



TEST REPORT

Report Number: 102811224MIN-002
Project Number: G102811224

Testing performed on the
MR102
FCC ID: RUVBIB2
IC: 22443-MR102

to
47 CFR Part 15. 225:2016
RSS- 210, Issue 9, 2016
RSS-Gen, Issue 4, 2014
47 CFR, Part 15:2016, §15.107 and §15.109, Class / ICES-003, Issue 6:2016

For
Bibliotheca LLC

Test Performed by:
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Oakdale, MN 55128 USA

Test Authorized by:
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Date of issue: January 10, 2017

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1.0 GENERAL DESCRIPTION

| | |
|-------------------------------------|---|
| Model: | MR102 with AC/DC Power Supply manufactured by XP Power model: VEC40US12 |
| Type of EUT: | RFID |
| Serial Number: | 5671330 |
| FCC ID: | RUVBIB2 |
| IC: | 22443-MR102 |
| Related Submittal(s) Grants: | None |
| Company: | Bibliotheca LLC |
| Customer: | Mr. Seth Liefert |
| Address: | 403 Hayward Avenue North Oakdale, MN 55128 USA |
| Phone: | (678) 336-7980 x 358 |
| e-mail: | S.Liefert@bibliotheca.com |
| Test Standards: | <input checked="" type="checkbox"/> 47 CFR, Part 15:2016, §15.225 <input checked="" type="checkbox"/> RSS-210, Issue 9, 2016 <input checked="" type="checkbox"/> RSS-Gen, Issue 4, 2014 <input checked="" type="checkbox"/> 47 CFR, Part 15:2016, §15.107 and §15.109, Class B, test method: ANSI C63.4-2014 <input checked="" type="checkbox"/> ICES-003, Issue 6:2016 <input type="checkbox"/> Other [REDACTED] |
| Type of radio: | <input checked="" type="checkbox"/> Stand -alone <input type="checkbox"/> Module <input type="checkbox"/> Hybrid |
| Date Sample Submitted: | December 5, 2016 |
| Test Work Started: | December 5, 2016 |
| Test Work Completed: | January 5, 2017 |
| Test Sample Conditions: | <input type="checkbox"/> Damaged <input type="checkbox"/> Poor (Usable) <input checked="" type="checkbox"/> Good |



1.1 Product Description; Test Facility

| | |
|---|--|
| Product Description: | RFID Transmitter |
| Operating Frequency | 13.56MHz |
| Modulation: | FSK |
| Emission Designator: | 6K1A1D |
| Antenna(s) Info: | <p>Antenna 1 Magnetic Loop by Bibliotheca, model: RFID selfCheck 500 shielded. Gain 0 dBi, Connector SMA, s/n 10002015</p> <p>Antenna 2: Magnetic Loop by Bibliotheca, model: RFID selfCheck. Gain 0 dBi, Connector SMA s/n 10002643</p> <p>Antenna 3: Magnetic Loop by Bibliotheca, model: RFID workstation shielded. Gain 0 dBi, Connector SMA, Black Plexiglas</p> <p>Antenna 4: Magnetic Loop by Bibliotheca, model: selfCheck 1000. Gain 0 dBi, Connector SMA, s/n 1879</p> <p>Antenna 5: Magnetic Loop by Bibliotheca, model: 78-8129-3044-0 hybrid selfCheck. Gain 0 dBi, Connector SMA</p> <p>Antenna 6: Magnetic Loop by Bibliotheca, model: RFID workstation/P12. Gain 0 dBi, Connector SMA, s/n PP1200544</p> <p>Antenna 7: Magnetic Loop by Bibliotheca, model: hybrid workstation/M946. Gain 0 dBi, Connector SMA, s/n 9400130</p> |
| Antenna Installation: | <input type="checkbox"/> User <input checked="" type="checkbox"/> Professional <input type="checkbox"/> Factory |
| Transmitter Power Configuration: | <input type="checkbox"/> Internal battery <input checked="" type="checkbox"/> External power source <input checked="" type="checkbox"/> 100-240VAC 1.7 Amp. <input checked="" type="checkbox"/> 50/60Hz |
| Special Test Arrangement: | None |
| Test Facility Accreditation: | A2LA (Certificate No. 1427.01) |
| Test Methodology: | Measurements performed according to the procedures in ANSI C63.10-2013 |



1.2 EUT Configuration

The equipment under test was operated during the measurement under the following conditions:

- Standby
- Continuous (See below)
- Continuous un-modulated
- Test program (customer specific)
- [REDACTED]

Operating modes of the EUT:

| No. | Description |
|-----|---------------------------|
| 1 | Continuous modulated mode |
| 2 | Continuous CW mode |

Cables:

| No. | Type | Length | Designation | Note |
|-----|---------------------------------------|--------|-------------|------|
| 1 | 3 wire unshielded | 1.6 m | AC Power | |
| 2 | 2 wires unshelled | 1.2 m | DC Power | |
| 3 | Shielded, USB | 1.6 m | USB cable | |
| 4. | Shielded, with pre-installed ferrites | 1.9 m | Antenna | |

Support equipment/Services:

| No. | Item | Description |
|-----|------------------------|-------------------|
| 1 | HP model EliteBook | Laptop |
| 2 | Agilent, model: E7402A | Spectrum Analyzer |

Note: RF ID MR102 is transmitter only, and has no receiver portion.

1.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal

Temperature: 15-35°C

Humidity: 30-60%

Atmospheric pressure: 86-106kPa

Extreme

Temperature: -20 to +50°C

Primary Supply Voltage: ± 15%



1.4 Measurement uncertainty

The expanded uncertainty ($k = 2$) for radiated emissions from 30 to 1000 MHz has been determined to be: ± 4 dB at 10m and ± 5.4 dB at 3m

The expanded uncertainty ($k = 2$) for radiated emissions above 1GHz has been determined to be: ± 6.4 dB at 3m

The expanded uncertainty ($k = 2$) for conducted emissions from 150 kHz to 30 MHz has been determined to be: ± 2.6 dB

1.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured emissions reading on the EMI Receiver.

The basic equation with a sample calculation is as follows:

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

Where: FS = Field Strength in dB(μ V/m)

RA = Receiver Amplitude in dB(μ V)

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB(m^{-1})

AG = Amplifier Gain in dB

Assume a receiver reading of 48.1 dB(μ V) is obtained. The antenna factor of 7.4 dB(m^{-1}) and cable factor of 1.6 dB is added and amplifier gain of 16.0 dB is subtracted giving field strength of 41.1 dB(μ V/m).

$$RA = 48.1 \text{ dB}(\mu\text{V})$$

$$AF = 7.4 \text{ dB}(m^{-1})$$

$$CF = 1.6 \text{ dB}$$

$$AG = 16.0 \text{ dB}$$

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

$$FS = 48.1 + 7.4 + 1.6 - 16.0$$

$$FS = 41.1 \text{ dB}(\mu\text{V}/\text{m})$$

General notes: None



2.0 TEST SUMMARY

Referring to the performance criteria and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards.

| TEST SPECIFICATION | TEST PARAMETERS | RESULT |
|--|---|--------|
| 15.225(a)(b)(c) / RSS-210 A2.6(a)(b)(c) | Field strength within the band of operation | Pass |
| 15.225(d) / RSS-210 A2.6(d) | Out of band emissions | Pass |
| 15.215(c) / RSS- Gen 4.6.1 | Bandwidth of the emission | Pass |
| 15.225(e) / RSS-210 A2.6 | Frequency tolerance | Pass |
| 15.207/RSS-Gen 7.2.2 | Transmitter Power Line conducted emissions | Pass |
| 15.109/ICES-003 | Receiver/digital device radiated emissions | N/A |
| 15.107/ ICES-003 | Receiver/digital device conducted emissions | N/A |



3.0 TEST CONDITIONS AND RESULTS

3.1 Field strength within the band of operation

Test location: OATS Anechoic Chamber Other

Test distance: 10 meters 3 meters

Test result: **Pass**

Max. Emissions margin at fundamental: **29.4dB** below the limits

Max. margin of harmonics and spurious emissions: **23.5dB** below the limits

- Notes:**
1. The Emissions pre-scan was performed in the Anechoic chamber at 3m measurement distance; final measurements were performed in the Open Area Test Site at 10m measurement distance (see Tables 3.1. - 3.1.7).
 2. RBW=9 kHz
-



| | | |
|----------------------------------|---|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(a)(b)(c) / RSS-210 A2.6(a)(b)(c) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: Black Plexiglas | |

Table 3.1.1

| Frequency | Ant. Orientation | Peak Reading dBμV | Ant.Factor dB1/m | Total at 10m dBμV/m | Limit dBμV/m | Margin dB |
|------------|------------------|-------------------|------------------|---------------------|--------------|-----------|
| 12.600 MHz | Front | -3.1 | 34.7 | 31.6 | 59.6 | -28.0 |
| 13.110 MHz | Front | 1.2 | 34.7 | 35.9 | 59.6 | -23.7 |
| 13.410 MHz | Front | 0.7 | 34.7 | 35.4 | 59.6 | -24.2 |
| 13.553 MHz | Front | 0.6 | 34.7 | 35.3 | 69.6 | -34.3 |
| 13.560 MHz | Front | 28.3 | 34.7 | 63.0 | 103.1 | -40.1 |
| 13.567 MHz | Front | 0.8 | 34.7 | 35.5 | 69.6 | -34.1 |
| 13.710 MHz | Front | -0.3 | 34.7 | 34.4 | 59.6 | -25.2 |
| 14.010 MHz | Front | -0.9 | 34.7 | 33.8 | 59.6 | -25.8 |
| 14.500 MHz | Front | -3.1 | 34.7 | 31.6 | 59.6 | -28.0 |
| 12.600 MHz | Side | -5.3 | 34.7 | 29.4 | 59.6 | -30.2 |
| 13.110 MHz | Side | -2.9 | 34.7 | 31.8 | 59.6 | -27.8 |
| 13.410 MHz | Side | -0.9 | 34.7 | 33.8 | 59.6 | -25.8 |
| 13.553 MHz | Side | 0.7 | 34.7 | 35.4 | 69.6 | -34.2 |
| 13.560 MHz | Side | 29.5 | 34.7 | 64.2 | 103.1 | -38.9 |
| 13.567 MHz | Side | 0.8 | 34.7 | 35.5 | 69.6 | -34.1 |
| 13.710 MHz | Side | 0.3 | 34.7 | 35.0 | 59.6 | -24.6 |
| 14.010 MHz | Side | -0.4 | 34.7 | 34.3 | 59.6 | -25.3 |
| 14.500 MHz | Side | -4.2 | 34.5 | 30.3 | 59.6 | -29.3 |



| | | |
|----------------------------------|---|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(a)(b)(c) / RSS-210 A2.6(a)(b)(c) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: s/n: 10002643 | |

Table 3.1.2

| Frequency | Ant. Orientation | Peak Reading dBμV | Ant.Factor dB1/m | Total at 10m dBμV/m | Limit dBμV/m | Margin dB |
|------------|------------------|-------------------|------------------|---------------------|--------------|-----------|
| 12.600 MHz | Front | -2.7 | 34.7 | 32.0 | 59.6 | -27.6 |
| 13.110 MHz | Front | -1.9 | 34.7 | 32.8 | 59.6 | -26.8 |
| 13.410 MHz | Front | -0.9 | 34.7 | 33.8 | 59.6 | -25.8 |
| 13.553 MHz | Front | 1.3 | 34.7 | 36.0 | 69.6 | -33.6 |
| 13.560 MHz | Front | 37.6 | 34.7 | 72.3 | 103.1 | -30.8 |
| 13.567 MHz | Front | 1.6 | 34.7 | 36.3 | 69.6 | -33.3 |
| 13.710 MHz | Front | 0.1 | 34.7 | 34.8 | 59.6 | -24.8 |
| 14.010 MHz | Front | -2.3 | 34.7 | 32.4 | 59.6 | -27.2 |
| 14.500 MHz | Front | -4.1 | 34.7 | 30.6 | 59.6 | -29.0 |
| 12.600 MHz | Side | -3.9 | 34.7 | 30.8 | 59.6 | -28.8 |
| 13.110 MHz | Side | -1.9 | 34.7 | 32.8 | 59.6 | -26.8 |
| 13.410 MHz | Side | 0.3 | 34.7 | 35.0 | 59.6 | -24.6 |
| 13.553 MHz | Side | 1.0 | 34.7 | 35.7 | 69.6 | -33.9 |
| 13.560 MHz | Side | 37.8 | 34.7 | 72.5 | 103.1 | -30.6 |
| 13.567 MHz | Side | 1.3 | 34.7 | 36.0 | 69.6 | -33.6 |
| 13.710 MHz | Side | 0.7 | 34.7 | 35.4 | 59.6 | -24.2 |
| 14.010 MHz | Side | 0.1 | 34.7 | 34.8 | 59.6 | -24.8 |
| 14.500 MHz | Side | -4.3 | 34.5 | 30.2 | 59.6 | -29.4 |



| | | |
|----------------------------------|---|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(a)(b)(c) / RSS-210 A2.6(a)(b)(c) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: s/n: 10002015 | |

Table 3.1.3

| Frequency | Ant. Orientation | Peak Reading dBμV | Ant.Factor dB1/m | Total at 10m dBμV/m | Limit dBμV/m | Margin dB |
|------------|------------------|-------------------|------------------|---------------------|--------------|-----------|
| 12.600 MHz | Front | -3.9 | 34.7 | 30.8 | 59.6 | -28.8 |
| 13.110 MHz | Front | 1.1 | 34.7 | 35.8 | 59.6 | -23.8 |
| 13.410 MHz | Front | 1.0 | 34.7 | 35.7 | 59.6 | -23.9 |
| 13.553 MHz | Front | 1.6 | 34.7 | 36.3 | 69.6 | -33.3 |
| 13.560 MHz | Front | 35.6 | 34.7 | 70.3 | 103.1 | -32.8 |
| 13.567 MHz | Front | 1.9 | 34.7 | 36.6 | 69.6 | -33.0 |
| 13.710 MHz | Front | 1.3 | 34.7 | 36.0 | 59.6 | -23.6 |
| 14.010 MHz | Front | 1.0 | 34.7 | 35.7 | 59.6 | -23.9 |
| 14.500 MHz | Front | -4.0 | 34.7 | 30.7 | 59.6 | -28.9 |
| 12.600 MHz | Side | -5.1 | 34.7 | 29.6 | 59.6 | -30.0 |
| 13.110 MHz | Side | 1.0 | 34.7 | 35.7 | 59.6 | -23.9 |
| 13.410 MHz | Side | 1.1 | 34.7 | 35.8 | 59.6 | -23.8 |
| 13.553 MHz | Side | 1.3 | 34.7 | 36.0 | 69.6 | -33.6 |
| 13.560 MHz | Side | 35.8 | 34.7 | 70.5 | 103.1 | -32.6 |
| 13.567 MHz | Side | 1.9 | 34.7 | 36.6 | 69.6 | -33.0 |
| 13.710 MHz | Side | 1.4 | 34.7 | 36.1 | 59.6 | -23.5 |
| 14.010 MHz | Side | 0.9 | 34.7 | 35.6 | 59.6 | -24.0 |
| 14.500 MHz | Side | -4.9 | 34.5 | 29.6 | 59.6 | -30.0 |



| | | |
|----------------------------------|---|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(a)(b)(c) / RSS-210 A2.6(a)(b)(c) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: s/n: 9400130 | |

Table 3.1.4

| Frequency | Ant. Orientation | Peak Reading dB μ V | Ant.Factor dB1/m | Total at 10m dB μ V/m | Limit dB μ V/m | Margin dB |
|------------|------------------|-------------------------|------------------|---------------------------|--------------------|-----------|
| 12.600 MHz | Front | -3.1 | 34.7 | 31.6 | 59.6 | -28.0 |
| 13.110 MHz | Front | -2.9 | 34.7 | 31.8 | 59.6 | -27.8 |
| 13.410 MHz | Front | -1.1 | 34.7 | 33.6 | 59.6 | -26.0 |
| 13.553 MHz | Front | 1.1 | 34.7 | 35.8 | 69.6 | -33.8 |
| 13.560 MHz | Front | 37.2 | 34.7 | 71.9 | 103.1 | -31.2 |
| 13.567 MHz | Front | 1.4 | 34.7 | 36.1 | 69.6 | -33.5 |
| 13.710 MHz | Front | 0.1 | 34.7 | 34.8 | 59.6 | -24.8 |
| 14.010 MHz | Front | -2.3 | 34.7 | 32.4 | 59.6 | -27.2 |
| 14.500 MHz | Front | -3.6 | 34.7 | 31.1 | 59.6 | -28.5 |
| 12.600 MHz | Side | -3.4 | 34.7 | 31.3 | 59.6 | -28.3 |
| 13.110 MHz | Side | -3.0 | 34.7 | 31.7 | 59.6 | -27.9 |
| 13.410 MHz | Side | 1.1 | 34.7 | 35.8 | 59.6 | -23.8 |
| 13.553 MHz | Side | 1.3 | 34.7 | 36.0 | 69.6 | -33.6 |
| 13.560 MHz | Side | 39.0 | 34.7 | 73.7 | 103.1 | -29.4 |
| 13.567 MHz | Side | 1.6 | 34.7 | 36.3 | 69.6 | -33.3 |
| 13.710 MHz | Side | 0.4 | 34.7 | 35.1 | 59.6 | -24.5 |
| 14.010 MHz | Side | 0.2 | 34.7 | 34.9 | 59.6 | -24.7 |
| 14.500 MHz | Side | -2.9 | 34.5 | 31.6 | 59.6 | -28.0 |



| | | |
|----------------------------------|---|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(a)(b)(c) / RSS-210 A2.6(a)(b)(c) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: s/n: P1200544 | |

Table 3.1.5

| Frequency | Ant. Orientation | Peak Reading dBμV | Ant.Factor dB1/m | Total at 10m dBμV/m | Limit dBμV/m | Margin dB |
|------------|------------------|-------------------|------------------|---------------------|--------------|-----------|
| 12.600 MHz | Front | -3.7 | 34.7 | 31.0 | 59.6 | -28.6 |
| 13.110 MHz | Front | 1.2 | 34.7 | 35.9 | 59.6 | -23.7 |
| 13.410 MHz | Front | 0.9 | 34.7 | 35.6 | 59.6 | -24.0 |
| 13.553 MHz | Front | 1.1 | 34.7 | 35.8 | 69.6 | -33.8 |
| 13.560 MHz | Front | 34.5 | 34.7 | 69.2 | 103.1 | -33.9 |
| 13.567 MHz | Front | 1.2 | 34.7 | 35.9 | 69.6 | -33.7 |
| 13.710 MHz | Front | 1.4 | 34.7 | 36.1 | 59.6 | -23.5 |
| 14.010 MHz | Front | 0.9 | 34.7 | 35.6 | 59.6 | -24.0 |
| 14.500 MHz | Front | -3.7 | 34.7 | 31.0 | 59.6 | -28.6 |
| 12.600 MHz | Side | -5.0 | 34.7 | 29.7 | 59.6 | -29.9 |
| 13.110 MHz | Side | 1.4 | 34.7 | 36.1 | 59.6 | -23.5 |
| 13.410 MHz | Side | 1.4 | 34.7 | 36.1 | 59.6 | -23.5 |
| 13.553 MHz | Side | 0.1 | 34.7 | 34.8 | 69.6 | -34.8 |
| 13.560 MHz | Side | 22.2 | 34.7 | 56.9 | 103.1 | -46.2 |
| 13.567 MHz | Side | 0.1 | 34.7 | 34.8 | 69.6 | -34.8 |
| 13.710 MHz | Side | 0.3 | 34.7 | 35.0 | 59.6 | -24.6 |
| 14.010 MHz | Side | 0.7 | 34.7 | 35.4 | 59.6 | -24.2 |
| 14.500 MHz | Side | -4.8 | 34.5 | 29.7 | 59.6 | -29.9 |



| | | |
|----------------------------------|---|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(a)(b)(c) / RSS-210 A2.6(a)(b)(c) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: s/n: 1879 | |

Table 3.1.6

| Frequency | Ant. Orientation | Peak Reading dB μ V | Ant.Factor dB1/m | Total at 10m dB μ V/m | Limit dB μ V/m | Margin dB |
|------------|------------------|-------------------------|------------------|---------------------------|--------------------|-----------|
| 12.600 MHz | Front | -4.1 | 34.7 | 30.6 | 59.6 | -29.0 |
| 13.110 MHz | Front | -0.3 | 34.7 | 34.4 | 59.6 | -25.2 |
| 13.410 MHz | Front | -0.1 | 34.7 | 34.6 | 59.6 | -25.0 |
| 13.553 MHz | Front | 1.1 | 34.7 | 35.8 | 69.6 | -33.8 |
| 13.560 MHz | Front | 39.2 | 34.7 | 73.9 | 103.1 | -29.2 |
| 13.567 MHz | Front | 0.8 | 34.7 | 35.5 | 69.6 | -34.1 |
| 13.710 MHz | Front | -0.6 | 34.7 | 34.1 | 59.6 | -25.5 |
| 14.010 MHz | Front | -1.1 | 34.7 | 33.6 | 59.6 | -26.0 |
| 14.500 MHz | Front | -3.9 | 34.7 | 30.8 | 59.6 | -28.8 |
| | | | | | | |
| 12.600 MHz | Side | -5.1 | 34.7 | 29.6 | 59.6 | -30.0 |
| 13.110 MHz | Side | -2.7 | 34.7 | 32.0 | 59.6 | -27.6 |
| 13.410 MHz | Side | -0.9 | 34.7 | 33.8 | 59.6 | -25.8 |
| 13.553 MHz | Side | 0.9 | 34.7 | 35.6 | 69.6 | -34.0 |
| 13.560 MHz | Side | 32.2 | 34.7 | 66.9 | 103.1 | -36.2 |
| 13.567 MHz | Side | 0.8 | 34.7 | 35.5 | 69.6 | -34.1 |
| 13.710 MHz | Side | 0.1 | 34.7 | 34.8 | 59.6 | -24.8 |
| 14.010 MHz | Side | -1.4 | 34.7 | 33.3 | 59.6 | -26.3 |
| 14.500 MHz | Side | -5.3 | 34.5 | 29.2 | 59.6 | -30.4 |



| | | |
|----------------------------------|---|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(a)(b)(c) / RSS-210 A2.6(a)(b)(c) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: built-in model; 78-8129-3044-0 | |

Table 3.1.7

| Frequency | Ant. Orientation | Peak Reading dB μ V | Ant.Factor dB1/m | Total at 10m dB μ V/m | Limit dB μ V/m | Margin dB |
|------------|------------------|-------------------------|------------------|---------------------------|--------------------|-----------|
| 12.600 MHz | Front | -3.8 | 34.7 | 30.9 | 59.6 | -28.7 |
| 13.110 MHz | Front | -2.7 | 34.7 | 32.0 | 59.6 | -27.6 |
| 13.410 MHz | Front | -1.0 | 34.7 | 33.7 | 59.6 | -25.9 |
| 13.553 MHz | Front | 0.4 | 34.7 | 35.1 | 69.6 | -34.5 |
| 13.560 MHz | Front | 22.5 | 34.7 | 57.2 | 103.1 | -45.9 |
| 13.567 MHz | Front | 0.7 | 34.7 | 35.4 | 69.6 | -34.2 |
| 13.710 MHz | Front | -1.3 | 34.7 | 33.4 | 59.6 | -26.2 |
| 14.010 MHz | Front | -2.3 | 34.7 | 32.4 | 59.6 | -27.2 |
| 14.500 MHz | Front | -3.7 | 34.7 | 31.0 | 59.6 | -28.6 |
| 12.600 MHz | Side | -3.9 | 34.7 | 30.8 | 59.6 | -28.8 |
| 13.110 MHz | Side | -3.3 | 34.7 | 31.4 | 59.6 | -28.2 |
| 13.410 MHz | Side | -1.0 | 34.7 | 33.7 | 59.6 | -25.9 |
| 13.553 MHz | Side | 0.9 | 34.7 | 35.6 | 69.6 | -34.0 |
| 13.560 MHz | Side | 23.8 | 34.7 | 58.5 | 103.1 | -44.6 |
| 13.567 MHz | Side | 0.8 | 34.7 | 35.5 | 69.6 | -34.1 |
| 13.710 MHz | Side | -0.9 | 34.7 | 33.8 | 59.6 | -25.8 |
| 14.010 MHz | Side | -1.9 | 34.7 | 32.8 | 59.6 | -26.8 |
| 14.500 MHz | Side | -3.1 | 34.5 | 31.4 | 59.6 | -28.2 |



3.2 Field strength outside of the band of operation

Test location: OATS Anechoic Chamber Other

Test distance: 10 meters 3 meters

Frequency range of measurements: 0.15MHz-1000MHz

Test result: **Pass**

Max. margin of spurious emissions: 1.2dB below the limits

Notes: The Emissions pre-test in frequency range from 150kHz to 30MHz was performed in the Anechoic chamber at 3m measurement distance (see Graphs 3.2.1 - 3.2.7);
Final measurements were performed in the Open Area Test Site at 10m measurement distance: no emissions above the ambient were detected.
The Emissions test in frequency range from 30MHz to 1GHz was performed in the Anechoic chamber at 3m measurement distance (see Tables 3.2.1 – 3.2.7 and Graphs 3.2.8 – 3.2.15).



| | | |
|----------------------------------|---|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(d) / RSS-210 A2.6(d) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: Black Glass Frequency Range: 30-1000MHz | |

Table 3.2.1

| Frequency MHz | Antenna Polarity | Peak Reading dB μ V | Total C.F. dB1/m | Total at 3m dB μ V/m | Limit dB μ V/m | Margin dB |
|------------------|---------------------|----------------------------|---------------------|-----------------------------|-----------------------|--------------|
| 30.93 MHz | V | 10.1 | 17.9 | 28.0 | 40.0 | -12.0 |
| 81.351 MHz | V | 23.8 | 8.0 | 31.8 | 40.0 | -8.2 |
| 94.926 MHz | V | 25.3 | 12.5 | 37.8 | 43.5 | -5.7 |
| 108.5 MHz | V | 15.9 | 14.0 | 29.9 | 43.5 | -13.6 |
| 401.07 MHz | V | 13.6 | 17.9 | 31.5 | 46.0 | -14.5 |
| 860.03 MHz | V | 12.5 | 23.3 | 35.8 | 46.0 | -10.2 |
| 35.948 MHz | H | 20.5 | 16.9 | 37.4 | 40.0 | -2.6 |
| 81.351 MHz | H | 30.1 | 8.6 | 38.8 | 40.0 | -1.2 |
| 94.882 MHz | H | 24.5 | 11.3 | 35.8 | 43.5 | -7.7 |
| 102.9 MHz | H | 20.1 | 12.7 | 32.7 | 43.5 | -10.8 |
| 203.35 MHz | H | 19.1 | 11.8 | 30.9 | 43.5 | -12.6 |



| | | |
|----------------------------------|--|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(d) / RSS-210 A2.6(d) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: s/n:10002643 Frequency Range: 30-1000MHz | |

Table 3.2.2

| Frequency MHz | Antenna Polarity | Peak Reading dBμV | Total C.F. dB1/m | Total at 3m dBμV/m | Limit dBμV/m | Margin dB |
|------------------|---------------------|----------------------|---------------------|-----------------------|-----------------|--------------|
| 30.416 MHz | V | 9.5 | 18.3 | 27.8 | 40.0 | -12.2 |
| 56.633 MHz | V | 15.7 | 8.1 | 23.8 | 40.0 | -16.2 |
| 94.927 MHz | V | 25.1 | 12.5 | 37.6 | 43.5 | -6.0 |
| 108.51 MHz | V | 22.8 | 14.0 | 36.8 | 43.5 | -6.8 |
| 203.39 MHz | V | 15.6 | 11.9 | 27.5 | 43.5 | -16.0 |
| 844.74 MHz | V | 12.5 | 23.3 | 35.8 | 46.0 | -10.2 |
| 31.004 MHz | H | 8.6 | 19.8 | 28.4 | 40.0 | -11.6 |
| 81.347 MHz | H | 18.9 | 8.6 | 27.6 | 40.0 | -12.4 |
| 94.927 MHz | H | 28.2 | 11.3 | 39.5 | 43.5 | -4.1 |
| 108.51 MHz | H | 25.0 | 13.2 | 38.2 | 43.5 | -5.4 |
| 122.09 MHz | H | 16.9 | 13.6 | 30.5 | 43.5 | -13.0 |
| 176.22 MHz | H | 15.2 | 11.0 | 26.1 | 43.5 | -17.4 |
| 189.88 MHz | H | 16.3 | 10.9 | 27.2 | 43.5 | -16.3 |
| 203.39 MHz | H | 19.6 | 11.8 | 31.4 | 43.5 | -12.1 |
| 908.05 MHz | H | 13.4 | 24.5 | 37.8 | 46.0 | -8.2 |



| | | |
|----------------------------------|--|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(d) / RSS-210 A2.6(d) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: s/n:10002015 Frequency Range: 30-1000MHz | |

Table 3.2.3

| Frequency | Antenna | Peak Reading | Total C.F. | Total at 3m | Limit | Margin |
|------------|---------|--------------|------------|-------------|-------|--------|
| 30.035 MHz | V | 8.8 | 18.6 | 27.3 | 40.0 | -12.7 |
| 30.228 MHz | V | 9.5 | 18.4 | 27.9 | 40.0 | -12.1 |
| 56.78 MHz | V | 15.8 | 8.1 | 23.9 | 40.0 | -16.1 |
| 81.351 MHz | V | 19.0 | 8.0 | 27.0 | 40.0 | -13.0 |
| 94.926 MHz | V | 24.5 | 12.5 | 37.0 | 43.5 | -6.6 |
| 938.88 MHz | V | 12.1 | 23.6 | 35.8 | 46.0 | -10.3 |
| 30.579 MHz | H | 7.8 | 20.0 | 27.8 | 40.0 | -12.2 |
| 81.351 MHz | H | 27.0 | 8.6 | 35.7 | 40.0 | -4.3 |
| 94.926 MHz | H | 24.8 | 11.3 | 36.1 | 43.5 | -7.4 |
| 176.29 MHz | H | 19.5 | 11.0 | 30.5 | 43.5 | -13.0 |
| 189.84 MHz | H | 18.0 | 10.9 | 28.8 | 43.5 | -14.7 |
| 203.35 MHz | H | 15.0 | 11.8 | 26.8 | 43.5 | -16.7 |
| 895.76 MHz | H | 11.8 | 24.6 | 36.4 | 46.0 | -9.6 |

| | | |
|----------------------------------|---|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(d) / RSS-210 A2.6(d) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: Built-in s/n: 9400130 Frequency Range: 30-1000MHz | |

Table 3.2.4

| Frequency | Antenna | Peak Reading | Total C.F. | Total at 3m | Limit | Margin |
|------------|---------|--------------|------------|-------------|-------|--------|
| 30.088 MHz | V | 9.0 | 18.5 | 27.5 | 40.0 | -12.5 |
| 38.984 MHz | V | 11.9 | 13.2 | 25.1 | 40.0 | -14.9 |
| 40.686 MHz | V | 20.7 | 12.4 | 33.2 | 40.0 | -6.8 |
| 81.351 MHz | V | 18.2 | 8.0 | 26.2 | 40.0 | -13.9 |
| 94.926 MHz | V | 19.7 | 12.5 | 32.2 | 43.5 | -11.4 |
| 111.1 MHz | V | 17.8 | 14.1 | 31.8 | 43.5 | -11.7 |
| 112.2 MHz | V | 19.9 | 14.1 | 34.0 | 43.5 | -9.5 |
| 114.5 MHz | V | 20.0 | 14.3 | 34.3 | 43.5 | -9.2 |
| 115.64 MHz | V | 24.2 | 14.3 | 38.6 | 43.5 | -5.0 |
| 116.79 MHz | V | 19.0 | 14.4 | 33.4 | 43.5 | -10.1 |
| 122.02 MHz | V | 22.0 | 14.5 | 36.5 | 43.5 | -7.0 |
| 135.57 MHz | V | 15.5 | 14.1 | 29.6 | 43.5 | -14.0 |
| 897.48 MHz | V | 12.3 | 23.5 | 35.8 | 46.0 | -10.2 |
| | | | | | | |
| 32.071 MHz | H | 8.7 | 19.2 | 27.8 | 40.0 | -12.2 |
| 40.668 MHz | H | 16.4 | 14.3 | 30.7 | 40.0 | -9.3 |
| 67.82 MHz | H | 29.3 | 7.1 | 36.4 | 40.0 | -3.6 |
| 81.351 MHz | H | 20.6 | 8.6 | 29.2 | 40.0 | -10.8 |
| 94.926 MHz | H | 23.9 | 11.3 | 35.2 | 43.5 | -8.4 |
| 108.5 MHz | H | 15.7 | 13.2 | 28.9 | 43.5 | -14.7 |
| 122.02 MHz | H | 24.7 | 13.6 | 38.3 | 43.5 | -5.2 |
| 149.19 MHz | H | 15.3 | 12.4 | 27.7 | 43.5 | -15.9 |
| 162.74 MHz | H | 14.2 | 11.6 | 25.8 | 43.5 | -17.8 |
| | | | | | | |



| | | |
|----------------------------------|--|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(d) / RSS-210 A2.6(d) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: s/n:P1200544 Frequency Range: 30-1000MHz | |

Table 3.2.5

| Frequency MHz | Antenna Polarity | Peak Reading dBμV | Total C.F. dB1/m | Total at 3m dBμV/m | Limit dBμV/m | Margin dB |
|------------------|---------------------|----------------------|---------------------|-----------------------|-----------------|--------------|
| 30.035 MHz | V | 8.8 | 18.6 | 27.3 | 40.0 | -12.7 |
| 40.668 MHz | V | 17.1 | 12.4 | 29.6 | 40.0 | -10.4 |
| 94.926 MHz | V | 25.4 | 12.5 | 37.9 | 43.5 | -5.7 |
| 108.5 MHz | V | 19.5 | 14.0 | 33.5 | 43.5 | -10.0 |
| 885.16 MHz | V | 11.8 | 23.5 | 35.3 | 46.0 | -10.7 |
| 30.246 MHz | H | 9.4 | 20.2 | 29.6 | 40.0 | -10.4 |
| 94.926 MHz | H | 29.9 | 11.3 | 41.2 | 43.5 | -2.4 |
| 108.5 MHz | H | 26.0 | 13.2 | 39.2 | 43.5 | -4.4 |
| 189.84 MHz | H | 17.5 | 10.9 | 28.3 | 43.5 | -15.2 |
| 203.35 MHz | H | 16.7 | 11.8 | 28.6 | 43.5 | -14.9 |
| 928.78 MHz | H | 11.7 | 24.3 | 36.0 | 46.0 | -10.0 |



| | | |
|----------------------------------|--|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(d) / RSS-210 A2.6(d) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: s/n:1879 Frequency Range: 30-1000MHz | |

Table 3.2.6

| Frequency MHz | Antenna Polarity | Peak Reading dB μ V | Total C.F. dB1/m | Total at 3m dB μ V/m | Limit dB μ V/m | Margin dB |
|------------------|---------------------|----------------------------|---------------------|-----------------------------|-----------------------|--------------|
| 30.123 MHz | V | 8.3 | 18.5 | 26.8 | 40.0 | -13.3 |
| 38.58 MHz | V | 11.8 | 13.4 | 25.1 | 40.0 | -14.9 |
| 94.926 MHz | V | 25.3 | 12.5 | 37.8 | 43.5 | -5.8 |
| 104.93 MHz | V | 16.9 | 14.1 | 30.9 | 43.5 | -12.6 |
| 108.5 MHz | V | 15.5 | 14.0 | 29.5 | 43.5 | -14.1 |
| 400.89 MHz | V | 13.1 | 17.9 | 31.0 | 46.0 | -15.0 |
| 30.632 MHz | H | 8.0 | 20.0 | 28.0 | 40.0 | -12.0 |
| 94.926 MHz | H | 27.3 | 11.3 | 38.6 | 43.5 | -4.9 |
| 108.46 MHz | H | 18.7 | 13.2 | 31.9 | 43.5 | -11.6 |
| 203.35 MHz | H | 20.3 | 11.8 | 32.1 | 43.5 | -11.4 |
| 894.03 MHz | H | 12.0 | 24.6 | 36.6 | 46.0 | -9.4 |



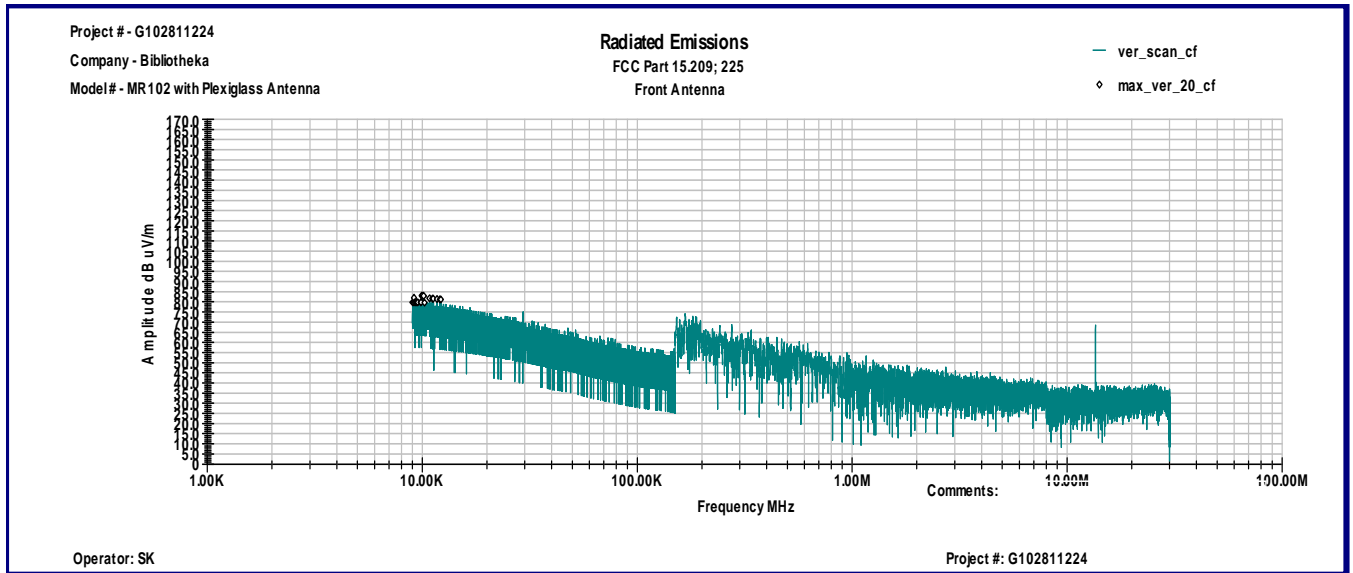
| | | |
|----------------------------------|--|---------------------|
| Date: | December 8-15, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC 15.225(d) / RSS-210 A2.6(d) | |
| Test Point: | Enclosure with antenna | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 36%(RH); 96.3kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | Antenna: 78-8129-3044-0 built-in device not powered Frequency Range: 30-1000MHz | |

Table 3.2.7

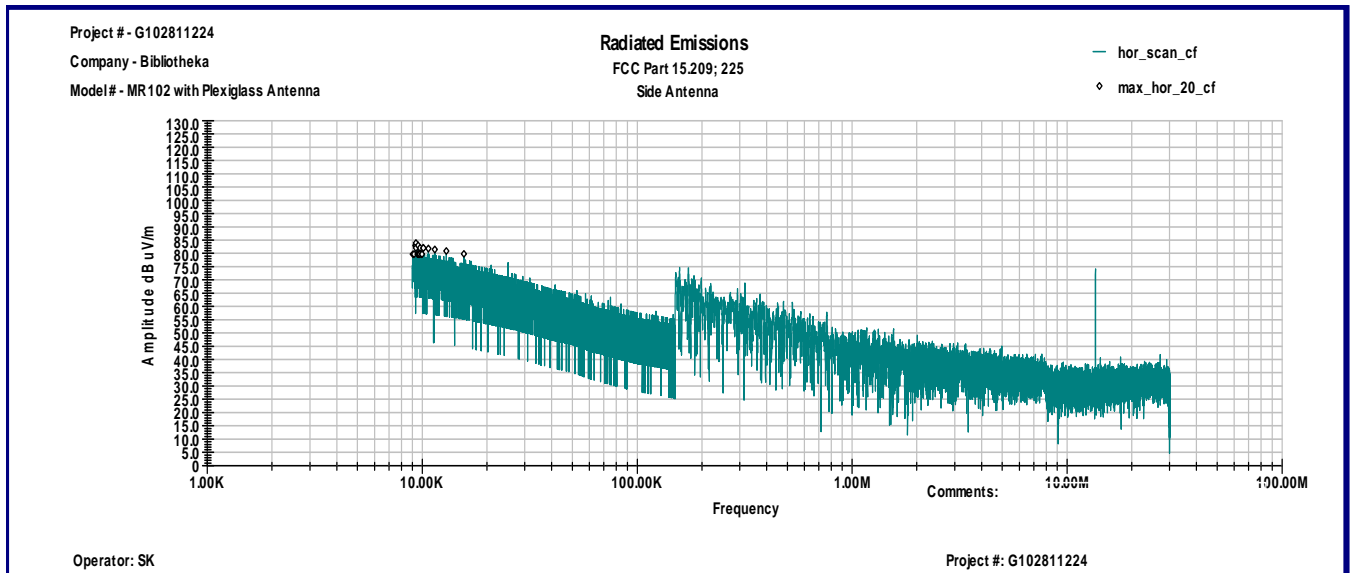
| Frequency MHz | Antenna Polarity | Peak Reading dBμV | Total C.F. dB1/m | Total at 3m dBμV/m | Limit dBμV/m | Margin dB |
|------------------|---------------------|----------------------|---------------------|-----------------------|-----------------|--------------|
| 30.719 MHz | V | 8.1 | 18.1 | 26.2 | 40.0 | -13.8 |
| 67.792 MHz | V | 22.2 | 6.9 | 29.0 | 40.0 | -11.0 |
| 149.19 MHz | V | 16.6 | 12.8 | 29.4 | 44.0 | -14.6 |
| 162.74 MHz | V | 11.7 | 12.3 | 24.0 | 44.0 | -20.0 |
| 400.89 MHz | V | 13.7 | 17.9 | 31.6 | 46.0 | -14.4 |
| 953.42 MHz | V | 11.5 | 23.9 | 35.4 | 46.0 | -10.7 |
| 31.334 MHz | H | 8.2 | 19.6 | 27.8 | 40.0 | -12.2 |
| 67.82 MHz | H | 22.4 | 7.1 | 29.5 | 40.0 | -10.5 |
| 108.5 MHz | H | 19.3 | 13.2 | 32.5 | 44.0 | -11.5 |
| 244.09 MHz | H | 15.4 | 13.7 | 29.2 | 46.0 | -16.8 |

Graph 3.2.1

Front antenna orientation

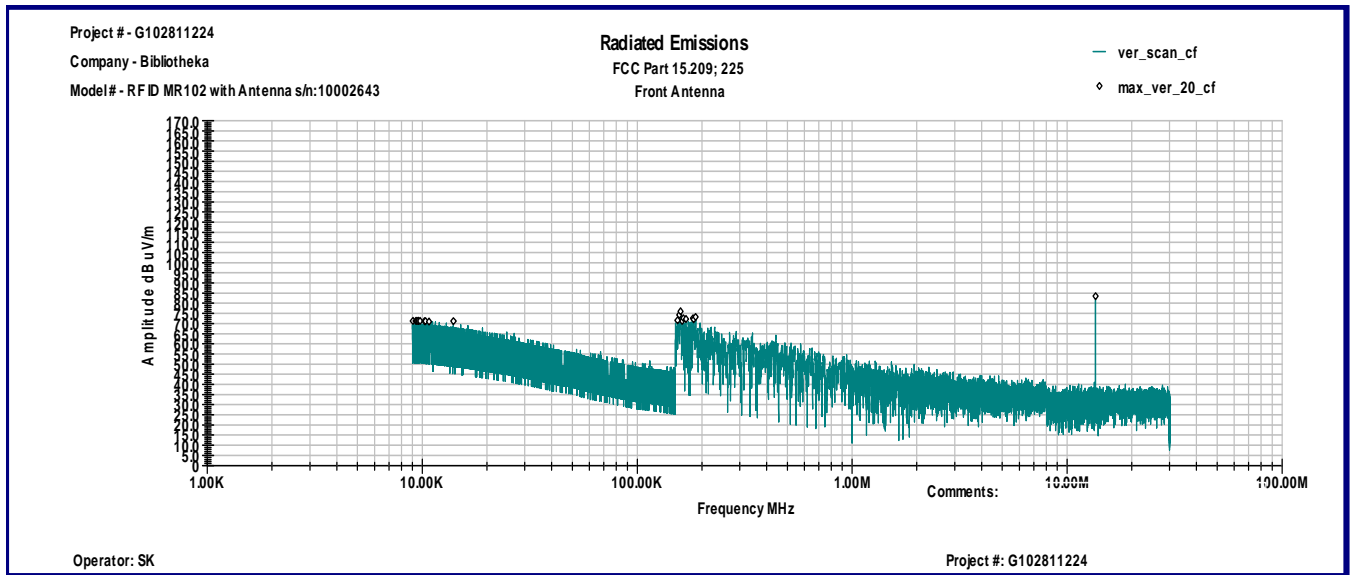


Side antenna orientation

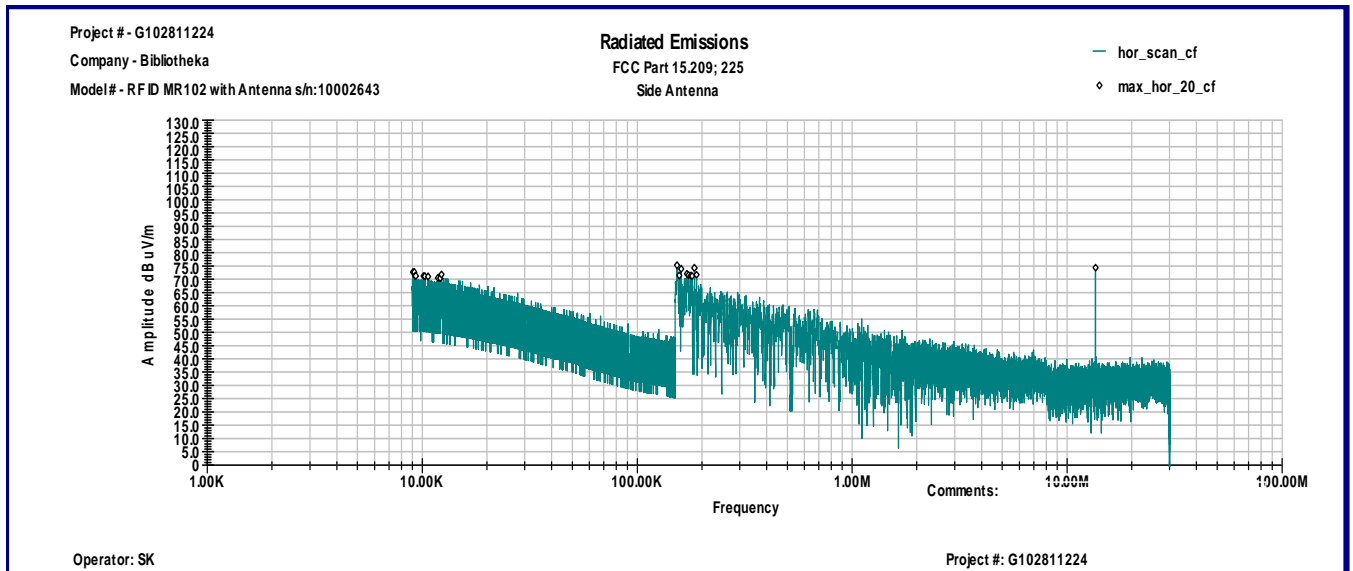


Graph 3.2.2

Front antenna orientation

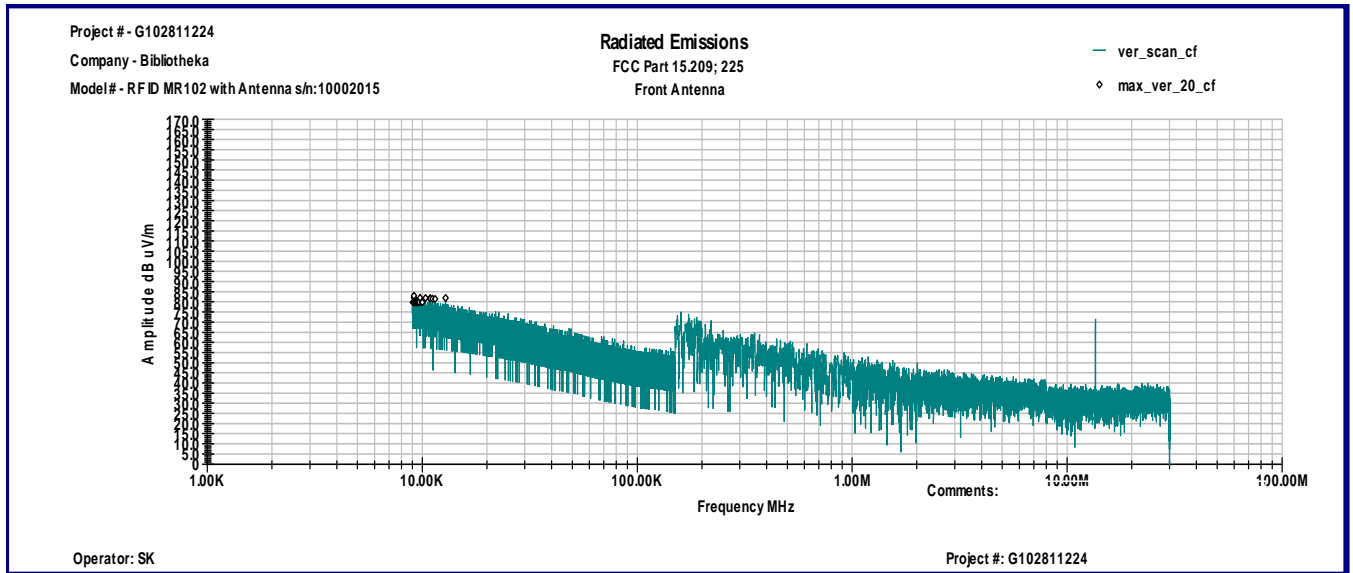


Side antenna orientation

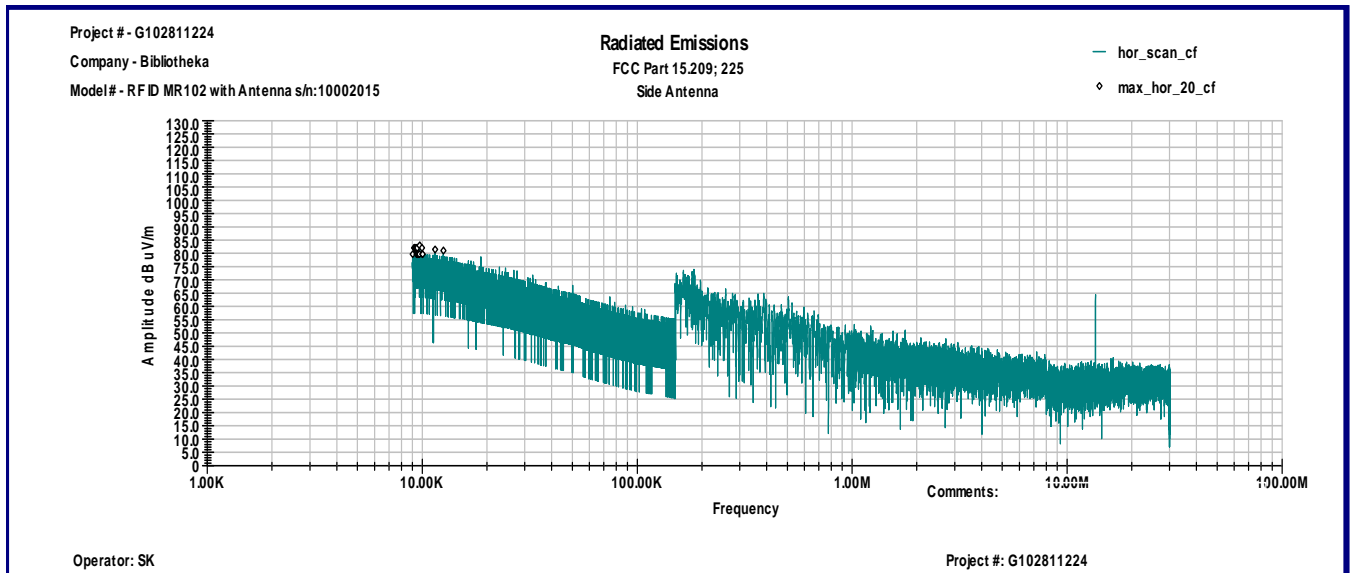


Graph 3.2.3

Front antenna orientation

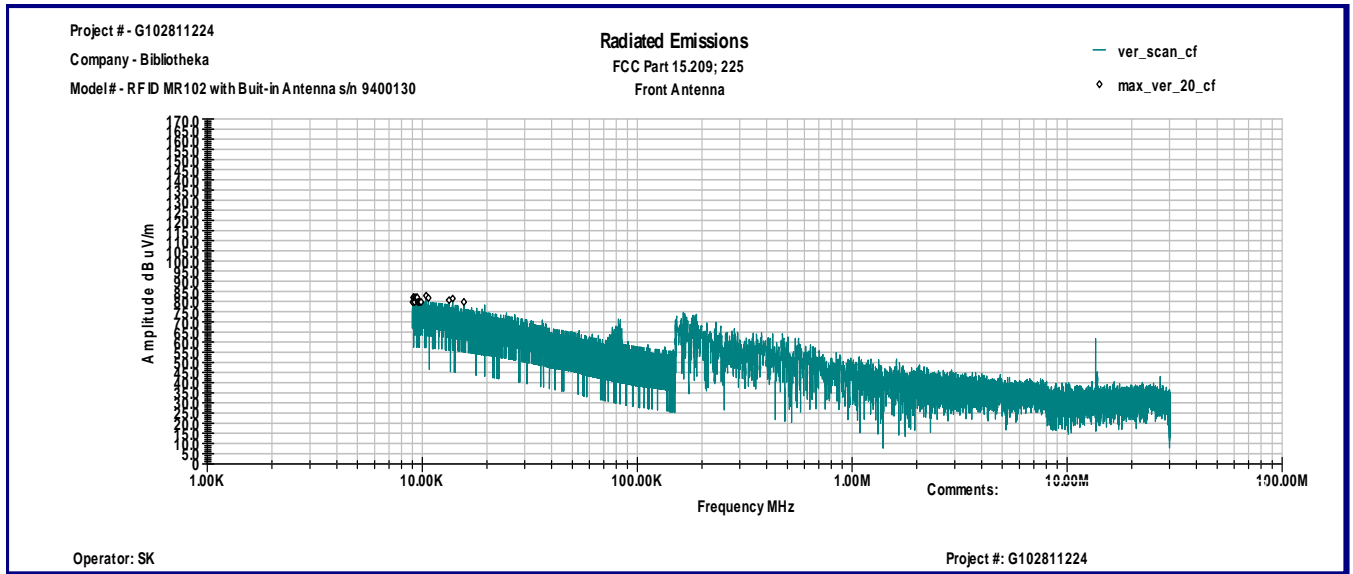


Side antenna orientation

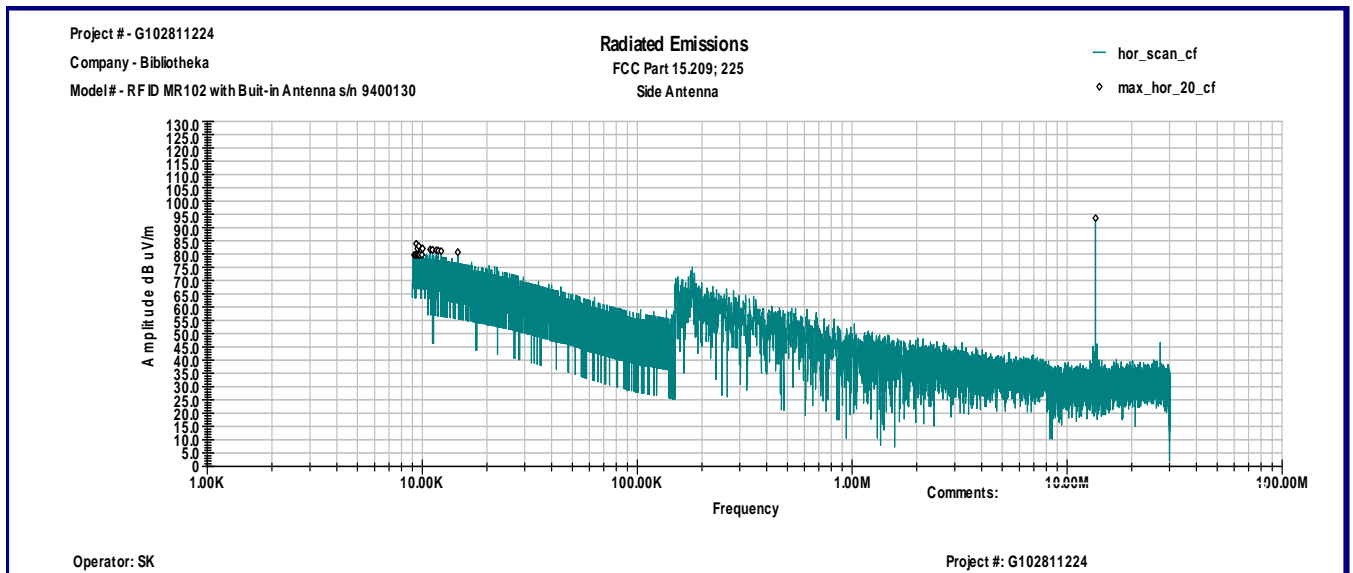


Graph 3.2.4

Front antenna orientation

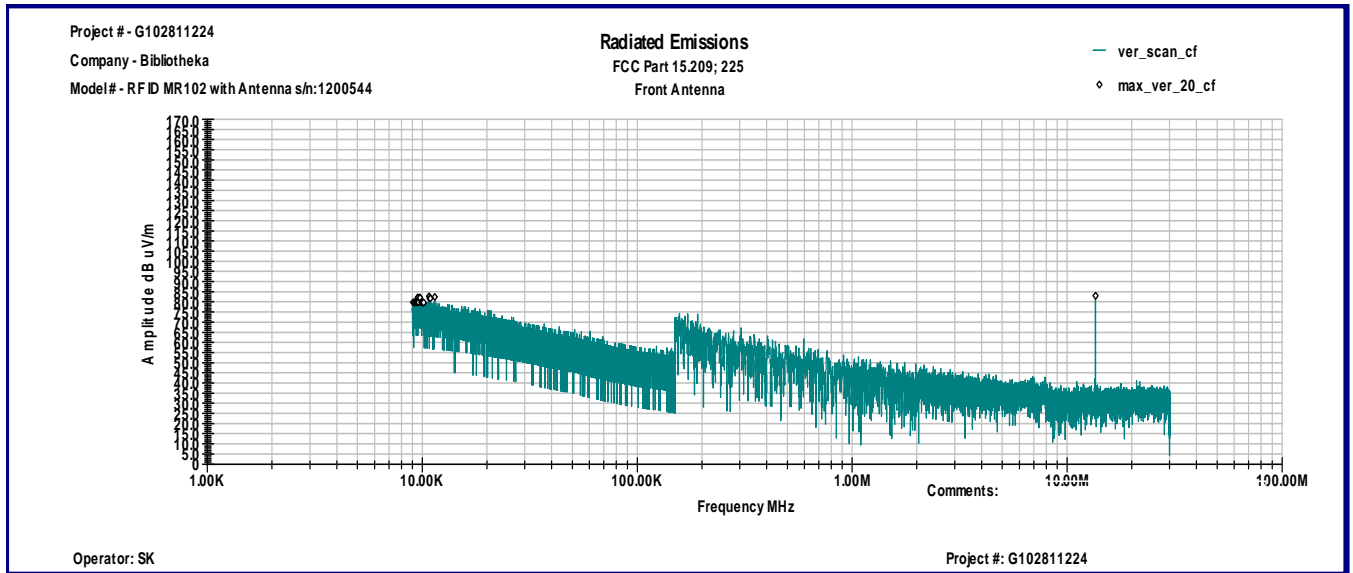


Side antenna orientation

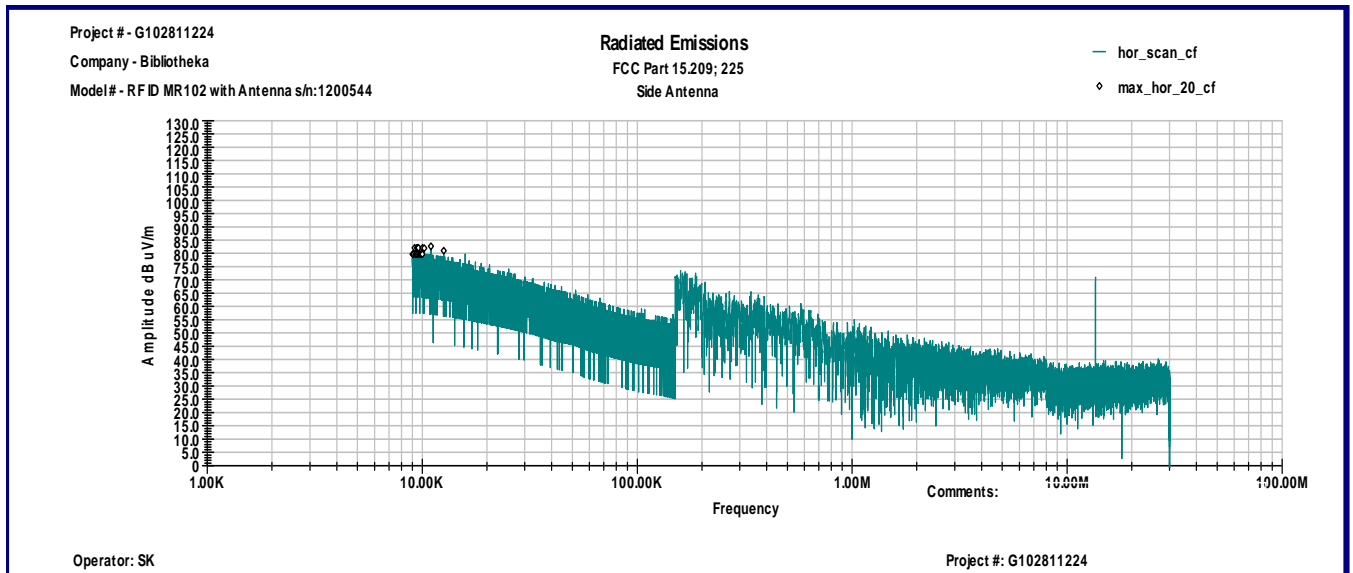


Graph 3.2.5

Front antenna orientation

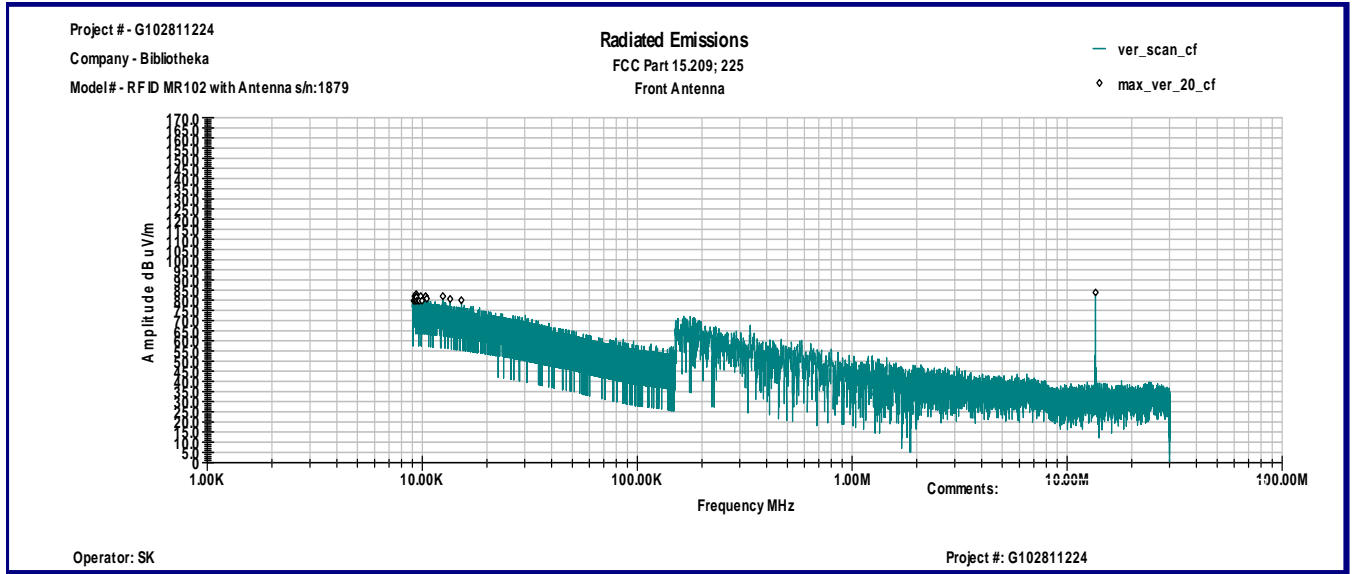


Side antenna orientation

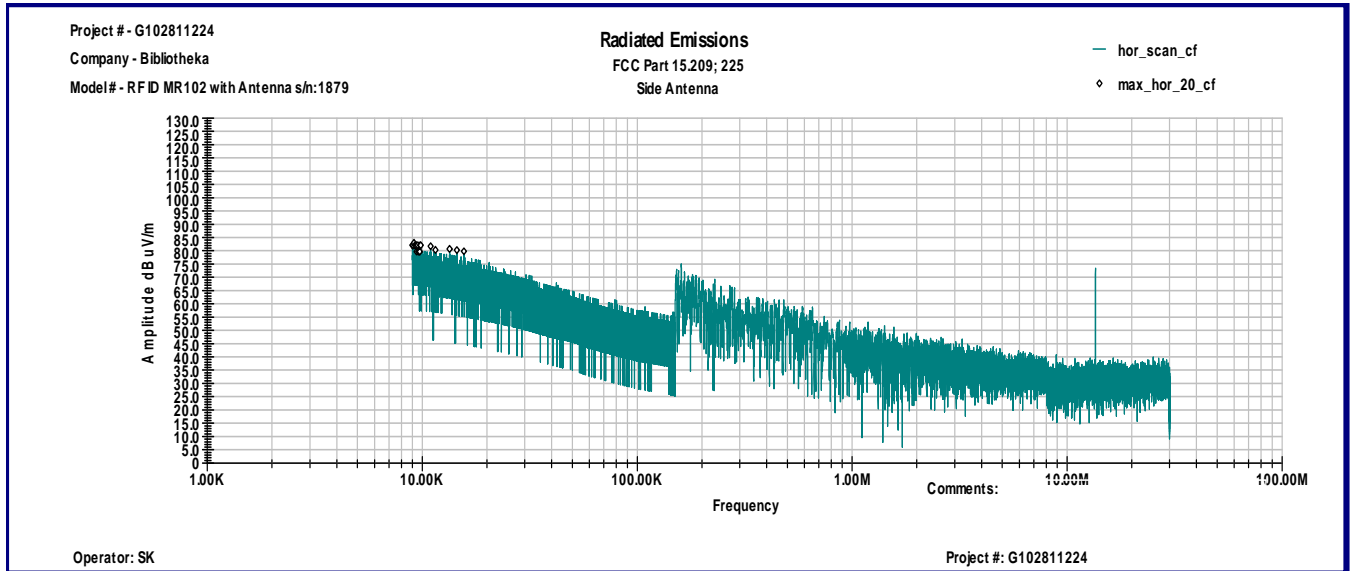


Graph 3.2.6

Front antenna orientation

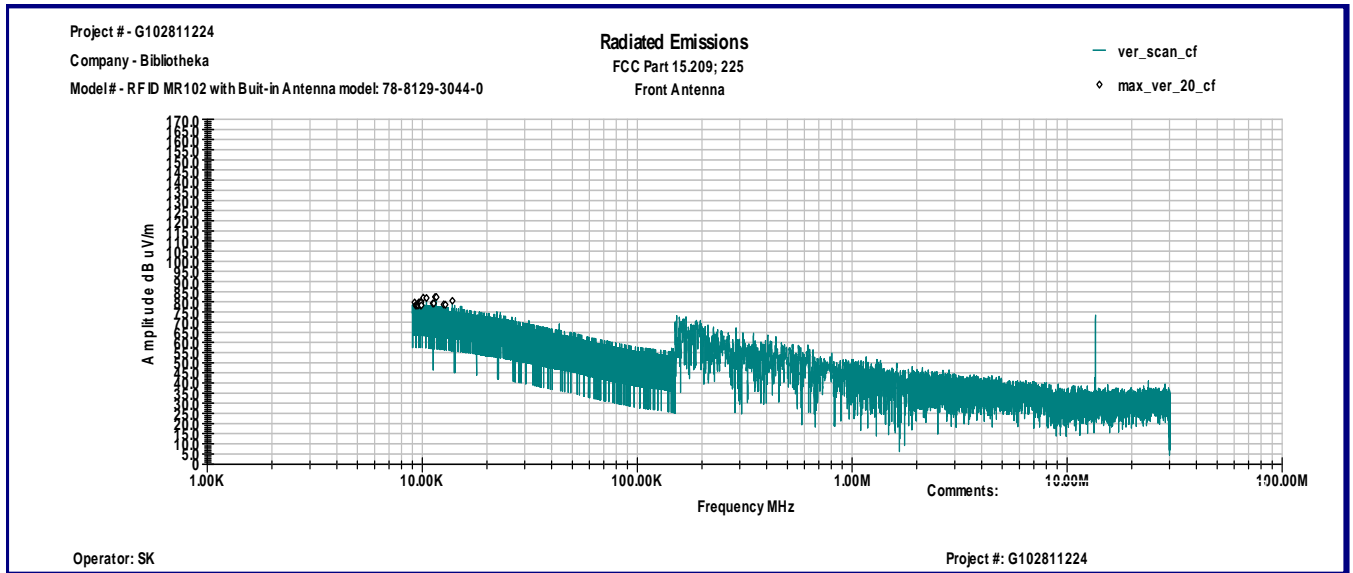


Side antenna orientation

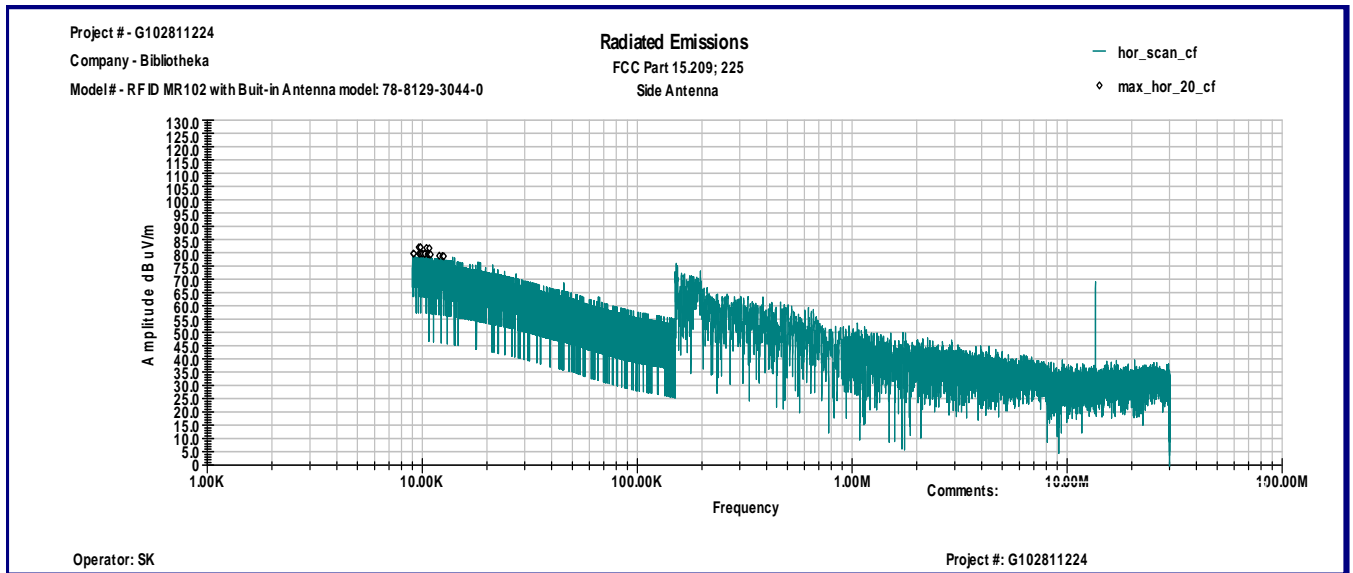


Graph 3.2.7

Front antenna orientation

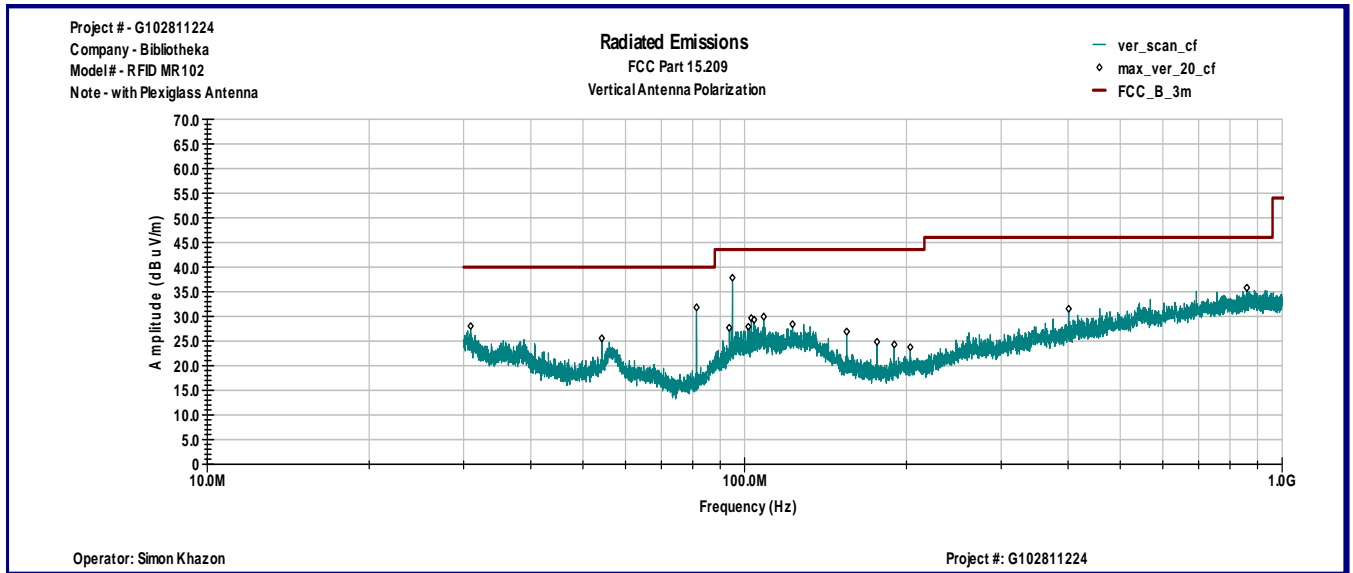


Side antenna orientation

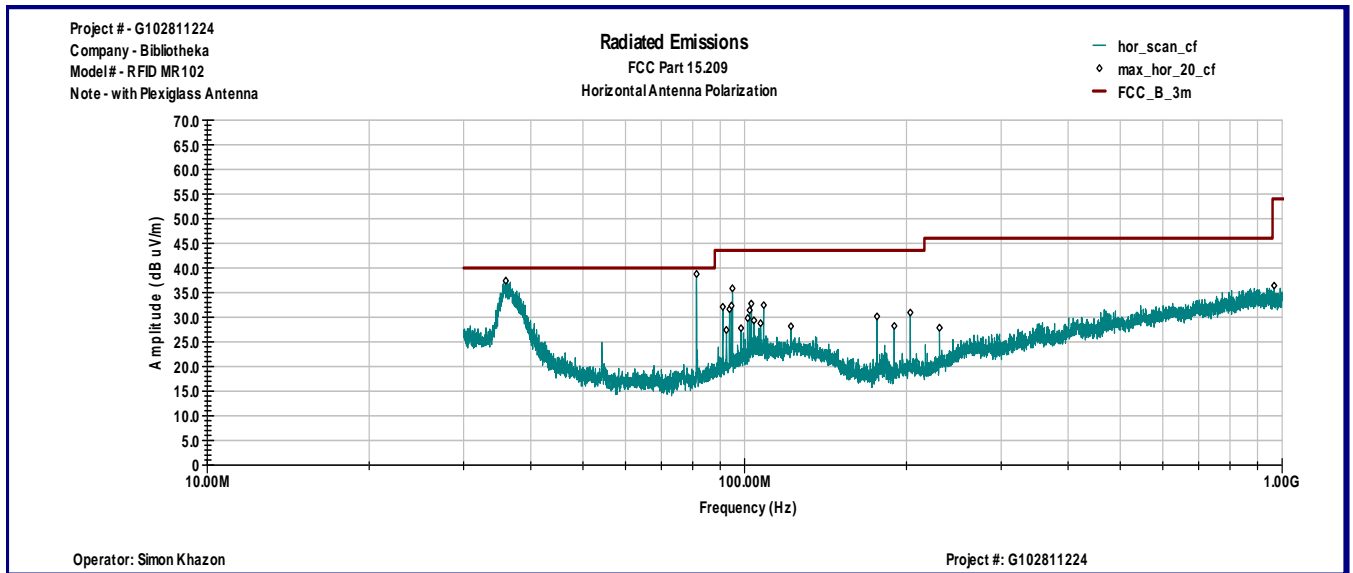


Graph 3.2.8

Vertical antenna polarization

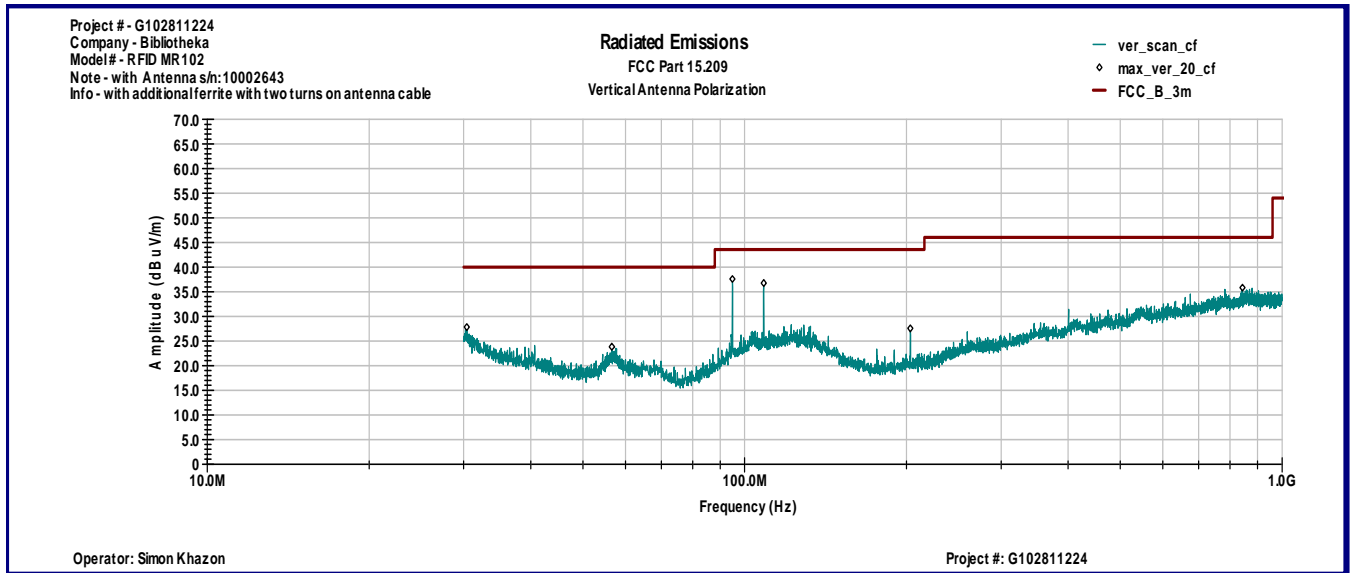


Horizontal antenna polarization

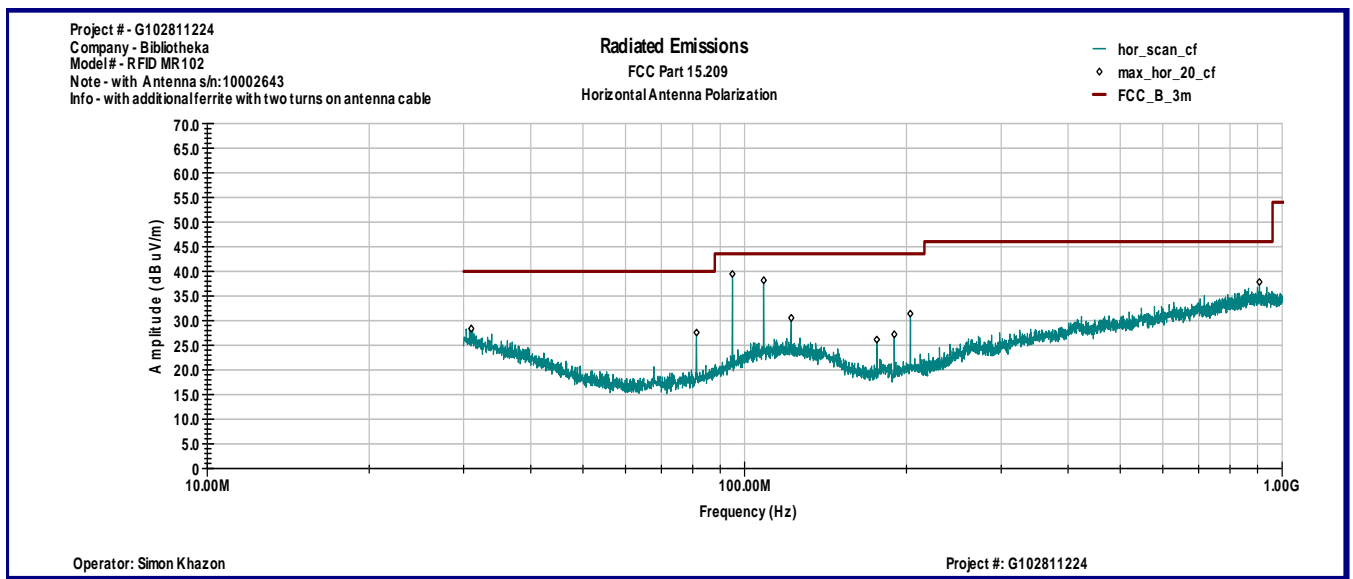


Graph 3.2.9

Vertical antenna polarization

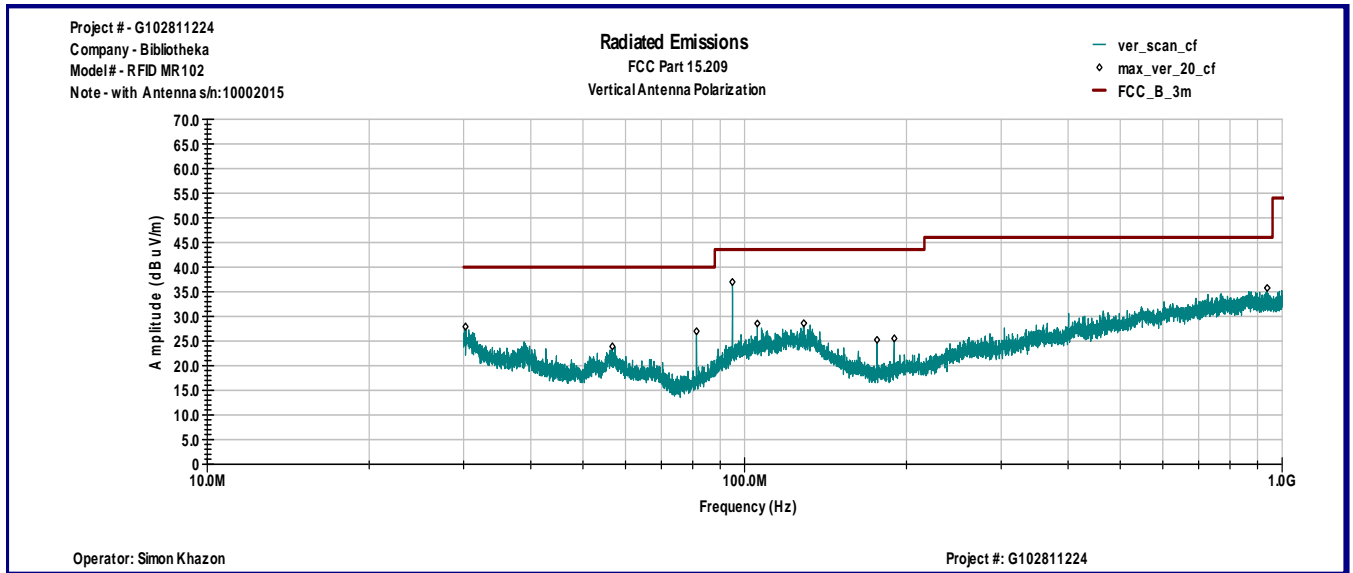


Horizontal antenna polarization

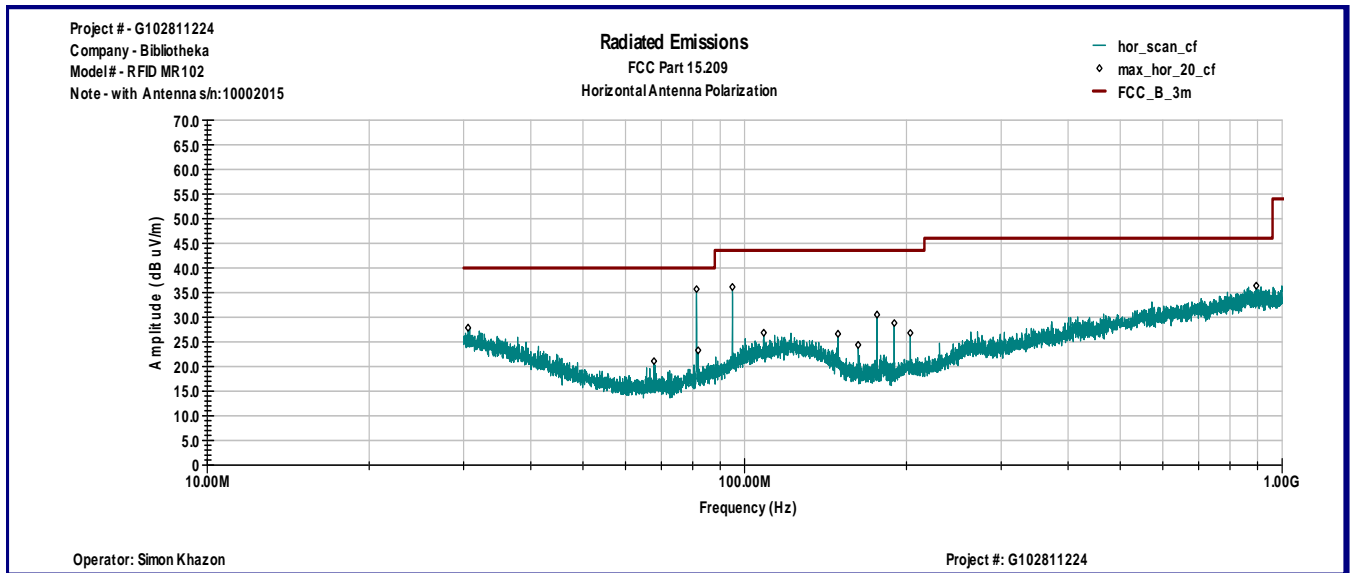


Graph 3.2.10

Vertical antenna polarization

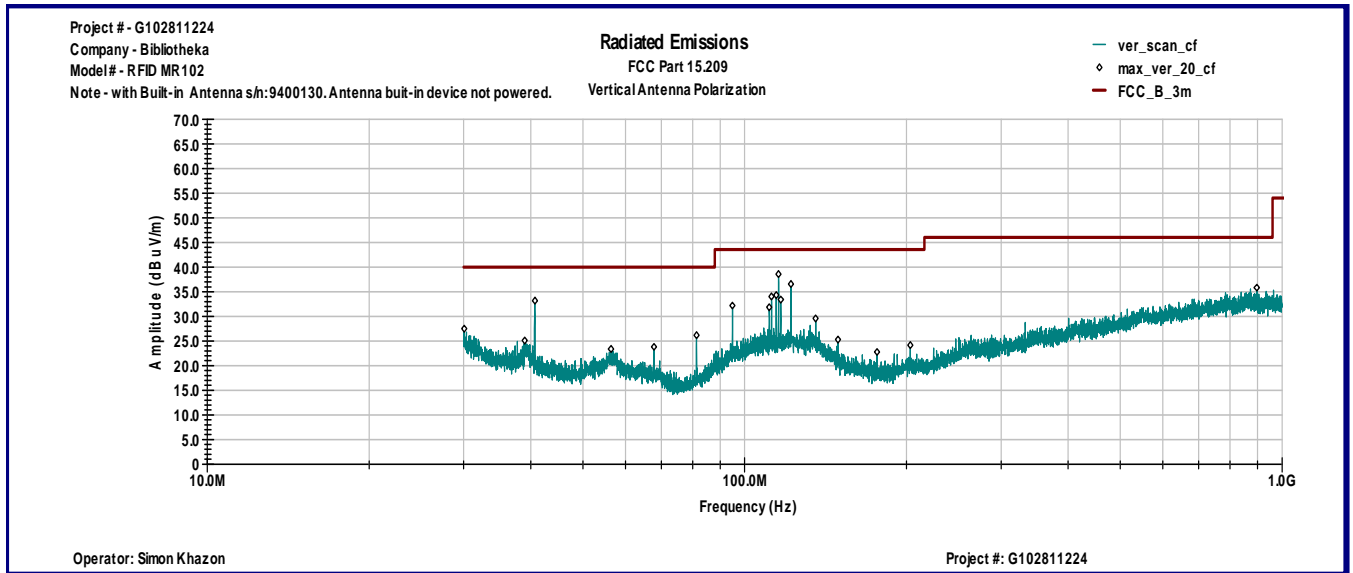


Horizontal antenna polarization

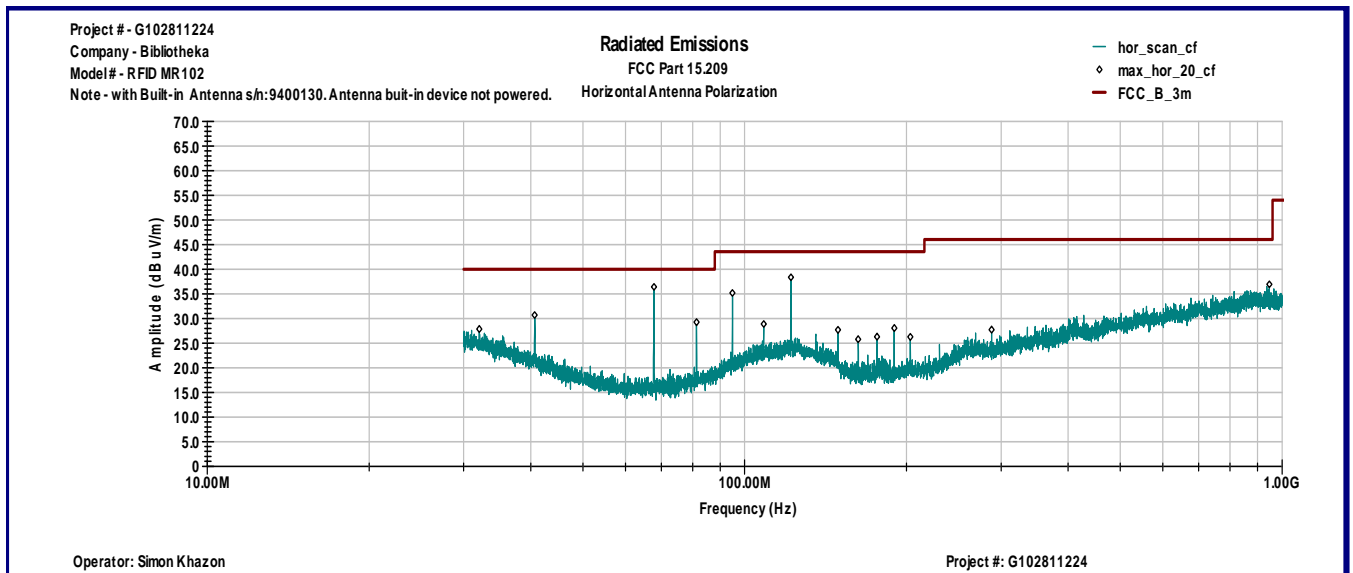


Graph 3.2.11

Vertical antenna polarization

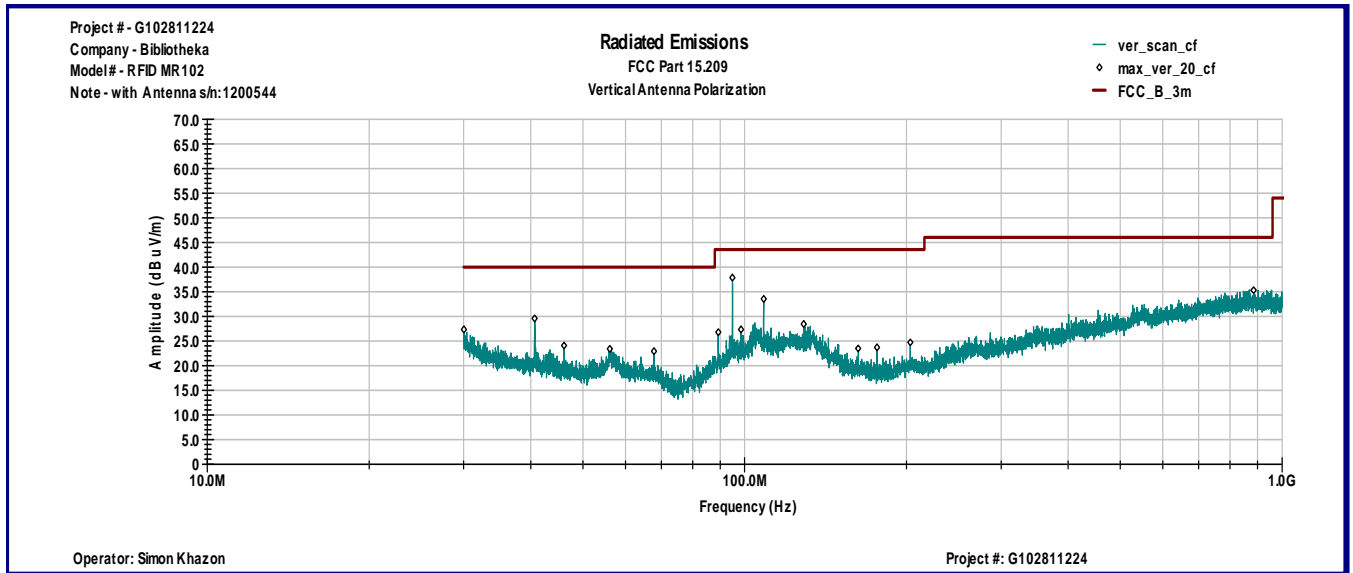


Horizontal antenna polarization

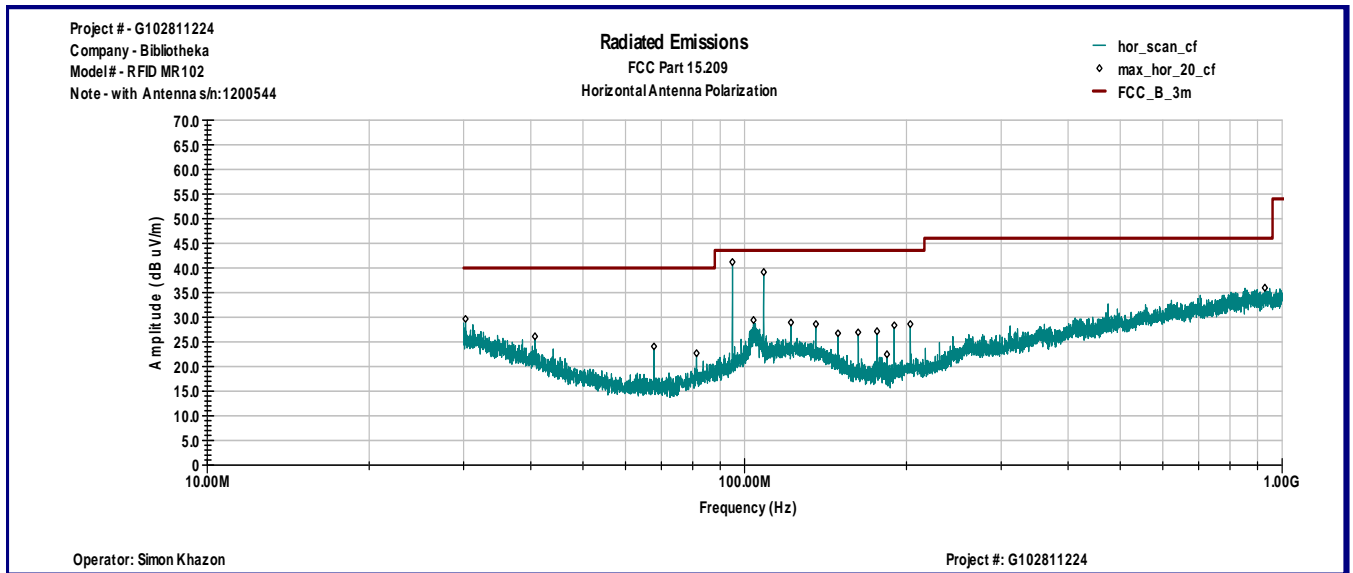


Graph 3.2.12

Vertical antenna polarization

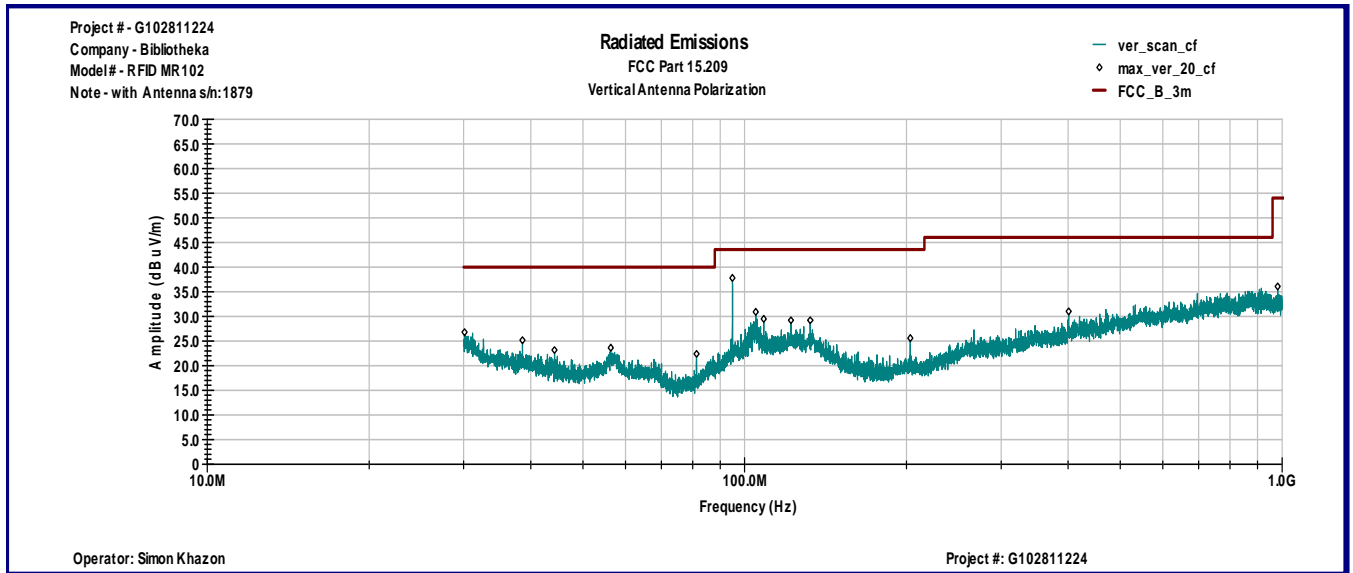


Horizontal antenna polarization

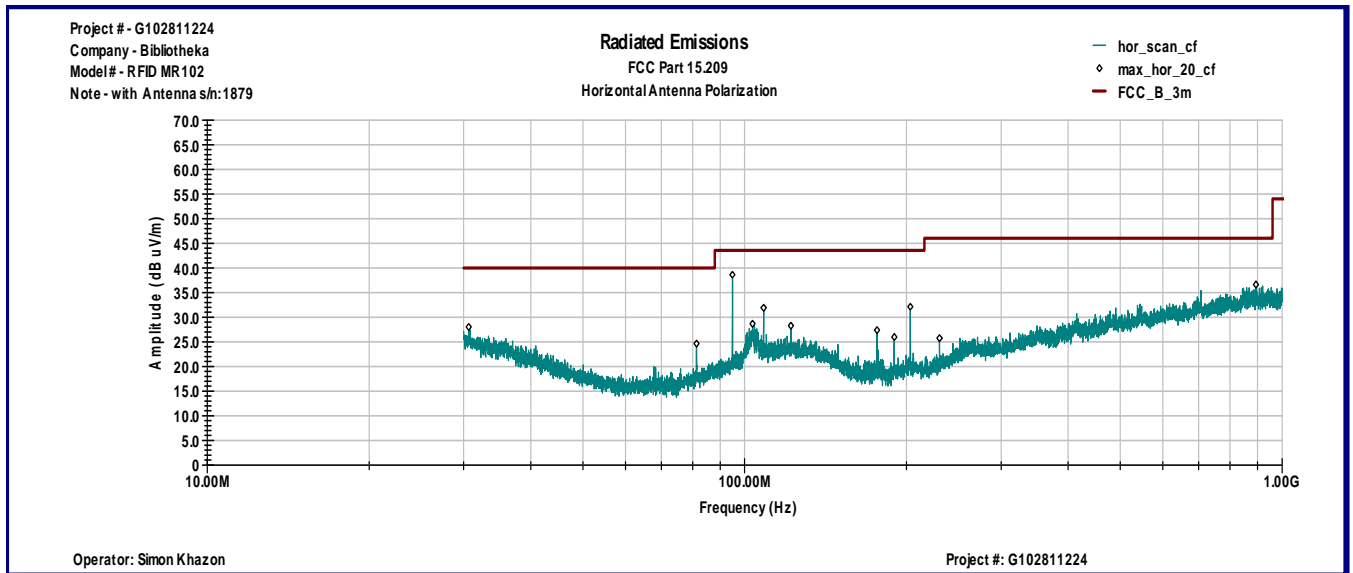


Graph 3.2.13

Vertical antenna polarization

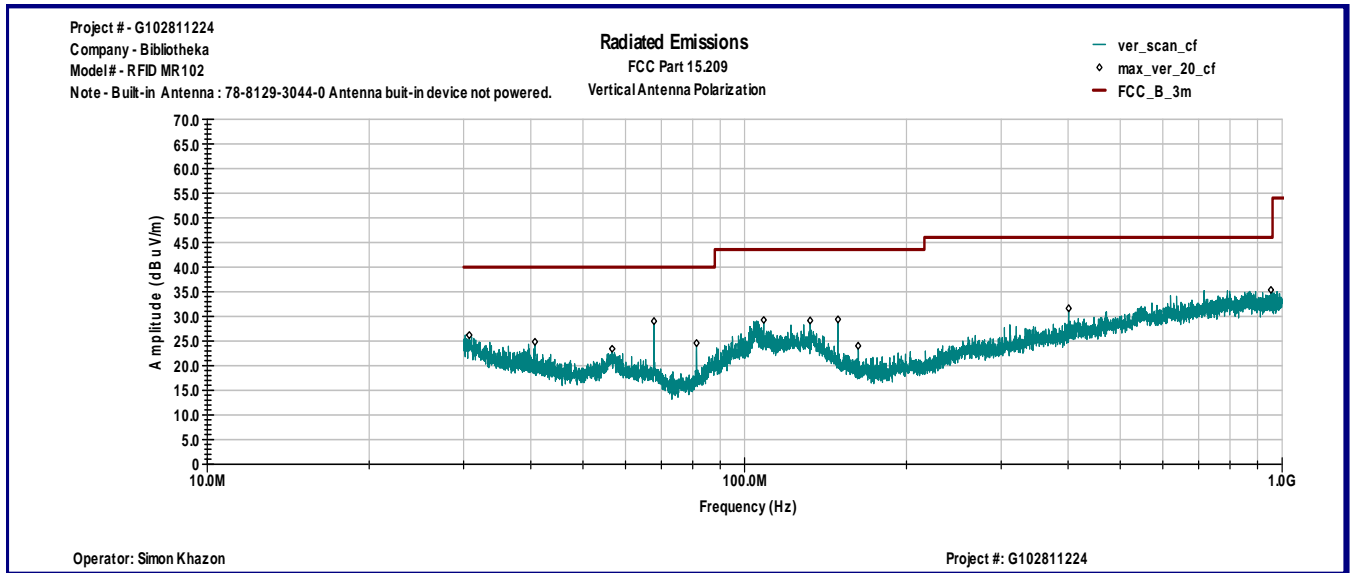


Horizontal antenna polarization

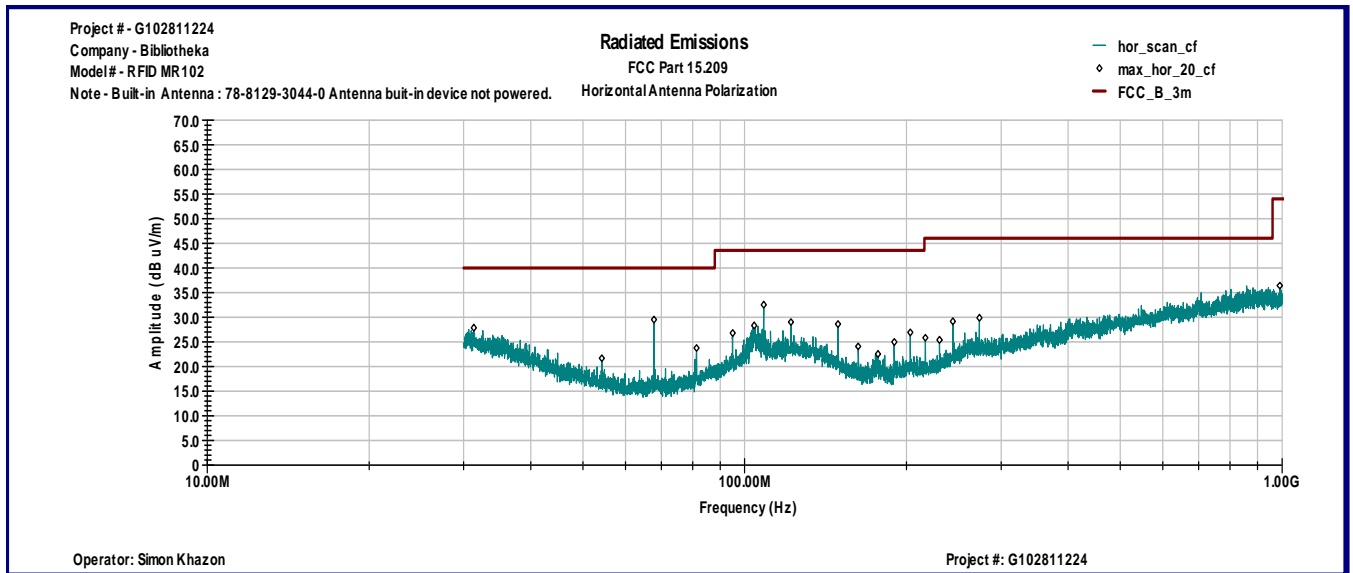


Graph 3.2.14

Vertical antenna polarization



Horizontal antenna polarization





3.3 Frequency Tolerance

Test location: OATS Anechoic Chamber Other

Test date: December 13-14, 2016

Tested by: Simon Khazon

Test result: **Pass**

| Test Parameter | | Measured Deviation (Hz) | Maximum Allowed Deviation (Hz) | Test Result |
|----------------|-----------|-------------------------|--------------------------------|-------------|
| Temperature °C | Voltage V | | | |
| -20 | 120 | -21.5 | ±1356 | Pass |
| -10 | | -14.3 | ±1356 | Pass |
| 0 | | -136.2 | ±1356 | Pass |
| 10 | | -128.2 | ±1356 | Pass |
| 20 | | 0 | ±1356 | Pass |
| 30 | | -48.2 | ±1356 | Pass |
| 40 | | -10.2 | ±1356 | Pass |
| 50 | | -3.1 | ±1356 | Pass |
| 20 | 102 | 0 | ±1356 | Pass |
| | 108 | 0 | ±1356 | Pass |
| | 114 | 0 | ±1356 | Pass |
| | 120 | 0 | ±1356 | Pass |
| | 126 | 0 | ±1356 | Pass |
| | 132 | 0 | ±1356 | Pass |
| | 138 | 0 | ±1356 | Pass |

Notes: The Transmitters operated in continuous CW mode during testing



3.4 Bandwidth of Emissions

Test location: OATS Anechoic Chamber Other

Test distance: 10 meters 3 meters

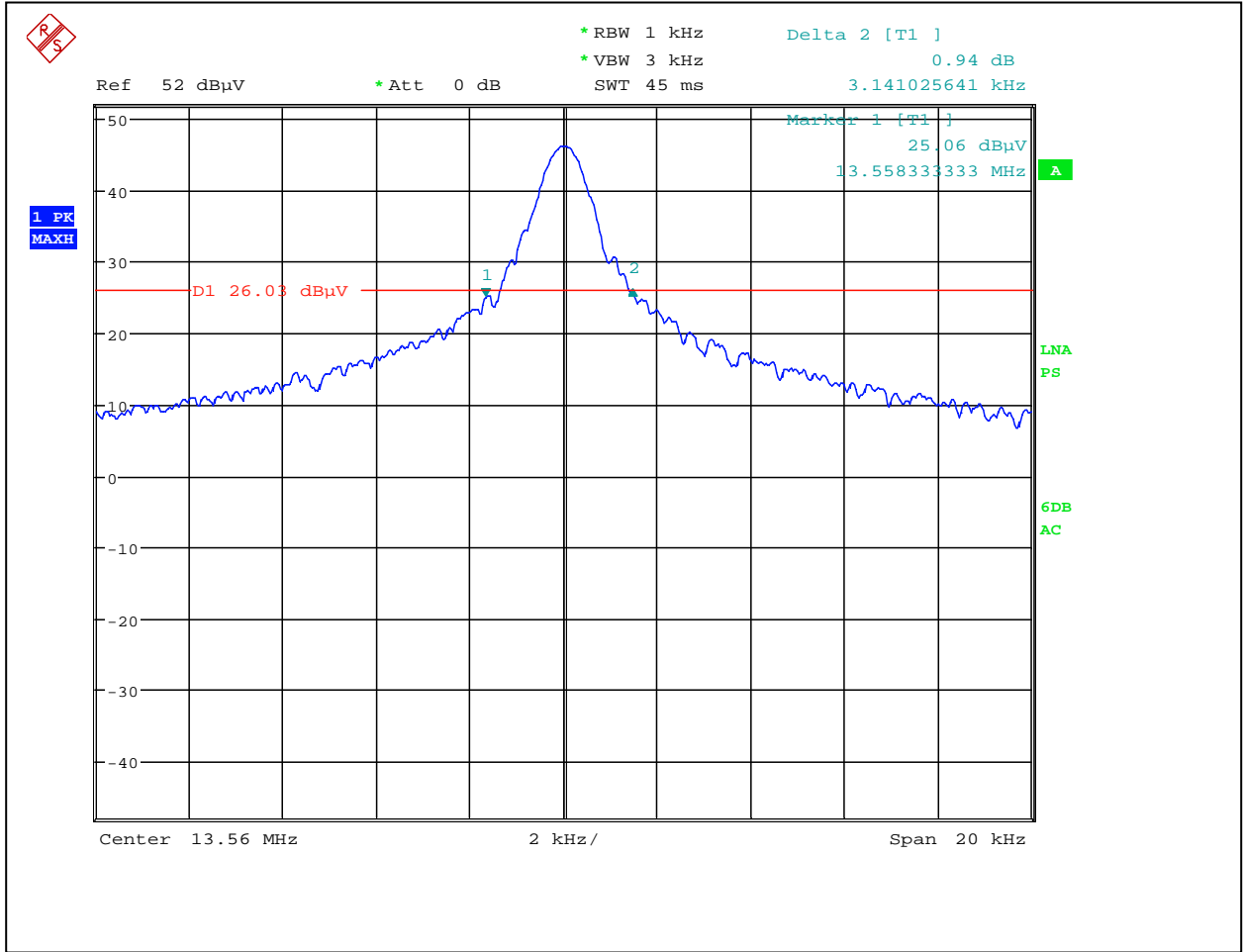
Test result: **Pass**

| Center Frequency of operation MHz | Measured 20dB bandwidth kHz | Measured 99% bandwidth kHz |
|-----------------------------------|-----------------------------|----------------------------|
| 13.56 | 3.1 | 6.1 |

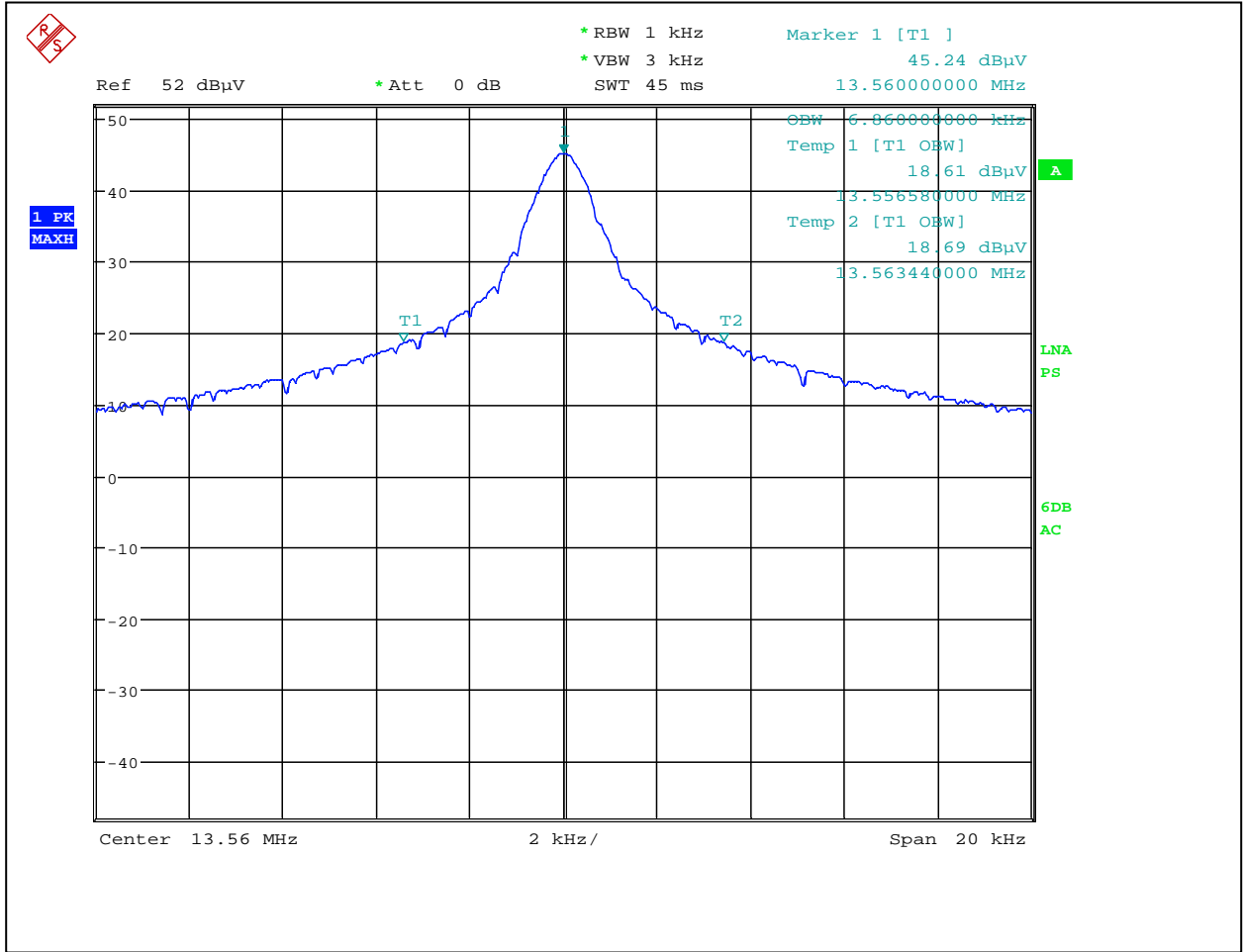
Graphs 3-4-1 and 3-4-2 are show bandwidth of emissions

Notes: The bandwidth of emissions is contained within the frequency band of operation

Graph 3.4.1



Graph 3.4.2





3.5 Transmitter power line conducted emissions

Test location: OATS Anechoic Chamber Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 7.8dB below the limits

Notes: None

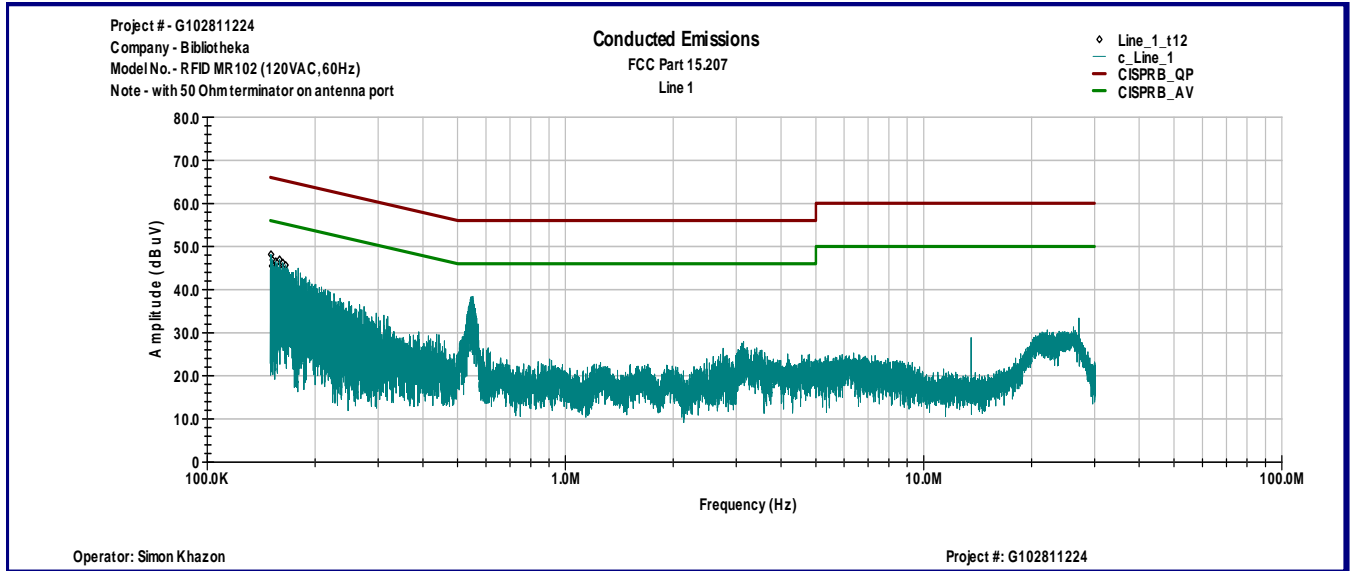
| | | |
|----------------------------------|---|---------------------|
| Date: | December 7, 2016 | Result: Pass |
| Tested by: | Simon Khazon | |
| Standard: | FCC Part 15.207 | |
| Test Point: | Power Line | |
| Operation mode: | See page 5 | |
| Environmental Conditions: | 23°C; 32%(RH); 96.5kPa | |
| Equipment Verification: | <input checked="" type="checkbox"/> | |
| Note: | EUT was powered at 120VAC, 60Hz Test was performed with 50 Ohm terminator on Antenna port. | |

Table 3.5.1

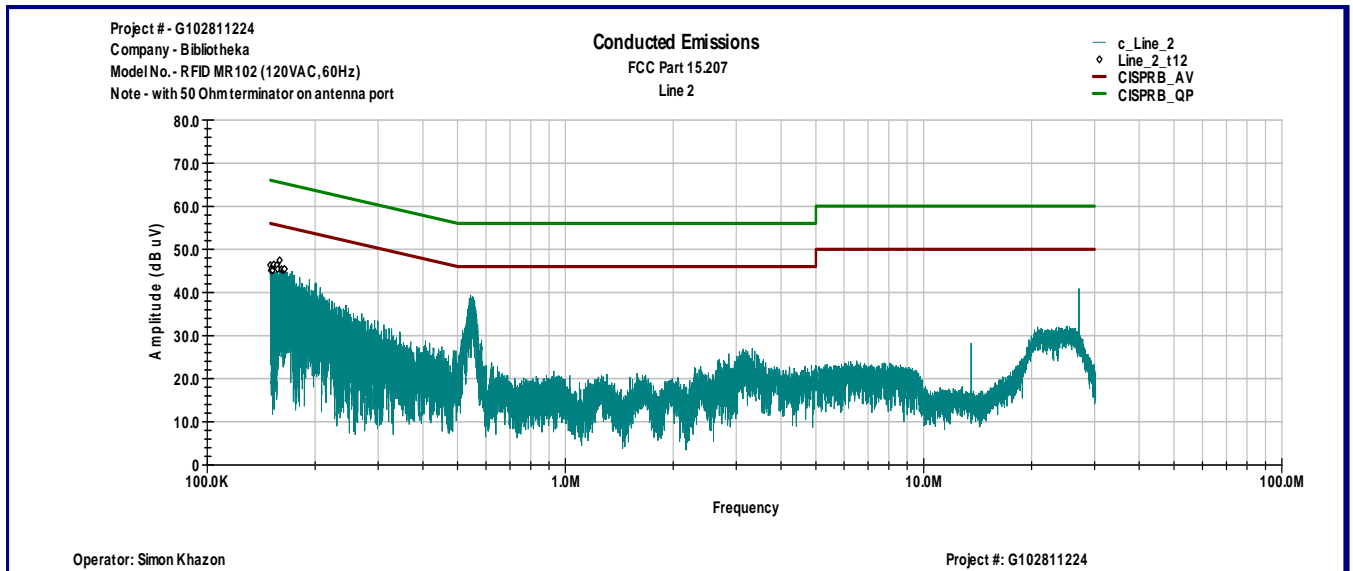
| Line 1 | | | | | |
|---------------|-----------|---------------|----------------|--------------|---------------|
| Frequency | Peak dBμV | QP Limit dBμV | AVG Limit dBμV | QP Margin dB | AVG Margin dB |
| 150.7 KHz | 48.2 | 66.0 | 56.0 | -17.8 | -7.8 |
| 151.48 KHz | 45.5 | 65.9 | 55.9 | -20.4 | -10.4 |
| 152.02 KHz | 46.8 | 65.9 | 55.9 | -19.1 | -9.1 |
| 153.22 KHz | 45.4 | 65.8 | 55.8 | -20.4 | -10.4 |
| 154.62 KHz | 45.2 | 65.8 | 55.8 | -20.6 | -10.6 |
| 155.17 KHz | 46.5 | 65.7 | 55.7 | -19.2 | -9.2 |
| 155.4 KHz | 45.1 | 65.7 | 55.7 | -20.6 | -10.6 |
| 156.68 KHz | 46.2 | 65.6 | 55.6 | -19.4 | -9.4 |
| 158.51 KHz | 45.3 | 65.5 | 55.5 | -20.3 | -10.3 |
| 159.28 KHz | 47.0 | 65.5 | 55.5 | -18.5 | -8.5 |
| 162.39 KHz | 46.2 | 65.3 | 55.3 | -19.1 | -9.1 |
| 165.54 KHz | 45.7 | 65.2 | 55.2 | -19.5 | -9.5 |
| Line 2 | | | | | |
| Frequency | Peak dBμV | QP Limit dBμV | AVG Limit dBμV | QP Margin dB | AVG Margin dB |
| 150.0 KHz | 46.3 | 66.0 | 56.0 | -19.7 | -9.7 |
| 150.58 KHz | 45.1 | 66.0 | 56.0 | -20.9 | -10.9 |
| 151.36 KHz | 45.5 | 65.9 | 55.9 | -20.4 | -10.4 |
| 152.02 KHz | 45.1 | 65.9 | 55.9 | -20.8 | -10.8 |
| 152.6 KHz | 46.2 | 65.9 | 55.9 | -19.7 | -9.7 |
| 153.22 KHz | 46.5 | 65.8 | 55.8 | -19.3 | -9.3 |
| 156.56 KHz | 46.4 | 65.6 | 55.6 | -19.3 | -9.3 |
| 157.11 KHz | 45.4 | 65.6 | 55.6 | -20.2 | -10.2 |
| 159.17 KHz | 47.4 | 65.5 | 55.5 | -18.1 | -8.1 |
| 161.22 KHz | 45.4 | 65.4 | 55.4 | -20.1 | -10.1 |
| 163.05 KHz | 45.2 | 65.3 | 55.3 | -20.1 | -10.1 |
| 164.33 KHz | 45.4 | 65.2 | 55.2 | -19.8 | -9.8 |

Graph 3.5.1

Line 1



Line 2





3.6 Receiver/digital device radiated emissions

Test location: OATS Anechoic Chamber

Test distance: 10 meters 3 meters

Test result: **N/A**

Frequency range: 30MHz-1000MHz

Max. Emissions margin: dB below the limits

Notes: EUT does not contain a Receiver portion.



3.7 Receiver/digital device conducted emissions

Test location: OATS Anechoic Chamber Other

Test result: N/A

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: dB below the limits

Notes: EUT does not contain a Receiver portion.

3.8 SAR Test Exclusion Calculation

The EUT Output Power can be calculated using the formula:

$$P = (E \times d / 7.02)^2, \text{ where}$$

P – power in W,

E – field strength in V/m,

D – field strength measurement distance in m

The maximum measured field strength is 73.7dB μ V/m, or 0.005V/m at 10m distance

The maximum Radiated power P is $(0.005\text{V/m} \times 10\text{m} / 7.02)^2 = 0.000051\text{W} = 51\text{mW}$

The Maximum Exclusion Threshold power per Appendix C of KDB 447498 D01 v05r02 is 738mW

The Maximum Exemption Limits for SAR Routine Evaluation of RSS-102 (section2.5) is 345mW

Based on that the Transmitter is exempt from SAR testing.



4.0 TEST EQUIPMENT

| DESCRIPTION | MANUFACTURER | MODEL | SERIAL NO. | INTERTEK ID | CAL DUE | USED |
|-----------------------|----------------|--------------------------|---------------|-------------|------------|-------------------------------------|
| Spectrum Analyzer | R & S | ESU | 100398 | 25283 | 02/11/2017 | <input checked="" type="checkbox"/> |
| Spectrum Analyzer | R & S | ESCI | 100358 | 12909 | 10/31/2017 | <input checked="" type="checkbox"/> |
| Spectrum Analyzer | Agilent | E7402A | MY44212200 | 12660 | 08/02/2017 | <input checked="" type="checkbox"/> |
| Bicono-Log Antenna | Teseq | CBL6112D | 32859 | 25289 | 10/03/2017 | <input checked="" type="checkbox"/> |
| Loop Antenna | ETS | 6512 | 00060486 | 19942 | 12/28/2016 | <input checked="" type="checkbox"/> |
| LISN | COM-Power | Li-215A | 191970 | 172315 | 06/13/2017 | <input checked="" type="checkbox"/> |
| System | Quantum Change | TILE! Instrument Control | Ver. 3.4.K.29 | 15259 | VBU | <input checked="" type="checkbox"/> |
| Environmental Chamber | CSZ | ZH-16-3.5-SCT/AC | Z0414046 | 17092 | 04/07/2017 | <input checked="" type="checkbox"/> |



5.0 Revision History

| REVISION LEVEL | DATE | REPORT NUMBER | PREPARED | REVIEWED | NOTES |
|----------------|------------|------------------|----------------------|-------------------------|--|
| 0 | 01-10-2017 | 102811224MIN-002 | SK | NS | Original Issue |
| 1 | 02-28-2017 | 102811224MIN-002 | SK <i>SKhejra</i> | NS <i>Nar. Jibbt</i> | IC certification number was changed |
| 2 | 03-20-2017 | 102811224MIN-002 | SK <i>SKhejra</i> | NS <i>Nar. Jibbt</i> | FCC ID certification number is changed. SAR Test Exclusion Calculation page is added. |



Test Setup Photos



