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TEST REPORT

PER FCC PART 15.247 FHSS

APPLICANT	Pyramid Technologies
ADDRESS	45 Gracey Ave. Meriden CT 06451 USA
FCC ID	WC7H9TX1W1
MODEL NUMBER	BDF42199
PRODUCT DESCRIPTION	FHSS Transceiver Board
DATE SAMPLE RECEIVED	May 1, 2008
DATE TESTED	May 27, 2008
TESTED BY	Joe Scoglio
APPROVED BY	Mario de Aranzeta C.E.T.
TIMCO REPORT NO	602ZUT8TestReport.pdf
TEST RESULTS	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

**THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**



Certificate # 0955-01

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ATTESTATION

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.



Certificate #0955-01

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made by me or under my supervision, at Timco Engineering, Inc. located at 849 N.W. State Road 45, Newberry, Florida 32669 USA.

Authorized By: Mario de Aranzeta
Signature: On File
Function: Lab Supervisor / Engineer
Date: June 2, 2008

REPORT SUMMARY

Purpose of Test:	To show the DUT in compliant with the requirements
Test Result:	The test results relate only to the items tested.

TEST ENVIRONMENT AND SYSTEM

Test Facility	The test sites used by Timco Engineering Inc. are located at 849 NW State Road 45 Newberry, FL 32669 USA.
Laboratory Test Condition:	Temperature: 26°C, Humidity: 55%
Test Exercise (e.g software description, test signal, etc.):	The EUT was set in continuous transmit mode of operation.
Supporting Peripheral Equipment	Not applicable. The device is a stand-alone device.
Deviation to the standard(s)	No deviation from the standard(s)
Modification to the DUT:	No modification was made to the DUT.

TEST SAMPLE DESCRIPTION

Product Description:	Transceiver Board
FCC ID:	WC7H9TX1W1
Model Number:	BDF42199
Brand Name:	Pyramid
Operating Frequency:	902.2 – 927.6 MHz
Number of Channels:	128 Channels
Max. Output Power:	0.950 Watts conducted
Type of Modulation:	FSK
EUT Power Source:	Primary Power – 110-120Vac/50-60 MHz
	Secondary Power – N/A
Test Item:	Prototype
Type of Equipment	Mobile
Antennas	External Dipole
Antenna Connector	Reverse SMA

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/20/07	3/19/10
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Antenna: Biconnical	Eaton	94455-1	1057	CAL 12/12/07	12/12/09
Antenna: Biconnical	Eaton	94455-1	1096	CAL 10/11/06	10/11/08
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 7/18/07	7/18/09
Analyzer Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 5/17/07	5/17/09
Analyzer Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 5/17/07	5/17/09
Analyzer Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 5/17/07	5/17/09
LISN	Electro-Metrics	ANS-25/2	2604	CAL 10/5/06	10/5/08
LISN	Electro-Metrics	EM-7820	2682	CAL 7/23/07	7/23/09
Antenna: Log-Periodic	Eaton	96005	1243	CAL 12/14/07	12/14/09

TEST PROCEDURES

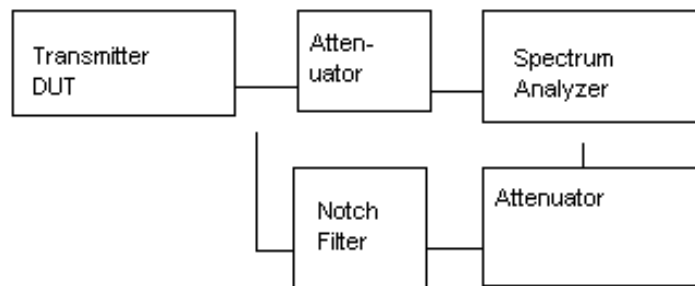
POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI C63.4-2003 using a 50uH LISN. Both lines were observed with the DUT transmitting. The resolution bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

BANDWIDTH 20 dB: The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 1 MHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

POWER OUTPUT: The RF power output was measured at the antenna feed point using a peak power meter.

ANTENNA CONDUCTED EMISSIONS: The RBW = 100 kHz, VBW = 300 kHz and the span set to 10 MHz and the spectrum was scanned from 30 MHz to the 10th Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz.

Spurious Emissions at
Antenna Terminals

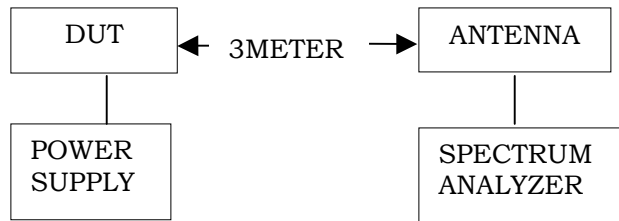


The spectrum was scanned to the tenth harmonic.

RADIATION INTERFERENCE: The test procedure used was ANSI C63.4-2003 using an Agilent spectrum receiver with preselector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

[Continued]

RADIATED SPURIOUS EMISSIONS: The procedure used was ANSI standard C63.4-2003 & the FCC/OET Guidance on Measurements for Spread Spectrum Systems – Public Notice DA 00-705.



Equipment placed 80cm above ground on a rotatable platform.

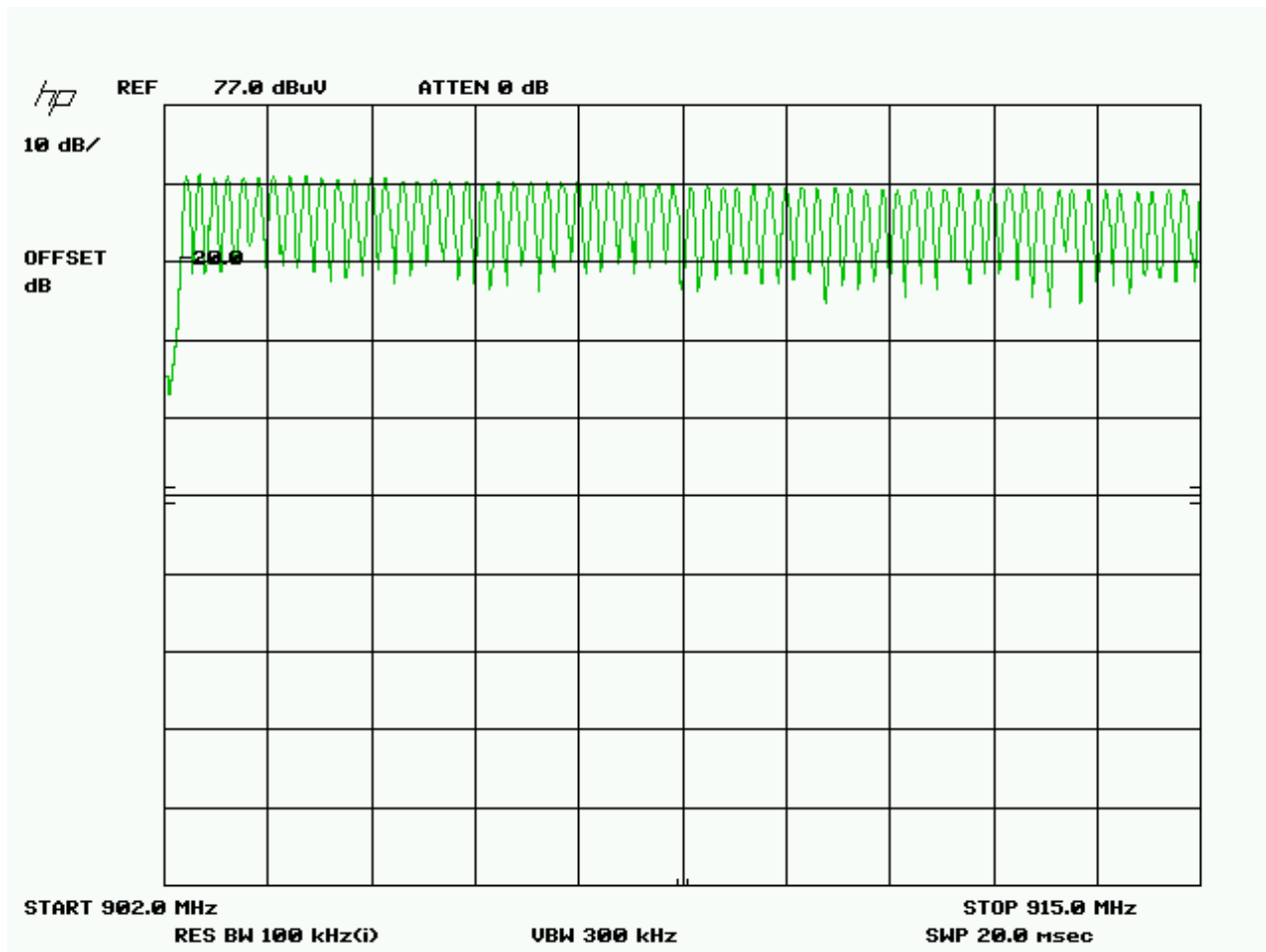
NUMBER OF HOPPING CHANNELS

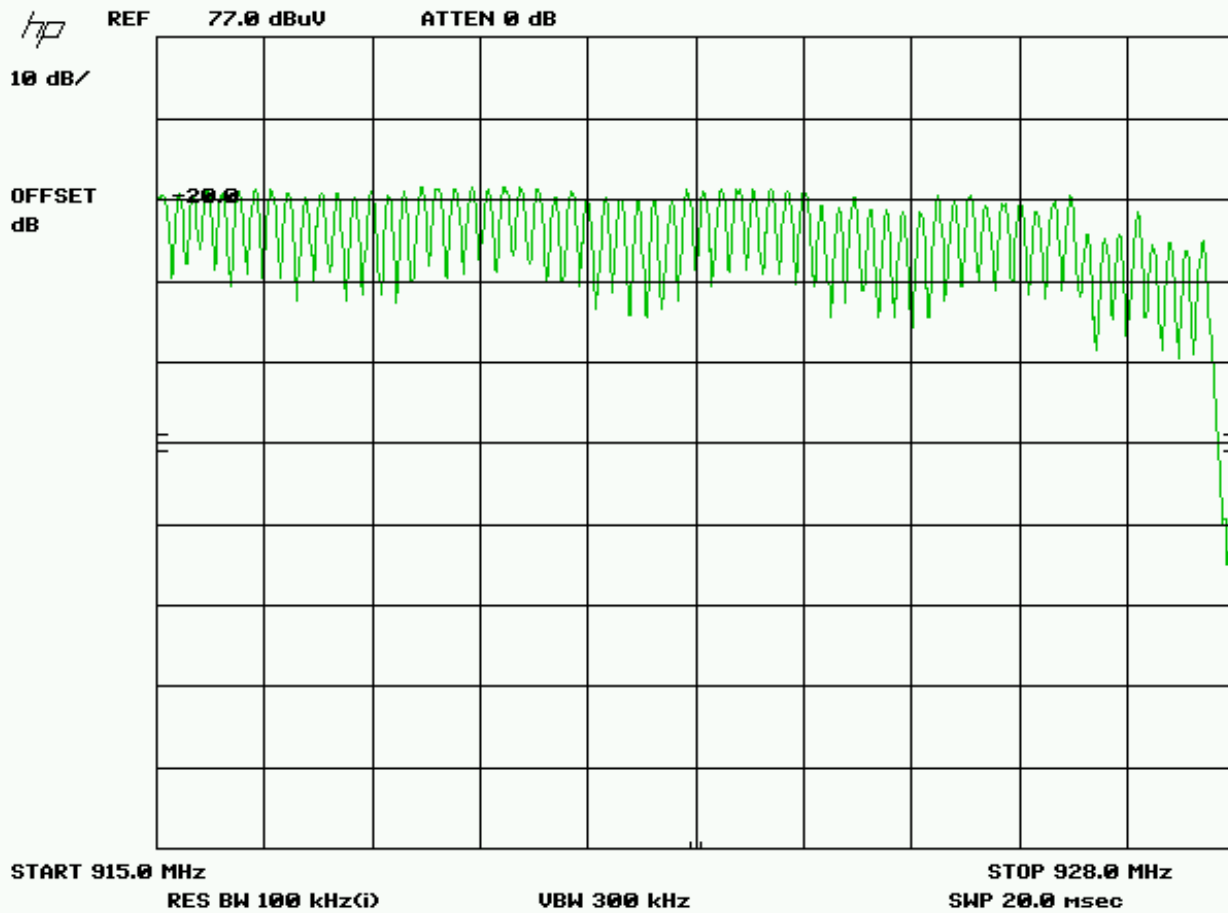
RULES PART NO.: 15.247(a)(1)

REQUIREMENTS:

902-928 MHz	If the 20 dB bandwidth is less than 250 kHz, the system shall use at least 50 hopping frequencies.
	If the 20 dB bandwidth is 250 kHz or greater, the system shall use at least 25 hopping frequencies.
2400-2483.5 MHz	At least 15 channels
5725-5850 MHz	At least 75 channels

TEST DATA: There are 128 hopping channels





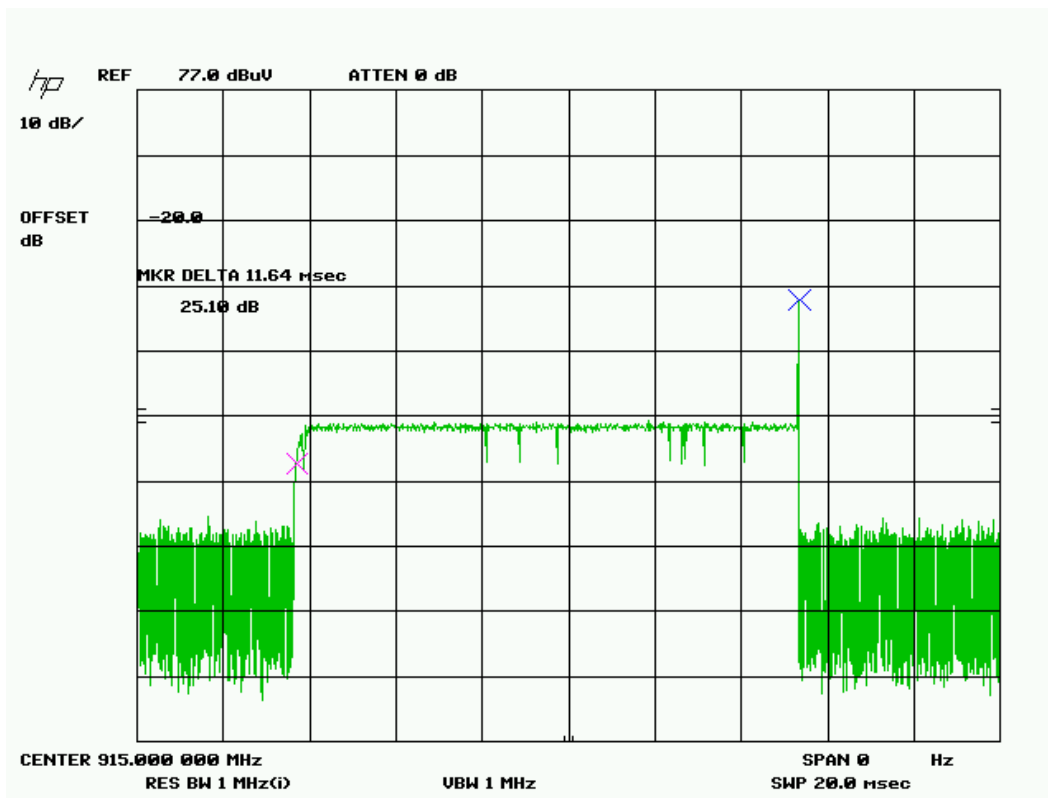
DWELL TIME OF A HOPPING CHANNEL

RULES PART NO.: 15.247(a)(1)(i)

REQUIREMENTS:

902-928 MHz	If 20 dB bandwidth is less than 250 kHz, Dwell time ≤ 0.4 seconds in a 20 second period.
	If 20 dB bandwidth is 250 kHz or greater, Dwell time ≤ 0.4 seconds in a 10 second period.
2400-2483.5 MHz	≤ 0.4 seconds in a 0.4 seconds multiplied the number of hopping channels employed.
5725-5850 MHz	≤ 0.4 seconds in a 30 second period.

TEST DATA: The dwell time is 12 msec.



Three places in the band were measured and the worst case presented above.

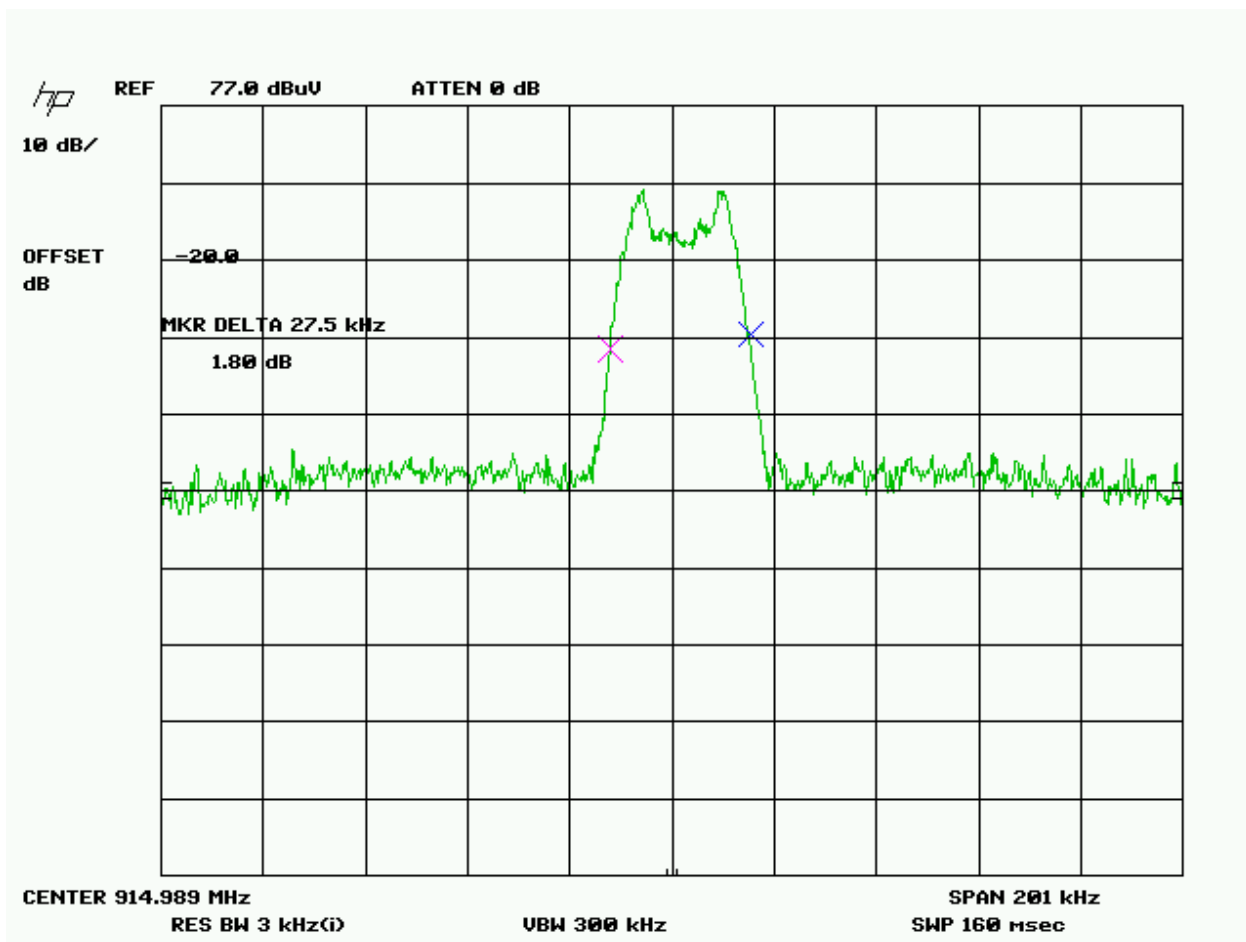
20 dB BANDWIDTH

RULES PART NO.: 15.247(a)(2)

REQUIREMENTS: The 20 dB bandwidth must be less than 500 kHz.

TEST DATA: See the following plots

Three places in the band were measured and the worst case presented above.

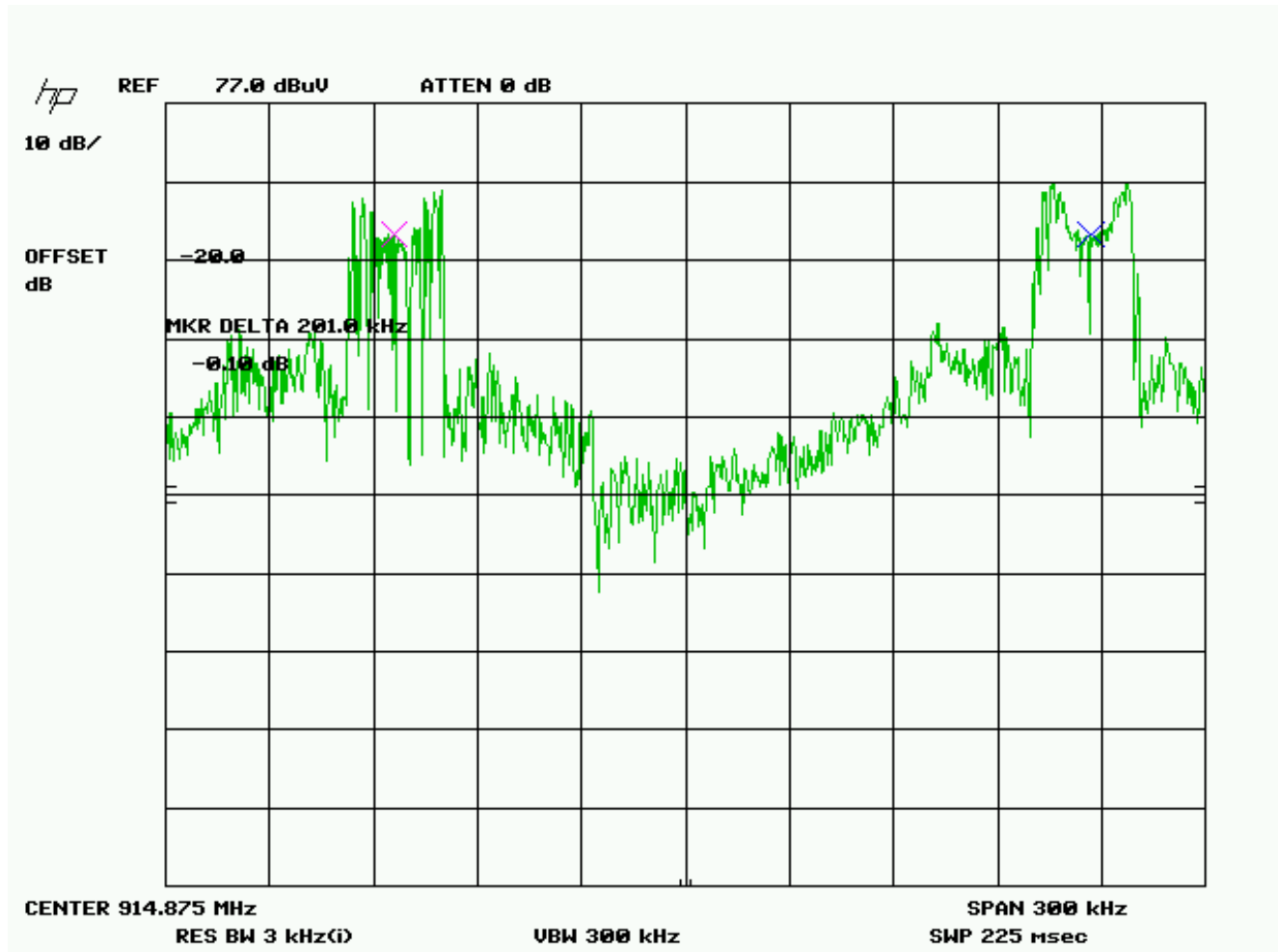


CARRIER FREQUENCY SEPARATION

RULES PART NO.: 15.247(a)(2)

REQUIREMENTS: The hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

TEST DATA: 200 kHz



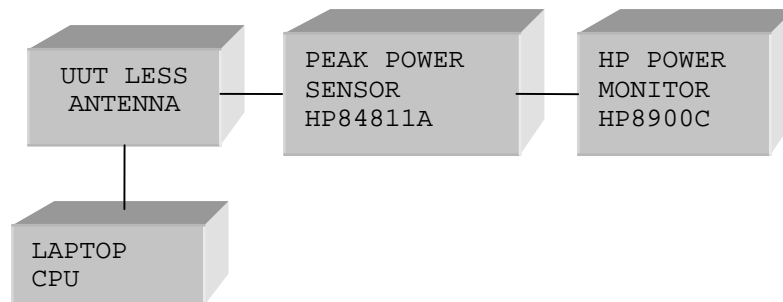
POWER OUTPUT

RULES PART NO.: 15.247(b)

REQUIREMENTS: The maximum peak output power shall not exceed 1 watt (30 dBm). If directional transmitting antennas with a gain of more than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST METHOD: Power was measured by disconnecting the antennas and measuring across a 50 ohm load as recommended by the manufacturer using a HP peak power meter Model 8900C. The antenna is non-directional and doesn't exceed 6 dBi gain. The power output was measured at three places in the band highest is reported below.

The RF power output was measured at the antenna feed point by removing the permanent antenna and connecting the UUT to a peak power meter, Agilent Model No. 8900C.



TEST DATA:

Three places in the band were measured and the highest power presented above.

Conducted Output Power was measured at three places in the band. The maximum output power is 0.950 Watts

Frequency MHz	Power Watts
902.5	0.90
915	0.95
927.5	0.90

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

RULES PART NO.: 15.247(c)

REQUIREMENTS: Emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

Note: The spectrum was scanned to the tenth harmonic.

Frequency	dBc
914.9	0
1829.8	64.5
2744.7	63.8
3659.6	73.4
4574.5	101.9
5489.4	107.4
6404.3	92.6
7319.2	108.6
8234.1	100.2
9149	88.7
903	0
1806	65.0
2709	63.0
3612	73.4
4515	101.0
5418	103.0
6321	92.2
7224	106.8
8127	100.0
9030	88.0
927	0
1854	64.3
2781	62.0
3708	71.3
4635	100.5
5562	105.6
6489	90.1
7416	105.6
8343	100.0
9270	86.8

FIELD STRENGTH OF SPURIOUS EMISSIONS

RULES PART NO.: 15.247(c), 15.205 & 15.209(b)

REQUIREMENTS:

§15.247(c) & §15.205	
(Fundamental) Frequency	(Field Strength) Limits
902 – 928 MHz	127.37 dBuV/m
2.4 – 2.4835 GHz	
	54 dBuV/m @3m
§15.209	
30 - 88 MHz	40 dBuV/m @3M
88 - 216 MHz	43.5 dBuV/m @3M
216 - 960 MHz	46 dBuV/m @3M
ABOVE 960 MHz	54 dBuV/m

Emissions that fall in the restricted bands (15.205) must be less than or equal to 500 uV/m (54 dBuV/m). Spurious not in a restricted band must be 20 dBc.

Harmonics were measured to the 10th harmonic.

TEST DATA:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Duty cycle dB	Field Strength dBuV/m	Margin dB
902.2	902.20	91.8	H	4.82	23.97		120.59	6.79
902.2	902.20	96.1	V	4.82	23.17		124.09	3.29
902.2	1,804.40	45.6	H	1.60	30.34	18.5	59.04	45.05
902.2	1,804.40	46.1	V	1.60	30.34	18.5	59.54	44.55
902.2	2,706.60	31.1	H	1.98	32.68	18.5	47.26	6.74
902.2	2,706.60	34.8	V	1.98	32.68	18.5	50.96	3.04
902.2	3,608.80	31.0	H	2.28	33.19	18.5	47.97	6.03
902.2	3,608.80	33.6	V	2.28	33.19	18.5	50.57	3.43
902.2	4,511.10	15.0	H	2.55	33.90	18.5	32.95	21.05
902.2	4,511.10	21.0	V	2.55	33.90	18.5	38.95	15.05
902.2	5,413.30	12.1	H	2.87	34.50	18.5	30.97	23.03
902.2	5,413.30	14.6	V	2.87	34.50	18.5	33.47	20.53
902.2	6,315.50	18.4	H	3.16	35.55	18.5	38.61	15.39
902.2	6,315.50	22.5	V	3.16	35.55	18.5	42.71	11.29
902.2	7,217.70	19.0	H	3.37	35.56	18.5	39.43	14.57
902.2	7,217.70	19.8	V	3.37	35.56	18.5	40.23	13.77
902.2	8,119.90	27.9	H	3.62	35.72	18.5	48.74	5.26
902.2	8,119.90	29.8	V	3.62	35.72	18.5	50.64	3.36
902.2	9,022.20	26.9	H	3.80	36.02	18.5	48.22	5.78
902.2	9,022.20	29.1	V	3.80	36.02	18.5	50.42	3.58

[Continued]

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Duty cycle dB	Field Strength dBuV/m	Margin dB
915.0	915.00	92.6	H	4.35	24.85		121.80	5.59
915.0	915.00	97.3	V	4.35	23.60		125.25	2.13
915.0	1,830.00	45.7	H	1.62	30.54	18.5	59.36	45.89
915.0	1,830.00	46.0	V	1.62	30.54	18.5	59.66	45.59
915.0	2,745.00	36.2	V	2.00	32.70	18.5	52.4	1.6
915.0	2,745.00	37.1	H	2.00	32.70	18.5	53.3	0.7
915.0	3,660.00	31.3	H	2.30	33.23	18.5	48.33	5.67
915.0	3,660.00	35.9	V	2.30	33.23	18.5	52.93	1.07
915.0	4,575.00	22.0	V	2.57	33.92	18.5	39.99	14.01
915.0	4,575.00	22.0	H	2.57	33.92	18.5	39.99	14.01
915.0	5,490.00	17.8	V	2.90	34.59	18.5	36.79	17.21
915.0	5,490.00	18.0	H	2.90	34.59	18.5	36.99	17.01
915.0	6,405.00	13.2	H	3.18	35.62	18.5	33.5	20.5
915.0	6,405.00	15.0	V	3.18	35.62	18.5	35.3	18.7
915.0	7,320.00	19.6	H	3.40	35.54	18.5	40.04	13.96
915.0	7,320.00	23.7	V	3.40	35.54	18.5	44.14	9.86
915.0	8,235.00	24.5	H	3.65	35.75	18.5	45.4	8.6
915.0	8,235.00	26.7	V	3.65	35.75	18.5	47.6	6.4
915.0	9,150.00	24.8	H	3.82	36.15	18.5	46.27	7.73
915.0	9,150.00	25.3	V	3.82	36.15	18.5	46.77	7.23

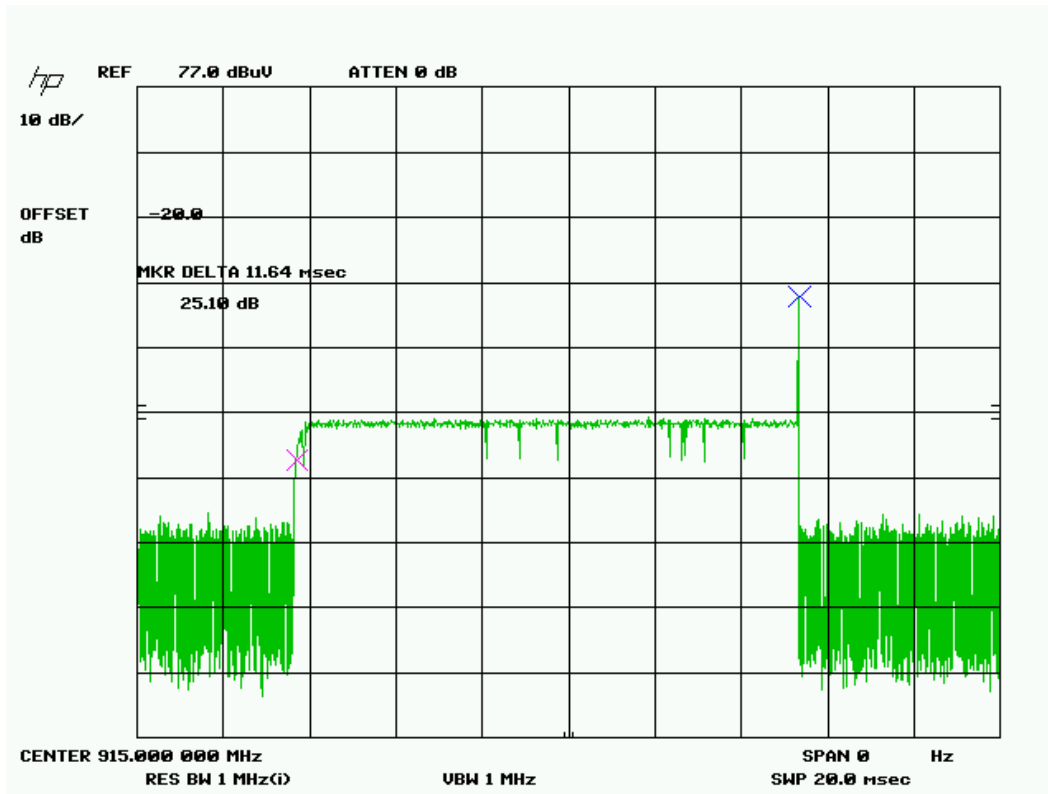
[Continued]

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Duty cycle dB	Field Strength dBuV/m	Margin dB
927.6	927.60	92.4	H	3.88	26.64		122.92	4.46
927.6	927.60	97.2	V	3.88	25.24		126.32	1.06
927.6	1,855.20	46.4	H	1.63	30.74	18.5	60.27	46.05
927.6	1,855.20	47.0	V	1.63	30.74	18.5	60.87	45.45
927.6	2,782.80	36.2	V	2.01	32.71	18.5	52.42	1.58
927.6	2,782.80	36.9	H	2.01	32.71	18.5	53.12	0.88
927.6	3,710.50	32.0	V	2.31	33.27	18.5	49.08	4.92
927.6	3,710.50	32.7	H	2.31	33.27	18.5	49.78	4.22
927.6	4,638.10	21.8	V	2.59	33.93	18.5	39.82	14.18
927.6	4,638.10	22.2	H	2.59	33.93	18.5	40.22	13.78
927.6	5,565.70	16.9	H	2.93	34.69	18.5	36.02	17.98
927.6	5,565.70	19.3	V	2.93	34.69	18.5	38.42	15.58
927.6	6,493.20	17.0	H	3.20	35.69	18.5	37.39	16.61
927.6	6,493.20	17.2	V	3.20	35.69	18.5	37.59	16.41
927.6	7,420.80	21.9	H	3.43	35.52	18.5	42.35	11.65
927.6	7,420.80	25.3	V	3.43	35.52	18.5	45.75	8.25
927.6	8,348.40	27.2	V	3.67	35.77	18.5	48.14	5.86
927.6	8,348.40	29.5	H	3.67	35.77	18.5	50.44	3.56
927.6	9,276.10	29.0	V	3.83	36.28	18.5	50.61	3.39
927.6	9,276.10	29.0	H	3.83	36.28	18.5	50.61	3.39

DUTY CYCLE

Total # of pulses: 11.64 in 100 ms

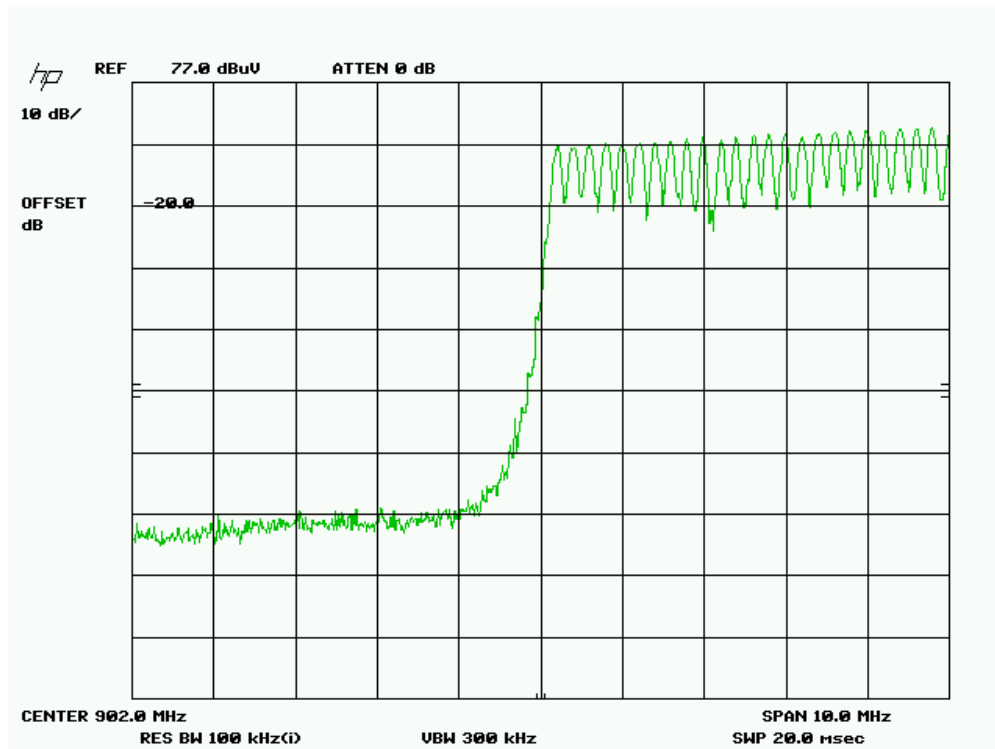
Duration of pulse: $20 \cdot \log((11.64)/100) = 20 \cdot \log(0.1164) = 18.68 \text{ dB}$

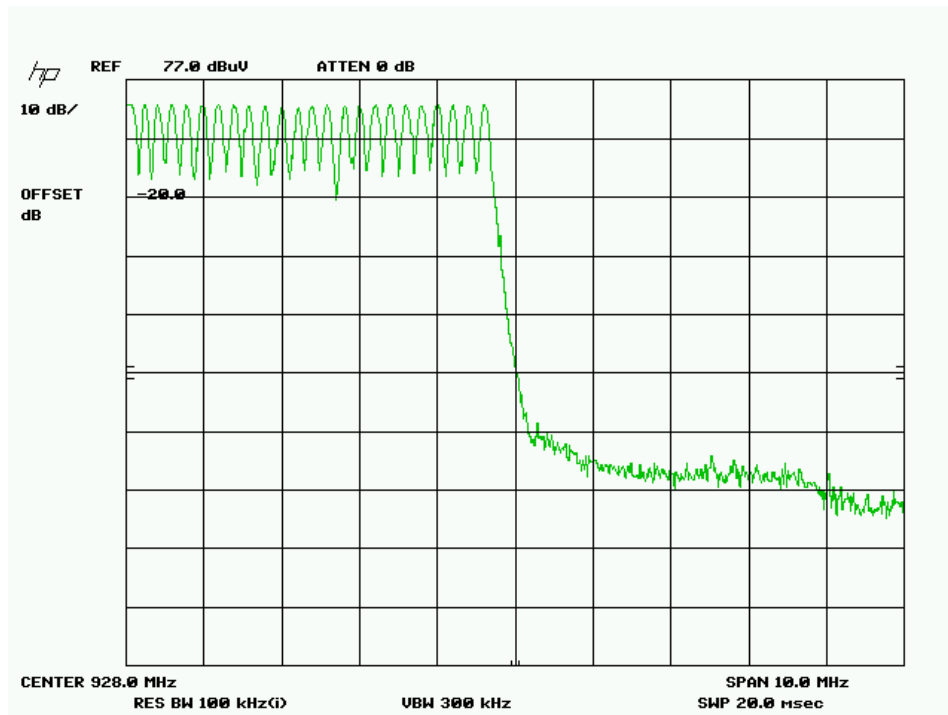


RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

REQUIREMENTS: Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54dBuV/m). Emissions not in the restricted band must be 20 dBc.

TEST DATA: The plots are presented below.





POWER LINE CONDUCTED INTERFERENCE

RULES PART NO.: 15.207

REQUIREMENTS:

Emission Frequency (MHz)	Conducted Limit (dBμV)	
	Quasi-peak (QP)	Average (AV)
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50
* Decreases with the logarithm of the frequency.		

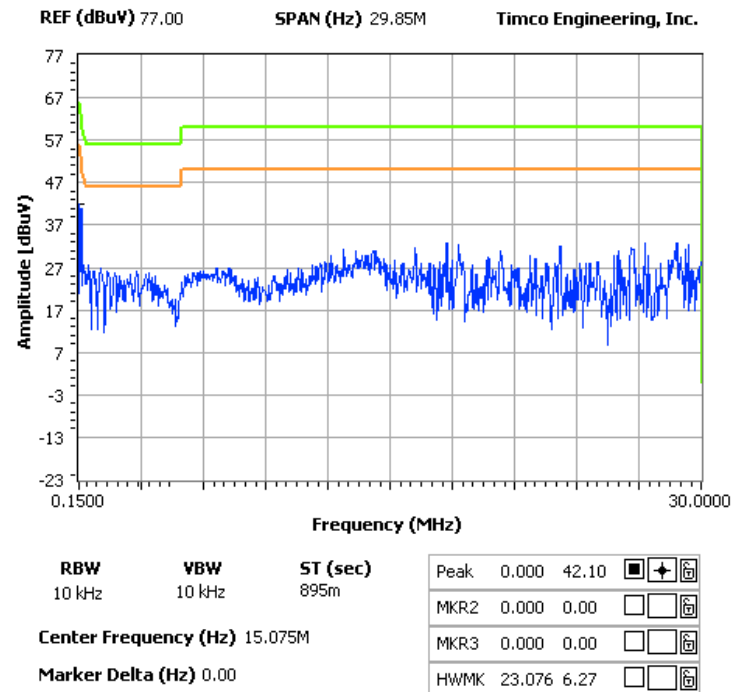
TEST DATA: This is Host specific data for the following hosts:
Unit with Part # 42377
Unit with Part # 9T1WI

See plots that follow.

NOTES:

ac line conducted line 1

FCC 15.107 Mask Class B



APPLICANT: Pyramid Technolgoies
FCC ID: WC7H9TX1W1
REPORT: X:\P\PYRAMID\602ZUT8\602ZUT8TestReport.doc

NOTES:

ac line conducted line 2

FCC 15.107 Mask Class B

