ENGINEERING TEST REPORT

4G V-Station Extreme
Model No.: ESTVPMW

FCC ID: QC4-ESTVPMW

Applicant:

Bioscrypt, Inc.
505 Cochrane Drive
Markham, Ontario
Canada L3R 8E3

In Accordance With
Federal Communications Commission (FCC)
Part 15, Subpart C, Section 15.209

UltraTech's File No.: MYT-157F15C209

This Test report is Issued under the Authority of Tri M. Luu, Professional Engineer, Vice President of Engineering UltraTech Group of Labs Date: October 26, 2009	
Report Prepared by: Dan Huynh Issued Date: October 26, 2009	Tested by: Wayne Wu, EMC/RFI Technician Test Dates: October. 14, 16 & 20, 2009

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

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ANSI	FC	VCI	Industry Canada / Industrie Canada	NVLAP	BSMI	Korea KCC-RRL
0685	91038	1309	46390-2049	NvLap Lab Code 200093-0	SL2-IN-E-1119R	CA2049

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart C
Title:	Code of Federal Regulations (CFR), Title 47, Telecommunication - Part 15
Purpose of Test:	To gain FCC Equipment Certification for section 15.209.
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:	Commercial, industrial or business environment

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

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC 47 CFR 15	2008	Code of Federal Regulations – Telecommunication
ANSI C63.4	2003	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	2008-09, Edition 6.0 2006	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement
CISPR 16-1-1 +A1 +A2	2006 2006 2007	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-1-2 +A1 +A2	2003 2004 2006	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-2: Conducted disturbances

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	Bioscrypt, Inc.
Address:	505 Cochrane Drive Markham, Ontario Canada L3R 8E3
Contact Person:	Shiraz Kapadia Phone #: 905-940-7750 Fax #: 905-940-7642 Email Address: shiraz.kapadia@bioscrypt.com

MANUFACTURER	
Name:	Knight Wah Technology Ltd.
Address:	Unit 16 - 19, 3/F Tower B,Regent Centre, 63-73 Wo Yi Hop Road, Kwai Chung, N. T. Hong Kong
Contact Person:	Y.H. Chan Phone #: (852) 2619 0162 Fax #: (852) 2619 0132 Email Address: yhchan@knightwah.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

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

Brand Name:	Bioscrypt, Inc.
Product Name:	4G V-Station Extreme
Model Name or Number:	ESTVPMW
Serial Number:	Test sample
Type of Equipment:	Low Power Transmitter Below 1705 kHz
Input Power Supply Type:	12-24 VDC
Primary User Functions of EUT:	Enroll, verification, communication output

2.3. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	Mobile
Intended Operating Environment:	Commercial, light industry & heavy industry
Power Supply Requirement:	4.75VDC – 16VDC
RF Output Power Rating:	77.03 dBµV/m peak at 3m distance
Operating Frequency Range:	125 kHz
Duty Cycle:	20% duty cycle @ 100ms
20 dB Bandwidth:	578 Hz
Modulation Type:	ASK 20% duty cycle @ 100ms
Oscillator Frequencies:	125 kHz
Antenna Connector Type:	LC (Coil) Integral

2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	Ethernet 100-Base TX	1	RJ45	Non shielded
2	Host RS-485	1	Header	Non shielded
3	Host RS-232	1	Header	Non shielded
4	Power	2	Bullet and Header	Non shielded
5	Wiegand I/O (8 Lines)	1	Header	Non shielded
6	General Purpose I/O (3 Inputs & 6 Outputs)	1	Header	Non shielded
7	Relay Control (NC, NO & COM)	1	Header	Non shielded
8	USB OTG (Auxiliary Port)*	1	USB-Micro-AB	Shielded

* Note: Used for Service only, Secured by a security door. Administrator usage only.

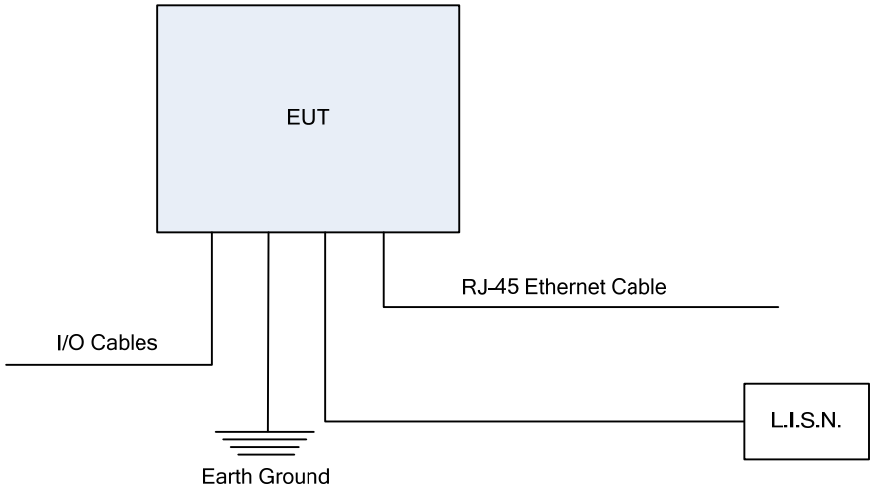
2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

None.

2.6. TEST SETUP BLOCK DIAGRAM

2.6.1. Power Line Conducted Emission Test Setup



2.6.2. Radiated Emission Test Setup

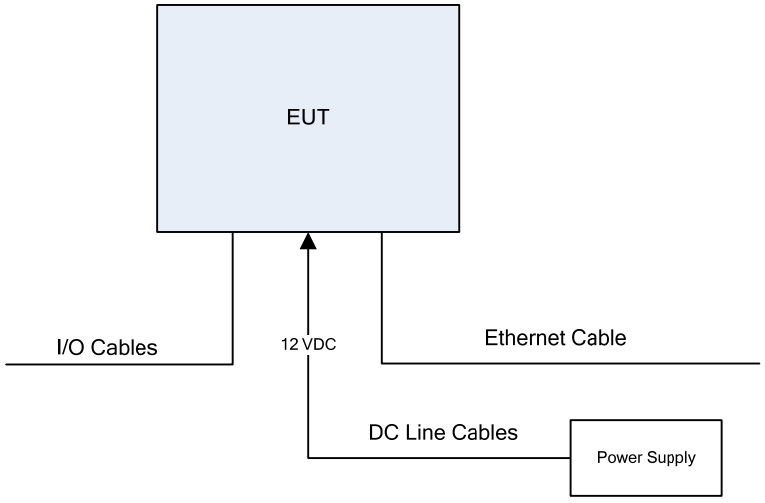


EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

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

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The EUT was configured for continuous transmission for the duration of testing.
Special Test Software:	N/A
Special Hardware Used:	N/A
Transmitter Test Antenna:	The EUT was tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment.

Transmitter Test Signals	
Frequency Band(s):	125 kHz
Test Frequency(ies):	125 kHz
RF Power Output:	77.03 dBµV/m peak at 3m distance
Normal Test Modulation:	ASK
Modulating Signal Source:	Internal

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. 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.

- AC Powerline Conducted Emissions were performed in UltraTech's shielded room, 16'(L) by 12'(W) by 12'(H).

- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site 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 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 91038) and Industry Canada office (Industry Canada File No.: 2049A-3). Expiry Date: 2011-05-01.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.203	Antenna Requirement	Yes
15.207(a)	Power Line Conducted Emissions	Yes
15.209(a)	20 dB Bandwidth	Yes
15.209	Transmitter Radiated Emissions - Fundamental, Harmonic and Spurious Emissions	Yes

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

The following modifications were made for compliance:

Ferrite material added outside device on cables:
4G (PIV-TWIC Station or V-Station) Extreme required the addition of a Steward Ferrite P/N: 28A4155-0A2, requiring 1 turn on the IO and Unit Power lines close to the unit.

4G (PIV-TWIC Station or V-Station) Extreme required the addition of a Steward Ferrite P/N: 28A2432-0A2, requiring 1 turn on the Ethernet lines close to the unit RJ45 port.

4G (PIV-TWIC Station or V-Station) Extreme also required the addition of a Steward Ferrite, 28A4155-0A2, requiring 1 turn on the Cooler DC Power lines close to the Cooler board power port.

Ferrite material added inside device:
4G (PIV-TWIC Station or V-Station) Extreme required the addition of two Steward Ferrites, P/N: 28B0562-000, and each ferrite required 2 turns on the internal LVDs cable. One ferrite closes to one end of the LVDs cable and another ferrite closes to another end of the LVDs cable.

4G (PIV-TWIC Station or V-Station) Extreme required the addition of two Steward Ferrites, P/N: 28B0562-000, and each ferrite required 2 turns on the internal Venus Sensor cable. One ferrite closes to one end of the Venus Sensor cable and another ferrite closes to another end of the Venus Sensor cable.

4G (PIV-TWIC Station or V-Station) Extreme required the addition of a Steward Ferrite, P/N: 28A2432-0A2, requiring 1 turn on the Magnetic Stripe Card Reader Cable closes to the connector side of LCD/Keypad PCB.

4G (PIV-TWIC Station or V-Station) Extreme also required Nickel Paint – MG Chemicals, Super Shield Nickel Conductive Coating, UL E202609, CAT/PN: 841-3406, applied to Lumidigm Venus Sensor on all sides.

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in ANSI C63.4 and Ultratech's test procedures ULTR-P001-2004.

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document LAB 34 with a confidence level of 95%. Please refer to Exhibit 7 for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4 and CISPR 16-1-1.

5.4. ANTENNA REQUIREMENTS [47 CFR § 15.203]

5.4.1. Requirements

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.

5.4.2. Engineering Analysis

The antenna is an integral part of the EUT; it is soldered onto the radio printed circuit board and located inside the enclosure.

5.5. POWERLINE CONDUCTED EMISSION [47 CFR 15.207(a)]

5.5.1. Limit(s)

The equipment shall meet the limits of the following table:

Frequency of emission (MHz)	Conducted Limits (dBμV)	
	Quasi-peak	Average
0.15–0.5 .....……..	66 to 56*	56 to 46*
0.5–5 .....……..	56	46
5-30 ……..	60 ...……..	50

*Decreases linearly with the logarithm of the frequency

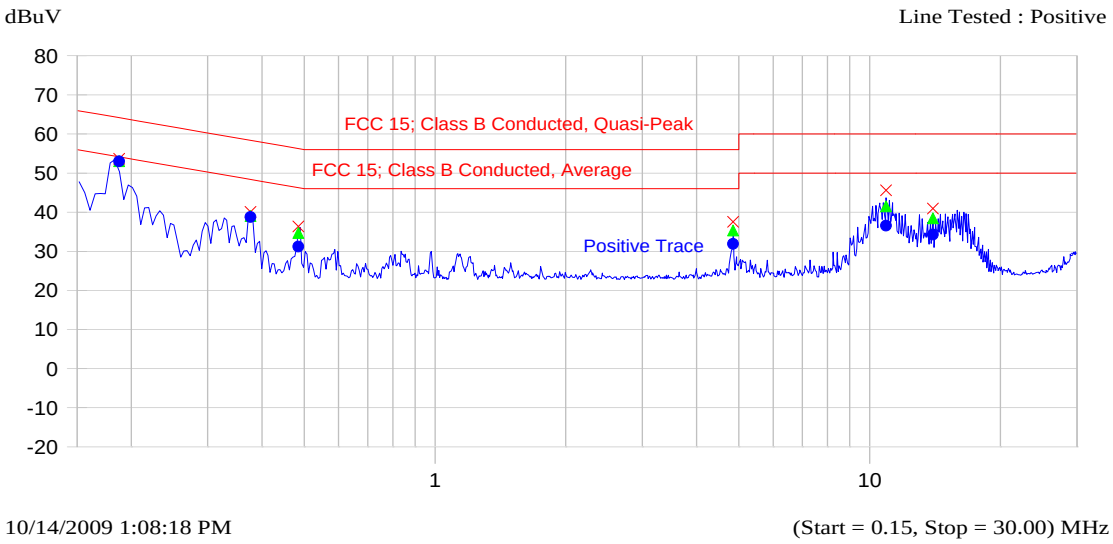
5.5.2. Method of Measurements

Refer to ANSI C63.4.

5.5.3. Test Data

Plot 5.5.3.1. Power Line Conducted Emission
Line Voltage: 12 VDC
Line Tested: Positive

Current Graph

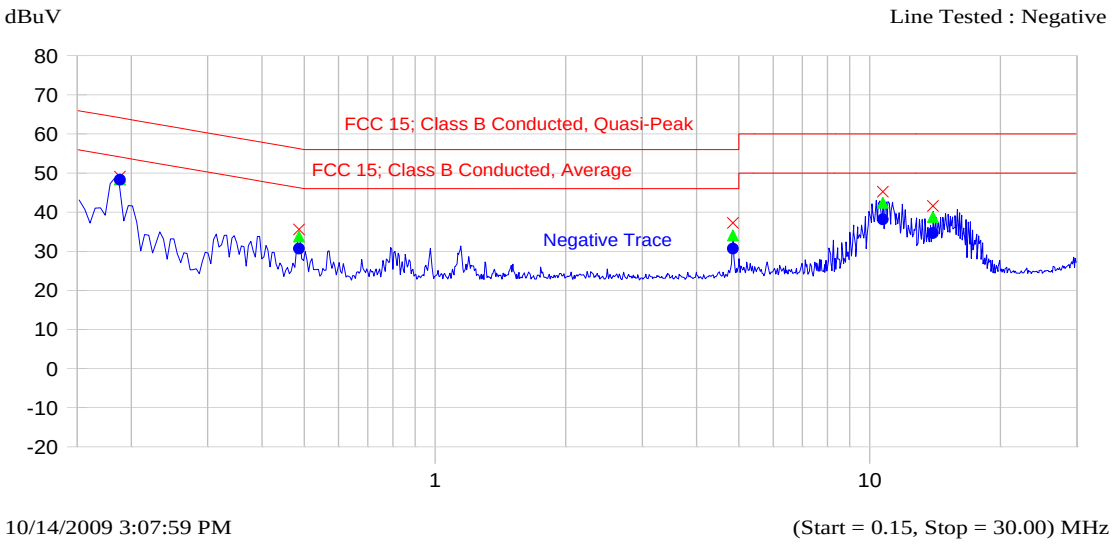


Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta Qp-Qp Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.188	53.6	53.0	-11.9	53.0	-1.9	Positive Trace
0.376	40.1	39.0	-20.5	38.8	-10.7	Positive Trace
0.485	36.3	34.7	-21.7	31.2	-15.2	Positive Trace
4.852	37.5	35.4	-20.6	31.9	-14.1	Positive Trace
10.907	45.6	41.5	-18.5	36.6	-13.4	Positive Trace
13.976	40.9	38.4	-21.6	34.3	-15.7	Positive Trace

Plot 5.5.3.2. Power Line Conducted Emission
Line Voltage: 12 VDC
Line Tested: Positive

Current Graph



Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta Qp-Qp Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.188	49.1	48.4	-16.5	48.3	-6.6	Negative Trace
0.486	35.6	33.7	-22.6	30.7	-15.7	Negative Trace
4.848	37.3	34.1	-21.9	30.7	-15.3	Negative Trace
10.725	45.2	42.4	-17.6	38.2	-11.8	Negative Trace
13.979	41.6	38.8	-21.2	34.6	-15.4	Negative Trace

5.6. TRANSMITTER RADIATED EMISSIONS [47 CFR §§ 15.209 & 15.205]

5.6.1. Limit(s)

§ 15.209:

(a) The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

47 CFR 15.209(a) General Field Strength Limits

Frequency (MHz)	Field Strength (microvolts/meter)	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 **	3
88 – 216	150 **	3
216 – 960	200 **	3
Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.		

(b) In the emission table above, the tighter limit applies at the band edges.

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other Sections within this Part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

(e) The provisions in Sections 15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this Part.

(f) In accordance with Section 15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in Section 15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in Section 15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in Section 15.109 that are applicable to the incorporated digital device.

(g) Perimeter protection systems may operate in the 54-72 MHz and 76-88 MHz bands under the provisions of this section. The use of such perimeter protection systems is limited to industrial, business and commercial applications.

5.6.2. Method of Measurements

Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4 for measurement methods.

5.6.3. Test Data

Remarks:

- The measuring receiver shall be tuned over the frequency range 10 kHz to 30 MHz.
- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.
- Extrapolation factor of 40dB/decade shall be used for frequencies below 30 MHz.

5.6.3.1. Fundamental Emissions

Remarks:

- Field strength limit of the fundamental (125 kHz) at 300m distance is 20*log(2400/125) = 25.7 dBµV/m
- EUT was initially tested a 10m, signal was not detected at this distance, and test distance was reduced to 3m. The value measured at 3m shall be extrapolated as applicable to compare with limit and measurement distance specified in section 15.209(a).
- The measured E-Field at 3m (column 2) will be extrapolated to 300m E-Field Level (column 3) using the extrapolation factor of 40*log(3/300) = -80 dB

Frequency (MHz)	Peak E-Field @ 3m (dBµV/m)	Extrapolated E-Field Level @ 300m (dBµV/m)	Antenna Plane (H/V)	§ 15.209 (a) Limits @ 300m (dBµV/m)	Margin (dB)
0.125	72.43	-7.57	V	25.7	-33.3
0.125	77.03	-2.97	H	25.7	-28.7

5.6.3.2. Harmonic/Spurious Emissions

Remarks:

- The value measured at 10m shall be extrapolated as applicable to compare with limit and measurement distance specified in section 15.209(a).
- For frequency band 0.009- 0.490 MHz, the measured E-Field at 10m (column 2) will be extrapolated to 300m E-Field Level (column 3) using the extrapolation factor of 40*log(10/300) = -59 dB
- For frequency bands 0.490-1.705 MHz and 1.705-30.0 MHz, the measured E-Field at 10m (column 2) will be extrapolated to 30m E-Field Level (column 3) using the extrapolation factor of 40*log(10/30) = -19.08 dB

Frequency (MHz)	Peak E-Field @ 10m (dBµV/m)	Extrapolated E-Field Level (dBµV/m)	Antenna Plane (H/V)	§ 15.209 (a) Limits (dBµV/m)	Margin (dB)
1.005	50.40	31.32	V	45.7	-14.4
1.005	49.67	30.59	H	45.7	-15.1
1.051	49.06	29.98	V	45.7	-15.7
1.051	48.63	29.55	H	45.7	-16.2

5.7. 20 dB BANDWIDTH [47 CFR 15.209 (a)]

5.7.1. Limit(s)

Emission bandwidth shall not be located in the restricted bands in 15.205 and the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz.

5.7.2. Method of Measurements

The measurements were performed in accordance with Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4:2003.

The transmitter output was loosely coupled to the spectrum analyzer through a receiving antenna. The bandwidth of the fundamental frequency was measured with the spectrum analyzer, with the resolution BW set to 1% to 3 % of the approximate emission width and video BW set to 3 times the resolution BW.

5.7.3. Test Data

Channel Frequency	20 dB Bandwidth
125 kHz	578 Hz

See the following plot for details.

Plot 5.7.3.1. 20 dB Bandwidth
Fc: 125 kHz

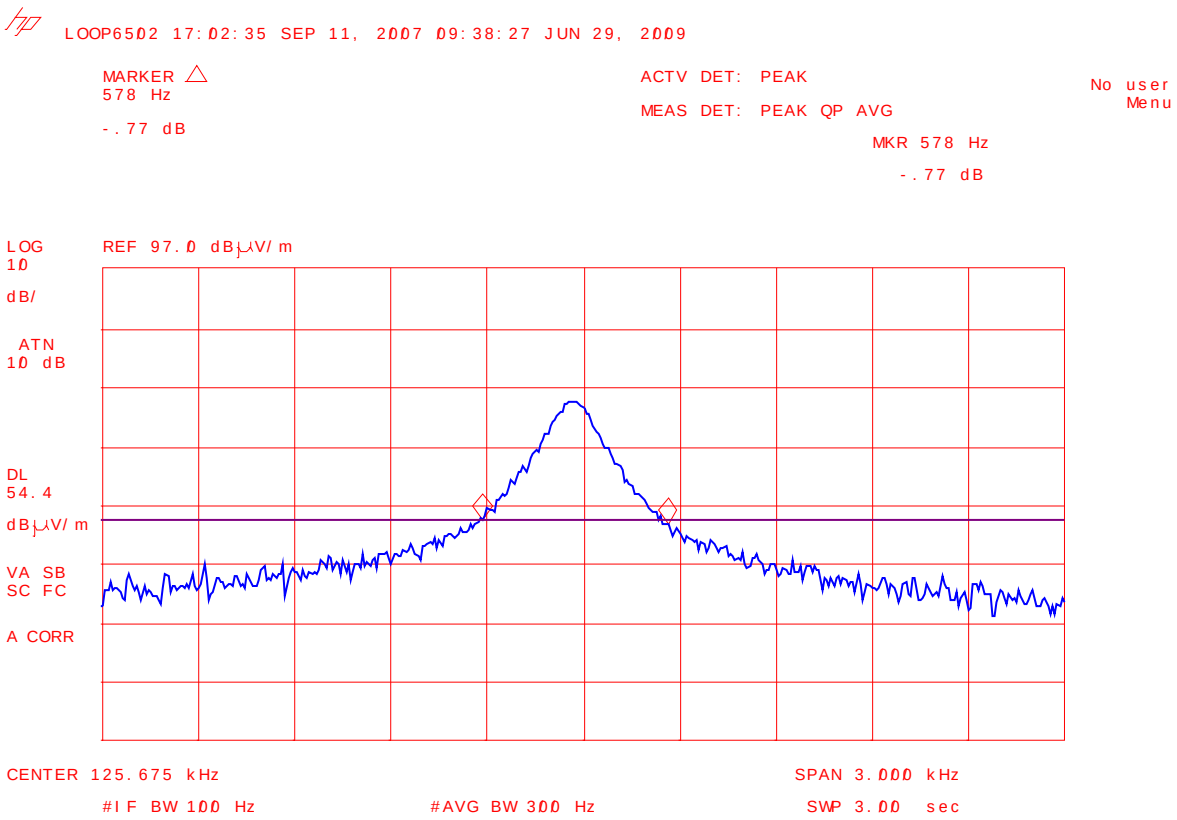


EXHIBIT 6. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Operating Range
EMI Receiver System/ Spectrum Analyzer with built-in Amplifier	Hewlett Packard	HP 8546A	3520A00248	9KHz-5.6GHz, 50 Ohms
Transient Limiter	Hewlett Packard	11947A	310701998	9 kHz – 200 MHz 10 dB attenuation
L.I.S.N.	EMCO	3825/2	89071531	9 kHz – 200 MHz 50 Ohms / 50 μH
12'x16'x12' RF Shielded Chamber	RF Shielding	…	..	…
EMI-Test Receiver	Rohde & Schwarz	ESU40	100037	20 Hz- 40 GHz Build in amplifier
Spectrum Analyzer	Rohde & Schwarz	FSEK	834157/005	9 kHz- 40 GHz
Spectrum Analyzer	Hewlett Packard	HP 8593EM	3412A00103	9 kHz – 26.5 GHz
Loop Antenna	Emco	6502	2611	10 kHz – 30 MHz
Biconilog Anenna	Emco	3142	10005	26 – 3000 MHz
Biconilog Anenna	Emco	3142B	1575	26 – 2000 MHz
RF Amplifier	Com-Power	PA-103A	161243	10 MHz – 1000 MHz
RF Amplifier	Hewlett Packard	84498	3008A00769	1 – 26.5 GHz

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and LAB 34

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Line Conducted)	PROBABILITY DISTRIBUTION	UNCERTAINTY (dB)	
		9-150 kHz	0.15-30 MHz
EMI Receiver specification	Rectangular	±1.5	±1.5
LISN coupling specification	Rectangular	±1.5	±1.5
Cable and Input Transient Limiter calibration	Normal (k=2)	±0.3	±0.5
Mismatch: Receiver VRC Γ_1 = 0.03 LISN VRC Γ_R = 0.8(9 kHz) 0.2 (30 MHz) Uncertainty limits 20Log(1±$\Gamma_1\Gamma_R$)	U-Shaped	±0.2	±0.3
System repeatability	Std. deviation	±0.2	±0.05
Repeatability of EUT	--	--	--
Combined standard uncertainty	Normal	±1.25	±1.30
Expanded uncertainty U	Normal (k=2)	±2.50	±2.60

Sample Calculation for Measurement Accuracy in 450 kHz to 30 MHz Band:

$u_c(y) = \sqrt{\sum_{i=1}^{m} u_i^2(y)} = \pm \sqrt{(1.5^2 + 1.5^2)/3 + (0.5/2)^2 + (0.05/2)^2 + 0.35^2} = \pm 1.30$ dB

$U = 2u_c(y) = \pm 2.6$ dB

7.2. 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 Directivity	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 Γ_1 = 0.2 Antenna VRC Γ_R = 0.67(Bi) 0.3 (Lp) Uncertainty limits 20Log(1±$\Gamma_1\Gamma_R$)	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