FCC Test Report

Report No.:	RFBDYV-WTW-P20120616
FCC ID:	PRDKB43
Test Model:	HSA-A014K
Received Date:	Dec. 17, 2020
Test Date:	Jan. 4 to 20, 2021
Issued Date:	Jan. 25, 2021
Applicant:	Acrox Technologies Co., Ltd
Address:	4F., No. 89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
FCC Registration / Designation Number:	198487 / TW2021

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Release Control Record

Issue No.	Description	Date Issued
RFBDYV-WTW-P20120616	Original release.	Jan. 25, 2021

1 Certificate of Conformity

Product:	HP Wireless Keyboard
Brand:	hp
Test Model:	HSA-A014K
Sample Status:	Engineering sample
Applicant:	Acrox Technologies Co., Ltd
Test Date:	Jan. 4 to 20, 2021
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.249) ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Annie Chang , **Date:** Jan. 25, 2021

Annie Chang / Senior Specialist

Approved by : Rex. Lai , **Date:** Jan. 25, 2021

Rex Lai / Associate Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.249)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	N/A	Power supply is 1.5Vdc from battery
15.215	Channel Bandwidth Measurement	-	
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	Pass	Meet the requirement of limit. Minimum passing margin is -12.05dB at 7320.00MHz.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions	9kHz ~ 40GHz	2.63 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.61 dB
	30MHz ~ 1000MHz	5.43 dB
Radiated Emissions above 1 GHz	Above 1GHz	5.42 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	HP Wireless Keyboard
Brand	hp
Test Model	HSA-A014K
Status of EUT	Engineering sample
Power Supply Rating	1.5Vdc from battery
Modulation Type	GFSK
Operating Frequency	2408MHz ~ 2474MHz
Number of Channel	34
Antenna Type	Printed antenna with -1.56dBi gain
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

34 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1	2408	11	2428	21	2448	31	2468
2	2410	12	2430	22	2450	32	2470
3	2412	13	2432	23	2452	33	2472
4	2414	14	2434	24	2454	34	2474
5	2416	15	2436	25	2456		
6	2418	16	2438	26	2458		
7	2420	17	2440	27	2460		
8	2422	18	2442	28	2462		
9	2424	19	2444	29	2464		
10	2426	20	2446	30	2466		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	Note	√	-

Where **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	1 to 34	1, 17, 34	GFSK

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	1 to 34	1	GFSK

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	1 to 34	1, 17, 34	GFSK

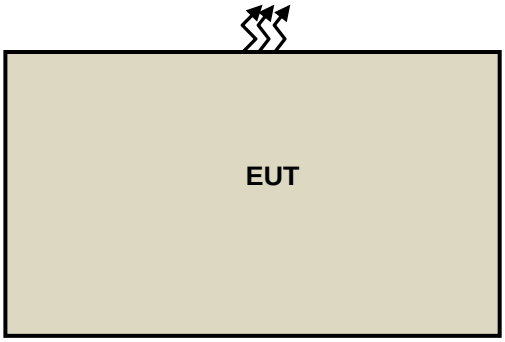
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	25deg. C, 75%RH	1.5Vdc	Dalen Dai
RE<1G	25deg. C, 75%RH	1.5Vdc	Dalen Dai
APCM	25deg. C, 76%RH	1.5Vdc	Pirar Hsieh

3.3 Description of Support Units

The EUT has been tested as an independent unit together without any necessary accessory or support unit.

3.3.1 Configuration of System under Test



(Powered from battery)

3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.249)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 19, 2020	Feb. 18, 2021
HP Preamplifier	8449B	3008A01201	Feb. 20, 2020	Feb. 19, 2021
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 19, 2020	Feb. 18, 2021
Agilent TEST RECEIVER	N9038A	MY51210129	Mar. 18, 2020	Mar. 17, 2021
Schwarzbeck Antenna	VULB 9168	139	Nov. 6, 2020	Nov. 5, 2021
Schwarzbeck Antenna	VHBA 9123	480	Jun. 3, 2019	Jun. 2, 2021
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 22, 2020	Nov. 21, 2021
EMCO Horn Antenna	3115	00027024	Nov. 22, 2020	Nov.21, 2021
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF102	Cable-CH6-01	Jul. 9, 2020	Jul. 8, 2021
EMEC RF cable With 3/4dB PAD	EM102-KMKM	01	Aug. 21, 2020	Aug. 20, 2021
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	Jun. 16, 2020	Jun. 15, 2021
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 22, 2020	Jul. 21, 2021
Loop Antenna EMCI	LPA600	270	Aug. 23, 2019	Aug. 22, 2021
EMCO Horn Antenna	3115	00028257	Nov. 22, 2020	Nov. 21, 2021
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 8, 2020	Sep. 7, 2021
Anritsu Power Sensor	MA2411B	0738404	Apr. 13, 2020	Apr. 12, 2021
Anritsu Power Meter	ML2495A	0842014	Apr. 13, 2020	Apr. 12, 2021

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

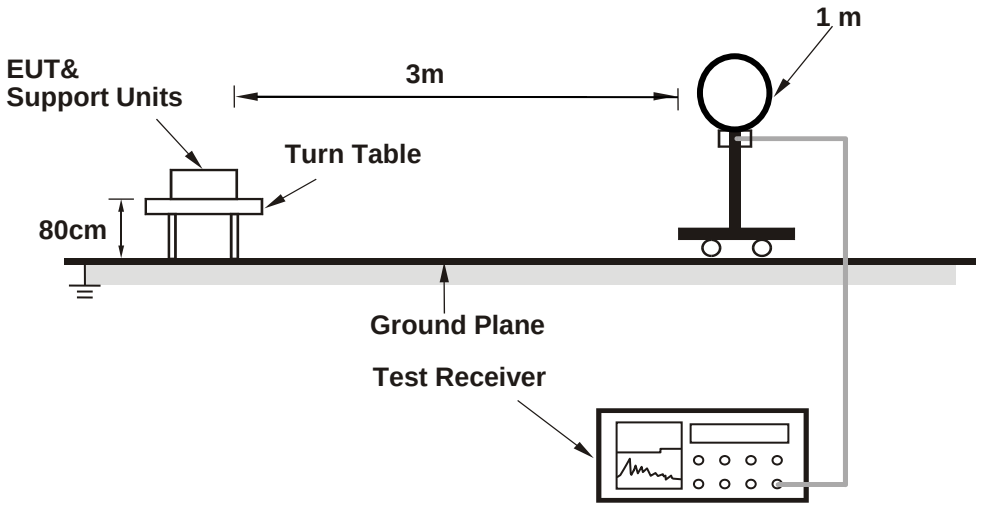
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz. ((PK) RB=1MHz, VB=3MHz; (AV) 1M/3M detector RMS trace AV)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

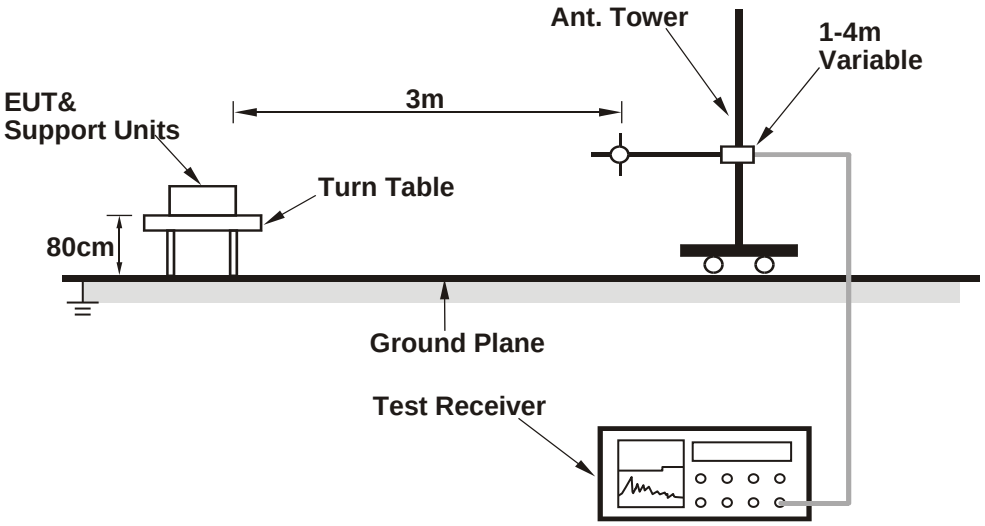
No deviation.

4.1.5 Test Setup

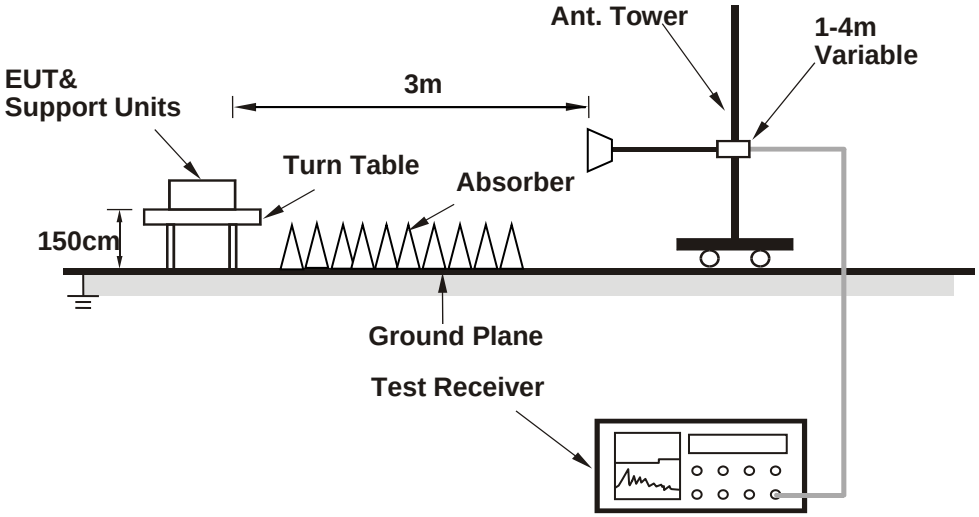
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

ABOVE 1GHz DATA

RF Mode	TX GFSK	Channel	CH 1：2408 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	49.16 PK	74.00	-24.84	1.12 H	340	47.81	1.35
2	2390.00	40.99 AV	54.00	-13.01	1.12 H	340	39.64	1.35
3	2400.00	53.02 PK	74.00	-20.98	1.12 H	340	51.62	1.40
4	2400.00	38.86 AV	54.00	-15.14	1.12 H	340	37.46	1.40
5	*2408.00	83.31 PK	114.00	-30.69	1.12 H	340	81.88	1.43
6	*2408.00	41.11 AV	94.00	-52.89	1.12 H	340	39.68	1.43
7	4816.00	58.66 PK	74.00	-15.34	1.56 H	349	49.24	9.42
8	4816.00	16.46 AV	54.00	-37.54	1.56 H	349	7.04	9.42
9	7224.00	61.78 PK	74.00	-12.22	1.54 H	256	48.21	13.57
10	7224.00	19.58 AV	54.00	-34.42	1.54 H	256	6.01	13.57
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	45.98 PK	74.00	-28.02	2.93 V	268	44.63	1.35
2	2390.00	34.91 AV	54.00	-19.09	2.93 V	268	33.56	1.35
3	2400.00	46.15 PK	74.00	-27.85	2.93 V	268	44.75	1.40
4	2400.00	34.84 AV	54.00	-19.16	2.93 V	268	33.44	1.40
5	*2408.00	75.04 PK	114.00	-38.96	2.93 V	268	73.61	1.43
6	*2408.00	32.84 AV	94.00	-61.16	2.93 V	268	31.41	1.43
7	4816.00	54.67 PK	74.00	-19.33	1.47 V	105	45.25	9.42
8	4816.00	12.47 AV	54.00	-41.53	1.47 V	105	3.05	9.42
9	7224.00	58.59 PK	74.00	-15.41	1.55 V	85	45.02	13.57
10	7224.00	16.39 AV	54.00	-37.61	1.55 V	85	2.82	13.57

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.5 ms / 64.1 ms) = -42.2 dB
   Please see page 18 for plotted duty.

RF Mode	TX GFSK	Channel	CH 17：2440 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	83.13 PK	114.00	-30.87	1.16 H	345	81.58	1.55
2	*2440.00	40.93 AV	94.00	-53.07	1.16 H	345	39.38	1.55
3	4880.00	58.94 PK	74.00	-15.06	1.58 H	351	49.42	9.52
4	4880.00	16.74 AV	54.00	-37.26	1.58 H	351	7.22	9.52
5	**7320.00**	**61.95 PK**	**74.00**	**-12.05**	**1.52 H**	**253**	**48.10**	**13.85**
6	7320.00	19.75 AV	54.00	-34.25	1.52 H	253	5.90	13.85
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	74.78 PK	114.00	-39.22	2.97 V	262	73.23	1.55
2	*2440.00	32.58 AV	94.00	-61.42	2.97 V	262	31.03	1.55
3	4880.00	55.03 PK	74.00	-18.97	1.45 V	109	45.51	9.52
4	4880.00	12.83 AV	54.00	-41.17	1.45 V	109	3.31	9.52
5	7320.00	58.82 PK	74.00	-15.18	1.57 V	90	44.97	13.85
6	7320.00	16.62 AV	54.00	-37.38	1.57 V	90	2.77	13.85

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.5 ms / 64.1 ms) = -42.2 dB
   Please see page 18 for plotted duty.

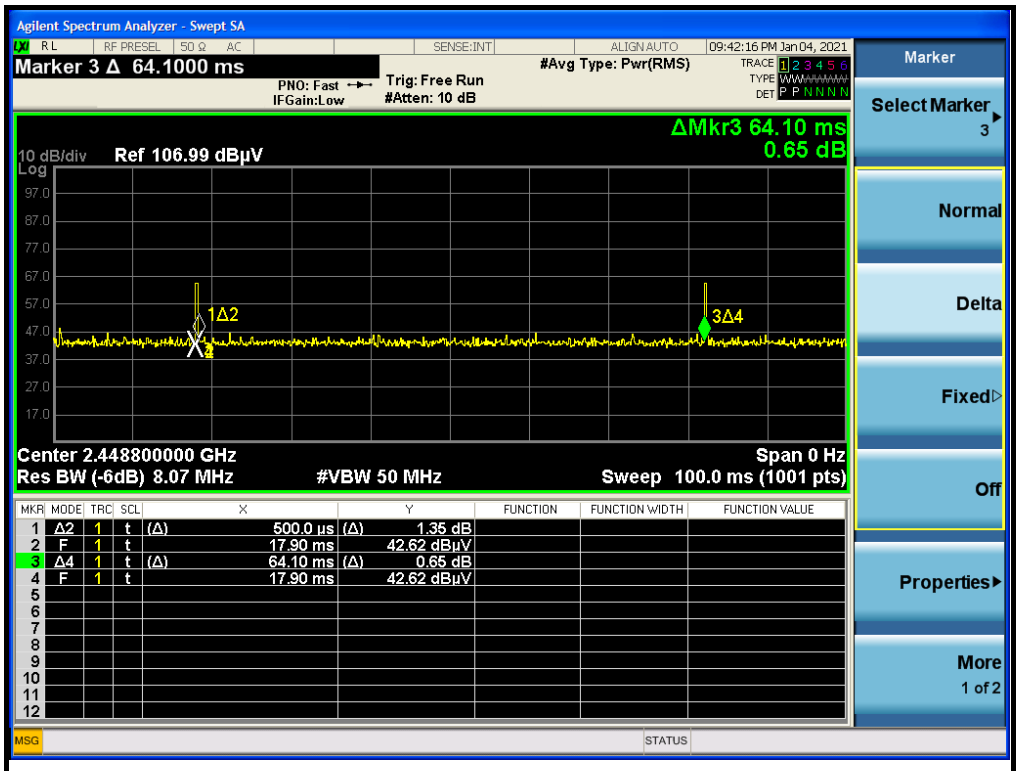
RF Mode	TX GFSK	Channel	CH 34：2474 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2474.00	82.49 PK	114.00	-31.51	1.50 H	128	80.73	1.76
2	*2474.00	40.29 AV	94.00	-53.71	1.50 H	128	38.53	1.76
3	2483.50	52.17 PK	74.00	-21.83	1.50 H	128	50.34	1.83
4	2483.50	36.34 AV	54.00	-17.66	1.50 H	128	34.51	1.83
5	4948.00	58.81 PK	74.00	-15.19	1.62 H	355	49.26	9.55
6	4948.00	16.61 AV	54.00	-37.39	1.62 H	355	7.06	9.55
7	7422.00	61.84 PK	74.00	-12.16	1.70 H	271	47.89	13.95
8	7422.00	19.64 AV	54.00	-34.36	1.70 H	271	5.69	13.95
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2474.00	76.08 PK	114.00	-37.92	2.91 V	264	74.32	1.76
2	*2474.00	33.88 AV	94.00	-60.12	2.91 V	264	32.12	1.76
3	2483.50	46.37 PK	74.00	-27.63	2.91 V	264	44.54	1.83
4	2483.50	35.06 AV	54.00	-18.94	2.91 V	264	33.23	1.83
5	4948.00	55.29 PK	74.00	-18.71	1.46 V	101	45.74	9.55
6	4948.00	13.09 AV	54.00	-40.91	1.46 V	101	3.54	9.55
7	7422.00	59.04 PK	74.00	-14.96	1.52 V	87	45.09	13.95
8	7422.00	16.84 AV	54.00	-37.16	1.52 V	87	2.89	13.95

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.5 ms / 64.1 ms) = -42.2 dB
   Please see page 18 for plotted duty.

Duty Cycle



20 log(Duty cycle) = 20 log(0.5 ms / 64.1 ms) = -42.2 dB

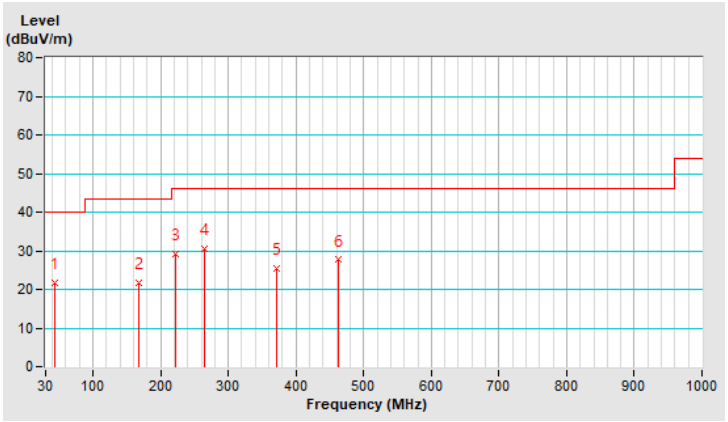
BELOW 1GHz WORST-CASE DATA

RF Mode	TX GFSK	Channel	CH 1：2408 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	43.39	21.68 QP	40.00	-18.32	1.82 H	102	29.19	-7.51
2	168.22	21.63 QP	43.50	-21.87	1.56 H	2	28.32	-6.69
3	221.72	29.11 QP	46.00	-16.89	1.92 H	360	37.97	-8.86
4	264.01	30.50 QP	46.00	-15.50	1.00 H	360	36.44	-5.94
5	371.15	25.34 QP	46.00	-20.66	2.17 H	332	28.12	-2.78
6	462.38	27.64 QP	46.00	-18.36	1.98 H	0	28.18	-0.54

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

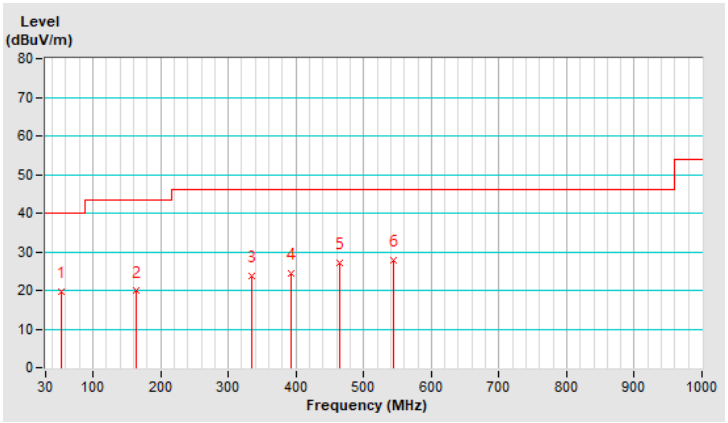


RF Mode	TX GFSK	Channel	CH 1：2408 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	53.38	19.61 QP	40.00	-20.39	1.67 V	200	26.95	-7.34
2	163.57	19.91 QP	43.50	-23.59	1.24 V	269	26.43	-6.52
3	333.80	23.85 QP	46.00	-22.15	1.51 V	236	27.18	-3.33
4	392.49	24.57 QP	46.00	-21.43	1.08 V	229	26.98	-2.41
5	464.03	27.26 QP	46.00	-18.74	1.93 V	198	27.78	-0.52
6	544.25	27.92 QP	46.00	-18.08	1.85 V	283	27.19	0.73

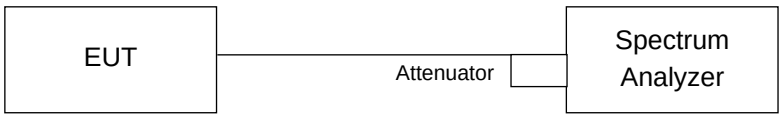
Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Channel Bandwidth

4.2.1 Test Setup



4.2.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.3 Test Procedure

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
d. Repeat above procedures until all frequencies measured were complete.

4.2.4 Deviation from Test Standard

No deviation.

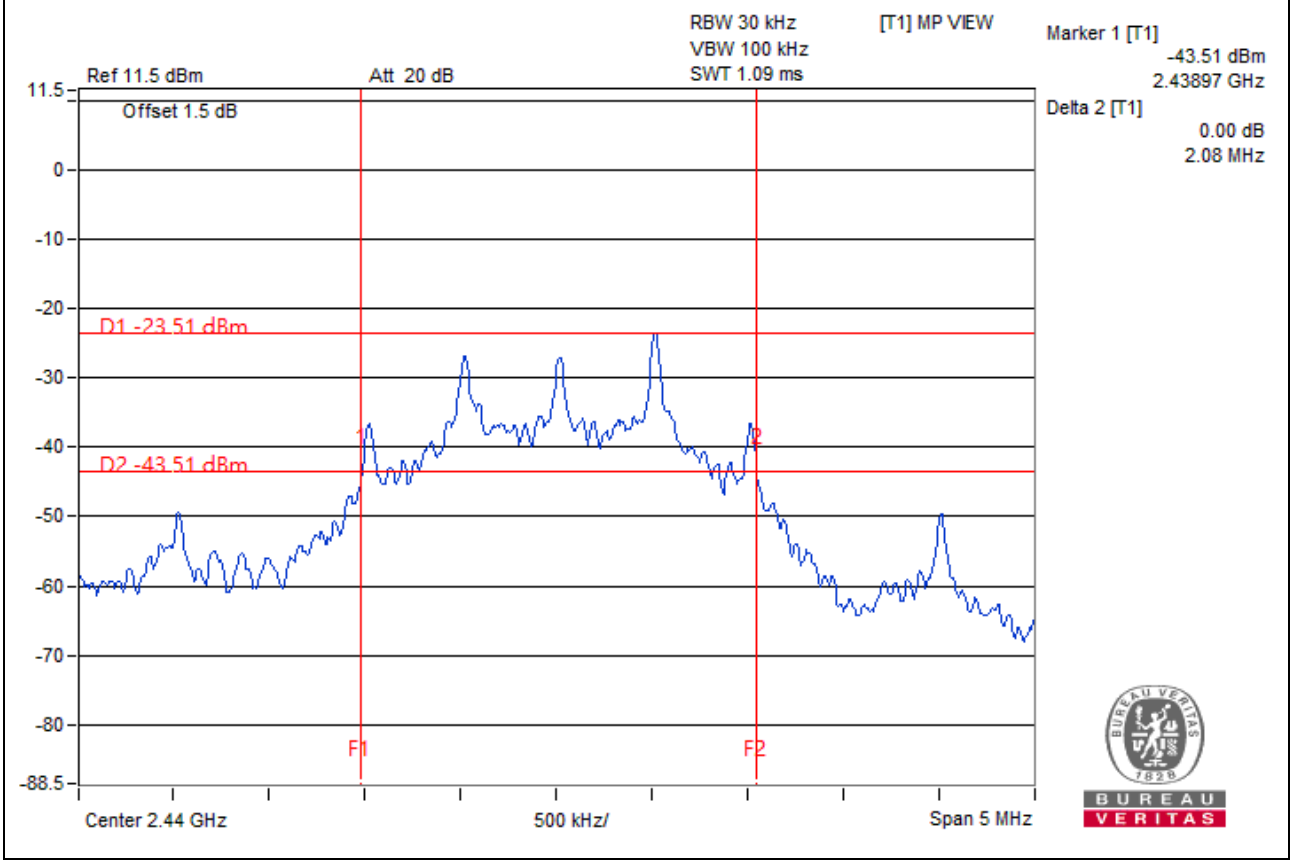
4.2.5 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.2.6 Test Results

CHANNEL	FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
1	2408	2.07
17	2440	2.08
34	2474	2.07

SPECTRUM PLOT of WORST VALUE



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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