Standards Council of Canada
Accredited Laboratory
Scope of Accreditation 75

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 75

TM

Test Report:	6W70163.2
Applicant:	ST.Michael Strategies 701, Salaberry St., Suite 201, Chambly, Quebec, J3L 1R2
Apparatus:	STC-W200 Sensor
FCC ID:	UPCDBRF15
In Accordance With:	FCC Part 15 Subpart C, 15.249 Operation in the 902-928MHz, 2400-2483.5 MHz, 5725-5850MHz and 24.0-24.25 GHz
Tested By:	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
Authorized By:	Xu Jin, Wireless Specialist
Date:	November 23, 2006
Total Number of Pages:	19

Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

Apparatus Assessed:	STC-W200 Sensor
Specification:	FCC Part 15 Subpart C, 15.249
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release

Author: Roman Kuleba, EMC/Wireless Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

TABLE OF CONTENTS

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows: STC-W200 Sensor

1.2 Samples Submitted for Assessment

The following samples of the apparatus have been submitted for type assessment:

Sample No.	Description	Serial No.
14, 19, 20	STC-W200 Traffic Counter (Host)	–
20 – 21	Host Board and 2.4GHz exchangeable modules	–
22 – 27	Infrared Sensor	–
29	OEM AC Adapter 120VAC/60 Hz to 15 VDC	MN # AD-1590N G

The first samples were received on: August 14, 2006

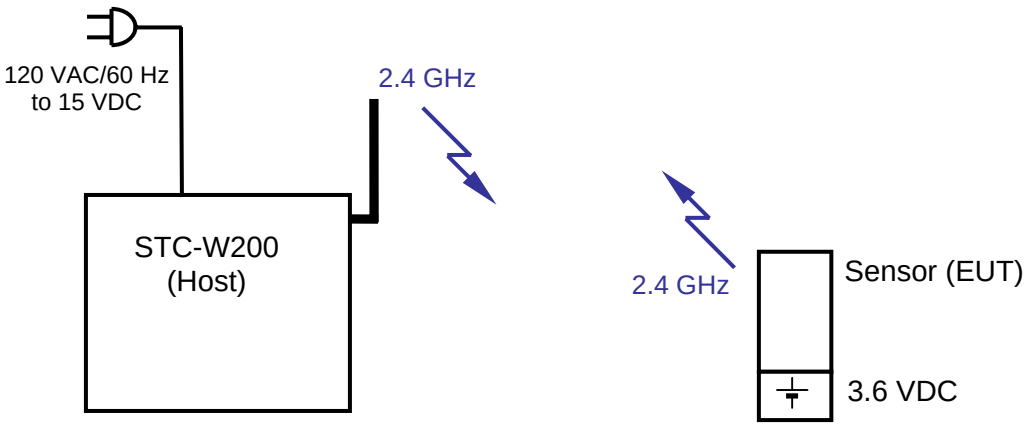
1.3 Theory of Operation

The STC-W200 is an electronic people counter that uses IR sensors to detect persons passing through. The sensors work in pairs; one of them is IR Transmitter that transmits its IR signal to another sensor being IR Receiver. Both sensors are equipped with 2.4 GHz radio that allows them to communicate with the RF Host within the STC-W200.

1.4 Technical Specifications of the EUT

Manufacturer:	St. Michael Strategies
Operating Frequency:	2408 MHz – 2475 MHz
Emission Designator:	F1D
Rated Power:	-5.0 dBm (Conducted)
Modulation:	GFSK
Antenna Data:	Integrated Antenna
Antenna Connector:	No connectors
Power Source:	3.6 VDC Lithium Ion Battery

1.5 Block Diagram of the EUT



Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.249

Operation in the 902-928MHz, 2400 - 2483.5 MHz, 5725-5850MHz and 24.0-24.25 GHz bands

2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 30 ^{o}C
Humidity range	:	20 - 75 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 5% of rated voltages

2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer	Rhode & Schwarz	FSP40	FA001920	March 17/06	March 17/07
Signal Generator	Rohde & Schwarz	SMR40	FA001879	July 27, 06	July 27, 07
Power Meter	Hewlett Packard	E4418B	FA001413	May 15, 06	May 15, 07
Power Sensor	Hewlett Packard	8487A	FA001908	Apr. 4, 06	Apr. 4, 07
RF AMP	JCA	1-2 GHz	FA001498	Aug. 2, 06	Aug. 2, 07
RF AMP	JCA	2-4 GHz	FA001496	Aug. 2, 06	Aug. 2, 07
RF AMP	JCA	4-8 GHz	FA001497	Aug. 2, 06	Aug. 2, 07
RF AMP	Narda	5 - 18GHz	FA001409	COU*	COU*
High Pass Filter (3.9 GHz)	K&L Microwave	11SH10-4000	FA001340	COU*	COU*
Attenuator, 20 dB	Narda	776B-20	FA001153	COU*	COU*
Bi-Conical Antenna #1	EMCO	3109	FA000805	May 03/06	May 03/07
Log Periodic Antenna #2	EMCO	3148	FA001355	May 16/06	May 16/07
Horn Antenna #2	EMCO	3115	FA000825	Dec. 16/05	Dec. 16/06
Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 16/06	May 16/07
Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 16/06	May 16/07
Receiver	Rohde & Schwarz	ESVS-30	FA001445	July 14/06	July 14/07
LISN	EMCO	4825/2	FA001545	Jan. 30/07	Jan. 30/07

* COU (Calibrate on Use)

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

3.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

3.4 Test Deleted

No Tests were deleted from this assessment.

3.5 Additional Observations

There were no additional observations made during this assessment.

Section 4 : Results Summary

This section contains the following:

FCC Part 15 Subpart C : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N	No : not applicable / not relevant.
Y	Yes : Mandatory i.e. the apparatus shall conform to these tests.
N/T	Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
15.207(a)	Powerline Conducted Emissions	N	N/A
15.209(a)	Radiated Emissions within Restricted Bands	Y	PASS
15.215(c)	20dB Bandwidth	Y	PASS
15.249(a)	Radiated emissions not in Restricted Bands	Y	PASS
15.249(b)	Fixed Point-to-Point operation in the 24.0-24.25 GHz Band	N	N/A
15.249(d)	Spurious emissions (except Harmonics)	Y	PASS

Notes:

Appendix A : Test Results

Clause 15.215(c) Occupied Bandwidth

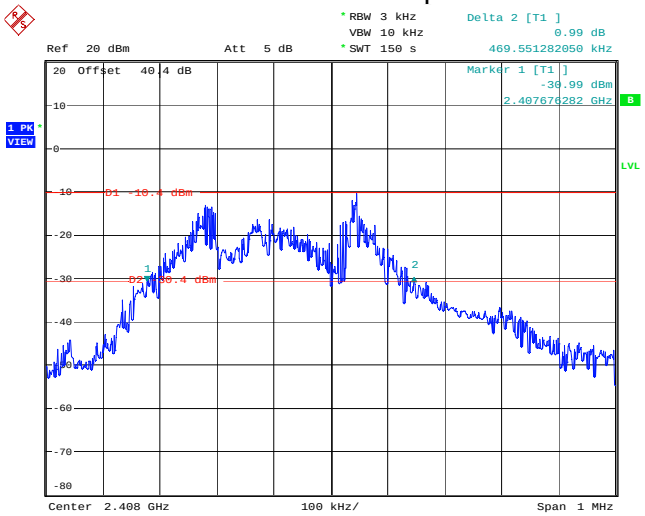
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Conditions:

Sample Number:	14, 19, 20 and 22 – 27	**Temperature:**	23 °C
Date:	October 12, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: Pass (See Attached Plots).

STC-W200 Sensor – 20dB Occupied Bandwidth:



Date: 13.OCT.2006 00:03:27

Clause 15.209(a) Radiated Emissions within Restricted Bands

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolt/smeter)	Measurement Distance (meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	30
30-88	100[1]	3
88-216	150[2]	3
216-960	200[3]	3
Above 960	500	3

Test Conditions:

Sample Number:	14, 19, 20 and 22 – 27	**Temperature:**	23 °C
Date:	October 12, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: Pass.

STC-W200 Sensor – Harmonics: No emissions within 20 dB below the limit were detected/measured in the Restricted Bands of operation.

STC-W200 Sensor – Spurious: No emissions within 20dB below the limit were detected/measured in the Restricted Bands of operation.

Additional Observations:

The Spectrum was searched from 30MHz to the 10th Harmonic.

These results apply to emissions found in the Restricted bands defined in FCC Part 15 Subpart C, 15.205.

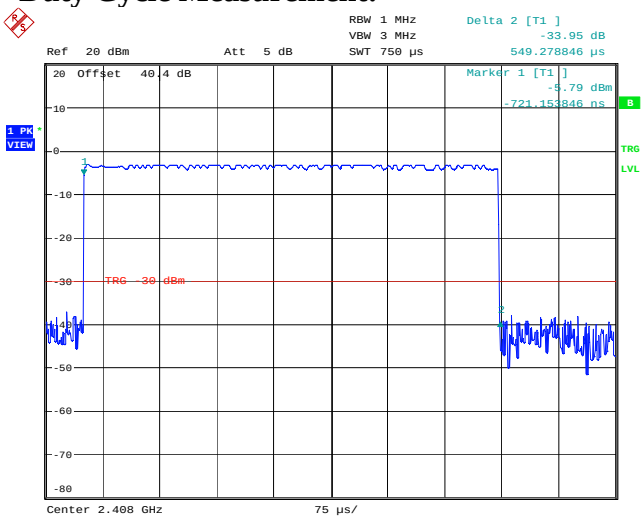
All measurements were performed using a Peak Detector with RBW/VBW setting as 100 kHz/300 kHz on frequencies below 1GHz and 1MHz/3MHz on frequencies above 1GHz, at a distance of 3 meters.

The EUT was measured on three orthogonal axes.

For all measurements the EUT was powered with the highest rated supply voltage (Lithium Ion Battery: 1.9 – 3.9 VDC).

Radiated Emissions within Restricted Bands, continued

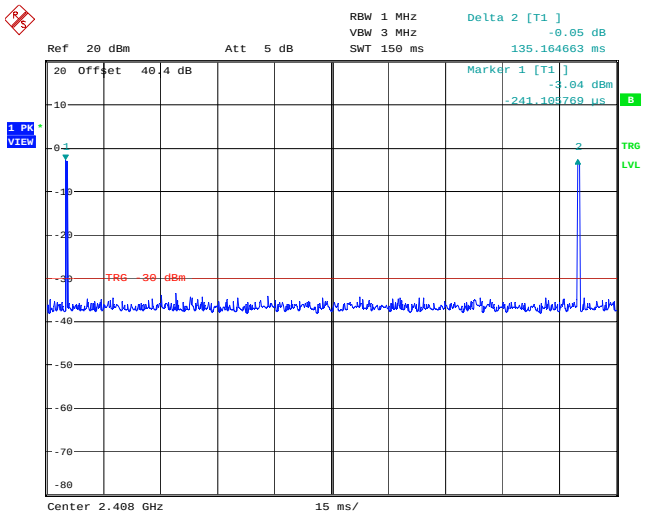
Duty Cycle Measurement:



Date: 12.OCT.2006 23:44:56

EUT: STC-W200 Sensor

Pulse Duration: 549.3 µs



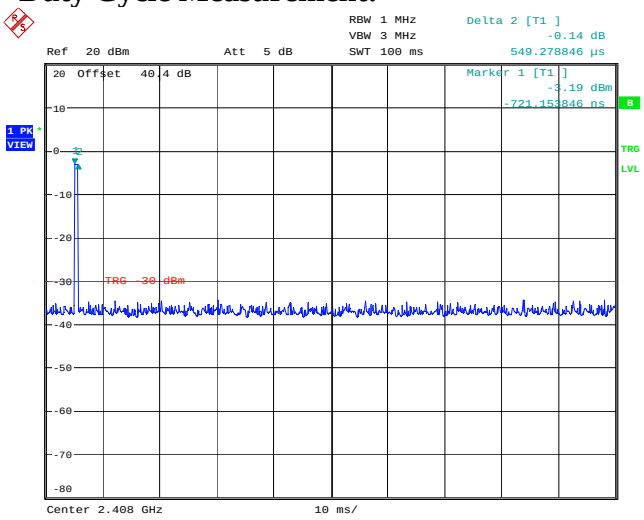
Date: 12.OCT.2006 23:48:14

EUT: STC-W200 Sensor

Pulse Period: 135.1647 ms

Radiated Emissions within Restricted Bands, continued

Duty Cycle Measurement:



EUT: STC-W200 Sensor

Number of pulses within 100 ms:

N = 1

Total TX-ON time within 100 ms:

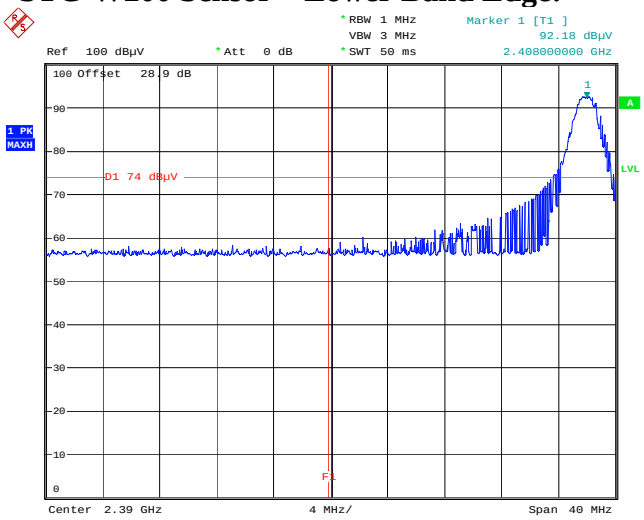
$T_{TX-ON} = 1 \times 549.3\ \mu s$

Duty Cycle Correction Factor = $20*\log_{10}(T_{TX-ON}/100ms)$

Duty Cycle Correction Factor = $20*\log_{10}(0.5493\ ms/100ms) = -45.2$ dB

Radiated Emissions within Restricted Bands, continued

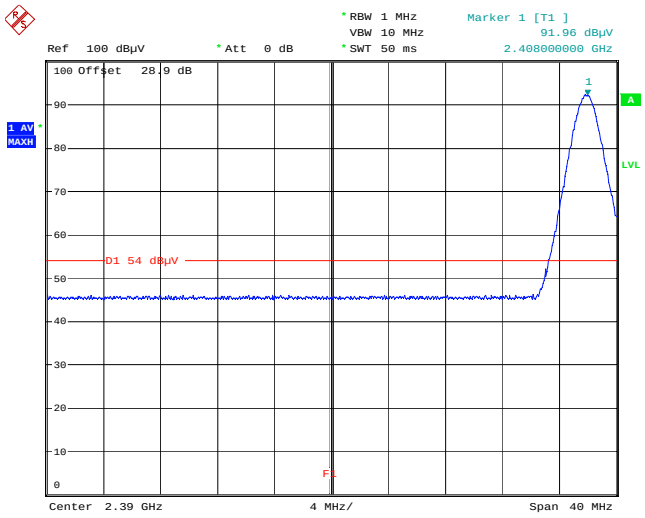
STC-W200 Sensor – Lower Band Edge:



Date: 12.OCT.2006 23:35:44

EUT: STC-W200 Sensor
TX Channel: Low (2408 MHz)

Lower Band Edge (2390 MHz)
Detector: Peak



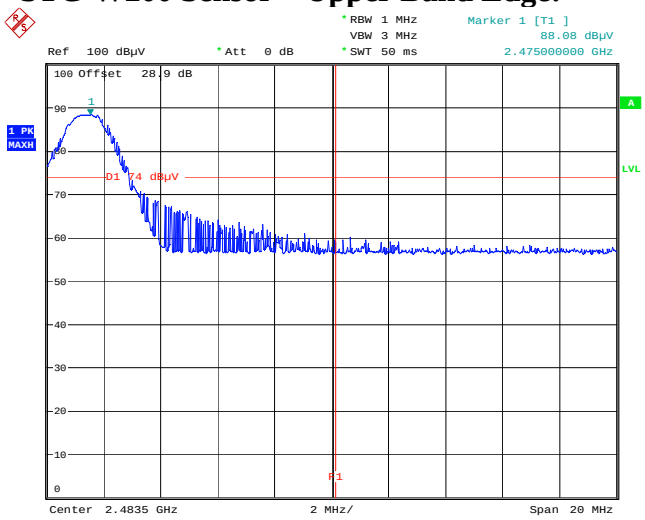
Date: 12.OCT.2006 23:34:12

EUT: STC-W200 Sensor
TX Channel: Low (2408 MHz)

Lower Band Edge (2390 MHz)
Detector: Average

Radiated Emissions within Restricted Bands, continued

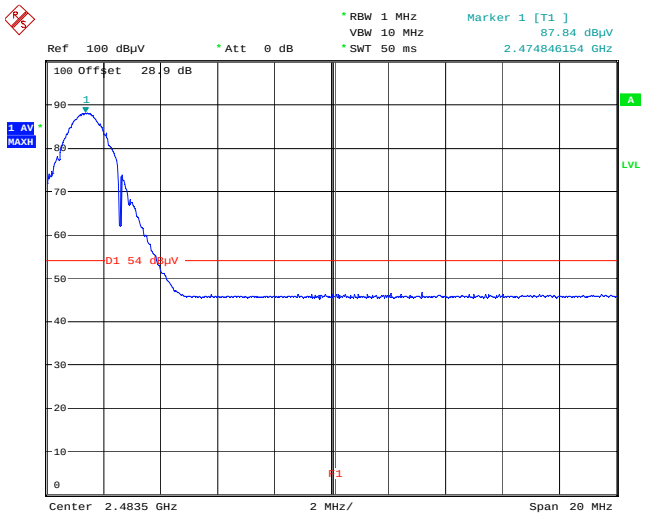
STC-W200 Sensor – Upper Band Edge:



Date: 12.OCT.2006 23:17:45

EUT: STC-W200 Sensor
TX Channel: High (2475 MHz)

Upper Band Edge (2483.5 MHz)
Detector: Peak



Date: 12.OCT.2006 23:14:33

EUT: STC-W200 Sensor
TX Channel: High (2475 MHz)

Upper Band Edge (2483.5 MHz)
Detector: Average

Clause 15.249(a) & (d) Radiated emissions not in Restricted Bands

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test Conditions:

Sample Number:	14, 19, 20 and 22 – 27	**Temperature:**	23 °C
Date:	October 12, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: See Attached Plots and Tables.

Additional Observations:

The Spectrum was searched from 30MHz to the 10th Harmonic.

All measurements were performed using a Peak Detector with RBW/VBW setting as 100 kHz/300KHz on frequencies below 1GHz and 1MHz/3MHz on frequencies above 1GHz, at a distance of 3 meters.

The EUT was measured on three orthogonal axes.

For all measurements the EUT was powered with the highest rated supply voltage (Lithium Ion Battery: 1.9 – 3.9 VDC).

Radiated emissions not in Restricted Bands, continued

STC-W200 Sensor – Fundamental Emissions and Harmonics:

	Frequency (MHz)	Antenna	Polarity	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Duty Cycle Corr.	Cable Loss (dB)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	2408.0000	Horn2	V	50.5	28.4	–	–	5.1	84.0	–	–	Peak
2	2444.0000	Horn2	V	61.2	28.4	–	–	5.0	94.5	–	–	Peak
3	2475.0000	Horn2	V	50.0	28.4	–	–	5.0	83.4	–	–	Peak
4	7224.0000	Horn2	V	56.0*	36.3	55.8	–	10.8	47.4	74.0	26.6	Peak
5	2408.0000	Horn2	H	47.3	28.4	–	–	5.1	80.7	–	–	Peak
6	2444.0000	Horn2	H	56.1	28.4	–	–	5.0	89.4	–	–	Peak
7	2475.0000	Horn2	H	45.2	28.4	–	–	5.0	78.6	–	–	Peak
8	7224.0000	Horn2	H	56.0*	36.3	55.8	–	10.8	47.4	74.0	26.6	Peak
9	2408.0000	Horn2	V	50.5	28.4	–	-45.2	5.1	38.8	94.0	55.2	Average
10	2444.0000	Horn2	V	61.2	28.4	–	-45.2	5.0	49.3	94.0	44.7	Average
11	2475.0000	Horn2	V	50.0	28.4	–	-45.2	5.0	38.2	94.0	55.8	Average
12	7224.0000	Horn2	V	56.0*	36.3	55.8	-45.2	10.8	2.2	54.0	51.8	Average
13	2408.0000	Horn2	H	47.3	28.4	–	-45.2	5.1	35.5	94.0	58.5	Average
14	2444.0000	Horn2	H	56.1	28.4	–	-45.2	5.0	44.2	94.0	49.8	Average
15	2475.0000	Horn2	H	45.2	28.4	–	-45.2	5.0	33.4	94.0	60.6	Average
16	7224.0000	Horn2	H	56.0*	36.3	55.8	-45.2	10.8	2.2	54.0	51.8	Average

Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole
Note 2: Positive Peak detector used
Note 3: * Noise Floor

STC-W200 Sensor – Spurious: No emissions within 20 dB below the limit were detected/measured.

Appendix B : Setup Photographs

Spurious Emissions Setup (Sensor):

Spurious Emissions Setup (System, Normal Operation Mode):

Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions