

# SUPPLEMENTARY FCC TEST REPORT

**REPORT NO.:** RF120903C21S-4

**MODEL NO.:** MC40N0

**FCC ID:** UZ7MC40N0

**RECEIVED:** Mar. 23, 2015

**TESTED:** Apr. 02, 2015 ~ Apr. 16, 2015

**ISSUED:** Jun. 05, 2015

**APPLICANT:** Zebra Technologies Corporation

**ADDRESS:** 1 Zebra Plaza, Holtsville, NY 11742

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

**LAB ADDRESS:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist.,  
New Taipei City, Taiwan ( R.O.C )

**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil., Kwei Shan  
Dist., Taoyuan City 33383, Taiwan (R.O.C.)

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.



## TABLE OF CONTENTS

REPORT ISSUE HISTORY RECORD .....	4
RELEASE CONTROL RECORD .....	5
1. CERTIFICATION .....	6
2. SUMMARY OF TEST RESULTS .....	7
2.1 MEASUREMENT UNCERTAINTY .....	7
3. GENERAL INFORMATION .....	8
3.1 GENERAL DESCRIPTION OF EUT .....	8
3.2 DESCRIPTION OF TEST MODES .....	9
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL .....	10
3.3 DESCRIPTION OF SUPPORT UNITS .....	12
3.3.1 CONFIGURATION OF SYSTEM UNDER TEST .....	12
3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	12
4. TEST TYPES AND RESULTS (FOR BLUETOOTH LE 4.0) .....	13
4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	13
4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	13
4.1.2 TEST INSTRUMENTS .....	14
4.1.3 TEST PROCEDURES .....	15
4.1.4 DEVIATION FROM TEST STANDARD .....	15
4.1.5 TEST SETUP .....	16
4.1.6 EUT OPERATING CONDITIONS .....	16
4.1.7 TEST RESULTS .....	17
4.2 CONDUCTED EMISSION MEASUREMENT .....	29
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	29
4.2.2 TEST INSTRUMENTS .....	29
4.2.3 TEST PROCEDURES .....	30
4.2.4 DEVIATION FROM TEST STANDARD .....	30
4.2.5 TEST SETUP .....	30
4.2.6 EUT OPERATING CONDITIONS .....	30
4.2.7 TEST RESULTS .....	31
4.3 6dB BANDWIDTH MEASUREMENT .....	35
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	35
4.3.2 TEST SETUP .....	35
4.3.3 TEST INSTRUMENTS .....	35
4.3.4 TEST PROCEDURE .....	35
4.3.5 DEVIATION FROM TEST STANDARD .....	35
4.3.6 EUT OPERATING CONDITIONS .....	35
4.3.7 TEST RESULTS .....	36
4.4 CONDUCTED OUTPUT POWER .....	37
4.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT .....	37
4.4.2 TEST SETUP .....	37
4.4.3 INSTRUMENTS .....	37
4.4.4 TEST PROCEDURES .....	37
4.4.5 DEVIATION FROM TEST STANDARD .....	37
4.4.6 EUT OPERATING CONDITIONS .....	37
4.4.7 TEST RESULTS .....	37
4.5 POWER SPECTRAL DENSITY MEASUREMENT .....	38
4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	38
4.5.2 TEST SETUP .....	38
4.5.3 TEST INSTRUMENTS .....	38
4.5.4 TEST PROCEDURE .....	38
4.5.5 DEVIATION FROM TEST STANDARD .....	38



A D T

4.5.6	EUT OPERATING CONDITION.....	38
4.5.7	TEST RESULTS.....	39
4.6	CONDUCTED OUT OF BAND EMISSION MEASUREMENT .....	40
4.6.1	LIMITS OF OUT OF BAND EMISSION MEASUREMENT .....	40
4.6.2	TEST SETUP .....	40
4.6.3	TEST INSTRUMENTS .....	40
4.6.4	TEST PROCEDURE .....	40
4.6.5	DEVIATION FROM TEST STANDARD .....	40
4.6.6	EUT OPERATING CONDITION.....	41
4.6.7	TEST RESULTS.....	41
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	44
6.	INFORMATION ON THE TESTING LABORATORIES .....	45
7.	APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB .....	46

## REPORT ISSUE HISTORY RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
1	Original release	Sep. 17, 2012
2	1. New LCM, TP, Scanner engine, larger speaker and MIC 2. New antenna design (WLAN1, WLAN2) and new antenna location (WLAN2, BT) 3. New Schematic, Block Diagram 4. Update SW and HW	Jun. 05, 2015



A D T

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120903C21S-4	Original release	Jun. 05, 2015

## 1. CERTIFICATION

**PRODUCT:** Mobile Computer  
**MODEL NO.:** MC40N0  
**BRAND:** Symbol  
**APPLICANT:** Zebra Technologies Corporation  
**TESTED:** Apr. 02, 2015 ~ Apr. 16, 2015  
**TEST SAMPLE:** Engineering Sample  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.10-2013

The above equipment (model: MC40N0) 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 :** Rona Chen , **DATE :** Jun. 05, 2015  
Rona Chen / Specialist

**APPROVED BY :** Sam chen , **DATE :** Jun. 05, 2015  
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) (Bluetooth LE 4.0)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.37dB at 0.37700MHz.
15.205 & 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -8.21dB at 79.95MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

### 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>	Mobile Computer
<b>MODEL NO.</b>	MC40N0
<b>POWER SUPPLY</b>	5Vdc (adapter or host equipment) 3.7Vdc (Li-ion battery)
<b>MODULATION TYPE</b>	GFSK
<b>TRANSFER RATE</b>	1Mbps
<b>OPERATING FREQUENCY</b>	2402 ~ 2480MHz
<b>NUMBER OF CHANNEL</b>	40
<b>CHANNEL SPACING</b>	2MHz
<b>OUTPUT POWER</b>	1.663mW
<b>ANTENNA TYPE</b>	PIFA antenna with 3.1dBi gain
<b>ANTENNA CONNECTOR</b>	NA
<b>DATA CABLE</b>	Refer to Note as below
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	Refer to Note as below
<b>HW VERSION</b>	EV2
<b>SW VERSION</b>	Android version: 4.4.4 Build number: 99-4AJ22-K-0008-0004-V0-M1-031315

**NOTE:**

1. This report is issued as a supplementary report of BV ADT report no.: RF120903C21-2. For more detail of difference compared with original report, please refer to issued no. 2 of "report issue history record" on page 5. Therefore, all items had been performed and presented in the test report.
2. The device is available with or without MSR.
3. The following accessories are optional.

ITEM	BRAND	MODEL	SPECIFICATION
Adapter	Motorola / Symbol	IU08-2050120-WP	I/P: 100-240Vac, 50/60Hz, 0.2A O/P: 5Vdc, 1.2A
Earphone 1	Symbol / Zebra	NA	1.3m non-shielded cable w/o core
Earphone 2	Symbol / Zebra	21-UNIV-HDSET1-01R	1.2m non-shielded cable w/o core
Micro USB Cable	Symbol / Zebra	25-MCXUSB-01R	1.5m shielded cable w/o core
Holster	Symbol / Zebra	SG-MC40HLSTR-03R	--
Handstrap	Symbol / Zebra	SG-MC40Strap-10R	--

4. The EUT uses following battery.

<b>Brand</b>	Symbol / Zebra
<b>Rating</b>	3.7Vdc

5. 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

#### Bluetooth LE 4.0:

40 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

#### BLUETOOTH LE 4.0:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	With MSR SKU
B	√	√	√	-	Without MSR SKU

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

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

**PLC**: Power Line Conducted Emission

**APCM**: Antenna Port Conducted Measurement

**NOTE:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
A,B	0 to 39	0, 19, 39	GFSK	1.0

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

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
A,B	0 to 39	0, 19, 39	GFSK	1.0

#### POWER LINE CONDUCTED EMISSION TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
A,B	0 to 39	19	GFSK	1.0



A D T

#### **ANTENNA PORT CONDUCTED MEASUREMENT:**

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
A	0 to 39	0, 19, 39	GFSK	1.0

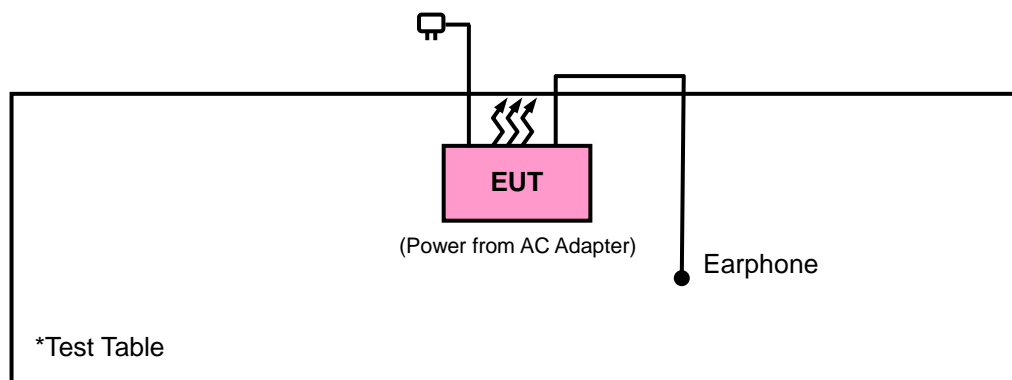
#### **TEST CONDITION:**

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

### 3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units.

#### 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 C63.10-2013**

**558074 D01 DTS Meas Guidance v03r02**

**FCC Public Notice DA 00-705**

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

**NOTE:** The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

## 4. TEST TYPES AND RESULTS (FOR BLUETOOTH LE 4.0)

### 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 Agilent	N9038A	MY51210203	Jan.21, 2015	Jan.21, 2016
Spectrum Analyzer Agilent	N9010A	MY52220314	Sep.03, 2014	Sep.02, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 10, 2014	Dec. 09, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Feb. 04, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Feb. 09, 2015	Feb. 09, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Feb. 04, 2015	Feb. 04, 2016
Loop Antenna	EM-6879	269	Aug.13, 2014	Aug.12, 2015
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2014	Aug. 08, 2015
Preamplifier EMCI	EMC 012645	980115	Dec. 12, 2014	Dec. 11, 2015
Preamplifier EMCI	EMC 184045	980116	Jan. 09, 2015	Jan. 08, 2016
Preamplifier EMCI	EMC 330H	980112	Dec. 27, 2014	Dec. 26, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 18, 2014	Oct. 17, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2014	Oct. 17, 2015
RF signal cable Worken	RG-213	NA	Nov. 07, 2014	Nov. 06, 2015
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
Bluetooth Tester	CBT	100980	Feb. 10, 2015	Feb. 09, 2016
Power Meter	ML2495A	1232002	Sep. 17, 2014	Sep. 16, 2015
Power Sensor	MA2411B	1207325	Sep. 17, 2014	Sep. 16, 2015

- 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 (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

#### **NOTE:**

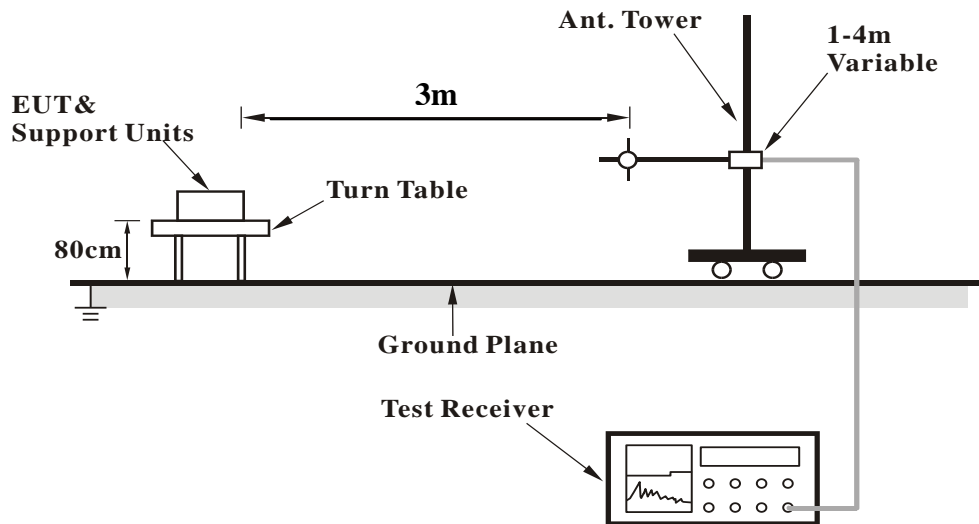
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### **4.1.4 DEVIATION FROM TEST STANDARD**

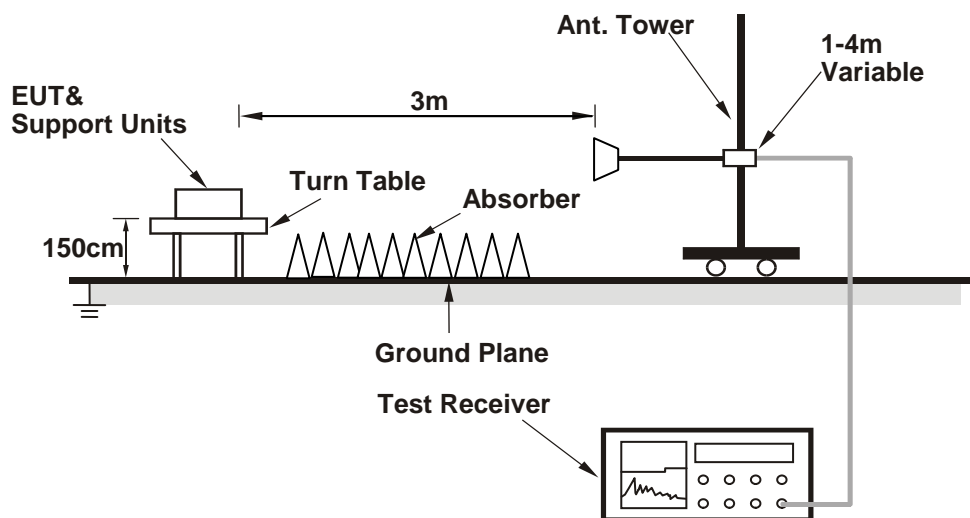
No deviation.

#### 4.1.5 TEST SETUP

<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

##### Mode A

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
2360	35.58	42.76	54	-18.42	26.81	3.5	37.49	103	214	Average
2360	56.32	63.5	74	-17.68	26.81	3.5	37.49	103	214	Peak
2402	97.28	104.35			26.91	3.54	37.52	103	214	Average
2402	98	105.07			26.91	3.54	37.52	103	214	Peak
2490	35.14	41.64	54	-18.86	27.2	3.62	37.32	103	214	Average
2490	57.27	63.77	74	-16.73	27.2	3.62	37.32	103	214	Peak
4804	38.69	55.07	54	-15.31	30.97	5.75	53.1	143	128	Average
4804	43.22	59.6	74	-30.78	30.97	5.75	53.1	143	128	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
2326	35.96	43.23	54	-18.04	26.72	3.48	37.47	120	187	Average
2326	56.88	64.15	74	-17.12	26.72	3.48	37.47	120	187	Peak
2402	97.92	104.99			26.91	3.54	37.52	120	187	Average
2402	98.72	105.79			26.91	3.54	37.52	120	187	Peak
2494	35.33	41.76	54	-18.67	27.2	3.62	37.25	120	187	Average
2494	56.99	63.42	74	-17.01	27.2	3.62	37.25	120	187	Peak
4804	37.5	53.88	54	-16.5	30.97	5.75	53.1	100	238	Average
4804	39.85	56.23	74	-34.15	30.97	5.75	53.1	100	238	Peak

##### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2402MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 19	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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	35.16	42.32	54	-18.84	26.81	3.52	37.49	103	228	Average
2364	57.38	64.54	74	-16.62	26.81	3.52	37.49	103	228	Peak
2440	99.88	106.7			27.06	3.58	37.46	103	228	Average
2440	100.63	107.45			27.06	3.58	37.46	103	228	Peak
2500	35.38	41.81	54	-18.62	27.2	3.62	37.25	103	228	Average
2500	57.02	63.45	74	-16.98	27.2	3.62	37.25	103	228	Peak
4880	39.57	55.76	54	-14.43	31.06	5.8	53.05	100	174	Average
4880	43.88	60.07	74	-30.12	31.06	5.8	53.05	100	174	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	34.93	42.05	54	-19.07	26.86	3.52	37.5	129	272	Average
2382	57.12	64.24	74	-16.88	26.86	3.52	37.5	129	272	Peak
2440	93.7	100.52			27.06	3.58	37.46	129	272	Average
2440	94.48	101.3			27.06	3.58	37.46	129	272	Peak
2492	35.28	41.71	54	-18.72	27.2	3.62	37.25	129	272	Average
2492	56.59	63.02	74	-17.41	27.2	3.62	37.25	129	272	Peak
4880	38.2	54.39	54	-15.8	31.06	5.8	53.05	108	195	Average
4880	43.36	59.55	74	-30.64	31.06	5.8	53.05	108	195	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2441MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
2362	34.42	41.6	54	-19.58	26.81	3.5	37.49	100	229	Average
2362	57.32	64.5	74	-16.68	26.81	3.5	37.49	100	229	Peak
2480	99.3	105.87			27.15	3.6	37.32	100	229	Average
2480	100.07	106.64			27.15	3.6	37.32	100	229	Peak
2500	37.37	43.8	54	-16.63	27.2	3.62	37.25	100	229	Average
2500	57.51	63.94	74	-16.49	27.2	3.62	37.25	100	229	Peak
4960	38.28	54.32	54	-15.72	31.16	5.84	53.04	124	175	Average
4960	43.98	60.02	74	-30.02	31.16	5.84	53.04	124	175	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	34.52	41.57	54	-19.48	26.91	3.54	37.5	124	271	Average
2388	57.17	64.22	74	-16.83	26.91	3.54	37.5	124	271	Peak
2480	94.38	100.95			27.15	3.6	37.32	124	271	Average
2480	95.19	101.76			27.15	3.6	37.32	124	271	Peak
2498	36.23	42.66	54	-17.77	27.2	3.62	37.25	124	271	Average
2498	56.49	62.92	74	-17.51	27.2	3.62	37.25	124	271	Peak
4960	34.05	50.09	54	-19.95	31.16	5.84	53.04	100	236	Average
4960	41.95	57.99	74	-32.05	31.16	5.84	53.04	100	236	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2480MHz: Fundamental frequency.

### Mode B

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
2368	36.66	43.83	54	-17.34	26.81	3.52	37.5	126	239	Average
2368	56.28	63.45	74	-17.72	26.81	3.52	37.5	126	239	Peak
2402	97.65	104.72			26.91	3.54	37.52	126	239	Average
2402	98.38	105.45			26.91	3.54	37.52	126	239	Peak
2496	35.12	41.55	54	-18.88	27.2	3.62	37.25	126	239	Average
2496	56.89	63.32	74	-17.11	27.2	3.62	37.25	126	239	Peak
4804	41.62	58.63	54	-12.38	30.97	5.12	53.1	137	135	Average
4804	46.41	63.42	74	-27.59	30.97	5.12	53.1	137	135	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
2364	35.25	42.41	54	-18.75	26.81	3.52	37.49	145	181	Average
2364	55.89	63.05	74	-18.11	26.81	3.52	37.49	145	181	Peak
2402	96.36	103.43			26.91	3.54	37.52	145	181	Average
2402	97.09	104.16			26.91	3.54	37.52	145	181	Peak
2494	35.26	41.69	54	-18.74	27.2	3.62	37.25	145	181	Average
2494	56.54	62.97	74	-17.46	27.2	3.62	37.25	145	181	Peak
4804	40.74	57.75	54	-13.26	30.97	5.12	53.1	123	161	Average
4804	45.67	62.68	74	-28.33	30.97	5.12	53.1	123	161	Peak

### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2402MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 19	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
2334	34.35	41.62	54	-19.65	26.72	3.48	37.47	102	227	Average
2334	56.4	63.67	74	-17.6	26.72	3.48	37.47	102	227	Peak
2440	99.11	105.93			27.06	3.58	37.46	102	227	Average
2440	99.76	106.58			27.06	3.58	37.46	102	227	Peak
2488	35.16	41.66	54	-18.84	27.2	3.62	37.32	102	227	Average
2488	56.52	63.02	74	-17.48	27.2	3.62	37.32	102	227	Peak
4880	42.7	58.89	54	-11.3	31.06	5.8	53.05	111	164	Average
4880	46.98	63.17	74	-27.02	31.06	5.8	53.05	111	164	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
2342	34.42	41.64	54	-19.58	26.77	3.5	37.49	117	179	Average
2342	55.73	62.95	74	-18.27	26.77	3.5	37.49	117	179	Peak
2440	95.14	101.96			27.06	3.58	37.46	117	179	Average
2440	95.79	102.61			27.06	3.58	37.46	117	179	Peak
2488	35.08	41.58	54	-18.92	27.2	3.62	37.32	117	179	Average
2488	56.23	62.73	74	-17.77	27.2	3.62	37.32	117	179	Peak
4880	38.03	54.22	54	-15.97	31.06	5.8	53.05	101	115	Average
4880	44.64	60.83	74	-29.36	31.06	5.8	53.05	101	115	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2441MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
2376	34.74	41.86	54	-19.26	26.86	3.52	37.5	122	238	Average
2376	57.12	64.24	74	-16.88	26.86	3.52	37.5	122	238	Peak
2480	99.28	105.85			27.15	3.6	37.32	122	238	Average
2480	100.01	106.58			27.15	3.6	37.32	122	238	Peak
2484	37.29	43.86	54	-16.71	27.15	3.6	37.32	122	238	Average
2484	57.56	64.13	74	-16.44	27.15	3.6	37.32	122	238	Peak
4960	41.93	57.97	54	-12.07	31.16	5.84	53.04	122	158	Average
4960	46.09	62.13	74	-27.91	31.16	5.84	53.04	122	158	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	34.63	41.7	54	-19.37	26.91	3.54	37.52	100	302	Average
2390	57.22	64.29	74	-16.78	26.91	3.54	37.52	100	302	Peak
2480	94.9	101.47			27.15	3.6	37.32	100	302	Average
2480	95.64	102.21			27.15	3.6	37.32	100	302	Peak
2500	35.72	42.15	54	-18.28	27.2	3.62	37.25	100	302	Average
2500	56.67	63.1	74	-17.33	27.2	3.62	37.25	100	302	Peak
4960	37.9	53.94	54	-16.1	31.16	5.84	53.04	128	148	Average
4960	44.05	60.09	74	-29.95	31.16	5.84	53.04	128	148	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2480MHz: Fundamental frequency.

# BELOW 1GHz WORST-CASE DATA :

## Mode A

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
84	22.03	44.53	40	-17.97	8.2	0.99	31.69	114	309	Peak
128.55	25.86	44.9	43.5	-17.64	11.61	1.23	31.88	124	103	Peak
183.36	27.63	47.38	43.5	-15.87	10.53	1.51	31.79	120	58	Peak
437.2	21.47	34.82	46	-24.53	16.08	2.57	32	135	129	Peak
479.2	23.18	35.41	46	-22.82	16.91	2.71	31.85	107	8	Peak
538	22.86	33.48	46	-23.14	18.19	2.91	31.72	129	105	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
31.62	22.63	40.86	40	-17.37	12.3	0.58	31.11	132	94	Peak
80.22	29.68	52.09	40	-10.32	8.13	0.97	31.51	120	34	Peak
126.93	30.98	50.17	43.5	-12.52	11.48	1.22	31.89	139	331	Peak
325.9	17.62	33.75	46	-28.38	13.57	2.14	31.84	137	291	Peak
412.7	19.19	33.12	46	-26.81	15.6	2.48	32.01	136	326	Peak
547.8	20.86	31.42	46	-25.14	18.41	2.94	31.91	115	99	Peak

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

Margin value = Emission level – Limit value



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 19	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
83.73	21.76	44.24	40	-18.24	8.18	0.99	31.65	126	253	Peak
126.66	27.44	46.63	43.5	-16.06	11.48	1.22	31.89	121	316	Peak
187.95	28.75	48.72	43.5	-14.75	10.19	1.54	31.7	136	249	Peak
326.6	19.75	35.84	46	-26.25	13.59	2.15	31.83	108	128	Peak
393.8	20.66	35.15	46	-25.34	15.19	2.4	32.08	110	164	Peak
479.2	23.03	35.26	46	-22.97	16.91	2.71	31.85	134	285	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
30.27	25.53	44.12	40	-14.47	11.98	0.57	31.14	103	160	Peak
79.95	31.79	53.99	40	-8.21	8.37	0.97	31.54	139	128	Peak
127.74	32.37	51.47	43.5	-11.13	11.55	1.23	31.88	138	148	Peak
332.2	16.39	32.3	46	-29.61	13.73	2.17	31.81	126	275	Peak
414.1	17.89	31.8	46	-28.11	15.62	2.48	32.01	105	106	Peak
566	22.82	33.06	46	-23.18	18.84	2.99	32.07	134	63	Peak

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

Margin value = Emission level – Limit value





A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
82.92	21.73	44.21	40	-18.27	8.18	0.99	31.65	140	344	Peak
126.93	25.71	44.9	43.5	-17.79	11.48	1.22	31.89	116	24	Peak
192.81	27.92	48.22	43.5	-15.58	9.84	1.56	31.7	139	313	Peak
318.2	20.43	36.83	46	-25.57	13.38	2.12	31.9	124	109	Peak
447	20.59	33.7	46	-25.41	16.27	2.61	31.99	133	1	Peak
595.4	23.91	33.54	46	-22.09	19.5	3.07	32.2	103	32	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
31.62	22.77	41	40	-17.23	12.3	0.58	31.11	103	194	Peak
80.76	31.15	53.56	40	-8.85	8.13	0.97	31.51	106	188	Peak
127.2	31.68	50.87	43.5	-11.82	11.48	1.22	31.89	103	234	Peak
367.9	17.08	32.15	46	-28.92	14.56	2.3	31.93	100	102	Peak
510	20.95	32.18	46	-25.05	17.55	2.81	31.59	114	236	Peak
638.1	22.22	31.05	46	-23.78	20.07	3.2	32.1	113	129	Peak

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

Margin value = Emission level – Limit value

### Mode B

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
79.41	18.59	40.79	40	-21.41	8.37	0.97	31.54	103	328	Peak
124.5	25.14	44.54	43.5	-18.36	11.28	1.21	31.89	125	197	Peak
193.35	28.33	48.63	43.5	-15.17	9.84	1.56	31.7	125	241	Peak
310.5	20.53	37.19	46	-25.47	13.2	2.09	31.95	103	135	Peak
393.8	20.32	34.81	46	-25.68	15.19	2.4	32.08	113	150	Peak
524.7	21.95	32.84	46	-24.05	17.88	2.86	31.63	110	306	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	24.81	43.4	40	-15.19	11.98	0.57	31.14	139	54	Peak
79.14	28.92	51.12	40	-11.08	8.37	0.97	31.54	126	163	Peak
119.1	27.52	47.3	43.5	-15.98	10.93	1.18	31.89	111	85	Peak
314	17.69	34.23	46	-28.31	13.29	2.1	31.93	128	270	Peak
436.5	20.81	34.19	46	-25.19	16.06	2.56	32	125	271	Peak
543.6	23.64	34.22	46	-22.36	18.3	2.92	31.8	121	210	Peak

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 19	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
84	18.65	41.15	40	-21.35	8.2	0.99	31.69	115	105	Peak
126.93	25.6	44.79	43.5	-17.9	11.48	1.22	31.89	133	151	Peak
187.68	28.95	48.92	43.5	-14.55	10.19	1.54	31.7	126	335	Peak
314.7	20.31	36.81	46	-25.69	13.31	2.11	31.92	116	43	Peak
457.5	22.11	34.98	46	-23.89	16.48	2.64	31.99	125	238	Peak
622	24.64	33.78	46	-21.36	19.87	3.15	32.16	106	336	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	24.88	43.47	40	-15.12	11.98	0.57	31.14	124	319	Peak
79.68	30.34	52.54	40	-9.66	8.37	0.97	31.54	130	23	Peak
124.77	30.02	49.35	43.5	-13.48	11.35	1.21	31.89	138	314	Peak
323.1	17.33	33.57	46	-28.67	13.5	2.13	31.87	137	242	Peak
437.2	20.19	33.54	46	-25.81	16.08	2.57	32	129	8	Peak
585.6	25.59	35.39	46	-20.41	19.28	3.05	32.13	118	311	Peak

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

Margin value = Emission level – Limit value



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Toby Tian

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
82.38	18.24	40.7	40	-21.76	8.16	0.98	31.6	134	155	Peak
124.77	25.03	44.36	43.5	-18.47	11.35	1.21	31.89	140	113	Peak
188.76	28.01	48.04	43.5	-15.49	10.12	1.54	31.69	129	253	Peak
309.1	20.24	36.93	46	-25.76	13.17	2.08	31.94	139	314	Peak
393.8	20.45	34.94	46	-25.55	15.19	2.4	32.08	134	15	Peak
548.5	22.41	32.96	46	-23.59	18.44	2.94	31.93	130	349	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	25.42	44.01	40	-14.58	11.98	0.57	31.14	124	180	Peak
79.95	29.92	52.12	40	-10.08	8.37	0.97	31.54	131	93	Peak
119.37	27.84	47.62	43.5	-15.66	10.93	1.18	31.89	126	313	Peak
407.8	19.62	33.72	46	-26.38	15.48	2.45	32.03	136	218	Peak
499.5	23.34	34.88	46	-22.66	17.31	2.78	31.63	125	253	Peak
654.9	26.74	35.2	46	-19.26	20.27	3.26	31.99	122	51	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	ESCI	100613	Nov. 11, 2014	Nov. 10, 2015
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 02, 2015	Mar. 01, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 21, 2014	Jul. 20, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

#### 4.2.3 TEST PROCEDURES

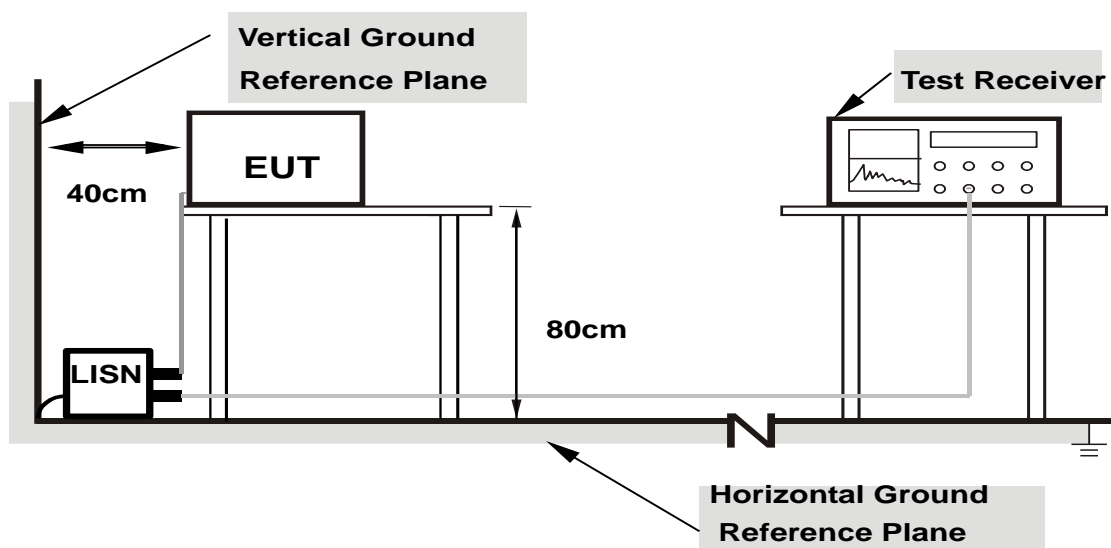
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 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:**
- Support units were connected to second LISN.
  - 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

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

#### 4.2.7 TEST RESULTS

##### CONDUCTED WORST-CASE DATA :

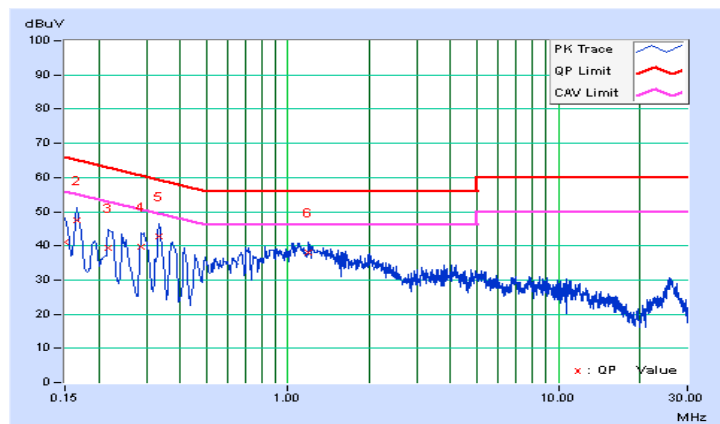
##### Mode A

PHASE	Line 1	6dB BANDWIDTH	9kHz
FUNCTION TYPE	BT LE Tx + Adapter + USB Cable + Earphone		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.05	41.12	27.19	41.17	27.24	66.00	56.00	-24.83	-28.76
2	0.16569	0.05	47.40	32.11	47.45	32.16	65.17	55.17	-17.72	-23.01
3	0.21565	0.06	39.32	25.95	39.38	26.01	62.98	52.98	-23.60	-26.97
4	0.28685	0.06	39.66	31.08	39.72	31.14	60.62	50.62	-20.90	-19.48
5	0.33396	0.06	42.74	34.33	42.80	34.39	59.35	49.35	-16.55	-14.96
6	1.19397	0.09	37.94	29.25	38.03	29.34	56.00	46.00	-17.97	-16.66

##### 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

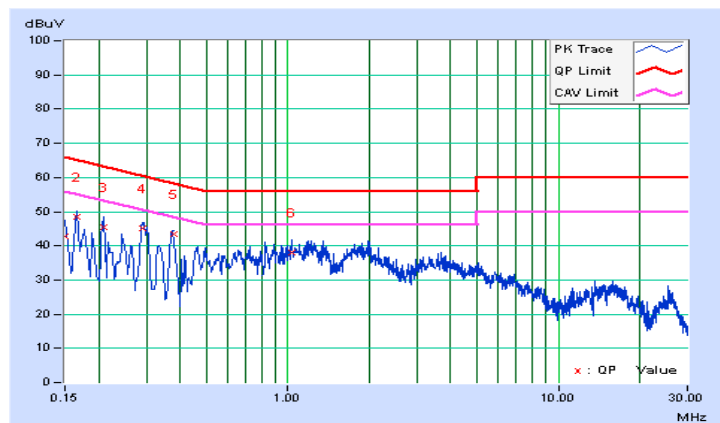


PHASE	Line 2	6dB BANDWIDTH	9kHz
FUNCTION TYPE	BT LE Tx + Adapter + USB Cable + Earphone		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.05	42.64	28.57	42.69	28.62	66.00	56.00	-23.31	-27.38
2	0.16564	0.05	48.59	34.14	48.64	34.19	65.18	55.18	-16.54	-20.99
3	0.20783	0.05	45.55	31.72	45.60	31.77	63.29	53.29	-17.69	-21.52
4	0.29043	0.05	44.95	38.96	45.00	39.01	60.51	50.51	-15.51	-11.50
5	0.37700	0.06	43.23	38.92	43.29	38.98	58.35	48.35	-15.06	-9.37
6	1.02975	0.08	38.01	28.51	38.09	28.59	56.00	46.00	-17.91	-17.41

Remarks:

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





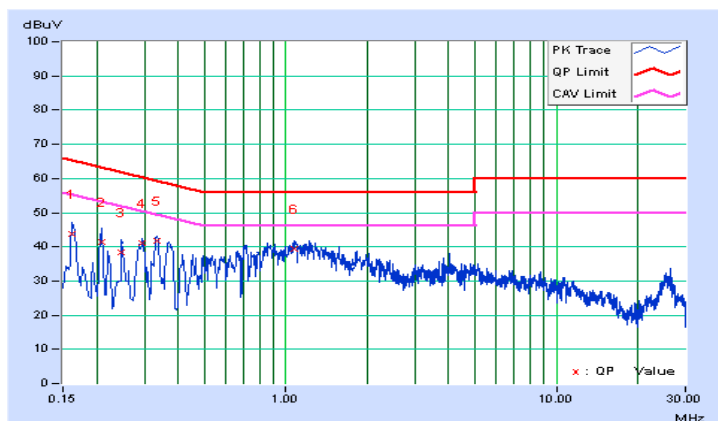
### Mode B

PHASE	Line 1	6dB BANDWIDTH	9kHz
FUNCTION TYPE	BT LE Tx + Adapter + USB Cable + Earphone		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16181	0.05	43.56	30.66	43.61	30.71	65.37	55.37	-21.76	-24.66
2	0.20865	0.06	41.30	30.22	41.36	30.28	63.26	53.26	-21.90	-22.98
3	0.24775	0.06	38.45	29.80	38.51	29.86	61.83	51.83	-23.32	-21.97
4	0.29351	0.06	41.00	35.96	41.06	36.02	60.42	50.42	-19.36	-14.40
5	0.33377	0.06	41.75	35.81	41.81	35.87	59.36	49.36	-17.55	-13.49
6	1.07025	0.08	39.18	31.48	39.26	31.56	56.00	46.00	-16.74	-14.44

#### 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

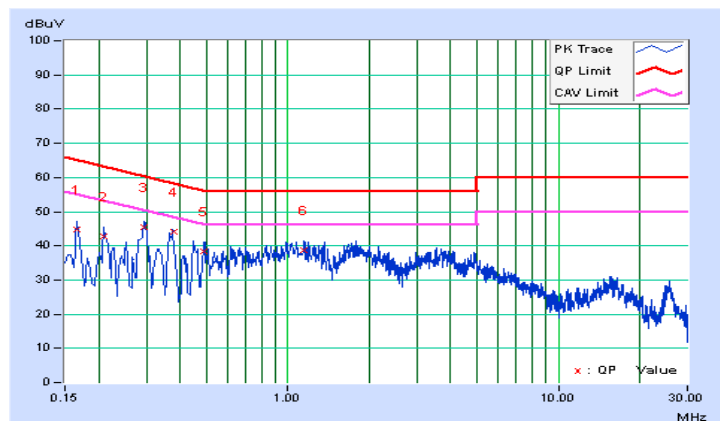


PHASE	Line 2	6dB BANDWIDTH	9kHz
FUNCTION TYPE	BT LE Tx + Adapter + USB Cable + Earphone		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16526	0.05	44.58	34.76	44.63	34.81	65.20	55.20	-20.57	-20.39
2	0.20893	0.05	42.56	32.03	42.61	32.08	63.25	53.25	-20.64	-21.17
3	<b>0.29351</b>	<b>0.05</b>	<b>45.54</b>	<b>39.94</b>	<b>45.59</b>	<b>39.99</b>	<b>60.42</b>	<b>50.42</b>	<b>-14.83</b>	<b>-10.43</b>
4	0.37700	0.06	43.90	37.84	43.96	37.90	58.35	48.35	-14.39	-10.45
5	0.49064	0.06	38.19	32.05	38.25	32.11	56.16	46.16	-17.90	-14.04
6	1.14705	0.08	38.60	27.65	38.68	27.73	56.00	46.00	-17.32	-18.27

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

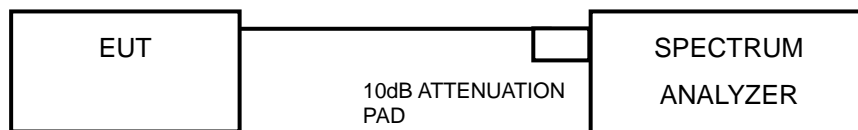


## 4.3 6dB BANDWIDTH MEASUREMENT

### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

### 4.3.2 TEST SETUP



### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.3.4 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 4.3.5 DEVIATION FROM TEST STANDARD

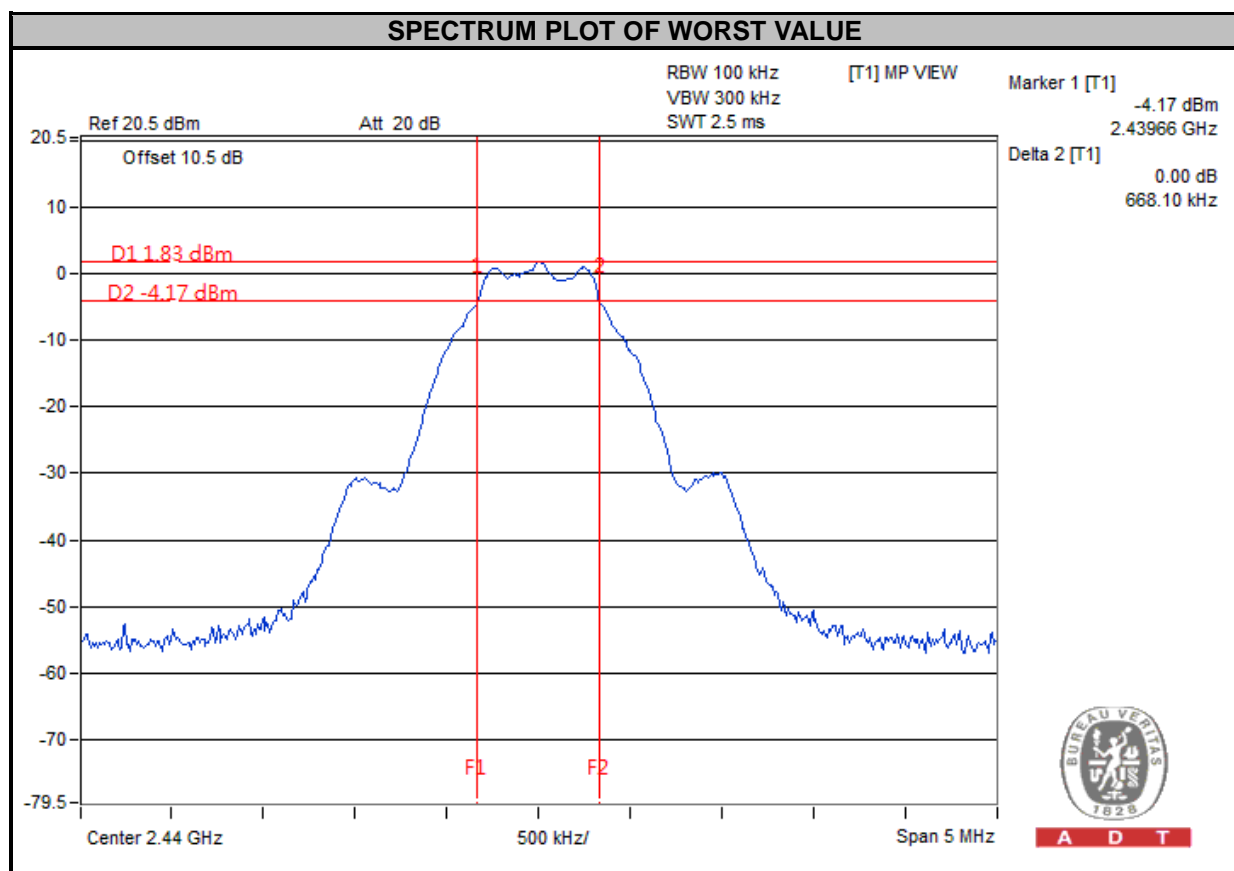
No deviation.

### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

#### 4.3.7 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (KHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	667.230	0.5	PASS
19	2440	668.100	0.5	PASS
39	2480	664.370	0.5	PASS

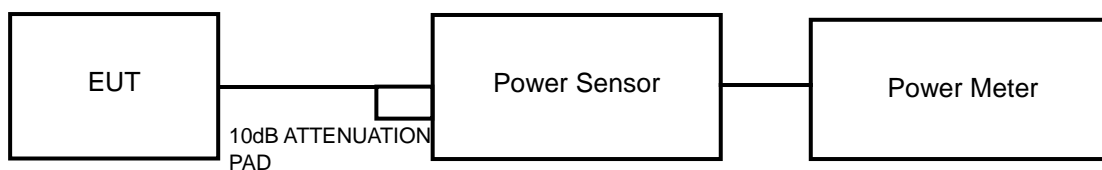


## 4.4 CONDUCTED OUTPUT POWER

### 4.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt (30dBm).

### 4.4.2 TEST SETUP



### 4.4.3 INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.4.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the peak power level.

### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 4.4.7 TEST RESULTS

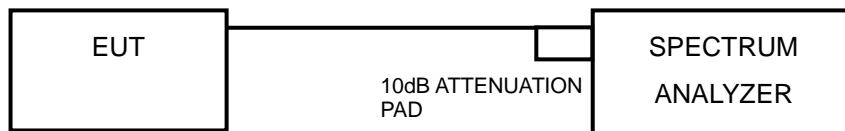
CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
0	2402	1.514	1.8	30	PASS
19	2440	1.585	2.0	30	PASS
39	2480	1.663	2.21	30	PASS

## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 TEST PROCEDURE.

- Set the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

### 4.5.5 DEVIATION FROM TEST STANDARD

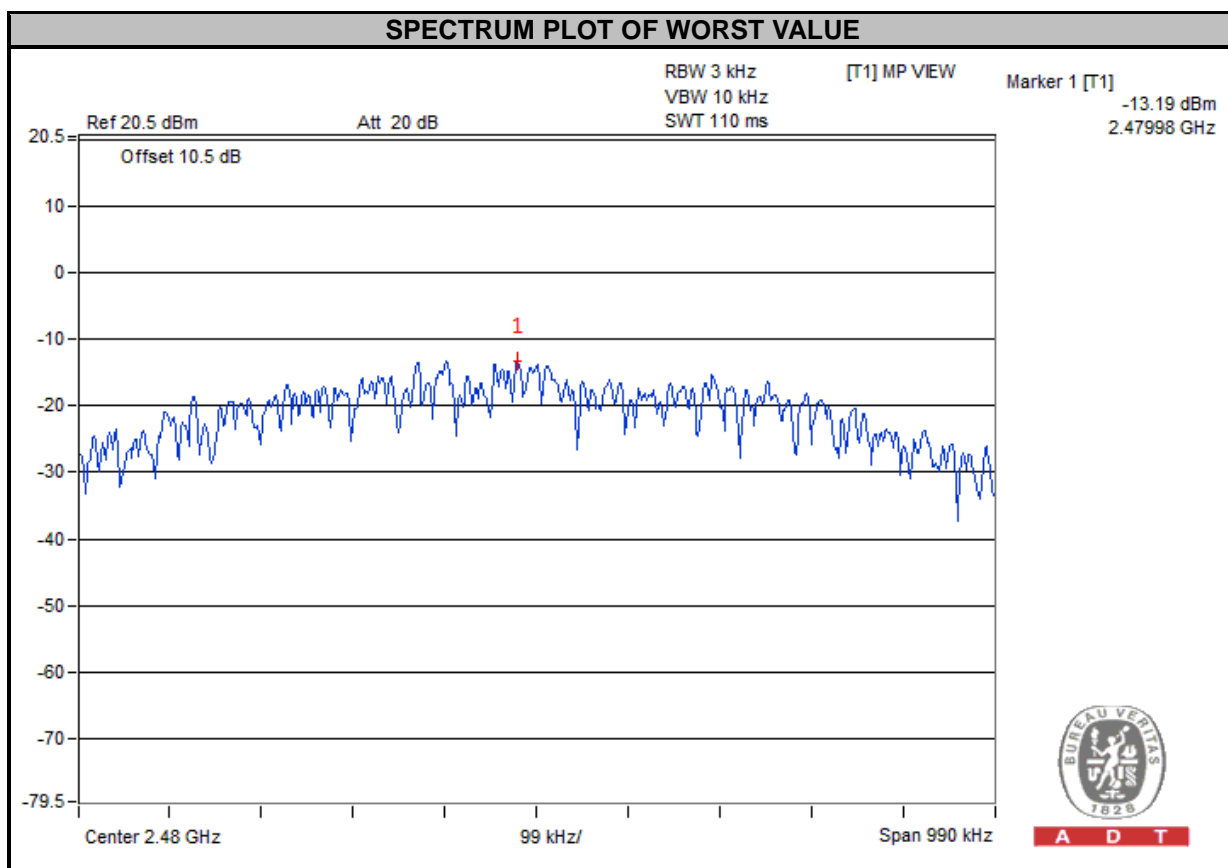
No deviation.

### 4.5.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

#### 4.5.7 TEST RESULTS

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS / FAIL
0	2402	-13.36	8	PASS
19	2440	-13.38	8	PASS
39	2480	-13.19	8	PASS

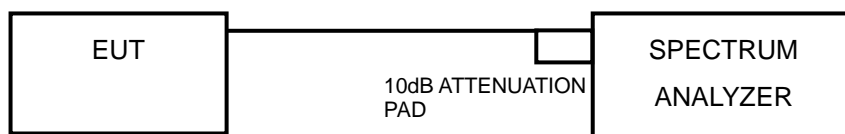


## 4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST SETUP



### 4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 TEST PROCEDURE

#### MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq 300$  kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

#### MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq 300$  kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

### 4.6.5 DEVIATION FROM TEST STANDARD

No deviation.





A D T

#### **4.6.6 EUT OPERATING CONDITION**

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

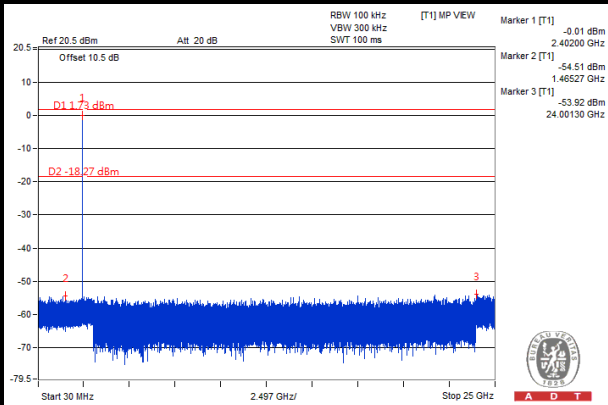
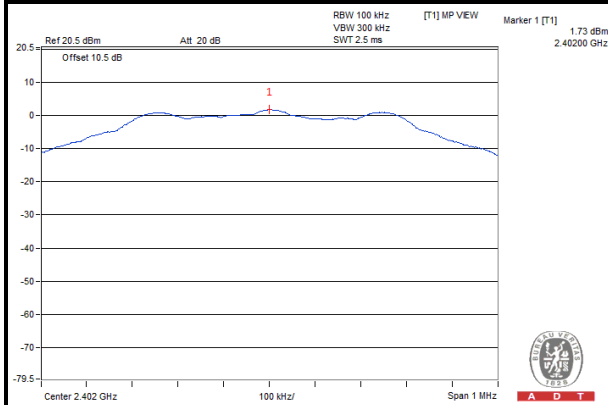
#### **4.6.7 TEST RESULTS**

The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

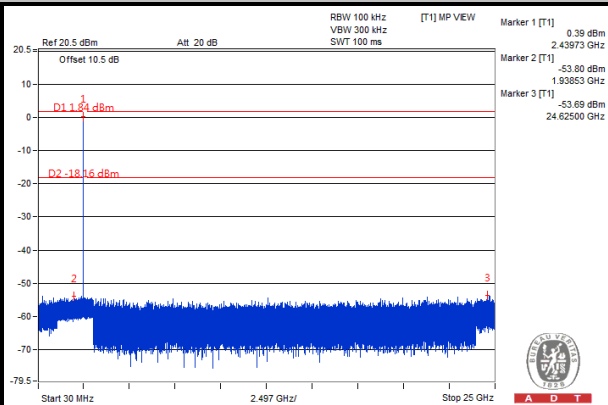
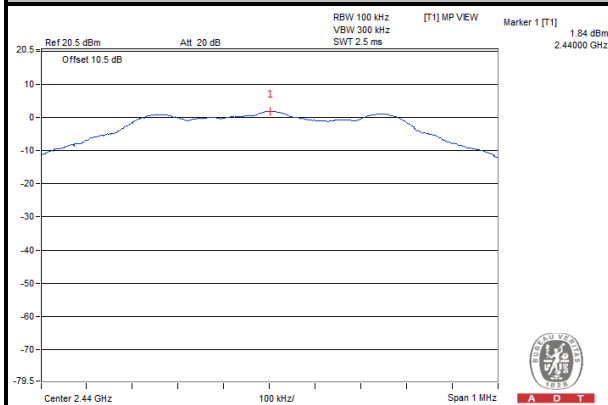


A D T

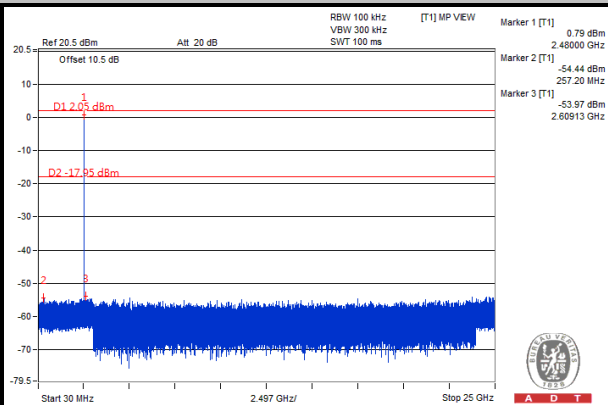
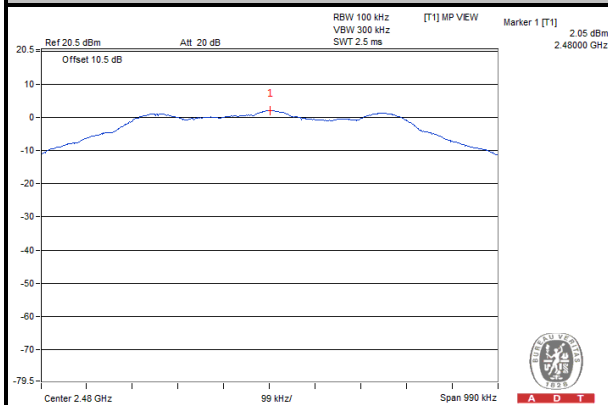
### CH 0



### CH 19

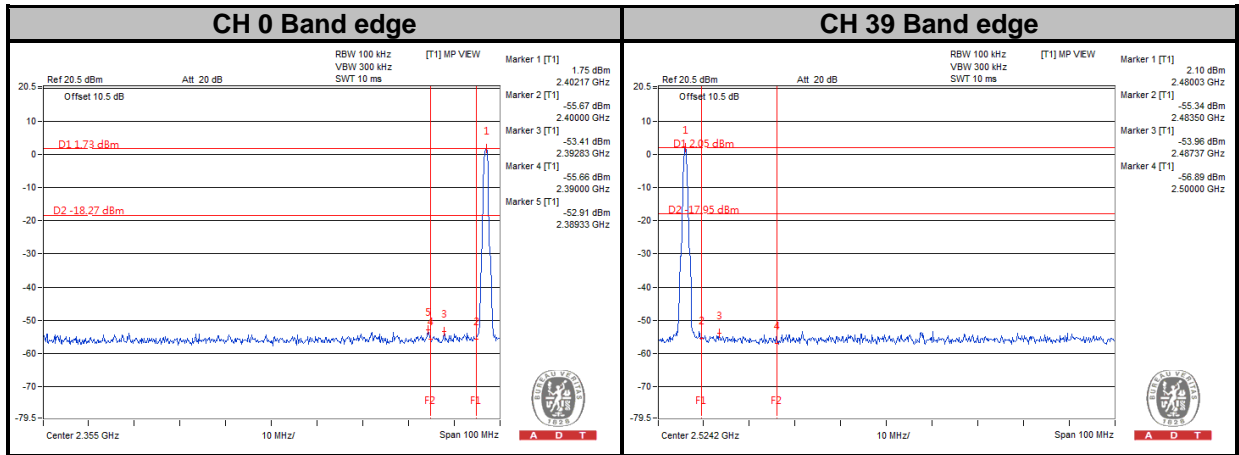


### CH 39





A D T



## 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:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

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

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**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.



A D T

## **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---