



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
Website: www.timcoengr.com

TEST REPORT
PER FCC PART 15.249 & IC RSS-210
UNLICENSED INTENTIONAL RADIATOR

Applicant	CATTRON-THEIMEG INCORPORATED
Address	58 W. Shenango Street Sharpville, Pa 16150-1198 USA
FCC ID	CN2U915
IC Cert. No.	IC: 1007A-U915
Model Number	U915 TRX
Product Description	900 MHz Low Power U915 TRX Module
Date Sample Received	11/14/2008
Date Tested	12/1/2008
Tested By	Joe Scoglio
Approved By	Mario de Aranzeta
Report Number	2675AUT8TestReport.pdf
Test Results	☒ PASS ☐ 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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ATTESTATIONS

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

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



Certificate # 0955-01

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, Fl 32669

Authorized Signatory Name: *Mario de Aranzeta*

Mario de Aranzeta C.E.T.
Compliance Engineer/ Lab. Supervisor

Date: January 10, 2008

REPORT SUMMARY

Disclaimer	The test results relate only to the items tested.
Purpose of Test	To demonstrate the DUT in compliance with FCC CFR 47, Part 15.249 requirements for low power intentional radios. To demonstrate the DUT in compliance with IC RSS-210 radiated spurious emissions requirements for low power intentional radios.
Test Standards	ANSI/TIA 603-C: 2004, FCC CFR 47 Part 15.249 ANSI C63.4: 2003, RSS-210, FCC Pt 15.109
Related Approval	Digital interface portion verified

TEST ENVIRONMENT

Test Facility	Timco Engineering, Inc. 849 NW State Road 45 Newberry, FL 32669 USA.
Test Condition in the laboratory	Temperature: 26°C Relative humidity: 50%

TEST SETUP SUMMARY

Test Setup Diagram/Description	The DUT was placed on the turntable per setup per ANSI C63.4: 2003. A test set up photo is provided for clarification.
Deviation from the standard/procedure	No deviation
Modification of DUT	No modification

TEST SUPPORTING EQUIPMENT

Supporting Device	Manufacturer	Model / FCC ID	Serial Number
N/A			

DUT SPECIFICATION

DUT Description	900 MHZ LOW POWER U915 TRX MODULE	
FCC ID	CN2U915	
IC Cert. No.	IC: 1007A-U915	
Model Number	U915 TRX	
Operating Frequency	TX: 902.2 – 927.8 MHz	RX: same as TX
DUT Power Source	☐ 110–120Vac/50– 60Hz	
	☐ DC Power	
	☒ Battery Operated Exclusively	
Test Item	☐ Prototype	
	☒ Pre-Production	
	☐ Production	
Type of Equipment	☐ Fixed	
	☐ Mobile	
	☒ Portable	
Antenna	Antenna 1: Internal Antenna 2: A467TR - 915 S Antenna 3: 3dB - 806	

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 12/7/07	12/7/09
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 12/7/07	12/7/09
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 12/8/07	12/8/09
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 12/8/07	12/8/09
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 4/29/07	4/29/09
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	CAL 12/29/06	12/29/08
Termaline Wattmeter	Bird Electronic Corporation	611	16405	CAL 7/16/07	7/16/09

TEST PROCEDURES

Radiation Interference: ANSI C63.4-2003 using a spectrum analyzer, a preselector, a quasi-peak adapter, and an appropriate antenna. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz with an appropriate sweep speed and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3 MHz above 1 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The spectrum was searched to at least the tenth (10) harmonic of the fundamental.

Formula Of Conversion Factors: The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBμV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

Example:

Freq (MHz)	Meter Reading	+ ACF	+ CL	= FS
33	20 dBμV	+ 10.36 dB	+ 0.5	= 30.86 dBμV/m @ 3m

Power Line Conducted Interference: The procedure used was ANSI C63.4-2003 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The spectrum was scanned from 0.15 to 30 MHz.

Occupied Bandwidth: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was printed. The vertical scale is set to -10 dBm per division.

ANSI C63.4-2003 Measurement Procedures: The DUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The DUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes. Emissions attenuated more than 20 dB below the permissible value are not reported.

RADIATION INTERFERENCE

Rules Part No.: 15.249, 15.209, RSS-210

Requirements:

Frequency	Limits
Part 15.209	
9 to 490 kHz	2400/F (kHz) μ V/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) μ V/m @ 30 meters
1705 kHz to 30 MHz	29.54 dB μ V/m @ 30 meters
30 – 88	40.0 dB μ V/m @ 3 meters
80 – 216	43.5 dB μ V/m @ 3 meters
216 – 960	46.0 dB μ V/m @ 3 meters
Above 960	54.0 dB μ V/m @ 3 meters
Part 15.249	
Fundamental 902 – 928 MHz	94.0 dB μ V/m @ 3 meters
Fundamental 2.4 – 2.4835 MHz	94.0 dB μ V/m @ 3 meters
Harmonics	54.0 dB μ V/m @ 3 meters

Test Data: internal antenna

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dB μ V	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dB μ V/m	Margin dB
903.0	903.00	64.8	H	1.95	23.33	90.08	3.92
903.0	903.00	65.9	V	1.95	22.67	90.52	3.48
903.0	1,806.00	14.5	V	2.74	29.96	47.20	6.80
903.0	1,806.00	15.2	H	2.74	29.96	47.90	6.10
909.0	909.00	63.3	H	1.96	23.39	88.65	5.35
909.0	909.00	65.0	V	1.96	22.61	89.57	4.43
909.0	1,818.00	15.8	V	2.75	30.04	48.59	5.41
924.0	924.00	64.7	H	1.99	23.38	90.07	3.93
924.0	924.00	65.2	V	1.99	22.64	89.83	4.17
924.0	1,848.00	16.1	V	2.78	30.23	49.11	4.89
924.0	1,848.00	16.2	H	2.78	30.23	49.21	4.79

[Continued]

**Test Data:**

Antenna: A467TR - 915 S

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Duty Cycle	Field Strength dBuV/m	Margin dB
903	903	66.9	H	1.95	23.33	15.2	76.98	17.02
903	903	75.1	V	1.95	22.67	15.2	84.52	9.48
903	1,806.00	11.2	H	2.74	29.96	15.2	28.7	25.3
903	1,806.00	13.9	V	2.74	29.96	15.2	31.4	22.6
909	909	61.3	H	1.96	23.39	15.2	71.45	22.55
909	909	71	V	1.96	22.61	15.2	80.37	13.63
909	1,818.00	10.2	H	2.75	30.04	15.2	27.79	26.21
909	1,818.00	13.8	V	2.75	30.04	15.2	31.39	22.61
909	3,636.00	7.3	H	4.17	33.02	15.2	29.29	24.71
924	924	62	H	1.99	23.38	15.2	72.17	21.83
924	924	73.3	V	1.99	22.64	15.2	82.73	11.27
924	1,848.00	10.1	H	2.78	30.23	15.2	27.91	26.09
924	1,848.00	13.9	V	2.78	30.23	15.2	31.71	22.29

[Continued]

**Test Data:**

Antenna: 3dB - 806

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Duty Cycle	Field Strength dBuV/m	Margin dB
903	903	66.3	H	1.95	23.33	15.2	76.38	17.62
903	903	75.5	V	1.95	22.67	15.2	84.92	9.08
903	1,806.00	13	H	2.74	29.96	15.2	30.5	23.5
903	1,806.00	15.3	V	2.74	29.96	15.2	32.8	21.2
909	909	59	H	1.96	23.39	15.2	69.15	24.85
909	909	71.2	V	1.96	22.61	15.2	80.57	13.43
909	1,818.00	10.9	H	2.75	30.04	15.2	28.49	25.51
909	1,818.00	15.4	V	2.75	30.04	15.2	32.99	21.01
924	924	61.7	H	1.99	23.38	15.2	71.87	22.13
924	924	73	V	1.99	22.64	15.2	82.43	11.57
924	1,848.00	11.7	H	2.78	30.23	15.2	29.51	24.49
924	1,848.00	12.5	V	2.78	30.23	15.2	30.31	23.69

APPLICANT: CATTRON-THEIMEG INCORPORATED

FCC ID: CN2U915, IC: 1007A-U915

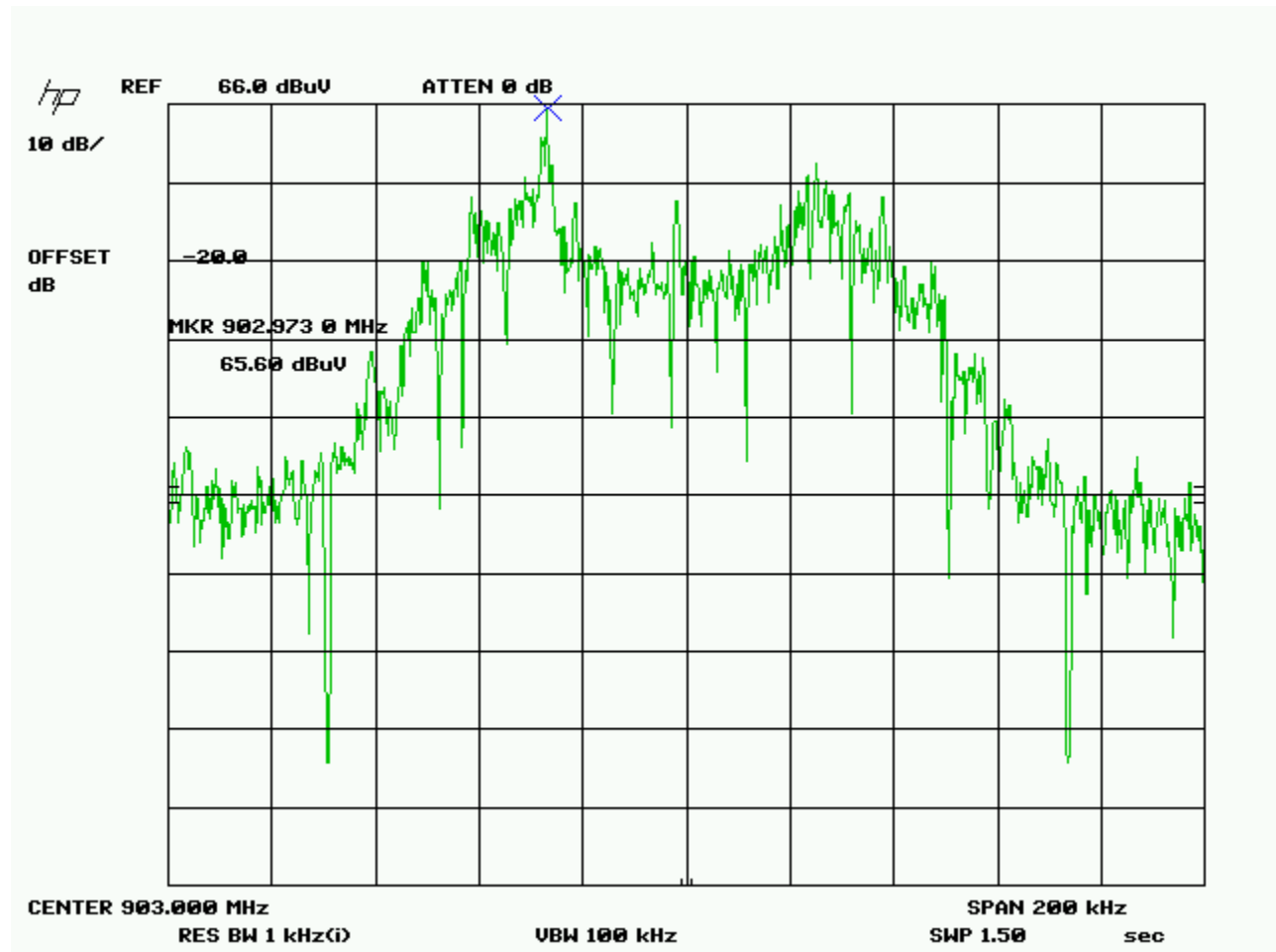
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OCCUPIED BANDWIDTH

Rules Part No.: 15.249 (d), RSS-210

Requirements: The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

Test Data:



BAND EDGE COMPLIANCE

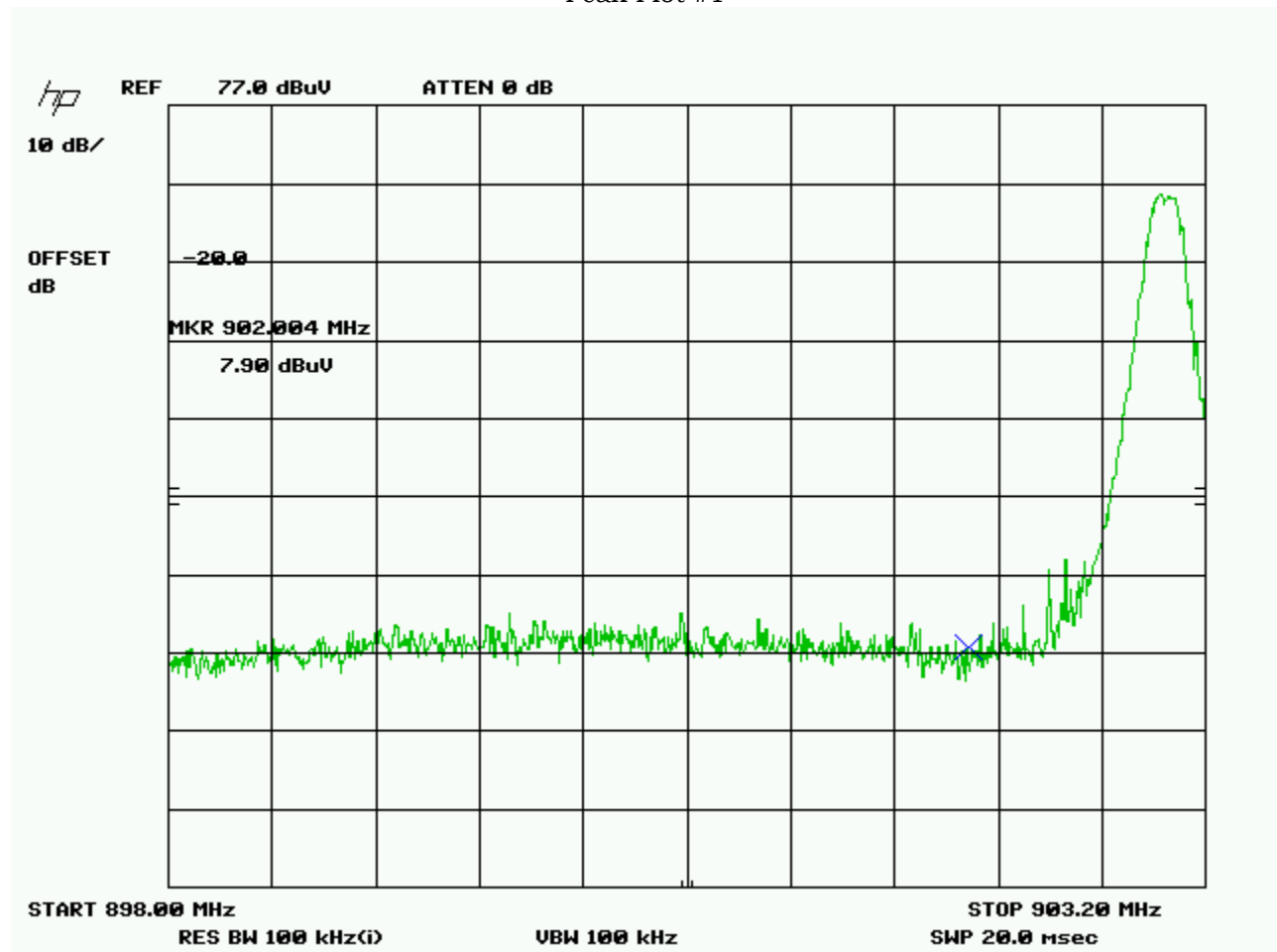
Rules Part No.: 15.249 (d), RSS-210

Requirements: 40 dBc or in the case of restricted bands 54 dB μ V/m.

Test Data:

Lower band edge

Peak Plot #1



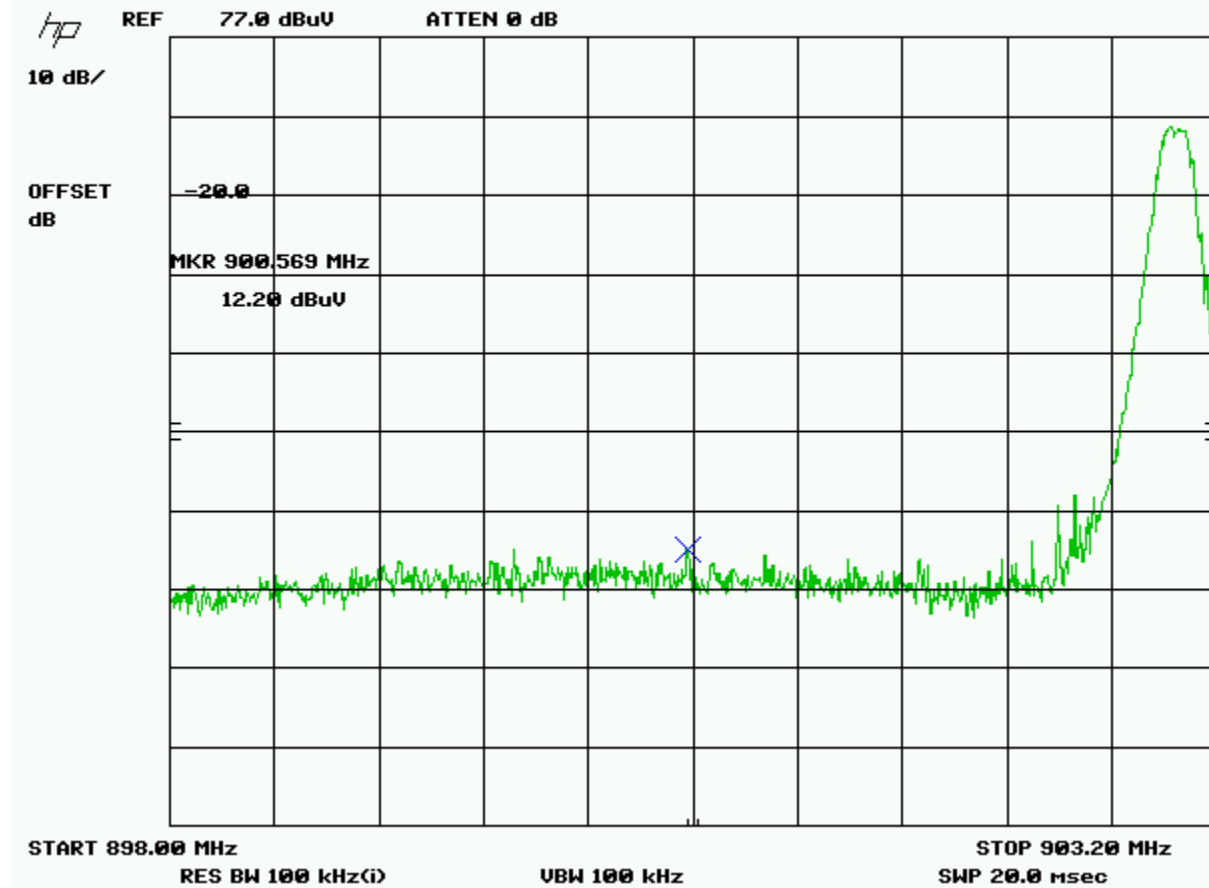
Lower band edge

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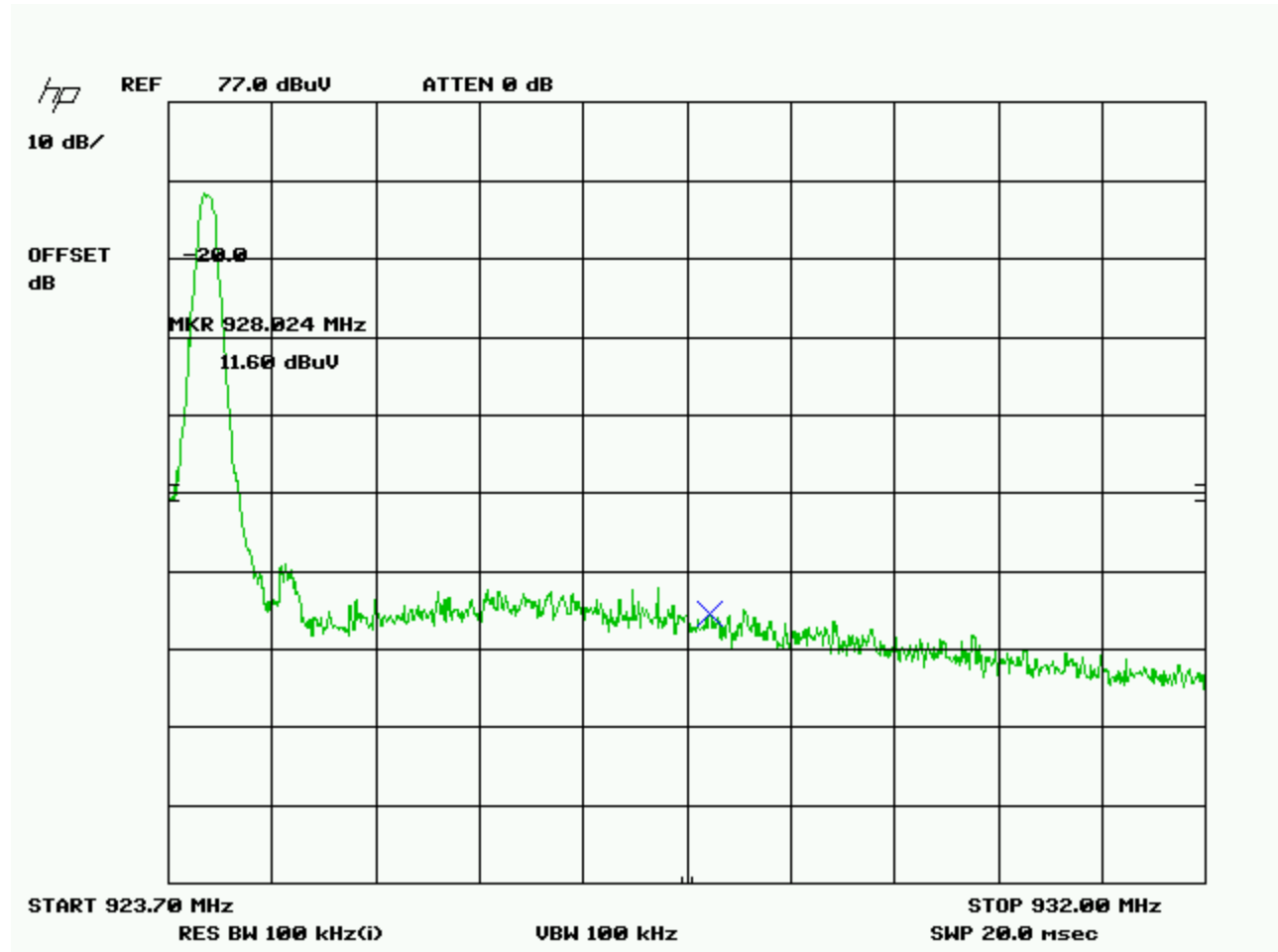
Peak Plot #2



Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBμV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBμV/m	Margin dB
903	900.5	12.2	V	1.95	22.7	36.85	57.15
903	902	7.9	V	1.95	22.68	32.53	61.47

Upper band edge

Peak Plot



Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBμV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBμV/m	Margin dB
924	928	11.6	V	1.99	22.68	36.27	9.73

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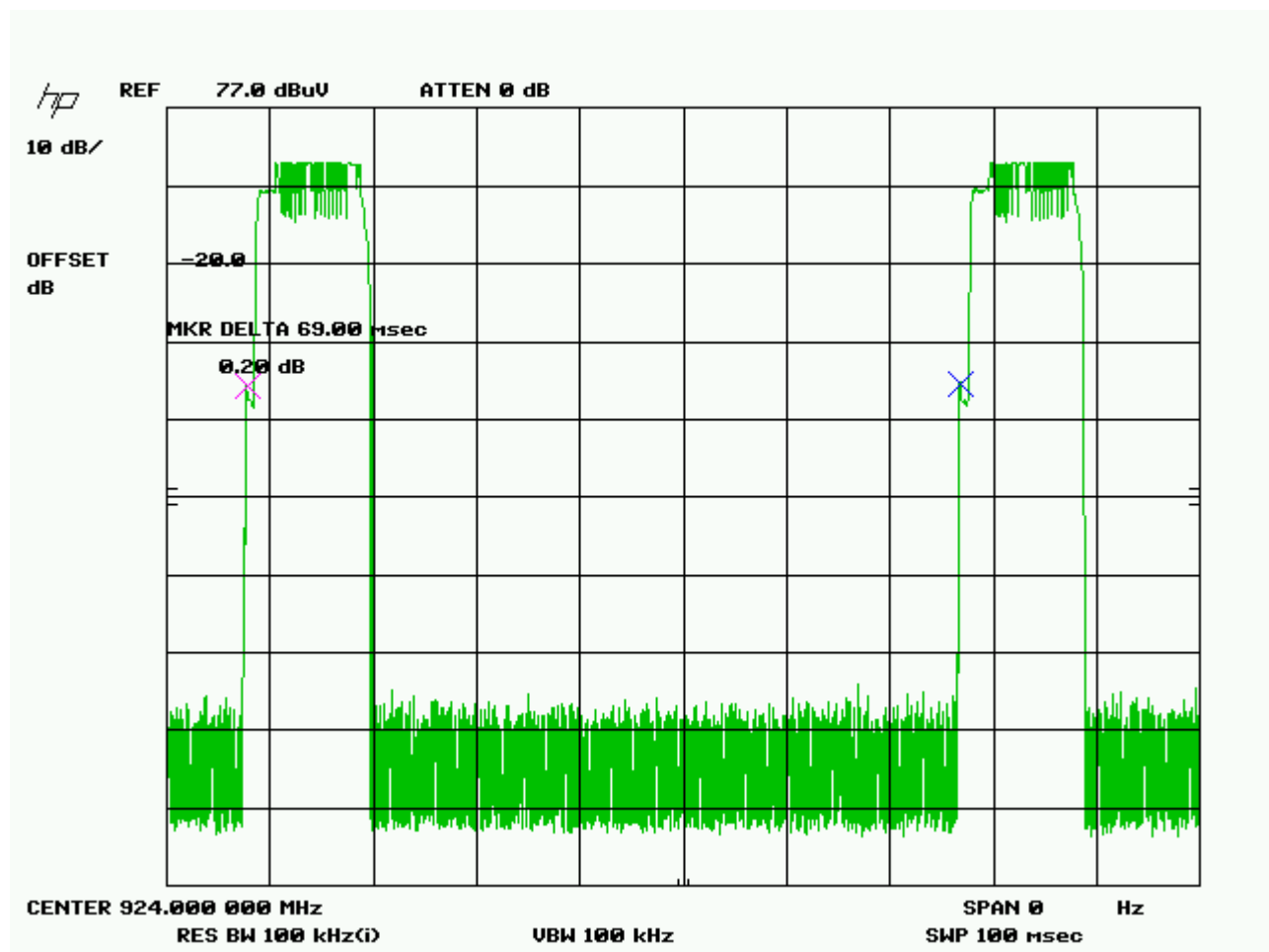
DUTY CYCLE

Total # of pulses: 1 in 69.0 ms

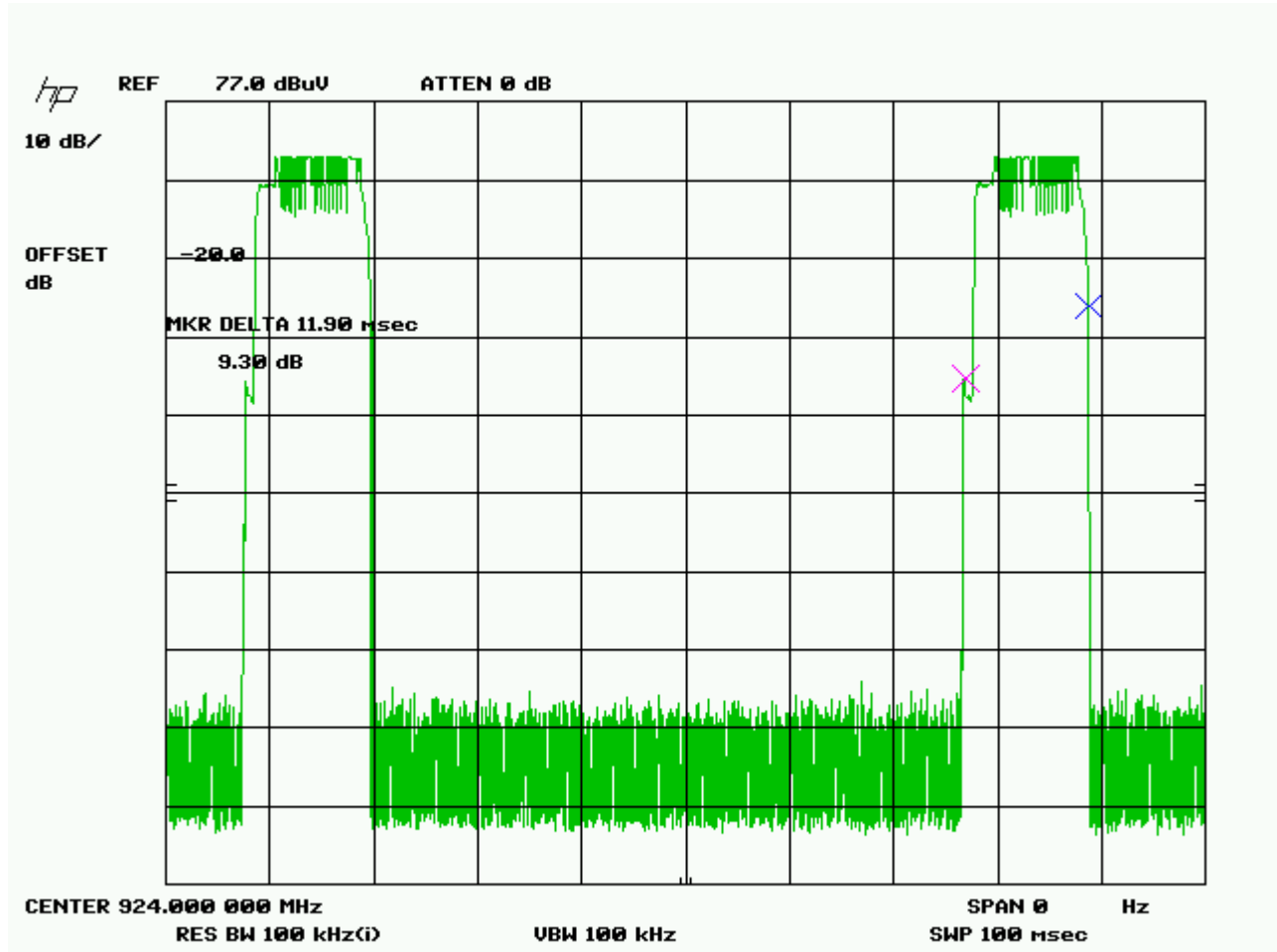
Duration of pulse: 11.9 ms maximum duration of pulse according to manufacturer.

$20 \cdot \log((1 \cdot 11.9) / 69) = 20 \cdot \log(0.17) = 15.2 \text{ dB}$

Duty cycle plot 1



Duty cycle plot 2



POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: 15.207, RSS-210

Requirements:

Frequency (MHz)	Quasi Peak Limits (dB μ V)	Average Limits (dB μ V)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Test Data: N/A. The DUT is battery powered.