FCC PART 22, 24 TYPE APPROVAL
EMI MEASUREMENT AND TEST REPORT

For

AnyDATA Corporation

18902 Bardeen Ave.
Irvine, CA 92612

FCC ID: P4M-DT2000

2004-01-26

This Report Concerns:	**Equipment Type:**
☒ Original Report	CDMA Dual Band Data Module

Test Engineer:	Ling Zhang /
Report No.:	R0312246
Test Date:	2004-01-08 / 2004-01-09 / 2004-01-12 / 2004-01-14
Reviewed By:	Ming Jing /
Prepared By:	Bay Area Compliance Laboratory Corporation (BACL) 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732 9164

Note: This test report is specially limited to the above client company and the product model only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *AnyDATA Corporation 's* product, FCC ID:P4M-DT2000 or the "EUT" as referred to in this report is a CDMA Dual Band Data Module, which is measured approximately 39mm x 49mm x 6mm. The EUT is a compact wireless data module operating in the cellular and PCS spectrum. The EUT also contains a complete digital modulation and demodulation system for CDMA standards as specified in IS-95 A/B and IS-2000.

The subsystem in the EUT includes a CDMA processor (MSM5100), an integrated CODEC with an ear piece and microphone amplifiers, and an RS-232 serial interface supporting forward link data communications at a rate of 230.4kbps.

The EUT provides an external interface that includes the standard RS-232, Digital Audio, External reset control, LCD Display, Keypad, and Ringer extension ports.

The EUT has the capability to power down unused circuits in order to dynamically minimize power consumption.

** The test data gathered are from typical production sample, serial number: 0309K1597156, provided by the manufacturer.*

Objective

This type approval report is prepared on behalf of *AnyDATA Corporation* in accordance with Part 2, Subpart J, Part 15, Subparts A and B, Part 22 Subpart H, and Part 24 Subpart E of the Federal Communication Commissions rules.

It is also prepared in accordance with Part 2, Subpart J, Part 15, Subparts A and B, Part 22 Subpart H and Part 24 Subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for output power, modulation characteristic, occupied bandwidth, spurious emission at antenna terminal, field strength of spurious radiation, frequency stability, and conducted and radiated margin.

Related Submittal(s)/Grant(s)

No Related Submittals

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 15 Subpart B – Unintentional Radiators
Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - PCS

Applicable Standards: TIA EIA 137-A, TIA EIA 98-C, ANSI 63.4-1992, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Open Area Test site used by BACL Corp. to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-1992.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACLa is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, CISPR 22: 1997, Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
SONY	Notebook PC	PCG-F150	28986303404240	DOC
HP	Printer	2225C	N/A	DOC

External I/O Cabling List and Details

Cable Description	Length (M)	Port/From	To
Shielded Printer Cable	1.5	Parallel Port/Notebook PC	Printer

Power Supply Information

Manufacturer	Description	Model	Serial Number	FCC ID
HP	Triple Output Power Supply	6236B	2212-19	DOC

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to ANSI C63.4-2001.

The final qualification test was performed with the EUT operating at normal mode.

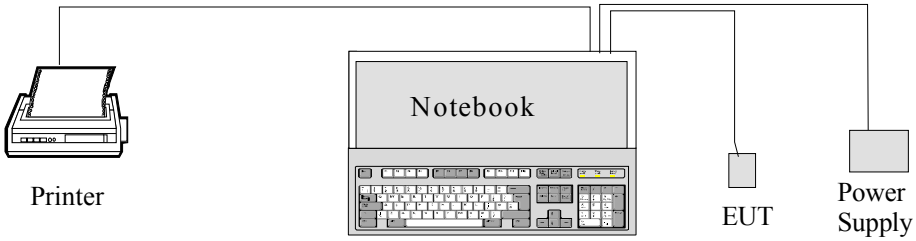
Block Diagram

Please refer to Exhibit D.

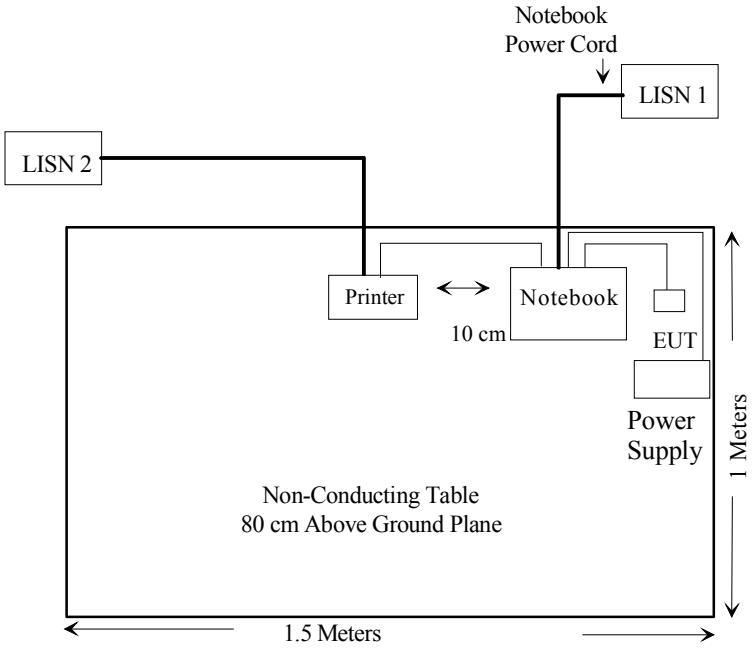
Equipment Modifications

No modifications were made to the EUT.

Configuration of Test System



Test Setup Block Diagram



SUMMARY OF TEST RESULTS

Results reported relate only to the product tested, serial number: 0309K1597156.

FCC RULE	DESCRIPTION OF TEST	RESULT
§ 2.1047	Modulation Characteristics	Compliant
§ 2.1053	Field Strength of Spurious Radiation	Compliant
§2.1093	RF Exposure	Compliant
§ 15.107	Conducted Emissions	Compliant
§ 2.1046, § 22.912 (d) § 24.232	RF Output Power	Compliant
§ 2.1046, § 22.913 (a) § 24.232	Conducted Output Power	Compliant
§ 2.1049 § 22.917 § 22.905 § 24.238	Out of Band Emission, Occupied Bandwidth	Compliant
§ 2.1051, § 22.917 § 24.238(a)	Spurious Emissions at Antenna Terminals	Compliant
§ 2.1055 (a) § 2.1055 (d) § 22.355 § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant
§ 22.917 §24.238	Band Edge	Compliant

§2.1047 - MODULATION CHARACTERISTIC

Applicable Standard

Requirement: FCC § 2.1047.

Test Procedure

CDMA digital mode is used by EUT.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	HP8564E	3943A01781	2003-08-01
HP	Plotter	HP7470A	2541A49659	Not Required

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

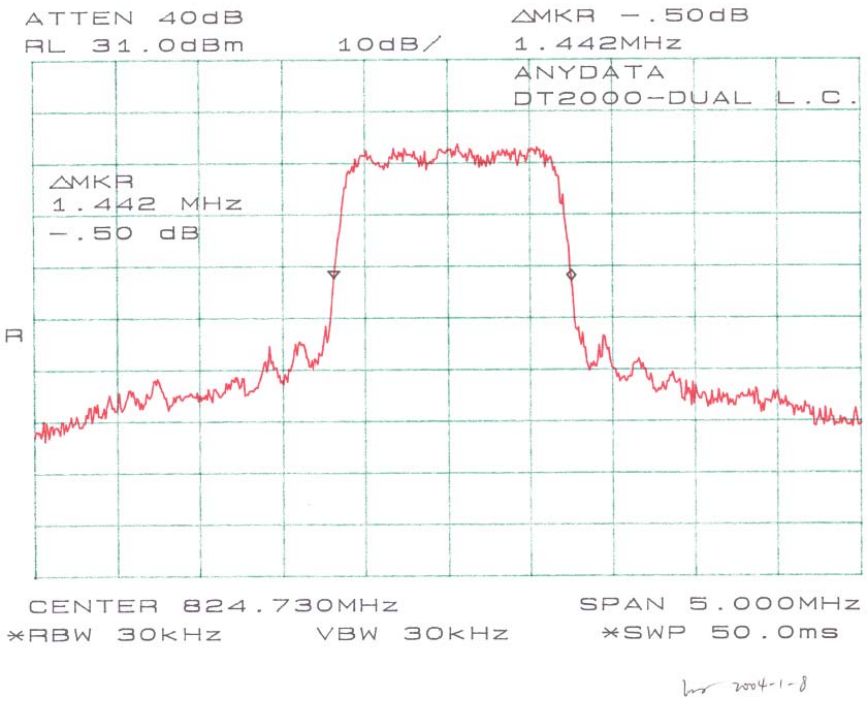
Environmental Conditions

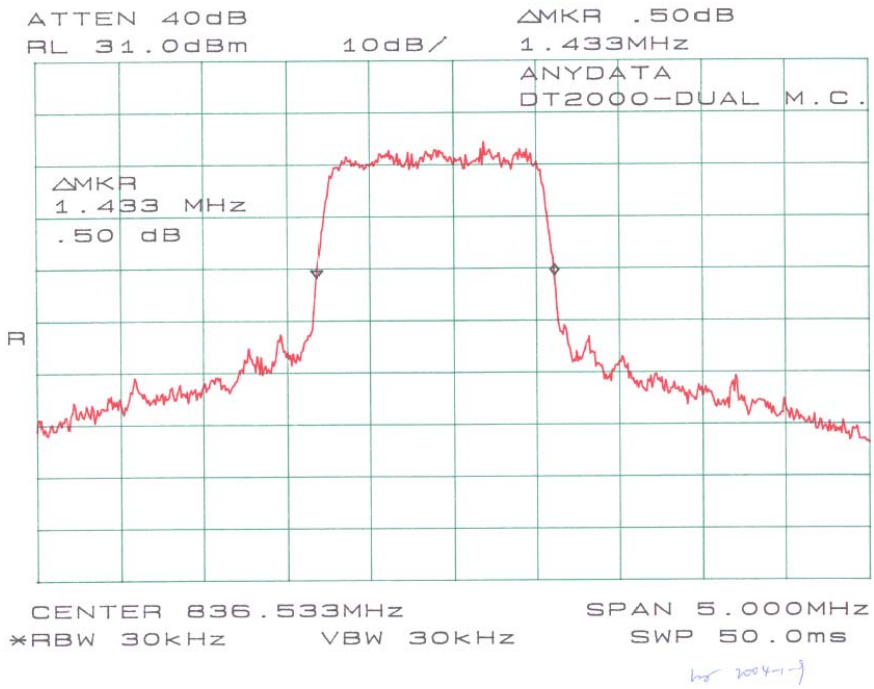
Temperature:	11° C
Relative Humidity:	82%
ATM Pressure:	1205 mbar

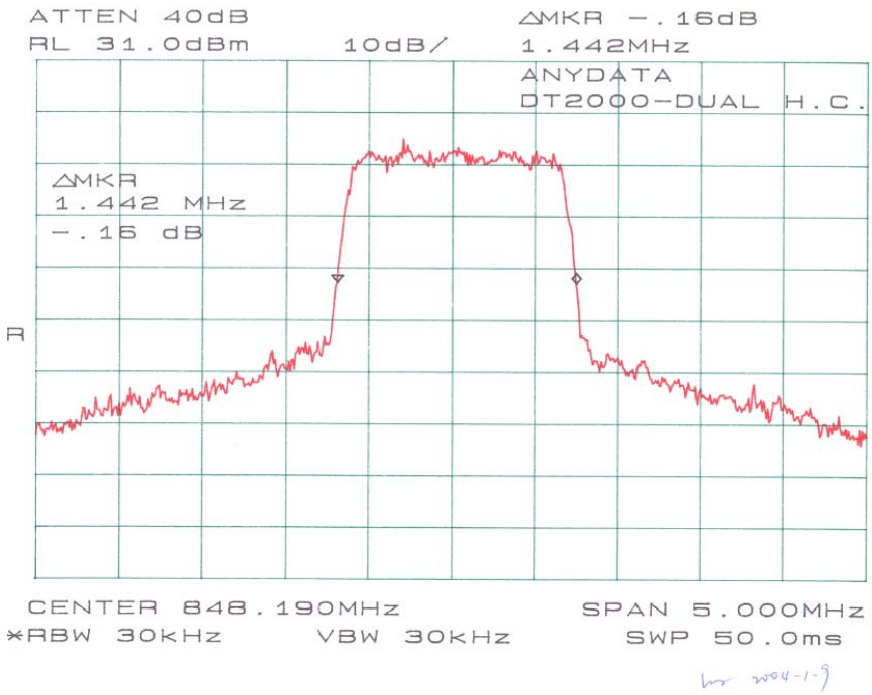
Test Results

Please refer to the hereinafter plots.

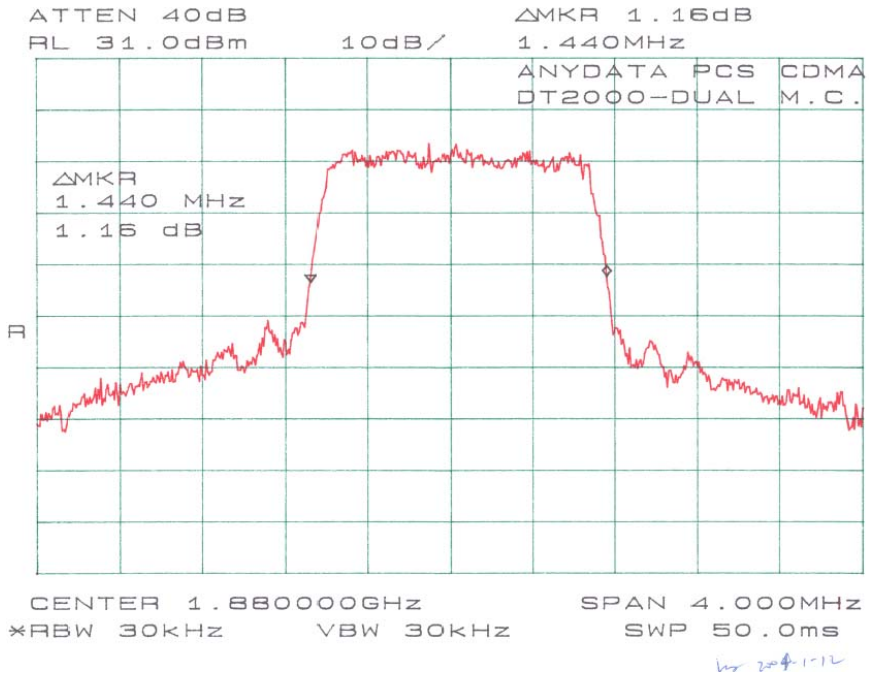
Plots of Modulation Characteristic for Part22

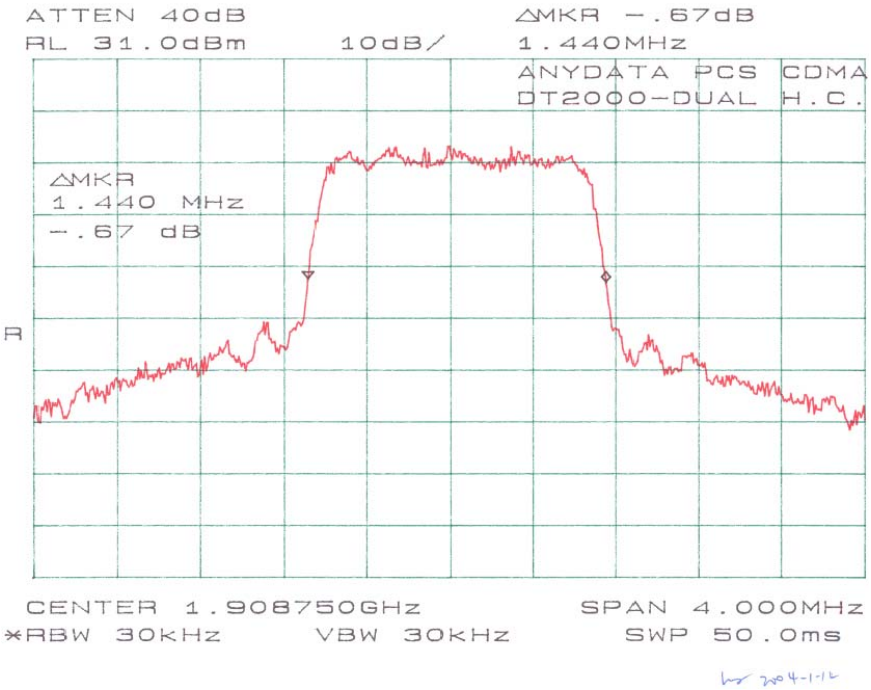






Plots of Modulation Characteristic for Part24


ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR 1.16dB
1.440MHz
ANYDATA PCS CDMA
DT2000-DUAL M.C.
ΔMKR
1.440 MHz
1.16 dB
A
CENTER 1.880000GHz
SPAN 4.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR -.67dB
1.440MHz
ANYDATA PCS CDMA
DT2000-DUAL H.C.
ΔMKR
1.440 MHz
-.67 dB
A
CENTER 1.908750GHz
SPAN 4.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

§2.1053 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

Requirements: CFR 47, § 2.1053.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	8568B	2601A02165	2003-07-03
HP	Amplifier	8447E	2944A10187	2003-09-23
HP	Quasi-Peak Adapter	85650A	3019A05393	2003-06-13
EMCO	Biconical Antenna	3110B	9309-1165	2003-10-11
EMCO	Log Periodic Antenna	3146	2101	2003-10-11
AH System	Horn Antenna	SAS-200/511	261	2003-08-02

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	11° C
Relative Humidity:	82%
ATM Pressure:	1205 mbar

Test Result

FCC Part 22: CDMA 800

Low Frequency: -20.7 dBm at 1649.46 MHz
Middle Frequency: -20.6 dBm at 2509.2 MHz
High Frequency: -20.5 dBm at 1696.38 MHz

FCC Part 24: CDMA 1900

Low Frequency: -20.7 dBm at 3702.5 MHz
Middle Frequency: -20.4 dBm at 3760.0 MHz
High Frequency: -20.5 dBm at 3817.5 MHz

Test Data for CDMA800

EUT							Generator			Standard	
Indicated		Table	Test Antenna		Substitution		Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Corrected	Loss dBm	Level dB	Limit dBm	Margin DBm
Low Channel											
824.73	126.50	45	1.50	V	824.73	19.3	6.1	0.1	25.3		
824.73	124.50	15	1.90	H	824.73	17.5	6.1	0.1	23.5		
1649.46	36.33	270	1.50	H	1649.46	-40.0	6.8	0.5	-33.7	-13	-20.7
1649.46	36.17	150	2.20	V	1649.46	-40.1	6.8	0.5	-33.8	-13	-20.8
2474.19	37.67	120	2.00	H	2474.19	-41.4	7.6	0.7	-34.5	-13	-21.5
2474.19	37.33	270	1.80	V	2474.19	-41.8	7.6	0.7	-34.9	-13	-21.9
MIDDLE CHANNEL											
836.40	126.30	45	2.20	V	836.40	19.1	6.1	0.1	25.1		
836.40	123.50	180	2.00	H	836.40	16.8	6.1	0.1	22.8		
2509.20	38.83	180	1.70	V	2509.20	-40.5	7.6	0.7	-33.6	-13	-20.6
1672.80	36.33	300	1.70	V	1672.80	-40.0	6.8	0.5	-33.7	-13	-20.7
1672.80	36.00	150	2.20	H	1672.80	-40.3	6.8	0.5	-34.0	-13	-21.0
2509.20	37.83	60	1.90	H	2509.20	-41.5	7.6	0.7	-34.6	-13	-21.6
HIGH CHANNEL											
848.19	126.50	15	2.30	V	848.19	19.3	6.1	0.1	25.3		
848.19	122.67	0	2.10	H	848.19	16.0	6.1	0.1	22.0		
1696.38	36.50	30	2.20	V	1696.38	-39.8	6.8	0.5	-33.5	-13	-20.5
1696.38	36.33	180	2.00	H	1696.38	-40.0	6.8	0.5	-33.7	-13	-20.7
2544.57	38.10	90	1.50	V	2544.57	-41.0	7.6	0.7	-34.1	-13	-21.1
2544.57	37.50	45	1.70	H	2544.57	-41.7	7.6	0.7	-34.8	-13	-21.8

Test Data for CDMA1900

EUT							Generator			Standard	
Indicated		Table	Test Antenna		Substitution		Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Corrected	Loss dBm	Level dB	Limit dBm	Margin DBm
Low Channel											
1851.25	123.33	180	1.90	V	1851.25	20.2	8.3	3.4	25.1		
1851.25	113.17	90	2.30	H	1851.25	11.6	8.3	3.4	16.5		
3702.50	36.67	30	1.50	V	3702.50	-39.7	10.3	4.3	-33.7	-13	-20.7
3702.50	36.33	270	2.00	H	3702.50	-40.0	10.3	4.3	-34.0	-13	-21.0
5553.75	37.50	180	2.20	V	5553.75	-40.5	10.6	5.4	-35.3	-13	-22.3
5553.75	37.10	90	1.70	H	5553.75	-40.8	10.6	5.4	-35.6	-13	-22.6
MIDDLE CHANNEL											
1880.00	123.50	180	2.30	V	1880.00	20.3	8.3	3.4	25.2		
1880.00	114.00	100	1.70	H	1880.00	12.1	8.3	3.4	17.0		
3760.00	37.10	0	2.10	V	3760.00	-39.4	10.3	4.3	-33.4	-13	-20.4
3760.00	36.83	45	1.70	H	3760.00	-39.7	10.3	4.3	-33.7	-13	-20.7
5640.00	37.17	60	1.90	V	5640.00	-40.8	10.6	5.4	-35.6	-13	-22.6
5640.00	36.50	90	2.30	H	5640.00	-41.2	10.6	5.4	-36.0	-13	-23.0
HIGH CHANNEL											
1908.75	124.00	180	1.80	V	1908.75	20.6	8.3	3.4	25.5		
1908.75	112.67	100	2.00	H	1908.75	11.4	8.3	3.4	16.3		
3817.50	37.00	300	2.00	V	3817.50	-39.5	10.3	4.3	-33.5	-13	-20.5
3817.50	36.17	30	2.00	H	3817.50	-40.3	10.3	4.3	-34.3	-13	-21.3
5726.25	36.83	60	2.30	H	5726.25	-41.0	10.6	5.4	-35.8	-13	-22.8
5726.25	36.50	0	2.10	V	5726.25	-41.2	10.6	5.4	-36.0	-13	-23.0

§1.1307(b)(1) & §2.1093 - RF EXPOSURE

According to §15.247(b)(4) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

MPE Prediction

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

CDMA800
Maximum peak output power at antenna input terminal: 25.33 (dBm)
Maximum peak output power at antenna input terminal: 341.19 (mW)
Prediction distance: 20 (cm)
Predication frequency: 800 (MHz)
Antenna Gain (typical): 1.5 (dBi)
antenna gain: 1.41 (numeric)
Power density at predication frequency at 20 cm: 0.096 (mW/cm^2)

MPE limit for uncontrolled exposure at prediction frequency: 0.53 (mW/cm^2)

CDMA1900
Maximum peak output power at antenna input terminal: 25.17 (dBm)
Maximum peak output power at antenna input terminal: 328.85 (mW)
Prediction distance: 20 (cm)
Predication frequency: 1900 (MHz)
Antenna Gain (typical): 1.5 (dBi)
antenna gain: 1.41 (numeric)
Power density at predication frequency at 20 cm: 0.092 (mW/cm^2)

MPE limit for uncontrolled exposure at prediction frequency: 1.0 (mW/cm^2)

Test Result

The EUT is a mobile device. The power density level at 20 cm is 0.096 mW/cm², which is below the uncontrolled exposure limit of 1.0mW/cm² at 800 MHz. The power density level at 20 cm is 0.092 mW/cm², which is below the uncontrolled exposure limit of 1.0mW/cm² at 1900 MHz.

§15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is ±2.4 dB.

EUT Setup

The measurement was performed in the shield room, using the same setup per ANSI C63.4-2001 measurement procedure. The specification used was FCC 15 Subpart B limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

Spectrum Analyzer Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30Mhz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Artificial LISN	ESH2-Z5	871884/039	2003-03-28
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2003-05-06

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -4 dBμV of specification limits). Quasi-peak readings are distinguished with a "**Qp**".

Summary of Test Results

According to the recorded data in following table, the EUT complies with the FCC Conducted margin for a Class B device, with the *worst* margin reading of:

-12.6 dB at 8.10 in the Neutral mode

Environmental Conditions

Temperature:	11°C
Relative Humidity:	8%
ATM Pressure:	1205ar

Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC PART 15 CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
8.10	37.40	AVG	Neutral	50	-12.60
4.54	27.40	AVG	Neutral	46	-18.60
4.55	25.40	AVG	Line	46	-20.60
11.80	28.80	AVG	Line	50	-21.20
8.10	38.80	QP	Neutral	60	-21.20
11.80	27.60	AVG	Neutral	50	-22.40
0.15	40.80	QP	Line	66	-25.20
4.54	30.80	QP	Neutral	56	-25.20
4.55	30.30	QP	Line	56	-25.70
11.80	34.10	QP	Line	60	-25.90
11.80	33.30	QP	Neutral	60	-26.70
0.15	14.60	AVG	Line	56	-41.40

Plot of Conducted Emissions Test Data

Plot(s) of Conducted Emissions Test Data is presented hereinafter as reference.

Bay Area Compliance Laboratory Corp 14. Jan 04 16:06

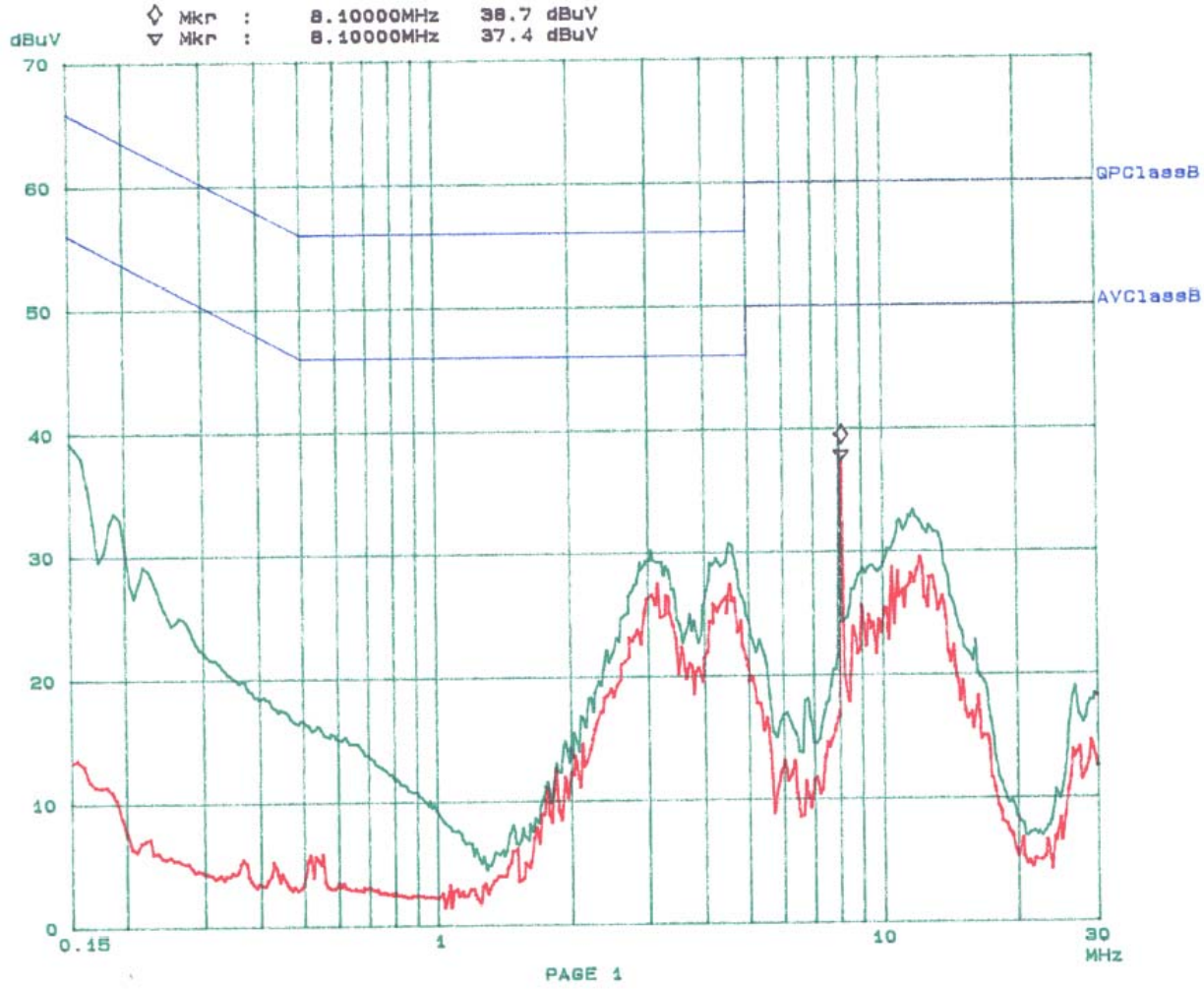
FCC

EUT: DT2000-DUAL
Manuf: ANYDATA
Op Cond: Normal
Operator: LING
Comment: N

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 25
Acc Margin: 6dB



PAGE 1

2004-1-14

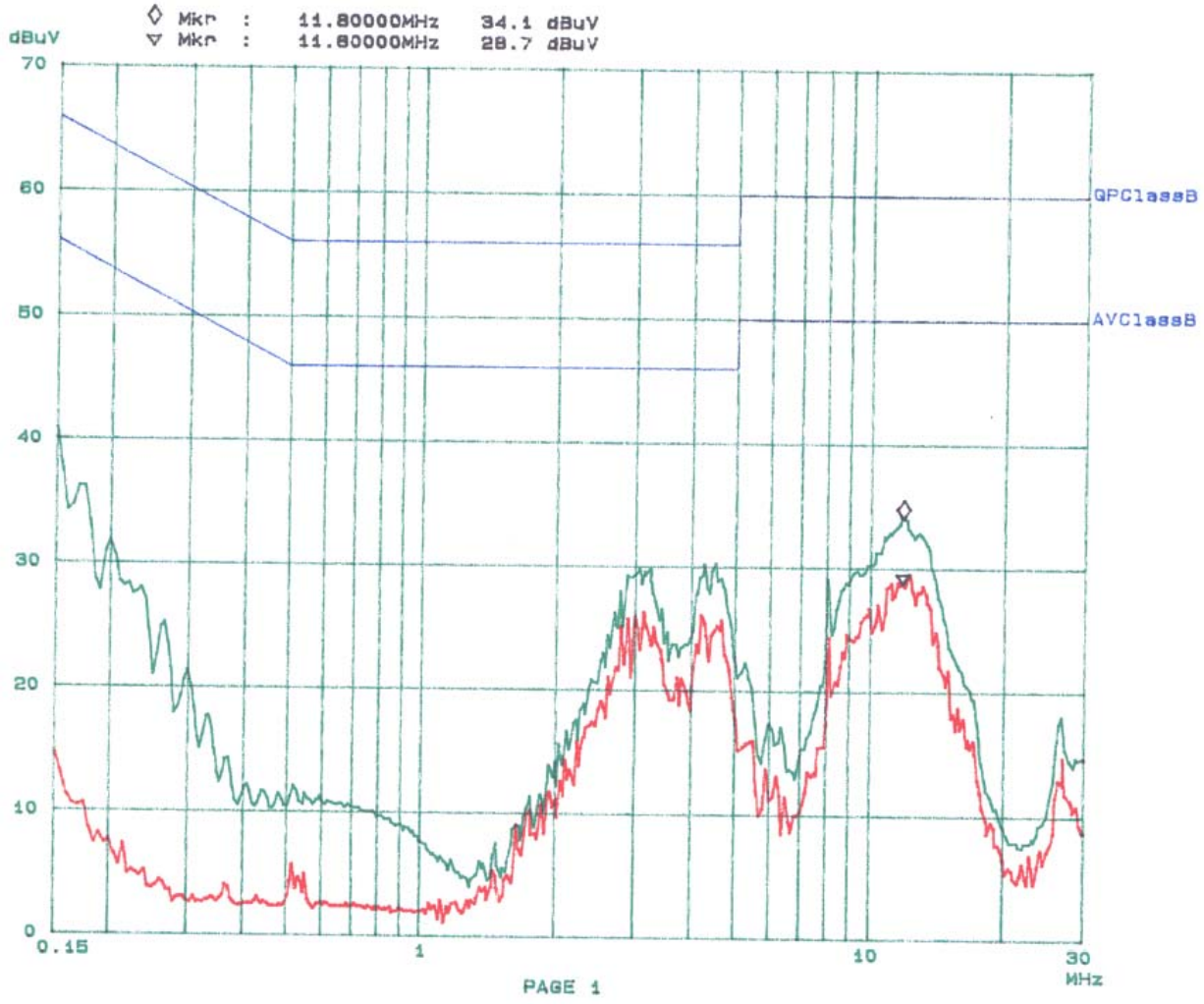
Bay Area Compliance Laboratory Corp 14. Jan 04 15:27
FCC

EUT: DT2000-DUAL
Manuf: ANYDATA
Op Cond: Normal
Operator: LING
Comment: L

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 25
Acc Margin: 6dB



PAGE 1

2004-1-14

§2.1046, §22.912(d), & §24.232 - RF POWER OUTPUT

Applicable Standard

According to FCC §2.1046 and §24.232 (1), mobile/portable stations are limited to 2 watts EIRP.
According to FCC §22.912(d), the ERP of mobile transmitters must not exceed 7 watts.

Test Procedure

1. On a test site, the EUT shall be placed at 1.5m height on a turn table, and in the position closest to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3m from EUT to correspond to the frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the quasi-peak detector is used for the measurement.
4. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a horn (substitution antenna).
10. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. In necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

17. The measure of the effective radiated power is the large of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	8568B	2601A02165	2003-07-03
HP	Amplifier	8447E	2944A10187	2003-09-23
HP	Quasi-Peak Adapter	85650A	3019A05393	2003-06-13
EMCO	Biconical Antenna	3110B	9309-1165	2003-10-11
EMCO	Log Periodic Antenna	3146	2101	2003-10-11
AH System	Horn Antenna	SAS-200/511	261	2003-08-02

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	11° C
Relative Humidity:	82%
ATM Pressure:	1205 mbar

Test Results

For CDMA1900 :

FREQUENCY (MHZ)	SUBSTITUTION READING (dBm)	SUBSTITUTION ANTENNA GAIN	SUBSTITUTION CALBE LOSS (dbm)	EIRP (dBm)
1851.25	20.2	8.3	3.4	25.1
1880.00	20.3	8.3	3.4	25.2
1908.75	20.6	8.3	3.4	25.5

For CDMA800:

FREQUENCY (MHZ)	SUBSTITUTION READING (dBm)	SUBSTITUTION ANTENNA GAIN	SUBSTITUTION CALBE LOSS (dBm)	EIRP (dBm)	ERP (dBm)
824.73	19.3	6.1	0.1	25.3	23.16
836.40	19.1	6.1	0.1	25.1	22.96
848.19	19.3	6.1	0.1	25.3	23.16

Sample calculation:

Absolute level = substitution reading + antenna gain - cable loss

For example:

20.2 + 8.3 - 3.4 = 25.1

§2.1046, §22.913(a), & §24.232 – CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (a), in no case may the peak output power of a base station transmitter exceed 100 watt.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	HP8564E	3943A01781	2003-08-01
HP	Plotter	HP7470A	2541A49659	Not Required
A.H. Systems	Horn Antenna	SAS200	261	2003-05-31
ETS	Logperiodic Antenna	3148	0004-1155	2003-10-11
EMCO	Biconical Antenna	3110B	9603-2315	2003-10-11

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Environmental Conditions

2004-01-09

Temperature:	13° C
Relative Humidity:	57%
ATM Pressure:	1108 mbar

2004-01-12

Temperature:	14° C
Relative Humidity:	65%
ATM Pressure:	1128 mbar

Test Results

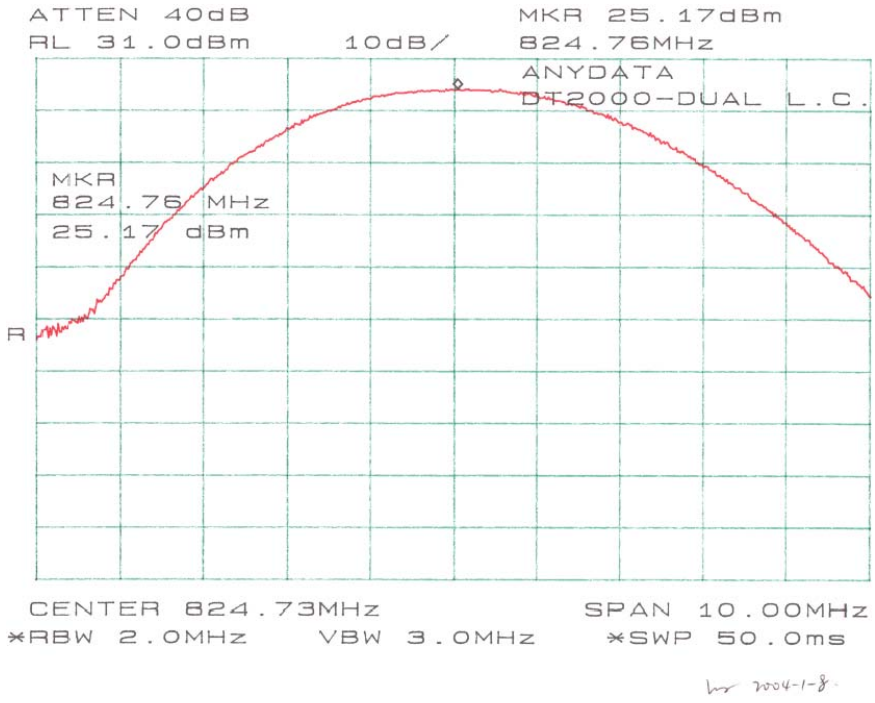
Part 22:

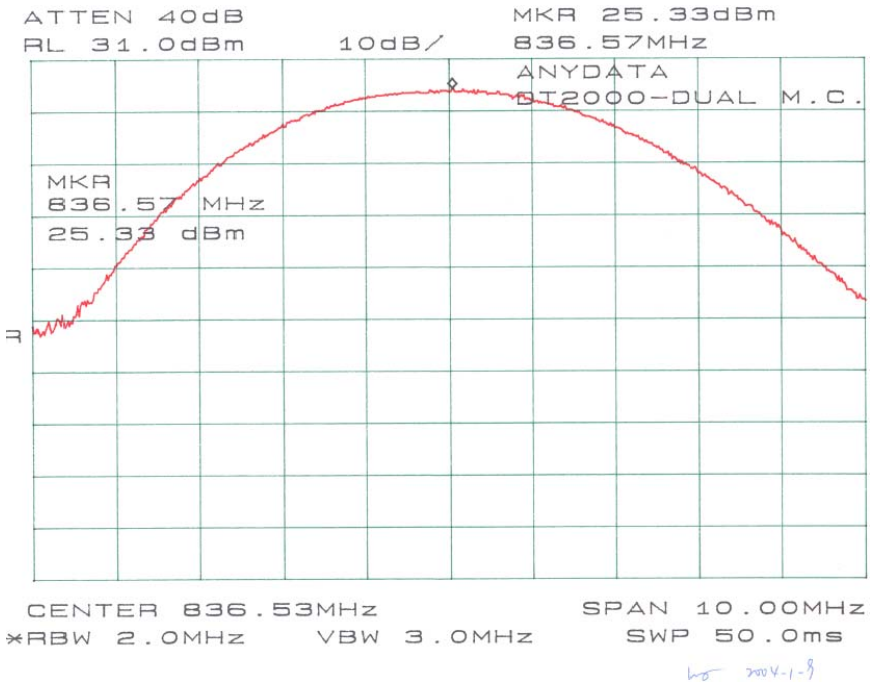
Channel	Frequency (MHz)	Output Power in dBm	Output Power in W	Limit in W
LOW	824.73	25.17	0.329	7
MIDDLE	836.53	25.33	0.341	7
HIGH	848.19	25.17	0.329	7

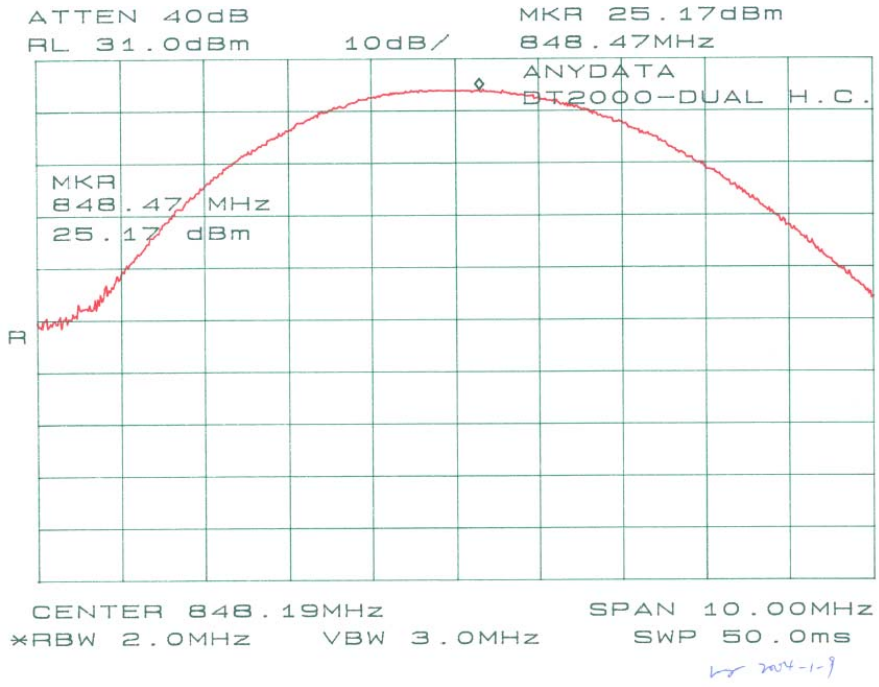
Part 24:

Channel	Frequency (MHz)	Output Power in dBm	Output Power in W	Limit in W
LOW	1851.25	25.00	0.316	100
MIDDLE	1880.00	25.17	0.329	100
HIGH	1908.75	25.00	0.316	100

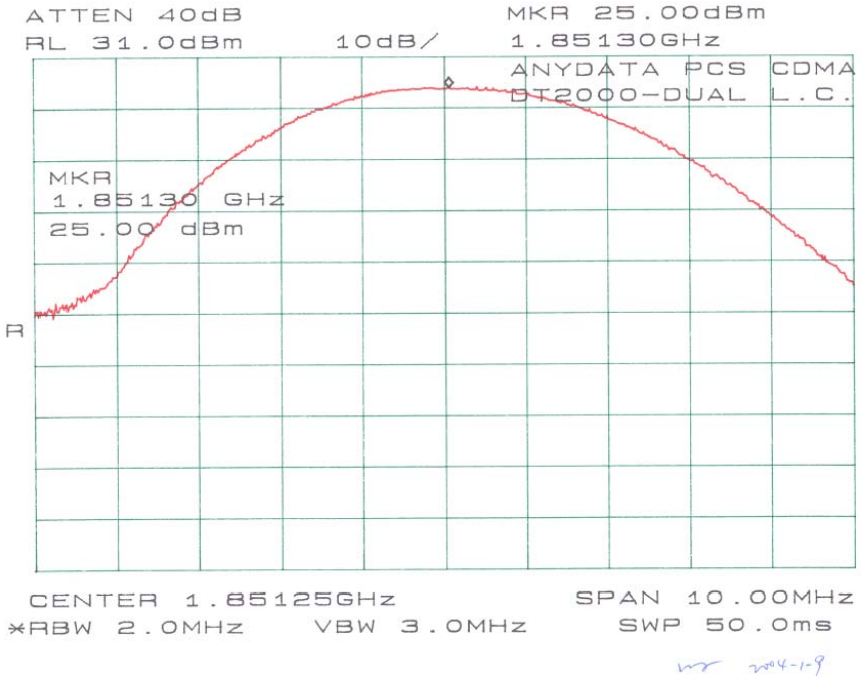
Plots of Conducted Output Power for Part 22

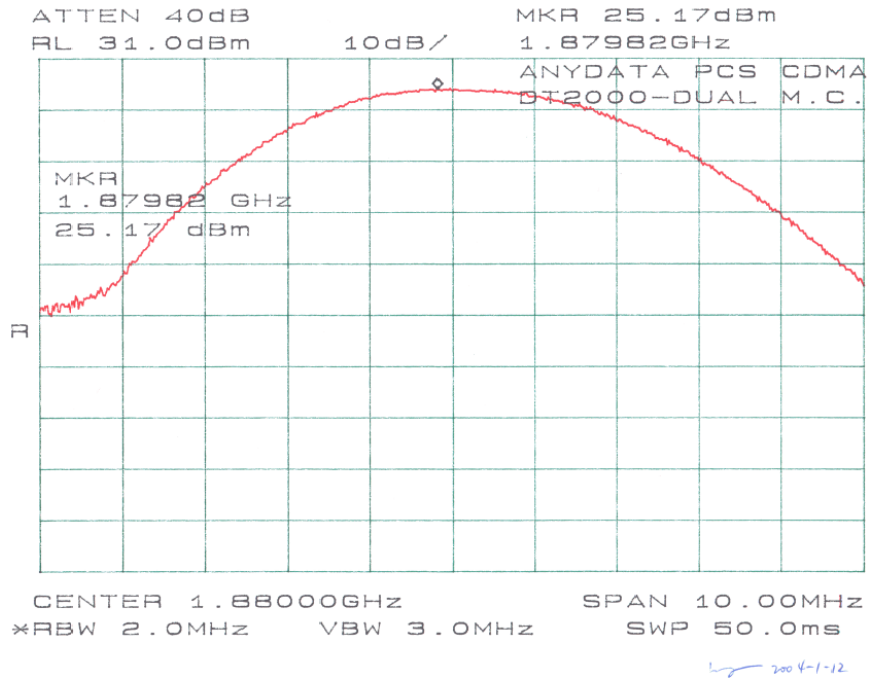


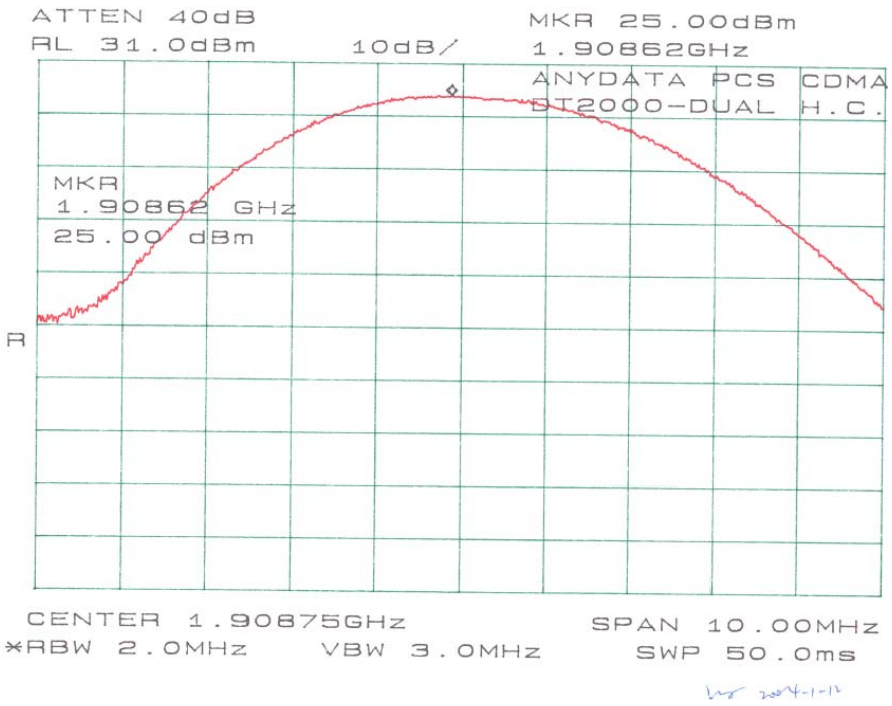

ATTEN 40dB
RL 31.0dBm
10dB/
MKR 25.33dBm
836.57MHz
ANYDATA
DT2000-DUAL M.C.
MKR
836.57 MHz
25.33 dBm
CENTER 836.53MHz
SPAN 10.00MHz
*RBW 2.0MHz
VBW 3.0MHz
SWP 50.0ms
2004-1-9


ATTEN 40dB
RL 31.0dBm
10dB/
MKR 25.17dBm
848.47MHz
ANYDATA
DT2000-DUAL H.C.
MKR
848.47 MHz
25.17 dBm
CENTER 848.19MHz
SPAN 10.00MHz
*RBW 2.0MHz
VBW 3.0MHz
SWP 50.0ms
2004-1-9

Plots of Conducted Output Power for Part24






ATTEN 40dB
RL 31.0dBm
10dB/
MKR 25.00dBm
1.90862GHz
ANYDATA PCS CDMA
DT2000-DUAL H.C.
MKR
1.90862 GHz
25.00 dBm
R
CENTER 1.90875GHz
SPAN 10.00MHz
*RBW 2.0MHz
VBW 3.0MHz
SWP 50.0ms

§2.1049, §22.917, §22.905, & §24.238 - OCCUPIED BANDWIDTH

Applicable Standard

Requirements: CFR 47, Section 2.1049, Section 22.901, Section 22.917 and Section 24.238.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 30 KHz and the 26 dB bandwidth was recorded.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	HP8564E	3943A01781	2003-08-01
HP	Plotter	HP7470A	2541A49659	Not Required

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Environmental Conditions

2004-01-09

Temperature:	13° C
Relative Humidity:	57%
ATM Pressure:	1108 mbar

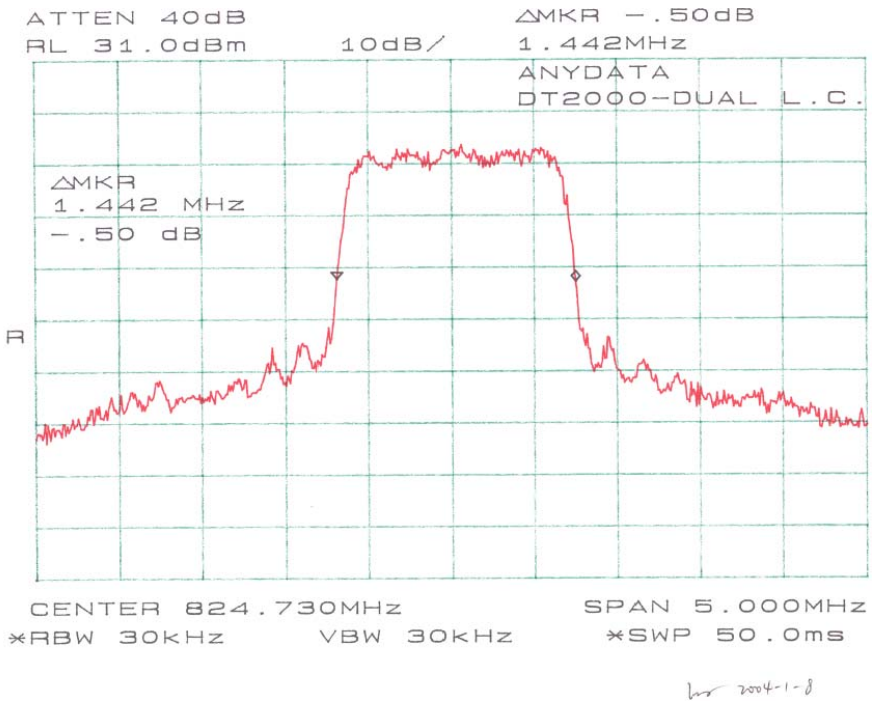
2004-01-14

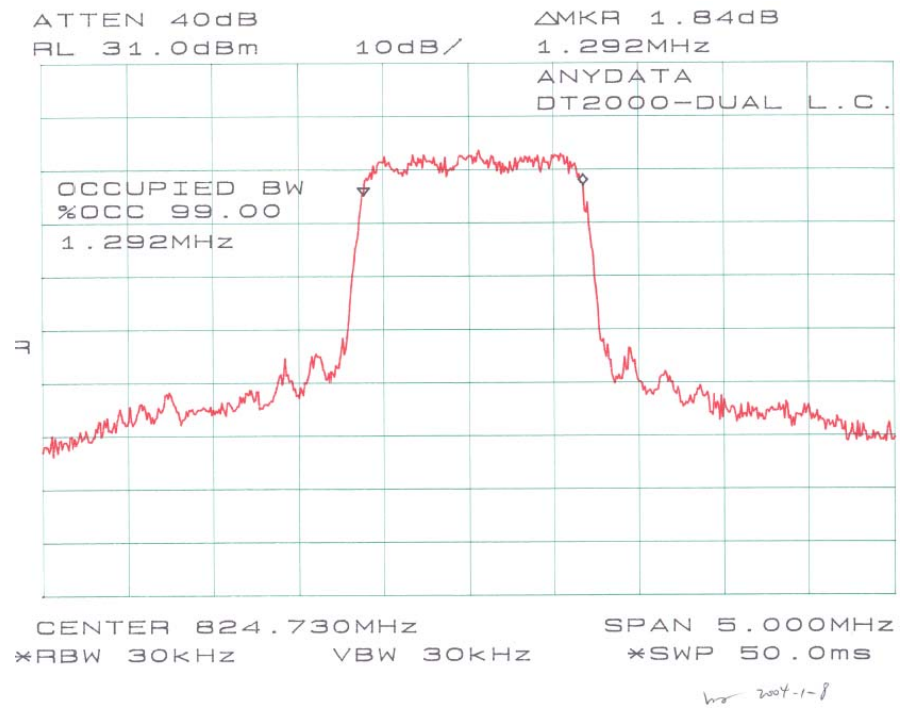
Temperature:	11° C
Relative Humidity:	82%
ATM Pressure:	1205 mbar

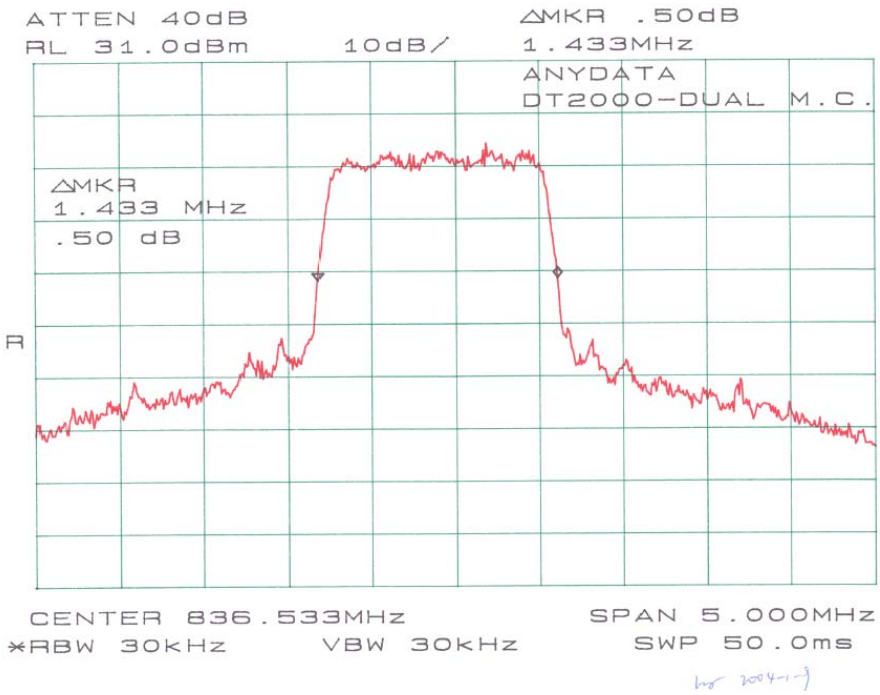
Test Results

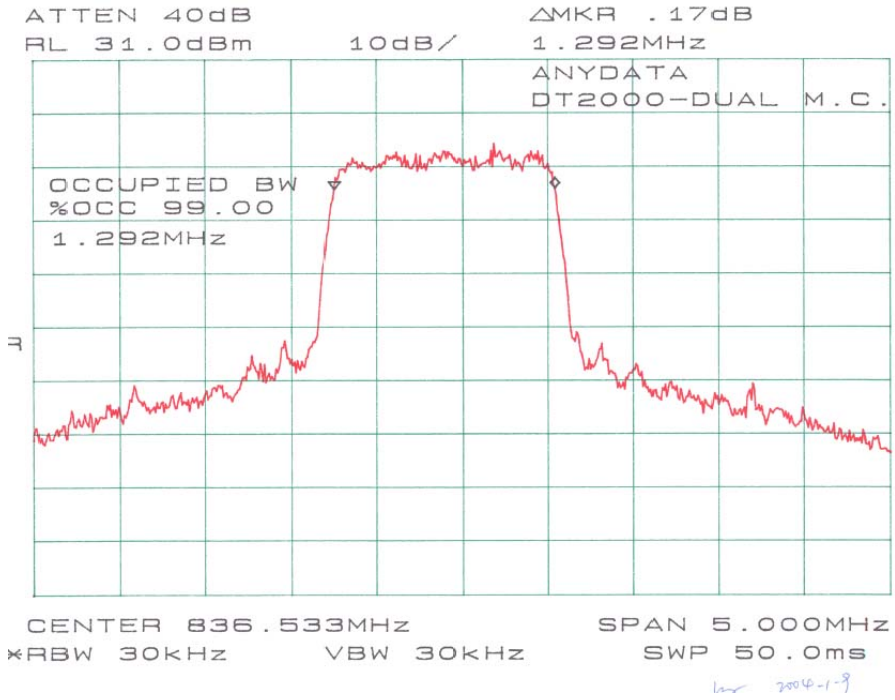
Please refer to the following plots.

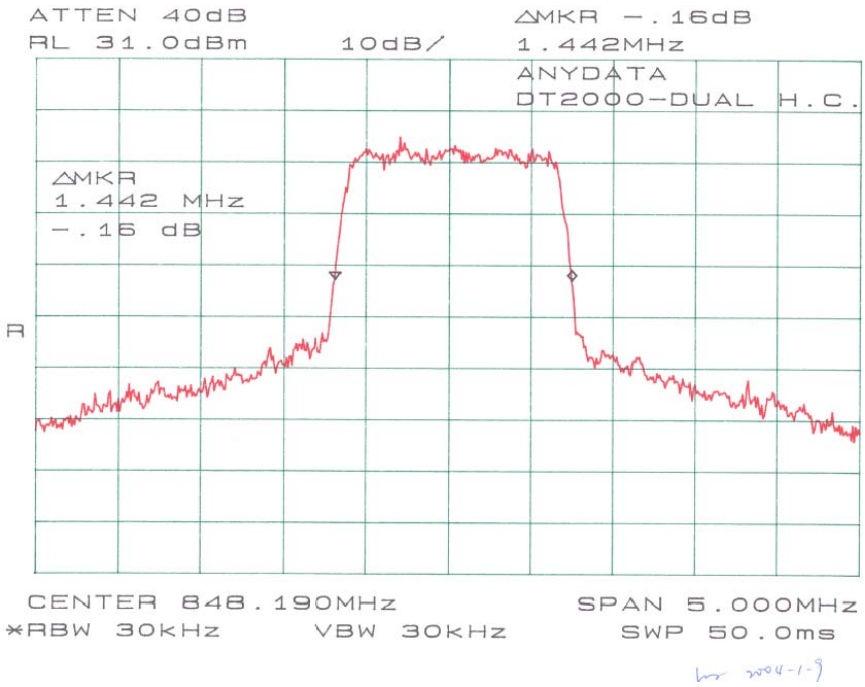
Plots of Occupied Bandwidth and 99% Bandwidth for Part 22

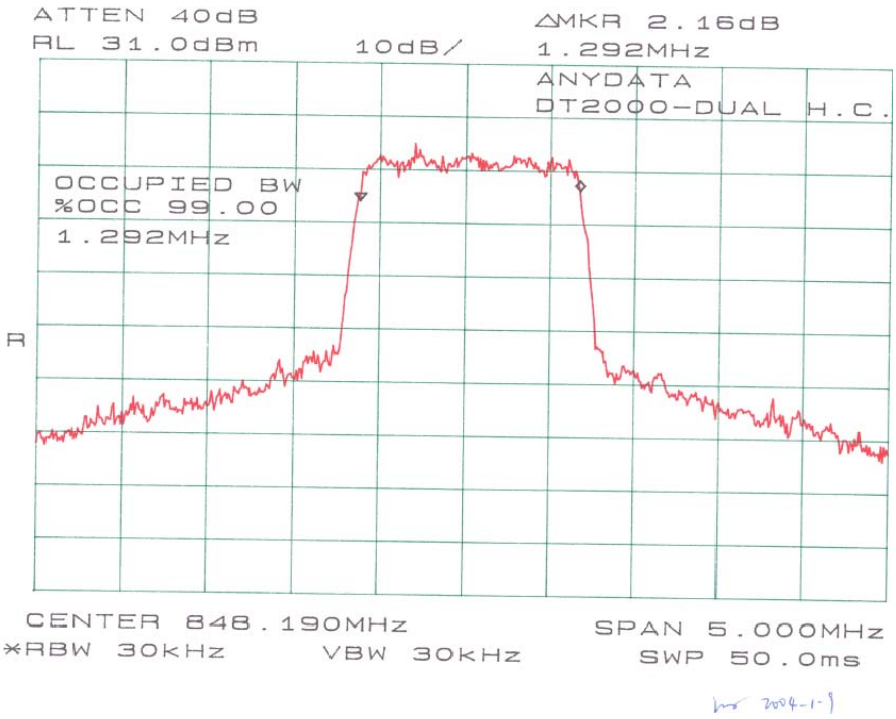




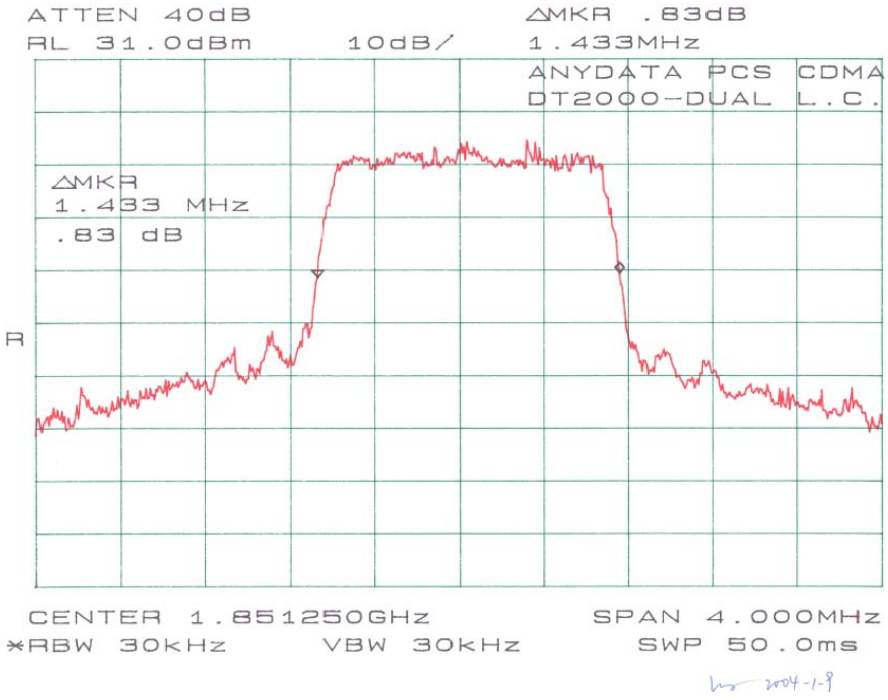

ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR .50dB
1.433MHz
ANYDATA
DT2000-DUAL M.C.
ΔMKR
1.433 MHz
.50 dB
CENTER 836.533MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

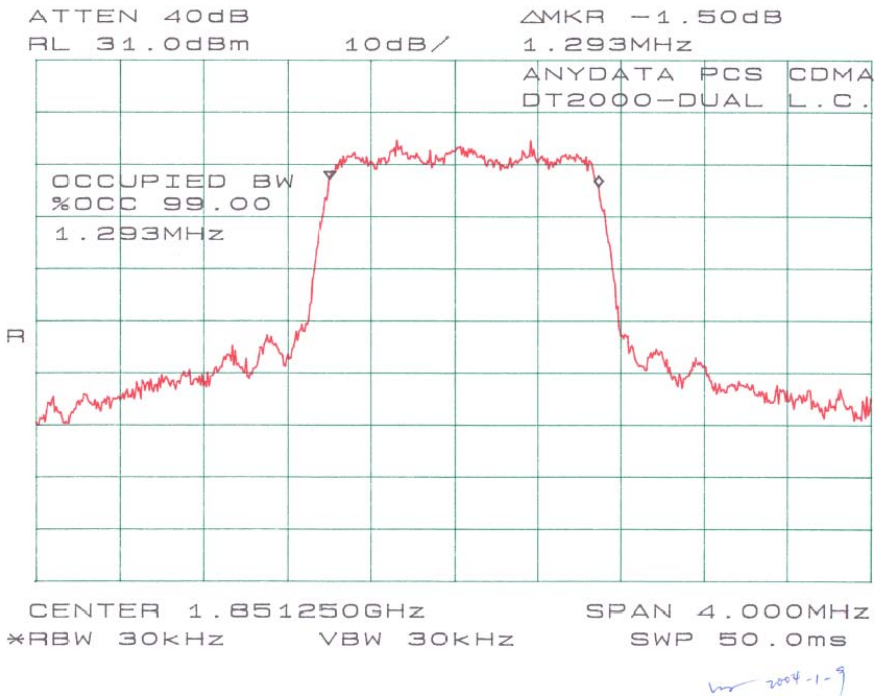

ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR .17dB
1.292MHz
ANYDATA
DT2000-DUAL M.C.
OCCUPIED BW
%OCC 99.00
1.292MHz
CENTER 836.533MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

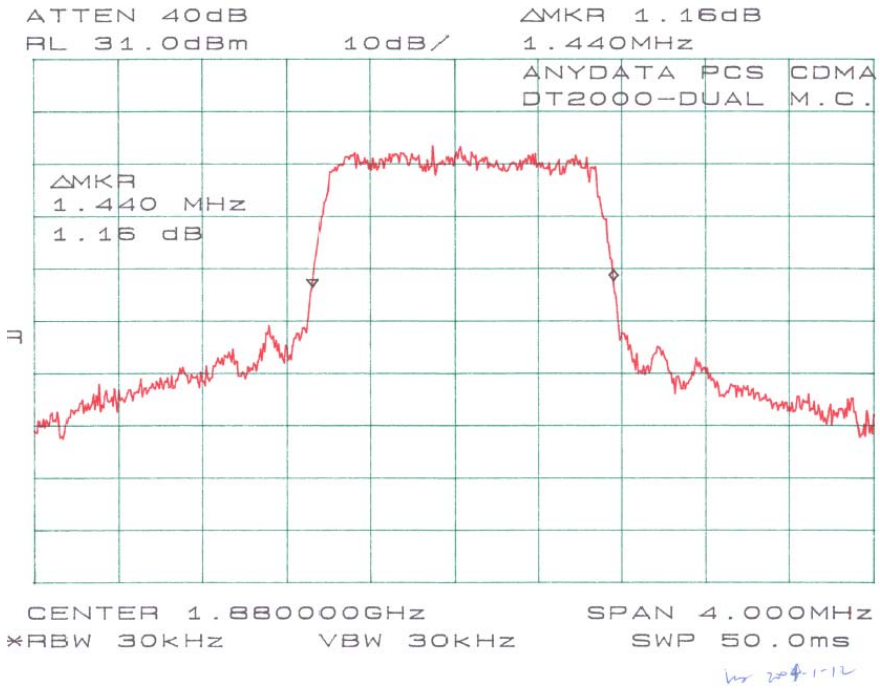

ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR -.16dB
1.442MHz
ANYDATA
DT2000-DUAL H.C.
ΔMKR
1.442 MHz
-.16 dB
R
CENTER 848.190MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms
2004-1-9

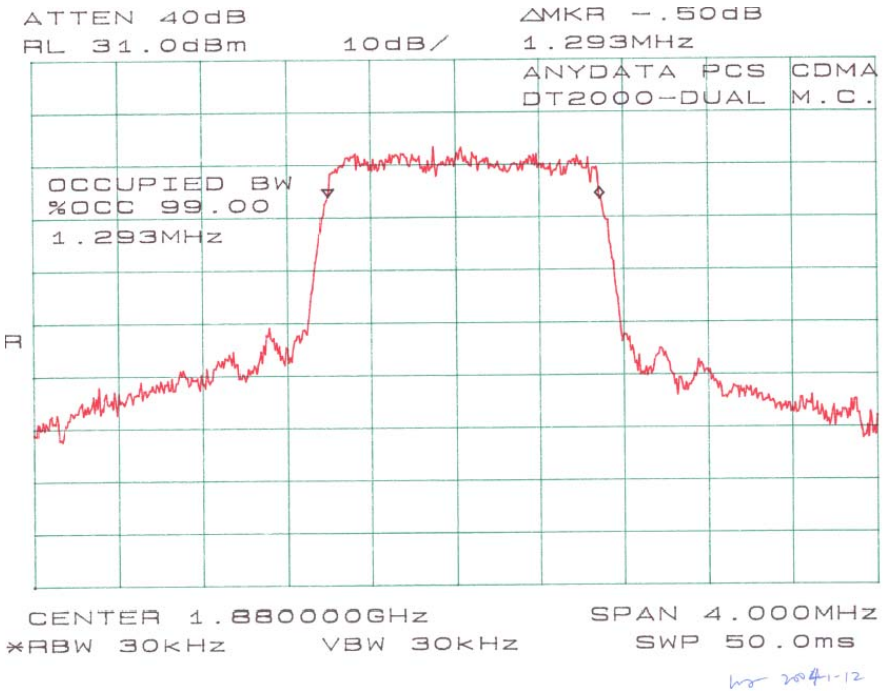

ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR 2.16dB
1.292MHz
ANYDATA
DT2000-DUAL H.C.
OCCUPIED BW
%OCC 99.00
1.292MHz
R
CENTER 848.190MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms
2004-1-9

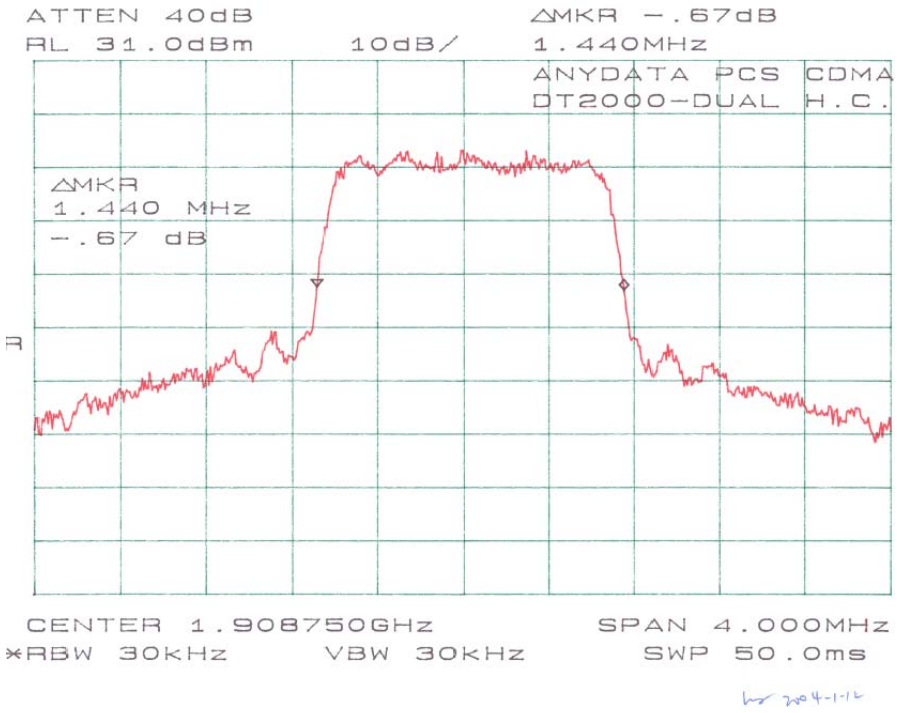
Plots of Occupied Bandwidth and 99% Bandwidth for Part 24

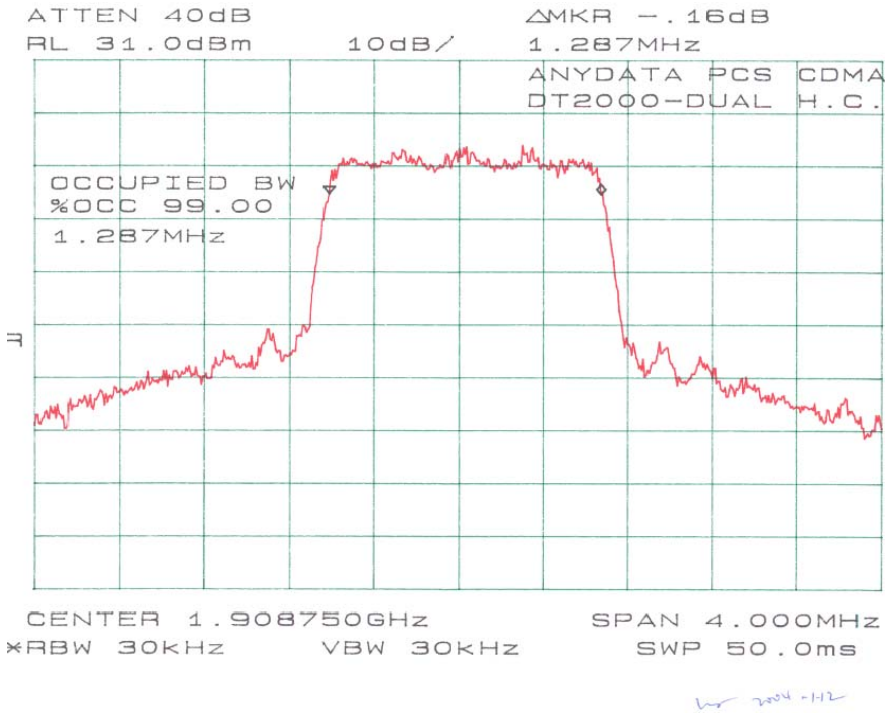





ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR 1.16dB
1.440MHz
ANYDATA PCS CDMA
DT2000-DUAL M.C.
ΔMKR
1.440 MHz
1.16 dB
CENTER 1.880000GHz
SPAN 4.000MHz
*RBW 30KHz
VBW 30KHz
SWP 50.0ms


ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR -.50dB
1.293MHz
ANYDATA PCS CDMA
DT2000-DUAL M.C.
OCCUPIED BW
%OCC 99.00
1.293MHz
CENTER 1.880000GHz
SPAN 4.000MHz
*RBW 30KHz
VBW 30KHz
SWP 50.0ms


ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR -.67dB
1.440MHz
ANYDATA PCS CDMA
DT2000-DUAL H.C.
ΔMKR
1.440 MHz
-.67 dB
CENTER 1.908750GHz
SPAN 4.000MHz
*RBW 30KHz
VBW 30KHz
SWP 50.0ms


ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR -.16dB
1.287MHz
ANYDATA PCS CDMA
DT2000-DUAL H.C.
OCCUPIED BW
%OCC 99.00
1.287MHz
CENTER 1.908750GHz
SPAN 4.000MHz
*RBW 30KHz
VBW 30KHz
SWP 50.0ms

§2.1051, §22.917, & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

Requirements: CFR 47, § 2.1051. § 22.917 & §24.238(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	HP8564E	3943A01781	2003-08-01
HP	Plotter	HP7470A	2541A49659	Not Required

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Environmental Conditions

2004-01-08

Temperature:	14° C
Relative Humidity:	55%
ATM Pressure:	1105 mbar

2004-01-09

Temperature:	13° C
Relative Humidity:	57%
ATM Pressure:	1108 mbar

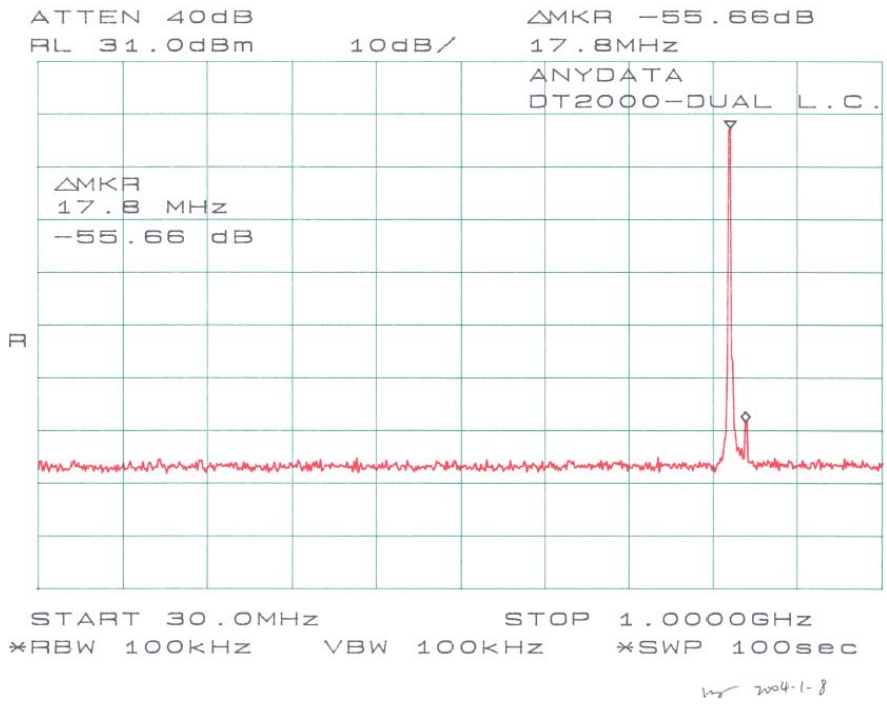
2004-01-12

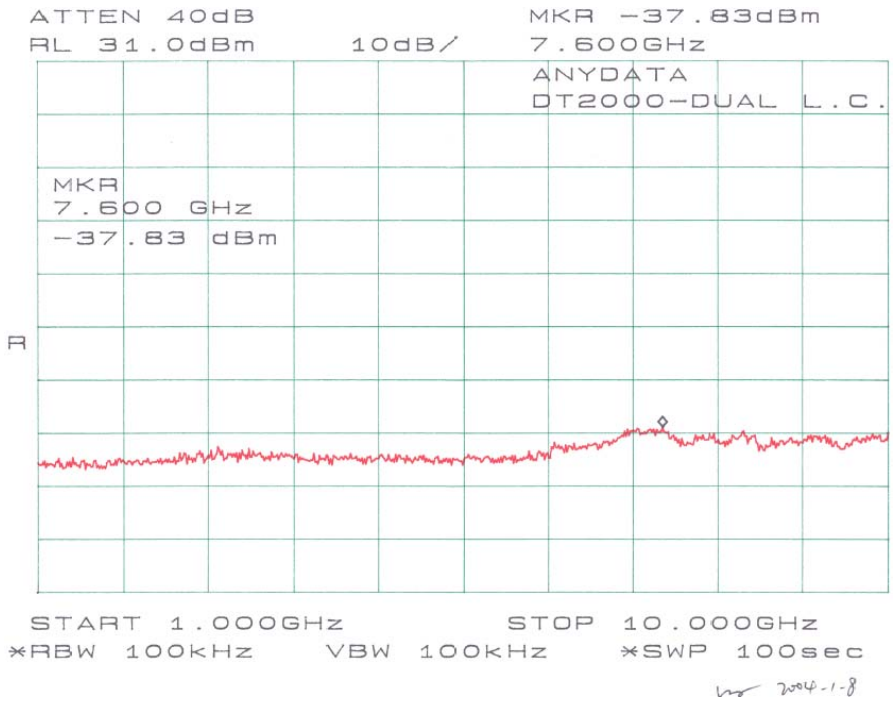
Temperature:	14° C
Relative Humidity:	65%
ATM Pressure:	1128 mbar

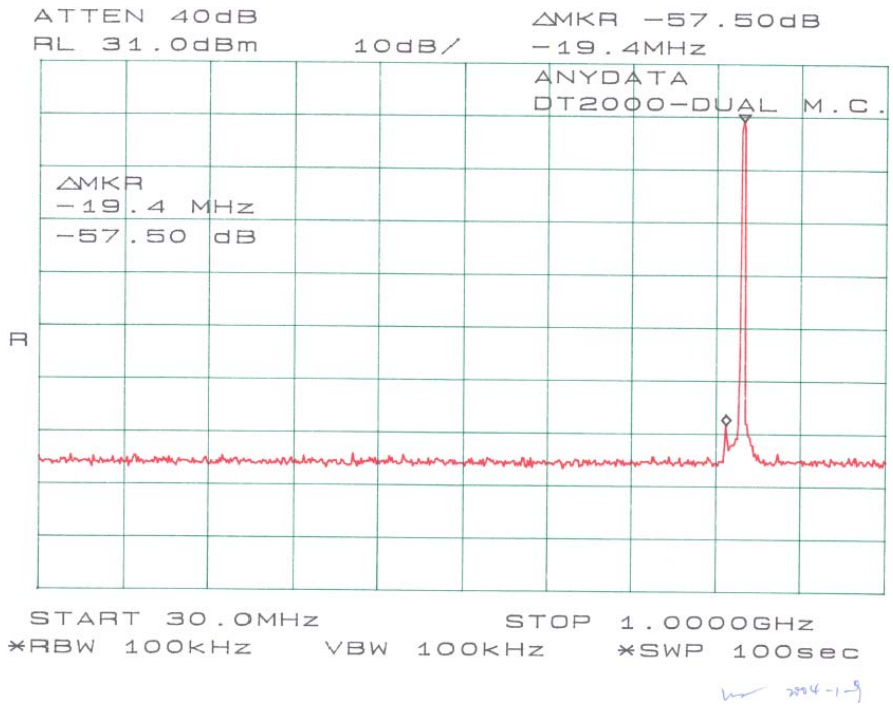
Test Results

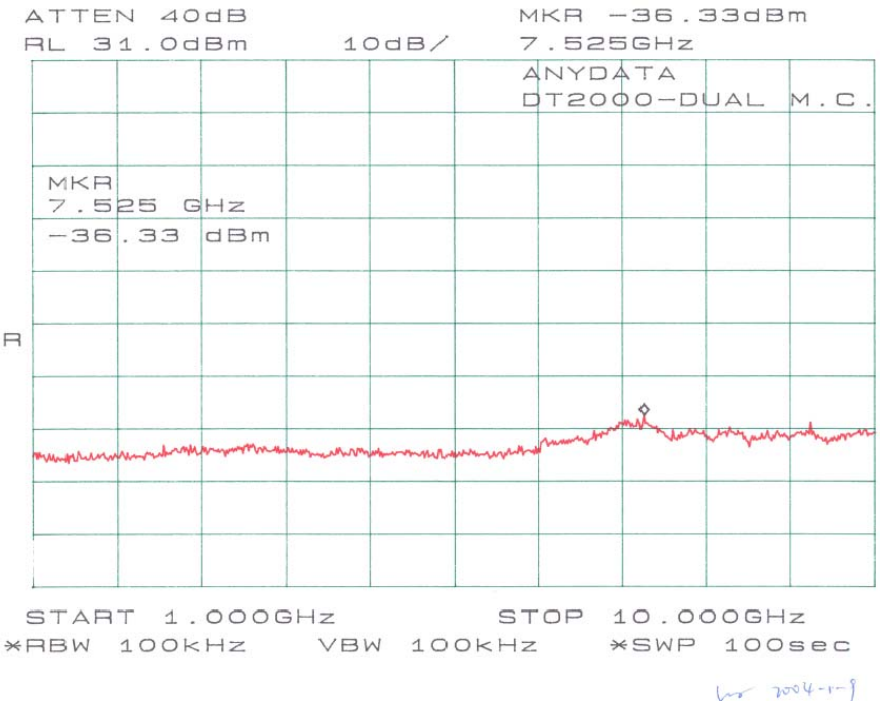
Please refer to the hereinafter plots.

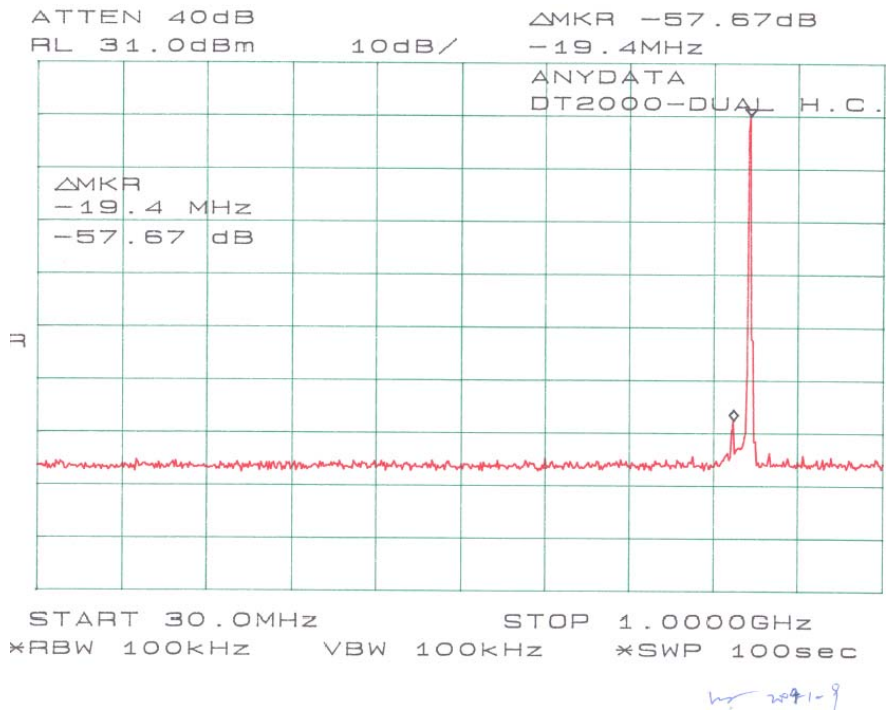
Plots of Spurious Emission for Part22

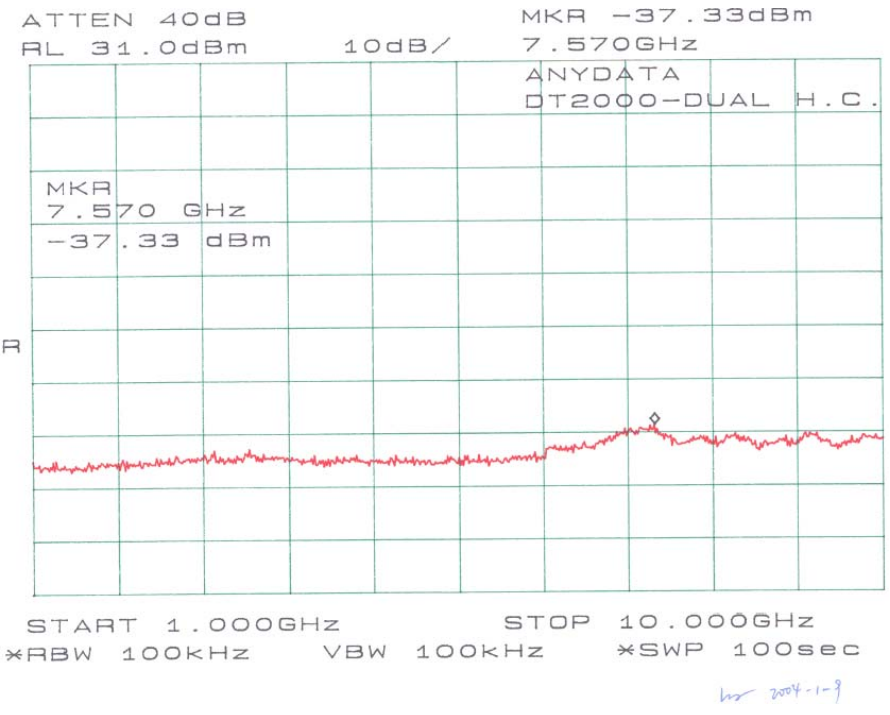




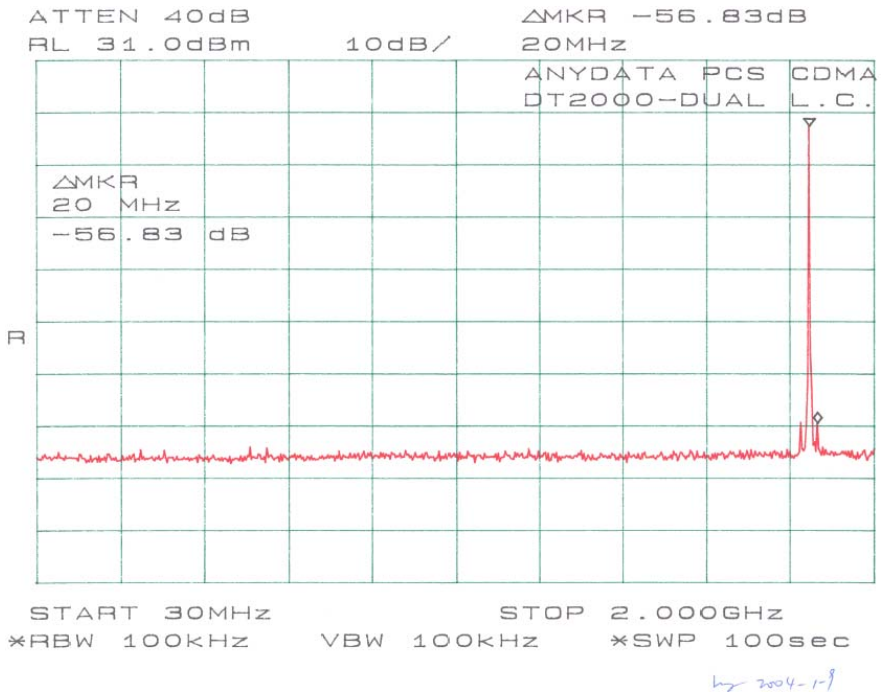

ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR -57.50dB
-19.4MHz
ANYDATA
DT2000-DUAL M.C.
ΔMKR
-19.4 MHz
-57.50 dB
R
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec

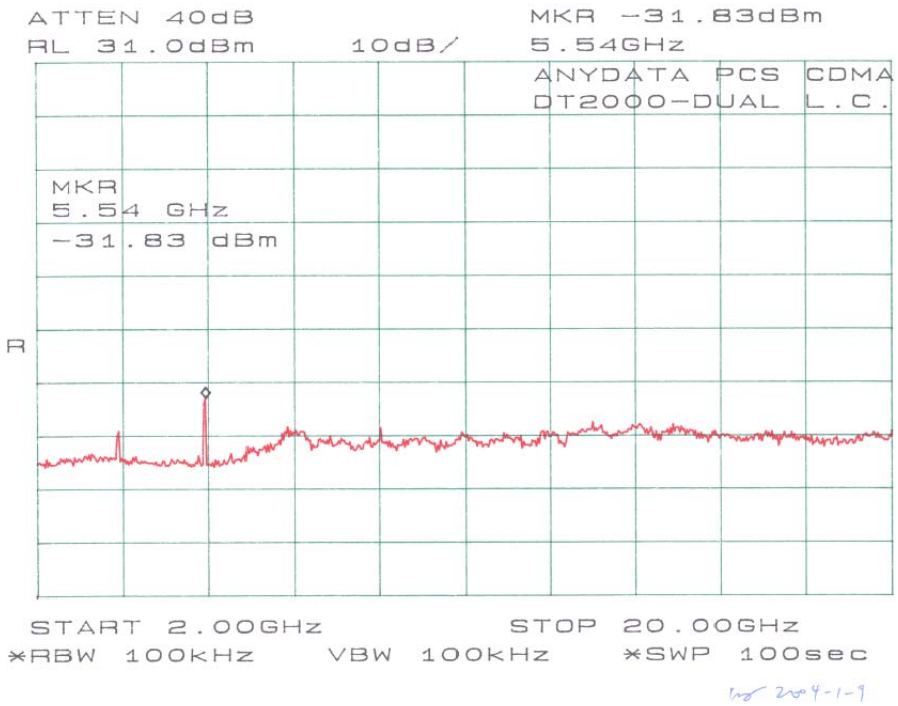

ATTEN 40dB
RL 31.0dBm
10dB/
MKR -36.33dBm
7.525GHz
ANYDATA
DT2000-DUAL M.C.
MKR
7.525 GHz
-36.33 dBm
R
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec

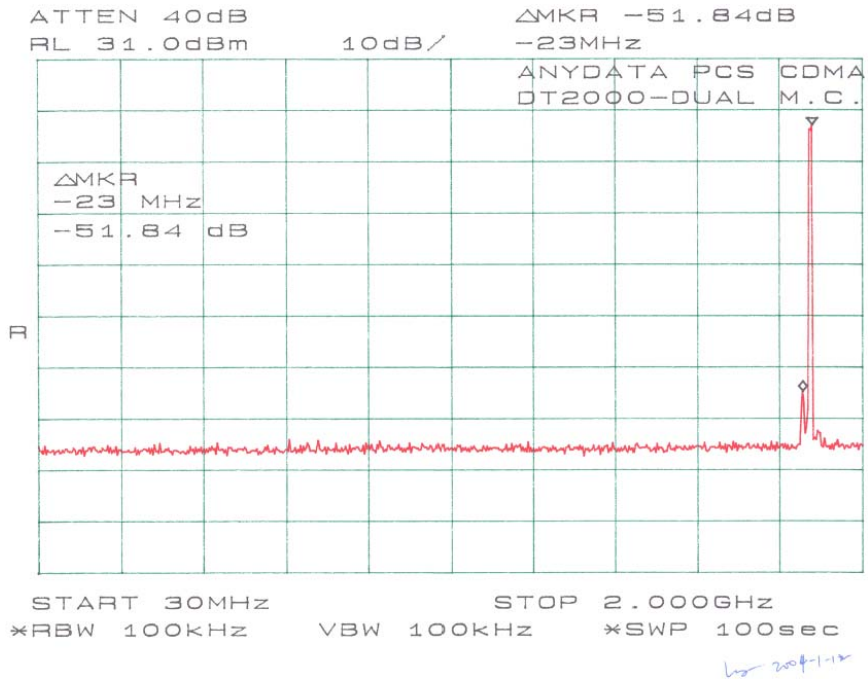

ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR -57.67dB
-19.4MHz
ANYDATA
DT2000-DUAL H.C.
ΔMKR
-19.4 MHz
-57.67 dB
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec

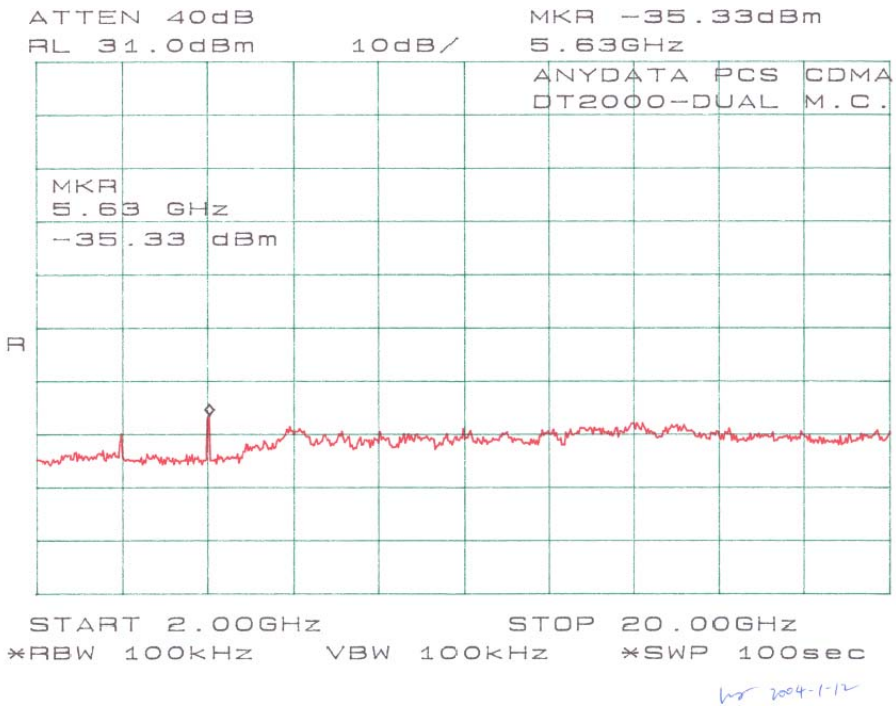

ATTEN 40dB
RL 31.0dBm
10dB/
MKR -37.33dBm
7.570GHz
ANYDATA
DT2000-DUAL H.C.
MKR
7.570 GHz
-37.33 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec

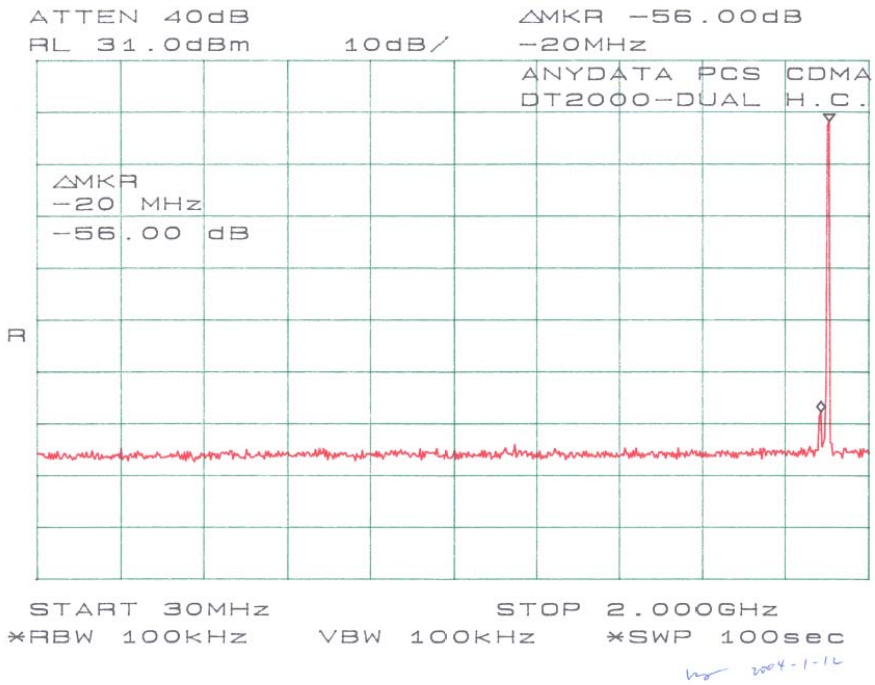
Plots of Spurious Emission for Part24

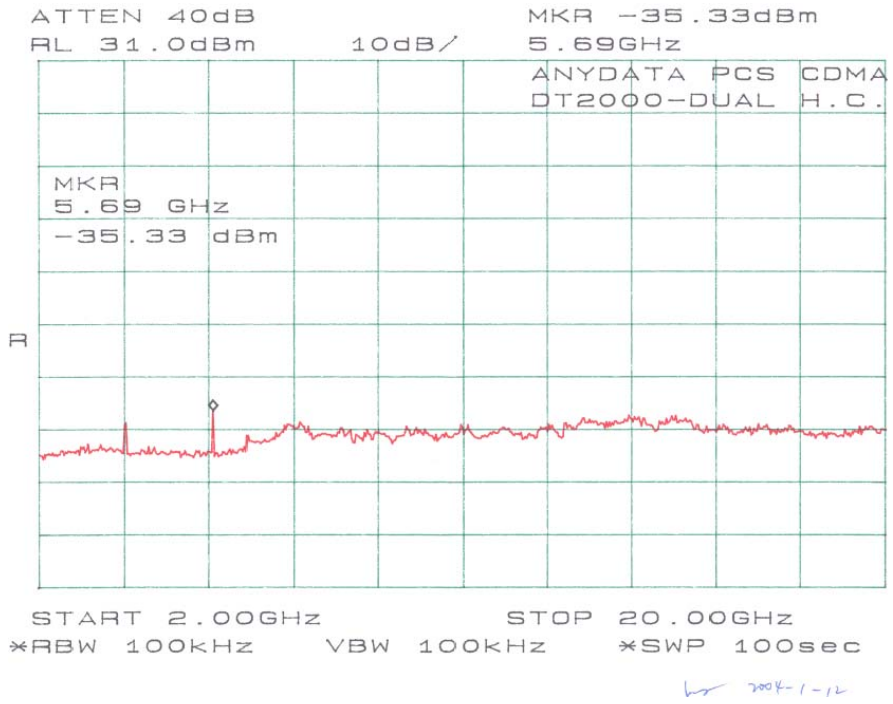





ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR -51.84dB
-23MHz
ANYDATA PCS CDMA
DT2000-DUAL M.C.
ΔMKR
-23 MHz
-51.84 dB
START 30MHz
STOP 2.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec


ATTEN 40dB
RL 31.0dBm
10dB/
MKR -35.33dBm
5.63GHz
ANYDATA PCS CDMA
DT2000-DUAL M.C.
MKR
5.63 GHz
-35.33 dBm
START 2.00GHz
STOP 20.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec


ATTEN 40dB
RL 31.0dBm
10dB/
ΔMKR -56.00dB
-20MHz
ANYDATA PCS CDMA
DT2000-DUAL H.C.
ΔMKR
-20 MHz
-56.00 dB
R
START 30MHz
STOP 2.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec
2004-1-12


ATTEN 40dB
RL 31.0dBm
10dB/
MKR -35.33dBm
5.69GHz
ANYDATA PCS CDMA
DT2000-DUAL H.C.
MKR
5.69 GHz
-35.33 dBm
R
START 2.00GHz
STOP 20.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec
2004-1-12

§2.1055 (a), §2.1055 (d), §22.355, & §24.235 - FREQUENCY STABILITY

Applicable Standard

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

Table C-1_Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile [SU][le][/ SU]3 watts (ppm)	Mobile [le]3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10.0	n/a	n/a

According to §24.235, The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
HP	Spectrum Analyzer	HP8564E	3943A01781	2003-08-01
HP	Plotter	HP7470A	2541A49659	Not Required

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	25° C
Relative Humidity:	52%
ATM Pressure:	1100 mbar

Test Results

Test Result for CDMA800

Frequency Stability Versus Temperature

Reference Frequency: 836.4 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		MHz	PPM Error
60	4	836.40012	0.14
50	4	836.40008	0.10
40	4	836.40005	0.06
30	4	836.40001	0.01
20	4	836.40001	0.01
10	4	836.39998	-0.02
0	4	836.39998	-0.02
-10	4	836.39994	-0.07
-20	4	836.39995	-0.06
-30	4	836.39992	-0.10

Frequency Stability Versus Battery Voltage

Reference Frequency: 836.4MHz, Limit: 2.5ppm			
Power Supplied (Vdc)	Environment Temperature (°C)	MHz	ppm
3.6	20	836.40005	0.06
4.4	20	836.40015	0.18

Test Result for CDMA1900

Frequency Stability Versus Temperature

Reference Frequency: 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		MHz	PPM Error
60	4	1880.00034	0.18
50	4	1880.00018	0.10
40	4	1880.00015	0.08
30	4	1880.00005	0.03
20	4	1880.00001	0.03
10	4	1879.99995	-0.03
0	4	1879.99992	-0.04
-10	4	1879.99990	-0.05
-20	4	1879.99985	-0.08
-30	4	1879.99985	-0.08

Frequency Stability Versus Battery Voltage

Reference Frequency: 1880MHz, Limit: 2.5ppm			
Power Supplied (Vdc)	Environment Temperature (°C)	MHz	ppm
3.6	20	1879.99974	-0.14
4.4	20	1879.99980	-0.11

§22.917 & §24.238 – BAND EDGE

Applicable Standard

According to § 22.917, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency, RBW set to 30KHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	HP8564E	3943A01781	2003-08-01
HP	Plotter	HP7470A	2541A49659	Not Required

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Environmental Conditions

2004-01-08

Temperature:	14° C
Relative Humidity:	55%
ATM Pressure:	1105 mbar

2004-01-09

Temperature:	13° C
Relative Humidity:	57%
ATM Pressure:	1108 mbar

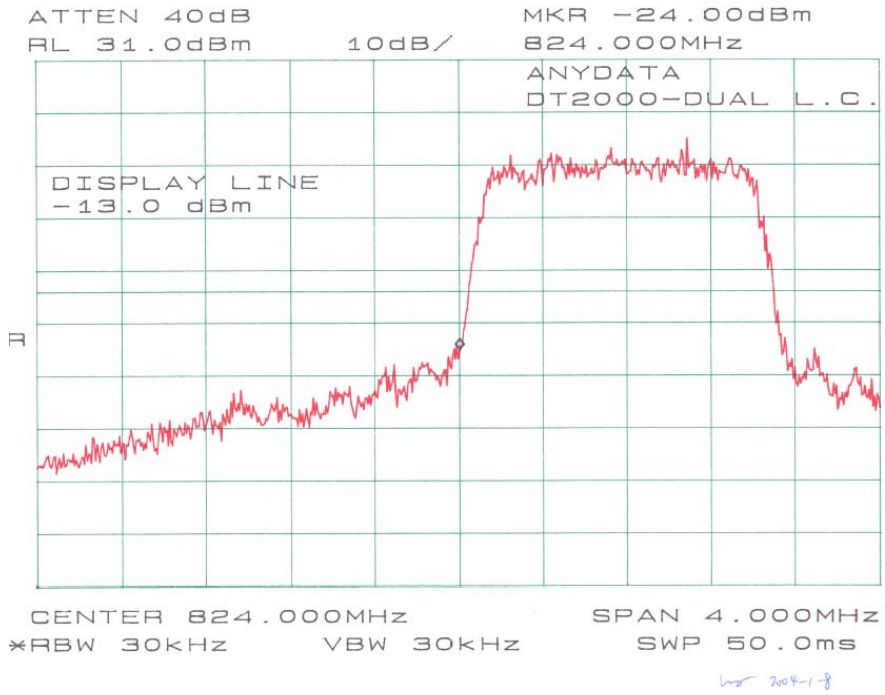
2004-01-12

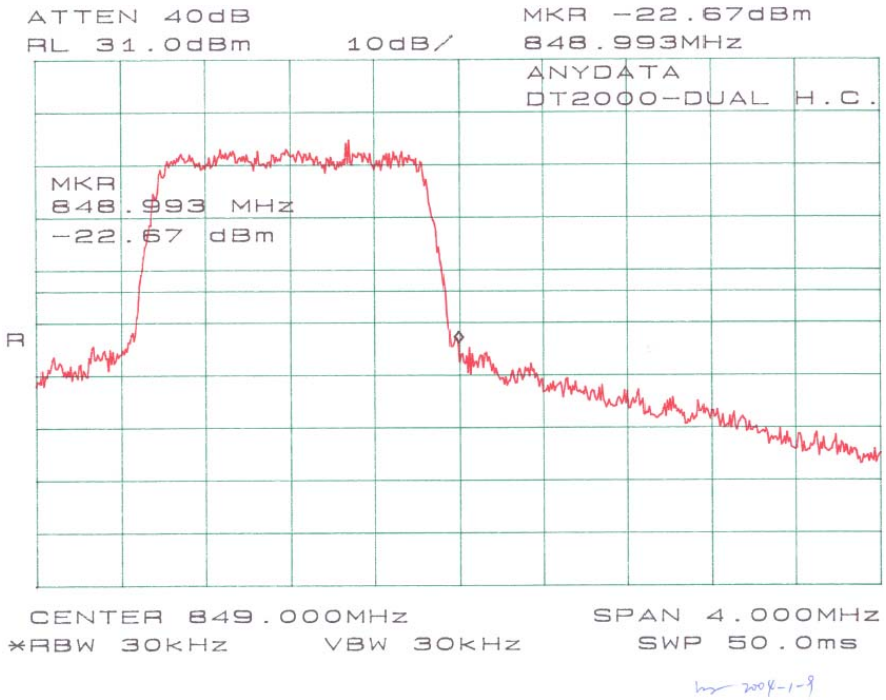
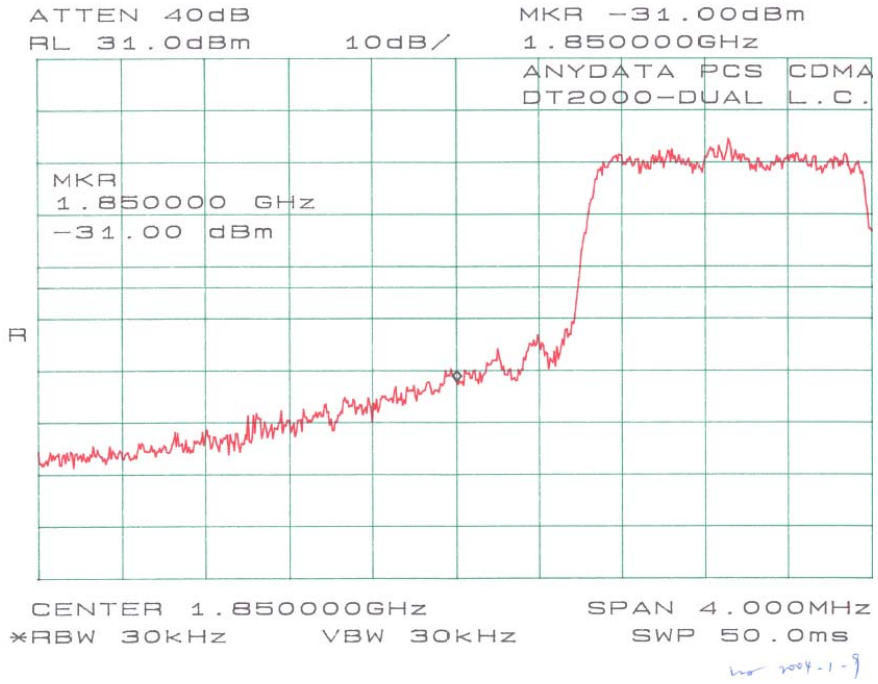
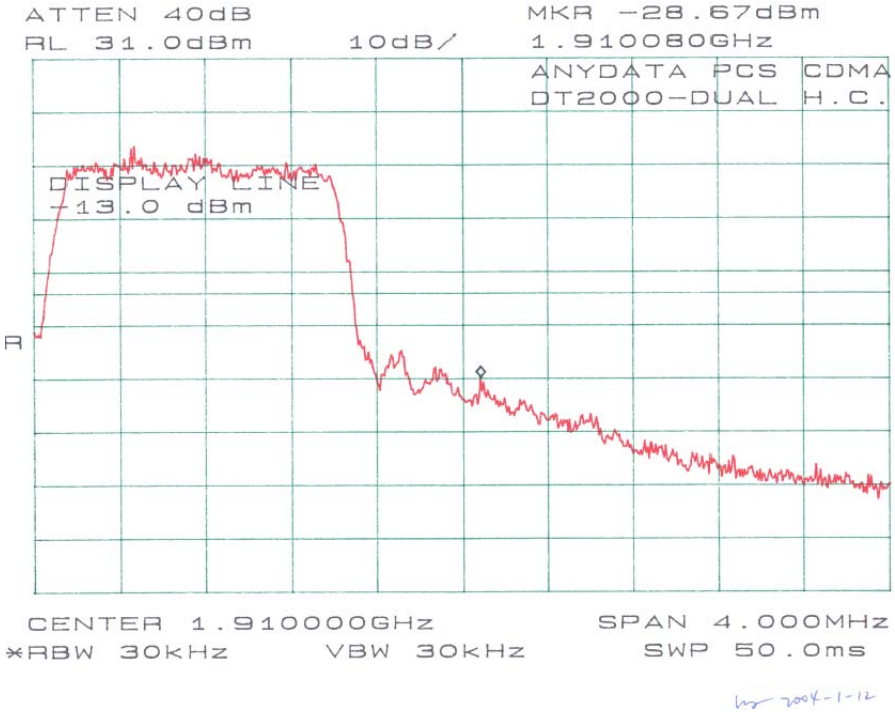
Temperature:	14° C
Relative Humidity:	65%
ATM Pressure:	1128 mbar

Test Results

Please refer to the following plots.

Plots of Band Edge for Part 22





Plots of Band Edge for Part 24