FCC TEST REPORT

REPORT NO.: RF990914D03-1

MODEL NO.: RMTP-S1H1, HWMP1

FCC ID: YSXRMTP-S1H1-01-D

RECEIVED: Sep. 14, 2010

TESTED: Sep. 15 ~ 20, 2010

ISSUED: Oct. 1, 2010

APPLICANT: SUYIN OPTRONICS CORP

ADDRESS: No.377, Fude 1st RD., Xizhi City, Taipei County 221, Taiwan

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

LAB LOCATION: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien, 244 Taiwan

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1. CERTIFICATION

PRODUCT:	RF2.4G dongle
MODEL NO.:	RMTP-S1H1 (**BRAND NAME:** SUYIN)
	HWMP1 (**BRAND NAME:** HAWKING)
APPLICANT:	SUYIN OPTRONICS CORP
TESTED:	Sep. 15 ~ 20, 2010
TEST ITEM:	ENGINEERING SAMPLE
STANDARDS:	FCC Part 15, Subpart C (Section 15.249)
	ANSI C63.4-2003

The above equipment (Model: RMTP-S1H1) 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 : Annie Chang , **DATE:** Oct. 1, 2010
(Annie Chang / Senior Specialist)

TECHNICAL ACCEPTANCE : Jamison Chan , **DATE:** Oct. 1, 2010
Responsible for RF
(Jamison Chan / Supervisor)

APPROVED BY : Ken Liu , **DATE:** Oct. 1, 2010
(Ken Liu / Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.249)			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207	Conducted Emission Test	PASS	Minimum passing margin is –11.08dB at 0.597MHz
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 12.209	PASS	Minimum passing margin is –5.3dB at 67.31MHz & 132.60MHz

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:

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

Measurement	Frequency	Uncertainty
Conducted emissions	150kHz ~ 30MHz	2.41 dB
Radiated emissions	30MHz ~ 1GHz	3.67 dB
	Above 1GHz	2.89 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	RF2.4G dongle
MODEL NO.	RMTP-S1H1, HWMP1
FCC ID	YSXRMTP-S1H1-01-D
POWER SUPPLY	5Vdc from host equipment
MODULATION TYPE	GFSK
OPERATING FREQUENCY	2402.5MHz ~ 2475MHz
NUMBER OF CHANNEL	30
ANTENNA TYPE	Printed antenna with -9.70dBi gain
ANTENNA CONNECTOR	N/A
DATA CABLE	N/A
I/O PORTS	USB port
ASSOCIATED DEVICES	N/A

NOTE:

1. The EUT is a transceiver.

2. The EUT has several models, which are identical to each other except for their brand name differences only, as the following:

Brand Name	Model No.	Differentiation
SUYIN	RMTP-S1H1	Marketing differentiation
HAWKING	HWMP1	

During the test, model: **RMTP-S1H1** was selected as the representative one and therefore only its test data was recorded in this report.

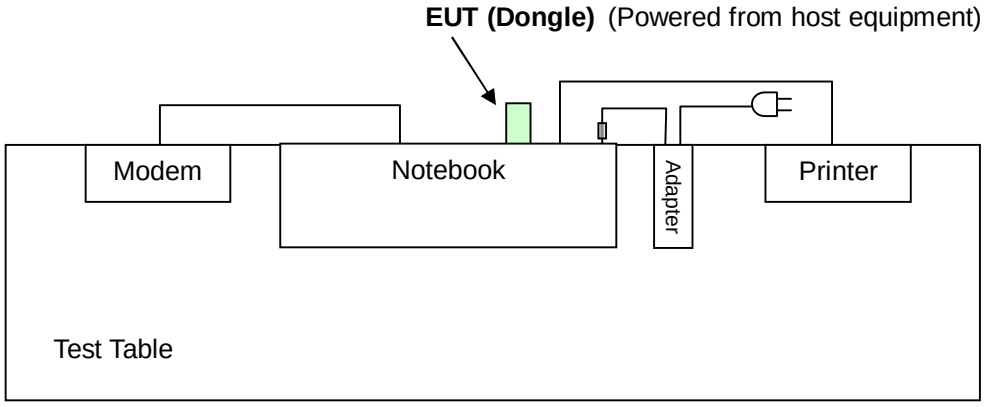
3. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

30 channels are provided to this EUT:

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1	2402.5	9	2422.5	17	2442.5	25	2462.5
2	2405.0	10	2425.0	18	2445.0	26	2465.0
3	2407.5	11	2427.5	19	2447.5	27	2467.5
4	2410.0	12	2430.0	20	2450.0	28	2470.0
5	2412.5	13	2432.5	21	2452.5	29	2472.5
6	2415.0	14	2435.0	22	2455.0	30	2475.0
7	2417.5	15	2437.5	23	2457.5		
8	2420.0	16	2440.0	24	2460.0		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	BM	
-	√	√	√	√	-

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz
RE≥1G: Radiated Emission above 1GHz BM: Bandedge Measurement

POWER LINE CONDUCTED EMISSION TEST:

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 30	1	GFSK

RADIATED EMISSION TEST (BELOW 1 GHz):

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 30	1	GFSK

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 30	1, 16, 30	GFSK

BANDEDGE MEASUREMENT:

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 30	1, 30	GFSK

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	26deg. C, 74% RH, 1011hPa	120Vac, 60Hz	Chad Lee
RE<1G	28deg. C, 67% RH, 1012hPa	120Vac, 60Hz	Chad Lee
RE≥1G	28deg. C, 67% RH, 1012hPa	120Vac, 60Hz	Chad Lee
BM	26deg. C, 72% RH, 1008hPa	120Vac, 60Hz	Nick Chen

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C. (15.249)

ANSI C63.4-2003

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	20375526736	FCC DoC Approved
2	PRINTER	EPSON	LQ-300+	DCGY017054	FCC DoC Approved
3	MODEM	ACEEX	1414	980020520	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	1.8m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.

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

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5 0.5-5 5-30	66 to 56 56 60	56 to 46 46 50

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. 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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100276	Dec. 15, 2009	Dec. 14, 2010
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Nov. 24, 2009	Nov. 23, 2010
LISN With Adapter (for EUT)	AD10	C10Ada-001	Nov. 24, 2009	Nov. 23, 2010
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Nov. 23, 2009	Nov. 22, 2010
Software	ADT_Cond_V7.3.7	NA	NA	NA
Software	ADT_ISN_V7.3.7	NA	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	Feb. 23, 2010	Feb. 22, 2011
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Feb. 23, 2010	Feb. 22, 2011

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 Shielded Room No. 10.
3. The VCCI Site Registration No. C-1852.

4.1.3 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.

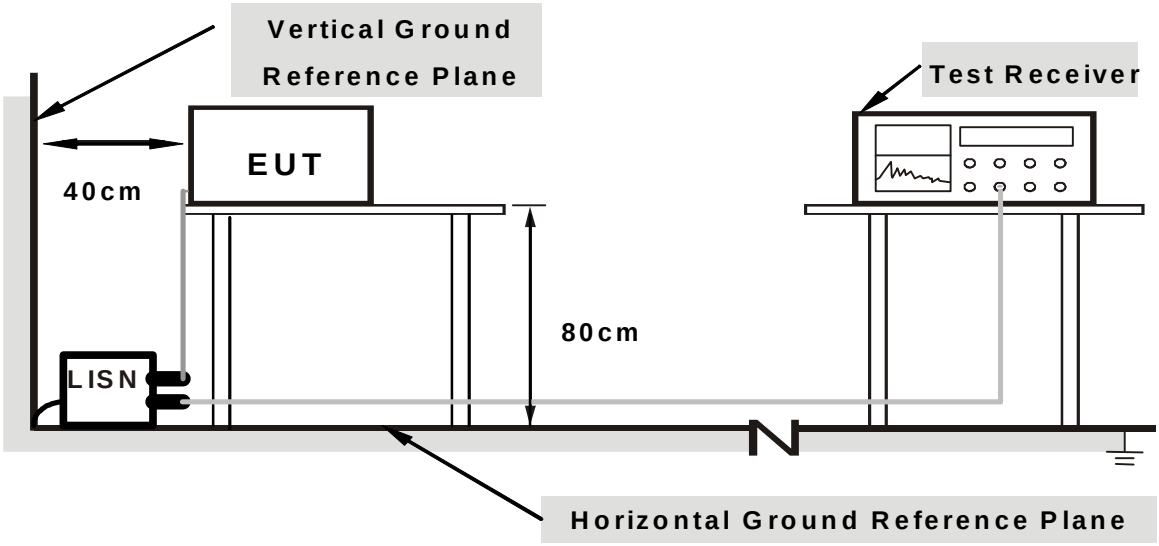
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 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 related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

a. Connected the EUT to a notebook placed on a testing table.
b. The notebook ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
c. The notebook sent messages to printer and the printer printed them out.
d. The notebook sent messages to modem.
e. Repeated c ~ e.

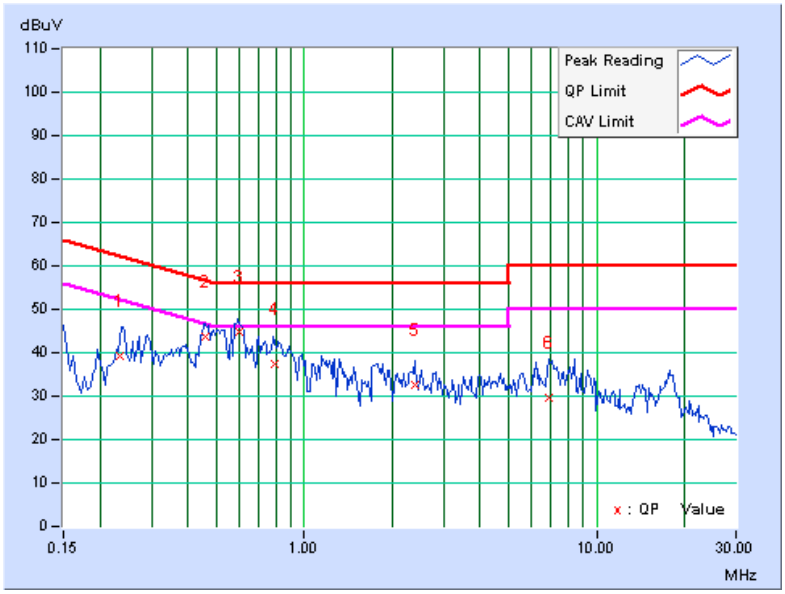
4.1.7 TEST RESULTS

CONDUCTED WORST CASE DATA

PHASE	Line 1	6dB BANDWIDTH	9 kHz

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.235	0.21	39.16	-	39.37	-	62.28	52.28	-22.91	-
2	0.456	0.30	43.24	-	43.54	-	56.77	46.77	-13.22	-
3	**0.597**	**0.30**	**44.62**	**-**	**44.92**	**-**	**56.00**	**46.00**	**-11.08**	**-**
4	0.795	0.31	37.13	-	37.44	-	56.00	46.00	-18.56	-
5	2.380	0.37	32.39	-	32.76	-	56.00	46.00	-23.24	-
6	6.849	0.59	29.06	-	29.65	-	60.00	50.00	-30.35	-

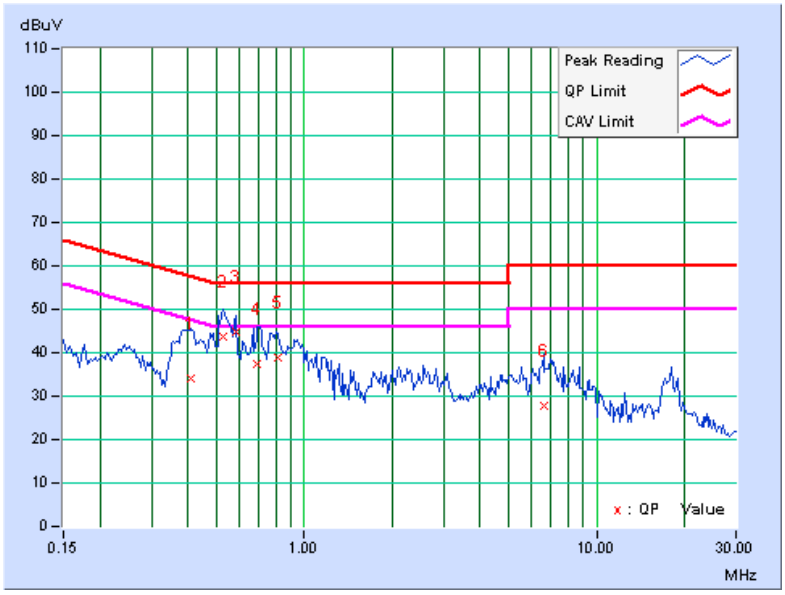
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



PHASE	Line 2	6dB BANDWIDTH	9 kHz

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.412	0.38	33.52	-	33.90	-	57.61	47.61	-23.71	-
2	0.529	0.38	43.15	-	43.53	-	56.00	46.00	-12.47	-
3	0.584	0.38	44.52	-	44.90	-	56.00	46.00	-11.10	-
4	0.693	0.38	37.18	-	37.56	-	56.00	46.00	-18.44	-
5	0.814	0.39	38.47	-	38.86	-	56.00	46.00	-17.14	-
6	6.613	0.62	27.08	-	27.70	-	60.00	50.00	-32.30	-

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209, 15.249 as following:

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	May 06, 2010	May 05, 2011
HP Preamplifier	8449B	3008A01924	Jul. 14, 2010	Jul. 13, 2011
HP Preamplifier	8449B	3008A01292	Jul. 14, 2010	Jul. 13, 2011
ROHDE & SCHWARZ TEST RECEIVER	ESU26	100005	Jun. 10, 2010	Jun. 09, 2011
Schwarzbeck Antenna	VULB 9168	137	Apr. 29, 2010	Apr. 28, 2011
Schwarzbeck Antenna	VHBA 9123	480	Apr. 29, 2010	Apr. 28, 2011
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	ADT_Radiated_V 7.6.15.9.2	NA	NA	NA
SUHNER RF cable	SF104-26.5	CABLE-CH6-17m -01	Aug. 20, 2010	Aug. 19, 2011
ROHDE & SCHWARZ Spectrum Analyzer	FSP 40	100036	Apr. 06, 2010	Apr. 05, 2011
EMCO Horn Antenna	3115	6714	Oct. 26, 2009	Oct. 25, 2010
EMCO Horn Antenna	3115	9312-4192	Apr. 23, 2010	Apr. 22, 2011

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.
5. The FCC Site Registration No. is 447212.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

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

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

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

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

f. 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 method or average method as specified and then reported in data sheet.

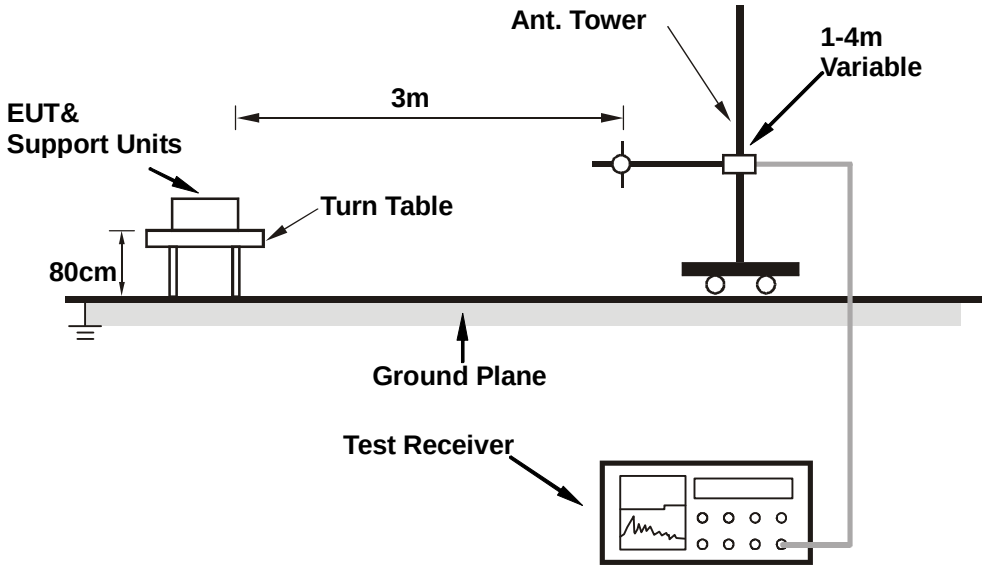
NOTE:

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Set the EUT under transmission condition continuously at specific channel frequency.

4.2.7 TEST RESULTS

ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 67%RH 1008 hPa	**TESTED BY**	Chad Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	58.9 PK	74.0	-15.1	1.00 H	81	26.96	31.89
2	2390.00	44.4 AV	54.0	-9.6	1.00 H	81	12.49	31.89
3	2400.00	43.7 PK	74.0	-30.3	1.00 H	81	11.75	31.93
4	2400.00	24.3 AV	54.0	-29.7	1.00 H	81	-7.65	31.93
5	*2402.50	92.3 PK	114.0	-21.7	1.00 H	81	60.34	31.94
6	*2402.50	72.9 AV	94.0	-21.1	1.00 H	81	40.94	31.94
7	4805.00	55.9 PK	74.0	-18.1	1.00 H	146	16.82	39.07
8	4805.00	36.5 AV	54.0	-17.5	1.00 H	146	-2.58	39.07
9	7207.50	59.9 PK	74.0	-14.1	1.09 H	237	14.64	45.27
10	7207.50	40.5 AV	54.0	-13.5	1.09 H	237	-4.76	45.27
11	9610.00	62.9 PK	74.0	-11.1	1.00 H	152	14.50	48.44
12	9610.00	43.5 AV	54.0	-10.5	1.00 H	152	-4.90	48.44

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
20 log (Duty cycle) = 20 log (0.44 ms / 4.11 ms) = -19.4 dB
Please see page 23 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 67%RH 1008 hPa	TESTED BY	Chad Lee

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.9 PK	74.0	-16.1	1.00 V	8	26.01	31.89
2	2390.00	44.9 AV	54.0	-9.1	1.00 V	8	12.96	31.89
3	2400.00	42.4 PK	74.0	-31.6	1.00 V	8	10.42	31.93
4	2400.00	23.0 AV	54.0	-31.0	1.00 V	8	-8.98	31.93
5	*2402.50	91.0 PK	114.0	-23.0	1.00 V	8	59.01	31.94
6	*2402.50	71.6 AV	94.0	-22.4	1.00 V	8	39.61	31.94
7	4805.00	54.8 PK	74.0	-19.2	1.05 V	87	15.69	39.07
8	4805.00	35.4 AV	54.0	-18.6	1.05 V	87	-3.71	39.07
9	7207.50	55.2 PK	74.0	-18.8	1.00 V	14	9.89	45.27
10	7207.50	35.8 AV	54.0	-18.2	1.00 V	14	-9.51	45.27
11	9610.00	60.5 PK	74.0	-13.5	1.05 V	3	12.08	48.44
12	9610.00	41.1 AV	54.0	-12.9	1.05 V	3	-7.32	48.44

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
20 log (Duty cycle) = 20 log (0.44 ms / 4.11 ms) = -19.4 dB
Please see page 23 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 16	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 67%RH 1008 hPa	TESTED BY	Chad Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	92.0 PK	114.0	-22.0	1.00 H	82	59.89	32.07
2	*2440.00	72.6 AV	94.0	-21.4	1.00 H	82	40.49	32.07
3	4880.00	55.5 PK	74.0	-18.5	1.00 H	135	16.13	39.41
4	4880.00	36.1 AV	54.0	-17.9	1.00 H	135	-3.27	39.41
5	7320.00	57.5 PK	74.0	-16.5	1.00 H	214	12.10	45.41
6	7320.00	38.1 AV	54.0	-15.9	1.00 H	214	-7.30	45.41
7	9760.00	62.6 PK	74.0	-11.4	1.00 H	150	13.96	48.61
8	9760.00	43.2 AV	54.0	-10.8	1.00 H	150	-5.44	48.61
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	89.2 PK	114.0	-24.8	1.00 V	1	57.12	32.07
2	*2440.00	69.8 AV	94.0	-24.2	1.00 V	1	37.72	32.07
3	4880.00	57.0 PK	74.0	-17.0	1.00 V	89	17.61	39.41
4	4880.00	37.6 AV	54.0	-16.4	1.00 V	89	-1.79	39.41
5	7320.00	60.6 PK	74.0	-13.4	1.14 V	179	15.14	45.41
6	7320.00	41.2 AV	54.0	-12.9	1.14 V	179	-4.26	45.41
7	9760.00	59.9 PK	74.0	-14.1	1.00 V	0	11.26	48.61
8	9760.00	40.5 AV	54.0	-13.5	1.00 V	0	-8.14	48.61

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
20 log (Duty cycle) = 20 log (0.44 ms / 4.11 ms) = -19.4 dB
Please see page 23 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 30	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 67%RH 1008 hPa	**TESTED BY**	Chad Lee

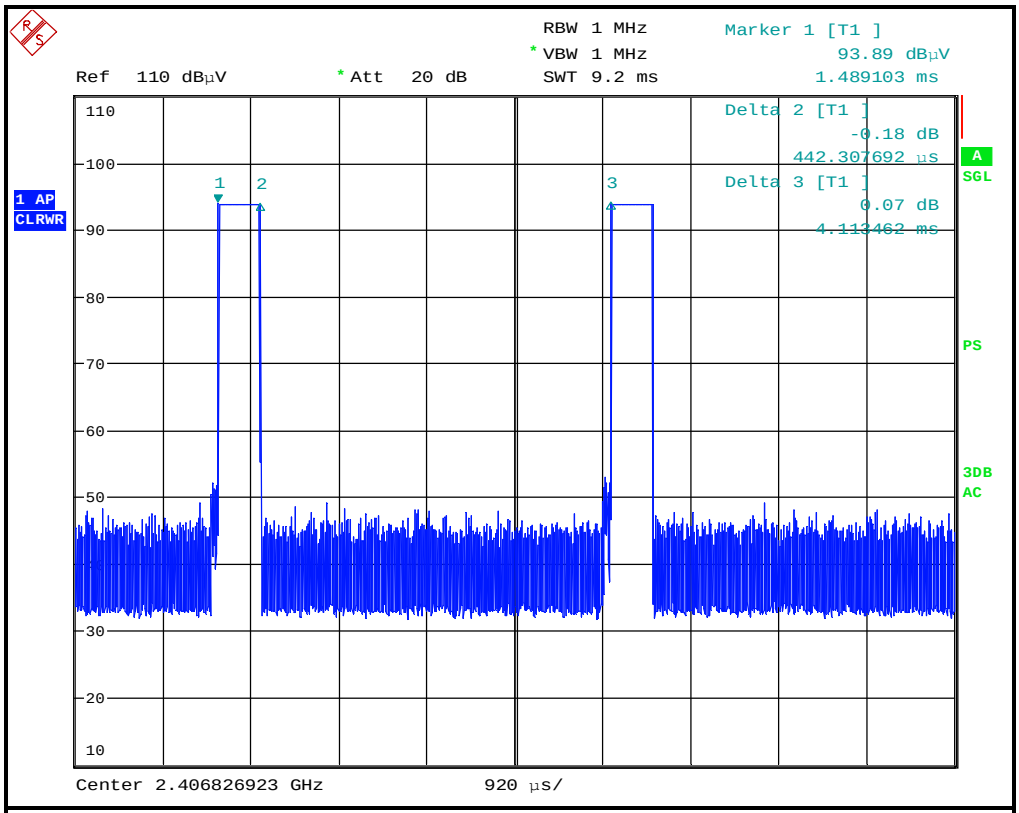
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	*2475.00	88.7 PK	114.0	-25.3	1.22 H	81	56.47	32.19
2	*2475.00	69.3 AV	94.0	-24.7	1.22 H	81	37.07	32.19
3	2483.50	39.5 PK	74.0	-34.5	1.22 H	81	7.33	32.21
4	2483.50	20.1 AV	54.0	-33.9	1.22 H	81	-12.07	32.21
5	4950.00	56.2 PK	74.0	-17.8	1.00 H	122	16.58	39.63
6	4950.00	36.8 AV	54.0	-17.2	1.00 H	122	-2.82	39.63
7	7425.00	56.9 PK	74.0	-17.1	1.00 H	220	11.48	45.38
8	7425.00	37.5 AV	54.0	-16.5	1.00 H	220	-7.92	45.38
9	9900.00	62.3 PK	74.0	-11.7	1.00 H	174	13.65	48.65
10	9900.00	42.9 AV	54.0	-11.1	1.00 H	174	-5.75	48.65

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
20 log (Duty cycle) = 20 log (0.44 ms / 4.11 ms) = -19.4 dB
Please see page 23 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 30	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 67%RH 1008 hPa	**TESTED BY**	Chad Lee

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	*2475.00	87.4 PK	114.0	-26.6	1.00 V	6	55.24	32.19
2	*2475.00	68.0 AV	94.0	-26.0	1.00 V	6	35.84	32.19
3	2483.50	38.3 PK	74.0	-35.7	1.00 V	6	6.10	32.21
4	2483.50	18.9 AV	54.0	-35.1	1.00 V	6	-13.30	32.21
5	4950.00	57.7 PK	74.0	-16.3	1.00 V	44	18.10	39.63
6	4950.00	38.3 AV	54.0	-15.7	1.00 V	44	-1.30	39.63
7	7425.00	58.8 PK	74.0	-15.2	1.11 V	181	13.46	45.38
8	7425.00	39.4 AV	54.0	-14.6	1.11 V	181	-5.94	45.38
9	9900.00	58.5 PK	74.0	-15.5	1.01 V	54	9.86	48.65
10	9900.00	39.1 AV	54.0	-14.9	1.01 V	54	-9.54	48.65

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
20 log (Duty cycle) = 20 log (0.44 ms / 4.11 ms) = -19.4 dB
Please see page 23 for plotted duty.



20 log (Duty cycle) = 20 log (0.44 ms / 4.11 ms) = -19.4 dB

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 67%RH 1012 hPa	TESTED BY	Chad Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	67.31	33.7 QP	40.0	-6.3	1.55 H	124	21.11	12.61
2	129.49	33.7 QP	43.5	-9.8	1.30 H	358	20.41	13.32
3	162.13	35.2 QP	43.5	-8.4	1.00 H	181	20.44	14.71
4	249.18	37.5 QP	46.0	-8.5	2.00 H	160	23.80	13.65
5	316.03	32.8 QP	46.0	-13.2	1.43 H	298	16.63	16.20
6	532.10	35.3 QP	46.0	-10.7	1.00 H	103	13.62	21.68
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	**67.31**	**34.7 QP**	**40.0**	**-5.3**	**1.15 V**	**109**	**22.09**	**12.61**
2	124.82	33.8 QP	43.5	-9.7	1.63 V	175	21.03	12.80
3	**132.60**	**38.2 QP**	**43.5**	**-5.3**	**1.52 V**	**58**	**24.58**	**13.66**
4	162.13	34.5 QP	43.5	-9.0	1.00 V	166	19.76	14.71
5	249.18	37.6 QP	46.0	-8.4	2.00 V	148	23.95	13.65
6	354.89	35.3 QP	46.0	-10.7	2.05 V	40	18.06	17.22

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

4.3 BAND EDGES MEASUREMENT

4.3.1 LIMITS OF BAND EDGES MEASUREMENT

Below –50dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP 40	100036	Apr. 06, 2010	Apr. 05, 2011

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

4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.
The spectrum plots are attached on the following pages.

4.3.4 DEVIATION FROM TEST STANDARD

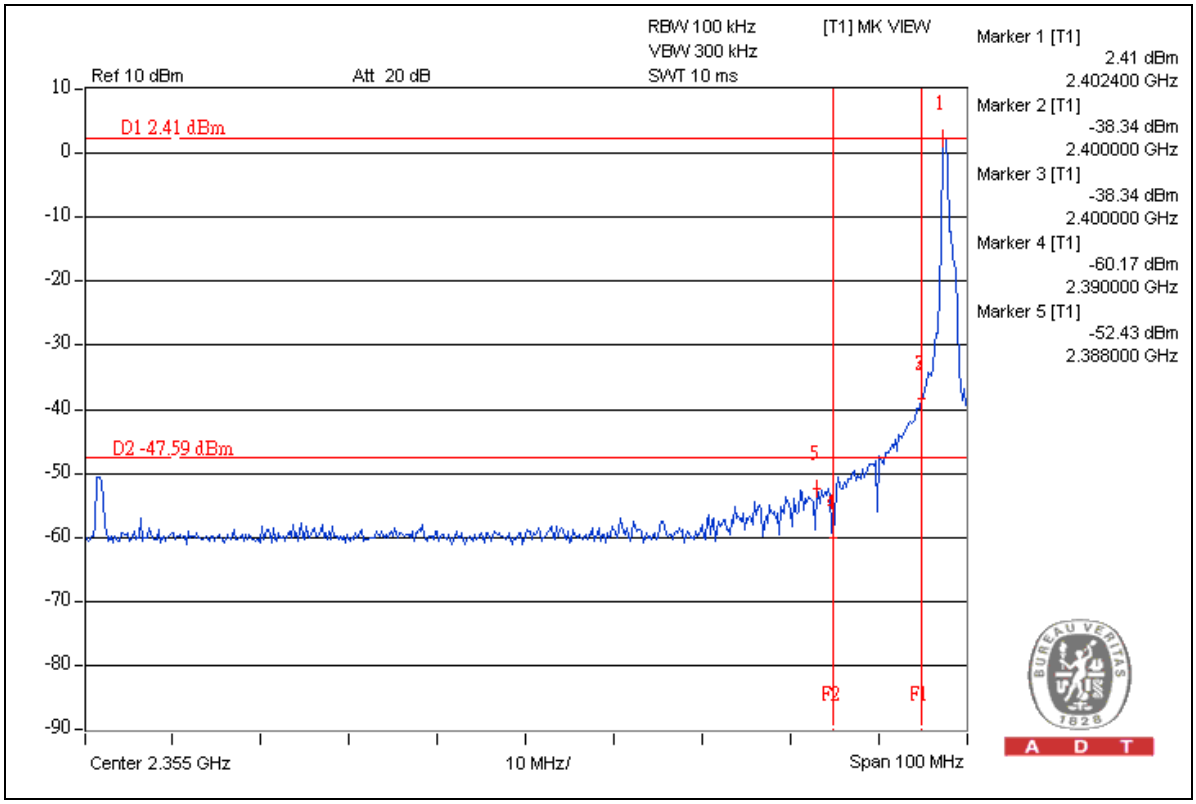
No deviation

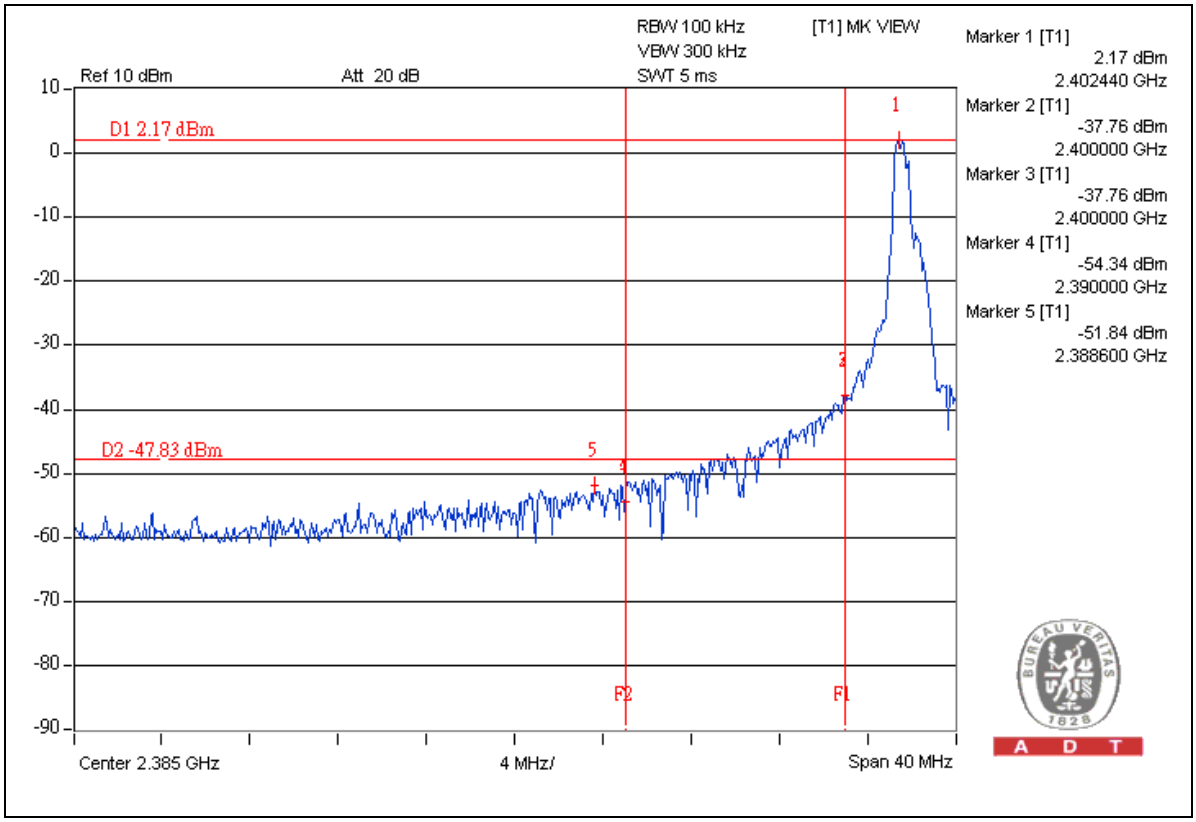
4.3.5 EUT OPERATING CONDITION

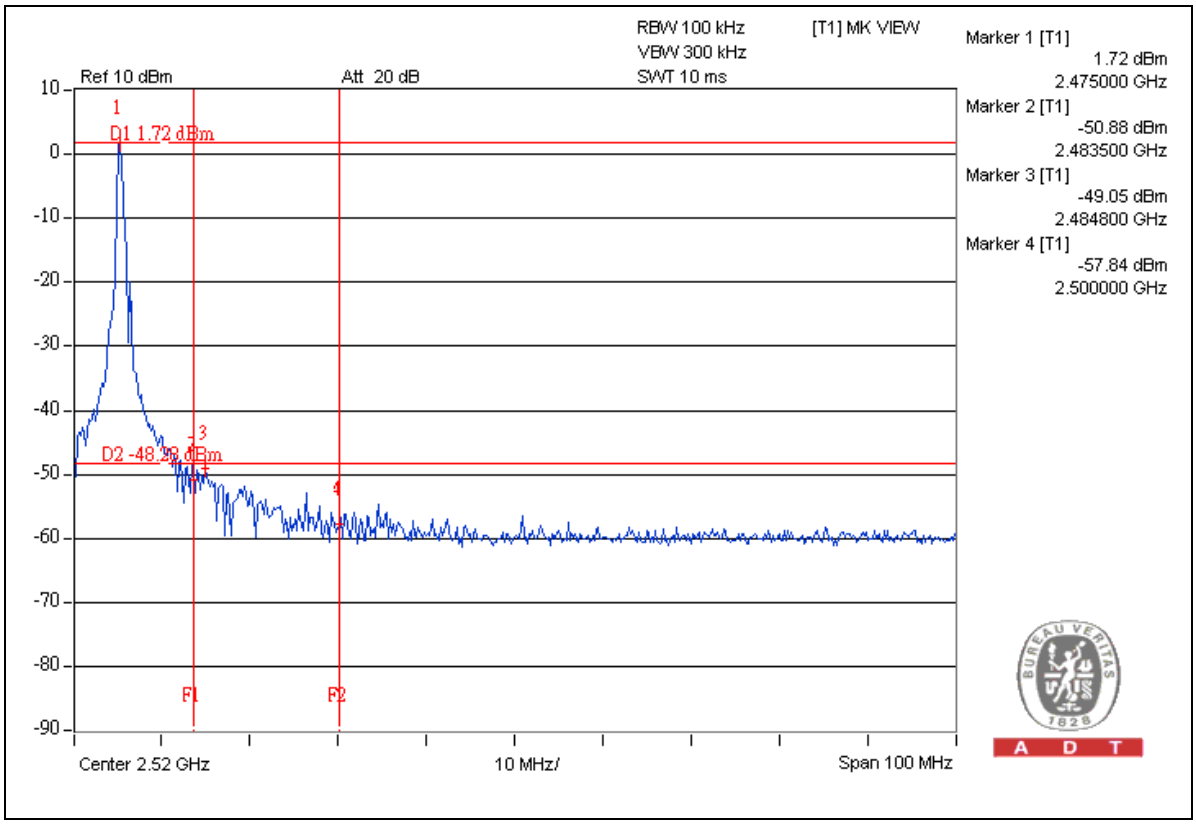
Same as Item 4.2.6

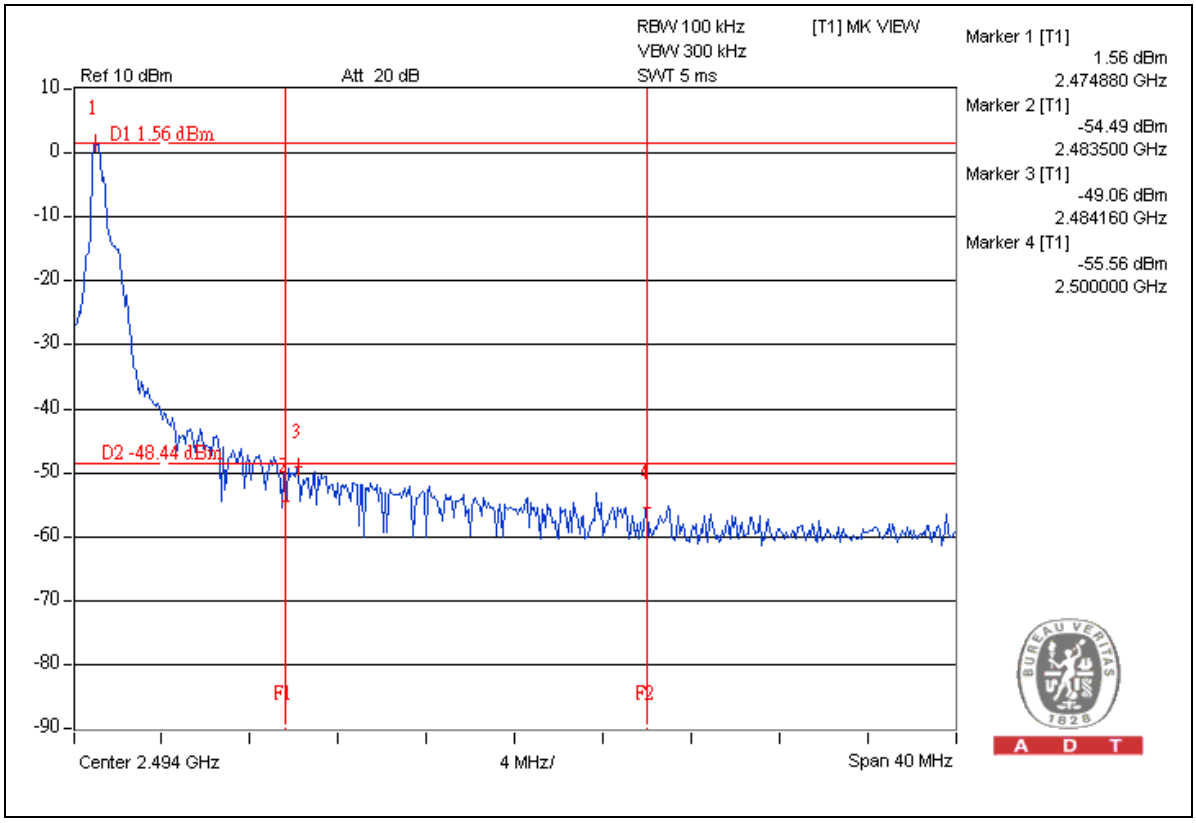
4.3.6 TEST RESULTS

The spectrum plots are attached on the following 4 images. D1 line indicates the highest level, and D2 line indicates the 50dB offset below D1. It shows compliance with the requirement in part 15.249(d).


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 10 dBm
Att 20 dB
D1 2.41 dBm
D2 -47.59 dBm
Marker 1 [T1]
2.41 dBm
2.402400 GHz
Marker 2 [T1]
-38.34 dBm
2.400000 GHz
Marker 3 [T1]
-38.34 dBm
2.400000 GHz
Marker 4 [T1]
-60.17 dBm
2.390000 GHz
Marker 5 [T1]
-52.43 dBm
2.388000 GHz
Center 2.355 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Ref 10 dBm
Att 20 dB
D1 2.17 dBm
D2 -47.83 dBm
Marker 1 [T1]
2.17 dBm
2.402440 GHz
Marker 2 [T1]
-37.76 dBm
2.400000 GHz
Marker 3 [T1]
-37.76 dBm
2.400000 GHz
Marker 4 [T1]
-54.34 dBm
2.390000 GHz
Marker 5 [T1]
-51.84 dBm
2.388600 GHz
Center 2.385 GHz
4 MHz/
Span 40 MHz


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 10 dBm
Att 20 dB
D1 1.72 dBm
D2 -48.28 dBm
Marker 1 [T1]
1.72 dBm
2.475000 GHz
Marker 2 [T1]
-50.88 dBm
2.483500 GHz
Marker 3 [T1]
-49.05 dBm
2.484800 GHz
Marker 4 [T1]
-57.84 dBm
2.500000 GHz
Center 2.52 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Ref 10 dBm
Att 20 dB
D1 1.56 dBm
D2 -48.44 dBm
Marker 1 [T1]
1.56 dBm
2.474880 GHz
Marker 2 [T1]
-54.49 dBm
2.483500 GHz
Marker 3 [T1]
-49.06 dBm
2.484160 GHz
Marker 4 [T1]
-55.56 dBm
2.500000 GHz
Center 2.494 GHz
4 MHz/
Span 40 MHz

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.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Web Site: www.adt.com.tw

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

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

No any modifications are made to the EUT by the lab during the test.

---END---