FCC TEST REPORT

REPORT NO.: RF980225L12
MODEL NO.: BS-02
RECEIVED: Feb. 25, 2009
TESTED: Mar. 12 ~ Mar. 26, 2009
ISSUED: Apr. 02, 2009

APPLICANT: Teraoka Weigh-System Pte Ltd

ADDRESS: 4, Leng Kee Road, #05-02/03/04/05/11, SIS Building, Singapore 159088

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.

TABLE OF CONTENTS

1. CERTIFICATION

PRODUCT:	Base Station
MODEL:	BS-02
BRAND:	DIGI
APPLICANT:	Teraoka Weigh-System Pte Ltd
TESTED:	Mar. 12 ~ Mar. 26, 2009
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)**
	ANSI C63.4-2003

The above equipment (model: BS-02) 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	: Joanna Wang / Senior Specialist	**, DATE :**	Apr. 02, 2009
TECHNICAL ACCEPTANCE Responsible for RF	: Long Chen / Senior Engineer	**, DATE :**	Apr. 02, 2009
APPROVED BY	: Gary Chang / Assistant Manager	**, DATE :**	Apr. 02, 2009

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 -13.49dB at 0.170MHz.
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 -3.34dB at 2483.50MHz.
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	9kHz~30MHz	2.44dB
Radiated emissions	30MHz ~ 200MHz	2.93dB
	200MHz ~1000MHz	2.95dB
	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	Base Station
MODEL NO.	BS-02
FCC ID	SUF000BS02
POWER SUPPLY	5Vdc from host equipment
MODULATION TYPE	MSK (For TX), FSK (For RX)
TRANSFER RATE	TX: 500kbps RX: 1.2kbps
FREQUENCY RANGE	TX 1: 2410MHz ~ 2480MHz TX 2: 2406MHz ~ 2480MHz
NUMBER OF CHANNEL	TX 1: 20 TX 2: 75
MAXIMUM OUTPUT POWER	TX 1: 0.501mW TX 2: 7.079mW
ANTENNA TYPE	TX 1: Chip antenna with -1.0dBi gain TX 2: Chip antenna with 2.1dBi gain
DATA CABLE	0.6m non-shielded RS232 cable with one core
I/O PORTS	NA
ACCESSORY DEVICES	NA

NOTE:

1. The EUT has two RF modules(TX 1 & TX 2) and they could not act simultaneously.
2. 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

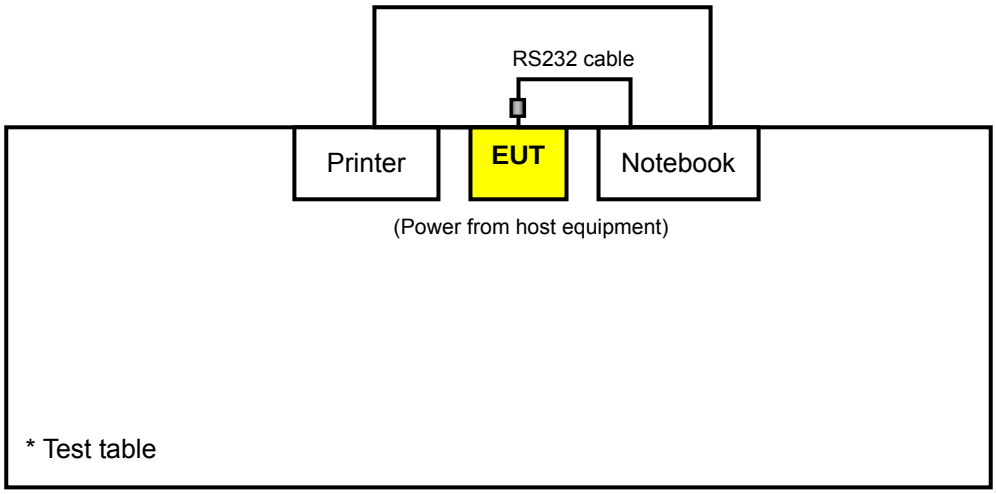
20 channels are provided to TX 1 of EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1	2410	6	2435	11	2451	16	2463
2	2415	7	2440	12	2453	17	2465
3	2420	8	2445	13	2455	18	2470
4	2425	9	2447	14	2459	19	2475
5	2430	10	2449	15	2460	20	2480

75 channels are provided to TX 2 of EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1	2406	20	2425	39	2444	58	2463
2	2407	21	2426	40	2445	59	2464
3	2408	22	2427	41	2446	60	2465
4	2409	23	2428	42	2447	61	2466
5	2410	24	2429	43	2448	62	2467
6	2411	25	2430	44	2449	63	2468
7	2412	26	2431	45	2450	64	2469
8	2413	27	2432	46	2451	65	2470
9	2414	28	2433	47	2452	66	2471
10	2415	29	2434	48	2453	67	2472
11	2416	30	2435	49	2454	68	2473
12	2417	31	2436	50	2455	69	2474
13	2418	32	2437	51	2456	70	2475
14	2419	33	2438	52	2457	71	2476
15	2420	34	2439	53	2458	72	2477
16	2421	35	2440	54	2459	73	2478
17	2422	36	2441	55	2460	74	2479
18	2423	37	2442	56	2461	75	2480
19	2424	38	2443	57	2462		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	RF module: TX 1
B	√	√	√	√	RF module: TX 2

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

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis 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	AXIS
A	1 to 20	1, 7, 20	MSK	Z
B	1 to 75	1, 35, 75	MSK	Z

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis 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	AXIS
A	1 to 20	1	MSK	Z
B	1 to 75	1	MSK	Z

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	1 to 20	1	MSK
B	1 to 75	1	MSK

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis 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	AXIS
A	1 to 20	1, 20	MSK	Z
B	1 to 75	1, 75	MSK	Z

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
A	1 to 20	1, 7, 20	MSK
B	1 to 75	1, 35, 75	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	NOTEBOOK	DELL	D531	CN-0XM006-48643 -81U-2610	QDS-BRCM1020
2	PRINTER	HP	HP LASERJET 1300	CNBKK91189	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8m braid shielded wire, DB25 connector, w/o core.

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	ESIB7	100212	May 28, 2008	May 27, 2009
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 08, 2008	Aug. 07, 2009
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 25, 2008	Apr. 24, 2009
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Aug. 06, 2008	Aug. 05, 2009
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 06, 2009	Jan. 05, 2010
Preamplifier Agilent	8449B	3008A01911	Sep. 10, 2008	Sep. 09, 2009
Preamplifier Agilent	8447D	2944A10638	Dec. 26, 2008	Dec. 25, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218190/4 231241/4	May 20, 2008	May 19, 2009
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 09, 2008	Aug. 08, 2009
Software	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	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 Chamber 9.

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

4. The FCC Site Registration No. is 460141.

5. The IC Site Registration No. is IC 7450F-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.

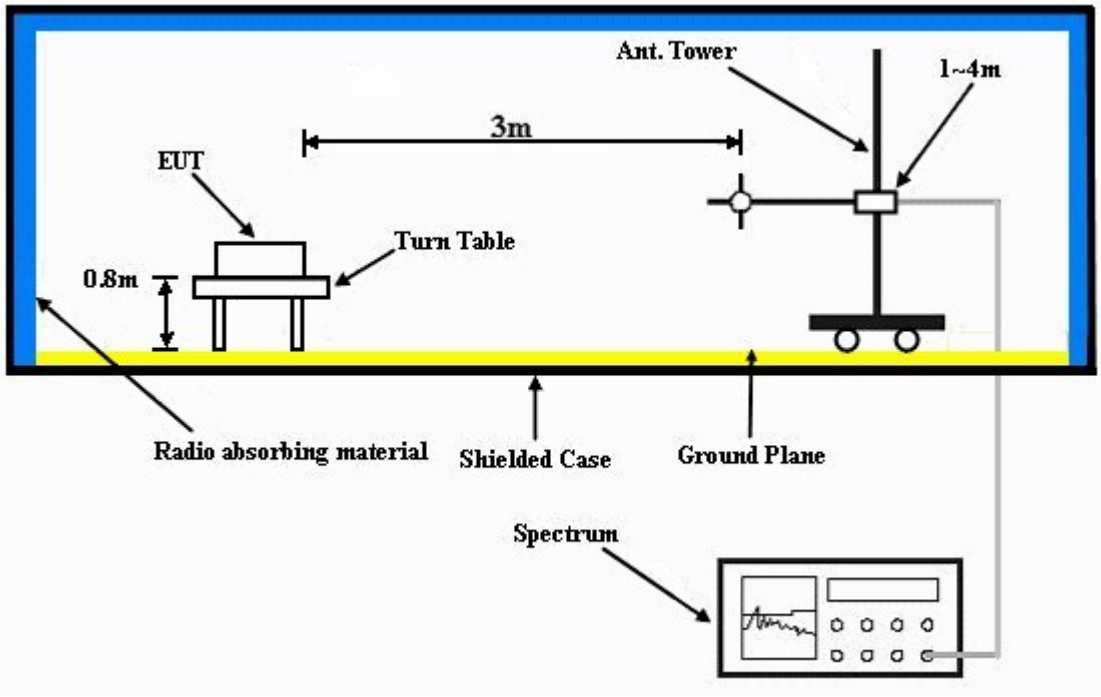
NOTE:

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. Connected the EUT to notebook via RS232 cable and placed on a testing table.

b. The notebook ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

c. The necessary accessories enable the EUT in full functions.

4.1.7 TEST RESULTS

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 1014hPa	TESTED BY	Lori Chiu
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	2390.000	39.91 PK	74.00	-34.09	1.19 H	287	6.83	33.08
2	2390.000	28.88 AV	54.00	-25.12	1.19 H	287	-4.20	33.08
3	#2400.000	34.13 PK	72.42	-38.29	1.19 H	287	1.00	33.13
4	#2400.000	33.54 AV	71.83	-38.29	1.19 H	287	0.41	33.13
5	*2410.000	92.42 PK			1.19 H	287	59.25	33.17
6	*2410.000	91.83 AV			1.19 H	287	58.66	33.17
7	4820.000	50.76 PK	74.00	-23.24	1.18 H	45	11.61	39.15
8	4820.000	40.50 AV	54.00	-13.50	1.18 H	45	1.35	39.15
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	2390.000	40.34 PK	74.00	-33.66	1.61 V	149	7.26	33.08
2	2390.000	28.98 AV	54.00	-25.02	1.61 V	149	-4.10	33.08
3	#2400.000	32.99 PK	70.28	-37.29	1.61 V	149	-0.14	33.13
4	#2400.000	32.52 AV	69.81	-34.29	1.61 V	149	-0.61	33.13
5	*2410.000	90.28 PK			1.61 V	149	57.11	33.17
6	*2410.000	89.81 AV			1.61 V	149	56.64	33.17
7	4820.000	51.59 PK	74.00	-22.41	1.18 V	100	12.44	39.15
8	4820.000	43.49 AV	54.00	-10.51	1.18 V	100	4.34	39.15

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 7	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 1014hPa	**TESTED BY**	Lori Chiu
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	*2440.000	92.60 PK			1.10 H	297	59.31	33.29
2	*2440.000	92.00 AV			1.10 H	297	58.71	33.29
3	4880.000	48.79 PK	74.00	-25.21	1.06 H	263	9.65	39.14
4	4880.000	38.45 AV	54.00	-15.55	1.06 H	263	-0.69	39.14
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	*2440.000	90.32 PK			1.52 V	332	57.03	33.29
2	*2440.000	89.84 AV			1.52 V	332	56.55	33.29
3	4880.000	50.36 PK	74.00	-23.64	1.21 V	217	11.22	39.14
4	4880.000	42.40 AV	54.00	-11.60	1.21 V	217	3.26	39.14

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 20	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 1014hPa	TESTED BY	Lori Chiu
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	*2480.000	92.66 PK			1.13 H	288	59.21	33.45
2	*2480.000	92.05 AV			1.13 H	288	58.60	33.45
3	2483.500	44.36 PK	74.00	-29.64	1.13 H	288	10.90	33.46
4	2483.500	43.75 AV	54.00	-10.25	1.13 H	288	10.29	33.46
5	4960.000	47.97 PK	74.00	-26.03	1.41 H	71	8.30	39.67
6	4960.000	37.43 AV	54.00	-16.57	1.41 H	71	-2.24	39.67
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	*2480.000	90.43 PK			1.37 V	152	56.98	33.45
2	*2480.000	89.86 AV			1.37 V	152	56.41	33.45
3	2483.500	42.13 PK	74.00	-31.87	1.37 V	152	8.67	33.46
4	2483.500	41.56 AV	54.00	-12.44	1.37 V	152	8.10	33.46
5	4960.000	48.93 PK	74.00	-25.07	1.41 V	160	9.26	39.67
6	4960.000	38.60 AV	54.00	-15.40	1.41 V	160	-1.07	39.67

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 1014hPa	TESTED BY	Lori Chiu
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	2390.000	41.20 PK	74.00	-32.80	1.09 H	243	8.12	33.08
2	2390.000	29.22 AV	54.00	-24.78	1.09 H	243	-3.86	33.08
3	#2400.000	41.36 PK	71.96	-30.60	1.09 H	243	8.23	33.13
4	#2400.000	41.00 AV	71.60	-30.60	1.09 H	243	7.87	33.13
5	*2406.000	91.96 PK			1.09 H	243	58.81	33.15
6	*2406.000	91.60 AV			1.09 H	243	58.45	33.15
7	4812.000	52.24 PK	74.00	-21.76	1.06 H	219	13.09	39.15
8	4812.000	45.38 AV	54.00	-8.62	1.06 H	219	6.23	39.15
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	2390.000	43.08 PK	74.00	-30.92	1.07 V	238	10.00	33.08
2	2390.000	31.76 AV	54.00	-22.24	1.07 V	238	-1.32	33.08
3	#2400.000	44.09 PK	74.69	-30.60	1.07 V	238	10.96	33.13
4	#2400.000	43.69 AV	74.29	-30.60	1.07 V	238	10.56	33.13
5	*2406.000	94.69 PK			1.07 V	238	61.54	33.15
6	*2406.000	94.29 AV			1.07 V	238	61.14	33.15
7	4812.000	53.78 PK	74.00	-20.22	1.05 V	99	14.63	39.15
8	4812.000	48.13 AV	54.00	-5.87	1.05 V	99	8.98	39.15

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 35	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 1014hPa	TESTED BY	Lori Chiu
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	*2440.000	94.46 PK			1.11 H	255	61.17	33.29
2	*2440.000	94.28 AV			1.11 H	255	60.99	33.29
3	4880.000	54.37 PK	74.00	-19.63	1.00 H	20	15.23	39.14
4	4880.000	47.83 AV	54.00	-6.17	1.00 H	20	8.69	39.14
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	*2440.000	97.06 PK			1.00 V	167	63.77	33.29
2	*2440.000	96.67 AV			1.00 V	167	63.38	33.29
3	4880.000	55.31 PK	74.00	-18.69	1.09 V	139	16.17	39.14
4	4880.000	50.12 AV	54.00	-3.88	1.09 V	139	10.98	39.14

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 75	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 1014hPa	**TESTED BY**	Lori Chiu
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	*2480.000	97.42 PK			1.09 H	250	63.97	33.45
2	*2480.000	97.28 AV			1.09 H	250	63.83	33.45
3	2483.500	48.21 PK	74.00	-25.79	1.01 H	193	14.75	33.46
4	2483.500	48.07 AV	54.00	-5.93	1.01 H	193	14.61	33.46
5	2485.500	58.93 PK	74.00	-15.07	1.09 H	250	25.46	33.47
6	2485.500	48.17 AV	54.00	-5.83	1.09 H	250	14.70	33.47
7	4960.000	53.33 PK	74.00	-20.67	1.10 H	263	13.66	39.67
8	4960.000	46.14 AV	54.00	-7.86	1.10 H	263	6.47	39.67
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	*2480.000	100.26 PK			1.00 V	193	66.81	33.45
2	*2480.000	99.87 AV			1.00 V	193	66.42	33.45
3	2483.500	51.05 PK	74.00	-22.95	1.00 V	193	17.59	33.46
4	**2483.500**	**50.66 AV**	**54.00**	**-3.34**	**1.00 V**	**193**	**17.20**	**33.46**
5	2485.500	61.01 PK	74.00	-12.99	1.01 V	193	27.54	33.47
6	2485.500	50.09 AV	54.00	-3.91	1.01 V	193	16.62	33.47
7	4960.000	54.39 PK	74.00	-19.61	1.05 V	136	14.72	39.67
8	4960.000	48.89 AV	54.00	-5.11	1.05 V	136	9.22	39.67

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.

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 70%RH 1015hPa	TESTED BY	Lori Chiu
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	76.56	29.27 QP	40.00	-10.73	1.75 H	151	20.00	9.27
2	103.78	28.88 QP	43.50	-14.62	1.75 H	142	19.09	9.79
3	467.36	32.45 QP	46.00	-13.55	1.75 H	85	14.20	18.25
4	494.58	34.29 QP	46.00	-11.71	1.50 H	94	15.21	19.08
5	547.08	31.03 QP	46.00	-14.97	1.50 H	142	10.36	20.68
6	665.68	37.27 QP	46.00	-8.73	1.00 H	61	14.82	22.45
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	49.34	35.15 QP	40.00	-4.85	1.00 V	40	21.62	13.53
2	76.56	30.07 QP	40.00	-9.93	1.00 V	10	20.81	9.27
3	131.00	26.75 QP	43.50	-16.75	1.00 V	55	14.57	12.18
4	424.59	36.34 QP	46.00	-9.66	1.00 V	115	19.46	16.88
5	467.36	30.01 QP	46.00	-15.99	2.00 V	106	11.77	18.25
6	494.58	29.37 QP	46.00	-16.63	1.75 V	127	10.30	19.08
7	665.68	33.92 QP	46.00	-12.08	1.50 V	340	11.47	22.45
8	797.89	29.07 QP	46.00	-16.93	1.25 V	199	3.81	25.26

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 70%RH 1015hPa	TESTED BY	Lori Chiu
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	76.43	29.35 QP	40.00	-10.65	1.00 H	200	20.04	9.31
2	103.69	28.75 QP	43.50	-14.75	1.50 H	154	18.97	9.78
3	467.50	32.61 QP	46.00	-13.39	1.00 H	325	14.36	18.25
4	494.66	34.33 QP	46.00	-11.67	1.25 H	147	15.25	19.08
5	547.14	31.43 QP	46.00	-14.57	1.75 H	249	10.75	20.68
6	665.74	37.47 QP	46.00	-8.53	1.50 H	311	15.02	22.45
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	49.41	35.45 QP	40.00	-4.55	1.25 V	34	21.90	13.55
2	76.52	30.14 QP	40.00	-9.86	1.00 V	123	20.86	9.28
3	424.51	36.26 QP	46.00	-9.74	1.50 V	24	19.39	16.87
4	467.47	30.27 QP	46.00	-15.73	1.75 V	316	12.02	18.25
5	494.49	29.44 QP	46.00	-16.56	1.25 V	6	10.37	19.07
6	665.71	33.80 QP	46.00	-12.20	1.00 V	167	11.35	22.45

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

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 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	100291	Nov. 19, 2008	Nov. 18, 2009
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 31, 2008	Dec. 30, 2009
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jun. 13, 2008	Jun. 12, 2009
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Dec. 04, 2008	Dec. 03, 2009
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 1.
3. The VCCI Site Registration No. is C-2040.

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.

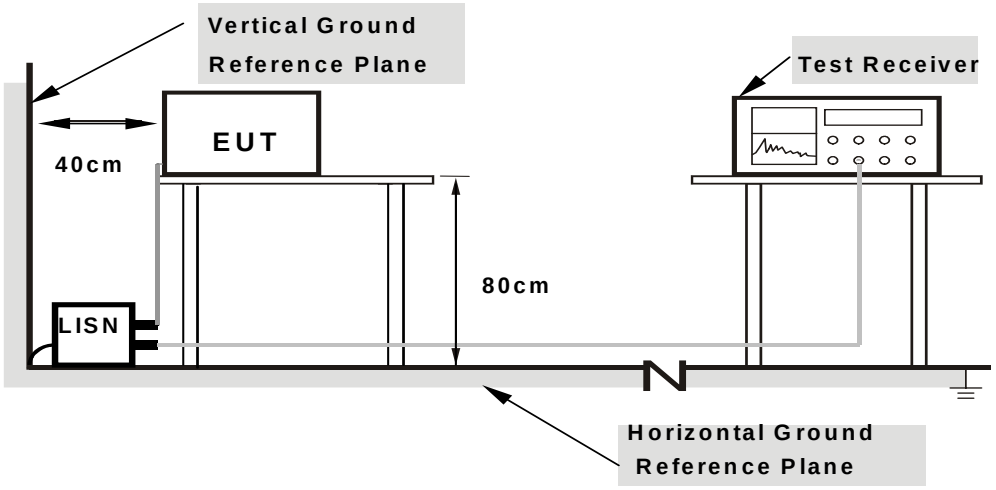
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

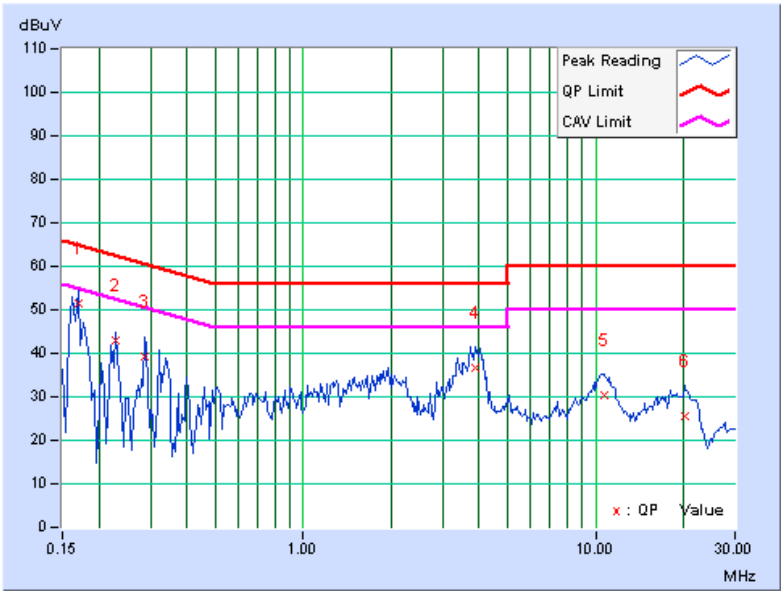
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	MSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1014hPa	6dB BANDWIDTH	9kHz
TEST MODE	A	TESTED BY	Mark Liao

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.170**	**0.13**	**51.36**	**-**	**51.49**	**-**	**64.98**	**54.98**	**-13.49**	**-**
2	0.228	0.13	42.70	-	42.83	-	62.52	52.52	-19.69	-
3	0.287	0.13	39.30	-	39.43	-	60.62	50.62	-21.18	-
4	3.902	0.36	36.23	-	36.59	-	56.00	46.00	-19.41	-
5	10.727	0.70	29.72	-	30.42	-	60.00	50.00	-29.58	-
6	20.125	1.15	24.57	-	25.72	-	60.00	50.00	-34.28	-

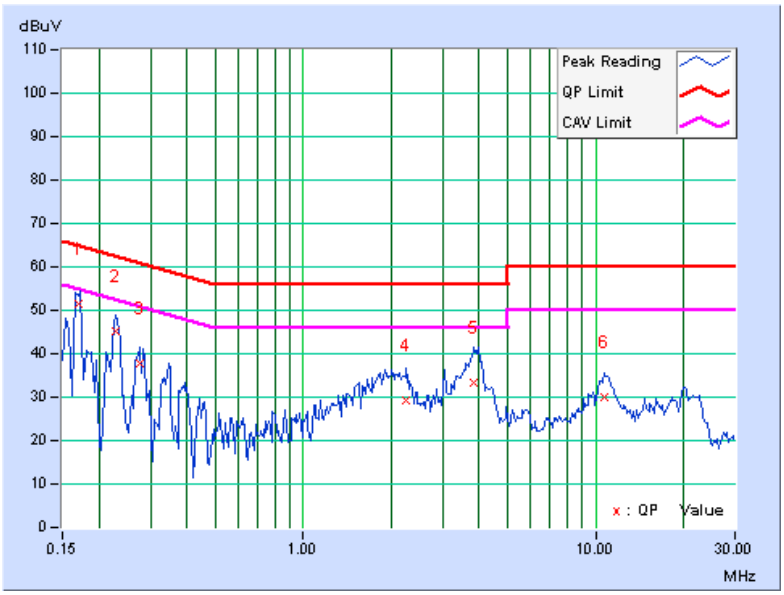
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	MSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1014hPa	6dB BANDWIDTH	9kHz
TEST MODE	A	TESTED BY	Mark Liao

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.14	51.24	-	51.38	-	64.94	54.94	-13.56	-
2	0.228	0.15	45.00	-	45.15	-	62.52	52.52	-17.37	-
3	0.275	0.15	37.52	-	37.67	-	60.97	50.97	-23.29	-
4	2.242	0.27	28.96	-	29.23	-	56.00	46.00	-26.77	-
5	3.852	0.38	33.13	-	33.51	-	56.00	46.00	-22.49	-
6	10.750	0.68	29.50	-	30.18	-	60.00	50.00	-29.82	-

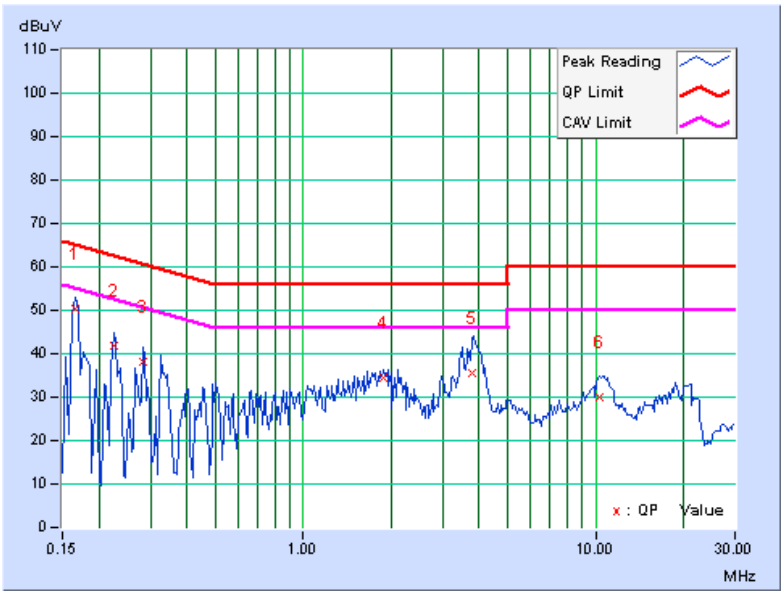
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	MSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1014hPa	6dB BANDWIDTH	9kHz
TEST MODE	B	TESTED BY	Mark Liao

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.166	0.13	50.10	-	50.23	-	65.18	55.18	-14.95	-
2	0.224	0.13	41.86	-	41.99	-	62.66	52.66	-20.67	-
3	0.283	0.13	37.90	-	38.03	-	60.73	50.73	-22.70	-
4	1.887	0.22	34.08	-	34.30	-	56.00	46.00	-21.70	-
5	3.762	0.35	35.07	-	35.42	-	56.00	46.00	-20.58	-
6	10.305	0.67	29.30	-	29.97	-	60.00	50.00	-30.03	-

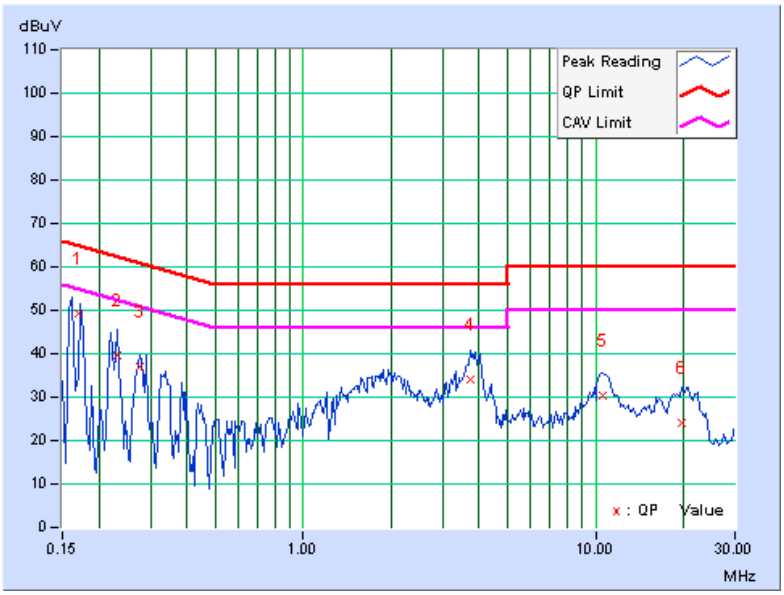
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	MSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1014hPa	6dB BANDWIDTH	9kHz
TEST MODE	B	TESTED BY	Mark Liao

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.169	0.14	49.23	-	49.37	-	64.99	54.99	-15.62	-
2	0.232	0.15	39.50	-	39.65	-	62.38	52.38	-22.73	-
3	0.275	0.15	36.78	-	36.93	-	60.97	50.97	-24.03	-
4	3.715	0.37	33.78	-	34.15	-	56.00	46.00	-21.85	-
5	10.594	0.68	29.67	-	30.35	-	60.00	50.00	-29.65	-
6	19.797	0.97	23.09	-	24.06	-	60.00	50.00	-35.94	-

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	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009

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

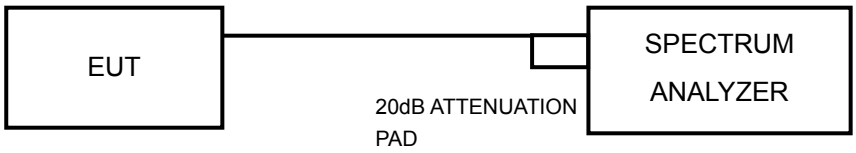
4.3.3 TEST PROCEDURE

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

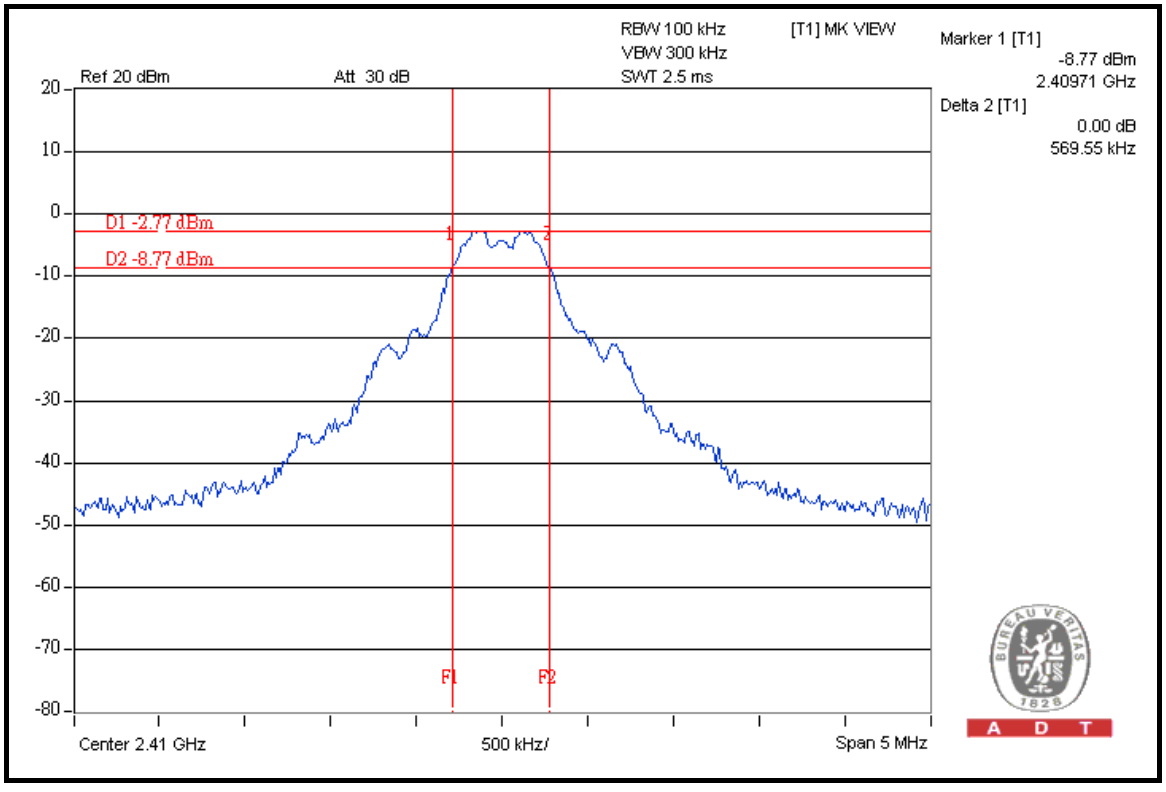
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

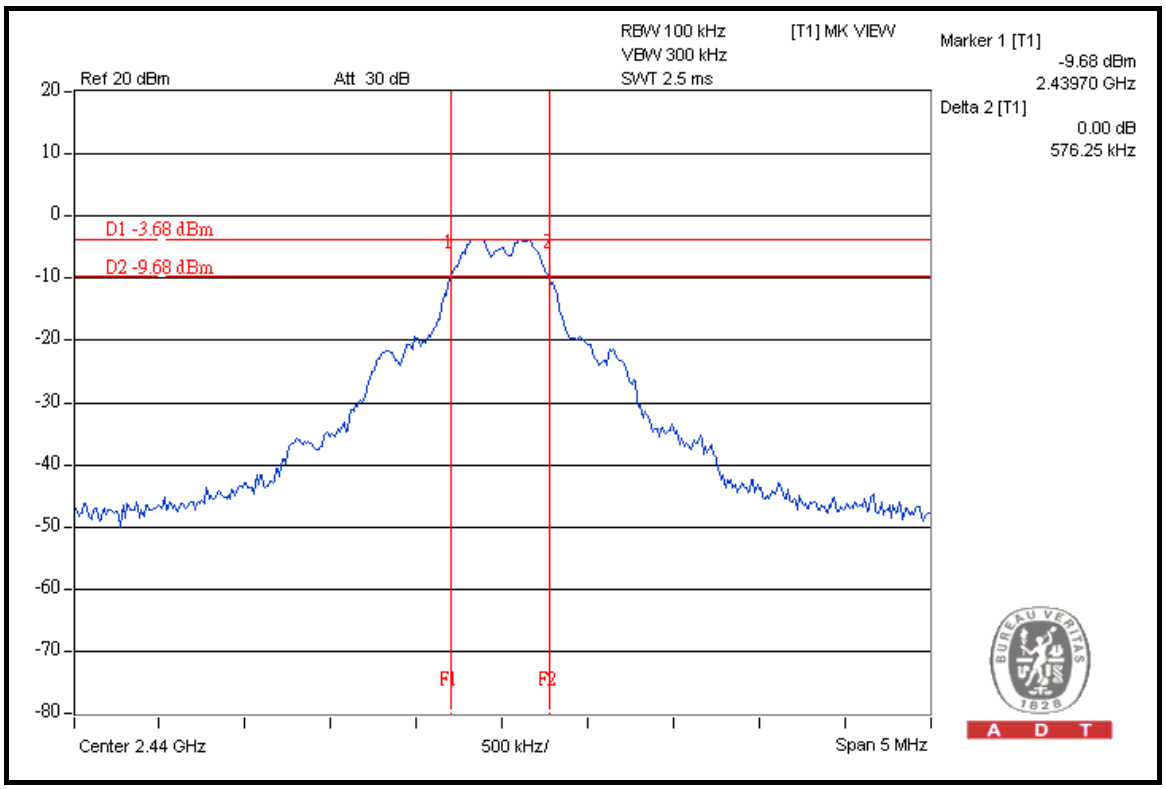
MODULATION TYPE	MSK	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 1017hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Brad Wu
TEST MDOE	A		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2410	0.56955	0.5	PASS
7	2440	0.57625	0.5	PASS
20	2480	0.56896	0.5	PASS

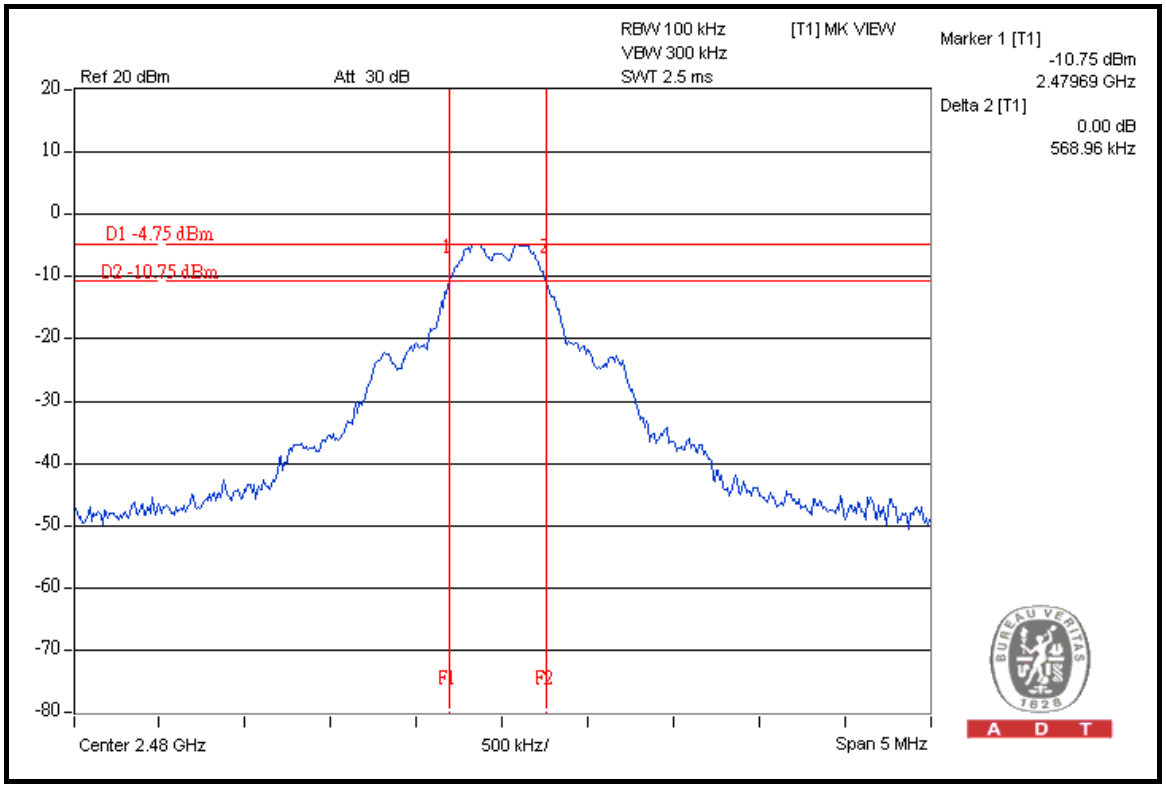
CH 1



CH 7


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
[T1] MK VIEW
Marker 1 [T1]
-9.68 dBm
2.43970 GHz
Delta 2 [T1]
0.00 dB
576.25 kHz
Ref 20 dBm
Att 30 dB
D1 -3.68 dBm
D2 -9.68 dBm
Center 2.44 GHz
500 kHz/
Span 5 MHz

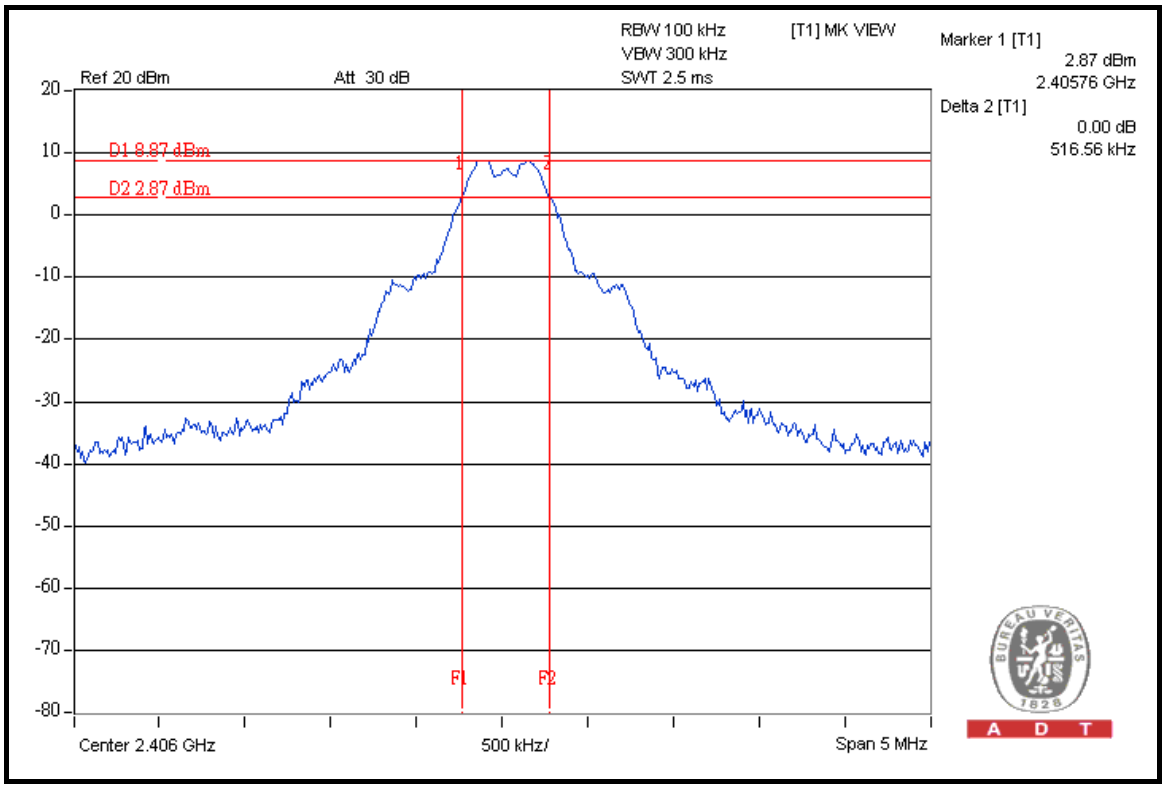
CH 20


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
[T1] MK VIEW
Marker 1 [T1]
-10.75 dBm
2.47969 GHz
Delta 2 [T1]
0.00 dB
568.96 kHz
Ref 20 dBm
Att 30 dB
D1 -4.75 dBm
D2 -10.75 dBm
Center 2.48 GHz
500 kHz/
Span 5 MHz

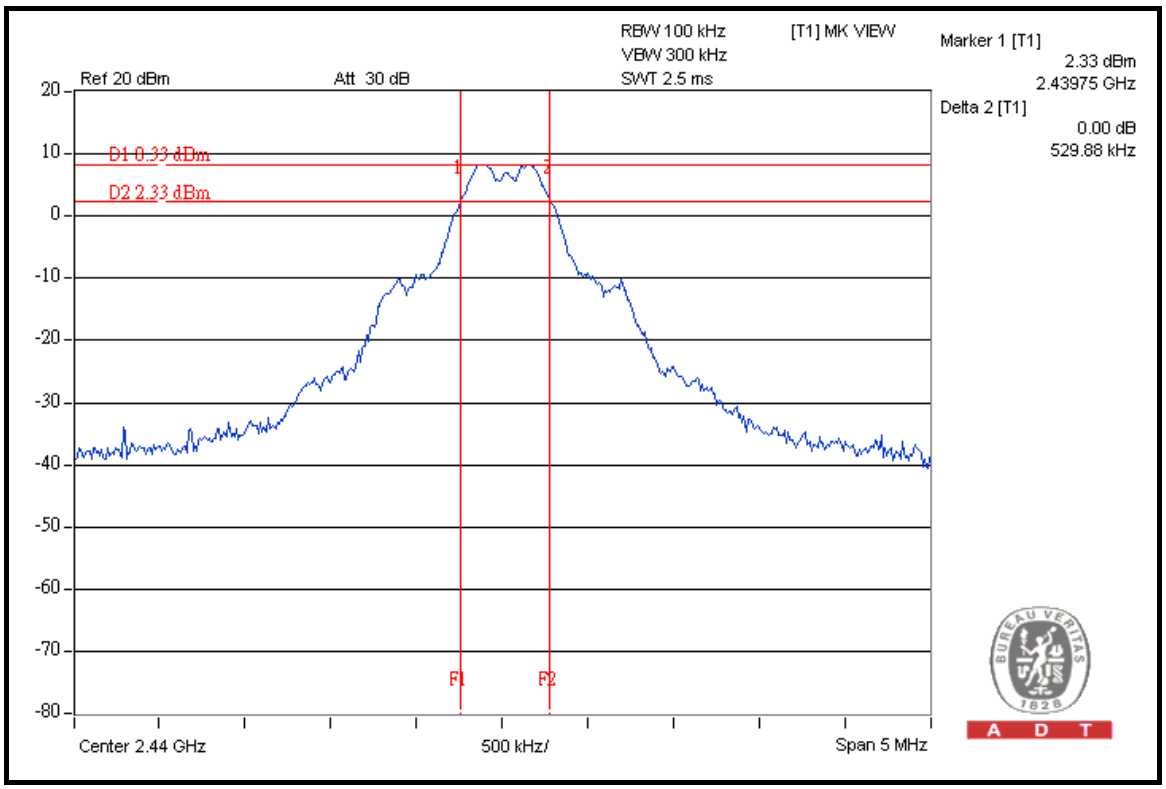
MODULATION TYPE	MSK	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 1017hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**TESTED BY**	Brad Wu
TEST MDOE	B		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2406	0.51656	0.5	PASS
35	2440	0.52988	0.5	PASS
75	2480	0.52580	0.5	PASS

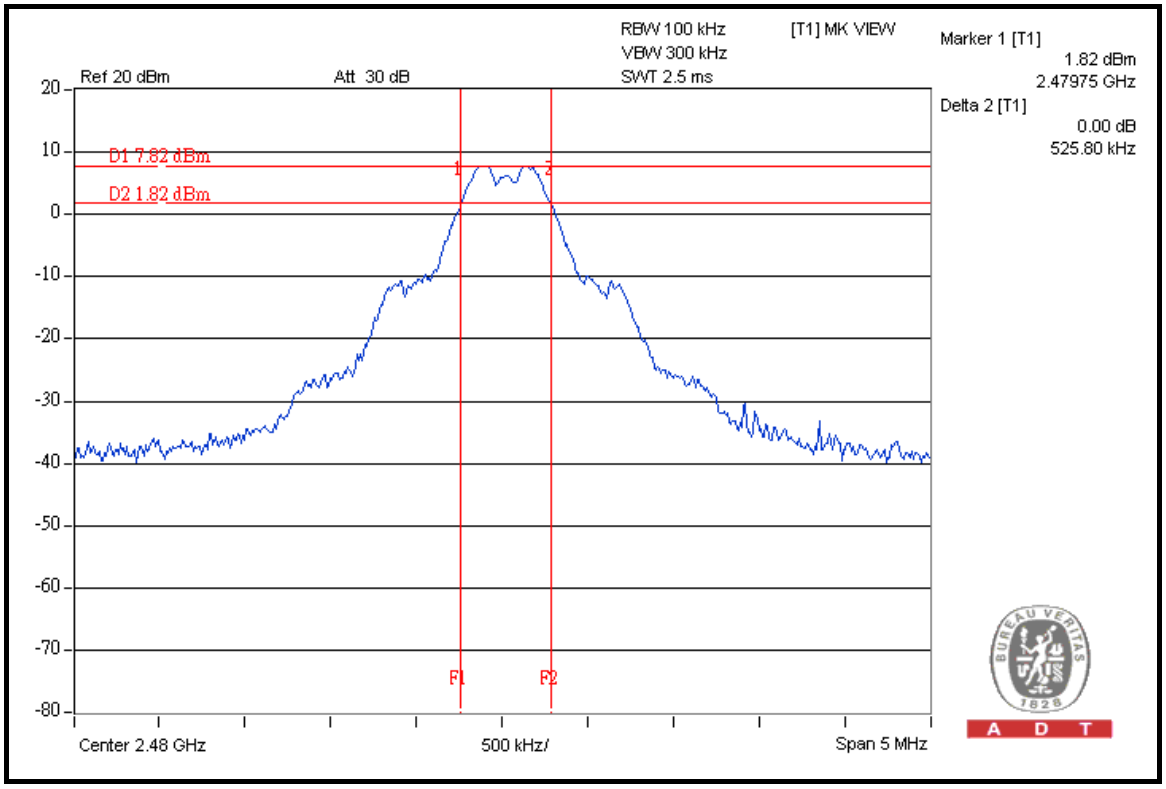
CH 1



CH 35


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
[T1] MK VIEW
Marker 1 [T1]
2.33 dBm
2.43975 GHz
Delta 2 [T1]
0.00 dB
529.88 kHz
Ref 20 dBm
Att 30 dB
D1 0.33 dBm
D2 2.33 dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 2.44 GHz
500 kHz/
Span 5 MHz

CH 75


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
[T1] MK VIEW
Marker 1 [T1]
1.82 dBm
2.47975 GHz
Delta 2 [T1]
0.00 dB
525.80 kHz
Ref 20 dBm
Att 30 dB
D1 7.82 dBm
D2 1.82 dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 2.48 GHz
500 kHz/
Span 5 MHz

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	CALIBRATED UNTIL
High Speed Peak Power Meter	ML2495A	0824012	Aug. 04, 2008	Aug. 03, 2009
Power Sensor	MA2411B	0738138	Aug. 04, 2008	Aug. 03, 2009

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.

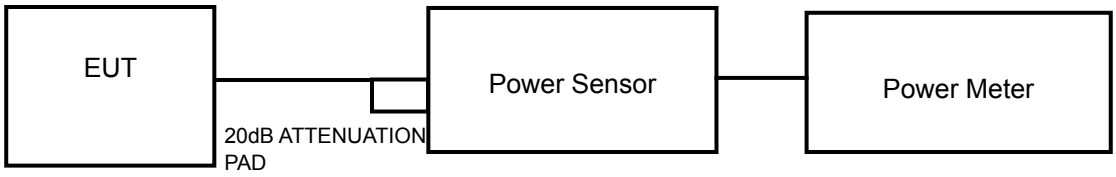
4.4.3 TEST PROCEDURES

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, 1017hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Brad Wu
TEST MDOE	A		

CHAN	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2410	0.501	-3.00	30	PASS
7	2440	0.359	-4.45	30	PASS
20	2480	0.281	-5.51	30	PASS

MODULATION TYPE	MSK	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 1017hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Brad Wu
TEST MDOE	B		

CHAN	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2406	7.079	8.50	30	PASS
35	2440	6.607	8.20	30	PASS
75	2480	5.702	7.56	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	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009

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

4.5.3 TEST PROCEDURE

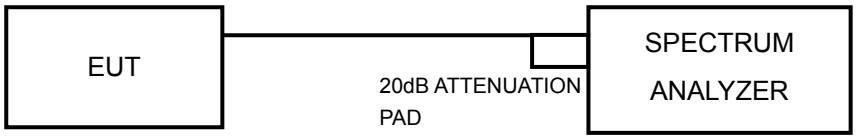
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

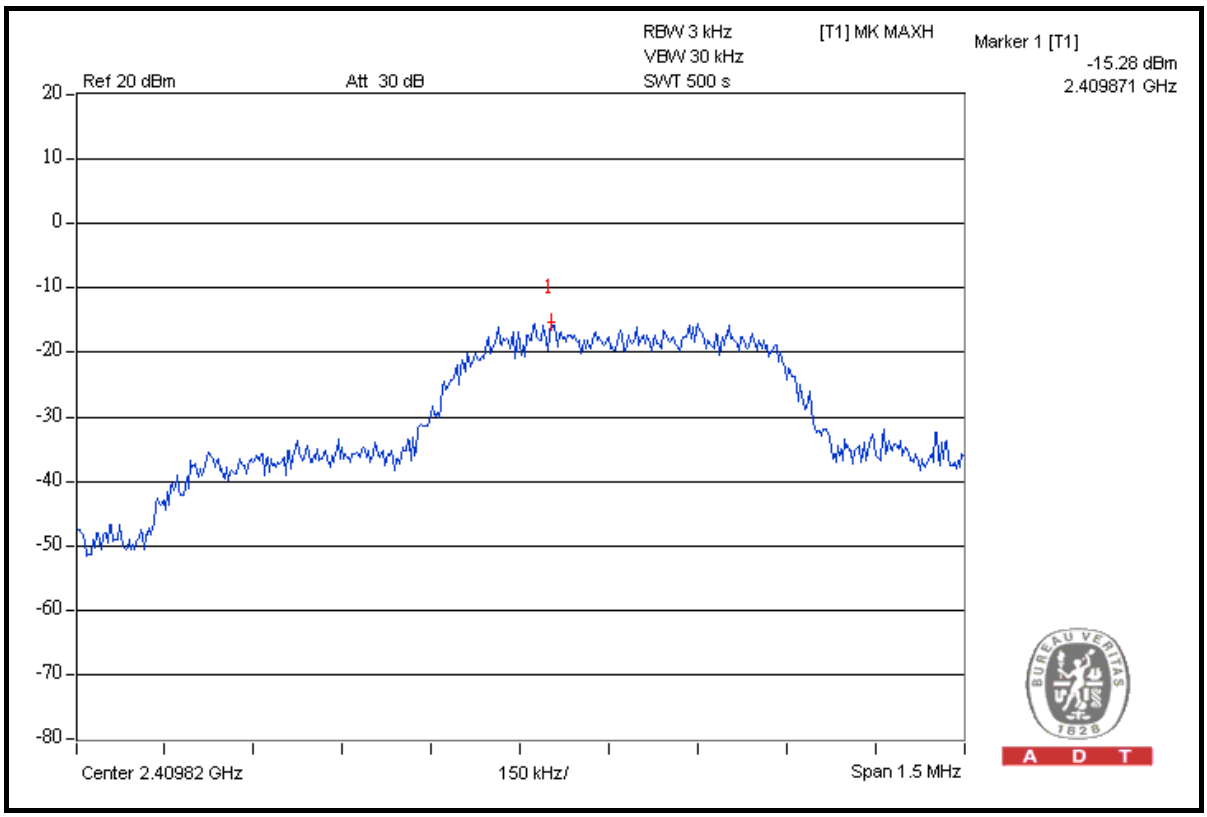
Same as Item 4.3.6.

4.5.7 TEST RESULTS

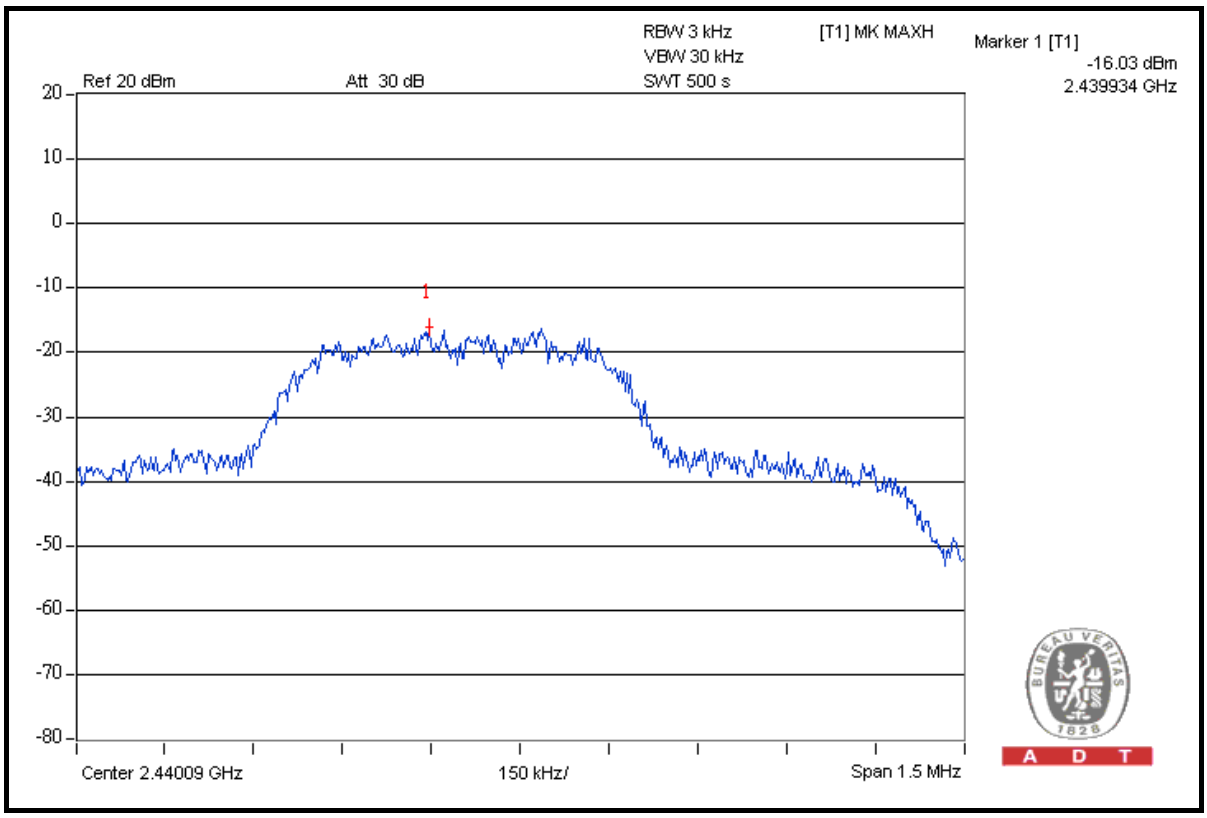
MODULATION TYPE	MSK	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 1017hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Brad Wu
TEST MDOE	A		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2410	-15.28	8	PASS
7	2440	-16.03	8	PASS
20	2480	-17.06	8	PASS

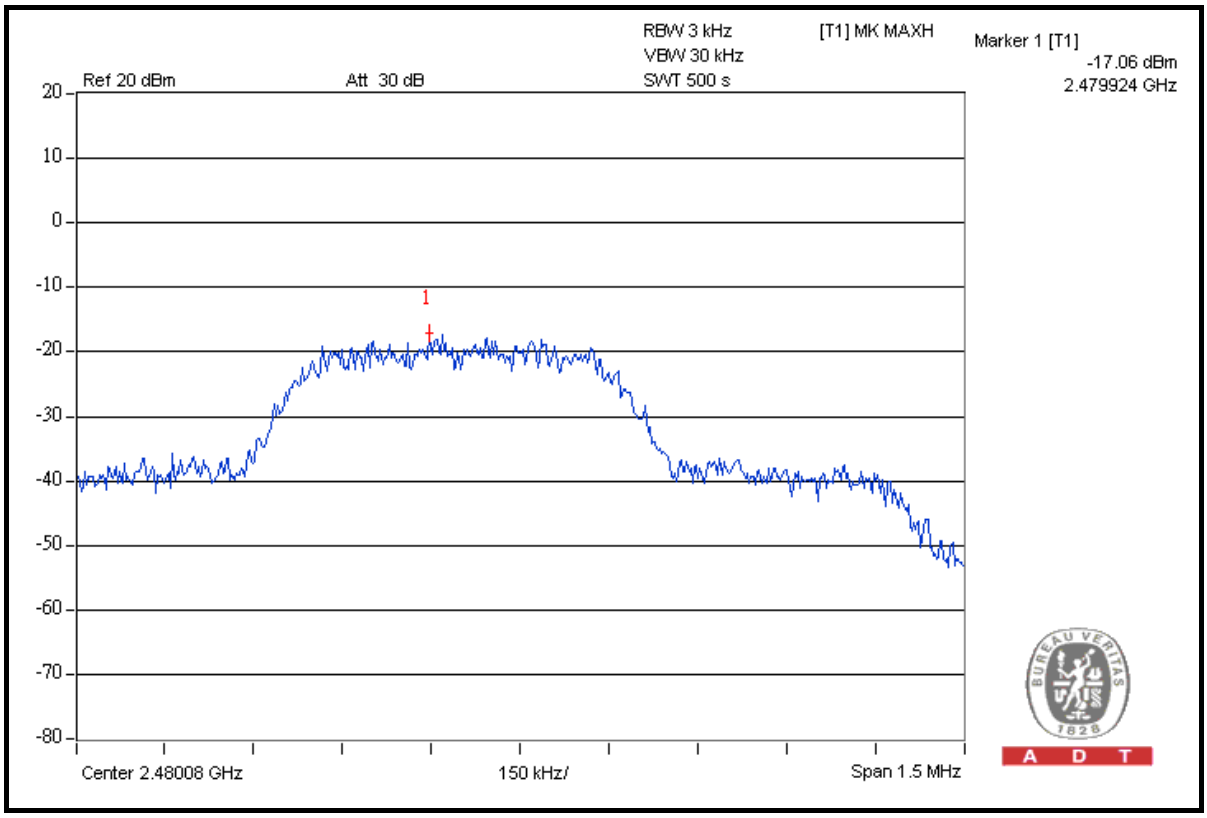
CH 1



CH 7


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-16.03 dBm
2.439934 GHz
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.44009 GHz
150 kHz/
Span 1.5 MHz

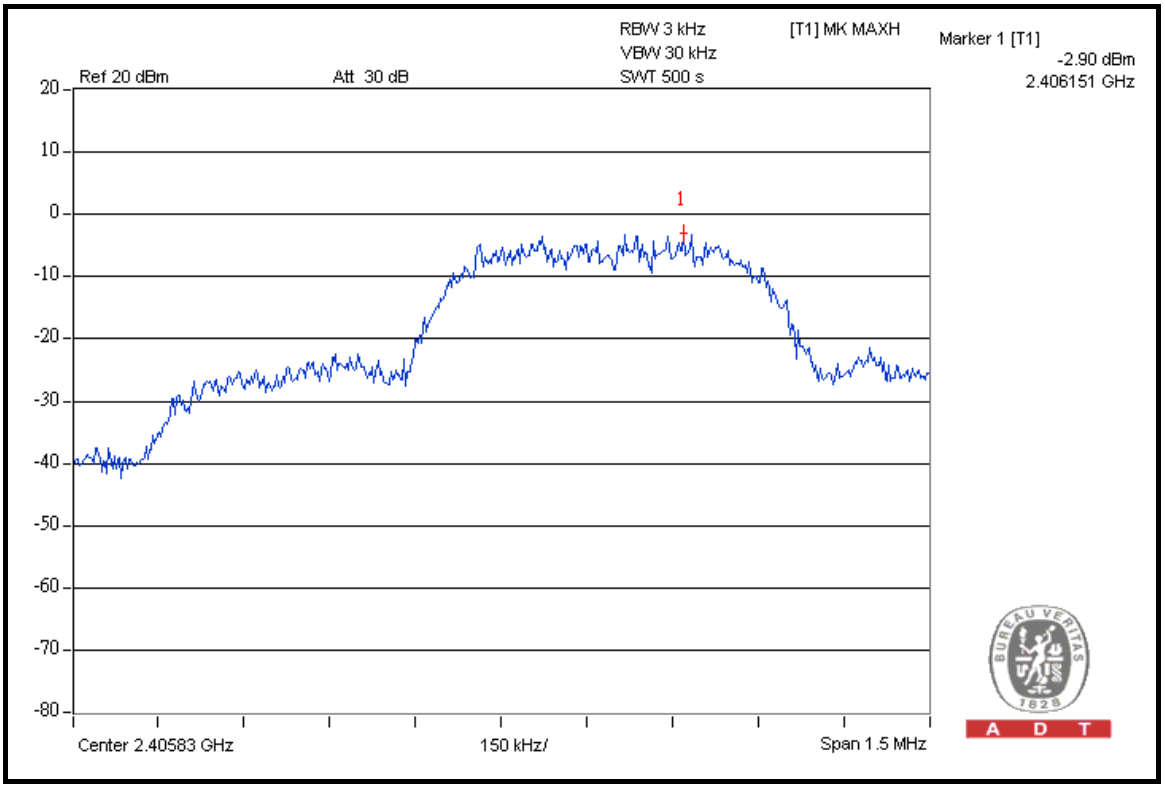
CH 20


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-17.06 dBm
2.479924 GHz
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48008 GHz
150 kHz/
Span 1.5 MHz

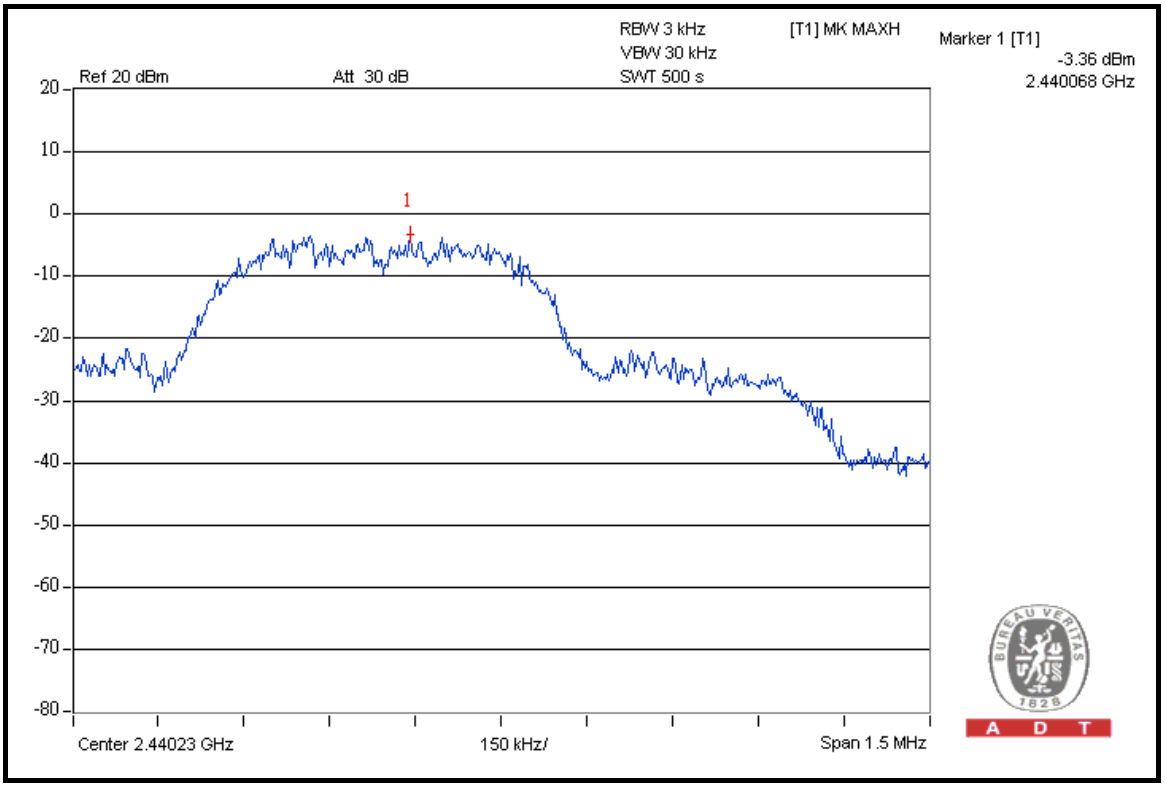
MODULATION TYPE	MSK	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 1017hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**TESTED BY**	Brad Wu
TEST MDOE	B		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2406	-2.90	8	PASS
35	2440	-3.36	8	PASS
75	2480	-3.87	8	PASS

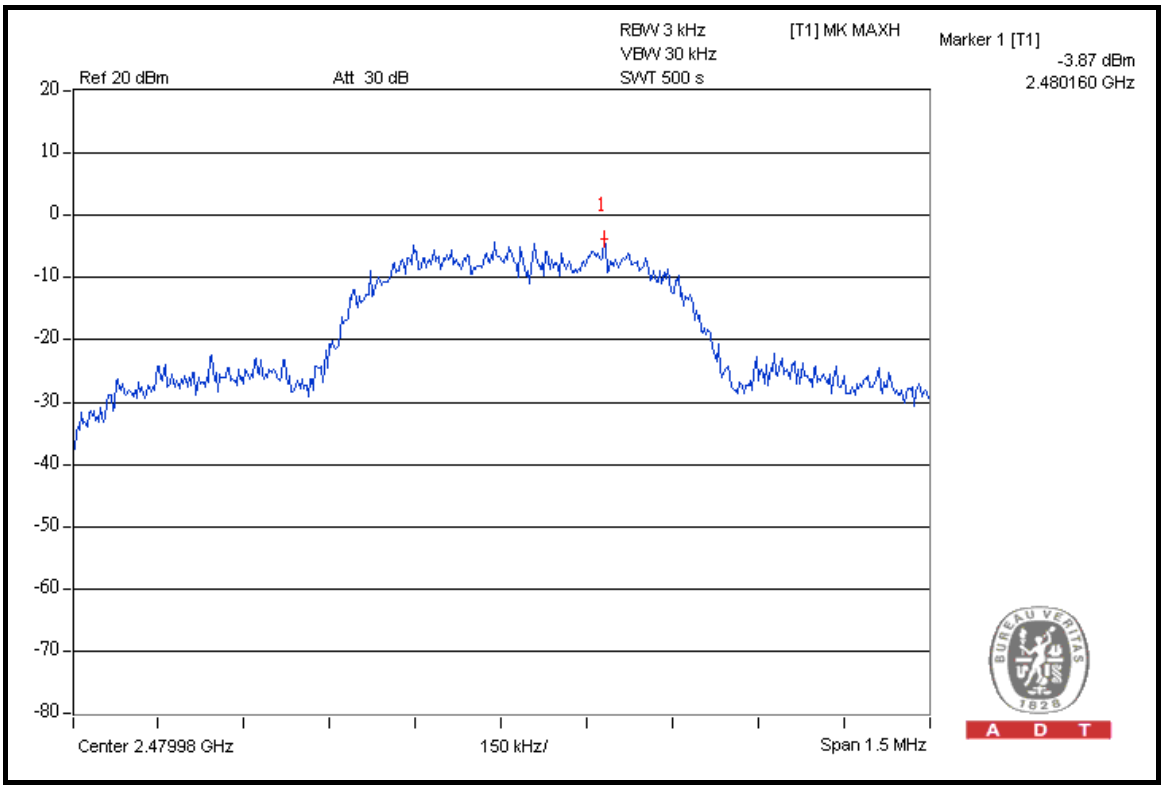
CH 1



CH 35


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-3.36 dBm
2.440068 GHz
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Center 2.44023 GHz
150 kHz/
Span 1.5 MHz

CH 75


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-3.87 dBm
2.480160 GHz
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Center 2.47998 GHz
150 kHz/
Span 1.5 MHz

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	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009

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.

2310~2390 MHz:
The spectrum plots (Peak RBW = 100kHz, VBW = 300kHz; Average RBW = 100kHz, VBW = 10Hz) are attached on the following pages.

2483.5~2500MHz:
Set the analyzer RBW to 100kHz, VBW=300kHz, Span=10MHz
Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band edge emission.
Peak value of bandedge = PK Filed strength of fundamental - amplitude delta
AV value of bandedge = AV Filed strength of fundamental - amplitude delta
(Reference KDB 913591)

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 12 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).

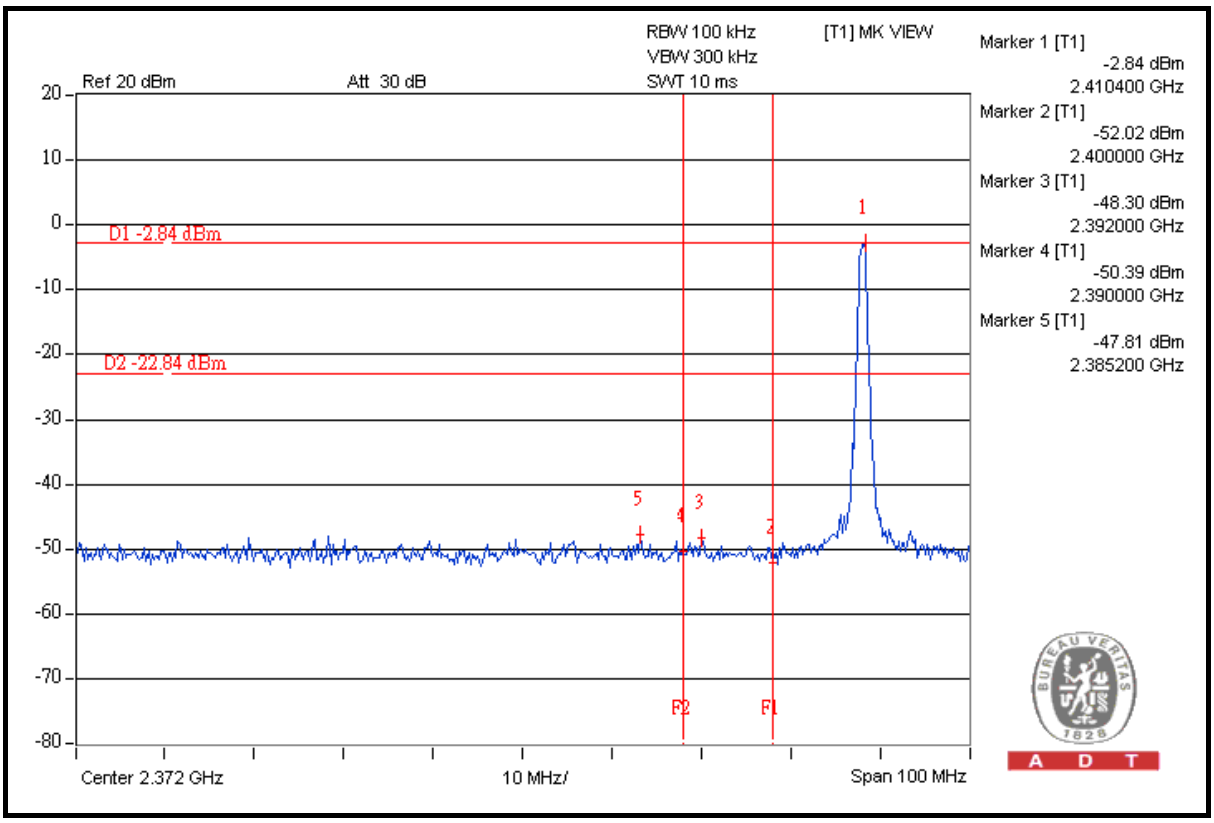
TEST MODE A

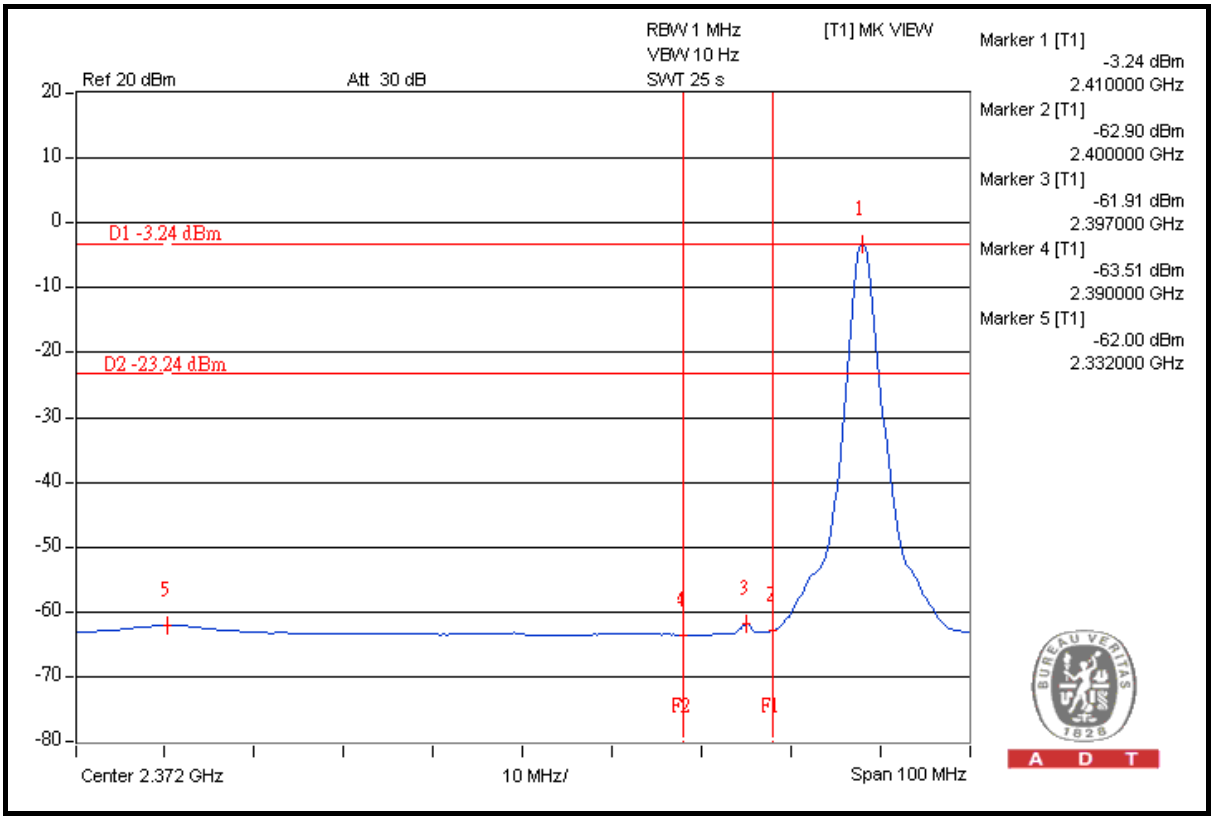
NOTE 1: The band edge emission plot on the next page shows 44.97dBc between carrier maximum power and local maximum emission in restrict band (2.38520GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 92.42dBuV/m (Peak), so the maximum field strength in restrict band is 92.42 – 44.97 = 47.45dBuV/m which is under 74dBuV/m limit.

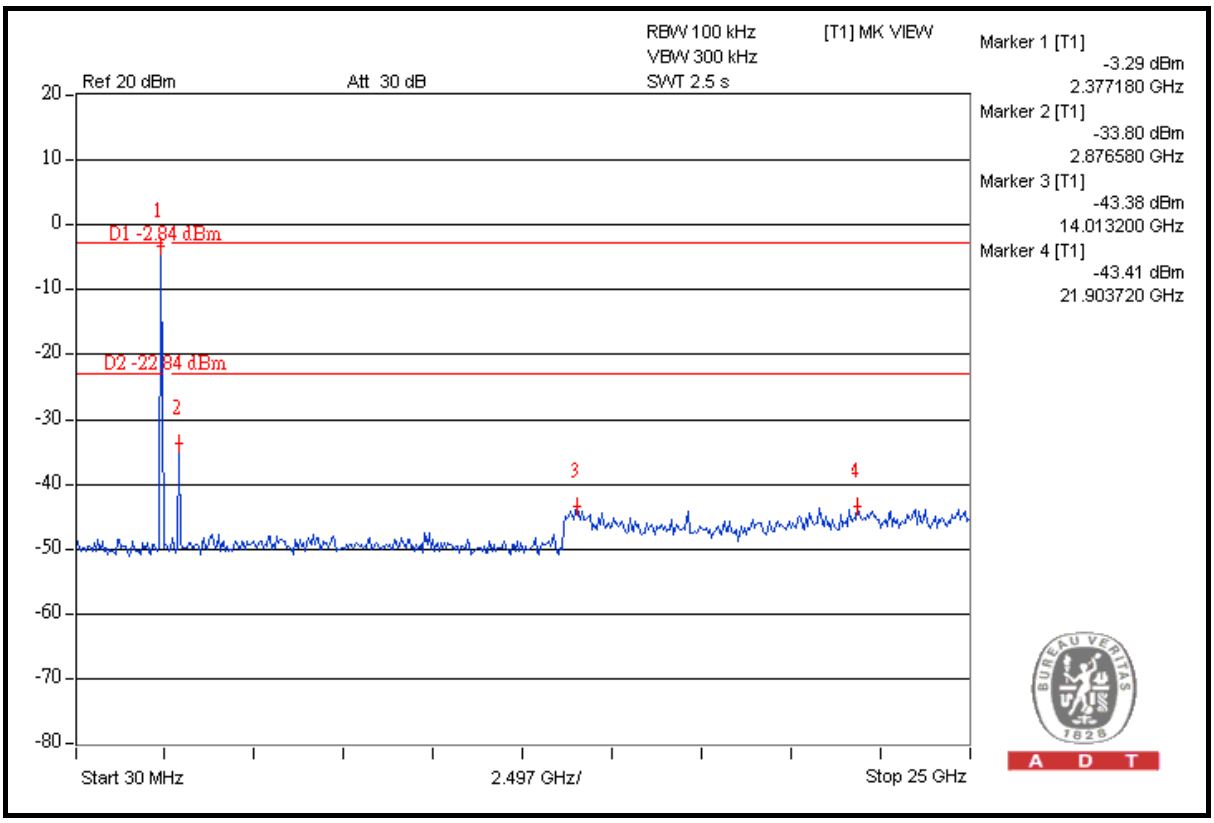
The band edge emission plot on the next page shows 58.76dBc between carrier maximum power and local maximum emission in restrict band (2.33200GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 91.83dBuV/m (Average), so the maximum field strength in restrict band is 91.83 – 58.76 = 33.07dBuV/m which is under 54dBuV/m limit.

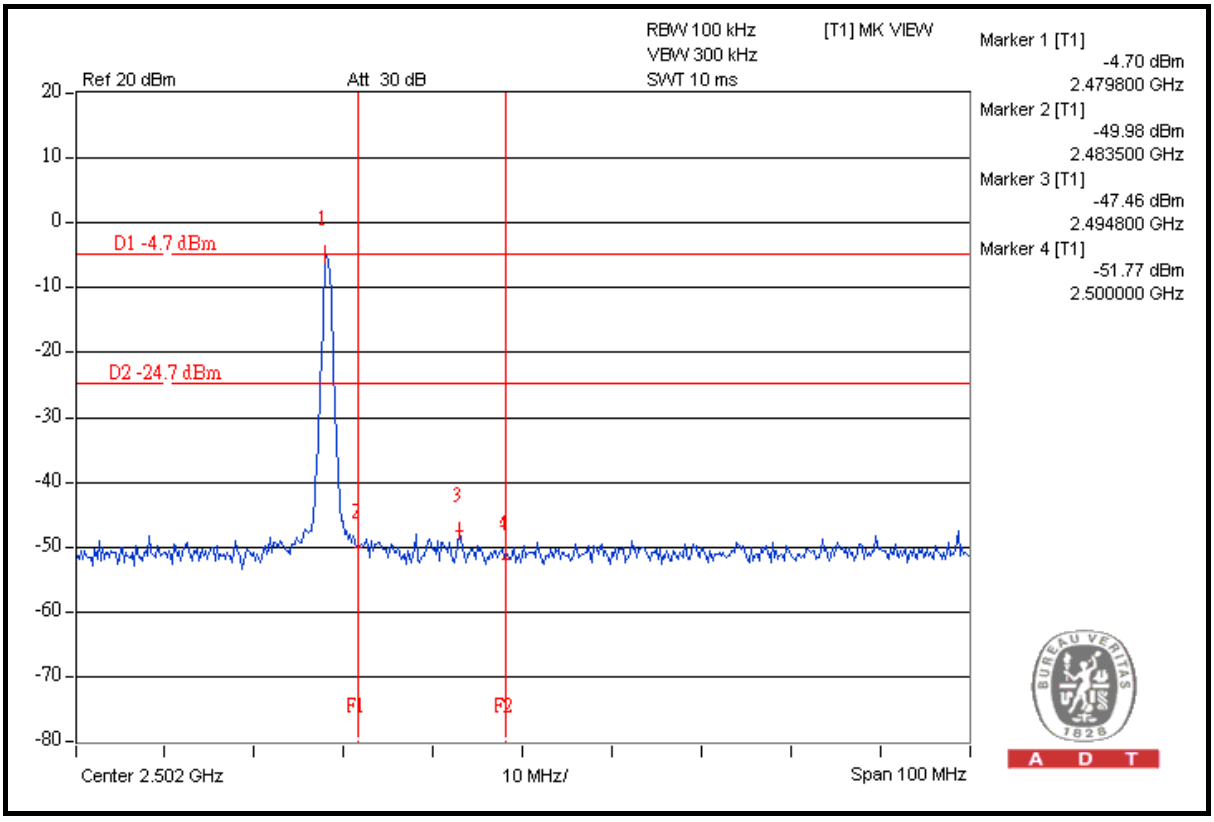
NOTE 2: The band edge emission plot on the next second page shows 44.09dBc between carrier maximum power and local maximum emission in restrict band (2.48360GHz). The emission of carrier strength list in the test result of channel 20 at the item 4.1.7 is 92.66dBuV/m (Peak), so the maximum field strength in restrict band is 92.66 – 44.09 = 48.57dBuV/m which is under 74dBuV/m limit.

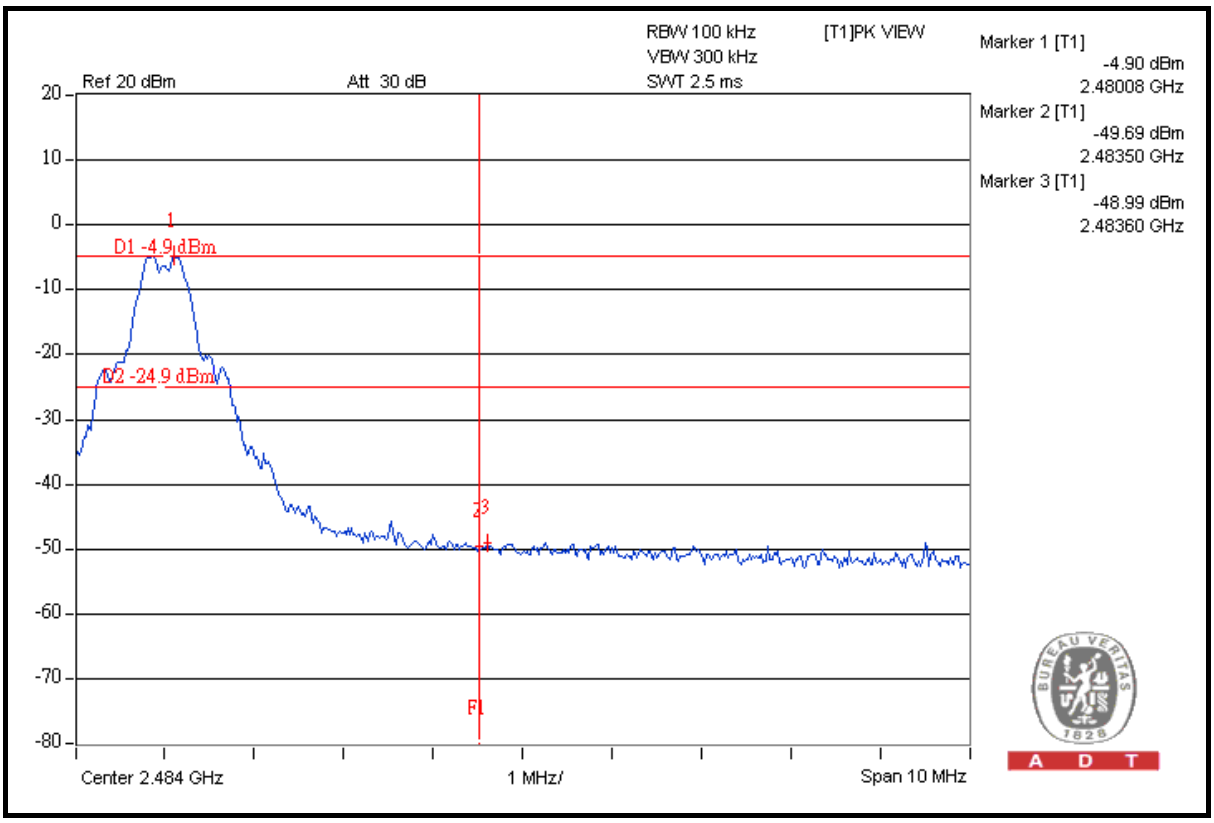
The band edge emission plot on the next second page shows 44.09dBc between carrier maximum power and local maximum emission in restrict band (2.48360GHz). The emission of carrier strength list in the test result of channel 20 at the item 4.1.7 is 92.05dBuV/m (Average), so the maximum field strength in restrict band is 92.05 – 44.09 = 47.96dBuV/m which is under 54dBuV/m limit.

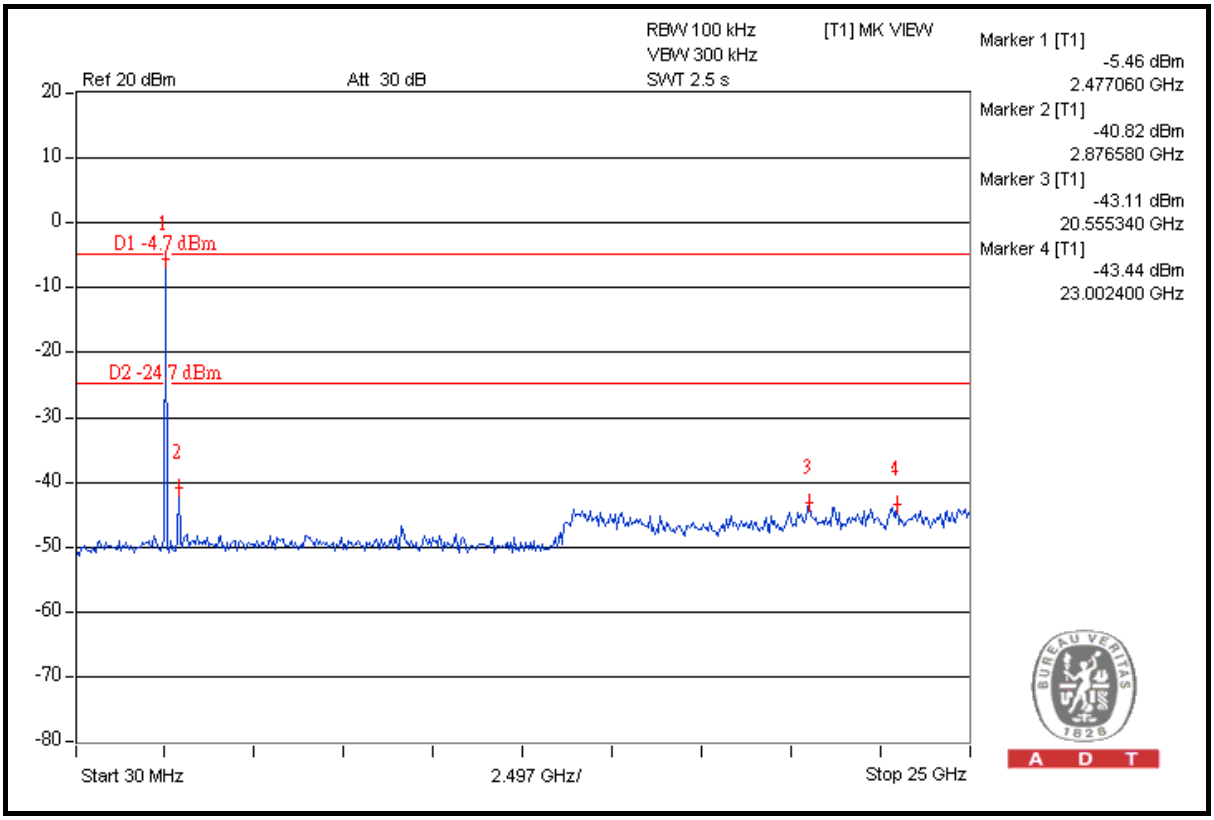

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 20 dBm
Att 30 dB
D1 -2.84 dBm
D2 -22.84 dBm
Marker 1 [T1]
-2.84 dBm
2.410400 GHz
Marker 2 [T1]
-52.02 dBm
2.400000 GHz
Marker 3 [T1]
-48.30 dBm
2.392000 GHz
Marker 4 [T1]
-50.39 dBm
2.390000 GHz
Marker 5 [T1]
-47.81 dBm
2.385200 GHz
Center 2.372 GHz
10 MHz/
Span 100 MHz


RBW 1 MHz
VBW 10 Hz
SWT 25 s
[T1] MK VIEW
Ref 20 dBm
Att 30 dB
D1 -3.24 dBm
D2 -23.24 dBm
Marker 1 [T1]
-3.24 dBm
2.410000 GHz
Marker 2 [T1]
-62.90 dBm
2.400000 GHz
Marker 3 [T1]
-61.91 dBm
2.397000 GHz
Marker 4 [T1]
-63.51 dBm
2.390000 GHz
Marker 5 [T1]
-62.00 dBm
2.332000 GHz
Center 2.372 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20 dBm
Att 30 dB
Marker 1 [T1]
-3.29 dBm
2.377180 GHz
Marker 2 [T1]
-33.80 dBm
2.876580 GHz
Marker 3 [T1]
-43.38 dBm
14.013200 GHz
Marker 4 [T1]
-43.41 dBm
21.903720 GHz
D1 -2.84 dBm
D2 -22.84 dBm
Start 30 MHz
2.497 GHz/
Stop 25 GHz


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 20 dBm
Att 30 dB
Marker 1 [T1]
-4.70 dBm
2.479800 GHz
Marker 2 [T1]
-49.98 dBm
2.483500 GHz
Marker 3 [T1]
-47.46 dBm
2.494800 GHz
Marker 4 [T1]
-51.77 dBm
2.500000 GHz
D1 -4.7 dBm
D2 -24.7 dBm
F1
F2
Center 2.502 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
[T1]PK VIEW
Ref 20 dBm
Att 30 dB
Marker 1 [T1]
-4.90 dBm
2.48008 GHz
Marker 2 [T1]
-49.69 dBm
2.48350 GHz
Marker 3 [T1]
-48.99 dBm
2.48360 GHz
D1 -4.9 dBm
D2 -24.9 dBm
Center 2.484 GHz
1 MHz/
Span 10 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20 dBm
Att 30 dB
Marker 1 [T1]
-5.46 dBm
2.477060 GHz
Marker 2 [T1]
-40.82 dBm
2.876580 GHz
Marker 3 [T1]
-43.11 dBm
20.555340 GHz
Marker 4 [T1]
-43.44 dBm
23.002400 GHz
D1 -4.7 dBm
D2 -24.7 dBm
Start 30 MHz
2.497 GHz/
Stop 25 GHz

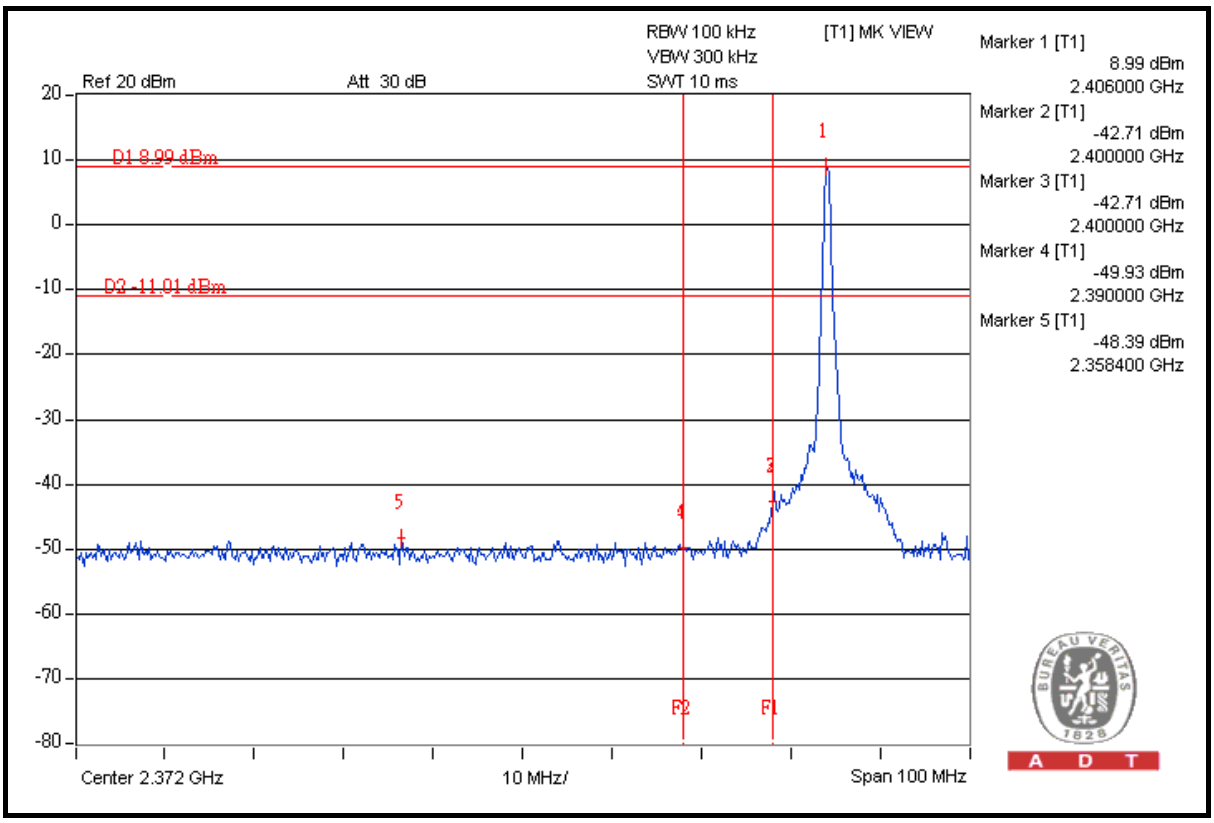
TEST MODE B

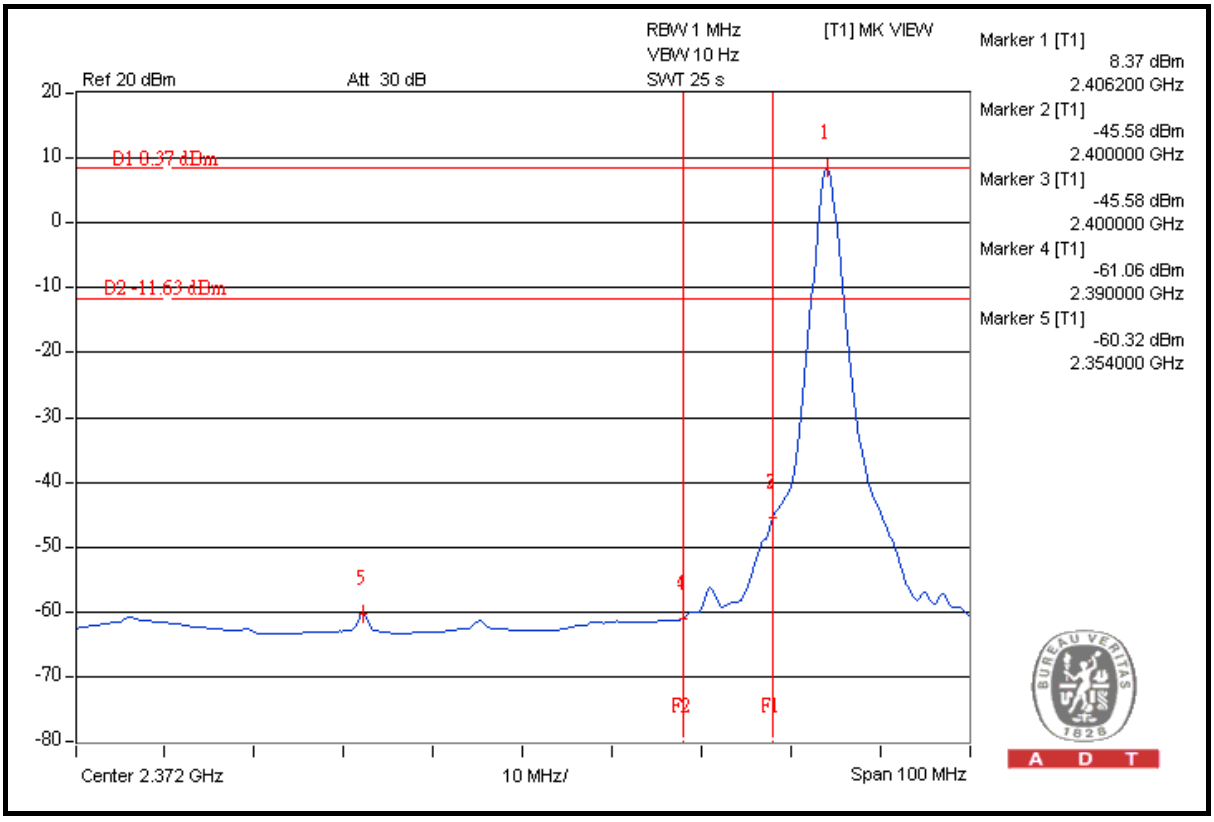
NOTE 1: The band edge emission plot on the next page shows 57.38dBc between carrier maximum power and local maximum emission in restrict band (2.35840GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 94.69dBuV/m (Peak), so the maximum field strength in restrict band is 94.69 – 57.38 = 37.31dBuV/m which is under 74dBuV/m limit.

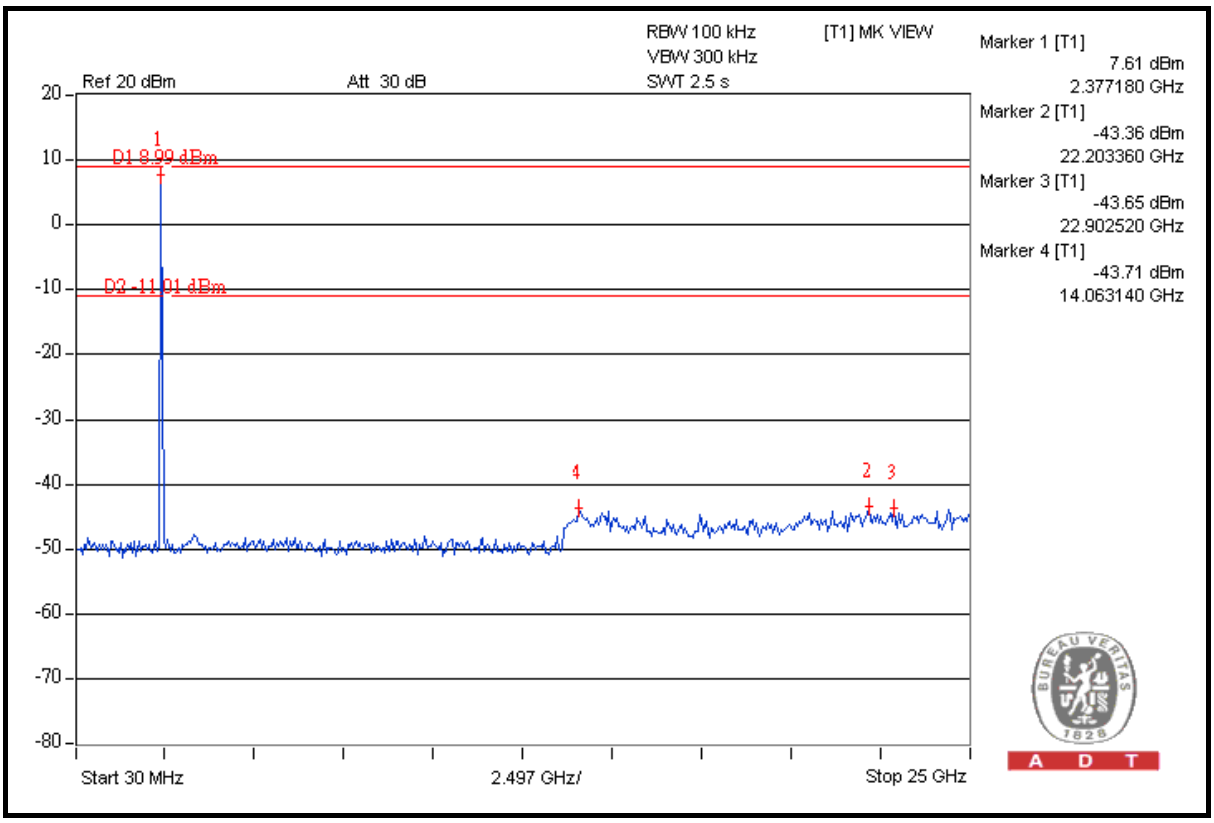
The band edge emission plot on the next page shows 68.69dBc between carrier maximum power and local maximum emission in restrict band (2.35400GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 94.29dBuV/m (Average), so the maximum field strength in restrict band is 94.29 – 68.69 = 25.60dBuV/m which is under 54dBuV/m limit.

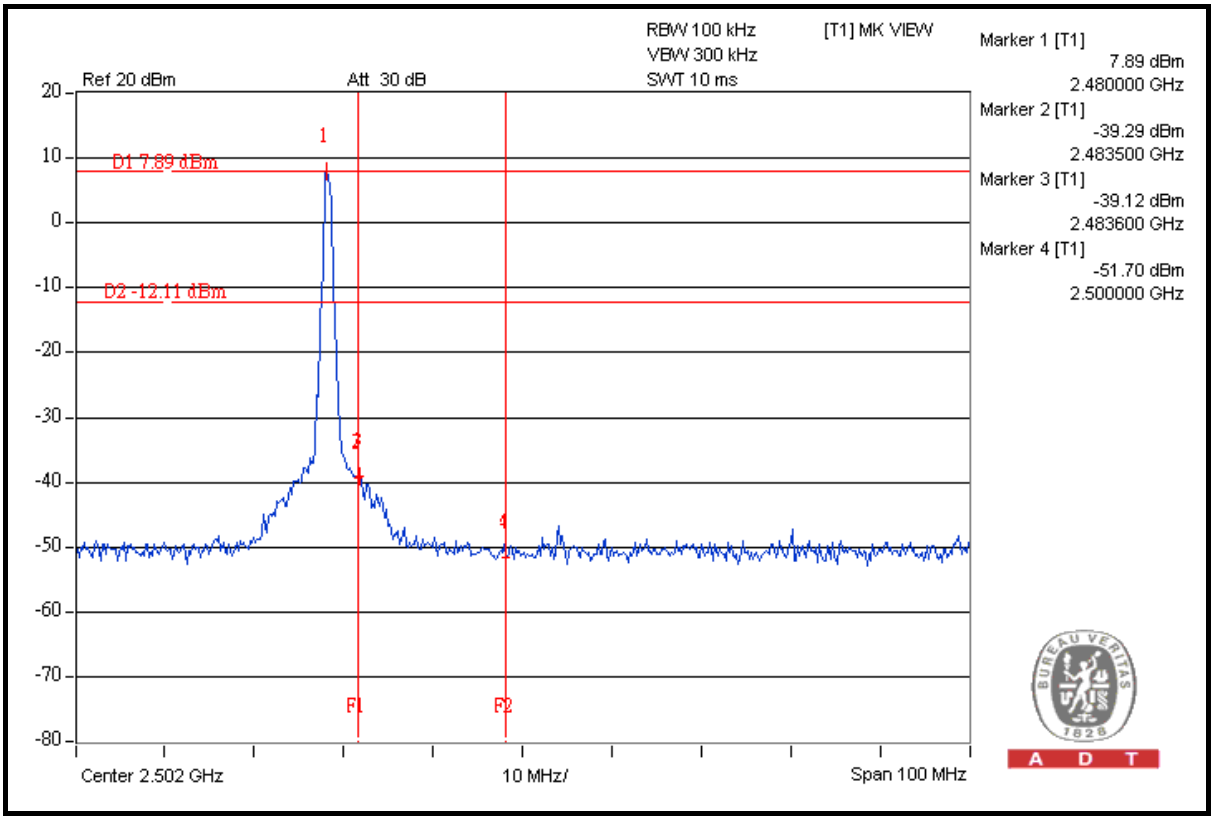
NOTE 2: The band edge emission plot on the next second page shows 46.27dBc between carrier maximum power and local maximum emission in restrict band (2.48352GHz). The emission of carrier strength list in the test result of channel 75 at the item 4.1.7 is 100.26dBuV/m (Peak), so the maximum field strength in restrict band is 100.26 – 46.27 = 53.99dBuV/m which is under 74dBuV/m limit.

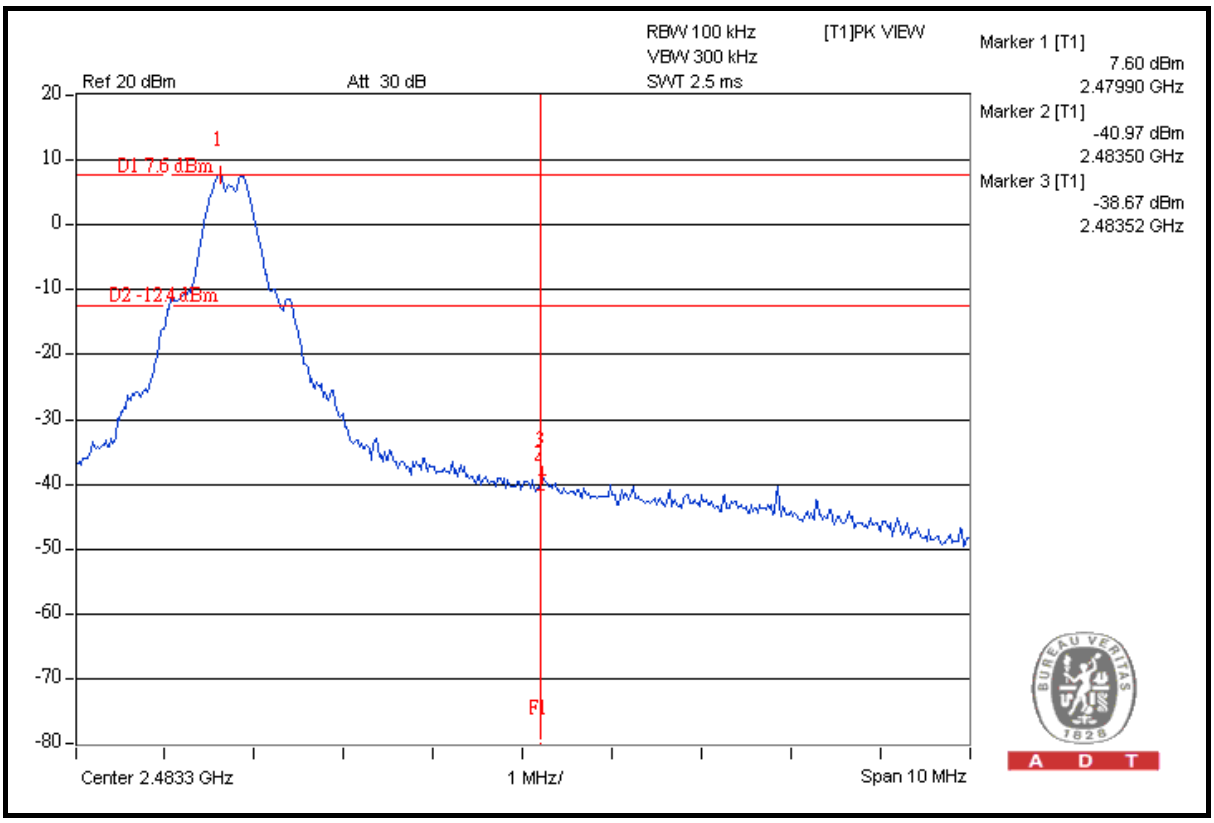
The band edge emission plot on the next second page shows 46.27dBc between carrier maximum power and local maximum emission in restrict band (2.48352GHz). The emission of carrier strength list in the test result of channel 75 at the item 4.1.7 is 99.87dBuV/m (Average), so the maximum field strength in restrict band is 99.87 – 46.27 = 53.60dBuV/m which is under 54dBuV/m limit.

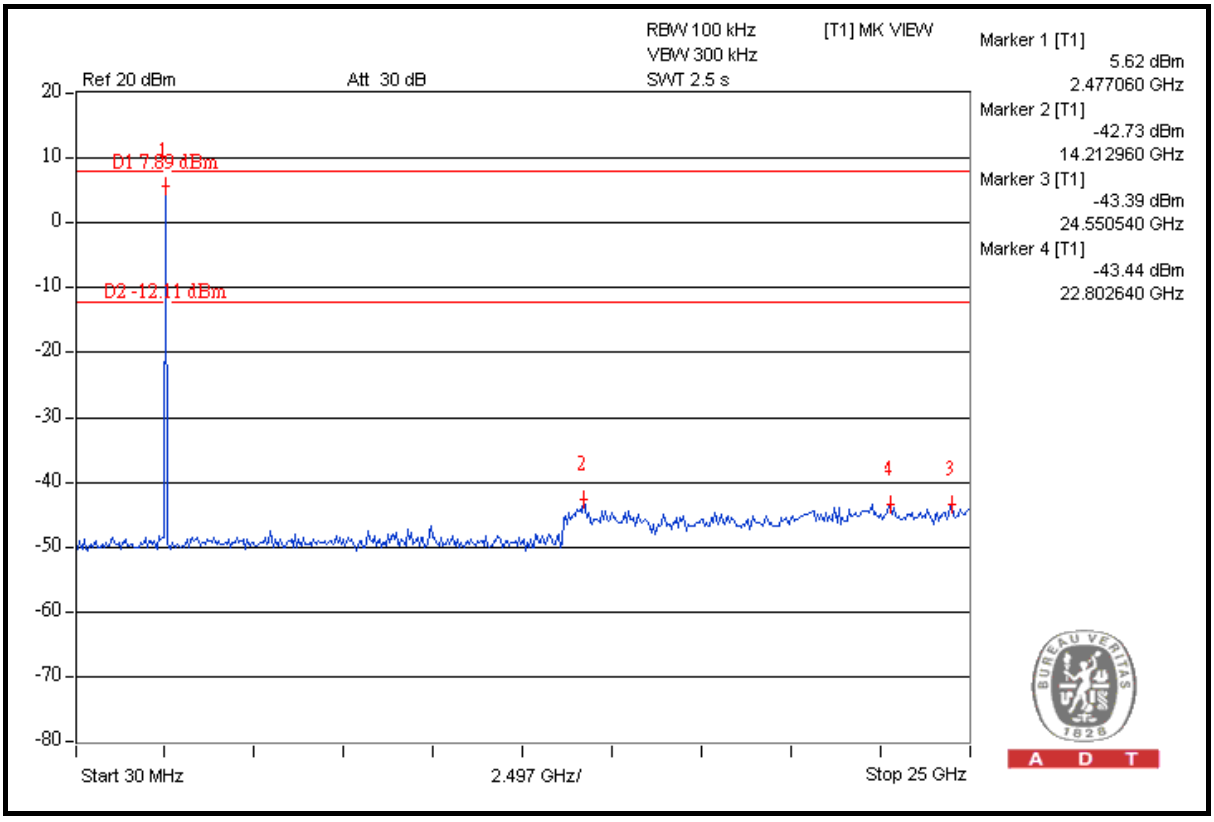

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 20 dBm
Att 30 dB
D1 8.99 dBm
D2 -11.01 dBm
Marker 1 [T1]
8.99 dBm
2.406000 GHz
Marker 2 [T1]
-42.71 dBm
2.400000 GHz
Marker 3 [T1]
-42.71 dBm
2.400000 GHz
Marker 4 [T1]
-49.93 dBm
2.390000 GHz
Marker 5 [T1]
-48.39 dBm
2.358400 GHz
Center 2.372 GHz
10 MHz/
Span 100 MHz


RBW 1 MHz
VBW 10 Hz
SWT 25 s
[T1] MK VIEW
Ref 20 dBm
Att 30 dB
D1 0.37 dBm
D2 -11.63 dBm
Marker 1 [T1]
8.37 dBm
2.406200 GHz
Marker 2 [T1]
-45.58 dBm
2.400000 GHz
Marker 3 [T1]
-45.58 dBm
2.400000 GHz
Marker 4 [T1]
-61.06 dBm
2.390000 GHz
Marker 5 [T1]
-60.32 dBm
2.354000 GHz
Center 2.372 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20 dBm
Att 30 dB
D1 8.99 dBm
D2 -11.01 dBm
Marker 1 [T1]
7.61 dBm
2.377180 GHz
Marker 2 [T1]
-43.36 dBm
22.203360 GHz
Marker 3 [T1]
-43.65 dBm
22.902520 GHz
Marker 4 [T1]
-43.71 dBm
14.063140 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 20 dBm
Att 30 dB
D1 7.89 dBm
D2 -12.11 dBm
Marker 1 [T1]
7.89 dBm
2.480000 GHz
Marker 2 [T1]
-39.29 dBm
2.483500 GHz
Marker 3 [T1]
-39.12 dBm
2.483600 GHz
Marker 4 [T1]
-51.70 dBm
2.500000 GHz
F1
F2
Center 2.502 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
[T1]PK VIEW
Ref 20 dBm
Att 30 dB
D1 7.6 dBm
D2 -12.4 dBm
Marker 1 [T1]
7.60 dBm
2.47990 GHz
Marker 2 [T1]
-40.97 dBm
2.48350 GHz
Marker 3 [T1]
-38.67 dBm
2.48352 GHz
Center 2.4833 GHz
1 MHz/
Span 10 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20 dBm
Att 30 dB
D1 7.89 dBm
D2 -12.11 dBm
Marker 1 [T1]
5.62 dBm
2.477060 GHz
Marker 2 [T1]
-42.73 dBm
14.212960 GHz
Marker 3 [T1]
-43.39 dBm
24.550540 GHz
Marker 4 [T1]
-43.44 dBm
22.802640 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

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 Chip antenna with SMT antenna connector.
The maximum Gain of the antenna is 2.1dBi.

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 ---