



FCC TEST REPORT

REPORT NO.: RF980602A16

MODEL NO.: MA2GC

RECEIVED: June 16, 2009

TESTED: June 16 ~ 19, 2009

ISSUED: June 29, 2009

APPLICANT: Darfon Electronics Corp.

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

LAB LOCATION: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou
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1. CERTIFICATION

PRODUCT: Wireless optical mouse
BRAND NAME: ACER
MODEL NO.: MA2GC
APPLICANT: Darfon Electronics Corp.
TESTED: June 16 ~ 19, 2009
TEST SAMPLE: R&D SAMPLE
STANDARDS: FCC Part 15, Subpart C (Section 15.247),
ANSI C63.4-2003

The above equipment 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 : Celia Chen , **DATE:** June 29, 2009
(Celia Chen / Senior Specialist)

TECHNICAL ACCEPTANCE : Jamison Chan , **DATE:** June 29, 2009
Responsible for RF (Jamison Chan / Supervisor)

APPROVED BY : Ken Liu , **DATE:** June 29, 2009
(Ken Liu / Assistant Manager)



2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
Standard Section	Test Type and Limit	Result	Remark
15.207	AC Power Conducted Emission	N/A	Power supply is 3Vdc from batteries
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 -6.31dB at 4958.00MHz
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:

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

Measurement	Frequency	Uncertainty
Radiated emissions	30MHz ~ 1GHz	3.72 dB
	1GHz ~ 40GHz	2.89 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Wireless optical mouse
MODEL NO.	MA2GC
FCC ID	O62MA2GC
POWER SUPPLY	3Vdc from batteries
MODULATION TYPE	GFSK
OUTPUT POWER	0.394mW
OPERATING FREQUENCY	2402MHz ~ 2479MHz
NUMBER OF CHANNEL	78
ANTENNA TYPE	Printed antenna with 0dBi gain
DATA CABLE	N/A
I/O PORTS	N/A
ASSOCIATED DEVICES	N/A

NOTE:

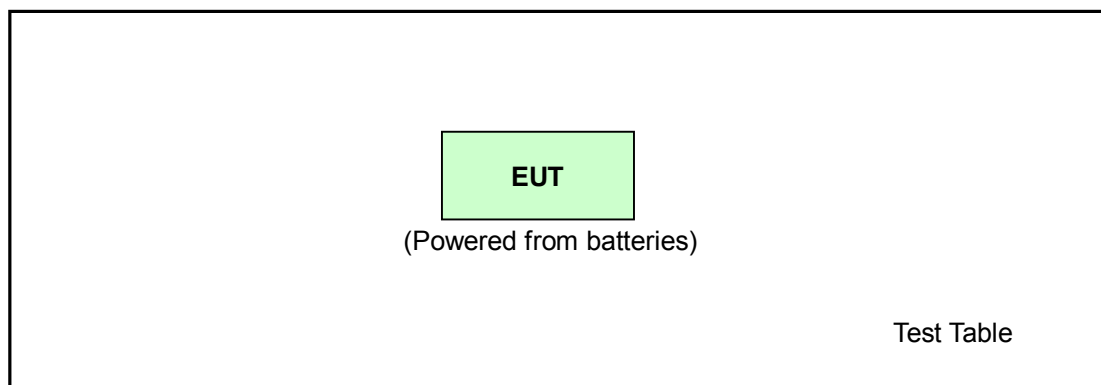
1. The EUT is a Wireless optical mouse, which is a transceiver.
2. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

78 channels are provided to this EUT:

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460		
19	2421	39	2441	59	2461		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST





3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	Note	√	√	√	-

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

Note: No need to concern of Conducted Emission due to the EUT is powered by battery.

RADIATED EMISSION TEST (BELOW 1 GHz):

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
0 to 77	77	GFSK

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
0 to 77	0, 39, 77	GFSK

BANDEDGE MEASUREMENT:

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
0 to 77	0, 77	GFSK

ANTENNA PORT CONDUCTED MEASUREMENT:

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
0 to 77	0, 39, 77	GFSK



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.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together without any necessary accessory or support unit.

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

N/A

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

NOTE:

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



4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	May 04, 2009	May 03, 2010
HP Preamplifier	8449B	3008A01924	Sep. 03, 2008	Sep. 02, 2009
HP Preamplifier	8449B	3008A01292	Aug. 06, 2008	Aug. 05, 2009
ROHDE & SCHWARZ TEST RECEIVER	ESI7	836697/012	Dec. 04, 2008	Dec. 03, 2009
Schwarzbeck Antenna	VULB 9168	137	Apr. 29, 2009	Apr. 28, 2010
Schwarzbeck Antenna	VHBA 9123	480	Apr. 21, 2009	Apr. 20, 2010
EMCO Horn Antenna	3115	6714	Oct. 17, 2008	Oct. 16, 2009
EMCO Horn Antenna	3115	9312-4192	Apr. 17, 2009	Apr. 16, 2010
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	ADT_Radiated_V 7.6.15.9.2	NA	NA	NA
SUHNER RF cable	SF104-26.5	CABLE-CH6-17m -01	Aug. 22, 2008	Aug. 21, 2009
ROHDE & SCHWARZ Spectrum Analyzer	FSP 40	100036	Apr. 03, 2009	Apr. 02, 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. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 3. The test was performed in Chamber No. 6.
 4. The Industry Canada Reference No. IC 7450E-6.
 5. The FCC Site Registration No. is 447212.



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4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. 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 method or average method as specified and then reported in data sheet.

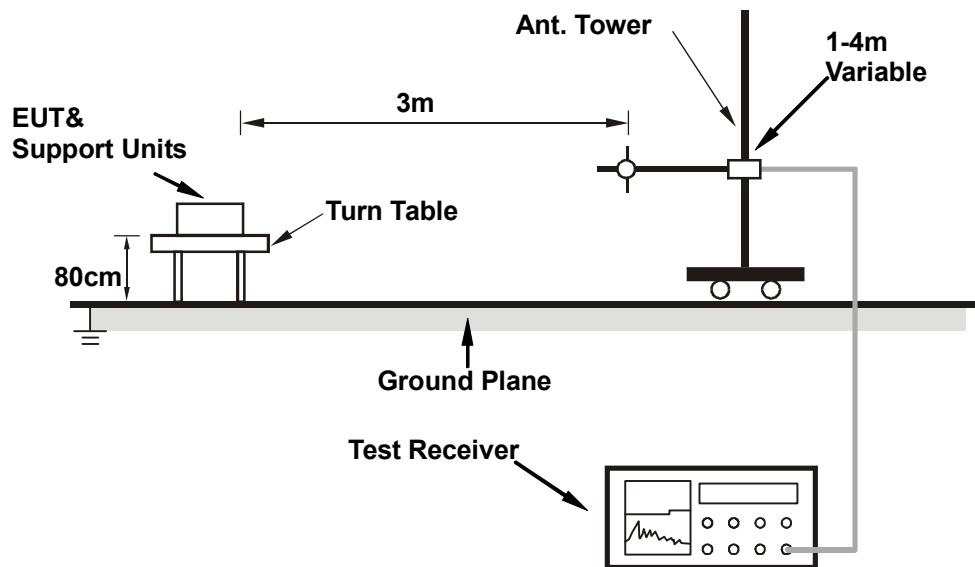
NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Set the EUT under transmission condition continuously at specific channel frequency.

4.2.7 TEST RESULTS

ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 83%RH 1006 hPa	TESTED BY	Nick Chen

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	61.10 PK	74.00	-12.90	1.00 H	231	26.03	35.07
2	2390.00	47.10 AV	54.00	-6.90	1.00 H	231	12.03	35.07
3	2400.00	55.11 PK	74.00	-18.89	1.00 H	231	20.02	35.09
4	2400.00	38.58 AV	54.00	-15.42	1.00 H	231	3.49	35.09
5	*2402.00	93.00 PK			1.00 H	231	57.91	35.09
6	*2402.00	76.47 AV			1.00 H	231	41.38	35.09
7	2747.00	51.45 PK	74.00	-22.55	1.02 H	201	15.05	36.40
8	2747.00	42.87 AV	54.00	-11.13	1.02 H	201	6.47	36.40
9	4804.00	54.86 PK	74.00	-19.14	1.00 H	193	11.87	42.99
10	4804.00	39.03 AV	54.00	-14.97	1.00 H	193	-3.96	42.99

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 83%RH 1006 hPa	TESTED BY	Nick Chen

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	59.89 PK	74.00	-14.11	1.00 V	171	24.82	35.07
2	2390.00	47.05 AV	54.00	-6.95	1.00 V	171	11.98	35.07
3	2400.00	48.20 PK	74.00	-25.80	1.00 V	171	13.11	35.09
4	2400.00	32.19 AV	54.00	-21.81	1.00 V	171	-2.90	35.09
5	*2402.00	86.09 PK			1.00 V	171	51.00	35.09
6	*2402.00	70.08 AV			1.00 V	171	34.99	35.09
7	2747.00	49.90 PK	74.00	-24.10	1.05 V	103	13.50	36.40
8	2747.00	40.63 AV	54.00	-13.37	1.05 V	103	4.23	36.40
9	4804.00	59.11 PK	74.00	-14.89	1.00 V	172	16.12	42.99
10	4804.00	42.37 AV	54.00	-11.63	1.00 V	172	-0.62	42.99

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 83%RH 1006 hPa	TESTED BY	Nick Chen

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	*2441.00	94.33 PK			1.00 H	243	59.16	35.17
2	*2441.00	77.51 AV			1.00 H	243	42.34	35.17
3	2792.00	50.82 PK	74.00	-23.18	1.05 H	201	14.24	36.58
4	2792.00	42.26 AV	54.00	-11.74	1.05 H	201	5.68	36.58
5	4882.00	55.21 PK	74.00	-18.79	1.00 H	189	12.07	43.14
6	4882.00	39.04 AV	54.00	-14.96	1.00 H	189	-4.10	43.14

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	*2441.00	87.83 PK			1.00 V	277	52.66	35.17
2	*2441.00	71.12 AV			1.00 V	277	35.95	35.17
3	2792.00	49.44 PK	74.00	-24.56	1.00 V	149	12.86	36.58
4	2792.00	39.30 AV	54.00	-14.70	1.00 V	149	2.72	36.58
5	4882.00	58.09 PK	74.00	-15.91	1.11 V	171	14.95	43.14
6	4882.00	42.08 AV	54.00	-11.92	1.11 V	171	-1.06	43.14

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 77	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 83%RH 1006 hPa	TESTED BY	Nick Chen

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	*2479.00	96.26 PK			1.00 H	241	61.01	35.25
2	*2479.00	79.51 AV			1.00 H	241	44.26	35.25
3	2483.50	50.61 PK	74.00	-23.39	1.00 H	241	15.35	35.26
4	2483.50	33.86 AV	54.00	-20.14	1.00 H	241	-1.40	35.26
5	2836.00	49.87 PK	74.00	-24.13	1.04 H	206	13.10	36.78
6	2836.00	40.97 AV	54.00	-13.03	1.04 H	206	4.20	36.78
7	4958.00	55.00 PK	74.00	-19.00	1.00 H	316	11.70	43.30
8	4958.00	38.26 AV	54.00	-15.74	1.00 H	316	-5.04	43.30
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	*2479.00	89.71 PK			1.24 V	147	54.46	35.25
2	*2479.00	73.36 AV			1.24 V	147	38.11	35.25
3	2483.50	44.06 PK	74.00	-29.94	1.24 V	147	8.80	35.26
4	2483.50	27.71 AV	54.00	-26.29	1.24 V	147	-7.55	35.26
5	2836.00	51.48 PK	74.00	-22.52	1.06 V	149	14.71	36.78
6	2836.00	41.65 AV	54.00	-12.35	1.06 V	149	4.88	36.78
7	4958.00	58.13 PK	74.00	-15.87	1.07 V	160	14.83	43.30
8	4958.00	47.69 AV	54.00	-6.31	1.07 V	160	4.39	43.30

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

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 77	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	3Vdc	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 83%RH 1006 hPa	TESTED BY	Nick Chen

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	64.99	19.93 QP	40.00	-20.07	1.08 H	259	7.42	12.51
2	696.75	23.09 QP	46.00	-22.91	1.13 H	10	-1.67	24.76
3	737.58	23.61 QP	46.00	-22.39	1.08 H	244	-1.94	25.55
4	786.17	23.81 QP	46.00	-22.19	1.32 H	10	-2.57	26.38
5	830.88	24.93 QP	46.00	-21.07	1.13 H	340	-2.17	27.10
6	863.93	25.23 QP	46.00	-20.77	1.11 H	268	-2.35	27.58
7	891.14	25.41 QP	46.00	-20.59	1.00 H	325	-2.51	27.93
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	66.93	21.12 QP	40.00	-18.88	1.02 V	316	8.74	12.38
2	103.87	31.96 QP	43.50	-11.54	1.11 V	301	22.59	9.37
3	700.64	23.25 QP	46.00	-22.75	1.25 V	160	-1.57	24.82
4	784.23	24.42 QP	46.00	-21.58	1.00 V	181	-1.93	26.35
5	832.83	24.60 QP	46.00	-21.40	1.08 V	214	-2.53	27.13
6	875.59	26.11 QP	46.00	-19.89	1.13 V	259	-1.62	27.73
7	904.75	25.71 QP	46.00	-20.29	1.00 V	157	-2.38	28.09
8	955.29	26.76 QP	46.00	-19.24	1.03 V	40	-1.89	28.65

- 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.

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP 40	100036	Apr. 03, 2009	Apr. 02, 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 enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.



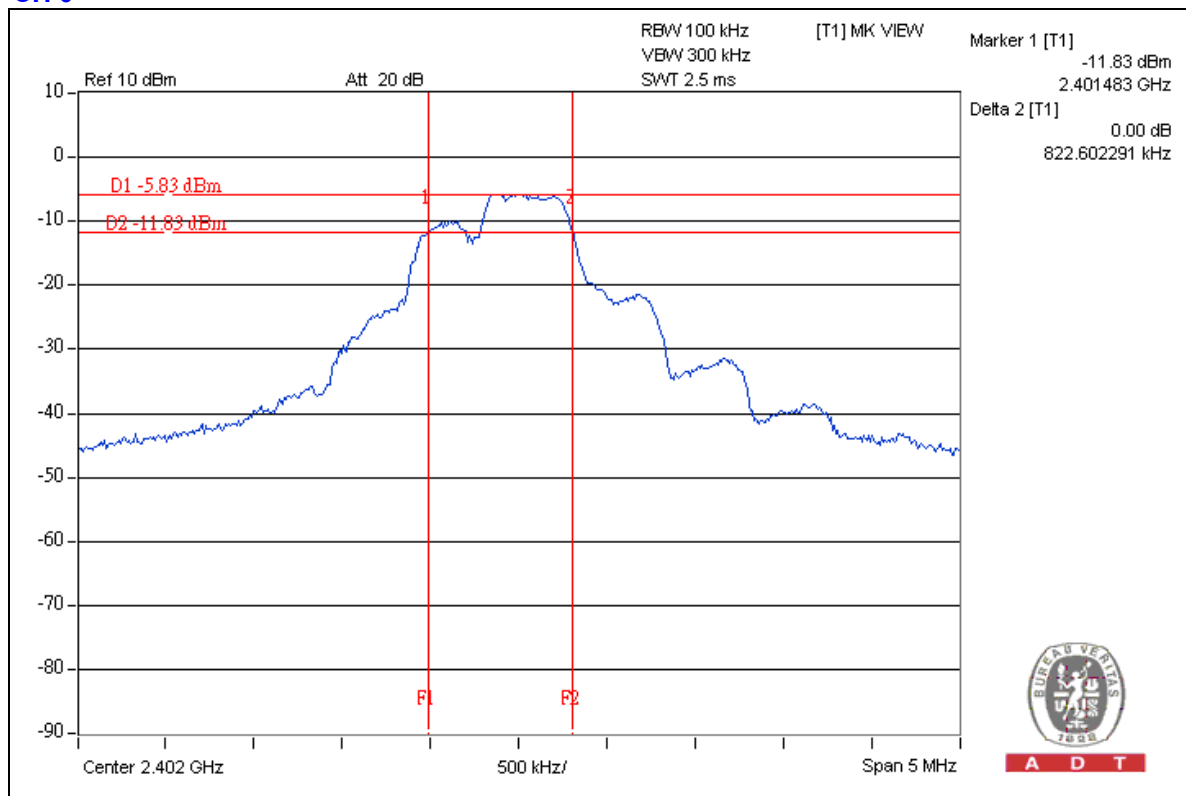
A D T

4.3.7 TEST RESULTS

CHANNEL	0, 39, 77	INPUT POWER	3Vdc
ENVIRONMENTAL CONDITIONS	26deg. C, 66% RH, 1003hPa	TESTED BY	Nick Chen

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
0	2402	0.822	0.5	PASS
39	2441	0.605	0.5	PASS
77	2479	0.543	0.5	PASS

CH 0

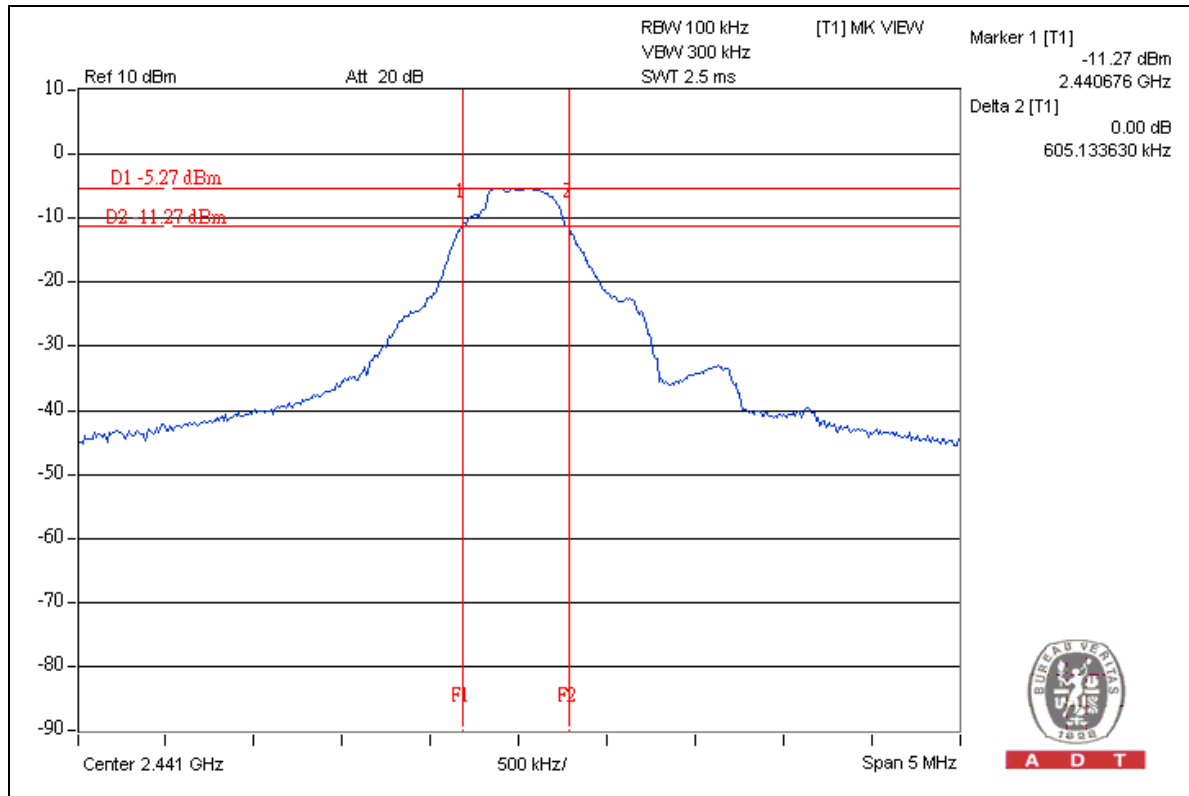


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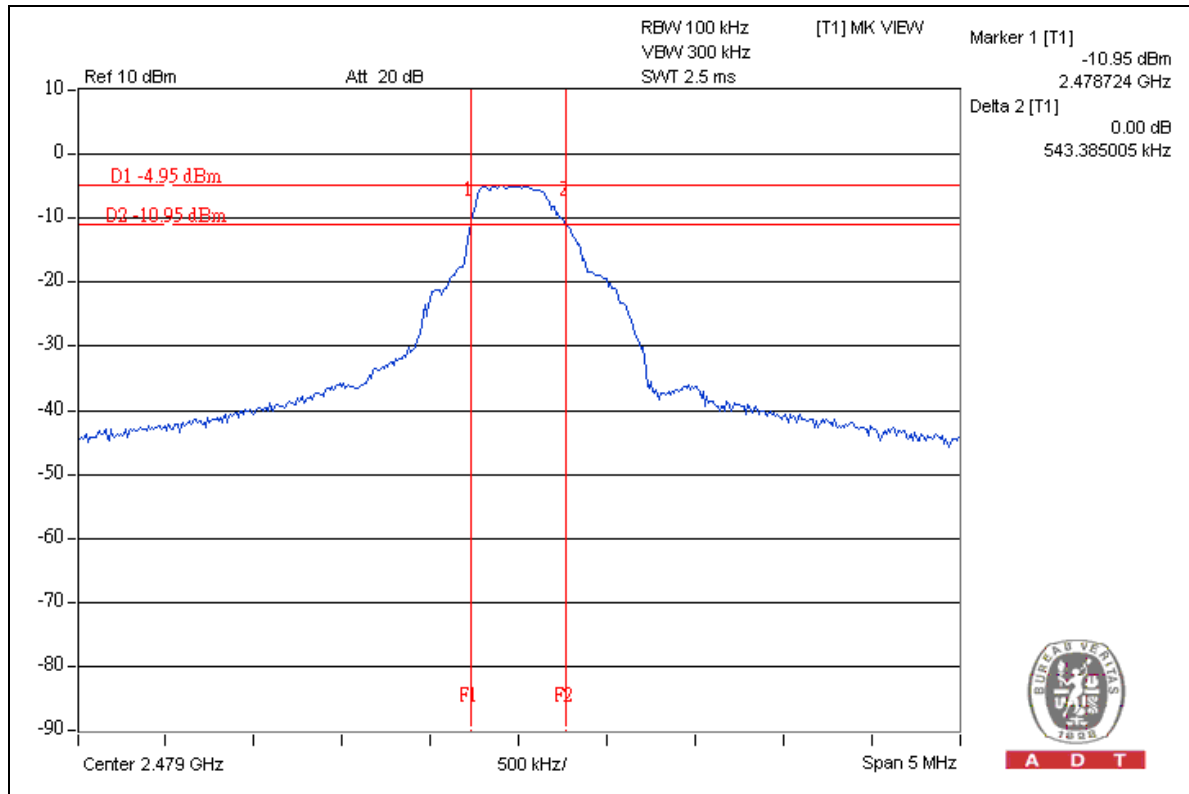


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CH 39



CH 77





4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP 40	100036	Apr. 03, 2009	Apr. 02, 2010

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

4.4.3 TEST PROCEDURES

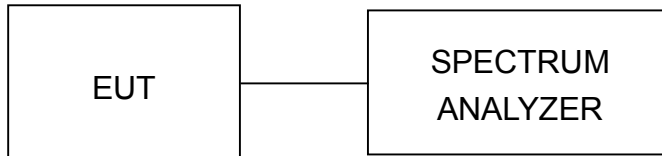
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3 MHz RBW and 10 MHz VBW, the peak value was measured and recorded.
4. Repeat above procedures until all frequencies measured were complete.

Note: The spectrum plots are attached on following pages.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

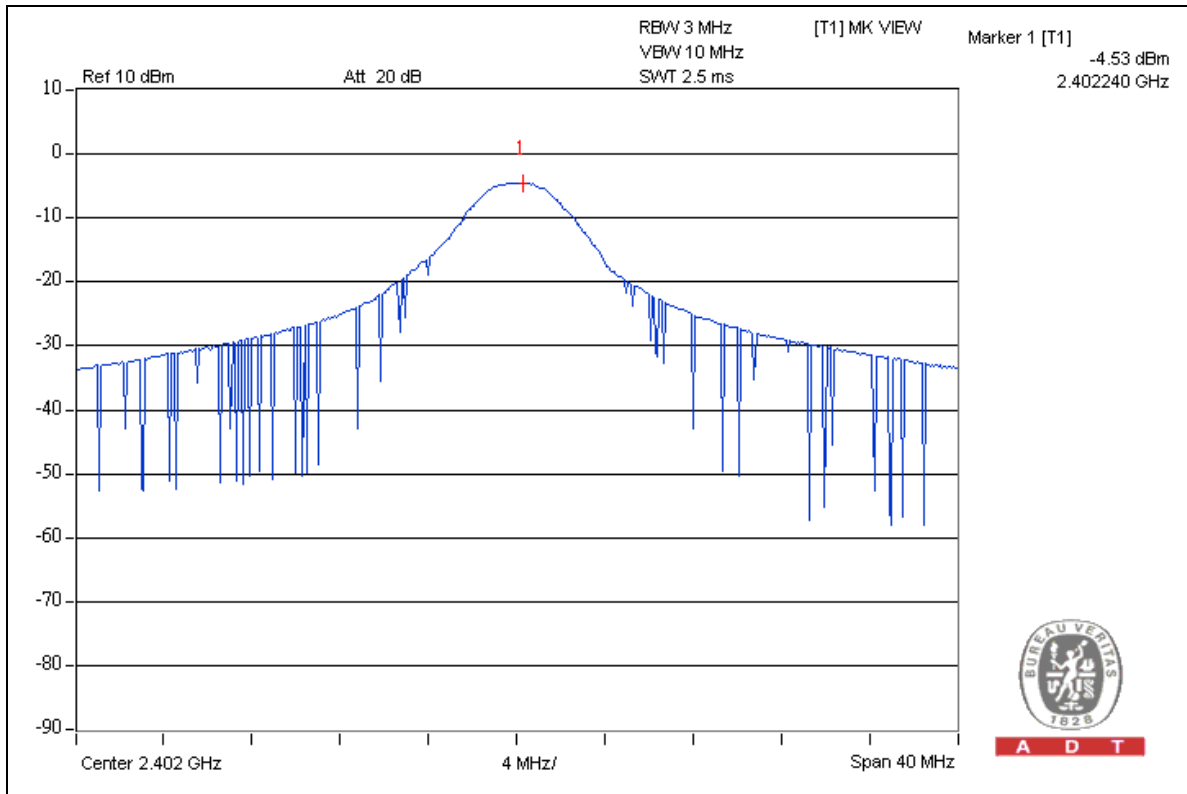
CHANNEL	0, 39, 77	INPUT POWER	3Vdc
ENVIRONMENTAL CONDITIONS	26deg. C, 66% RH, 1003hPa	TESTED BY	Nick Chen

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	-4.53	0.352	30	PASS
39	2441	-4.10	0.389	30	PASS
77	2479	-4.04	0.394	30	PASS

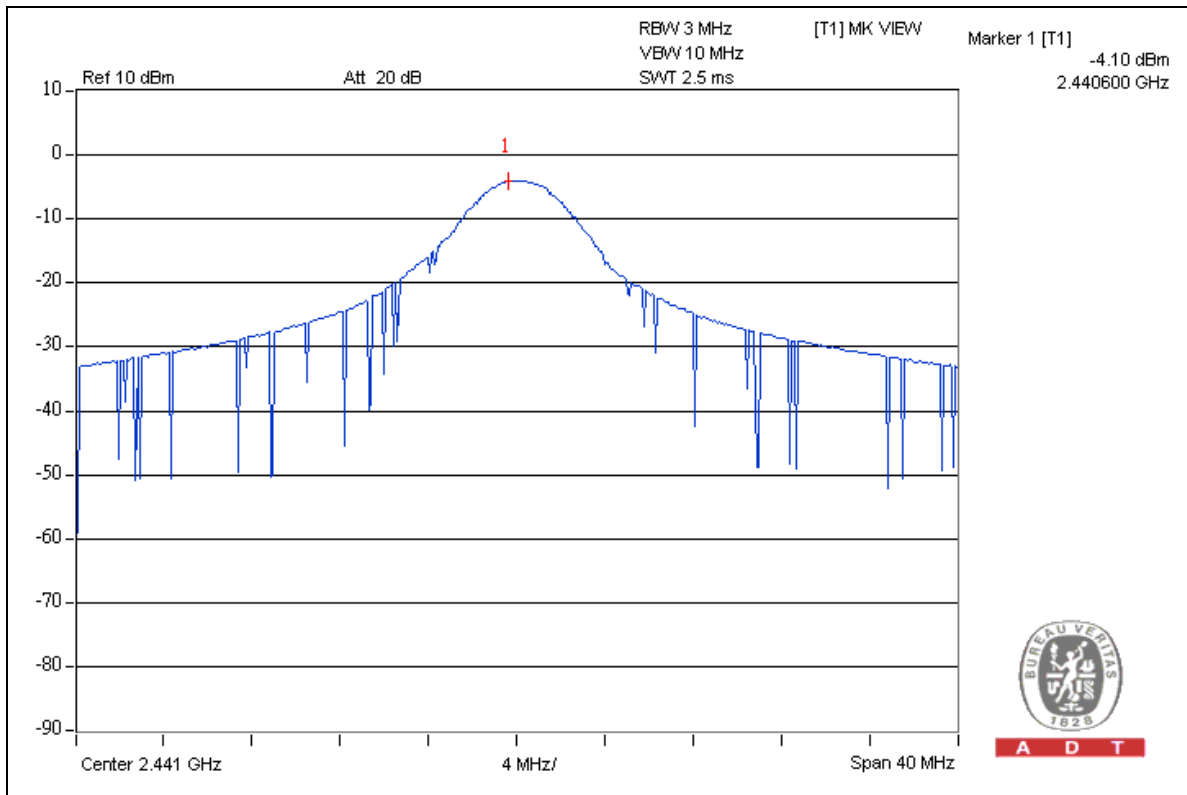


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CH 0



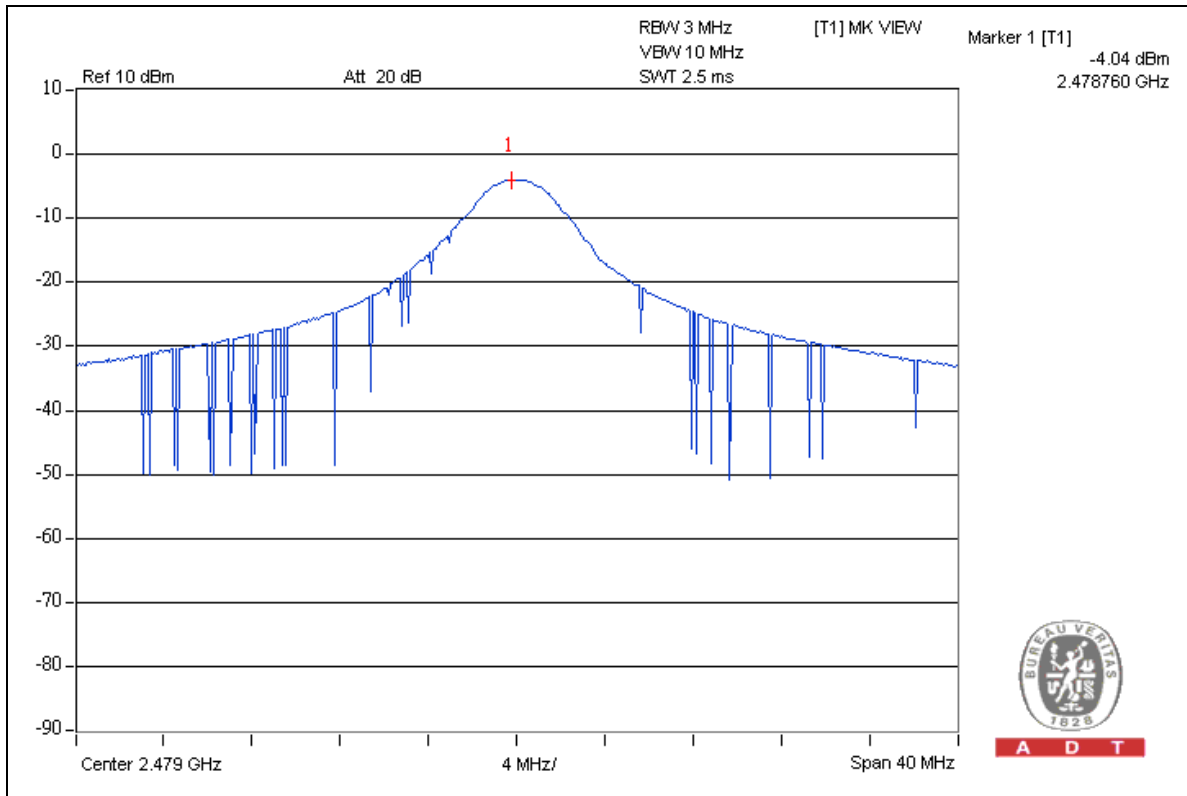
CH 39





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CH 77



4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP 40	100036	Apr. 03, 2009	Apr. 02, 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

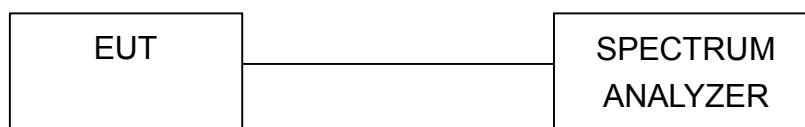
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

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



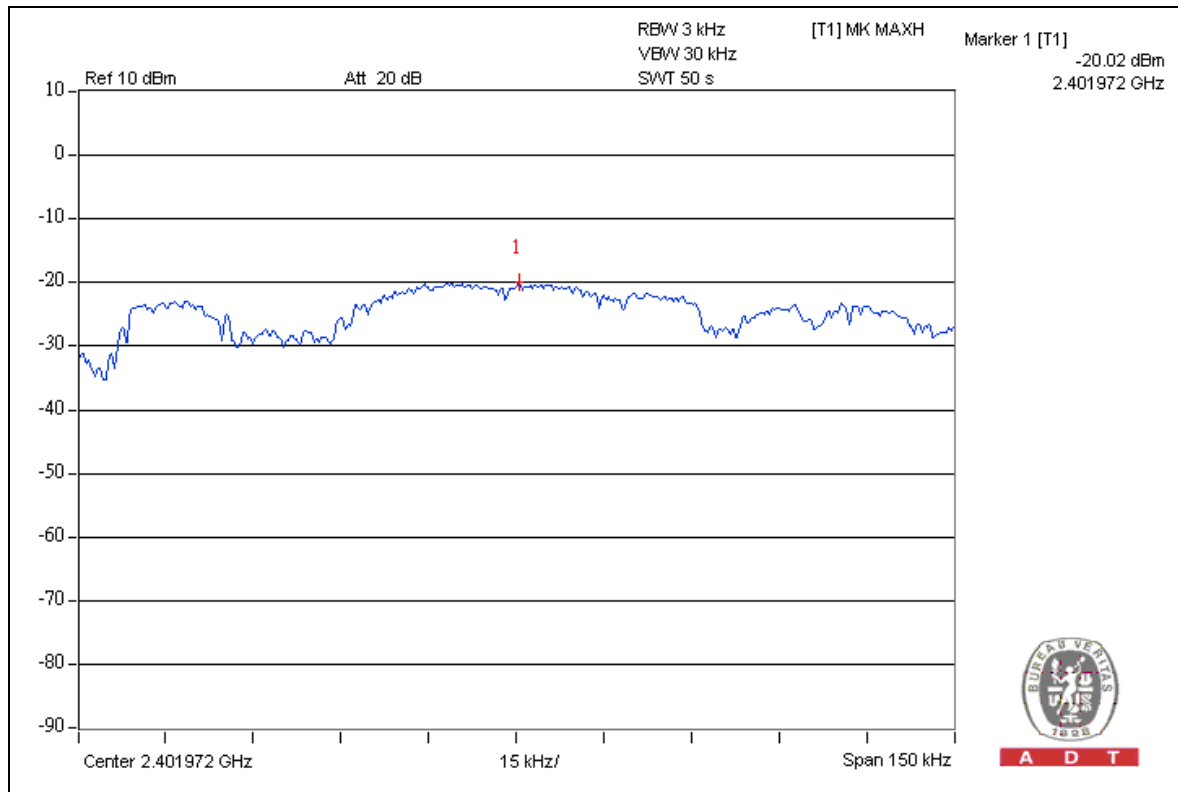
A D T

4.5.7 TEST RESULTS

CHANNEL	0, 39, 77	INPUT POWER	3Vdc
ENVIRONMENTAL CONDITIONS	26deg. C, 66% RH, 1003hPa	TESTED BY	Nick Chen

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
0	2402	-20.02	8	PASS
39	2441	-16.39	8	PASS
77	2479	-16.43	8	PASS

CH 0

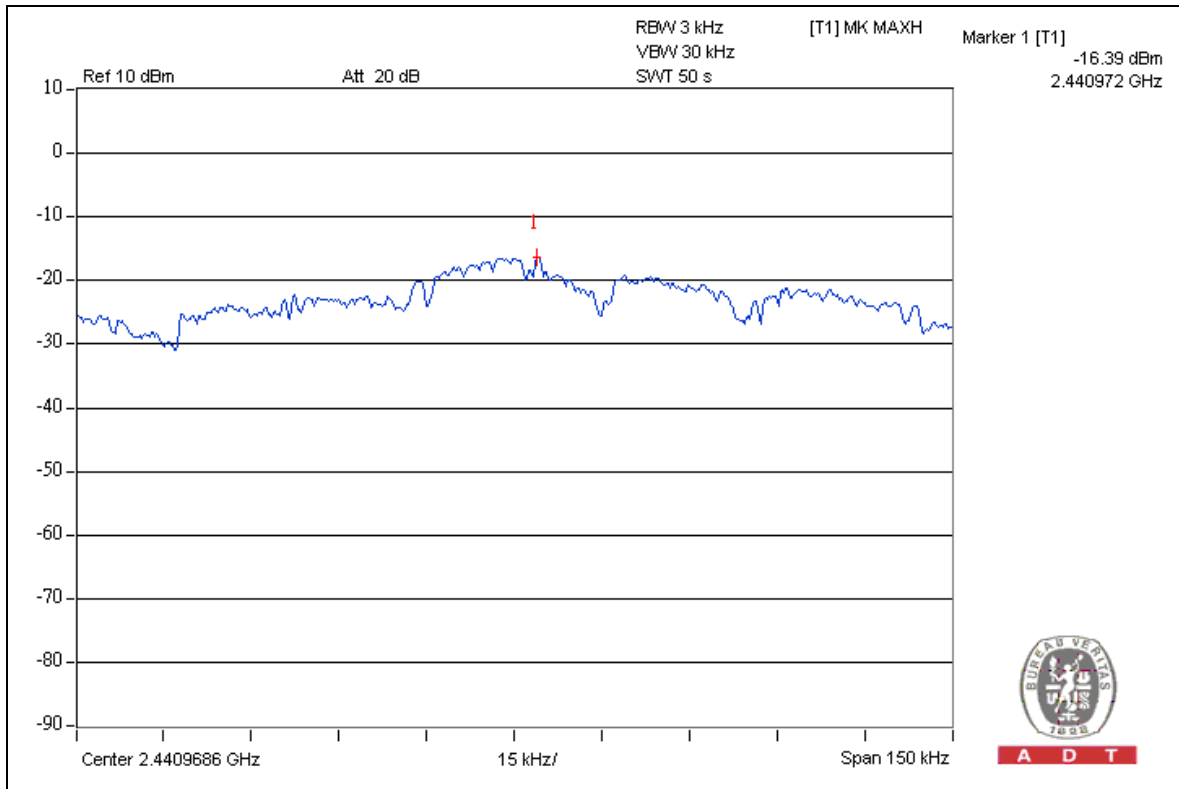


A D T

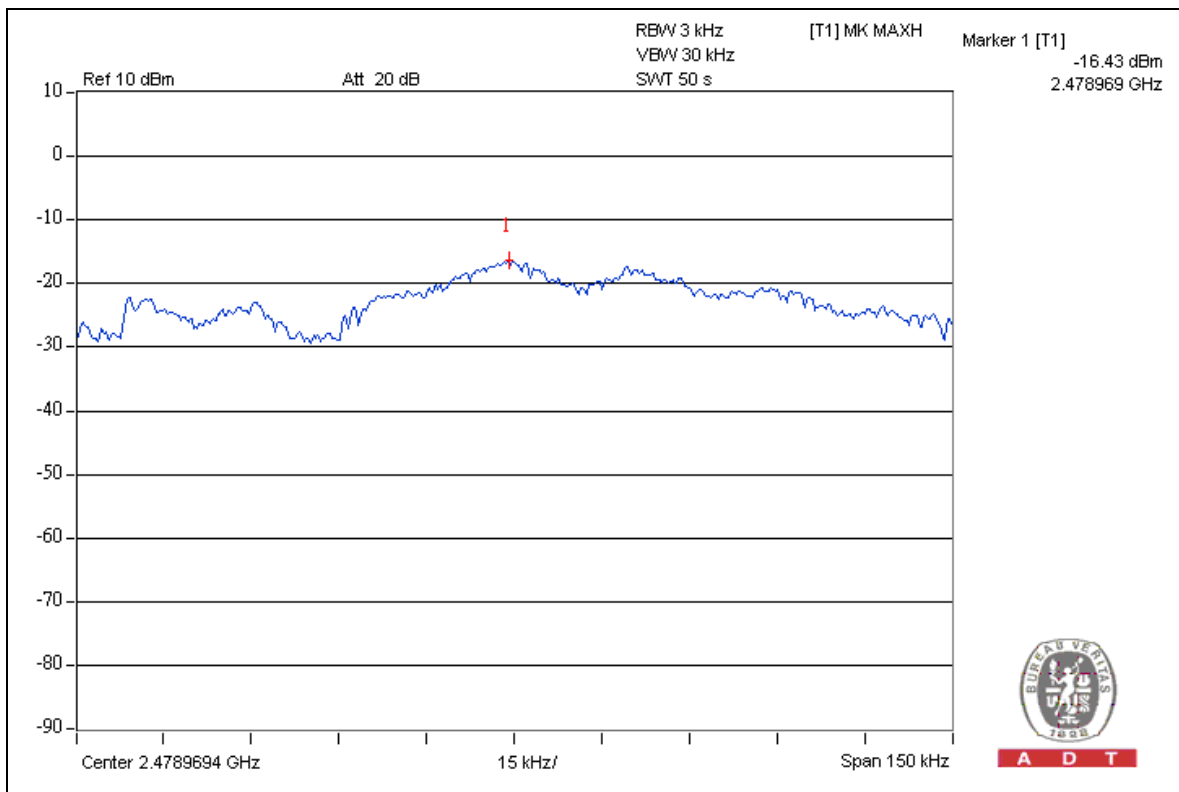


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CH 39



CH 77





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.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP 40	100036	Apr. 03, 2009	Apr. 02, 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 RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW=100kHz, VBW=300kHz; Average RBW=1MHz, VBW= 1kHz 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 50.38dBc between carrier maximum power and local maximum emission in restrict band (2.3898GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 93.00dBuV/m (Peak), so the maximum field strength in restrict band is $93.00 - 50.38 = 42.62$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot the next page shows 61.55dBc between carrier maximum power and local maximum emission in restrict band (2.3860GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 76.47dBuV/m (Average), so the maximum field strength in restrict band is $76.47 - 61.55 = 14.92$ dBuV/m which is under 54dBuV/m limit.

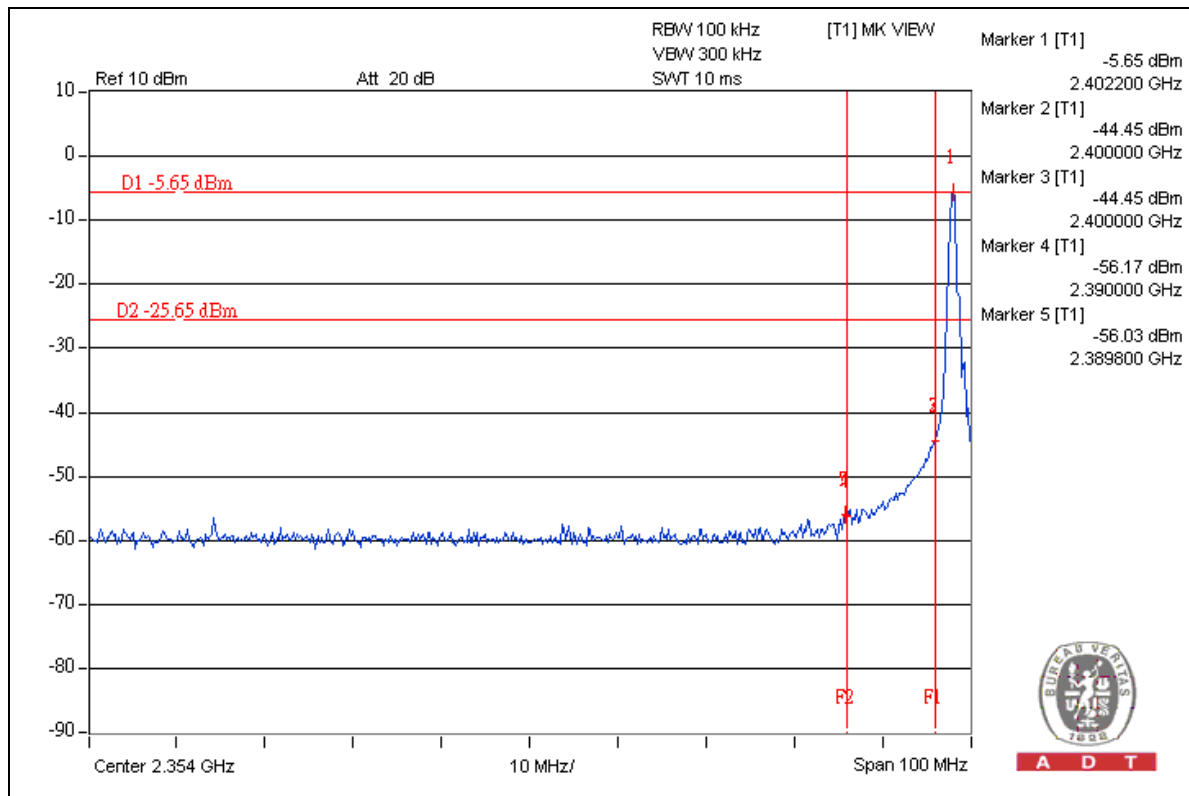
Note 2:

The band edge emission plot on the next second page shows 45.53dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 77 at the item 4.2.7 is 96.26dBuV/m (Peak), so the maximum field strength in restrict band is $96.26 - 45.53 = 50.73$ dBuV/m which is under 74dBuV/m limit.

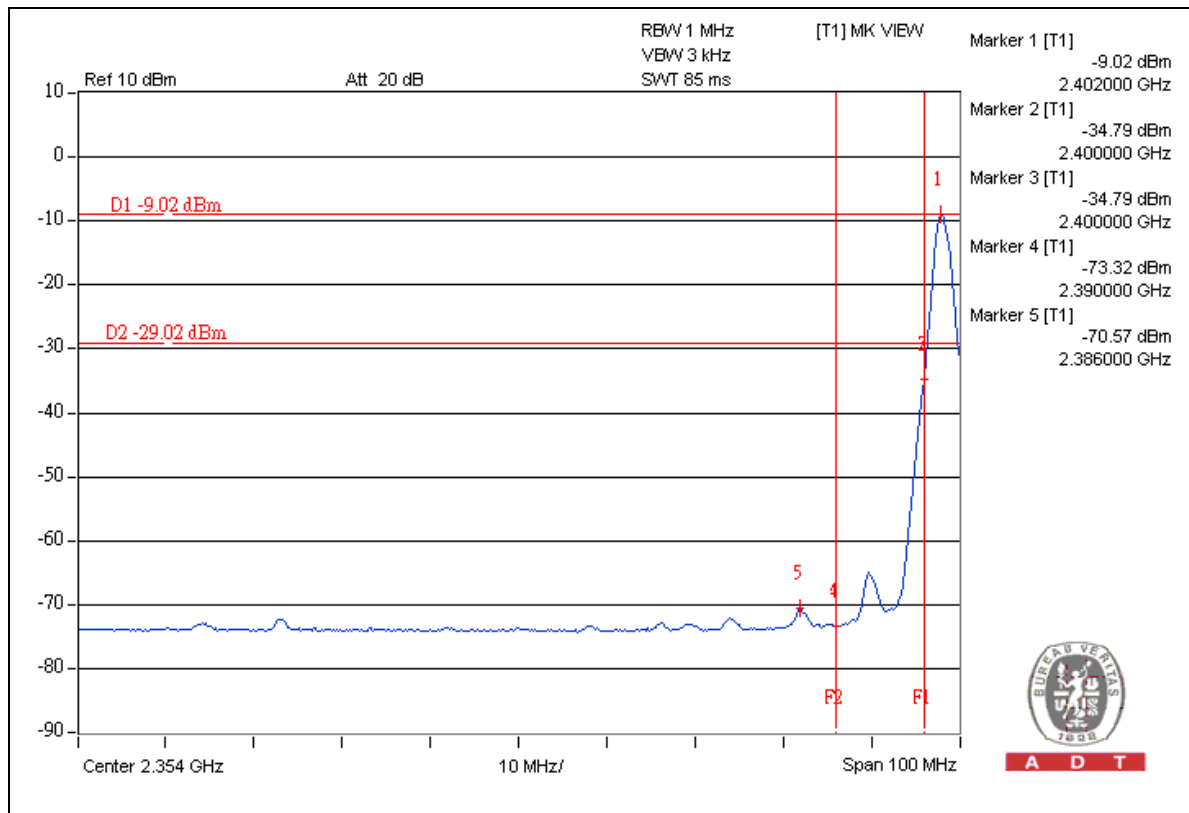
The band edge emission plot on the next third page shows 50.26dBc between carrier maximum power and local maximum emission in restrict band (2.4385GHz). The emission of carrier strength list in the test result of channel 77 at the item 4.2.7 is 79.51dBuV/m (Average), so the maximum field strength in restrict band is $79.51 - 50.26 = 29.25$ dBuV/m which is under 54dBuV/m limit.



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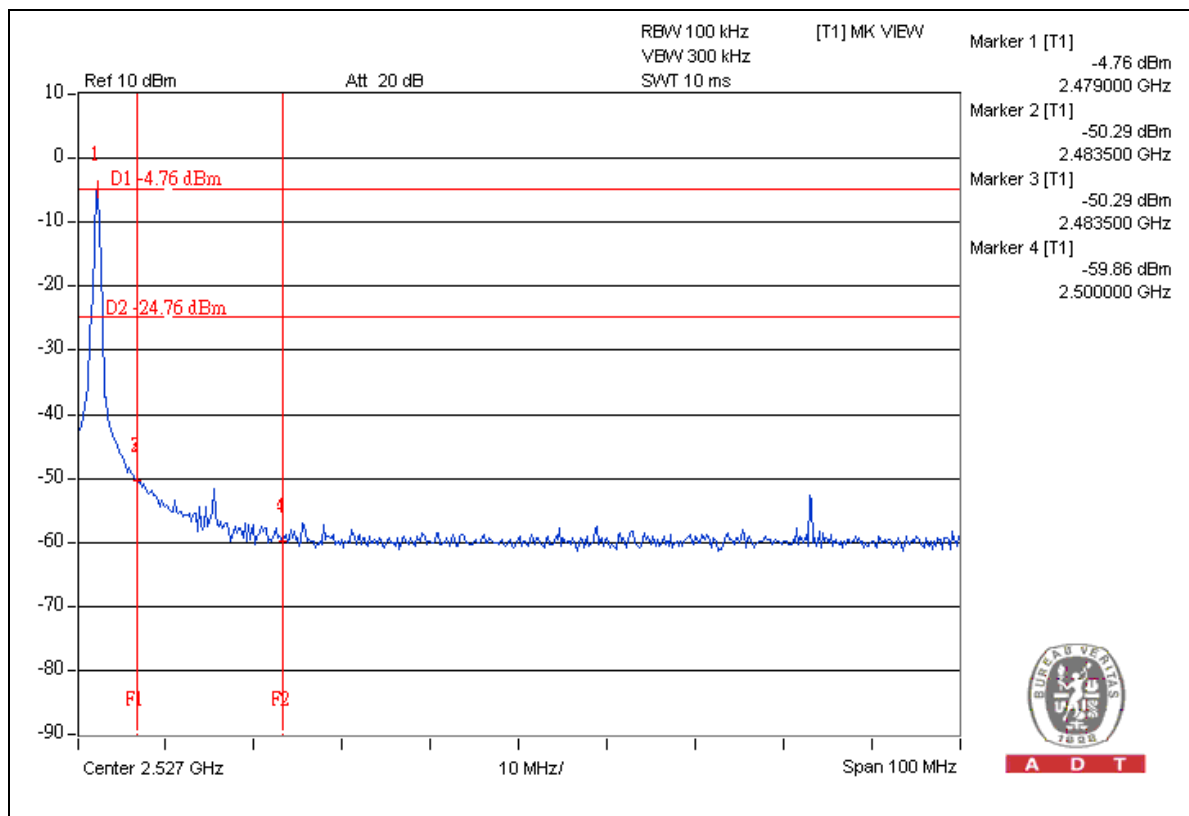
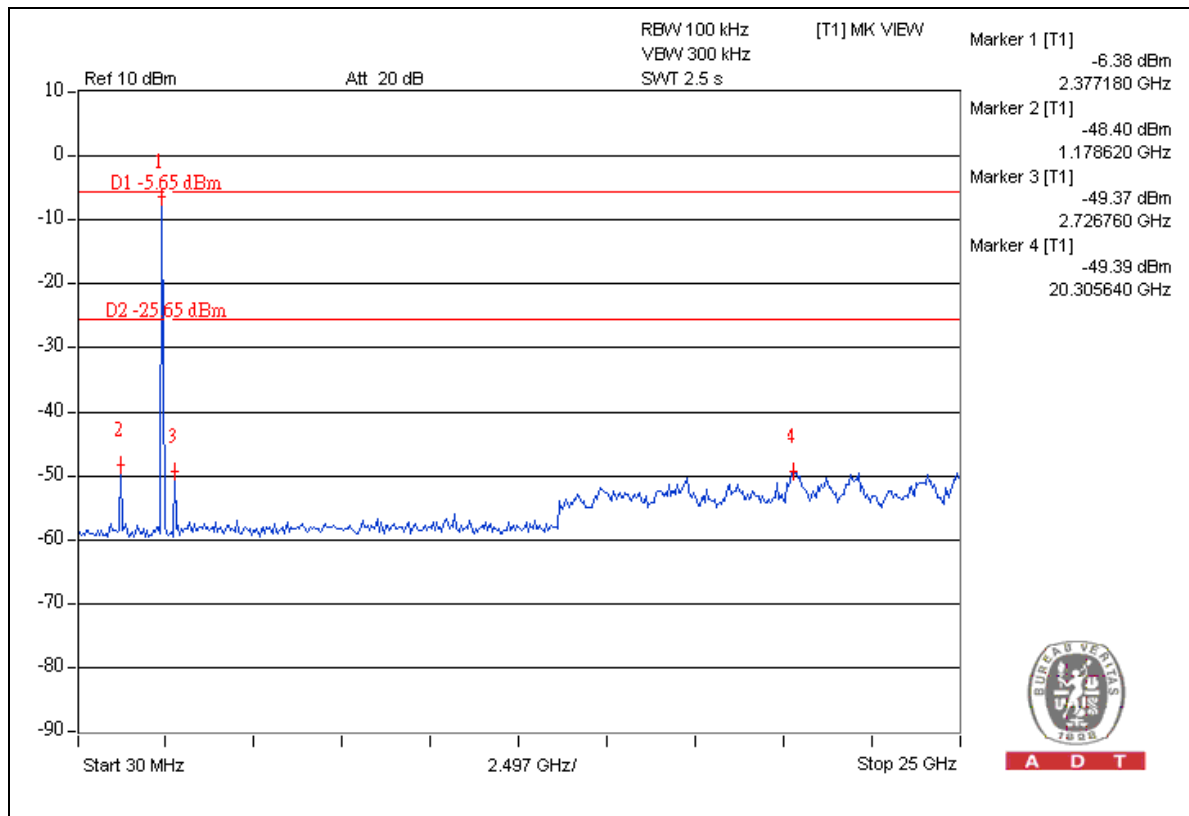
A D T



A D T

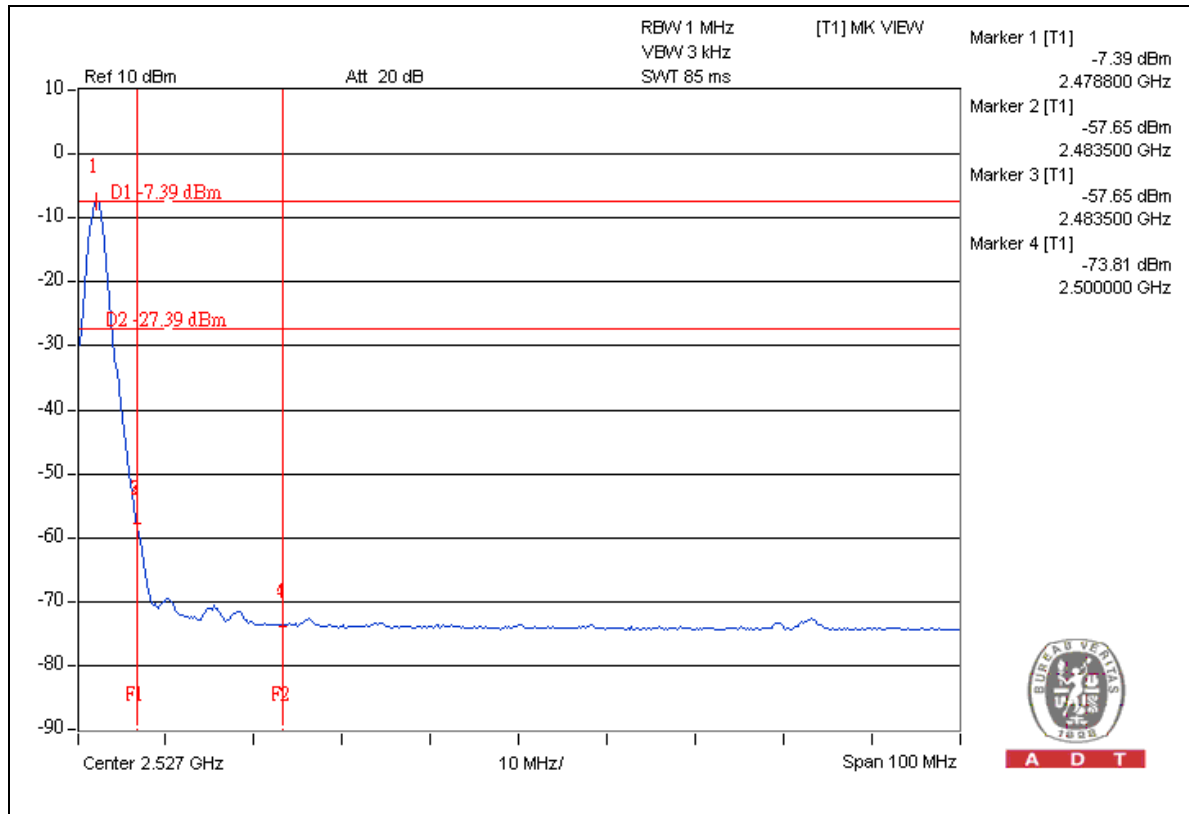


A D T

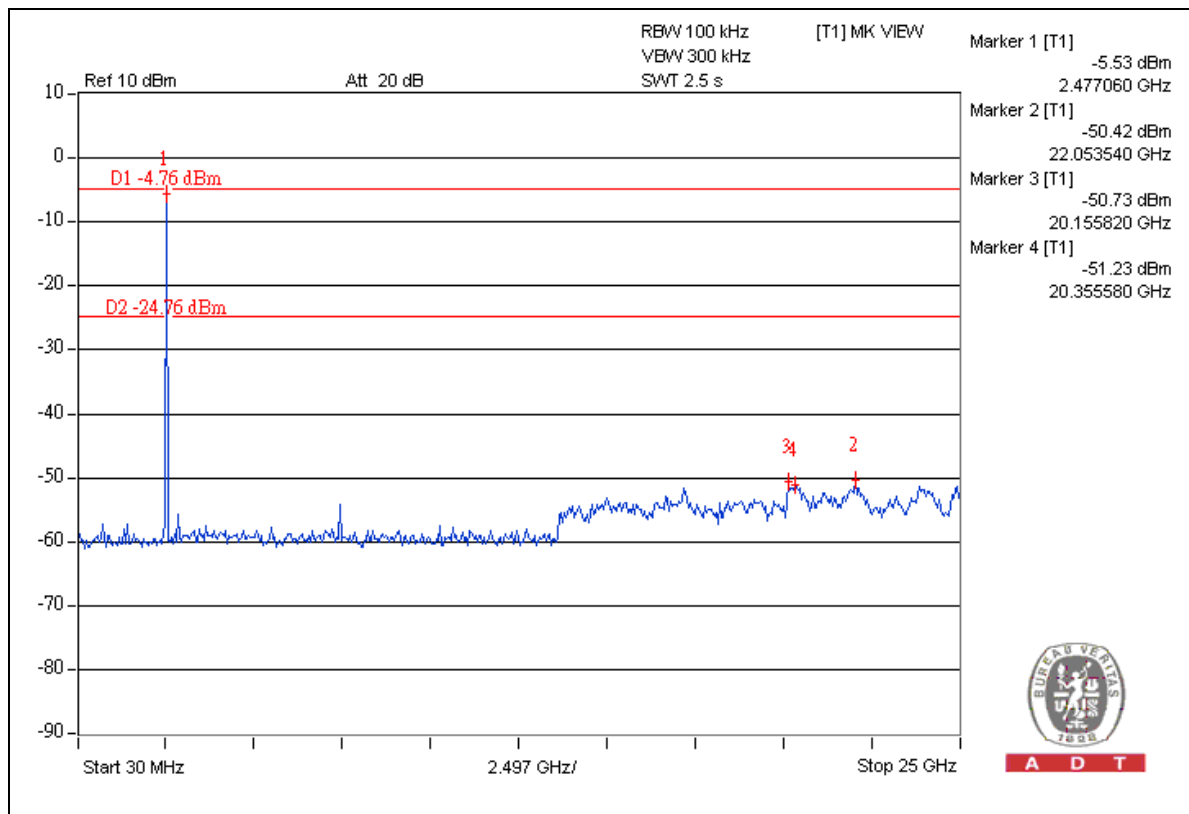




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4.7 ANTENNA REQUIREMENT

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 Printed antenna without connector. The maximum gain of the antenna is 0dBi.

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 ---