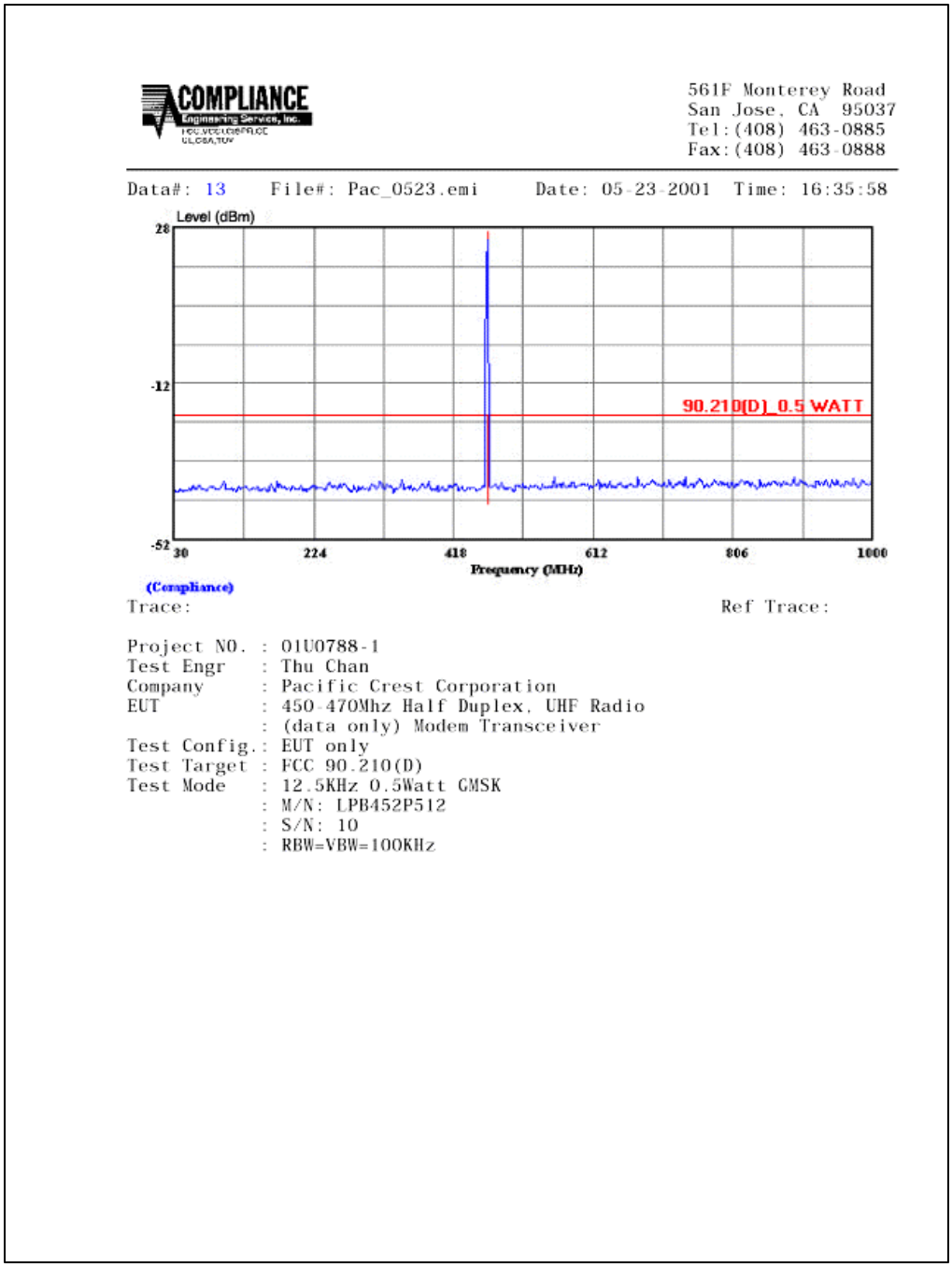
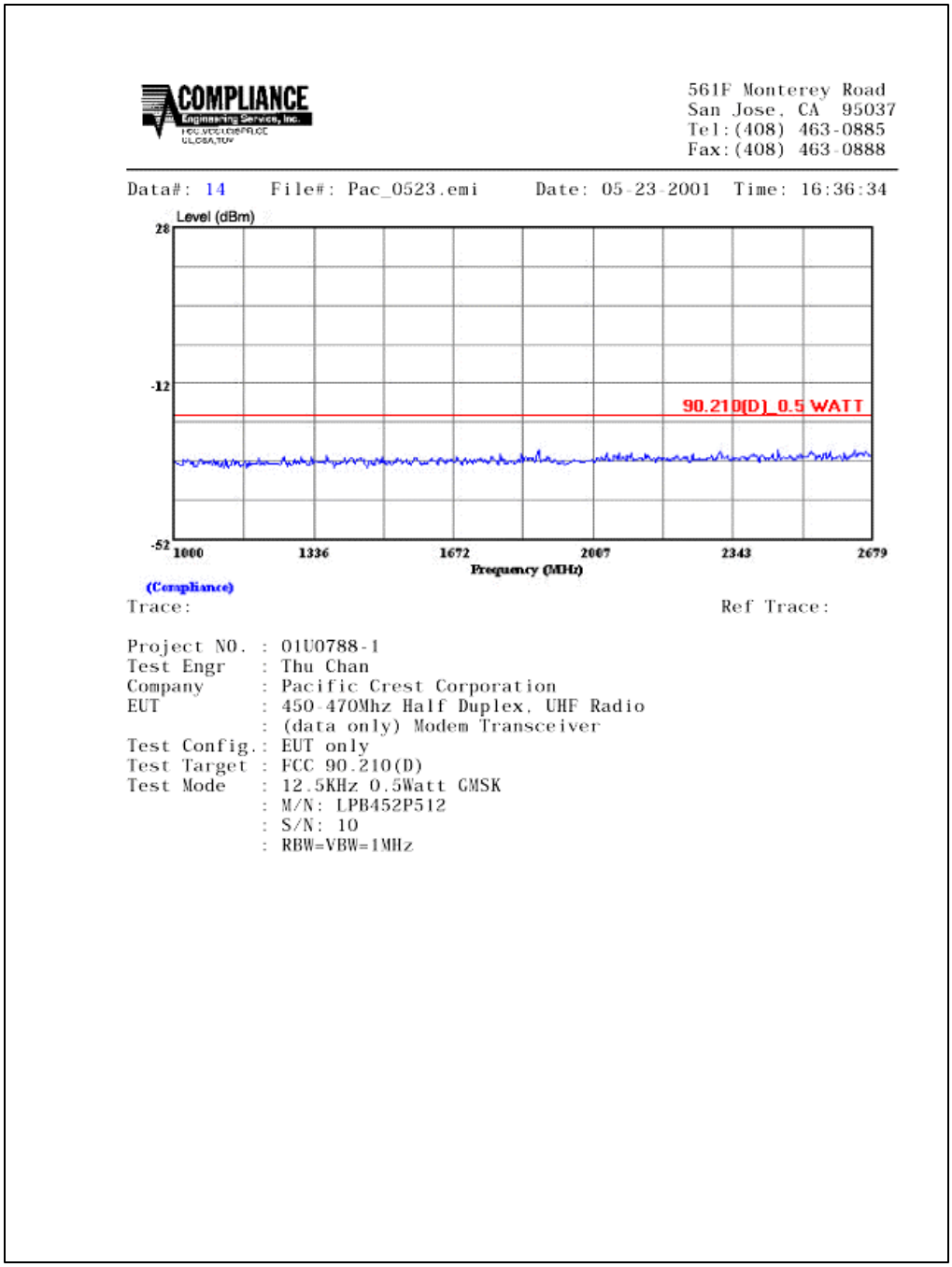


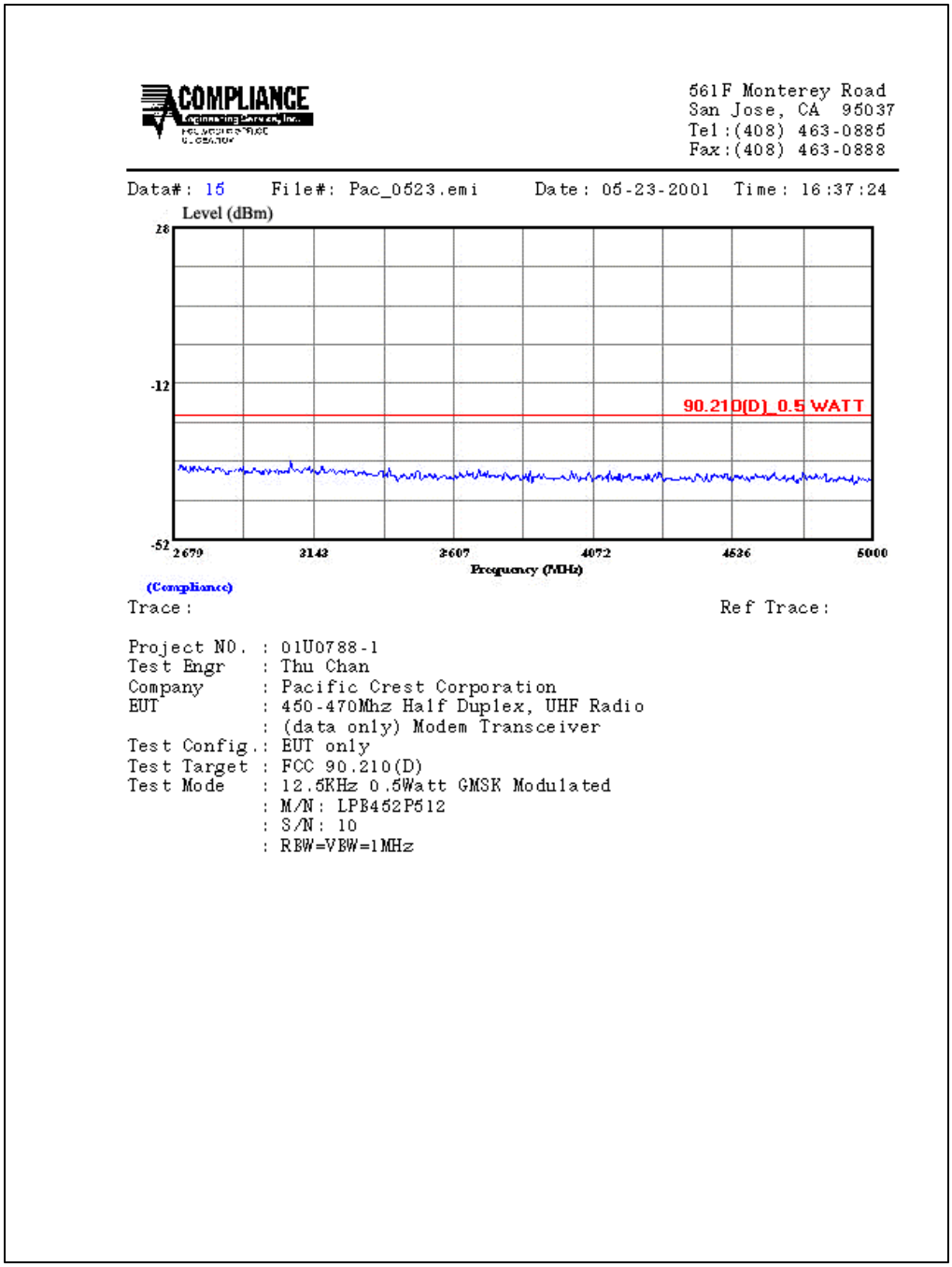
Out-Of-Band1: GMSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Out-Of-Band2: GMSK Modulation

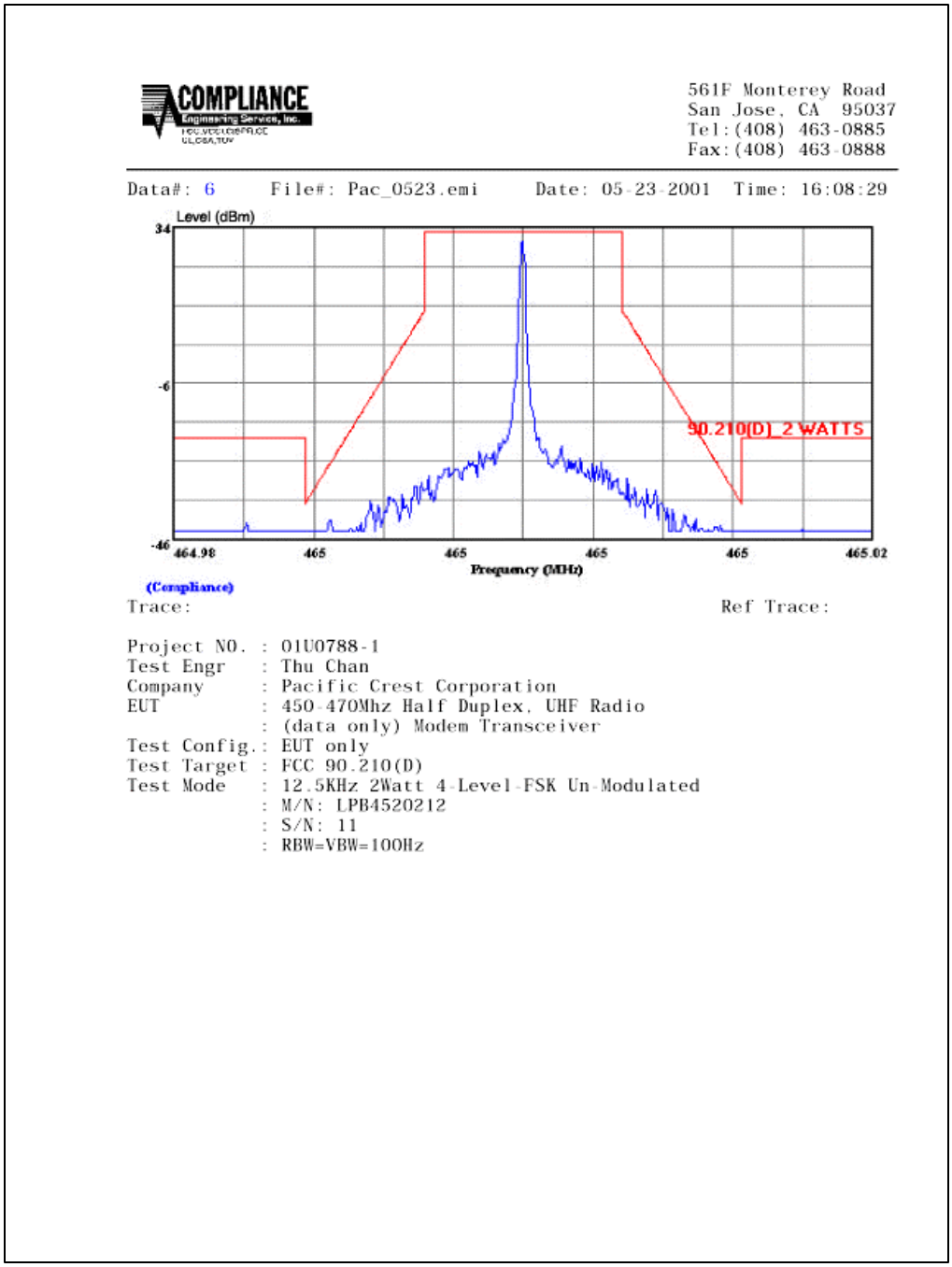
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Out-Of-Band3: GMSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

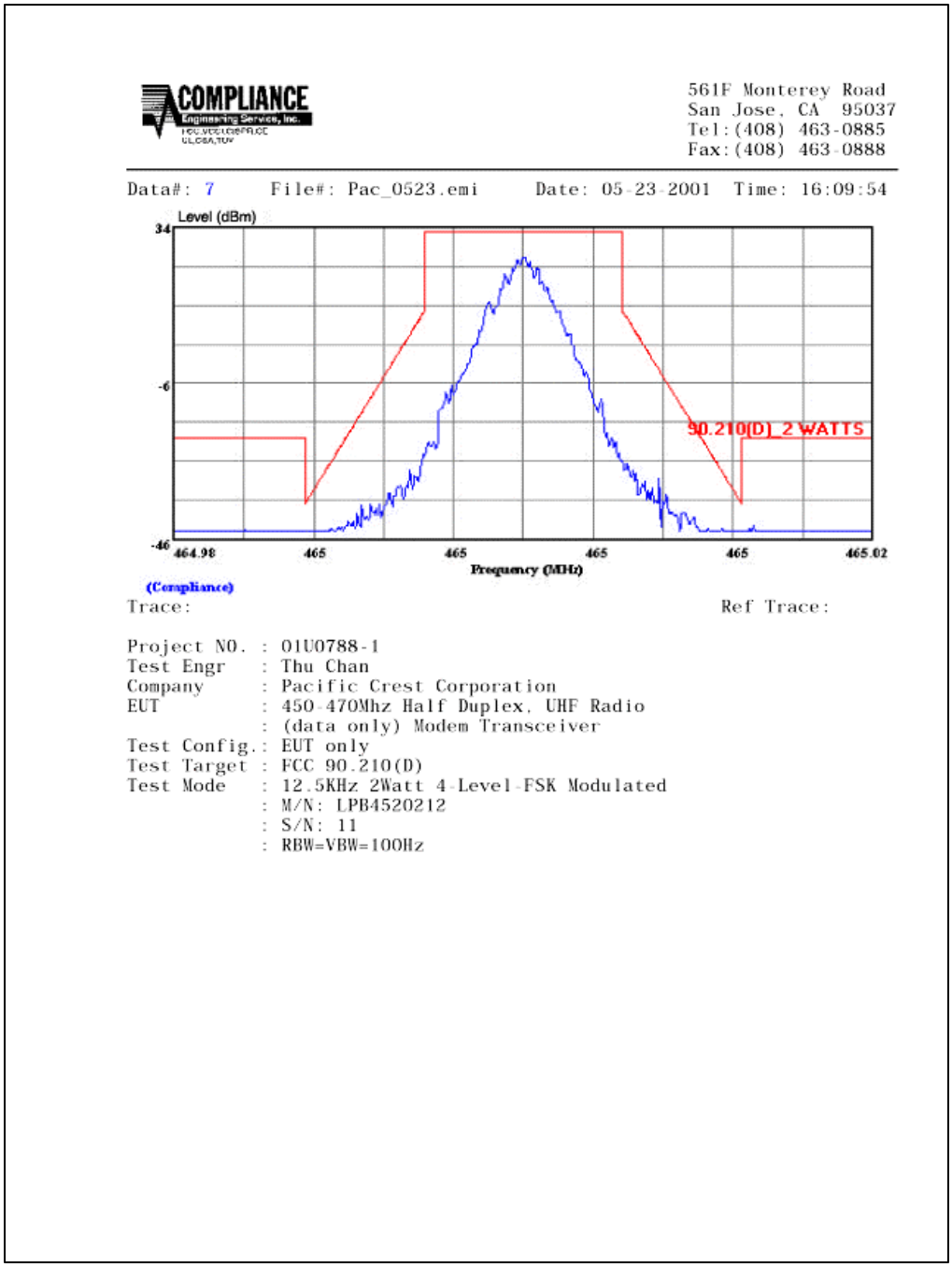
Mask_12.5KHz_4-Level FSK_2W: *Mask Unmodulated, Mask Modulation, Out of Band1, Out of Band2, Out of Band 3.*



Mask: 4-Level FSK Unmodulated

_ 4KHz / Division

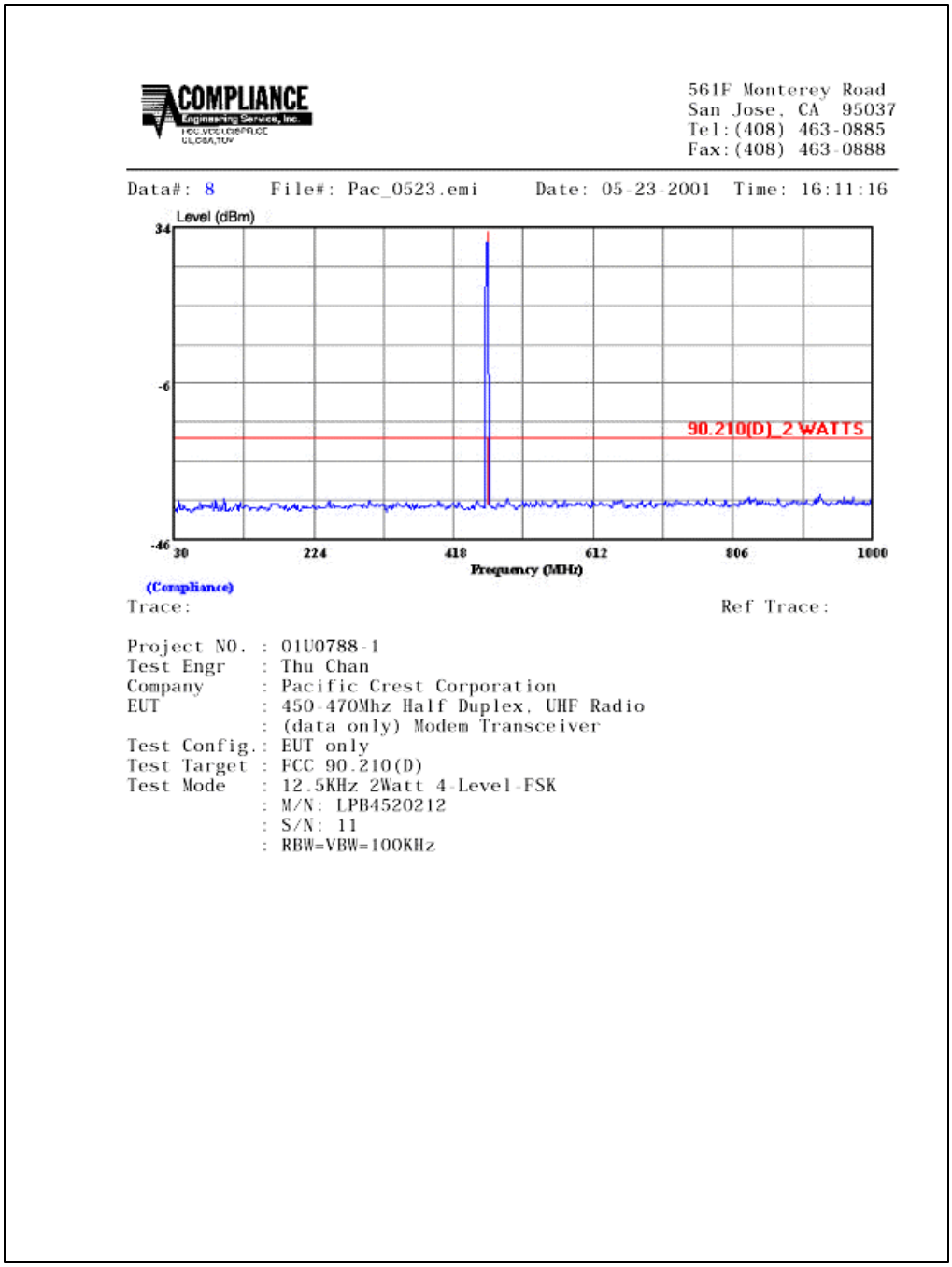
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Mask: 4-Level FSK Modulation

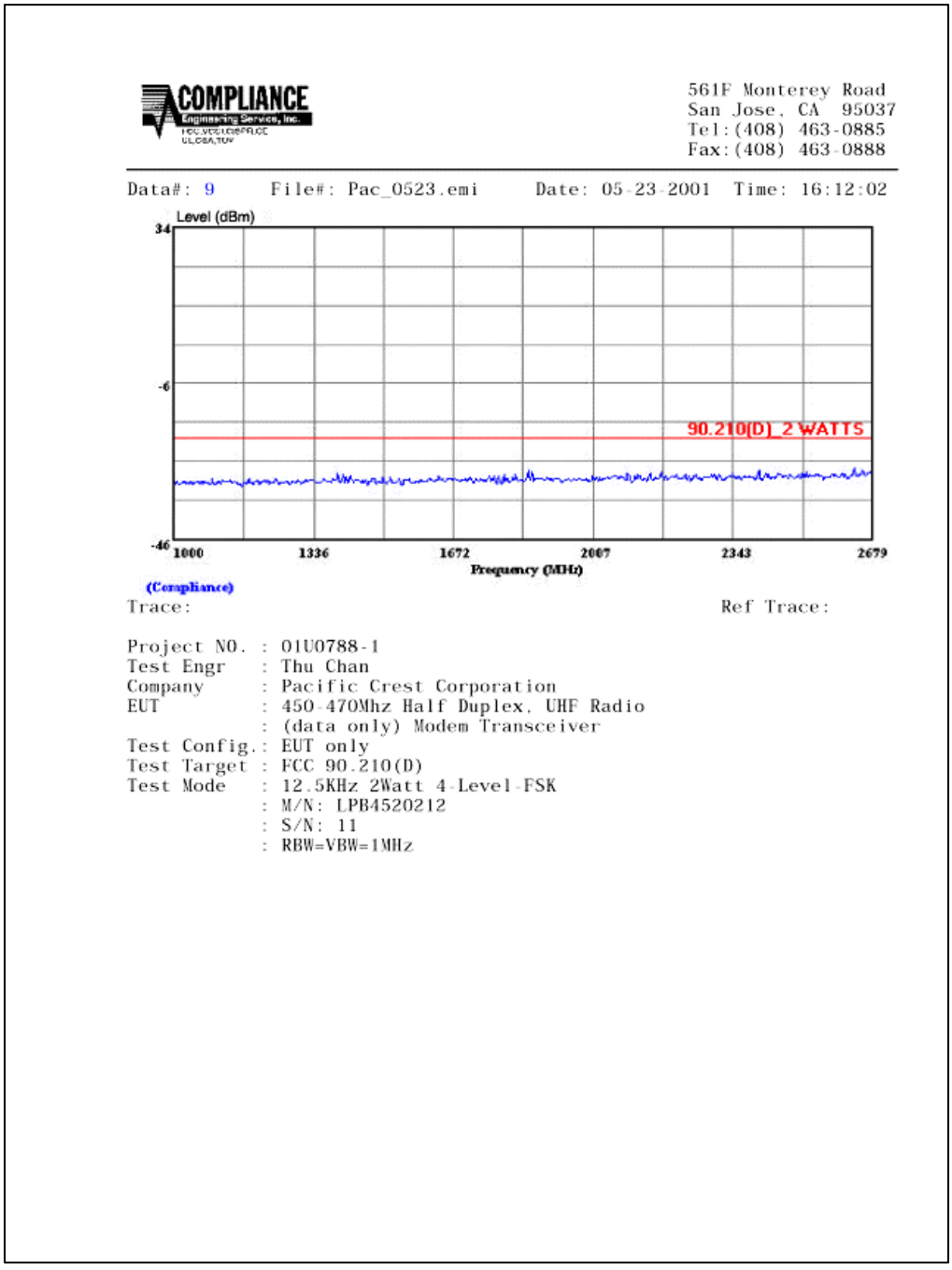
_ 4KHz / Division

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



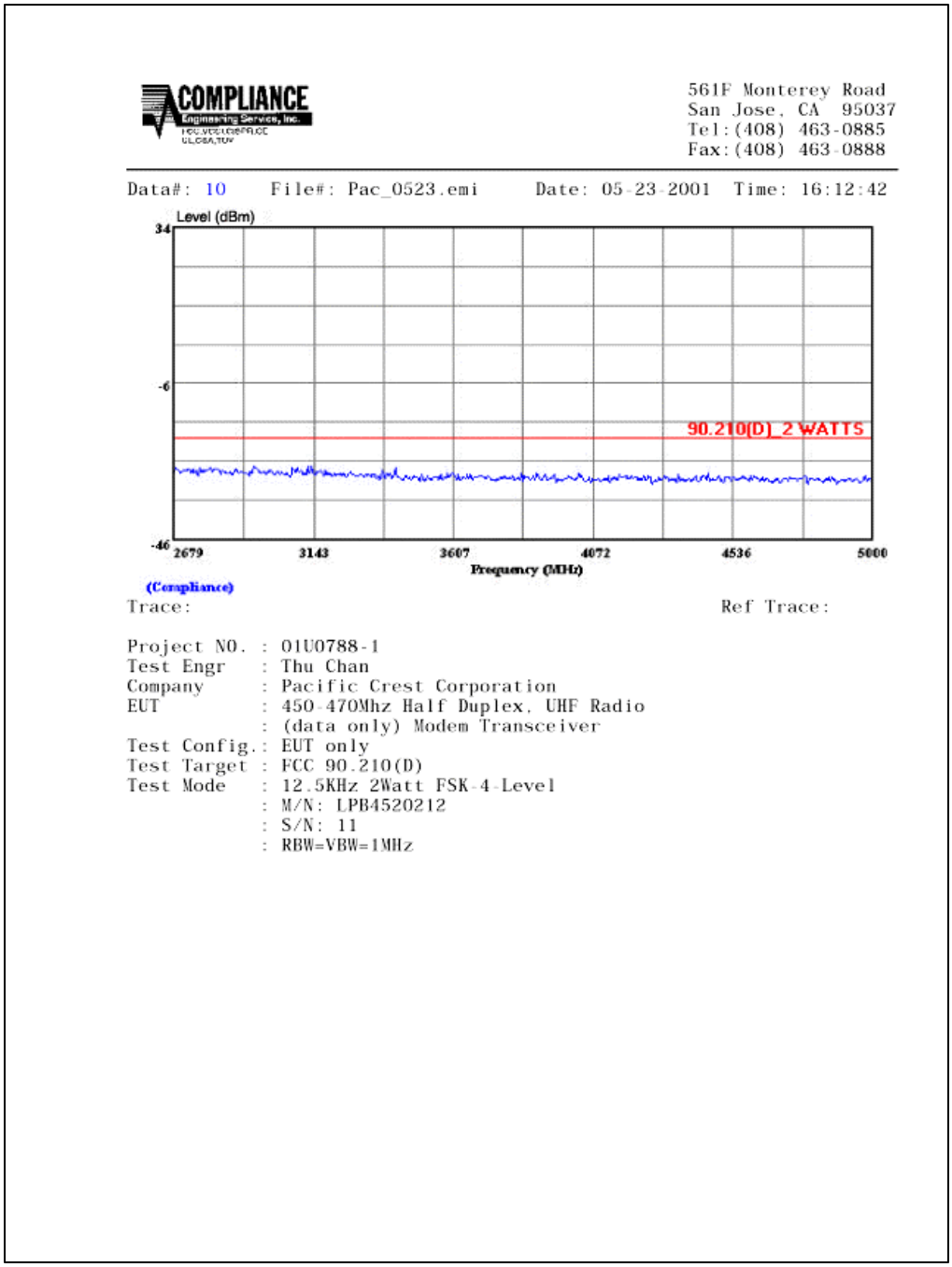
Out-Of-Band1: 4-Level FSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Out-Of-Band2: 4-Level FSK Modulation

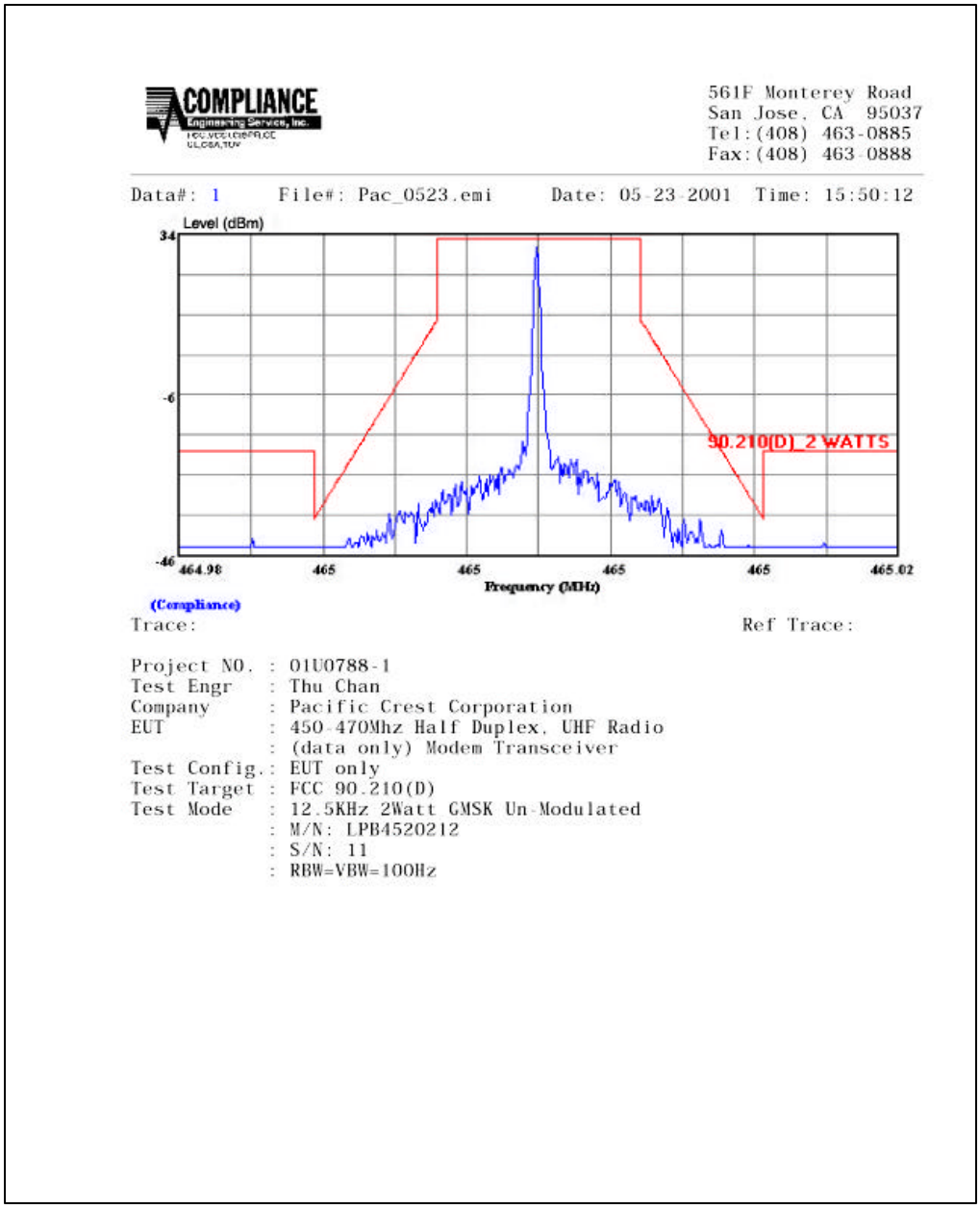
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Out-Of-Band3: 4-Level FSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

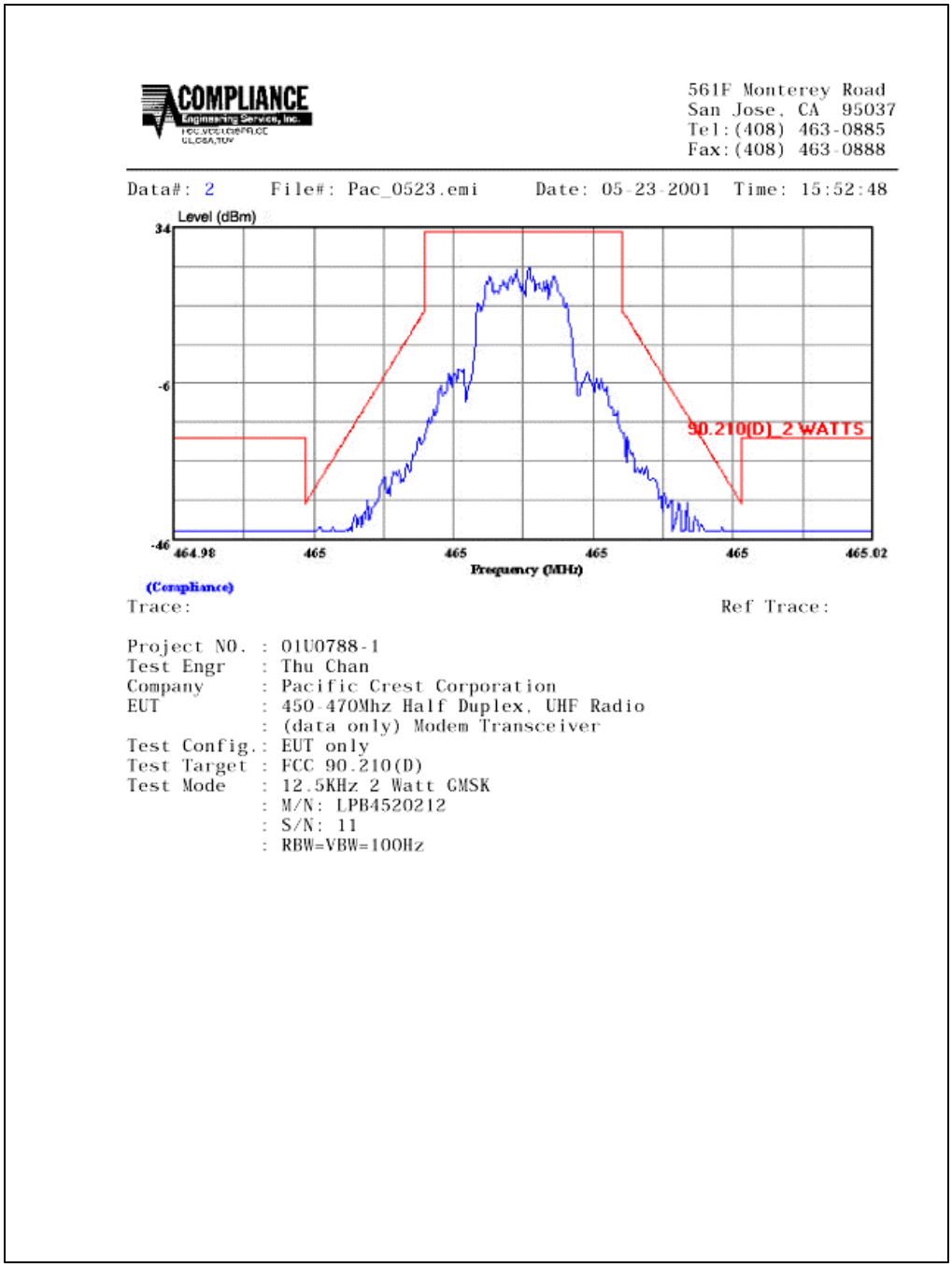
Mask_12.5KHz_GMSK_P2W: ***Mask Unmodulated, Mask Modulation, Out of Band1, Out of Band2, Out of Band3.***



Mask: GMSK Unmodulated

_ 4KHz / Division

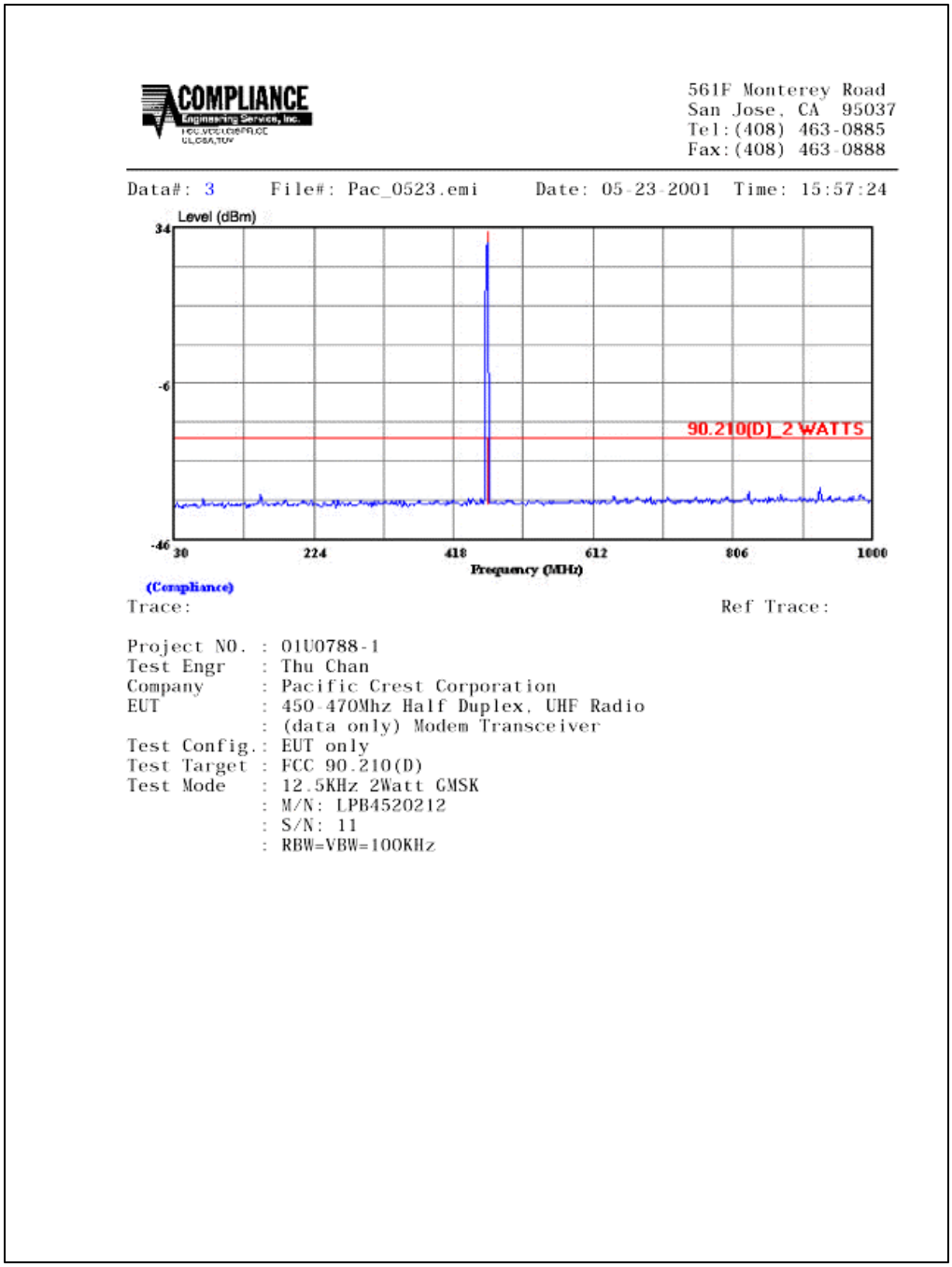
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Mask: GMSK Modulation

_ 4KHz / Division

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

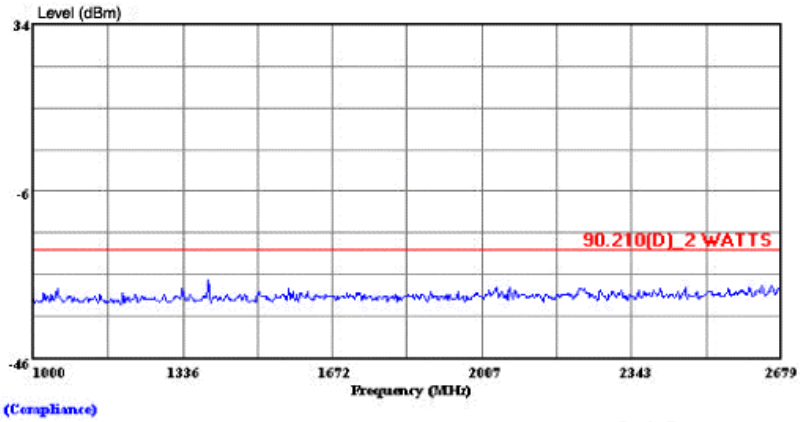


Out-Of-Band1: GMSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

COMPLIANCE Engineering Services, Inc.
561F Monterey Road
San Jose, CA 95037
Tel:(408) 463-0885
Fax:(408) 463-0888

Data#: 4 File#: Pac_0523.emi Date: 05-23-2001 Time: 15:59:06



(Compliance)
Trace: Ref Trace:

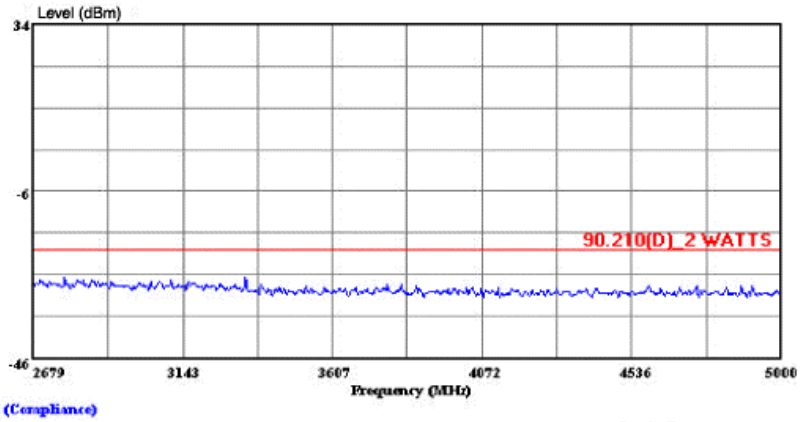
Project NO. : 01U0788-1
Test Engr : Thu Chan
Company : Pacific Crest Corporation
EUT : 450-470Mhz Half Duplex, UHF Radio
: (data only) Modem Transceiver
Test Config.: EUT only
Test Target : FCC 90.210(D)
Test Mode : 12.5KHz 2Watt GMSK
: M/N: LPB4520212
: S/N: 11
: RBW=VBW=1MHz

Out-Of-Band2: GMSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

COMPLIANCE Engineering Services, Inc.
561F Monterey Road
San Jose, CA 95037
Tel:(408) 463-0885
Fax:(408) 463-0888

Data#: 5 File#: Pac_0523.emi Date: 05-23-2001 Time: 15:59:41



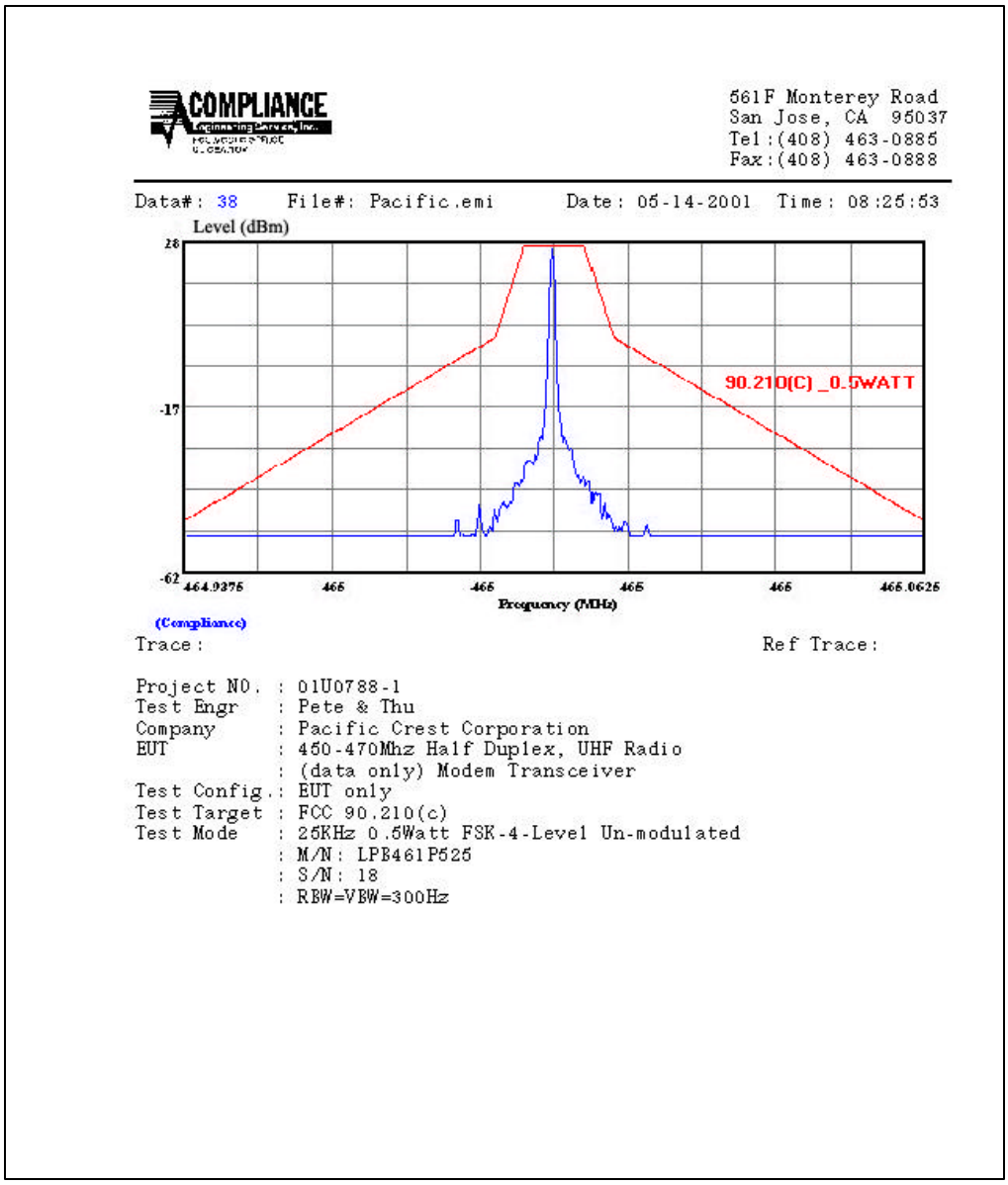
(Compliance)
Trace: Ref Trace:

Project NO. : 01U0788-1
Test Engr : Thu Chan
Company : Pacific Crest Corporation
EUT : 450-470Mhz Half Duplex, UHF Radio
: (data only) Modem Transceiver
Test Config.: EUT only
Test Target : FCC 90.210(D)
Test Mode : 12.5KHz 2Watt GMSK
: M/N: LPB4520212
: S/N: 11
: RBW=VBW=1MHz

Out-Of-Band3: GMSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

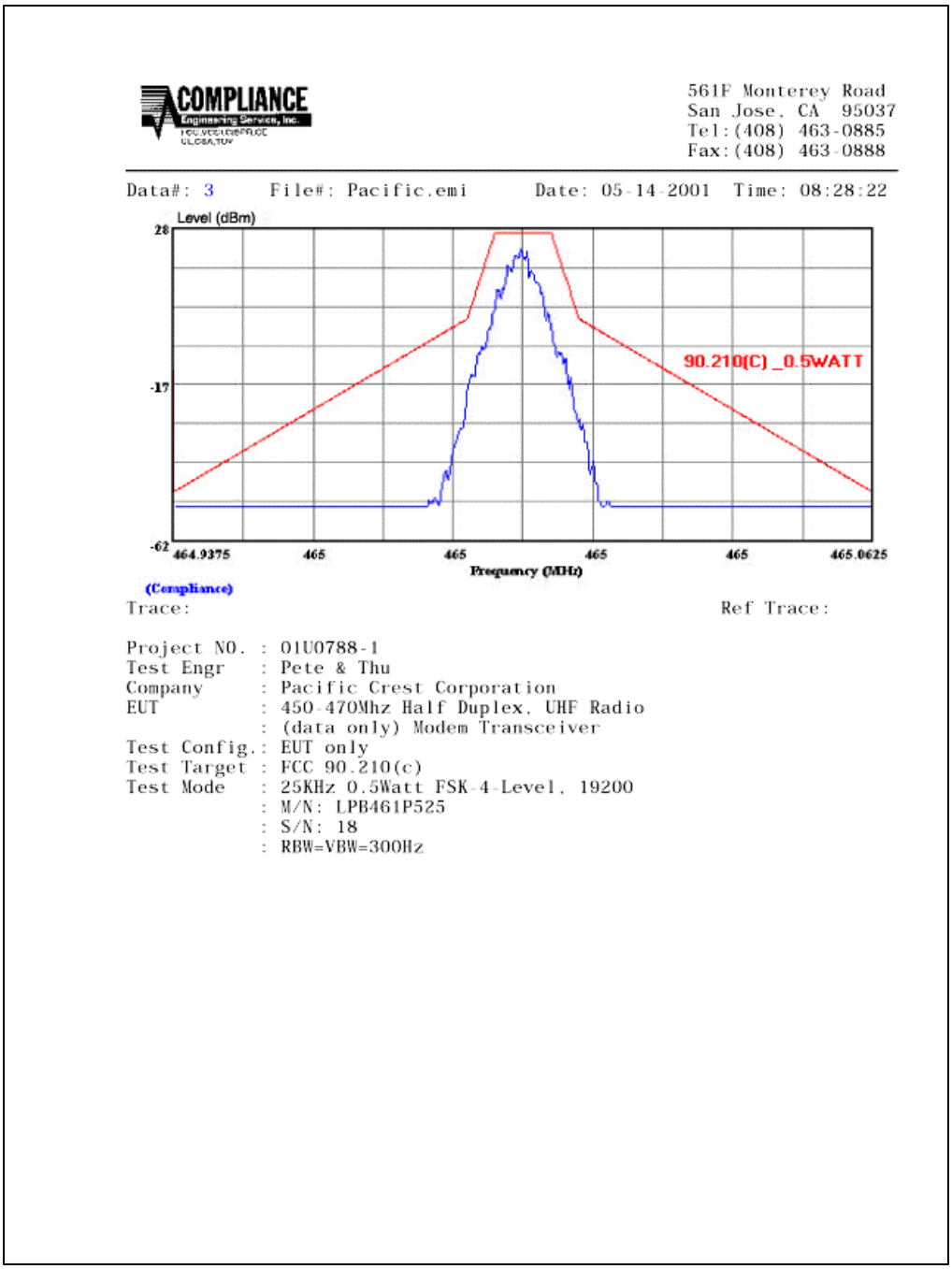
Mask_25KHz_4-Level FSK_P5W: ***Mask Unmodulated, Mask Modulation, Out of Band1, Out of Band2, Out of Band3.***



Mask: 4-Level FSK Unmodulated

_ 12.5KHz / Division

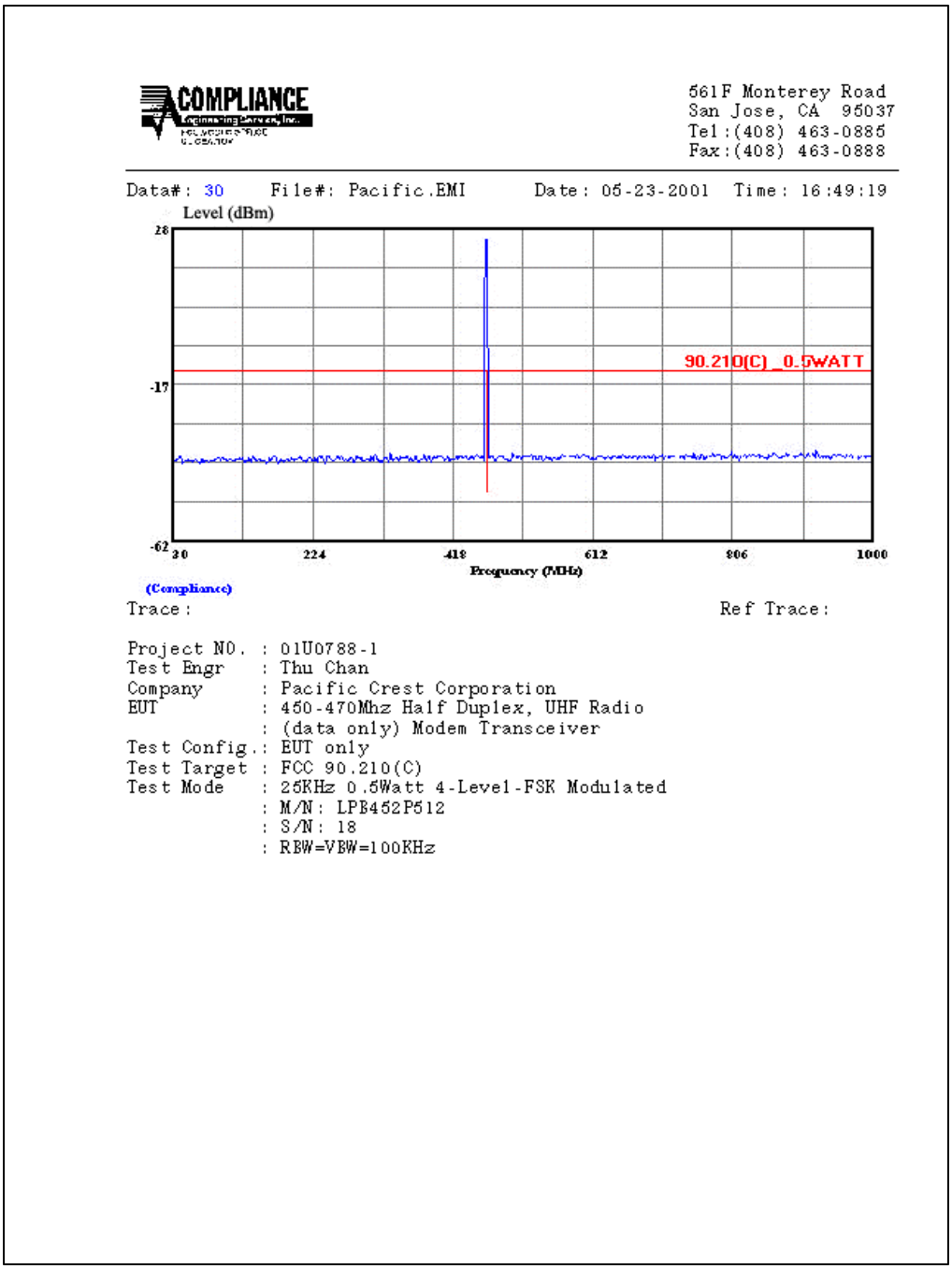
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Mask: 4-Level FSK Modulation

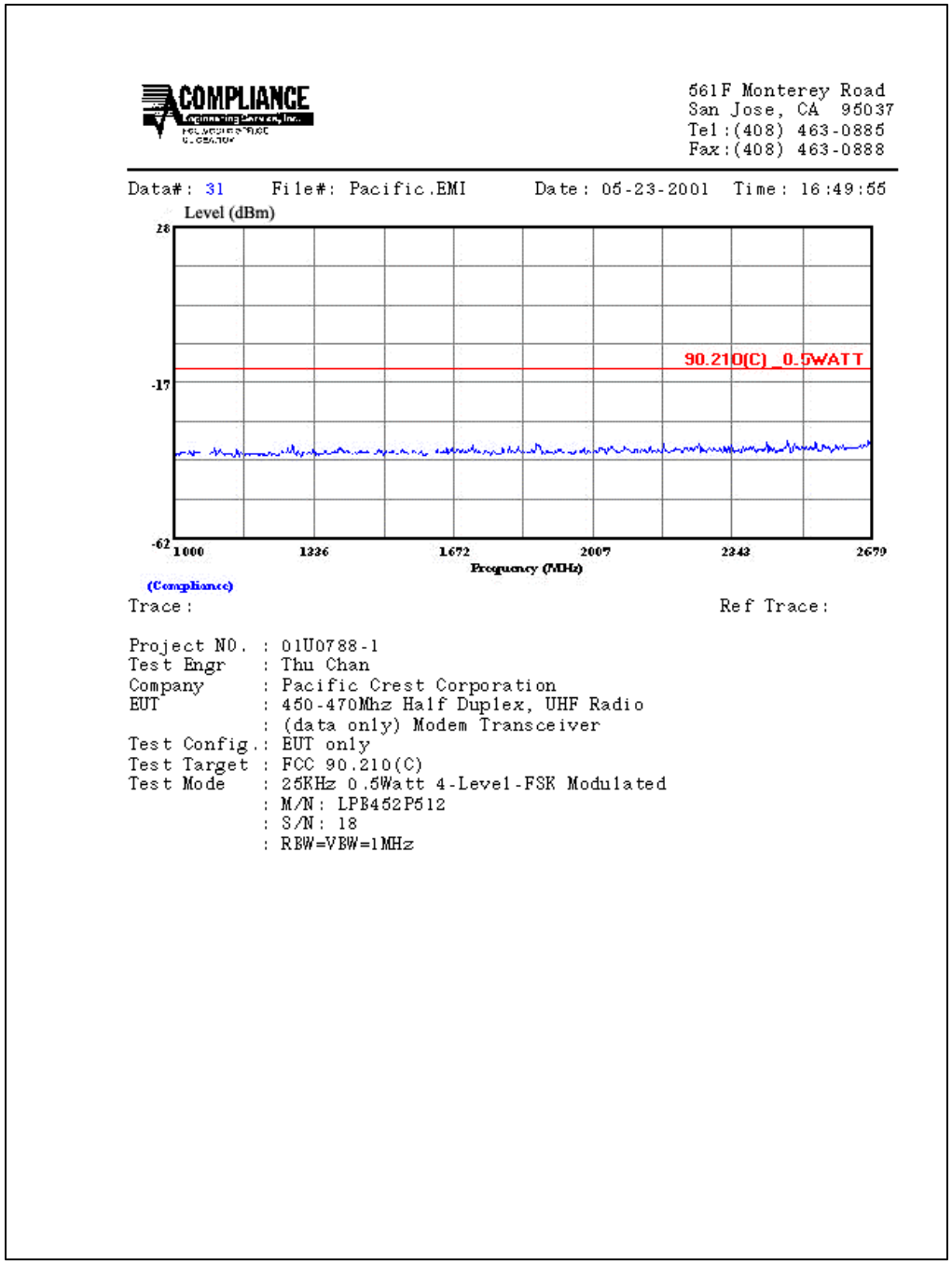
_ 12.5KHz / Division

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



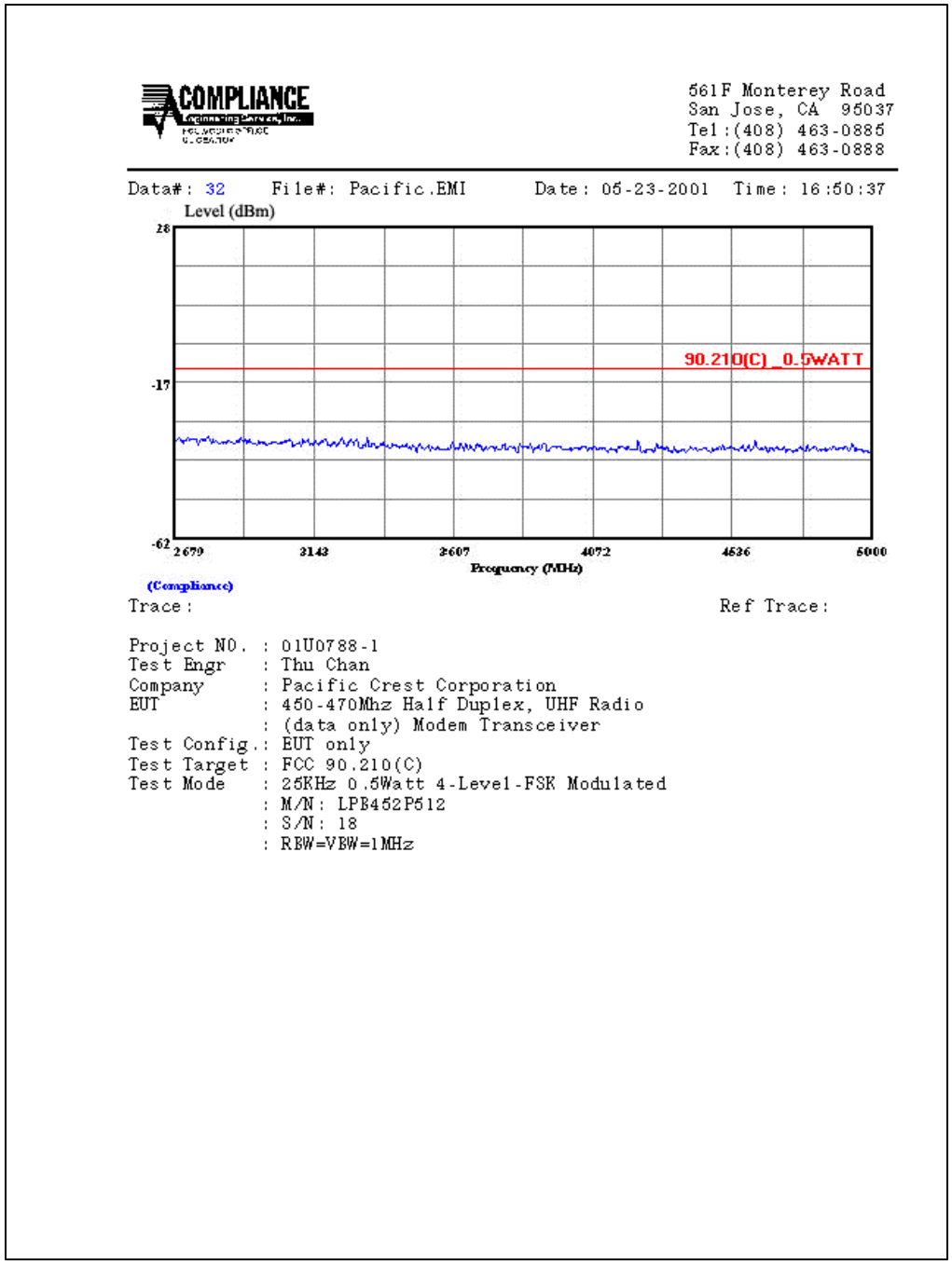
Out-Of-Band 1: 4-Level FSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Out-Of-Band 2: 4-Level FSK Modulation

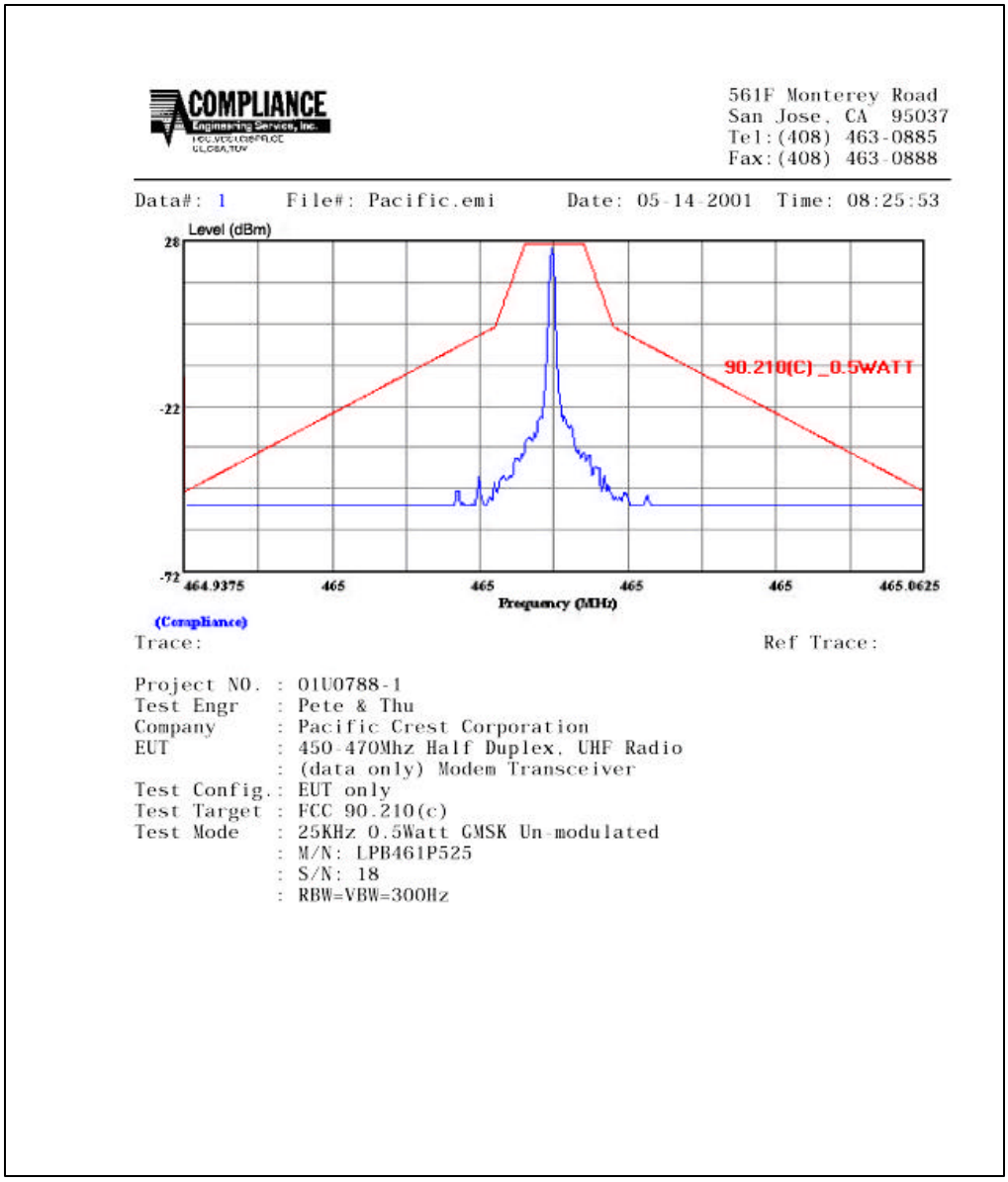
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Out-Of-Band 3: 4-Level FSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

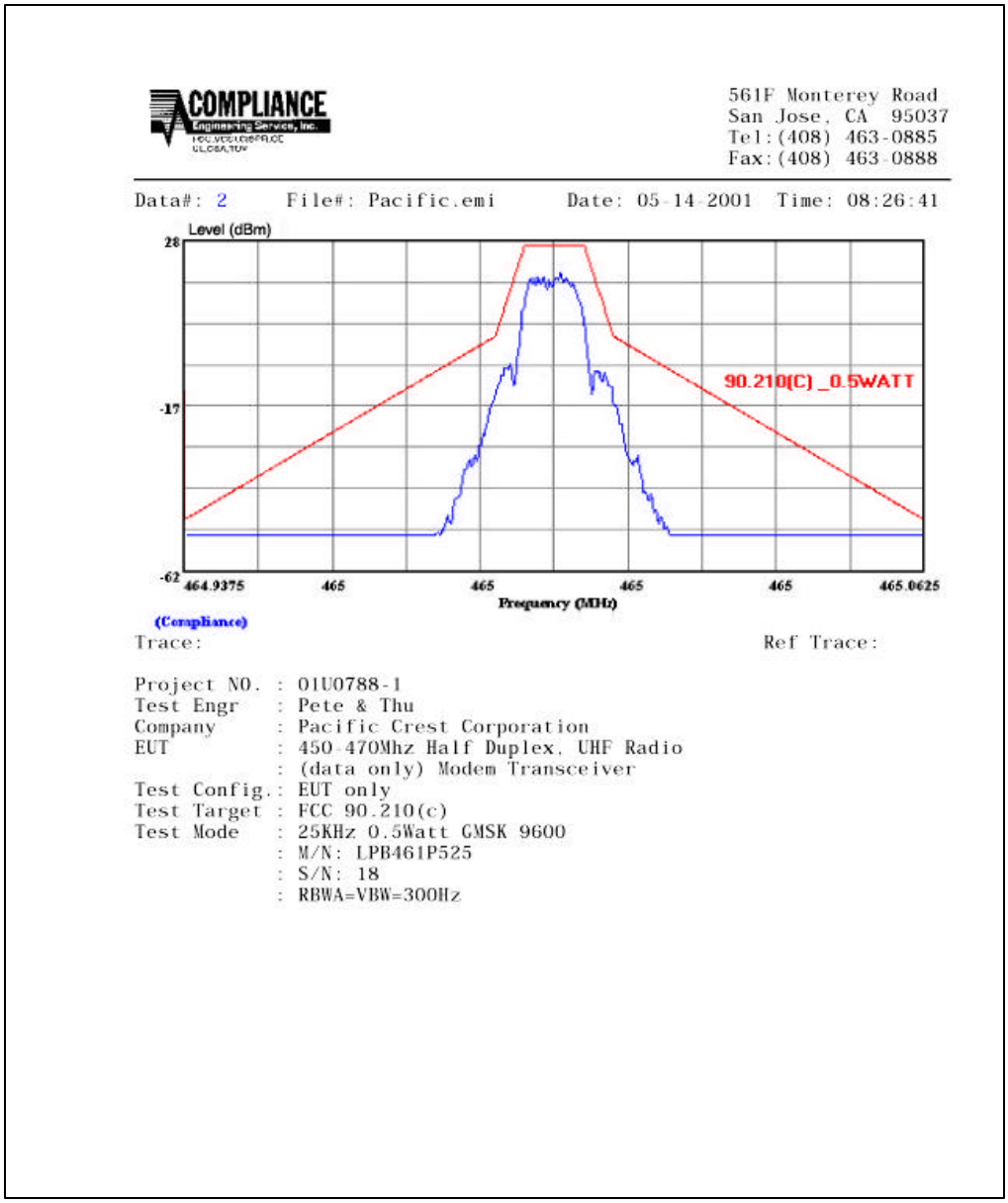
Mask_25KHz_GMSK_P5W: ***Mask Unmodulated, Mask Modulation, Out of Band1, Out of Band2, Out of Band3.***



Mask: GMSK Unmodulated

_ 12.5KHz / Division

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



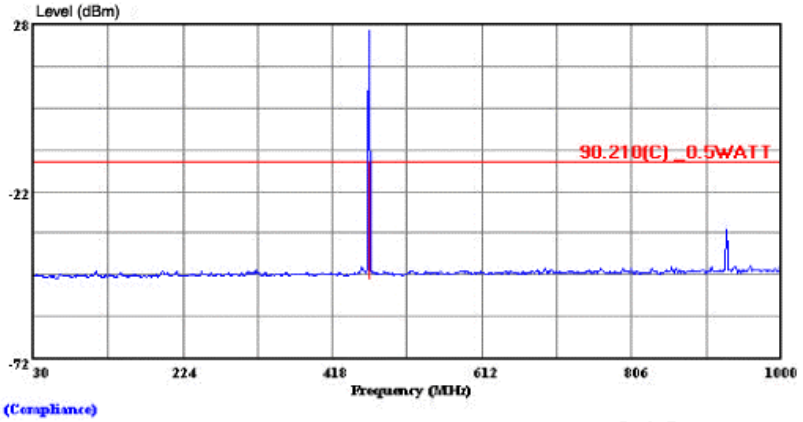
Mask: GMSK Modulation

_ 12.5KHz / Division

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

COMPLIANCE Engineering Service, Inc.
561F Monterey Road
San Jose, CA 95037
Tel:(408) 463-0885
Fax:(408) 463-0888

Data#: 12 File#: Pacific.emi Date: 05-14-2001 Time: 09:19:33



Trace: Ref Trace:

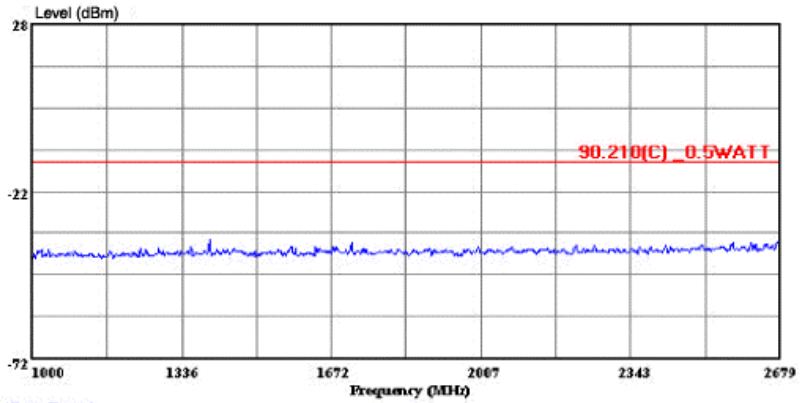
Project NO. : 01U0788-1
Test Engr : Pete & Thu
Company : Pacific Crest Corporation
EUT : 450-470Mhz Half Duplex, UHF Radio
: (data only) Modem Transceiver
Test Config.: EUT only
Test Target : FCC 90.210(c)
Test Mode : 25KHz 0.5Watt GMSK 9600
: M/N: LPB461P525
: S/N: 18
: RBW=VBW=100KHz

Out-Of-Band1: GMSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

561F Monterey Road
San Jose, CA 95037
Tel:(408) 463-0885
Fax:(408) 463-0888

Data#: 13 File#: Pacific.emi Date: 05-14-2001 Time: 09:20:23



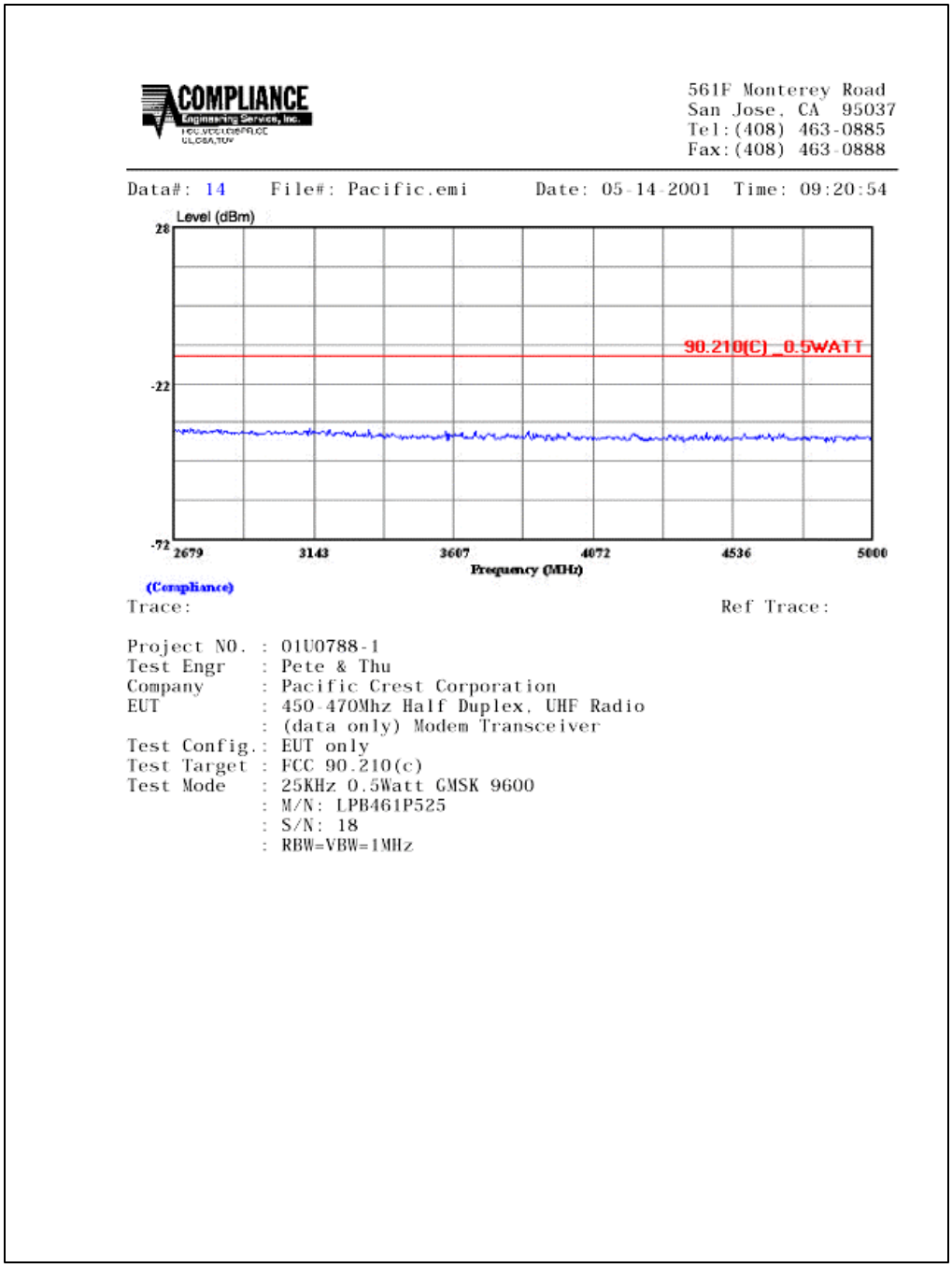
(Compliance)

Trace: Ref Trace:

Project NO. : 01U0788-1
Test Engr : Pete & Thu
Company : Pacific Crest Corporation
EUT : 450-470Mhz Half Duplex, UHF Radio
: (data only) Modem Transceiver
Test Config.: EUT only
Test Target : FCC 90.210(c)
Test Mode : 25KHz 0.5Watt GMSK 9600
: M/N: LPB461P525
: S/N: 18
: RBW=VBW=1MHz

Out-Of-Band2: GMSK Modulation

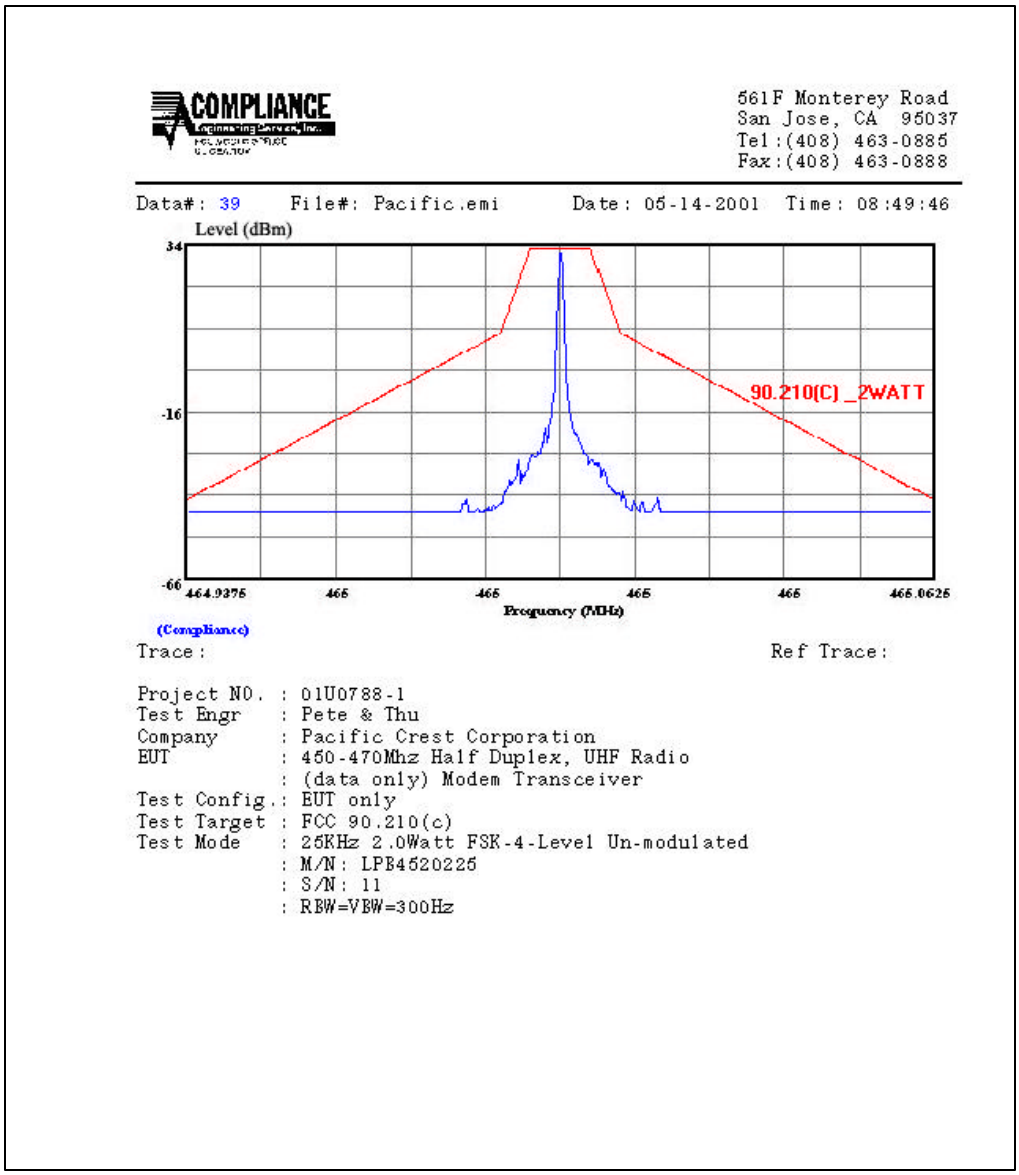
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Out-Of-Band3: GMSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

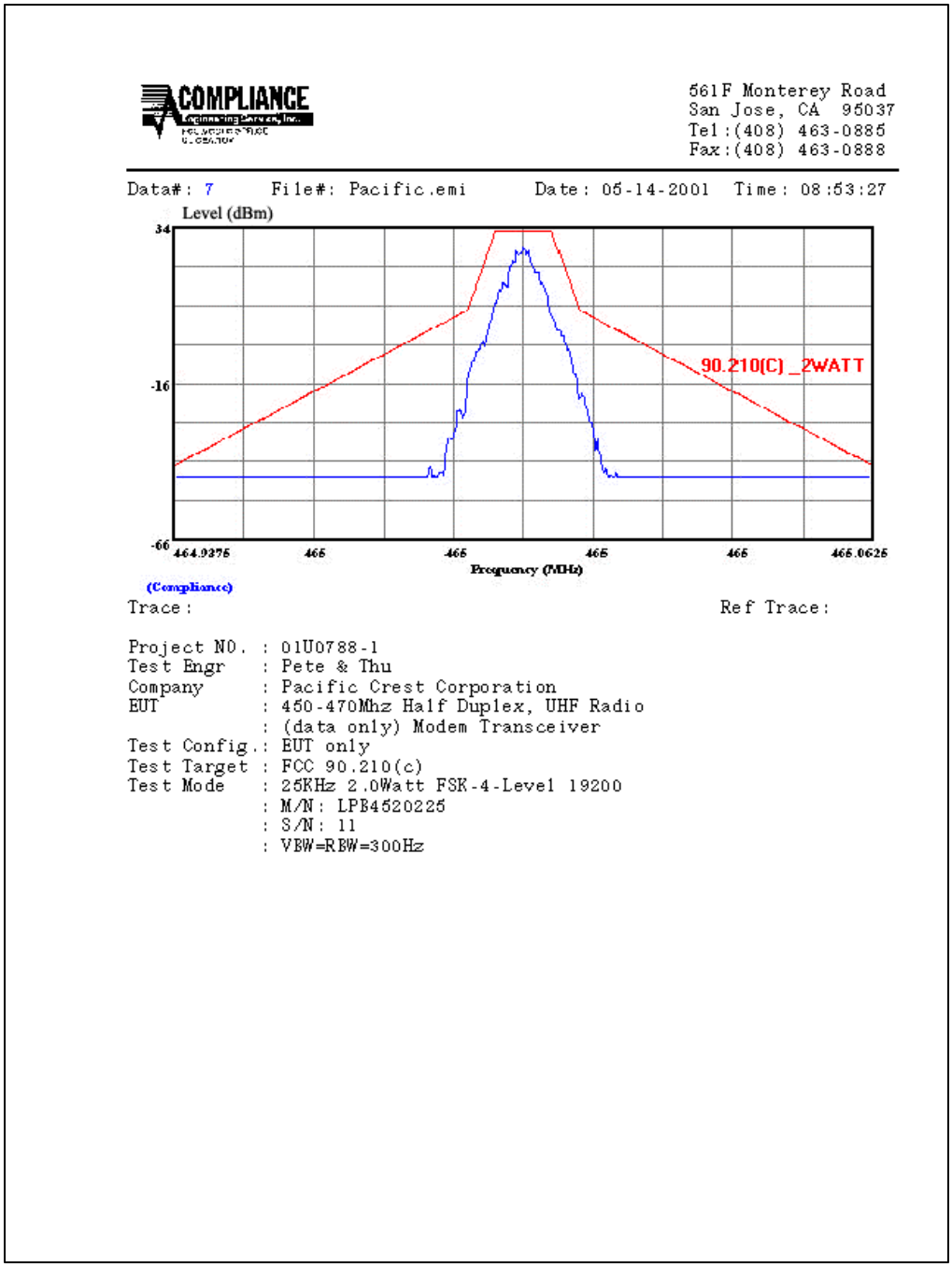
Mask_25KHz_4-Level FSK_2W: ***Mask Unmodulated, Mask Modulation, Out of Band1, Out of Band2, Out of Band3.***



Mask: 4-Level FSK Unmodulated

_ 12.5KHz / Division

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



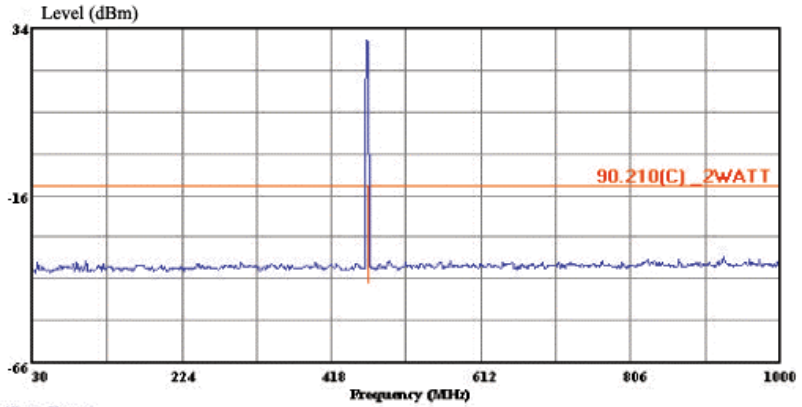
Mask: 4-Level FSK Modulation

_ 12.5KHz / Division

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

COMPLIANCE Engineering Services, Inc.
561F Monterey Road
San Jose, CA 95037
Tel:(408) 463-0885
Fax:(408) 463-0888

Data#: 38 File#: Pacific.EMI Date: 05-23-2001 Time: 16:11:16



Trace: Ref Trace:

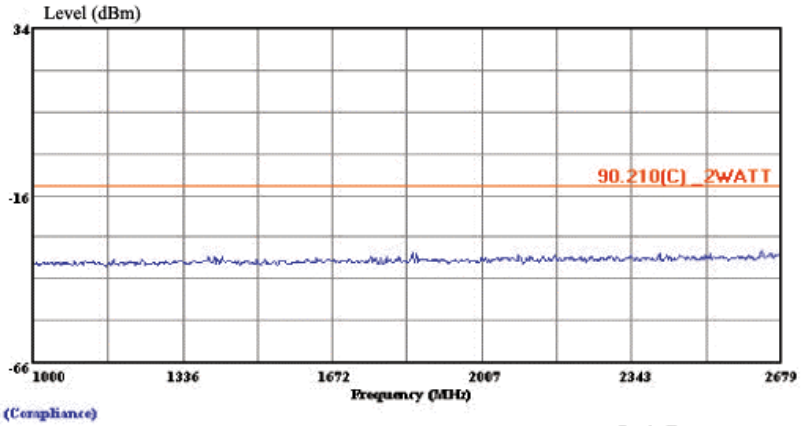
Project NO. : 01U0788-1
Test Engr : Thu Chan
Company : Pacific Crest Corporation
EUT : 450-470Mhz Half Duplex, UHF Radio
: (data only) Modem Transceiver
Test Config.: EUT only
Test Target : FCC 90.210(C)
Test Mode : 25KHz 2Watt 4-Level-FSK Modulated
: M/N: LPB4520212
: S/N: 11
: VBW=RBW=100KHz

Out-Of-Band1: 4-Level FSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

561F Monterey Road
San Jose, CA 95037
Tel:(408) 463-0885
Fax:(408) 463-0888

Data#: 36 File#: Pacific.EMI Date: 05-23-2001 Time: 16:12:02



Trace: Ref Trace:

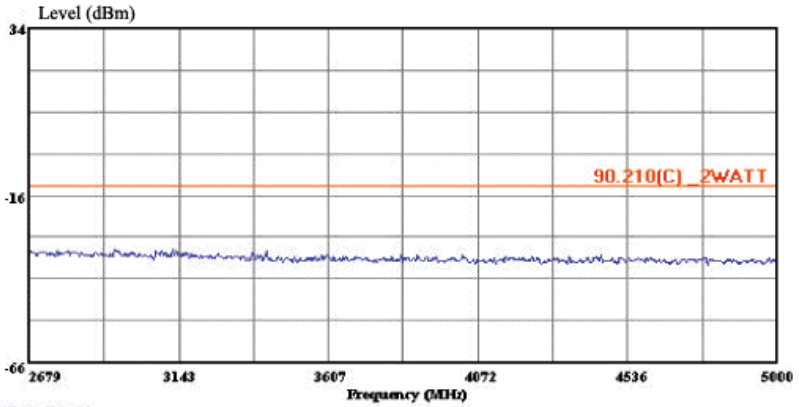
Project NO. : 01U0788-1
Test Engr : Thu Chan
Company : Pacific Crest Corporation
EUT : 450-470Mhz Half Duplex, UHF Radio
: (data only) Modem Transceiver
Test Config.: EUT only
Test Target : FCC 90.210(C)
Test Mode : 25KHz 2Watt 4-Level-FSK Modulated
: M/N: LPB4520212
: S/N: 11
: RBW=VBW=1MHz

Out-Of-Band2: 4-Level FSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

COMPLIANCE Engineering Services, Inc.
561F Monterey Road
San Jose, CA 95037
Tel:(408) 463-0885
Fax:(408) 463-0888

Data#: 37 File#: Pacific.EMI Date: 05-23-2001 Time: 16:12:42



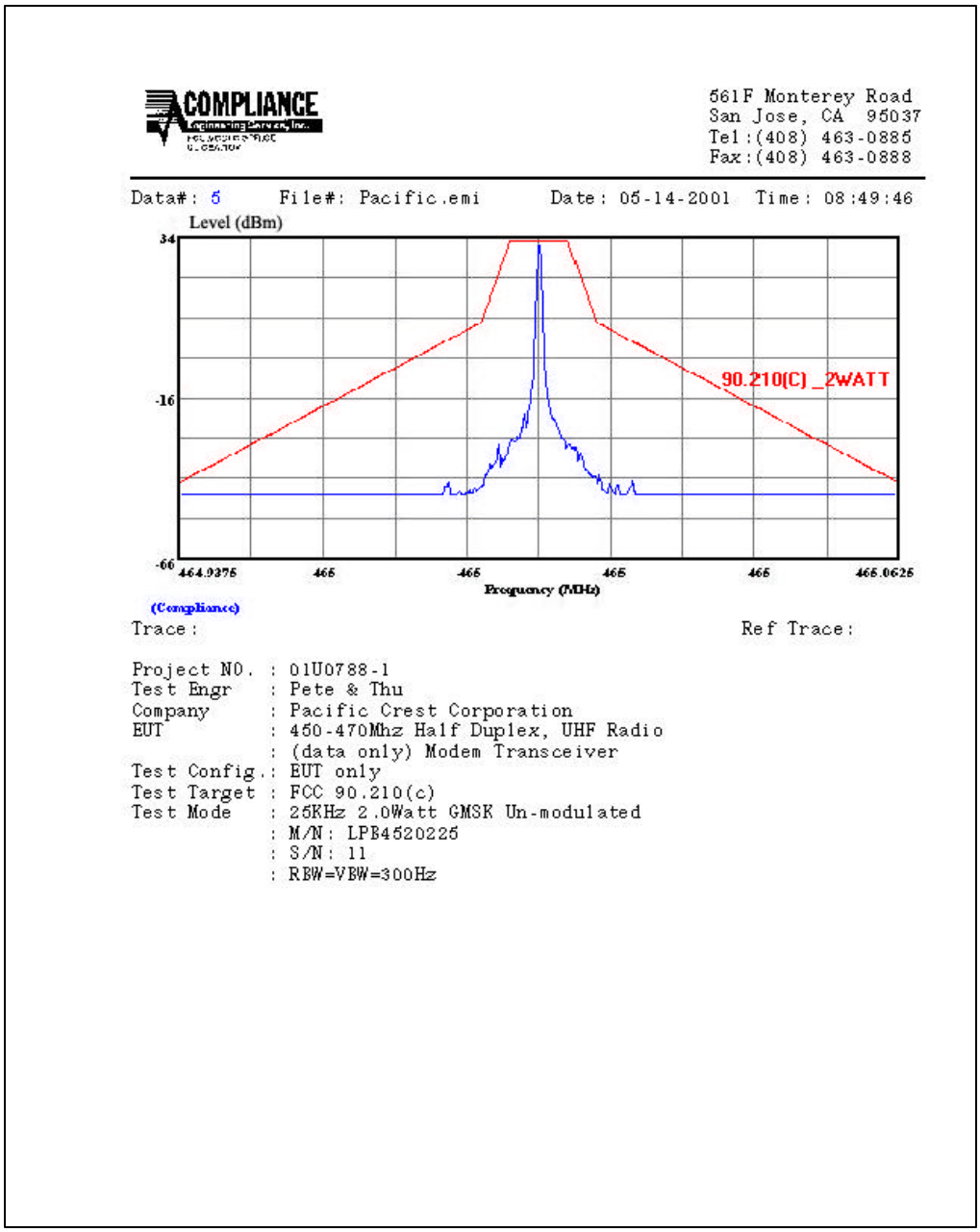
Trace: Ref Trace:

Project NO. : 01U0788-1
Test Engr : Thu Chan
Company : Pacific Crest Corporation
EUT : 450-470Mhz Half Duplex, UHF Radio
: (data only) Modem Transceiver
Test Config.: EUT only
Test Target : FCC 90.210(C)
Test Mode : 25KHz 2Watt 4-Level-FSK Modulated
: M/N: LPB4520212
: S/N: 11
: RBW=VBW=1MHz

Out-Of-Band3: 4-Level FSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

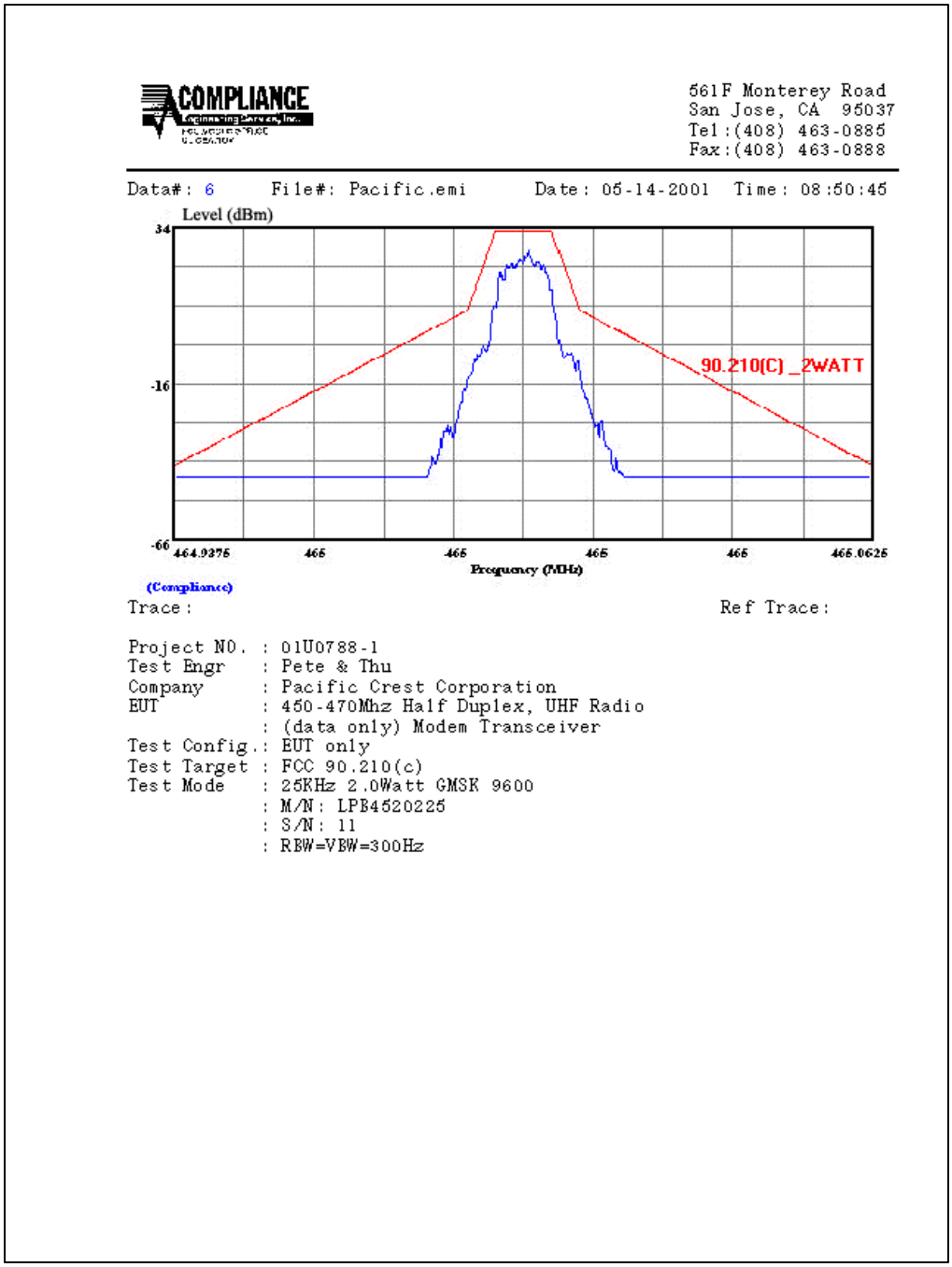
Mask_25KHz_GMSK_P2W: ***Mask Unmodulated, Mask Modulation, Out of Band1, Out of Band2, Out of Band3.***



Mask: GMSK Unmodulated

_ 12.5KHz / Division

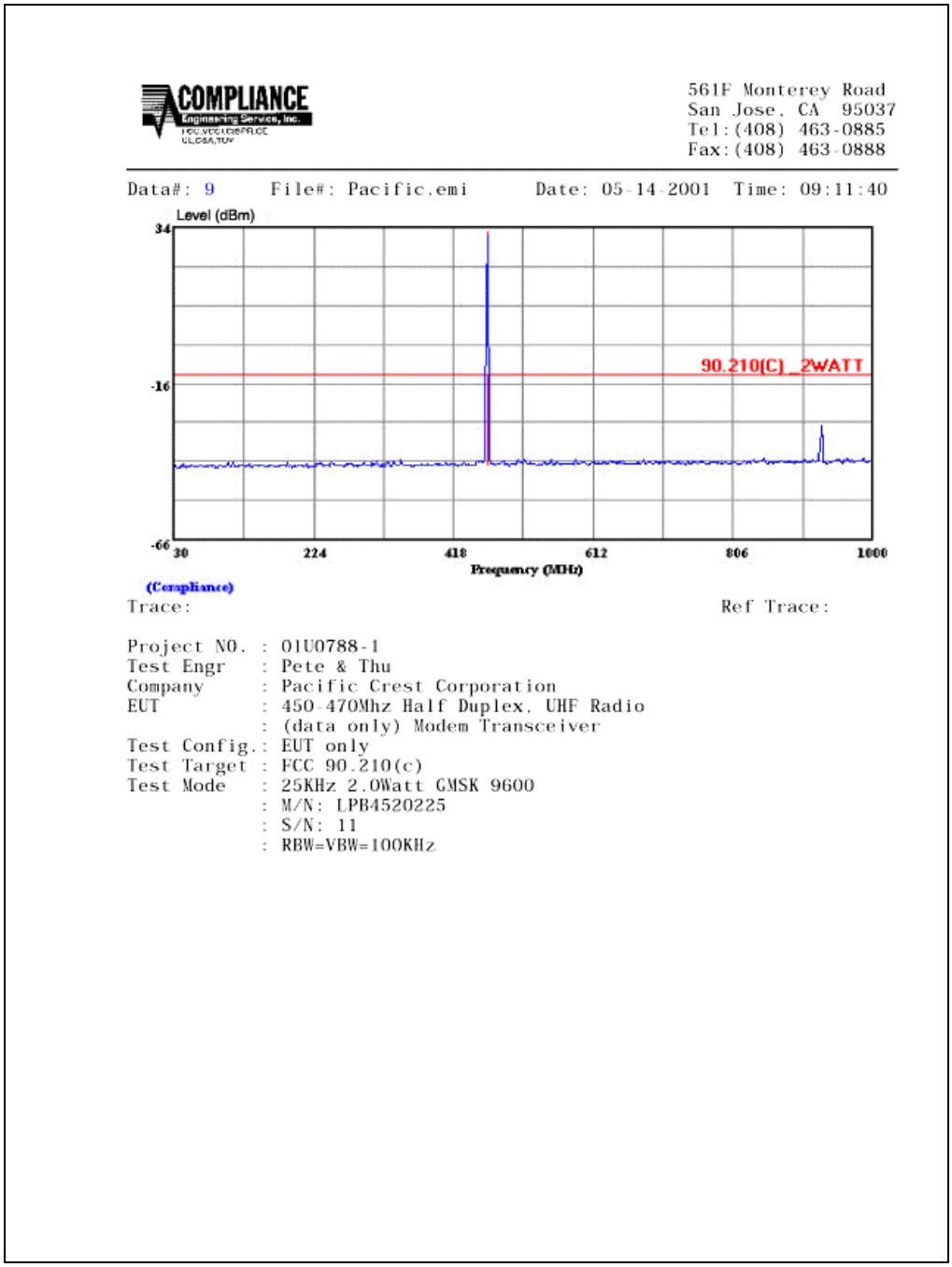
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Mask: GMSK Modulation

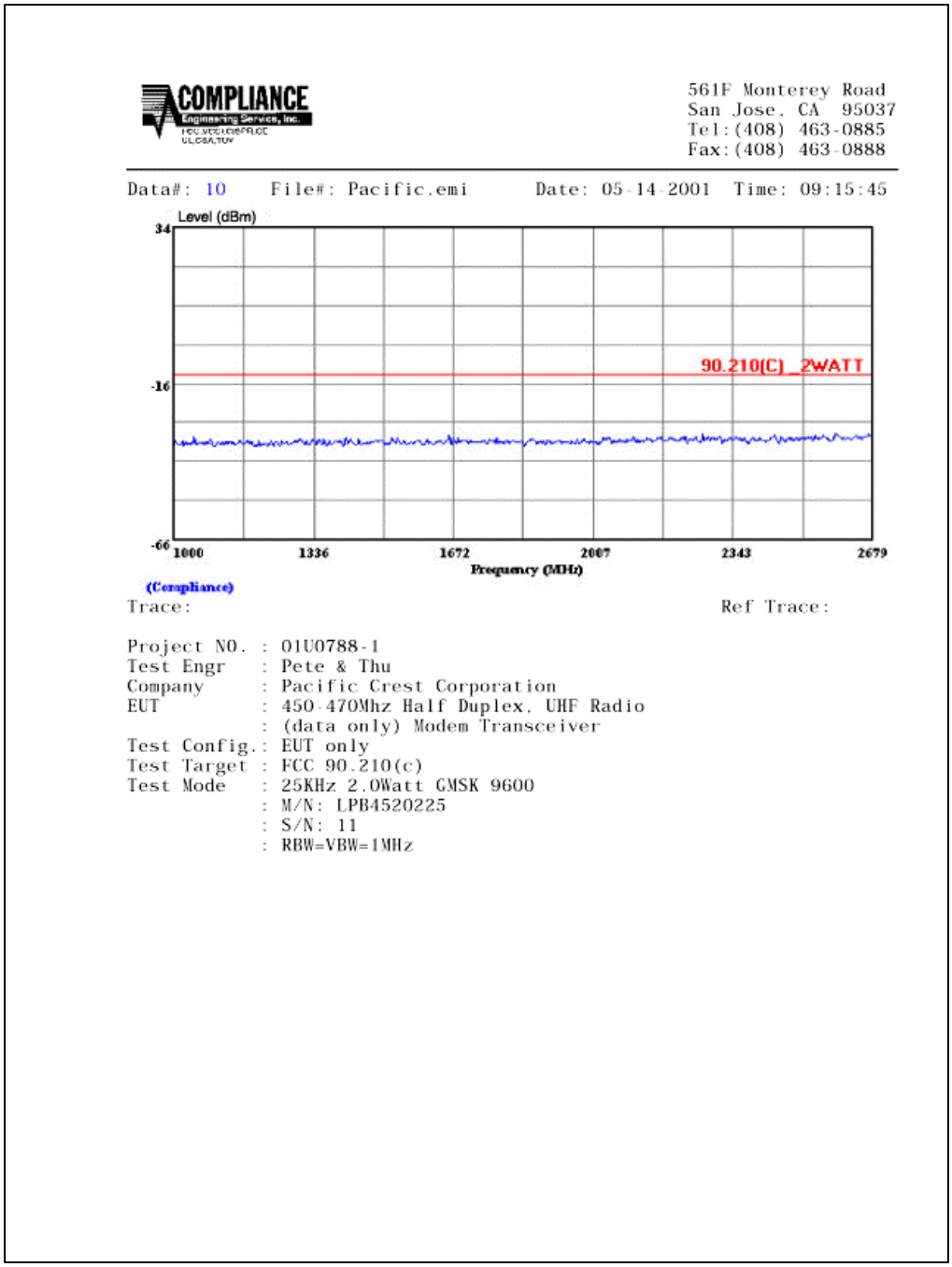
_ 12.5KHz / Division

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



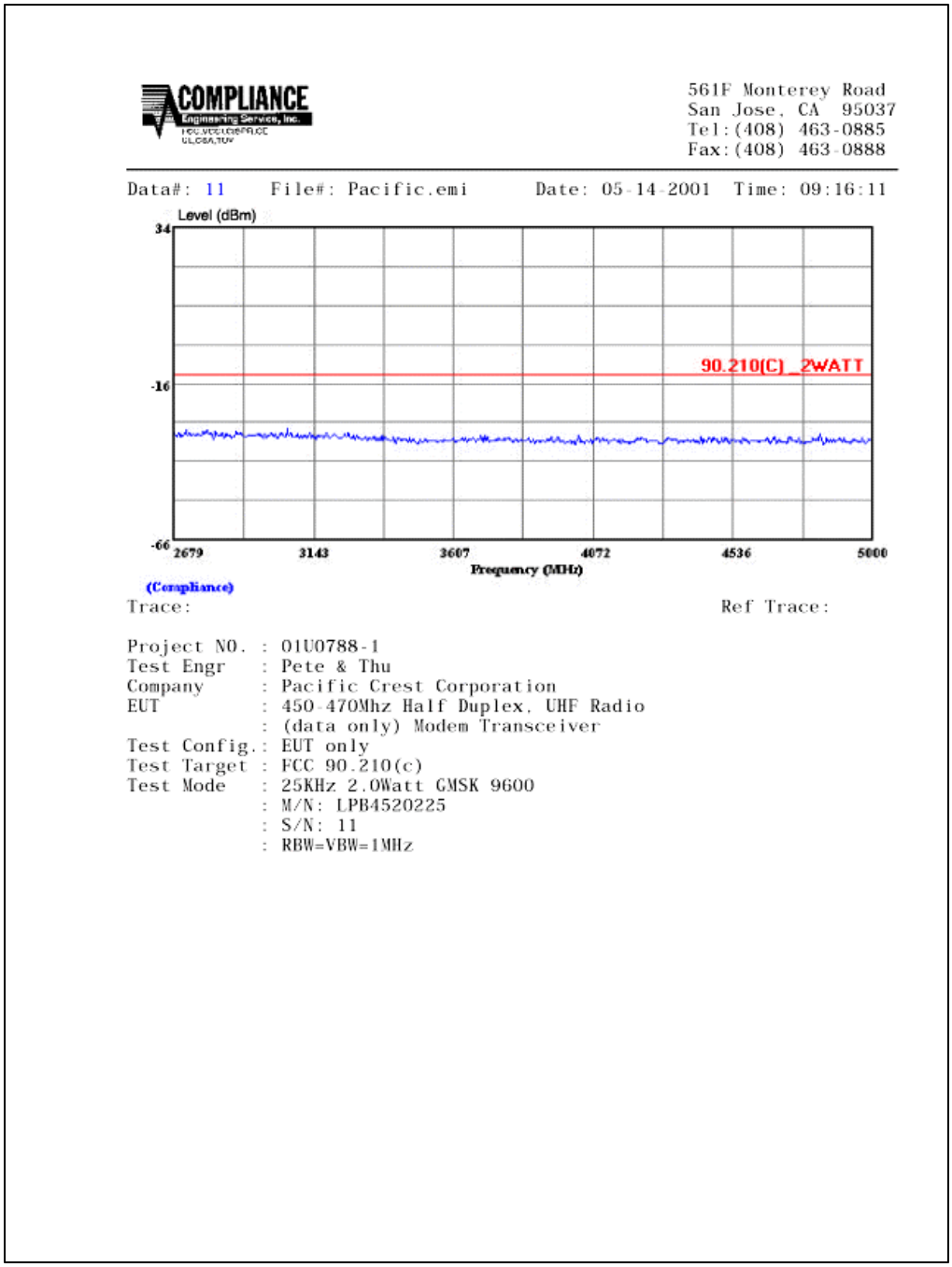
Out-Of-Band1: GMSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Out-Of-Band2: GMSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.



Out-Of-Band3: GMSK Modulation

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

8.6 FREQUENCY STABILITY

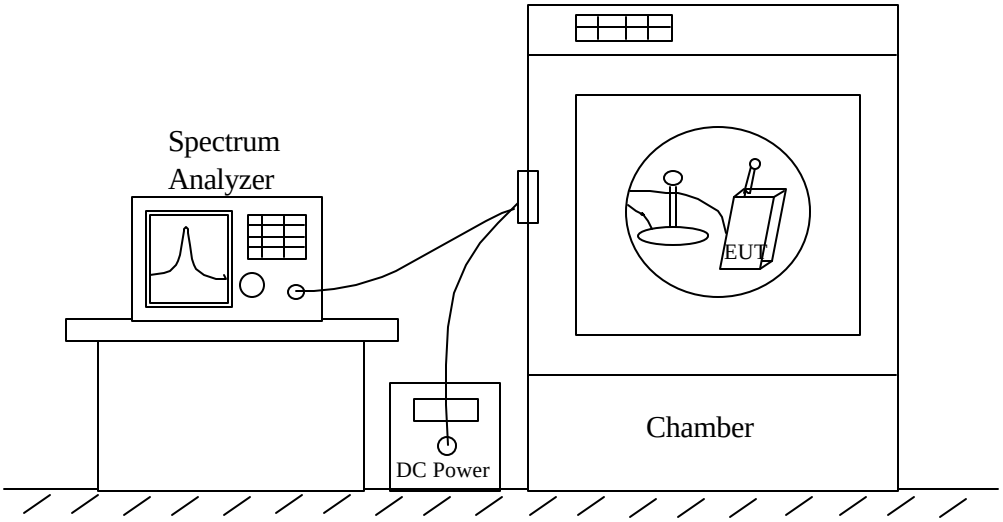
INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Spectrum Analyzer	HP	8562EC	07/18/02
Attenuator	HP	8496A	N/A
Attenuator	HP	8494A	N/A
Environmental Chamber	TENNY	TUJR	Customer Cal.
Thermostat	Fluke	87	06/26/02

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	Peak	100 Hz	100 Hz
Above 1000	Peak	100 Hz	100 Hz

TEST SETUP



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

TEST PROCEDURE

- **Frequency stability versus environmental temperature**

1). Setup the configuration per figure 6 for frequencies measurement inside the environmental chamber. Set the temperature of the chamber to 25°C and Install new batteries to the EUT if it is battery powered. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.
2). Turn EUT off and set Chamber temperature to -30°C.
3). Allow sufficient time (approximately 20 to 30 minus after chamber reach the assigned temperature) for EUT to stabilize. Turn on EUT and measure the EUT operating frequency. Turn off EUT after the measurement.
4). Repeat step 3 with a 10°C increased per stage until the highest temperature of +50°C reached, record all measured frequencies on each temperature step.

- **Frequency stability versus DC input voltage**

1). Setup the configuration per figure 6 and set chamber temperature to 25°C. Use a variable DC power supply to power the EUT and set DC output voltage to EUT nominal input DC voltage. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.
2). Slowly reduce the EUT input voltage to specified extreme voltage variation or battery-end-point voltage (if battery powered) and record the maximum frequency change.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

RESULT

Complies, as shown below.

Frequency stability versus environmental temperature

Reference Frequency: 459.999800 MHz		Limit: 2.5 ppm (1150Hz)	
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency deviation measured with time elapse	
		MHz	Delta (Hz)
50	Fixed ext DC 12V	459.999558	242
40	Fixed ext DC 12V	459.999875	75
30	Fixed ext DC 12V	460.000150	350
20	Fixed ext DC 12V	459.99980	0
10	Fixed ext DC 12V	460.000050	250
0	Fixed ext DC 12V	460.000150	350
-10	Fixed ext DC 12V	459.999842	42
-20	Fixed ext DC 12V	459.999742	58
-30	Fixed ext DC 12V	460.000175	375

Frequency stability versus DC input voltage

Reference Frequency: 459.999800 MHz			Limit: 2.5 ppm (1150Hz)
Environment Temperature (°C)	Power Supplied		Frequency deviation measured with time elapse Delta (Hz)
	12Vdc	9Vdc	
20	459.999800 MHz	459.999833 MHz	33 Hz

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

8.7 TRANSIENT FREQUENCY BEHAVIOR

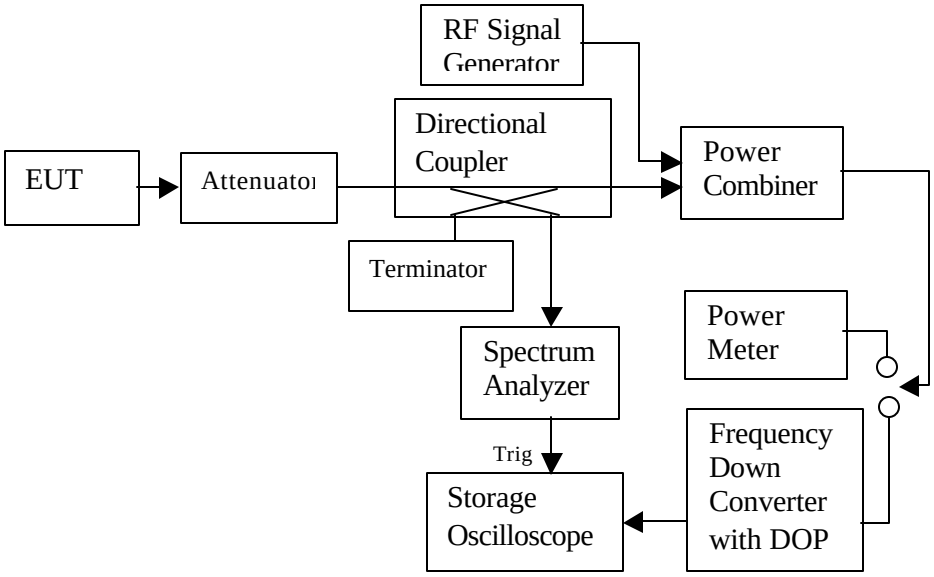
INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Spectrum Analyzer	HP	8562EC	07/18/02
Communication System Analyzer	Motorola	R-2600 B/NT	In house cal.
Signal Generator	HP	83732B	03/21/02
Storage Oscilloscope	Tektronix	TDS 220	In house cal.
Power Meter	HP	436B	04/02/02
Directional Coupler	Werlatone	06021	N/A
Power Combiner	Mini Circuits	15542	N/A
Attenuator			

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	☒ Peak ☐ Quasi Peak	☒ 100 KHz ☐ 120 KHz	☒ 100 KHz ☐ 120 KHz
Above 1000	☒ Peak ☐ Average	☒ 1 MHz ☐ 1 MHz	☒ 1 MHz ☐ 10 Hz

TEST SETUP



*p.s. Setup in according to TIA/EIA 603

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

TEST PROCEDURE

a) Connect the equipment as illustrated.
b) Connect the test receiver's Demodulator Output Port (DOP) to the vertical input channel of the storage oscilloscope. Connect the output of the RF peak detector to the external trigger on the storage oscilloscope. Connect the output of the RF combiner to the RF power meter.
c) Set the test receiver to measure FM deviation with the audio bandwidth set at ≤ 50 Hz to ≥15,000 Hz and tune the RF frequency to the transmitter assigned frequency.
d) Set the signal generator to the assigned transmitter frequency and modulated it with a 1 kHz tone at ±25 kHz deviation and set its output level to –100 dBm.
e) Turn the transmitter on.
f) Supply sufficient attenuation via the RF attenuator to provide an input level to the test receiver which is approximately 40 dB below the test receiver's maximum allowed input power when the transmitter is operating at its rated power level. Note this power level on the RF power meter.
g) Turn the transmitter off.
h) Adjust the RF level of the signal generator to provide RF power into the RF power meter 20dB below the level noted in step f). This signal generator RF level shall be maintained throughout the rest of the measurement.
i) Disconnect the RF power meter and connect the output of the RF combiner network to the input of the test receiver.
j) Set the horizontal sweep rate on the storage oscilloscope to 10 milliseconds per division and adjust the display to continuously view the 1000 Hz tone from the DOP. Adjust the vertical

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

amplitude control of the oscilloscope to display the 1000 Hz at ±4 divisions vertically centered on the display.

k) Adjust the oscilloscope so it will trigger on an increasing magnitude from the RF peak detector at 1 division from the left side of the display when the transmitter is turned on. Set the controls to store the display.

l) Reduce the attenuation of the RF attenuator so the input to the RF peak detector and the RF combiner is increased by 30 dB when the transmitter is turned on.

m) Turn on the transmitter and observe the stored display. The output at the DOP, due to the change in the ratio of power between the signal generator input power and the transmitter output power will, because of the capture effect of the test receiver, produce a change in display. For the first part of the sweep it will show the 1 kHz test signal. Then once the receiver's demodulator has been captured by the transmitter power, the display will show the frequency difference from the assigned frequency to the actual transmitter frequency versus time. The instant when the 1 kHz test signal is completely suppressed (including any capture time due phasing) is considered to be $t_{on.}$ The trace should be maintained within the allowed divisions during the period t_1 and t_2. See the figure in the appropriate standards section.

n) During the time from the end of t_2 to the beginning of t_3 the frequency difference should not exceed the limits set by the FCC in part 90.213 and outlined in the Carrier Frequency Stability sections. The allowed limit is equal to the transmitter frequency times its FCC frequency tolerance times ±4 display divisions divided by 25 kHz. For example, at a transmitter assigned frequency of 500 MHz and a frequency tolerance of 5 ppm. This would be 500 MHz times 5 ppm times ±4 divisions divided by 25 kHz. This equals ±0.4 divisions in this example. Greater vertical sensitivity may be required to view this accuracy.

o) Turn on the transmitter and observe the stored display. The trace should be maintained within the allowed divisions after the end of t_2 and remain within it until the end of the trace. See the figure in the appropriate standards sections.

p) To test t he transient frequency behavior during the period t_3, the transmitter shall be switched on.

q) Adjust the oscilloscope trigger controls so it will trigger on a decreasing magnitude from the RF peak detector, at 1 division from the right side of the display, when the transmitter is turned off. Set the controls to store the display. The moment when the 1 kHz test signal starts to rise is considered to provide $t_{off.}$

r) The transmitter shall be switched off.

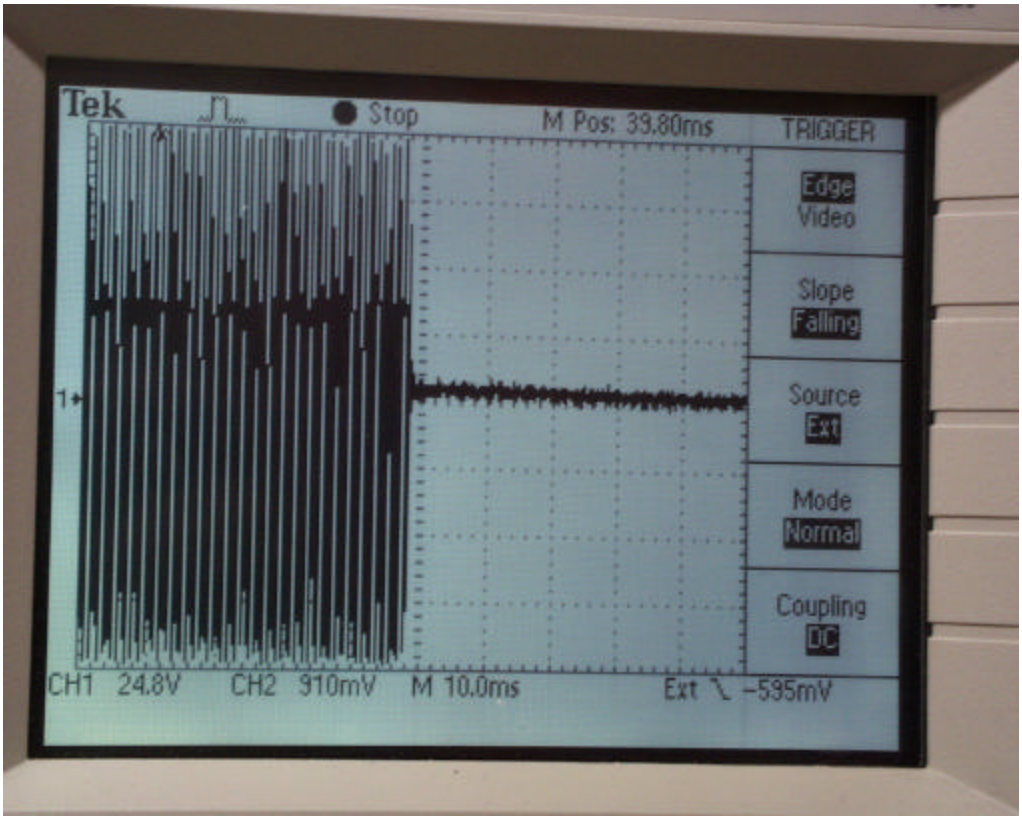
s) Observe the display. The trace should remain within the allowed divisions during period $t_{3.}$ See the figures in the appropriate standards section.

RESULT

Complies. See plots *TransientOn* and *TransientOff*.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

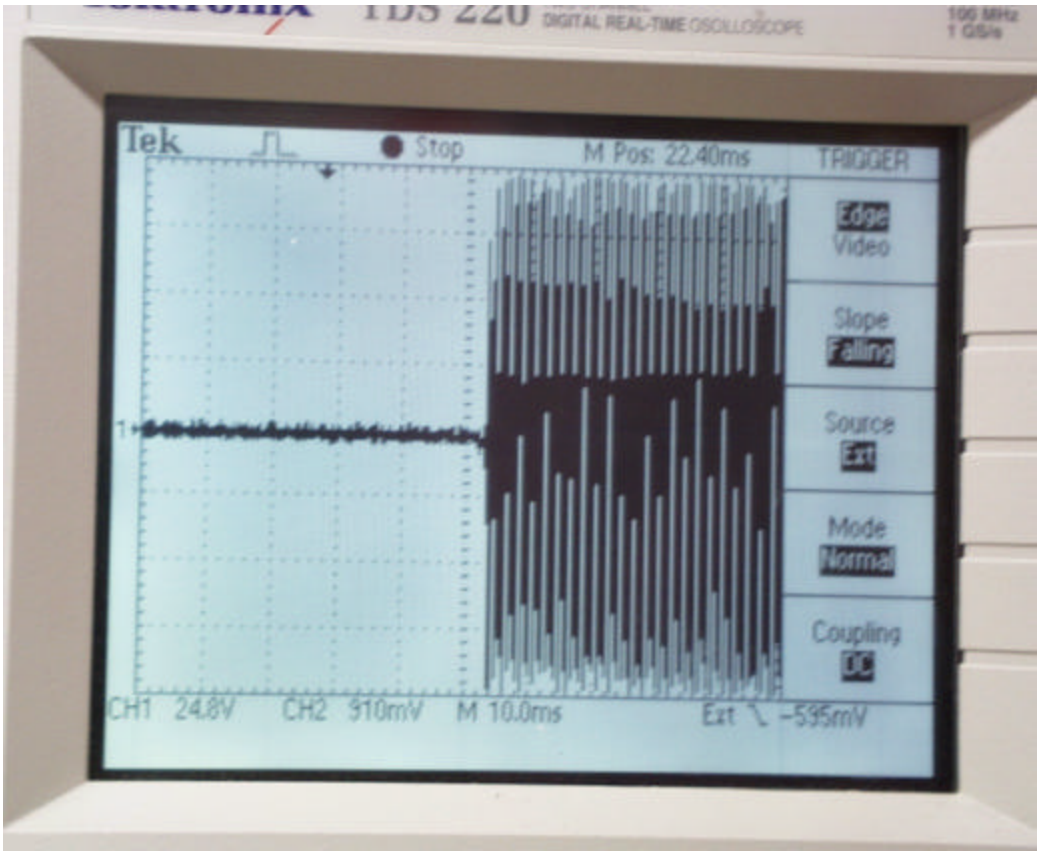
Transient On



_ Each division has been adjusted to 6.25KHz.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

Transient Off



_ Each division has been adjusted to 6.25KHz.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

8.8 RADIATED EMISSION (Digital Section 15.209)

INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Spectrum Analyzer	HP	8593EM	06/20/02
Bilog Antenna	CHASE EMC LTD	CBL6112	12/11/01
Amplifier	HP	8447D	11/21/01

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	☒ Peak ☐ Quasi Peak	☒ 100 KHz ☐ 120 KHz	☒ 100 KHz ☐ 120 KHz
Above 1000	☒ Peak ☐ Average	☒ 1 MHz ☐ 1 MHz	☒ 1 MHz ☐ 10 Hz

TEST SETUP & PROCEDURE

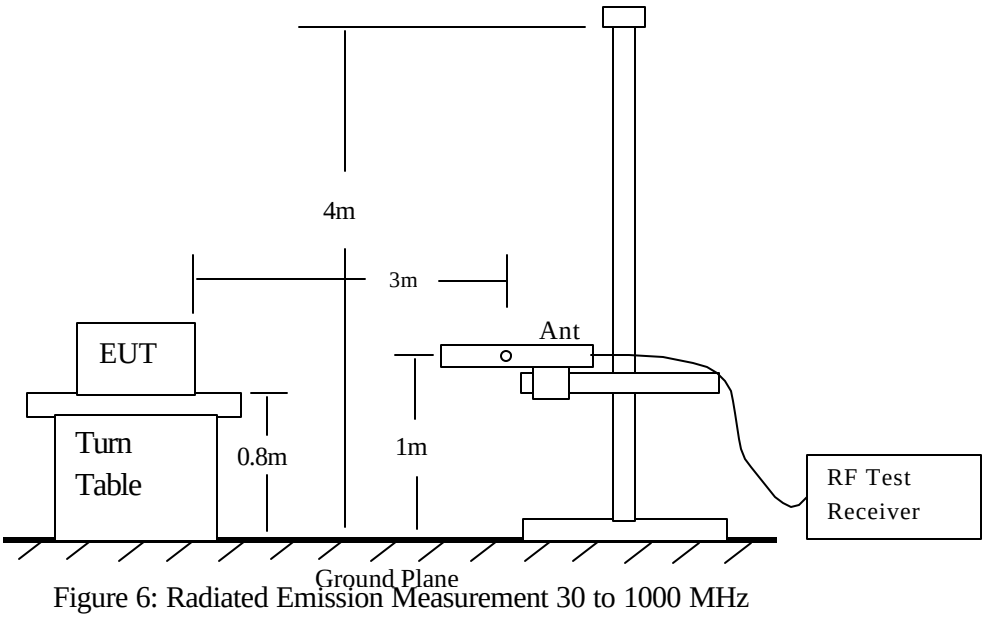


Figure 6: Radiated Emission Measurement 30 to 1000 MHz

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

Setup Photos:

RESULT

Complies, as shown below.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

COMPLIANCE Certification Services

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #: 01u0788-1
Report #: 010504a1
Date& Time: 05/14/01 2:30 PM
Test Engr: Thu Chan

Company: Pacific Crest Corporation
EUT Description: 450-470MHz Half Duplex, UHF Radio (data only) Modem Trans
Test Configuration : EUT only
Type of Test: FCC 15.209
Mode of Operation: Transmitting / Receiving (M/N: LPB4520225 S/N:11)

(•) A-Site ( ) B-Site ( ) C-Site ( ) F-Site [6 Worst Data] [Descending]

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
Transmittting Mode:											
Broadband emissions, replaced AC/DC adapter to DC battery:											
80.00	57.20	8.20	1.18	27.84	38.74	40.00	-1.26	3mV	180.00	1.00	P
85.00	57.00	9.45	1.22	27.82	39.86	40.00	-0.14	3mV	180.00	1.00	P
85.00	56.00	9.45	1.22	27.82	38.86	40.00	-1.15	3mV	180.00	1.00	QP
80.00	47.00	8.20	1.18	27.84	28.54	40.00	-11.46	3mH	180.00	3.00	P
85.00	47.00	9.45	1.22	27.82	29.86	40.00	-10.15	3mH	180.00	3.00	P
Receiving Mode:											
80.00	46.00	8.20	1.18	27.84	27.54	40.00	-12.46	3mH	180.00	2.50	P
84.63	46.00	9.36	1.22	27.82	28.76	40.00	-11.24	3mH	180.00	2.50	P
80.00	53.00	8.20	1.18	27.84	34.54	40.00	-5.46	3mV	180.00	1.00	P
84.50	52.00	9.33	1.22	27.82	34.72	40.00	-5.28	3mV	180.00	1.00	P

No emissions were found within 20dB under the 15.209 FCC limits up to 1GHz.
Total data #: 9
V.2a

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

8.9 POWER LINE CONDUCTED EMISSION

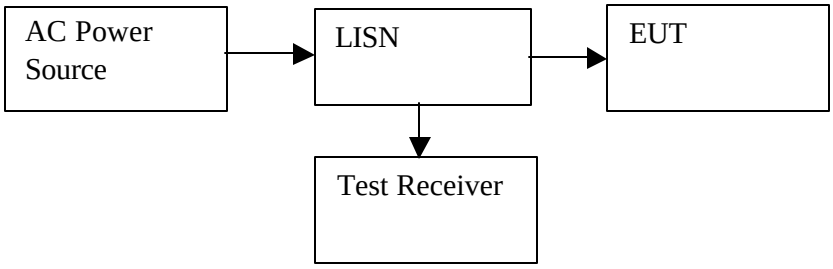
INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Test Receiver	Rohde & Schwarz	ESHS 20	2/28/02
LISN	Fischer	50/250/25/2	7/5/01

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
450 K to 30 MHz	☒ Peak ☐ CISPR Quasi Peak	☒ 9 KHz	☒ 9 KHz

TEST SETUP



TEST PROCEDURE

1. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit in a continuous mode.

2. Line conducted data was recorded for both NEUTRAL and HOT lines.

RESULT

Not applicable. EUT is using DC battery operating.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

9. RF EXPOSURE REQUIREMENT

§ 1.1310 Radiofrequency radiation ex-posure

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field Strength (V/m)	Magnetic field Strength (A/m)	Power density (mW/cm 2)	Averaging time (minutes)
(B) 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

Test result:

TABLE 1 (B) LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

F(MHz)	**(POWER DENSITY (mW/cm²)**
300 - 1500	f/1500

So, the Power Density at 465Mhz should be 0.31 (mW/cm²)

From page 12, P=31.93dBm=1.559W, G=0dBi=1.0, Duty Cycle=-2.2dB-60%
Computation method:

$P = E^2 / 3770$

$\sqrt{E^2} = \sqrt{0.31\ mW/cm^2 * 3770}$

E = 34.18 V/m

$$E = \frac{\sqrt{30 * P * DC * G}}{D}$$

$$D = \frac{\sqrt{30 * 1.56 * 0.6 * 1.0}}{34.18\ V/m}$$

D = 15.50 cm (Minimum required on Warning Label at least 20cm)

20.00 / 2.54 = 7.87 inch

MPE distance requirement is 7.87 inch. A warning statement is place in the manual.

COMPLIANCE CERTIFICATION SERVICES DOCUMENT NO: CCSUP4031A
561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA TEL: (408) 463-0885 FAX: (408) 463-0888
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

10. ATTACHMENT

10.1. ATTACHMENT# 1: EUT PHOTOGRAPHS

10.2. ATTACHMENT# 2: PROPOSED FCC ID LABEL FORMAT

10.3. ATTACHMENT# 3: REQUEST FOR CONFIDENTIALITY LETTER

10.4. ATTACHMENT# 4: EUT TECHNICAL DESCRIPTION

10.5. ATTACHMENT# 5: USER'S GUIDE

10.6. ATTACHMENT# 6: SCHEMATIC DIAGRAM AND BLOCK DIAGRAM

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.