



849 NW STATE ROAD 45  
NEWBERRY, FL 32669 USA  
PH: 888.472.2424 OR 352.472.5500  
FAX: 352.472.2030  
EMAIL: [INFO@TIMCOENGR.COM](mailto:INFO@TIMCOENGR.COM)  
[HTTP://WWW.TIMCOENGR.COM](http://WWW.TIMCOENGR.COM)

## TEST REPORT

PER FCC PT 15.247 HYBRID & IC RSS-210

APPLICANT	SAFETRAN SYSTEMS CORPORATION
ADDRESS	7775 BAYMEADOWNS WAY SUITE 201 JACKSONVILLE, FL 32256 USA
FCC ID	LTY80320
IC LABEL	IC: 2347A-80320
MODEL	A80320
PRODUCT DESCRIPTION	Base
DATE SAMPLE RECEIVED	5/29/2008
DATE TESTED	6/25/2008
TESTED BY	Joe Scoglio
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	1126UT8TestReport.doc
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.**





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APPLICANT: SAFETRAN SYSTEMS CORPORATION  
 FCC ID: LTY80320, IC: 2347A-80320  
 REPORT: X:\S\Safetran\1126UT8\1126UT8TestReport.doc

## 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 27, 2008

**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
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:	Base
FCC ID:	LTY80320
IC label	IC: 2347A-80320
Model Number	A80320
Family Number(s)	N/A
Maximum Output Pwr	8.5 mW
Operating Frequency:	903.6 ~ 925.1 MHz
Type of Modulation:	GFSK
EUT Power Source:	Primary Power – Any 12V dc source (battery) Secondary Power – N/A
Test Item:	Prototype
Type of Equipment	Fixed
Antenna	Removable
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
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		11/25/07	11/25/09

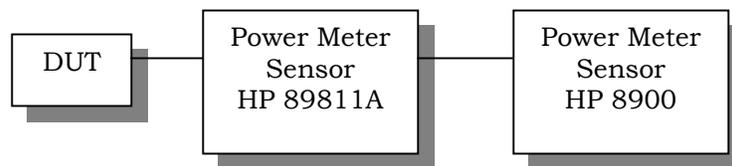
## TEST PROCEDURES

**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.

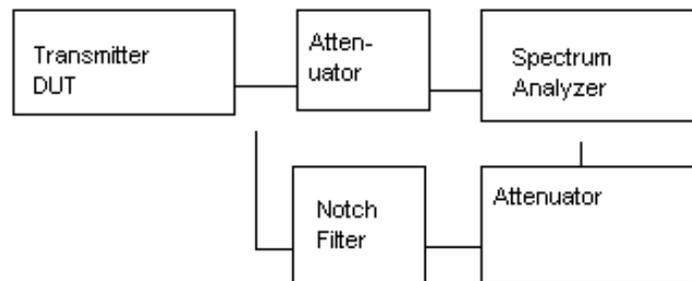
**RF Power Output:** The RF power output was measured at the antenna feed point using a peak power meter.

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 10<sup>th</sup> 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, RSS-210

**REQUIREMENTS:**

Emission Frequency (MHz)	Conducted Limit (dB $\mu$ V)	
	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.		

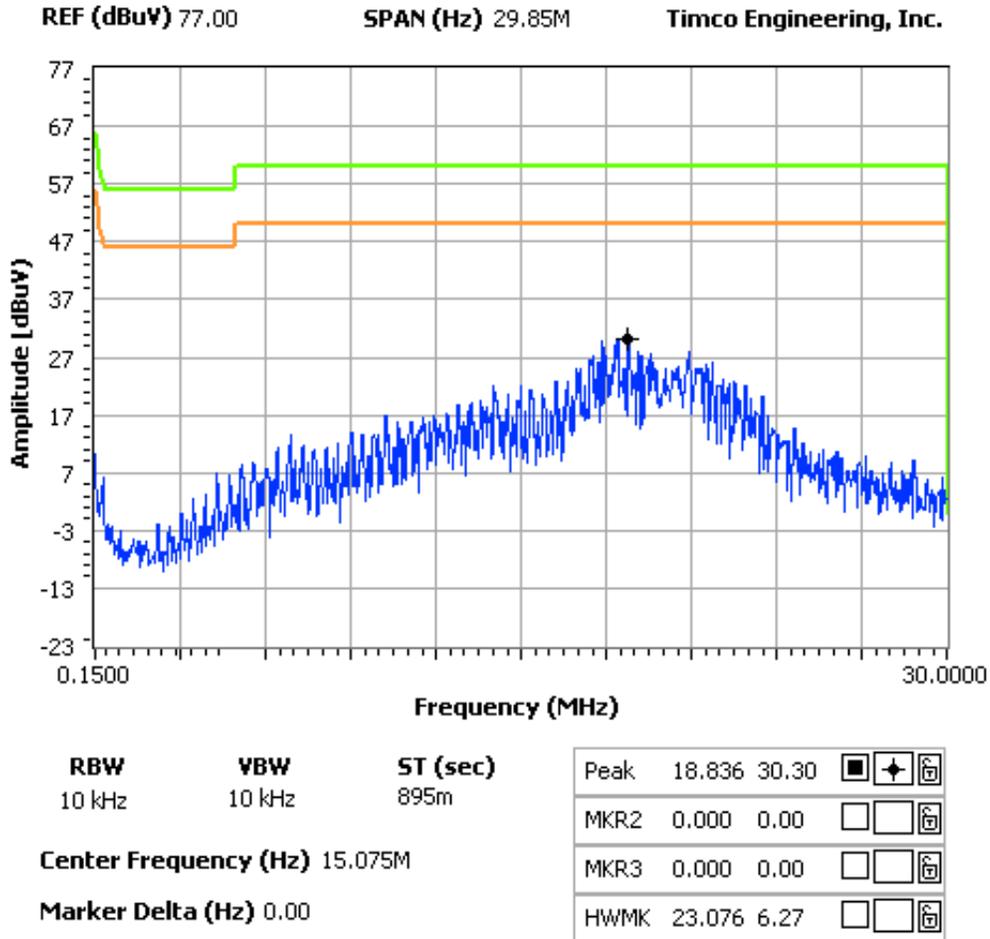
**TEST DATA:** The following plots represent the emissions read for power line conducted. Both lines were observed

POWERLINE CONDUCTED EMISSIONS LINE 1

**NOTES:**

ac line conducted line 1 LAB SUPPLY

**FCC 15.107 Mask Class B**



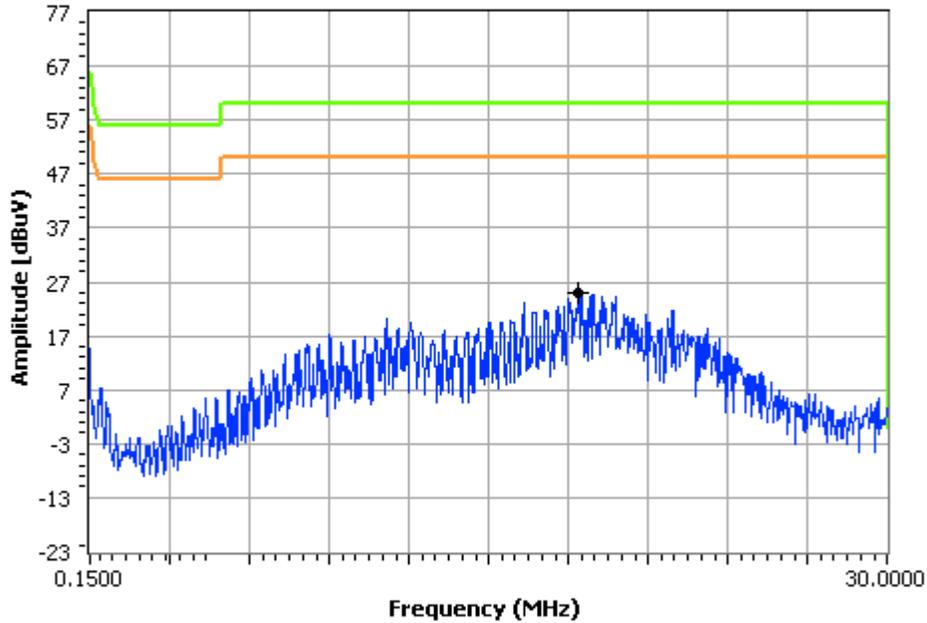
POWERLINE CONDUCTED EMISSIONS LINE 2

**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.



<b>RBW</b> 10 kHz	<b>VBW</b> 10 kHz	<b>ST (sec)</b> 895m	Peak 18.448 25.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Center Frequency (Hz)</b> 15.075M			MKR2 0.000 0.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Marker Delta (Hz)</b> 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"/>

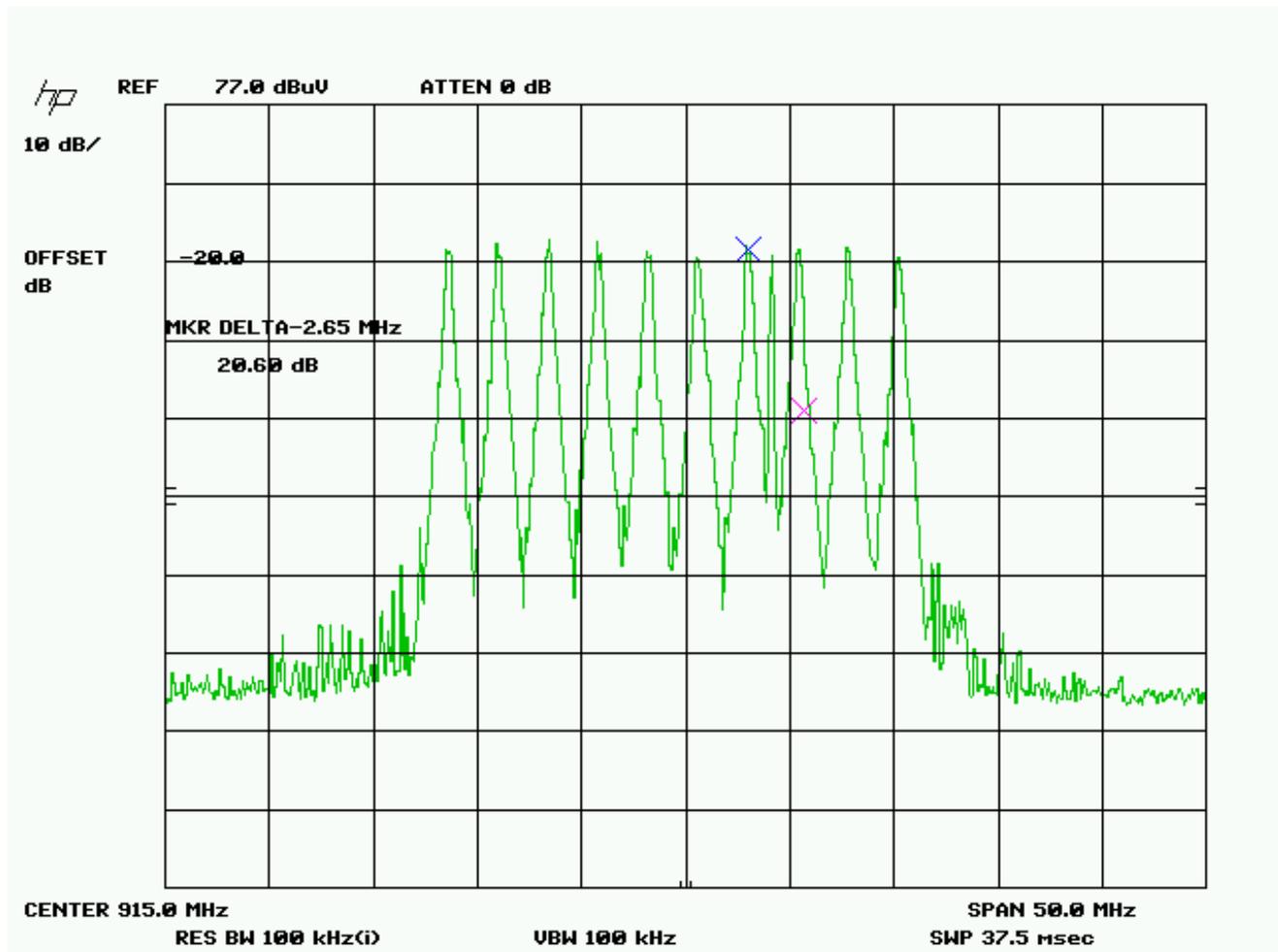
## NUMBER OF HOPPING CHANNELS

**Rules Part No.:** 15.247(a)(1), RSS-210

### 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



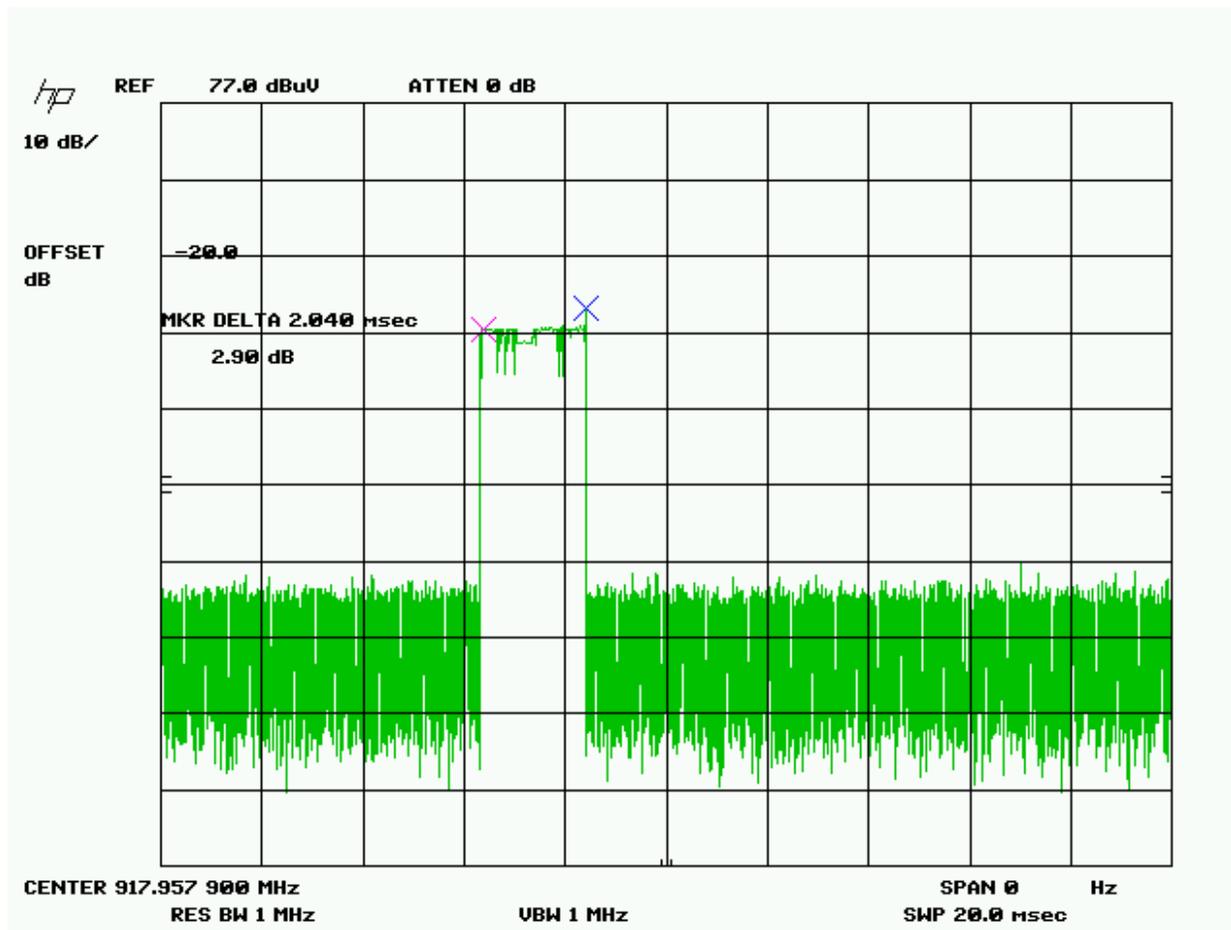
### DWELL TIME OF A HOPPING CHANNEL

**RULES PART NO.:** 15.247(a)(1)(i), RSS-210

**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.

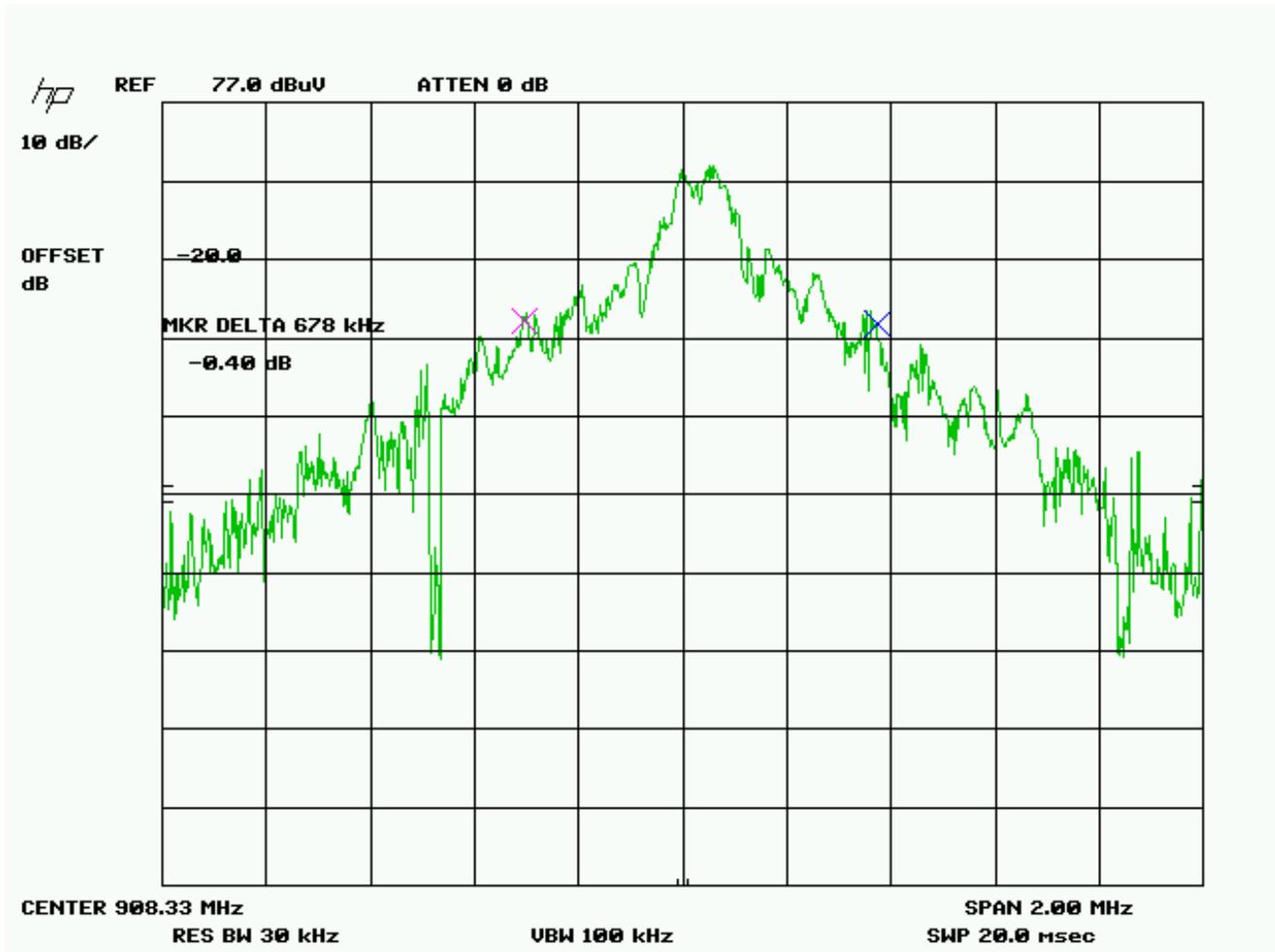


**20 dB BANDWIDTH**

**RULES PART NO.:** 15.247(a)(2), RSS-210

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

**TEST DATA:** See the following plot(s). 680 kHz



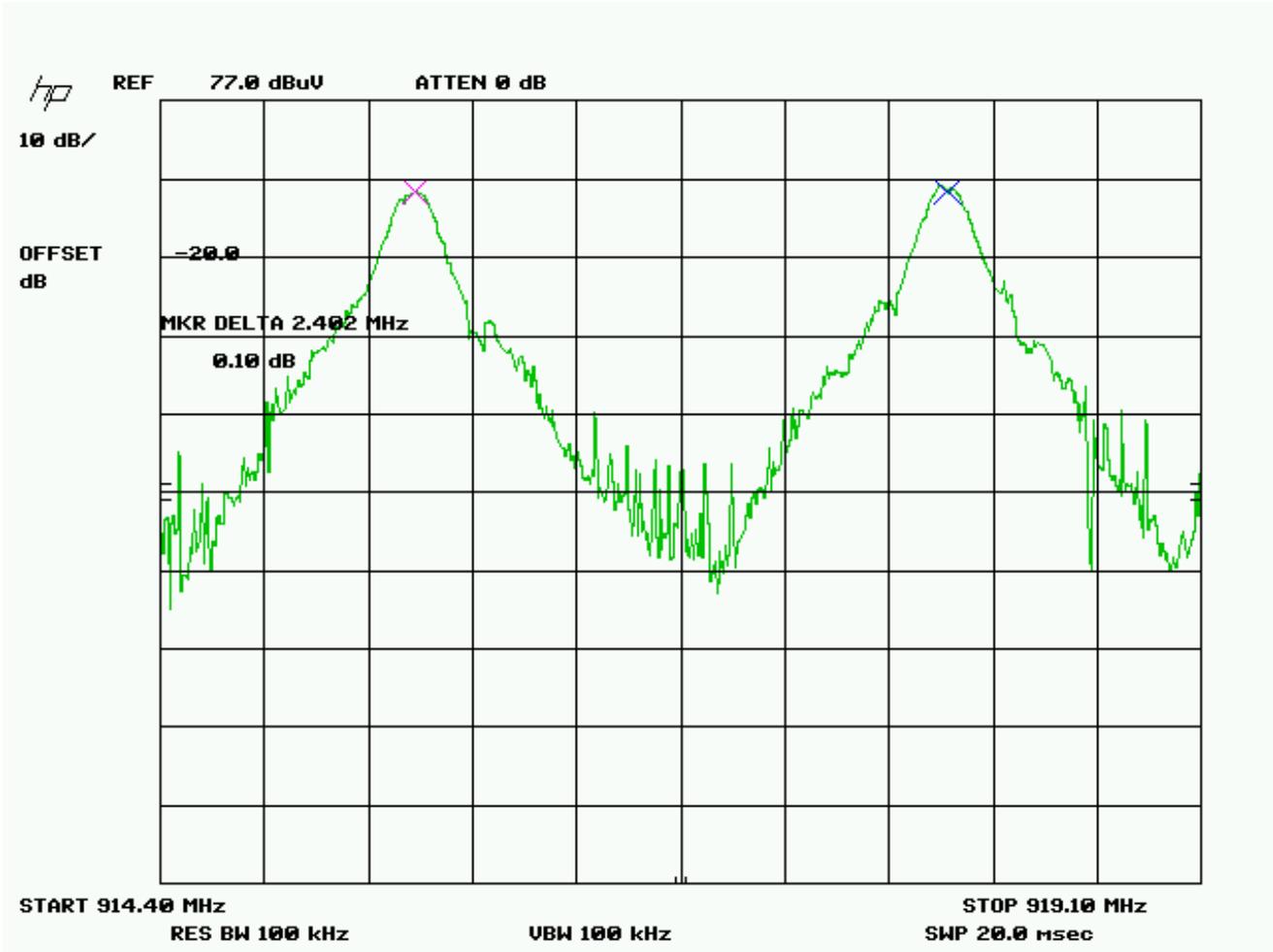
Three places in the band were measured and the worst case presented above.

## 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. 2.4 MHz



## 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	8.5
913.2	8.2
925.2	8.5



## 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

Freq.	dBuV	dBc	Freq.	dBuV	dBc	Freq.	dBuV	dBc
903.60		0	913.20		0	925.20		0
1807.20	69.4	46.9	1826.40	73.4	42.8	1850.40	73.7	42.6
2710.80	38.3	78	2739.60	36.7	79.5	2775.60	35.6	80.7
3614.40	32.4	83.9	3652.80	33.3	82.9	3700.80	35.4	80.9
4518.00	46.4	69.9	4566.00	41.9	74.3	4626.00	38.8	77.5
5421.60	61.8	54.5	5479.20	59.9	56.3	5551.20	61.7	54.6
6325.20	69.4	46.9	6392.40	67.9	48.3	6476.40	70.1	46.2
7228.80	54.8	61.5	7305.60	58.5	57.7	7401.60	56.1	60.2
8132.40	41.2	75.1	8218.80	40.5	75.7	8326.80	38.7	77.6
9036.00	61.6	54.7	9132.00	62.1	54.1	9252.00	63	53.3

**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
§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 10<sup>th</sup> harmonic.

**Test Data:**

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
903.6	903.60	71.8	H	1.96	23.34	97.10	30.28
903.6	903.60	79.6	V	1.96	22.66	104.22	23.16
903.6	1,807.20	16.9	H	2.75	29.97	49.62	34.60
903.6	1,807.20	17.6	V	2.75	29.97	50.32	33.90
903.6	3,614.40	8.4	H	4.15	32.98	45.53	8.47
903.6	3,614.40	10.1	V	4.15	32.98	47.23	6.77
903.6	4,518.00	9.8	V	4.76	34.10	48.66	5.34
903.6	4,518.00	10.1	H	4.76	34.10	48.96	5.04
903.6	5,421.60	10.4	V	5.13	34.61	50.14	3.86
903.6	5,421.60	12.1	H	5.13	34.61	51.84	2.16
903.6	6,325.20	13.0	H	5.40	35.66	54.06	30.16
903.6	6,325.20	18.0	V	5.40	35.66	59.06	25.16

[Continued]

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
903.6	7,228.80	11.8	V	5.74	36.05	53.59	0.41
903.6	7,228.80	12.6	H	5.74	36.05	54.39	29.83
903.6	9,036.00	6.8	H	6.61	36.32	49.73	4.27
903.6	9,036.00	7.2	V	6.61	36.32	50.13	3.87
913.1	913.10	74.2	H	1.97	23.37	99.54	27.84
913.1	913.10	80.1	V	1.97	22.60	104.67	22.71
913.1	1,826.30	16.5	H	2.76	30.09	49.35	34.87
913.1	1,826.30	18.5	V	2.76	30.09	51.35	32.87
913.1	3,652.70	7.9	H	4.19	33.04	45.13	8.87
913.1	3,652.70	12.5	V	4.19	33.04	49.73	4.27
913.1	4,565.90	8.8	V	4.78	34.10	47.68	6.32
913.1	4,565.90	10.3	H	4.78	34.10	49.18	4.82
913.1	5,479.00	11.0	H	5.14	34.67	50.81	3.19
913.1	5,479.00	11.7	V	5.14	34.67	51.51	2.49
913.1	6,392.20	15.2	H	5.42	35.71	56.33	27.89
913.1	6,392.20	21.6	V	5.42	35.71	62.73	21.49
913.1	7,305.40	13.4	H	5.78	36.06	55.24P	18.76
913.1	7,305.40	6.00	H	5.78	36.06	47.84A	6.16
913.1	7,305.40	13.7	V	5.78	36.06	55.54P	18.46
913.1	7,305.40	6.00	V	5.78	36.06	47.84A	6.16
913.1	9,131.80	6.9	H	6.64	36.38	49.92	4.08
913.1	9,131.80	7.0	V	6.64	36.38	50.02	3.98

All readings are peak unless marked otherwise.

P= Peak, A= Average, R= Restricted band frequency

Harmonics were checked through the 10<sup>th</sup> harmonic.

Continued

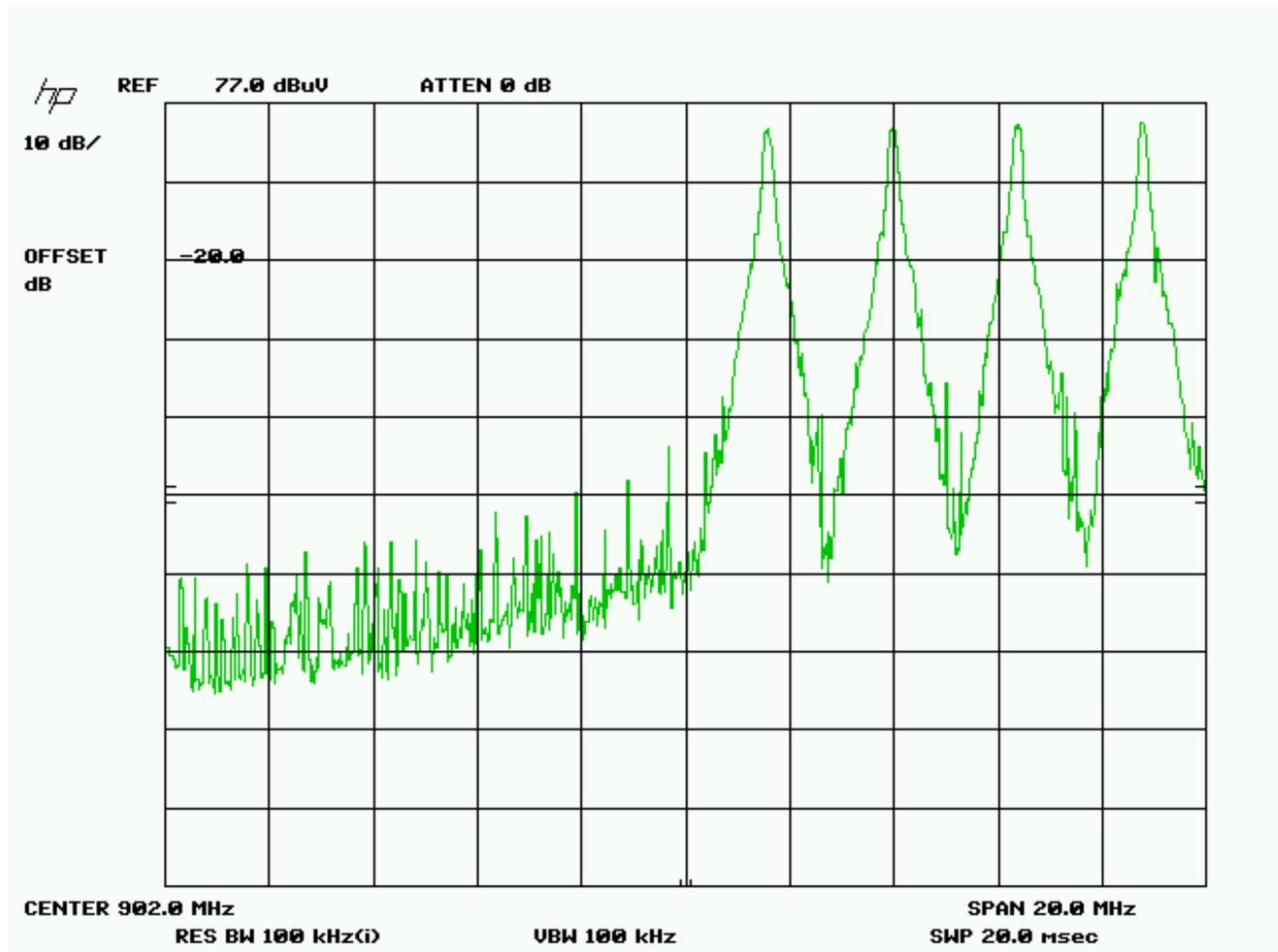
Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
925.1	925.10	70.0	H	1.99	23.40	95.39	31.99
925.1	925.10	77.7	V	1.99	22.65	102.34	25.04
925.1	1,850.30	19.9	V	2.78	30.24	52.92	74.46
925.1	1,850.30	19.9	H	2.78	30.24	52.92	74.46
925.1	3,700.60	11.7	H	4.23	33.12	49.05	4.95
925.1	3,700.60	13.6	V	4.23	33.12	50.95	3.05
925.1	4,625.80	11.4	H	4.81	34.10	50.31	3.69
925.1	4,625.80	13.3	V	4.81	34.10	52.21	1.79
925.1	5,550.90	12.8	H	5.17	34.77	52.74	1.26
925.1	5,550.90	15.7	V	5.17	34.77	55.64	28.58
925.1	6,476.10	17.0	H	5.44	35.78	58.22	26.00
925.1	6,476.10	21.1	V	5.44	35.78	62.32	21.90
925.1	7,401.20	15.8	V	5.84	36.08	57.72P	16.28
925.1	7,401.20	8.3	V	5.84	36.08	50.22A	3.78
925.1	7,401.20	16.4	H	5.84	36.08	58.32P	15.68
925.1	7,401.20	8.3	H	5.84	36.08	50.22A	3.78
925.1	9,251.60	5.0	H	6.68	36.45	48.13	5.87
925.1	9,251.60	5.4	V	6.68	36.45	48.53	5.47

## RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

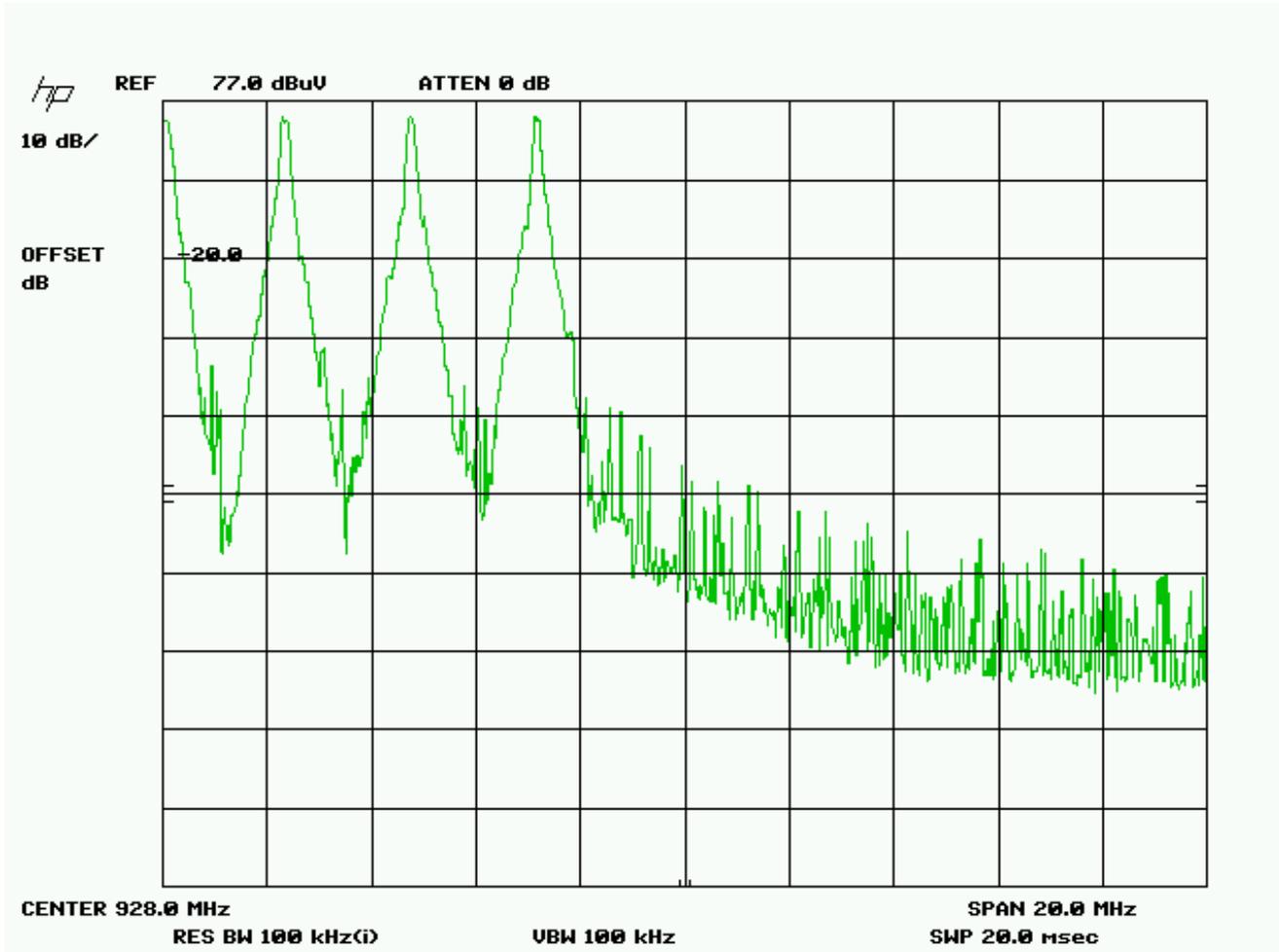
**REQUIREMENTS:** Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54dBuV/m). Emissions not in the restricted band must be 20 dBc.

**TEST DATA:** The plots are presented below.

Lower bandedge



Upper bandedge (peak value)

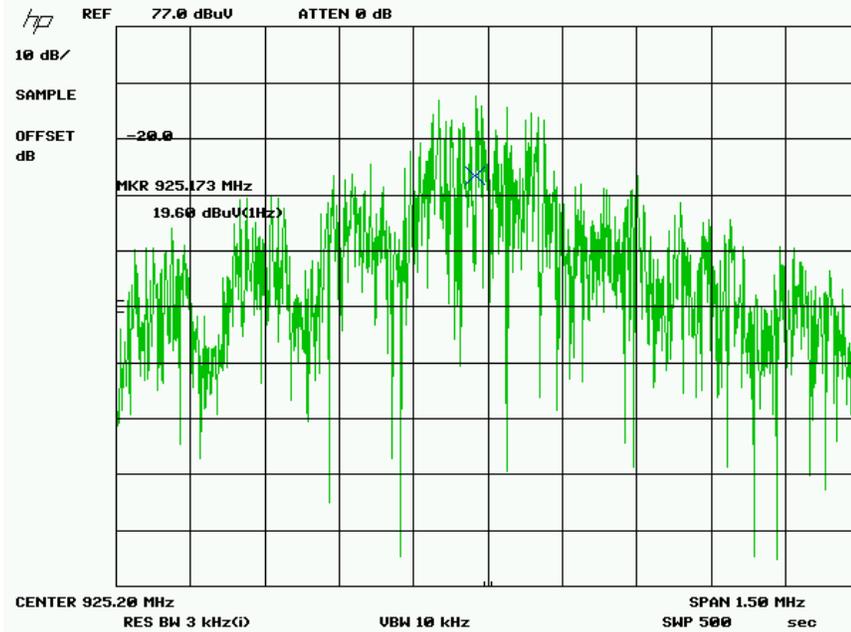


## POWER SPECTRAL DENSITY

**Rules Part No.:** 15.247(d)

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

**Test Data:** SEE THE FOLLOWING PLOT(S)



19.6 dBuV  
 35.0 dB  
 40.0 dB  
 94.6 dBuV  
-107 conversion factor  
 -12.4 dBm

-12.4 dBm is less than +8 dBm

Three places in the band were tested and the worst case presented.