

FCC TEST REPORT

REPORT NO.: RF900713R02

MODEL NO.: BRG700

RECEIVED: July 13, 2001

TESTED: July 13 ~ July 23, 2001

APPLICANT: NATIONAL DATACOMM CORPORATION

ADDRESS: 4F, No.24-2, Industry East 4th Road,
Science Park, Hsinchu,
Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 47 14th Lin, Chiapau Tsun, Linko, Taipei,
Taiwan, R.O.C.

This test report consists of 51 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, NVLAP or any government agencies. The test results in the report only apply to the tested sample.



0528



Lab Code: 200102-0

Table of Contents

1	CERTIFICATION.....	4
2	SUMMARY OF TEST RESULTS	5
3	GENERAL INFORMATION	6
3.1	GENERAL DESCRIPTION OF EUT	6
3.2	DESCRIPTION OF TEST MODES	7
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	7
3.4	DESCRIPTION OF SUPPORT UNITS	8
4	TEST TYPES AND RESULTS	9
4.1	CONDUCTED EMISSION MEASUREMENT.....	9
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	9
4.1.2	TEST INSTRUMENTS	9
4.1.3	TEST PROCEDURES	10
4.1.4	TEST SETUP	10
4.1.5	EUT OPERATING CONDITIONS.....	11
4.1.6	TEST RESULTS	12
4.2	RADIATED EMISSION MEASUREMENT	18
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	18
4.2.2	TEST INSTRUMENTS	19
4.2.3	TEST PROCEDURES	20
4.2.4	TEST SETUP	21
4.2.5	EUT OPERATING CONDITIONS.....	21
4.2.6	TEST RESULTS	22
4.3	6DB BANDWIDTH MEASUREMENT	27
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	27
4.3.2	TEST INSTRUMENTS	27
4.3.3	TEST PROCEDURE	28
4.3.4	TEST SETUP	28
4.3.5	EUT OPERATING CONDITIONS.....	28
4.3.6	TEST RESULTS	29
4.4	MAXIMUM PEAK OUTPUT POWER.....	33
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	33
4.4.2	INSTRUMENTS.....	33
4.4.3	TEST PROCEDURES	34
4.4.4	TEST SETUP	34
4.4.5	EUT OPERATING CONDITIONS.....	34
4.4.6	TEST RESULTS	35
4.5	POWER SPECTRAL DENSITY MEASUREMENT	36
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	36
4.5.2	TEST INSTRUMENTS	36
4.5.3	TEST PROCEDURE	37
4.5.4	TEST SETUP	37
4.5.5	EUT OPERATING CONDITION	37
4.5.6	TEST RESULTS	38
4.6	BAND EDGES MEASUREMENT	42



4.6.1	LIMITS OF BAND EDGES MEASUREMENT	42
4.6.2	TEST INSTRUMENTS	42
4.6.3	TEST PROCEDURE	42
4.6.4	EUT OPERATING CONDITION	43
4.6.5	TEST RESULTS	43
4.7	ANTENNA REQUIREMENT	48
4.7.1	STANDARD APPLICABLE	48
4.7.2	ANTENNA CONNECTED CONSTRUCTION	48
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	49
6	INFORMATION ON THE TESTING LABORATORIES.....	51



1 CERTIFICATION

PRODUCT : Broadband Residential Gateway
BRAND NAME : NDC
MODEL NO. : BRG700
APPLICANT : NATIONAL DATACOMM CORPORATION
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.247),
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from July 13, 2001 to July 23, 2001. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

TESTED BY: _____ , **DATE:** _____
Steven Lu

CHECKED BY: _____ , **DATE:** _____
Demi Chen

APPROVED BY: _____ , **DATE:** _____
Dr. Alan Lane
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
15.107	AC Power Conducted Emission Limit: 48dBuV	PASS	Meet the requirement of limit Minimum passing margin is -10.17dBuV at 2.55300MHz
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(c)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -2.7dBuV at 750.00 MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Broadband Residential Gateway
MODEL NO.	BRG700
POWER SUPPLY	5VDC from AC adapter
MODULATION TYPE	BPSK, QPSK, CCK
RADIO TECHNOLOGY	DSSS
TRANSFER RATE	1/2/5.5/11Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	<20dBm
ANTENNA TYPE	External dual dipole antenna
POWER CABLE	Nonshielded 1.8m
I/O PORTS	RJ 45 Port, WAN Port
ASSOCIATED DEVICES	NA

NOTE: The EUT is operated with the following power adapter.

Brand Name :	HiTRON
Model No. :	HES10-05020-01-1
Input Power :	100 - 240V, 20-40VA, 50-60Hz
Output Power :	5VDC, 2A

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided in 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 1 GHz, the channel 1, 6, and 11 were pre-tested in chamber. The channel 11, worst case one, was chosen for final test.

2. Above 1 GHz, the channel 1, 6, and 11 were tested individually.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC CFR 47 Part 15, Subpart C. (15.247)

ANSI C63.4 : 1992

All tests 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	Personal Computer	IBM	2187-12W	1S218714ABNA000V	FCC DoC APPROVED
2	21" COLOR MONITOR	HP	D2846	JP92233133	FCC DoC APPROVED
3	PS/2 KEYBOARD	FORWARD	FDA-104GA	FDKB8110111	F4ZDA-104G
4	MOUSE	LOGITECH	M-S43	LZE00703207	DZL211106
5	PRINTER	HP	2225C+	3123S97230	DSI6XU2225
6	MODEM	ACEEX	1414	980020510	IFAXDM1414
7	NOTEBOOK	DELL	Inspiron 5000e	TW-012JXN-12961-0BP-2192	FCC DoC APPROVED
8	LAN CARD	3COM	3CLFE575CT-D	6ZE1316B4E	FCC DoC APPROVED

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core.
3	1.5 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
4	1.8 m foil shielded wire, terminated with PS2 connector via drain wire, w/o core.
5	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
6	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
7	NA
8	NA

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

4 TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.45 – 30	48	-

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
*ROHDE & SCHWARZ Test Receiver	ESHS30	828109/007	July 4, 2002
*ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	839135/006	July 3, 2002
ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Nov. 28, 2001
ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Dec. 3, 2001
*EMCO-L.I.S.N. (for peripheral)	3825/2	9204-1964	July 3, 2002
*Software	Cond-V2J	NA	NA
*RF cable (JYEBAO)	RG-58A/U	Cable-C02.01	July 9, 2001
HP Terminator (For EMCO LISN)	11593A	E1-01-298	Feb. 20, 2002
HP Terminator (For EMCO LISN)	11593A	E1-01-299	Feb. 20, 2002
Shielded Room	Site 2	ADT-C02	NA
VCCI Site Registration No.	Site 2	C-240	NA

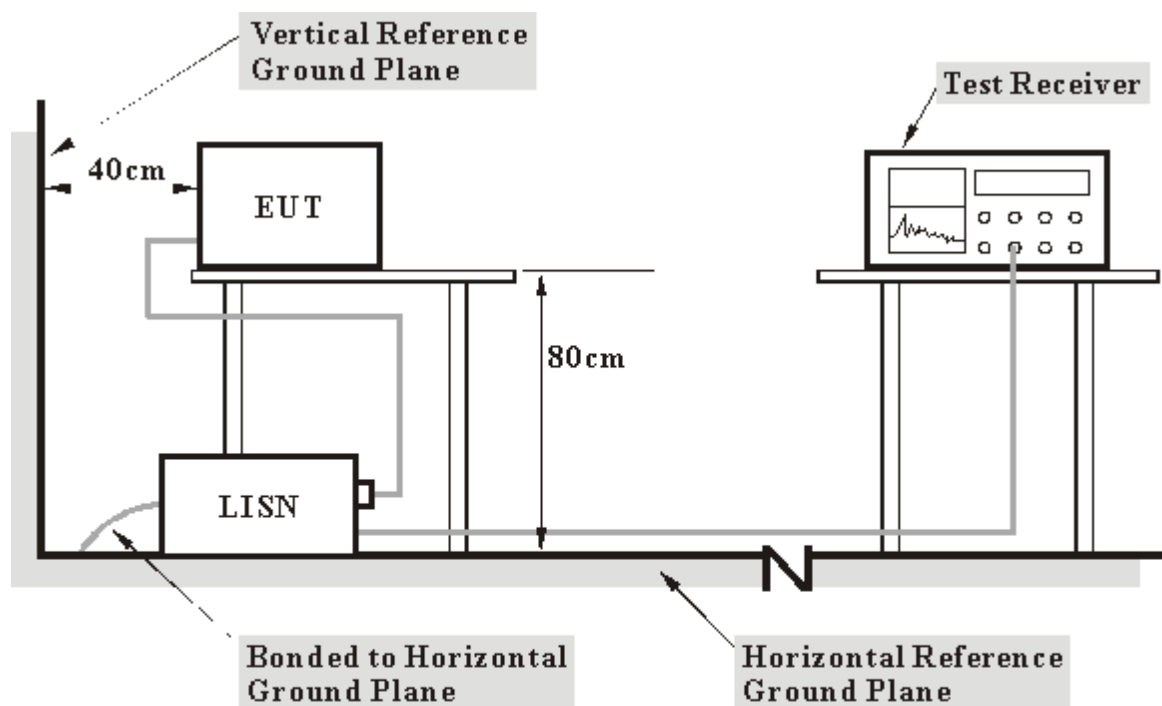
NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. “*” = These equipments are used for the final measurement.

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 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

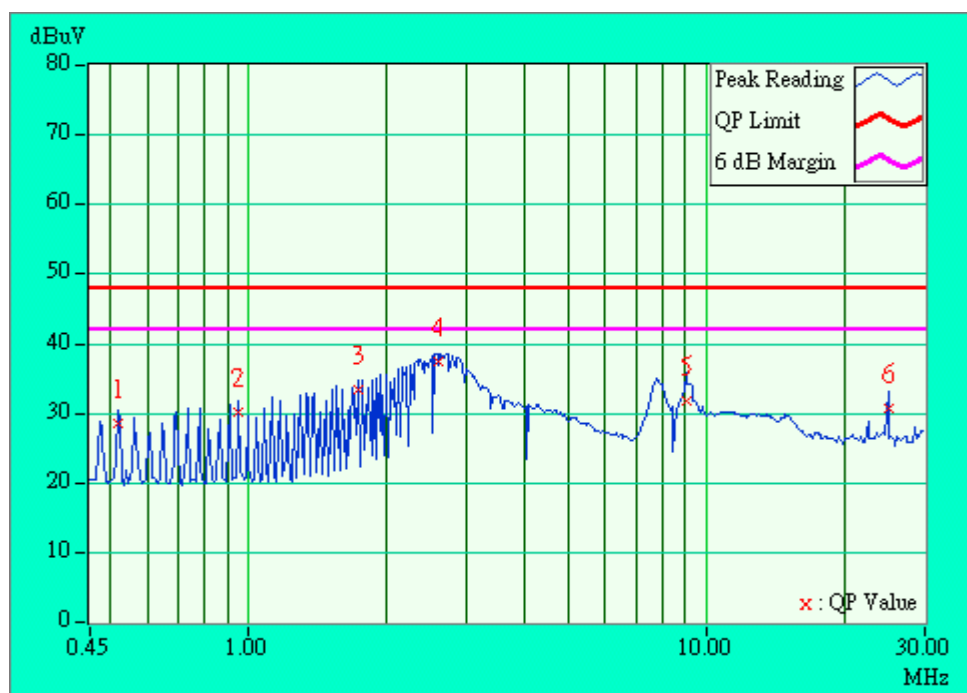
- a. Placed the EUT (with a computer system) on the testing table.
- b. The computer system sent data to EUT by command "PIN" via an RJ 45 cable.
- c. The computer system sent "H" messages to Color Monitor and Monitor displayed "H" patterns on its screen.
- d. The computer system sent "H" messages to modem.
- e. The computer system sent "H" messages to printer, and the printer prints them on paper.
- f. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- g. The communication partner run a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency via an RJ 45 cable.
- h. The communication partner sent data to EUT by command "PIN".

4.1.6 TEST RESULTS

EUT	Broadband Residential Gateway	MODEL	BRG700
MODE	Channel 1	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	230Vac, 50 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.51900	0.20	28.58	-	28.78	-	48.00	-	-19.22	-
2	0.95100	0.20	30.05	-	30.25	-	48.00	-	-17.75	-
3	1.73100	0.20	33.32	-	33.52	-	48.00	-	-14.48	-
4	2.59800	0.26	37.35	-	37.61	-	48.00	-	-10.39	-
5	9.00500	0.65	31.66	-	32.31	-	48.00	-	-15.69	-
6	24.99800	1.40	30.68	-	32.08	-	48.00	-	-15.92	-

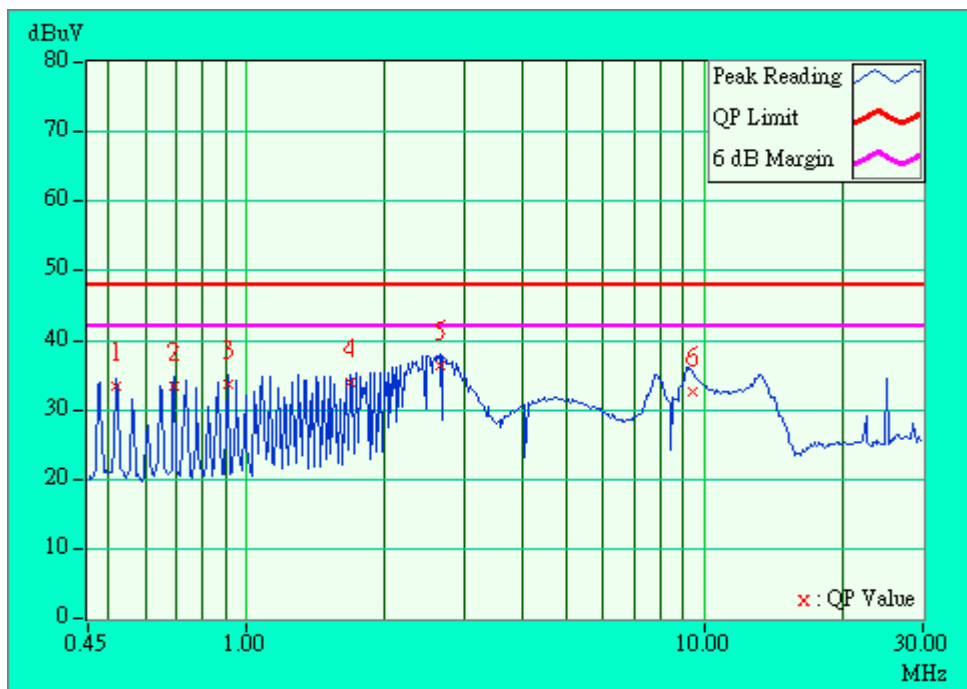
- Remarks:
1. "": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



EUT	Broadband Residential Gateway	MODEL	BRG700
MODE	Channel 1	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	230Vac, 50 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.51882	0.20	33.30	-	33.50	-	48.00	-	-14.50	-
2	0.69300	0.20	33.48	-	33.68	-	48.00	-	-14.32	-
3	0.90900	0.20	33.72	-	33.92	-	48.00	-	-14.08	-
4	1.68800	0.20	33.87	-	34.07	-	48.00	-	-13.93	-
5	2.64300	0.26	36.40	-	36.66	-	48.00	-	-11.34	-
6	9.39800	0.58	32.46	-	33.04	-	48.00	-	-14.96	-

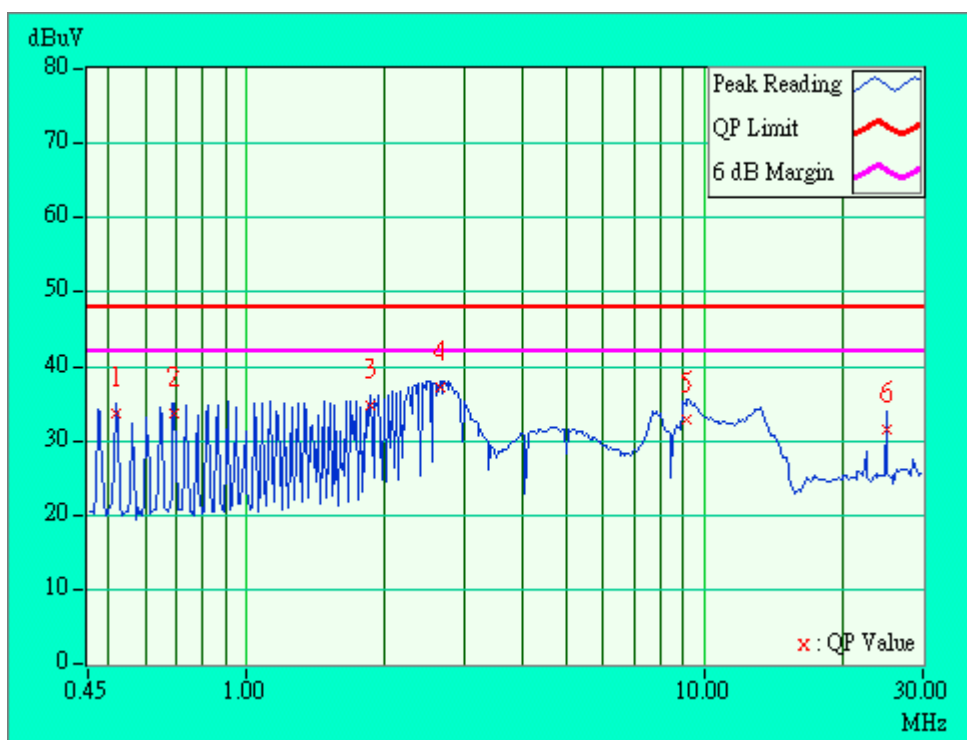
- Remarks:
1. "**": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



EUT	Broadband Residential Gateway	MODEL	BRG700
MODE	Channel 6	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	230Vac, 50 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.51952	0.20	33.68	-	33.88	-	48.00	-	-14.12	-
2	0.69284	0.20	33.80	-	34.00	-	48.00	-	-14.00	-
3	1.86000	0.20	34.62	-	34.82	-	48.00	-	-13.18	-
4	2.64000	0.26	37.11	-	37.37	-	48.00	-	-10.63	-
5	9.17600	0.57	32.90	-	33.47	-	48.00	-	-14.53	-
6	24.99919	1.30	31.52	-	32.82	-	48.00	-	-15.18	-

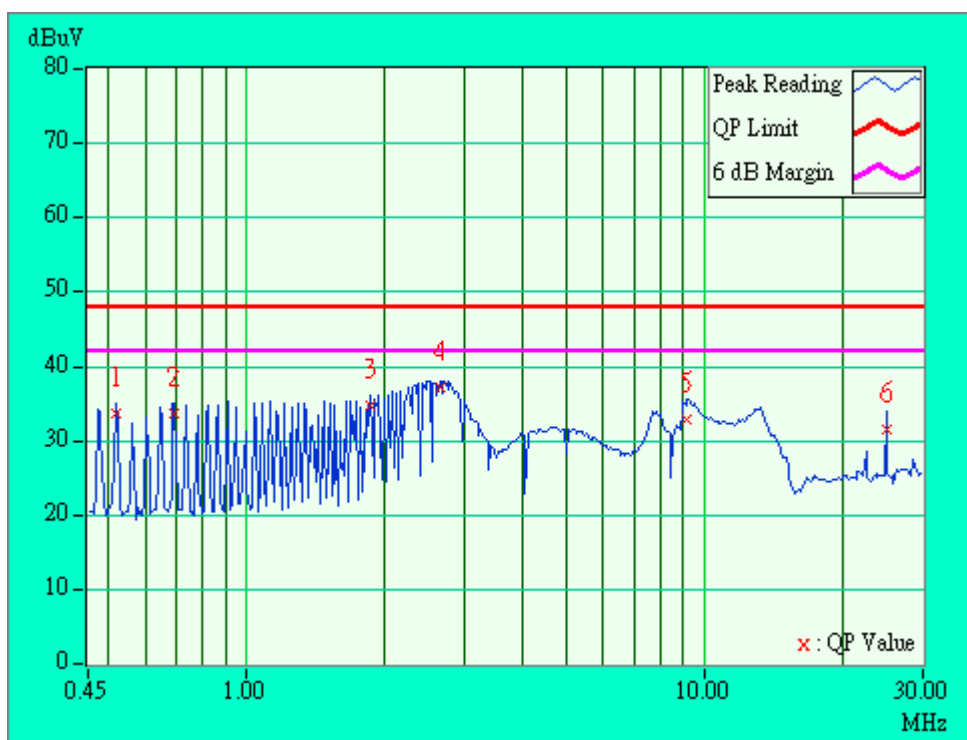
- Remarks:
1. "**": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



EUT	Broadband Residential Gateway	MODEL	BRG700
MODE	Channel 6	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	230Vac, 50 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.51952	0.20	33.68	-	33.88	-	48.00	-	-14.12	-
2	0.69284	0.20	33.80	-	34.00	-	48.00	-	-14.00	-
3	1.86000	0.20	34.62	-	34.82	-	48.00	-	-13.18	-
4	2.64000	0.26	37.11	-	37.37	-	48.00	-	-10.63	-
5	9.17600	0.57	32.90	-	33.47	-	48.00	-	-14.53	-
6	24.99919	1.30	31.52	-	32.82	-	48.00	-	-15.18	-

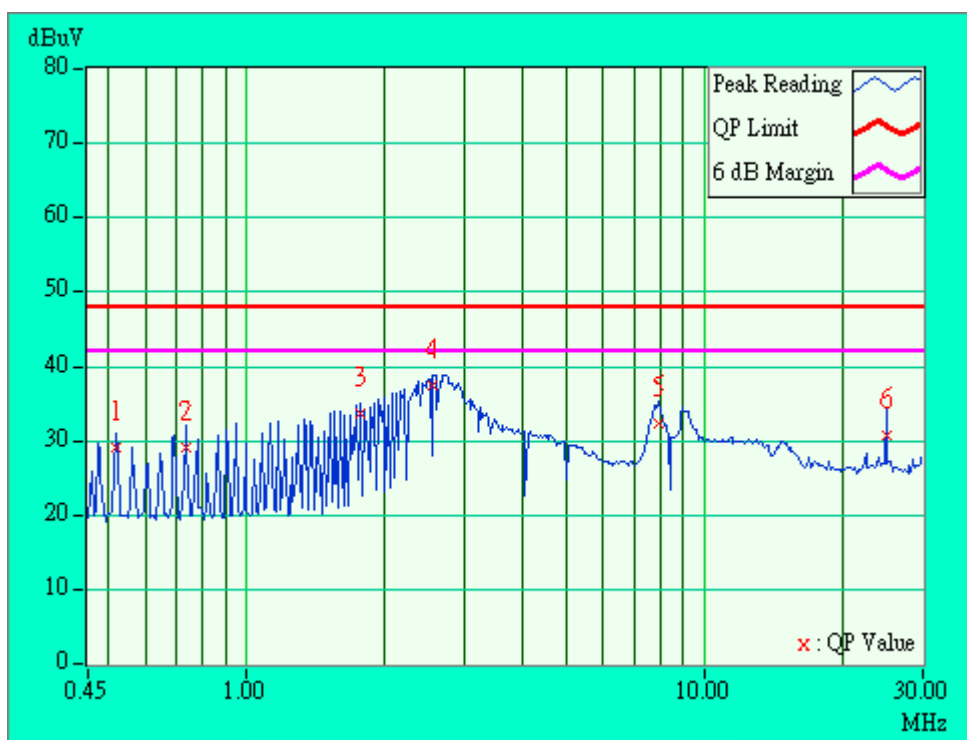
- Remarks:
1. "**": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



EUT	Broadband Residential Gateway	MODEL	BRG700
MODE	Channel 11	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	230Vac, 50 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.51900	0.20	28.98	-	29.18	-	48.00	-	-18.82	-
2	0.73500	0.20	29.19	-	29.39	-	48.00	-	-18.61	-
3	1.77300	0.20	33.70	-	33.90	-	48.00	-	-14.10	-
4	2.55300	0.26	37.57	-	37.83	-	48.00	-	-10.17	-
5	7.96100	0.60	32.34	-	32.94	-	48.00	-	-15.06	-
6	24.99800	1.40	30.78	-	32.18	-	48.00	-	-15.82	-

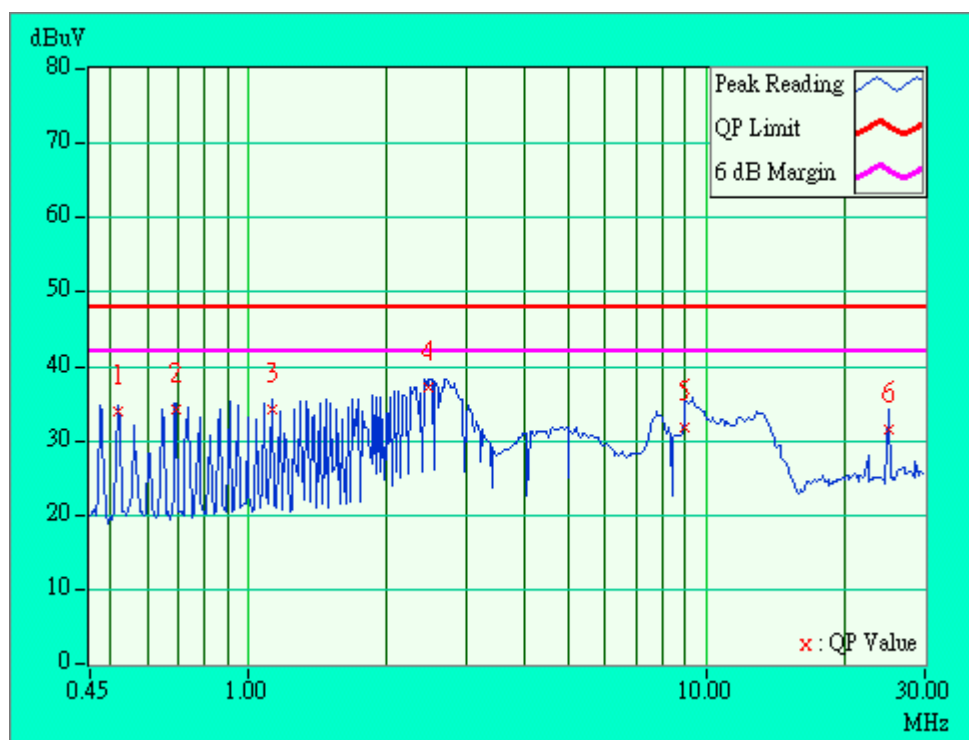
- Remarks:
1. "**": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



EUT	Broadband Residential Gateway	MODEL	BRG700
MODE	Channel 11	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	230Vac, 50 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.51900	0.20	33.90	-	34.10	-	48.00	-	-13.90	-
2	0.69149	0.20	34.22	-	34.42	-	48.00	-	-13.58	-
3	1.12500	0.20	34.26	-	34.46	-	48.00	-	-13.54	-
4	2.46600	0.25	37.18	-	37.43	-	48.00	-	-10.57	-
5	8.99900	0.57	31.82	-	32.39	-	48.00	-	-15.61	-
6	24.99866	1.30	31.48	-	32.78	-	48.00	-	-15.22	-

- Remarks:
1. "**": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field Strength of Fundamental	
	uV/m	dBuV/m
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

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
*HP Spectrum Analyzer	8590L	3544A01176	May 7, 2002
*HP Preamplifier	8447D	2944A08485	Nov. 4, 2001
* HP Preamplifier	8449B	3008A01201	Dec. 13, 2001
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 25, 2002
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2001
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 4, 2001
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	AS61D	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Aug. 4, 2001
* TIMES RF cable	LMR-600	CABLE-ST5-01	Aug. 4, 2001
* Antenna (Horn)	BBHA9120-D	D130	July 10, 2002
Open Field Test Site	Site 5	ADT-R05	July 28, 2001
Site Registration No.	FCC: 90422 VCCI : R-1039 Canada IC: IC 3789-5		

NOTE: 1. The measurement uncertainty is less than +/- 3.0dB, which is calculated as per the NAMAS document NIS81.

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

3. "*" = These equipments are used for the final measurement.



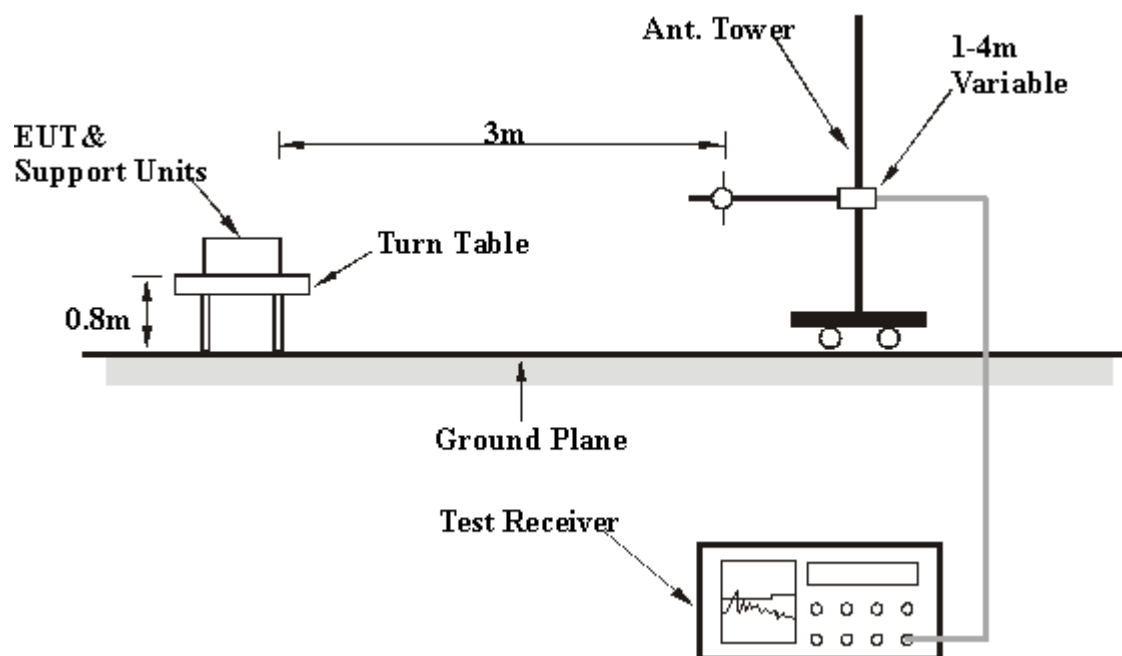
4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. 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 300 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 TEST SETUP



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

4.2.5 EUT OPERATING CONDITIONS

Same as 4.1.5.

4.2.6 TEST RESULTS

EUT	Broadband Residential Gateway	MODEL	BRG700
MODE	Channel 11	FREQUENCY RANGE	30-1000 MHz
INPUT POWER (SYSTEM)	230Vac, 50 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 1005 hPa	TESTED BY: Steven Lu	

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)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	125.30	35.9 QP	43.50	-7.60	1.14H	110	22.30	11.16	2.48	0.00	-13.64
2	150.20	34.7 QP	43.50	-8.80	1.14H	103	22.30	9.83	2.59	0.00	-12.43
3	200.00	30.6 QP	43.50	-12.90	1.16H	212	19.35	8.41	2.79	0.00	-11.20
4	225.01	32.1 QP	46.00	-13.90	1.09H	107	19.35	9.88	2.83	0.00	-12.71
5	250.01	32.7 QP	46.00	-13.30	1.00H	200	18.32	11.50	2.89	0.00	-14.39
6	264.01	30.2 QP	46.00	-15.80	1.00H	3	15.32	11.96	2.96	0.00	-14.93
7	395.96	38.6 QP	46.00	-7.40	1.00H	98	19.90	15.22	3.46	0.00	-18.69
8	440.01	41.0 QP	46.00	-5.00	1.00H	89	21.80	15.93	3.27	0.00	-19.21
9	484.01	36.5 QP	46.00	-9.50	1.71H	339	16.32	16.67	3.53	0.00	-20.20
10	528.01	40.1 QP	46.00	-5.90	1.71H	301	19.36	17.03	3.67	0.00	-20.71
11	528.01	38.7 QP	46.00	-7.30	1.71H	285	17.96	17.03	3.67	0.00	-20.71
12	550.02	38.0 QP	46.00	-8.00	1.73H	149	17.21	17.09	3.67	0.00	-20.76
13	600.02	35.6 QP	46.00	-10.40	1.40H	176	14.39	17.72	3.53	0.00	-21.25
14	616.02	36.8 QP	46.00	-9.20	1.45H	10	15.47	17.68	3.61	0.00	-21.29
15	748.02	37.4 QP	46.00	-8.60	1.51H	242	14.36	18.80	4.21	0.00	-23.02
16	750.01	41.6 QP	46.00	-4.40	1.40H	209	18.60	18.82	4.22	0.00	-23.05
17	900.02	42.4 QP	46.00	-3.60	1.25H	244	18.00	19.57	4.82	0.00	-24.39
18	950.02	42.8 QP	46.00	-3.20	1.17H	34	17.20	20.00	5.57	0.00	-25.58

- NOTE:** 1 Emission level = Raw Value - Correction Factor
2 Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss
(External Preamp. Gain = 0, when the test receiver is used for the test.)
3 The other emission levels were very low against the limit.
4 Margin value = Emission level - Limit value

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)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	125.09	33.2 QP	43.50	-10.30	1.54V	47	19.60	11.16	2.48	0.00	-13.64
2	149.98	31.5 QP	43.50	-12.00	1.22V	279	18.90	10.03	2.59	0.00	-12.62
3	200.00	34.4 QP	43.50	-9.10	1.22V	16	23.20	8.41	2.79	0.00	-11.20
4	225.36	32.5 QP	46.00	-13.50	1.13V	240	19.67	10.03	2.84	0.00	-12.86
5	250.00	34.7 QP	46.00	-11.30	1.13V	315	20.30	11.50	2.89	0.00	-14.39
6	264.01	31.8 QP	46.00	-14.20	1.32V	326	16.87	12.00	2.96	0.00	-14.96
7	396.02	34.4 QP	46.00	-11.60	1.58V	189	15.69	15.22	3.46	0.00	-18.68
8	440.00	41.5 QP	46.00	-4.50	1.74V	32	22.30	15.93	3.27	0.00	-19.21
9	484.02	35.9 QP	46.00	-10.10	1.63V	16	15.70	16.67	3.53	0.00	-20.21
10	500.00	38.2 QP	46.00	-7.80	1.05V	175	17.56	16.96	3.68	0.00	-20.65
11	528.00	39.0 QP	46.00	-7.00	1.59V	321	18.30	17.03	3.67	0.00	-20.72
12	550.00	42.1 QP	46.00	-3.90	1.11V	218	21.30	17.09	3.67	0.00	-20.77
13	600.00	35.8 QP	46.00	-10.20	1.30V	3	14.60	17.72	3.53	0.00	-21.25
14	616.01	34.9 QP	46.00	-11.10	1.54V	356	13.58	17.68	3.61	0.00	-21.29
15	748.78	35.4 QP	46.00	-10.60	1.26V	165	12.35	18.80	4.21	0.00	-23.02
16	750.00	43.3 QP	46.00	-2.70	1.00V	191	20.30	18.82	4.22	0.00	-23.04
17	900.02	41.6 QP	46.00	-4.40	1.13V	3	17.20	19.57	4.82	0.00	-24.38
18	950.02	41.5 pk	46.00	-4.50	1.13V	207	42.96	20.00	5.57	27.00	1.44

- NOTE:**
- 1 Emission level = Raw Value - Correction Factor
 - 2 Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss
(External Preamp. Gain = 0, when the test receiver is used for the test.)
 - 3 The other emission levels were very low against the limit.
 - 4 Margin value = Emission level - Limit value



EUT	Broadband Residential Gateway	MODEL	BRG700
MODE	Channel 1	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	230Vac, 50 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	TESTED BY: Steven Lu	

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)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2037.7	51.2 PK	74.00	-22.80	1.15H	314	20.30	27.57	3.29	0.00	-30.86
2	2037.7	46.1 AV	54.00	-7.90	1.15H	315	15.20	27.57	3.29	0.00	-30.86
3	*2411.4	92.3 PK	NA	NA	1.17H	321	60.30	28.33	3.62	0.00	-31.96
4	*2411.4	85.6 AV	NA	NA	1.17H	321	53.64	28.33	3.62	0.00	-31.96
5	4076.4	45.1 PK	74.00	-28.90	1.09H	307	7.90	32.40	4.77	0.00	-37.18
6	4076.4	40.8 AV	54.00	-13.20	1.09H	307	3.60	32.40	4.77	0.00	-37.17
7	4820.9	47.9 PK	74.00	-26.10	1.09H	217	9.70	32.99	5.21	0.00	-38.20
8	4820.9	40.6 AV	54.00	-13.40	1.09H	217	2.40	32.99	5.21	0.00	-38.20
9	7239.9	47.7 PK	74.00	-26.30	1.09H	1	5.30	36.01	6.38	0.00	-42.39
10	7239.9	44.4 AV	54.00	-9.60	1.09H	1	2.00	36.01	6.38	0.00	-42.39

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)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2037.7	52.7 PK	74.00	-21.30	1.07V	359	21.80	27.57	3.29	0.00	-30.86
2	2037.7	50.9 AV	54.00	-3.10	1.07V	359	20.07	27.57	3.29	0.00	-30.86
3	*2413.6	106.2 PK	NA	NA	1.05V	196	74.20	28.33	3.62	0.00	-31.96
4	*2413.6	100.3 AV	NA	NA	1.05V	196	68.30	28.33	3.62	0.00	-31.96
5	4075.7	49.5 PK	74.00	-24.50	1.07V	47	12.36	32.40	4.77	0.00	-37.17
6	4075.7	39.5 AV	54.00	-14.50	1.07V	47	2.36	32.40	4.77	0.00	-37.17
7	4827.8	56.5 PK	74.00	-17.5	1.08V	248	18.30	32.99	5.21	0.00	-38.20
8	4827.8	49.2 AV	54.00	-4.80	1.08V	248	11.03	32.99	5.21	0.00	-38.20
9	7237.1	55.6 PK	74.00	-18.4	1.09V	249	13.20	36.01	6.38	0.00	-42.39
10	7237.1	50.1 AV	54.00	-3.90	1.09V	249	7.74	36.01	6.38	0.00	-42.39

- NOTE:**
1. Emission level = Raw Value - Correction Factor
 2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss
(External Preamp. Gain = 0, when the test receiver is used for the test.)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. The limit value is defined as per 15.247
 6. " * " : Fundamental frequency

EUT	Broadband Residential Gateway	MODEL	BRG700
MODE	Channel 6	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	230Vac, 50 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 1005 hPa	TESTED BY: Steven Lu	

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)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2062.7	51.9 PK	74.00	-22.10	1.04H	316	21.00	27.61	3.31	0.00	-30.92
2	2062.7	47.9 AV	54.00	-6.10	1.04H	316	16.95	27.61	3.31	0.00	-30.92
3	*2438.4	95.2 PK	NA	NA	1.01H	117	63.20	28.38	3.64	0.00	-32.03
4	*2438.4	86.7 AV	NA	NA	1.01H	117	54.69	28.38	3.64	0.00	-32.03
5	4126.3	50.7 PK	74.00	-23.30	1.04H	313	13.50	32.40	4.79	0.00	-37.19
6	4126.3	45.7 AV	54.00	-8.30	1.04H	313	8.50	32.40	4.79	0.00	-37.20
7	4874.2	52.5 PK	74.00	-21.50	1.04H	279	14.20	33.07	5.25	0.00	-38.31
8	4874.2	45.5 AV	54.00	-8.50	1.04H	279	7.20	33.07	5.25	0.00	-38.32

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)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2062.7	51.9 PK	74.00	-22.10	1.07V	358	21.00	27.61	3.31	0.00	-30.92
2	2062.7	50.7 AV	54.00	-3.30	1.07V	358	19.80	27.61	3.31	0.00	-30.92
3	*2438.4	100.2 PK	NA	NA	1.10V	200	68.20	28.38	3.64	0.00	-32.03
4	*2438.4	90.9 AV	NA	NA	1.10V	200	58.90	28.38	3.64	0.00	-32.03
5	4125.8	52.5 PK	74.00	-21.50	1.07V	11	15.30	32.40	4.79	0.00	-37.19
6	4125.8	44.4 AV	54.00	-9.60	1.07V	11	7.20	32.40	4.79	0.00	-37.20
7	4873.8	51.9 PK	74.00	-22.10	1.00V	283	13.60	33.07	5.25	0.00	-38.31
8	4873.8	40.8 AV	54.00	-13.20	1.00V	283	2.50	33.07	5.25	0.00	-38.31

- NOTE:**
1. Emission level = Raw Value - Correction Factor
 2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss
(External Preamp. Gain = 0, when the test receiver is used for the test.)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. The limit value is defined as per 15.247
 6. " * " : Fundamental frequency



EUT	Broadband Residential Gateway	MODEL	BRG700
MODE	Channel 11	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	230Vac, 50 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	TESTED BY: Steven Lu	

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)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
2	2087.7	51.3 PK	74.00	-22.70	1.06H	276	20.30	27.66	3.33	0.00	-30.99
1	2087.7	49.6 AV	54.00	-4.40	1.06H	276	18.60	27.66	3.33	0.00	-30.99
4	*2463.5	101.0 PK	NA	NA	1.10H	323	68.90	28.42	3.66	0.00	-32.09
3	*2463.5	93.2 AV	NA	NA	1.10H	323	61.09	28.42	3.66	0.00	-32.09
5	2483.8	44.4 PK	74.00	-29.60	1.10H	160	12.30	28.47	3.68	0.00	-32.15
6	2483.8	38.8 AV	54.00	-15.20	1.10H	160	6.70	28.47	3.68	0.00	-32.15
7	4175.5	45.5 AV	54.00	-8.50	1.04H	104	8.30	32.40	4.81	0.00	-37.22
8	4925.5	43.4 AV	54.00	-10.60	1.02H	115	4.94	33.15	5.28	0.00	-38.43

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)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2087.8	49.3 PK	74.00	-24.70	1.07V	30	18.30	27.66	3.33	0.00	-30.99
2	2087.8	45.5 AV	54.00	-8.50	1.07V	30	14.55	27.66	3.33	0.00	-30.99
4	*2462.5	102.3 PK	NA	NA	1.02V	156	70.20	28.42	3.66	0.00	-32.09
3	*2462.5	96.0 AV	NA	NA	1.02V	156	63.90	28.42	3.66	0.00	-32.09
6	2483.8	49.3 PK	74.00	-24.70	1.10V	233	17.20	28.47	3.68	0.00	-32.15
5	2483.8	41.6 AV	54.00	-12.40	1.10V	233	9.50	28.47	3.68	0.00	-32.15
7	4176.2	45.4 AV	54.00	-8.60	1.02V	64	8.20	32.40	4.81	0.00	-37.21
9	4924.1	50.7 PK	74.00	-23.30	1.02V	268	12.30	33.15	5.28	0.00	-38.43
8	4924.1	41.6 AV	54.00	-12.40	1.02V	268	3.20	33.15	5.28	0.00	-38.43

- NOTE:**
1. Emission level= Raw Value - Correction Factor
 2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss
(External Preamp. Gain = 0, when the test receiver is used for the test.)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. The limit value is defined as per 15.247
 6. " * " : 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
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839379/002	Dec. 28, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

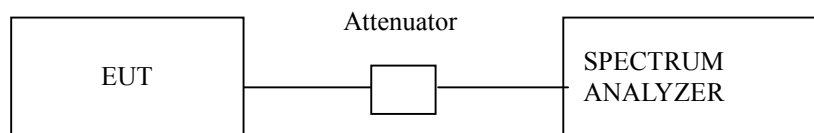
Notes:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
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 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 100 kHz RBW and 100 kHz VBW. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

4.3.4 TEST SETUP



4.3.5 EUT OPERATING CONDITIONS

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

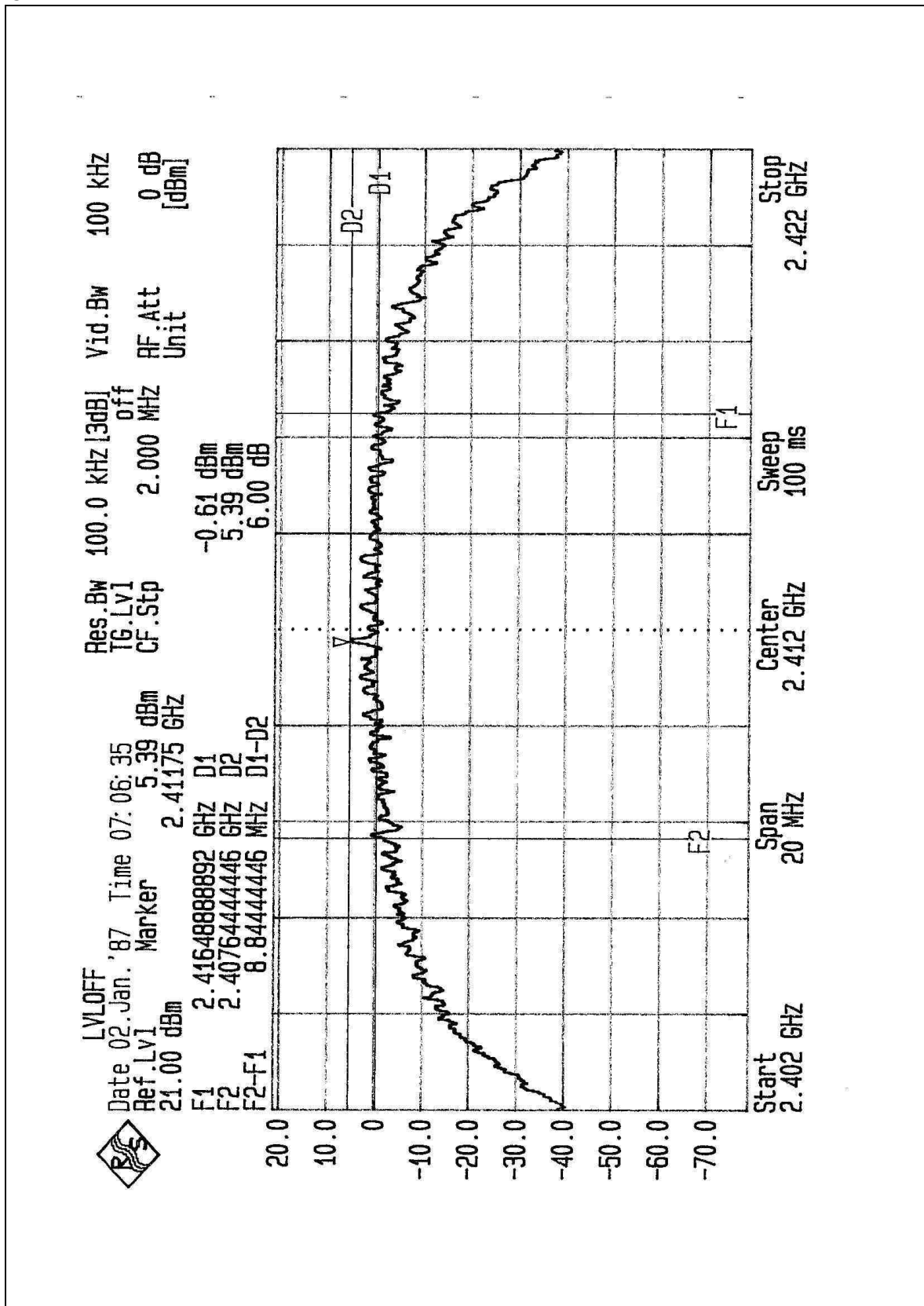


4.3.6 TEST RESULTS

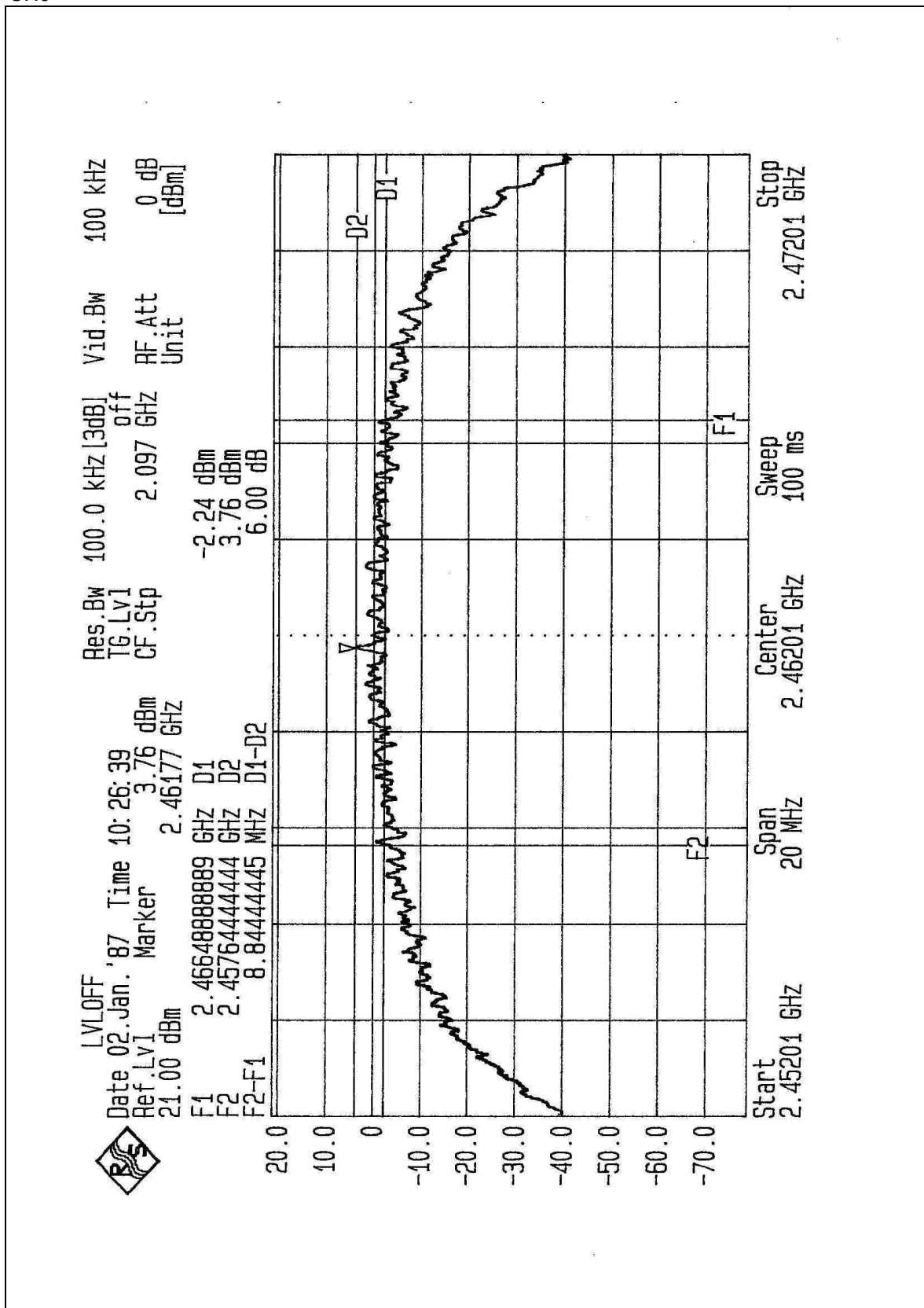
EUT	Broadband Residential Gateway	MODEL	BRG700
INPUT POWER (SYSTEM)	230Vac, 50 Hz	ENVIRONMENTAL CONDITIONS	27 deg. C, 65%RH, 1005 hPa
TESTED BY: Steven Lu			

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	8.84	0.5	PASS
6	2437	8.84	0.5	PASS
11	2462	8.84	0.5	PASS

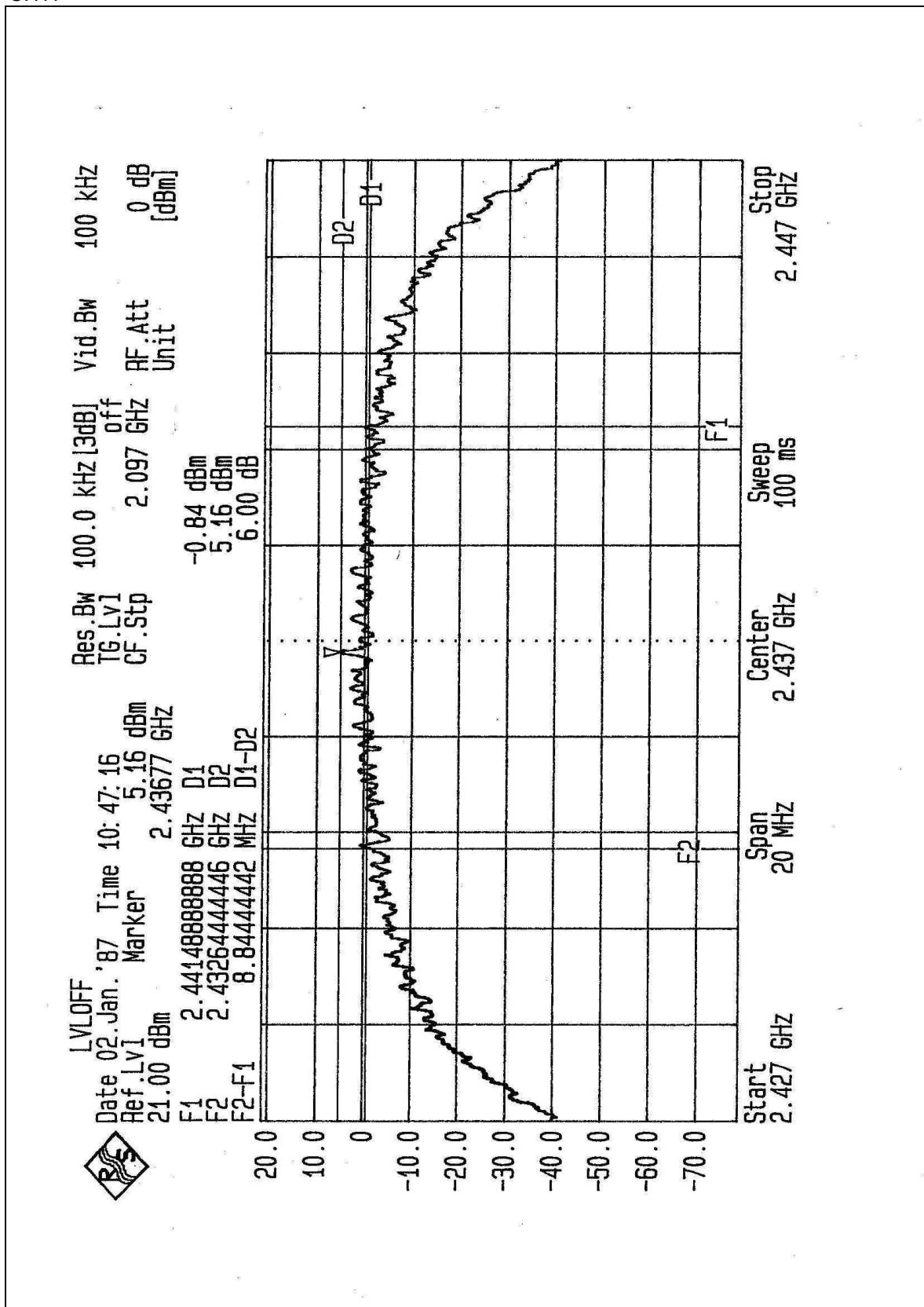
CH1



CH6



CH11



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
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839379/002	Dec. 28, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

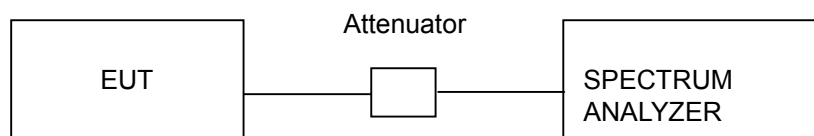
- NOTE:** 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST PROCEDURES

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The center frequency of the spectrum analyzer was set to the fundamental frequency and using 3 MHz RBW and 3 MHz VBW.
3. The span of the spectrum analyzer was larger than 6dB BandWidth plus 10MHz.
4. Used Peak Search to read the peak power after Maximum Hold function is activated.
5. Shifted the marker to +/- 3MHz and +/-6MHz, and recorded the reading.
6. The Maximum Peak Output Power is the linear summation of the five readings in 4 and 5.

NOTE: This measurement is the total power of 12MHz bandwidth which is far more wider than 6dB bandwidth.

4.4.4 TEST SETUP



4.4.5 EUT OPERATING CONDITIONS

Same as Item 3.4.5

4.4.6 TEST RESULTS

EUT	Broadband Residential Gateway	MODEL	BRG700
INPUT POWER (SYSTEM)	230Vac, 50 Hz	ENVIRONMENTAL CONDITIONS	25 deg. C, 60%RH, 1005 hPa
TESTED BY: Steven Lu			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	18.17	30	PASS
6	2437	18.58	30	PASS
11	2462	17.49	30	PASS