ION Digital LLP

5800MICRA / 5800RPS

Class 2 Permissive Change Test Report

per

FCC CFR47 Part 15/B Subpart 15.231 IC RSS 210-Issue 7

FCC ID-QN35800M

IC Certification Number: 4488A-5800M

Revision 1.1

February 7, 2011

Approval		
Checked By:	Robert Stirling, P. Eng.	Feb 7, 2011 Date

Protocol Data Systems Inc, EMC Lab, Abbotsford BC, Canada. SCC ISO/17025 (CAN-P-4E) Accredited Laboratory No. 612
FCC O.A.T.S. Registration Number 96437 Industry Canada O.A.T.S. Registration Number IC3384

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Section I: Report of Measurements Testing Information

General Information

Applicant Company Name	ION Digital LLP
Address	Unit 2109, 1225 Kingsway Ave
	Port Coquitlam,BC V3C 1S2
	Phone: 800-407-4389
	Fax 800-407-4465
	Contact Person: Dean Schebel
	Email: dean.schebel@ion-digital.com
Product Name	Intrusion Detector Sensor – Plungger Plastic with wire Antenna
FCC ID#	QN35800M
IC Certification Number	IC ID is:4488A-5800M.
Applicable Standard	FCC Part 15.231, ANSI C63.4:2003; Part 15.207, 15.209 IC RSS-210-Issue 7
Test Results	Pass
Related Report/s Approval	ION Digital RN 03023 Rev 0.2
Statement of Compliance	This equipment has been tested in accordance with the standards indentified in the referenced test report. To the best of our 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. – Signature on Front Cover Page.

Equipment Under Test Specification

Manufacturer	ION Digital LLP
Product Description	Intrusion Detector Sensor – Plungger Plastic with wire Antenna
FCC ID#	QN35800M
IC Certification Number	IC ID is:4488A-5800M.
Model Number	5800MICRA / 5800RPS
Name	Intrusion Detector Sensor
Operating Frequency	345 MHz
Emission Designator	DXX
EUT Power Source	3Vdc Coin Cell Battery
Test Item	Production Unit
Type of Equipment	Fixed
Antennas	Wire Antenna
Antenna Connector	permanently attached
Test Voltage	3Vdc Coin Cell Battery

Test Environment

Test Facility	Protocol Data Systems Inc.
	4741 Olund Rd.
	Abbotsford, BC V4X 2E7
	Phone: 604-504-0091
	Fax: 604-554-0091
	Email: info@protocol-emc.com
	Website: www.protocol-emc.com
Test Facility ID's	SCC ISO/17025 (CAN-P-4E) Accredited Laboratory No. 612
	FCC O.A.T.S. Registration Number 627740
	Industry Canada O.A.T.S. Registration Number IC3384
Date Tested	January 31, 2011
Tested By	Rob Stirling

Test Setup

Test Supporting Equipment	None required
Test Conditions	Temperature and Humidity: 25°C, 44%
Test Exercise e.g. software description, test signal, etc.	The EUT was set for continuous transmit mode of operation. It only has 1 frequency. The options were for a CW and modulated frequency.
Deviation from Standard/s	No deviation from Standard
Modification to the EUT	No modifications was made.

Test Equipment List

Manufacturer	Model	Equipment Description	Serial No.	Next Cal
HP	85650A	CDN Quasi-Peak Adapter	2811A01080	12/08/11
HP	85662A	Spectrum Analyzer Display	2152A03569	11/08/11
HP	8566B	Spectrum Analyzer RF Section	2241A02102	11/08/11
HP	85685A	RF-Preselector	3107A01222	11/08/11
EMCO	3146	Ant Log Periodic 200-1000MHZ	9611-4699	08/08/11
EMCO	3110B	Ant Biconical 20-300MHz	9401-1850	08/08/11
EMCO	3115	Horn Antenna 1-18GHz	9403-4251	20/08/11
EMCO	3825/2	LISN	2470	20/07/11
Protocol EMC	Custom	Antenna Mast	N/A	N/A
Protocol EMC	Custom	Turntable	N/A	N/A

Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	±1 x 10-5
Total RF power, conducted	±1,5 dB
RF power density, conducted	±3 dB
Spurious emissions, conducted	±3 dB
All emissions, radiated	±3 dB
Temperature	±1□C
Humidity	±5 %
DC and low frequency voltages	±3 %

Section II: Report of Measurements Test Procedure

Radiation Interference:

The measurement was made per ANSI C63.4-2003 using an Agilent model 8566B spectrum analyzer, a model 85685A Preselector, a model 85650A quasi-peak adapter, and the appropriate antenna. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100kHz with an appropriate sweep speed and the video bandwidth was 300kHz up to 1GHz and 1MHz with a VBW greater than or equal to the RBW above 1GHz. 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 EUT was re-positioned to produce the highest emission level. 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
330	20 dBμV	+10.36 dB	+0.5	= 30.86 dBμV/m @ 3m

Where the field strength was too low to get an accurate reading at the required distance of 3meters, the Antenna was moved closer to 1 meter. The resulting measurement was distance corrected for 3 meters by using the formula:

(1 meter result) – (20Log(measured distance/required distance)) = (3 meter result)

Example:

1 meter result + distance correction = 3 meter result

54.5 dBμV + -9.54dB = 45 dBμV

Power Line Conducted Interference:

The procedure used was ANSI C63.4-2003 using a 50μH 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 30MHz. The measurement was performed on an Open Air Test Site at 0.8meters above the horizontal groundplane.

Occupied Bandwidth:

A sample of the transmitter output detected by an antenna was fed into the spectrum analyzer and the attached plot was printed. The vertical scale is set to 10dB per division.

ANSI C63.4-2003 Measurement Procedures:

The EUT was placed in a horizontal orientation, laying flat, on top of a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.m 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.

Due to the construction of the EUT, the EUT was also placed in a vertical orientation and rotated on its axis and the emissions were maximized again to identify the highest emission level.

Frequencies less than 1GHz were measured using the Quasi-Peak receiver. Frequencies equal to and greater than 1GHz were measured using the Average receiver

Section III: Report of Measurements to Radiation Interference

DATE: October 26, 2009

TEST STANDARD: FCC CFR47, Part 15, Subpart C and IC RSS 210-Issue 7

TEST VOLTAGE: 3Vdc, as noted in the individual test records

REQUIREMENTS: FCC Pt 15.231, Pt 15.209

Frequency	Limits
Part 15.209	
9 to 490 kHz	2400/F (kHz) μV/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) μV/m @ 30 meters
1705 to 30 MHZ	29.54 dBμV/m @ 30 meters
30 – 88	40.0 dBμV/m @ 3 meters
80 – 216	43.5 dBμV/m @ 3 meters
216 - 960	46.0 dBμV/m @ 3 meters
Above 960	54.0 dBμV/m @ 3 meters
Part 15.231	
280-470	71.5 to 81.94 dBμV/m @ 3 meters - Average
Above 470	81.94dBμV/m @ 3 meters – Average
Spurious Emissions 280-470	51.48-61.94 dBμV/m @ 3 meters - Average
Spurious Emissions above 470	61.94 dBμV/m @ 3 meters – Average

IC RSS-210 Issue 6

Frequency	Limits
280-470	71.5 to 81.94 dBμV/m @ 3 meters - Average
Above 470	81.94dBμV/m @ 3 meters - Average
Spurious Emissions 280-470	51.48-61.94 dBμV/m @ 3 meters - Average
Spurious Emissions above 470	61.94 dBμV/m @ 3 meters - Average

TEST DATA FOR FUNDAMENTALS AND HARMONICS:

MEASUREMENT DATA: See Appendix A

PERFORMANCE: The radiated emissions for the EUT meet the requirements for FCC CFR47 Part 15.231 and IC RSS-210 Issue7 and other applicable standards for Intentional Radiators. No other emissions or Harmonics were detected. The spectrum was checked to the tenth harmonic.

Section IV: Spurious Radiated Emissions Measurements

DATE: October 26, 2009

TEST STANDARD: FCC CFR47, Part 15, Subpart C and IC RSS-210 Issue7

TEST VOLTAGE: 3Vdc, as noted in the individual test records

MINIMUM STANDARD: According to FCC Subpart C, 15.209(a) and RSS-210 Issue7,for an intentional radiator devices, the general required field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values

Frequency (MHz)	Field Strength	
	uV/m @ 3-m	dBμV/m at 3m
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

TEST SETUP: During performing the below 1GHz, the equipment was set up in a 3-meter open field test site. Emissions in both horizontal and vertical polarization were measured while rotating the EUT on a turntable to maximize the emissions signal strength.

During performing radiated emissions above 1GHz, the equipment was set 1 meter away from the interference-receiving horn antenna. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz for Peak detection and frequency above 1GHz.

The test-receiver system was set to Peak Detect Function and above specified bandwidth with Maximum Hold Mode. If the emissions level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. All measurement performed for this EUT had the 10dB margin, so it did not need re-testing using Quasi-Peak or Average Detection method.

DEVICE DESCRIPTIONS: Refer to the Equipment Under Test Section for EUT Descriptions.

MODIFICATIONS: No modifications were made to the EUT to pass this test.

MEASUREMENTS PLOTS: No Measureable Data

PERFORMANCE: The radiated emissions for the EUT meet the requirements for FCC Part 15.231, 15.209 and IC RSS-210 Issue7 standards for Intentional Radiators. No emissions other than fundamental Harmonics were detected. The spectrum was checked from 30MHz –10 GHz.

Section V: Report of Measurements per FCC CFR47 Part 15/B

General

Tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15B- Unintentional Radiators, Class B. Radiated Emissions tests were performed using measurement procedure outlined in the above standard. Power Line Conducted Emission was not required since equipment under test is battery operated equipment.

FCC Labelling and Marking Requirements:

Markings

According to FCC Section 15.19, and ICES 003, a statement similar to the following must be included on an identification label, which also uniquely identifies the Manufactured date, either explicitly or through a Serial number etc.:

> "This equipment complies with FCC Rules, Part 15 and Industry Canada's ICES 003 for a Class B Digital Device. Operation is subject to two conditions:
>
> 1) This device may not cause harmful interference, and
>
> 2) This device must accept any interference that may cause any undesired operation"

Additionally, if the manufacturer markets product to Quebec, the following supplemental information should be added to the label:

> "Cet Apparreil numerique de la Classe B respecte toutes les exigences du Reglement sur le material broilleur du Canada."

Labelling

According to FCC Section 15.105, and ICES 003, the following statement must be included in a prominent location your User's Manual:

> Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules and ICES 03. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
>
> - Reorient or relocate the receiving antenna.
> - Increase the separation between the equipment and receiver.
> - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
> - Consult the dealer or an experienced radio/TV technician for help.

It is also required according to FCC Part B Section 15.21 that a caution is included such as:

> Caution: Changes or modifications to this equipment, not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Section IV: Spurious Radiated Emissions Measurements

TEST STANDARD: FCC CFR47, Part 15, Subpart C and IC RSS-210 Issue7

TEST VOLTAGE: 3Vdc, as noted in the individual test records

MINIMUM STANDARD: According to FCC Subpart C, 15.209(a) and RSS-210 Issue7,for an intentional radiator devices, the general required field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values

Frequency (MHz)	Field Strength	
	uV/m @ 3-m	dBμV/m at 3m
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

TEST SETUP: During performing the below 1GHz, the equipment was set up in a 3-meter open field test site. Emissions in both horizontal and vertical polarization were measured while rotating the EUT on a turntable to maximize the emissions signal strength.

During performing radiated emissions above 1GHz, the equipment was set 1 meter away from the interference-receiving horn antenna. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz for Peak detection and frequency above 1GHz.

The test-receiver system was set to Peak Detect Function and above specified bandwidth with Maximum Hold Mode. If the emissions level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. All measurement performed for this EUT had the 10dB margin, so it did not need re-testing using Quasi-Peak or Average Detection method.

DEVICE DESCRIPTIONS: Refer to the Equipment Under Test Section for EUT Descriptions.

MODIFICATIONS: No modifications were made to the EUT to pass this test.

MEASUREMENTS PLOTS: No Measureable Data

PERFORMANCE: The radiated emissions for the EUT meet the requirements for FCC Part 15.231, 15.209 and IC RSS-210 Issue7 standards for Intentional Radiators. No emissions other than fundamental Harmonics were detected. The spectrum was checked from 30MHz –10GHz.

Section V: Report of Measurements per FCC CFR47 Part 15/B

General

Tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15B- Unintentional Radiators, Class B. Radiated Emissions tests were performed using measurement procedure outlined in the above standard. Power Line Conducted Emission was not required since equipment under test is battery operated equipment.

FCC Labelling and Marking Requirements:

Markings

According to FCC Section 15.19, and ICES 003, a statement similar to the following must be included on an identification label, which also uniquely identifies the Manufactured date, either explicitly or through a Serial number etc.:

> "This equipment complies with FCC Rules, Part 15 and Industry Canada's ICES 003 for a Class B Digital Device. Operation is subject to two conditions:
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> 1) This device may not cause harmful interference, and
>
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Additionally, if the manufacturer markets product to Quebec, the following supplemental information should be added to the label:

> "Cet Apparreil numerique de la Classe B respecte toutes les exigences du Reglement sur le material broilleur du Canada."

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> Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules and ICES 03. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
>
> - Reorient or relocate the receiving antenna.
> - Increase the separation between the equipment and receiver.
> - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
> - Consult the dealer or an experienced radio/TV technician for help.

It is also required according to FCC Part B Section 15.21 that a caution is included such as:

> Caution: Changes or modifications to this equipment, not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Part 1 - Radiated Emission Testing

TEST STANDARD: FCC CFR47, Part 15, Subpart B

TEST VOLTAGE: 3Vdc as noted in the individual test records

MINIMUM STANDARD: Class B Limit

Frequency (MHz)	Field Strength	
	uV/m @ 3-m	dBμV/m at 3m
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
960 - 1000	500	54.0

TEST SETUP: The equipment was set up in a 3-meter open field test site. Emissions in both horizontal and vertical polarization were measured while rotating the EUT on a turntable to maximize the emissions signal strength.

DEVICE DESCRIPTIONS: Refer to the Equipment Under Test Section for EUT Descriptions.

MODIFICATIONS: No modifications were made to the EUT to pass this test.

PERFORMANCE: No frequency signal is emitted by the EUT has been found while performing prescan for Radiated Emissions test in the 30MHz – 1GHz. So EUT complies with the standard.

MEASUREMENTS PLOTS: No Measureable Data

Part 2-Power Line Conducted Interference

TEST STANDARD: Pt 15.207

REQUIREMENTS:

Frequency MHz	Quasi Peak Limits dBµV	Average Limits dBµV
0.15 – 0.5	66 – 56	56 –46
0.5 – 5.0	56	46
5.0 – 30	60	50

PERFORMANCE: This test is not required since equipment operates on 3Vdc battery operated

Section VI: Report of Measurements per IC ICES-003

Summary for IC ICES-003 issue 4

Testing was performed pursuant to Industry Canada ICES-003 issue 4

Test	Standard	Description	Result
Radiated Emissions sublclause 8.2	ICES-003 Issue 4 Class B Limits	The Radiated Emissions are measured in the 30 -1000MHz range	Complies

Part 1 - Radiated Emissions Testing

TEST STANDARD: ICES-003 Issue 4

TEST VOLTAGE: 3Vdc as noted in the individual test records

MINIMUM STANDARD: Class B Limit:

Frequency (MHz)	Maximum Field Strength dBµV/m at 10 m
30 - 230	30.0
230 - 1000	37.0
Note 1. The lower limit shall apply at the transition frequency Note 2. Additional provisions may be required for cases where interference occurs	

METHOD OF MEASUREMENT: The equipment was set up in an open area test site; Tests were performed at 3 meters. Limit lines were modified to compensate as per procedures for short range, as below, using the manufacturer's specified normal cabling configuration, with all cables over 1 meter in length bundled at 1 meter and retained from the floor. A typical application was tested.

Emissions in both horizontal and vertical polarization's were measured while rotating the EUT on a turntable to maximize the emissions signal strength.

In cases where the presence of high ambient noise makes it impossible to measure an emission at the required distance, the measurement is performed at a closer distance and the limit is adjusted per EN61000-6-3: 2006

20 Log (D1/D2)
Where D1 = New Distance D2 = Required Distance The result is added or subtracted to the required emission level to ensure compliance at the new distance.

EMISSIONS DATA: **No Measureable Data**

PERFORMANCE: No frequency signal is emitted by the EUT has been found while performing prescan for Radiated Emissions test in the 30MHz – 1GHz. So EUT complies with the standard.

Part 2: Power Line Conducted Interference

TEST STANDARD: Pt 15.207

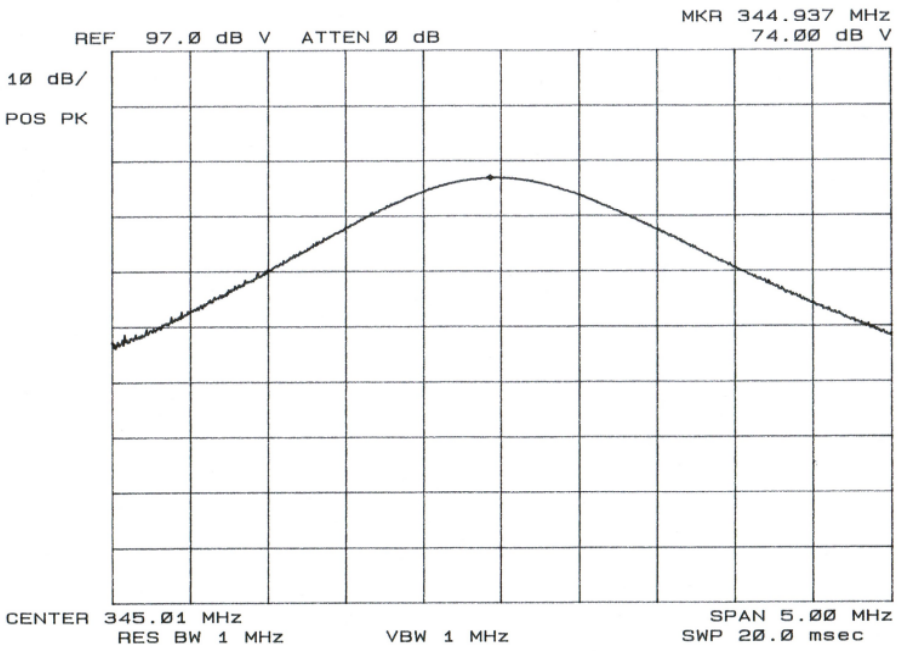
REQUIREMENTS:

Frequency MHz	Quasi Peak Limits dBµV	Average Limits dBµV
0.15 – 0.5	66 – 56	56 –46
0.5 – 5.0	56	46
5.0 – 30	60	50

PERFORMANCE: This test is not required since equipment operates on 3Vdc battery operated

Appendix A: Fundamental and Harmonics Emissions Data and Plots

5800 RPS

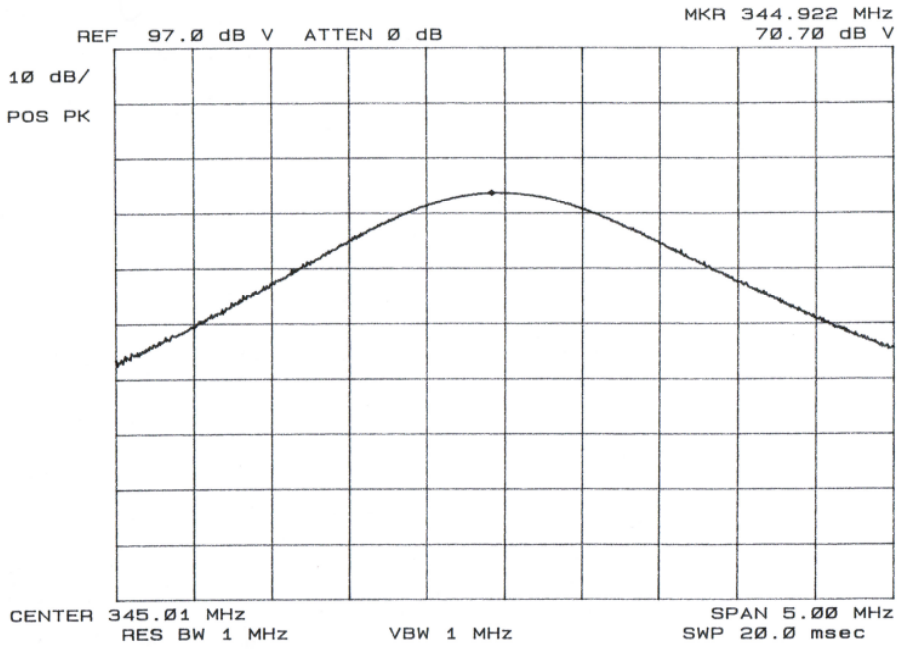


Fundamerntal Plot (in Vertical Orientation)

	Frequency (MHz)	Uncor-Pk (dBuV)	Gain (dB)	Antenna factor (dB)	Total Correction Factors	Peak (dBuV/m)	Duty Cycle Correction Factors *	Corrected Signal	Peak Lmt (dBuV/m)	DelLim-Pk (dB)	Angle/ orientation
Fund.	344.5	74	2	15.3	17.3	91.3	21.3	70	77.25	-4.95	30
2	689	23.5	3.1	20.7	23.8	47.3	21.3	26	57.25	-31.25	180
3	1033.5	51.8	17.6	25.8	8.2	60	21.3	38.7	54	-15.3	90
4	1378	52.4	15.5	25.9	10.4	62.8	21.3	41.5	54	-12.5	180
5	1722.5	55.6	14.1	28.9	14.8	70.4	21.3	49.1	57.25	-8.15	180
6	2067	48.5	16.9	28.9	12	60.5	21.3	39.2	57.25	-18.05	180
7	2411.5	50.7	13.9	29.9	16	66.7	21.3	45.4	57.25	-11.85	90
8	2780	50.8	31.9	30.9	-1	49.8	21.3	28.5	57.25	-28.75	90
9	3105.5	32.7	30.1	31	0.9	33.6	21.3	12.3	57.25	-44.95	270
10	3450	20.1	30.9	31.6	0.7	20.8	21.3	-0.5	57.25	-57.75	270

* Per Appendix C in original submission RN 03023

5800 MICRA



Fundamerntal Plot (in Horizonatal Orientation)

	Frequency (MHz)	Uncor-Pk (dBuV)	Gain (dB)	Antenna factor (dB)	Total Correction Factors	Peak (dBuV/m)	Duty Cycle Correction Factors	Corrected Signal	Peak Lmt (dBuV/m)	DelLim-Pk (dB)	Angle/ orientation
Fund.	344.5	70.7	2	15.3	17.3	88	21.3	66.7	77.25	-10.5	0
2	689	35.2	3.1	20.7	23.8	59	21.3	32.1	57.25	-19.55	180
3	1033.5	56.7	17.6	25.8	8.2	64.9	21.3	43.6	54	-10.4	30
4	1378	50.9	15.5	25.9	10.4	61.3	21.3	40	54	-14	180
5	1722.5	51.5	14.1	28.9	14.8	66.3	21.3	45	57.25	-12.25	90
6	2067	51.2	16.9	28.9	12	63.2	21.3	41.9	57.25	-15.35	270
7	2411.5	49.7	13.9	29.9	16	65.7	21.3	44.4	57.25	-12.85	180
8	2780	54	31.9	30.9	-1	53	21.3	31.7	57.25	-25.55	180
9	3105.5	33.5	30.1	31	0.9	34.4	21.3	13.1	57.25	-44.15	90
10	3450	27	30.9	31.6	0.7	27.7	21.3	6.4	57.25	-50.85	0

* Per Appendix C in original submission RN 03023

Appendix B: Test Set-Up Pictures

Test Setup 5800 RPS

Test Setup 5800 MICRA