

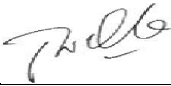
FCC PART 22 TYPE APPROVAL EMI MEASUREMENT AND TEST REPORT

For

VCom Inc.

150 Cardinal Place
Saskatoon, SK Canada S7L 6H7

FCC ID: OPPTR850

This Report Concerns: ☒ Original Report	Equipment Type: 850MHz Subscriber Transceiver
Test Engineer: Daniel Deng / 	
Report No.: R0504252	
Report Date: 2005-06-17	
Reviewed By: Richard Lee / 	
Prepared By: Bay Area Compliance Laboratory Corporation (BACL) 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732 9164	

Note: The test report is specially limited to the above company and this particular sample 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 certification, approval, or endorsement by NVLAP, NIST or any agency of the US Government.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The VCom Inc. 's product, FCC ID: *OPPTR850* or the "EUT" as referred to in this report is a 850MHz Subscriber Transceiver, which measures approximately 178mm L x 127mm W x 25mm H.

The EUT operates at the frequency of 824~849MHz, Maximum output power of 0.271W (640Ksym/sec), 0.282W (1280Ksym/sec) & 0.279W (2580Ksym/sec), frequency tolerance 2.5ppm and emission designator 7K63G1D (640Ksym/sec) & 1M48G1D (1280Ksym/sec) & 3M07G1D (2580Ksym/sec).

** The test data gathered are from typical production sample, serial number: FA3J01 provided by the manufacturer.*

Objective

This type approval report is prepared on behalf of VCom Inc. in accordance with Part 2, Subpart J, Part 22 Subpart H 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

Applicable Standards: TIA EIA 137-A, TIA EIA 603-B, ANSI 63.4-2003, 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 Bay Area Compliance Laboratory Corporation 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 Bay Area Compliance Laboratory Corporation 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 C63.4-2003.

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, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603.

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.

Support Equipment List and Details

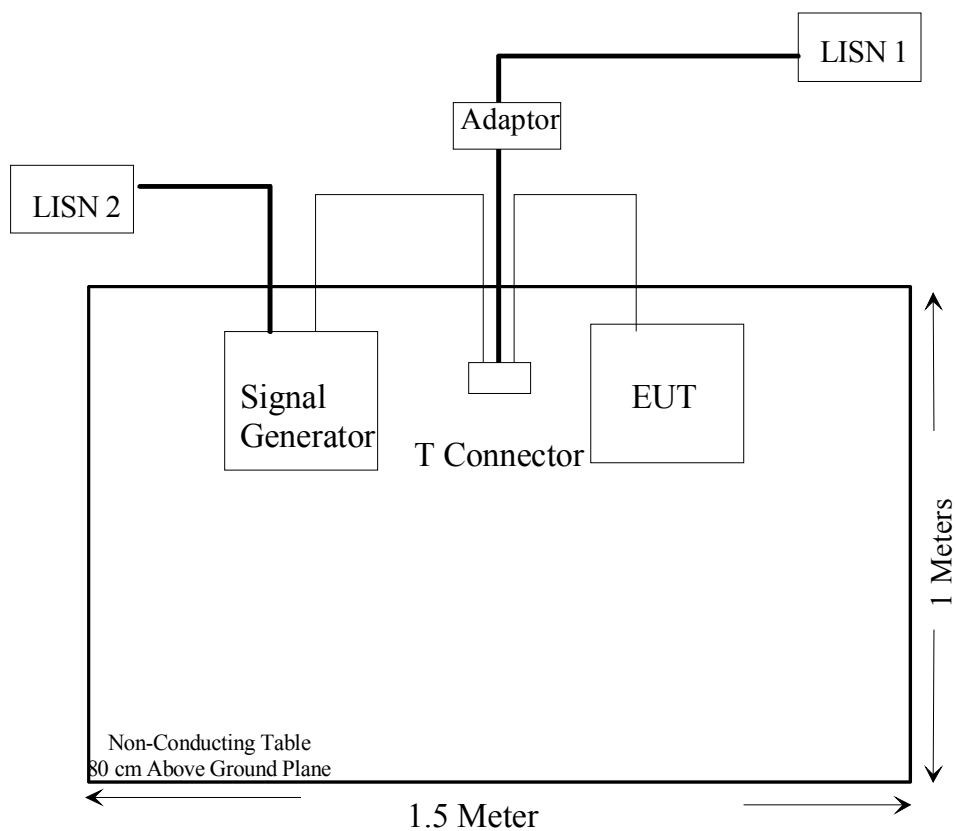
Manufacturer	Description	Model	Serial Number	FCC ID
Rohde & Schwarz	Signal Generator	SMIQ03	DE23746	N/A

Power Supply Information

Manufacturer	Description	Model	Serial Number	FCC ID
Vcom	AC Adapter	N/A	N/A	DOC

Interface Ports and Cabling

Cable Description	Length (M)	From	To
Shield 75 ohm Cable	0.5	IF Port / EUT	Transceiver Port / T Connector
50 ohm Load	/	Antenna Port / EUT	/
Shield 75 ohm Cable	0.5	Modem Port / T Connector	Signal Generator

Test Setup Block Diagram

SUMMARY OF TEST RESULTS

Results reported relate only to the product tested, serial number: *FA3J01*

FCC RULE	DESCRIPTION OF TEST	RESULT
§15.107	AC Line Conducted Emission	Compliant
§ 2.1047	Modulation Characteristics	Compliant
§ 2.1053	Field Strength of Spurious Radiation	Compliant
§2.1091	RF Exposure	Compliant
§ 2.1046, § 22.913 (a)	RF Output Power	Compliant
§ 2.1046, § 22.913 (a)	Conducted Output Power	Compliant
§ 2.1049 § 22.917 § 22.905	Out of Band Emission, Occupied Bandwidth	Compliant
§ 2.1051, § 22.917	Spurious Emissions at Antenna Terminals	Compliant
§ 2.1055 (a) § 2.1055 (d) § 22.355	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant
§ 22.917	Band Edge	Compliant

§15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. 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 shielded room, using the same setup per ANSI C63.4-2003 measurement procedure. The specification used was FCC 15 Class B limits.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and bundled as required.

The power adapter of the EUT was connected to 120VAC/60Hz power source.

Spectrum Analyzer Setup

The spectrum analyzer 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	2004-08-16
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2004-09-15

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

Test Procedure

During the conducted emission test, the power cord of the EUT was connected to the mains outlet of the LISN-1, the power cord signal generator was connected to the LISN-2.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the quasi-peak and average detection mode. Quasi-Peak readings are distinguished with an "QP". Average readings are distinguished with an "Ave".

Test Results Summary

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

-10.3 dB at 2.06 MHz in the **Line** conductor mode.

Conducted Emissions Test Data

Environmental Conditions

Temperature:	23° C
Relative Humidity:	48%
ATM Pressure:	1018mbar

* The testing was performed by Daniel Deng on 2005-06-14.

LINE CONDUCTED EMISSIONS				FCC15 CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
2.06	35.7	Ave	Line	46	-10.3
0.23	48.3	QP	Neutral	63	-14.3
0.23	37.7	Ave	Neutral	53	-14.9
2.06	38.6	QP	Line	56	-17.4
1.77	28.6	Ave	Neutral	46	-17.4
1.77	37.8	QP	Neutral	56	-18.2
8.20	39.9	QP	Line	60	-20.1
0.34	27.7	Ave	Neutral	49	-21.6
0.22	30.4	Ave	Line	53	-22.4
0.34	36.6	QP	Neutral	59	-22.7
0.22	40.0	QP	Line	63	-22.8
8.20	26.7	Ave	Line	50	-23.3

Plots of Conducted Emission

The plots of conducted emission are presented hereinafter as reference.

Bay Area Compliance Laboratory Corp Class B

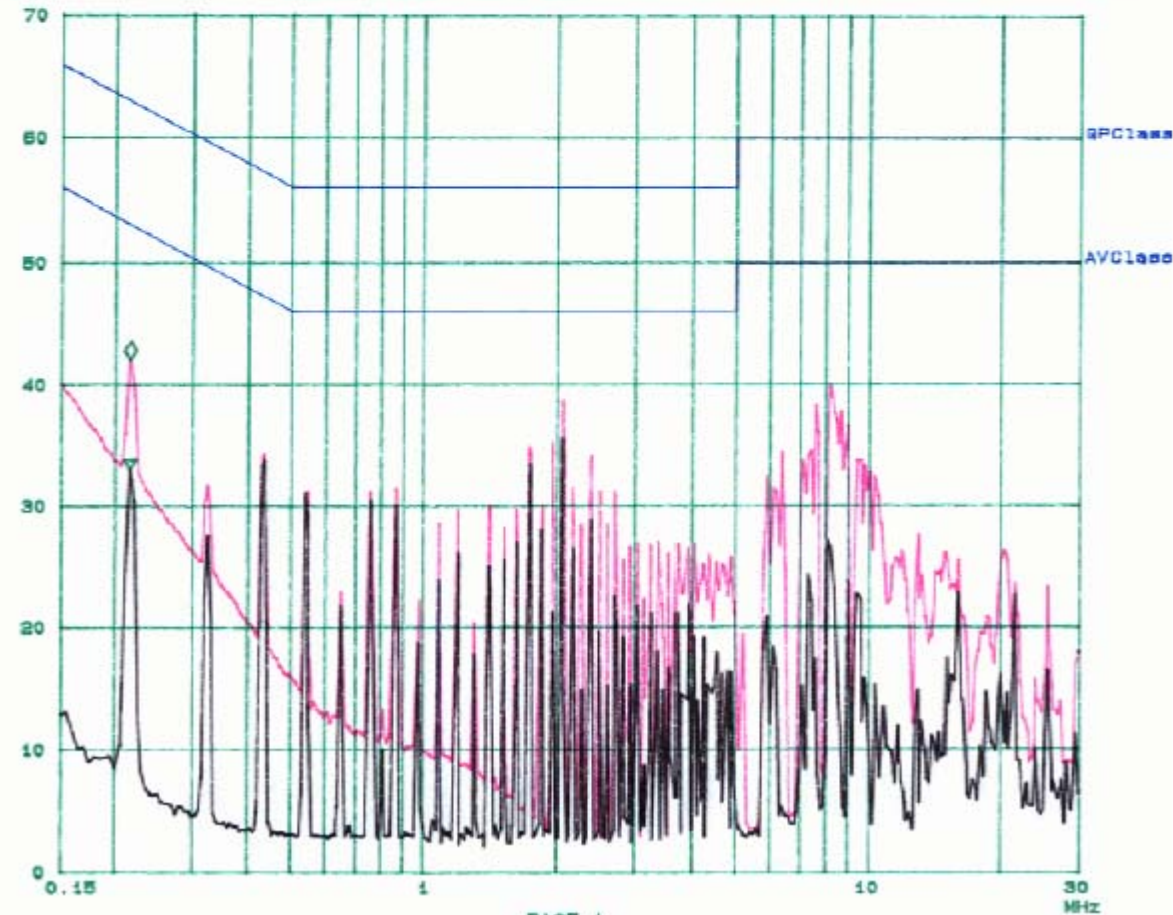
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EUT: TR850
Manuf: VCOM
Op Cond: Normal
Operator: Daniel
Comment: LINE

Scan Settings (3 Ranges)

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

◇ Mkr : 215.00 kHz 42.1 dBuV
▽ Mkr : 215.00 kHz 33.0 dBuV



PAGE 1

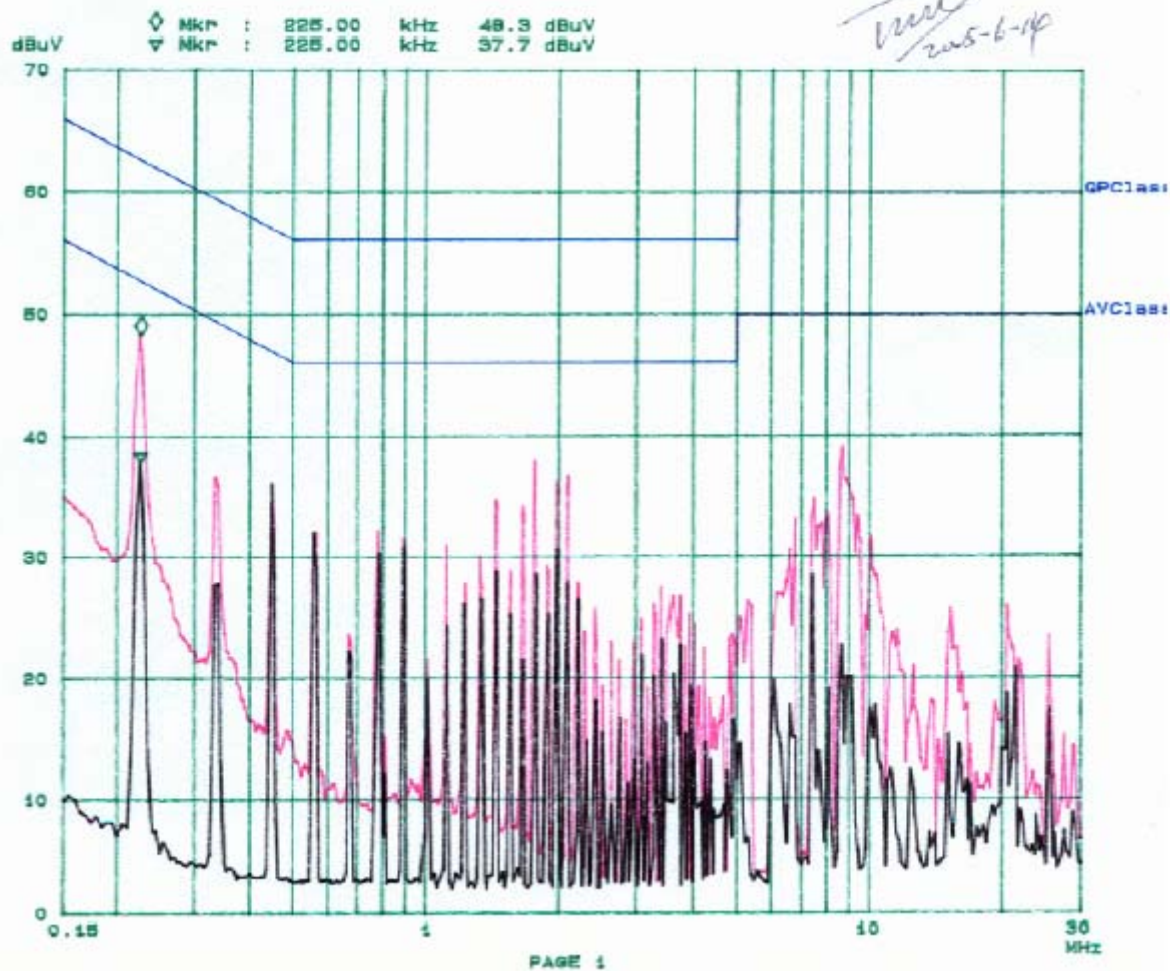
Bay Area Compliance Laboratory Corp Class B

14 Jun 05 08:38

EUT: TR850
Muhf: VCOM
Op Cond: Normal
Operator: Daniel
Comment: Neutral

Scan Settings (3 Ranges)

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



§2.1047 - MODULATION CHARACTERISTIC

Applicable Standard

Requirement: FCC § 2.1047.

Test Procedure

QPSK and 16QAM modulation signals were used by EUT.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Spectrum Analyzer	8564E	3943A01781	2004-10-04
HP	Plotter	HP7470A	2541A49659	N/R

- **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

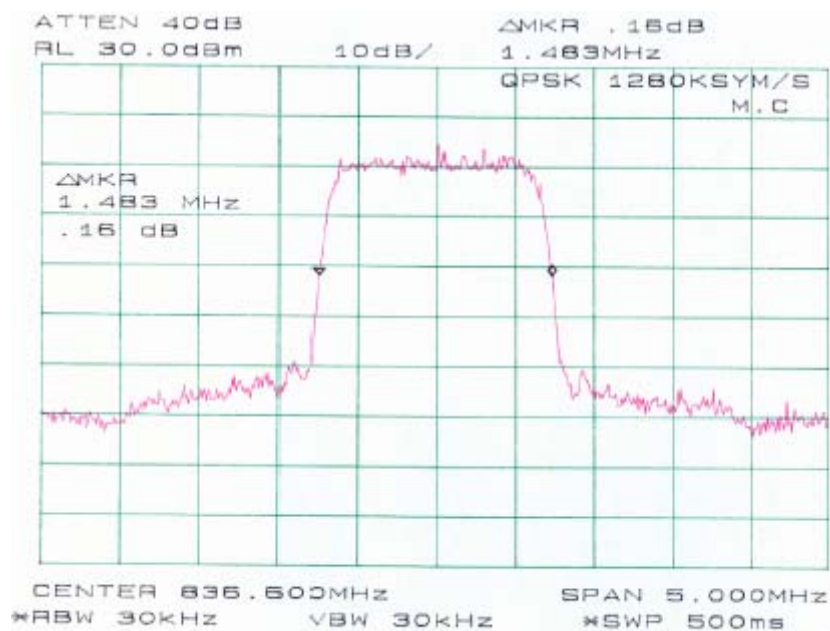
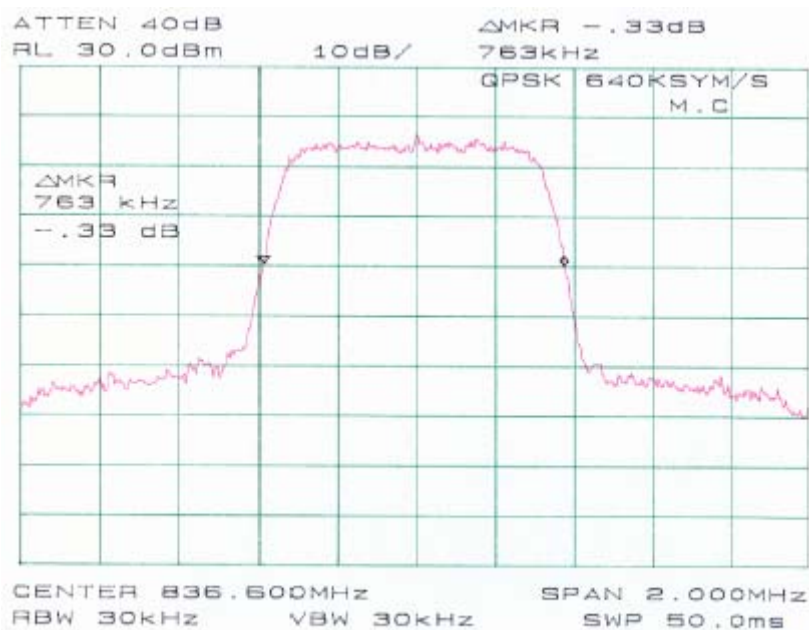
Environmental Conditions

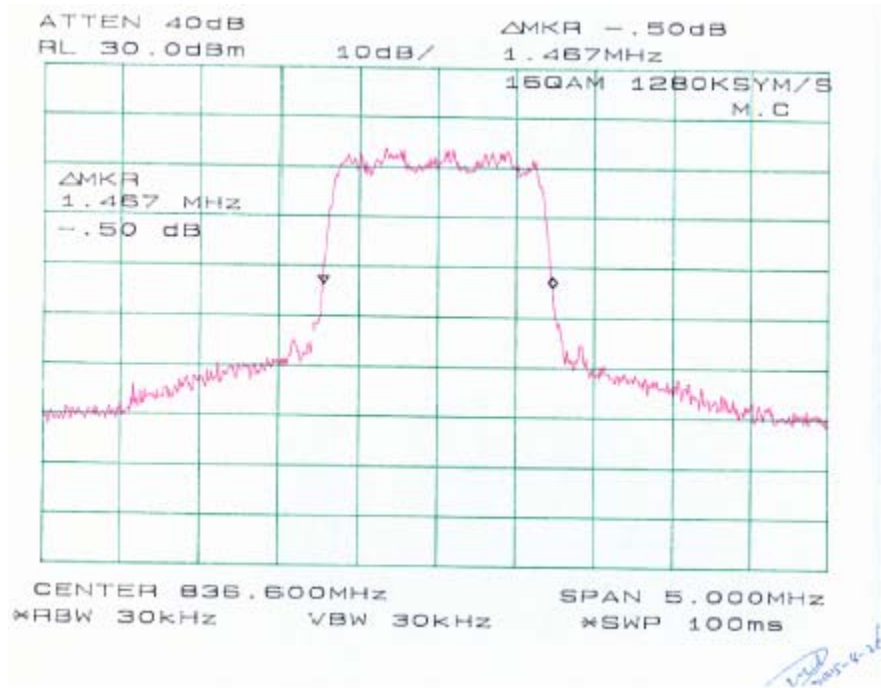
Temperature:	22° C
Relative Humidity:	48%
ATM Pressure:	1018mbar

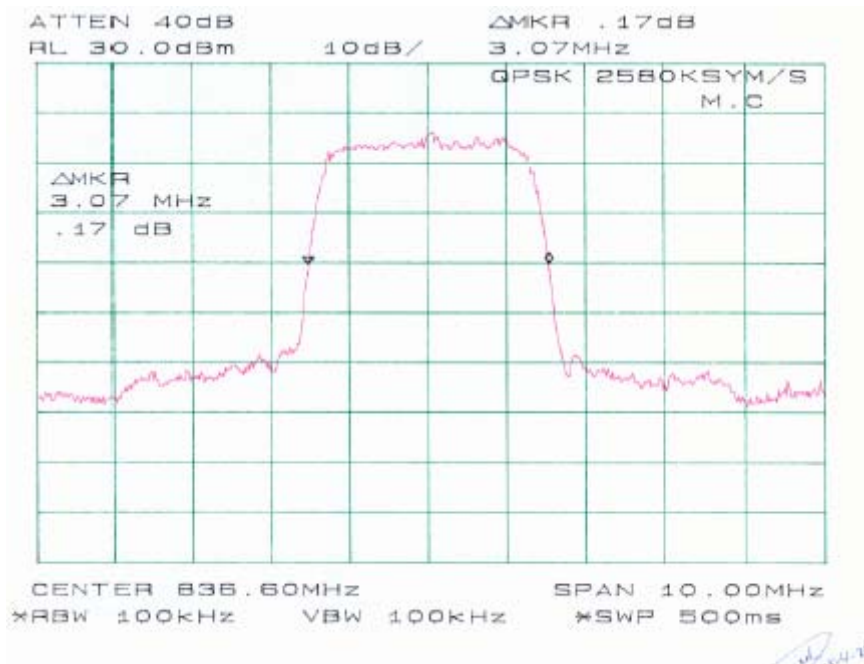
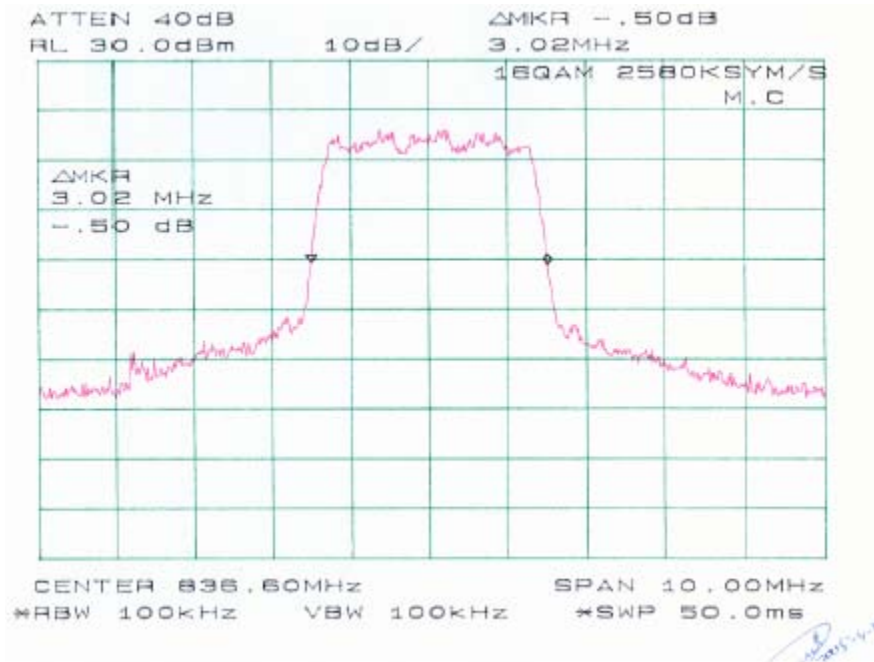
The testing was performed by Daniel Deng on 2005-04-26.

Test Results

Please refer to the hereinafter plots.







§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 = $10 \lg(\text{TXpwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \log_{10}(\text{power out in Watts})$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2004-11-10
ETS	Antenna, Log-Periodic	3148	4-1155	2004-12-14
ETS	Antenna, Biconical	3110B	9603-2315	2004-12-14
R&S	Generator, Signal	SMIQ03	DE23746	2004-07-03
Com-Power	Antenna, Dipole	AD-100	2222	2004-09-26
A.H.Systems	Antenna, Horn	SAS-200/571	261	2005-04-20
Sunol Science	Antenna	DRH-118	A052704	2005-06-02

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Environmental Conditions

Temperature:	21° C
Relative Humidity:	40%
ATM Pressure:	1015 mbar

The testing was performed by Daniel Deng on 2005-04-28.

Test Result

The worse case readings are

-45.7 dB at 809.49 MHz in Vertical Polarization for QPSK 2580Ksym/sec
 -45.2 dB at 809.49 MHz in Vertical Polarization for 16QAM 2580Ksym/sec

QPSK 2580 Ksym/sec

Run # 1 : 30MHz -10GHz ,

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Level dBm	dBm	dB
809.49	48.59	0	1.8	v	809.49	-63.1	5.2	0.8	-58.7	-13	-45.7
809.49	46.88	0	2.1	h	809.49	-64.8	5.2	0.8	-60.4	-13	-47.4
3346.3	35.85	0	1.6	v	3346.3	-68.5	10	1.9	-60.4	-13	-47.4
3346.3	35.12	0	1.8	h	3346.3	-69.1	10	1.9	-61	-13	-48.0
1673.2	39.47	0	1.6	v	1673.2	-70.1	9.3	1.3	-62.1	-13	-49.1
2509.8	36.45	180	1.6	v	2509.8	-69.8	9.3	1.6	-62.1	-13	-49.1
2509.8	35.89	180	1.6	h	2509.8	-70.1	9.3	1.6	-62.4	-13	-49.4
1673.2	38.25	0	1.5	h	1673.2	-71.6	9.3	1.3	-63.6	-13	-50.6
1206.27	37.56	0	1.7	v	1206.27	-71.8	7.5	1.1	-65.4	-13	-52.4
1206.27	35.12	0	1.8	h	1206.27	-74.1	7.5	1.1	-67.7	-13	-54.7

Note: EUT was terminated with a 50 Ω terminator

16QAM 2580 Ksym/sec

Run # 2 : 30MHz -10GHz ,

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Level dBm	dBm	dB
809.49	49.05	0	1.8	v	809.49	-62.6	5.2	0.8	-58.2	-13	-45.2
809.49	47.23	0	1.9	h	809.49	-64.4	5.2	0.8	-60	-13	-47.0
3346.3	35.68	0	1.6	v	3346.3	-68.7	10	1.9	-60.6	-13	-47.6
3346.3	35.22	0	1.7	h	3346.3	-69.0	10	1.9	-60.9	-13	-47.9
1673.2	40.29	0	1.5	v	1673.2	-69.3	9.3	1.3	-61.3	-13	-48.3
2509.8	37.15	180	1.6	v	2509.8	-69.1	9.3	1.6	-61.4	-13	-48.4
2509.8	35.98	180	1.6	h	2509.8	-69.9	9.3	1.6	-62.2	-13	-49.2
1673.2	38.9	0	1.5	h	1673.2	-70.9	9.3	1.3	-62.9	-13	-49.9
1206.27	38.12	0	1.7	v	1206.27	-71.2	7.5	1.1	-64.8	-13	-51.8
1206.27	35.89	0	1.7	h	1206.27	-73.3	7.5	1.1	-66.9	-13	-53.9

Note: EUT was terminated with a 50 Ω terminator

§1.1310 and §2.1091 - RF EXPOSURE

According to §1.1307, 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 §2.1091 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

Maximum peak output power at antenna input terminal: 24.5 (dBm)

Maximum peak output power at antenna input terminal: 282 (mW)

Prediction distance: 150 (cm)

Predication frequency: 850 (MHz)

Antenna Gain (typical): 10 (dBi)

antenna gain: 10 (numeric)

Power density at predication frequency at 150 cm: 0.01 (mW/cm²)

MPE limit for uncontrolled exposure at prediction frequency: 0.57 (mW/cm²)

Test Result

The power density level at 150 cm is 0.01mW/cm², which is below the uncontrolled exposure limit of 0.57mW/cm² at 850 MHz.

§2.1046, §22.913(a) – RF 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.

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
Agilent	Spectrum Analyzer	8564E	3943A01781	2004-10-04
HP	Plotter	HP7470A	2541A49659	N/R
Agilent	Spectrum Analyzer	E4446A	US44300386	2004-11-10

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

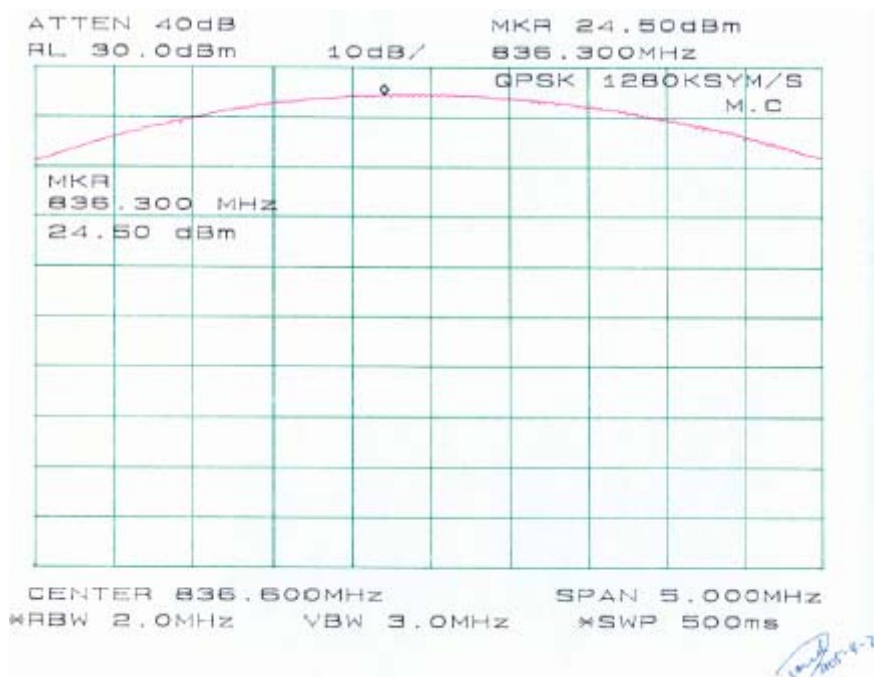
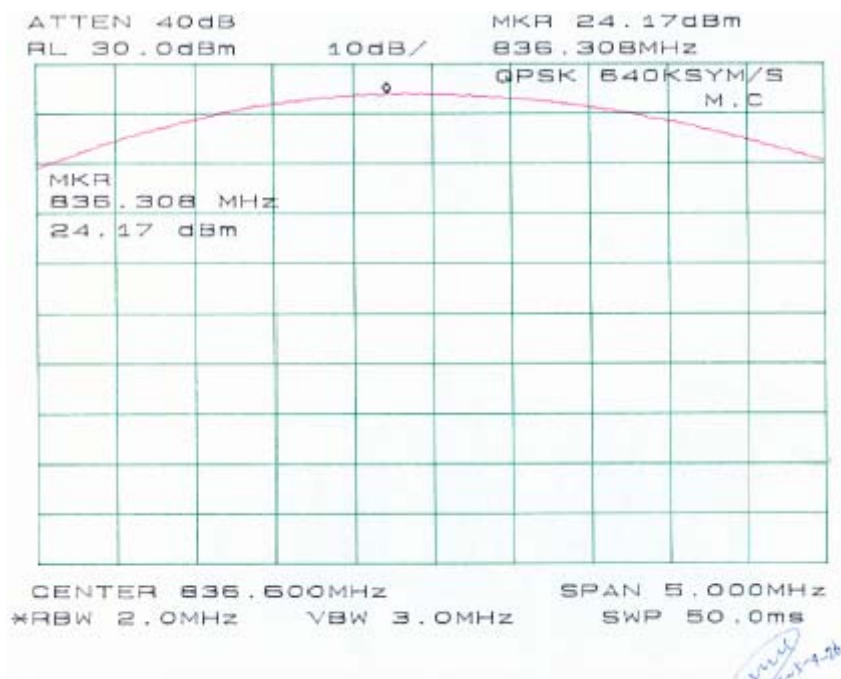
Environmental Conditions

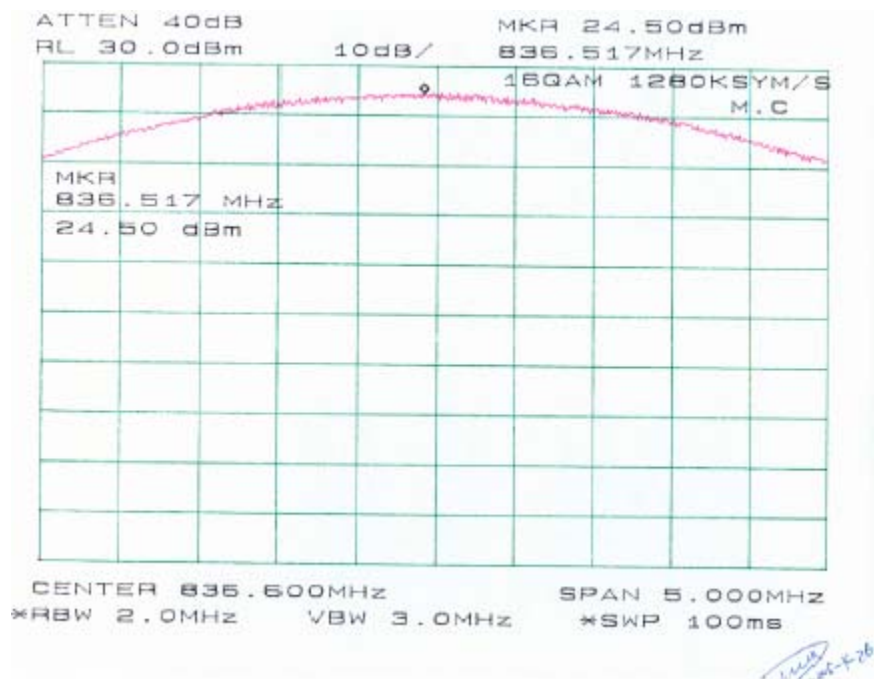
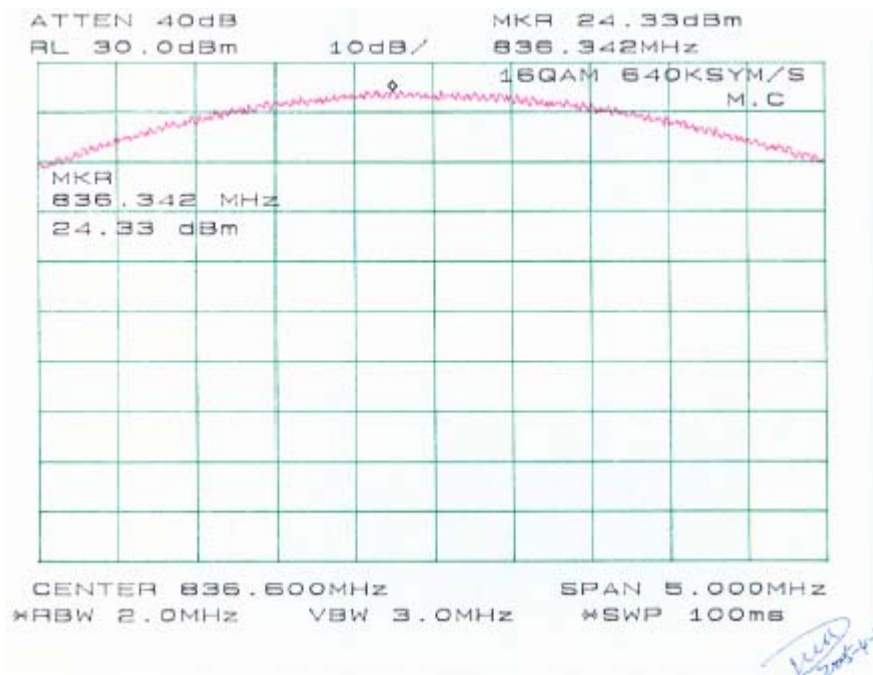
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Relative Humidity:	48%
ATM Pressure:	1018 mbar

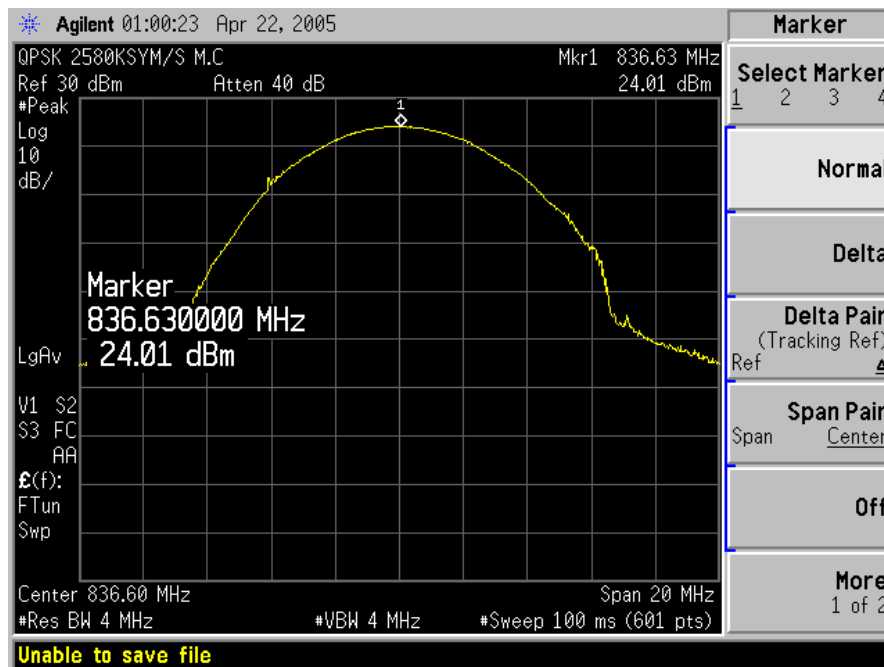
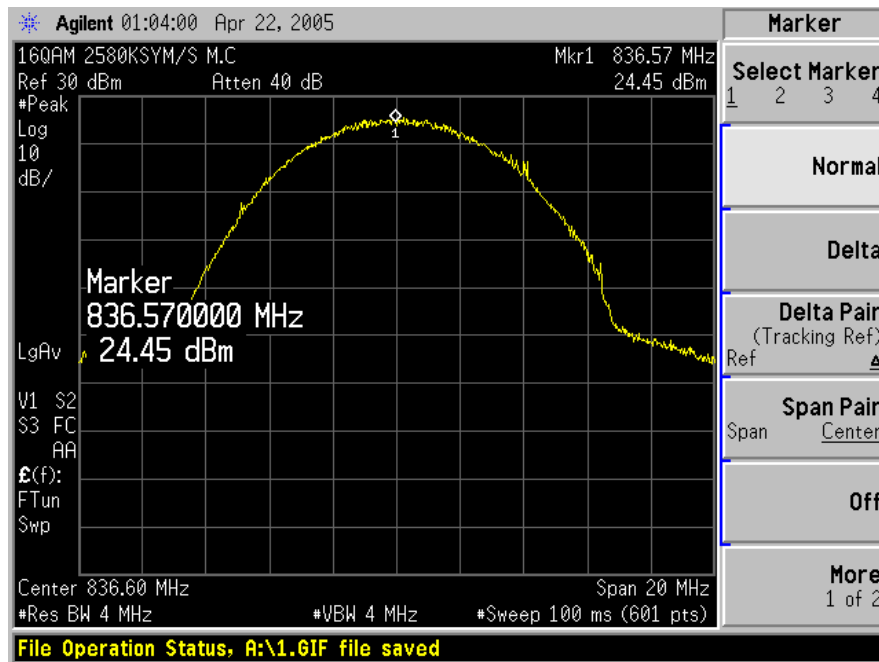
The testing was performed by Daniel Deng on 2005-04-26.

Test Results

MODE	Channel	Frequency (MHz)	Output Power in dBm	ERP in dBm	Output Power in W	Limit in W
QPSK 640KSYM/S	Middle	836.60	24.17	32.02	1.592	7
QPSK 1280KSYM/S	Middle	836.60	24.50	32.35	1.718	7
16QAM 640KSYM/S	Middle	836.60	24.33	32.18	1.652	7
16QAM 1280KSYM/S	Middle	836.60	24.50	32.35	1.718	7
QPSK 2580KSYM	Middle	836.60	24.01	31.86	1.535	7
16QAM 2580KSYM/S	Middle	836.60	24.45	32.30	1.698	7







§2.1049, §22.917(b) - OCCUPIED BANDWIDTH

Applicable Standard

Requirements: CFR 47, Section 2.1049 and 22.917(b).

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
Agilent	Spectrum Analyzer	8564E	3943A01781	2004-10-04
HP	Plotter	HP7470A	2541A49659	N/R

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Environmental Conditions

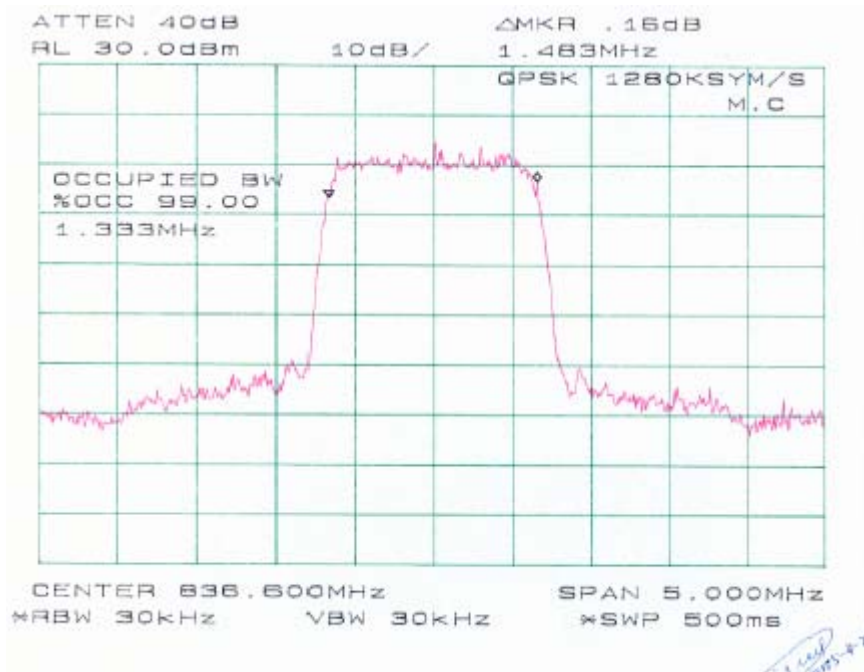
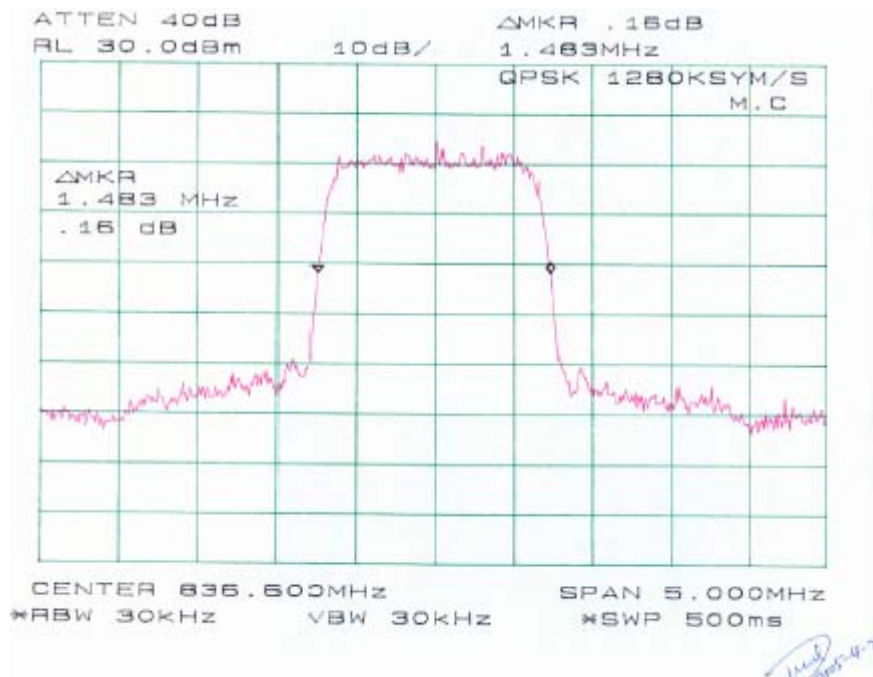
Temperature:	22° C
Relative Humidity:	48%
ATM Pressure:	1018 mbar

The testing was performed by Daniel Deng on 2005-04-26.

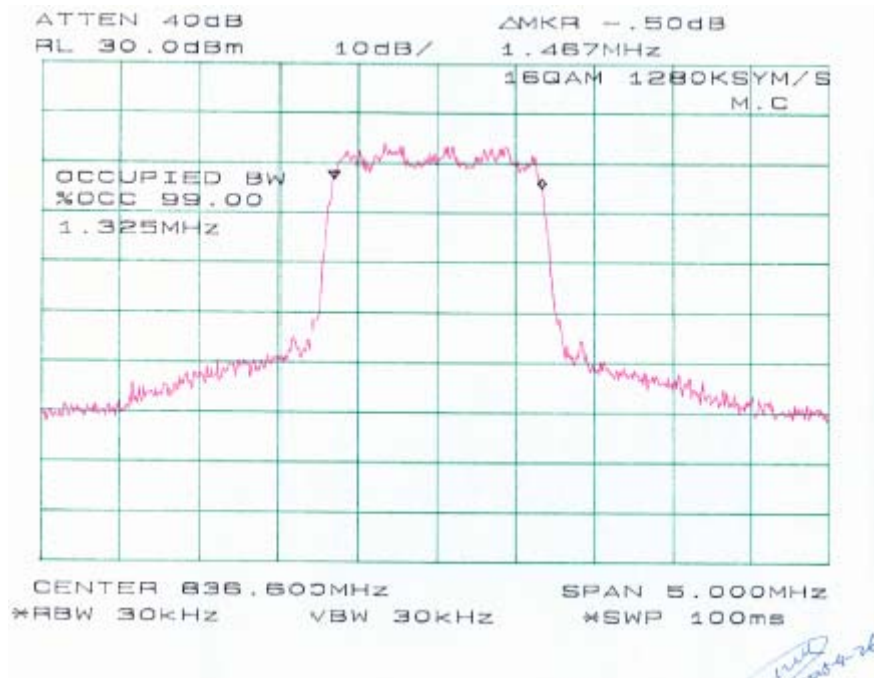
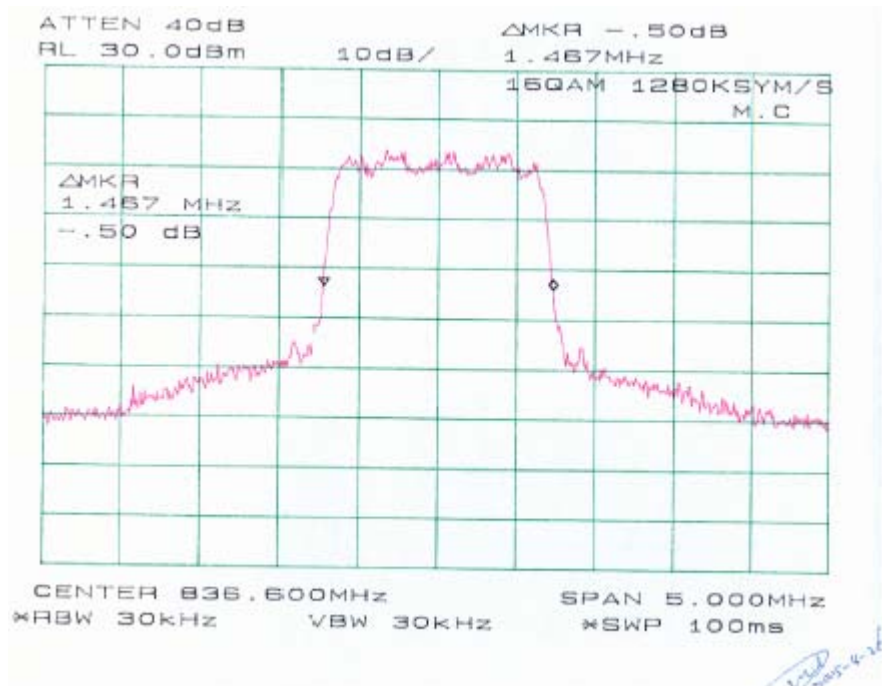
Test Results

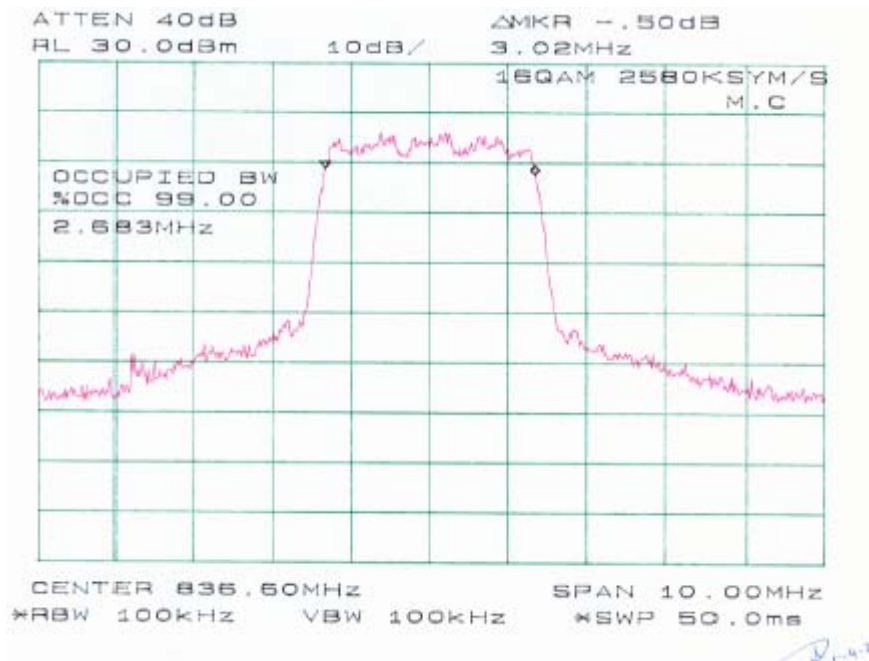
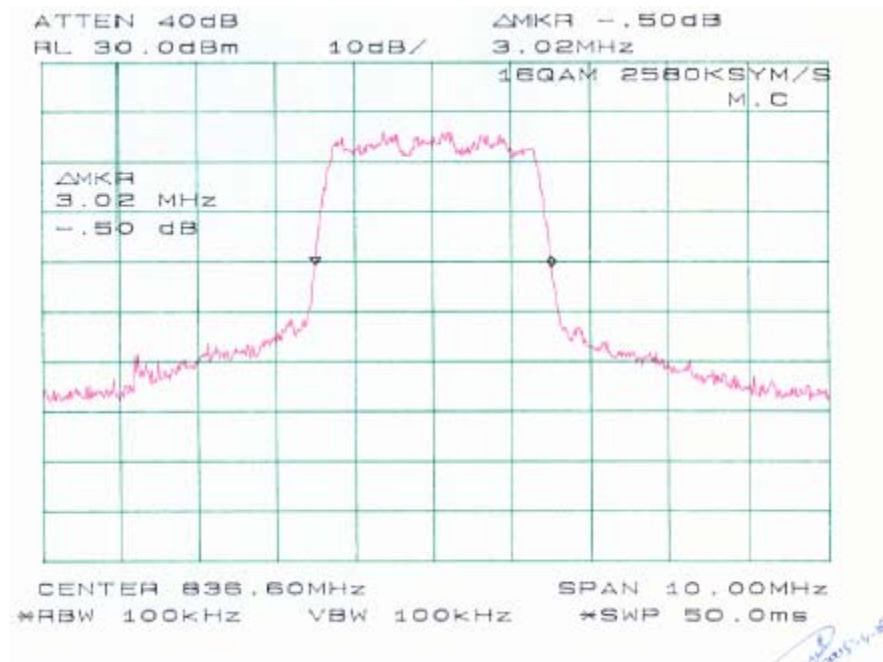
Please refer to the following plots.

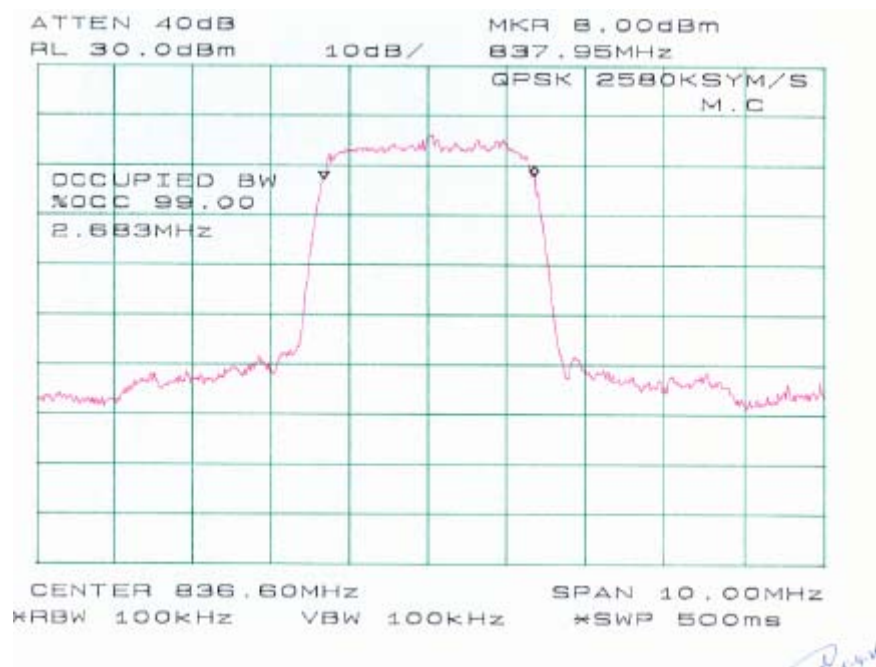
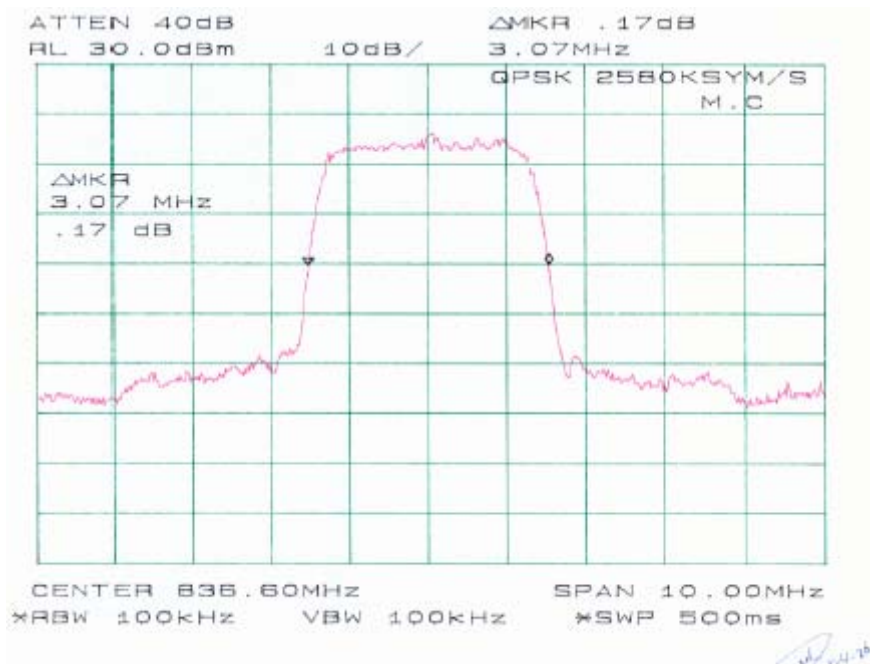












§2.1051, §22.917 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

Requirements: CFR 47, § 2.1051, § 22.917.

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
Agilent	Spectrum Analyzer	8564E	3943A01781	2004-10-04
HP	Plotter	HP7470A	2541A49659	N/R

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

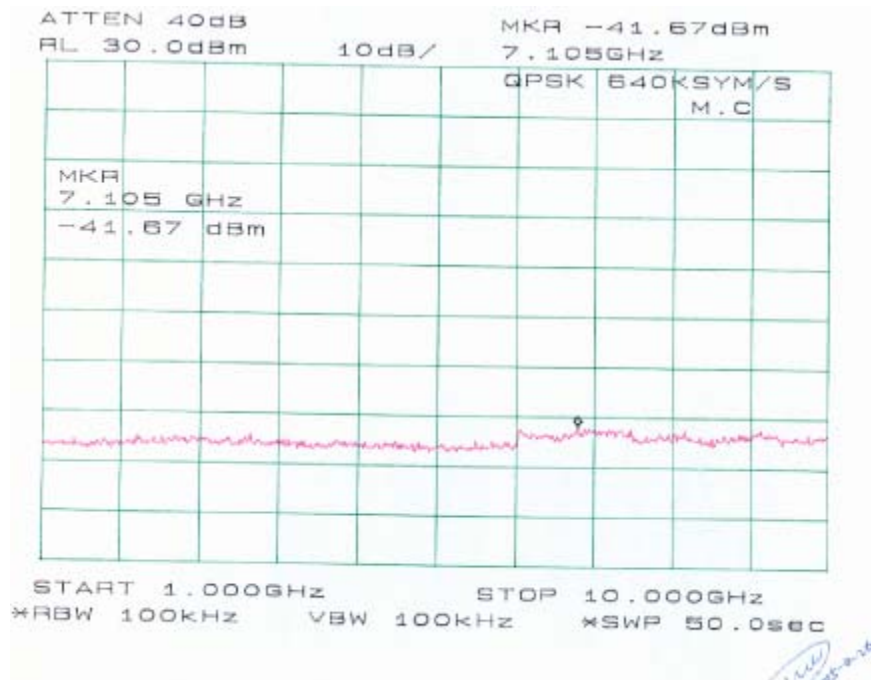
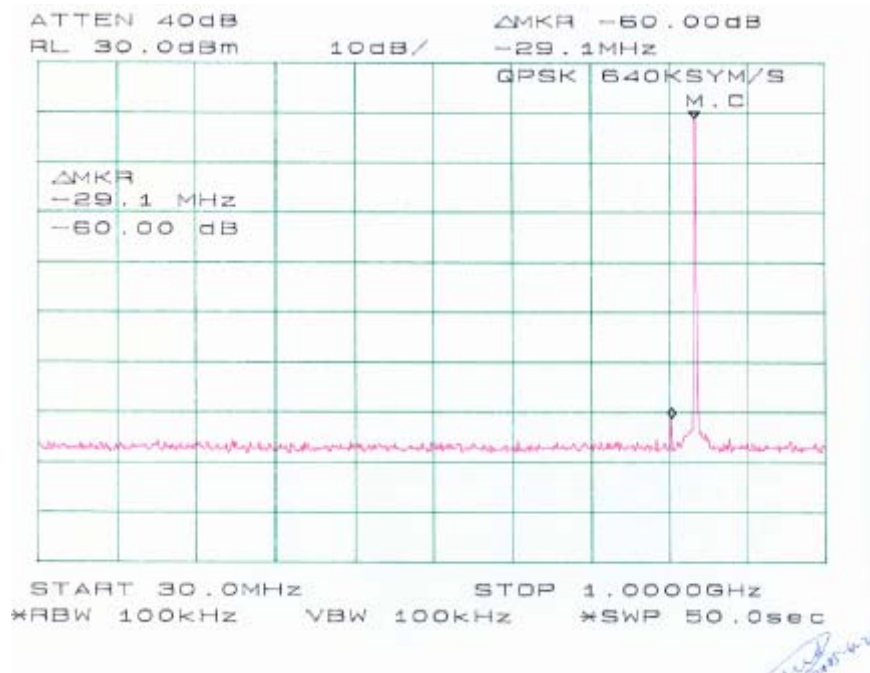
Environmental Conditions

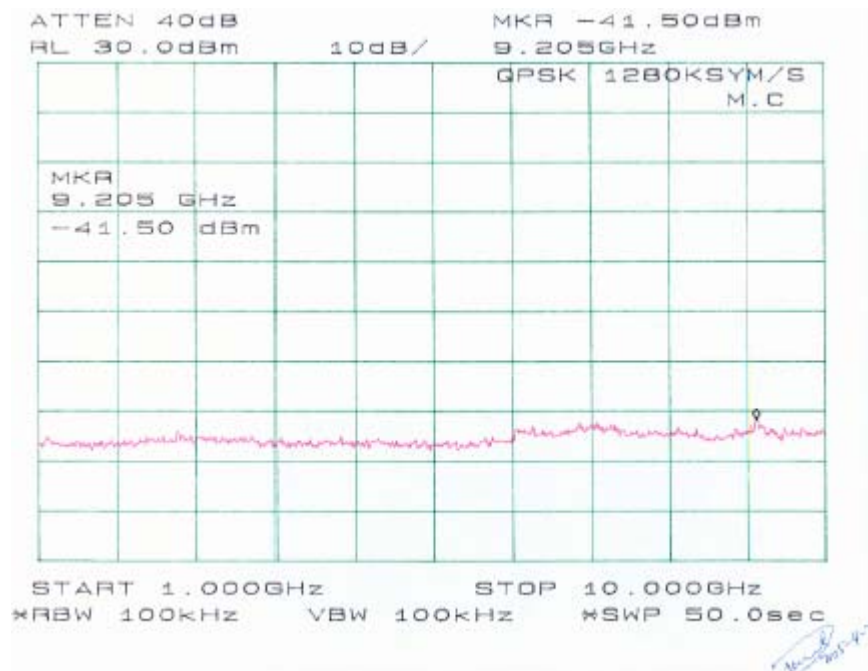
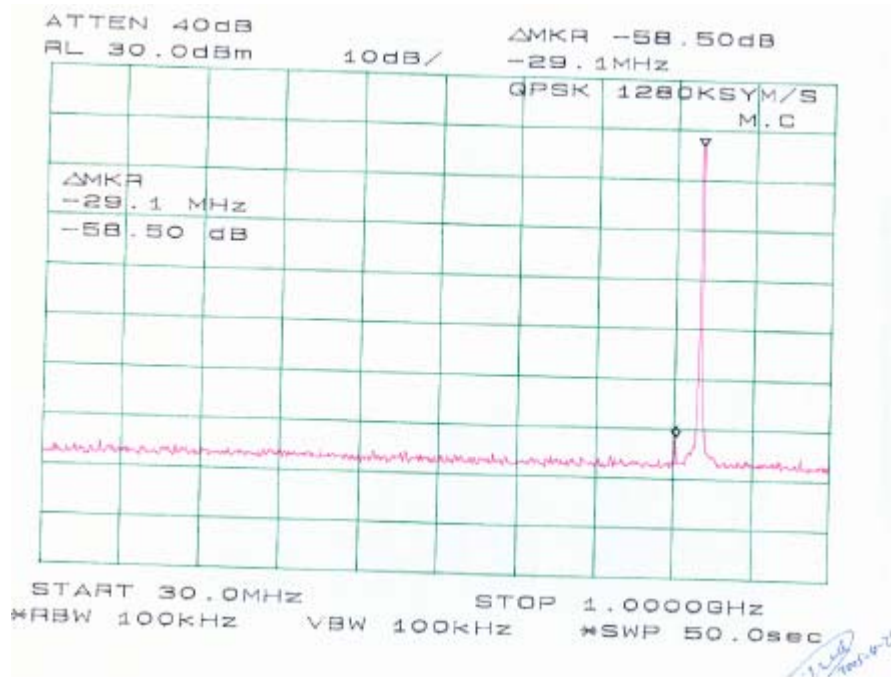
Temperature:	22° C
Relative Humidity:	48%
ATM Pressure:	1018 mbar

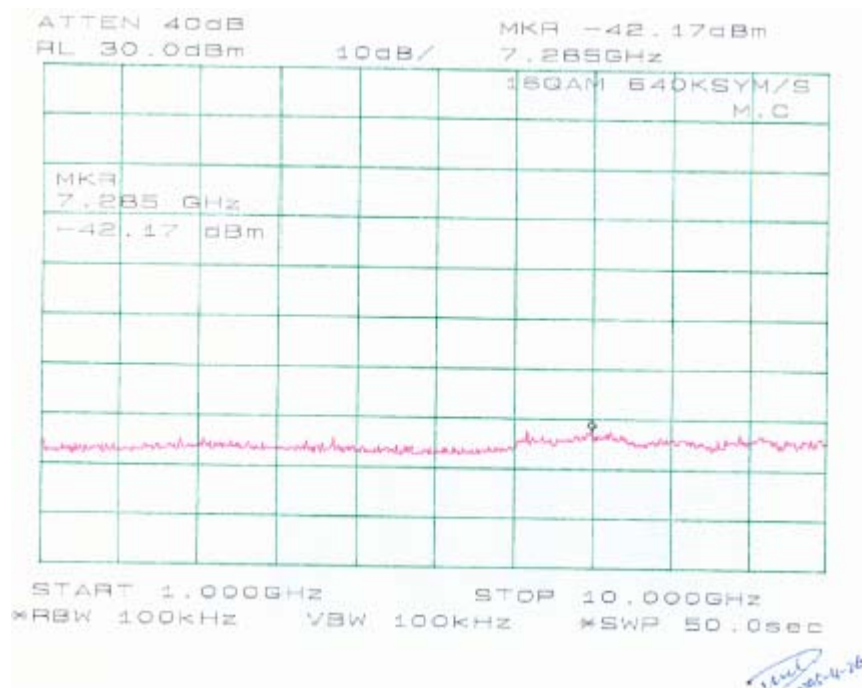
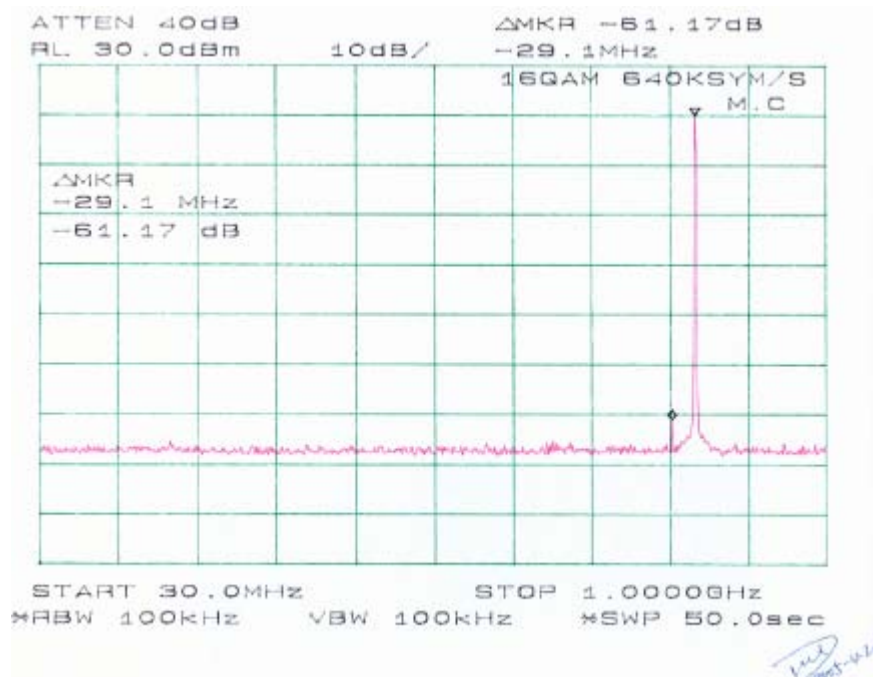
The testing was performed by Daniel Deng on 2005-04-26.

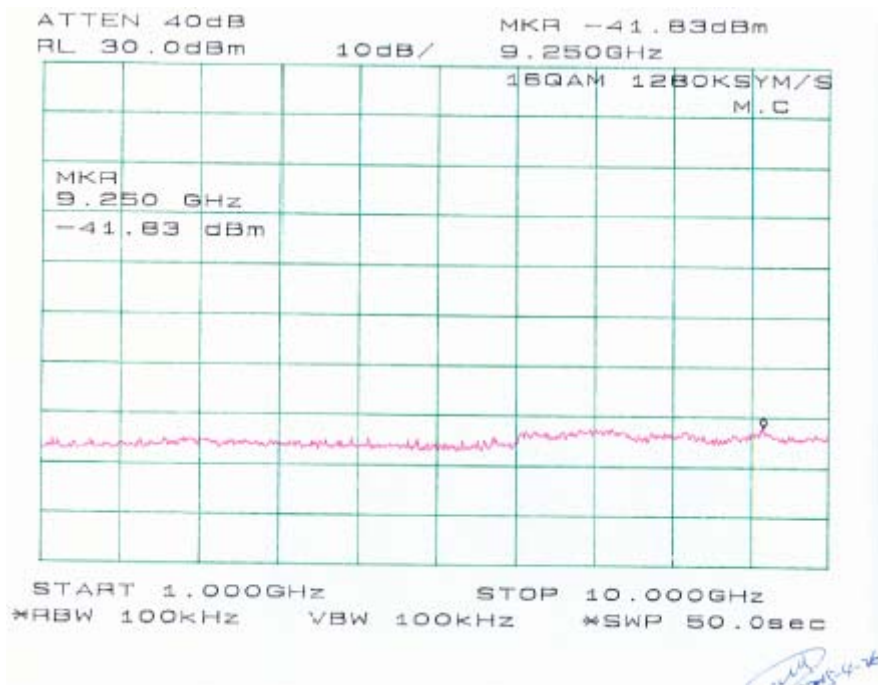
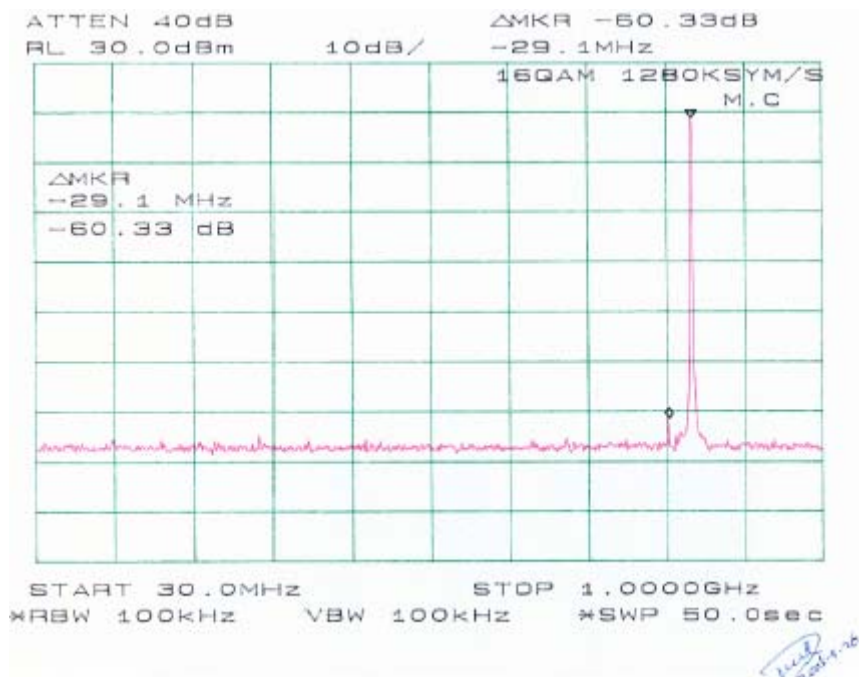
Test Results

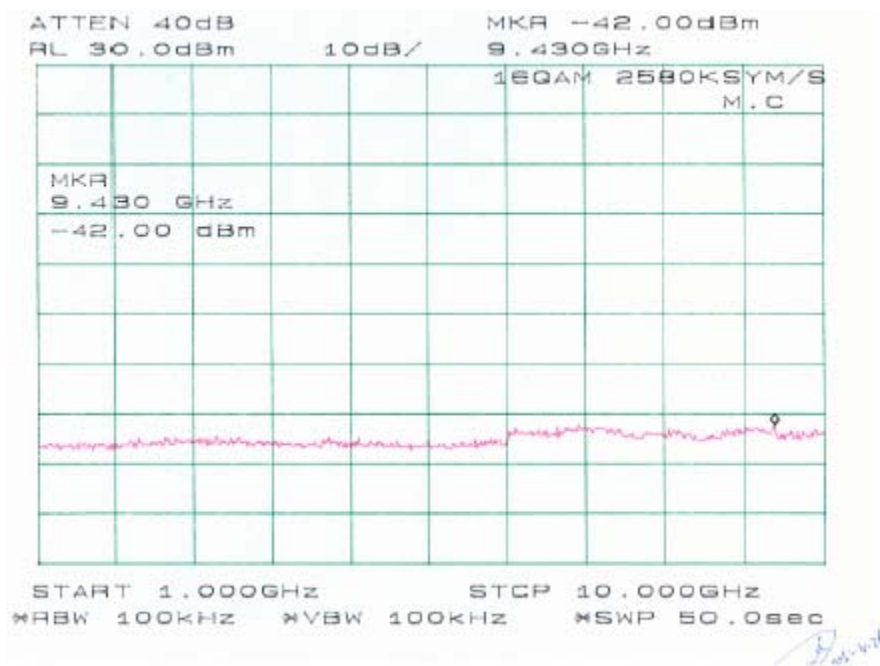
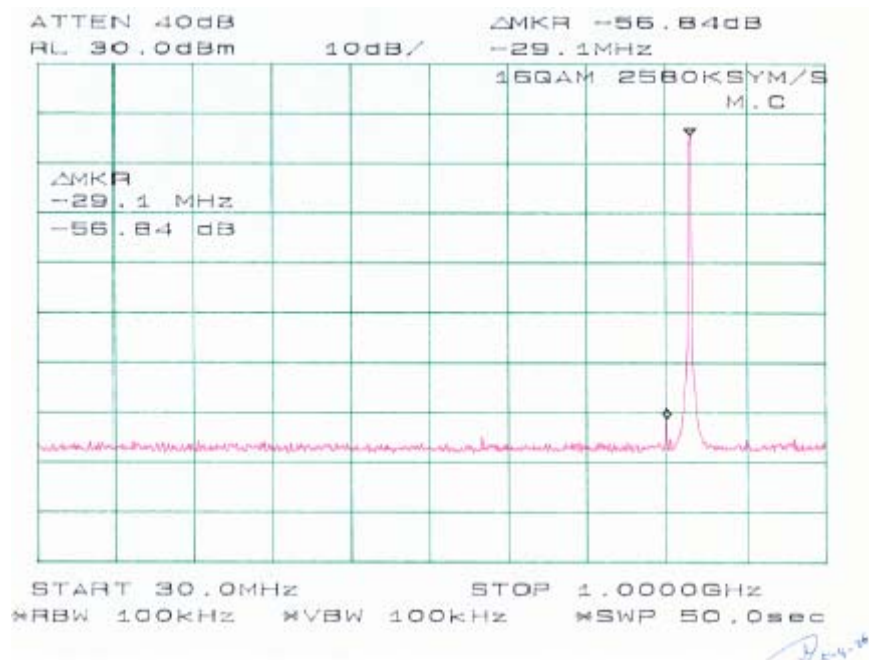
Please refer to the hereinafter plots.

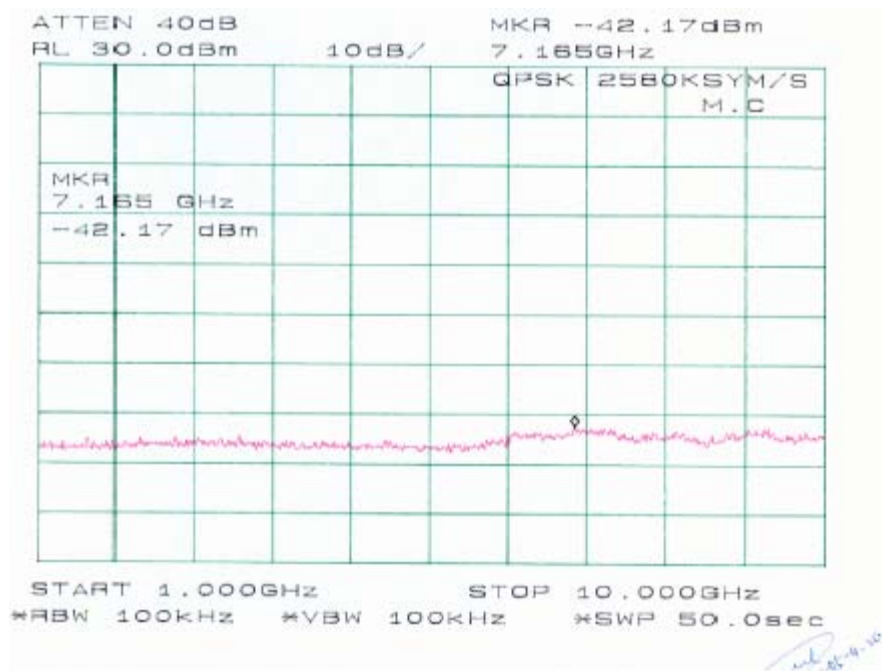
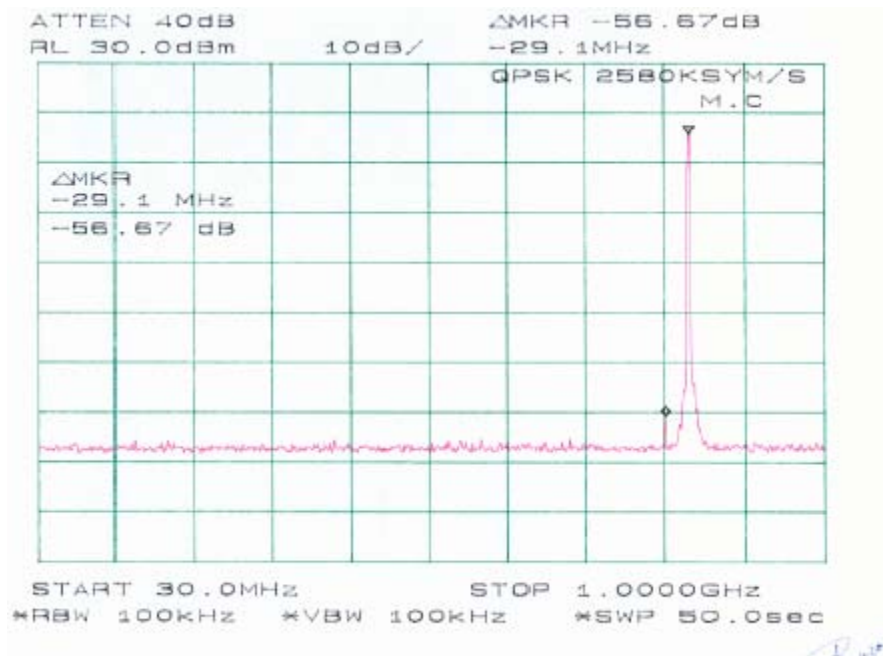












§2.1055 (a), §2.1055 (d), §22.355 - FREQUENCY STABILITY

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)	Mobile Base, fixed	[SU][le]/ (ppm)	Mobile SU]3 watts [le]3 watts (ppm)
		(ppm)	(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

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
Tenney	Oven, Temperature	VersaTenn	12.222-193	2005-06-04
HP	Counter, Microwave Frequency	5342A	2232A06380	2004-09-07

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Environmental Conditions

Temperature:	22° C
Relative Humidity:	48%
ATM Pressure:	1018 mbar

The testing was performed by Daniel Deng on 2005-04-26.

Test Results

Frequency Stability Versus Temperature

Reference Frequency: 836.6 MHz, Limit: 1.5ppm			
Environment Temperature (°C)	Power Supplied (VAc)	Frequency Measure with Time Elapsed	
		MHz	PPM Error
50	120	836.599107	-1.07
40	120	836.599197	-0.96
30	120	836.599252	-0.89
20	120	836.599309	-0.83
10	120	836.599421	-0.69
0	120	836.599582	-0.5
-10	120	836.599483	-0.62
-20	120	836.599532	-0.56
-30	120	836.599781	-0.26

Frequency Stability Versus Voltage

Reference Frequency: 836.6MHz, Limit: 1.5ppm			
Power Supplied (VAc)	Environment Temperature (°C)	MHz	ppm
102	20	836.599328	-0.8
138	20	836.599301	-0.84

§22.917 – 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.

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
Agilent	Spectrum Analyzer	8564E	3943A01781	2004-10-04
HP	Plotter	HP7470A	2541A49659	N/R

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Environmental Conditions

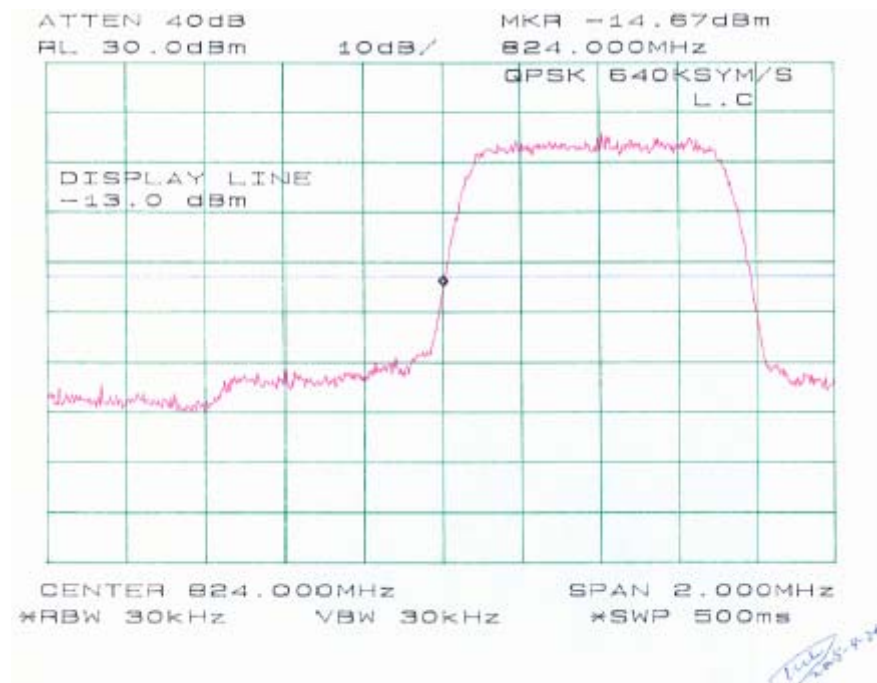
Temperature:	22° C
Relative Humidity:	48%
ATM Pressure:	1018 mbar

The testing was performed by Daniel Deng on 2005-04-26.

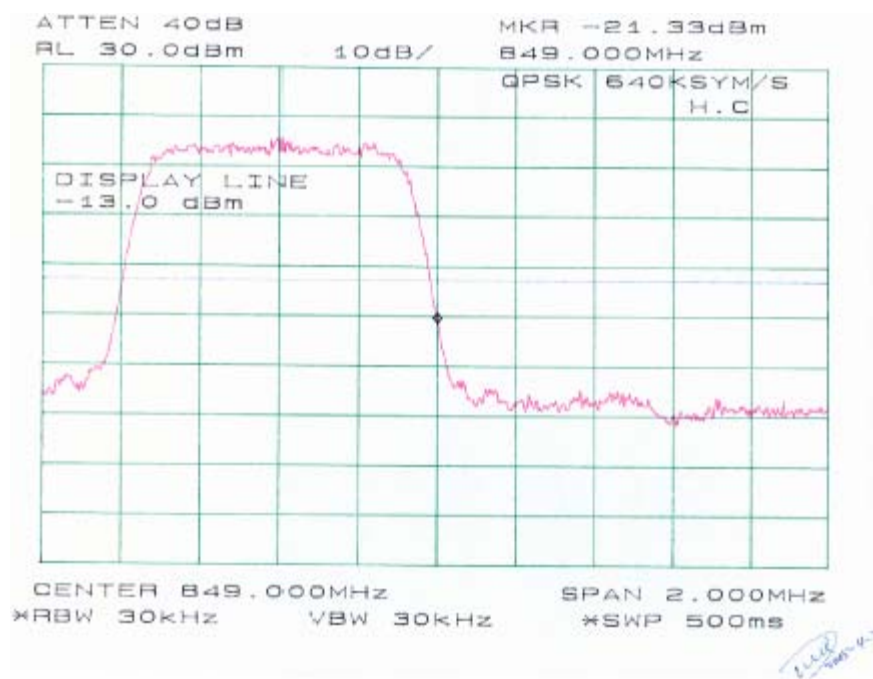
Test Results

Please refer to the following plots.

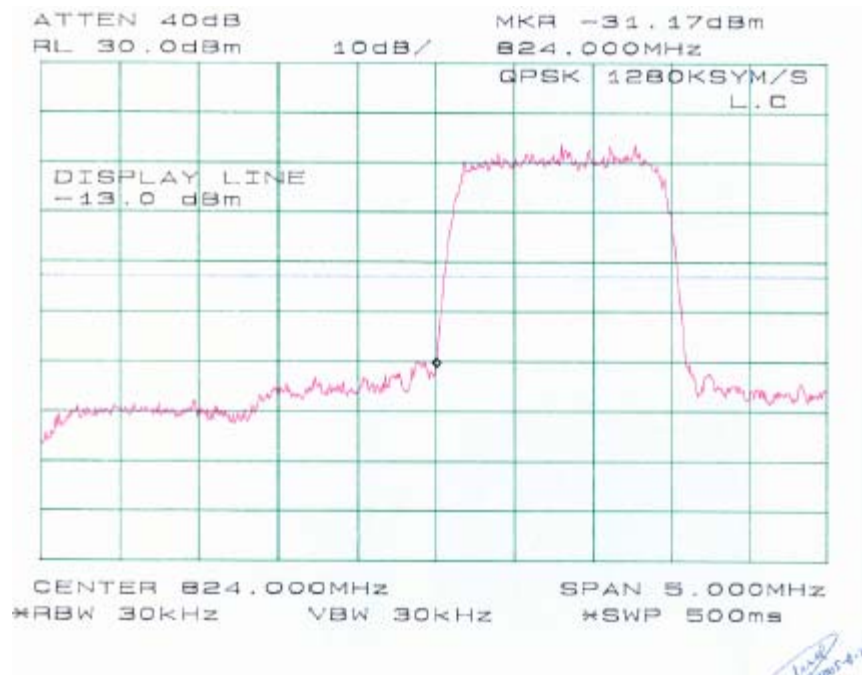
$f_{\text{low}} = 824.4\text{MHz}$, QPSK, 640ksym/s



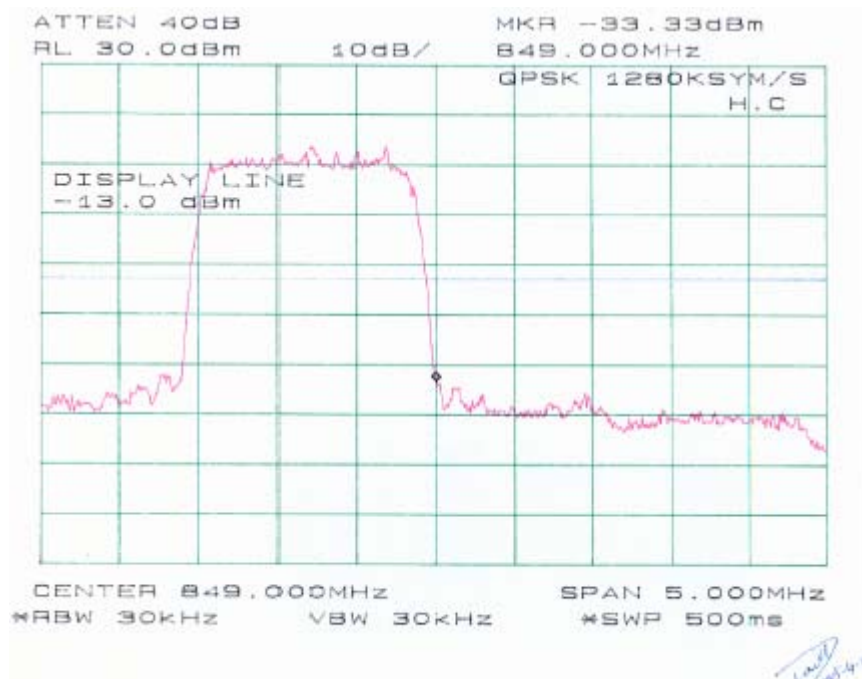
$f_{\text{high}} = 848.6\text{MHz}$, QPSK, 640ksym/s



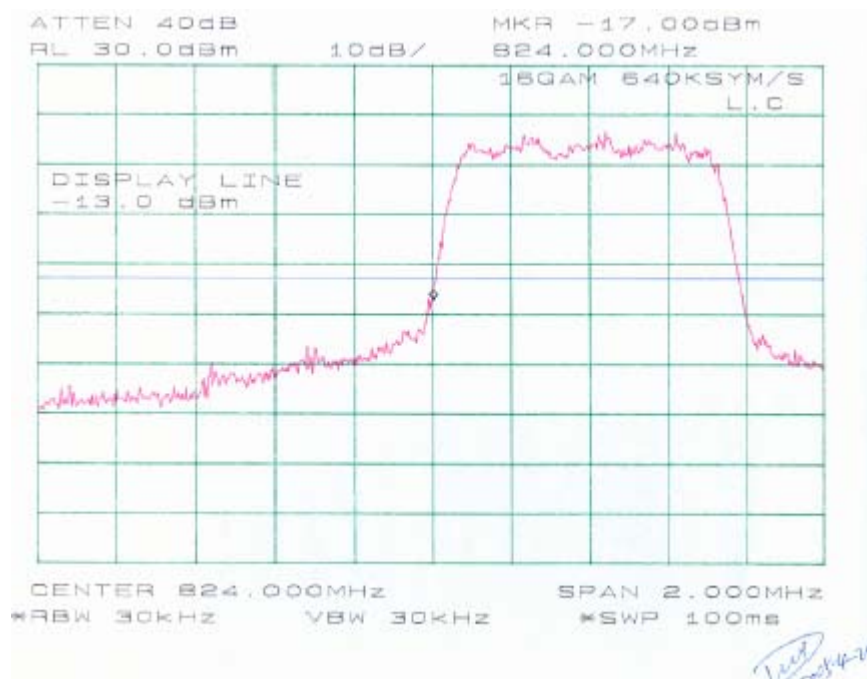
$f_{\text{low}} = 824.4\text{MHz}$, QPSK, 640ksym/s



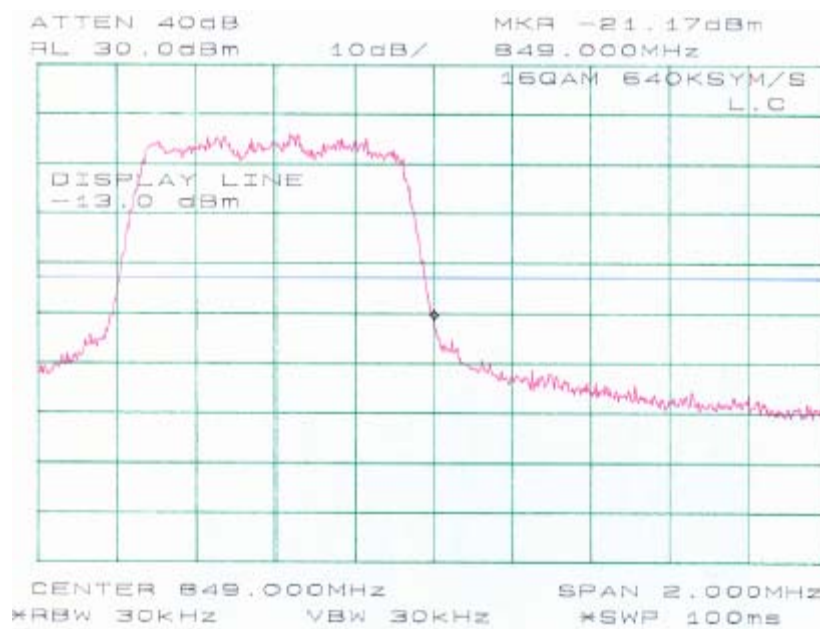
$f_{\text{high}} = 848.2\text{MHz}$, QPSK, 1280ksym/s



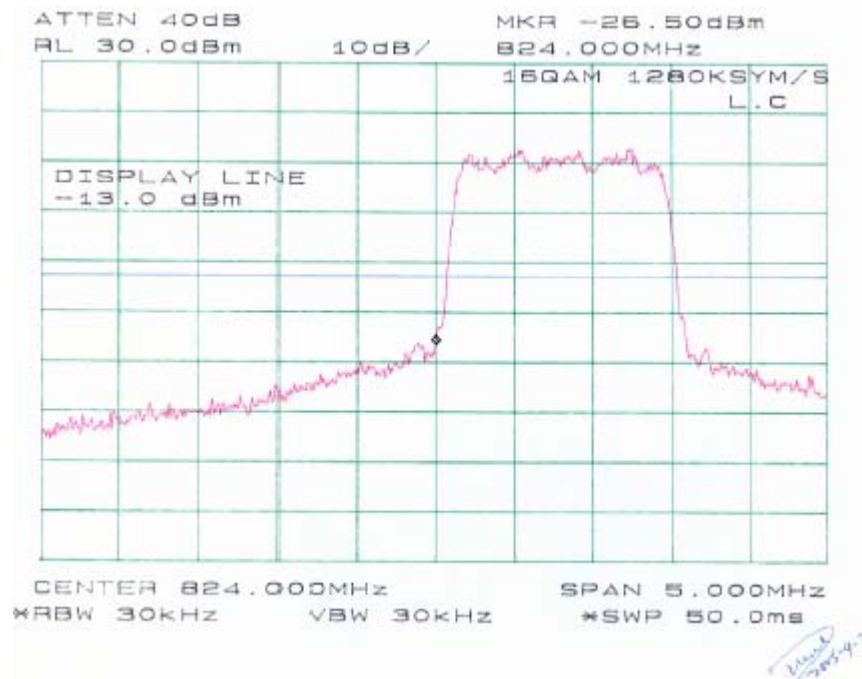
$f_{\text{low}} = 824.4\text{MHz}$, 16QAM, 640ksym/s



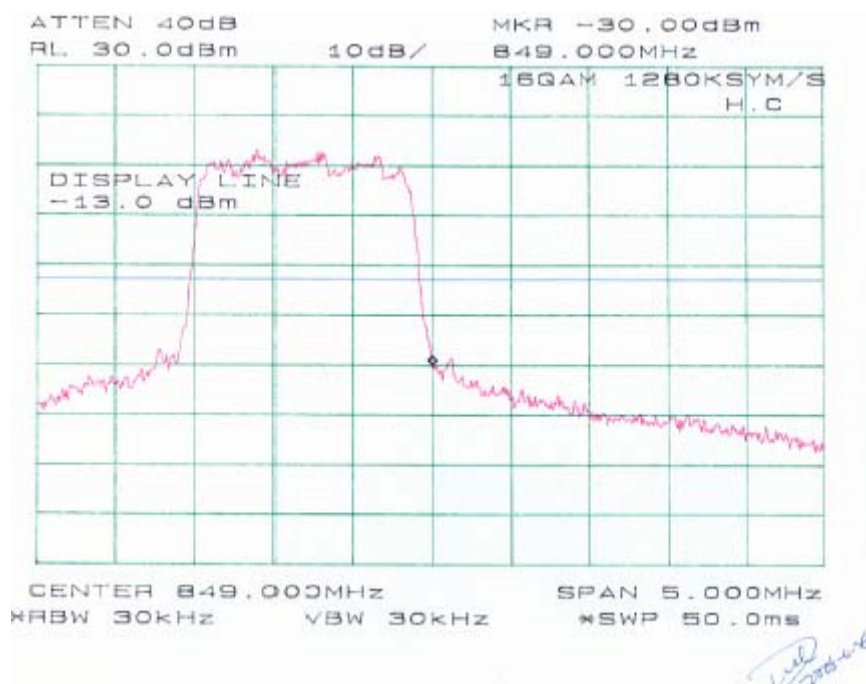
$f_{\text{high}} = 848.6\text{MHz}$, 16QAM, 640ksym/s



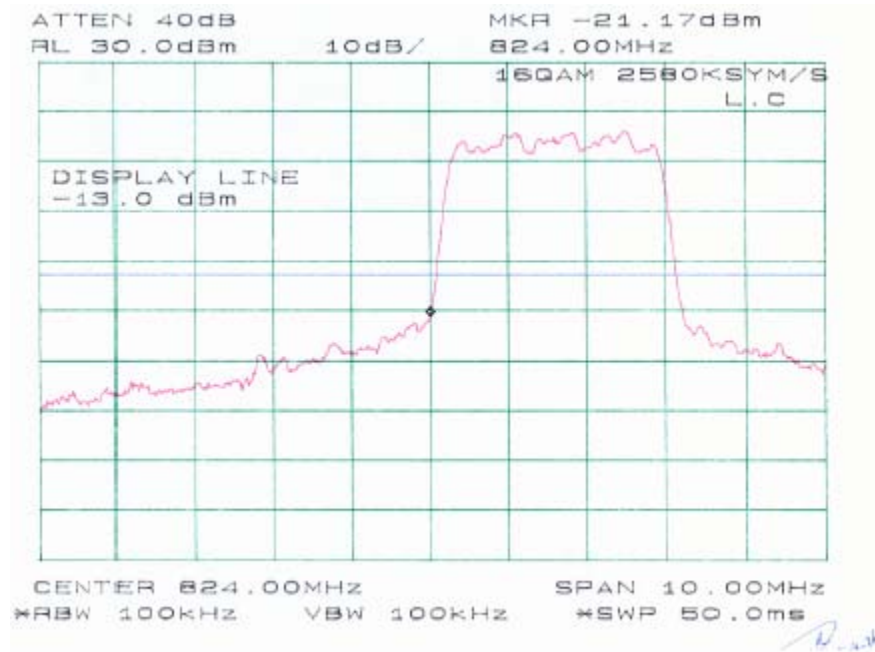
$f_{\text{low}} = 824.8\text{MHz}$, 16QAM, 1280ksym/s



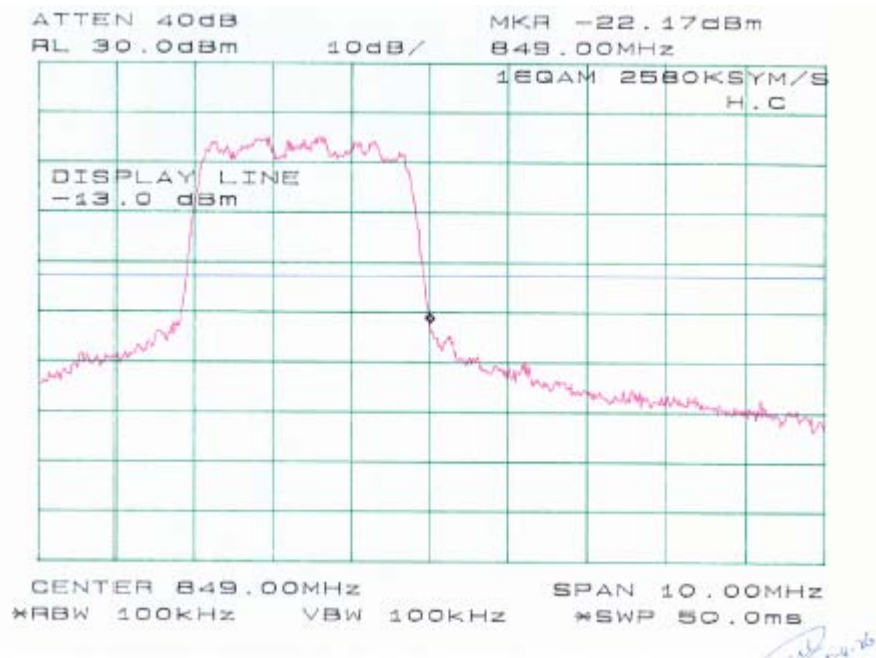
$f_{\text{high}} = 848.2\text{MHz}$, 16QAM, 1280ksym/s



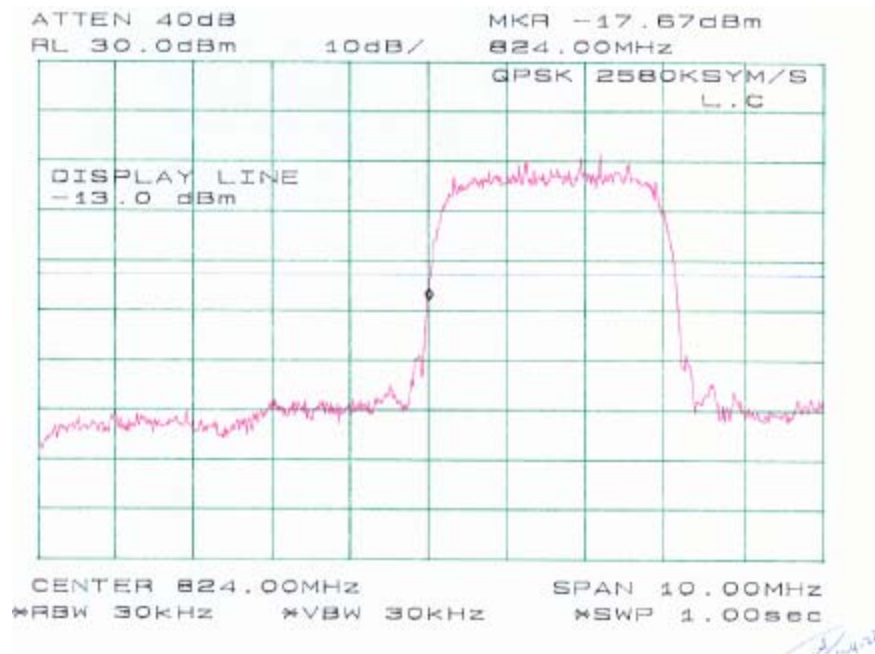
$f_{\text{low}} = 825.6\text{MHz}$, 16QAM, 2580ksym/s



$f_{\text{high}} = 847.4\text{MHz}$, 16QAM, 2580ksym/s



$f_{\text{low}} = 825.6\text{MHz}$, QPSK, 2580ksym/s



$f_{\text{high}} = 847.4\text{MHz}$, QPSK, 2580ksym/s

