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COMPLIANCE TEST REPORT

PER FCC PART 15.247 FHSS INDUSTRY CANADA RSS-210

APPLICANT	Safetran Systems Corporation
ADDRESS	7775 Baymeadows Way Suite 201 Jacksonville, FL 32256 USA
FCC ID Label	FCC ID: LTY80319
IC Label	IC: 2347A-80319
Model Number	A80319
PRODUCT DESCRIPTION	Sensor
DATE SAMPLE RECEIVED	5/29/2008
DATE TESTED	6/25/2008
TESTED BY	Joe Scoglio
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	1140AUT8TestReport.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 and demonstrate that the equipment complies with the appropriate standards.

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.



Testing Certificate #0955-01

AUTHORIZED BY: Mario de Aranzeta

SIGNATURE: On File

FUNCTION: Lab Supervisor/ Test Engineer

DATE: June 30, 2008

APPLICANT: SAFETRAN SYSTEMS CORPORATION

FCC ID: LTY80319

REPORT: X:\S\Safetran\1140AUT8\Extra1140AUT8\1140AUT8TestReport.doc

REPORT SUMMARY

Disclaimer:	The test results relate only to the items tested.
Purpose of Test:	To demonstrate that the DUT is compliant with FCC Pt 15.247 requirements for a FHSS radio.
Applicable Standards:	FCC Pt 15.247, ANSI C63.4: 2003, ANSI TIA-603: 2004, FCC Pt 15.109, RSS-210, RSS-GEN
Related Reports:	N/A

TEST ENVIRONMENT AND TEST SETUP

Test Facilities:	All measurements were made at one or more of the test sites of TIMCO ENGINEERING INC. located at 849 N.W. State Road 45, Newberry, FL 32669.
Laboratory Test Conditions:	Temperature: 26°C, Humidity: 55%
Test Exercise:	The DUT was set in continuous transmit mode of operation.
Deviation to the Standards:	There was no deviation from the standard.
Modification to the DUT:	No modification was made.
Supporting Accessories:	None

DUT DESCRIPTION

Applicant:	Safetran Systems Corporation
Product Description:	Sensor
FCC ID:	LTY80319
IO Label:	IC: 2347A-83019
Model Number:	A80319
Family Model(s):	N/A
Operating Frequency:	902 ~ 928 MHz
Type of Modulation:	GFSK
EUT Power Source:	Primary Power – any > 9V
	Secondary Power – N/A
Test Item:	Prototype
Type of Equipment	Fixed
Antenna	Fixed
Antenna Connector	Integral

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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
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 452	3138A07786 3144A20661	CAL 11/30/07	11/30/09
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 11/30/07	11/30/09
Analyzer Tan tower Quasi-Peak Adapter	HP	85650A	303A01690	CAL 11/30/07	11/30/09
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
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	CAL 7/18/07	7/18/09
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 Receiver	Eaton	96005	1243	CAL 12/14/07	12/14/09
	R & S	ESIB40		11/25/2007	11/25/2009

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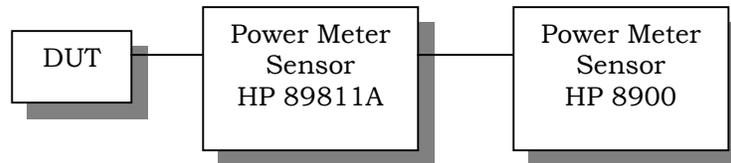
TEST PROCEDURES

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.

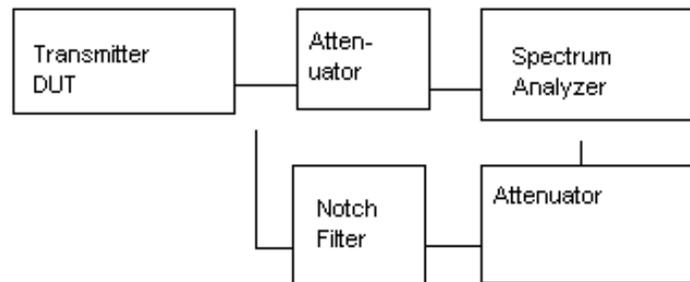
RF Power Output: The RF power output was measured at the antenna feed point using a peak power meter.

Output Power Test Setup Diagram



ANTENNA CONDUCTED EMISSIONS: The RBW = 100 kHz, VBW = 300 kHz and the span set to 10.0 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. Power was measured by disconnecting the antennas and measuring across a 50 ohm load as recommended by the manufacturer using a peak power meter. 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.

Spurious Emissions at Antenna Terminals





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.

RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND: An in band field strength measurement of the fundamental emission using the RBW and detector function required by ANSI C63.4-2003 and the FCC rules.

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: The following plots represent the emissions read for power line conducted. Both lines were observed

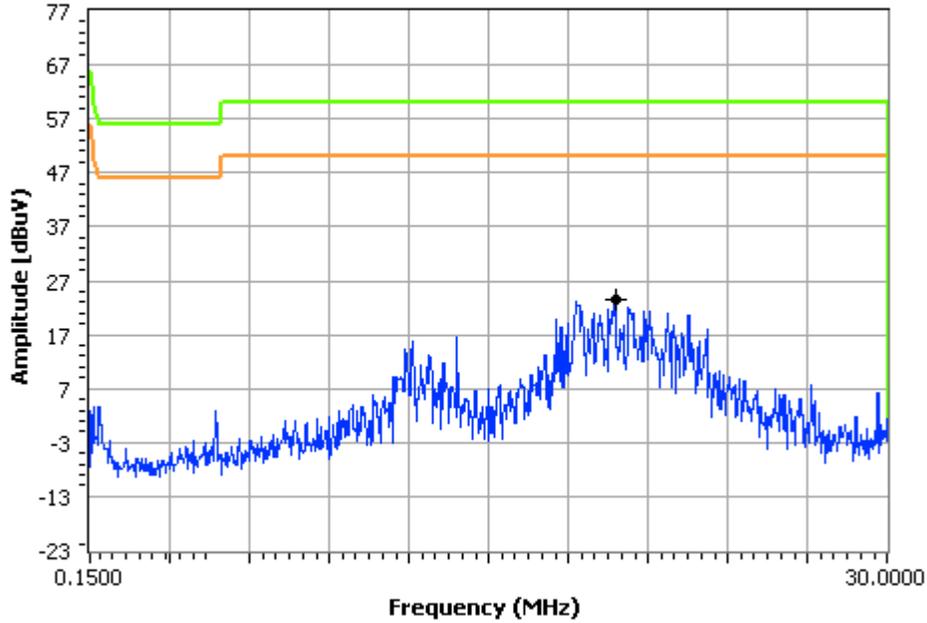
Powerline Conducted Emissions Line 1

NOTES:

ac line conducted line 1 LAB SUPPLY

FCC 15.107 Mask Class B

REF (dBuV) 77.00 SPAN (Hz) 29.85M Timco Engineering, Inc.



RBW 10 kHz	VBW 10 kHz	ST (sec) 895m	Peak 19.821 23.50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Center Frequency (Hz) 15.075M			MKR2 0.000 0.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marker Delta (Hz) 0.00			MKR3 0.000 0.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			HWMK 23.076 6.27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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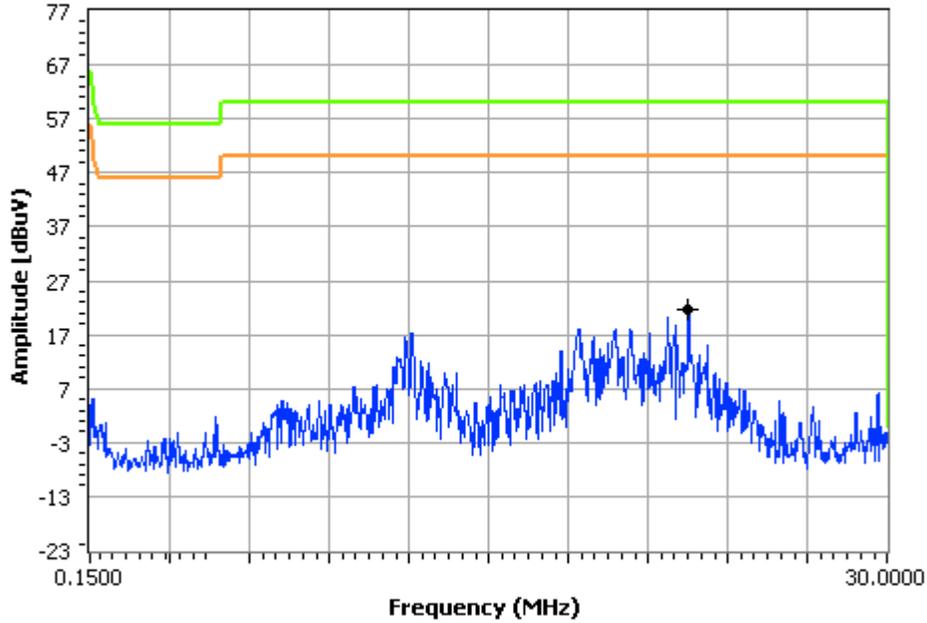
Powerline Conducted Emissions Line 2

NOTES:

ac line conducted line 2 LAB SUPPLY

FCC 15.107 Mask Class B

REF (dBuV) 77.00 SPAN (Hz) 29.85M Timco Engineering, Inc.



RBW 10 kHz	VBW 10 kHz	ST (sec) 895m	Peak 22.567 21.80	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Center Frequency (Hz) 15.075M			MKR2 0.000 0.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marker Delta (Hz) 0.00			MKR3 0.000 0.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			HWMK 23.076 6.27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

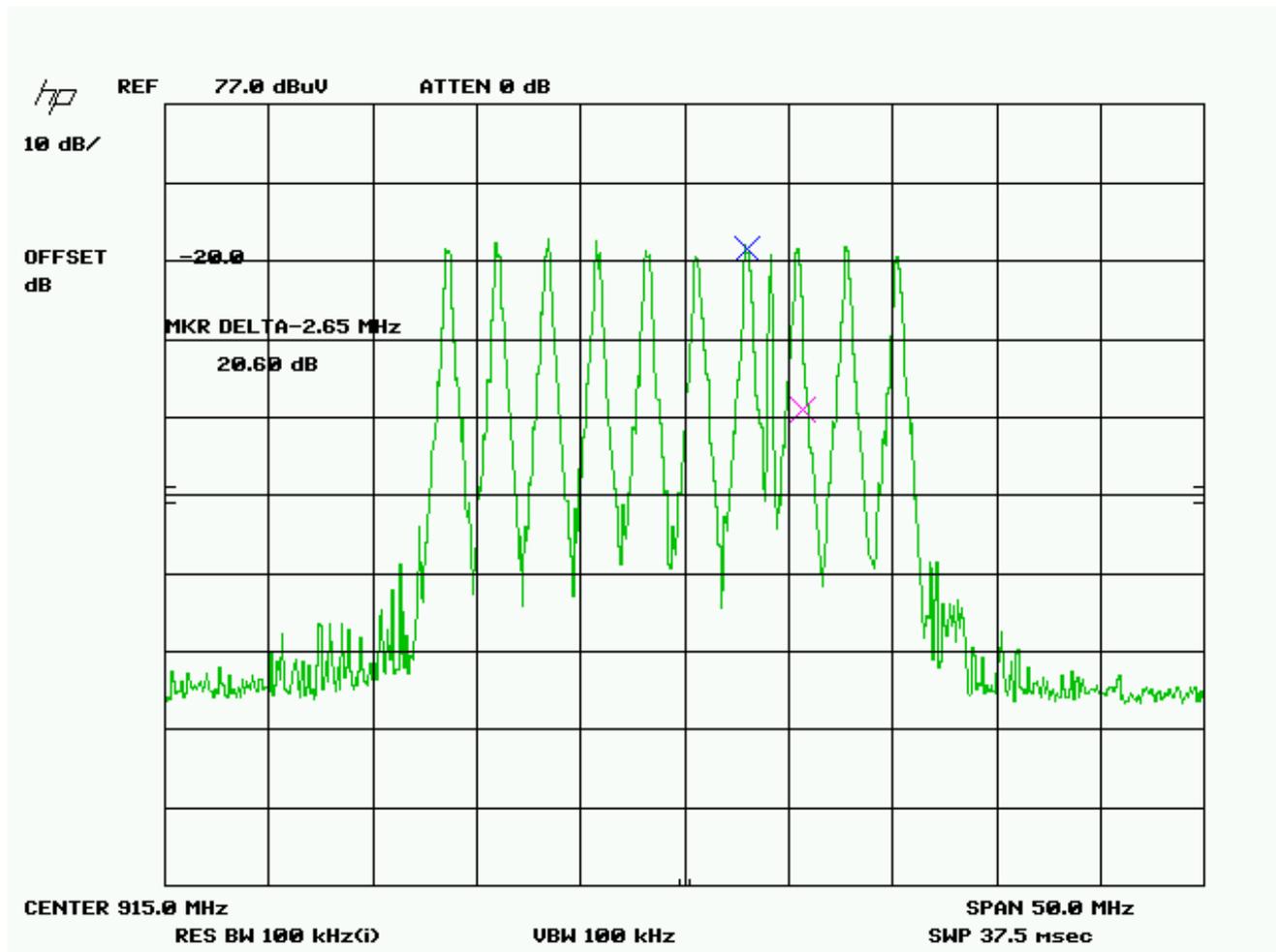
NUMBER OF HOPPING CHANNELS

Rules Part No.: 15.247(a)(1)

Requirements:

902-928 MHz	If the 20 dB bandwidth is < 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 10 hopping channels



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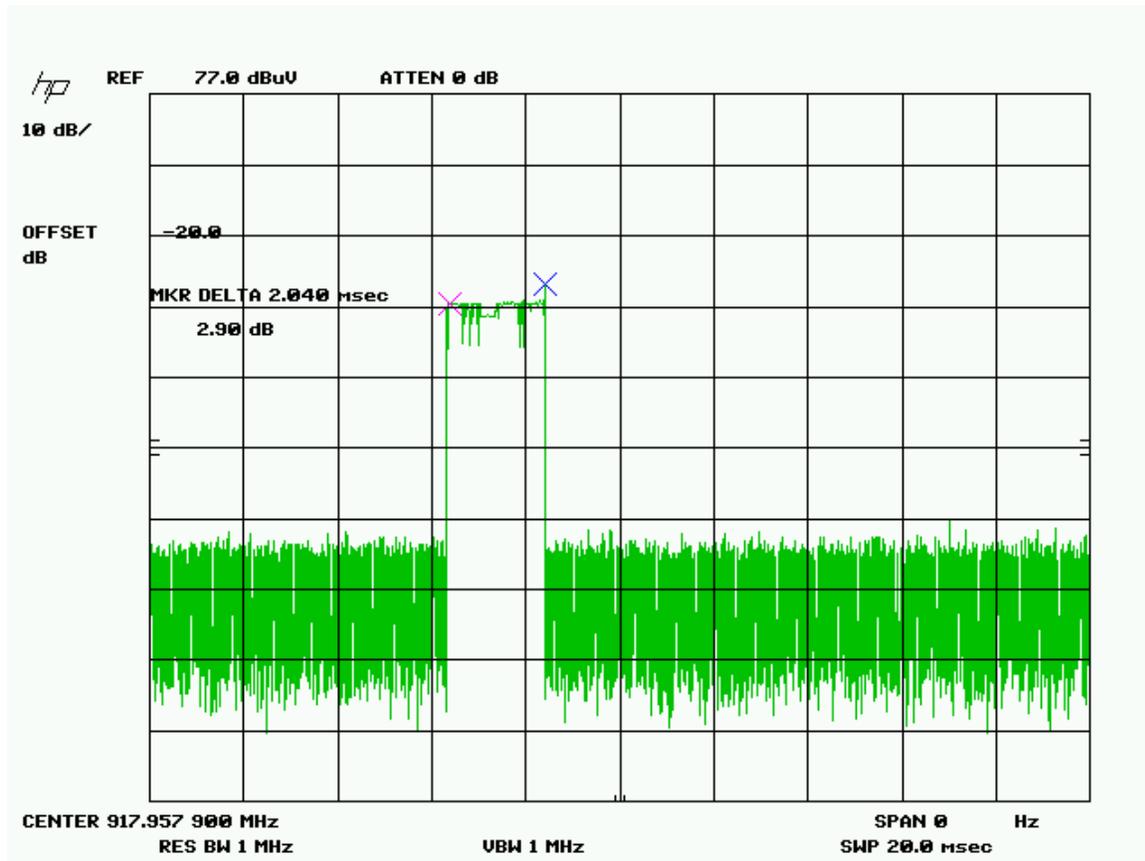
DWELL TIME OF A HOPPING CHANNEL

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

REQUIREMENTS:

902-928 MHz	If 20 dB bandwidth is < 250 kHz, average time of occupancy of any frequency shall not exceed 0.4 sec in 20 seconds.
	If 20 dB bandwidth is 250 kHz or greater, dwell time < = 0.4 seconds n 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 2.04 msec per hop. Three places in the band were measured and the worst case presented.

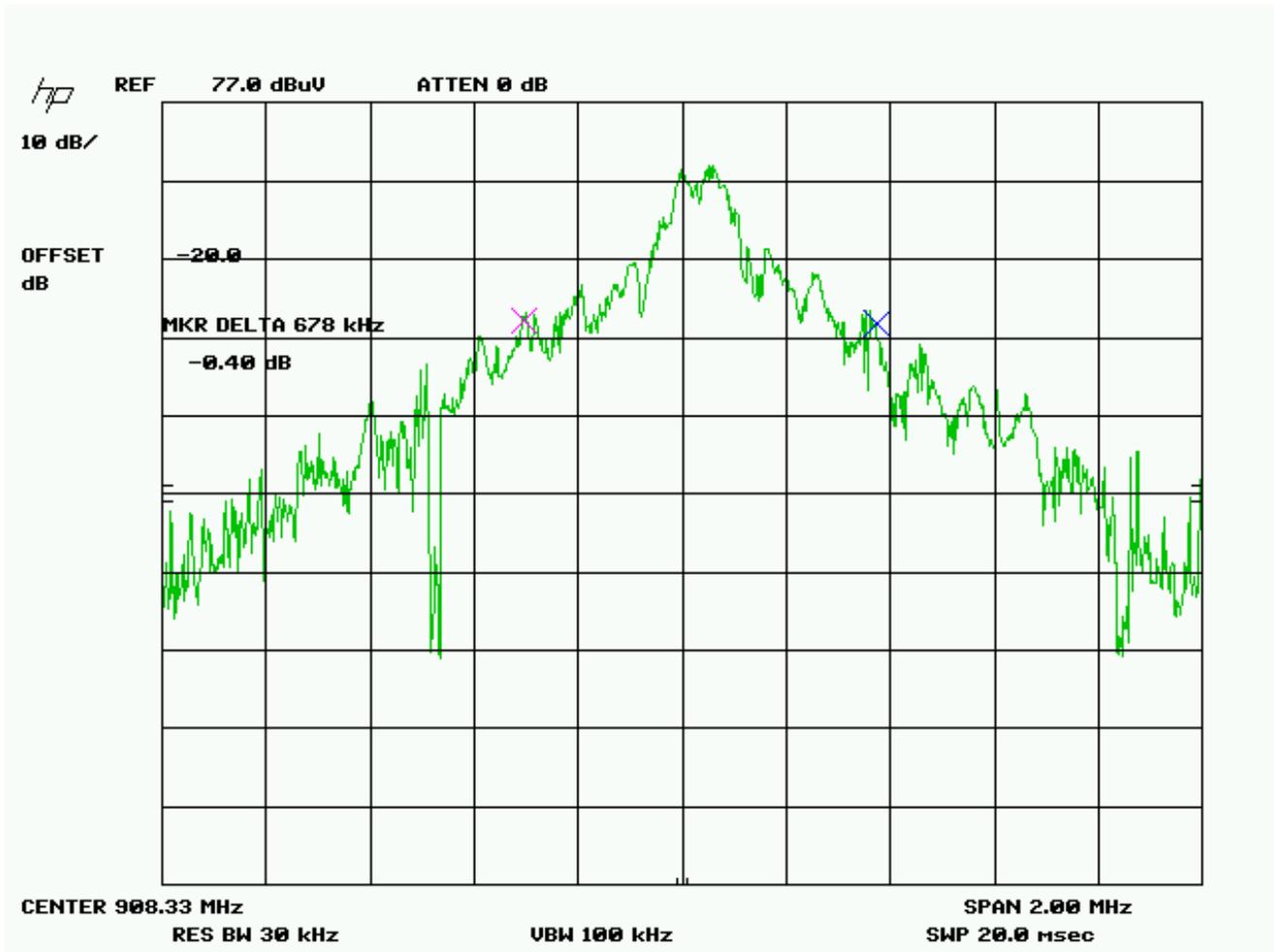


20 dB BANDWIDTH

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

REQUIREMENTS: The 20 dB bandwidth must be at least 500 kHz.

TEST DATA: See the following plot(s)



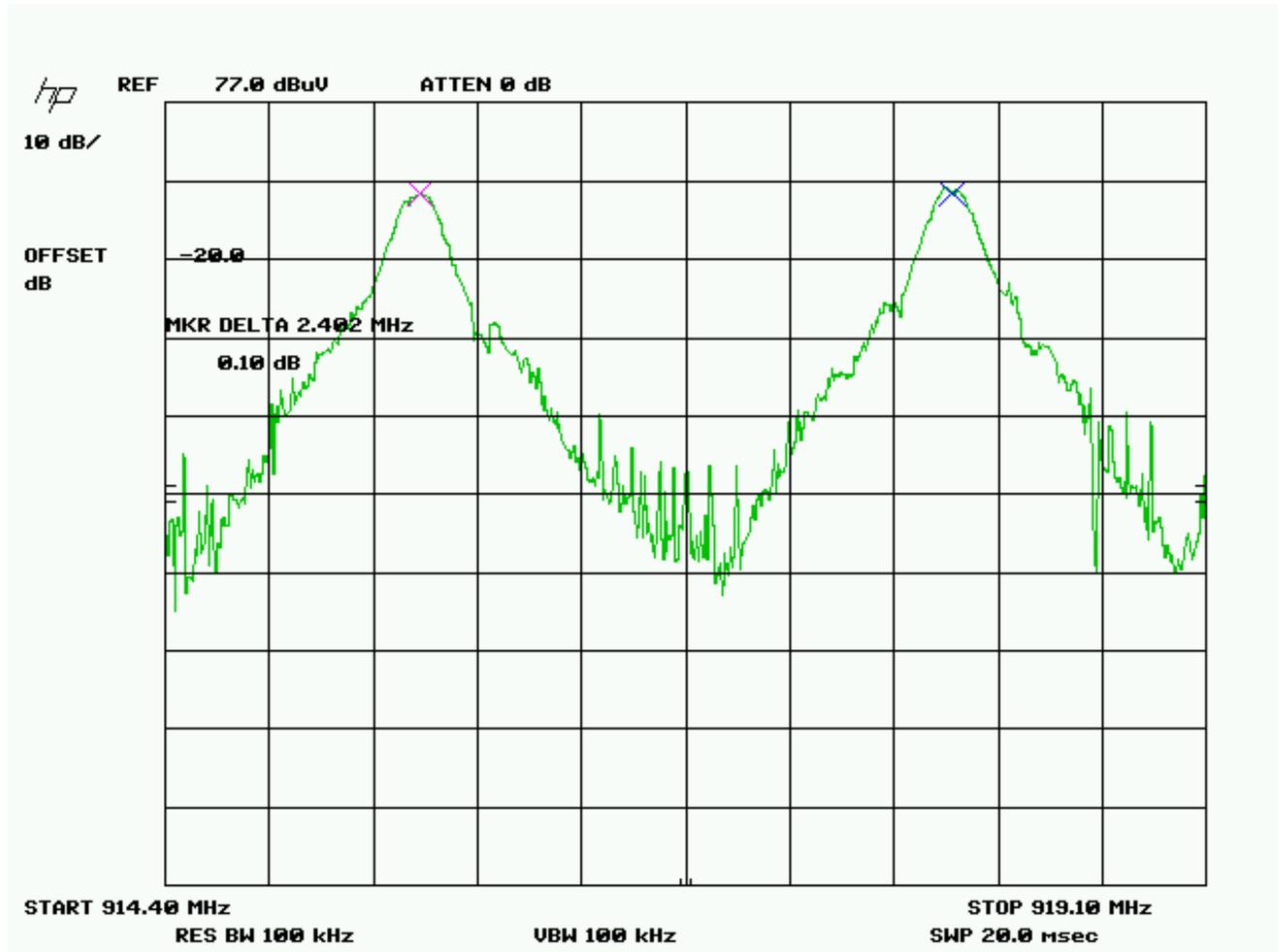
Three places in the band were measured and the worst case presented above.

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: See the following plot



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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 Data: The device under test has an integral antenna and the power was measured on a radiated basis.

Frequency MHz	Power (EIRP) mW
903.6	1
913.1	1
925.1	1



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.

TEST DATA: Not applicable. The DUT utilizes an integral antenna.

APPLICANT: SAFETRAN SYSTEMS CORPORATION

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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 – 928MHz 2.4 – 2.4835GHz	127.37dBuV/m
	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	54dBuV/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
903.6	903.6	69.8	V	1.96	22.66	20	74.42	52.95
903.6	903.6	70.2	H	1.96	23.34	20	75.5	51.87
903.6	1,807.20	16.1	H	2.75	29.97	20	28.82	25.18
903.6	1,807.20	16.7	V	2.75	29.97	20	29.42	24.58
903.6	3,614.40	8.5	H	4.15	32.98	20	25.63	28.37
903.6	3,614.40	8.9	V	4.15	32.98	20	26.03	27.97
903.6	5,421.60	11.3	V	5.13	34.61	20	31.04	22.96
903.6	5,421.60	12.6	H	5.13	34.61	20	32.34	21.66
903.6	6,325.20	6.6	V	5.4	35.66	20	27.66	26.34
903.6	6,325.20	7.2	H	5.4	35.66	20	28.26	25.74

[Continued]

APPLICANT: SAFETRAN SYSTEMS CORPORATION

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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
903.6	7,228.80	13.2	H	5.74	36.05	20	34.99	19.01
913.1	913.1	70.9	V	1.97	22.6	20	75.47	31.91
913.1	913.1	71.8	H	1.97	23.37	20	77.14	30.24
913.1	1,826.30	15.9	H	2.76	30.09	20	28.75	25.25
913.1	1,826.30	16	V	2.76	30.09	20	28.85	25.15
913.1	3,652.70	8.2	H	4.19	33.04	20	25.43	28.57
913.1	3,652.70	9.2	V	4.19	33.04	20	26.43	27.57
913.1	5,479.00	11.3	H	5.14	34.67	20	31.11	22.89
913.1	5,479.00	11.4	V	5.14	34.67	20	31.21	22.79
913.1	6,392.20	6.1	V	5.42	35.71	20	27.23	26.77
913.1	6,392.20	7.4	H	5.42	35.71	20	28.53	25.47
913.1	7,305.40	10.7	V	5.78	36.06	20	32.54	21.46
913.1	7,305.40	12.5	H	5.78	36.06	20	34.34	19.66
925.1	925.1	71.9	V	1.99	22.65	20	76.54	31.91
925.1	925.1	72.2	H	1.99	23.4	20	77.59	30.24
925.1	1,850.30	17	V	2.78	30.24	20	30.02	23.98
925.1	1,850.30	17	H	2.78	30.24	20	30.02	23.98
925.1	3,700.70	10.1	H	4.23	33.12	20	27.45	26.55
925.1	3,700.70	10.7	V	4.23	33.12	20	28.05	25.95
925.1	5,551.00	14.1	V	5.17	34.77	20	34.04	19.96
925.1	5,551.00	14.2	H	5.17	34.77	20	34.14	19.86
925.1	6,476.20	8.1	V	5.44	35.78	20	29.32	24.68
925.1	6,476.20	8.8	H	5.44	35.78	20	30.02	23.98
925.1	7,401.40	13.8	V	5.84	36.08	20	35.72	18.28
925.1	7,401.40	15.5	H	5.84	36.08	20	37.42	16.58

All readings are peak unless marked otherwise.

P= Peak

A= Average

R= Restricted band frequency

Harmonics were checked through the 10th harmonic.

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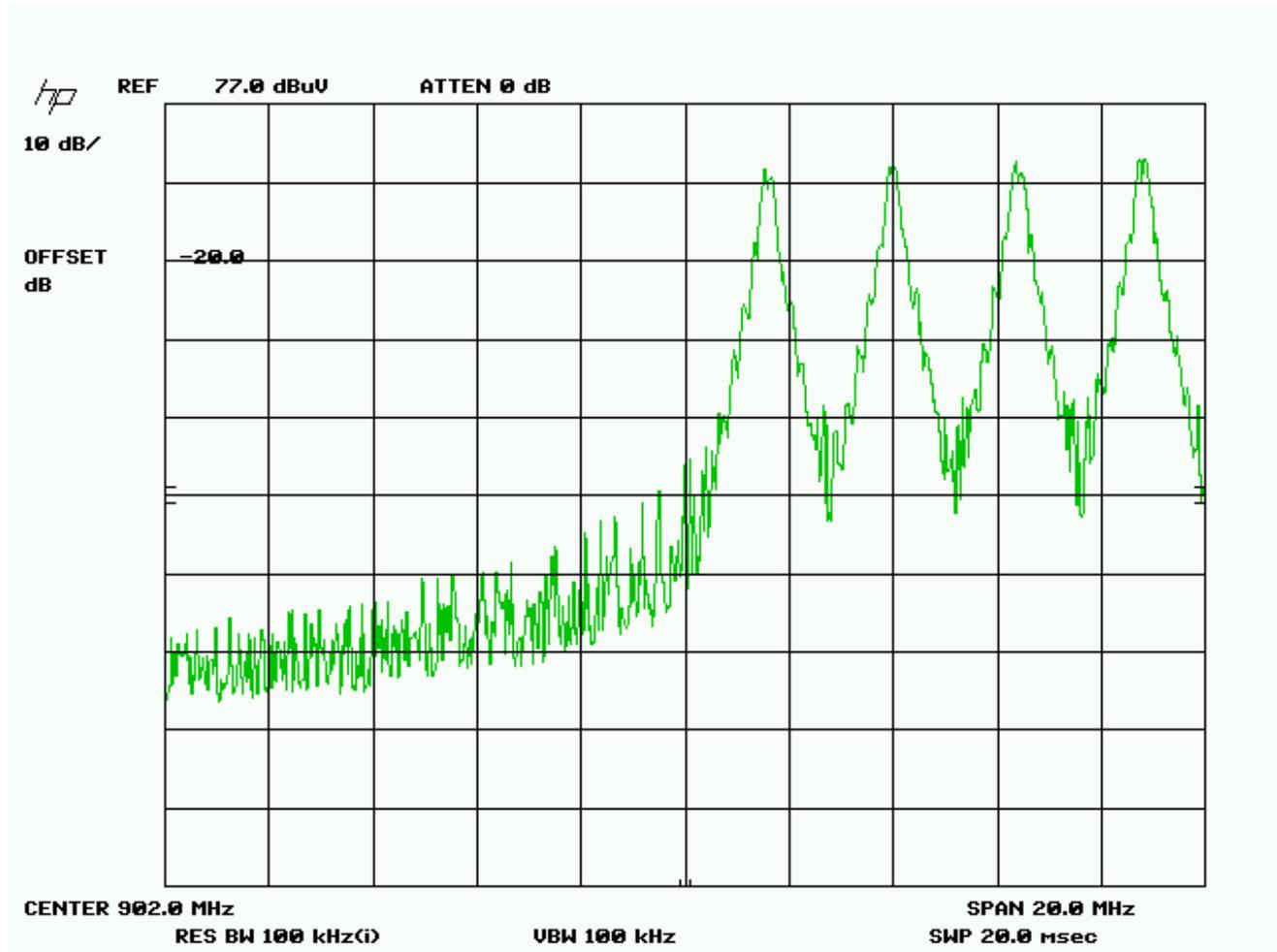
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RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

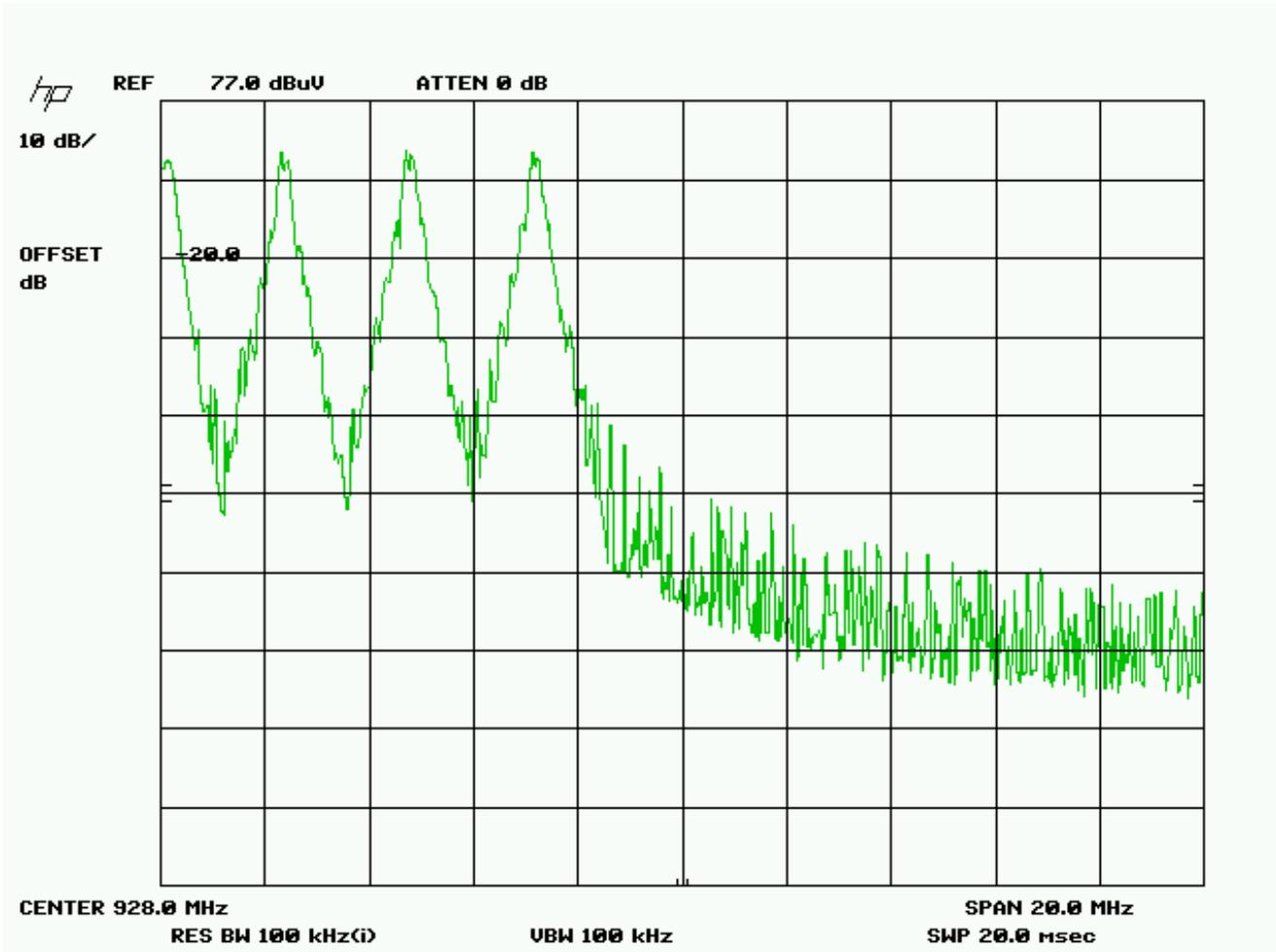
REQUIREMENTS: Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54dBuV/m). Emissions not in the restricted band must be 20 dBc.

TEST DATA: The plots are presented below.

Lower bandedge



Upper bandedge (peak value)



DUTY CYCLE

The duty cycle was calculated from the dwell time and the information provided by the manufacturer that the DUT does not transmit but once in any 100 msec time period.

The correction factor was taken as 20 dB.

Dwell time is 2.04 msec (see page 13)

The device does not transmit but once every 100 msec.

$$20*\log(2.04/100)=-33.8 \text{ dB}$$

20 dB was taken.



POWER SPECTRAL DENSITY

Rules Part No.: 15.247(d)

Requirements: The peak level measured must be less than +8.0 dBm.

Test Data: SEE THE FOLLOWING

This is a 1 mW conducted power device. This is 0 dBm. Using good engineering judgement, the power spectral density can't possibly exceed the +8 dBm limit.