

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

UN-INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART B REQUIREMENT

OF

Product Name: GPS Compass – GuideMate
Brand Name: NolaN, PMR
Model Name: NGPSCPXXX (X= 0~9 or A~Z)
FCC ID: TNZNGPSCPXXX
Model Difference: Different model name depend on different traders.
Report No: ER/2008/70040
Issue Date: Aug. 06, 2008
FCC Rule Part: Part 15 B
Prepared for: Nolan Systems Inc.
1595 Cleo Springs Dr., San Jose, CA 95131, USA
Prepared by: SGS Taiwan Ltd.
Electronics & Communication Laboratory
No. 134, Wu Kung Rd., Wuku Industrial Zone,
Taipei County, Taiwan.



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VERIFICATION OF COMPLIANCE

Applicant: Nolan Systems Inc.
1595 Cleo Springs Dr., San Jose, CA 95131, USA

Product Name: GPS Compass – GuideMate

Brand / Marketing Name: NolaN, PMR

FCC ID Number: TNZNGPSCPXXX

Model Name: NGPSCPXXX (X= 0~9 or A~Z)

Model Difference: Different model name depend on different traders.

File Number: ER/2008/70040

Date of test: Jul. 25, 2008 ~Aug. 05, 2008

Date of EUT Receive: Jul. 24, 2008

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15B.

The test results of this report relate only to the tested sample identified in this report.

Test By:

Sky Wang

Date

Aug. 06, 2008

Sky Wang / Asst. Supervisor

Prepared By:

Gigi yeh

Date

Aug. 06, 2008

Gigi Yeh / Clerk

Approved By

Vincent Su

Date

Aug. 06, 2008

Vincent Su / Manager

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Version

Version No.	Date	Description
00	Aug. 06, 2008	Initial creation of document

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Table of Contents

1.	GENERAL INFORMATION	5
1.2	RELATED SUBMITTAL(S) / GRANT (S)	6
1.3	TEST METHODOLOGY	6
1.4	TEST FACILITY	6
1.5	SPECIAL ACCESSORIES	6
1.6	EQUIPMENT MODIFICATIONS	6
2.	SYSTEM TEST CONFIGURATION	7
2.1	EUT CONFIGURATION	7
2.2	EUT EXERCISE	7
2.3	TEST PROCEDURE	7
2.4	LIMITATION	8
2.5	CONFIGURATION OF TESTED SYSTEM	9
3.	SUMMARY OF TEST RESULTS	10
4.	DESCRIPTION OF TEST MODES	10
5.	CONDUCTED EMISSIONS TEST	11
5.1	MEASUREMENT PROCEDURE:	11
5.2	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	11
5.3	MEASUREMENT EQUIPMENT USED:	12
5.4	MEASUREMENT RESULT : N/A	12
6.	RADIATED EMISSION TEST	13
6.1	MEASUREMENT PROCEDURE	15
6.2	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	15
6.3	MEASUREMENT EQUIPMENT USED:	16
6.4	FIELD STRENGTH CALCULATION	16
6.5	MEASUREMENT RESULT	17
	PHOTOGRAPHS OF SET UP	21
	PHOTOGRAPHS OF EUT	24
	LABELING REQUIREMENTS	32

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1. GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	GPS Compass – GuideMate
Brand Name:	NolaN, PMR
Model Name:	NGPSCPXXX (X= 0~9 or A~Z)
Model Difference:	Different model name depend on different traders.
Data Cable (USB):	One provided to a PC for data transfer, Model: N/A
Power Supply	DC 3V form AAA batteries *2
Hardware Version:	V1.0
Software Version:	V5.06

GPS:

Receiver Frequency	L1 Band, 1575.42MHz
Frequency Conversion oscillator	12MHz and 32.768kHz
Antenna Designation	mono pole

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1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: TNZNGPSCPXXX filing to comply with Section Part 15B of the FCC CFR 47 Rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

All equipment is calibrated externally and traceable to SI (International System of Unit).

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT was operated in the normal operating data transfer with PC through USB interface mode.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 7 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna. according to the requirements in Section 8 and Sub-clause 8.3.1.2 of ANSI C63.4-2003.

2.4 Limitation

(1) Conducted Emission

According to section 15.107(a) Conducted Emission Limits is as following.

Frequency range MHz	Class B Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note		
1.The lower limit shall apply at the transition frequencies		
2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

(2) Radiated Emission

According to section 15.109(a) Radiated Emission Class B Limits is as following:

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance (m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark: 1. Emission level in $\text{dB}\mu\text{V/m}=20 \log (\text{uV/m})$
 2. Measurement was performed at an antenna to the closed point of EUT distance of 3 meters.

2.5 Configuration of Tested System

Fig. 1 Configuration of Tested System

Radiated Emission

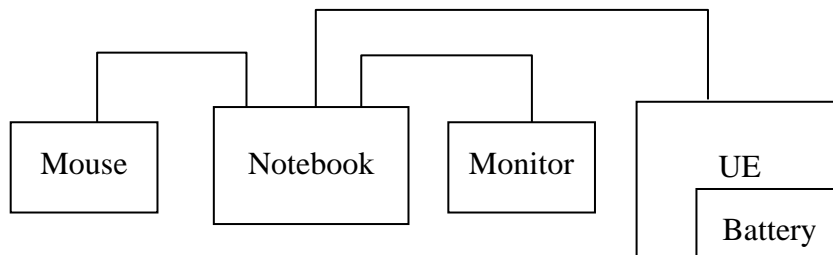


Table 1 Support Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Notebook PC	IBM	T60	L3DK794	Shielded	Un-shielded
2.	Monitor	DELL	E153FPC	N/A	Shielded,	Un-shielded
3.	USB Mouse	BENQ	M106-C2W	99Q3188C2W48C 04422SA0000	Shielded,	N/A

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

Summary of Test Results

FCC Rules	Description Of Test	Result
§15.107	Conducted Emission Class B	Compliant
§15.109	Radiated Emission Class B	Compliant

3. Description of test modes

Test program used to control the EUT for staying in continuous data transfer with PC mode was programmed

5.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMC Analyzer	HP	8594EM	3624A00203	09/02/2007	09/03/2008
EMI Test Receiver	R&S	ESCS30	828985/004	06/09/2008	06/10/2009
Transient Limiter	HP	11947A	3107A02062	09/02/2007	09/03/2008
LISN	Rolf-Heine	NNB-2/16Z	99012	12/31/2007	12/30/2008
LISN	Rolf-Heine	NNB-2/16Z	99013	01/10/2008	01/09/2009
Coaxial Cables	FCC	FCC-LISN-50/250-25 -2-01	04034	01/11/2008	01/10/2009

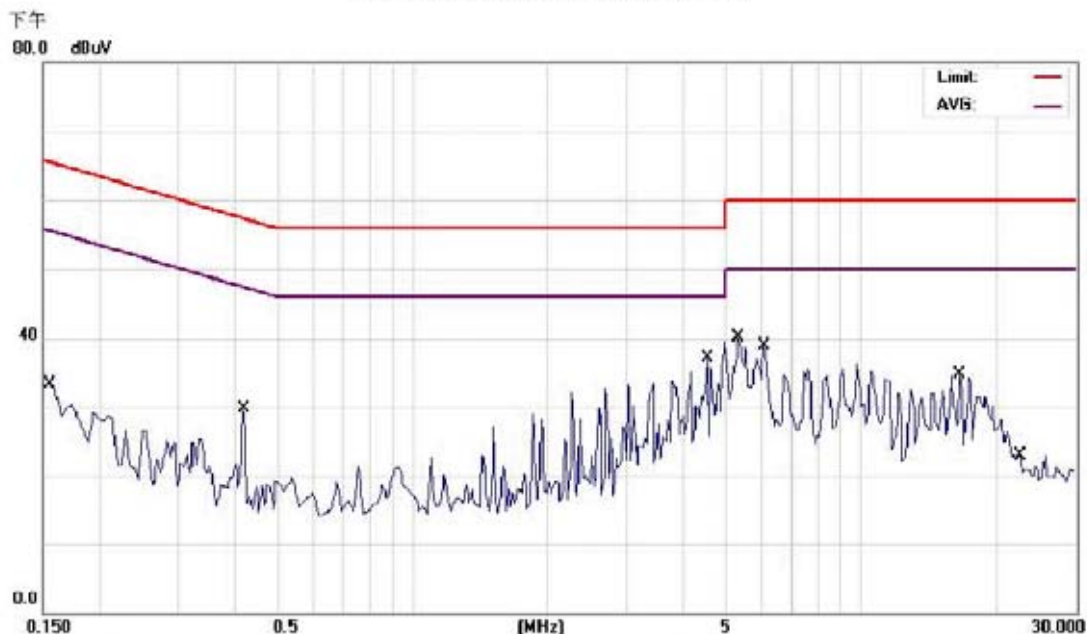
5.4 Measurement Result :

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	GPS+USB Data Link			Test Date:	Aug. 01, 2008
Temperature:	25 °C	Humidity:	62 %	Test By:	Sky

Conducted Emission Measurement



Site SGS CONDUCTED #1

Limit: CISPR22 Class B Conduction(QP)

EUT: GPS Compass - GuideMate

MN: NGPSCPXXX

Note: GPS + USB Data Link

Phase: L1

Power: AC 120V/60Hz

Distance:

Temperature: 25 °C

Humidity: 62 %

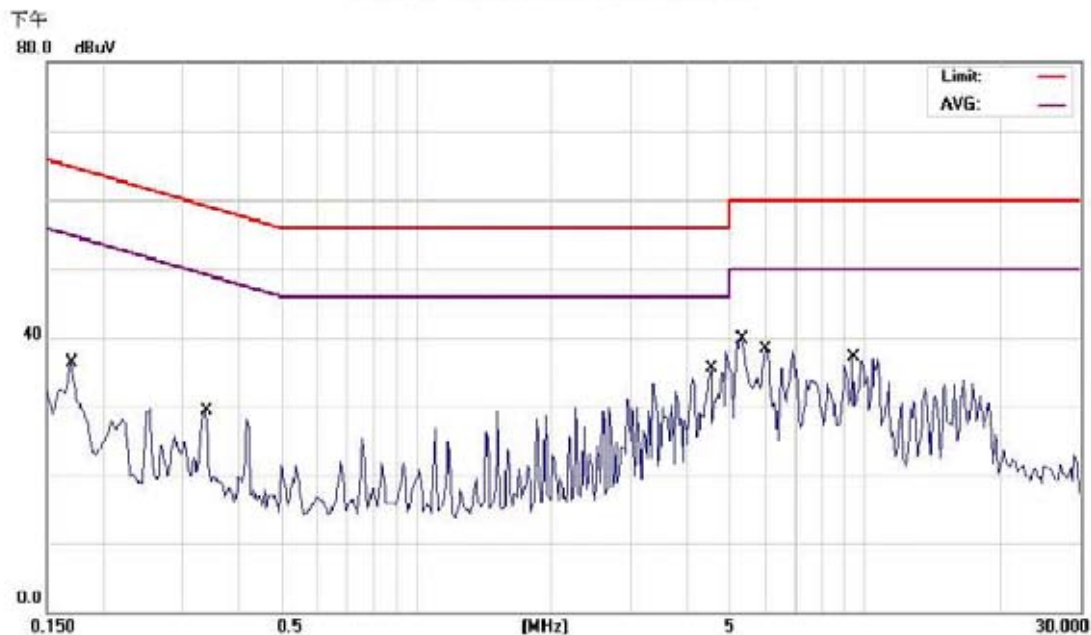
Air Pressure: hpa

No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1550	32.89	0.46	33.35	65.73	-32.38	QP	
2		0.4200	29.07	0.63	29.70	57.45	-27.75	QP	
3	*	4.5600	36.02	0.99	37.01	56.00	-18.99	QP	
4		5.3200	39.13	1.02	40.15	60.00	-19.85	QP	
5		6.0800	37.88	1.04	38.92	60.00	-21.08	QP	
6		16.6400	33.52	1.20	34.72	60.00	-25.28	QP	

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Conducted Emission Measurement



Site SGS CONDUCTED #1

Phase: **N**

Temperature: 25 °C

Limit: CISPR22 Class B Conduction(QP)

Power: AC 120V/60Hz

Humidity: 62 %

EUT: GPS Compass - GuideMate

Distance:

Air Pressure: hpa

MN: NGPSCPXXX

Note: GPS + USB Data Link

No. Mk.	Freq.	Reading Level	Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBμV	dB	dBμV	dBμV	dB		
1	0.1700	35.88	0.48	36.36	64.96	-28.60	QP	
2	0.3400	28.66	0.59	29.25	59.20	-29.95	QP	
3	4.5600	34.37	1.09	35.46	56.00	-20.54	QP	
4 *	5.3200	38.61	1.12	39.73	60.00	-20.27	QP	
5	6.0800	36.97	1.14	38.11	60.00	-21.89	QP	
6	9.4400	35.79	1.23	37.02	60.00	-22.98	QP	

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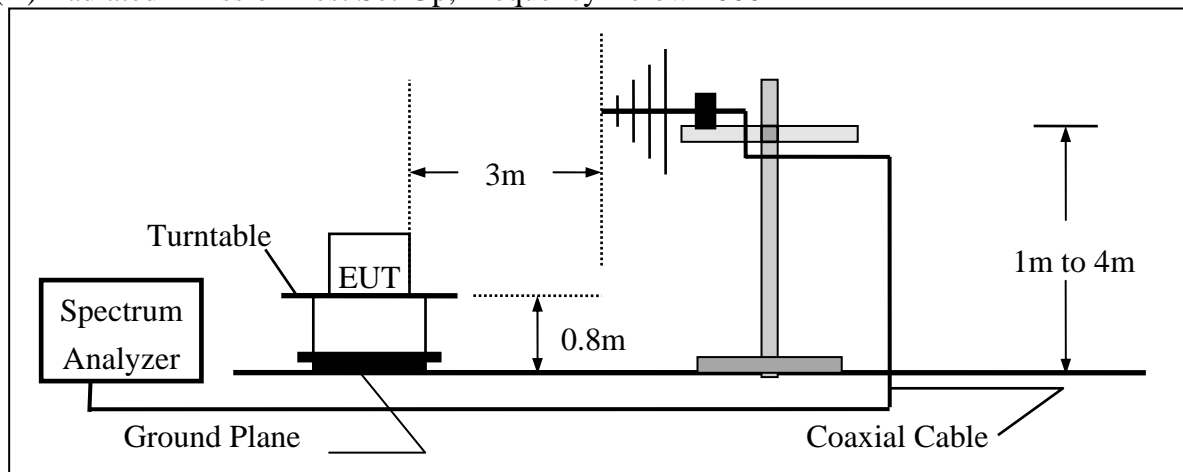
5. Radiated Emission Test

6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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6.3 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	01/05/2008	01/04/2009
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009
Loop Antenna	Messtec	FLA30	03/10086	03/06/2008	03/05/2009
Bi-log Antenna	SCHWAZBECK	VULB9160	3224	11/14/2008	11/13/2008
Pre-Amplifier	HP	8447D	2944A09469	07/19/2008	07/18/2009
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	10/09/2007	10/08/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	10/09/2007	10/08/2008
Site NSA	SGS	966 chamber	N/A	11/17/2007	11/16/2008

6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

6.5 Measurement Result

Test Mode: GPS Link

Test Date : Aug. 01, 2008

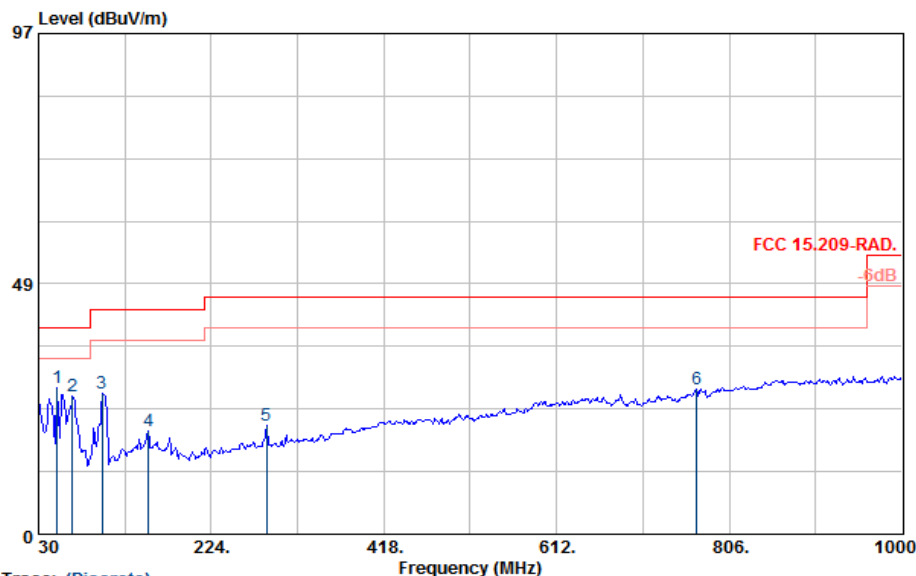
Detector Function: Quasi-Peak/PK

Test By: Sky

Frequency Range: 30MHz-1000MHz

Temperature : 25 °C

Humidity : 65 %



Site : RF SITE
 Condition : FCC 15.209-RAD. 3m VULB9160 VERTICAL
 Project No. : ER/2008/70039
 Applicant : Nolan
 EUT Description : GPS Compass – GuideMate
 EUT Model : NGPSCPXXX
 Test Mode : GPS RX
 Temp./Humid. : 25/65
 Operator : SKY

	Freq	ReadAntenna	Preamp	Cable		Level	Limit	Over	
	MHz	Level	Factor	Factor	Loss	dBuV/m	Line	Limit	Remark
		dBuV	dB/m	dB	dB	dB/m	dBuV/m	dB	
1	51.34	42.54	12.54	27.57	0.84	-14.19	28.35	40.00	-11.65 Peak
2	67.83	42.22	11.53	28.09	0.96	-15.60	26.62	40.00	-13.38 Peak
3	101.78	44.17	10.38	28.37	1.12	-16.87	27.30	43.50	-16.20 Peak
4	153.19	32.94	13.69	28.11	1.42	-13.00	19.94	43.50	-23.56 Peak
5	286.08	34.29	12.85	28.00	1.89	-13.26	21.03	46.00	-24.97 Peak
6	769.14	31.98	21.26	28.21	3.15	-3.80	28.18	46.00	-17.82 Peak

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz.

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Test Mode: GPS Link

Test Date : Aug. 01, 2008

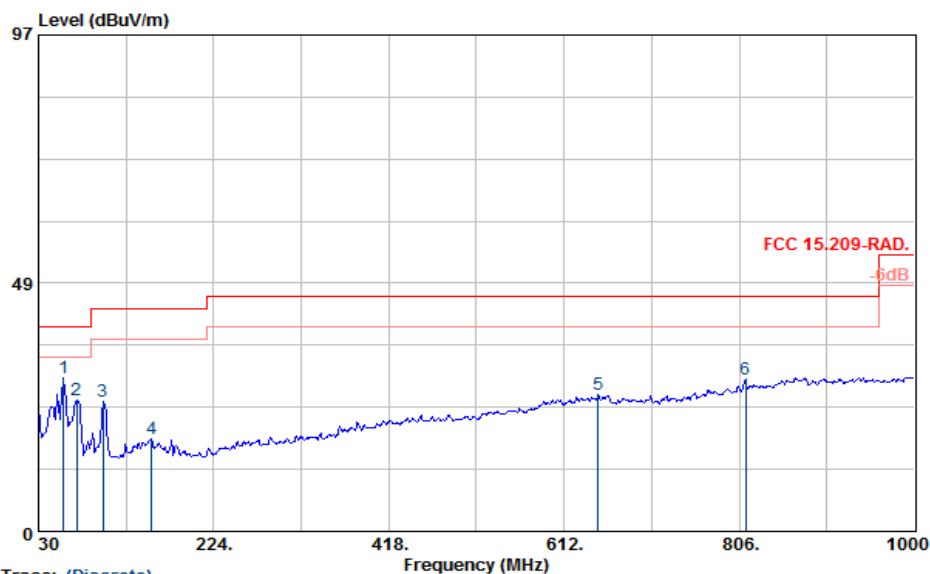
Detector Function: Quasi-Peak/PK

Test By: Sky

Frequency Range: 30MHz-1000MHz

Temperature : 25 °C

Humidity : 65 %



Trace: (Discrete)

Site : RF SITE
 Condition : FCC 15.209-RAD. 3m VULB9160 HORIZONTAL
 Project No. : ER/2008/70039
 Applicant : Nolan
 EUT Description : GPS Compass – GuideMate
 EUT Model : NGPSCPXXX
 Test Mode : GPS RX
 Temp./Humid. : 25/65
 Operator : SKY

	Freq	ReadAntenna	Preamp	Cable		Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	dBuV/m	Line	Limit	Remark
		dBuV	dB/m	dB			dBuV/m	dB	
1	58.13	44.58	12.56	28.06	0.84	-14.66	29.92	40.00	-10.08 Peak
2	72.68	42.21	10.32	27.90	0.96	-16.62	25.59	40.00	-14.41 Peak
3	101.78	42.35	10.38	28.37	1.12	-16.87	25.48	43.50	-18.02 Peak
4	155.13	31.28	13.55	28.09	1.42	-13.12	18.16	43.50	-25.34 Peak
5	649.83	31.81	19.65	27.46	2.86	-4.95	26.86	46.00	-19.14 Peak
6	812.79	32.41	21.86	27.88	3.28	-2.74	29.67	46.00	-16.33 Peak

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz.

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Test Mode: GPS+USB Data Link

Test Date : Aug. 01, 2008

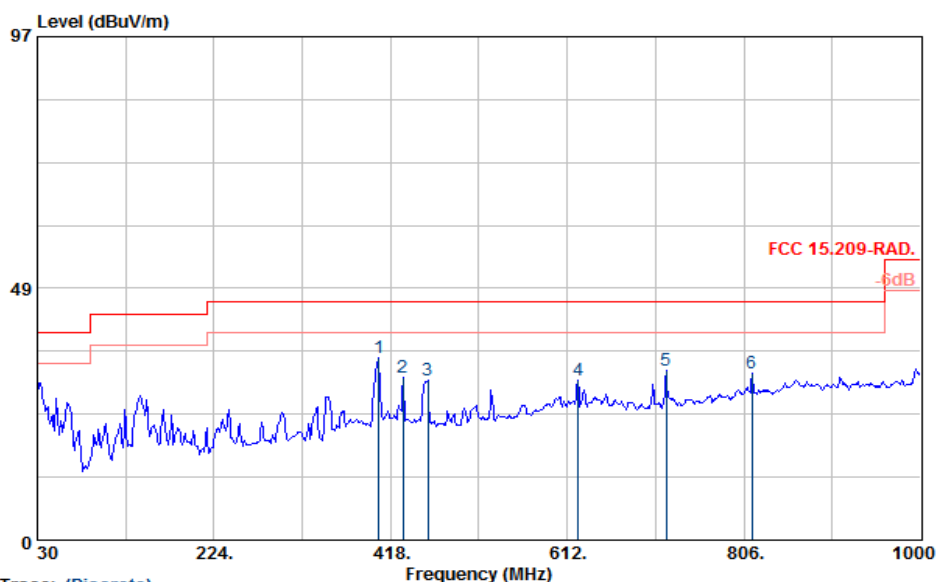
Detector Function: Quasi-Peak/PK

Test By: Sky

Frequency Range: 30MHz-1000MHz

Temperature : 25 °C

Humidity : 65 %



Trace: (Discrete)
 Site : RF SITE
 Condition : FCC 15.209-RAD. 3m VULB9160 VERTICAL
 Project No. : ER/2008/70039
 Applicant : Nolan
 EUT Description : GPS Compass – GuideMate
 EUT Model : NGPSCPXXX
 Test Mode : GPS + USB Data Link
 Temp./Humid. : 25/65
 Operator : Sky

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB	
1	405.39	45.02	15.43	27.50	2.21	-9.86	35.16	46.00	-10.84	Peak
2	431.58	40.33	16.01	27.41	2.31	-9.09	31.24	46.00	-14.76	Peak
3	458.74	39.37	16.47	27.48	2.40	-8.61	30.76	46.00	-15.24	Peak
4	623.64	36.37	19.39	27.71	2.81	-5.51	30.86	46.00	-15.14	Peak
5	720.64	37.45	20.47	28.21	3.01	-4.73	32.72	46.00	-13.28	Peak
6	814.73	34.82	21.88	27.86	3.28	-2.70	32.12	46.00	-13.88	Peak

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz.

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Test Mode: GPS+USB Data Link

Test Date : Aug. 01, 2008

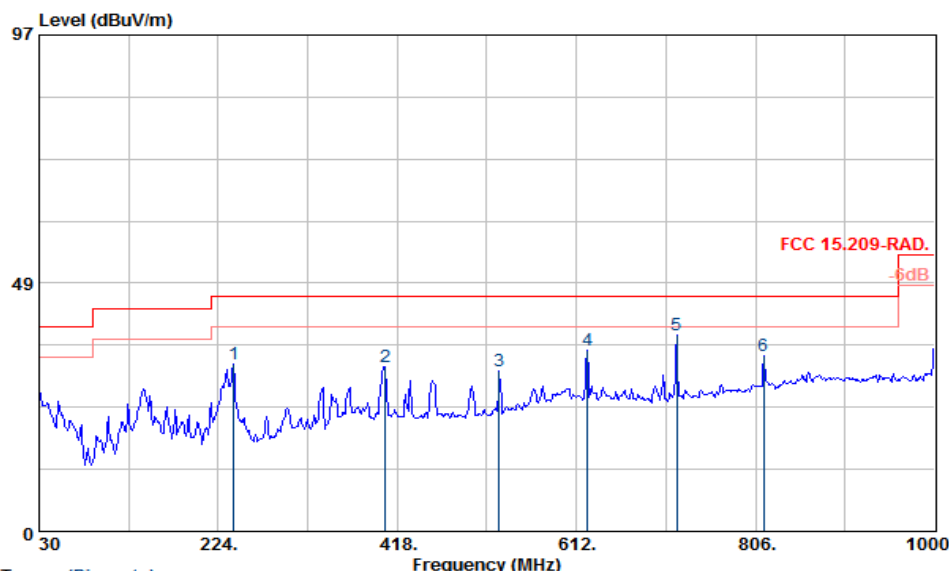
Detector Function: Quasi-Peak/PK

Test By: Sky

Frequency Range: 30MHz-1000MHz

Temperature : 25 °C

Humidity : 65 %



Trace: (Discrete)
 Site : RF SITE
 Condition : FCC 15.209-RAD. 3m VULB9160 HORIZONTAL
 Project No. : ER/2008/70039
 Applicant : Nolan
 EUT Description : GPS Compass – GuideMate
 EUT Model : NGPSCPXXX
 Test Mode : GPS + USB Data Link
 Temp./Humid. : 25/65
 Operator : Sky

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Factor	Level	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB	
1	240.49	46.68	11.71	27.46	1.64	-14.11	32.57	46.00	-13.43	Peak
2	405.39	42.08	15.43	27.50	2.21	-9.86	32.22	46.00	-13.78	Peak
3	528.58	39.30	17.65	28.31	2.64	-8.02	31.28	46.00	-14.72	Peak
4	623.64	40.77	19.39	27.71	2.81	-5.51	35.26	46.00	-10.74	Peak
5	720.64	43.22	20.47	28.21	3.01	-4.73	38.49	46.00	-7.51	Peak
6	814.73	36.99	21.88	27.86	3.28	-2.70	34.29	46.00	-11.71	Peak

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz.

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