243 Jubug-Ri,Yangji-Myeon, Yongin-Si, Gyeonggi-Do, Korea 449-822
Tel: +82-31-323-6008 Fax: +82-31-323-6010
http://www.ltalab.com

Dates of Tests: Feb 20~Mar 12, 2012
Test Report S/N: LR500111203A
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID. **LXP-SMARTRA32**
IC **2298A-SMARTRA32**
APPLICANT **Robert Bosch (Australia) Pty Ltd**

FCC Classification	**:**	**Part 15 Low Power Transmitter Below 1705 kHz (DCD)**
Manufacturing Description	**:**	**Car Immobilizer**
Manufacturer	**:**	**Robert Bosch (Australia) Pty Ltd**
Model name	**:**	**Smartra 3.2 (I001)**
Test Device Serial No.:	**:**	**Identification**
Rule Part(s)	**:**	**FCC Part 15.209 Subpart C; ANSI C-63.4-2003**
		RSS-210 Issue 8, RSS-Gen Issue 3
Frequency Range	**:**	**125 kHz**
Data of issue	**:**	**March 22, 2012**

This test report is issued under the authority of:

Kyu-Hyun Lee, Manager

The test was supervised by:

Ki-Hun Cho, Test Engineer

NVLAP LAB Code.: 200723-0

TABLE OF CONTENTS

1. General information's

1-1 Test Performed

Company name : LTA Co., Ltd.

Address : 243, Jubug-ri,Yangji-Myeon,Youngin-Si, Kyunggi-Do, Korea. 449-822

Web site : http://www.ltalab.com

E-mail : chahn@ltalab.com

Telephone : +82-31-323-6008

Facsimile +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2012-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2013-04-24	EMC accredited Lab.
FCC	U.S.A	610755	2014-04-27	FCC filing
FCC	U.S.A	649054	2013-04-13	FCC CAB
VCCI	JAPAN	R2133(10m), C2307	2014-06-21	VCCI registration
VCCI	JAPAN	T-2009	2013-12-23	VCCI registration
IC	CANADA	IC5799	2012-05-14	IC filing

2. Information's about test item

2-1 Applicant & Manufacturer

Company name	:	Robert Bosch (Australia) Pty Ltd
Address	:	Locked Bag 66, CLAYTON SOUTH, VIC, 3169, AUSTRALIA
Tel / Fax	:	+61-3-9541-5021 / +61-3-9544-1137

2-2 Equipment Under Test (EUT)

Trade name	:	Car Immobilizer
FCC ID	:	LXP-SMARTRA32
Model name	:	Smartra 3.2 (I001)
Serial number	:	Identification
Date of receipt	:	February 20, 2012
EUT condition	:	Pre-production, not damaged
Frequency Range	:	125 kHz
Modulation Type	:	ASK
Power Source	:	DC 12V by Car battery

2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	0.125	-	-

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Notebook	Latitude D530	N/A	DELL

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	RSS-210 Part Section(s)	Parameter	Status (note 1)
15.209(a)	RSS-210, Issue 8 Table 3	Radiated emission, Spurious Emission and Field Strength of Fundamental	C
-	RSS-Gen, Issue 3, 4.6.1	Occupied Bandwidth	C
15.109 (a)	RSS-Gen, Issue 3, 6	Receiver Radiated Spurious Emission	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

Note 3: This device is only operated by DC

*The sample was tested according to the following specification:

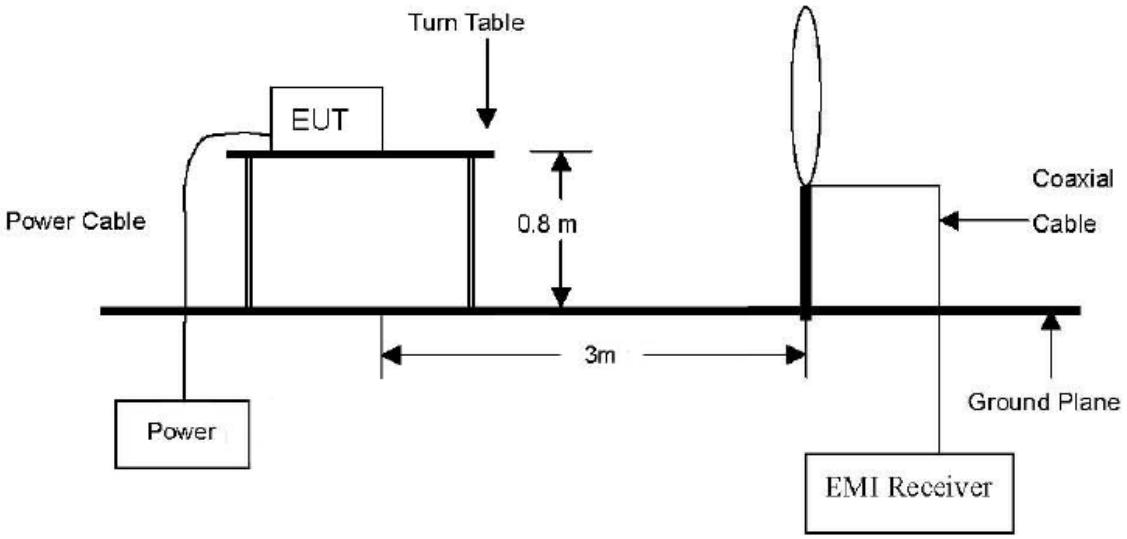
FCC Parts 15.209; ANSI C-63.4-2003

RSS-210 and ISSUE No.:8 Date: 2010

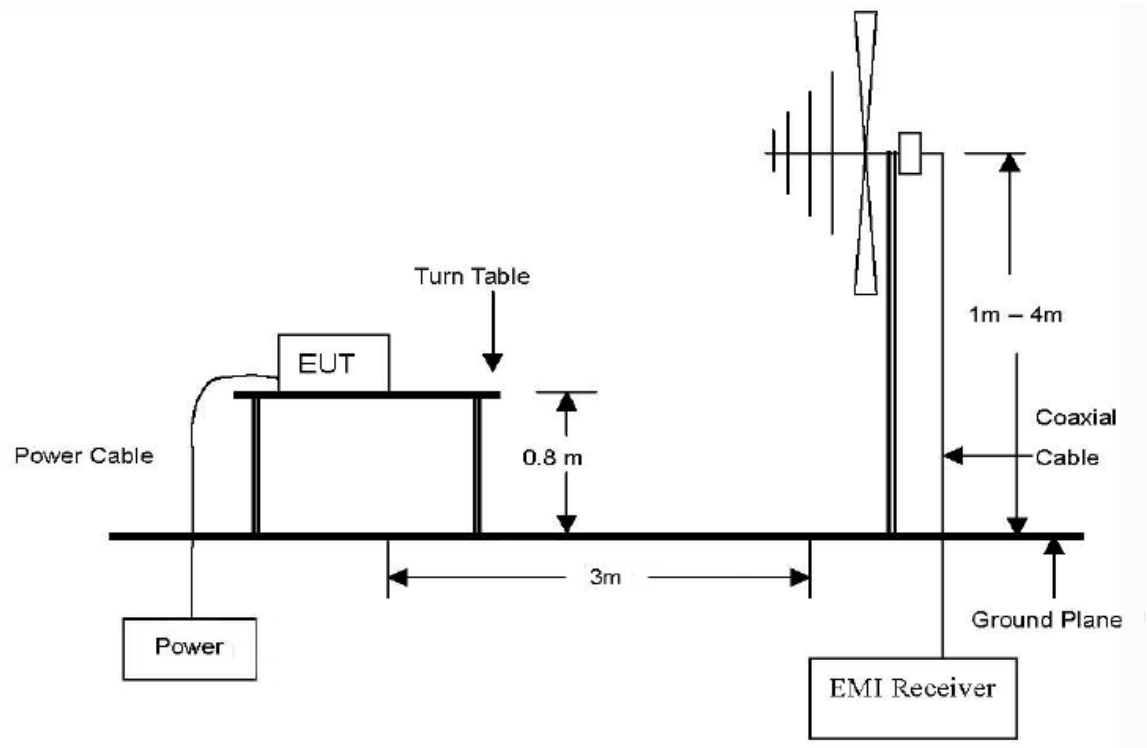
4. Field Strength of Fundamental

4.1 Test Setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9kHz to 30MHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30MHz to 1GHz Emissions.



4.2. LIMITS

4.2.1 Radiated emission limits, general requirements

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Field Strength of Spurious Emissions (uV/m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	2400/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

**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, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241

4.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

4.3.1. Test Procedures for emission from 9 kHz to 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.

c. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.

d. The test-receiver system was set to average Detect Function and Specified Bandwidth with Maximum Hold Mode.

4.3.2. Test Procedures for emission from 30 MHz to 1000 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

4.4 Test Result

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical

Freq. [MHz]	Reading [dBuV]	Correction Factor [dB/m]	Pol [H/V]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
AVERAGE data						
0.125	66.71	-9.52	V	57.19	79.20	22.01
PEAK data						
0.125	71.65	-9.52	V	62.13	99.20	37.07

Remark:

To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes. The worst case is XY.

Note:

1. A Peak limit is 20 dB above the average limit.
2. 300 m Result (dBuV/m) = 3 m Result (dBuV/m) – 40 log(300/3) (dBuV/m)
3. Correction Factor = Antenna Factor + Cable Loss- AMP gain

5. Spurious Emission

5.1. Test Setup

Same as section 4.1 of this report

5.2. Limit

Same as section 4.2 of this report

5.3. Test Procedures

Same as section 4.3 of this report

5.4 Test Result

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical

Freq. [MHz]	Reading [dBuV]	Correction Factor [dB/m]	Pol [H/V]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
AVERAGE data						
0.375	46.84	-9.52	V	37.32	79.20	41.88
-	-	-	-	-	-	-
PEAK data						
0.375	52.22	-9.52	V	42.70	99.20	56.50
-	-	-	-	-	-	-

- Correction Factor = Antenna Factor + Cable Loss – AMP gain

Remark:

To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes. The worst case is XY.

Note: A Peak limit is 20 dB above the average limit.

Radiated Emissions – Wireless mode

LTA
Laboratory for Test & Approval Co.,Ltd.

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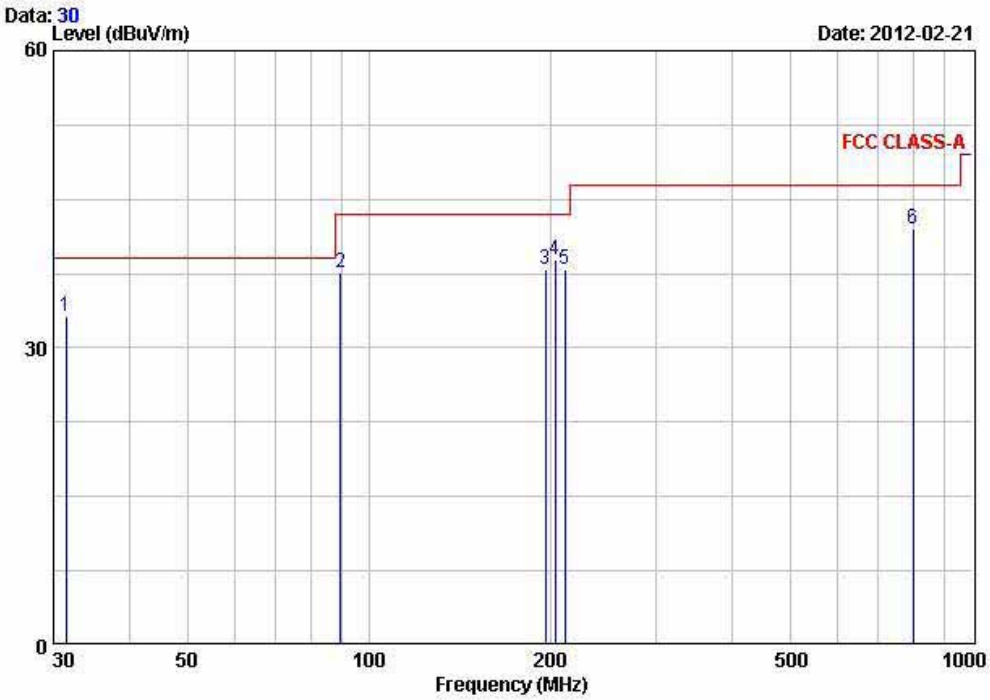
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: Smartra 3.2 (I001) TEST MODE: Wireless mode

Temp Humi : 1 / 26 Tested by: Park H W

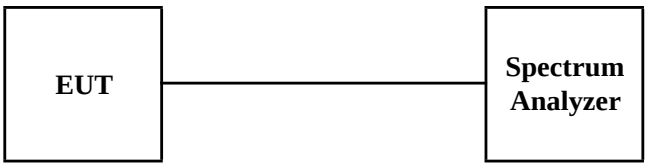


	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	31.51	50.02	-16.82	33.20	39.00	5.80	100	301	VERTICAL
2	89.90	57.24	-19.64	37.60	43.50	5.90	100	112	VERTICAL
3	196.51	53.11	-15.23	37.88	43.50	5.62	400	96	HORIZONTAL
4	203.52	54.19	-15.28	38.91	43.50	4.59	400	223	HORIZONTAL
5	211.53	52.71	-14.81	37.90	43.50	5.60	400	196	HORIZONTAL
6	798.98	40.68	1.27	41.95	46.40	4.45	351	206	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

6. Bandwidth of Operation Frequency

6.1. Test Setup



6.2. Limit

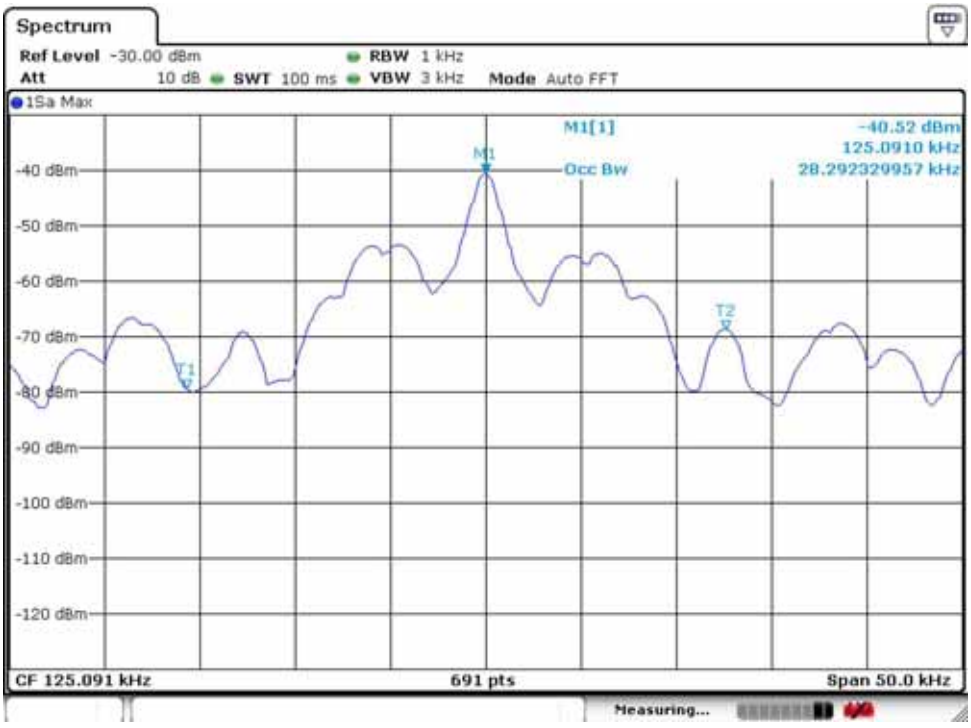
None; for reporting purposed only

6.3. Test Procedure

1. The transmitter output is connected to the spectrum analyzer.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW=1 kHz, VBW=3 kHz and Span=50 kHz.
3. The bandwidth of fundamental frequency was measured and recorded.

6.4. Test Result

Carrier Frequency (MHz)	Bandwidth of the emission (kHz)	Limit (kHz)	Remark
0.125	28.292	-	99% Occupied bandwidth



7. Receiver Radiated spurious emission

7.1 Test Setup

Same as section 4.1 of this report

7.2 Limit

According to Part 15.109(a), Except for Class A digital devices, the field strength of radiated emission from unintentional radiator at a distance of 3 m shall not exceed the following values;

Frequency (MHz)	Distance (Meter)	Radiated (dBuV/m)	Radiated (uV/m)
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
Above 960	3	54.0	500

7.3 Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

7.3.1. Test Procedures for emission from 30 MHz to 1000 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

7.4 Test Result

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical

Freq. [MHz]	Reading [dBuV]	Correction Factor [dB/m]	Pol [H/V]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
AVERAGE data						
-	-	-	-	-	-	-
PEAK data						
-	-	-	-	-	-	-

- Correction Factor = Antenna Factor + Cable Loss – AMP gain

Note:

1. A Peak limit is 20 dB above the average limit.
2. Other Spurious Frequencies were not detected up to 5000 MHz.

8. AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: **Not Applicable** **(This product is operated by DC)**

Minimum Standard: FCC Part 15.207(a)/EN 55022

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

* Note: The limits will decrease with the frequency logarithmically within 0.15MHz to 0.5MHz

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Interval	Last Cal. Date
1	Spectrum Analyzer (~30GHz)	FSV-30	100757	R&S	1 year	2012-01-10
2	Signal Generator (~3.2GHz)	8648C	3623A02597	HP	1 year	2011-03-30
3	Signal Generator (1~20GHz)	83711B	US34490456	HP	1 year	2011-03-30
4	Attenuator (3dB)	8491A	37822	HP	2 year	2010-10-08
5	Attenuator (10dB)	8491A	63196	HP	2 year	2010-10-08
6	Attenuator (30dB)	8498A	3318A10929	HP	2 year	2011-01-05
7	Test Receiver (~30MHz)	ESHS10	828404/009	R&S	1 year	2011-03-30
8	EMI Test Receiver (~1GHz)	ESCI7	100722	R&S	1 year	2011-10-07
9	RF Amplifier (~1.3GHz)	8447D	2439A09058	HP	2 year	2010-10-08
10	RF Amplifier (1~18GHz)	8449B	3008A02126	HP	2 year	2010-03-29
11	Horn Antenna (1~18GHz)	BBHA 9120D	9120D122	SCHWARZBECK	2 year	2010-12-24
12	Horn Antenna (18 ~ 40GHz)	SAS-574	154	Schwarzbeck	2 year	2010-11-25
13	Horn Antenna (18 ~ 40GHz)	SAS-574	155	Schwarzbeck	2 year	2010-11-25
14	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	2 year	2010-10-07
15	Dipole Antenna	VHA9103	2116	SCHWARZBECK	2 year	2010-11-25
16	Dipole Antenna	VHA9103	2117	SCHWARZBECK	2 year	2010-11-25
17	Dipole Antenna	VHA9105	2261	SCHWARZBECK	2 year	2010-11-25
18	Dipole Antenna	VHA9105	2262	SCHWARZBECK	2 year	2010-11-25
19	Hygro-Thermograph	THB-36	0041557-01	ISUZU	2 year	2010-04-12
20	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-	-
21	Power Divider	11636A	6243	HP	2 year	2010-10-08
22	DC Power Supply	6622A	3448A03079	HP	-	-
23	Frequency Counter	5342A	2826A12411	HP	1 year	2011-03-30
24	Power Meter	EPM-441A	GB32481702	HP	1 year	2011-03-30
25	Power Sensor	8481A	US41030291	HP	1 year	2011-10-07
26	Audio Analyzer	8903B	3729A18901	HP	1 year	2011-10-07
27	Modulation Analyzer	8901B	3749A05878	HP	1 year	2011-10-07
28	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2011-10-07
29	Stop Watch	HS-3	601Q09R	CASIO	2 year	2010-03-31
30	LISN	ENV216	100408	R&S	1 year	2011-10-07
31	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	2 year	2010-05-13
32	Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	-	-
33	Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	-	-