u>	bal Compliance(Shenzhen) Co., Ltd





## **Report Revise Record**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Mar. 19, 2024	Valid	Initial Release



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## **1. VERIFICATION OF CONFORMITY**

I. VENILICATION OF CON			
Applicant	Dongguan Pinmi Electronic Technology Co., Ltd		
Address	Room 201, No. 158, Shatong Road, Dalang Town, Dongguan City, China		
Manufacturer	Dongguan Pinmi Electronic Technology Co., Ltd		
Address	Room 201, No. 158, Shatong Road, Dalang Town, Dongguan City, China		
Factory	Dongguan Pinmi Electronic Technology Co., Ltd		
Address	Room 201, No. 158, Shatong Road, Dalang Town, Dongguan City, China		
Product Designation	Bluetooth FM Transmitter		
Brand Name	N/A		
Test Model	Т92		
Series Model(s)	T81, T71, T72, T73, T74, T75, T76, T77, T78, T79, T80, T82, T83, T84, T85, T86, T87, T88, T89, T90, T91, T93, T94, T95, T96, T97, T98, T99, T100, T101, T102, T103, T104, T105, T106, T107, T108, T109, T110, T111, T66, RM170, RM180, RM140, RM130, RM150		
Difference Description	All the same except for the model name.		
Date of receipt of test item	Jan. 11, 2024		
Date of Test	Jan. 11, 2024 to Mar. 19, 2024		
Deviation	No any deviation from the test method		
Condition of Test Sample	Normal		
Test Result	Pass		
Report Template	AGCRT-US-BR/RF (2013-03-01)		

Note: The test results of this report relate only to the tested sample identified in this report.

Thea Yuang Prepared By Thea Huang Mar. 19, 2024 (Project Engineer) **Reviewed By** Calvin Liu Mar. 19, 2024 (Reviewer) ax Zhang Approved By

Max Zhang (Authorized Officer)

Mar. 19, 2024



# 2. GENERAL INFORMATION

## 2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	88.1MHz-107.9MHz		
Test Frequency	Low: 88.1 MHz; Middle:98.0 MHz; High: 107.9 MHz		
Field Strength(3m)	37.17dBuV/m(PK)@3m		
Modulation	FM		
Number of channels	199(Channel spacing 100kHz)		
Hardware Version	V1.2		
Software Version	V1.07		
Antenna Designation	Built-in Antenna (Met 15.203 Antenna requirement)		
Antenna Gain	OdBi		
Power Supply	DC 12V-24V		

NOTE: About the EUT, please refer to User's Manual.

#### 2.2 TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	1	88.10
	2	88.20
	100	98.00
88.1MHz-107.9MHz	101	98.10
	198	107.80
	199	107.90

## **3. MEASUREMENT UNCERTAINTY**

- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.9 Db
- Uncertainty of Occupied Channel Bandwidth, Uc = ±2 %



# 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION				
1	Transmitting mode(Low channel)				
2	Transmitting mode(Middle channel)				
3	Transmitting mode(High channel)				
Note: 1. For Radiated Emission, 3axis were chosen for testing for each applicable mode.					
2. All the requirements have been tested by modulating the transmitter with a 2.5 kHz tone at a fixed level which set to the manufacturer's maximum rated input to the modulator.					

3. Only the result of the worst case was recorded in the report, if no other cases.

4. The EUT was supplied by DC 12V and DC 24V. Only the worst test mode data (DC 12V) recorded in the test report.



# **5. SYSTEM TEST CONFIGURATION**

## 5.1. EQUIPMENT USED IN EUT SYSTEM

### ☑ Test Accessories Come From The Laboratory

No.	Equipment	Model No.	Manufacturer Specification Information		Cable
1	Control Box	QUALCOMM TRBI200	N/A	N/A	
2	Cement Resistance	N/A	N/A	The resistance may change	
3	DC 12V Battery	N/A	FengFan	N/A	

☑ Test Accessories Come From The Manufacturer

No.	Equipment	Model No.	Manufacturer	Specification Information/ID	Cable
1	Bluetooth FM Transmitter	T92	Dongguan Pinmi Electronic Technology Co., Ltd	2AMBA-T92	

## 5.2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT	
15.239&15.209	Field Strength of Fundamental and Spurious Emission	Compliant	
15.215	Bandwidth	Compliant	
15.207	Line Conducted Emission	Not applicable	

**Note:** The EUT was supplied by car battery.



## 6. TEST FACILITY

TestSite	Attestation of Global Compliance(Shenzhen) Co., Ltd	
Location	1-2/F,Building19,JunfengIndustrialPark,ChongqingRoad,HepingCommunity,F Street,Bao'anDistrict,Shenzhen,Guangdong,China	
Designation Number	CN1259	
FCC Test Firm Registration Number	975832	
A2LA Cert. No.	5054.02	
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA	

## TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
TEST RECEIVER	R&S	ESCI	10096	Feb. 01, 2024	Jan. 31, 2025
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Jun. 01, 2023	May 31, 2024
Attenuator	ZHINAN	E-002	N/A	Aug. 04, 2022	Aug. 03, 2024
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Mar. 05, 2024	Mar. 04, 2026
Double-Ridged Waveguide Horn	ETS	3117	00034609	Mar. 23, 2023	Mar. 22, 2024
Preamplifier Assembly	ETS	3117PA	00225134	Sep. 02, 2022	Sep. 01, 2024
Wideband Antenna	SCHWARZBE CK	VULB9168	VULB9168-4 94	Jan. 05, 2023	Jan. 04, 2025
Test software	FARA	EZ-EMC (Ver.RA-03A)	N/A	N/A	N/A
RF Communications Test Set	Agilent	8920B	US35010161	Jun. 02, 2023	Jun. 01, 2024



# 7. RADIATED EMISSION

## 7.1. MEASUREMENT PROCEDURE

- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 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.
- 2. 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 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.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. 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.
- 7. 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 values.
- 8.If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. 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. High Low scan is not required in this case.



The following table is the setting of spectrum analyzer and receiver.

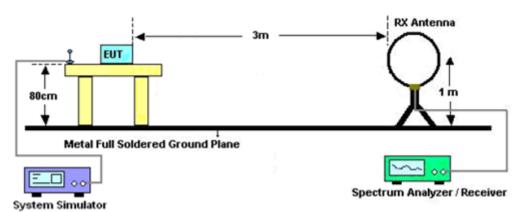
Spectrum Parameter	Setting			
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP			
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP			
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP			
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average			

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

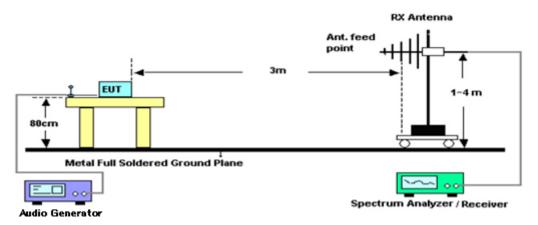


## 7.2.TEST SETUP

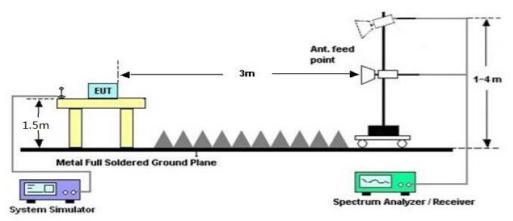
Radiated Emission Test-Setup Frequency Below 30MHz



#### RADIATED EMISSION TEST SETUP 30MHz-1000MHz



#### RADIATED EMISSION TEST SETUP ABOVE 1000MHz





#### 7.3. TEST RESULTFOR FIELD STRENGTH OF FUNDAMENTAL

Frequency MHz	Polarization	Measurement dB(uV/m) PK	Limit dB(uV/m) AV	Over dB	Pass/Fail	Detector
88.100	Н	28.30	47.96	-19.66	Pass	PK
88.100	V	37.17	47.96	-10.79	Pass	PK
98.000	Н	27.96	47.96	-20.00	Pass	PK
98.000	V	36.54	47.96	-11.42	Pass	PK
107.900	Н	28.05	47.96	-19.91	Pass	PK
107.900	V	36.87	47.96	-11.09	Pass	PK

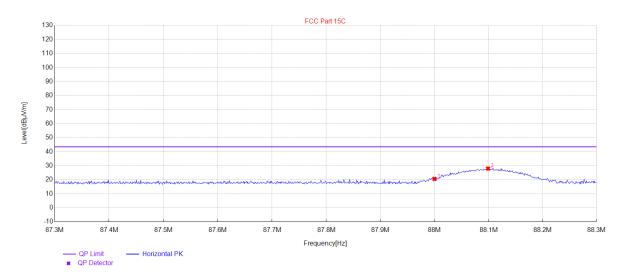
## 7.4. TEST RESULT FOR FIELD STRENGTH OF BAND EDGE EMISSION

Frequency MHz	Polarization	Measurement dB(uV/m) QP	Limit dB(uV/m) QP	Over dB	Pass/Fail	Detector
88.000	Н	20.62	40	19.38	Pass	QP
88.000	V	26.49	40	13.51	Pass	QP
108.000	Н	22.89	43.5	20.61	Pass	QP
108.000	V	27.74	43.5	15.76	Pass	QP

Note: The above two frequencies are the worst case for the band edge emission test.



EUT Name	Bluetooth FM Transmitter	Model Name	Т92
Temperature	<b>22.0</b> ℃	Relative Humidity	63.3%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna Polarity	Horizontal

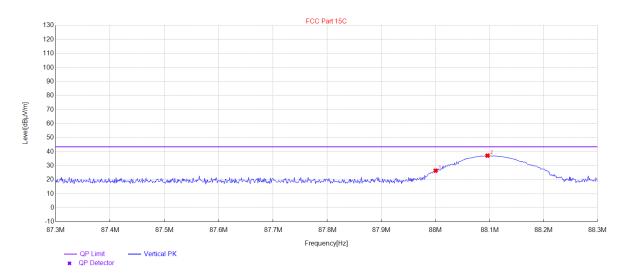


Suspected Data List										
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	88	20.62	13.63	40.00	19.38	100	127	Horizontal		
2	88.099	27.97	13.65	/	/	100	226	Horizontal		

### **RESULT: Pass**



EUT Name	Bluetooth FM Transmitter	Model Name	Т92
Temperature	<b>22.0</b> ℃	Relative Humidity	63.3%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna Polarity	Vertical

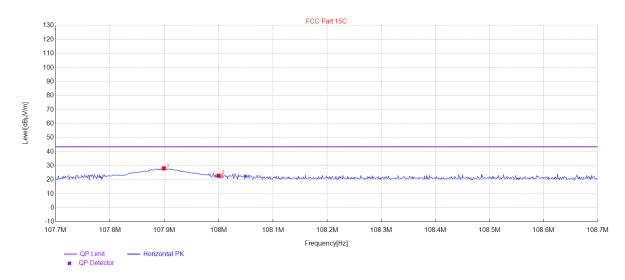


Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	
1	88	26.49	13.63	40.00	13.51	100	357	Vertical	
2	88.096	37.22	13.65	/	/	100	335	Vertical	

## **RESULT: Pass**



EUT Name	Bluetooth FM Transmitter	Model Name	Т92
Temperature	<b>22.0</b> ℃	Relative Humidity	63.3%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna Polarity	Horizontal

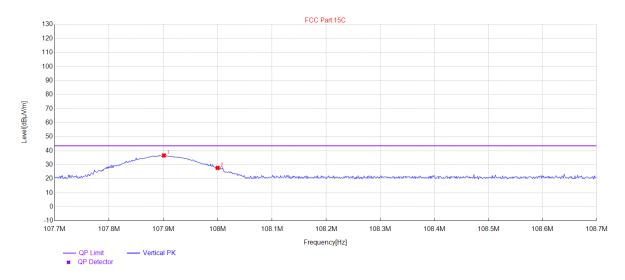


Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	
1	107.899	28.10	16.66	/	/	100	355	Horizontal	
2	108	22.89	16.65	43.50	20.61	100	6	Horizontal	

## **RESULT: Pass**



EUT Name	Bluetooth FM Transmitter	Model Name	Т92
Temperature	<b>22.0</b> ℃	Relative Humidity	63.3%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna Polarity	Vertical



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	
1	107.901	36.61	16.66	/	/	100	77	Vertical	
2	108	27.74	16.65	43.50	15.76	100	0	Vertical	

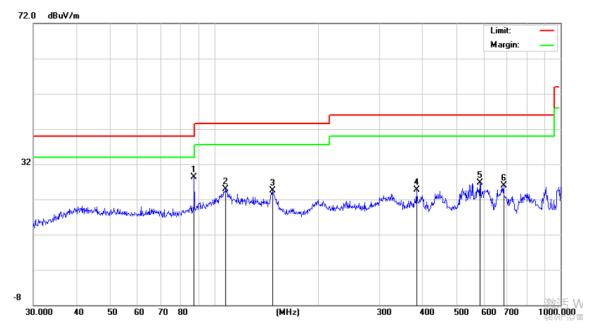
### **RESULT: Pass**



#### 7.5. TEST RESULT FOR SPURIOUS EMISSION

#### RADIATED EMISSION BELOW 30MHz

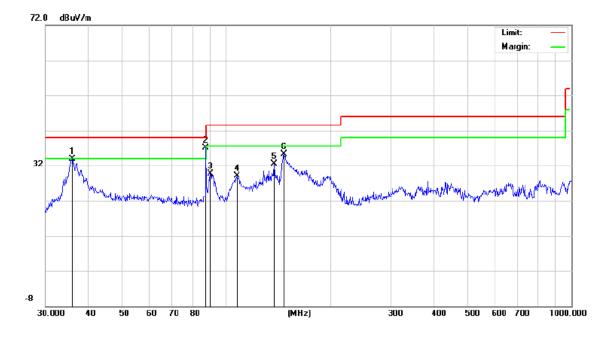
No emission found between lowest internal used/generated frequencies to 30MHz. RADIATED EMISSION BELOW 1GHZ-Horizontal



No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	88.1000	14.05	14.25	28.30	47.96	-19.66	peak
2		107.8876	8.66	16.28	24.94	43.50	-18.56	peak
3		147.4036	10.40	14.13	24.53	43.50	-18.97	peak
4		383.9318	6.01	18.63	24.64	46.00	-21.36	peak
5		584.7894	2.29	24.49	26.78	46.00	-19.22	peak
6		684.7454	1.32	24.56	25.88	46.00	-20.12	peak

## **RESULT: PASS**





## **RADIATED EMISSION BELOW 1GHZ-Vertical**

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		35.8746	18.38	15.54	33.92	40.00	-6.08	peak
2	*	88.1000	21.27	15.90	37.17	47.96	-10.79	peak
3		90.2205	14.09	15.52	29.61	43.50	-13.89	peak
4		107.5100	13.61	15.51	29.12	43.50	-14.38	peak
5		137.9028	14.28	18.15	32.43	43.50	-11.07	peak
6		147.4036	17.13	18.20	35.33	43.50	-8.17	peak

#### **RESULT: PASS**

Note: 1. Factor=Antenna Factor+ Cable loss-Amplifier gain, Over= Measurement-Limit.

- 2. The "Factor" value can be calculated automatically by software of measurement system.
- 3. All test modes had been pre-tested. The mode 3 is the worst case and recorded in the report.
- 4. Which above 1GHz are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



# 8. BANDWIDTH

## **8.1. MEASUREMENT PROCEDURE**

- 1. Set the parameters of SPA as below:
  - Centre frequency = Operation Frequency

RBW=3KHz

VBW=10KHz

Span: 150kHz

Sweep time: Auto

For the occupied bandwidth measurements, the input signal shall be a 2.5 kHz tone.

The level of the tone shall be 16 dB higher than that required to produce a frequency deviation

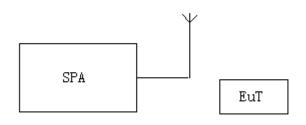
of 75 kHz, or 50% of the manufacturer's rated deviation, whichever is less.

Alternatively, in the event that a 16 dB increase cannot be achieved, the level of the tone shall

be set to the manufacturer's maximum rated input to the modulator.

- 2.Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the "N dB down" function of SPA to define the bandwidth.
- 3. Record the plots and Reported.

## 8.2. TEST SETUP





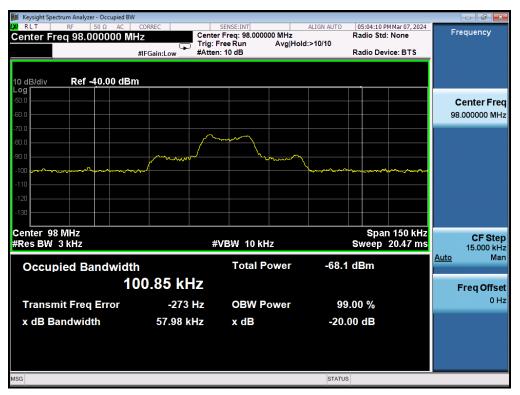
#### 8.3. TEST RESULT

Channel	Channel Frequency(MHz)	-20dB bandwidth (kHz)	Limit(kHz)	
Low	88.1	66.56	200	
Middle	98.0	57.98	200	
High	107.9	69.68	200	

Discrete Contemporation (Contemporation of the second seco					
Center Freq 88.100000 MH	Iz Center	SENSE:INT ALIGN AUTO			Frequency
10 dB/div  Ref -40.00 dBn    -50.0	in Guilleon		· · · · · · · · · · · · · · · · · · ·	Radio Device: BTS	Center Freq 88.100000 MHz
Center 88.1 MHz #Res BW 3 kHz	#\	/BW 10 kHz		Span 150 kHz Sweep 20.47 ms	
Occupied Bandwidth Total Power -63.2 dBm 63.669 kHz					Auto Man Freq Offset
Transmit Freq Error x dB Bandwidth	-1.097 kHz 66.56 kHz			00 % 00 dB	0 Hz
MSG			STATUS	6	

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





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## **APPENDIX A: PHOTOGRAPHS OF TEST SETUP**

Refer to the Report No.: AGC01924240101AP02

# APPENDIX B: PHOTOGRAPHS OF EUT

Refer to the Report No.: AGC01924240101AP03

----END OF REPORT----



# Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.