ENGINEERING TEST REPORT

Wireless Remote Transmitter
Model No.: WS100T

FCC ID: KUTWS100T

Applicant: **Capital Prospect Ltd.**
Rm 16, 13/F, Block B, Veristrong Ind. Centre,
34 AuPuiWan Street, Fotan
Hong Kong

In Accordance With
FEDERAL COMMUNICATIONS COMMISSION (FCC)
PART 15, SUBPART C, SEC. 15.231
Momentarily Operated Transmitters in 304.8 to 314.1 MHz

UltraTech's File No.: ULC88-FTX

This Test report is Issued under the Authority of
Tri M. Luu, Professional Engineer,
Vice President of Engineering
UltraTech Group of Labs

Date: September 28, 2001

Report Prepared by: Dan Huynh	Tested by: Vinh K. Ngo, RFI/EMI Technicain Hung Trinh, RFI/EMI Technicain
Issued Date: September 28, 2001	Test Dates: Jun. 22, Aug. 7 & Sep. 28, 2001

The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.

UltraTech

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EXHIBIT 1. SUBMITTAL CHECK LIST

Annex No.	Exhibit Type	Description of Contents	Quality Check (OK)
--	Test Report	• Exhibit 1: Submittal check lists • Exhibit 2: Introduction • Exhibit 3: Performance Assessment • Exhibit 4: EUT Operation and Configuration during Tests • Exhibit 5: Summary of test Results • Exhibit 6: Measurement Data • Exhibit 7: Measurement Uncertainty • Exhibit 8: Measurement Methods	OK
1	Test Setup Photos	Radiated Emissions Test Setup Photos	OK
2	External EUT Photos	External EUT Photos	OK
3	Internal EUT Photos	Internal EUT Photos	OK
4	Cover Letters	• Letter from Ultratech for Certification Request • Letter from the Applicant to appoint Ultratech to act as an agent	OK
5	ID Label/Location Info	• ID Label • Location of ID Label	OK
6	Block Diagram(s)	WS100T Block Diagram	OK
7	Schematic Diagram(s)	WS100T Schematic Diagram	OK
8	Parts List/Tune Up Info	Parts List	OK
9	Operational Description	Technical Description	OK
10	Users Manual	WS-100 Wireless Remote Control	OK

EXHIBIT 2. INTRODUCTION

2.1. SCOPE

Reference:	FCC Part 15, Subpart C, Section 15.231
Title:	Telecommunication - Code of Federal Regulations, CFR 47, Part 15
Purpose of Test:	To gain FCC Certification Authorization for a Low Power Transmitter operating in the frequency band 304.8 to 314.1 MHz.
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Environmental Classification:	• Residential • Light-industry, Commercial • Industry

2.2. RELATED SUBMITTAL(S)/GRANT(S)

None

2.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC CFR Parts 0-19	2000	Code of Federal Regulations – Telecommunication
ANSI C63.4	1992	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CISPR 22 & EN 55022	1997 1998	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
CISPR 16-1		Specification for Radio Disturbance and Immunity measuring apparatus and methods

EXHIBIT 3. PERFORMANCE ASSESSMENT

3.1. CLIENT INFORMATION

APPLICANT	
Name:	Capital Prospect Ltd.
Address:	Rm 16, 13/F, Block B, Veristrong Ind. Centre, 34 AuPuiWan Street, Fotan, Hong Kong
Contact Person:	Mr Joe Ng Phone #: (852) 26021318 Fax #: (852) 26024684 Email Address: joelng@skylinkhome.com

MANUFACTURER	
Name:	Capital Prospect Ltd.
Address:	Rm 16, 13/F, Block B, Veristrong Ind. Centre, 34 AuPuiWan Street, Fotan, Hong Kong
Contact Person:	Ms. Pat Ho Phone #: (852) 26021318 Fax #: (852) 26024684 Email Address: patho@skylinkhome.com

3.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	Capital Prospect Ltd.
Product Name:	Wireless Remote Transmitter
Model Name or Number:	WS100T
Serial Number:	Test Sample
Type of Equipment:	Momentarily operated Transmitter
Input Power Supply Type:	Internal Battery
Primary User Functions of EUT:	Remote Control

3.3. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	Portable
Intended Operating Environment:	▪ Residential ▪ Commercial, light industry & heavy industry
Power Supply Requirement:	12V battery
RF Output Power Rating:	67 dBµV/m
Operating Frequency Range:	304.8 to 314.1 MHz
RF Output Impedance:	50 Ohms
Duty Cycle:	Continuous
20 dB Bandwidth:	703 kHz
Modulation Type:	F2X
Emission Designation:	703KF2X
Oscillator Frequencies:	32.768 kHz
Antenna Connector Type:	Integral (the antenna component is soldered onto the radio printed circuit board and located inside the enclosure)

3.4. GENERAL TEST SETUP

Standalone Unit

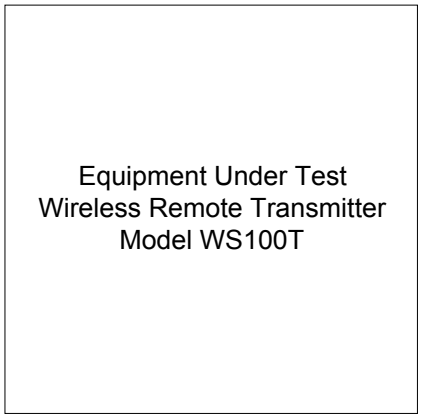


EXHIBIT 4. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

4.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C
Humidity:	51%
Pressure:	102 kPa
Power input source:	12V battery

4.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The transmitter was operated in a continuous transmission mode with the carrier modulated as specified in the Test Data.
Special Test Software:	None
Special Hardware Used:	None
Transmitter Test Antenna:	Integral antenna (the antenna component is soldered onto the radio printed circuit board and located inside the enclosure)

Transmitter Test Signals	
Frequency Band: ▪ 304.8 to 314.1 MHz	Frequency of Carrier Tested: • 304.8 MHz • 309.8 MHz • 314.1 MHz

EXHIBIT 5. SUMMARY OF TEST RESULTS

5.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- Radiated Emissions were performed at the Ultratech's 3 Meter Open Field Test Site (OFTS) situated in the Town of Oakville, province of Ontario.

The above site have been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville Open Field Test Site has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049). Last Date of Site Calibration: Sep.20, 1999.

5.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Paragraph	Test Requirements	Compliance (Yes/No)
15.203	Antenna Requirement	Yes
15.231(a)	Provisions of FCC 15.231	Yes
15.231(a) & (b)	Transmitter Radiated Emissions - Fundamental, Harmonic and Spurious	Yes
15.231(c)	20 dB Bandwidth	Yes

Note 1: The digital circuits portion of the EUT has been tested and verified to comply with FCC Part 15, Subpart B, Class B Digital Devices and Radio Receivers. The engineering test report can be provided upon FCC requests.

5.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

The following modifications was implemented for compliance:

1) Resistor R2 was changed from 51 Ω to 75 Ω
2) Resistor R3 was changed from 22K Ω to 18K Ω
3) Capacitor C3 was changed from 1pF to 4pF
4) Capacitor C4 was changed from 1pF to 2.4pF
5) Capacitor C5 was changed from 7pF to 3.3pF

EXHIBIT 6. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

6.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in Exhibit 8 of this report

6.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document NIS 81 with a confidence level of 95%. Please refer to Exhibit 7 for Measurement Uncertainties.

6.3. MEASUREMENT EQUIPMENT USED:

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C64-3:1992, FCC 15.231 and CISPR 16-1.

6.4. ESSENTIAL/PRIMARY FUNCTIONS AS DECLARED BY THE MANUFACTURER

The essential function of the EUT is to correctly communicate data to and from radios over RF link.

6.5. ANTENNA REQUIREMENTS @ FCC CFR 47, PARA 15.203

6.5.1. Limits

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

N**otes**: This requirement does not apply to carrier current devices operated under the provisions of @ 15.211, 15.213, 15.217, 17.219 or 15.221.

6.5.2. Engineering Analysis

Internal integral antenna component mounted on the printed circuit board.

6.6. PROVISIONS OF FCC 15.231(a) FOR PERIODIC TRANSMITTERS

6.6.1. Engineering Analysis

FCC PROVISSIONS	ANALYSIS ON COMPLIANCE
Permitted Type of Devices (alarm systems, door opener, remote switches etc ...)	Remote control
Prohibited Type of Devices (radio control of toys)	Not radio control toys
Prohibited Transmission Type (voice, video or data continuous transmission)	Recognition codes to identify other particular component as part of the system
A Manually Operated Transmitter (shall employ with the switch that automatically deactivate the transmitter within 5 seconds of being released)	The transmitter is automatically deactivated within less than 1 seconds of being released.
Periodic Transmissions: at regular predetermined intervals are not permitted. However, polling or supervision transmissions to determine system integrity of transmitter used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for the transmitter Internal Radiators which are not employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.	Not applicable, WS100T is a wireless remote control for electronic appliance.

6.7. TRANSMITTER RADIATED EMISSIONS @ 3 METERS, FCC CFR 47, PARA. 15.231(b) & (c), 15.209 & 15.205

6.7.1. Limits

The RF radiated emissions measured at 3 Meter distance shall not exceed the field strength below:

Fundamental Frequency (MHz)	Average Field Strength Limits (μV)	
	Fundamental	Harmonic/Spurious
260 - 470	[1]3750 - 12,500	[1]375 - 1250

[1]Linear interpolations

All other emissions inside restricted bands specified in @ 15.205(a) shall not exceed the general radiated emission limits specified @ 15.209(a)

Remarks:

- Applies to harmonics/spurious emissions that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209.
- **@ FCC CFR 47, Para. 15.237(c)** - The emission limits as specified above are based on measurement instrument employing an average detector. The provisions in **@15.35** for limiting peak emissions apply.

FCC CFR 47, Part 15, Subpart C, Para. 15.205(a) - Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1]0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	([2])
13.36–13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.
[2]Above 38.6

FCC CFR 47, Part 15, Subpart C, Para. 15.209(a)
-- Field Strength Limits within Restricted Frequency Bands --

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009 - 0.490	2,400 / F (KHz)	300
0.490 - 1.705	24,000 / F (KHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.7.2. Method of Measurements

Refer to Exhibit 8, Section 8.2 of this test report & ANSI C63-4:1992

Applies to harmonics/spurious that fall in the restricted bands listed in Section 15.205. the maximum permitted average field strength is listed in Section 15.209. A Pre-Amp and high pass filter are used for this measurement.

- For measurements from 9 KHz to 150 KHz, set RBW = 200 Hz, VBW $\geq$ RBW, SWEEP=AUTO.
- For measurements from 150 KHz to 30 MHz, set RBW = 10 KHz, VBW $\geq$ RBW, SWEEP=AUTO.
- For measurements from 30 MHz to 1 GHz, set RBW = 100 KHz, VBW $\geq$ RBW, SWEEP=AUTO.
- For measurement above 1 GHz, set RBW = 1 MHz, VBW = 1 MHz, SWEEP=AUTO.

If the emission is pulsed, modified the unit for continuous operation, then use the settings above for measurements, then correct the reading by subtracting the peak-average correction factor derived from the appropriate duty cycle calculation. See Section 15.35(b) and (c).

6.7.3. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Hewlett Packard	HP 8593EM	3412A00103	9 kHz – 26.5 GHz
Peak Power Meter & Peak Power Sensor	Hewlett Packard	8900 8481A	2131A00124 2551A01965	0.1-18 GHz 50 Ohms Input
Microwave Amplifier	Hewlett Packard	HP 83017A	--	1 GHz to 26.5 GHz
Active Loop Antenna	EMCO	6507	8906-1167	1 kHz – 30 MHz
Log Periodic/Bow-Tie Antenna	EMCO	3143	1029	20 - 1000 MHz
Horn Antenna	EMCO	3155	9701-5061	1 GHz – 18 GHz

6.7.4. Test Data

The emissions were scanned from 10 MHz to 10th harmonic of the highest oscillator frequency and all emissions less 20 dB below the limits were recorded.

Note:

- For portable transmitter was placed in three different orthogonal positions for searching maximum field strength level.
- In the restricted band per FCC 15.205: Limit (2) per 15.209 is applied
- Outside the restricted band per FCC 15.205: Limit (1) per FCC 15.231 or Limit (2) per 15.209 whichever allows higher field strength emission, is applied.

Frequency (MHz)	Peak E-Field @ 3 m (dBµV/m)	Average E-Field @ 3 m (dBµV/m)	Antenna Plane (H/V)	Average (1) Limit @ 3m (dBµV/m)	Restricted (2) Band Limits @3m (dBµV/m)	Margin (dB)	Pass / Fail
*304.8	48.4	48.4	V	75.0	46.0	-26.6	Pass
*304.8	52.9	52.9	H	75.0	46.0	-22.2	Pass
**609.6	32.6	32.6	V	55.0	46.0	-13.4	Pass
**609.6	25.5	25.5	H	55.0	46.0	-20.5	Pass
914.4	30.5	30.5	V	55.0	46.0	-24.5	Pass
914.4	25.3	25.3	H	55.0	46.0	-29.7	Pass

* Fundamental frequency
** Frequency in restricted band

Frequency (MHz)	Peak E-Field @ 3 m (dBµV/m)	Average E-Field @ 3 m (dBµV/m)	Antenna Plane (H/V)	Average (1) Limit @ 3m (dBµV/m)	Restricted (2) Band Limits @3m (dBµV/m)	Margin (dB)	Pass / Fail
*309.8	49.1	49.1	V	75.3	46.0	-26.3	Pass
*309.8	57.7	57.7	H	75.3	46.0	-17.6	Pass
619.6	30.1	30.1	V	55.3	46.0	-25.2	Pass
619.6	26.9	26.9	H	55.3	46.0	-28.4	Pass
929.4	29.5	29.5	V	55.3	46.0	-25.8	Pass
929.4	30.1	30.1	H	55.3	46.0	-25.2	Pass

* Fundamental frequency

Frequency (MHz)	Peak E-Field @ 3 m (dBµV/m)	Average E-Field @ 3 m (dBµV/m)	Antenna Plane (H/V)	Average (1) Limit @ 3m (dBµV/m)	Restricted (2) Band Limits @3m (dBµV/m)	Margin (dB)	Pass / Fail
*314.1	67.0	67.0	V	75.6	46.0	-8.6	Pass
*314.1	65.5	65.5	H	75.6	46.0	-10.1	Pass
628.2	37.1	37.1	H	55.6	46.0	-18.5	Pass
942.3	44.1	44.1	V	55.6	46.0	-11.5	Pass
942.3	45.8	45.8	H	55.6	46.0	-9.8	Pass
1256.4	39.1	39.1	V	55.6	54.0	-16.5	Pass
1256.4	44.7	44.7	H	55.6	54.0	-10.9	Pass

* Fundamental frequency

6.8. 20 dB BANDWIDTH @ FCC CFR 47, PARA. 15.209(c)

6.8.1. Limits

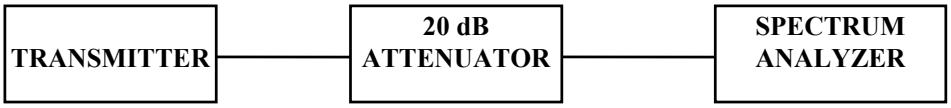
The 20dB bandwidth of the emission shall be no more than 0.25% of the centre frequency for devices operating above 70MHz.

6.8.2. Method of Measurements

Refer to FCC 15.231(c) & ANSI C63-4:1992

The transmitter output was loosely coupled to the spectrum analyzer through a receiving antenna and the bandwidth of bandwidth of the fundamental frequency was measured with the spectrum analyzer with the resolution bandwidth of the spectrum analyzer set per ANSI 63-4:1992, Sec. 13.1.6.2

6.8.3. Test Arrangement



6.8.4. Test Equipment List

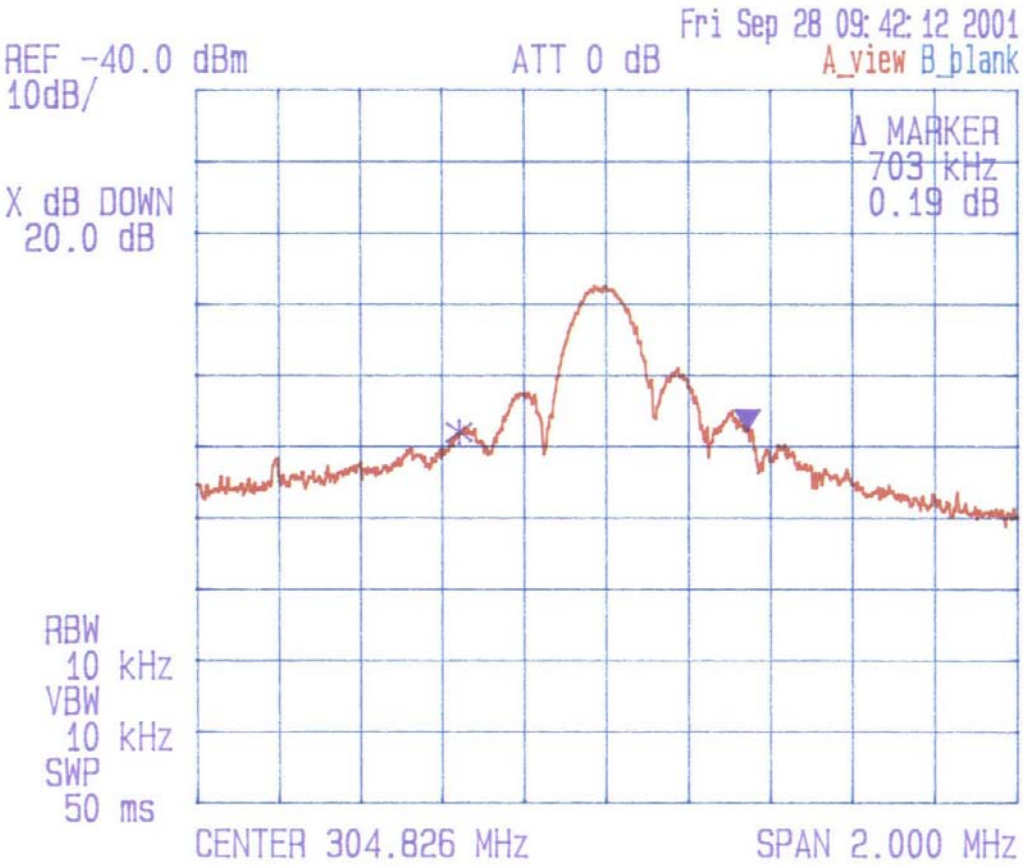
Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Hewlett Packard	HP 8593EM	3412A00103	9 kHz – 26.5 GHz

6.8.5. Test Data

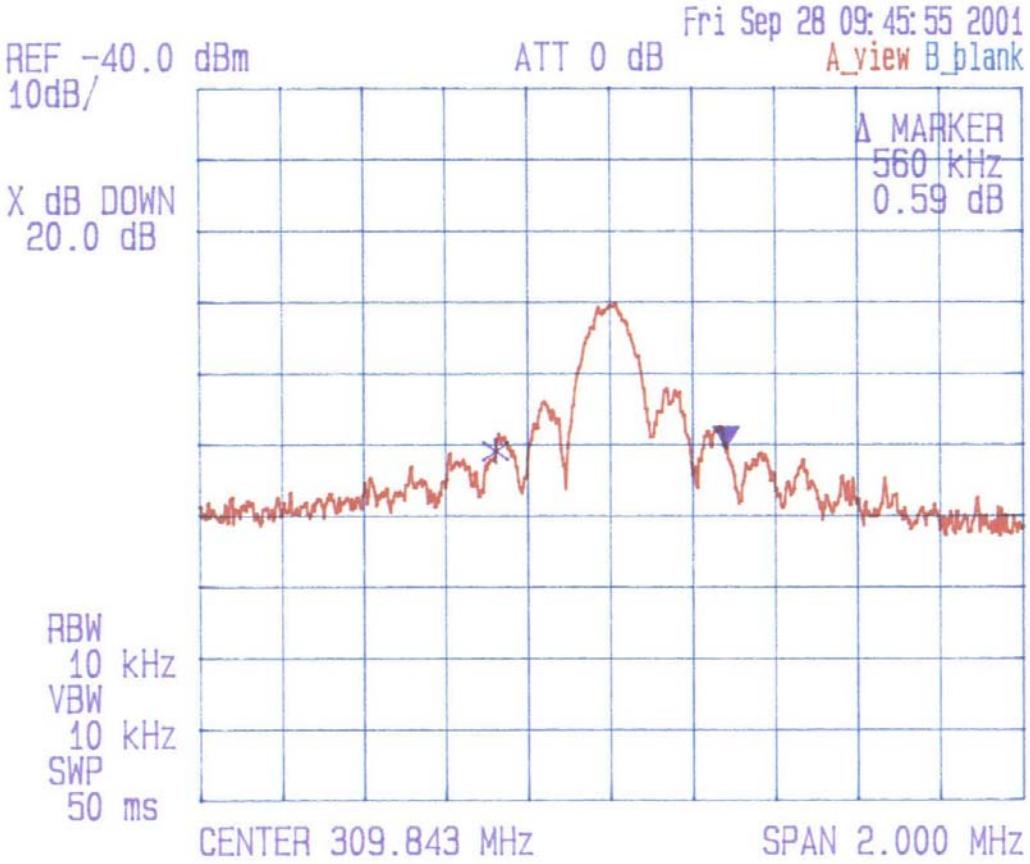
Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/Fail
304.8	703	762	Pass
309.8	560	775	Pass
314.1	471	785	Pass

Refer to the following plot for measurement data:

Plot #1
20dB Bandwidth
Carrier Frequency: 304.8 MHz (near lowest frequency)



Plot #2
20dB Bandwidth
Carrier Frequency: 309.8 MHz (middle frequency)



Plot #3
20dB Bandwidth
Carrier Frequency: 314.1 MHz (near highest frequency)

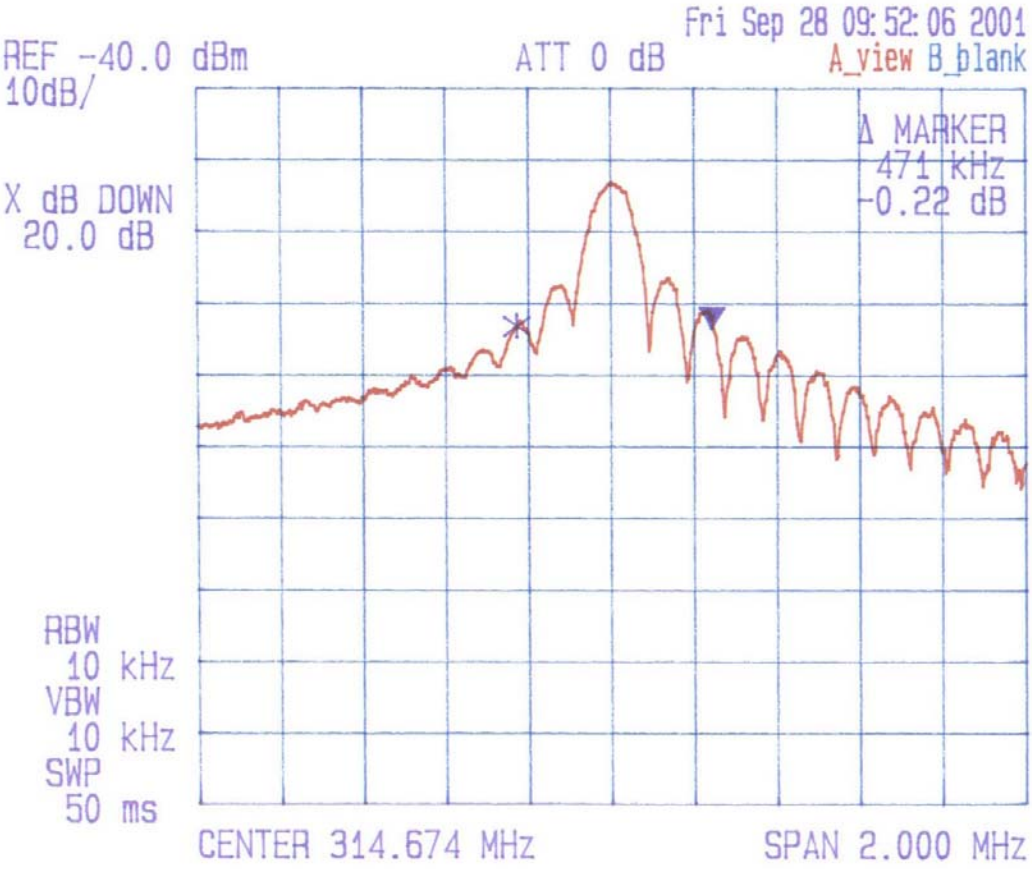


EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and NIS 81 (1994)

7.1. RADIATED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Radiated Emissions)	PROBABILITY DISTRIBUTION	UNCERTAINTY (± dB)	
		3 m	10 m
Antenna Factor Calibration	Normal (k=2)	±1.0	±1.0
Cable Loss Calibration	Normal (k=2)	±0.3	±0.5
EMI Receiver specification	Rectangular	±1.5	±1.5
Antenna Directivit	Rectangular	+0.5	+0.5
Antenna factor variation with height	Rectangular	±2.0	±0.5
Antenna phase center variation	Rectangular	0.0	±0.2
Antenna factor frequency interpolation	Rectangular	±0.25	±0.25
Measurement distance variation	Rectangular	±0.6	±0.4
Site imperfections	Rectangular	±2.0	±2.0
Mismatch: Receiver VRC $\Gamma_1 = 0.2$ Antenna VRC $\Gamma_R = 0.67$(Bi) 0.3 (Lp) Uncertainty limits $20\text{Log}(1\pm\Gamma_1\Gamma_R)$	U-Shaped	+1.1 -1.25	±0.5
System repeatability	Std. Deviation	±0.5	±0.5
Repeatability of EUT		-	-
Combined standard uncertainty	Normal	+2.19 / -2.21	+1.74 / -1.72
Expanded uncertainty U	Normal (k=2)	+4.38 / -4.42	+3.48 / -3.44

Calculation for maximum uncertainty when 3m biconical antenna including a factor of k=2 is used:

$U = 2u_c(y) = 2x(+2.19) = +4.38$ dB And $U = 2u_c(y) = 2x(-2.21) = -4.42$ dB

EXHIBIT 8. MEASUREMENT METHODS

8.1. GENERAL TEST CONDITIONS

The following test conditions shall be applied throughout the tests covered in this report.

8.1.1. Normal temperature and humidity

- Normal temperature: +15°C to +35°C
- Relative Humidity: +20% to 75%

The actual values during tests shall be recorded in the test report.

8.1.2. Normal power source

8.1.2.1. Mains Voltage

The nominal test voltage of the equipment to be connected to mains shall be the nominal mains voltage which is the declared voltage or any of the declared voltages for which the equipment was designed.

The frequency of test power source corresponding to the AC mains shall be between 59 Hz and 61 Hz.

8.1.2.2. Battery Power Source

For operation from battery power sources, the nominal test voltage shall be as declared by the equipment manufacturer. This shall be recorded in the test report.

8.1.3. Operating Condition of Equipment under Test

- All tests were carried out while the equipment operated at the following frequencies (if applicable):
  - The lowest operating frequency,
  - The middle operating frequency and
  - The highest operating frequency

- Modulation were applied using the Test Data sequence
- The transmitter was operated at the highest output power, or in the case the equipment able to operate at more than one power level, at the lowest and highest output powers

8.2. SPURIOUS EMISSIONS (RADIATED)

The spurious emissions were scanned from the lowest frequency generated by the EUT or 10 MHz whichever is lower to 10th harmonic of the highest frequency generated by the EUT.

- The radiated emission measurements were performed at the UltraTech's 3 Meter Open Field Test Site (OFTS) situated in the Town of Oakville, province of Ontario. The Attenuation Characteristics of OFTS have been filed to FCC, Industry Canada, ACA/Austel, NVLap and ITI.
- Radiated emissions measurements were made using the following test instruments:

  1. Calibrated EMCO BiconiLog antenna in the frequency range from 30 MHz to 2000 MHz.
  2. Calibrated Emco Horn antennas in the frequency range above 1000 MHz (1GHz - 40 GHz).
  3. Calibrated Advantest spectrum analyzer and pre-selector were used. The spectrum analyzer would be used as follows:

     For frequencies below 1 GHz:

     - Resolution BW: 100 kHz
     - Video BW: same or greater
     - Detector Mode: Positive Peak
     - Averaging: Off
     - Span: 100 MHz
     - Amplitude: Adjust for middle of the instrument's range
     - Sweep Time: Auto

     For frequencies above 1 GHz:
     - Resolution BW: 1 MHz
     - Video BW: same or greater
     - Detector Mode: Positive Peak
     - Averaging: Off
     - Span: 500 MHz
     - Amplitude: Adjust for middle of the instrument's range
     - Sweep Time: Auto

- The frequencies of emissions was first detected. Then the amplitude of the emissions was measured at the specified measurement distance using required antenna height, polarization, and detector characteristics.
- During this process, cables and peripheral devices were manipulated within the range of likely configuration.
- For each mode of operation required to be tested, the frequency spectrum was monitored. Variations in antenna heights (from 1 meter to 4 meters above the ground plane), antenna polarization (horizontal plane and vertical plane), cable placement and peripheral placement were explored to produce the highest amplitude signal relative to the limit.

  The maximum radiated emission for a given mode of operation was found by using the following step-by-step procedure:

  Step1: Monitor the frequency range of interest at a fixed antenna height and EUT azimuth.

  Step2: Manipulate the system cables to produce highest amplitude signal relative to the limit. Note the amplitude and frequency of the suspect signal.

Step3: Rotate the EUT 360 degrees to maximize the suspected highest amplitude signal. If the signal or another at a different frequency is observed to exceed the previously noted highest amplitude signal by 1 dB or more, go back to the azimuth and repeat Step 2. Otherwise, orient the EUT azimuth to repeat the highest amplitude observation and proceed.

Step4: Move the antenna over its full allowable range of travel (1 to 4 meters) to maximize the suspected highest amplitude signal. If the signal or another at a different frequency is observed to exceed the previously noted highest amplitude signal by 1 dB or more, return to Step 2 with the highest amplitude observation and proceed.

Step5: Change the polarization of the antenna and repeat Step 2 through 4. Compare the resulting suspected highest amplitude signal with that found for the other polarization. Select and note the higher of the two signals. This signal is termed the highest observed signal with respect to the limit for this EUT operational mode.

Step6: The effects of various modes of operation are examined. This is done by varying the equipment modes as steps 2 through 5 are being performed.

Step7: After completing steps 1 through 6, record the final highest emission level, frequency, antenna polarization and detector mode of the measuring instrument.

Calculation of Field Strength:

The field strength is calculated by adding the calibrated antenna factor and cable factor, and subtracting the Amplifier gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength
RA = Receiver/Analyzer Reading
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Example: If a receiver reading of 60.0 dBμV is obtained, the antenna factor of 7.0 dB/m and cable factor of 1.0 dB are added, and the amplifier gain of 30 dB is subtracted. The actual field strength will be:

Field Level = 60 + 7.0 + 1.0 - 30 = 38.0 dBμV/m.
Field Level = $10^{(38/20)}$ = 79.43 μV/m.