
FCC Test Report

Report No.: AGC07846201201FE03

FCC ID : XEN-CKW
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : RF Keyboard
BRAND NAME : Heng Yu
MODEL NAME : CKW
APPLICANT : Heng Yu Electronic Manufacturing Company Ltd
DATE OF ISSUE : Dec. 11, 2020
STANDARD(S) : FCC Part 15 Rules
TEST PROCEDURE(S)
REPORT VERSION : V1.0

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec. 11, 2020	Valid	Initial Release

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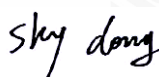


1. VERIFICATION OF CONFORMITY

Applicant	Heng Yu Electronic Manufacturing Company Ltd
Address	Room 1503-5, Nan Fung Commercial Centre, 19 Lam Lo Hong Kong China
Manufacturer	Zhuhai Heng Yu New Technology Company Limited
Address	No. 10, Yingyue Road, Yunong Village North, Sanzao Town, Zhuhai, Guangdong, P.R. China
Factory	Zhuhai Heng Yu New Technology Company Limited
Address	No. 10, Yingyue Road, Yunong Village North, Sanzao Town, Zhuhai, Guangdong, P.R. China
Product Designation	RF Keyboard
Brand Name	Heng Yu
Test Model	CKW
Date of test	Dec. 08, 2020 to Dec. 11, 2020
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	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 Rules Part 15.249.

Prepared By		
	Sky Dong (Project Engineer)	Dec. 11, 2020
Reviewed By		
	Max Zhang (Reviewer)	Dec. 11, 2020
Approved By		
	Forrest Lei (Authorized Officer)	Dec. 11, 2020

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	2402MHz-2475MHz
Maximum field strength	74.81dBuV/m(Average)@3m
Modulation	GFSK
Number of channels	69
Antenna Gain	0dBi
Antenna Designation	Internal Antenna (Met 15.203 Antenna requirement)
Hardware Version	V1.0
Software Version	V1.0
Power Supply	DC 3.7V by battery or DC 5V by adapter

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2.2. TABLE OF CARRIER FREQUENCY

Frequency Band	Channel Number	Frequency(MHZ)	Channel Number	Frequency(MHZ)	Channel Number	Frequency(MHZ)
2400~2483.5MHZ	01	2402	25	2426	49	2451
	02	2403	26	2427	50	2452
	03	2404	27	2428	51	2453
	04	2405	28	2429	52	2454
	05	2406	29	2430	53	2455
	06	2407	30	2431	54	2456
	07	2408	31	2432	55	2457
	08	2409	32	2433	56	2458
	09	2410	33	2434	57	2459
	10	2411	34	2435	58	2460
	11	2412	35	2436	59	2461
	12	2413	36	2437	60	2462
	13	2414	37	2438	61	2467
	14	2415	38	2439	62	2468
	15	2416	39	2440	63	2469
	16	2417	40	2441	64	2470
	17	2418	41	2442	65	2471
	18	2419	42	2443	66	2472
	19	2420	43	2444	67	2473
	20	2421	44	2445	68	2474
	21	2422	45	2446	69	2475
	22	2423	46	2447		
	23	2424	47	2448		
	24	2425	48	2450		

2.3. 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.

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3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, $U_c = \pm 3.1$ dB
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 4.0$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.8$ dB

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4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	TX mode at 2402MHz
2	TX mode at 2442MHz
3	TX mode at 2475MHz
Note: 1. All the test modes can be supply by battery, 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. The EUT enters test modes by pressing keys of EUT.	

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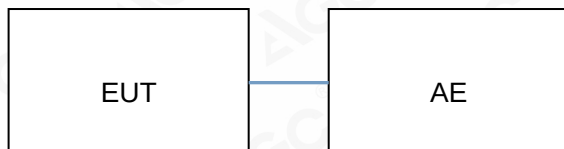
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5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure:



5.2 EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	RF Keyboard	CKW	XEN-CKW	EUT
2	Adapter	TPA-46050100VU	N/A	AE
3	PC	Huawei	N/A	AE

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249&15.209	Radiated Emission	Compliant
§15.249	Band Edges	Compliant
§15.215	20dB bandwidth	Compliant
§15.207	Conducted Emission	Compliant

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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 CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2021
LISN	R&S	ESH2-Z5	100086	Jul. 03,2020	Jul. 02,2021
Test software	R&S	ES-K1(Ver.V1.71)	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	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2021
2.4GHz Fliter	EM Electronics	2400-2500MHz	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	ZHINAN	E-002	N/A	Sep. 03, 2020	Sep. 02, 2022
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.21, 2019	Sep. 20, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00154520	Oct. 26, 2019	Oct. 25, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 15, 2019	Oct. 16, 2021
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A

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7. RADIATED EMISSION

7.1 TEST LIMIT

Standard FCC15.249

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
900-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/m	dB(μ V)/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	Other:74.0 dB(μ V)/m (Peak) 54.0 dB(μ V)/m (Average)	

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.

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7.2. 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 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 minimum resolution bandwidth of 1 MHz. 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 RBW 2.4MHz/ VBW 8MHz for Peak, RBW 2.4MHz/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

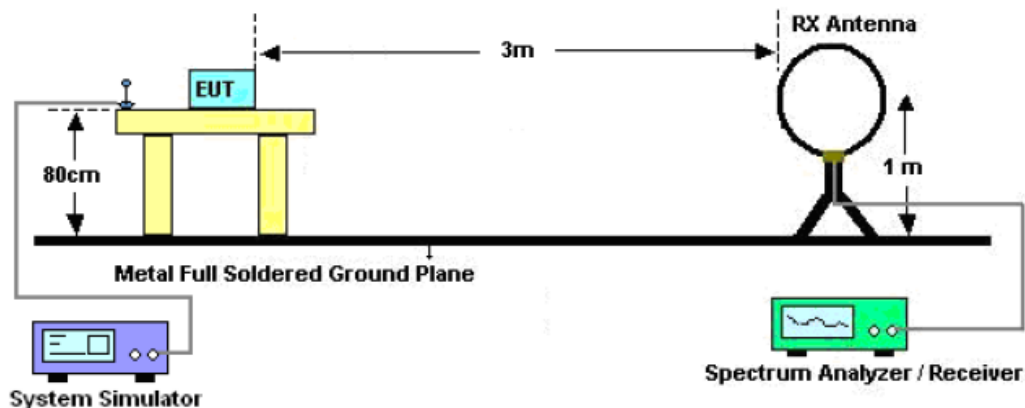
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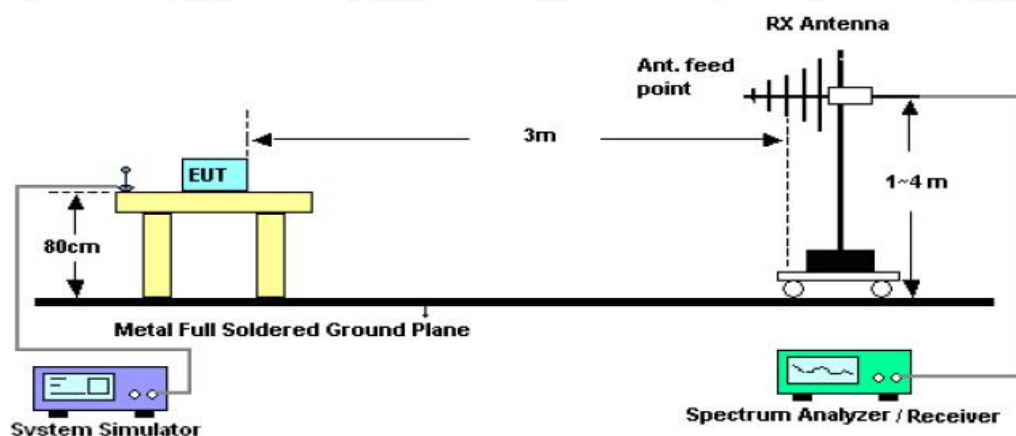


7.3. TEST SETUP

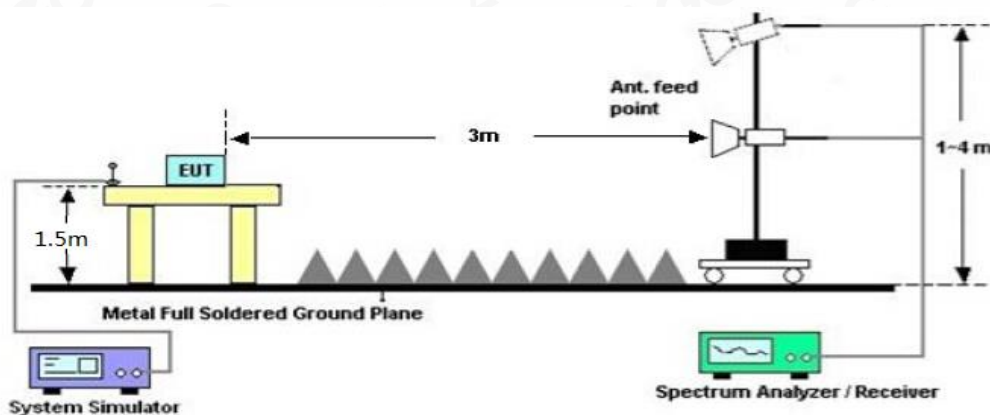
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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7.4. TEST RESULT

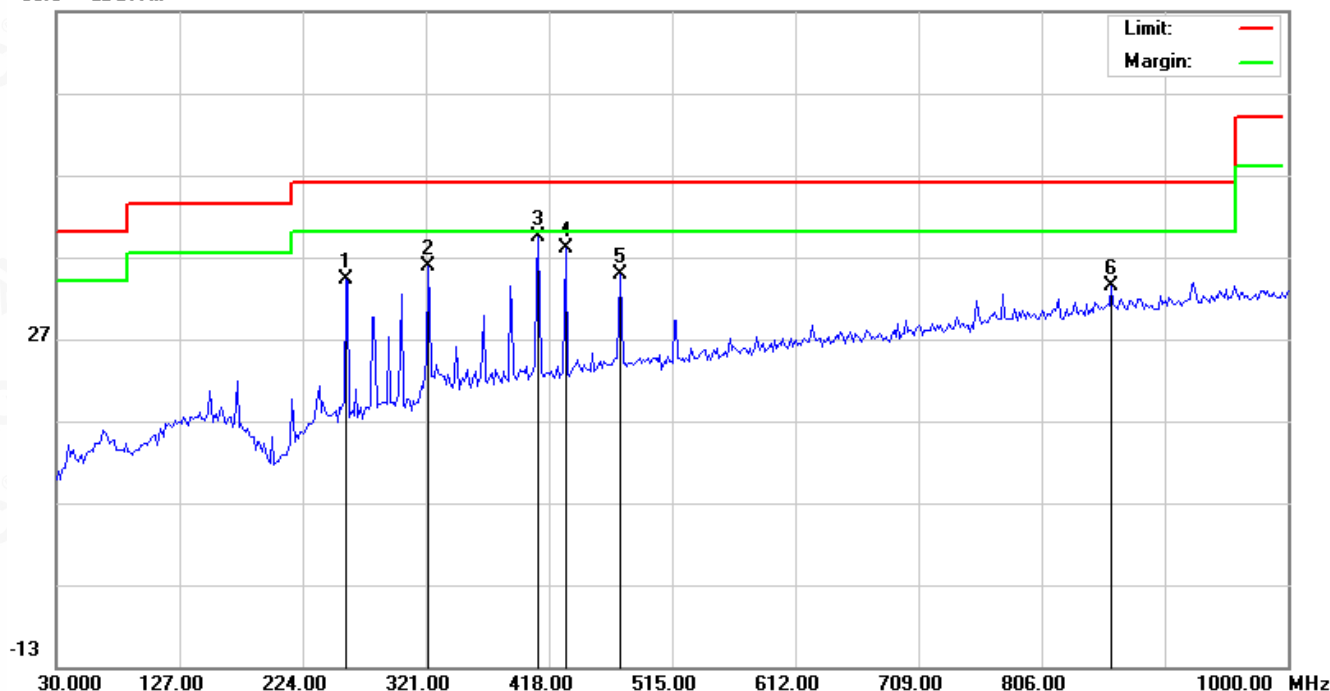
RADIATED EMISSION BELOW 30MHZ

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

RADIATED EMISSION 30MHz- 1GHZ

EUT	RF Keyboard	Model Name	CKW
Temperature	21.8℃	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 1	Polarization	Horizontal

66.9 dBuV/m



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		257.9500	15.94	18.35	34.29	46.00	-11.71	peak
2		322.6167	15.61	20.26	35.87	46.00	-10.13	peak
3	*	409.9166	16.30	23.18	39.48	46.00	-6.52	peak
4		430.9333	14.35	23.60	37.95	46.00	-8.05	peak
5		474.5833	10.23	24.48	34.71	46.00	-11.29	peak
6		860.9667	2.11	31.20	33.31	46.00	-12.69	peak

RESULT: PASS

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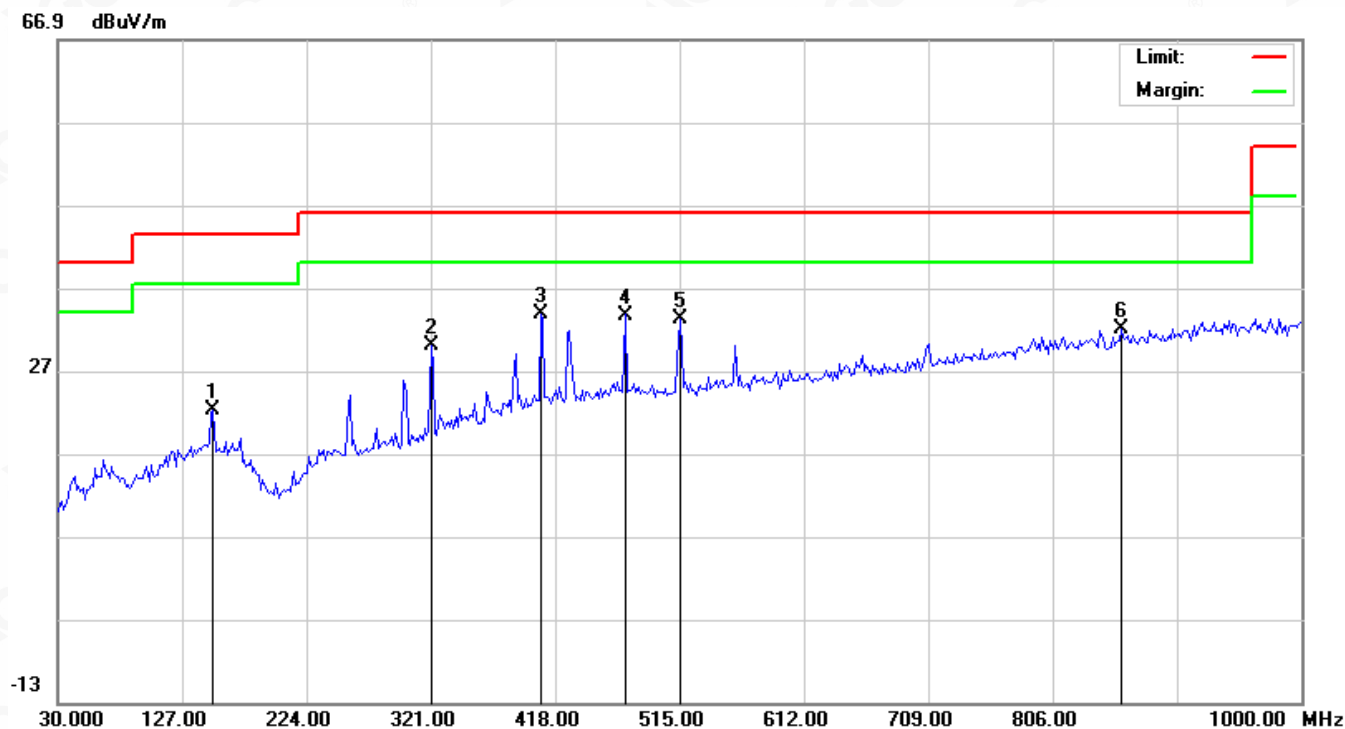
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EUT	RF Keyboard	Model Name	CKW
Temperature	21.8℃	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 1	Polarization	Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		151.2500	2.90	19.21	22.11	43.50	-21.39	peak
2		321.0000	9.79	20.21	30.00	46.00	-16.00	peak
3	*	406.6833	10.65	23.11	33.76	46.00	-12.24	peak
4		472.9667	9.25	24.45	33.70	46.00	-12.30	peak
5		515.0000	7.87	25.28	33.15	46.00	-12.85	peak
6		859.3500	0.84	31.18	32.02	46.00	-13.98	peak

RESULT: PASS

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

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

The mode 1 is the worst case, and only the data of the worst case recorded in this test report.

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FIELD STRENGTH OF FUNDAMENTAL

EUT	RF Keyboard	Model Name	CKW
Temperature	21.8℃	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Modulation	GFSK	Polarization	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402	39.54	49.05	88.59	114.00	-25.41	peak
2402	25.76	49.05	74.81	94.00	-19.19	AVG
2442	39.30	49.12	88.42	114.00	-25.58	peak
2442	25.49	49.12	74.61	94.00	-19.39	AVG
2475	39.13	49.25	88.38	114.00	-25.62	peak
2475	25.09	49.25	74.34	94.00	-19.66	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	RF Keyboard	Model Name	CKW
Temperature	21.8℃	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Modulation	GFSK	Polarization	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402	37.48	49.05	86.53	114.00	-27.47	peak
2402	22.86	49.05	71.91	94.00	-22.09	AVG
2442	37.33	49.12	86.45	114.00	-27.55	peak
2442	22.86	49.12	71.98	94.00	-22.02	AVG
2475	37.15	49.25	86.40	114.00	-27.60	peak
2475	22.76	49.25	72.01	94.00	-21.99	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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RADIATED EMISSION ABOVE 1GHZ

EUT	RF Keyboard	Model Name	CKW
Temperature	21.8℃	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 1	Polarization	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.67	55.22	0.08	55.30	74.00	-18.70	peak
4804.67	42.91	0.08	42.99	54.00	-11.01	AVG
7206.426	50.12	2.21	52.33	74.00	-21.67	peak
7206.426	38.13	2.21	40.34	54.00	-13.66	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	RF Keyboard	Model Name	CKW
Temperature	21.8℃	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 1	Polarization	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.67	53.13	0.08	53.21	74.00	-20.79	peak
4804.67	42.15	0.08	42.23	54.00	-11.77	AVG
7206.426	47.33	2.21	49.54	74.00	-24.46	peak
7206.426	35.45	2.21	37.66	54.00	-16.34	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	RF Keyboard	Model Name	CKW
Temperature	21.8℃	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 2	Polarization	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4884.683	51.12	0.14	51.26	74.00	-22.74	peak
4884.683	43.14	0.14	43.28	54.00	-10.72	AVG
7326.436	45.39	2.36	47.75	74.00	-26.25	peak
7326.436	34.47	2.36	36.83	54.00	-17.17	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	RF Keyboard	Model Name	CKW
Temperature	21.8℃	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 2	Polarization	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4884.683	49.17	0.14	49.31	74.00	-24.69	peak
4884.683	39.26	0.14	39.40	54.00	-14.60	AVG
7326.436	44.27	2.36	46.63	74.00	-27.37	peak
7326.436	36.23	2.36	38.59	54.00	-15.41	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	RF Keyboard	Model Name	CKW
Temperature	21.8℃	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 3	Polarization	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4950.056	53.22	0.22	53.44	74.00	-20.56	peak
4950.056	46.23	0.22	46.45	54.00	-7.55	AVG
7425.384	50.95	2.64	53.59	74.00	-20.41	peak
7425.384	39.97	2.64	42.61	54.00	-11.39	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	RF Keyboard	Model Name	CKW
Temperature	21.8℃	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 3	Polarization	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4950.056	54.34	0.22	54.56	74.00	-19.44	peak
4950.056	43.37	0.22	43.59	54.00	-10.41	AVG
7425.384	49.76	2.64	52.40	74.00	-21.60	peak
7425.384	37.87	2.64	40.51	54.00	-13.49	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Note: 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=Measurement-Limit.

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

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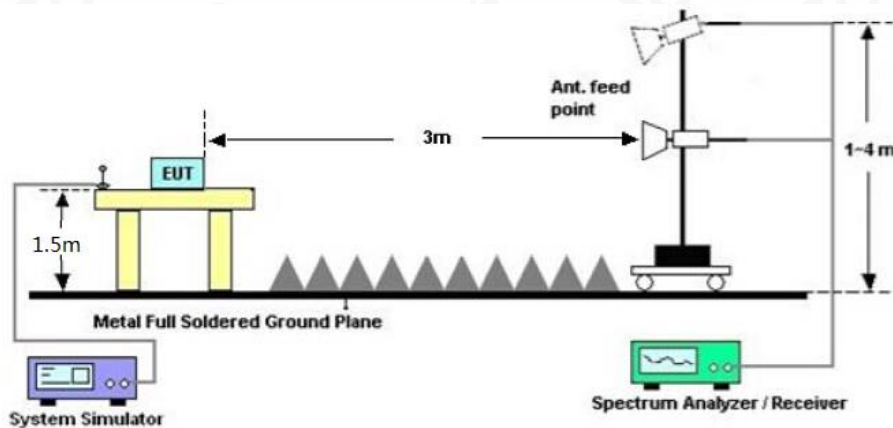
8. BAND EDGE EMISSION

8.1. MEASUREMENT PROCEDURE

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.
2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission: (a) PEAK: RBW=1MHz, VBW=3MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz ; VBW=3MHz / Sweep=AUTO
3. Other procedures refer to clause 7.2.

8.2 TEST SETUP

RADIATED EMISSION TEST SETUP



8.3 RADIATED TEST RESULT

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μ V) to represent the Amplitude. Use the F dB(μ V/m) to represent the Field Strength. So A=F.

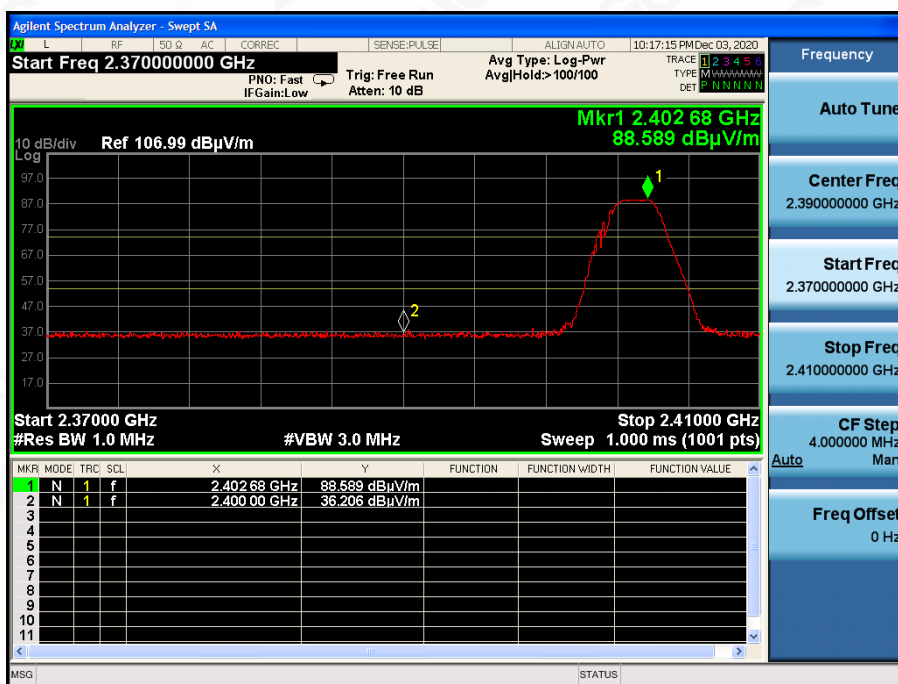
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EUT	RF Keyboard	Model Name	CKW
Temperature	21.8°C	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 1	Polarization	Horizontal

Peak Value



Average Value



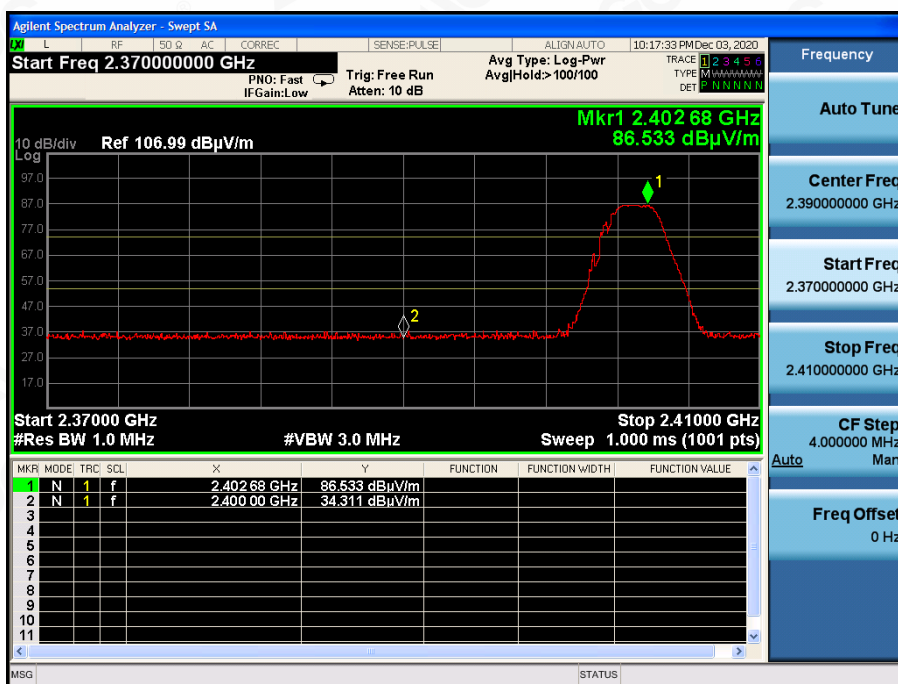
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EUT	RF Keyboard	Model Name	CKW
Temperature	21.8°C	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 1	Polarization	Vertical

Peak Value



Average Value



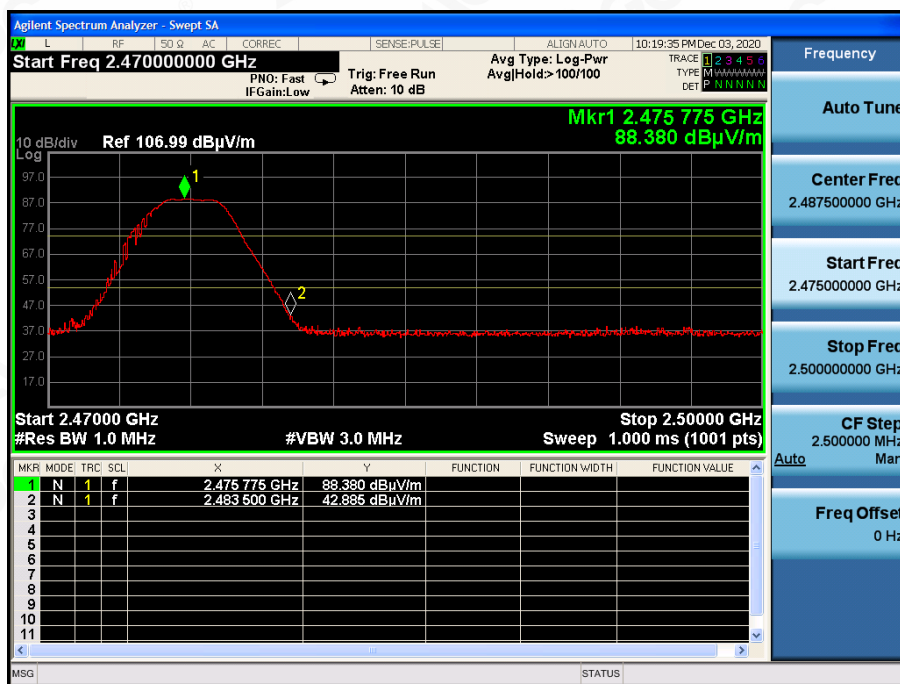
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EUT	RF Keyboard	Model Name	CKW
Temperature	21.8°C	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 3	Polarization	Horizontal

Peak Value



Average Value



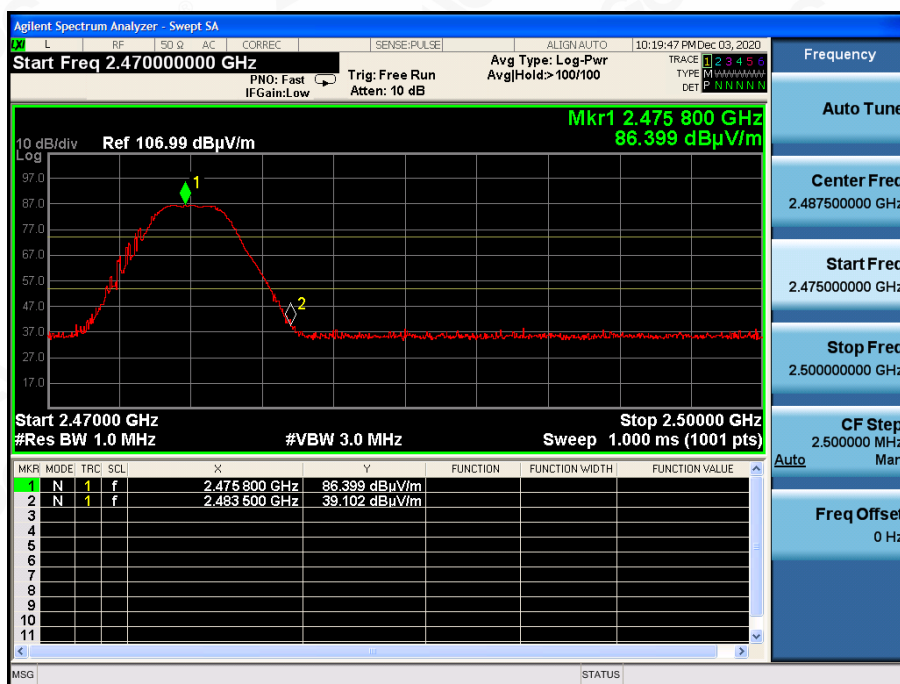
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EUT	RF Keyboard	Model Name	CKW
Temperature	21.8°C	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 3.7V
Test Mode	Mode 3	Polarization	Vertical

Peak Value



Average Value



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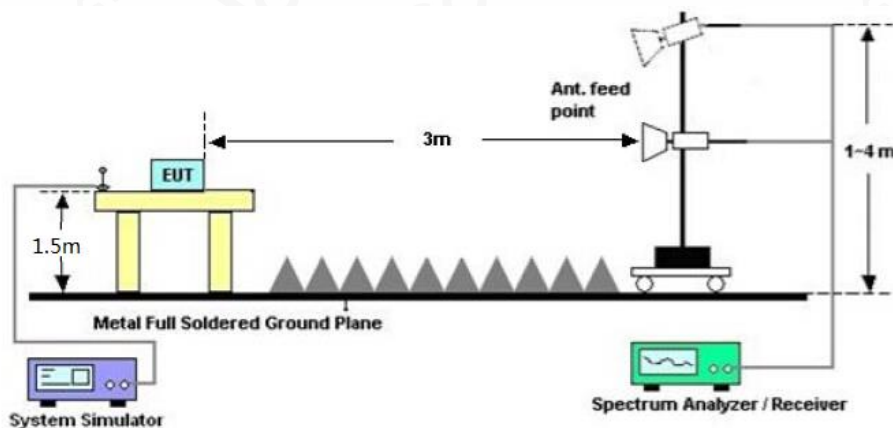


9. 20DB BANDWIDTH

9.1. MEASUREMENT PROCEDURE

1. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
2. Set SPA Centre Frequency = Operation Frequency, RBW= 30 KHz, VBW $\geq 3 \times$ RBW.
3. Set SPA Trace 1 Max hold, then View.

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



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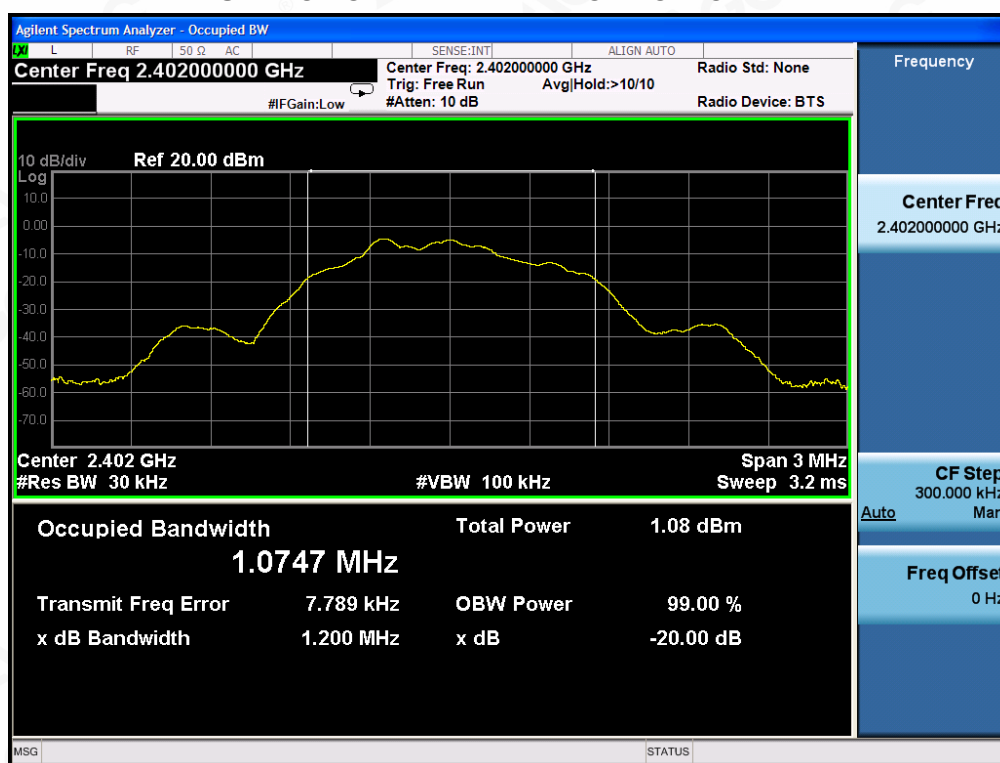


9.3. MEASUREMENT RESULTS

TEST ITEM	20DB BANDWIDTH
TEST MODULATION	GFSK

Test Channel (MHz)	20DB BANDWIDTH (MHz)	99% BANDWIDTH (MHz)	Criteria
2402	1.200	1.0747	PASS
2442	1.199	1.0737	PASS
2475	1.197	1.0737	PASS

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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10. FCC LINE CONDUCTED EMISSION TEST

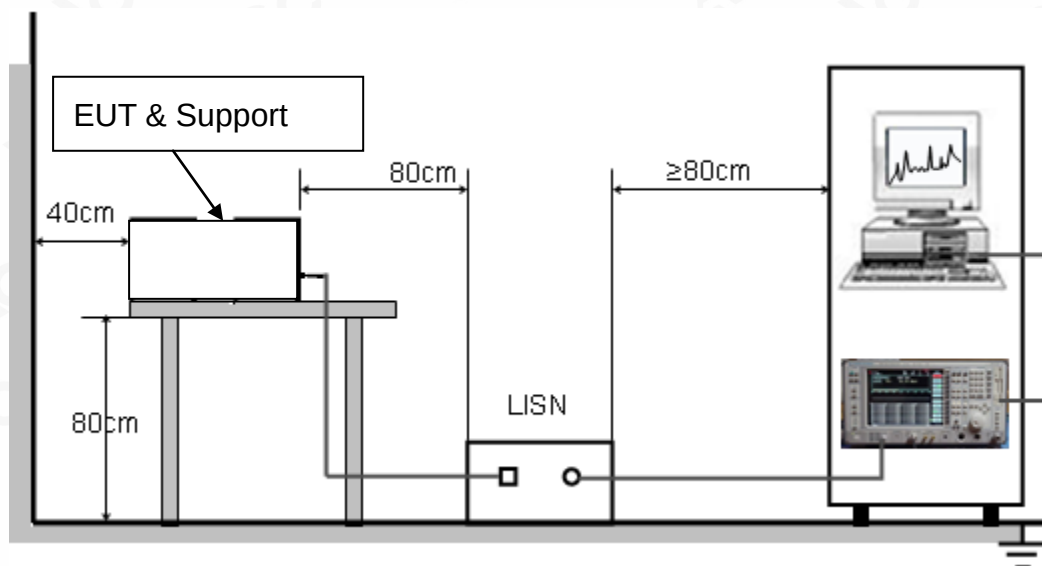
10.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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.

10.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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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 PC 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.

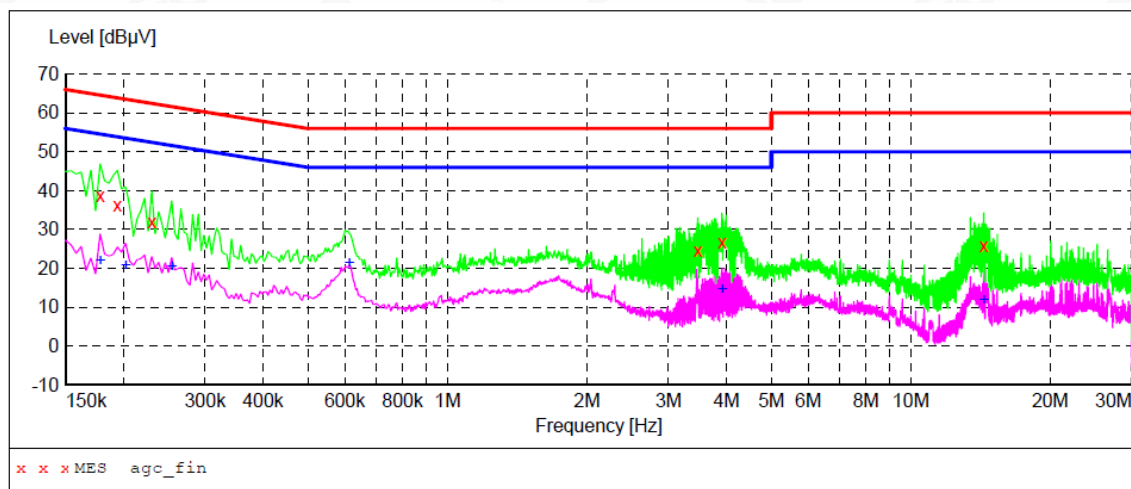
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12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "agc_fin"

2020/12/2 21:03

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.178000	38.60	11.3	65	26.0	QP	L1
0.194000	36.10	11.3	64	27.8	QP	L1
0.230000	32.00	11.3	62	30.4	QP	L1
3.470000	24.40	11.4	56	31.6	QP	L1
3.914000	26.70	11.4	56	29.3	QP	L1
14.374000	25.90	12.8	60	34.1	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2020/12/2 21:03

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.178000	22.00	11.3	55	32.6	AV	L1
0.202000	20.80	11.3	54	32.7	AV	L1
0.254000	20.40	11.3	52	31.2	AV	L1
0.614000	21.50	11.3	46	24.5	AV	L1
3.914000	14.60	11.4	46	31.4	AV	L1
14.374000	12.10	12.8	50	37.9	AV	L1

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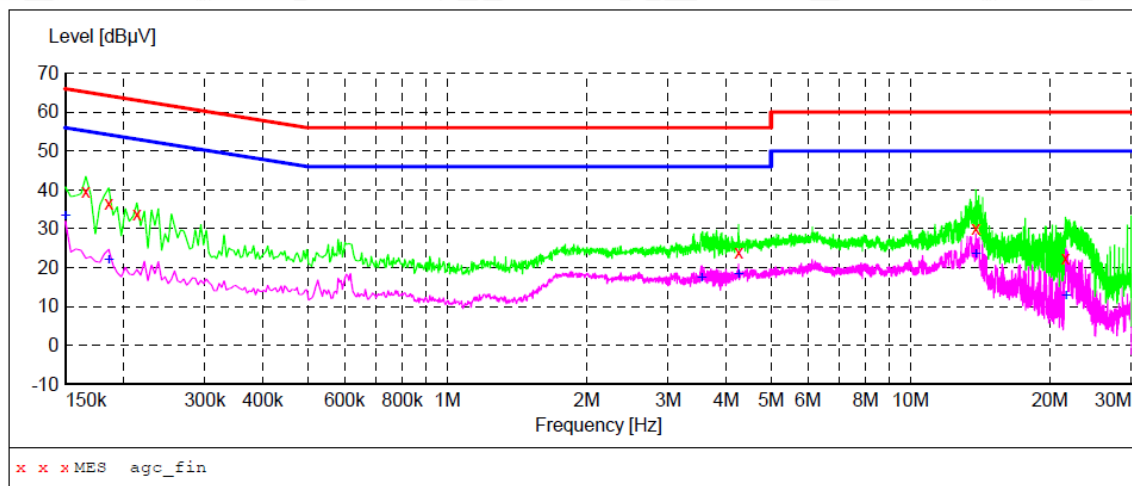
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Line Conducted Emission Test Line 2-N


MEASUREMENT RESULT: "agc_fin"

2020/12/2 19:53

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.166000	39.70	11.3	65	25.5	QP	N
0.186000	36.60	11.3	64	27.6	QP	N
0.214000	33.80	11.3	63	29.2	QP	N
4.258000	23.80	11.4	56	32.2	QP	N
13.830000	30.10	12.7	60	29.9	QP	N
21.630000	22.30	13.4	60	37.7	QP	N

MEASUREMENT RESULT: "agc_fin2"

2020/12/2 19:53

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.150000	33.60	11.3	56	22.4	AV	N
0.186000	22.00	11.3	54	32.2	AV	N
3.542000	17.60	11.4	46	28.4	AV	N
4.254000	18.30	11.4	46	27.7	AV	N
13.846000	23.50	12.7	50	26.5	AV	N
21.650000	12.90	13.4	50	37.1	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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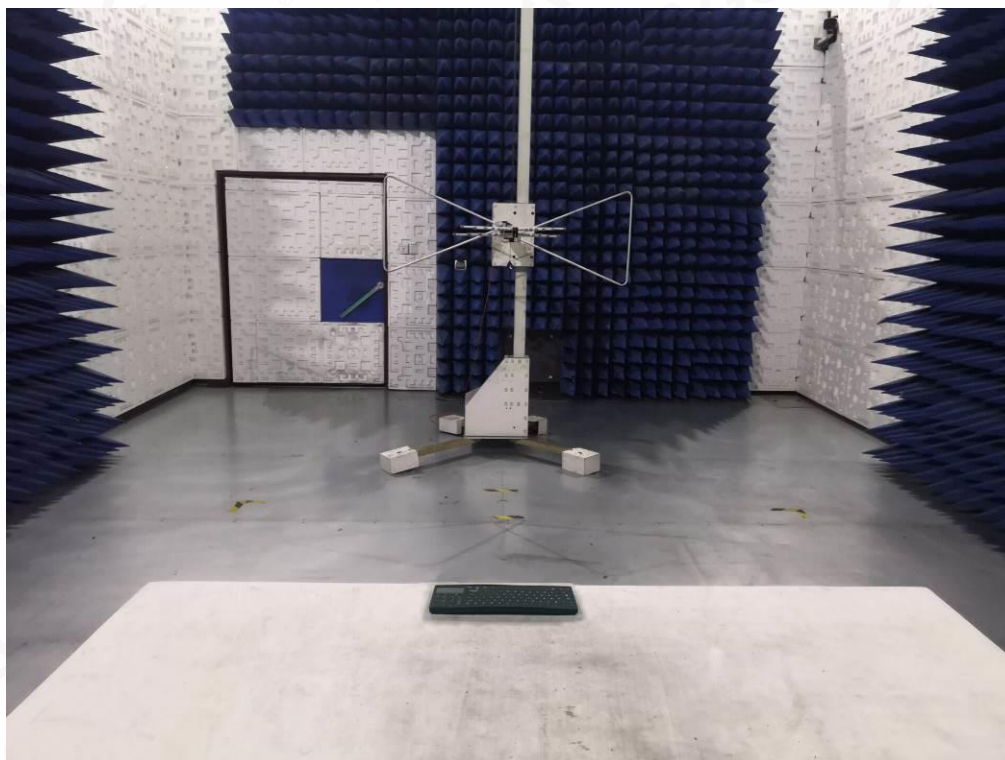
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APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ



FCC RADIATED EMISSION TEST SETUP ABOVE 1



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CONDUCTED EMISSION TEST SETUP



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APPENDIX B: PHOTOGRAPHS OF THE EUT

ALL VIEW OF EUT



TOP VIEW OF EUT

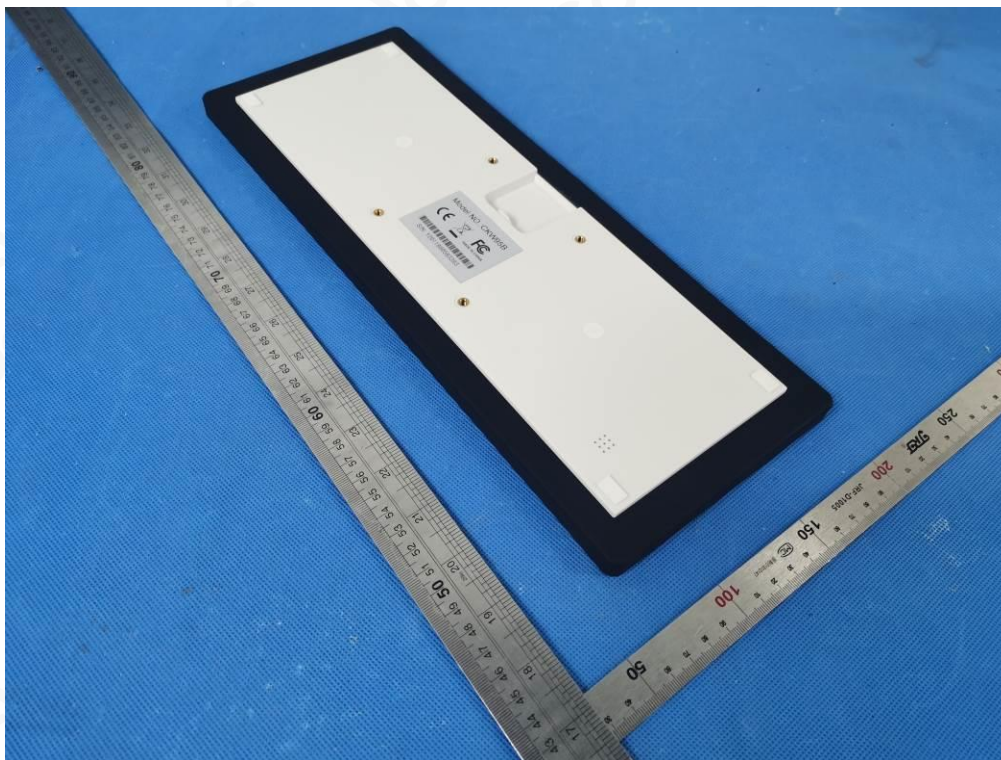


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BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



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BACK VIEW OF EUT



LEFT VIEW OF EUT



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RIGHT VIEW OF EUT



VIEW OF EUT (PORT)



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