

Global EMC Inc. Labs EMC & RF Test Report

As per

RSS 210 Issue 8:2010

&

FCC Part 15 Subpart C:2013

Unlicensed Intentional Radiators

on the

VTGP Transceiver Card



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Testing produced for




See Appendix A for full customer & EUT details.



| | | |
|-------------|--|--|
| Client | Viconics Technologies Inc | |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

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| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Report Scope

This report addresses the EMC verification testing and test results of Viconics Technologies Inc's VTGP Transceiver Card, herein referred to as EUT (Equipment Under Test) performed at Global EMC Labs.

The EUT was tested for compliance against the following standards:


RSS 210 Issue 8:2010
FCC Part 15 Subpart C 15:2013

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

The results contained in this report relate only to the item(s) tested.

This report does not imply product endorsement by A2LA or any other accreditation agency, any government, or Global EMC Inc.


Opinions/interpretations expressed in this report, if any, are outside the scope of Global EMC Inc accreditation. Any opinions expressed do not necessarily reflect the opinions of Global EMC Inc, unless otherwise stated.

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| Client | Viconics Technologies Inc |  |
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Summary

The results contained in this report relate only to the item(s) tested.

| | |
|--|--------------------------------|
| EUT FCC Certification #, FCC ID: | V95-VTGP |
| EUT Industry Canada Certification #, IC: | 7591A-VTGP |
| EUT Passed all tests performed. | Yes (see test results summary) |
| Tests conducted by | Min Xie |


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Test Results Summary

| Standard/Method | Description | Class/Limit | Result |
|-------------------------------------|--|-----------------------|--|
| FCC 15.203 | Antenna Requirement | Unique | Pass See Justification |
| FCC 15.205 RSS 210 (Table 1) | Restricted Bands for intentional operation | QuasiPeak Average | Pass |
| FCC 15.207 | Power line conducted emissions | QuasiPeak Average | Pass |
| FCC 15.209 RSS-210 (Table 2) | Spurious Radiated emissions | QuasiPeak Average | Pass |
| FCC 15.247(a)2 RSS-210 A8.2(a) | 6 dB Bandwidth | > 500 kHz | Pass |
| FCC 15.247(b)2 RSS-210 A8.4(4) | Max output power | < 1 Watt | Pass |
| FCC 15.247(b)(4) RSS-210 A8.4(5) | Antenna Gain | < 6 dBi | Pass See Justifications |
| FCC 15.247(d) RSS-210 A8.5 | Antenna conducted spurious | < 20 dBc | Pass |
| FCC 15.247(e) RSS-210 A8.2(b) | Spectral Density | < 8 dBm (3 kHz BW) | Pass |
| FCC 15.247(i) IC Safety code 6 | Maximum Permissible Exposure | > 20 cm separation. | Pass See justification and calculations |
| Overall Result | | | PASS |

All tests were performed by Min Xie.

If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties. A 'PASS' / 'FAIL' grade within measurement uncertainty is marked with a '*'.

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Justifications, Descriptions, or Deviations

The following justifications for tests not performed or deviations from the above listed specifications apply:

525-0023_JOHANSON-TECH_2450AT42B100.pdf

For the Antenna requirement specified in FCC 15.203 (RSS 210 section 5.5), the unit uses a permanently connected ceramic chip antenna (0 dBi gain - Johanson 2450AT42B100) with less than 6 dBi gain.

For the Restricted Bands of operation, the EUT is designed to only operate between 2400 – 2483.5 MHz.

For maximum permissible exposure, this device operates at less than 1 Watt at 2400 – 2483.5 MHz and is designed to operate greater than 20 cm from any personnel during normal operation. No testing is required, however worst case calculated exposure compliance follows later in this report.

The EUT is not a hybrid system and FCC 15.247 (f) does not apply to it. However the 15.247 (d) requirement of power density were met and are detailed later in this test report.

For the scope of this test report the EUT was mounted in three orthogonal axes to maximize emissions. Worst case results are presented.

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Applicable Standards, Specifications and Methods

- ANSI C63.4:2009 - Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
- ANSI C63.10:2009 - American national standard for testing unlicensed wireless devices
- CFR 47 FCC 15 - Code of Federal Regulations – Radio Frequency Devices
- CISPR 22:2008 - Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
- FCC KDB 558074 - FCC KDB 558074 Digital Transmission Systems, measurements and procedures
- ICES-003:2012 - Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard
- ISO 17025:2005 - General Requirements for the competence of testing and calibration laboratories
- RSS-GEN General Requirements and Information for the Certification of Radio Apparatus
- RSS 210:2010 - Issue 8: Spectrum Management and Telecommunications Policy. Radio Standards Specification Low Power License-Exempt Radiocommunication Devices

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Sample calculation(s)

Margin = limit – (received signal + antenna factor + cable loss – pre-amp gain)


Margin = 50.5dBuV/m – (50dBuV + 10dB + 2.5dB – 20dB)

Margin = 8.5 dB

Document Revision Status

Revision 1 - October 16, 2013

Initial release

| | | |
|-------------|--|---|
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Definitions and Acronyms

The following definitions and acronyms are applicable in this report.
See also ANSI C63.14.

AE – Auxillary Equipment.

BW – Bandwidth. Unless otherwise stated, this refers to the 6 dB bandwidth.

EMC – Electro-Magnetic Compatibility

EMI – Electro-Magnetic Immunity


EUT – Equipment Under Test

ITE – Information Technology Equipment with a primary function(s) of entry, storage, display, retrieval, transmission, processing, switching, or control, of data.

LISN – Line impedance stabilization network

NCR – No Calibration Required

RF – Radio Frequency


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Testing Facility

Testing for EMC on the EUT was carried out at Global EMC labs in Toronto, Ontario, Canada. The testing lab consists of a 3m semi-anechoic chamber calibrated to be able to allow measurements on an EUT with a maximum width or length of up to 2m and height up to 3m. The chamber is equipped with a turn table that is capable of testing devices up to 3300lb in weight. This facility is capable of testing products that are rated for 120 Vac and 240Vac single phase, or 208 Vac 3 phase input. DC capability is also available. The chamber is equipped with an antenna mast that controls polarization and height from the control room adjoining the shielded chamber. Radiated emissions measurements are performed using a Bilog, and Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN.

Calibrations and Accreditations


The 3m semi-anechoic chamber is registered with Federal Communications Commission (FCC, 377448), Industry Canada (IC, 6844A-3) and VCCI (R-4023, G-506, T-1246, and C-4498). This semi-anechoic chamber complies with the requirements of EN55016-2-3:2006, section 7.5 and the site attenuation requirements of EN55016-1-4. This chamber was additionally calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz”. The chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. The NSA data is kept on file at Global EMC. For radiated susceptibility testing, a 16 point field calibration has been performed on the chamber. The field uniformity data is kept on file at Global EMC. Global EMC Inc is accredited to ISO 17025 by A2LA with Testing Certificate #2555.01. The laboratories current scope of accreditation listing can be found as listed on the A2LA website. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test.

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Testing Environmental Conditions and Dates

Following were the environmental conditions in the facility during time of testing –

| Date | Test | Init. | Temperature (°C) | Humidity (%) | Pressure (kPa) |
|-------------------|-------------|--------------|-------------------------|---------------------|-----------------------|
| 8/29 to 9/5, 2013 | All | MX | 23-26°C | 35 - 41% | 98 -103kPa |

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Detailed Test Results Section

| | | |
|-------------|--|---|
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6dB Bandwidth of Digitally Modulated Systems

Purpose

The purpose of this test is to ensure that the bandwidth occupied exceeds a stated minimum. This helps ensure the utilization of the frequency allocation is sufficiently wide. This also helps prevent corruption of data by ensuring adequate data separation to distinguish the reception of the intended information.


Limits

The Limit is as specified in FCC Part 15 and RSS 210.

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. This should be measured with a 100 kHz RBW and a 300 kHz VBW.

Results

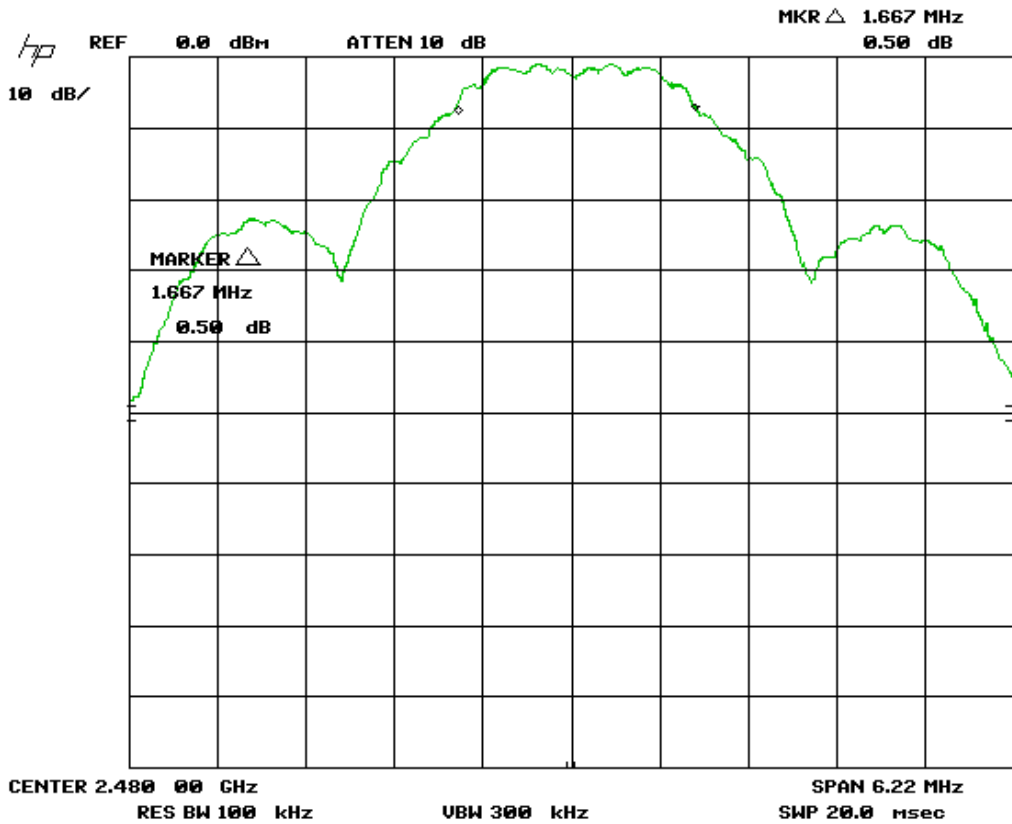
The EUT passed. The minimum 6 dB BW measured was 1.63 MHz and the 20 dB BW is 2.92 MHz.

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Graph(s)

The graphs showed below shows the OBW during the operation of the device. This is measured by a max hold on the spectrum analyzer and the highest resolution bandwidth that is sufficiently low to exhibit the 6 dB bandwidth of a channel during operation of the EUT. This measurement is a peak measurement. Max hold is performed for a duration of not less than 1 minute.

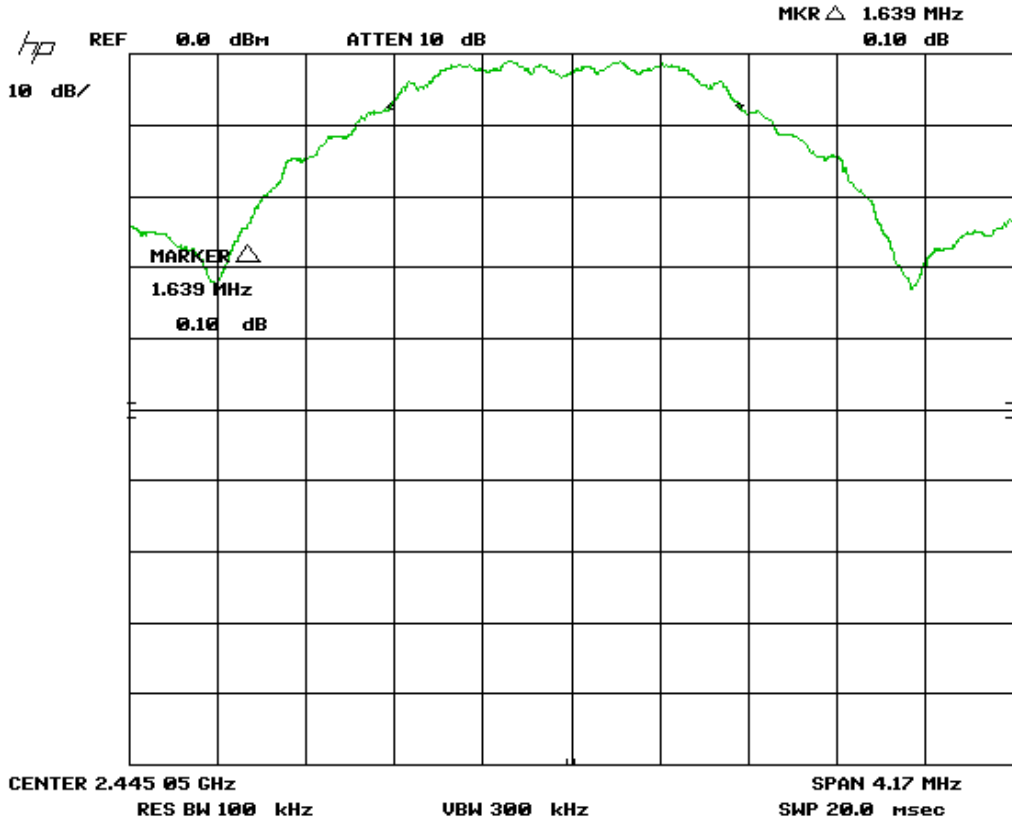
Hi Channel




6 dB BW = 1.67 MHz
 20 dB BW = 2.89 MHz

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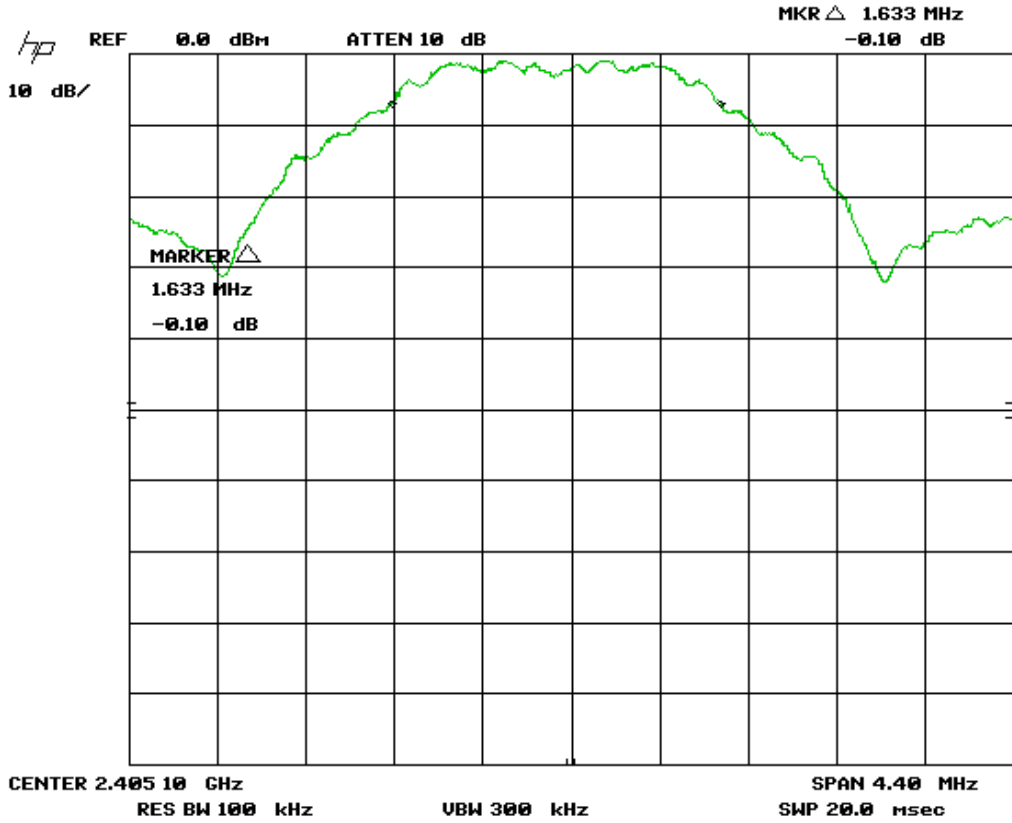
Mid Channel



6 dB BW = 1.64 MHz
 20 dB BW = 2.90 MHz


| | | |
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Low Channel



6 dB BW = 1.63 MHz
 20 dB BW = 2.92 MHz


Note: See 'Appendix B – EUT & Test Setup Photographs' for photos showing the test set-up.

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| Client | Viconics Technologies Inc |  |
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| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Test Equipment List

| Equipment | Model No. | Manufacturer | Last calibration date | Next calibration due date | Asset # |
|--------------------|------------------------|--------------|-----------------------|---------------------------|----------|
| Quasi Peak Adapter | 85650A | HP | 12/21/ 2011 | 12/21/2013 | GEMC 7 |
| Spectrum Analyzer | 8566B | HP | 12/21/ 2011 | 12/21/2013 | GEMC 141 |
| Attenuator 10 dB | 8493B | Agilent | NCR | NCR | GEMC 133 |
| RF Cable 1m | LMR-400-1M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 29 |

This report module is based on GEMC template "FCC -- Power Line Conducted Emissions Class B_Rev1"

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Maximum Peak Envelope Conducted Power - DM

Purpose

The purpose of this test is to ensure that the maximum power conducted to the radiating element does not exceed the limits specified. This ensures that if the end-user replaces the antenna, that the maximum power does not exceed an amount which may create an excessive power level.

Limits


The limits are defined in FCC Part 15.247(b) and RSS 210.

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands, the peak limit is 1 watt.

Results

The EUT passed. The power of the EUT was set to (-2 dBm for channels 0xB to 0x19 and to -20 dBm for channel 0x1A) for the internal antenna and for the external antenna it was set to (-11 dBm for channels 0xB to 0x19 and -26 dBm for channel 0x1A). Three Channels 0xB, 0x13, and 0x19 were measured for each channel range. The following table show the peak powers measured

| Internal Antenna | | | |
|------------------|-----------------|-------------|------------|
| Channel | Frequency (MHz) | Power (dBm) | Power (mW) |
| Lo Channel (11) | 2405 | 12.78 | 18.96 |
| Mid Channel (19) | 2445 | 12.80 | 19.05 |
| Hi Channel (26) | 2480 | 12.80 | 19.05 |

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Table(s)


The photos shown below shows the peak power output of the device during the antenna conducted measurement during transmit operation of the EUT.

Tests were conducted using a power meter.



Figure 1: Maximum power of Lo, Mid, and High channels

Note: See ‘Appendix B – EUT & Test Setup Photographs’ for photos showing the test set-up.

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| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Test Equipment List

| Equipment | Model No. | Manufacturer | Last calibration date | Next calibration due date | Asset # |
|-------------|------------------------|--------------|-----------------------|---------------------------|---------|
| Power Head | PH 2000 | AR | 2013-02-07 | 2015-02-07 | GEMC 15 |
| Power meter | PM 2002 | AR | 2013-02-07 | 2015-02-07 | GEMC 16 |
| RF Cable 1m | LMR-400-1M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 29 |

This report module is based on GEMC template "FCC – Power Line Conducted Emissions Class B_Rev1"

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Antenna Spurious Conducted Emissions (-20 dBc Requirement)

Purpose


The purpose of this test is to ensure that the maximum power conducted to the radiating element at frequencies outside of the authorized spectrum does not exceed the limits specified. This ensures that the only the intended signal is delivered to the radiating element.

Limits

The limits are defined in 15.247(d). In any 100 kHz band, the peak spurious harmonics emissions must be at least 20 dB below the fundamental. Spurious Conducted emissions are to be evaluated up to the 10th harmonic. This -20 dBc requirement also applies at the 'band edge' or 2.4 GHz and 2.4835 GHz.

Results

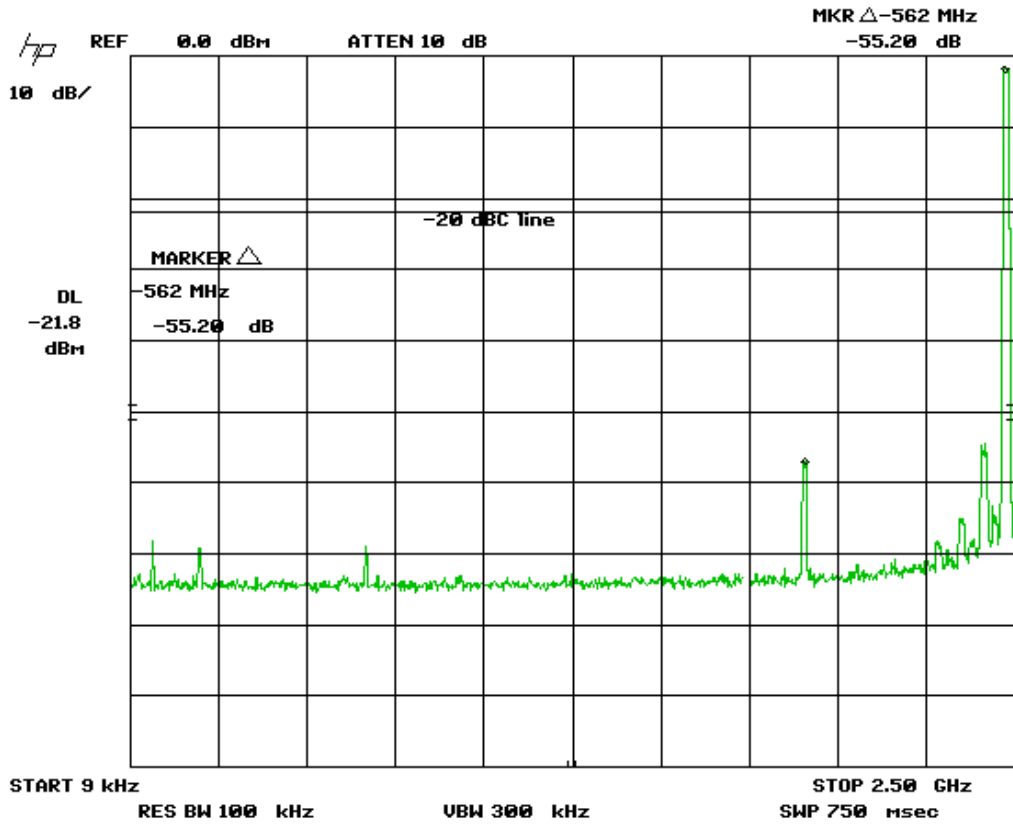
The EUT passed the limits. Low, middle and high band was measured. The worst case is presented as a graph for the spectrum. The -20 dBc requirement is shown for the lower band edge at 2.4 GHz in the low band. The -20 dBc requirement is also shown for the higher band edge at 2.4835 GHz in the high band.


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Graph(s)

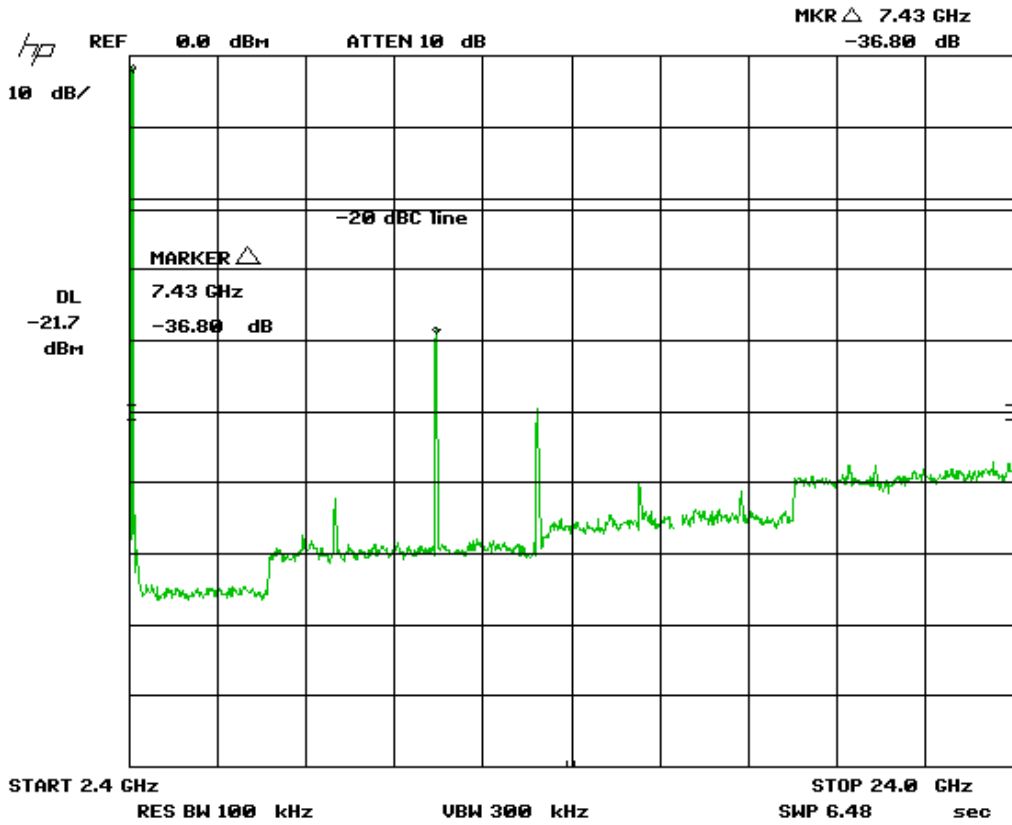
The graphs shown below shows the peak power output of the device during the antenna conducted measurement during transmit operation of the EUT.


Hi Channel 9 kHz – 2.5 GHz



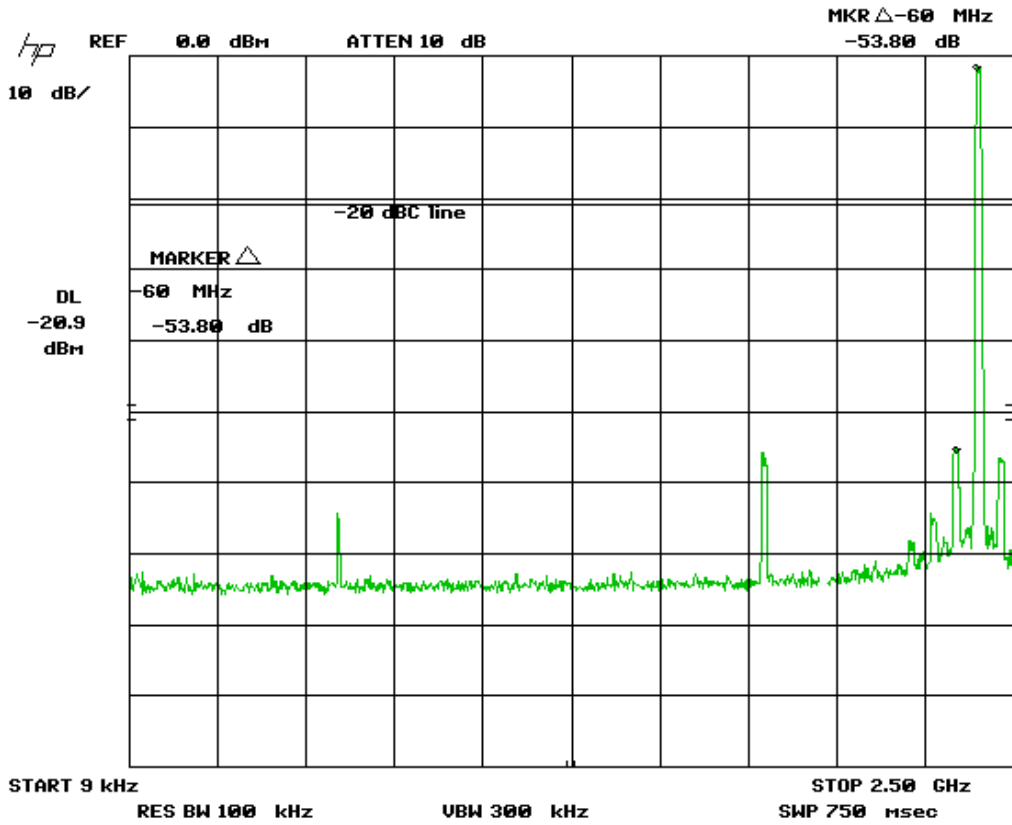
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|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Hi Channel 2.4 GHz – 24 GHz



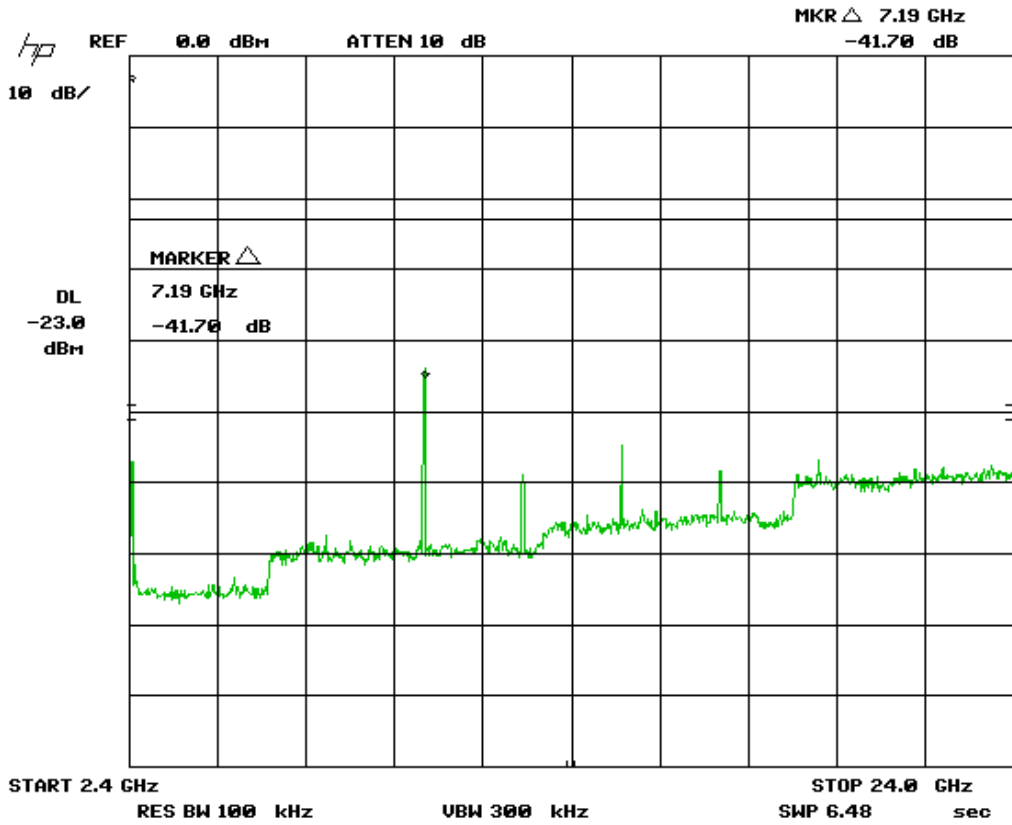
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|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Low Channel 9 kHz – 2.5 GHz



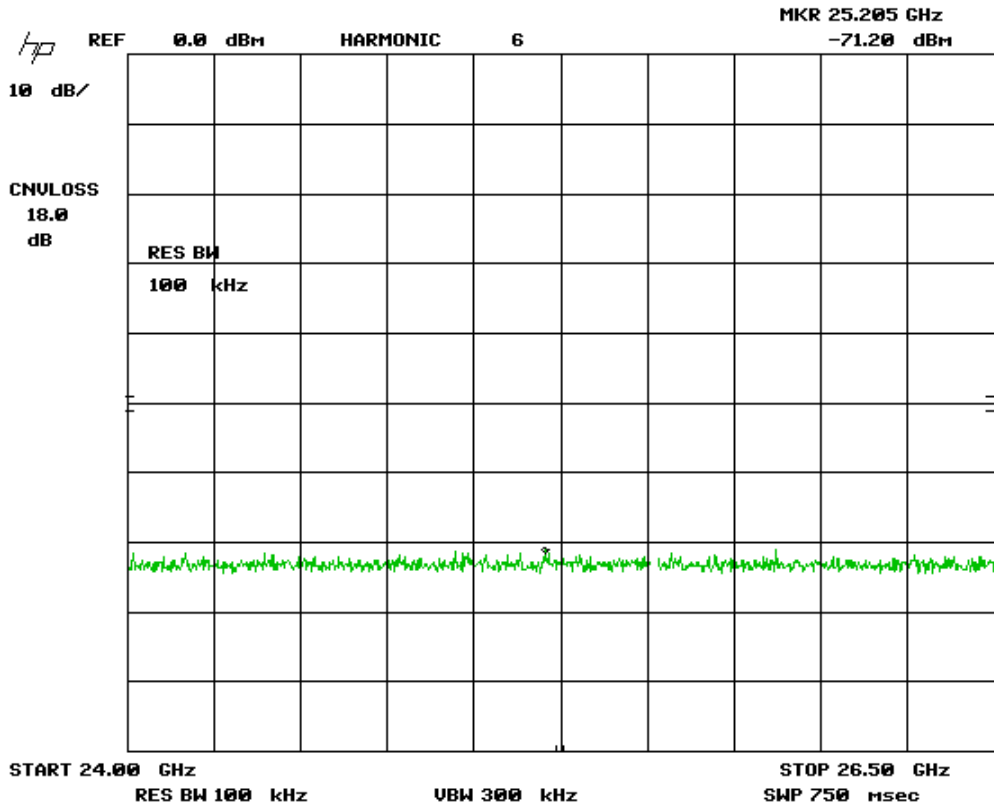
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|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Low Channel 2.4 GHz – 24 GHz



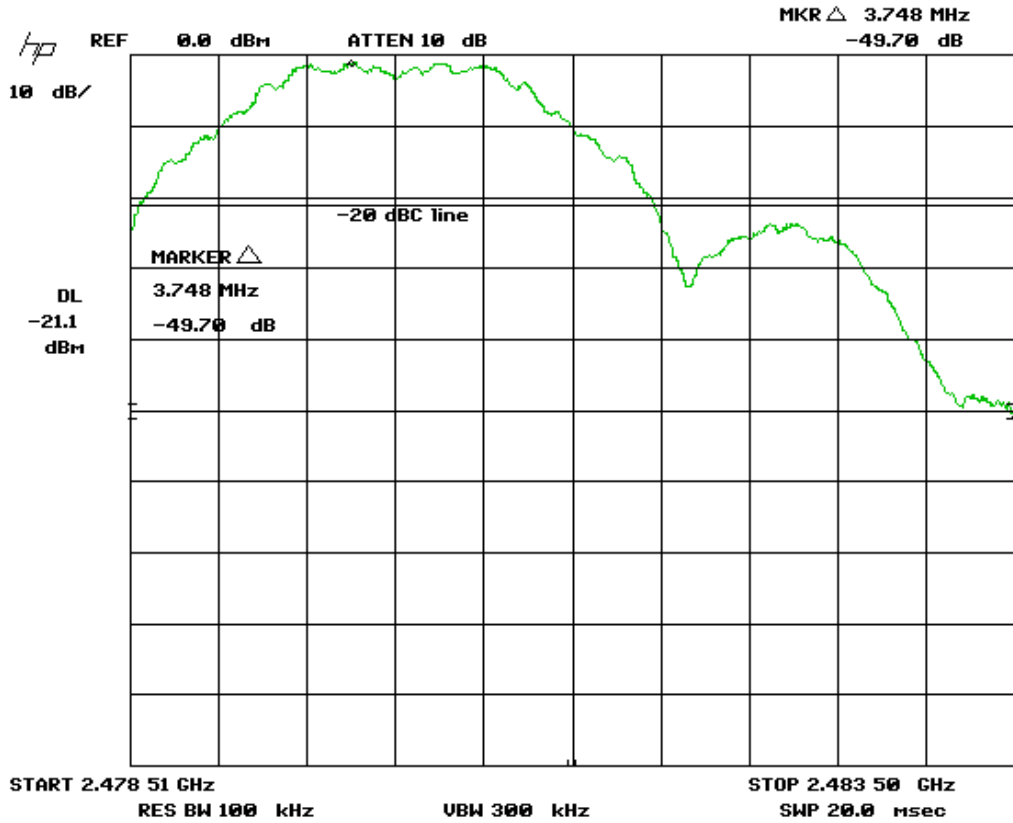
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| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Low Channel 24 GHz – 26 GHz



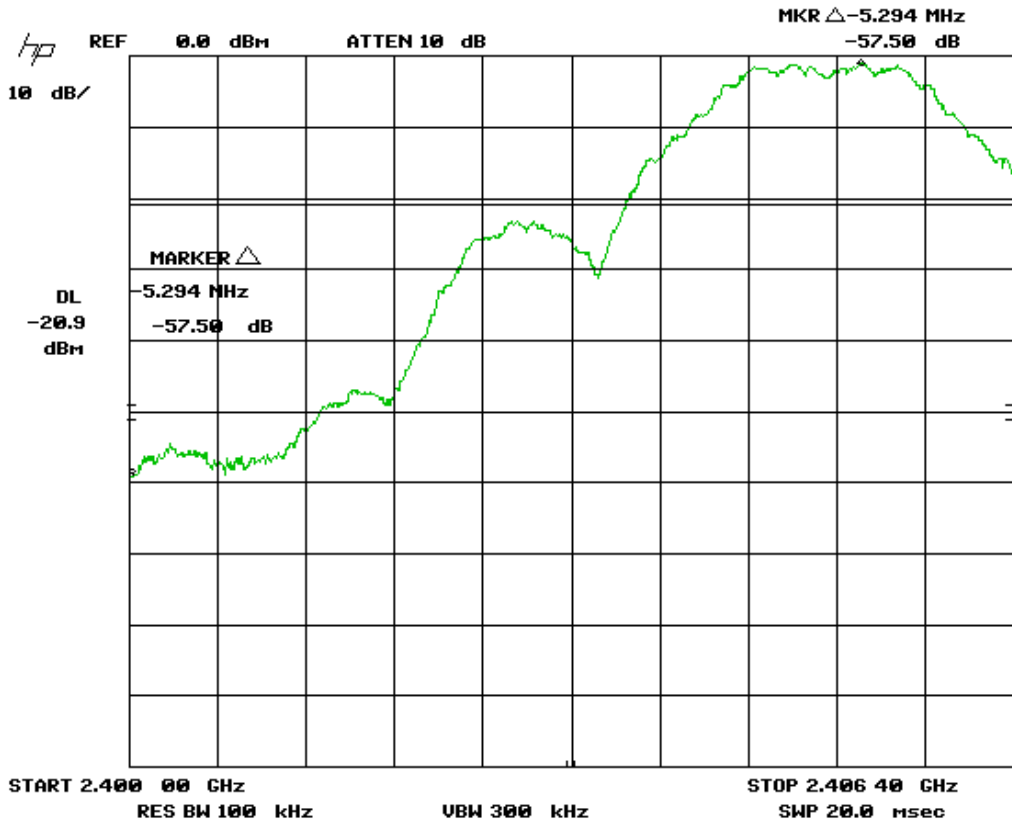
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Hi Channel – 2483.5 Band Edge




| | | |
|-------------|--|---|
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Low Channel – 2400 MHz



Note: See 'Appendix B – EUT & Test Setup Photographs' for photos showing the test set-up.

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| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Test Equipment List

| Equipment | Model No. | Manufacturer | Last calibration date | Next calibration due date | Asset # |
|--------------------|------------------------|--------------|-----------------------|---------------------------|----------|
| Attenuator 10 dB | 8493B | Agilent | NCR | NCR | GEMC 133 |
| Spectrum Analyzer | 8566B | HP | 12/21/ 2011 | 12/21/2013 | GEMC 141 |
| Quasi Peak Adapter | 85650A | HP | 12/21/ 2011 | 12/21/2013 | GEMC 7 |
| RF Cable 1m | LMR-400-1M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 29 |

This report module is based on GEMC template "FCC -- Power Line Conducted Emissions Class B_Rev1"

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| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Transmitter Spurious Radiated Emissions

Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

Limit(s) and Method

The method is as defined in ANSI C63.4:2003.

The limits are as defined in FCC Part 15, Section 15.209:

The limits, as defined in 15.247(d) for unintentional radiated emissions apply for those emissions that fall in the restricted bands, as defined in Section 15.205(a). These emissions must comply with the radiated emission limits specified in Section 15.209(a).


All unintentional emissions must also meet the ‘Spurious Conducted Emissions’ requirements of -20 dBc or greater. See also ‘Spurious Conducted Emissions’ for further details.

0.009 MHz – 0.490 MHz, 2400/F(kHz) uV/m at 300 m¹
0.490 MHz – 1.705 MHz, 24000/F(kHz) uV/m at 30 m¹
1.705 MHz – 30 MHz, 30 uV/m at 30 m¹
30 MHz – 88 MHz, 100 uV/m (40.0 dBuV/m¹) at 3 m
88 MHz – 216 MHz, 150 uV/m (43.5 dBuV/m¹) at 3 m
216 MHz – 960 MHz, 200 uV/m (46.0 dBuV/m¹) at 3 m
Above 960 MHz, 500 uV/m (54.0 dBuV/m¹) at 3 m
Above 1000 MHz, 500 uV/m (54 dBuV/m²) at 3m
Above 1000 MHz, 500 uV/m (74 dBuV/m³) at 3m

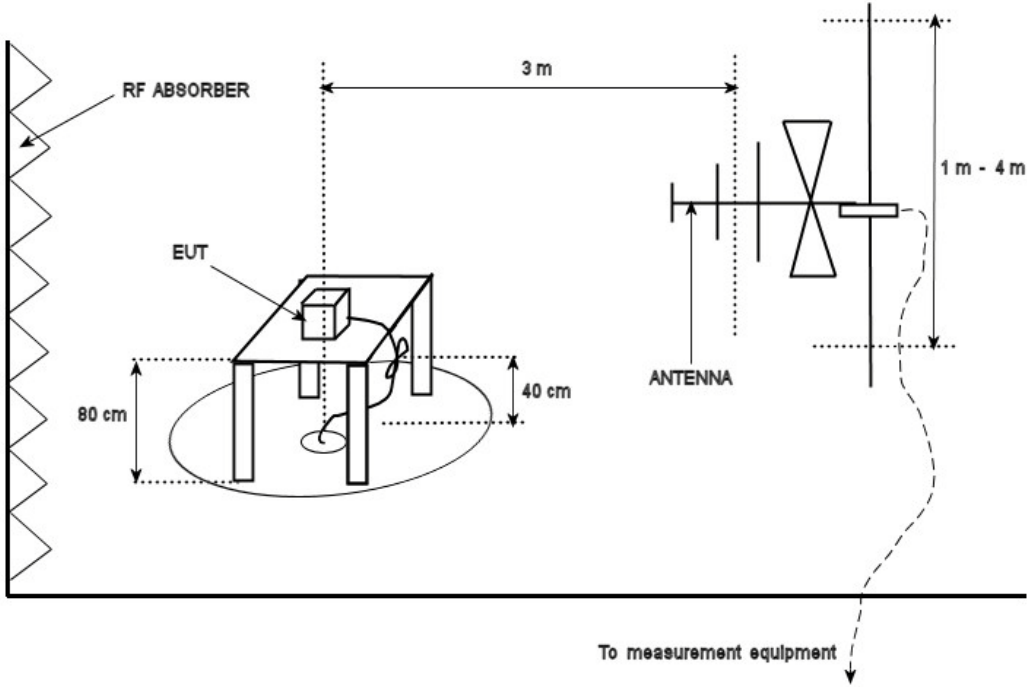
¹Limit is with Quasi Peak detector with bandwidths as defined in CISPR-16-1-1

²Limit is with 1 MHz measurement bandwidth and using an Average detector

³Limit is with 1 MHz measurement bandwidth and using a Peak detector

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Typical Radiated Emissions Setup



Measurement Uncertainty


The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is +/-4.4 dB with a 'k=2' coverage factor and a 95% confidence level.

Preliminary Graphs

Note the graphs shown below are for graphical illustration only. For final measurements with the appropriate detector, please refer to the final measurement table where applicable. The graph shown below is a maximized peak measurement graph, measured with a resolution bandwidth greater than the final required detector and over a full 0-360 rotation. This peaking process is done as a worst case measurement. This process enables the detection of frequencies of concern for final measurement, and provides considerable time savings.

In accordance with FCC Part 15, Subpart A, Section 15.33, the device was scanned to the 10th harmonic (a minimum of a 24.835 GHz).

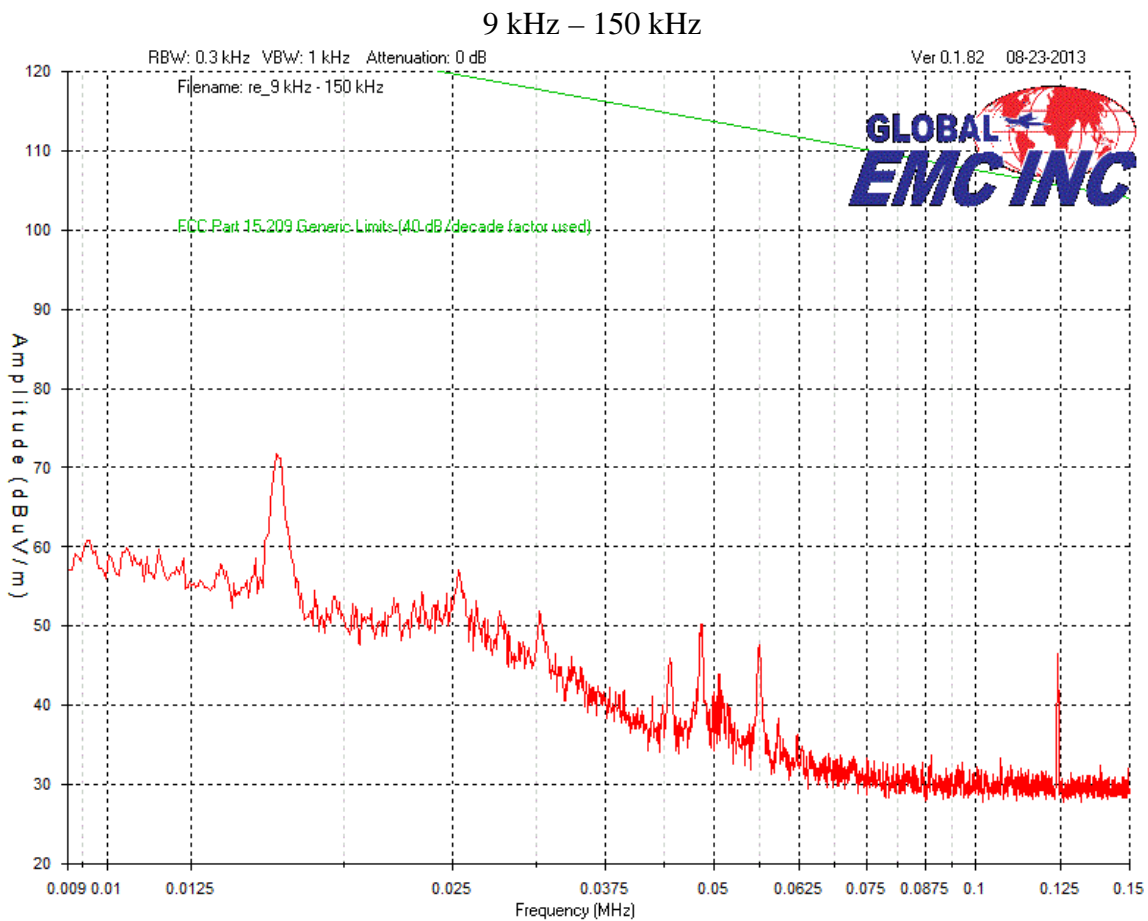
Devices scanned may be scanned at alternate test distances, and in accordance with FCC Part 15, Subpart A, Section 15.31, an extrapolation factor of 20 dB/decade was used above


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30 MHz and 40 dB/decade below 30 MHz. For example for 1 meter measurements, an extrapolation factor 9.5 dB from 20 Log (1m / 3m) is applied.

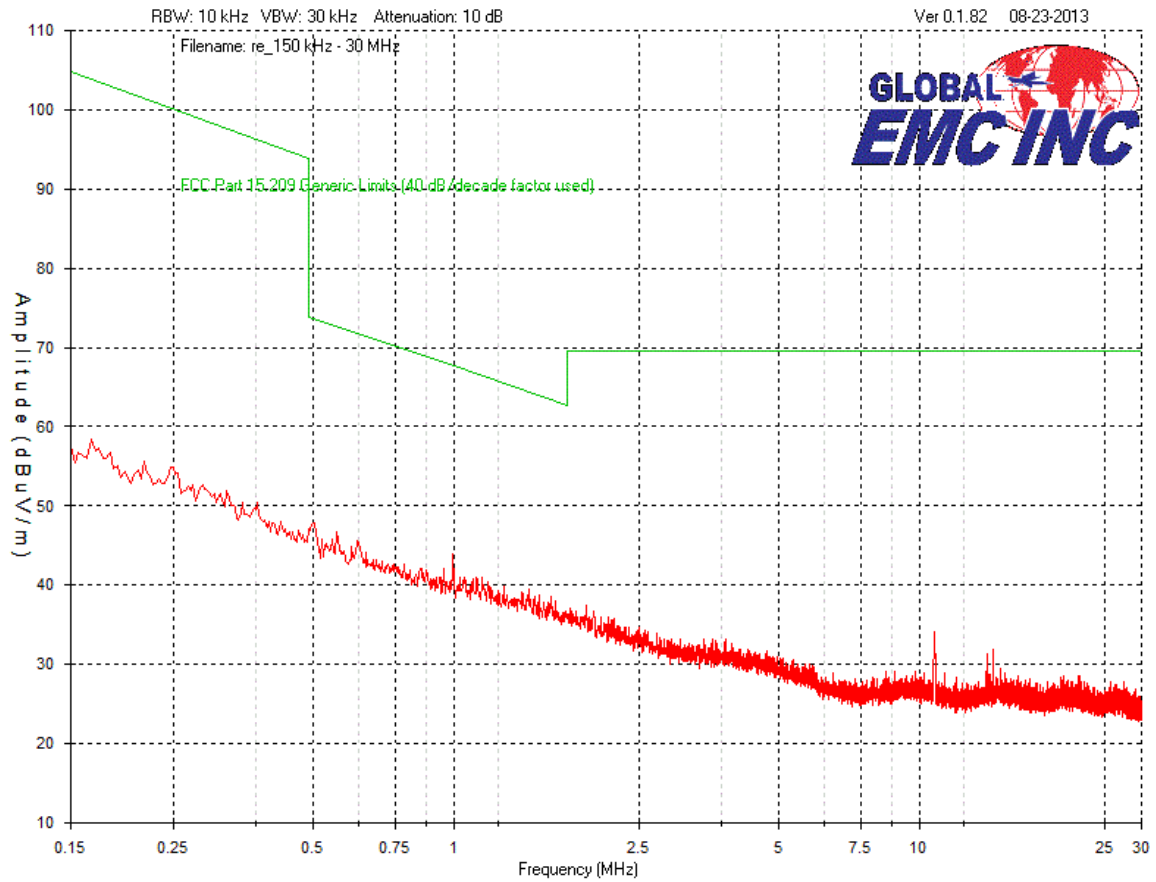
Low, middle and high channels, each in three orthogonal axes were checked; however the worst case graphs are presented.


Band edge measure graphs were shown for illustrations purpose. See final measurement section for all measurements.



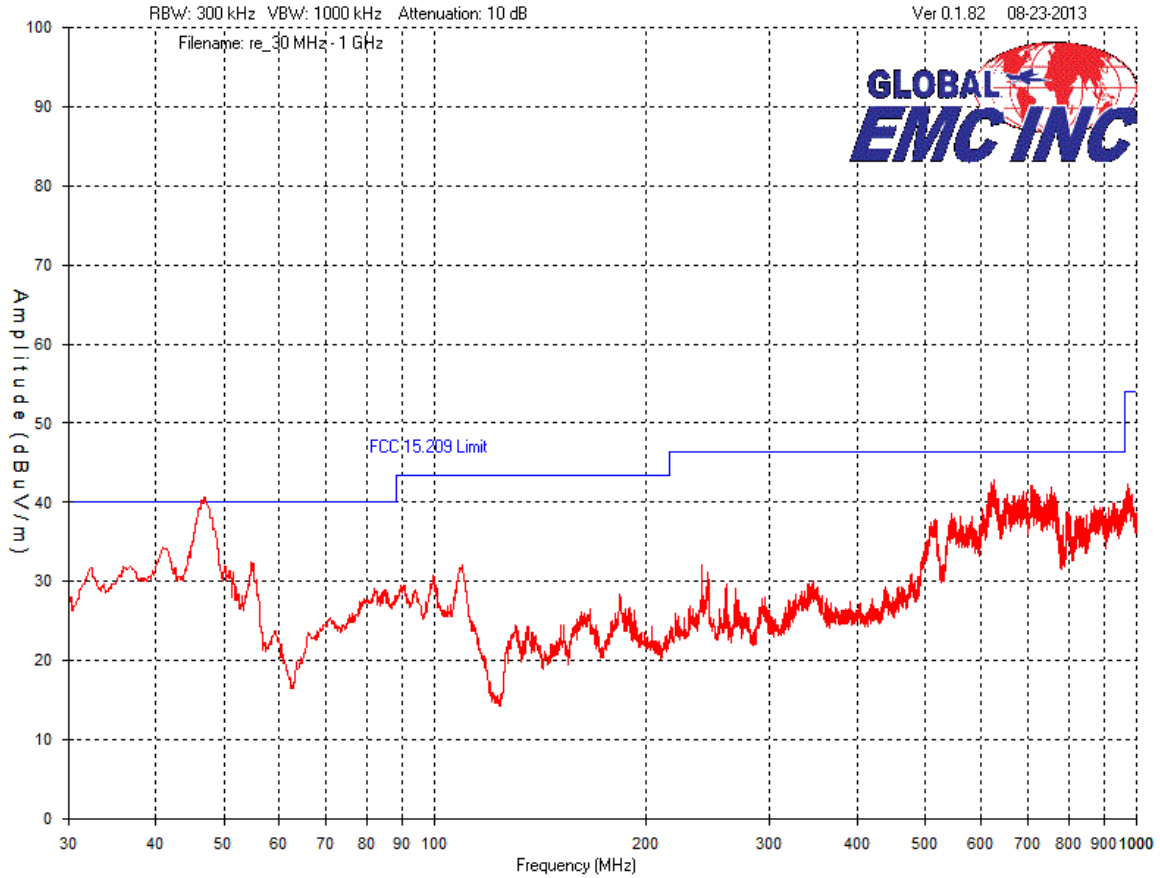
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


150 kHz – 30 MHz



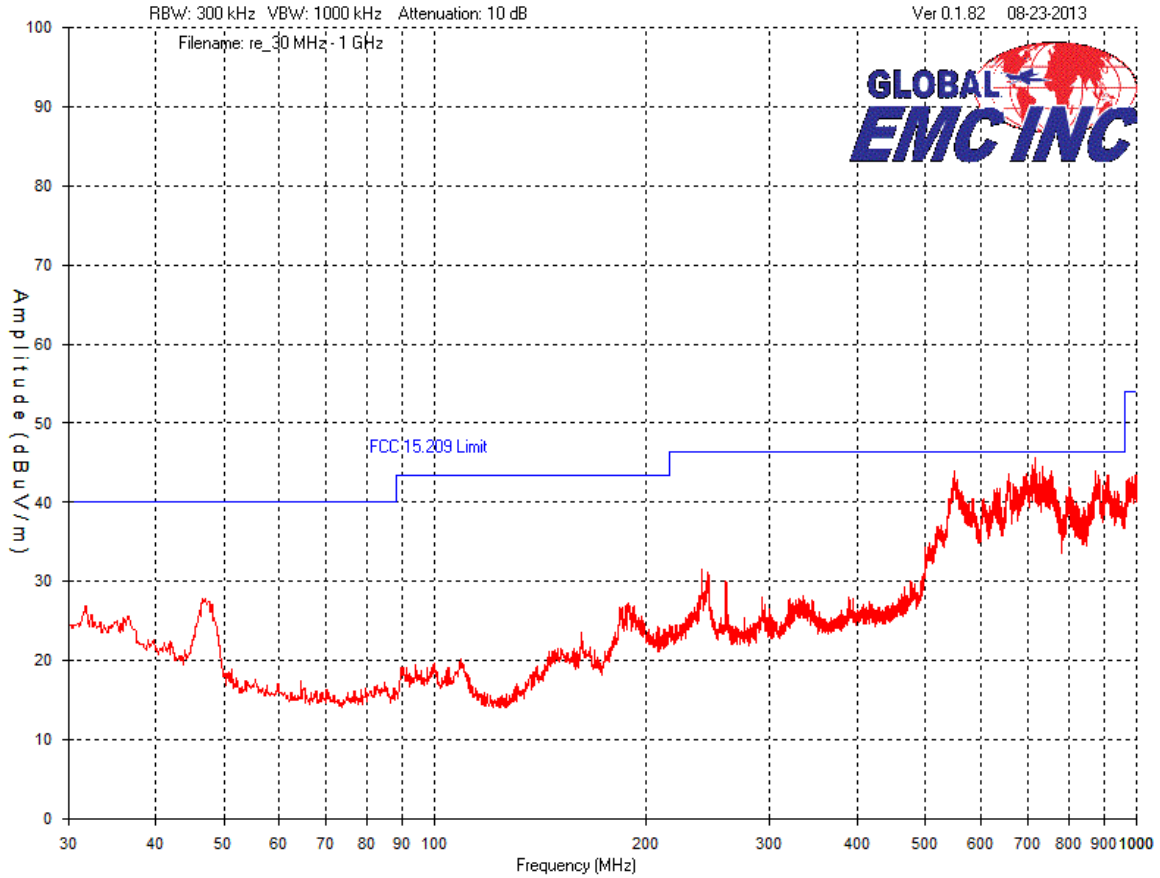
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel - 30 MHz – 1 GHz
Vertical – Peak Emission Graph



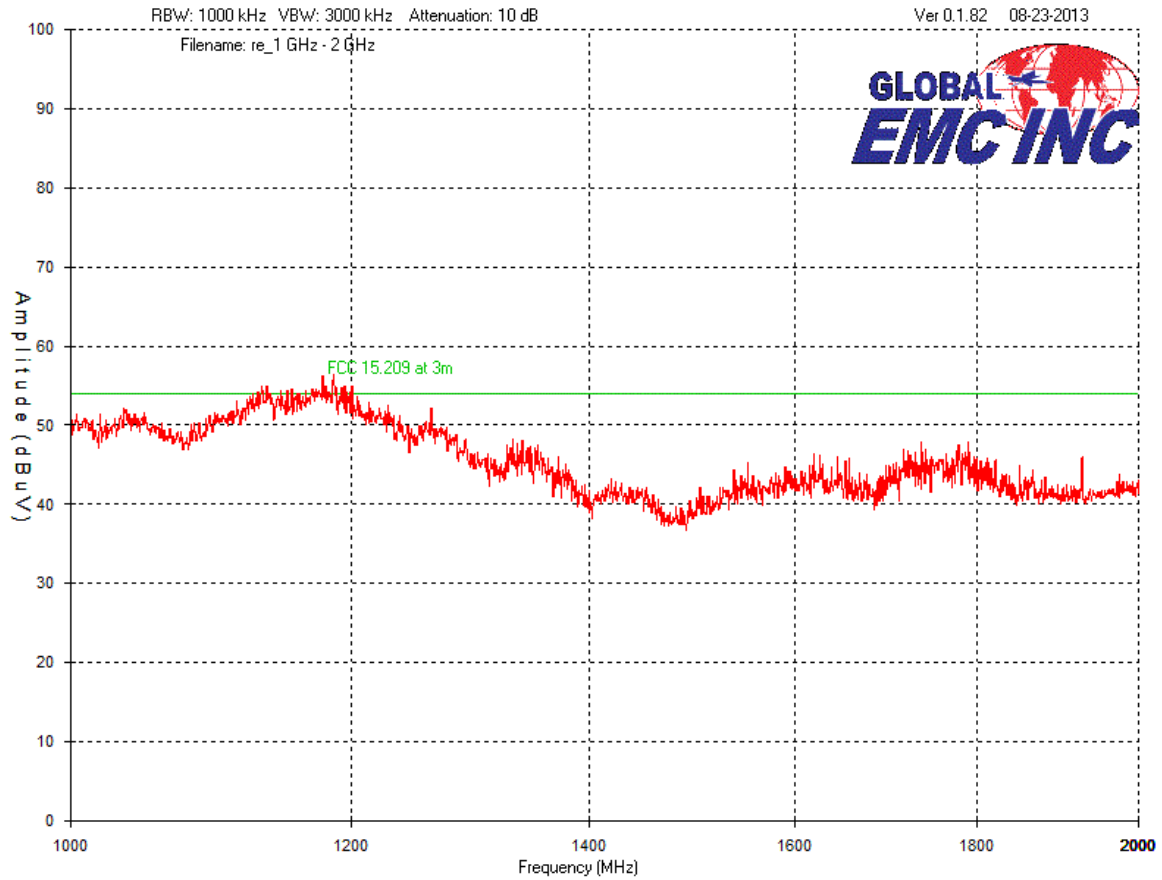
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 30 MHz – 1 GHz
Horizontal - Peak Emission Graph



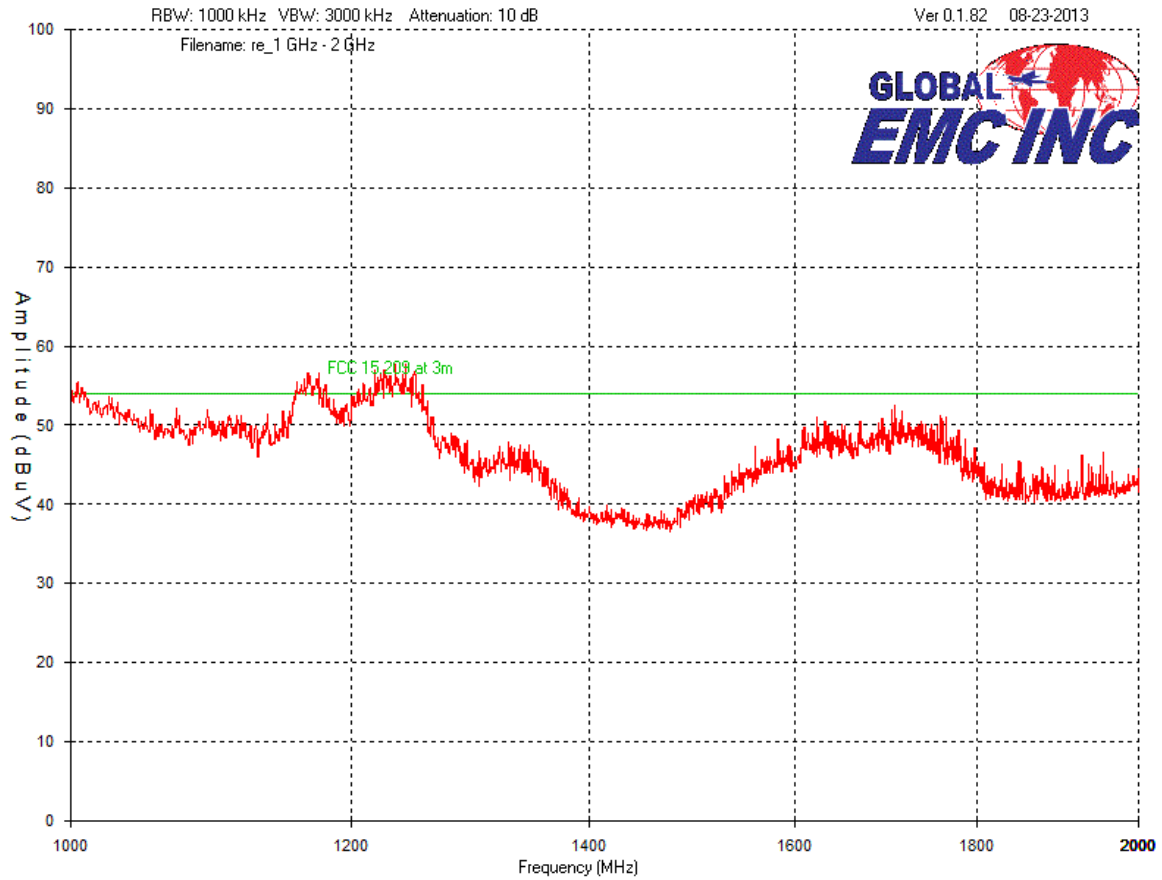
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 1 GHz – 2 GHz
Vertical - Peak Emission Graph



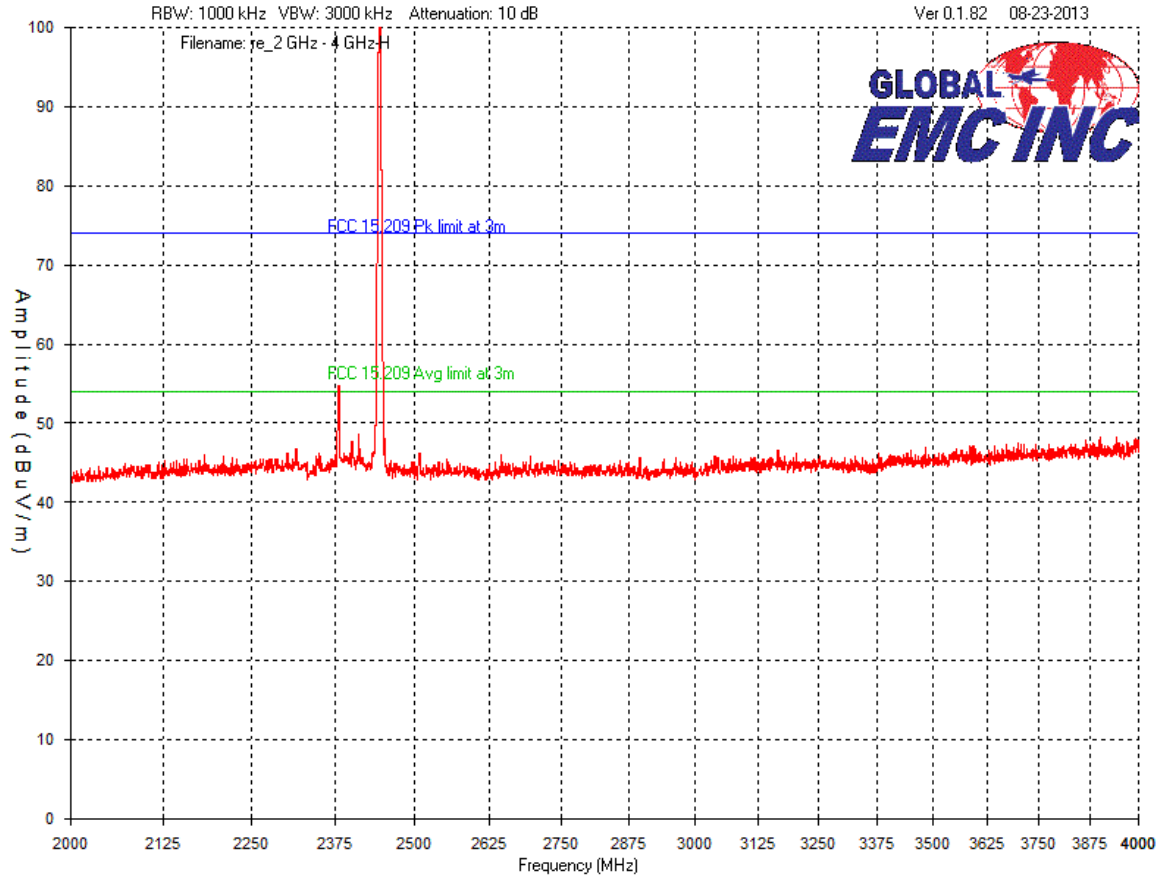
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 1 GHz – 2 GHz
Horizontal - Peak Emission Graph



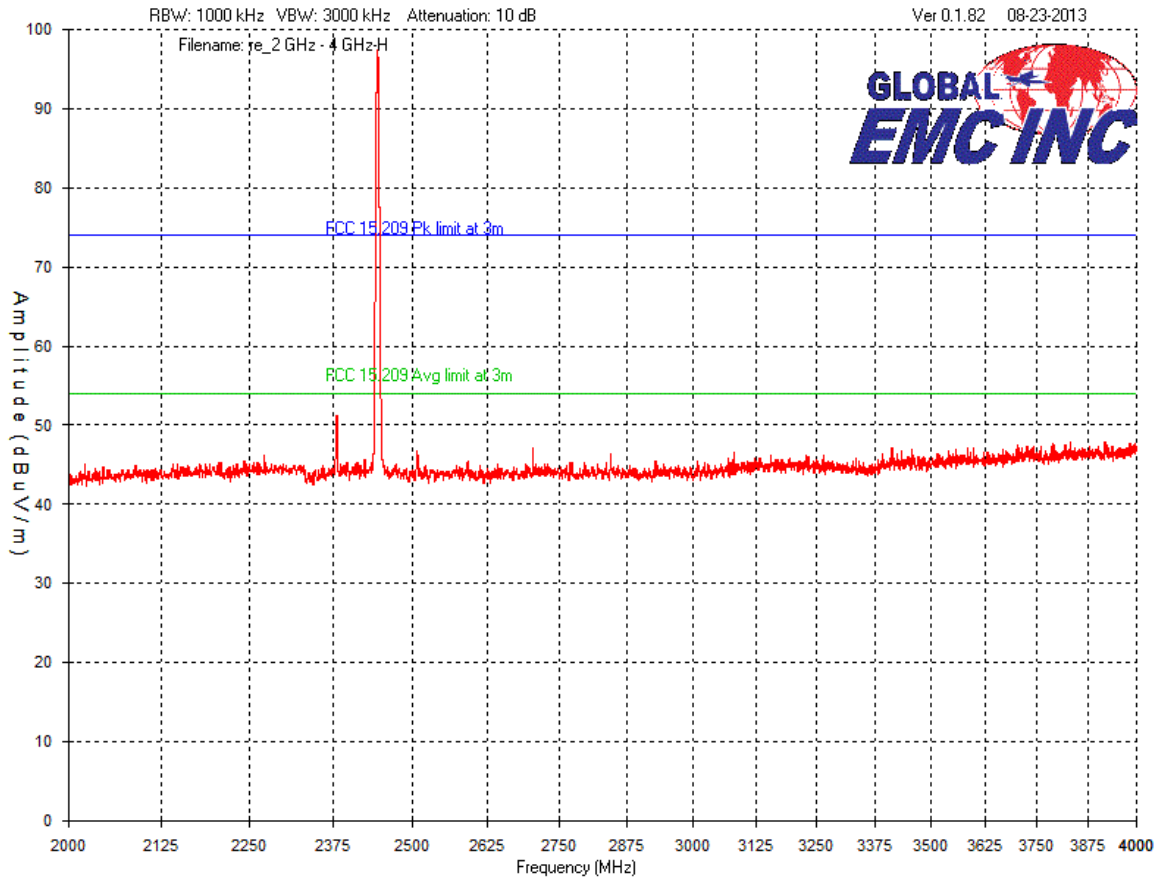
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 2 GHz – 4 GHz
Horizontal - Peak Emission Graph



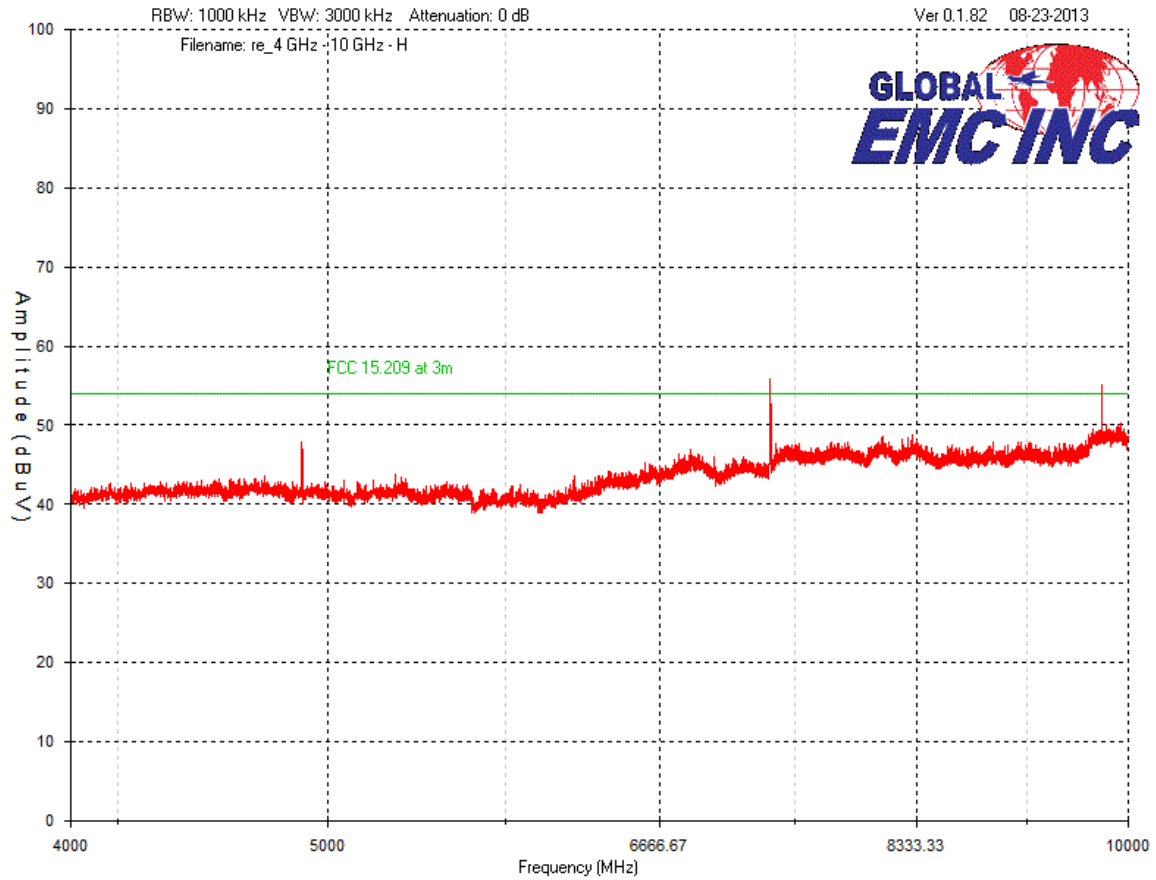
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 2 GHz – 4 GHz
Vertical - Peak Emission Graph



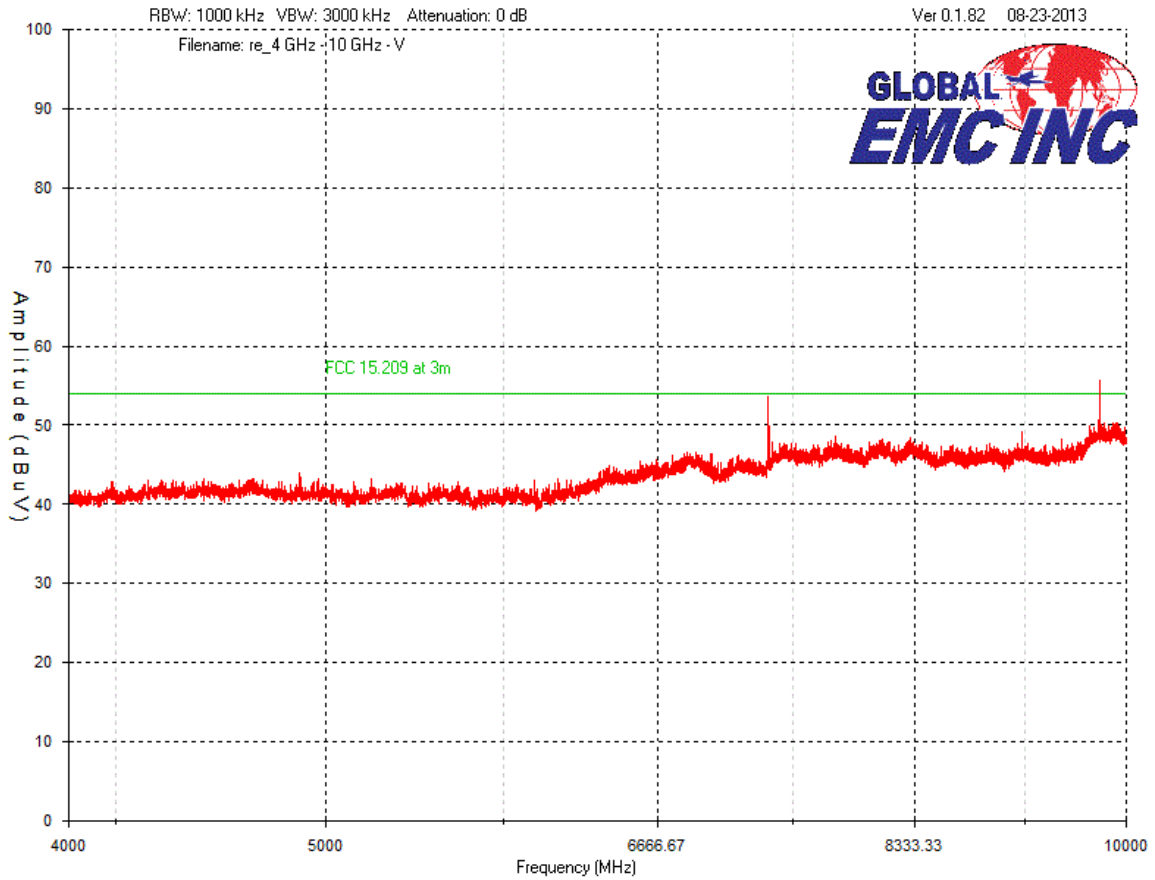
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 4 GHz – 10 GHz
Horizontal - Peak Emission Graph



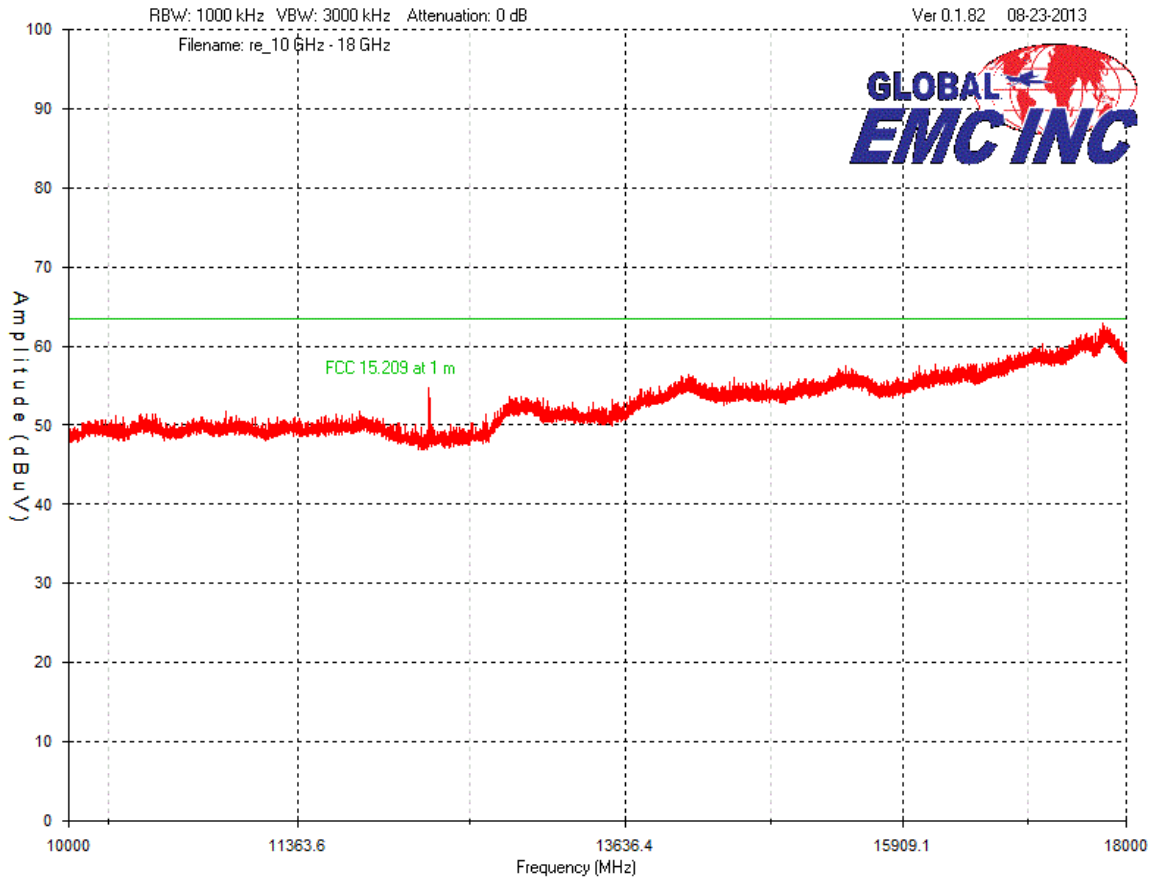
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 4 GHz – 10 GHz
Vertical - Peak Emission Graph



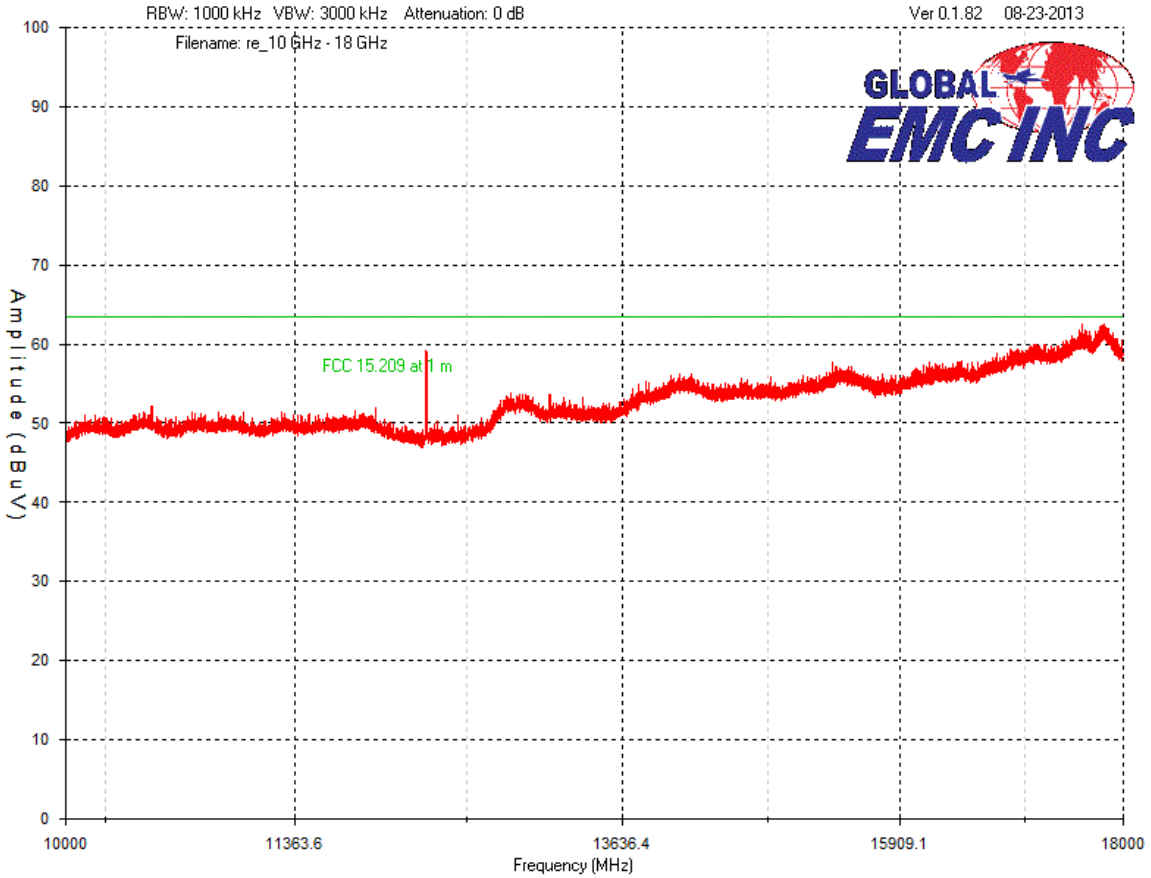
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 10 GHz – 18 GHz
Horizontal - Peak Emission Graph



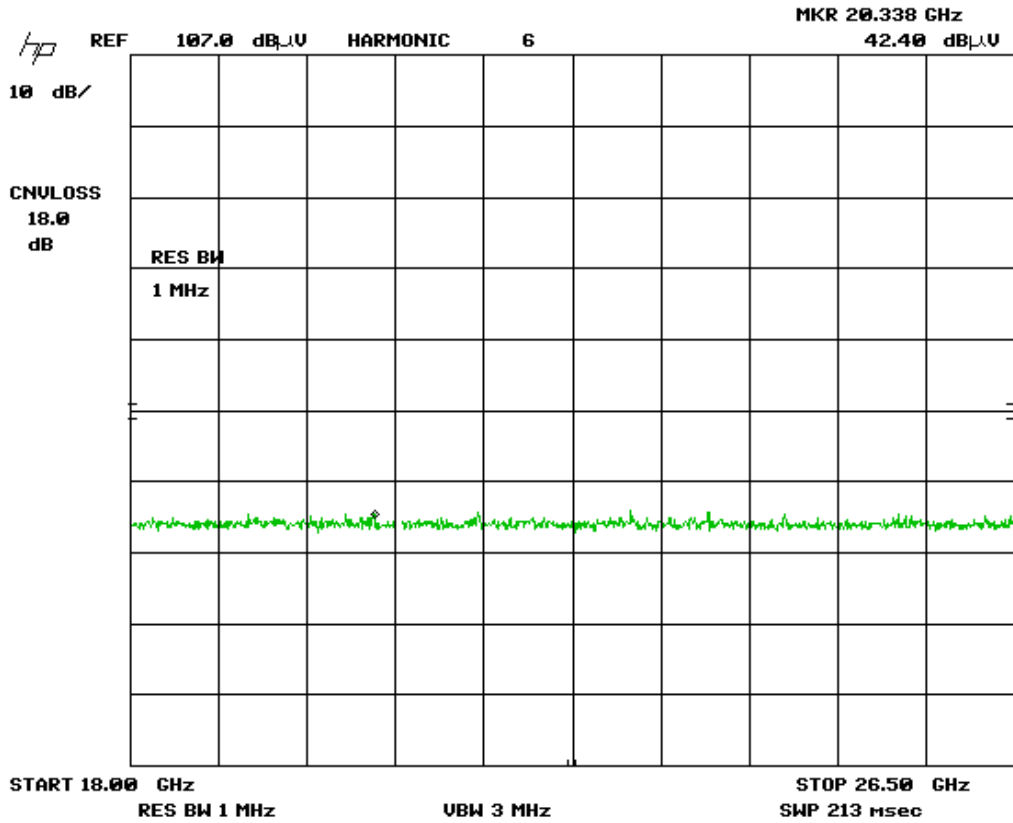
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 10 GHz – 18 GHz
Vertical - Peak Emission Graph



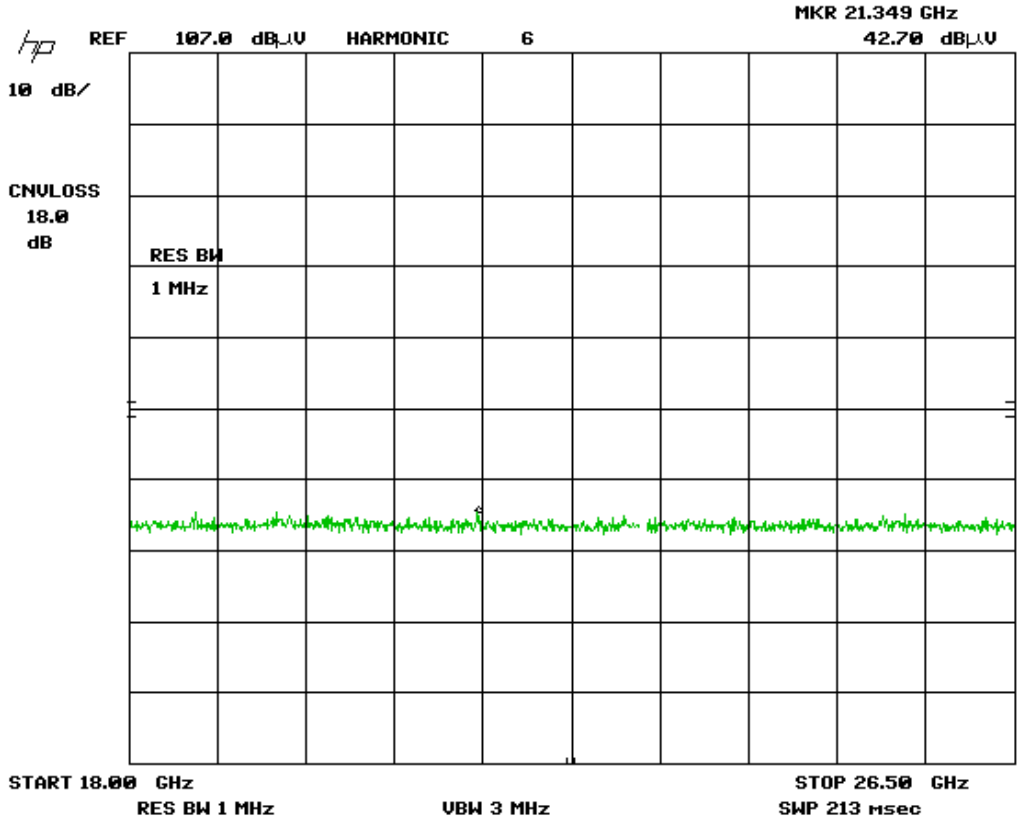
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 18 GHz – 26 GHz
Horizontal - Peak Emission Graph



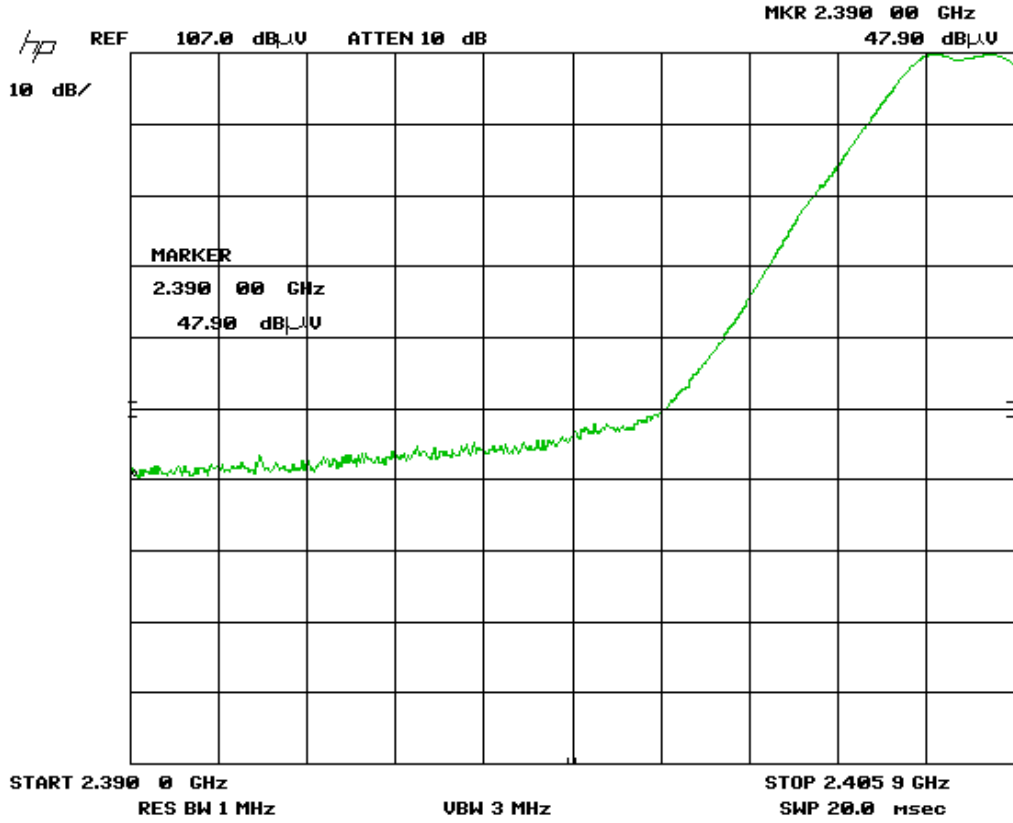
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Mid Channel – 18 GHz – 26 GHz
Vertical - Peak Emission Graph



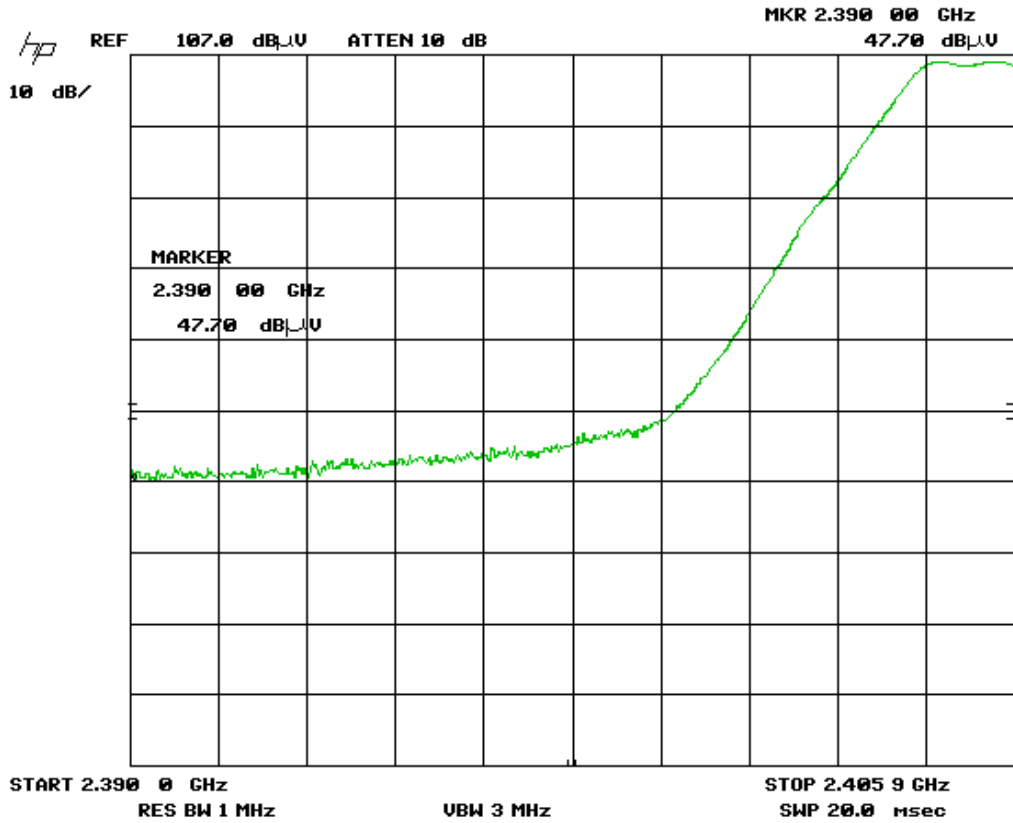
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Band Edge – Low Channel
Vertical - Peak Emission



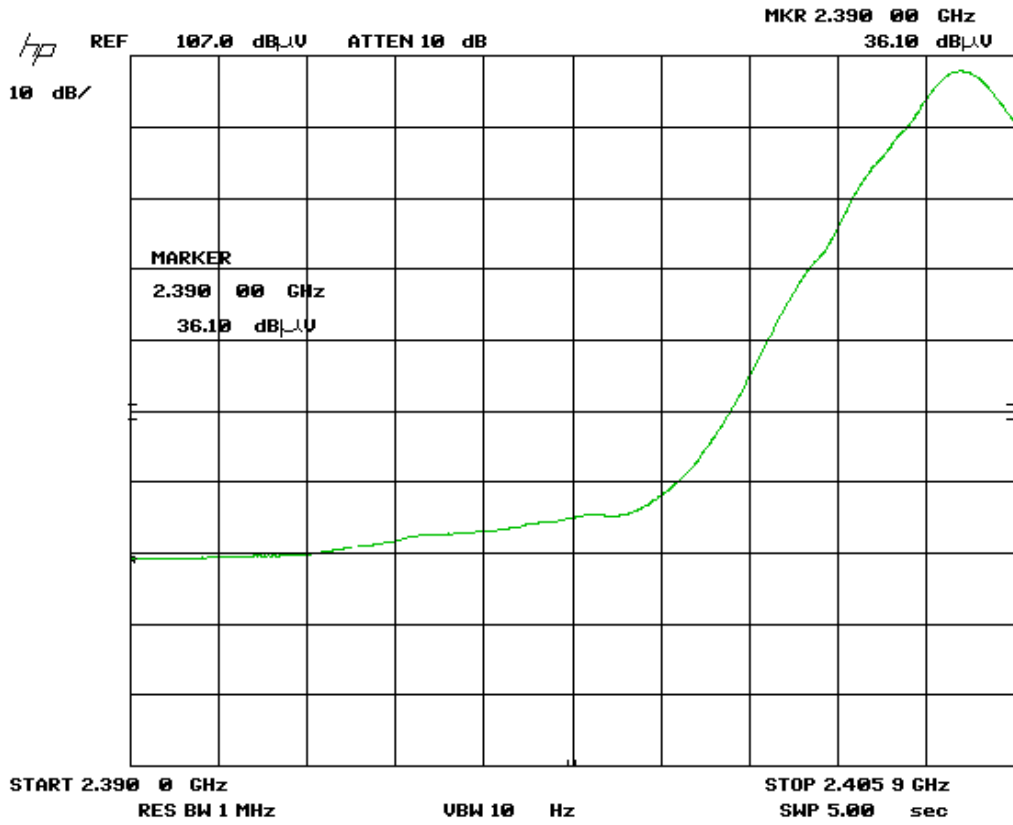
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Band Edge – Low Channel
Horizontal - Peak Emission



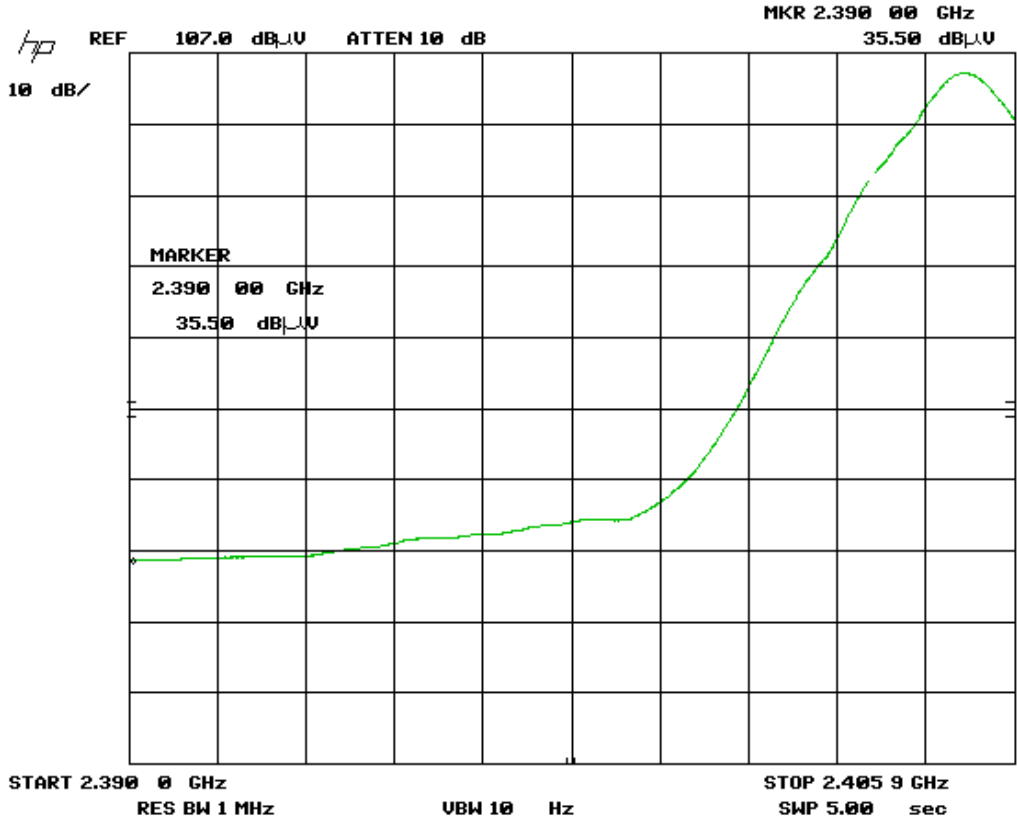
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Band Edge – Low Channel
Vertical – Average Emission



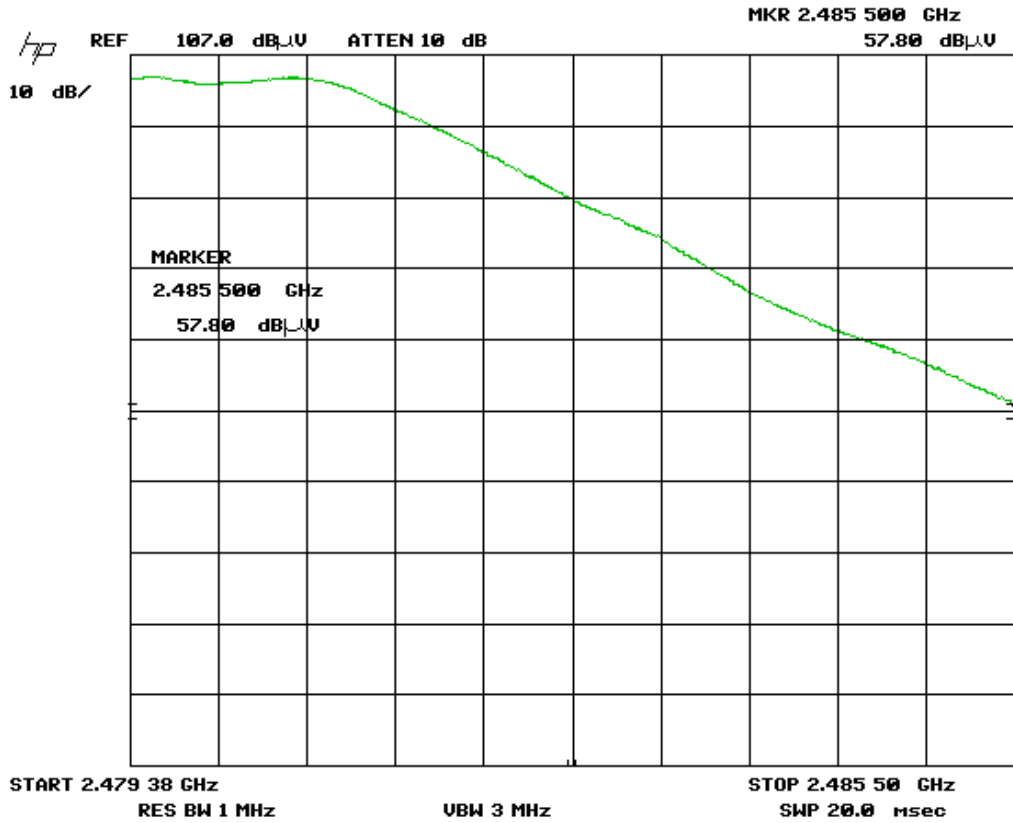
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Band Edge – Low Channel
Horizontal - Average Emission



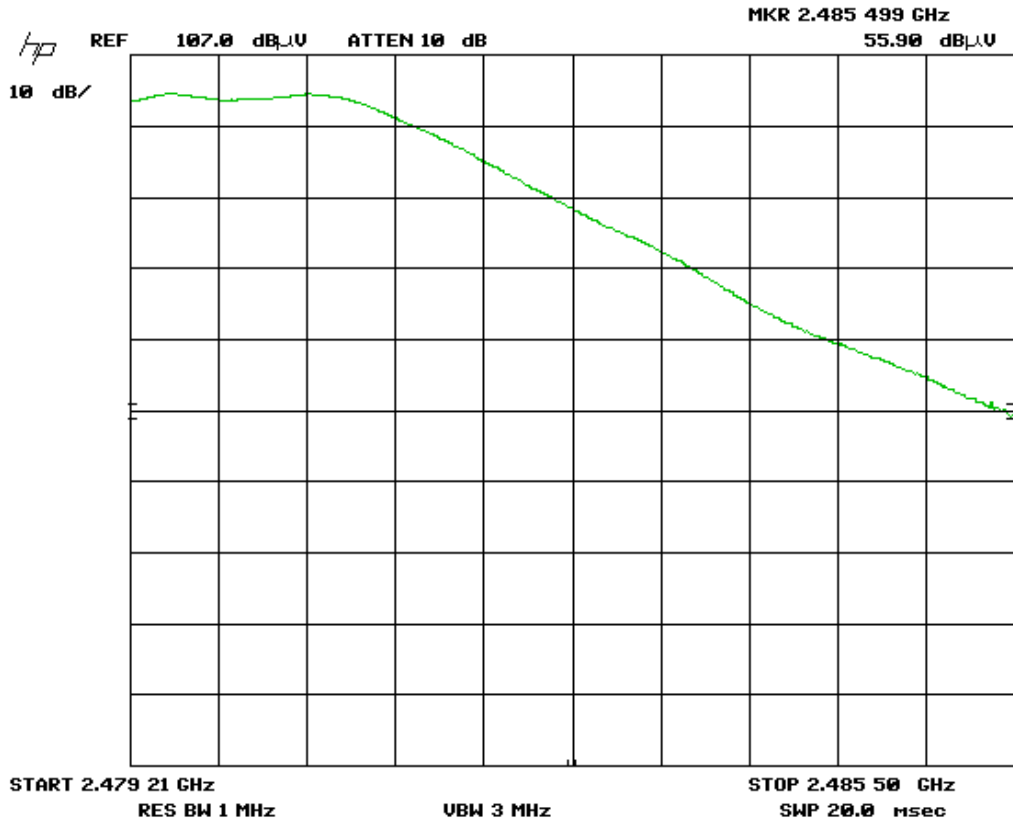
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Band Edge – Hi Channel
Vertical - Peak Emission



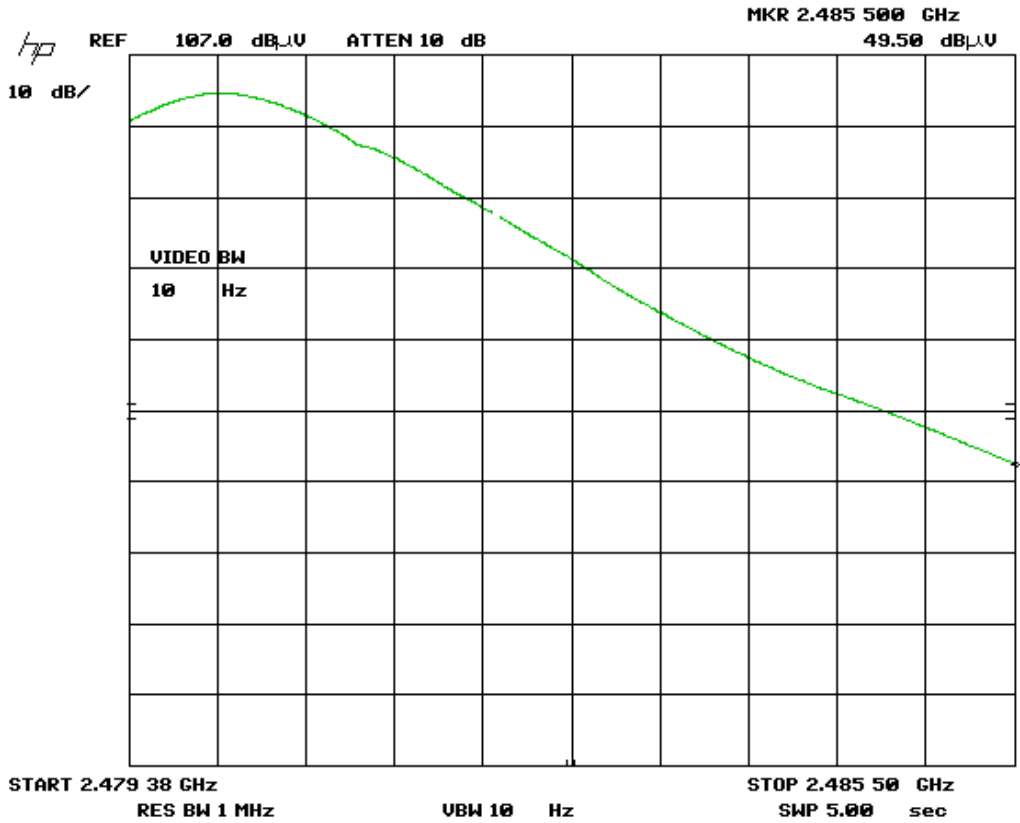
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Band Edge – Hi Channel
Horizontal - Peak Emission



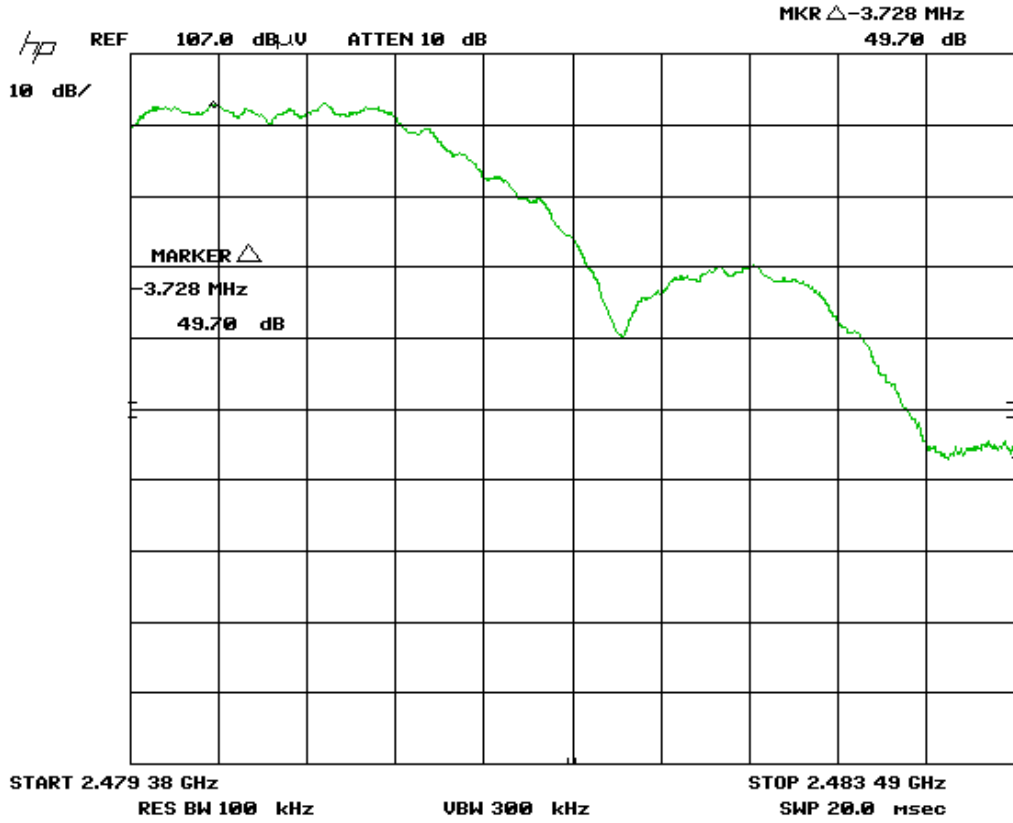
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Band Edge – Hi Channel
Horizontal - Average Emission



| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Band Edge – High channel
Vertical – Marker-Delta measurement



| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Final Measurements

Note: In accordance with 15.247(d), only frequencies exceeding the 15.209 limit that occur within the bands listed in 15.205, need to be verified with a final detector.

For frequency shown on the peak graphs and not listed in 15.205, measurements were taken for reference.


| Emissions Table - Vertical | | | | | | | | | |
|------------------------------|----------|------------|-----------------------|----------------------|--------------|----------------|------------|-------------|------------|
| Frequency (MHz) | Detector | Raw (dBuV) | Antenna Factor (dB/m) | Cable RE Factor (dB) | Pre-Amp (dB) | Level (dBuV/m) | Limit (dB) | Margin (dB) | Pass /Fail |
| 46.878 | QP | 50.7 | 10.1 | 0.1 | -28.7 | 32.2 | 40 | 7.8 | Pass |
| 1186.67 | AVG | 37.2 | 25.1 | 2.2 | -36.8 | 27.7 | 54 | 26.3 | Pass |
| 2381 | AVG | 48 | 30.6 | 4.0 | -36.1 | 46.5 | 54 | 7.5 | Pass |
| Emissions Table - Horizontal | | | | | | | | | |
| 716.372 | QP | 36.78 | 22.2 | 0.8 | -28.9 | 30.88 | 46.4 | 15.52 | Pass |
| 1243 | AVG | 36.6 | 24.6 | 2.2 | -36.7 | 26.7 | 54 | 27.3 | Pass |
| 1167 | AVG | 38 | 24.6 | 2.1 | -36.9 | 27.8 | 54 | 26.2 | Pass |
| 1005 | AVG | 37.5 | 23 | 1.9 | -37.1 | 25.3 | 54 | 28.7 | Pass |
| 1706.67 | AVG | 38.4 | 26.7 | 3 | -36.3 | 31.8 | 54 | 22.2 | Pass |
| 2381 | AVG | 51.5 | 30.6 | 4.0 | -36.1 | 50 | 54 | 4 | Pass |

h

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


| Test Frequency (MHz) | Detection mode (Q-Peak) | Antenna polarity (Horz/Vert) | Raw signal dB(µV) | Antenna factor dB | Cable loss dB + Preselector | Attenuator dB | Pre-Amp Gain dB | Received signal dB(µV/m) | Emission limit dB(µV/m) | Margin dB(µV) | Result |
|--|-------------------------|------------------------------|-------------------|-------------------|-----------------------------|---------------|-----------------|--------------------------|-------------------------|---------------|--------|
| Low Channel (26) - Y axis (Horizontal)(20 dBm) | | | | | | | | | | | |
| 2405 | Peak | Horz | 103.2 | 30.6 | 5.4 | 0.0 | 36.2 | 103.0 | | | PASS |
| 2405 | Avg | Horz | 100.7 | 30.6 | 5.4 | 0.0 | 36.2 | 100.5 | | | PASS |
| 2405 | Peak | Vert | 106.9 | 30.6 | 5.4 | 0.0 | 36.2 | 106.7 | | | PASS |
| 2405 | Avg | Vert | 105.0 | 30.6 | 5.4 | 0.0 | 36.2 | 104.8 | | | PASS |
| 2390 | Peak | Horz | 45.8 | 30.6 | 5.4 | 0.0 | 36.2 | 45.6 | 74.0 | 28.4 | PASS |
| 2390 | Avg | Horz | 34.6 | 30.6 | 5.4 | 0.0 | 36.2 | 34.4 | 54.0 | 19.6 | PASS |
| 2390 | Peak | Vert | 47.6 | 30.6 | 5.4 | 0.0 | 36.2 | 47.4 | 74.0 | 26.6 | PASS |
| 2390 | Avg | Vert | 36.0 | 30.6 | 5.4 | 0.0 | 36.2 | 35.8 | 54.0 | 18.2 | PASS |
| Low Channel (26) - X axis (Flat)(20 dBm) | | | | | | | | | | | |
| 2405 | Peak | Horz | 107.8 | 30.6 | 5.4 | 0.0 | 36.2 | 107.6 | | | PASS |
| 2405 | Avg | Horz | 105.8 | 30.6 | 5.4 | 0.0 | 36.2 | 105.6 | | | PASS |
| 2405 | Peak | Vert | 103.7 | 30.6 | 5.4 | 0.0 | 36.2 | 103.5 | | | PASS |
| 2405 | Avg | Vert | 100.7 | 30.6 | 5.4 | 0.0 | 36.2 | 100.5 | | | PASS |
| 2390 | Peak | Horz | 53.3 | 30.6 | 5.4 | 0.0 | 36.2 | 53.1 | 74.0 | 20.9 | PASS |
| 2390 | Avg | Horz | 41.5 | 30.6 | 5.4 | 0.0 | 36.2 | 41.3 | 54.0 | 12.7 | PASS |
| 2390 | Peak | Vert | 46.9 | 30.6 | 5.4 | 0.0 | 36.2 | 46.7 | 74.0 | 27.3 | PASS |
| 2390 | Avg | Vert | 34.8 | 30.6 | 5.4 | 0.0 | 36.2 | 34.6 | 54.0 | 19.4 | PASS |
| Low Channel (26) - Z axis (Vertical)(20 dBm) | | | | | | | | | | | |
| 2405 | Peak | Horz | 106.7 | 30.6 | 5.4 | 0.0 | 36.2 | 106.5 | | | PASS |
| 2405 | Avg | Horz | 104.3 | 30.6 | 5.4 | 0.0 | 36.2 | 104.1 | | | PASS |
| 2405 | Peak | Vert | 107.0 | 30.6 | 5.4 | 0.0 | 36.2 | 106.8 | | | PASS |
| 2405 | Avg | Vert | 105.0 | 30.6 | 5.4 | 0.0 | 36.2 | 104.8 | | | PASS |
| 2390 | Peak | Horz | 47.7 | 30.6 | 5.4 | 0.0 | 36.2 | 47.5 | 74.0 | 26.5 | PASS |
| 2390 | Avg | Horz | 35.5 | 30.6 | 5.4 | 0.0 | 36.2 | 35.3 | 54.0 | 18.7 | PASS |
| 2390 | Peak | Vert | 47.9 | 30.6 | 5.4 | 0.0 | 36.2 | 47.7 | 74.0 | 26.3 | PASS |
| 2390 | Avg | Vert | 36.1 | 30.6 | 5.4 | 0.0 | 36.2 | 35.9 | 54.0 | 18.1 | PASS |
| 4810 | Peak | Horz | 50.8 | 33.7 | 7.7 | 0.0 | 35.7 | 56.5 | 74.0 | 17.5 | PASS |
| 4810 | Avg | Horz | 40.9 | 33.7 | 7.7 | 0.0 | 35.7 | 46.6 | 54.0 | 7.4 | PASS |
| 4810 | Peak | Vert | 51.5 | 33.7 | 7.7 | 0.0 | 35.7 | 57.2 | 74.0 | 16.8 | PASS |
| 4810 | Avg | Vert | 41.6 | 33.7 | 7.7 | 0.0 | 35.7 | 47.3 | 54.0 | 6.7 | PASS |
| 7215 | Peak | Horz | 54.3 | 37.9 | 9.6 | 0.0 | 35.7 | 66.1 | 74.0 | 7.9 | PASS |
| 7215 | Avg | Horz | 26.3 | 37.9 | 9.6 | 0.0 | 35.7 | 38.1 | 54.0 | 15.9 | PASS |
| 7215 | Peak | Vert | 55.2 | 37.9 | 9.6 | 0.0 | 35.7 | 67.0 | 74.0 | 7.0 | PASS |
| 7215 | Avg | Vert | 27.2 | 37.9 | 9.6 | 0.0 | 35.7 | 39.0 | 54.0 | 15.0 | PASS |
| 9620 | Peak | Horz | 54.4 | 39.0 | 7.4 | 0.0 | 36.2 | 64.6 | 74.0 | 9.4 | PASS |
| 9620 | Avg | Horz | 41.9 | 39.0 | 7.4 | 0.0 | 36.2 | 52.1 | 54.0 | 1.9 | PASS |
| 9620 | Peak | Vert | 52.8 | 39.0 | 7.4 | 0.0 | 36.2 | 63.0 | 74.0 | 11.0 | PASS |
| 9620 | Avg | Vert | 41.3 | 39.0 | 7.4 | 0.0 | 36.2 | 51.5 | 54.0 | 2.5 | PASS |
| 12025 | Peak | Horz | 50.5 | 38.8 | 8.4 | 0.0 | 35.4 | 62.3 | 74.0 | 11.7 | PASS |
| 12025 | Avg | Horz | 37.7 | 38.8 | 8.4 | 0.0 | 35.4 | 49.5 | 54.0 | 4.5 | PASS |
| 12025 | Peak | Vert | 51.0 | 38.8 | 8.4 | 0.0 | 35.4 | 62.8 | 74.0 | 11.2 | PASS |
| 12025 | Avg | Vert | 38.0 | 38.8 | 8.4 | 0.0 | 35.4 | 49.8 | 54.0 | 4.2 | PASS |

Note: The Average emission at the 3rd harmonic was obtained by applying duty cycle factor of 27.95 dB (a maximum duty cycle of 4%.was declared by the client).

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

| Test Frequency (MHz) | Detection mode (Q-Peak) | Antenna polarity (Horz/Vert) | Raw signal dB(µV) | Antenna factor dB | Cable loss dB + Preselector | Attenuator dB | Pre-Amp Gain dB | Received signal dB(µV/m) | Emission limit dB(µV/m) | Margin dB(µV) | Result |
|--|-------------------------|------------------------------|-------------------|-------------------|-----------------------------|---------------|-----------------|--------------------------|-------------------------|---------------|--------|
| Mid Channel (26) - X axis (Flat)(20 dBm) | | | | | | | | | | | |
| 2445 | Peak | Horz | 104.2 | 30.6 | 5.4 | 0.0 | 36.2 | 104.0 | | | PASS |
| 2445 | Avg | Horz | 102.0 | 30.6 | 5.4 | 0.0 | 36.2 | 101.8 | | | PASS |
| 2445 | Peak | Vert | 100.3 | 30.6 | 5.4 | 0.0 | 36.2 | 100.1 | | | PASS |
| 2445 | Avg | Vert | 97.9 | 30.6 | 5.4 | 0.0 | 36.2 | 97.7 | | | PASS |
| Mid Channel (26) - Y axis (Horizontal)(20 dBm) | | | | | | | | | | | |
| 2445 | Peak | Horz | 106.9 | 30.6 | 5.4 | 0.0 | 36.2 | 106.7 | | | PASS |
| 2445 | Avg | Horz | 104.9 | 30.6 | 5.4 | 0.0 | 36.2 | 104.7 | | | PASS |
| 2445 | Peak | Vert | 105.1 | 30.6 | 5.4 | 0.0 | 36.2 | 104.9 | | | PASS |
| 2445 | Avg | Vert | 102.6 | 30.6 | 5.4 | 0.0 | 36.2 | 102.4 | | | PASS |
| 4890 | Peak | Horz | 49.8 | 33.4 | 7.7 | 0.0 | 35.7 | 55.2 | 74.0 | 18.8 | PASS |
| 4890 | Avg | Horz | 39.5 | 33.4 | 7.7 | 0.0 | 35.7 | 44.9 | 54.0 | 9.1 | PASS |
| 4890 | Peak | Vert | 47.7 | 33.4 | 7.7 | 0.0 | 35.7 | 53.1 | 74.0 | 20.9 | PASS |
| 4890 | Avg | Vert | 35.5 | 33.4 | 7.7 | 0.0 | 35.7 | 40.9 | 54.0 | 13.1 | PASS |
| 7335 | Peak | Vert | 57.4 | 37.9 | 9.6 | 0.0 | 35.9 | 69.0 | 74.0 | 5.0 | PASS |
| 7335 | Avg | Vert | 29.4 | 37.9 | 9.6 | 0.0 | 35.9 | 41.0 | 54.0 | 13.0 | PASS |
| 7335 | Peak | Horz | 54.6 | 37.9 | 9.6 | 0.0 | 35.9 | 66.2 | 74.0 | 7.8 | PASS |
| 7335 | Avg | Horz | 26.6 | 37.9 | 9.6 | 0.0 | 35.9 | 38.2 | 54.0 | 15.8 | PASS |
| 9780 | Peak | Horz | 54.8 | 39.0 | 7.4 | 0.0 | 36.2 | 65.0 | 74.0 | 9.0 | PASS |
| 9780 | Avg | Horz | 43.6 | 39.0 | 7.4 | 0.0 | 36.2 | 53.8 | 54.0 | 0.2 | PASS |
| 9780 | Peak | Vert | 51.7 | 39.0 | 7.4 | 0.0 | 36.2 | 61.9 | 74.0 | 12.1 | PASS |
| 9780 | Avg | Vert | 40.3 | 39.0 | 7.4 | 0.0 | 36.2 | 50.5 | 54.0 | 3.5 | PASS |
| 12225 | Peak | Horz | 50.4 | 38.8 | 8.4 | 0.0 | 35.4 | 62.2 | 74.0 | 11.8 | PASS |
| 12225 | Avg | Horz | 37.8 | 38.8 | 8.4 | 0.0 | 35.4 | 49.6 | 54.0 | 4.4 | PASS |
| 12225 | Peak | Vert | 53.1 | 38.8 | 8.4 | 0.0 | 35.4 | 64.9 | 74.0 | 9.1 | PASS |
| 12225 | Avg | Vert | 41.8 | 38.8 | 8.4 | 0.0 | 35.4 | 53.6 | 54.0 | 0.4 | PASS |
| Mid Channel (26) - Z axis (Vertical)(20 dBm) | | | | | | | | | | | |
| 2445 | Peak | Horz | 103.4 | 30.6 | 5.4 | 0.0 | 36.2 | 103.2 | | | PASS |
| 2445 | Avg | Horz | 100.8 | 30.6 | 5.4 | 0.0 | 36.2 | 100.6 | | | PASS |
| 2445 | Peak | Vert | 104.4 | 30.6 | 5.4 | 0.0 | 36.2 | 104.2 | | | PASS |
| 2445 | Avg | Vert | 101.9 | 30.6 | 5.4 | 0.0 | 36.2 | 101.7 | | | PASS |


Note: The Average emission at the 3rd harmonic was obtained by applying duty cycle factor of 27.95 dB (a maximum duty cycle of 4%.was declared by the client).

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

| Test Frequency (MHz) | Detection mode (Q-Peak) | Antenna polarity (Horz/Vert) | Raw signal dB(µV) | Antenna factor dB | Cable loss dB + Preselector | Attenuator dB | Pre-Amp Gain dB | Received signal dB(µV/m) | Emission limit dB(µV/m) | Margin dB(µV) | Result |
|---|-------------------------|------------------------------|-------------------|-------------------|-----------------------------|---------------|-----------------|--------------------------|-------------------------|---------------|--------|
| High Channel (26) - X axis (Flat)(20 dBm) | | | | | | | | | | | |
| 2480 | Peak | Horz | 102.7 | 30.6 | 5.4 | 0.0 | 36.2 | 102.5 | | | PASS |
| 2480 | Avg | Horz | 100.4 | 30.6 | 5.4 | 0.0 | 36.2 | 100.2 | | | PASS |
| 2480 | Peak | Vert | 98.9 | 30.6 | 5.4 | 0.0 | 36.2 | 98.7 | | | PASS |
| 2480 | Avg | Vert | 96.6 | 30.6 | 5.4 | 0.0 | 36.2 | 96.4 | | | PASS |
| High Channel (26) - Y axis (Horizontal)(20 dBm) | | | | | | | | | | | |
| 2480 | Peak | Horz | 101.9 | 30.6 | 5.4 | 0.0 | 36.2 | 101.7 | | | PASS |
| 2480 | Avg | Horz | 99.4 | 30.6 | 5.4 | 0.0 | 36.2 | 99.2 | | | PASS |
| 2480 | Peak | Vert | 103.9 | 30.6 | 5.4 | 0.0 | 36.2 | 103.7 | | | PASS |
| 2480 | Avg | Vert | 101.7 | 30.6 | 5.4 | 0.0 | 36.2 | 101.5 | | | PASS |
| 2483.5 | Peak | Horz | 53.2 | 30.6 | 5.4 | 0.0 | 36.2 | 53.0 | 74.0 | 21.0 | PASS |
| 2483.5 | Avg | Horz | 50.7 | 30.6 | 5.4 | 0.0 | 36.2 | 50.5 | 54.0 | 3.5 | PASS |
| 2483.5 | Peak | Vert | 54.2 | 30.6 | 5.4 | 0.0 | 36.2 | 54.0 | 74.0 | 20.0 | PASS |
| 2483.5 | Avg | Vert | 52.0 | 30.6 | 5.4 | 0.0 | 36.2 | 51.8 | 54.0 | 2.2 | PASS |
| 2485.5 | Peak | Horz | 56.0 | 30.6 | 5.4 | 0.0 | 36.2 | 55.8 | 74.0 | 18.2 | PASS |
| 2485.5 | Avg | Horz | 45.7 | 30.6 | 5.4 | 0.0 | 36.2 | 45.5 | 54.0 | 8.5 | PASS |
| 2485.5 | Peak | Vert | 57.6 | 30.6 | 5.4 | 0.0 | 36.2 | 57.4 | 74.0 | 16.6 | PASS |
| 2485.5 | Avg | Vert | 49.5 | 30.6 | 5.4 | 0.0 | 36.2 | 49.3 | 54.0 | 4.7 | PASS |
| 4960 | Peak | Horz | 50.4 | 33.7 | 7.7 | 0.0 | 35.7 | 56.1 | 74.0 | 17.9 | PASS |
| 4960 | Avg | Horz | 40.7 | 33.7 | 7.7 | 0.0 | 35.7 | 46.4 | 54.0 | 7.6 | PASS |
| 4960 | Peak | Vert | 47.6 | 33.7 | 7.7 | 0.0 | 35.7 | 53.3 | 74.0 | 20.7 | PASS |
| 4960 | Avg | Vert | 36.2 | 33.7 | 7.7 | 0.0 | 35.7 | 41.9 | 54.0 | 12.1 | PASS |
| 7440 | Peak | Vert | 53.2 | 38.5 | 9.6 | 0.0 | 35.9 | 65.4 | 74.0 | 8.6 | PASS |
| 7440 | Avg | Vert | 25.2 | 38.5 | 9.6 | 0.0 | 35.9 | 37.4 | 54.0 | 16.6 | PASS |
| 7440 | Peak | Horz | 57.8 | 38.5 | 9.6 | 0.0 | 35.9 | 70.0 | 74.0 | 4.0 | PASS |
| 7440 | Avg | Horz | 29.8 | 38.5 | 9.6 | 0.0 | 35.9 | 42.0 | 54.0 | 12.0 | PASS |
| 9920 | Peak | Horz | 52.8 | 39.0 | 7.4 | 0.0 | 36.2 | 63.0 | 74.0 | 11.0 | PASS |
| 9920 | Avg | Horz | 41.0 | 39.0 | 7.4 | 0.0 | 36.2 | 51.2 | 54.0 | 2.8 | PASS |
| 9920 | Peak | Vert | 51.8 | 39.0 | 7.4 | 0.0 | 36.2 | 62.0 | 74.0 | 12.0 | PASS |
| 9920 | Avg | Vert | 40.5 | 39.0 | 7.4 | 0.0 | 36.2 | 50.7 | 54.0 | 3.3 | PASS |
| 12400 | Peak | Horz | 51.3 | 38.8 | 8.6 | 0.0 | 35.3 | 63.4 | 74.0 | 10.6 | PASS |
| 12400 | Avg | Horz | 38.5 | 38.8 | 8.6 | 0.0 | 35.3 | 50.6 | 54.0 | 3.4 | PASS |
| 12400 | Peak | Vert | 50.8 | 38.8 | 8.6 | 0.0 | 35.3 | 62.9 | 74.0 | 11.1 | PASS |
| 12400 | Avg | Vert | 37.7 | 38.8 | 8.6 | 0.0 | 35.3 | 49.8 | 54.0 | 4.2 | PASS |
| High Channel (26) - Z axis (Vertical)(20 dBm) | | | | | | | | | | | |
| 2480 | Peak | Horz | 101.4 | 30.6 | 5.4 | 0.0 | 36.2 | 101.2 | | | PASS |
| 2480 | Avg | Horz | 98.6 | 30.6 | 5.4 | 0.0 | 36.2 | 98.4 | | | PASS |
| 2480 | Peak | Vert | 100.2 | 30.6 | 5.4 | 0.0 | 36.2 | 100.0 | | | PASS |
| 2480 | Avg | Vert | 98.0 | 30.6 | 5.4 | 0.0 | 36.2 | 97.8 | | | PASS |
| 2483.5 | Peak | Horz | 53.0 | 30.6 | 5.4 | 0.0 | 36.2 | 52.8 | 74.0 | 21.2 | PASS |
| 2483.5 | Avg | Horz | 50.2 | 30.6 | 5.4 | 0.0 | 36.2 | 50.0 | 54.0 | 4.0 | PASS |
| 2483.5 | Peak | Vert | 51.8 | 30.6 | 5.4 | 0.0 | 36.2 | 51.6 | 74.0 | 22.4 | PASS |
| 2483.5 | Avg | Vert | 49.6 | 30.6 | 5.4 | 0.0 | 36.2 | 49.4 | 54.0 | 4.6 | PASS |
| 2485.5 | Peak | Horz | 55.2 | 30.6 | 5.4 | 0.0 | 36.2 | 55.0 | 74.0 | 19.0 | PASS |
| 2485.5 | Avg | Horz | 45.2 | 30.6 | 5.4 | 0.0 | 36.2 | 45.0 | 54.0 | 9.0 | PASS |
| 2485.5 | Peak | Vert | 54.4 | 30.6 | 5.4 | 0.0 | 36.2 | 54.2 | 74.0 | 19.8 | PASS |
| 2485.5 | Avg | Vert | 44.6 | 30.6 | 5.4 | 0.0 | 36.2 | 44.4 | 54.0 | 9.6 | PASS |

Note:

1. The Average emission at the 3rd harmonic was obtained by applying duty cycle factor of 27.95 dB (a maximum duty cycle of 4%.was declared by the client).

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

2. The marker-delta method was used at 2483.5 MHz with the measuring antenna at horizontal polarity and external antenna in horizontal position and with the measuring antenna at vertical polarity and external antenna in vertical position. The RBW = 100 kHz is used to obtain the marker-delta value. The marker-delta value is 49.7 dB.

Test Equipment List

| Equipment | Model No. | Manufacturer | Last calibration date | Next calibration due date | Asset # |
|--------------------------------|--------------------------|-----------------|-----------------------|---------------------------|-----------|
| Spectrum Analyzer | 8566B | HP | 12/21/ 2011 | 12/21/2013 | GEMC 141 |
| Spectrum Analyzer | ESL 6 | Rohde & Schwarz | Oct-06, 2011 | Oct-06, 2013 | GEMC 160 |
| Quasi Peak Adapter | 85650A | HP | 12/21/ 2011 | 12/21/2013 | GEMC 7 |
| Loop Antenna | EM 6871 | Electro-Metrics | Feb 5, 2013 | Feb 5, 2015 | GEMC 70 |
| Loop Antenna | EM 6872 | Electro-Metrics | Feb 5, 2013 | Feb 5, 2015 | GEMC 71 |
| BiLog Antenna | 3142-C | ETS | Feb 4, 2013 | Feb 4, 2015 | GEMC 137 |
| Attenuator 10 dB | 8493B | Agilent | NCR | NCR | GEMC 133 |
| 4GHZ-12GHZ High Pass filter | 11SH10-4000/T12000-0/0 | K & L Microwave | NCR | NCR | GEMC 119 |
| Chase Preamp 9kHz - 2 GHz | CPA9231A | Chase | 8/29/2012 | 8/29/2014 | GEMC 6403 |
| Q-Par 1.5-18 GHz Horn | 6878/24 | Q-par | 8/23/2012 | 8/23/2014 | GEMC 6365 |
| Horn Antenna 18 GHz - 26.5 GHz | SAS-572 | A.H. Systems | 8/27/2012 | 8/27/2014 | GEMC 6371 |
| 18.0-26.5 GHz Harmonic Mixer | 11970K | HP | 21-Dec-11 | 21-Dec-13 | GEMC 158 |
| 1-26G pre-amp | HP 8449B | HP | 8/22/2012 | 8/22/2014 | GEMC 6351 |
| RF Cable 7m | LMR-400-7M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 28 |
| RF Cable 1m | LMR-400-1M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 29 |
| RF Cable 0.5M | LMR-400-0.5M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 31 |

This report module is based on GEMC template "FCC - 15.209 - Radiated Emissions_Rev1.doc"

| | | |
|-------------|--|--|
| Client | Viconics Technologies Inc | |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Receiver Spurious Radiated Emissions

Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

Limit(s) and Method

The method is as defined in ANSI C63.4:2003.


The limits are as defined in FCC Part 15, Section 15.209:

0.009 MHz – 0.490 MHz, 2400/F(kHz) uV/m at 300 m¹
0.490 MHz – 1.705 MHz, 24000/F(kHz) uV/m at 30 m¹
1.705 MHz – 30 MHz, 30 uV/m at 30 m¹
30 MHz – 88 MHz, 100 uV/m (40.0 dBuV/m¹) at 3 m
88 MHz – 216 MHz, 150 uV/m (43.5 dBuV/m¹) at 3 m
216 MHz – 960 MHz, 200 uV/m (46.0 dBuV/m¹) at 3 m
Above 960 MHz, 500 uV/m (54.0 dBuV/m¹) at 3 m
Above 1000 MHz, 500 uV/m (54 dBuV/m²) at 3m
Above 1000 MHz, 500 uV/m (74 dBuV/m³) at 3m

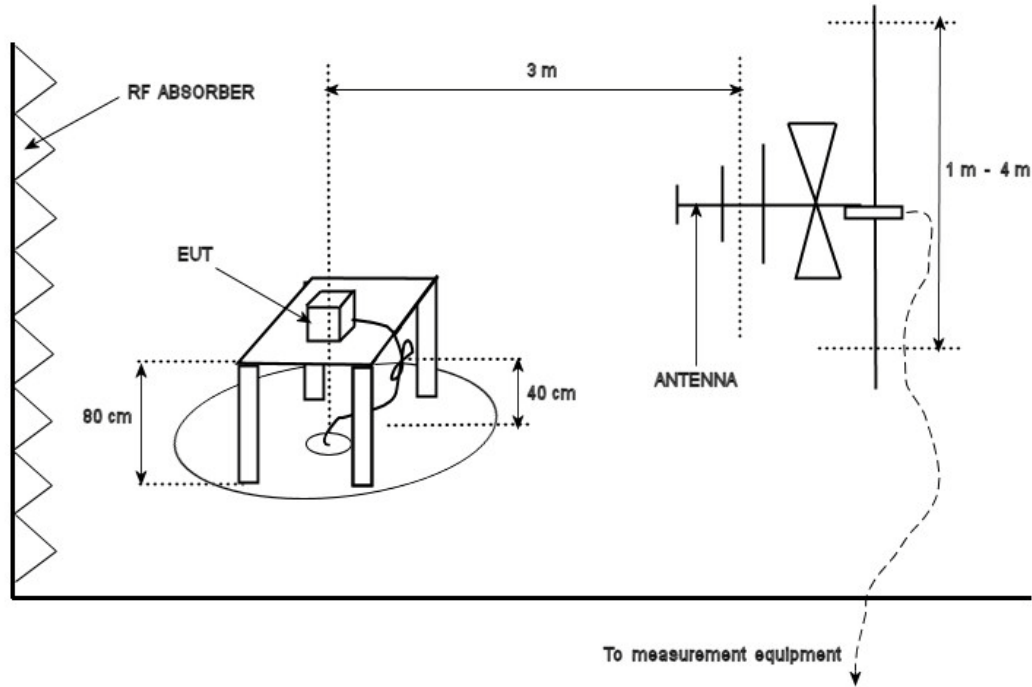
¹Limit is with Quasi Peak detector with bandwidths as defined in CISPR-16-1-1

²Limit is with 1 MHz measurement bandwidth and using an Average detector

³Limit is with 1 MHz measurement bandwidth and using a Peak detector

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Typical Radiated Emissions Setup




Measurement Uncertainty

The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is +/-4.4 dB with a ‘k=2’ coverage factor and a 95% confidence level.

Preliminary Graphs

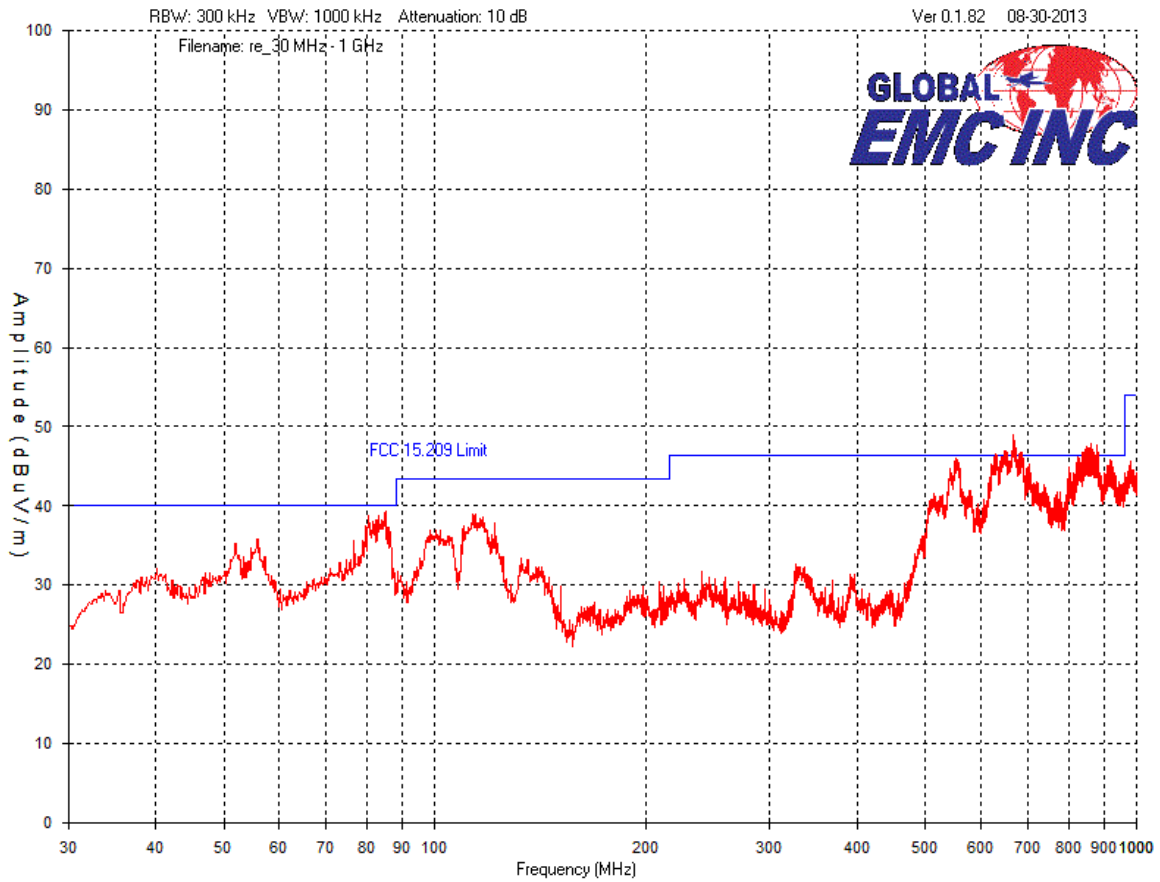
Note the graphs shown below are for graphical illustration only. For final measurements with the appropriate detector, please refer to the final measurement table where applicable. The graph shown below is a maximized peak measurement graph, measured with a resolution bandwidth greater than the final required detector and over a full 0-360 rotation. This peaking process is done as a worst case measurement. This process enables the detection of frequencies of concern for final measurement, and provides considerable time savings.


In accordance with FCC Part 15, Subpart A, Section 15.33, the device was scanned to the 10th harmonic (a minimum of a 25 GHz). however no emissions were detected above 6 GHz.

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

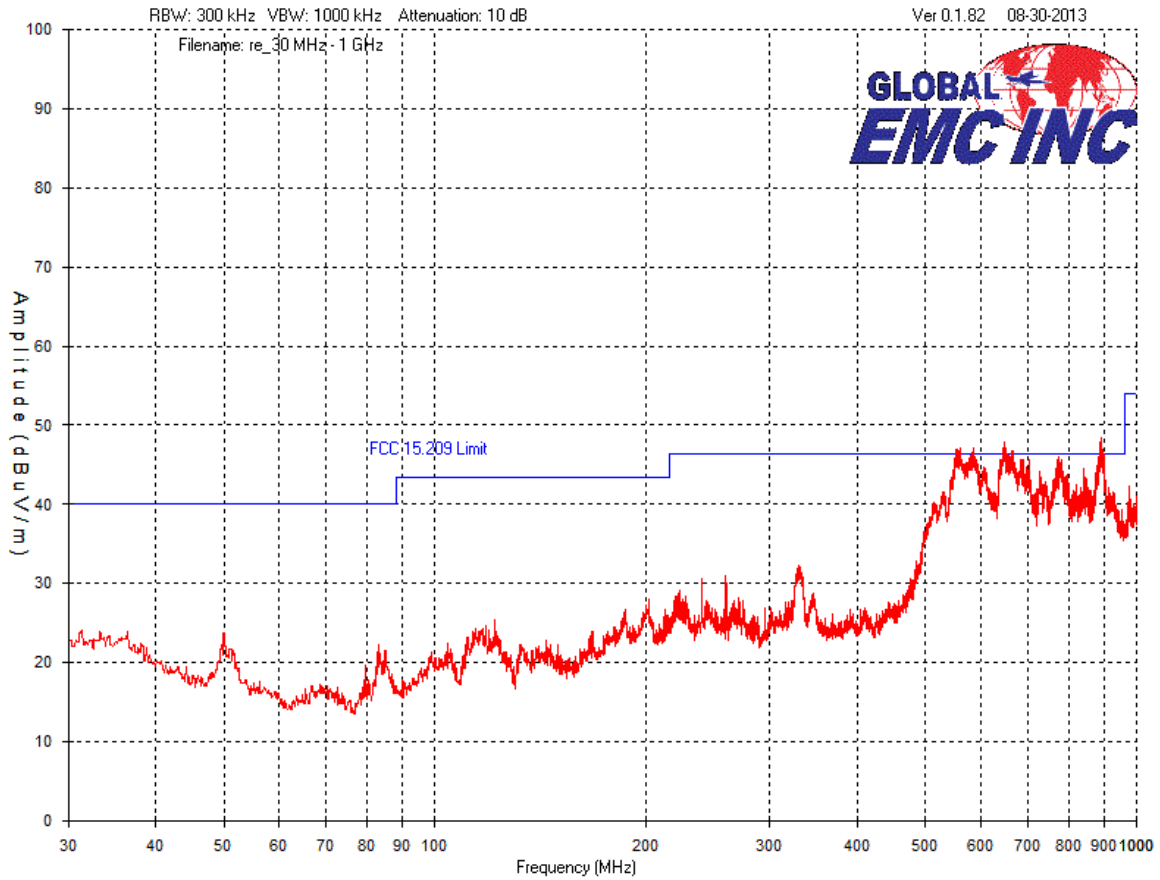
Devices scanned may be scanned at alternate test distances, and in accordance with FCC Part 15, Subpart A, Section 15.31, an extrapolation factor of 20 dB/decade was used above 30 MHz and 40 dB/decade below 30 MHz. For example for 1 meter measurements, an extrapolation factor 9.5 dB from 20 Log (1m / 3m) is applied.


Vertical – Peak Emissions Graph
30 MHz – 1 GHz



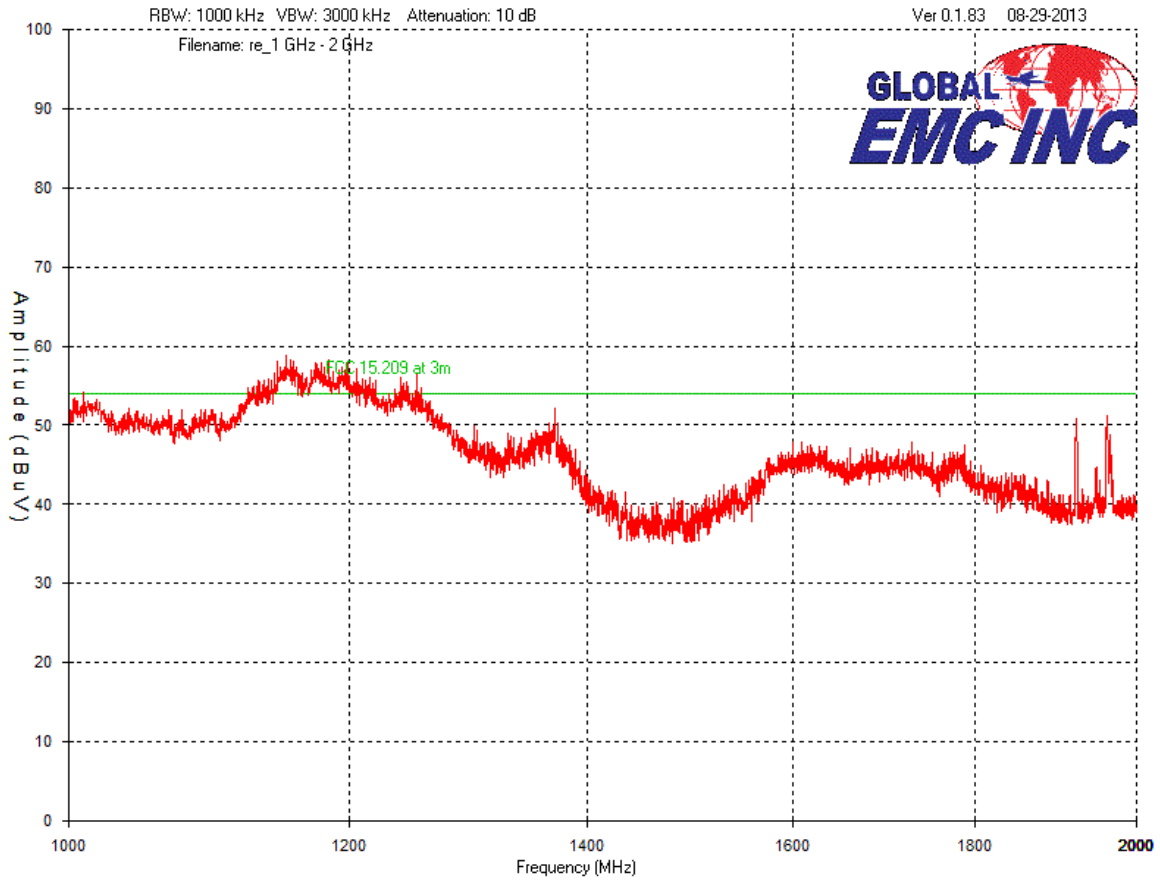
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Horizontal – Peak Emissions Graph
30 MHz – 1 GHz



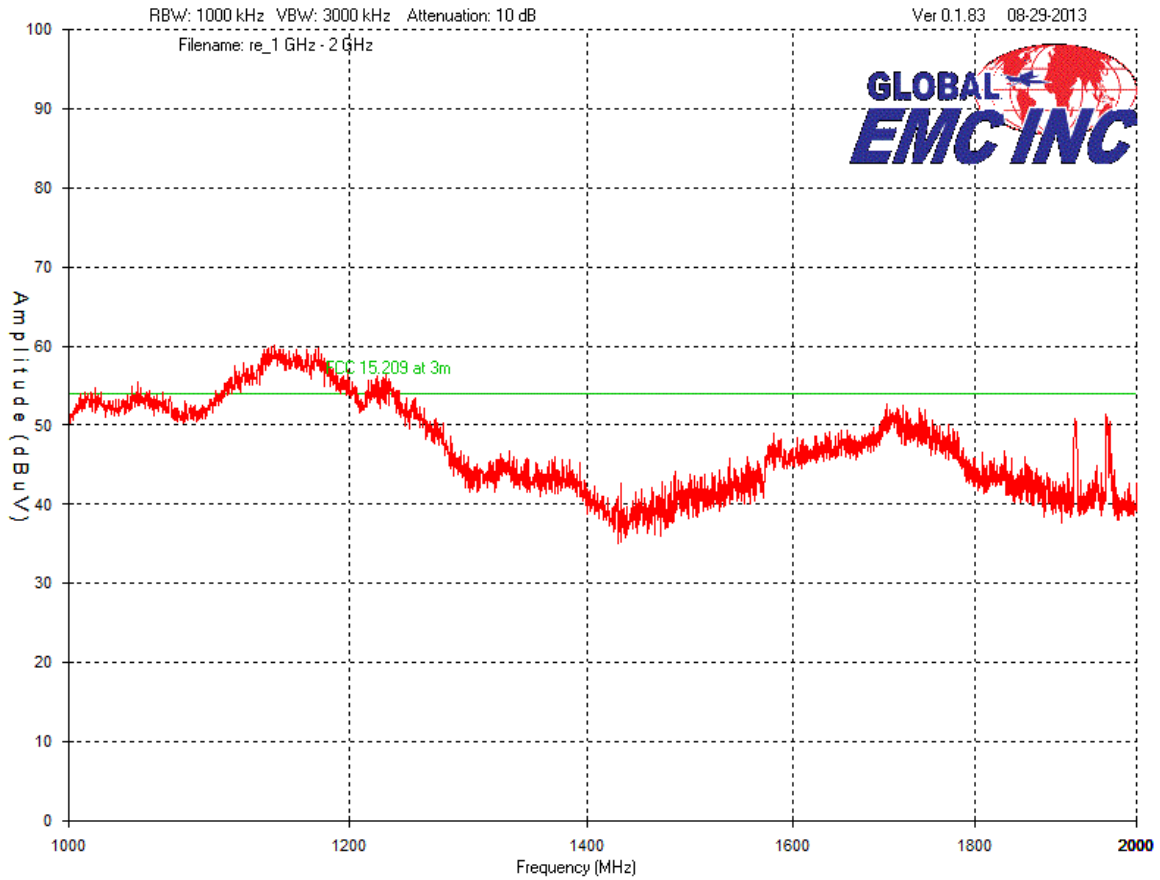
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Vertical – Peak Emission Graph
1 GHz – 2 GHz



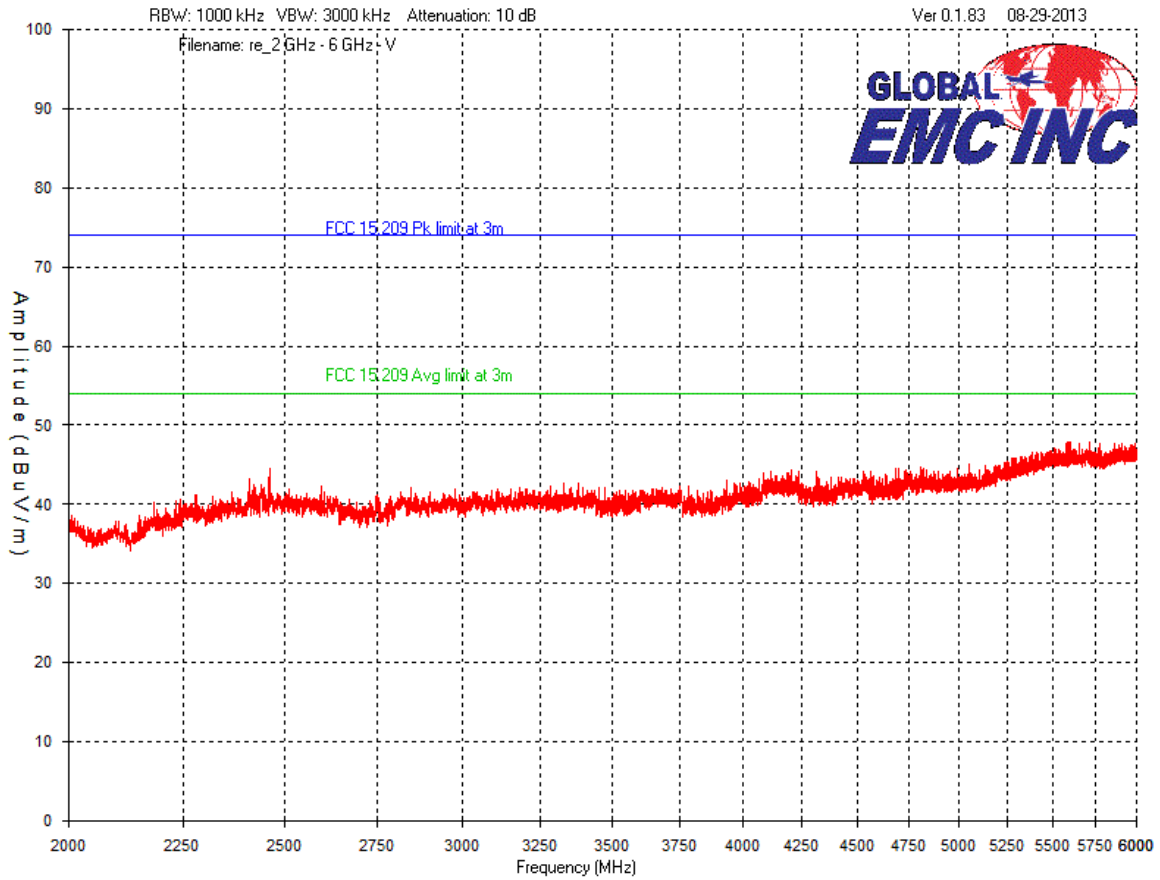
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Horizontal – Peak Emission Graphs
1 GHz – 2 GHz



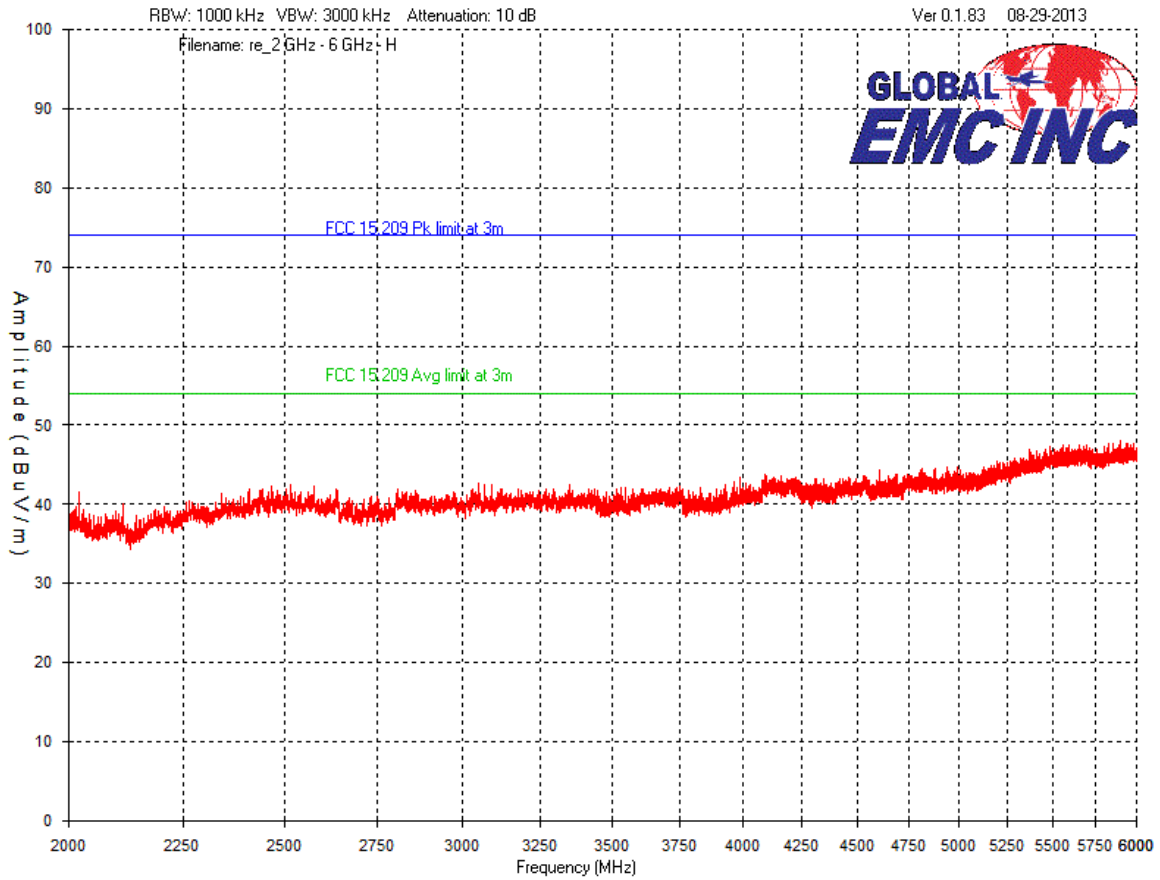
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Vertical – Peak Emission Graph
2 GHz – 6 GHz



| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Horizontal – Peak Emission Graphs
2 GHz – 6 GHz




| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Final Measurements

Note: In accordance with 15.247(d), only frequencies exceeding the 15.209 limit that occur within the bands listed in 15.205, need to be verified with a final detector.

For frequency shown on the peak graphs and not listed in 15.205, measurements were taken for reference.


| Emissions Table - Vertical | | | | | | | | | |
|------------------------------|----------|------------|-----------------------|----------------------|--------------|----------------|------------|-------------|------------|
| Frequency (MHz) | Detector | Raw (dBuV) | Antenna Factor (dB/m) | Cable RE Factor (dB) | Pre-Amp (dB) | Level (dBuV/m) | Limit (dB) | Margin (dB) | Pass /Fail |
| 666.611 | QP | 42.73 | 19.9 | 0.8 | -29 | 34.43 | 46.4 | 11.97 | Pass |
| 861.387 | QP | 36.4 | 21.7 | 1 | -28.7 | 30.4 | 46.4 | 16 | Pass |
| 552.927 | QP | 42.9 | 18.5 | 0.6 | -29 | 33 | 46.4 | 13.4 | Pass |
| 85.193 | QP | 46.4 | 6.9 | 0.1 | -28.7 | 24.7 | 40 | 15.3 | Pass |
| 1151.45 | AVG | 41.5 | 25.3 | 2.2 | -36.8 | 27.7 | 54 | 26.3 | Pass |
| 1010.31 | AVG | 40.5 | 24 | 2.2 | -36.9 | 32.1 | 54 | 21.9 | Pass |
| 1371.03 | AVG | 36 | 27.8 | 2.2 | -37.1 | 29.6 | 54 | 24.4 | Pass |
| Emissions Table - Horizontal | | | | | | | | | |
| 890.487 | QP | 40.4 | 22.3 | 1 | -28.6 | 35.1 | 46.4 | 11.3 | Pass |
| 648.278 | QP | 43.9 | 19.5 | 0.7 | -29 | 35.1 | 46.4 | 11.3 | Pass |
| 559.135 | QP | 43.8 | 18.5 | 0.6 | -29 | 33.9 | 46.4 | 12.5 | Pass |
| 775.057 | QP | 35.9 | 21.2 | 0.9 | -28.9 | 29.1 | 46.4 | 17.3 | Pass |
| 840.144 | QP | 34.2 | 22 | 1 | -28.7 | 28.5 | 46.4 | 17.9 | Pass |
| 1142.86 | AVG | 42.9 | 25.2 | 2.2 | -36.9 | 33.4 | 54 | 20.6 | Pass |
| 1700.83 | AVG | 30.7 | 28.3 | 3.0 | -36.3 | 25.7 | 54 | 28.3 | Pass |

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Test Equipment List

| Equipment | Model No. | Manufacturer | Last calibration date | Next calibration due date | Asset # |
|--------------------------------|--------------------------|-----------------|-----------------------|---------------------------|-----------|
| Spectrum Analyzer | 8566B | HP | 12/21/ 2011 | 12/21/2013 | GEMC 141 |
| Spectrum Analyzer | ESL 6 | Rohde & Schwarz | Oct-06, 2011 | Oct-06, 2013 | GEMC 160 |
| Quasi Peak Adapter | 85650A | HP | 12/21/ 2011 | 12/21/2013 | GEMC 7 |
| Loop Antenna | EM 6871 | Electro-Metrics | Feb 5, 2013 | Feb 5, 2015 | GEMC 70 |
| Loop Antenna | EM 6872 | Electro-Metrics | Feb 5, 2013 | Feb 5, 2015 | GEMC 71 |
| BiLog Antenna | 3142-C | ETS | Feb 4, 2013 | Feb 4, 2015 | GEMC 137 |
| Chase Preamp 9kHz - 2 GHz | CPA9231A | Chase | 8/29/2012 | 8/29/2014 | GEMC 6403 |
| Q-Par 1.5-18 GHz Horn | 6878/24 | Q-par | 8/23/2012 | 8/23/2014 | GEMC 6365 |
| Horn Antenna 18 GHz - 26.5 GHz | SAS-572 | A.H. Systems | 8/27/2012 | 8/27/2014 | GEMC 6371 |
| 18.0-26.5 GHz Harmonic Mixer | 11970K | HP | 21-Dec-11 | 21-Dec-13 | GEMC 158 |
| 1-26G pre-amp | HP 8449B | HP | 8/22/2012 | 8/22/2014 | GEMC 6351 |
| RF Cable 7m | LMR-400-7M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 28 |
| RF Cable 1m | LMR-400-1M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 29 |
| RF Cable 0.5M | LMR-400-0.5M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 31 |

This report module is based on GEMC template "FCC - 15.209 - Radiated Emissions_Rev1.doc"

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Power Spectral Density - DM

Purpose

The purpose of this test is to ensure that the maximum power spectral density to the radiating element does not exceed the limits specified. This ensures that the modulation is significantly wide enough, or low enough in power that it will allow for co-operation of other wireless devices operating within this frequency allocation.

Limits

The limits are defined in 15.247(e).


For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Results

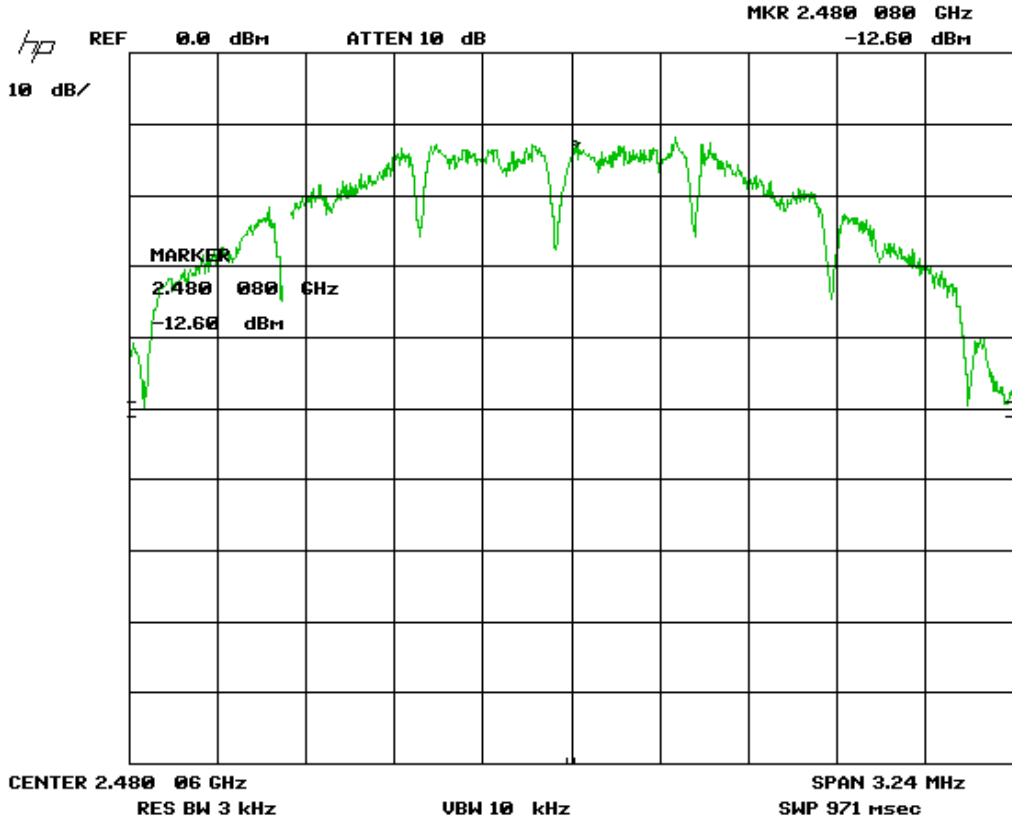
The EUT passed. Low, medium, and high band was tested. The worst case value is -1.6 dBm as measured with a 3 kHz resolution bandwidth (peak power).


Graph(s)

The graphs shown below show the power spectral density of the device during the conducted measurement operation of the EUT. Low, middle, and high channel was investigated in each mode, with the worst case being presented.

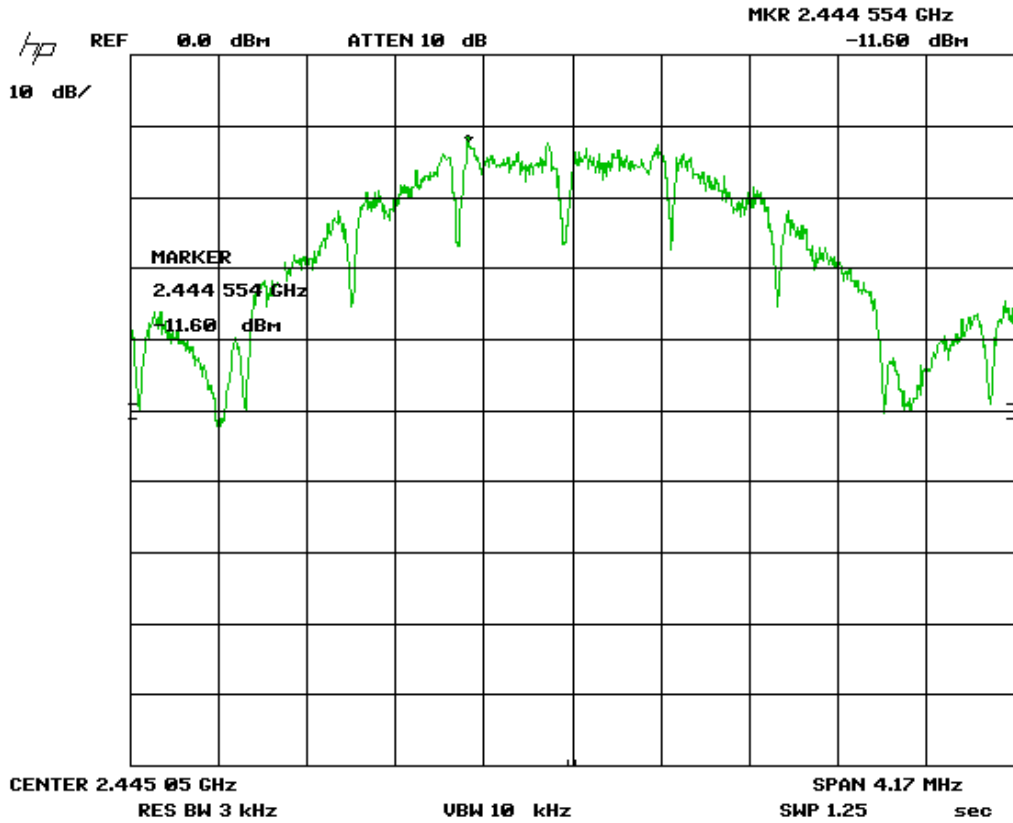
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


High Channel (10 dB external attenuator)



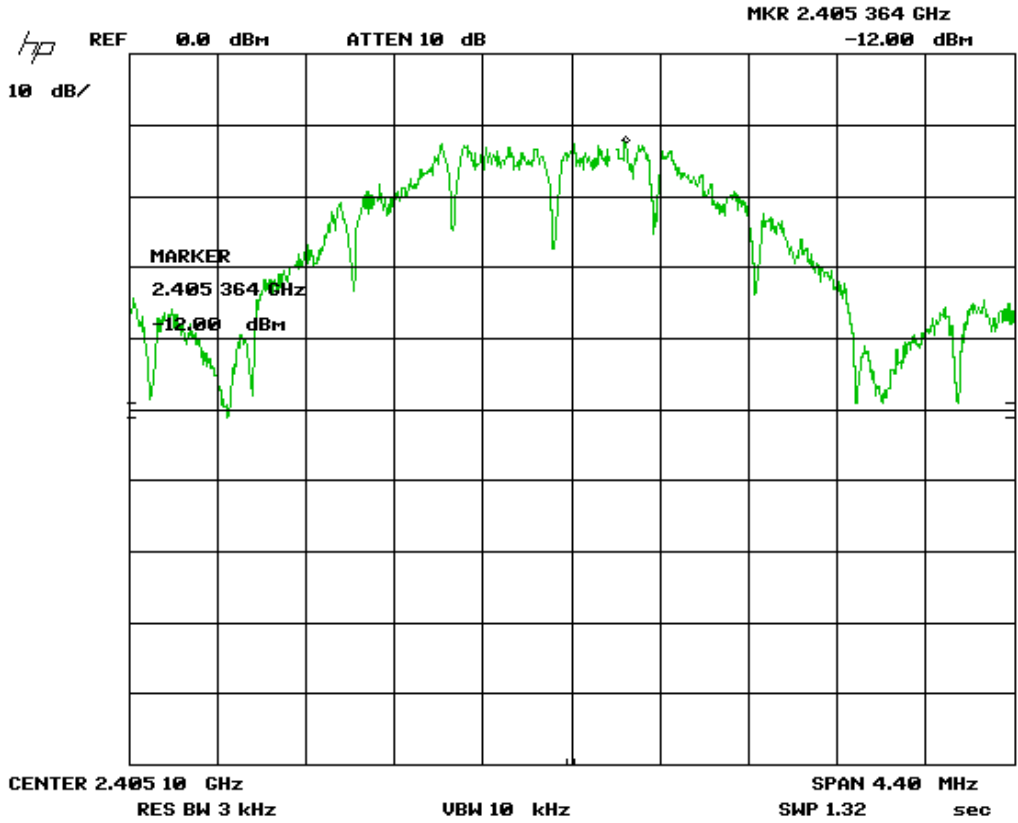
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Mid Channel (10 dB external attenuator)




| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Low Channel (10 dB external attenuator)




Note: See 'Appendix B – EUT & Test Setup Photographs' for photos showing the test set-up.

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Test Equipment List

| Equipment | Model No. | Manufacturer | Last calibration date | Next calibration due date | Asset # |
|--------------------|------------------------|--------------|-----------------------|---------------------------|----------|
| Attenuator 10 dB | 8493B | Agilent | NCR | NCR | GEMC 133 |
| Spectrum Analyzer | 8566B | HP | 12/21/ 2011 | 12/21/2013 | GEMC 141 |
| Quasi Peak Adapter | 85650A | HP | 12/21/ 2011 | 12/21/2013 | GEMC 7 |
| RF Cable 1m | LMR-400-1M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 29 |

This report module is based on GEMC template "FCC – Power Line Conducted Emissions Class B_Rev1"

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


Maximum Permissible Exposure

Purpose

The purpose of this test is to ensure that the RF energy intentionally transmitted, in terms of power density emitted from the EUT at a stated operating distance does not exceed the limits listed below as defined in the applicable test standard, as calculated based upon readings obtained during testing. This helps protect human exposure to excessive RF fields.

Limit(s) and Method

The limits, as defined in FCC 15.247(i) and FCC 1.1310 Table 1 (B) limits for general public exposure was applied. The limit for the frequency range of 1.5 GHz to 100 GHz was applied. This is a limit of 1.0 mW/cm^2 . The distance used for calculations was 20cm, as this is the minimum distance an operator will be from the EUT during normal operation, as stated by the manufacturer.

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Results

The EUT passed the requirements. The worst case calculated power density was 0.02 mW/cm², this is significantly under the 1.0 mW/cm² requirement.

Calculations

Method 1 (conducted power)

Internal antenna

$$P_d = (P_t * G) / (4 * \pi * R^2)$$

Where $P_t = 12.8$ dBm or 19.1 mW as per Peak power conducted output


Where $G = 0$ dBi, or numerically 1.0

Where $R = 20$ cm

$$P_d = (19.1 \text{ mW} * 1.0) / (4 * \pi * 20\text{cm}^2)$$

$$P_d = 19.1 \text{ mW} / 5026 \text{ cm}^2$$

$$P_d = 0.004 \text{ mW/cm}^2$$

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Power Line Conducted Emissions

Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT's power line does not exceed the limits listed below as defined in the applicable test standard, as measured from a LISN. This helps protect lower frequency radio services such as AM radio, shortwave radio, amateur radio operators, maritime radio, CB radio, and so on, from unwanted interference.

Limits & Method

The limits are as defined in 47 CFR FCC Part 15 Section 15.207


Method is as defined in ANSI C64:2003

| Average Limits | | QuasiPeak Limits | |
|-------------------|---------------|-------------------|---------------|
| 150 kHz – 500 kHz | 56 to 46 dBuV | 150 kHz – 500 kHz | 66 to 56 dBuV |
| 500 kHz – 5 MHz | 46 dBuV | 500 kHz – 5 MHz | 56 dBuV |
| 5 MHz – 30 MHz | 50 dBuV | 500 kHz – 30 MHz | 60 dBuV |

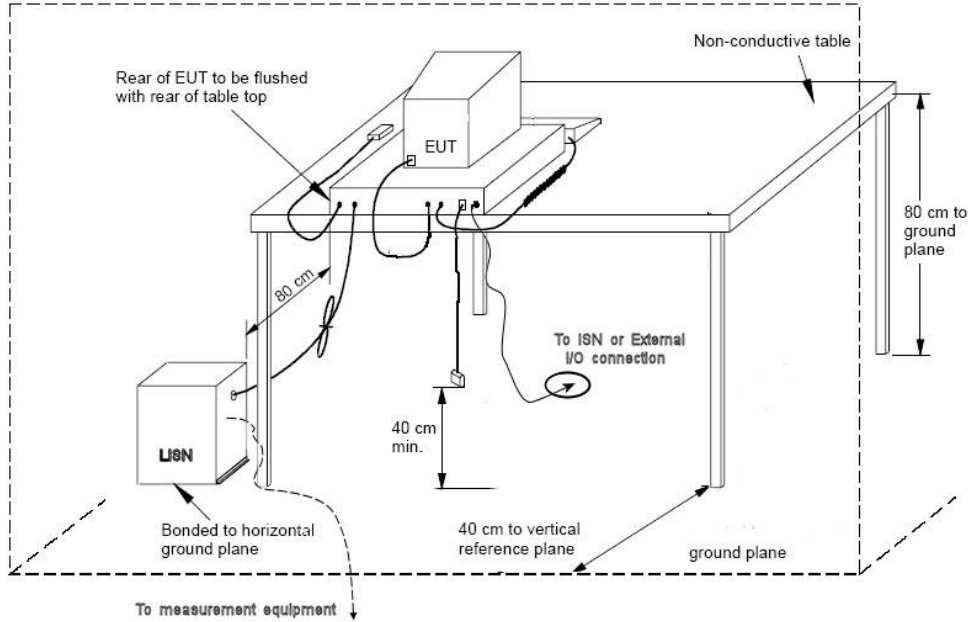
The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

Note: If the Peak or Quasi Peak detector measurements do not exceed the Average limits, then the EUT is deemed to have passed the requirements.

Both limits are applicable, and each is specified as being measured with a 9 kHz measurement bandwidth.

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Typical Setup Diagram




Measurement Uncertainty

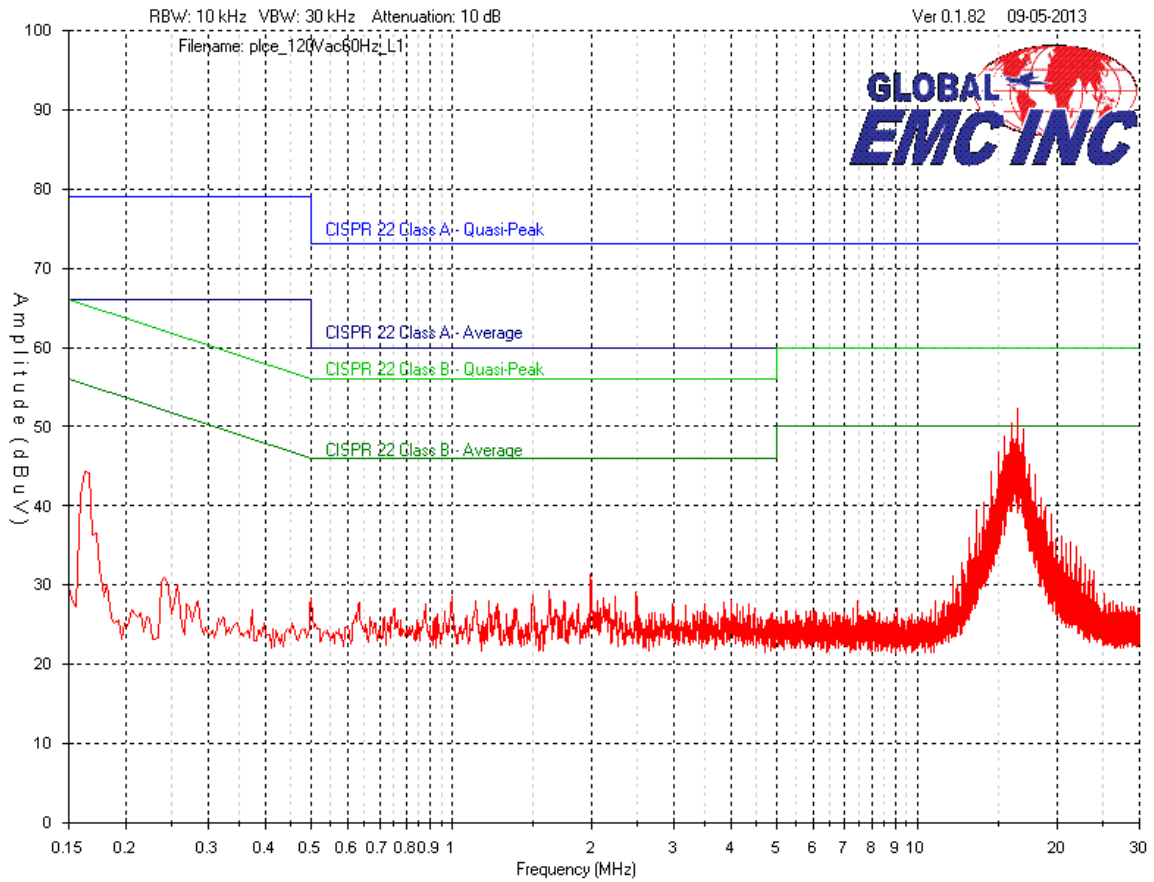
The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is +/-3.6 dB with a 'k=2' coverage factor and a 95% confidence level.


Preliminary Graphs

Note the graphs shown below are for graphical illustration only. For final measurements with the appropriate detector where applicable, please refer to the table. The graph shown below is a peak measurement graph, measured with a resolution bandwidth greater then or equal to the final required detector. These graphs are performed as a worst case measurement to enable the detection of frequencies of concern and for considerable time savings.

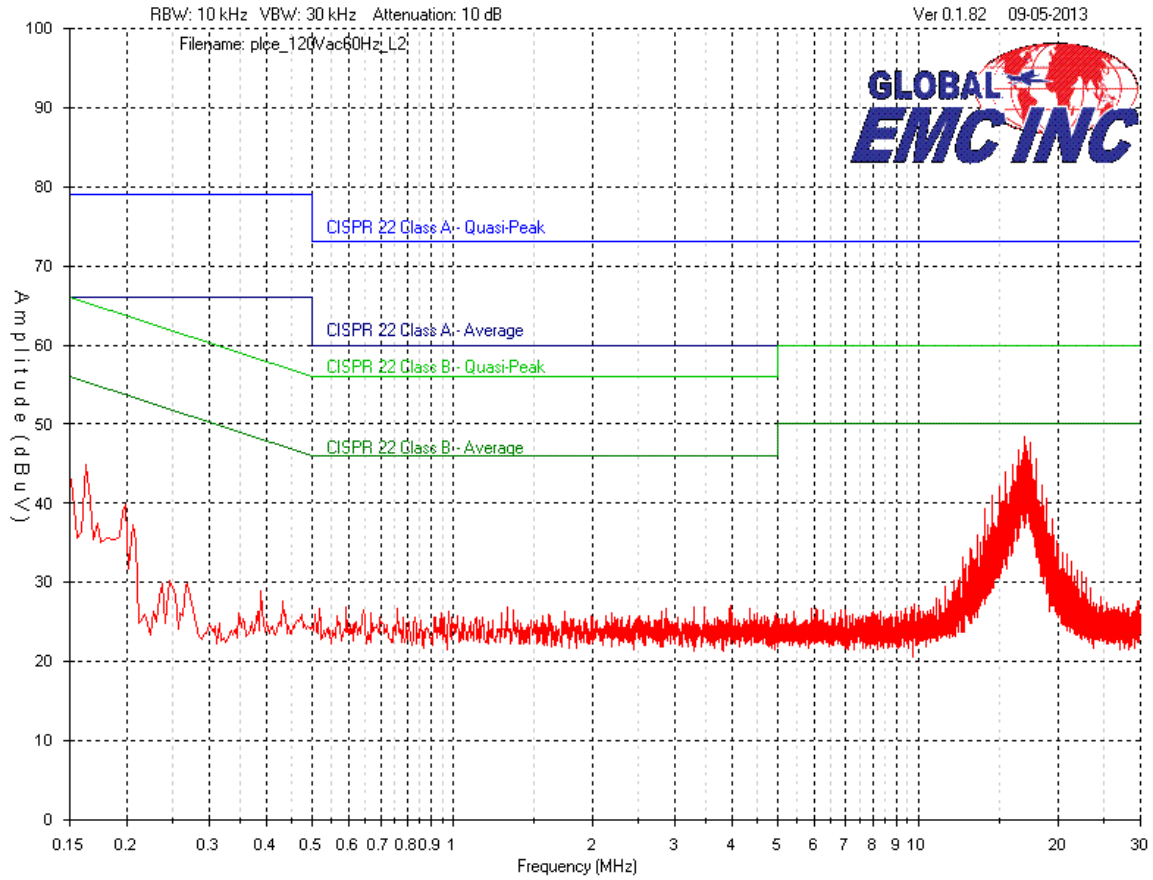
| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |


L1(Line) – 120Vac 60Hz



| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

L2 (Neutral) – 120Vac 60Hz




| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Final Measurements

| Product Category | | Class B | | | | | | |
|-------------------------|------------|-------------------|-----------------|------------------|--------------|------------|-------------|-----------|
| Product | | Zigbee Pro Module | | | | | | |
| Supply | | 120 VAC 60 Hz | | | | | | |
| L1 (Line) - Average | | | | | | | | |
| Frequency (MHz) | Raw (dBUV) | Atten Factor (dB) | Cable Loss (dB) | LISN Factor (dB) | Level (dBUV) | Limit (dB) | Margin (dB) | Pass/Fail |
| 16.441 | 35.9 | 10 | 0.2 | 0.1 | 46.2 | 50 | 3.8 | Pass |
| 15.9348 | 35.4 | 10 | 0.2 | 0.2 | 45.8 | 50 | 4.2 | Pass |
| 16.9341 | 33 | 10 | 0.2 | 0.1 | 43.3 | 50 | 6.7 | Pass |
| 15.4449 | 33.6 | 10 | 0.2 | 0.2 | 44 | 50 | 6 | Pass |
| 16.0613 | 33.1 | 10 | 0.2 | 0.1 | 43.4 | 50 | 6.6 | Pass |
| 16.3112 | 33.2 | 10 | 0.2 | 0.1 | 43.5 | 50 | 6.5 | Pass |
| L2 (Neutral) - Average | | | | | | | | |
| 16.9406 | 32.8 | 10 | 0.2 | 0.1 | 43.1 | 50 | 6.9 | Pass |
| 17.4338 | 32.6 | 10 | 0.2 | 0.1 | 42.9 | 50 | 7.1 | Pass |
| 17.0542 | 31.9 | 10 | 0.2 | 0.1 | 42.2 | 50 | 7.8 | Pass |
| 16.4377 | 31.7 | 10 | 0.2 | 0.1 | 42 | 50 | 8 | Pass |
| 17.184 | 31.4 | 10 | 0.2 | 0.1 | 41.7 | 50 | 8.3 | Pass |
| 16.8173 | 31.1 | 10 | 0.2 | 0.1 | 41.4 | 50 | 8.6 | Pass |

Notes:


1. No peak emissions exceeded power line conducted emission quasi-peak limits; therefore, the unit was deemed to meet power line conducted emission quasi-peak requirements base on peak emissions.
2. The EUT was installed in a VT8000 thermostat and. Power line conducted emissions was performed on the 24 Vac transformer.
3. See 'Appendix B – EUT & Test Setup Photographs' for photos showing the test set-up for the highest line conducted emission

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Test Equipment List

| Equipment | Model No. | Manufacturer | Last calibration date | Next calibration due date | Asset # |
|-------------------|-------------------------|-----------------|-----------------------|---------------------------|----------|
| Spectrum Analyzer | ESL 6 | Rohde & Schwarz | Oct-06, 2011 | Oct-06, 2013 | GEMC 160 |
| LISN | FCC-LISN-50/250-16-2-01 | FCC | Feb 03, 2011 | Feb 03, 2013 | GEMC 65 |
| RF Cable 7m | LMR-400-7M-50OHM-MN-MN | LexTec | NCR | NCR | GEMC 28 |

This report module is based on GEMC template "FCC – Power Line Conducted Emissions Class B_Rev1"


| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Appendix A – EUT Summary


For further details for filing purposes, refer to filing package.

General EUT Description


| Client | |
|--|--|
| Organization | Viconics Electronics Inc. 9245 Langelier Blvd. Montreal, Quebec, Canada, H1P 3K9 |
| Contact | Paolo Primiani |
| Phone | 514-321-5660 |
| Email | Paolo.Primiani@schneider-electric.com |
| EUT Details | |
| EUT Name (for report title) | VTP Transceiver card |
| EUT Model / SN (if known) | VTP |
| FCC ID | V95-VTP |
| Industry Canada # | 7591A-VTP |
| Equipment category | Wireless module |
| EUT is powered using | DC |
| Input voltage range(s) (V) | 6.5Vdc – 9Vdc |
| Frequency range(s) (Hz) | DC |
| Rated input current (A) | 0.08A |
| Nominal power consumption (W) | 0.3W |
| Number of power supplies in EUT | 1 |
| Transmits RF energy? (describe) | Yes |
| Basic EUT functionality description | EUT is a wireless module for sending data related to temperature and humidity. |

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Note the EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see ‘Appendix B – EUT & Test Setup Photographs’.

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Appendix B – EUT and Test Setup Photographs

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

Note: These photos are for information purposes only. Also refer to PDF files that are separate from this test report.

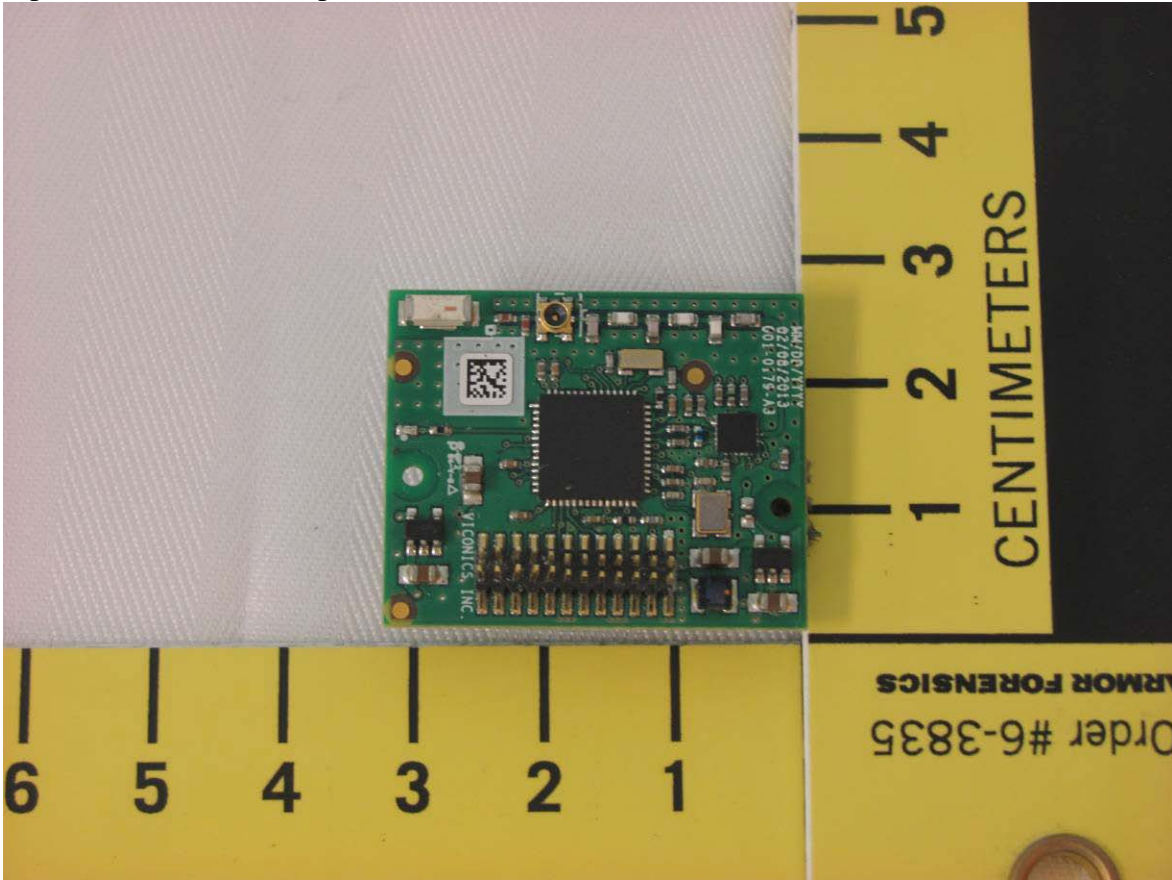



Illustration 1: EUT front view

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

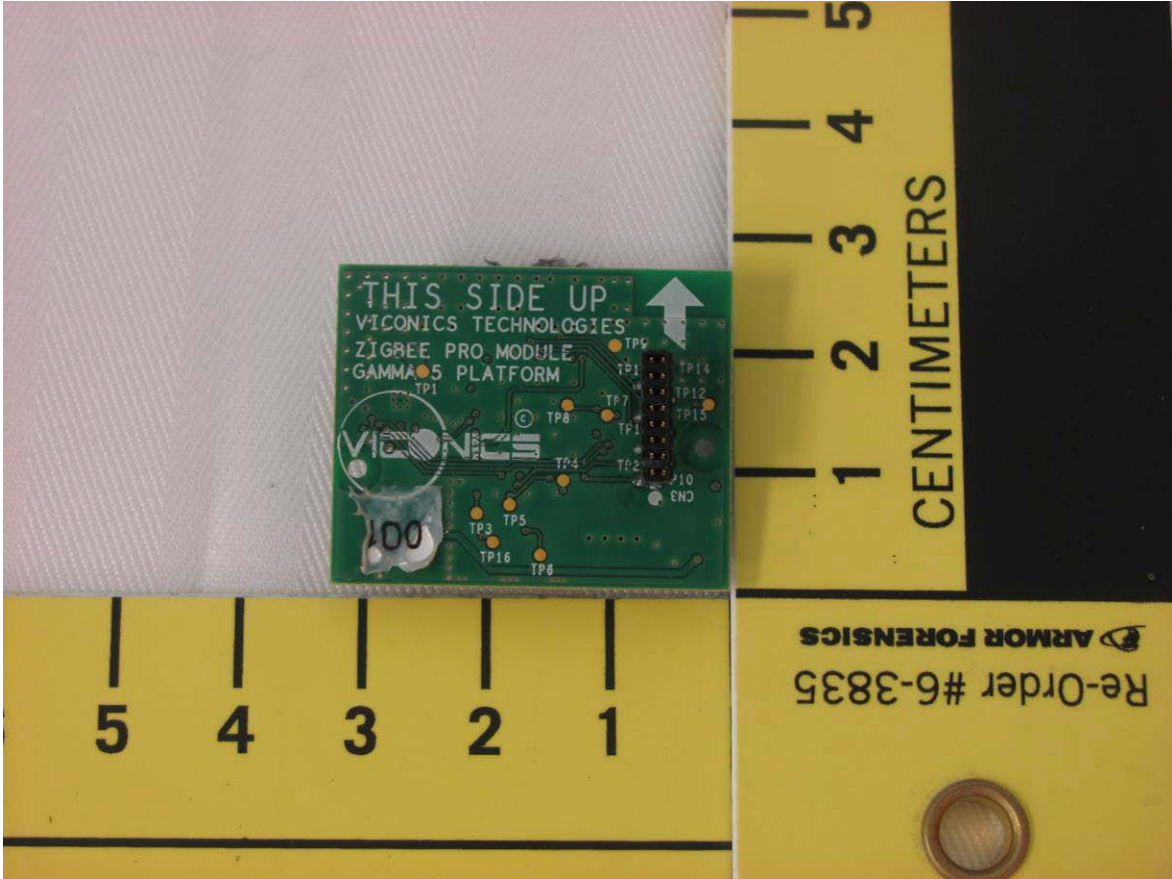


Illustration 2: EUT rear view


| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |



Illustration 3: Radiated emission setup – photo 1


| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |



Illustration 4: Radiated emission setup - photo 2

| | | |
|-------------|--|--|
| Client | Viconics Technologies Inc | |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |



Illustration 5: Radiated setup - photo 3



| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |



Illustration 6: Antenna conducted emission setup

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

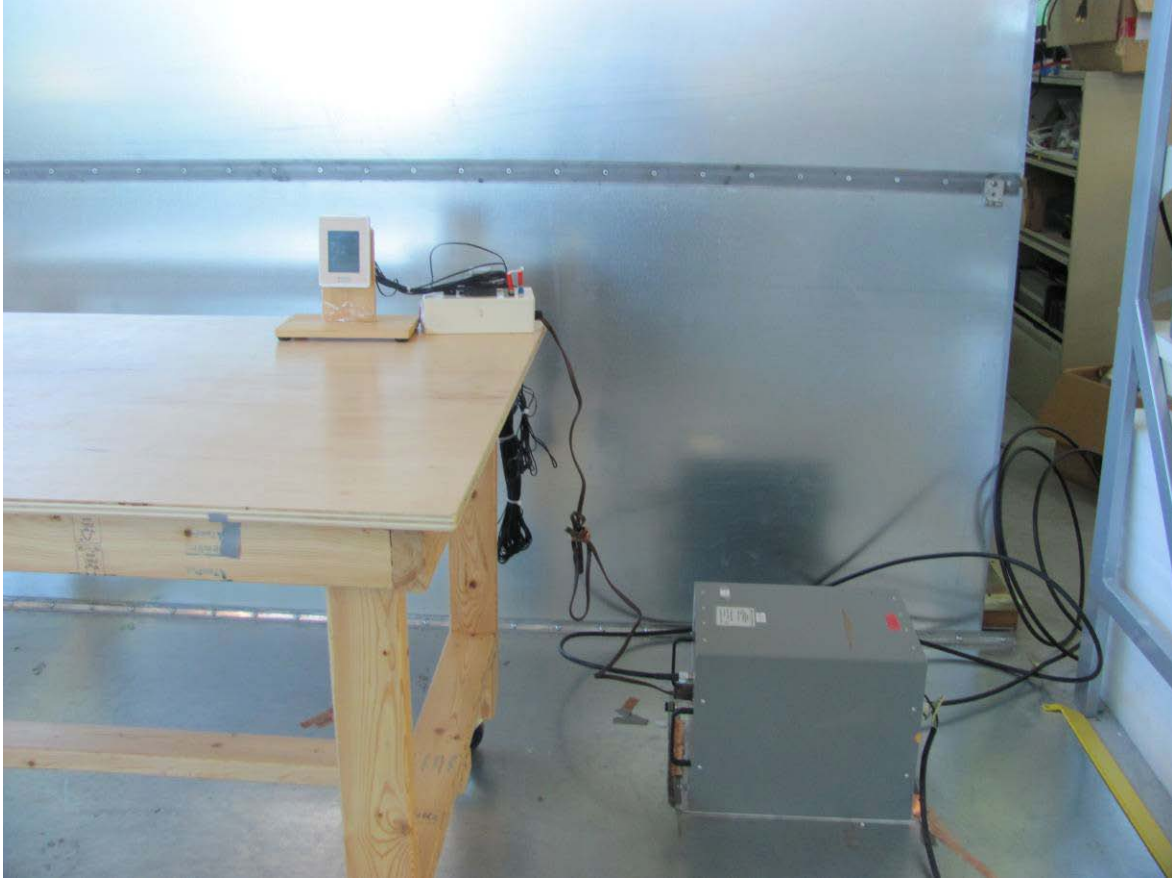



Illustration 7: Power line conducted emission setup – photo 1

| | | |
|-------------|--|---|
| Client | Viconics Technologies Inc |  |
| Product | VTGP Transceiver Card | |
| Standard(s) | RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013 | |

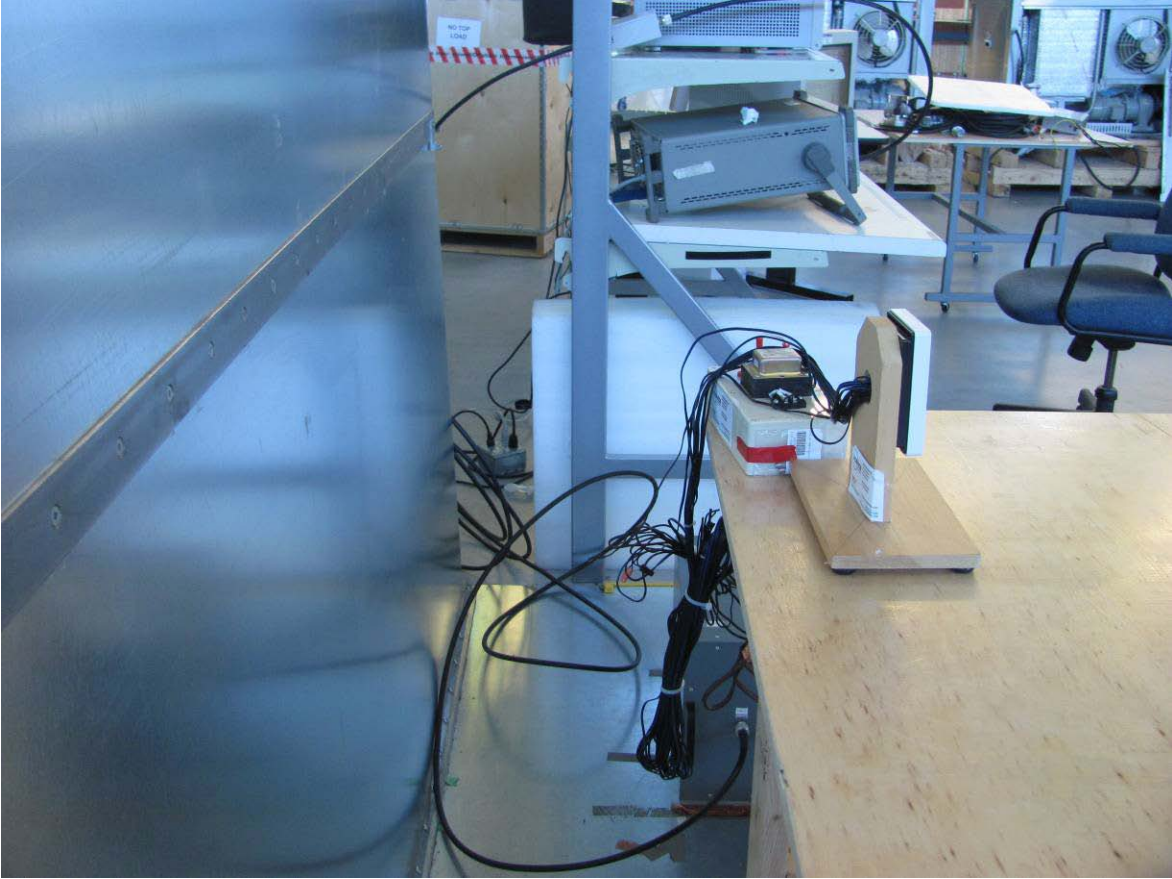


Illustration 8: Power line conducted emission – photo 2