



Test Report No. 8912353243

Applicant: StePac L.A. Ltd.

Equipment Under Test:

Control Unit transceiver

Model: Xsense-HUB

FCC ID: XCCXSENSE-CU

***From The Standards Institution
Of Israel***

Industry Division

Electronics & Telematics Laboratory

EMC Section

**Test Report No.:** 8912353243**Page 1 of 25 pages****Title:** Test on Control Unit transceiver **FCC ID:** XCCXSENSE-CU **Model:** Xsense-HUB

| | |
|-------------------------------------|---|
| Order placed by: | StePac L.A. Ltd. |
| Address: | Tefen Industrial Park, Building 12, PO Box 73, Tefen 24959, Israel |
| Sample for test selected by: | The customer |
| The date of tests: | 7- 9 December 2008 |

| | |
|---|---------------------------|
| Description of Equipment Under Test (EUT): | Control Unit transceiver. |
| Model: | Xsense-HUB |
| Software version of radio unit | 5.8 |
| Hardware version of radio unit | Rev. C |
| Serial Number: | 0330 |
| Manufactured by: | CartaSense |

Reference Documents:

- ❖ CFR 47 FCC: Rules and Regulations; Part 15. "Radio frequency devices";
Subpart B: "Unintentional radiators" (2007)
Section 15.109 "Radiated emission limit"
Subpart C: "Intentional radiators" (2007),
Section 15.205. "Restricted bands of operations"
Section 15.207. "Conducted limits".
Section 15.209. "Radiated emission limits, general requirements".
"Radiated Emission Limits, Additional Provisions";
Section 15.231. "Periodic operation in the bands 40.66 – 40.70 MHz,
and above 70 MHz".

This Test Report contains 25 pages
and may be used only in full.

This Test Report applies only to the specimen tested and may not
be applied to other specimens of the same product.



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1. EUT Description and operation

1.1. General description:

* Note: the customer supplied all information in clause below.

The hub function is to communicate with wireless tags. When tags come in range of the hub they connect to the hub by wireless communication and transfer information to the hub. The hub selects one of 4 operation frequencies, upon channel availability. Channel is changed if the hub detects interference. Channel frequencies are:

Channel 0 – 433.75 MHz

Channel 1 – 433.90 MHz

Channel 2 – 434.05 MHz

Channel 3 – 434.20 MHz

| | |
|-----------------------------|---|
| Declare maximum EIRP power: | -10 dBm@ 434 MHz |
| Type of modulation: | FSK |
| Antenna type: | External flat antenna. Mfr Byoondoor mod.BY-433-5 |

The EUT power source: 100 – 230VAC power supply.

The EUT's block diagram is shown in Figures 1

The EUT external and internal views are presented in Photos #1.

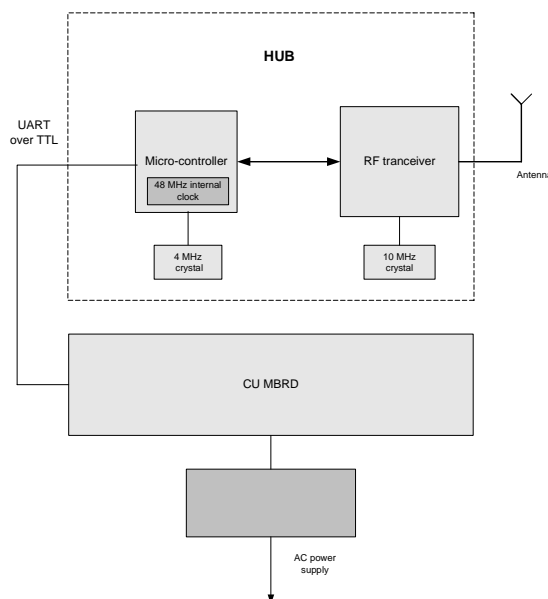


Figure 1. Transceiver block diagram.

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2. Test summary

| Parameter | FCC Part 15 Reference paragraph | Comply/not comply with the requirements |
|--|--|---|
| Radiated emission test in receive mode | Subpart B Section 15.109(a) | Comply |
| Test of field strength emission from intentional radiators | "Radiated Emission Limits, Additional Provisions" Section 15.231(e). | Comply |
| Radiated emission from intentional radiators in restricted bands | Subpart C Section 15.205 | Comply |
| Conducted emission test | Subpart C Section 15.207 | Comply |
| Occupied bandwidth test | Subpart C Section 15.231(c) | Comply |

Name: Eng. Yuri Rozenberg
Position: Head of EMC Branch

Telematics
Laboratory

December 2008

Name: Michael Feldman
Position: Test Technician

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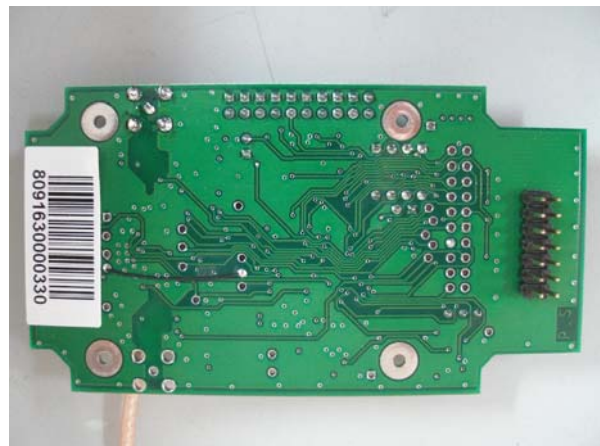
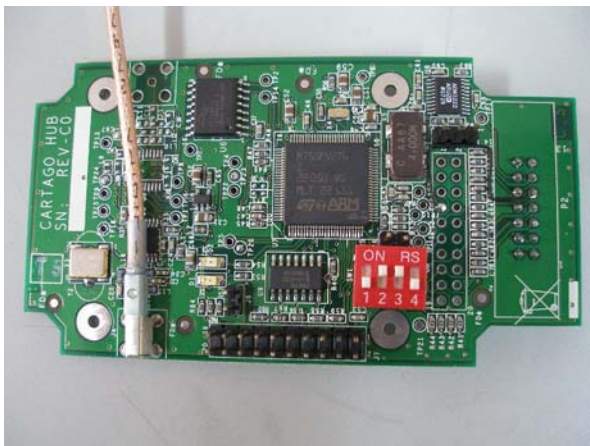
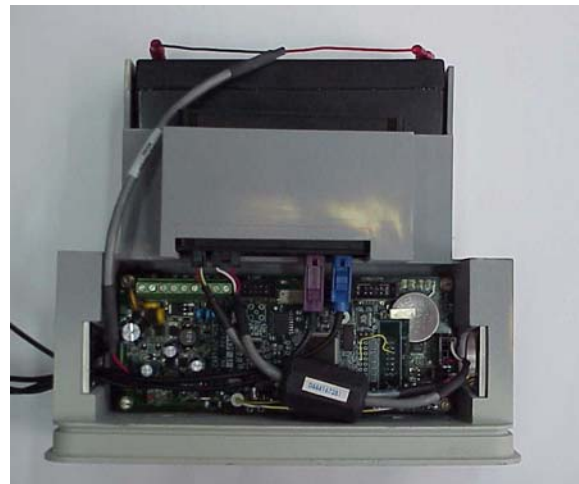


Photo 1. EUT's external and internal view

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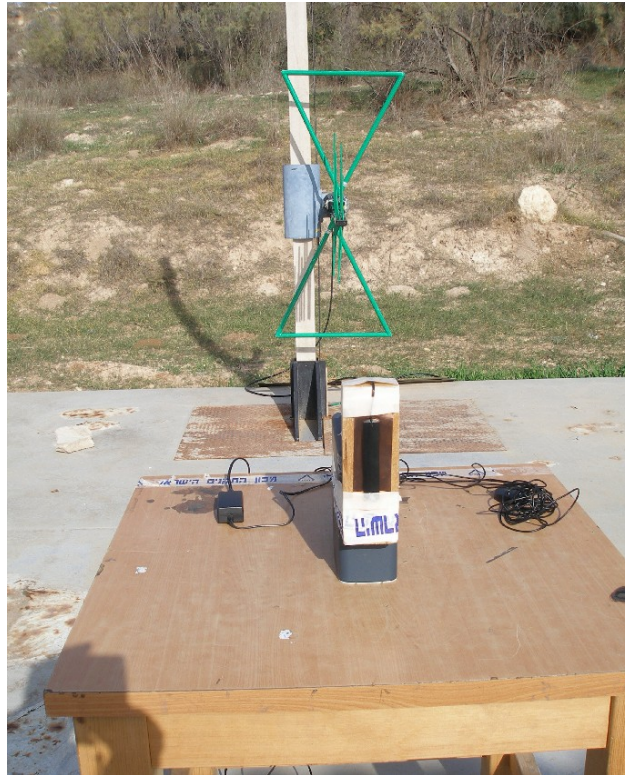


Photo 2. Spurious emissions test setup.



**Photo 3. Antenna typical installation on metal surface.
Typically installation of external antenna on metal surface.**

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2.1. Potential emission sources:

The potential emission sources are detailed in Table 1.

Table 1. Potential emission sources

| Frequency | Location |
|--------------------|-----------------------------------|
| 32.768 kHz crystal | Microcontroller oscillator |
| 4.0 MHz crystal | Microcontroller oscillator |
| 10.0 MHz crystal | RF transceiver crystal oscillator |
| 48.0 MHz | Internal microcontroller clock |
| 434 MHz RF signal | PCB |

2.2. EUT setup and operation:

Respective tests were performed in Transmission (Tx) and Receiving (Rx) modes. Radiated emission test was performed at middle carrier frequency -434.05 MHz. Measurements of transmitter were performed in continue transmission mode.

3. Measurements, examinations and derived results

3.1. Location of the Test Site:

Preliminary radiated test was conducted at the EMC laboratory of the Standards Institution of Israel in Tel-Aviv. Final tests were conducted in an Open Area Test Site located at Kibbutz Native Halamed Hai in Emek HaEla, Israel.

3.2. Test condition:

Temperature: 20 °C. Humidity: 56 %. Atmospheric pressure: 1011 mbar.

3.3. Initial visual check and functional test:

Initial visual check and brief built- in- test of the EUT was performed before testing.

- No external damages were found.
- The test on the EUT passed successfully.

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3.4. Radiated emission test.

3.4.1. General:

Per FCC Part 15 Subpart C Sections 15.209(a), 15.231(e).

- * Initial scans were made using a peak detector but still using the appropriate ANSI IF bandwidth.
- * A tolerance limit was set 10 dB below the specification limit. Levels above the tolerance limit were retested using the Peak, QP and Average detectors.

3.4.2. Preliminary radiated emission tests:

Preliminary investigation from 9 kHz up to ten harmonic of carrier frequency was performed. Test was conducted in a semi-anechoic chamber at distance 3 meters. The EUT was setup in its typical configuration and operated in its various modes. For each mode of operation the frequency spectrum was monitored. EUT configuration, cable configuration and mode of operation, which produced the maximum level of emission, were documented. A list of frequencies to be tested was prepared.

3.4.3. Final measurements:

The final radiated emission measurements were performed at the Open Area Test Site at the same (3 m) test distance. The EUT was operated as described above. The EUT was installed on a turn - table. Biconilog and Double Ridged Guide antennas were used. The measurements were performed at each frequency that founded previously at which the signal level was 10 dB below the limit or less. The levels were maximized by rotating turntable through 360°, changing antenna height and changing antenna-to-EUT polarization from vertical to horizontal. The worse case result was noted in tables.

3.4.4. Radiated emission test results:

All emissions, measured from the EUT at the 9kHz-30MHz frequency range were to 20 dB at least below limit.

Final result measurements in transmit mode above 30MHz are presented in tables and plots ##1 - 14 in section 3.5.5.

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3.5. Test of field strength emission from intentional radiator.

3.5.1. General:

Per FCC Part 15 Subpart C clause 15.231 (e)

3.5.2. Requirements:

The field strength emissions from intentional radiators operated according to section 15.231 (e) requirements shall comply with the limit based on the average value.

Table 2. Section 15.231(e) limit.

| Fundamental Frequency MHz | Calculated Field Strength limit of Fundamental dB ($\mu\text{V/m}$) | Calculated Field Strength limit of Spurious Emissions dB ($\mu\text{V/m}$) |
|------------------------------|--|---|
| 434.05 | 72.9 | 52.9 |

Note: Peak field strength shall not exceed the maximum permitted specified limit by more than 20 dB. Field strength limits are specified at a distance of 3 meters.

3.5.3. Test procedure:

The test was conducted according to clause 15.231.

3.5.4. Test summary:

The tested unit meets the standard requirement.

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| Carrier frequency MHz | Peak Ampl. dB (μV/m) | Peak Limit dB (μV/m) | Margin dB | Avg Ampl.* dB (μV/m) | Specified Avg@3m limit, dB (μV/m) | Margin dB |
|--------------------------|-------------------------|-------------------------|--------------|-------------------------|--|--------------|
| 434.05 | 80.7 | 92.9 | 13.2 | 70.7 | 72.9 | 2.2 |

*Average amplitude result was calculated from measured Peak value – Average factor.
 Average factor calculation see at bottom of the page.
 For recorded Fundamental frequencies result see plots #1.
 Noted spurious emission results present in table below.

Spurious emissions test result.**Table 4. Spurious emission result.**

| Freq. MHz | Peak Ampl dB (μV/m) | Peak Ampl limit, dB (μV/m) | Margin dB | Avg Ampl** dB (μV/m) | Specified @3m limit, dB (μV/m) | Margin dB | Reference Plot |
|--------------|------------------------|----------------------------------|--------------|----------------------------|---|--------------|-------------------|
| 868.2 | 40.8 | 72.9 | 32.1 | 30.8 | 52.9 | 22.1 | Plot #4 |
| 1302.1 | 50.2 | 74.0* | 23.8 | 40.2 | 54.0* | 13.8 | Plot #6 |
| 1736.2 | 42.0 | 74.0 | 42.0 | 32.0 | 54.0 | 22.0 | Plot #7 |

*Limit 15.205 restricted bands.

**Average amplitude result was calculated from measured Peak value – Average factor.
 Average factor = $20 \log \text{Tx on}/100\text{msec} = 20 \log [31.5\text{ms}/100] = -10.0 \text{ dB}$.
 Average factor calculations based on result from plot # 9 (b).



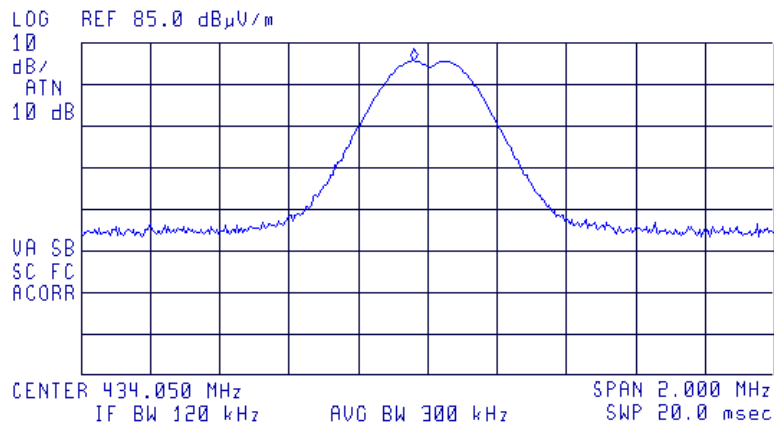
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Title: Test on Control Unit transceiver FCC ID: XCCXSENSE-CU Model: Xsense-HUB

08:56:20 DEC 07, 2008
WAC EUT-Xsense-HUB

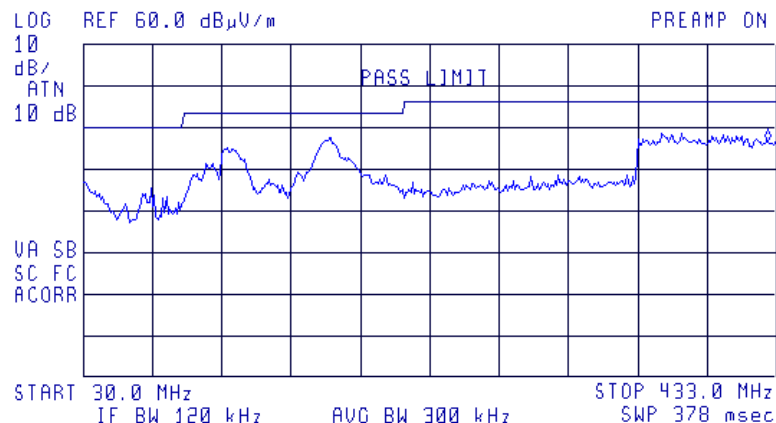
ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 434.010 MHz
80.68 dBμV/m



Plot # 1. Field strength of fundamental frequency 434.05 MHz.

09:04:10 DEC 07, 2008
WAC EUT-Xsense-HUB

ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 428.0 MHz
36.77 dBμV/m



Plot # 2. Spurious emissions scan 30 MHz – 433 MHz. Test distance =3m.

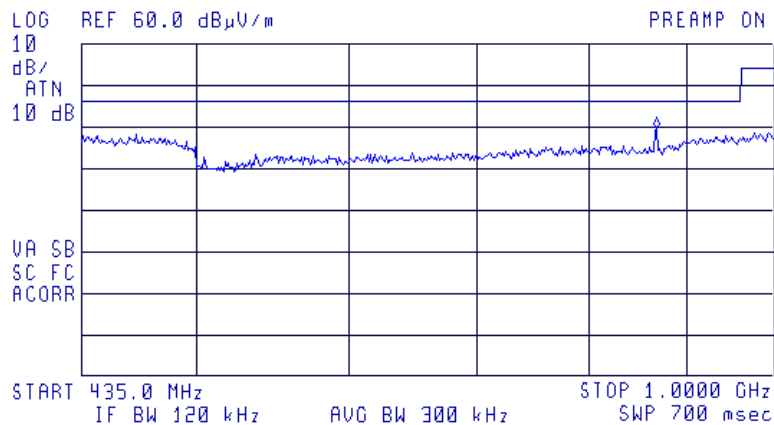
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Title: Test on Control Unit transceiver FCC ID: XCCXSENSE-CU Model: Xsense-HUB

09:13:31 DEC 07, 2008
WAC EUT-Xsense-HUB

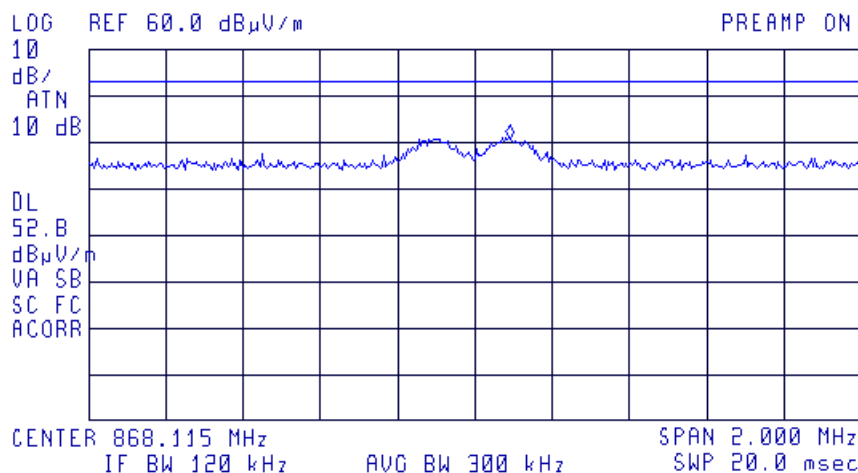
ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 867.0 MHz
39.63 dB μ V/m



Plot # 3. Emissions scan at 435 MHz – 1000 MHz frequency range. Fc- 434.05 MHz.

09:11:44 DEC 07, 2008
WAC EUT-Xsense-HUB

ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 868.205 MHz
40.82 dB μ V/m



Plot # 4. The carrier frequency second harmonic. Detector peak.

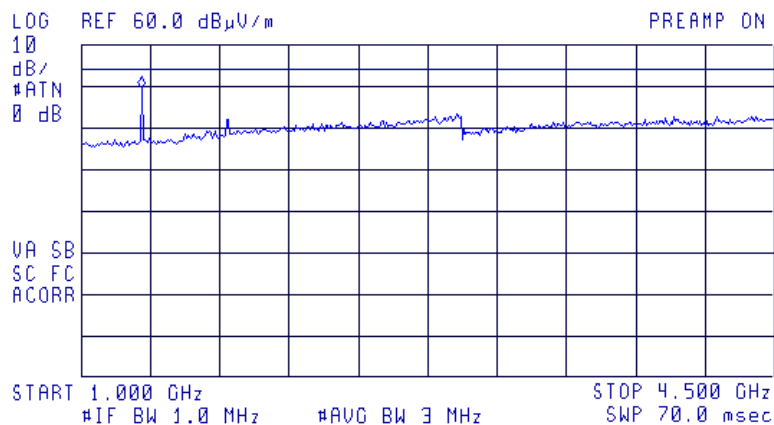
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09:23:58 DEC 07, 2008
WAC EUT-Xsense-HUB

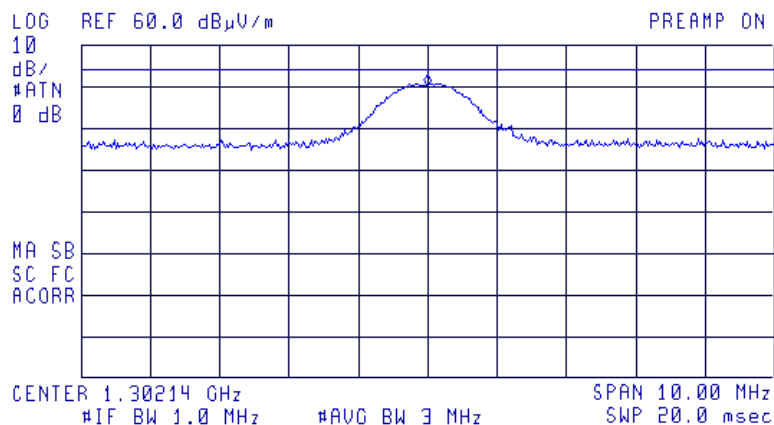
ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 1.307 GHz
49.42 dBμV/m



Plot # 5. Emission scan at 1.0 – 4.5 GHz frequency range.

09:29:41 DEC 07, 2008 Fc-434.05 MHz
WAC EUT-Xsense-HUB

ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 1.30214 GHz
50.18 dBμV/m



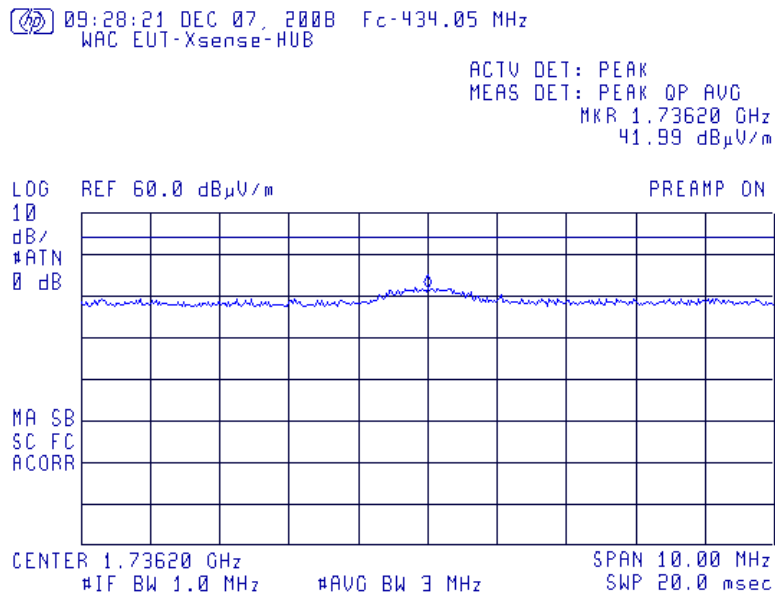
Plot # 6. The carrier frequency third harmonic. Detector peak.



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Plot # 7. The carrier frequency 4 th harmonic. Detector peak.

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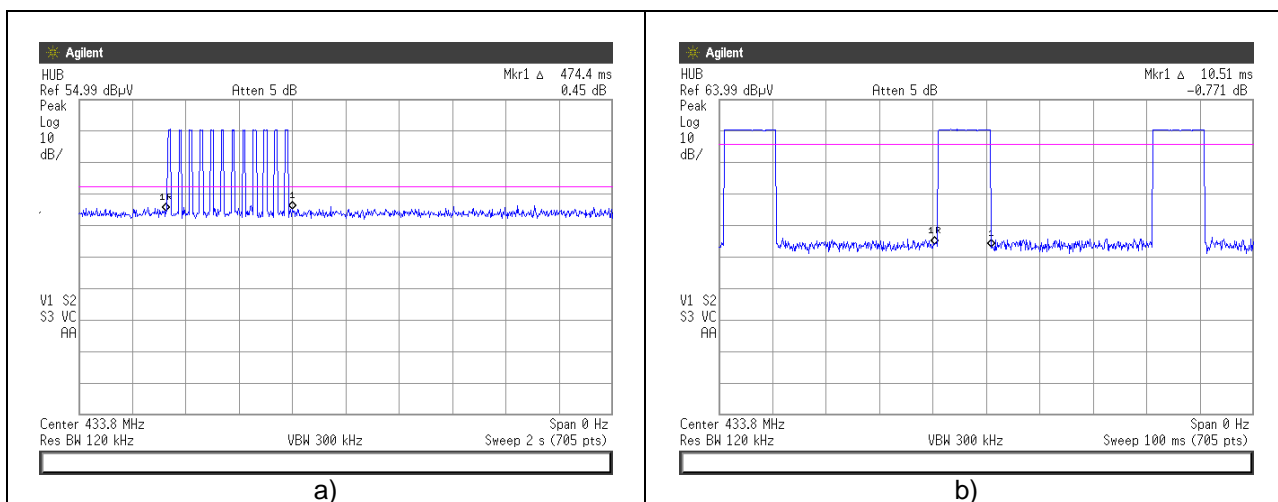
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Title: Test on Control Unit transceiver FCC ID: XCCXSENSE-CU Model: Xsense-HUB

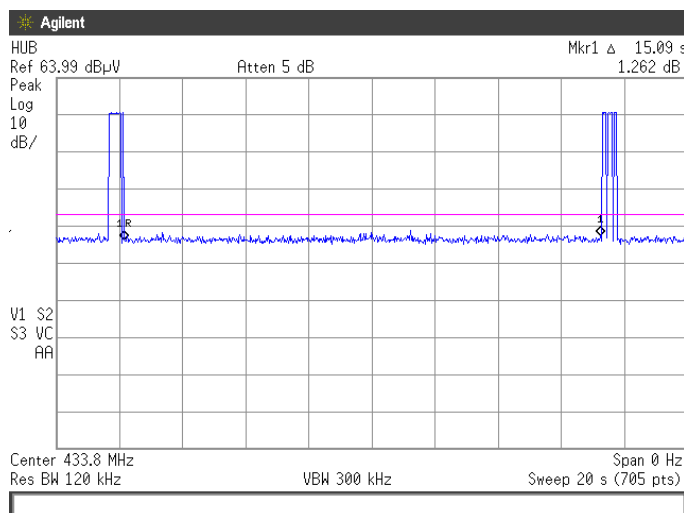
3.6. Test of automatically limiting operation.

3.6.1. General

Per FCC Part 15 Subpart C clause 15.231 (e)



Plot # 8. Duration of transmission- Tx on.



Plot # 9. Test of the silent period between transmissions.

3.6.2. Test summary:

Duration of each transmission is 0.47 sec and silent period between transmissions is 15.1 second.

The transmitter meets standard requirement.

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3.7. Test of occupied bandwidth per 15.231(c)

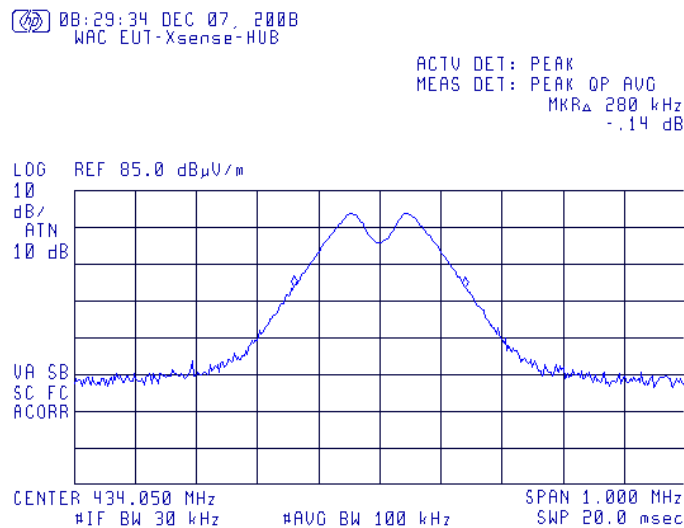
3.7.1. Requirements:

The bandwidth of the emissions shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the centre of modulated carrier.

For 434.05 MHz centre frequency allowed occupied bandwidth shall be less than $(434/100) \cdot 0.25 = 1.085$ MHz.

3.7.2. Test results:

Test result is presented in plot # 10 below.



Plot # 10. Occupied bandwidth test result

3.7.3. Test summary:

20 dB occupied bandwidth is 280 kHz.

The tested unit meets the standards requirements.

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3.8. Test of conducted emission at main terminal.

3.8.1. General

Per FCC Part 15 Subpart C clause 15.207 (a)

3.8.2. Test procedure:

The test was conducted according to clause 15.207.

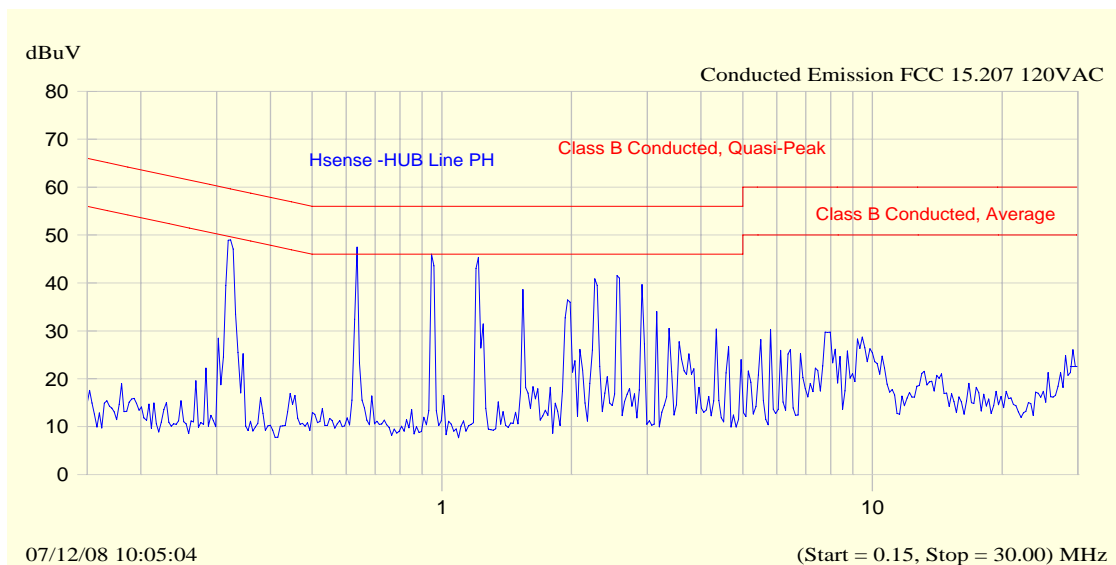


Table 5. Test result. Line Phase.

| Frequency MHz | Peak dBuV | QP dBuV | QP Limit dB | Avg dBuV | Avg Limit dB | QP-Avg Limit dB |
|------------------|--------------|------------|----------------|-------------|-----------------|--------------------|
| 0.325 | 50.4 | 47.9 | 59.6 | 44.8 | 49.6 | -1.7 |
| 0.644 | 47.5 | 42.4 | 56.0 | 30.8 | 46.0 | -3.6 |
| 0.980 | 46.5 | 44.0 | 56.0 | 35.3 | 46.0 | -2.0 |
| 1.316 | 42.8 | 40.8 | 56.0 | 29.9 | 46.0 | -5.2 |
| 2.573 | 40.3 | 39.7 | 56.0 | 18.0 | 46.0 | -6.3 |
| 2.906 | 10.5 | 36.5 | 56.0 | 24.6 | 46.0 | -9.5 |

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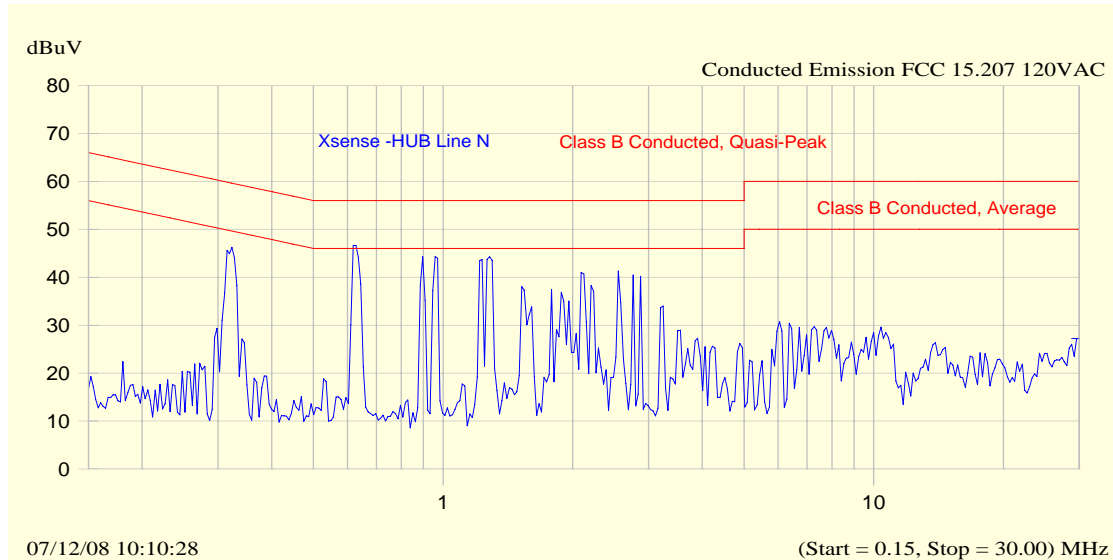


Table 6. Test result. Line Neutral.

| Frequency MHz | Peak dBuV | QP dBuV | QP Limit dB | Avg dBuV | Avg Limit dB | QP-Avg Limit dB |
|------------------|--------------|------------|----------------|-------------|-----------------|--------------------|
| 0.325 | 46.6 | 44.7 | 59.6 | 43.3 | 49.6 | -4.8 |
| 0.644 | 46.9 | 41.0 | 56.0 | 29.9 | 46.0 | -5.0 |
| 0.980 | 45.2 | 43.8 | 56.0 | 33.6 | 46.0 | -2.2 |
| 2.573 | 41.7 | 36.4 | 56.0 | 4.4 | 46.0 | -9.6 |
| 2.906 | 41.5 | 39.1 | 56.0 | 26.1 | 46.0 | -6.9 |

3.8.3. Test summary:

The unit meets the standard requirement.

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3.9. Test of field strength emission in receive mode

3.9.1. General

Per FCC Part 15 Subpart B clause 15.109 (a)

3.9.2. Test procedure:

The test was conducted according to clause 15.109.

Table 7. Radiated emission test results

| Frequency (MHz) | Antenna Polariz. V/H | Antenna Height (m) | Turn- table Angle (°) | Emission Level @ 3 m (dB μ V/m) | Limit @ 3 m (dB μ V/m) | Margin (dB) | Results |
|--------------------|----------------------------|--------------------------|--------------------------------|--|----------------------------------|----------------|----------|
| 111.3 | V | 1.0 | 345 | 41.8 | 43.5 | 1.7 | Complies |
| 118.7 | V | 1.0 | 280 | 37.8 | 43.5 | 5.7 | Complies |
| 125.7 | V | 1.0 | 275 | 38.7 | 43.5 | 4.8 | Complies |
| 137.5 | V | 1.0 | 216 | 35.2 | 43.5 | 8.3 | Complies |
| 176.1 | H | 3.2 | 267 | 41.1 | 43.5 | 2.4 | Complies |
| 181.9 | V | 1.0 | 199 | 39.6 | 43.5 | 3.9 | Complies |

In test above 1 GHz no emission found above SA noise floor that is at least 15 dB under the limit. Test result present in plot #10.

Note: Emission level = E Reading (dB μ V) + Cable loss (dB) + Antenna Factor (dB/m)
For Cable Loss and Antenna Factor refer to Appendix 2.

3.9.3. Test summary:

The tested unit meets the standard requirement.



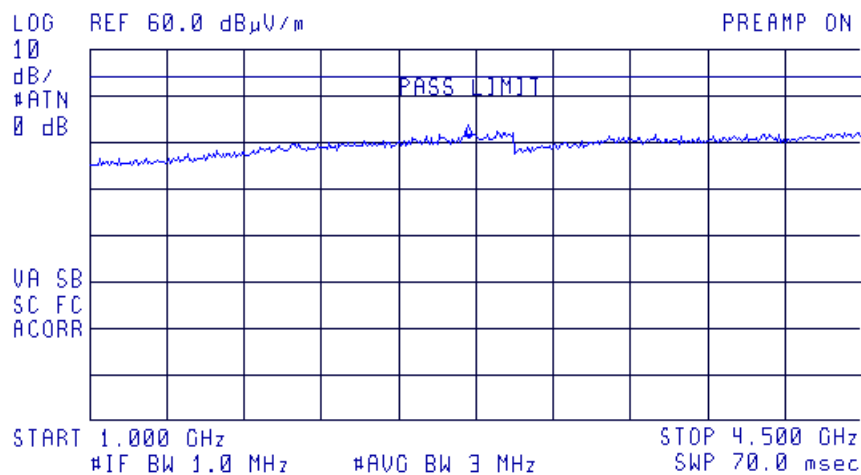
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10:45:44 DEC 07, 2008 Rx mode
WAC EUT-Xsense -HUB

ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 2.720 GHz
40.83 dBμV/m



Plot # 11. Emissions scan at 1.0 – 4.5 GHz frequency range. Receive mode.

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4. Appendix 1. Test equipment used

All measurements equipment is on SII calibration schedule with a recalibration interval not exceeding one year.

| Instrument | MFR | Model | Serial No. | Due calibration date |
|--|------------|------------------|------------|----------------------|
| EMI Receiver 9 kHz – 6.5 GHz | HP | 8546A+85460A | SII 4068 | April 2009 |
| Antenna Loop 0.009 - 30 MHz | EMCO | 6502 | SII 4874 | Mar 09 |
| Biconilog Antenna 30 – 2000 MHz | Teseq GmbH | CBL 6112D | S/N 23181 | Sept 2009 |
| EMI Analyser 9 kHz - 26.5 GHz | HP | E7405A | SII 4944 | Nov 2009 |
| Antenna Double Ridged Guide, 1-18 GHz | EMCO | 3115 | SII4873 | Sept 2009 |
| LISN 9 kHz – 30 MHz | FCC | LISN 250-32-4-16 | SII5023 | Oct 2009 |
| Transient limiter 0.009-200 MHz | HP | 11947A | 3107105 | Oct 2009 |
| Oscilloscope | HP | 54610B | US37340682 | May 2009 |
| RF cable, 3m | Sucoflex | 104PE | 21328/4PE | Oct 2009 |
| Antenna Mast | R&S | HCM | 100002 | N/A |
| Metallic turntable | R&S | HCT12 | 100001 | N/A |
| Positioning controller | R&S | HCC | 100002 | N/A |

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5. Appendix 2: Antenna Factor and Cable Loss

Cable Loss (10m cable + Mast)

| Point | Frequency (MHz) | Cable Loss (dB) | Point | Frequency (MHz) | Cable Loss (dB) |
|-------|-----------------|-----------------|-------|-----------------|-----------------|
| 1 | 30 | 0.53 | 21 | 1000 | 3.68 |
| 2 | 50 | 0.75 | 22 | 1100 | 3.82 |
| 3 | 100 | 1.08 | 23 | 1200 | 4.07 |
| 4 | 150 | 1.39 | 24 | 1300 | 4.24 |
| 5 | 200 | 1.61 | 25 | 1400 | 4.43 |
| 6 | 250 | 1.752 | 26 | 1500 | 4.6 |
| 7 | 300 | 2.00 | 27 | 1600 | 4.7 |
| 8 | 350 | 2.15 | 28 | 1700 | 4.85 |
| 9 | 400 | 2.26 | 29 | 1800 | 4.98 |
| 10 | 450 | 2.383 | 30 | 1900 | 5.19 |
| 11 | 500 | 2.52 | 31 | 2000 | 5.34 |
| 12 | 550 | 2.606 | 32 | 2100 | 5.51 |
| 13 | 600 | 2.75 | 33 | 2200 | 5.69 |
| 14 | 650 | 2.856 | 34 | 2300 | 5.89 |
| 15 | 700 | 3.06 | 35 | 2400 | 6.07 |
| 16 | 750 | 3.20 | 36 | 2500 | 6.22 |
| 17 | 800 | 3.27 | 37 | 2600 | 6.28 |
| 18 | 850 | 3.38 | 38 | 2700 | 6.41 |
| 19 | 900 | 3.46 | 39 | 2800 | 6.53 |
| 20 | 950 | 3.55 | 40 | 2900 | 6.84 |

**Test Report No.: 8912353243****Page 23 of 25 pages****Title: Test on Control Unit transceiver FCC ID: XCCXSENSE-CU Model: Xsense-HUB****Table 8. Antenna Factor****For Bilog Antenna, Model Number: CBL 6112D, S/N: 23181**

| No. | f / MHz) | AF / dB/m | f / MHz) | AF / dB/m | f / MHz) | AF / dB/m | f / MHz) | AF / dB/m |
|-----|----------|-----------|----------|-----------|----------|-----------|----------|-----------|
| 1 | 30 | 17.90 | 170 | 9.40 | 530 | 17.70 | 1040 | 22.20 |
| 2 | 32 | 16.70 | 175 | 9.00 | 540 | 18.25 | 1060 | 22.50 |
| 3 | 34 | 15.55 | 180 | 8.50 | 550 | 18.60 | 1080 | 22.50 |
| 4 | 36 | 14.35 | 185 | 8.45 | 560 | 14.45 | 1100 | 22.40 |
| 5 | 38 | 13.30 | 190 | 8.60 | 570 | 18.40 | 1120 | 22.60 |
| 6 | 40 | 12.20 | 195 | 8.85 | 580 | 18.50 | 1140 | 22.45 |
| 7 | 42 | 11.05 | 200 | 8.95 | 590 | 18.60 | 1160 | 22.50 |
| 8 | 44 | 9.95 | 205 | 8.80 | 600 | 18.60 | 1180 | 22.40 |
| 9 | 46 | 8.90 | 210 | 8.50 | 610 | 18.80 | 1200 | 22.80 |
| 10 | 48 | 8.05 | 215 | 8.20 | 620 | 18.99 | 1220 | 22.95 |
| 11 | 50 | 7.30 | 220 | 8.50 | 630 | 19.05 | 1240 | 23.10 |
| 12 | 52 | 6.80 | 225 | 9.00 | 640 | 19.23 | 1260 | 23.40 |
| 13 | 54 | 6.45 | 230 | 9.65 | 650 | 19.10 | 1280 | 23.35 |
| 14 | 56 | 6.00 | 235 | 10.30 | 660 | 19.13 | 1300 | 23.62 |
| 15 | 58 | 5.70 | 240 | 11.00 | 670 | 19.04 | 1320 | 23.64 |
| 16 | 60 | 5.45 | 245 | 11.60 | 680 | 19.00 | 1340 | 23.86 |
| 17 | 62 | 5.30 | 250 | 12.00 | 690 | 19.17 | 1360 | 23.95 |
| 18 | 64 | 5.20 | 255 | 12.45 | 700 | 19.28 | 1380 | 23.90 |
| 19 | 66 | 5.30 | 260 | 12.85 | 710 | 19.25 | 1400 | 24.45 |
| 20 | 68 | 5.30 | 265 | 12.50 | 720 | 19.45 | 1420 | 24.74 |
| 21 | 70 | 5.35 | 270 | 12.45 | 730 | 19.75 | 1440 | 24.93 |
| 22 | 72 | 5.50 | 275 | 12.40 | 740 | 19.95 | 1460 | 25.03 |
| 23 | 74 | 5.80 | 280 | 12.55 | 750 | 20.07 | 1480 | 25.45 |
| 24 | 76 | 6.00 | 285 | 12.65 | 760 | 19.85 | 1500 | 25.30 |
| 25 | 78 | 6.60 | 290 | 12.75 | 770 | 19.80 | 1520 | 25.25 |
| 26 | 80 | 6.70 | 295 | 12.95 | 780 | 19.85 | 1540 | 25.36 |
| 27 | 82 | 7.15 | 300 | 13.00 | 790 | 19.95 | 1560 | 25.58 |
| 28 | 84 | 7.60 | 310 | 13.35 | 800 | 20.05 | 1580 | 25.50 |
| 29 | 86 | 8.10 | 320 | 13.75 | 810 | 20.10 | 1600 | 25.65 |
| 30 | 88 | 8.50 | 330 | 13.85 | 820 | 20.35 | 1620 | 25.60 |
| 31 | 90 | 8.90 | 340 | 14.10 | 830 | 20.40 | 1640 | 25.70 |
| 32 | 92 | 9.20 | 350 | 14.50 | 840 | 20.35 | 1660 | 25.83 |
| 33 | 94 | 9.75 | 360 | 14.70 | 850 | 20.46 | 1680 | 25.97 |
| 34 | 96 | 9.95 | 370 | 14.90 | 860 | 20.39 | 1700 | 26.10 |
| 35 | 98 | 10.20 | 380 | 15.10 | 870 | 20.29 | 1720 | 26.25 |
| 36 | 100 | 10.50 | 390 | 15.45 | 880 | 20.24 | 1740 | 26.04 |
| 37 | 105 | 11.25 | 400 | 16.00 | 890 | 20.35 | 1760 | 26.14 |
| 38 | 110 | 11.70 | 410 | 16.40 | 900 | 20.55 | 1780 | 26.20 |
| 39 | 115 | 11.70 | 420 | 16.70 | 910 | 20.45 | 1800 | 26.40 |
| 40 | 120 | 11.80 | 430 | 16.35 | 920 | 20.60 | 1820 | 26.64 |
| 41 | 125 | 11.80 | 440 | 16.30 | 930 | 20.60 | 1840 | 26.86 |
| 42 | 130 | 11.70 | 450 | 16.30 | 940 | 20.66 | 1860 | 27.12 |
| 43 | 135 | 11.35 | 460 | 16.70 | 950 | 20.88 | 1880 | 27.00 |
| 44 | 140 | 10.95 | 470 | 17.05 | 960 | 21.11 | 1900 | 27.25 |
| 45 | 145 | 10.35 | 480 | 17.20 | 970 | 20.93 | 1920 | 27.36 |
| 46 | 150 | 10.05 | 490 | 17.30 | 980 | 21.03 | 1940 | 27.68 |
| 47 | 155 | 9.70 | 500 | 17.40 | 990 | 21.05 | 1960 | 27.10 |
| 48 | 160 | 9.70 | 510 | 17.50 | 1000 | 21.10 | 1980 | 27.06 |
| 49 | 165 | 9.45 | 520 | 17.60 | 1020 | 21.40 | 2000 | 27.25 |

**Test Report No.:** 8912353243**Page** 24 **of** 25 **pages****Title:** Test on Control Unit transceiver **FCC ID:** XCCXSENSE-CU **Model:** Xsense-HUB**Antenna Factor****Double Ridged Guide Antenna mfr EMCO model 3115 1m calibration**

| Point | Frequency (MHz) | Antenna Factor (dB/m) |
|-------|-----------------|-----------------------|
| 1 | 1000 | 23.9 |
| 2 | 2000 | 28.3 |
| 3 | 3000 | 31.0 |
| 4 | 4000 | 33.1 |
| 5 | 4500 | 32.5 |
| 6 | 5000 | 32.4 |
| 7 | 6000 | 53.7 |
| 8 | 6500 | 35.6 |
| 9 | 7000 | 36.4 |
| 10 | 7500 | 36.9 |
| 11 | 8000 | 37.0 |
| 12 | 8500 | 38.0 |
| 13 | 9000 | 38.6 |
| 14 | 9500 | 38.4 |
| 15 | 10000 | 38.4 |
| 16 | 10500 | 38.4 |
| 17 | 11000 | 38.9 |
| 18 | 11500 | 39.6 |
| 19 | 12000 | 39.4 |
| 20 | 12500 | 39.2 |
| 21 | 13000 | 40.3 |
| 22 | 13500 | 41.0 |
| 23 | 14000 | 41.2 |
| 24 | 14500 | 41.3 |
| 25 | 15000 | 40.0 |
| 26 | 15500 | 38.0 |
| 27 | 16000 | 38.1 |
| 28 | 16500 | 40.3 |
| 29 | 17000 | 42.2 |
| 30 | 17500 | 44.6 |
| 31 | 18000 | 46.2 |

Cable Loss**Type: Sucoflex 104PE; Ser.No.21328/4PE; 4 m length**

| Point | Frequency (GHz) | Cable Loss (dB) |
|-------|-----------------|-----------------|
| 1 | 0.0-1.0 | 1.7 |
| 2 | 1.0- 3.5 | 3.2 |
| 3 | 3.5- 5.5 | 4.0 |
| 4 | 5.5 - 7.5 | 4.7 |
| 5 | 7.5 - 9.5 | 5.3 |
| 6 | 9.5 - 10.5 | 5.6 |
| 7 | 10.5 - 12.5 | 6.2 |
| 8 | 12.5 - 14.5 | 6.8 |
| 9 | 14.5 - 16.5 | 7.5 |
| 10 | 16.5 - 18.0 | 8.1 |