

FCC TEST REPORT (BLUETOOTH)

REPORT NO.: RF140417C06

MODEL NO.: PS01-4E

FCC ID: 2ACEL-PS014E

RECEIVED: Apr. 17, 2014

TESTED: May 05, 2014~Jun. 13, 2014

ISSUED: Jun. 18, 2014

APPLICANT: bOMDIC, Inc.

ADDRESS: No.40, Xuefu Rd., East Dist., Hsinchu City 300,

Taiwan (R.O.C.)

ISSUED BY: Bureau Veritas Consumer Products Services

(H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 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 Tsuen, Kwei

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140417C06	Original release	Jun. 18, 2014

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1. CERTIFICATION

PRODUCT: Bluetooth Fitness Stamina Sensor

MODEL NO.: PS01-4E

BRAND: GoMore

APPLICANT: bOMDIC, Inc.

TESTED: May 05, 2014~Jun. 13, 2014

TEST SAMPLE: Identical Prototype

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

ANSI C63.10-2009

The above equipment (model: PS01-4E) 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 : , **DATE** : Jun. 18, 2014

Gina Liu / Specialist

Sam Chen / Senior Project Engineer



2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED S	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 -10.60dB at 0.56797MHz.				
15.205 & 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -7.73dB at 35.40MHz.				
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
	30MHz ~ 200MHz	2.93 dB
Radiated emissions	200MHz ~1000MHz	2.95 dB
Radiated emissions	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Bluetooth Fitness Stamina Sensor
MODEL NO.	PS01-4E
POWER SUPPLY	5.0Vdc (adapter or host equipment) 5.0Vdc (battery)
MODULATION TYPE	GFSK
TRANSFER RATE	1Mbps
OPERATING FREQUENCY	2402 ~ 2480MHz
NUMBER OF CHANNEL	40
CHANNEL SPACING	2MHz
OUTPUT POWER	2.113mW
ANTENNA TYPE	Chip antenna with 1.0dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	Refer to Note as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below

NOTE:

1. The EUT contains following accessory devices.

ITEM	BRAND	MODEL	SPECIFICATION
Battery 1	JUSTING PRECISION CO., LTD	FT042025	Rating: 5Vdc, 150mAh
Battery 2	Coppercell Technology Corp.,LTD.	YJ-(PL)402025	Rating: 5Vdc, 150mAh
USB cable 1	GIANTCONN TECHNOLOGY CO., LTD	A187-A002-V24	0.15m cable
Strap	Clothing+	N/A	

2. The device has 2 configurations as below.

Main Sample (A): EUT + Battery 1

2nd Sample (B): EUT + Battery 2

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

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3.2 DESCRIPTION OF TEST MODES

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

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3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

BLUETOOTH LE 4.0:

EUT CONFIGURE		APPLICABLE TO			DESCRIPTION	
MODE	RE≥1G	RE<1G	PLC	APCM	DESCRIPTION	
А	√	\checkmark	\checkmark	√	Sample A	
В	√	√	\checkmark	-	Sample B	

Where **RE≥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):

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)
А	0 to 39	0, 19, 39	GFSK	1.0
В	0 to 39	39	GFSK	1.0

RADIATED EMISSION TEST (BELOW 1GHz):

- ☐ 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	39	GFSK	1.0

POWER LINE CONDUCTED EMISSION TEST:

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

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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)	
А	0 to 39	0, 19, 39	GFSK	1.0	

Test CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin
PLC	25deg. C, 65%RH	120Vac, 60Hz	Peter Weng
APCM	25deg. C, 65%RH	120Vac, 60Hz	Howard Kao

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3.3 DESCRIPTION OF SUPPORT UNITS

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

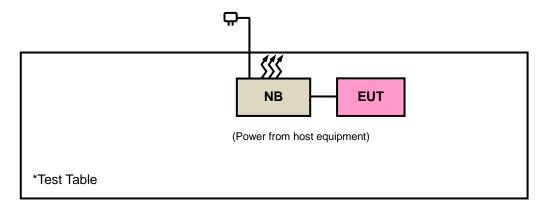
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Universal Radio Communication Tester	R&S	CMU200	123121	N/A
2	Wireless N Dual band Router	D-LINK	DIR-815	PVK21B5000399	N/A
3	Notebook	DELL	Inspiron 14R	8LRKKW1	N/A

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

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

2. Item 1, 2 as a communication partner to transfer data.

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



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3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)
ANSI C63.10-2009
558074 D01 DTS Meas Guidance v03r01
FCC Public Notice DA 00-705

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

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

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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.

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4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	N9038A	MY51210203	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 21, 2013	Dec. 20, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Feb. 27. 2014	Feb. 26, 2015
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-404	Jan. 05, 2014	Jan. 04, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 18, 2013	Dec. 17, 2014
Loop Antenna	HFH2-Z2	100070	Mar. 06, 2014	Mar. 05, 2015
Preamplifier EMCI	EMC 012645	980115	Dec. 26, 2013	Dec. 25, 2014
Preamplifier EMCI	EMC 184045	980116	Jan. 13, 2014	Jan. 12, 2015
Preamplifier EMCI	EMC 330H	980112	Dec. 27, 2013	Dec. 26, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable Worken	RG-213	NA	Nov. 07, 2013	Nov. 06, 2014
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Bluetooth Tester	CBT	100946	Jul. 29, 2013	Jul. 28, 2014
Power Meter	ML2495A	1232002	Aug. 23, 2013	Aug. 22, 2014
Power Sensor	MA2411B	1207325	Aug. 23, 2013	Aug. 22, 2014

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

- 2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
- 3. The test was performed in HwaYa Chamber 10.
- 4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 5. The FCC Site Registration No. is 690701.
- 6. The IC Site Registration No. is IC 7450F-10.



4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

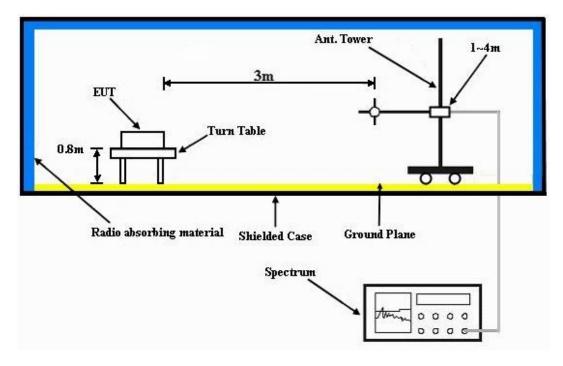
- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
- 3. The resolution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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.



4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

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



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	Anson Lin		

	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	35.29	42.45	54	-18.71	26.81	3.52	37.49	108	40	Average
2364	47.91	55.07	74	-26.09	26.81	3.52	37.49	108	40	Peak
2402	86.69	93.76			26.91	3.54	37.52	108	40	Average
2402	87.65	94.72			26.91	3.54	37.52	108	40	Peak
2490	35.8	42.3	54	-18.2	27.2	3.62	37.32	108	40	Average
2490	48.33	54.83	74	-25.67	27.2	3.62	37.32	108	40	Peak
		ANTEN	NA POLA	RITY & T	EST DIST	ANCE: V	/ERTICAL	. 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
2328	35.07	42.34	54	-18.93	26.72	3.48	37.47	124	136	Average
2328	47.47	54.74	74	-26.53	26.72	3.48	37.47	124	136	Peak
2402	93.12	100.19			26.91	3.54	37.52	124	136	Average
2402	94.19	101.26			26.91	3.54	37.52	124	136	Peak
2486	35.59	42.16	54	-18.41	27.15	3.6	37.32	124	136	Average
2486	48.28	54.85	74	-25.72	27.15	3.6	37.32	124	136	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss Preamp Factor Margin value = Emission level – Limit value
- 2. 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	Anson Lin		

	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
2380	35.04	42.16	54	-18.96	26.86	3.52	37.5	105	37	Average
2380	48.47	55.59	74	-25.53	26.86	3.52	37.5	105	37	Peak
2440	86.77	93.59			27.06	3.58	37.46	105	37	Average
2440	87.73	94.55			27.06	3.58	37.46	105	37	Peak
2498	35.97	42.4	54	-18.03	27.2	3.62	37.25	105	37	Average
2498	48.28	54.71	74	-25.72	27.2	3.62	37.25	105	37	Peak
		ANTEN	NA POLA	RITY & T	EST DIST	ANCE: V	/ERTICAL	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
2370	35.29	42.41	54	-18.71	26.86	3.52	37.5	119	91	Average
2370	47.83	54.95	74	-26.17	26.86	3.52	37.5	119	91	Peak
2440	93.21	100.03			27.06	3.58	37.46	119	91	Average
2440		.00.00								
2440	94.11	100.93			27.06	3.58	37.46	119	91	Peak
			54	-18.16	27.06 27.15	3.58 3.6	37.46 37.32	119 119	91 91	Peak Average

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss Preamp Factor Margin value = Emission level – Limit value
- 2. 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	Anson Lin		

	•		:							
	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
2354	35.07	42.25	54	-18.93	26.81	3.5	37.49	104	37	Average
2354	48.28	55.46	74	-25.72	26.81	3.5	37.49	104	37	Peak
2480	86.94	93.51			27.15	3.6	37.32	104	37	Average
2480	87.95	94.52			27.15	3.6	37.32	104	37	Peak
2496	35.67	42.1	54	-18.33	27.2	3.62	37.25	104	37	Average
2496	48.34	54.77	74	-25.66	27.2	3.62	37.25	104	37	Peak
		ANTEN	NA POLA	RITY & T	EST DIST	ANCE: V	/ERTICAL	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	35.3	42.42	54	-18.7	26.86	3.52	37.5	118	92	Average
2376	48.62	55.74	74	-25.38	26.86	3.52	37.5	118	92	Peak
2480	93.21	99.78			27.15	3.6	37.32	118	92	Average
0.400	94.25	100.82			27.15	3.6	37.32	118	92	Peak
2480	34.23	100.02				0.0				
2480	36.34	42.91	54	-17.66	27.15	3.6	37.32	118	92	Average

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss Preamp Factor Margin value = Emission level – Limit value
- 2. 2480MHz: Fundamental frequency.

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MODE B

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	Anson Lin					

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK	
2390	34.18	41.25	54	-19.82	26.91	3.54	37.52	104	5	Average	
2390	45.97	53.04	74	-28.03	26.91	3.54	37.52	104	5	Peak	
2480	87.5	94.07			27.15	3.6	37.32	104	5	Average	
2480	88.75	95.32			27.15	3.6	37.32	104	5	Peak	
2484	34.71	41.28	54	-19.29	27.15	3.6	37.32	104	5	Average	
2484	47.52	54.09	74	-26.48	27.15	3.6	37.32	104	5	Peak	
		ANTEN	NA POLA	RITY & T	EST DIST	ANCE: V	/ERTICAL	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	34.36	41.63	54	-19.64	26.72	3.48	37.47	121	160	Average	
2334	45.89	53.16	74	-28.11	26.72	3.48	37.47	121	160	Peak	
2480	91.21	97.78			27.15	3.6	37.32	121	160	Average	
2480	92.36	98.93			27.15	3.6	37.32	121	160	Peak	
2484	35.28	41.85	54	-18.72	27.15	3.6	37.32	121	160	Average	
2484	53.43	60	74	-20.57	27.15	3.6	37.32	121	160	Peak	

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss Preamp Factor Margin value = Emission level - Limit value
- 2. 2480MHz: Fundamental frequency.



BELOW 1GHz WORST-CASE DATA:

MODE A

EUT TEST CONDITION		MEASUREMENT DETAIL			
CHANNEL	Channel 39	FREQUENCY RANGE	30MHz ~ 1GHz		
INPUT POWER (SYSTEM)	120Vac, 60 Hz		Peak (PK) Quasi-peak (QP)		
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin		

	А	NTENN	A POLAR	ITY & TE	ST DISTAI	NCE: HC	RIZONTA	AL 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
42.96	28.89	45.69	40	-11.11	13.58	0.7	31.08	114	276	Peak
152.58	26.14	43.74	43.5	-17.36	12.71	1.35	31.66	100	18	Peak
279.21	25.35	42.89	46	-20.65	12.34	1.96	31.84	100	62	Peak
315.4	29.54	46.04	46	-16.46	13.31	2.11	31.92	100	121	Peak
426	23.15	36.81	46	-22.85	15.85	2.52	32.03	100	78	Peak
703.2	30.67	38.15	46	-15.33	20.86	3.44	31.78	100	281	Peak
		ANTEN	NA POLA	RITY & T	EST DIST	ANCE: V	/ERTICAL	. 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
35.67	32.14	49.64	40	-7.86	12.94	0.61	31.05	103	352	Peak
152.85	22.49	40.1	43.5	-21.01	12.72	1.36	31.69	100	140	Peak
286.77	19.15	36.31	46	-26.85	12.57	1.99	31.72	100	56	Peak
305.6	23.78	40.53	46	-22.22	13.08	2.07	31.9	100	136	Peak
601	27.27	36.79	46	-18.73	19.62	3.09	32.23	100	220	Peak
713	28.55	35.8	46	-17.45	21	3.47	31.72	100	109	Peak

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

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MODE B

EUT TEST CONDITION		MEASUREMENT DETAIL						
CHANNEL	Channel 39	30MHz ~ 1GHz						
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-peak (QP)					
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin					

	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	
55.92	26.66	44.85	40	-13.34	12.35	0.8	31.34	100	117	Peak	
152.58	24.17	41.77	43.5	-19.33	12.71	1.35	31.66	100	20	Peak	
233.58	25.21	44.49	46	-20.79	10.79	1.76	31.83	100	103	Peak	
305.6	34.59	51.34	46	-11.41	13.08	2.07	31.9	100	159	Peak	
507.2	21.07	32.39	46	-24.93	17.48	2.8	31.6	100	24	Peak	
669.6	25.79	33.86	46	-20.21	20.44	3.31	31.82	100	194	Peak	
		ANTEN	NA POLA	RITY & T	EST DIST	ANCE: V	/ERTICAL	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	
55.92	27.54	45.73	40	-12.46	12.35	0.8	31.34	100	164	Peak	
152.31	23.46	41.06	43.5	-20.04	12.71	1.35	31.66	100	39	Peak	
229.26	19.98	39.52	46	-26.02	10.58	1.73	31.85	100	89	Peak	
304.2	27.82	44.58	46	-18.18	13.06	2.07	31.89	100	236	Peak	
307.2											
503.7	24.19	35.61	46	-21.81	17.4	2.79	31.61	101	188	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 (dBµV)				
	Quasi-peak	Average			
0.15 ~ 0.5	66 to 56	56 to 46			
0.5 ~ 5	56	46			
5 ~ 30	60	50			

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 29, 2013	Nov. 28, 2014
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 13, 2014	Feb. 12, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 17, 2013	Jul. 16, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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



4.2.3 TEST PROCEDURES

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

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

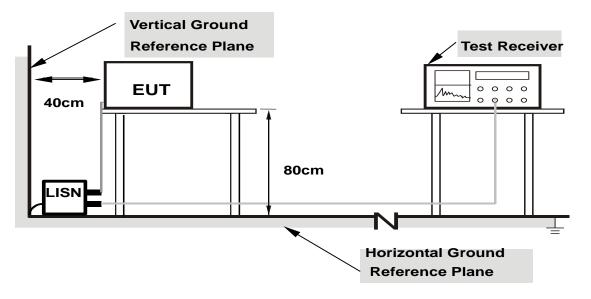
4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

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4.2.5 TEST SETUP



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

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT OPERATING CONDITIONS

Same as section 4.1.6.



4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA:

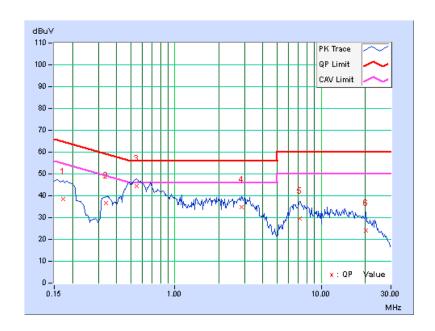
MODE A

PHASE	Line 1	6dB BANDWIDTH	9kHz
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	Freq.	Corr.	Reading Value		Emissic	Emission Level		Limit		Margin	
No		Factor	[dB ((uV)]	[dB ((uV)]	[dB	(uV)]	(d	B)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.17344	0.27	38.17	12.21	38.44	12.48	64.79	54.79	-26.35	-42.31	
2	0.33750	0.29	36.24	26.03	36.53	26.32	59.26	49.26	-22.73	-22.94	
3	0.54844	0.31	44.29	34.98	44.60	35.29	56.00	46.00	-11.40	-10.71	
4	2.84375	0.39	34.28	24.98	34.67	25.37	56.00	46.00	-21.33	-20.63	
5	7.12891	0.47	29.18	22.92	29.65	23.39	60.00	50.00	-30.35	-26.61	
6	20.25391	0.59	23.40	16.14	23.99	16.73	60.00	50.00	-36.01	-33.27	

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



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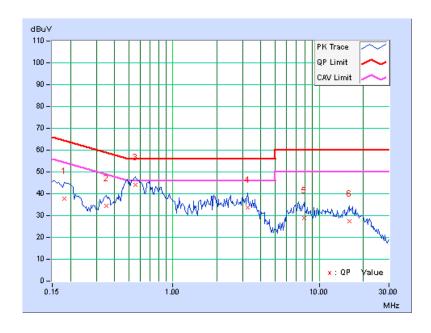


PHASE	Line 2	6dB BANDWIDTH	9kHz

	Freq.	Corr.	Reading Value		Emissic	Emission Level		nit	Margin	
No		Factor	[dB ((uV)]	[dB ((uV)]	[dB	(uV)]	(d	B)
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	0.27	37.66	13.57	37.93	13.84	64.43	54.43	-26.49	-40.58
2	0.34922	0.29	34.07	20.70	34.36	20.99	58.98	48.98	-24.62	-27.99
3	0.55234	0.31	43.66	32.19	43.97	32.50	56.00	46.00	-12.03	-13.50
4	3.25391	0.41	33.43	24.51	33.84	24.92	56.00	46.00	-22.16	-21.08
5	7.91016	0.49	28.40	21.92	28.89	22.41	60.00	50.00	-31.11	-27.59
6	16.08203	0.58	26.74	20.53	27.32	21.11	60.00	50.00	-32.68	-28.89

REMARKS:

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



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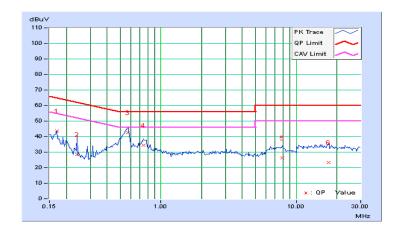
MODE B

PHASE	Line 1	6dB BANDWIDTH	9kHz
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	Freq.	Corr.	Readin	g Value	Emissic	n Level	Lir	nit	Mai	gin
No		Factor	[dB	(uV)]	[dB ((uV)]	[dB	(uV)]	(d	B)
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.27	43.56	27.17	43.83	27.44	64.98	54.98	-21.15	-27.54
2	0.23984	0.28	28.40	19.11	28.68	19.39	62.10	52.10	-33.42	-32.71
3	0.56797	0.31	42.33	35.09	42.64	35.40	56.00	46.00	-13.36	-10.60
4	0.73984	0.32	34.03	25.10	34.35	25.42	56.00	46.00	-21.65	-20.58
5	7.91016	0.48	25.98	21.26	26.46	21.74	60.00	50.00	-33.54	-28.26
6	17.37109	0.56	22.82	17.40	23.38	17.96	60.00	50.00	-36.62	-32.04

REMARKS:

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



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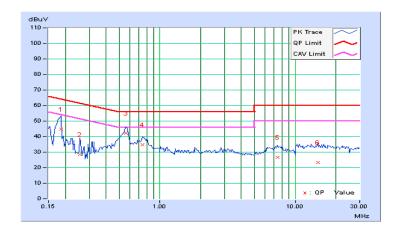


PHASE	Line 2	6dB BANDWIDTH	9kHz
		• • • • • • • • • • • • • • • • • • • •	•=

	Freq.	Corr.	Reading	g Value	Emissio	n Level	Lir	nit	Mai	gin
No		Factor	[dB ((uV)]	[dB	(uV)]	[dB ((uV)]	(d	B)
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.28	44.46	23.12	44.74	23.40	64.25	54.25	-19.52	-30.86
2	0.25547	0.29	28.36	15.61	28.65	15.90	61.58	51.58	-32.93	-35.68
3	0.56406	0.31	42.01	34.00	42.32	34.31	56.00	46.00	-13.68	-11.69
4	0.74375	0.32	34.37	25.38	34.69	25.70	56.00	46.00	-21.31	-20.30
5	7.39453	0.49	26.10	21.01	26.59	21.50	60.00	50.00	-33.41	-28.50
6	14.76563	0.56	22.67	17.71	23.23	18.27	60.00	50.00	-36.77	-31.73

REMARKS:

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



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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) ≥ 3 x RBW, Detector = Peak.

Trace mode = max hold.
 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

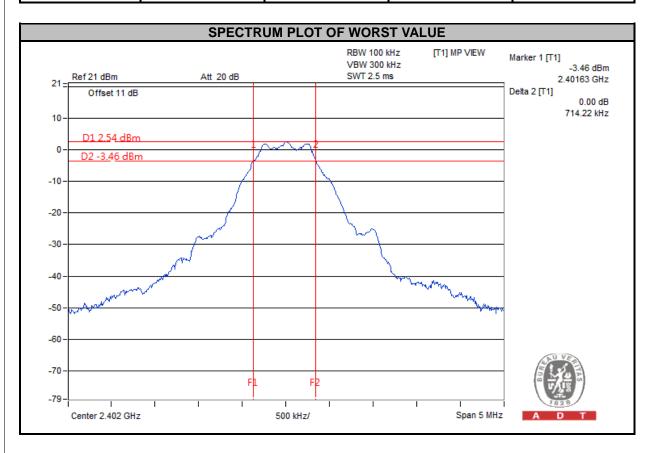
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

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4.3.7 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (KHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	714.220	0.5	PASS
19	2440	705.680	0.5	PASS
39	2480	693.380	0.5	PASS



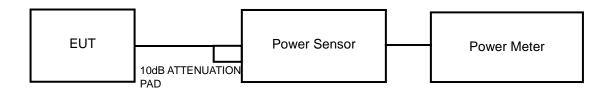


4.4 CONDUCTED OUTPUT POWER

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

There are 79 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plot, it shows that the hopping frequencies are equally spaced.

4.4.7 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
0	2402	2.089	3.20	30	PASS
19	2440	2.113	3.25	30	PASS
39	2480	1.995	3.00	30	PASS

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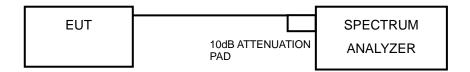


4.5 POWER SPECTRAL DENSITY MEASUREMENT

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.

- a. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
- b. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- c. 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

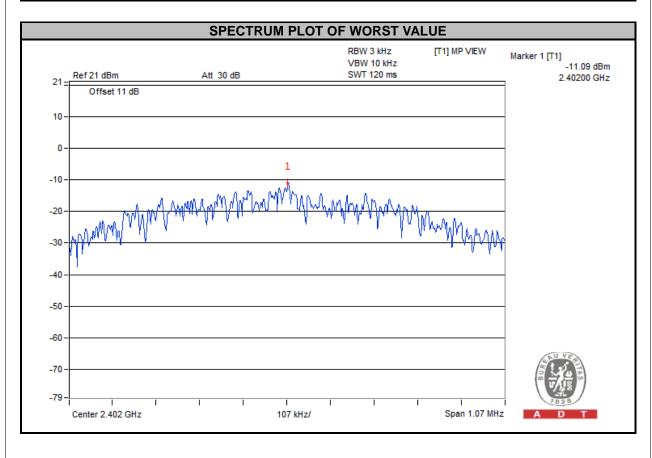
There are 79 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plot, it shows that the hopping frequencies are equally spaced.

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4.5.7 TEST RESULTS

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS / FAIL
0	2402	-11.09	8	PASS
19	2440	-11.54	8	PASS
39	2480	-12.03	8	PASS





4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below –20dB 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 ≥ 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 OOBE

- 1. Set RBW = 100 kHz.
- 2. Set VBW ≥ 300 kHz.
- 3. Ensure that the number of measurement points ≥ span/RBW
- 4. According to measurement points to set differ measurement span.
- 5. Detector = peak.
- 6. Trace Mode = max hold.
- 7. Sweep = auto couple.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

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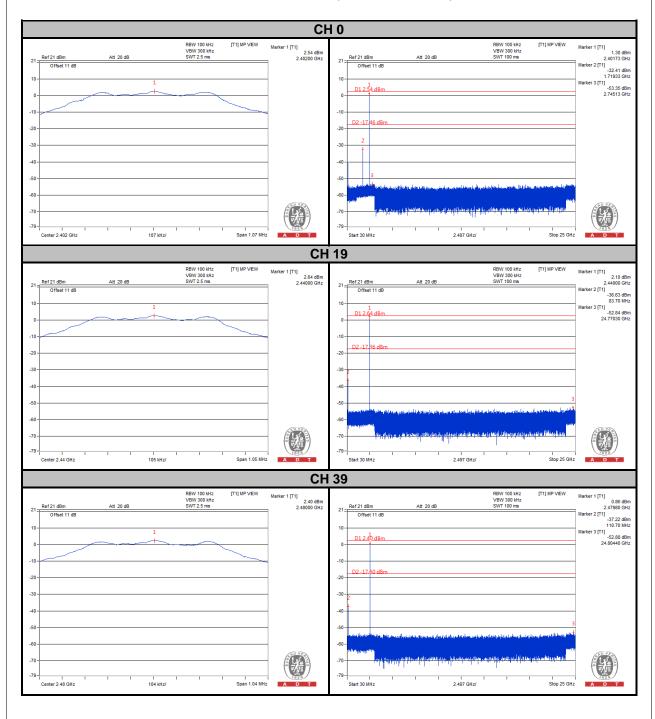


4.6.6 EUT OPERATING CONDITION
There are 79 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plot, it shows that the hopping frequencies are equally spaced.



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.





5. PHOTOGRAPHS OF THE TEST CONFIGURATION
Please refer to the attached file (Test Setup Photo).

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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: Hsin Chu EMC/RF Lab:

Tel: 886-2-26052180 Tel: 886-3-5935343 Fax: 886-2-26051924 Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:

Tel: 886-3-3183232 Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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7. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

ENGINEERING CHANGES TO THE EUT BY THE LAB
No any modifications are made to the EUT by the lab during the test.
END

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