



FCC TEST REPORT

REPORT NO.: RF980717L12

MODEL NO.: TR170 (refer to item 3.1 for more details)

RECEIVED: Jul. 13, 2009

TESTED: Jul. 13 ~ Aug. 20, 2009

ISSUED: Aug. 24, 2009

APPLICANT: Sennheiser electronic GmbH & Co.KG

ADDRESS: Am Labor 1, D-30900 Wedemark Postfach 100 264,
D-30892 Wedemark, Germany

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.

This test report consists of 50 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by TAF or any government agencies. The test results in the report only apply to the tested sample.





TABLE OF CONTENTS

1.	CERTIFICATION	4
2.	SUMMARY OF TEST RESULTS	5
2.1	MEASUREMENT UNCERTAINTY	5
3.	GENERAL INFORMATION	6
3.1	GENERAL DESCRIPTION OF EUT	6
3.2	DESCRIPTION OF TEST MODES	7
3.2.1	CONFIGURATION OF SYSTEM UNDER TEST	8
3.2.2	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	9
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	11
3.4	DESCRIPTION OF SUPPORT UNITS	11
4.	TEST TYPES AND RESULTS	12
4.1	RADIATED EMISSION MEASUREMENT	12
4.1.1	LIMITS OF RADIATED EMISSION MEASUREMENT	12
4.1.2	TEST INSTRUMENTS	13
4.1.3	TEST PROCEDURES	14
4.1.4	DEVIATION FROM TEST STANDARD	14
4.1.5	TEST SETUP	15
4.1.6	EUT OPERATING CONDITIONS	15
4.1.7	TEST RESULTS	16
4.2	CONDUCTED EMISSION MEASUREMENT	25
4.2.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	25
4.2.2	TEST INSTRUMENTS	25
4.2.3	TEST PROCEDURES	26
4.2.4	DEVIATION FROM TEST STANDARD	26
4.2.5	TEST SETUP	27
4.2.6	EUT OPERATING CONDITIONS	27
4.2.7	TEST RESULTS	28
4.3	6dB BANDWIDTH MEASUREMENT	32
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	32
4.3.2	TEST INSTRUMENTS	32
4.3.3	TEST PROCEDURE	32
4.3.4	DEVIATION FROM TEST STANDARD	32
4.3.5	TEST SETUP	33
4.3.6	EUT OPERATING CONDITIONS	33
4.3.7	TEST RESULTS	34



A D T

4.4	MAXIMUM PEAK OUTPUT POWER	36
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT.....	36
4.4.2	INSTRUMENTS	36
4.4.3	TEST PROCEDURES.....	36
4.4.4	DEVIATION FROM TEST STANDARD	36
4.4.5	TEST SETUP	37
4.4.6	EUT OPERATING CONDITIONS.....	37
4.4.7	TEST RESULTS.....	37
4.5	POWER SPECTRAL DENSITY MEASUREMENT	38
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	38
4.5.2	TEST INSTRUMENTS	38
4.5.3	TEST PROCEDURE	38
4.5.4	DEVIATION FROM TEST STANDARD	38
4.5.5	TEST SETUP	39
4.5.6	EUT OPERATING CONDITION	39
4.5.7	TEST RESULTS.....	40
4.6	BAND EDGES MEASUREMENT	42
4.6.1	LIMITS OF BAND EDGES MEASUREMENT	42
4.6.2	TEST INSTRUMENTS	42
4.6.3	TEST PROCEDURE	42
4.6.4	DEVIATION FROM TEST STANDARD	42
4.6.5	EUT OPERATING CONDITION	42
4.6.6	TEST RESULTS.....	43
4.7	ANTENNA REQUIREMENT	47
4.7.1	STANDARD APPLICABLE	47
4.7.2	ANTENNA CONNECTED CONSTRUCTION.....	47
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION	48
6.	INFORMATION ON THE TESTING LABORATORIES.....	49
7.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	50

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	Remark
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -24.04dB at 4.777MHz.
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -5.81dB at 12190.00MHz.
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

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	150kHz~30MHz	2.44dB
Radiated emissions	30MHz ~ 200MHz	3.19dB
	200MHz ~1000MHz	3.21dB
	1GHz ~ 18GHz	2.26dB
	18GHz ~ 40GHz	1.94dB

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

PRODUCT	Digital Wireless Headphone System (RS170/180)
MODEL NO.	TR170 (refer to NOTE 1 for more details)
FCC ID	DMOTR180
POWER SUPPLY	5Vdc from adapter
MODULATION TYPE	MSK
TRANSFER RATE	2.37Mb/s
OPRTAING FREQUENCY	2403MHz ~ 2473MHz
NUMBER OF CHANNEL	15
MAXIMUM OUTPUT POWER	4.385mW
ANTENNA TYPE	Inverted F antenna with 2.15dBi gain
DATA CABLE	2.1m non-shielded audio cable without core 0.3m non-shielded Y cable without core
I/O PORTS	NA
ACCESSORY DEVICES	Adapter

NOTE:

1. The following models are provided to this EUT.

BRAND	MODEL	DESCRIPTION
SENNHEISER	TR170	1. Without 2 Audio output 2. With Bass and surround function 3. Color: Black 4. Same PCB
SENNHEISER	TR180	1. With 2 Audio output 2. With ALC function 3. Color: Grey 4. Same PCB

2. The EUT was operated with following power adapter:

BRAND:	SENNHEISER
MODEL:	SSA-4P 5050F
INPUT:	100-240Vac, 50-60Hz, 0.2A
OUTPUT:	5Vdc, 500mA
POWER LINE:	1.8m non-shielded cable without core

3. 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.

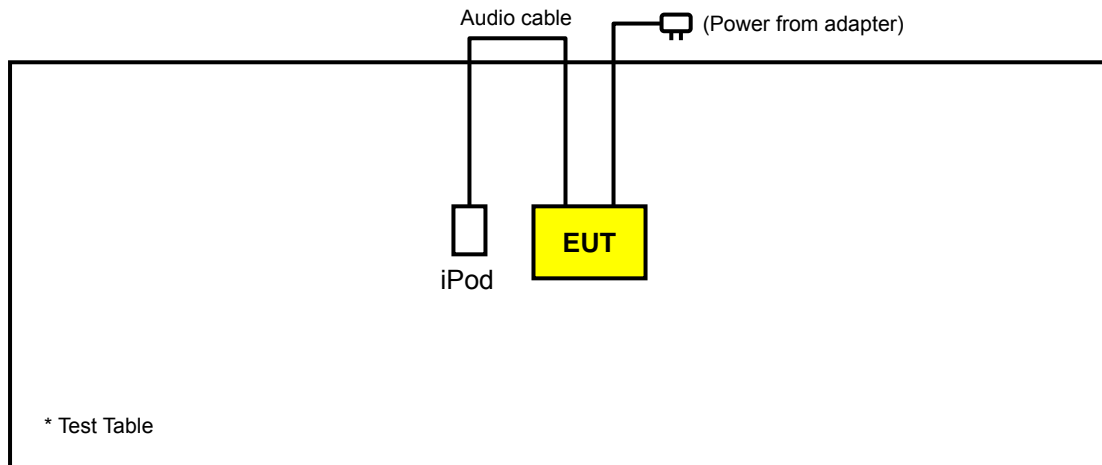
3.2 DESCRIPTION OF TEST MODES

15 channels are provided to this EUT:

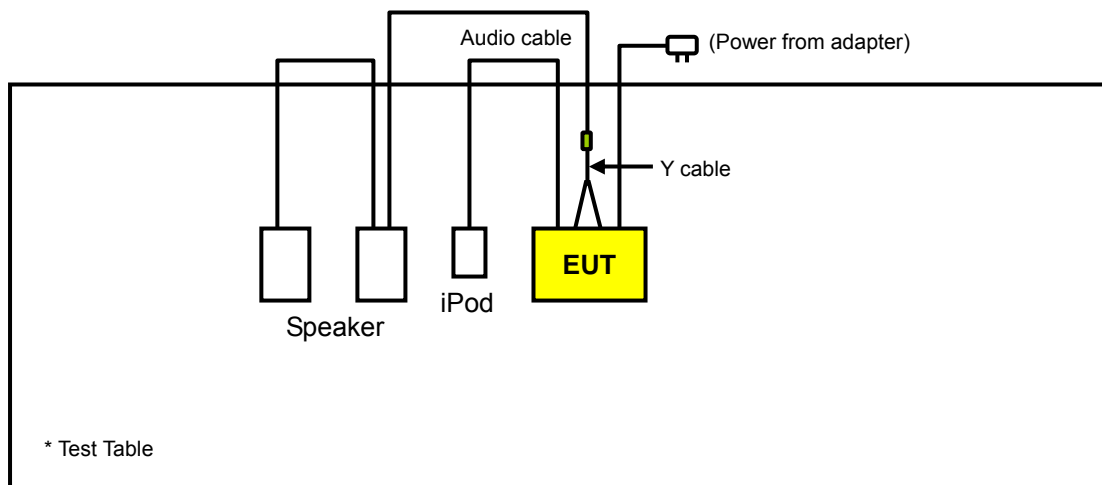
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
0	2403MHz	8	2443MHz
1	2408MHz	9	2448MHz
2	2413MHz	10	2453MHz
3	2418MHz	11	2458MHz
4	2423MHz	12	2463MHz
5	2428MHz	13	2468MHz
6	2433MHz	14	2473MHz
7	2438MHz		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

TEST MODE A



TEST MODE B



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE \geq 1G	RE<1G	PLC	APCM	
A	-	√	-	-	Model: TR170
B	√	√	√	√	Model: TR180

Where **PLC**: Power Line Conducted Emission **RE<1G**: Radiated Emission below 1GHz
RE \geq 1G: Radiated Emission above 1GHz **APCM**: Antenna Port Conducted Measurement

NOTE: “-“ means no effect.

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
B	0 to 14	0, 7, 14	MSK

RADIATED EMISSION TEST (BELOW 1 GHz):

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
A, B	0 to 14	7	MSK

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
A, B	0 to 14	7	MSK

BANDEDGE MEASUREMENT:

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
B	0 to 14	0, 14	MSK

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
B	0 to 14	0, 7, 14	MSK

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)

ANSI C63.4-2003

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	iPod	Apple	A1112	4H520QU2RS9	NA
2	SPEAKER	SANYO	SYSP-802	SP07500040300860	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.5m non-shielded audio cable without core x 2

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

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 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Dec. 29, 2008	Dec. 28, 2009
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Dec. 08, 2008	Dec. 07, 2009
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 30, 2008	Apr. 28, 2010
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Dec. 29, 2008	Dec. 28, 2009
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 06, 2009	Jan. 05, 2010
Preamplifier Agilent	8449B	3008A01960	Nov. 03, 2008	Nov. 02, 2009
Preamplifier Agilent	8447D	2944A10631	Nov. 03, 2008	Nov. 02, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 13, 2009	May 12, 2010
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 13, 2009	May 12, 2010
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

- 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.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

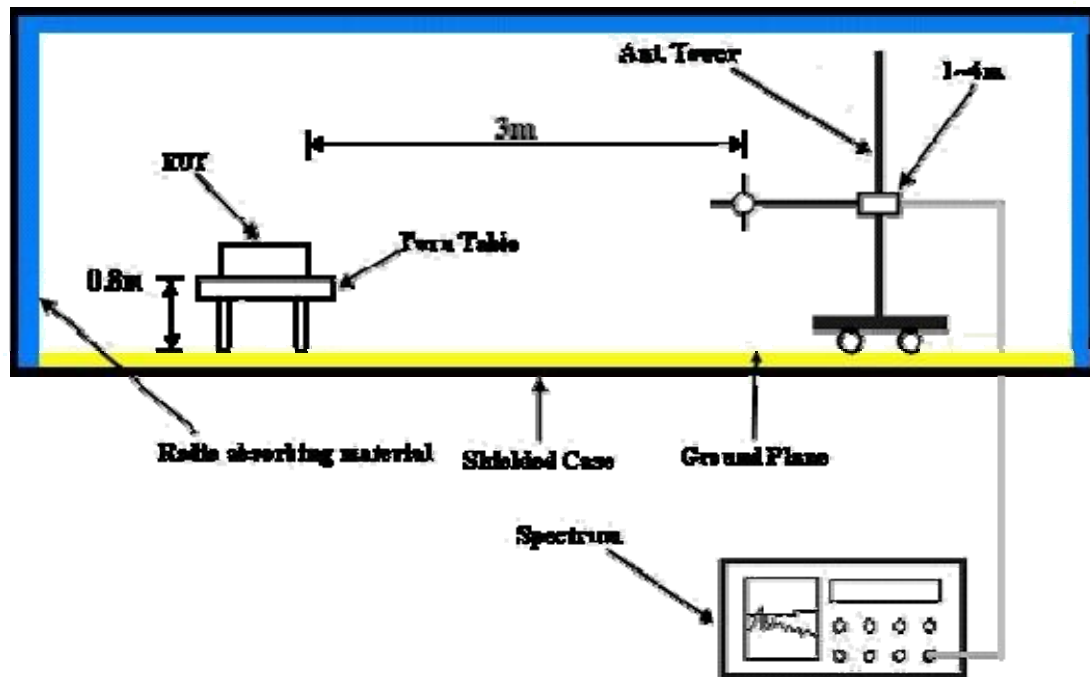
NOTE:

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. Set the EUT under transmission condition.
- c. The necessary accessories enable the system in full functions.

4.1.7 TEST RESULTS

ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 63%RH 1002 hPa	TESTED BY	Sun Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	50.61 PK	74.00	-23.39	1.14 H	61	17.18	33.43
2	2390.00	38.03 AV	54.00	-15.97	1.14 H	61	4.60	33.43
3	#2400.00	75.20 PK	85.46	-10.26	1.41 H	300	41.72	33.48
4	#2400.00	66.74 AV	77.00	-10.26	1.41 H	300	33.26	33.48
5	*2403.00	105.46 PK			1.41 H	300	71.97	33.49
6	*2403.00	97.00 AV			1.41 H	300	63.51	33.49
7	4806.00	55.21 PK	74.00	-18.79	1.83 H	59	15.30	39.91
8	4806.00	38.36 AV	54.00	-15.64	1.83 H	59	-1.55	39.91
9	#7209.00	62.63 PK	85.46	-22.83	1.76 H	291	16.53	46.10
10	#7209.00	45.66 AV	77.00	-31.34	1.76 H	291	-0.44	46.10
11	#9612.00	62.57 PK	85.46	-22.89	1.60 H	9	12.04	50.53
12	#9612.00	43.11 AV	77.00	-33.89	1.60 H	9	-7.42	50.53
13	12015.00	67.28 PK	74.00	-6.72	1.81 H	326	14.76	52.52
14	12015.00	47.88 AV	54.00	-6.12	1.81 H	326	-4.64	52.52

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.
7. The average value of fundamental frequency and harmonics is calculated by using formula as below

$$\text{Average} = \text{Reading value of RBW=1MHz and VBW=10Hz} + 20 \log (\text{duty cycle})$$

$$20 \log (\text{Duty cycle}) = 20 \log (52.64 \text{ ms} / 100 \text{ ms}) = -5.57 \text{ dB}$$

Therefore

$$\text{Average} = \text{Reading value of RBW=1MHz and VBW=10Hz} - 5.57 \text{ dB}$$

Please see page 22 for plotted duty.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 63%RH 1002 hPa	TESTED BY	Sun Lin

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	50.40 PK	74.00	-23.60	1.01 V	178	16.97	33.43
2	2390.00	33.14 AV	54.00	-20.86	1.01 V	178	-0.29	33.43
3	#2400.00	76.93 PK	85.40	-8.47	1.05 V	178	43.45	33.48
4	#2400.00	68.43 AV	76.90	-8.47	1.05 V	178	34.95	33.48
5	*2403.00	105.40 PK			1.05 V	178	71.91	33.49
6	*2403.00	96.90 AV			1.05 V	178	63.41	33.49
7	4806.00	57.90 PK	74.00	-16.10	1.02 V	252	17.99	39.91
8	4806.00	41.99 AV	54.00	-12.01	1.02 V	252	2.09	39.91
9	#7209.00	62.85 PK	85.40	-22.55	1.04 V	300	16.75	46.10
10	#7209.00	46.74 AV	76.90	-30.16	1.04 V	300	0.64	46.10
11	#9612.00	64.74 PK	85.40	-20.66	1.04 V	232	14.21	50.53
12	#9612.00	48.21 AV	76.90	-28.69	1.04 V	232	-2.32	50.53
13	12015.00	64.38 PK	74.00	-9.62	1.73 V	53	11.86	52.52
14	12015.00	44.86 AV	54.00	-9.14	1.73 V	53	-7.66	52.52

- 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.
 7. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle)
20 log (Duty cycle) = 20 log (52.64 ms / 100 ms) = -5.57 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -5.57 dB
Please see page 22 for plotted duty.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 63%RH 1002 hPa	TESTED BY	Sun Lin

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	*2438.00	105.38 PK			1.40 H	310	71.76	33.62
2	*2438.00	96.87 AV			1.40 H	310	63.25	33.62
3	4876.00	56.42 PK	74.00	-17.58	1.00 H	40	16.34	40.08
4	4876.00	40.25 AV	54.00	-13.75	1.00 H	40	0.17	40.08
5	7314.00	62.30 PK	74.00	-11.70	1.57 H	287	15.99	46.32
6	7314.00	45.00 AV	54.00	-9.00	1.57 H	287	-1.32	46.32
7	#9752.00	61.78 PK	85.38	-23.60	1.75 H	312	11.02	50.76
8	#9752.00	42.65 AV	76.87	-34.22	1.75 H	312	-8.11	50.76
9	12190.00	66.83 PK	74.00	-7.17	1.75 H	325	14.45	52.38
10	12190.00	48.19 AV	54.00	-5.81	1.75 H	325	-4.19	52.38

- 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.
 7. The average value of fundamental frequency and harmonics is calculated by using formula as below

$$\text{Average} = \text{Reading value of RBW=1MHz and VBW=10Hz} + 20 \log (\text{duty cycle})$$

$$20 \log (\text{Duty cycle}) = 20 \log (52.64 \text{ ms} / 100 \text{ ms}) = -5.57 \text{ dB}$$

Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -5.57 dB

Please see page 22 for plotted duty.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 63%RH 1002 hPa	TESTED BY	Sun Lin

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	*2438.00	105.08 PK			1.42 V	10	71.46	33.62
2	*2438.00	96.45 AV			1.42 V	10	62.83	33.62
3	4876.00	56.54 PK	74.00	-17.46	1.55 V	41	16.46	40.08
4	4876.00	40.43 AV	54.00	-13.57	1.55 V	41	0.35	40.08
5	7314.00	63.91 PK	74.00	-10.09	1.31 V	311	17.59	46.32
6	7314.00	46.06 AV	54.00	-7.94	1.31 V	311	-0.25	46.32
7	#9752.00	63.48 PK	85.08	-21.60	1.48 V	255	12.72	50.76
8	#9752.00	44.08 AV	76.45	-32.37	1.48 V	255	-6.68	50.76
9	12190.00	65.01 PK	74.00	-8.99	1.04 V	292	12.63	52.38
10	12190.00	46.04 AV	54.00	-7.96	1.04 V	292	-6.34	52.38

- 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.
 7. The average value of fundamental frequency and harmonics is calculated by using formula as below

$$\text{Average} = \text{Reading value of RBW=1MHz and VBW=10Hz} + 20 \log (\text{duty cycle})$$

$$20 \log (\text{Duty cycle}) = 20 \log (52.64 \text{ ms} / 100 \text{ ms}) = -5.57 \text{ dB}$$

Therefore

$$\text{Average} = \text{Reading value of RBW=1MHz and VBW=10Hz} - 5.57 \text{ dB}$$

Please see page 22 for plotted duty.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 14	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 63%RH 1002 hPa	TESTED BY	Sun Lin

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	*2473.00	105.41 PK			1.12 H	298	71.65	33.76
2	*2473.00	96.01 AV			1.12 H	298	62.25	33.76
3	2483.50	47.35 PK	74.00	-26.65	1.12 H	298	13.55	33.80
4	2483.50	37.95 AV	54.00	-16.05	1.12 H	298	4.15	33.80
5	4946.00	59.05 PK	74.00	-14.95	1.00 H	39	18.80	40.25
6	4946.00	42.32 AV	54.00	-11.68	1.00 H	39	2.07	40.25
7	7419.00	61.49 PK	74.00	-12.51	1.00 H	320	14.90	46.60
8	7419.00	44.00 AV	54.00	-10.00	1.00 H	320	-2.59	46.60
9	#9892.00	63.54 PK	85.41	-21.87	1.00 H	328	12.77	50.77
10	#9892.00	45.69 AV	76.01	-30.32	1.00 H	328	-5.08	50.77
11	12365.00	65.02 PK	74.00	-8.98	1.75 H	326	12.60	52.42
12	12365.00	46.46 AV	54.00	-7.54	1.75 H	326	-5.96	52.42

- 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.
 7. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle)
20 log (Duty cycle) = 20 log (52.64 ms / 100 ms) = -5.57 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -5.57 dB
Please see page 22 for plotted duty.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 14	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 63%RH 1002 hPa	TESTED BY	Sun Lin

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	*2473.00	104.33 PK			1.71 V	200	70.57	33.76
2	*2473.00	94.43 AV			1.71 V	200	60.67	33.76
3	2483.50	48.09 PK	74.00	-25.91	1.71 V	200	14.29	33.80
4	2483.50	38.19 AV	54.00	-15.81	1.71 V	200	4.39	33.80
5	4946.00	58.29 PK	74.00	-15.71	1.04 V	181	18.04	40.25
6	4946.00	42.30 AV	54.00	-11.70	1.04 V	181	2.05	40.25
7	7419.00	62.18 PK	74.00	-11.82	1.04 V	254	15.59	46.60
8	7419.00	44.89 AV	54.00	-9.11	1.04 V	254	-1.70	46.60
9	#9892.00	63.45 PK	84.33	-20.88	1.04 V	251	12.68	50.77
10	#9892.00	45.19 AV	74.43	-29.24	1.04 V	251	-5.58	50.77
11	12365.00	64.76 PK	74.00	-9.24	1.03 V	293	12.34	52.42
12	12365.00	45.75 AV	54.00	-8.25	1.03 V	293	-6.67	52.42

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.
7. The average value of fundamental frequency and harmonics is calculated by using formula as below

$$\text{Average} = \text{Reading value of RBW}=1\text{MHz and VBW}=10\text{Hz} + 20 \log (\text{duty cycle})$$

$$20 \log (\text{Duty cycle}) = 20 \log (52.64 \text{ ms} / 100 \text{ ms}) = -5.57 \text{ dB}$$

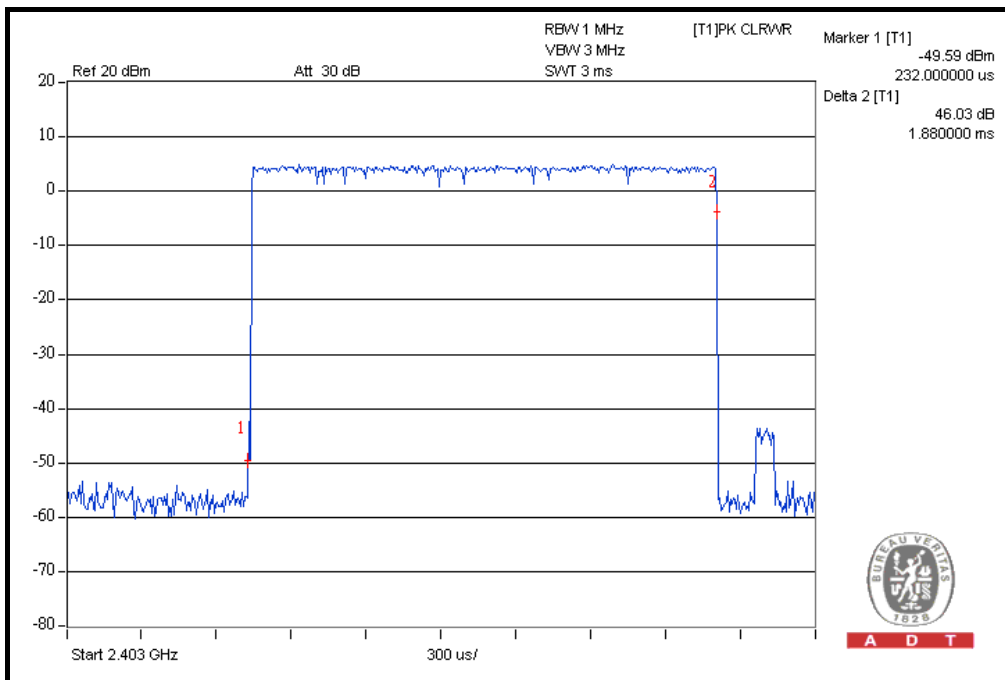
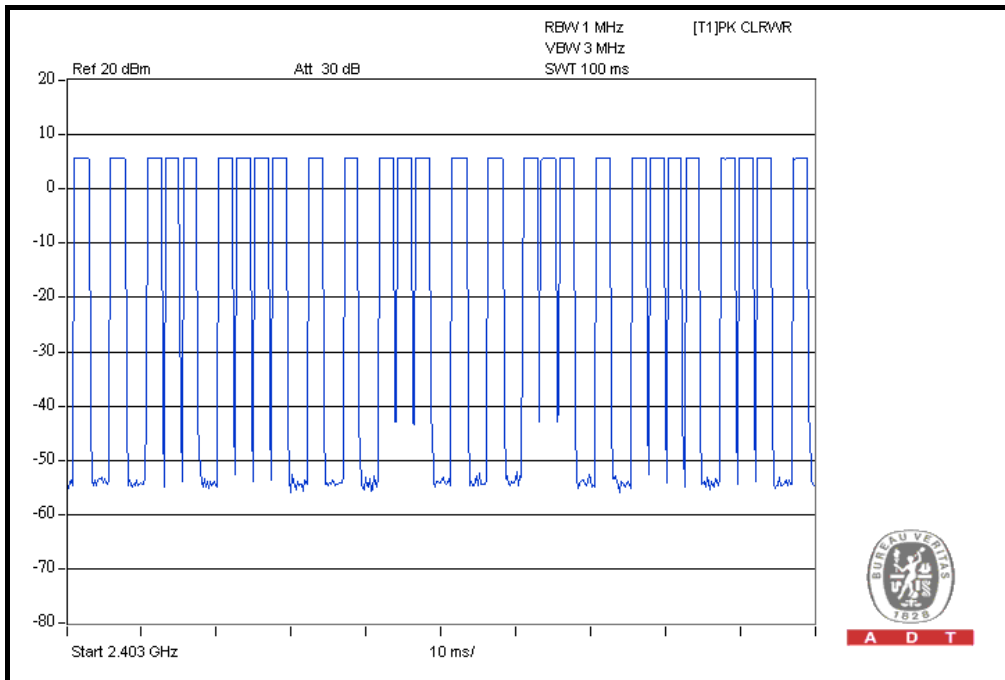
Therefore

$$\text{Average} = \text{Reading value of RBW}=1\text{MHz and VBW}=10\text{Hz} - 5.57 \text{ dB}$$

Please see page 22 for plotted duty.



A D T



$$20 \log (\text{Duty cycle}) = 20 \log (1.88 \times 28 \text{ ms} / 100 \text{ ms}) = -5.57 \text{ dB}$$



BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH 1006 hPa	TESTED BY	Sun Lin
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	57.12	27.50 QP	40.00	-12.50	2.00 H	271	14.50	13.00
2	86.28	29.18 QP	40.00	-10.82	2.00 H	283	20.20	8.98
3	228.22	34.22 QP	46.00	-11.78	1.50 H	55	21.76	12.47
4	300.16	34.26 QP	46.00	-11.74	1.00 H	232	18.72	15.54
5	360.43	34.18 QP	46.00	-11.82	1.00 H	229	17.18	17.00
6	515.97	29.59 QP	46.00	-16.41	2.00 H	151	8.44	21.14
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	42.07	31.16 QP	40.00	-8.84	1.00 V	111	17.20	13.96
2	59.06	31.91 QP	40.00	-8.09	1.00 V	109	18.91	13.00
3	86.28	26.99 QP	40.00	-13.01	1.25 V	121	18.01	8.98
4	208.77	29.30 QP	43.50	-14.20	1.00 V	265	17.49	11.81
5	300.16	32.61 QP	46.00	-13.39	1.50 V	199	17.07	15.54
6	372.09	30.95 QP	46.00	-15.05	1.00 V	211	13.67	17.28

- 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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH 1006 hPa	TESTED BY	Sun Lin
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	41.57	18.51 QP	40.00	-21.49	1.25 H	154	4.58	13.92
2	111.56	21.37 QP	43.50	-22.13	1.25 H	85	10.76	10.60
3	202.94	28.97 QP	43.50	-14.53	1.00 H	106	17.36	11.61
4	235.99	30.32 QP	46.00	-15.68	1.25 H	229	17.60	12.73
5	286.55	28.69 QP	46.00	-17.31	1.00 H	88	13.79	14.90
6	360.43	31.37 QP	46.00	-14.63	1.00 H	223	14.37	17.00

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	41.57	32.95 QP	40.00	-7.05	1.00 V	88	19.03	13.92
2	61.01	31.57 QP	40.00	-8.43	1.00 V	226	18.62	12.95
3	97.95	21.85 QP	43.50	-21.65	1.25 V	64	12.62	9.23
4	208.77	24.39 QP	43.50	-19.11	1.00 V	223	12.58	11.81
5	300.16	29.87 QP	46.00	-16.13	1.50 V	211	14.33	15.54
6	372.09	27.07 QP	46.00	-18.93	1.25 V	211	9.79	17.28

- 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 μ 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 0.50 MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Sep. 22, 2008	Sep. 21, 2009
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 31, 2008	Dec. 30, 2009
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Dec. 29, 2008	Dec. 28, 2009
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jul. 29, 2009	Jul. 28, 2010
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

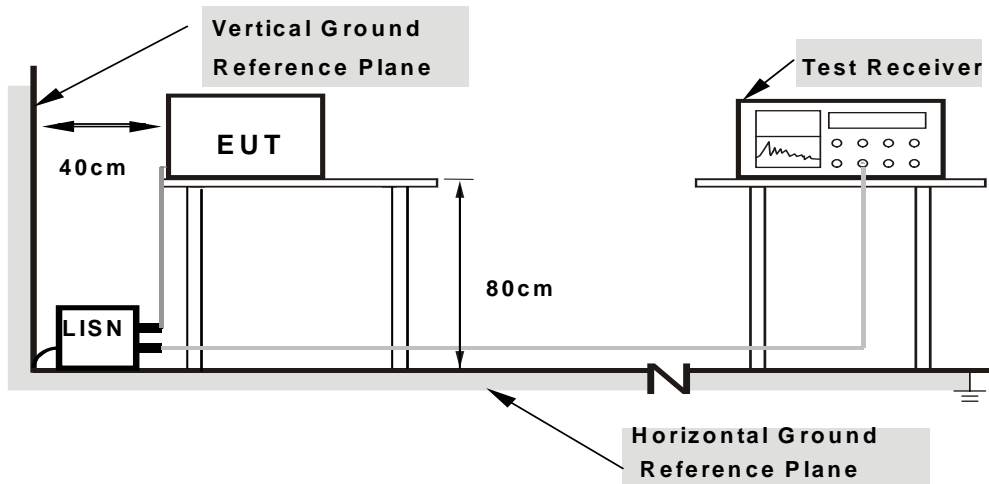
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



- 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.

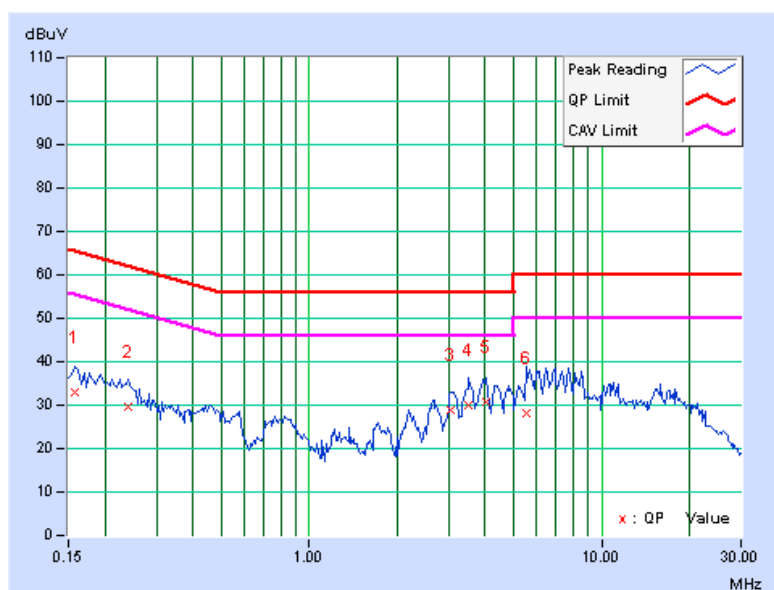
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	PHASE	Line 1
MODULATION TYPE	MSK	INPUT POWER	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 67%RH, 1006hPa	6dB BANDWIDTH	9kHz
TEST MODE	A	TESTED BY	Dean Wang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.13	33.00	-	33.13	-	65.58	55.58	-32.45	-
2	0.240	0.13	29.32	-	29.45	-	62.10	52.10	-32.65	-
3	3.059	0.24	28.60	-	28.84	-	56.00	46.00	-27.16	-
4	3.512	0.26	29.66	-	29.92	-	56.00	46.00	-26.08	-
5	4.012	0.28	30.59	-	30.87	-	56.00	46.00	-25.13	-
6	5.527	0.32	27.93	-	28.25	-	60.00	50.00	-31.75	-

- 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.



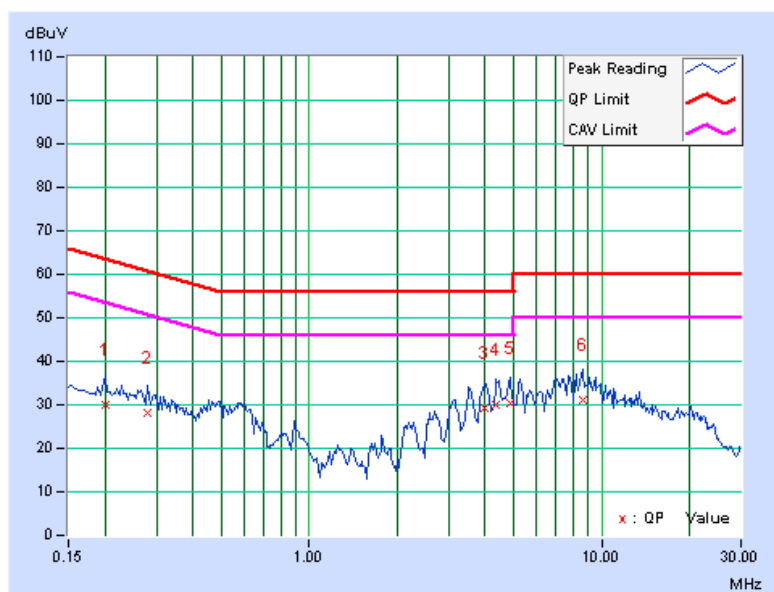


A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	PHASE	Line 2
MODULATION TYPE	MSK	INPUT POWER	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 67%RH, 1006hPa	6dB BANDWIDTH	9kHz
TEST MODE	A	TESTED BY	Dean Wang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.13	30.05	-	30.18	-	63.58	53.58	-33.40	-
2	0.279	0.14	28.01	-	28.15	-	60.85	50.85	-32.70	-
3	3.977	0.30	28.93	-	29.23	-	56.00	46.00	-26.77	-
4	4.371	0.31	29.73	-	30.04	-	56.00	46.00	-25.96	-
5	4.887	0.33	30.11	-	30.44	-	56.00	46.00	-25.56	-
6	8.621	0.45	30.62	-	31.07	-	60.00	50.00	-28.93	-

- 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.



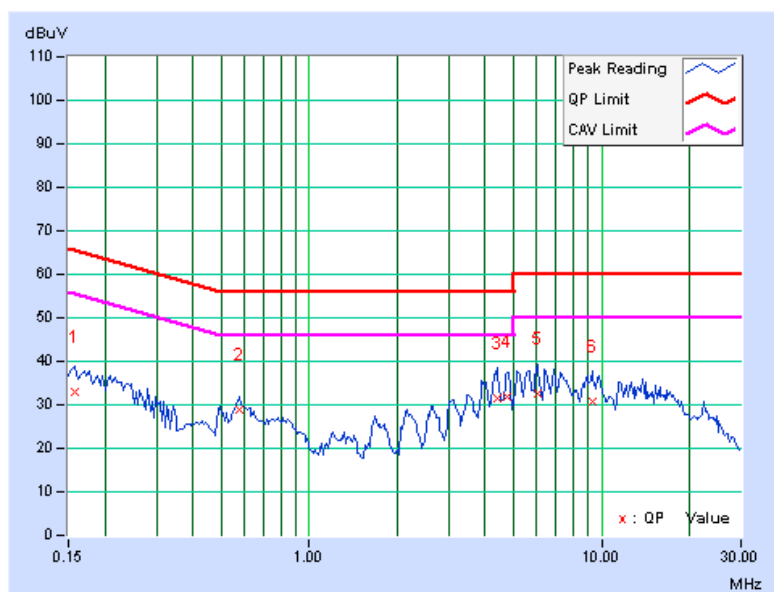


A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	PHASE	Line 1
MODULATION TYPE	MSK	INPUT POWER	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 67%RH, 1006hPa	6dB BANDWIDTH	9kHz
TEST MODE	B	TESTED BY	Dean Wang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.13	32.78	-	32.91	-	65.58	55.58	-32.67	-
2	0.580	0.15	28.92	-	29.07	-	56.00	46.00	-26.93	-
3	4.387	0.29	31.23	-	31.52	-	56.00	46.00	-24.48	-
4	4.777	0.30	31.66	-	31.96	-	56.00	46.00	-24.04	-
5	6.023	0.33	32.20	-	32.53	-	60.00	50.00	-27.47	-
6	9.289	0.41	30.27	-	30.68	-	60.00	50.00	-29.32	-

- 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.



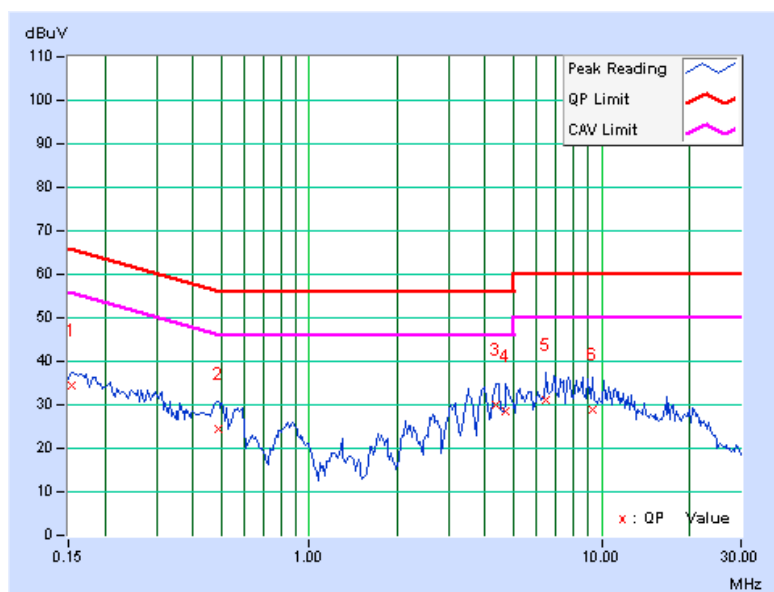


A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	PHASE	Line 2
MODULATION TYPE	MSK	INPUT POWER	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 67%RH, 1006hPa	6dB BANDWIDTH	9kHz
TEST MODE	B	TESTED BY	Dean Wang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.154	0.13	34.36	-	34.49	-	65.79	55.79	-31.30	-
2	0.486	0.15	24.19	-	24.34	-	56.24	46.24	-31.89	-
3	4.352	0.31	29.63	-	29.94	-	56.00	46.00	-26.06	-
4	4.715	0.32	28.35	-	28.67	-	56.00	46.00	-27.33	-
5	6.477	0.38	30.81	-	31.19	-	60.00	50.00	-28.81	-
6	9.277	0.48	28.25	-	28.73	-	60.00	50.00	-31.27	-

- 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 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100040	Jul. 07, 2009	Jul. 06, 2010

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

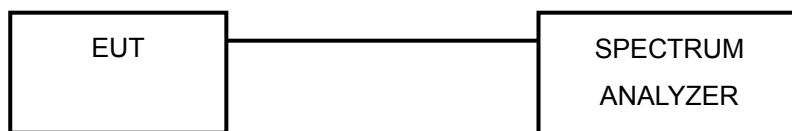
4.3.3 TEST PROCEDURE

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



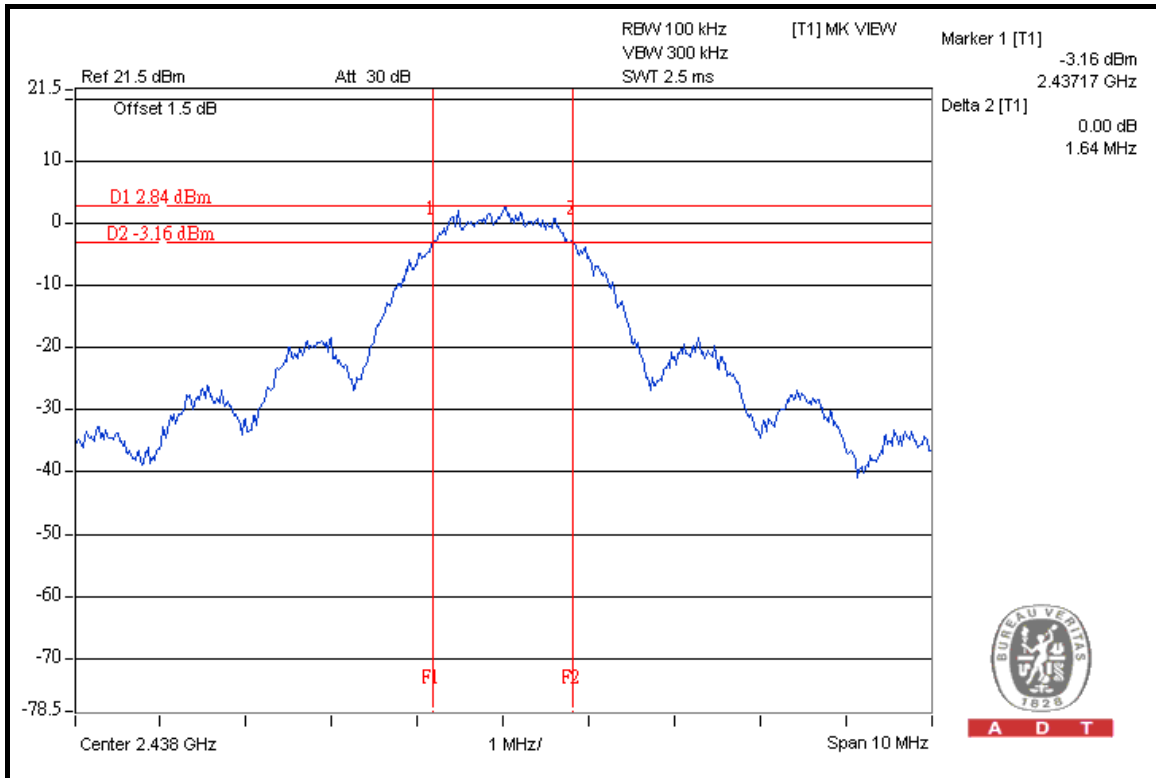
4.3.6 EUT OPERATING CONDITIONS

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

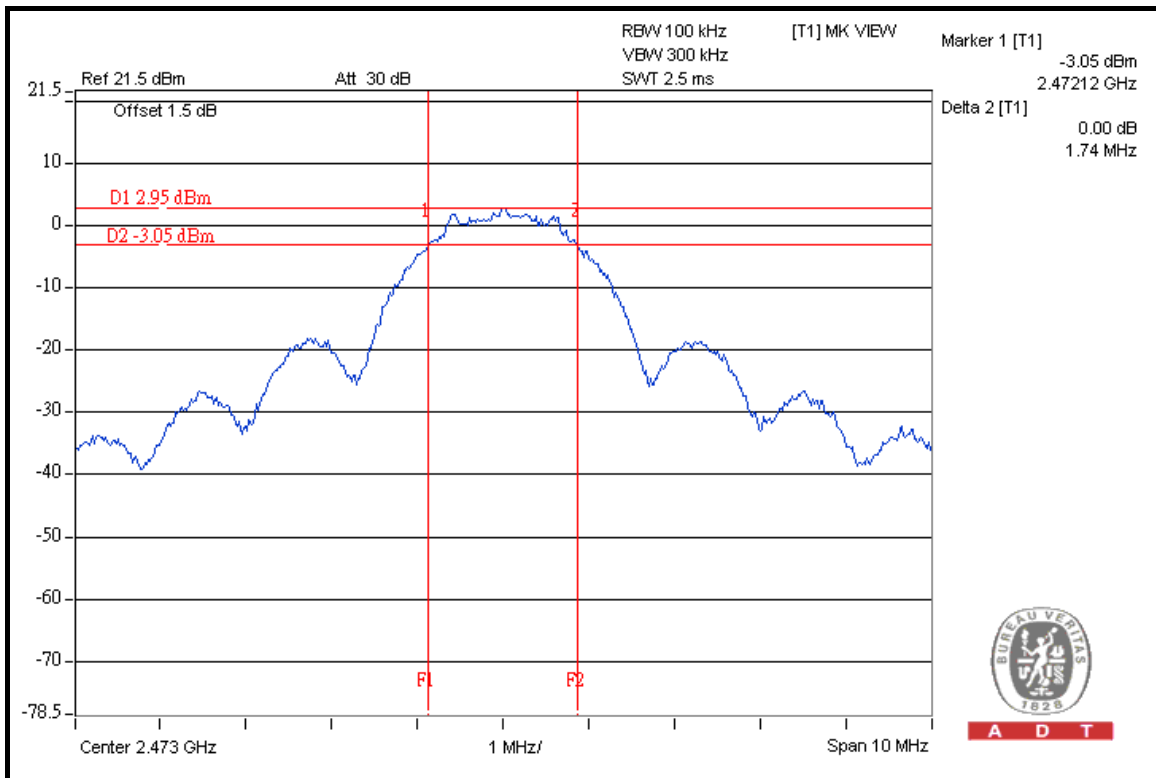


A D T

CH 7



CH 14



4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
High Speed Peak Power Meter	ML2495A	0824012	Aug. 10, 2009	Aug. 09, 2010
Power Sensor	MA2411B	0738138	Aug. 10, 2009	Aug. 09, 2010

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 6dB bandwidth of emission.

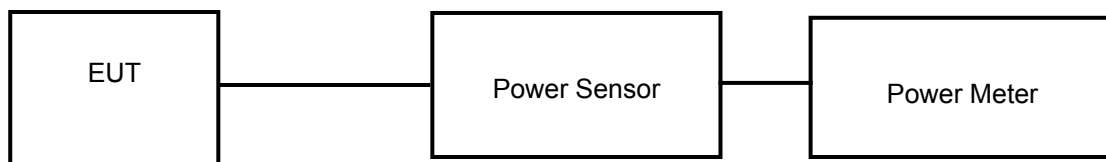
4.4.3 TEST PROCEDURES

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.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

4.4.7 TEST RESULTS

MODULATION TYPE	MSK	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1004hPa
INPUT POWER	120Vac, 60 Hz	TESTED BY	Brad Wu

CHAN	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2403	4.207	6.24	30	PASS
7	2438	4.385	6.42	30	PASS
14	2473	3.289	5.17	30	PASS



4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100040	Jul. 07, 2009	Jul. 06, 2010

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

4.5.3 TEST PROCEDURE

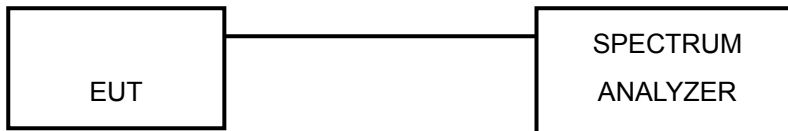
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6.



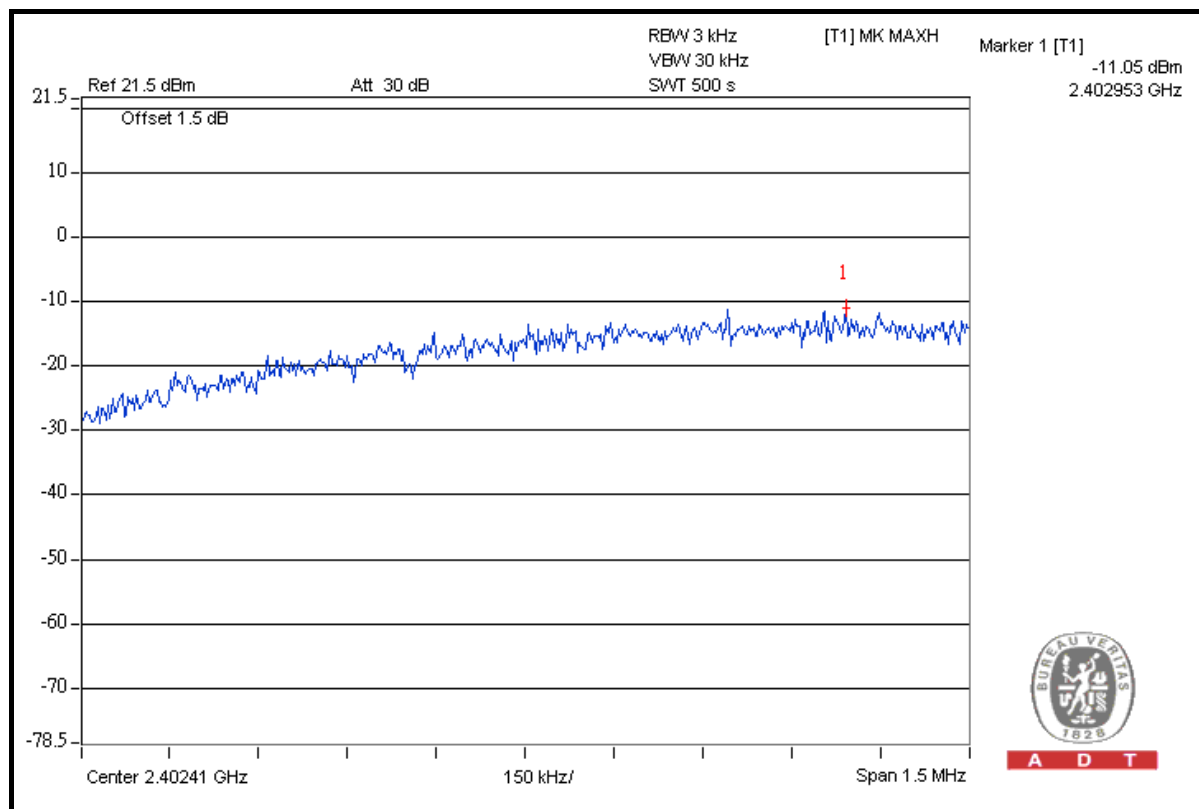
A D T

4.5.7 TEST RESULTS

MODULATION TYPE	MSK	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1004hPa
INPUT POWER	120Vac, 60 Hz	TESTED BY	Brad Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
0	2403	-11.05	8	PASS
7	2438	-11.11	8	PASS
14	2473	-11.18	8	PASS

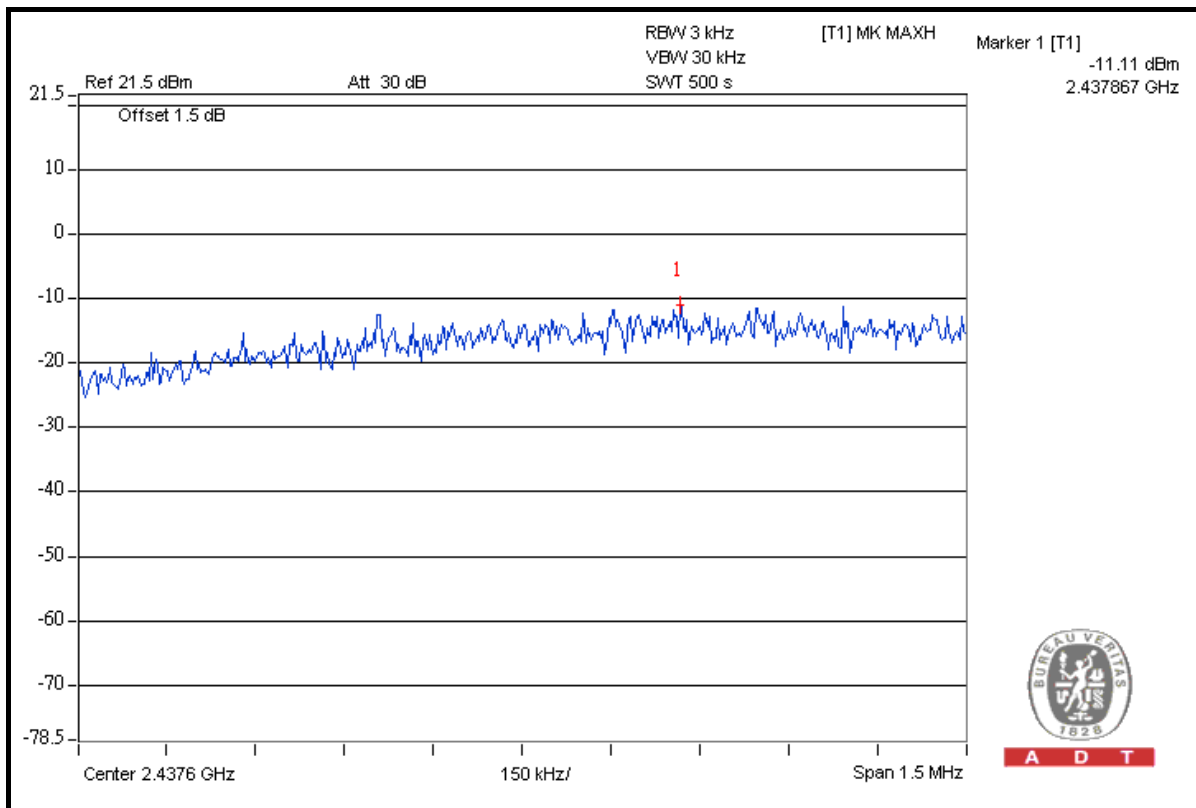
CH 0



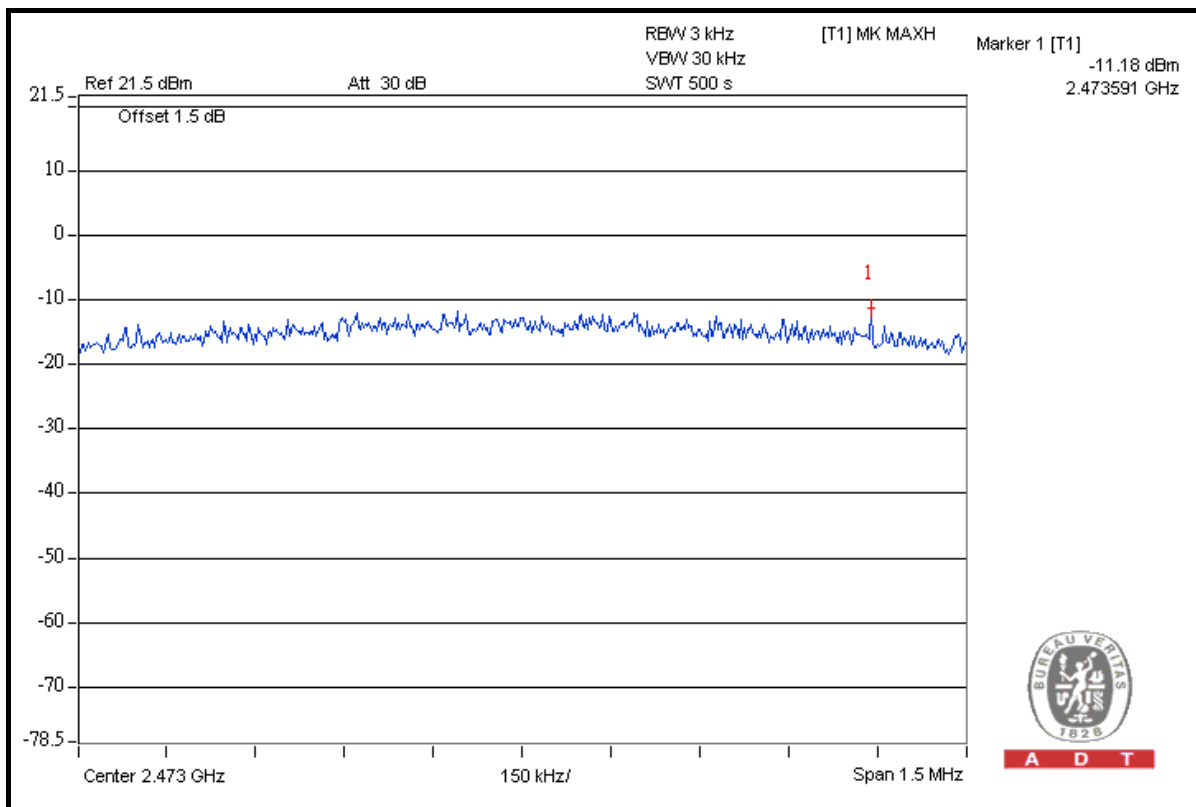


A D T

CH 7



CH 14



4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100040	Jul. 07, 2009	Jul. 06, 2010

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

4.6.3 TEST PROCEDURE

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

The spectrum plots (Peak RBW = 100kHz, VBW = 300kHz; Average RBW = 1MHz, VBW = 10Hz) are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6.

4.6.6 TEST RESULTS

The spectrum plots are attached on the following 6 images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

NOTE 1: The band edge emission plot on the next page shows 49.12dBc between carrier maximum power and local maximum emission in restrict band (2.38880GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.1.7 is 105.46dBuV/m (Peak), so the maximum field strength in restrict band is $105.46 - 49.12 = 56.34$ dBuV/m which is under 74dBuV/m limit.

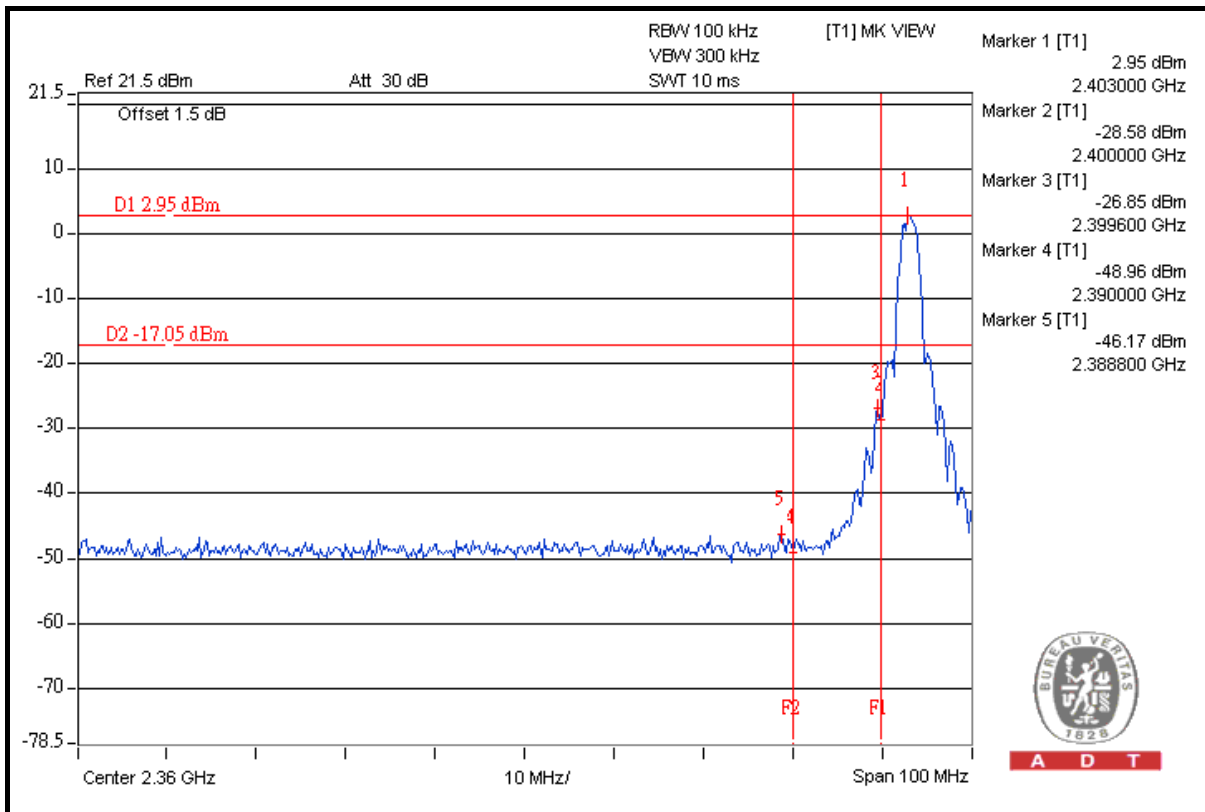
The band edge emission plot on the next page shows 60.81dBc between carrier maximum power and local maximum emission in restrict band (2.38040GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.1.7 is 97.00dBuV/m (Average), so the maximum field strength in restrict band is $97.00 - 60.81 = 36.19$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the next second page shows 47.06dBc between carrier maximum power and local maximum emission in restrict band (2.48600GHz). The emission of carrier strength list in the test result of channel 14 at the item 4.1.7 is 105.41dBuV/m (Peak), so the maximum field strength in restrict band is $105.41 - 47.06 = 58.35$ dBuV/m which is under 74dBuV/m limit.

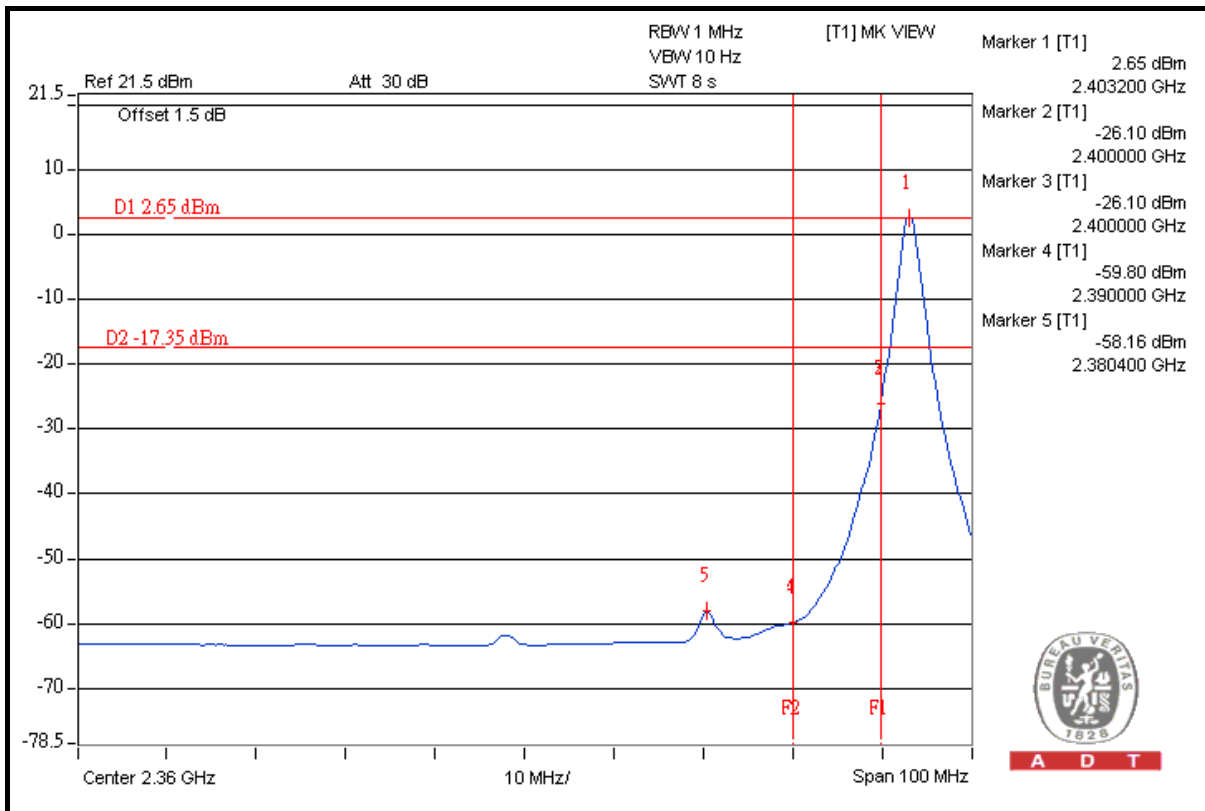
The band edge emission plot on the next third page shows 57.33dBc between carrier maximum power and local maximum emission in restrict band (2.48350GHz). The emission of carrier strength list in the test result of channel 14 at the item 4.1.7 is 96.01dBuV/m (Average), so the maximum field strength in restrict band is $96.01 - 57.33 = 38.68$ dBuV/m which is under 54dBuV/m limit.



A D T



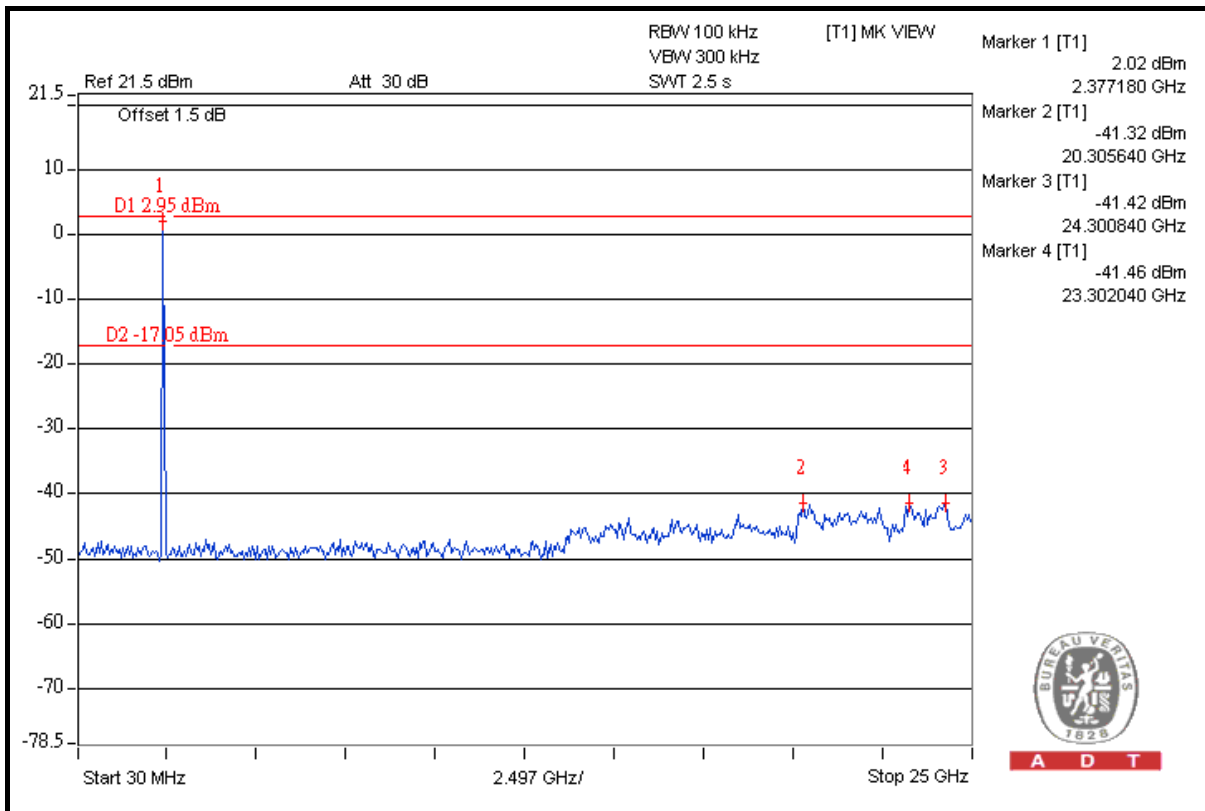
A D T



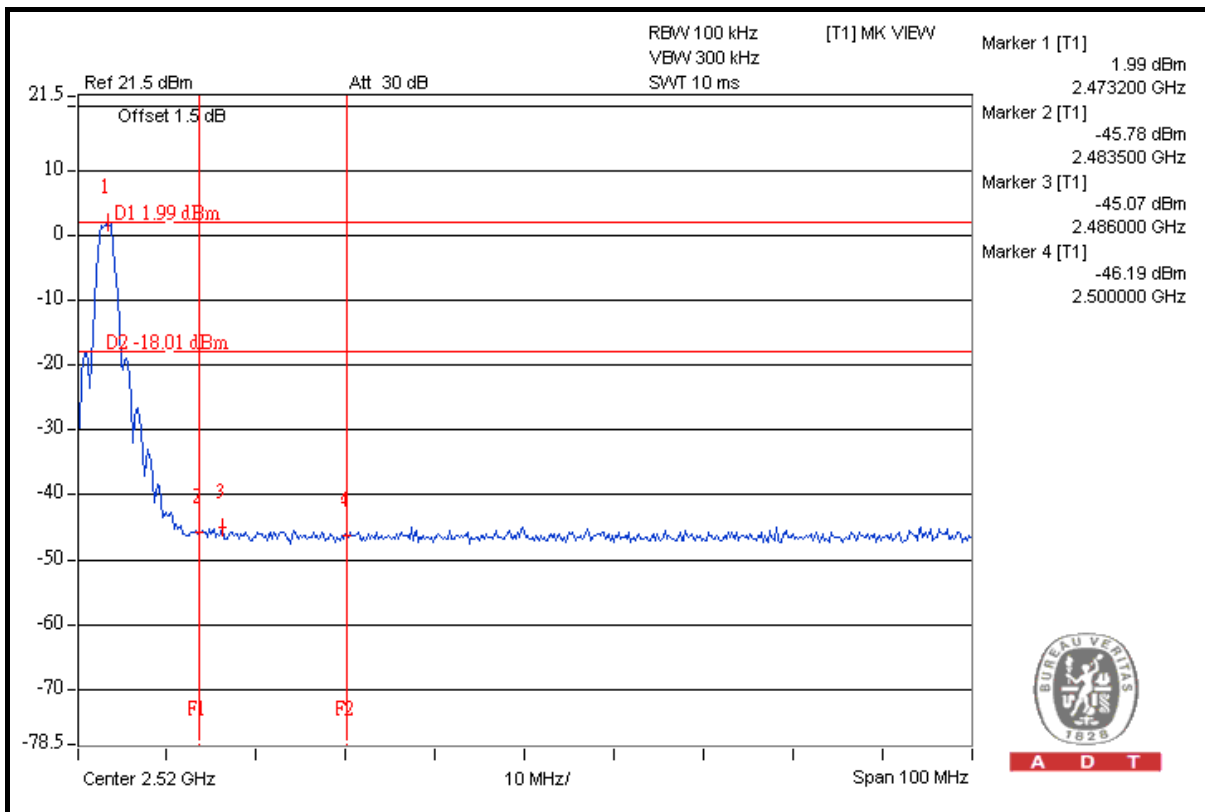
A D T



A D T



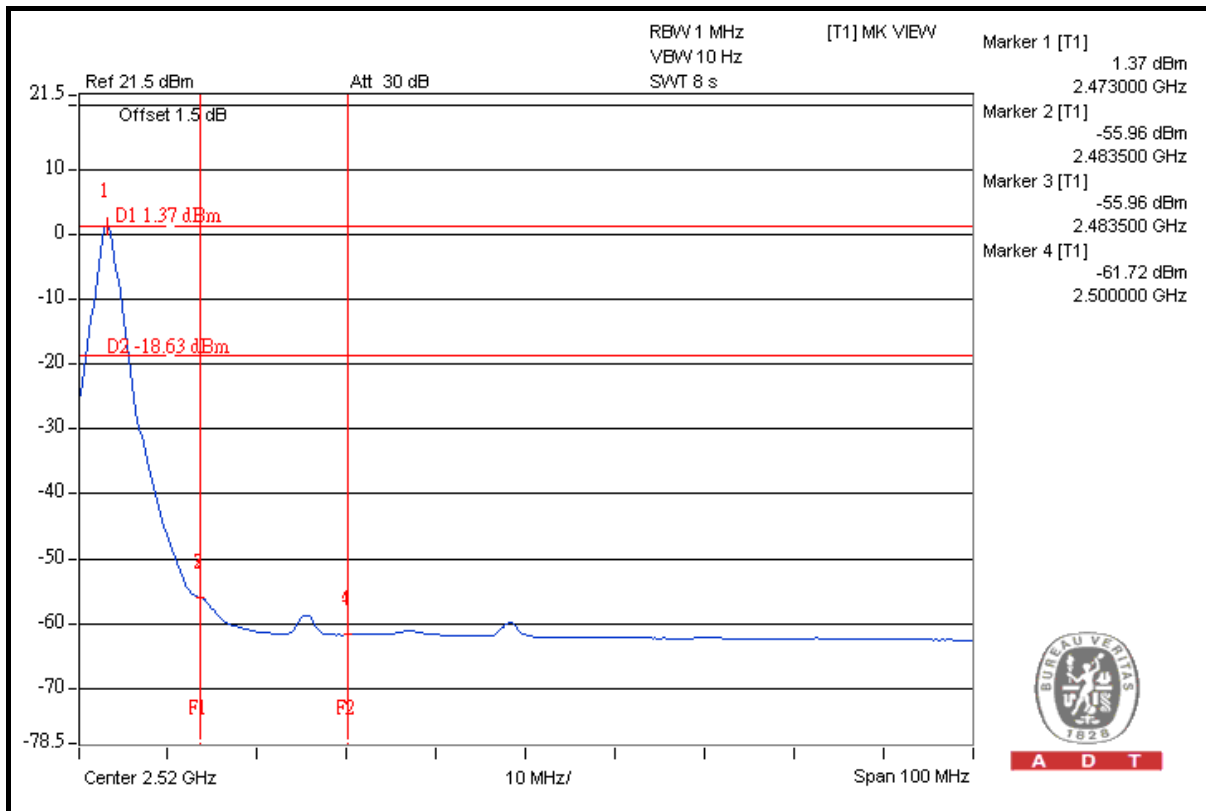
A D T



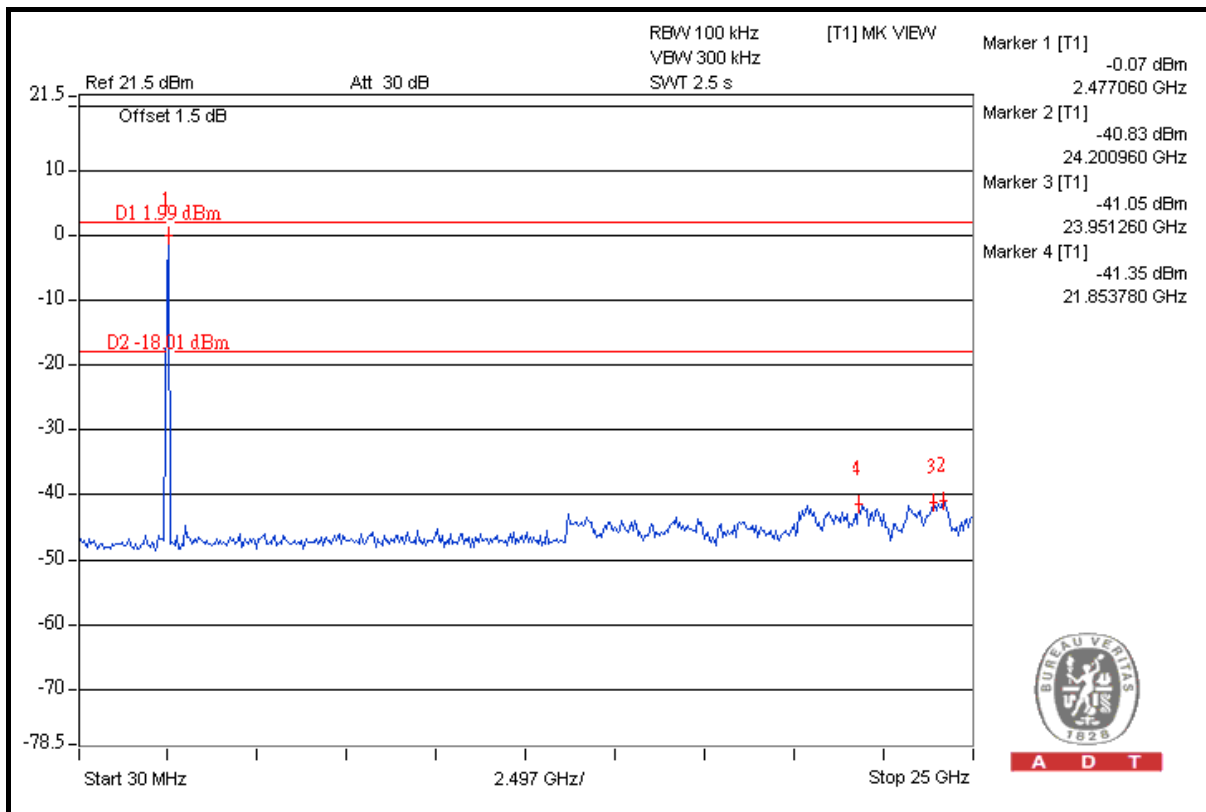
A D T



A D T



A D T



A D T

4.7 ANTENNA REQUIREMENT

4.7.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Inverted F antenna without antenna connector. The maximum Gain of the antenna is 2.15dBi.

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 by the following approval agencies according to ISO/IEC 17025.

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	GOST-ASIA(MOU)
Russia	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

Web Site: www.adt.com.tw

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

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

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

--- END ---