ENGINEERING TEST REPORT

LUCENT 802.11 WAVELAN DSSS RADIO
MODEL NO.: TRX7430

In Accordance With

FEDERAL COMMUNICATIONS COMMISSION (FCC)
PART 15, SUBPART C, SEC. 15.247
Direct Sequence Spread Spectrum Transmitters
operating in the frequency band 2412 - 2462 MHz

UltraTech's FILE NO.: TEK-141FTX

Tested for:

TEKLOGIX INC.
2100 Meadowvale Blvd.
Mississauga, Ontario
Canada, L5N 7J9

Tested by:

UltraTech - Group of Labs
4181 Sladeview Crescent, Unit 33
Mississauga, Ontario
Canada L5L 5R2

Report Prepared by: Tri M. Luu, P.Eng.

DATE: Sept. 08, 1998

TABLE OF CONTENTS

1. EXHIBIT 1 - SUMMARY OF TEST RESULTS & GENERAL STATEMENT OF CERTIFICATION

FCC PARAGRAPH.	TEST REQUIREMENTS	COMPLIANCE (YES/NO)
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System	Yes
15.247(b) & 1.1310	Maximum Peak Power and RF Exposure Limits	Yes
15.247(c)	RF Conducted Spurious Emissions at the Transmitter Antenna Terminal	Yes
15.247(c), 15.209 & 15.205	Transmitter Radiated Emissions	Yes
15.247(d)	Transmitted Power Density of a Direct Sequence Spread Spectrum System	Yes
15.247(e)	Processing Gain of Direct Sequence Spread Spectrum System	Yes
15.107, 15.109	AC Power Conducted Emissions & Radiated Emissions for Receiver and Digital Circuit Portions	Yes (Note 1)

Note 1: The digital circuits portion of the EUT has been tested and verified to comply with FCC Part 15, Subpart B, Class B Digital Devices. Please note that this equipment is only required to comply with the FCC Class A since it is only marketed for use in the commercial/industrial environments and it is required professional installation by the applicant or its professional sub-contractors. However, Teklogix (applicant) wishes to have his equipment tested and comply with the FCC Class B Limits under Verification Authorization.

The engineering test report can be provided upon FCC requests.

TESTIMONIAL AND STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY:

1) *THAT the application was prepared either by, or under the direct supervision of the undersigned.*

2) *THAT the measurement data supplied with the application was taken under my direction and supervision.*

3) *THAT the data was obtained on a representative production unit.*

4) *THAT, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.*

Certified by:

Tri Minh Luu, P. Eng.
V.P., Engineering

DATE: Sept. 08, 1998

2. EXHIBIT 2 - GENERAL INFORMATION

2.1. APPLICANT

TEKLOGIX INC.
2100 Meadowvale Blvd.
Mississauga, Ontario
Canada, L5N 7J9

Applicant's Representative: Mr. Sada Dharwarkar

2.2. MANUFACTURER OF THE RADIO TRANSCEIVER CARD

LUCENT TECHNOLOGIES WCND BV
3431 JZ Nieuwegein
The Netherlands

2.3. DESCRIPTION OF EQUIPMENT UNDER TEST

PRODUCT NAME:	LUCENT 802.11 WAVELAN DSSS RADIO
MODEL NUMBER:	TRX7430
SERIAL NUMBER:	Preproduction
TYPE OF EQUIPMENT:	Direct Sequence Spread Spectrum Transmitters
OPERATING FREQ.:	2412 - 2462 MHz
NUMBER OF CHANNELS:	11
CHANBEL SPACING:	5 MHz
BANDWIDTH (6 dB OBW):	10.1 MHz
POWER RATING:	35.4 mW peak or 243.8 miW EIRP (with 7.5 dBi max. Antenna Gain)
CHIP RATE:	11 chips/symbol (1 symbol = 2 bits)
DATA RATE:	1 Mb/s or 2 Mb/s
MODULATION TYPE:	QPSK
DUTY CYCLE:	25 %
OSC. FREQUENCY(IES):	Tx IF: 352 MHz (low), Tx Local Osc. = Tx Freq. - 352 MHz

CPU SPEED:	16 MHz
INPUT SUPPLY:	7.2 Vdc (from the Teklogix Digital Communication Systems)
ASSOCIATED DEVICES:	Optional external antennas as follows:

1. Centurian Dipole, Model No.: CAF28832, Freq. Range: 2.4-2.5 GHz, Antenna Gain: 0 dBd.
2. Cushcraft/Signals Omnidirectional Antenna, Model No.: S2403B, Freq. Range: 2.4-2.5 GHz, Antenna Gain: 3 dBd
3. Cushcraft/Signals DirectLink Wall Mount Antenna, Model No.: S2307MP10SMF, Freq. Range: 2.3-2.5 GHz, Antenna Gain: 7.5 dBi
4. Larsen Collinear G/P Antenna, Model FB2400, Freq. Range: 2.4-2.485 GHz,, Antenna Gain: 5 dBi.

FCC ID:	GM3WLPC24
INTERFACE PORTS:	Antenna Terminal (SMA Connector). Since all Teklogix sysetms are professionally installed, and the transmitter and its antenna are always located far away from the users. Application for no SAR tests and standard antenna coupling using SMA connectors are requested by the applicant.

2.4. RELATED SUBMITTAL(S)/GRANT

This Lucent 802.11 WaveLan DSSS Radio (Teklogix Model TRX7430) is manufactured by Lucent Technologies (in The Netherlands) and the applicant for its FCC Certification is Teklogix Inc (in Canada). This radio is exactly identical with the Lucent WaveLan PC24 Radio, which has been certified by FCC under FCC ID: IMRWLPC24 (Applicant: Lucent Technologies WCND BV). However, there is some minor changes in the circuit board layout applied to this radio to remove the internal integrated antenna inside the Lucent PC24 so that the Teklogix Inc. (as an applicant) can use it with their own external antennas.

Since there is no change made to this radio circuit design and its signal characteristics, the processing gain is not necessary to be tested by Ultratech Engineering Labs Inc. However, the processing gain measurement data conducted by Lucent Technologies will be included in this report for FCC's review.

2.5. TEST METHODOLOGY

These tests were conducted on a sample of the equipment for the purpose of certification compliance with Code of Federal Regulations (CFR47-1991), Part 15, Subpart C, Para. 15.247, Direct Sequence Spread Spectrum Transmitters operating in the Frequency Band 2412 - 2462 MHz.

Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4-1992 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz.

2.6. TEST FACILITY

AC Powerline Conducted Emissions were performed in UltraTech's shielded room, 16'(L) by 12'(W) by 12'(H).

Radiated Emissions were performed at the UltraTech's 3-10 Meter Open Field Test Site (OFTS) situated in the Town of Oakville, province of Ontario.

The above sites have been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville Open Field Test Site has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049). Last Date of Site Calibration: July 16, 1997.

The above test site is also filed with Interference Technology International Ltd (ITI - An EC Directive on EMC).

2.7. UNITS OF MEASUREMENTS

Measurements of conducted emissions are reported in units of dB referenced to one microvolt [dB(μV)].

Measurements of radiated emissions are reported in units of dB referenced to one microvolt per meter [dB(μV)/m] at the distance specified in the report, wherever it is applicable.

3. EXHIBIT 3 - SYSTEM TEST CONFIGURATION

3.1. TEST SYSTEM DETAILS

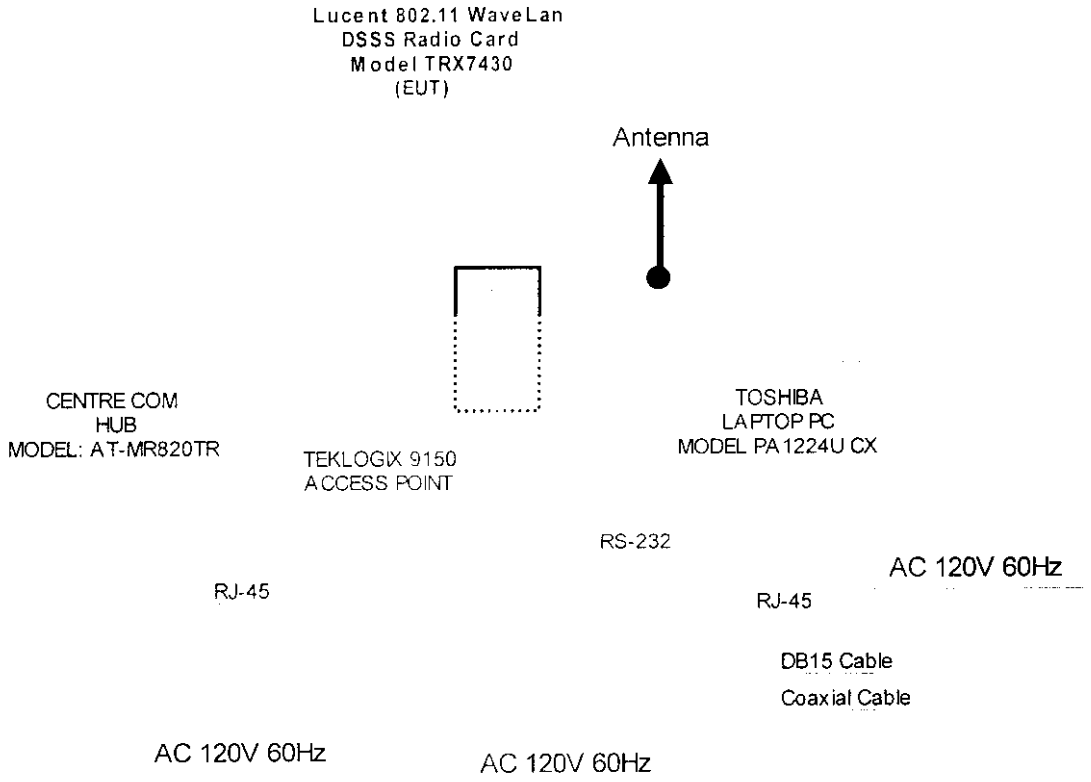
The following peripherals, FCC identifiers and types interconnecting cables were used with the EUT for testing:

(1) **EUT**: TEKLOGIX INC., LUCENT 802.11 WAVELAN DSSS RADIO, Model : TRX7430, S/N: Preproduction, OSC. FREQ: Tx IF: 352 MHz (low), Tx Local Osc. = Tx Freq. - 352 MHz. This radio module
I/O Cable: All I/O cables were shielded
Power Supply Cable: Non-shielded

(2) **PERIPHERAL**: Centre COM Hub. Model AT-MR820TR, S/N: GODT6054C, FCC Class A Verified.
I/O Cable: Nonshielded RJ-45 cables
Power Supply Cable: Non-shielded power cord.

(3) **PERIPHERAL**: Toshiba Laptop Computer, Model PA1224U CX, S/N: 07614075, FCC DoC Class B
I/O Cable: Nonshielded RJ-45 cables and shield I/O and RF cables
Power Supply Cable: Non-shielded power cord.

3.2. BLOCK DIAGRAMS FOR CONDUCTED & RADIATED EMISSION MEASUREMENTS



3.4. JUSTIFICATION

No deviation, in both configuration and operation manners, different from normal operation were required.

3.5. EUT OPERATING CONDITION

Software provided by TEKLOGIX INC. to set the EUT to transmit or receive at various channel frequencies.

3.6. SPECIAL ACCESSORIES

No special accessories were required.

3.7. EQUIPMENT MODIFICATIONS

Not required.

4. EXHIBIT 4 - TEST DATA

4.1. 6 DB BANDWIDTH @ FCC 15.247(A)(2)

PRODUCT NAME: **LUCENT 802.11 WAVELAN DSSS RADIO, Model No.: TRX7430**

FCC REQUIREMENTS:

For a direct sequence spread spectrum system, the minimum 6 dB bandwidth shall be at least 500 KHz.

CLIMATE CONDITION:

Standard Temperature and Humidity:

- Ambient temperature: 23 °C
- Relative humidity: 43 %

POWER INPUT:

7.2 Vdc (from the Teklogix Digital Communication Systems).

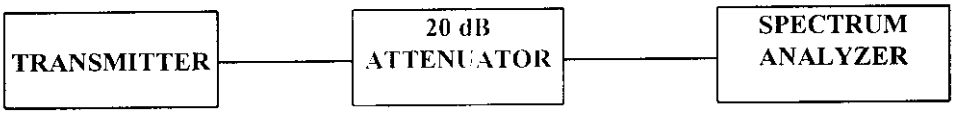
TEST EQUIPMENT:

- Advantest Spectrum Analyzer, Model R3271, S/N: 15050203
- Bird 20 dB Attenuator, 50 Ohm IN/OUT

METHOD OF MEASUREMENTS:

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 30 kHz RBW, VBW ≥ 100 kHz. The 6 dB bandwidth was measured and recorded.

TEST ARRANGEMENT



TEST RESULTS: Conforms.

TEST PERSONNEL: Hung Trinh, EMI/RFI Technician

DATE: Sept. 10, 1998

MEASUREMENT DATA:

CHANNEL FREQUENCY (MHz)	MODE OF OPERATION	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
2412 (lowest)	1 Mb/s QPSK	9.9	0.5	PASS
2442 (middle)	1 Mb/s QPSK	9.8	0.5	PASS
2462 (highest)	1 Mb/s QPSK	9.8	0.5	PASS
2412 (lowest)	2 Mb/s QPSK	10.1	0.5	PASS
2442 (middle)	2 Mb/s QPSK	10.1	0.5	PASS
2462 (highest)	2 Mb/s QPSK	10.0	0.5	PASS

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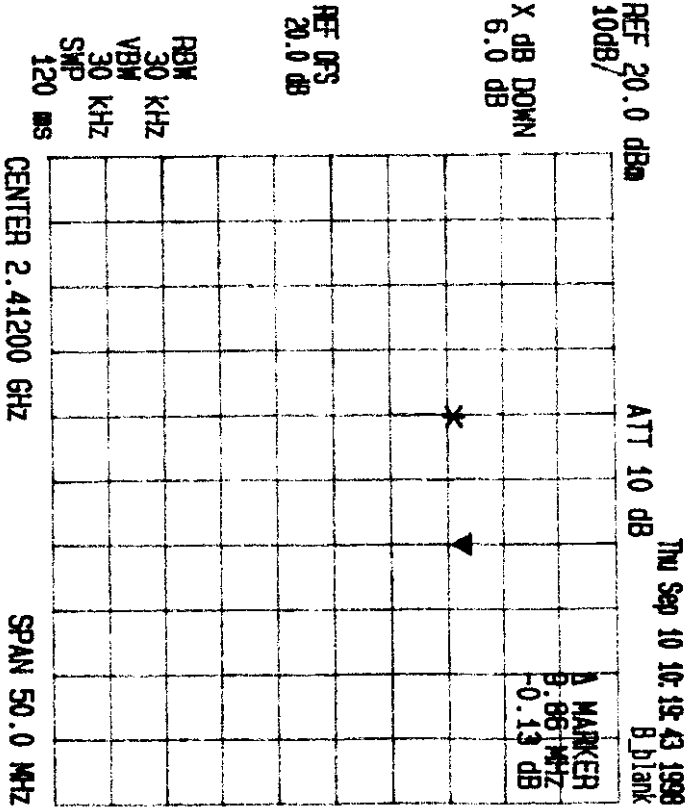
LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

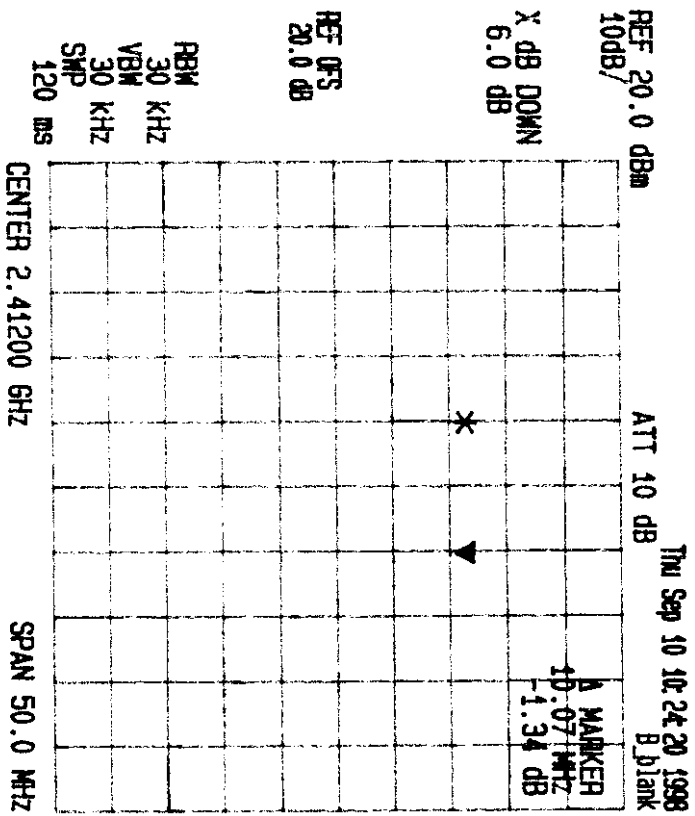
Channel: 1, Centre Freq.: 2412 MHz , Outout PWR: 29.1 mW

Modulation: QPSK with 1&2 Mb/s Data Rate, Transmitting Antenna: _____

Date: September 10 1998
Tested by: Hung Trinh



1 Mb/s



2 Mb/s

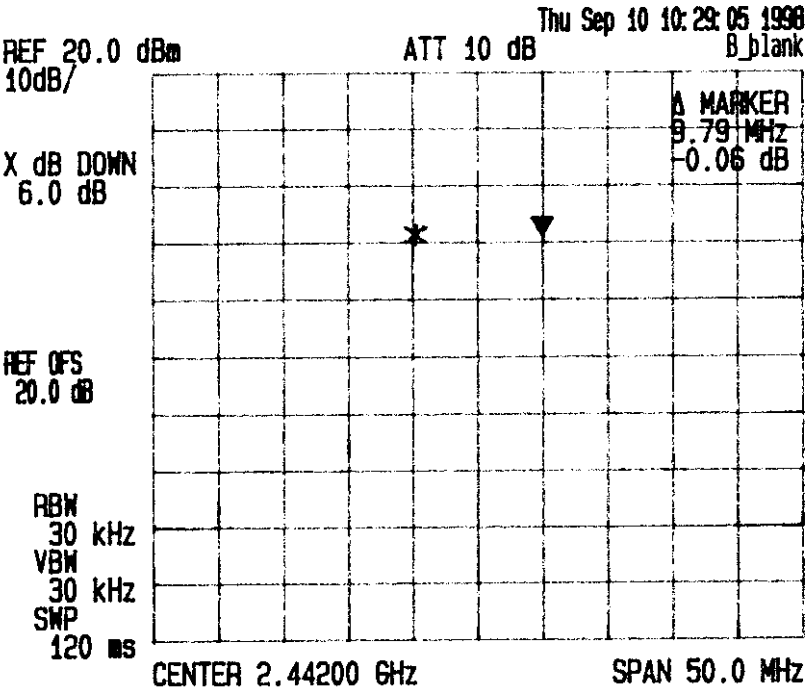
Date: September 2, 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

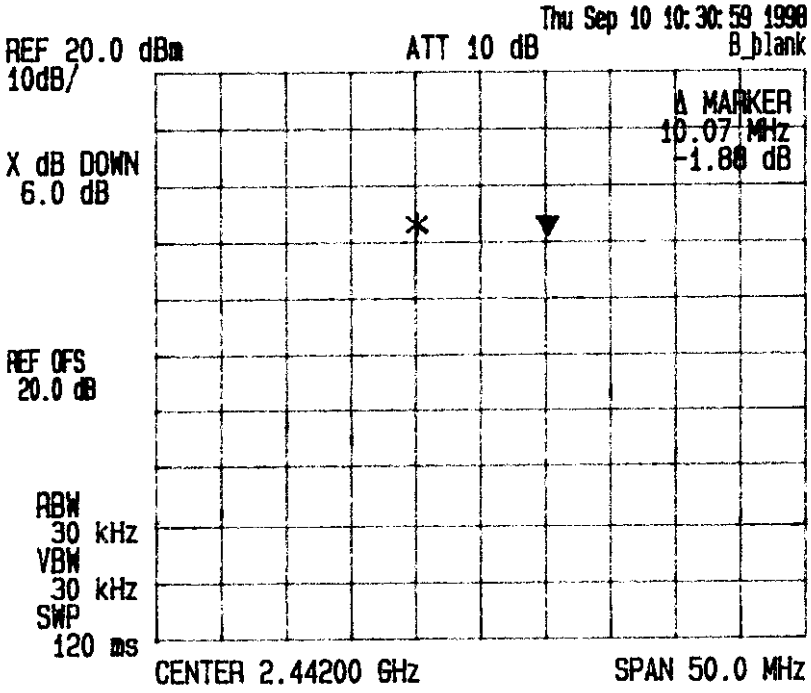
Channel: 7, Centre Freq.: 2442 MHz, Outout PWR: 35.4mW

Modulation: QPSK with 1 & 2Mb/s Data Rate, Transmitting Antenna: _____

UltraTech
Engineering Labs Inc.



1 Mb/s



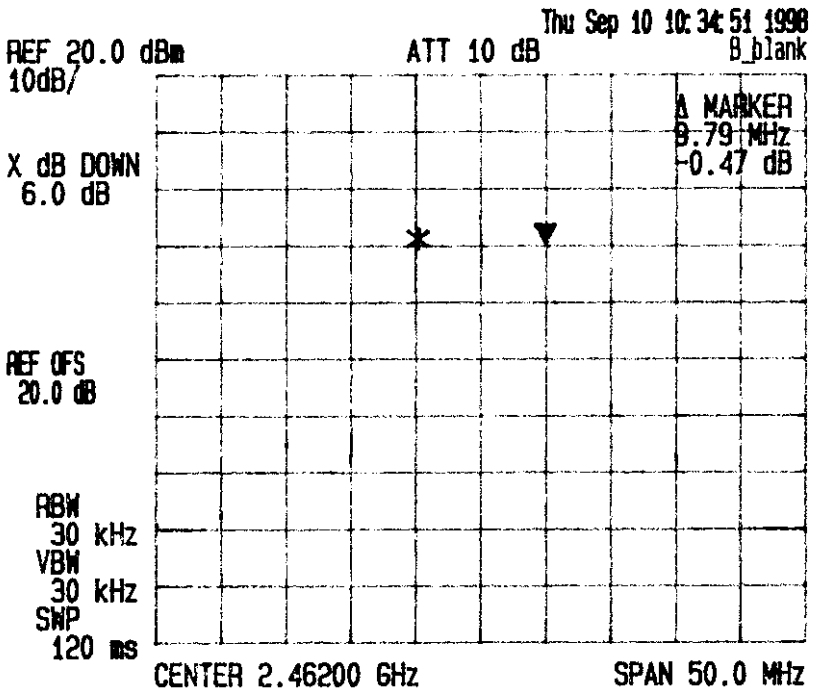
2 Mb/s

Date: September 2, 1998
Tested by: Hung Trinh

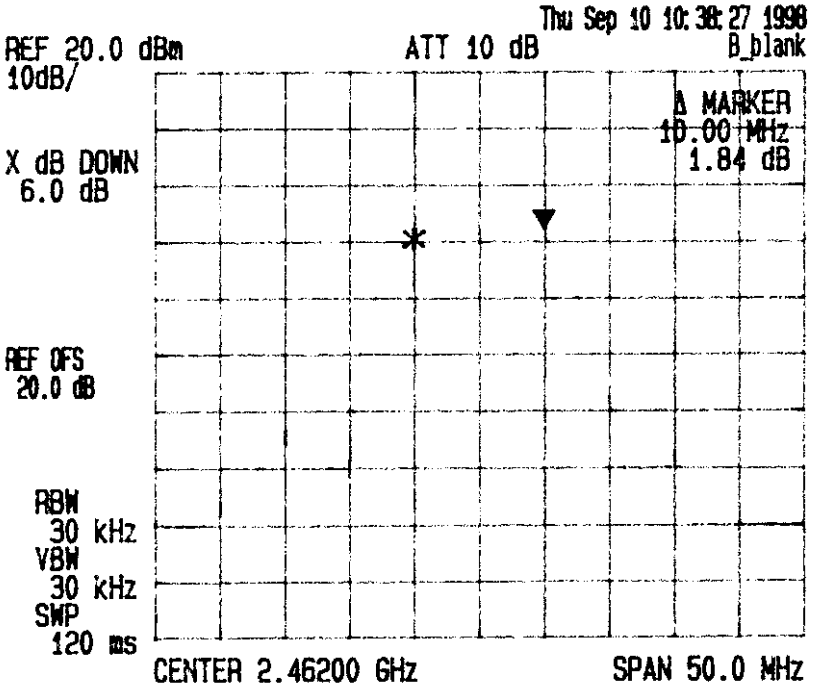
LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 11, Centre Freq.: 2462 MHz, Outout PWR: 33.7mW
Modulation: QPSK with 2Mb/s Data Rate, Transmitting Antenna:

UltraTech
Engineering Labs Inc.



1 Mb/s



2 Mb/s

4.2. MAXIMUM PEAK OUTPUT POWER @ FCC 15.247(B) AND RF EXPOSURE LIMIT FCC 1.1310

PRODUCT NAME: LUCENT 802.11 WAVELAN DSSS RADIO, Model No.: TRX7430

FCC REQUIREMENTS:

FCC 15.247(b):- Maximum peak output power of the transmitter shall not exceed 1 Watt.

(i) Systems operating in the 2400-2483.5 MHz band that used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduce by 1 dB for every 3 dB that the directional gain of the antenna exceed 6 dBi.

FCC 1.1310:- The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in 1.1307(b).

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
(A) Limits for Occupational/Control Exposures				
300-1500	...	...	F/300	6
1500-100,000	...	...	5	6
(B) Limits for General Population/Uncontrolled Exposure				
300-1500	...	...	F/1500	6
1500-100,000	...	...	1.0	30

F = Frequency in MHz
* = Plane-wave equivalent power density

CLIMATE CONDITION:

Standard Temperature and Humidity:

- Ambient temperature: 23 °C
- Relative humidity: 43 %

POWER INPUT:

7.2 Vdc (from the Teklogix Digital Communication Systems).

TEST EQUIPMENT:

- HP RF Peak Power Meter, Model 8900, S/N: 2131A00124, Measuring Freq. Range: 01 - 18 GHz, 50 Ohm IN.
- HP RF Peak Power Sensor, Model 8481A, S/N: 2551A01965, Measuring Freq. Range: 0.1 - 18 GHz, 50 Ohm IN/OUT

METHOD OF MEASUREMENTS:

FCC @ 1.1310 & OST Bulletin No. 65-October 1985

$S = PG/4\Pi r^2 = EIRP/4\Pi r^2$

Where: P: power input to the antenna in mW
EIRP: Equivalent (effective) isotropic radiated power.
S: power density mW/cm^2
G: numeric gain of antenna relative to isotropic radiator
r: distance to centre of radiation in cm

FCC radio frequency exposure limits may be exceeded at distances closer than r cm from the antenna of this device

$$r = \sqrt{PG/4\Pi S}$$

FCC radio frequency exposure limits may be exceeded at distances closer than r cm from the antenna of this device

TEST ARRANGEMENT

TEST RESULTS: Conforms.

TEST PERSONNEL: Hung Trinh, EMI/RFI Technician

DATE: Sept. 08, 1998

MEASUREMENT DATA:

PEAK POWER MEASUREMENT

DIRECT PEAK POWER MEASUREMENTS AT THE ANTENNA TERMINAL WITH THE ANTENNA REPLACED BY A SMA CONNECTOR

TRANSMITTER CHANNEL OUTPUT	FUNDAMENTAL FREQUENCY (MHz)	DATA RATE / MODULATION	MEASURED PEAK TOTAL POWER (mW)	PEAK POWER LIMIT (mW)
Lowest	2412	1 Mb/s QPSK	29.1	1000.0
Middle	2442	1 Mb/s QPSK	35.4	1000.0
Highest	2462	1 Mb/s QPSK	33.7	1000.0
Lowest	2412	2 Mb/s QPSK	29.1	1000.0
Middle	2442	2 Mb/s QPSK	35.4	1000.0
Highest	2462	2 Mb/s QPSK	33.7	1000.0

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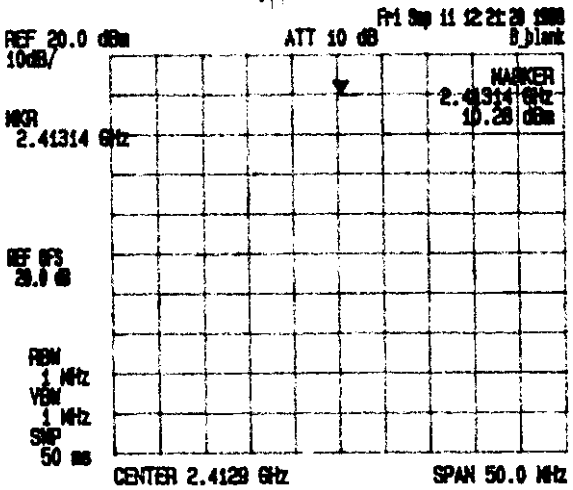
LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 1, 7, 11, Centre Freq.:_____MHz Output PWR:_____mW

Modulation: QPSK with ___/___Mb/s Data Rate,Transmitting Antenna:_____

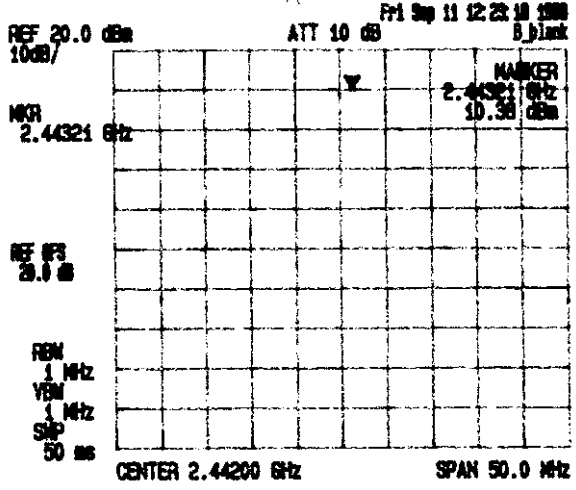
Date: September 11, 1998
Tested by: Hung Trinh

#1



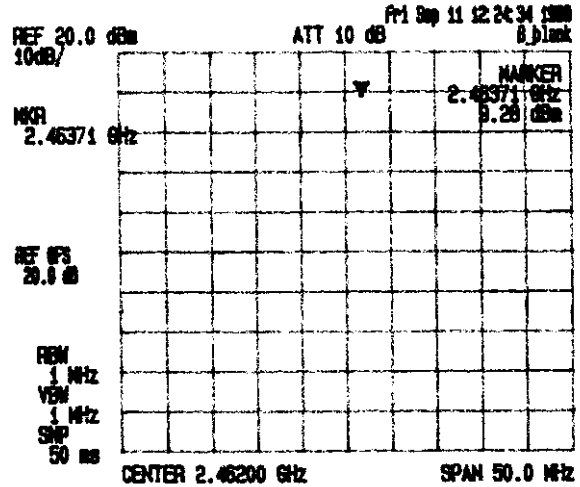
1MHz BW - FULL BW FACTOR = 14.6dBm - 10.3dBm
= 4.3dB

#2



1MHz BW - FULL BW FACTOR = 15.5dBm - 10.4dBm
= 5.1 dB

#3



1MHz BW - FULL BW FACTOR
= 15.3dBm - 9.3dBm
= 6dB.

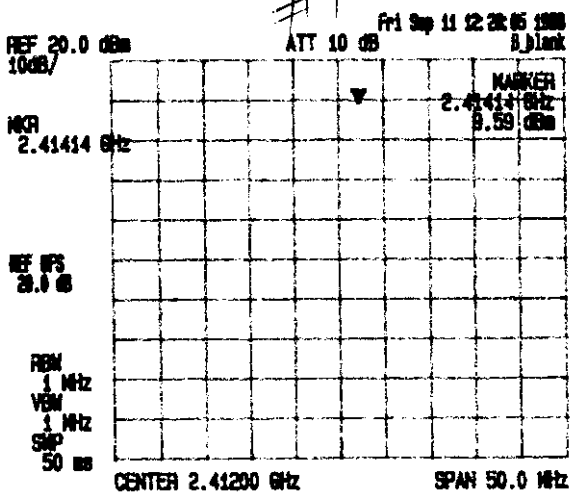
UltraTech
Engineering Labs Inc.

LUCENT 802.11 WAVELAN DSSS RADIO MODEL TRX 7400

Channel: 1, 7, 11, Centre Freq.:_____MHz Output PWR:_____mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna:_____

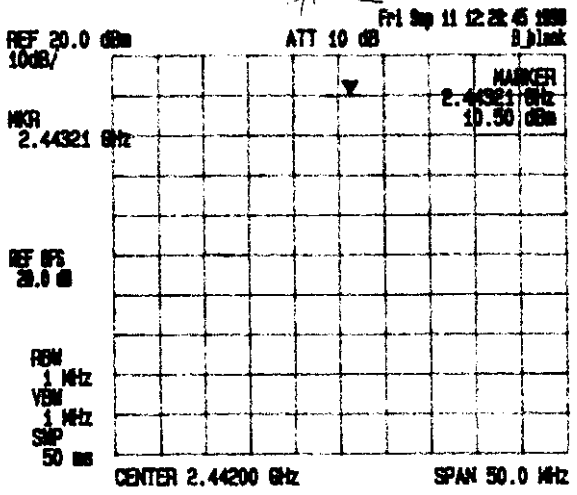
Date: September 11, 1998
Tested by: Hung Trinh

#1



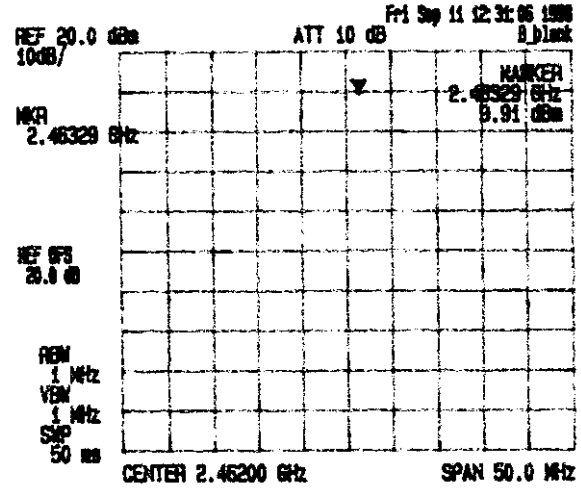
1MHz BW - FULL BW FACTOR = 14.6 dBm - 9.6 dBm
= 5 dB

#2



1MHz BW - FULL BW FACTOR =
15.5 dBm - 10.5 dBm = 5 dB.

#3



1MHz BW - FULL BW FACTOR =
15.3 dBm - 9.9 dBm = 5.4 dB

EFFECTIVE ISOTROPIC RADIATED POWER (EIRP) MEASURED AT 3 METER DISTANCE
(Substitution Method)

Remarks:

(1) EIRP power measured in 1 MHz BW

(2) Conversion of power measured in 1MHz BW using the EMI receiver to power in full BW using HP8900 peak power meter:
1MHz BW-Full BW power conversion factor = peak power level measured using the HP peak power meter - peak power level measured using EMI receiver in 1 MHz BW

(a) Tx Antenna: Centurian Dipole, Model No.: CAF28832, Freq. Range: 2.4-2.5 GHz, Antenna Gain: 0 dB

TX CHANNEL OUTPUT	Center FREQUENCY (MHz)	DATA RATE / MODULATION	Tx Antenna Gain (Numeric)	Max. Field Strength Level @ 1 MHz BW At 3 m (dBuV/m)	(1) Max. EIRP POWER @ 1 MHz BW (dBm)	Measured 1MHz-BW to Full Power Conversion Factor (dB)	(2) Max. EIRP POWER In a full BW (dBm	PEAK POWER LIMIT (dBm)
Lowest	2412	1 Mb/s	1	109.3	14.1	4.3	18.4	36
Middle	2442	1 Mb/s	1	111.1	15.9	5.1	21.0	36
Highest	2462	1 Mb/s	1	109.5	14.3	6.0	20.3	36
Lowest	2412	2 Mb/s	1	109.8	14.6	5.0	19.6	36
Middle	2442	2 Mb/s	1	111.1	15.9	5.0	20.9	36
Highest	2462	2 Mb/s	1	111.0	15.8	5.4	**21.2**	36

RF EXPOSURE DISTANCE LIMITS: $r = (PG/4\Pi S)^{1/2} = (EIRP/4\Pi S)^{1/2}$
S=1mW/cm², G = 0 dBd typical or 1 numeric

TRANSMITTER CHANNEL OUTPUT	FUNDAMENTAL FREQUENCY (MHz)	DATA RATE / MODULATION	MESURED EIRP FULL POWER (mWatts)	MNIMUM ALLOWABLE DISTANCE (r) FROM SKIN (Centi-Meter)
1	2412	1 Mb/s QPSK	68.7	2.3
7	2442	1 Mb/s QPSK	125.1	3.2
11	2462	1 Mb/s QPSK	106.4	2.9
1	2412	2 Mb/s QPSK	90.6	2.7
7	2442	2 Mb/s QPSK	122.2	3.1
11	2462	2 Mb/s QPSK	**131.0**	**3.2**

Since the power density of 1 mW/cm² is at a very short distance from the radiating antenna and the antenna is required to be mounted at a distance away from the users' location, the RF exposure limit warning or SAR tests are not necessary.

(b) Tx Antenna: Cushcraft/Signals Omnidirectional Antenna, Model No.: S2403B, Freq. Range: 2.4-2.5 GHz, Antenna Gain: 3 dBd

TX CHANNEL OUTPUT	Center FREQUENCY (MHz)	DATA RATE / MODULATION	Tx Antenna Gain (Numeric)	Max. Field Strength Level @ 3 MHz BW At 3 m (dBuV/m)	(1) Max. EIRP POWER @ 1 MHz BW (dBm)	1MHz-BW to Full Power Conversion Factor (dB)	(2) Max. EIRP POWER In a full BW (dBm	PEAK POWER LIMIT (dBm)
Lowest	2412	1 Mb/s	2	113.1	17.9	4.3	22.2	36
Middle	2442	1 Mb/s	2	113.0	17.8	5.1	22.9	36
Highest	2462	1 Mb/s	2	112.5	17.3	6.0	23.3	36
Lowest	2412	2 Mb/s	2	113.9	18.7	5.0	**23.7**	36
Middle	2442	2 Mb/s	2	113.2	18.0	5.0	23.0	36
Highest	2462	2 Mb/s	2	113.2	18.0	5.4	23.4	36

RF EXPOSURE DISTANCE LIMITS: $r = (PG/4\Pi S)^{1/2} = (EIRP/4\Pi S)^{1/2}$

S=1mW/cm², G = 3 dBd typical or 2 numeric

TRANSMITTER CHANNEL OUTPUT	FUNDAMENTAL FREQUENCY (MHz)	DATA RATE / MODULATION	MESURED EIRP FULL POWER (mWatts)	MNIMUM ALLOWABLE DISTANCE (r) FROM SKIN (Centi-Meter)
1	2412	1 Mb/s QPSK	164.9	3.6
7	2442	1 Mb/s QPSK	193.7	3.9
11	2462	1 Mb/s QPSK	212.4	4.1
1	2412	2 Mb/s QPSK	**232.9**	**4.3**
7	2442	2 Mb/s QPSK	198.2	4.0
11	2462	2 Mb/s QPSK	217.3	4.2

Since the power density of 1 mW/cm² is at a very short distance from the radiating antenna and the antenna is required to be mounted at a distance away from the users' location, the RF exposure limit warning or SAR tests are not necessary.

(c) Tx Antenna: Cushcraft/Signals DirectLink Wall Mount Antenna, Model No.: S2307MP10SMF, Freq. Range: 2.3-2.5 GHz, Antenna Gain: 7.5 dBi

TX CHANNEL OUTPUT	Center FREQUENCY (MHz)	DATA RATE / MODULATION	Tx Antenna Gain (Numeric)	Max. Field Strength Level @ 1 MHz BW At 3 m (dBuV/m)	(1) Max. EIRP POWER @ 1 MHz BW (dBm)	1MHz-BW to Full Power Conversion Factor (dB)	(2) Max. EIRP POWER In a full BW (dBm	PEAK POWER LIMIT (dBm)
Lowest	2412	1 Mb/s	5.6	113.5	18.3	4.3	22.6	36
Middle	2442	1 Mb/s	5.6	112.8	17.6	5.1	22.7	36
Highest	2462	1 Mb/s	5.6	112.5	17.3	6.0	23.3	36
Lowest	2412	2 Mb/s	5.6	114.1	18.9	5.0	**23.9**	36
Middle	2442	2 Mb/s	5.6	113.7	18.5	5.0	23.5	36
Highest	2462	2 Mb/s	5.6	113.3	18.1	5.4	23.5	36

RF EXPOSURE DISTANCE LIMITS: $r = (PG/4\Pi S)^{1/2} = (EIRP/4\Pi S)^{1/2}$

S=1mW/cm^2, G 7.5 dBi typical or 5.6 numeric

TRANSMITTER CHANNEL OUTPUT	FUNDAMENTAL FREQUENCY (MHz)	DATA RATE / MODULATION	MESURED EIRP FULL POWER (mWatts)	MNIMUM ALLOWABLE DISTANCE (r) FROM SKIN (Centi-Meter)
1	2412	1 Mb/s QPSK	180.8	3.8
7	2442	1 Mb/s QPSK	185.0	3.8
11	2462	1 Mb/s QPSK	212.4	4.1
1	2412	2 Mb/s QPSK	**243.8**	**4.4**
7	2442	2 Mb/s QPSK	222.4	4.2
11	2462	2 Mb/s QPSK	222.4	4.2

Since the power density of 1 mW/cm^2 is at a very short distance from the radiating antenna and the antenna is required to be mounted at a distance away from the users' location, the RF exposure limit warning or SAR tests are not necessary.

(d) Tx Antenna: Larsen Collinear G/P Antenna. Model FB2400. Freq. Range: 2.4-2.485 GHz, Antenna Gain: 5 dBi.

TX CHANNEL OUTPUT	Center FREQUENCY (MHz)	DATA RATE / MODULATION	Tx Antenna Gain (Numeric)	Max. Field Strength Level @ 1 MHz BW At 3 m (dBmV/m)	(1) Max. EIRP POWER @ 1 MHz BW (dBm)	1MHz-BW to Full Power Conversion Factor (dB)	(2) Max. EIRP POWER In a full BW (dBm	PEAK POWER LIMIT (dBm)
Lowest	2412	1 Mb/s	3.2	112.9	17.7	4.3	22.0	36
Middle	2442	1 Mb/s	3.2	112.8	17.6	5.1	22.7	36
Highest	2462	1 Mb/s	3.2	112.9	17.7	6.0	23.7	36
Lowest	2412	2 Mb/s	3.2	113.8	18.6	5.0	23.6	36
Middle	2442	2 Mb/s	3.2	113.4	18.2	5.0	23.2	36
Highest	2462	2 Mb/s	3.2	113.6	18.4	5.4	**23.8**	36

RF EXPOSURE DISTANCE LIMITS: $r = (PG/4\Pi S)^{1/2} = (EIRP/4\Pi S)^{1/2}$

S=1mW/cm^2, G= 5 dBi typical or 3.2 numeric

TRANSMITTER CHANNEL OUTPUT	FUNDAMENTAL FREQUENCY (MHz)	DATA RATE / MODULATION	MESURED EIRP FULL POWER (mWatts)	MNIMUM ALLOWABLE DISTANCE (r) FROM SKIN (Centi-Meter)
1	2412	1 Mb/s QPSK	157.4	3.5
7	2442	1 Mb/s QPSK	185.0	3.8
11	2462	1 Mb/s QPSK	232.9	4.3
1	2412	2 Mb/s QPSK	227.6	4.3
7	2442	2 Mb/s QPSK	207.5	4.1
11	2462	2 Mb/s QPSK	**238.3**	**4.4**

Since the power density of 1 mW/cm^2 is at a very short distance from the radiating antenna and the antenna is required to be mounted at a distance away from the users' location, the RF exposure limit warning or SAR tests are not necessary.

4.3. RF CONDUCTED EMISSIONS AT THE TRANSMITTER ANTENNA TERMINAL, FCC CFR 47, PARA. 15.247(C)

PRODUCT NAME: LUCENT 802.11 WAVELAN DSSS RADIO, Model No.: TRX7430

FCC REQUIREMENTS:

In any 100 KHz bandwidth outside the operating frequency band, the radio frequency power that is produced by modulation products of the spreading sequence, the information sequence and the carrier frequency shall be at least 20 dB below that in any 100 KHz bandwidth within the band that contains the highest level of the desired power.

CLIMATE CONDITION:

Standard Temperature and Humidity:

- Ambient temperature: 23 °C
- Relative humidity: 43 %

POWER INPUT:

7.2 Vdc (from the Teklogix Digital Communication Systems).

TEST EQUIPMENT:

- Advantest Spectrum Analyzer, Model R3271, S/N: 15050203
- Bird 20 dB Attenuator, 50 Ohm IN/OUT
- Microphase Highpass Filter, P/N: CR220HIB, S/N: 1301, Cut-off Freq. 1.8 GHz. (Optional)

METHOD OF MEASUREMENT:

A scan was made by using a spectrum analyzer with the detector function set to PEAK mode.

Set RBW = 100 KHz, VBW = 100 KHz.

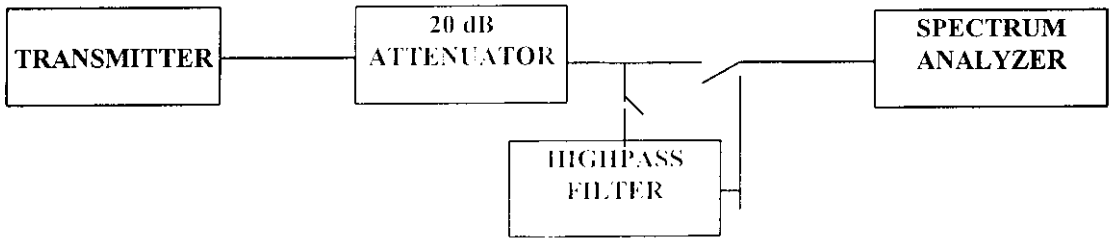
FCC CFR 47, Para. 2.997 - Frequency spectrum to be investigated

The spectrum was investigated from the lowest radio generated in the equipment up to at least the 10th harmonic of the carrier frequency or to the highest frequency practicable in the present state of the art of measuring techniques, whichever is lower. Particular attention should be paid to harmonics and subharmonics of the carrier frequency. Radiation at the frequencies of multiplier stages should be checked. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

FCC CFR 47, Para. 2.991 - Spurious Emissions at Antenna Terminal

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of the harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in 2.989 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

TEST ARRANGEMENT



TEST RESULTS:

Conforms.

TEST RESULTS: Conforms.

TEST PERSONNEL: Hung Trinh, EMI/RFI Technician

DATE: Sept. 10, 1998

MEASUREMENT DATA

SPURIOUS & HARMONIC EMISSIONS AT THE TRANSMITTER ANTENNA TERMINAL

TEST CONFIGURATION

- *The transmitter was coupled to the Spectrum Analyzer through a 20 dB attenuator.*
- *The insertion loss between the transmitter output terminal and the spectrum analyzer was measured to be 20 dB*
- *The channel frequencies were established on the extreme edges (both upper and lower) and middle of the 2412 - 2462 MHz band at its full rated output power. The emissions was investigated up to the tenth harmonic of the fundamental emissions in each case, the measured level of the carrier was recorded and compared to the level of the emissions as required in Part 15.247(c)*

Channel Frequency: 2412 MHz **Modulation: QPSK with 1 Mb/s random data** **Full Rated Power: 29.1 mW peak**		**Power Level in 100 KHz BW: 3.0 dBm** Limit = 3 dBm - 20 dB = -17.0 dBm		
FREQUENCY (MHz)	**RF LEVEL 100 kHz BW (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**	**PASS/ FAIL**
2412.0	3.0	--	--	--
196.0	-36.8	-17.0	-19.8	PASS
695.0	-37.5	-17.0	-20.5	PASS
1038.0	-33.5	-17.0	-16.5	PASS
1394.0	-25.7	-17.0	-8.7	PASS
1751.0	-36.6	-17.0	-19.6	PASS
2037.0	-36.1	-17.0	-19.1	PASS
2793.0	-34.4	-17.0	-17.4	PASS
4805.0	-28.3	-17.0	-11.3	PASS
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details				

Channel Frequency: 2412 MHz **Modulation: QPSK with 2 Mb/s random data** **Full Rated Power: 29.1 mW peak**		**Power Level in 100 KHz BW: 2.7 dBm** **Limit = 2.7 dBm - 20 dB = -17.3 dBm**		
FREQUENCY (MHz)	**RF LEVEL 100 kHz BW (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**	**PASS/ FAIL**
2412.0	2.7	--	--	--
210.0	-36.7	-17.3	-19.4	PASS
695.0	-36.1	-17.3	-18.8	PASS
1038.0	-32.9	-17.3	-15.6	PASS
1394.0	-24.9	-17.3	-7.6	PASS
1737.0	-35.9	-17.3	-18.6	PASS
2037.0	-35.3	-17.3	-18.0	PASS
2793.0	-34.8	-17.3	-17.5	PASS
4805.0	-33.3	-17.3	-16.0	PASS
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details				

Channel Frequency: 2442 MHz **Modulation: QPSK with 1 Mb/s random data** **Full Rated Power: 33.7 mW peak**		**Power Level in 100 KHz BW: 3.3 dBm** **Limit = dBm - 20 dB = -16.7 dBm**		
FREQUENCY (MHz)	**RF LEVEL 100 kHz BW (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**	**PASS/ FAIL**
2442.0	3.3	--	--	--
210.0	-37.5	-16.7	-20.8	PASS
695.0	-35.5	-16.7	-18.8	PASS
1038.0	-35.3	-16.7	-18.6	PASS
1394.0	-26.1	-16.7	-9.4	PASS
2065.0	-36.9	-16.7	-20.2	PASS
2793.0	-36.8	-16.7	-20.1	PASS
4877.0	-28.8	-16.7	-12.1	PASS
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details				

Channel Frequency: 2442 MHz **Modulation: QPSK with 2 Mb/s random data** **Full Rated Power: 33.7 mW peak**		**Power Level in 100 KHz BW: 3.2 dBm** **Limit = 3.2 dBm - 20 dB = -16.8 dBm**		
FREQUENCY (MHz)	**RF LEVEL 100 kHz BW (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**	**PASS/ FAIL**
2442.0	3.2	--	--	--
196.0	-34.6	-16.8	-17.8	PASS
695.0	-35.0	-16.8	-18.2	PASS
1038.0	-34.2	-16.8	-17.4	PASS
1394.0	-25.8	-16.8	-9.0	PASS
2065.0	-38.4	-16.8	-21.6	PASS
2793.0	-36.0	-16.8	-19.2	PASS
4862.0	-32.8	-16.8	-16.0	PASS
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details				

Channel Frequency: 2462 MHz **Modulation: QPSK with 1 Mb/s random data** **Full Rated Power: 35.4 mW peak**		**Power Level in 100 KHz BW: 2.1 dBm** **Limit = 2.1 dBm - 20 dB = -17.9 dBm**		
FREQUENCY (MHz)	**RF LEVEL 100 kHz BW (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**	**PASS/ FAIL**
2462.0	2.1	--	--	--
196.0	-32.9	-17.9	-15.0	PASS
695.0	-34.2	-17.9	-16.3	PASS
1038.0	-32.8	-17.9	-14.9	PASS
1409.0	-24.7	-17.9	-6.8	PASS
1737.0	-35.7	-17.9	-17.8	PASS
2094.0	-33.7	-17.9	-15.8	PASS
2793.0	-33.3	-17.9	-15.4	PASS
4919.0	-30.8	-17.9	-12.9	PASS
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details				

Channel Frequency: 2462 MHz **Modulation: QPSK with 1 Mb/s random data** **Full Rated Power: 35.4 mW peak**		**Power Level in 100 KHz BW: 2.3 dBm** **Limit = 2.3 dBm - 20 dB = -17.7 dBm**		
FREQUENCY (MHz)	RF LEVEL 100 kHz BW (dBm)	LIMIT (dBm)	MARGIN (dB)	**PASS/ FAIL**
2462.0	2.3	--	--	--
196.0	-33.2	-17.7	-15.5	PASS
695.0	-35.8	-17.7	-18.1	PASS
1038.0	-32.5	-17.7	-14.8	PASS
1394.0	-24.8	-17.7	-7.1	PASS
1751.0	-36.2	-17.7	-18.5	PASS
2094.0	-34.4	-17.7	-16.7	PASS
2793.0	-35.6	-17.7	-17.9	PASS
4905.0	-34.3	-17.7	-16.6	PASS
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details				

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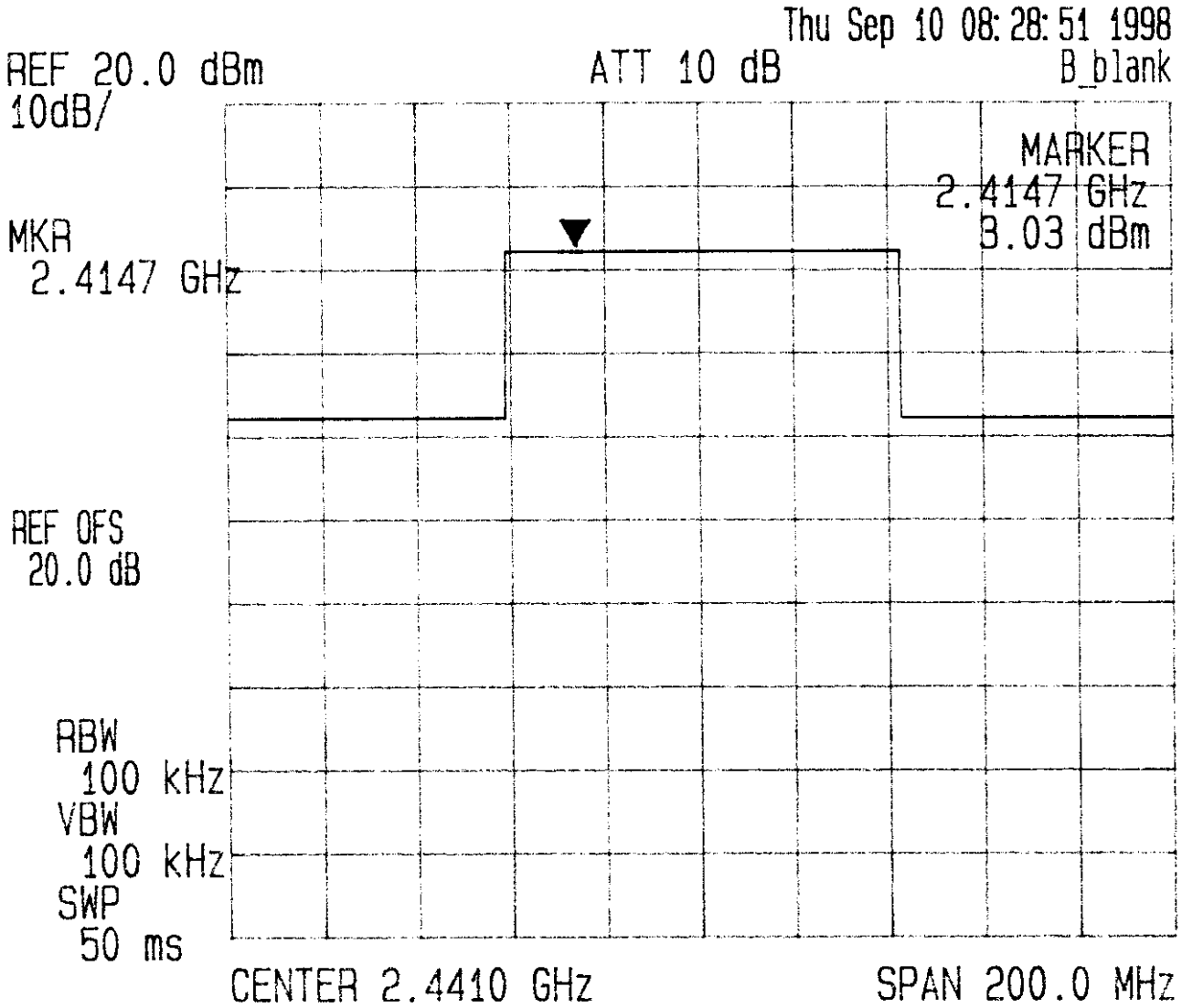
LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 1, Centre Freq.: 2412 MHz , Outout PWR: 29.1 mW

Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: _____

Date: September 10 1998
Tested by: Hung Trinh



Date: September 23 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 1, Centre Freq.: 2412 MHz, Outout PWR: 21.1 mW

Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: _____

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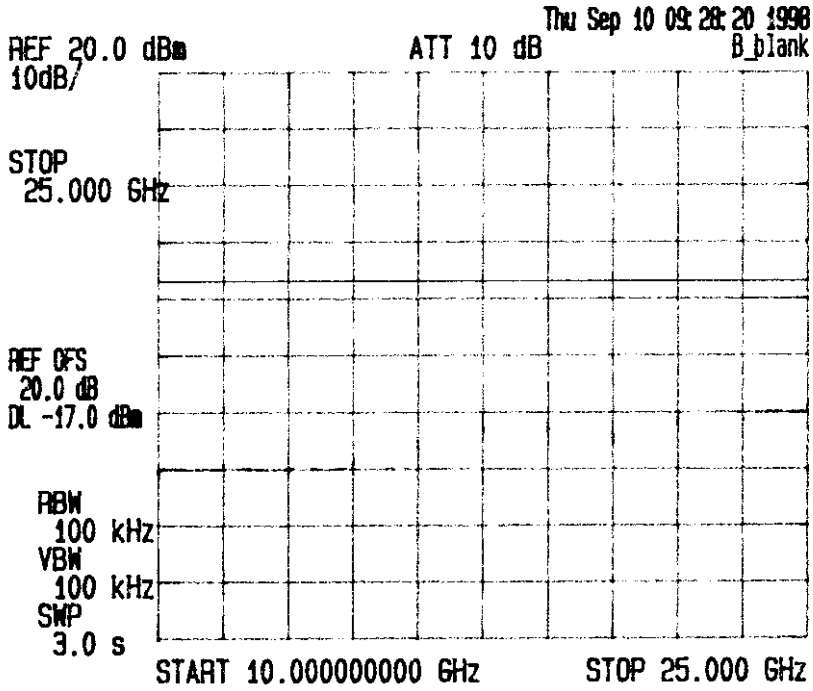

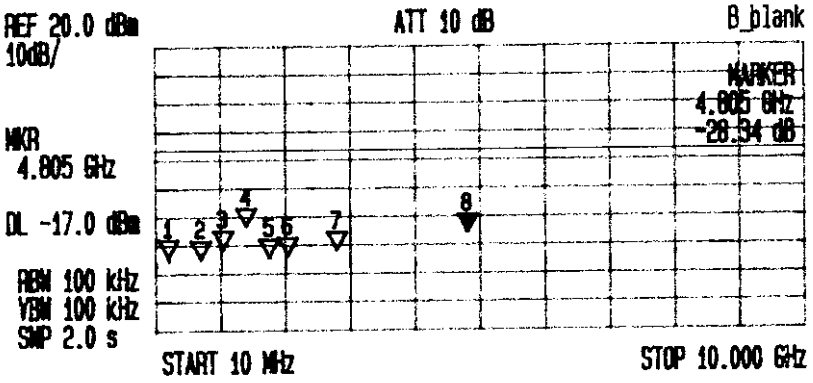

*** Multi Marker List ***

No.1:	196 MHz	-36.78 dB	A
No.2:	695 MHz	-37.50 dB	A
No.3:	1.038 GHz	-33.53 dB	A
No.4:	1.394 GHz	-25.69 dB	A
No.5:	1.751 GHz	-36.63 dB	A
No.6:	2.037 GHz	-36.09 dB	A
No.7:	2.793 GHz	-34.44 dB	A
No.8:	4.805 GHz	-28.34 dB	A
Δ:			

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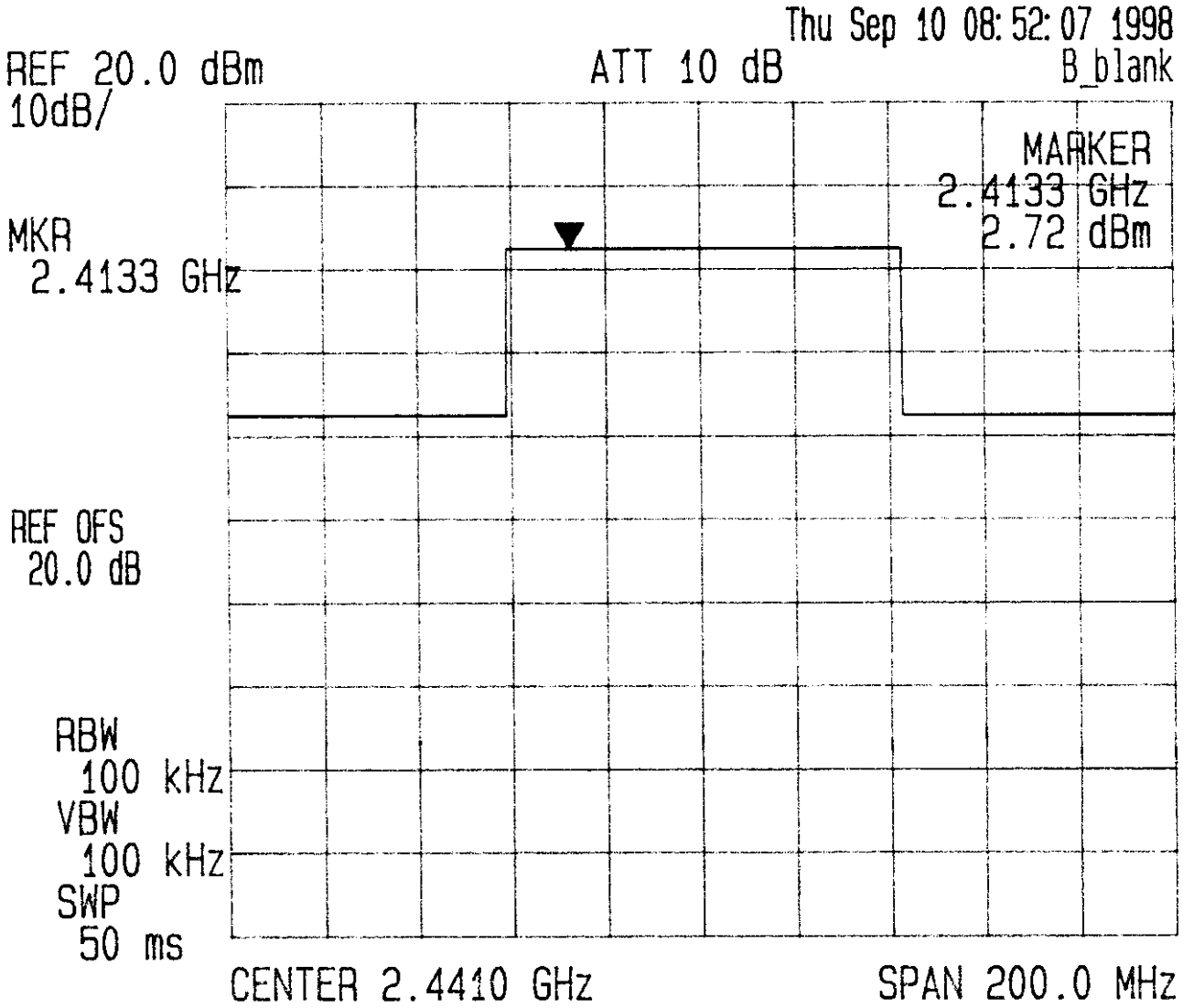
LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430
Channel: 1, Centre Freq.: 2412 MHz , Outout PWR: 29.1 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: _____

Date: September 10, 1998
Tested by: Hung Trinh



Date: September/22 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 1, Centre Freq.: 2412 MHz , Outout PWR: 22.1 mW

Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna:

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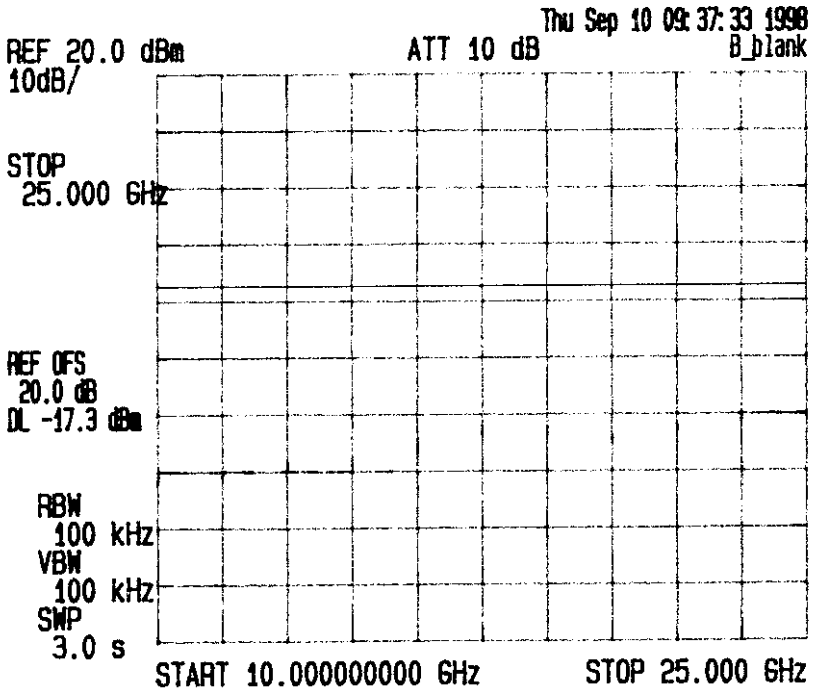

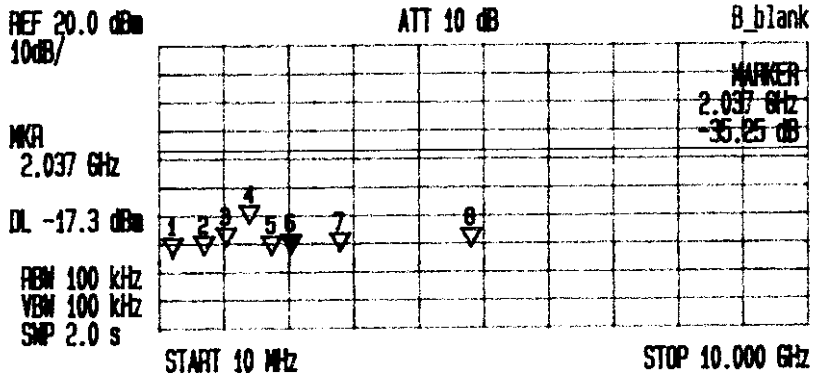

*** Multi Marker List ***

No.1:	210 MHz	-36.69 dB	A
No.2:	695 MHz	-36.06 dB	A
No.3:	1.038 GHz	-32.88 dB	A
No.4:	1.394 GHz	-24.94 dB	A
No.5:	1.737 GHz	-35.88 dB	A
No.6:	2.037 GHz	-35.25 dB	A
No.7:	2.793 GHz	-34.75 dB	A
No.8:	4.805 GHz	-33.25 dB	A
Δ:			

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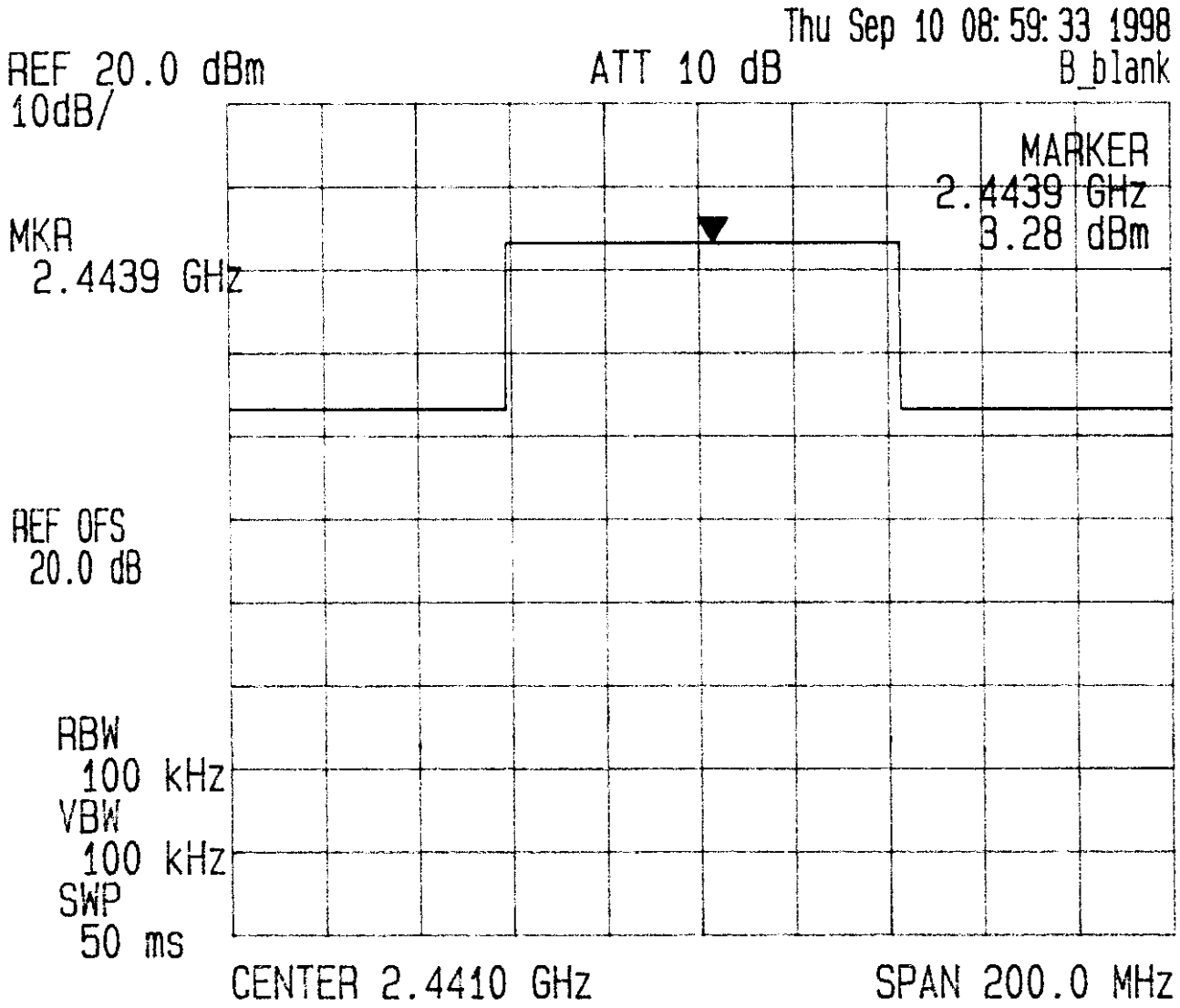
LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 7, Centre Freq.: 2.442 MHz , Outout PWR: 35.4 mW

Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: _____

Date: September 10 1998
Tested by: Hung Trinh

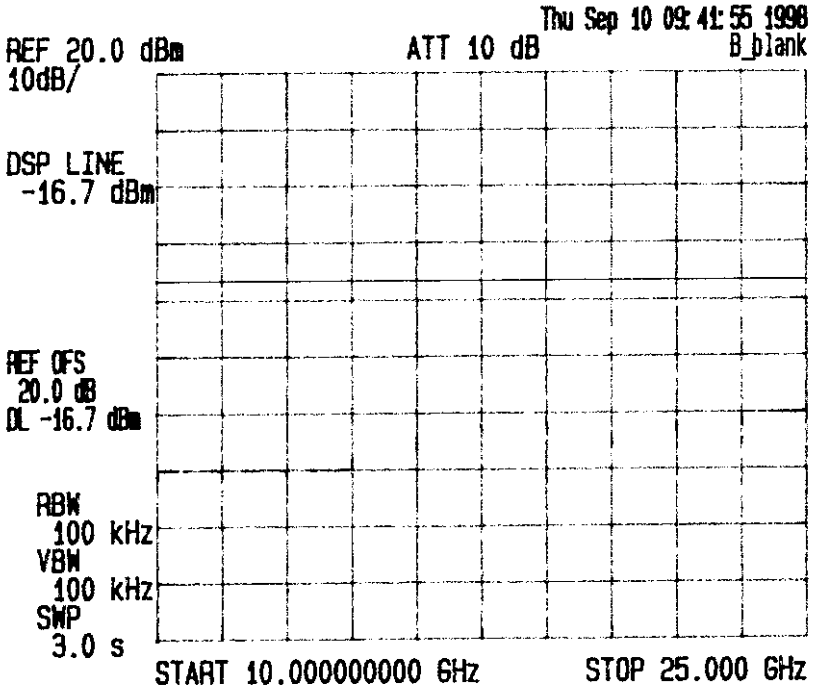


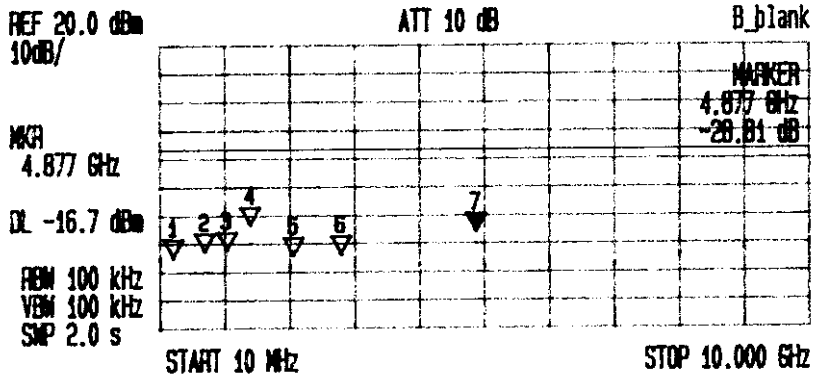
Date: September 21, 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 7, Centre Freq.: 2442 MHz, Outout PWR: 354 mW

Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: _____





*** Multi Marker List ***

No.1:	210 MHz	-37.53 dB	A
No.2:	695 MHz	-35.47 dB	A
No.3:	1.038 GHz	-35.31 dB	A
No.4:	1.394 GHz	-26.06 dB	A
No.5:	2.065 GHz	-36.91 dB	A
No.6:	2.793 GHz	-36.81 dB	A
No.7:	4.877 GHz	-28.81 dB	A
No.8:			
Δ:			

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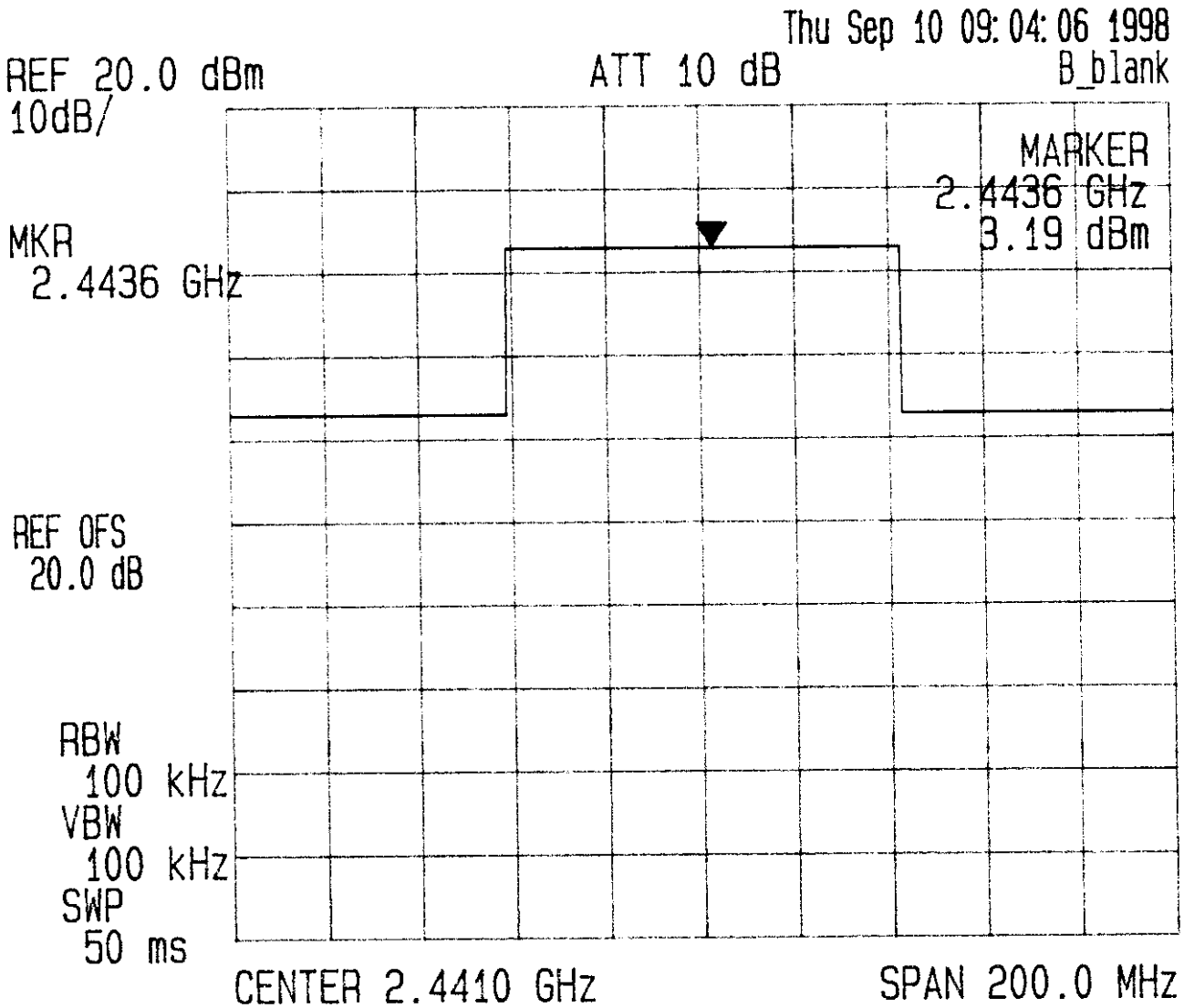
LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 7, Centre Freq.: 2442 MHz , Outout PWR: 35.4 mW

Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: _____

Date: September 12, 1998
Tested by: Hung Trinh

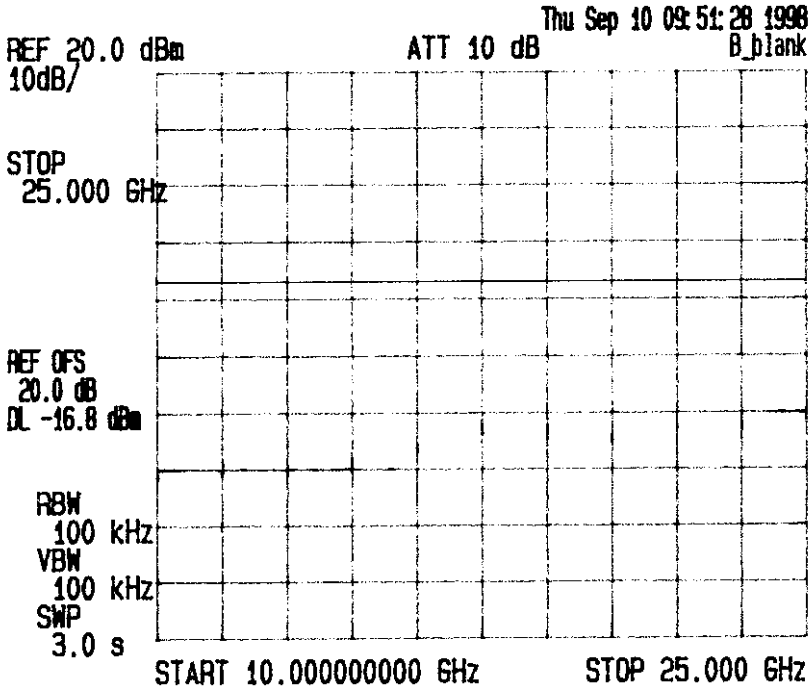


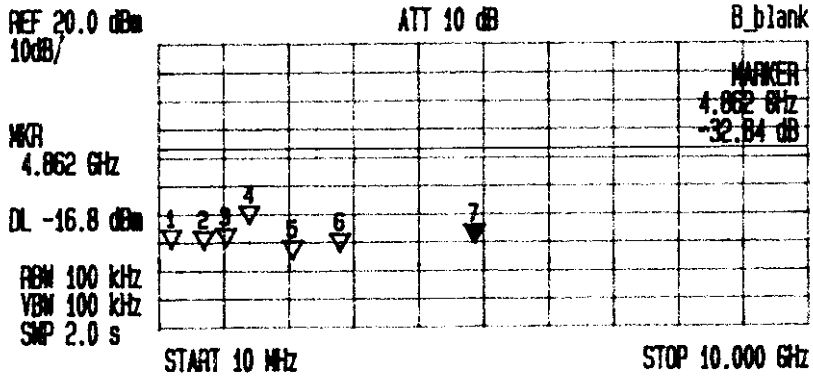
Date: September 10 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 7, Centre Freq.: 2442 MHz, Outout PWR: 354 mW

Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: _____





*** Multi Marker List ***

No.1:	196 MHz	-34.59 dB	A
No.2:	695 MHz	-34.97 dB	A
No.3:	1.038 GHz	-34.16 dB	A
No.4:	1.394 GHz	-25.81 dB	A
No.5:	2.065 GHz	-38.38 dB	A
No.6:	2.793 GHz	-35.97 dB	A
No.7:	4.862 GHz	-32.84 dB	A
No.8:			
A:			

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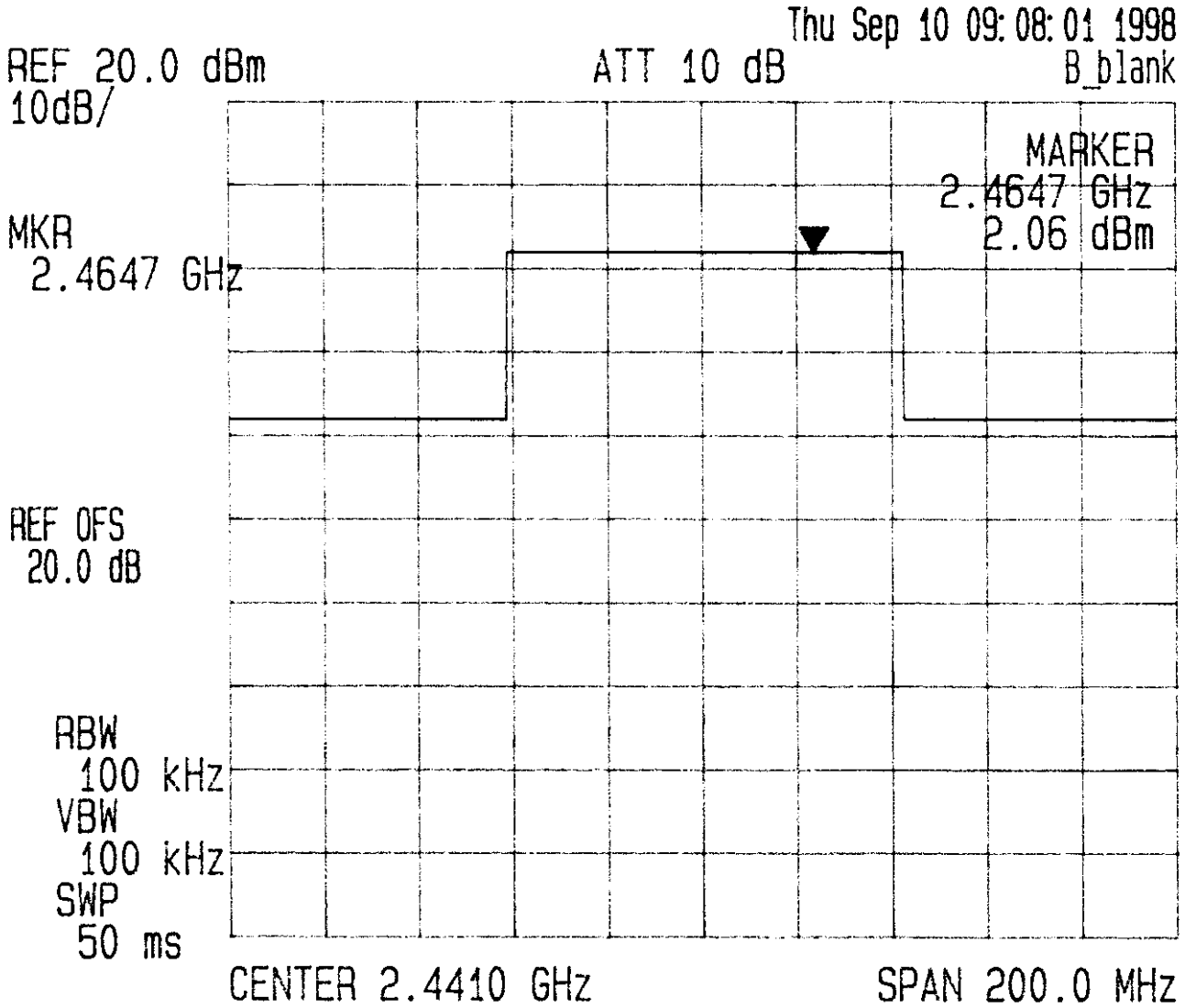
LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 11, Centre Freq.: 2462 MHz , Outout PWR: 33.7 mW

Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: _____

Date: September 10 1998
Tested by: Hung Trinh



Date: September 2 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 11, Centre Freq.: 2462 MHz , Outout PWR: 33.7 mW

Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna:

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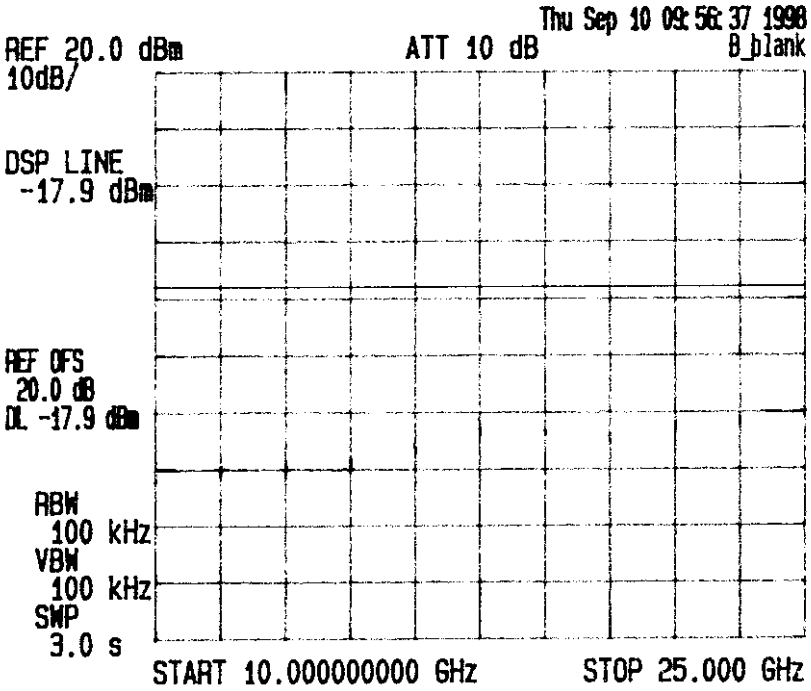
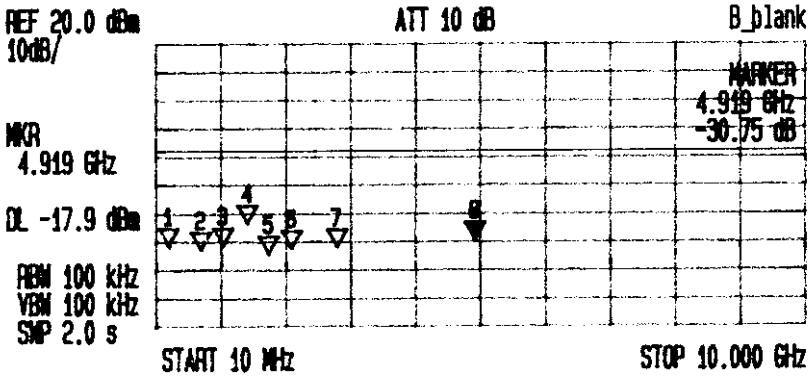




*** Multi Marker List ***

No.1:	196 MHz	-32.94 dB	A
No.2:	695 MHz	-34.22 dB	A
No.3:	1.038 GHz	-32.81 dB	A
No.4:	1.409 GHz	-24.69 dB	A
No.5:	1.737 GHz	-35.69 dB	A
No.6:	2.094 GHz	-33.72 dB	A
No.7:	2.793 GHz	-33.28 dB	A
No.8:	4.919 GHz	-30.75 dB	A
Δ:			

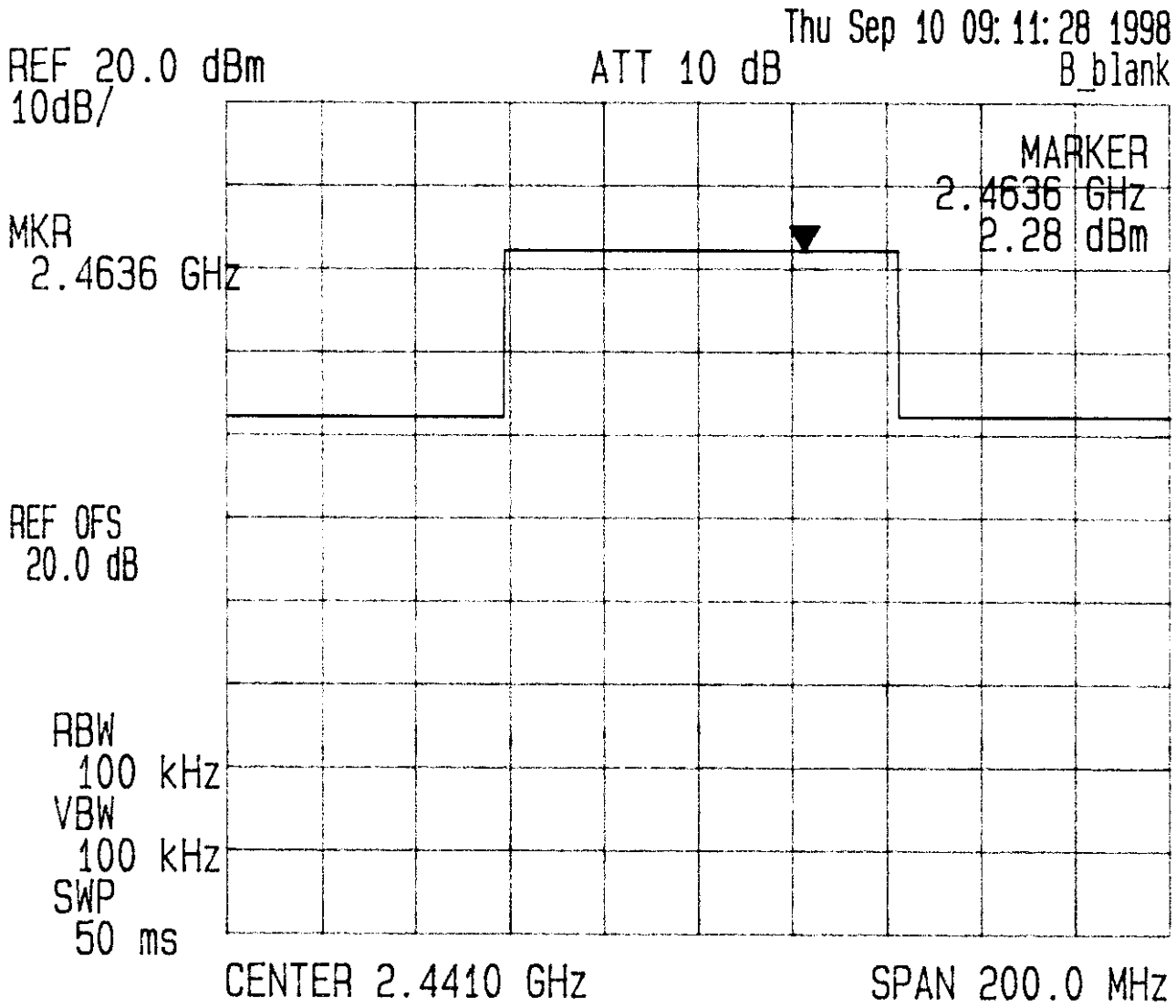
UltraTech
Engineering Labs Inc.

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 11, Centre Freq.: 2462 MHz, Outout PWR: 33.7mW

Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: _____

Date: September 10, 1998
Tested by: Hung Trinh



Date: September 2, 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: //, Centre Freq.: 2462 MHz , Outout PWR: 32.7mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: _____

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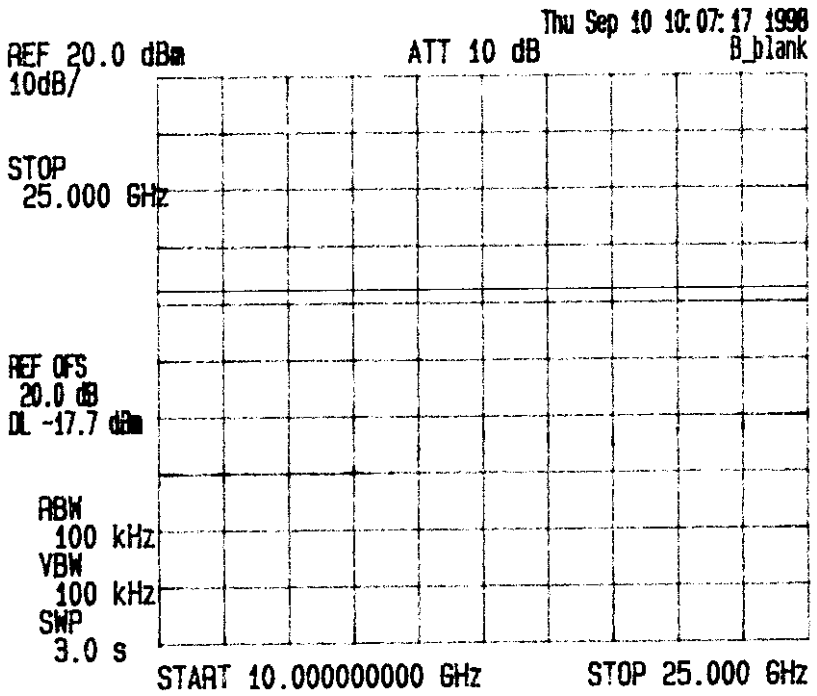
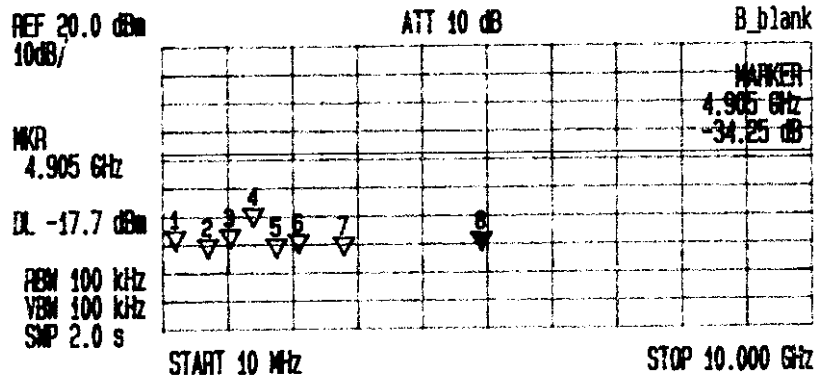




*** Multi Marker List ***

No.1:	196 MHz	-33.19 dB	A
No.2:	695 MHz	-35.84 dB	A
No.3:	1.038 GHz	-32.53 dB	A
No.4:	1.394 GHz	-24.84 dB	A
No.5:	1.751 GHz	-36.22 dB	A
No.6:	2.094 GHz	-34.38 dB	A
No.7:	2.793 GHz	-35.63 dB	A
No.8:	4.905 GHz	-34.25 dB	A
Δ:			

4.4. TRANSMITTER RADIATED EMISSIONS @ 3 METERS, FCC CFR 47, PARA. 15.247(C), 15.209 & 15.205

PRODUCT NAME: LUCENT 802.11 WAVELAN DSSS RADIO, Model No.: TRX7430

FCC REQUIREMENTS:

In any 100 KHz bandwidth outside the operating frequency band, the radio frequency power that is produced by modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 KHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in @ 15.209(a), which lesser attenuation.

All other emissions inside restricted bands specified in @ 15.205(a) shall not exceed the general radiated emission limits specified in @ 15.209(a).

Remarks:

- Applies to harmonics spurious emissions that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209.
- @ FCC CFR 47, Para. 15.237(c) - The emission limits as specified above are based on measurement instrument employing an average detector. The provisions in @15.35 for limiting peak emissions apply.

FCC CFR 47, Part 15, Subpart C, Para. 15.205(a) - Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 - 0.110	162.0125 - 167.17	2310 - 2390	9.3 - 9.5
0.49 - 0.51	167.72 - 173.2	2483.5 - 2500	10.6 - 12.7
2.1735 - 2.1905	240 - 285	2655 - 2900	13.25 - 13.4
8.362 - 8.366	322 - 335.4	3260 - 3267	14.47 - 14.5
13.36 - 13.41	399.9 - 410	3332 - 3339	14.35 - 16.2
25.5 - 25.67	608 - 614	3345.8 - 3358	17.7 - 21.4
37.5 - 38.25	960 - 1240	3600 - 4400	22.01 - 23.12
73 - 75.4	1300 - 1427	4500 - 5250	23.6 - 24.0
108 - 121.94	1435 - 1626.5	5350 - 5460	31.2 - 31.8
123 - 138	1660 - 1710	7250 - 7750	36.43 - 36.5
149.9 - 150.05	1718.8 - 1722.2	8025 - 8500	Above 38.6
156.7 - 156.9	2200 - 2300	9000 - 9200	

FCC CFR 47, Part 15, Subpart C, Para. 15.209(a)
-- Field Strength Limits within Restricted Frequency Bands --

FREQUENCY (MHz)	FIELD STRENGTH LIMITS (microvolts/m)	DISTANCE (Meters)
0.009 - 0.490	2.400/F (KHz)	300
0.490 - 1.705	24.000/F (KHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

CLIMATE CONDITION:

Standard Temperature and Humidity:

- Ambient temperature: 23 °C
- Relative humidity: 43 %

POWER INPUT:

7.2 Vdc (from the Teklogix Digital Communication Systems).

TEST EQUIPMENT:

- **Spectrum Analyzer**, Advantest, Model R3271, S/N: 15050203, 100 Hz to 32 GHz)
- **Microwave Amplifier**, HP, Model 8349A, Frequency Range 1 to 26.5 GHz, 34-38 dBdB gain nominal.
- **Active Loop Antenna**, Emco, Model 6507, SN 8906-1167, Frequency Range 1 KHz - 30 MHz, @ 50 Ohms
- **Log Periodic/Bow-Tie Antenna**, Emco, Model 3143, SN 1029, 20 - 1000 MHz, @ 50 ohms.
- **Horn Antenna**, Emco, Model 3115, SN 9701-5061, Frequency Range: 1 - 18 GHz, @ 50 Ohms.
- **Horn Antenna**, Emco, Model 3160-09, 18-26.5GHz
- **Horn Antenna**, Emco, Model 3160-09, 18-26.5GHz
- **Horn Antenna**, Emco, Model 3160-10, 26.5-40GHz
- **Mixer**, Tektronix, P N 118-0098-00, 18-26.5GHz
- **Mixer**, Tektronix, P N 119-0098-00, 26.5-40GHz

METHOD OF MEASUREMENTS:

Refer to **ANSI 63.4-1992**, Para. 8 for detailed radiated emissions measurement procedures.

Applies to harmonics/spurious that fall in the restricted bands listed in Section 15.205, the maximum permitted average field strength is listed in Section 15.209. A Pre-Amp and highpass filter are used for this measurement.

For measurement below 1 GHz, set RBW = 100 KHz, VBW ≥ 100 KHz, SWEEP=AUTO.

For measurement above 1 GHz, set RBW = 1 MHz, VBW = 1 MHz (Peak) & VBW = 10 Hz (Average), SWEEP=AUTO.

If the emission is pulsed, modified the unit for continuous operation, then use the settings above for measurements, then correct the reading by subtracting the peak-average correction factor derived from the appropriate duty cycle calculation. See Section 15.35(b) and (c).

FCC CFR 47, Para. 2.997 - Frequency spectrum to be investigated

The spectrum was investigated from the lowest radio generated in the equipment up to at least the 10th harmonic of the carrier frequency or to the highest frequency practicable in the present state of the art of measuring techniques, whichever is lower. Particular attention should be paid to harmonics and subharmonics of the carrier frequency. Radiation at the frequencies of multiplier stages should be checked. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

FCC CFR 47, Para. 2.993 - Field Strength Spurious Emissions

(a) Measurements was made to detect spurious emissions radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data were supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph 2.989(c) as appropriate. For equipment operating on frequencies below 1 GHz, an Open Field Test is normally required, with the measuring instrument antenna located in the far field at all test frequencies. In event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurement will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with the reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.

(b) Measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emission are required to be 60 dB or more below the mean power of the transmitter.
(2) All equipment operating on frequencies higher than 25 MHz
(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.
(4) Other types of equipment as required, when deemed necessary by the Commission.

TEST RESULTS: Conforms.

TEST PERSONNEL: Hung Trinh, EMI RFI Technician

DATE: Sept. 08 - Sept. 10, 1998

MEASUREMENT DATA

RADIATED EMISSIONS MEASUREMENTS @ 3 METERS

TEST CONFIGURATION

- *This lowest, middle and highest channels were established at its full rated output power. The emissions were investigated from the lowest frequency generated by the transmitter up to the 10th harmonic of the fundamental emissions in each case, the measured level of the carrier was recorded and compared to the level of the emissions as required in Parts 15.247(c) or 15.209(a) whichever was applicable.*
- *For measuring radiated emissions at frequencies below 1 GHz, the Spectrum Analyzer was set as 100 KHz RBW, VBW ≥ RBW, SWEEP TIME: AUTO, PEAK DETECTOR.*
- *For measuring radiated emissions at frequencies above 1 GHz, the Spectrum Analyzer was set as 1 MHz RBW, 1 MHz VBW, SWEEP TIME: AUTO for PEAK measurements and 1 MHz RBW, 10 Hz VBW, SWEEP TIME: AUTO for AVERAGE measurements.*
- *The following measurements were the worst cases when the radiating antenna was placed in both horizontal and vertical polarization.*
- *The following **AVERAGE** rf levels were obtained from either Peak or Average readings added by the duty cycle correction factor. **DUTY CYCLE FACTOR = $20LOG_{10}(0.25)$ = -12 dB***

4.4.1. Test Configuration #1: Centurian Dipole, Model No.: CAF28832, Freq. Range: 2.4-2.5 GHz, Antenna Gain: 0 dBd.

Test Condition #1: Channel Frequency: 2412 MHz (Lowest),
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 29.1 mW Peak

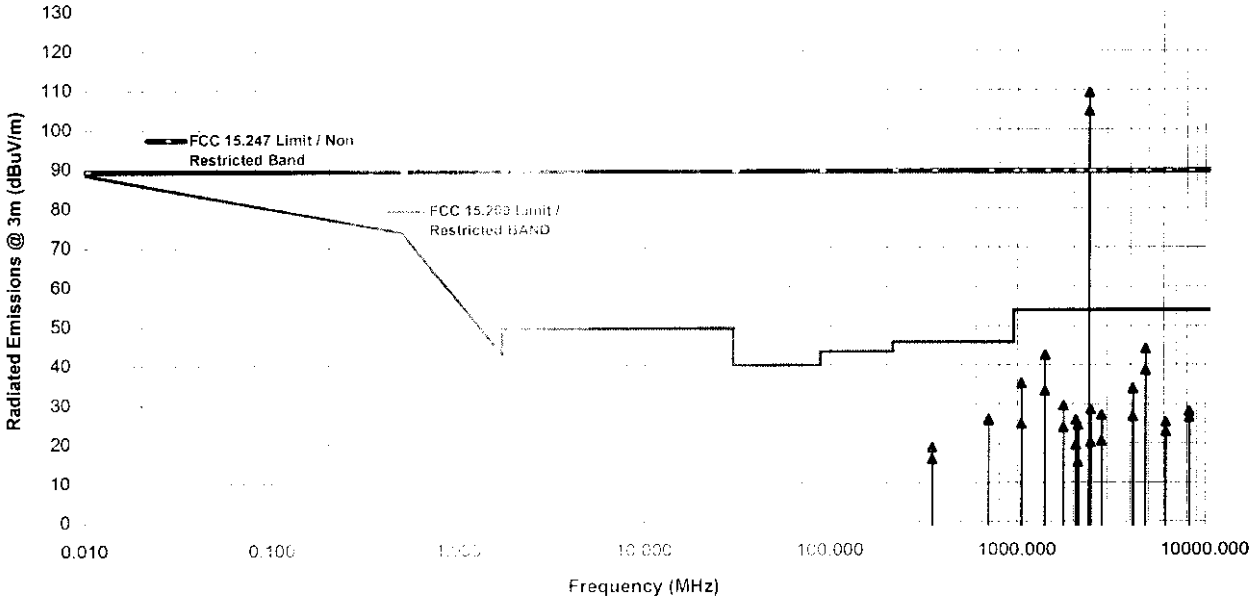
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	19.2	V	46.0	89.3	-70.1	PASS
352.00	37.9	16.2	H	46.0	89.3	-73.1	PASS
704.00	39.6	26.3	V	46.0	89.3	-63.0	PASS
704.00	39.5	26.0	H	46.0	89.3	-63.3	PASS
1056.00	51.5	35.4	V	54.0	89.3	-18.6	PASS**
1056.00	42.9	25.1	H	54.0	89.3	-28.9	PASS**
1408.00	55.5	42.7	V	54.0	89.3	-11.3	PASS**
1408.00	48.6	33.5	H	54.0	89.3	-20.5	PASS**
1760.00	47.5	29.7	V	54.0	89.3	-59.6	PASS
1760.00	43.4	24.2	H	54.0	89.3	-65.1	PASS
2060.00	41.4	19.7	V	54.0	89.3	-69.6	PASS
2060.00	44.0	26.1	H	54.0	89.3	-63.2	PASS
2112.00	42.6	24.7	V	54.0	89.3	-64.6	PASS
2112.00	40.3	15.3	H	54.0	89.3	-74.0	PASS
2412.00	104.6	--	V	--	--	--	--
2412.00	109.3	--	H	--	--	--	--
2464.00	53.1	28.7	V	54.0	89.3	-60.6	PASS
2464.00	45.6	20.4	H	54.0	89.3	-68.9	PASS
2816.00	45.3	27.4	V	54.0	89.3	-26.6	PASS**
2816.00	43.2	20.6	H	54.0	89.3	-33.4	PASS**
4120.00	50.9	34.1	V	54.0	89.3	-19.9	PASS**
4120.00	48.3	26.9	H	54.0	89.3	-27.1	PASS**
4824.00	58.4	44.3	V	54.0	89.3	-9.7	PASS**
4824.00	54.8	38.7	H	54.0	89.3	-15.3	PASS**
6180.00	46.4	23.0	V	54.0	89.3	-66.3	PASS
6180.00	48.4	25.5	H	54.0	89.3	-63.8	PASS
8240.00	50.3	26.7	V	54.0	89.3	-27.3	PASS**
8240.00	51.8	28.3	H	54.0	89.3	-25.7	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

*** Emission within the restricted band specified in @ 15.205(a)*

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #1: Teklogix TRX7430 Radio Transmitter
with Centurian Dipole, Model No.: CAF28832, Antenna Gain: 0 dBd.

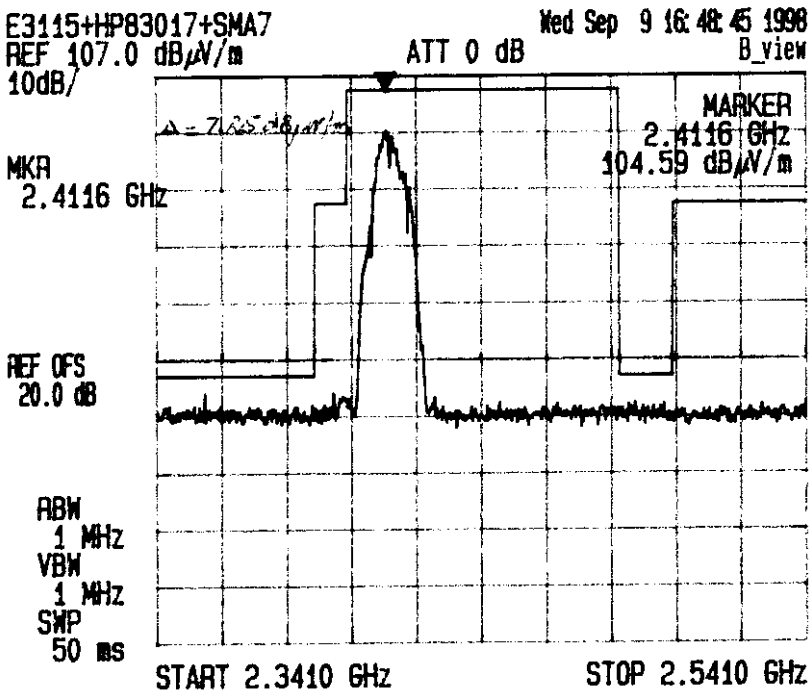
Channel #1, Tx Freq.: 2412 MHz, Modulation: QPSK with 1Mb/s random data



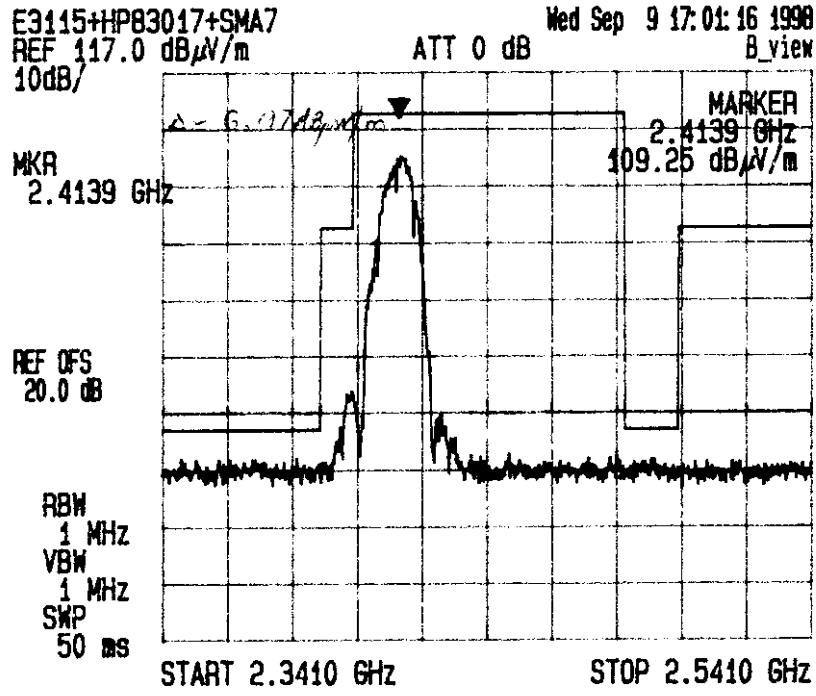
Date: September 9, 1998
Tested by: Hung Trinh

Channel: 1, Centre Freq.: 2412 MHz, Outout PWR: 22.1 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: VENDORIAN STRIPLINE

Radiated Emissions Measurements @ 3 Meters
Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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Test Condition #2: Channel Frequency: 2442 MHz (Middle)
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 35.4 mW Peak

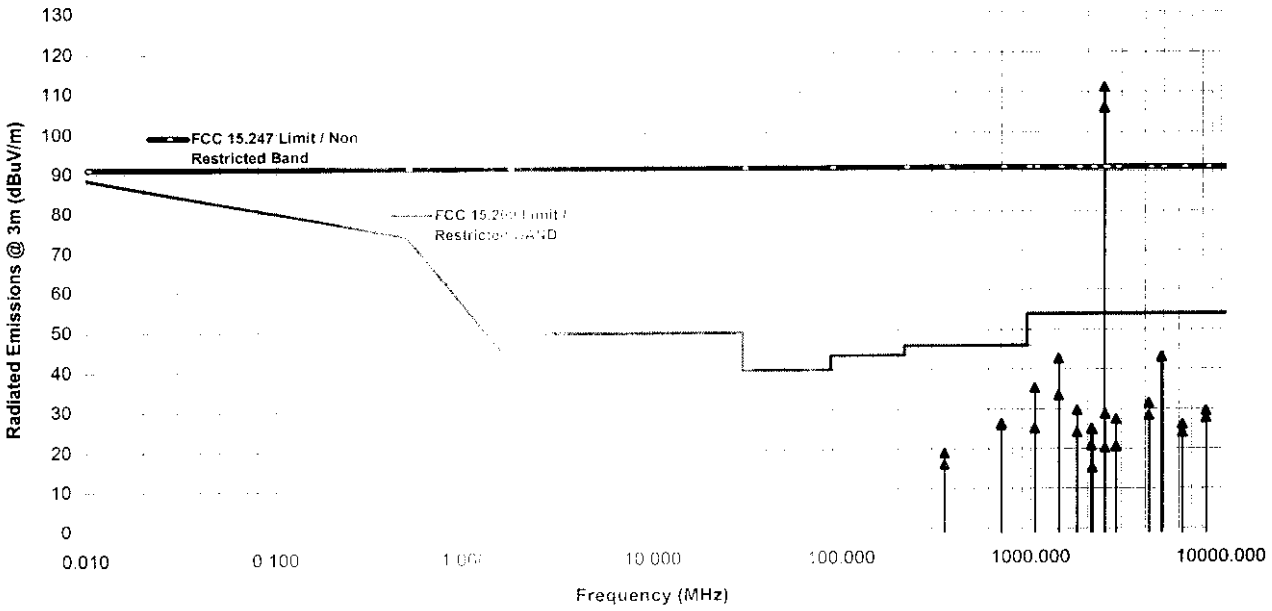
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	19.2	V	46.0	91.1	-71.9	PASS
352.00	37.9	16.2	H	46.0	91.1	-74.9	PASS
704.00	39.6	26.3	V	46.0	91.1	-64.8	PASS
704.00	39.5	26.0	H	46.0	91.1	-65.1	PASS
1056.00	51.5	35.4	V	54.0	91.1	-18.6	PASS**
1056.00	42.9	25.1	H	54.0	91.1	-28.9	PASS**
1408.00	55.5	42.7	V	54.0	91.1	-11.3	PASS**
1408.00	48.6	33.5	H	54.0	91.1	-20.5	PASS**
1760.00	47.5	29.7	V	54.0	91.1	-61.4	PASS
1760.00	43.4	24.2	H	54.0	91.1	-66.9	PASS
2090.00	41.0	20.9	V	54.0	91.1	-70.2	PASS
2090.00	43.9	25.0	H	54.0	91.1	-66.1	PASS
2112.00	42.6	24.7	V	54.0	91.1	-66.4	PASS
2112.00	40.3	15.3	H	54.0	91.1	-75.8	PASS
2442.00	106.0	--	V	--	--	--	--
2442.00	111.1	--	H	--	--	--	--
2464.00	53.1	28.7	V	54.0	91.1	-62.4	PASS
2464.00	45.6	20.4	H	54.0	91.1	-70.7	PASS
2816.00	45.3	27.4	V	54.0	91.1	-26.6	PASS**
2816.00	43.2	20.6	H	54.0	91.1	-33.4	PASS**
4180.00	49.4	31.6	V	54.0	91.1	-22.4	PASS**
4180.00	48.1	28.4	H	54.0	91.1	-25.6	PASS**
4884.00	57.8	43.0	V	54.0	91.1	-11.0	PASS**
4884.00	58.2	43.1	H	54.0	91.1	-10.9	PASS**
6270.00	48.6	26.1	V	54.0	91.1	-65.0	PASS
6270.00	47.6	24.1	H	54.0	91.1	-67.0	PASS
8360.00	52.3	29.6	V	54.0	91.1	-24.4	PASS**
8360.00	51.5	27.7	H	54.0	91.1	-26.3	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

*** Emission within the restricted band specified in @ 15.205(a)*

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #1: Teklogix TRX7430 Radio Transmitter
with Centurian Dipole, Model No.: CAF28832, Antenna Gain: 0 dBd.

Channel #7, Tx Freq : 2442 MHz, Modulation: QPSK with 1Mb/s random data



Date: September 2, 1998
Tested by: Hung Trinh

Channel: 7 , Centre Freq.: 2442 MHz , Outout PWR: 354 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: CENTURION 21 PATCH

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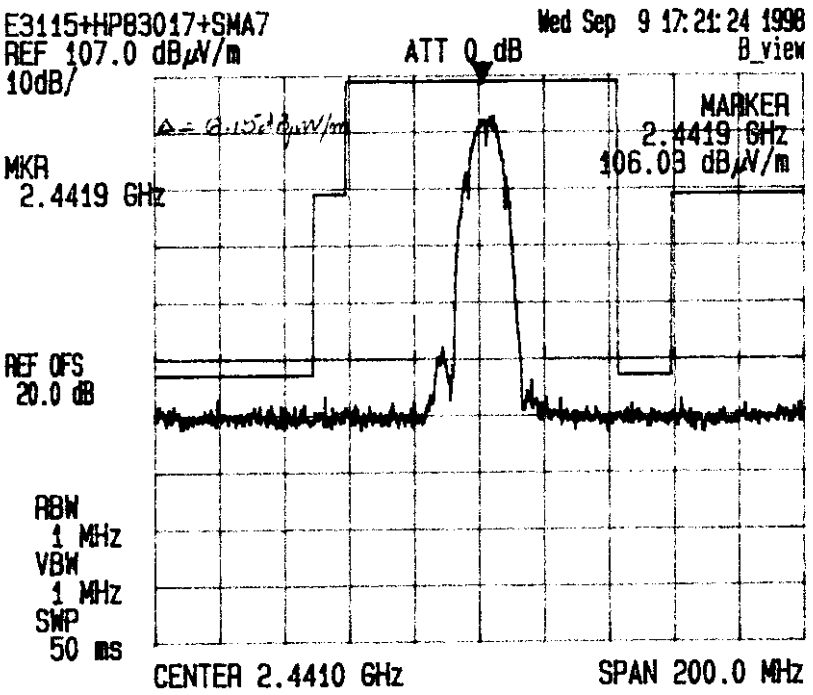
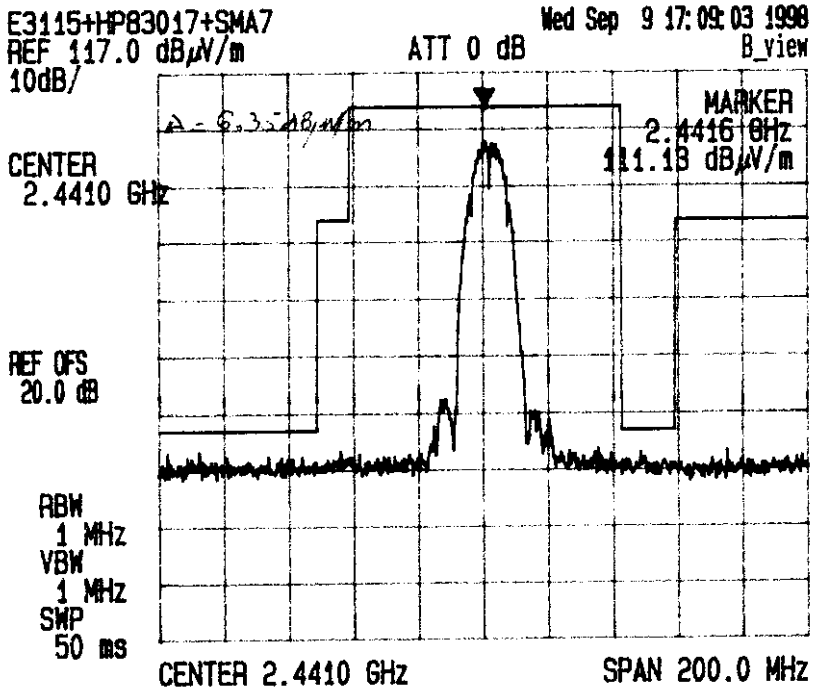
Radiated Emissions Measurements @ 3 Meters

Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

Test Condition #3: Channel Frequency: 2462 MHz (Highest)
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 33.7 mW Peak

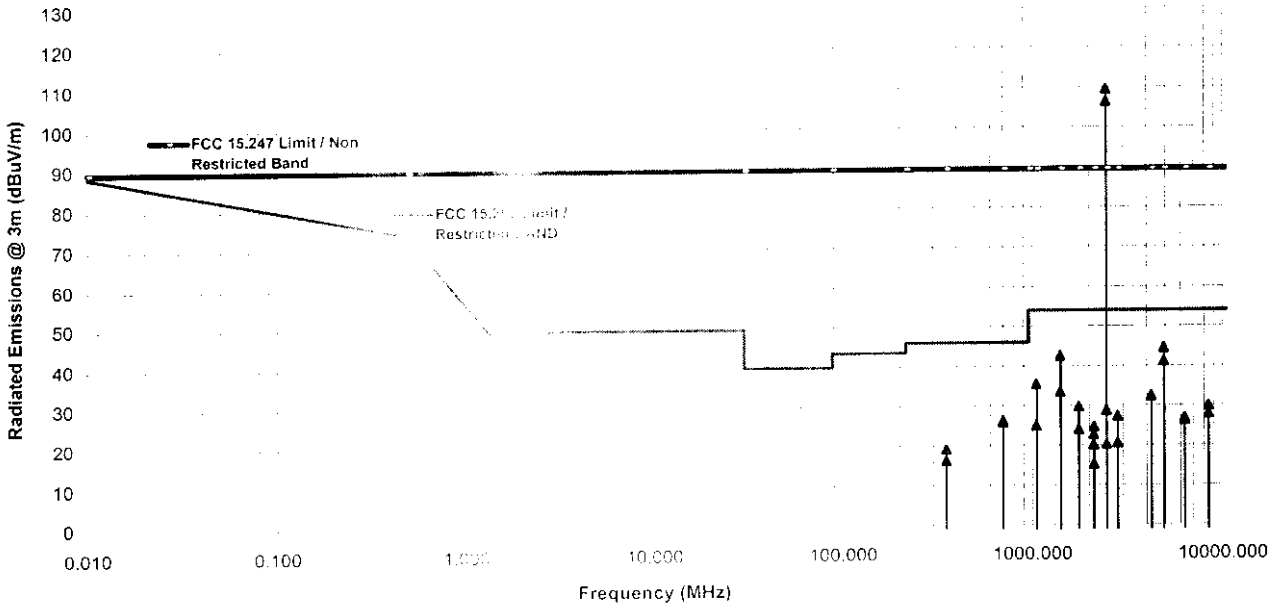
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	19.2	V	46.0	89.5	-70.3	PASS
352.00	37.9	16.2	H	46.0	89.5	-73.3	PASS
704.00	39.6	26.3	V	46.0	89.5	-63.2	PASS
704.00	39.5	26.0	H	46.0	89.5	-63.5	PASS
1056.00	51.5	35.4	V	54.0	89.5	-18.6	PASS**
1056.00	42.9	25.1	H	54.0	89.5	-28.9	PASS**
1408.00	55.5	42.7	V	54.0	89.5	-11.3	PASS**
1408.00	48.6	33.5	H	54.0	89.5	-20.5	PASS**
1760.00	47.5	29.7	V	54.0	89.5	-59.8	PASS
1760.00	43.4	24.2	H	54.0	89.5	-65.3	PASS
2110.00	42.5	22.8	V	54.0	89.5	-66.7	PASS
2110.00	41.5	20.2	H	54.0	89.5	-69.3	PASS
2112.00	42.6	24.7	V	54.0	89.5	-64.8	PASS
2112.00	40.3	15.3	H	54.0	89.5	-74.2	PASS
2462.00	106.4	--	V	--	--	--	--
2462.00	109.5	--	H	--	--	--	--
2464.00	53.1	28.7	V	54.0	89.5	-60.8	PASS
2464.00	45.6	20.4	H	54.0	89.5	-69.1	PASS
2816.00	45.3	27.4	V	54.0	89.5	-26.6	PASS**
2816.00	43.2	20.6	H	54.0	89.5	-33.4	PASS**
4220.00	50.1	32.4	V	54.0	89.5	-21.6	PASS**
4220.00	48.4	32.4	H	54.0	89.5	-21.6	PASS**
4924.00	56.3	41.3	V	54.0	89.5	-12.7	PASS**
4924.00	59.4	44.6	H	54.0	89.5	-9.4	PASS**
6330.00	48.8	26.4	V	54.0	89.5	-63.1	PASS
6330.00	48.8	26.9	H	54.0	89.5	-62.6	PASS
8440.00	52.6	30.0	V	54.0	89.5	-24.0	PASS**
8440.00	53.4	28.0	H	54.0	89.5	-26.0	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

** ***Emission within the restricted band specified in @ 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #1: Teklogix TRX7430 Radio Transmitter
with Centurian Cable, Model No.: CAF28832, Antenna Gain: 0 dBd.

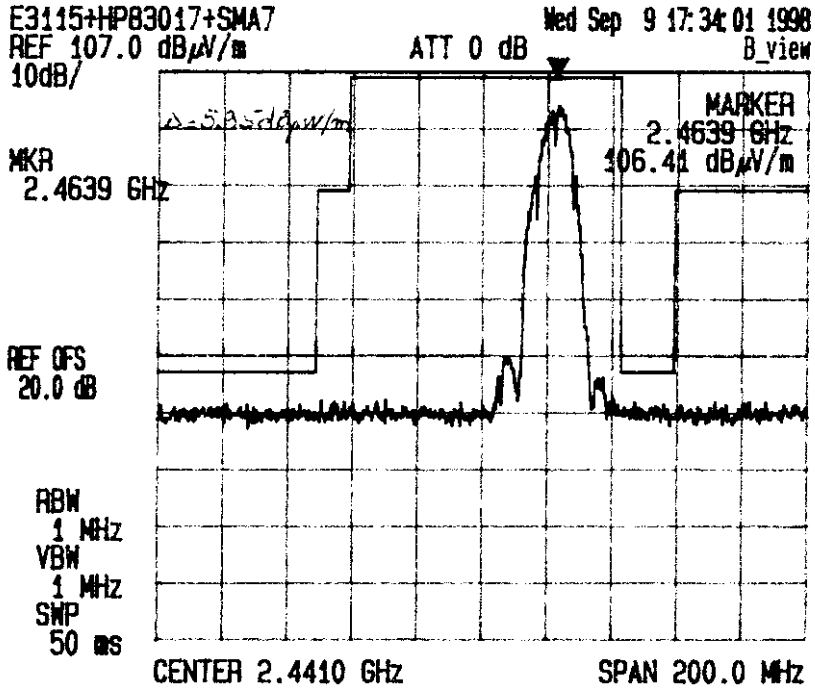
Ch. #11, Tx Freq.: 2 2 MHz, Modulation: QPSK with 1Mb/s random data



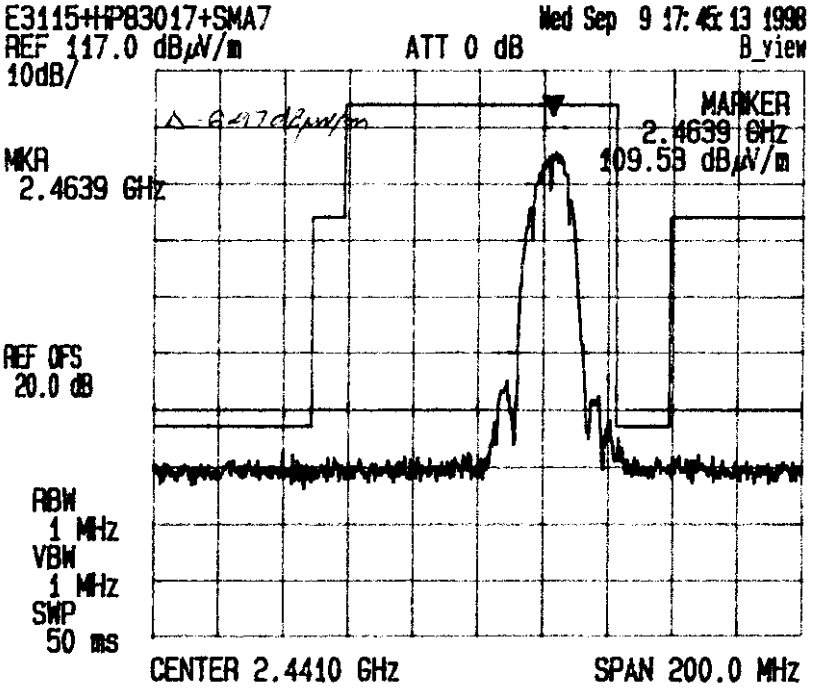
Date: September 9, 1998
Tested by: Hung Trinh

Channel: 11 , Centre Freq.: 2462 MHz , Outout PWR: 35.7 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: Ceiling Dipole

Radiated Emissions Measurements @ 3 Meters
Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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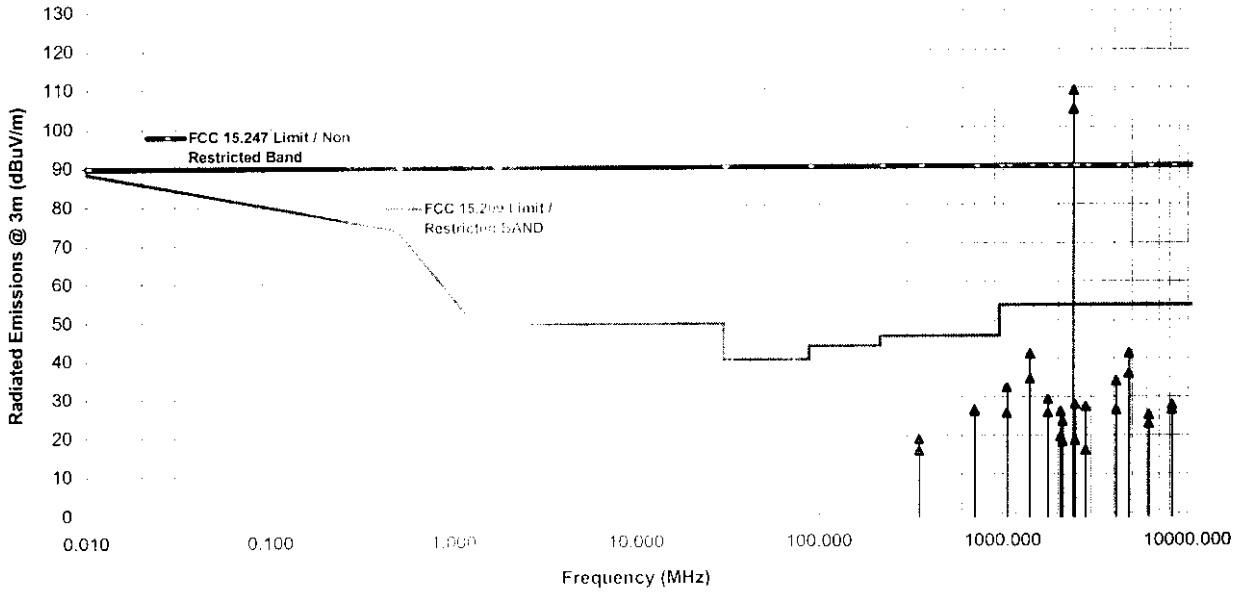
Test Condition #4: Channel Frequency: 2412 MHz (Lowest)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: 29.1 mW Peak

FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	19.1	V	46.0	89.8	-70.7	PASS
352.00	37.4	16.2	H	46.0	89.8	-73.6	PASS
704.00	39.9	26.7	V	46.0	89.8	-63.1	PASS
704.00	39.6	26.3	H	46.0	89.8	-63.5	PASS
1056.00	48.3	32.6	V	54.0	89.8	-21.4	PASS**
1056.00	43.1	25.8	H	54.0	89.8	-28.2	PASS**
1408.00	54.2	41.3	V	54.0	89.8	-12.7	PASS**
1408.00	47.5	34.8	H	54.0	89.8	-19.2	PASS**
1760.00	47.3	29.4	V	54.0	89.8	-60.4	PASS
1760.00	44.2	25.9	H	54.0	89.8	-63.9	PASS
2060.00	41.3	19.8	V	54.0	89.8	-70.1	PASS
2060.00	44.8	26.2	H	54.0	89.8	-63.6	PASS
2112.00	43.1	23.6	V	54.0	89.8	-66.2	PASS
2112.00	40.5	18.4	H	54.0	89.8	-71.4	PASS
2412.00	104.6	--	V	--	--	--	--
2412.00	109.8	--	H	--	--	--	--
2464.00	52.2	28.1	V	54.0	89.8	-61.7	PASS
2464.00	43.1	18.8	H	54.0	89.8	-71.0	PASS
2816.00	45.6	27.5	V	54.0	89.8	-26.5	PASS**
2816.00	41.5	16.2	H	54.0	89.8	-37.8	PASS**
4120.00	50.5	34.3	V	54.0	89.8	-19.7	PASS**
4120.00	47.7	26.6	H	54.0	89.8	-27.4	PASS**
4824.00	58.1	41.5	V	54.0	89.8	-12.5	PASS**
4824.00	53.9	36.3	H	54.0	89.8	-17.7	PASS**
6180.00	47.0	23.0	V	54.0	89.8	-66.8	PASS
6180.00	48.5	25.3	H	54.0	89.8	-64.5	PASS
8240.00	50.2	26.7	V	54.0	89.8	-27.3	PASS**
8240.00	51.8	28.0	H	54.0	89.8	-26.0	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

***** Emission within the restricted band specified in @ 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS
Test Configuration #1: Teklogix TRX7430 Radio Transmitter
with Centurian Dipole, Model No.: CAF28832, Antenna Gain: 0 dBd.

Channel #1, Tx Freq : 2412 MHz, Modulation: QPSK with 2Mb/s random data

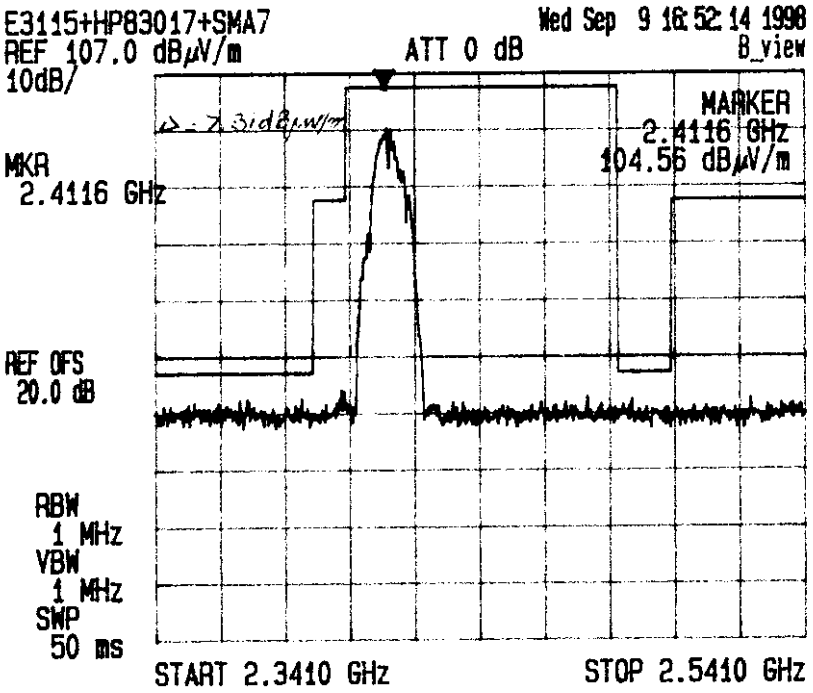


Date: September 2, 1998
Tested by: Hung Trinh

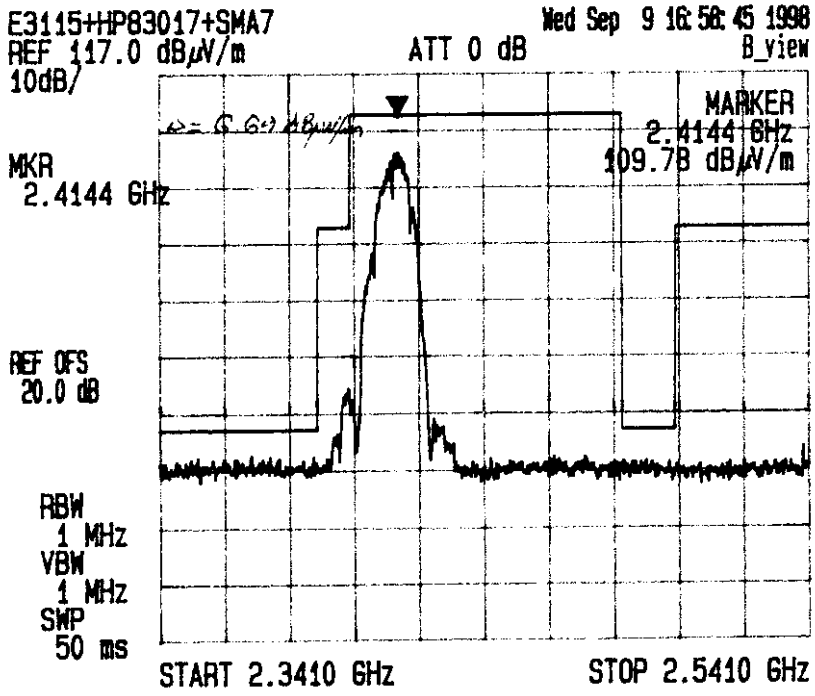
Channel: 1, Centre Freq.: 2441.2 MHz, Outout PWR: 29.1 mW
Modulation: QPSC with 2 Mb/s Data Rate, Transmitting Antenna: CERAMIC Patch Dipole

Radiated Emissions Measurements @ 3 Meters

Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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Test Condition #5: Channel Frequency: 2442 MHz (Middle)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: 35.4 mW Peak

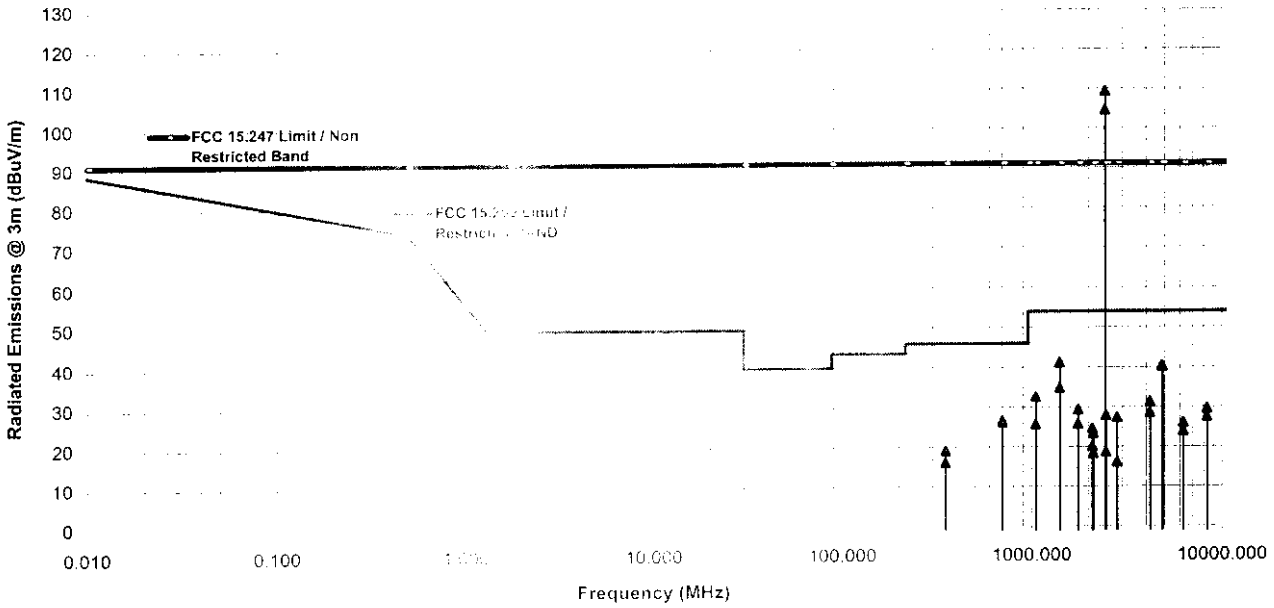
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	19.1	V	46.0	91.1	-72.0	PASS
352.00	37.4	16.2	H	46.0	91.1	-74.9	PASS
704.00	39.9	26.7	V	46.0	91.1	-64.4	PASS
704.00	39.6	26.3	H	46.0	91.1	-64.8	PASS
1056.00	48.3	32.6	V	54.0	91.1	-21.4	PASS**
1056.00	43.1	25.8	H	54.0	91.1	-28.2	PASS**
1408.00	54.2	41.3	V	54.0	91.1	-12.7	PASS**
1408.00	47.5	34.8	H	54.0	91.1	-19.2	PASS**
1760.00	47.3	29.4	V	54.0	91.1	-61.7	PASS
1760.00	44.2	25.9	H	54.0	91.1	-65.2	PASS
2090.00	41.6	20.2	V	54.0	91.1	-70.9	PASS
2090.00	43.6	24.8	H	54.0	91.1	-66.3	PASS
2112.00	43.1	23.6	V	54.0	91.1	-67.5	PASS
2112.00	40.5	18.4	H	54.0	91.1	-72.7	PASS
2442.00	106.2	--	V	--	--	--	--
2442.00	111.1	--	H	--	--	--	--
2464.00	52.2	28.1	V	54.0	91.1	-63.0	PASS
2464.00	43.1	18.8	H	54.0	91.1	-72.3	PASS
2816.00	45.6	27.5	V	54.0	91.1	-26.5	PASS**
2816.00	41.5	16.2	H	54.0	91.1	-37.8	PASS**
4180.00	49.0	31.5	V	54.0	91.1	-22.5	PASS**
4180.00	48.0	28.7	H	54.0	91.1	-25.3	PASS**
4824.00	57.6	40.4	H	54.0	91.1	-13.6	PASS**
4884.00	57.4	40.3	V	54.0	91.1	-13.7	PASS**
6270.00	48.5	26.2	V	54.0	91.1	-64.9	PASS
6270.00	47.6	24.1	H	54.0	91.1	-67.0	PASS
8360.00	52.8	29.7	H	54.0	91.1	-24.3	PASS**
8360.00	51.5	27.7	H	54.0	91.1	-26.3	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

** ***Emission within the restricted band specified in 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #1: Teklogix TRX7430 Radio Transmitter
with Centurian Cradle, Model No.: CAF28832, Antenna Gain: 0 dBd.

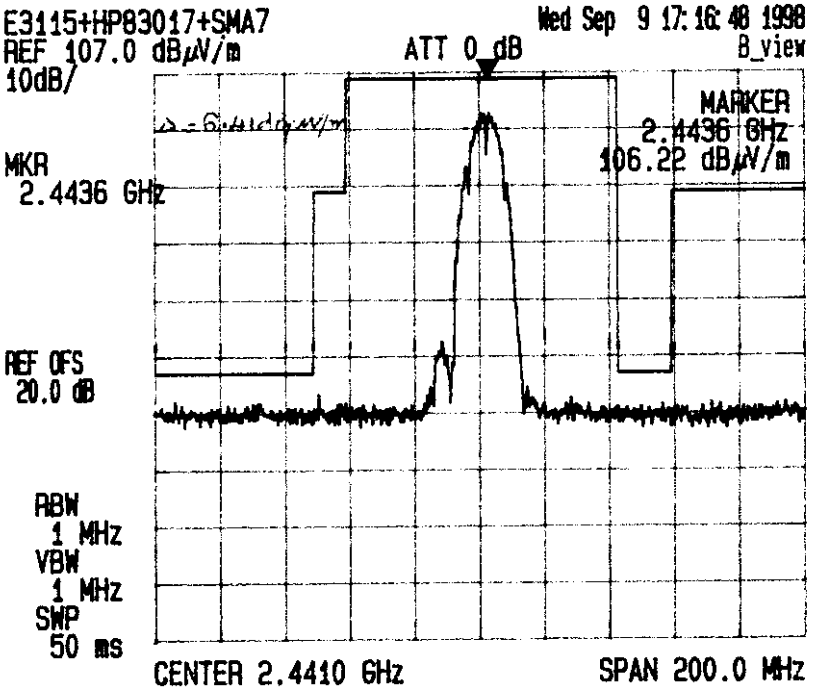
Channel #7, Tx Freq: 2442 MHz, Modulation: QPSK with 2Mb/s random data



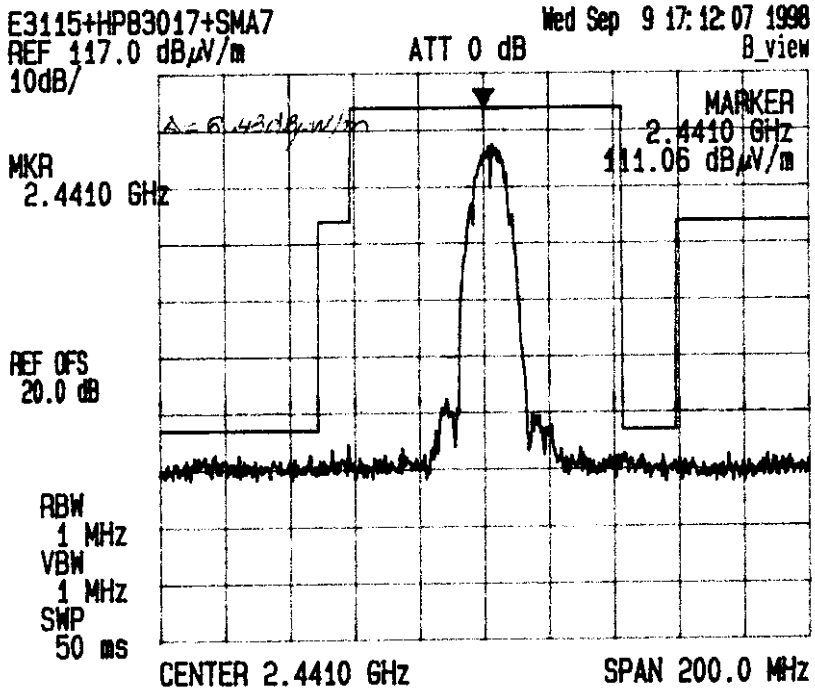
Date: September 9, 1998
Tested by: Hung Trinh

Channel: 7 , Centre Freq.: 2442.62 MHz , Outout PWR: 3344 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: OMNIDIRECTIONAL DIPOLE

Radiated Emissions Measurements @ 3 Meters
Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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Test Condition #6: Channel Frequency: 2462 MHz (Highest)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: 33.7 mW Peak

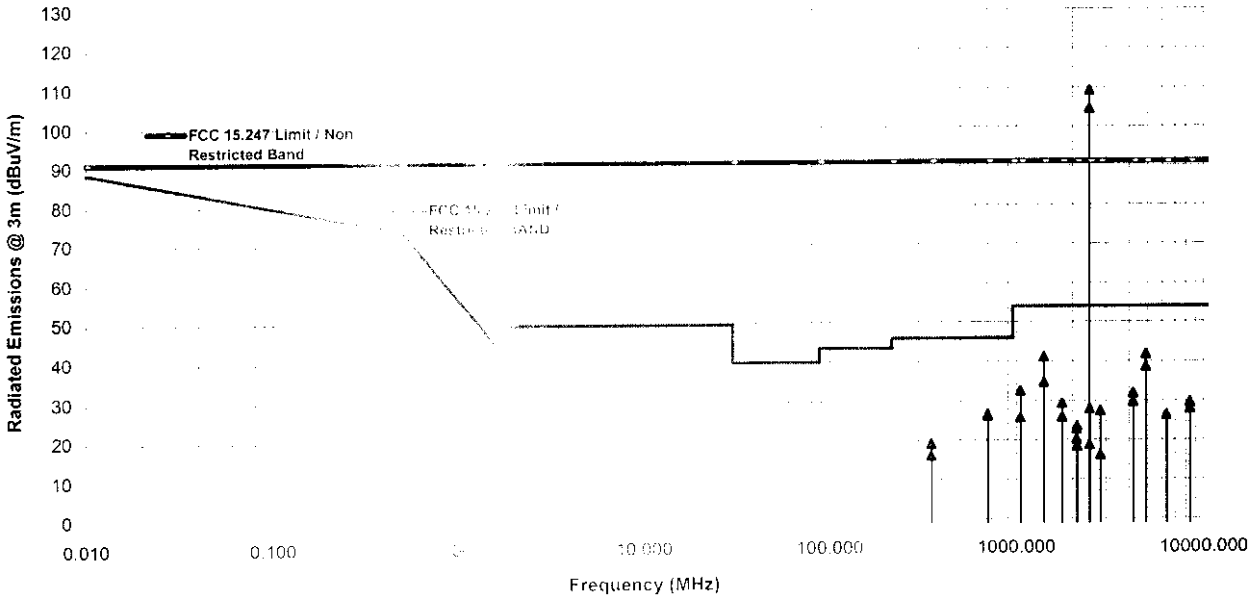
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	19.1	V	46.0	91.1	-72.0	PASS
352.00	37.4	16.2	H	46.0	91.1	-74.9	PASS
704.00	39.9	26.7	V	46.0	91.1	-64.4	PASS
704.00	39.6	26.3	H	46.0	91.1	-64.8	PASS
1056.00	48.3	32.6	V	54.0	91.1	-21.4	PASS**
1056.00	43.1	25.8	H	54.0	91.1	-28.2	PASS**
1408.00	54.2	41.3	V	54.0	91.1	-12.7	PASS**
1408.00	47.5	34.8	H	54.0	91.1	-19.2	PASS**
1760.00	47.3	29.4	V	54.0	91.1	-61.7	PASS
1760.00	44.2	25.9	H	54.0	91.1	-65.2	PASS
2110.00	42.5	32.8	V	54.0	91.0	-68.2	PASS
2110.00	41.9	20.2	H	54.0	91.0	-70.8	PASS
2112.00	43.1	23.6	V	54.0	91.1	-67.5	PASS
2112.00	40.5	18.4	H	54.0	91.1	-72.7	PASS
2462.00	106.3	--	V	--	--	--	--
2462.00	111.0	--	H	--	--	--	--
2464.00	52.2	28.1	V	54.0	91.1	-63.0	PASS
2464.00	43.1	18.8	H	54.0	91.1	-72.3	PASS
2816.00	45.6	27.5	V	54.0	91.1	-26.5	PASS**
2816.00	41.5	16.2	H	54.0	91.1	-37.8	PASS**
4220.00	49.8	32.0	V	54.0	91.0	-22.0	PASS**
4220.00	48.9	29.8	H	54.0	91.0	-24.2	PASS**
4924.00	56.9	38.8	V	54.0	91.0	-15.2	PASS**
4924.00	58.7	41.9	H	54.0	91.0	-12.1	PASS**
6330.00	48.7	26.5	V	54.0	91.0	-64.5	PASS
6330.00	48.8	26.4	H	54.0	91.0	-64.6	PASS
8440.00	52.9	29.7	V	54.0	91.0	-24.3	PASS**
8440.00	51.8	28.0	H	54.0	91.0	-26.0	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

** ***Emission within the restricted band specified in 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #1: Teklogix TRX7430 Radio Transmitter
with Centurian L pole, Model No.: CAF28832, Antenna Gain: 0 dBd.

Ch.#11, Tx Freq.: 2462 MHz, Modulation: QPSK with 2Mb/s random data

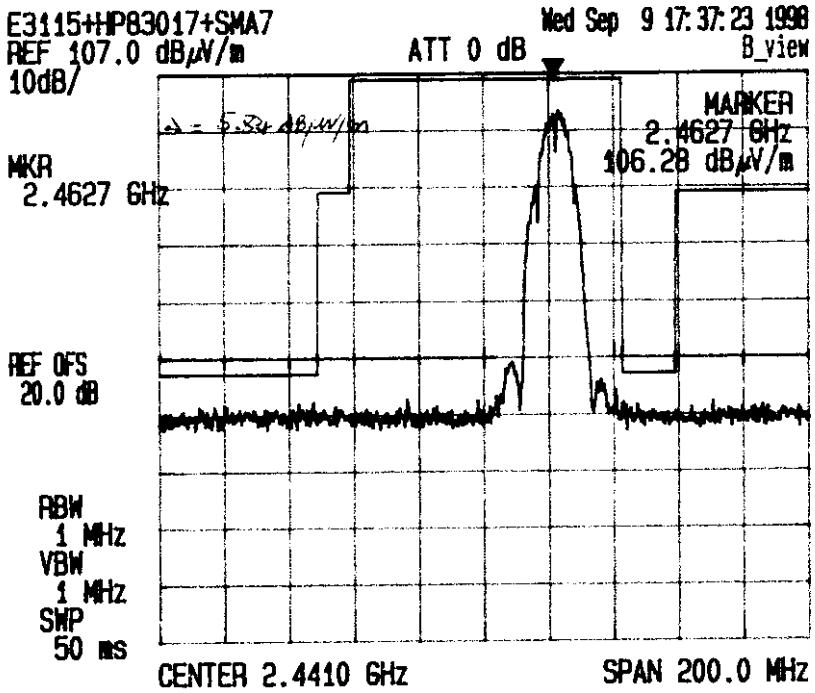


Date: September 22, 1998
Tested by: Hung Trinh

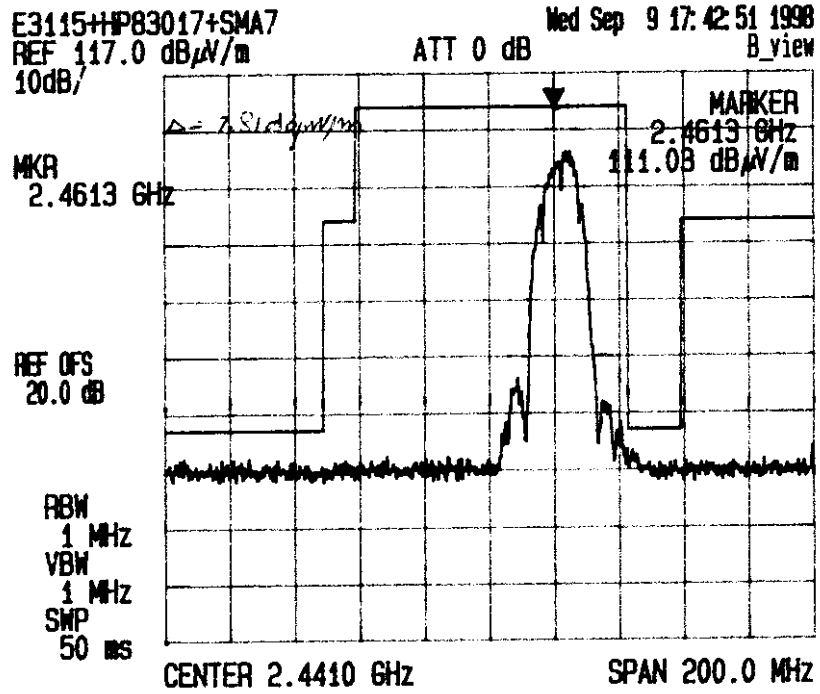
Channel: 11, Centre Freq.: 2462 MHz, Outout PWR: 33.7mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: CENTURY Dipole

Radiated Emissions Measurements @ 3 Meters

Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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4.4.2. Test Configuration #2: Cushcraft/Signals Omnidirectional Antenna, Model No.: S2403B, Freq. Range: 2.4-2.5 GHz, Antenna Gain: 3 dBd = 5.14 dBi

Test Condition #1: Channel Frequency: 2412 MHz (Lowest)
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 29.1 mW Peak

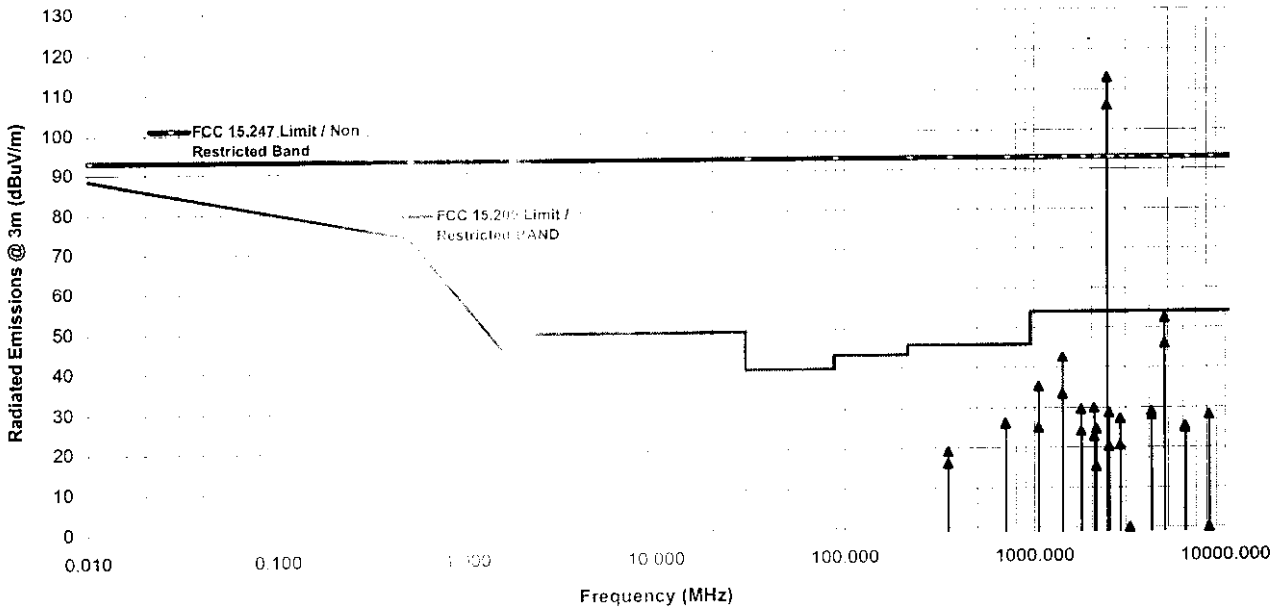
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	19.2	V	46.0	93.1	-73.9	PASS
352.00	37.9	16.2	H	46.0	93.1	-76.9	PASS
704.00	39.6	26.3	V	46.0	93.1	-66.8	PASS
704.00	39.5	26.0	H	46.0	93.1	-67.1	PASS
1056.00	51.5	35.4	V	54.0	93.1	-18.6	PASS**
1056.00	42.9	25.1	H	54.0	93.1	-28.9	PASS**
1408.00	55.5	42.7	V	54.0	93.1	-11.3	PASS**
1408.00	48.6	33.5	H	54.0	93.1	-20.5	PASS**
1760.00	47.5	29.7	V	54.0	93.1	-63.4	PASS
1760.00	43.4	24.2	H	54.0	93.1	-68.9	PASS
2060.00	51.6	30.0	V	54.0	93.1	-63.1	PASS
2060.00	42.8	22.8	H	54.0	93.1	-70.3	PASS
2112.00	42.6	24.7	V	54.0	93.1	-68.4	PASS
2112.00	40.3	15.3	H	54.0	93.1	-77.8	PASS
2412.00	113.1	--	V	--	--	--	--
2412.00	106.1	--	H	--	--	--	--
2464.00	53.1	28.7	V	54.0	93.1	-64.4	PASS
2464.00	45.6	20.4	H	54.0	93.1	-72.7	PASS
2816.00	45.3	27.4	V	54.0	93.1	-26.6	PASS**
2816.00	43.2	20.6	H	54.0	93.1	-33.4	PASS**
4120.00	48.8	29.1	V	54.0	93.1	-24.9	PASS**
4120.00	47.8	28.3	H	54.0	93.1	-25.7	PASS**
4824.00	66.1	52.4	V	54.0	93.1	-1.6	PASS**
4824.00	60.3	46.1	H	54.0	93.1	-7.9	PASS**
6180.00	48.3	25.4	V	54.0	93.1	-67.7	PASS
6180.00	48.5	25.0	H	54.0	93.1	-68.1	PASS
8240.00	51.4	28.2	V	54.0	93.1	-25.8	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

*** Emission within the restricted band specified in @ 15.205(a)*

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #2: Teklogix TRX7430 Radio Transmitter
with Cushcraft/Signals S2403B Antenna, Gain: 3 dBd.

Channel #1, Tx Freq.: 2412 MHz, Modulation: QPSK with 1Mb/s random data

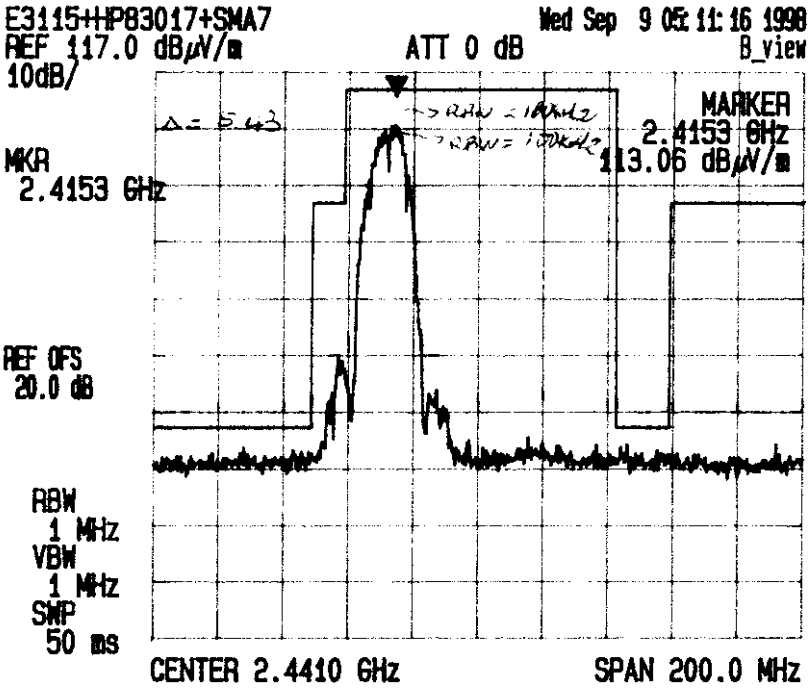


Date: September 9, 1998
Tested by: Hung Trinh

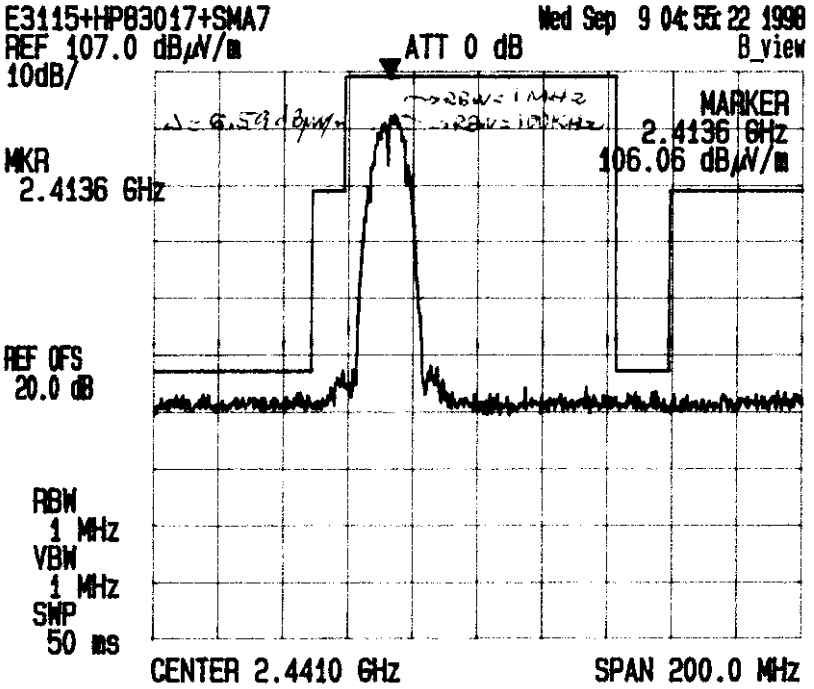
TEKLOGIX INC.

Channel: 1 , Centre Freq.: 2412 MHz , Outout PWR: 23.1 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: Quad S2403BP

Radiated Emissions Measurements @ 3 Meters



VERTICAL



HORIZONTAL

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Test Condition #2: Channel Frequency: 2442 MHz (Middle)
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 35.4 mW Peak

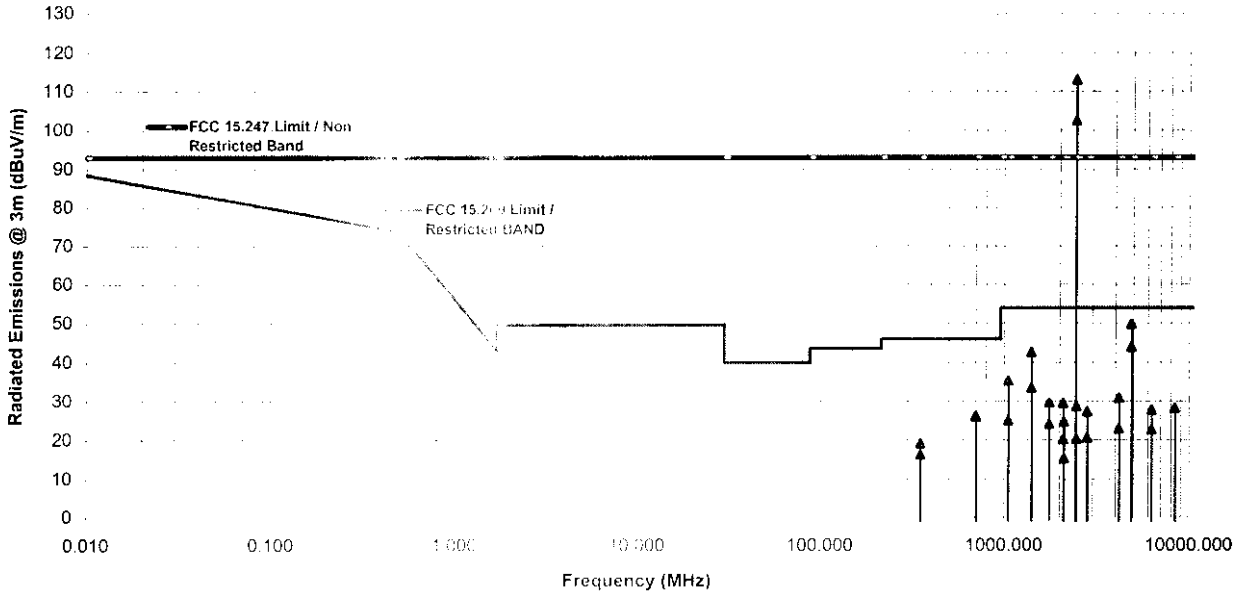
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	19.2	V	46.0	93.0	-73.8	PASS
352.00	37.9	16.2	H	46.0	93.0	-76.8	PASS
704.00	39.6	26.3	V	46.0	93.0	-66.7	PASS
704.00	39.5	26.0	H	46.0	93.0	-67.0	PASS
1056.00	51.5	35.4	V	54.0	93.0	-18.6	PASS**
1056.00	42.9	25.1	H	54.0	93.0	-28.9	PASS**
1408.00	55.5	42.7	V	54.0	93.0	-11.3	PASS**
1408.00	48.6	33.5	H	54.0	93.0	-20.5	PASS**
1760.00	47.5	29.7	V	54.0	93.0	-63.3	PASS
1760.00	43.4	24.2	H	54.0	93.0	-68.8	PASS
2090.00	45.8	29.5	V	54.0	93.0	-63.5	PASS
2090.00	41.1	20.2	H	54.0	93.0	-72.8	PASS
2112.00	42.6	24.7	V	54.0	93.0	-68.3	PASS
2112.00	40.3	15.3	H	54.0	93.0	-77.7	PASS
2442.00	113.0	--	V	--	--	--	--
2442.00	102.6	--	H	--	--	--	--
2464.00	53.1	28.7	V	54.0	93.0	-64.3	PASS
2464.00	45.6	20.4	H	54.0	93.0	-72.6	PASS
2816.00	45.3	27.4	V	54.0	93.0	-26.6	PASS**
2816.00	43.2	20.6	H	54.0	93.0	-33.4	PASS**
4180.00	48.3	30.9	V	54.0	93.0	-23.1	PASS**
4180.00	45.9	22.9	H	54.0	93.0	-31.1	PASS**
4884.00	63.78	49.9	V	54.0	93.0	-4.1	PASS**
4884.00	58.47	44.0	H	54.0	93.0	-10.0	PASS**
6270.00	48.3	27.8	V	54.0	93.0	-65.2	PASS
6270.00	46.4	22.6	H	54.0	93.0	-70.4	PASS
8360.00	51.5	28.2	V	54.0	93.0	-25.8	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

** ***Emission within the restricted band specified in @ 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #2: Teklogix TRX7430 Radio Transmitter
with Cushcraft/Signals S2403B Antenna, Gain: 3 dBd.

Channel #7, Tx Freq.: 2442 MHz, Modulation: QPSK with 1Mb/s random data

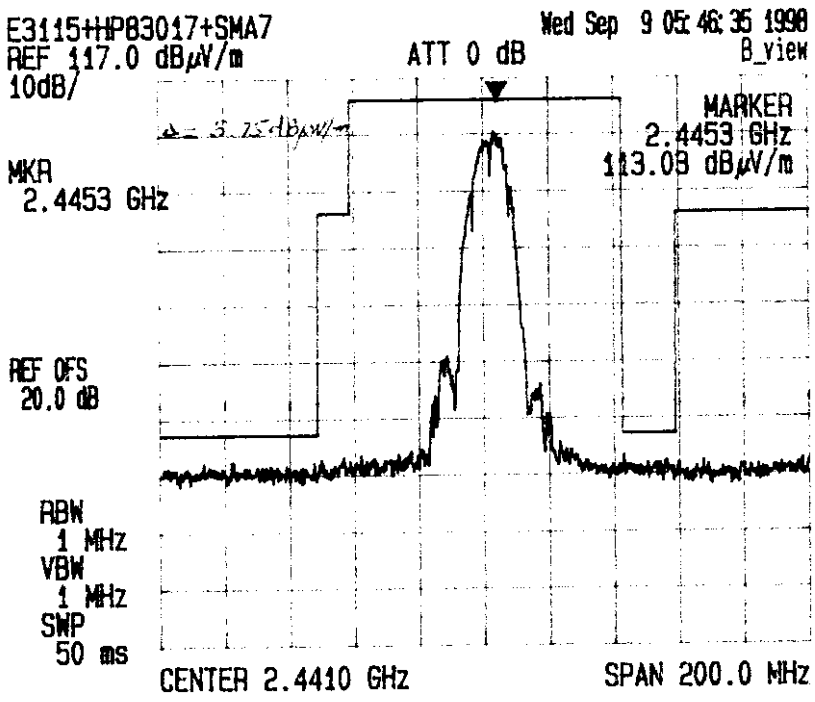


Date: September 4, 1998
Tested by: Hung Trinh

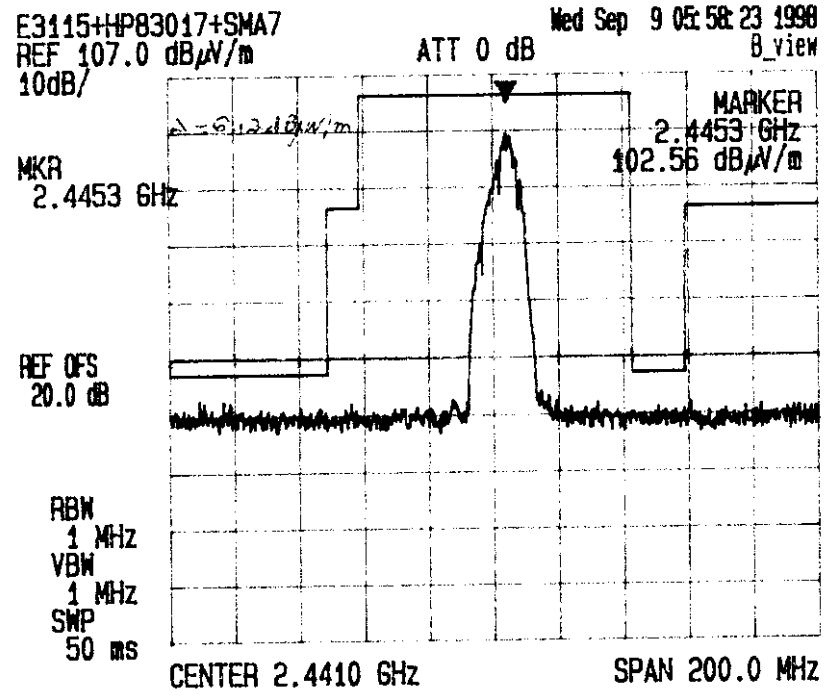
Channel: 7 , Centre Freq.: 2442 MHz , Outout PWR: 354 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: Quad 2.4 GHz 3dBi

Radiated Emissions Measurements @ 3 Meters

Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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Test Condition #3: Channel Frequency: 2462 MHz (Highest)
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 33.7 mW Peak

FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	19.2	V	46.0	92.5	-73.3	PASS
352.00	37.9	16.2	H	46.0	92.5	-76.3	PASS
704.00	39.6	26.3	V	46.0	92.5	-66.2	PASS
704.00	39.5	26.0	H	46.0	92.5	-66.5	PASS
1056.00	51.5	35.4	V	54.0	92.5	-18.6	PASS**
1056.00	42.9	25.1	H	54.0	92.5	-28.9	PASS**
1408.00	55.5	42.7	V	54.0	92.5	-11.3	PASS**
1408.00	48.6	33.5	H	54.0	92.5	-20.5	PASS**
1760.00	47.5	29.7	V	54.0	92.5	-62.8	PASS
1760.00	43.4	24.2	H	54.0	92.5	-68.3	PASS
2110.00	48.0	33.2	V	54.0	92.5	-59.3	PASS
2110.00	42.9	23.3	H	54.0	92.5	-69.2	PASS
2112.00	42.6	24.7	V	54.0	92.5	-67.8	PASS
2112.00	40.3	25.3	H	54.0	92.5	-77.2	PASS
2462.00	112.5	--	V	--	--	--	--
2462.00	101.3	--	H	--	--	--	--
2464.00	53.1	38.2	V	54.0	92.5	-63.8	PASS
2464.00	45.6	20.4	H	54.0	92.5	-72.1	PASS
2816.00	45.3	27.4	V	54.0	92.5	-26.6	PASS**
2816.00	43.2	20.6	H	54.0	92.5	-33.4	PASS**
4220.00	46.3	25.5	V	54.0	92.5	-28.5	PASS**
4220.00	44.5	20.7	H	54.0	92.5	-33.3	PASS**
4924.00	53.9	37.9	V	54.0	92.5	-16.1	PASS**
4924.00	56.3	40.9	H	54.0	92.5	-13.1	PASS**
6330.00	50.0	29.9	V	54.0	92.5	-62.6	PASS
6330.00	48.7	26.1	H	54.0	92.5	-66.4	PASS
8440.00	52.1	26.1	V	54.0	92.5	-23.9	PASS**
8440.00	51.9	27.6	H	54.0	92.5	-26.4	PASS**

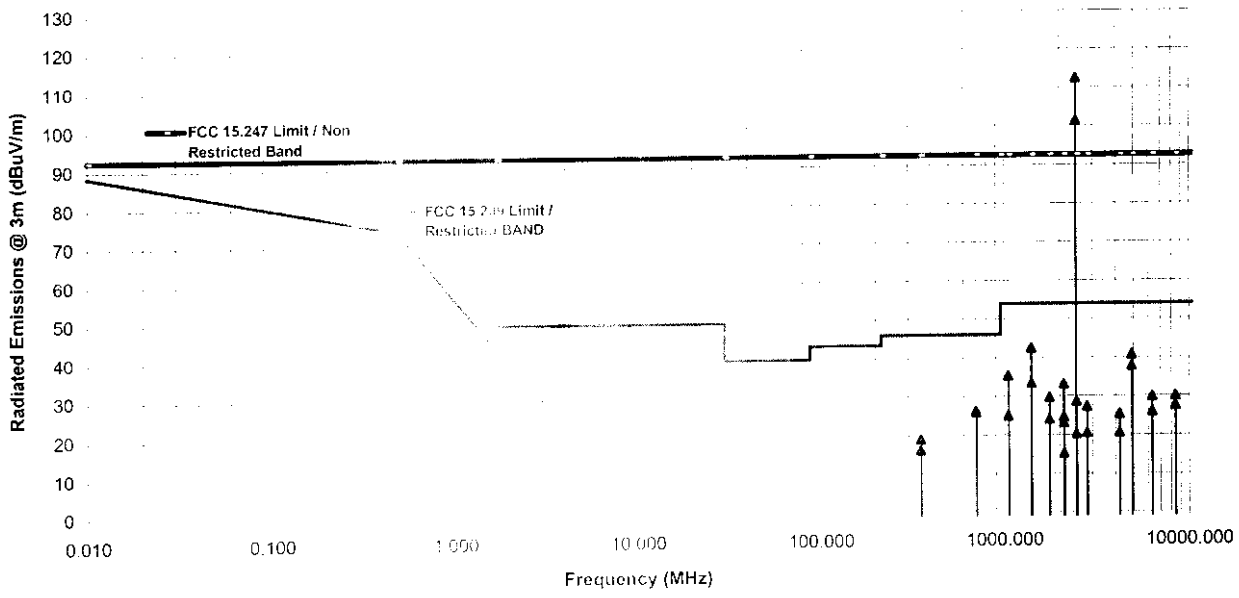
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details

** ***Emission within the restricted band specified in @ 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #2: Teklogix TRX7430 Radio Transmitter
with Cushcraft/Signals S2403B Antenna, Gain: 3 dBd.

Ch. #11, Tx Freq.: 2462 MHz, Modulation: QPSK with 1Mb/s random data



Date: September 4, 1998
Tested by: Hung Trinh

Channel: 11, Centre Freq.: 2402 MHz, Outout PWR: 38.7 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: Quasi Omni

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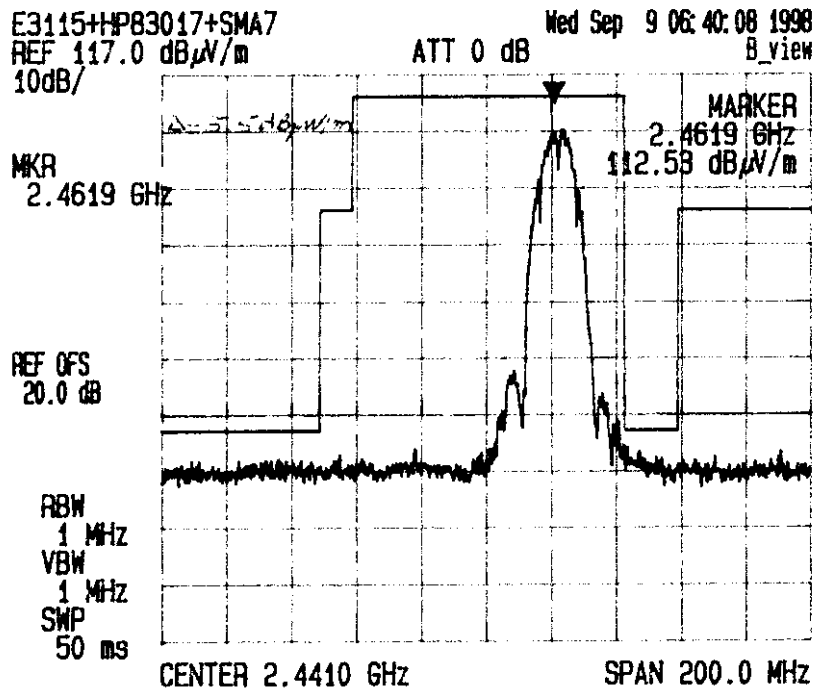
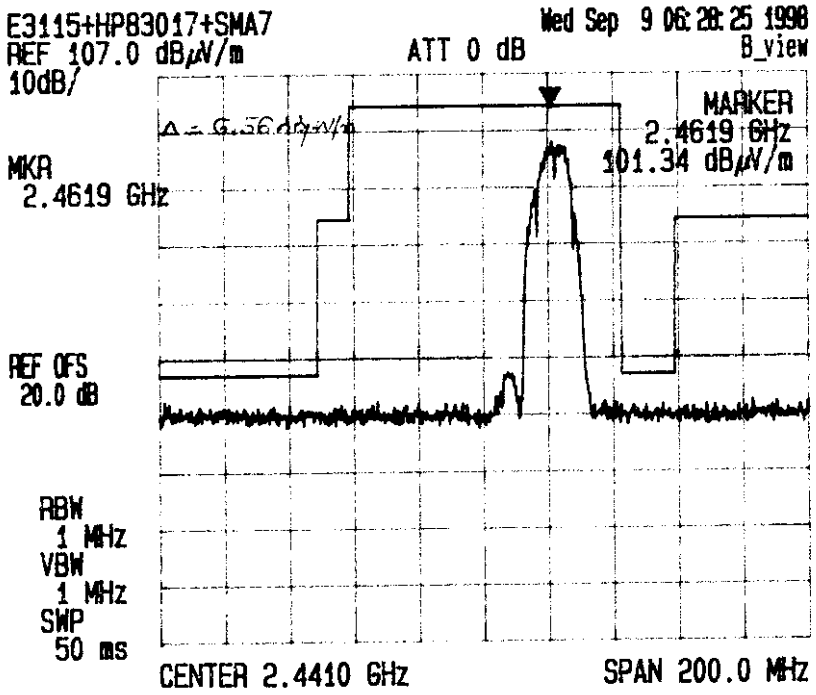
Radiated Emissions Measurements @ 3 Meters

Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

Test Condition #4: Channel Frequency: 2412 MHz (Lowest)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: 29.1 mW Peak

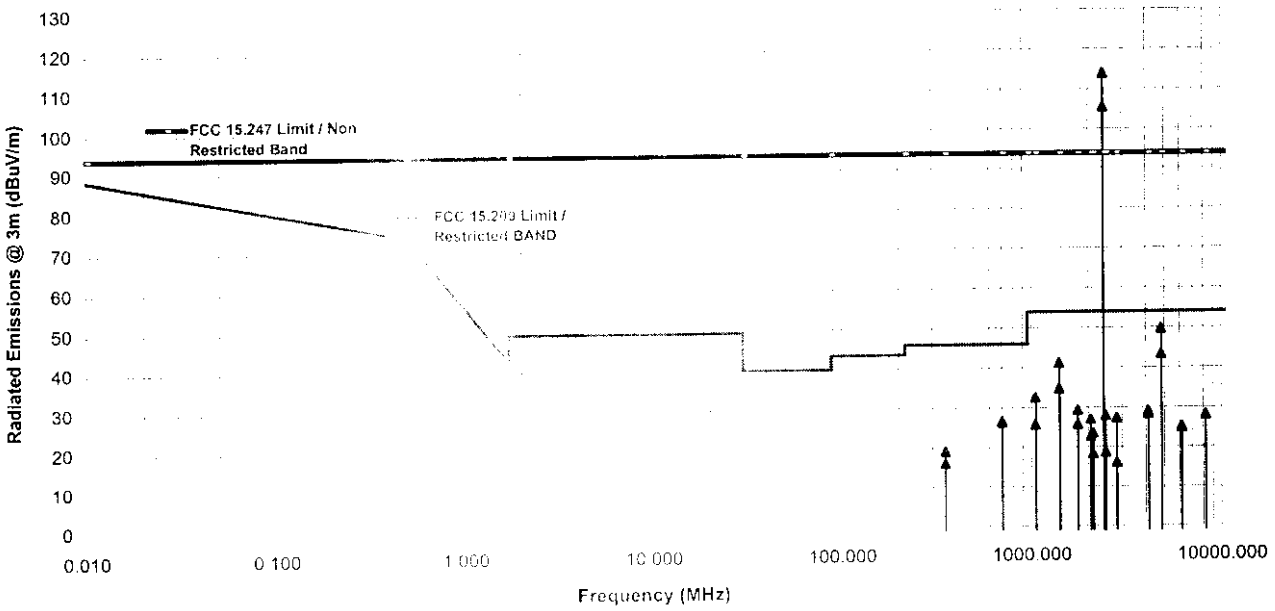
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	19.1	V	46.0	93.9	-74.8	PASS
352.00	37.4	16.2	H	46.0	93.9	-77.7	PASS
704.00	39.9	26.7	V	46.0	93.9	-67.2	PASS
704.00	39.6	26.3	H	46.0	93.9	-67.6	PASS
1056.00	48.3	32.6	V	54.0	93.9	-21.4	PASS**
1056.00	43.1	25.8	H	54.0	93.9	-28.2	PASS**
1408.00	54.2	41.3	V	54.0	93.9	-12.7	PASS**
1408.00	47.5	34.8	H	54.0	93.9	-19.2	PASS**
1760.00	47.3	29.4	V	54.0	93.9	-64.5	PASS
1760.00	44.2	25.9	H	54.0	93.9	-68.0	PASS
2060.00	44.6	27.2	V	54.0	93.9	-66.7	PASS
2060.00	43.1	22.8	H	54.0	93.9	-71.2	PASS
2112.00	43.1	23.6	V	54.0	93.9	-70.3	PASS
2112.00	40.5	18.4	H	54.0	93.9	-75.5	PASS
2412.00	113.9	--	V	--	--	--	--
2412.00	105.5	--	H	--	--	--	--
2464.00	52.2	28.1	V	54.0	93.9	-65.8	PASS
2464.00	43.1	18.8	H	54.0	93.9	-75.1	PASS
2816.00	45.6	27.5	V	54.0	93.9	-26.5	PASS**
2816.00	41.5	16.2	H	54.0	93.9	-37.8	PASS**
4120.00	47.9	29.2	V	54.0	93.9	-24.8	PASS**
4120.00	47.6	28.4	H	54.0	93.9	-25.6	PASS**
4824.00	65.7	49.8	V	54.0	93.9	-4.2	PASS**
4824.00	60.6	43.5	H	54.0	93.9	-10.5	PASS**
6180.00	48.6	25.3	V	54.0	93.9	-68.6	PASS
6180.00	47.9	24.9	H	54.0	93.9	-69.0	PASS
8240.00	51.3	28.3	V	54.0	93.9	-25.8	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

** ***Emission within the restricted band specified in @ 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #2: Teklogix TRX7430 Radio Transmitter
with Cushcraft/Signals S2403B Antenna, Gain: 3 dBd.

Channel ..., Tx Freq.: 2412 MHz, Modulation: QPSK with 2 Mb/s random data

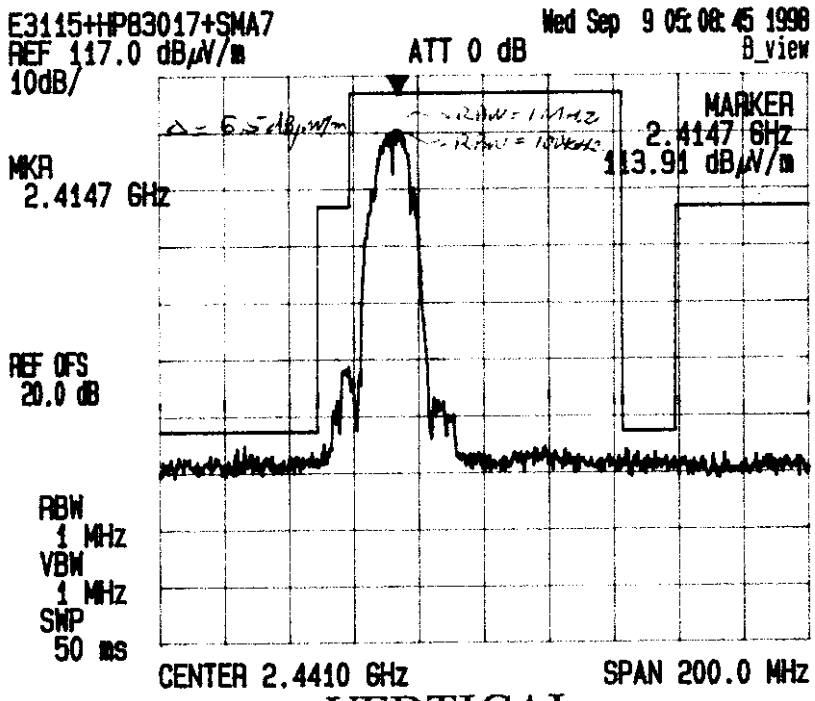


Date: September 4 1998
Tested by: Hung Trinh

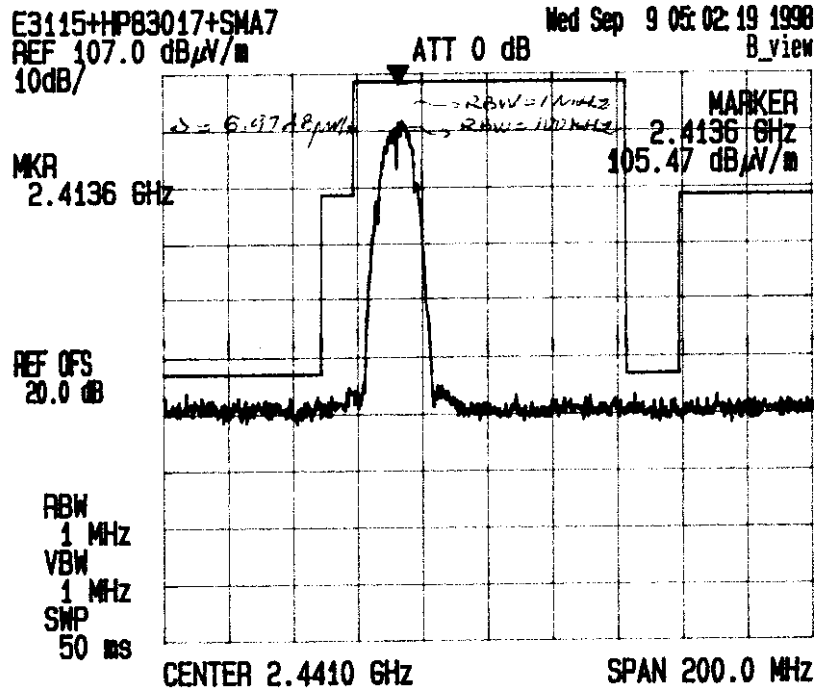
TEKLOGIX INC.

Channel: 1 , Centre Freq.: 2442 MHz , Outout PWR: 82.4 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: Omni 6340320

Radiated Emissions Measurements @ 3 Meters



VERTICAL



HORIZONTAL

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Engineering Labs Inc.

Test Condition #5: Channel Frequency: 2442 MHz (Middle)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: 85.4 mW Peak

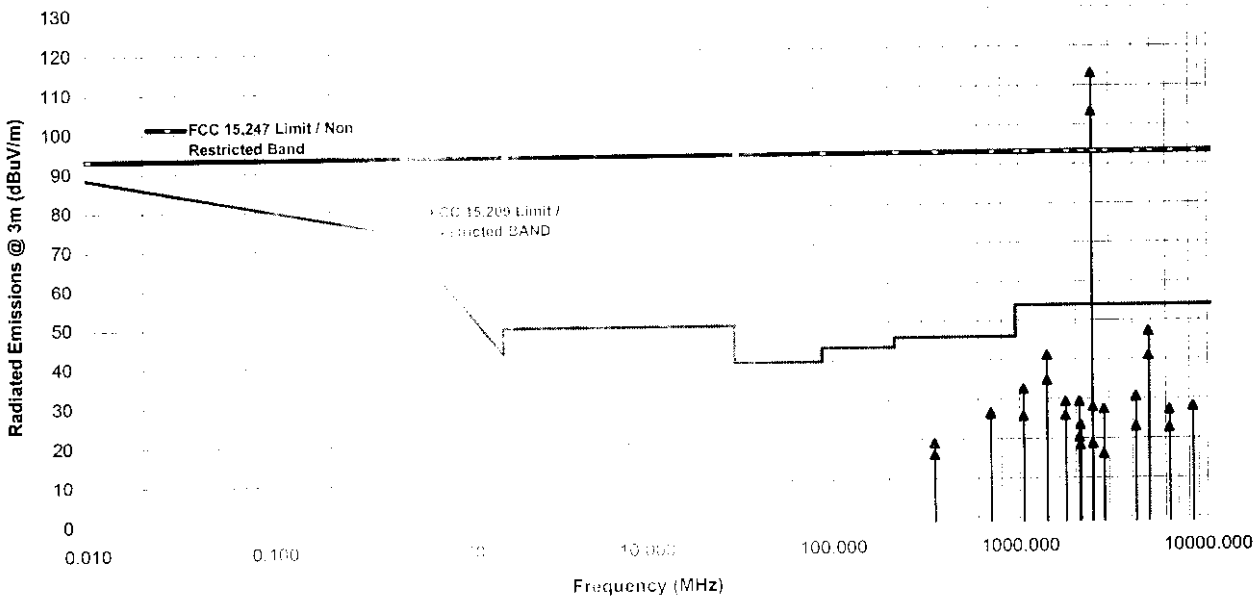
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	29.1	V	46.0	93.2	-74.1	PASS
352.00	37.4	30.2	H	46.0	93.2	-77.0	PASS
704.00	39.9	26.7	V	46.0	93.2	-66.5	PASS
704.00	39.6	26.3	H	46.0	93.2	-66.9	PASS
1056.00	48.3	32.6	V	54.0	93.2	-21.4	PASS**
1056.00	43.1	25.8	H	54.0	93.2	-28.2	PASS**
1408.00	54.2	41.3	V	54.0	93.2	-12.7	PASS**
1408.00	47.5	34.8	H	54.0	93.2	-19.2	PASS**
1760.00	47.3	30.4	V	54.0	93.2	-63.8	PASS
1760.00	44.2	25.9	H	54.0	93.2	-67.3	PASS
2090.00	45.5	30.4	V	54.0	93.2	-63.8	PASS
2090.00	41.3	20.4	H	54.0	93.2	-72.8	PASS
2112.00	43.1	23.6	V	54.0	93.2	-69.6	PASS
2112.00	40.5	18.4	H	54.0	93.2	-74.8	PASS
2442.00	113.2	--	V	--	--	--	--
2442.00	103.4	--	H	--	--	--	--
2464.00	52.2	45.1	V	54.0	93.2	-65.1	PASS
2464.00	43.1	28.8	H	54.0	93.2	-74.4	PASS
2816.00	45.6	27.5	V	54.0	93.2	-26.5	PASS**
2816.00	41.5	16.2	H	54.0	93.2	-37.8	PASS**
4180.00	48.3	30.6	V	54.0	93.2	-23.4	PASS**
4180.00	45.0	23.0	H	54.0	93.2	-31.0	PASS**
4884.00	63.7	47.2	V	54.0	93.2	-6.8	PASS**
4884.00	57.8	41.1	H	54.0	93.2	-12.9	PASS**
6270.00	49.2	27.3	V	54.0	93.2	-65.9	PASS
6270.00	46.4	22.7	H	54.0	93.2	-70.5	PASS
8360.00	51.5	28.1	V	54.0	93.2	-25.9	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

** ***Emission within the restricted band specified in 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #2: Teklogix TRX7430 Radio Transmitter
Test Antenna: Cushcraft/Signals S2403B Antenna, Gain: 3 dBd.

Channel #1, Tx Freq: 2442 MHz, Modulation: QPSK with 2Mb/s random data

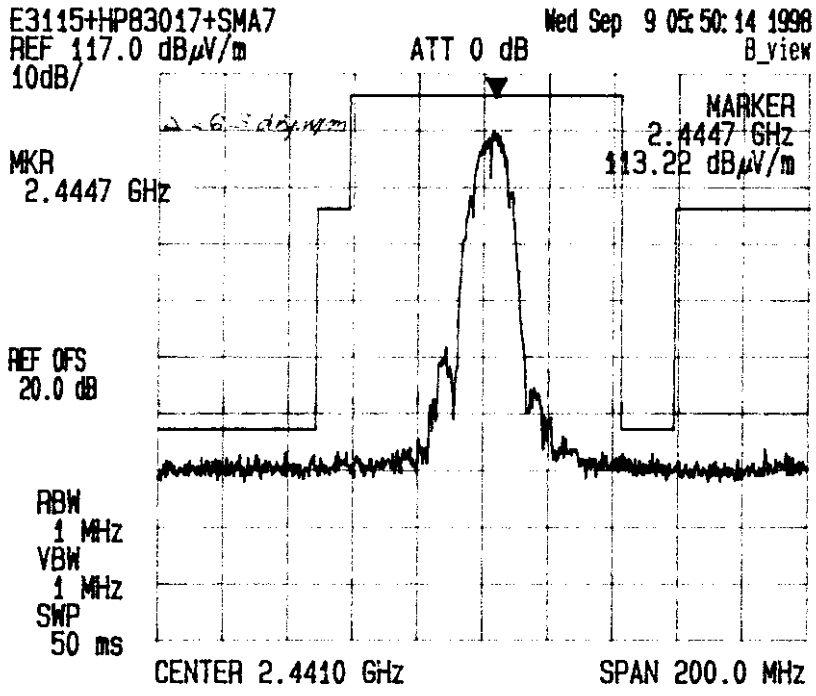


Date: September 2, 1998
Tested by: Hung Trinh

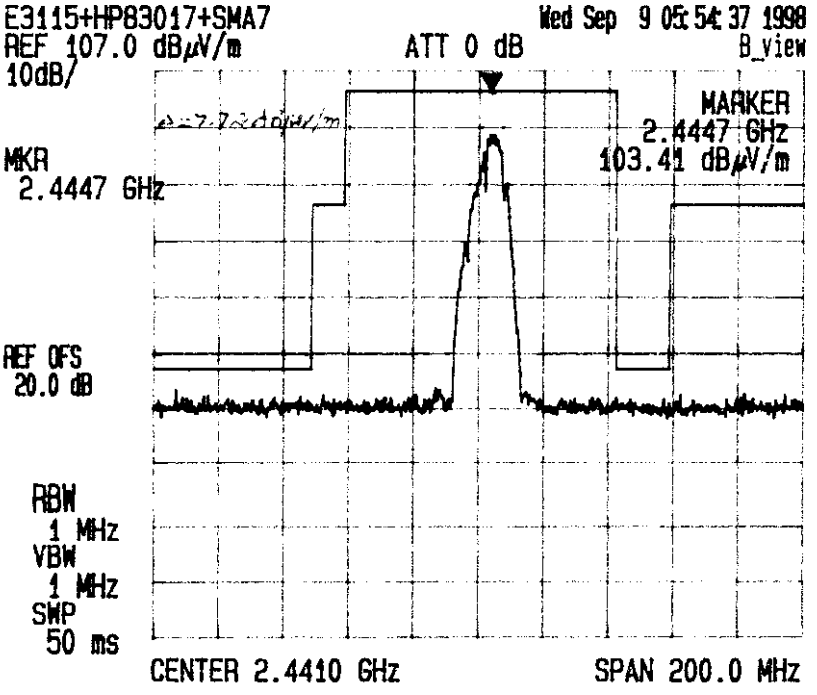
Channel: 7 , Centre Freq.: 2442 MHz , Outout PWR: 3374 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: Panel SA1403P

Radiated Emissions Measurements @ 3 Meters

Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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Test Condition #6: Channel Frequency 2462 MHz (Highest)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power [illegible] mW Peak

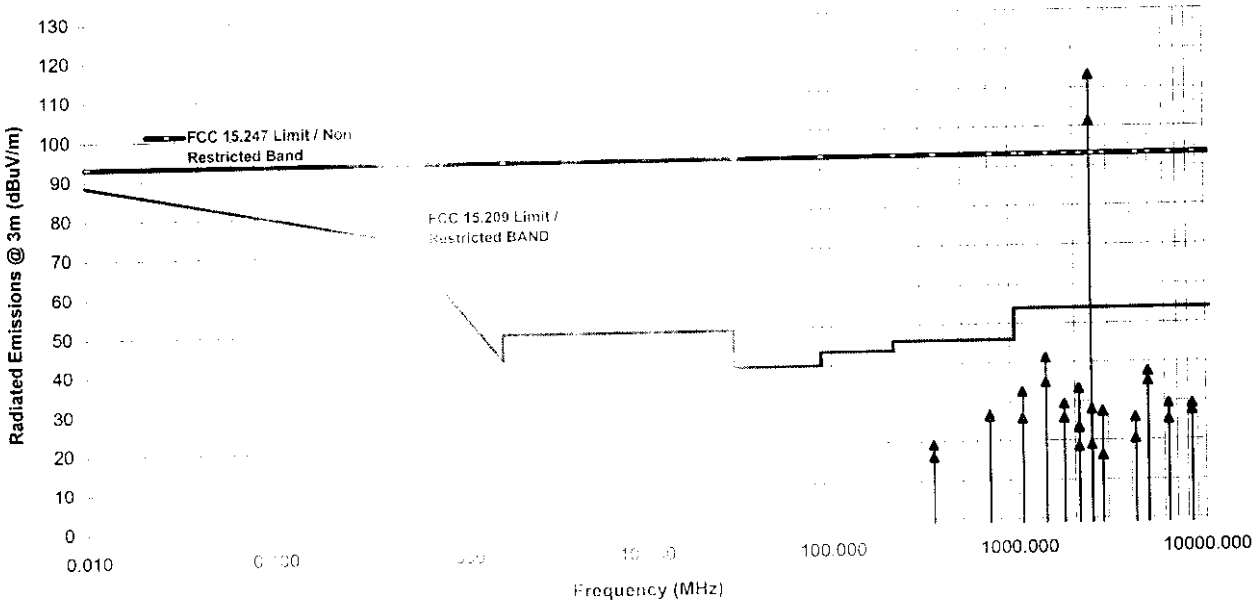
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	AVG LEVEL (dBuV/m)	ANTENNA PLANE (H&V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	[illegible]	V	46.0	93.2	-74.1	PASS
352.00	37.4	[illegible]	H	46.0	93.2	-77.0	PASS
704.00	39.9	[illegible]	V	46.0	93.2	-66.5	PASS
704.00	39.6	[illegible]	H	46.0	93.2	-66.9	PASS
1056.00	48.3	[illegible]	V	54.0	93.2	-21.4	PASS**
1056.00	43.1	[illegible]	H	54.0	93.2	-28.2	PASS**
1408.00	54.2	[illegible]	V	54.0	93.2	-12.7	PASS**
1408.00	47.5	[illegible]	H	54.0	93.2	-19.2	PASS**
1760.00	47.3	[illegible]	V	54.0	93.2	-63.8	PASS
1760.00	44.2	[illegible]	H	54.0	93.2	-67.3	PASS
2110.00	48.3	[illegible]	V	54.0	93.2	-60.0	PASS
2110.00	42.4	[illegible]	H	54.0	93.2	-70.1	PASS
2112.00	43.1	[illegible]	V	54.0	93.2	-69.6	PASS
2112.00	40.5	[illegible]	H	54.0	93.2	-74.8	PASS
2462.00	113.2	[illegible]	V	--	--	--	--
2462.00	101.3	[illegible]	H	--	--	--	--
2464.00	52.2	[illegible]	V	54.0	93.2	-65.1	PASS
2464.00	43.1	[illegible]	H	54.0	93.2	-74.4	PASS
2816.00	45.6	[illegible]	V	54.0	93.2	-26.5	PASS**
2816.00	41.5	[illegible]	H	54.0	93.2	-37.8	PASS**
4220.00	46.1	[illegible]	V	54.0	93.2	-28.1	PASS**
4220.00	44.3	[illegible]	H	54.0	93.2	-33.7	PASS**
4924.00	55.1	[illegible]	V	54.0	93.2	-18.9	PASS**
4924.00	55.7	[illegible]	H	54.0	93.2	-16.4	PASS**
6330.00	49.6	[illegible]	V	54.0	93.2	-63.8	PASS
6330.00	48.7	[illegible]	H	54.0	93.2	-67.8	PASS
8440.00	51.7	[illegible]	V	54.0	93.2	-24.8	PASS**
8440.00	51.3	[illegible]	H	54.0	93.2	-26.3	PASS**

No other significant emissions were [illegible] in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details

** ***Emission within the restricted band specified in @ 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS
Configuration #2: Teklogix TRX7430 Radio Transmitter
with Cushcraft/Signals S2403B Antenna, Gain: 3 dBd.

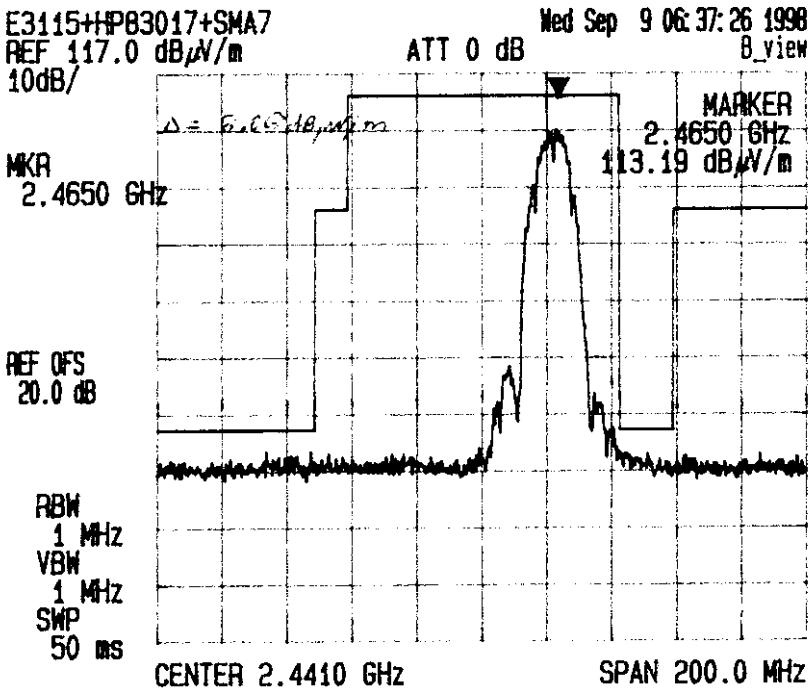
Ch. #11, Tx Freq.: 2462 MHz, Modulation: QPSK with 2Mb/s random data



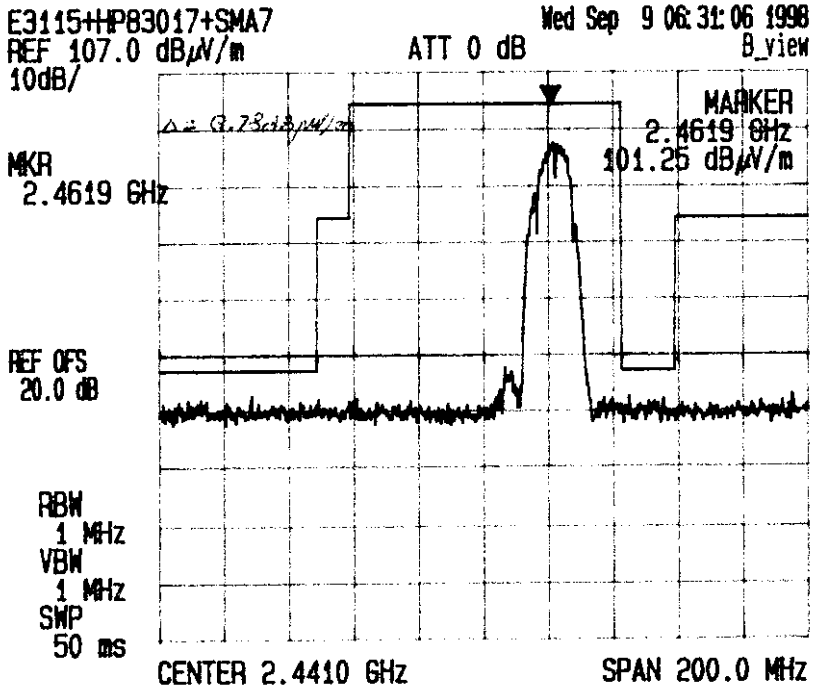
Date: September 9, 1998
Tested by: Hung Trinh

Channel: 11 , Centre Freq.: 2462 MHz , Outout PWR: 33.7 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: Omni 5.2dBi

Radiated Emissions Measurements @ 3 Meters
Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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4.4.3. Test Configuration #3: Larsen Collinear G/P Antenna, Model FB2400, Freq. Range: 2.4-2.485 GHz,, Antenna Gain: 5 dBi.

Test Condition #1: Channel Frequency: 2412 MHz (Lowest)
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 29.1 mW Peak

FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	[illegible]	V	46.0	92.9	-73.7	PASS
352.00	37.9	[illegible]	H	46.0	92.9	-76.7	PASS
704.00	39.6	[illegible]	V	46.0	92.9	-66.6	PASS
704.00	39.5	26.0	H	46.0	92.9	-66.9	PASS
1056.00	51.5	38.4	V	54.0	92.9	-18.6	PASS**
1056.00	42.9	25.1	H	54.0	92.9	-28.9	PASS**
1408.00	55.5	[illegible]	V	54.0	92.9	-11.3	PASS**
1408.00	48.6	[illegible]	H	54.0	92.9	-20.5	PASS**
1760.00	47.5	[illegible]	V	54.0	92.9	-63.2	PASS
1760.00	43.4	[illegible]	H	54.0	92.9	-68.7	PASS
2060.00	49.0	[illegible]	V	54.0	92.9	-67.8	PASS
2060.00	44.7	[illegible]	H	54.0	92.9	-67.4	PASS
2112.00	42.6	[illegible]	V	54.0	92.9	-68.2	PASS
2112.00	40.3	[illegible]	H	54.0	92.9	-77.6	PASS
2412.00	112.9	--	V	--	--	--	--
2412.00	103.4	--	H	--	--	--	--
2464.00	53.1	[illegible]	V	54.0	92.9	-64.2	PASS
2464.00	45.6	[illegible]	H	54.0	92.9	-72.5	PASS
2816.00	45.3	[illegible]	V	54.0	92.9	-26.6	PASS**
2816.00	43.2	[illegible]	H	54.0	92.9	-33.4	PASS**
4120.00	53.0	[illegible]	V	54.0	92.9	-16.6	PASS**
4120.00	47.4	[illegible]	H	54.0	92.9	-27.3	PASS**
4824.00	55.4	[illegible]	V	54.0	92.9	-14.0	PASS**
4824.00	51.7	[illegible]	H	54.0	92.9	-19.5	PASS**
6180.00	48.8	[illegible]	V	54.0	92.9	-66.7	PASS
6180.00	48.2	[illegible]	H	54.0	92.9	-68.6	PASS
8240.00	51.6	[illegible]	V	54.0	92.9	-25.8	PASS**

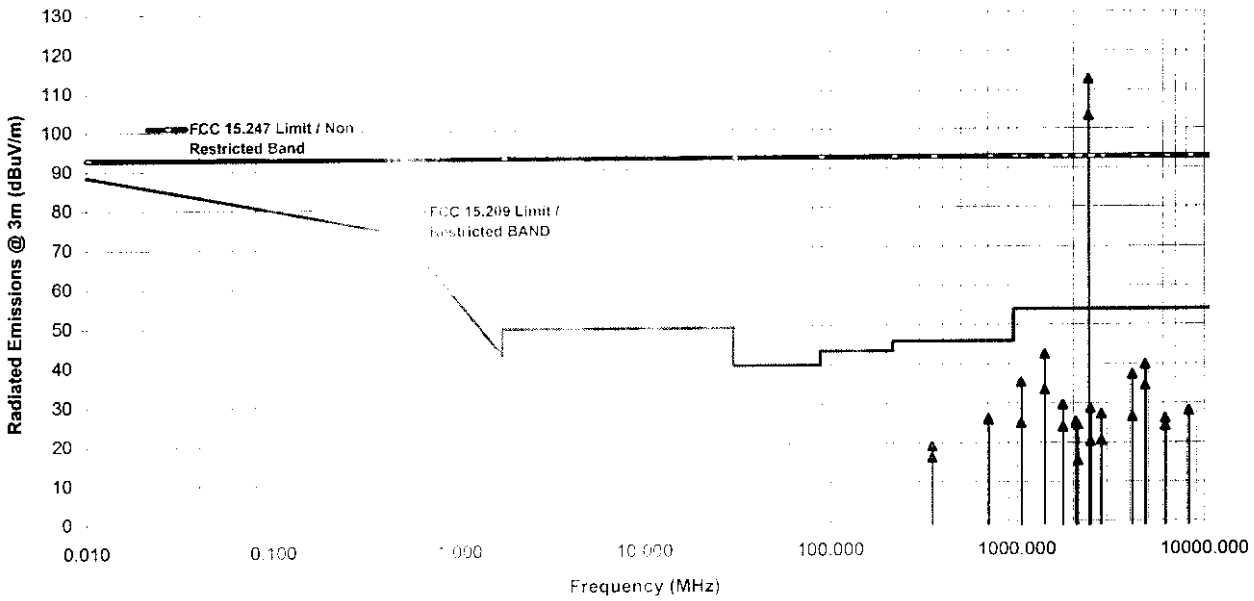
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details

*** Emission within the restricted band specified in 47 CFR 15.205(a)*

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #3: Teklogix TRX7430 Radio Transmitter
with Larsen Collinear FB2400 Antenna, Gain: 5 dBi

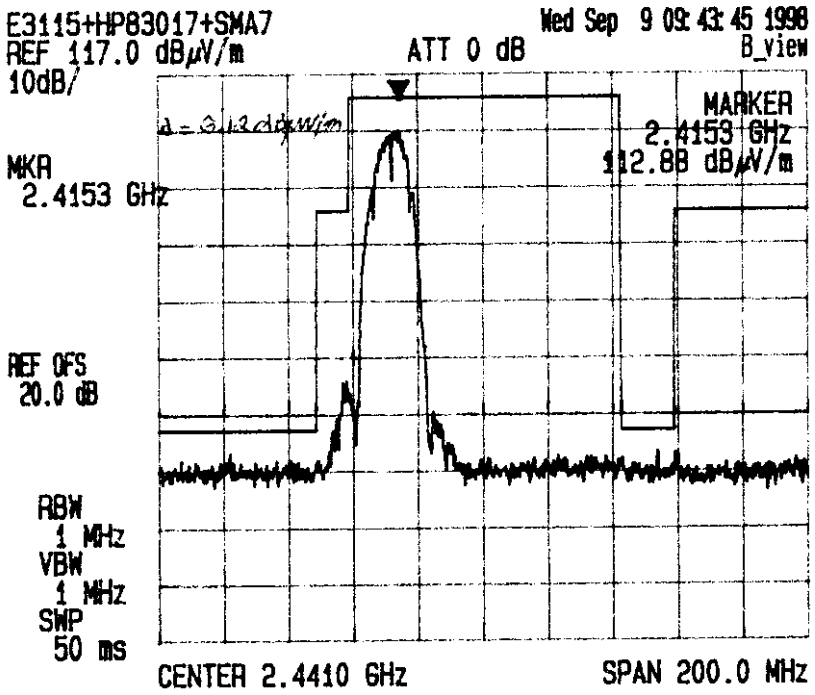
Channel #1, Tx Freq.: 2412 MHz, Modulation: QPSK with 1Mb/s random data



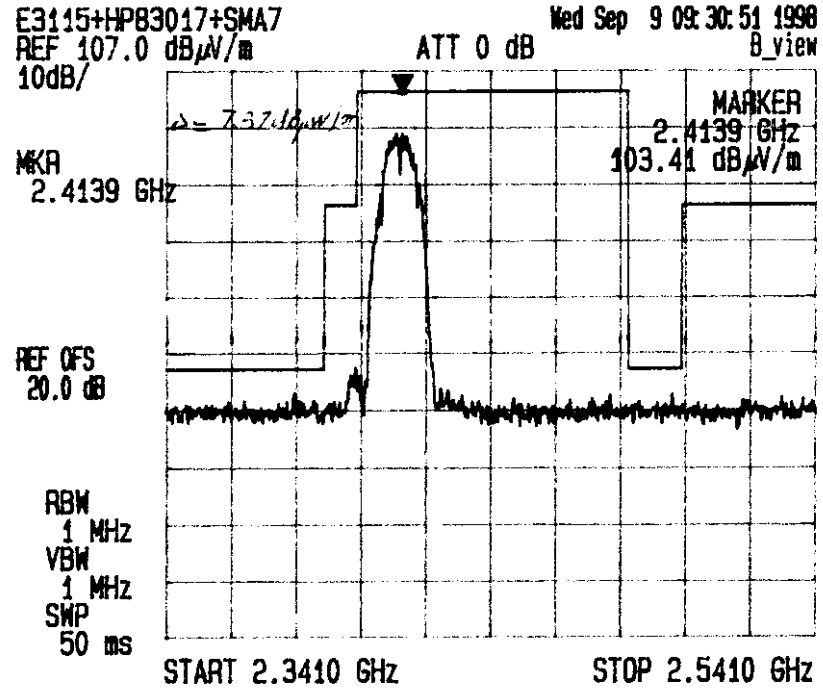
Date: September 2, 1998
Tested by: Hung Trinh

Channel: 1, Centre Freq.: 2412 MHz, Outout PWR: 22.1 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: MONOPOLE FOR 2400

Radiated Emissions Measurements @ 3 Meters
Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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Test Condition #2: Channel Frequency: 2442 MHz (Middle)
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 55.1 mW Peak

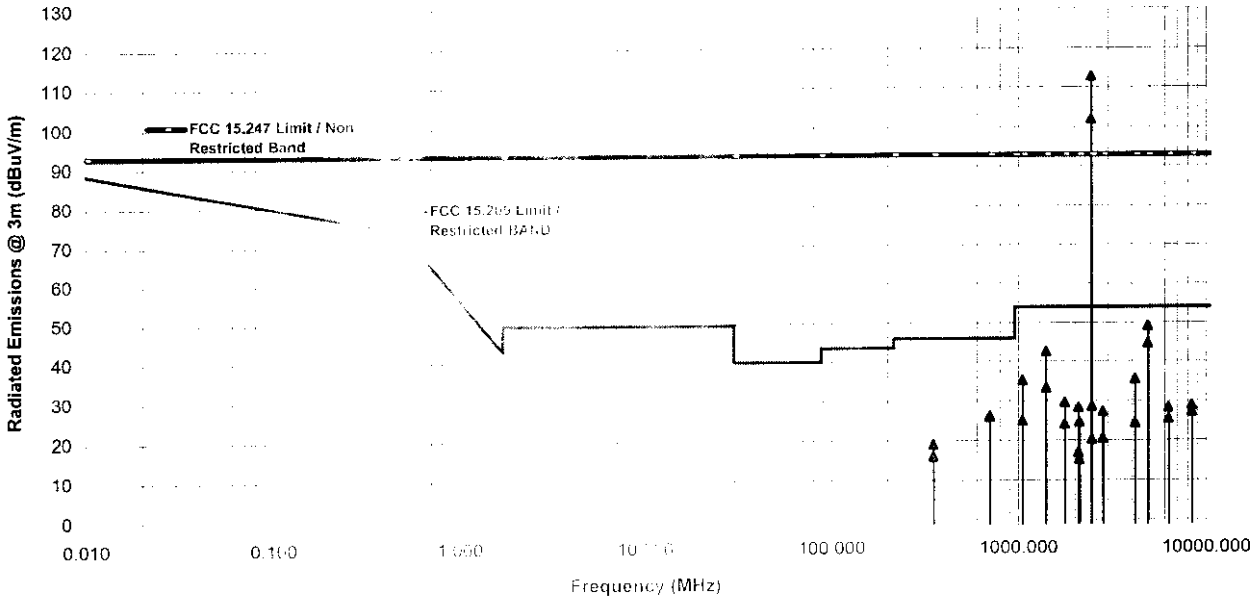
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	[illegible]	V	46.0	92.8	-73.6	PASS
352.00	37.9	[illegible]	H	46.0	92.8	-76.6	PASS
704.00	39.6	[illegible]	V	46.0	92.8	-66.5	PASS
704.00	39.5	[illegible]	H	46.0	92.8	-66.8	PASS
1056.00	51.5	[illegible]	V	54.0	92.8	-18.6	PASS**
1056.00	42.9	[illegible]	H	54.0	92.8	-28.9	PASS**
1408.00	55.5	[illegible]	V	54.0	92.8	-11.3	PASS**
1408.00	48.6	[illegible]	H	54.0	92.8	-20.5	PASS**
1760.00	47.5	[illegible]	V	54.0	92.8	-63.1	PASS
1760.00	43.4	[illegible]	H	54.0	92.8	-68.6	PASS
2090.00	45.3	[illegible]	V	54.0	92.8	-64.4	PASS
2090.00	40.2	[illegible]	H	54.0	92.8	-75.6	PASS
2112.00	42.6	[illegible]	V	54.0	92.8	-68.1	PASS
2112.00	40.3	[illegible]	H	54.0	92.8	-77.5	PASS
2442.00	112.8	[illegible]	V	--	--	--	--
2442.00	102.1	[illegible]	H	--	--	--	--
2464.00	53.1	[illegible]	V	54.0	92.8	-64.1	PASS
2464.00	45.6	[illegible]	H	54.0	92.8	-72.4	PASS
2816.00	45.3	[illegible]	V	54.0	92.8	-26.6	PASS**
2816.00	43.2	[illegible]	H	54.0	92.8	-33.4	PASS**
4180.00	51.9	[illegible]	V	54.0	92.8	-18.3	PASS**
4180.00	46.6	[illegible]	H	54.0	92.8	-29.6	PASS**
4884.00	63.1	[illegible]	V	54.0	92.8	-4.8	PASS**
4884.00	59.6	[illegible]	H	54.0	92.8	-9.2	PASS**
6270.00	49.3	[illegible]	V	54.0	92.8	-64.4	PASS
6270.00	47.9	[illegible]	H	54.0	92.8	-67.3	PASS
8360.00	52.7	[illegible]	V	54.0	92.8	-24.9	PASS**
8360.00	51.7	[illegible]	H	54.0	92.8	-26.7	PASS**

No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details

** ***Emission within the restricted band specified in 47 CFR 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS
Test Configuration #3: Teklogix TRX7430 Radio Transmitter
with Larsen Collinear FB2400 Antenna, Gain: 5 dBi

Channel - Tx Freq.: 2442 MHz, Modulation: QPSK with 1Mb/s random data

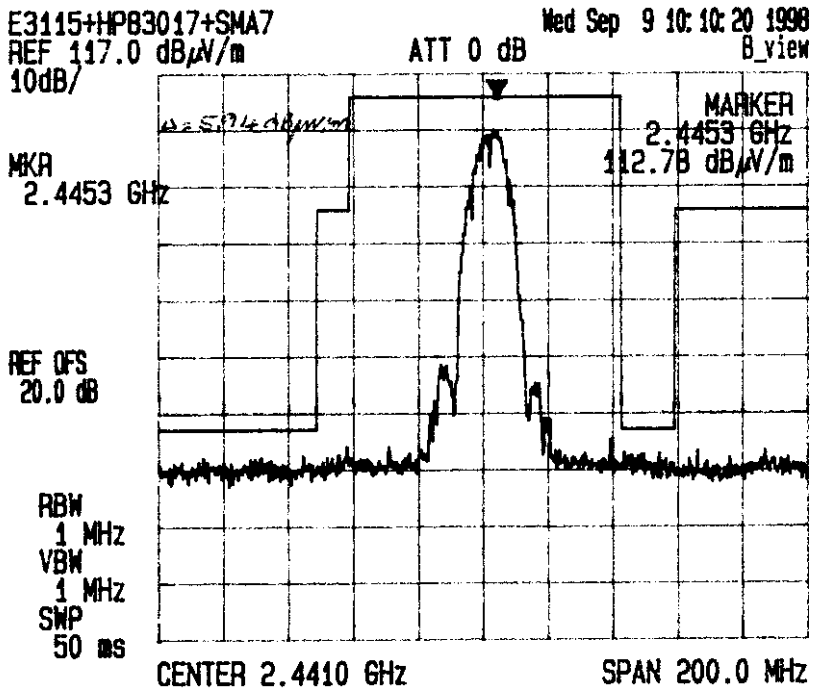


Date: September 2, 1998
Tested by: Hung Trinh

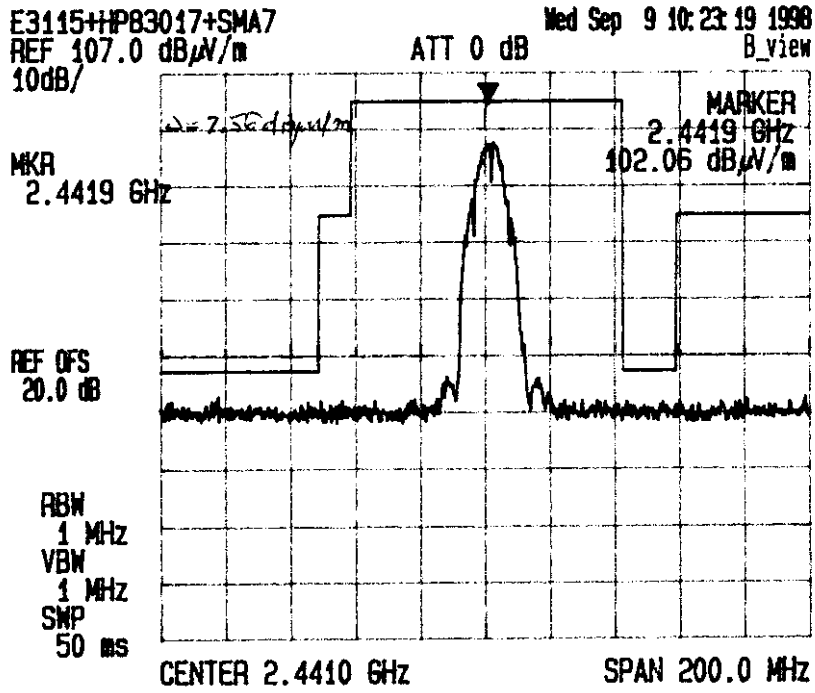
Channel: 7 , Centre Freq.: 2442 MHz , Outout PWR: 35.4 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: 4ARSEN FB 8dBi

Radiated Emissions Measurements @ 3 Meters

Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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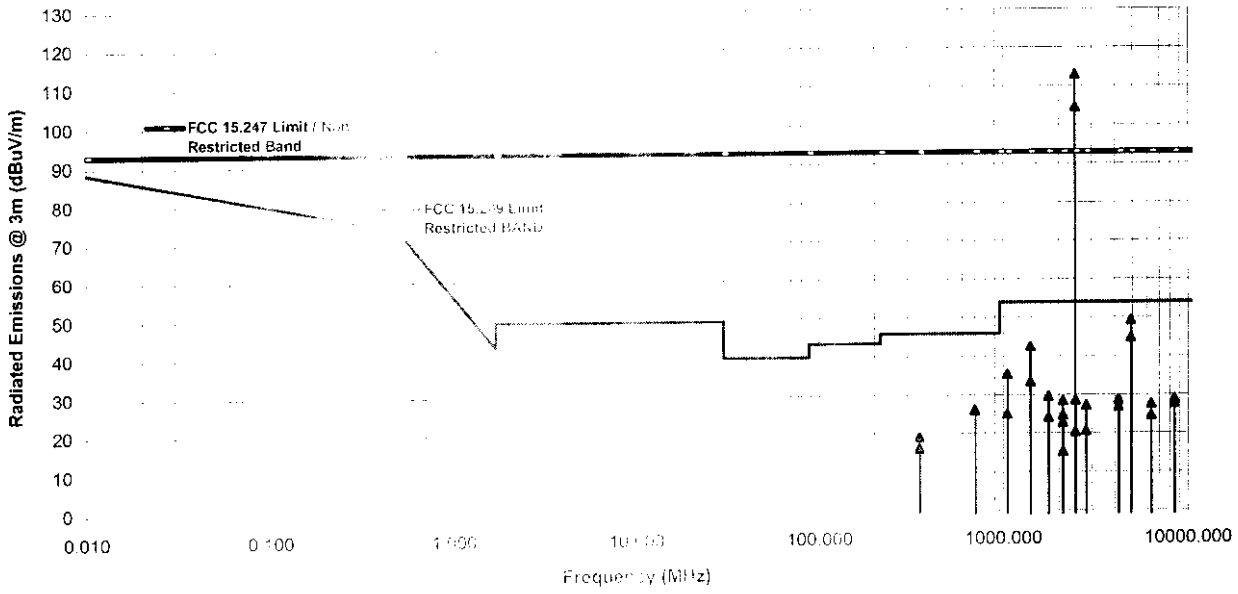
Test Condition #3: Channel Frequency: 2462 MHz (Highest)
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 3.7 mW Peak

FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	29.2	V	46.0	92.9	-73.7	PASS
352.00	37.9	26.2	H	46.0	92.9	-76.7	PASS
704.00	39.6	26.3	V	46.0	92.9	-66.6	PASS
704.00	39.5	26.0	H	46.0	92.9	-66.9	PASS
1056.00	51.5	45.4	V	54.0	92.9	-18.6	PASS**
1056.00	42.9	35.1	H	54.0	92.9	-28.9	PASS**
1408.00	55.5	42.7	V	54.0	92.9	-11.3	PASS**
1408.00	48.6	33.5	H	54.0	92.9	-20.5	PASS**
1760.00	47.5	30.7	V	54.0	92.9	-63.2	PASS
1760.00	43.4	26.2	H	54.0	92.9	-68.7	PASS
2110.00	45.7	36.6	V	54.0	92.9	-64.3	PASS
2110.00	42.6	32.8	H	54.0	92.9	-70.1	PASS
2112.00	42.6	34.7	V	54.0	92.9	-68.2	PASS
2112.00	40.3	35.3	H	54.0	92.9	-77.6	PASS
2462.00	112.9	--	V	--	--	--	--
2462.00	104.6	--	H	--	--	--	--
2464.00	53.1	46.7	V	54.0	92.9	-64.2	PASS
2464.00	45.6	38.4	H	54.0	92.9	-72.5	PASS
2816.00	45.3	37.4	V	54.0	92.9	-26.6	PASS**
2816.00	43.2	35.6	H	54.0	92.9	-33.4	PASS**
4220.00	48.3	37.9	V	54.0	92.9	-25.1	PASS**
4220.00	47.9	37.1	H	54.0	92.9	-26.9	PASS**
4924.00	63.6	49.3	V	54.0	92.9	-4.7	PASS**
4924.00	59.3	45.0	H	54.0	92.9	-9.0	PASS**
6330.00	49.2	37.7	V	54.0	92.9	-65.2	PASS
6330.00	48.2	34.7	H	54.0	92.9	-68.2	PASS
8440.00	53.0	29.0	V	54.0	92.9	-25.0	PASS**
8440.00	52.2	27.8	H	54.0	92.9	-26.2	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

** ***Emission within the restricted bands specified in 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS
Test Configuration #3: Teklogix TRX7430 Radio Transmitter
with Larsen Collinear FB2400 Antenna, Gain: 5 dBi

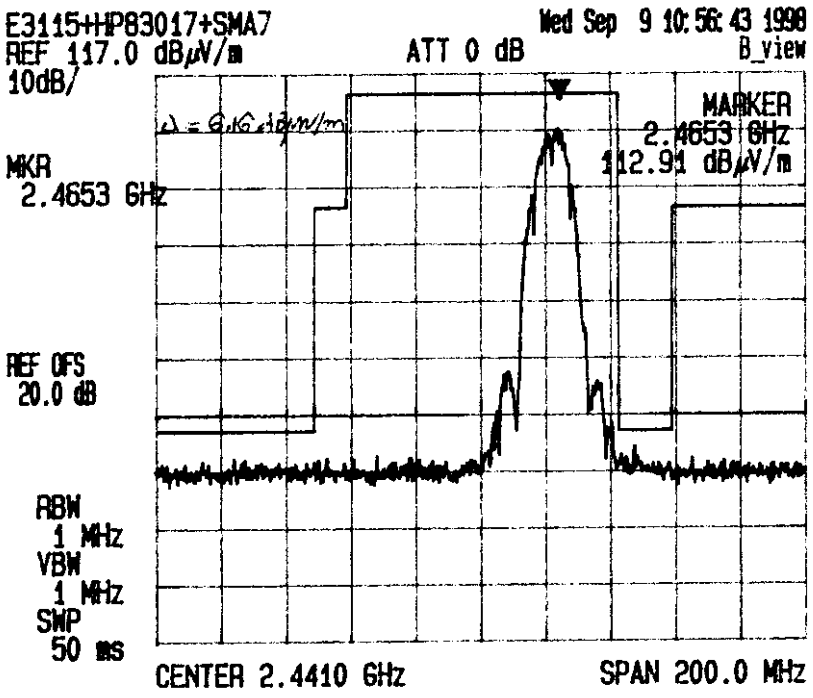
Channel #11, Tx Freq.: 2462 MHz, Modulation: QPSK with 1Mb/s random data



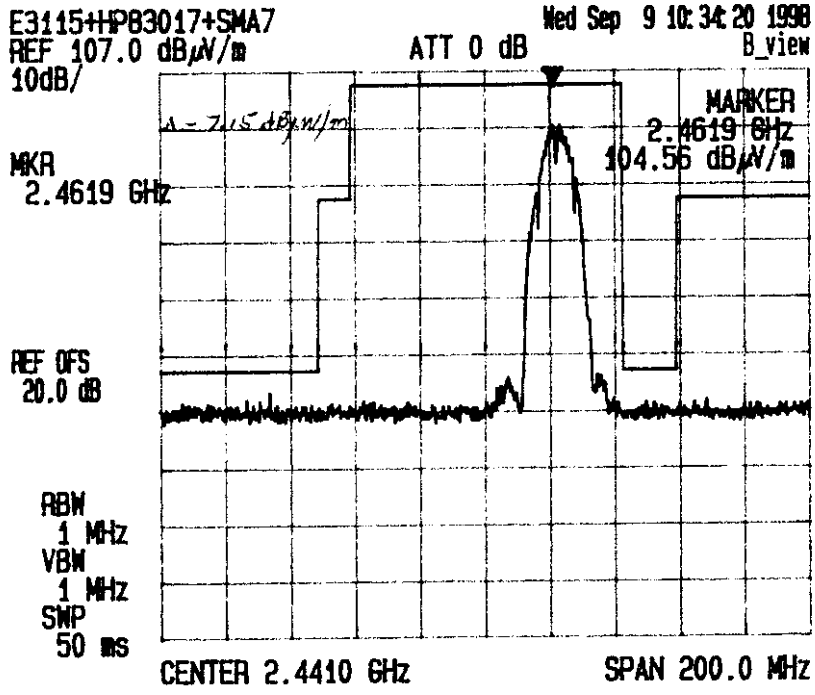
Date: September 9, 1998
Tested by: Hung Trinh

Channel: 11 , Centre Freq.: 2462 MHz , Outout PWR: 33.7 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: Log-periodic 28.3dBi

Radiated Emissions Measurements @ 3 Meters
Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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Test Condition #4: Channel Frequency: 2412 MHz (Lowest)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: 102.1 mW Peak

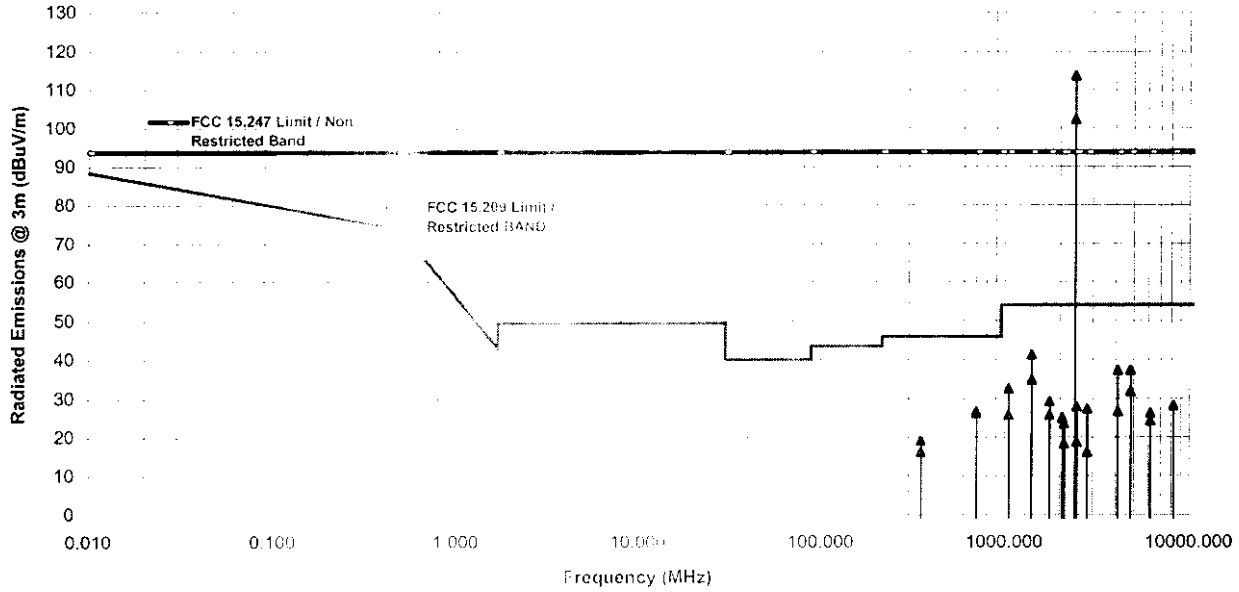
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	19.1	V	46.0	93.8	-74.7	PASS
352.00	37.4	20.2	H	46.0	93.8	-77.6	PASS
704.00	39.9	26.7	V	46.0	93.8	-67.1	PASS
704.00	39.6	26.3	H	46.0	93.8	-67.5	PASS
1056.00	48.3	32.6	V	54.0	93.8	-21.4	PASS**
1056.00	43.1	25.8	H	54.0	93.8	-28.2	PASS**
1408.00	54.2	41.3	V	54.0	93.8	-12.7	PASS**
1408.00	47.5	34.8	H	54.0	93.8	-19.2	PASS**
1760.00	47.3	29.4	V	54.0	93.8	-64.4	PASS
1760.00	44.2	25.9	H	54.0	93.8	-67.9	PASS
2060.00	50.1	25.0	V	54.0	93.8	-68.8	PASS
2060.00	44.8	25.2	H	54.0	93.8	-68.6	PASS
2112.00	43.1	23.6	V	54.0	93.8	-70.2	PASS
2112.00	40.5	18.4	H	54.0	93.8	-75.4	PASS
2412.00	113.8	--	V	--	--	--	--
2412.00	102.4	--	H	--	--	--	--
2464.00	52.2	28.1	V	54.0	93.8	-65.7	PASS
2464.00	43.1	18.8	H	54.0	93.8	-75.0	PASS
2816.00	45.6	27.5	V	54.0	93.8	-26.5	PASS**
2816.00	41.5	16.2	H	54.0	93.8	-37.8	PASS**
4120.00	52.8	37.3	V	54.0	93.8	-16.7	PASS**
4120.00	47.2	26.8	H	54.0	93.8	-27.2	PASS**
4824.00	54.8	37.4	V	54.0	93.8	-16.6	PASS**
4824.00	51.9	31.9	H	54.0	93.8	-22.1	PASS**
6180.00	48.3	36.4	V	54.0	93.8	-67.4	PASS
6180.00	47.4	4.3	H	54.0	93.8	-69.5	PASS
8240.00	51.7	38.3	V	54.0	93.8	-25.7	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

** ***Emission within the restricted band specified in a 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #3: Teklogix TRX7430 Radio Transmitter
with Larsen Collinear FB2400 Antenna, Gain: 5 dBi

Channel #1, Tx Freq.: 2412 MHz, Modulation: QPSK with 2Mb/s random data

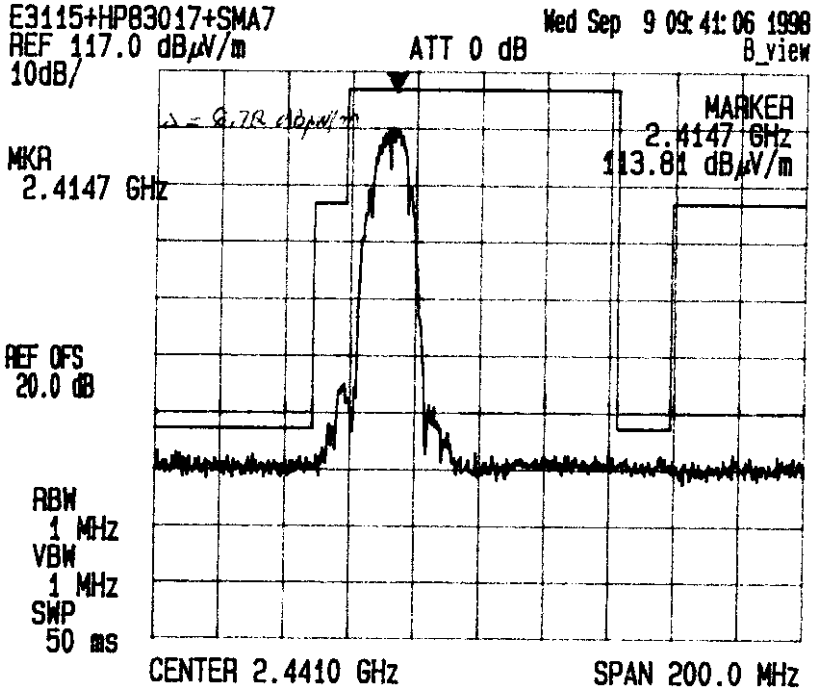


Date: September 2, 1998
Tested by: Hung Trinh

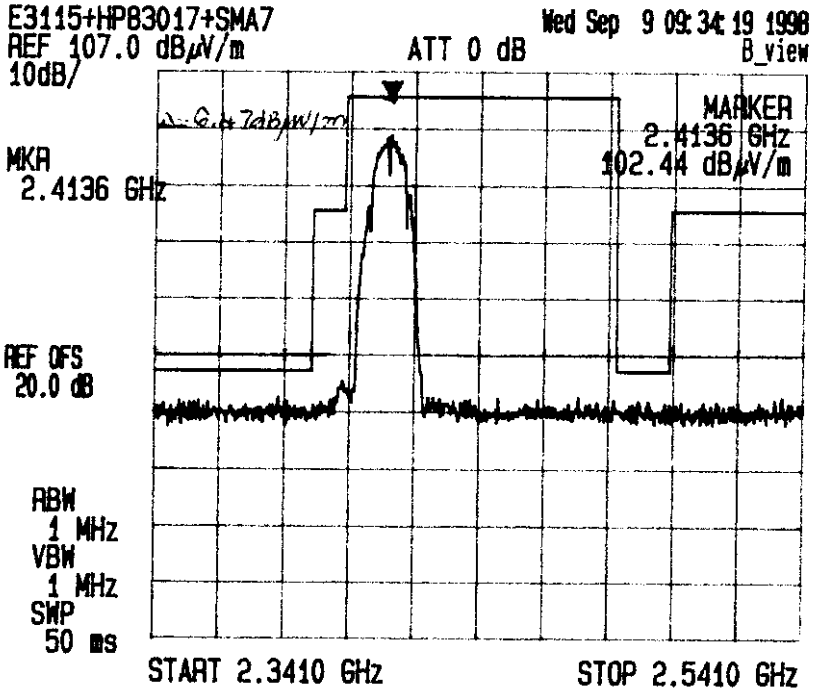
Channel: 1 Centre Freq.: 2412 MHz, Outout PWR: 22.1 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: Integral 2dBi PIFA

Radiated Emissions Measurements @ 3 Meters

Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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Test Condition #5: Channel Frequency: 2442 MHz (Middle)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: 25.4 mW Peak

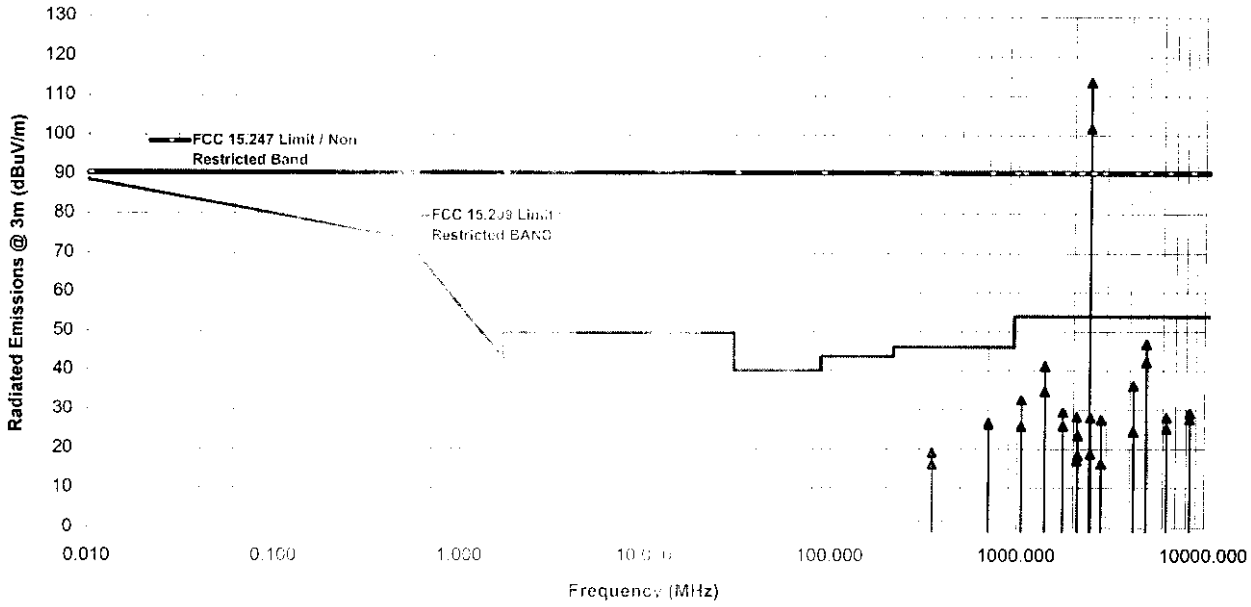
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	29.1	V	46.0	90.4	-71.3	PASS
352.00	37.4	30.2	H	46.0	90.4	-74.2	PASS
704.00	39.9	36.7	V	46.0	90.4	-63.7	PASS
704.00	39.6	36.3	H	46.0	90.4	-64.1	PASS
1056.00	48.3	42.6	V	54.0	90.4	-21.4	PASS**
1056.00	43.1	35.8	H	54.0	90.4	-28.2	PASS**
1408.00	54.2	41.3	V	54.0	90.4	-12.7	PASS**
1408.00	47.5	34.8	H	54.0	90.4	-19.2	PASS**
1760.00	47.3	29.4	V	54.0	90.4	-61.0	PASS
1760.00	44.2	25.9	H	54.0	90.4	-64.5	PASS
2090.00	45.3	28.3	V	54.0	90.4	-62.2	PASS
2090.00	40.8	27.0	H	54.0	90.4	-73.4	PASS
2112.00	43.1	33.6	V	54.0	90.4	-66.8	PASS
2112.00	40.5	33.4	H	54.0	90.4	-72.0	PASS
2442.00	113.4	--	V	--	--	--	--
2442.00	101.8	--	H	--	--	--	--
2464.00	52.2	28.1	V	54.0	90.4	-62.3	PASS
2464.00	43.1	38.8	H	54.0	90.4	-71.6	PASS
2816.00	45.6	27.5	V	54.0	90.4	-26.5	PASS**
2816.00	41.5	26.2	H	54.0	90.4	-37.8	PASS**
4180.00	52.0	36.3	V	54.0	90.4	-17.7	PASS**
4180.00	46.6	31.5	H	54.0	90.4	-29.5	PASS**
4884.00	63.2	46.8	V	54.0	90.4	-7.2	PASS**
4884.00	58.9	42.3	H	54.0	90.4	-11.8	PASS**
6270.00	48.8	33.0	V	54.0	90.4	-62.4	PASS
6270.00	48.2	35.3	H	54.0	90.4	-65.2	PASS
8360.00	51.8	39.2	V	54.0	90.4	-24.8	PASS**
8360.00	51.7	37.6	H	54.0	90.4	-26.4	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

***** Emission within the restricted band specified in 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #3: Teklogix TRX7430 Radio Transmitter
with Larsen Collinear FB2400 Antenna, Gain: 5 dBi

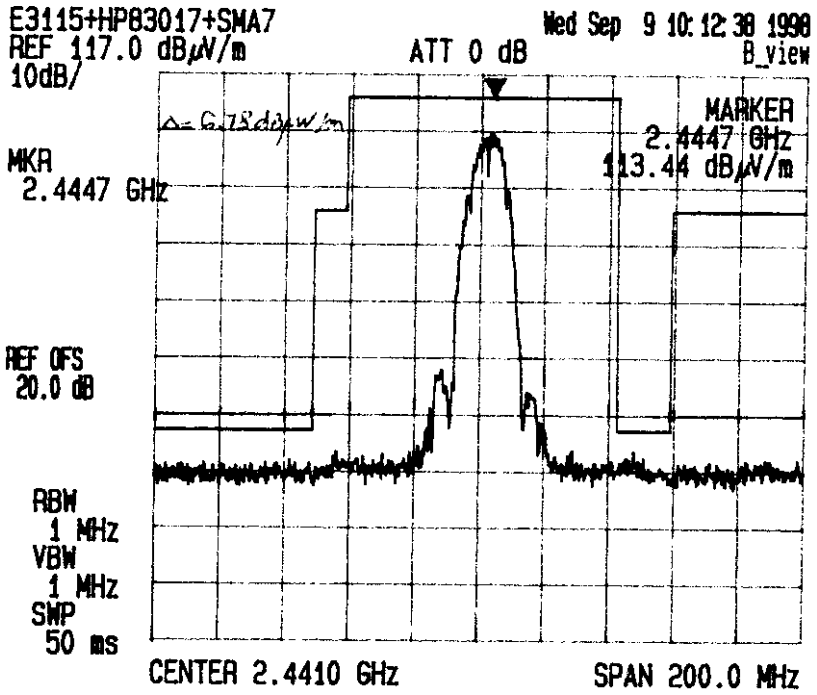
Channel #1, Tx Freq.: 2442 MHz, Modulation: QPSK with 2Mb/s random data



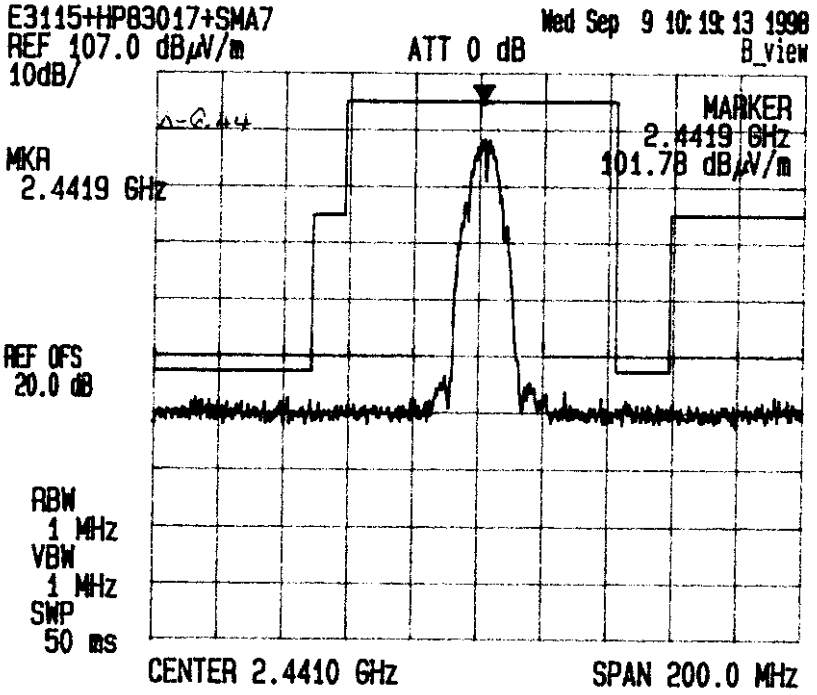
Date: September 4, 1998
Tested by: Hung Trinh

Channel: 7 , Centre Freq.: 2442 MHz , Outout PWR: 35.4 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: LARSEN 2.4GHz

Radiated Emissions Measurements @ 3 Meters
Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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Test Condition #6: Channel Frequency: 2462 MHz (Highest)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: 33.7 mW Peak

FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	29.1	V	46.0	113.6	-94.5	PASS
352.00	37.4	30.2	H	46.0	113.6	-97.4	PASS
704.00	39.9	33.7	V	46.0	113.6	-86.9	PASS
704.00	39.6	26.3	H	46.0	113.6	-87.3	PASS
1056.00	48.3	32.6	V	54.0	113.6	-21.4	PASS**
1056.00	43.1	25.8	H	54.0	113.6	-28.2	PASS**
1408.00	54.2	41.3	V	54.0	113.6	-12.7	PASS**
1408.00	47.5	34.8	H	54.0	113.6	-19.2	PASS**
1760.00	47.3	39.4	V	54.0	113.6	-84.2	PASS
1760.00	44.2	35.9	H	54.0	113.6	-87.7	PASS
2110.00	45.2	38.5	V	54.0	113.6	-85.1	PASS
2110.00	41.6	31.1	H	54.0	113.6	-92.5	PASS
2112.00	43.1	33.6	V	54.0	113.6	-90.0	PASS
2112.00	40.5	28.4	H	54.0	113.6	-95.2	PASS
2462.00	133.6	--	V	--	--	--	--
2462.00	104.1	--	H	--	--	--	--
2464.00	52.2	38.1	V	54.0	113.6	-85.5	PASS
2464.00	43.1	28.8	H	54.0	113.6	-94.8	PASS
2816.00	45.6	37.5	V	54.0	113.6	-26.5	PASS**
2816.00	41.5	29.2	H	54.0	113.6	-37.8	PASS**
4220.00	48.1	39.0	V	54.0	113.6	-25.0	PASS**
4220.00	48.2	37.7	H	54.0	113.6	-26.3	PASS**
4924.00	63.0	46.8	V	54.0	113.6	-7.2	PASS**
4924.00	59.3	42.1	H	54.0	113.6	-11.9	PASS**
6330.00	49.8	27.7	V	54.0	113.6	-85.9	PASS
6330.00	47.9	24.6	H	54.0	113.6	-89.0	PASS
8440.00	52.5	29.1	V	54.0	113.6	-24.9	PASS**
8440.00	52.0	27.8	H	54.0	113.6	-26.3	PASS**

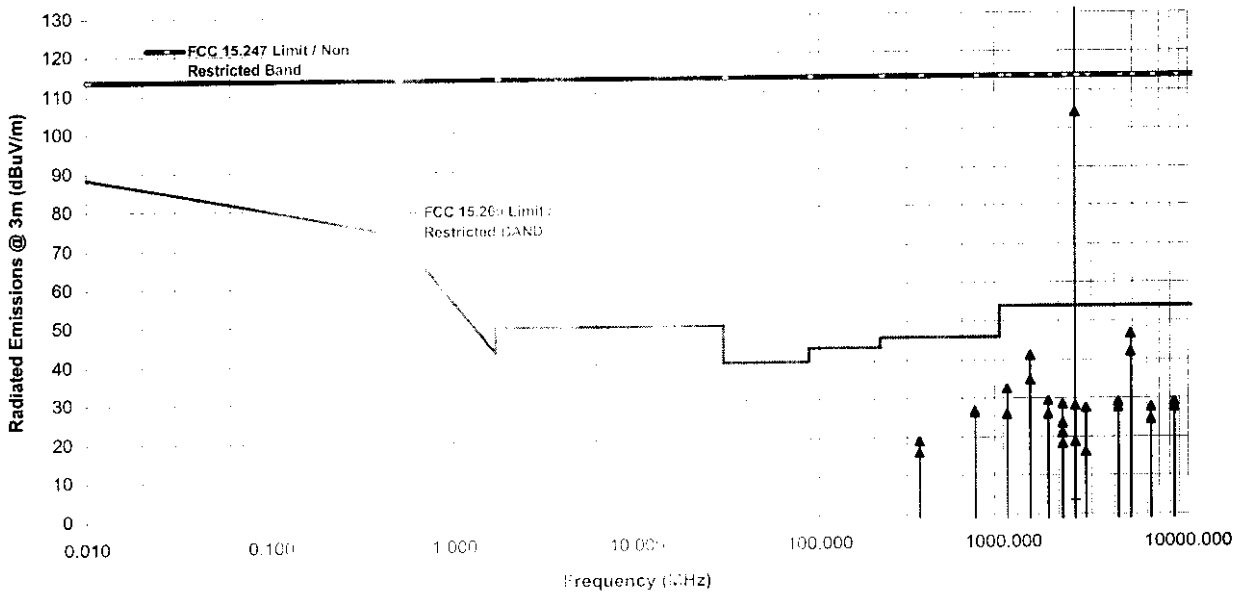
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details

** ***Emission within the restricted bands specified in 47 CFR 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #3: Teklogix TRX7430 Radio Transmitter
with Larsen Corp. near FB2400 Antenna, Gain: 5 dBi

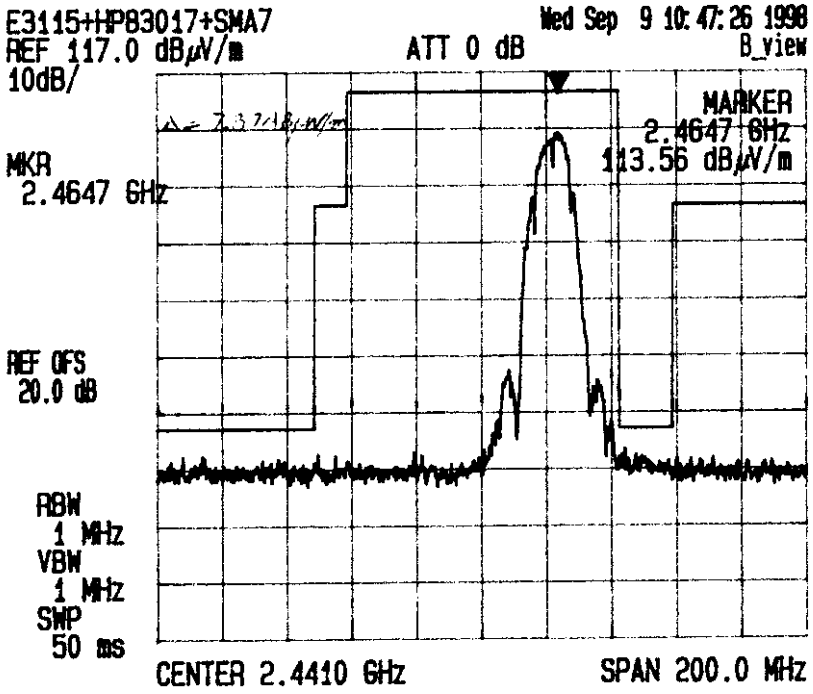
Ch #1 Low Freq: 2402 MHz, Modulation: QPSK with 2Mb/s random data



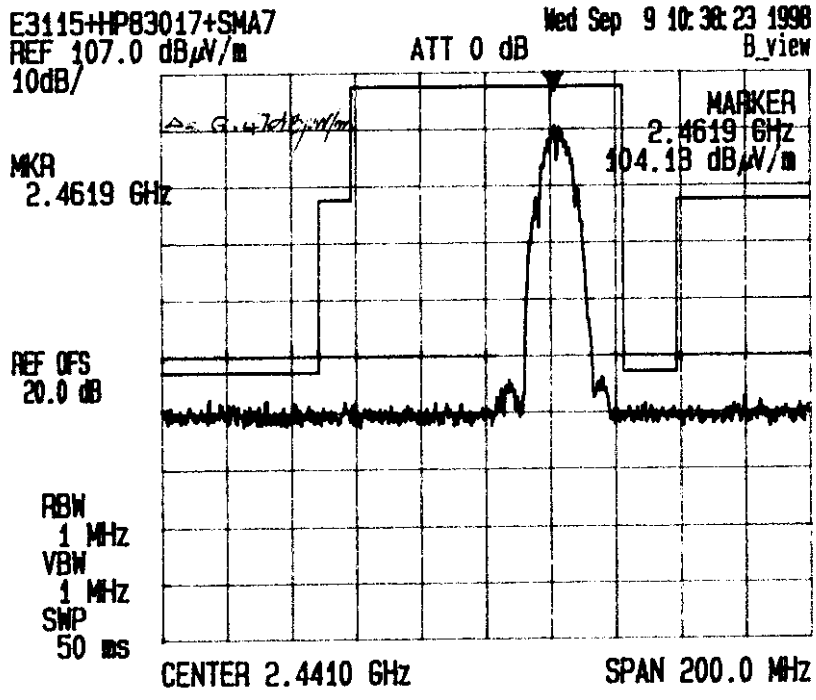
Date: September 2, 1998
Tested by: Hung Trinh

Channel: 11 , Centre Freq.: 2462 MHz , Outout PWR: 337 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: Log-EN FB2440

Radiated Emissions Measurements @ 3 Meters
Legend: □ Red: RBW=1MHz, ■ Blue: RBW=100KHz



VERTICAL



HORIZONTAL

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4.4.4. Test Configuration #4: Cushcraft/Signals DirectLink Wall Mount Antenna, Model No.: S2307MP10SMF, Freq. Range: 2.3-2.5 GHz, Antenna Gain: 7.5 dBi

Test Condition #1: Channel Frequency: 2412 MHz (Lowest)
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 89.1 mW Peak

FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	29.2	V	46.0	93.5	-74.3	PASS
352.00	37.9	36.2	H	46.0	93.5	-77.3	PASS
704.00	39.6	33.3	V	46.0	93.5	-67.2	PASS
704.00	39.5	33.0	H	46.0	93.5	-67.5	PASS
1056.00	51.5	45.4	V	54.0	93.5	-18.6	PASS**
1056.00	42.9	36.1	H	54.0	93.5	-28.9	PASS**
1408.00	55.5	42.7	V	54.0	93.5	-11.3	PASS**
1408.00	48.6	33.5	H	54.0	93.5	-20.5	PASS**
1760.00	47.5	29.7	V	54.0	93.5	-63.8	PASS
1760.00	43.4	24.2	H	54.0	93.5	-69.3	PASS
2060.00	45.4	26.7	V	54.0	93.5	-66.8	PASS
2060.00	42.5	22.6	H	54.0	93.5	-70.9	PASS
2112.00	42.6	24.7	V	54.0	93.5	-68.8	PASS
2112.00	40.3	26.3	H	54.0	93.5	-78.2	PASS
2412.00	113.5	--	V	--	--	--	--
2412.00	106.1	--	H	--	--	--	--
2464.00	53.1	28.7	V	54.0	93.5	-64.8	PASS
2464.00	45.6	20.4	H	54.0	93.5	-73.1	PASS
2816.00	45.3	27.4	V	54.0	93.5	-26.6	PASS**
2816.00	43.2	20.6	H	54.0	93.5	-33.4	PASS**
4120.00	50.0	33.1	V	54.0	93.5	-20.9	PASS**
4120.00	47.9	27.6	H	54.0	93.5	-26.4	PASS**
4824.00	56.7	41.6	V	54.0	93.5	-12.4	PASS**
4824.00	56.2	40.9	H	54.0	93.5	-13.1	PASS**
6180.00	48.9	36.8	V	54.0	93.5	-66.7	PASS
6180.00	47.6	41.9	H	54.0	93.5	-68.6	PASS
8240.00	50.3	37.2	V	54.0	93.5	-26.8	PASS**
8240.00	51.2	36.6	H	54.0	93.5	-27.4	PASS**

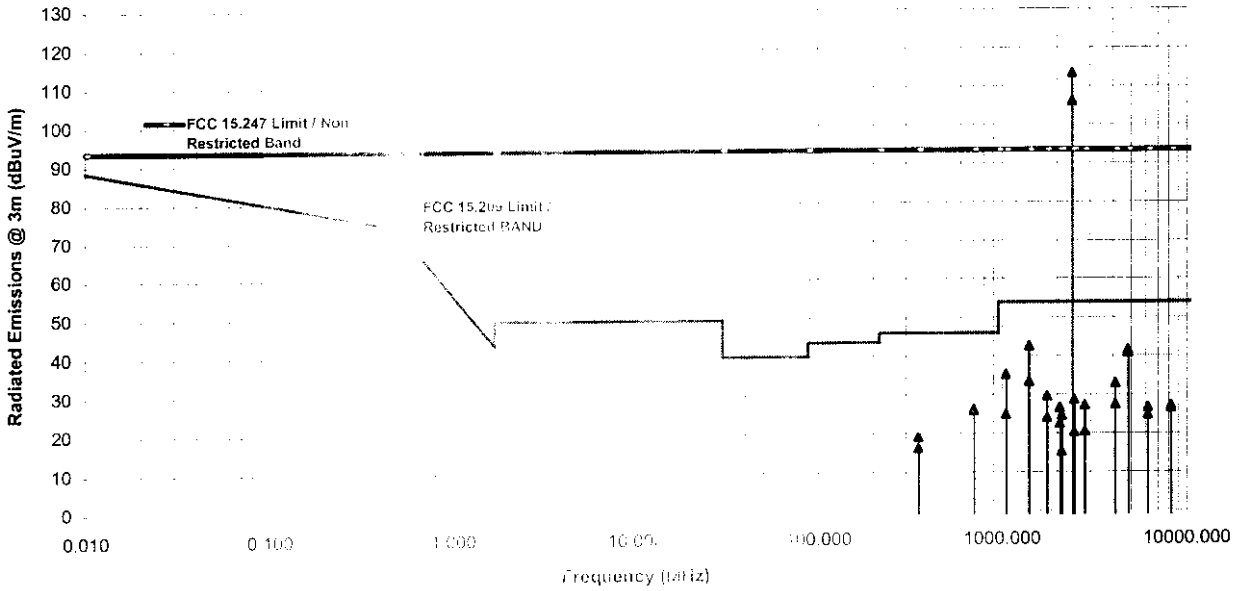
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details

*** Emission within the restricted band specified in 15.205(a)*

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #4: Teklogix TRX7430 Radio Transmitter
with Cushcraft Signals S2307MP10SMF Antenna, Gain: 7.5 dBi.

Channel #1, Tx Freq.: 2412 MHz, Modulation: QPSK with 1Mb/s random data

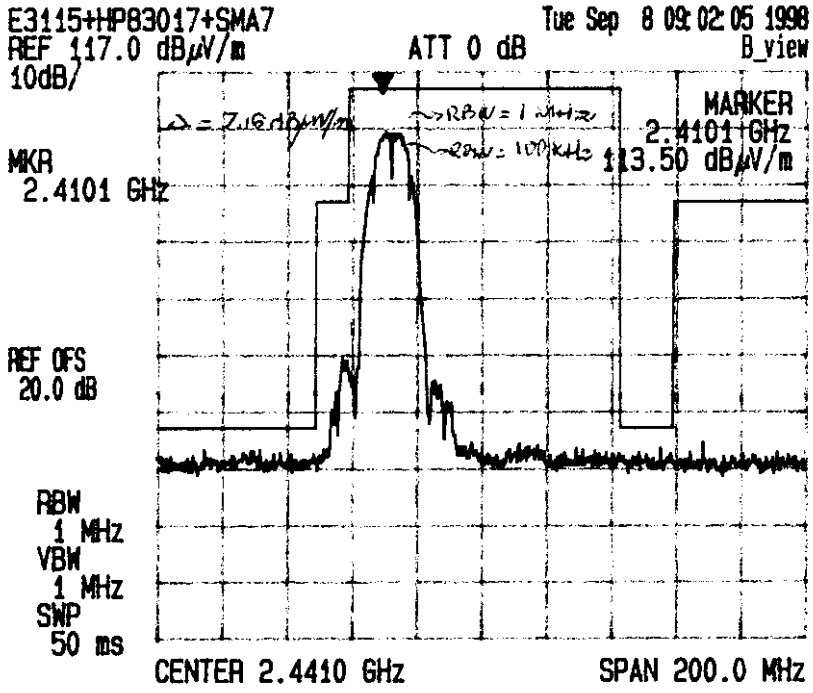


Date: September 9, 1998
Tested by: Hung Trinh

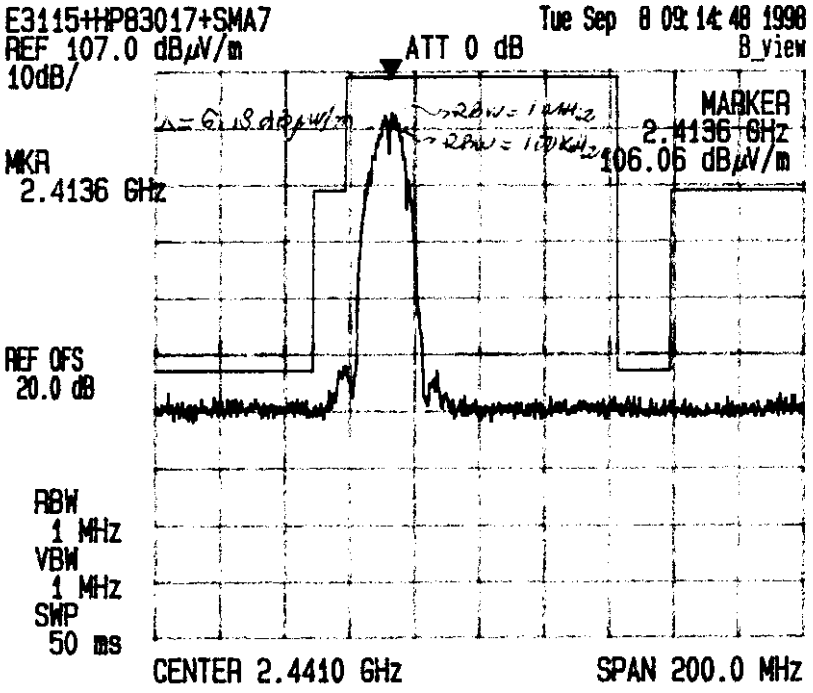
TEKLOGIX INC.

Channel: 1 , Centre Freq.: 2412 MHz , Outout PWR: 22.1 mW Quadrature
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: S2230ZNP 10 Smt

Radiated Emissions Measurements @ 3 Meters



VERTICAL



HORIZONTAL

UltraTech
Engineering Labs Inc.

Test Condition #2: Channel Frequency: 2442 MHz (Middle)
Modulation: QPSK, with 1 Mb/s Data Rate
RF Output Power: 57.4 mW Peak

FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	19.2	V	46.0	92.8	-73.6	PASS
352.00	37.9	16.2	H	46.0	92.8	-76.6	PASS
704.00	39.6	26.3	V	46.0	92.8	-66.5	PASS
704.00	39.5	26.0	H	46.0	92.8	-66.8	PASS
1056.00	51.5	35.4	V	54.0	92.8	-18.6	PASS**
1056.00	42.9	28.1	H	54.0	92.8	-28.9	PASS**
1408.00	55.5	42.7	V	54.0	92.8	-11.3	PASS**
1408.00	48.6	33.5	H	54.0	92.8	-20.5	PASS**
1760.00	47.5	29.7	V	54.0	92.8	-63.1	PASS
1760.00	43.4	24.2	H	54.0	92.8	-68.6	PASS
2090.00	46.2	37.0	V	54.0	92.8	-45.8	PASS
2090.00	41.5	31.9	H	54.0	92.8	-50.9	PASS
2112.00	42.6	23.7	V	54.0	92.8	-68.1	PASS
2112.00	40.3	25.3	H	54.0	92.8	-77.5	PASS
2442.00	112.8	--	V	--	--	--	--
2442.00	105.1	--	H	--	--	--	--
2464.00	53.1	28.7	V	54.0	92.8	-64.1	PASS
2464.00	45.6	20.4	H	54.0	92.8	-72.4	PASS
2816.00	45.3	27.4	V	54.0	92.8	-26.6	PASS**
2816.00	43.2	20.6	H	54.0	92.8	-33.4	PASS**
4180.00	51.2	30.4	V	54.0	92.8	-23.6	PASS**
4180.00	47.9	21.3	H	54.0	92.8	-32.8	PASS**
4884.00	61.3	34.5	V	54.0	92.8	-19.5	PASS**
4884.00	56.9	28.1	H	54.0	92.8	-25.9	PASS**
6270.00	50.0	29.2	V	54.0	92.8	-62.6	PASS
6270.00	48.3	25.5	H	54.0	92.8	-67.3	PASS
8360.00	52.9	29.9	V	54.0	92.8	-24.1	PASS**
8360.00	52.0	27.4	H	54.0	92.8	-26.6	PASS**

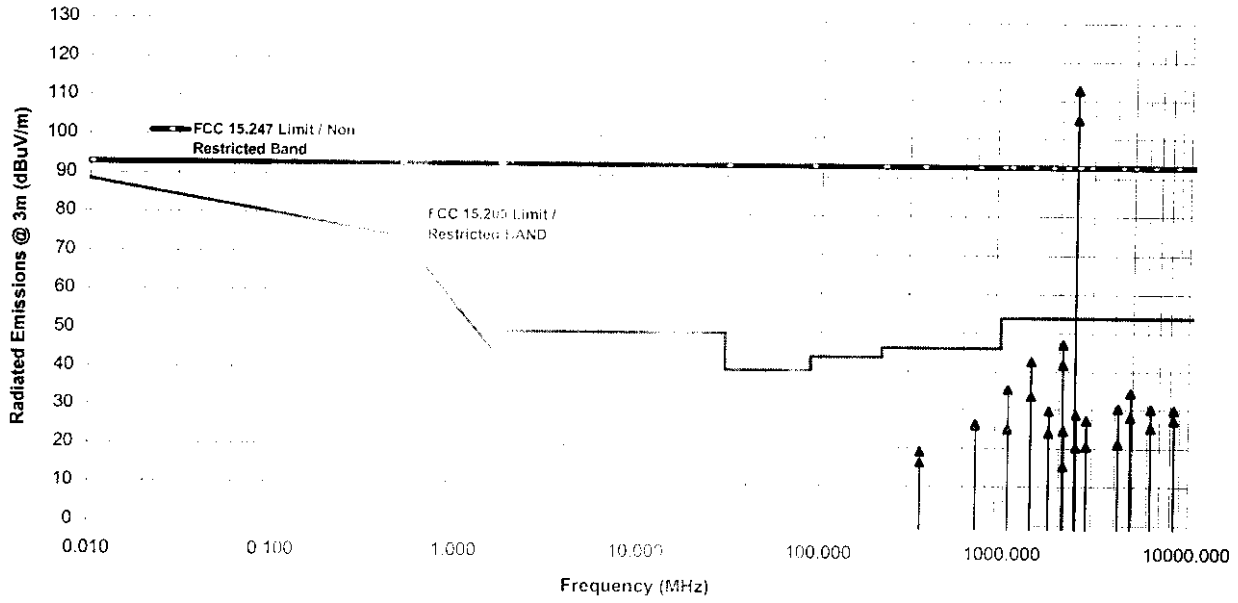
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details

** ***Emission within the restricted band specified in 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #4: Teklogix TRX7430 Radio Transmitter
with Cushcraft Signals S2307MP10SMF Antenna, Gain: 7.5 dBi.

Channel 37, Tx Freq.: 2442 MHz, Modulation: QPSK with 1Mb/s random data

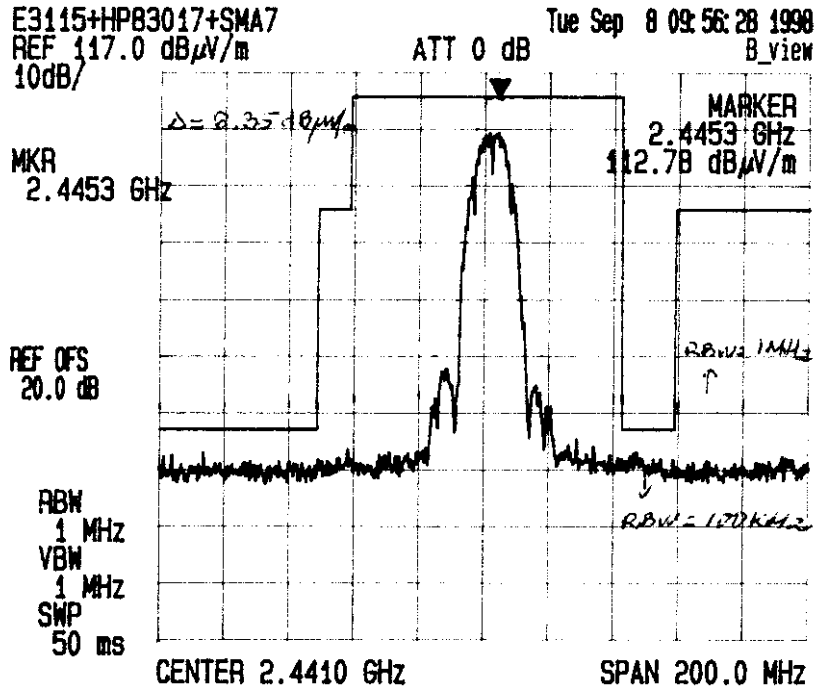


Date: September 8, 1998
Tested by: Hung Trinh

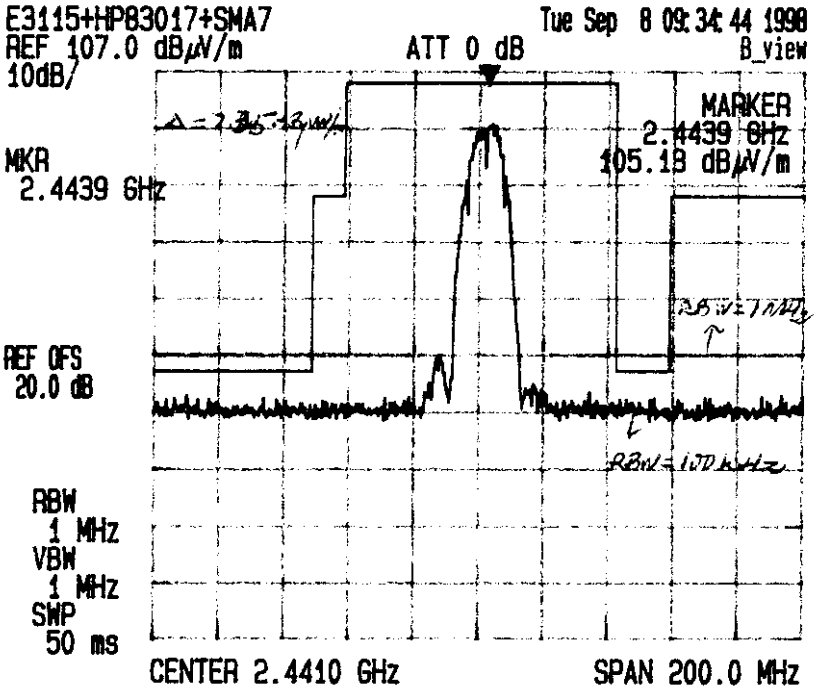
TEKLOGIX INC.

Channel: 77, Centre Freq.: 2441.8 MHz, Outout PWR: 35.4 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: 2330 Zwp 10 Swp

Radiated Emissions Measurements @ 3 Meters



VERTICAL



HORIZONTAL

UltraTech
Engineering Labs Inc.

Test Condition #3: Channel Frequency: 2462 MHz (Highest)
Modulation: QPSK with 1 Mb/s Data Rate
RF Output Power: 53.7 mW Peak

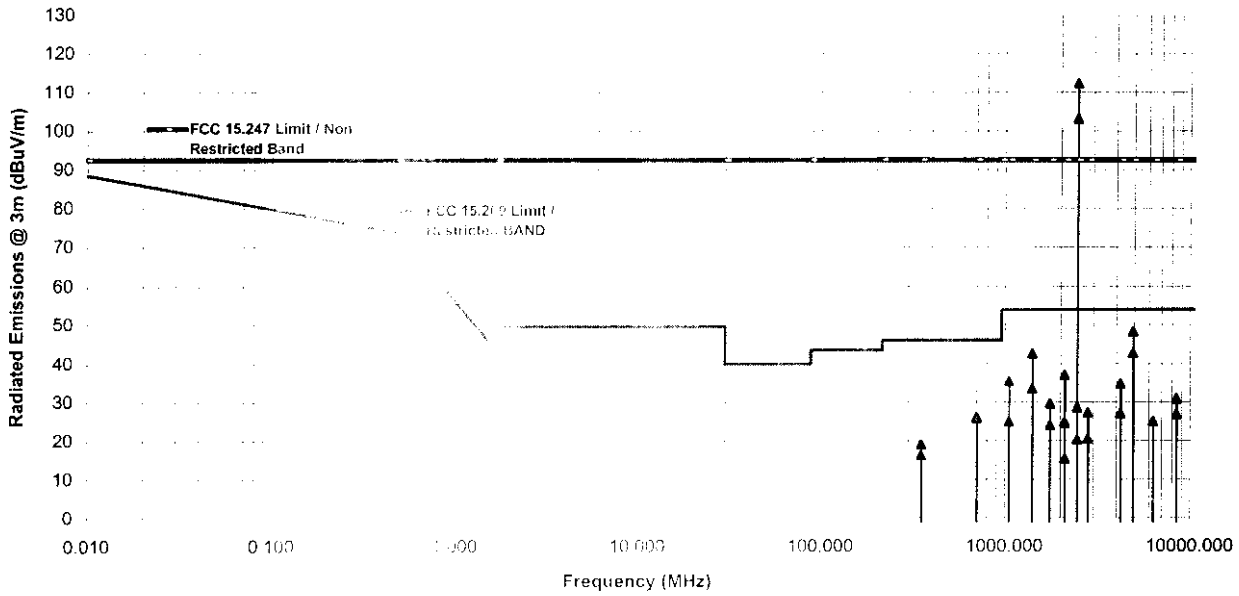
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	35.7	19.2	V	46.0	92.5	-73.3	PASS
352.00	37.9	19.2	H	46.0	92.5	-76.3	PASS
704.00	39.6	26.3	V	46.0	92.5	-66.2	PASS
704.00	39.5	26.0	H	46.0	92.5	-66.5	PASS
1056.00	51.5	33.4	V	54.0	92.5	-18.6	PASS**
1056.00	42.9	25.1	H	54.0	92.5	-28.9	PASS**
1408.00	55.5	42.7	V	54.0	92.5	-11.3	PASS**
1408.00	48.6	33.5	H	54.0	92.5	-20.5	PASS**
1760.00	47.5	29.7	V	54.0	92.5	-62.8	PASS
1760.00	43.4	24.2	H	54.0	92.5	-68.3	PASS
2110.00	51.3	37.1	V	54.0	92.5	-55.4	PASS
2110.00	44.1	25.0	H	54.0	92.5	-67.5	PASS
2112.00	42.6	34.7	V	54.0	92.5	-67.8	PASS
2112.00	40.3	13.3	H	54.0	92.5	-77.2	PASS
2462.00	112.5		V	--	--	--	PASS
2462.00	103.2	--	H	--	--	--	PASS
2464.00	53.1	28.7	V	54.0	92.5	-63.8	PASS
2464.00	45.6	20.4	H	54.0	92.5	-72.1	PASS
2816.00	45.3	27.4	V	54.0	92.5	-26.6	PASS**
2816.00	43.2	20.6	H	54.0	92.5	-33.4	PASS**
4220.00	51.0	34.8	V	54.0	92.5	-19.2	PASS**
4220.00	47.6	27.2	H	54.0	92.5	-26.8	PASS**
4924.00	62.1	48.2	V	54.0	92.5	-5.8	PASS**
4924.00	58.3	43.8	H	54.0	92.5	-11.3	PASS**
6330.00	47.9	25.1	V	54.0	92.5	-67.4	PASS
6330.00	48.1	25.2	H	54.0	92.5	-67.3	PASS
8440.00	52.6	31.0	V	54.0	92.5	-23.0	PASS**
8440.00	50.8	27.0	H	54.0	92.5	-27.0	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

*** Emission within the restricted band specified in @ 15.205(a)*

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #4: Teklogix TRX7430 Radio Transmitter
with Cushcraft Signals S2307MP10SMF Antenna, Gain: 7.5 dBi.

Ch #11, Tx Freq: 2462 MHz, Modulation: QPSK with 1Mb/s random data

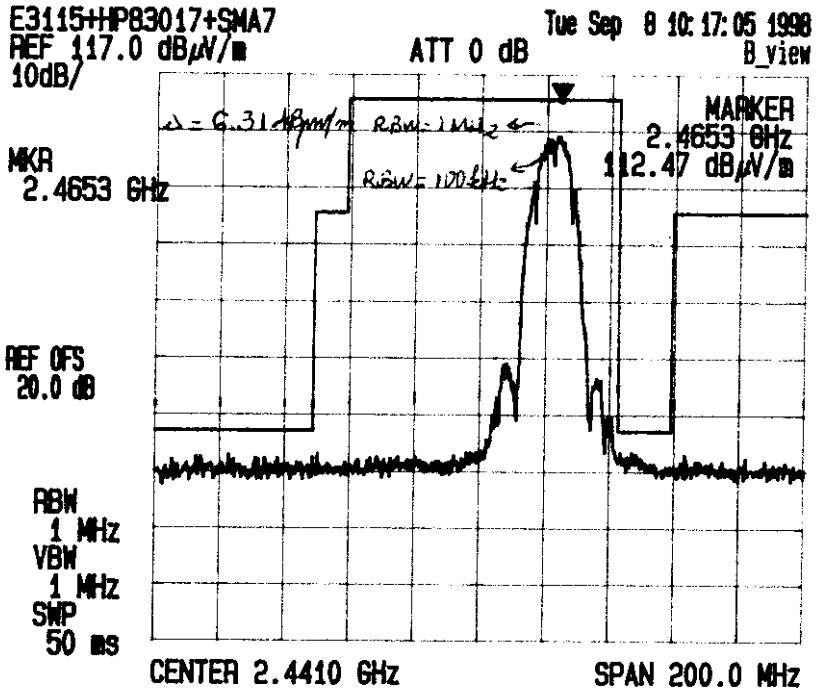


Date: September 8, 1998
Tested by: Hung Trinh

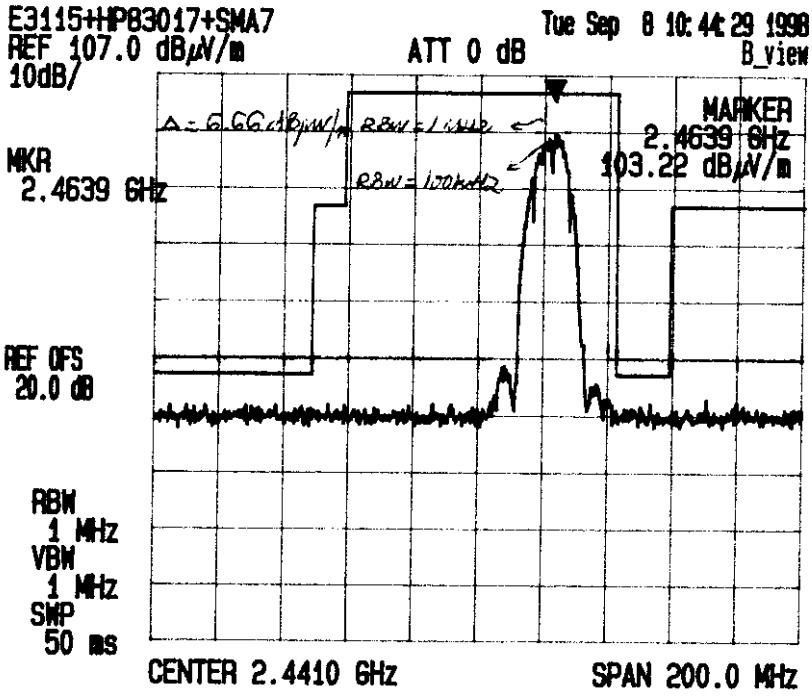
TEKLOGIX INC.

Channel: 11 , Centre Freq.: 2462 MHz , Outout PWR: 337 mW
Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: S2230ZMP 10 SMA

Radiated Emissions Measurements @ 3 Meters



VERTICAL



HORIZONTAL

UltraTech
Engineering Labs Inc.

Test Condition #4: Channel Frequency: 2412 MHz (Lowest)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: 29.1 mW Peak

FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	[illegible]	V	46.0	94.1	-75.0	PASS
352.00	37.4	[illegible]	H	46.0	94.1	-77.9	PASS
704.00	39.9	[illegible]	V	46.0	94.1	-67.4	PASS
704.00	39.6	[illegible]	H	46.0	94.1	-67.8	PASS
1056.00	48.3	[illegible]	V	54.0	94.1	-21.4	PASS**
1056.00	43.1	[illegible]	H	54.0	94.1	-28.2	PASS**
1408.00	54.2	[illegible]	V	54.0	94.1	-12.7	PASS**
1408.00	47.5	[illegible]	H	54.0	94.1	-19.2	PASS**
1760.00	47.3	[illegible]	V	54.0	94.1	-64.7	PASS
1760.00	44.2	[illegible]	H	54.0	94.1	-68.2	PASS
2060.00	43.4	[illegible]	V	54.0	94.1	-74.2	PASS
2060.00	42.8	[illegible]	H	54.0	94.1	-71.4	PASS
2112.00	43.1	[illegible]	V	54.0	94.1	-70.5	PASS
2112.00	40.5	[illegible]	H	54.0	94.1	-75.7	PASS
2412.00	114.1	--	V	--	--	--	--
2412.00	105.8	--	H	--	--	--	--
2464.00	52.2	[illegible]	V	54.0	94.1	-66.0	PASS
2464.00	43.1	[illegible]	H	54.0	94.1	-75.3	PASS
2816.00	45.6	[illegible]	V	54.0	94.1	-26.5	PASS**
2816.00	41.5	[illegible]	H	54.0	94.1	-37.8	PASS**
4120.00	52.2	[illegible]	V	54.0	94.1	-18.1	PASS**
4120.00	47.8	[illegible]	H	54.0	94.1	-26.4	PASS**
4824.00	56.3	[illegible]	V	54.0	94.1	-15.0	PASS**
4824.00	55.5	[illegible]	H	54.0	94.1	-15.7	PASS**
6180.00	48.8	[illegible]	V	54.0	94.1	-67.4	PASS
6180.00	48.8	[illegible]	H	54.0	94.1	-69.4	PASS
8240.00	50.9	[illegible]	V	54.0	94.1	-26.8	PASS**
8240.00	50.6	[illegible]	H	54.0	94.1	-27.4	PASS**

No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details

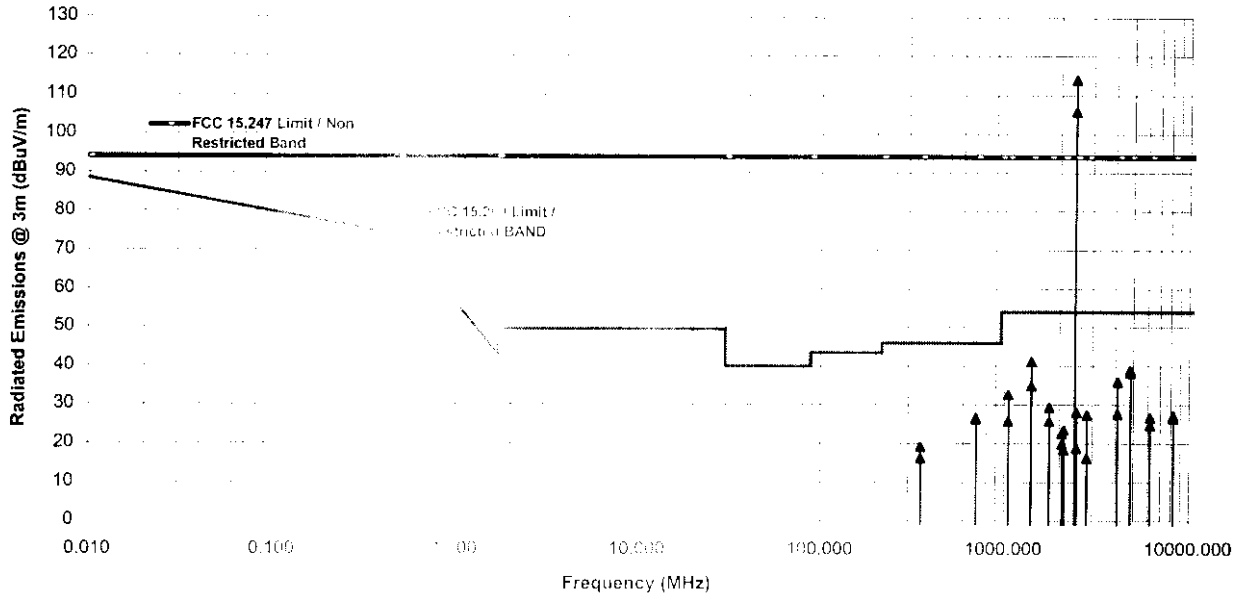
***** Emission within the restricted band specified in (a) 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Configuration #4: Teklogix TRX7430 Radio Transmitter

with Spectrum Signals S2307MP10SMF Antenna, Gain: 7.5 dBi.

Channel #1 Freq: 2412 MHz, Modulation: QPSK with 2Mb/s random data

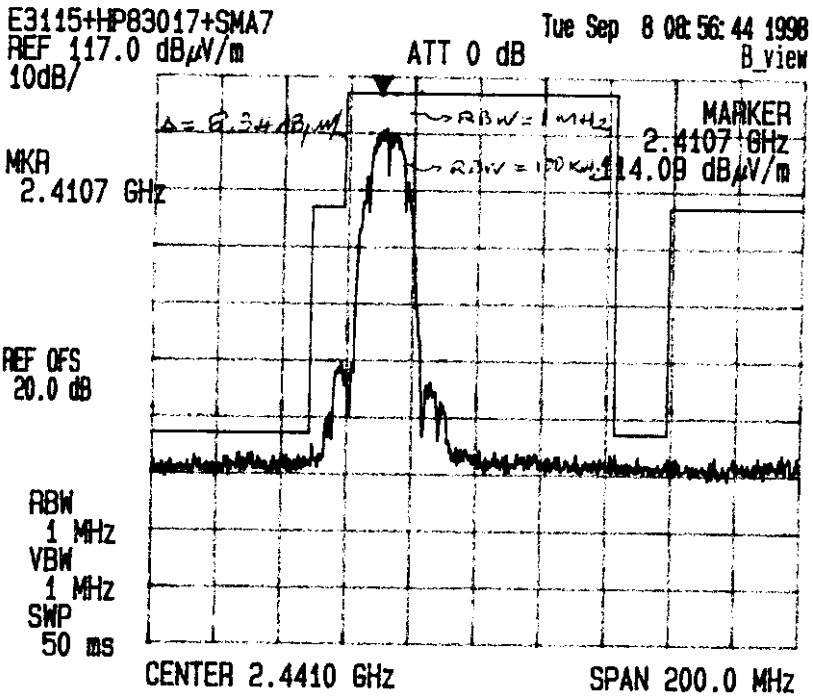


Date: September 8, 1998
Tested by: Hung Trinh

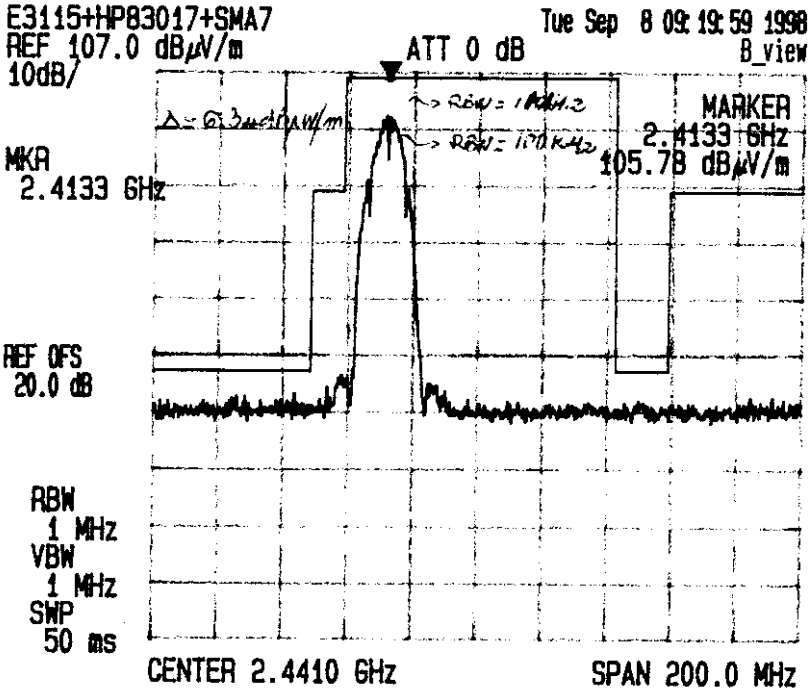
TEKLOGIX INC.

Channel: 1 Centre Freq.: 2412 MHz, Outout PWR: 29 /mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: S2230 7dP 10 ENF

Radiated Emissions Measurements @ 3 Meters



VERTICAL



HORIZONTAL

UltraTech
Engineering Labs Inc.

Test Condition #5: Channel Frequency: 2442 MHz (Middle)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: [illegible] mW Peak

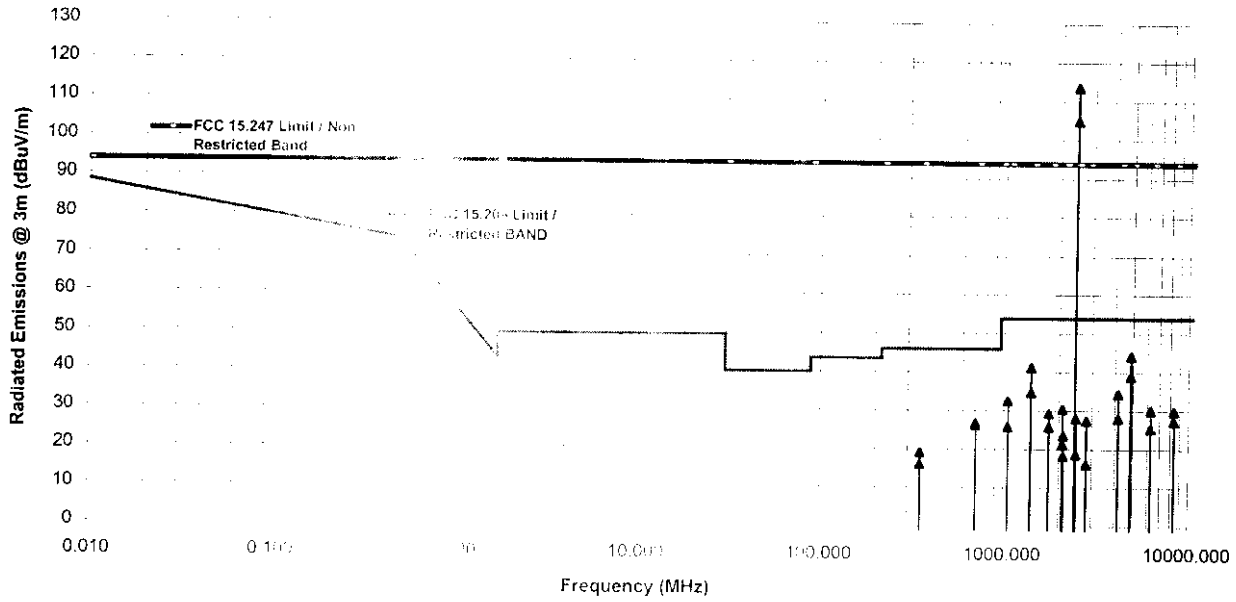
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	[illegible]	V	46.0	93.7	-74.6	PASS
352.00	37.4	[illegible]	H	46.0	93.7	-77.5	PASS
704.00	39.9	[illegible]	V	46.0	93.7	-67.0	PASS
704.00	39.6	[illegible]	H	46.0	93.7	-67.4	PASS
1056.00	48.3	[illegible]	V	54.0	93.7	-21.4	PASS**
1056.00	43.1	[illegible]	H	54.0	93.7	-28.2	PASS**
1408.00	54.2	[illegible]	V	54.0	93.7	-12.7	PASS**
1408.00	47.5	[illegible]	H	54.0	93.7	-19.2	PASS**
1760.00	47.3	[illegible]	V	54.0	93.7	-64.3	PASS
1760.00	44.2	[illegible]	H	54.0	93.7	-67.8	PASS
2090.00	46.1	[illegible]	V	54.0	93.7	-63.2	PASS
2090.00	41.6	[illegible]	H	54.0	93.7	-72.3	PASS
2112.00	43.1	[illegible]	V	54.0	93.7	-70.1	PASS
2112.00	40.5	[illegible]	H	54.0	93.7	-75.3	PASS
2442.00	113.7	[illegible]	V	--	--	--	--
2442.00	105.0	[illegible]	H	--	--	--	--
2464.00	52.2	[illegible]	V	54.0	93.7	-65.6	PASS
2464.00	43.1	[illegible]	H	54.0	93.7	-74.9	PASS
2816.00	45.6	[illegible]	V	54.0	93.7	-26.5	PASS**
2816.00	41.5	[illegible]	H	54.0	93.7	-37.8	PASS**
4180.00	50.8	[illegible]	V	54.0	93.7	-19.5	PASS**
4180.00	47.3	[illegible]	H	54.0	93.7	-26.0	PASS**
4884.00	60.6	[illegible]	V	54.0	93.7	-9.8	PASS**
4884.00	56.8	[illegible]	H	54.0	93.7	-14.9	PASS**
6270.00	49.7	[illegible]	V	54.0	93.7	-63.5	PASS
6270.00	48.3	[illegible]	H	54.0	93.7	-68.2	PASS
8360.00	52.3	[illegible]	V	54.0	93.7	-24.1	PASS**
8360.00	50.0	[illegible]	H	54.0	93.7	-26.6	PASS**
No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details							

***** Emission within the restricted band specified in @ 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS

Test Configuration #4: Teklogix TRX7430 Radio Transmitter
with Cushcraft/Signals S2307MP10SMF Antenna, Gain: 7.5 dBi.

Channel #7, Tx Freq.: 2442 MHz, Modulation: QPSK with 2Mb/s random data

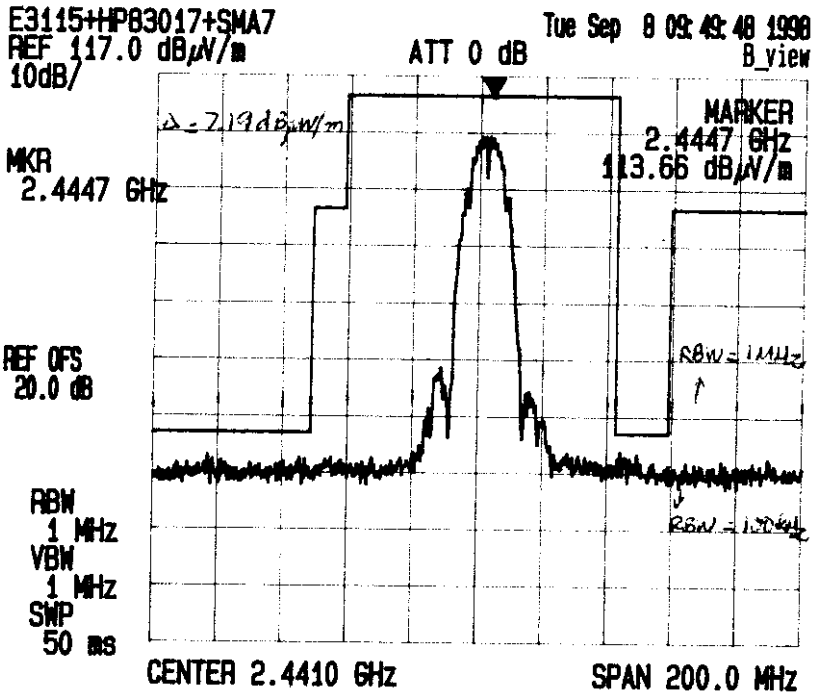


Date: September 8, 1998
Tested by: Hung Trinh

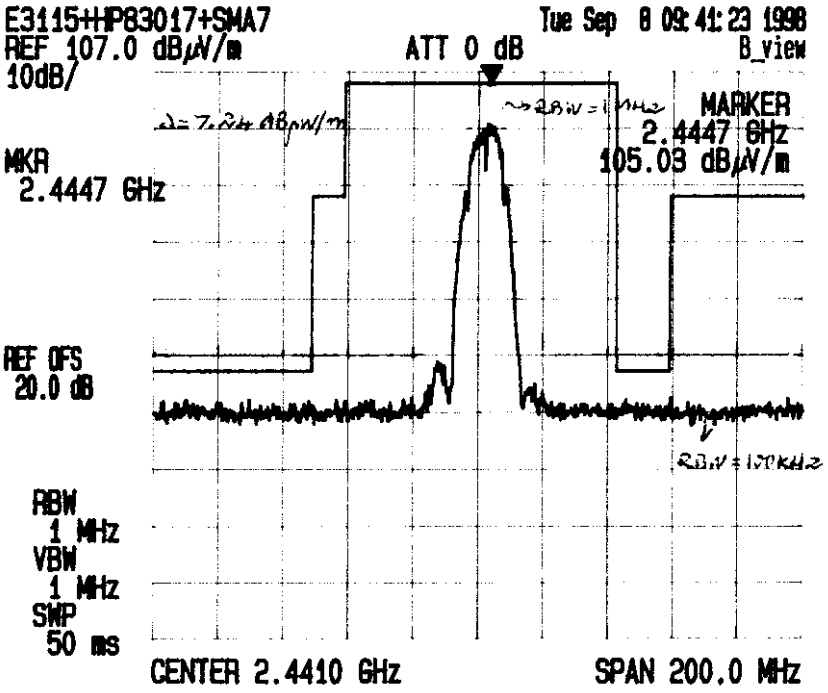
TEKLOGIX INC.

Channel: 7 , Centre Freq.: 2442 MHz , Outout PWR: 354 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: 2230 2M2 10ENF

Radiated Emissions Measurements @ 3 Meters



VERTICAL



HORIZONTAL

UltraTech
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Test Condition #6: Channel Frequency 2462 MHz (Highest)
Modulation: QPSK with 2 Mb/s Data Rate
RF Output Power: 17 dBm Peak

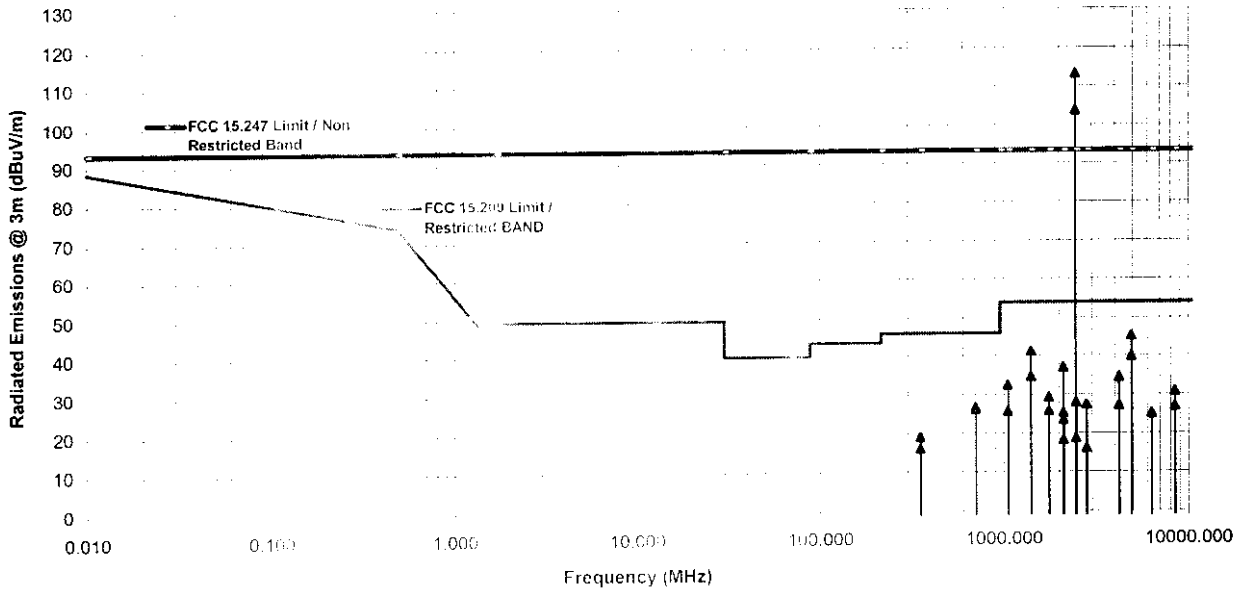
FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	RF AVG LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.247 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
352.00	36.0	19.1	V	46.0	93.3	-74.2	PASS
352.00	37.4	16.2	H	46.0	93.3	-77.1	PASS
704.00	39.9	26.7	V	46.0	93.3	-66.6	PASS
704.00	39.6	26.3	H	46.0	93.3	-67.0	PASS
1056.00	48.3	32.6	V	54.0	93.3	-21.4	PASS**
1056.00	43.1	25.8	H	54.0	93.3	-28.2	PASS**
1408.00	54.2	41.3	V	54.0	93.3	-12.7	PASS**
1408.00	47.5	34.8	H	54.0	93.3	-19.2	PASS**
1760.00	47.3	29.4	V	54.0	93.3	-63.9	PASS
1760.00	44.2	25.9	H	54.0	93.3	-67.4	PASS
2110.00	51.8	37.1	V	54.0	93.3	-56.2	PASS
2110.00	43.6	25.3	H	54.0	93.3	-68.0	PASS
2112.00	43.1	23.6	V	54.0	93.3	-69.7	PASS
2112.00	40.5	18.4	H	54.0	93.3	-74.9	PASS
2462.00	113.3	--	V	--	--	--	--
2462.00	103.8	--	H	--	--	--	--
2464.00	52.2	28.1	V	54.0	93.3	-65.2	PASS
2464.00	43.1	18.8	H	54.0	93.3	-74.5	PASS
2816.00	45.6	27.5	V	54.0	93.3	-26.5	PASS**
2816.00	41.5	16.2	H	54.0	93.3	-37.8	PASS**
4220.00	51.8	34.7	V	54.0	93.3	-19.3	PASS**
4220.00	47.8	27.3	H	54.0	93.3	-26.8	PASS**
4924.00	61.6	45.3	V	54.0	93.3	-8.7	PASS**
4924.00	57.5	40.0	H	54.0	93.3	-14.0	PASS**
6330.00	47.5	25.1	V	54.0	93.3	-68.2	PASS
6330.00	48.7	25.2	H	54.0	93.3	-68.1	PASS
8440.00	52.4	30.9	V	54.0	93.3	-23.1	PASS**
8440.00	51.1	27.0	H	54.0	93.3	-27.0	PASS**

No other significant emissions were found in the frequency range from 10 MHz to 25 GHz. Refer to attached plots for details

***** Emission within the restricted band specified in @ 15.205(a)***

Transmitter Radiated Emissions Measurements at 3 Meter OFTS
Test Configuration #4: Teklogix TRX7430 Radio Transmitter
with Cushcraft/Signals S2307MP10SMF Antenna, Gain: 7.5 dBi.

Ch. #11, Tx Freq.: 2462 MHz, Modulation: QPSK with 2Mb/s random data

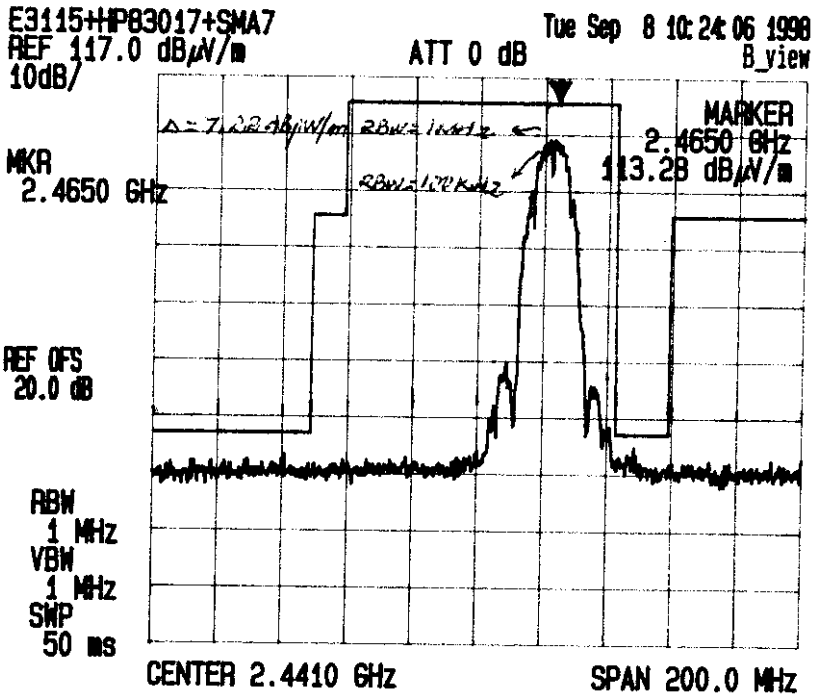


Date: September __, 1998
Tested by: Hung Trinh

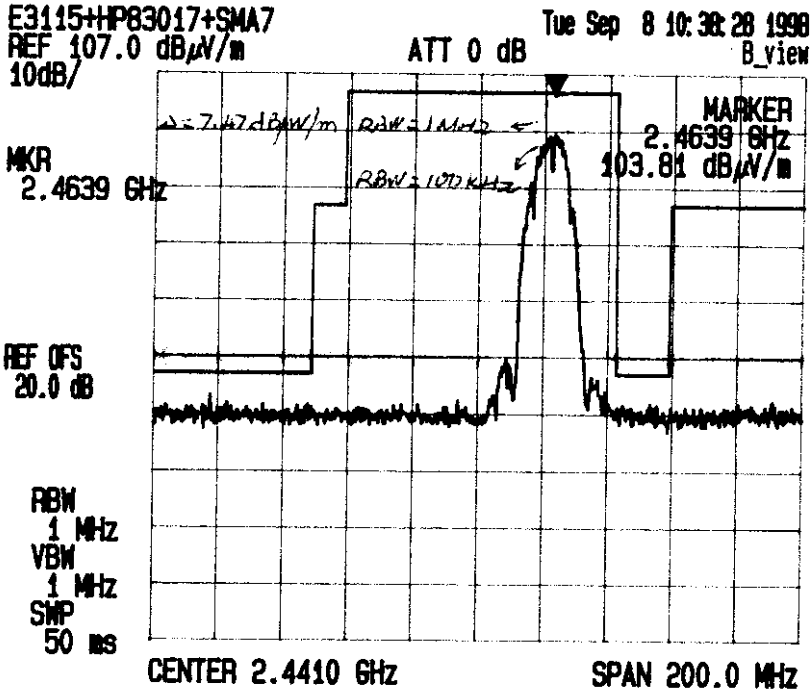
TEKLOGIX INC.

Channel: 11 , Centre Freq.: 2462 MHz , Outout PWR: 33.7 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: SR230.7MP 10 SMA

Radiated Emissions Measurements @ 3 Meters



VERTICAL



HORIZONTAL

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4.5. TRANSMITTED POWER DENSITY OF A DIRECT SEQUENCE SPREAD SPECTRUM SYSTEM, FCC CFR 47, PARA. 15.247(D)

PRODUCT NAME: LUCENT 802.11 WAVELAN DSSS RADIO, Model No.: TRX7430

FCC REQUIREMENTS

For a direct sequence system, the transmitted power density average over any 1 second interval shall not be greater than 8 dBm in any 3 KHz bandwidth within this band.

CLIMATE CONDITION:

Standard Temperature and Humidity:

- Ambient temperature: 23 °C
- Relative humidity: 42 %

POWER INPUT:

7.2 Vdc (from the Teklogix Digital Communication Systems).

TEST EQUIPMENT:

- Advantest Spectrum Analyzer, Model R3271, S/N: 15050203
- Bird 20 dB Attenuator, 50 Ohm IN/OUT

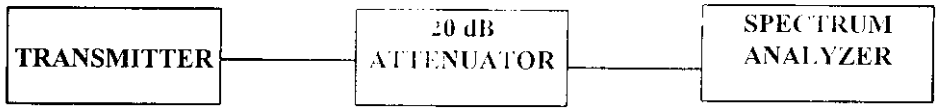
METHOD OF MEASUREMENT:

A scan was made by using a spectrum analyzer with the detector function set to NORMAL mode.

Locate and zoom in on emission peak(s) within the passband. Set RBW = 3 KHz, VBW ≥ RBW, Sweep = SPAN/3 KHz. For example, a span of 1.5 MHz, the sweep should be $1.6x10^6/3.0x10^3$= 500 seconds. The measured peak level must be no greater than +8 dBm.

- For devices with spectrum line spacing greater than 3 KHz no change is required.
- For devices with spectrum line spacing equal to or less than 3 KHz, the resolution bandwidth must be reduced below 3 KHz until the individual lines in the spectrum are resolved. The measurement data must then be normalized to 3 KHz by summing the power of all the individual spectral lines within 3 KHz band (in linear power units) to determine compliance.
- If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzer will directly measure the noise power density normalized to 1 Hz noise power bandwidth. Add 30 dB for correction to 3 KHz.
- Should all the above fail or any controversy develop regarding accuracy of measurement, the Laboratory will use HP 89440A Vector Signal Analyzer for final measurement unless a clear showing can be made for a further alternate.

TEST ARRANGEMENT



TEST RESULTS: Conforms.

TEST PERSONNEL: Hung Trinh, EMI RFI Technician

DATE: Sept. 10, 1998

MEASUREMENT DATA:

TEST CONFIGURATION

- *The transmitter was coupled to the Spectrum Analyzer through a 20 dB attenuator.*
- *The insertion loss between the transmitter output terminal and the spectrum analyzer was measured to be 20 dB*
- *The channel frequencies were established on the extreme edges (both upper and lower) and middle of the 2412 - 2462 MHz band at its full rated output power. The emissions was investigated up to the tenth harmonic of the fundamental emissions in each case, the measured level of the carrier was recorded and compared to the level of the emissions as required in Part 15.247(d)*

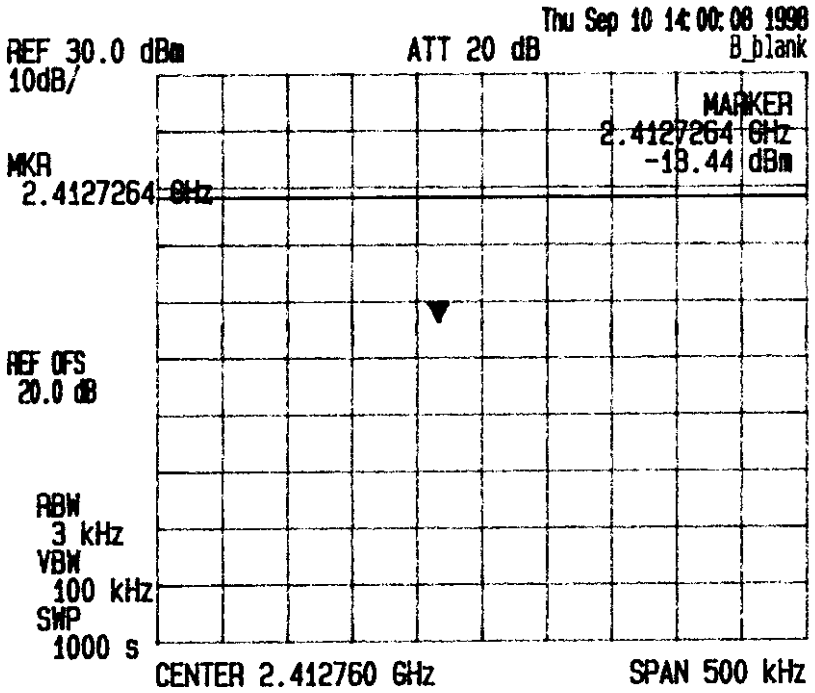
CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	MODULATION	RF POWER LEVEL IN 3 KHz BW (dBm)	LIMIT (dBm)	MARGIN (dB)	COMMENTS (PASS/FAIL)
1	2412	QPSK with 1 Mb/s Data Rate	-9.78	8.0	-17.78	PASS
7	2442	QPSK with 1 Mb/s Data Rate	-10.22	8.0	-18.22	PASS
11	2462	QPSK with 1 Mb/s Data Rate	-10.63	8.0	-18.63	PASS
1	2412	QPSK with 2 Mb/s Data Rate	-7.91	8.0	-15.91	PASS
7	2442	QPSK with 2 Mb/s Data Rate	-7.38	8.0	-15.38	PASS
11	2462	QPSK with 2 Mb/s Data Rate	-7.81	8.0	-15.81	PASS

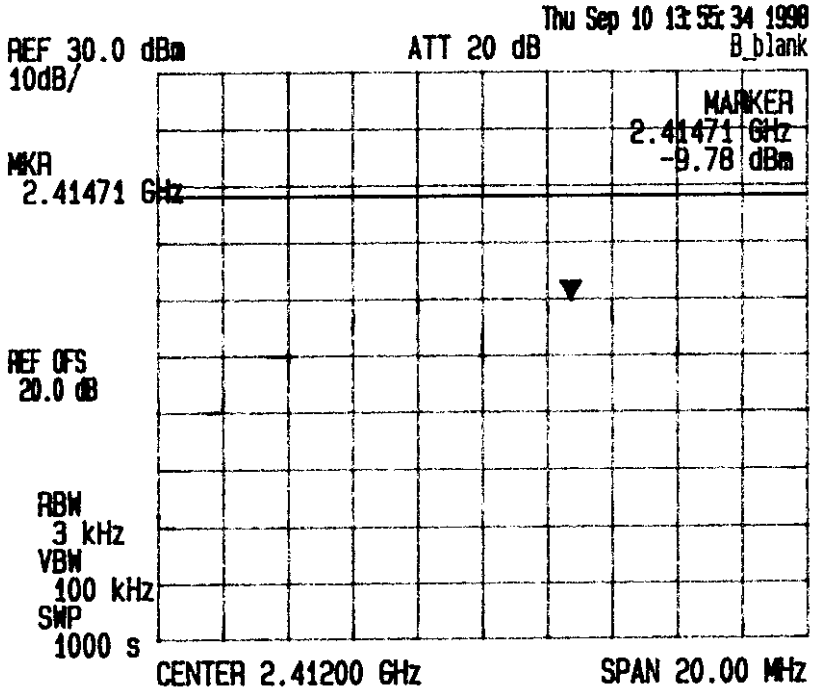
Date: September 2, 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 1, Centre Freq.: 2412 MHz, Outout PWR: 20 / mW

Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: _____





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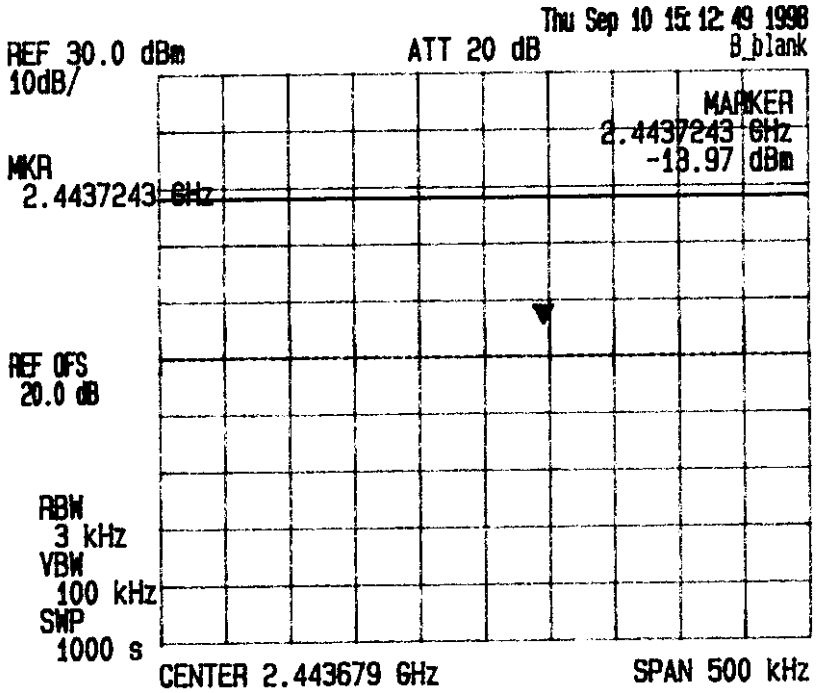
Engineering Labs Inc.

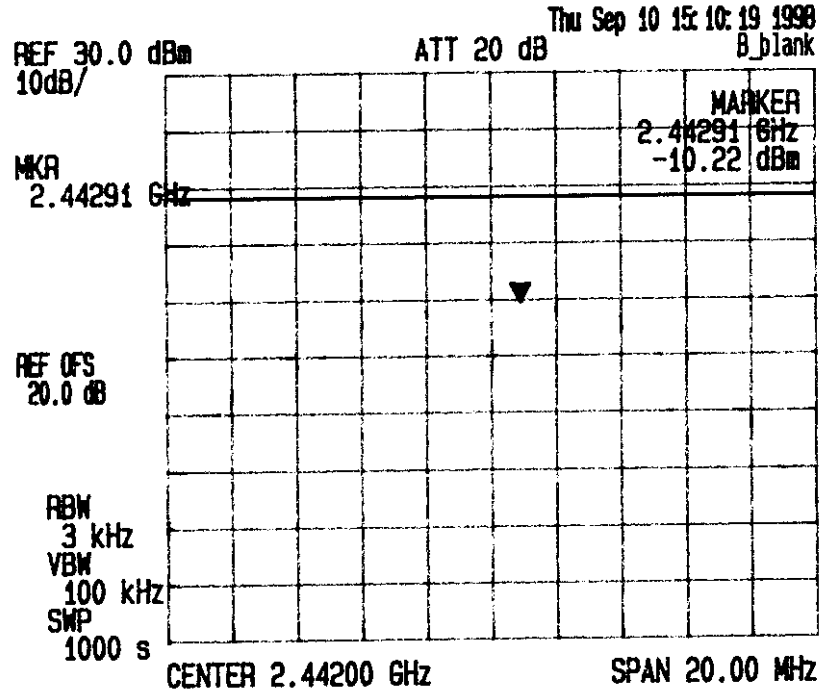
Date: September 23 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 7, Centre Freq.: 2442.3 MHz, Outout PWR: 35.4 mW

Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: _____





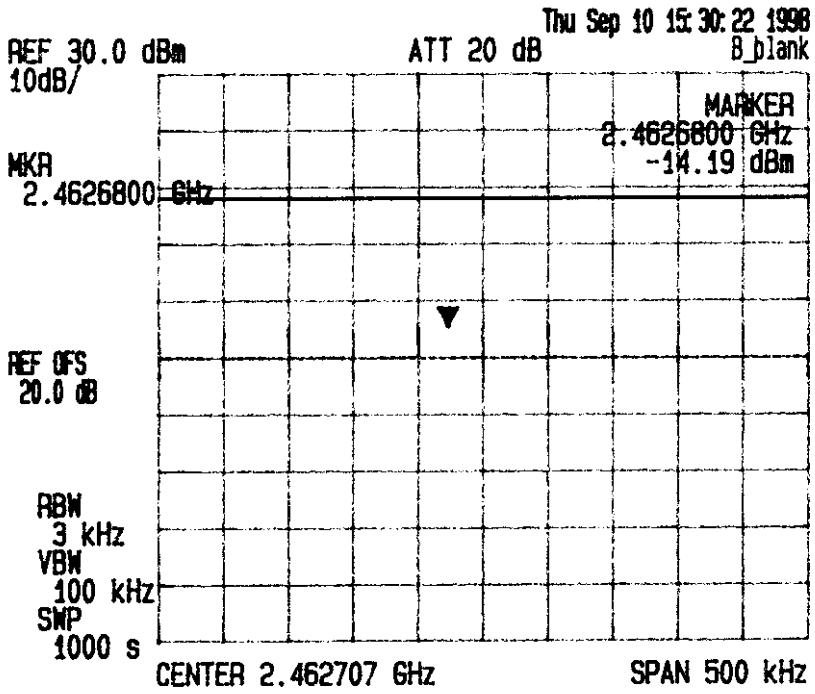
UltraTech
Engineering Labs Inc.

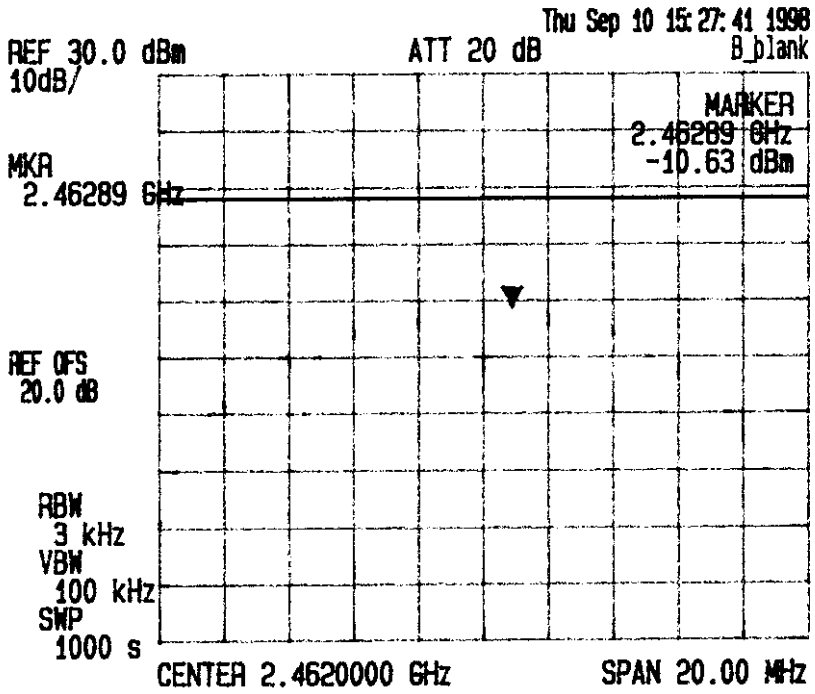
Date: September 2, 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 11, Centre Freq: 2462 MHz, Outout PWR: 33.7 mW

Modulation: QPSK with 1 Mb/s Data Rate, Transmitting Antenna: _____





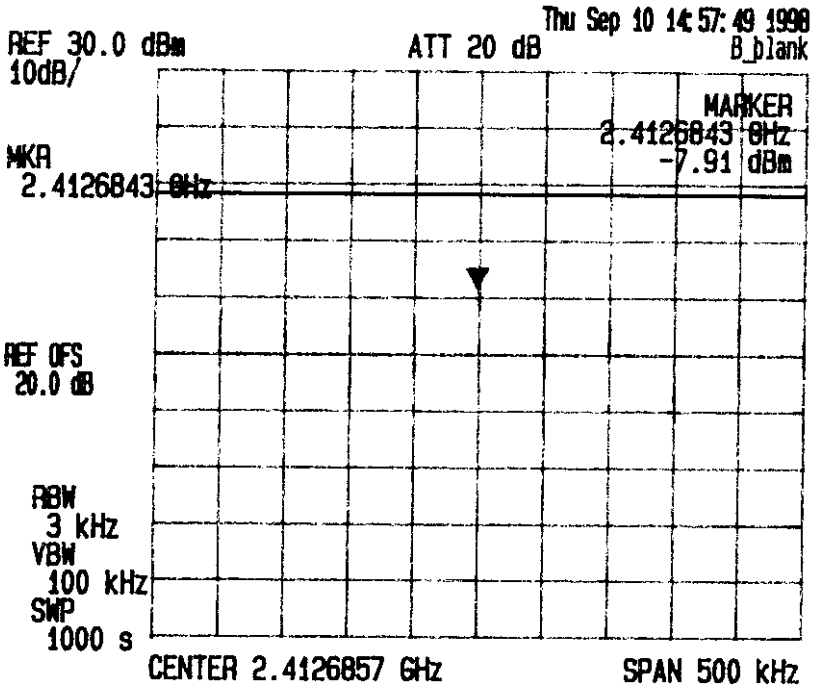
UltraTech
Engineering Labs Inc.

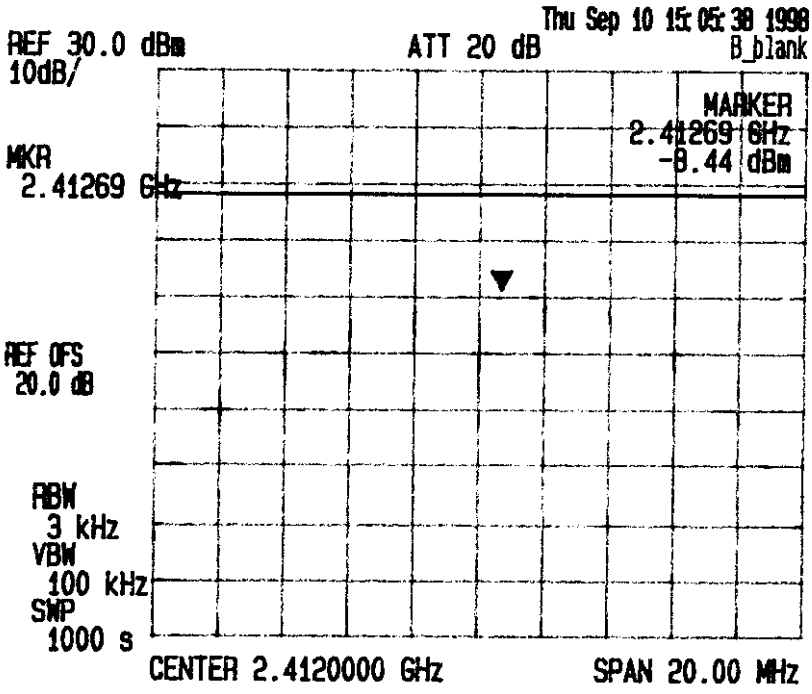
Date: September 10 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 1, Centre Freq.: 2412 MHz , Outout PWR: 30.1 mW

Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: _____



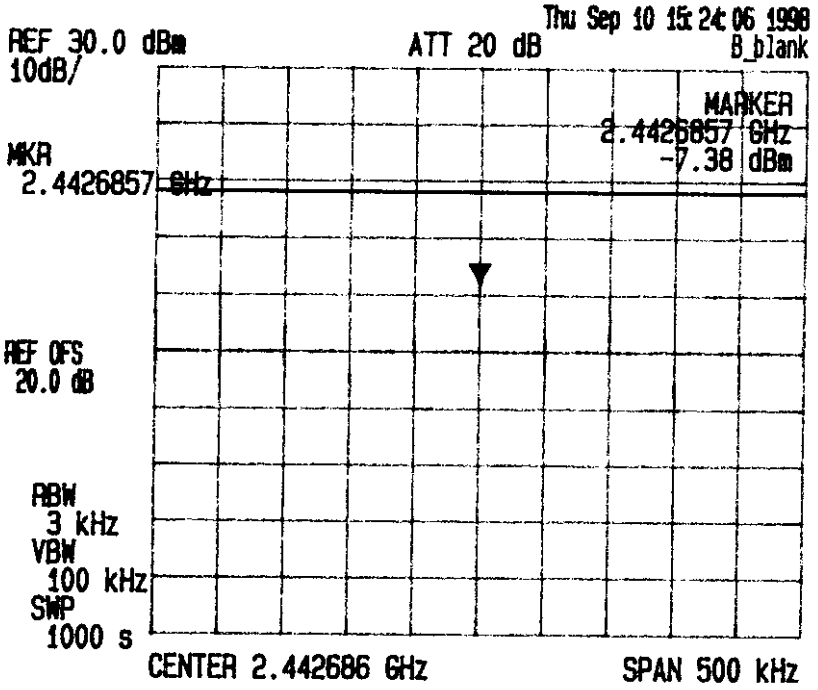


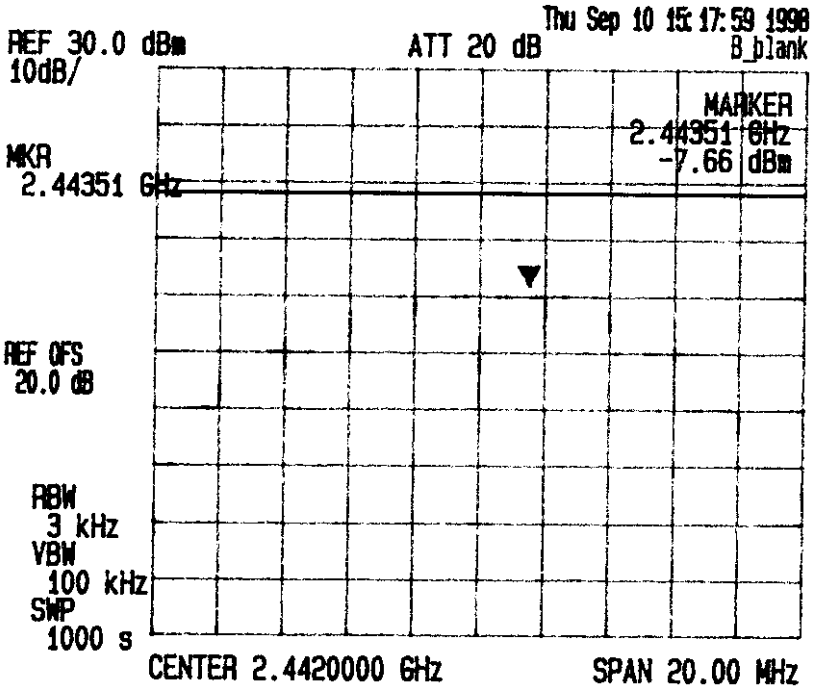
UltraTech
Engineering Labs Inc.

Date: September 2, 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 7, Centre Freq.: 2442.3 MHz, Outout PWR: 35.4 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna: _____



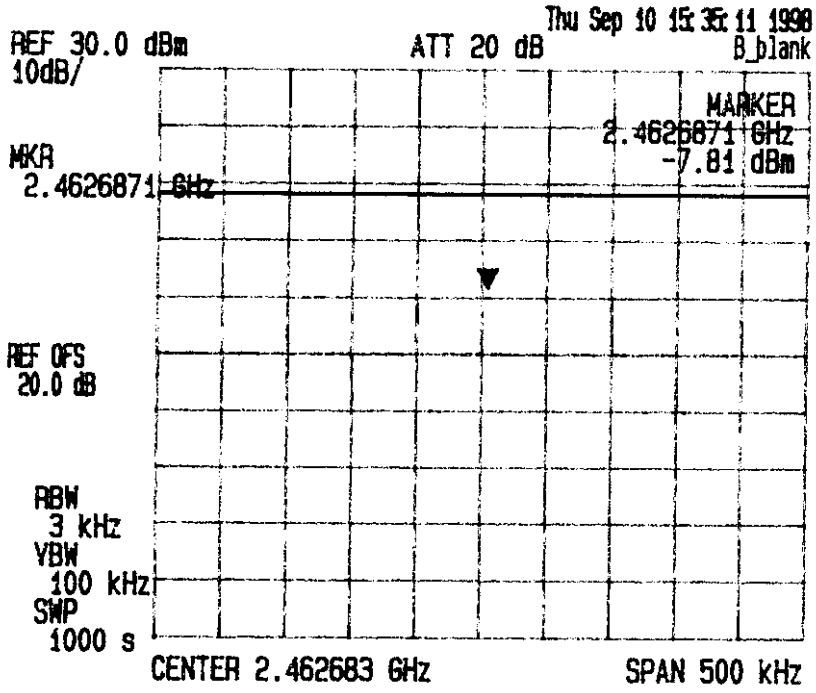


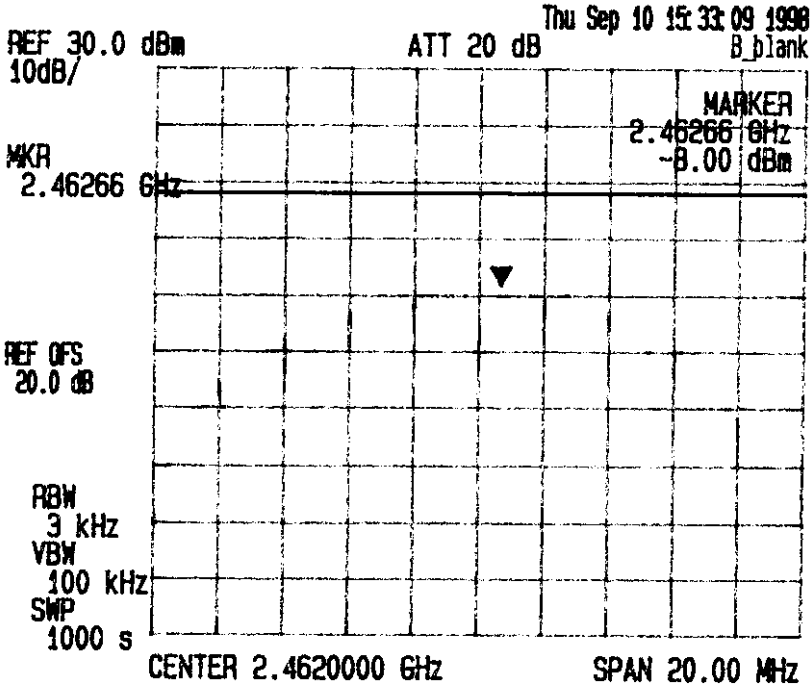
UltraTech
Engineering Labs Inc.

Date: September 2, 1998
Tested by: Hung Trinh

LUCENT 802.11 WAVELAN DSSS RADIO,MODEL TRX 7430

Channel: 11, Centre Freq:: 2462 MHz , Outout PWR: 22.7 mW
Modulation: QPSK with 2 Mb/s Data Rate, Transmitting Antenna:





UltraTech
Engineering Labs Inc.

4.6. PROCESSING GAIN OF A DIRECT SEQUENCE SPREAD SPECTRUM, FCC CFR 47, PARA. 15.247(E)

PRODUCT NAME: LUCENT 802.11 WAVELAN DSSS RADIO, Model No.: TRX7430

FCC REQUIREMENTS:

The processing gain of a direct sequence system shall be at least 10 dB. The processing gain shall be determined from the ratio in dB of the signal-to-noise ratio with the system spreading code turned off to the signal-to-noise ratio with the system spreading code turned on, as measured at the demodulated output of the receiver.

REMARKS:

This Lucent 802.11 WaveLan DSSS Radio (Teklogix Model TRX7430) is manufactured by Lucent Technologies (in The Netherlands) and the applicant for its FCC Certification is Teklogix Inc (in Canada). This radio is exactly identical with the Lucent WaveLan PC24 Radio, which has been certified by FCC under FCC ID: IMRWLPC24 (Applicant: Lucent Technologies WCND BV). However, there is some minor changes in the circuit board layout applied to this radio to remove the internal integrated antenna inside the Lucent PC24 so that the Teklogix Inc. (as an applicant) can use it with their own external antennas.

Since there is no change made to this radio circuit design and its signal characteristics, the processing gain is not necessary to be tested by Ultratech Engineering Labs Inc. However, the processing gain measurement data conducted by Lucent Technologies will be included in this report (Appendix A) for FCC's review.

4.7. AC POWERLINE CONDUCTED EMISSIONS, FCC CFR 47, PARA. 15.107(A)

PRODUCT NAME: LUCENT 802.11 WAVELAN DSSS RADIO, Model No.: TRX7430

NAME OF TEST: AC Powerline Conducted Emissions.

FCC LIMIT:

The RF voltage conducted back onto the public utility lines shall not exceed 250 μV or 48.0 dBμV measured from 450 KHz to 30 MHz

CLIMATE CONDITION:

Standard Temperature and Humidity:

- Ambient temperature: 23 °C
- Relative humidity: 43 %

POWER INPUT:

7.2 Vdc (from the Teklogix Digital Communication Systems).

TEST EQUIPMENT:

- Advantest R3271 Spectrum Analyzer, Frequency Range: 100Hz-26.5GHz, with built-in Peak, Quasi-Peak and Average Detectors.
- HP 11947A Transient Limiter, HP, Model 11947A, Frequency Range: 9KHz-200MHz, Attenuation: 10dB HP.
- HP 7475 Plotter
- EMCO 3825 2 LISN, Frequency Range: 9KHz-200MHz
- RF Shielded Enclosure (12x16x12 feet)

METHOD OF MEASUREMENTS:

Refer to ANSI C63.4-1992.

TEST RESULTS: Conforms.

TEST PERSONNEL: Hung Trinh, EMI/RFI Technician

DATE: Sept. 9, 1998

MEASUREMENT DATA

AC POWER-LINE CONDUCTED EMISSIONS

REMARKS

- ***All rf emissions from 450 KHz to 30 MHz were scanned, and eight highest emission levels were recorded. See attached plots.***
- ***P: Peak Detector, 10 KHz RBW, VBW ≥ RBW***
- ***Q: CISPR QUASI-PEAK, 9 KHz RBW, VBW ≥ RBW***
- ***QP/BB: for broadband emission (QP level - AVG level > 6 dB); the recorded level was QP level less 13 dB.***

FREQUENCY (MHz)	RF LEVEL (dBuV)	RECEIVER DETECTOR (P/QP/AVG)	QP/NB LIMIT (dBuV)	QP/BB LIMIT (dBuV)	MARGIN (dB)	PASS/ FAIL	LINE TESTED (L1/L2)
7.64	43.3	QP	48.0	61.0	-4.7	PASS	L1
11.30	41.5	QP	48.0	61.0	-6.5	PASS	L1
17.24	35.5	QP	48.0	61.0	-12.5	PASS	L1
7.73	40.0	QP	48.0	61.0	-8.0	PASS	L2
11.45	34.1	QP	48.0	61.0	-13.9	PASS	L2
19.41	34.3	QP	48.0	61.0	-13.7	PASS	L2

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APPLICANT: TEKLOGIX PRODUCT:
MODEL: S/N:
EMI Detector: [✓] Peak [✓] Quasi Peak [✓] Average Temp.: 23 °C, Humidity: 43 % Test Date: 29 SEPT 98
Line Tested: 1, Input Voltage: 120 VAC, Tested by: HUNG TRAN
Test Performed: FCC 15 B

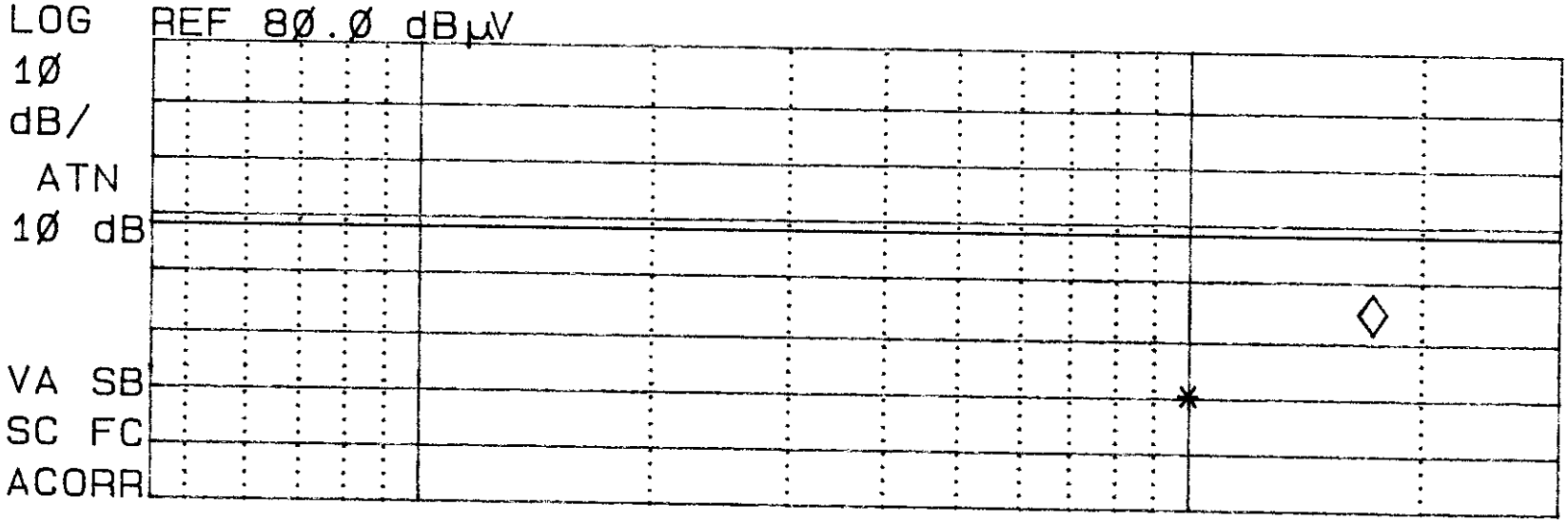
17: 27: 28 SEP Ø9, 1998

Signal	Freq (MHz)	PK Amp	QP Amp	AV Amp	QP Δ 1
1	7.642475	46.5	43.3	27.1	-4.7
2	11.3Ø1575	44.7	41.5	31.4	-6.4
3	17.241675	37.5	35.5	29.Ø	-12.5

No user Menu

STOP
3Ø.ØØ MHz

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 17.21 MHz
31.Ø1 dBµV



START 45Ø kHz
IF BW 9.Ø kHz
AVG BW 3Ø kHz
STOP 3Ø.ØØ MHz
SWP 1.33 sec

UltraTech
Engineering Labs Inc.

APPLICANT: TEKLOGIX PRODUCT:
MODEL: S/N:
EMI Detector: [M] Peak [M] Quasi Peak [M] Average Temp.: 23 °C, Humidity: 43 % Test Date: 09 SEPT 98
Line Tested: R, Input Voltage: 120 VAC, Tested by: MIKE TRINH
Test Performed: FCC 15B

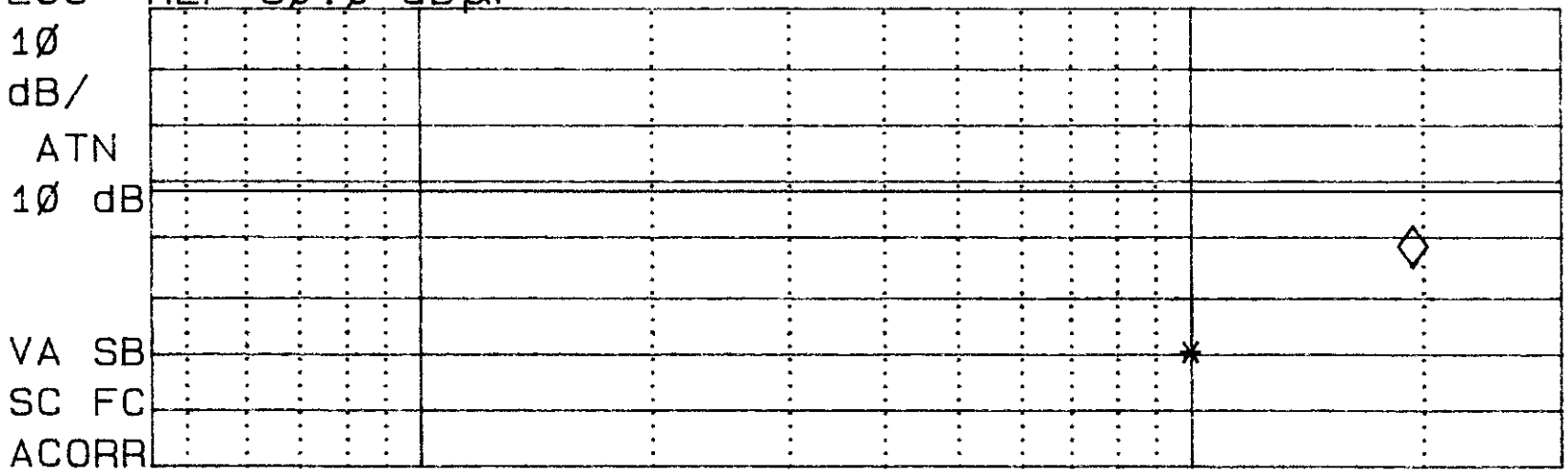
17: 35: 46 SEP Ø9, 1998

Signal	Freq (MHz)	PK Amp	QP Amp	AV Amp	QP Δ 1
1	7.728400	42.7	40.0	24.6	-8.0
2	11.447400	38.3	34.1	23.2	-13.9
3	19.413075	38.9	34.3	27.0	-13.7

No user Menu

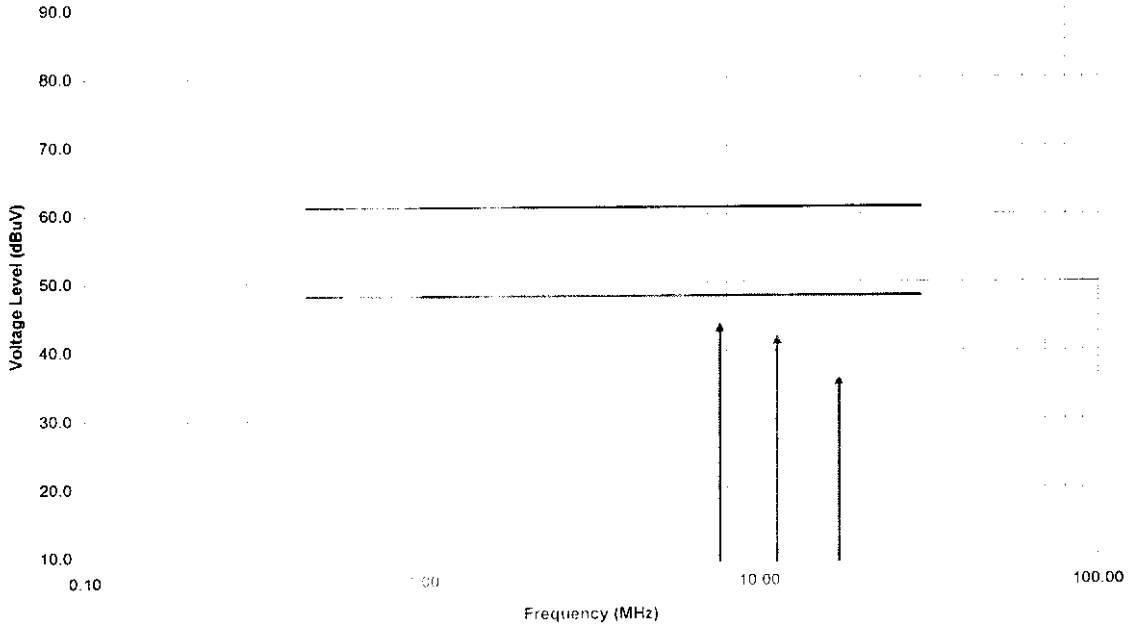
STOP
30.00 MHz

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 19.35 MHz
34.92 dBµV

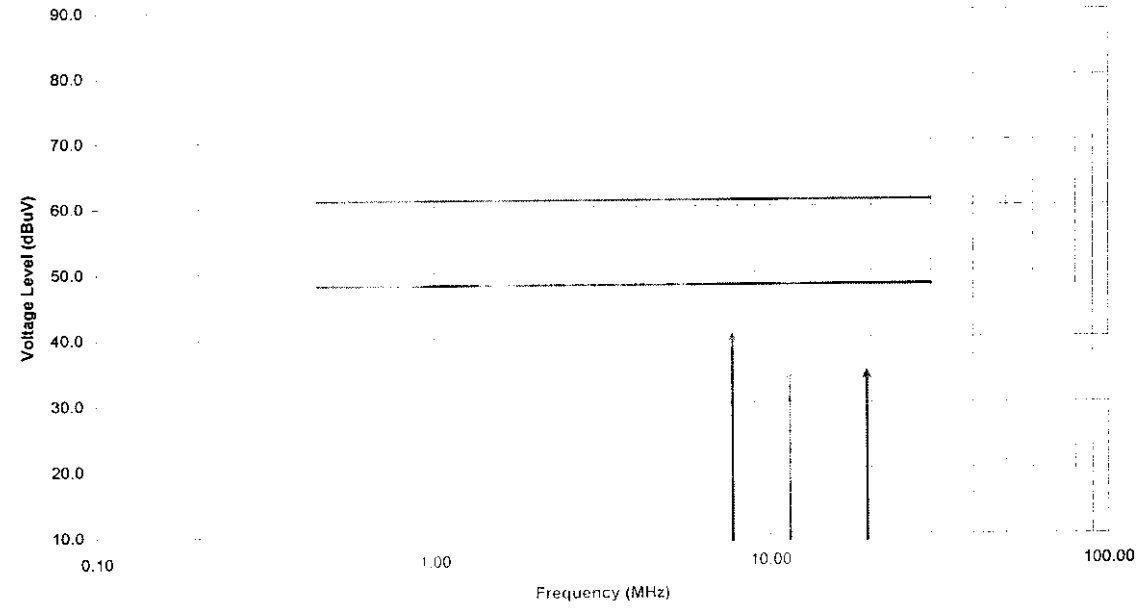


START 450 kHz
STOP 30.00 MHz
IF BW 9.0 kHz AVG BW 30 kHz SWP 1.33 sec

TEKLOGIX INC.
Lucent 802.11 Wavelan DSSS Radio, Model: TRX7430
AC Conducted Emissions - Line #1 (Hot)
Ultratech Engineering Labs Inc.



TEKLOGIX INC.
Lucent 802.11 Wavelan DSSS Radio, Model: TRX7430
AC Conducted Emissions - Line #2 (Neutral)
Ultratech Engineering Labs Inc.



5. EXHIBIT 5 - GENERAL TEST PROCEDURES

5.1. AC POWERLINE CONDUCTED EMISSIONS MEASUREMENTS - GENERAL TEST METHOD

- AC Powerline Conducted Emissions were performed in the shielded room, 16'(L) by 12'(W) by 12'(H).
- Conducted power-line measurements were made over the frequency range from 450 KHz to 30 MHz to determine the line-to-ground radio noise voltage which was conducted from the EUT power-input terminals that were directly connected to a public power network.
- The EUT normally received power from another device that connects to the public utility ac power lines, measurements would be made on that device with the EUT in operation to ensure that the device continues to comply with the appropriate limits while providing the EUT with power.
- If the EUT was operates only from internal or dedicated batteries, with no provisions for connection to the public utility ac power lines, ac power-line conducted measurements are not required.
- Table-top devices were placed on a platform of nominal size 1 m by 1.5m raised 80 cm above the conducting ground plane.
- The EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the power source. All unused 50-ohm connectors of the LISN was terminated in 50-ohm when not connected to the measuring instruments.
- The line cord of the EUT connected to one LISN which was connected to the measuring instrument. Those power cords for the units of devices not under measurement were connected to a separate multiple ac outlets. Drawings and photographs of typically conducted emission test setups were shown in the Test Report. Each current-carrying conductor of the EUT shall be individually tested.
- The EUT was normally operated with a ground (safety) connection, the EUT was connected to the ground at the LISN through a conductor provided in the lead from the ac power mains to the LISN.
- The excess length of the power cord was folded back and forth in an 8-shape on a wooden strip with a vertical prong located on the top of the LISN case.
- The EUT was set-up in its typical configuration and operated in its various modes as described in 3.2 of the test report.
- A preliminary scan was made by using spectrum analyzer system with the detector function set to PEAK mode (10 KHz RBW, VBW ≥ RBW), frequency span =50KHz-30MHz.

- The maximum conducted emission for a given mode of operation was found by using the following step-by-step procedure:

  Step1. Monitor the frequency range of interest at a fixed EUT azimuth.

  Step2. Manipulate the system cables and peripheral devices to produce highest amplitude signal relative to the limit. Note the amplitude and frequency of the suspect signal.

  Step3. The effects of various modes of operation is examined. This is done by varying equipment operation modes as step 2 is being performed.

  Step4. After completing step 1 through 3, record EUT and peripheral device configuration, mode of operation, cable configuration, signal levels and frequencies for final test.

- Each highest signal level at the maximized test configuration was zoomed in a small frequency span on the spectrum analyzer's display (the manipulation of cables and peripheral devices and EUT operation modes might have to be repeated to obtain the highest signal level with the spectrum analyzer set to PEAK detector mode 10 KHz RBW and VBW ≥ RBW). The spectrum analyzer was then set to CISPR QUASI-PEAK detector mode (9 KHz RBW, 1 MHz VBW) and the final highest RF signal level and frequency was record.

- ***Broad-band ac Powerline conducted emissions***:- If the EUT exhibits ac Powerline conducted emissions that exceed the limit with the instrument set to the quasi-peak mode, then measurements should be made in the average mode. If the amplitude measured in the quasi-peak mode is at least 6 dB higher than the amplitude measured in the average mode, the level measured in quasi peak mode may be reduced by 13 dB before comparing it to the limit.

5.2. ELECTRICAL FIELD RADIATED EMISSIONS MEASUREMENTS - GENERAL TEST METHOD

- The radiated emission measurements were performed at the UltraTech's 3 Meter Open Field Test Site (OFTS) situated in the Town of Oakville, province of Ontario. The Attenuation Characteristics of OFTS have been filed to FCC.

- Radiated emissions measurements were made using the following test instruments:

  1) Calibrated EMCO active loop antenna in the frequency range from 10 KHz to 1 MHz
  2) Calibrated EMCO biconilog antenna in the frequency range from 30 MHz to 2000 MHz.
  3) Horn Antennas:
     a) Horn Antenna, [illegible] Model 3115, 1 - 18 GHz
     b) Horn Antenna, [illegible] Model 3160-09, 18-26.5 GHz
     c) Horn Antenna, [illegible] Model 3160-10, 26.5-40 GHz
     d) Mixer, Tektronix, P/N 119-0098-00, 18-26.5 GHz
     e) Mixer, Tektronix, P/N 119-0098-00, 26.5-40 GHz
  4) Calibrated Advantest spectrum analyzer and pre-selector/pre-amplifier. In general, the spectrum analyzer would be used as follows:

     – The rf electric field levels were measured with the spectrum analyzer set to PEAK detector (1 KHz RBW and 1 KHz VBW for frequency below 30 MHz, 100 KHz RBW and VBW ≥ RBW for Frequency below 1 GHz and 1 MHz RBW and 1 MHz VBW for frequency greater than 1 GHz).

- If any rf emission was observed to be a broadband noise, the spectrum analyzer's CISPR QUASI-PEAK detector (120 KHz RBW and 1MHz VBW) was then set to measure the signal level.

- If the signal being measured was narrowband and the ambient field was broadband, the bandwidth of the spectrum analyzer was reduced.

- The EUT was set-up in its typical configuration and operated in its various modes as described in 3.2 of the test report.

- The frequencies of emissions were first detected. Then the amplitude of the emissions was measured at the specified measurement distance using required antenna height, polarization, and detector characteristics.

- During this process, cables and peripheral devices were manipulated within the range of likely configuration.

- For each mode of operation required to be tested, the frequency spectrum was monitored. Variations in antenna heights (from 1 meter to 4 meters above the ground plane), antenna polarization (horizontal plane and vertical plane), cable placement and peripheral placement (each variable within bounds specified elsewhere) were explored to produce the highest amplitude signal relative to the limit.

The maximum radiated emission for a given mode of operation was found by using the following step-by-step procedure:

Step1: Monitor the frequency range of interest at a fixed antenna height and EUT azimuth.

Step2: Manipulate the system cables to produce highest amplitude signal relative to the limit. Note the amplitude and frequency of the suspect signal.

Step3: Rotate the EUT 360 degrees to maximize the suspected highest amplitude signal. If the signal or another at a different frequency is observed to exceed the previously noted highest amplitude signal by 1 dB or more, go back to the azimuth and repeat step 2. Otherwise, orient the EUT azimuth to repeat the highest amplitude observation and proceed.

Step4: Move the antenna over its full allowed range of travel (1 to 4 meters) to maximize the suspected highest amplitude signal. If the signal or another at a different frequency is observed to exceed the previously noted highest amplitude signal by 1 dB or more, return to Step 2 with the highest amplitude observation and proceed.

Step5: Change the polarization of the antenna and repeat Step 2 through 4. Compare the resulting suspected highest amplitude signal with that found for the other polarization. Select and note the higher of the two signals. This signal is recorded the highest observed signal with respect to the limit for this EUT operational mode.

Step6: The effects of various modes of operation is examined. This is done by varying the equipment modes as steps 2 through 5 are then performed.

Step7: After completing steps 1 through 6, record the final highest emission level, frequency, antenna polarization and detector mode of the measuring instrument.

Calculation of Field Strength:

The field strength is calculated by adding the calibrated antenna factor and cable factor, and subtracting the Amplifier gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength
RA = Receiver Analyzer Reading
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Example: If a receiver reading of 60.0 dBμV is obtained, the antenna factor of 7.0 dB/m and cable factor of 1.0 dB are added, and the amplifier gain of 30 dB is subtracted. The actual field strength will be:.

Field Level in dBμV/m = 60 + 7.0 + 1.0 - 30 = 38.0 dBμV/m.

Field Level in μV/m = $10^{(38/20)}$ = 79.43 μV/m.

Notes: The frequency and amplitude of at least six highest conducted emissions relative to the limit are recorded unless such emissions are more than 20 dB below the limit. If less than six emissions are within 20dB of the limit, the background or receiver noise level shall be reported at representative frequencies.

6. EXHIBIT 6 - INFORMATION RELATED TO EQUIPMENT UNDER TESTS

6.1. FCC ID LABELING AND SKETCH OF FCC LABEL LOCATION

Refer to the attached sheets

6.2. PHOTOGRAPHS OF EQUIPMENT UNDER TEST

Refer to the attached photographs

6.3. SYSTEM BLOCK DIAGRAM(S)

Will be submitted to FCC by Lucent Technologies.

6.4. SCHEMATIC DIAGRAMS

Will be submitted to FCC by Lucent Technologies.

6.5. USER'S MANUAL WITH "FCC INFORMATION TO USER STATEMENTS"

Refer to the attached Users' manual

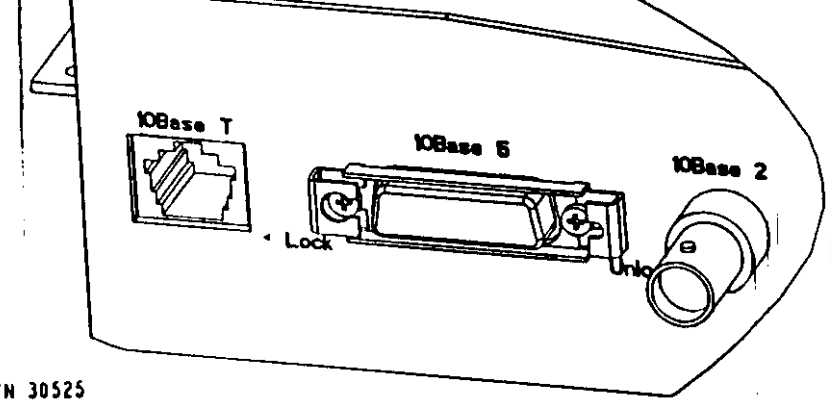
6.6. PROCESSING GAIN FOR WAVELAN-IEEE PC CARD

Refer to Appendix A

REF. ASSY., M.L.B. P/N 30183-001

6

DETAIL E
MAIN LOGIC BOARD/CONNECTOR PLATE



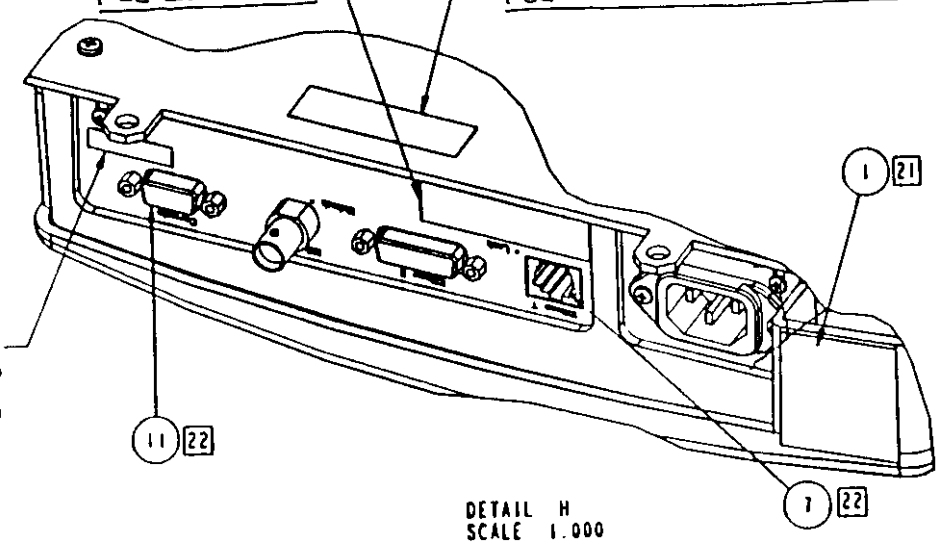
RING P/N 30525

REF. KIT, SCREWLOCK P/N 90824 (2 PLCS.)

DETAIL F
SCALE 2.000
SLIDE LATCH ORIENTATION
SHOWN IN UNLOCKED POSITION

21 REF. LABEL, 9150 COUNTRY
FCC ID LABEL

REF. LABEL, P/N 17804 21
(NORTH AMERICA ONLY)
FCC LABEL OF TWO CONDITIONS



21 REF. LABEL, ETHERNET ADDRESS (SUPPLIED WITH M.L.B.)

REF. CONNECTOR PLATE P/N 30186-003

DETAIL H
SCALE 1.000

REF. ASSY., M.L.B. P/N 30183

INTERNAL P/N 30211-001

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TEKLOGIX INC MISSISSAUGA ONTARIO

ASSY., 9150
SINGLE RADIO, S.S.

CODE IDENT NO	SIZE	DRAWING NO.	REV
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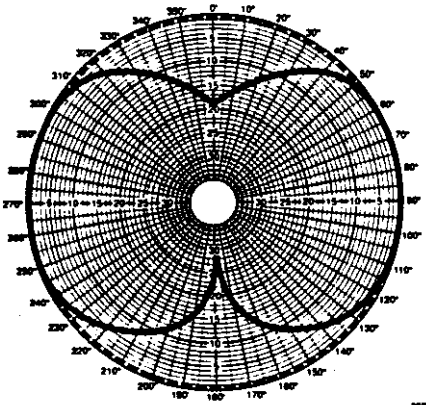
Omnidirectional Antennas Above 800 MHz

Cushcraft/Signals offers a broad line of high frequency omnidirectional antennas for data collection applications. As designed, these antennas feature PC board etched radiators, handcrafted matching and decoupling networks and fiberglass enclosures. They may be mounted in many ways. They are provided with hardware designed for mounting on round members such as pipes up to 2 inches in diameter. Also, ceiling mounting and I-beam clamps can be used to place these antennas in the best possible locations. These omnis are mass produced using techniques assuring long life and consistent performance. Production models are available covering frequency ranges from 806 through 960 MHz and 2.4 through 2.5 GHz. Models for 1.7 through 1.9 GHz and 5.725 through 5.850 GHz will soon be available.

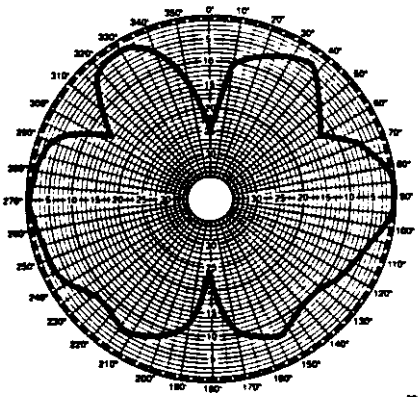
OMNIS ABOVE 800 MHz

Model	S8960B	S8963B	S8964B	S2400B	S2403B
Type	Omni	Omni	Omni	Omni	Omni
Frequency, MHz	896-960	896-960	896-960	2400-2500	2400-2500
Gain	Unity	3 dBd	4 dBd	Unity	3 dBd
Front to Back, dB	NA	NA	NA	NA	NA
Bandwidth, 1.5:1, MHz	64	64	64	100	100
-3 dB Beamwidth					
E-Plane, degrees	75	45	25	75	45
H-Plane, degrees	360	360	360	360	360
Connector Type	N-female	N-female	N-female	N-female	N-female
Enclosure Material	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass
Height, inches (cm)	17-1/2 (44.5)	30-3/4 (78)	42-1/8 (107)	8 (20.3)	13-1/2 (34.3)
Weight, oz. (g)	9 (252)	19 (532)	25 (700)	5 (140)	6 (168)
Mount Style	Pipe clamp	Pipe clamp	Pipe clamp	Pipe clamp	Pipe clamp
Max Mast Dia, in (cm)	2 (5.1)	2 (5.1)	2 (5.1)	2 (5.1)	2 (5.1)

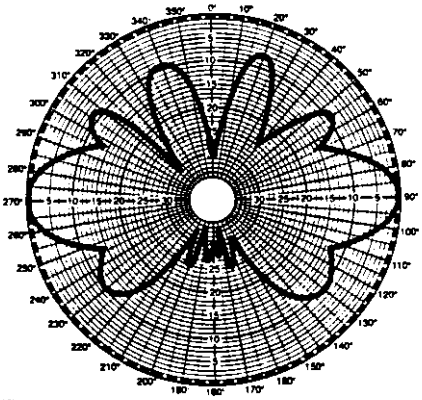
S8960B
0 dBd



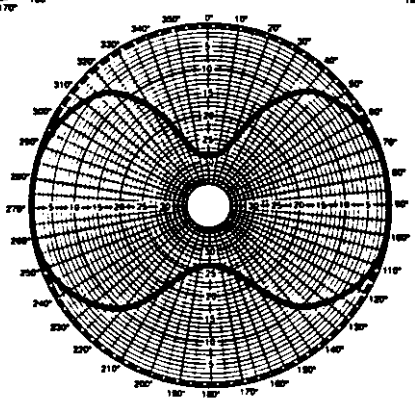
S8963B
3 dBd



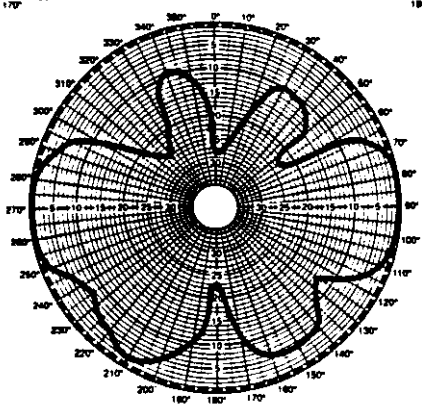
S8964B
4 dBd



H-Plane
E-Plane



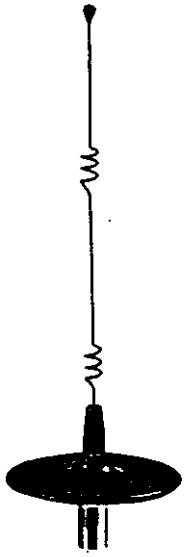
S2400B
0 dBd

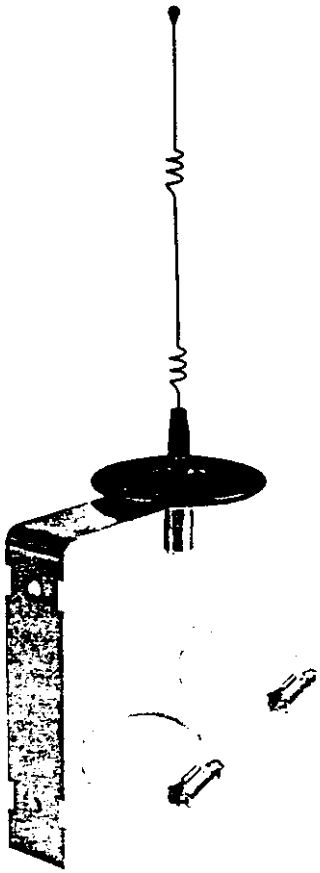


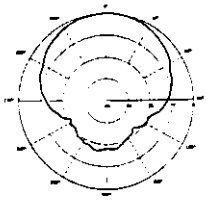
H-Plane
E-Plane

S2403B
3 dBd

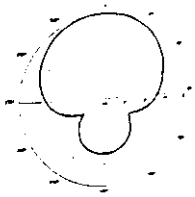
Base Station Antennas







Frequency: 900 MHz
Polarization: Horizontal



Frequency: 800 MHz
Polarization: Horizontal

MODEL	FREQUENCY
FB42400WA	2400-2485 MHz
SPECIFICATIONS	
GAIN	5dB
TYPE	5/8 over 5/8 over 1/4 wave
VSWR	1.5:1 or less
COLOR	Black
WHIP	.070, twin open coil
POWER RATING	100 watts
DIMENSION	8" H
FEED CONNECTION	N FEMALE
WINDLOAD	100 mph

MODEL	FREQUENCY
FB42400	2400-2485 MHz 5" ARM MT BRKT INCL
SPECIFICATIONS	
GAIN	5dB
TYPE	5/8 over 5/8 over 1/4 wave
VSWR	1.5:1 or less
COLOR	Black
WHIP	.070, twin open coil
POWER RATING	100 watts
FEED CONNECTION	N FEMALE
WINDLOAD	100 mph

MODEL	FREQUENCY	CONNECTOR
PA18806N	806-866 MHz	N CONN
PA18824N	824-896 MHz	N CONN
PA18902N	890-960 MHz	N CONN
SPECIFICATIONS		
TYPE	Single element panel	
GAIN	8dBi	
VSWR	1.5:1 or less Tx	
H PLANE	60 min.	
E PLANE	60 min.	
IMPEDANCE	50 ohms	
POLARIZATION	Vertical	
FRONT TO BACK RATIO	20dBi nominal	
AMBIENT TEMP	-40 to 120°	
LIFE EXPECTANCY	20 years	
DIMENSION	9.4L/6.75"W/1.15"D	

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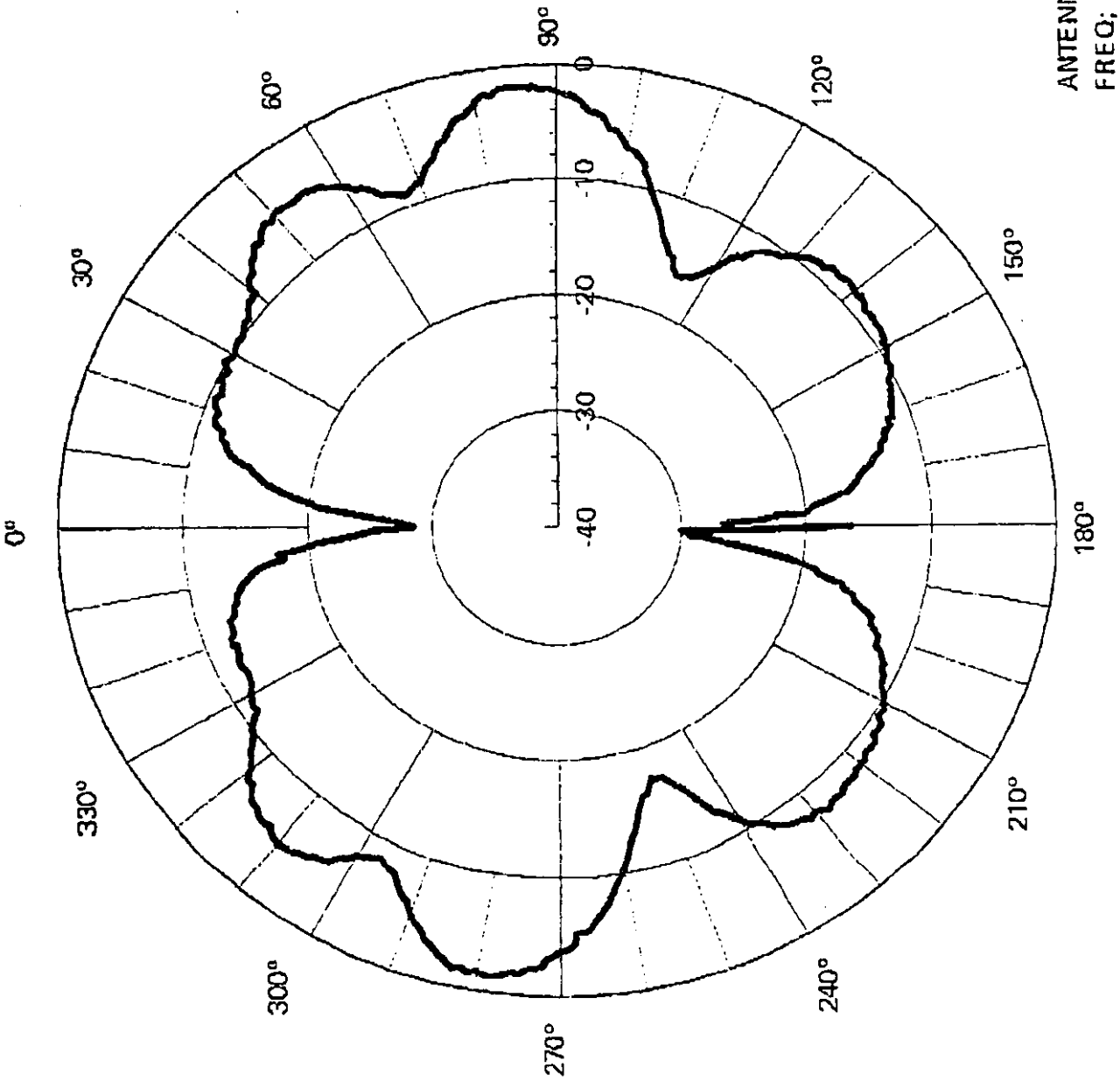
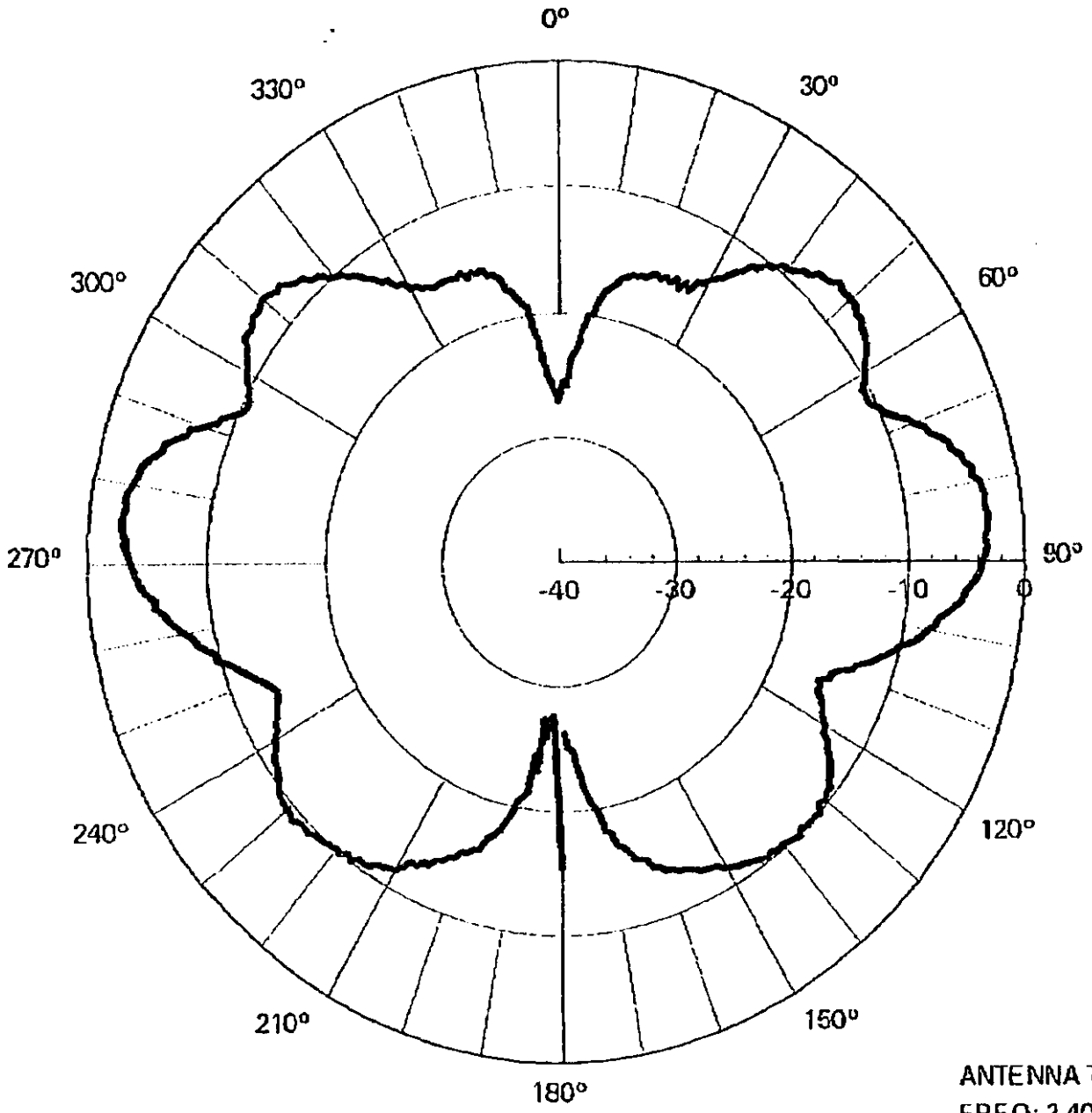
Phone #	Phone #	
Fax # 615.830.5426	Fax #	

FB3 2400
LATER CHANGED TO
FB4 2400

LARSEN ELECTRONICS
ANTENNA TYPE; Collinear G/P MODEL No. FB3-2400
FREQ; 2.485 GHZ POLORIZATION; HORIZONTAL
FILE No. FB324002 DATE; 3-19-96 ENG; JBV
NOTES; E-PLANE GAIN; RELATIVE

5dBd





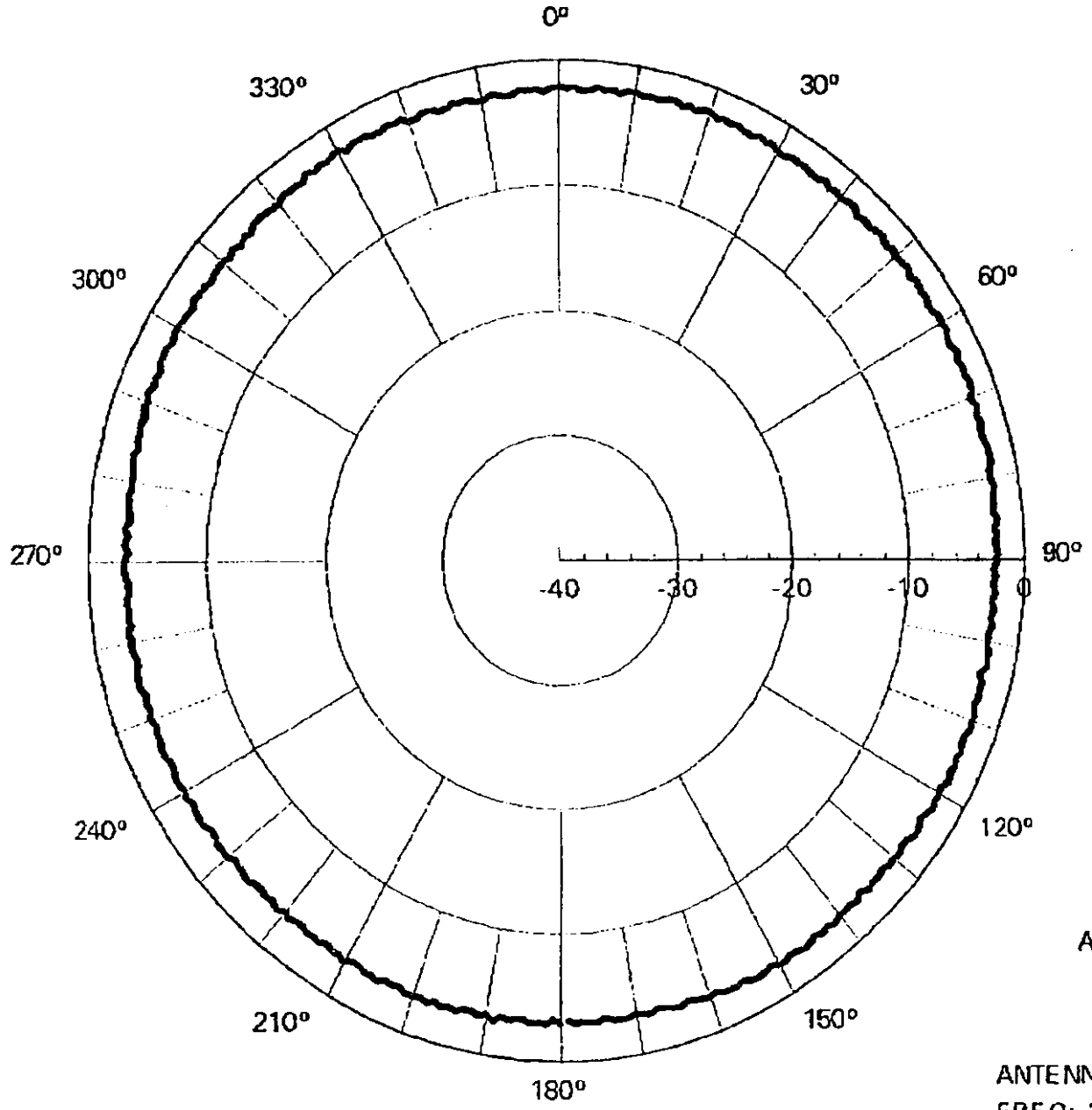
LARSEN ELECTRONICS

ANTENNA TYPE; Collinear G/P MODEL No. FB3-2400

FREQ; 2.40 GHZ POLORIZATION; HORIZONTAL

FILE No. FB324001 DATE; 3-19-96 ENG; JBV

NOTES; E-PLANE GAIN; RELATIVE



AVG. REL. GAIN; -2.7DB

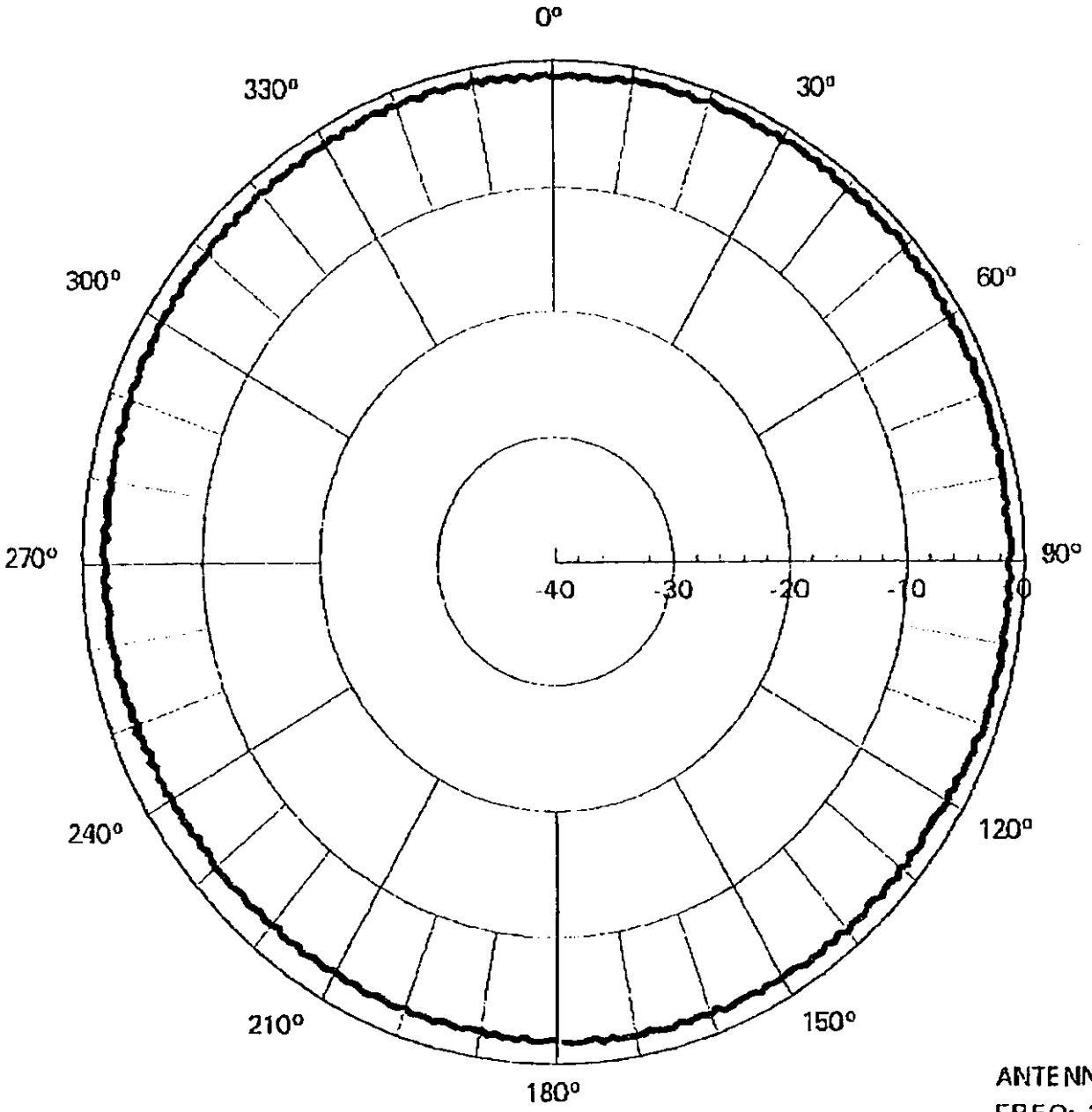
LARSEN ELECTRONICS

ANTENNA TYPE; Collinear G/P MODEL No. FB3-2400

FREQ; 2.40 GHZ POLORIZATION; VERTICAL

FILE No. FB324003 DATE; 3-19-96 ENG; JBV

NOTES; H-PLANE GAIN; RELATIVE



AVG. REL. GAIN; -1.5DB

LARSEN ELECTRONICS

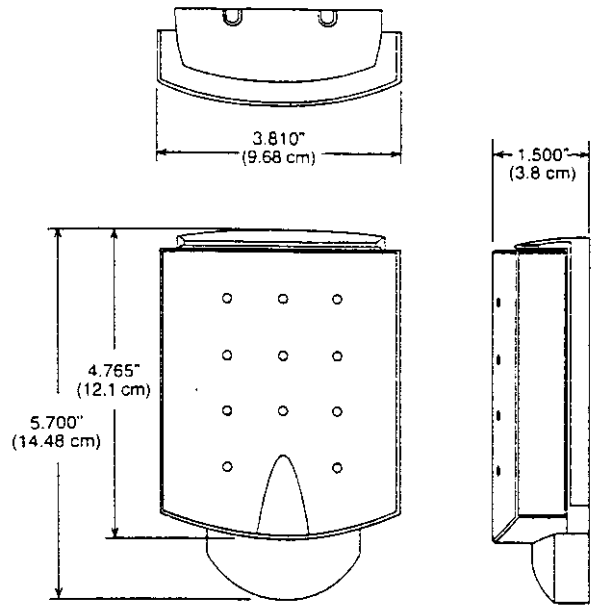
ANTENNA TYPE; Collinear G/P MODEL No. FB3-2400

FREQ; 2.485 GHZ POLORIZATION; VERTICAL

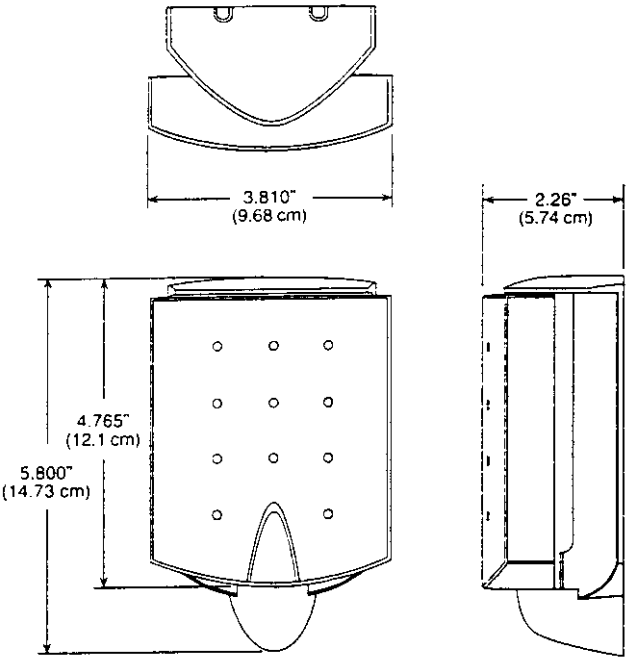
FILE No. FB324004 DATE; 3-19-96 ENG; JBV

NOTES; H-PLANE GAIN; RELATIVE

DirectLink **Series Antennas**



STANDARD WALL MOUNT



ARTICULATING MOUNT
(±30 degrees)

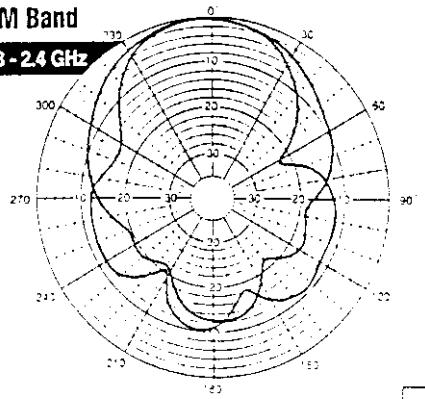
FREQUENCY MHz	MODEL	GAIN dBi	3dB Bandwidth, deg. E-Plane	H-Plane	VSWR	F/B dB	Connector (female)	Articulating Version
1710-1880	S1718AMP10SMF	7.5	60	85	1.5:1	12	SMA	Yes
1710-1880	S1718MP10SMF	7.5	60	85	1.5:1	12	SMA	No
1710-1880	S1718AMP10TNF	7.5	60	85	1.5:1	12	TNC	Yes
1710-1880	S1718MP10TNF	7.5	60	85	1.5:1	12	TNC	No
1850-1990	S1857AMP10SMF	7.5	55	80	1.5:1	12	SMA	Yes
1850-1990	S1857MP10SMF	7.5	55	80	1.5:1	12	SMA	No
1850-1990	S1857AMP10TNF	7.5	55	80	1.5:1	12	TNC	Yes
1850-1990	S1857MP10TNF	7.5	55	80	1.5:1	12	TNC	No
2300-2500	S2307AMP10SMF	7.5	50	65	1.5:1	12	SMA	Yes
2300-2500	S2307MP10SMF	7.5	50	65	1.5:1	12	SMA	No
2300-2500	S2307AMP10TNF	7.5	50	65	1.5:1	12	TNC	Yes
2300-2500	S2307AM10TNF	7.5	50	65	1.5:1	12	TNC	No
5150-5350	S5150	12	35	60	1.5:1	12		Yes
5725-5825	S5725	12	35	60	1.5:1	12		Yes

Specifications subject to change without notice.

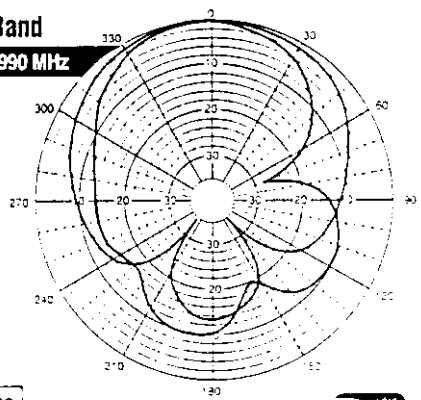
Power Handling: 50 Watts (25 Watts at 5 GHz)
Polarization: Linear
Dimensions & Weight:
Articulating versions - 5.80 x 3.81 x 2.26 in. (14.73 x 9.68 x 5.74 cm), 8 oz (.23 kg)
Non-Articulating versions - 5.70 x 3.81 x 1.50 in. (14.48 x 9.68 x 3.80 cm), 5 oz (.14 kg)
Connectors: SMA, TNC. Other connector types available on special request.
Mounting: Standard units for wall mounted. Mast mount kits available. Custom mount configurations available for volume users.
Cable: Low loss "pigtail" provided

Product also available in private labeled versions for volume users.
Notes: Specifications for 5 GHz versions are preliminary. First availability second half 1997.

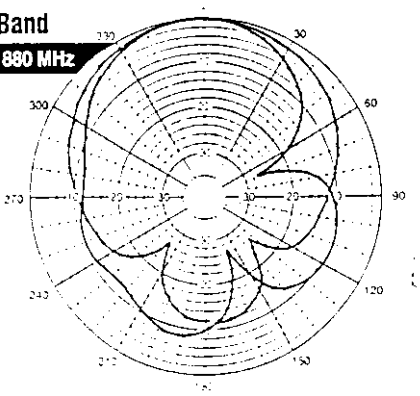
ISM Band
2.3 - 2.4 GHz

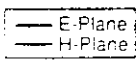


PCS Band
1850-1990 MHz



PCN Band
1710-1880 MHz





CUSHCRAFT
COMMUNICATIONS ANTENNAS

Appendix A

Processing Gain for WaveLAN-IEEE PC CARD