

FCC Test Report (Co-Located)

Report No.: RFBCUG-WTW-P22010682B-7

FCC ID: B32UX7002

Model No.: UX700-WBU-2

Received Date: 2022/11/11

Test Date: 2022/12/13

Issued Date: 2023/1/13

Applicant: Verifone, Inc.

Address: 1400 West Stanford Ranch Road Suite 150 Rocklin CA 95765 USA

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

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33383, TAIWAN

**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBCUG-WTW-P22010682B-7	Original release	2023/1/13

1 Certificate of Conformity

Product: Point of Sale Terminal

Brand: Verifone

Test Model: UX700-WBU-2

Sample Status: Engineering sample

Applicant: Verifone, Inc.

Test Date: 2022/12/13

Standards: 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 : Celine Chou , **Date:** 2023/1/13
Celine Chou / Senior Specialist

Approved by : Jeremy Lin , **Date:** 2023/1/13
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)/ 5/6/9)	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -6.10dB at 2390.00MHz.

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)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.99 dB
	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Point of Sale Terminal	
Brand	Verifone	
Model No.	UX700-WBU-2	
Status of EUT	Engineering sample	
Power Supply Rating	9-43Vdc, 2.4A-0.5A	
Modulation Type	WLAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	BT EDR	GFSK, $\pi/4$ -DQPSK, 8DPSK
	BT LE	GFSK
Transfer Rate	WLAN	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps 802.11a: 54/48/36/24/18/12/9/6 Mbps 802.11n: up to 72.2 Mbps (For 2.4GHz Band) 802.11n: up to 150 Mbps (For 5GHz Band) 802.11ac: up to 433.3 Mbps
	BT EDR	1/2/3Mbps
	BT LE	1Mbps
Operating Frequency	WLAN	2.4GHz: 2412 ~ 2462 MHz 5.0GHz: 5180 ~ 5320 MHz, 5500 ~ 5720 MHz, 5745 ~ 5825 MHz
	BT EDR	2402 ~ 2480 MHz
	BT LE	2402 ~ 2480 MHz
Number of Channel	WLAN	2412 ~ 2462 MHz: 802.11b, 802.11g, 802.11n (HT20): 11 5180 ~ 5240 MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5260 ~ 5320 MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5500 ~ 5720 MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 12 802.11n (HT40), 802.11ac (VHT40): 6 802.11ac (VHT80): 3 5745 ~ 5825 MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
	BT EDR	79
	BT LE	40

Output Power	WLAN	2412 ~ 2462 MHz: 191.426 mW (22.82 dBm) 5180 ~ 5240 MHz: 45.186 mW (16.55 dBm) 5260 ~ 5320 MHz: 44.771 mW (16.51 dBm) 5500 ~ 5720 MHz: 42.767 mW (16.31 dBm) 5745 ~ 5825 MHz: 30.549 mW (14.85 dBm)
	BT EDR	12.531 mW (10.98 dBm)
	BT LE	1.531 mW (1.85 dBm)
Antenna Type	WLAN	2.4GHz: Dipole antenna with 2.60dBi gain 5GHz: Dipole antenna with 3.60dBi gain
	BT EDR	Dipole antenna with 2.60dBi gain
	BT LE	Dipole antenna with 2.60dBi gain
Antenna Connector	ipex(MHF)	
Accessory Device	Refer to external photo	
Cable Supplied	Refer to external photo	

Note:

1. The EUT provides 1 completed transmitter and 1 receiver.

2.4 GHz Band		
Modulation Mode	Tx & Rx Configuration	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
5 GHz 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

2. The accessory devices of EUT, please refer to external photo.
3. 2.4GHz & BT or 5GHz & BT technology can transmit at same time.
4. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.
5. 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

For 2412 ~ 2462MHz:

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		

For 5180 ~ 5320MHz:

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

Channel	Frequency	Channel	Frequency
36	5180 MHz	52	5260 MHz
40	5200 MHz	56	5280 MHz
44	5220 MHz	60	5300 MHz
48	5240 MHz	64	5320 MHz

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	54	5270 MHz
46	5230 MHz	62	5310 MHz

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz

For 5500 ~ 5720MHz:

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

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

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

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	138	5690 MHz
122	5610 MHz		

For 5745 ~ 5825MHz:

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

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to			Description
	RE \geq 1G	RE<1G	OB	
-	√	√	√	-

Where RE \geq 1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz
 OB: Conducted Out-Band Emission Measurement

Radiated Emission Test (Above 1 GHz):

- 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
-	802.11b + BT EDR	2412-2462	1 to 11	6 + 0	DSSS
		2402-2480	0 to 78		GFSK
-	802.11a + BT EDR	5180-5240	36 to 48	40 + 0	OFDM
		2402-2480	0 to 78		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	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11b + BT EDR	2412-2462	1 to 11	6 + 0	DSSS
		2402-2480	0 to 78		GFSK
-	802.11a + BT EDR	5180-5240	36 to 48	40 + 0	OFDM
		2402-2480	0 to 78		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
-	802.11b + BT EDR	2412-2462	1 to 11	6 + 0	DSSS
		2402-2480	0 to 78		GFSK
-	802.11a + BT EDR	5180-5240	36 to 48	40 + 0	OFDM
		2402-2480	0 to 78		GFSK

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE \geq 1G	23 deg. C, 66% RH	120Vac, 60Hz	Luis Lee
RE $<$ 1G	23 deg. C, 66% RH	120Vac, 60Hz	Luis Lee
OB	23 deg. C, 66% RH	120Vac, 60Hz	Luis Lee

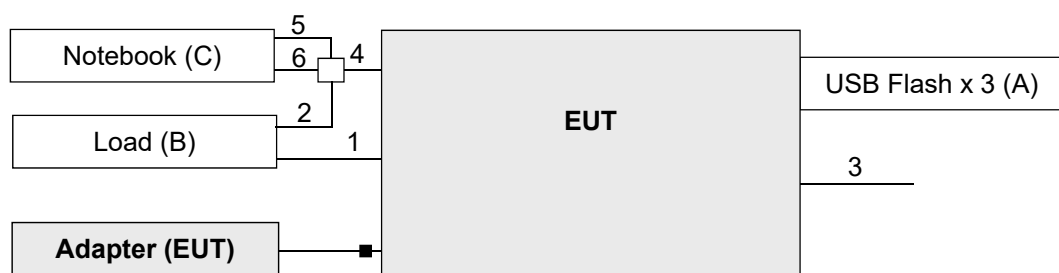
3.3 Description of Support Units

The EUT 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	USB Flash x 3	SanDisk	SDDDC3-032G	N/A	N/A	Provided by Lab
B	Load	N/A	N/A	N/A	N/A	Provided by Lab
C	Notebook	DELL	E5430	2RL3YW1	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	LAN Cable	3	1.5	N	0	RJ45, Cat5e
2	LAN Cable	1	1.5	N	0	RJ45, Cat5e
3	USB Cable	1	1.2	Y	0	-
4	RS-232 Cable	1	0.2	N	0	Provided by client
5	USB Cable	1	1.2	Y	0	-
6	RS-232 Cable	1	1.0	N	0	-

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

KDB 987594 D02 EMC Measurement v01r01

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	<input checked="" type="checkbox"/> 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}
	<input type="checkbox"/> 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*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:

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

4.1.2 Test Instruments

Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Bi_Log Antenna Schwarbeck	VULB9168	9168-155	2022/10/21	2023/10/20
Loop Antenna EMCI	EM-6879	269	2022/9/19	2023/9/18
Loop Antenna TESEQ	HLA 6121	45745	2022/7/27	2023/7/26
Pre-amplifier EMCI	EMC001340	980201	2022/9/23	2023/9/22
Pre_Amplifier Agilent	8447D	2944A10631	2022/5/14	2023/5/13
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	2022/1/15	2023/1/14
RF Coaxial Cable WOKEN	8D-FB	Cable-CH4-01	2022/7/9	2023/7/8
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Spectrum Analyzer R&S	FSW43	101582	2022/4/13	2023/4/12
Test Receiver R&S	ESCI	100424	2021/12/30	2022/12/29
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2022/12/13

Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	5	N/A	N/A
Horn Antenna Schwarzbeck	9120D	9120D-408	2022/11/13	2023/11/12
	BBHA 9170	9170-480	2022/11/13	2023/11/12
Pre-Amplifier EMCI	EMC 184045	980116	2022/10/1	2023/9/30
Pre_Amplifier KEYSIGHT	83017A	MY53270295	2022/5/14	2023/5/13
RF cable HUBER+SUHNER	Sucoflex 104	MY 13380+295012/04	2022/5/14	2023/5/13
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2022/7/9	2023/7/8
	EMC102-KM-KM-3000	150929	2022/7/9	2023/7/8
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03(250724)	2022/5/14	2023/5/13
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Spectrum Analyzer R&S	FSW43	101582	2022/4/13	2023/4/12
Test Receiver R&S	ESCI	100424	2021/12/30	2022/12/29
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2022/12/13

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:

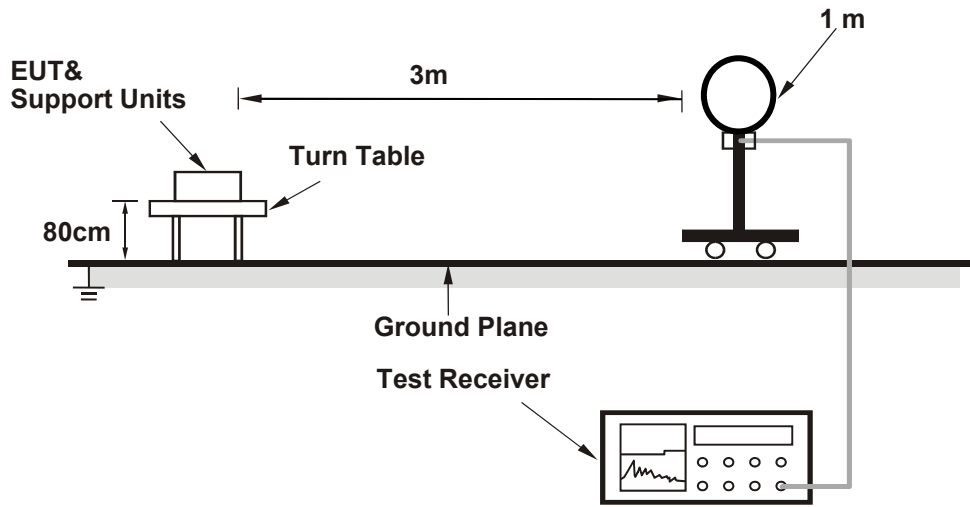
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
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. (RBW = 1MHz, VBW = 1kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

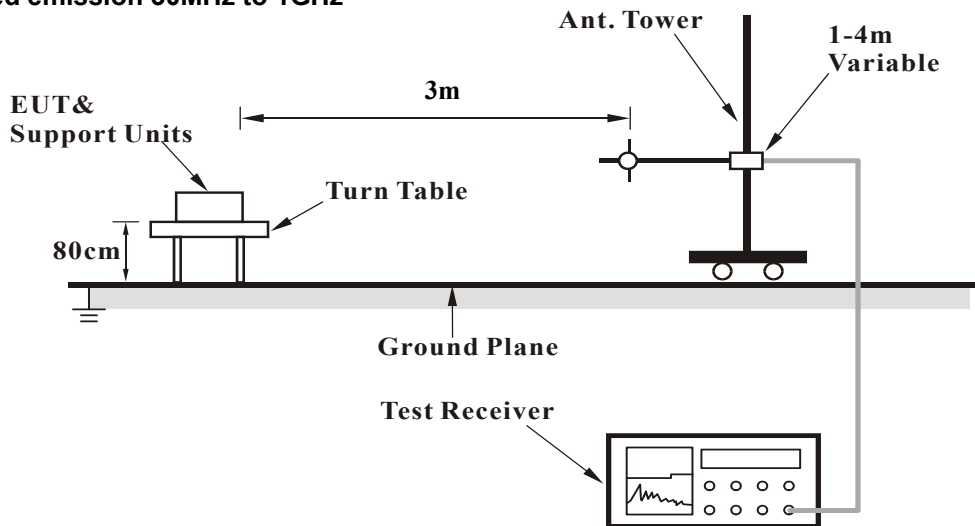
No deviation.

4.1.5 Test Setup

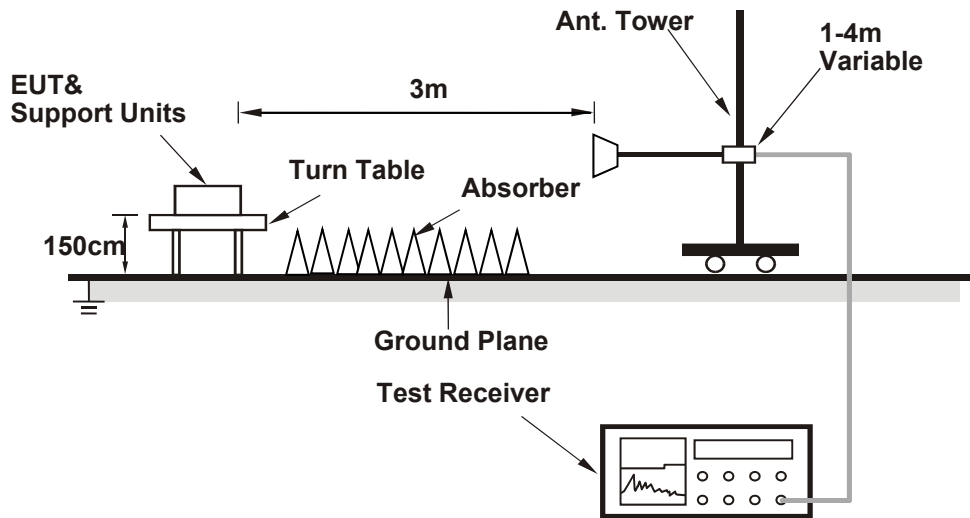
For Radiated emission below 30MHz



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

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

4.1.7 Test Results

Above 1GHz Data:

RF Mode	TX 802.11b + BT EDR	Channel	CH 6 : 2437 MHz + CH 0 : 2402 MHz
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	60.40 PK	74.00	-13.60	1.69 H	52	25.50	34.90
2	2390.00	47.40 AV	54.00	-6.60	1.69 H	52	12.50	34.90
3	*2402.00	99.30 PK			1.69 H	52	64.30	35.00
4	*2402.00	68.80 AV			1.69 H	52	33.80	35.00
5	*2437.00	97.90 PK			1.92 H	50	63.20	34.70
6	*2437.00	95.20 AV			1.92 H	50	60.50	34.70
7	4804.00	51.10 PK	74.00	-22.90	1.69 H	259	37.50	13.60
8	4804.00	20.60 AV	54.00	-33.40	1.69 H	259	7.00	13.60
9	4874.00	50.50 PK	74.00	-23.50	1.55 H	254	37.20	13.30
10	4874.00	37.80 AV	54.00	-16.20	1.55 H	254	24.50	13.30
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	60.70 PK	74.00	-13.30	1.32 V	119	25.80	34.90
2	2390.00	47.90 AV	54.00	-6.10	1.32 V	119	13.00	34.90
3	*2402.00	107.00 PK			1.32 V	119	72.00	35.00
4	*2402.00	76.50 AV			1.32 V	119	41.50	35.00
5	*2437.00	106.30 PK			1.47 V	116	71.60	34.70
6	*2437.00	103.70 AV			1.47 V	116	69.00	34.70
7	4804.00	51.60 PK	74.00	-22.40	1.77 V	209	38.00	13.60
8	4804.00	21.10 AV	54.00	-32.90	1.77 V	209	7.50	13.60
9	4874.00	51.80 PK	74.00	-22.20	1.71 V	185	38.50	13.30
10	4874.00	38.50 AV	54.00	-15.50	1.71 V	185	25.20	13.30

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 BT's fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.97 \text{ ms} / 100 \text{ ms}) = -30.5 \text{ dB}$$

RF Mode	TX 802.11a + BT EDR	Channel	CH 40 : 5200 MHz + CH 0 : 2402 MHz
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	60.10 QP	74.00	-13.90	1.65 H	55	25.20	34.90
2	2390.00	47.30 QP	54.00	-6.70	1.65 H	55	12.40	34.90
3	*2402.00	98.80 QP			1.65 H	55	63.80	35.00
4	*2402.00	68.30 QP			1.65 H	55	33.30	35.00
5	4804.00	51.20 QP	74.00	-22.80	1.65 H	261	37.60	13.60
6	4804.00	20.70 QP	54.00	-33.30	1.65 H	261	7.10	13.60
7	*5200.00	108.00 QP			1.44 H	149	65.50	42.50
8	*5200.00	97.40 QP			1.44 H	149	54.90	42.50
9	10400.00	61.70 QP	68.20	-6.50	1.69 H	224	39.00	22.70
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	60.40 QP	74.00	-13.60	1.33 V	121	25.50	34.90
2	2390.00	47.60 QP	54.00	-6.40	1.33 V	121	12.70	34.90
3	*2402.00	106.50 QP			1.33 V	121	71.50	35.00
4	*2402.00	76.00 QP			1.33 V	121	41.00	35.00
5	4804.00	51.40 QP	74.00	-22.60	1.82 V	211	37.80	13.60
6	4804.00	20.90 QP	54.00	-33.10	1.82 V	211	7.30	13.60
7	*5200.00	102.80 QP			1.06 V	278	60.30	42.50
8	*5200.00	92.70 QP			1.06 V	278	50.20	42.50
9	10400.00	61.40 QP	68.20	-6.80	1.99 V	287	38.70	22.70

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 BT's fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.97 \text{ ms} / 100 \text{ ms}) = -30.5 \text{ dB}$$

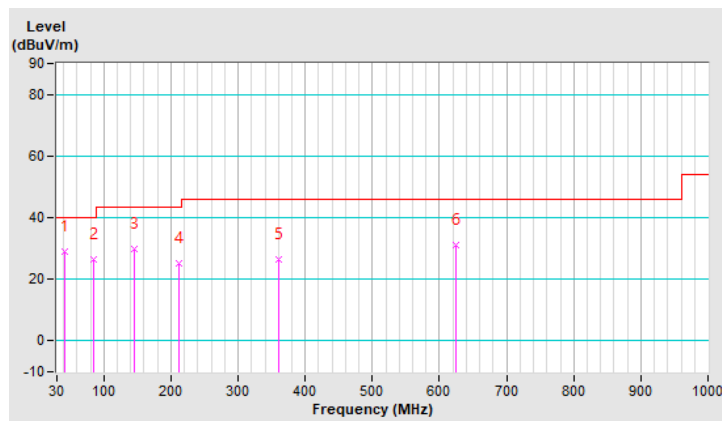
Below 1GHz data

RF Mode	TX 802.11b + BT EDR	Channel	CH 6 : 2437 MHz + CH 0 : 2402 MHz
Frequency Range	30MHz ~ 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	41.64	29.00 QP	40.00	-11.00	1.00 H	35	38.20	-9.20
2	84.32	26.40 QP	40.00	-13.60	1.00 H	283	40.30	-13.90
3	144.46	29.70 QP	43.50	-13.80	1.50 H	121	38.50	-8.80
4	211.39	25.10 QP	43.50	-18.40	1.50 H	179	36.30	-11.20
5	359.80	26.50 QP	46.00	-19.50	1.00 H	105	32.90	-6.40
6	623.64	30.90 QP	46.00	-15.10	1.00 H	137	32.10	-1.20

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.

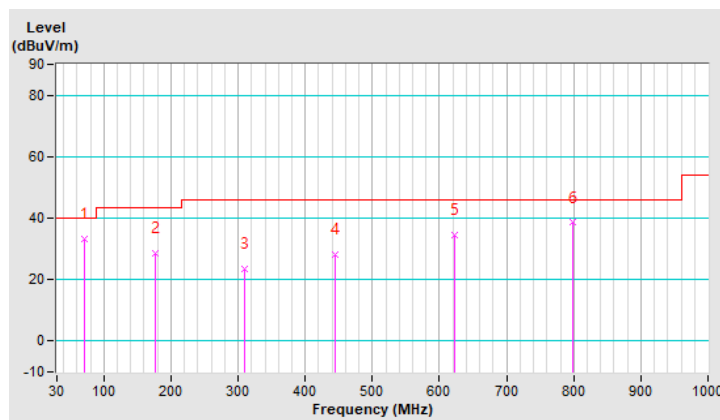


RF Mode	TX 802.11b + BT EDR	Channel	CH 6 : 2437 MHz + CH 0 : 2402 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	70.74	33.30 QP	40.00	-6.70	1.49 V	155	44.20	-10.90
2	176.47	28.70 QP	43.50	-14.80	1.49 V	69	38.20	-9.50
3	310.33	23.60 QP	46.00	-22.40	1.49 V	185	30.70	-7.10
4	445.16	28.10 QP	46.00	-17.90	1.00 V	0	33.00	-4.90
5	622.67	34.40 QP	46.00	-11.60	1.00 V	67	35.60	-1.20
6	799.21	38.50 QP	46.00	-7.50	1.00 V	326	35.80	2.70

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.

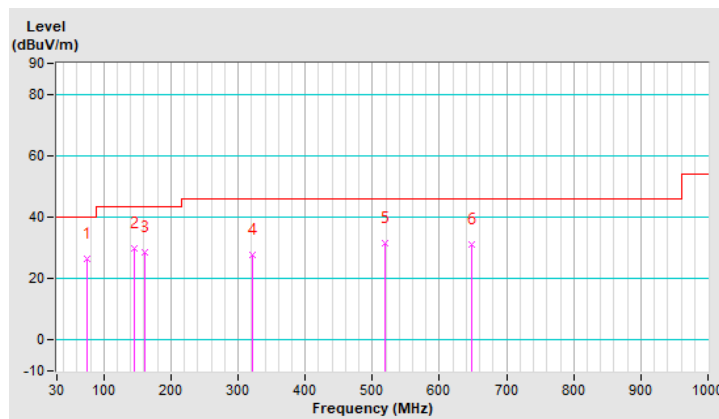


RF Mode	TX 802.11a + BT EDR	Channel	CH 40 : 5200 MHz + CH 0 : 2402 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	74.62	26.50 QP	40.00	-13.50	1.49 H	6	38.00	-11.50
2	144.46	30.00 QP	43.50	-13.50	2.00 H	229	38.80	-8.80
3	160.95	28.60 QP	43.50	-14.90	1.49 H	163	37.10	-8.50
4	321.00	27.80 QP	46.00	-18.20	1.00 H	128	34.70	-6.90
5	518.88	31.60 QP	46.00	-14.40	1.49 H	152	35.30	-3.70
6	648.86	31.00 QP	46.00	-15.00	2.00 H	45	31.80	-0.80

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.

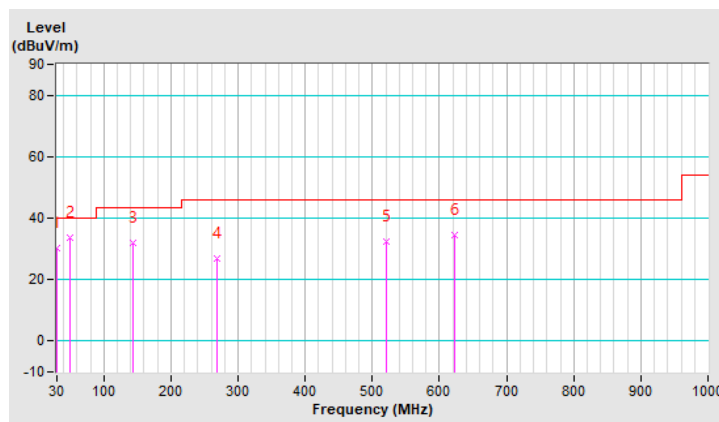


RF Mode	TX 802.11a + BT EDR	Channel	CH 40 : 5200 MHz + CH 0 : 2402 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	30.97	30.40 QP	40.00	-9.60	1.01 V	6	41.00	-10.60
2	50.37	33.70 QP	40.00	-6.30	1.01 V	160	42.50	-8.80
3	142.52	32.10 QP	43.50	-11.40	1.01 V	120	40.90	-8.80
4	267.65	26.90 QP	46.00	-19.10	1.01 V	160	35.30	-8.40
5	521.79	32.30 QP	46.00	-13.70	1.01 V	270	36.00	-3.70
6	622.67	34.30 QP	46.00	-11.70	1.49 V	293	35.50	-1.20

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.

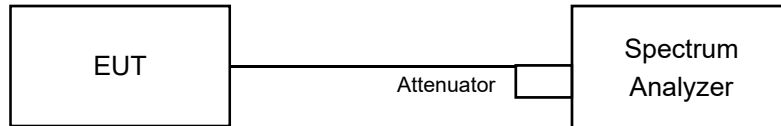


4.2 Conducted Out of Band Emission Measurement

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 \geq 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 OOB

- a. Set RBW = 100 kHz.
- b. Set VBW \geq 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.

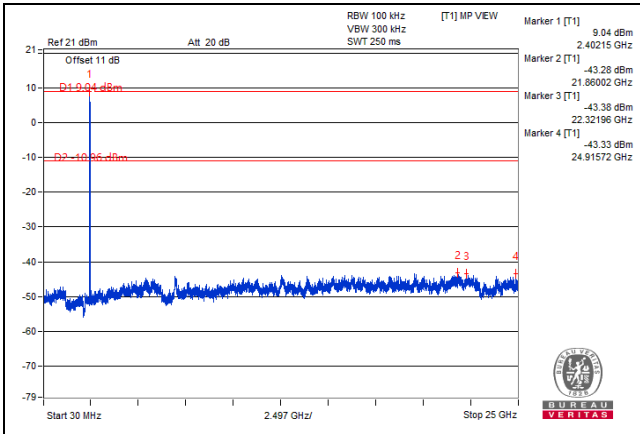
4.2.6 EUT Operating Condition

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

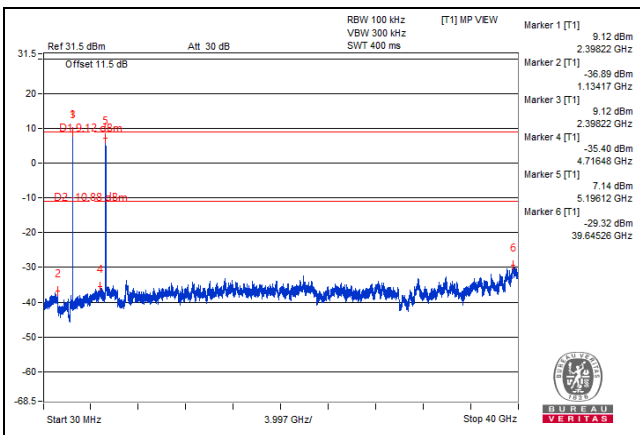
4.2.7 Test Results

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.

802.11b + BT EDR



802.11a + BT EDR



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 and approved according to ISO/IEC 17025.

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

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Fax: 886-2-26051924

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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.

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