



Test Procedures: As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of TIA/EIA-603-A-2001 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 10 meter semi-anechoic chamber. The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated. The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10th or 40GHz, whichever was the lesser, were investigated.

Test Results: The EUT complies with the requirements of this section.

Test Engineer: Shawn McMillen

Test Date(s): August 31, 2006

**Electromagnetic Compatibility Criteria for Intentional Radiators****§ 2.1053 Measurements required: Field strength of spurious radiation. (Part 22H Downlink)**

Frequency (MHz)	Antenna Polarity (H/V)	Field Strength of Spurious Harmonics (dBm)	Substitution Antenna Gain (dBi)	Power into Substitution Antenna(dBm)	EIRP (dBm)	Limit (dBm)	Margin	Detector Type
1738.0	V	-60.2	8.5	-50.2	-41.7	-13	28.7	Peak
1738.0	H	-69.3	8.5	-56.8	-48.3	-13	35.3	Peak
2607.0	V	-62.3	9.8	-50.7	-40.9	-13	27.9	Peak
2607.0	H	-60.1	9.8	-48.8	-39	-13	26	Peak

Low Channel

Frequency (MHz)	Antenna Polarity (H/V)	Field Strength of Spurious Harmonics (dBm)	Substitution Antenna Gain (dBi)	Power into Substitution Antenna(dBm)	EIRP (dBm)	Limit (dBm)	Margin	Detector Type
1763.0	V	-61.5	8.5	-51.7	-43.2	-13	30.2	Peak
1763.0	H	-66.4	8.5	-55.5	-47	-13	34	Peak
2644.5	V	-60.8	9.8	-50.9	-41.1	-13	28.1	Peak
2644.5	H	-65.5	9.8	-47.4	-37.6	-13	24.6	Peak

Mid Channel

Frequency (MHz)	Antenna Polarity (H/V)	Field Strength of Spurious Harmonics (dBm)	Substitution Antenna Gain (dBi)	Power into Substitution Antenna(dBm)	EIRP (dBm)	Limit (dBm)	Margin	Detector Type
1788.0	V	-66.3	8.5	-55.5	-47.0	-13	34.0	Peak
1788.0	H	-67.1	8.5	-60.2	-51.7	-13	38.7	Peak
2682.0	V	-69.1	9.8	-50.4	-40.6	-13	27.6	Peak
2682.0	H	-58.1	9.8	-48.7	-38.9	-13	25.9	Peak

High Channel

Note: All other emissions were measured at the noise floor of the spectrum analyzer. The Uplink harmonic emissions were at the noise floor of the spectrum analyzer.



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Electromagnetic Compatibility

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 2.1053 Measurements required: Field strength of spurious radiation. (Part 24E Downlink)

Frequency (MHz)	Antenna Polarity (H/V)	Field Strength of Spurious Harmonics (dBm)	Substitution Antenna Gain (dBi)	Power into Substitution Antenna(dBm)	EIRP (dBm)	Limit (dBm)	Margin	Detector Type
3860	V	-52.1	9.6	-47.3	-37.7	-13	24.7	Peak
3860	H	-55.6	9.6	-45.2	-35.6	-13	22.6	Peak
5790	V	-61.9	11.4	-46.3	-34.9	-13	21.9	Peak
5790	H	-62.5	11.4	-47.0	-35.6	-13	22.6	Peak

Low Channel

Frequency (MHz)	Antenna Polarity (H/V)	Field Strength of Spurious Harmonics (dBm)	Substitution Antenna Gain (dBi)	Power into Substitution Antenna(dBm)	EIRP (dBm)	Limit (dBm)	Margin	Detector Type
3920	V	-58.8	9.6	-49.3	-39.7	-13	26.7	Peak
3920	H	-57.2	9.6	-48.2	-38.6	-13	25.6	Peak
5880	V	-59.8	11.4	-46.9	-35.5	-13	22.5	Peak
5880	H	-60.2	11.4	-48.2	-36.8	-13	23.8	Peak

Mid Channel

Frequency (MHz)	Antenna Polarity (H/V)	Field Strength of Spurious Harmonics (dBm)	Substitution Antenna Gain (dBi)	Power into Substitution Antenna(dBm)	EIRP (dBm)	Limit (dBm)	Margin	Detector Type
3980	V	-52.2	9.6	-50.2	-40.6	-13	27.6	Peak
3980	H	-55.1	9.6	-47.2	-37.6	-13	24.6	Peak
5970	V	-59.4	11.4	-48.5	-37.1	-13	24.1	Peak
5970	H	-58.8	11.4	-45.6	-34.2	-13	21.2	Peak

High Channel

Note: All other emissions were measured at the noise floor of the spectrum analyzer. The Uplink harmonic emissions were at the noise floor of the spectrum analyzer.



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Electromagnetic Compatibility

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Electromagnetic Compatibility Criteria for Intentional Radiators



Photograph 3. Test Equipment and setup for various Radiated Measurements



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 2.1051 Spurious Emissions at Antenna Terminals

Test Requirement(s): **§ 2.1051 Measurements required: Spurious emissions at antenna terminals:** The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 22.917 Emission limitations for Broadband PCS equipment: The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

§ 22.917 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

§ 24.238 Emission limitations for Broadband PCS equipment: The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

§ 24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Test Procedures: A modulated carrier generated by the signal generator carrier was connected to either the Uplink or Downlink RF port at a maximum level as determined by the OEM. A spectrum analyzer was connected to either the Uplink or Downlink port depending on the circuitry being measured. The spectrum analyzer was set to 1MHz RBW and 3MHz VBW. The spectrum was investigated from 30MHz to the 10th harmonic of the carrier.

The inter-modulation requirements were performed in a similar manner as described above. The spectrum analyzer was set to 100KHz RBW and 300KHz VBW. Two modulated carriers were injected into the EUT. One carrier was set at the band edge of either the Uplink or Downlink band and the other at carrier set at 6MHz deviation from the first carrier. The in band spurious emissions were investigated.

Test Results: The EUT complies with the requirements of this section. There were no detectable spurious emissions for this EUT.

Test Engineer(s): Shawn McMillen

Test Date(s): August 30, 2006

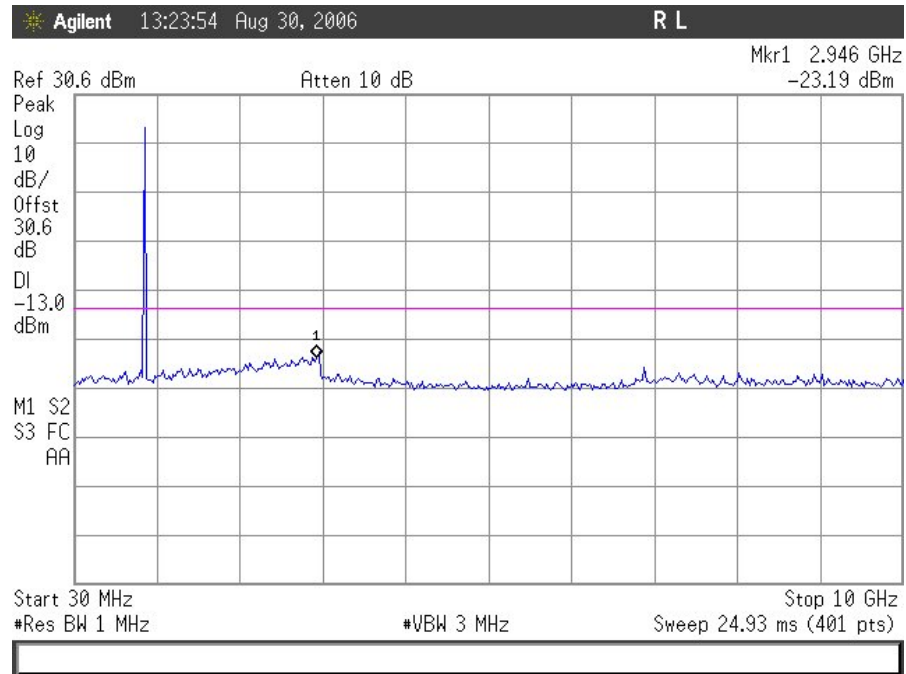


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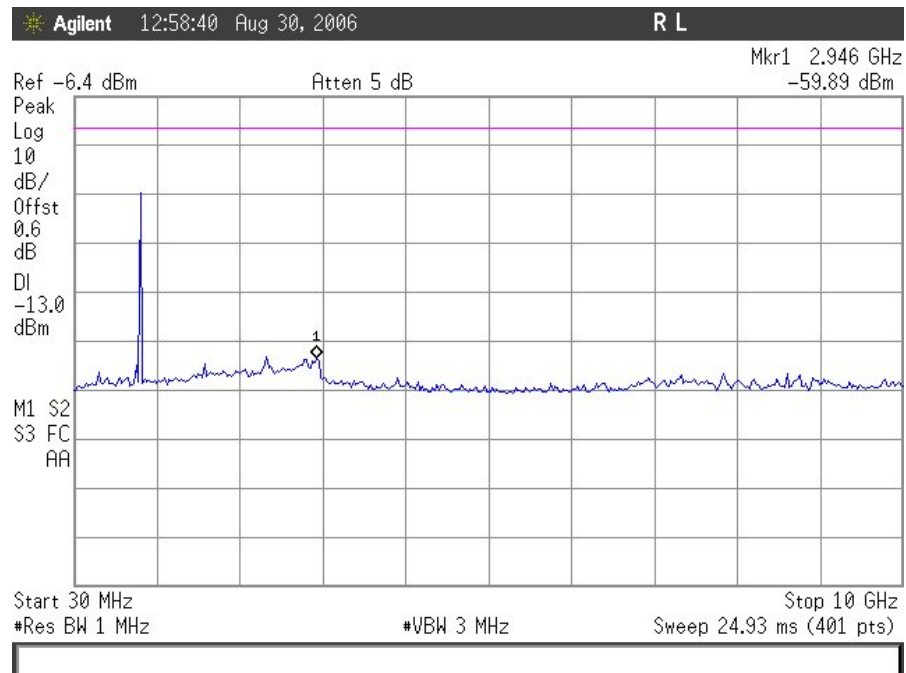
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



AMPS Downlink Conducted Emissions 30 MHz – 10 GHz (Low Channel - Cellular)



AMPS Uplink Conducted Emissions 30 MHz – 10 GHz (Low Channel - Cellular)

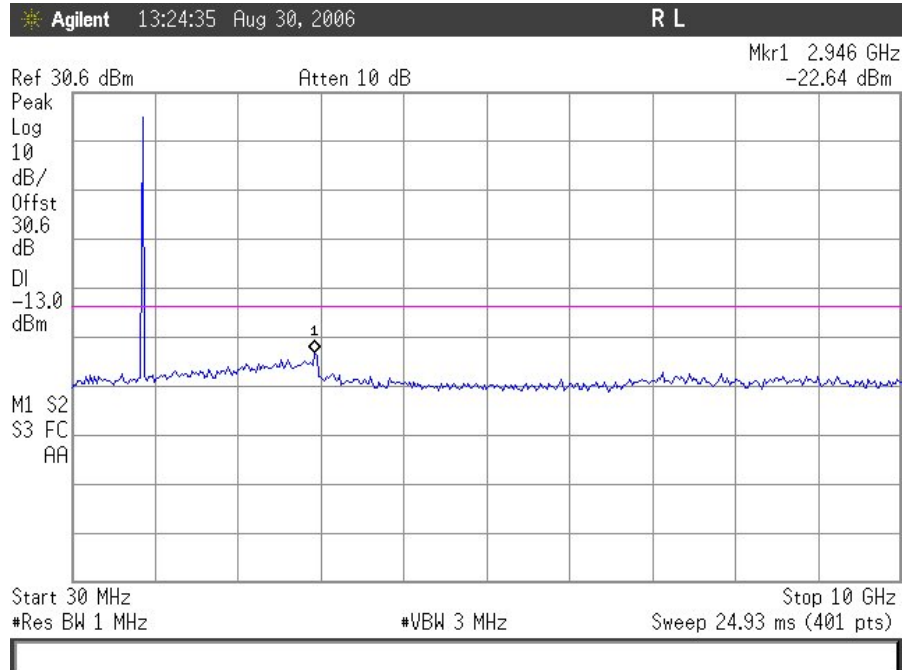


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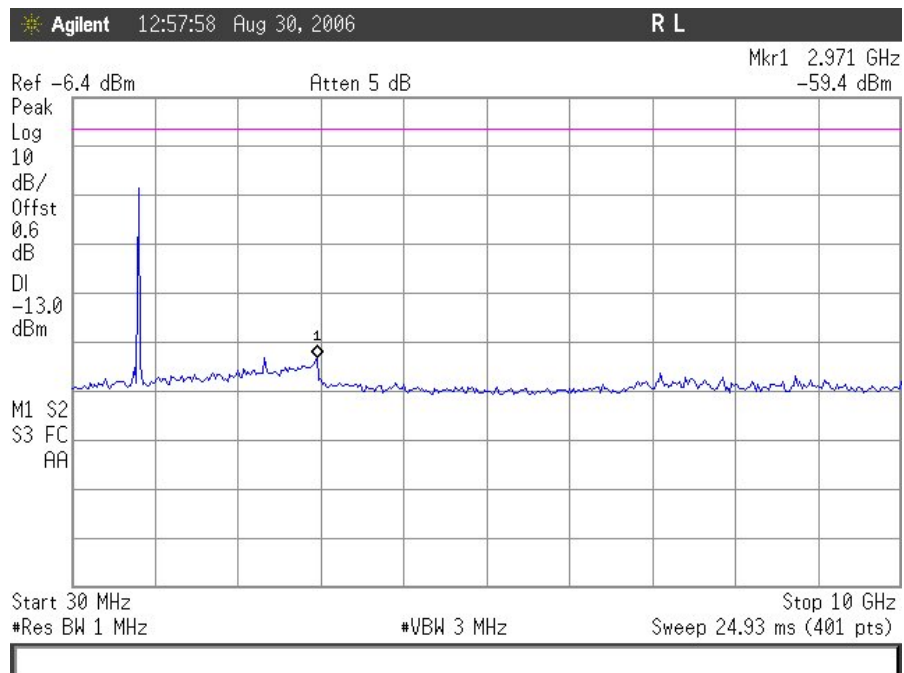
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



AMPS Downlink Conducted Emissions 30 MHz – 10 GHz (Mid Channel - Cellular)



AMPS Uplink Conducted Emissions 30 MHz – 10 GHz (High Channel - Cellular)

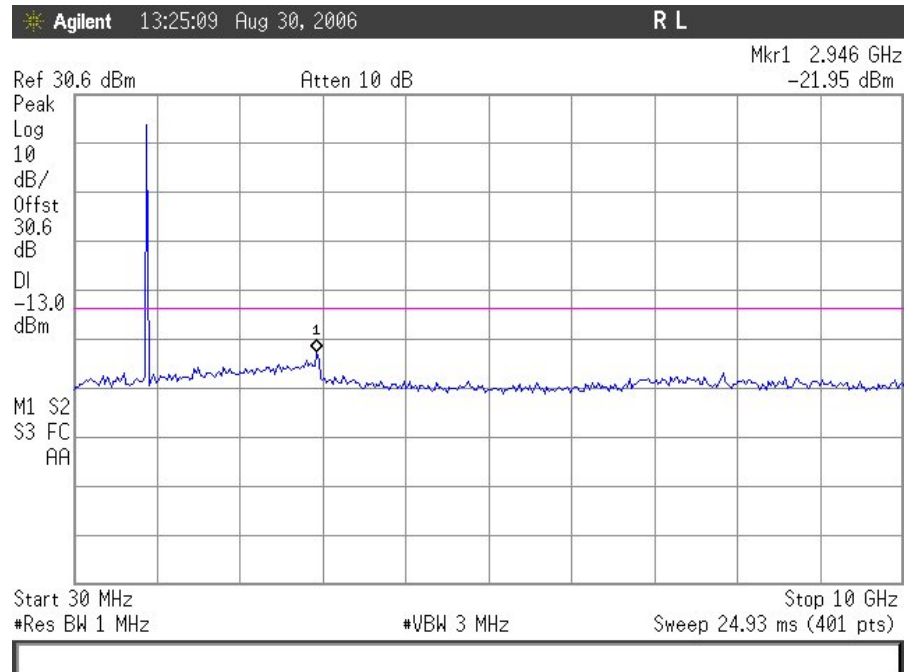


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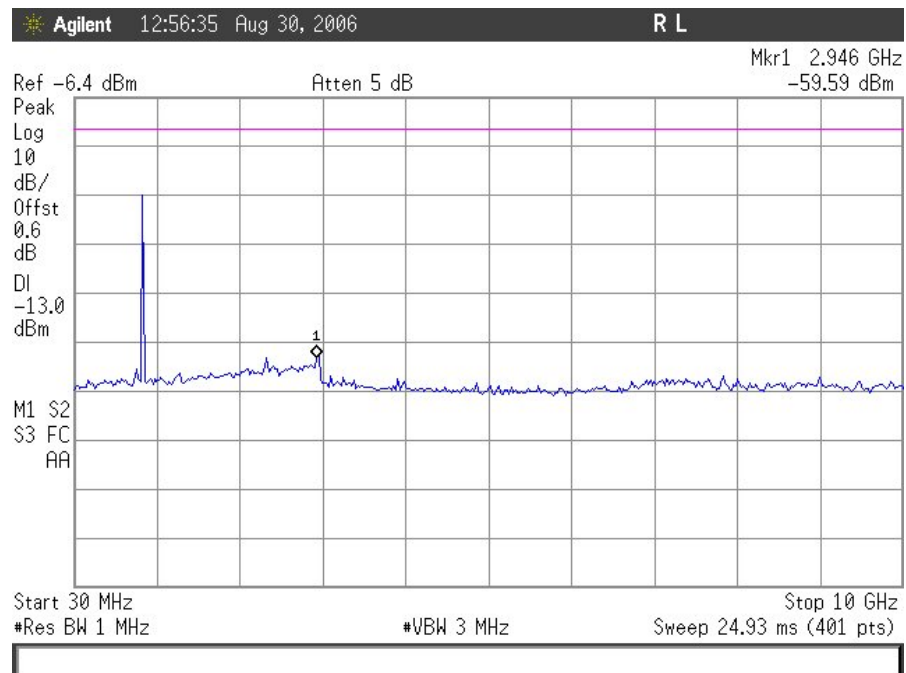
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



AMPS Downlink Conducted Emissions 30 MHz – 10 GHz (High Channel - Cellular)



AMPS Uplink Conducted Emissions 30 MHz – 10 GHz (High Channel - Cellular)

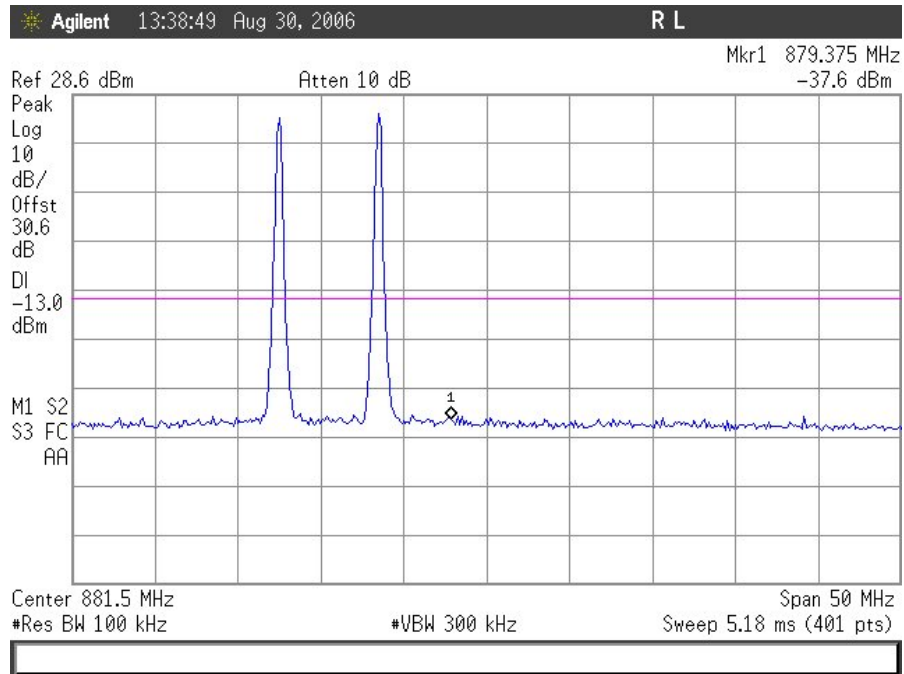


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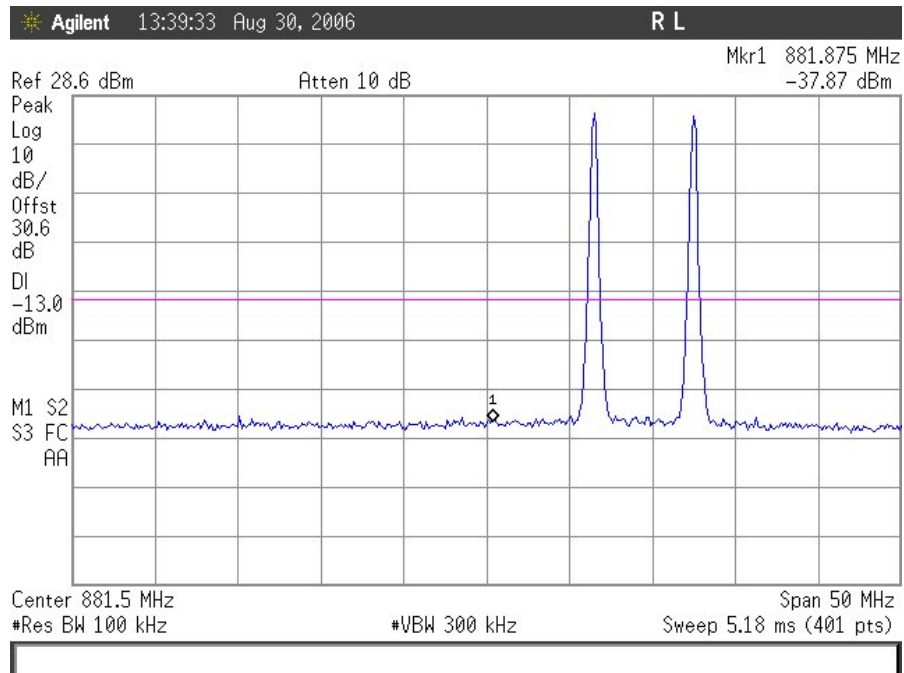
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



AMPS Downlink Intermodulation, Low End - Cellular



AMPS Downlink Intermodulation, High End - Cellular

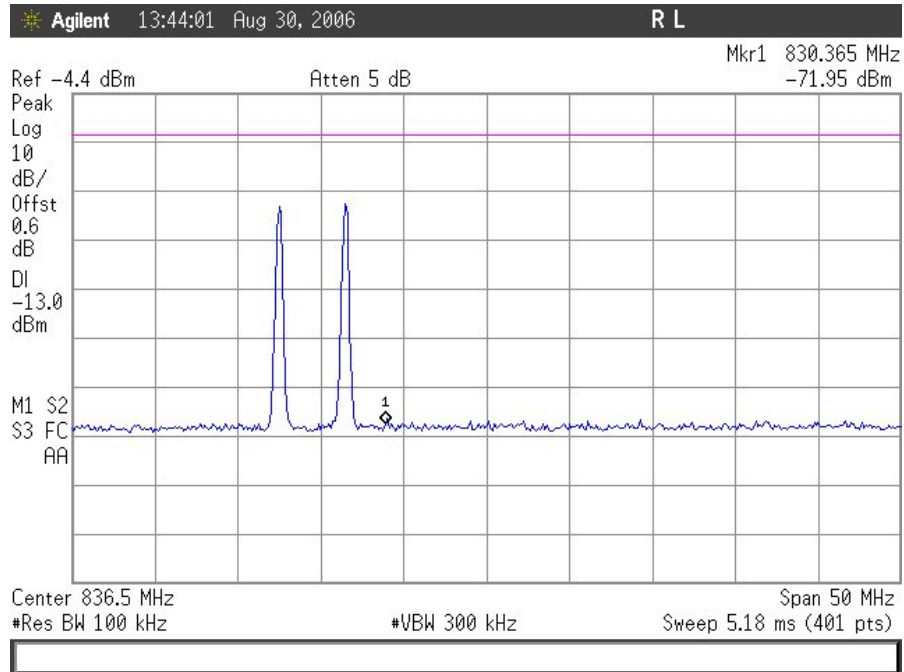


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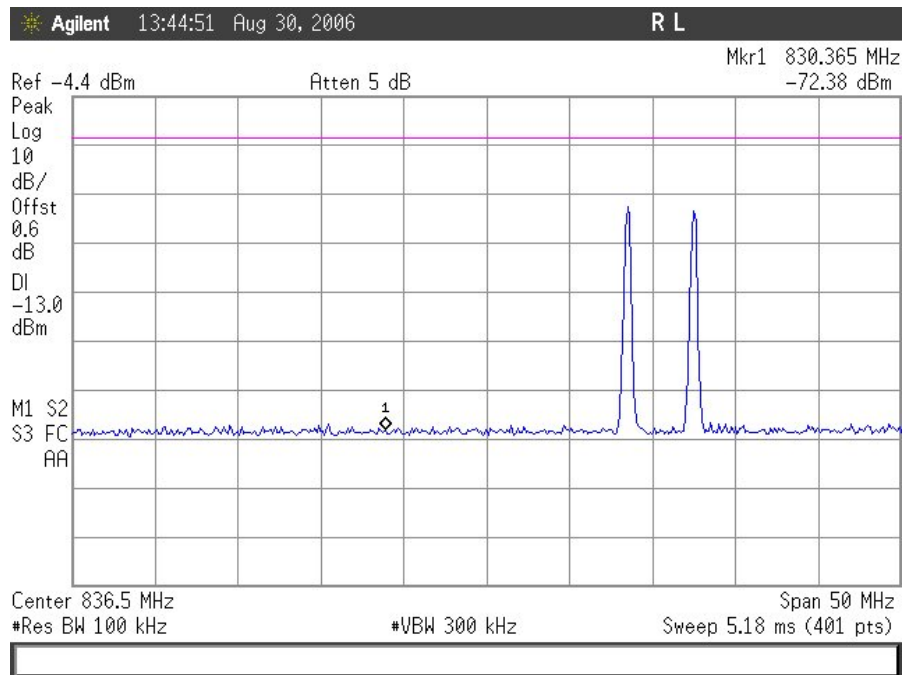
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



AMPS Uplink Intermodulation Low End - Cellular



AMPS Uplink Intermodulation High End - Cellular

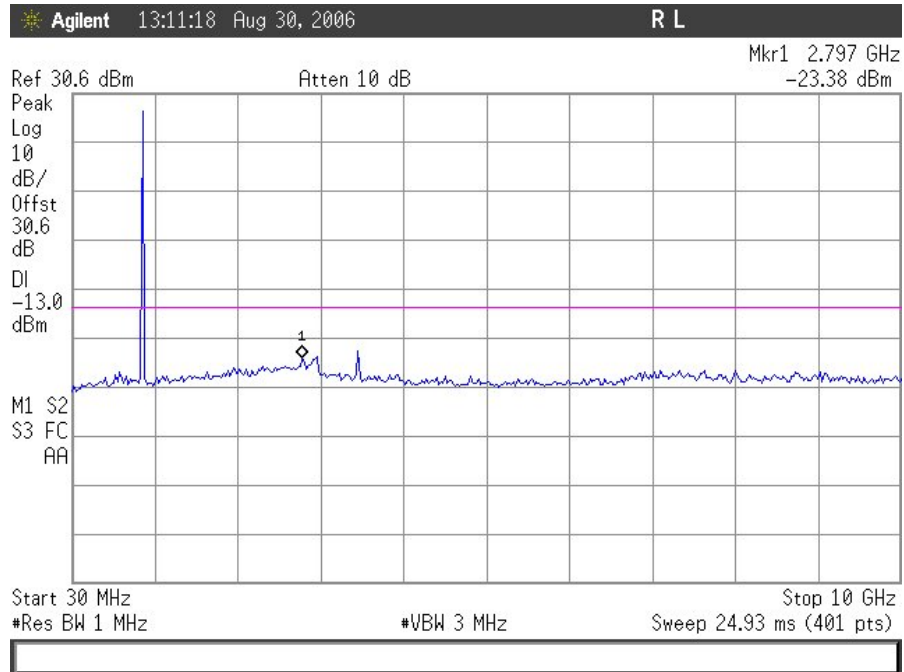


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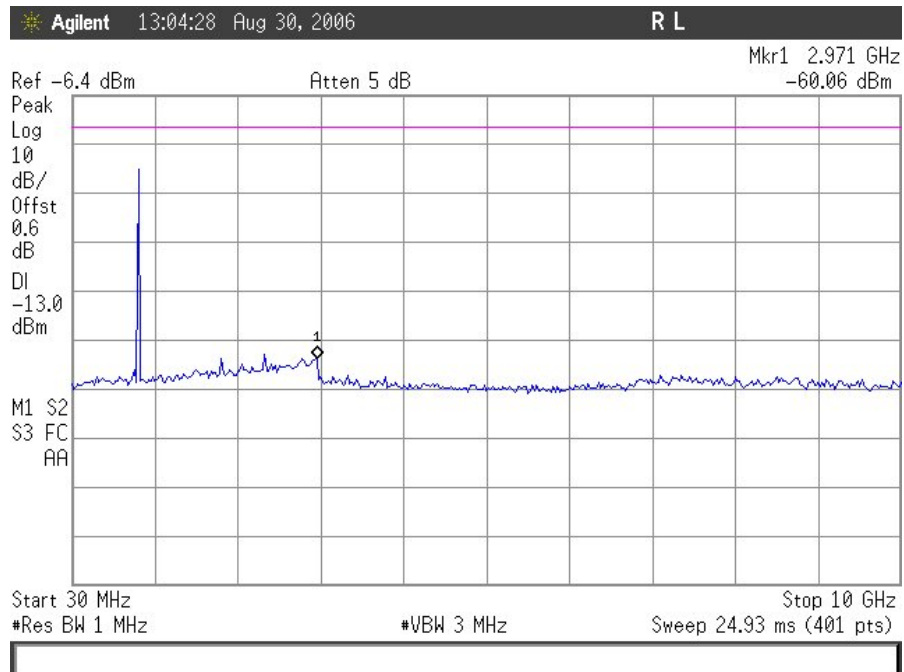
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



CDMA Downlink Conducted Emissions 30 MHz – 10 GHz (Low Channel - Cellular)



CDMA Uplink Conducted Emissions 30 MHz – 10 GHz (Low Channel - Cellular)

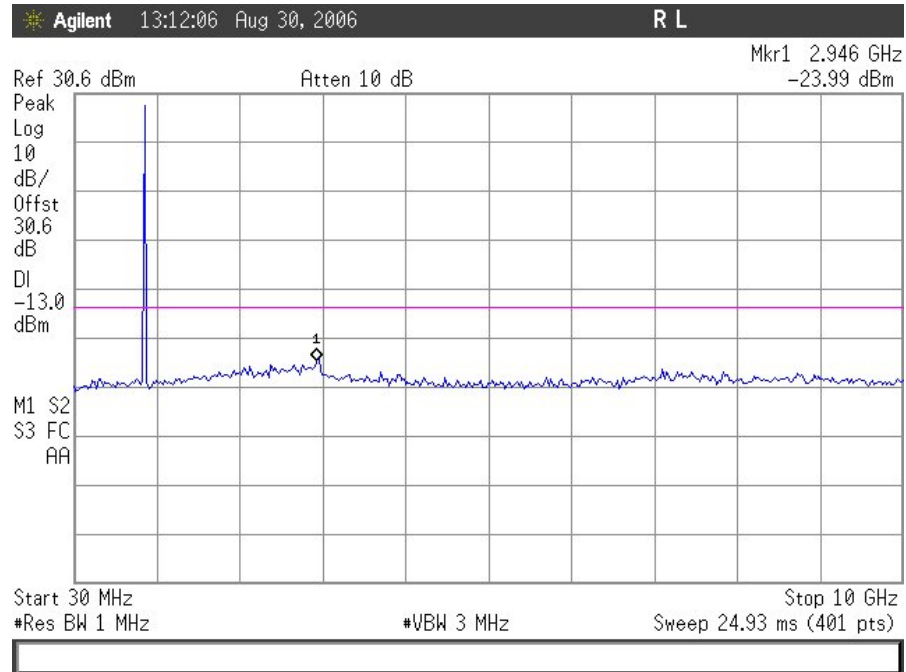


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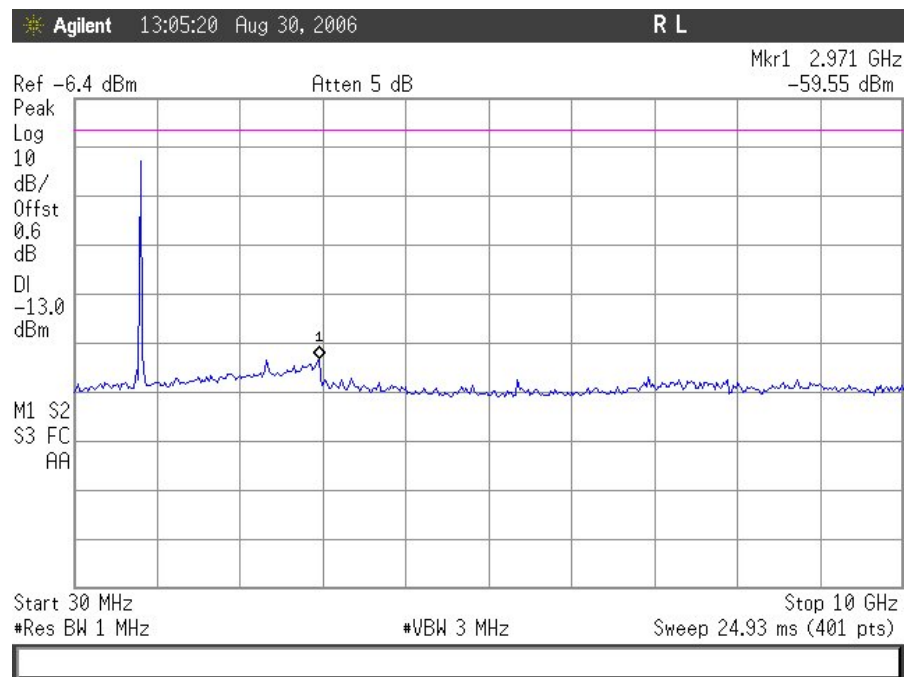
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



CDMA Downlink Conducted Emissions 30 MHz – 10 GHz (Mid Channel - Cellular)



CDMA Uplink Conducted Emissions 30 MHz – 10 GHz (Mid Channel - Cellular)

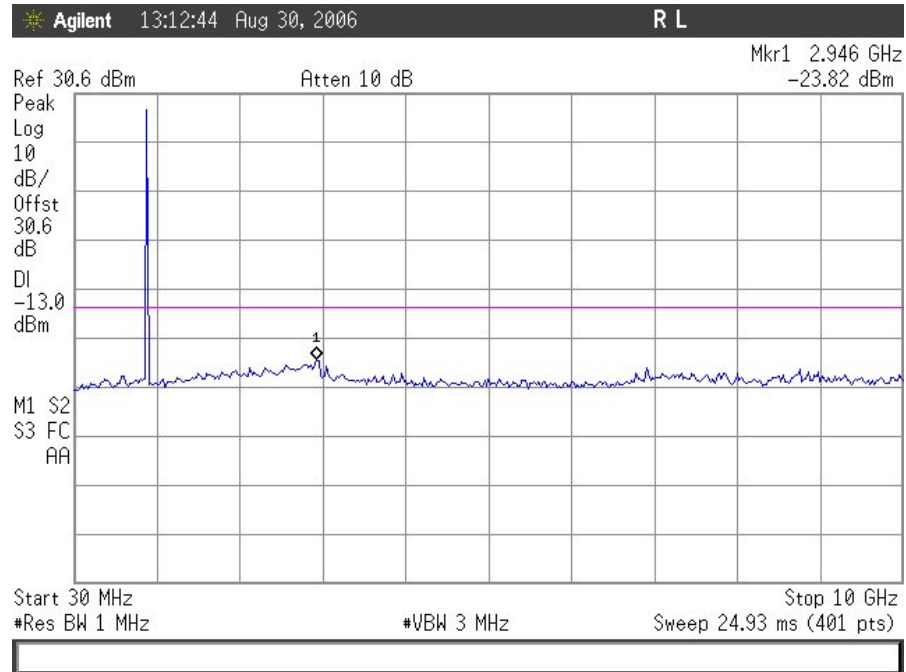


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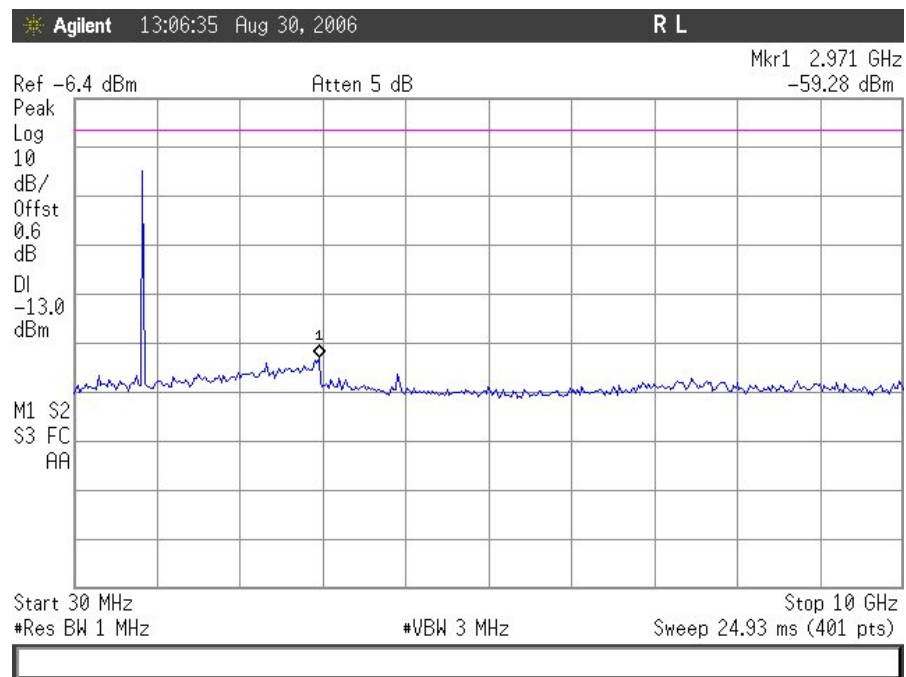
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



CDMA Downlink Conducted Emissions 30 MHz – 10 GHz (High Channel - Cellular)



CDMA Uplink Conducted Emissions 30 MHz – 10 GHz (High Channel - Cellular)

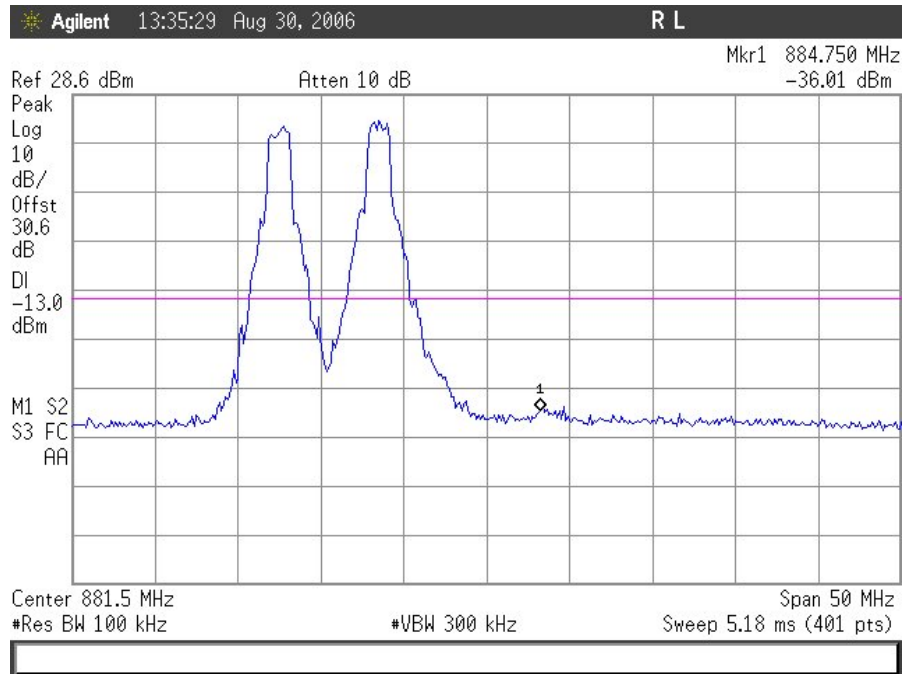


LGC Wireless

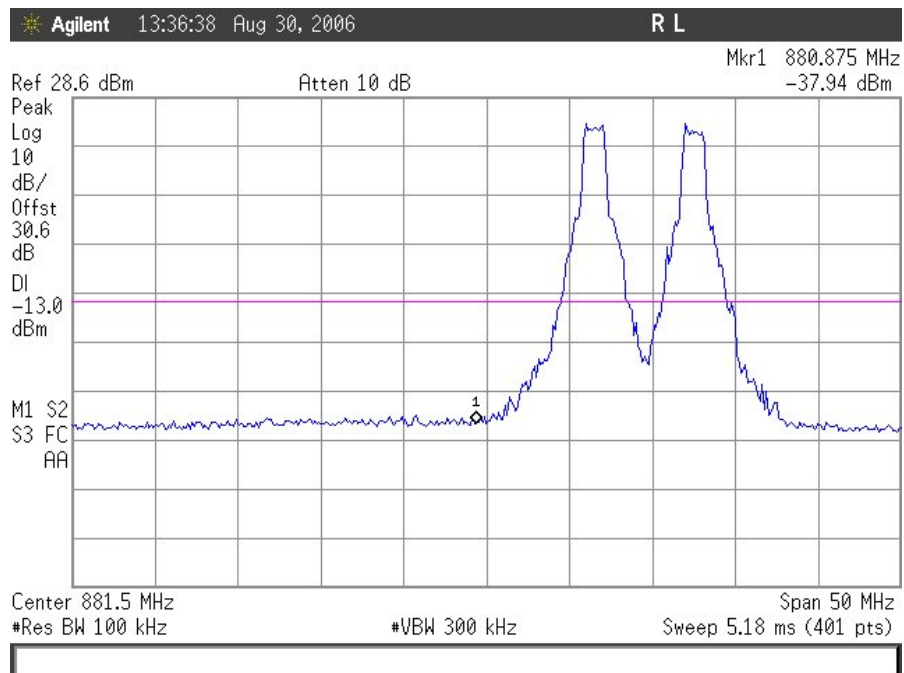
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



CDMA Downlink Intermodulation Low End - Cellular



CDMA Downlink Intermodulation High End - Cellular

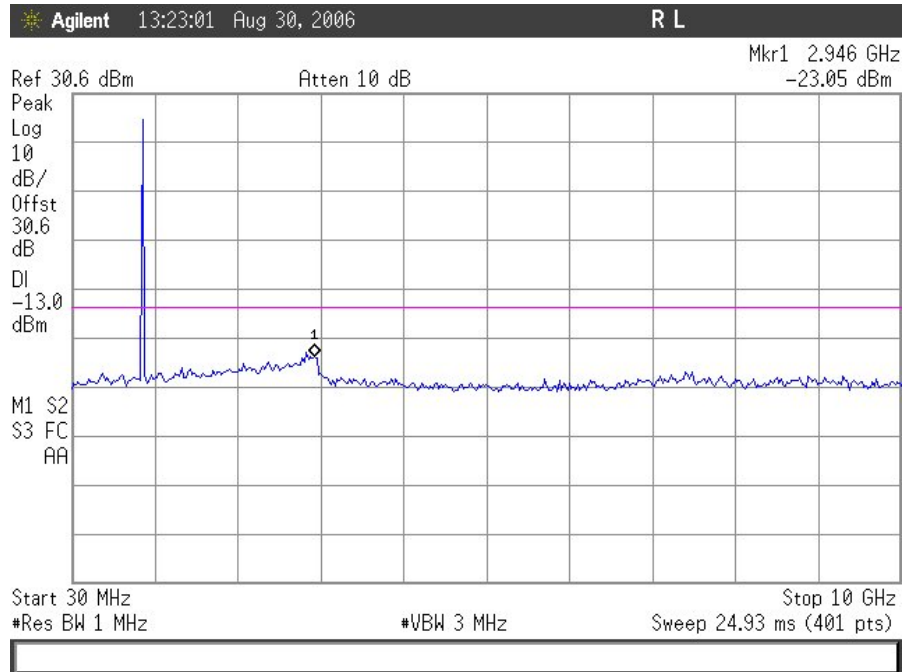


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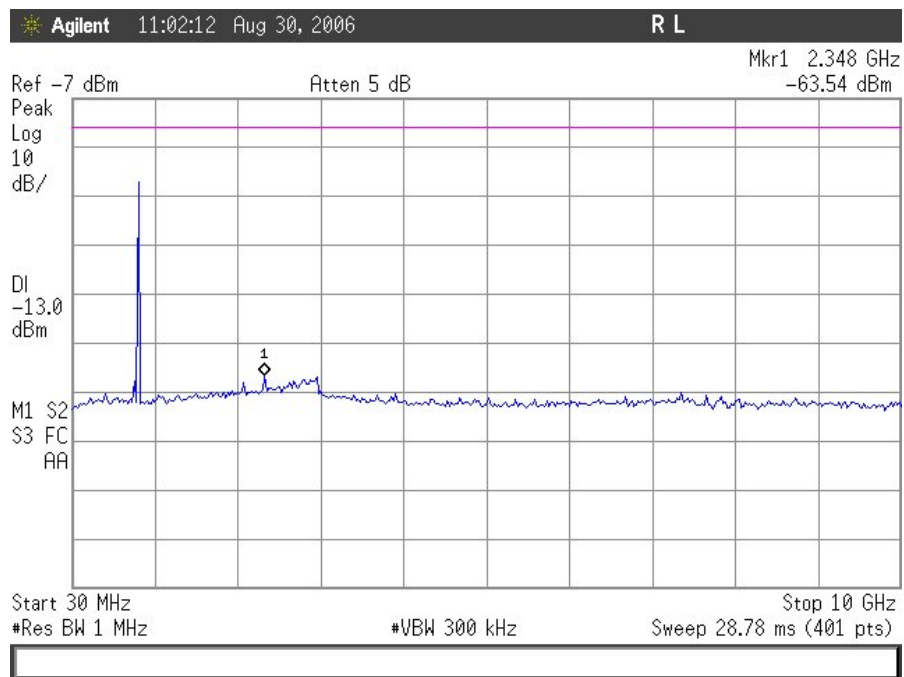
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

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TDMA Downlink Conducted Emissions 30 MHz – 10 GHz (Low Channel - Cellular)



TDMA Uplink Conducted Emissions 30 MHz – 10 GHz (Low Channel - Cellular)

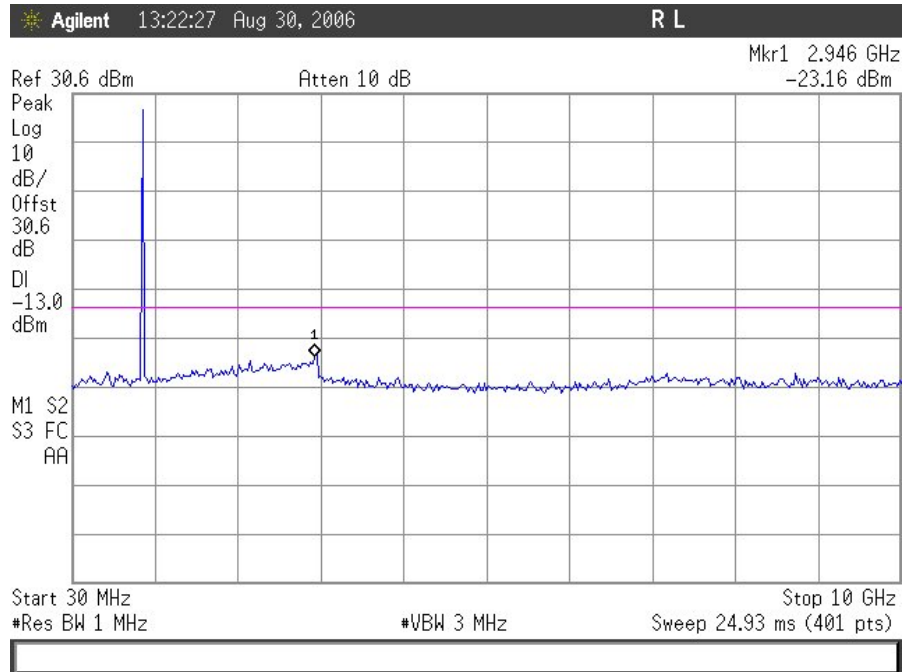


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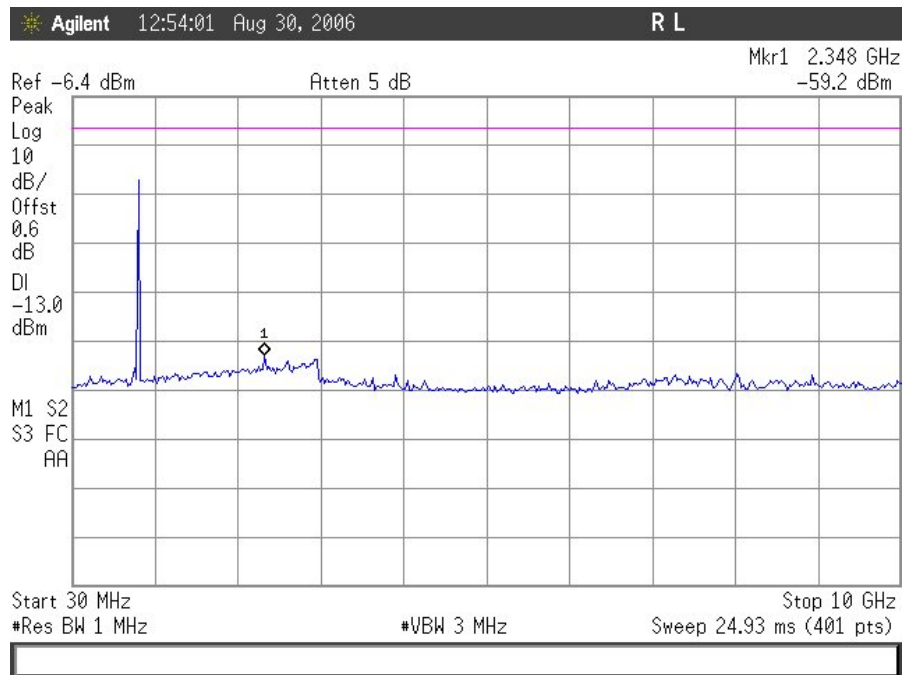
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

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TDMA Downlink Conducted Emissions 30 MHz – 10 GHz (Mid Channel - Cellular)



TDMA Uplink Conducted Emissions 30 MHz – 10 GHz (Mid Channel - Cellular)

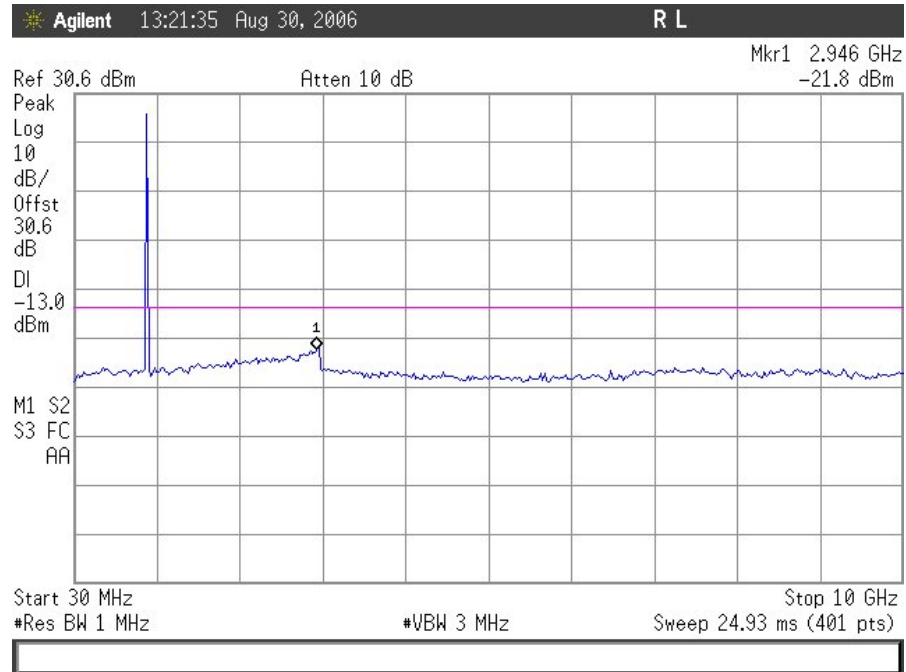


LGC Wireless

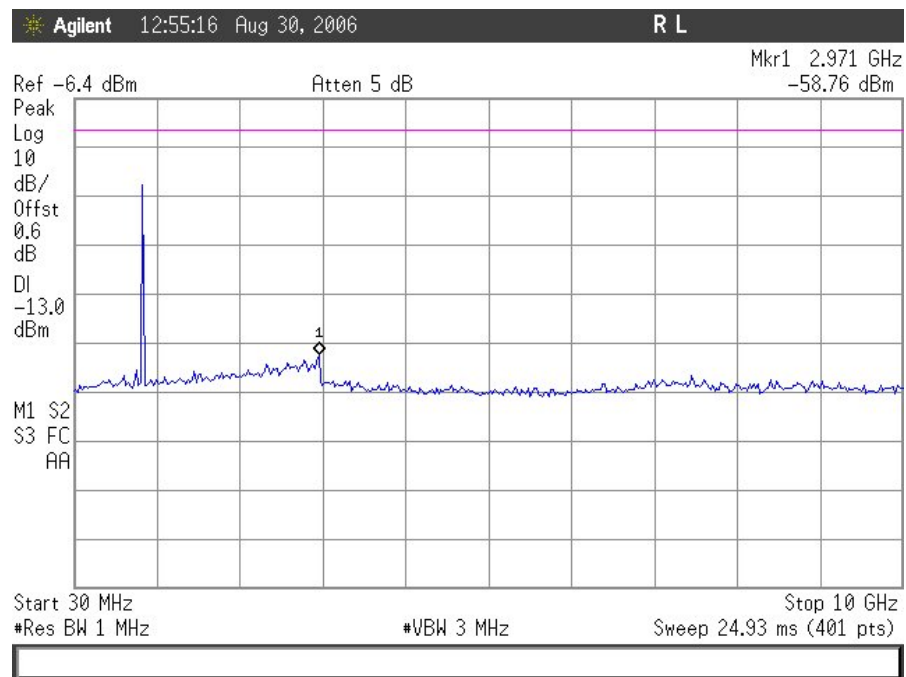
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



TDMA Downlink Conducted Emissions 30 MHz – 10 GHz (High Channel - Cellular)



TDMA Uplink Conducted Emissions 30 MHz – 10 GHz (High Channel - Cellular)

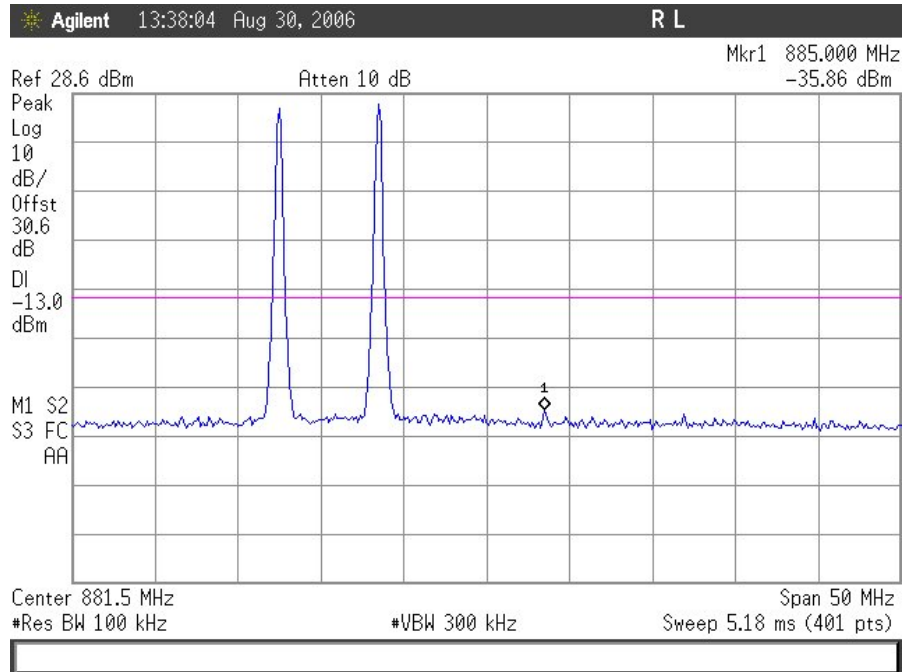


LGC Wireless

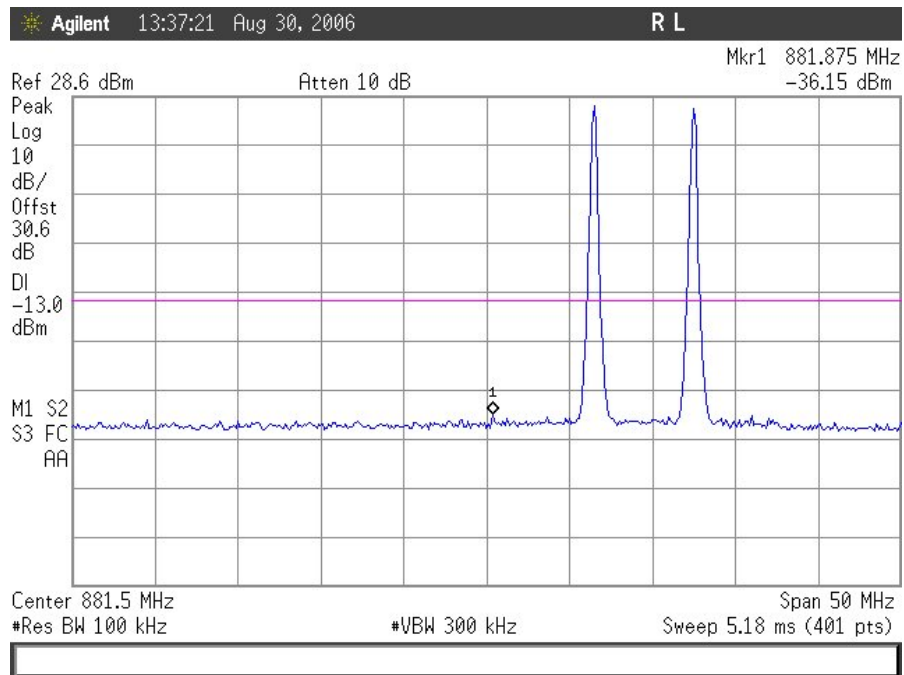
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

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TDMA Downlink Intermodulation Low End - Cellular



TDMA Downlink Intermodulation High End - Cellular

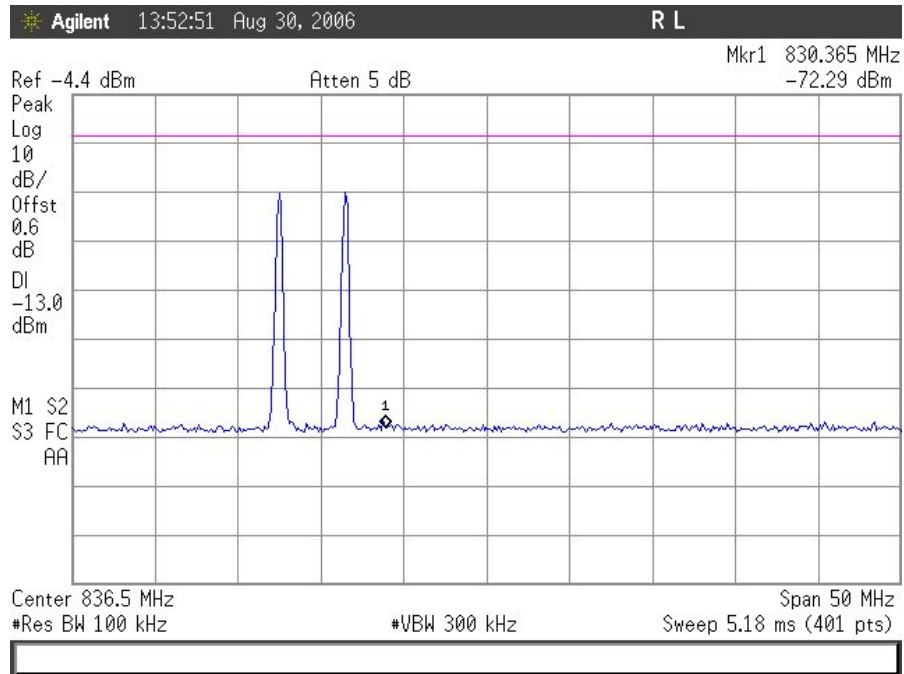


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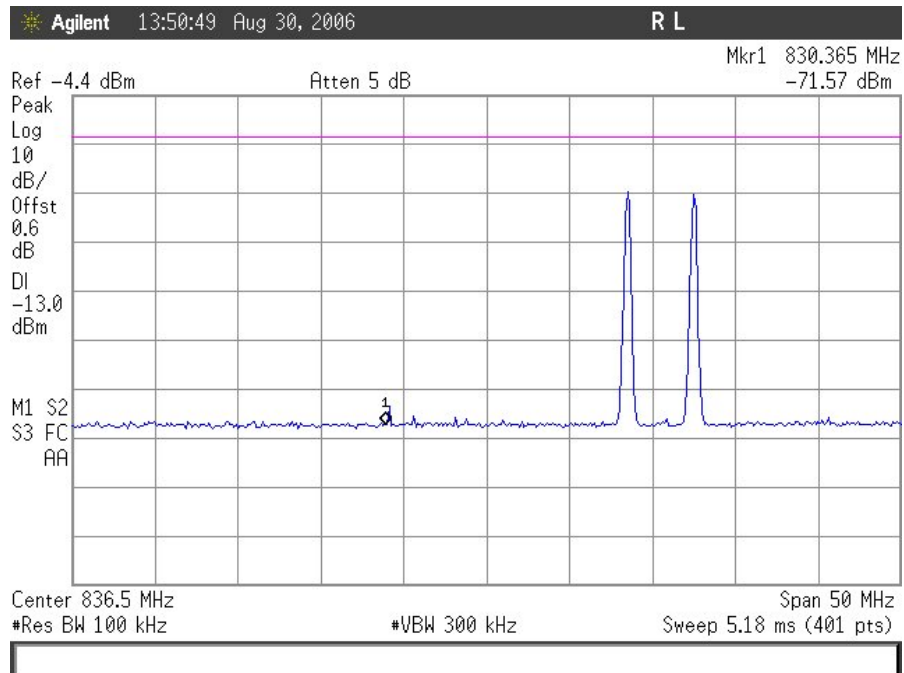
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



TDMA Uplink Intermodulation Low End - Cellular



TDMA Uplink Intermodulation High End - Cellular

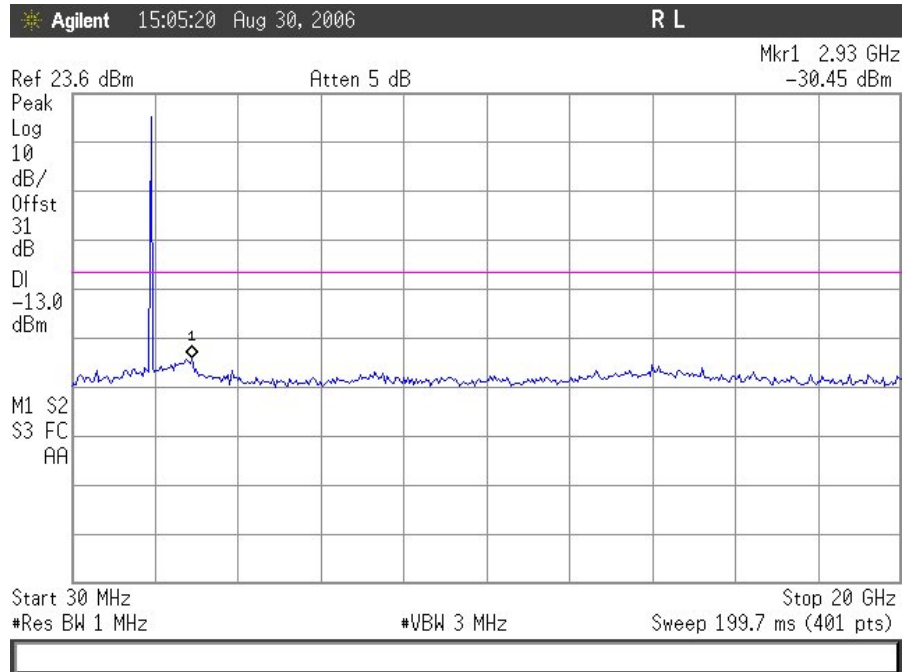


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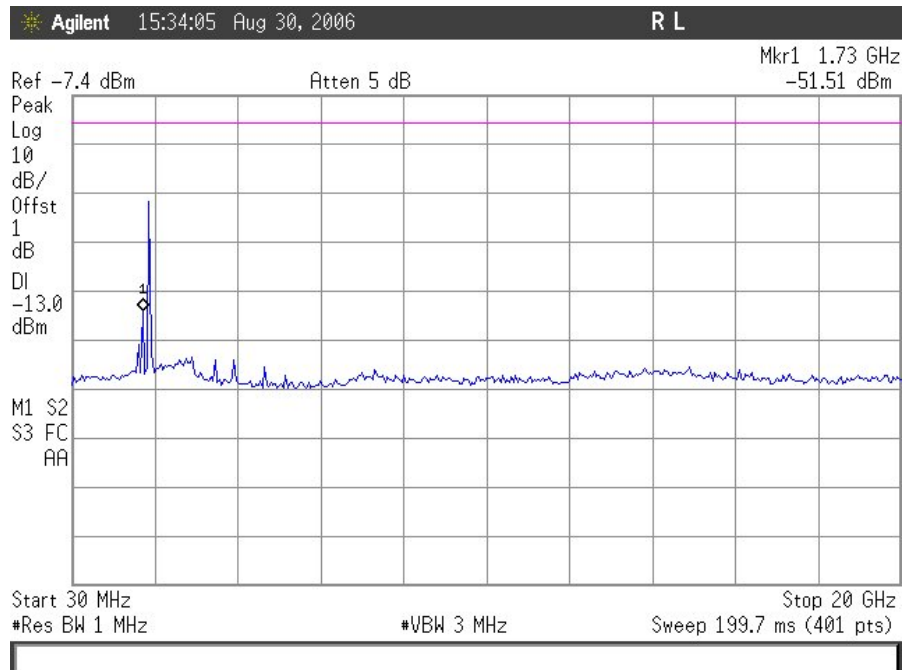
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



GSM Downlink Conducted Emissions 30 MHz – 20 GHz (Low Channel - PCS)



GSM Uplink Conducted Emissions 30 MHz – 20 GHz (Low Channel - PCS)

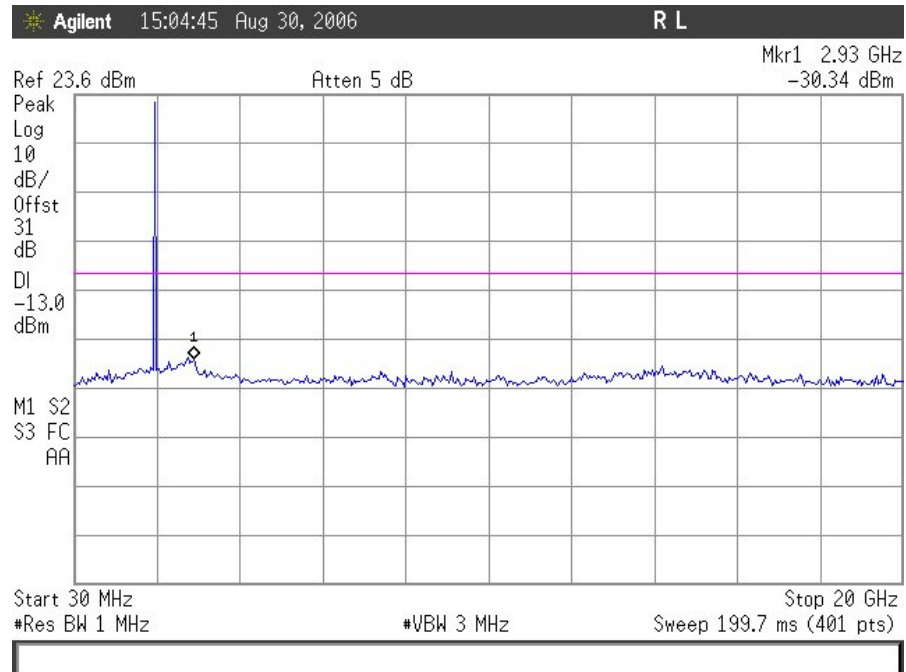


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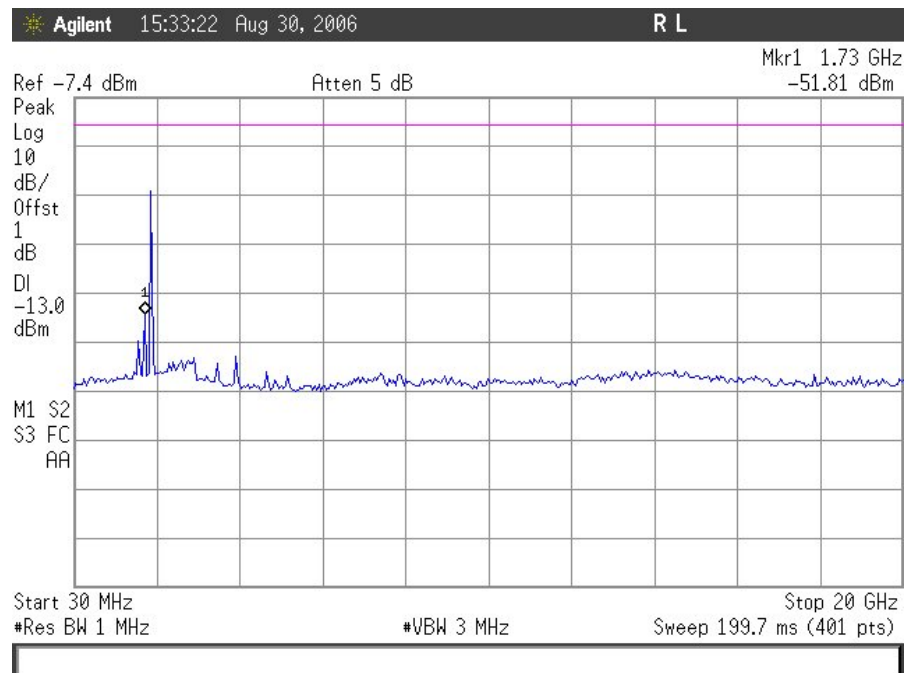
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



GSM Downlink Conducted Emissions 30 MHz – 20 GHz (Mid Channel - PCS)



GSM Uplink Conducted Emissions 30 MHz – 20 GHz (Mid Channel - PCS)

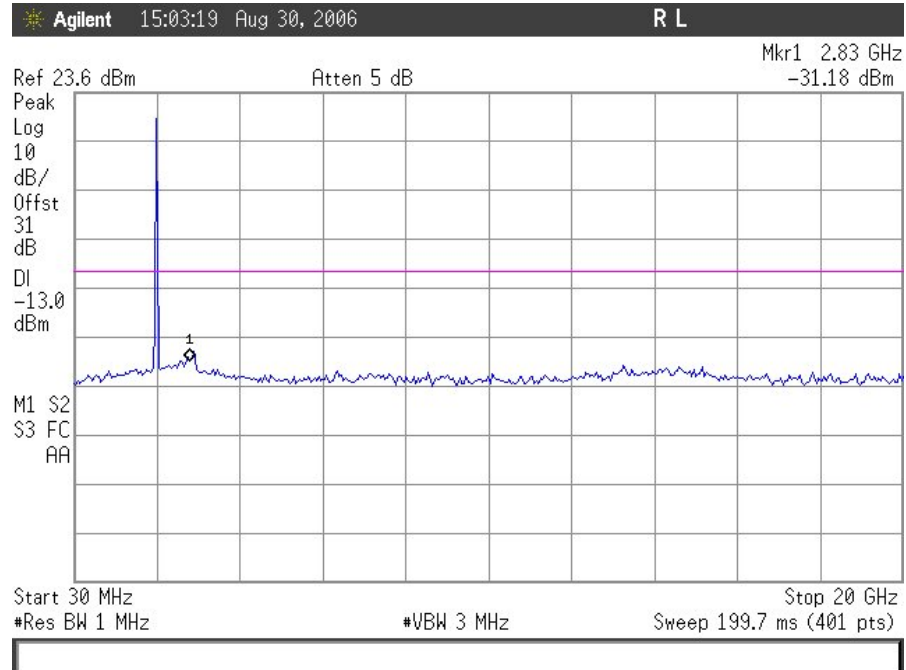


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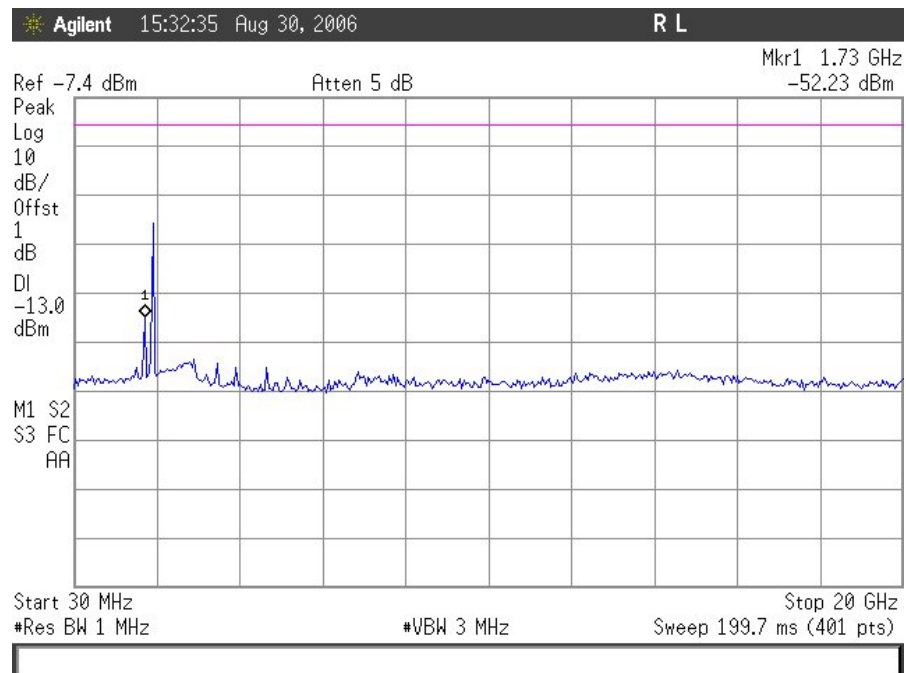
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



GSM Downlink Conducted Emissions 30 MHz – 20 GHz (High Channel - PCS)



GSM Uplink Conducted Emissions 30 MHz – 20 GHz (High Channel - PCS)

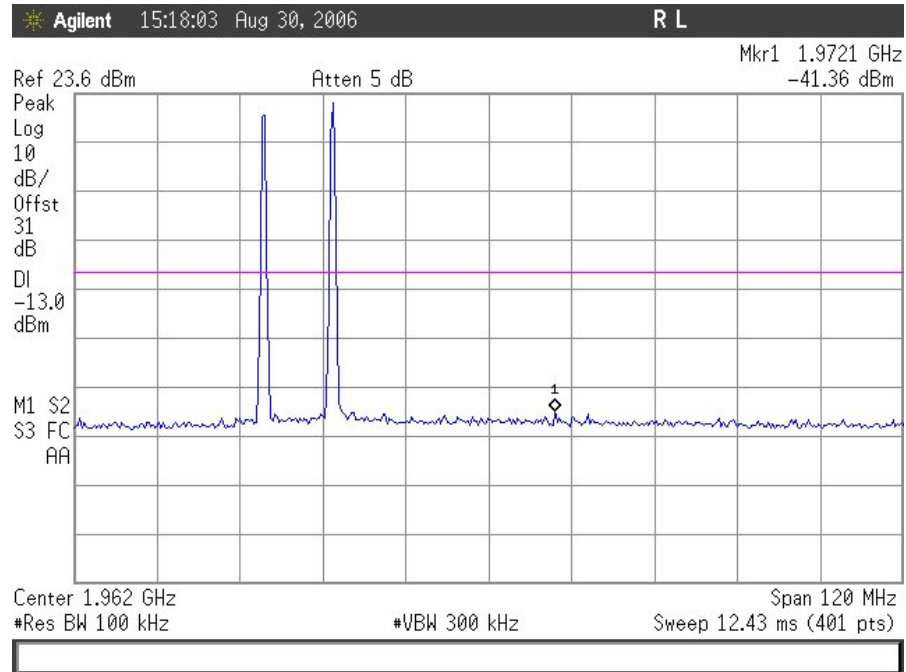


LGC Wireless

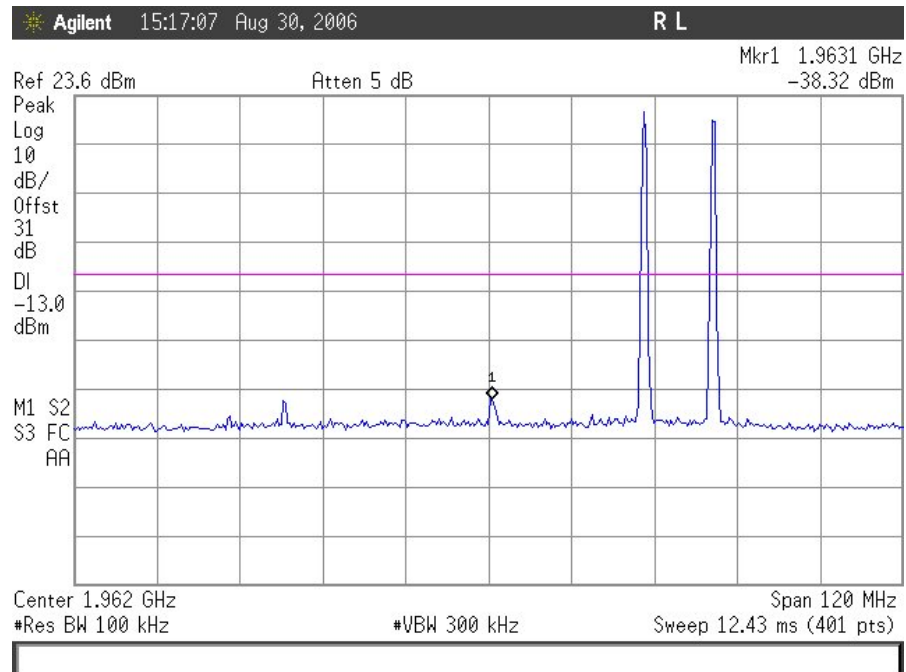
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

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GSM Downlink Intermodulation Low End - PCS



GSM Downlink Intermodulation High End - PCS

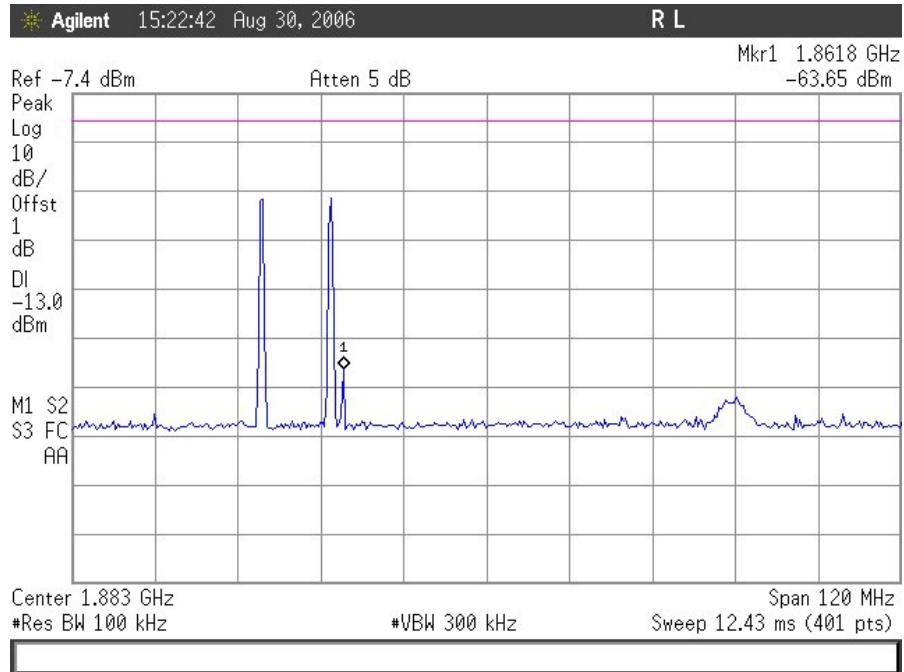


LGC Wireless

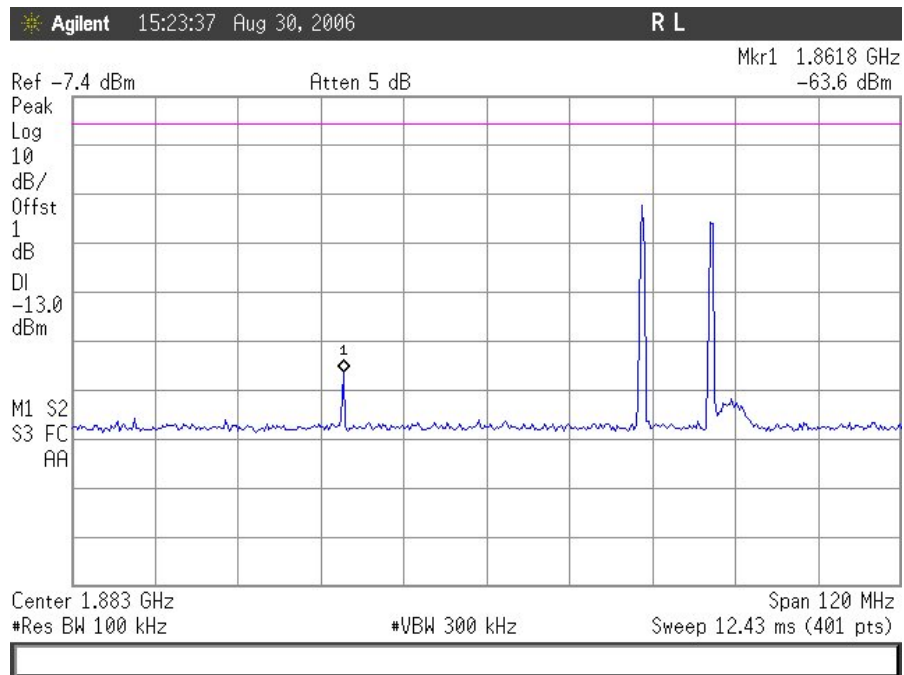
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

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GSM Uplink Intermodulation Low End - PCS



GSM Uplink Intermodulation High End - PCS

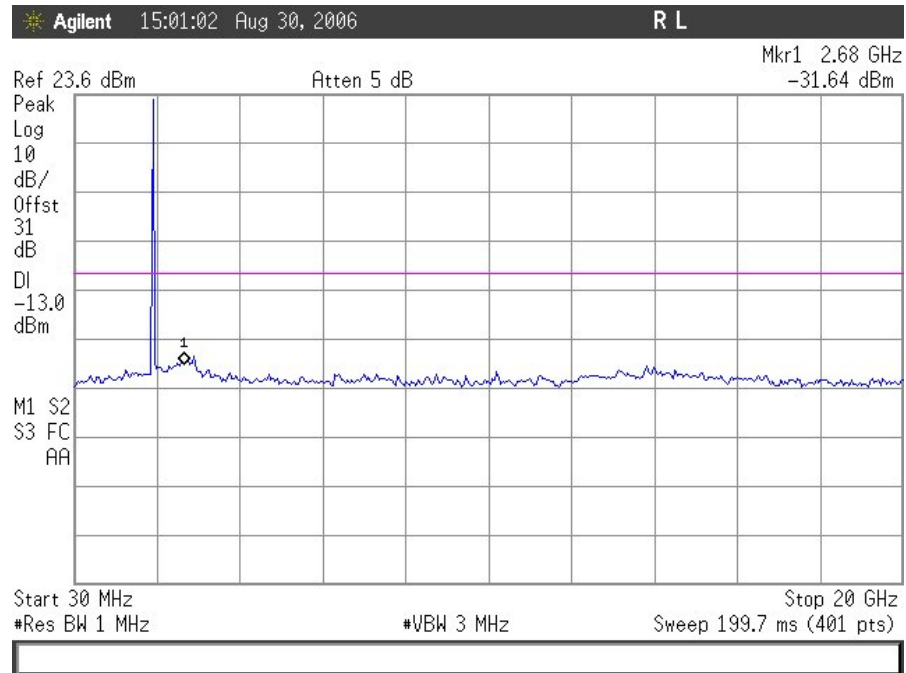


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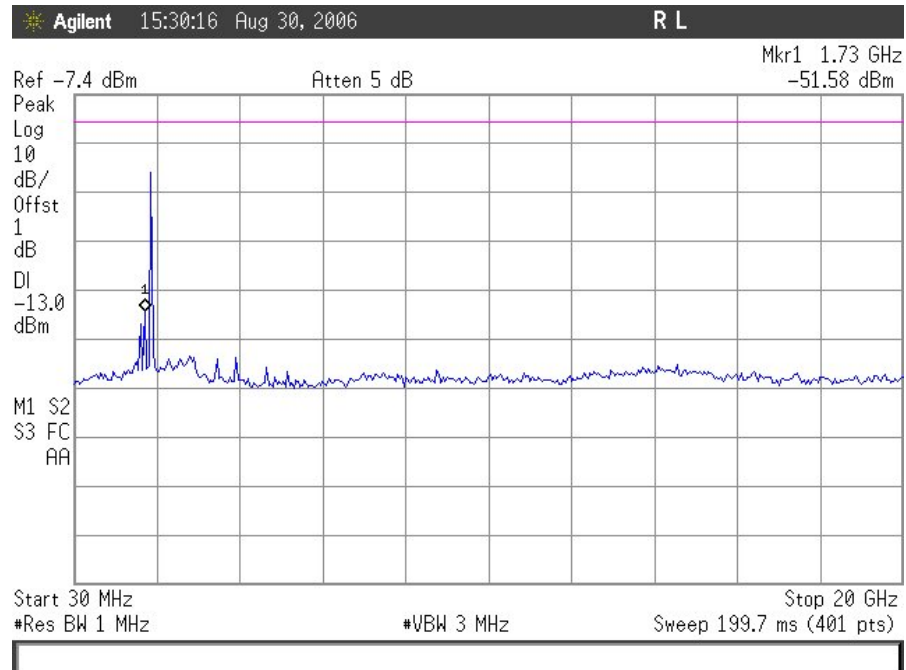
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



CDMA Downlink Conducted Emissions 30 MHz – 20 GHz (Low Channel - PCS)



CDMA Uplink Conducted Emissions 30 MHz – 20 GHz (Low Channel - PCS)

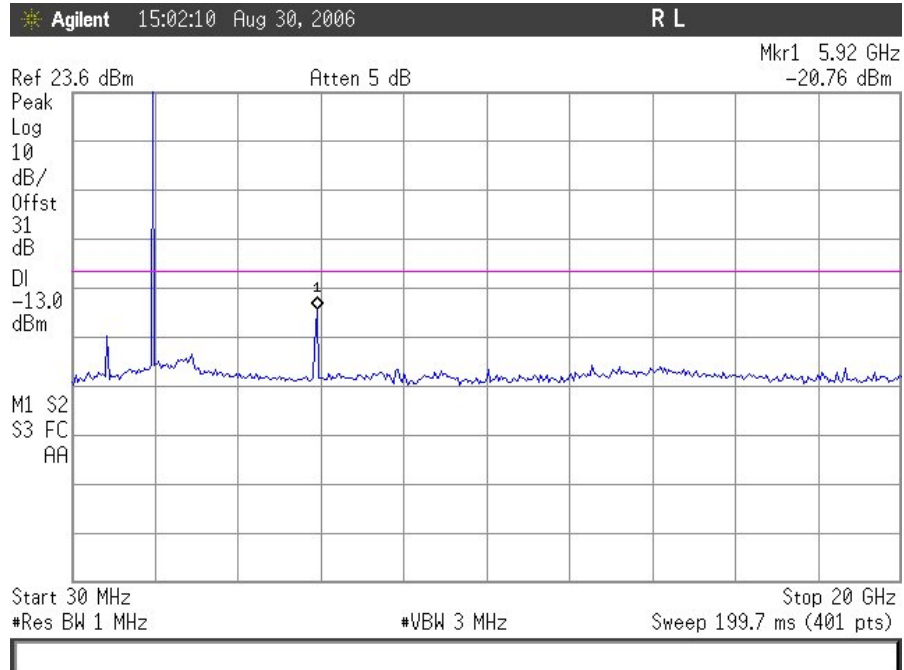


LGC Wireless

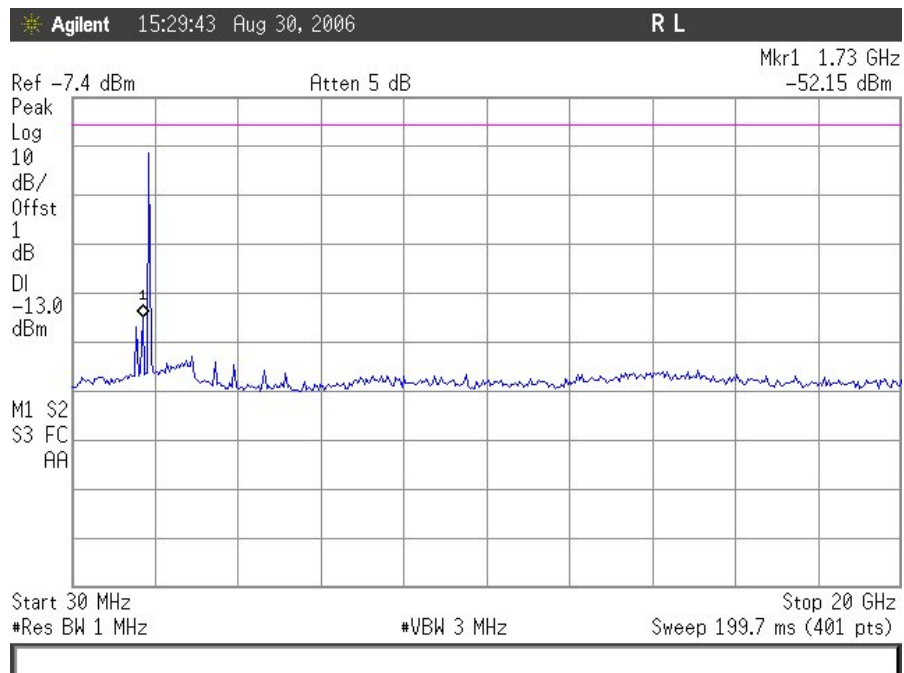
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

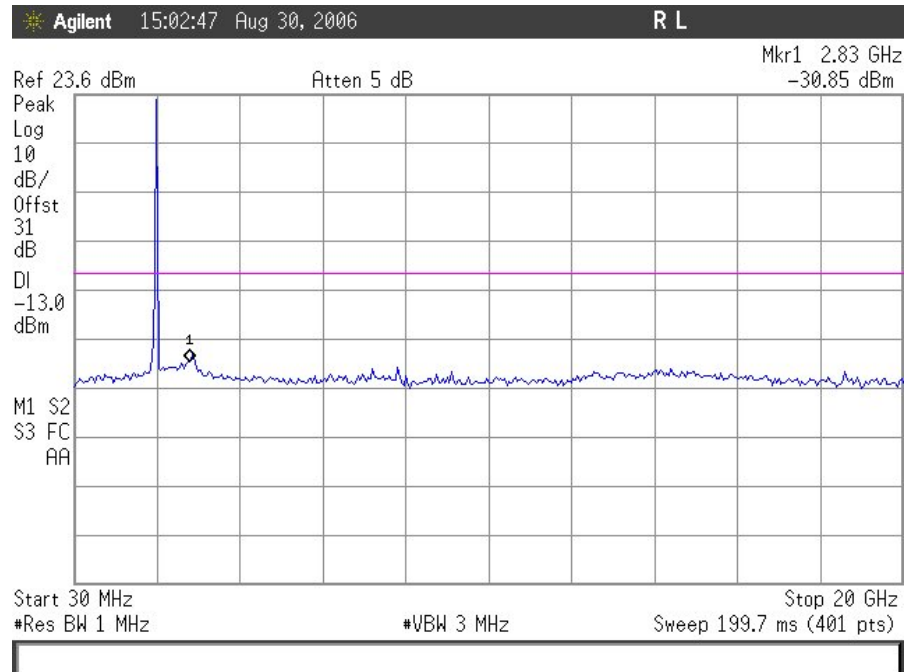
CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



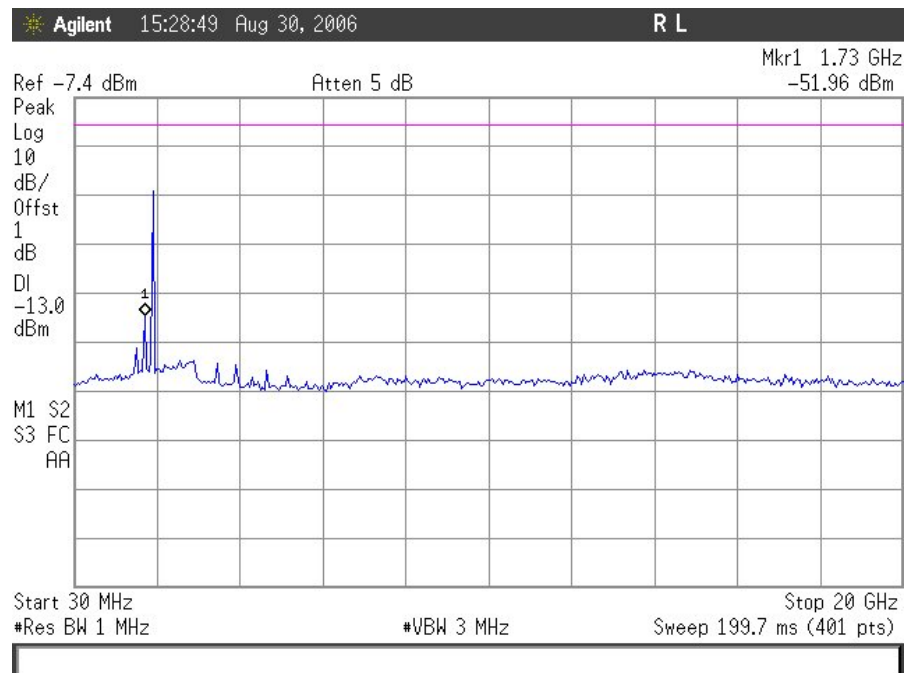
CDMA Downlink Conducted Emissions 30 MHz – 20 GHz (Mid Channel - PCS)



CDMA Uplink Conducted Emissions 30 MHz – 20 GHz (Mid Channel - PCS)



CDMA Downlink Conducted Emissions 30 MHz – 20 GHz (High Channel – PCS)



CDMA Uplink Conducted Emissions 30 MHz – 20 GHz (High Channel - PCS)

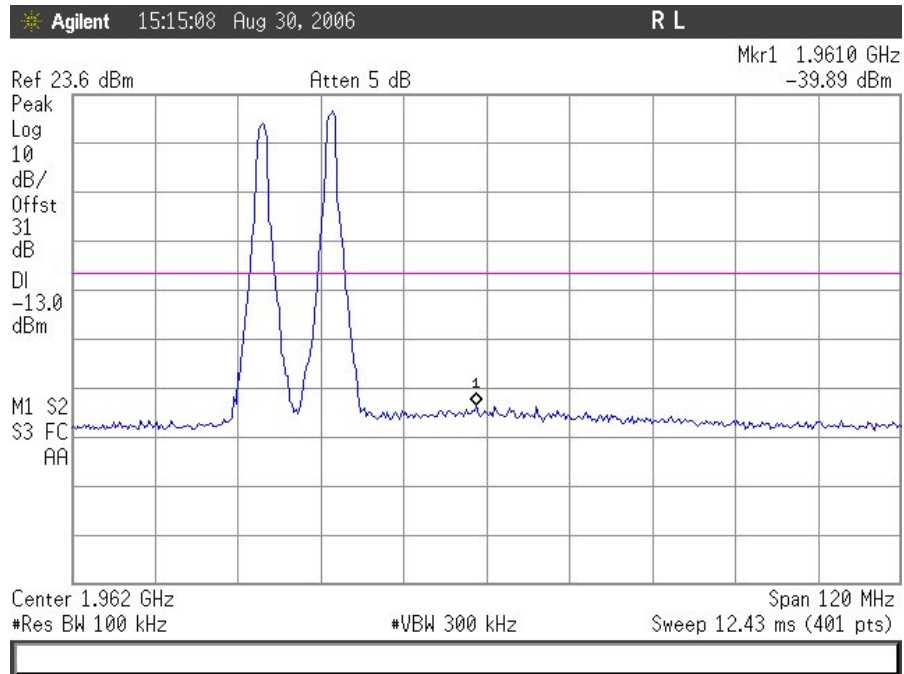


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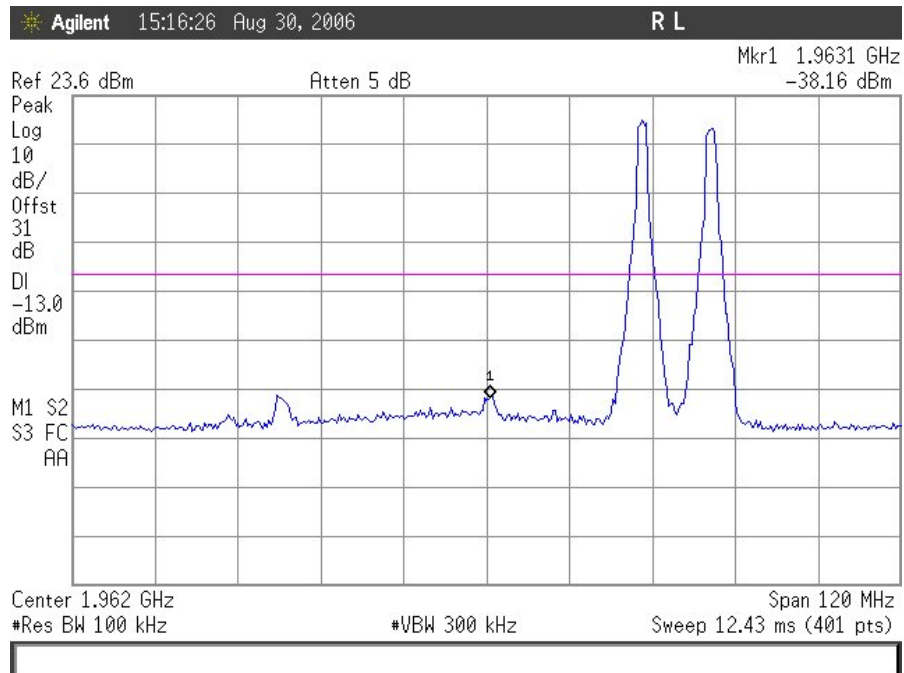
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



CDMA Downlink Intermodulation Low End - PCS



CDMA Downlink Intermodulation High End - PCS

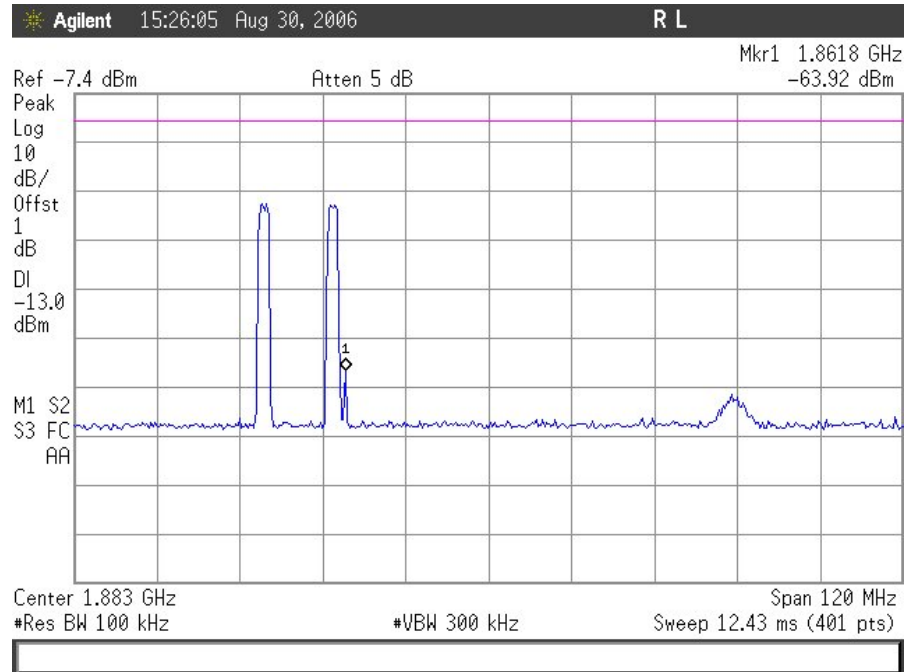


LGC Wireless

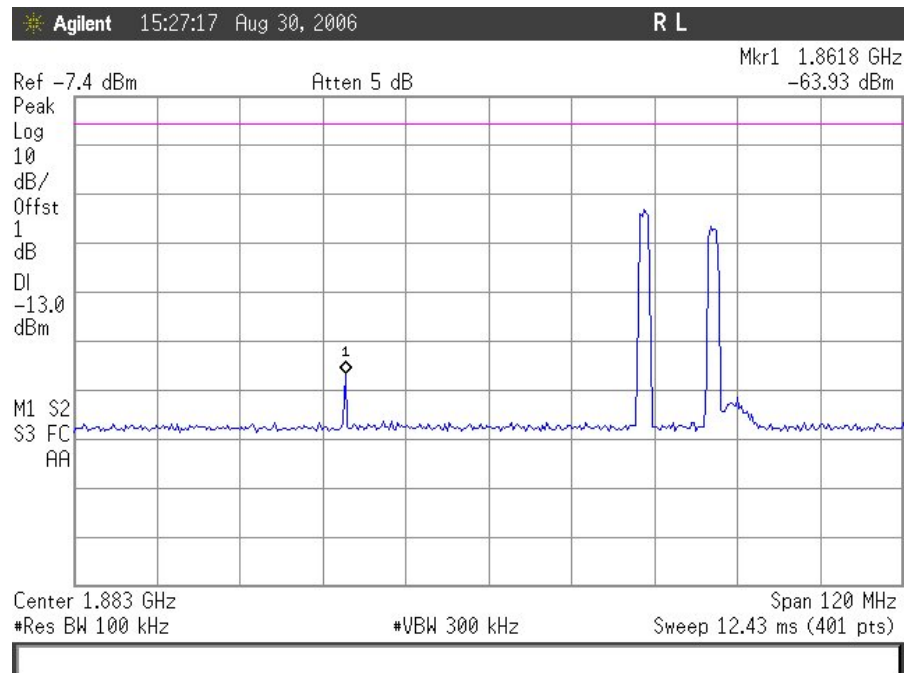
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



CDMA Uplink Intermodulation Low End - PCS



CDMA Uplink Intermodulation High End - PCS

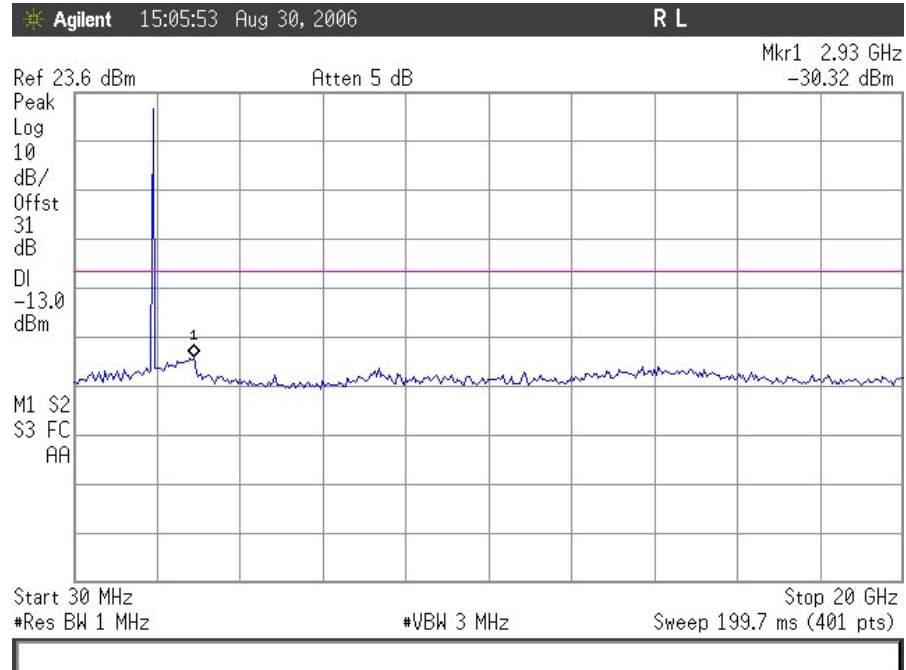


LGC Wireless

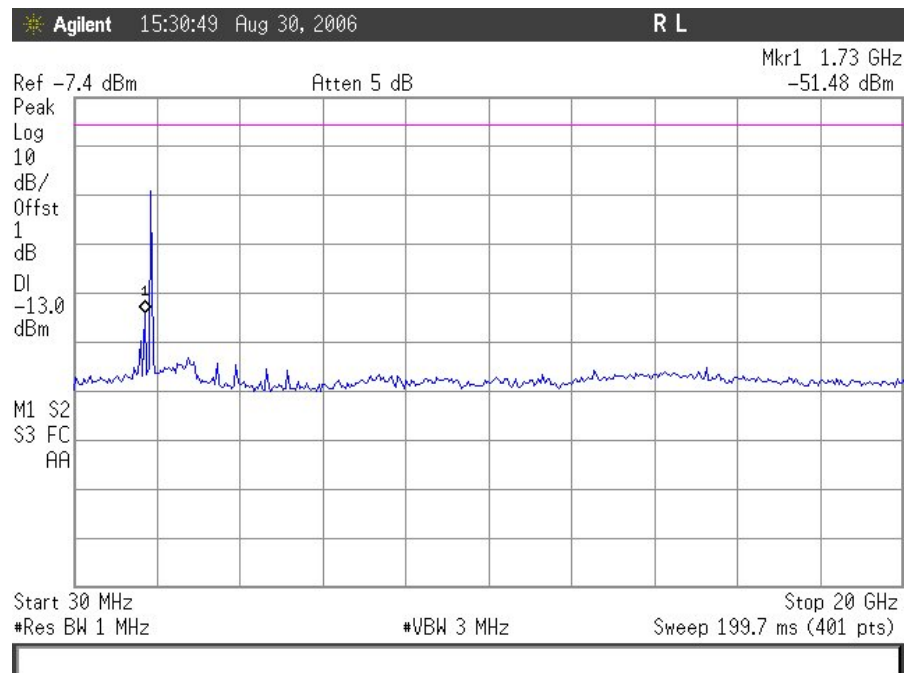
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



TDMA Downlink Conducted Emissions 30 MHz – 20 GHz (Low Channel - PCS)



TDMA Uplink Conducted Emissions 30 MHz – 20 GHz (Low Channel - PCS)

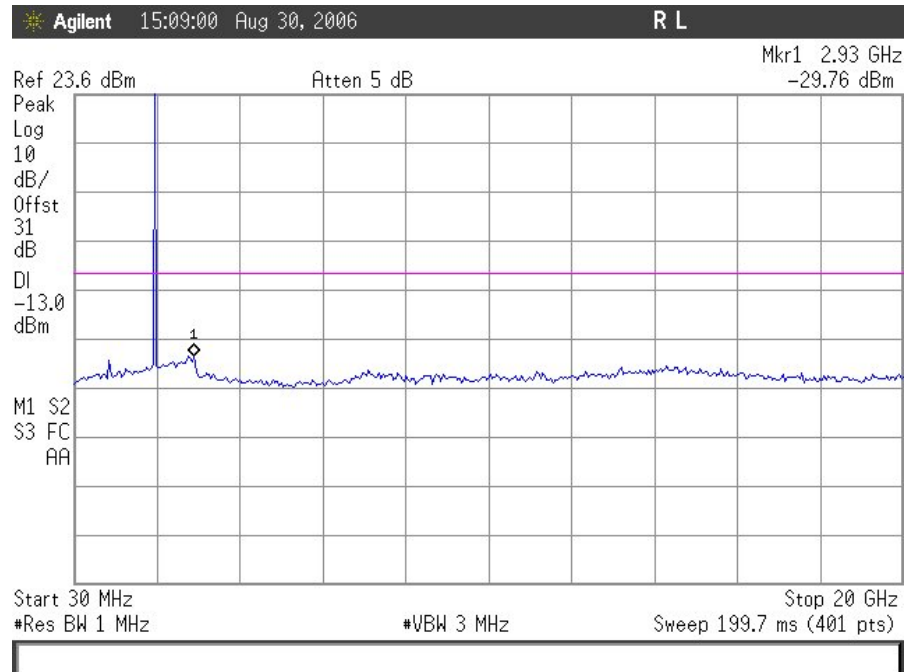


LGC Wireless

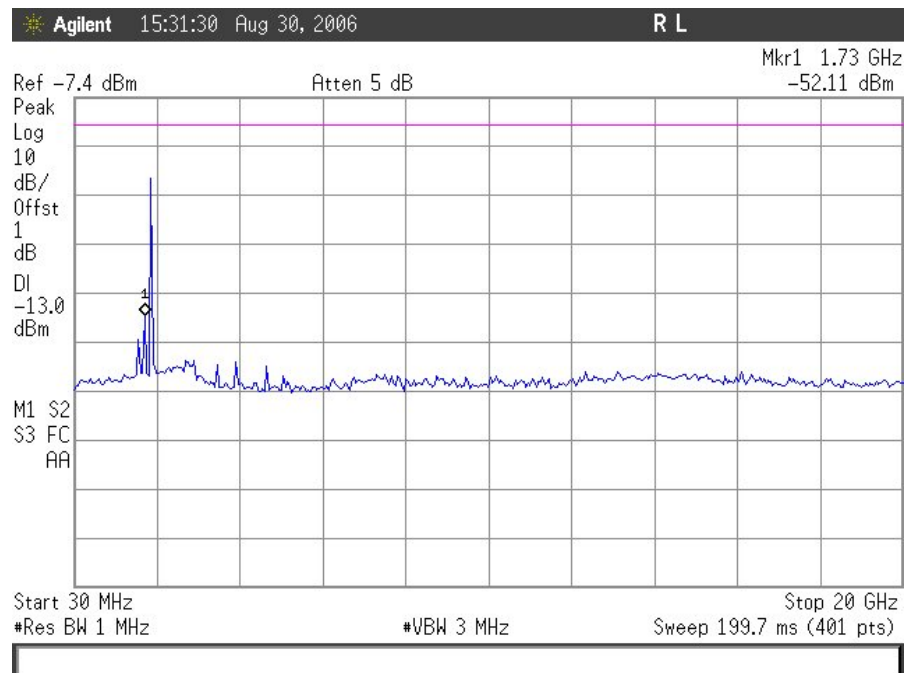
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

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TDMA Downlink Conducted Emissions 30 MHz – 20 GHz (Mid Channel - PCS)



TDMA Uplink Conducted Emissions 30 MHz – 20 GHz (Mid Channel - PCS)

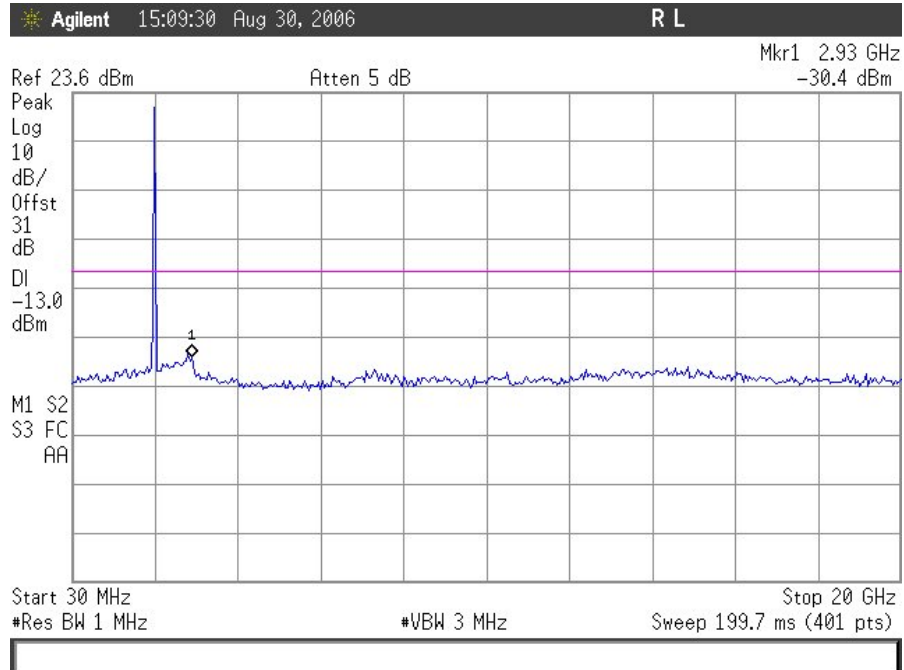


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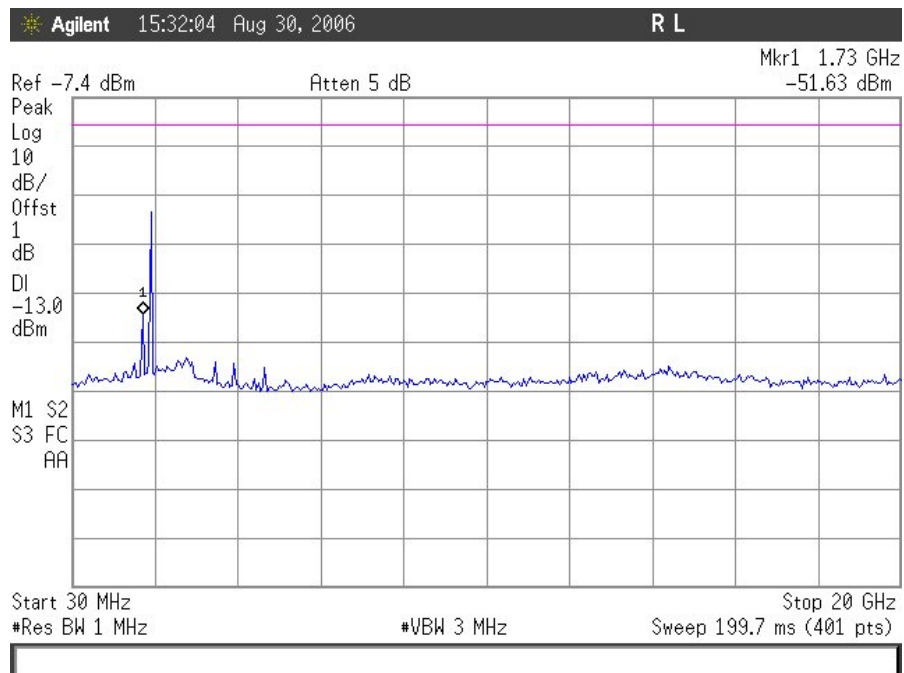
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

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TDMA Downlink Conducted Emissions 30 MHz – 20 GHz (High Channel - PCS)



TDMA Uplink Conducted Emissions 30 MHz – 20 GHz (High Channel - PCS)

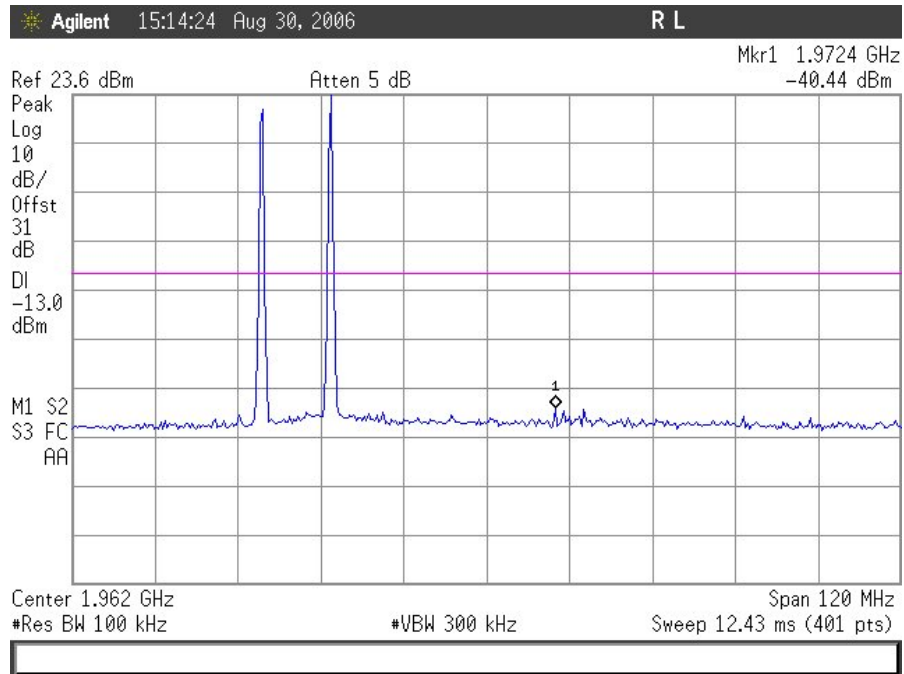


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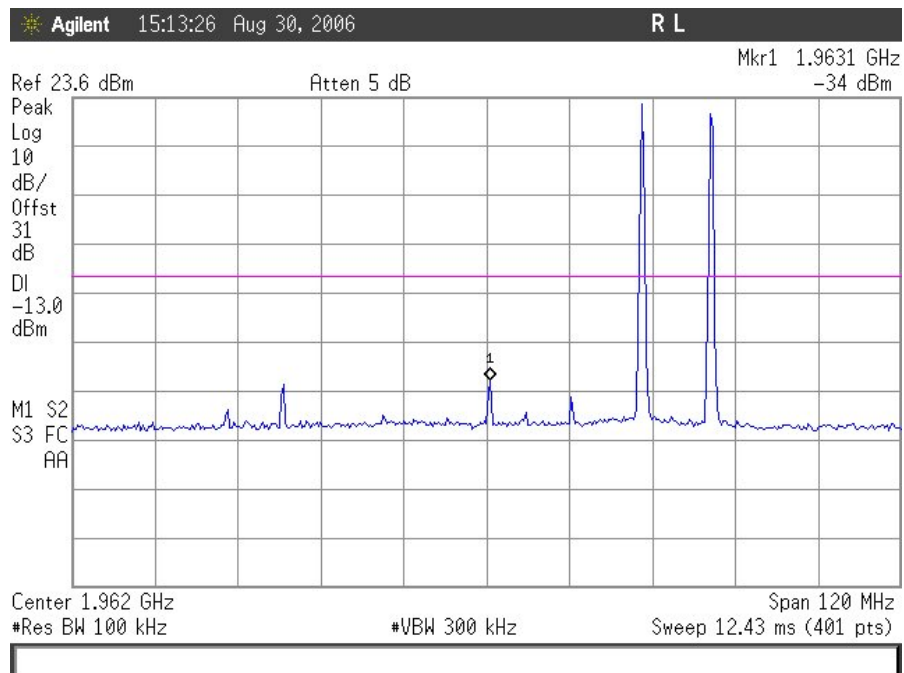
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E



TDMA Downlink Intermodulation Low End - PCS



TDMA Downlink Intermodulation High End - PCS

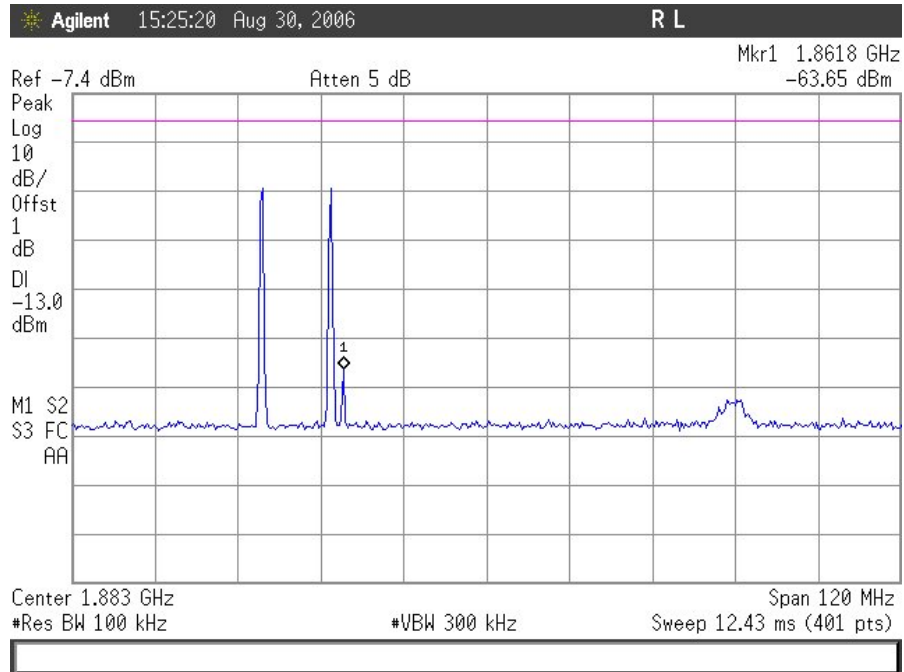


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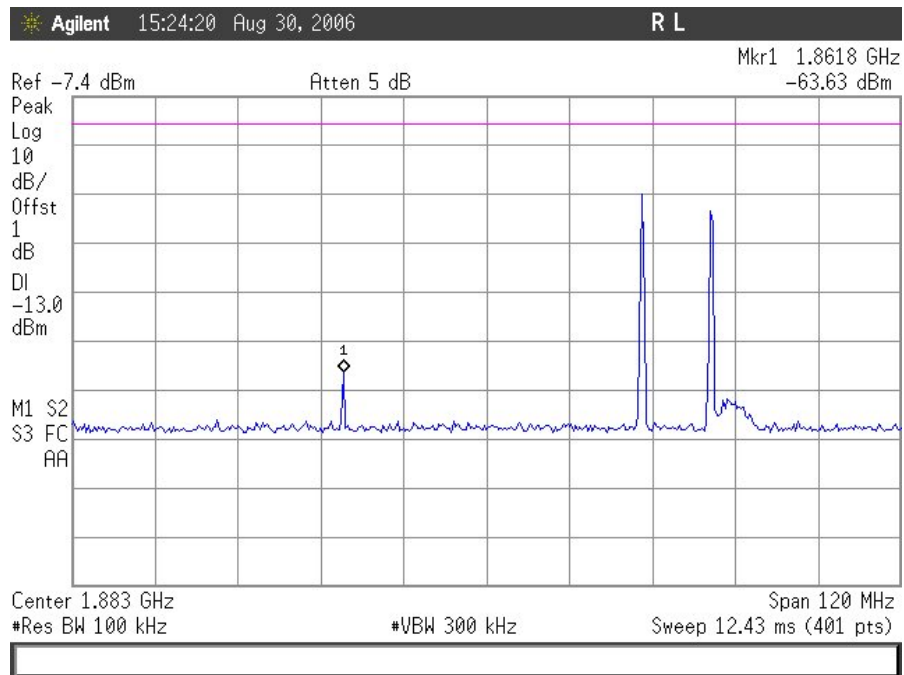
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

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TDMA Uplink Intermodulation Low End - PCS



TDMA Uplink Intermodulation High End - PCS



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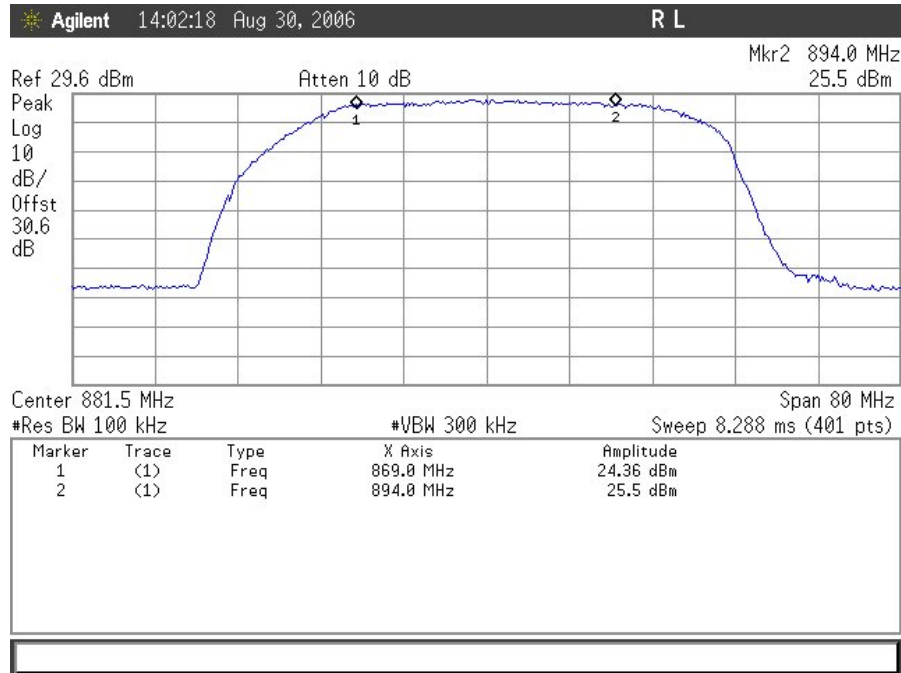
InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

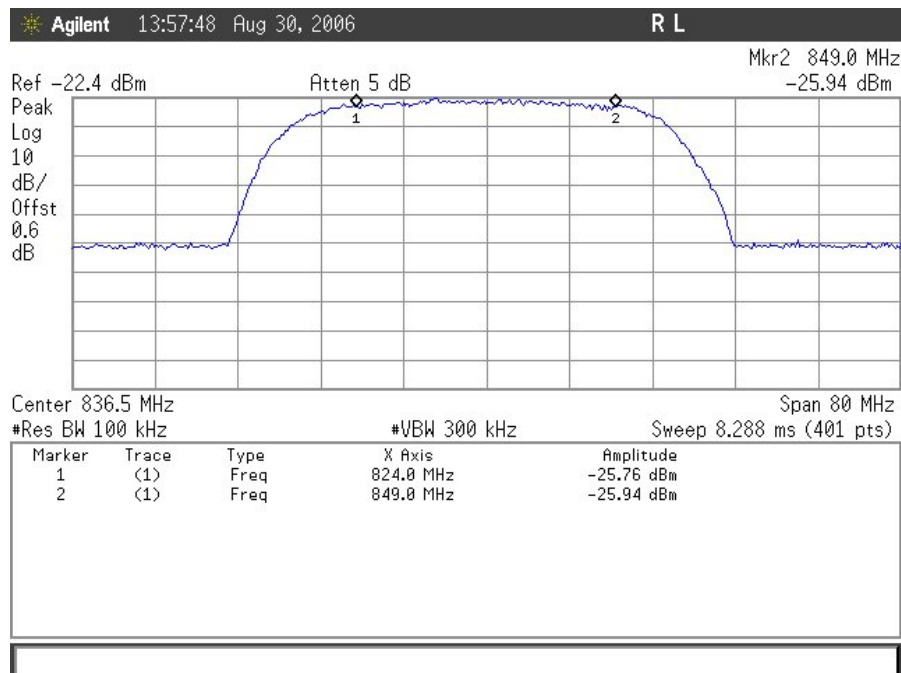
CFR Title 47 Part 22 Subpart H & CFR Title 47 Part 24 Subpart E

Electromagnetic Compatibility Criteria for Intentional Radiators

2-11-04/EAB/RF Out of Band Rejection



Out of Band Rejection Downlink – Cellular



Out of Band Rejection Uplink – Cellular

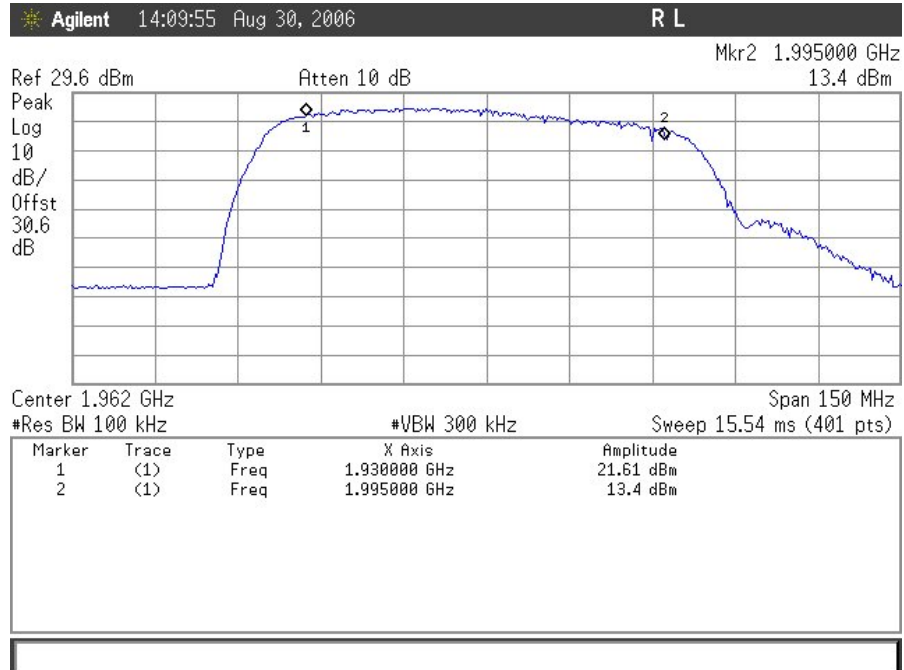


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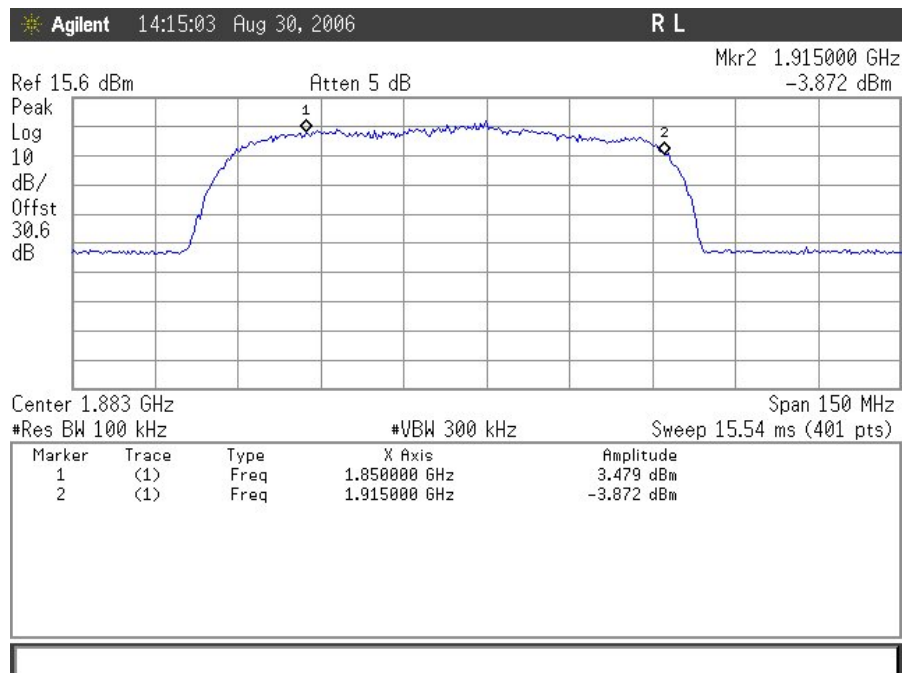
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Electromagnetic Compatibility

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Out of Band Rejection Downlink – PCS



Out of Band Rejection Uplink – PCS



Electromagnetic Compatibility Criteria for Intentional Radiators

§2.1055 Frequency Stability over Temperature and Voltage Variations

Test Requirement(s): §2.1055(a)(1) §22.355, §24.235

Test Procedures: As required by 47 CFR 2.1055, *Frequency Stability measurements* were made at the RF output terminals using a Directional Coupler through a Spectrum Analyzer and Power Meter.

The EUT was placed in the Environmental Chamber and support equipments are outside the chamber on a table. A CW signal was injected into the EUT at the appropriate RF level. The frequency counter option on the Spectrum Analyzer was used to measure frequency deviations. The frequency drift was investigated for every 10^C increment until the unit is stabilized then recorded the reading in tabular format with the temperature range of -30 to 50^C.

Voltage supplied to EUT is 120 VAC reference temperature was done at 20^C. The voltage was varied by $\pm 15\%$ of nominal

Test Results: Equipment complies with Section 2.1055 and 22.355

Test Engineer(s): Shawn McMillen

Test Date(s): August 30, 2006

**Frequency Stability Test Results – 800MHz****Reference Freq.: 881.500716MHz at 20°C**

Temperature (Celsius)	Measured Freq (MHz)	Drift ppm
50	881.500727	0.015
40	881.500719	0.024
30	881.500722	0.020
20	Reference	
10	881.500708	0.036
0	881.500740	0.000
-10	881.500736	0.005
-20	881.500768	-0.032
-30	881.500860	-0.136

Table 13. Temperature Vs. Frequency Test Results**Reference: 120Vac at 20°C Freq. = 881.500716MHz**

Measured Voltage(dc)	Measured	Drift
+/-15% of nominal	Freq (MHz)	(Hz)
102	881.500711	0.033
138	881.500737	0.003

Table 14. Frequency vs. Voltage Test Results



Frequency Stability Test Results – 1900MHz**Reference Freq.:** 1959.999420MHz at 20°C

Temperature	Measured	Drift
(Celsius)	Freq (MHz)	ppm
50	1959.998834	0.299
40	1959.998890	0.270
30	1959.999887	-0.238
20	Reference	
10	1959.998851	0.290
0	1959.998861	0.285
-10	1959.998956	0.237
-20	1959.998895	0.268
-30	1959.998869	0.281

Table 15. Temperature Vs. Frequency Test Results**Reference:** 120Vac at 20°C **Freq.** = 1959.999420MHz

Measured	Measured	Drift
Voltage(dc)	Freq (MHz)	(Hz)
+/-15% of nominal		
102	1959.999424	-0.002
138	1959.999424	-0.004

Table 16. Frequency vs. Voltage Test Results



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Electromagnetic Compatibility

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IV. Test Equipment



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InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

Electromagnetic Compatibility

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Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ANSI/NCSL Z540-1-1994 and ANSI/ISO/IEC 17025:2000.

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2421	EMI RECEIVER	ROHDE&SCHWARZ	ESIB 7	2/9/2006	2/9/2007
1S2184	BILOG ANTENNA	CHASE	CBL6112A	1/12/2006	1/12/2007
1S2121	PRE-AMPLIFIER	HEWLETT PACKARD	8449B	10/14/2005	10/14/2006
1S2198	ANTENNA, HORN	EMCO	3115	8/17/2006	8/17/2007
1S2202	ANTENNA, HORN, 1 METER	EMCO	3116	3/23/2004	3/23/2007
N/A	HIGH PASS FILTER	MICRO-TRONICS	HPM13146	SEE NOTE	
1S2263	CHAMBER, 10 METER	RANTEC	N2-14	8/18/2006	8/15/2007
1S2430	WIDEBAND POWER METER	ANRITSU COMPANY	ML2488A	1/12/2006	1/12/2007
1S2432	WIDEBAND POWER SENSOR	ANRITSU COMPANY	MA2491A	1/12/2006	1/12/2007
1S2034	COUPLER, DIRECTIONAL 1-20 GHz	KRYTAR	101020020	SEE NOTE	
1S2041	COUPLER, BI DIRECTIONAL COAXIAL	NARDA	N/A	SEE NOTE	
1S2460	Analyzer, Spectrum 9 kHz-40GHz	Agilent	E4407B	07/06/2005	07/06/2008
1S2430	WIDEBAND POWER METER	ANRITSU COMPANY	ML2488A	1/12/2006	1/12/2007
1S2432	WIDEBAND POWER SENSOR	ANRITSU COMPANY	MA2491A	1/12/2006	1/12/2007
1S2034	COUPLER, DIRECTIONAL 1-20 GHz	KRYTAR	101020020	SEE NOTE	
1S2041	COUPLER, BI DIRECTIONAL COAXIAL	NARDA	N/A	SEE NOTE	
1S2128	Harmonic Mixer	Hewlett Packard	11970A	10/07/2003	10/07/2006
1S2129	Harmonic Mixer	Hewlett Packard	11970K	10/07/2003	10/07/2006

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.



V. Certification & User's Manual Information



Certification & User's Manual Information

A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

- (a) The various types of radio communication transmitting devices described throughout this chapter.
- (b) *The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.*
- (c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.
- (d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

- (a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:
 - (1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or
 - (2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.
- (d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.



- (e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:
- (i) *Compliance testing;*
 - (ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;
 - (iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;
 - (iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or
 - (v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.
- (e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.
- (f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.



Certification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

- (a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.¹ *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.*
- (b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.907 Certification.

- (a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.
- (b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

¹ In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.



Certification & User's Manual Information

§ 2.948 Description of measurement facilities.

- (a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.
 - (1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.
 - (i) *If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.*
 - (ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.
 - (2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.



Certification & User's Manual Information

Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) *In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:*

- (1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

- (2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

- (3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

- (4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.
- (5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

- (a) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



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Electromagnetic Compatibility
Exhibits

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VI. Exhibits



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Electromagnetic Compatibility
Exhibits

InterReach Fusion FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub, FSN-8519-1 Remote Unit

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Exhibit A, Hopping Capability Requirements



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Exhibits

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Exhibit B, Non-Coordination Requirements



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Electromagnetic Compatibility

End of Report

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End of Report