

FCC Test Report

Report No.: AGC02762230802FR05

FCC ID : 2AL26-KS4-US

APPLICATION PURPOSE: Original Equipment

PRODUCT DESIGNATION: Body Worn Camera

BRAND NAME : Reveal Media

MODEL NAME : KS4

APPLICANT: Reveal Media Limited

DATE OF ISSUE : Dec. 20, 2023

STANDARD(S) : FCC Part 15 Subpart C §15.225

REPORT VERSION: V 1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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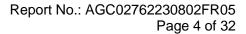
Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec. 20, 2023	Valid	Initial Release



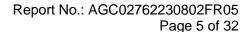
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1. GENERAL INFORMATION

Applicant	Reveal Media Limited	
Address	Riverview House, 20 Old Bridge Street, Hampton Wick, KT1 4BU, United	
	Kingdom	
Manufacturer	Reveal Media Hong Kong Ltd.	
Address	6/F., Luk Kwok Centre, 72 Gloucester Road, Wan Chai, HongKong	
Factory	Reveal Media Hong Kong Ltd.	
Address 6/F., Luk Kwok Centre, 72 Gloucester Road, Wan Chai, HongKong		
Product Designation Body Worn Camera		
Brand Name	Reveal Media	
Test Model	KS4	
Series Model(s)	N/A	
Difference Description	N/A	
Deviation from Standard	No any deviation from the test method	
Date of Receipt Aug. 03, 2023		
Date of Test Aug. 03, 2023~ Dec. 20, 2023		
Test Result	Pass	



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2. PRODUCT INFORMATION

2.1 PRODUCT TECHNICAL DESCRIPTION

Hardware Version	EP-VRM05RFB-02
Software Version	V1.0
Operation Frequency	13.56MHz
Modulation Type	ASK
Number of channels	1
Field Strength of Fundamental	65.75dBuV/m
Antenna Designation	PIFA Antenna
Antenna Gain	0dBi
Power Supply	DC 3.8V by battery

2.2 TEST FREQUENCY LIST

Frequency Band	Channel Number	Frequency
13.110~14.010 MHz	01	13.56 MHz



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2.3 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: **2AL26-KS4-US**, filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

2.4 TEST METHODOLOGY

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

2.5 SPECIAL ACCESSORIES

Not available for this EUT intended for grant.

2.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.7 ANTENNA REQUIREMENT

Standard Requirement

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 0 dBi.



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3. TEST ENVIRONMENT

3.1 ADDRESS OF THE TEST LABORATORY

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842(CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.



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3.3 ENVIRONMENTAL CONDITIONS

	NORMAL CONDITIONS	EXTREME CONDITIONS			
Temperature range (°ℂ)	15 - 35	-20 - 50			
Relative humidty range	20 % - 75 %	20 % - 75 %			
Pressure range (kPa)	86 - 106	86 - 106			
Power supply	DC 3.8V	DC 3.23V/DC 4.35V			
Note: The Estrone Temporature and Estrone Valle and declared by the grounds strong					

Note: The Extreme Temperature and Extreme Voltages declared by the manufacturer.

3.4 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 150kHz	$U_c = \pm 4.2 \text{ dB}$
Uncertainty of Radiated Emission below 30MHz	$U_c = \pm 3.8 \text{ dB}$
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 4.0 \text{ dB}$
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 = ±2 %
Uncertainty of Occupied Channel Bandwidth	U _c = ±2 %



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3.5 LIST OF EQUIPMENTS USED

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	R&S	ES-K1(Ver.V1.71)	N/A	N/A	N/A
TEST RECEIVER	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
EXA Signal Analyzer	Aglient	N9010A	MY5347050 4	Jun. 01, 2023	May 31, 2024
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024
ANTENNA	SCHWARZBECK	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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4.SYSTEM TEST CONFIGURATION

4.1 EUT CONFIGURATION

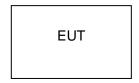
The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT EXERCISE

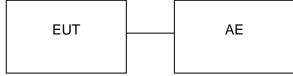
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 CONFIGURATION OF TESTED SYSTEM

Radiated Emission Configure:



Conducted Emission Configure:



4.4 EQUIPMENT USED IN TESTED SYSTEM

The Following Peripheral Devices And Interface Cables Were Connected During The Measurement:

☐ Test Accessories Come From The Laboratory

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	Huawei adapter	HW-200325CP0	huawei	Input: AC 100-240V 50/60Hz, 1.8A	1.0m
	•			Output: DC 5V 2A	unshielded

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	Battery	ICR011GB	ICON ENERGY SYSTEM (SHENZHEN) CO.,LTD	DC 3.8V 1000mAh	



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4.5 SUMMARY OF TEST RESULTS

Item	FCC Rules	Description Of Test	Result
1	§15.203	Antenna Equipment	Pass
2	15.225(a)(b)(c)	Field Strength of Fundamental	Pass
3	§15.209	Radiated Emission	Pass
4	§15.215(c)	20dB Bandwidth	Pass
5	§15.205(a)	Restricted Bands of Operation	Pass
6	§15.225(e)	Frequency Stability	Pass
7	§15.207	AC Power Line Conducted Emission	Pass



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5. DESCRIPTION OF TEST MODES

Summary table of Test Cases					
Test Item	Data Rate / Modulation				
iest item	NFC/ ASK				
Radiated&Conducted Test Cases	Mode 1: Tx _13.56 MHz				
AC Conducted Emission	Mode 2: Tx _13.56 MHz				

Note:

- 1. Only the result of the worst case was recorded in the report, if no other cases.
- 2. The battery is full-charged during the test.
- 3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
- 4. For Conducted Test method, a temporary antenna connector is provided by the manufacture.



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6. FIELD STRENGTH OF FUNDAMENTAL

6.1 PROVISIONS APPLICABLE

Rules and specifications	FCC CFR 47 Part 15 section 15.225					
Description	Compliance v	vith the spectrum ma	sk is tested with RBV	V set to 9kHz.		
Freq. of Emission (MHz)	Field Strength (µV/m) at 30m	Field Strength (dBµV/m) at 3m				
1.705~13.110	30	29.5	48.58	69.5		
13.110~13.410	106	40.5	59.58	80.5		
13.410~13.553	334	50.5	69.58	90.5		
13.553~13.567	15848	84.0	103.08	124.0		
13.567~13.710	334	50.5	69.58	90.5		
13.710~14.010	106	40.5	59.58	80.5		
14.010~30.000	30	29.5	48.58	69.5		

6.2 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



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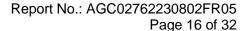
pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.

- 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				
Start ~Stop Frequency	1MHz/3MHz for Peak, 1MHz/3MHz for Average				

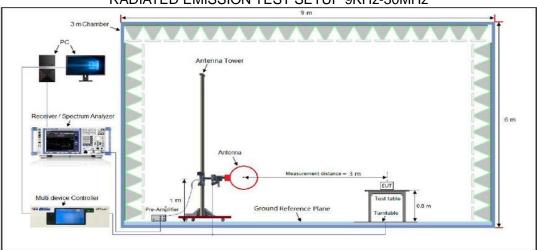
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP



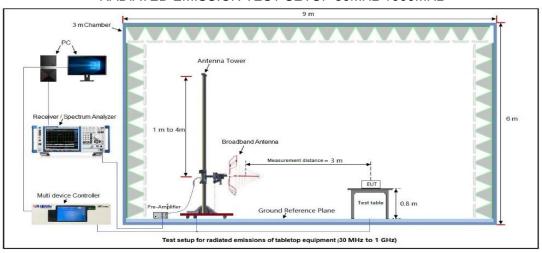


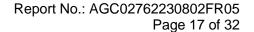
6.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)

RADIATED EMISSION TEST SETUP 9KHz-30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz







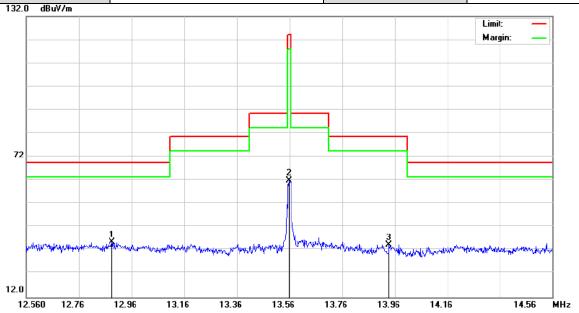
6.4 MEASUREMENT RESULTS

EUT		Body '	Worn Cam	era		Model N	lame		KS4		
Temperature	Temperature		25° C			Relative	Relative Humidity		55.4%	55.4%	
Pressure	Pressure		P a			Test Vol	tage		DC 3.	.8V by	battey
est Mode		Mode	1			Antenna	a		Face		
132.0 dBuV	V/m								Limit: Margin	n:	-
12 12**********************************	May rest a facility of the		and the second	why the confidence of	Land Jan	the make Majorgraphical	- Andrews Andrews	- Monday A	publishers Webs	eta _{gga} lmetua	an.
12.0	12.76	12.96		13.36	13.56		3.96	14.16		14.56	#h-
12.0	12.76	12.96 Freq.	13.16 Readir	13.36 ng C			13.96	14.16			
12.0 12.560	12.76		13.16 Readir	13.36 ng C	13.56 orrect	13.76 1 Measure	3.96 }- Lin	14.16			MHz
12.0 12.560	12.76 Mk.	Freq.	13.16 Readir Level	13.36 ng C	13.56 orrect	13.76 1 Measure ment	3.96 }- Lin	14.16 mit	Over	14.56	MHz
12.0 12.560 No.	12.76 Mk.	Freq.	Readir Level dBuV	13.36 ng C l F	13.56 orrect actor	13.76 1 Measure ment dBuV/m	3.96 - Lin	14.16 mit 8/m	Over dB	Dete	MHz ector ak

RESULT: PASS



EUT	Body Worn Camera	Model Name	KS4
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 3.8V by battey
Test Mode	Mode 1	Antenna	Side



No. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
	MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1 *	12.8856	10.98	24.59	35.57	69.50	-33.93	peak
2	13.5579	37.23	24.64	61.87	124.0	-62.13	peak
3	13.9380	9.68	24.67	34.35	80.50	-46.15	peak

RESULT: PASS



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7. RADIATED EMISSION

7.1 LIMITS OF RADIATED EMISSION TEST

According to 15.35, on any frequency or frequencies below or equal to 1000 MHz, the limits Shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test.

The field strength of any emissions which appear outside of 13.110 ~14.010MHz band shall not exceed the general radiated emissions limits.

15.209 Limit in the below table has to be followed:

Frequency	Distance	Field Strengths Limit			
(MHz)	Meters	μ V/m	dB(μV)/m		
0.009 ~ 0.490	300	2400/F(kHz)			
0.490 ~ 1.705	30	24000/F(kHz)			
1.705 ~ 30	30	30			
30 ~ 88	3	100	40.0		
88 ~ 216	3	150	43.5		
216 ~ 960	3	200	46.0		
960 ~ 1000	3	500	54.0		
Above 1000	3	74.0 dB(μV)/r 54.0 dB(μV)/r			

Remark:

- (1) Emission level dB μ V = 20 log Emission level μ V/m
- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

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

7.2 MEASUREMENT PROCEDURE

- 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



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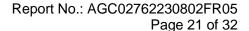
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.

- 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.
- 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				
Start ~Stop Frequency	1MHz/3MHz for Peak, 1MHz/3MHz for Average				

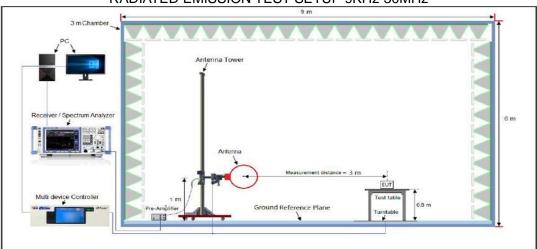
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP



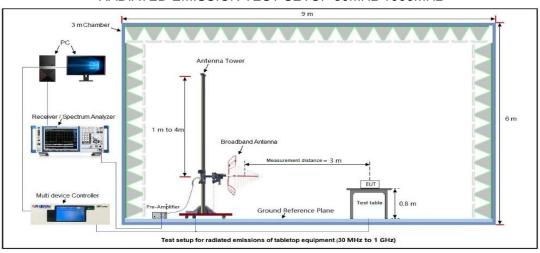


7.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)

RADIATED EMISSION TEST SETUP 9KHz-30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz





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7.4 MEASUREMENT RESULT

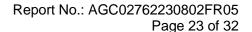
RADIATED EMISSION BELOW 30MHz

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

RADIATED EMISSION FROM 30MHz ~1000MHz

		RAD	DIATED EN	IISSION FRO	M 30MHz ~	1000MHz			
EUT		Body W	orn Came	ra	Model N	ame	KS4		
Temperature		25° C	25° C			Humidity	55.4%	55.4%	
Pressure	е	960hPa	960hPa Test Voltage DC 3.8			DC 3.8V by battey			
Test Mo	de	Mode 1			Antenna	Antenna		Horizontal	
	130			FCC PART	15C				
	120								
	110								
	90								
	80								
N/m]	70								
Level[dBµV/m]	60								
Leve	50								
	30			2			4 #5	MALL MARKET MALL	
	20	*1		hy manners		Mary Mary Mary Mary Mary Mary Mary Mary	And the property of the second	***	
	10		~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
	-10								
	30M		100M					1G	
	— QP Limit	Horizontal PK		Frequency	[Hz]				
	# QP Detecto								
	Freq.	Level	Factor	Limit	Margin	Height	Angle		
NO.	[MHz]	[dBµV/m]	[dB]	[dBµV/m]	[dB]	[cm]	[°]	Polarity	
1	57.16	23.45	12.39	40.00	16.55	100	90	Horizontal	
2	104.69	28.04	19.17	43.50	15.46	100	190	Horizontal	
3	337.49	25.36	20.92	46.00	20.64	100	110	Horizontal	
4	456.8	31.26	27.15	46.00	14.74	100	330	Horizontal	
					12.34				
5	605.21	33.66	28.53	46.00		100	120	Horizontal	
6	874.87	37.14	32.43	46.00	8.86	100	330	Horizontal	

RESULT: PASS





EUT		Body W	orn Came	Model Na	ame	KS4	KS4			
Tempera	ture	25° C		Relative	Humidity	55.4%				
Pressure	•	960hPa	a		Test Volt	age	DC 3.8	BV by battey		
Test Mod	de	Mode 1			Antenna		Vertica	al		
	130			FCC PART	15C					
	120									
	110									
	90									
Ę.	70									
Level[dBµV/m]	60									
Leve	50									
	30			3			aggirden sakrajo iz historian alfred	# # 5 # 6		
	20	^_	~ ^	Comment of the	mummy maybrake	Lypny Land Shaday and Share Mary Maller	Approx 1			
	0									
	-10 30M		100M					1G		
			10011	Frequency[Hz]					
	— QP Limit # QP Detector	Vertical PK								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	57.16	26.30	14.46	40.00	13.70	100	240	Vertical		
2	78.5	23.94	12.36	40.00	16.06	100	190	Vertical		
3	159.98	25.62	21.94	43.50	17.88	100	230	Vertical		
4	704.15	33.90	28.72	46.00	12.10	100	40	Vertical		
5	765.26	36.12	30.62	46.00	9.88	100	80	Vertical		
	847.71	37.43	32.30	46.00	8.57	100	270	Vertical		

RESULT: PASS

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

2. All test modes had been pre-tested. The mode 1 is the worst case and recorded in the report.



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8. 20 dB BANDWIDTH

8.1 PROVISIONS APPLICABLE

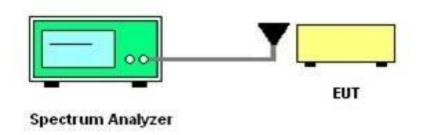
Intentional radiators must be designed to ensure that the 20dB and 99% emission bandwidth in the specific band 13.553~13.567MHz.

8.2 MEASUREMENT PROCEDURE

Set the parameters of SPA as below:

- 1. The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max hold mode.
- 2. Centre frequency = Operation Frequency
- 3. The resolution bandwidth of 10 kHz and the video bandwidth of 30 kHz were used.
- 4. Span: 100kHz, Sweep time: Auto
- Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the "N dB down" function of SPA to define the bandwidth.
- 6. Measured the spectrum width with power higher than 20dB below carrier.
- 7. Measured the 99% OBW.
- 8. Record the plots and Reported.

8.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)





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8.4 MEASUREMENT RESULTS

Test Data of Occupied Bandwidth and -20dB Bandwidth										
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	-20dB Bandwidth (MHz)	Limits (MHz)	Pass or Fail					
ASK	13.56	0.022806	0.02686	N/A	Pass					

Test Graphs of Occupied Bandwidth &-20dB Bandwidth





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9. FREQUENCY STABILITY

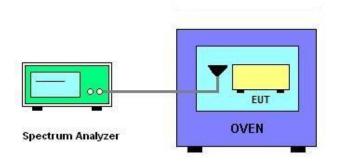
9.1 PROVISIONS APPLICABLE

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

9.2 MEASUREMENT PROCEDURE

- 1. The spectrum analyzer connected via a receive antenna placed near the EUT.
- 2. EUT have transmitted signal and fixed channelize.
- 3. Set the spectrum analyzer span to view the entire emissions bandwidth.
- 4. Set RBW = 1 kHz, VBW = 3 kHz with peak detector and maxhold settings.
- 5. The fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 106 ppm and the limit is less than ±100ppm.
- 6. Extreme temperature rule is -20°C~50°C.

9.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)





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9.4 MEASUREMENT RESULTS

Operating frequency: 13.56MHz

Voltage vs. Frequency Stability (Test Temperature: 20 °C)

Voltage(V)	Measurement Frequency (MHz)	Max. Deviation (ppm)	Limit(ppm)	Conclusion
3.80	13.56052			
3.23	13.56066	+48.67	±100	PASS
4.35	13.56056			

Temperature vs. Frequency Stability (Test Voltage: 3.8V)

Temperature	Measurement Frequency (MHz)	Max. Deviation (ppm)	Limit(ppm)	Conclusion
-30℃	13.56045			
-20 ℃	13.56056			
-10℃	13.56058			
0℃	13.56061			
10℃	13.56060	+54.57	± 100	PASS
20℃	13.56058			
30℃	13.56074			
40℃	13.56066			
50℃	13.56059			



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10. AC POWER LINE CONDUCTED EMISSION TEST

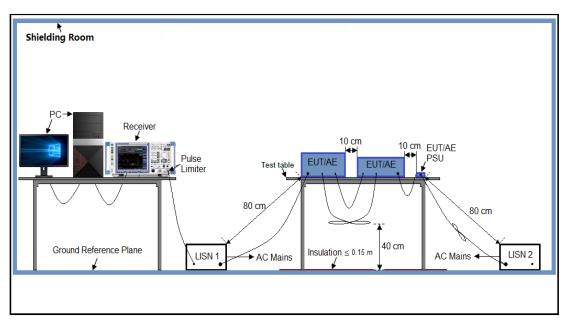
10.1 LIMITS OF LINE CONDUCTED EMISSION TEST

Francisco	Maximum RF	Line Voltage
Frequency	Q.P. (dBμV)	Average (dBμV)
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.

10.2 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)





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10.3 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.

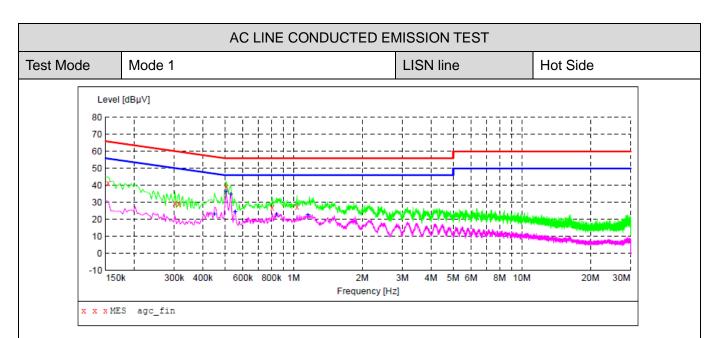
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

10.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 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.

10.5 MEASUREMENT RESULTS





MEASUREMENT RESULT: "agc_fin"

2023/8/9 0:06 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.154000 0.302000 0.314000 0.506000 0.806000 1.034000	41.20 29.80 29.30 39.00 27.00 27.40	6.1 6.1 6.2 6.2 6.2	66 60 60 56 56	24.6 30.4 30.6 17.0 29.0 28.6	QP QP QP QP QP QP	L1 L1 L1 L1 L1 L1

MEASUREMENT RESULT: "agc_fin2"

2023/8/9 0:06 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.450000 0.506000 0.530000 0.554000 0.842000 1.154000	23.20 36.60 34.70 24.40 23.20 22.60	6.1 6.2 6.2 6.2 6.2	47 46 46 46 46	23.7 9.4 11.3 21.6 22.8 23.4	AV AV	L1 L1 L1 L1 L1

RESULT: PASS



AC LINE CONDUCTED EMISSION TEST																	
t Mode 1 LISN line Neutra									al Sid	le							
Leve	[dBµV]																
80																	
70 60			<u></u>		-			-			₋		7-7-				
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-10		- -				;				¦				· -			
150	lk 3	00k 40	00k	600k	800k	1M		2M luenc	3M v [Hz]	41	M 5N	/ 6M	8M	10M		20M	30M
x x x ME	S agc_fi	.n					Fred	quenc	y [Hz]								

MEASUREMENT RESULT: "agc_fin"

2023/8/9 0:09 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.154000	41.50	6.1	66	24.3	QP	N
0.506000	39.90	6.2	56	16.1	QP	N
0.530000	39.00	6.2	56	17.0	QP	N
1.034000	29.90	6.2	56	26.1	QP	N
1.174000	27.00	6.2	56	29.0	QP	N
1.398000	25.70	6.2	56	30.3	QP	N

MEASUREMENT RESULT: "agc fin2"

2023/8/9 0:09 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.250000 0.506000	22.80 35.30	6.1 6.2	52 46	29.0 10.7	AV AV	N N
0.530000	33.60	6.2	46	12.4	AV	N
0.822000	21.20	6.2	46	24.8	AV	N
0.878000	20.50	6.2	46	25.5	AV	N
2.162000	16.70	6.2	46	29.3	AV	N

RESULT: PASS

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APPENDIX I: PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC02762230802AP01

APPENDIX II: PHOTOGRAPHS OF TEST EUT

Refer to the Report No.: AGC02762230802AP04

----END OF REPORT----



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