



# FCC TEST REPORT

**REPORT NO.:** RF941229L01E

**MODEL NO.:** QBTM400

**RECEIVED:** Sep. 14, 2009

**TESTED:** Sep. 18 ~ Sep. 21, 2009

**ISSUED:** Sep. 23, 2009

**APPLICANT:** Qcom Technology Inc.

**ADDRESS:** 7F, NO. 178, MING CHUAN E. RD. SEC 3,  
TAIPEI TAIWAN R.O.C.

**ISSUED BY:** Bureau Veritas Consumer Products Services  
(H.K.) Ltd., Taoyuan Branch

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Shan Hsiang, Taoyuan Hsien 333, Taiwan,  
R.O.C.

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# 1. CERTIFICATION

**PRODUCT:** Bluetooth Module  
**MODEL:** QBTM400  
**BRAND:** Qcom Technology Inc.  
**APPLICANT:** Qcom Technology Inc.  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**TESTED:** Sep. 18 ~ Sep. 21, 2009  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.4-2003

The above equipment (Model: QBTM400) 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** : Peggy Chen , **DATE** : Sep. 23, 2009  
Peggy Chen / Specialist

**TECHNICAL ACCEPTANCE** : Long Chen , **DATE** : Sep. 23, 2009  
Responsible for RF Long Chen / Senior Engineer

**APPROVED BY** : Gary Chang , **DATE** : Sep. 23, 2009  
Gary Chang / Assistant Manager

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -10.84dB at 0.185MHz.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -1.07dB at 1500.00MHz.

### 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:

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>	Bluetooth Module
<b>MODEL NO.</b>	QBTM400
<b>FCC ID</b>	RUJ-QBTM400
<b>POWER SUPPLY</b>	3.3Vdc from host equipment
<b>MODULATION TYPE</b>	GFSK, $\pi/4$ -DQPSK, 8DPSK
<b>MODULATION TECHNOLOGY</b>	FHSS
<b>TRANSFER RATE</b>	1/2/3Mbps
<b>OPERATING FREQUENCY</b>	2402MHz ~ 2480MHz
<b>NUMBER OF CHANNEL</b>	79
<b>OUTPUT POWER</b>	1.714mW
<b>ANTENNA TYPE</b>	Refer to note as below
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	NA
<b>ACCESSORY DEVICES</b>	NA

**NOTE:**

1. This report is prepared for FCC class II permissive change. Difference compared with the original report are adding a PIFA antenna and adding co-located test for testing with WLAN module (FCC ID: VQF-RT2700E).
2. The following antennas are used in this EUT. (New antenna is marked in boldface.)

NO.	BRAND	MODEL	TYPE	GAIN (dBi)	CONNECTOR	REMARK
1	Qcom	NA	Printed	-4.67	NA	Original ant.
2	WNC	EBJ-I2	PIFA	-0.55	U.FL	Original ant.
<b>3</b>	<b>WNC</b>	<b>81.EEU15.001</b>	<b>PIFA</b>	<b>-0.56</b>	<b>U.FL</b>	<b>New ant.</b>

3. The WLAN module is authorized for use in specific End-product (mini PC, brand: ViewSonic, model: MP45-R). Please refer to below table for further details.

Product Name	Brand	Model Name	FCC ID
11b/g/n 1T2R WLAN Half Mini Card	Ralink	RT2700E	VQF-RT2700E

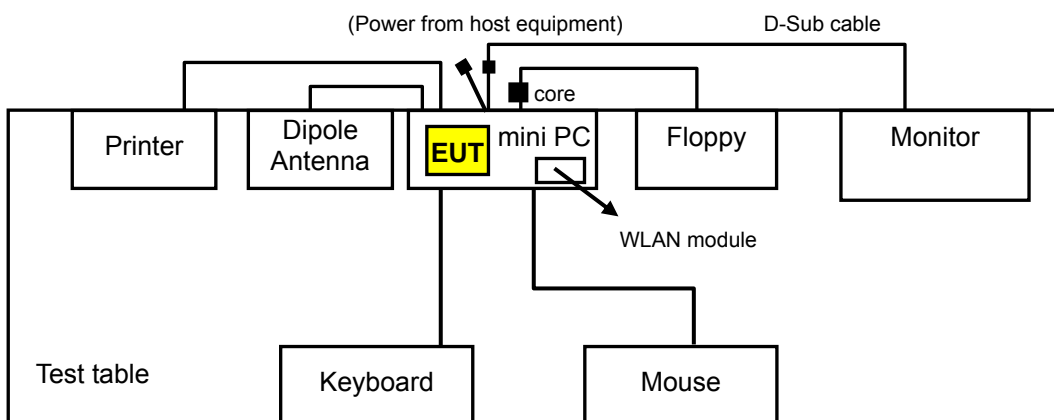
4. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

### 3.2 DESCRIPTION OF TEST MODES

79 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

#### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.2.2 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  
**PLC**: Power Line Conducted Emission t

**RE<1G**: Radiated Emission below 1GHz

#### RADIATED EMISSION TEST (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet type, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE	AXIS
GFSK+ 802.11b	0 to 78	0 + 6	FHSS	GFSK	DH5	Z
	1 to 11		DSSS	DBPSK	-	
GFSK+ DRAFT 802.11n (20MHz)	0 to 78	0 + 6	FHSS	GFSK	DH5	Z
	1 to 11		OFDM	BPSK	-	
8DPSK+ 802.11b	0 to 78	0 + 6	FHSS	8DPSK	DH5	Z
	1 to 11		DSSS	DBPSK	-	
8DPSK+ DRAFT 802.11n (20MHz)	0 to 78	0 + 6	FHSS	8DPSK	DH5	Z
	1 to 11		OFDM	BPSK	-	

#### RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet type, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE	AXIS
GFSK+ 802.11b	0 to 78	0 + 6	FHSS	GFSK	DH5	Z
	1 to 11		DSSS	DBPSK	-	
GFSK+ DRAFT 802.11n (20MHz)	0 to 78	0 + 6	FHSS	GFSK	DH5	Z
	1 to 11		OFDM	BPSK	-	
8DPSK+ 802.11b	0 to 78	0 + 6	FHSS	8DPSK	DH5	Z
	1 to 11		DSSS	DBPSK	-	
8DPSK+ DRAFT 802.11n (20MHz)	0 to 78	0 + 6	FHSS	8DPSK	DH5	Z
	1 to 11		OFDM	BPSK	-	



**POWER LINE CONDUCTED EMISSION TEST:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet type and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE	AXIS
GFSK+ 802.11b	0 to 78 1 to 11	0 + 6	FHSS DSSS	GFSK DBPSK	DH5 -	Z
GFSK+ DRAFT 802.11n (20MHz)	0 to 78 1 to 11	0 + 6	FHSS OFDM	GFSK BPSK	DH5 -	Z
8DPSK+ 802.11b	0 to 78 1 to 11	0 + 6	FHSS DSSS	8DPSK DBPSK	DH5 -	Z
8DPSK+ DRAFT 802.11n (20MHz)	0 to 78 1 to 11	0 + 6	FHSS OFDM	8DPSK BPSK	DH5 -	Z

**3.3 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 C63.4-2003**

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



### 3.4 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	mini PC	ViewSonic	MP45-R	NA	FCC DoC Approved
2	LCD MONITOR	ACER	AL1511 bm	ET.L1408.04334 80013APK01	FCC DoC Approved
3	PRINTER	HP	HP LASERJET 1300	CNCM065718	FCC DoC Approved
4	KEYBOARD	DELL	SK-8115	MY-0DJ325-716 19-857-1198	FCC DoC Approved
5	MOUSE	DELL	MO56U0	516056250	FCC DoC Approved
6	EXTERNAL USB 1.1 FLOPPY	SONY	MPF82E	50010255	FCC DoC Approved
7	DIPOLE ANTENNA	NA	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	0.25m non-shielded Y cable without core. 1.8m braid shielded wire, D-Sub connector, without core.
2	1.8m braid shielded wire, DB25 connector, w/o core.
3	1.8m foil shielded wire, USB Connector, w/o core.
4	1.8m foil shielded wire, USB Connector, w/o core.
5	1.8m foil shielded wire, USB Connector, with one core.
6	NA

**NOTE:**

1. All power cords of the above support units are non shielded (1.8m).
2. Item 1, 7 were provided by client.
3. Y cable of item 1 was provided by client.

## 4. TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

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. As shown in 15.35(b), 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	ESI7	100033	Jul. 06, 2009	Jul. 05, 2010
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100076	May. 26, 2009	May 25, 2010
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 27, 2009	Apr. 26, 2010
HORN Antenna SCHWARZBECK	9120D	9120D-209	Jul. 01, 2009	Jun. 30, 2010
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 25, 2008	Dec. 24, 2009
Preamplifier Agilent	8447D	2944A10633	Nov. 03, 2008	Nov. 02, 2009
Preamplifier Agilent	8449B	3008A01964	Oct. 23, 2008	Oct. 22, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 13, 2009	May 12, 2010
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 13, 2009	May 12, 2010
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	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 3.
  3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  4. The FCC Site Registration No. is 988962.
  5. The IC Site Registration No. is IC 7450F-3.

#### 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 meter 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. The antenna is a broadband antenna, and its height 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.

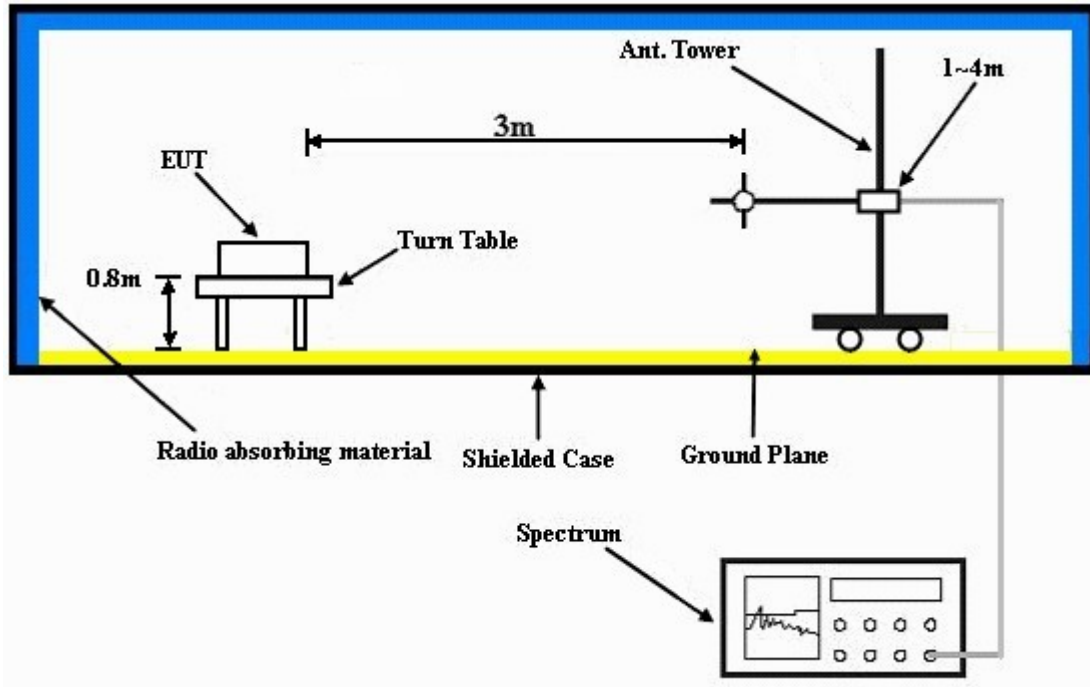
**NOTE:**

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 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. 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. Installed the EUT into the mini PC.
- b. The mini PC ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- c. The mini PC sent "H" messages to monitor and the monitors displayed "H" patterns.
- d. The mini PC sent "H" messages to printer, and the printer printed them on paper.
- e. The EUT communicated messages with the external USB 1.1 floppy.
- c. Steps c-d was repeated.



### 4.1.7 TEST RESULTS

#### GFSK MODULATION + 802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 1000hPa	TESTED BY	Brad Wu

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	1500.00	51.92 PK	74.00	-22.08	1.02 H	271	23.34	28.58
2	1500.00	47.83 AV	54.00	-6.17	1.02 H	271	19.25	28.58
3	2390.00	56.43 PK	74.00	-17.57	1.40 H	225	25.68	30.75
4	2390.00	44.59 AV	54.00	-9.41	1.40 H	225	13.84	30.75
5	#2400.00	49.37 PK	69.56	-20.19	1.40 H	225	18.58	30.79
6	#2400.00	19.27 AV	39.46	-20.19	1.40 H	225	-11.52	30.79
7	*2402.00	89.56 PK			1.40 H	225	58.76	30.80
8	*2402.00	59.46 AV			1.40 H	225	28.66	30.80
9	*2437.00	101.66 PK			1.40 H	84	70.75	30.91
10	*2437.00	97.47 AV			1.40 H	84	66.56	30.91
11	4804.00	53.62 PK	74.00	-20.38	1.01 H	39	16.99	36.63
12	4804.00	23.52 AV	54.00	-30.48	1.01 H	39	-13.11	36.63
13	4874.00	50.40 PK	74.00	-23.60	1.00 H	14	13.68	36.72
14	4874.00	42.64 AV	54.00	-11.36	1.00 H	14	5.92	36.72

- 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.
  5. “ \* “: Fundamental frequency.
  6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1$  dB.
  7. Average value = peak reading +  $20\log(\text{duty cycle})$ .



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 1000hPa	TESTED BY	Brad Wu

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	1500.00	54.16 PK	74.00	-19.84	1.35 V	174	25.58	28.58
2	1500.00	52.68 AV	54.00	-1.32	1.35 V	174	24.10	28.58
3	2390.00	58.24 PK	74.00	-15.76	1.14 V	45	27.49	30.75
4	2390.00	47.35 AV	54.00	-6.65	1.14 V	45	16.60	30.75
5	#2400.00	54.16 PK	74.65	-20.49	1.14 V	45	23.37	30.79
6	#2400.00	24.06 AV	44.55	-20.49	1.14 V	45	-6.73	30.79
7	*2402.00	94.65 PK			1.14 V	45	63.85	30.80
8	*2402.00	64.55 AV			1.14 V	45	33.75	30.80
9	*2437.00	108.56 PK			1.12 V	82	77.65	30.91
10	*2437.00	104.50 AV			1.12 V	82	73.59	30.91
11	4804.00	58.65 PK	74.00	-15.35	1.12 V	321	22.02	36.63
12	4804.00	28.55 AV	54.00	-25.45	1.12 V	321	-8.08	36.63
13	4874.00	52.47 PK	74.00	-21.53	1.32 V	278	15.75	36.72
14	4874.00	47.23 AV	54.00	-6.77	1.32 V	278	10.51	36.72

- 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.
  5. “ \* “: Fundamental frequency.
  6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1$  dB.
  7. Average value = peak reading +  $20\log(\text{duty cycle})$ .



A D T

**GFSK MODULATION + DRAFT 802.11n (20MHz) OFDM MODULATION**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 1000hPa	TESTED BY	Brad Wu

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	1500.00	51.65 PK	74.00	-22.35	1.00 H	269	23.07	28.58
2	1500.00	47.64 AV	54.00	-6.36	1.00 H	269	19.06	28.58
3	2390.00	56.61 PK	74.00	-17.39	1.41 H	226	25.86	30.75
4	2390.00	44.72 AV	54.00	-9.28	1.41 H	226	13.97	30.75
5	#2400.00	49.51 PK	69.70	-20.19	1.41 H	226	18.72	30.79
6	#2400.00	19.41 AV	39.60	-20.19	1.41 H	226	-11.38	30.79
7	*2402.00	89.70 PK			1.41 H	226	58.90	30.80
8	*2402.00	59.60 AV			1.41 H	226	28.80	30.80
9	*2437.00	101.53 PK			1.02 H	137	70.62	30.91
10	*2437.00	91.39 AV			1.02 H	137	60.48	30.91
11	4804.00	53.89 PK	74.00	-20.11	1.12 H	66	17.26	36.63
12	4804.00	23.79 AV	54.00	-30.21	1.12 H	66	-12.84	36.63
13	4874.00	48.18 PK	74.00	-25.82	1.03 H	21	11.46	36.72
14	4874.00	35.04 AV	54.00	-18.96	1.03 H	21	-1.68	36.72

- 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.
  5. “ \* “: Fundamental frequency.
  6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1$  dB.
  7. Average value = peak reading +  $20\log(\text{duty cycle})$ .





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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 1000hPa	TESTED BY	Brad Wu

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	1500.00	54.32 PK	74.00	-19.68	1.34 V	170	25.74	28.58
2	1500.00	52.87 AV	54.00	-1.13	1.34 V	170	24.29	28.58
3	2390.00	58.46 PK	74.00	-15.54	1.15 V	41	27.71	30.75
4	2390.00	47.50 AV	54.00	-6.50	1.15 V	41	16.75	30.75
5	#2400.00	54.76 PK	74.95	-20.19	1.15 V	41	23.97	30.79
6	#2400.00	24.66 AV	44.85	-20.19	1.15 V	41	-6.13	30.79
7	*2402.00	94.95 PK			1.15 V	41	64.15	30.80
8	*2402.00	64.85 AV			1.15 V	41	34.05	30.80
9	*2437.00	107.74 PK			1.07 V	58	76.83	30.91
10	*2437.00	97.21 AV			1.07 V	58	66.30	30.91
11	4804.00	59.19 PK	74.00	-14.81	1.13 V	319	22.56	36.63
12	4804.00	29.09 AV	54.00	-24.91	1.13 V	319	-7.54	36.63
13	4874.00	47.96 PK	74.00	-26.04	1.00 V	19	11.24	36.72
14	4874.00	34.86 AV	54.00	-19.14	1.00 V	19	-1.86	36.72

- 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.
  5. “ \* “: Fundamental frequency.
  6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1$  dB.
  7. Average value = peak reading +  $20\log(\text{duty cycle})$ .



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### 8DPSK MODULATION + 802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 1000hPa	TESTED BY	Brad Wu

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	1500.00	51.68 PK	74.00	-22.32	1.01 H	263	23.10	28.58
2	1500.00	47.52 AV	54.00	-6.48	1.01 H	263	18.94	28.58
3	2390.00	56.51 PK	74.00	-17.49	1.38 H	221	25.76	30.75
4	2390.00	44.72 AV	54.00	-9.28	1.38 H	221	13.97	30.75
5	#2400.00	49.64 PK	70.26	-20.62	1.38 H	221	18.85	30.79
6	#2400.00	19.54 AV	40.16	-20.62	1.38 H	221	-11.25	30.79
7	*2402.00	90.26 PK			1.38 H	221	59.46	30.80
8	*2402.00	60.16 AV			1.38 H	221	29.36	30.80
9	*2437.00	101.54 PK			1.38 H	221	70.63	30.91
10	*2437.00	97.35 AV			1.38 H	221	66.44	30.91
11	4804.00	53.41 PK	74.00	-20.59	1.02 H	46	16.78	36.63
12	4804.00	23.31 AV	54.00	-30.69	1.02 H	46	-13.32	36.63
13	4874.00	50.62 PK	74.00	-23.38	1.01 H	22	13.90	36.72
14	4874.00	42.93 AV	54.00	-11.07	1.01 H	22	6.21	36.72

- 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.
  5. “ \* “: Fundamental frequency.
  6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1$  dB.
  7. Average value = peak reading +  $20\log(\text{duty cycle})$ .



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 1000hPa	TESTED BY	Brad Wu

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	1500.00	56.38 PK	74.00	-17.62	1.32 V	176	27.80	28.58
2	1500.00	52.82 AV	54.00	-1.18	1.32 V	176	24.24	28.58
3	2390.00	58.39 PK	74.00	-15.61	1.00 V	5	27.64	30.75
4	2390.00	47.48 AV	54.00	-6.52	1.00 V	5	16.73	30.75
5	#2400.00	55.37 PK	75.99	-20.62	1.00 V	5	24.58	30.79
6	#2400.00	25.27 AV	45.89	-20.62	1.00 V	5	-5.52	30.79
7	*2402.00	95.99 PK			1.00 V	5	65.19	30.80
8	*2402.00	65.89 AV			1.00 V	5	35.09	30.80
9	*2437.00	108.23 PK			1.11 V	85	77.32	30.91
10	*2437.00	104.19 AV			1.11 V	85	73.28	30.91
11	4804.00	55.09 PK	74.00	-18.91	1.00 V	314	18.46	36.63
12	4804.00	24.99 AV	54.00	-29.01	1.00 V	314	-11.64	36.63
13	4874.00	52.68 PK	74.00	-21.32	1.29 V	274	15.96	36.72
14	4874.00	47.45 AV	54.00	-6.55	1.29 V	274	10.73	36.72

- REMARKS:**
- Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  - Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  - The other emission levels were very low against the limit.
  - Margin value = Emission level – Limit value.
  - “ \* “: Fundamental frequency.
  - The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1$  dB.
  - Average value = peak reading +  $20\log(\text{duty cycle})$ .



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**8DPSK MODULATION + DRAFT 802.11n (20MHz) OFDM MODULATION**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 1002 hPa	TESTED BY	Brad Wu

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	1500.00	51.42 PK	74.00	-22.58	1.04 H	269	22.84	28.58
2	1500.00	47.35 AV	54.00	-6.65	1.04 H	269	18.77	28.58
3	2390.00	56.84 PK	74.00	-17.16	1.38 H	220	26.09	30.75
4	2390.00	45.13 AV	54.00	-8.87	1.38 H	220	14.38	30.75
5	#2400.00	50.32 PK	70.94	-20.62	1.38 H	220	19.53	30.79
6	#2400.00	20.22 AV	40.84	-20.62	1.38 H	220	-10.57	30.79
7	*2402.00	90.94 PK			1.38 H	220	60.14	30.80
8	*2402.00	60.84 AV			1.38 H	220	30.04	30.80
9	*2437.00	102.26 PK			1.03 H	136	71.35	30.91
10	*2437.00	91.85 AV			1.03 H	136	60.94	30.91
11	4804.00	53.86 PK	74.00	-20.14	1.03 H	51	17.23	36.63
12	4804.00	23.76 AV	54.00	-30.24	1.03 H	51	-12.87	36.63
13	4874.00	48.69 PK	74.00	-25.31	1.05 H	42	11.97	36.72
14	4874.00	35.62 AV	54.00	-18.38	1.05 H	42	-1.10	36.72

- 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.
  5. “ \* “: Fundamental frequency.
  6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1$  dB.
  7. Average value = peak reading +  $20\log(\text{duty cycle})$ .



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 1002 hPa	TESTED BY	Brad Wu

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	1500.00	56.45 PK	74.00	-17.55	1.31 V	169	27.87	28.58
2	1500.00	52.93 AV	54.00	-1.07	1.31 V	169	24.35	28.58
3	2390.00	58.56 PK	74.00	-15.44	1.02 V	11	27.81	30.75
4	2390.00	47.62 AV	54.00	-6.38	1.02 V	11	16.87	30.75
5	#2400.00	55.22 PK	75.84	-20.62	1.02 V	11	24.43	30.79
6	#2400.00	25.12 AV	45.74	-20.62	1.02 V	11	-5.67	30.79
7	*2402.00	95.84 PK			1.02 V	11	65.04	30.80
8	*2402.00	65.74 AV			1.02 V	11	34.94	30.80
9	*2437.00	108.06 PK			1.00 V	92	77.15	30.91
10	*2437.00	97.53 AV			1.00 V	92	66.62	30.91
11	4804.00	55.36 PK	74.00	-18.64	1.03 V	316	18.73	36.63
12	4804.00	25.26 AV	54.00	-28.74	1.03 V	316	-11.37	36.63
13	4874.00	48.23 PK	74.00	-25.77	1.01 V	25	11.51	36.72
14	4874.00	35.12 AV	54.00	-18.88	1.01 V	25	-1.60	36.72

- 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.
  5. “ \* “: Fundamental frequency.
  6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1$  dB.
  7. Average value = peak reading +  $20\log(\text{duty cycle})$ .



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

**GFSK MODULATION + 802.11b DSSS MODULATION**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 999hPa	TESTED BY	Brad Wu

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	35.73	34.21 QP	40.00	-5.79	2.00 H	295	19.85	14.36
2	119.34	39.83 QP	43.50	-3.67	1.50 H	151	28.50	11.33
3	171.83	42.32 QP	43.50	-1.18	2.00 H	104	28.73	13.59
4	195.16	38.77 QP	43.50	-4.73	1.00 H	256	28.04	10.73
5	300.16	35.89 QP	46.00	-10.11	1.00 H	10	22.16	13.73
6	589.86	33.95 QP	46.00	-12.05	1.50 H	106	11.74	22.21
7	751.23	33.43 QP	46.00	-12.57	1.00 H	79	7.92	25.51

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	171.83	42.40 QP	43.50	-1.10	1.50 V	40	28.81	13.59
2	193.22	40.26 QP	43.50	-3.24	1.00 V	46	29.42	10.84
3	582.08	35.80 QP	46.00	-10.20	1.50 V	193	13.74	22.07
4	899.00	44.86 QP	46.00	-1.14	1.00 V	208	16.97	27.89
5	933.99	41.84 QP	46.00	-4.16	2.00 V	136	13.49	28.35
6	957.33	42.70 QP	46.00	-3.30	1.00 V	127	14.11	28.59

- 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.

**GFSK MODULATION + DRAFT 802.11n (20MHz) OFDM MODULATION**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 999hPa	TESTED BY	Brad Wu

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	119.34	39.47 QP	43.50	-4.03	2.00 H	121	28.14	11.33
2	179.61	42.11 QP	43.50	-1.39	1.00 H	298	30.40	11.71
3	265.16	34.57 QP	46.00	-11.43	1.00 H	61	20.78	13.79
4	506.25	31.98 QP	46.00	-14.02	1.50 H	4	11.42	20.56
5	751.23	33.56 QP	46.00	-12.44	1.00 H	85	8.05	25.51
6	935.94	34.43 QP	46.00	-11.57	2.00 H	208	6.06	28.37
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	121.28	35.62 QP	43.50	-7.88	1.50 V	91	24.20	11.42
2	177.67	39.86 QP	43.50	-3.64	1.00 V	103	27.43	12.42
3	300.16	30.75 QP	46.00	-15.25	1.50 V	163	17.02	13.73
4	539.30	31.84 QP	46.00	-14.16	1.50 V	43	10.59	21.25
5	751.23	35.44 QP	46.00	-10.56	1.50 V	166	9.93	25.51
6	895.11	38.26 QP	46.00	-7.74	1.00 V	148	10.45	27.81

- 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.



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**8DPSK MODULATION + 802.11b DSSS MODULATION**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 999hPa	TESTED BY	Brad Wu

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	119.34	39.55 QP	43.50	-3.95	1.00 H	130	28.22	11.33
2	173.78	40.30 QP	43.50	-3.20	1.00 H	64	26.83	13.47
3	574.30	37.69 QP	46.00	-8.31	1.00 H	31	15.77	21.92
4	663.74	35.42 QP	46.00	-10.58	1.00 H	142	11.28	24.14
5	899.00	39.51 QP	46.00	-6.49	1.00 H	154	11.62	27.89
6	939.83	41.20 QP	46.00	-4.80	1.00 H	154	12.78	28.43
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	35.73	35.57 QP	40.00	-4.43	1.00 V	19	21.21	14.36
2	119.34	36.51 QP	43.50	-6.99	2.00 V	121	25.18	11.33
3	177.67	38.63 QP	43.50	-4.87	1.00 V	73	26.21	12.42
4	533.47	33.51 QP	46.00	-12.49	1.50 V	346	12.38	21.13
5	751.23	34.27 QP	46.00	-11.73	1.00 V	184	8.76	25.51
6	972.88	39.56 QP	54.00	-14.44	1.50 V	133	10.90	28.66

- 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.





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### 8DPSK MODULATION + DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 69%RH 999hPa	TESTED BY	Brad Wu

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	119.34	41.68 QP	43.50	-1.82	1.50 H	124	30.35	11.33
2	177.67	42.01 QP	43.50	-1.49	2.00 H	295	29.59	12.42
3	239.88	36.06 QP	46.00	-9.94	1.00 H	70	22.91	13.15
4	506.25	31.94 QP	46.00	-14.06	2.00 H	28	11.38	20.56
5	580.13	32.39 QP	46.00	-13.61	1.50 H	106	10.36	22.03
6	751.23	33.41 QP	46.00	-12.59	1.00 H	88	7.90	25.51
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	35.73	36.06 QP	40.00	-3.94	1.50 V	64	21.70	14.36
2	121.28	37.13 QP	43.50	-6.37	1.00 V	127	25.70	11.42
3	175.72	41.92 QP	43.50	-1.58	1.00 V	55	28.79	13.13
4	751.23	35.72 QP	46.00	-10.28	1.50 V	175	10.21	25.51
5	906.77	44.22 QP	46.00	-1.78	1.00 V	154	16.23	28.00
6	970.94	42.72 QP	54.00	-11.28	1.50 V	130	14.07	28.65

- 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 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 0.50 MHz.
  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	Sep. 22, 2008	Sep. 21, 2009
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 31, 2008	Dec. 30, 2009
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Dec. 29, 2008	Dec. 28, 2009
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jul. 29, 2009	Jul. 28, 2010
Software ADT	ADT_Cond_ V7.3.7	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

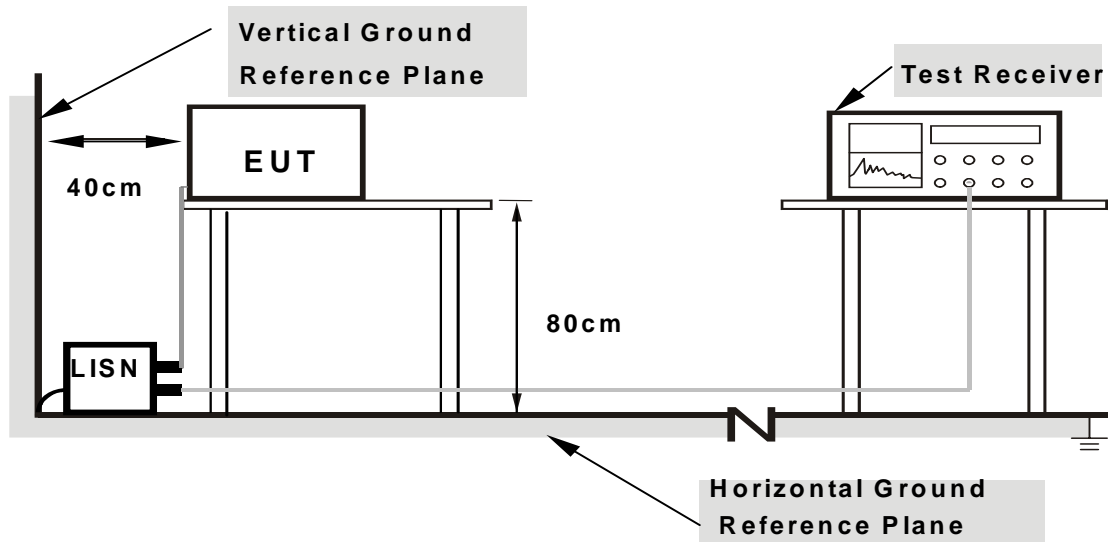
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

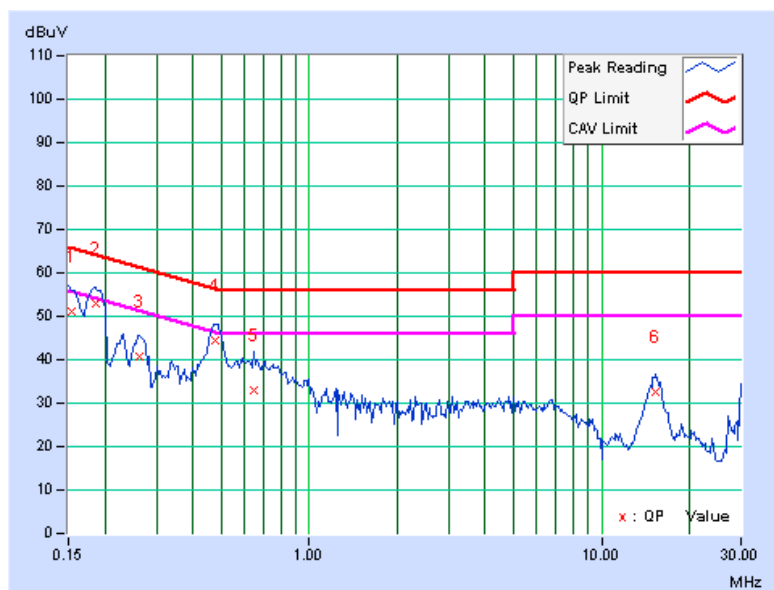
### 4.2.7 TEST RESULTS

#### CONDUCTED WORST CASE DATA: GFSK MODULATION + 802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	PHASE	Line 1
MODULATION TYPE	GFSK + DBPSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1017hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	0.154	0.13	51.13	-	51.26	-	65.79	55.79	-14.53	-
2	0.185	0.13	52.96	-	53.09	-	64.25	54.25	-11.16	-
3	0.263	0.13	40.64	-	40.77	-	61.33	51.33	-20.55	-
4	0.478	0.14	44.18	-	44.32	-	56.37	46.37	-12.05	-
5	0.650	0.15	32.79	-	32.94	-	56.00	46.00	-23.06	-
6	15.328	0.56	31.91	-	32.47	-	60.00	50.00	-27.53	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



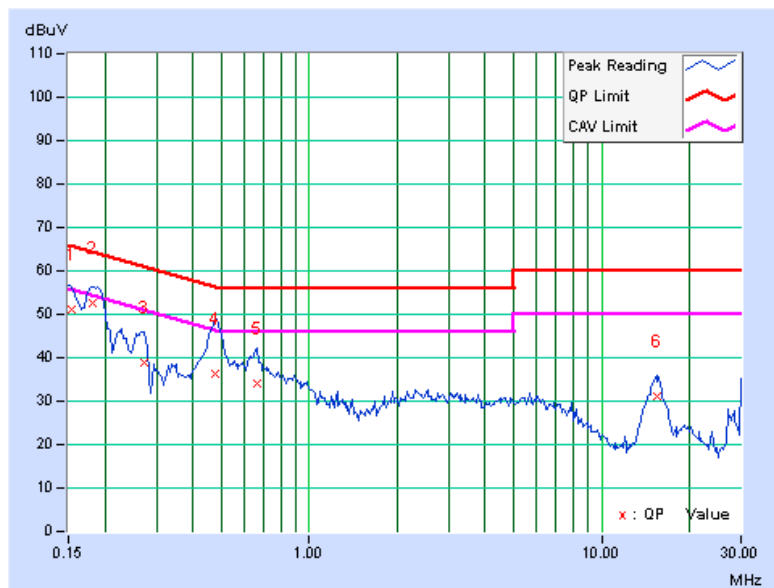


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	PHASE	Line 2
MODULATION TYPE	GFSK + DBPSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1017hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	0.154	0.13	51.07	-	51.20	-	65.79
2	0.181	0.13	52.30	-	52.43	-	64.43	54.43	-12.00	-
3	0.271	0.14	38.62	-	38.76	-	61.08	51.08	-22.33	-
4	0.474	0.15	36.00	-	36.15	-	56.44	46.44	-20.29	-
5	0.662	0.16	33.99	-	34.15	-	56.00	46.00	-21.85	-
6	15.406	0.68	30.53	-	31.21	-	60.00	50.00	-28.79	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.





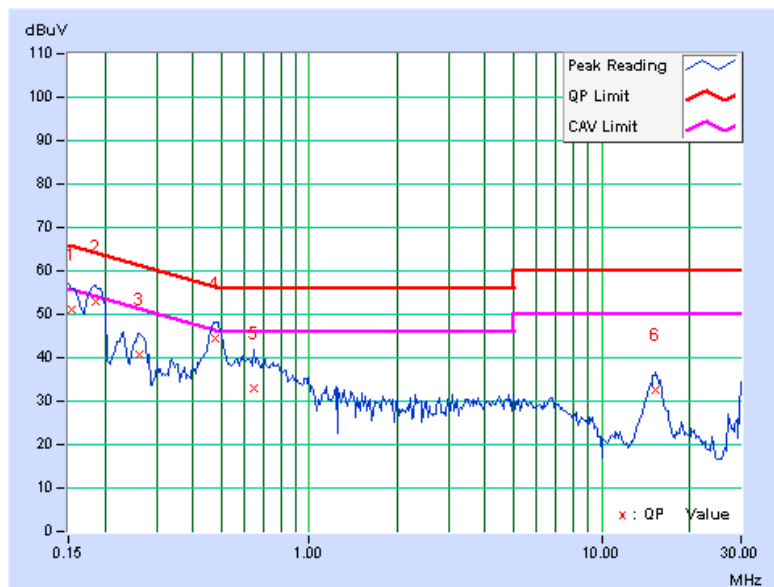
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**GFSK MODULATION + DRAFT 802.11n (20MHz) OFDM MODULATION**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	PHASE	Line 1
MODULATION TYPE	GFSK + BPSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1017hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	0.154	0.13	50.81	-	50.94	-	65.79	55.79	-14.85	-
2	0.181	0.13	53.22	-	53.35	-	64.43	54.43	-11.08	-
3	0.267	0.13	39.11	-	39.24	-	61.20	51.20	-21.96	-
4	0.470	0.14	44.73	-	44.87	-	56.51	46.51	-11.63	-
5	0.666	0.15	34.61	-	34.76	-	56.00	46.00	-21.24	-
6	15.469	0.57	32.41	-	32.98	-	60.00	50.00	-27.02	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



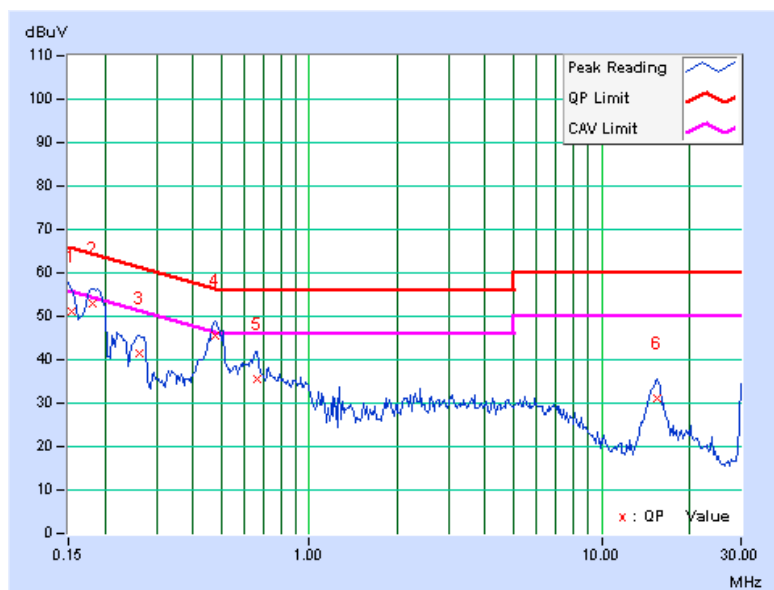


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	PHASE	Line 2
MODULATION TYPE	GFSK + BPSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1017hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	0.154	0.13	50.83	-	50.96	-	65.79
2	0.181	0.13	52.74	-	52.87	-	64.43	54.43	-11.56	-
3	0.263	0.14	41.27	-	41.41	-	61.33	51.33	-19.92	-
4	0.474	0.15	45.36	-	45.51	-	56.44	46.44	-10.93	-
5	0.666	0.16	35.40	-	35.56	-	56.00	46.00	-20.44	-
6	15.430	0.68	30.25	-	30.93	-	60.00	50.00	-29.07	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



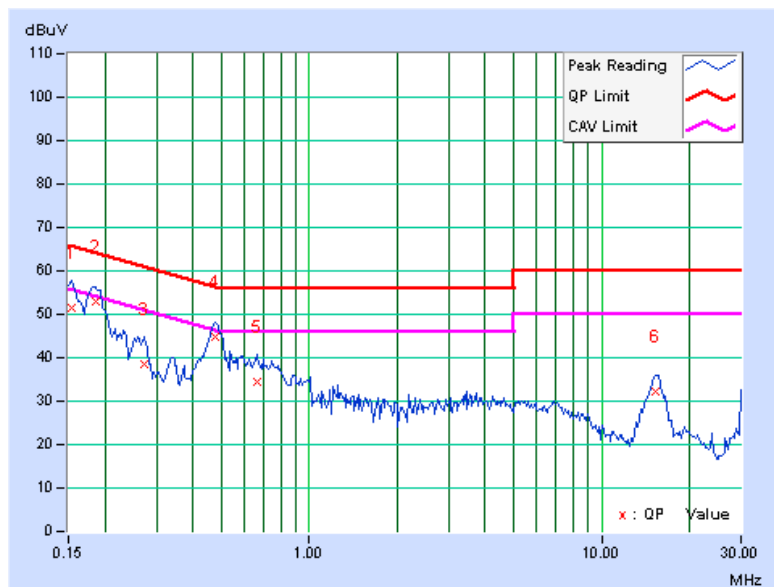


### 8DPSK MODULATION + 802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	PHASE	Line 1
MODULATION TYPE	8DPSK + DBPSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1017hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	0.154	0.13	51.37	-	51.50	-	65.79
2	0.185	0.13	52.94	-	53.07	-	64.25	54.25	-11.18	-
3	0.271	0.13	38.38	-	38.51	-	61.08	51.08	-22.57	-
4	0.474	0.14	44.59	-	44.73	-	56.44	46.44	-11.71	-
5	0.666	0.15	34.39	-	34.54	-	56.00	46.00	-21.46	-
6	15.215	0.56	31.50	-	32.06	-	60.00	50.00	-27.94	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



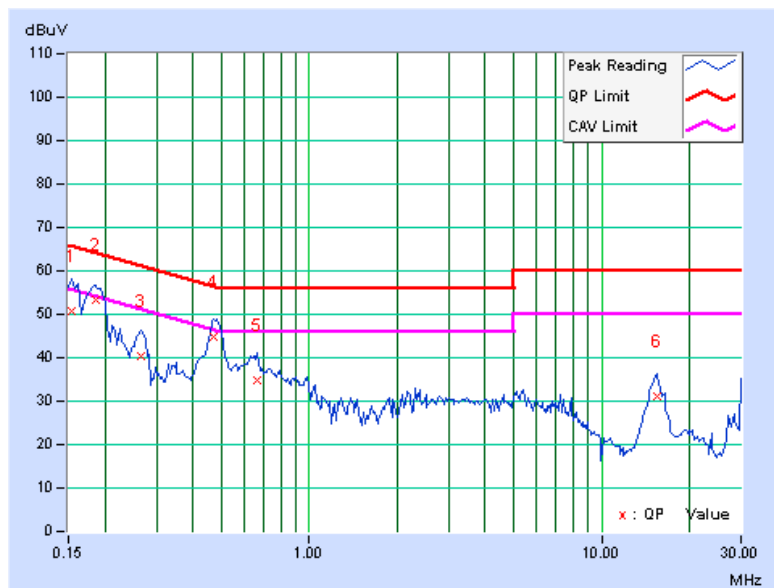


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	PHASE	Line 2
MODULATION TYPE	8DPSK + DBPSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1017hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	0.154	0.13	50.79	-	50.92	-	65.79
2	<b>0.185</b>	<b>0.13</b>	<b>53.28</b>	-	<b>53.41</b>	-	<b>64.25</b>	<b>54.25</b>	<b>-10.84</b>	-
3	0.267	0.14	40.31	-	40.45	-	61.20	51.20	-20.76	-
4	0.470	0.15	44.75	-	44.90	-	56.51	46.51	-11.61	-
5	0.666	0.16	34.71	-	34.87	-	56.00	46.00	-21.13	-
6	15.422	0.68	30.45	-	31.13	-	60.00	50.00	-28.87	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.





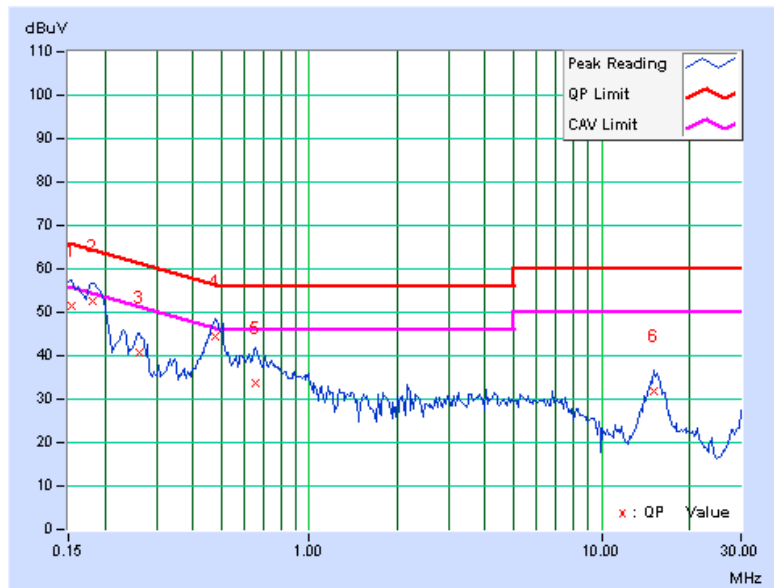
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**8DPSK MODULATION + DRAFT 802.11n (20MHz) OFDM MODULATION**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	PHASE	Line 1
MODULATION TYPE	8DPSK + BPSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1017hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	0.154	0.13	51.41	-	51.54	-	65.79
2	0.181	0.13	52.50	-	52.63	-	64.43	54.43	-11.80	-
3	0.263	0.13	40.59	-	40.72	-	61.33	51.33	-20.60	-
4	0.478	0.14	44.12	-	44.26	-	56.37	46.37	-12.11	-
5	0.654	0.15	33.58	-	33.73	-	56.00	46.00	-22.27	-
6	15.141	0.56	31.29	-	31.85	-	60.00	50.00	-28.15	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



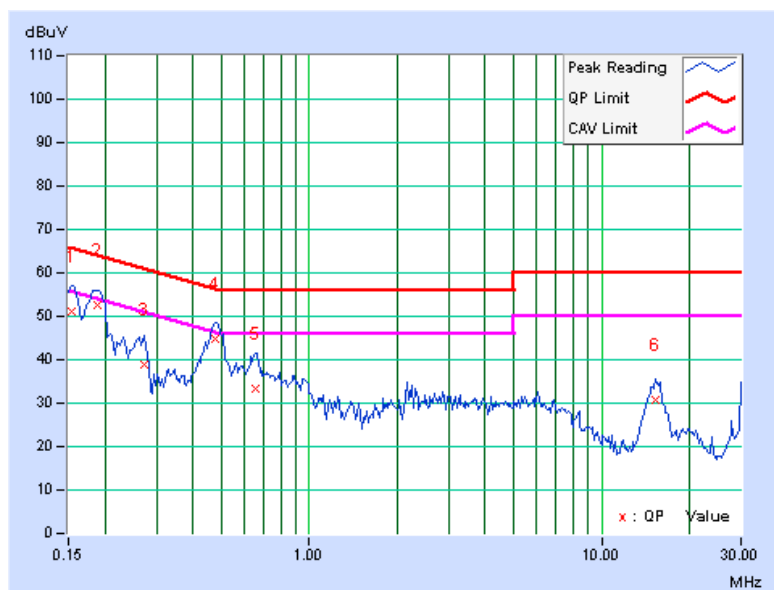


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 0 + CH 6	PHASE	Line 2
MODULATION TYPE	8DPSK + BPSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1017hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	0.154	0.13	50.85	-	50.98	-	65.79
2	0.189	0.13	52.33	-	52.46	-	64.08	54.08	-11.62	-
3	0.271	0.14	38.83	-	38.97	-	61.08	51.08	-22.12	-
4	0.474	0.15	44.85	-	45.00	-	56.44	46.44	-11.44	-
5	0.654	0.16	33.20	-	33.36	-	56.00	46.00	-22.64	-
6	15.211	0.67	30.15	-	30.82	-	60.00	50.00	-29.18	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



### 4.3 ANTENNA REQUIREMENT

#### 4.3.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

#### 4.3.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is PIFA antenna with U.FL antenna connector. The maximum gain of this antenna is -0.56dBi.



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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 by the following approval agencies according to ISO/IEC 17025.

<b>USA</b>	FCC, NVLAP
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA, CSA
<b>R.O.C.</b>	TAF, BSMI, NCC
<b>Netherlands</b>	Telefication
<b>Singapore</b>	GOST-ASIA(MOU)
<b>Russia</b>	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

[www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml). If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Telecom Lab:**

Tel: 886-3-3183232

Fax: 886-3-3185050

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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.

**---END---**