

Technical Information

Name:	Applicant Magnetek	Name:	Manufacturer Magnetek
Address:	N49 W13650 Campbell Drive	Address:	N49 W13650 Campbell Drive
City, State, Zip:	Menomonee Falls, WI 53051	City, State, Zip:	Menomonee Falls, WI 53051
Date of Report:	December 5, 2009		

Test Specifications:

FCC Rules and Regulations Part 15, Subpart B, Para. 15.107(a) and 15.109(a)

Radio Standards Specification, RSS-210, Issue 7, June, 2007 and RSS-GEN, Issue 2, June 2007

Test Procedure: ANSI C63.4:2003

Test Sample Description

TEST SAMPLE: 450 - 470 MHz Receiver

BRANDNAME: Enrange

MODEL(s): Telerange

FCC ID: TNE-450LMA1

IC ID: 6145A-450LMA1

TYPE: Superheterodyne RF Receiver Module

POWER REQUIREMENTS: 5 VDC derived from Host

FREQUENCY OF OPERATION: 450 - 470 MHz

CONFIGURATION: The RF Receiver Module was tested in a test bed which provided DC input voltages and an RF antenna connector.

Tests Performed

The test methods performed on the 450 to 470 MHz Band RF Receiver Module are shown below:

Testing Dates	FCC Part 15, Subpart B	Industry Canada RSS-210, Issue 7, June 2007	Industry Canada RSS-GEN Issue 2, June 2008	Test Method
December 3, 2009	15.107(a)	N/A	7.2.2	Conducted Emissions, Power Leads, 150 kHz to 30 MHz
December 2, 2009	15.109(a)	2.6	7.2.3	Receiver Radiated Emissions, 30 MHz to 2 GHz

Requirements and Test Results

Requirement:

FCC Section 15.107(a) - Conducted Limits

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back only the AC power line on any frequency or frequencies with the band 150 kHz to 30 MHz shall not exceed the limits shown in Table 1, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of the paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

IC RSS-GEN, Section 7.2.2 -

Transmitter and Receiver AC Power Lines Conducted Emissions Limits

The purpose of this test is to measure unwanted radio frequency currents induced in any AC conductor external to the equipment which could conduct interference to other equipment via the AC electrical network.

Except when the requirements applicable to a given device state otherwise, for any license-exempt radio communication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in Table 1. The tighter limit applies at the frequency range boundaries.

The conducted emissions shall be measured with a 50 ohm/50 microhenry line impedance stabilization network.

Table 1 - Conducted Emission Limits

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50
*Decreases due to logarithm of the frequency		

- Results:
The conducted emissions observed did not exceed the limits specified in Table 1.

FCC Section 15.109(a) - Receiver Radiated Emissions

Except for Class A digital devices, the field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the values shown in Table 2.

IC RSS-GEN, 7.2.3 - Receiver Spurious Emission Limits

Receiver spurious emissions at any discrete frequency shall not exceed 2 nanowatts in the band 30-1000 MHz, or 5 nanowatts above 1 GHz. All spurious emissions shall comply with the limits specified in Table 2.

Table 2 - Radiated Emission Limits

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 to 88	100	3
88 to 216	150	3
216 to 960	200	3
Above 960	500	3

- Results:
The field strength of radiated emissions did not exceed the limits specified in Table 2.

General Notes

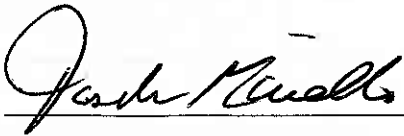
1. All readings were taken utilizing a quasi-peak detector and peak detector function at a test distance of 3 meters.
2. All measurements were made with the device powered an input of 120 VAC, 60 Hz.
3. The frequency range was scanned from 30 MHz to 2 GHz. All emissions not reported were more than 20 dB below the specified limit.

Modifications

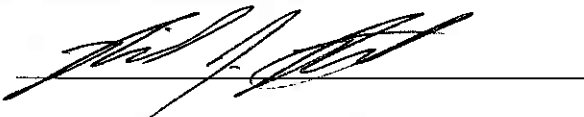
No Modifications were made during the course of this testing program in order to demonstrate compliance with the specified requirements.

Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.



Joseph Maiello
Branch Manager



Richard J. Reitz
Corporate Laboratory Manager
iNARTE Certified Engineer ATL-0036-E
NVLAP Approved Signatory

Non-Warranty Provision

The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

Non-Endorsement

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

Equipment List

Conducted Emissions, Power Leads, 150 kHz to 30 MHz

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
8079	EMI Test Receiver	Rohde & Schwarz	0.9-30 MHz	ESH3	6/2/2009	6/2/2010
8194	LISN	Solar Electronics	10 kHz - 30 MHz	8028-50-TS-24-B	11/17/2007	5/17/2010
8195	LISN	Solar Electronics	10 kHz - 30 MHz	8028-50-TS-24-B	11/17/2007	5/17/2010
8355	10.0 dB Attenuator	Narda	DC - 11 GHz, 20 W	768-10	9/23/2009	9/23/2010
8366A	Cable 20' BNC	Retlif	10 kHz - 1 GHz	n/a	11/5/2009	11/5/2010

Radiated Emissions, 30 MHz to 2 GHz

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
8071	Spectrum Analyzer	Hewlett Packard	100Hz-2.5 GHz/2-22GH	8566B	8/17/2009	8/17/2010
8072	Spectrum Analyzer Display	Hewlett Packard		85662A	8/17/2009	8/17/2010
8080	Receiver	Rohde & Schwarz	20-1300 MHz	ESVP	5/20/2009	5/20/2010
8300	OATS Site NSA	RSI	3/10 Meter Site		9/1/2009	9/1/2010
8300B	OATS Cable				10/12/2009	10/12/2010
8411	Preamplifier	Sonoma Instrument	9 kHz - 1 GHz	310N	9/30/2009	9/30/2010
8433	Biconilog	ETS Lindgren	20 - 6000 MHz	3142D	9/21/2009	9/21/2010

**Conducted Emissions, Power Leads, 150 kHz to 30 MHz
FCC Part 15, Subpart B, Section 15.107(a)
RSS-GEN, Paragraph 7.2.2
Test Data**

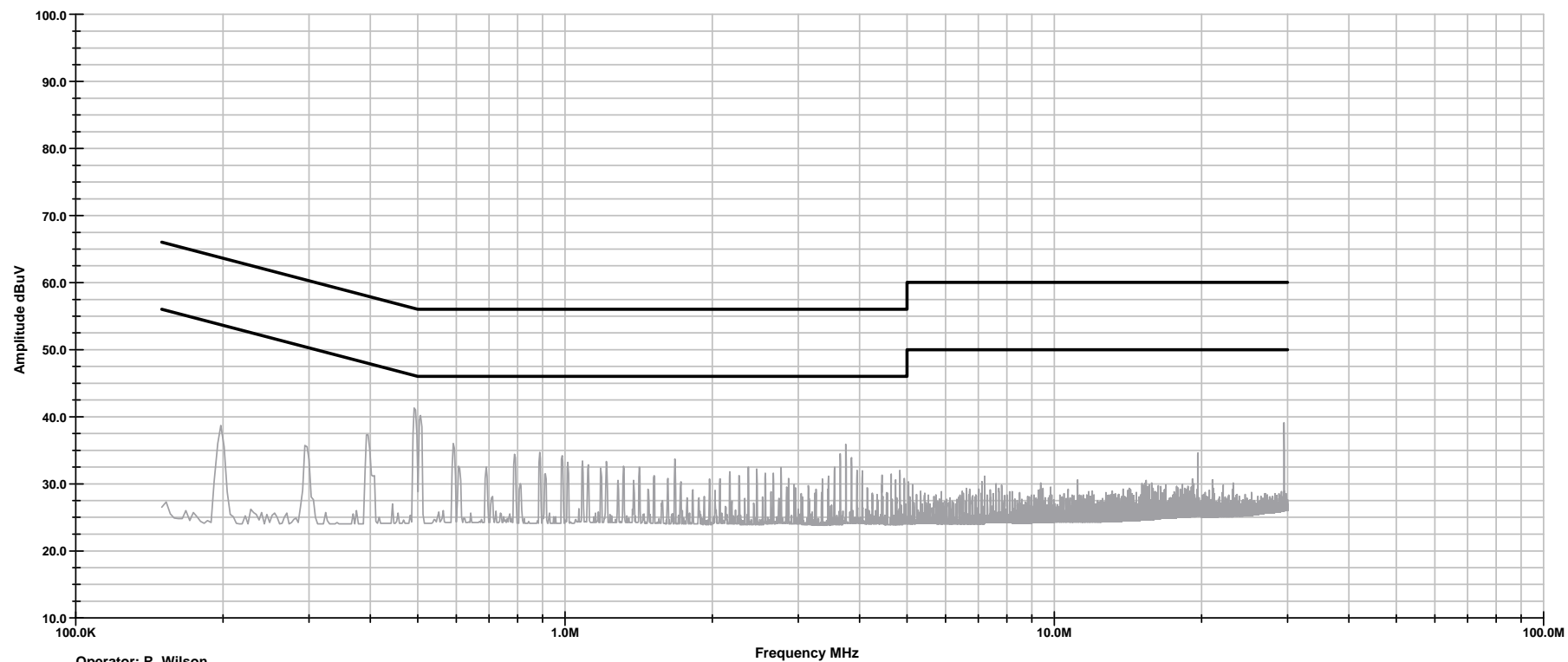
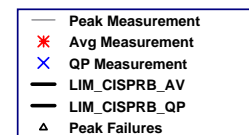
December 3, 2009

Customer: Magnetek
Test Sample: 450 to 470 MHz RF Receiver Module
Model Number: 00282164/V1.1
Test Specification: FCC 15.107(a) Conducted Emissions and RSS-GEN Para. 7.2.2
Mode of Operation: Powered on Receive Mode CH.A 450.300 MHz
Lead Tested: 120 VAC, 60 Hz, Hot
Job #: R-1452P-1

Retlif Testing Laboratories

Conducted Emissions

Class B 150kHz-30MHz Graph



Operator: R. Wilson

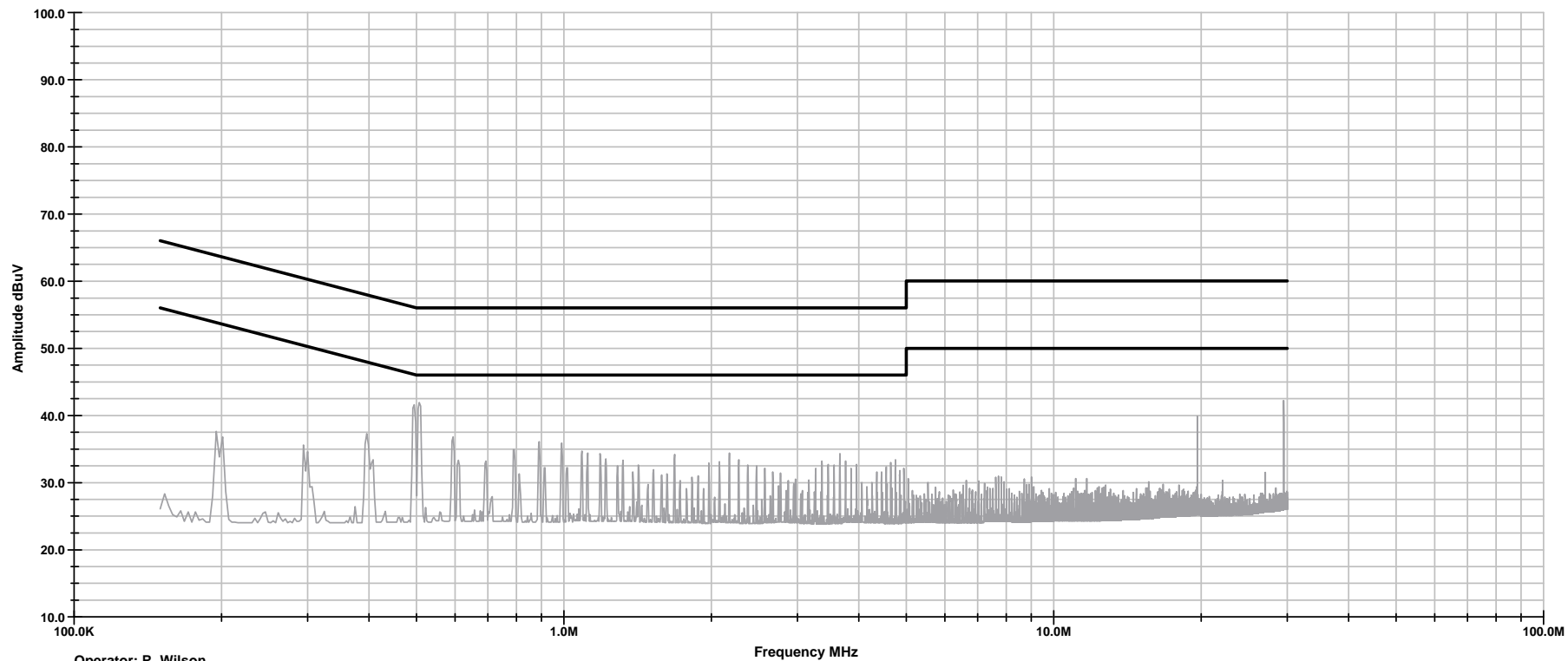
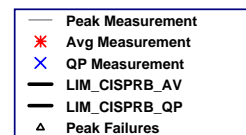
10:08:10 AM, Thursday, December 03, 2009

Customer: Magnetek
Test Sample: 450 to 470 MHz RF Receiver Module
Model Number: 00282164/V1.1
Test Specification: FCC 15.107(a) Conducted Emissions and RSS-GEN Para. 7.2.2
Mode of Operation: Powered on Receive Mode CH.A 450.300 MHz
Lead Tested: 120 VAC, 60 Hz, Neutral
Job #: R-1452P-1

Retlif Testing Laboratories

Conducted Emissions

Class B 150kHz-30MHz Graph



Operator: R. Wilson

10:41:26 AM, Thursday, December 03, 2009

**Spurious Radiated Emissions, 30 MHz to 2 GHz
FCC Part 15, Subpart B, Section 15.209(a)
RSS-210, Section 2.6 and RSS-GEN, Section 7.2.3
Test Data**

December 2, 2009

Test Method:		FCC Part 15, Subpart B, Class B, Radiated Emissions, 30 MHz to 2 GHz, Para:15.109(a) Industry Canada, RSS-210, Section 2.6 and RSS-GEN, Section 7.2.3					
Customer:		Magnetek			Job No.:		R-1452P-1
Test Sample:		450 to 470 MHz RF Receiver Module					
Part Number.		00282164			Serial No.:		V 1.1
Operating Mode:		Powered on in Receive mode CH. A at 450.300MHz					
Technician:		R. Wilson			Date:		12-2-09
Notes:		Test Distance: 3 Meters Detector: Quasi-Peak Below 1 GHz, Peak above 1 GHz				Temp:10 °C RH: 49%	
Frequency	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
39.360	V / 1.0	155.0	17.1	13.5	30.6	34.0	
39.360	H / 4.0	202.0	9.3	13.5	22.8	14.0	
58.980	V / 1.0	296.0	23.0	7.6	30.6	34.0	
59.980	H / 4.0	124.0	17.3	7.6	24.9	17.6	
78.660	V / 1.0	71.0	19.2	8.7	27.9	24.8	
78.660	H / 2.3	185.0	22.8	8.7	31.5	37.6	
88.00							100
88.00							150
216							150
216							200
255.600	V / 3.0	160.0	14.7	14.5	29.2	29.0	
255.600	H / 1.1	35.0	10.8	14.5	25.3	18.4	
275.280	V / 1.4	266.0	12.4	14.4	26.8	22.0	
275.280	H / 1.5	180.0	13.2	14.4	27.6	24.0	
294.960	V / 1.0	150.0	8.9	15.3	24.2	16.2	
294.960	H / 1.5	0.0	13.6	15.3	28.9	28.0	
450.6072	V / 1.0	180.0	-1.6	19.5	17.9	7.9	
450.6072	H / 1.0	180.0	-1.6	19.5	17.9	7.9	
960.00							200
960.00							500
2000.0							500
The frequency range was scanned from 30 MHz to 2 GHz.							
The emissions observed from the EUT do not exceed the specified limits.							
Emissions not recorded were more than 20dB under the specified limit.							

Test Method:	FCC Part 15, Subpart B, Class B, Radiated Emissions, 30 MHz to 2 GHz, Para:15.109(a) Industry Canada, RSS-210, Section 2.6 and RSS-GEN, Section 7.2.3						
Customer:	Magnetek				Job No.:	R-1452P-1	
Test Sample:	450 to 470MHz RF Receiver Module						
Part Number:	00282164				Serial No.:	V 1.1	
Operating Mode:	Powered on in Receive mode CH. B at 460.000MHz						
Technician:	R. Wilson				Date:	12-2-09	
Notes:	Test Distance: 3 Meters Detector: Quasi-Peak Below 1 GHz, Peak above 1 GHz Temp:10 °C RH: 49%						
Frequency	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
39.360	V / 1.0	169.0	17.0	13.5	30.5	33.5	
39.360	H / 4.0	190.0	9.7	13.5	23.2	14.5	
58.980	V / 1.0	291.0	23.0	7.6	30.6	34.0	
59.980	H / 4.0	123.0	16.6	7.6	24.2	16.2	
78.660	V / 1.0	57.0	19.3	8.7	28.0	25.1	
78.660	H / 2.3	171.0	22.1	8.7	30.8	35.0	
88.00							100
88.00							150
216							150
216							200
255.600	V / 2.9	166.0	14.7	14.5	29.2	29.0	
255.600	H / 1.2	45.0	11.1	14.5	25.6	19.1	
275.280	V / 1.6	268.0	12.2	14.4	26.6	21.4	
275.280	H / 1.4	175.0	13.3	14.4	27.7	24.3	
294.960	V / 1.0	151.0	9.4	15.3	24.7	17.2	
294.960	H / 1.4	0.0	13.6	15.3	28.9	28.0	
460.3072	V / 1.0	182.0	-1.6	19.9	18.3	8.2	
460.3072	H / 1.0	182.0	-1.6	19.9	18.3	8.2	
960.00							200
960.00							500
2000.0							500
The frequency range was scanned from 30 MHz to 2 GHz.							
The emissions observed from the EUT do not exceed the specified limits.							
Emissions not recorded were more than 20dB under the specified limit.							

Test Method:	FCC Part 15, Subpart B, Class B, Radiated Emissions, 30 MHz to 2 GHz, Para:15.109(a) Industry Canada, RSS-210, Section 2.6 and RSS-GEN, Section 7.2.3						
Customer:	Magnetek			Job No.:	R-1452P-1		
Test Sample:	450 to 470MHz RF Receiver Module						
Part Number.	00282164			Serial No.:	V 1.1		
Operating Mode:	Powered on in Receive mode CH. C at 469.700MHZ						
Technician:	R. Wilson			Date:	12-2-09		
Notes:	Test Distance: 3 Meters Detector: Quasi-Peak Below 1 GHz, Peak above 1 GHz			Temp:10 °C		RH: 49%	
Frequency	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
39.360	V / 1.0	162.0	16.2	13.5	29.7	30.5	
39.360	H / 4.0	210.0	7.4	13.5	20.9	11.1	
58.980	V / 1.0	292.0	23.3	7.6	30.9	35.1	
59.980	H / 4.0	126.0	16.4	7.9	24.0	16.0	
78.660	V / 1.0	58.0	19.7	8.7	28.4	26.3	
78.660	H / 2.6	183.0	23.3	8.7	32.0	40.0	
88.00							100
88.00							150
216							150
216							200
255.600	V / 3.0	178.0	14.8	14.5	29.3	29.2	
255.600	H / 1.2	45.0	11.0	14.5	25.5	19.0	
275.280	V / 1.4	271.0	12.5	14.4	26.9	22.1	
275.280	H / 1.9	180.0	13.2	14.4	27.6	24.0	
294.960	V / 1.0	144.0	9.7	15.3	25.0	17.8	
294.960	H / 1.5	0.0	13.7	15.3	29.0	28.2	
470.0072	V / 1.0	179.0	-2.1	20.1	18.0	8.0	
470.0072	H / 1.0	179.0	-2.1	20.1	18.0	8.0	
960.00							200
960.00							500
2000.0							500
The frequency range was scanned from 30 MHz to 2 GHz.							
The emissions observed from the EUT do not exceed the specified limits.							
Emissions not recorded were more than 20dB under the specified limit.							