

# PARTIAL FCC TEST REPORT (15.247)

**REPORT NO.:** RF140128C25A

**MODEL NO.:** RTL8723BE / RTL8723BE1T1R / RTL8723BENF

**FCC ID:** TX2-RTL8723BE

**RECEIVED:** Mar. 13, 2014

**TESTED:** Mar. 17, 2014 ~ Mar. 20, 2014

**ISSUED:** Mar. 25, 2014

**APPLICANT:** Realtek Semiconductor Corp.

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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
RF140128C25A	Original release	Mar. 25, 2014

## 1. CERTIFICATION

**PRODUCT:** 802.11b/g/n RTL8723BE Combo module

**MODEL NO.:** RTL8723BE / RTL8723BE1T1R / RTL8723BENF

**BRAND:** REALTEK

**APPLICANT:** Realtek Semiconductor Corp.

**TESTED:** Mar. 17, 2014 ~ Mar. 20, 2014

**TEST SAMPLE:** Identical Prototype

**STANDARDS:** FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10-2009

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 EMC characteristics under the conditions specified in this report.

**PREPARED BY** : Gina Liu , **DATE** : Mar. 25, 2014

Gina Liu / Specialist

**APPROVED BY** : Sam chen , **DATE** : Mar. 25, 2014

Sam Chen / Senior Project Engineer

## 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 -7.94dB at 0.46641MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -7.55dB at 30.81MHz.

### 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
Conducted emissions	9kHz~30MHz	2.44 dB
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

<b>EUT</b>	802.11b/g/n RTL8723BE Combo module
<b>MODEL NO.</b>	RTL8723BE / RTL8723BE1T1R / RTL8723BENF
<b>POWER SUPPLY</b>	20Vdc (adapter)
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to MCS7
<b>OPERATING FREQUENCY</b>	2412 ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
<b>ANTENNA TYPE</b>	Refer to NOTE as below
<b>ANTENNA CONNECTOR</b>	NA
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	Refer to NOTE as below

#### NOTE:

- The antenna information is listed as below.

Antenna Type	Brand Name	Parts Number	Antenna Gain
PIFA	Smart Approach Co., Ltd	WLAN Main Antenna: SE-ECVY2-001 WLAN Aux Antenna: SE-ECVY2-001	Main: 1.80 Aux. : -3.13
	HIGH-TEK ELECTRONICS CO., LTD	WLAN Main Antenna: 0ACCN013036 WLAN Aux Antenna: 0ACCN013036	Main: -0.07 Aux. : -1.81
	TONGDA Corporation	WLAN Main Antenna: T-543-9021012-A WLAN Aux Antenna: T-543-9021012-A	Main: 1.98 Aux. : 1.85

✧ Only the antenna with the worst gain has been tested and records the test result in this report.

- The EUT contains following accessory devices.

ITEM	BRAND	MODEL	DESCRIPTION
AC Adapter	lenovo	ADL135NLC3A	I/P: 100-240Vac, 50-60Hz, 2.5A O/P: 20Vdc, 6.75A 1.8m cable w/ one core
Module	REALTEK	RTL8723BE	--

- The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	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.

## 3.2 DESCRIPTION OF TEST MODES

### FOR 2.4GHz:

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		

7 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	
-	√	√	√	-

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 **Z-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	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

#### 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	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (40MHz)	3 to 9	3	OFDM	BPSK	MCS0

#### POWER LINE CONDUCTED EMISSION TEST:

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (40MHz)	3 to 9	3	OFDM	BPSK	MCS0





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**Test CONDITION:**

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

### 3.3 DESCRIPTION OF SUPPORT UNITS

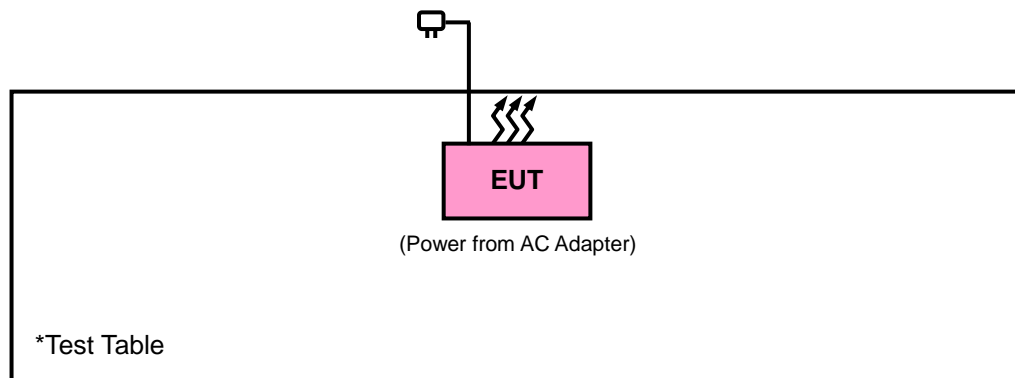
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Bluetooth Tester	R&S	CBT	100870	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

**NOTE:** 1. All power cords of the above support units are non shielded (1.8m).  
2. Item 1 as a communication partner to transfer data.

#### 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**

**558074 D01 DTS Meas Guidance v03r01**

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 (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

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	100744	Apr. 15, 2013	Apr. 14, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 21, 2013	Dec. 20, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Feb. 19, 2014	Feb. 18, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 18, 2013	Dec. 17, 2014
Active Loop Antenna	6502	00143303	Jan. 16, 2014	Jan. 15, 2015
Preamplifier EMCI	EMC 012645	980115	Dec. 26, 2013	Dec. 25, 2014
Preamplifier EMCI	EMC 184045	980116	Jan. 13, 2014	Jan. 12, 2015
Preamplifier EMCI	EMC 330H	980112	Dec. 27, 2013	Dec. 26, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable Worken	RG-213	NA	Nov. 07, 2013	Nov. 06, 2014
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
Power Meter	ML2495A	1232002	Aug. 23, 2013	Aug. 22, 2014
Power Sensor	MA2411B	1207325	Aug. 23, 2013	Aug. 22, 2014

- 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 preamplifier (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:**

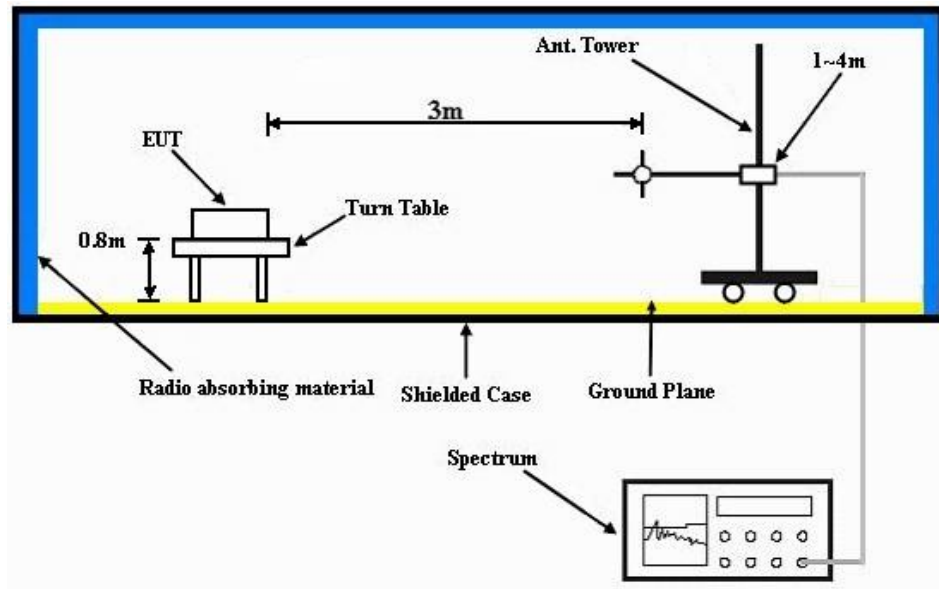
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 1kHz (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

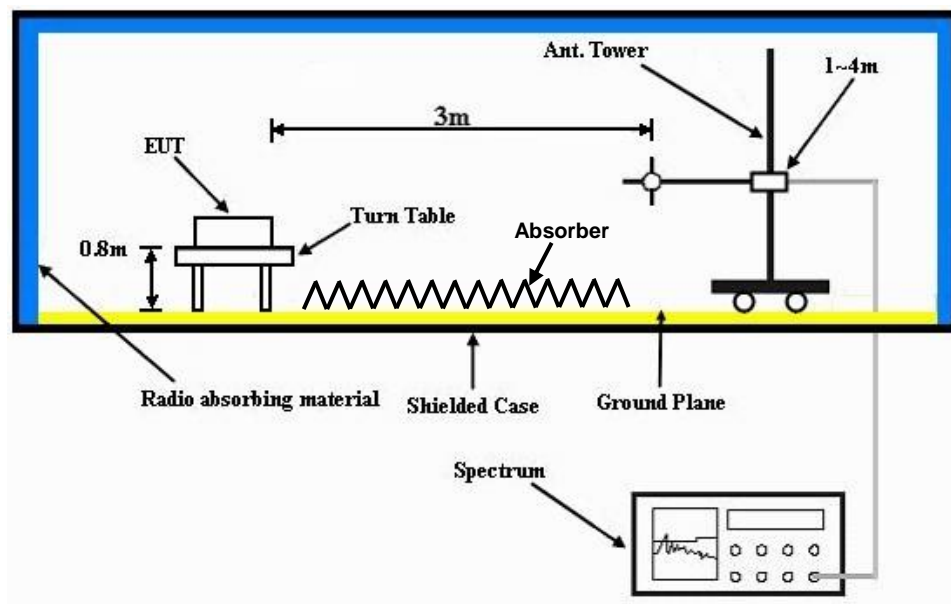
No deviation.

#### 4.1.5 TEST SETUP

Frequency Range 30MHz ~ 1GHz



Frequency Range above 1GHz



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

#### 4.1.6 EUT OPERATING CONDITIONS

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

#### 4.1.7 TEST RESULTS

##### ABOVE 1GHz WORST-CASE DATA

802.11b

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

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
2390	37.34	43.98	54	-16.66	26.91	3.97	37.52	129	58	Average
2390	51	57.64	74	-23	26.91	3.97	37.52	129	58	Peak
2412	95.63	102.22			26.96	3.97	37.52	129	58	Average
2412	100.03	106.62			26.96	3.97	37.52	129	58	Peak
2500	34.61	40.6	54	-19.39	27.2	4.06	37.25	129	58	Average
2500	50.79	56.78	74	-23.21	27.2	4.06	37.25	129	58	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
2386	41.22	48.29	54	-12.78	26.91	3.52	37.5	100	180	Average
2386	52.49	59.56	74	-21.51	26.91	3.52	37.5	100	180	Peak
2412	102.48	109.5			26.96	3.54	37.52	100	180	Average
2412	106.74	113.76			26.96	3.54	37.52	100	180	Peak
2486	35.92	42.49	54	-18.08	27.15	3.6	37.32	100	180	Average
2486	51.71	58.28	74	-22.29	27.15	3.6	37.32	100	180	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
2348	33.17	40.39	54	-20.83	26.77	3.5	37.49	136	198	Average
2348	50.51	57.73	74	-23.49	26.77	3.5	37.49	136	198	Peak
2437	96.27	103.11			27.06	3.56	37.46	136	198	Average
2437	100.46	107.3			27.06	3.56	37.46	136	198	Peak
2496	34.34	40.77	54	-19.66	27.2	3.62	37.25	136	198	Average
2496	50.35	56.78	74	-23.65	27.2	3.62	37.25	136	198	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	35.74	42.86	54	-18.26	26.86	3.52	37.5	100	180	Average
2382	51.52	58.64	74	-22.48	26.86	3.52	37.5	100	180	Peak
2437	102.84	109.68			27.06	3.56	37.46	100	180	Average
2437	106.89	113.73			27.06	3.56	37.46	100	180	Peak
2486	35.43	42	54	-18.57	27.15	3.6	37.32	100	180	Average
2486	51	57.57	74	-23	27.15	3.6	37.32	100	180	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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

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
2352	33.42	40.6	54	-20.58	26.81	3.5	37.49	107	198	Average
2352	50.91	58.09	74	-23.09	26.81	3.5	37.49	107	198	Peak
2462	95.93	102.64			27.1	3.58	37.39	107	198	Average
2462	100.33	107.04			27.1	3.58	37.39	107	198	Peak
2486	39.37	45.94	54	-14.63	27.15	3.6	37.32	107	198	Average
2486	51.53	58.1	74	-22.47	27.15	3.6	37.32	107	198	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
2380	35.15	42.27	54	-18.85	26.86	3.52	37.5	128	183	Average
2380	50.94	58.06	74	-23.06	26.86	3.52	37.5	128	183	Peak
2462	101.48	108.19			27.1	3.58	37.39	128	183	Average
2462	105.92	112.63			27.1	3.58	37.39	128	183	Peak
2490	42.31	48.81	54	-11.69	27.2	3.62	37.32	128	183	Average
2490	53.16	59.66	74	-20.84	27.2	3.62	37.32	128	183	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.

# 802.11g

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

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
2390	37.55	44.62	54	-16.45	26.91	3.54	37.52	130	57	Average
2390	54.09	61.16	74	-19.91	26.91	3.54	37.52	130	57	Peak
2412	89.09	96.11			26.96	3.54	37.52	130	57	Average
2412	98.73	105.75			26.96	3.54	37.52	130	57	Peak
2496	35.14	41.57	54	-18.86	27.2	3.62	37.25	130	57	Average
2496	50.02	56.45	74	-23.98	27.2	3.62	37.25	130	57	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
2390	41.47	48.54	54	-12.53	26.91	3.54	37.52	100	180	Average
2390	59.21	66.28	74	-14.79	26.91	3.54	37.52	100	180	Peak
2412	96.46	103.48			26.96	3.54	37.52	100	180	Average
2412	106.22	113.24			26.96	3.54	37.52	100	180	Peak
2484	37.61	44.18	54	-16.39	27.15	3.6	37.32	100	180	Average
2484	51.21	57.78	74	-22.79	27.15	3.6	37.32	100	180	Peak

## REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
2346	34.53	41.75	54	-19.47	26.77	3.5	37.49	138	199	Average
2346	50.04	57.26	74	-23.96	26.77	3.5	37.49	138	199	Peak
2437	92.42	99.26			27.06	3.56	37.46	138	199	Average
2437	102.15	108.99			27.06	3.56	37.46	138	199	Peak
2492	35.83	42.26	54	-18.17	27.2	3.62	37.25	138	199	Average
2492	51.73	58.16	74	-22.27	27.2	3.62	37.25	138	199	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
2390	37.07	44.14	54	-16.93	26.91	3.54	37.52	100	181	Average
2390	52.11	59.18	74	-21.89	26.91	3.54	37.52	100	181	Peak
2437	98.26	105.1			27.06	3.56	37.46	100	181	Average
2437	107.72	114.56			27.06	3.56	37.46	100	181	Peak
2484	37.54	44.11	54	-16.46	27.15	3.6	37.32	100	181	Average
2484	53.66	60.23	74	-20.34	27.15	3.6	37.32	100	181	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.

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

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
2374	33.89	41.01	54	-20.11	26.86	3.52	37.5	135	200	Average
2374	50.08	57.2	74	-23.92	26.86	3.52	37.5	135	200	Peak
2462	91.44	98.15			27.1	3.58	37.39	135	200	Average
2462	101.06	107.77			27.1	3.58	37.39	135	200	Peak
2484	39.53	46.1	54	-14.47	27.15	3.6	37.32	135	200	Average
2484	53.57	60.14	74	-20.43	27.15	3.6	37.32	135	200	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
2380	36.19	43.31	54	-17.81	26.86	3.52	37.5	100	183	Average
2380	50.68	57.8	74	-23.32	26.86	3.52	37.5	100	183	Peak
2462	96.27	102.98			27.1	3.58	37.39	100	183	Average
2462	105.87	112.58			27.1	3.58	37.39	100	183	Peak
2484	41.57	48.14	54	-12.43	27.15	3.6	37.32	100	183	Average
2484	57.16	63.73	74	-16.84	27.15	3.6	37.32	100	183	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.

# 802.11n (20MHz)

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

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
2390	37.69	44.76	54	-16.31	26.91	3.54	37.52	108	58	Average
2390	53.92	60.99	74	-20.08	26.91	3.54	37.52	108	58	Peak
2412	88.44	95.46			26.96	3.54	37.52	108	58	Average
2412	98.02	105.04			26.96	3.54	37.52	108	58	Peak
2488	35.02	41.52	54	-18.98	27.2	3.62	37.32	108	58	Average
2488	50.72	57.22	74	-23.28	27.2	3.62	37.32	108	58	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
2390	41.03	48.1	54	-12.97	26.91	3.54	37.52	100	180	Average
2390	59.9	66.97	74	-14.1	26.91	3.54	37.52	100	180	Peak
2412	95.79	102.81			26.96	3.54	37.52	100	180	Average
2412	105.31	112.33			26.96	3.54	37.52	100	180	Peak
2500	37.83	44.26	54	-16.17	27.2	3.62	37.25	100	180	Average
2500	51.76	58.19	74	-22.24	27.2	3.62	37.25	100	180	Peak

## REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
2384	34.66	41.78	54	-19.34	26.86	3.52	37.5	110	199	Average
2384	49.63	56.75	74	-24.37	26.86	3.52	37.5	110	199	Peak
2437	91.64	98.48			27.06	3.56	37.46	110	199	Average
2437	101.17	108.01			27.06	3.56	37.46	110	199	Peak
2484	35.95	42.52	54	-18.05	27.15	3.6	37.32	110	199	Average
2484	50.6	57.17	74	-23.4	27.15	3.6	37.32	110	199	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
2378	36.87	43.99	54	-17.13	26.86	3.52	37.5	100	182	Average
2378	51.89	59.01	74	-22.11	26.86	3.52	37.5	100	182	Peak
2437	97.51	104.35			27.06	3.56	37.46	100	182	Average
2437	107.13	113.97			27.06	3.56	37.46	100	182	Peak
2484	37.26	43.83	54	-16.74	27.15	3.6	37.32	100	182	Average
2484	52.31	58.88	74	-21.69	27.15	3.6	37.32	100	182	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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

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
2318	33.7	40.97	54	-20.3	26.72	3.48	37.47	136	200	Average
2318	50.01	57.28	74	-23.99	26.72	3.48	37.47	136	200	Peak
2462	90.96	97.67			27.1	3.58	37.39	136	200	Average
2462	100.5	107.21			27.1	3.58	37.39	136	200	Peak
2484	38.79	45.36	54	-15.21	27.15	3.6	37.32	136	200	Average
2484	54.99	61.56	74	-19.01	27.15	3.6	37.32	136	200	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
2386	36.06	43.13	54	-17.94	26.91	3.52	37.5	100	183	Average
2386	51.86	58.93	74	-22.14	26.91	3.52	37.5	100	183	Peak
2462	95.79	102.5			27.1	3.58	37.39	100	183	Average
2462	105.41	112.12			27.1	3.58	37.39	100	183	Peak
2484	41.45	48.02	54	-12.55	27.15	3.6	37.32	100	183	Average
2484	56.15	62.72	74	-17.85	27.15	3.6	37.32	100	183	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.

**802.11n (40MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
2386	40.3	47.37	54	-13.7	26.91	3.52	37.5	128	57	Average
2386	55.45	62.52	74	-18.55	26.91	3.52	37.5	128	57	Peak
2422	85.89	92.78			27.01	3.56	37.46	128	57	Average
2422	95.16	102.05			27.01	3.56	37.46	128	57	Peak
2498	35.4	41.83	54	-18.6	27.2	3.62	37.25	128	57	Average
2498	50.71	57.14	74	-23.29	27.2	3.62	37.25	128	57	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
2388	45.15	52.2	54	-8.85	26.91	3.54	37.5	100	181	Average
2388	59.63	66.68	74	-14.37	26.91	3.54	37.5	100	181	Peak
2422	93.01	99.9			27.01	3.56	37.46	100	181	Average
2422	102.49	109.38			27.01	3.56	37.46	100	181	Peak
2486	38.4	44.97	54	-15.6	27.15	3.6	37.32	100	181	Average
2486	51.71	58.28	74	-22.29	27.15	3.6	37.32	100	181	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2422MHz: Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
2390	37.79	44.86	54	-16.21	26.91	3.54	37.52	134	199	Average
2390	52.46	59.53	74	-21.54	26.91	3.54	37.52	134	199	Peak
2437	89.27	96.11			27.06	3.56	37.46	134	199	Average
2437	98.93	105.77			27.06	3.56	37.46	134	199	Peak
2484	42.23	48.8	54	-11.77	27.15	3.6	37.32	134	199	Average
2484	59.88	66.45	74	-14.12	27.15	3.6	37.32	134	199	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
2388	44.21	51.26	54	-9.79	26.91	3.54	37.5	101	179	Average
2388	57.9	64.95	74	-16.1	26.91	3.54	37.5	101	179	Peak
2437	94.76	101.6			27.06	3.56	37.46	101	179	Average
2437	104.43	111.27			27.06	3.56	37.46	101	179	Peak
2486	44.58	51.15	54	-9.42	27.15	3.6	37.32	101	179	Average
2486	62.25	68.82	74	-11.75	27.15	3.6	37.32	101	179	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
2364	34.75	41.91	54	-19.25	26.81	3.52	37.49	136	199	Average
2364	50.43	57.59	74	-23.57	26.81	3.52	37.49	136	199	Peak
2452	87.97	94.72			27.06	3.58	37.39	136	199	Average
2452	97.39	104.14			27.06	3.58	37.39	136	199	Peak
2484	40.89	47.46	54	-13.11	27.15	3.6	37.32	136	199	Average
2484	57.19	63.76	74	-16.81	27.15	3.6	37.32	136	199	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	37.85	44.97	54	-16.15	26.86	3.52	37.5	100	181	Average
2384	51.41	58.53	74	-22.59	26.86	3.52	37.5	100	181	Peak
2452	93.21	99.96			27.06	3.58	37.39	100	181	Average
2452	102.86	109.61			27.06	3.58	37.39	100	181	Peak
2484	43.6	50.17	54	-10.4	27.15	3.6	37.32	100	181	Average
2484	58.69	65.26	74	-15.31	27.15	3.6	37.32	100	181	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2452MHz: Fundamental frequency.

# **BELOW 1GHz WORST-CASE DATA:**

**802.11n (40MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
54.3	22.86	40.84	40	-17.14	12.56	0.79	31.33	133	258	Peak
132.87	26.56	45.23	43.5	-16.94	11.88	1.26	31.81	165	202	Peak
265.17	32.09	50.23	46	-13.91	11.91	1.89	31.94	144	256	Peak
405.7	31.43	45.58	46	-14.57	15.45	2.45	32.05	100	201	Peak
672.4	33.84	41.85	46	-12.16	20.48	3.33	31.82	169	200	Peak
798.4	35.83	41.36	46	-10.17	22.2	3.69	31.42	133	269	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
30.81	32.45	50.86	40	-7.55	12.14	0.57	31.12	185	102	Peak
162.03	27.25	45.16	43.5	-16.25	12.54	1.4	31.85	122	310	Peak
270.03	32.27	50.34	46	-13.73	12.05	1.91	32.03	105	355	Peak
404.3	32.86	47.06	46	-13.14	15.43	2.44	32.07	173	144	Peak
696.2	35.82	43.44	46	-10.18	20.77	3.42	31.81	100	166	Peak
797	37.43	42.97	46	-8.57	22.19	3.69	31.42	174	209	Peak

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ 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. 17, 2013	Nov. 16, 2014
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 23, 2013	Dec. 22, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 08, 2013	Jul. 07, 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.

#### 4.2.3 TEST PROCEDURES

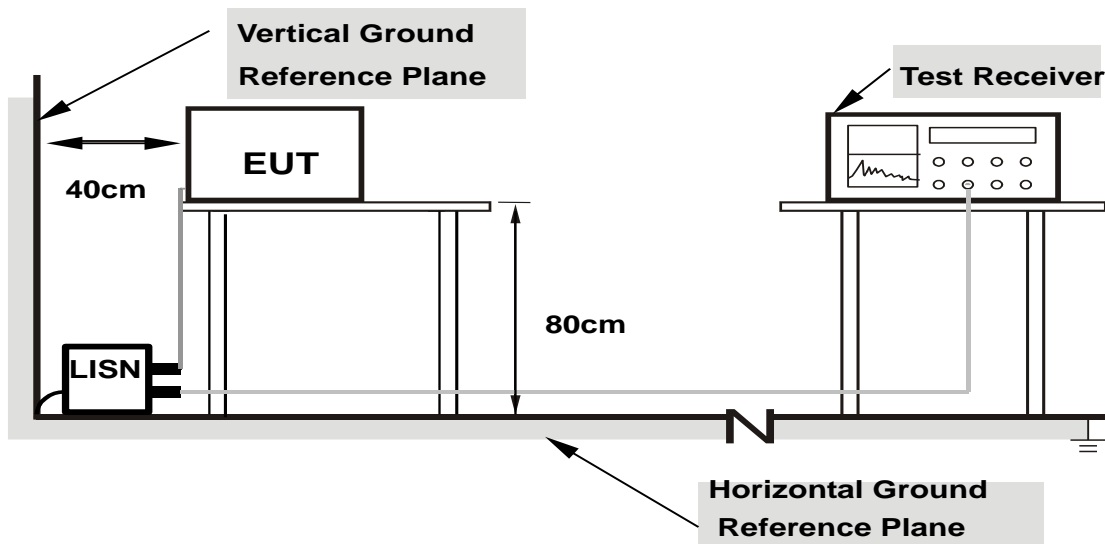
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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 section 4.1.6.

#### 4.2.7 TEST RESULTS

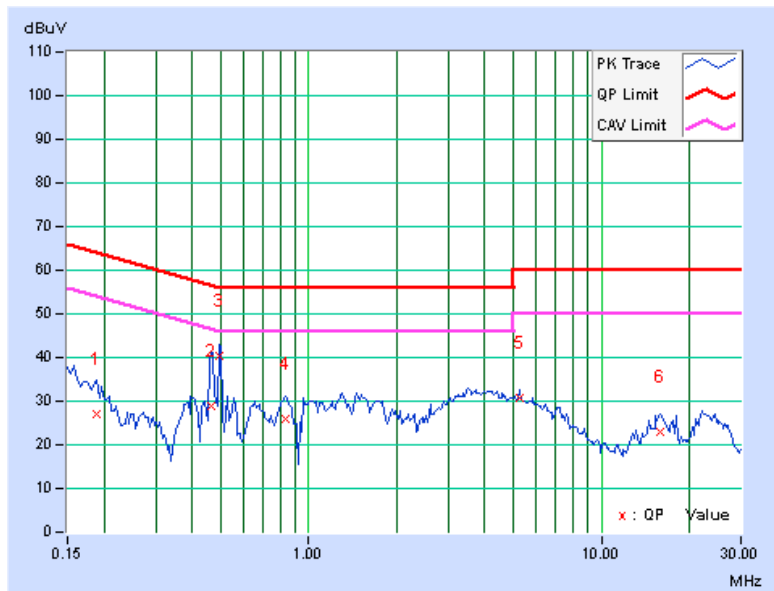
##### CONDUCTED WORST-CASE DATA :

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.28	26.82	14.51	27.10	14.79	64.08	54.08	-36.98	-39.29
2	0.46641	0.30	28.77	17.87	29.07	18.17	56.58	46.58	-27.50	-28.40
3	0.49375	0.31	40.21	37.09	40.52	37.40	56.10	46.10	-15.59	-8.71
4	0.83750	0.33	25.78	18.47	26.11	18.80	56.00	46.00	-29.89	-27.20
5	5.23438	0.44	30.40	25.78	30.84	26.22	60.00	50.00	-29.16	-23.78
6	15.98047	0.54	22.39	17.01	22.93	17.55	60.00	50.00	-37.07	-32.45

##### 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

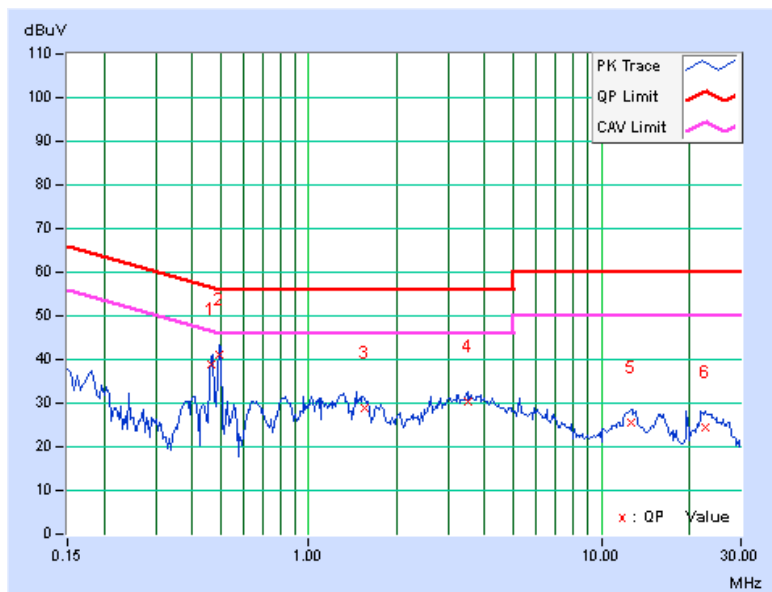


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.46641	0.30	38.68	38.33	38.98	38.63	56.58	46.58	-17.59	-7.94
2	0.49375	0.31	40.71	37.85	41.02	38.16	56.10	46.10	-15.09	-7.95
3	1.55469	0.36	28.38	25.58	28.74	25.94	56.00	46.00	-27.26	-20.06
4	3.49609	0.42	29.81	24.60	30.23	25.02	56.00	46.00	-25.77	-20.98
5	12.57031	0.54	24.84	17.53	25.38	18.07	60.00	50.00	-34.62	-31.93
6	22.76172	0.60	23.89	19.07	24.49	19.67	60.00	50.00	-35.51	-30.33

#### 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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**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

## **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.

---END---