

4.6 EFFECTIVE ISOTROPIC RADIATED POWER SPURIOUS EMISSIONS MEASUREMENT

4.6.1 LIMITS OF EFFECTIVE ISOTROPIC RADIATED POWER SPURIOUS EMISSIONS MEASUREMENT

- (1) For transmitters operating in the 5.15 – 5.25 GHz band:
All emissions outside of the 5.15 – 5.25 GHz band shall not exceed an EIRP of –27dBm/MHz.
- (2) For transmitters operating in the 5.25 – 5.35 GHz band:
All emissions outside of the 5.25 – 5.35 GHz band shall not exceed an EIRP of –27dBm/MHz.
- (3) For transmitters operating in the 5.725 – 5.825 GHz band:
All emissions operating within the frequency range from the band edge 10 MHz above or below the band edge shall not exceed an EIRP of –17dBm/MHz; for frequencies 10 MHz or greater above or below the band edge shall not exceed an EIRP of –27dBm/MHz.

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* ROHDE & SCHWARZ Spectrum Analyzer	FSEK30	100049	July 17, 2002
ROHDE & SCHWARZ Signal Generator	68247B	984703	May 28, 2002
* EMCO Horn Antenna	3115	5623	Apr. 25, 2002
* EMCO Horn Antenna	3115	5619	May 11, 2002
MITEQ Preamplifier	AMF-4D-0051	692677	Jun. 22, 2002
MITEQ Preamplifier	AFS33-18002	690751	
Broadband Horn Antenna	BBHA 9170	147	Apr. 2, 2002
Broadband Horn Antenna	BBHA 9170	148	Apr. 2, 2002

NOTE:

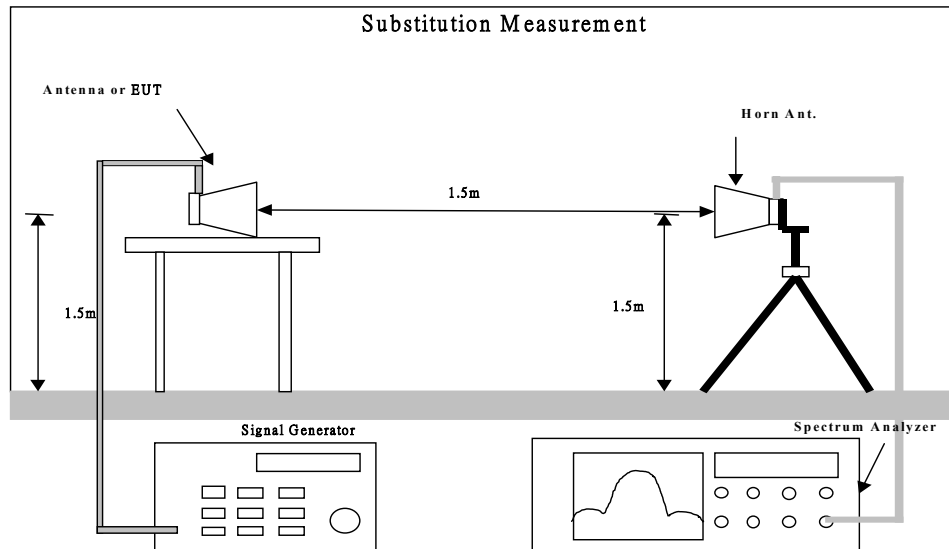
5. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
6. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.



4.6.3 TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 1.5 meters away from the receiving antenna, which was mounted on antenna tower and its position at 1.5 m above the ground.
3. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
4. The EUT is replaced by a horn antenna connected to a signal generator tuned to the frequency of emission and with the same radiation nature.
5. The radiated power can be calculated via the factor and antenna gain.
6. Repeat step 1-6 for horizontal polarization.

4.6.4 TEST SETUP



4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.5

4.6.6 TEST RESULTS

EUT	54Mbps Wireless Access Point	MODEL	WAP54A
MODE	Normal Mode	CHANNEL	1
FREQUENCY RANGE	Above 1000 MHz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Bruce Shiao		

EIRP SPURIOUS EMISSION LEVEL					
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
10355.47	V	-36.0	-27.0	-9.0	
10368.27	H	-37.8	-27	-10.8	
15540.00	-	-	-	-	Note
20720.00	-	-	-	-	Note
25894.09	V	-44.8	-27	-17.8	

NOTE: The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



EUT	54Mbps Wireless Access Point	MODEL	WAP54A
MODE	Normal Mode	CHANNEL	4
FREQUENCY RANGE	Above 1000 MHz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Steven Lu		

EIRP SPURIOUS EMISSION LEVEL					
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
10480.15	H	-38.4	-27	-11.4	
10476.35	V	-35.9	-27	-8.9	
15720.00	-	-	-	-	Note
20960.00	-	-	-	-	Note
26198.20	V	-48.6	-27	-21.6	

NOTE: The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



EUT	54Mbps Wireless Access Point	MODEL	WAP54A
MODE	Normal Mode	CHANNEL	5
FREQUENCY RANGE	Above 1000 MHz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Bruce Shiau		

EIRP SPURIOUS EMISSION LEVEL					
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
10519.56	H	-37.4	-27	-10.4	
10516.59	V	-32.2	-27	-5.2	
15780.00	-	-	-	-	Note
21040.00	-	-	-	-	Note
26305.68	V	-47.1	-27	-20.1	

NOTE: The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



EUT	54Mbps Wireless Access Point	MODEL	WAP54A
MODE	Normal Mode	CHANNEL	8
FREQUENCY RANGE	Above 1000 MHz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Steven Lu		

EIRP SPURIOUS EMISSION LEVEL					
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
10640.00	-	-	-	-	Note
15960.00	-	-	-	-	Note
21280.00	-	-	-	-	Note
26584.08	H	-47.5	-27	-20.5	
26608.21	V	-45.2	-27	-18.2	

NOTE: The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



EUT	54Mbps Wireless Access Point	MODEL	WAP54A
MODE	Turbo Mode	CHANNEL	1
FREQUENCY RANGE	Above 1000 MHz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Steven Lu		

EIRP SPURIOUS EMISSION LEVEL					
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
10359.36	H	-47.2	-27	-20.2	
10354.84	V	-38.6	-27	-11.6	
15540.00	-	-	-	-	Note
20720.00	-	-	-	-	Note
25788.78	H	-54.3	-27	-27.3	
25871.44	V	-50.9	-27	-23.9	

NOTE: The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



EUT	54Mbps Wireless Access Point	MODEL	WAP54A
MODE	Turbo Mode	CHANNEL	4
FREQUENCY RANGE	Above 1000 MHz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Steven Lu		

EIRP SPURIOUS EMISSION LEVEL					
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
10481.10	H	-47.6	-27	-20.6	
10470.68	V	-38.1	-27	-11.1	
15720.00	-	-	-	-	Note
20960.00	-	-	-	-	Note
26167.24	V	-50.6	-27	-23.6	
26247.44	H	-51.8	-27	-24.8	

NOTE: The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



EUT	54Mbps Wireless Access Point	MODEL	WAP54A
MODE	Turbo Mode	CHANNEL	5
FREQUENCY RANGE	Above 1000 MHz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Gary Chang		

EIRP SPURIOUS EMISSION LEVEL					
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
10520.10	V	-36.5	-27	-9.5	
10521.70	H	-43.0	-27	-16.0	
15780.00	-	-	-	-	Note
21040.00	-	-	-	-	Note
26256.82	H	-52.6	-27	-25.6	
26287.13	V	-50.7	-27	-23.7	

NOTE: The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



EUT	54Mbps Wireless Access Point	MODEL	WAP54A
MODE	Turbo Mode	CHANNEL	8
FREQUENCY RANGE	Above 1000 MHz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Gary Chang		

EIRP SPURIOUS EMISSION LEVEL					
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
10640.00	-	-	-	-	Note
15960.00	-	-	-	-	Note
21280.00	-	-	-	-	Note
26608.00	V	-48.7	-27	-21.7	
26611.08	H	-51.1	-27	-24.1	

NOTE: The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.

4.7 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ANRITSU SPECTRUM ANALYZER	MS2667C	M10281	Mar. 15, 2003
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W901030	Jun. 13, 2002

NOTE:

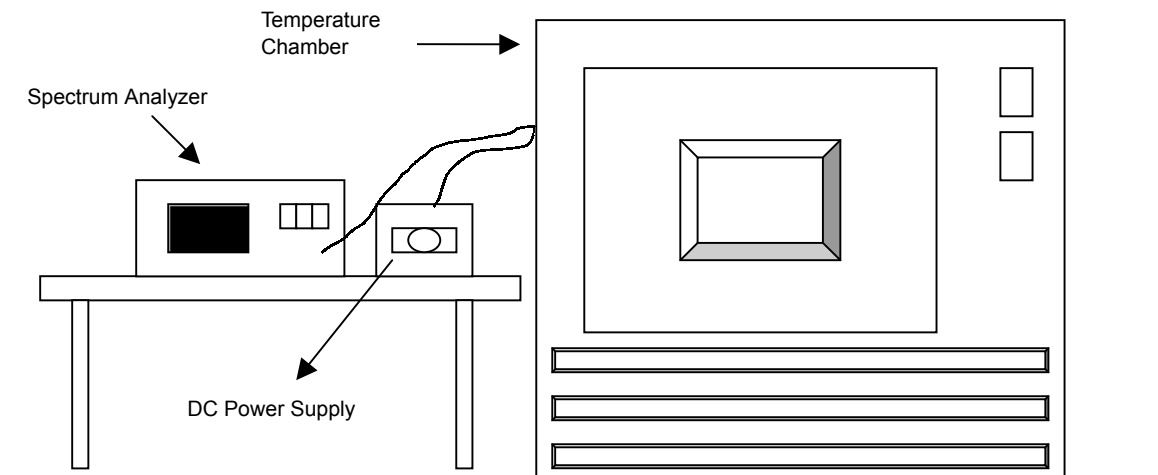
The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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

4.6.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
5. Turn the EUT on and couple its output to a spectrum analyzer.
6. Turn the EUT off and set the chamber to the highest temperature specified.
7. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
8. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
9. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.4 TEST SETUP



4.6.5 EUT OPERATING CONDITION

Same as Item 4.1.5

4.6.6 TEST RESULTS

Operating frequency:5180.03640 MHz				Limit : $\pm 0.02\%$			
Temp. (°C)	Power supply (VDC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	264.5	5180.045050	0.0001670	5180.045469	0.0001751	5180.045902	0.0001834
	230.0	5180.045080	0.0001676	5180.045401	0.0001738	5180.045802	0.0001815
	195.5	5180.045155	0.0001690	5180.045724	0.0001800	5180.045947	0.0001843
40	264.5	5180.030958	-0.0001051	5180.031044	-0.0001034	5180.031065	-0.0001030
	230.0	5180.030917	-0.0001058	5180.030994	-0.0001044	5180.031072	-0.0001029
	195.5	5180.030974	-0.0001047	5180.031046	-0.0001034	5180.031056	-0.0001032
30	264.5	5180.031202	-0.0001003	5180.031083	-0.0001026	5180.030996	-0.0001043
	230.0	5180.031236	-0.0000997	5180.031118	-0.0001020	5180.031045	-0.0001034
	195.5	5180.031145	-0.0001014	5180.031059	-0.0001031	5180.031023	-0.0001038
20	264.5	5180.037365	0.0000186	5180.037292	0.0000172	5180.037182	0.0000151
	230.0	5180.036462	0.0000012	5180.037276	0.0000169	5180.037163	0.0000147
	195.5	5180.037323	0.0000178	5180.037233	0.0000161	5180.037154	0.0000146
10	264.5	5180.035891	-0.0000098	5180.035606	-0.0000153	5180.027195	-0.0001777
	230.0	5180.036078	-0.0000062	5180.035754	-0.0000125	5180.027364	-0.0001744
	195.5	5180.035843	-0.0000108	5180.035459	-0.0000182	5180.027239	-0.0001768
0	264.5	5180.025191	-0.0002164	5180.024030	-0.0002388	5180.023508	-0.0002489
	230.0	5180.025083	-0.0002185	5180.025362	-0.0002131	5180.023735	-0.0002445
	195.5	5180.025261	-0.0002150	5180.023860	-0.0002421	5180.023613	-0.0002468
-10	264.5	5180.012553	0.0111224	5180.013007	-0.0004516	5180.013620	-0.0004398
	230.0	5180.012172	-0.0004677	5180.012860	-0.0004544	5180.013274	-0.0004464
	195.5	5180.012766	-0.0004562	5180.013151	-0.0004488	5180.013513	-0.0004418
-20	264.5	5180.033957	-0.0000472	5180.035950	-0.0000087	5180.036699	0.0000058
	230.0	5180.033487	-0.0000562	5180.035644	-0.0000146	5180.036443	0.0000008
	195.5	5180.035205	-0.0000231	5180.036148	-0.0000049	5180.037004	0.0000117
-30	264.5	5180.054622	0.0003518	5180.054108	0.0003418	5180.055476	0.0003683
	230.0	5181.654286	0.0312325	5180.054905	0.0003572	5180.655374	0.0119490
	195.5	5180.054782	0.0003549	5180.054258	0.0003447	5180.055604	0.0003707

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 Resolution Bandwidth).

4.8.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 17, 2002

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.

4.8.3 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 kHz bandwidth from band edge. The band edges was measured and recorded.

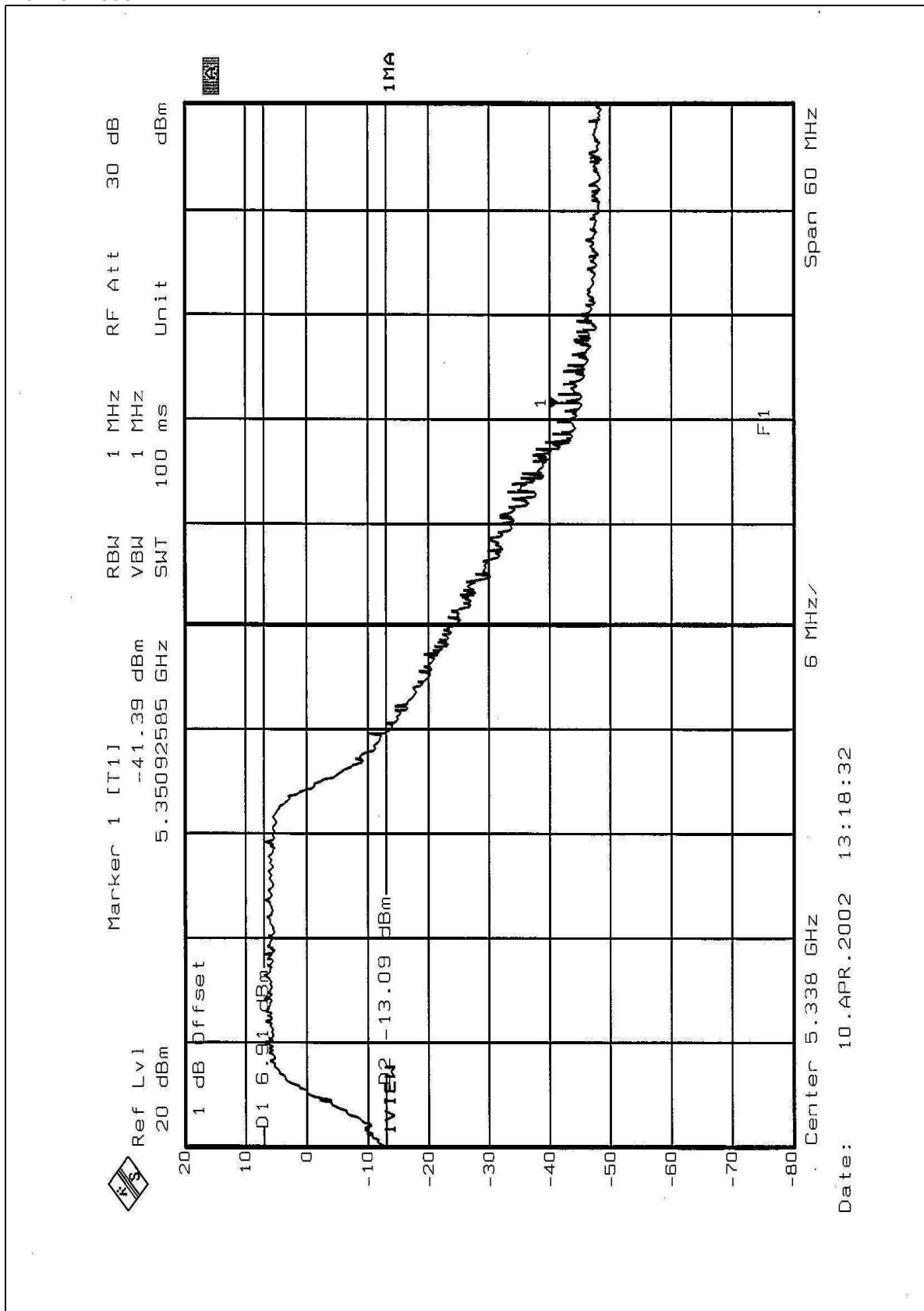


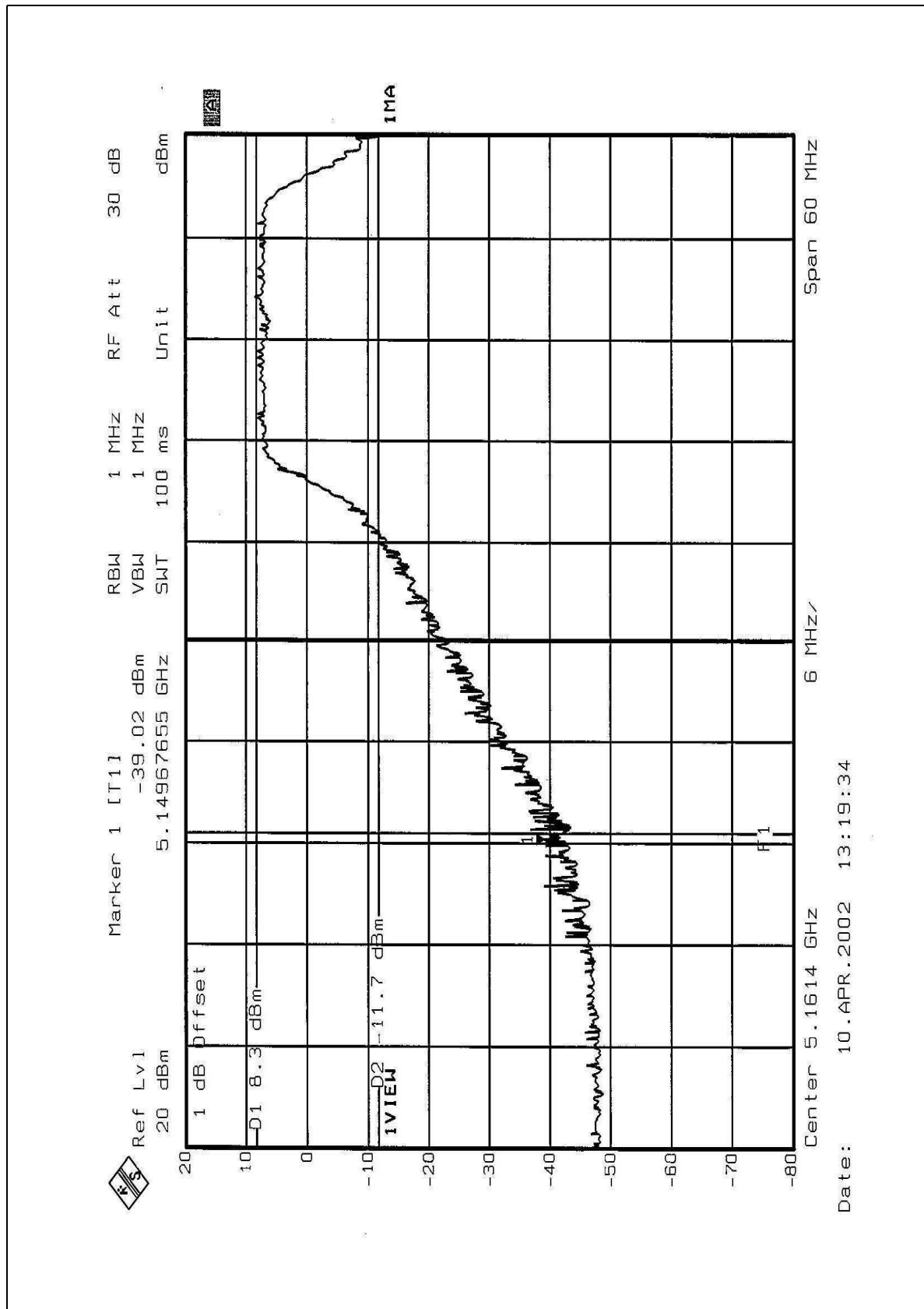
4.8.4 EUT OPERATING CONDITION

4.8.5 TEST RESULTS

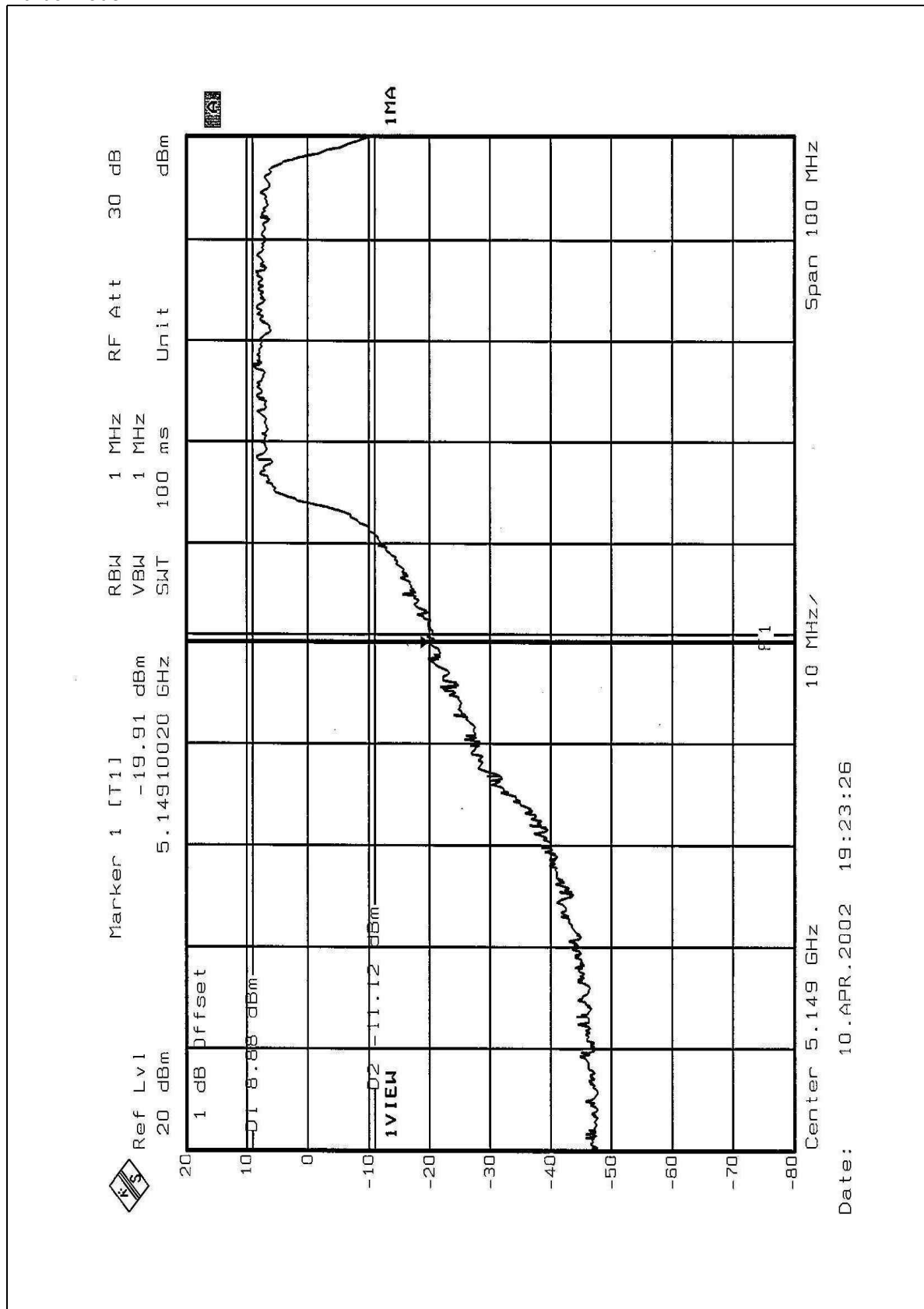
The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

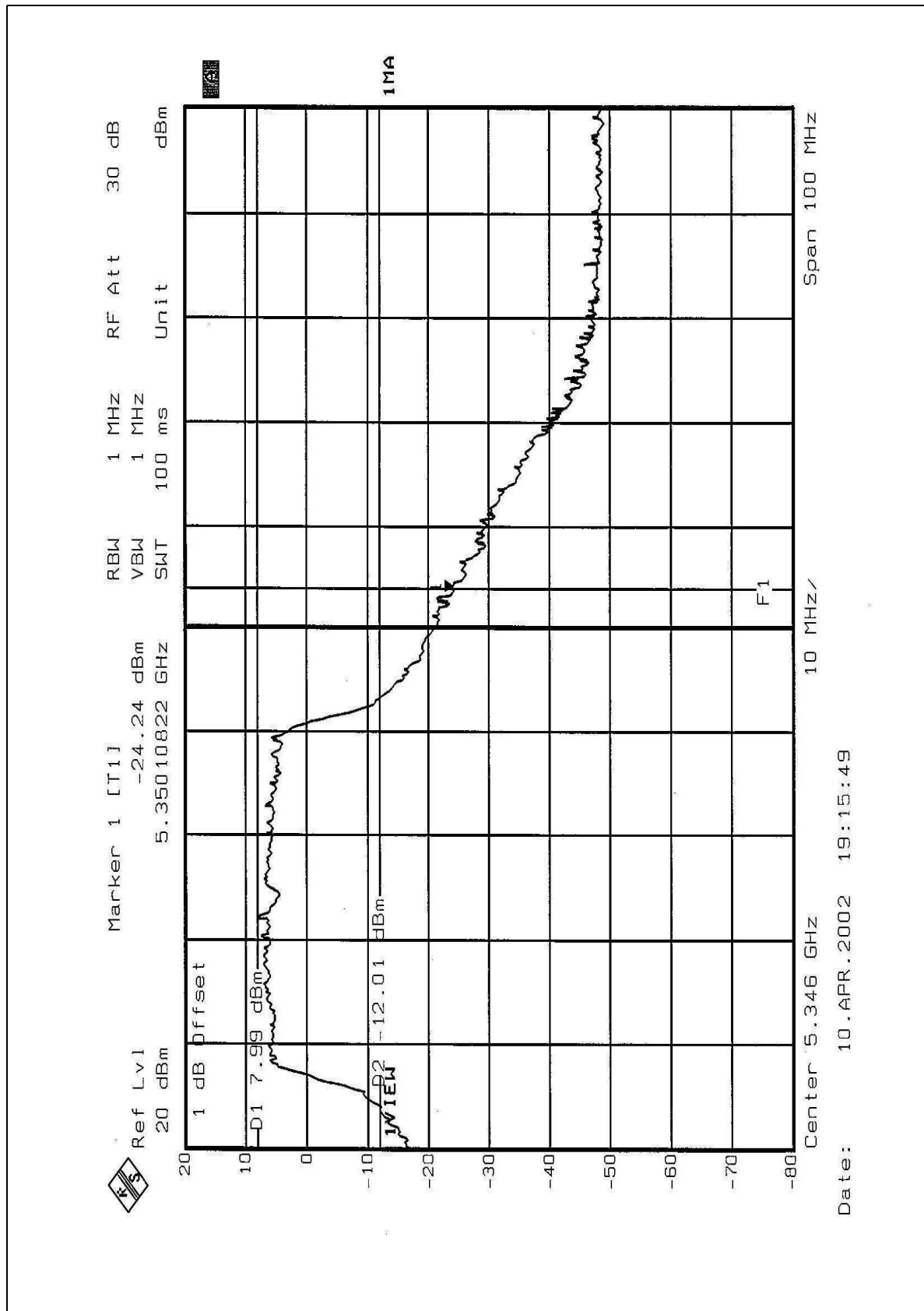
Normal Mode





Turbo Mode







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.

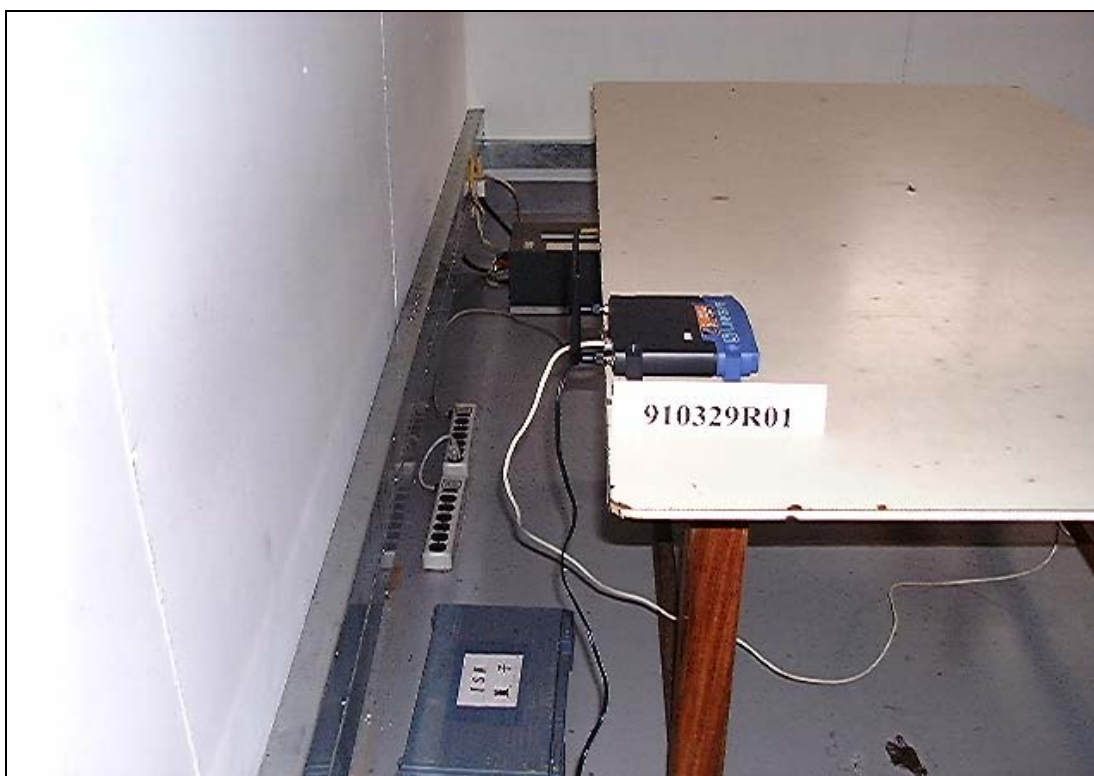
And according to FCC 47 CFR Section 15.407(a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Dipole Antenna. The antenna connector for the device is MMCX Antenna. And the maximum Gain of this antenna is only 2dBi.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST



RADIATED EMISSION TEST





6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
R.O.C.	BSMI, DGT, CNLA

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:

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