Engineering Test Services
FCC Part 15.249 / RSS-210 6.2.2(m2)
900MHz Transmitter

Device Model: 52ESS
FCC ID: EO9-52ESS
IC ID: 864D-52ESS

Signatures
The following tests were performed under my guidance and supervision. I hold a firm understanding of the rules and regulations to which this document pertains and can competently answer any questions regarding the data that is presented.
Drew Rosenberg — Name Regulatory Engineer — Title

Summary

Rule	Description	Notes	Pass/Fail
15.207 RSS-210 sec. 6.6(a)	Powerline Conducted Emissions	See appendix A - powerline conducted emissions measurements for test results.	Pass
15.249(d)/15.209 RSS-210 Sec. 6.2.2 (m2)(3)	Out of band non-harmonic radiated emissions	Prescan measurements made in the uncalibrated setup in our anechoic chamber revealed no emissions. After the attempted prescan, the device was scanned at our OATS. Power was removed from the device when signals were deteceted to differentiate between ambient and device signals. No signals were deteceted at the OATS that were not ambient signals. The highest frequency oscillator is < 5MHz. The scan was performed between 30MHz and 1GHz.	Pass
15.35(b) RSS-210 Sec. 6.5	Pulsed operation / duty cycle correction	This device only uses SCM messages, which can allow for the full 20dB of relaxation. See Appendix C of PRT-0047-001 (attached) for details.	N/A
15.249(a)/15.35(b) RSS-210 Sec. 6.2.2 (m2)(1) and 6.5	Radiated emissions of transmitter fundamental and harmonics	All measurements were peak measurements. The analyzer input was measured as the power level going into the preamp. Harmoncs above the 5th harmonic were below the noise floor of the analyzer.	Pass
15.31(m)	Relative field intensities at high and low frequencies of transmitter	See appendix B - relative transmission levels across transmission bandwidth for test results.	Pass

Test 1: FCC Part 15.207 / RSS-210 sec. 6.6(a)
Powerline Conducted Emissions

Signatures		
The data presented in this section was collected either by me or under my direct supervision.		
7/16/2004	78F	71%
Test Date(s)	Temperature	Humidity
Mark Kvamme	Senior Technician	
Name	Title	

Measure the AC powerline conducted emissions from 150kHz to 30 MHz using a 50µH/50Ω line impedance stabilization network (LISN). Follow the procedure specified in PRT-0047-001. Verify that no emissions exceed the following limits:

Frequency (MHz)	Quasi-Peak (dBuV)	Average (dBuV)
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of frequency

Equipment Used	Model Number	Asset Number	Serial Number	Calibration Due Date
LISN	EMCO 3925/2	8925	9605-2535	1/23/05
Spectrum Analyzer	HP8593E	6965	3543A02032	9/6/2004

Notes:
See appendix A - powerline conducted emissions measurements for test results.

Test 2: FCC Part 15.209 / RSS-210 sec. 6.2(m2)(3)
Out of band non-harmonic emissions

Signatures		
The data presented in this section was collected either by me or under my direct supervision.		
8/5/2004	70F	68%
Test Date(s)	Temperature	Humidity
Drew Rosenberg	Regulatory Engineer	
Name	Title	

Measure the field strength of digital emissions according to PRT-0047-001. The maximum field strength of emissions may not exceed:

Frequency (MHz)	Field Strength (μV/m)
30-88	100
88-216	150
216-960	200
>960	500

Equipment Used	Model Number	Asset Number	Serial Number	Calibration Due Date
Spectrum Analyzer	HP 8594E	10202	3710A04999	02/2005
Double Ridged Waveguide Antenna (>1GHz)	None	None	None	None
Biconical Antenna (30MHz-200MHz)	EMCO 3110B	11730	9807-3129	01/2005
Log Periodic Antenna (200MHz - 1GHz)	EMCO 3146	16248	9203-3358	01/2005

Notes:
Prescan measurements made in the uncalibrated setup in our anechoic chamber revealed no emissions.

After the attempted prescan, the device was scanned at our OATS. Power was removed from the device when signals were deteceted to differentiate between ambient and device signals. No signals were deteceted at the OATS that were not ambient signals.

The highest frequency oscillator is < 5MHz. The scan was performed between 30MHz and 1GHz.

Test 3: FCC Part 15.35(b) / RSS-210 sec. 6.5
Pulsed Operation

Signatures		
The data presented in this section was collected either by me or under my direct supervision.		
N/A	N/A	N/A
Test Date(s)	Temperature	Humidity
Drew Rosenberg	Regulatory Engineer	
Name	Title	

Calculate the maximum duty cycle relaxation allowed for harmonic measurements.

Notes:
This device only uses SCM messages, which can allow for the full 20dB of relaxation. See Appendix C of PRT-0047-001 (attached) for details.

Test 4: FCC Part 15.249(a) / RSS-210 sec. 6.2(m2)(1)
Transmitter Fundamental and Harmonic Emissions

Signatures		
The data presented in this section was collected either by me or under my direct supervision.		
7/15-16/2004	80F, 78F	47%, 71%
Test Date(s)	Temperature	Humidity
Mark Kvamme	Senior Technician	
Name	Title	

Measure the field strength of the transmitter fundamental and harmonic emissions according to the procedure in PRT-0047-001. The maximum field strength of emissions may not exceed:

Fundamental	Harmonics
50,000 uV/m	500 uV/m

For harmonics, adjust for the proper duty cycle correction of up to 20dB above the limit in accordance with the results from test 3.

Equipment Used	Model Number	Asset Number	Serial Number	Calibration Due Date
Spectrum Analyzer	Agilent E4408B	2064147	US40240538	3/7/2005
Roberts Dipole (Fundamental)	EMCO R007990	6294	3038	09/08/2005
Double Ridged Waveguide Antenna (Harmonics)	EMCO 3115	16256	9205-3878	4/13/2006
Power Meter	HP 437B	01872024	3125U11553	10/14/2004
Power Sensor	HP 8481D	01872025	3318A08626	11/4/2004
Signal Generator	HP 8673D	00012392	3123A01161	10/15/2004

Frequency (MHz)	Polarity (H/V)	Analyzer Input (dBm)	Analyzer Reading (dBuV)	ACF (dB)	Cable Loss (dB)	Field Strength (dBuV/m)	Duty Cycle relaxation (dB)	Limit (dBuV/m)	Margin (dB)
915	V	-43.33	63.67	28.10	1.64	93.41	-	94	0.59
1830	H	-69.24	37.76	26.30	2.44	66.50	20	74	7.50
2745	H	-80.45	26.55	29.35	2.54	58.44	20	74	15.56
3660	V	-84.45	22.55	33.01	3.21	58.77	20	74	15.23
4575	V	-78.96	28.04	32.30	3.47	63.81	20	74	10.19
5490		-98.20	8.80	34.11	3.74	46.65	20	74	27.35
6405		-98.20	8.80	34.57	3.79	47.16	20	74	26.84
7320		-96.60	10.40	35.90	4.59	50.89	20	74	23.11
8235		-95.50	11.50	36.95	4.69	53.14	20	74	20.86
9150		-95.30	11.70	37.80	4.82	54.32	20	74	19.68

Notes:
All measurements were peak measurements. The analyzer input was measured as the power level going into the preamp. Harmoncs above the 5th harmonic were below the noise floor of the analyzer.

Test 5: FCC Part 15.31(m) – Relative Field Intensities at high and low frequencies

Signatures		
The data presented in this section was collected either by me or under my direct supervision.		
7/29/2004	83F	40%
Test Date(s)	Temperature	Humidity
Drew Rosenberg	Regulatory Engineer	
Name	Title	

Use the max hold feature of the analyzer to capture the full bandwidth of transmissions. Place markers near the highest and lowest transmission frequencies to demonstrate the relative field strengths of each.

Equipment Used	Model Number	Asset Number	Serial Number	Calibration Due Date
Spectrum Analyzer	Agilent E4408B	2064147	US40240538	3/7/2005
Roberts Dipole (Fundamental)	EMCO R007990	6294	3038	09/08/2005

Notes:
See appendix B - relative transmission levels across transmission bandwidth for test results.