FCC Part 15.247
Transmitter Certification

900 MHz ISM Band
Frequency Hopping Spread Spectrum Transmitter

Test Report

FCC ID: TEB-HUNTSU864

FCC Rule Part: 15.247

Test Begin Date: 1/15/2010
Test End Date: 1/26/2010

Report Issue Date: 4/13/2010

Hunt Technologies, Inc.
6436 County Rd. 11
Pequot Lakes, MN 56472

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1.0 GENERAL

1.1 Purpose
The purpose of this report is to demonstrate compliance with Part 15, Subpart C of the FCC's Code of Federal Regulations.

1.2 Product Description

1.2.1 General
Hunt Technologies' FOCUS AX Universal RF endpoint model 864 consists of a 900 MHz transceiver and a separate ZigBee transceiver on a single printed circuit board. The 900 MHz circuit, operating in the 902-928 MHz frequency band, is a frequency hopping spread spectrum transceiver utilizing GFSK modulation. The ZigBee circuit is a direct sequence spread spectrum transmitter operating in the 2400-2483.5 MHz unlicensed band and utilizing O-QPSK modulation. The 864 module will be assembled into a Landis+Gyr FOCUS AX meter before delivery to the customer.

This report specifically addresses the testing of the 900 MHz transceiver. The requirements for a single modular approval have been met and are outlined in "Exhibit P - Modular Approval (900 MHz).pdf".

Exhibits A and B are detailed external and internal photographs of the EUT.

1.2.2 Intended Use
The FOCUS AX Universal RF endpoint model 864 will be transmitting and receiving over 902-928 MHz ISM band. It collects metering data from the meter module and transmits it to electric utility companies. It can also receive and repeat data from other similar modules or a central collector module.

2.0 STATEMENT OF COMPLIANCE

§2.907 Certification
This is an application for certification.

§2.911 Application
a) This is an application and has been filed electronically with form 731.
b) All information required has been supplied.
c) The applicant has signed the application (electronically).
d) The technical data has been signed.
e) Applicant signature block on electronic form 731 completed by officer of the company or authorized company personnel.
f) The appropriate fee has been paid.

§2.915 Grant
This application demonstrates that all applicable technical standards have been met.

§2.925 Label
Each piece of equipment for which authorization will be granted will be uniquely identified with "TEB-HUNTSU864". The required statement will appear with the FCC ID on the outside cover of the product. "Exhibit C - FCC Label.pdf" shows the external label and "Exhibit D - Product Ship Sheet.pdf" is the product's ship-sheet (pamphlet) provided to the end-user that contains the required compliance statement as defined by §15.19.

§2.947 Measurement Procedure
a) The scan of the restricted bands was made in a radiated manner. The radiated measurement procedure follows ANSI C63.4 procedure.
b) All other RF measurements were made in a conducted manner.
c) Procedural notes are contained in this test report.
d) A list of test equipment used is contained in this test report.

§2.948 Description of Measurement Facilities
Measurements were performed at TUV Testing Services Open Test Site. The FCC keeps a full description of the measurement facilities on file. TUV's acceptance and approval is dated as December 5, 1993 in a letter received from the FCC. TUV FCC OATS #90983, IC OATS #2932L-1

The address of the test facility is:
TÜV Product Service
19035 Wild Mountain Road
Taylors Falls, MN 55084-1758
Phone: 651-638-0297
Contact: Joel Schneider (Test Engineer in Charge)

See "Exhibit O - Radiated Emissions Sketch.pdf" for a sketch of radiated measurement setup.

The radiated emissions and the power line conducted emissions were tested at TUV.

The remainder of the RF conducted emissions tests (including all conducted emissions, 6-dB bandwidth, peak power output, spurious emissions from 30 MHz to 26 GHz, and power spectral density) were done at the following address:

Hunt Technologies, Inc.
6436 County Rd. 11
Pequot Lakes, MN 56472

§2.1033 Application for Certification
a) Form 731 has been electronically filed on 4/13/2010. Items that did not apply were left blank.
b) This technical report contains the following information where applicable.
1. Full name and mailing address of manufacturer and applicant for certification:
Hunt Technologies, LLC.
6436 County Rd. 11
Pequot Lakes, MN 56472
2. FCC Identifier:
TEB-HUNTSU864
3. Brief Description of circuit functions and device operation:

See "Exhibit F - Operational Statement.pdf" for operational description.
See "Exhibit G - Schematic.pdf" for schematic

4. Block Diagram:
   See "Exhibit H - Block Diagram.pdf"
5. Report of the measurements of conducted and radiated emissions:
   See figs. in section 6 and Exhibits J, K, L, M, and N shown and discussed later in this report.
6. Photographs
   External: See "Exhibit A - External Photos.pdf"
   Internal: See "Exhibit B - Internal Photos.pdf"
   Test Setup: See "Exhibit E - Test Setup Photos.pdf"
7. Peripheral or Accessory devices:
   There are no peripheral or accessory devices designed to operate with this product.
8. Transition Rules
   This application is not pursuant to the transition rules of §15.37
9. Application for scanning receivers:
   Not applicable to this device.
10. Application for operation within the 59-64GHz band:
    Not applicable to this device.

c) Composite Systems
   Not applicable to this device.

d) Software Defined Radio
   Not applicable to this device. See "Exhibit I - SDR Statement.pdf"

3.0 APPLICABLE STANDARD REFERENCES

The following standards were used:

 ANSI C63.4-1992: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz

 US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures (October 2004)

 US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators (October 2004)

 FCC OET Bulletin 65 Appendix C - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

4.0 LIST OF TEST EQUIPMENT

All test equipment used for regulatory testing is calibrated yearly or according to manufacturer's specifications. The equipment used to do all Radiated testing and Power Line Conducted Emissions is the property of TUV Product Services and is located at their Taylor's Falls facility. The FCC keeps a full description of TUV's measurement facilities on file. The equipment listed below was used at Hunt Technologies' Pequot Lakes, MN facility to do all RF conducted measurements.

Table 4.0-1: Test Equipment

Mfg.	Equip. Type	Model	S/N	Cal. Due
Agilent	Spectrum Analyzer	E4404B	MY41440735	7/30/2010
Agilent	Spectrum Analyzer	E4407B	MY45106578	7/30/2010

5.0 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

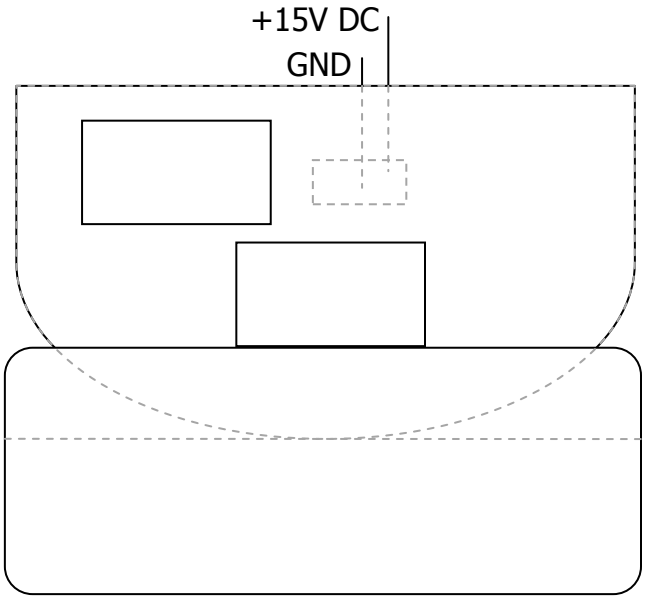

Figure 5.0-1 Radiated Emissions Test Setup

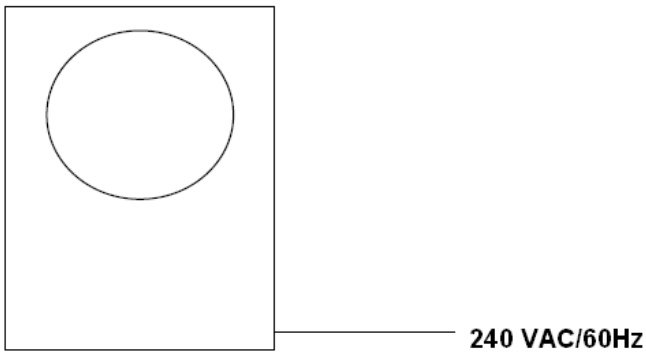

Figure 5.0-2 Power Line Conducted Emissions Test Setup

6.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

6.1 Frequencies to be Examined [§15.31(m)]

In accordance with the guidelines of §15.31(m), all conducted and radiated measurements were performed at the lowest (902.10 MHz), middle (915.00 MHz), and highest (927.900 MHz) frequencies that the product will transmit. For baud rates above 38400 KBPS measurements were performed at the lowest (902.30 MHz), middle (914.90 MHz), and highest (927.80 MHz) that the product will transmit.

6.2 Antenna Requirement [§15.203]
The transmitter antenna is integral to the circuit board, and therefore complies with the requirement that no other antenna shall be used with the device.

6.3 Antenna Characteristics [§15.204]
There is only one antenna proposed for use with this device.

6.3.1 Antenna Type
Inverted F

6.3.2 Antenna Manufacturer
None; the antenna is part of the printed circuit board.

6.3.3 Antenna Gain
The ¼ wave monopole is a well known antenna type. The theoretical gain of an ideal ¼ wave monopole is 5.15 dBi. The antenna on this transmitter has some non-ideal characteristics. The finite ground plane is the most significant non-ideal characteristic. Therefore, the antenna gain will be somewhat lower than the ideal number of 5.15 dBi.

6.4 Power Line Conducted Emissions [§15.207]

6.4.1 Test Methodology
ANSI C63.4 sections 6 and 7 were the guiding documents for this evaluation. Conducted emissions were performed from 150 kHz to 30 MHz.

6.4.2 Test Results
The summary of the results are shown below in figure 6.4-1. For the complete test report, see "Exhibit J - Conducted Emissions.pdf"

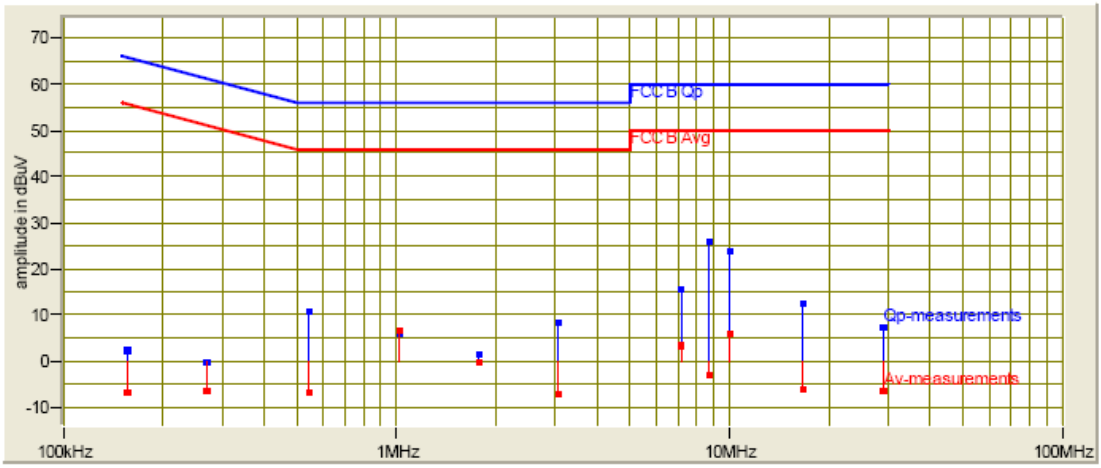

Figure 6.4-1: Power Line Conducted Emissions Summary

6.5 Radiated Emissions [§15.109] and Radiated Spurious Emissions (Restricted Bands) [§15.205]

6.5.1 Test Methodology
Radiated emissions tests were performed over the frequency range of 30MHz to 1 GHz and in the restricted bands up to 10 GHz, greater than 10 times the highest fundamental frequency. The restricted band tests were done at the lowest, middle, and highest transmit frequencies. Measurements of the radiated field strength were made at a distance of 3m from the boundary of

the equipment under test (EUT) and the receiving antenna. The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a resolution bandwidth (RBW) of 120 kHz and a video bandwidth (VBW) of 300 kHz. For frequencies above 1000MHz, average measurements were made using an RBW of 1 MHz and a VBW of 10 Hz and peak measurements were made with RBW of 1 MHz and a VBW of 1 MHz. See "Exhibit O - Radiated Emissions Sketch.pdf" for a sketch of the test setup.

6.5.2 Calculation of allowed limit for Radiated Spurious Emissions

For spurs above 1000 MHz, §15.205(b) allows duty cycle averaging per §15.35. This device transmits packets less than 400 ms and longer than 100 ms, therefore, there is no duty cycle correction for this product.

6.5.3 Test Results

Radiated spurious emissions found in the band of 30MHz to 10GHz are all below the applicable limits. Each emission found to be in a restricted band as defined by section 15.205, was compared to the radiated emission limits as defined in section 15.209. Results are shown in "Exhibit K - RE 30 to 1000 MHz.pdf", "Exhibit L - RE 1 to 10 GHz.pdf", "Exhibit M - RE Spurs 30 to 1000 MHz.pdf", and "Exhibit N - RE Spurs 1 to 10 GHz.pdf". The signals from the fundamental frequencies were all under the 1W limit. No significant harmonic emission was detected within the restricted bands. Only the lowest baud rate was checked for spurious because it is worst case. One channel was tested at the highest baud rate and all levels were lower than at the lowest baud rate. This verifies the theory that the lowest baud rate is the worst case for radiated emission levels.

6.6 Peak Output Power – [§15.247(b)(2)]

6.6.1 Test Methodology (Conducted Method)

The 20dB bandwidth of the EUT was within the resolution bandwidth of spectrum analyzer, therefore the power measurement was made using the spectrum analyzer method. The resolution and video bandwidth were set to > 20 dB bandwidth of the emission measured (300 kHz/1 MHz). The device employs >50 channels, therefore the power is limited to 1 Watt.

6.6.2 Test Results

Results are shown below in table 6.6-1 and the worst case was plotted and shown in figure 6.6-1 to 6.6-3 below:

Table 6.6-1: RF Output Power

Frequency (MHz)	Level (dBm)
902.10	27.48
915.00	26.80
927.900	25.68

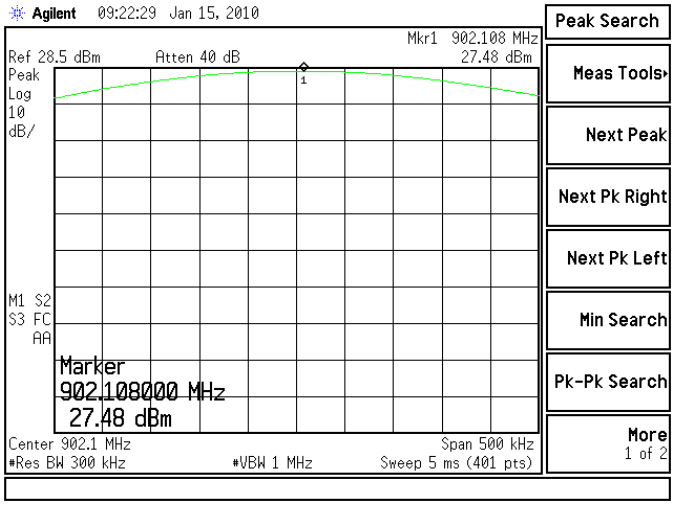

Figure 6.6-1: Output Power – Low Channel

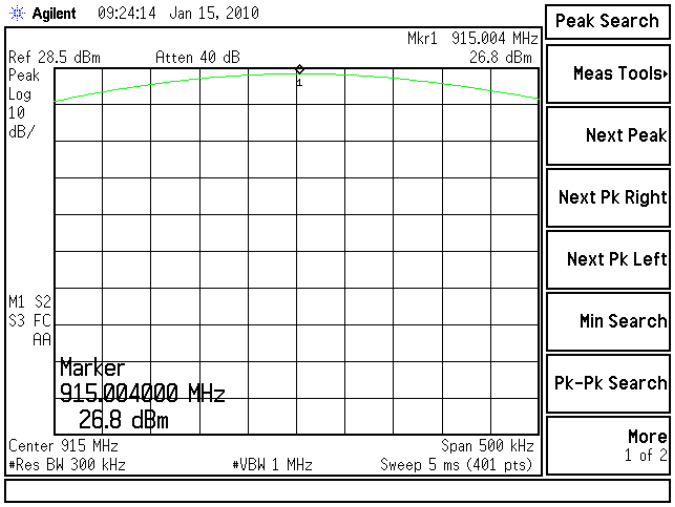

Figure 6.6-2: Output Power – Mid Channel

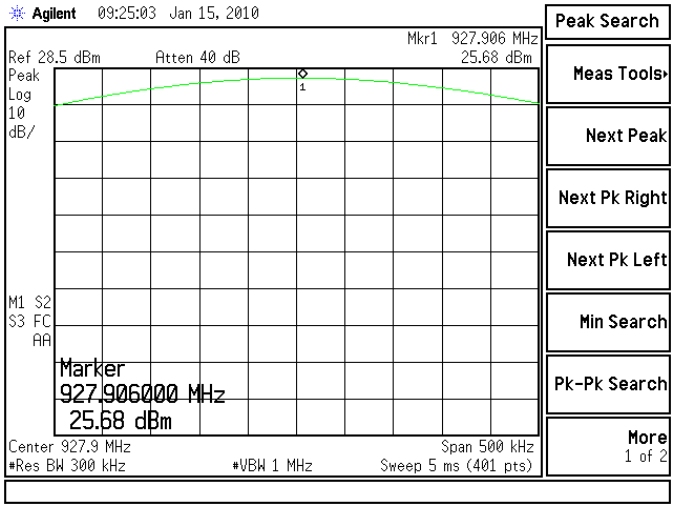

Figure 6.6-3: Output Power – High Channel

6.6.3 De Facto EIRP Limit

The gain of the transmit antenna is given earlier in this report. Because the gain of the antenna is less than 6 dBi, the peak output power need not be reduced to comply with this requirement.

6.6.4 RF Exposure Compliance Requirements

This device is not intended to operate within 20 cm of a person's body. Therefore, RF exposure requirements are not applicable to this application for certification. See "Exhibit Q - RF Exposure.pdf" for technical information and MPE calculations.

6.7 Channel Usage Requirements [§15.247(a) (1)]

15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

15.247(a) (1) (i): For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

6.7.1 Carrier Frequency Separation

6.7.1.1 Test Methodology

The span of the spectrum analyzer was set wide enough to capture two adjacent peaks and the RBW and VBW were set to ≥ 1% of the span.

6.7.1.2 Test Results

The adjacent channel separation for a System with <=38.4 KBPS was measured to be approximately 100 kHz The adjacent channel separation for baud rates above 38.4 KBPS were measured . Results are shown in figures 6.7.1-1 and 6.7.1-2 below:

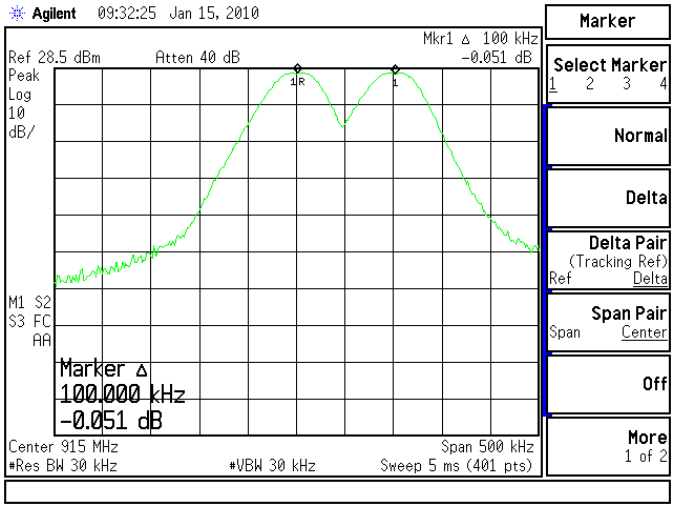

Figure 6.7.1-1: Carrier Frequency Separation <=38.4KBPS

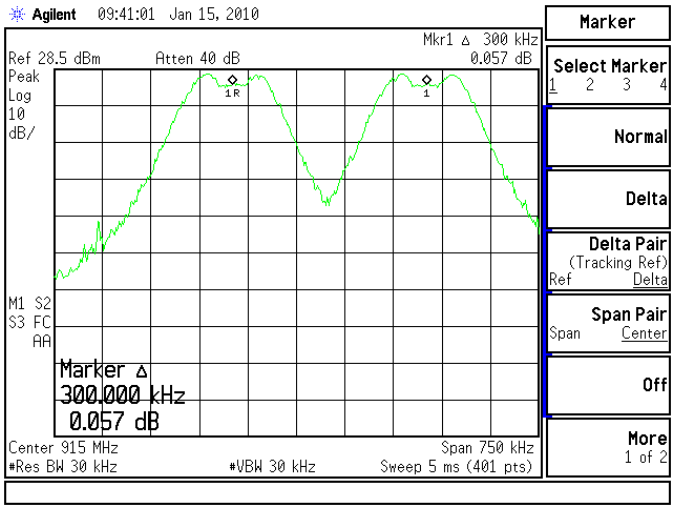

Figure 6.7.1-2: Carrier Frequency Separation 76.8 And 115.2 KBPS

6.7.2 Number of Hopping Channels

The 20dB bandwidth of the device is less than 250 kHz. The device employs at least 50 hopping channels as required. The device will use one frequency lists. The list of channels in pseudo-random order resides in non-volatile memory. The device starts at the first frequency in the list, and then proceeds through to the end of the list, looping back around to the first frequency when done. This guarantees equal usage of all channels in the list.

The maximum baud rate can be set to any of the radio's available baud rates: 9.6 kbps, 19.2 kbps, 38.4 kbps, 76.8 kbps, or 115.2 kbps. If the maximum baud rate is greater than 38.4 kbps (i.e. set at 76.8 kbps or 115.2 kbps), the radio will use wide channel mode, with 86 channels, and a spacing of 300 kHz. If the maximum baud rate is 38.4 kbps or less, the radio may either use wide channel mode or narrow channel mode, with 240 channels and a spacing of 100 kHz. Note the wide channel lowest frequency is 902.3 MHz, and highest frequency is 927.8 MHz. The narrow channel lowest tested frequency is 902.1 MHz and highest is 927.9 MHz. Note that currently the channel list for narrow channel mode only uses 904 MHz through 927.9 MHz; however, 902.1 MHz was used for testing in case it is ever desired to do a permissive change to change the hop sequence to include all possible 100 kHz channels in the 902-928 MHz band.

Table 6.7.2-1 lists the frequencies and hopping order of the narrow channel mode. Table 6.7.2-2 lists the frequencies and hopping order of the wide channel mode.

Channel	Freq (MHz)	Channel	Freq (MHz)	Channel	Freq (MHz)	Channel	Freq (MHz)	Channel	Freq (MHz)
86	910.6	69	908.9	252	927.2	214	923.4	208	922.8
211	923.1	256	927.6	200	922	28	904.8	84	910.4
173	919.3	176	919.6	185	920.5	158	917.8	21	904.1
141	916.1	52	907.2	36	905.6	77	909.7	121	914.1
72	909.2	134	915.4	131	915.1	124	914.4	125	914.5
166	918.6	242	926.2	32	905.2	61	908.1	81	910.1
63	908.3	228	924.8	22	904.2	147	916.7	165	918.5
23	904.3	187	920.7	235	925.5	191	921.1	95	911.5
180	920	82	910.2	222	924.2	150	917	182	920.2
227	924.7	174	919.4	108	912.8	171	919.1	122	914.2
40	906	230	925	99	911.9	41	906.1	229	924.9
144	916.4	241	926.1	126	914.6	188	920.8	216	923.6
33	905.3	133	915.3	152	917.2	89	910.9	253	927.3
195	921.5	169	918.9	193	921.3	220	924	204	922.4
154	917.4	30	905	254	927.4	127	914.7	70	909
190	921	136	915.6	146	916.6	20	904	44	906.4
236	925.6	178	919.8	34	905.4	217	923.7	259	927.9
149	916.9	210	923	49	906.9	114	913.4	240	926
143	916.3	71	909.1	255	927.5	111	913.1	48	906.8
181	920.1	205	922.5	129	914.9	213	923.3	66	908.6
232	925.2	192	921.2	209	922.9	35	905.5	79	909.9
123	914.3	85	910.5	94	911.4	42	906.2	132	915.2
233	925.3	53	907.3	140	916	172	919.2	245	926.5
38	905.8	202	922.2	83	910.3	25	904.5	120	914
118	913.8	37	905.7	257	927.7	59	907.9	67	908.7
60	908	43	906.3	237	925.7	87	910.7	183	920.3
201	922.1	54	907.4	135	915.5	168	918.8	248	926.8
198	921.8	243	926.3	234	925.4	196	921.6	78	909.8
116	913.6	64	908.4	92	911.2	223	924.3	80	910
91	911.1	68	908.8	57	907.7	24	904.4	93	911.3
212	923.2	100	912	109	912.9	225	924.5	184	920.4
221	924.1	239	925.9	249	926.9	103	912.3	74	909.4
96	911.6	29	904.9	215	923.5	151	917.1	153	917.3
157	917.7	177	919.7	179	919.9	203	922.3	65	908.5
247	926.7	139	915.9	258	927.8	197	921.7	159	917.9
167	918.7	117	913.7	186	920.6	219	923.9	142	916.2
224	924.4	148	916.8	244	926.4	97	911.7	58	907.8
246	926.6	75	909.5	189	920.9	51	907.1	164	918.4
238	925.8	206	922.6	31	905.1	98	911.8	163	918.3
46	906.6	226	924.6	73	909.3	45	906.5	90	911
39	905.9	155	917.5	130	915	156	917.6	106	912.6
251	927.1	47	906.7	194	921.4	101	912.1	145	916.5
115	913.5	62	908.2	162	918.2	50	907	76	909.6
128	914.8	138	915.8	119	913.9	27	904.7	199	921.9
110	913	231	925.1	107	912.7	207	922.7		
160	918	113	913.3	88	910.8	250	927		
56	907.6	137	915.7	175	919.5	102	912.2		
26	904.6	55	907.5	170	919	112	913.2		
161	918.1	105	912.5	218	923.8	104	912.4		

Table 6.7.2-1: Hop / Frequency Table for Baud rates <= 38.4 KBPS (narrow channel mode)

Hop #	Channel	Freq (MHz)		Hop #	Channel	Freq (MHz)		Hop #	Channel	Freq (MHz)
0	76	925.1		29	36	913.1		58	6	904.1
1	19	908		30	34	912.5		59	78	925.7
2	71	923.6		31	13	906.2		60	21	908.6
3	77	925.4		32	20	908.3		61	51	917.6
4	68	922.7		33	17	907.4		62	82	926.9
5	24	909.5		34	70	923.3		63	59	920
6	83	927.2		35	39	914		64	30	911.3
7	23	909.2		36	73	924.2		65	81	926.6
8	42	914.9		37	10	905.3		66	60	920.3
9	11	905.6		38	48	916.7		67	75	924.8
10	72	923.9		39	26	910.1		68	3	903.2
11	5	903.8		40	28	910.7		69	84	927.5
12	58	919.7		41	54	918.5		70	22	908.9
13	62	920.9		42	47	916.4		71	80	926.3
14	12	905.9		43	74	924.5		72	37	913.4
15	49	917		44	46	916.1		73	38	913.7
16	9	905		45	45	915.8		74	85	927.8
17	18	907.7		46	53	918.2		75	43	915.2
18	65	921.8		47	29	911		76	15	906.8
19	55	918.8		48	0	902.3		77	14	906.5
20	2	902.9		49	33	912.2		78	52	917.9
21	64	921.5		50	67	922.4		79	69	923
22	27	910.4		51	1	902.6		80	40	914.3
23	44	915.5		52	4	903.5		81	8	904.7
24	41	914.6		53	57	919.4		82	66	922.1
25	56	919.1		54	61	920.6		83	7	904.4
26	25	909.8		55	35	912.8		84	50	917.3
27	31	911.6		56	16	907.1		85	79	926
28	32	911.9		57	63	921.2				

Table 6.7.2-2: Hop / Frequency Table for Baud rates > 38.4 KBPS (wide channel mode)

6.7.3 Channel Dwell Time

6.7.3.1 Test Methodology

The analyzer is centered on the measured emission's center frequency and the span set to 0 Hz. The RBW was set to 3 MHz and the VBW to 3 MHz Sweep time was set to 300 ms to capture the burst duration of the emission. The marker–delta function of the analyzer was employed to measure the burst duration.

6.7.3.2 Test Results

The transmission time is < 400 milliseconds and there are 240 transmitter frequencies used sequentially. The dwell time is < 400 ms per channel within a 20 second period. A typical transmission is shown in figure 6.7.3-1 below:

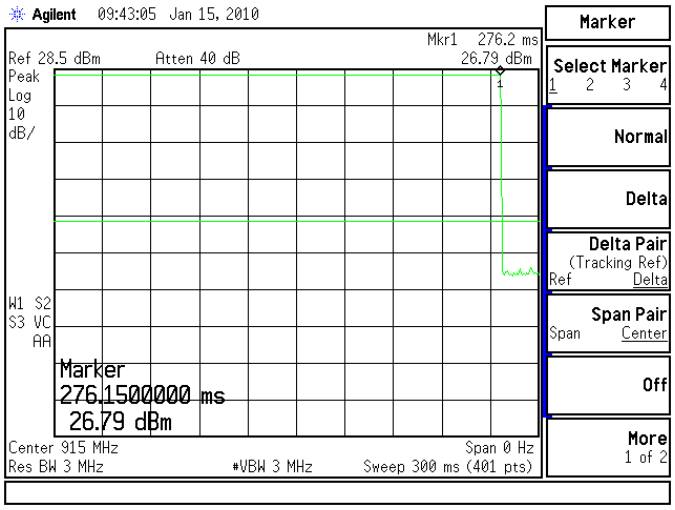

Figure 6.7.3-1: Channel Dwell Time

6.7.4 20dB Bandwidth

6.7.4.1 Test Methodology

The spectrum analyzer span was set to 2 to 3 times the estimated 20 dB bandwidth of the emission. The RBW was to ≥ 1% of the estimated 20 dB bandwidth. The trace was set to max hold with a peak detector active. The N-dB down function of the analyzer was utilized to determine the 20 dB bandwidth of the emission. The span and RBW were examined and re-adjusted if necessary to meet the requirements of 2 to 3 time the 20 bandwidth for the span and ≥ 1% of the 20 dB bandwidth for the RBW.

6.7.4.2 Test Results

Results are summarized below in table 6.7.4-1 below. Plots are shown below in Figure 6.7.4-1 through 6.7.4-15.

Table 6.7.4-1: 20dB Bandwidth
For all Baud Rates BPS

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
Low 9600	902.10	23.80
Mid 9600	915.00	24.00
High 9600	927.90	23.80
Low 19200	902.10	52.10
Mid 19200	915.00	52.20
High 19200	927.90	52.80
Low 38400	902.10	86.50
Mid 38400	915.00	84.50
High 38400	927.9	84.50
Low 76800	902.30	165.00
Mid 76800	914.9	209.00
High 76800	927.80	165.00
Low 115200	902.30	203.00
Mid 115200	914.90	224.00
High 115200	927.80	197.00

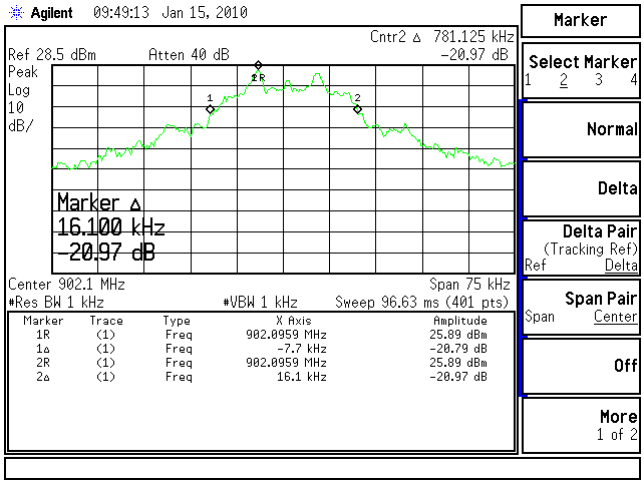

Figure 6.7.4-1: 20dB Bandwidth – Low Channel Baud Rate 9600 BPS

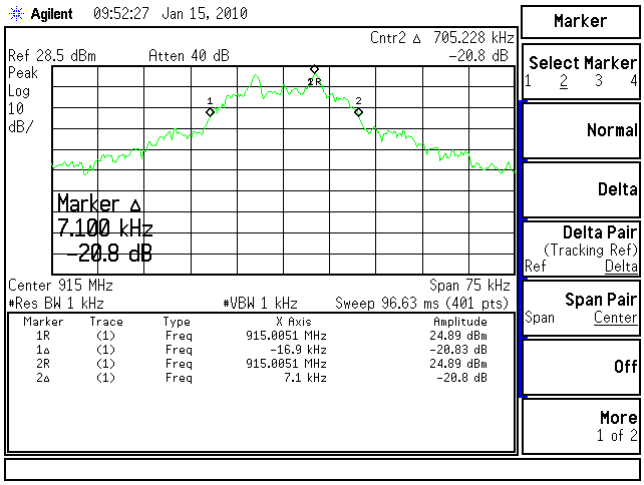

Figure 6.7.4-2: 20dB Bandwidth – Mid Channel Baud Rate 9600 BPS

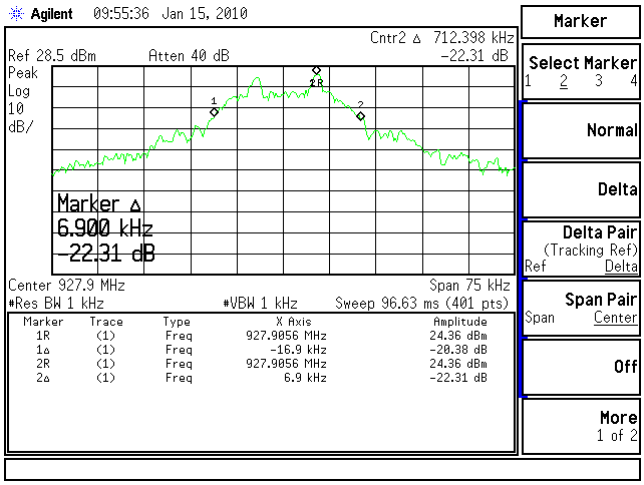

Figure 6.7.4-3: 20dB Bandwidth – High Channel Baud Rate 9600 BPS

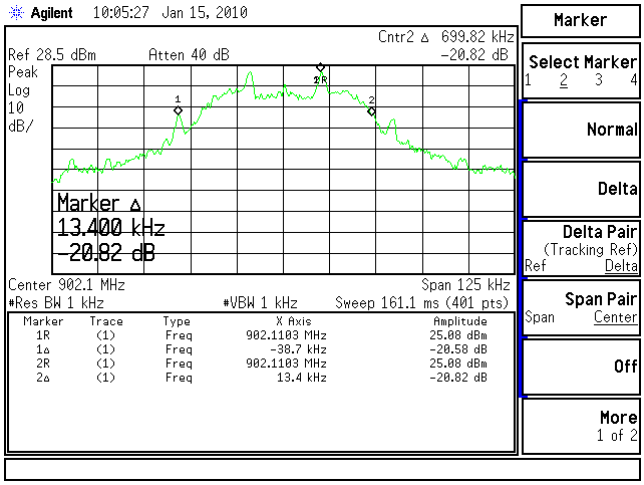

Figure 6.7.4-4: 20dB Bandwidth – Low Channel Baud Rate 19200 BPS

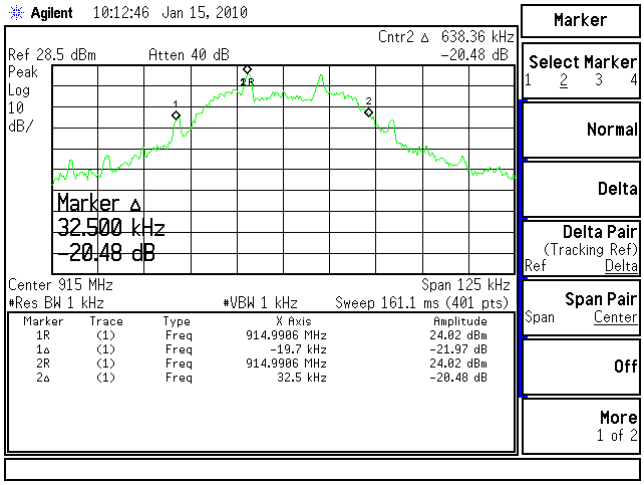

Figure 6.7.4-5: 20dB Bandwidth – Mid Channel Baud Rate 19200 BPS

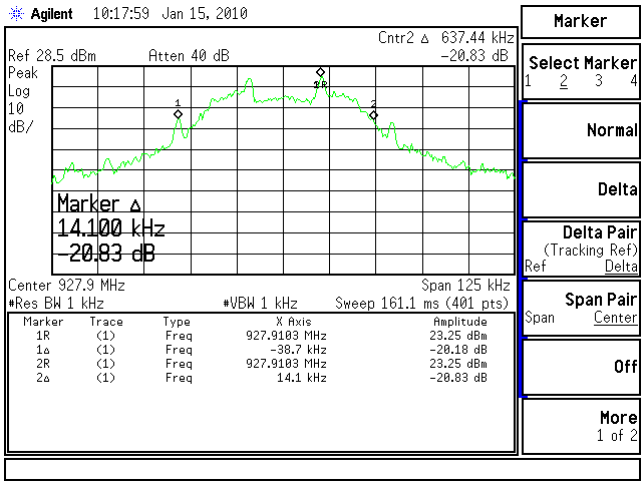

Figure 6.7.4-6: 20dB Bandwidth – High Channel Baud Rate 19200 BPS

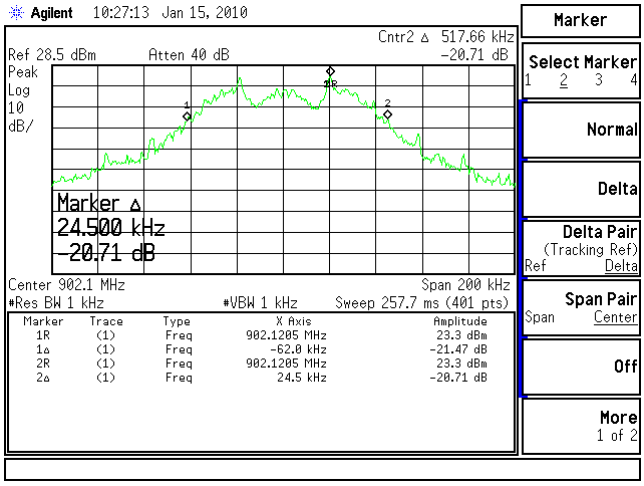

Figure 6.7.4-7: 20dB Bandwidth – Low Channel Baud Rate 38400 BPS

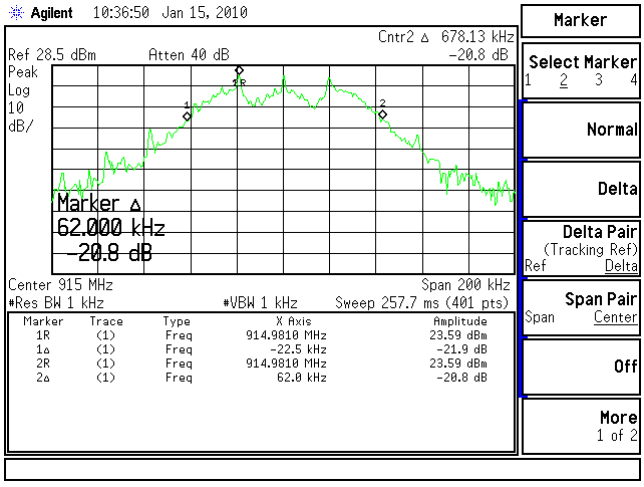

Figure 6.7.4-8: 20dB Bandwidth – Mid Channel Baud Rate 38400 BPS

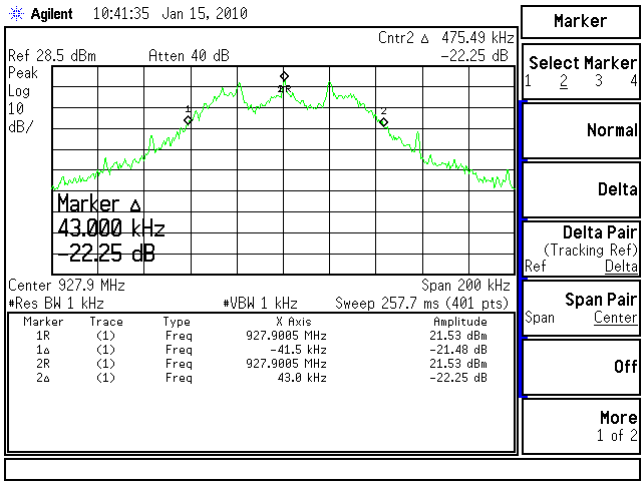

Figure 6.7.4-9: 20dB Bandwidth – High Channel Baud Rate 38400 BPS

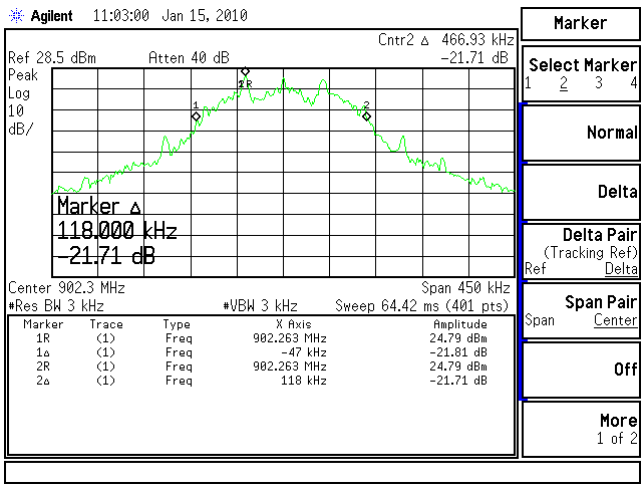

Figure 6.7.4-10 20dB Bandwidth – Low Channel Baud Rate 76800 BPS

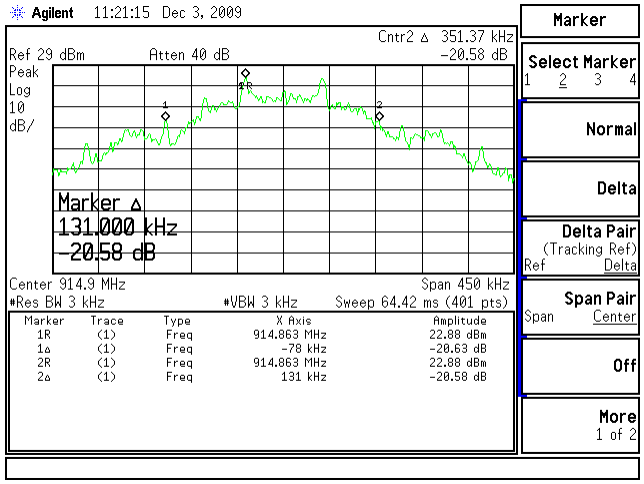

Figure 6.7.4-11: 20dB Bandwidth – Mid Channel Baud Rate 76800 BPS

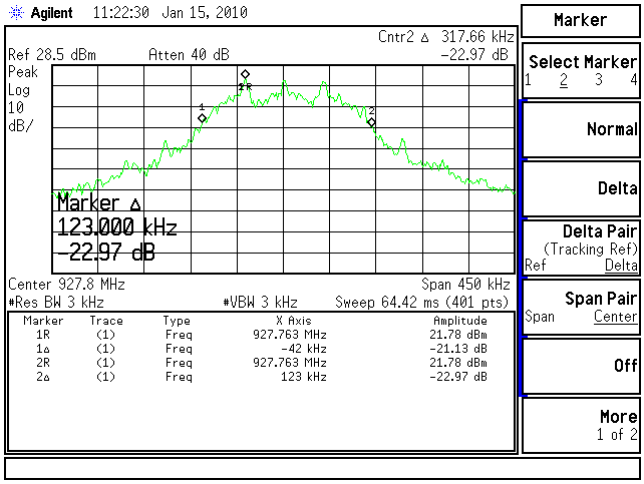

Figure 6.7.4-12: 20dB Bandwidth – High Channel Baud Rate 76800 BPS

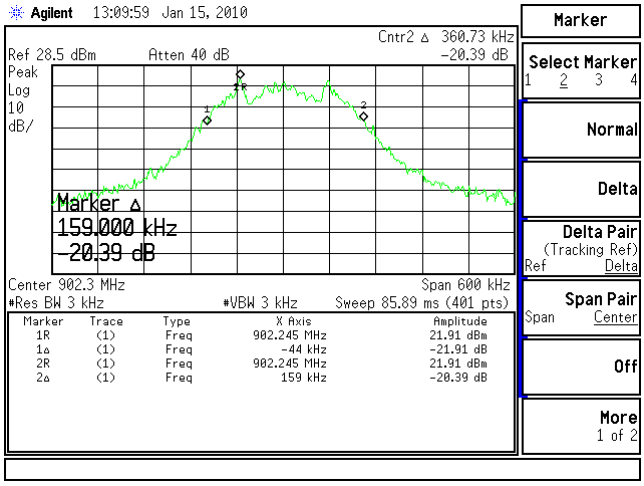

Figure 6.7.4-13: 20dB Bandwidth – Low Channel Baud Rate 115200 BPS

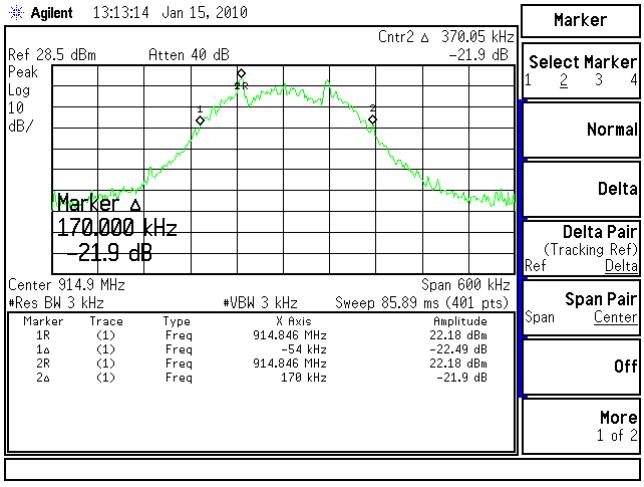

Figure 6.7.4-14: 20dB Bandwidth – Mid Channel Baud Rate 115200 BPS

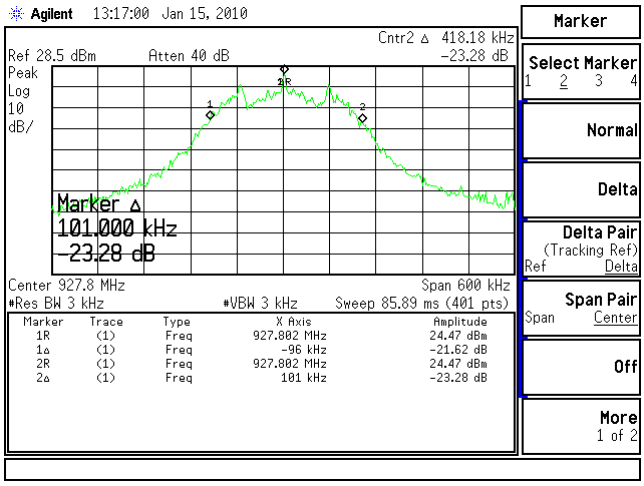

Figure 6.7.4-15: 20dB Bandwidth – High Channel Baud Rate 115200 BPS

6.8 Band-Edge Compliance and Spurious Emissions [§15.247(c)]

6.8.1 Band-Edge Compliance of RF Conducted Emissions

6.8.1.1 Test Methodology

The EUT was investigated at the lowest and highest channel available to determine band-edge compliance. For each measurement the spectrum analyzer's RBW was set to 30 kHz, which is ≥1% of the span, and the VBW was set to 30 KHz

6.8.1.2 Test Results

In a 100 kHz bandwidth at the lower and upper band-edge, the radio frequency power that was produced by the EUT is at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power. Band-edge compliance is displayed in Figures 6.8.1-1 thru 6.8.1-10.

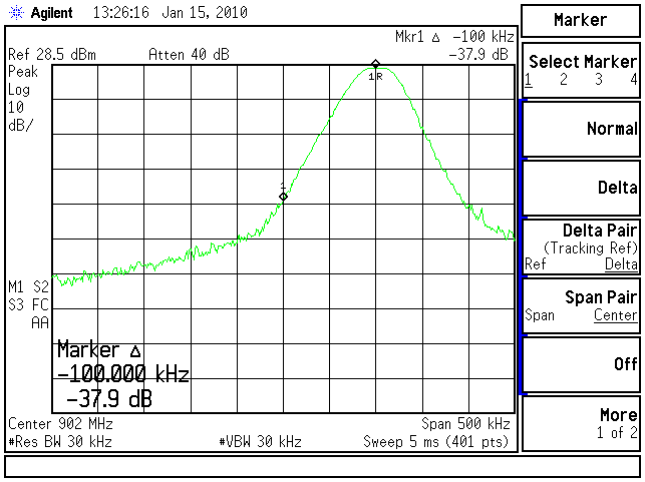

Figure 6.8.1-1: Lower Band-Edge
Baud Rate 9600 BPS

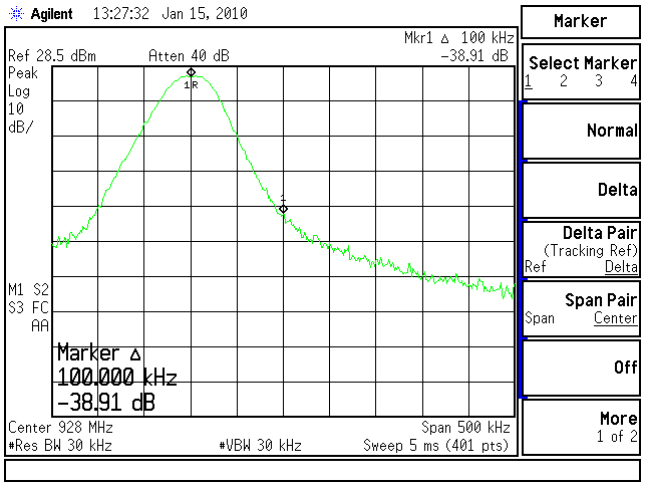

Figure 6.8.1-2: Upper Band-Edge
Baud Rate 9600 BPS

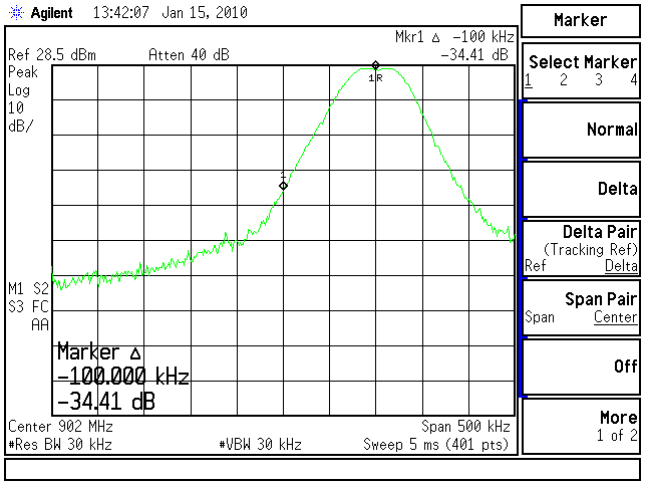

Figure 6.8.1-3: Lower Band-Edge
Baud Rate 19200 BPS

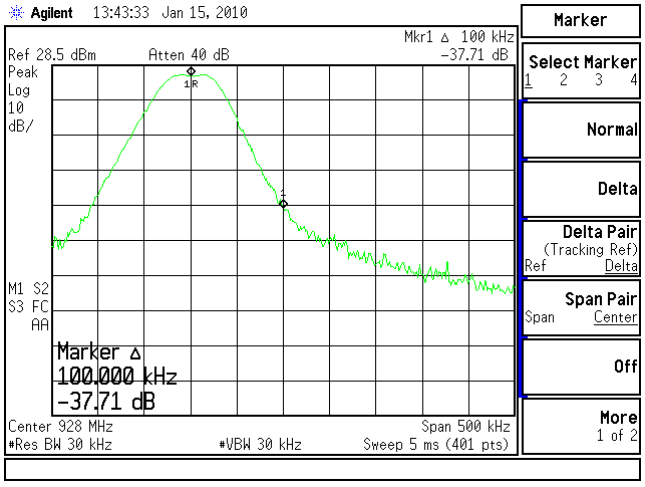

Figure 6.8.1-4: Upper Band-Edge
Baud Rate 19200 BPS

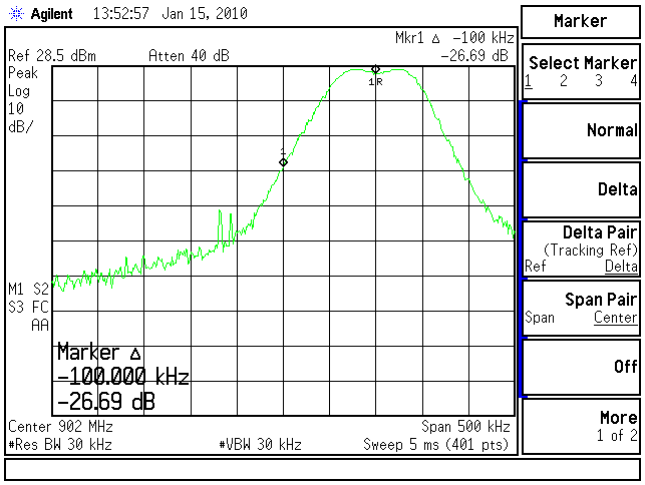

Figure 6.8.1-5: Lower Band-Edge
Baud Rate 38400 BPS

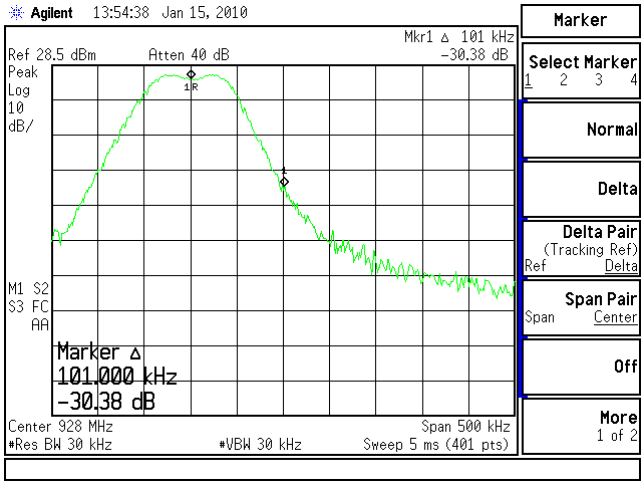

Figure 6.8.1-6: Upper Band-Edge
Baud Rate 38400 BPS

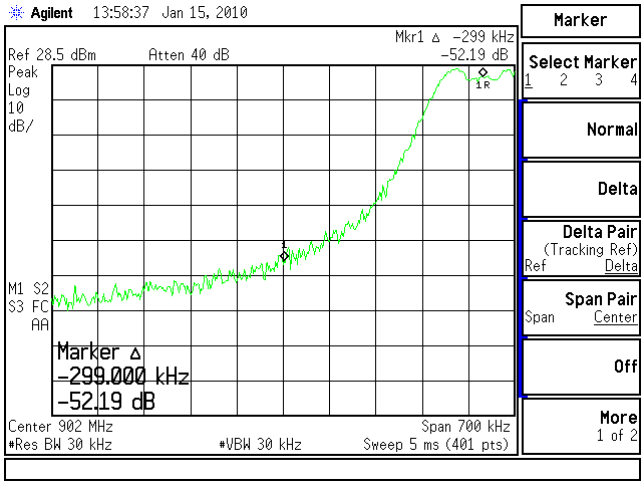

Figure 6.8.1-7: Lower Band-Edge
Baud Rate 76800 BPS

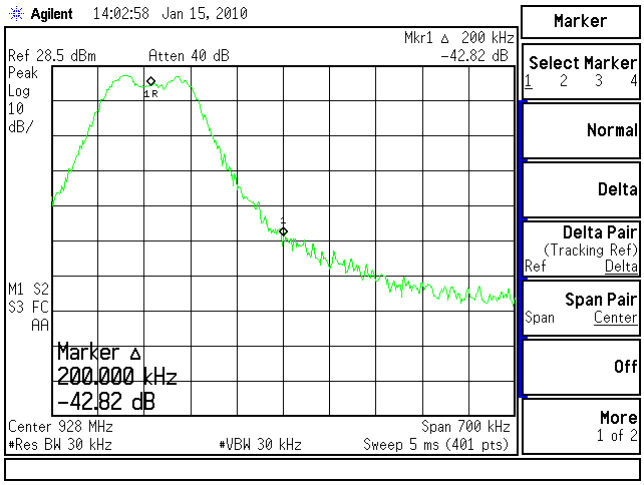

Figure 6.8.1-8: Upper Band-Edge
Baud Rate 76800 BPS

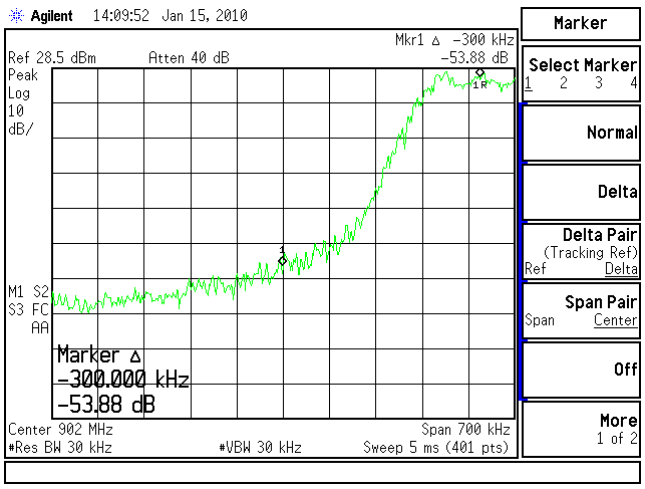

Figure 6.8.1-9: Lower Band-Edge
Baud Rate 115200 BPS

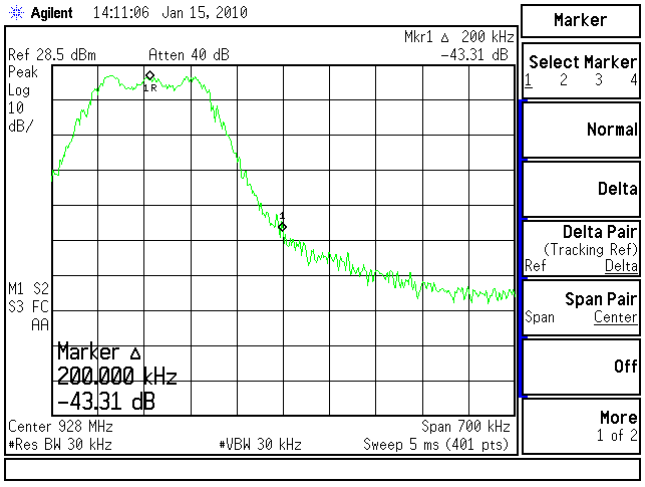

Figure 6.8.1-10: Upper Band-Edge
Baud Rate 115200 BPS

6.8.2 RF Conducted Spurious Emissions

6.8.2.1 Test Methodology

The EUT was investigated for conducted spurious emissions from 30MHz to 10GHz, 10 times the highest fundamental frequency. Measurements were made at the low, center and high channels of the EUT. For each measurement, the spectrum analyzer's VBW was set to 100 kHz and the RBW was set to 1MHz. A peak detector function was used with the trace set to max hold.

6.8.2.2 Test Results

All emission found were greater than 20dB down from the fundamental carrier. The RF conducted spurious emissions were measured in the band of 30MHz to 10GHz. Results are shown below in Figure 6.8.2-1 through 6.8.2-6.

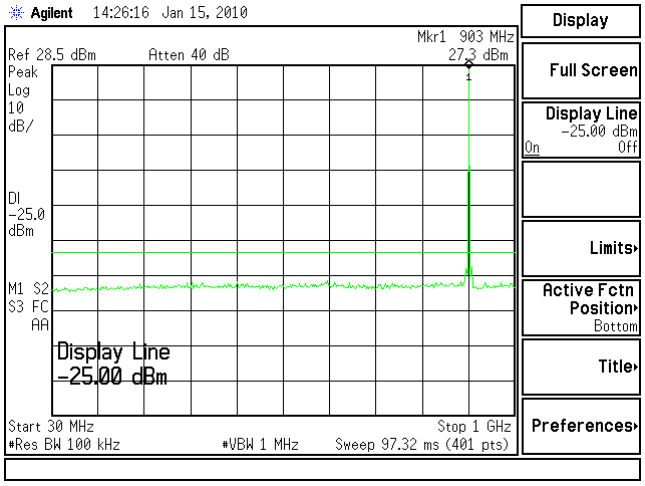

Figure 6.8.2-1: RF Conducted Spurious Emissions – Low Channel

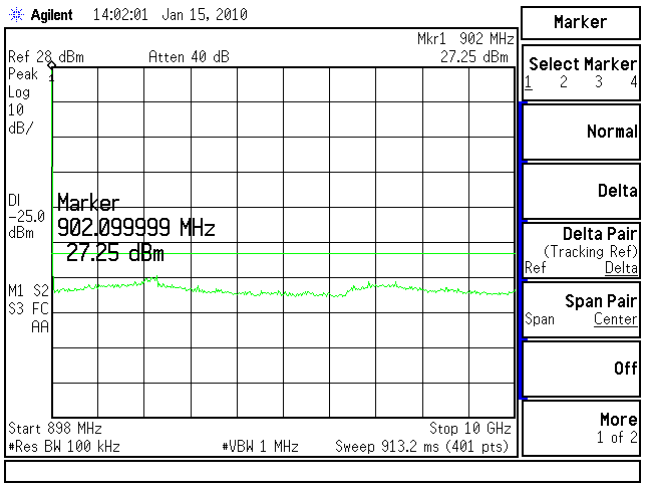

Figure 6.8.2-2: RF Conducted Spurious Emissions – Low Channel

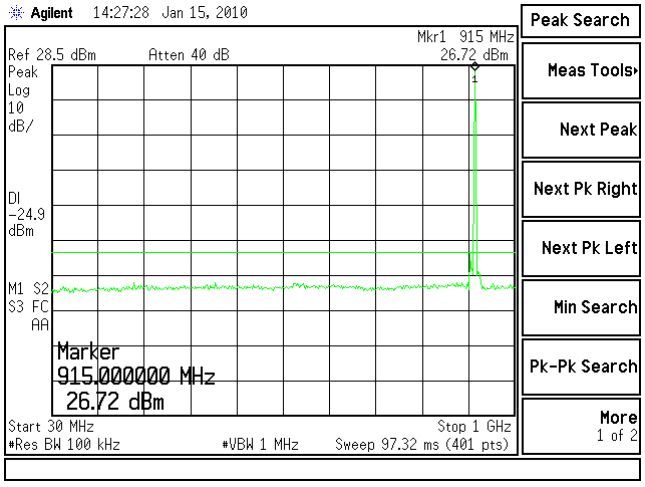

Figure 6.8.2-3: RF Conducted Spurious Emissions – Mid Channel

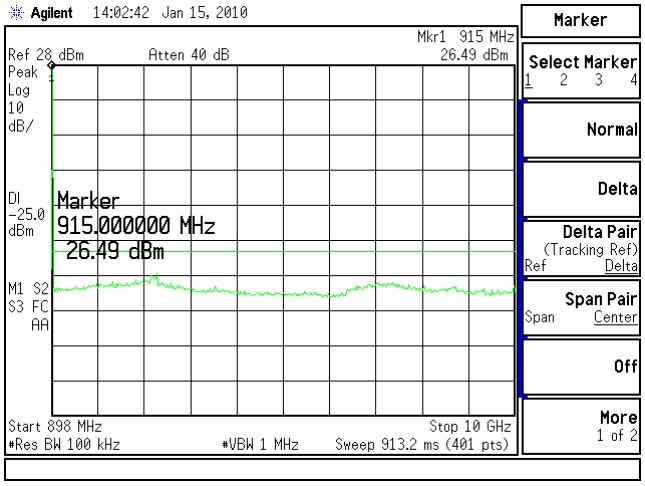

Figure 6.8.2-4: RF Conducted Spurious Emissions – Mid Channel

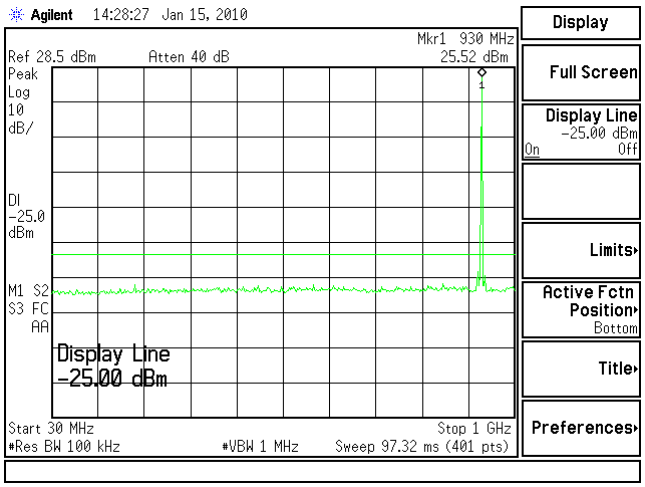

Figure 6.8.2-5: RF Conducted Spurious Emissions – High Channel

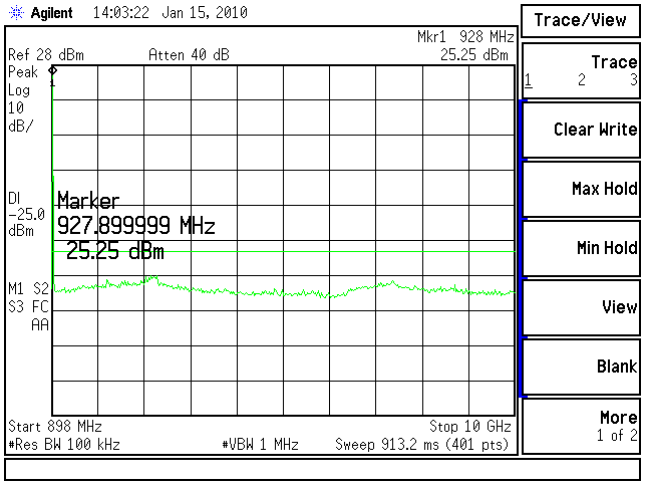

Figure 6.8.2-6: RF Conducted Spurious Emissions – High Channel

7.0 CONCLUSION

The Hunt Technologies' FOCUS AX Universal RF endpoint model 864 meets the requirements of FCC Part 15 subpart C.