

# **FCC Test Report**

Report No.: AGC13578220701FE02

FCC ID : 2AA4QM7304HRF

**APPLICATION PURPOSE**: Original Equipment

**PRODUCT DESIGNATION**: Wireless Monitor

**BRAND NAME** : Convoy Technologies

**MODEL NAME** : M7304HRF

**APPLICANT**: Convoy Technologies Inc

**DATE OF ISSUE** : Aug. 17, 2022

**STANDARD(S)** : FCC Part 15.247

**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd





Page 2 of 43

# **REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Aug. 17, 2022	Valid	Initial Release



# Report No.: AGC13578220701FE02 Page 3 of 43

1. VERIFICATION OF COMPLIANCE	5
2. GENERAL INFORMATION	6
2.1. PRODUCT DESCRIPTION	6
2.2. TABLE OF CARRIER FREQUENCYS	7
2.3. RELATED SUBMITTAL(S)/GRANT(S)	8
2.4. TEST METHODOLOGY	
2.5. SPECIAL ACCESSORIES	
2.6. EQUIPMENT MODIFICATIONS	
2.7. ANTENNA REQUIREMENT	8
3. MEASUREMENT UNCERTAINTY	9
4. DESCRIPTION OF TEST MODES	10
5. SYSTEM TEST CONFIGURATION	11
5.1. CONFIGURATION OF TESTED SYSTEM	11
5.2. EQUIPMENT USED IN TESTED SYSTEM	11
5.3. SUMMARY OF TEST RESULTS	11
6. TEST FACILITY	12
7. PEAK OUTPUT POWER	13
7.1. MEASUREMENT PROCEDURE	13
7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	13
7.3. LIMITS AND MEASUREMENT RESULT	14
8. BANDWIDTH	16
8.1. MEASUREMENT PROCEDURE	16
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	16
8.3. LIMITS AND MEASUREMENT RESULTS	16
9. CONDUCTED SPURIOUS EMISSION	20
9.1. MEASUREMENT PROCEDURE	20
9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	20
9.3. MEASUREMENT EQUIPMENT USED	20
9.4. LIMITS AND MEASUREMENT RESULT	20
10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY	27

**TABLE OF CONTENTS** 



Page 4 of 43

10.1. MEASUREMENT PROCEDURE	27
10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	27
10.3. MEASUREMENT EQUIPMENT USED	27
10.4. LIMITS AND MEASUREMENT RESULT	27
11. RADIATED EMISSION	29
11.1. MEASUREMENT PROCEDURE	29
11.2. TEST SETUP	30
11.3. LIMITS AND MEASUREMENT RESULT	31
11.4. TEST RESULT	31
12. LINE CONDUCTED EMISSION TEST	41
12.1. LIMITS OF LINE CONDUCTED EMISSION TEST	41
12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST	41
12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST	42
12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST	
12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST	42
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	43
APPENDIX B: PHOTOGRAPHS OF EUT	43



Page 5 of 43

# 1. VERIFICATION OF COMPLIANCE

Applicant	Convoy Technologies Inc
Address	6409 Highview Drive, Fort Wayne, Indiana 46818, Fort Wayne, IN 46818, United States
Manufacturer	Intec International (HongKong) Ltd
Address	Unit 1223, Metro Center Tower 1, 32 Lamhing Street, Kowloon Bay, HongKong
Factory	Convoy Technologies Inc
Address	6409 Highview Drive, Fort Wayne, Indiana 46818, Fort Wayne, IN 46818, United States
Product Designation	Wireless Monitor
Brand Name	Convoy Technologies
Test Model	M7304HRF
Date of test	Jul. 29, 2022 to Aug. 17, 2022
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BLE/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC part 15.247.

Prepared By	Bi bo zhay	
	Bibo Zhang (Project Engineer)	Aug. 17, 2022
Reviewed By	Calvin Lin	
	Calvin Liu (Reviewer)	Aug. 17, 2022
Approved By	Max Zhang	
	Max Zhang (Authorized Officer)	Aug. 17, 2022



Page 6 of 43

# 2. GENERAL INFORMATION

# 2.1. PRODUCT DESCRIPTION

The EUT is designed as a "Wireless Monitor". It is designed by way of utilizing the GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2410-2476MHz
RF Output Power	17.464dBm (Max)
Modulation	GFSK
Number of channels	67Channels
Antenna Designation	External antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	2dBi
Hardware Version	JY-KM004-MB-V1.05
Software Version	KM004_RX_220811_V1_4.bin
Power Supply	DC 12V



Page 7 of 43

# 2.2. TABLE OF CARRIER FREQUENCYS

Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
1	2410	26	2435	51	2460
2	2411	27	2436	52	2461
3	2412	28	2437	53	2462
4	2413	29	2438	54	2463
5	2414	30	2439	55	2464
6	2415	31	2440	56	2465
7	2416	32	2441	57	2466
8	2417	33	2442	58	2467
9	2418	34	2443	59	2468
10	2419	35	2444	60	2469
11	2420	36	2445	61	2470
12	2421	37	2446	62	2471
13	2422	38	2447	63	2472
14	2423	39	2448	64	2473
15	2424	40	2449	65	2474
16	2425	41	2450	66	2475
17	2426	42	2451	67	2476
18	2427	43	2452		
19	2428	44	2453		
20	2429	45	2454		
21	2430	46	2455		
22	2431	47	2456		
23	2432	48	2457		
24	2433	49	2458		
25	2434	50	2459		



Page 8 of 43

# 2.3. RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for **FCC ID: 2AA4QM7304HRF** filing to comply with the FCC Part 15.247 requirements.

#### 2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

#### 2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

# 2.6. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

#### 2.7. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device. For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.



Page 9 of 43

# 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty	
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 3.1 \text{ dB}$	
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 4.0 \text{ dB}$	
Uncertainty of Radiated Emission above 1GHz	$U_c = \pm 4.8 \text{ dB}$	
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$	
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$	
Uncertainty of spurious emissions, conducted	$U_c = \pm 2 \%$	
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2 \%$	



Page 10 of 43

# 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX

#### Note:

- 1. Only the result of the worst case was recorded in the report, if no other cases.
- 2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
- 3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
- 4. The fixed frequency mode is to press the key to trigger the frequency point without external software



Page 11 of 43

# 5. SYSTEM TEST CONFIGURATION

# **5.1. CONFIGURATION OF TESTED SYSTEM**

Radiated Emission Configure:

Е	UT	

#### **5.2. EQUIPMENT USED IN TESTED SYSTEM**

Item	Equipment	Model No.	ID or Specification	Remark
1	Wireless Monitor	M7304HRF	2AA4QM7304HRF	EUT

#### **5.3. SUMMARY OF TEST RESULTS**

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(3)	Peak Output Power	Compliant
15.247 (a)(2)	6 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.247 (e)	Maximum Conducted Output Power Density	Compliant
15.209	Radiated Emission	Compliant
15.207	Conducted Emission	Not applicable

Note: The EUT was supplied by DC source



Page 12 of 43

# **6. TEST FACILITY**

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, 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	Mar. 28, 2022	Mar. 27, 2023
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Nov. 17, 2021	Nov. 16, 2022
2.4GHz Filter	EM Electronics	2400-2500MHz	N/A	Mar. 22, 2022	Mar. 21, 2024
Attenuator	ZHINAN	E-002	N/A	Sep. 03, 2020	Sep. 02, 2022
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Oct. 31, 2021	Oct. 30, 2023
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 21, 2024
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03, 2020	Sep. 02, 2022
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 08, 2020	Jan. 07, 2023
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A



Page 13 of 43

# 7. PEAK OUTPUT POWER

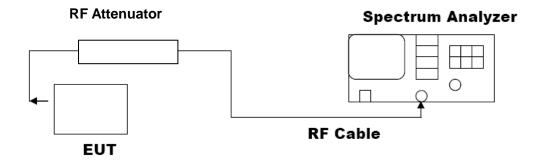
# 7.1. MEASUREMENT PROCEDURE

For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. RBW ≥ DTS bandwidth
- 3. VBW≥3\*RBW.
- 4. SPAN≥VBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: Max hold.

Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

# 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) PEAK POWER TEST SETUP



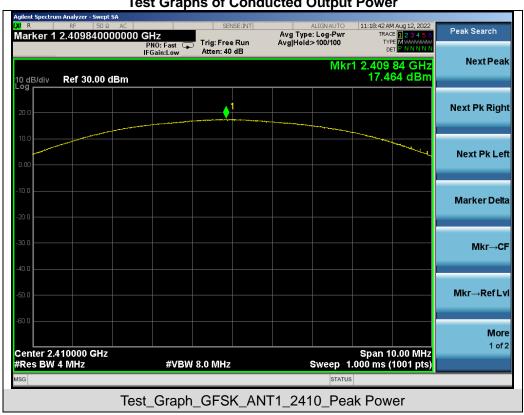


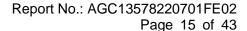
Page 14 of 43

# 7.3. LIMITS AND MEASUREMENT RESULT

	Test Data of Conducted Output Power							
Test Mode	Pass or Fail							
	2410	17.464	≤30	Pass				
GFSK	2445	17.300	≤30	Pass				
	2476	17.007	≤30	Pass				

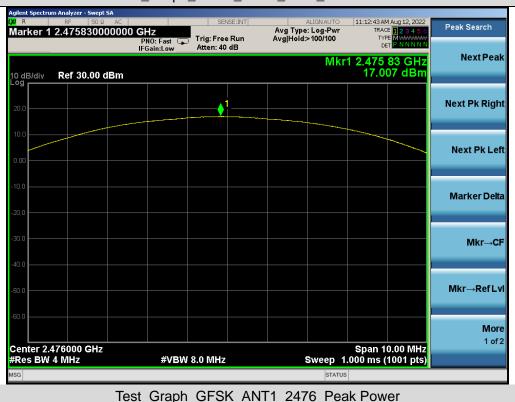
**Test Graphs of Conducted Output Power** 













Page 16 of 43

# 8. BANDWIDTH

#### **8.1. MEASUREMENT PROCEDURE**

#### 6dB bandwidth:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 kHz, VBW ≥ 3×RBW.
- 4. Set SPA Trace 1 Max hold, then View.

#### Occupied bandwidth:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hoping channel
  The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video
  bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
- 4. Set SPA Trace 1 Max hold, then View.

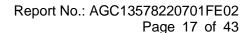
**Note:** The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

# 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

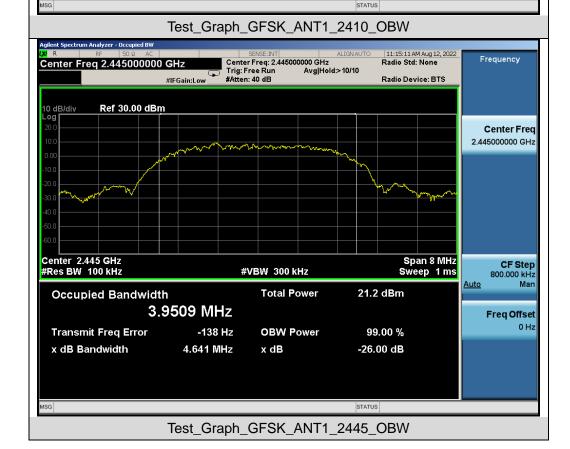
#### **8.3. LIMITS AND MEASUREMENT RESULTS**

Test Data of Occupied Bandwidth and DTS Bandwidth								
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	-6dB Bandwidth (MHz)	Limits (MHz)	Pass or Fail			
	2410	3.9382	3.189	≥0.5	Pass			
GFSK	2445	3.9509	3.188	≥0.5	Pass			
	2476	3.9358	3.182	≥0.5	Pass			

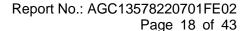




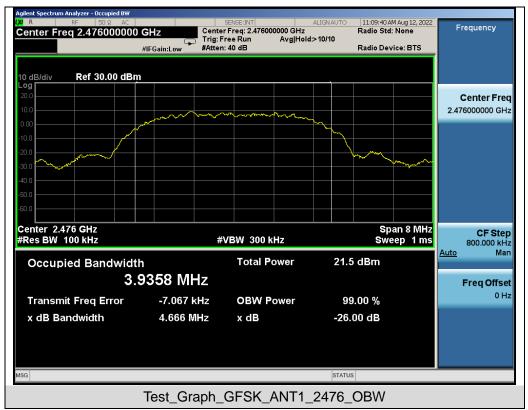
**Test Graphs of Occupied Bandwidth** |11:17:49 AM Aug 12, 2022 Radio Std: None Frequency Center Freq: 2.410000000 GHz Trig: Free Run Avg|Hol #Atten: 40 dB Center Freq 2.410000000 GHz Avg|Hold>10/10 #IFGain:Low Radio Device: BTS Ref 30.00 dBm I0 dB/div Center Freq 2.410000000 GHz Center 2.41 GHz #Res BW 100 kHz Span 8 MHz Sweep 1 ms **CF Step #VBW 300 kHz** 800.000 kHz Man Auto Occupied Bandwidth **Total Power** 22.0 dBm 3.9382 MHz Freq Offset Transmit Freq Error -6.173 kHz **OBW Power** 99.00 % x dB Bandwidth -26.00 dB 4.676 MHz x dB

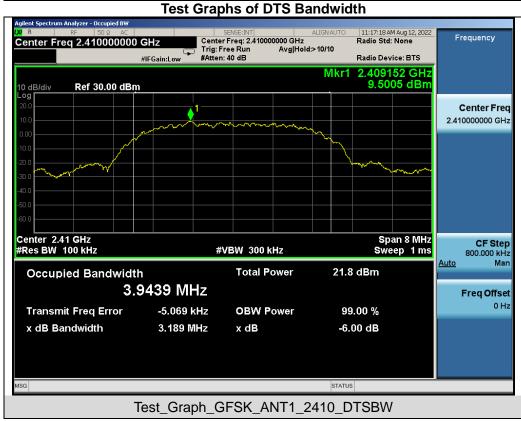


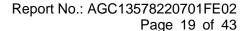
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.





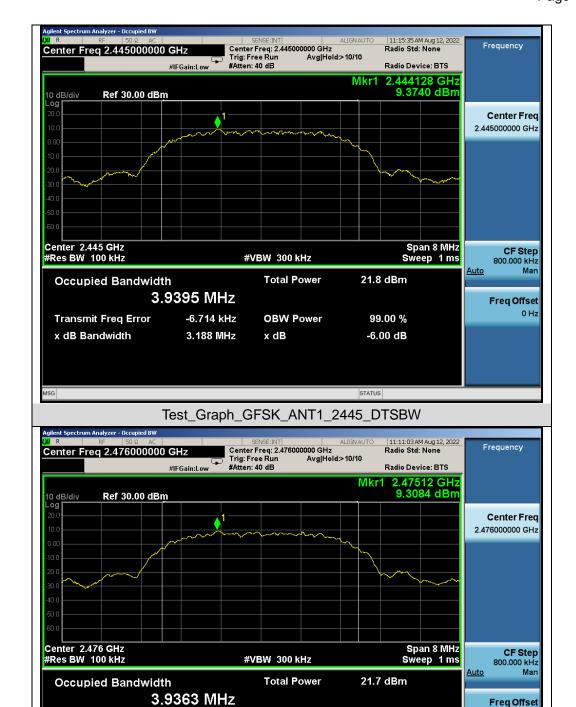






0 Hz





Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.

**OBW Power** 

Test Graph GFSK ANT1 2476 DTSBW

x dB

99.00 %

-6.00 dB

-11.032 kHz

3.182 MHz

Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: http://www.agccert.com/

Transmit Freq Error

x dB Bandwidth



Page 20 of 43

# 9. CONDUCTED SPURIOUS EMISSION

# 9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

# 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

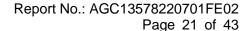
The same as described in section 7.2.

#### 9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.

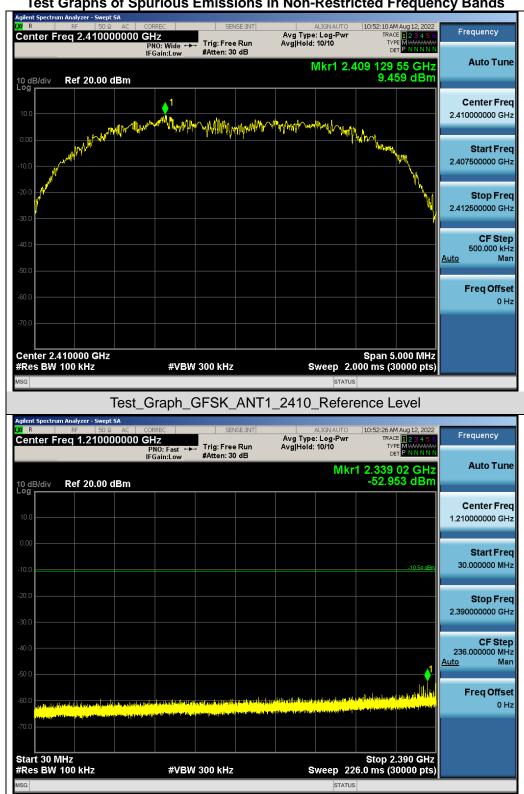
#### 9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT					
Annilla abda di insita	Measurement Result				
Applicable Limits	Test Data	Criteria			
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the reference level	PASS			





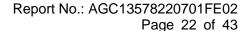
Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.

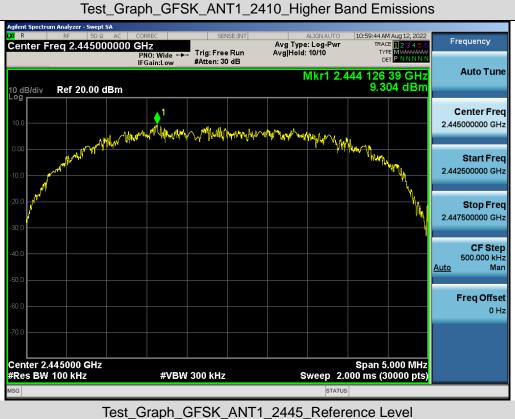
Test\_Graph\_GFSK\_ANT1\_2410\_Lower Band Emissions

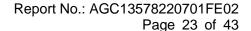
Web: http://www.agccert.com/







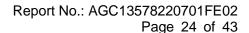








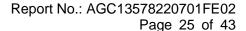




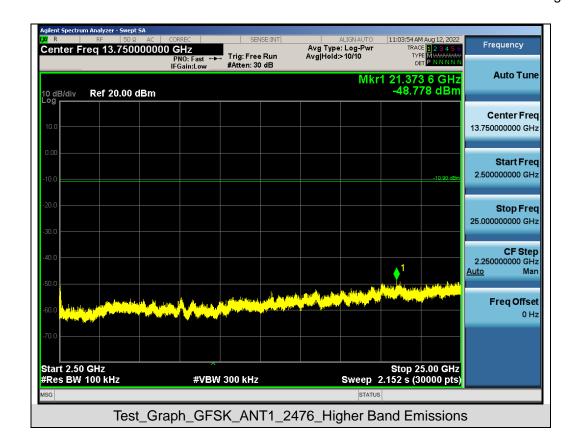


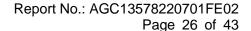














Test Graphs of Band Edge Emissions in Non-Restricted Frequency Bands



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.



Page 27 of 43

# 10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

#### 10.1. MEASUREMENT PROCEDURE

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set the SPA Trace 1 Max hold, then View.

Note: The method of PKPSD in the KDB 558074 item 8.4 was used in this testing.

# 10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer to Section 7.2.

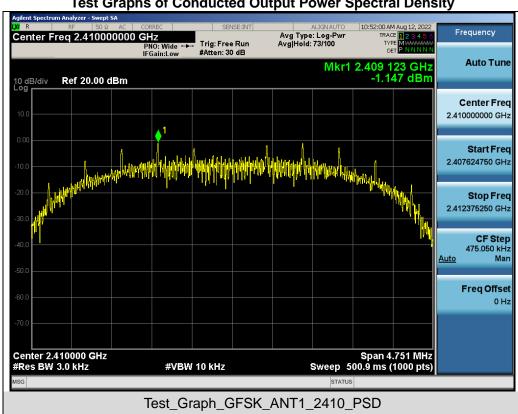
#### 10.3. MEASUREMENT EQUIPMENT USED

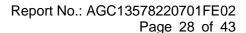
Refer to Section 6.

#### 10.4. LIMITS AND MEASUREMENT RESULT

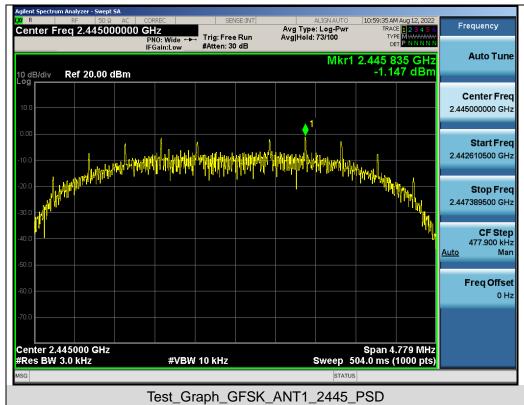
Test Data of Conducted Output Power Spectral Density							
Test Mode Test Channel Power density Limit (dBm/3kHz) Pass or Fa							
	2410	-1.147	<b>≤8</b>	Pass			
GFSK	2445	-1.147	≤8	Pass			
	2476	-1.347	<b>≤8</b>	Pass			

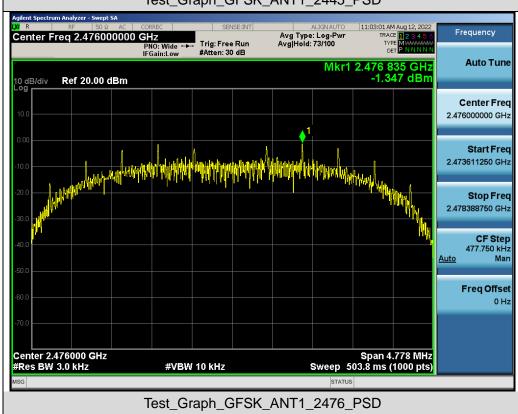
Test Graphs of Conducted Output Power Spectral Density











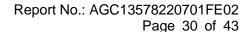


Page 29 of 43

# 11. RADIATED EMISSION

#### 11.1. MEASUREMENT PROCEDURE

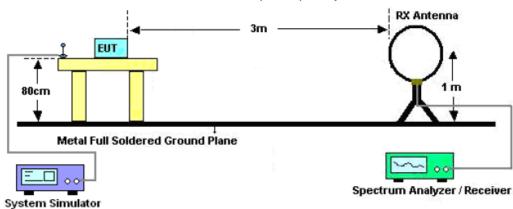
- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated 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 emission, 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.



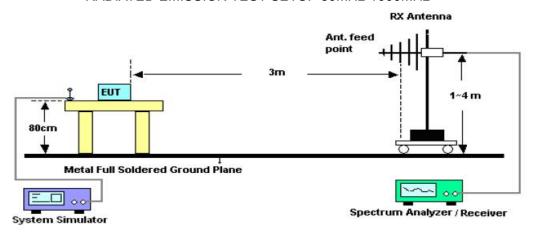


# 11.2. TEST SETUP

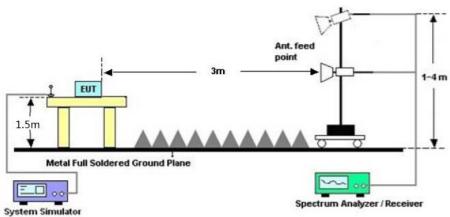
# Radiated Emission Test-Setup Frequency Below 30MHz



# RADIATED EMISSION TEST SETUP 30MHz-1000MHz



# RADIATED EMISSION TEST SETUP ABOVE 1000MHz





Page 31 of 43

# 11.3. LIMITS AND MEASUREMENT RESULT

15.209 Limit in the below table 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	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

# 11.4. TEST RESULT

# Radiated emission below 30MHz

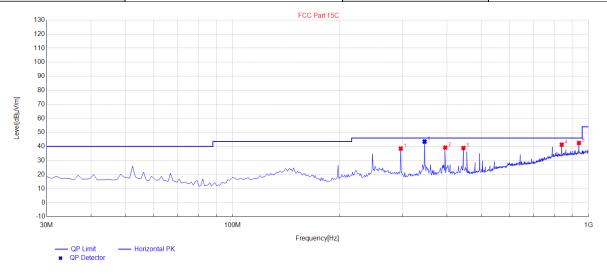
The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.



Page 32 of 43

# Radiated emission from 30MHz to 1000MHz

EUT	Wireless Monitor	Model Name	M7304HRF
Temperature	23.3° C	Relative Humidity	64%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal



**Suspected Data List** 

	Odopodiod Bata Elot							
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	296.75	38.50	14.95	46.00	7.50	100	200	Horizontal
2	395.69	39.21	17.16	46.00	6.79	100	342	Horizontal
3	445.16	38.94	17.58	46.00	7.06	100	48	Horizontal
4	840.92	41.31	29.74	46.00	4.69	100	240	Horizontal
5	939.86	42.53	31.27	46.00	3.47	100	295	Horizontal

# **Final Data List**

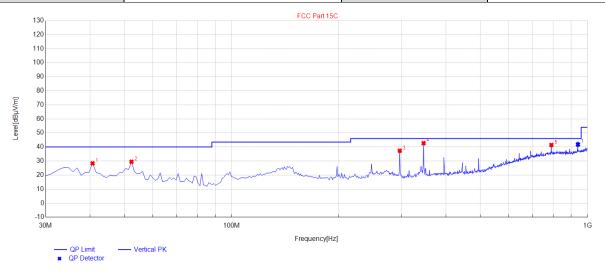
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	346.22	15.91	43.50	46.00	2.50	100	224	Horizontal

**RESULT: PASS** 



Page 33 of 43

EUT	Wireless Monitor	Model Name	M7304HRF
Temperature	23.3° C	Relative Humidity	64%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical



# **Suspected Data List**

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	40.67	28.33	10.79	40.00	11.67	100	35	Vertical
2	52.31	29.47	11.49	40.00	10.53	100	1	Vertical
3	296.75	37.32	14.95	46.00	8.68	100	115	Vertical
4	346.22	42.75	15.91	46.00	3.25	100	15	Vertical
5	791.45	41.43	31.31	46.00	4.57	100	211	Vertical

# **Final Data List**

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	939.86	32.67	41.80	46.00	4.20	100	345	Vertical

# **RESULT: PASS**

#### Note:

- 1. Factor=Antenna Factor + Cable loss, Margin=Limit-Level.
- 2. All test modes had been tested. The mode 1 is the worst case and recorded in the report.



Page 34 of 43

# Radiated emission above 1GHz

EUT	Wireless Monitor	Model Name	M7304HRF
Temperature	23.3° C	Relative Humidity	64%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4820.000	45.25	0.08	45.33	74	-28.67	peak
4820.000	36.53	0.08	36.61	54	-17.39	AVG
7230.000	41.01	2.21	43.22	74	-30.78	peak
7230.000	32.46	2.21	34.67	54	-19.33	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

EUT	Wireless Monitor	Model Name	M7304HRF
Temperature	23.3° C	Relative Humidity	64%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4820.000	46.24	0.08	46.32	74	-27.68	peak
4820.000	36.55	0.08	36.63	54	-17.37	AVG
7230.000	42.18	2.21	44.39	74	-29.61	peak
7230.000	31.53	2.21	33.74	54	-20.26	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.



Page 35 of 43

EUT	Wireless Monitor	Model Name	M7304HRF
Temperature	23.3° C	Relative Humidity	64%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4890.000	46.23	0.14	46.37	74	-27.63	peak
4890.000	36.51	0.14	36.65	54	-17.35	AVG
7335.000	41.07	2.36	43.43	74	-30.57	peak
7335.000	32.48	2.36	34.84	54	-19.16	AVG

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

EUT	Wireless Monitor	Model Name	M7304HRF
Temperature	23.3° C	Relative Humidity	64%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4890.000	46.28	0.14	46.42	74	-27.58	peak
4890.000	37.43	0.14	37.57	54	-16.43	AVG
7335.000	41.09	2.36	43.45	74	-30.55	peak
7335.000	32.47	2.36	34.83	54	-19.17	AVG

# Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.



Page 36 of 43

EUT	Wireless Monitor	Model Name	M7304HRF
Temperature	23.3° C	Relative Humidity	64%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4952.000	45.13	0.22	45.35	74	-28.65	peak
4952.000	36.24	0.22	36.46	54	-17.54	AVG
7428.000	38.47	2.64	41.11	74	-32.89	peak
7428.000	42.15	2.64	44.79	54	-9.21	AVG

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT	Wireless Monitor	Model Name	M7304HRF
Temperature	23.3° C	Relative Humidity	64%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		
4952.000	43.19	0.22	43.41	74	-30.59	peak	
4952.000	34.27	0.22	34.49	54	-19.51	AVG	
7428.000	39.64	2.64	42.28	74	-31.72	peak	
7428.000	28.68	2.64	31.32	54	-22.68	AVG	
Remark:							

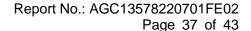
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

# **RESULT: PASS**

The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin=Level-Limit.

The "Factor" value can be calculated automatically by software of measurement system.





Test result for band edge emission at restricted bands

EUT	Wireless Monitor	Model Name	M7304HRF
Temperature	23.3° C	Relative Humidity	64%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Test Graph for Peak Measurement



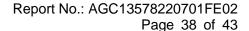




**RESULT: PASS** 

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.

Web: http://www.agccert.com/

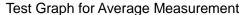




**EUT Model Name** M7304HRF Wireless Monitor 23.3° C **Temperature Relative Humidity** 64% 960hPa **Test Voltage** Normal Voltage **Pressure Test Mode** Mode 1 **Antenna** Vertical

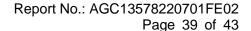
Test Graph for Peak Measurement







**RESULT: PASS** 





**EUT Model Name** M7304HRF Wireless Monitor 23.3° C **Temperature Relative Humidity** 64% 960hPa **Test Voltage** Normal Voltage **Pressure Test Mode** Mode 3 **Antenna** Horizontal

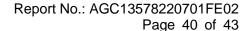
Test Graph for Peak Measurement







**RESULT: PASS** 





**EUT Model Name** M7304HRF Wireless Monitor 23.3° C **Temperature Relative Humidity** 64% 960hPa Normal Voltage **Pressure Test Voltage Test Mode** Mode 3 **Antenna** Vertical

Test Graph for Peak Measurement







# **RESULT: PASS**

Note: The factor had been edited in the "Input Correction" of the Spectrum Analyzer.



Page 41 of 43

# 12. LINE CONDUCTED EMISSION TEST

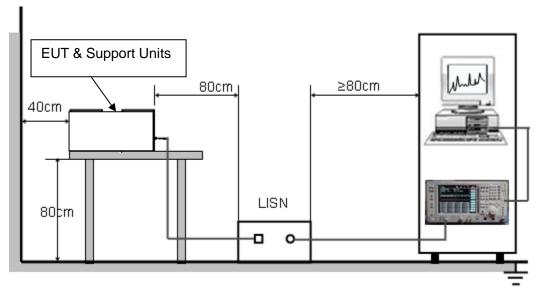
# 12.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Francis	Maximum RF Line Voltage			
Frequency	Q.P.( dBuV)	Average( dBuV)		
150kHz~500kHz	66-56	56-46		
500kHz~5MHz	56	46		
5MHz~30MHz	60	50		

#### Note:

- 1. The lower limit shall apply at the transition frequency.
- 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

# 12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST





Page 42 of 43

#### 12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipment received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

#### 12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- 2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.

#### 12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

N/A

Note: The EUT was supplied by DC source



Page 43 of 43

# APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC13578220701AP01

**APPENDIX B: PHOTOGRAPHS OF EUT** 

Refer to the Report No.: AGC13578220701AP02

----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.