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# **EN**<sup><sup>1</sup>USTECH</sup>

Dates of Tests: Aug 10~21, 2009 Test Report S/N: LR500190908I Test Site : LTA CO., LTD.

**Device Transmitter** 

# **CERTIFICATION OF COMPLIANCE**

## FCC ID.

## **TT2JABRACRUISER**

APPLICANT

## ENUSTECH., INC.

FCC Classification	:	Low Power Communication
Manufacturing Description	:	Wireless Bluetooth Carkit
Manufacturer	:	ENUSTECH.,INC.
Model name	:	Jabra CRUISER
Variant Model name		BHF1400
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.239 Subpart C;
		RSS-210 and ISSUE No.:7 Da
Frequency Range	:	88.2 ~ 107.9MHz
Data of issue	:	August 24, 2009
		-

This test report is issued under the authority of:

Dong -Min JUNG, Technical Manager

: ANSI C-63.4-2003 Date:2007

The test was supervised by:

Kyung-Taek LEE, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.

NVLAP LAB Code.: 200723-0

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## 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	: <u>http://www.ltalab.com</u>
E-mail	: <u>chahn@ltalab.com</u>
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 competent 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	200723-0 2009-09-30 ECT accredited		
RRL	KOREA	KR0049	2011-06-20	EMC accredited Lab.	
FCC	U.S.A	610755	2011-04-22	FCC filing	
VCCI	JAPAN	R2133, C2307	2011-06-21	VCCI registration	
IC	CANADA	IC5799	2010-05-03	IC filing	

## 2. Information's about test item

## 2-1 Applicant & Manufacturer

Company name	:	ENUSTECH.,INC.
Address	:	JnJ Bldg., 5 Yeoksam 2(i)-dong,785-12,Gangnam-gu,
	:	Seoul 135-515,Korea
Telephone / Facsimile		+82-2-565-0785 / +82-2-565-0785

## **<u>2-2 Equipment Under Test (EUT)</u>**

:	Wireless Bluetooth Carkit
:	TT2JABRACRUISER
:	Jabra CRUISER
:	BHF1400
:	Identical prototype
:	August 07, 2009
:	Pre-production, not damaged
:	Diopole Antenna
:	88.2 ~ 107.9MHz
erat	ing Frequency: Manual Switch
:	Battery Pack: 3.7V (Li-Ion Polymer Battery)
	· · · · ·

## 2-3 Tested frequency & signal

	LOW	MID	HIGH			
Frequency (MHz)	88.2	98.0	107.9			
	We tested only under the module of audio input. The device audio input source					
Audio signal:	from maximum audio input for the tested. Test report is recorded the worst					
	mode data.					

### 2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer		
DC Power Supply	E3615A	KR72705061	НР		

## 3. Test Report

### 3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Status (note 1)					
15.239	Field Strength of Fundamental and Emissions within permitted band.	< 250 uV @ 3m	С					
15.239	Occupied channel bandwidth	< 200kHz	С					
15.209	Radiated Emission	< FCC 15.209 limits	С					
15.207	AC Conducted Emissions	< FCC 15.207 limits	С					
15.203	Antenna Requirement	-	С					
<u>Note 1</u> : C=Comp	<u>Note 1</u> : C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable							

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

#### Note 1: Antenna Requirement

 $\rightarrow$  The ENUSTECH.,INC. Jabra CRUISER unit complies with the requirement of §15.203.

The antenna is Diopole antenna.

Note 2: The sample was tested according to the following specification:

FCC Parts 15.239; ANSI C-63.4-2003

RSS-210 and ISSUE No.: 7 Date: 2007

### **3.2 Transmitter requirements**

#### 3.2.1 Field Strength of Fundamental and Emissions within permitted band.

#### **Procedure:**

The field strength of emissions from intentional radiators operated within the bands 88 ~108MHz was measured in accordance with FCC Part § 15.239. The test set-up was made according to ANSI C 63.4:2003.

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in an OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:	
Span = 1 MHz	
RBW = 120 kHz	Sweep = auto
VBW = 300  kHz	Detector function = Peak & Average
Trace = max hold	

#### **Measurement Data: Complies**

#### $\rightarrow$ For Spurious emission of the fundamental, refer to the item '3.2.2 radiated emission'

Frequency	Pol.	Read (dBu	V/m) C.F		Result Level (dBuV/m)			mit V/m)		rgin B)
(MHz)	(H/V)	РК	AV	(dB)	РК	AV	РК	AV	PK	AV
88.2	Н	58.28	55.34	-17.27	41.01	38.07	68	48	26.99	9.93
88.2	V	47.33	44.85	-17.27	30.06	27.58	68	48	37.94	20.42
98.0	Н	61.34	59.89	-16.24	45.1	43.65	68	48	22.9	4.35
98.0	V	50.28	48.76	-16.24	34.04	32.52	68	48	33.96	15.48
107.9	Н	58.34	55.55	-15.20	43.14	40.35	68	48	24.86	7.65
107.9	V	48.26	45.25	-15.20	33.06	30.05	68	48	34.94	17.95

Operating Condition: Transmit the audio signal (modulated signal)

Note 1: Field Strength Calculation

C.F = Antenna Factor + Cable Loss - Preamp Factor

Margin = Limit - Level

#### Minimum Standard: FCC Part 15.239

The maximum Field Strength authorized within 200kHz is 250 uV/m@3m

### **3.2.2 Radiated Emissions**

#### **Procedure:**

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:Center frequency = the worst channelFrequency Range =  $30 \text{ MHz} \sim 10^{\text{th}}$  harmonic.RBW =  $100 \text{ kHz} (30 \text{ MHz} \sim 1 \text{ GHz})$ VBW  $\geq$  RBW= 1 MHz ( $1 \text{ GHz} \sim 10^{\text{th}}$  harmonic )Span = 100 MHzDetector function = peakTrace = max holdSweep = auto

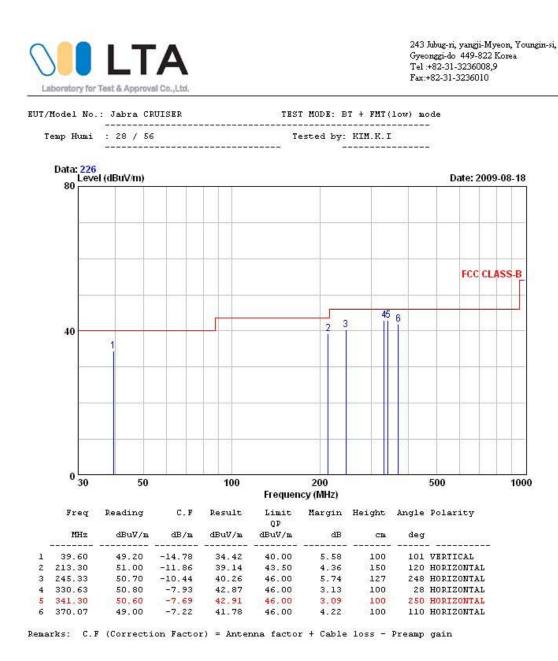
#### Measurement Data: Complies

#### Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m		
30 ~ 88	100 **		
88 ~ 216	150 **		
216 ~ 960	200 **		
Above 960	500		

\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

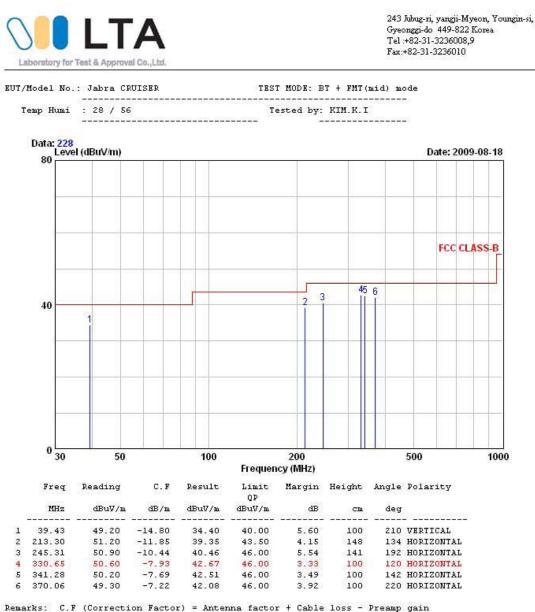
#### **Fundamental Frequency: 88.1MHz**



-1-

 $\rightarrow$  No other emissions were detected at a level greater than 20dB below limit.

#### **Fundamental Frequency: 98.0MHz**

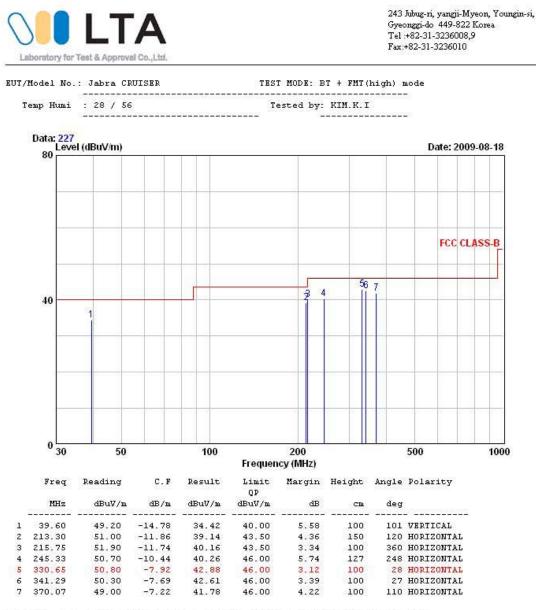


Remarks: C.F (Correction Factor) = Antenna factor + Capie loss - Preamp gain

-1-

 $\rightarrow$  No other emissions were detected at a level greater than 20dB below limit.

#### **Fundamental Frequency: 107.9MHz**



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

- 1 -

 $\rightarrow$  No other emissions were detected at a level greater than 20dB below limit.

### **3.2.3 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: Complies

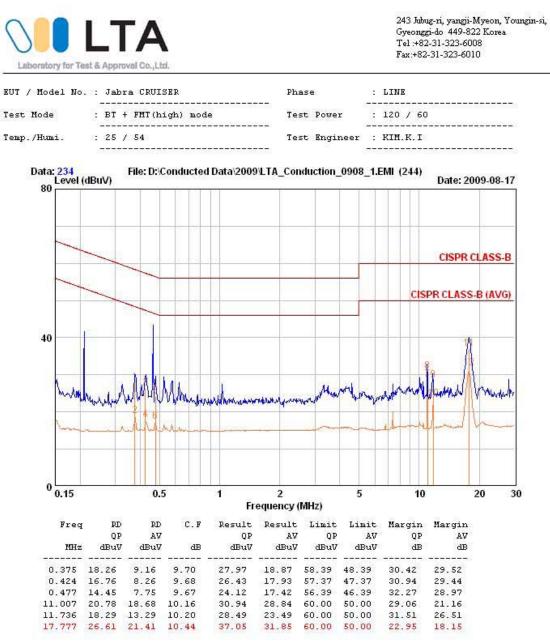
- Refer to the next page.

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

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

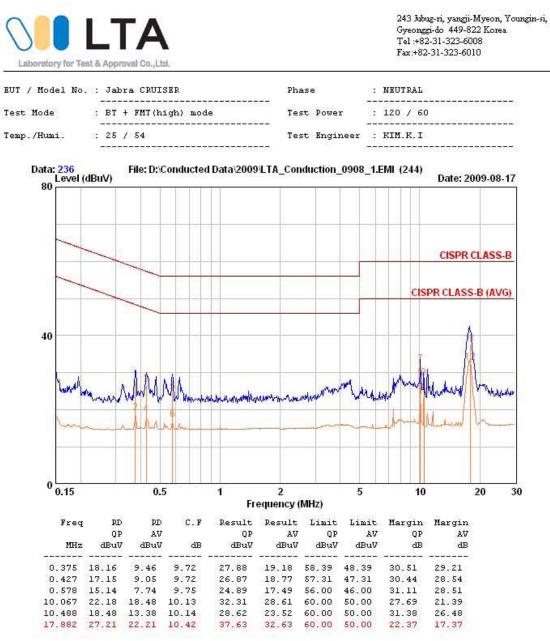
\* Decreases with the logarithm of the frequency

LINE – HIGH



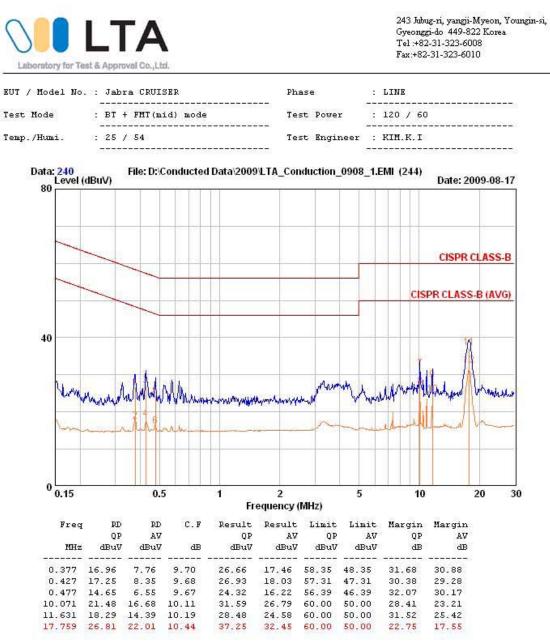
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

#### **NEUTRAL - HIGH**



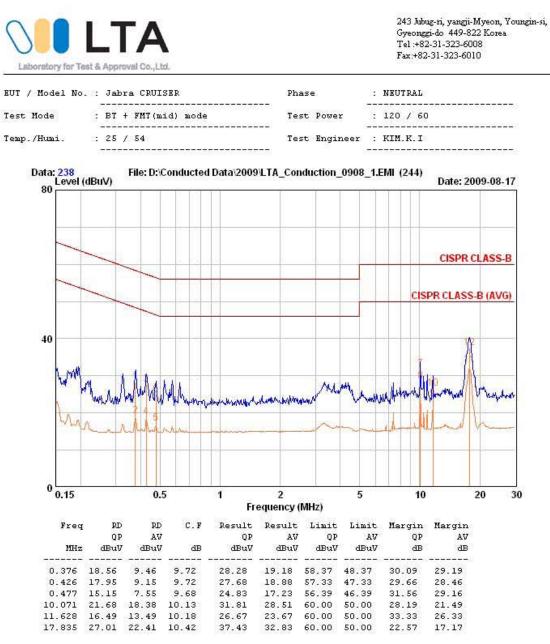
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

LINE – MID



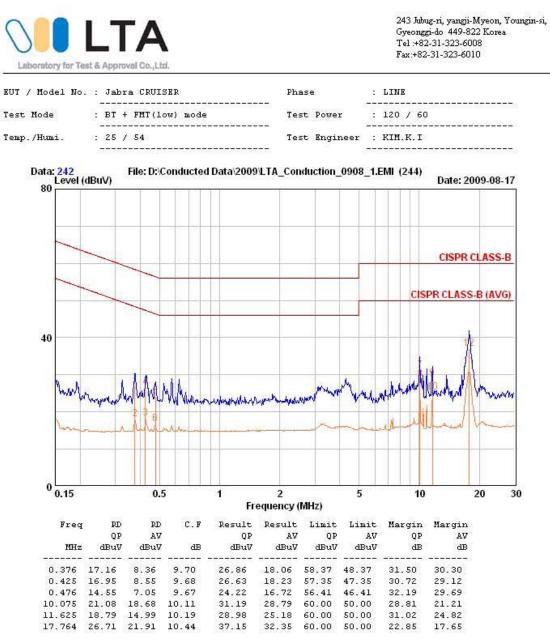
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

#### **NEUTRAL - MID**



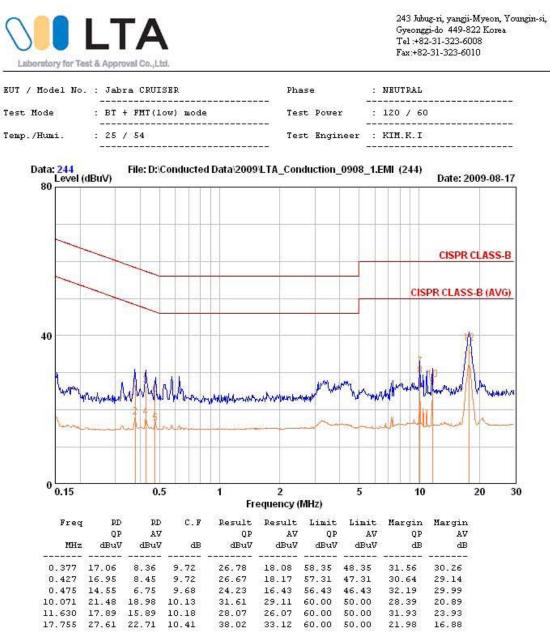
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

LINE – LOW



Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

#### **NEUTRAL – LOW**



Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

### 3.2.4 20dB Bandwidth

#### **Procedure:**

The channel Bandwidth is defined as the minimum declared bandwidth within which the transmitter's necessary bandwidth can be contained. The transmitter was adjusted to work at the selected channels. The Channel BW was measured at an amplitude level reduced from the reference level by the 20dB.

Occupied Bandwidth was measured as shown in the below.

The EUT was placed on a 0.8m high wooden table. An antenna was placed near the EUT and measurements of frequencies were recorded for reference during final measurements. Measurements were performed with the EUT rotated 360 degrees to determine worst-case orientation for maximum emissions.

#### $\rightarrow$

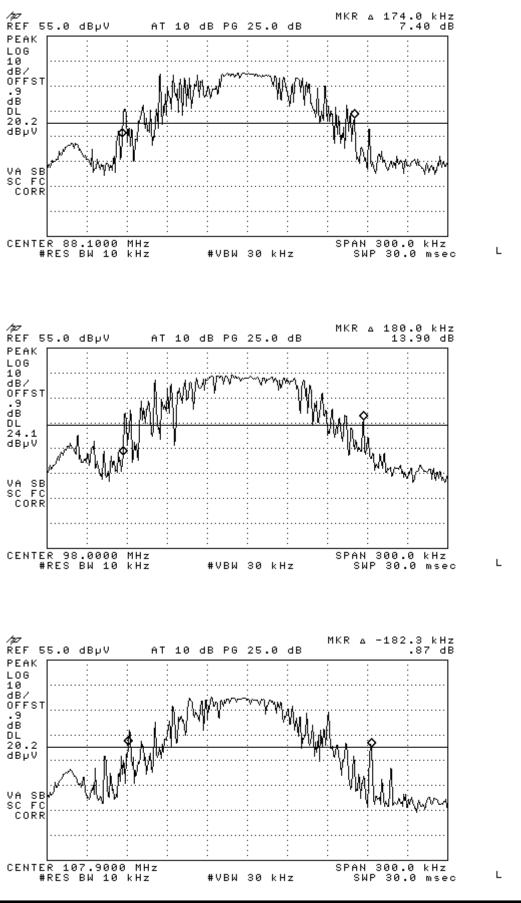
The spectrum analyzer is set to:					
Frequency Range = 88 ~ 108MHz					
RBW = 10 kHz	VBW = 30  kHz				
Trace = max hold	Detector function = Peak				
Sweep = auto	Span = 300  kHz				
Operating Condition: Transmit the maximum audio signal (modulation)					
we played a song from the "LG-LH2100" with the maximum audio input.					

#### Measurement Data: Complies

Refer to the next page.

#### Minimum Standard:

Occupied Bandwidth < 200kHz.



#### 20 dB Occupied Bandwidth

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## APPENDIX

## TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	FSV-30	100757	R&S	Feb-10
2	Spectrum Analyzer	8563E	3425A02505	HP	Apr-10
3	Spectrum Analyzer	8594E	3710A04074	HP	Oct-09
4	Signal Generator	8648C	3623A02597	HP	Apr-10
5	Signal Generator	83711B	US34490456	HP	Apr-10
6	Attenuator (3dB)	8491A	37822	HP	Oct-09
7	Attenuator (10dB)	8491A	63196	HP	Oct-09
8	Attenuator (30dB)	8498A	1801A06689	HP	Oct-09
9	EMI Test Receiver	ESVD	843748/001	R&S	Apr-10
10	Horn Antenna(18 ~ 40GHz)	SAS-574	154	Schwarzbeck	Nov-10
11	Horn Antenna(18 ~ 40GHz)	SAS-574	155	Schwarzbeck	Nov-10
12	RF Amplifier	8447D	2949A02670	HP	Oct-10
13	RF Amplifier	8449B	3008A02126	HP	Apr-10
14	Test Receiver	ESHS10	828404/009	R&S	Apr-10
15	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Apr-11
16	LogPer. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-11
17	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-11
18	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-11
19	Horn Antenna	BBHA 9120D	9120D122	SCHWARZBECK	Dec-11
20	Dipole Antenna	VHA9103	2116	SCHWARZBECK	Nov-09
21	Dipole Antenna	VHA9103	2117	SCHWARZBECK	Nov-09
22	Dipole Antenna	VHA9105	2261	SCHWARZBECK	Nov-09
23	Dipole Antenna	VHA9105	2262	SCHWARZBECK	Nov-09
24	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Apr-10
25	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
26	RF Switch	MP59B	6200414971	ANRITSU	-
27	Power Divider	11636A	6243	HP	Oct-09
28	DC Power Supply	6622A	3448A03079	HP	Oct-09
29	Frequency Counter	5342A	2826A12411	HP	Apr-10
30	Power Meter	EPM-441A	GB32481702	HP	Apr-10
31	Power Sensor	8481A	2702A64048	HP	Apr-10
32	Audio Analyzer	8903B	3729A18901	HP	Oct-09
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-09
34	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	Oct-09
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-11
36	Stop Watch	HS-3	601Q09R	CASIO	Apr-10
37	LISN	ENV216	100408	R&S	Oct-09