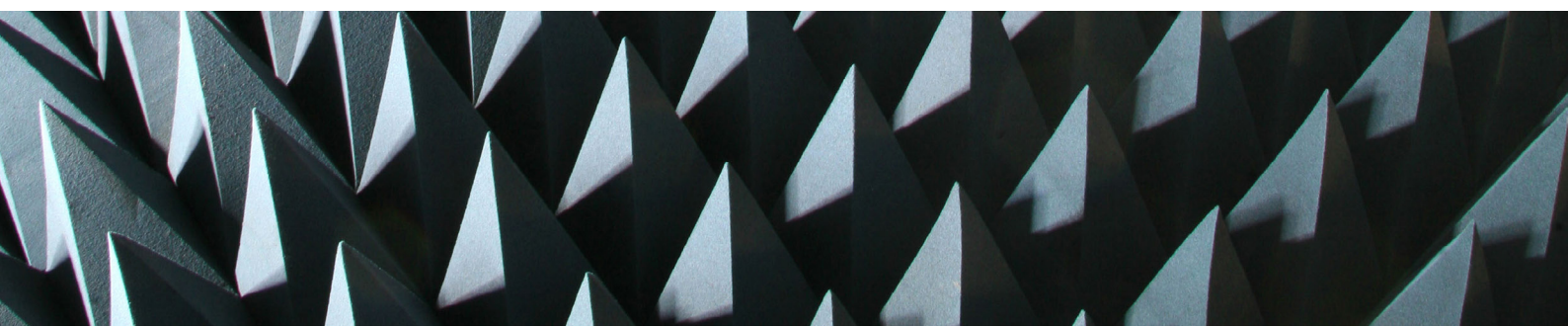


UWB.31

Device Active
Mode: Sensitivity



Service name:

UWB.31 Device Active Mode: Sensitivity

Deliverables

EIS performance report

Duration:

2 days

Items:

- A. Test in Taoglas 3D anechoic chamber or Outdoor environment
– Full UWB EIS/TIS Physical channel frequency analysis as per IEEE 802.15.4a-2007 UWB Device OTA test standards in line with reference kits adhering to same using Taoglas UWB antennas <https://www.decawave.com/products/dw1000>
- B. If fail consult with Noise Control Division. Postintegration verification performance of device Effective Isotropic Sensitivity (in 4 quadrants in Azimuth plane; 0, 90, 180, & 270 degrees) EIS/ TIS is dependent on both antenna performance and system design, device emissions control. Many of the network operators in North America have specific tests and metrics for radiated performance on transmit (EIRP/TRP), receive (EIS/ TIS) and coexistence interference (RSE). These tests enforce a minimum level of performance on the wireless product. This is done to ensure end customer useexperience expectations are met, thus, protecting the carrier's network brand. Testing these performance parameters early in the design cycle can reduce risk of certification failure and costly design and tooling changes late in the design cycle. The best way to test these parameters is through completing the real testing in a real chamber or outdoor test environment. Taoglas can currently perform these tests with any of these tests enforce a minimum level of performance on the wireless product. This is done to ensure end customer useexperience expectations are met, thus protecting the carrier's network brand. Testing these performance parameters early in the design cycle can reduce risk of certification failure and costly design and tooling changes late in the design cycle. The best way to test these parameters is through completing the real testing in a real chamber. Taoglas can currently perform these tests on any UWB device for various UWB channels using a Reference Kit with Taoglas antenna vs the customer UWB device with Taoglas designed Antenna.

What is the problem or concern we are addressing?

What can Taoglas offer you? — The Taoglas advantage

1. Materials

We are not committed to one material technology. We use a wide variety of materials and are constantly researching the latest developments. We ship antennas made from high grade Ceramics, FR4, Metal, Fiberglass, PTFE, Mylar, and flexible PCB.

2. Surface Mount Technology

Taoglas are the worldwide leaders of high performance surface mounted ceramic antenna solutions for UWB with unique (patent pending) products. These products are delivered on tape and reel and connect to our customers devices during the standard reflow process.

We are first in the market to provide automotive approved SMT UWB ceramic antenna products and unique UWB channel specific LTCC UWB antennas with integrated Wi-Fi notch filters to offer high efficiency and performance off the shelf in a small footprint.

This integrated filter technology can also be applied to mitigate certain co-existing wireless protocols within the UWB frequency bands. Ceramics also offer some immunity to thermal conductivity which makes them less susceptible to thermal noise from the electronics.

3. Antenna Design Techniques

We select the antenna design that is right for the individual project, application, or market; Rigid FR4 PCB antennas, FPCB polyimide/Kapton antennas, ceramic SMT antennas, stamped folded metal, LDS on plastic housing, and larger external horn antennas for instance. We are not limited by design methodology, we use EM/PCB software and practical tried and tested procedures to deliver the most effective and efficient antenna. This means we are also not limited by antenna frequency we have the ability to deliver all antennas for the project.

For the device itself you may need to have multiple antenna types GPS, multi band cellular, diversity, Wi-Fi, Bluetooth, RFID etc. It is best to have one antenna company provide all the antennas because it cuts development time by half while also availing of bulk buying discounts.

We can design and deliver an antenna at any frequency and we have a huge amount of experience in being challenged to design with small spaces and high target specifications. This means we can provide full antenna network solutions - base station antennas, external/remote/mobile, and embedded antennas.

4. M2M Focused

Taoglas employees have built up years of practical international experience in different markets, and have worked on thousands of custom M2M devices. Simply put, we know what designs work and what do not. We also stay close to M2M module developments and offer performance test services for a complete radio product with our UWB antenna integrated in your product.

We would typically test for EIS (Effective Isotropic Receiver) Sensitivity using a reference kit as receiver to the DUT in 4 azimuth plane quadrants (0, 90, 180, and 270 degrees analysis of radiation pattern). We select the antenna design that is right for the individual project, application or market; PIFA antennas, Monopoles, Dipoles, Loop Antennas etc.

We are not limited by design methodology, we use software and practical tried and tested procedures to deliver the most effective and efficient antenna. This means we are also not limited by antenna frequency we have the ability to deliver all antennas for the project. For the device itself you may need to have multiple antenna types GPS, multi band cellular, diversity, Wi-Fi, Bluetooth, RFID etc. It is best to have one antenna company provide all the antennas because it cuts development time by half while also availing of bulk buying discounts.

The Processes

Part 1

1. Taoglas will setup your device in our chamber and power the device on per your instructions. If the device is intended to be used on a person, a phantom will be used.
2. A base station emulator UWB kit will be used to establish a call or test-mode connection with your device.
3. Taoglas' automated test system will perform the EIRP tests at required UWB channel Bands.
4. Taoglas will complete the test report detailing the setup and results. If the antenna performance is not acceptable, Taoglas sales and engineering can make recommendations to improve the antenna performance. If the antenna performance is acceptable the next step would be further active measurement - TIS/EIS, and RSE.

Deliverables

Taoglas will compile a report on the EIRP measurements, including:

- Device test setup picture
- EIS values at 4 quadrant azimuth angles of the DUT (0, 90, 180, and 270 degrees) at the relevant UWB channels
- Taoglas will perform 500 MHz wideband tests per band of the following tests as required

See table below:

DWB1000 UWB localisation chip covers FCC UWB channels 1-7 (EU/EC UWB channels 5&7)

- Only one band usually used, there is no Carrier Aggregation (CA)
- Most common is either channel 2 or channel 5

UWB PHY channel frequencies for DW100

Channel Number	Centre Frequency (MHz)	DW1000 operational BW (MHz)
1	3493.4	500
2	3993.6	500
3	4492.8	500
4	3993.4	900
5	6489.6	500
7	6489.6	900

USA

EU / CN / AU / CA

What does Taoglas need?

In all cases Taoglas will require the following:

- Two (2) complete devices, with all the bits and pieces
- The devices need to be functional enough to enable the Customer UWB modem with an interface for comms via RS 232 serial port but preferably USB and or ethernet port for direct access to server for the latter and also a programme to enable AT command access that can be downloaded to a Taoglas computer. The devices should be built-up as much as possible, the closer to the final assembly the more accurate the results. Batteries, displays, and metallic sub-assemblies will impact the test results and should be included.
- One complete set of any support devices such as spare battery packs, battery charger, interface cables, etc.
- Instructions on how to connect the device, power on the device, and connect to the AT command interface. If the battery will need to be charged or replaced.

Taoglas will provide a Reference Kit for Receiver for the EIS receiver sensitivity tests. It will comprise of a DW1000 kit and a Taoglas reference antenna in all cases. Taoglas will also reference the customer device measurements Vs Taoglas kit to an all Taoglas reference kit measurement set up for EIS/TIS.

OTA EIS/TIS Control Test

- Taoglas Eval kit Vs Taoglas Eval kit Golden Standard
- Customer Test kit Vs Taoglas Eval kit

Same Test is also used for active system Group Delay ripple testing in transmit mode. Basically, a maximally flat group delay phase response over radiation pattern or frequency is ideal for an active Group Delay measurement. The premise being that 100-150 ps ripple realizes minimum distortion for (RTLS) Real Time Location System Accuracy in UWB Antenna Systems enabling higher accuracy within 10cm or so. This total system test; customer transmitter/receiver system + Taoglas antenna is a follow up to the UWB.10 passive antenna Group Delay ripple test.

Include instructions on how to do so.

Part 2

Taoglas engineering in consultation with the customer on the final report will determine if the measured performance factors are sufficient for the product to meet its performance and certification requirements.

* If a device radio module can accommodate more than the typical 3.2-7.2 GHz as per UWB reference module DW1000 (reference it) i.e. the wider 3.1-10.6 GHz range then applicable charges will apply TBD.