FCC TEST REPORT

REPORT NO.:	RF110516E05
MODEL NO.:	SMCSR01-Z, SMCSR01-Z CA
FCC ID:	JI5-SMCSR01Z
RECEIVED:	May 16, 2011
TESTED:	May 20 to June 03, 2011
ISSUED:	July 07, 2011

APPLICANT:	SMC Networks
ADDRESS:	20 Mason, Irvine, California 92618 United States

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
LAB ADDRESS :	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan
TEST LOCATION (1):	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan
TEST LOCATION (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

Table of Contents

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF110516E05	Original release	July 07, 2011

1. CERTIFICATION

PRODUCT:	Home Siren Repeator
BRAND NAME:	SMC
MODEL NO.:	SMCSR01-Z, SMCSR01-Z CA
TEST SAMPLE:	R&D SAMPLE
APPLICANT:	SMC Networks
TESTED:	May 20 to June 03, 2011
STANDARDS:	FCC Part 15, Subpart C (Section 15.247) ANSI C63.4-2003 ANSI C63.10-2009

The above equipment (Model: SMCSR01-Z) 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:** *July 07, 2011*
(Claire Kuan, Specialist)

APPROVED BY : _____ , **DATE:** *July 07, 2011*
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
Standard Section	**Test Type and Limit**	**Result**	**Remark**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.02 dB at 0.170 MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -0.8dB at 2483.50MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Conducted Out-Band Emission Measurement Limit: 20dB less than the peak value of fundamental frequency	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:

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

Measurement	Value
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	3.81 dB
Radiated emissions (1GHz -18GHz)	2.19 dB
Radiated emissions (18GHz -40GHz)	2.56 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Home Siren Repeator
MODEL NO.	SMCSR01-Z, SMCSR01-Z CA
FCC ID	JI5-SMCSR01Z
POWER SUPPLY	DC 5V from internal power supply or DC 3.6V from battery
MODULATION TYPE	O-QPSK
MODULATION TECHNOLOGY	DSSS
TRANSFER RATE	250kbps
OPERATING FREQUENCY	2405 ~ 2475MHz
NUMBER OF CHANNEL	15
MAXIMUM OUTPUT POWER	60.3mW
ANTENNA TYPE	Please see note
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	Adapter x 1 Battery x 1

NOTE:

1. The EUT has two model names which are identical to each other in all aspects except for the following table:

Brand	Model Name	Description
SMC	SMCSR01-Z	For marketing requirement
	SMCSR01-Z CA	

From the above models, model: **SMCSR01-Z** was selected as representative model for the test and its data was recorded in this report.

2. There is two antennas provided to this EUT, please refer to the following table:

Position	Antenna Type	Gain	Remark
Left	ceramic	2.5dBi	SMT
Right	ceramic	2.5dBi	SMT

3. There is ZigBee technology used for the EUT.

4. The EUT could be supplied with 3.6V battery or the following internal power supply which will be sold together with the EUT:

Item	Brand	Model No.	Spec.
Adapter	sunny	Sys1451-1505	I/P: 90-264V, 0.5A DC O/P: 5V, 3.0A
Battery	Metalligence	HWS6505-RP	capacity: nominal 2600mAh / 3.6V / 500mA

5. The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	Battery mode
Mode B	**Recharge mode**

From the above modes, the worst case for radiated test was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

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

3.2 DESCRIPTION OF TEST MODES

Fifteen channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
11	2405	15	2425	19	2445	23	2465
12	2410	16	2430	20	2450	24	2470
13	2415	17	2435	21	2455	25	2475
14	2420	18	2440	22	2460		

NOTE:

1. Below 1 GHz, the channel 11, 18, and 25 were pre-tested in chamber. The channel 18, worst case one, was chosen for final test.
2. Above 1 GHz, the channel 11, 18, and 25 were tested individually.

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	PLC	RE < 1G	RE ³ 1G	APCM	OBE	
A	√	√	-	√	√	X-Y plane: Recharge mode
B	-	-	√	-	-	Y-Z plane: Recharge mode

Where **PLC:** Power Line Conducted Emission **RE < 1G:** Radiated Emission below 1GHz

RE ³ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

OBE: Conducted Out-Band Emission measurement

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	EUT CONFIGURE MODE
11 to 25	18	O-QPSK	A

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ 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).

☒ Pre-Scan the XYZ axis to determine the worst-case mode.

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	EUT CONFIGURE MODE
11 to 25	18	O-QPSK	A

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ 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).
☒ Pre-Scan the XYZ axis to determine the worst-case mode.
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	EUT CONFIGURE MODE
11 to 25	11, 18, 25	O-QPSK	B

CONDUCTED OUT-BAND EMISSION 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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	EUT CONFIGURE MODE
11 to 25	11, 25	O-QPSK	A

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ 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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	EUT CONFIGURE MODE
11 to 25	11, 18, 25	O-QPSK	A

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	27deg. C, 75%RH, 1005 hPa	120Vac, 60Hz	Eagle Chen
RE≥1G	25deg. C, 69%RH, 1005 hPa	120Vac, 60Hz	Rex Huang
RE<1G	20deg. C, 68%RH, 1005 hPa	120Vac, 60Hz	Frank Liu
APCM	25deg. C, 60%RH, 1005 hPa	120Vac, 60Hz	Rex Huang
OBE	25deg. C, 60%RH, 1005 hPa	120Vac, 60Hz	Rex Huang

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C. (15.247)
ANSI C63.4-2003
ANSI C63.10-2009

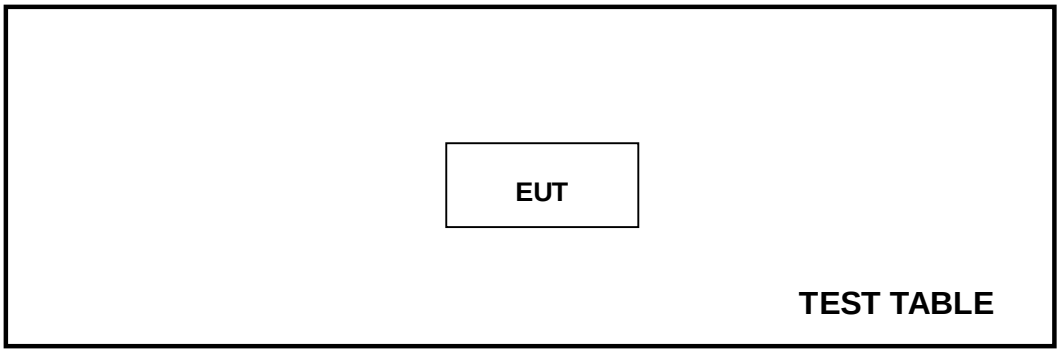
All test items have been performed and recorded as per the above standards.

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.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit.

3.5 CONFIGURATION OF SYSTEM UNDER TEST



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	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 09, 2011	Mar. 08, 2012
Line-Impedance Stabilization Network (for EUT)	NSLK 8127	8127-522	Sep. 08, 2010	Sep. 07, 2011
Line-Impedance Stabilization Network (for Peripheral)	ESH3-Z5	848773/004	Nov. 03, 2010	Nov. 02, 2011
RF Cable (JYEBAO)	5DFB	COCCAB-002	Aug. 30, 2010	Aug. 29, 2011
50 ohms Terminator	50	3	Nov. 03, 2010	Nov. 02, 2011
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.

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.

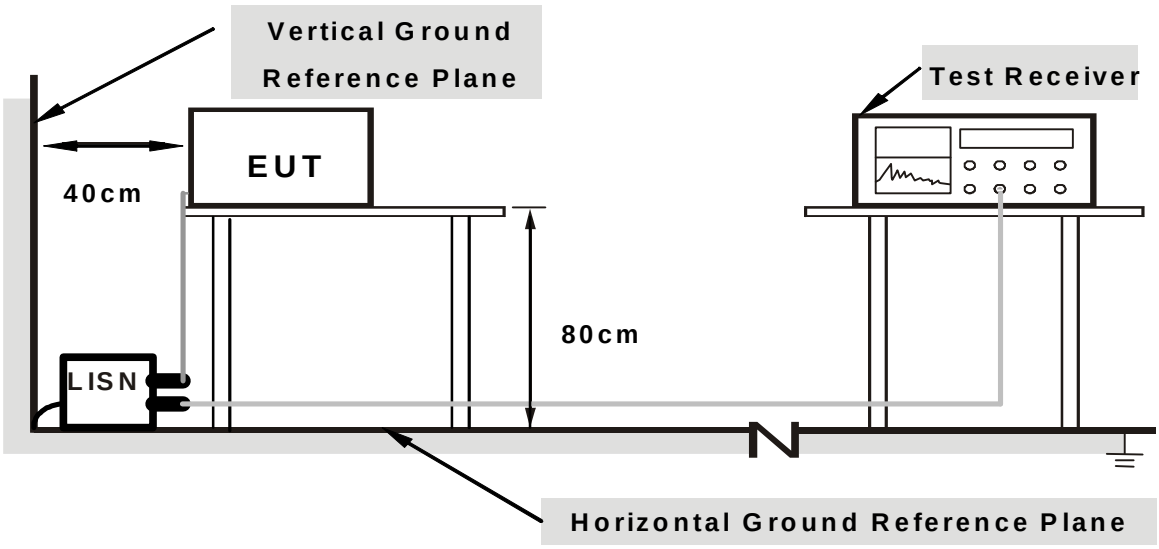
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were 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

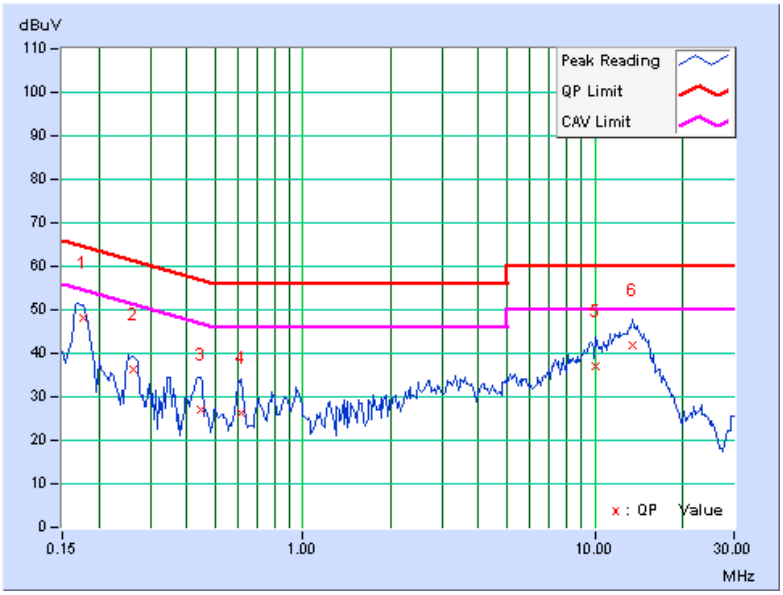
1. Placed the EUT on testing table.
2. The software (InSight Desktop Installer 2.1b75.exe) provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.
3. The EUT was testing under recharging condition.

4.1.7 TEST RESULTS

PHASE	Line (L)	6dB BANDWIDTH	9 kHz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	0.12	48.11	39.12	48.23	39.24	64.61	54.61	-16.38	-15.37
2	0.263	0.13	36.25	28.20	36.38	28.33	61.33	51.33	-24.95	-23.00
3	0.447	0.13	26.74	15.45	26.87	15.58	56.93	46.93	-30.06	-31.35
4	0.615	0.13	26.35	19.54	26.48	19.67	56.00	46.00	-29.52	-26.33
5	10.016	0.48	36.61	31.47	37.09	31.95	60.00	50.00	-22.91	-18.05
6	13.457	0.54	41.37	35.91	41.91	36.45	60.00	50.00	-18.09	-13.55

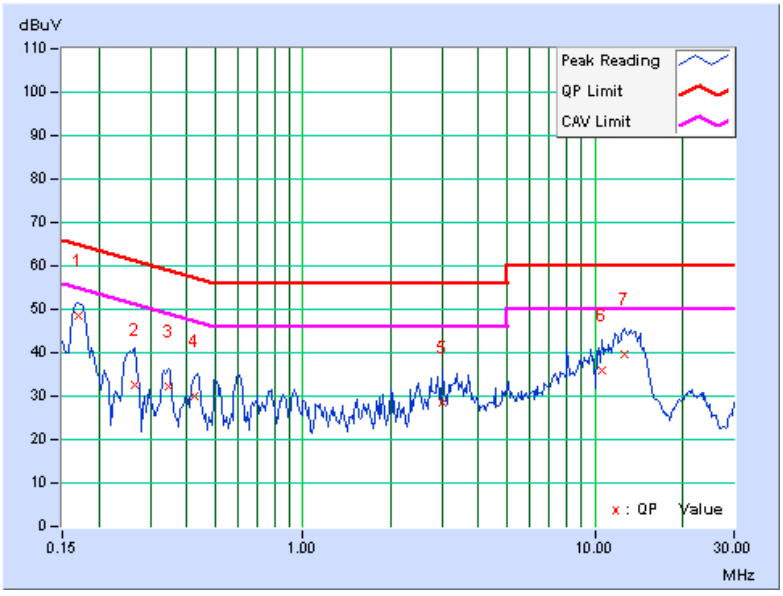
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.170**	**0.12**	**48.55**	**40.84**	**48.67**	**40.96**	**64.98**	**54.98**	**-16.31**	**-14.02**
2	0.267	0.14	32.29	17.27	32.43	17.41	61.20	51.20	-28.77	-33.79
3	0.345	0.15	31.99	27.69	32.14	27.84	59.07	49.07	-26.94	-21.24
4	0.423	0.15	29.96	23.45	30.11	23.60	57.38	47.38	-27.27	-23.78
5	3.023	0.24	28.10	21.80	28.34	22.04	56.00	46.00	-27.66	-23.96
6	10.578	0.86	34.95	29.57	35.81	30.43	60.00	50.00	-24.19	-19.57
7	12.637	0.98	38.67	33.11	39.65	34.09	60.00	50.00	-20.35	-15.91

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.



4.2 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 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
4. Section 15.205 restricted bands of operation shall compliance with the limits in Section 15.209.

4.2.2 TEST INSTRUMENTS

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250254	July 14, 2010	July 13, 2011
Agilent Pre-Selector	N9039A	MY46520311	July 14, 2010	July 13, 2011
Agilent Signal Generator	N5181A	MY49060517	July 14, 2010	July 13, 2011
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-03	Nov. 16, 2010	Nov. 15, 2011
Agilent Pre-Amplifier	8449B	3008A02578	July 05, 2010	July 04, 2011
Miteq Pre-Amplifier	AFS33-18002650-30-8P-44	881786	NA	NA
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-360	Apr. 14, 2011	Apr. 13, 2012
AISI Horn_Antenna	AIH.8018	0000320091110	Nov. 12, 2010	Nov. 11, 2011
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 08, 2010	Oct. 07, 2011
RF CABLE	NA	RF104-201 RF104-203 RF104-204	Dec. 27, 2010	Dec. 26, 2011
RF Cable	NA	CHGCAB_001	NA	NA
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.

For above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250253	Aug. 23, 2010	Aug. 22, 2011
Agilent Pre-Selector	N9039A	MY46520310	Aug. 23, 2010	Aug. 22, 2011
Agilent Signal Generator	N5181A	MY49060347	July 30, 2010	July 29, 2011
LIG NEX1 Test Receiver	ER-265	L09068005	Oct. 25, 2010	Oct. 24, 2011
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-04	Nov. 16, 2010	Nov. 15, 2011
Agilent Pre-Amplifier	8449B	3008A02465	Feb. 28, 2011	Feb. 27, 2012
Miteq Pre-Amplifier	AFS33-18002650-30-8P-44	881786	NA	NA
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-361	Apr. 14, 2011	Apr. 13, 2012
AISI Horn_Antenna	AIH.8018	0000220091110	Nov. 22, 2010	Nov. 21, 2011
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 08, 2010	Oct. 07, 2011
RF CABLE	NA	RF104-205 RF104-207 RF104-202	Dec. 28, 2010	Dec. 27, 2011
RF Cable	NA	CHHCAB_001	NA	NA
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.

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 chamber room for below 1GHz test and 10 meter chamber room for above 1GHz 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. 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. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

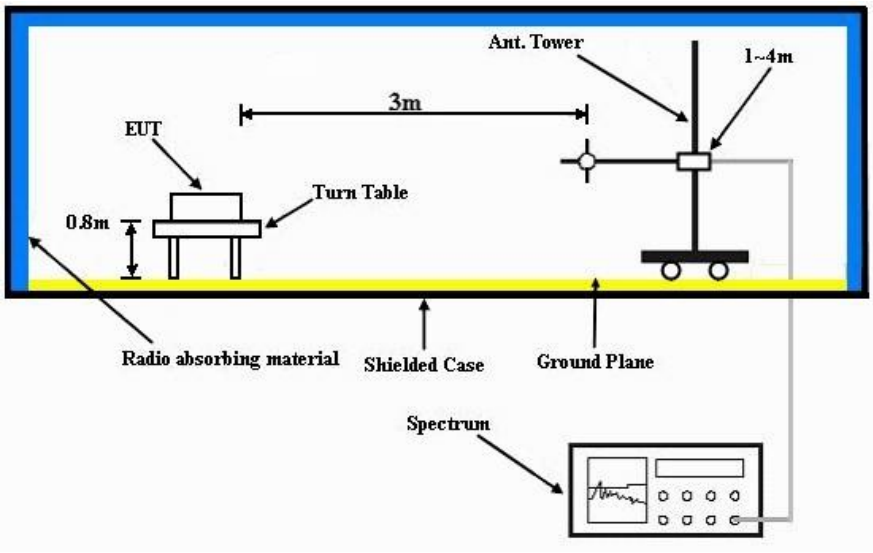
NOTE:

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

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

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 18	**FREQUENCY RANGE**	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20deg. C, 68%RH 1005 hPa	**TESTED BY**	Frank Liu

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	371.18	44.5 QP	46.0	-1.5	1.00 H	53	27.56	16.95
2	500.49	42.6 QP	46.0	-3.4	1.50 H	35	22.64	19.93
3	524.41	42.7 QP	46.0	-3.3	1.50 H	31	22.21	20.46
4	532.70	44.5 QP	46.0	-1.5	1.50 H	40	23.84	20.65
5	557.10	41.9 QP	46.0	-4.1	1.50 H	360	20.75	21.19
6	581.14	39.7 QP	46.0	-6.3	1.50 H	99	17.94	21.73
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	371.29	44.8 QP	46.0	-1.2	1.00 V	18	27.83	16.95
2	500.26	43.1 QP	46.0	-2.9	1.00 V	72	23.16	19.93
3	517.66	41.5 QP	46.0	-4.5	1.00 V	77	21.16	20.31
4	532.82	41.5 QP	46.0	-4.5	1.00 V	77	20.86	20.65
5	556.86	40.7 QP	46.0	-5.3	1.00 V	63	19.55	21.18
6	590.38	38.1 QP	46.0	-7.9	1.50 V	326	16.18	21.93

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.

ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 69%RH 1005 hPa	TESTED BY	Rex Huang

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	2389.33	53.3 PK	74.0	-20.7	1.15 H	328	22.09	31.21
2	2389.33	48.6 AV	54.0	-5.4	1.15 H	328	17.39	31.21
3	2400.00	67.9 PK	89.3	-21.4	1.15 H	328	36.66	31.24
4	2400.00	63.2 AV	84.6	-21.4	1.15 H	328	31.96	31.24
5	*2405.00	109.3 PK			1.15 H	328	78.05	31.25
6	*2405.00	104.6 AV			1.15 H	328	73.35	31.25
7	4810.00	54.5 PK	74.0	-19.5	1.12 H	38	15.13	39.37
8	4810.00	49.8 AV	54.0	-4.2	1.12 H	38	10.43	39.37
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2389.60	54.1 PK	74.0	-19.9	1.00 V	28	22.89	31.21
2	2389.60	49.4 AV	54.0	-4.6	1.00 V	28	18.19	31.21
3	2400.00	68.3 PK	89.7	-21.4	1.00 V	28	37.06	31.24
4	2400.00	63.6 AV	85.0	-21.4	1.00 V	28	32.36	31.24
5	*2405.00	109.7 PK			1.00 V	28	78.45	31.25
6	*2405.00	105.0 AV			1.00 V	28	73.75	31.25
7	4810.00	56.9 PK	74.0	-17.1	1.17 V	16	17.53	39.37
8	4810.00	52.2 AV	54.0	-1.8	1.17 V	16	12.83	39.37

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 (3 ms / 5.16 ms) = -4.7 dB
Please see page 43 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 18	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 69%RH 1005 hPa	TESTED BY	Rex Huang

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	109.6 PK			1.13 H	326	78.26	31.34
2	*2440.00	104.9 AV			1.13 H	326	73.56	31.34
3	4880.00	56.3 PK	74.0	-17.7	1.04 H	39	16.66	39.64
4	4880.00	51.6 AV	54.0	-2.4	1.04 H	39	11.96	39.64
5	7320.00	53.0 PK	74.0	-21.0	1.00 H	337	8.89	44.11
6	7320.00	48.3 AV	54.0	-5.7	1.00 H	337	4.19	44.11
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	110.0 PK			1.00 V	27	78.66	31.34
2	*2440.00	105.3 AV			1.00 V	27	73.96	31.34
3	4880.00	56.6 PK	74.0	-17.4	1.17 V	17	16.96	39.64
4	4880.00	51.9 AV	54.0	-2.1	1.17 V	17	12.26	39.64
5	7320.00	55.3 PK	74.0	-18.7	1.42 V	13	11.19	44.11
6	7320.00	50.6 AV	54.0	-3.4	1.42 V	13	6.49	44.11

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 (3 ms / 5.16 ms) = -4.7 dB
Please see page 43 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 25	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 69%RH 1005 hPa	TESTED BY	Rex Huang

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	108.4 PK			1.11 H	326	76.96	31.44
2	*2475.00	103.7 AV			1.11 H	326	72.26	31.44
3	2483.50	57.9 PK	74.0	-16.1	1.11 H	326	26.44	31.46
4	**2483.50**	**53.2 AV**	**54.0**	**-0.8**	**1.11 H**	**326**	**21.74**	**31.46**
5	4950.00	56.6 PK	74.0	-17.4	1.00 H	40	16.68	39.92
6	4950.00	51.9 AV	54.0	-2.1	1.00 H	40	11.98	39.92
7	7425.00	53.1 PK	74.0	-20.9	1.00 H	322	8.87	44.23
8	7425.00	48.4 AV	54.0	-5.6	1.00 H	322	4.17	44.23
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	108.1 PK			1.00 V	26	76.66	31.44
2	*2475.00	103.4 AV			1.00 V	26	71.96	31.44
3	2483.50	57.6 PK	74.0	-16.4	1.00 V	26	26.14	31.46
4	2483.50	52.9 AV	54.0	-1.1	1.00 V	26	21.44	31.46
5	4950.00	55.7 PK	74.0	-18.3	1.18 V	23	15.78	39.92
6	4950.00	51.0 AV	54.0	-3.0	1.18 V	23	11.08	39.92
7	7425.00	54.1 PK	74.0	-19.9	1.39 V	9	9.87	44.23
8	7425.00	49.4 AV	54.0	-4.6	1.39 V	9	5.17	44.23

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 (3 ms / 5.16 ms) = -4.7 dB
Please see page 43 for plotted duty.

BANEDGE MEASUREMENT

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN BAND EDGE (dBuV/m)	LIMIT (dBuV/m)
2405.00 (PK)	109.7	41.4	68.3	89.7

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN BAND EDGE (dBuV/m)	LIMIT (dBuV/m)
2475.00 (PK)	108.4	50.5	57.9	74.00

NOTE:

1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check section 4.6.6.
2. Maximum field strength in authorized band edge = Fundamental emission – Delta.
3. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle). And it meets the requirement of limit.

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100060	May 11, 2011	May 10, 2012

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

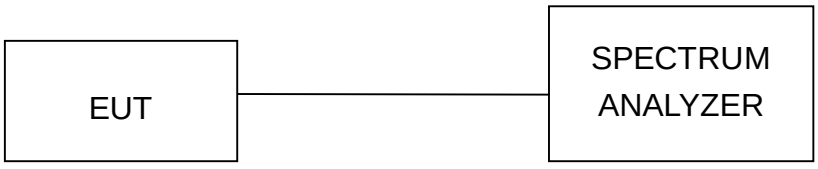
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



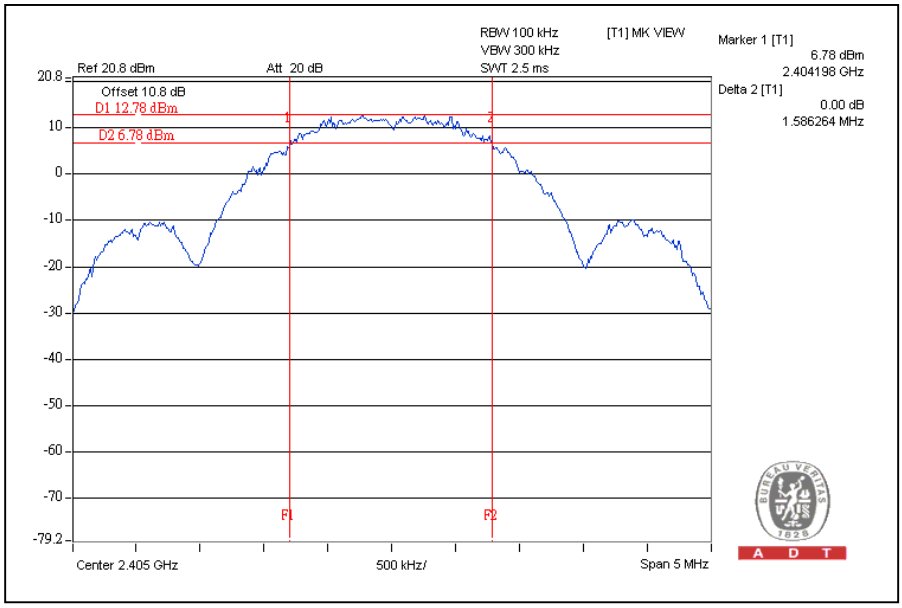
4.3.6 EUT OPERATING CONDITIONS

The software (InSight Desktop Installer 2.1b75.exe) 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	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
11	2405	1.58	0.5	PASS
18	2440	1.57	0.5	PASS
25	2475	1.55	0.5	PASS

CH11



4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Peak Power Meter	ML2495A	0824006	May 04, 2011	May 03, 2012
Power Sensor	MA2411B	0738172	May 03, 2011	May 02, 2012

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

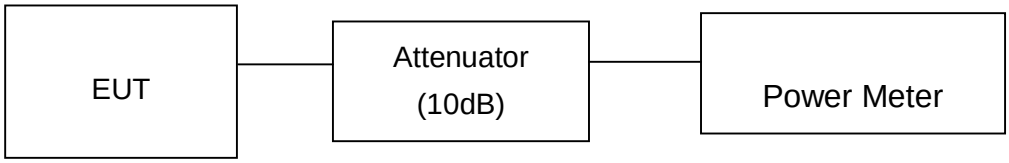
4.4.3 TEST PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator; the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
11	2405	47.9	16.8	30	PASS
18	2440	60.3	17.8	30	PASS
25	2475	45.7	16.6	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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100060	May 11, 2011	May 10, 2012

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

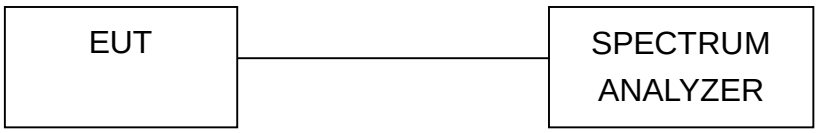
4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



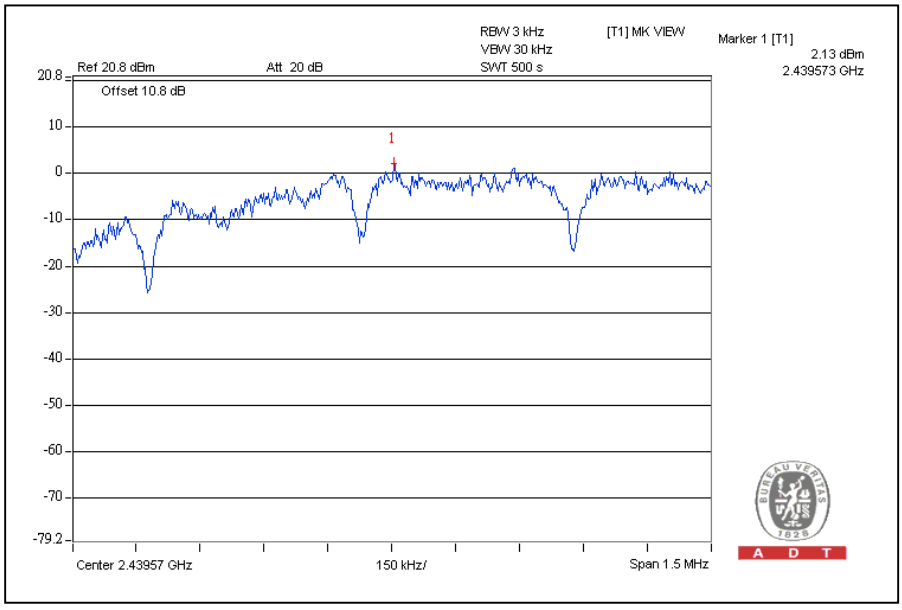
4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
11	2405	0.2	8	PASS
18	2440	2.1	8	PASS
25	2475	1.1	8	PASS

CH18



4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100060	May 11, 2011	May 10, 2012

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

4.6.3 TEST PROCEDURE

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

The spectrum plots (RBW = 100kHz, VBW = 300kHz) are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

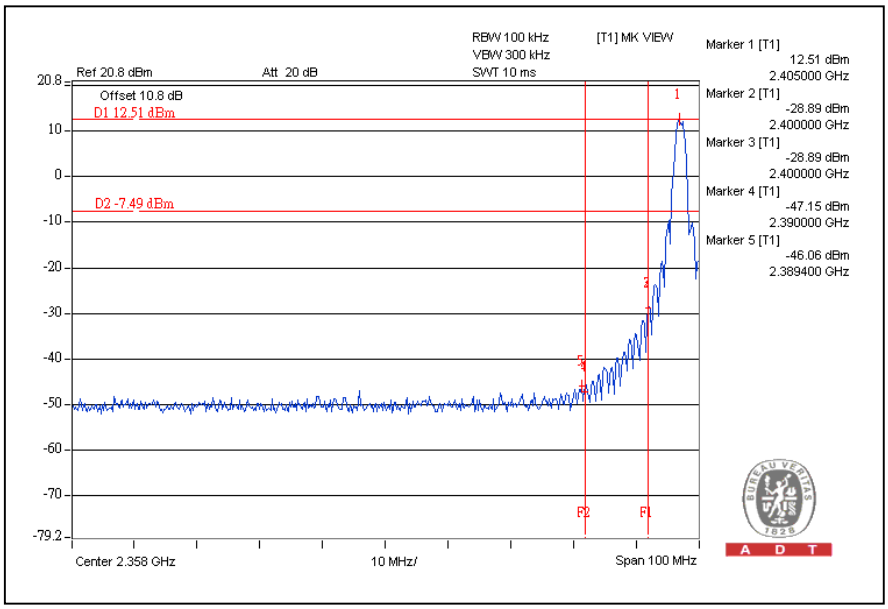
4.6.5 EUT OPERATING CONDITION

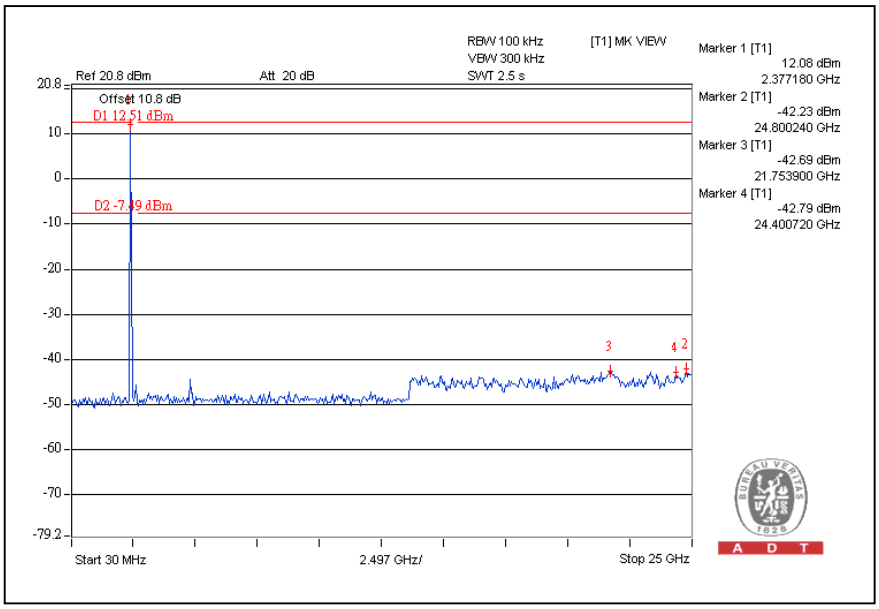
Same as Item 4.3.6

4.6.6 TEST RESULTS

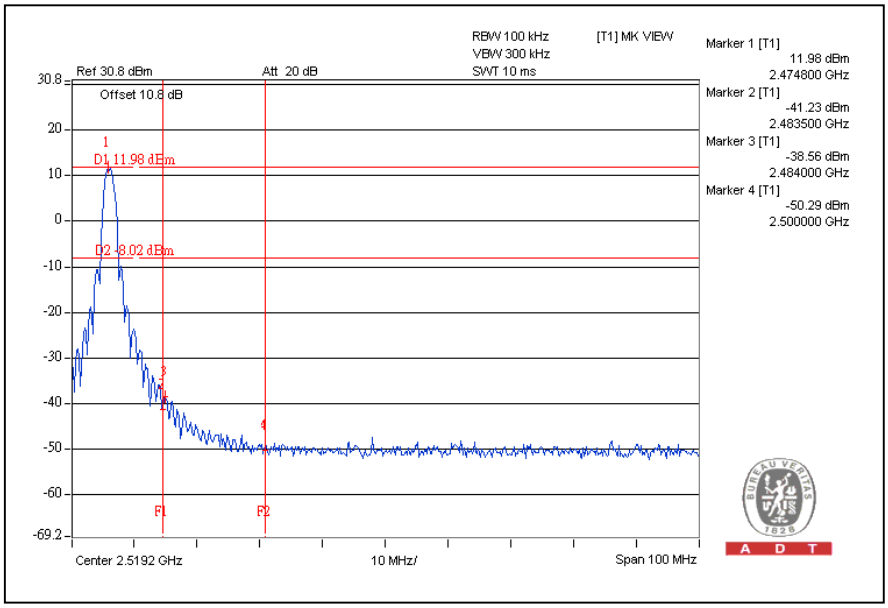
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

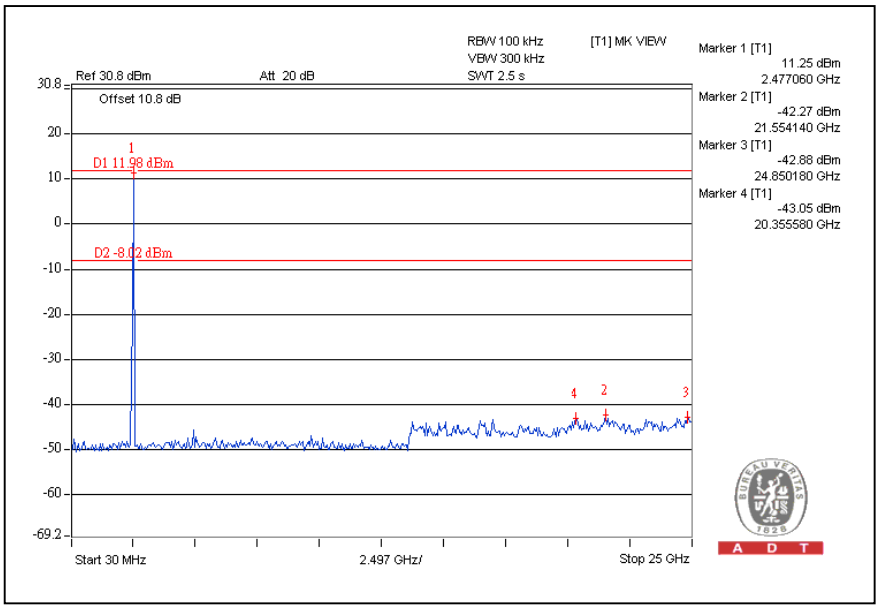
CH11


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 20.8 dBm
Att 20 dB
Offset 10.8 dB
D1 12.51 dBm
D2 -7.49 dBm
Marker 1 [T1]
12.51 dBm
2.405000 GHz
Marker 2 [T1]
-28.89 dBm
2.400000 GHz
Marker 3 [T1]
-28.89 dBm
2.400000 GHz
Marker 4 [T1]
-47.15 dBm
2.390000 GHz
Marker 5 [T1]
-46.06 dBm
2.389400 GHz
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
F2
F1
Center 2.358 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.8 dBm
Att 20 dB
Offset 10.8 dB
D1 12.51 dBm
D2 -7.49 dBm
Marker 1 [T1]
12.08 dBm
2.377180 GHz
Marker 2 [T1]
-42.23 dBm
24.800240 GHz
Marker 3 [T1]
-42.69 dBm
21.753900 GHz
Marker 4 [T1]
-42.79 dBm
24.400720 GHz
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH25


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 30.8 dBm
Att 20 dB
Offset 10.8 dB
D1 11.98 dBm
D2 -8.02 dBm
Marker 1 [T1]
11.98 dBm
2.474800 GHz
Marker 2 [T1]
-41.23 dBm
2.483500 GHz
Marker 3 [T1]
-38.56 dBm
2.484000 GHz
Marker 4 [T1]
-50.29 dBm
2.500000 GHz
30.8
20
10
0
-10
-20
-30
-40
-50
-60
-69.2
F1
F2
Center 2.5192 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 30.8 dBm
Att 20 dB
Offset 10.8 dB
D1 11.98 dBm
D2 -8.02 dBm
Marker 1 [T1]
11.25 dBm
2.477060 GHz
Marker 2 [T1]
-42.27 dBm
21.554140 GHz
Marker 3 [T1]
-42.88 dBm
24.850180 GHz
Marker 4 [T1]
-43.05 dBm
20.355580 GHz
30.8
20
10
0
-10
-20
-30
-40
-50
-60
-69.2
Start 30 MHz
2.497 GHz/
Stop 25 GHz

5. 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: 886-2-26052943

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

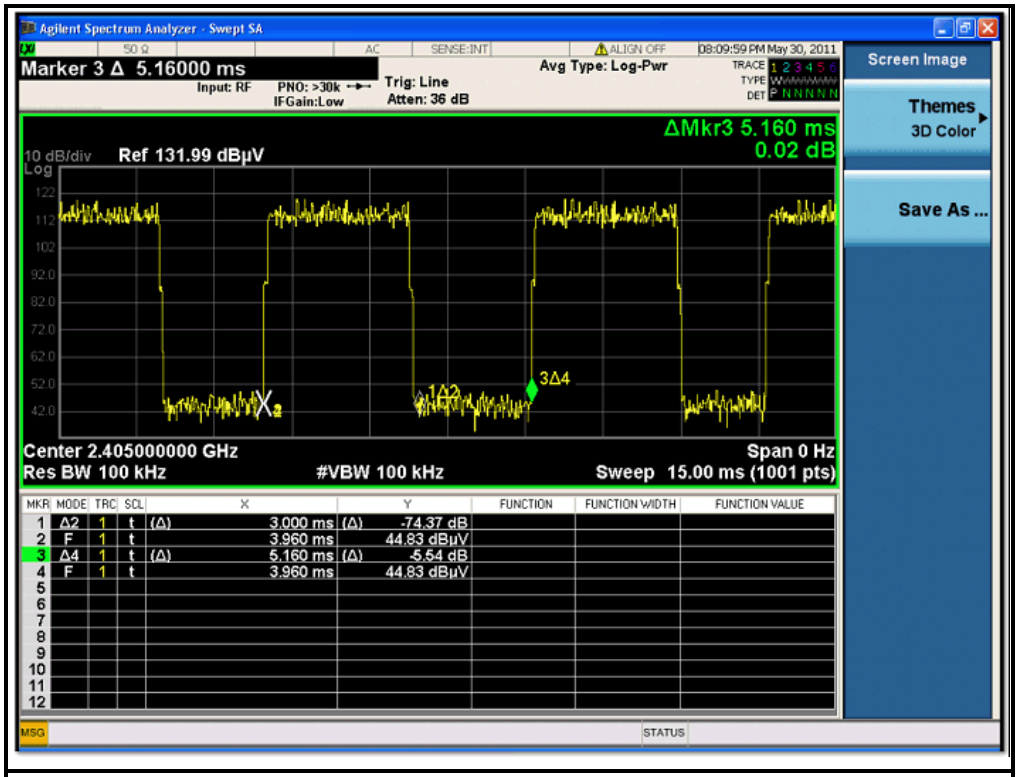
Web Site: www.adt.com.tw

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

6.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.

7. APPENDIX B -DUTY CYCLE CORRECTION FACTOR



20 log (Duty cycle) = 20 log (3 ms / 5.16 ms) = -4.7 dB

--- END ---