



# FCC TEST REPORT (15.407)

**REPORT NO.:** RF110607C27A

**MODEL NO.:** SWW1890R /27, SWW1810R /27  
(refer to item 3.1 for more details)

**FCC ID:** YG7ZRF32200

**RECEIVED:** Jun. 14, 2011

**TESTED:** Jul. 14 ~ Jul. 19, 2011

**ISSUED:** Jul. 28, 2011

**APPLICANT:** Zinwell Corporation

**ADDRESS:** 7F., No.512, Yuanshan Rd., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C.)

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

**LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien 244, 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
Original release	N/A	Jul. 28, 2011



## 1. CERTIFICATION

**PRODUCT:** Wireless HD Net Connect Receiver / Wireless HD AV Connect Receiver (refer to item 3.1 for more details)

**MODEL:** SWW1890R /27, SWW1810R /27 (refer to item 3.1 for more detail)

**BRAND:** PHILIPS (refer to item 3.1 for more detail)

**APPLICANT:** Zinwell Corporation

**TEST SAMPLE:** ENGINEERING SAMPLE

**TESTED:** Jul. 14 ~ Jul. 19, 2011

**STANDARDS: FCC Part 15, Subpart E (Section 15.407)**

ANSI C63.4-2003

ANSI C63.10-2009

The above equipment (Model: SWW1890R /27, SWW1810R /27, WHD100R, WHD200R) 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** : Jul. 28, 2011  
Polly Chien / Specialist

**APPROVED BY** :  , **DATE** : Jul. 28, 2011  
Gary Chang / Technical Manager

## 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 AND LIMIT	RESULT	REMARK
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -20.04dB at 0.201MHz.
15.407(b/1/2/3)(b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -1.1 dB at 10540.00MHz.
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

### 2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	Wireless HD Net Connect Receiver / Wireless HD AV Connect Receiver (refer to note as below)
<b>MODEL NO.</b>	SWW1890R /27, SWW1810R /27 (refer to note as below)
<b>FCC ID</b>	YG7ZRF32200
<b>POWER SUPPLY</b>	5Vdc
<b>MODULATION TECHNOLOGY</b>	OFDM
<b>TRANSFER RATE</b>	100Kbps transmission, 1Gbps reception
<b>OPERATING FREQUENCY</b>	5270 ~ 5310MHz, 5510 ~ 5670MHz
<b>CHANNEL BANDWIDTH</b>	Only support 40MHz
<b>NUMBER OF CHANNEL</b>	5270 ~ 5310MHz: 2 for WHDI (40MHz) 5510 ~ 5670MHz: 3 for WHDI (40MHz)
<b>OUTPUT POWER</b>	79.4mW for 5270 ~ 5310MHz 79.4mW for 5510 ~ 5670MHz
<b>ANTENNA TYPE</b>	Printed antenna with 6.2dBi gain x 2 (1TX, 2RX) Chip antenna with 6.2dBi gain x 3 (3RX)
<b>ANTENNA CONNECTER</b>	NA
<b>DATA CABLE</b>	1.5m shielded HDMI cable with one core 1.0m IR cable without core
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	Adapter

**NOTE:**

1. This report is prepared for FCC class II permissive change. The difference compared with the original report is adding frequency band from 5.27 to 5.31GHz and 5.51 to 5.67GHz by software.
2. The following models are provided to this EUT.

BRAND	MODEL	HDMI OUT	USB PORT	IR IN	DESCRIPTION
PHILIPS	SWW1890R /27	√	X	X	Wireless HD Net Connect Receiver
	SWW1810R /27	√	X	√	Wireless HD AV Connect Receiver
ZINWELL	WHD100R	√	√	X	Wireless HD Net Connect Receiver
	WHD200R	√	√	X	Wireless HD AV Connect Receiver

BRAND	PHILIPS		ZINWELL	
MODEL	SWW1890R /27	SWW1810R /27	WHD100R	WHD200R
IR receiver	X	X	√	√
IR external board + IR extender board	X	√	X	X
IR Sensor Extender	X	√	X	X
Power Adapter	3.5mm DC Jack Output: 5Vdc, 2A	3.5mm DC Jack Output: 5Vdc, 2A	Mini USB Output: 5Vdc, 1.5A	Mini USB Output: 5Vdc, 1.5A
HDMI (Output) cable	With 1 core	With 1 core	With 1 core	With 1 core

\*\*SWW1810R / 27 has IR function but this function is not built-in main PCB.  
IR function is supported by adding IR PCB and sensor extender.

3. The EUT incorporates a MIMO function. Physically, the EUT provides one completed transmitter and five receivers.

MODULATION MODE	TX FUNCTION
WHDI (40MHz)	1TX

4. The EUT was powered by the following adapters:

ADAPTER 1 (FOR PHILIPS)	
BRAND	SINO-AMERICAN
MODEL	SA110C-05S-A
INPUT POWER	100-240Vac, 50-60Hz, 0.3A
OUTPUT POWER	5Vdc, 2A, 10W
POWER LINE	DC 1.5m shielded cable with one core

ADAPTER 2 (FOR ZINWELL)	
BRAND	SINO-AMERICAN
MODEL	SA110C-05S-A
INPUT POWER	100-240Vac, 50-60Hz, 0.3A
OUTPUT POWER	5Vdc, 1.5A, 7.5W
POWER LINE	DC 1.5m shielded USB cable with one core

5. The above EUT information is 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 5270 ~ 5310MHz

2 channels are provided as below:

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

#### Operated in 5510 ~ 5670MHz

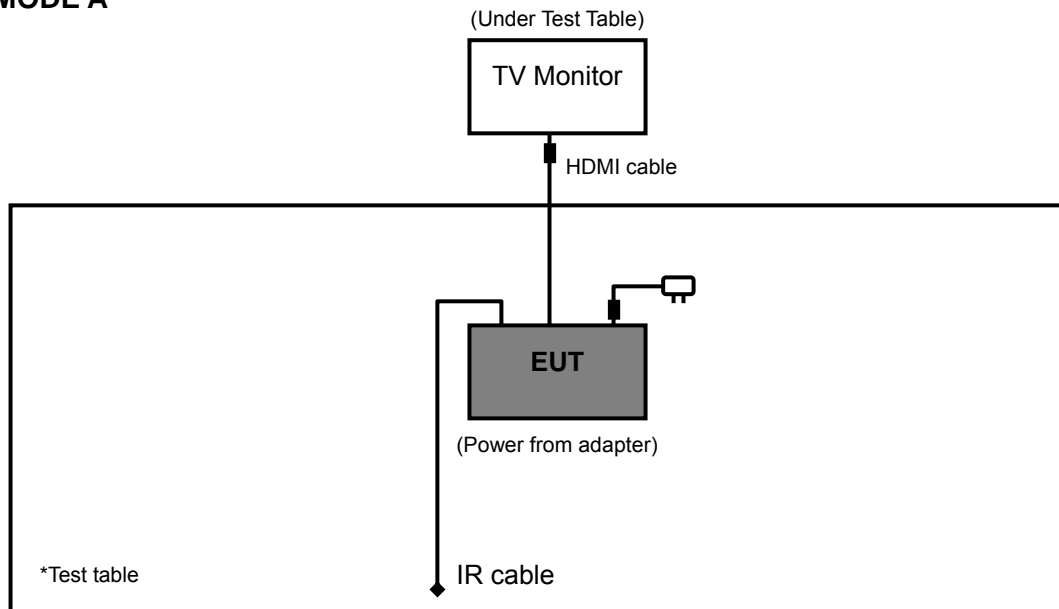
3 channels are provided as below:

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

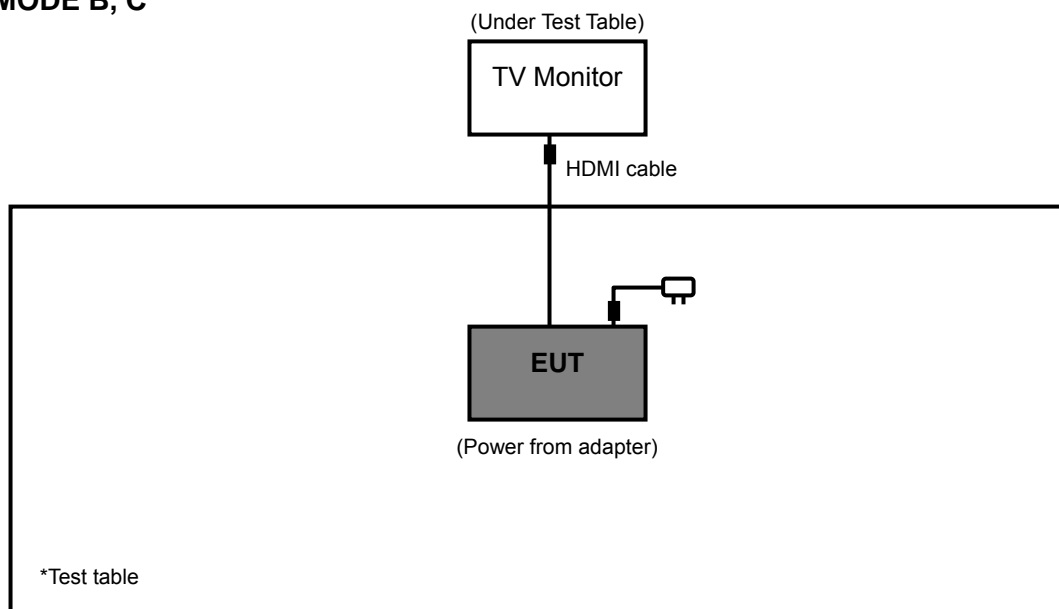


### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

#### TEST MODE A



#### TEST MODE B, C



### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE $<$ 1G	PLC	APCM	
A	√	√	√	√	PHILIPS sample with IR cable
B	-	√	√	-	PHILIPS sample without IR cable
C	-	√	√	-	ZINWELL sample

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

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

**PLC**: Power Line Conducted Emission

**APCM**: Antenna Port Conducted Measurement

**NOTE**: "-" means no effect.

#### **RADIATED EMISSION TEST (ABOVE 1GHz):**

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

EUT CONFIGURE MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (kbps)
A	5270-5310	54 to 62	54, 62	OFDM	100
A	5510-5670	102 to 134	102, 110, 134	OFDM	100

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

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

EUT CONFIGURE MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (kbps)
A, B, C	5270-5310	54 to 62	62	OFDM	100
A, B, C	5510-5670	102 to 134	110	OFDM	100

#### **POWER LINE CONDUCTED EMISSION TEST:**

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

EUT CONFIGURE MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (kbps)
A, B, C	5270-5310	54 to 62	62	OFDM	100
A, B, C	5510-5670	102 to 134	110	OFDM	100

**BANDEDGE MEASUREMENT:**

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

EUT CONFIGURE MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (kbps)
A	5270-5310	54 to 62	54, 62	OFDM	100
A	5510-5670	102 to 134	102, 134	OFDM	100

**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.

EUT CONFIGURE MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (kbps)
A	5270-5310	54 to 62	54, 62	OFDM	100
A	5510-5670	102 to 134	102, 110, 134	OFDM	100

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE $\geq$ 1G	25deg. C, 68%RH	120Vac, 60Hz	Frank Wang
RE $<$ 1G	25deg. C, 68%RH	120Vac, 60Hz	Frank Wang
PLC	26deg. C, 65%RH	120Vac, 60Hz	Frank Wang
APCM	25deg. C, 68%RH	120Vac, 60Hz	Frank Wang

### 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 E (Section 15.407)**

**ANSI C63.4-2003**

**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.

### 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	TV MONITOR	SANYO	SMF32KE5	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

**NOTE:**

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1 was under test table during test.

## 4. TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 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.

#### 4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

FREQUENCIES (MHz)	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBµV/m) *NOTE 3
	PK	PK
5270 ~ 5310	-27	68.3
5510 ~ 5670	-27	68.3

**NOTE:** The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

#### 4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Dec. 27, 2010	Dec. 26, 2011
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Aug. 02, 2010	Aug. 01, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 06, 2011	Jan. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01961	Nov. 02, 2010	Nov. 01, 2011
Preamplifier Agilent	8447D	2944A10738	Nov. 02, 2010	Nov. 01, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250792/4	Sep. 03, 2010	Sep. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	283397/4	Sep. 03, 2010	Sep. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Sep. 03, 2010	Sep. 02, 2011
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	07026401	Aug. 25, 2010	Aug. 24, 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 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 988962.
  5. The IC Site Registration No. is IC7450F-4.

#### 4.1.4 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. 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.

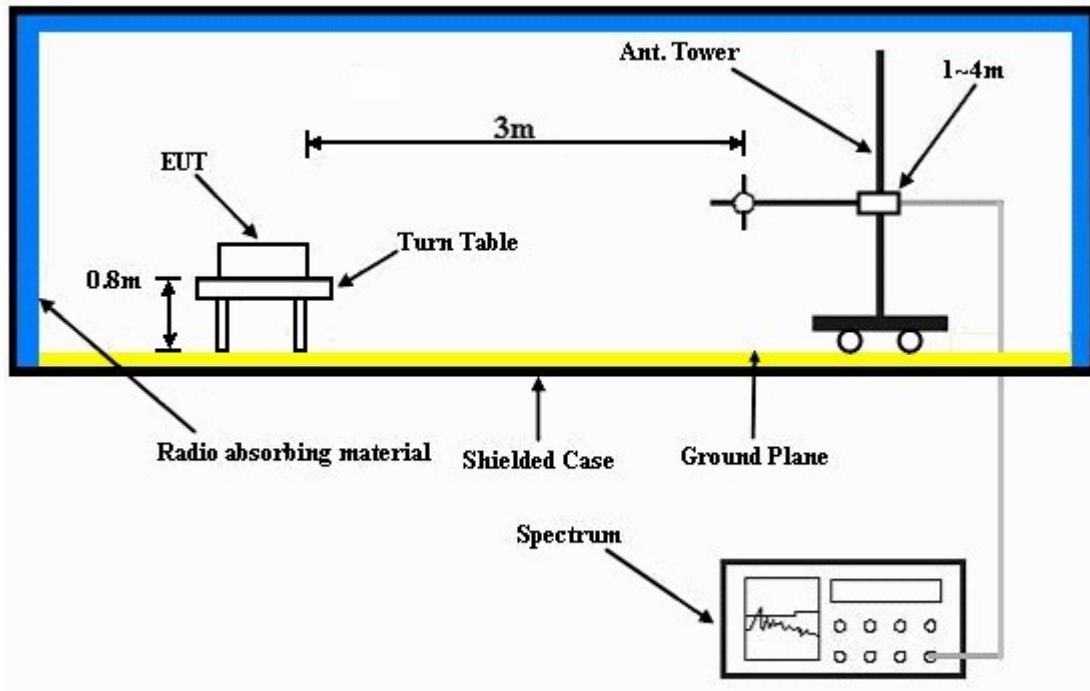
**NOTE:**

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.

#### 4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.1.6 TEST SETUP



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

#### 4.1.7 EUT OPERATING CONDITION

- a. Placed the EUT on the testing table.
- b. The EUT sent messages to the TV monitor, which is acted as a communication partner.



#### 4.1.8 TEST RESULTS

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 54	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang

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	5150.00	46.4 PK	74.0	-27.6	1.32 H	290	6.80	39.60
2	5150.00	33.0 AV	54.0	-21.0	1.32 H	290	-6.60	39.60
3	*5270.00	110.6 PK			1.32 H	290	70.90	39.70
4	*5270.00	97.6 AV			1.32 H	290	57.90	39.70
5	#10540.00	67.2 PK	68.3	-1.1	1.26 H	66	16.30	50.90
6	15810.00	60.9 PK	74.0	-13.1	1.00 H	340	10.40	50.50
7	15810.00	48.0 AV	54.0	-6.0	1.00 H	340	-2.50	50.50
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	5150.00	46.2 PK	74.0	-27.8	1.04 V	328	6.60	39.60
2	5150.00	32.8 AV	54.0	-21.2	1.04 V	328	-6.80	39.60
3	*5270.00	109.7 PK			1.04 V	328	70.00	39.70
4	*5270.00	96.7 AV			1.04 V	328	57.00	39.70
5	#10540.00	66.5 PK	68.3	-1.8	1.00 V	315	15.60	50.90
6	15810.00	60.2 PK	74.0	-13.8	1.00 V	41	9.70	50.50
7	15810.00	46.8 AV	54.0	-7.2	1.00 V	41	-3.70	50.50

- 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.
  5. “ \* “: Fundamental frequency.
  6. “#”:The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 62	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang

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	*5310.00	111.5 PK			1.03 H	345	71.70	39.80
2	*5310.00	98.1 AV			1.03 H	345	58.30	39.80
3	5350.00	65.3 PK	74.0	-8.7	1.03 H	345	25.50	39.80
4	5350.00	47.8 AV	54.0	-6.2	1.03 H	345	8.00	39.80
5	10620.00	64.5 PK	74.0	-9.5	1.00 H	52	13.40	51.10
6	10620.00	51.2 AV	54.0	-2.8	1.00 H	52	0.10	51.10
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	*5310.00	109.9 PK			1.10 V	79	70.10	39.80
2	*5310.00	96.0 AV			1.10 V	79	56.20	39.80
3	5350.00	62.5 PK	74.0	-11.5	1.10 V	79	22.70	39.80
4	5350.00	46.0 AV	54.0	-8.0	1.10 V	79	6.20	39.80
5	10620.00	62.4 PK	74.0	-11.6	1.00 V	48	11.30	51.10
6	10620.00	49.7 AV	54.0	-4.3	1.00 V	48	-1.40	51.10

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 102	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang

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	5460.00	60.7 PK	74.0	-13.3	1.33 H	288	20.70	40.00
2	5460.00	47.3 AV	54.0	-6.7	1.33 H	288	7.30	40.00
3	#5470.00	67.0 PK	68.3	-1.3	1.33 H	288	27.00	40.00
4	*5510.00	110.8 PK			1.35 H	287	70.80	40.00
5	*5510.00	97.0 AV			1.35 H	287	57.00	40.00
6	11020.00	62.6 PK	74.0	-11.4	1.30 H	53	10.50	52.10
7	11020.00	50.2 AV	54.0	-3.8	1.30 H	53	-1.90	52.10
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	5460.00	57.0 PK	74.0	-17.0	1.00 V	340	17.00	40.00
2	5460.00	44.5 AV	54.0	-9.5	1.00 V	340	4.50	40.00
3	#5470.00	66.2 PK	68.3	-2.1	1.00 V	34	26.20	40.00
4	*5510.00	109.7 PK			1.00 V	341	69.70	40.00
5	*5510.00	96.2 AV			1.00 V	341	56.20	40.00
6	11020.00	61.2 PK	74.0	-12.8	1.00 V	204	9.10	52.10
7	11020.00	49.4 AV	54.0	-4.6	1.00 V	204	-2.70	52.10

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 110	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang

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	*5550.00	111.4 PK			1.00 H	335	71.30	40.10
2	*5550.00	97.9 AV			1.00 H	335	57.80	40.10
3	11100.00	61.5 PK	74.0	-12.5	1.50 H	20	9.50	52.00
4	11100.00	50.0 AV	54.0	-4.0	1.50 H	20	-2.00	52.00
5	#16650.00	62.8 PK	68.3	-5.5	1.00 H	45	10.10	52.70
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	*5550.00	109.9 PK			1.00 V	298	69.80	40.10
2	*5550.00	96.3 AV			1.00 V	298	56.20	40.10
3	11100.00	61.0 PK	74.0	-13.0	1.50 V	20	9.00	52.00
4	11100.00	49.5 AV	54.0	-4.5	1.50 V	20	-2.50	52.00
5	#16650.00	62.3 PK	68.3	-6.0	1.00 V	270	9.60	52.70

- 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.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 134	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang

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	*5670.00	110.6 PK			1.22 H	315	70.30	40.30
2	*5670.00	97.8 AV			1.22 H	315	57.50	40.30
3	#5725.00	63.1 PK	68.3	-5.2	1.22 H	317	22.60	40.50
4	11340.00	61.6 PK	74.0	-12.4	1.36 H	352	9.60	52.00
5	11340.00	51.4 AV	54.0	-2.6	1.36 H	352	-0.60	52.00
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	*5670.00	109.1 PK			1.32 V	285	68.80	40.30
2	*5670.00	95.9 AV			1.32 V	285	55.60	40.30
3	#5725.00	62.2 PK	68.3	-6.1	1.32 V	285	21.70	40.50
4	11340.00	60.0 PK	74.0	-14.0	1.00 V	330	8.00	52.00
5	11340.00	49.4 AV	54.0	-4.6	1.00 V	330	-2.60	52.00

- 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.



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**BELOW 1GHz WORST-CASE DATA :**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 62	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang
TEST MODE	A		

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	136.84	30.3 QP	43.5	-13.2	1.00 H	88	15.80	14.50
2	288.49	31.7 QP	46.0	-14.3	1.00 H	10	16.80	14.90
3	576.25	27.6 QP	46.0	-18.4	1.50 H	7	4.40	23.20
4	648.18	29.8 QP	46.0	-16.2	1.00 H	10	5.40	24.40
5	768.73	29.4 QP	46.0	-16.6	2.00 H	139	2.80	26.60
6	864.00	30.4 QP	46.0	-15.6	1.50 H	145	2.20	28.20

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	66.84	31.6 QP	40.0	-8.4	1.50 V	283	18.50	13.10
2	129.06	28.9 QP	43.5	-14.6	1.00 V	238	15.30	13.60
3	288.49	25.5 QP	46.0	-20.5	2.00 V	109	10.60	14.90
4	648.18	28.0 QP	46.0	-18.0	1.00 V	301	3.60	24.40
5	790.12	28.5 QP	46.0	-17.5	1.50 V	55	1.30	27.20
6	881.50	32.6 QP	46.0	-13.4	1.00 V	64	4.20	28.40

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 62	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang
TEST MODE	B		

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	66.84	27.8 QP	40.0	-12.2	2.00 H	43	14.70	13.10
2	239.88	29.0 QP	46.0	-17.0	1.00 H	106	15.80	13.20
3	683.18	24.5 QP	46.0	-21.5	1.75 H	46	-0.30	24.80
4	825.11	26.5 QP	46.0	-19.5	1.50 H	64	-1.30	27.80
5	924.27	28.6 QP	46.0	-17.4	2.00 H	310	-0.30	28.90
6	984.55	29.7 QP	54.0	-24.3	2.00 H	283	0.00	29.70
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	31.84	29.0 QP	40.0	-11.0	1.00 V	79	16.10	12.90
2	66.84	32.5 QP	40.0	-7.5	2.00 V	250	19.40	13.10
3	129.06	29.8 QP	43.5	-13.7	1.00 V	307	16.20	13.60
4	541.25	26.4 QP	46.0	-19.6	1.00 V	316	4.10	22.30
5	825.11	27.5 QP	46.0	-18.5	1.25 V	253	-0.30	27.80
6	945.66	28.9 QP	46.0	-17.1	1.50 V	274	-0.20	29.10

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 62	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang
TEST MODE	C		

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	66.84	25.1 QP	40.0	-14.9	2.00 H	139	12.00	13.10
2	239.88	27.5 QP	46.0	-18.5	1.00 H	91	14.30	13.20
3	681.24	25.9 QP	46.0	-20.1	1.00 H	10	1.10	24.80
4	807.62	27.1 QP	46.0	-18.9	1.50 H	64	-0.40	27.50
5	910.66	27.6 QP	46.0	-18.4	2.00 H	283	-1.20	28.80
6	978.71	29.3 QP	54.0	-24.7	1.00 H	190	-0.30	29.60
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	70.73	31.0 QP	40.0	-9.0	1.00 V	130	18.70	12.30
2	99.89	30.5 QP	43.5	-13.0	1.00 V	142	19.30	11.20
3	129.06	27.3 QP	43.5	-16.2	1.00 V	148	13.70	13.60
4	760.95	25.4 QP	46.0	-20.6	2.00 V	64	-1.10	26.50
5	860.11	28.0 QP	46.0	-18.0	1.00 V	304	-0.20	28.20
6	955.38	27.0 QP	46.0	-19.0	1.50 V	1	-2.30	29.30

- 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.





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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 110	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang
TEST MODE	A		

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	66.84	27.7 QP	40.0	-12.3	2.00 H	175	14.60	13.10
2	136.84	28.6 QP	43.5	-14.9	2.00 H	94	14.10	14.50
3	288.49	30.0 QP	46.0	-16.0	1.00 H	10	15.10	14.90
4	659.85	27.4 QP	46.0	-18.6	1.00 H	10	2.90	24.50
5	786.23	28.4 QP	46.0	-17.6	1.00 H	157	1.30	27.10
6	924.27	29.1 QP	46.0	-16.9	2.00 H	199	0.20	28.90
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	66.84	31.2 QP	40.0	-8.8	1.00 V	118	18.10	13.10
2	99.89	29.9 QP	43.5	-13.6	1.00 V	280	18.70	11.20
3	648.18	26.2 QP	46.0	-19.8	1.00 V	271	1.80	24.40
4	786.23	28.5 QP	46.0	-17.5	1.00 V	340	1.40	27.10
5	881.50	31.5 QP	46.0	-14.5	1.00 V	106	3.10	28.40
6	970.94	27.6 QP	54.0	-26.4	1.50 V	166	-1.90	29.50

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 110	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang
TEST MODE	B		

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	66.84	25.3 QP	40.0	-14.7	2.00 H	19	12.20	13.10
2	239.88	29.4 QP	46.0	-16.6	1.00 H	118	16.20	13.20
3	681.24	24.9 QP	46.0	-21.1	1.00 H	34	0.10	24.80
4	801.78	27.0 QP	46.0	-19.0	2.00 H	151	-0.40	27.40
5	871.78	27.4 QP	46.0	-18.6	1.50 H	172	-0.90	28.30
6	972.88	28.7 QP	54.0	-25.3	1.00 H	22	-0.80	29.50
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	66.84	30.2 QP	40.0	-9.8	2.00 V	253	17.10	13.10
2	99.89	30.8 QP	43.5	-12.7	1.00 V	1	19.60	11.20
3	541.25	26.4 QP	46.0	-19.6	1.00 V	298	4.10	22.30
4	757.06	26.3 QP	46.0	-19.7	1.00 V	73	-0.10	26.40
5	871.78	27.8 QP	46.0	-18.2	2.00 V	316	-0.50	28.30
6	951.49	28.5 QP	46.0	-17.5	1.50 V	352	-0.70	29.20

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 110	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Frank Wang
TEST MODE	C		

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	66.84	25.5 QP	40.0	-14.5	2.00 H	268	12.40	13.10
2	239.88	28.6 QP	46.0	-17.4	1.00 H	85	15.40	13.20
3	648.18	30.0 QP	46.0	-16.0	1.00 H	151	5.60	24.40
4	720.12	29.6 QP	46.0	-16.4	1.00 H	10	4.10	25.50
5	873.72	28.2 QP	46.0	-17.8	1.00 H	94	-0.20	28.40
6	992.32	30.8 QP	54.0	-23.2	2.00 H	295	1.00	29.80
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	66.84	32.6 QP	40.0	-7.4	1.00 V	295	19.50	13.10
2	129.06	30.0 QP	43.5	-13.5	1.00 V	85	16.40	13.60
3	541.25	27.1 QP	46.0	-18.9	1.00 V	148	4.80	22.30
4	648.18	28.5 QP	46.0	-17.5	1.50 V	124	4.10	24.40
5	739.57	27.5 QP	46.0	-18.5	1.50 V	88	1.60	25.90
6	840.67	30.6 QP	46.0	-15.4	1.00 V	103	2.60	28.00

- 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.

## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

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

### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 23, 2010	Nov. 22, 2011
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 30, 2010	Dec. 29, 2011
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 06, 2011	Jan. 05, 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.

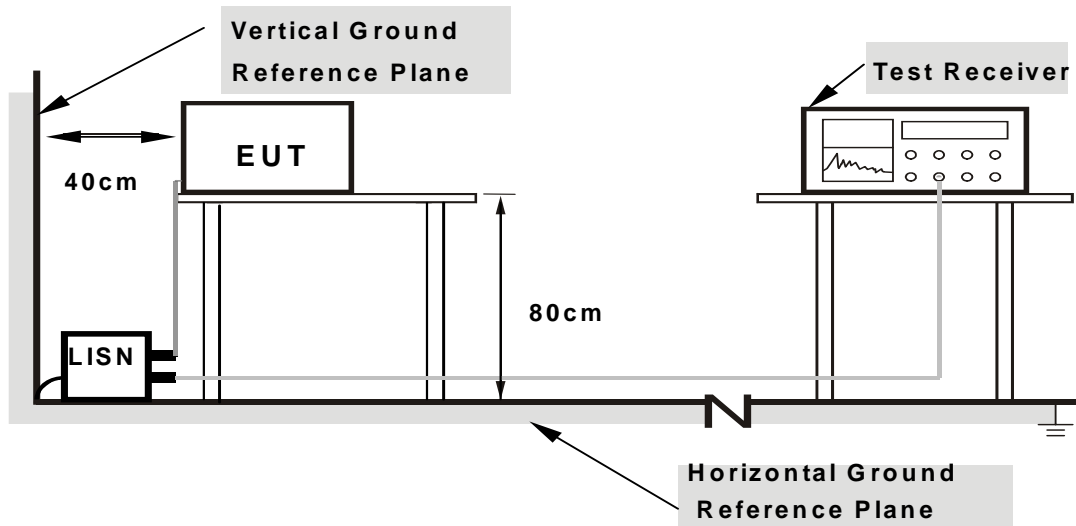
#### 4.2.3 TEST PROCEDURES

- 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.

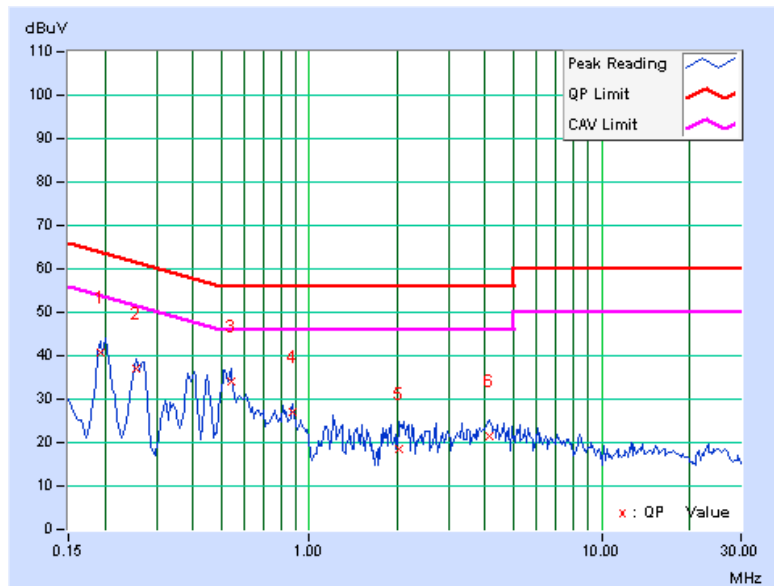
### 4.2.7 TEST RESULTS

#### CONDUCTED WORST-CASE DATA

<b>CHANNEL</b>	Channel 62	<b>PHASE</b>	Line 1
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	A

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.15	40.65	-	40.80	-	63.91	53.91	-23.11	-
2	0.255	0.16	36.95	-	37.11	-	61.58	51.58	-24.47	-
3	0.541	0.17	33.96	-	34.13	-	56.00	46.00	-21.87	-
4	0.880	0.19	26.68	-	26.87	-	56.00	46.00	-29.13	-
5	2.039	0.22	18.41	-	18.63	-	56.00	46.00	-37.37	-
6	4.133	0.33	21.16	-	21.49	-	56.00	46.00	-34.51	-

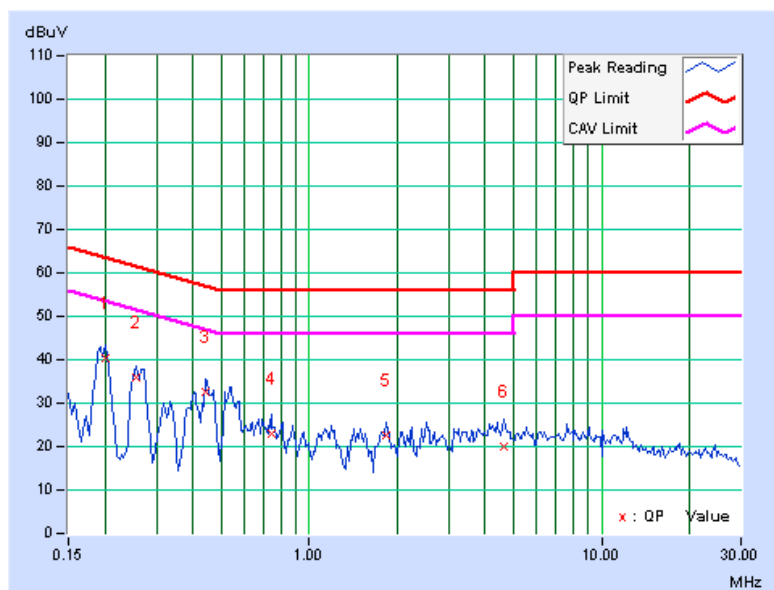
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>CHANNEL</b>	Channel 62	<b>PHASE</b>	Line 2
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	A

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.17	40.37	-	40.54	-	63.58	53.58	-23.04	-
2	0.255	0.18	35.70	-	35.88	-	61.58	51.58	-25.70	-
3	0.443	0.19	32.44	-	32.63	-	57.01	47.01	-24.37	-
4	0.740	0.20	22.85	-	23.05	-	56.00	46.00	-32.95	-
5	1.840	0.23	22.45	-	22.68	-	56.00	46.00	-33.32	-
6	4.652	0.34	19.77	-	20.11	-	56.00	46.00	-35.89	-

- 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.





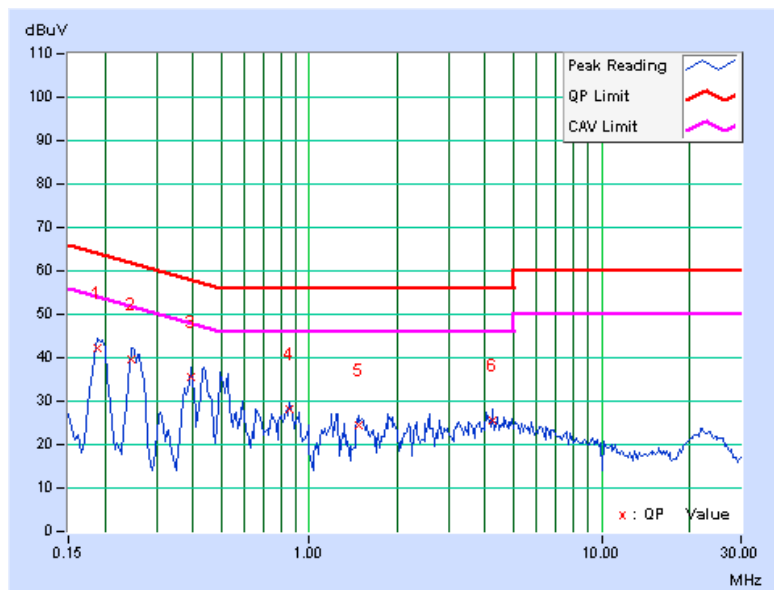


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<b>CHANNEL</b>	Channel 62	<b>PHASE</b>	Line 1
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	B

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.15	41.92	-	42.07	-	64.08	54.08	-22.01	-
2	0.248	0.15	39.60	-	39.75	-	61.84	51.84	-22.08	-
3	0.392	0.17	35.47	-	35.64	-	58.02	48.02	-22.38	-
4	0.853	0.19	28.06	-	28.25	-	56.00	46.00	-27.75	-
5	1.480	0.20	24.34	-	24.54	-	56.00	46.00	-31.46	-
6	4.215	0.33	25.22	-	25.55	-	56.00	46.00	-30.45	-

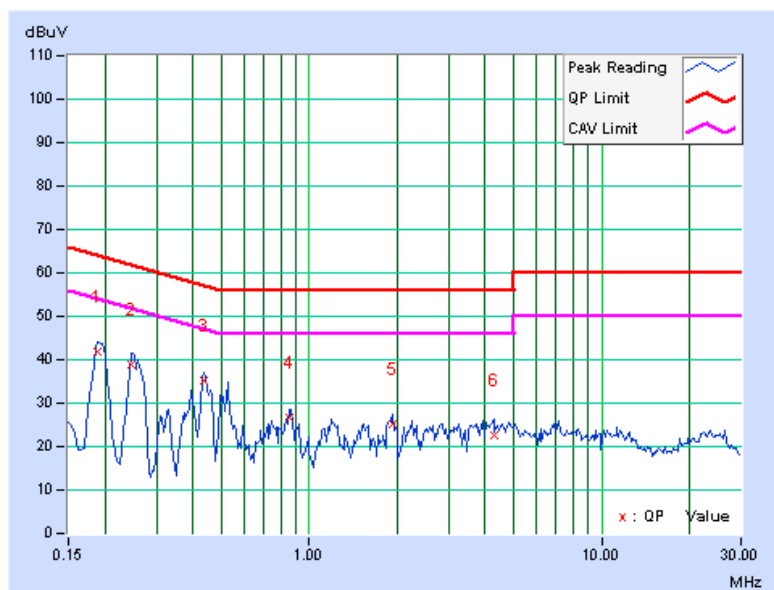
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>CHANNEL</b>	Channel 62	<b>PHASE</b>	Line 2
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	B

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.17	41.60	-	41.77	-	64.08	54.08	-22.31	-
2	0.248	0.17	38.85	-	39.02	-	61.84	51.84	-22.81	-
3	0.435	0.19	35.14	-	35.33	-	57.15	47.15	-21.82	-
4	0.853	0.21	26.44	-	26.65	-	56.00	46.00	-29.35	-
5	1.926	0.23	24.79	-	25.02	-	56.00	46.00	-30.98	-
6	4.273	0.33	22.24	-	22.57	-	56.00	46.00	-33.43	-

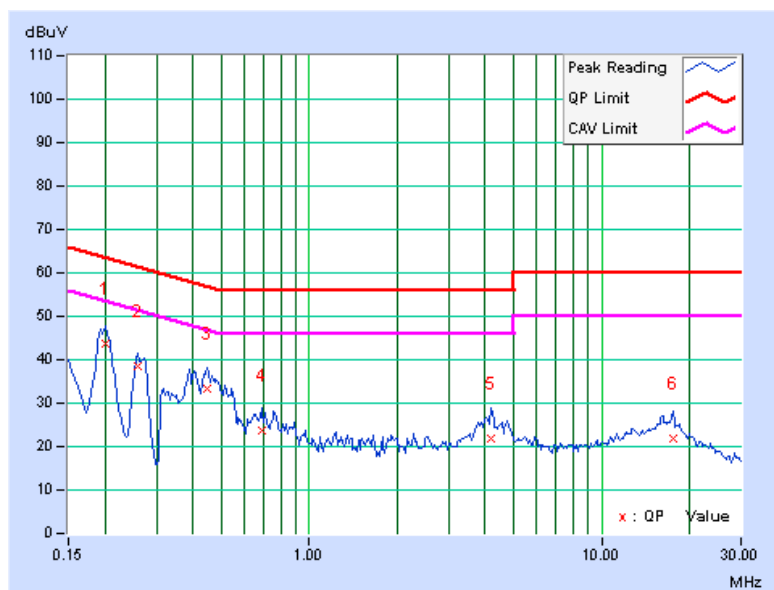
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>CHANNEL</b>	Channel 62	<b>PHASE</b>	Line 1
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	C

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.15	43.39	-	43.54	-	63.58	53.58	-20.04	-
2	0.259	0.16	38.25	-	38.41	-	61.45	51.45	-23.05	-
3	0.447	0.17	33.06	-	33.23	-	56.93	46.93	-23.70	-
4	0.685	0.18	23.53	-	23.71	-	56.00	46.00	-32.29	-
5	4.176	0.33	21.46	-	21.79	-	56.00	46.00	-34.21	-
6	17.555	1.01	20.88	-	21.89	-	60.00	50.00	-38.11	-

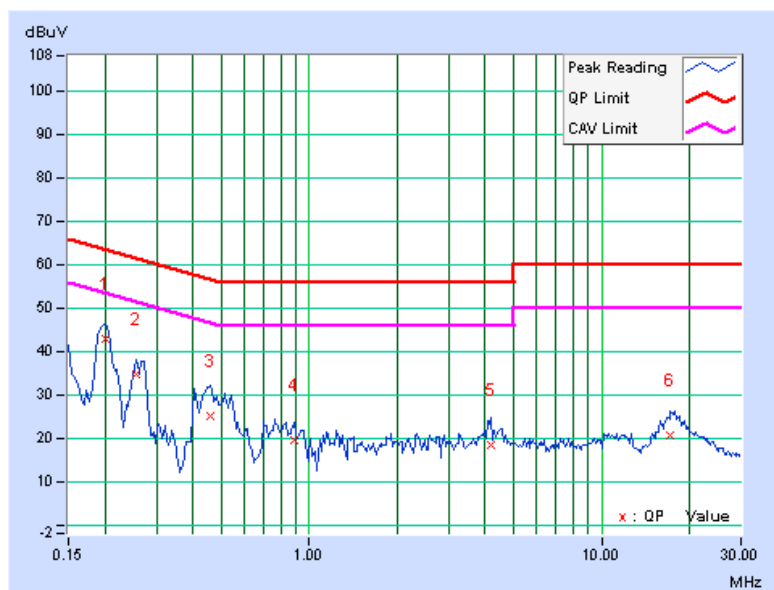
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>CHANNEL</b>	Channel 62	<b>PHASE</b>	Line 2
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	C

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.17	42.93	-	43.10	-	63.58	53.58	-20.48	-
2	0.255	0.18	34.61	-	34.79	-	61.58	51.58	-26.79	-
3	0.459	0.19	24.92	-	25.11	-	56.72	46.72	-31.61	-
4	0.884	0.21	19.52	-	19.73	-	56.00	46.00	-36.27	-
5	4.180	0.33	18.34	-	18.67	-	56.00	46.00	-37.33	-
6	17.242	0.82	19.98	-	20.80	-	60.00	50.00	-39.20	-

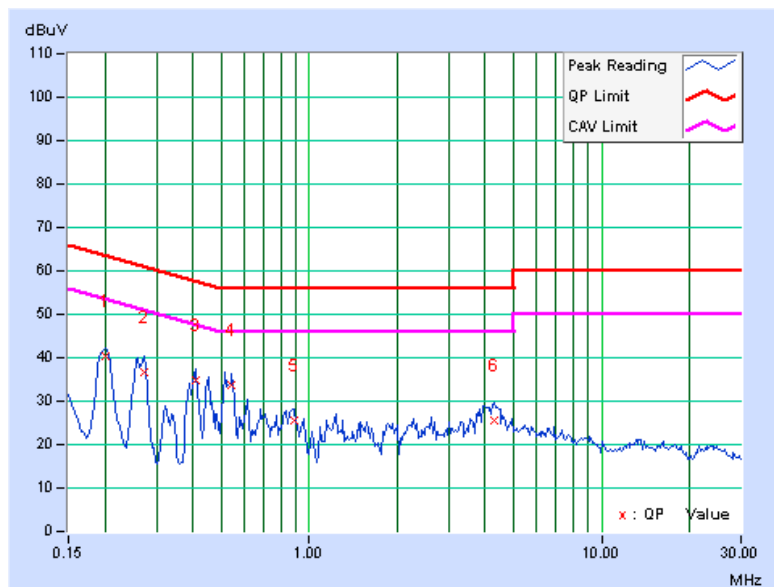
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>CHANNEL</b>	Channel 110	<b>PHASE</b>	Line 1
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	A

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.15	40.21	-	40.36	-	63.58	53.58	-23.22	-
2	0.271	0.16	36.52	-	36.68	-	61.08	51.08	-24.41	-
3	0.408	0.17	34.80	-	34.97	-	57.69	47.69	-22.72	-
4	0.545	0.17	33.69	-	33.86	-	56.00	46.00	-22.14	-
5	0.884	0.19	25.32	-	25.51	-	56.00	46.00	-30.49	-
6	4.301	0.33	25.30	-	25.63	-	56.00	46.00	-30.37	-

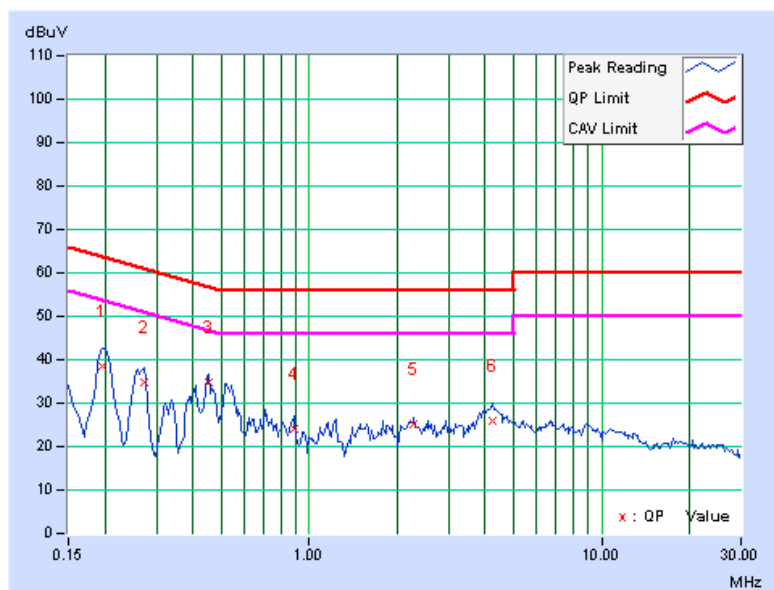
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>CHANNEL</b>	Channel 110	<b>PHASE</b>	Line 2
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	A

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.17	38.45	-	38.62	-	63.74	53.74	-25.12	-
2	0.271	0.18	34.46	-	34.64	-	61.08	51.08	-26.45	-
3	0.451	0.19	34.46	-	34.65	-	56.86	46.86	-22.21	-
4	0.884	0.21	23.97	-	24.18	-	56.00	46.00	-31.82	-
5	2.270	0.24	24.81	-	25.05	-	56.00	46.00	-30.95	-
6	4.246	0.33	25.55	-	25.88	-	56.00	46.00	-30.12	-

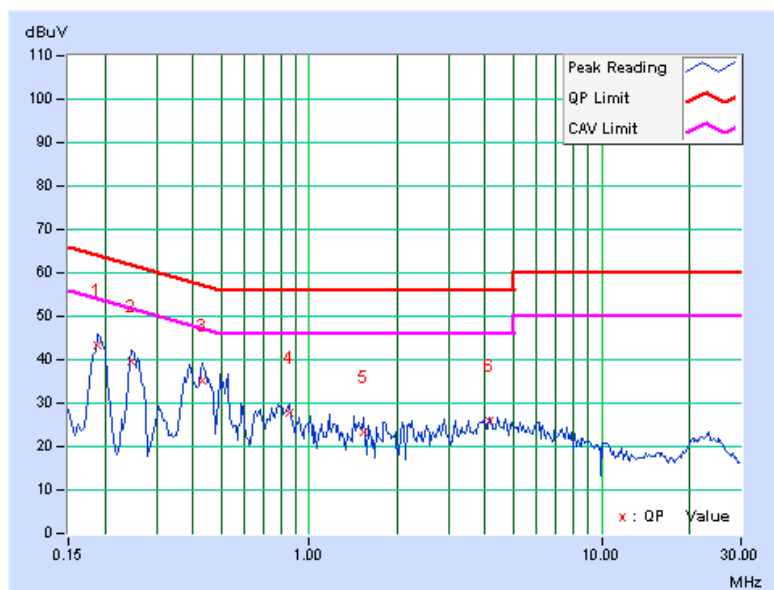
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>CHANNEL</b>	Channel 110	<b>PHASE</b>	Line 1
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	B

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.15	43.15	-	43.30	-	64.08	54.08	-20.78	-
2	0.248	0.15	39.44	-	39.59	-	61.84	51.84	-22.24	-
3	0.431	0.17	35.20	-	35.37	-	57.23	47.23	-21.86	-
4	0.853	0.19	27.62	-	27.81	-	56.00	46.00	-28.19	-
5	1.531	0.21	22.96	-	23.17	-	56.00	46.00	-32.83	-
6	4.137	0.33	25.51	-	25.84	-	56.00	46.00	-30.16	-

- 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.

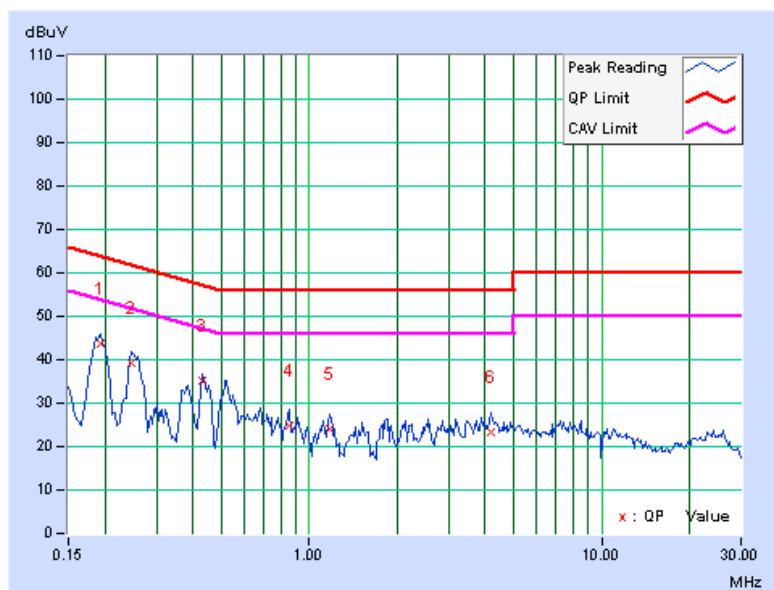




<b>CHANNEL</b>	Channel 110	<b>PHASE</b>	Line 2
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	B

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.17	43.37	-	43.54	-	63.91	53.91	-20.37	-
2	0.248	0.17	38.95	-	39.12	-	61.84	51.84	-22.71	-
3	0.431	0.19	35.14	-	35.33	-	57.23	47.23	-21.90	-
4	0.857	0.21	24.67	-	24.88	-	56.00	46.00	-31.12	-
5	1.180	0.21	23.84	-	24.05	-	56.00	46.00	-31.95	-
6	4.184	0.33	22.87	-	23.20	-	56.00	46.00	-32.80	-

- 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.

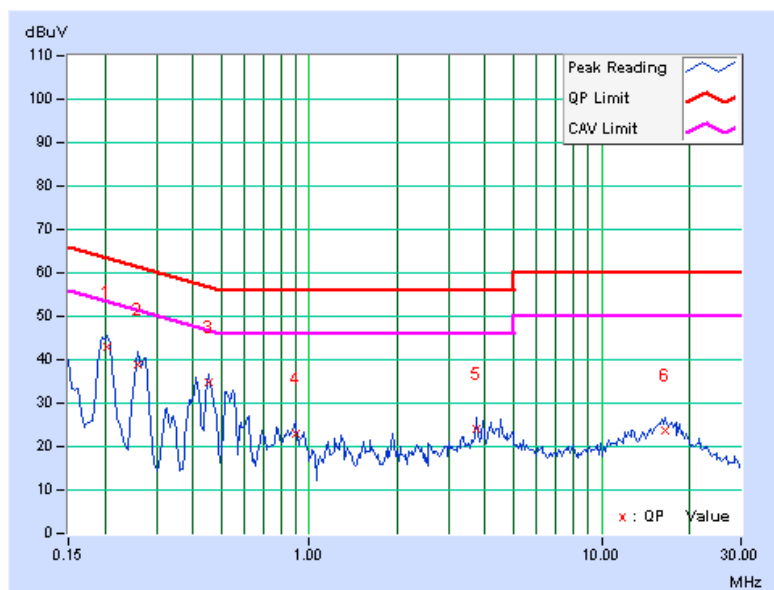




<b>CHANNEL</b>	Channel 110	<b>PHASE</b>	Line 1
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	C

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.15	42.68	-	42.83	-	63.42	53.42	-20.59	-
2	0.259	0.16	38.87	-	39.03	-	61.45	51.45	-22.43	-
3	0.455	0.17	34.54	-	34.71	-	56.79	46.79	-22.08	-
4	0.896	0.19	22.84	-	23.03	-	56.00	46.00	-32.97	-
5	3.723	0.31	23.61	-	23.92	-	56.00	46.00	-32.08	-
6	16.453	0.95	22.68	-	23.63	-	60.00	50.00	-36.37	-

- 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.



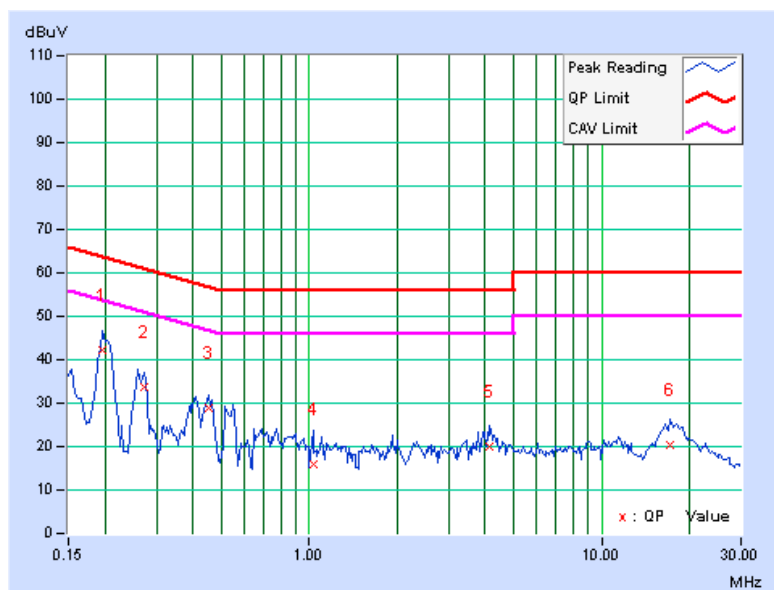


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<b>CHANNEL</b>	Channel 110	<b>PHASE</b>	Line 2
<b>6dB BANDWIDTH</b>	9kHz	<b>TEST MODE</b>	C

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.17	42.00	-	42.17	-	63.74	53.74	-21.57	-
2	0.271	0.18	33.67	-	33.85	-	61.08	51.08	-27.24	-
3	0.455	0.19	28.72	-	28.91	-	56.79	46.79	-27.88	-
4	1.031	0.21	15.89	-	16.10	-	56.00	46.00	-39.90	-
5	4.113	0.32	19.57	-	19.89	-	56.00	46.00	-36.11	-
6	17.176	0.81	19.39	-	20.20	-	60.00	50.00	-39.80	-

- 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.



### 4.3 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

#### 4.3.1 LIMITS OF MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

FREQUENCY BAND	LIMIT
5.270 ~ 5.310GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.510 ~ 5.670GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB

**NOTE:** Where B is the 26dB emission bandwidth in MHz.

#### 4.3.2 TEST INSTRUMENTS

##### FOR POWER OUTPUT MEASUREMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
High Speed Peak Power Meter	ML2495A	0824011	Aug. 02, 2010	Aug. 01, 2011
Power Sensor	MA2411B	0738171	Aug. 02, 2010	Aug. 01, 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. Measurement Bandwidth of ML2495A is 65MHz greater than 26dB bandwidth of emission.

##### FOR 26dB OCCUPIED BANDWIDTH

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 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

#### FOR AVERAGE POWER MEASUREMENT

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

#### FOR 26dB OCCUPIED BANDWIDTH

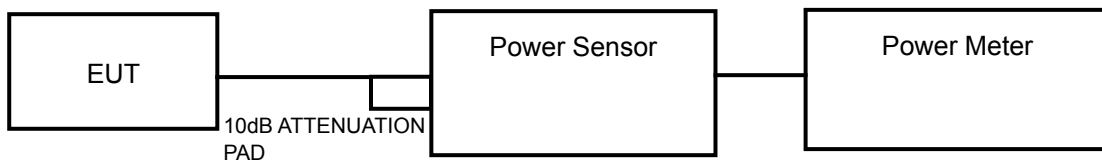
The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 300kHz RBW and 1MHz VBW. The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.

### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

### 4.3.5 TEST SETUP

#### FOR POWER OUTPUT MEASUREMENT



#### FOR 26dB OCCUPIED BANDWIDTH



### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



### 4.3.7 TEST RESULTS

#### FOR POWER OUTPUT MEASUREMENT

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	AVERAGE POWER LIMIT (dBm)	PASS/FAIL
54	5270	79.4	19.0	23.8	PASS
62	5310	<b>79.4</b>	19.0	23.8	PASS
102	5510	70.8	18.5	23.8	PASS
110	5550	<b>79.4</b>	19.0	23.8	PASS
134	5670	77.6	18.9	23.8	PASS

**NOTE:** Directional gain = 6.2dBi > 6dBi, so the conducted power limit shall be reduced to  $24 - (6.2 - 6) = 23.8\text{dBm}$ .

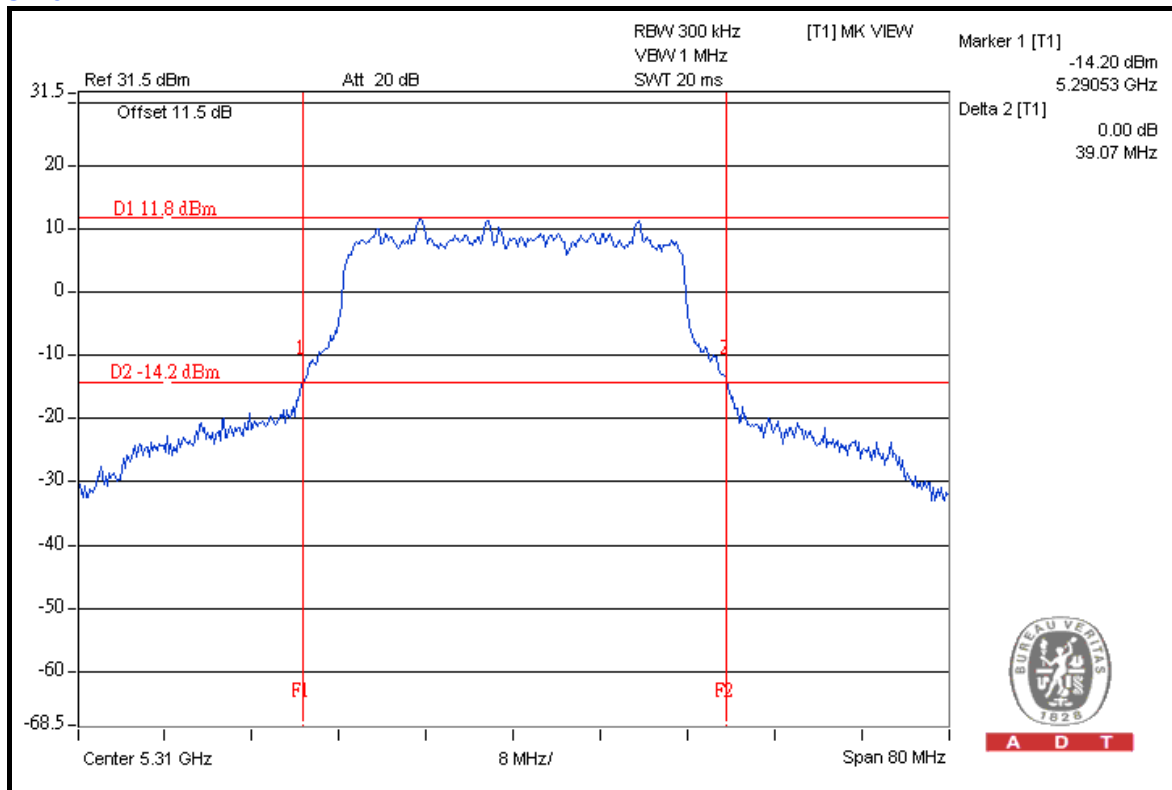


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### 26dB OCCUPIED BANDWIDTH

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)	PASS / FAIL
54	5270	39.00	PASS
62	5310	39.07	PASS
102	5510	38.82	PASS
110	5550	38.71	PASS
134	5670	38.81	PASS

### CH 62



#### 4.4 PEAK POWER EXCURSION MEASUREMENT

##### 4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

FREQUENCY BAND	LIMIT
5.270 ~ 5.310GHz	13dB
5.510 ~ 5.670GHz	13dB

##### 4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012

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

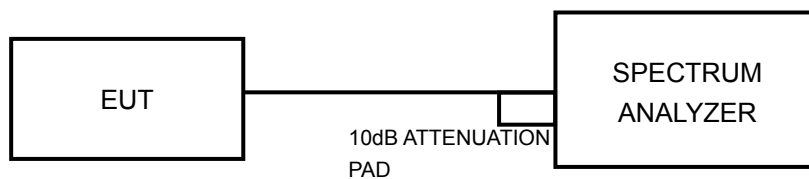
##### 4.4.3 TEST PROCEDURE

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set the spectrum bandwidth span to view the entire spectrum.
- c. Using peak detector and Max-hold function for Trace 1 (RB = 1MHz, VB = 3MHz) and 2 (RB = 1MHz, VB = 300kHz).
- d. The differences between Trace1 and Trace 2 in any 1MHz band at f1 to f2 range were recorded and showed to another trace.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.





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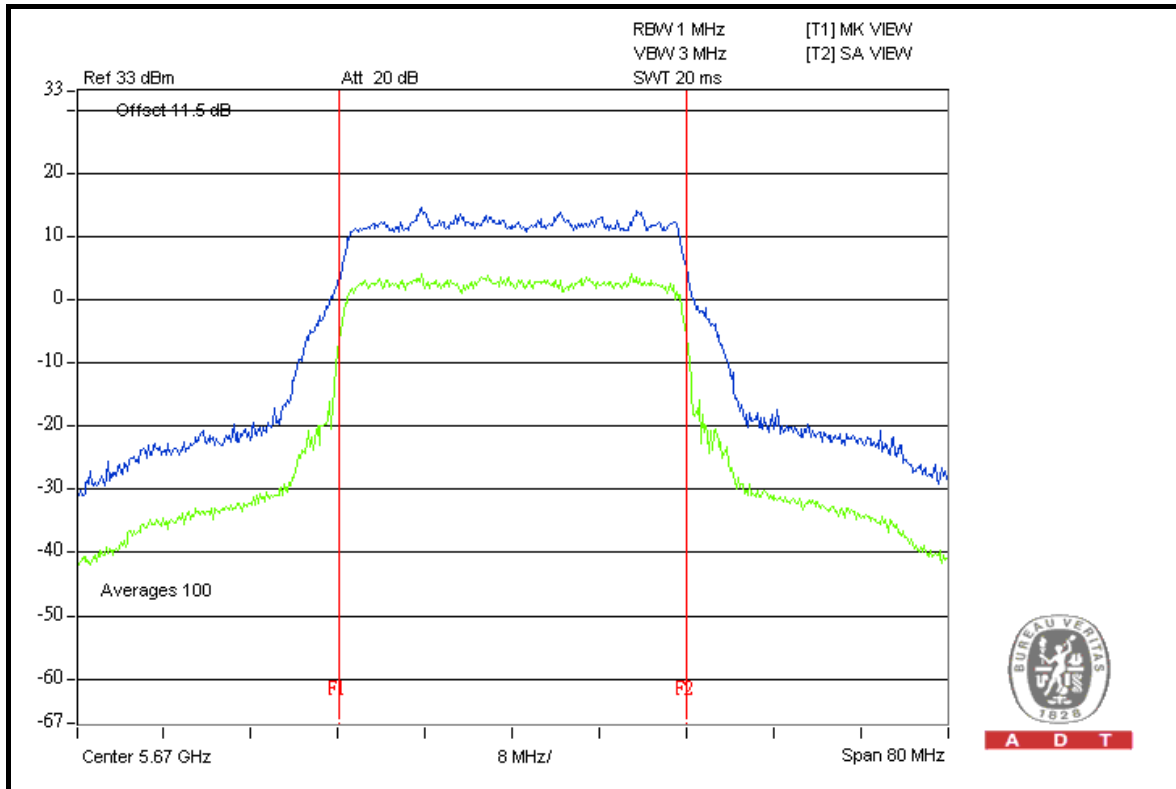
#### 4.4.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
54	5270	11.74	13	PASS
62	5310	11.95	13	PASS
102	5510	12.13	13	PASS
110	5550	11.89	13	PASS
134	5670	12.24	13	PASS

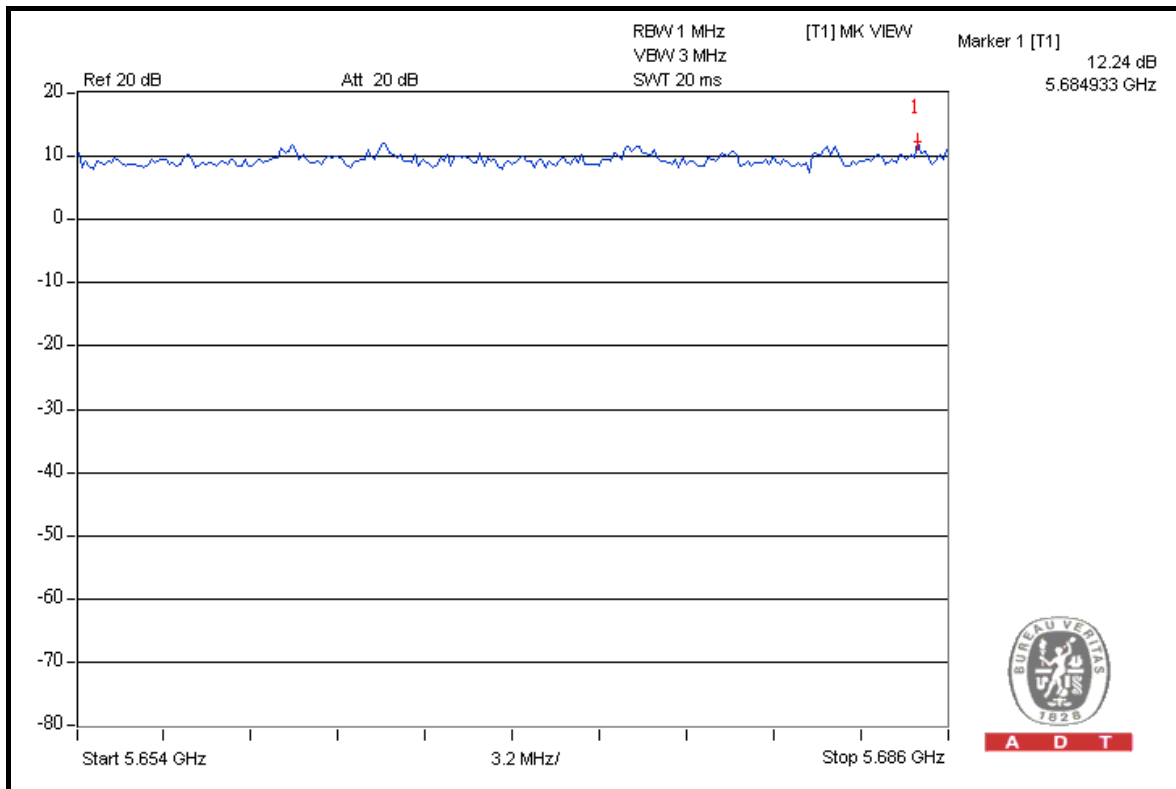


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### CH 134



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## 4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

FREQUENCY BAND	LIMIT
5.270 ~ 5.310GHz	11dBm
5.510 ~ 5.670GHz	11dBm

### 4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012

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

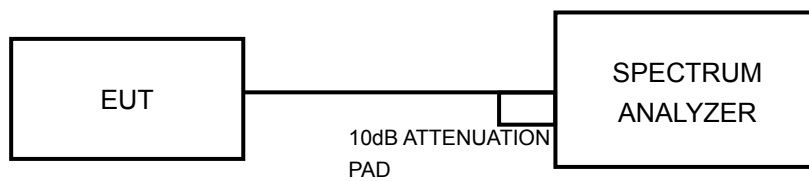
### 4.5.3 TEST PROCEDURES

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW = 1MHz, VBW = 3MHz. The PPSD is the highest level found across the emission in any 1MHz band.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITIONS

Same as 4.3.6.



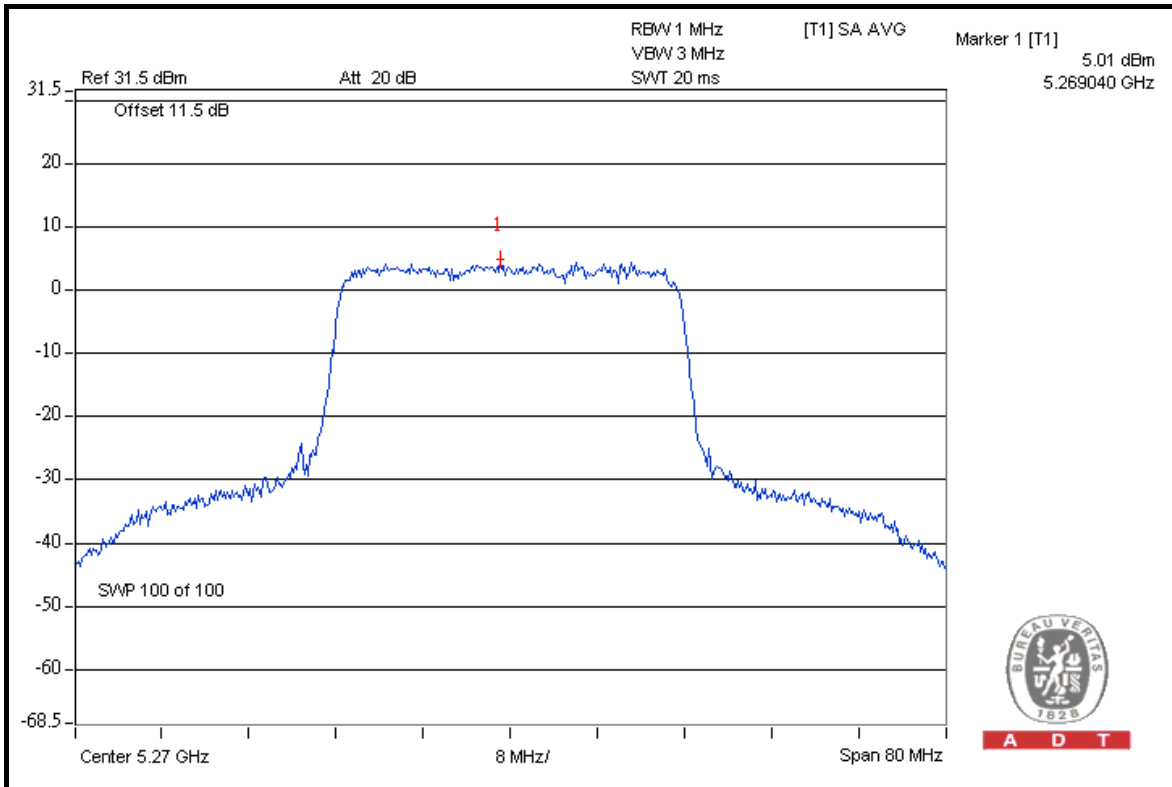
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### 4.5.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
54	5270	5.0	10.8	PASS
62	5310	4.9	10.8	PASS
102	5510	4.4	10.8	PASS
110	5550	4.8	10.8	PASS
134	5670	4.8	10.8	PASS

**NOTE:** Directional gain = 6.2dBi > 6dBi, so the power density limit shall be reduced to  $11-(6.2-6) = 10.8$  dBm.

#### CH 54



## 4.6 FREQUENCY STABILITY

### 4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within the band of operation frequency over a temperature variation of –30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W981030	Jun. 15, 2011	Jun. 14, 2012

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

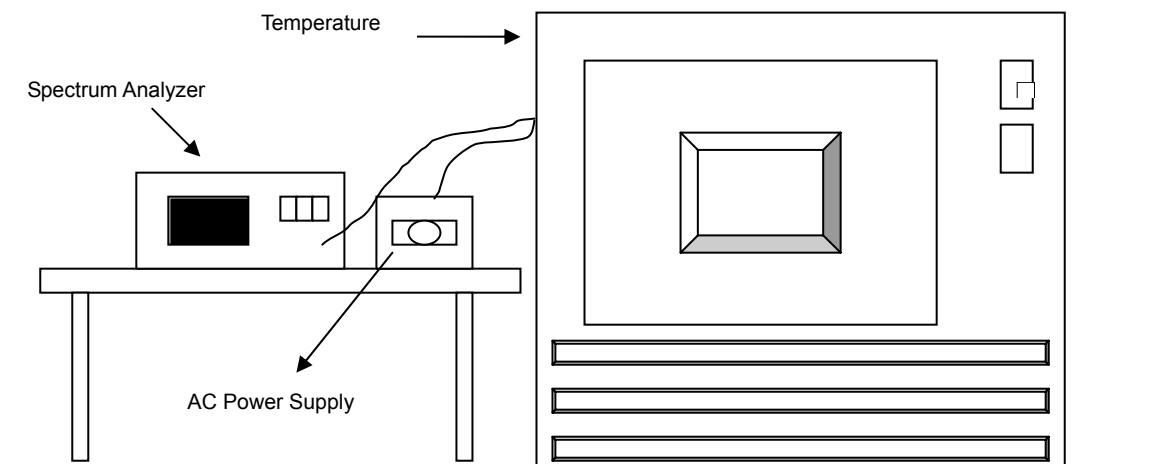
### 4.6.3 TEST PROCEDURE

- a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

#### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.6.5 TEST SETUP



#### 4.6.6 EUT OPERATING CONDITION

Same as Item 4.1.6.



#### 4.6.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5310MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
55	110.0	5310.002087	0.393	5310.002209	0.416	5310.001984	0.374	5310.002282	0.430
50	110.0	5310.002412	0.454	5310.002352	0.443	5310.002465	0.464	5310.002890	0.544
40	110.0	5310.003149	0.593	5310.002917	0.549	5310.003140	0.591	5310.002854	0.537
30	110.0	5310.043351	8.164	5310.043374	8.168	5310.043220	8.139	5310.043601	8.211
20	110.0	5310.007139	1.344	5310.007334	1.381	5310.007210	1.358	5310.007399	1.393
10	110.0	5310.002847	0.536	5310.003135	0.590	5310.003013	0.567	5310.002575	0.485
0	110.0	5310.001023	0.193	5310.000991	0.187	5310.000931	0.175	5310.001038	0.195
-10	110.0	5310.008049	1.516	5310.007945	1.496	5310.007859	1.480	5310.007995	1.506
-20	110.0	5310.025365	4.777	5310.025544	4.811	5310.025668	4.834	5310.025178	4.742
-30	110.0	5310.039287	7.399	5310.039496	7.438	5310.039001	7.345	5310.039610	7.460

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5310MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	93.5	5310.043351	8.164	5310.043895	8.266	5310.043665	8.223	5310.043437	8.180
	110.0	5310.007139	1.344	5310.007334	1.381	5310.007210	1.358	5310.007399	1.393
	126.5	5310.002847	0.536	5310.002599	0.489	5310.003010	0.567	5310.002638	0.497



## 4.7 BAND EDGES MEASUREMENT

### 4.7.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Dec. 27, 2010	Dec. 26, 2011
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Aug. 02, 2010	Aug. 01, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 06, 2011	Jan. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01961	Nov. 02, 2010	Nov. 01, 2011
Preamplifier Agilent	8447D	2944A10738	Nov. 02, 2010	Nov. 01, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250792/4	Sep. 03, 2010	Sep. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	283397/4	Sep. 03, 2010	Sep. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Sep. 03, 2010	Sep. 02, 2011
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	07026401	Aug. 25, 2010	Aug. 24, 2011

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

#### 4.7.2 TEST PROCEDURE

- 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. 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. Set both RBW and VBW of spectrum analyzer to 1MHz and 3MHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

**NOTE:** The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz

#### 4.7.3 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

#### 4.7.4 TEST RESULTS

For signals in the restricted bands above and below the 5.27 to 5.31GHz and 5.51 to 5.67GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak field strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

The spectrum plots (Peak RBW = 1MHz, VBW = 3MHz) are attached on the following pages.

#### FOR 5270-5310MHz BAND:

##### RESTRICT BAND (4500 ~ 5150 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
5270.00 (PK)	110.6	58.11	52.49	74.00
5270.00 (AV)	97.6	58.29	39.31	54.00

##### RESTRICT BAND (5350 ~ 5460 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
5310.00 (PK)	111.5	41.08	70.42	74.00
5310.00 (AV)	98.1	48.16	49.94	54.00

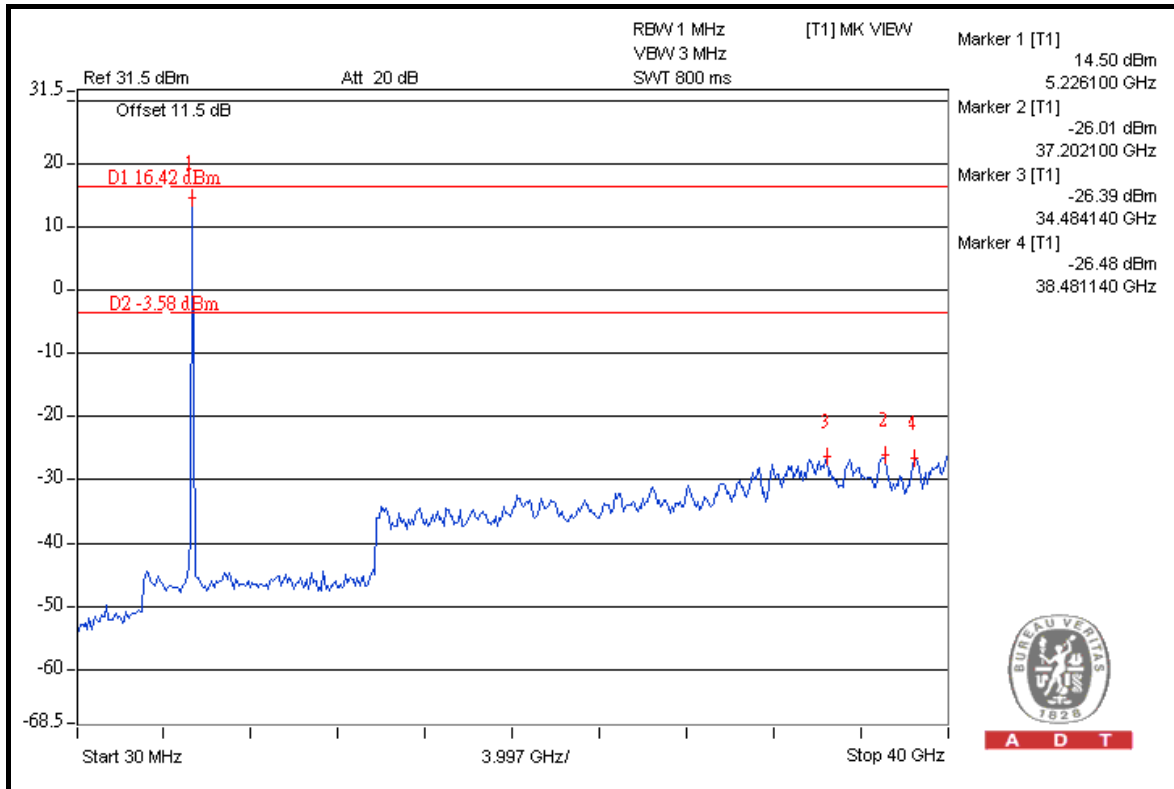
#### NOTE:

- Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
- Maximum field strength in restrict band = Fundamental emission – Delta.

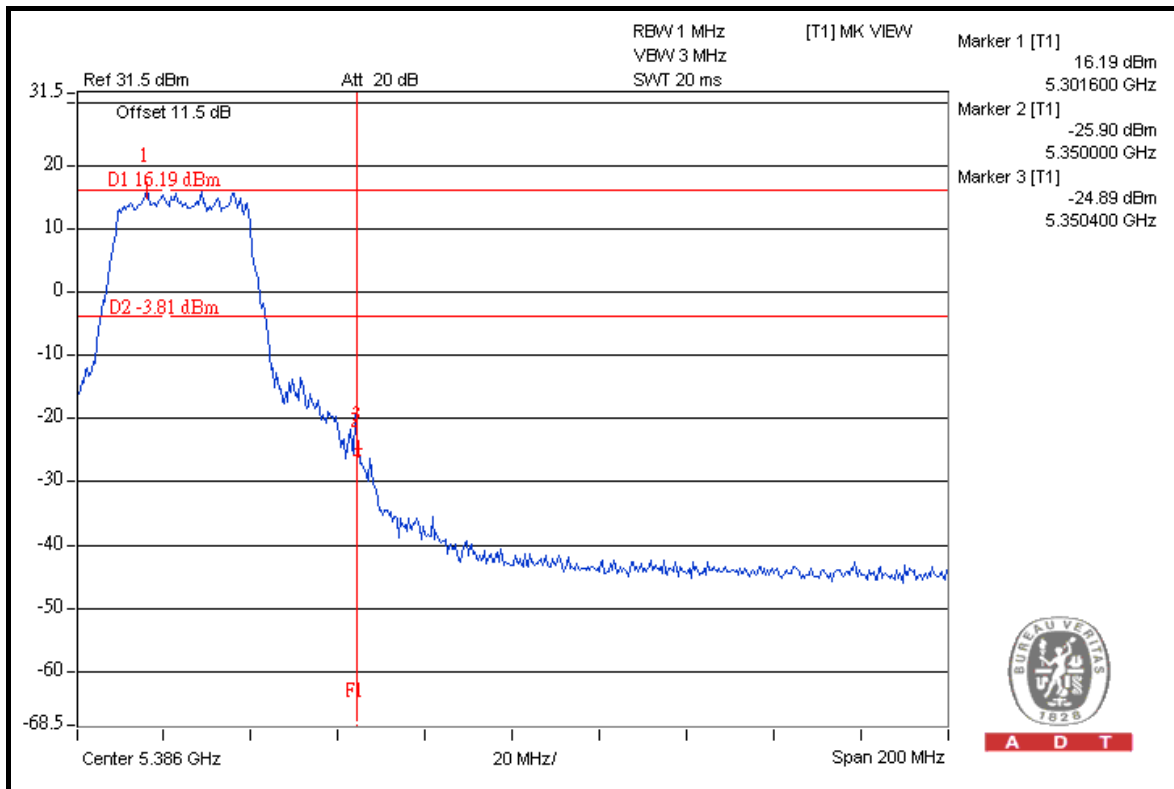




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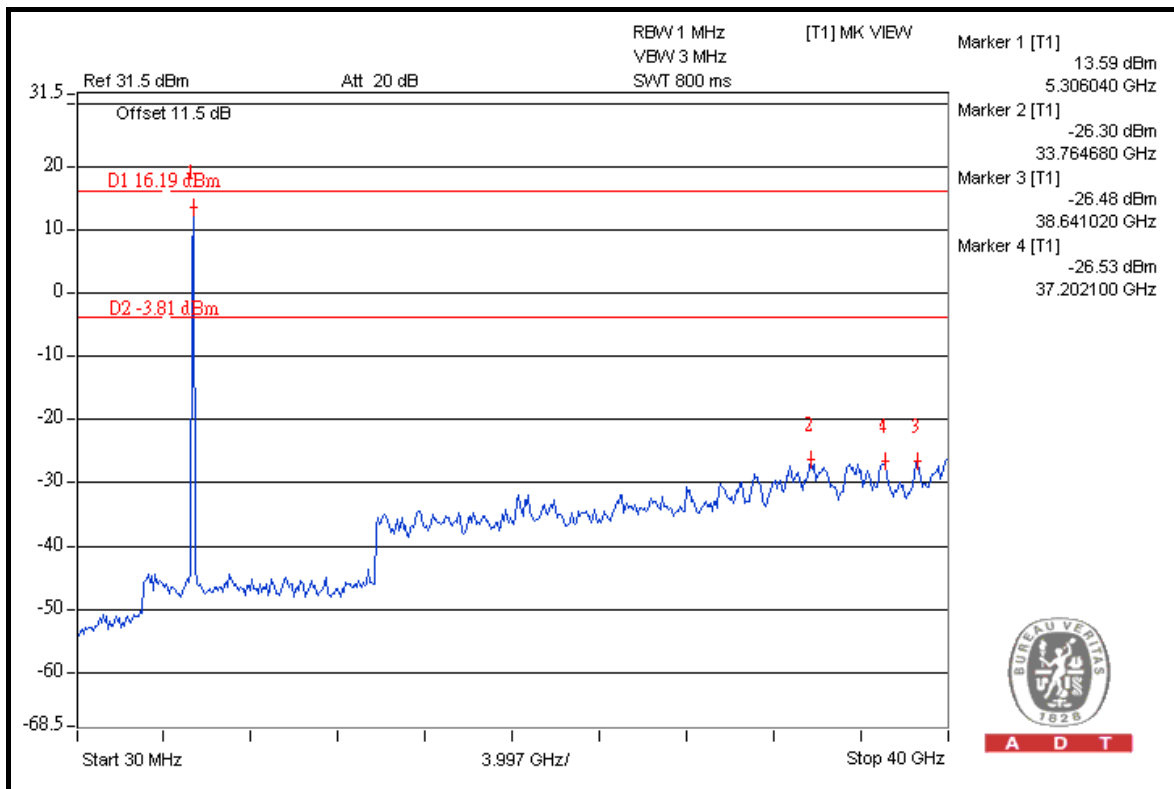
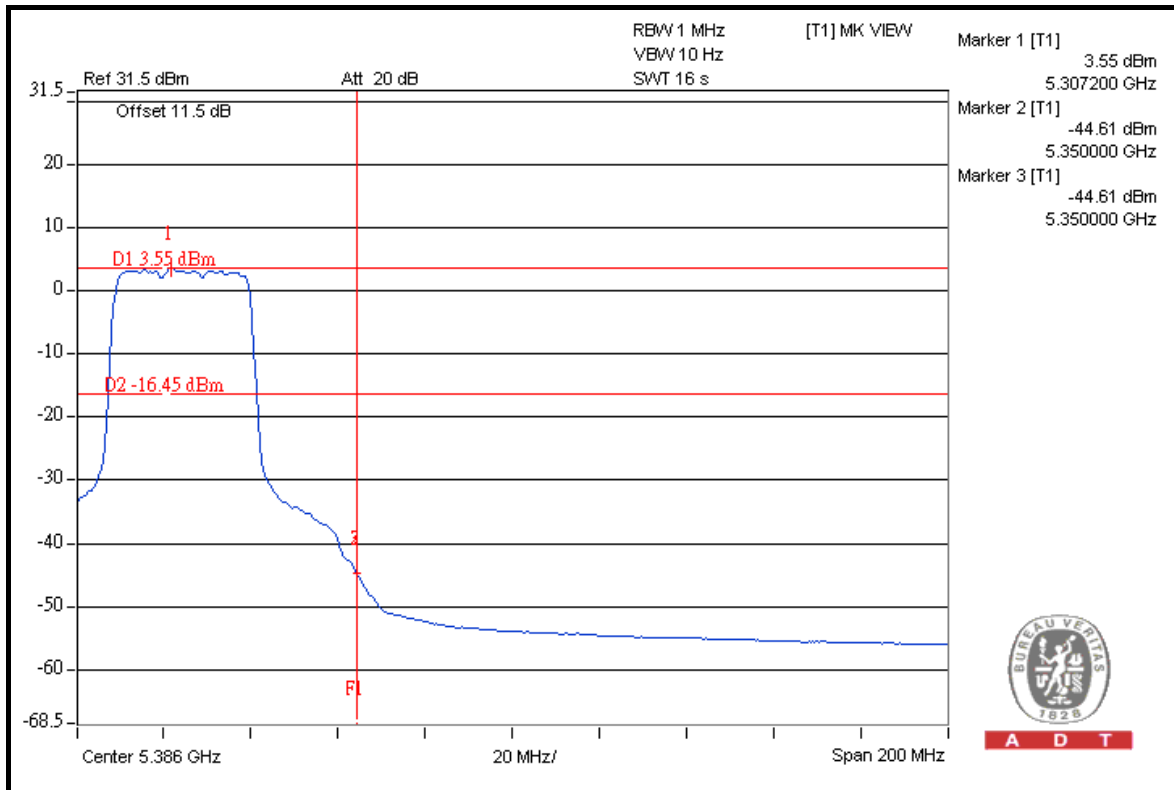
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**FOR 5510-5670MHz BAND:**

**5510MHz**

**RESTRICT BAND (5350 ~ 5460 MHz)**

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
5510.00 (PK)	110.8	51.12	59.68	74.00
5510.00 (AV)	97.0	51.87	45.13	54.00

**FREQUENCY BAND (5460 ~ 5470 MHz)**

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH (dBuV/m)	LIMIT (dBuV/m)
5510.00 (PK)	110.8	43.61	67.19	68.30

**5670MHz**

**ABOVE 5725 MHz**

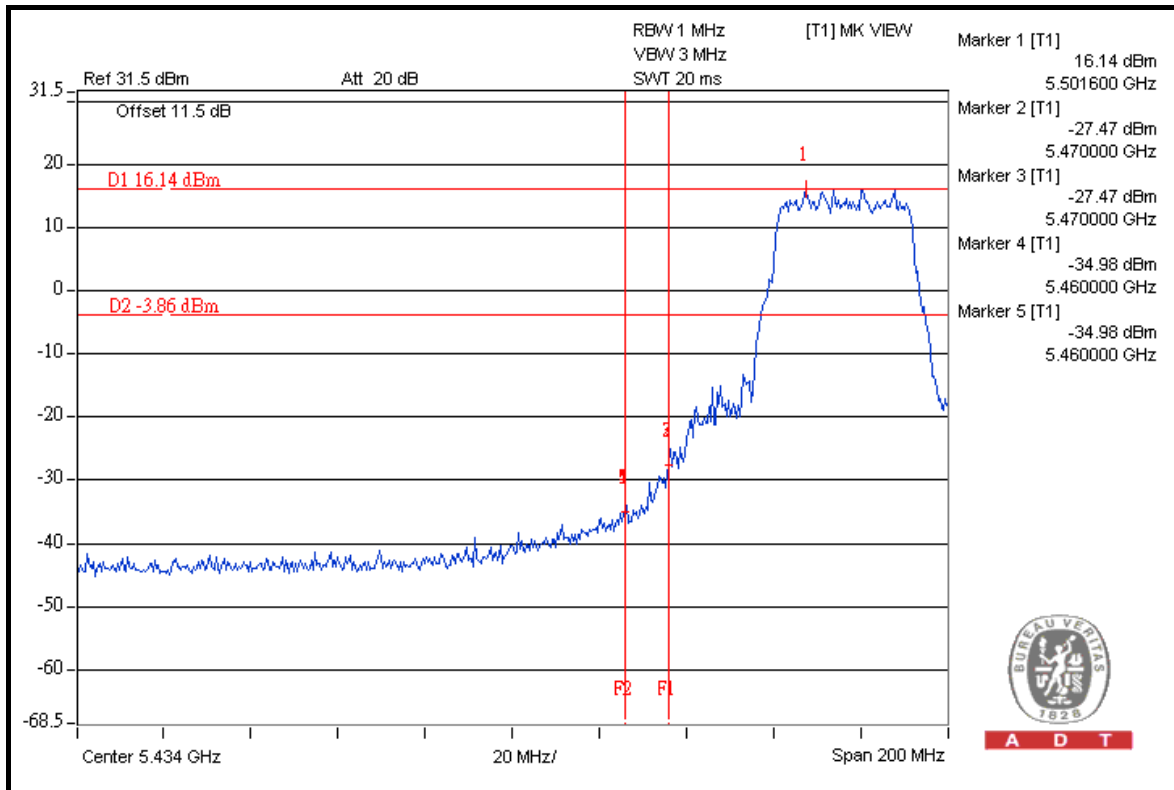
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH (dBuV/m)	LIMIT (dBuV/m)
5670.00 (PK)	110.6	48.37	62.23	68.30

**NOTE:**

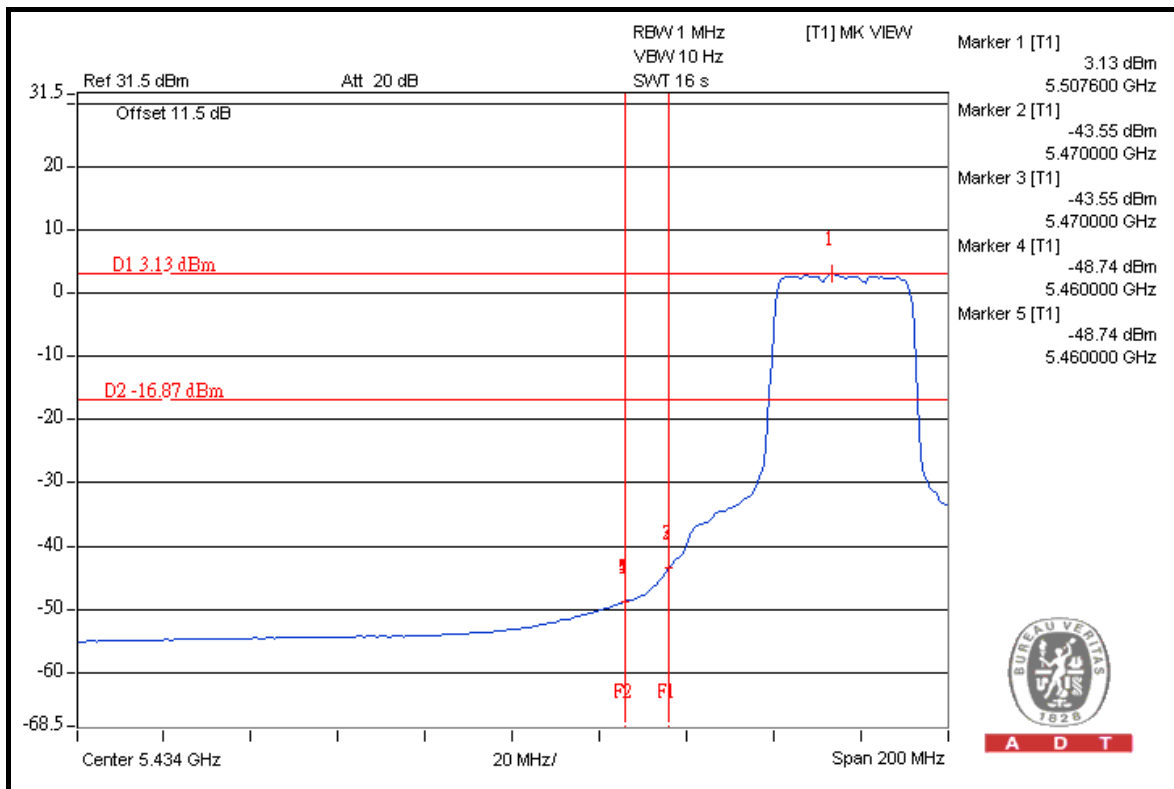
1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
2. Maximum field strength in restrict band = Fundamental emission – Delta.



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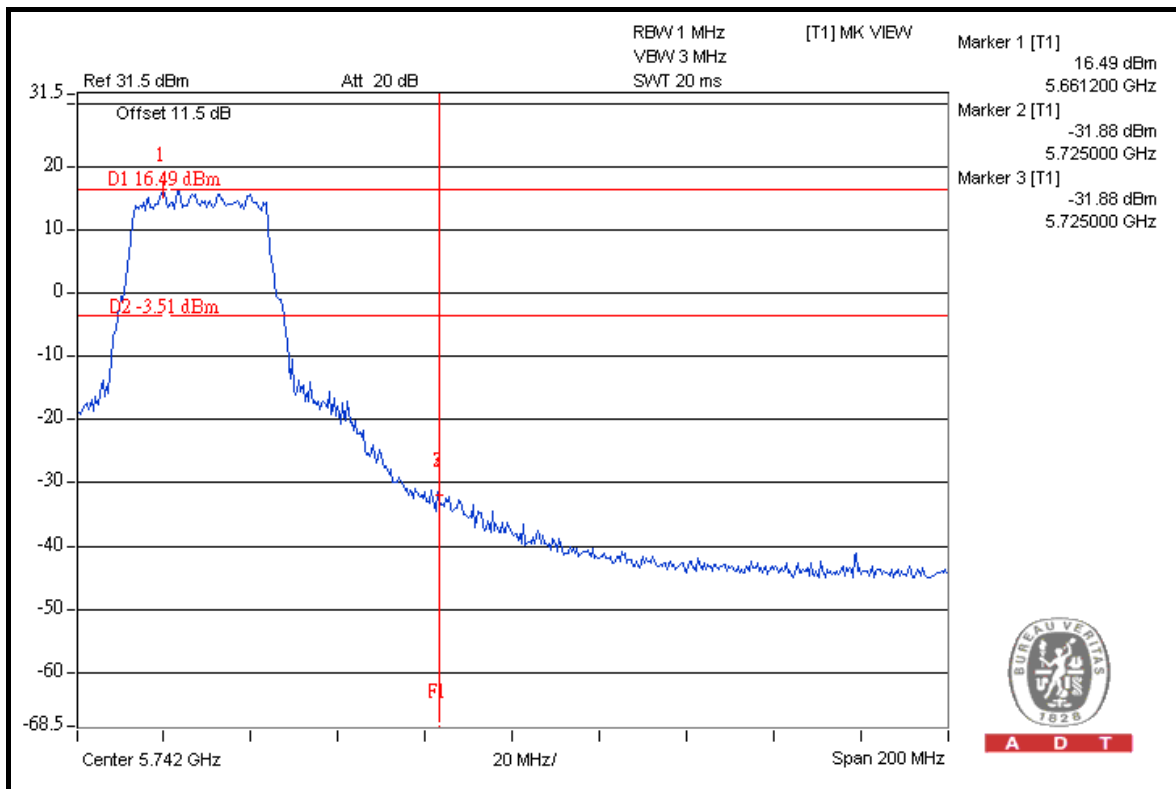
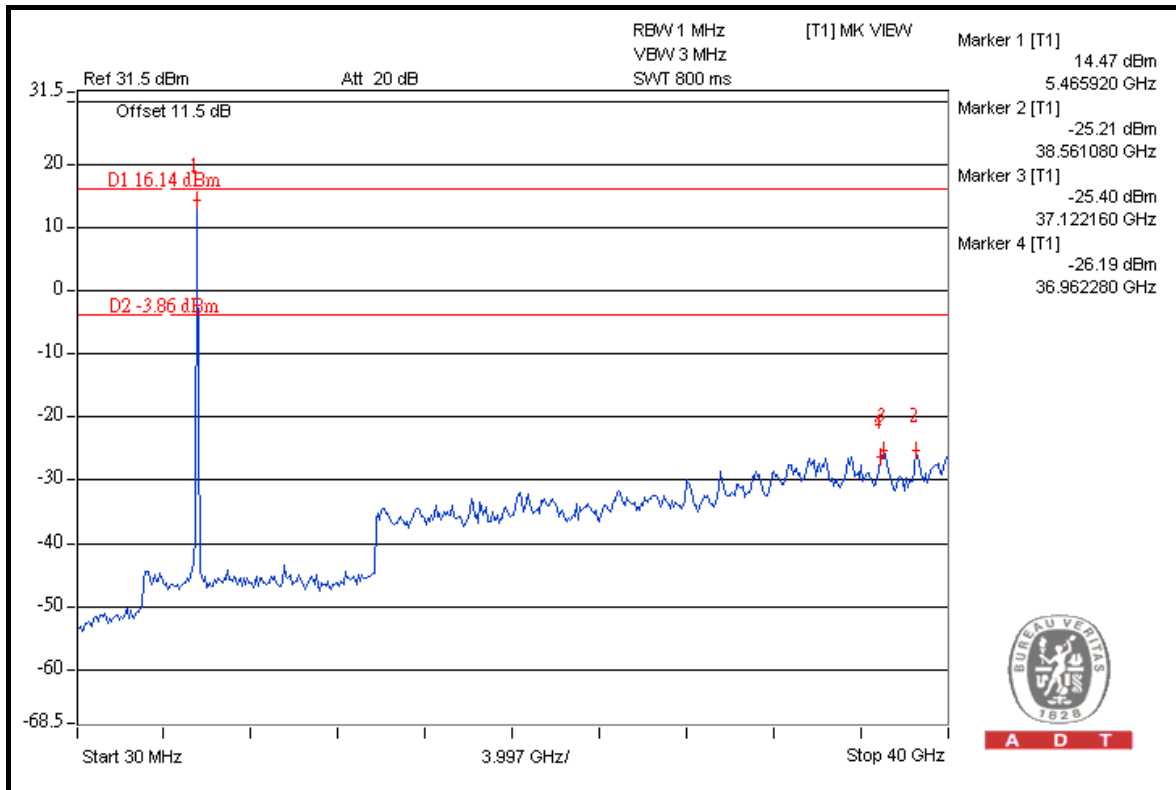


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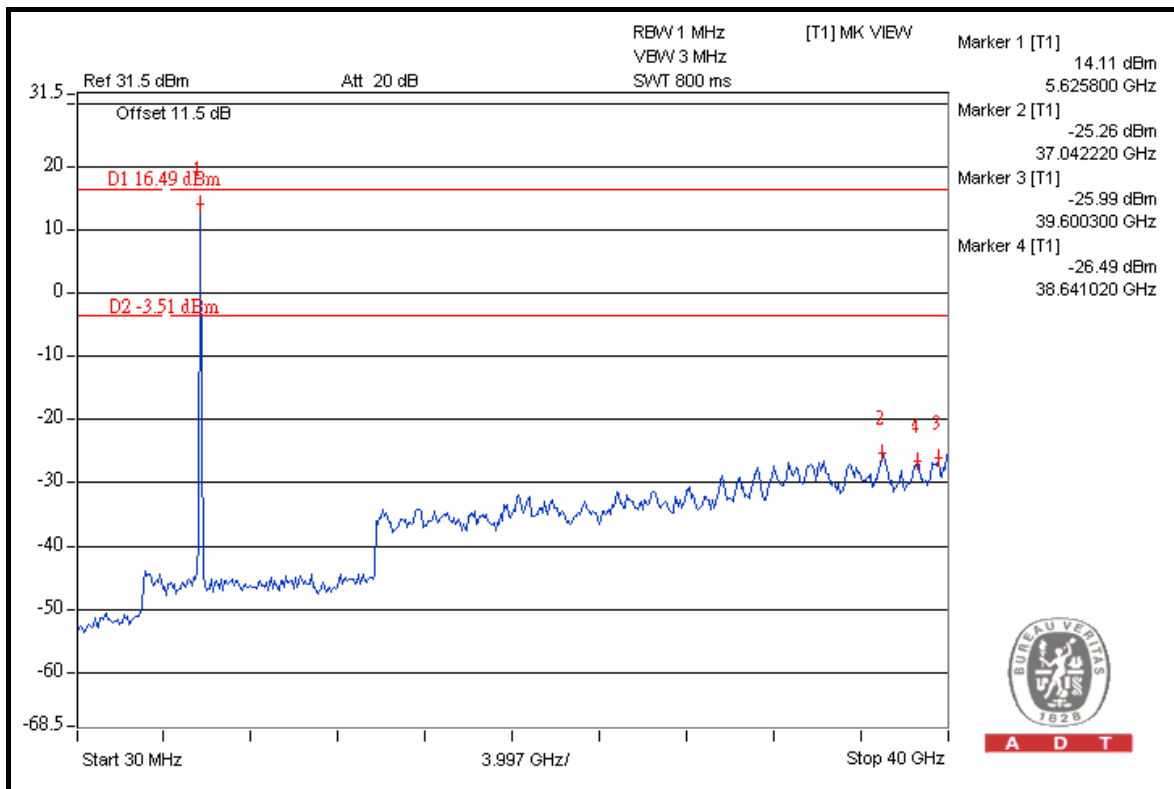
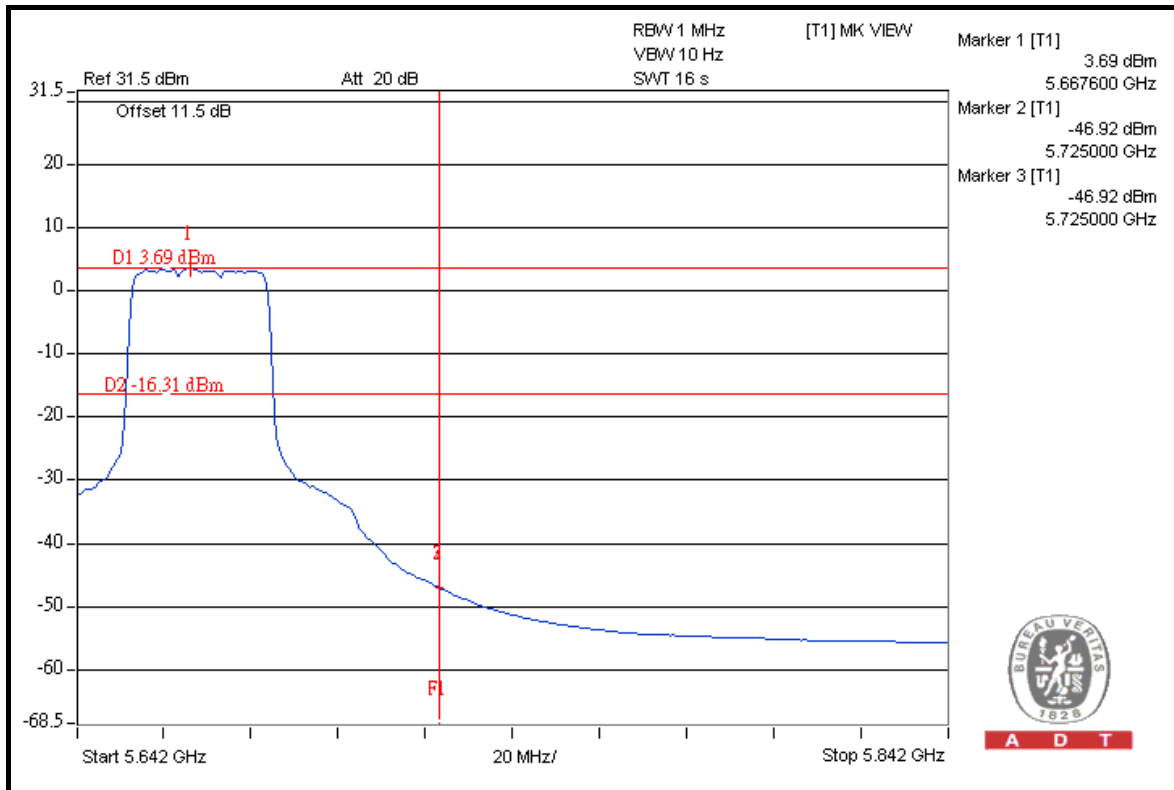


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## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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](http://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](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.adt.com.tw](http://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---**