

FCC C2PC TEST REPORT (15.247)

REPORT NO.: RF130610C08-1

MODEL NO.: BHT-1306BWB, BHT-1306QWB

FCC ID: PZWDWWB001

RECEIVED: Jun. 10, 2013

TESTED: Jul. 09, 2013 ~ Jul. 29, 2013

ISSUED: Jul. 30, 2013

APPLICANT: Denso Wave Incorporated

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ISSUED BY: Bureau Veritas Consumer Products Services
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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130610C08-1	Original release	Jul. 30, 2013



1. CERTIFICATION

PRODUCT: Barcode Handy Terminal / 2D Code Handy Terminal
MODEL NO.: BHT-1306BWB, BHT-1306QWB
BRAND: DENSO
APPLICANT: Denso Wave Incorporated
TESTED: Jul. 09, 2013 ~ Jul. 29, 2013
TEST SAMPLE: Production Unit
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (model: BHT-1306BWB, BHT-1306QWB) 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 EMC characteristics under the conditions specified in this report.

PREPARED BY : Vera Huang , **DATE** : Jul. 30, 2013
Vera Huang / Specialist

APPROVED BY : Sam chen , **DATE** : Jul. 30, 2013
Sam Chen / Assistant Manager



2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.29dB at 0.23203MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -4.27dB at 2484MHz.
15.247(d)	Band Edge Measurement	N/A	Refer to NOTE below.
15.247(a)(2)	6dB bandwidth	N/A	Refer to NOTE below.
15.247(b)	Conducted power	N/A	Refer to NOTE below.
15.247(e)	Power Spectral Density	N/A	Refer to NOTE below.
15.203	Antenna Requirement	N/A	Refer to NOTE below.

NOTE: Test items for conducted and radiated emission were performed for this report. Other testing data please refer to module (Brand: DENSO, Model: DWWB001, FCC ID: PZWDWWB001) Report No.: RF130613C10-1

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	UNCERTAINTY
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Barcode Handy Terminal / 2D Code Handy Terminal
MODEL NO.	BHT-1306BWB, BHT-1306QWB
POWER SUPPLY	5.0Vdc (adapter) 3.7Vdc (Li-ion battery)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 65.0Mbps
OPERATING FREQUENCY	2412 ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz)
ANTENNA TYPE	PCB antenna with 1.3dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	Refer to Note as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below

NOTE:

- This report is prepared for FCC class II permissive change. The transmitter module is authorized for use in specific End-product (Barcode Handy Terminal / 2D Code Handy Terminal, Brand: DENSO, Model No.: BHT-1306BWB, BHT-1306QWB). Thus, we re-test conducted emission and radiated emission Tests.
- The detail information of model names and the differences of two samples are as below.

PRODUCT NAME	MODEL NAME	SAMPLE	DESCRIPTION
Barcode Handy Terminal	BHT-1306BWB	A	1D Scanner
2D Code Handy Terminal	BHT-1306QWB	B	2D Scanner

- The EUT contains following accessory devices.

ITEM	BRAND	MODEL	SPECIFICATION
Li-ion Battery	DENSO	BT-20LB	Rating: 3.7Vdc, 1880mAh
USB cable 1	ELECOM	U2C-B30BK	3m shielded cable
USB cable 2	ELECOM	U2C-AMB20BK	2m non-shielded cable

- The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX

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



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3.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE \geq 1G	RE $<$ 1G	PLC	
A	√	√	√	Sample A
B	√	√	√	Sample B

Where **RE \geq 1G**: Radiated Emission above 1GHz **RE $<$ 1G**: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATI ON TYPE	DATA RATE (Mbps)
A & B	802.11g	1 to 11	11	OFDM	BPSK	6.0

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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATI ON TYPE	DATA RATE (Mbps)
A & B	802.11g	1 to 11	11	OFDM	BPSK	6.0

POWER LINE CONDUCTED EMISSION TEST:

The EUT was tested with the following mode.

EUT CONFIGURE MODE	TEST CONDITION
A & B	BT Link + WLAN (2.4G) Link + Adapter

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao

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.

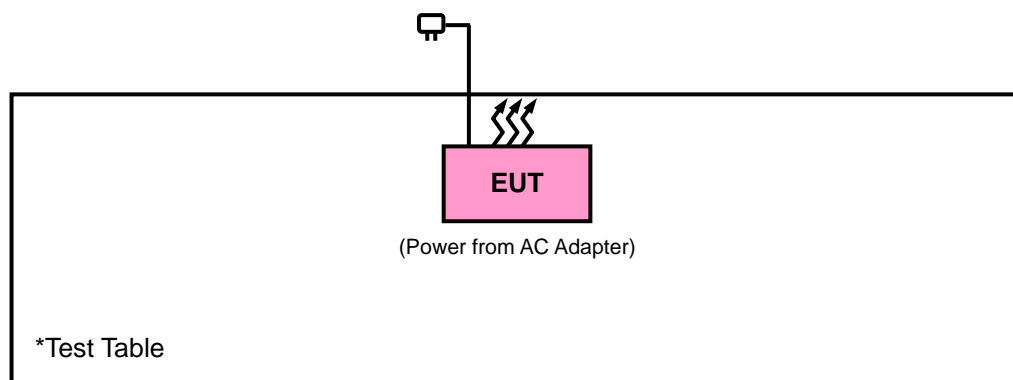
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Adapter	DENSO	AWW0515NE-001	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1 was provided by the client.

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:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2009

KDB 558074 D01 DTS Meas Guidance v02

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B. The test report has been issued separately.

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 20dB 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:

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.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Aug. 21, 2012	Aug. 20, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2012	Dec. 16, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 07, 2013	Jan. 06, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 25, 2012	Dec. 24, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplicifier EMCI	EMC 012645	980115	Dec. 28, 2012	Dec. 27, 2013
Preamplicifier EMCI	EMC 184045	980116	Dec. 28, 2012	Dec. 27, 2013
Preamplicifier EMCI	EMC 330H	980112	Dec. 28, 2012	Dec. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable Worken	RG-213	NA	Dec. 29, 2012	Dec. 28, 2013
Software	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 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. The test was performed in HwaYa Chamber 10.
 4. The horn antenna and HP preamplicifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 5. The FCC Site Registration No. is 690701.
 6. The IC Site Registration No. is IC 7450F-10.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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. Height of receiving 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

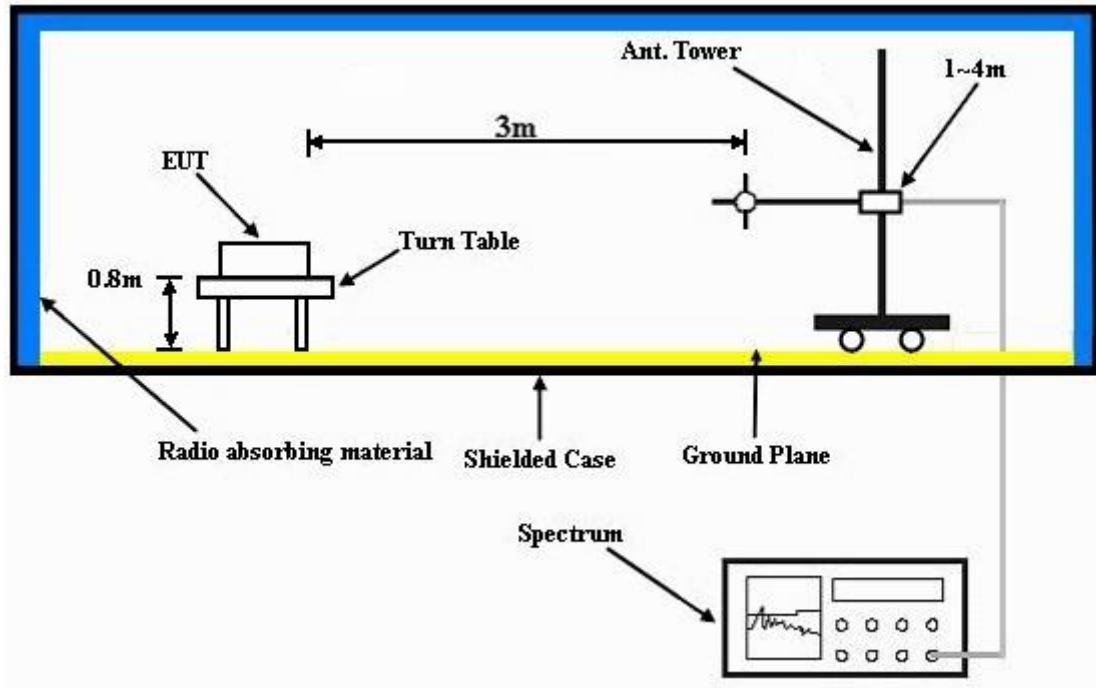
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
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 the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.



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4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA

MODE A

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2378	34.72	41.84	54	-19.28	26.86	3.52	37.5	106	340	Average
2378	53.11	60.23	74	-20.89	26.86	3.52	37.5	106	340	Peak
2462	98.15	104.86			27.1	3.58	37.39	106	340	Average
2462	107.91	114.62			27.1	3.58	37.39	106	340	Peak
2484	47.04	53.61	54	-6.96	27.15	3.6	37.32	106	340	Average
2484	66.84	73.41	74	-7.16	27.15	3.6	37.32	106	340	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2382	33.94	41.06	54	-20.06	26.86	3.52	37.5	161	41	Average
2382	51.93	59.05	74	-22.07	26.86	3.52	37.5	161	41	Peak
2462	93.11	99.82			27.1	3.58	37.39	161	41	Average
2462	102.82	109.53			27.1	3.58	37.39	161	41	Peak
2484	41.95	48.52	54	-12.05	27.15	3.6	37.32	161	41	Average
2484	60.16	66.73	74	-13.84	27.15	3.6	37.32	161	41	Peak

REMARKS:

- 2462MHz: Fundamental frequency.



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MODE B

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2378	34.94	42.06	54	-19.06	26.86	3.52	37.5	106	342	Average
2378	50.35	57.47	74	-23.65	26.86	3.52	37.5	106	342	Peak
2462	99.79	106.5			27.1	3.58	37.39	106	342	Average
2462	109.37	116.08			27.1	3.58	37.39	106	342	Peak
2484	49.02	55.59	54	-4.98	27.15	3.6	37.32	106	342	Average
2484	69.73	76.3	74	-4.27	27.15	3.6	37.32	106	342	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2384	34.1	41.22	54	-19.9	26.86	3.52	37.5	162	40	Average
2384	50.95	58.07	74	-23.05	26.86	3.52	37.5	162	40	Peak
2462	91.23	97.94			27.1	3.58	37.39	162	40	Average
2462	100.98	107.69			27.1	3.58	37.39	162	40	Peak
2484	41.18	47.75	54	-12.82	27.15	3.6	37.32	162	40	Average
2484	58.9	65.47	74	-15.1	27.15	3.6	37.32	162	40	Peak

REMARKS:

- 1. 2462MHz: Fundamental frequency.



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BELOW 1GHz WORST-CASE DATA:

MODE A

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
45.39	34.23	51.15	40	-5.77	13.5	0.74	31.16	102	162	Peak
158.52	22.99	40.71	43.5	-20.51	12.73	1.38	31.83	107	288	Peak
265.98	29.99	48.12	46	-16.01	11.94	1.89	31.96	114	310	Peak
320.3	31.09	47.43	46	-14.91	13.43	2.12	31.89	100	351	Peak
608.7	24.59	33.85	46	-21.41	19.72	3.12	32.1	100	264	Peak
926.5	29.44	33.75	46	-16.56	23.66	4.02	31.99	100	184	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
45.12	29.18	46.1	40	-10.82	13.5	0.74	31.16	151	304	QP
177.96	23.17	42.58	43.5	-20.33	10.92	1.49	31.82	131	261	Peak
280.02	23.01	40.5	46	-22.99	12.37	1.96	31.82	164	188	Peak
393.1	22.46	36.96	46	-23.54	15.17	2.4	32.07	100	310	Peak
665.4	28.74	36.91	46	-17.26	20.4	3.3	31.87	100	194	Peak
931.4	35.56	39.82	46	-10.44	23.68	4.04	31.98	100	241	Peak



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MODE B

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
91.83	23.46	45.94	43.5	-20.04	8.45	1.03	31.96	100	152	Peak
199.56	30.44	51.26	43.5	-13.06	9.36	1.59	31.77	106	242	Peak
239.79	29.77	48.73	46	-16.23	11.03	1.79	31.78	100	158	Peak
319.6	32.27	48.61	46	-13.73	13.43	2.12	31.89	100	274	Peak
399.4	25.16	39.54	46	-20.84	15.33	2.42	32.13	100	199	Peak
739.6	26.66	33.21	46	-19.34	21.38	3.55	31.48	100	53	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
93.72	25.28	47.6	43.5	-18.22	8.6	1.04	31.96	102	343	Peak
199.83	29.84	50.66	43.5	-13.66	9.36	1.59	31.77	105	94	Peak
293.79	27.28	44.23	46	-18.72	12.77	2.02	31.74	100	172	Peak
398.7	30.27	44.66	46	-15.73	15.31	2.42	32.12	100	179	Peak
556.2	26.33	36.8	46	-19.67	18.59	2.96	32.02	100	228	Peak
732.6	31.62	38.4	46	-14.38	21.27	3.52	31.57	100	17	Peak

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:** 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 09, 2012	Nov. 08, 2013
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 21, 2012	Dec. 20, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 02, 2013	Jul. 01, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.



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4.2.3 TEST PROCEDURES

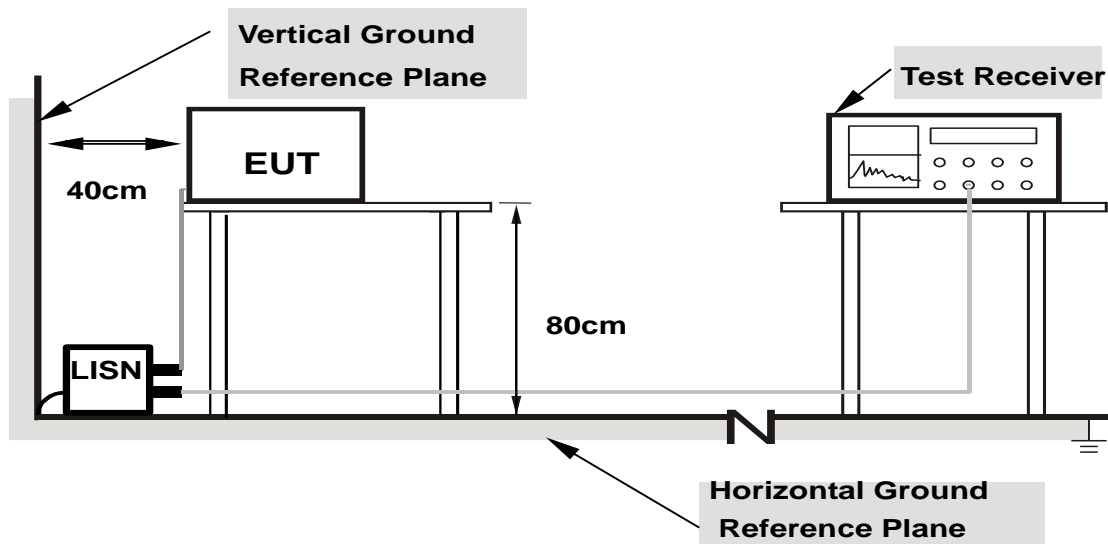
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

CONDUCTED WORST CASE DATA: GFSK

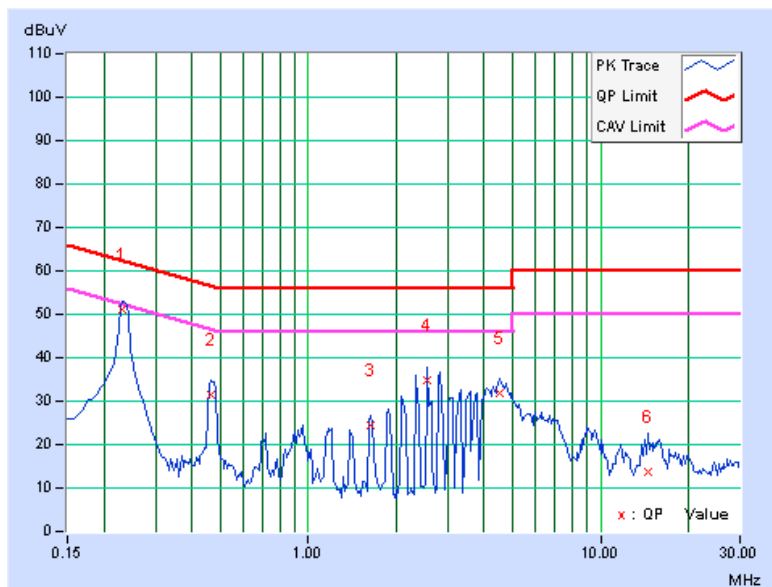
MODE A

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.23203	0.18	50.98	42.87	51.16	43.05	62.38
2	0.46250	0.22	31.12	17.92	31.34	18.14	56.65	46.65	-25.31	-28.51
3	1.63281	0.28	24.28	9.66	24.56	9.94	56.00	46.00	-31.44	-36.06
4	2.55859	0.31	34.34	16.16	34.65	16.47	56.00	46.00	-21.35	-29.53
5	4.53906	0.38	31.29	13.79	31.67	14.17	56.00	46.00	-24.33	-31.83
6	14.57031	0.53	13.29	2.30	13.82	2.83	60.00	50.00	-46.18	-47.17

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

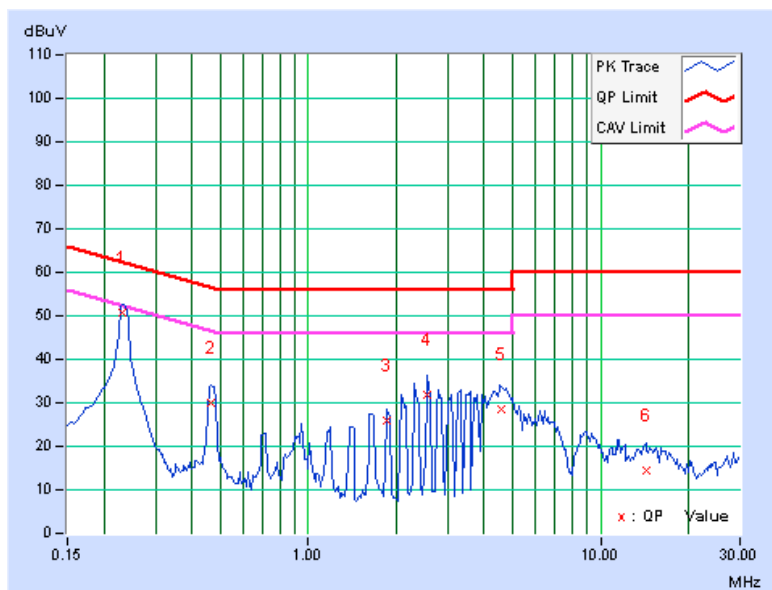


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.23203	0.19	50.52	42.90	50.71	43.09	62.38
2	0.46641	0.25	29.65	19.42	29.90	19.67	56.58	46.58	-26.68	-26.91
3	1.85156	0.27	25.56	11.77	25.83	12.04	56.00	46.00	-30.17	-33.96
4	2.56641	0.31	31.71	13.39	32.02	13.70	56.00	46.00	-23.98	-32.30
5	4.60156	0.40	27.95	7.09	28.35	7.49	56.00	46.00	-27.65	-38.51
6	14.27344	0.59	14.02	2.87	14.61	3.46	60.00	50.00	-45.39	-46.54

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



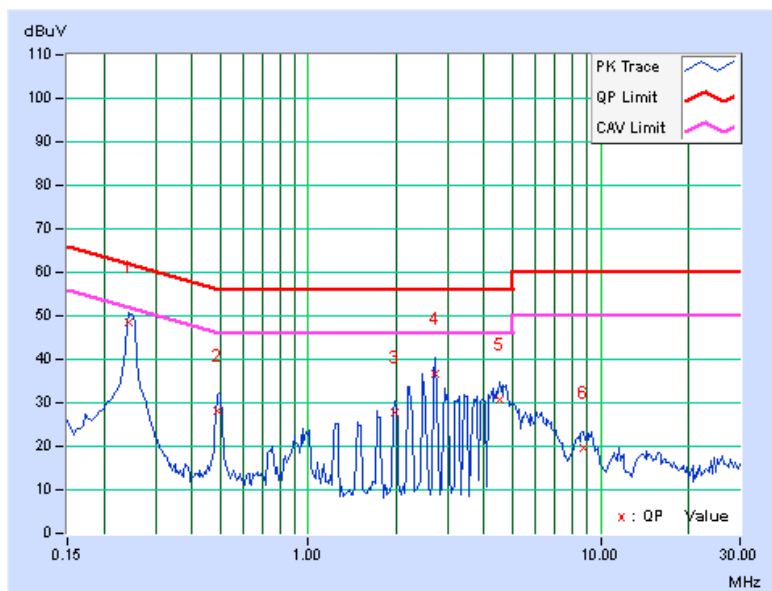
MODE B

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.24375	0.18	48.25	39.68	48.43	39.86	61.97
2	0.48594	0.22	27.85	13.47	28.07	13.69	56.24	46.24	-28.17	-32.55
3	1.96875	0.28	27.45	12.84	27.73	13.12	56.00	46.00	-28.27	-32.88
4	2.70703	0.31	36.22	18.99	36.53	19.30	56.00	46.00	-19.47	-26.70
5	4.51953	0.38	30.53	15.39	30.91	15.77	56.00	46.00	-25.09	-30.23
6	8.79688	0.42	19.21	6.17	19.63	6.59	60.00	50.00	-40.37	-43.41

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

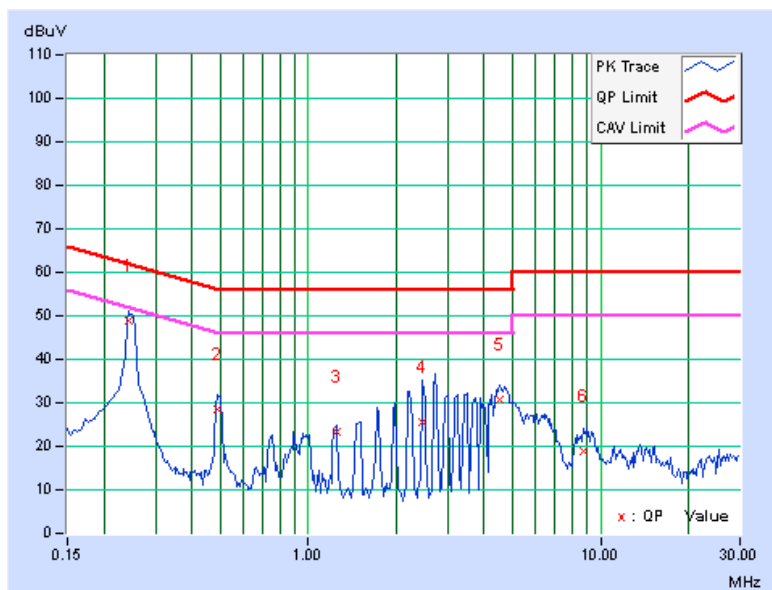


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.24375	0.20	48.63	40.62	48.83	40.82	61.97
2	0.48984	0.25	28.44	17.51	28.69	17.76	56.17	46.17	-27.48	-28.41
3	1.25391	0.24	23.09	10.36	23.33	10.60	56.00	46.00	-32.67	-35.40
4	2.46484	0.31	25.34	11.45	25.65	11.76	56.00	46.00	-30.35	-34.24
5	4.51172	0.40	30.45	13.52	30.85	13.92	56.00	46.00	-25.15	-32.08
6	8.77734	0.46	18.41	5.14	18.87	5.60	60.00	50.00	-41.13	-44.40

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value





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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



6. INFORMATION ON 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 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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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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7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

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