Nemko Test Report: 10219960RUS1

Applicant: Applied Concepts, Inc.
2609 Technology Drive
Plano, TX 75074
USA

Equipment Under Test: (E.U.T.) Stationary Speed Sensor II

FCC Identifier: IBQACMI007

In Accordance With: **FCC Part 15, Subpart C, 15.245**
Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, and 24075-24175 MHz

Tested By: Nemko USA, Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

TESTED BY: _____ **DATE:** **13 February 2012**
David Light, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** **20 February 2012**
Michael Cantwell

Number of Pages: 19

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Section 1. Summary of Test Results

Manufacturer: Applied Concepts, Inc.

Model No.: Stationary Speed Sensor II

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.245 for Field Disturbance Sensors operating within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, and 24075-24175 MHz.. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

☒	New Submission	☒	Production Unit
☐	Class II Permissive Change	☐	Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP Lab Code 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a)	Complies
Radiated Field Strength	15.245(b)	Complies

Footnotes:

Section 2. Equipment Under Test (E.U.T.)

General Equipment Information

Frequency Band (MHz): 24075 to 24175

Operating Frequency of Test Sample: 24125 MHz

Channel Spacing: NA

User Frequency Adjustment: Software controlled

Description of EUT

The Stationary Speed Sensor II utilizes digital signal processing to enable target direction sensing and can also include an optional statistical data collection package. This package will collect traffic profiles such as traffic volume, average speeds, peak speeds, hourly and daily trends, and vehicle size classifications

Section 3. Radiated Field Strength

NAME OF TEST: Radiated Field Strength	PARA. NO.: 15.245(b)
TESTED BY: David Light	DATE: 13 February 2012

Test Results: Complies.

Measurement Data: See attached data below.

Test Conditions: 57 %RH
21 °C

Measurement Uncertainty: +/-3.7 dB

Test Equipment Used: 1464-1082-993-1016-1025-1480-989-984-986-985-990-987-991-992

Test Data – Radiated Field Strength

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment	
24125	H	0	74.8	40.4	3.4	0.0	118.6	137.5	-18.9	Pass	Carrier	1 m
24125	V	0	48.8	40.4	3.4	0.0	92.6	137.5	-44.9	Pass	Carrier	1m
48.25	H	0	28	40.5	0.0	0.0	68.5	101.0	-32.5	Pass	Noise Floor	20 cm
48.25	V	0	28	40.5	0.0	0.0	68.5	101.0	-32.5	Pass	Noise Floor	20 cm
72375	H	0	40	43.7	0.0	0.0	83.7	101.0	-17.3	Pass	Noise Floor	20 cm
72375	V	0	40	43.7	0.0	0.0	83.7	101.0	-17.3	Pass	Noise Floor	20 cm
96500	H	0	43.3	46.4	0.0	0.0	89.7	101.0	-11.3	Pass	Noise Floor	20 cm
96500	V	0	43.3	46.4	0.0	0.0	89.7	101.0	-11.3	Pass	Noise Floor	20 cm

The carrier measurement was made at 1 meter distance.

Harmonic emissions were measured at 20 cm.

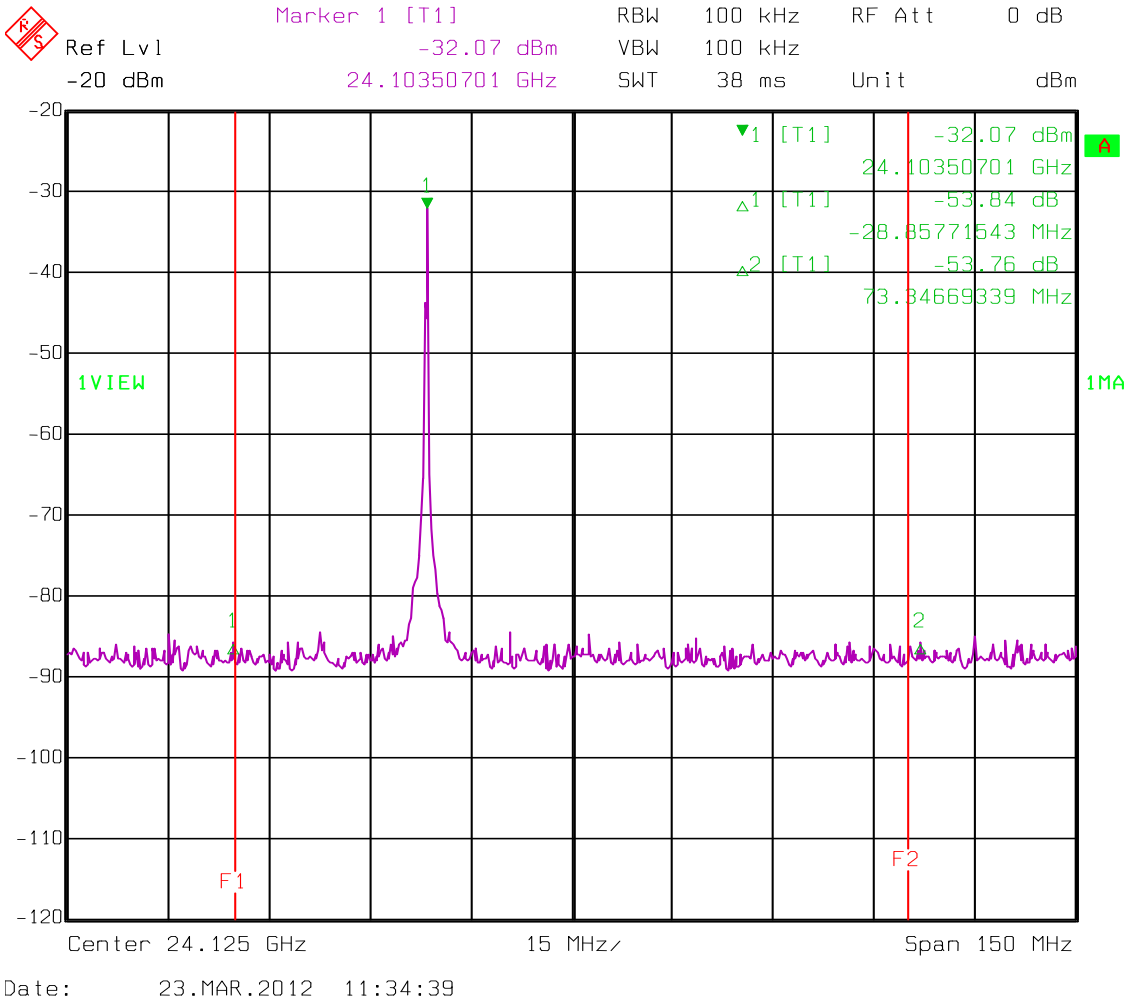
The spectrum was searched from 30 MHz to 100 GHz.

Input voltage was varied from 8.5 to 55.2 Vdc with no variance in output field strength.

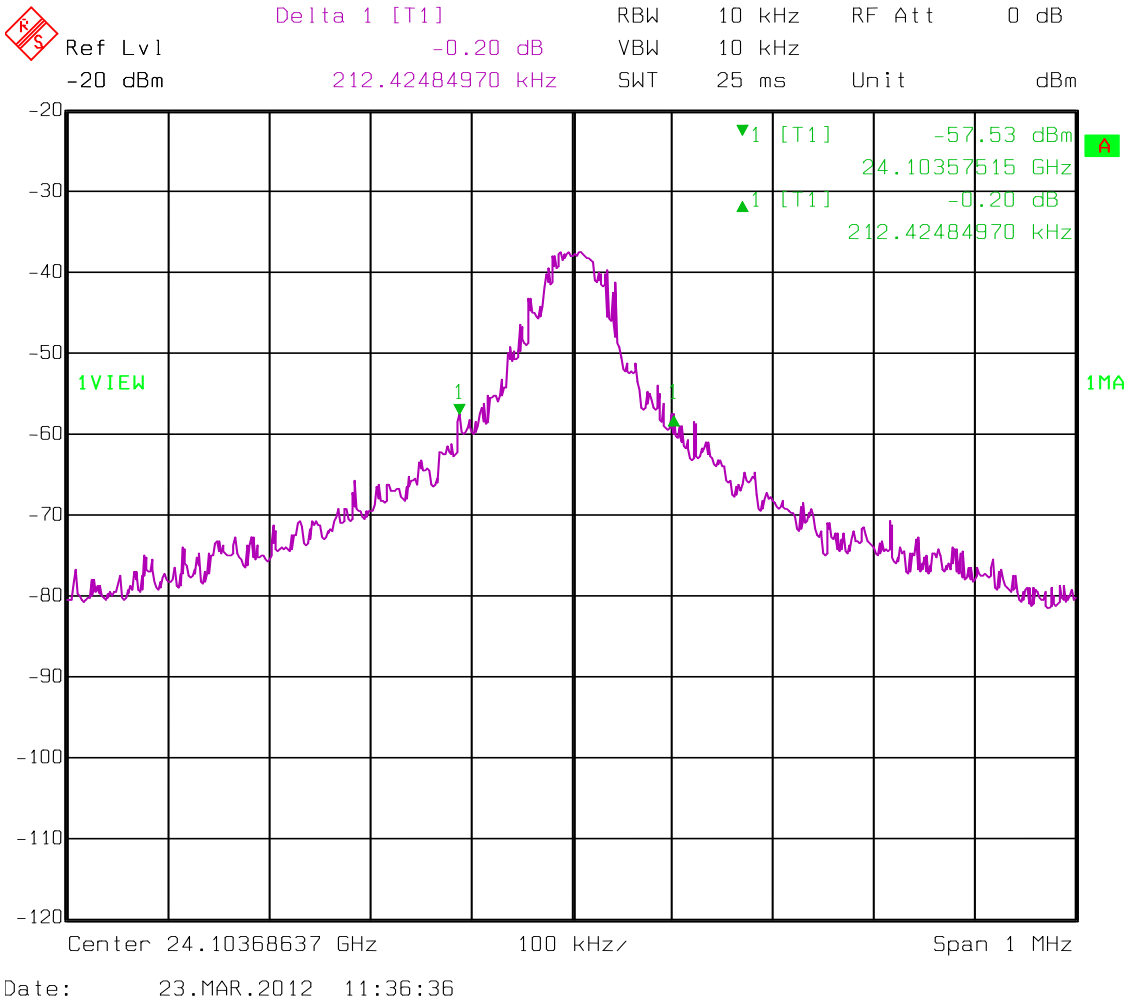
RBW/VBW = 1 MHz

Detector = Peak

Test Data – Band Edges



Test Data – Bandwidth



Section 4. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)
TESTED BY: David Light	DATE: 13 February 2012

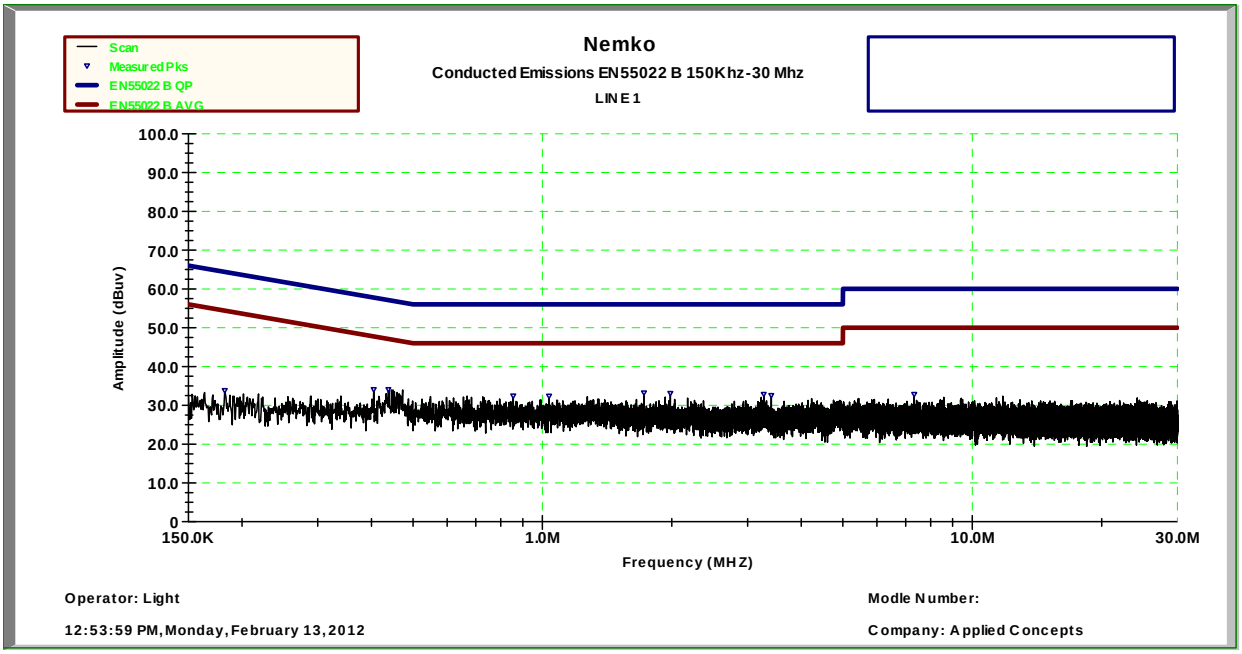
Test Results: Complies.

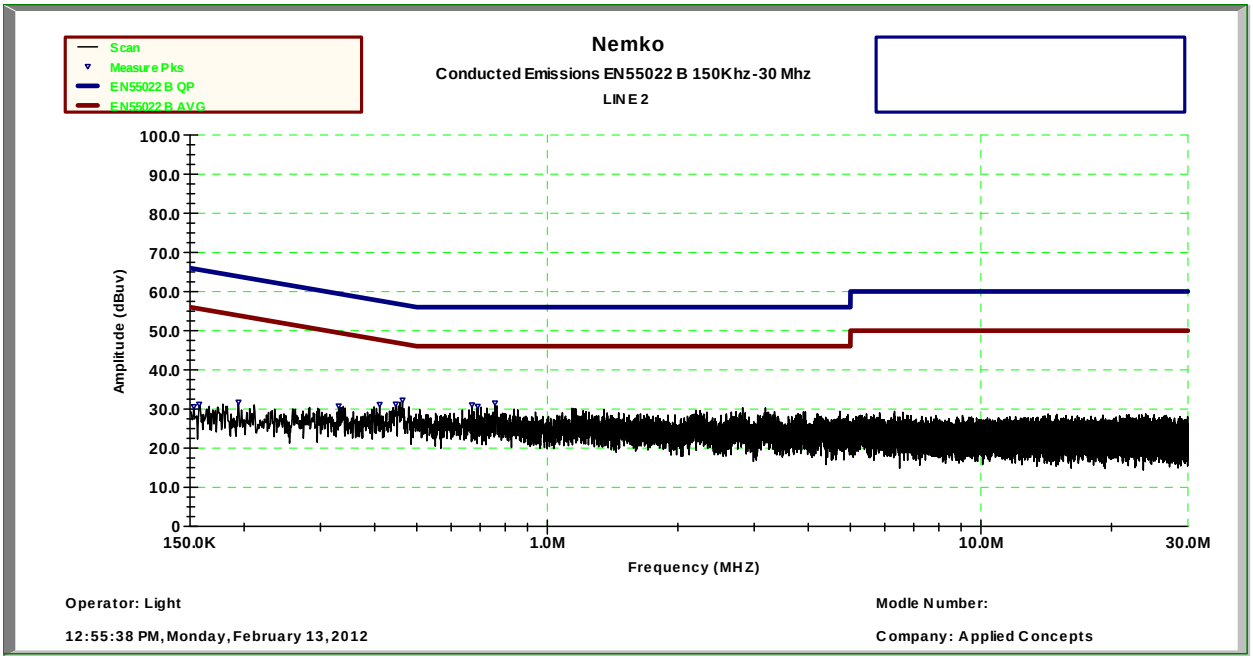
Measurement Data: See attached plots.

Measurement Uncertainty: +/- 1.7 dB

Test Equipment Used: 1188-1555-1080-1663

Test Data – Powerline Conducted Emissions





RBW = 10 kHz VBW = 30 kHz

Test Data – Powerline Conducted Emissions

Operator: Light Model Number: Stationary Speed Sensor II
Company: Applied Concepts

Line 1

Frequency (MHz)	Peaks (dBµV)	Avg Limit (dBµV)	QP Limit (dBµV)	Avg Margin (dBµV)	QP Margin (dBµV)
0.182	33.8	55.1	65.1	21.3	31.3
0.405	34.1	48.7	58.7	14.6	24.6
0.438	34.1	47.8	57.8	13.7	23.7
0.855	32.4	46.0	56.0	13.6	23.6
1.036	32.4	46.0	56.0	13.6	23.6
1.721	33.2	46.0	56.0	12.8	22.8
1.984	33.1	46.0	56.0	12.9	22.9
3.272	32.9	46.0	56.0	13.1	23.1
3.407	32.6	46.0	56.0	13.4	23.4
7.324	32.8	50.0	60.0	17.2	27.2

Line 2

Frequency (MHz)	Peaks (dBµV)	Avg Limit (dBµV)	QP Limit (dBµV)	Avg Margin (dBµV)	QP Margin (dBµV)
0.153	30.6	55.9	65.9	25.3	35.3
0.157	31.2	55.8	65.8	24.6	34.6
0.194	31.7	54.7	64.7	23.0	33.0
0.330	30.8	50.8	60.8	20.1	30.1
0.411	31.2	48.6	58.6	17.4	27.4
0.447	31.3	47.5	57.5	16.3	26.3
0.463	32.3	47.0	57.0	14.8	24.8
0.671	31.1	46.0	56.0	14.9	24.9
0.691	30.7	46.0	56.0	15.3	25.3
0.758	31.6	46.0	56.0	14.4	24.4

Power supply used is generic supply.
GlobTek Inc. p/n WR9QE2080LCP-N Model GT-41060-2512

Section 5. Test Equipment List

Asset Tag	Description	Manufacturer	Model	Serial #
984	Antenna, Horn	Millitech	SGH-19	None
985	Antenna, Horn	Millitech	SGH-15	None
986	Harmonic Mixer	Hewlett Packard	11970V	2521A01222
987	Harmonic Mixer	Hewlett Packard	5356D	2521A00583
989	Harmonic Mixer	Hewlett Packard	11970U	2332A00116
990	Antenna, Horn	Millitech	SGH-10	None
991	Antenna, Horn	EMCO	3160-10	9704-1049
992	Antenna, Horn	EMCO	3160-09	9705-1079
993	Antenna, Horn	A.H. Systems	SAS-200/571	162
1016	Preamplifier	Hewlett Packard	8449A	2749A00159
1025	Preamplifier, 25dB	Nemko USA, Inc.	LNA25	399
1080	Cable, 3m	Nemko USA, Inc.	RG223	None
1082	Cable, 2m	Astrolab	32027-2-29094-72TC	None
1188	LISN	EMCO	3825/2	1214
1464	Spectrum Analyzer	Hewlett Packard	8563E	3551A04428
1480	Antenna, Bilog	Schaffner-Chase	CBL6111C	2572
1555	High Pass Filter	Solar Electronics	7930-5.0	933125
1663	Spectrum Analyzer	Rohde & Schwartz	FSP3	100073

ANNEX A - TEST DETAILS

NAME OF TEST: Powerline Conducted Emissions PARA. NO.: 15.207(a)

Minimum Standard: §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this 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 boundary between the frequency ranges.

Frequency of Conducted Emission (MHz)	Limit (dBmV) Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 mV within the frequency band 535-1705 kHz, as measured using a 50 mH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as provided in §15.205 and §§15.209, 15.221, 15.223, 15.225 or 15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

NAME OF TEST: Field Strength PARA. NO.: 15.245

(a) Operation under the provisions of this section is limited to intentional radiators used as field disturbance sensors, excluding perimeter protection systems.

(b) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Freq. (MHz)	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (millivolts/meter)
902.928	500	1.6
2435-2465	500	1.6
5785-5815	500	1.6
10500-10550	2500	25.0
24075-24175	2500	25.0

(1) Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in §15.205, shall not exceed the field strength limits shown in §15.209. Harmonic emissions in the restricted bands at and above 17.7 GHz shall not exceed the following field strength limits:

(i) For the second and third harmonics of field disturbance sensors operating in the 24075–24175 MHz band and for other field disturbance sensors designed for use only within a building or to open building doors, 25.0 mV/m.

(ii) For all other field disturbance sensors, 7.5 mV/m.

(iii) Field disturbance sensors designed to be used in motor vehicles or aircraft must include features to prevent continuous operation unless their emissions in the restricted bands, other than the second and third harmonics from devices operating in the 24075–24175 MHz band, fully comply with the limits given in §15.209. Continuous operation of field disturbance sensors designed to be used in farm equipment, vehicles such as fork lifts that are intended primarily for use indoors or for very specialized operations, or railroad locomotives, railroad cars and other equipment which travels on fixed tracks is permitted. A field disturbance sensor will be considered not to be operating in a continuous mode if its operation is limited to specific activities of limited duration (e.g., putting a vehicle into reverse gear, activating a turn signal, etc.).

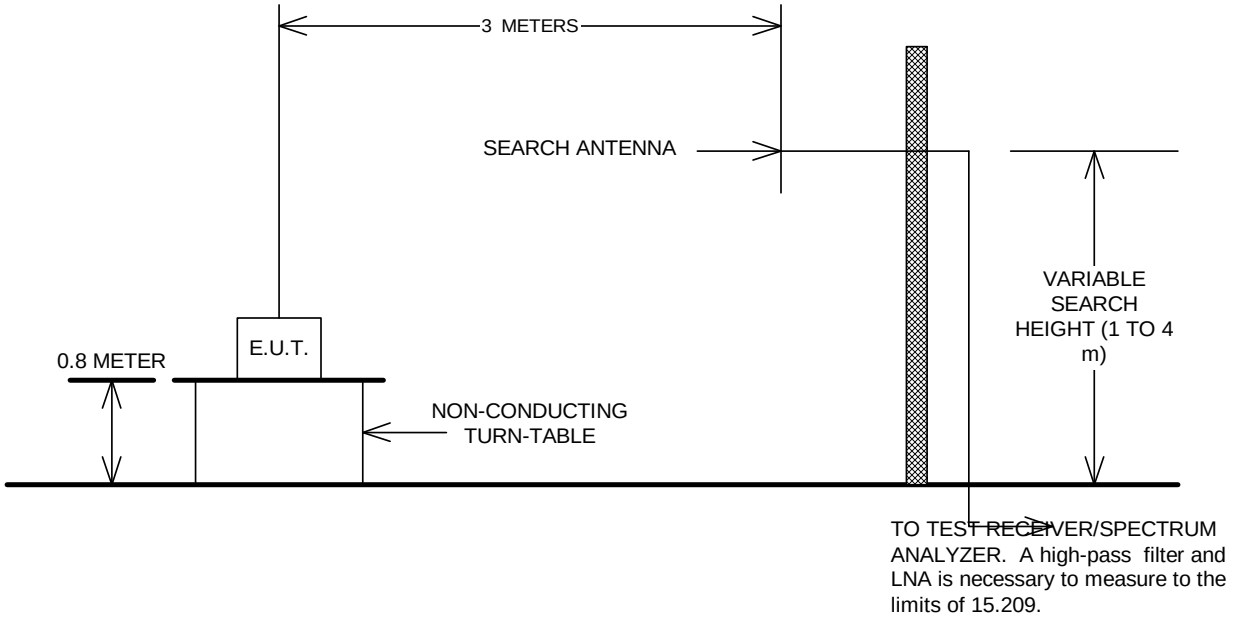
(2) Field strength limits are specified at a distance of 3 meters.

(3) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

(4) The emission limits shown above are based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

ANNEX B - TEST DIAGRAMS

Test Site For Radiated Emissions



Conducted Emissions