



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Applicant : Link Concept (Macao Commercial Offshore) Limited

Address : Avn. Da Praia Grande, 762 Edf. Chino Plaza, 12 And. (H)
Macau

Product Name : GPS

Model Name : NAV-4303

Brand Name : N/A

FCC ID : XNQ-NAV-4303

Report No. : SZSTS090802F1

Date of Issue : August 28, 2009

Issued by : Shenzhen Super Test Service Technology Co., Ltd.

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1. VERIFICATION OF CONFORMITY

Equipment Under Test: GPS
Brand Name: N/A
Model Number: NAV-4303
FCC ID: XNQ-NAV-4303
Applicant: Link Concept (Macao Commercial Offshore) Limited
Avn. Da Praia Grande, 762 Edf. Chino Plaza, 12 And. (H) Macau
Manufacturer: Intech Electronics (HK) CO., LTD.
Shengwu Industrial Park, Changzhen Village, GongMing Town, Bao'an District
Shenzhen, China.
Technical Standards: 47 CFR Part 15 Subpart C
File Number: SZSTS090802F1
Date of test: August 17 - August 28, 2009
Deviation: None
Condition of Test Sample: Normal
Test Result: PASS

The above equipment was tested by Shenzhen Super Test Service Technology Co., Ltd. for compliance with the requirements set forth in FCC rules and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

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

Tested by (+ signature):

Petter Ping

2009. 8. 28

Petter Ping

August 28, 2009

Review by (+ signature):

July Wen

2009. 8. 28

July Wen

August 28, 2009

Approved by (+ signature):

Terry Yang

2009. 8. 28

Terry Yang

August 28, 2009

2. GENERAL INFORMATION

2.1 Product Information

EUT- Bluetooth headset	
Description:	GPS
Model Name:	NAV-4303
Series Number:	N/A
Model Difference description:	N/A
Power Supply:	DC 5.0V by Battery or charge
Frequency Range:	88.1MHz – 106.5MHz
Channel Number:	184
Channel Spacing:	100 KHz
Antenna Gain:	0.0 dBi
Modulation Technique:	FM
Temperature Range:	-10°C ~ +55°C

NOTE:

- Please refer to Appendix I for the photographs of the EUT. For a more detailed features description about the EUT, please refer to User's Manual.*

2.2 Objective

The objective of the report is to perform tests according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-05 Edition)	Radio Frequency Devices

2.3 Test Standards and Results

Test items and the results are as bellow:

No.	Section	Description	Result	Date of Test
1	15.239	26dB Bandwidth	PASS	2009-8-26
2	15.239	Frequency Range	PASS	2009-8-26
3	15.239 15.209 15.205	Radiated Emission	PASS	2009-8-26
4	15.239	Conducted Emission	PASS	2009-8-26
5	15.203	Antenna Requirement	PASS	2009-8-28

Note: 1. The test result judgment is decided by the limit of measurement standard
2. The information of measurement uncertainty is available upon the customer's request.

2.4 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

3. TEST FACILITY

Test Site: Most Technology Service Co.,ltd

Location: Add: No.5, Nangshan 2nd Rd., North Hi-Tech Industrial park , Nanshan Shenzhen, Guangdong ,China

Description: There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4 and CISPR 16 requirements.

The FCC Registration Number is **490827**.

Site Filing: The site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.

Instrument Tolerance: All measuring equipment is in accord with ANSI C63.4 and CISPR 16 requirements that meet industry regulatory agency and accreditation agency requirement.

Ground Plane: Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

4. TEST EQUIPMENT LIST

Instrumentation: The following list contains equipment used at Most for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1.0 GHz or above.

No.	Equipment	Manufacturer	Model No.	S/N	Calculator due date
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2010/03/14
2	Spectrum Analyzer	Agilent	E7405A	US44210471	2010/03/14
3	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2010/03/14
4	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2010/03/14
5	Terminator	Hubersuhner	50Ω	No.1	2010/03/14
6	RF Cable	SchwarzBeck	N/A	No.1	2010/03/14
7	Test Receiver	Rohde & Schwarz	ESPI	101202	2010/03/14
8	Bilog Antenna	Sunol	JB3	A121206	2010/03/14
9	Horn Antenna	TRC	N/A	N/A	2010/03/14
10	Cable	Resenberger	N/A	NO.1	2010/03/14
11	Cable	SchwarzBeck	N/A	NO.2	2010/03/14
12	Cable	SchwarzBeck	N/A	NO.3	2010/03/14
13	DC Power Filter	DuoJi	DL2×30B	N/A	2010/03/14
14	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2010/03/14
15	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	2010/03/14
16	Test Receiver	Rohde & Schwarz	ESCI	100492	2010/03/14
17	Absorbing Clamp	Luthi	MDS21	3635	2010/03/14
18	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2010/03/14
19	AC Power Source	Kikusui	AC40MA	LM003232	2010/03/14
20	Test Analyzer	Kikusui	KHA1000	LM003720	2010/03/14
21	Line Impedance Network	Kikusui	LIN40MA-PCR-L	LM002352	2010/03/14
22	ESD Tester	Kikusui	KES4021	LM003537	2010/03/14
23	EMCPRO System	EM Test	UCS-500-M4	V0648102026	2010/03/14
24	Signal Generator	IFR	2032	203002/100	2010/03/14
25	Amplifier	A&R	150W1000	301584	2010/03/14
26	CDN	FCC	FCC-801-M2-25	47	2010/03/14
27	CDN	FCC	FCC-801-M3-25	107	2010/03/14
28	EM Injection Clamp	FCC	F-203I-23mm	403	2010/03/14
29	RF Cable	MIYAZAKI	N/A	No.1/No.2	2010/03/14
30	Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	0304789	2010/03/14
31	Telecommunication Antenna	European Antennas	PSA 75301R/170	0304213	2010/03/14

NOTE: Equipments listed above have been calibrated and are in the period of validation.

5. 47 CFR Part 15 C Requirements

5.1 26dB Bandwidth

5.1.1 Definition

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

5.1.2 Test Description

The EUT was placed on a non-conductive table 0.8 meters above the floor. The table was rotated to an angle which presented the highest signal level. The occupied bandwidth was based on a 26 dB criteria (26 dB down either side of the emission from the peak emission). A drawing showing the test setup is given as Figure 1.

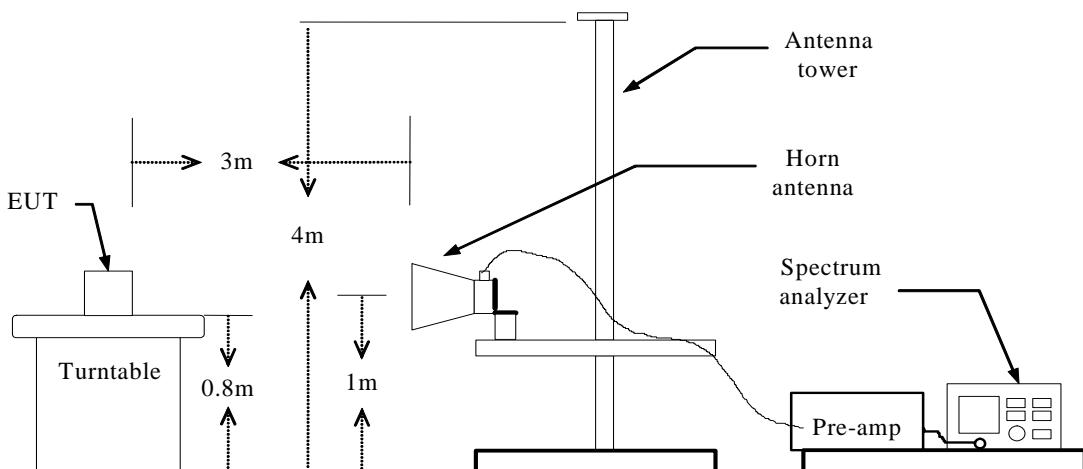
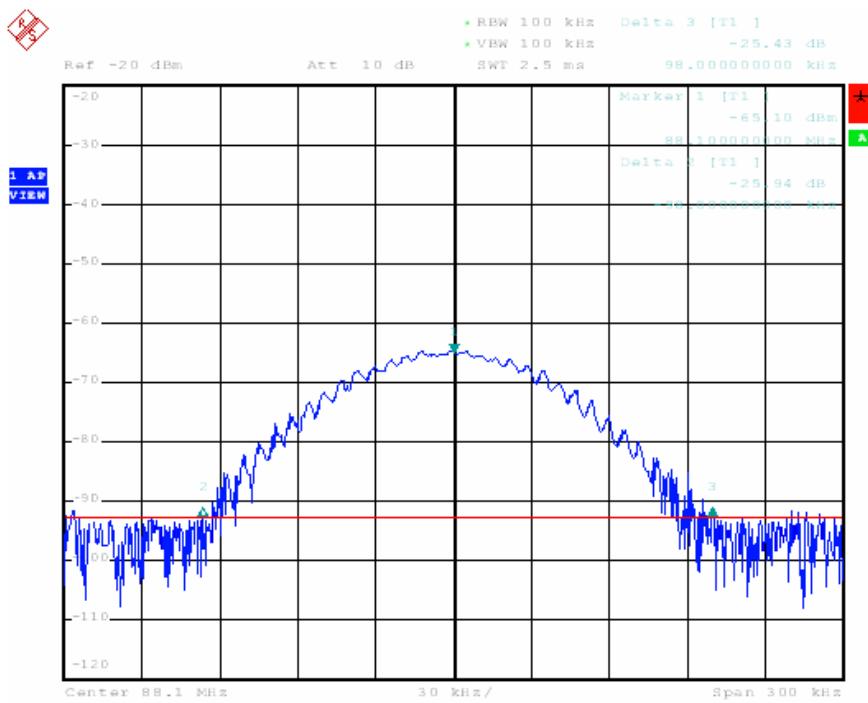


Figure 1: Radiated Emission Test Setup

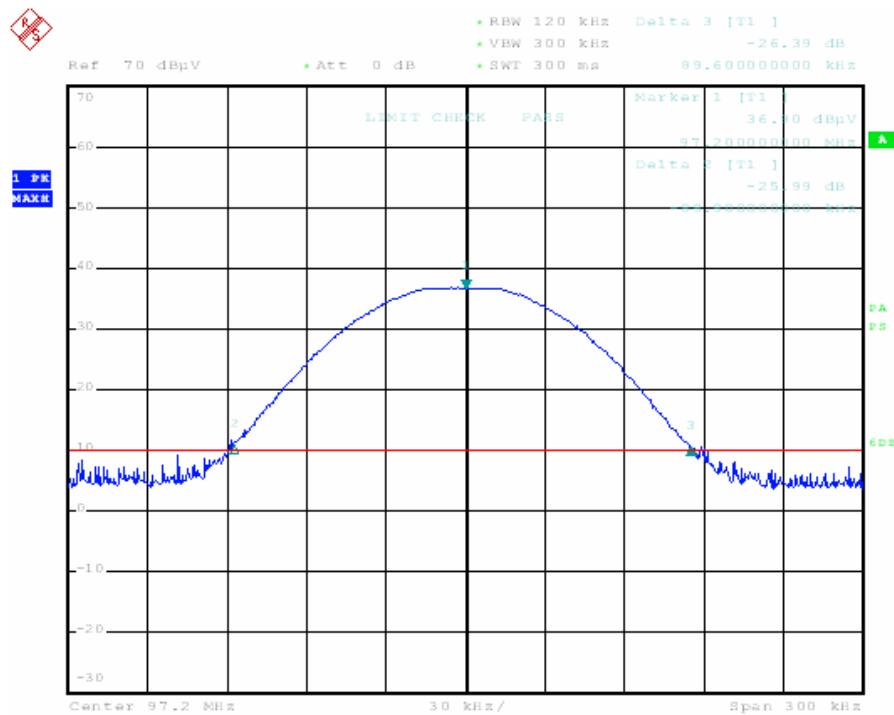
5.1.3 Test Result

The maximum occupied bandwidth for the fundamental frequency 97.2 MHz is 179.5 kHz. This occupied bandwidth complies with the FCC requirement.

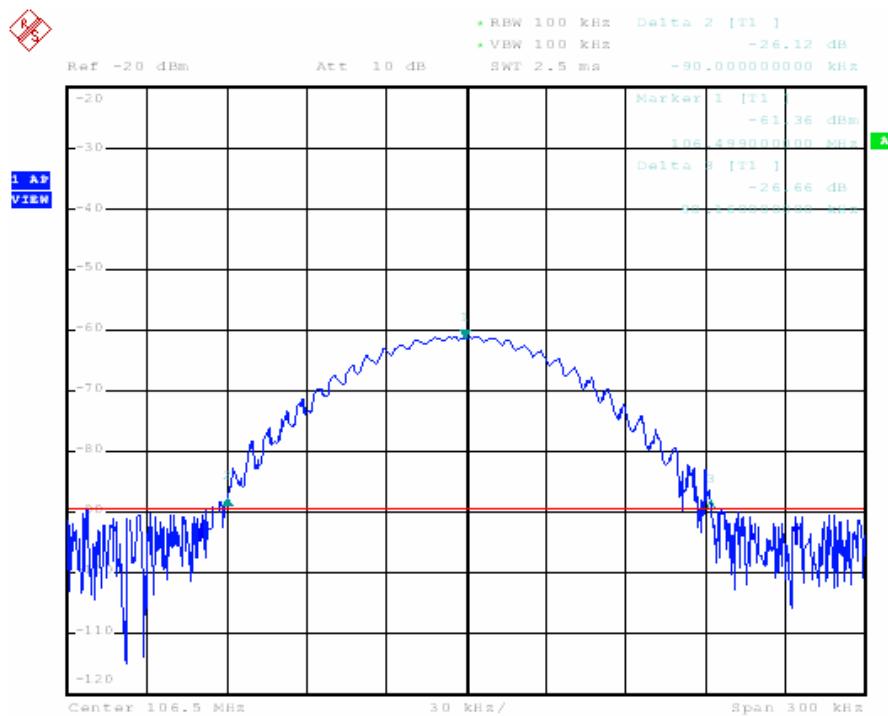
The occupied bandwidth test data is included in Plot A- Plot C.

Test Plot:

(Plot A: Channel Low)



(Plot B: Channel Middle)



(Plot C: Channel High)

5.2 Frequency Range

5.2.1 Definition

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

5.2.2 Test Description

The EUT was placed on a non-conductive table 0.8 meters above the floor. The table was rotated to an angle which presented the highest signal level. The occupied bandwidth was based on a 26 dB criteria (26 dB down either side of the emission from the peak emission). A drawing showing the test setup is given as Figure 1.

5.2.3 Test Result

The operation frequency band is from 88.1 MHz to 106.5 MHz.

This frequency range complies with the FCC requirement.

5.3 Radiated Emission

5.3.1 Definition

The field strength of any emission within this band (section 15.239, frequency between 88 MHz –108 MHz) shall not exceed 250 micro volts /meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

1. The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209(Intentional Radiators general limit), as below.

Frequency (MHz)	Field Strength (μ V/m)	Measurement Distance (m)
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

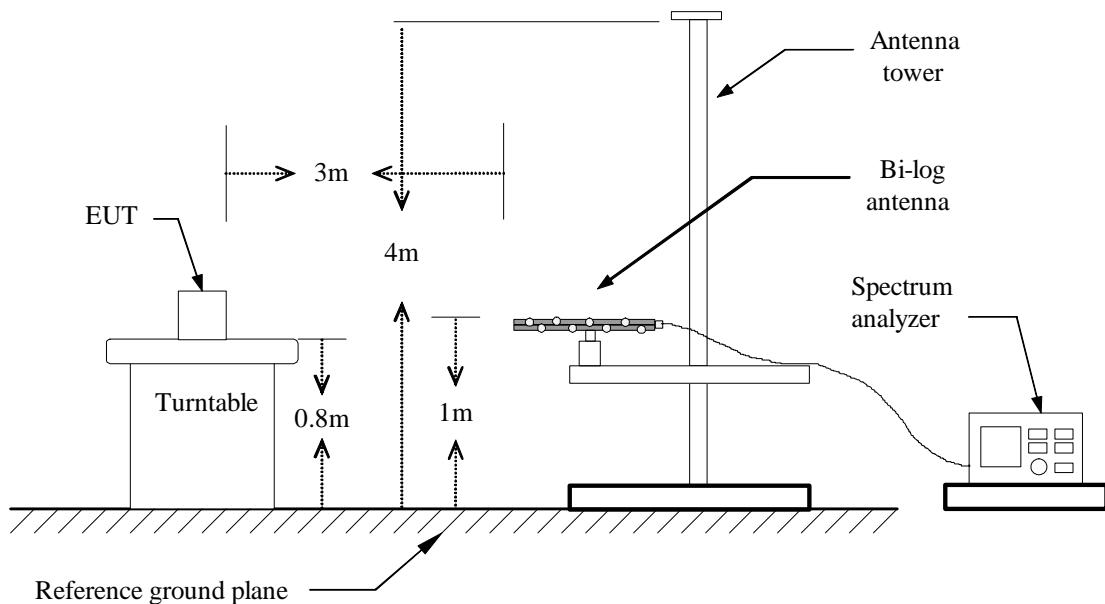
2. In the above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength (μ V/m at 3-meter)	Test Distance (m)	Field Strength (dB μ V/m at 3-meter)
1.705-30	30	3	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54
Fundamental	250	3	48

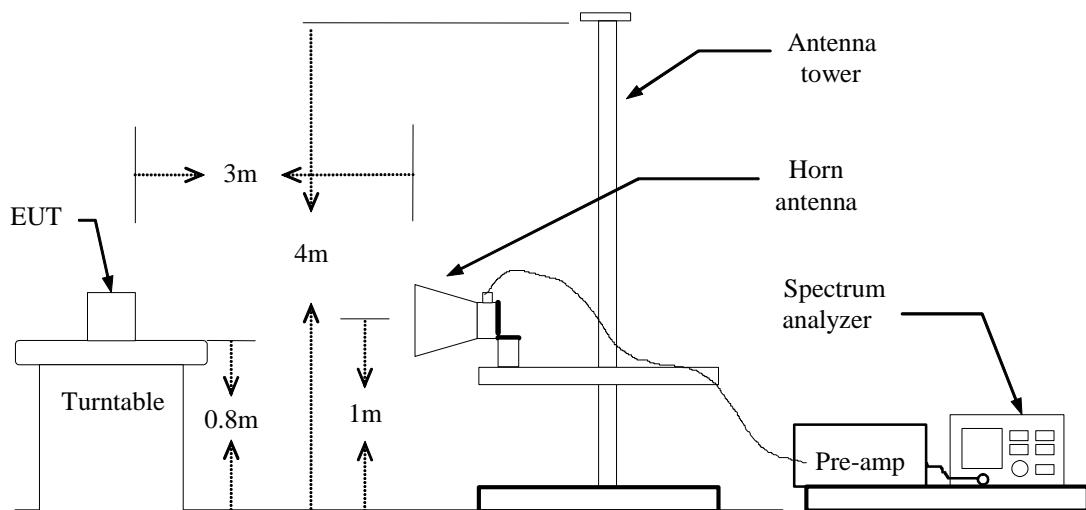
5.3.2 Test Configuration

Test Setup:

Below 1GHz:



Above 1GHz:



5.3.3 Test Description

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
Below 1GHz: RBW=100 kHz / VBW=300 kHz / Sweep=AUTO
Above 1GHz :(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

5.3.4 Test Result

Operation Mode:	CH Low	Test Date:	August 26, 2009
Temperature:	20°C	Tested by:	Petter Ping
Humidity:	70 % RH	Polarity:	Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
88.104	V	Peak	31.73	5.87	37.60	48.00	-10.40
175.500	V	Peak	16.92	8.13	25.05	43.50	-18.45
286.080	V	Peak	19.44	8.59	28.03	46.00	-17.97
383.076	V	Peak	18.16	9.51	27.67	46.00	-18.33
88.104	H	Peak	34.25	5.87	40.12	48.00	-7.88
175.500	H	Peak	18.18	8.13	26.31	43.50	-17.19
359.800	H	Peak	18.30	8.72	27.02	46.00	-18.98
439.340	H	Peak	20.30	11.23	31.53	46.00	-14.74
793.028	H	Peak	23.72	15.45	39.17	46.00	-6.83

Notes:

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 between 30MHz to 1GHz was 100 kHz.

Operation Mode: CH Middle**Test Date:** August 26, 2009**Temperature:** 20°C**Tested by:** Petter Ping**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
97.374	V	Peak	25.85	7.70	33.55	48.00	-14.45
109.311	V	Peak	30.89	7.00	37.89	43.50	-5.61
197.251	V	Peak	22.88	5.67	28.55	43.50	-14.95
360.977	V	Peak	20.36	9.66	30.02	46.00	-15.98
97.374	H	Peak	31.98	7.70	39.68	48.00	-8.32
110.858	H	Peak	25.27	6.80	32.07	43.50	-11.43
195.870	H	Peak	22.94	5.67	28.61	43.50	-14.89
602.928	H	Peak	24.55	15.04	39.59	46.00	-6.41
844.803	H	Peak	23.60	17.83	41.43	46.00	-4.57

Notes:

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 between 30MHz to 1GHz was 100 kHz.

Operation Mode: CH High**Test Date:** August 26, 2009**Temperature:** 20°C**Tested by:** Petter Ping**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
106.502	V	Peak	28.89	7.26	36.15	48.00	-11.85
213.104	V	Peak	22.94	6.11	29.05	43.50	-14.45
360.978	V	Peak	19.36	9.66	29.02	46.00	-16.98
106.502	H	Peak	31.16	7.26	38.42	48.00	-9.58
213.104	H	Peak	25.00	6.11	31.11	43.50	-12.39
602.929	H	Peak	25.46	15.04	40.50	46.00	-5.50
844.803	H	Peak	25.17	17.83	43.00	46.00	-3.00

Notes:

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 between 30MHz to 1GHz was 100 kHz.

5.4 Conducted Emission

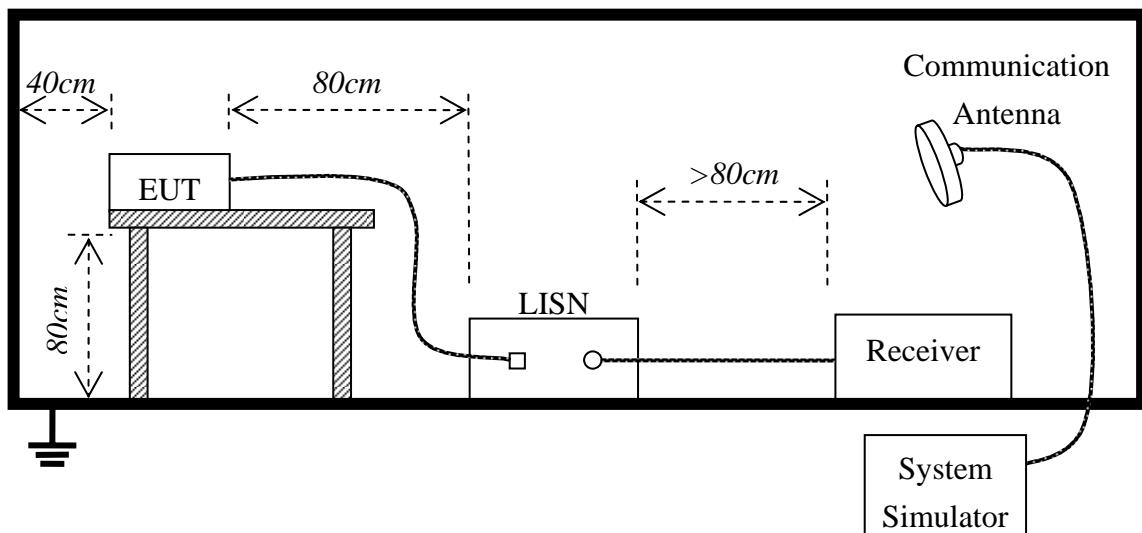
5.4. 1 Definition

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

****Note:** 1. the lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

5.4. 1 Block Diagram of Test Setup



5.4.2 Preliminary Procedure of Line Conducted Emission Test

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per FCC Part 15 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per FCC Part 15.
- 3) All I/O cables were positioned to simulate typical actual usage as per FCC Part 15.
- 4) The EUT received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5) All support equipments received power from a second LISN supplying power of AC 120V/60Hz, if any.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

Preliminary Conducted Emission Test				
Frequency Range Investigated		150KHz TO 30 MHz		
Mode of operation	Date	Report No.	Data#	Worst Mode
FM Mode	August 26, 2009	SZSTS090802F1	1_(L,N)	
SD Card	August 26, 2009	SZSTS090802F1	2_(L,N)	▲
Bluetooth Mode	August 26, 2009	SZSTS090802F1	3_(L,N)	

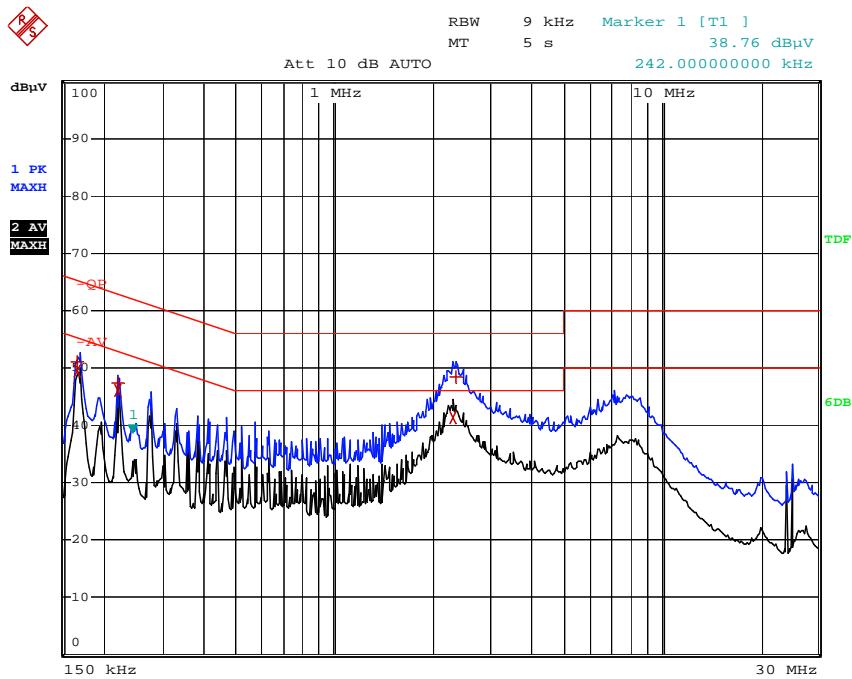
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

5.4.3 Final Procedure of Line Conducted Emission Test

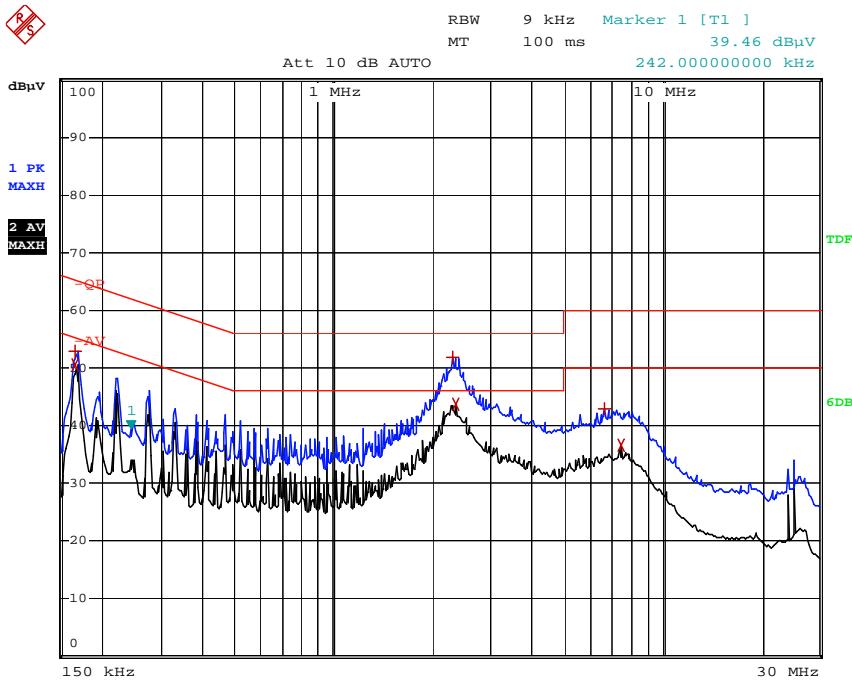
EUT and support equipment was set up on the test bench as per step 9 of the preliminary test. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

The test data of the worst case condition(s) was reported on the Summary Data page.

5.4.4 Test Result of Line Conducted Emission Test



Date: 26.AUG.2009 16:06:37



Date: 26.AUG.2009 16:08:46

5.5 Antenna Requirement

5.5.1 Definition

An analysis of the NAV-4303 was performed to determine compliance with FCC Section 15.203. This section requires specific handling and control of antennas used for devices subject to regulations.

5.5.2 Evaluation Procedure

The structure and application of the NAV-4303 was analyzed with respect to the rules. The antenna is an internal antenna, and is not accessible to the user. An auxiliary antenna port is not present.

5.5.3 Evaluation Criteria

Section 15.203 of the rules states that the subject device must meet at least one of the following criteria:

- (a) Antenna must be permanently attached to the unit.
- (b) Antenna must use a unique type of connector to attach to the EUT.
- (c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

5.5.4 Evaluation Results

The NAV-4303 meets the criteria of this rule by virtue of having an internal antenna inaccessible to the user. The EUT is therefore compliant.