FCC Test Report

Report No.:	RF171006C01A-4
FCC ID:	CFS8DLRCHS5200W
Test Model:	RCHS5200W
Received Date:	Dec. 29, 2017
Test Date:	Jan. 05 ~ Jan. 10, 2018
Issued Date:	Jan. 17, 2018
Applicant:	Honeywell International Inc.
Address:	2 Corporate Center Drive Melville NY 11747 United States Of America
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
FCC Registration:	788550
Designation Number:	TW0003

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF171006C01A-4	Original release.	Jan. 17, 2018

1 Certificate of Conformity

Product: Smart Home Security Base Station

Brand: Honeywell

Test Model: RCHS5200W

Sample Status: Engineering sample

Applicant: Honeywell International Inc.

Test Date: Jan. 05 ~ Jan. 10, 2018

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.249)
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Jan. 17, 2018
Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Jan. 17, 2018
Bruce Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.249)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -11.42dB at 0.34159MHz.
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	Pass	Meet the requirement of limit. Minimum passing margin is -6.8dB at 255.04MHz.

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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 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	Smart Home Security Base Station
Brand	Honeywell
Test Model	RCHS5200W
Sample Status	Engineering sample
Power Supply Rating	12Vdc (adapter)
Modulation Type	GFSK
Operating Frequency	908.4 ~ 916MHz
Number of Channel	3
Antenna Type	Coupling antenna with 1.8dBi gain
Antenna Connector	NA
Accessory Device	Adapter
Cable Supplied	NA

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the original report (BV CPS report no.: RF171006C01-5) is Layout & software change (Listed as below). Therefore, test items for conducted emission and radiated emission test had been re-tested in this report.

DAS MB Schematic Design Change List - DVT1 to PVT

No.	Catalog	Function	Change Description
1	BB	Reset	■ Change the reset control from MOSFET to a diode, and the pull up source change to VPH_PWR.
2	BB	Audio Power Path	■ Add R2514 & C2513 to well control the Q2503 turn off when the AC adaptor remove.
3	MB	HW ID	Mount R1022, R1026, R1027 Non-mount R1023, R1024, R1025
4	MB	RS Test	Change R2914 from 22K to 10K.
5	Touch Board	Camera Desense issue	Change TP_RST_N_C signal D231 from ESD diode to 33pF
6	Touch Board	Mute Key Power on issue	Change TP R233 from 1K to 10K to ensure the voltage of PM8953_RESIN pin is higher than 1.12V.
7	Halo LED	LED power	Add a load switch on the LED board. The power off current can reduce from 5mA to 0.5mA.

DAS MB Layout Design Change List - DVT1 to PVT

No.	Catalog	Function	Change Description
1	BB	DDR	■ Reduce the DDR trace length to meet Qualcomm new layout guide from 20mm to 13.2mm.
2	BB	Reset	■ Change the reset control from MOSFET to a diode, and the pull up source change to VPH_PWR. ■ Add R1622 & R1623 at the up of bottom layer. ■ Add D1601 next to Q1602.
3	BB	Audio Power Path	■ Add R2514 & C2513 to well control the Q2503 turn off when the AC adaptor remove.
4	BB	DDR	Reduce trace length of EBI0_CA6 ~ EBI0_CA9
5	BB	DDR	Add trace length of EBI0_DQ17, EBI0_DQ21, EBI0_DQ29
6	BB	DDR	Modify some DQ trace length to target Qualcomm request
7	BB	Audio codec	Modify some trace routing and trace width of WCD9326
8	BB	PMIC Xtal	1. Delete GND under Xtal in layer2 2. Move layer2 trace to layer3
9	BB	Audio AMP	Modify some trace routing and trace width of WSA8815
10	BB	Camera	Follow new request of Camera MIPI match to modify some trace length
11	RF	WIFI	Follow new request of WLAN_BB_I/Q match to modify some trace length, the change of the control signals circuit between CPU and WiFi chip does not have an impact on the RF function.
12	RFI	Desense	Add 2 beads on the LED control signals to prevent LTE B12 desense issue.
13	MB	USB OTG	Remove MB U2903.
14	IO board	USB	Remove IO board CN104
15	MB	Debug Conn	Remove MB CN2101
16	Touch Board	Camera Desense issue	Add extra 33pF capacitor in parallel with the D231 on the Touch board.

2. The EUT consumes power from the following adapter.

Adapter	
Brand	Asian Power Devices Inc.
Model	WA-30J12FU
Input Power	100-240Vac~50-60Hz, 0.9A Max
Output Power	12Vdc/ 2.5A
Power Line	1.5m non-shielded cable with one core

3. 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

3 channels are provided to this EUT:

Channel	Freq. (MHz)
1	908.4
2	908.42
3	916.0

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE≥1G	RE<1G	PLC	
-	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

Note:

1. The antenna had been pre-tested on the positioned of each 3 axis. The worst cases were 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 CONFIGUURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	1 to 3	1, 3	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 CONFIGUURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	1 to 3	1, 3	GFSK

Power Line Conducted Emission Test:

☒ 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 CONFIGUURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	1 to 3	1	GFSK

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 66%RH	120Vac, 60Hz	Greg Lin
RE<1G	25deg. C, 66%RH	120Vac, 60Hz	Greg Lin
PLC	25deg. C, 75%RH	120Vac, 60Hz	Matthew Yang

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.	Notebook	ASUS	P2420L	FCNXCV16385351D	FCC DoC Approved	-

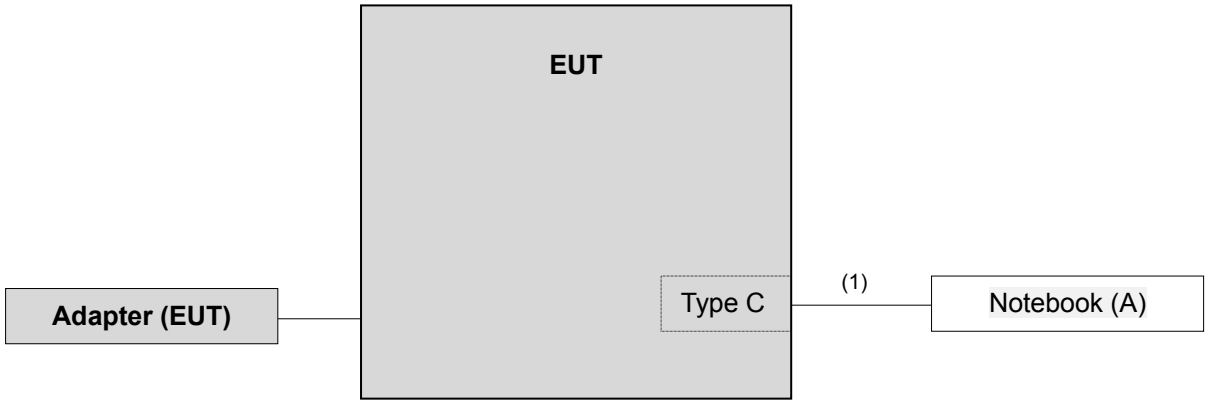
Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Type C to USB cable	1	1.0	-	0	-

Note: The core(s) is(are) originally attached to the cable(s).

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 (15.249)

ANSI C63.10-2013

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

Note: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). 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

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(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.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Mar. 27, 2017	Mar. 26, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	May 11, 2017	May 10, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Dec. 12, 2017	Dec. 11, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Aug. 08, 2017	Aug. 07, 2018
Preamplifier Agilent (Above 1GHz)	8449B	3008A01638	Feb. 22, 2017	Feb. 21, 2018
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2017	Aug. 07, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Aug. 08, 2017	Aug. 07, 2018
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 01, 2017	Jul. 31, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	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 Chamber 9.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The IC Site Registration No. is IC 7450F-9.

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. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

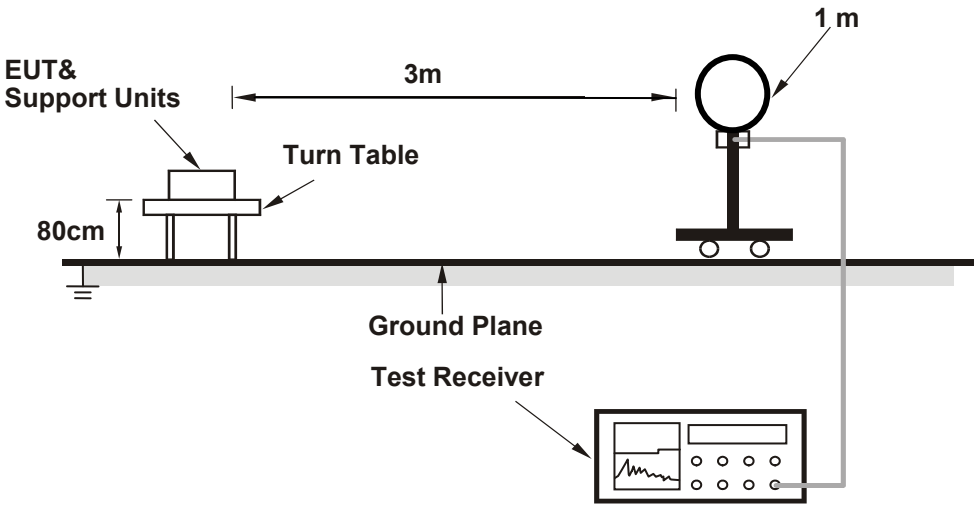
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

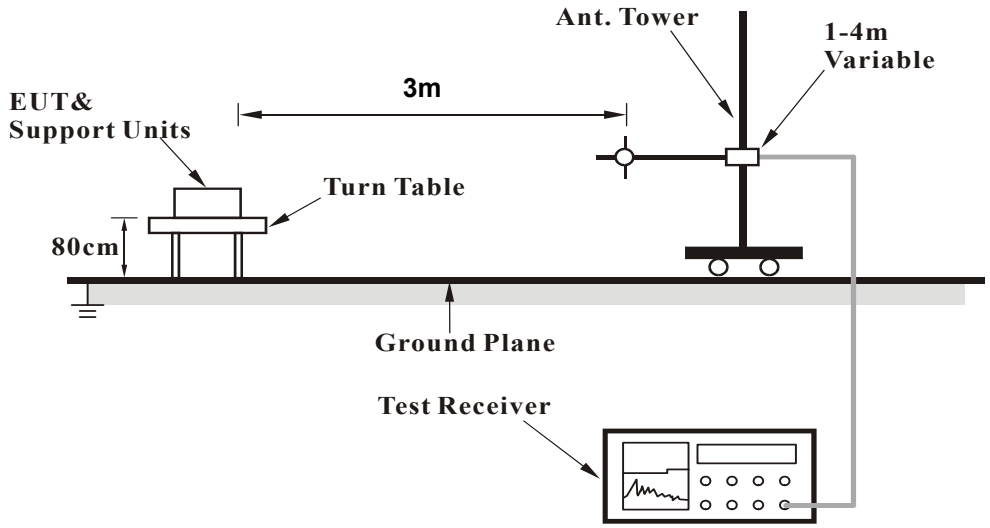
No deviation.

4.1.5 Test Set Up

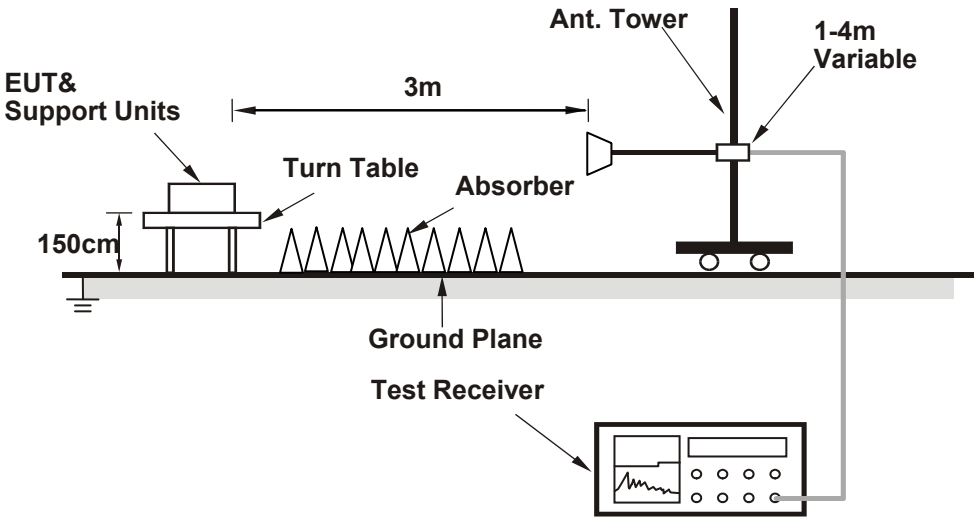
For Radiated emission below 30MHz



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. Connected the EUT and a notebook via a type C to USB cable and placed them on the testing table.
b. The notebook ran a test program to enable EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#1816.80	37.7 PK	74.0	-36.3	3.25 H	147	44.2	-6.5
2	#1816.80	25.3 AV	54.0	-28.7	3.25 H	147	31.8	-6.5
3	2725.20	44.1 PK	74.0	-29.9	3.19 H	72	46.6	-2.5
4	2725.20	36.0 AV	54.0	-18.0	3.19 H	72	38.5	-2.5
5	3633.60	44.2 PK	74.0	-29.8	3.23 H	90	44.1	0.1
6	3633.60	33.8 AV	54.0	-20.2	3.23 H	90	33.7	0.1
7	4542.00	47.0 PK	74.0	-27.0	3.01 H	144	44.6	2.4
8	4542.00	34.8 AV	54.0	-19.2	3.01 H	144	32.4	2.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#1816.80	37.5 PK	74.0	-36.5	1.43 V	354	44.0	-6.5
2	#1816.80	25.3 AV	54.0	-28.7	1.43 V	354	31.8	-6.5
3	2725.20	46.1 PK	74.0	-27.9	3.17 V	45	48.6	-2.5
4	2725.20	41.1 AV	54.0	-12.9	3.17 V	45	43.6	-2.5
5	3633.60	47.4 PK	74.0	-26.6	3.16 V	84	47.3	0.1
6	3633.60	36.9 AV	54.0	-17.1	3.16 V	84	36.8	0.1
7	4542.00	48.1 PK	74.0	-25.9	3.14 V	111	45.7	2.4
8	4542.00	36.4 AV	54.0	-17.6	3.14 V	111	34.0	2.4

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#1832.00	38.3 PK	74.0	-35.7	1.67 H	241	44.5	-6.2
2	#1832.00	25.9 AV	54.0	-28.1	1.67 H	241	32.1	-6.2
3	2748.00	42.9 PK	74.0	-31.1	3.84 H	71	45.2	-2.3
4	2748.00	34.1 AV	54.0	-19.9	3.84 H	71	36.4	-2.3
5	3664.00	44.8 PK	74.0	-29.2	4.00 H	338	44.6	0.2
6	3664.00	35.2 AV	54.0	-18.8	4.00 H	338	35.0	0.2
7	4580.00	46.0 PK	74.0	-28.0	3.33 H	39	43.3	2.7
8	4580.00	33.8 AV	54.0	-20.2	3.33 H	39	31.1	2.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#1832.00	44.4 PK	74.0	-29.6	1.57 V	176	50.6	-6.2
2	#1832.00	32.8 AV	54.0	-21.2	1.57 V	176	39.0	-6.2
3	2748.00	45.8 PK	74.0	-28.2	4.00 V	36	48.1	-2.3
4	2748.00	39.8 AV	54.0	-14.2	4.00 V	36	42.1	-2.3
5	3664.00	44.8 PK	74.0	-29.2	3.95 V	357	44.6	0.2
6	3664.00	32.1 AV	54.0	-21.9	3.95 V	357	31.9	0.2
7	4580.00	45.2 PK	74.0	-28.8	3.49 V	228	42.5	2.7
8	4580.00	32.4 AV	54.0	-21.6	3.49 V	228	29.7	2.7

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

Below 1GHz worst-case data

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	92.08	23.7 QP	43.5	-19.8	1.50 H	165	42.7	-19.0
2	**255.04**	**39.2 QP**	**46.0**	**-6.8**	**1.00 H**	**116**	**53.2**	**-14.0**
3	447.10	23.3 QP	46.0	-22.7	1.00 H	127	33.3	-10.0
4	650.80	23.4 QP	46.0	-22.6	1.25 H	171	30.1	-6.7
5	829.28	25.8 QP	46.0	-20.2	2.00 H	35	29.7	-3.9
6	928.22	31.2 QP	46.0	-14.8	1.00 H	248	33.6	-2.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	92.08	29.7 QP	43.5	-13.8	1.00 V	17	48.7	-19.0
2	253.10	31.9 QP	46.0	-14.1	1.49 V	157	45.9	-14.0
3	447.10	26.3 QP	46.0	-19.7	1.00 V	118	36.3	-10.0
4	557.68	24.4 QP	46.0	-21.6	1.00 V	252	33.1	-8.7
5	767.20	24.6 QP	46.0	-21.4	1.00 V	9	29.2	-4.6
6	988.36	27.2 QP	54.0	-26.8	1.99 V	15	28.7	-1.5

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	99.84	30.6 QP	43.5	-12.9	1.99 H	132	48.6	-18.0
2	165.80	36.4 QP	43.5	-7.1	1.50 H	156	50.1	-13.7
3	267.65	33.8 QP	46.0	-12.2	1.00 H	113	47.2	-13.4
4	431.58	32.1 QP	46.0	-13.9	1.99 H	98	42.4	-10.3
5	781.75	32.0 QP	46.0	-14.0	1.99 H	117	36.4	-4.4
6	960.23	30.7 QP	54.0	-23.3	1.00 H	128	32.4	-1.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	99.84	33.5 QP	43.5	-10.0	1.25 V	48	51.5	-18.0
2	239.52	31.8 QP	46.0	-14.2	1.01 V	236	46.5	-14.7
3	487.84	29.8 QP	46.0	-16.2	1.50 V	48	39.4	-9.6
4	666.32	29.5 QP	46.0	-16.5	1.50 V	66	36.1	-6.6
5	855.47	33.8 QP	46.0	-12.2	1.01 V	142	37.3	-3.5
6	960.23	29.8 QP	54.0	-24.2	1.01 V	154	31.5	-1.7

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	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.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
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 1.
3. The VCCI Site Registration No. is C-2040.

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.

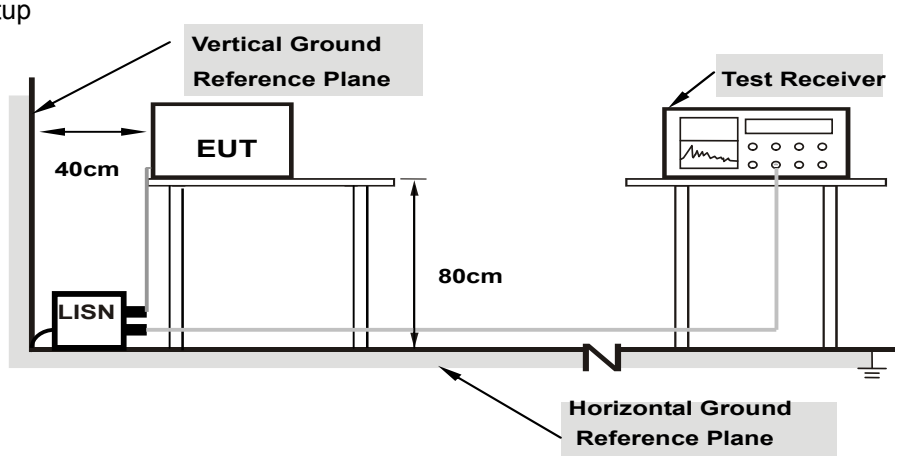
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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.

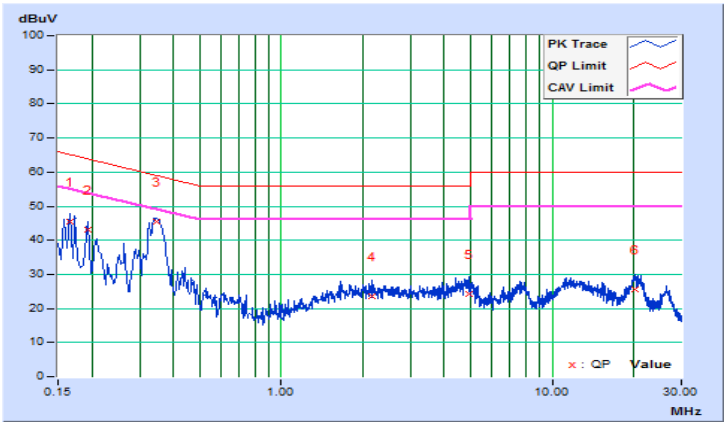
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	Channel 1		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16569	10.16	35.42	21.76	45.58	31.92	65.17	55.17	-19.59	-23.25
2	0.19305	10.16	32.95	21.13	43.11	31.29	63.90	53.90	-20.79	-22.61
3	0.34560	10.19	35.42	27.25	45.61	37.44	59.07	49.07	-13.46	-11.63
4	2.17538	10.25	13.36	8.41	23.61	18.66	56.00	46.00	-32.39	-27.34
5	4.92802	10.39	13.83	6.38	24.22	16.77	56.00	46.00	-31.78	-29.23
6	20.31778	11.26	14.29	6.87	25.55	18.13	60.00	50.00	-34.45	-31.87

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.

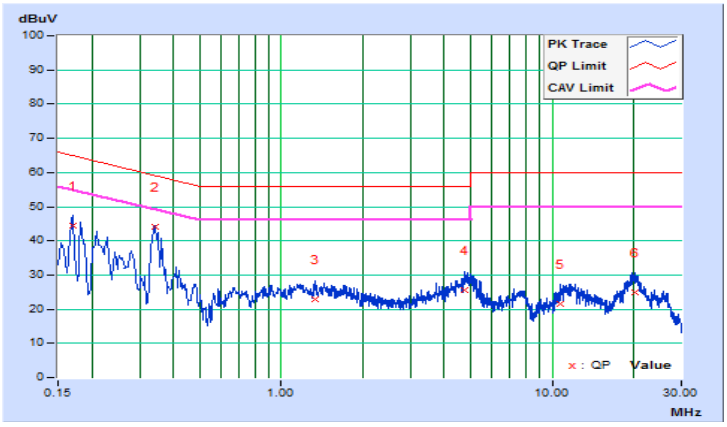


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	Channel 1		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16955	10.15	34.41	19.80	44.56	29.95	64.98	54.98	-20.42	-25.03
2	**0.34159**	**10.19**	**34.03**	**27.55**	**44.22**	**37.74**	**59.16**	**49.16**	**-14.94**	**-11.42**
3	1.32691	10.21	12.65	6.92	22.86	17.13	56.00	46.00	-33.14	-28.87
4	4.75207	10.37	15.10	7.79	25.47	18.16	56.00	46.00	-30.53	-27.84
5	10.71482	10.60	11.05	5.15	21.65	15.75	60.00	50.00	-38.35	-34.25
6	20.29041	11.02	13.98	7.27	25.00	18.29	60.00	50.00	-35.00	-31.71

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.



5 Pictures of Test Arrangements

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

Appendix – 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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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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