

FCC Test Report

Report No.: RFBDBO-WTW-P20080529

FCC ID: 2AAUCGKBWOW

Test Model: GKB-WOW

Received Date: Aug. 26, 2020

Test Date: Oct. 23, 2020

Issued Date: Oct. 30, 2020

Applicant: Thermaltake Technology Co., Ltd.

Address: 5F, No. 185, Sec. 2, Tiding Blvd., 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



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by your negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specifically mentioned, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Modification Record	5
3 General Information	6
3.1 General Description of EUT	6
3.2 Description of Test Modes	7
3.2.1 Test Mode Applicability and Tested Channel Detail	8
3.3 Description of Support Units	9
3.3.1 Configuration of System under Test	9
3.4 General Description of Applied Standards	9
4 Test Types and Results	10
4.1 Radiated Emission and Bandedge Measurement	10
4.1.1 Limits of Radiated Emission and Bandedge Measurement	10
4.1.2 Test Instruments	11
4.1.3 Test Procedures	12
4.1.4 Deviation from Test Standard	12
4.1.5 Test Setup	13
4.1.6 EUT Operating Conditions	14
4.1.7 Test Results	15
4.2 Channel Bandwidth	21
4.2.1 Test Setup	21
4.2.2 Test Instruments	21
4.2.3 Test Procedure	21
4.2.4 Deviation from Test Standard	21
4.2.5 EUT Operating Condition	21
4.2.6 Test Results	22
5 Pictures of Test Arrangements	23
Appendix – Information of the Testing Laboratories	24

Release Control Record

Issue No.	Description	Date Issued
RFBDBO-WTW-P20080529	Original release.	Oct. 30, 2020

1 Certificate of Conformity

Product: W1 Wireless Gaming Keyboard

Brand: Thermaltake

Test Model: GKB-WOW

Sample Status: Engineering sample

Applicant: Thermaltake Technology Co., Ltd.

Test Date: Oct. 23, 2020

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 :


Jessica Cheng / Senior Specialist

Date: Oct. 30, 2020

Approved by :


Rex Lai / Associate Technical Manager

Date: Oct. 30, 2020

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 3.0Vdc from batteries
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 -2.12dB at 4804.00MHz.
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) ($\pm$)
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	W1 Wireless Gaming Keyboard
Brand	Thermaltake
Test Model	GKB-WOW
S/N number	GKB-WOWBLSNUS01XR000001
Test Software Version	V1.00.06
Status of EUT	Engineering sample
Power Supply Rating	3.0Vdc from batteries
Modulation Type	GFSK
Operating Frequency	2402MHz ~ 2478MHz
Number of Channel	77
Antenna Type	Chip antenna with 3.64dBi gain
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	Shielded USB type A to C cable (1.5m)

Note:

1. Bluetooth & GFSK technologies can not transmit at same time.
2. The power setting are list as below:

Modulation Mode	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
GFSK	2402	0	2440	0	2478	0

3. 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.
4. 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

77 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459		
18	2420	38	2440	58	2460		
19	2421	39	2441	59	2461		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	Note	√	-

Where **RE $\geq$ 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 batteries

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
-	0 to 76	0, 38, 76	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
-	0 to 76	0	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
-	0 to 76	0, 38, 76	GFSK

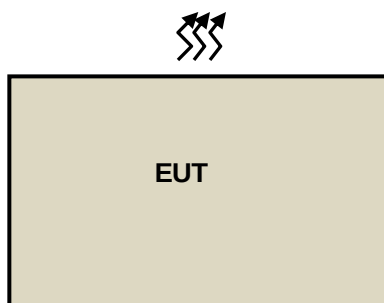
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE $\geq$ 1G	21deg. C, 74%RH	3Vdc	Dalen Dai
RE<1G	21deg. C, 74%RH	3Vdc	Dalen Dai
APCM	25deg. C, 76%RH	3Vdc	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 batteries)

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	$2400/F(\text{kHz})$	300
0.490 ~ 1.705	$24000/F(\text{kHz})$	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. 7, 2019	Nov. 6, 2020
Schwarzbeck Antenna	VHBA 9123	480	Jun. 3, 2019	Jun. 2, 2021
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 24, 2019	Nov. 23, 2020
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Nov. 24, 2019	Nov. 23, 2020
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. 24, 2019	Nov. 23, 2020
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

- 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:

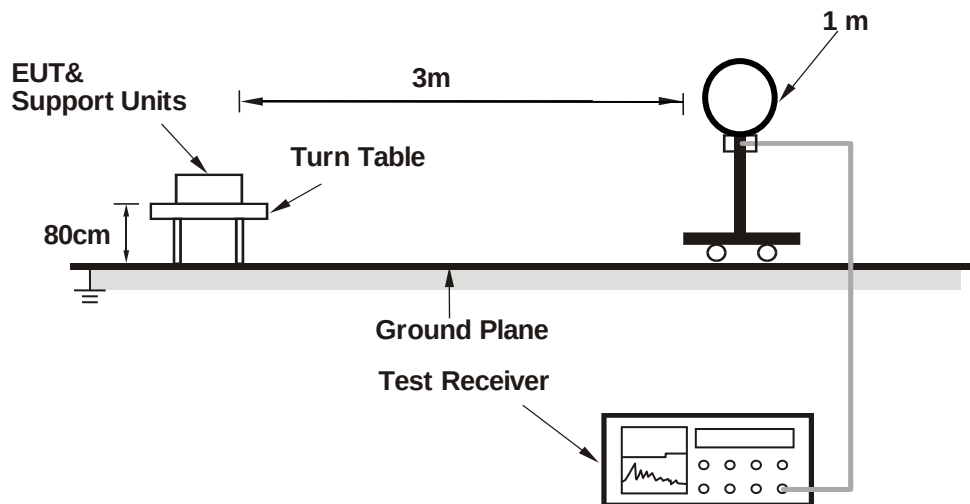
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) 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

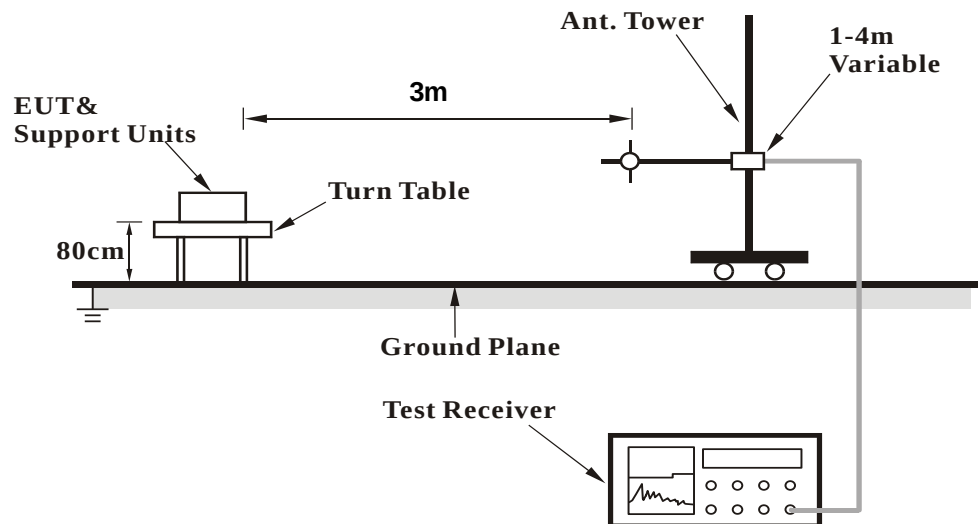
No deviation.

4.1.5 Test Setup

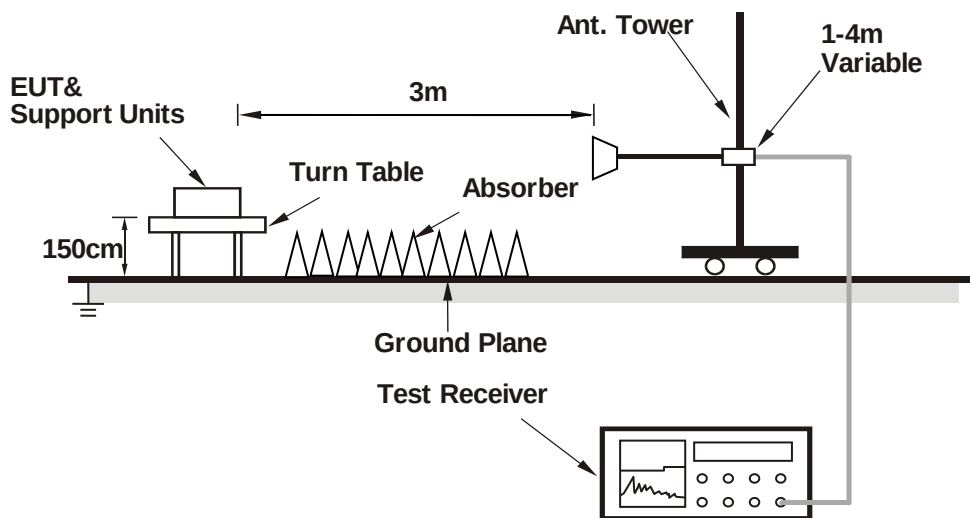
For Radiated emission below 30MHz



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 0 : 2402 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	56.26 PK	74.00	-17.74	1.03 H	0	54.94	1.32
2	2390.00	39.90 AV	54.00	-14.10	1.03 H	0	38.58	1.32
3	2400.00	58.08 PK	74.00	-15.92	1.03 H	0	56.71	1.37
4	2400.00	45.58 AV	54.00	-8.42	1.03 H	0	44.21	1.37
5	*2402.00	92.23 PK	114.00	-21.77	1.03 H	0	90.85	1.38
6	*2402.00	86.13 AV	94.00	-7.87	1.03 H	0	84.75	1.38
7	4804.00	57.98 PK	74.00	-16.02	3.03 H	88	48.81	9.17
8	4804.00	51.88 AV	54.00	-2.12	3.03 H	88	42.71	9.17

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	52.34 PK	74.00	-21.66	1.15 V	256	51.02	1.32
2	2390.00	37.37 AV	54.00	-16.63	1.15 V	256	36.05	1.32
3	2400.00	48.20 PK	74.00	-25.80	1.15 V	256	46.83	1.37
4	2400.00	34.71 AV	54.00	-19.29	1.15 V	256	33.34	1.37
5	*2402.00	86.25 PK	114.00	-27.75	1.15 V	256	84.87	1.38
6	*2402.00	80.15 AV	94.00	-13.85	1.15 V	256	78.77	1.38
7	4804.00	57.75 PK	74.00	-16.25	1.02 V	131	48.58	9.17
8	4804.00	51.65 AV	54.00	-2.35	1.02 V	131	42.48	9.17

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:

$$20 \log(\text{Duty cycle}) = 20 \log(0.455 \text{ ms} / 0.92 \text{ ms}) = -6.1 \text{ dB}$$
Please see page 18 for plotted duty.

RF Mode	TX GFSK	Channel	CH 38 : 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	92.17 PK	114.00	-21.83	1.05 H	4	90.70	1.47
2	*2440.00	86.07 AV	94.00	-7.93	1.05 H	4	84.60	1.47
3	4880.00	57.69 PK	74.00	-16.31	2.97 H	85	48.44	9.25
4	4880.00	51.59 AV	54.00	-2.41	2.97 H	85	42.34	9.25
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	85.93 PK	114.00	-28.07	1.18 V	254	84.46	1.47
2	*2440.00	79.83 AV	94.00	-14.17	1.18 V	254	78.36	1.47
3	4880.00	57.62 PK	74.00	-16.38	1.00 V	134	48.37	9.25
4	4880.00	51.52 AV	54.00	-2.48	1.00 V	134	42.27	9.25

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:

$$20 \log(\text{Duty cycle}) = 20 \log(0.455 \text{ ms} / 0.92 \text{ ms}) = -6.1 \text{ dB}$$
 Please see page 18 for plotted duty.

RF Mode	TX GFSK	Channel	CH 76 : 2478 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

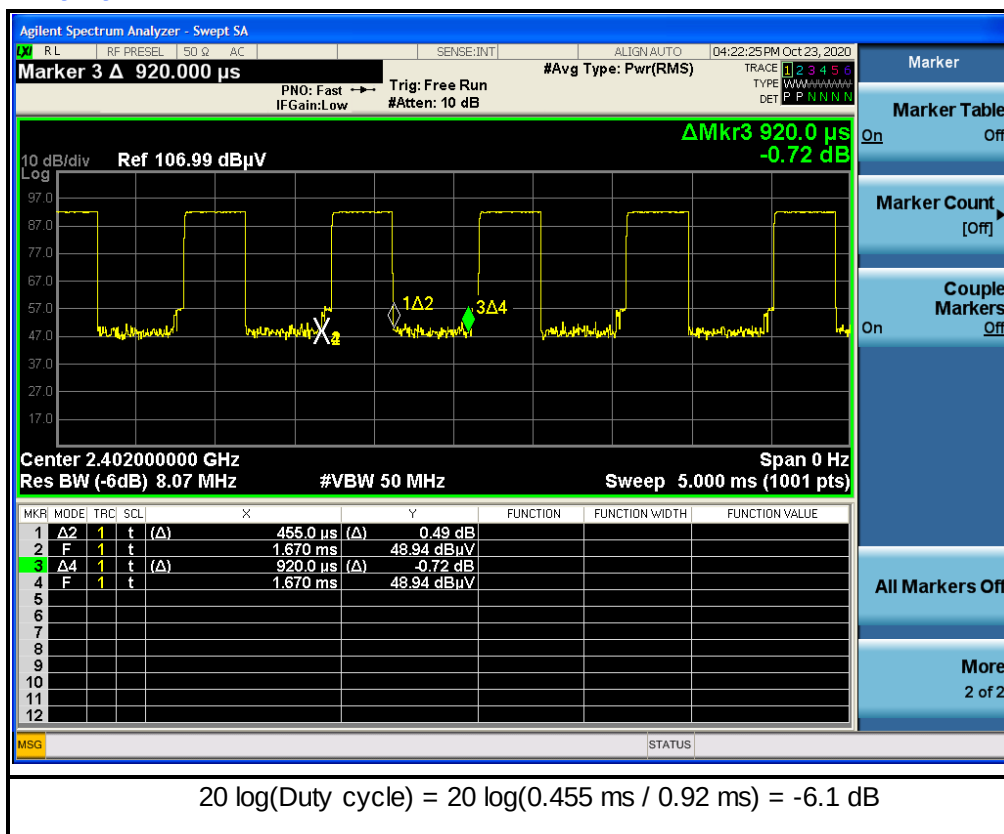
Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2478.00	90.03 PK	114.00	-23.97	1.30 H	1	88.36	1.67
2	*2478.00	83.93 AV	94.00	-10.07	1.30 H	1	82.26	1.67
3	2483.50	56.19 PK	74.00	-17.81	1.30 H	1	54.48	1.71
4	2483.50	42.47 AV	54.00	-11.53	1.30 H	1	40.76	1.71
5	4956.00	56.62 PK	74.00	-17.38	3.39 H	105	47.40	9.22
6	4956.00	50.51 AV	54.00	-3.49	3.39 H	105	41.29	9.22
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	*2478.00	84.16 PK	114.00	-29.84	1.21 V	259	82.49	1.67
2	*2478.00	78.06 AV	94.00	-15.94	1.21 V	259	76.39	1.67
3	2483.50	48.19 PK	74.00	-25.81	1.21 V	259	46.48	1.71
4	2483.50	34.92 AV	54.00	-19.08	1.21 V	259	33.21	1.71
5	4956.00	56.33 PK	74.00	-17.67	1.10 V	129	47.11	9.22
6	4956.00	50.23 AV	54.00	-3.77	1.10 V	129	41.01	9.22

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:

$$20 \log(\text{Duty cycle}) = 20 \log(0.455 \text{ ms} / 0.92 \text{ ms}) = -6.1 \text{ dB}$$
Please see page 18 for plotted duty.

Duty Cycle



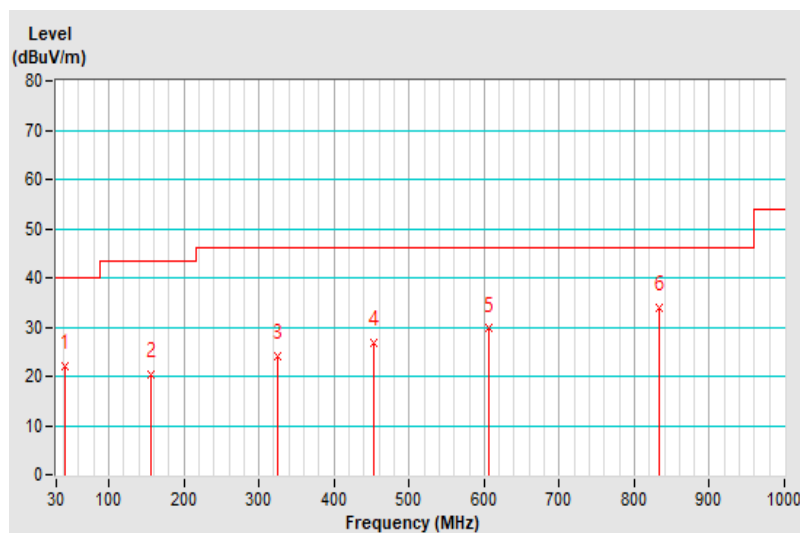
BELOW 1GHz WORST-CASE DATA

RF Mode	TX	Channel	CH 0 : 2402 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	41.16	21.96 QP	40.00	-18.04	1.85 H	197	29.38	-7.42
2	156.54	20.48 QP	43.50	-23.02	1.23 H	360	26.79	-6.31
3	324.69	24.11 QP	46.00	-21.89	1.45 H	276	27.49	-3.38
4	452.34	26.87 QP	46.00	-19.13	1.96 H	69	27.56	-0.69
5	606.33	29.71 QP	46.00	-16.29	1.74 H	32	27.28	2.43
6	833.94	34.06 QP	46.00	-11.94	1.61 H	66	27.55	6.51

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.

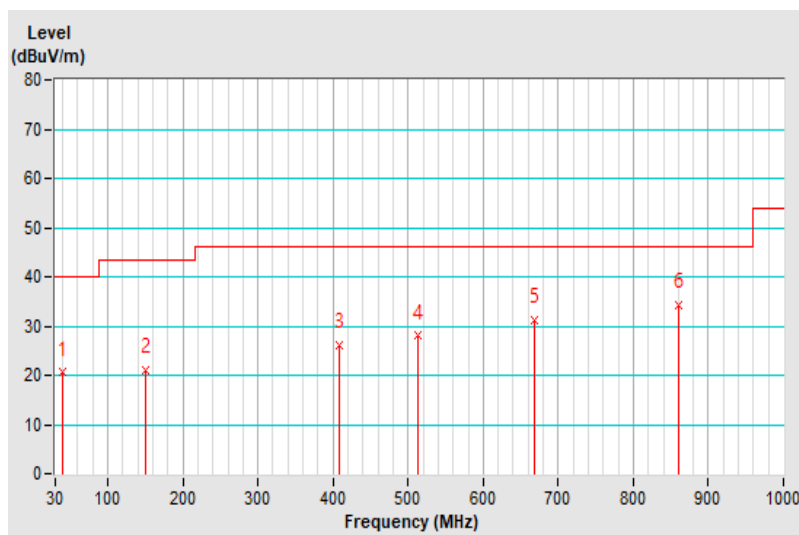


RF Mode	TX	Channel	CH 0 : 2402 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	40.33	20.56 QP	40.00	-19.44	1.69 V	32	28.04	-7.48
2	149.36	21.14 QP	43.50	-22.36	1.38 V	156	27.67	-6.53
3	407.57	26.05 QP	46.00	-19.95	1.62 V	304	28.14	-2.09
4	512.72	27.97 QP	46.00	-18.03	1.70 V	223	27.73	0.24
5	668.36	31.25 QP	46.00	-14.75	2.17 V	304	27.81	3.44
6	859.50	34.34 QP	46.00	-11.66	1.35 V	117	27.58	6.76

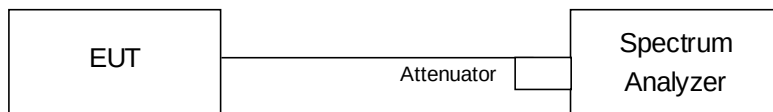
Remarks:

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

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.

4.2.4 Deviation from Test Standard

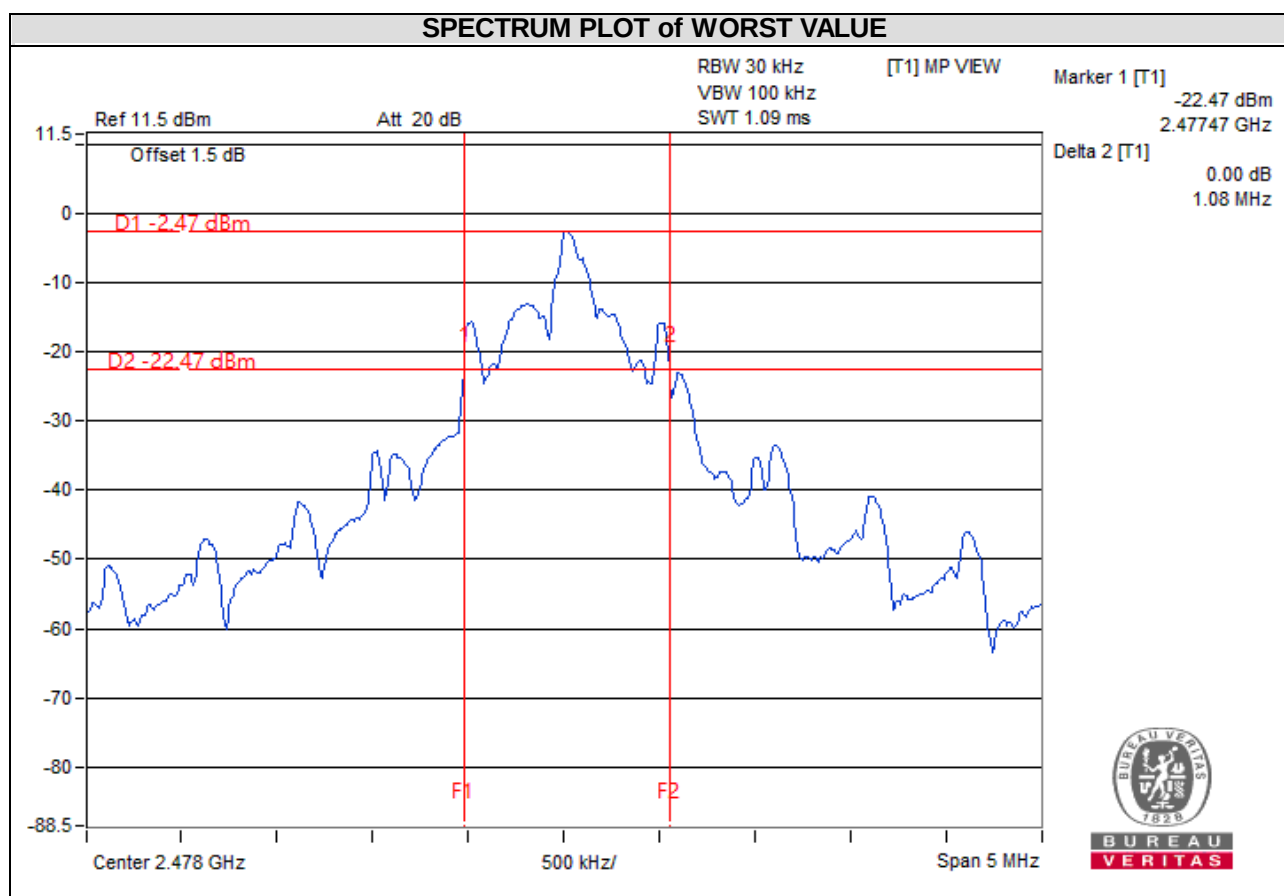
No deviation.

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)
0	2402	1.07
38	2440	1.07
76	2478	1.08



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:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---