

ENGINEERING TEST REPORT



V-Smart, A,H,R
Model No.: V-Smrt, A,H,R

FCC ID: QC4-VSMRTAHR

Applicant: **Bioscrypt Inc.**
505 Cochrane Drive
Markham, Ontario
Ontario, L3R 8E3

In Accordance With

FEDERAL COMMUNICATIONS COMMISSION (FCC)
PART 15, SUBPART C, SEC. 15.225
Unlicensed Low Power Transmitters
Operating in the frequency band 13.11-14.01 MHz

UltraTech's File No.: MYT-086FCC15C

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



Date: July 10, 2006

Report Prepared by: Dharmajit Solanki

Tested by: Mr. Hung Trinh

Issued Date: July 10, 2006

Test Dates: May 9 - June 22, 2006

- 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.*

UltraTech

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SL2-IN-E-1119R

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

| | |
|--------------------------------------|--|
| Reference: | FCC Part 15, Subpart C, Section 15.225 |
| Title | Telecommunication - Code of Federal Regulations, CFR 47, Part 15 |
| Purpose of Test: | To gain FCC Certification Authorization for Unlicensed Low Power Transmitters operating in the Frequency Band 13.11-14.01 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: | <ul style="list-style-type: none">• Light-industry, Commercial• Industry |

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

None

1.3. NORMATIVE REFERENCES

| | | |
|-----------------------------|----------------------------------|---|
| FCC CFR Parts 0-19 | Feb. 16 - 2006 | Code of Federal Regulations – Telecommunication |
| ANSI C63.4 | 2004 | 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 +A1 EN 55022 | 2003-04-10 2004-10-14 2003 | Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment |
| CISPR 16-1-1 | 2003 | Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus |
| CISPR 16-2-1 | 2003 | Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-1: Conducted disturbance measurement |
| CISPR 16-2-3 | 2003 | Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-3: Radiated disturbance measurement |

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File #: MYT-086FCC15C

July 10, 2006

- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

| APPLICANT: | |
|------------------------|---|
| Name: | Bioscrypt Inc. |
| Address: | 505 Cochrane Drive Markham, Ontario Ontario, L3R 8E3 |
| Contact Person: | Mr. Vladimir Lazic Phone #: 905-940-7787 Fax #: 905-940-7642 Email Address: vladimir.lazic@bioscrypt.com |

| MANUFACTURER: | |
|------------------------|---|
| Name: | Bioscrypt Inc. |
| Address: | 505 Cochrane Drive Markham, Ontario Ontario, L3R 8E3 |
| Contact Person: | Mr. Vladimir Lazic Phone #: 905-940-7787 Fax #: 905-940-7642 Email Address: vladimir.lazic@bioscrypt.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 | V-Smrt, A,H,R |
| Model Name or Number | V-Smrt, A,H,R |
| Serial Number | N/A |
| Type of Equipment | Unlicensed Low Power Transmitters |
| Input Power Supply Type | 9-12 V DC using a generic external power supply |
| Primary User Functions of EUT: | finger print reader |

2.3. EUT'S TECHNICAL SPECIFICATIONS

V-Smart, A,H,R employs an HID make 13.553-13.567 MHz Radio Transmitter Module (OEM 150).

| TRANSMITTER | |
|--|---|
| Equipment Type: | ▪ Base station (fixed use) |
| Intended Operating Environment: | ▪ Commercial, light industry & heavy industry |
| Power Supply Requirement: | 12 VDC, 200mA |
| E-Field of the Carrier Signal: | 35 dBuV/m at 10 meters |
| Operating Frequency: | 13.56 MHz |
| RF Output Impedance: | 50 Ohms |
| Channel Spacing: | N/A |
| Duty Cycle: | 100% |
| 20 dB Bandwidth: | 3.39 kHz |
| Modulation Type: | ASK, ISO 15963 |
| Antenna Connector Type: | Manufacturer: HID Type: Integral loop antenna itched into printed circuit board Model: 3135A 2-turn Frequency Range: 13.56 MHz |

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 | RS-232 | 1x 2 wires | DB-15 (all ports) | Non shielded |
| 2 | RS-485 | 1x 2 wires | DB-15 | Non shielded |
| 3 | Wiegand Input | 1x 2 wires | DB-15 | Non shielded |
| 4 | Wiegand Output | 1x 2 wires | DB-15 | Non shielded |
| 5 | Signal GND | 1 | DB-15 | Non shielded |
| 6 | Wiegand GND | 1 | DB-15 | Non shielded |
| 7 | Power | 1 | DB-15 | Non shielded |
| 8 | Power Return | 1 | DB-15 | Non shielded |
| 9 | Line Trigger (GPO) | 1 | DB-15 | Non shielded |
| 10 | Earth GND | 1 | DB-15 | Non shielded |
| 11 | USB Service Port | 1 | Min USB | |

2.5. ANCILLARY EQUIPMENT

N/A

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2.6. GENERAL TEST SETUP

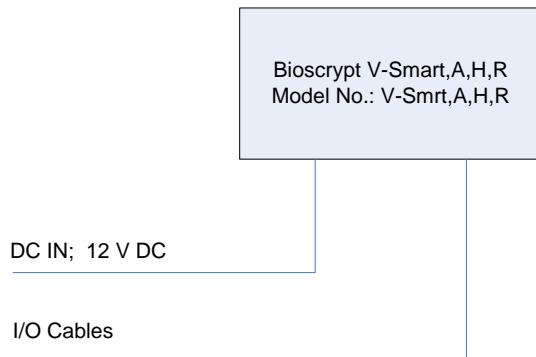


EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

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 V DC |

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

The Model V-Smrt, A,H,R was set to transmit continuously during tests.

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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.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049-1). Last Date of Site Calibration: June. 20, 2005.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

| FCC PARAGRAPH | TEST REQUIREMENTS | COMPLIANCE (YES/NO) |
|-----------------|---|--------------------------|
| 15.203 | Antenna Requirement | Yes. Integral antenna |
| 15.225 (e) | Frequency Stability | Yes |
| 15.225 & 15.205 | Transmitter Radiated Emissions - Fundamental, Harmonic and Spurious | Yes |
| 15.215(c) | 26 & 20 dB Bandwidths | Yes |
| 15.107(a) | Power Line Conducted Emissions Measurements (Transmit & Receive) | Yes |

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

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None

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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 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 6 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.

5.4. AC POWERLINE CONDUCTED EMISSIONS @ FCC PART 15, SUBPARTS B & C, PARA.15.107(A) & 15.207

5.4.1. Limits

The equipment shall meet the limits of the following table:

| CLASS B LIMITS | | | |
|----------------------------|-------------------------|-----------------------|--|
| Test Frequency Range (MHz) | Quasi-Peak (dB μ V) | Average* (dB μ V) | Measuring Bandwidth |
| 0.15 to 0.5 | 66 to 56* | 56 to 46* | RBW = 9 kHz VBW \geq 9 kHz for QP VBW = 1 Hz for Average |
| 0.5 to 5 | 56 | 46 | RBW = 9 kHz VBW \geq 9 kHz for QP VBW = 1 Hz for Average |
| 5 to 30 | 60 | 50 | RBW = 9 kHz VBW \geq 9 kHz for QP VBW = 1 Hz for Average |

* Decreasing linearly with logarithm of frequency

5.4.2. Method of Measurements

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

5.4.3. Test Equipment List

| Test Instruments | Manufacturer | Model No. | Serial No. | Frequency 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 μ H |
| 12'x16'x12' RF Shielded Chamber | RF Shielding | ... | .. | ... |

5.4.4. Photographs of Test Setup

Refer to the Photographs #1 & #2 in Annex 1 for setup and arrangement of equipment under tests and its ancillary equipment.

5.4.5. Test data

Conforms. Refer to Plots # 1 to 4 for details of measurements

| Plot #1: DC POWER LINE CONDUCTED EMISSION MEASUREMENTS | | | |
|---|---------------------------------------|--------------------|------------------------|
| Detector: <input checked="" type="checkbox"/> PEAK <input checked="" type="checkbox"/> QUASI-PEAK <input checked="" type="checkbox"/> AVERAGE | Temp: 23C° | Humidity: 12% | File#: MYT-086Q |
| Line Tested: 1 | Line Voltage: 9 Vdc | Test Tech: Carolyn | Test Date: June 08, 06 |
| Standard: FCC 15B | Comments: OEM 150 50 OHM ANTENNA LOAD | | |

Hz

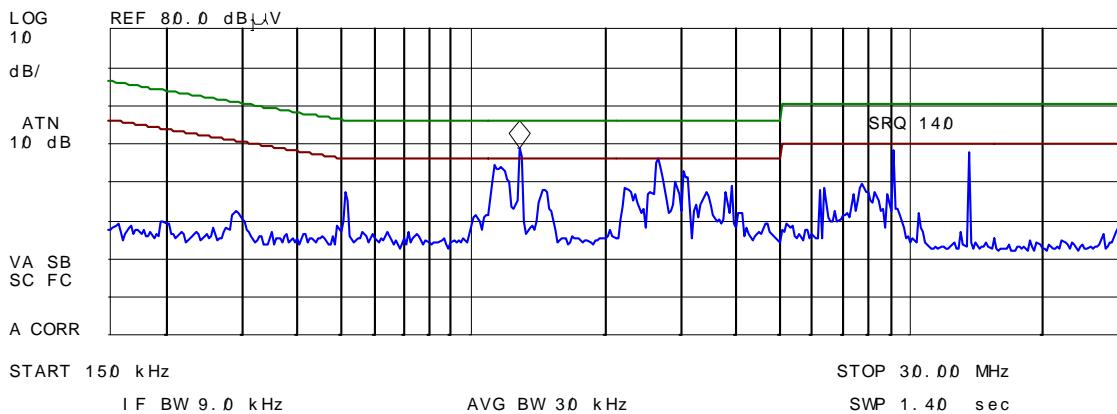
| Si gnal | Fr eq (MHz) | PK Amp | QP Amp | AV Amp | AV \triangle L2 |
|---------|---------------|--------|--------|--------|-------------------|
| 1 | 1. 302395 | 51. 0 | 47. 5 | 33. 0 | - 13. 0 |
| 2 | 2. 675970 | 47. 3 | 42. 2 | 28. 8 | - 17. 2 |
| 3 | 7. 799375 | 51. 7 | 46. 4 | 29. 7 | - 20. 3 |
| 4 | 9. 100440 | 50. 5 | 44. 4 | 27. 5 | - 22. 5 |
| 5 | 13. 561745 | 50. 2 | 47. 9 | 34. 9 | - 15. 1 |

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKR 1. 30 MHz

48. 85 dB μ V



Plot #2: DC POWER LINE CONDUCTED EMISSIONS MEASUREMENTS

| | | | |
|---|---------------------------------------|--------------------|------------------------|
| Detector: [X] PEAK [X] QUASI-PEAK [X] AVERAGE | Temp: 23C° | Humidity: 12% | File#: MYT-086Q |
| Line Tested: 2 | Line Voltage: 9 Vdc | Test Tech: Carolyn | Test Date: June 08, 06 |
| Standard: FCC 15B | Comments: OEM 150 50 OHM ANTENNA LOAD | | |

1/2

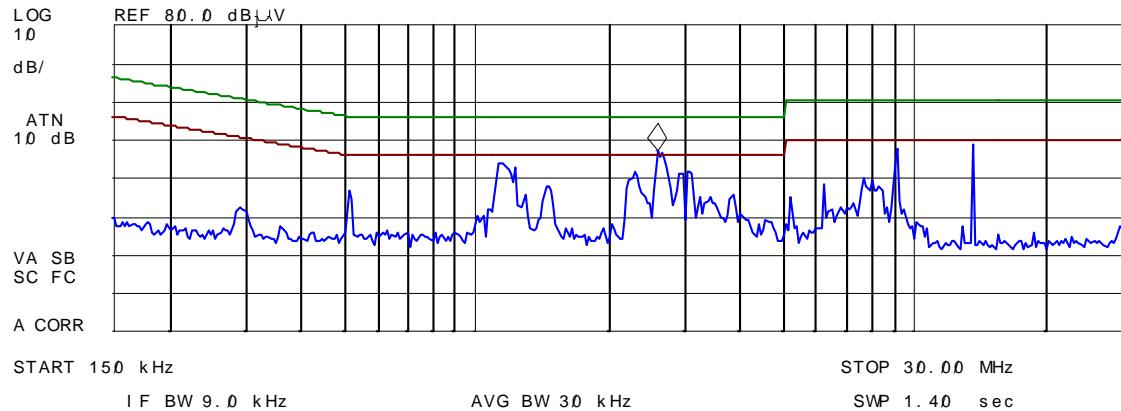
| Si gnal | Freq (MHz) | PK Amp | QP Amp | AV Amp | AV \triangle L2 |
|---------|-------------|--------|--------|--------|-------------------|
| 1 | 1. 293725 | 50. 1 | 41. 3 | 25. 2 | - 20. 8 |
| 2 | 2. 600300 | 49. 4 | 45. 9 | 31. 2 | - 14. 8 |
| 3 | 7. 825375 | 51. 8 | 46. 6 | 29. 9 | - 20. 1 |
| 4 | 9. 104750 | 50. 8 | 45. 6 | 28. 2 | - 21. 8 |
| 5 | 13. 562075 | 50. 2 | 48. 1 | 34. 9 | - 15. 1 |

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKR 2. 60 MHz

46. 98 dB μ V



Plot #3: DC POWER LINE CONDUCTED EMISSIONS MEASUREMENTS

| | | | |
|---|---------------------------------------|--------------------|------------------------|
| Detector: [X] PEAK [X] QUASI-PEAK [X] AVERAGE | Temp: 23C° | Humidity: 12% | File#: MYT-086Q |
| Line Tested: 1 | Line Voltage: 12 Vdc | Test Tech: Carolyn | Test Date: June 08, 06 |
| Standard: FCC 15B | Comments: OEM 150 50 OHM ANTENNA LOAD | | |

/

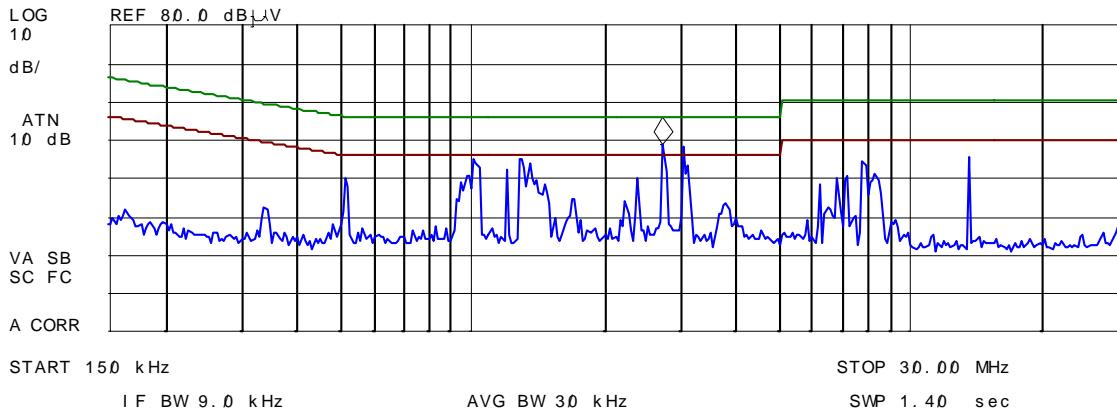
| Signal | Freq (MHz) | PK Amp | QP Amp | AV Amp | AV \triangle L2 |
|--------|------------|--------|--------|--------|-------------------|
| 1 | 1.292570 | 49.0 | 42.0 | 23.6 | -22.4 |
| 2 | 2.744100 | 50.4 | 48.6 | 43.5 | -2.5 |
| 3 | 3.083750 | 51.0 | 48.1 | 43.4 | -2.6 |
| 4 | 7.676250 | 50.0 | 40.1 | 21.5 | -28.5 |
| 5 | 13.561050 | 49.9 | 47.6 | 34.5 | -15.5 |

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKR 2.73 MHz

48.47 dB μ V

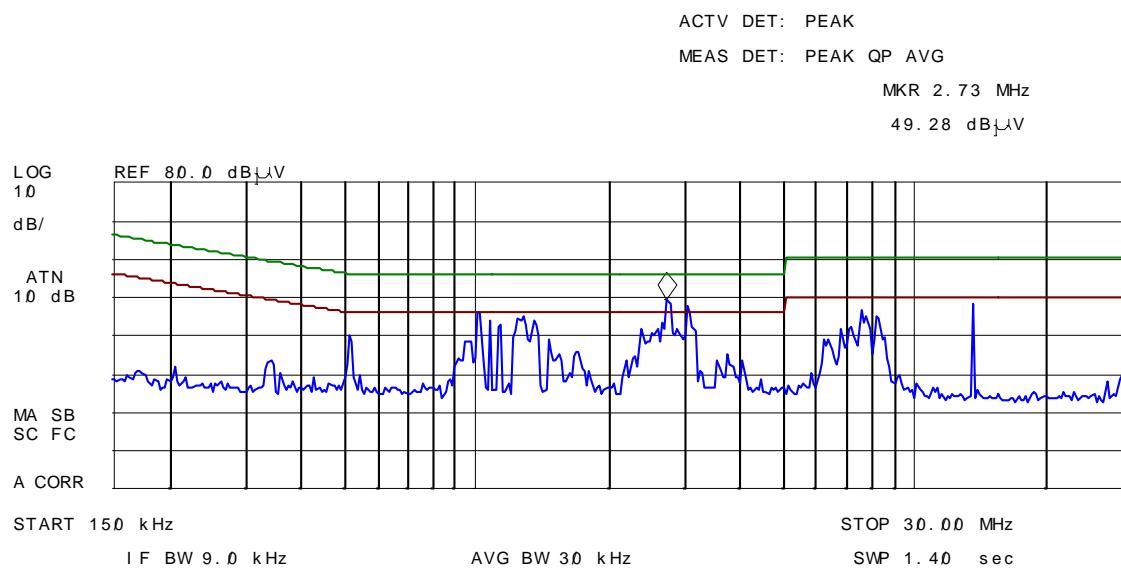


Plot #4: DC POWER LINE CONDUCTED EMISSIONS MEASUREMENTS

| | | | | |
|---|---------------------------------------|----------------------|--------------------|------------------------|
| Detector: [X] PEAK [X] QUASI-PEAK [X] AVERAGE | | Temp: 23C° | Humidity: 12% | File#: MYT-086Q |
| Line Tested: 2 | | Line Voltage: 12 Vdc | Test Tech: Carolyn | Test Date: June 08, 06 |
| Standard: FCC 15B | Comments: OEM 150 50 OHM ANTENNA LOAD | | | |

/

| Si gnal | Fr eq (MHz) | PK Amp | QP Amp | AV Amp | AV \triangle L2 |
|---------|--------------|--------|--------|--------|-------------------|
| 1 | 1. 292125 | 47. 5 | 41. 6 | 23. 4 | - 22. 6 |
| 2 | 2. 738900 | 51. 2 | 50. 0 | 45. 6 | - 0. 4 |
| 3 | 3. 082438 | 52. 0 | 48. 5 | 43. 6 | - 2. 4 |
| 4 | 13. 561550 | 50. 4 | 48. 1 | 34. 9 | - 15. 1 |



5.5. 26 DB & 20 DB BANDWIDTH @ FCC 15.215(C)

5.5.1. Limits

The rf spectrum shall not stay in the restricted band specified in FCC 15.205

5.5.2. Method of Measurements

Refer to ANSI C63.4

The transmitter output was connected to the spectrum analyzer through an attenuator. the bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW = 1% of approximate 26dB BW, VBW > RBW, Span = approx. 3x26dB BW. The 26 dB Bandwidth was measured and recorded.

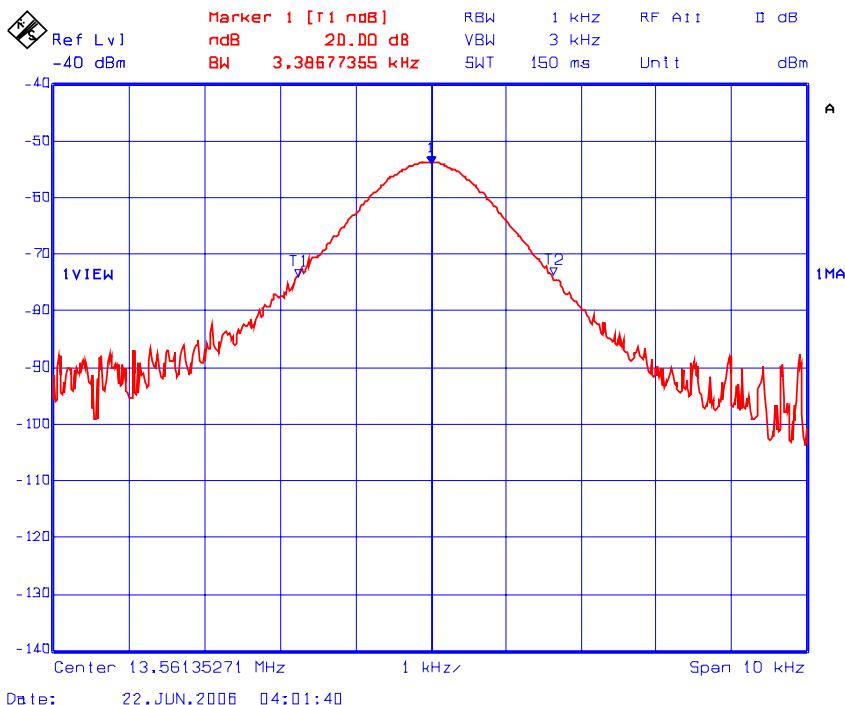
5.5.3. Test Equipment List

| Test Instruments | Manufacturer | Model No. | Serial No. | Frequency Range |
|------------------------------------|-----------------|---------------|------------|---------------------------------------|
| Spectrum Analyzer/ EMI Receiver | Rohde & Schawrz | FSEK20/B4/B21 | 834157/005 | 9 kHz – 40 GHz with external mixer |

5.5.4. Test Data

| CHANNEL FREQUENCY (MHz) | 26 dB Bandwidth (KHz) | 20 dB Bandwidth (KHz) |
|----------------------------|--------------------------|--------------------------|
| 13.56 | 4.25 | 3.39 |

20 dB Occupied Bandwidth:-



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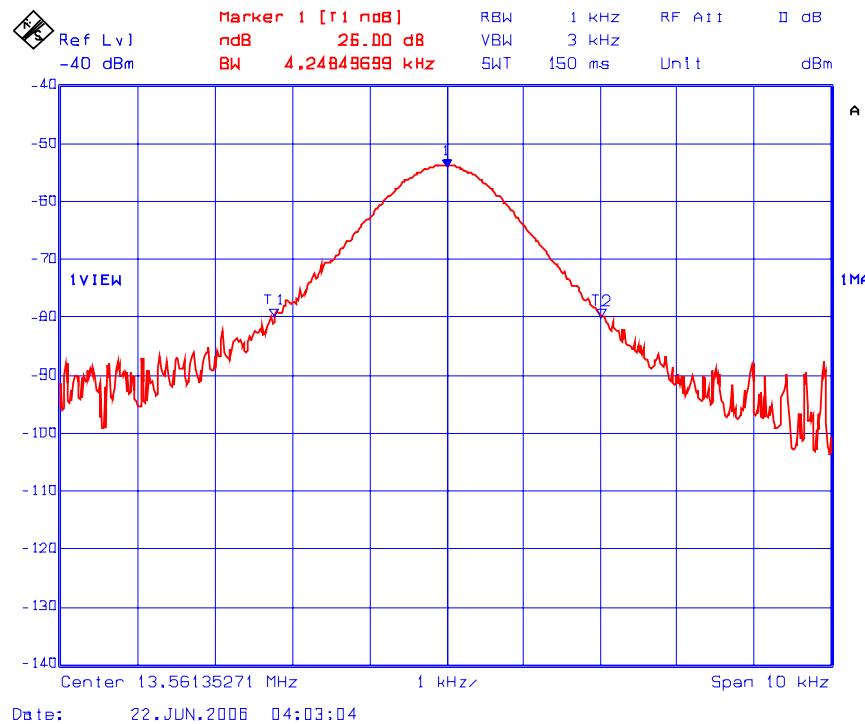
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26 dB Occupied Bandwidth:-



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5.6. FREQUENCY STABILITY @ FCC §15.225(E)

5.6.1. Limits

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

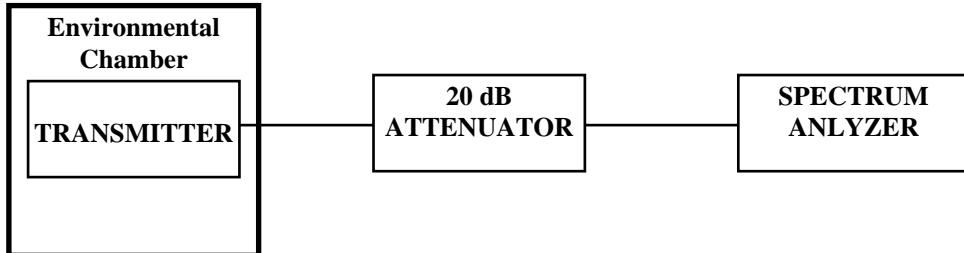
5.6.2. Method of Measurements

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

5.6.3. Test Equipment List

| Test Instruments | Manufacturer | Model No. | Serial No. | Frequency Range |
|------------------------------------|--------------------|---------------|------------|---------------------------------------|
| Spectrum Analyzer/ EMI Receiver | Rohde & Schawrz | FSEK20/B4/B21 | 834157/005 | 9 kHz – 40 GHz with external mixer |
| Attenuator(s) | Bird | .. | ... | DC – 22 GHz |
| Temperature & Humidity Chamber | Tenney | T5 | 9723B | -40° to +60° C range |

5.6.4. Test Arrangement



5.6.5. Test Data

| | |
|------------------------------------|-------------------------|
| Frequency Band: | 13.553-13.567 MHz |
| Center Frequency: | 13.56 MHz |
| Frequency Tolerance Limit: | $\pm 0.01\%$ or 1356 Hz |
| Max. Frequency Tolerance Measured: | 80 Hz |
| Input Voltage Rating: | 12 V DC Nominal |

| Ambient Temperature (°C) | Center Frequency & RF Power Output Variation | | |
|--------------------------|--|---|--|
| | Supply Voltage (Nominal) 12 Volts | Supply Voltage (85 % of Nominal) 9 Volts | Supply Voltage (115% of Nominal) 12 Volts |
| | Hz | Hz | Hz |
| -30 | -80 | N/A | N/A |
| -20 | -40 | N/A | N/A |
| -10 | -40 | N/A | N/A |
| 0 | -40 | N/A | N/A |
| +10 | 0 | N/A | N/A |
| +20 | 0 | 0 | 0 |
| +30 | -80 | N/A | N/A |
| +40 | -40 | N/A | N/A |
| +50 | 40 | N/A | N/A |
| +55 | 40 | N/A | N/A |

**5.7. TRANSMITTER SPURIOUS EMISSIONS (RADIATED @ 3 METERS), FCC
 CFR 47, PARA. 15.225, 15.209 & 15.205**

5.7.1. Limits

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110 – 14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Remarks:

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

| MHz | MHz | MHz | GHz |
|-----------------|-------------------|---------------|---------------|
| 0.090 - 0.110 | 162.0125 - 167.17 | 2310 - 2390 | 9.3 - 9.5 |
| 0.49 - 0.51 | 167.72 - 173.2 | 2483.5 - 2500 | 10.6 - 12.7 |
| 2.1735 - 2.1905 | 240 - 285 | 2655 - 2900 | 13.25 - 13.4 |
| 8.362 - 8.366 | 322 - 335.4 | 3260 - 3267 | 14.47 - 14.5 |
| 13.36 - 13.41 | 399.9 - 410 | 3332 - 3339 | 14.35 - 16.2 |
| 25.5 - 25.67 | 608 - 614 | 3345.8 - 3358 | 17.7 - 21.4 |
| 37.5 - 38.25 | 960 - 1240 | 3600 - 4400 | 22.01 - 23.12 |
| 73 - 75.4 | 1300 - 1427 | 4500 - 5250 | 23.6 - 24.0 |
| 108 - 121.94 | 1435 - 1626.5 | 5350 - 5460 | 31.2 - 31.8 |
| 123 - 138 | 1660 - 1710 | 7250 - 7750 | 36.43 - 36.5 |
| 149.9 - 150.05 | 1718.8 - 1722.2 | 8025 - 8500 | Above 38.6 |
| 156.7 - 156.9 | 2200 - 2300 | 9000 - 9200 | |

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

| FREQUENCY (MHz) | FIELD STRENGTH LIMITS (microvolts/m) | 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 |

5.7.2. Method of Measurements

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

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 highpass 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).

5.7.3. Test Equipment List

| Test Instruments | Manufacturer | Model No. | Serial No. | Frequency Range |
|---|-----------------|---------------|--------------------------|------------------------------------|
| Spectrum Analyzer/ EMI Receiver | Rohde & Schawrz | FSEK20/B4/B21 | 834157/005 | 9 kHz – 40 GHz with external mixer |
| 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 |

5.7.4. Photographs of Test Setup

Refer to photos in Annex 1 for test setup photos.

5.7.5. Test Data

5.7.5.1. Radiated emissions from 9 KHz to 30 MHz at 10 Meters Distance using an Active Loop Antenna

| FREQUENCY (MHz) | RF PEAK LEVEL (dBuV/m) | RF AVG LEVEL (dBuV/m) | ANTENNA PLANE (Degree) | LIMIT @ 10m 15.209 (dBuV/m) | LIMIT MARGIN (dB) | PASS/ FAIL | Distance (m) |
|---|------------------------|-----------------------|------------------------|-----------------------------|-------------------|------------|--------------|
| 13.559 | 34.94 | Peak | 0 | 93.5 | -58.6 | PASS | 10 |
| 13.559 | 28.20 | Peak | 90 | 93.5 | -65.3 | PASS | 10 |
| <ul style="list-style-type: none"> The emissions were scanned from 10 kHz to 30 MHz and all emissions within 40 dB below the limits were recorded. | | | | | | | |

5.7.5.2. Radiated emissions from 30 MHz to 1 GHz at 10 Meters Distance using Biconilog Antenna

| FREQUENCY (MHz) | RF PEAK LEVEL (dBuV/m) | EMI DETECTOR (Peak/QP) | ANTENNA PLANE (V/H) | LIMIT @ 10m 15.225/15.209 (dBuV/m) | LIMIT MARGIN (dB) | PASS/ FAIL | Distance (m) |
|---|------------------------|------------------------|---------------------|------------------------------------|-------------------|------------|--------------|
| 40.677 | 25.16 | Peak | V | 29.5 | -4.3 | PASS | 10 |
| 54.236 | 21.30 | Peak | V | 29.5 | -8.2 | PASS | 10 |
| 54.236 | 20.92 | Peak | H | 29.5 | -8.6 | PASS | 10 |
| 67.795 | 22.39 | Peak | V | 29.5 | -7.1 | PASS | 10 |
| 67.795 | 16.57 | Peak | H | 29.5 | -12.9 | PASS | 10 |
| <ul style="list-style-type: none"> The emissions were scanned from 30 MHz to 1000 GHz and all emissions within 20 dB below the limits were recorded. | | | | | | | |

EXHIBIT 6. MEASUREMENT UNCERTAINTY

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

6.1. 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 $\Gamma_1 = 0.03$ LISN VRC $\Gamma_R = 0.8(9 \text{ kHz}) 0.2 (30 \text{ MHz})$ Uncertainty limits $20\text{Log}(1+\Gamma_1\Gamma_R)$ | 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:

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

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

6.2. 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 $\Gamma_1 = 0.2$ Antenna VRC $\Gamma_R = 0.67(Bi)$ 0.3 (Lp) Uncertainty limits $20\log(1+\Gamma_1\Gamma_R)$ | 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:

$$U = 2u_c(y) = 2x(+2.19) = +4.38 \text{ dB} \quad \text{And} \quad U = 2u_c(y) = 2x(-2.21) = -4.42 \text{ dB}$$