FCC TEST REPORT (15.407)

REPORT NO.:	RF991008C05D-1
MODEL NO.:	ISB7005
FCC ID:	MXF-S981116N
RECEIVED:	Feb. 29, 2012
TESTED:	Feb. 29 ~ Apr. 06, 2012
ISSUED:	Apr. 09, 2012

APPLICANT:	Gemtek Technology Co., Ltd.
ADDRESS:	No.15-1, Zhonghua Rd, Hsinchu Industrial Park, Hsinchu County, Taiwan, R.O.C. 303

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
RF991008C05D-1	Original release	Apr. 09, 2012

1. CERTIFICATION

PRODUCT: Internet Protocol Wireless Set Top Box
MODEL: ISB7005
BRAND: Cisco
APPLICANT: Gemtek Technology Co., Ltd.
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Feb. 29 ~ Apr. 06, 2012
STANDARDS: **FCC Part 15, Subpart E (Section 15.407)**
ANSI C63.10-2009

This report is issued as a supplementary report of RF991008C05C-1. This report shall be used combined together with its original report.

PREPARED BY : Andrea Hsia / Specialist , **DATE:** Apr. 09, 2012

APPROVED BY : Gary Chang / Technical Manager , **DATE:** Apr. 09, 2012

NOTE: The conducted emission & radiated emission below 1GHz test were performed for the addendum. Refer to original report for the other test data.

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -1.29dB at 0.18516MHz.
15.407(b/1/2/3) (b)(6)	Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 274.06MHz & 799.84MHz.
15.407(a/1/2)	Peak Transmit Power	NA	Refer to Note
15.407(a)(6)	Peak Power Excursion	NA	Refer to Note
15.407(a/1/2)	Peak Power Spectral Density	NA	Refer to Note
15.407(g)	Frequency Stability	NA	Refer to Note
15.203	Antenna Requirement	NA	Refer to Note

NOTE: The conducted emission & radiated emission below 1GHz test were performed for the addendum. Refer to original report for the other test data.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 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	Internet Protocol Wireless Set Top Box
MODEL NO.	ISB7005
FCC ID	MXF-S981116N
POWER SUPPLY	12Vdc
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	5180 ~ 5320MHz, 5500 ~ 5700MHz & 5745 ~ 5825MHz
NUMBER OF CHANNEL	5180 ~ 5320MHz: 8 for 802.11a, 802.11n (20MHz) 4 for 802.11n (40MHz) 5500 ~ 5700MHz: 8 for 802.11a, 802.11n (20MHz) 3 for 802.11n (40MHz)
OUTPUT POWER	48.2mW for 5180 ~ 5240MHz 158.9mW for 5260 ~ 5320MHz 180.6mW for 5500 ~ 5700MHz
ANTENNA TYPE	Please see note
ANTENNA CONNECTOR	Please see note
I/O PORTS	Refer to user's manual
DATA CABLE	NA
ACCESSORY DEVICES	Adapter, Remote controller

NOTE:

1. This report is issued as a supplementary report of BV ADT report no.: RF991008C05C-1. The differences are list as below. Only conducted emission & radiated emission were re-tested.
   *Modified main board version from V05A to V06A.
   *Added a microcontroller (ATMELGA168, U106) and modified PWM IC (U103, U102, U101) to have better solution to comply with requirement of Energy Star
   * Add second source component of DC/DC converter.
2. There are three antennas provided to this EUT, please refer to the following table:

Chain	Manufacture	Model	Antenna Gain (dBi)	Antenna Type	Connector	Remark
Chain (0) Antenna (1)	Airgain	M2450DLC	5	PCB	NA	-
Chain (1) Antenna (2)	Airgain	M5X05C	4	PIFA	NA	Rx only
Chain (2) Antenna (3)	Airgain	M2450DLCB	4	PCB	NA	-

3. The frequency bands used in this EUT are listed as follows:

Frequency Band (MHz)	5180~5320	5500~5700	5745~5825
802.11a	√	√	√
802.11n (20MHz)	√	√	√
802.11n (40MHz)	√	√	√

4. The EUT is actually a 2x2 radio with diversity.
5. The EUT is a 2x2 with 2 spatial streams without beam forming.
6. The EUT complies with 802.11n standards and backwards compatible with 802. 11a products.
7. The EUT was powered by the following adapter:

ADAPTER 1	
BRAND:	OEM
MODEL:	ADS0202-U120167
INPUT:	100-240Vac, 0.6A, 50-60Hz
OUTPUT:	12Vdc, 1.67A
POWER LINE:	AC: 1.5 m non-shielded cable without core DC: 1.8 m non-shielded cable without core

ADAPTER 2	
BRAND:	OEM
MODEL:	ADS0202-U120167
INPUT:	100-120Vac, 0.6A, 50-60Hz
OUTPUT:	12Vdc, 1.67A
POWER LINE:	AC: 1.5 m non-shielded cable without core DC: 1.8 m non-shielded cable without core

8. 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

Operated in 5180 ~ 5320MHz

8 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	52	5260 MHz
40	5200 MHz	56	5280 MHz
44	5220 MHz	60	5300 MHz
48	5240 MHz	64	5320 MHz

4 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	54	5270 MHz
46	5230 MHz	62	5310 MHz

Operated in 5500 ~ 5700MHz

8 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
100	5500 MHz	116	5580 MHz
104	5520 MHz	132	5660 MHz
108	5540 MHz	136	5680 MHz
112	5560 MHz	140	5700 MHz

3 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	134	5670 MHz
110	5550 MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE≥1G	RE<1G	PLC	
-	√	√	√	-

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

MODE	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5320	36 to 64	60	OFDM	BPSK	6.0

RADIATED EMISSION TEST (BELOW 1GHz):

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5320	36 to 64	60	OFDM	BPSK	6.0
802.11a	5500-5700	100 to 140	116	OFDM	BPSK	6.0

POWER LINE CONDUCTED EMISSION TEST:

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5320	36 to 64	60	OFDM	BPSK	6.0
802.11a	5500-5700	100 to 140	116	OFDM	BPSK	6.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 65%RH	120Vac, 60Hz	Alan Wu
RE<1G	25deg. C, 68%RH	120Vac, 60Hz	Alan Wu
PLC	23deg. C, 70%RH	120Vac, 60Hz	Aska Huang

3.3 DESCRIPTION OF SUPPORT UNITS

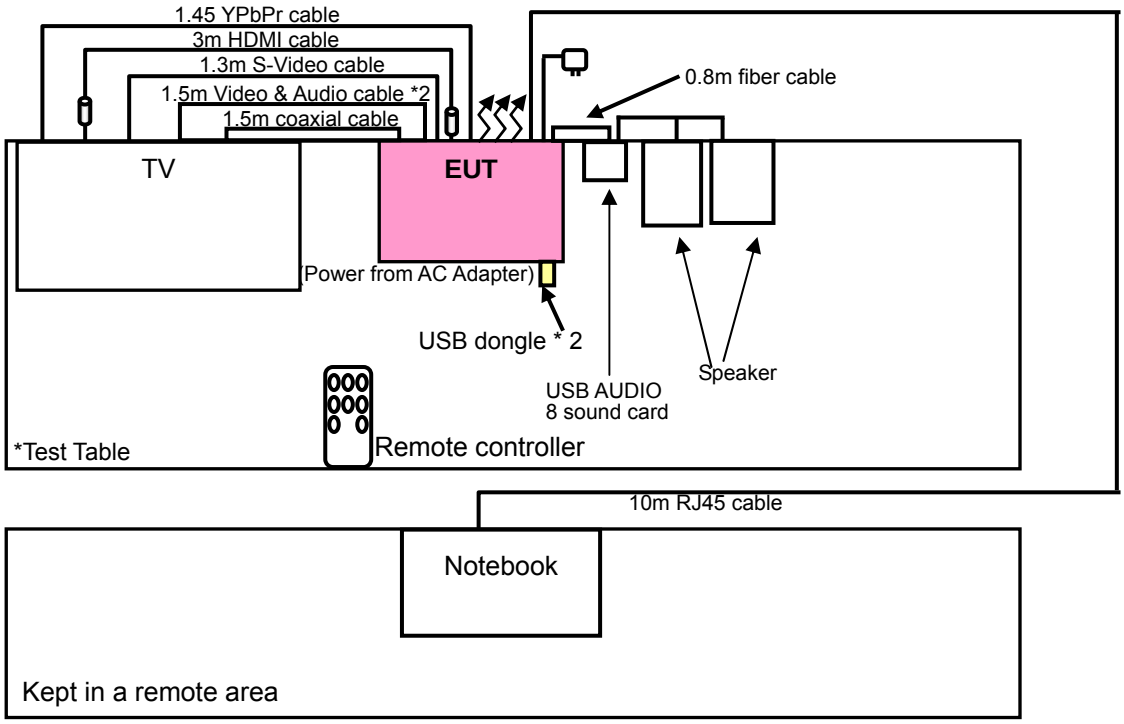
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	TV	SANYO	SMT-32KE5	004253	NA
2	SPEAKER	Bluesky	SP-200	NA	NA
3	NOTEBOOK	DELL	E5420	33MLMQ1	NA
4	USB DONGLE	PDI	NA	NA	NA
5	USB DONGLE	Sandisk	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.5m coaxial cable, 1.5m Audio & Video cable *2, 3m HDMI cable with 2 cores, 1.3m S-Vedio cable, 1.45m YPbPr cable
2	0.8m fiber cable
3	10m RJ45 cable
4	NA
5	NA

NOTE: 1. All power cords of the above support units are non shielded (1.8m).
2. Items 3 acted as communication partners to transfer data.

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)
ANSI C63.10-2009

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.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Jan. 03, 2012	Jan. 02, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jan. 30, 2012	Jan. 29, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 05, 2012	Jan. 04, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 20, 2011	Jul. 19, 2012
Preamplifier Agilent	8449B	3008A01961	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8447D	2944A10738	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Nov. 03, 2011	Nov. 02, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Nov. 03, 2011	Nov. 02, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Nov. 03, 2011	Nov. 02, 2012
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table ADT.	TT100.	TT93021704	NA	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 29, 2011	Oct. 28, 2012

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

2. The test was performed in HwaYa Chamber 4.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 460141.

5. The IC Site Registration No. is IC7450F-4.

4.1.3 TEST PROCEDURES

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

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

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

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

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

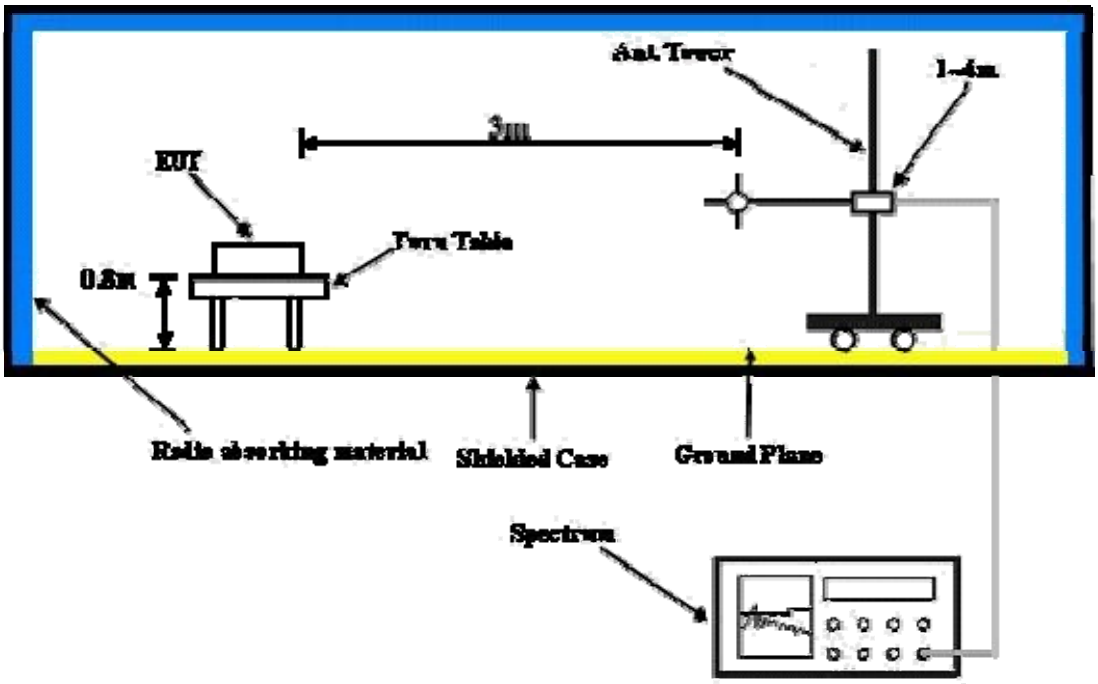
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) 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 CONDITION

a. Placed the EUT on the testing table.
b. Prepared notebook systems to act as a communication partner and placed them outside of testing area.
c. The notebook system ran a test program (provided by manufacturer) to enable EUT under receiving condition continuously at specific channel frequency.
d. The necessary accessories enable the EUT in full functions.

4.1.7 TEST RESULTS

ABOVE 1GHz DATA: 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH	TESTED BY	Alan Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	105.0 PK			1.25 H	320	66.20	38.80
2	*5300.00	93.9 AV			1.25 H	320	55.10	38.80
3	#7066.00	51.5 PK	68.3	-16.8	1.00 H	8	7.60	43.90
4	10600.00	65.7 PK	74.0	-8.3	1.96 H	140	15.70	50.00
5	10600.00	46.0 AV	54.0	-8.0	1.96 H	140	-4.00	50.00
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	*5300.00	114.1 PK			1.24 V	83	75.30	38.80
2	*5300.00	103.3 AV			1.24 V	83	64.50	38.80
3	#7066.00	52.3 PK	68.3	-16.0	1.00 V	339	8.40	43.90
4	10600.00	72.1 PK	74.0	-1.9	1.40 V	131	22.10	50.00
5	10600.00	49.0 AV	54.0	-5.0	1.40 V	131	-1.00	50.00

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 radiated frequency is out the restricted band.

BELOW 1GHz WORST-CASE DATA：802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH	TESTED BY	Alan Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	180.00	42.4 QP	43.5	-1.1	1.75 H	327	29.30	13.10
2	**274.06**	**45.0 QP**	**46.0**	**-1.0**	**1.00 H**	**249**	**30.30**	**14.70**
3	302.10	44.7 QP	46.0	-1.3	1.00 H	259	28.90	15.80
4	337.10	44.6 QP	46.0	-1.4	1.00 H	247	27.80	16.80
5	374.04	44.8 QP	46.0	-1.2	1.00 H	256	27.00	17.80
6	432.37	44.6 QP	46.0	-1.4	1.00 H	235	25.30	19.30
7	475.14	44.4 QP	46.0	-1.6	1.75 H	160	23.90	20.50
8	547.08	44.8 QP	46.0	-1.2	1.50 H	160	22.50	22.30
9	725.96	44.3 QP	46.0	-1.7	1.25 H	154	19.10	25.20
10	776.51	44.5 QP	46.0	-1.5	1.00 H	163	18.00	26.50
11	**799.84**	**45.0 QP**	**46.0**	**-1.0**	**1.00 H**	**142**	**17.90**	**27.10**

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	30.00	38.4 QP	40.0	-1.6	1.25 V	109	25.90	12.50
2	197.11	41.7 QP	43.5	-1.8	1.00 V	208	30.00	11.70
3	274.88	44.8 QP	46.0	-1.2	1.75 V	349	30.10	14.70
4	374.04	44.0 QP	46.0	-2.0	1.75 V	304	26.20	17.80
5	432.37	44.0 QP	46.0	-2.0	1.25 V	292	24.70	19.30
6	776.51	44.8 QP	46.0	-1.2	2.00 V	157	18.30	26.50

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 116	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH	TESTED BY	Alan Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	180.12	42.3 QP	43.5	-1.2	1.50 H	251	29.20	13.10
2	274.16	44.9 QP	46.0	-1.1	1.25 H	211	30.20	14.70
3	302.45	44.5 QP	46.0	-1.5	1.25 H	301	28.70	15.80
4	337.66	44.4 QP	46.0	-1.6	1.75 H	50	27.60	16.80
5	374.01	44.9 QP	46.0	-1.1	1.25 H	203	27.10	17.80
6	432.26	44.8 QP	46.0	-1.2	1.50 H	81	25.50	19.30
7	475.21	44.6 QP	46.0	-1.4	1.00 H	201	24.10	20.50
8	547.21	44.9 QP	46.0	-1.1	1.25 H	255	22.60	22.30
9	725.75	44.5 QP	46.0	-1.5	1.00 H	351	19.40	25.10
10	776.42	44.3 QP	46.0	-1.7	1.25 H	50	17.80	26.50
11	800.00	44.9 QP	46.0	-1.1	1.20 H	191	17.80	27.10
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	30.00	38.2 QP	40.0	-1.8	1.00 V	81	25.70	12.50
2	197.15	41.6 QP	43.5	-1.9	1.25 V	147	29.90	11.70
3	274.65	44.6 QP	46.0	-1.4	1.50 V	291	29.90	14.70
4	374.22	44.3 QP	46.0	-1.7	1.25 V	63	26.50	17.80
5	432.83	44.1 QP	46.0	-1.9	1.50 V	301	24.80	19.30
6	776.41	44.6 QP	46.0	-1.4	1.75 V	199	18.10	26.50

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

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (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. 19, 2011	Nov. 18, 2012
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 22, 2011	Dec. 21, 2012
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Dec. 30, 2011	Dec. 29, 2012
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jul. 07, 2011	Jul. 06, 2012
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 30, 2011	Jun. 29, 2012
LISN ROHDE & SCHWARZ	ENV216	100072	Jun. 10, 2011	Jun. 09, 2012
Software ADT	ADT_Cond_ V7.3.7	NA	NA	NA

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

2. The test was performed in HwaYa Shielded Room 2.

3. The VCCI Site Registration No. is C-2047.

4.2.3 TEST PROCEDURES

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

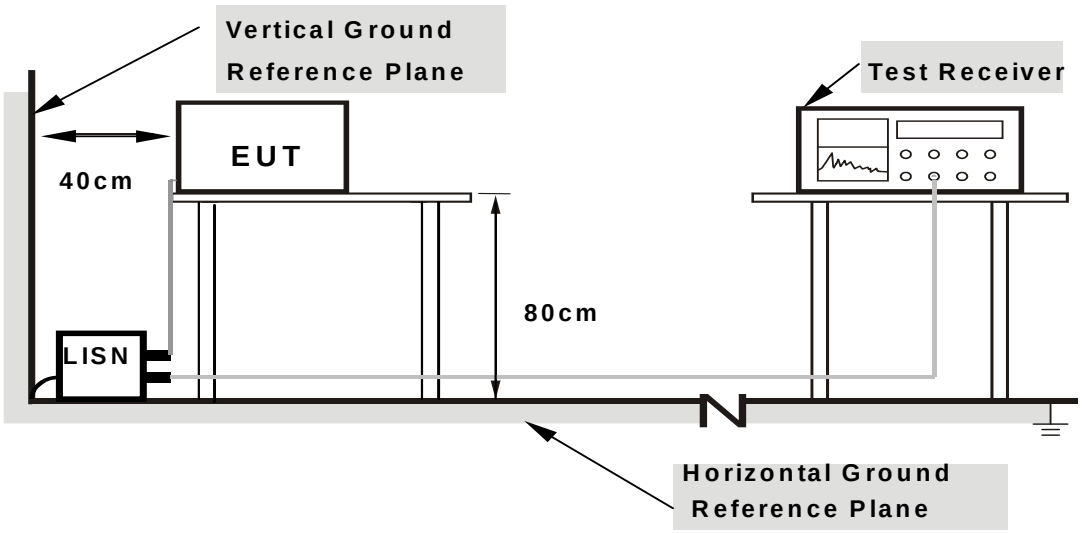
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

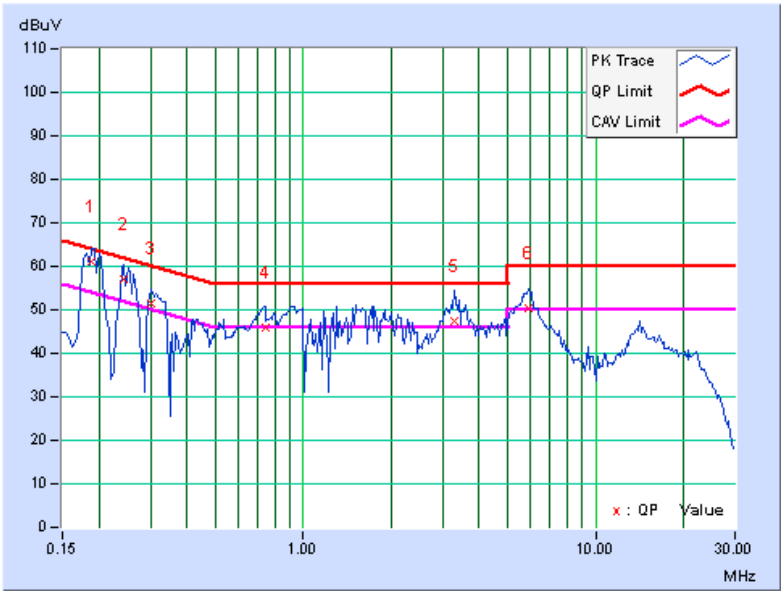
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA：802.11a

CHANNEL	Channel 60	PHASE	Line 1
6dB BANDWIDTH	9kHz		

	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	0.18906	0.17	60.83	48.55	61.00	48.72	64.08	54.08	-3.08	-5.36
2	0.24375	0.18	56.85	43.95	57.03	44.13	61.97	51.97	-4.94	-7.84
3	0.30234	0.19	51.33	39.94	51.52	40.13	60.18	50.18	-8.66	-10.05
4	0.73984	0.22	45.69	30.08	45.91	30.30	56.00	46.00	-10.09	-15.70
5	3.29688	0.36	47.16	37.72	47.52	38.08	56.00	46.00	-8.48	-7.92
6	5.90625	0.42	49.77	43.39	50.19	43.81	60.00	50.00	-9.81	-6.19

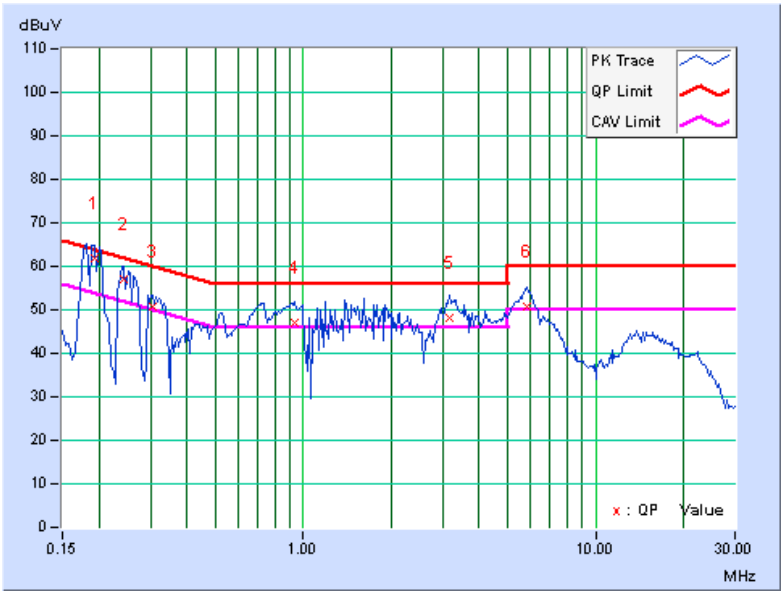
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



CHANNEL	Channel 60	PHASE	Line 2
6dB BANDWIDTH	9kHz		

	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	0.19297	0.15	61.75	48.65	61.90	48.80	63.91	53.91	-2.00	-5.10
2	0.24375	0.16	56.85	43.51	57.01	43.67	61.97	51.97	-4.96	-8.30
3	0.30625	0.17	50.48	40.47	50.65	40.64	60.07	50.07	-9.43	-9.44
4	0.93125	0.19	46.91	31.91	47.10	32.10	56.00	46.00	-8.90	-13.90
5	3.17578	0.33	47.83	37.73	48.16	38.06	56.00	46.00	-7.84	-7.94
6	5.84375	0.44	50.19	44.28	50.63	44.72	60.00	50.00	-9.37	-5.28

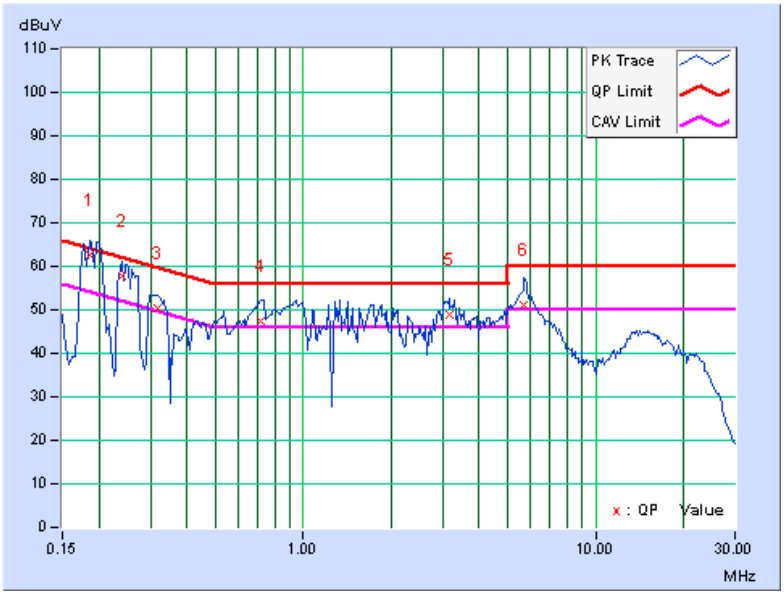
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



CHANNEL	Channel 116	PHASE	Line 1
6dB BANDWIDTH	9kHz		

	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	0.18516	0.17	62.35	49.91	62.52	50.08	64.25	54.25	-1.73	-4.17
2	0.23984	0.18	57.59	41.64	57.77	41.82	62.10	52.10	-4.34	-10.29
3	0.31797	0.19	50.03	39.65	50.22	39.84	59.76	49.76	-9.54	-9.92
4	0.71641	0.22	47.22	32.70	47.44	32.92	56.00	46.00	-8.56	-13.08
5	3.15234	0.35	48.39	38.21	48.74	38.56	56.00	46.00	-7.26	-7.44
6	5.66016	0.41	50.61	43.79	51.02	44.20	60.00	50.00	-8.98	-5.80

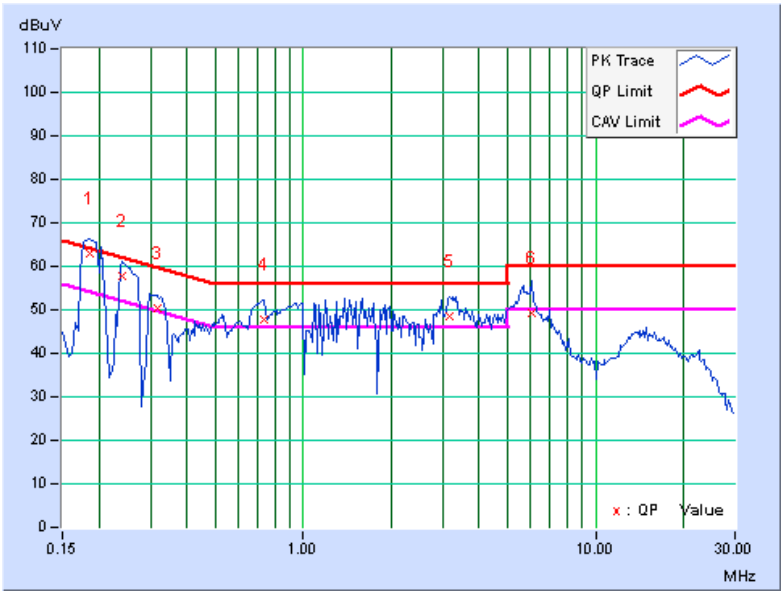
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



CHANNEL	Channel 116	PHASE	Line 2
6dB BANDWIDTH	9kHz		

	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	**0.18516**	**0.16**	**62.80**	**50.11**	**62.96**	**50.27**	**64.25**	**54.25**	**-1.29**	**-3.98**
2	0.23984	0.16	57.61	41.60	57.77	41.76	62.10	52.10	-4.34	-10.35
3	0.31797	0.17	50.27	39.85	50.44	40.02	59.76	49.76	-9.32	-9.74
4	0.73203	0.19	47.44	33.48	47.63	33.67	56.00	46.00	-8.37	-12.33
5	3.16797	0.33	48.37	38.42	48.70	38.75	56.00	46.00	-7.30	-7.25
6	6.05469	0.45	48.63	42.70	49.08	43.15	60.00	50.00	-10.92	-6.85

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.



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 and authorization 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

Email: service.adt@tw.bureauveritas.com
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 modifications were made to the EUT by the lab during the test.

---END---