

FCC TEST REPORT

REPORT NO.: RF931221L22

MODEL NO.: DWL-G650M

RECEIVED: Dec. 21, 2004

TESTED: Dec. 21 ~ Dec. 27, 2004

ISSUED: Dec. 28, 2004

APPLICANT: D-Link Corporation

ADDRESS: No.8, Li-Hsin VII Road Science Based Industrial
Park Hsin-Chu, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou
Hsiang 244, Taipei Hsien, 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 72 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 CNLA, A2LA or any government agencies. The test results in the report only apply to the tested sample.



0528
ILAC MRA



No. 2177-01

Table of Contents

1.	CERTIFICATION	4
2.	SUMMARY OF TEST RESULTS	5
2.1	MEASUREMENT UNCERTAINTY	6
3.	GENERAL INFORMATION.....	7
3.1	GENERAL DESCRIPTION OF EUT	7
3.2	DESCRIPTION OF TEST MODES.....	8
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	8
3.4	DESCRIPTION OF SUPPORT UNITS	9
3.5	CONFIGURATION OF SYSTEM UNDER TEST	10
4.	TEST TYPES AND RESULTS	11
4.1	CONDUCTED EMISSION MEASUREMENT	11
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT.....	11
4.1.2	TEST INSTRUMENTS.....	11
4.1.3	TEST PROCEDURES	12
4.1.4	DEVIATION FROM TEST STANDARD	12
4.1.5	TEST SETUP	13
4.1.6	EUT OPERATING CONDITIONS	13
4.1.7	TEST RESULTS	14
4.2	RADIATED EMISSION MEASUREMENT	20
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT.....	20
4.2.2	TEST INSTRUMENTS.....	21
4.2.3	TEST PROCEDURES	22
4.2.4	DEVIATION FROM TEST STANDARD	22
4.2.5	TEST SETUP	23
4.2.6	EUT OPERATING CONDITIONS	23
4.2.7	TEST RESULTS	24
4.2.8	TEST RESULTS (A)	25
4.2.9	TEST RESULTS (B)	28
4.3	6dB BANDWIDTH MEASUREMENT	30
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	32
4.3.2	TEST INSTRUMENTS.....	32
4.3.3	TEST PROCEDURE.....	33
4.3.4	DEVIATION FROM TEST STANDARD	33
4.3.5	TEST SETUP	33
4.3.6	EUT OPERATING CONDITIONS	33
4.3.7	TEST RESULTS (A)	34
4.3.8	TEST RESULTS (B)	37
4.4	MAXIMUM PEAK OUTPUT POWER	42
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	42

4.4.2	INSTRUMENTS.....	42
4.4.1	TEST PROCEDURES	43
4.4.2	DEVIATION FROM TEST STANDARD	43
4.4.3	TEST SETUP	43
4.4.4	EUT OPERATING CONDITIONS	43
4.4.3	TEST RESULTS (A)	44
4.4.4	TEST RESULTS (B)	45
4.5	POWER SPECTRAL DENSITY MEASUREMENT.....	46
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	46
4.5.2	TEST INSTRUMENTS.....	46
4.5.3	TEST PROCEDURE.....	47
4.5.4	DEVIATION FROM TEST STANDARD	47
4.5.5	TEST SETUP	47
4.5.6	EUT OPERATING CONDITION	47
4.5.7	TEST RESULTS (A)	48
4.5.8	TEST RESULTS (B)	51
4.6	BAND EDGES MEASUREMENT	56
4.6.1	LIMITS OF BAND EDGES MEASUREMENT	56
4.6.2	TEST INSTRUMENTS.....	56
4.6.3	TEST PROCEDURE.....	56
4.6.4	DEVIATION FROM TEST STANDARD	56
4.6.5	EUT OPERATING CONDITION	56
4.6.6	TEST RESULTS	57
4.6.7	TEST RESULTS(A)	57
4.6.8	TEST RESULTS(B)	58
4.7	ANTENNA REQUIREMENT	69
4.7.1	STANDARD APPLICABLE	69
4.7.2	ANTENNA CONNECTED CONSTRUCTION.....	69
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	70
6.	INFORMATION ON THE TESTING LABORATORIES	72

1. CERTIFICATION

PRODUCT: Super G Smart Antenna Notebook Adapter
BRAND NAME: D-Link
MODEL NO.: DWL-G650M
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Dec. 21 ~ Dec. 27, 2004
APPLICANT: D-Link Corporation
STANDARDS: FCC Part 15, Subpart C (Section 15.247),
ANSI C63.4-2003

The above equipment have been tested by **Advance Data Technology Corporation**, 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 : Andrea Hsia , **DATE:** Dec. 28, 2004
(Andrea Hsia)

TECHNICAL
ACCEPTANCE : Gary Chang , **DATE:** Dec. 28, 2004
Responsible for RF (Gary Chang)

APPROVED BY : Cody Chang , **DATE:** Dec. 28, 2004
(Cody Chang,
Deputy Manager)

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 -5.23dB at 0.662MHz
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 -1.27dB at 2390.00MHz
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:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.55 dB
	200MHz ~ 1000MHz	3.58 dB
	1GHz ~ 18GHz	1.10 dB
	18GHz ~ 40GHz	0.91 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Super G Smart Antenna Notebook Adapter
MODEL NO.	DWL-G650M
POWER SUPPLY	3.3Vdc from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
RADIO TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps (up to 108Mbps for turbo mode)
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	52.119mW
ANTENNA TYPE	Printed antenna with 0dBi gain (For Rx)
DATA CABLE	NA
I/O PORTS	Cardbus
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 108Mbps.
2. The EUT complies with IEEE 802.11g standards and backwards compatible with IEEE 802.11b products.
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

802.11b and 802.11g: Eleven channels are provided to this EUT.

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

NOTE:

1. Below 1GHz, the channel 1, 6, and 11 were pre-tested in chamber. The channel 11 with OFDM technique, the worst case was chosen for final test.
2. Above 1GHz, the channel 1, 6, and 11 were tested individually.
3. After pre-testing all data rates, we have chosen 11Mbps with DSSS technique, 6Mbps with OFDM technique for normal mode and 12Mbps with OFDM technique for turbo mode, as the worst cases for the test among other data rates.
4. For conducted emission test, we have chosen 6Mbps with OFDM technique as the worst case after pre-testing in conducted emission test site.
5. Two test results were presented in the following sections. The test result A was for DSSS technique and the test result B was for OFDM technique.
6. EUT have used the function of TX diversity, so after pre-tested the both Chip antenna, found out the worst case for final test and reported in this report.

One channel is provided to this EUT for Turbo Mode.

Channel	Frequency
6	2437 MHz

NOTE: One turbo mode at frequency 2437MHz.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Super G Smart Antenna Notebook Adapter. 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

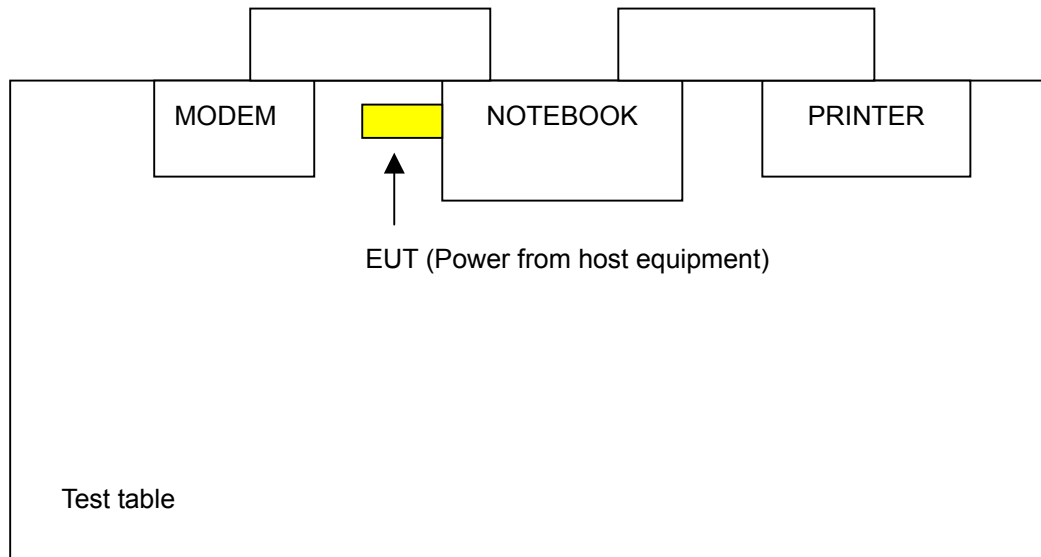
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	16484462992	E2K24CLNS
2	PRINTER	EPSON	LQ-300+	DCGY054147	FCC DoC Approved
3	MODEM	ACEEX	1414V/3	0401008269	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2 shielded cable without core
3	1.2 shielded cable without core

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

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 16, 2005
RF signal cable Woken	5D-FB	Cable-HYC01-01	Mar. 02, 2005
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Mar. 03, 2005
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Mar. 02, 2005
Software ADT	ADT_Cond_V3	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.



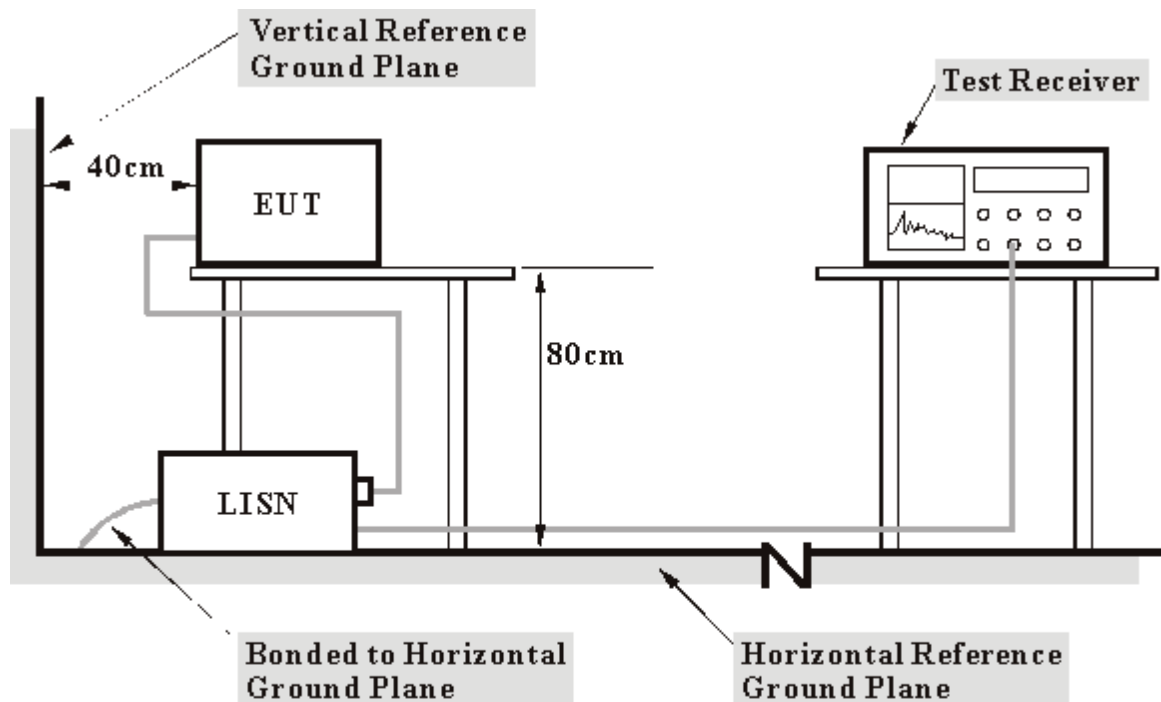
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

4.1.6 EUT OPERATING CONDITIONS

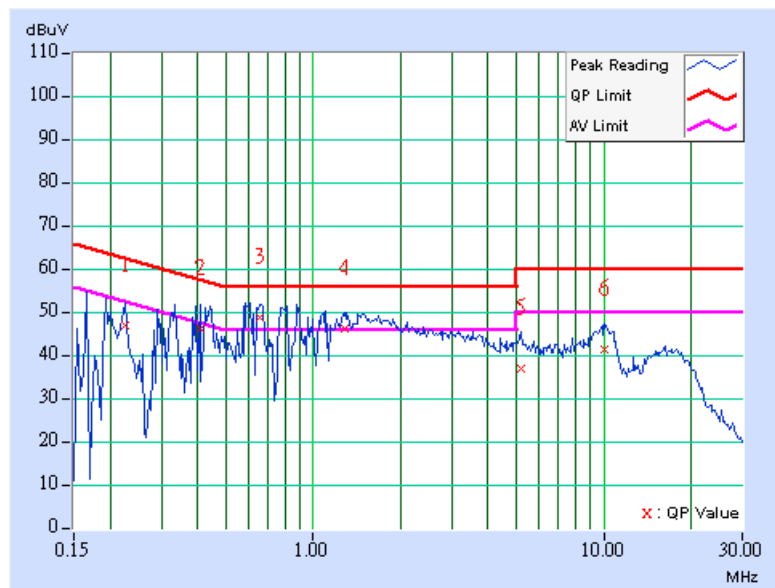
- a. Connected the EUT to a notebook system placed on a testing table.
- b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The notebook system sent "H" messages to its screen.
- d. The notebook system sent "H" messages to modem.
- e. The notebook system sent "H" messages to printer, and the printer printed them on paper.
- f. Steps c ~ e were repeated.

4.1.7 TEST RESULTS

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
MODE	Channel 1	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	TESTED BY: Match Tsui	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.224	0.12	46.70	-	46.82	-	62.66	52.66	-15.84	-
2	0.408	0.13	45.85	-	45.98	-	57.69	47.69	-11.72	-
3	0.654	0.13	48.59	36.44	48.72	36.57	56.00	46.00	-7.28	-9.43
4	1.281	0.15	46.15	31.78	46.30	31.93	56.00	46.00	-9.70	-14.07
5	5.207	0.24	36.80	-	37.04	-	60.00	50.00	-22.96	-
6	10.109	0.31	41.33	-	41.64	-	60.00	50.00	-18.36	-

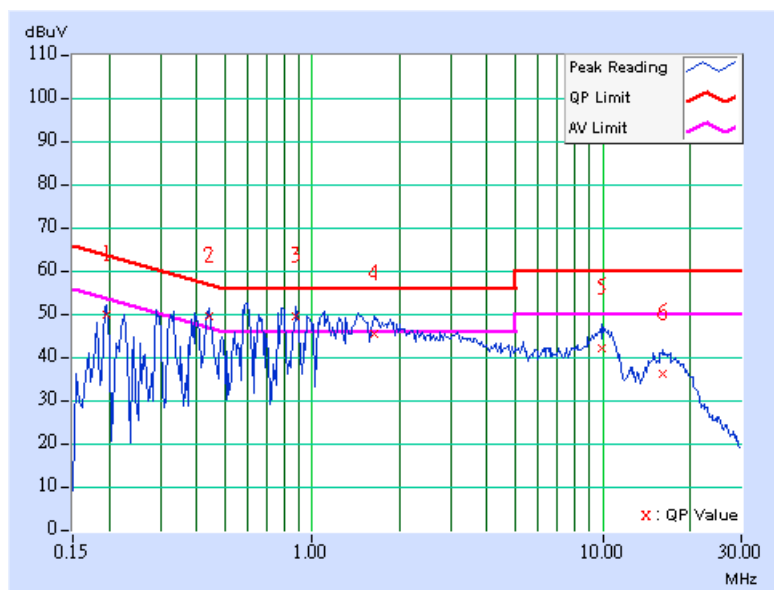
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value =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



EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
MODE	Channel 1	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	TESTED BY: Match Tsui	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.11	49.22	-	49.33	-	63.74	53.74	-14.41	-
2	0.443	0.12	48.91	40.00	49.03	40.12	57.01	47.01	-7.98	-6.89
3	0.880	0.14	48.98	40.42	49.12	40.56	56.00	46.00	-6.88	-5.44
4	1.641	0.16	44.99	-	45.15	-	56.00	46.00	-10.85	-
5	9.969	0.28	41.43	-	41.71	-	60.00	50.00	-18.29	-
6	16.141	0.66	35.80	-	36.46	-	60.00	50.00	-23.54	-

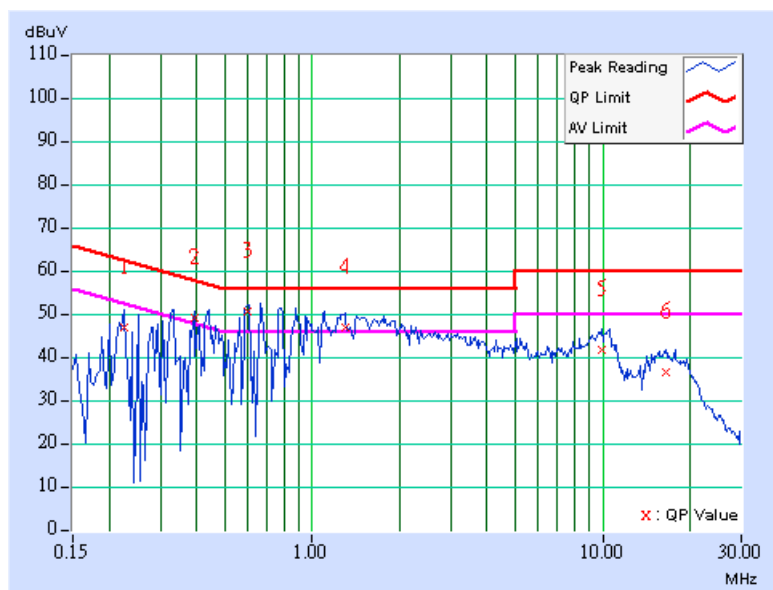
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
MODE	Channel 6	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	TESTED BY: Match Tsui	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.224	0.12	46.37	-	46.49	-	62.66	52.66	-16.17	-
2	0.392	0.13	48.46	38.09	48.59	38.22	58.02	48.02	-9.43	-9.80
3	0.599	0.13	49.85	36.60	49.98	36.73	56.00	46.00	-6.02	-9.27
4	1.297	0.15	46.24	33.08	46.39	33.23	56.00	46.00	-9.61	-12.77
5	9.953	0.30	41.09	-	41.39	-	60.00	50.00	-18.61	-
6	16.457	0.85	35.99	-	36.84	-	60.00	50.00	-23.16	-

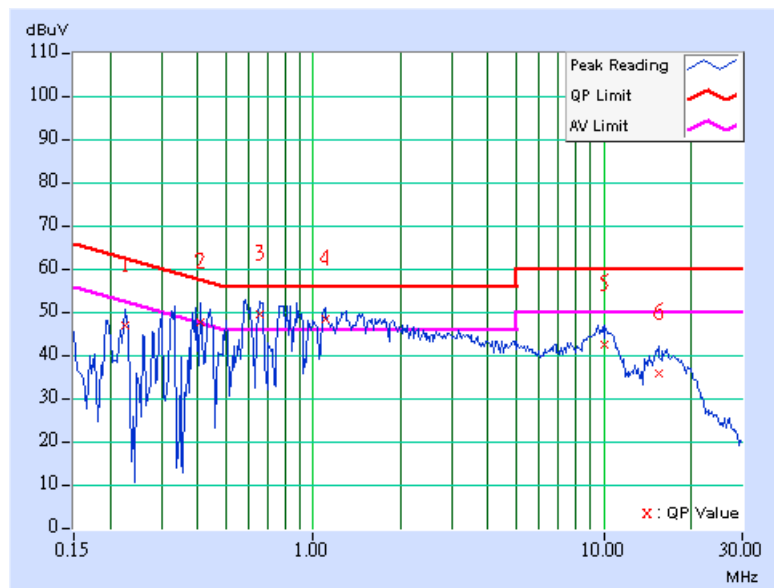
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
MODE	Channel 6	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	TESTED BY: Match Tsui	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.224	0.11	46.21	-	46.32	-	62.66	52.66	-16.34	-
2	0.408	0.12	47.10	-	47.22	-	57.69	47.69	-10.48	-
3	0.654	0.12	48.93	36.84	49.05	36.96	56.00	46.00	-6.95	-9.04
4	1.105	0.15	47.69	38.74	47.84	38.89	56.00	46.00	-8.16	-7.11
5	10.109	0.29	41.88	-	42.17	-	60.00	50.00	-17.83	-
6	15.469	0.65	35.30	-	35.95	-	60.00	50.00	-24.05	-

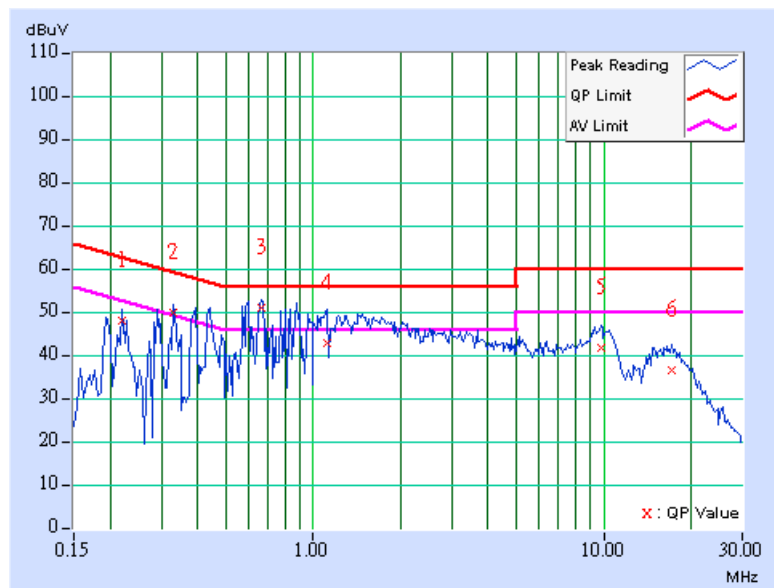
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
MODE	Channel 11	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	TESTED BY: Match Tsui	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.220	0.12	47.33	-	47.45	-	62.81	52.81	-15.36	-
2	0.330	0.12	49.10	-	49.22	-	59.46	49.46	-10.23	-
3	0.662	0.13	50.11	40.64	50.24	40.77	56.00	46.00	-5.76	-5.23
4	1.121	0.15	41.90	-	42.05	-	56.00	46.00	-13.95	-
5	9.758	0.30	40.83	-	41.13	-	60.00	50.00	-18.87	-
6	17.063	0.88	35.77	-	36.65	-	60.00	50.00	-23.35	-

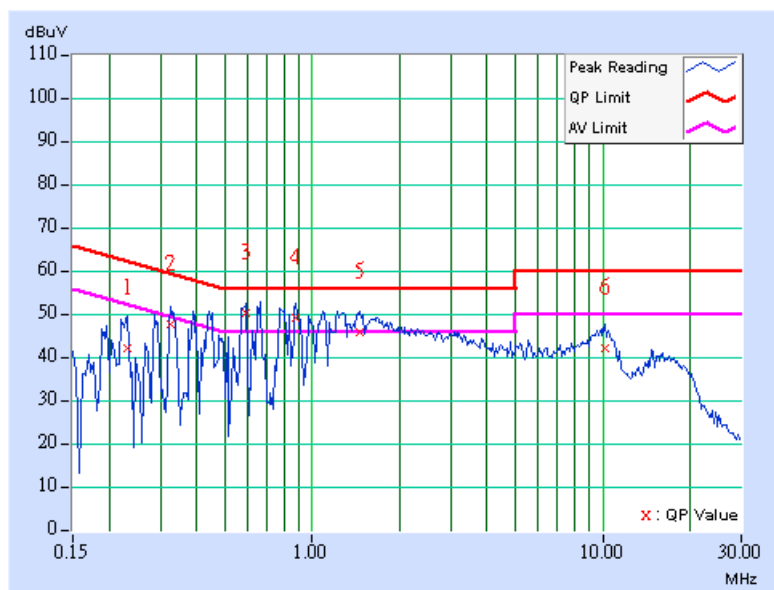
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
MODE	Channel 11	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	TESTED BY: Match Tsui	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.232	0.11	42.04	-	42.15	-	62.38	52.38	-20.23	-
2	0.326	0.11	47.63	-	47.74	-	59.56	49.56	-11.81	-
3	0.595	0.12	50.17	36.98	50.29	37.10	56.00	46.00	-5.71	-8.90
4	0.880	0.14	49.05	40.50	49.19	40.64	56.00	46.00	-6.81	-5.36
5	1.449	0.15	45.69	-	45.84	-	56.00	46.00	-10.16	-
6	10.164	0.29	41.98	-	42.27	-	60.00	50.00	-17.73	-

- 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.



4.2 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 UNTIL
Test Receiver ROHDE & SCHWARZ	ESIB7	100188	Jan. 13, 2005
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 21, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-157	Feb. 03, 2005
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-407	Feb. 03, 2005
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170241	Feb. 23, 2005
Preamplifier Agilent	8449B	3008A01961	Nov. 09, 2005
Preamplifier Agilent	8447D	2944A10629	Nov. 09, 2005
RF signal cable HUBER+SUHNER	SUCOFLEX 104	218182/4	Mar. 04, 2005
RF signal cable HUBER+SUHNER	SUCOFLEX 104	218194/4	Mar. 04, 2005
Software ADT.	ADT_Radiated_V5.1 4	NA	NA
Antenna Tower ADT.	AT100	AT93021702	NA
Turn Table ADT.	TT100.	TT93021702	NA
Controller ADT.	SC100.	SC93021702	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 1.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The IC Site Registration No. is IC4924-2.

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

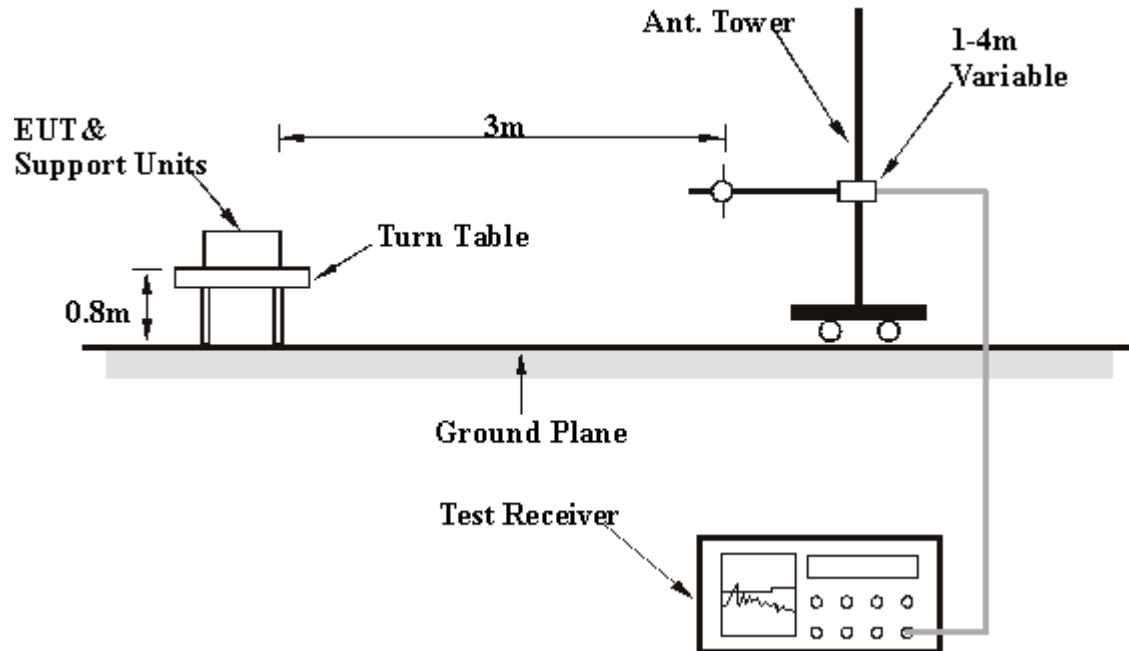
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) 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

Same as 4.1.6

4.2.7 TEST RESULTS

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH, 991hPa	TESTED BY: Match Tsui	

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	20.95 QP	40.00	-19.05	1.00 H	226	7.80	13.15
2	113.59	37.34 QP	43.50	-6.16	1.50 H	253	24.96	12.38
3	160.24	29.49 QP	43.50	-14.01	1.50 H	247	14.65	14.84
4	232.16	26.30 QP	46.00	-19.70	1.25 H	259	13.70	12.60
5	298.26	30.23 QP	46.00	-15.77	1.00 H	271	15.72	14.51
6	329.36	32.24 QP	46.00	-13.76	1.00 H	283	17.04	15.20
7	409.06	30.15 QP	46.00	-15.85	1.50 H	283	13.11	17.05
8	449.88	30.59 QP	46.00	-15.41	1.50 H	235	12.46	18.13
9	465.43	33.03 QP	46.00	-12.97	1.75 H	265	14.71	18.32
10	533.47	28.41 QP	46.00	-17.59	1.50 H	322	8.98	19.43
11	552.91	29.08 QP	46.00	-16.92	1.50 H	271	9.24	19.84
12	599.56	28.62 QP	46.00	-17.38	1.25 H	124	7.52	21.10
13	665.65	33.58 QP	46.00	-12.42	1.25 H	145	11.62	21.96
14	735.63	28.87 QP	46.00	-17.13	1.00 H	79	5.63	23.24
15	828.94	30.24 QP	46.00	-15.76	1.00 H	211	6.13	24.10
16	920.30	31.22 QP	46.00	-14.78	1.50 H	196	5.72	25.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	66.93	34.94 QP	40.00	-5.06	1.00 V	115	22.01	12.93
2	82.48	30.37 QP	40.00	-9.63	1.25 V	307	20.33	10.04
3	127.19	28.59 QP	43.50	-14.91	1.00 V	52	15.07	13.53
4	158.30	29.22 QP	43.50	-14.28	1.50 V	358	14.40	14.82
5	315.75	30.54 QP	46.00	-15.46	1.50 V	340	15.64	14.90
6	344.91	31.83 QP	46.00	-14.17	1.75 V	4	16.27	15.56
7	376.01	31.60 QP	46.00	-14.40	1.25 V	25	15.34	16.26
8	407.11	31.55 QP	46.00	-14.45	1.25 V	343	14.55	17.00
9	449.88	31.48 QP	46.00	-14.52	1.00 V	316	13.35	18.13
10	465.43	31.75 QP	46.00	-14.25	2.00 V	196	13.42	18.32
11	533.47	28.16 QP	46.00	-17.84	1.00 V	337	8.73	19.43
12	591.78	29.43 QP	46.00	-16.57	1.75 V	208	8.53	20.89
13	667.60	30.57 QP	46.00	-15.43	1.00 V	13	8.58	21.99
14	735.63	28.60 QP	46.00	-17.40	1.50 V	163	5.36	23.24
15	801.72	28.44 QP	46.00	-17.56	1.50 V	313	4.57	23.87
16	920.30	31.51 QP	46.00	-14.49	1.50 V	226	6.01	25.50

REMARKS:

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

4.2.8 TEST RESULTS (A)

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	TESTED BY: Match Tsui	

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	2386.00	55.24 PK	74.00	-18.76	1.10 H	149	23.45	31.79
1	2386.00	46.70 AV	54.00	-7.30	1.10 H	149	14.91	31.79
2	*2412.00	106.68 PK			1.10 H	149	74.81	31.87
2	*2412.00	99.22 AV			1.10 H	149	67.35	31.87
3	2688.00	44.73 PK	74.00	-29.27	1.23 H	48	11.83	32.90
4	4824.00	53.51 PK	74.00	-20.49	1.03 H	34	15.39	38.11
4	4824.00	45.98 AV	54.00	-8.02	1.03 H	34	7.86	38.11

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	2386.00	56.82 PK	74.00	-17.18	1.13 V	212	25.03	31.79
1	2386.00	48.36 AV	54.00	-5.64	1.13 V	212	16.57	31.79
2	*2412.00	109.79 PK			1.13 V	212	77.92	31.87
2	*2412.00	102.10 AV			1.13 V	212	70.23	31.87
3	2688.00	46.93 PK	74.00	-27.07	1.19 V	257	14.03	32.90
4	4824.00	52.46 PK	74.00	-21.54	1.00 V	70	14.34	38.11
4	4824.00	45.58 AV	54.00	-8.42	1.00 V	70	7.46	38.11

- 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	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	TESTED BY: Match Tsui	

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	*2437.00	108.07 PK			1.08 H	123	76.12	31.95
1	*2437.00	100.20 AV			1.08 H	123	68.25	31.95
2	2688.00	45.27 PK	74.00	-28.73	1.20 H	50	12.37	32.90
3	4874.00	52.18 PK	74.00	-21.82	1.03 H	360	13.89	38.28
3	4874.00	45.15 AV	54.00	-8.85	1.03 H	360	6.86	38.28

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	*2437.00	109.90 PK			1.38 V	208	77.95	31.95
1	*2437.00	102.57 AV			1.38 V	208	70.62	31.95
2	2688.00	46.72 PK	74.00	-27.28	1.18 V	257	13.82	32.90
3	4874.00	50.83 PK	74.00	-23.17	1.18 V	36	12.54	38.28

- 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.
 5. “ * ” : Fundamental frequency

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	TESTED BY: Match Tsui	

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	*2462.00	107.36 PK			1.33 H	113	75.34	32.02
1	*2462.00	99.98 AV			1.33 H	113	67.96	32.02
2	2483.50	56.07 PK	74.00	-17.93	1.33 H	113	23.98	32.09
2	2483.50	47.43 AV	54.00	-6.57	1.33 H	113	15.34	32.09
3	2688.00	44.95 PK	74.00	-29.05	1.20 H	49	12.05	32.90
4	4924.00	51.10 PK	74.00	-22.90	1.02 H	37	12.61	38.49
4	4924.00	43.41 AV	54.00	-10.59	1.02 H	37	4.92	38.49

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	*2462.00	110.48 PK			1.02 V	258	78.46	32.02
1	*2462.00	102.83 AV			1.02 V	258	70.81	32.02
2	2483.50	55.53 PK	74.00	-18.47	1.02 V	258	23.44	32.09
2	2483.50	48.95 AV	54.00	-5.05	1.02 V	258	16.86	32.09
3	2688.00	47.20 PK	74.00	-26.80	1.19 V	256	14.30	32.90
4	4924.00	52.62 PK	74.00	-21.38	1.08 V	70	14.13	38.49
4	4924.00	45.14 AV	54.00	-8.86	1.08 V	70	6.65	38.49

- 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

4.2.9 TEST RESULTS (B)

Normal mode:

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	TESTED BY: Match Tsui	

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	66.55 PK	74.00	-7.45	1.33 H	49	34.75	31.80
1	2390.00	49.47 AV	54.00	-4.53	1.33 H	49	17.67	31.80
2	*2412.00	104.11 PK			1.33 H	49	72.24	31.87
2	*2412.00	93.86 AV			1.33 H	49	61.99	31.87
3	2688.00	45.10 PK	74.00	-28.90	1.16 H	61	12.20	32.90
4	4824.00	59.16 PK	74.00	-14.84	1.00 H	175	21.04	38.11
4	4824.00	46.10 AV	54.00	-7.90	1.00 H	175	7.98	38.11

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	69.14 PK	74.00	-4.86	1.30 V	255	37.34	31.80
1	2390.00	52.73 AV	54.00	-1.27	1.30 V	255	20.93	31.80
2	*2412.00	107.88 PK			1.30 V	255	76.01	31.87
2	*2412.00	98.67 AV			1.30 V	255	66.80	31.87
3	2688.00	47.06 PK	74.00	-26.94	1.18 V	255	14.16	32.90
4	4824.00	66.29 PK	74.00	-7.71	1.00 V	231	28.17	38.11
4	4824.00	52.69 AV	54.00	-1.31	1.00 V	231	14.57	38.11
5	7236.00	63.94 PK	74.00	-10.06	1.04 V	111	20.89	43.05
5	7236.00	51.32 AV	54.00	-2.68	1.04 V	111	8.27	43.05

- 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	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 54%RH, 991hPa	TESTED BY: Match Tsui	

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	*2437.00	104.66 PK			1.10 H	100	72.71	31.95
1	*2437.00	94.57 AV			1.10 H	100	62.62	31.95
2	2688.00	44.29 PK	74.00	-29.71	1.01 H	240	11.39	32.90
3	4874.00	54.18 PK	74.00	-19.82	1.20 H	250	15.90	38.28
3	4874.00	40.28 AV	54.00	-13.72	1.20 H	250	2.00	38.28
4	7311.00	51.20 PK	74.00	-22.80	1.19 H	240	8.23	42.97
4	7311.00	40.25 AV	54.00	-13.75	1.19 H	240	-2.72	42.97

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	*2437.00	106.81 PK			1.12 V	213	74.86	31.95
1	*2437.00	96.79 AV			1.12 V	213	64.84	31.95
2	2688.00	46.07 PK	74.00	-27.93	1.16 V	257	13.17	32.90
3	4874.00	58.00 PK	74.00	-16.00	1.15 V	211	19.71	38.28
3	4874.00	45.32 AV	54.00	-8.68	1.15 V	211	7.03	38.28
4	7311.00	60.19 PK	74.00	-13.81	1.16 V	101	17.22	42.97
4	7311.00	47.01 AV	54.00	-6.99	1.16 V	101	4.04	42.97

- 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	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	TESTED BY: Match Tsui	

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	*2462.00	100.92 PK			1.07 H	121	68.90	32.02
1	*2462.00	90.95 AV			1.07 H	121	58.93	32.02
2	2483.50	58.09 PK	74.00	-15.91	1.07 H	121	26.00	32.09
2	2483.50	47.09 AV	54.00	-6.91	1.07 H	121	15.00	32.09
3	2688.00	45.12 PK	74.00	-28.88	1.23 H	50	12.22	32.90
4	4924.00	55.11 PK	74.00	-18.89	1.25 H	360	16.62	38.49
4	4924.00	41.95 AV	54.00	-12.05	1.25 H	360	3.46	38.49

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	*2462.00	105.00 PK			1.02 V	257	72.98	32.02
1	*2462.00	94.81 AV			1.02 V	257	62.79	32.02
2	2483.50	59.33 PK	74.00	-14.67	1.02 V	257	27.24	32.09
2	2483.50	49.14 AV	54.00	-4.86	1.02 V	257	17.05	32.09
3	2688.00	46.73 PK	74.00	-27.27	1.17 V	258	13.83	32.90
4	4924.00	57.87 PK	74.00	-16.13	1.20 V	239	19.38	38.49
4	4924.00	44.64 AV	54.00	-9.36	1.20 V	239	6.15	38.49
5	7386.00	60.16 PK	74.00	-13.84	1.18 V	106	17.61	42.55
5	7386.00	47.35 AV	54.00	-6.65	1.18 V	106	4.80	42.55

- 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

Turbo mode:

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	TESTED BY: Match Tsui	

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	59.55 PK	74.00	-14.45	1.07 H	148	28.84	30.71
1	2390.00	46.64 AV	54.00	-7.36	1.07 H	148	15.93	30.71
2	*2437.00	101.39 PK			1.07 H	148	70.49	30.90
2	*2437.00	92.13 AV			1.07 H	148	61.23	30.90
3	2483.50	59.57 PK	74.00	-14.43	1.07 H	148	28.50	31.07
3	2483.50	47.26 AV	54.00	-6.74	1.07 H	148	16.19	31.07
4	2688.00	41.69 PK	74.00	-32.31	1.00 H	129	10.17	31.52
5	4874.00	51.62 PK	74.00	-22.38	1.08 H	360	14.86	36.76
5	4874.00	38.92 AV	54.00	-15.08	1.08 H	360	2.16	36.76

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	58.73 PK	74.00	-15.27	1.02 V	259	28.02	30.71
1	2390.00	47.70 AV	54.00	-6.30	1.02 V	259	16.99	30.71
2	*2437.00	104.21 PK			1.02 V	259	73.31	30.90
2	*2437.00	95.48 AV			1.02 V	259	64.58	30.90
3	2483.50	63.22 PK	74.00	-10.78	1.02 V	259	32.15	31.07
3	2483.50	50.16 AV	54.00	-3.84	1.02 V	259	19.09	31.07
4	2688.00	42.27 PK	74.00	-31.73	1.19 V	266	10.75	31.52
5	4874.00	53.27 PK	74.00	-20.73	1.08 V	38	16.51	36.76
5	4874.00	40.93 AV	54.00	-13.07	1.08 V	38	4.17	36.76

- 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

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 Until
SPECTRUM ANALYZER	FSEK 30	100049	Aug. 12, 2005

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 100kHz 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

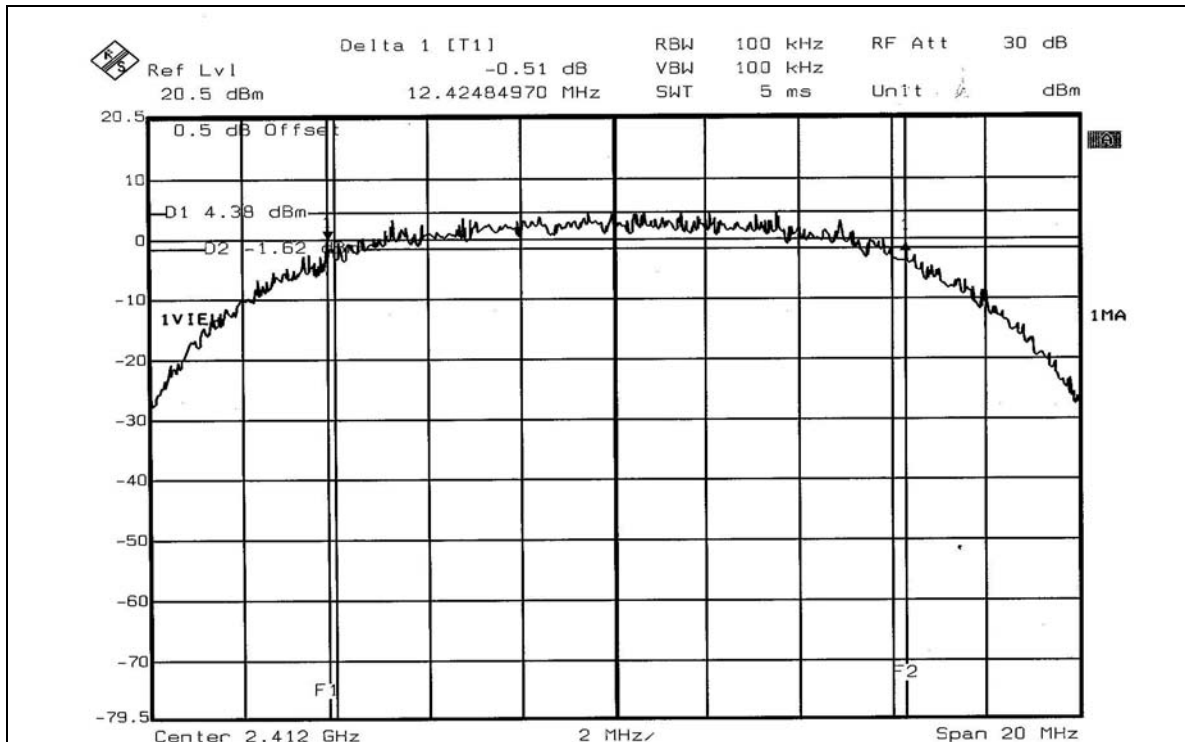
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS (A)

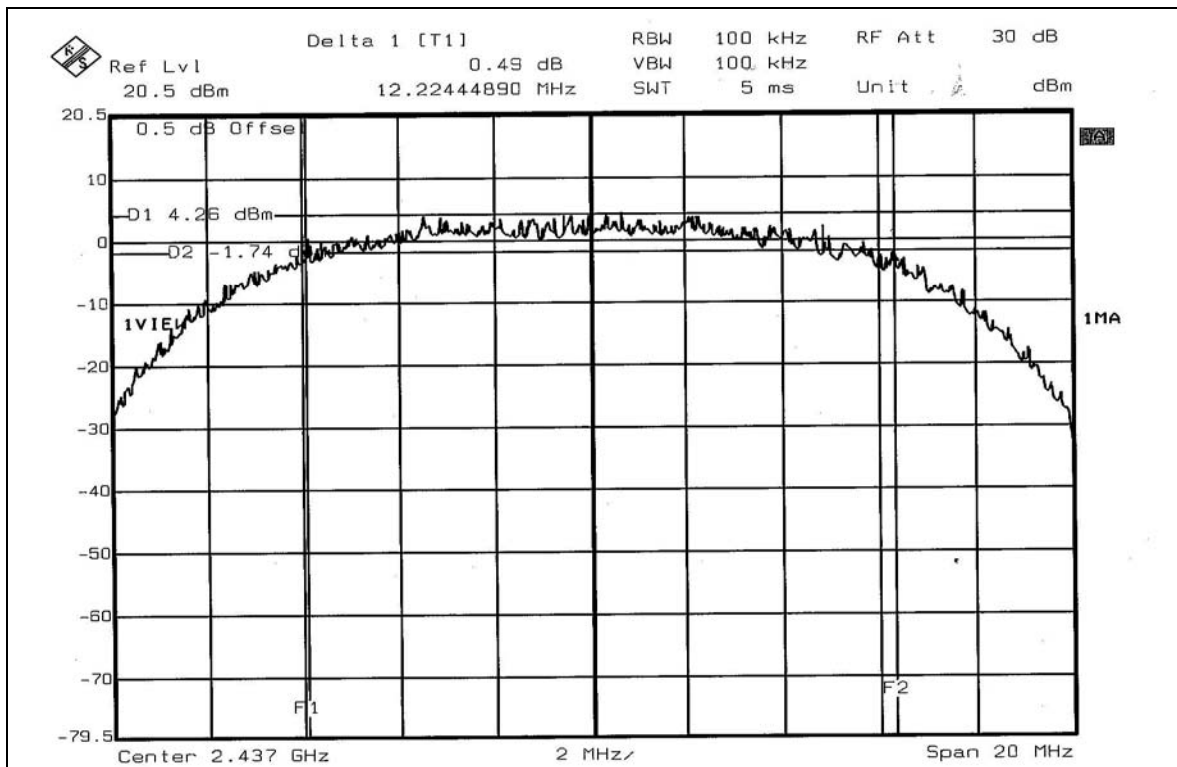
EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	12.42	0.5	PASS
6	2437	12.22	0.5	PASS
11	2462	12.18	0.5	PASS

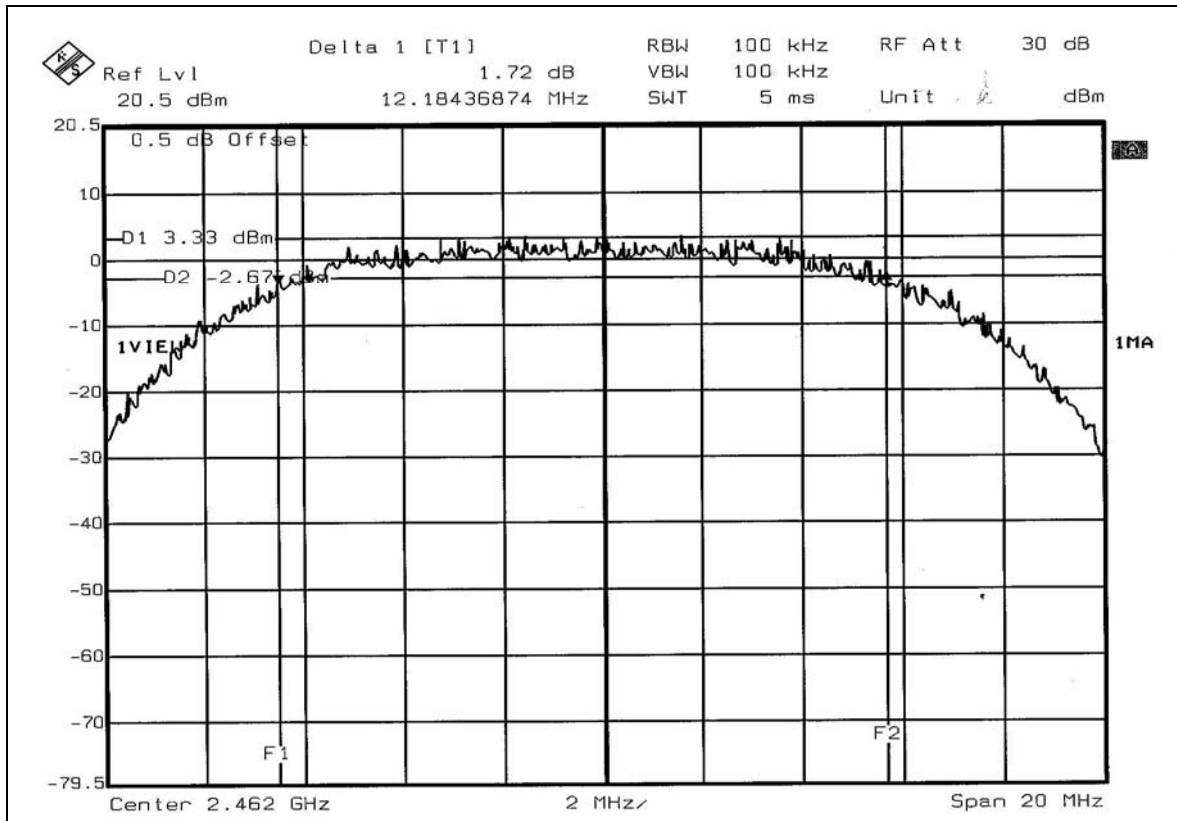
CH1



CH6



CH11



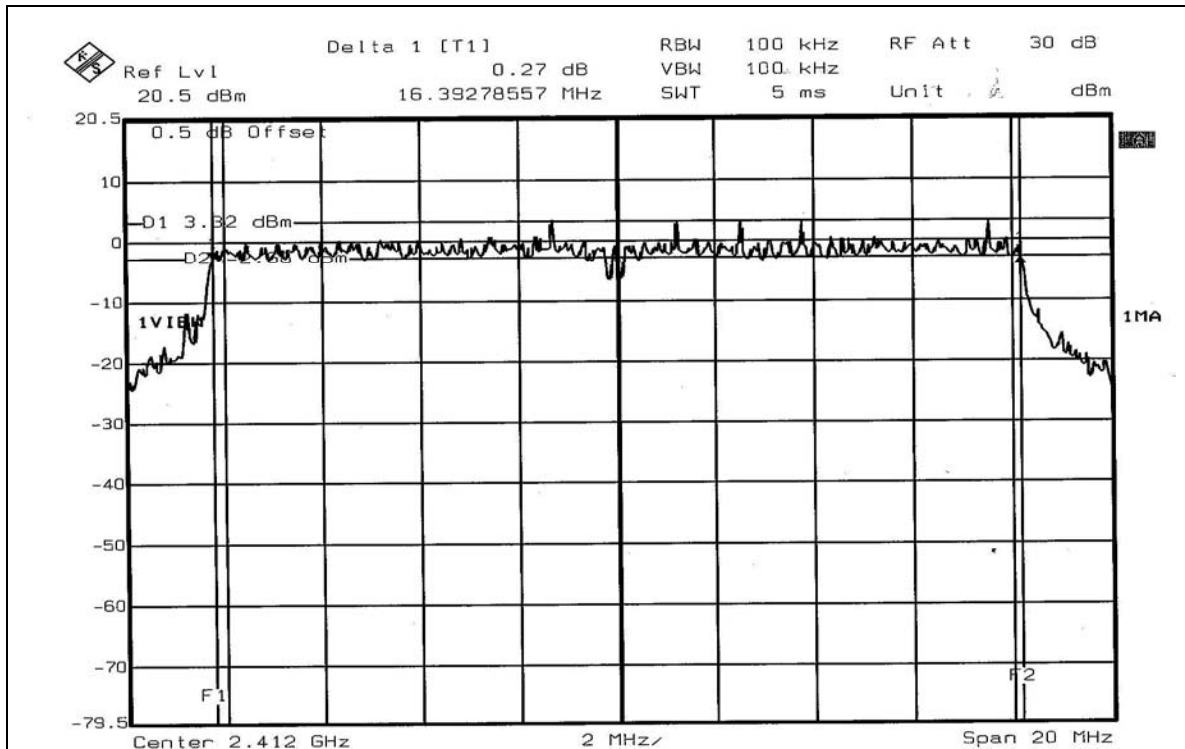
4.3.8 TEST RESULTS (B)

Normal mode:

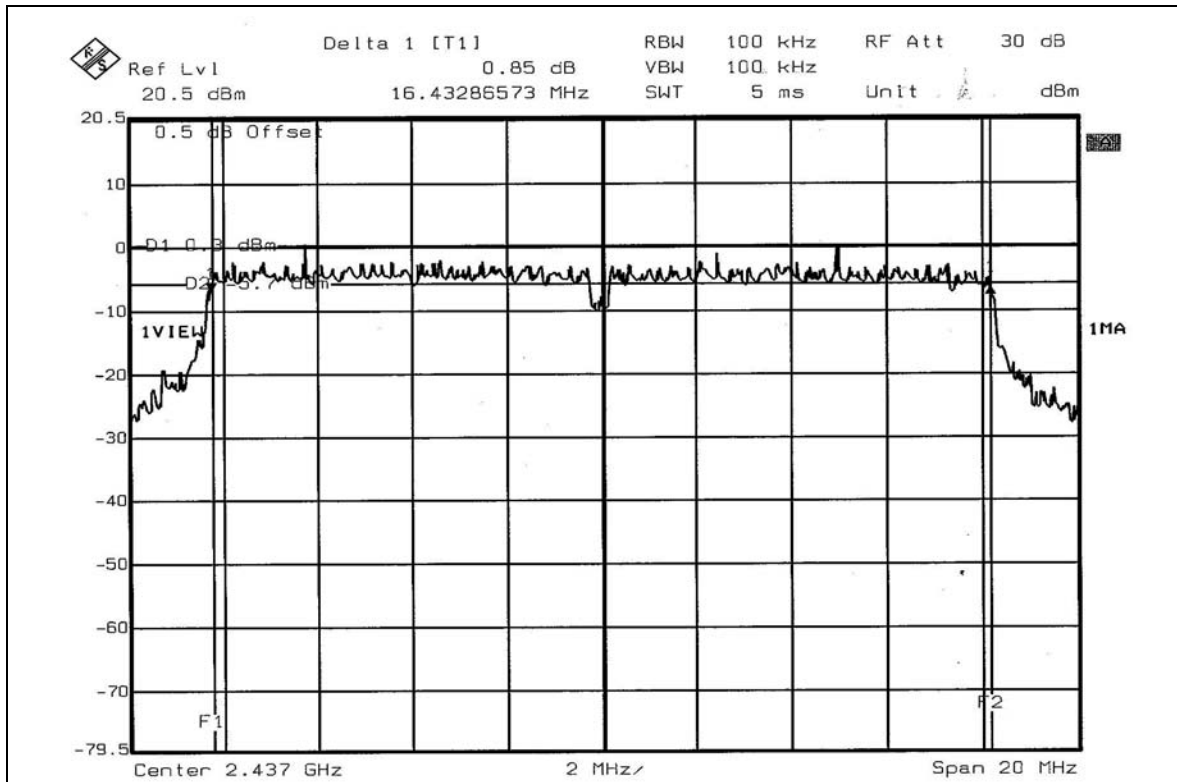
EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.39	0.5	PASS
6	2437	16.43	0.5	PASS
11	2462	16.35	0.5	PASS

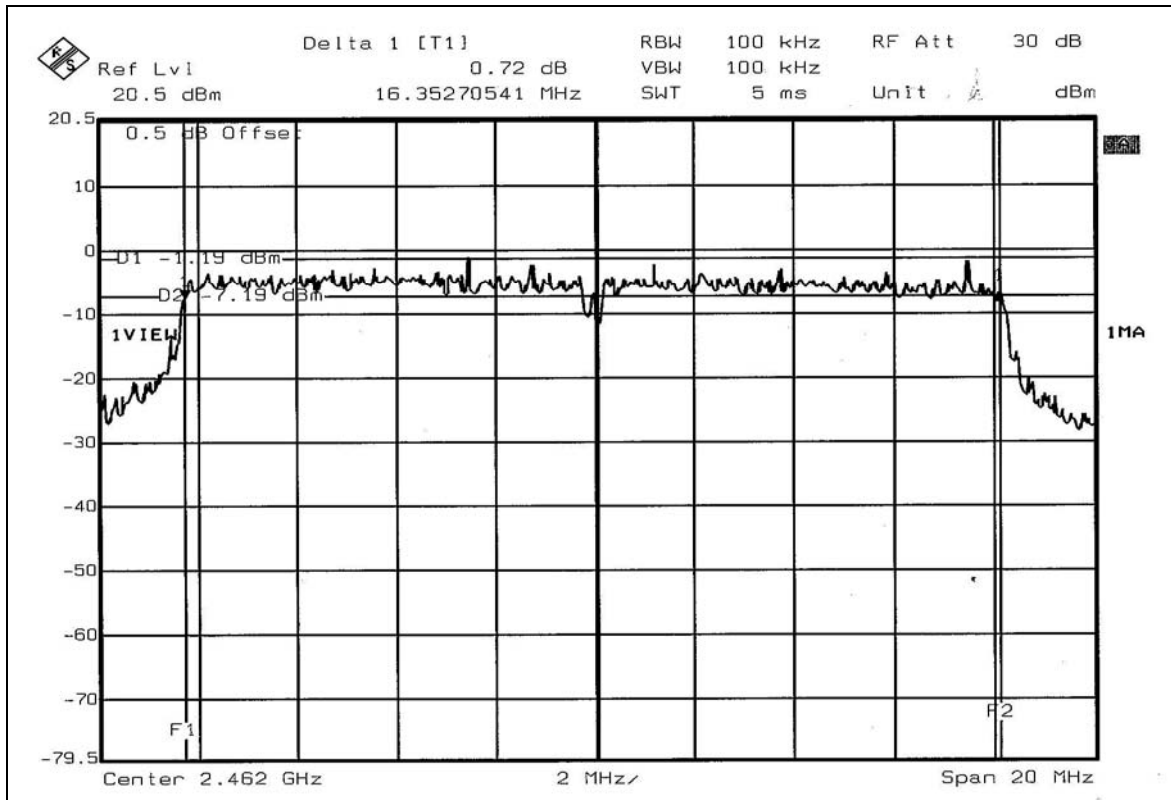
CH1



CH6



CH11

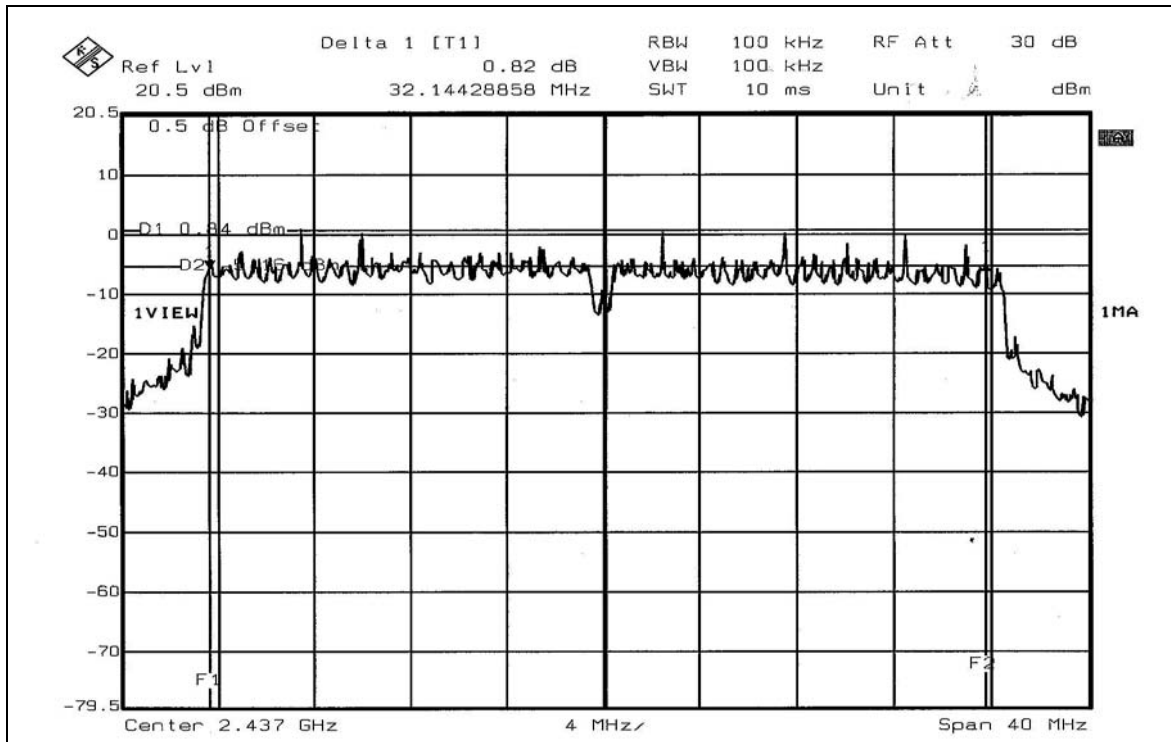


Turbo mode:

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
6	2437	32.14	0.5	PASS

CH6



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 Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 06, 2005
TEKTRONIX OSCILLOSCOPE	TDS 1012	C019167	Feb. 01, 2005
NARDA DETECTOR	4503A	FSCM99899	NA

NOTE:

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

.

4.4.1 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

4.4.2 DEVIATION FROM TEST STANDARD

No deviation

4.4.3 TEST SETUP



4.4.4 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.3 TEST RESULTS (A)

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	51.286	17.10	30	PASS
6	2437	51.404	17.11	30	PASS
11	2462	50.699	17.05	30	PASS

4.4.4 TEST RESULTS (B)

Normal mode:

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	51.761	17.14	30	PASS
6	2437	52.119	17.17	30	PASS
11	2462	36.728	15.65	30	PASS

Turbo mode:

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
6	2437	50.582	17.04	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.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

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

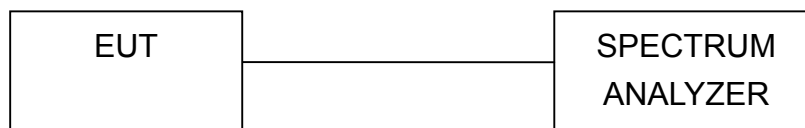
4.5.3 TEST PROCEDURE

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

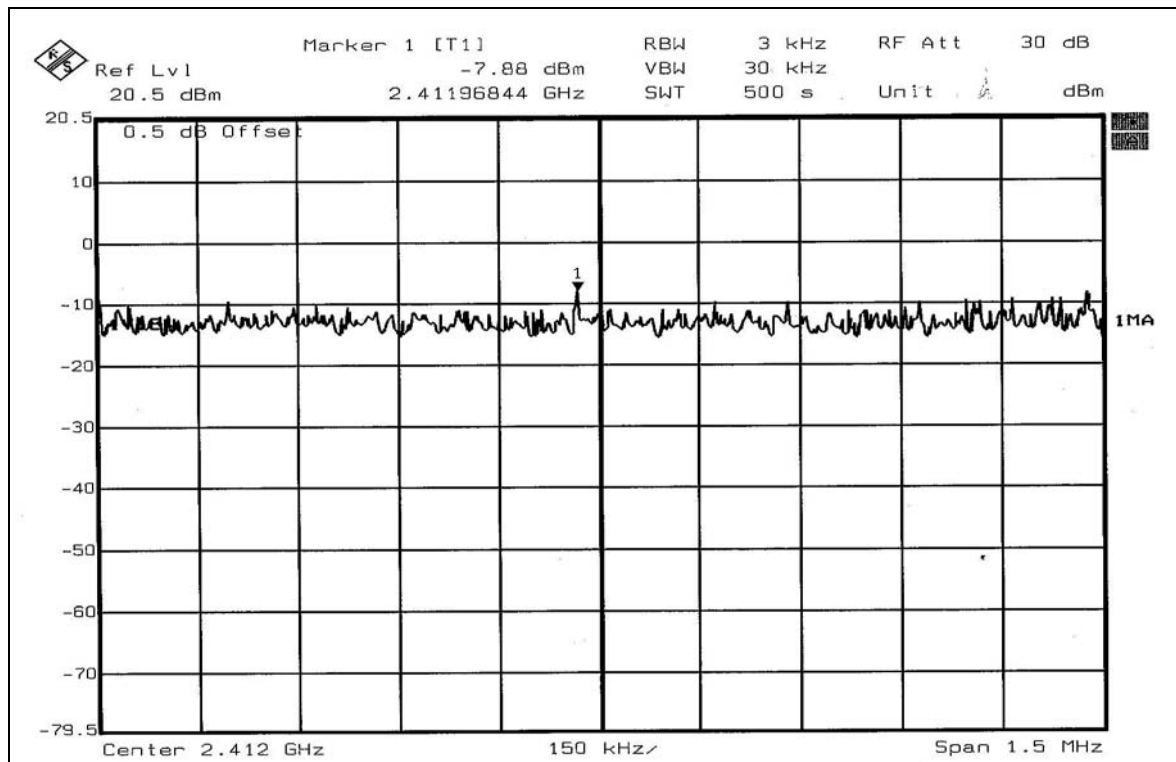
Same as Item 4.3.6

4.5.7 TEST RESULTS (A)

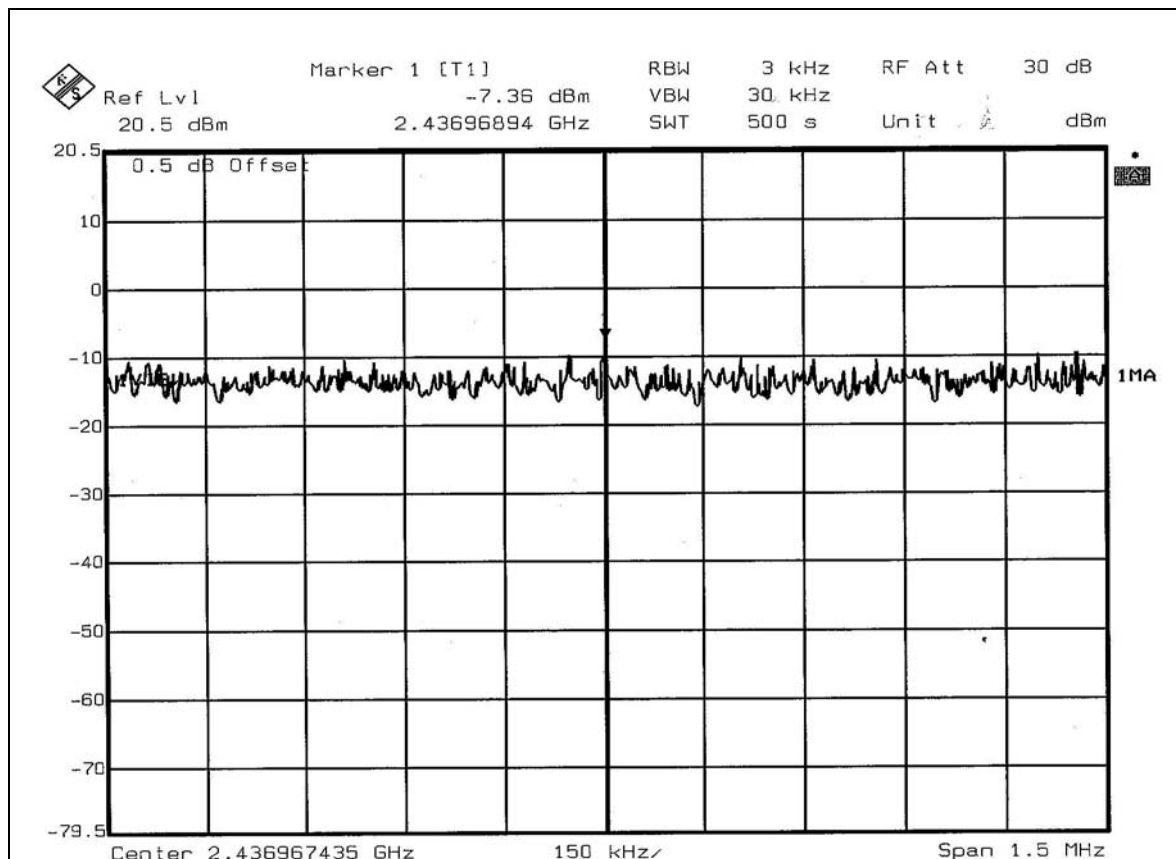
EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-7.88	8	PASS
6	2437	-7.36	8	PASS
11	2462	-7.28	8	PASS

CH1

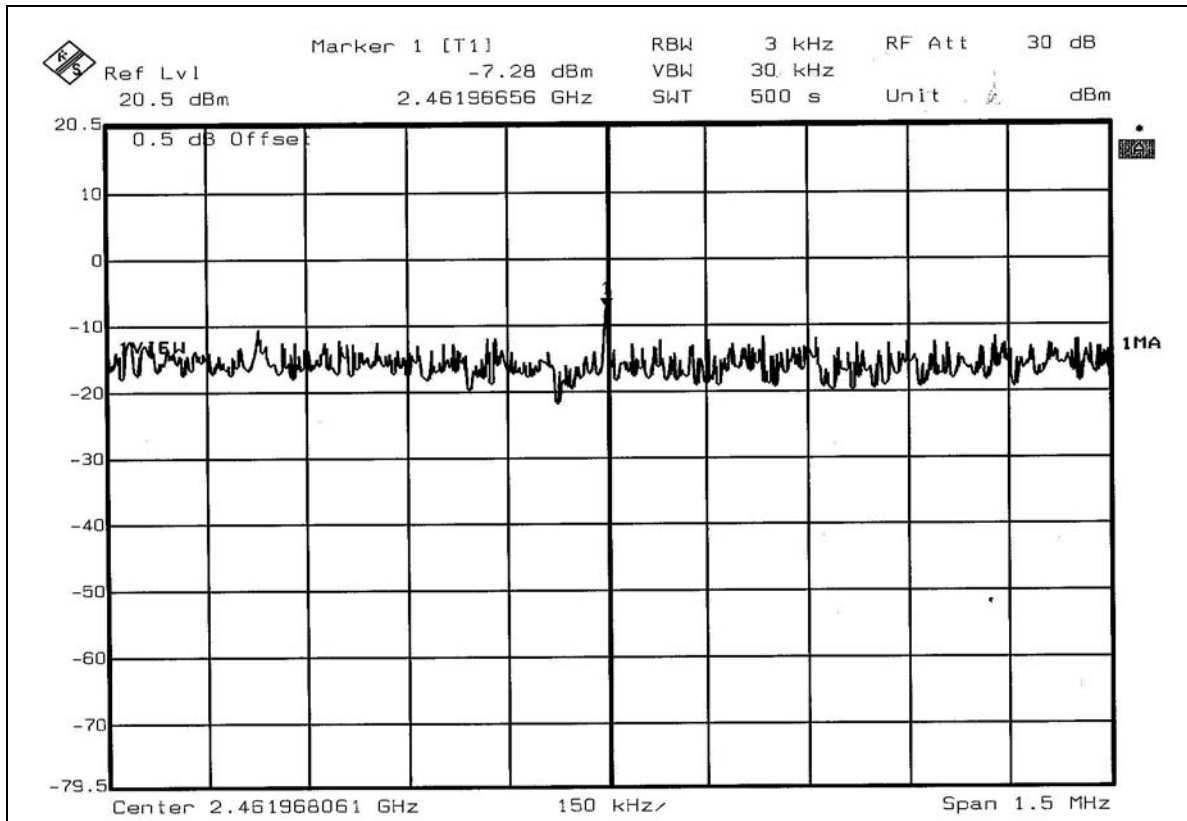


CH6





CH11



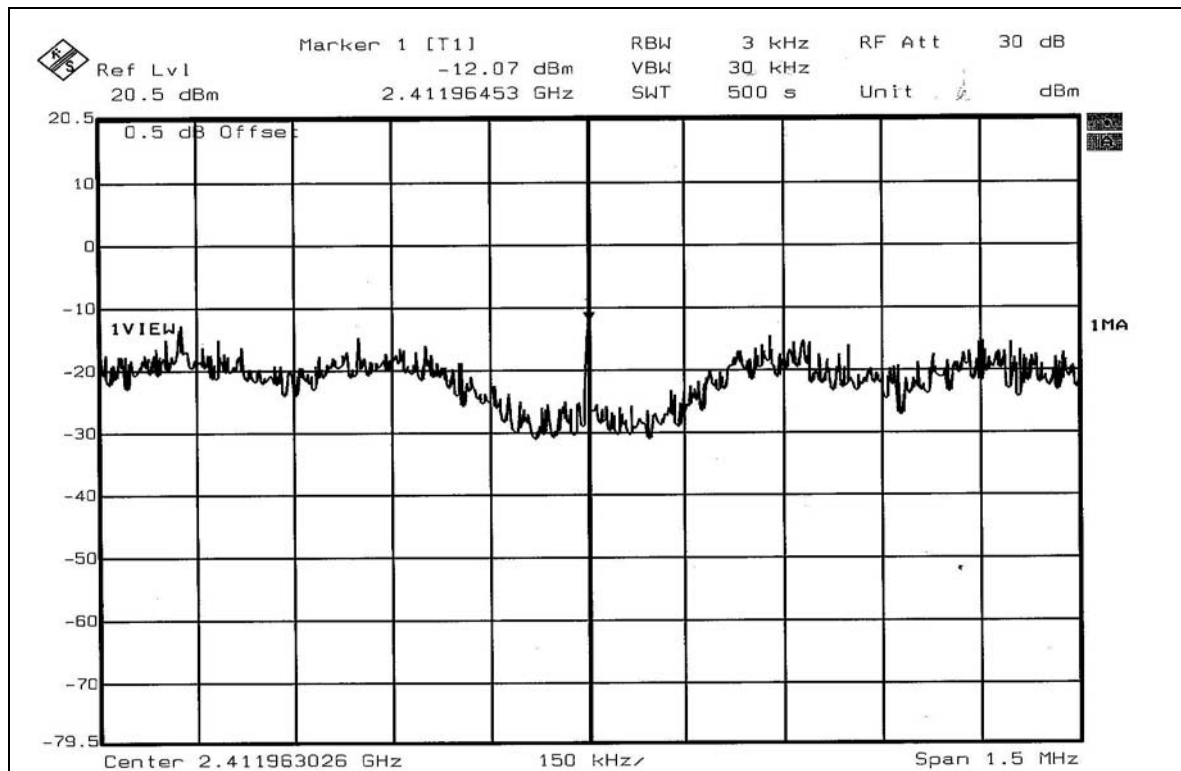
4.5.8 TEST RESULTS (B)

Normal mode

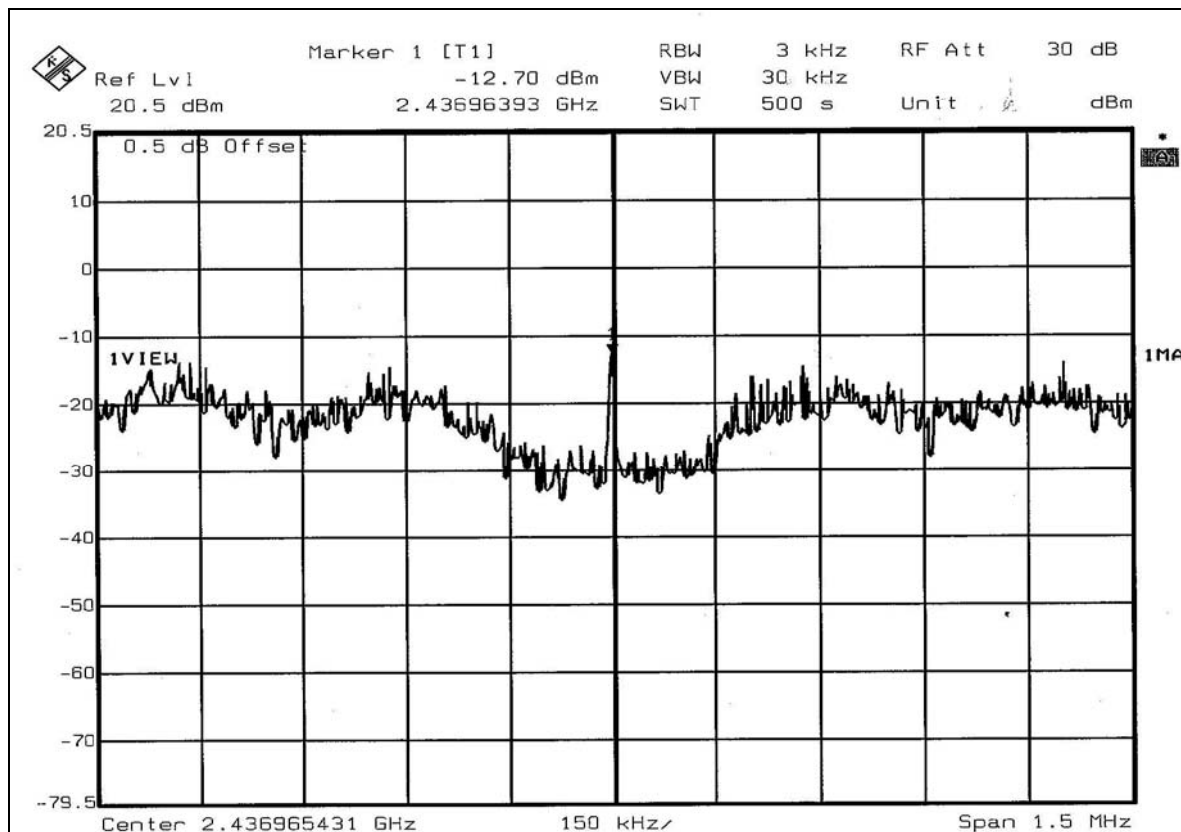
EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-12.07	8	PASS
6	2437	-12.70	8	PASS
11	2462	-14.40	8	PASS

CH1

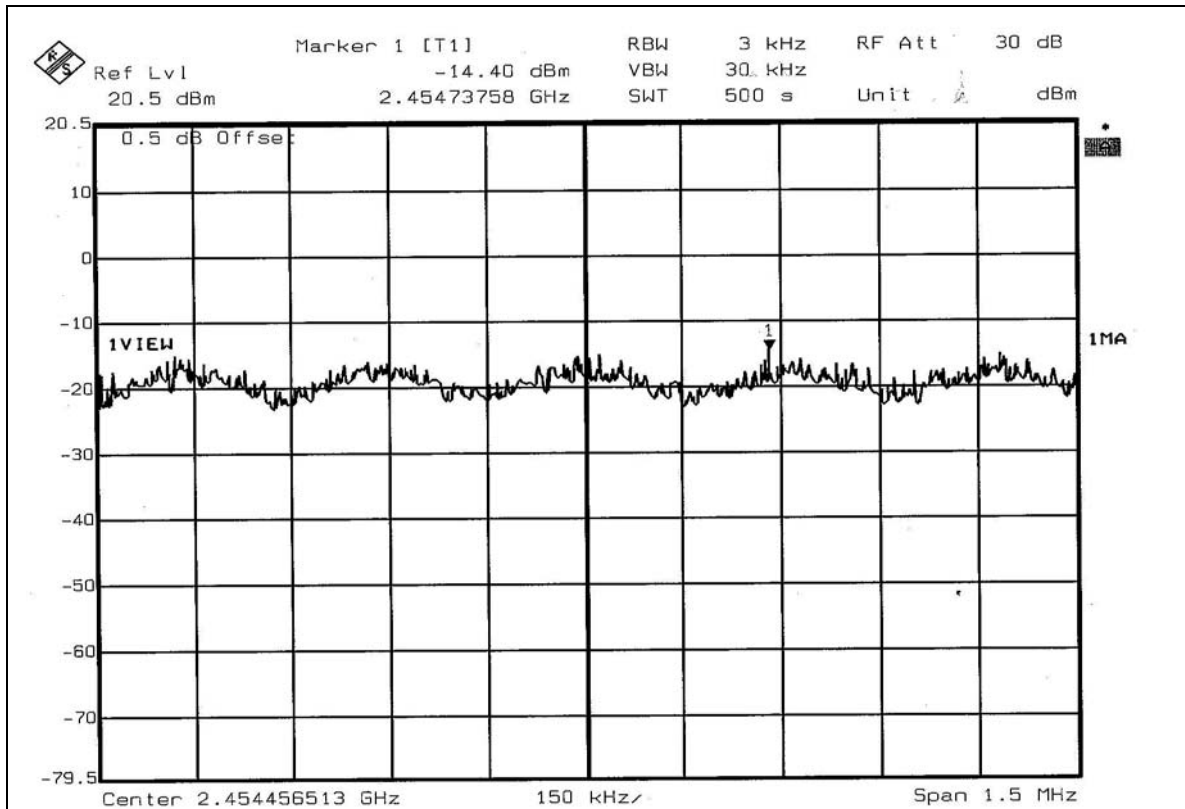


CH6





CH11

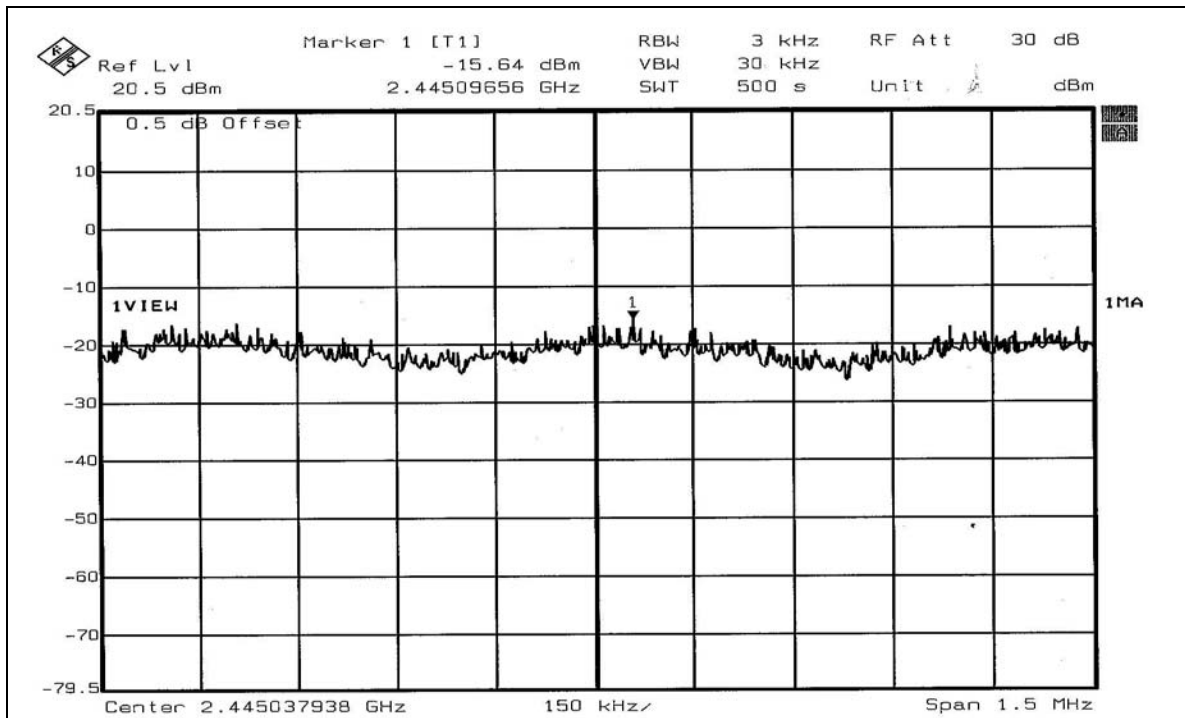


Turbo mode:

EUT	Super G Smart Antenna Notebook Adapter	MODEL	DWL-G650M
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
6	2437	-15.64	8	PASS

CH6



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 Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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 with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW=VBW=100kHz ; 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 18 images. D2 line indicates the highest level, and D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

4.6.7 TEST RESULTS(A)

NOTE:

The band edge emission plot of DSSS technique on page 60 shows 53.81dB between carrier maximum power and local maximum emission in restrict band (2.3684GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.8 is 109.79dBuV/m (Peak), so the maximum field strength in restrict band is $109.79 - 53.81 = 55.98$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of DSSS technique on page 60 shows 57.49dB between carrier maximum power and local maximum emission in restrict band (2.3868GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.8 is 102.10dBuV/m (Average), so the maximum field strength in restrict band is $102.10 - 57.49 = 44.61$ dBuV/m which is under 54dBuV/m limit.

The band edge emission plot of DSSS technique on page 61 shows 55.60dB between carrier maximum power and local maximum emission in restrict band (2.4877GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.8 is 110.48dBuV/m (Peak), so the maximum field strength in restrict band is $110.48 - 55.60 = 54.88$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of DSSS technique on page 62 shows 58.50dB between carrier maximum power and local maximum emission in restrict band (2.4875GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.8 is 102.83dBuV/m (Average), so the maximum field strength in restrict band is $102.83 - 58.50 = 44.33$ dBuV/m which is under 54dBuV/m limit.



4.6.8 TEST RESULTS(B)

Normal mode:

NOTE:

The band edge emission plot of OFDM technique with normal mode on page 63 shows 42.83dB between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.9 is 107.88dBuV/m (Peak), so the maximum field strength in restrict band is $107.88 - 42.83 = 65.05$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of OFDM technique with normal mode on page 63 shows 48.35dB between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.9 is 98.67dBuV/m (Average), so the maximum field strength in restrict band is $98.67 - 48.35 = 50.32$ dBuV/m which is under 54dBuV/m limit.

The band edge emission plot of OFDM technique with normal mode on page 64 shows 46.37dB between carrier maximum power and local maximum emission in restrict band (2.4841GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.9 is 105.00dBuV/m (Peak), so the maximum field strength in restrict band is $105.00 - 46.37 = 58.63$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of OFDM technique with normal mode on page 65 shows 48.11dB 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 11 at the item 4.2.9 is 94.81dBuV/m (Average), so the maximum field strength in restrict band is $94.81 - 48.11 = 46.70$ dBuV/m which is under 54dBuV/m limit.

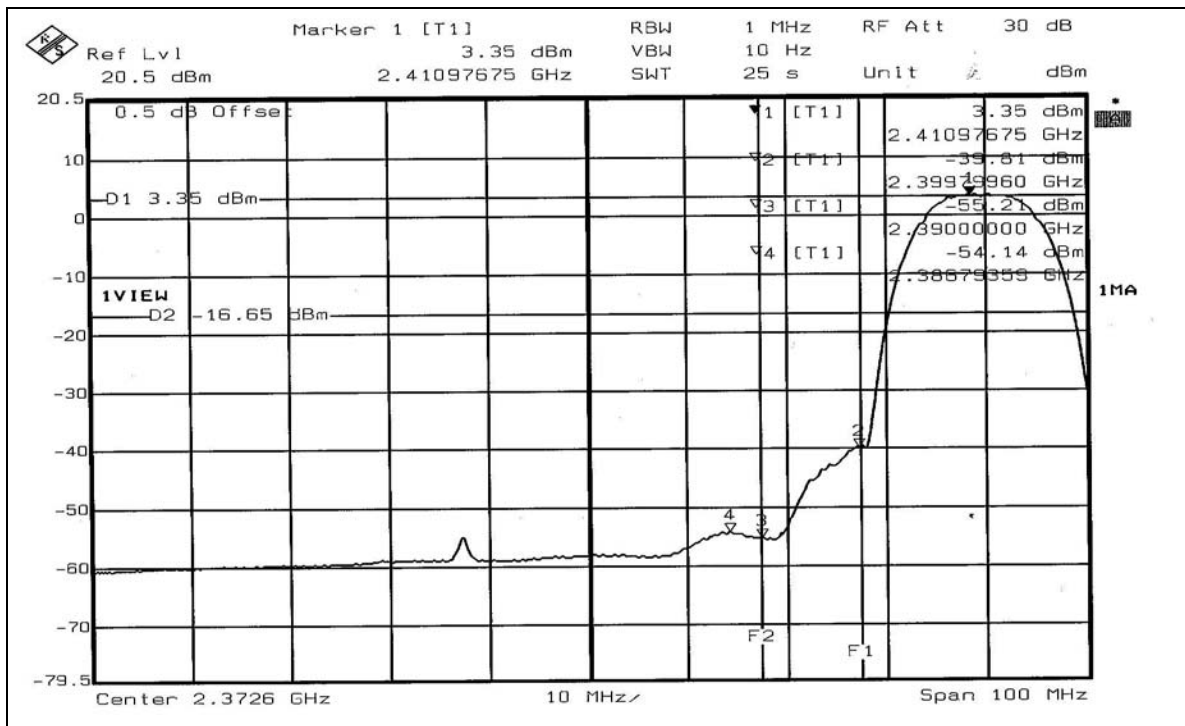
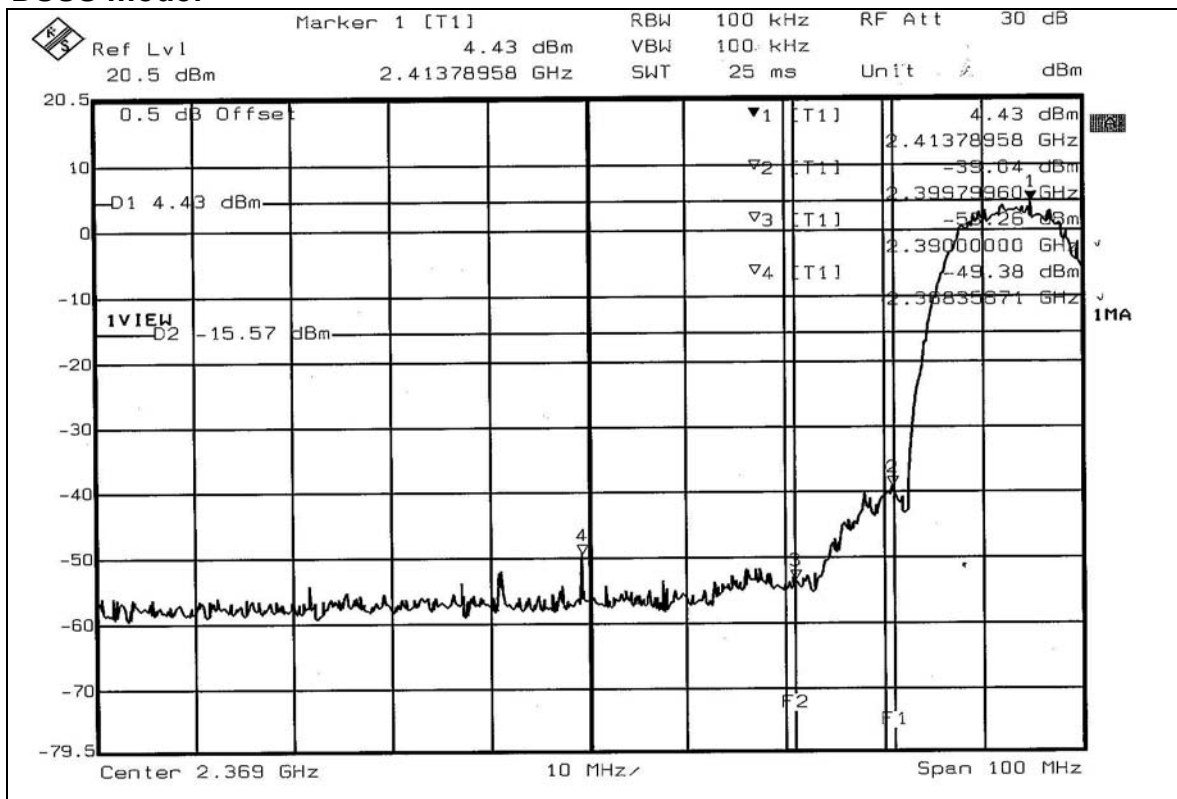
**Turbo mode:****NOTE:**

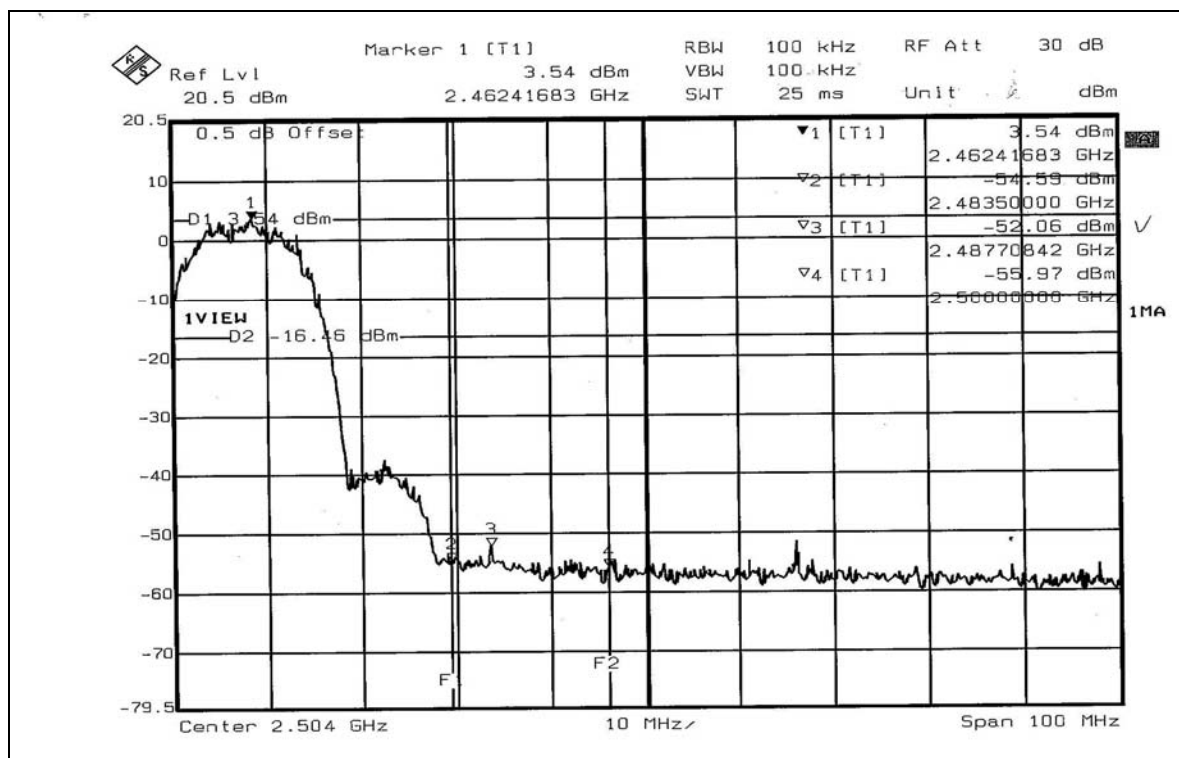
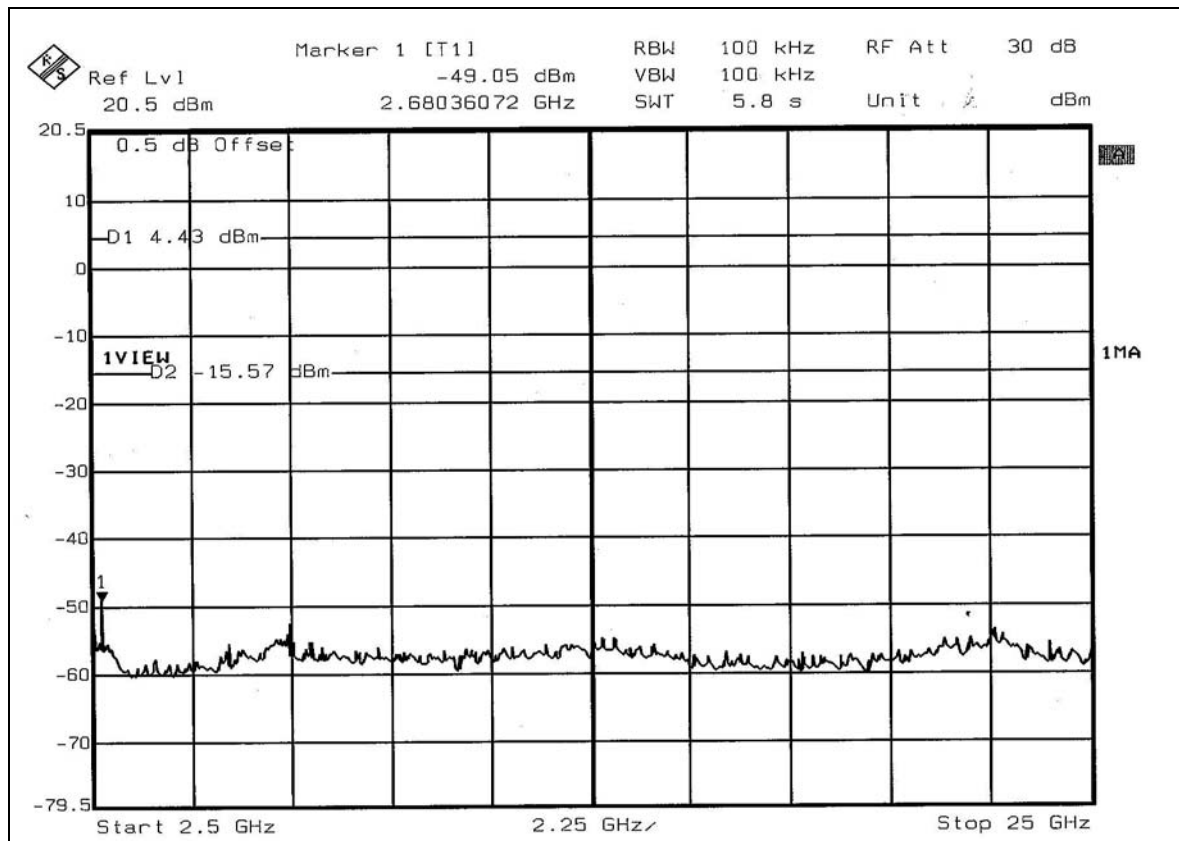
The band edge emission plot of OFDM technique with turbo mode on page 66 shows 49.61dB between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.9 is 104.21dBuV/m (Peak), so the maximum field strength in restrict band is $104.21 - 49.61 = 54.60$ dBuV/m which is under 74dBuV/m limit.

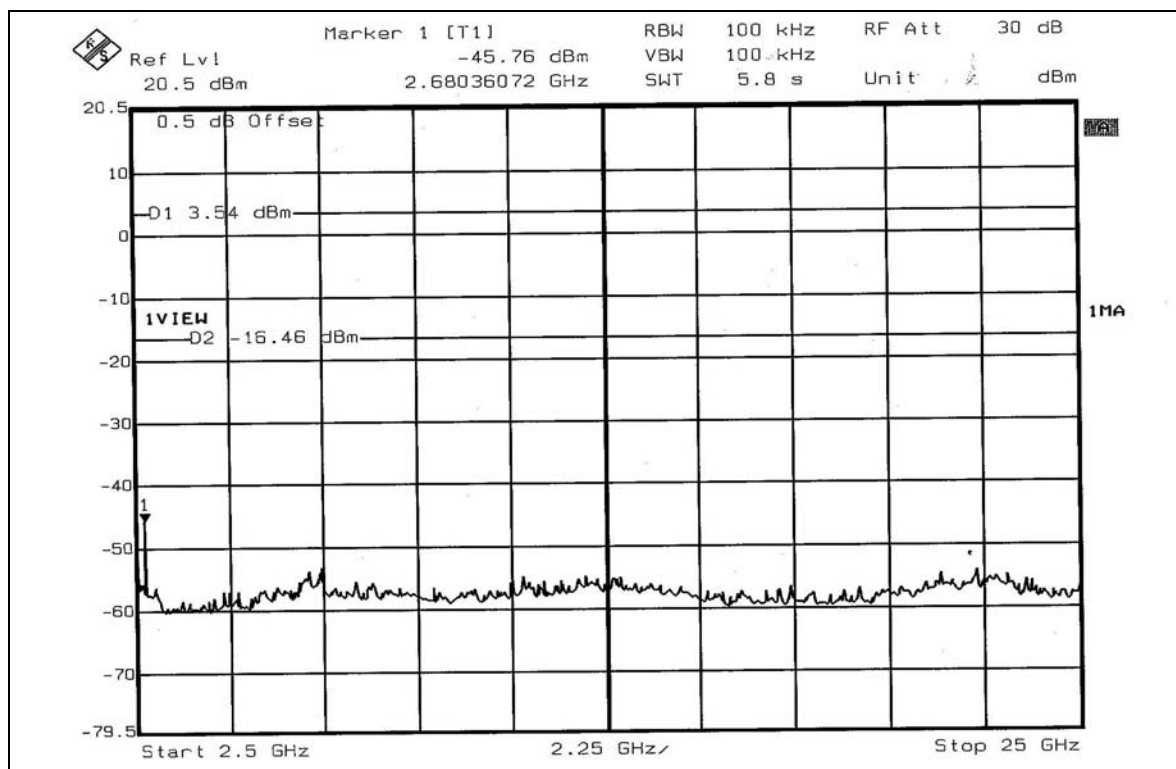
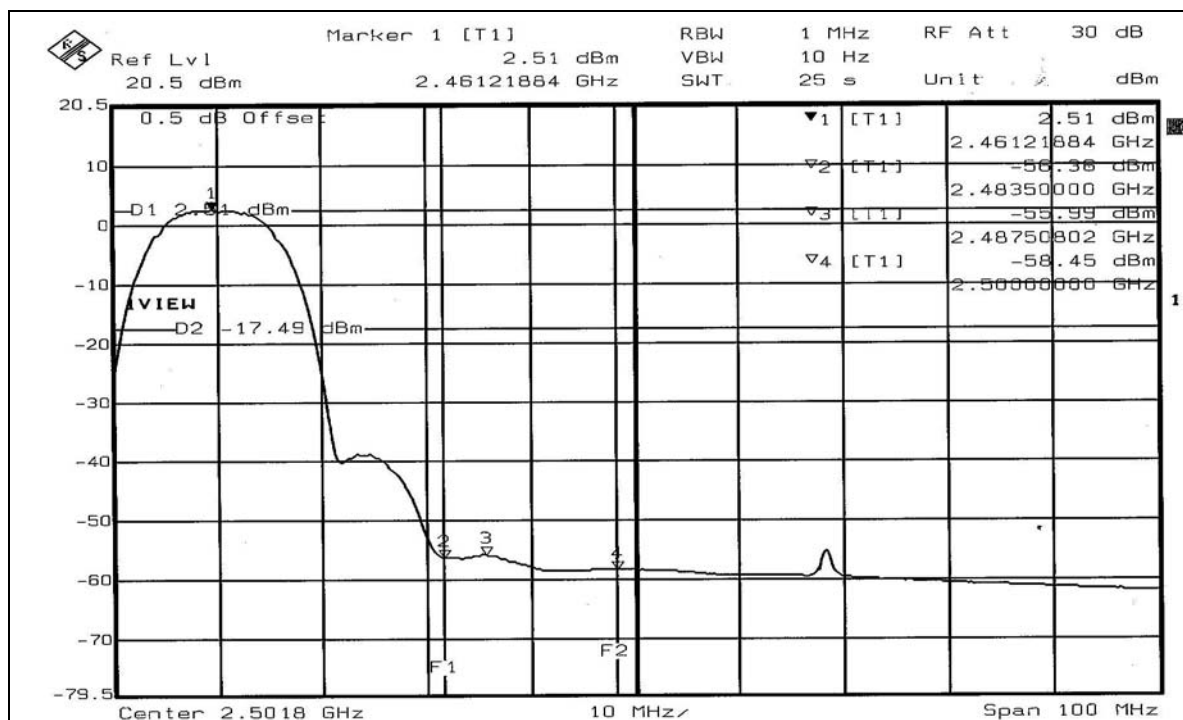
The band edge emission plot of OFDM technique with turbo mode on page 66 shows 50.57dB between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.9 is 95.48dBuV/m (Average), so the maximum field strength in restrict band is $95.48 - 50.57 = 44.91$ dBuV/m which is under 54dBuV/m limit.

The band edge emission plot of OFDM technique with turbo mode on page 67 shows 51.77dB between carrier maximum power and local maximum emission in restrict band (2.4879GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.9 is 104.21dBuV/m (Peak), so the maximum field strength in restrict band is $104.21 - 51.77 = 52.44$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of OFDM technique with turbo mode on page 68 shows 49.03dB 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 6 at the item 4.2.9 is 95.48dBuV/m (Average), so the maximum field strength in restrict band is $95.48 - 49.03 = 46.45$ dBuV/m which is under 54dBuV/m limit.

DSSS mode:





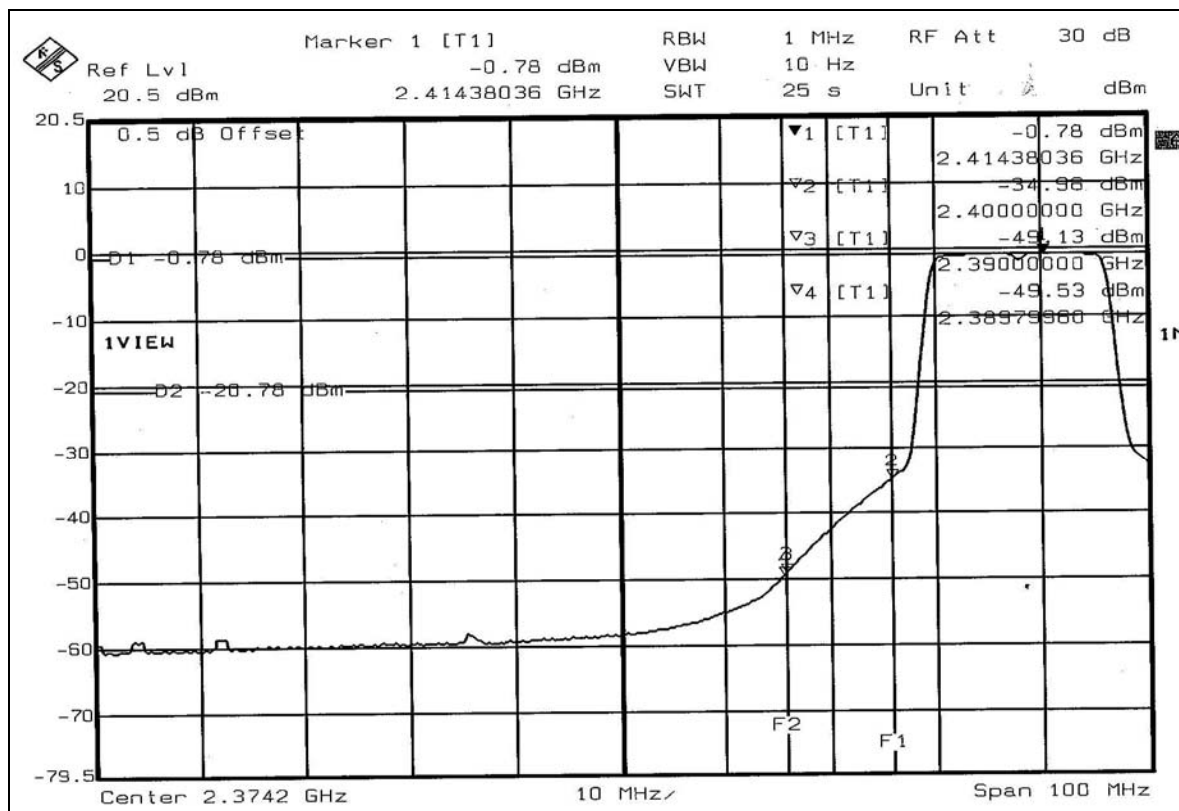
Marker 1 [T1] 3.55 dBm
 Ref Lvl 20.5 dBm 2.40696794 GHz
 RBW 100 kHz VBW 100 kHz RF Att 30 dB
 Unit 25 ms

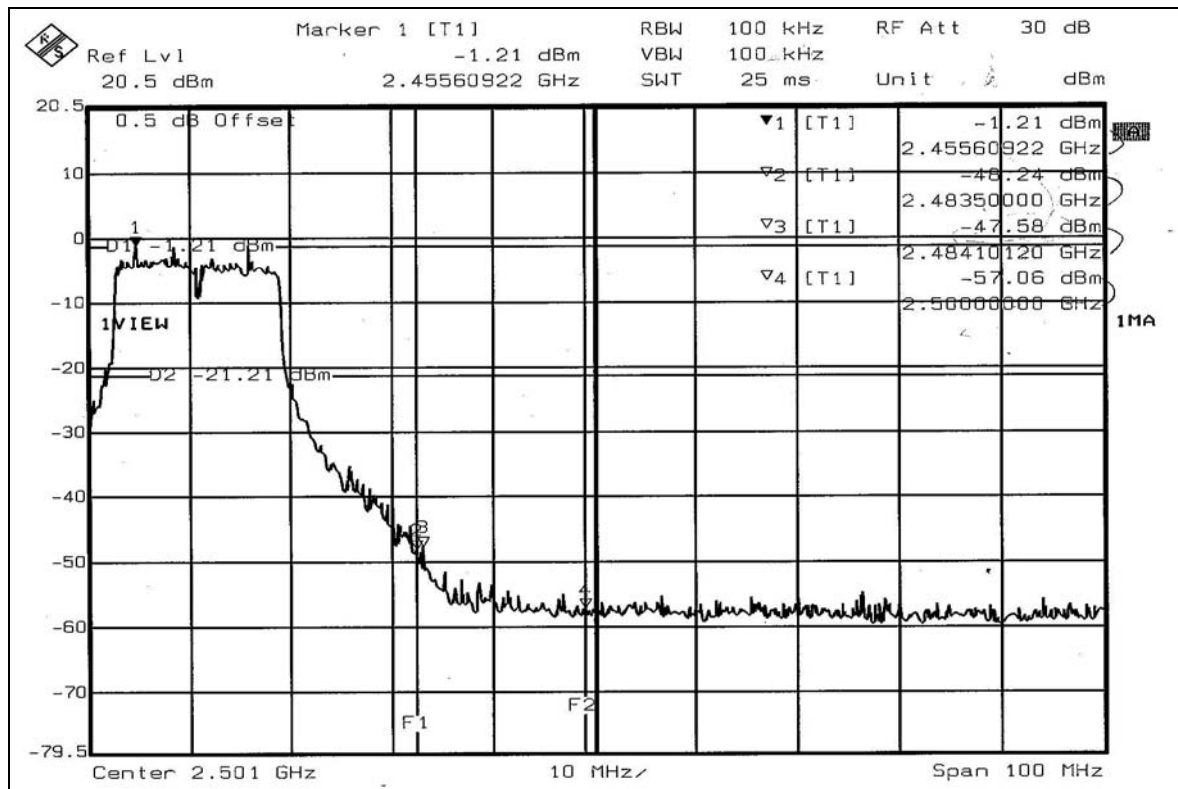
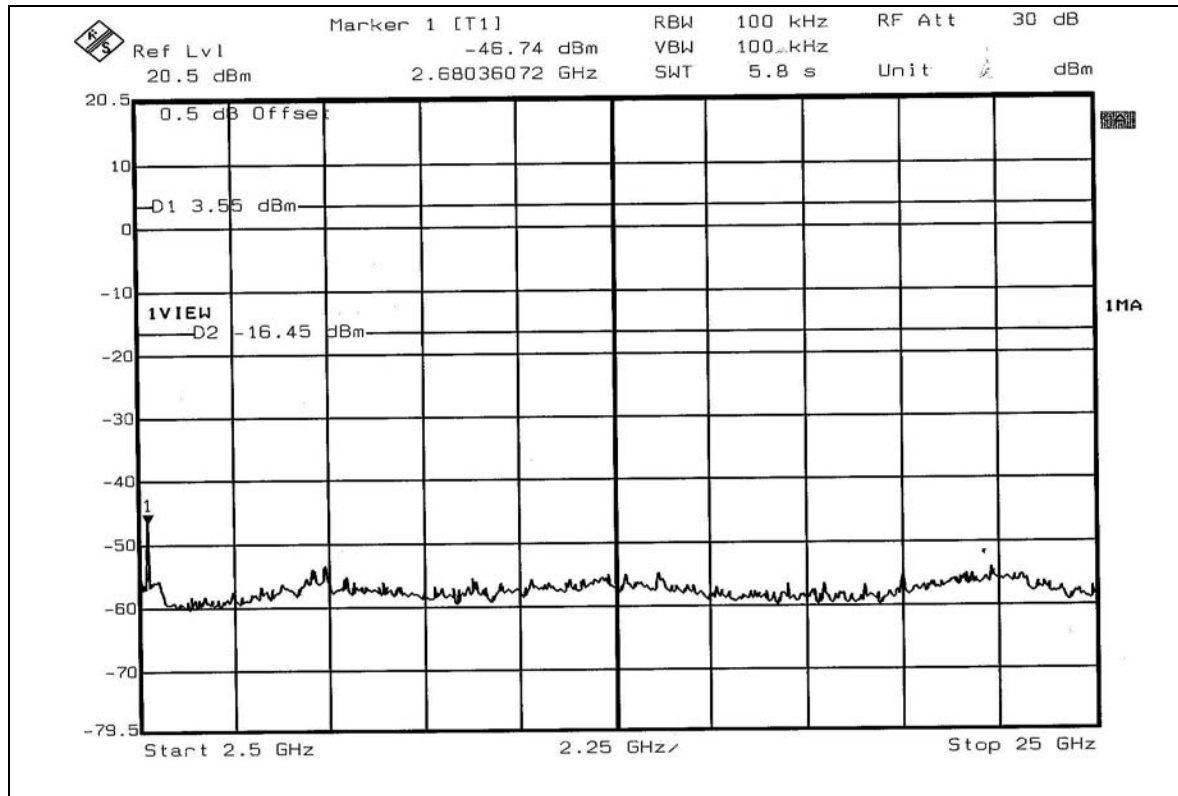
0.5 dB Offset
 D1 3.55 dBm
 1VIEW
 D2 -16.45 dBm

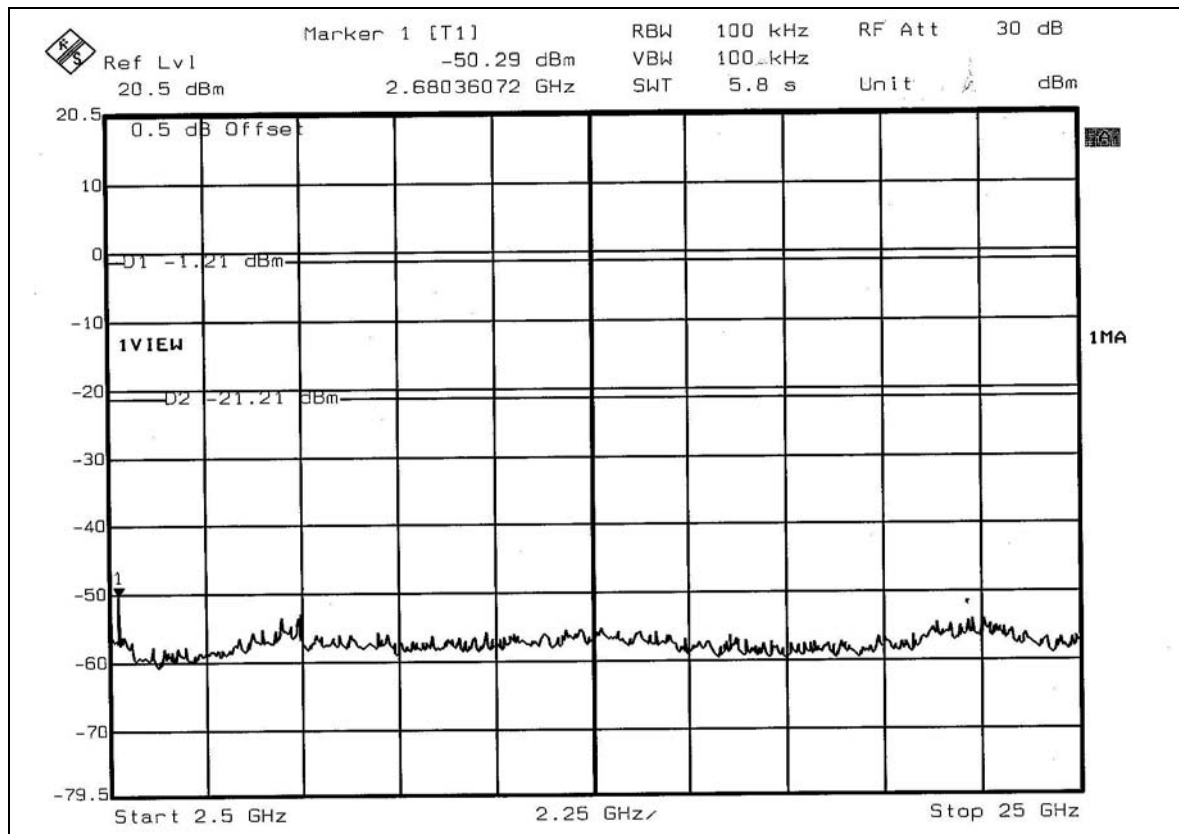
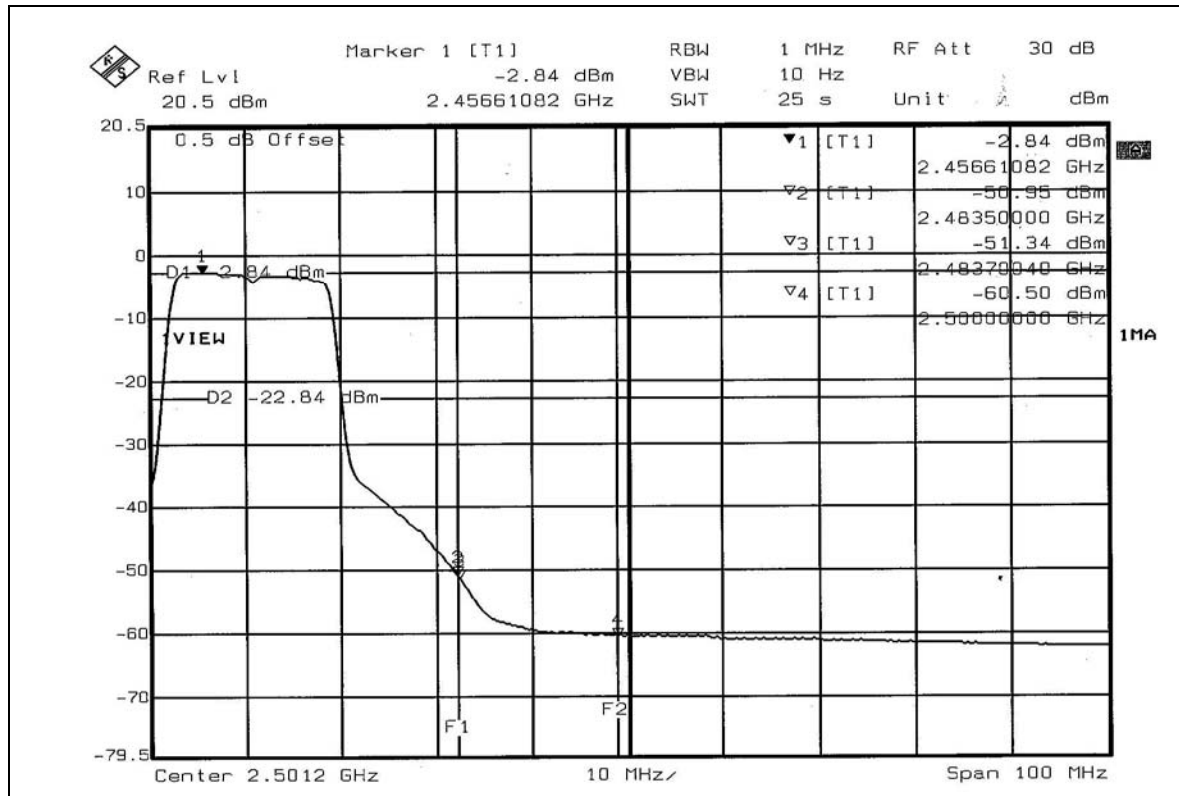
1 [T1] 3.55 dBm
 2 [T1] 2.40696794 GHz -25.13 dBm
 3 [T1] 2.39959920 GHz -39.28 dBm
 4 [T1] 2.39000000 GHz -39.74 dBm
 2.38979960 GHz

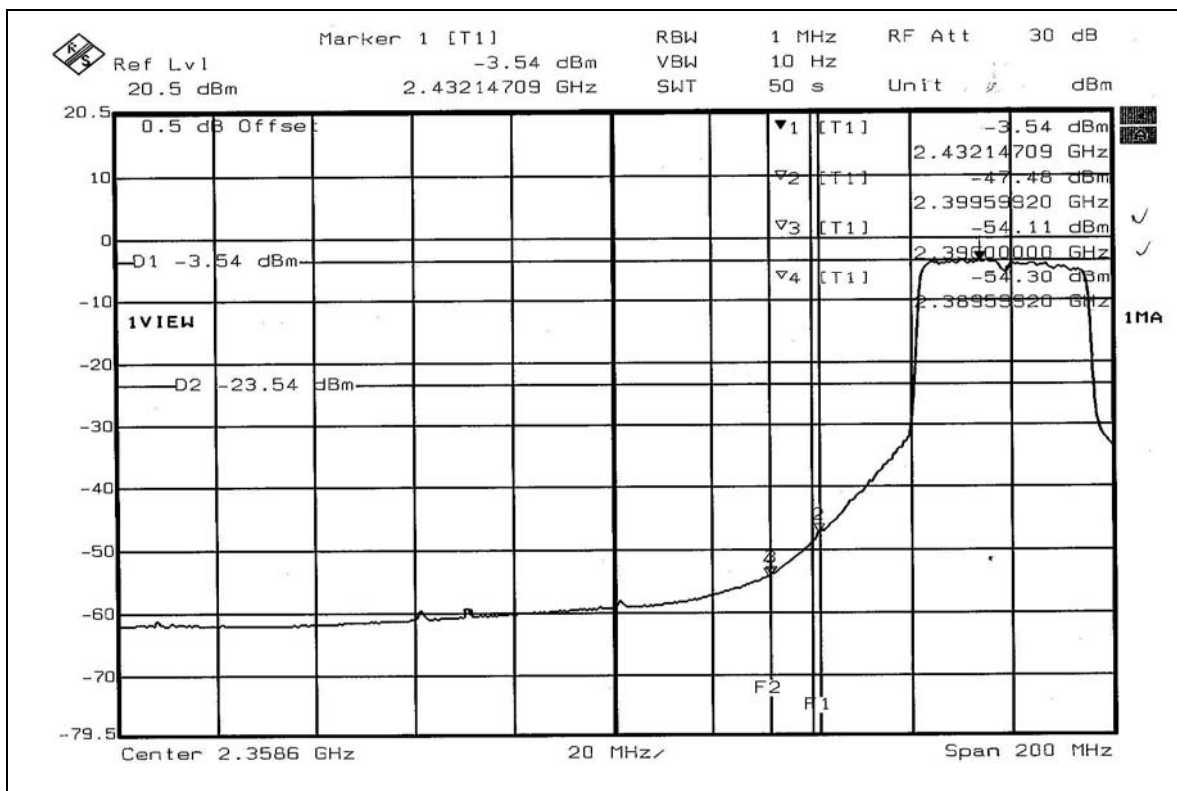
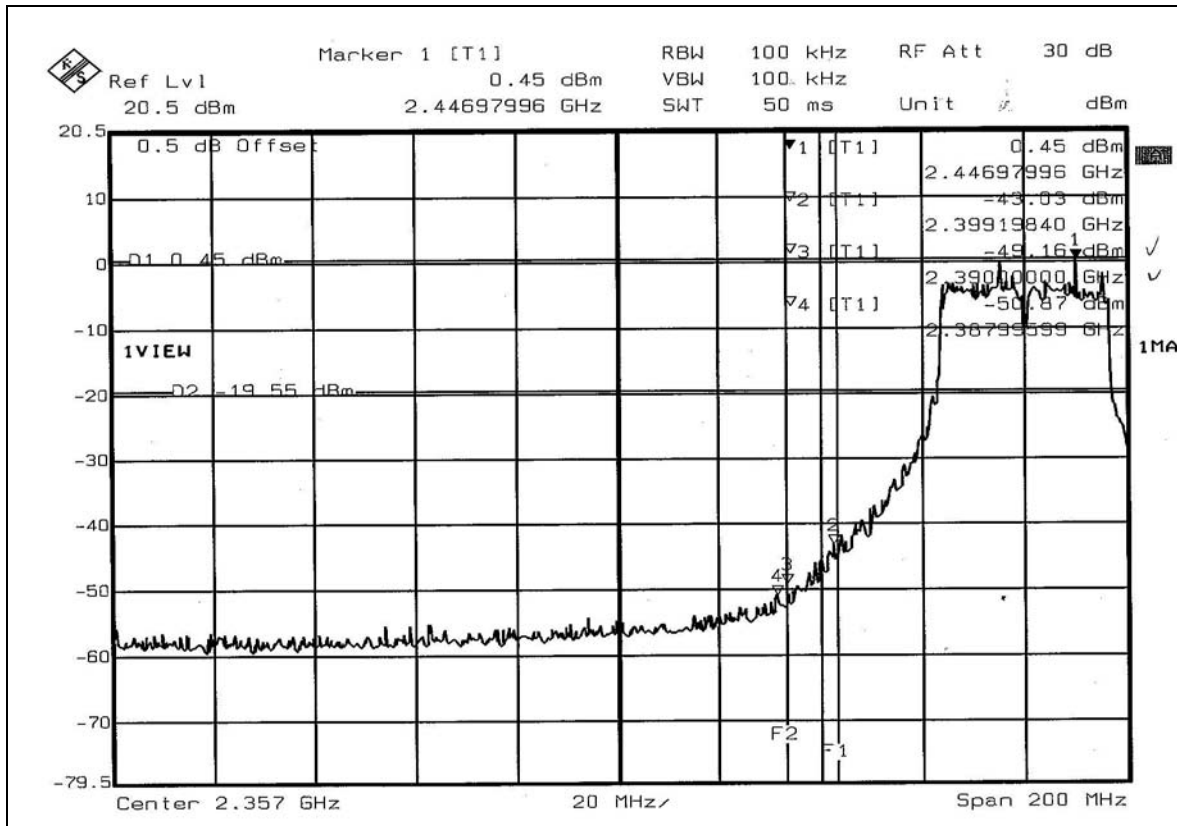
F2 F1

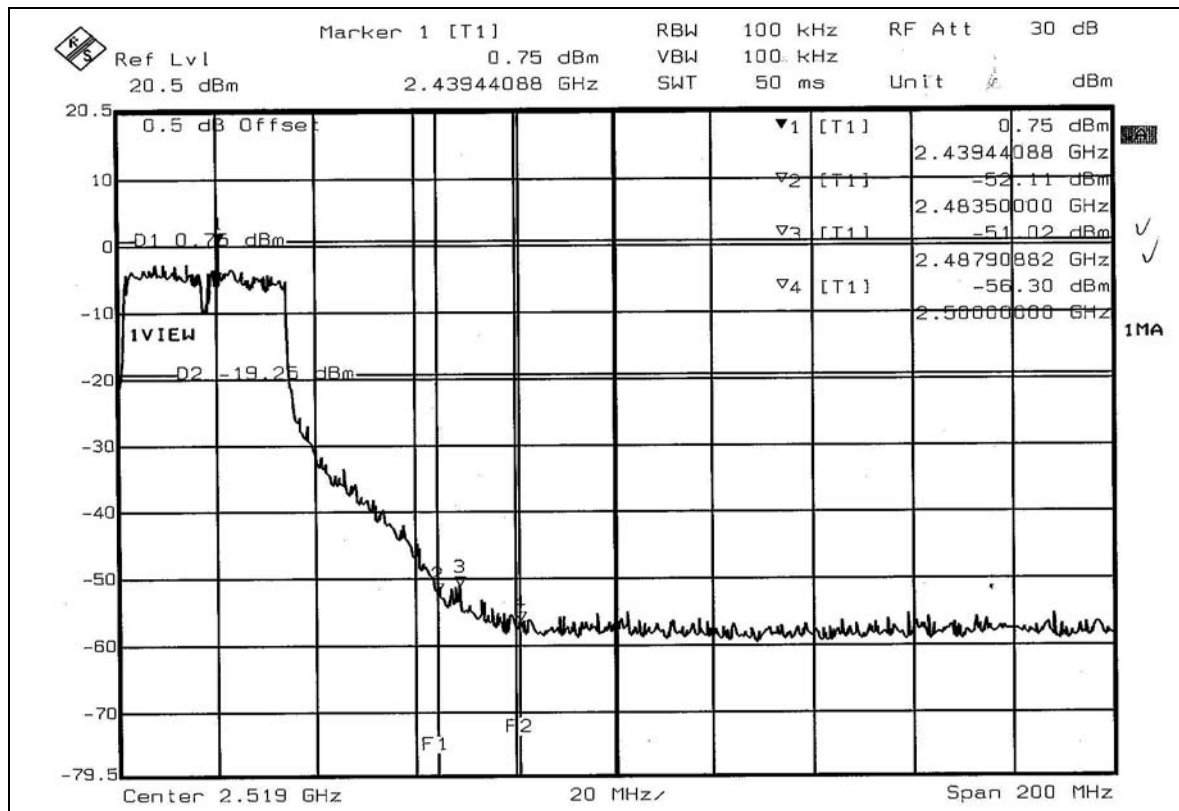
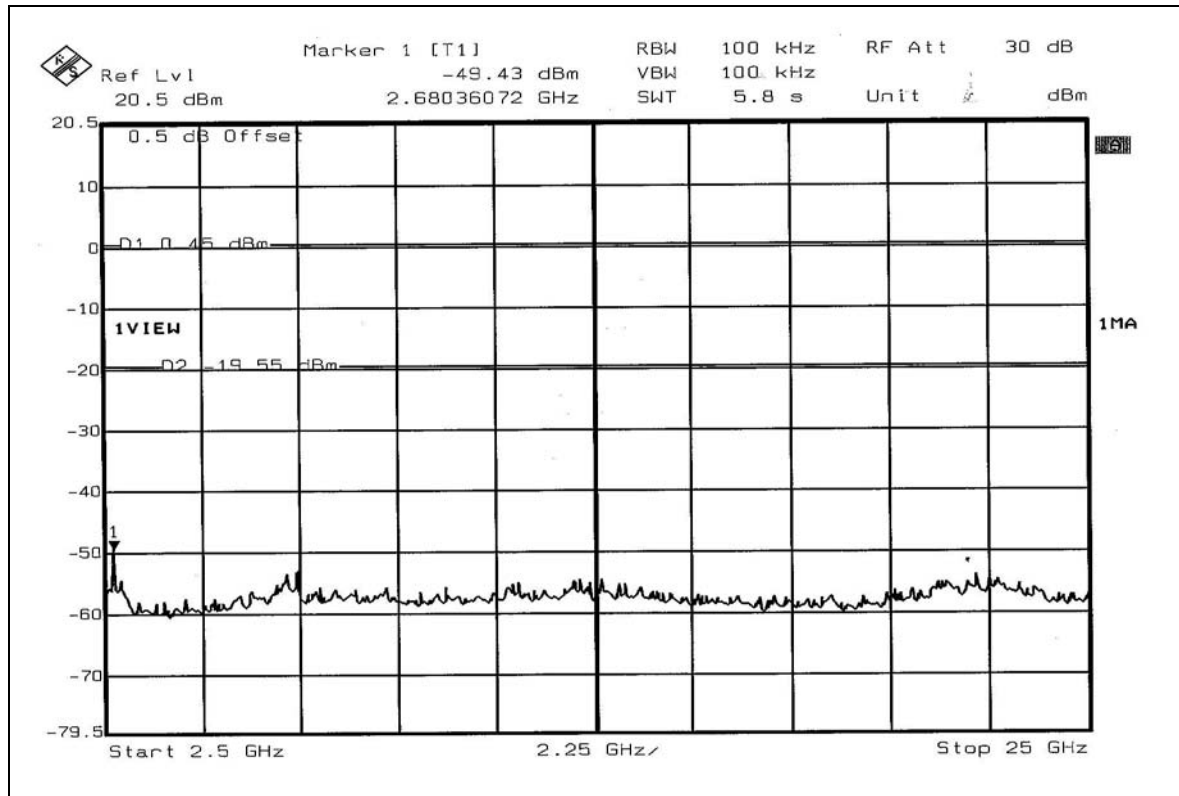
Center 2.373 GHz 10 MHz Span 100 MHz

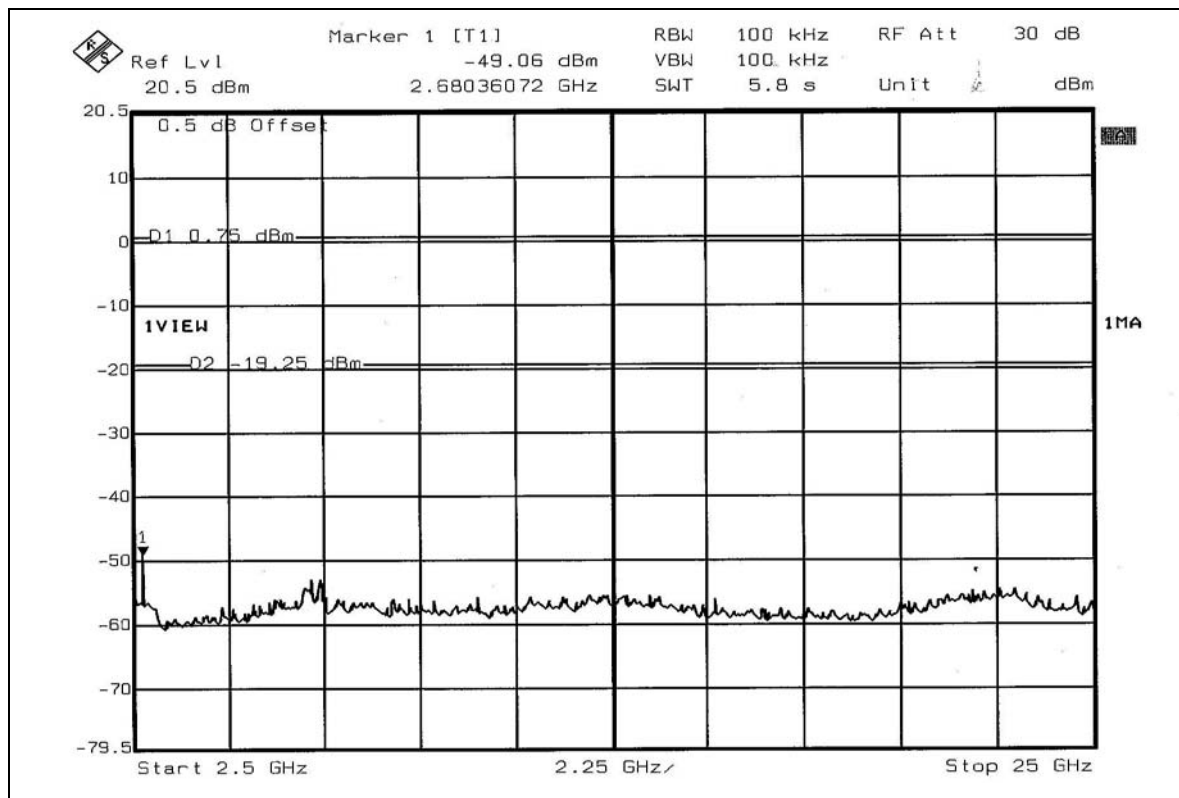
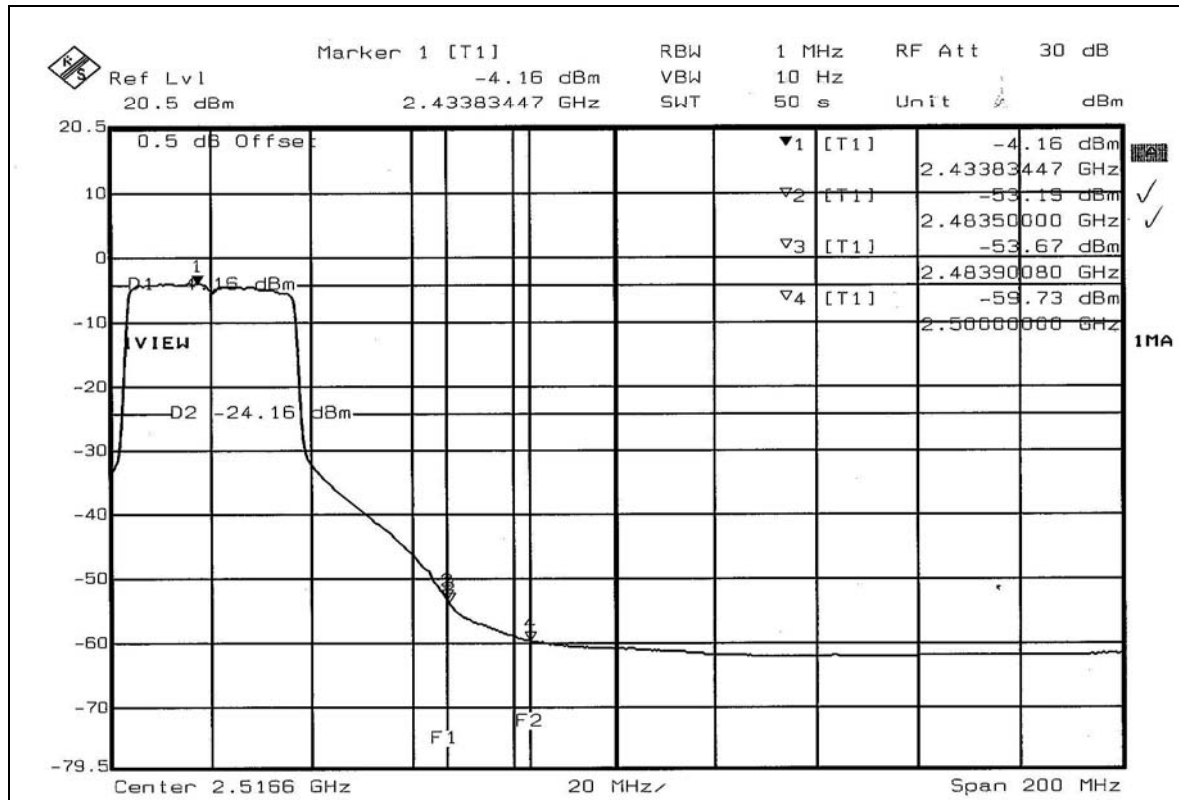






OFDM turbo mode:





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

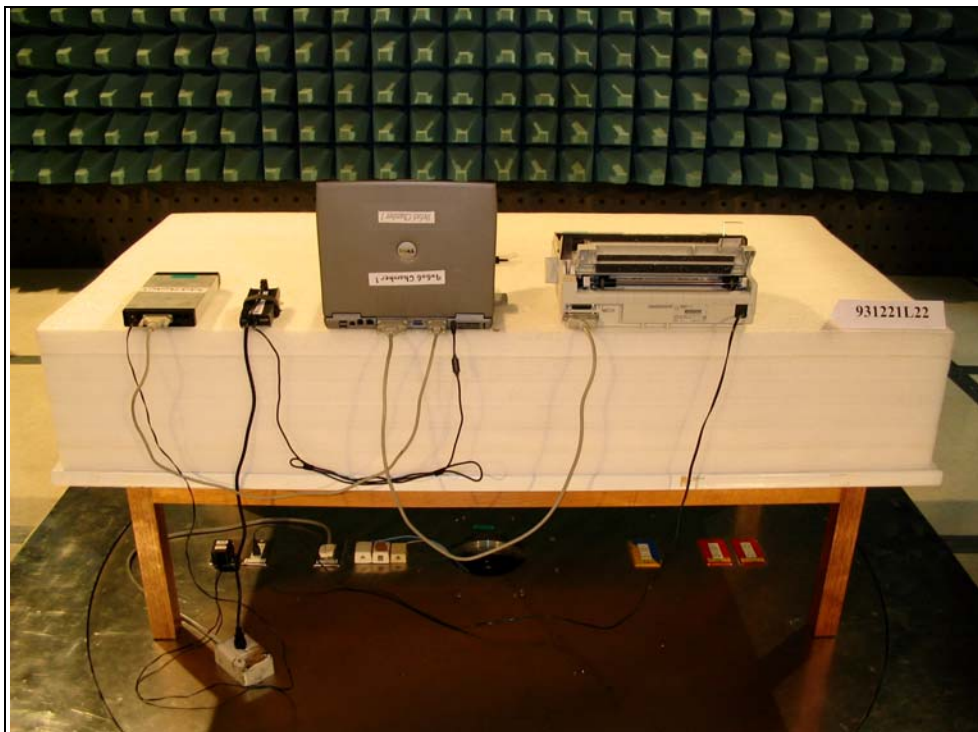
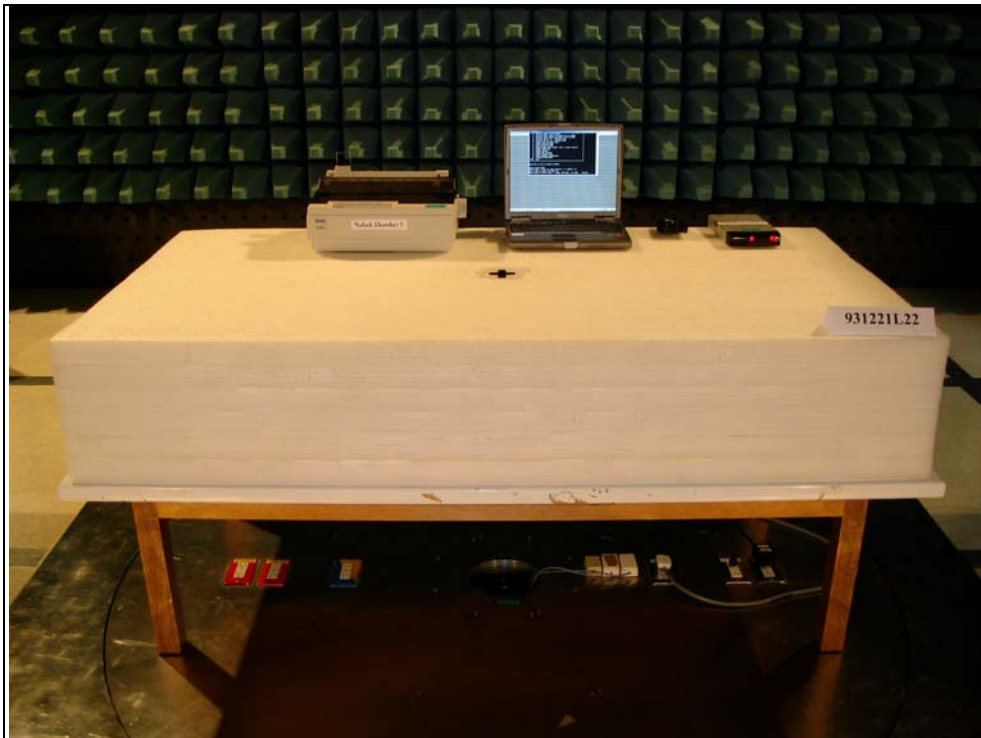
The antenna used in this product is Chip antenna without UFL antenna connector. The maximum Gain of the antenna is 0dBi.

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST



RADIATED EMISSION TEST



6. INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., 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, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , 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: 886-2-26052943

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

Linko RF Lab.

Tel: 886-3-3270910

Fax: 886-3-3270892

Web Site: www.adt.com.tw

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