



EMC EMISSIONS - TEST REPORT (FULL)

Test Report No.	BC500220-1	Issue Date:	May 17, 2005
Model / Serial No.	M1B / 2513		
Product Type	Utility Automated Meter Reading Radio		
Client	Metron Farnier		
Manufacturer	Transparent Technologies		
License holder	Transparent Technologies		
Address	5665 Airport Blvd Boulder, CO 80301		
Test Criteria Applied	FCC CFR47 Part 15.247		
Test Result	PASS		
Test Project Number	BC500220-1	Title 47 CFR 15: RADIO FREQUENCY DEVICES	
References			
Total Pages			
Including			
Appendices:	38		
Reviewed By :	<i>Todd J. Kelley</i>		
Approved By :	<i>Robert Crosswell</i>		

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Lab Code:200264-0

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STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The measurement uncertainty for Conducted Emissions in the frequency range of 150kHz – 30MHz is calculated to be $\pm 2.30\text{dB}$ and for Radiated Emissions is calculated to be $\pm 3.60\text{dB}$ in the frequency range of 30MHz – 200MHz and $\pm 3.38\text{dB}$ in the frequency range of 200MHz – 1000MHz.

EUT Received Date: 29-April-2005

Testing Start Date: 29-April-2005

Testing End Date: 3-May-2005

The tests were performed according to following regulations :

1. FCC CFR47 Part 15.205
2. FCC CFR47 Part 15.207
3. FCC CFR47 Part 15.209
4. FCC CFR47 Part 15.247
5. ICES-003

Emission Test Results:

Conducted Emissions, Powerline (15.207) - Not Applicable

Test Result

Minimum limit margin NA dB at NA MHz

Maximum limit exceeding dB at MHz

Remarks: _____

Radiated Emissions (15.209) - PASS

Test Result

Minimum limit margin -2.0 dB at 0.06 MHz

Maximum limit exceeding dB at MHz

Remarks: _____

Bandwidth 15.247 (a)(2) - PASS

Test Result

Remarks: The 6dB was measured to be 585kHz

Peak Output Power 15.247 (b)(3) - PASS

Test Result

Minimum limit margin -16.3 dB at 920.0 MHz

Maximum limit exceeding dB at MHz

Remarks: _____

Radiated Emissions 15.205/15.247(c) - PASS

Test Result

Minimum limit margin -8.6 dB at 2760.04 MHz

Maximum limit exceeding dB at MHz

Remarks: _____

Spectral Density 15.247(d) - PASS**Test Result**

Remarks: Maximum measured value = 6.66dBm/delta from the limit = -1.34

GENERAL REMARKS:

The following remarks are to be considered as “where applicable” and are taken into account while completing any FCC/IC/ETSI radio tests at International Approvals Laboratories, LLC.

Testing was performed in 3 different orthogonal axis to determine the worst case emissions from the device. The worst case emissions measurements are shown in this report.

FCC CFR47 Part 15.31: Measurement Standards: In any case where the device is powered off a battery, a fresh battery was used during test. In cases where the device is powered off an AC supply, voltage was varied per Part 15.31 to find worst case emissions.

FCC CFR47 Part 15.35: Measurement Detector Functions and Bandwidths: FCC Part 15.35 was utilized when performing the measurements within this report.

In any case where the device is powered off a battery, a fresh battery was used during test. In cases where the device is powered off an AC supply, voltage was verified per Part 15.31 to find worst case emissions.

The actual test distance for the FCC Part 15.209 testing was conducted at 10m for the fact that the device was being tested to EN55022 Class B from 30 MHz to 1000 MHz (meets/exceeds the FCC Part 15.209 & 109B limits) The data is automatically extrapolated back to the FCC 3m limits and measurements are corrected to better show the compliance to FCC requirements and reduce confusion. A correction factor of 10.54dB is used in cases of 30MHz and up for a difference between 10m and 3m measurement distances. All measurements that are lesser than 30MHz where applicable are accompanied with the full of measurements and calculations to support the interpolation.

Modifications required to pass:

Test Specification Deviations: Additions to or Exclusions from

Required Information In Accordance to FCC CFR 47 Part 2.1033:

Rule Part 11, 15 & 18 Devices	Other Rule Part Devices	Description	Comments
2.1033(b)(1)	2.1033(c)(1)	Manu. Contact	See Page 1 of this report
2.1033(b)(2)	2.1033(c)(2)	FCC Identifier	
2.1033(b)(3)	2.1033(c)(3)	Users Manual to include Operating, installation	Attached as Exhibit
	2.1033(c)(4)	Emissions Designator per 2.	
	2.1033(c)(5)	Frequency Range	Not Applicable to Part 15 Devcies
	2.1033(c)(6)	Power range and controls	Not Applicable to Part 15 Devcies
	2.1033(c)(7)	Maximum power ouput rating	Not Applicable to Part 15 Devcies
	2.1033(c)(8)	DC Voltage and Current supplying final RF stages	Not Applicable to Part 15 Devcies
2.1033(b)(3)	2.1033(c)(9)	Tune –up procedure	Please refer to the users manual for applicability
2.1033(b)(4&5)	2.1033(c)(10)	Complete Circuit Diagrams and circuit operation description	Attached as Exhibit
2.1033(b)(7)	2.1033(c)(11)	Photographs/drawings of the identification label & its location on the device	Attached as Exhibit
2.1033(b)(7)	2.1033(c)(12)	Photographs of the external and internal surfaces, and construction	Attached as Exhibit
	2.1033(c)(13)	Digital Modulation	Not Applicable
2.1033(b)(6)	2.1033(c)(14)	Report of Measurement Data Required by 2.1046 – 2.1057	See Data Below (This report consists of the testing required under Part 15.231)
2.1033(b)(8)		Description of publicly available support equipment used during test	Refer to Exhibit B of this report (Client Test Plan)
2.1033(b)(9)		Statement of Autorization to Part 15.37 of CFR47	The equipment herein is being authorized in accordance to 15.37 of the CFR47 Rules.
2.1033(b)(10)		Direct Sequence Spread Spectrum Devices (DSSS)	Exhibit of compliance to 15.247(e)
2.1033(b)(10)		Frequency Hopping Devices	Exhibit of compliance to 15.247(a)(1)
2.1033(b)(11)		Scanning receiver construction	Exhibit stating compliance to construction in accordance to 15.121.
15.31	15.31	Transmitter Supply Voltage	Testing herein was completed in accordance to FCC CFR47 Part 15.31

Exhibits Including (where applicable):

- | | |
|------------------------------------|---|
| 1. Users Manual | 7. Parts List |
| 2. Operation Description | 8. Tuning Procedure (if applicable) |
| 3. Block Diagram | 9. Test Setup Photograph |
| 4. Report of Measurement | 10. Label Drawings and or Photographs |
| 5. External & Internal Photographs | 11. Description of Support Equipment (where Applicable) |
| 6. Schematic | |

Required Information in Accordance to Industry Canada Regulations (In addition to the above):

Information Required	Description	Comments
Modulation Type	(i.e. ASK, NON, FSK, DSSS, FHSS, etc.)	
Emissions Designator	Per TRC-49	
In Country Representative	Contact Information	
99% Bandwidth Measurement	Per RSS-210	

Test-setup photo(s):
Conducted Emissions

Not Applicable

Test-setup photo(s):
Radiated Intentional/Unintentional Emissions



Test-setup photo(s):
Radiated Intentional/Unintentional Emissions



Test-setup photo(s):
Conducted Port Emissions



Appendix A

Test Data Sheets
and
Test Equipment Used



15.209 Test Data

Radiated Electromagnetic Emissions

Test Report #:	BC500220 Run 03	Test Area:	Pinewood Site 1 (3m)	Temperature:	21.0	°C
Test Method:	FCC pt. 15.209	Test Date:	03-May-2005	Relative Humidity:	<26	%
EUT Model #:	M1B	EUT Power:	3.6 VDC Battery Powered	Air Pressure:	81	kPa
EUT Serial #:	2513					
Manufacturer:	Metron					
EUT Description:	M1B Utility Radio					
Notes:						

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dbuV)	(m) (DEG)	15.209 <30MHz	15.209 >30MHz
Loop Antenna is perpendicular						
0.0320	48.1 Qp	0.0 / 11.9 / 0.0	60.0	V / 1.0 / 0.0	-37.5	N/A
0.0600	79.4 Qp	0.1 / 10.5 / 0.0	90.0	V / 1.0 / 0.0	-2.0	N/A
0.0990	52.8 Qp	0.1 / 10.5 / 0.0	63.3	V / 1.0 / 0.0	-24.4	N/A
2.49	33.7 Qp	0.1 / 10.2 / 0.0	44.1	V / 1.0 / 0.0	-5.4	N/A
10.91	12.6 Qp	0.2 / 10.3 / 0.0	23.1	V / 1.0 / 0.0	-26.4	N/A
29.60	10.0 Qp	0.5 / 8.3 / 0.0	18.8	V / 1.0 / 0.0	-30.7	N/A
Loop antenna is Parallel						
0.0600	73.6 Qp	0.1 / 10.5 / 0.0	84.1	V / 1.0 / 0.0	-7.9	N/A
0.0990	47.1 Qp	0.1 / 10.5 / 0.0	57.7	V / 1.0 / 0.0	-30.0	N/A
2.49	27.8 Qp	0.1 / 10.2 / 0.0	38.1	V / 1.0 / 0.0	-11.4	N/A
10.91	12.8 Qp	0.2 / 10.3 / 0.0	23.3	V / 1.0 / 0.0	-26.2	N/A
29.60	10.0 Qp	0.5 / 8.3 / 0.0	18.8	V / 1.0 / 0.0	-30.7	N/A
30.00	25.5 Qp	0.5 / 12.9 / 28.4	10.5	V / 1.0 / 0.0	-39.0	-29.5
43.13	30.3 Qp	0.7 / 11.5 / 28.4	14.1	V / 1.0 / 0.0	N/A	-25.9
48.00	34.3 Qp	0.7 / 10.8 / 28.4	17.4	V / 1.0 / 0.0	N/A	-22.6
113.28	29.8 Qp	1.1 / 11.1 / 28.1	13.8	V / 1.0 / 0.0	N/A	-29.7
115.40	27.8 Qp	1.2 / 11.2 / 28.1	12.0	V / 1.0 / 0.0	N/A	-31.5
90 degrees						
115.40	28.9 Qp	1.2 / 11.2 / 28.1	13.1	V / 1.0 / 90.0	N/A	-30.4
180 degrees						
43.13	30.5 Qp	0.7 / 11.5 / 28.4	14.2	V / 1.0 / 180.0	N/A	-25.8

Radiated Electromagnetic Emissions

Test Report #:	BC500220 Run 03	Test Area:	Pinewood Site 1 (3m)	Temperature:	21.0	°C
Test Method:	FCC pt. 15.209	Test Date:	03-May-2005	Relative Humidity:	<26	%
EUT Model #:	M1B	EUT Power:	3.6 VDC Battery Powered	Air Pressure:	81	kPa
EUT Serial #:	2513					
Manufacturer:	Metron					
EUT Description:	M1B Utility Radio					
Notes:						

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <30MHz	DELTA2 (dB) 15.209 >30MHz
270 degrees						
190.00	25.2 Qp	1.4 / 12.8 / 27.7	11.8	V / 1.0 / 270.0	N/A	-31.7
No significant emissions found within 20 dB of the limit.						
Changing to Horizontal						
30.00	21.1 Qp	0.5 / 12.9 / 28.4	6.1	H / 2.0 / 0.0	-43.4	-33.9
43.13	23.1 Qp	0.7 / 11.5 / 28.4	6.9	H / 2.0 / 0.0	N/A	-33.1
48.00	24.8 Qp	0.7 / 10.8 / 28.4	8.0	H / 2.0 / 0.0	N/A	-32.0
113.28	23.3 Qp	1.1 / 11.1 / 28.1	7.4	H / 2.0 / 0.0	N/A	-36.1
115.40	24.8 Qp	1.2 / 11.2 / 28.1	9.0	H / 2.0 / 0.0	N/A	-34.5
190.00	21.5 Qp	1.4 / 12.8 / 27.7	8.1	H / 2.0 / 0.0	N/A	-35.4
90 degrees						
No higher emissions found at 90 degrees.						
180 degrees						
No higher emissions found at 180 degrees.						
270 degrees						
No higher emissions found at 270 degrees						
No significant emissions found within 30 dB of the limit.						
0 degrees						
No significant emissions detected at 0 degrees.						
90 degrees						
No significant emissions detected between 200 - 1000 MHz.						
The following are noise floor points.						
200.00	19.9 Qp	1.5 / 10.9 / 27.6	4.6	V / 1.0 / 90.0	N/A	-38.9
400.00	18.8 Qp	2.2 / 14.8 / 27.9	7.9	V / 1.0 / 90.0	N/A	-38.1

Radiated Electromagnetic Emissions

Test Report #: BC500220 Run 03	Test Area: Pinewood Site 1 (3m)	Temperature: 21.0 °C
Test Method: FCC pt. 15.209	Test Date: 03-May-2005	Relative Humidity: <26 %
EUT Model #: M1B	EUT Power: 3.6 VDC Battery Powered	Air Pressure: 81 kPa
EUT Serial #: 2513		
Manufacturer: Metron		
EUT Description: M1B Utility Radio		
Notes:		

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av – Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dBm) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <30MHz	DELTA2 (dB) 15.209 >30MHz
600.00	24.8 Qp	2.9 / 18.6 / 28.5	17.8	V / 1.0 / 90.0	N/A	-28.2
800.00	19.3 Qp	3.3 / 20.5 / 28.9	14.1	V / 1.0 / 90.0	N/A	-31.9
999.78	18.9 Qp	3.7 / 23.2 / 27.4	18.5	V / 1.0 / 90.0	N/A	-35.5
Changing to Horizontal						
No significant emissions detected between 200 - 1000 MHz, Horizontal.						
The following are noise floor points.						
300.00	18.6 Qp	1.9 / 13.5 / 27.2	6.7	H / 2.5 / 0.0	N/A	-39.3
500.00	19.2 Qp	2.6 / 17.0 / 28.6	10.3	H / 2.5 / 0.0	N/A	-35.7
700.00	19.3 Qp	3.3 / 20.6 / 28.5	14.7	H / 2.5 / 0.0	N/A	-31.3
900.00	19.0 Qp	3.6 / 22.4 / 28.1	16.9	H / 2.5 / 0.0	N/A	-29.1
No significant emissions detected between 1 - 4 GHz, Vertical.						
The following are noise floor points.						
1000.00	33.8 Av	3.7 / 24.2 / 37.5	24.2	V / 1.0 / 0.0	N/A	-29.8
3000.00	34.5 Av	4.6 / 30.3 / 37.5	31.8	V / 1.0 / 0.0	N/A	-22.2
Changing to Horizontal						
No significant emissions detected between 1 - 4 GHz, Horizontal.						
The following are noise floor points.						
2000.00	35.1 Av	3.2 / 27.4 / 37.3	28.5	H / 1.0 / 0.0	N/A	-25.5
4000.00	34.1 Av	5.7 / 32.8 / 37.6	35.0	H / 1.0 / 0.0	N/A	-19.0
Scanned from 4 - 8 GHz at 0 degrees and 270 degrees.						
No significant emissions detected between 4 - 8 GHz, Horizontal.						
The following are noise floor points.						

Radiated Electromagnetic Emissions

Test Report #: **BC500220 Run 03**
 Test Method: FCC pt. 15.209
 EUT Model #: M1B
 EUT Serial #: 2513
 Manufacturer: Metron
 EUT Description: M1B Utility Radio
 Notes:

Test Area: Pinewood Site 1 (3m)
 Test Date: 03-May-2005
 EUT Power: 3.6 VDC Battery Powered

Temperature: 21.0 °C
 Relative Humidity: <26 %
 Air Pressure: 81 kPa

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dBm) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <30MHz	DELTA2 (dB) 15.209 >30MHz
5000.00	32.3 Av	7.6 / 33.5 / 39.1	34.3	H / 1.0 / 0.0	N/A	-19.7
7000.00	31.3 Av	8.1 / 35.6 / 40.0	35.0	H / 1.0 / 0.0	N/A	-19.0
Changing to Vertical						
No significant emissions detected between 4 - 8 GHz, Vertical.						
The following are noise floor points.						
6000.00	31.7 Av	7.7 / 34.7 / 39.1	34.9	V / 1.0 / 0.0	N/A	-19.1
8000.00	30.3 Av	8.3 / 36.9 / 40.5	35.0	V / 1.0 / 0.0	N/A	-19.0
Scanned from 8 - 10 GHz at 0 and 90 degrees.						
No significant emissions detected, the following is noise floor.						
9000.00	38.9 Av	8.5 / 37.4 / 46.8	38.0	V / 1.0 / 0.0	N/A	-16.0
Changing to Horizontal						
No significant emissions detected between 8 - 10 GHz, Horizontal.						
The following is noise floor.						
10000.0	42.2 Av	9.5 / 38.4 / 48.3	41.8	V / 1.0 / 0.0	N/A	-12.2
End of Run						

Radiated Electromagnetic Emissions

Test Report #: **BC500220 Run 03**
 Test Method: FCC pt. 15.209
 EUT Model #: M1B
 EUT Serial #: 2513
 Manufacturer: Metron
 EUT Description: M1B Utility Radio
 Notes:

Test Area: Pinewood Site 1 (3m)
 Test Date: 03-May-2005
 EUT Power: 3.6 VDC Battery Powered

Temperature: 21.0 °C
 Relative Humidity: <26 %
 Air Pressure: 81 kPa

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <30MHz	DELTA2 (dB) 15.209 >30MHz
***** Measurement Summary *****						
0.0600	79.4 Qp	0.1 / 10.5 / 0.0	90.0	V / 1.0 / 0.0	-2.0	N/A
2.49	33.7 Qp	0.1 / 10.2 / 0.0	44.1	V / 1.0 / 0.0	-5.4	N/A
10000.0	42.2 Av	9.5 / 38.4 / 48.3	41.8	V / 1.0 / 0.0	N/A	-12.2
9000.00	38.9 Av	8.5 / 37.4 / 46.8	38.0	V / 1.0 / 0.0	N/A	-16.0
4000.00	34.1 Av	5.7 / 32.8 / 37.6	35.0	H / 1.0 / 0.0	N/A	-19.0
7000.00	31.3 Av	8.1 / 35.6 / 40.0	35.0	H / 1.0 / 0.0	N/A	-19.0
8000.00	30.3 Av	8.3 / 36.9 / 40.5	35.0	V / 1.0 / 0.0	N/A	-19.0
6000.00	31.7 Av	7.7 / 34.7 / 39.1	34.9	V / 1.0 / 0.0	N/A	-19.1
5000.00	32.3 Av	7.6 / 33.5 / 39.1	34.3	H / 1.0 / 0.0	N/A	-19.7
3000.00	34.5 Av	4.6 / 30.3 / 37.5	31.8	V / 1.0 / 0.0	N/A	-22.2
48.00	34.3 Qp	0.7 / 10.8 / 28.4	17.4	V / 1.0 / 0.0	N/A	-22.6
0.0990	52.8 Qp	0.1 / 10.5 / 0.0	63.3	V / 1.0 / 0.0	-24.4	N/A
2000.00	35.1 Av	3.2 / 27.4 / 37.3	28.5	H / 1.0 / 0.0	N/A	-25.5
43.13	30.5 Qp	0.7 / 11.5 / 28.4	14.2	V / 1.0 / 180.0	N/A	-25.8
10.91	12.8 Qp	0.2 / 10.3 / 0.0	23.3	V / 1.0 / 0.0	-26.2	N/A
600.00	24.8 Qp	2.9 / 18.6 / 28.5	17.8	V / 1.0 / 90.0	N/A	-28.2
900.00	19.0 Qp	3.6 / 22.4 / 28.1	16.9	H / 2.5 / 0.0	N/A	-29.1
30.00	25.5 Qp	0.5 / 12.9 / 28.4	10.5	V / 1.0 / 0.0	-39.0	-29.5
113.28	29.8 Qp	1.1 / 11.1 / 28.1	13.8	V / 1.0 / 0.0	N/A	-29.7
1000.00	33.8 Av	3.7 / 24.2 / 37.5	24.2	V / 1.0 / 0.0	N/A	-29.8
115.40	28.9 Qp	1.2 / 11.2 / 28.1	13.1	V / 1.0 / 90.0	N/A	-30.4
29.60	10.0 Qp	0.5 / 8.3 / 0.0	18.8	V / 1.0 / 0.0	-30.7	N/A
700.00	19.3 Qp	3.3 / 20.6 / 28.5	14.7	H / 2.5 / 0.0	N/A	-31.3
190.00	25.2 Qp	1.4 / 12.8 / 27.7	11.8	V / 1.0 / 270.0	N/A	-31.7
800.00	19.3 Qp	3.3 / 20.5 / 28.9	14.1	V / 1.0 / 90.0	N/A	-31.9
999.78	18.9 Qp	3.7 / 23.2 / 27.4	18.5	V / 1.0 / 90.0	N/A	-35.5
500.00	19.2 Qp	2.6 / 17.0 / 28.6	10.3	H / 2.5 / 0.0	N/A	-35.7
0.0320	48.1 Qp	0.0 / 11.9 / 0.0	60.0	V / 1.0 / 0.0	-37.5	N/A
400.00	18.8 Qp	2.2 / 14.8 / 27.9	7.9	V / 1.0 / 90.0	N/A	-38.1

Radiated Electromagnetic Emissions

Test Report #:	BC500220 Run 03	Test Area:	Pinewood Site 1 (3m)
Test Method:	FCC pt. 15.209	Test Date:	03-May-2005
EUT Model #:	M1B	EUT Power:	3.6 VDC Battery Powered
EUT Serial #:	2513		
Manufacturer:	Metron		
EUT Description:	M1B Utility Radio		
Notes:			

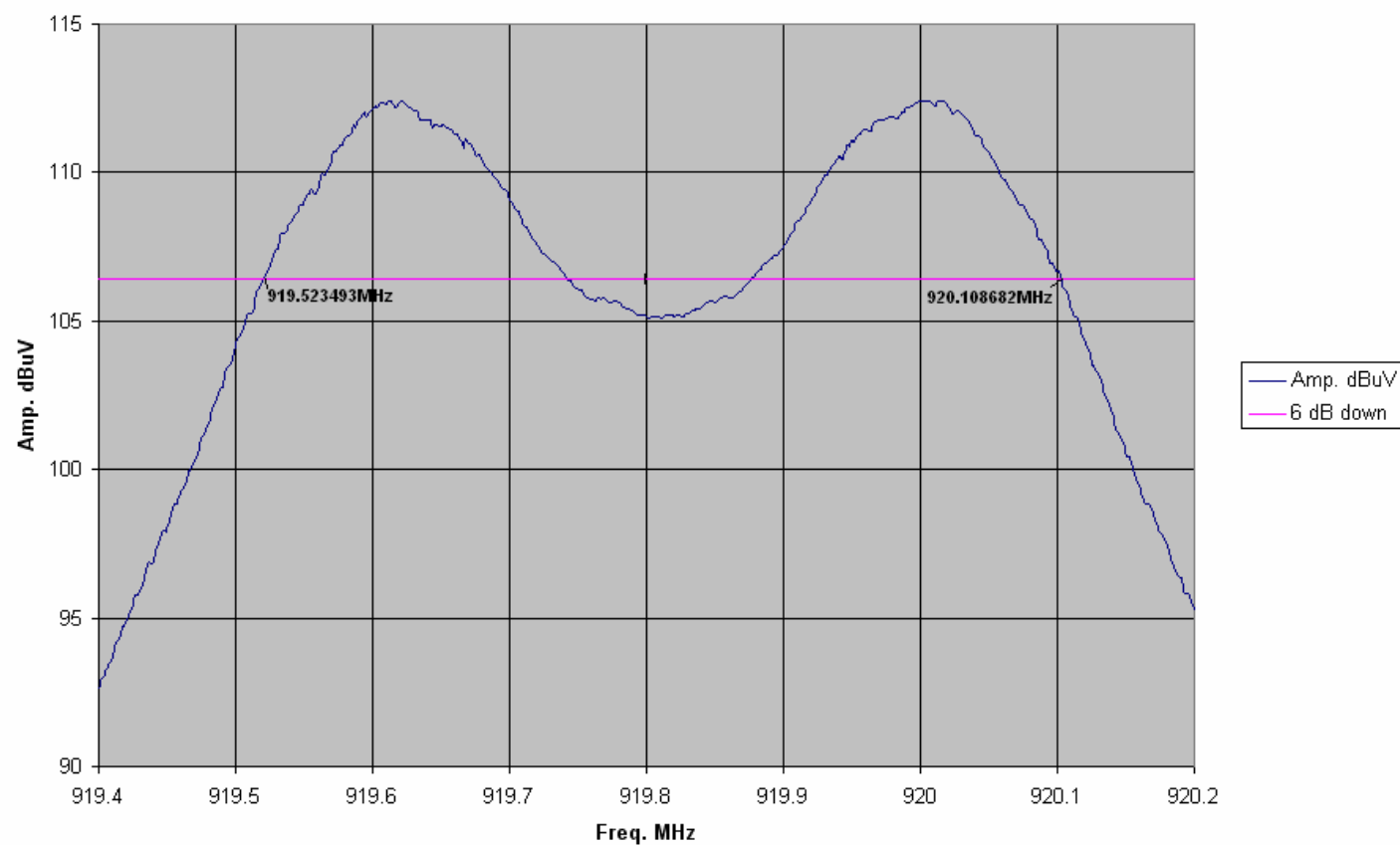
Temperature:	21.0	°C
Relative Humidity:	<26	%
Air Pressure:	81	kPa

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dbuV)	(m) (DEG)	15.209 <30MHz	15.209 >30MHz
200.00	19.9 Qp	1.5 / 10.9 / 27.6	4.6	V / 1.0 / 90.0	N/A	-38.9
300.00	18.6 Qp	1.9 / 13.5 / 27.2	6.7	H / 2.5 / 0.0	N/A	-39.3

15.247(a)(2) Test Data

FCC 15.247(a)(2) 6dB Bandwidth



15.247 (b)(3), (c)/15.205 Test Data

Field Strength Measurements

Fundamental and Spurious of the Transmitter

Test Report #: BC500220 Run 03	Test Area: Pinewood Site 1 (3m)	Temperature: 22.6 °C
Test Method: FCC pt. 15.209	Test Date: 03-May-2005	Relative Humidity: <26 %
EUT Model #: M1B	EUT Power: 3.6 VDC Battery Powered	Air Pressure: 80 kPa
EUT Serial #: 2513		
Manufacturer: Metron		
EUT Description: M1B Utility Radio		
Notes:		

Nb – Narrow Band
 Qp – QuasiPeak Bb – Broad Band
 Av - Average

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit	DELTA
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35 utilized to calculate field strength emissions. The testing performed in accordance to FCC CFR47 Part 15.205 (restricted bands of operation) and 15.247 emissions and delta limits were calculated as follows: Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.209 and 15.247 and the emission/limit delta was calculated. the DTCF is calculated as follows $20 \cdot \log_{10}(\text{duty cycle in 100ms})$ "not to exceed 20dB"								
Part 15.247 and 15.205 Respectively								
Eut is Flat on table. Maximizing fundamental frequency.								
919.59	73.3 Qp	3.6 / 22.5 / 0.0	99.4	V / 1.0 / 152.0	0	99.4	125.2	-25.80
920	73.3 Qp	3.6 / 22.4 / 0.0	99.3	V / 1.0 / 152.0	0	99.3	125.2	-25.90
919.59	80.2 Qp	3.6 / 22.5 / 0.0	106.3	H / 1.4 / 210.0	0	106.3	125.2	-18.90
920	80.1 Qp	3.6 / 22.4 / 0.0	106.1	H / 1.4 / 210.0	0	106.1	125.2	-19.10
EUT is Vertical on table, antenna on top.								
919.59	75.7 Qp	3.6 / 22.5 / 0.0	101.8	H / 1.0 / 44.0	0	101.8	125.2	-23.40
920	75.7 Qp	3.6 / 22.4 / 0.0	101.7	H / 1.0 / 44.0	0	101.7	125.2	-23.50
920	82.9 Qp	3.6 / 22.4 / 0.0	108.9	V / 1.0 / 92.0	0	108.9	125.2	-16.30
919.59	82.6 Qp	3.6 / 22.5 / 0.0	108.7	V / 1.0 / 92.0	0	108.7	125.2	-16.50
EUT is on its side, Battery on bottom								
919.59	76.7 Qp	3.6 / 22.5 / 0.0	102.8	V / 1.0 / 232.0	0	102.8	125.2	-22.40
920	76.5 Qp	3.6 / 22.4 / 0.0	102.5	V / 1.0 / 232.0	0	102.5	125.2	-22.70
919.59	78.2 Qp	3.6 / 22.5 / 0.0	104.4	H / 1.0 / 36.0	0	104.4	125.2	-20.80
920	78.1 Qp	3.6 / 22.4 / 0.0	104.1	H / 1.0 / 36.0	0	104.1	125.2	-21.10
EUT vertical on table with antenna on top was determined to be worst case position.								
Testing continued in that position.								
1839.2	34.5 Pk	3.1 / 26.7 / 0.0	64.3	V / 1.0 / 90.0	-20	44.3	105.2	-60.90
1839.2	39.7 Pk	3.1 / 26.7 / 0.0	69.4	H / 2.1 / 145.0	-20	49.4	105.2	-55.80
1840	34.0 Pk	3.1 / 26.7 / 0.0	63.7	V / 1.0 / 0.0	-20	43.7	105.2	-61.50
1840.05	39.5 Pk	3.1 / 26.7 / 0.0	69.3	H / 2.1 / 145.0	-20	49.3	105.2	-55.90

Field Strength Measurements Fundamental and Spurious of the Transmitter

Test Report #: BC500220 Run 03	Test Area: Pinewood Site 1 (3m)	Temperature: 22.6 °C
Test Method: FCC pt. 15.209	Test Date: 03-May-2005	Relative Humidity: <26 %
EUT Model #: M1B	EUT Power: 3.6 VDC Battery Powered	Air Pressure: 80 kPa
EUT Serial #: 2513		
Manufacturer: Metron		
EUT Description: M1B Utility Radio		
Notes:		

Nb – Narrow Band

Qp – QuasiPeak Bb – Broad Band

Av - Average

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit	DELTA
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35 utilized to calculate field strength emissions. The testing performed in accordance to FCC CFR47 Part 15.205 (restricted bands of operation) and 15.247 emissions and delta limits were calculated as follows: Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.209 and 15.247 and the emission/limit delta was calculated. the DTCF is calculated as follows $20 \cdot \log_{10}(\text{duty cycle in 100ms})$ "not to exceed 20dB"								
Part 15.247 and 15.205 Respectively								
2758.72	68.8 Pk	4.3 / 29.4 / 37.5	65.1	V / 1.0 / 120.0	-20	45.1	54	-8.90
2758.77	65.4 Pk	4.3 / 29.4 / 37.5	61.6	H / 1.0 / 220.0	-20	41.6	54	-12.40
2760.04	65.7 Pk	4.3 / 29.4 / 37.5	62	H / 1.0 / 220.0	-20	42	54	-12.00
2760.04	69.1 Pk	4.3 / 29.4 / 37.5	65.4	V / 1.0 / 120.0	-20	45.4	54	-8.60
3678.37	59.8 Pk	5.1 / 32.0 / 37.9	59	H / 1.0 / 0.0	-20	39	54	-15.00
3678.38	56.2 Pk	5.1 / 32.0 / 37.9	55.4	V / 2.0 / 200.0	-20	35.4	54	-18.60
3680.05	60.1 Pk	5.1 / 32.0 / 37.9	59.3	H / 1.0 / 0.0	-20	39.3	54	-14.70
3680.05	56.0 Pk	5.1 / 32.0 / 37.9	55.2	V / 2.0 / 200.0	-20	35.2	54	-18.80
4597.95	52.4 Pk	6.8 / 32.5 / 39.3	52.4	V / 1.0 / 245.0	-20	32.4	54	-21.60
4597.95	48.8 Pk	6.8 / 32.5 / 39.3	48.9	H / 1.0 / 225.0	-20	28.9	54	-25.10
4600.05	52.6 Pk	6.8 / 32.5 / 39.3	52.7	V / 1.0 / 245.0	-20	32.7	54	-21.30
4600.05	49.4 Pk	6.8 / 32.5 / 39.3	49.5	H / 1.0 / 225.0	-20	29.5	54	-24.50
5517.56	43.4 Pk	6.7 / 34.3 / 38.6	45.8	V / 1.0 / 220.0	-20	25.8	105.2	-79.40
5517.56	48.7 Pk	6.7 / 34.3 / 38.6	51.1	H / 1.0 / 140.0	-20	31.1	105.2	-74.10
5520.07	45.0 Pk	6.7 / 34.3 / 38.6	47.4	V / 1.0 / 220.0	-20	27.4	105.2	-77.80
5520.07	49.6 Pk	6.7 / 34.3 / 38.6	52	H / 1.0 / 140.0	-20	32	105.2	-73.20
6437.14	37.7 Pk	8.4 / 34.9 / 39.0	41.9	V / 1.0 / 102.0	-20	21.9	105.2	-83.30
6437.14	41.2 Pk	8.4 / 34.9 / 39.0	45.5	H / 1.0 / 142.0	-20	25.5	105.2	-79.70
6440.09	39.1 Pk	8.4 / 34.9 / 39.0	43.4	V / 1.0 / 102.0	-20	23.4	105.2	-81.80
6440.09	42.6 Pk	8.4 / 34.9 / 39.0	46.9	H / 1.0 / 142.0	-20	26.9	105.2	-78.30
7356.77	34.7 Pk	8.2 / 36.5 / 40.3	39.1	V / 1.0 / 270.0	-20	19.1	54	-34.90
7356.77	34.2 Pk	8.2 / 36.5 / 40.3	38.5	H / 1.0 / 0.0	-20	18.5	54	-35.50
7360.09	35.5 Pk	8.2 / 36.5 / 40.3	39.8	V / 1.0 / 270.0	-20	19.8	54	-34.20
7360.09	34.1 Pk	8.2 / 36.5 / 40.3	38.4	H / 1.0 / 0.0	-20	18.4	54	-35.60
8276.37	40.3 Pk	8.4 / 37.1 / 45.2	40.6	H / 1.0 / 0.0	-20	20.6	54	-33.40
8276.37	41.6 Pk	8.4 / 37.1 / 45.2	41.9	V / 1.0 / 0.0	-20	21.9	54	-32.10
8280.09	42.3 Pk	8.4 / 37.1 / 45.2	42.5	H / 1.0 / 0.0	-20	22.5	54	-31.50
8280.09	42.8 Pk	8.4 / 37.1 / 45.2	43.1	V / 1.0 / 0.0	-20	23.1	54	-30.90

Field Strength Measurements Fundamental and Spurious of the Transmitter

Test Report #: BC500220 Run 03	Test Area: Pinewood Site 1 (3m)	Temperature: 22.6 °C
Test Method: FCC pt. 15.209	Test Date: 03-May-2005	Relative Humidity: <26 %
EUT Model #: M1B	EUT Power: 3.6 VDC Battery Powered	Air Pressure: 80 kPa
EUT Serial #: 2513		
Manufacturer: Metron		
EUT Description: M1B Utility Radio		
Notes:		

Nb – Narrow Band

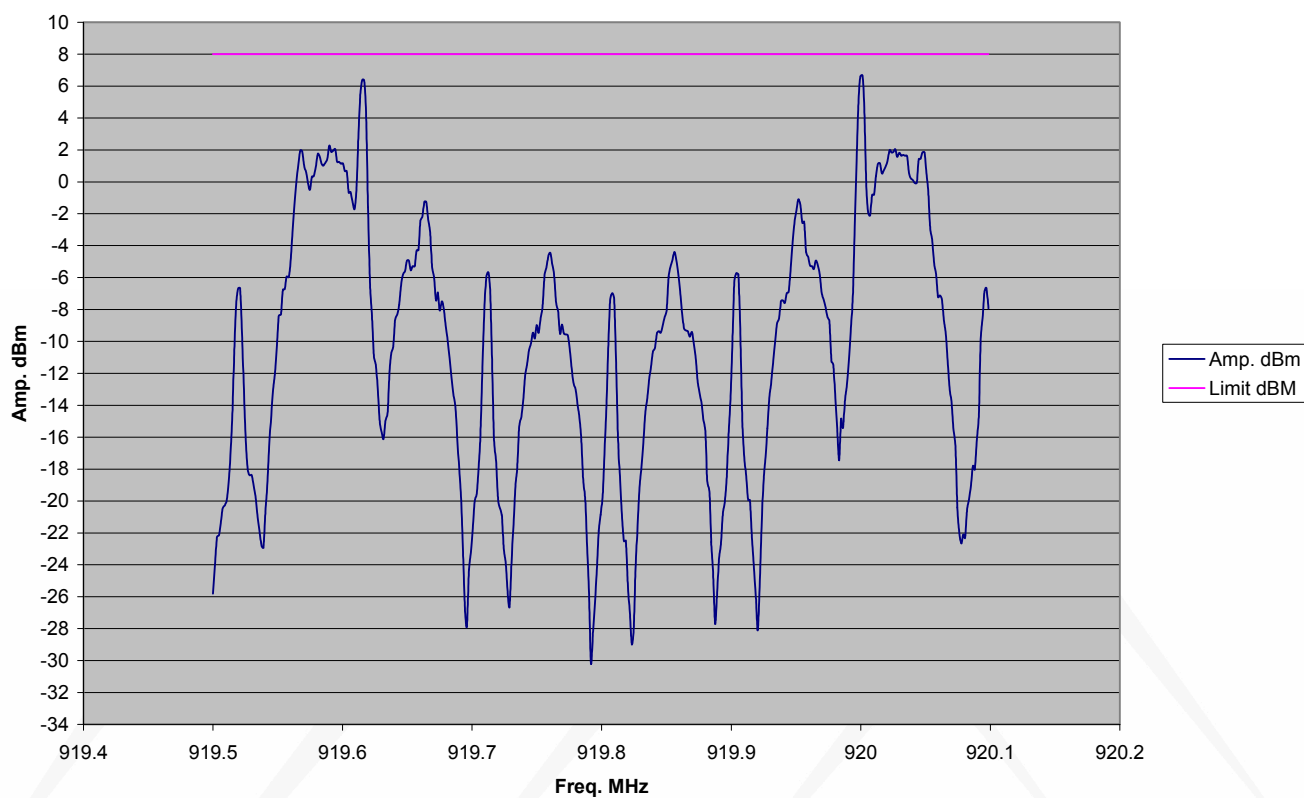
Qp – QuasiPeak Bb – Broad Band

Av - Average

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit	DELTA
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35 utilized to calculate field strength emissions. The testing performed in accordance to FCC CFR47 Part 15.205 (restricted bands of operation) and 15.247 emissions and delta limits were calculated as follows: Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.209 and 15.247 and the emission/limit delta was calculated. the DTCF is calculated as follows $20 \cdot \log_{10}(\text{duty cycle in 100ms})$ "not to exceed 20dB"								
Part 15.247 and 15.205 Respectively								
9195.97	44.3 Pk	8.9 / 37.6 / 47.2	43.6	H / 1.0 / 0.0	-20	23.6	54	-30.40
9195.97	43.5 Pk	8.9 / 37.6 / 47.2	42.7	V / 1.0 / 0.0	-20	22.7	54	-31.30
9200.01	44.5 Pk	8.9 / 37.6 / 47.2	43.8	H / 1.0 / 0.0	-20	23.8	54	-30.20
9200.01	43.2 Pk	8.9 / 37.6 / 47.2	42.5	V / 1.0 / 0.0	-20	22.5	54	-31.50

15.247 (d) Test Data

FCC 15.247(d) Spectral Density 3kHz RBW





Equipment Utilized during testing

Project Report

Begin Date: 4/29/2005 **End Date:** 5/3/2005

Technician Mike Spataro

Project BC500220

Capital Asset ID	Manufacturer	Model #	Serial #	Description	Test Performed	Service Type	Service Date	Service Due
6	Hewlett-Packard	8594E	3223A00145	Spectrum Analyzer	R Radiated Emissions	For Cal	1/6/2005	1/6/2006
106	TENSOR	4105	2020	Ridged Guide Antenna 1-18GHz	R Radiated Emissions	For Cal	6/28/2004	6/28/2005
135	EMCO	3146	9402-3775	Log Periodic Antenna (200-1000MHz)	R Radiated Emissions	For Cal	9/18/2004	9/18/2005
138	EMC TEST SYSTEMS	3109	3142	Biconical Antenna 30-300MHz	R Radiated Emissions	For Cal	9/30/2004	9/30/2005
195	EMCO	6502	9205-2738	Magnetic loop	R Radiated Emissions	For Cal	6/2/2004	6/2/2005
202	Avantek	AWT-18037	1002	RF Pre-Amplifier (8-18 GHz)	R Radiated Emissions	For Ver	4/4/2005	4/4/2006
203	Avantek	AFT97-8434-10F	1007	RF Pre-Amplifier (4-8 GHz)	R Radiated Emissions	For Ver	4/4/2005	4/4/2006
213	Mini-Circuits Lab	ZHL-42	N052792-2	Amplifier	R Radiated Emissions	For Ver	5/6/2005	5/6/2006
248	Hewlett-Packard	8447F	3113A05545	9 kHz- 1.3GHz Pre Amp	R Radiated Emissions	For Ver	5/6/2005	5/6/2006
259	Hewlett-Packard	E7405A	My44211889	Spectrum Analyzer	R Radiated Emissions	For Cal	10/11/2004	10/11/2005

Appendix B

Test Plan and Constructional Data Form

Request for Estimate:

Agent/Test Lab: International Approvals Laboratories, LLC
Address: 5541 Central Avenue Suite 110 Boulder, CO 80301
Contact: Todd Seeley
Title: Principal Engineer (Services Development Focus)
Phone Number: (303) 402-5272
Cell Number: (303) 503-2491
Fax Number: (303) 449-6160
Email Address: todd@ialabs.com

License Holder: Transparent Technologies, Inc.
Address: 5665 Airport Blvd
Contact: Mark Shamley
Title: Operations Manager
Phone Number: 720-406-1294 / 303-449-8833
Fax Number: 303-441-0203

Please provide all pertinent information below and email this Form to Todd Seeley at todd@ialabs.com for a quotation:

General Product Information:

Product/Model Number:	M1B			
Description of product:	Utility Automatic Meter Reading Radio			
Intended Use:	☐ Household	☒ Commercial	☐ Industrial	☐ Hospital ☐ Life Supporting
Intended Location:	☒ Dry ☒ Damp ☒ Wet ☐ Hazardous Location			
Product Type:	☒ Prototype ☐ Production Sample ☐ Manufacturing Design Change: Please Describe			
If more than one product, what are the differences?				
Is the Product Enclosure:	☐ Metal ☒ Plastic ☐ Both			
Size:	Length: 4"	Width: 1.5"	Height: 5"	Weight: 1 lb
What Voltages/Current does the EUT run at?	Rated Voltage: 3.6V Rated Current: # of Phases/Conductors: / # of Power Cords:			
Are there Multiple Modes of Operation?	☐ Yes ☒ No If Yes Please Describe:			
Can all modes of operation be operated simultaneously?	☐ Yes ☐ No Explain:			
In which countries will you be selling the product?	USA			

EMC Information:

What EMC certifications are desired?	☒ FCC/ICES (US & Canada) ☐ CE / EMC / MMD ☐ BSMI (Taiwan) ☐ VCCI (Japan) ☐ SII (Israel) ☐ AS/NZS (Australia/New Zealand) ☐ Other: Please Specify
Highest frequency utilized for device operation:	928 MHz
List of Clock Frequencies:	Refer to previous testing
What is the time that it takes for the device to complete a full cycle of operation? (time required to identify any degradation in performance)	Same as M1
Total Number of I/O Cables: # Greater than 3m (9.75 feet) in Length # Greater than 30m (97.5 feet) in Length # of cables at a longer length (specify)	1
Number of Dedicated Earth Equalization Ports	
Number of Ethernet and/or Telecommunications Ports	1

Radio Information:

What Radio certifications are desired?	☒ FCC (USA) ☐ Industry Canada ☐ ETSI (R&TTE) ☐ Other: Please Specify
Operating Frequency:	919.80
RF Output Power:	DTS mode under FCC 15.247 Wideband FSK 520 KHz
Number of Antennas & Description: (Internal, External, etc.)	1
Modulation Technique:	DTS
Number of Channels:	1
Can the device be operated in CW Mode?	☒ Yes ☐ No

Safety Information:

What safety certifications are desired?	☐ NRTL Listing ☐ CE / LVD / MDD ☐ CB Certification ☐ Other: Please Specify
Has the device been tested and certified for product safety before? A. If it has been previously tested, to which standard and by which organization? B. Can you provide the test report?	☐ Yes ☒ No Standard tested to: Organization tested by: ☐ Yes ☐ No
Is the power supply	☐ An approved off the shelf power supply OR ☐ A Custom Model that will need evaluation/ certification
Does the device contain batteries?	☒ Yes ☐ No What Type? Lithium Thionyl Chloride C-Cell How Many? 1
What technology is used? (i.e., lasers, X Ray, etc.)	RF and IrDA
If Laser:	Class: Output Power: Beam Divergence Angle: Wavelength:
Is the product a Medical Device?	☐ Yes ☒ No
Is it an In Vitro Diagnostic Device?	☐ Yes ☒ No
Testing location: (to be filled in by IALabs)	

Additional Information:

This information is required to be filled in to act as a test plan and constructional data form required to be supplied as part of the test report in accordance to the required standards. This information is not required to obtain a quote.

Support Equipment:

IALabs requires our customers provide all support equipment necessary to fully operate the EUT.

Item	Description	Manufacturer	Model No.
1			
2			
3			
4			

Cabling Information:

Cable	Function*	Type of Shield	Length	Connectors	Connection**
1					
2					
3					
4					
5					
6					

* Function examples (Ethernet, RS232, USB, Analog, physiological parameter, etc.)

** Connection examples (Outside Plant, Patient Coupled, Ring Voltage, etc.)

Monitoring the EUT:

Please provide instructions below on how to observe the EUT to verify proper operation in all modes. (including software revision)

Any other information required: (Notes, Photos, Block Diagrams, Drawings, etc.)

A minimum of a block diagram showing the equipment under test and its support equipment.

Note: To insert files and photos within this document please fill in the information above and then unlock the FORM by:

1. Right click on the tool bar above and select "Form"
2. Select the Lock Button within the "form" toolbar

For International Approvals Laboratories, Use Only.
Please do not fill in the following Information.

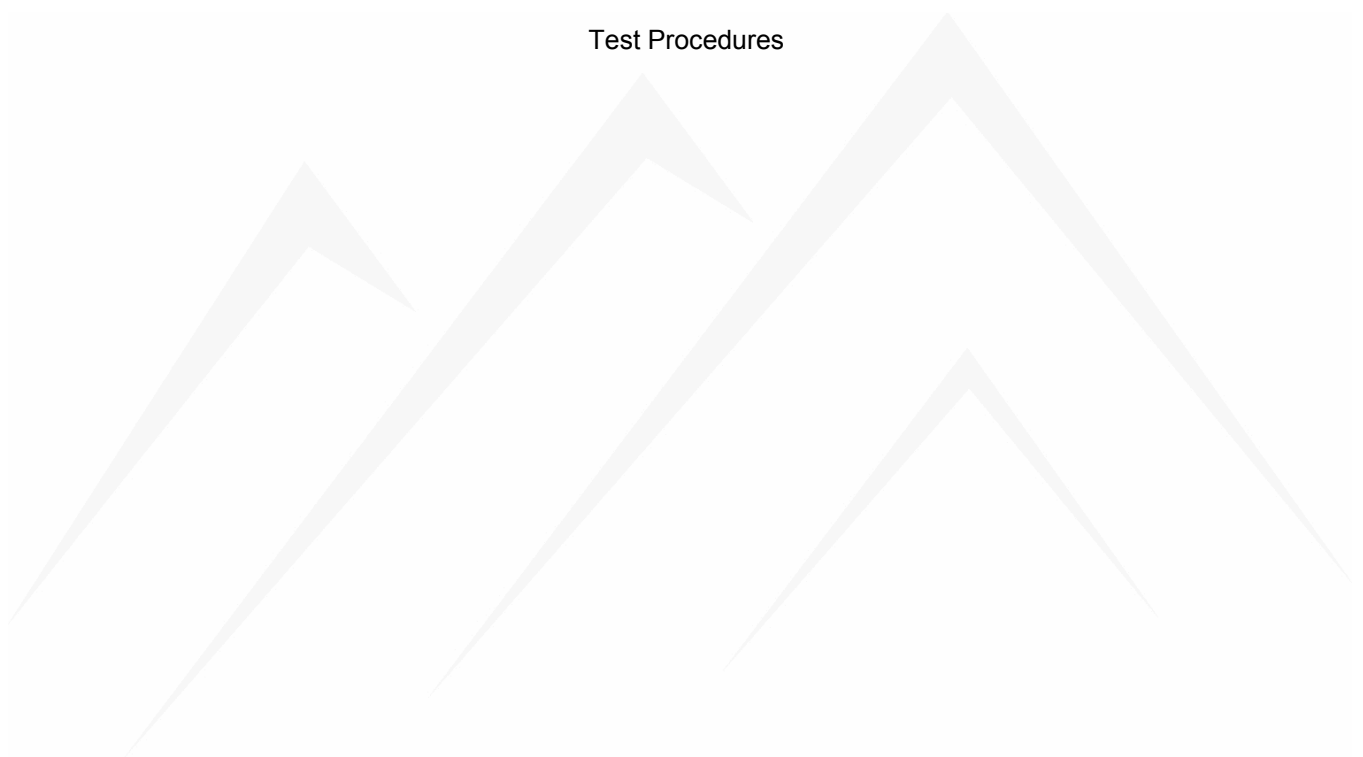
Emissions Testing Required		
☒ FCC Part 15	☐ ICES-003	☐ VCCI
☐ FCC Part 18	☐ BSMI	☐ CISPR 22/EN 55022
☐ CISPR 11/EN 55011	☐ IEC/EN 61326	☐ IEC/EN61000-6-3
☐ IEC/EN61000-6-4	☐ CNS13438	☐ AS/NZS 3548
☐ IEC/EN61000-3-2	☐ IEC/EN61000-3-3	☐ ETSI/EN 301 489
☐ Other:		
OATS Testing Voltages		
☐ 100VAC/50 Hz	☐ 120VAC/60Hz	☐ 230VAC/50Hz
☐ 110VAC/60Hz	☐ 220VAC/60Hz	☐ 240VAC/50Hz
☐ Other:		
Immunity Product Family Standard		
☐ CISPR24/EN 55024	☐ IEC/EN 61000-6-1	☐ IEC/EN 61000-6-2
☐ IEC/EN 60601-1-2	☐ IEC/EN 61326	☐ CISPR14/ EN 55014-2
☐ ETSI/EN 401 489		
☐ Other:		
Immunity Methods		
☐ EN61000-4-2	☐ 4kV/8kV ☐ 6kV/8kV ☐ 8kV ☐ 12kV ☐ 15kV	☐ Other:
☐ EN61000-4-3	☐ 3V/m ☐ 10V/m ☐ 1 kHz Modulation ☐ 400 Hz Modulation ☐ 2 Hz Modulation	☐ Other:
☐ EN61000-4-4	☐ 0.5 kV ☐ 1.0 kV ☐ 2.0 kV	☐ Other:
☐ EN61000-4-5	☐ 0.5 kV ☐ 1.0 kV ☐ 2.0 kV ☐ 4.0 kV	☐ Other:
☐ EN61000-4-6	☐ 3Vrms ☐ 10Vrms ☐ 1 kHz Modulation ☐ 400 Hz Modulation ☐ 2 Hz Modulation	☐ Other:
☐ EN61000-4-8	☐ 1A/m ☐ 30A/m ☐ 400A/m	☐ Other:
☐ EN61000-4-11	☐ >95% 0.5 Cycles ☐ 60% 5 Cycles ☐ 30% 25 Cycles ☐ >95% 250 Cycles	☐ Other:

Appendix C

Measurement Protocol

And

Test Procedures



MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Conducted and radiated emission testing is performed according to the procedures in ANSI C63.4 & CNS13438.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the applicable limit.

To convert between dB μ V and μ V, the following conversions apply:

- $\text{dB}\mu\text{V} = 20(\log \mu\text{V})$
- $\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$

RADIATED EMISSIONS

The final level, expressed in dB μ V/m, is arrived at by taking the reading from the spectrum analyzer (Level dB μ V) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has the applicable limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment B. The amplifier gain is automatically accounted for by using an analyzer offset.

Example: At a Test Frequency of 30 MHz, with a peak reading on the spectrum analyzer or measuring receiver of 14 dB μ V:

Measured Level	+	Transducer & Cable Loss factor	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dB μ V)		(dB)		(dB μ V/m)	(dB μ V/m)		(dB μ V/m)		
14.0		14.9		28.9	40.0		28.9		-11.1

DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 22GHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

Radiated Emissions Diagram:

