FCC Test Report

(Co-Located)

Report No.: RFBEMI-WTW-P21080520-4

FCC ID: NOIKBN778K

Test Model: N778K

Received Date: 2021/8/11

Test Date: 2021/11/9

Issued Date: 2021/11/18

Applicant: NETRONIX, INC.

Address: No 945, Boai St, Jubei City. Hsinchu, 30265 Taiwan

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories

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FCC Registration / Designation Number: 198487 / TW2021

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Release Control Record

Issue No.	Description	Date Issued
RFBEMI-WTW-P21080520-4	Original release	

1 Certificate of Conformity

Product: Electronic Display Device

Brand: Rakuten kobo

Test Model: N778K

Sample Status: Engineering sample

Applicant: NETRONIX, INC.

Test Date: 2021/11/9

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.247)
47 CFR FCC Part 15, Subpart E (Section 15.407)
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 , **Date:** 2021/11/18

Jessica Cheng / Senior Specialist

Approved by : Jeremy Lin , **Date:** 2021/11/18

Jeremy Lin / Project Engineer

2 Summary of Test Results

Applied Standard	47 CFR FCC Part 15, Subpart C (Section 15.247) 47 CFR FCC Part 15, Subpart E (Section 15.407)		
FCC Clause	Test Item	Result	Remarks
15.205 / 15.209 / 15.247(d)/ 15.407(b) (1/2/3/4(i/ii)/9)	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -2.25dB at 2483.500MHz.

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) (±)
Radiated Emissions above 1 GHz	Above 1GHz	5.21 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Electronic Display Device	
Brand	Rakuten kobo	
Test Model	N778K	
Status of EUT	Engineering sample	
Power Supply Rating	3.7Vdc from Battery or 5Vdc from USB interface	
Modulation Type	**2.4GHz WLAN**	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	5GHz WLAN	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
	BTEDR	GFSK, π/4-DQPSK, 8DPSK
	BTLE	GFSK
Modulation Technology	**2.4GHz WLAN**	DSSS, OFDM
	5GHz WLAN	OFDM
	BTEDR	FHSS
Transfer Rate	**2.4GHz WLAN**	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 72.2Mbps
	5GHz WLAN	802.11a: up to 54Mbps 802.11n up to 150Mbps 802.11ac: up to 433.3Mbps
	BTEDR	Up to 3Mbps
	BTLE	Up to 1Mbps
Operating Frequency	**2.4GHz WLAN**	2412MHz ~ 2462MHz
	5GHz WLAN	5180 ~ 5240MHz, 5745 ~ 5825MHz
	BTEDR	2402MHz ~ 2480MHz
	BTLE	2402MHz ~ 2480MHz
Number of Channel	**2.4GHz WLAN**	802.11b/ 802.11g/802.11n (HT20): 11
	5GHz WLAN	**5180 ~ 5240MHz** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 **5745 ~ 5825MHz** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 11ac (VHT40): 2 802.11ac (VHT80): 1
	BTEDR	79
	BTLE	40
Output Power	**2.4GHz WLAN**	158.855mW
	5GHz WLAN	**5180 ~ 5240MHz:** 12.303mW **5745 ~ 5825MHz:** 4.266mW
	BTEDR	2.999mW
	BTLE	2.958mW

Antenna Type	Refer to note as below
Antenna Connector	Refer to note as below
Accessory Device	N/A
Cable Supplied	Shielded USB cable (1.0m)

Note:

1. There are WLAN and Bluetooth technologies used for the EUT.
2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	Bluetooth
2	WLAN (5GHz)	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliances was found		

3. Two eMMCs provided to the EUT, please refer to the following table:

No.	Model	Remark
1	EMMC32G-TX29-GA8A	1st source eMMC
2	MKEMF032GZ1E-C	2nd source eMMC
Note: From the above eMMCs the worst case was found in **No. 1.** Therefore only the test data of the mode was recorded in this report.		

4. The following antennas were provided to the EUT.

Brand	Model	Gain (dBi)	Frequency range	Antenna Type	Antenna Connector
INPAQ	ACM3-3216-P1-CC-S	0.6	2.4~2.4835GHz	Chip	None
INPAQ	ACM3-3216-P1-CC-S	2	5.15~5.85GHz	Chip	None

5. 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.
6. The EUT incorporates a SISO function.

2.4GHz Band		
Modulation Mode	TX & RX Configuration	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
5GHz Band		
Modulation Mode	TX & RX Configuration	
802.11a	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX
802.11ac (VHT20)	1TX	1RX
802.11ac (VHT40)	1TX	1RX
802.11ac (VHT80)	1TX	1RX

7. 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

WLAN 2.4G:

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

WLAN 5G:

For 5180 ~ 5240MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

For 5745~5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

BT EDR:

79 channels are provided for BT-EDR mode:

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	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

BT LE:

40 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To		Description
	RE≥1G	OB	
-	√	√	USB Adapter mode with Leather Sheath

Where **RE≥1G:** Radiated Emission above 1GHz **OB:** Conducted Out-Band Emission Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

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	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
A	802.11g +BT LE	2412 ~ 2462	1 to 11	6 + 0	OFDM
		2402 ~ 2480	0 to 39		GFSK
B	802.11ac (VHT40) +BT LE	5180 ~ 5240 5745 ~ 5825	38 to 46 151 to 159	46 + 0	OFDM
		2402 ~ 2480	0 to 39		GFSK

Conducted Out-Band Emission Measurement:

☒ 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	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
A	802.11g +BT LE	2412 ~ 2462	1 to 11	6 + 0	OFDM
		2402 ~ 2480	0 to 39		GFSK
B	802.11ac (VHT40) +BT LE	5180 ~ 5240 5745 ~ 5825	38 to 46 151 to 159	46 + 0	OFDM
		2402 ~ 2480	0 to 39		GFSK

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	25deg. C, 70%RH	120Vac, 60Hz (Adapter)	Jed Wu
OB	25deg. C, 70%RH	120Vac, 60Hz (Adapter)	Pirar Hsieh

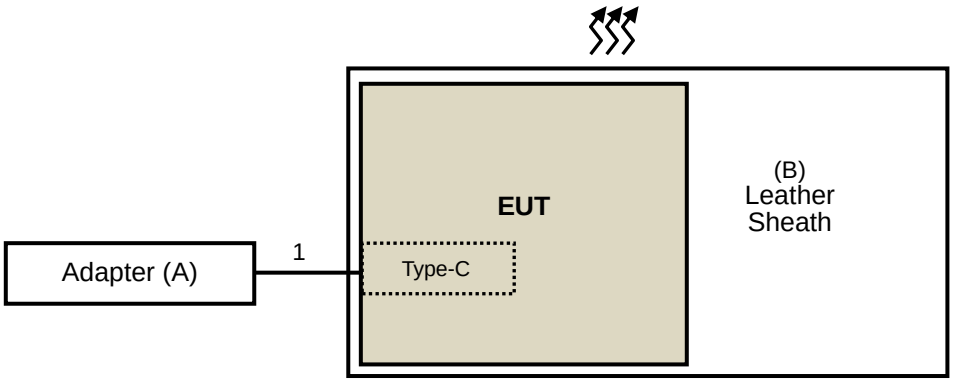
3.3 Description of Support Units

The ET has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Adapter	Apple	A1385	N/A	N/A	Provided by Lab
B.	Leather Sheath	Rakuten kobo	N/A	N/A	N/A	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Type-C cable	1	1	Y	0	Supplied by applicant

3.3.1 Configuration of System under Test



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 and references:

Test Standard:
FCC Part 15, Subpart C (15.247)
FCC Part 15, Subpart E (15.407)
ANSI C63.10-2013

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

References Test Guidance:

KDB 558074 D01 Meas Guidance v05r02
KDB 789033 D02 General UNII Test Procedures New Rules v02r01
All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK: 74 (dBµV/m)	AV: 54 (dBµV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2(dBµV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i)	PK: -27 (dBm/MHz) *1 PK: 10 (dBm/MHz) *2 PK: 15.6 (dBm/MHz) *3 PK: 27 (dBm/MHz) *4	PK: 68.2(dBµV/m) *1 PK: 105.2 (dBµV/m) *2 PK: 110.8(dBµV/m) *3 PK: 122.2 (dBµV/m) *4

*1 beyond 75 MHz or more above of the band edge.

*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ µV/m, where P is the eirp (Watts).

4.1.2 Test Instruments

Description & Manufacturer	Model no.	Serial No.	Calibrated Date	Calibrated Until
Test Receiver Agilent	N9038A	MY51210129	2021/3/12	2022/3/11
Software BVADT	ADT_Radiated_V8.7.08	NA	NA	NA
Software BVADT	ADT_RF Test Software V6.6.5.4	NA	NA	NA
Auto Control System(Antenna Tower, Table, Controller) ADT	SC100+AT100+TT100	0306	NA	NA
Pre_Amplifier EMCI	EMC001340	980269	2021/6/29	2022/6/28
LOOP ANTENNA EMCI	LPA600	270	2021/9/2	2023/9/1
RF Coaxial Cable Pacific	8D-FB	Cable-CH6-02	2021/7/13	2022/7/12
Pre_Amplifier HP	8447D	2432A03504	2021/2/18	2022/2/17
Bi-log Broadband Antenna Schwarzbeck	VULB9168	139	2021/11/1	2022/10/31
Attenuator Mini-Circuits	UNAT-5+	PAD-CH6-01	2021/7/13	2022/7/12
RF Coaxial Cable Pacific	8D-FB	Cable-CH6-02	2021/7/13	2022/7/12
Antenna(Horn) EMCO	3115	00028257	2020/11/22	2021/11/21
Test Receiver Agilent	N9038A	MY51210129	2021/3/12	2022/3/11
Pre-amplifier HP	8449B	3008A01201	2021/2/19	2022/2/18
RF Coaxial Cable NEAT BAR PROER SUHNER	SF-102	Cable-CH6-01	2021/7/8	2022/7/7
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	2021/5/28	2022/5/27
Fix tool for Boresight	BAF-01	5	NA	NA
Pre_Amplifier MITEQ	AMF-6F-260400-33-8P	892164	2021/2/19	2022/2/18
Antenna(Horn) Schwarzbeck	BBHA-9170	BBHA9170190	2020/11/22	2021/11/21
Spectrum Analyzer R&S	FSV40	101544	2021/5/24	2022/5/23
RF Coaxial Cable WOKEN	WC01	Cable-CH10-03	2021/7/8	2022/7/7
RF Coaxial Cable Rosnol	K1K50-UP0279-K1K50-3000	Cable-CH10(3m)-04	2021/7/8	2022/7/7
Highpass filter SUHNER	11SH10-7000/T18000-O/OP	SN 4	2021/5/28	2022/5/27

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 LK - 966 chamber 1.
4. Tested Date: 2021/11/9

4.1.3 Test Procedure

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:

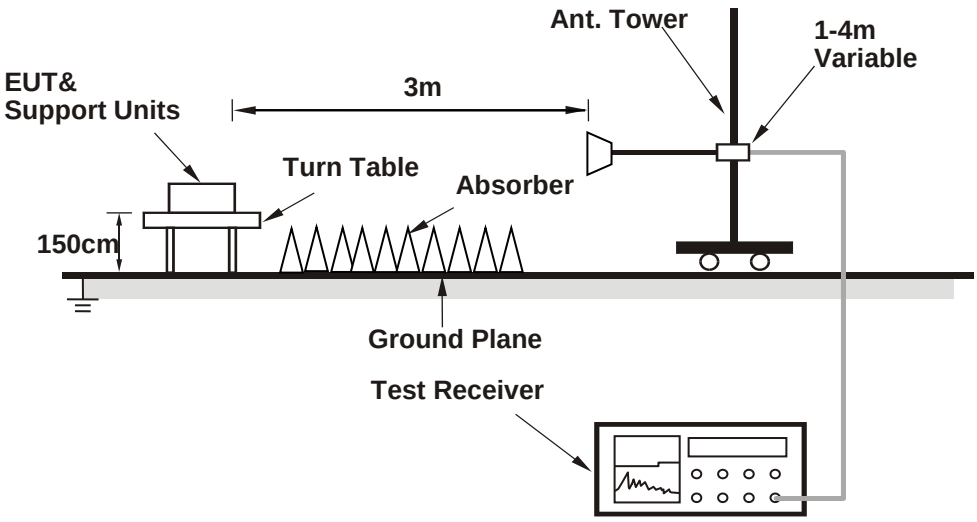
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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. (**802.11g):** RBW = 1MHz, VBW = 510Hz; **802.11ac (VHT40):** RBW = 1MHz, VBW = 1.1kHz)
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 above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT to Adapter.

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

4.1.7 Test Results (Mode A)

Frequency Range	1GHz ~ 40GHz	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	62.98 PK	74.00	-11.02	1.23 H	260	65.26	-2.28
2	2390.00	51.43 AV	54.00	-2.57	1.23 H	260	53.71	-2.28
3	*2402.00	109.65 PK			1.80 H	206	111.87	-2.22
4	*2402.00	79.35 AV			1.80 H	206	81.57	-2.22
5	*2437.00	115.17 PK			1.23 H	260	117.32	-2.15
6	*2437.00	107.70 AV			1.23 H	260	109.85	-2.15
7	2483.50	65.34 PK	74.00	-8.66	1.23 H	260	67.28	-1.94
8	**2483.50**	**51.75 AV**	**54.00**	**-2.25**	**1.23 H**	**260**	**53.69**	**-1.94**
9	4804.00	48.67 PK	74.00	-25.33	1.39 H	334	43.01	5.66
10	4804.00	18.37 AV	54.00	-35.63	1.39 H	334	12.71	5.66
11	4874.00	53.83 PK	74.00	-20.17	3.08 H	295	48.14	5.69
12	4874.00	44.55 AV	54.00	-9.45	3.08 H	295	38.86	5.69
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	62.03 PK	74.00	-11.97	2.93 V	132	64.31	-2.28
2	2390.00	51.47 AV	54.00	-2.53	2.93 V	132	53.75	-2.28
3	*2402.00	108.12 PK	74.00	34.12	3.68 V	16	110.34	-2.22
4	*2402.00	77.82 AV	54.00	23.82	3.68 V	16	80.04	-2.22
5	*2437.00	113.05 PK			2.93 V	132	115.20	-2.15
6	*2437.00	105.81 AV			2.93 V	132	107.96	-2.15
7	2483.50	63.53 PK	74.00	-10.47	2.93 V	132	65.47	-1.94
8	2483.50	49.92 AV	54.00	-4.08	2.93 V	132	51.86	-1.94
9	4804.00	48.41 PK	74.00	-25.59	2.30 V	52	42.75	5.66
10	4804.00	18.11 AV	54.00	-35.89	2.30 V	52	12.45	5.66
11	4874.00	47.81 PK	74.00	-26.19	1.76 V	41	42.12	5.69
12	4874.00	35.66 AV	54.00	-18.34	1.76 V	41	29.97	5.69

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.

4.1.8 Test Results (Mode B)

Frequency Range	1GHz ~ 40GHz	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	51.46 PK	68.20	-16.74	1.80 H	206	53.74	-2.28
2	2390.00	41.53 AV	54.00	-12.47	1.80 H	206	43.81	-2.28
3	*2402.00	109.41 PK			1.80 H	206	111.63	-2.22
4	*2402.00	79.11 AV			1.80 H	206	81.33	-2.22
5	4804.00	48.50 PK	74.00	-25.50	1.39 H	334	42.84	5.66
6	4804.00	18.20 AV	54.00	-35.80	1.39 H	334	12.54	5.66
7	5150.00	66.55 PK	74.00	-7.45	2.22 H	221	59.74	6.81
8	5150.00	51.73 AV	54.00	-2.27	2.22 H	221	44.92	6.81
9	*5230.00	110.15 PK			2.22 H	221	102.85	7.30
10	*5230.00	102.38 AV			2.22 H	221	95.08	7.30
11	5350.00	59.95 PK	74.00	-14.05	2.22 H	221	52.11	7.84
12	5350.00	48.71 AV	54.00	-5.29	2.22 H	221	40.87	7.84
13	#10460.00	52.87 PK	68.20	-15.33	1.81 H	234	37.94	14.93
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	51.51 PK	68.20	-16.69	3.68 V	16	53.79	-2.28
2	2390.00	40.55 AV	54.00	-13.45	3.68 V	16	42.83	-2.28
3	*2402.00	108.18 PK			3.68 V	16	110.40	-2.22
4	*2402.00	77.88 AV			3.68 V	16	80.10	-2.22
5	4804.00	48.61 PK	74.00	-25.39	2.30 V	52	42.95	5.66
6	4804.00	18.31 AV	54.00	-35.69	2.30 V	52	12.65	5.66
7	5150.00	63.43 PK	74.00	-10.57	1.11 V	156	56.62	6.81
8	5150.00	49.83 AV	54.00	-4.17	1.11 V	156	43.02	6.81
9	*5230.00	108.18 PK			1.11 V	156	100.88	7.30
10	*5230.00	99.92 AV			1.11 V	156	92.62	7.30
11	5350.00	60.46 PK	74.00	-13.54	1.11 V	156	52.62	7.84
12	5350.00	48.38 AV	54.00	-5.62	1.11 V	156	40.54	7.84
13	#10460.00	52.05 PK	68.20	-16.15	1.58 V	204	37.12	14.93

Remarks:

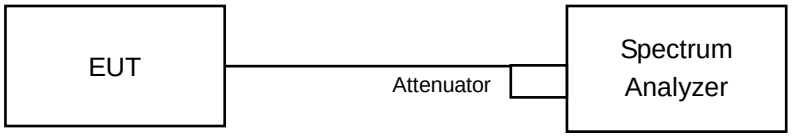
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

4.2 Conducted Out of Band Emission Measurement

4.2.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

MEASUREMENT PROCEDURE REF

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep time = auto couple.
e. Trace mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Condition

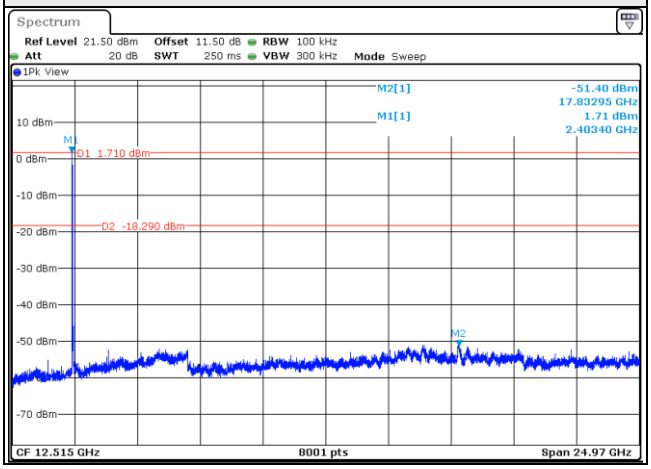
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.2.7 Test Results

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

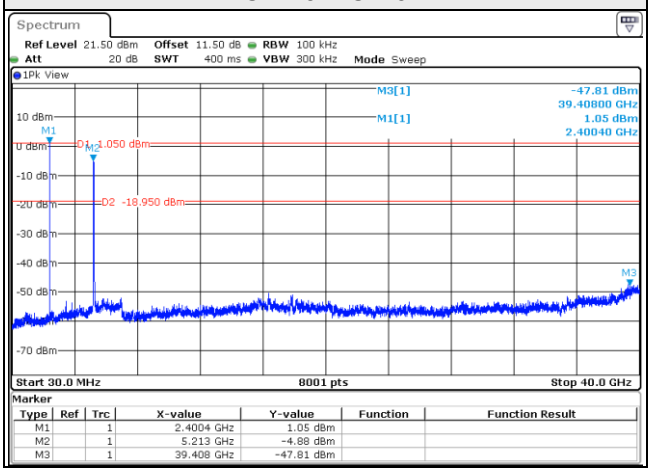
Mode A-802.11g +BT LE

CH 6 + CH 0



Mode B-802.11ac (VHT40) +BT LE

CH 46 + CH 0



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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Web Site: www.bureauveritas-adt.com

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

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