FCC TEST REPORT

REPORT NO.:	RF961017H03
MODEL NO.:	GR-312, GR-310, T-365U, T-365, Trine XL, NS-DL001, 10-037-00
RECEIVED:	Oct. 17, 2007
TESTED:	Nov. 16, 2007 to Jan. 03, 2008
ISSUED:	Jan. 08, 2008

APPLICANT:	NaviSys Technology Corp.
ADDRESS:	5F, No. 2, Industry E. Rd. IX, Science-Based Industrial Park, Hsinchu 300, Taiwan

ISSUED BY:	Advance Data Technology Corporation
LAB LOCATION:	No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien, Taiwan, R.O.C.

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Testing Laboratory
0536

ACCREDITED
No. 2177-01

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1.CERTIFICATION

PRODUCT :	Bluetooth GPS Receiver & Data Logger Dongle
BRAND NAME :	Navisys, ProGin, RightWay, Nextar, DeluoGPS
MODEL NO. :	GR-312, GR-310, T-365U, T-365, Trine XL, NS-DL001, 10-037-00
APPLICANT :	NaviSys Technology Corp.
TESTED DATE :	Nov. 16, 2007 to Jan. 03, 2008
TEST SAMPLE :	R&D SAMPLE
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

The above equipment (Model: GR-312) has 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 : Sunny Wen , **DATE:** Jan. 08, 2008
(Sunny Wen, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** Jan. 08, 2008
Responsible for RF
(Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** Jan. 08, 2008
(May Chen, Deputy Manager)

2.SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR 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 -11.12dB at 0.175MHz
15.247(a)(1)(I)-(ii)	Number of Hopping Frequency Used Spec.: At least 15 channels	PASS	Meet the requirement of limit
15.247(a)(1)(ii)	Dwell Time on Each Channel Spec. : Max. 0.4 second within 31.6 second	PASS	Meet the requirement of limit
15.247(a)(1)(I)-(ii)	Hopping Channel Separation Spec. : Min. 25 kHz or two-thirds of 20 dB bandwidth, which ever is greater	PASS	Meet the requirement of limit
15.247(a)(2)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Report reference
15.247(b)	Maximum Peak Output Power Spec.: max. 125mW	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -9.21dB at 2483.50MHz
15.247(c)	Band Edge Measurement	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:

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

Measurement	Value
Conducted emissions	2.44 dB
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz ~18GHz)	2.33 dB
Radiated emissions (18GHz ~20GHz)	2.55 dB

3.GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Bluetooth GPS Receiver & Data Logger Dongle
MODEL NO.	GR-312, GR-310, T-365U, T-365, Trine XL, NS-DL001, 10-037-00
FCC ID	VRQ-GR-312
POWER SUPPLY	DC 4.75~5.25V from Adapter, DC 5V from host equipment, DC 5V from Battery Bank & DC 5V from Car Charger
MODULATION TYPE	GFSK
MODULATION TECHNOLOGY	FHSS
FREQUENCY RANGE	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	0.590 mW
ANTENNA TYPE	SMD Antenna (Antenna gain : -0.5dBi)
DATA CABLE	USB connector cable (shielded, 1.5m) Power to USB cable (shielded, 1.55m)
INTERFACE	USB

NOTE:

1. The EUT has different models names, which are identical to each other in all aspects except for the followings :

Brand	Model No.	Difference
NaviSys	GR-312	USB Bluetooth GPS receiver & data logger dongle
	GR-310	USB Bluetooth GPS receiver dongle
ProGin	T-365U	USB Bluetooth GPS receiver & data logger dongle
	T-365	USB Bluetooth GPS receiver & data logger dongle plus battery bank
RightWay	Trine XL	USB Bluetooth GPS receiver & data logger dongle plus battery bank
Nextar	NS-DL001	USB Bluetooth GPS receiver & data logger dongle
DeluoGPS	10-037-00	Deluo GPS Dongle - USB and Bluetooth

From the above models, model: **GR-312** was selected as representative model for the test and its data was recorded in this report.

2. The EUT must be supplied with a power adapter / battery bank / car charger as following:

Adapter 1		
Brand	Model No.	Spec.
SEMDITECH	TC-FU-USB	AC Input: 110-240V, 0.15A, 47-63Hz DC Output: 4.75-5.25V, 1A, 5W
Adapter 2		
Brand	Model No.	Spec.
CHENTAI	CT-0505WU	AC Input: 100-240V, 0.15A, 50-60Hz DC Output: 5V, 1A, 0.5W
Battery Bank		
Brand	Model No.	Spec.
NaviSys	BB-100	DC Input: 5V, 1A DC Output: 3.7V, 500mA
Car Charger 1		
Brand	Model No.	Spec.
SEMDITECH	C-USB	DC Input: 12-24V DC Output: 5V, 1A
Car Charger 2		
Brand	Model No.	Spec.
CHENTAI	CC-0103	DC Input: 12-24V DC Output: 5V, 850mA

3. 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

Seventy-nine 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	78	2480
19	2421	39	2441	59	2461		

3.3 Test Mode Applicability and tested channel detail

EUT CONFIGURE MODE	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	NA

Where **PLC:** Power Line Conducted Emission **RE<1G:** Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	78	FHSS	GFSK	DH5

☒ The EUT was tested as the following test modes:

Test Mode	Description
Mode 1	Battery Bank + Power to USB cable + USB connector cable + N/B
Mode 2	Battery Bank + Power to USB cable + USB connector cable + Adapter 1
Mode 3	Battery Bank + Power to USB cable + USB connector cable + Adapter 2

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0	FHSS	GFSK	DH5

☒ For spurious emissions (below 1GHz), the EUT was pre-tested in chamber as the following test modes:

Test Mode	Description
Mode 1	Battery Bank
Mode 2	N/B
Mode 3	USB connector cable + N/B
Mode 4	USB connector cable + Adapter 1
Mode 5	USB connector cable + Adapter 2
Mode 6	USB connector cable + Car Charger 1
Mode 7	USB connector cable + Car Charger 2
Mode 8	Battery Bank + Power to USB cable + N/B
Mode 9	Battery Bank + Power to USB cable + Adapter 1
Mode 10	Battery Bank + Power to USB cable + Adapter 2
Mode 11	Battery Bank + Power to USB cable + Car Charger 1
Mode 12	Battery Bank + Power to USB cable + Car Charger 2
Mode 13	Battery Bank + Power to USB cable + USB connector cable + N/B
Mode 14	Battery Bank + Power to USB cable + USB connector cable + Adapter 1
Mode 15	Battery Bank + Power to USB cable + USB connector cable + Adapter 2
Mode 16	Battery Bank + Power to USB cable + USB connector cable + Car Charger 1
Mode 17	Battery Bank + Power to USB cable + USB connector cable + Car Charger 2

Mode 17, the worse case one, was chosen for final test.

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0, 39, 78	FHSS	GFSK	DH5

☒ The EUT was tested as the following test mode:

Test Mode	Description
Mode 1	Battery Bank + Power to USB cable + USB connector cable + N/B

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0, 78	FHSS	GFSK	DH5

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0, 39, 78	FHSS	GFSK	DH5

3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Bluetooth GPS Receiver & Data Logger Dongle. 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.

3.5 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.

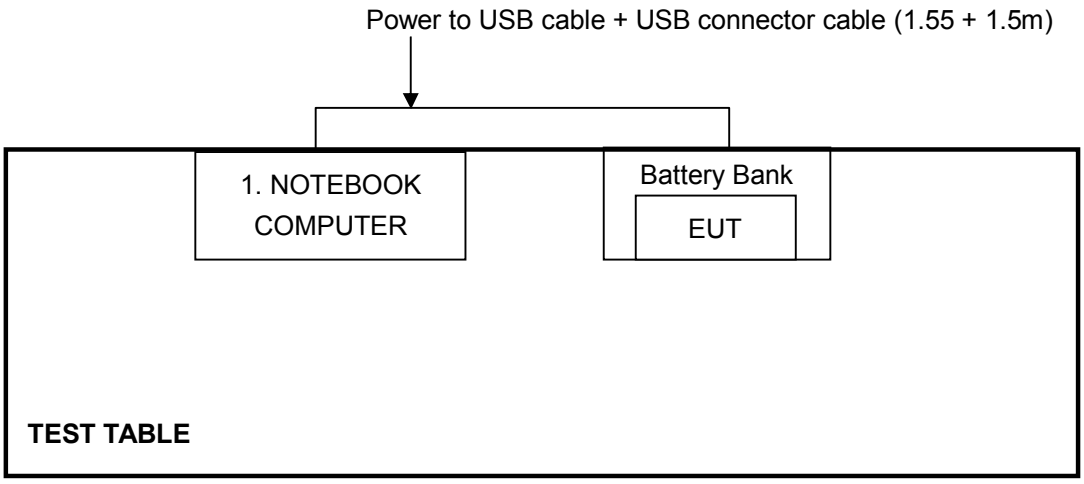
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP21L	CN-0GD366-70166-5B3-09ZX	QDS-BRCM1016
2	DC POWER SUPPLY	GOOD WILL INSTRUMENT CO., LTD.	GPC-3030D	7700087	NA

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

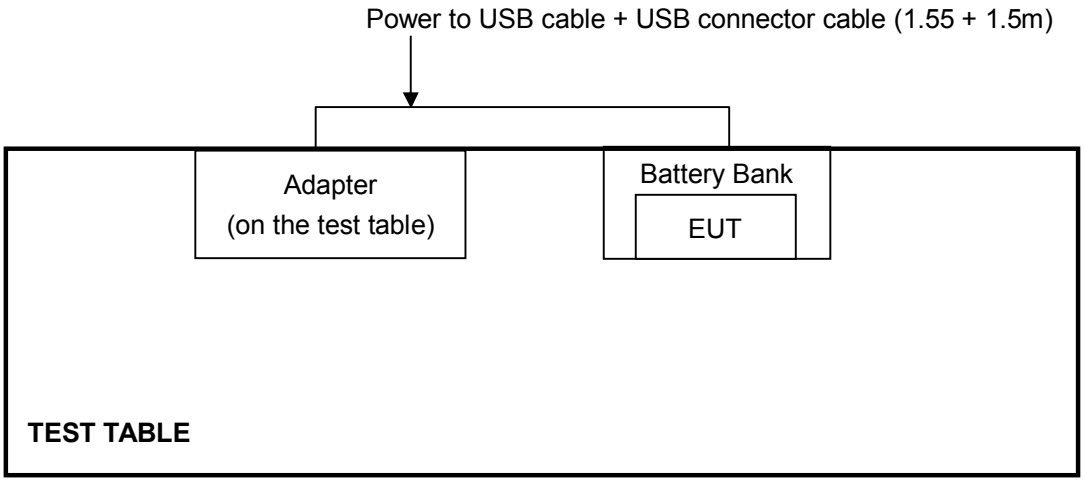
NOTE: All power cords of the above support units are non shielded (1.8m).

3.6 CONFIGURATION OF SYSTEM UNDER TEST

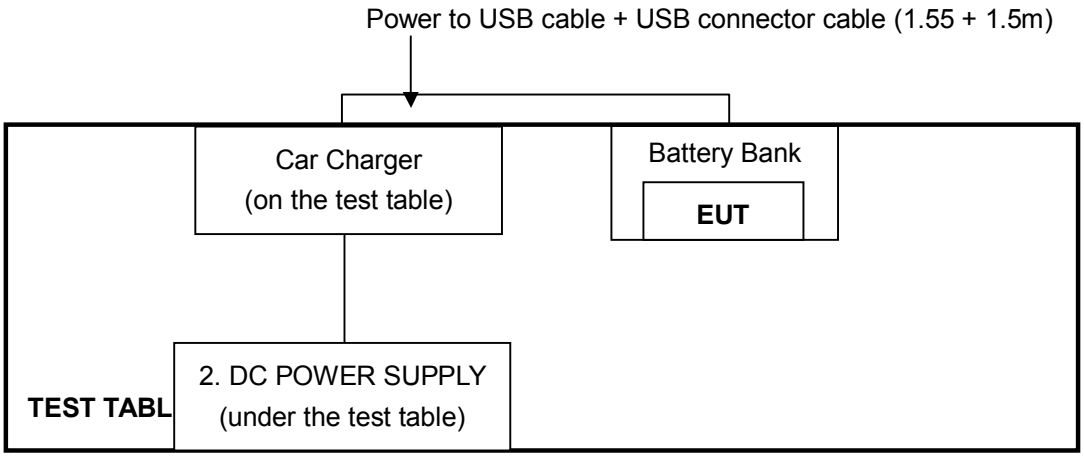
For Battery Bank + Power to USB cable + USB connector cable + N/B Mode :



For Battery Bank + Power to USB cable + USB connector cable Adapter Mode :



For Battery Bank + Power to USB cable + USB connector cable + Car Charger Mode :



4.TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. All emanations from a class 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	ESCS 30	847124/029	Mar. 28, 2008
Line-Impedance Stabilization Network(for EUT)	ESH3-Z5	848773/004	Nov. 08, 2008
Line-Impedance Stabilization Network(for Peripheral)	ENV-216	100071	Nov. 26, 2008
RF Cable (JETBAO)	RG233/U	Cable_CB_01	Dec. 09, 2008
50 ohms Terminator	50	3	Nov. 15, 2008
Software	ADT_Cond_V7.3.2	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 ADT Shielded Room No. B.
3. The VCCI Con B Registration No. is C-2193.

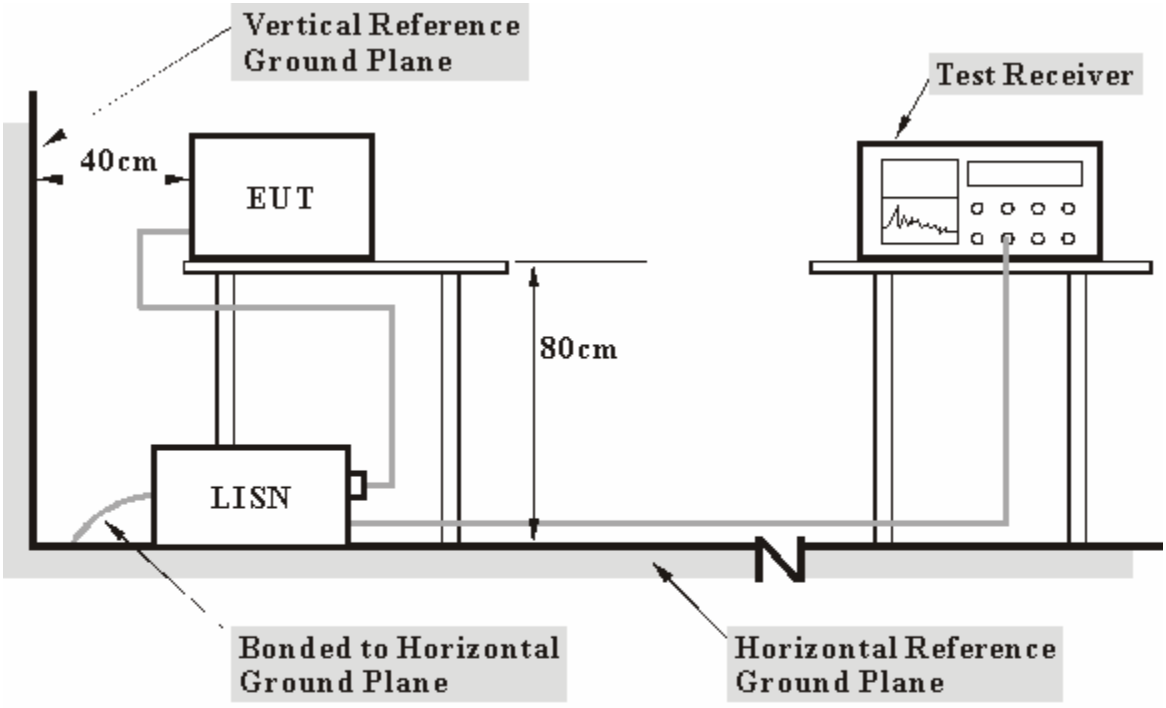
4.1.3 TEST PROCEDURES

a. The EUT/HOST was placed 0.4 meters from the conducting wall of the shielded room with EUT/HOST 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/HOST were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 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.

4.1.5 EUT OPERATING CONDITIONS

For Battery Bank + Power to USB cable + USB connector cable + N/B Mode :

1. Placed the EUT on the testing table.
2. The communication partner run test program “WDS Commander” to enable EUT under transmission/receiving condition continuously at specific channel frequency via USB cables.

For Battery Bank + Power to USB cable + USB connector cable Adapter or Car Charger Mode :

1. Placed the EUT on the testing table.
2. The communication partner run test program “WDS Commander” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

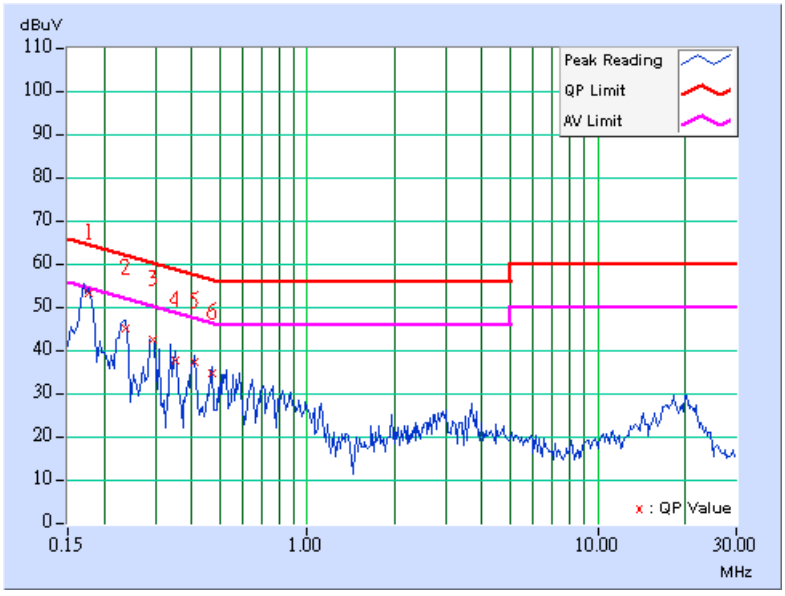
4.1.6 TEST RESULTS

For Notebook Computer Mode :

INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6DB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 56%RH, 960 hPa	**PHASE**	Line (L)
TESTED BY	Wen Yu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.176	0.15	53.11	-	53.26	-	64.65	54.65	-11.39	-
2	0.236	0.16	45.03	-	45.19	-	62.24	52.24	-17.05	-
3	0.296	0.16	42.30	-	42.46	-	60.36	50.36	-17.89	-
4	0.351	0.17	37.76	-	37.93	-	58.95	48.95	-21.02	-
5	0.412	0.17	37.39	-	37.56	-	57.61	47.61	-20.05	-
6	0.470	0.18	34.72	-	34.90	-	56.51	46.51	-21.61	-

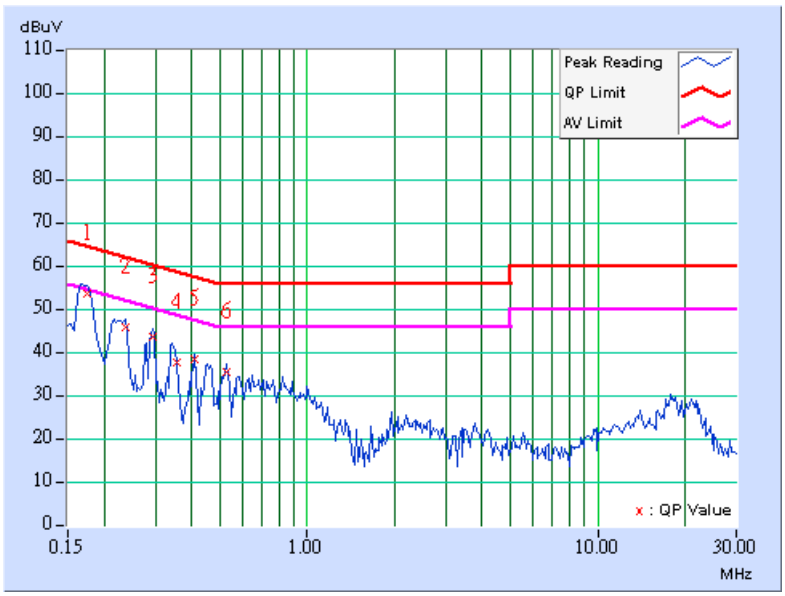
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 56%RH, 960 hPa	**PHASE**	Neutral (N)
TESTED BY	Wen Yu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.175**	**0.08**	**53.53**	**-**	**53.61**	**-**	**64.73**	**54.73**	**-11.12**	**-**
2	0.236	0.08	45.67	-	45.75	-	62.24	52.24	-16.49	-
3	0.295	0.08	43.64	-	43.72	-	60.40	50.40	-16.68	-
4	0.355	0.08	37.82	-	37.90	-	58.85	48.85	-20.95	-
5	0.412	0.08	38.45	-	38.53	-	57.61	47.61	-19.08	-
6	0.529	0.10	35.49	-	35.59	-	56.00	46.00	-20.41	-

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.

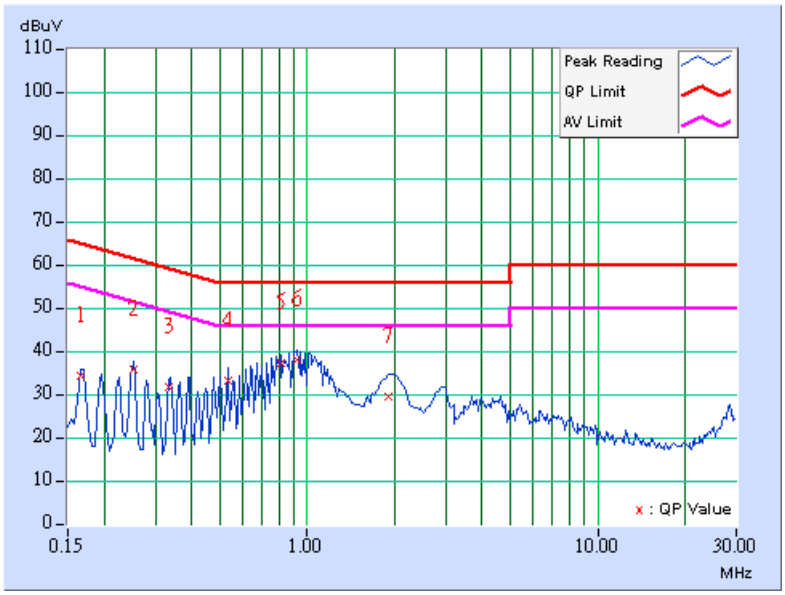


For Adapter 1 Mode :

INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6DB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 960 hPa	**PHASE**	Line (L)
TESTED BY	Moris Lin		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.166	0.15	34.09	-	34.24	-	65.18	55.18	-30.94	-
2	0.252	0.16	35.64	-	35.80	-	61.71	51.71	-25.90	-
3	0.334	0.17	31.45	-	31.62	-	59.36	49.36	-27.74	-
4	0.533	0.19	32.91	-	33.10	-	56.00	46.00	-22.90	-
5	0.810	0.25	37.09	-	37.34	-	56.00	46.00	-18.66	-
6	0.920	0.27	37.80	-	38.07	-	56.00	46.00	-17.93	-
7	1.904	0.39	29.21	-	29.60	-	56.00	46.00	-26.40	-

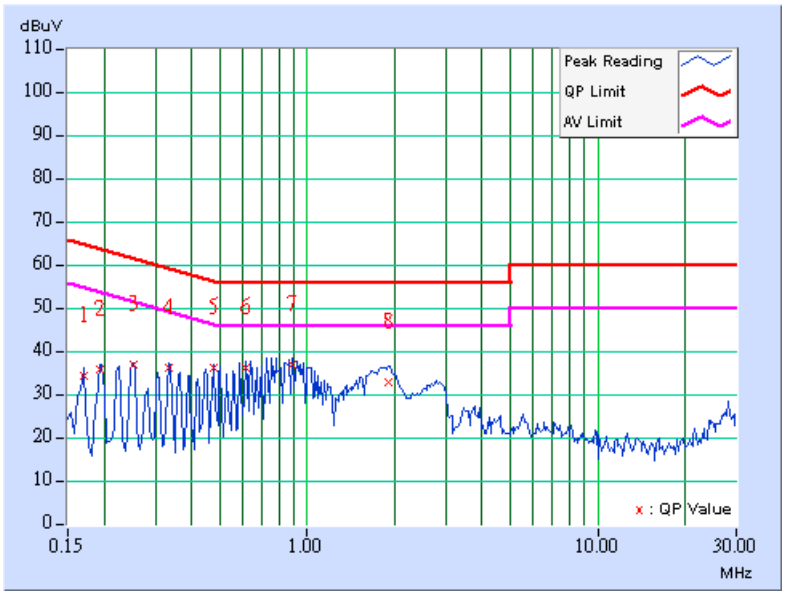
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 960 hPa	**PHASE**	Neutral (N)
TESTED BY	Moris Lin		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.08	34.30	-	34.38	-	64.98	54.98	-30.61	-
2	0.193	0.08	35.44	-	35.52	-	63.91	53.91	-28.39	-
3	0.252	0.08	36.84	-	36.92	-	61.71	51.71	-24.79	-
4	0.334	0.08	36.10	-	36.18	-	59.36	49.36	-23.18	-
5	0.474	0.09	35.86	-	35.95	-	56.44	46.44	-20.49	-
6	0.615	0.12	35.94	-	36.06	-	56.00	46.00	-19.94	-
7	0.892	0.17	36.85	-	37.02	-	56.00	46.00	-18.98	-
8	1.900	0.31	32.57	-	32.88	-	56.00	46.00	-23.12	-

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

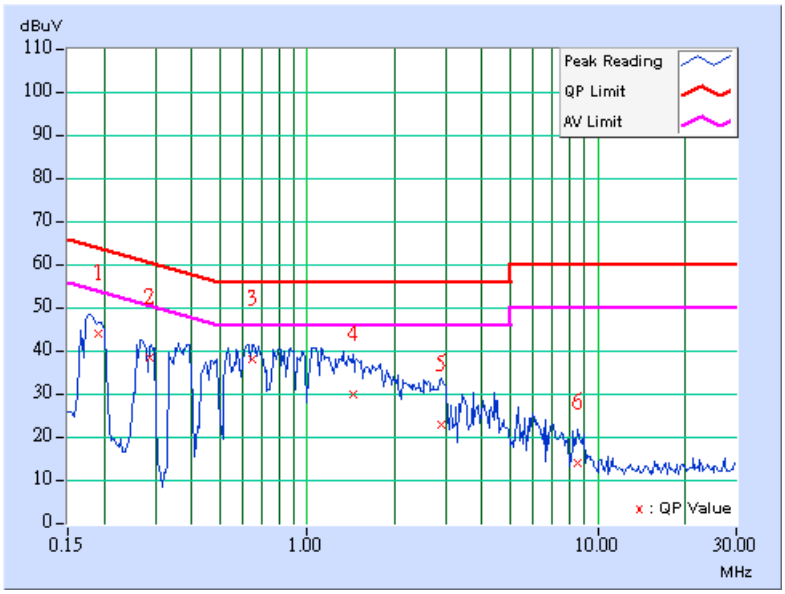


For Adapter 2 Mode :

INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6DB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 65%RH, 960 hPa	**PHASE**	Line (L)
TESTED BY	Moris Lin		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.191	0.34	43.73	-	44.07	-	64.01	54.01	-19.94	-
2	0.286	0.24	38.02	-	38.26	-	60.65	50.65	-22.39	-
3	0.650	0.19	37.59	-	37.78	-	56.00	46.00	-18.22	-
4	1.435	0.30	29.58	-	29.88	-	56.00	46.00	-26.12	-
5	2.880	0.34	22.45	-	22.79	-	56.00	46.00	-33.21	-
6	8.535	0.52	13.46	-	13.98	-	60.00	50.00	-46.02	-

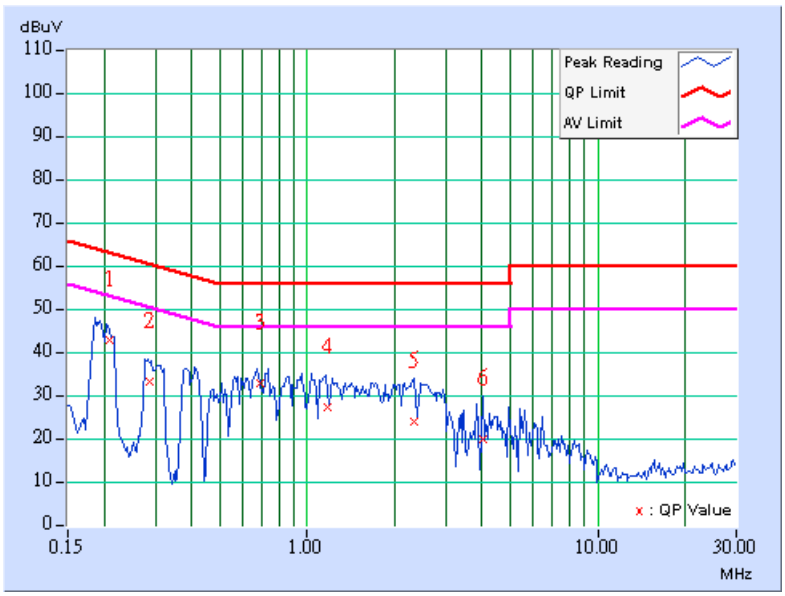
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 65%RH, 960 hPa	**PHASE**	Neutral (N)
TESTED BY	Moris Lin		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.208	0.35	42.45	-	42.80	-	63.29	53.29	-20.49	-
2	0.286	0.24	33.06	-	33.30	-	60.64	50.64	-27.34	-
3	0.687	0.20	32.49	-	32.69	-	56.00	46.00	-23.31	-
4	1.170	0.31	26.87	-	27.18	-	56.00	46.00	-28.82	-
5	2.330	0.30	23.63	-	23.93	-	56.00	46.00	-32.07	-
6	4.037	0.41	19.48	-	19.89	-	56.00	46.00	-36.11	-

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



4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 hopping frequencies, and should be equally spaced.

4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

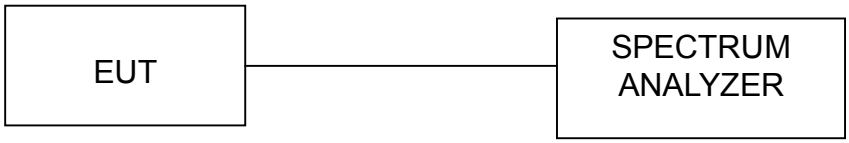
4.2.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

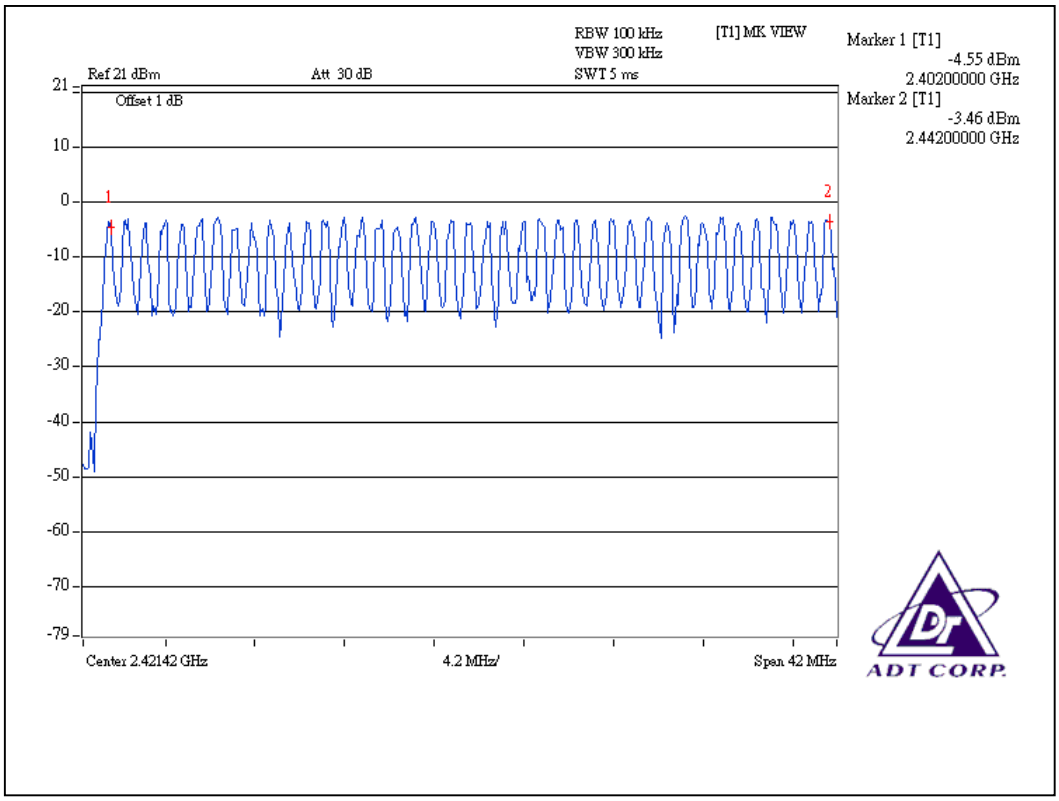
No deviation

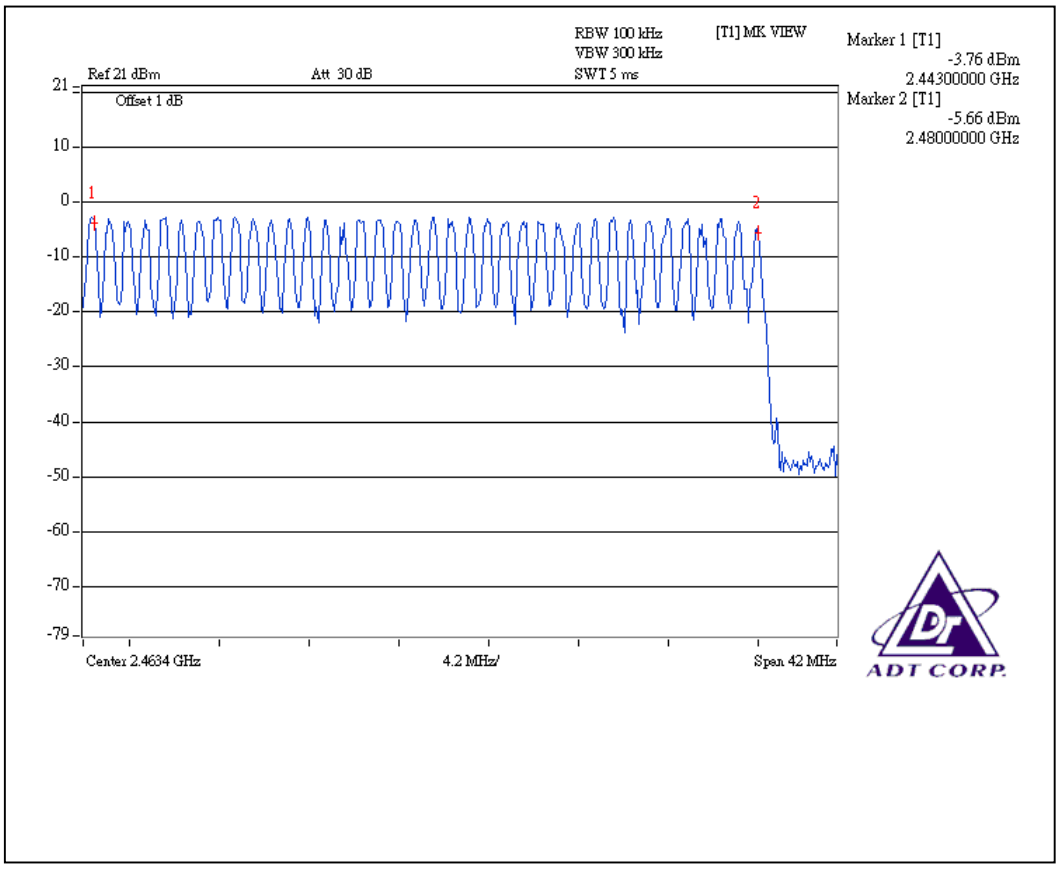
4.2.5 TEST SETUP



4.2.6 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plots, it shows that the hopping frequencies are equally spaced.


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-4.55 dBm
2.40200000 GHz
Marker 2 [T1]
-3.46 dBm
2.44200000 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.42142 GHz
4.2 MHz/
Span 42 MHz
ADT CORP.


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-3.76 dBm
2.44300000 GHz
Marker 2 [T1]
-5.66 dBm
2.48000000 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.4634 GHz
4.2 MHz/
Span 42 MHz
ADT CORP.

4.3 DWELL TIME ON EACH CHANNEL

4.3.1 LIMIT OF DWELL TIME USED

For FHSS, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 31.6 second period. For hybrid systems, the average time of occupancy on any frequency should not exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

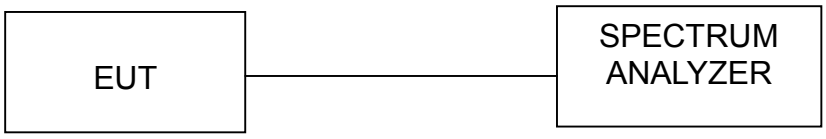
4.3.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP

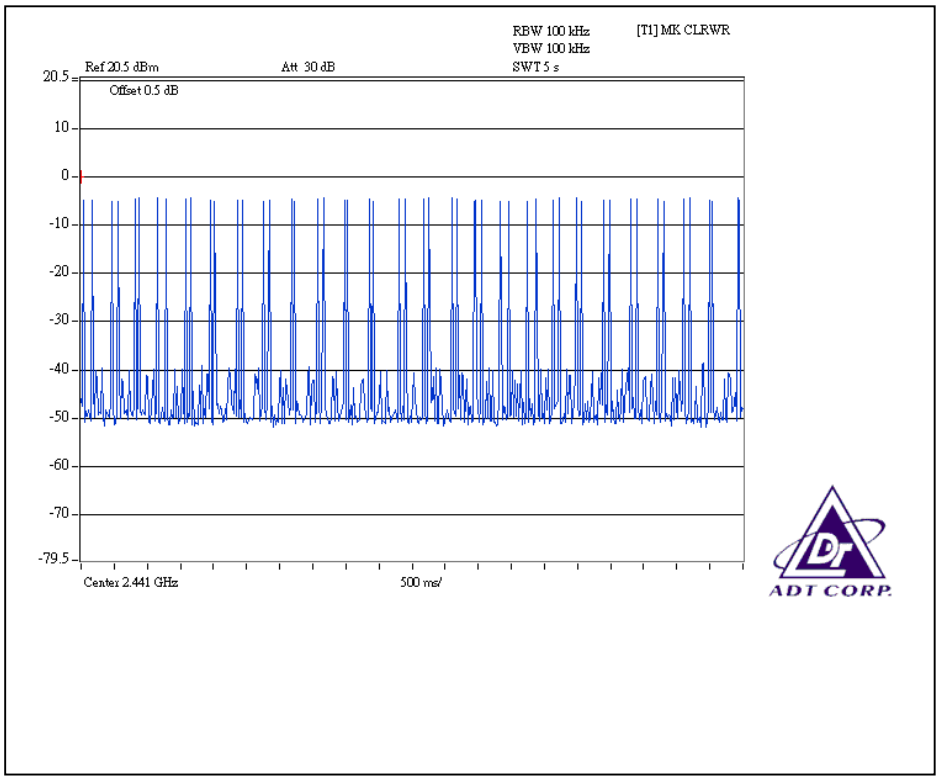


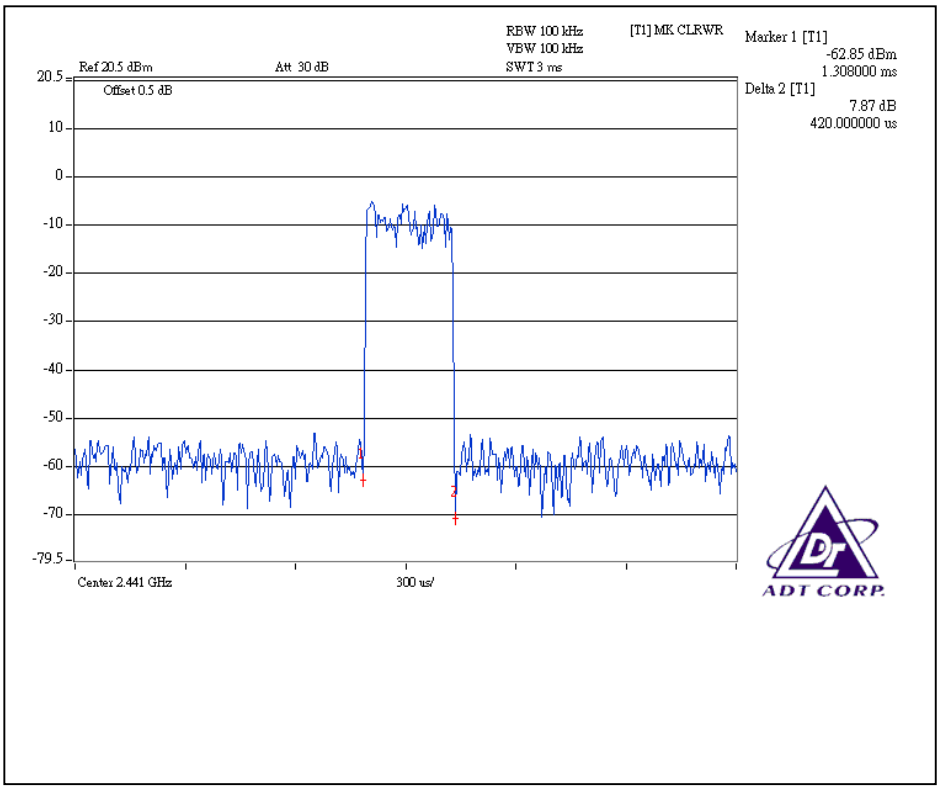
4.3.6 TEST RESULTS

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 (times / 5 sec) *6.32=322.32 times	0.42	135.4	400
DH3	24 (times / 5 sec) *6.32=151.68 times	1.68	254.8	400
DH5	18 (times / 5 sec) *6.32=113.76 times	2.96	336.7	400

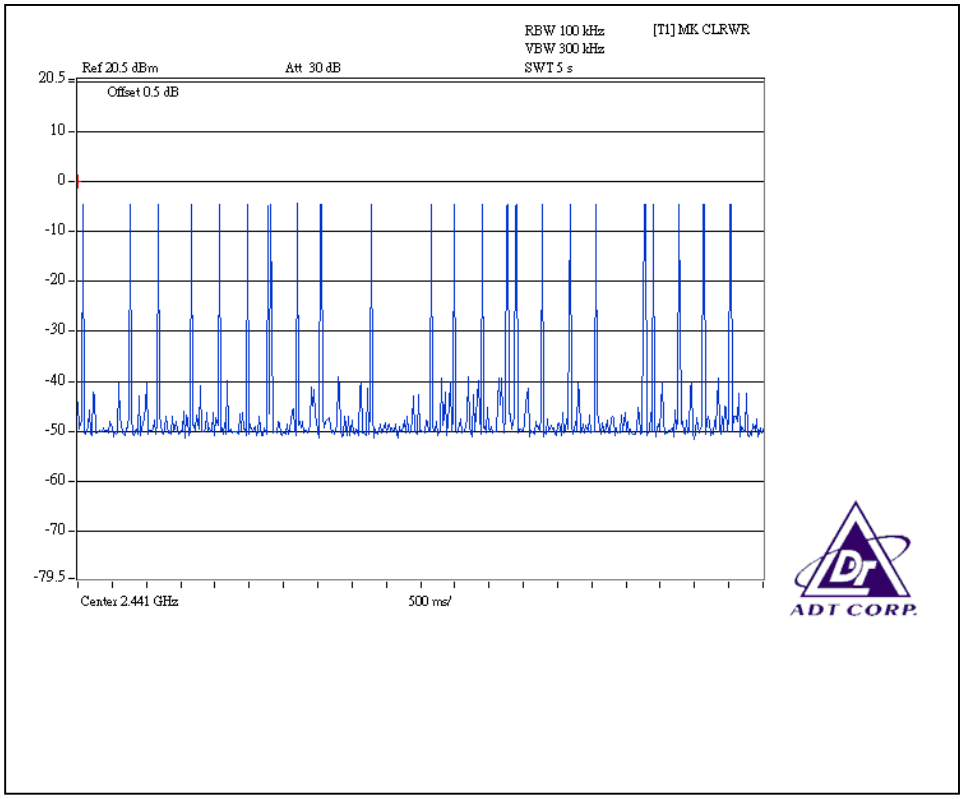
Test plots of the transmitting time slot are shown on next three pages.

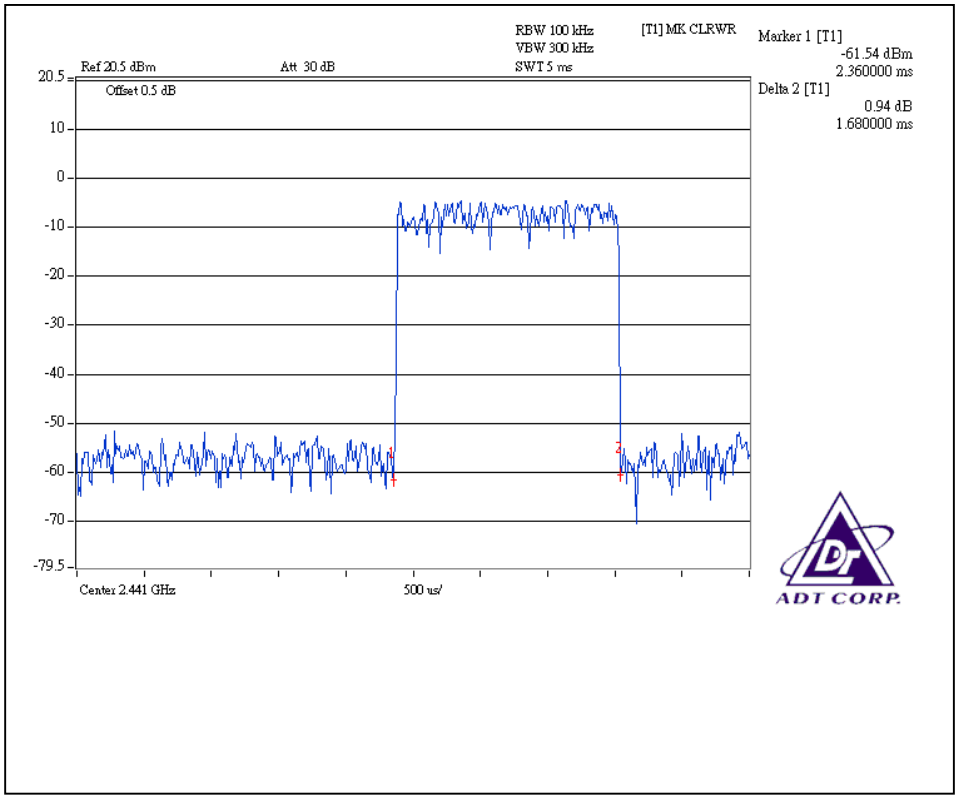
DH1


RBW 100 kHz
VBW 100 kHz
SWT 5 s
[T1] MK CLRWR
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 ms/
ADT CORP.

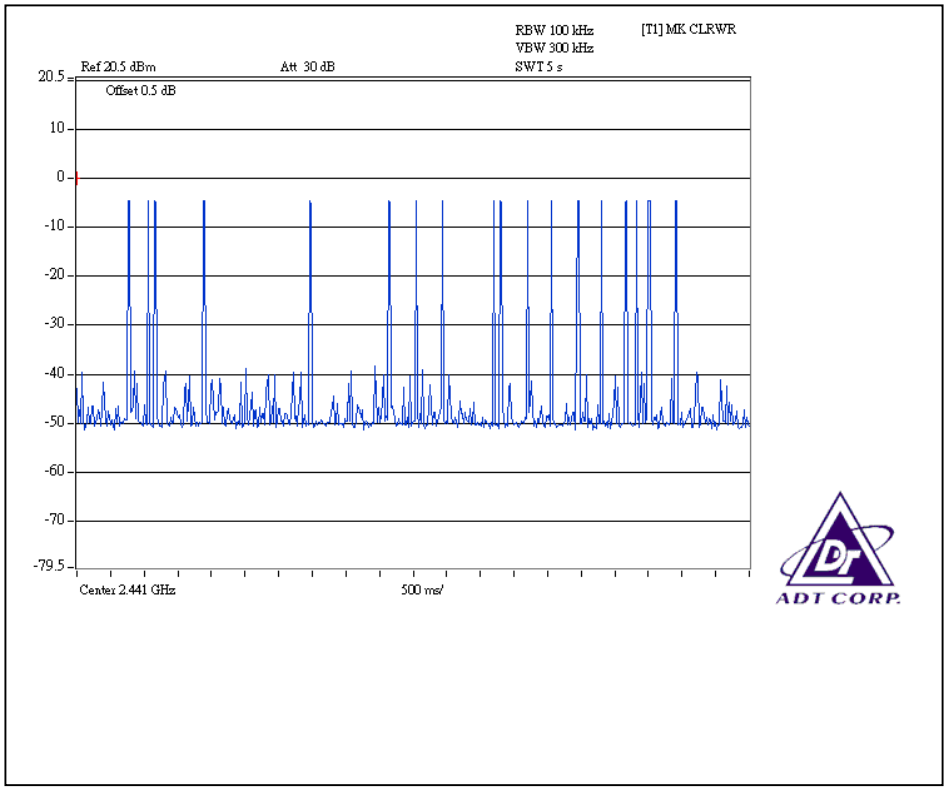

RBW 100 kHz
VBW 100 kHz
SWT 3 ms
[T1] MK CLRWR
Marker 1 [T1]
-62.85 dBm
1.308000 ms
Delta 2 [T1]
7.87 dB
420.000000 us
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
300 us/
ADT CORP.

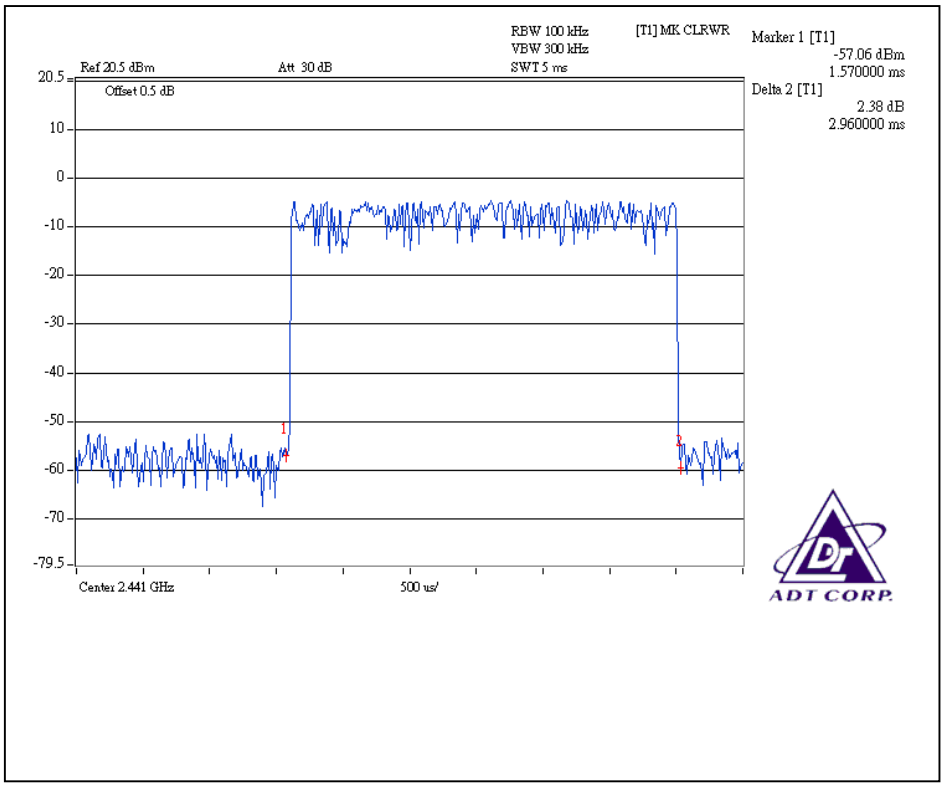
DH3


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MK CLRWR
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK CLRWR
Marker 1 [T1]
-61.54 dBm
2.360000 ms
Delta 2 [T1]
0.94 dB
1.680000 ms
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 us/

DH5


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MK CLRWR
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 ms/
ADT CORP.


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK CLRWR
Marker 1 [T1]
-57.06 dBm
1.570000 ms
Delta 2 [T1]
2.38 dB
2.960000 ms
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 us/
ADT CORP.

4.4 CHANNEL BANDWIDTH

4.4.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

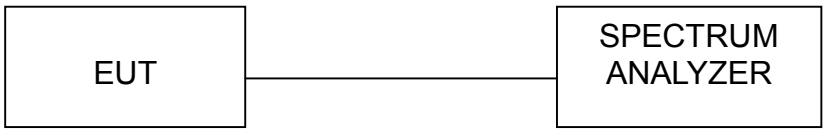
4.4.2 TEST PROCEDURE

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. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

4.4.3 DEVIATION FROM TEST STANDARD

No deviation

4.4.4 TEST SETUP



4.4.5 EUT OPERATING CONDITION

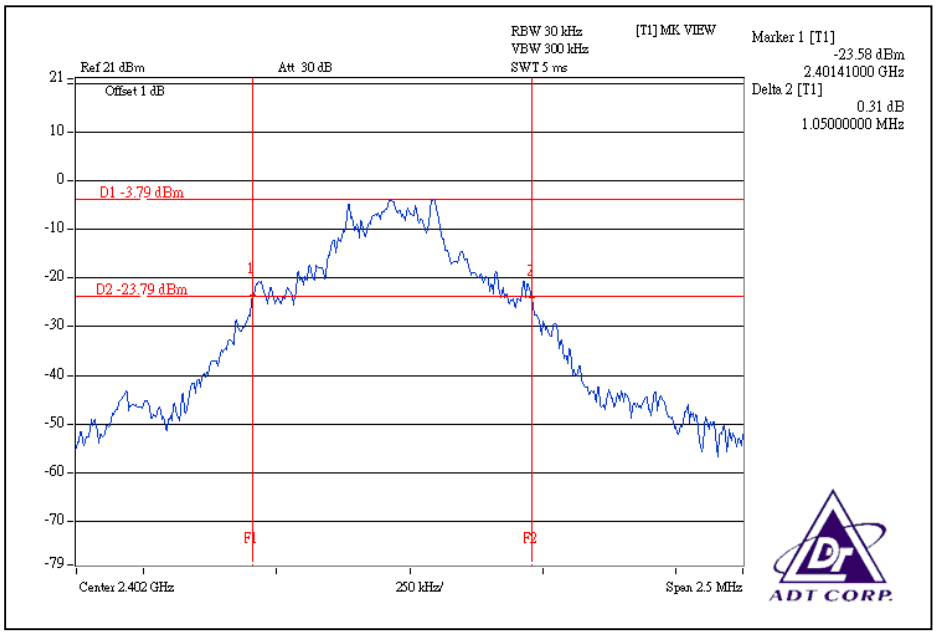
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.4.6 TEST RESULTS

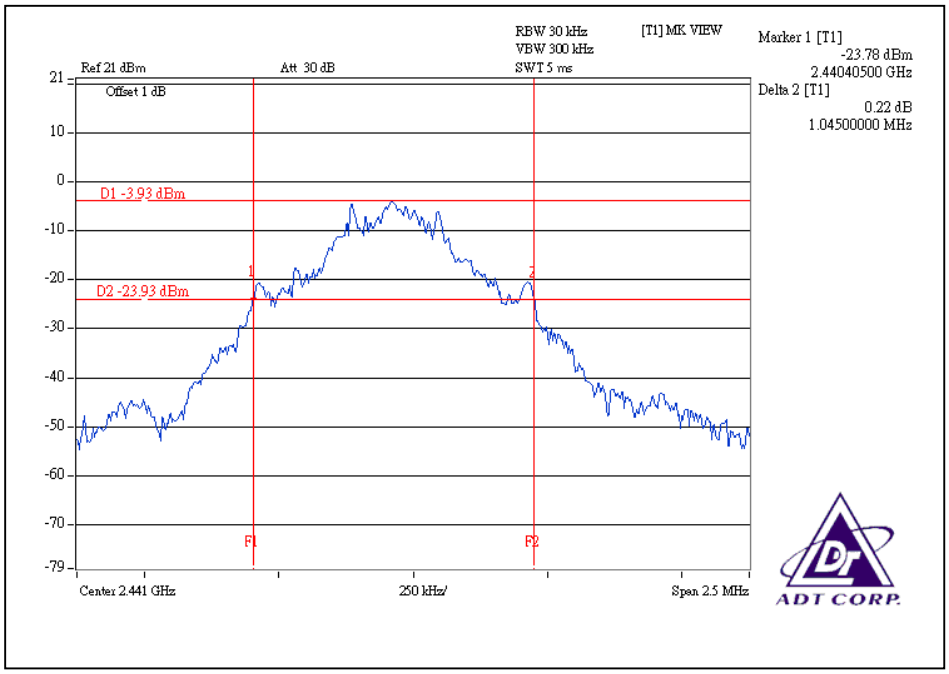
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 960 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
0	2402	1050
39	2441	1045
78	2480	1045

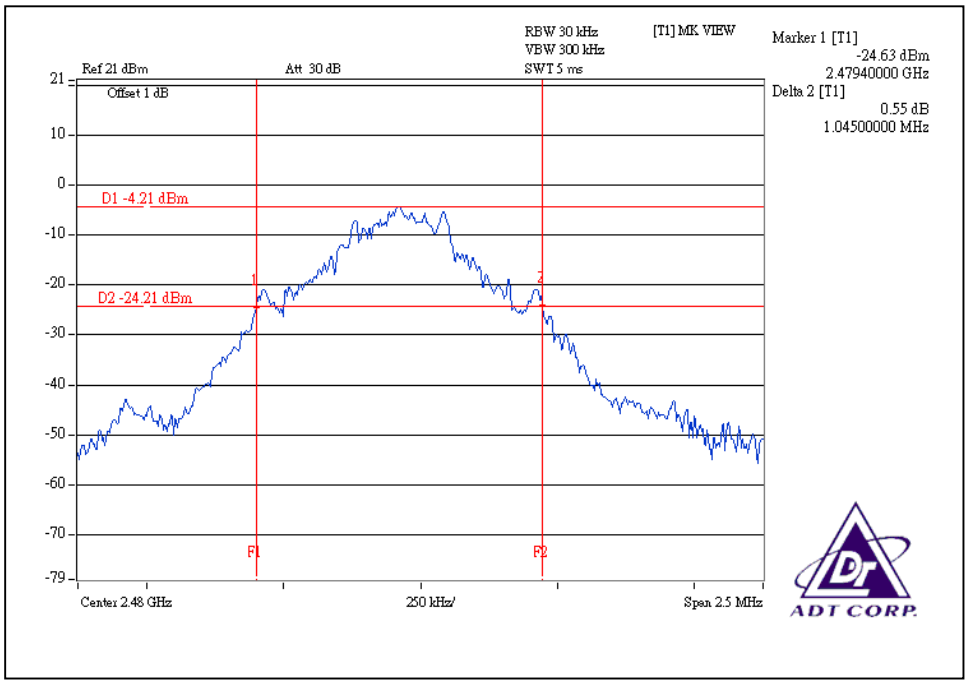
Channel 0



Channel 39



Channel 78


RBW 30 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-24.63 dBm
2.47940000 GHz
Delta 2 [T1]
0.55 dB
1.04500000 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -4.21 dBm
D2 -24.21 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 2.48 GHz
250 kHz/
Span 2.5 MHz
ADT CORP.

4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25 kHz or two-thirds of 20dB hopping channel bandwidth (whichever is greater).

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

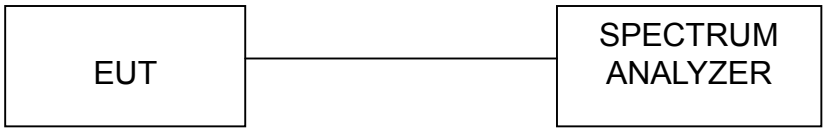
4.5.3 TEST PROCEDURES

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.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



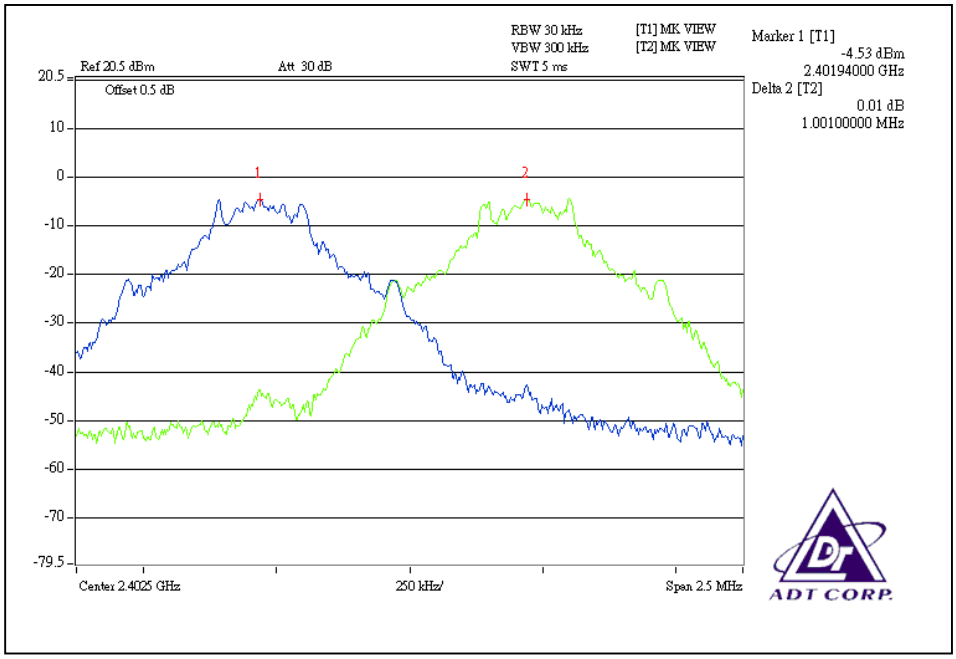
4.5.6 TEST RESULTS

ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 960 hPa	INPUT POWER (SYSTEM)	DC 5V
TESTED BY	Wen Yu		

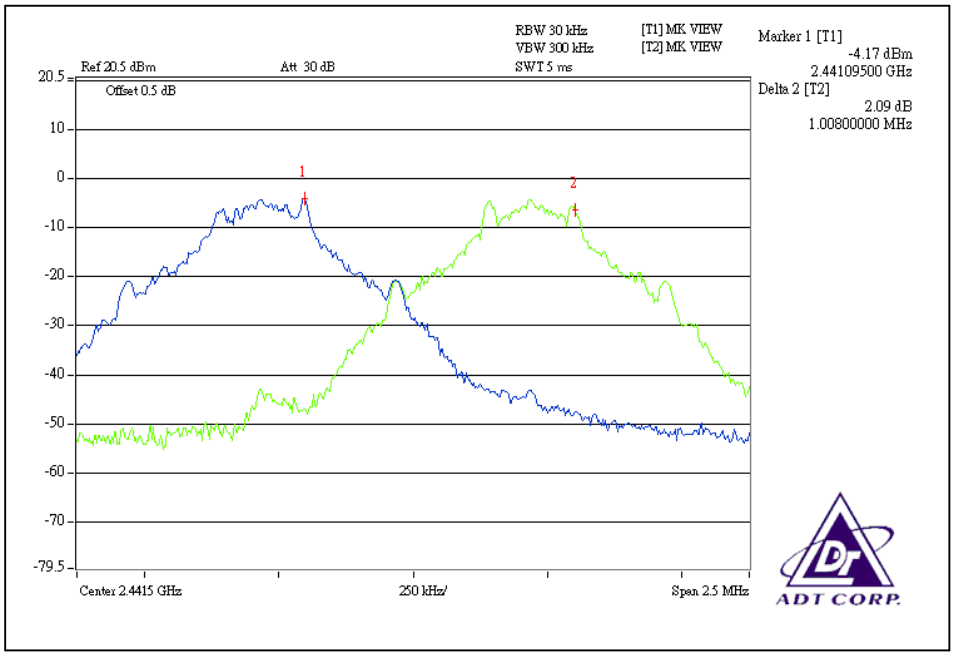
Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (kHz)	Pass / Fail
0	2402	1.001MHz	700	PASS
39	2441	1.008MHz	697	PASS
78	2480	1.001MHz	697	PASS

The minimum limit is two-thirds of 20dB bandwidth. Test results please refer to next two pages.

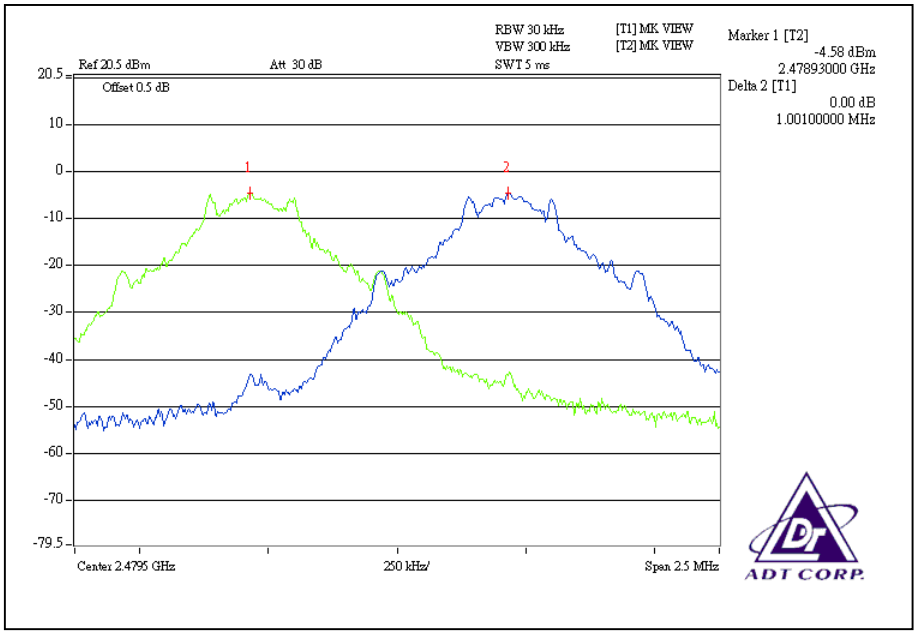
Channel 0



Channel 39



Channel 78


RBW 30 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
[T2] MK VIEW
Marker 1 [T2]
-4.58 dBm
2.47893000 GHz
Delta 2 [T1]
0.00 dB
1.00100000 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.4795 GHz
250 kHz/
Span 2.5 MHz
ADT CORP.

4.6 MAXIMUM PEAK OUTPUT POWER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 125mW.

4.6.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

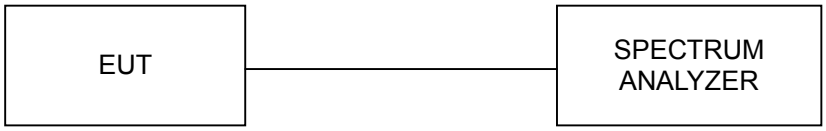
4.6.3 TEST PROCEDURES

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 3 MHz VBW.
4. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



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

4.6.6 EUT OPERATING CONDITION

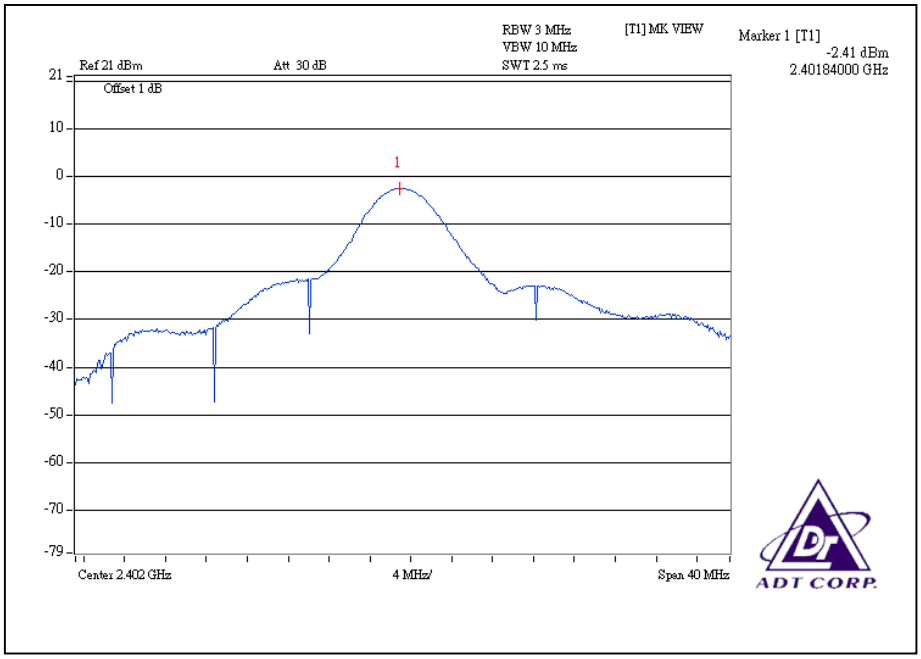
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS

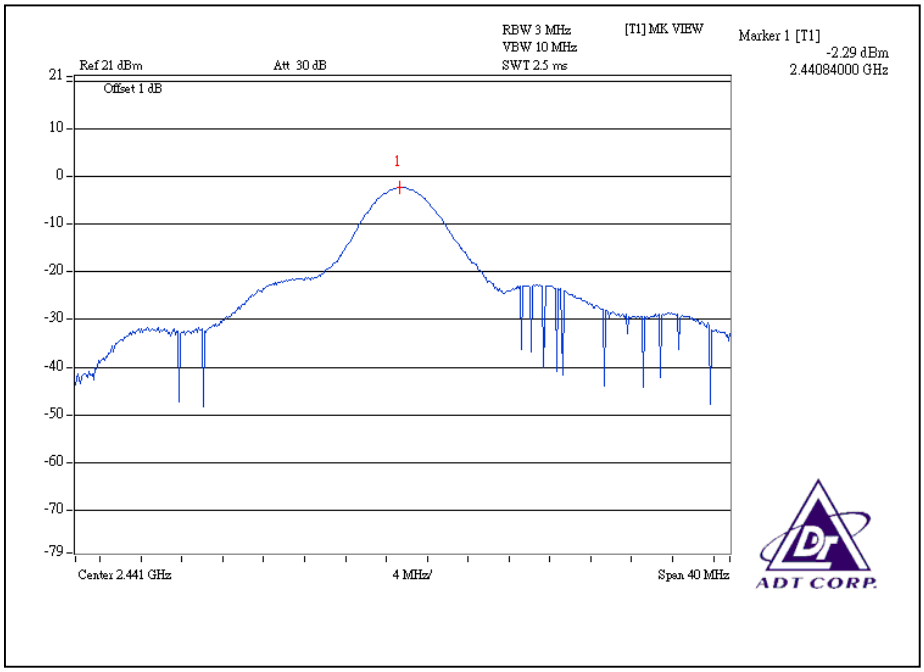
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 960 hPa	INPUT POWER (SYSTEM)	DC 5V
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	0.574	-2.41	125	PASS
39	2441	0.590	-2.29	125	PASS
78	2480	0.547	-2.62	125	PASS

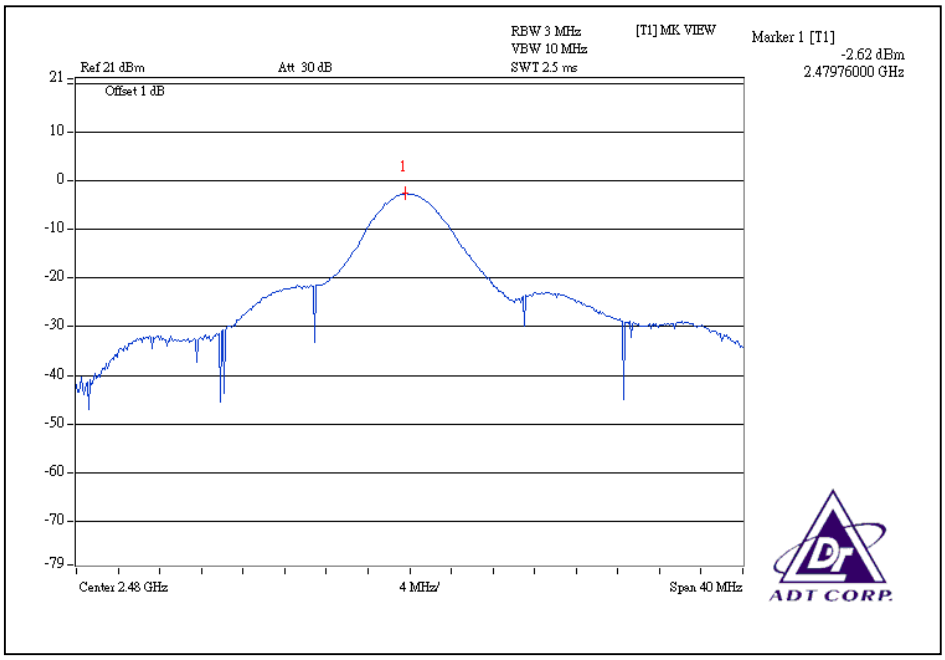
Channel 0



Channel 39



Channel 78


RBW 3 MHz
VBW 10 MHz
SWT 2.5 ms
[T1] MK VIEW
Marker 1 [T1]
-2.62 dBm
2.47976000 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
1
Center 2.48 GHz
4 MHz/
Span 40 MHz
ADT CORP.

4.7 RADIATED EMISSION MEASUREMENT

4.7.1 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

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.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 15, 2008
HP Pre_Amplifier	8449B	3008A01922	Oct. 04, 2008
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Mar. 26, 2008
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	July 26, 2008
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 25, 2008
R&S Loop Antenna	HFH2-Z2	881058/15	Nov. 29, 2008
RF Switches (ARNITSU)	CS-201	1565157	Aug. 13, 2008
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14. 2008
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Aug. 13, 2008
Software	ADT_Radiated_V 7.6.15.8	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	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 horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in ADT Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 4824A-3.
7. The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.7.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 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 peak, quasi-peak or average method as specified and then reported in a data sheet.

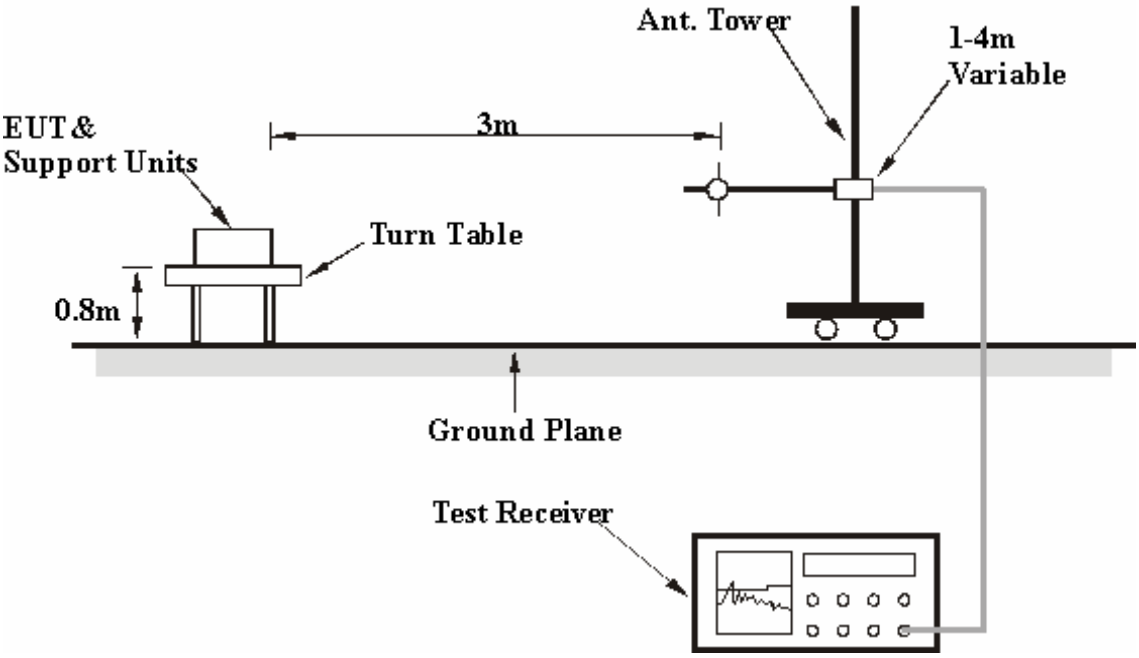
NOTE:

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 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.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



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

4.7.6 TEST RESULTS

CHANNEL	Channel 0	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	DC 5V	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 61%RH, 960 hPa	TESTED BY	Rex Huang

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	160.02	21.70 QP	43.50	-21.80	1.24 H	237	6.45	15.25
2	240.00	21.31 QP	46.00	-24.69	1.57 H	38	8.64	12.67
3	400.06	30.76 QP	46.00	-15.24	1.00 H	339	12.71	18.05
4	479.99	31.61 QP	46.00	-14.39	1.00 H	163	11.03	20.58
5	500.26	29.69 QP	46.00	-16.31	1.37 H	145	8.64	21.05
6	639.98	34.15 QP	46.00	-11.85	1.22 H	85	9.87	24.28
7	799.96	35.16 QP	46.00	-10.84	1.04 H	286	7.11	28.05
8	959.99	35.28 QP	46.00	-10.72	1.25 H	18	5.61	29.67

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	70.86	25.74 QP	40.00	-14.26	1.00 V	183	13.90	11.84
2	160.04	25.70 QP	43.50	-17.80	1.00 V	120	10.45	15.25
3	239.99	23.65 QP	46.00	-22.35	1.00 V	106	10.98	12.67
4	400.10	28.08 QP	46.00	-17.92	1.00 V	327	10.03	18.05
5	479.97	33.40 QP	46.00	-12.60	1.00 V	360	12.82	20.58
6	500.26	32.02 QP	46.00	-13.98	1.00 V	86	10.97	21.05
7	640.02	33.61 QP	46.00	-12.39	1.72 V	360	9.33	24.28
8	799.95	34.08 QP	46.00	-11.92	1.34 V	146	6.03	28.05
9	959.99	35.92 QP	46.00	-10.08	1.17 V	329	6.25	29.67

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.

CHANNEL	Channel 0	FREQUENCY RANGE	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 960 hPa	TESTED BY	Sky Liao

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	54.30 PK	74.00	-19.70	1.33 H	16	22.37	31.93
2	2390.00	43.48 AV	54.00	-10.52	1.33 H	16	11.55	31.93
3	*2402.00	89.20 PK			1.33 H	16	57.22	31.98
4	*2402.00	59.20 AV			1.33 H	16	27.22	31.98
5	4804.00	60.30 PK	74.00	-13.70	1.50 H	13	24.38	35.92
6	4804.00	30.30 AV	54.00	-23.70	1.50 H	13	-5.62	35.92
7	7206.00	55.00 PK	74.00	-19.00	1.22 H	10	12.87	42.13
8	7206.00	25.00 AV	54.00	-29.00	1.22 H	10	-17.13	42.13

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	54.57 PK	74.00	-19.43	1.64 V	325	22.64	31.93
2	2390.00	43.47 AV	54.00	-10.53	1.64 V	325	11.54	31.93
3	*2402.00	88.70 PK			1.64 V	325	56.72	31.98
4	*2402.00	58.70 AV			1.64 V	325	26.72	31.98
5	4804.00	56.50 PK	74.00	-17.50	1.55 V	326	20.58	35.92
6	4804.00	26.50 AV	54.00	-27.50	1.55 V	326	-9.42	35.92
7	7206.00	54.50 PK	74.00	-19.50	1.36 V	323	12.37	42.13
8	7206.00	24.50 AV	54.00	-29.50	1.36 V	323	-17.63	42.13

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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 DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625*5 per 296.25 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading +20log(duty cycle)

CHANNEL	Channel 39	**FREQUENCY RANGE**	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 960 hPa	**TESTED BY**	Sky Liao

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	88.30 PK			1.33 H	17	56.17	32.13
2	*2441.00	58.30 AV			1.33 H	17	26.17	32.13
3	4882.00	53.80 PK	74.00	-20.20	1.92 H	15	17.70	36.10
4	4882.00	23.80 AV	54.00	-30.20	1.92 H	15	-12.30	36.10
5	7323.00	53.00 PK	74.00	-21.00	1.68 H	11	10.44	42.56
6	7323.00	23.00 AV	54.00	-31.00	1.68 H	11	-19.56	42.56

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	89.10 PK			1.40 V	354	56.97	32.13
2	*2441.00	59.10 AV			1.40 V	354	26.97	32.13
3	4882.00	51.90 PK	74.00	-22.10	1.43 V	5	15.80	36.10
4	4882.00	21.90 AV	54.00	-32.10	1.43 V	5	-14.20	36.10
5	7323.00	53.30 PK	74.00	-20.70	1.53 V	25	10.74	42.56
6	7323.00	23.30 AV	54.00	-30.70	1.53 V	25	-19.26	42.56

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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 DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625*5 per 296.25 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading +20log(duty cycle)

CHANNEL	Channel 78	**FREQUENCY RANGE**	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 960 hPa	**TESTED BY**	Sky Liao

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	*2480.00	87.10 PK			1.35 H	186	54.83	32.27
2	*2480.00	57.10 AV			1.35 H	186	24.83	32.27
3	2483.50	54.24 PK	74.00	-19.76	1.35 H	186	21.95	32.29
4	**2483.50**	**44.79 AV**	**54.00**	**-9.21**	**1.35 H**	**186**	**12.50**	**32.29**
5	4960.00	48.30 PK	74.00	-25.70	1.25 H	20	12.03	36.27
6	4960.00	18.30 AV	54.00	-35.70	1.25 H	20	-17.97	36.27
7	7440.00	53.70 PK	74.00	-20.30	1.40 H	40	10.70	43.00
8	7440.00	23.70 AV	54.00	-30.30	1.40 H	40	-19.30	43.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	86.50 PK			1.40 V	333	54.23	32.27
2	*2480.00	56.50 AV			1.40 V	333	24.23	32.27
3	2483.50	53.80 PK	74.00	-20.20	1.40 V	333	21.51	32.29
4	2483.50	44.52 AV	54.00	-9.48	1.40 V	333	12.23	32.29
5	4960.00	46.80 PK	74.00	-27.20	1.44 V	335	10.53	36.27
6	4960.00	16.80 AV	54.00	-37.20	1.44 V	335	-19.47	36.27
7	7440.00	54.10 PK	74.00	-19.90	1.35 V	350	11.10	43.00
8	7440.00	24.10 AV	54.00	-29.90	1.35 V	350	-18.90	43.00

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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 DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625*5 per 296.25 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading +20log(duty cycle)

4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100KHz RBW).

4.8.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.8.3 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 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.6 TEST RESULTS

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

Note - The delta method is only used up to 2 MHz away from the restricted bandage, The radiated emissions which located in other restricted frequency band, the result, please refer to 4.2.

NOTE (Peak):

The band edge emission plot on the following page show 47.02dB delta 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 0 at the item 4.2 is 89.20dBuV/m, so the maximum field strength in restrict band is 89.20-47.02=42.18dBuV/m which is under 74 dBuV/m limit.

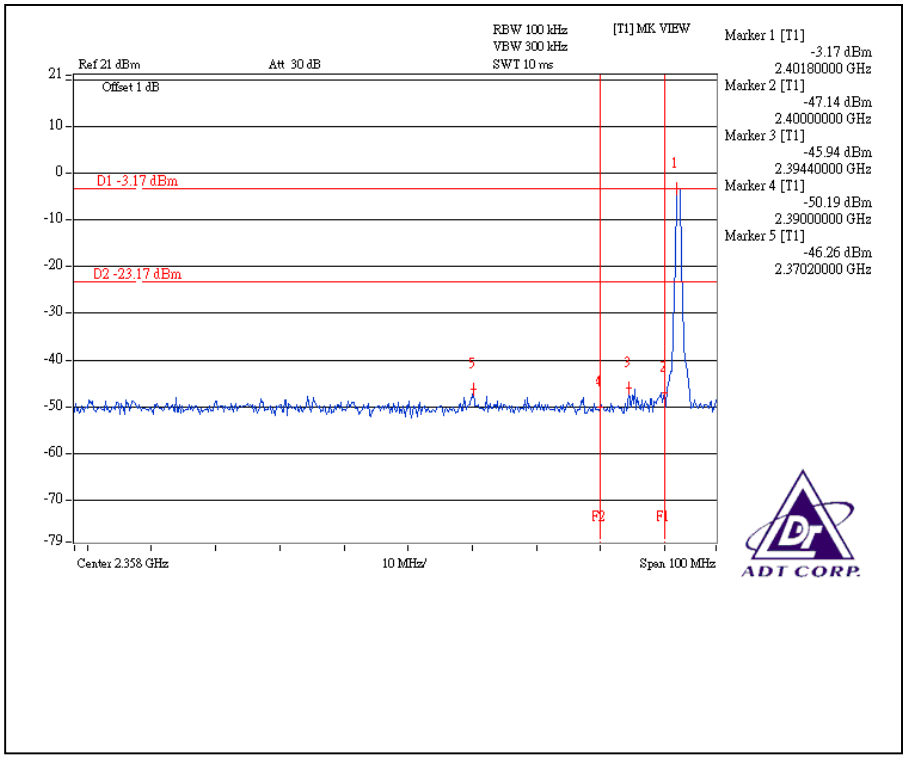
The band edge emission plot on the following page shows 47.61dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.2 is 87.10dBuV/m, so the maximum field strength in restrict band is 87.10-47.61=39.49dBuV/m which is under 74 dBuV/m limit.

NOTE (Average):

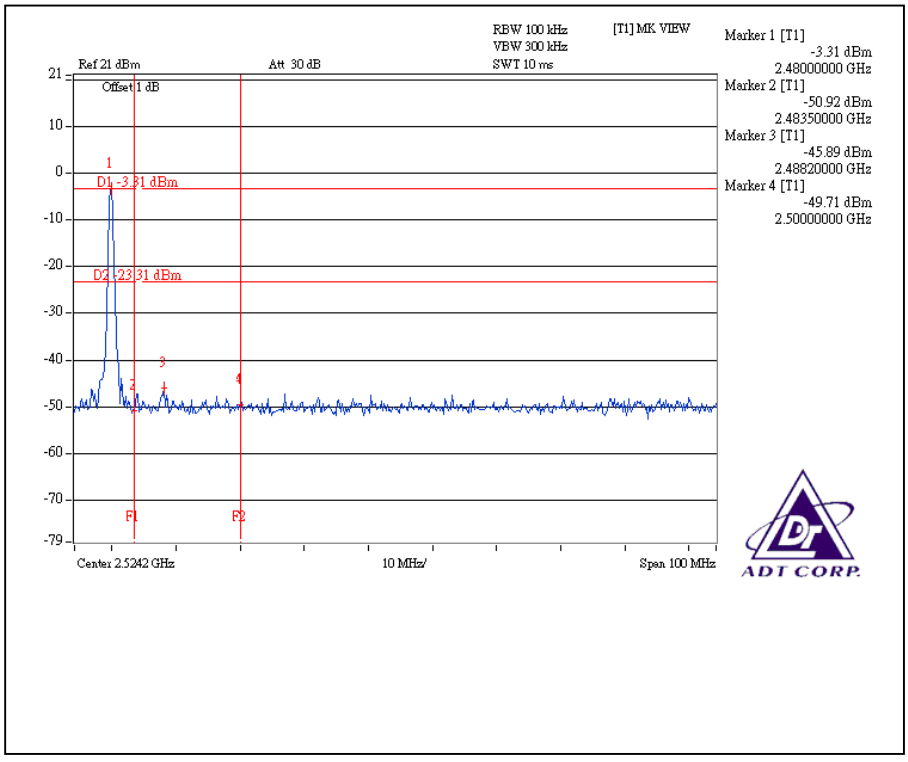
Average value = 42.18-30.00= 12.18dBuV/m, which is under 54dBuV/m limit.
*The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle be equal to: 20log(3.125/100)= -30 dB. Average value = peak reading – 30.00.

Average value = 39.49-30.00= 9.49dBuV/m, which is under 54dBuV/m limit.
*The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle be equal to: 20log(3.125/100)= -30 dB. Average value = peak reading – 30.00.

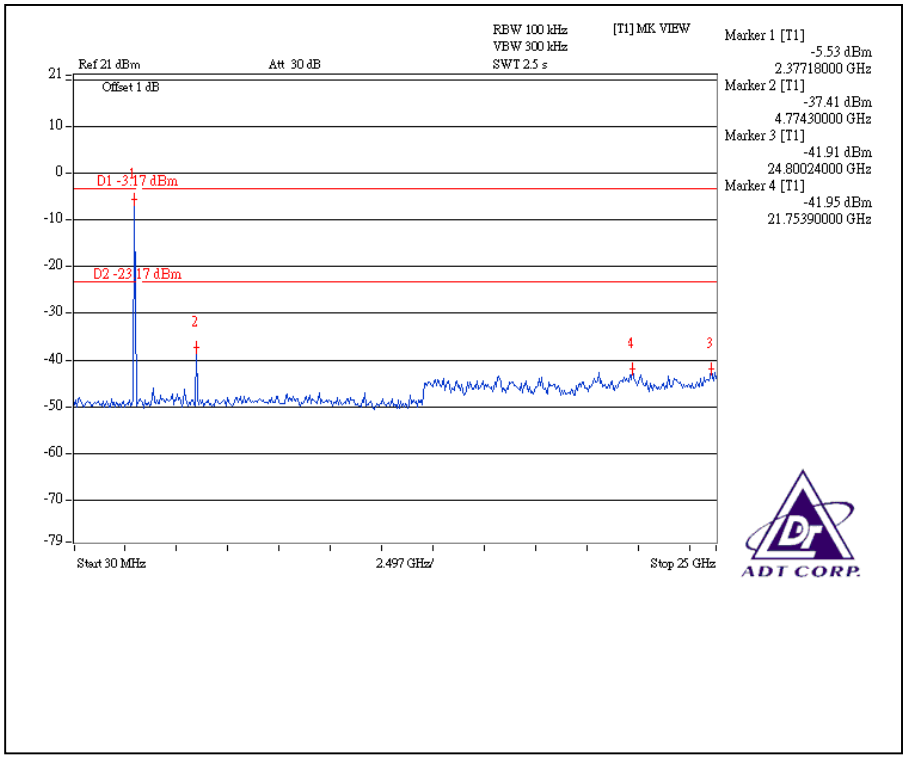
CH0


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -3.17 dBm
D2 -23.17 dBm
Marker 1 [T1]
-3.17 dBm
2.40180000 GHz
Marker 2 [T1]
-47.14 dBm
2.40000000 GHz
Marker 3 [T1]
-45.94 dBm
2.39440000 GHz
Marker 4 [T1]
-50.19 dBm
2.39000000 GHz
Marker 5 [T1]
-46.26 dBm
2.37020000 GHz
Center 2.358 GHz
10 MHz/
Span 100 MHz
ADT CORP.

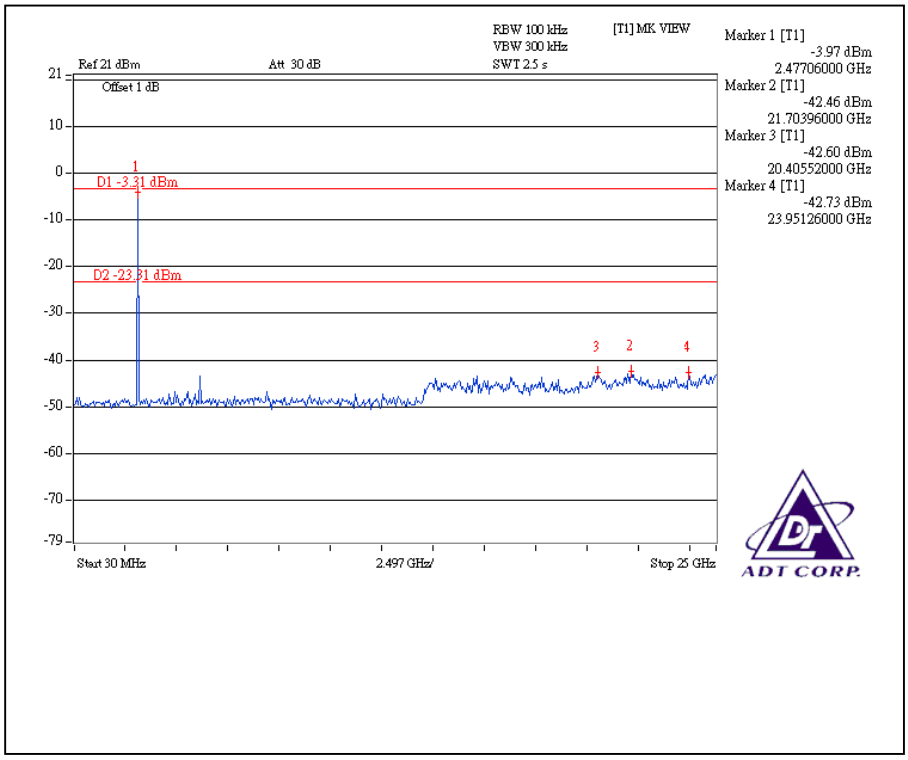
CH78


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -3.31 dBm
D2 -23.31 dBm
Marker 1 [T1]
-3.31 dBm
2.48000000 GHz
Marker 2 [T1]
-50.92 dBm
2.48350000 GHz
Marker 3 [T1]
-45.89 dBm
2.48820000 GHz
Marker 4 [T1]
-49.71 dBm
2.50000000 GHz
Center 2.5242 GHz
10 MHz/
Span 100 MHz
ADT CORP.

CH0


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -3.17 dBm
D2 -23.17 dBm
Marker 1 [T1]
-5.53 dBm
2.37718000 GHz
Marker 2 [T1]
-37.41 dBm
4.77430000 GHz
Marker 3 [T1]
-41.91 dBm
24.80024000 GHz
Marker 4 [T1]
-41.95 dBm
21.75390000 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz
ADT CORP.

CH78


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -3.31 dBm
D2 -23.31 dBm
Marker 1 [T1]
-3.97 dBm
2.47706000 GHz
Marker 2 [T1]
-42.46 dBm
21.70396000 GHz
Marker 3 [T1]
-42.60 dBm
20.40552000 GHz
Marker 4 [T1]
-42.73 dBm
23.95126000 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz
ADT CORP.

4.9 ANTENNA REQUIREMENT

4.9.1 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 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is SMD antenna without connector. The maximum Gain of the antenna is -0.5dBi

5. 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, UL, A2LA
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: 886-2-26052943

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

Email: service@adt.com.tw
Web Site: www.adt.com.tw

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

6. 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.