

Variant FCC Test Report

Report No.: RFBERD-WTW-P22060334

FCC ID: HD5-CK65L0N

Test Model: CK65L0N

Received Date: Jun. 09, 2022

Test Date: Jun. 25, 2022

Issued Date: Jul. 27, 2022

Applicant: Honeywell International Inc.

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

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FCC Registration /
Designation Number: 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBERD-WTW-P22060334	Original Release	Jul. 27, 2022

1 Certificate of Conformity

Product: Mobile computer

Brand: Honeywell

Test Model: CK65L0N

Sample Status: Engineering Sample

Applicant: Honeywell International Inc.

Test Date: Jun. 25, 2022

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

This report is issued as a supplementary report to BV CPS report no.: RFBERD-WTW-P21020547. This report shall be used by combining with its original report.

Prepared by : Gina Liu, **Date:** Jul. 27, 2022
Gina Liu / Specialist

Approved by : Jeremy Lin, **Date:** Jul. 27, 2022
Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	N/A	Without AC power port of the EUT.
15.247(a)(1)(iii)	Number of Hopping Frequency Used	N/A	Refer to Note
15.247(a)(1)(iii)	Dwell Time on Each Channel	N/A	Refer to Note
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	N/A	Refer to Note
15.247(a)(1)	Maximum Peak Output Power	N/A	Refer to Note
---	Occupied Bandwidth Measurement	N/A	Refer to Note
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -10.3 dB at 48.43 MHz.
15.247(d)	Band Edge Measurement	N/A	Refer to Note
15.247(d)	Antenna Port Emission	N/A	Refer to Note
15.203	Antenna Requirement	N/A	Refer to Note

Note:

- Only Radiated Emissions test was performed for this addendum. Refer to original report for other test data.
- 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 up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Mobile computer
Brand	Honeywell
Test Model	CK65L0N
Model Description	For India (BIS & WPC) information only : - Standard Version : CK65-L0N - Cold Storage Version : CK65-L0N-CS
Status of EUT	Engineering Sample
Power Supply Rating	3.6 Vdc or 3.7 Vdc (Battery)
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8DPSK
Transfer Rate	1/2/3 Mbps
Operating Frequency	2402 ~ 2480 MHz
Number of Channel	79
Antenna Type	Refer to Note as below
Antenna Connector	Refer to Note as below
Accessory Device	Refer to Note as below
Antenna Connector	N/A
HW Version	V1.1
HW P/N	DVT1
SW Version	01.04.00.1392
SW P/N	91.00.00-DEBUG-(0574)

Note:

1. This report is issued as a supplementary report to BV CPS report no.: RFBERD-WTW-P21020547. The differences compared with original report is changing NFC chip and add new scanner (S0703VE - Gen 8), and the change list is listed as below. Therefore, only Radiated Emissions test was verified on the worst case of original report and recorded in this report.

2. Change list:

Original Source			Second Source			
Vender	Vender P/N	Location	Vender	Vender P/N	TYPE	
					Phase 2	Phase 3
HON	N6703SR-WS-103-O	N/A	HON	S0703SR-W4-103O	v	v
NXP	NQ310A1EV/C101Y	U901	NXP	NQ410A1EV/C101Y	v	v
NXP	PCA9412AUKZ	U902	SGMICRO	SGM66055A-5.4YG/T R	v	v
ST	LSM6DSMTR	U1502	TDK	ICM-42607	v	x
			Bosch	BMI270	x	v

VISHAY	SIA483DJ-T1-GE3	Q2201,Q2204,Q2205	VISHAY	SIA483ADJ-T1-GE3	v	v
DIODES	DMN3730UFB4-7	Q1401,Q2203,Q2206 ,Q2303,Q2401	DIODES	DMN3731UFB4-7B	v	v
SAMSUNG MURATA	CL05A475KP5NRNC GRM15SR61A475KEAA D	STD: C2311 CS: C2311, C2515	Darfon	C1005X5R475KDTS	v	v
SIWARD	XTL741-E149-094	Y2001	Taitien	06172-W-087-3	v	v
YAGEO	CC0201MRX5R5BB225	CAM: C1308 No CAM: N/A	Darfon	C0603X5R225MCTS	v	v

3. The EUT contains following accessory devices.

Product	Brand	Model	Description
Battery 1	Intermec Technologies Corporation	AB18	3.7 Vdc, 5.1 Ah, 18.9 Wh
Battery 2	Honeywell	CK65-BTCS	3.6 Vdc, 5200 mAh, 18.7 Wh
Battery 3	Honeywell	CK65-BTSC	3.6 Vdc, 7000 mAh, 25.2 Wh R5480(RICHO)
Battery 4	Honeywell	CK65-BTSC	3.6 Vdc, 7000 mAh, 25.2 Wh MM3722(MITSUMI)

4. There're 8 configurations for the EUT listed as below. (New configuration is marked in gray.)

Sample	Scanner	Keypad	Antenna Type			
			Type	Connector	Gain (dBi)	
					Chain 0	Chain 1
A	N6703	Alpha/Num	FPC antenna	POGO pin	2.62	2.85
B	EX20	Alpha/Num	FPC antenna	POGO pin	2.62	2.85
C	N6703	Num	FPC antenna	POGO pin	2.64	2.88
D	EX20	Num	FPC antenna	POGO pin	2.64	2.88
E	S0803	Alpha/Num	FPC antenna	POGO pin	2.53	2.66
F	S0703	Alpha/Num	FPC antenna	POGO pin	2.56	2.61
G	S0703VE	Alpha/Num	FPC antenna	POGO pin	2.56	2.61
H	Gen8	Alpha	FPC antenna	POGO pin	2.62	2.85

*From the above samples the worst cases were found in sample H. therefore only the test of the mode was recorded in the report.

5. The above Antenna information refers to the manufacturer's antenna specifications, the laboratory shall not be held responsible.

6. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.

3.2 Description of Test Modes

79 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	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To	Description
	Radiated Emission below 1 GHz	
-	√	-

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
2. "-" means no effect.

Radiated Emission Test (Below 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	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	78	FHSS	GFSK	DH5

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE<1G	22 deg. C, 66 % RH	3.6 Vdc	Thomas Cheng

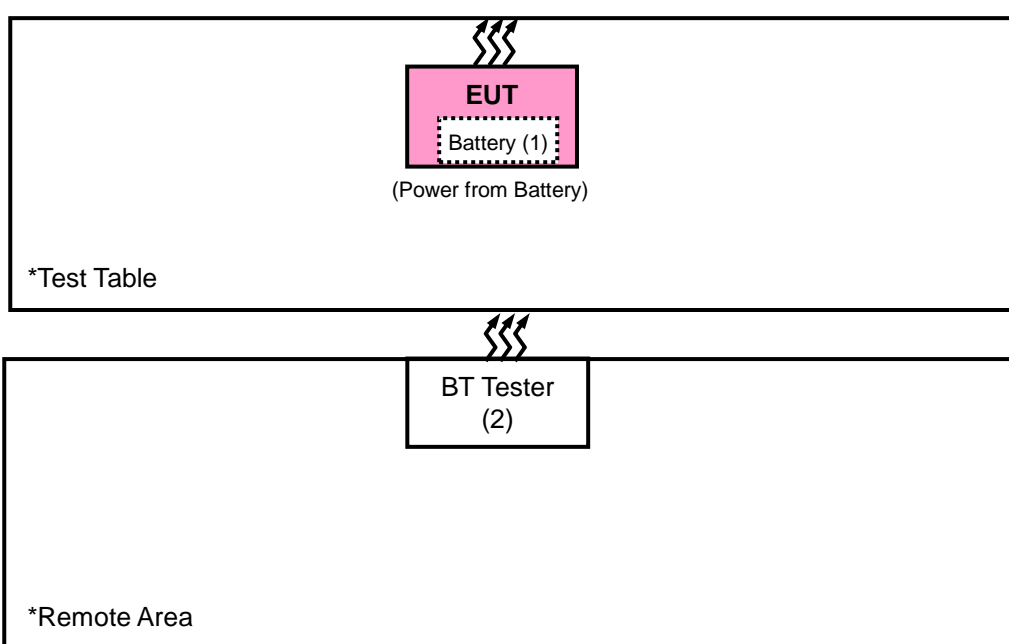
3.3 Description of Support Units

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.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Battery	Honeywell	CK65-BTCS	N/A	N/A
2.	Bluetooth Tester	R&S	CBT	100980	N/A

Note: Items 2 acted as communication partners to transfer data.

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards and References

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)

ANSI C63.10-2013

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

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

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. Other emissions shall be at least 20 dB below the highest level of the desired power:

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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000 MHz, 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 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Spectrum Analyzer Agilent	N9010A	MY52220314	2021/12/03	2022/12/02
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	2021/11/14	2022/11/13
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	2021/10/28	2022/10/27
Fixed Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/04/05	2023/04/04
Bluetooth Tester	CBT	100946	2020/08/06	2022/08/05
Preamplifier EMCI	EMC 012645	980115	2021/10/05	2022/10/04
Preamplifier EMCI	EMC 330H	980112	2021/10/05	2022/10/04
RF Coaxial Cable EMCI	EMC104-SM-SM-8 000	171005	2021/10/05	2022/10/04
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1 000(140807)	2021/10/05	2022/10/04
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	2021/10/05	2022/10/04
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

- 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 test was performed in HwaYa Chamber 10.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- 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:

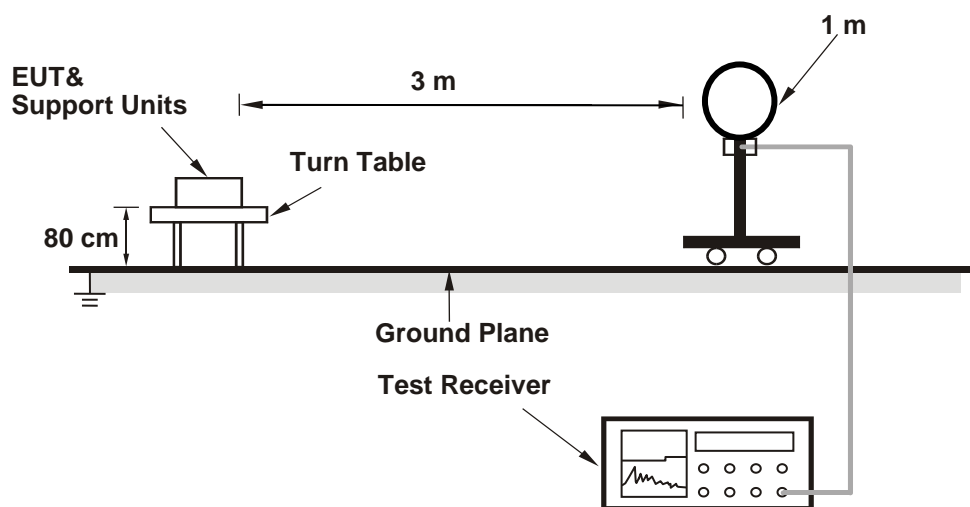
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

4.1.4 Deviation from Test Standard

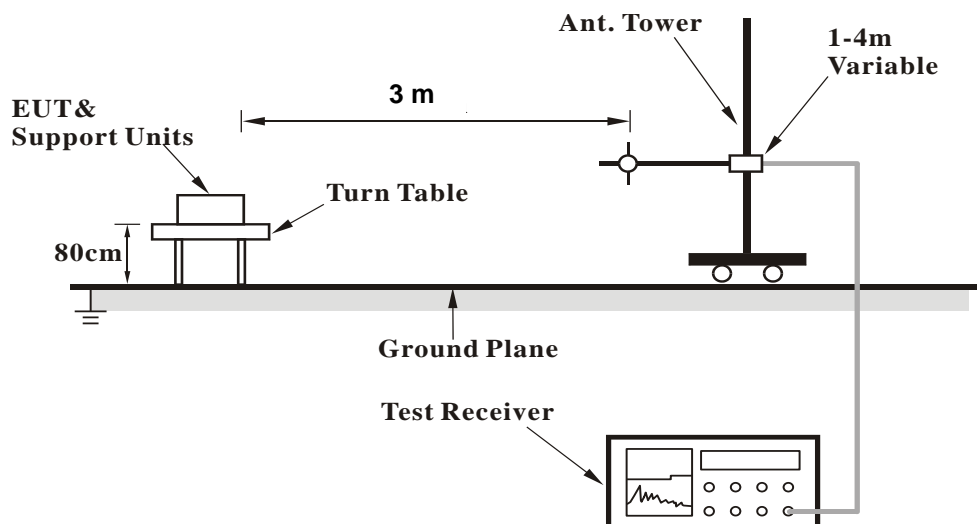
No deviation.

4.1.5 Test Set Up

<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



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

9 kHz ~ 1 GHz Worst-Case Data:

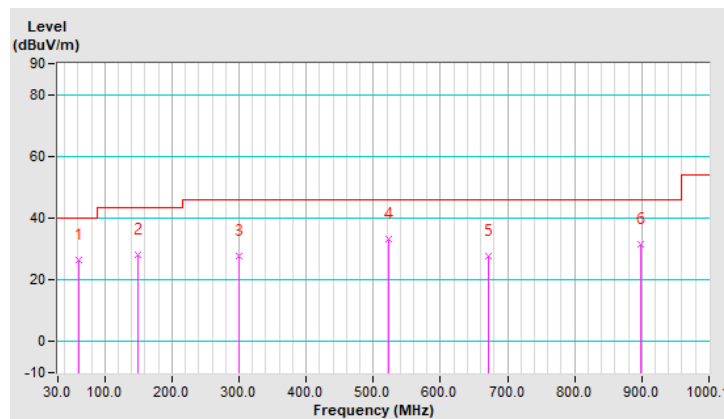
RF Mode	TX BT GFSK	Channel	CH 78 : 2480 MHz
Frequency Range	9 kHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	22°C, 66% RH
Tested By	Thomas Cheng	Test Date	2022/6/25

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	61.04	26.6 QP	40.0	-13.4	2.88 H	46	40.1	-13.5
2	148.35	28.3 QP	43.5	-15.2	3.38 H	70	40.5	-12.2
3	299.69	27.6 QP	46.0	-18.4	2.91 H	318	39.7	-12.1
4	522.81	33.4 QP	46.0	-12.6	2.11 H	111	39.0	-5.6
5	672.21	27.6 QP	46.0	-18.4	2.38 H	155	29.7	-2.1
6	898.24	31.5 QP	46.0	-14.5	1.38 H	115	29.9	1.6

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 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

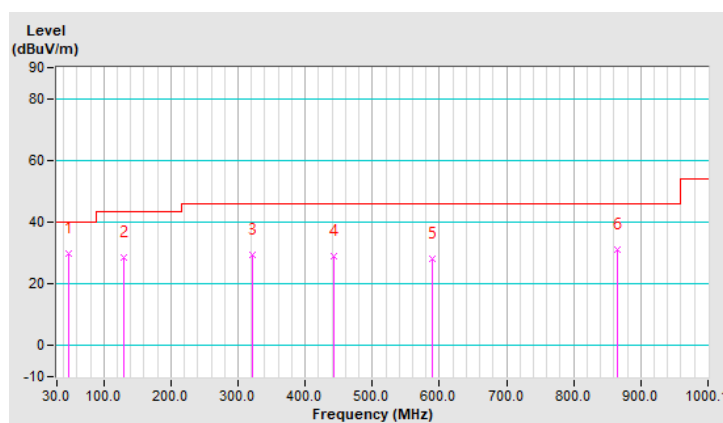


RF Mode	TX BT GFSK	Channel	CH 78 : 2480 MHz
Frequency Range	9 kHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	22°C, 66% RH
Tested By	Thomas Cheng	Test Date	2022/6/25

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	48.43	29.7 QP	40.0	-10.3	1.75 V	303	42.2	-12.5
2	128.95	28.5 QP	43.5	-15.0	3.94 V	167	42.0	-13.5
3	321.03	29.2 QP	46.0	-16.8	2.27 V	337	40.4	-11.2
4	443.26	28.9 QP	46.0	-17.1	1.64 V	97	36.4	-7.5
5	589.75	28.3 QP	46.0	-17.7	1.14 V	318	32.1	-3.8
6	865.26	31.1 QP	46.0	-14.9	1.56 V	43	29.9	1.2

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 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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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