Engineering and Testing for EMC and Safety Compliance

CLASS II PERMISSIVE CHANGE REPORT
FCC PART 15

Test Lab:	Applicant:
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FCC ID	PVTTR800-US	**TEST REPORT DATE**	May 17, 2006
PLAT FORM	N/A	**RTL WORK ORDER NUMBER**	2006060
MODEL	TR800	**RTL QUOTE NUMBER**	QRTL06-186

FCC Classification:	DXT – Part 15 Low Power Transceiver – RX Verified
FCC Rule Part(s):	Part 15.249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz, and 24.0-24.25 GHz
Digital Interface Information	Digital Interface was found to be compliant
Receiver Information	Receiver was found to be compliant

Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
902.5 - 927.45	0.0006	N/A	9K30DSR

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. Modifications made to the equipment during testing, in order to achieve compliance with these standards, are listed in the report.

Furthermore, there was no deviation from, additions to, or exclusions from the FCC Part 2, FCC Part 15, and ANSI C63.4

Signature: _____ Date: May 17, 2006

Typed/Printed Name: Desmond A. Fraser Position: President

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1 General Information

1.1 Scope

FCC Rules Part 15.249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz, and 24.0-24.25 GHz.

1.2 Modifications

No modifications were made to the unit to achieve the results in this test report.

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 2003).

1.4 Related Submittal(s)/Grant(s)

This is a permissive change request to the original limited modular approval certification for IKUSI Model Number: TR800, FCC ID: PVTTR800-US. The change is the addition of two arrangements of an external antenna. The first arrangement is mounted directly to the fixed unit and the second arrangement is mounted to a mounting bracket attached to the fixed unit with a 1.5 m shielded cable. Both arrangements use the same antenna. The IF, LO, and up to the 2nd LO were investigated and tested, and found to be compliant also.

2 Test Information

2.1 Test Justification

The EUT was tested in all three orthogonal planes in order to determine worst-case emissions. Channel 1 at 902.5 MHz, Channel 36 at 915.025 MHz, and Channel 70 at 927.45 MHz were tested and investigated from 9 kHz to 10 GHz. Data for all three channels are presented in this report. The test results relate only to the item(s) that was tested.

The antenna arrangements transmit, receive, and are connected to the only antenna port available.

2.2 Exercising the EUT

The EUT was provided with the firmware programmed into the handheld unit to control the fixed unit and was provided a means for continuous transmission during testing. The carrier was also checked to verify that the information was being transmitted. There were no deviations from the test standard(s) and/or methods.

2.3 Test Result Summary

Table 2-1: Test Result Summary with FCC Rules and Regulations

STANDARD	TEST	PASS/FAIL OR N/A
FCC 15.249(a)	Radiated Emissions	Pass

2.4 Test System Details

The test sample was received by Rhein Tech Labs on May 15, 2006. The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system, are:

Table 2-2: Equipment Under Test (EUT)

Part	Manufacturer	Model	Serial Number	FCC ID	Cable Description	RTL Bar Code
Antenna/Bracket/ Cable Assembly	IKUSI	N/A	NA	NA	1.5 m Shielded I/O	17226
Battery	IKUSI	BT06K	NA	NA	N/A	17224
Battery	IKUSI	BT06K	NA	NA	N/A	17223
Transceiver	IKUSI	TM70/2.21	0705157	NA	1 m Unshielded AC Power	17220

Table 2-3: External Components in Test Configuration

Part	Manufacturer	Model	Serial Number	FCC ID	Cable Description	RTL Bar Code
Charger For Handheld Batteries	IKUSI	CB60	NA	NA	NA	17225
Handheld Transceiver	IKUSI	TM70/2.21	0705167	NA	n/a	17221
AC Adapter	Ontop	A42004Q	07C2C	N/A	1.9 m Unshielded	17222

2.5 Configuration of Tested System

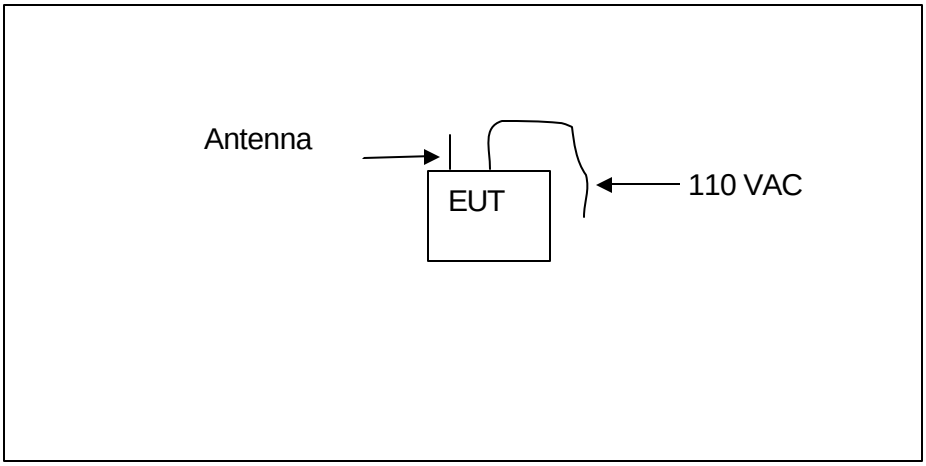
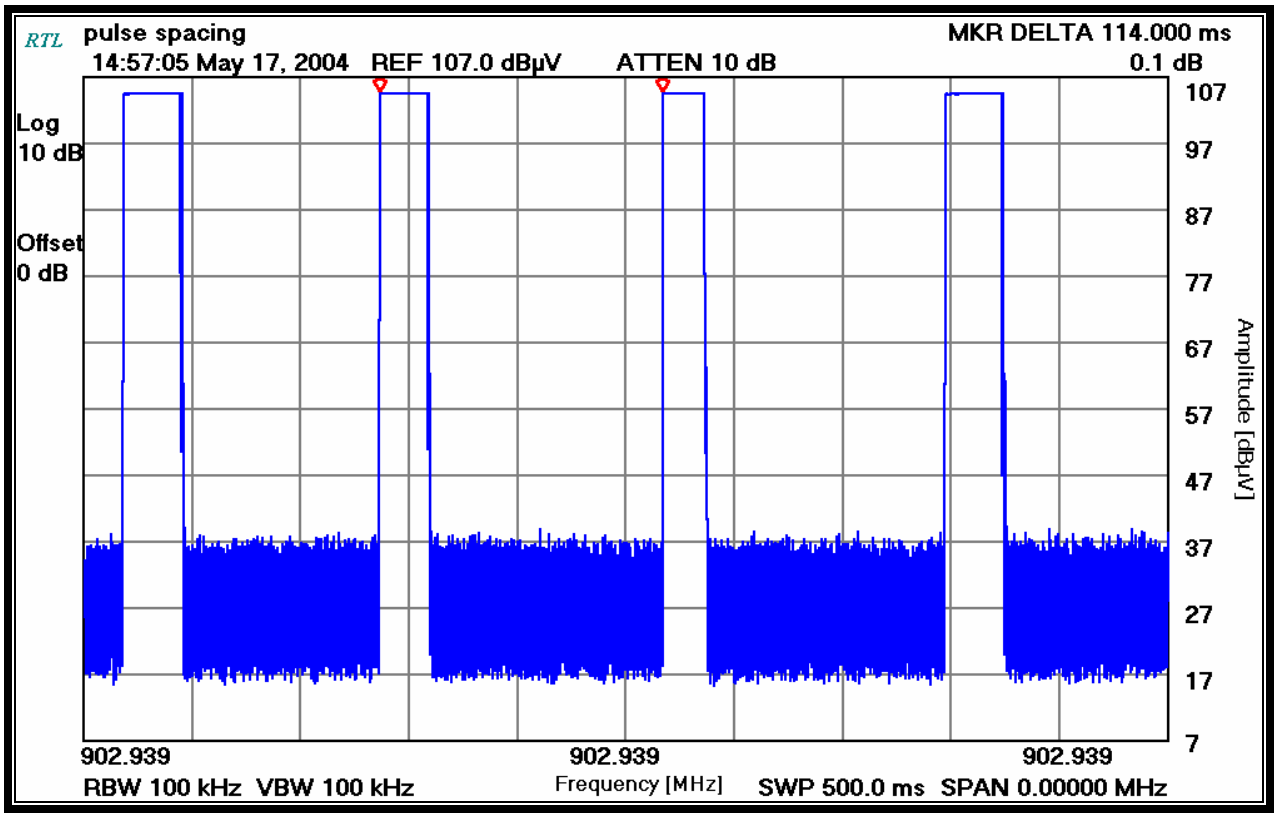


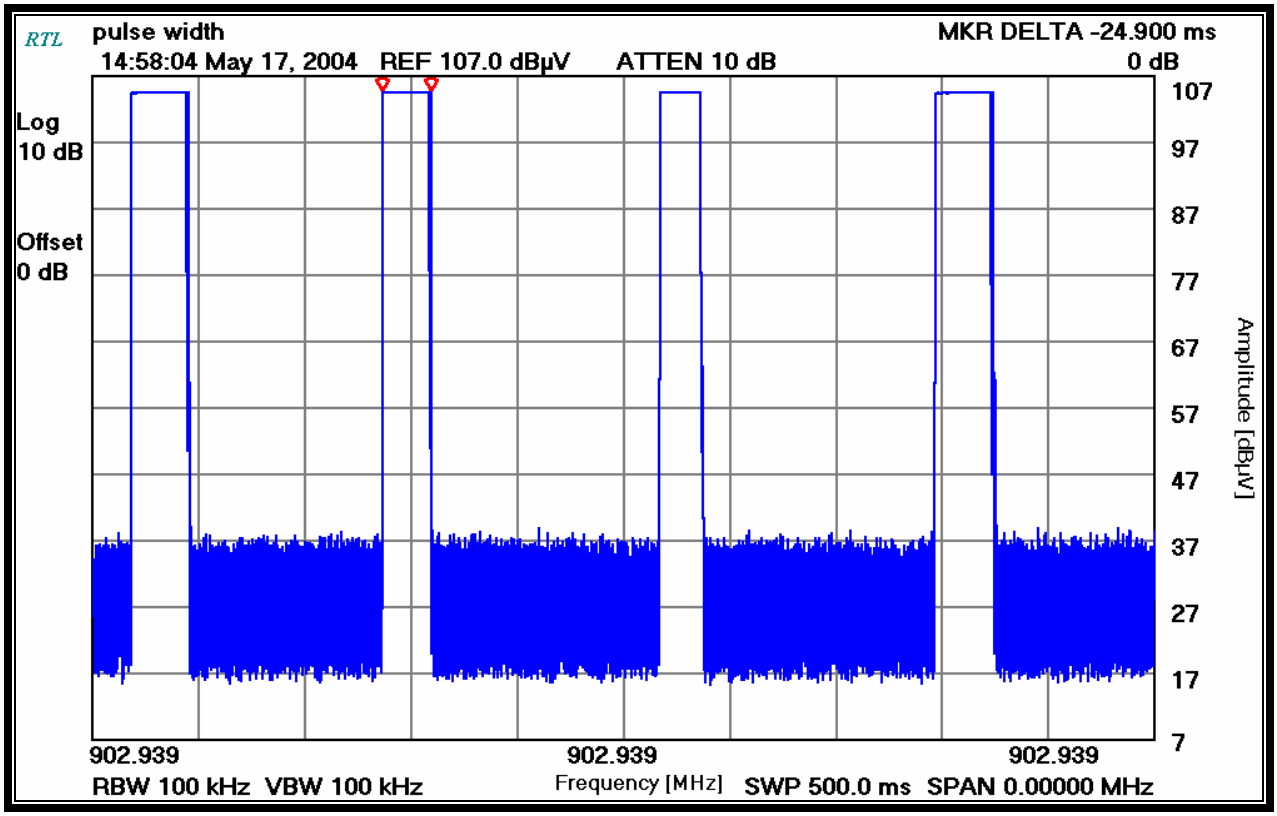
Figure 2-1: Worst Case Configuration of System Under Test

3 Duty Cycle Calculation

The duty cycle data is taken from the original certification report for use in average calculations.



Plot 3-1: Pulse Spacing



Plot 3-2: Pulse Width

Duty Cycle Calculation: 20 Log (24.9ms/100ms) = -12.1 dB
24.9% duty cycle used.

4 Radiated Emission Limits Radiated Harmonics - §15.249

4.1 Radiated Emission Limits Test Procedure

Radiated Emissions of the harmonics were tested at three meters, and meet the requirements of 500 microvolts/meter in average mode, and 20 dB higher in peak mode, per 15.249(e). The EUT was tested in three orthogonal planes to determine worst case emissions which are presented here.

4.2 Radiated Emissions Harmonics/Spurious Test Data

Table 4-1: Radiated Emissions Harmonics/Spurious (Channel 1, 902.5 MHz) - Attached Antenna Configuration

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m) (Average less 12.1 dB duty cycle correction factor)	Limit (dBuV/m)	Margin (dB)
1805.0	Pk	48.6	8.0	56.6	74.0	-17.4
1805.0	Av	48.6	8.0	39.7	54.0	-14.3
2707.5	Pk	56.8	9.0	65.8	74.0	-8.2
2707.5	Av	56.8	9.0	48.9	54.0	-5.1
3610.0	Pk	45.0	7.2	52.2	74.0	-21.8
3610.0	Av	45.0	7.2	35.3	54.0	-18.7
4512.5	Pk	45.5	11.9	57.4	74.0	-16.6
4512.5	Av	45.5	11.9	40.5	54.0	-13.5
5415.0	Pk	42.8	11.6	54.4	74.0	-19.6
5415.0	Av	42.8	11.6	37.5	54.0	-16.5
6317.5	Pk	40.3	11.2	51.5	74.0	-22.5
6317.5	Av	40.3	11.2	34.6	54.0	-19.4
7220.0	Pk	40.2	10.3	50.5	74.0	-23.5
7220.0	Av	40.2	10.3	33.6	54.0	-20.4
8122.5	Pk	39.8	9.9	49.7	74.0	-24.3
8122.5	Av	39.8	9.9	32.8	54.0	-21.2
9025.0	Pk	37.2	14.0	51.2	74.0	-22.8
9025.0	Av	37.2	14.0	34.3	54.0	-19.7

Peak Resolution/Video Bandwidth is 1 MHz

Table 4-2: Radiated Emissions Harmonics/Spurious (Channel 36, 915.025 MHz) - Attached Antenna Configuration

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m) (Average less 12.1 dB duty cycle correction factor)	Limit (dBuV/m)	Margin (dB)
1830.1	Pk	47.6	9.6	57.2	74.0	-16.8
1830.1	Av	47.6	9.6	40.3	54.0	-13.7
2745.1	Pk	52.2	9.3	61.5	74.0	-12.5
2745.1	Av	52.2	9.3	44.6	54.0	-9.4
3660.1	Pk	44.2	7.5	51.7	74.0	-22.3
3660.1	Av	44.2	7.5	34.8	54.0	-19.2
4575.1	Pk	45.2	11.1	56.3	74.0	-17.7
4575.1	Av	45.2	11.1	39.4	54.0	-14.6
5490.2	Pk	43.8	12.2	56.0	74.0	-18.0
5490.2	Av	43.8	12.2	39.1	54.0	-14.9
6405.2	Pk	40.8	11.6	52.4	74.0	-21.6
6405.2	Av	40.8	11.6	35.5	54.0	-18.5
7320.2	Pk	39.8	10.1	49.9	74.0	-24.1
7320.2	Av	39.8	10.1	33.0	54.0	-21.0
8235.2	Pk	40.0	14.9	54.9	74.0	-19.1
8235.2	Av	40.0	14.9	38.0	54.0	-16.0
9150.3	Pk	39.7	14.2	53.9	74.0	-20.1
9150.3	Av	39.7	14.2	37.0	54.0	-17.0

Peak Resolution/Video Bandwidth is 1 MHz

Table 4-3: Radiated Emissions Harmonics/Spurious (Channel 70, 927.45 MHz) - Attached Antenna Configuration

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m) (Average less 12.1 dB duty cycle correction factor)	Limit (dBuV/m)	Margin (dB)
1854.9	Pk	50.9	10.0	60.9	74.0	-13.1
1854.9	Av	50.9	10.0	44.0	54.0	-10.0
2782.4	Pk	54.3	8.6	62.9	74.0	-11.1
2782.4	Av	54.3	8.6	46.0	54.0	-8.0
3709.8	Pk	44.3	7.9	52.2	74.0	-21.8
3709.8	Av	44.3	7.9	35.3	54.0	-18.7
4637.3	Pk	46.0	10.8	56.8	74.0	-17.2
4637.3	Av	46.0	10.8	39.9	54.0	-14.1
5564.7	Pk	42.8	11.9	54.7	74.0	-19.3
5564.7	Av	42.8	11.9	37.8	54.0	-16.2
6492.2	Pk	41.2	11.1	52.3	74.0	-21.7
6492.2	Av	41.2	11.1	35.4	54.0	-18.6
7419.6	Pk	40.3	11.0	51.3	74.0	-22.7
7419.6	Av	40.3	11.0	34.4	54.0	-19.6
8347.1	Pk	39.2	15.0	54.2	74.0	-19.8
8347.1	Av	39.2	15.0	37.3	54.0	-16.7
9274.5	Pk	38.2	13.7	51.9	74.0	-22.1
9274.5	Av	38.2	13.7	35.0	54.0	-19.0

Peak Resolution/Video Bandwidth is 1 MHz

Table 4-4: Radiated Emissions Harmonics/Spurious (Channel 1, 902.5 MHz) - Unattached Antenna Configuration

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m) (Average less 12.1 dB duty cycle correction factor)	Limit (dBuV/m)	Margin (dB)
1805.0	Pk	49.3	8.0	57.3	74.0	-16.7
1805.0	Av	49.3	8.0	40.4	54.0	-13.6
2707.5	Pk	57.8	9.0	66.8	74.0	-7.2
2707.5	Av	57.8	9.0	49.9	54.0	-4.1
3610.0	Pk	46.2	7.2	53.4	74.0	-20.6
3610.0	Av	46.2	7.2	36.5	54.0	-17.5
4512.5	Pk	42.8	11.9	54.7	74.0	-19.3
4512.5	Av	42.8	11.9	37.8	54.0	-16.2
5415.0	Pk	42.8	11.6	54.4	74.0	-19.6
5415.0	Av	42.8	11.6	37.5	54.0	-16.5
6317.5	Pk	40.5	11.2	51.7	74.0	-22.3
6317.5	Av	40.5	11.2	34.8	54.0	-19.2
7220.0	Pk	39.7	10.3	50.0	74.0	-24.0
7220.0	Av	39.7	10.3	33.1	54.0	-20.9
8122.5	Pk	39.8	9.9	49.7	74.0	-24.3
8122.5	Av	39.8	9.9	32.8	54.0	-21.2
9025.0	Pk	37.7	14.0	51.7	74.0	-22.3
9025.0	Av	37.7	14.0	34.8	54.0	-19.2

Peak Resolution/Video Bandwidth is 1 MHz

Table 4-5: Radiated Emissions Harmonics/Spurious (Channel 36, 915.025 MHz) - Unattached Antenna Configuration

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m) (Average less 12.1 dB duty cycle correction factor)	Limit (dBuV/m)	Margin (dB)
1830.1	Pk	51.2	8.4	59.6	74.0	-14.4
1830.1	Av	51.2	8.4	42.7	54.0	-11.3
2745.1	Pk	52.0	9.3	61.3	74.0	-12.7
2745.1	Av	52.0	9.3	44.4	54.0	-9.6
3660.1	Pk	43.5	7.5	51.0	74.0	-23.0
3660.1	Av	43.5	7.5	34.1	54.0	-19.9
4575.1	Pk	45.3	11.1	56.4	74.0	-17.6
4575.1	Av	45.3	11.1	39.5	54.0	-14.5
5490.2	Pk	43.2	12.2	55.4	74.0	-18.6
5490.2	Av	43.2	12.2	38.5	54.0	-15.5
6405.2	Pk	42.2	11.6	53.8	74.0	-20.2
6405.2	Av	42.2	11.6	36.9	54.0	-17.1
7320.2	Pk	41.2	10.1	51.3	74.0	-22.7
7320.2	Av	41.2	10.1	34.4	54.0	-19.6
8235.2	Pk	41.0	14.9	55.9	74.0	-18.1
8235.2	Av	41.0	14.9	39.0	54.0	-15.0
9150.3	Pk	38.2	14.2	52.4	74.0	-21.6
9150.3	Av	38.2	14.2	35.5	54.0	-18.5

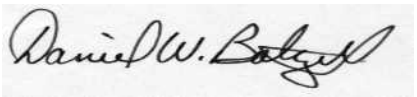
Peak Resolution/Video Bandwidth is 1 MHz

Table 4-6: Radiated Emissions Harmonics/Spurious (Channel 70, 927.45 MHz) - Unattached Antenna Configuration

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m) (Average less 12.1 dB duty cycle correction factor)	Limit (dBuV/m)	Margin (dB)
1854.9	Pk	50.4	8.8	59.2	74.0	-14.8
1854.9	Av	50.4	8.8	42.3	54.0	-11.7
2782.4	Pk	55.8	8.6	64.4	74.0	-9.6
2782.4	Av	55.8	8.6	47.5	54.0	-6.5
3709.8	Pk	43.3	7.9	51.2	74.0	-22.8
3709.8	Av	43.3	7.9	34.3	54.0	-19.7
4637.3	Pk	45.7	10.8	56.5	74.0	-17.5
4637.3	Av	45.7	10.8	39.6	54.0	-14.4
5564.7	Pk	42.7	11.9	54.6	74.0	-19.4
5564.7	Av	42.7	11.9	37.7	54.0	-16.3
6492.2	Pk	41.0	11.1	52.1	74.0	-21.9
6492.2	Av	41.0	11.1	35.2	54.0	-18.8
7419.6	Pk	39.3	11.0	50.3	74.0	-23.7
7419.6	Av	39.3	11.0	33.4	54.0	-20.6
8347.1	Pk	39.2	15.0	54.2	74.0	-19.8
8347.1	Av	39.2	15.0	37.3	54.0	-16.7
9274.5	Pk	38.2	13.7	51.9	74.0	-22.1
9274.5	Av	38.2	13.7	35.0	54.0	-19.0

Peak Resolution/Video Bandwidth is 1 MHz

TEST PERSONNEL:



Daniel Baltzell		May 16, 2006
Test Engineer	Signature	Date Of Test

4.3 Test Equipment Used for Testing

Table 4-7: Radiated Spurious Emissions Test Equipment

RTL Asset	Manufacturer	Model	Part Type	Serial Number	Calibration Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	8/3/06
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	8/3/06
901053	Schaffner &Chase	CBL6112B	Bilog antenna (20 MHz - 2 GHz)	2648	11/1/06
900905	Rhein Tech Laboratories, Inc.	PR-1040	Pre Amplifier 40dB (10 MHz – 2 GHz)	1006	3/15/07
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	9/14/06
901365	MITEQ	JS4-00102600-41-5P	Amplifier, 15 V, 0.1-26 GHz, 28dB gain, power 5dB	1094152	3/24/07
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	5/20/07
900323	EMCO	3160-07	Horn Antenna (8.2 - 12.4 GHz)	9605-1054	5/20/07
900321	EMCO	3161-03	Horn Antenna (4.0 - 8.2 GHz)	9508-1020	5/20/07
901425	Insulated Wire, Inc.	KPS-1503-2400-KPS	RF cable, 20'	NA	12/12/06
901424	Insulated Wire Inc.	KPS-1503-360-KPS	RF cable 36"	NA	12/12/06

5 Conclusion

The data in this Class II report shows that the 2 antenna arrangements for Ikusi Model: TR800; FCC ID: PVTTR800-US, comply with all the requirements of Parts 2 and 15 of the FCC Rules.