



CALIFORNIA AMPLIFIER TEST REPORT
FOR THE
MMDS-MMDS TRANSCIEVER, 520010-1 AND 5200010-2
FCC PART 21
COMPLIANCE

DATE OF ISSUE: MARCH 6, 2000

PREPARED FOR:

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Camarillo, CA 93012

P.O. No: 22823
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Mariposa, CA 95338

Date of test: January 23-25, 2001

Report No: FC01-009

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ADMINISTRATIVE INFORMATION

DATE OF TEST:	January 23-25, 2001
DATE OF RECEIPT:	January 23, 2001
PURPOSE OF TEST:	To demonstrate the compliance of the MMDS-MMDS Transceiver, 520010-1 and 520010-2, with the requirements for FCC Part 21 devices.
TEST METHOD:	FCC Part 2 and 21
MANUFACTURER:	California Amplifier, Inc. 460 Calle San Pablo Camarillo, CA 93012
REPRESENTATIVE:	Shawn Aleman
TEST LOCATION:	CKC Laboratories, Inc. 5473A Clouds Rest, Mariposa, CA 95338
FREQUENCY RANGE TESTED:	30 MHz - 26 GHz

SUMMARY OF RESULTS

The California Amplifier MMDS-MMDS Transciever, 520010-1 and 5200010-2, was tested in accordance with FCC Part 21 devices. As received, the above equipment was found to be fully compliant with the limits of FCC Part 21 devices. The results in this report apply only to the items tested, as identified herein.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ± 4 dB measurement uncertainty.

EUT OPERATING FREQUENCY

The EUT was operating at 2644-2686 MHz.

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

APPROVALS

QUALITY ASSURANCE:



Dennis Ward, Quality Manager



Chuck Kendall, EMC/Lab Manager

TEST PERSONNEL:



Randy Clark, EMC Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

MMDS-MMDS transceiver. The model 520010-1 a transmitter inside a case to be used with a parabolic antenna. The model 520010-2 is the enclosed transmitter set inside a planar antenna sold as one unit.

EQUIPMENT UNDER TEST:

Power Supply

Manuf: California Amplifier
Model: 71441
Serial: N/A
FCC ID: N/A (UL)

MMDS-MMDS Transceiver

Manuf: California Amplifier
Model: 520010-1
Serial: 1040014449
FCC ID: J26 (pending)

MMDS-MMDS Transceiver

Manuf: California Amplifier
Model: 520010-2
Serial: 1050049441
FCC ID: J26 (pending)

The EUT was tested with the following peripheral device(s):

Signal Generator

Manuf: HP
Model: E4437B
Serial: US39260148
FCC ID: N/A

2.1033(c)(5) – Frequency Range

2644-2686 MHz

2.1033(c)(7) – Maximum Power Rating

Maximum power rating as defined in the operating part(s) of the rules.

22 dBm or 158.5 mW

2.1033(c)(14)/2.1046/21.107/21.904(b)/21.909(g)(2) - RF POWER OUTPUT

The emission designator is: *Customer has not provided at this time.*

Test data Sheets:

Specification: **FCC 21.909(g)(2)**
Work Order #: **75897** Date: 01/23/2001
Test Type: **RF Power Output** Time: 18:18:54
Equipment: **MMDS-MMDS Transceiver** Sequence#: 1
Manufacturer: Cal Amp Tested By: Randal Clark
Model: 520010-1
S/N: 1040014449

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A0140	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A0824	11/03/2000	11/03/2001	489
QP Adapter	2811A0126	11/03/2000	11/03/2001	478
HF Cable, Andrew	FSJ1-50A	05/10/00	05/10/01	N/A

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver*	Cal Amp	520010-1	1040014449

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

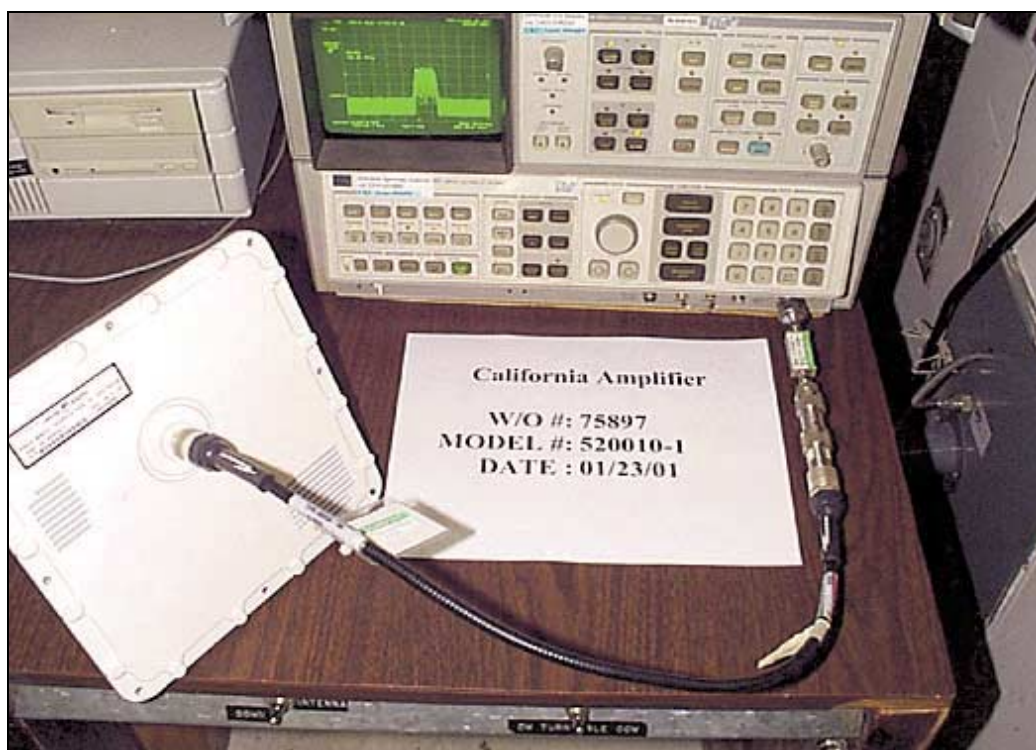
EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. Fundamental at antenna conducted.

Measurement Data: Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	GHz C 28dB				Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
			dB	dB	dB	dB					
1	2665.080M	102.3	+0.5	+27.8			+0.0	130.6	140.0	-9.4	None
									Mid Channel 1MHz		
2	2682.220M	102.3	+0.5	+27.8			+0.0	130.6	140.0	-9.4	None
									Hi Channel 1MHz		
3	2647.060M	102.3	+0.5	+27.8			+0.0	130.6	140.0	-9.4	None
									Lo Channel 1MHz		
4	2682.640M	98.7	+0.5	+27.8			+0.0	127.0	140.0	-13.0	None
									Hi Channel 100kHz		
5	2665.500M	98.6	+0.5	+27.8			+0.0	126.9	140.0	-13.1	None
									Mid Channel 100kHz		
6	2646.720M	98.2	+0.5	+27.8			+0.0	126.5	140.0	-13.5	None
									Lo Channel 100kHz		

SETUP PHOTOGRAPH SHOWING RF POWER OUTPUT



Antenna Conducted

Specification: **FCC 21.904(b)**
 Work Order #: **75897**
 Test Type: **RF Power Output**
 Equipment: **MMDS-MMDS Transceiver**
 Manufacturer: Cal Amp
 Model: 520010-1
 S/N: 1040014449

Date: 01/25/2001
 Time: 11:32:26
 Sequence#: 7
 Tested By: Randal Clark

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A0140	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A0824	11/03/2000	11/03/2001	489
QP Adapter	2811A0126	11/03/2000	11/03/2001	478
HF Cable, Andrew (3)	FSJ1-50A	05/10/00	05/10/01	N/A
Preamplifier 1-2, HP	3008A0030	10/13/00	10/13/01	2010
1-18 GHz, horn antenna	9602-4660	11/10/00	11/10/01	2113

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver*	Cal Amp	520010-1	1040014449

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC).
 The input signal is obtained from the HP signal generator. Fundamental reading with 24 dBi parabolic antenna attached. Calculations:
 Limit: 21.106(i) 10Log(360/12.5)=14.59dB>6dB
 33dBW +10Log(360/Beamwidth)<=6dB Thus we use the max allowable: 6dB
 Beamwidth=12.5 33+6=39dBW = 176dBuV

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	Horn dB	GHz C dB	GHz C dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	2664.617M	101.7	+30.8	+7.9	+5.8	+0.0	146.2	176.0	-29.8	Vert
								Mid Channel		
2	2682.683M	101.7	+30.9	+7.8	+5.8	+0.0	146.2	176.0	-29.8	Vert
								Hi Channel		
3	2647.417M	101.2	+30.7	+7.9	+5.8	+0.0	145.6	176.0	-30.4	Vert
								Lo Channel		
4	2682.683M	80.3	+30.9	+7.8	+5.8	+0.0	124.8	176.0	-51.2	Horiz
								Hi Channel		
5	2665.017M	79.8	+30.8	+7.9	+5.8	+0.0	124.3	176.0	-51.7	Horiz
								Mid Channel		
6	2647.417M	79.5	+30.7	+7.9	+5.8	+0.0	123.9	176.0	-52.1	Horiz
								Lo Channel		

SETUP PHOTOGRAPH SHOWING RF POWER OUTPUT



Transmitter with Parabolic Antenna

Specification: **FCC 21.904(b)**
 Work Order #: **75897**
 Test Type: **RF Power Output**
 Equipment: **MMDS-MMDS Transceiver**
 Manufacturer: Cal Amp
 Model: 520010-2
 S/N: 1050049441

Date: 01/25/2001
 Time: 17:55:55
 Sequence#: 10
 Tested By: Randal Clark

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A0140	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A0824	11/03/2000	11/03/2001	489
QP Adapter	2811A0126	11/03/2000	11/03/2001	478
HF Cable, Andrew (3)	FSJ1-50A	05/10/00	05/10/01	N/A
Preamp 1-2, HP	3008A0030	10/13/00	10/13/01	2010
1-18 GHz, horn antenna	9602-4660	11/10/00	11/10/01	2113

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver*	Cal Amp	520010-2	1050049441

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. Fundamental reading with 18 dBi planar antenna. Calculations:
 Limit: 21.106(i). $10\log(360/12.5)=12.89\text{dB}>6\text{dB}$
 $33\text{dBW} + 10\log(360/\text{Beamwidth}) \leq 6\text{dB}$ Thus we use the max allowable: 6dB
 Beamwidth=18.5 $33+6=39\text{dBW} = 176\text{dBuV}$

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	Horn dB	GHz C dB	GHz C dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	2647.350M	99.8	+30.7	+7.9	+5.8	+0.0	144.2	176.0	-31.8	Vert
								Lo Channel		
2	2665.167M	98.5	+30.8	+7.9	+5.8	+0.0	143.0	176.0	-33.0	Vert
	Ave							Mid Channel		
3	2682.650M	98.2	+30.9	+7.8	+5.8	+0.0	142.7	176.0	-33.3	Vert
	Ave							Hi Channel		
4	2665.167M	80.3	+30.8	+7.9	+5.8	+0.0	124.8	176.0	-51.2	Horiz
	Ave							Mid Channel		
5	2682.567M	79.8	+30.9	+7.8	+5.8	+0.0	124.3	176.0	-51.7	Horiz
	Ave							Hi Channel		
6	2647.350M	79.5	+30.7	+7.9	+5.8	+0.0	123.9	176.0	-52.1	Horiz
								Lo Channel		

SETUP PHOTOGRAPH SHOWING RF POWER OUTPUT



Transmitter with Planar Antenna

VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:

Frequency Range	Signal Analyzer VBW & RBW Setting
2644 MHz – 2686 MHz	1MHz

Amendment: RC

Output Power calculations:

Low Channel:

Power=130.6dBV

=130.6-107=23.6dBm

= $10^{(23.6/10)}$ =229.0 mW

Mid Channel:

Power=130.6dBV

=130.6-107=23.6dBm

= $10^{(23.6/10)}$ =229.0 mW

High Channel:

Power=130.6dBV

=130.6-107=23.6dBm

= $10^{(23.6/10)}$ =229.0 mW

2.1033(c)(14)/2.1047(a) MODULATION CHARACTERISTICS – Audio Frequency Response

Customer has not provided at this time.

2.1033(c)(14)/2.1047(b) MODULATION CHARACTERISTICS – Modulation Limiting Response

Customer has not provided at this time.

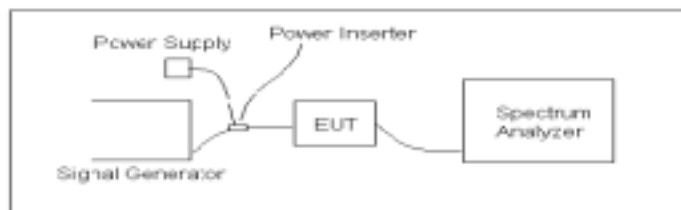
2.1033(c)(14)/2.1049(i)/21.105/21.905 - OCCUPIED BANDWIDTH

Test Description: EUT is connected directly to the analyzer. EUT only produces a modulated signal, therefore, all data is taken using modulation characteristic of normal usage. EUT receives power through a transformer, which is fed through RG58 cable from a power inserter.

Amendment: RC used.

The emission designator is: *Customer has not provided at this time.*

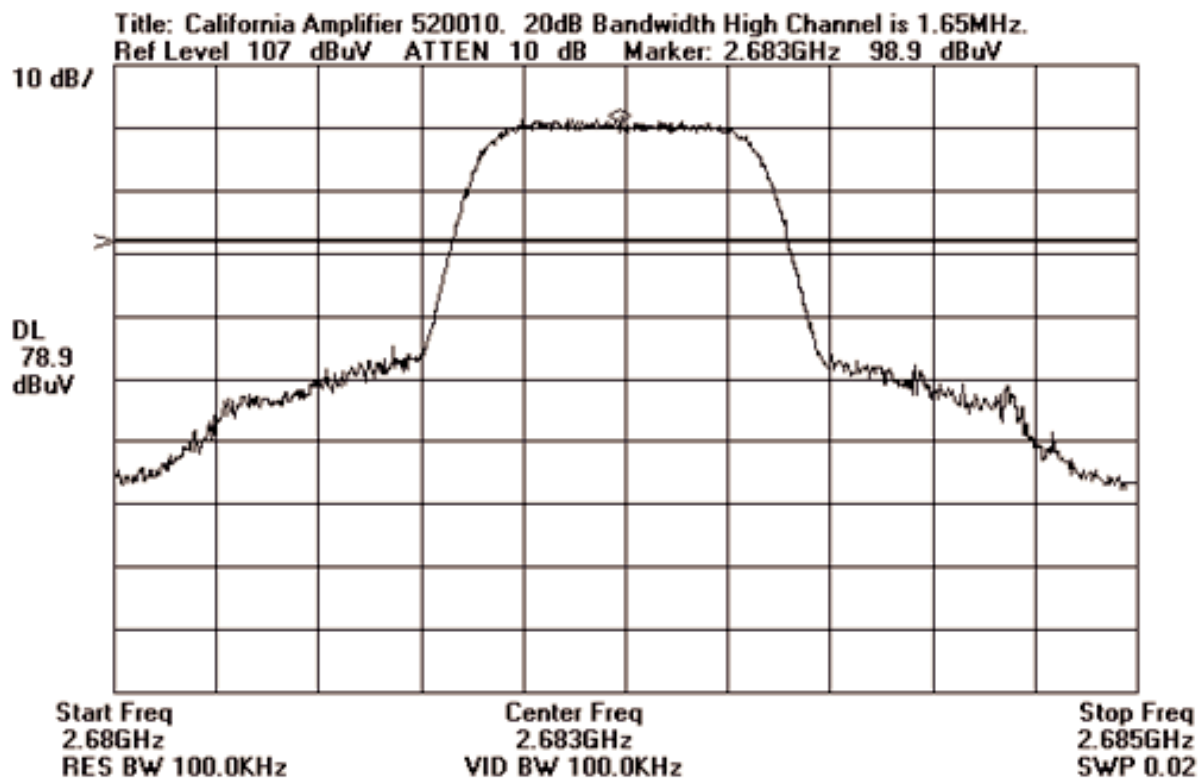
Diagram of Test Setup



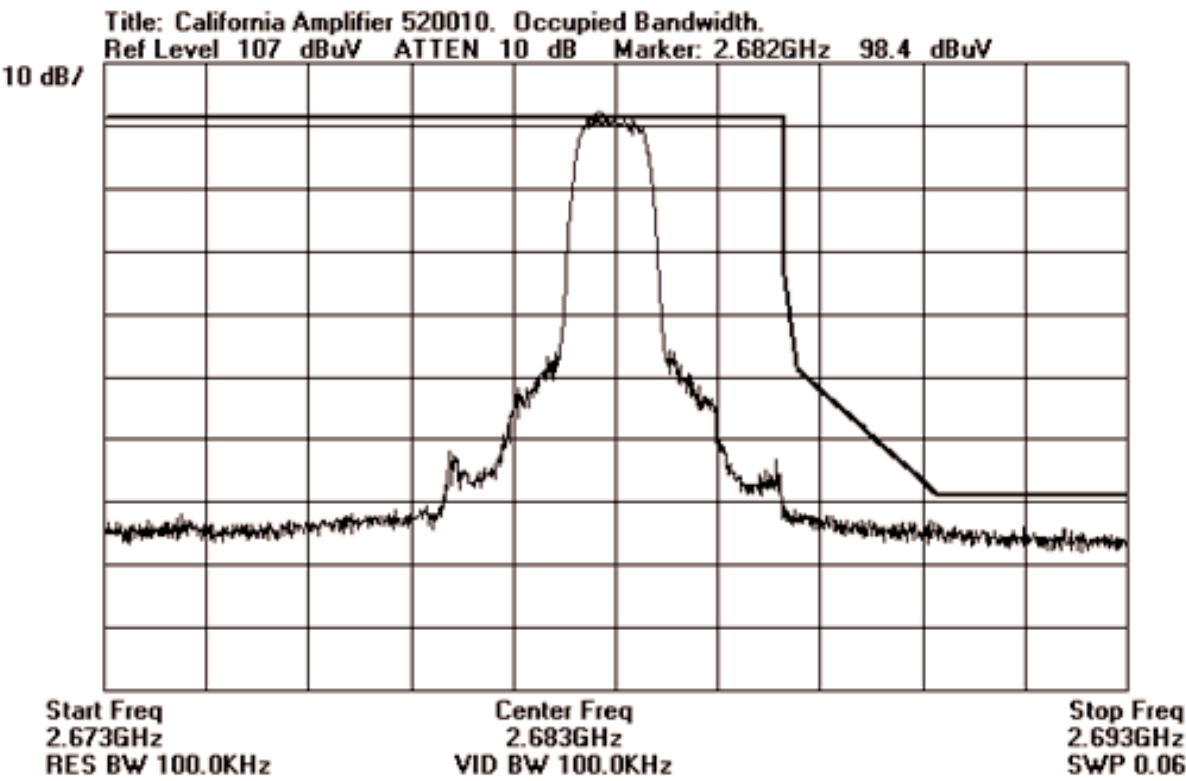
Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer, HP	2727A0047	12/05/00	12/05/01	P00709
Spectrum Analyzer	2816A1596	12/05/00	12/05/01	P00708
Display				
QP Adapter	2043A0020	12/05/00	12/05/01	2430
HF Cable, Andrew	FSJ1-150A	05/10/00	05/10/01	N/A
2.4 GHz Filter	1	10/03/00	10/03/01	1439

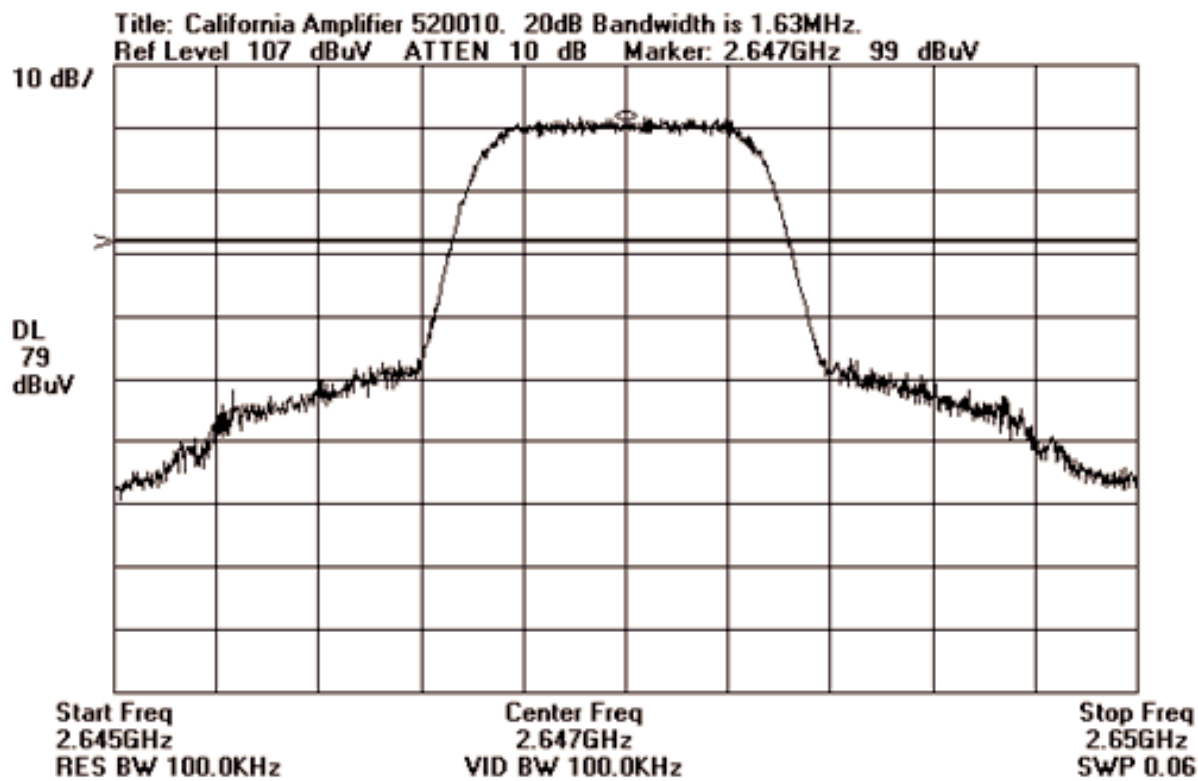
Bandwidth Plot



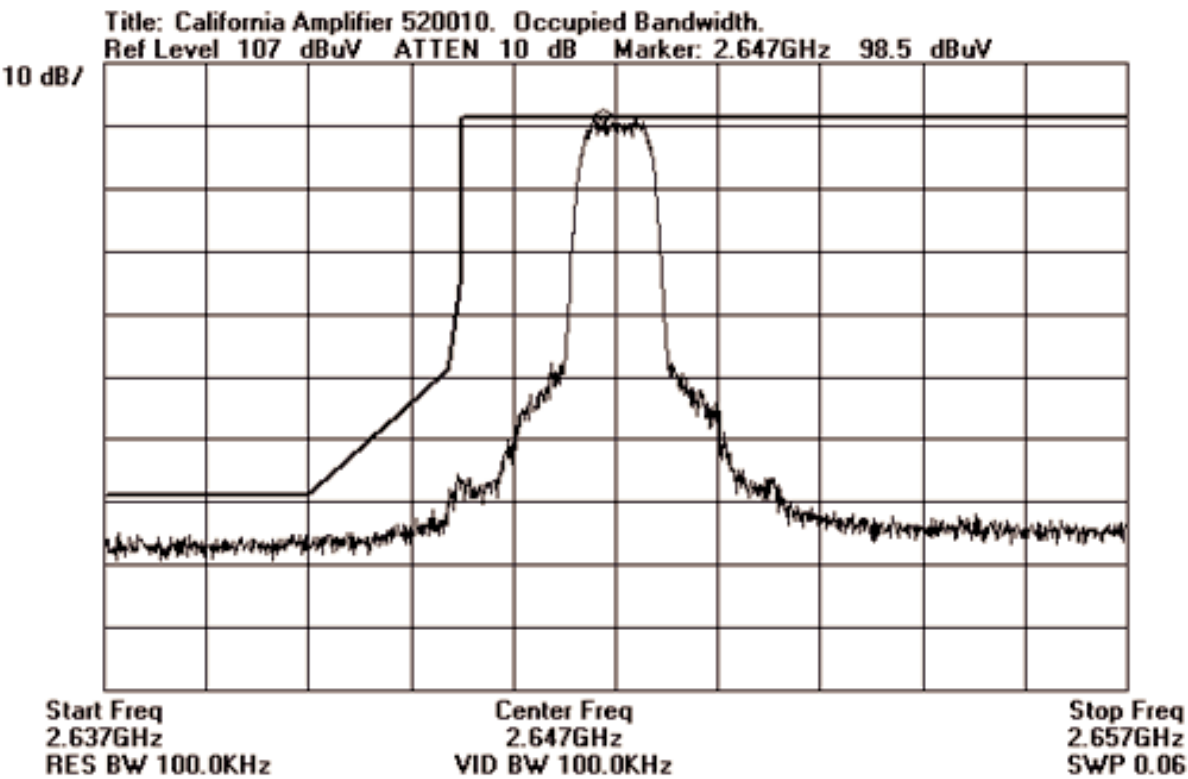
Bandwidth Plot



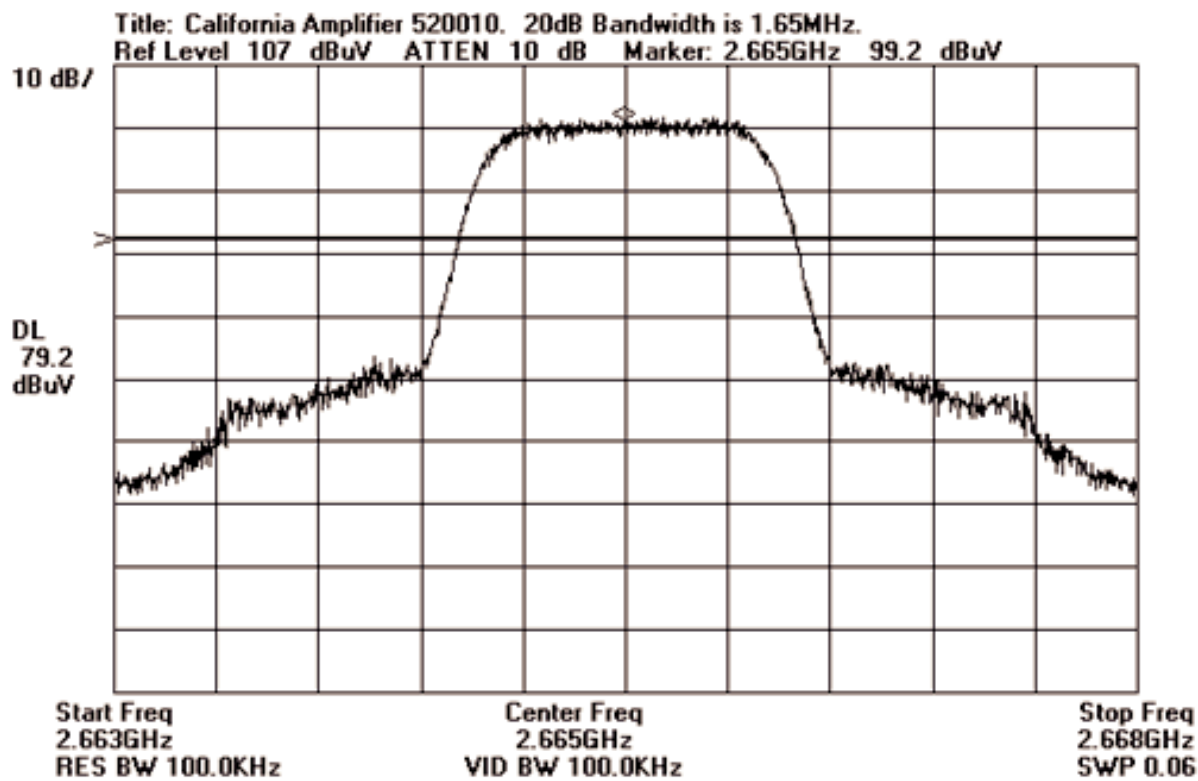
Bandwidth Plot



Bandwidth Plot



Bandwidth Plot



2.1033(c)(14)/2.1051/21.106/21.905 - SPURIOUS EMISSIONS AT ANTENNA TERMINAL

VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:

Frequency Range	Signal Analyzer VBW & RBW Setting
30MHz – 1MHz	120 kHz
1GHz – 26GHz	1MHz

Specification: **FCC 21.106**
Work Order #: **75897** Date: 01/24/2001
Test Type: **Spurious Emissions at Antenna Terminal** Time: 12:47:16
Equipment: **MMDS-MMDS Transceiver** Sequence#: 4
Manufacturer: Cal Amp Tested By: Randal Clark
Model: 520010-1
S/N: 1040014449

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer, HP	2727A0047	12/05/00	12/05/01	P00709
Spectrum Analyzer Display	2816A1596	12/05/00	12/05/01	P00708
QP Adapter	2043A0020	12/05/00	12/05/01	2430
HF Cable, Andrew	FSJ1-150A	05/10/00	05/10/01	N/A
2.4 GHz Filter	1	10/03/00	10/03/01	1439

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver*	Cal Amp	520010-1	1040014449

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. 30 MHz – 26 GHz. ***No emissions found.***

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBμV	GHz C		Low P		Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
			dB	dB	dB	dB					

Specification: **FCC 21.106**
 Work Order #: **75897**
 Test Type: **Spurious Emissions at Antenna Terminal**
 Equipment: **MMDS-MMDS Transceiver**
 Manufacturer: Cal Amp
 Model: 520010-1
 S/N: 1040014449

Date: 01/24/2001

Time: 12:35:27

Sequence#: 2

Tested By: Randal Clark

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A0140	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A0824	11/03/2000	11/03/2001	489
QP Adapter	2811A0126	11/03/2000	11/03/2001	478
3.5 GHz HP filter	3643A0002	03/02/00	03/02/01	1416

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. 2-18 GHz.

Measurement Data:		Reading listed by margin.					Test Distance: None				
#	Freq MHz	Rdng dBµV	GHz C		3.5 G		Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	7403.913M Ave	59.6	+1.7		+0.2		+0.0	61.5	66.5	-5.0	None
									Lo Channel		
^	7403.910M	63.2	+1.7		+0.2		+0.0	65.1	66.5	-1.4	None
									Lo Channel		
3	13414.720 M	58.8	+1.7		+0.2		+0.0	60.7	66.5	-5.8	None
									Hi Channel		
4	8049.200M	59.4	+0.8		+0.0		+0.0	60.2	66.5	-6.3	None
									Hi Channel		
5	15945.990 M	57.3	+2.4		+0.4		+0.0	60.1	66.5	-6.4	None
									Lo Channel		
6	4555.995M Ave	57.3	+1.0		+1.6		+0.0	59.9	66.5	-6.6	None
									Lo Channel		
^	4555.995M	59.9	+1.0		+1.6		+0.0	62.5	66.5	-4.0	None
									Lo Channel		
8	5306.030M	57.7	+1.0		+0.1		+0.0	58.8	66.5	-7.7	None
									Lo Channel		
9	9112.070M	55.7	+1.4		+0.0		+0.0	57.1	66.5	-9.4	None
									Lo Channel		
10	11389.980 M	54.6	+1.4		+0.9		+0.0	56.9	66.5	-9.6	None
									Lo Channel		
11	4936.010M	54.3	+1.0		+1.2		+0.0	56.5	66.5	-10.0	None
									Lo Channel		

12	12340.040 M	54.6	+1.5	+0.0	+0.0	56.1	66.5	-10.4	None
Lo Channel									
13	13324.240 M	54.0	+1.7	+0.2	+0.0	55.9	66.5	-10.6	None
Mid Channel									
14	10731.920 M	51.9	+1.4	+1.6	+0.0	54.9	66.5	-11.6	None
Hi Channel									
15	7995.080M	53.4	+0.7	+0.1	+0.0	54.2	66.5	-12.3	None
Mid Channel									
16	10660.400 M	49.1	+1.3	+1.7	+0.0	52.1	66.5	-14.4	None
Mid Channel									
17	5366.280M	49.4	+1.0	-0.1	+0.0	50.3	66.5	-16.2	None
Hi Channel									
18	5330.080M	46.9	+1.0	+0.0	+0.0	47.9	66.5	-18.6	None
Mid Channel									
19	7959.185M Ave	44.4	+0.8	+0.1	+0.0	45.3	66.5	-21.2	None
Lo Channel									
^	7959.180M	63.0	+0.8	+0.1	+0.0	63.9	66.5	-2.6	None
Lo Channel									

**SETUP PHOTOGRAPH SHOWING SPURIOUS EMISSIONS
AT ANTENNA TERMINAL**



Antenna Conducted

Specification: **FCC 21.106**
 Work Order #: **75897**
 Test Type: **Spurious Emissions at Antenna Terminal**

Date: 01/24/2001
 Time: 12:24:34

Equipment: **MMDS-MMDS Transceiver**
 Manufacturer: Cal Amp
 Model: 520010-1
 S/N: 1040014449

Sequence#: 3
 Tested By: Randal Clark

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
3.5 GHz HP filter	3643A0002	03/02/00	03/02/01	1416
Spectrum Analyzer, HP	3623A0053	12/12/00	12/12/01	1406

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver*	Cal Amp	520010-1	1040014449

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. 18-26 GHz.

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	3.5 G				Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
			dB	dB	dB	dB					
1	18571.500 M	46.5	+0.3				+0.0	46.8	66.5	-19.7	None
									Hi Channel		
2	20502.000 M	41.0	+0.9				+0.0	41.9	66.5	-24.6	None
									Hi Channel		
3	19558.700 M	39.7	+0.6				+0.0	40.3	66.5	-26.2	None
									Hi Channel		
4	19928.970 M	38.3	+0.8				+0.0	39.1	66.5	-27.4	None
									Hi Channel		
5	20502.130 M	38.0	+0.9				+0.0	38.9	66.5	-27.6	None
									Lo Channel		
6	20502.200 M	37.2	+0.9				+0.0	38.1	66.5	-28.4	None
									Mid Channel		
7	18780.530 M	37.0	+0.4				+0.0	37.4	66.5	-29.1	None
									Lo Channel		
8	22212.190 M	36.2	+1.2				+0.0	37.4	66.5	-29.1	None
									Mid Channel		

9	22212.120 M	36.2	+1.2	+0.0	37.4	66.5	-29.1	None
Lo Channel								
10	22212.040 M	35.2	+1.2	+0.0	36.4	66.5	-30.1	None
Hi Channel								
11	19958.930 M	35.3	+0.8	+0.0	36.1	66.5	-30.4	None
Lo Channel								
12	19959.250 M	34.0	+0.8	+0.0	34.8	66.5	-31.7	None
Lo Channel								
13	19546.700 M	33.8	+0.6	+0.0	34.4	66.5	-32.1	None
Mid Channel								
14	19941.070 M	33.5	+0.8	+0.0	34.3	66.5	-32.2	None
Mid Channel								

SETUP PHOTOGRAPH SHOWING RF SPURIOUS EMISSIONS AT ANTENNA TERMINAL



Antenna Conducted

2.1033(c)(14)/2.1053/21.106/21.905 - FIELD STRENGTH OF SPURIOUS RADIATION

VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:

Frequency Range	Signal Analyzer VBW & RBW Setting
30MHz – 1MHz	120 kHz
1GHz – 26GHz	1MHz

Specification: **FCC 21.106**
Work Order #: **75897**
Test Type: **Field Strength of Spurious Emissions**
Equipment: **MMDS-MMDS Transceiver**
Manufacturer: **Cal Amp**
Model: **520010-1**
S/N: **1040014449**

Date: 01/25/2001
Time: 19:41:45
Sequence#: 12
Tested By: Randal Clark

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer, HP	2727A0047	12/05/00	12/05/01	P00709
Spectrum Analyzer Display	2816A1596	12/05/00	12/05/01	P00708
QP Adapter	2043A0020	12/05/00	12/05/01	2430
Bicon Antenna	156	12/08/00	12/08/01	225
Log Antenna	154	12/08/00	12/08/01	1330
Preamp	1937A0260	04/03/00	04/03/01	99
2.4 GHz Filter	1	10/03/00	10/03/01	1439

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver	Cal Amp	520010-2	1050049441

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. 30-1000 MHz. **No emissions found.**

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	Low P Barn dB	Pream dB	Bicon dB	Log 1 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
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SETUP PHOTOGRAPH SHOWING FIELD STRENGTH OF SPURIOUS EMISSIONS



Transmitter with Parabolic Antenna

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362
 Customer: **California Amplifier**
 Specification: **FCC 21.106**
 Work Order #: **75897** Date: 01/25/2001
 Test Type: **Field Strength of Spurious Emissions at Antenna Terminal** Time: 19:41:45
 Equipment: **MMDS-MMDS Transceiver** Sequence#: 12
 Manufacturer: Cal Amp Tested By: Randal Clark
 Model: 520010-2
 S/N: 1050049441

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer, HP	2727A0047	12/05/00	12/05/01	P00709
Spectrum Analyzer	2816A1596	12/05/00	12/05/01	P00708
Display				
QP Adapter	2043A0020	12/05/00	12/05/01	2430
Bicon Antenna	156	12/08/00	12/08/01	225
Log Antenna	154	12/08/00	12/08/01	1330
Preamp	1937A0260	04/03/00	04/03/01	99
2.4 GHz Filter	1	10/03/00	10/03/01	1439

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver	Cal Amp	520010-2	1050049441

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. 30-1000 MHz. **No emissions found.**

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq MHz	Rdng dBµV	Low P Barn dB	Pream dB	Bicon dB	Log 1 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant

SETUP PHOTOGRAPH SHOWING FIELD STRENGTH OF SPURIOUS EMISSIONS



Transmitter with Planar Antenna

Specification: **FCC 21.106**
 Work Order #: **75897**
 Test Type: **Field Strength of Spurious Emissions**
 Equipment: **MMDS-MMDS Transceiver**
 Manufacturer: **Cal Amp**
 Model: **520010-1**
 S/N: **1040014449**

Date: 01/25/2001
 Time: 15:59:20
 Sequence#: 8
 Tested By: Randal Clark

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer, HP	2209A0140	11/13/00	11/13/01	490
Spectrum Analyzer Display	2403A0824	11/13/00	11/13/01	489
QP Adapter	2811A0126	11/03/00	11/03/01	478
Preamplifier 1-2, HP	3008A0030	10/13/00	10/13/01	2010
1-18 GHz Antenna	9602-4660	11/10/00	11/10/01	2113
2.4 GHz Filter	1	10/03/00	10/03/01	1439
3.5 GHz Filter	3643A0002	03/02/00	03/02/01	1416
HF Cable, Andrew (4)	FSJ1-50A	05/10/00	05/10/01	N/A

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver*	Cal Amp	520010-1	1040014449

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. 1-18 GHz.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	Pream GHz C dB	Horn 3.5 G dB	GHz C dB	GHz C dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	15989.900 M	32.7	-32.0	+41.1	+15.0	+8.7	+0.0	68.4	86.2	-17.8	Vert
			+2.5	+0.4					Mid Channel		
2	15882.270 M	32.2	-32.2	+40.5	+15.0	+9.5	+0.0	68.2	86.2	-18.0	Vert
			+2.7	+0.5					Lo Channel		
3	16097.970 M	32.0	-32.0	+41.3	+14.9	+9.1	+0.0	67.8	86.2	-18.4	Vert
			+2.1	+0.4					Hi Channel		
4	16098.100 M	31.7	-32.0	+41.3	+14.9	+9.1	+0.0	67.5	86.2	-18.7	Horiz
			+2.1	+0.4					Hi Channel		
5	15881.900 M	31.2	-32.2	+40.5	+15.0	+9.5	+0.0	67.2	86.2	-19.0	Horiz
			+2.7	+0.5					Lo Channel		
6	15989.900 M	31.0	-32.0	+41.1	+15.0	+8.7	+0.0	66.7	86.2	-19.5	Horiz
			+2.5	+0.4					Mid Channel		

7	4556.000M	46.0	-35.2 +2.0	+37.0 +1.6	+7.4	+5.1	+0.0	63.9	86.2	-22.3	Vert
8	8049.066M	48.5	-35.8 +0.8	+33.2 +0.0	+9.4	+7.4	+0.0	63.5	86.2 Hi Channel	-22.7	Vert
9	13234.900 M	30.8	-32.5 +1.7	+38.5 +0.2	+14.0	+7.6	+0.0	60.3	86.2 Lo Channel	-25.9	Horiz
10	13415.070 M	29.7	-32.2 +1.4	+39.6 +0.2	+13.7	+7.5	+0.0	59.9	86.2 Hi Channel	-26.3	Vert
11	9872.000M	39.2	-35.0 +2.3	+35.3 +1.7	+10.5	+5.8	+0.0	59.8	86.2	-26.4	Vert
12	13235.270 M	30.0	-32.5 +1.7	+38.5 +0.2	+14.0	+7.6	+0.0	59.5	86.2 Lo Channel	-26.7	Vert
13	13324.900 M	29.5	-32.3 +1.5	+39.1 +0.2	+13.9	+7.5	+0.0	59.4	86.2 Mid Channel	-26.8	Vert
14	5294.267M	43.5	-36.2 +1.9	+36.5 +0.1	+8.5	+4.8	+0.0	59.1	86.2 Lo Channel	-27.1	Vert
15	7994.900M	44.5	-35.7 +0.3	+33.0 +0.1	+9.2	+7.4	+0.0	58.8	86.2 Mid Channel	-27.4	Vert
16	13415.100 M	28.5	-32.2 +1.4	+39.6 +0.2	+13.7	+7.5	+0.0	58.7	86.2 Hi Channel	-27.5	Horiz
17	13324.900 M	28.7	-32.3 +1.5	+39.1 +0.2	+13.9	+7.5	+0.0	58.6	86.2 Mid Channel	-27.6	Horiz
18	4556.000M	39.8	-35.2 +2.0	+37.0 +1.6	+7.4	+5.1	+0.0	57.7	86.2	-28.5	Horiz
19	5365.733M	42.0	-36.4 +1.7	+36.7 -0.1	+8.5	+4.9	+0.0	57.3	86.2 Hi Channel	-28.9	Vert
20	5330.333M	41.5	-36.3 +1.8	+36.6 +0.0	+8.5	+4.8	+0.0	56.9	86.2 Mid Channel	-29.3	Vert
21	10587.900 M	31.7	-34.5 +1.7	+36.5 +1.7	+11.0	+6.4	+0.0	54.5	86.2 Lo Channel	-31.7	Horiz
22	10588.270 M	30.5	-34.5 +1.7	+36.5 +1.7	+11.0	+6.4	+0.0	53.3	86.2 Lo Channel	-32.9	Vert
23	12340.000 M	29.5	-33.4 +0.7	+38.5 +0.0	+11.1	+6.8	+0.0	53.2	86.2	-33.0	Vert
24	10659.900 M	30.3	-34.4 +1.5	+36.4 +1.7	+10.9	+6.4	+0.0	52.8	86.2 Mid Channel	-33.4	Vert
25	4936.000M	35.8	-35.6 +2.6	+35.7 +1.2	+8.3	+4.6	+0.0	52.6	86.2	-33.6	Vert
26	11390.000 M	30.7	-34.7 +1.3	+36.6 +0.9	+11.3	+6.4	+0.0	52.5	86.2	-33.7	Vert
27	10732.070 M	29.8	-34.4 +1.4	+36.3 +1.6	+10.8	+6.4	+0.0	51.9	86.2 Hi Channel	-34.3	Vert

28	10659.900 M	29.2	-34.4 +1.5	+36.4 +1.7	+10.9	+6.4	+0.0	51.7	86.2	-34.5	Horiz
Mid Channel											
29	7404.000M	35.0	-36.3 +1.4	+34.2 +0.2	+9.7	+6.5	+0.0	50.7	86.2	-35.5	Vert
30	9112.001M	29.5	-35.9 +4.0	+35.9 +0.0	+10.9	+5.7	+0.0	50.1	86.2	-36.1	Vert
31	10732.250 M	27.3	-34.4 +1.4	+36.3 +1.6	+10.8	+6.4	+0.0	49.4	86.2	-36.8	Horiz
Hi Channel											
32	6834.000M	28.0	-35.5 +2.2	+35.1 +0.4	+10.7	+6.8	+0.0	47.7	86.2	-38.5	Horiz
33	6834.000M	27.3	-35.5 +2.2	+35.1 +0.4	+10.7	+6.8	+0.0	47.0	86.2	-39.2	Vert
34	5293.900M	29.7	-36.2 +1.9	+36.5 +0.1	+8.5	+4.8	+0.0	45.3	86.2	-40.9	Horiz
Lo Channel											
35	7994.900M	29.7	-35.7 +0.3	+33.0 +0.1	+9.2	+7.4	+0.0	44.0	86.2	-42.2	Horiz
Mid Channel											
36	7940.900M	29.5	-35.8 +0.4	+33.2 +0.1	+9.2	+7.3	+0.0	43.9	86.2	-42.3	Horiz
Lo Channel											
37	8049.250M	28.5	-35.8 +0.8	+33.2 +0.0	+9.4	+7.4	+0.0	43.5	86.2	-42.7	Horiz
Hi Channel											
38	5329.900M	27.3	-36.3 +1.8	+36.6 +0.0	+8.5	+4.8	+0.0	42.7	86.2	-43.5	Horiz
Mid Channel											
39	4936.000M	25.5	-35.6 +2.6	+35.7 +1.2	+8.3	+4.6	+0.0	42.3	86.2	-43.9	Horiz
40	5366.250M	26.8	-36.4 +1.7	+36.7 -0.1	+8.5	+4.9	+0.0	42.1	86.2	-44.1	Horiz
Hi Channel											
41	7941.267M	27.3	-35.8 +0.4	+33.2 +0.1	+9.2	+7.3	+0.0	41.7	86.2	-44.5	Vert
Lo Channel											
42	7404.000M	25.8	-36.3 +1.4	+34.2 +0.2	+9.7	+6.5	+0.0	41.5	86.2	-44.7	Horiz

SETUP PHOTOGRAPH SHOWING FIELD STRENGTH OF SPURIOUS EMISSIONS



Transmitter with Parabolic Antenna

Specification: **FCC 21.106**
 Work Order #: **75897**
 Test Type: **Field Strength of Spurious Emissions**
 Equipment: **MMDS-MMDS Transceiver**
 Manufacturer: **Cal Amp**
 Model: **520010-2**
 S/N: **1050049441**

Date: 01/25/2001
 Time: 19:05:10
 Sequence#: 11
 Tested By: Randal Clark

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer, HP	2209A0140	11/13/00	11/13/01	490
Spectrum Analyzer Display	2403A0824	11/13/00	11/13/01	489
QP Adapter	2811A0126	11/03/00	11/03/01	478
Preamplifier 1-2, HP	3008A0030	10/13/00	10/13/01	2010
1-18 GHz Antenna	9602-4660	11/10/00	11/10/01	2113
2.4 GHz Filter	1	10/03/00	10/03/01	1439
3.5 GHz Filter	3643A0002	03/02/00	03/02/01	1416
HF Cable, Andrew (4)	FSJ1-50A	05/10/00	05/10/01	N/A

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver*	Cal Amp	520010-2	1050049441

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. 1-18 GHz.

Measurement Data:			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq MHz	Rdng dBμV	Pream GHz C dB	Horn 3.5 G dB	GHz C dB	GHz C dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	16097.980 M	36.3	-32.0	+41.3	+14.9	+9.1	+0.0	72.1	86.2	-14.1	Horiz
			+2.1	+0.4					Hi Channel		
2	15989.980 M	35.8	-32.0	+41.1	+15.0	+8.7	+0.0	71.5	86.2	-14.7	Horiz
			+2.5	+0.4					Mid Channel		
3	15882.080 M	34.5	-32.2	+40.5	+15.0	+9.5	+0.0	70.5	86.2	-15.7	Horiz
			+2.7	+0.5					Lo Channel		
4	15971.980 M	30.5	-32.0	+41.0	+15.0	+8.8	+0.0	66.2	86.2	-20.0	Vert
			+2.5	+0.4					Lo Channel		
5	16097.980 M	29.7	-32.0	+41.3	+14.9	+9.1	+0.0	65.5	86.2	-20.7	Vert
			+2.1	+0.4					Hi Channel		
6	15989.980 M	29.7	-32.0	+41.1	+15.0	+8.7	+0.0	65.4	86.2	-20.8	Vert
			+2.5	+0.4					Mid Channel		

7	13414.980 M	34.8	-32.2 +1.4	+39.6 +0.2	+13.7	+7.5	+0.0	65.0	86.2	-21.2	Horiz
									Hi Channel		
8	13235.030 M	34.7	-32.5 +1.7	+38.5 +0.2	+14.0	+7.6	+0.0	64.2	86.2	-22.0	Horiz
									Lo Channel		
9	13324.980 M	34.2	-32.3 +1.5	+39.1 +0.2	+13.9	+7.5	+0.0	64.1	86.2	-22.1	Horiz
									Mid Channel		
10	4555.950M	42.8	-35.2 +2.0	+37.0 +1.6	+7.4	+5.1	+0.0	60.7	86.2	-25.5	Vert
11	13306.980 M	30.2	-32.3 +1.5	+39.0 +0.2	+13.9	+7.6	+0.0	60.1	86.2	-26.1	Vert
									Lo Channel		
12	13324.980 M	28.3	-32.3 +1.5	+39.1 +0.2	+13.9	+7.5	+0.0	58.2	86.2	-28.0	Vert
									Mid Channel		
13	10588.030 M	35.2	-34.5 +1.7	+36.5 +1.7	+11.0	+6.4	+0.0	58.0	86.2	-28.2	Horiz
									Lo Channel		
14	13414.980 M	27.7	-32.2 +1.4	+39.6 +0.2	+13.7	+7.5	+0.0	57.9	86.2	-28.3	Vert
									Hi Channel		
15	10731.980 M	35.5	-34.4 +1.4	+36.3 +1.6	+10.8	+6.4	+0.0	57.6	86.2	-28.6	Horiz
									Hi Channel		
16	10659.980 M	33.0	-34.4 +1.5	+36.4 +1.7	+10.9	+6.4	+0.0	55.5	86.2	-30.7	Horiz
									Mid Channel		
17	4935.917M	36.5	-35.6 +2.6	+35.7 +1.2	+8.3	+4.6	+0.0	53.3	86.2	-32.9	Vert
18	10641.980 M	29.3	-34.4 +1.6	+36.4 +1.7	+10.9	+6.4	+0.0	51.9	86.2	-34.3	Vert
									Lo Channel		
19	10659.980 M	29.3	-34.4 +1.5	+36.4 +1.7	+10.9	+6.4	+0.0	51.8	86.2	-34.4	Vert
									Mid Channel		
20	10731.980 M	29.5	-34.4 +1.4	+36.3 +1.6	+10.8	+6.4	+0.0	51.6	86.2	-34.6	Vert
									Hi Channel		
21	7941.034M	36.0	-35.8 +0.4	+33.2 +0.1	+9.2	+7.3	+0.0	50.4	86.2	-35.8	Horiz
									Lo Channel		
22	5293.617M	32.7	-36.2 +1.9	+36.5 +0.1	+8.5	+4.8	+0.0	48.3	86.2	-37.9	Horiz
									Lo Channel		
23	5329.983M	32.0	-36.3 +1.8	+36.6 +0.0	+8.5	+4.8	+0.0	47.4	86.2	-38.8	Horiz
									Mid Channel		
24	8048.983M	32.2	-35.8 +0.8	+33.2 +0.0	+9.4	+7.4	+0.0	47.2	86.2	-39.0	Horiz
									Hi Channel		
25	7994.983M	32.2	-35.7 +0.3	+33.0 +0.1	+9.2	+7.4	+0.0	46.5	86.2	-39.7	Horiz
									Mid Channel		
26	7976.983M	31.7	-35.7 +0.3	+33.1 +0.1	+9.2	+7.4	+0.0	46.1	86.2	-40.1	Vert
									Lo Channel		
27	5365.983M	30.5	-36.4 +1.7	+36.7 -0.1	+8.5	+4.9	+0.0	45.8	86.2	-40.4	Horiz
									Hi Channel		

28	5329.983M	29.7	-36.3 +1.8	+36.6 +0.0	+8.5	+4.8	+0.0	45.1	86.2 Mid Channel	-41.1	Vert
29	5365.983M	29.8	-36.4 +1.7	+36.7 -0.1	+8.5	+4.9	+0.0	45.1	86.2 Hi Channel	-41.1	Vert
30	8048.983M	29.8	-35.8 +0.8	+33.2 +0.0	+9.4	+7.4	+0.0	44.8	86.2 Hi Channel	-41.4	Vert
31	5311.983M	26.0	-36.3 +1.9	+36.5 +0.1	+8.5	+4.8	+0.0	41.5	86.2 Lo Channel	-44.7	Vert
32	7994.983M	27.0	-35.7 +0.3	+33.0 +0.1	+9.2	+7.4	+0.0	41.3	86.2 Mid Channel	-44.9	Vert

SETUP PHOTOGRAPH SHOWING FIELD STRENGTH OF SPURIOUS EMISSIONS



Transmitter with Planar Antenna

Specification: **FCC 21.106**
 Work Order #: **75897**
 Test Type: **Field Strength of Spurious Radiation**
 Equipment: **MMDS-MMDS Transceiver**
 Manufacturer: **Cal Amp**
 Model: **520010-1**
 S/N: **1040014449**

Date: 01/25/2001
 Time: 20:55:52
 Sequence#: 13
 Tested By: Randal Clark

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Preamp 1-2, HP	3008A0030	10/13/00	10/13/01	2010
18-26 GHz Antenna	942126-003	02/02/00	02/02/01	1413
3.5 GHz Filter	3643A0002	03/02/00	03/02/01	1416
Spectrum Analyzer, HP	3623A0053	12/12/00	12/12/01	1406

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver*	Cal Amp	520010-1	1040014449

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. 18-26 GHz. **No emissions found.**

Measurement Data:			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq MHz	Rdng dBμV	Low P Barn dB	Pream dB	Bicon dB	Log 1 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant

SETUP PHOTOGRAPH SHOWING FIELD STRENGTH OF SPURIOUS EMISSIONS



Transmitter with Parabolic Antenna

Specification: **FCC 21.106**
 Work Order #: **75897**
 Test Type: **Field Strength of Spurious Radiation**
 Equipment: **MMDS-MMDS Transceiver**
 Manufacturer: **Cal Amp**
 Model: **520010-2**
 S/N: **1050049441**

Date: 01/25/2001
 Time: 20:55:52
 Sequence#: 13
 Tested By: Randal Clark

Equipment Used During Testing:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Preamp 1-2, HP	3008A0030	10/13/00	10/13/01	2010
18-26 GHz Antenna	942126-003	02/02/00	02/02/01	1413
3.5 GHz Filter	3643A0002	03/02/00	03/02/01	1416
Spectrum Analyzer, HP	3623A0053	12/12/00	12/12/01	1406

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Power Supply	Cal Amp	71441	N/A
MMDS-MMDS Transceiver	Cal Amp	520010-2	1050049441

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	HP	E4437B	US39260148

Test Conditions / Notes:

EUT is an MMDS Transceiver operating on 2644-2686 MHz. Power is supplied through a transformer (22VDC). The input signal is obtained from the HP signal generator. 18-26 GHz. **No emissions found.**

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	Low P Barn dB	Pream dB	Bicon dB	Log 1 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
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SETUP PHOTOGRAPH SHOWING FIELD STRENGTH OF SPURIOUS EMISSIONS



Transmitter with Parabolic Antenna

2.1033(c)(14)/2.1055/21.101 - FREQUENCY STABILITY

TEST CONDITIONS: The EUT was connected directly to the signal analyzer. EUT is an MMDS-MMDS Transceiver operating at 2644 – 2686 MHz. The EUT receives power from the signal generator. The power to the cable is provided through the Power Inserter. The EUT is continually sending packets via command from the PC.

TEST EQUIPMENT USED:

1. Spectrum Analyzer, Hewlett Packard, Model No. 8564E, S/N 3623A0053. Calibration date: December 12, 2000. Calibration due date: December 12, 2001.
2. Voltmeter, Radio Shack, Model 22-183, Asset # 2041. Calibration date: August 30, 2000. Calibration due date: August 30, 2001.
3. Vairac, Superior Electric, Model No. 126, Asset #2037. Calibration date: April 21, 2000. Calibration due date: April 21, 2001.
4. Temperature Chamber Thermotron Corp S-1.2 Mini Max 11899. Calibration date: April 3, 2000. Calibration Due: April 3, 2001.
5. 2.4 GHz Filter, K & L, Model 10L121-2000, S/N 1. Calibration date: October 3, 2000. Calibration Due: October 3, 2001.

VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:

Frequency Range	Signal Analyzer VBW & RBW Setting
30MHz – 1MHz	120 kHz
1GHz – 26GHz	1MHz

TEST Conditions:

Simultaneous frequency stability test in accordance with FCC 2.1055: -30°C to +50°C and $\pm 15\%$ on AC mains. Clock oscillator is 2.468 GHz.

TEST DATA

Temp	-30 Frequency Error Hz	
V-	2.468000334	334.0
V	2.468000332	332.0
V+	2.468000335	335.0
Temp	-20	
V-	2.468000443	443.0
V	2.468000452	452.0
V+	2.468000468	468.0
Temp	-10	
V-	2.468000407	407.0
V	2.46800041	410.0
V+	2.468000415	415.0
Temp	0	
V-	2.467999811	-189.0
V	2.467999796	-204.0
V+	2.467999793	-207.0
Temp	10	
V-	2.467999358	-642.0
V	2.467999354	-646.0
V+	2.467999355	-645.0
Temp	20	
V-	2.467999722	-278.0
V	2.467999731	-269.0
V+	2.467999734	-266.0
Temp	30	
V-	2.468000038	38.0
V	2.468000003	30.0
V+	2.468000017	17.0
Temp	40	
V-	2.468000444	444.0
V	2.46800046	460.0
V+	2.46800047	470.0
Temp	50	
V-	2.468000602	602.0
V	2.468000605	605.0
V+	2.468000608	608.0

SETUP PHOTOGRAPH SHOWING FREQUENCY STABILITY



APPENDIX A

INFORMATION ABOUT TEST DATA SHEET HEADERS

**A TYPICAL DATA SHEET WILL DISPLAY THE FOLLOWING
IN COLUMN FORMAT:**

#	Freq MHz	Rdng dBuV	GHz C	Pream	Bicon	Horn	28 dB	3.5 G	Corr dBuV/m	Spec	Margin	Polar
				Log 1					Low P			

means reading number

Freq MHz is the frequency in MHz of the obtained reading.

Rdng dBuV is the reading obtained on the spectrum analyzer in dBμV.

Pream is short for the preamplifier factor or gain in dB.

Bicon is the biconical antenna factor in dB.

Log 1 is the log periodic antenna factor in dB.

Horn is the horn antenna factor in dB.

GHz C is the cable loss in dB of the coaxial cable on the OATS.

28 dB is the attenuators used.

3.5G is the GHz high pass filter.

Low P is the low pass filter.

Corr dBμV/m is the corrected reading which is now in dBμV/m (field strength).

Spec is the specification limit (dB) stated in the regulations.

Margin is the closeness to the specified limit in dB; + is over and - is under the limit.

Polar is the Polarity of the antenna with respect to earth.