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# FCC Test Report

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Report No.: AGC02170230701FR01

**FCC ID** : 2AANZAIR

**APPLICATION PURPOSE** : Class II Equipment

**PRODUCT DESIGNATION** : QUIRKY AIR

**BRAND NAME** : QUIRKY

**MODEL NAME** : QKY-AIR, QKY-AIR-5, QKY-AIR-5-BLK, EU-QKY-AIR,  
EU-QKY-AIR-5, EU-QKY-AIR-7

**APPLICANT** : DGL Group LTD.

**DATE OF ISSUE** : Jul. 21, 2023

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

**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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### REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jul. 21, 2023	Valid	Initial Release

**Note:**

The original test report AGC01559190610FE03 (dated Oct. 19, 2019 and tested from Sep. 12, 2019 to Sep. 20, 2019) was modified on Apr. 10, 2023, including the following changes and additions:

- Changed the address of the applicant and Manufacturer;
- Added the name and address of the factory;
- Reduced the series model;
- Optimize charging port grounding;
- Change in product appearance color.

For the above described change(s) the following tests was considered to be necessary:

Clause	Testing
15.209	Radiated Emission
15.207	Conducted Emission

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## 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	DGL Group LTD.
<b>Address</b>	2045 Lincoln Highway, 3rd Floor, Edison, NJ 08817, United States
<b>Manufacturer</b>	DGL Group LTD.
<b>Address</b>	2045 Lincoln Highway, 3rd Floor, Edison, NJ 08817, United States
<b>Factory</b>	Asimom Technology Co., Ltd
<b>Address</b>	1/F Block C, No.431 Yangxin Road, Yangyong Village, Dalang Town, Dongguan, 523770, China
<b>Product Designation</b>	QUIRKY AIR
<b>Brand Name</b>	QUIRKY
<b>Test Model</b>	QKY-AIR
<b>Series Model</b>	QKY-AIR-5, QKY-AIR-5-BLK, EU-QKY-AIR, EU-QKY-AIR-5, EU-QKY-AIR-7
<b>Difference description</b>	All the same except for the model name and different appearance color
<b>Date of receipt of test item</b>	Jun. 14, 2023
<b>Date of test</b>	Jun. 14, 2023 to Jun. 21, 2023
<b>Deviation</b>	None
<b>Condition of Test Sample</b>	Normal
<b>Test Result</b>	Pass
<b>Report Template</b>	AGCRT-US-BR/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



Cool Cheng  
(Project Engineer)

Jul. 21, 2023

Reviewed By



Calvin Liu  
(Reviewer)

Jul. 21, 2023

Approved By



Max Zhang  
(Authorized Officer)

Jul. 21, 2023

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## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

The EUT is designed as “QUIRKY AIR”. It is designed by way of utilizing the GFSK, Pi/4 DQPSK and 8DPSK technology to achieve the system operation.

A major technical description of EUT is described as following

<b>Operation Frequency</b>	2.402 GHz to 2.480GHz
<b>RF Output Power</b>	3.244dBm(Max)
<b>Bluetooth Version</b>	V 5.0
<b>Modulation</b>	BR <input checked="" type="checkbox"/> GFSK, EDR <input checked="" type="checkbox"/> π /4-DQPSK, <input checked="" type="checkbox"/> 8DPSK BLE <input type="checkbox"/> GFSK 1Mbps <input type="checkbox"/> GFSK 2Mbps
<b>Number of channels</b>	79
<b>Hardware Version</b>	V1.1
<b>Software Version</b>	V1.0
<b>Antenna Designation</b>	PCB antenna(Comply with requirements of the FCC part 15.203)
<b>Antenna Gain</b>	0dBi
<b>Power Supply</b>	DC 3.7V by battery or DC 5V by adapter

### 2.2. TABLE OF CARRIER FREQUENCIES

Frequency Band	Channel Number	Frequency
2402~2480MHZ	0	2402MHZ
	1	2403MHZ
	:	:
	38	2440 MHZ
	39	2441 MHZ
	40	2442 MHZ
	:	:
	77	2479 MHZ
	78	2480 MHZ

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### 2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHz, in every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally, the type of connection (e.g. single or multi slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also, the slave of the connection will use these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be sent on the same frequency, it is sent on the next frequency of the hopping sequence.

### 2.4. EXAMPLE OF A HOPPING SEQUENCE IN DATA MODE

Example of a 79 hopping sequence in data mode:

40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67  
56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59  
72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75  
09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06  
01, 51, 03, 55, 05, 04

### 2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:

1. LAP/UAP of the master of the connection.
2. Internal master clock

The LAP(lower address part) are the 24 LSB's of the 48 BD\_ADDRESS. The BD\_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP(upper address part) are the 24MSB's of the 48BD\_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronization with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us. The clock has a cycle of about one day(23h30). In most cases it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire LAP(24 bits), 4LSB's(4bits)(Input 1) and the 27MSB's of the clock(Input 2) are used. With these input values different mathematical procedures(permutations, additions, XOR-operations) are performed to generate the Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behavior:

The first connection between the two devices is established, a hopping sequence was generated. For transmitting the wanted data the complete hopping sequence was not used. The connection ended.

The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmissions is longer (and it cannot be shorter) than the minimum resolution of the clock(312.5us). The hopping sequence will always differ from the first one.

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

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

## 2.7. 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.

## 2.8. SPECIAL ACCESSORIES

Refer to section 5.2.

## 2.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

## 2.10. 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.



### 3. MEASUREMENT UNCERTAINTY

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

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 2.9 \text{ dB}$
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 3.9 \text{ dB}$
Uncertainty of Radiated Emission above 1GHz	$U_c = \pm 4.9 \text{ dB}$
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	$U_c = \pm 2 \%$

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#### 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel $\pi/4$ -DQPSK
5	Middle channel $\pi/4$ -DQPSK
6	High channel $\pi/4$ -DQPSK
7	Low channel 8DPSK
8	Middle channel 8DPSK
9	High channel 8DPSK
10	Hopping mode GFSK
11	Hopping mode $\pi/4$ -DQPSK
12	Hopping mode 8DPSK

Note:

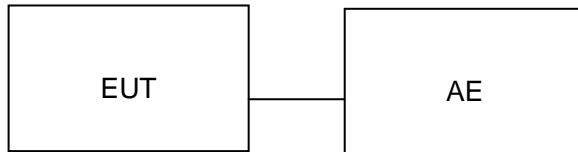
1. Only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
4. The test software is the BK3266 RF Test\_V1.5 which can set the EUT into the individual test modes.

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## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure :



### 5.2 EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	QUIRKY AIR	QKY-AIR	2AANZAIR	EUT
2	Xiaomi phone	Mi 10	N/A	AE
3	Huawei adapter	HW-200325CP0	N/A	AE

### 5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.209	Radiated Emission	Compliant
15.207	Conducted Emission	Compliant

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## 6. TEST FACILITY

<b>Test Site</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd
<b>Location</b>	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
<b>Designation Number</b>	CN1259
<b>FCC Test Firm Registration Number</b>	975832
<b>A2LA Cert. No.</b>	5054.02
<b>Description</b>	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun. 03, 2023	Jun. 02, 2024
LISN	R&S	ESH2-Z5	100086	Jun. 03, 2023	Jun. 02, 2024
Test software	FARA	EZ-EMC (Ver. AGC-CON03A1)	N/A	N/A	N/A

### 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
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Aug. 04, 2022	Aug. 03, 2023
2.4GHz Fliter	EM Electronics	N/A	N/A	Mar. 18, 2022	Mar. 19, 2024
Attenuator	ZHINAN	E-002	N/A	Aug. 04, 2022	Aug. 03, 2024
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Oct. 31, 2021	Oct. 30, 2023
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Apr. 23, 2023	Apr. 22, 2024
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 01, 2022	Sep. 02, 2024
ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 05, 2023	Jan. 04, 2025
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A

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## 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.

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

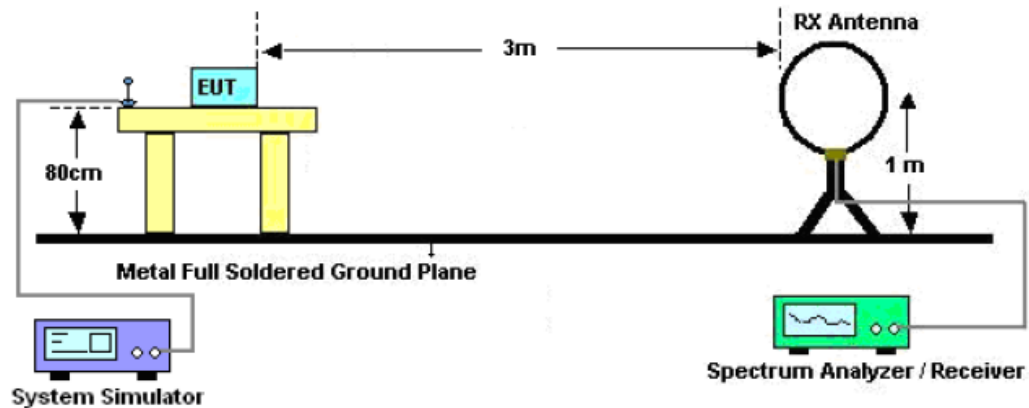
Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

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

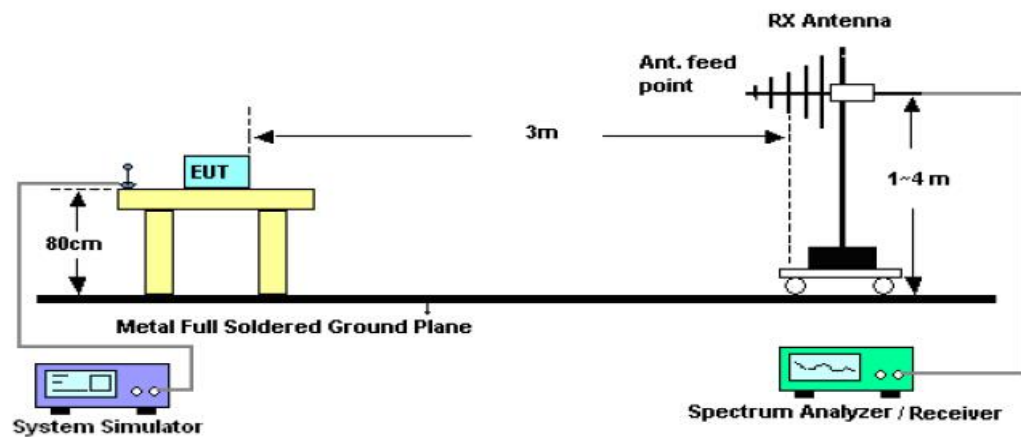
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## 7.2. TEST SETUP

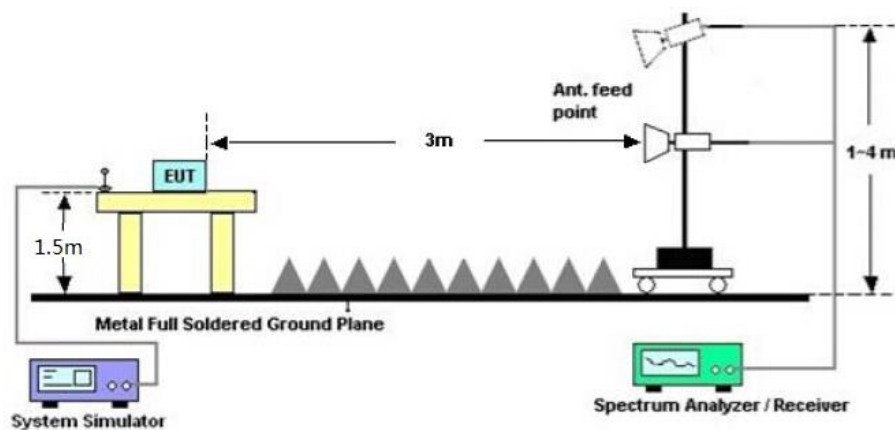
### Radiated Emission Test-Setup Frequency Below 30MHz



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



### RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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### 7.3. LIMITS AND MEASUREMENT RESULT

15.209 Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

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

### 7.4. TEST RESULT

#### RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

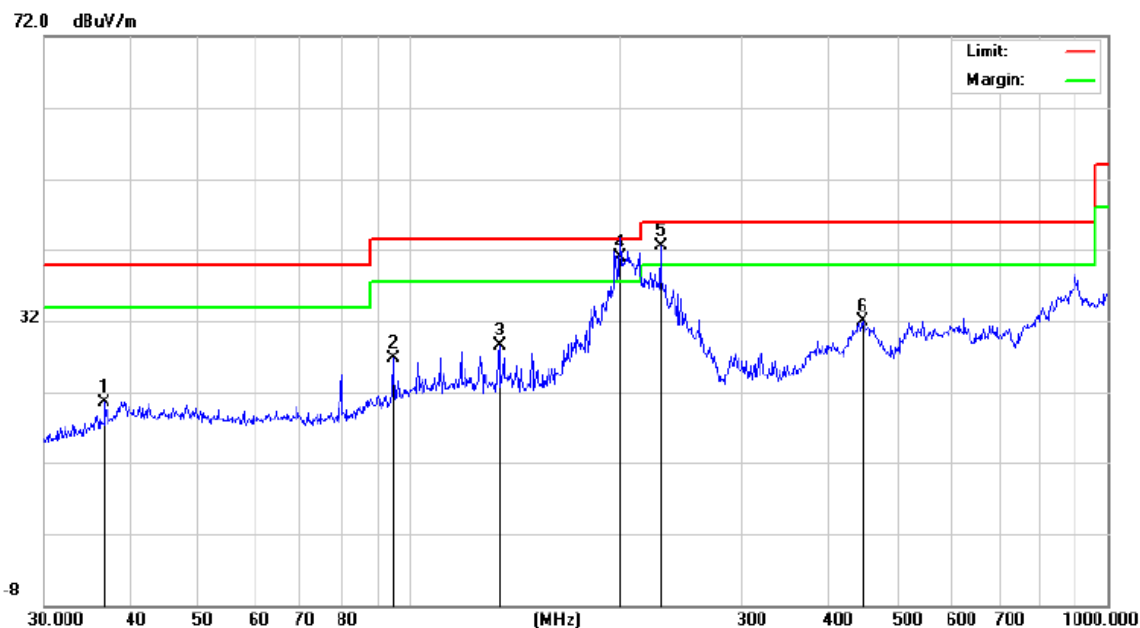
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### RADIATED EMISSION BELOW 1GHZ

EUT	QUIRKY AIR	Model Name	QKY-AIR
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna	Horizontal



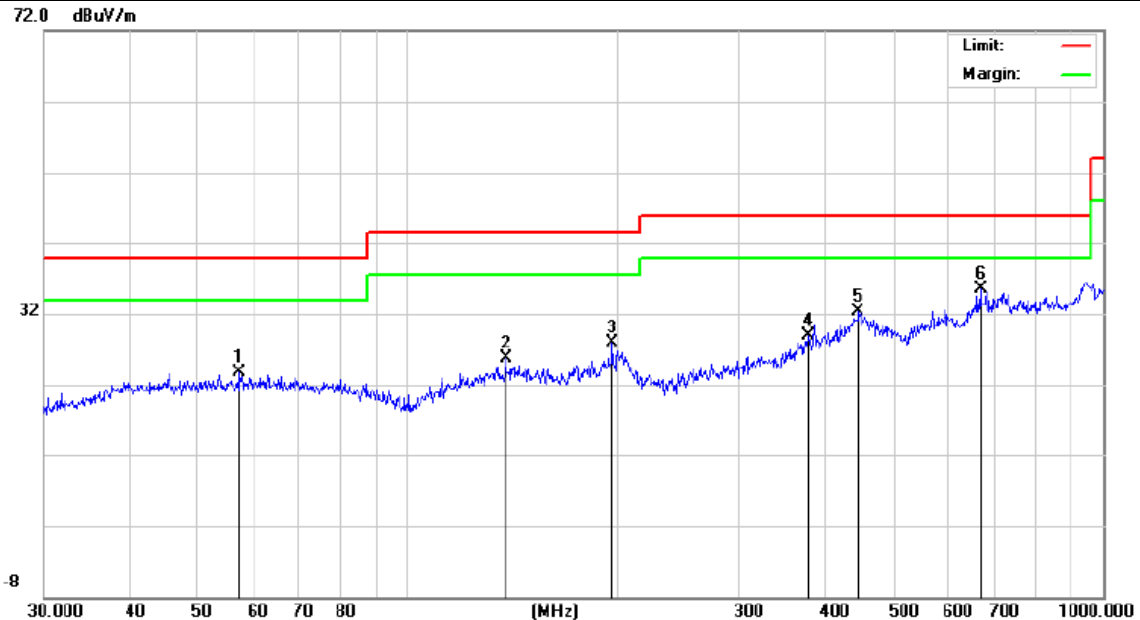
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		36.6375	8.09	12.45	20.54	40.00	-19.46	peak
2		94.7601	11.22	15.39	26.61	43.50	-16.89	peak
3		134.5592	12.96	15.53	28.49	43.50	-15.01	peak
4	*	200.6881	26.43	14.50	40.93	43.50	-2.57	QP
5	!	229.2931	27.74	14.86	42.60	46.00	-3.40	peak
6		446.4141	6.95	24.88	31.83	46.00	-14.17	peak

**RESULT: PASS**

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EUT	QUIRKY AIR	Model Name	QKY-AIR
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna	Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		57.3923	6.70	17.07	23.77	40.00	-16.23	peak
2		138.3873	7.58	18.16	25.74	43.50	-17.76	peak
3		197.2001	9.89	17.98	27.87	43.50	-15.63	peak
4		377.2591	7.48	21.37	28.85	46.00	-17.15	peak
5		444.8514	6.33	25.88	32.21	46.00	-13.79	peak
6	*	665.8035	7.95	27.56	35.51	46.00	-10.49	peak

## RESULT: PASS

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. All test modes had been pre-tested. The mode 4 is the worst case and recorded in the report.

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### RADIATED EMISSION ABOVE 1GHZ

<b>EUT</b>	QUIRKY AIR	<b>Model Name</b>	QKY-AIR
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 1	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.066	54.26	0.08	53.22	74.00	-20.78	peak
4804.066	45.29	0.08	48.69	54.00	-5.31	AVG
7206.099	44.37	2.21	46.66	74.00	-27.34	peak
7206.099	41.05	2.21	43.71	54.00	-10.29	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

<b>EUT</b>	QUIRKY AIR	<b>Model Name</b>	QKY-AIR
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 1	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.066	55.67	0.08	55.71	74.00	-18.29	peak
4804.066	46.37	0.08	49.07	54.00	-4.93	AVG
7206.099	50.16	2.21	48.99	74.00	-25.01	peak
7206.099	41.05	2.21	45.05	54.00	-8.95	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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<b>EUT</b>	QUIRKY AIR	<b>Model Name</b>	QKY-AIR
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 2	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.066	54.15	0.14	53.71	74.00	-20.29	peak
4882.066	47.64	0.14	47.69	54.00	-6.31	AVG
7323.099	46.25	2.36	48.39	74.00	-25.61	peak
7323.099	43.21	2.36	45.04	54.00	-8.96	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

<b>EUT</b>	QUIRKY AIR	<b>Model Name</b>	QKY-AIR
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 2	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.022	54.15	0.14	54.29	74.00	-19.71	peak
4882.022	46.37	0.14	46.51	54.00	-7.49	AVG
7323.033	49.64	2.36	52.00	74.00	-22.00	peak
7323.033	38.74	2.36	41.10	54.00	-12.90	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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<b>EUT</b>	QUIRKY AIR	<b>Model Name</b>	QKY-AIR
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 3	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.022	55.67	0.22	55.89	74.00	-18.11	peak
4960.022	47.19	0.22	47.41	54.00	-6.59	AVG
7440.033	51.08	2.64	53.72	74.00	-20.28	peak
7440.033	42.35	2.64	44.99	54.00	-9.01	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

<b>EUT</b>	QUIRKY AIR	<b>Model Name</b>	QKY-AIR
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 3	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.022	48.64	0.22	48.86	74.00	-25.14	peak
4960.022	45.34	0.22	45.56	54.00	-8.44	AVG
7440.033	47.51	2.64	50.15	74.00	-23.85	peak
7440.033	43.25	2.64	45.89	54.00	-8.11	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

## RESULT: PASS

### Note:

Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

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

All test modes had been tested. The GFSK modulation is the worst case and recorded in the report.

## 8. FCC LINE CONDUCTED EMISSION TEST

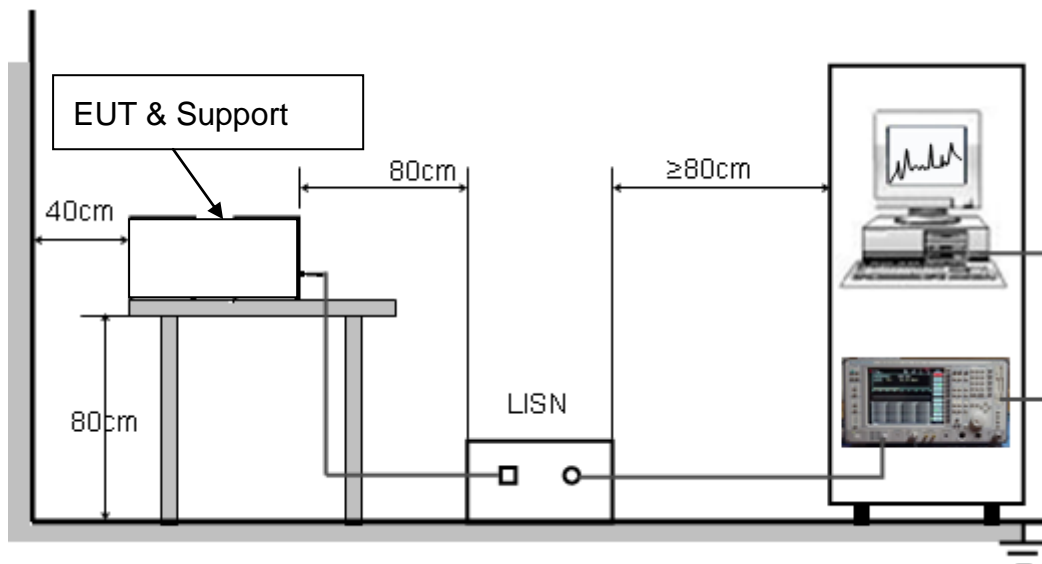
### 8.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	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.

### 8.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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### 8.3. 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 equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC charging voltage by adapter which received AC120V/60Hz power by 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.

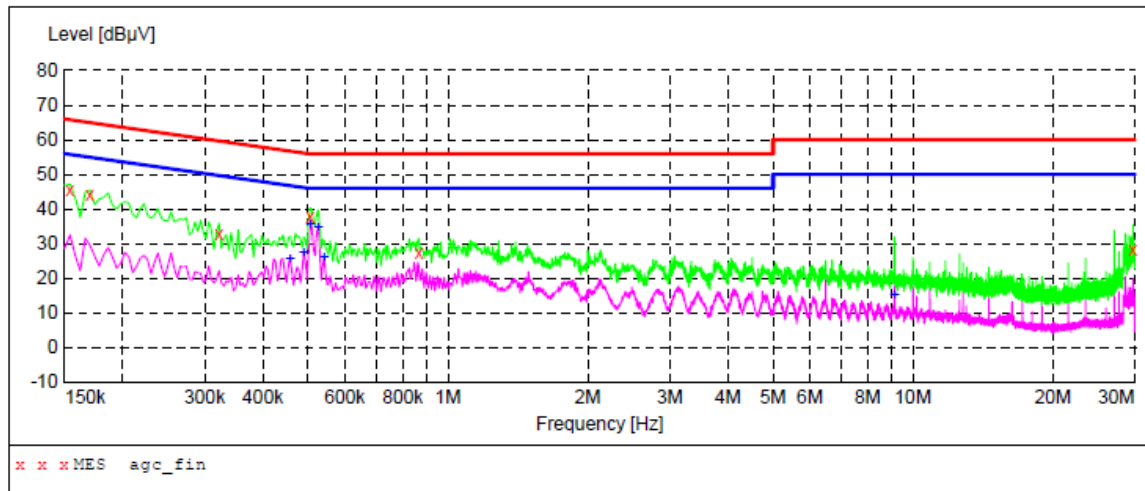
### 8.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

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.



## 8.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

### Line Conducted Emission Test Line 1-L



#### MEASUREMENT RESULT: "agc\_fin"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.154000	45.30	6.1	66	20.5	QP	L1
0.170000	44.20	6.1	65	20.8	QP	L1
0.322000	32.70	6.1	60	27.0	QP	L1
0.506000	38.00	6.2	56	18.0	QP	L1
0.866000	27.20	6.2	56	28.8	QP	L1
29.730000	28.50	8.3	60	31.5	QP	L1

#### MEASUREMENT RESULT: "agc\_fin2"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.458000	25.60	6.1	47	21.1	AV	L1
0.490000	27.60	6.1	46	18.6	AV	L1
0.506000	35.70	6.2	46	10.3	AV	L1
0.526000	34.50	6.2	46	11.5	AV	L1
0.542000	26.10	6.2	46	19.9	AV	L1
9.126000	15.30	6.6	50	34.7	AV	L1

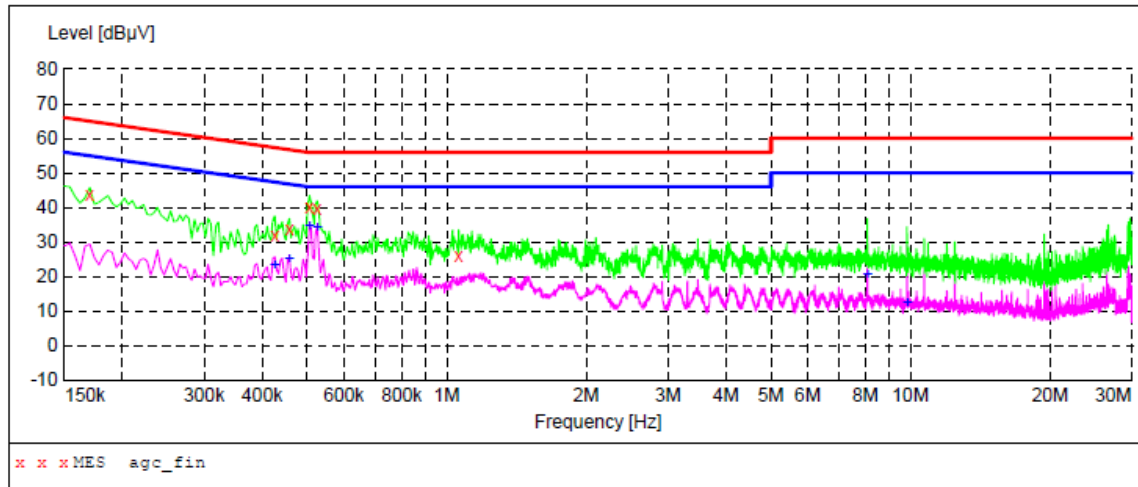
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## Line Conducted Emission Test Line 2-N


**MEASUREMENT RESULT: "agc\_fin"**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.170000	43.80	6.1	65	21.2	QP	N
0.426000	32.00	6.1	57	25.3	QP	N
0.458000	33.90	6.1	57	22.8	QP	N
0.506000	40.30	6.2	56	15.7	QP	N
0.526000	39.50	6.2	56	16.5	QP	N
1.062000	26.20	6.2	56	29.8	QP	N

**MEASUREMENT RESULT: "agc\_fin2"**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.426000	23.50	6.1	47	23.8	AV	N
0.458000	25.30	6.1	47	21.4	AV	N
0.506000	34.60	6.2	46	11.4	AV	N
0.526000	34.10	6.2	46	11.9	AV	N
8.074000	20.50	6.6	50	29.5	AV	N
9.830000	12.30	6.7	50	37.7	AV	N

**RESULT: PASS**

Note: All the test modes had been tested, the mode 1 was the worst case. Only the data of the worst case would be record in this test report.

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

Refer to the Report No.: AGC02170230701AP01

## **APPENDIX B: PHOTOGRAPHS OF EUT**

Refer to the Report No.: AGC02170230701AP02

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

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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.
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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.

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