User Manual of
CSL CS508 USB dongle

FCC Regulations:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiated radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

FCC Note:

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user‘s authority to operate the equipment.

FCC RF Exposure Information (SAR)

This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the United States.

During SAR testing, this device is set to transmit at its highest certified power level and placed in positions that simulate RF exposure in usage near the body with the separation of **5 mm**.

The exposure standard for wireless employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6W/kg.

The FCC has granted an Equipment Authorization for this model device with all reported SAR levels evaluated as in compliance with the FCC RF exposure guidelines. SAR information on this model device is on file with the FCC and can be found under the Display Grant section of www.fcc.gov/oet/ea/fccid after searching on FCC ID: UB4CS508.

Carry this device, at least **5 mm** away from your body to ensure RF exposure level compliant or lower to the reported level.

Table of Content

Introduction

CS508 is a RTLS USB dongle to be used in a RTLS system. It can be used with other RTLS tag together for tag finding and range measurement.

1 Installation

1.1 Power up :

- CS508 takes power from the USB interface of an Andriod tablet as in the picture below. When CS508 is inserted into the tablet, the orange system LED will be light up.

1.2 Operation :

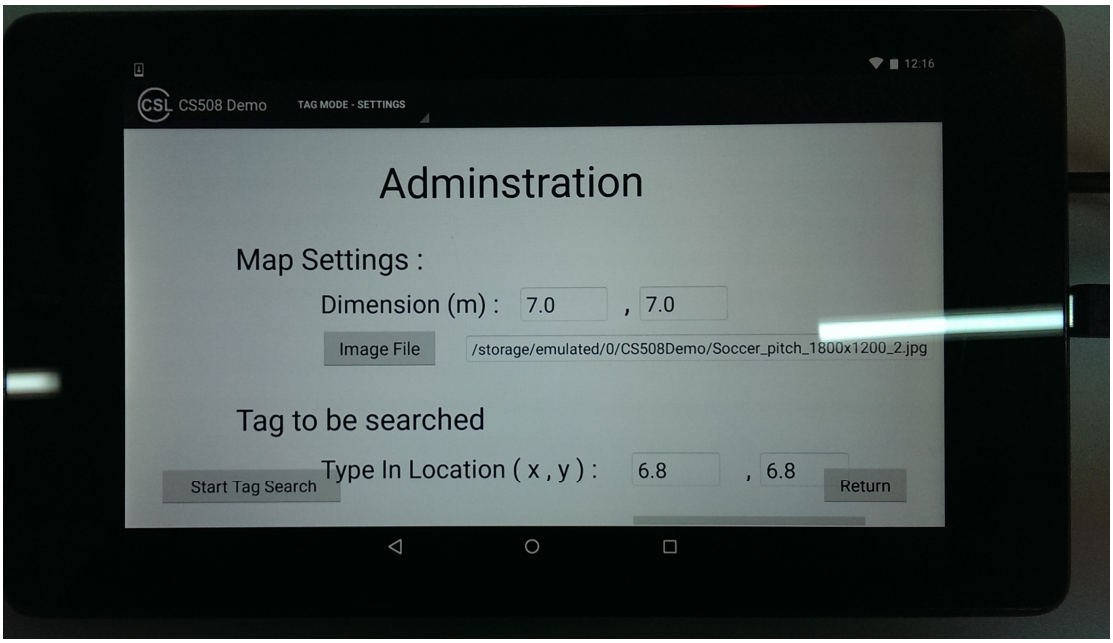
- Start the application program in Android tablet. CS508 will be automatically detected.

1.3 CS508 operation modes

- CS508 can be worked either as an Anchor or as a tag.

1.3.1 Tag Mode

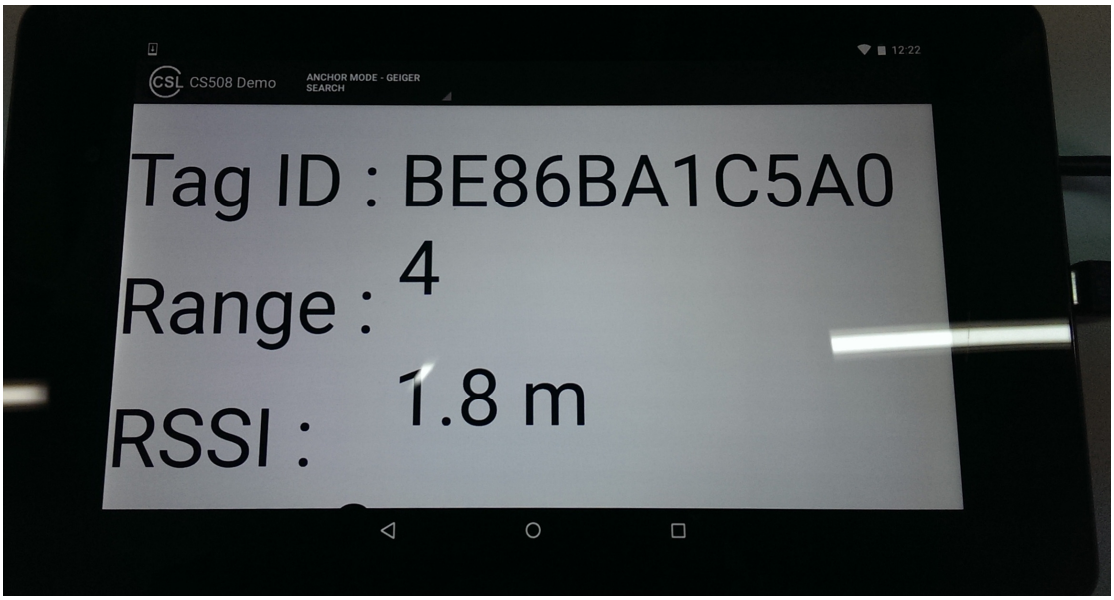
In tag mode, CS508 acts as a tag and can do normal RTLS ranging by putting it into a RTLS anchor installed environment.



1.3.2 Anchor Mode

In anchor mode, CS508 acts as an anchor. This can be done by running the application program in anchor mode and run tag search as below.

Besides, there is also a Geiger function to update the tag distance information regularly.



1.3.3 Product Specification

Specifications:	
Physical Characteristics:	**Plastic sealed enclosure: 60 mm x 37 mm x 10 mm; Weight 30 g**

Read Range:	**Up to 100 meters depending on reader power**
Frequency:	**2400-2483 MHz ISM license-free band**
Environment:	**Operating Temp: -40° C to 65° C (-40° F to 149° F)**
	Storage Temp: -40° C to 85° C (-40° F to 185° F)
	Humidity: 0% to 95% RH non-condensing
Technology:	**CSS modulation**
Output RF Power:	**+13 dBm**
Ranging Method:	**Time Of Arrival (TOA)**
Ranging Accuracy:	**+/- 1 meter**
Protocol:	**CSL RTLS Protocol, orderly inventory method to handle large tag population**
Power:	**+5V+/-10% From external USB interface**
Order Code:	**CS508**

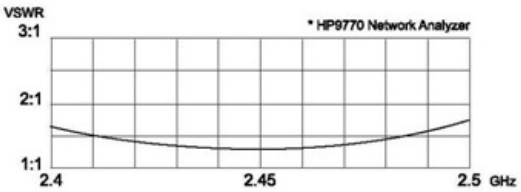
1.3.4 Antenna Properties

CS508 employs two antennas - an external monopole and an internal miniaturized SMD antenna for effective RF transmission and reception. Their properties are as below :

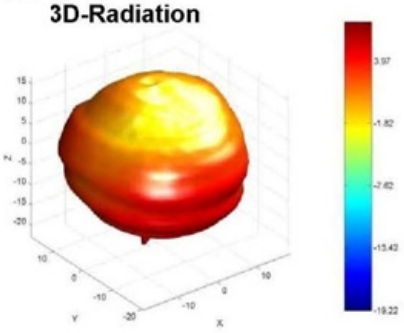
Antenna 1 :

Electrical Items	**Specifications**
Model	3030A5687-01
Type of antenna	SMD chip type
Frequency range	2400MHz – 2500MHz
Nominal impedance	50 ohm
Polarization	Linear
V.S.W.R	1.5 typically, mounting on CS508
Gain	2.1dBi typically, mounting on CS508
Mechanical Items	**Specifications**
Dimension in millimeter	12.8(L) x 3.9(W) x 1.1(H)
Weight	0.1gram

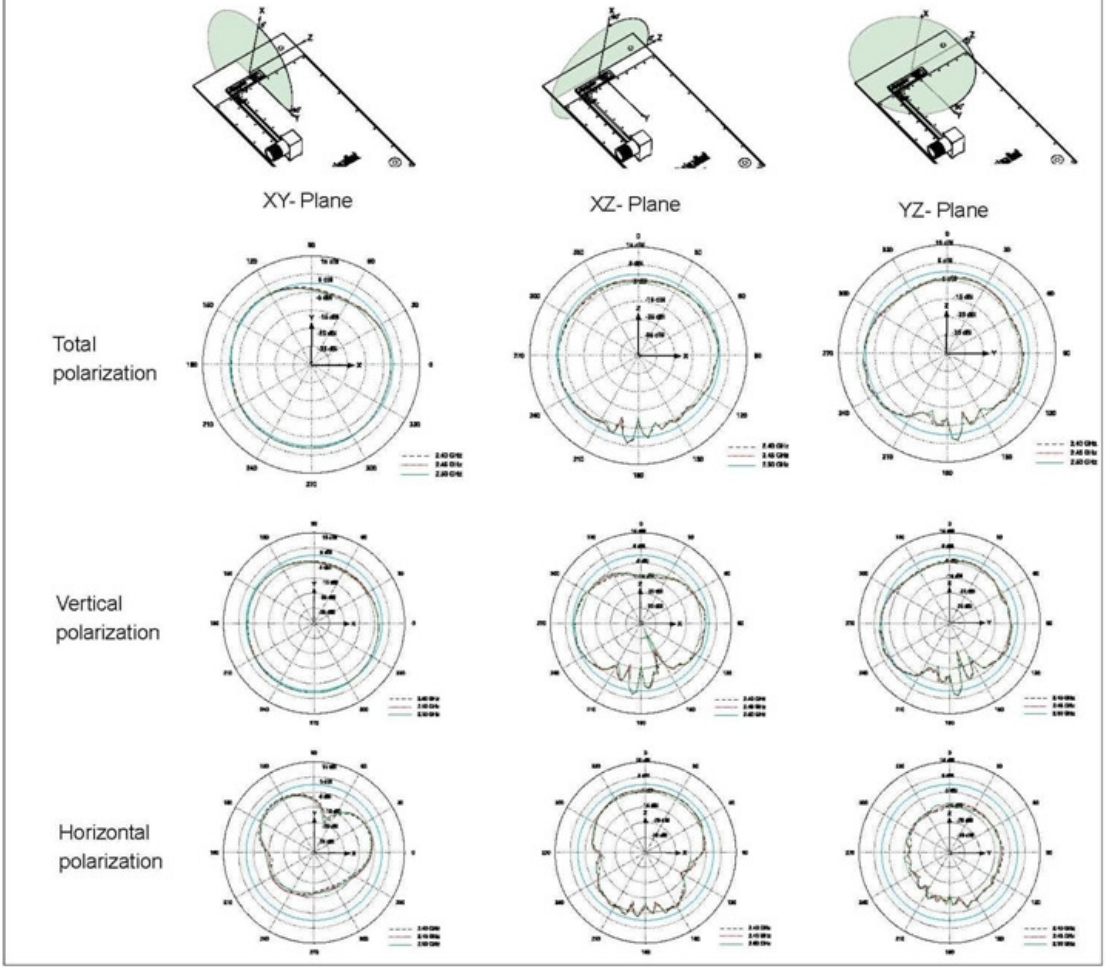
Voltage Standing Wave Ratio



3D-Radiation

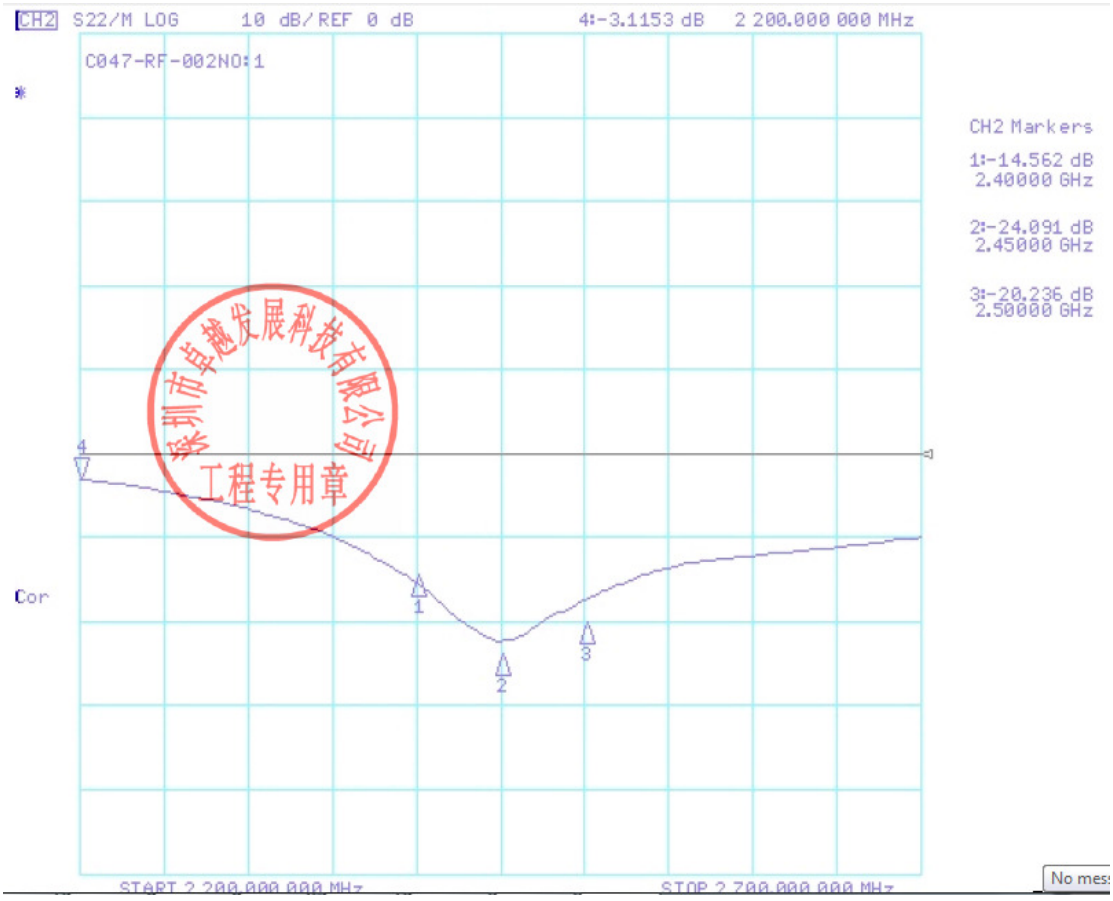


Radiation patterns



Antenna2 :

Electrical Items	**Specifications**
Model	C047-RF-002
Type of antenna	Monopole with SMA male RP connector
Frequency range	2400MHz – 2500MHz
Nominal impedance	50 ohm
Polarization	Linear
V.S.W.R	1.5 typically
Gain	+2.0dBi
Mechanical Items	**Specifications**
Dimension in millimeter	108.5mm in length
Weight	10gram



深圳市卓越发展世纪有限公司

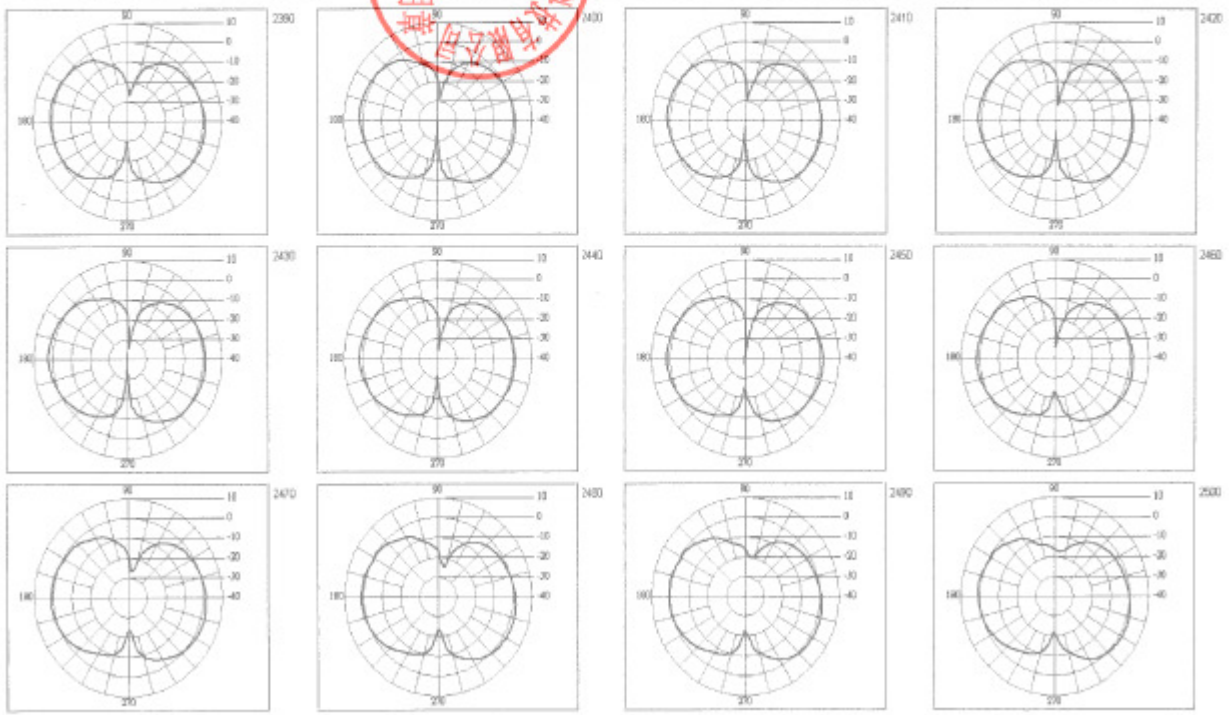
Model : 2.4GHz 0°1
Remak : E-Plane // Horizontal Polarization
Tested by : CORTEC Antenna 3D Lab (IP: Q.B

Location: Chamber
Temperature (℃): 22.00

Data: 2008/7/9
Humidity (%): 55.00

Time: 下午 07:20:03
Approved by:

Freq. (MHz)	2390	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	1.62	1.7	1.66	1.76	2.04	1.79	1.78	2.07	1.86	2.11	1.73	1.36
Peak Degree	348	170	176	176	176	102	103	343	343	343	342	336
AV Gain (dBi)	-2.01	-1.78	-2	-1.58	-1.83	-1.54	-1.75	-1.67	-2.1	-2	-2.3	-3.58



深圳市卓越发展世纪有限公司

Model : 2.4GHz /// 1
Remark : H-Plane // Vertical Polarization
Tested by : CORTEC Antenna 3D Lab /// P. G.B

Location : Chamber
Temperature (°C) : 22.00

Freq. (MHz)	2390	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	1.91	2.43	2.22	2.11	2.35	1.91	1.85	1.71	1.16	1.07	0.75	0.22
Peak Degree	49	50	56	58	62	19	18	332	328	320	193	194
AV Gain (dBi)	0.78	1.15	0.95	0.85	1.21	0.77	0.54	0.31	0.26	0.4	0.02	-0.41