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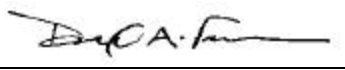
RTL Work Order: 2001345
RTL Quote Number: QRTL01-37T
Date of Tests: 2-22-02
TELAXIS COMMUNICATIONS; FCC ID: P57-AU2006

CERTIFICATE OF COMPLIANCE FCC PART 15.255 CERTIFICATION

Test Lab:		Applicant Information:	
Rhein Tech Laboratories, Inc. 360 Herndon Parkway Suite 1400 Herndon, VA 20170		Telaxis Communications Corporation 20 Industrial Drive East South Deerfield, MA 01373 USA	
Phone:	703-689-0368		
Fax:	703-689-2056		
Web Site:	www.rheintech.com		
FCC ID:	P57-AU2006	FRN NUMBER:	0005084207
EQUIPMENT TYPE:	Communications Transceiver Units	MODEL(S):	Access Units A and B
RTL WORK ORDER NUMBER:	2001345	RTL QUOTE NUMBER:	QRTL01-37T
DATE OF TEST REPORT:	2-22-02		
FCC Classification:	☐ DCD: Part 15 Low Power Transmitter Below 1705 kHz ☐ DXT: Part 15 Low Power Transceiver, Rx Verified ☒ DXX: Part 15 Low Power Communication Device Transmitter		
FCC Rule Part(s):	Part 15.255: Operation within the bands 57.0 – 64.0 GHz		
Carrier/Frequency Range (GHz)	Output Power (mW)	Freq. Tolerance (Deviation Hz)	Emission Designator
62 / 57-64	0.295 (UNIT A)	7160000	N/A
58.7 / 57-64	0.117 (UNIT B)	2694000	N/A

We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards.

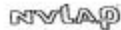
Furthermore, there was no deviation from, additions to or exclusions from the FCC Part 2, FCC Part 15 and ANSI 63.4.

Signature: 

Date: February 22, 2002

Typed/Printed Name: Desmond A. Fraser

Position: President
(NVLAP Signatory)



Accredited by the National Voluntary Accreditation Program for the specific scope of accreditation under Lab Code 200061-0.

Note: This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.



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1 GENERAL INFORMATION

1.1 SCOPE

FCC Rules Part 15.255: Operation within the band of 57.0-64.0 GHz, products other than fixed disturbance sensors. The EUT is a low power telecommunications device.

1.2 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communication Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 1992)

1.3 RELATED SUBMITAL (S)/GRANT (S)

This is an original application for Certification.



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2 EQUIPMENT INFORMATION

2.1 APPLICANT AND EQUIPMENT INFORMATION

Test Lab:		Applicant Information:	
Rhein Tech Laboratories, Inc. 360 Herndon Parkway Suite 1400 Herndon, VA 20170		Telaxis Communications Corporation 20 Industrial Drive East South Deerfield, MA 01373 USA	
Phone: 703-689-0368 Fax: 703-689-2056 Web Site: www.rheintech.com			
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62 / 57-64	0.295 (UNIT A)	7160000	N/A
58.7 / 57-64	0.117 (UNIT B)	2694000	N/A

2.2 EXERCISING THE EUT CW MODE

The EUT was configured internally so that the radiated carrier produced was un-modulated i.e. CW mode in order to measure the peak power densities of each access unit. The test was performed with the EUT polarized horizontally and vertically in order to determine worst-case emissions. The EUT supports only one channel within the authorized band, namely 58.7 GHz and 62 GHz for access unit's A and B. Data for both access units are in the report. To complete the configuration required, the transceiver was tested with a fiber breakout box, and a 48-volt DC supply. The modulation input connector to the fiber break out box was left unconnected in this mode. All radiated measurements were performed at an antenna test distance of 3 meters.

2.3 EXERCISING THE EUT OC3 AND OC12 MODULATION MODE

The EUT was configured with a communication analyzer providing OC3 and OC12 fiber optic output signals. To complete the configuration required, the transceiver was tested with a fiber breakout box, and a 48-volt DC supply. The modulation input connector to the fiber break out box was connected to the communication analyzer. Both access units were modulated with this device in order to measure bandwidths, investigation of the restricted bands, and temperature /voltage frequency stabilities. The access unit's spurious emissions were also investigated and tested in this mode. The tests were performed with the EUT polarized horizontally and vertically in order to determine worst-case emissions. The EUT supports only one channel within the authorized band, namely 62 GHz and 58.7 GHz for access units A and B respectively. All radiated measurements were performed at an antenna test distance of 3 meters.



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2.4 TEST SYSTEM DETAILS

The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system are:

TABLE 2-1: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
ACCESS UNIT A	TELAXIS	AU2006-ALS	013208945	P57-AU2006	SHIELDED I/O	14135
ACCESS UNIT B	TELAXIS	AU2006-BLS	013208947	P57-AU2006	SHIELDED I/O	14031

TABLE 2-2: EXTERNAL COMPONENTS IN TEST CONFIGURATION

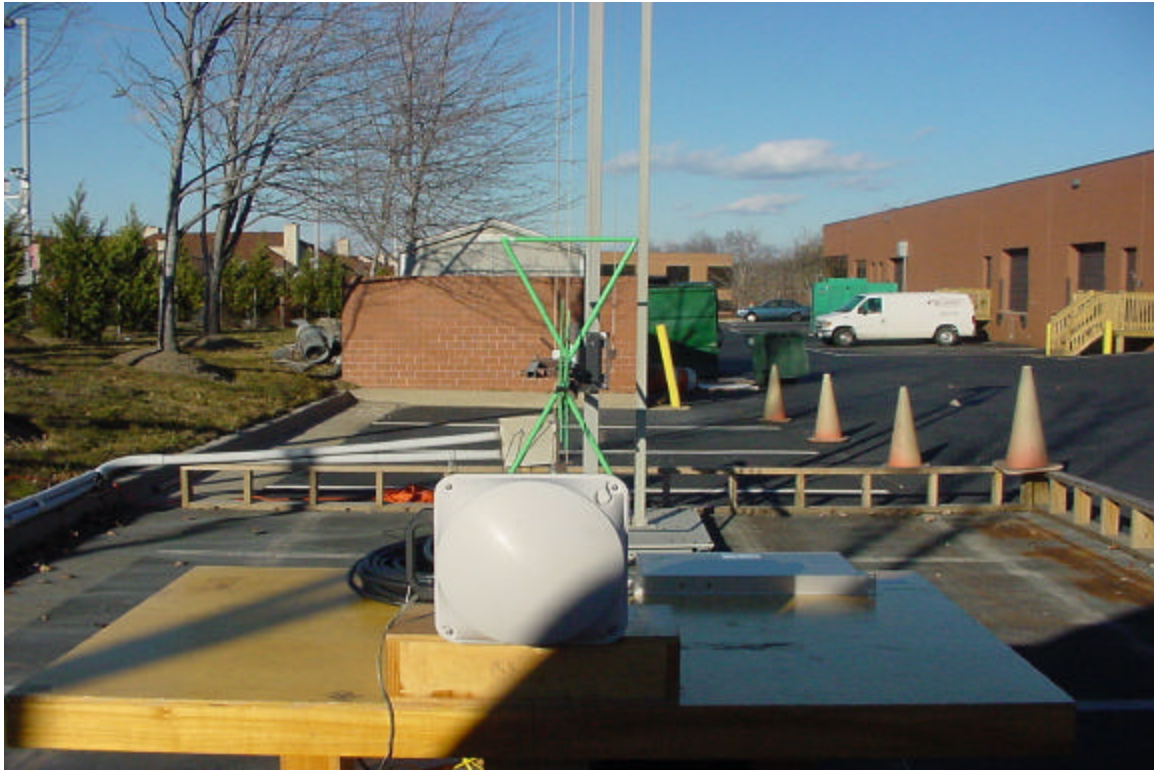
PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
FIBER BREAKOUT BOX	TELAXIS	FIBER INTERFACE PANEL	01341900	N/A	FIBER CABLE/	14033
DC POWER SUPPLY	XANTREX	LX60-1	0000	N/A	SHIELDED	14034
CABLE (167 FEET)	GLENAIR INC.	ABC56375-0050	007	N/A	FIBER/COPPER CABLE SHIELDED	14032



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2.5 CONFIGURATION OF TESTED SYSTEM



PHOTOGRAPH 1: CONFIGURATION OF TESTED SYSTEM (FRONT VIEW)



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PHOTOGRAPH 2: CONFIGURATION OF TESTED SYSTEM (REAR VIEW)



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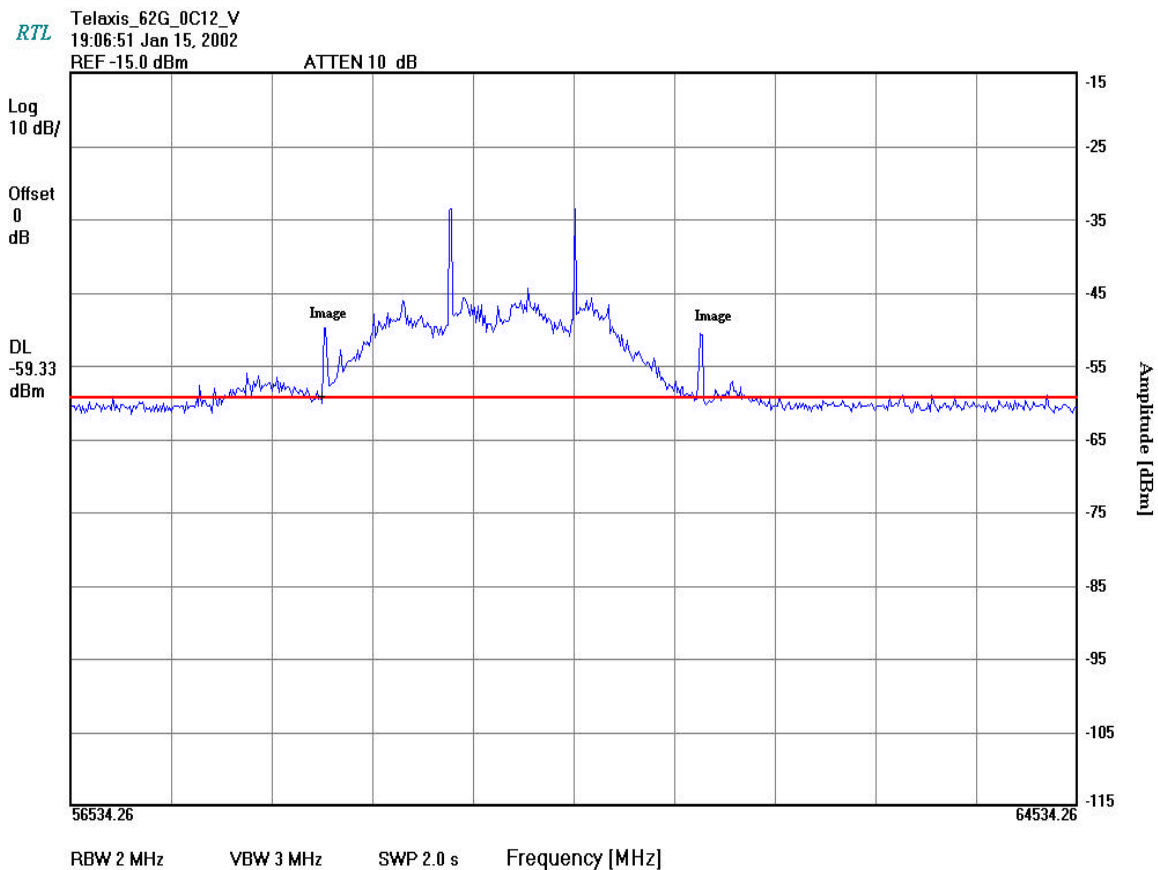
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3 RESTRICTED BANDS OF OPERATION - §15.205

3.1 TEST PROCEDURE

The restricted band edges at 57 GHz and 64 GHz were investigated and checked for compliance. The entire modulated carrier at 58.7GHz and 62 GHz were within the authorized band for both access units when exercised in the CW, OC3 and OC12 modes. For both units OC12 is the worst-case mode.

Access unit: A
Carrier Frequency: 62.0 GHz
Resolution Bandwidth: 2 MHz
Video Bandwidth: 3 MHz
Sweep Time: 2 Sec
Span 8 GHz



PLOT 3-1: OC12 BANDEDGES ACCESS UNIT A

TEST PERSONNEL:

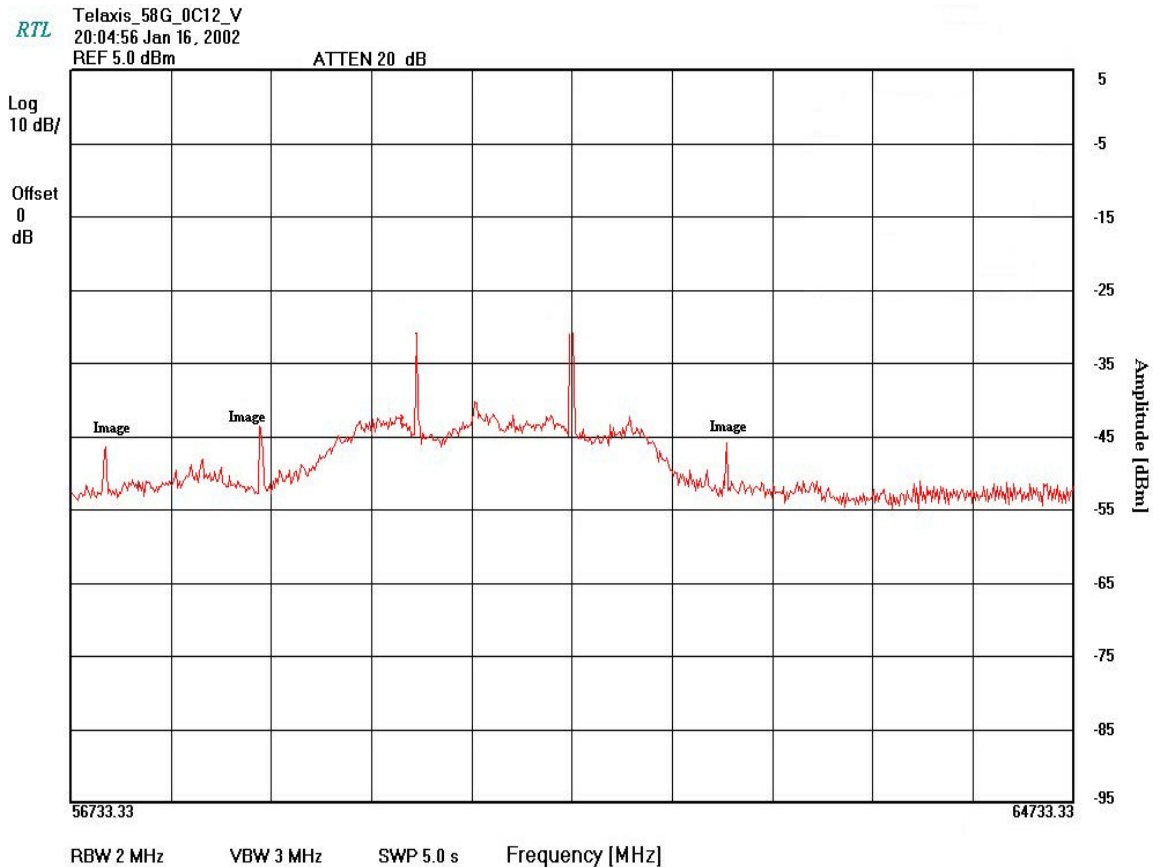
Test Engineer	Signature	Date Of Test
Desmond A. Fraser		1-15-02



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Access unit: B
Frequency: 58.7 GHz
Resolution Bandwidth: 2 MHz
Video Bandwidth: 3 MHz
Sweep Time: 5 sec
Span 8 GHz



PLOT 3-2: OC12 BANDEDGES ACCESS UNIT B

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		1-16-02

TABLE 3-1: RETRICTED BANDS TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CAL DUE
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	06/07/2002
900772	ATM	3161-02	Horn Antenna (50-75GHz)	38041904-01	7/30/04
900716	Hewlett Packard	11970W	Harmonic Mixer (50 - 75GHz)	2521A00710	07/30/2004



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14035	TTC	Tberd 310	Communications Analyzer	6285	14035
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4 CONDUCTED LIMITS - §15.207

This units are 48 VDC powered. Conducted emission is not applicable.



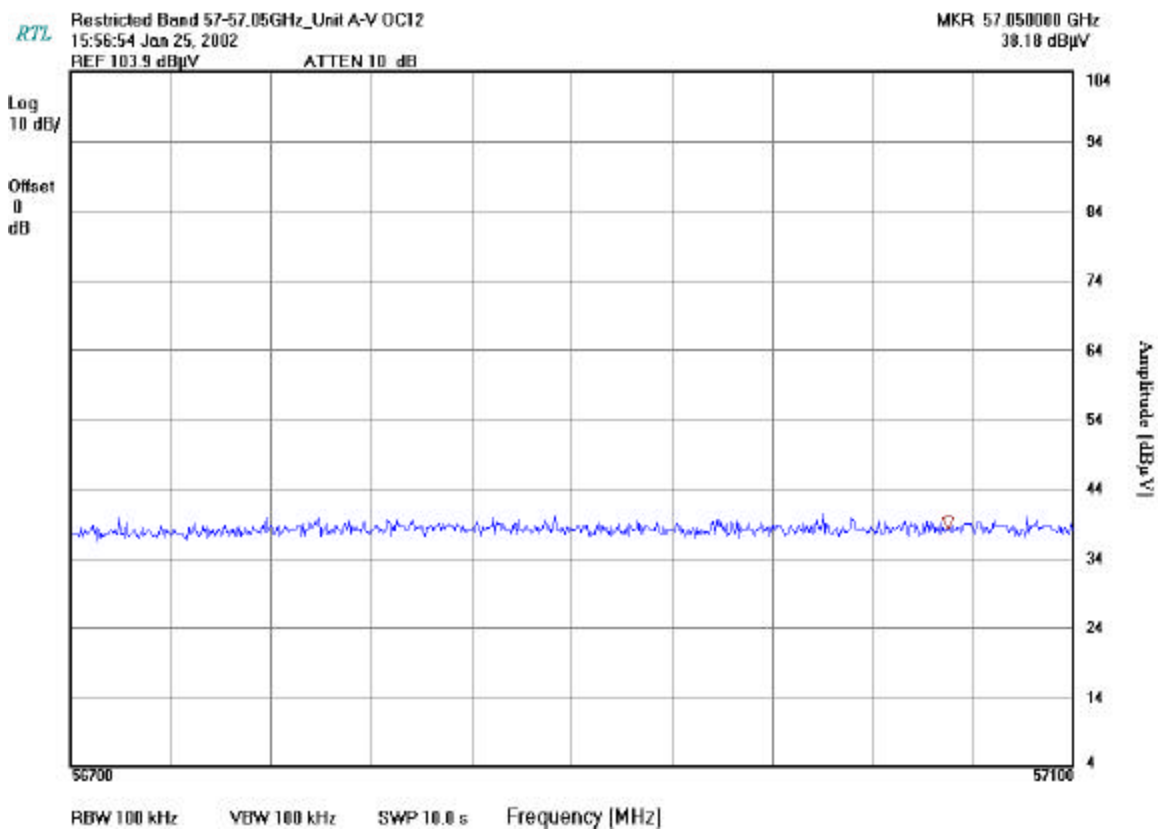
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5 COMPLIANCE WITH THE PUBLIC ACCESS BAND 57-57.05GHZ - §15.255 (d)

The EUT does not support public accessible coordination within the 57-57.05GHz channel, the public access band at 57-57.05 GHz were investigated and checked for compliance on both access units in the CW, OC3 and OC 12 modes for spurious noise. There was no spurious noise within this band on both units. The OC12 mode is considered the worst-case mode for both units. See plots for this mode below.

Access unit: A
Carrier Frequency: 62.0 GHz
Resolution Bandwidth: 100KHz
Video Bandwidth: 100KHz
Sweep Time: 10sec
Span 400 MHz



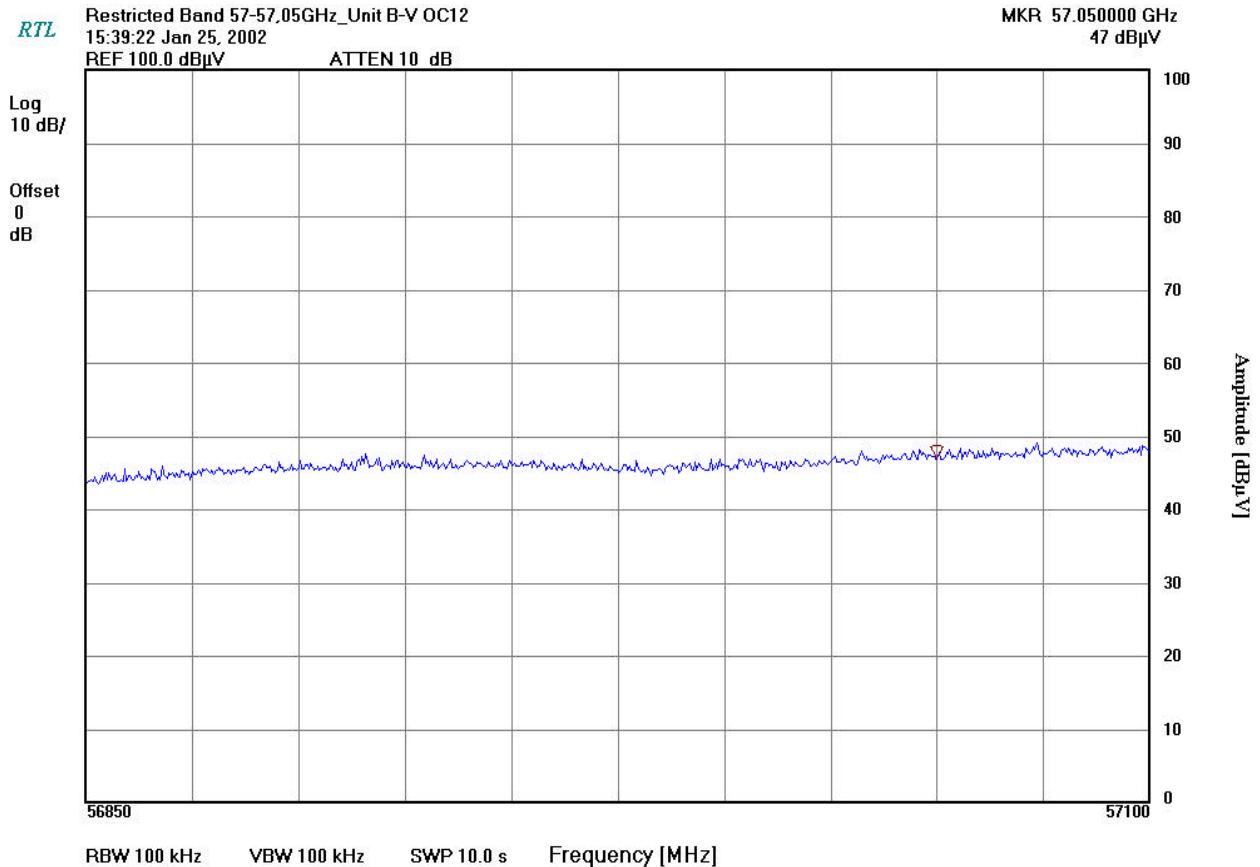
PLOT 5-1: OC12 BANDEDGES ACCESS UNIT A



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Access unit: B
Frequency: 58.7 GHz
Resolution Bandwidth: 100KHz
Video Bandwidth: 100KHz
Sweep Time: 10sec
Span 400 MHz



PLOT 5-2: OC12 BANDEDGES ACCESS UNIT B

TABLE 5-1: PUBLIC ACCESS BAND TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CAL DUE
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	06/07/2002
900772	ATM	3161-02	Horn Antenna (50-75GHz)	38041904-01	7/30/04
900716	Hewlett Packard	11970W	Harmonic Mixer (50 - 75GHz)	2521A00710	07/30/2004
14035	TTC	Tberd 310	Communications Analyzer	6285	14035



6 RADIATED EMISSION LIMITS - §15.255(C)(2) AND (C)(3)

6.1 RADIATED EMISSION LIMITS TEST PROCEDURE

Radiated Spurious Emissions applies to harmonics and spurious emissions that fall in the restricted and non-restricted bands were investigated from 10 KHz to 200 GHz. The restricted bands are listed in Part 15.205. The maximum permitted average field strength for the restricted band is listed in Part 15.209. The EUT was tested in the in horizontal and vertical polarized plane. The general limit under part 15.209 was applied for all frequencies 10 KHz to 40 GHz per FCC 15.255 (c)(2). Above 40 GHz, the limit from FCC 15.255 (c) (3) is applicable. The worst-case mode is represented by OC12 mode.

6.2 RADIATED EMISSION LIMITS TEST DATA

TABLE 6-1: RADIATED EMISSIONS ACCESS UNIT A OC12

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (Deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin
155.35	Qp	V	47	2.3	37.0	-17.1	20.4	43.5	Pass
155.35	Qp	H	90	2.7	33.0	-17.1	15.9	43.5	Pass

NO OTHER SPURIOUS EMISSION WERE FOUND

AVERAGE MEASUREMENT MODE: RES: =1 MHz, VID= 10Hz; NF = NOISE FLOOR

6.3 RADIATED EMISSION LIMITS TEST DATA

TABLE 6-2: RADIATED EMISSIONS ACCESS UNIT B OC12

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin
155.37	Qp	V	47	2.3	33.0	-17.1	15.9	43.5	Pass
155.37	Qp	H	95	2.7	29.0	-17.1	11.9	43.5	Pass

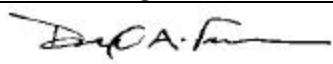
NO OTHER SPURIOUS EMISSION WERE FOUND

AVERAGE MEASUREMENT MODE: RES: =1 MHz, VID= 10Hz; NF = NOISE FLOOR

TEST PERSONNEL:

AVERAGE: RES. =1 MHz, VID= 10Hz; NF = NOISE FLOOR

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		1-17-02



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6.4 TEST EQUIPMENT USED FOR TESTING

TABLE 6-3: RADIATED SPURIOUS EMISSIONS TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900717	HEWLETT PACKARD	11970U	Harmonic Mixer (40 - 60 GHz)	2332A01110
901218	EMCO	3160-09	Horn Antenna (18-26 GHz)	960281-003
900392	HEWLETT PACKARD	11970K	Harmonic Mixer (18 - 26 GHz)	3525A00159
900715	HEWLETT PACKARD	11970V	Harmonic Mixer (50 - 75 GHz)	2521A00512
900716	HEWLETT PACKARD	11970W	Harmonic Mixer (75 - 110 GHz)	2521A00710
900126	HEWLETT PACKARD	11970A	Harmonic Mixer (26 - 40 GHz)	2332A01199
900056	ATM	19-443-6	Horn Antenna (40 – 60 GHz)	8041704-01
901218	EMCO	3160-09	Horn Antenna (25-40 GHz)	960452-007
900826	ATM	08-443-6	Horn Antenna (90– 140 GHz)	8041904-01
900719	ATM	05-443-6	Horn Antenna (140 – 220 GHz)	50685
90066	ATM	10-443-6	Horn Antenna (75 – 110GHz)	805 1905-1
900723	HP	NA	AMP-1GHz-26GHz	NA
900744	Olsen	Mixer	90-220 GHz	F80814-1
900744	Olsen	Mixer	140-220 GHz	G80814-1
900444	Miteq	Amplifier	30 –1000 MHz	PR1040
900791	Schaffner - Chase	CBL6112	Antenna (25 MHz 2 GHz)	2099
14035	TTC	Tberd 310	Communications Analyzer	6285



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7 RESERVED



8 MODULATED BANDWIDTH - §15.255

8.1 MODULATED BANDWIDTH TEST PROCEDURE

The minimum 26 dB bandwidth per FCC 15.255 was measured using a 50-ohm spectrum analyzer using the bandwidth measurement guideline from the FCC's Millimeter Wave Procedure. Measurements were made for each access units using CW, OC3 and OC 12 modulation. CW mode was configured by the manufacturer, while a TBERD analyzer model 310 with fiber optic interface provided OC 3 and OC 12 modulations. The modulated bandwidth measurements may be used to calculate wide band Emission per the Millimeter Wave Guide procedure. However, emission bandwidth measurement results were not used in this report, the EUT's were configured in CW mode for the power density test presented in section 9.

8.2 MODULATED BANDWIDTH TEST DATA

TABLE 8-1: MINIMUM 26 DB MODULATED BANDWIDTHS

EUT	MODULATION	26 dB BANDWIDTH (MHz)
Access Unit A	CW	1.85
Access Unit A	OC3	312.1
Access Unit A	OC12	1866.1
Access Unit B	CW	1.80
Access Unit B	OC3	316.1
Access Unit B	OC12	1862.8

The 26 dB bandwidth plots are listed below.

TABLE 8-2: TEST EQUIPMENT USED FOR TESTING (MODULATED BANDWIDTH)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
900931	HP	8564E	Spectrum Analyzer (30Hz – 40 GHz)	3138A07771
900126	HP	11970V	Mixer (50-75 GHz)	2332A01199
900712	ATM	WR15	Horn Antenna	8051805-1
901055	TTA	Tberd 310	Communication analyzer	2545A04102

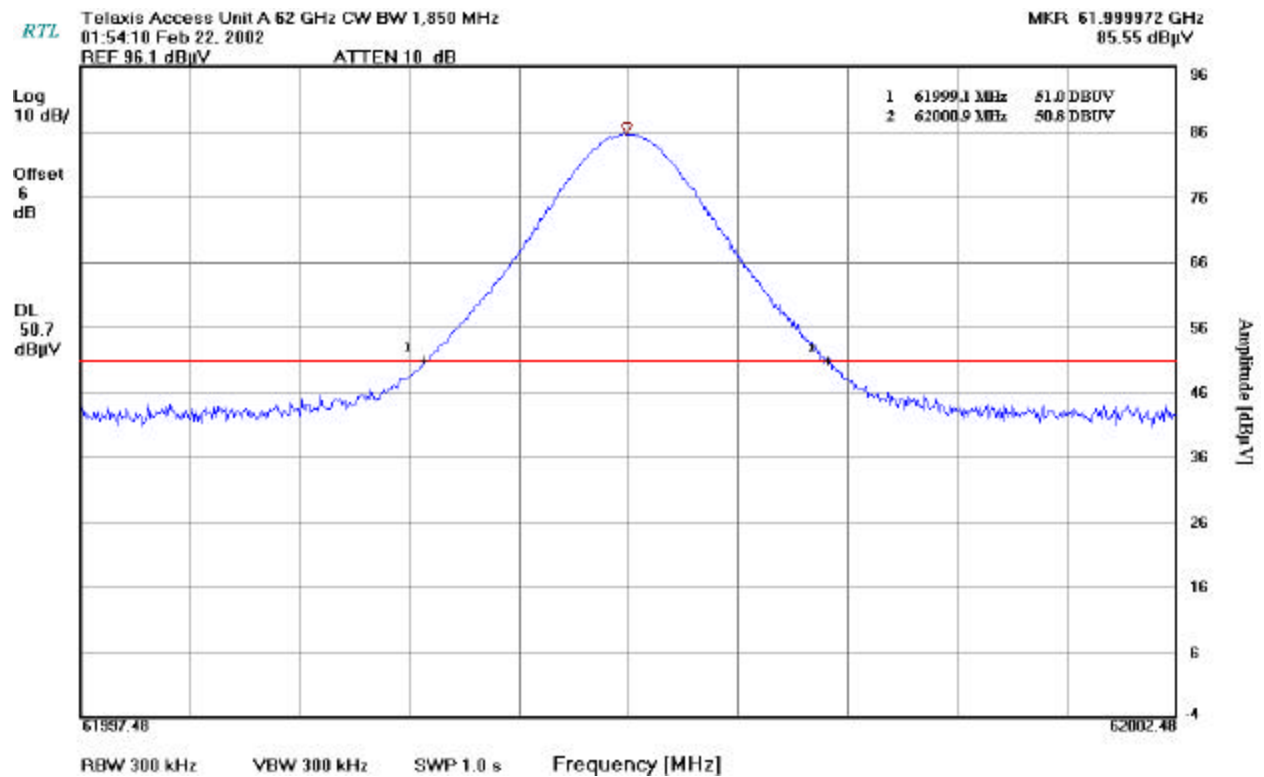


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8.3 26 DB BANDWIDTH PLOTS

Access unit: A
Frequency: 62 GHz
Resolution Bandwidth: 300KHz
Video Bandwidth: 300KHz
Sweep Time: 1sec
Span 5 MHz



PLOT 8-1: CW BANDWIDTH ACCESS UNIT A

TEST PERSONNEL:

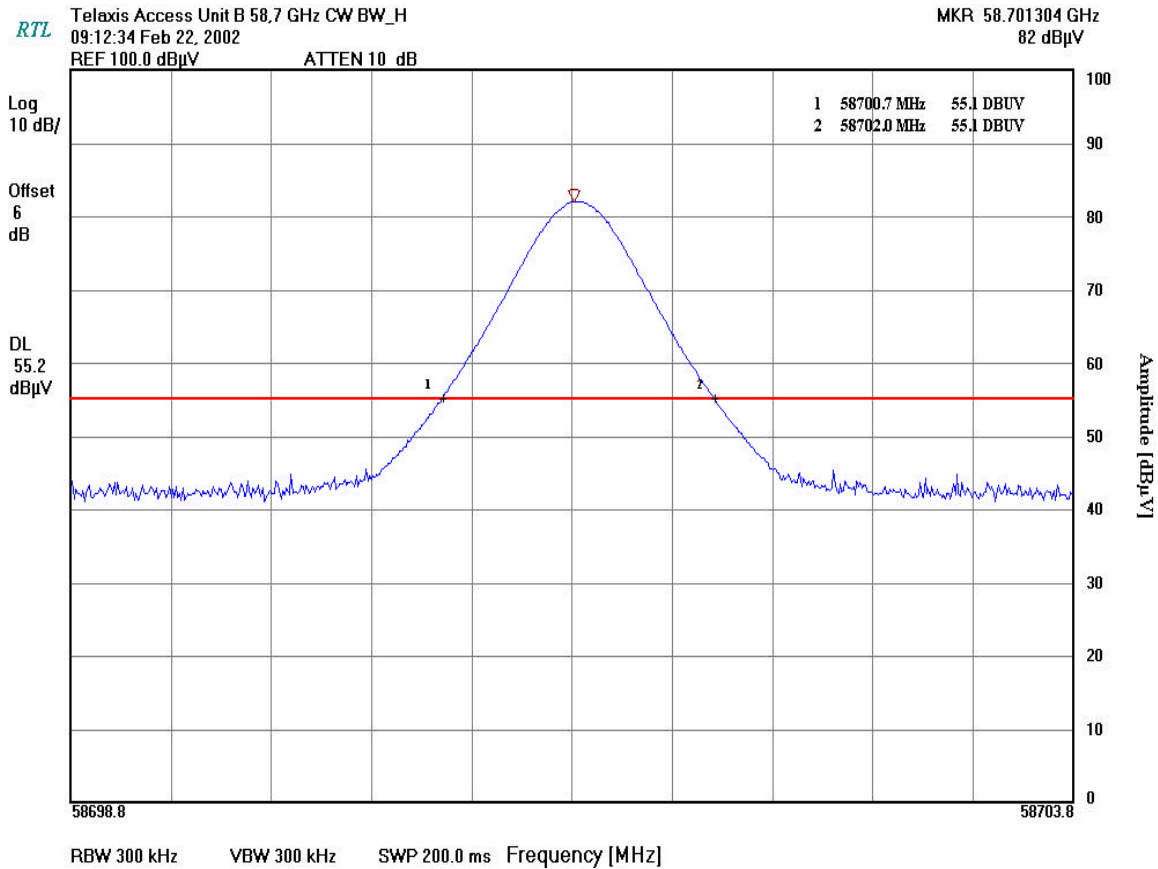
Test Engineer	Signature	Date Of Test
Desmond A. Fraser		1-22-02



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Access unit: B
Frequency: 58.7GHz
Resolution Bandwidth: 300KHz
Video Bandwidth: 300KHz
Sweep Time: 200 mS
Span 5 MHz



PLOT 8-2: CW BANDWIDTH ACCESS UNIT B

TEST PERSONNEL:

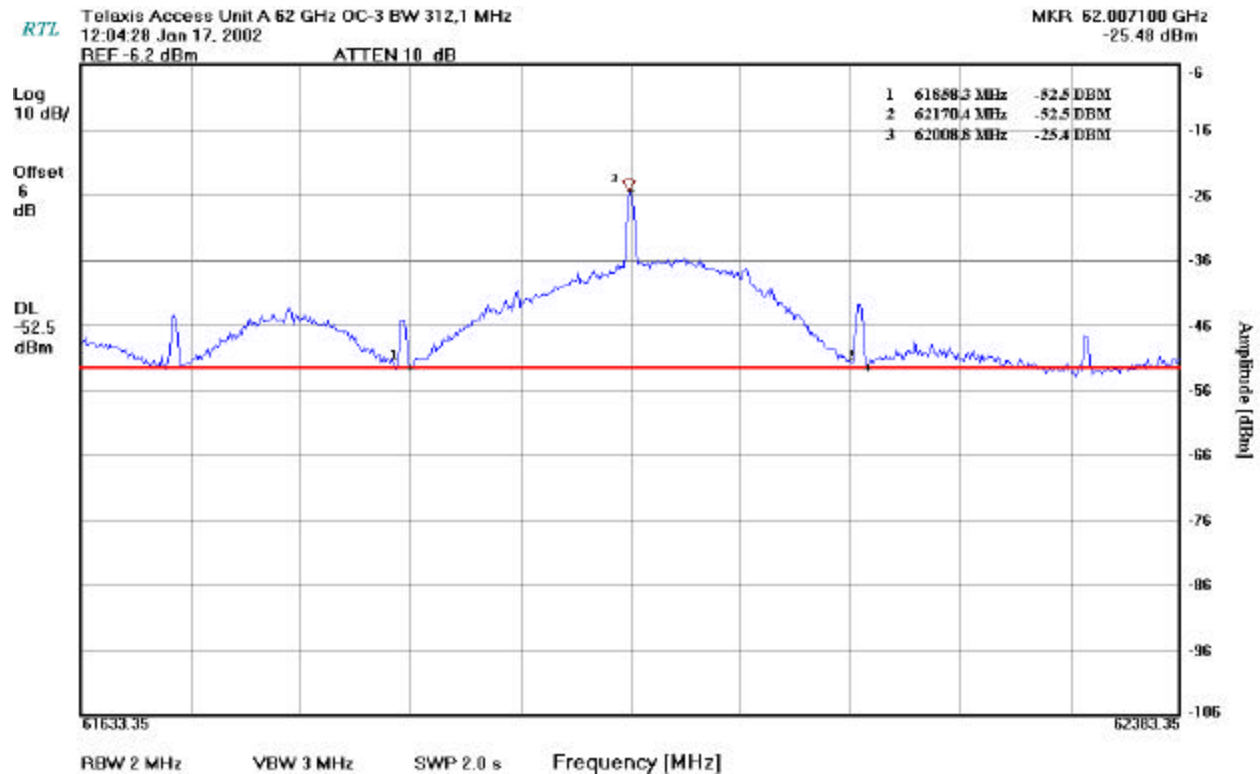
Test Engineer	Signature	Date Of Test
Desmond A. Fraser		1-22-02



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Access unit: A
Carrier Frequency: 62 GHz
Resolution Bandwidth: 2 MHz
Video Bandwidth: 3 MHz
Sweep Time: 2 sec
Span 750 MHz



PLOT 8-3: OC 3 MODULATION BANDWIDTH ACCESS UNIT A

TEST PERSONNEL:

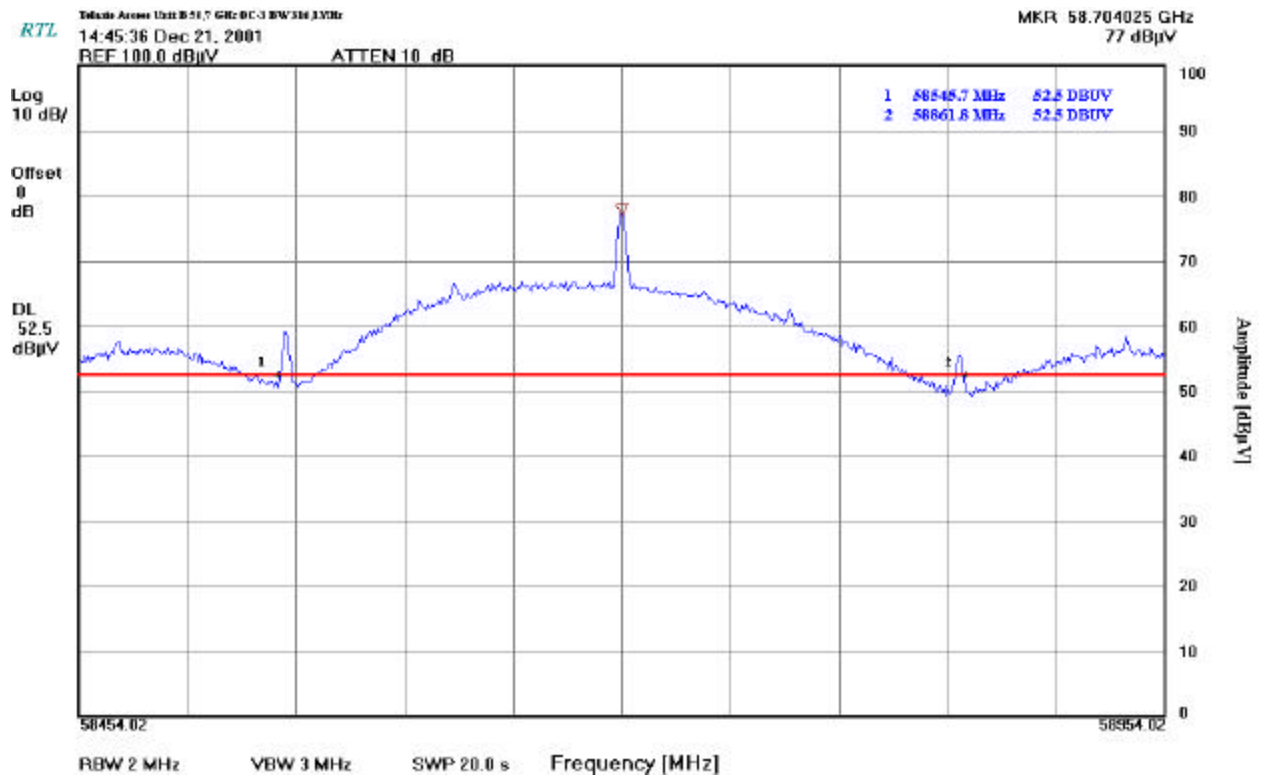
Test Engineer	Signature	Date Of Test
Desmond A. Fraser		1-17-02



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Access unit: B
Frequency: 58.7 GHz
Resolution Bandwidth: 2 MHz
Video Bandwidth: 3 MHz
Sweep Time: 20 sec
Span 500 MHz



PLOT 8-4: OC 3 MODULATION BANDWIDTH ACCESS UNIT B

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		12-21-01

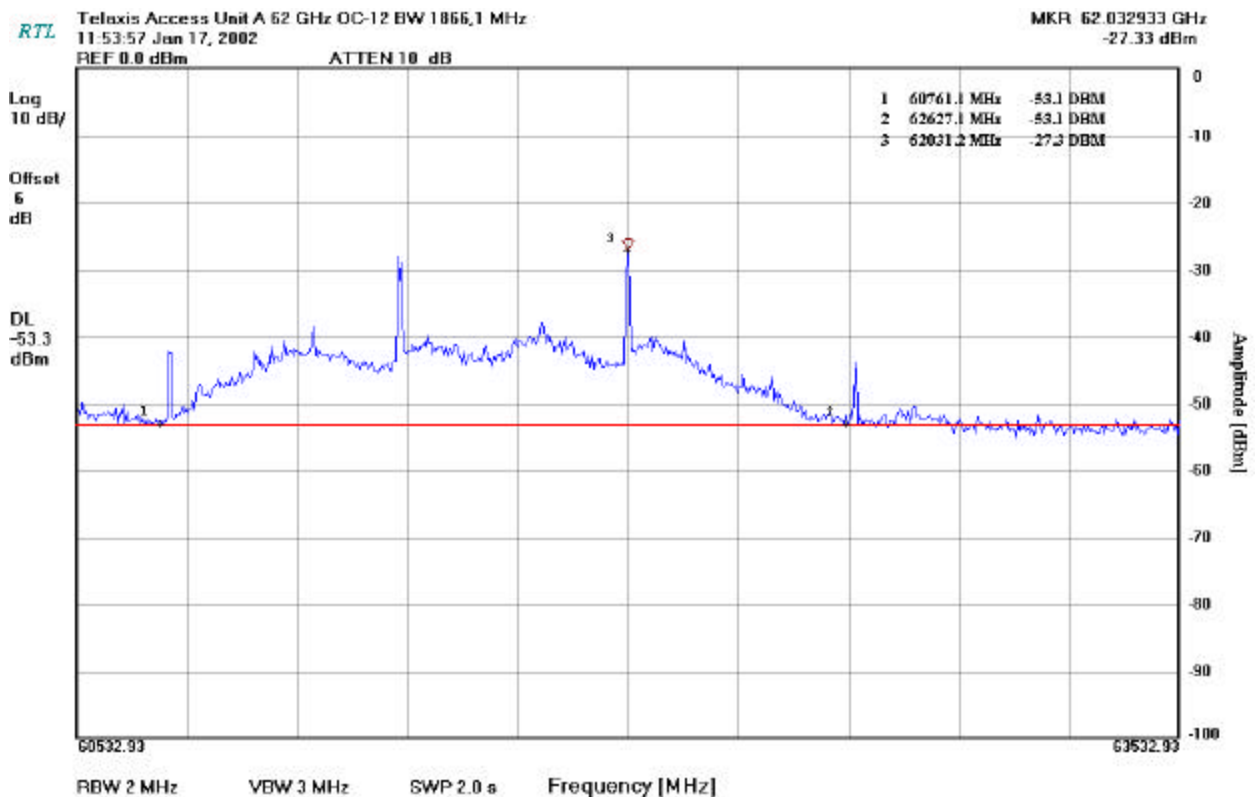


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Access unit: A
Frequency: 58.7 GHz
Resolution Bandwidth: 2 MHz
Video Bandwidth: 3 MHz
Sweep Time: 2 sec
Span 3000 MHz

PLOT 8-5: OC 12 MODULATION BANDWIDTH ACCESS UNIT A



TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		1-17-02

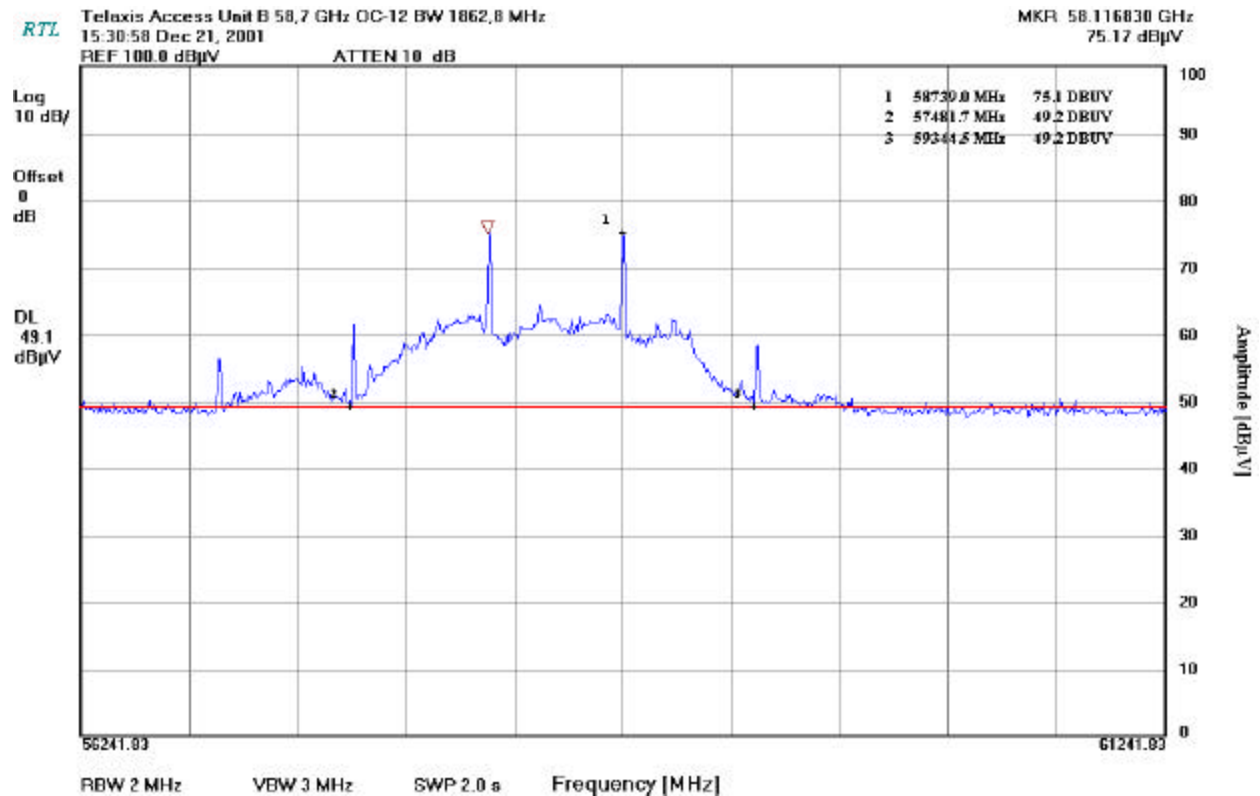


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Access unit: B
Carrier Frequency: 58.7 GHz
Resolution Bandwidth: 2 MHz
Video Bandwidth: 3 MHz
Sweep Time: 2 sec
Span 5000 MHz

PLOT 8-6: OC 12 MODULATION BANDWIDTH ACCESS UNIT B



TEST PERSONNEL:

Test Technician/Engineer	Signature	Date Of Test
Desmond A. Fraser		12-21-01



9 PEAK POWER DENSITY AND AVERAGED POWER - §15.255 (b)(1)

9.1 PEAK POWER DENSITY AND AVERAGED POWER TEST PROCEDURE

In order to calculate the Average Peak Power and Peak Power Densities of the EUT, the field strengths at 3 meters were measured for both access units. Mixer conversion loss associated with each mixer was input into the Spectrum analyzer Conversion loss register so that the spectrum analyzer result contained the mixer conversion loss. The peak radiated field strength was measured in the CW mode. The result from this measurement was used to calculate the Peak Power Density for access units A and B. The measurements were performed using the FCC's 15.255 Millimeter Wave Test procedure. Care was taken, as described in the aforementioned procedure, to avoid mixer saturation and overloading. During testing smaller adjustments were made in-order to stay within the EUT's narrow beam width for azimuth and test antenna height variations. Maximum Spectrum analyzer resolution bandwidth, video bandwidth, and appropriate sweep time that ensure a stable signal were used. The Spectrum analyzer signal identification feature was enabled to ensure proper identification of all valid spurious signals as well as wanted signals. The following equations were used to calculate the corrected field strength, peak power density and peak power.

$$P_d = E^2/Z$$

$$P_t = \frac{P_r}{GrGt \left[\frac{4\pi d}{\lambda} \right]^2}$$

$$E = \frac{2P}{\lambda} \sqrt{\frac{120 \cdot P_r}{Gr}} \text{ this formula is used to calculate field strength when the test receiver antenna gain is used}$$

Where **P_t** = transmitter Power (EUT)
G_t = transmitter antenna gain (EUT)
d = distance
P_r = Received Power
G_r = Test receiver antenna gain
E = Corrected radiated Electric field strength
λ = Wavelength
P_d = Power Density
Z = Free space impedance

S/A Reading (dBuV) = Received field strength plus mixer conversion loss

Antenna Factor (dB/m) = Test antenna factor

Cable loss (dB) = Loss between mixer and spectrum analyzer if port

Mixer Loss (dB) = Contained in Spectrum analyzer conversion loss register

Corrected Field Strength (dBuV/m) = Spectrum analyzer Reading + Antenna factor + Cable loss

Power Density (uW/cm²) = Calculated using the corrected field strength and the P_d formula below

Average Power Density (uW/cm²) = Power Density – Duty cycle (3dB)

Transmitter Power (watts) = Calculated using transmitter power formula below

Duty Cycle (dB) = Calculated from the



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9.2 POWER DENSITY TEST DATA POWER OUTPUT TEST DATA

9.2.1 PEAK POWER DENSITY MEASURED DATA

TABLE 9-1 ACCESS UNIT A PEAK CW MODE

V/H	Freq MHz	S/A Reading (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Mixer Factor (dB)	Corrected Field strength (dBμV/m)	Peak Power Density (μW/cm ²)	Peak Power Density Limit (μW/cm ²)	Peak TX Output power (dBm)	Result
V	620000.110	86.0	42.925	1.0	0.0	129.9	2.6	18	-5.3	Pass
H	620000.108	85.4	42.925	1.0	0.0	129.3	2.3	18	-5.9	Pass

TABLE 9-2 ACCESS UNIT B PEAK CW MODE

V/H	Freq MHz	S/A Reading (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Mixer Factor (dB)	Corrected Field strength (dBμV/m)	Peak Power Density (μW/cm ²)	Peak Power Density Limit (μW/cm ²)	Peak TX Output power (dBm)	Result
V	58701.304	81.2	42.925	1.0	0.0	125.1	0.8	18.0	-10.3	Pass
H	58701.304	82.0	42.925	1.0	0.0	125.9	1.0	18.0	-9.3	Pass

Note: Mixer conversion loss is within spectrum analyzer reading

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		2-22-02



9.2.2 AVERAGE POWER DENSITY CALCULATED DATA

The average power density transmitted from the EUTs was calculated based on the worst-case power output data measured in paragraph 9.2.1 above. In doing the calculation for duty cycle it was considered that the EUT operates with SNET compliant data that is scrambled, resulting in a 50% Duty cycle data stream to the EUT. The EUT modulates the incoming SNET data for the transmission over the air. Modulation used by the EUT is such that the 50% SNET duty cycle is maintained and results in average EUT power output being 3dB below the peak power measured in 9.2.1.

TABLE 9-3 ACCESS UNIT A AVERAGE CW MODE

V/H	Freq MHz	S/A Reading (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Mixer Factor (dB)	Corrected Field strength (dBμV/m)	Average Power Density (μW/cm ²)	Avg. Power Density Limit (μW/cm ²)	Peak TX Output power (dBm)	Result
V	620000.110	83.0	42.925	1.0	0.0	126.9	1.3	9	-8.30	Pass
H	620000.108	82.4	42.925	1.0	0.0	126.3	1.1	9	-8.90	Pass

TABLE 9-4 ACCESS UNIT B AVERAGE CW MODE

V/H	Freq MHz	S/A Reading (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Mixer Factor (dB)	Corrected Field strength (dBμV/m)	Average Power Density (μW/cm ²)	Avg. Power Density Limit (μW/cm ²)	Peak TX Output power (dBm)	Result
V	58701.304	78.2	42.925	1.0	0.0	122.1	0.4	9	-13.10	Pass
H	58701.304	79.0	42.925	1.0	0.0	122.9	0.5	9	-12.30	Pass

Note: Mixer conversion loss is within spectrum analyzer reading

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		2-22-02



9.2.3 TOTAL PEAK TRANSMITTER OUT POWER FCC 15.255 (e)

The total Peak transmitter output power (P_t) in tables 9-1 through 9-4 was calculated using the formula of transmitter output power in section 9-1. The total peak output power complies with the FCC's total peak output power limit of 500 mW.

9.3 TEST EQUIPMENT USED FOR PEAK POWER DENSITY AND AVERAGE POWER DENSITY MEASUREMENTS

TABLE 9-5: TEST EQUIPMENT USED FOR TESTING RADIATED MEASUREMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900931	HP	8564E	Spectrum Analyzer (30Hz – 40 GHz)	3138A07771
900772	EMCO	3161-02	Horn Antenna (2-4 GHz)	900772
900321	EMCO	3161-03	Horn Antennas (4-8,2GHz)	9508-1020
900323	EMCO	3160-7	Horn Antennas (8,2-12,4 GHz)	9605-1054
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051
900337	EMCO	3160-10	Horn Antenna (26.5 – 40 GHz)	9606-1033
901256	ATM	WR19	Horn Antenna (40 – 60 GHz)	8041704-01
900712	ATM	WR15	Horn Antenna (50 – 75 GHz)	8051805-1
900711	ATM	WR10	Horn Antenna (75 – 110GHz)	8051905-1
900826	ATM	WR08	Horn Antenna (90 - 140GHz)	8041904-1
900713	ATM	WR05	Horn Antenna (140 – 220GHz)	S0685
900723	Miteq	NA	AMP 100MHz-26GHz	NA
900392	HP	11970K	Mixer 18 – 26.5 GHz	3525A00159
900126	HP	11970A	Mixer 26.5 – 40 GHz	2332A01199
900717	HP	11970U	Mixer 40 – 60 GHz	2332A01110
900715	HP	11970V	Mixer 50 – 75 GHz	2521A00512
900716	HP	11970W	Mixer 75 – 110 GHz	2521A00710
901257	OML	M05HW	Mixer 140-220 GHz	G80814-1
900946	Tenney Engineering	TH65	Temperature Chamber	11380
900791	Schaffner - Chase	CBL6112	Antenna (25 MHz - 2 GHz)	2099
14035	TTC	Tberd 310	Communications Analyzer	6285



10 FREQUENCY STABILITY - §15.255(f)

The EUTs were tested using the general frequency stability set up found in the Millimeter Wave Test procedure. The horn antenna and mixer were placed outside the test chamber at 100 cm from the test chamber viewing glass window. The EUTs were tested from +50 degrees Celsius to -40 degrees Celsius for temperature stability and from 36 VDC to 60 VDC for voltage stability. Both Access units, A and B were tested. The reference frequency in the tables below is based on the EUTs nominal voltage of 48VDC and at nominal temperature of 20 °C

TABLE 10-1: TEMPERATURE STABILITY ACCESS UNIT A OC3 MODULATION

Temperature °C	Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (MHz)	Pass/Fail
+50	62004.490	61998.750	5.740	Pass
+40	62004.490	61997.330	7.160	Pass
+30	62004.490	62000.910	3.580	Pass
+20	62004.490	62004.490	0.000	Pass
+10	62004.490	62003.470	1.020	Pass
0	62004.490	62001.350	3.140	Pass
-10	62004.490	62002.450	2.040	Pass
-20	62004.490	62003.415	1.075	Pass
-30	62004.490	62003.391	1.099	Pass
-40	62004.490	62001.034	3.456	Pass

Maximum allowable deviation per manufacturer specification: 20 MHz

TEST PERSONNEL:

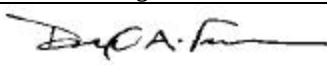
Test Engineer	Signature	Date Of Test
Desmond A. Fraser		1-23-02



TABLE 10-2: TEMPERATURE STABILITY ACCESS UNIT A OC12 MODULATION

Temperature °C	Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (MHz)	Pass/Fail
+50	62003.510	61998.020	5.490	Pass
+40	62003.510	61997.180	6.330	Pass
+30	62003.510	62000.350	3.160	Pass
+20	62003.510	62003.510	0.000	Pass
+10	62003.510	62004.630	-1.120	Pass
0	62003.510	62001.750	1.760	Pass
-10	62003.510	62003.882	-0.372	Pass
-20	62003.510	62003.000	0.510	Pass
-30	62003.510	62004.122	-0.612	Pass
-40	62003.510	62001.024	2.486	Pass

Maximum allowable deviation per manufacturer specification: 20 MHz

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		12-21-01

TABLE 10-3 VOLTAGE STABILITY ACCESS UNIT A OC3 MODULATION

Voltage (VAC)	Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (MHz)	Pass/Fail
36	62001.182	62001.224	-0.042	Pass
40	62001.182	62001.240	-0.058	Pass
44	62001.182	62001.215	-0.033	Pass
48	62001.182	62001.182	0.000	Pass
52	62001.182	62001.215	-0.033	Pass
56	62001.182	62001.240	-0.058	Pass
60	62001.182	62001.232	-0.050	Pass

Maximum allowable deviation per manufacturer specification: 20 MHz

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		12-21-01



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TABLE 10-4: VOLTAGE STABILITY ACCESS UNIT A OC12 MODULATION

Voltage (VAC)	Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (MHz)	Pass/Fail
36	62001.190	62001.207	-0.017	Pass
40	62001.190	62001.199	-0.009	Pass
44	62001.190	62001.190	0.000	Pass
48	62001.190	62001.190	0.000	Pass
52	62001.190	62001.190	0.000	Pass
56	62001.190	62001.199	-0.009	Pass
60	62001.190	62001.215	-0.025	Pass

Maximum allowable deviation per manufacturer specification: 20 MHz

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		12-21-01

TABLE 10-5: TEMPERATURE STABILITY ACCESS UNIT B OC3 MODULATION

Temperature °C	Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (MHz)	Pass/Fail
+50	58701.227	58701.080	0.147	Pass
+40	58701.227	58701.130	0.097	Pass
+30	58701.227	58701.180	0.047	Pass
+20	58701.227	58701.227	0.000	Pass
+10	58701.227	58700.329	0.898	Pass
0	58701.227	58699.431	1.796	Pass
-10	58701.227	58698.533	2.694	Pass
-20	58701.227	58697.630	3.597	Pass
-30	58701.227	58696.737	4.490	Pass
-40	58701.227	58695.840	5.387	Pass

Maximum allowable deviation per manufacturer specification: 20 MHz

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		12-21-01



TABLE 10-6: TEMPERATURE STABILITY ACCESS UNIT B OC12 MODULATION

Temperature °C	Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (MHz)	Pass/Fail
+50	58701.203	58700.460	0.743	Pass
+40	58701.203	58700.710	0.493	Pass
+30	58701.203	58700.960	0.243	Pass
+20	58701.203	58701.203	0.000	Pass
+10	58701.203	58700.310	0.893	Pass
0	58701.203	58699.420	1.783	Pass
-10	58701.203	58698.520	2.683	Pass
-20	58701.203	58697.630	3.573	Pass
-30	58701.203	58696.730	4.473	Pass
-40	58701.203	58695.840	5.363	Pass

Maximum allowable deviation per manufacture r specification: 20 MHz

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		1-23-02

TABLE 10-7: VOLTAGE STABILITY ACCESS UNIT B OC3 MODULATION

Voltage (VAC)	Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (MHz)	Pass/Fail
36	58700.155	58701.138	-0.983	Pass
40	58700.155	58701.105	-0.950	Pass
44	58700.155	58701.147	-0.992	Pass
48	58700.155	58701.155	-1.000	Pass
52	58700.155	58701.138	-0.983	Pass
56	58700.155	58701.155	-1.000	Pass
60	58700.155	58701.155	-1.000	Pass

Maximum allowable deviation per manufacturer specification: 20 MHz

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		12-21-01



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TABLE 10-8 VOLTAGE STABILITY ACCESS UNIT B OC12 MODULATION

Voltage (VAC)	Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (MHz)	Pass/Fail
36	58700.148	58701.161	-1.013	Pass
40	58700.148	58701.148	-1.000	Pass
44	58700.148	58701.157	-1.009	Pass
48	58700.148	58701.140	-0.992	Pass
52	58700.148	58701.165	-1.017	Pass
56	58700.148	58701.148	-1.000	Pass
60	58700.148	58701.132	-0.984	Pass

Maximum allowable deviation per manufacturer specification: 20 MHz

TEST PERSONNEL:

Test Engineer	Signature	Date Of Test
Desmond A. Fraser		12-21-01

TABLE 10-9: TEST EQUIPMENT USED FOR FREQUENCY STABILITY MEASUREMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900931	HP	8564E	Spectrum Analyzer (30Hz – 40 GHz)	3138A07771
900712	ATM	WR15	Horn Antenna (50 – 75 GHz)	8051805-1
900723	Miteq	NA	AMP 100MHz-26GHz	NA
900715	HP	11970V	Mixer 50 – 75 GHz	2521A00512
900946	Tenney Engineering	TH65	Temperature Chamber	11380
14035	TTC	Tberd 310	Communications Analyzer	6285



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11 CONCLUSION

Test Lab: Rhein Tech Laboratories, Inc. 360 Herndon Parkway Suite 1400 Herndon, VA 20170 Phone: 703-689-0368 Fax: 703-689-2056 Web Site: www.rheintech.com		Applicant Information: Telaxis Communications Corporation 20 Industrial Drive East South Deerfield, MA 01373 USA	
FCC ID:	P57-AU2006	FRN NUMBER:	0005084207
EQUIPMENT TYPE:	Communication Transceiver Units	MODEL(S):	Access Units A and B
RTL WORK ORDER NUMBER:	2001345	RTL QUOTE NUMBER:	QRTL01-37T
DATE OF TEST REPORT:	2-22-02		
FCC Classification:	☐ DCD: Part 15 Low Power Transmitter Below 1705 kHz ☐ DXT: Part 15 Low Power Transceiver, Rx Verified ☒ DXX: Part 15 Low Power Communication Device Transmitter		
FCC Rule Part(s):	Part 15.255: Operation within the bands 57.0 – 64.0 GHz		
Carrier/Frequency Range (GHz)	Output Power (mW)	Freq. Tolerance (Deviation Hz)	Emission Designator
62 / 57-64	0.295 (UNIT A)	7160000	N/A
58.7 / 57-64	0.117 (UNIT B)	2694000	N/A

The data in this application test report for FCC certification complies with the Federal Communications commission's rules and regulations on all the requirements listed above.

TEST PERSONNEL: