Inventek ISM14585 BLE 5.0 Module

2022

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Inventek ISM14585 Feature Highlights

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Inventek ISM14585 Feature Highlights

- Frequency Band: 2.4GHz
- Complies to the Bluetooth 5 core specification
- Supports up to 8 Bluetooth LE connections
- Network Standard: Bluetooth Low Energy
- Longest battery life
- Operating voltage 3.3V
- Operating Temperature: -40°C to 85°C
- MSL level 3
- Low system Bill of Materials
- **FCC, CE, IE Certified**
- **SARs Certified Exemption**

- Processing power
  - 16 MHz 32 bit ARM Cortex-M0 with SWD
  - Dedicated Link Layer Processor
  - AES-128 bit encryption Processor

- Memory Resources
  - Integrated One-Time-Programmable memory 64 kB (OTP)
  - 96 kB Data/Retention SRAM
  - 128 kB ROM
  - **8Mb integrated Flash**

- Power Management
  - Integrated Buck DCDC converter
  - P0, P1 and P2 ports with 3.3 V tolerance
  - Internal decoupling of the supply pins
  - Supports Coin (typ. 3.3 V)
  - 10-bit ADC for battery voltage measurement
  - **Integrated Power Amplifier for maximum radio performance**

- Package
  - **6.0mm x 8.6mm x 1.2mm**
  - LGA 35

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Inventek ISM14585 Support Collateral & Services

Inventek ISM14585 Support Collateral & Services

- Complete customer schematic reviews
- Customer Application/Implementation consultation services
- Design support services
- Complete & Certified Antenna layout guidelines and support
- Custom Antennas and associated Certification services
- Model Support
  - 3D CAD)
  - PCB Footprint (STEP)
  - Schematic symbol

- Dialog SDK for the ISM14585:

https://www.dialog-semiconductor.com/products/inventek-ism14585-l35

- OTA support
- AT Commands supported (CODELess)
- IO Expanders
- ISM14585 Battery Life Calculator
- SDK SmartSnippet BLE Application Examples
- SDK Power Profiler
- Power Savings Config Options:
  - No Power Savings
  - Bypass PA only
  - Flash Sleep only
  - Bypass PA & Flash Sleep

SDK

	Date	Version
INVENTEK SDK 6.0.14.1114 RELEASE FOR THE ISM14585 (Registered users only)	28/05/2020	6.0.14.1114

NOTE: Users must register on Dialog's site to access the Inventek ISM14585 SDK.

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Inventek ISM14585 & DA14585 Range Testing

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ISM14585 & DA14585 Range Testing

- Range Measurements Performed On Open Football Field
  - Environmental Conditions during measurements
    - Field Elevation: 1306 Feet
    - Temperature: 62°F
    - Humidity: 70%
    - Slight Crown in the field: slops away from center at about 1' drop to field edges
- Devices Under Tests: DA14585, ISM14585
- DA14585 and ISM14585 Modules powered via Dialog's Pro EVB board
- ***At 100m, the DA14585, and ISM14585***
- ***At 100m:***
  - *DA14585 power was -94dbm*
  - *ISM14585 power was -84dbm*
- ***Dialog 14585, sensitivity per datasheet is down to -91db***
- ***Measurements were made every 10 yards out to 110 yards (~100m)***
- "Ideal" Free Space Path Loss was used in the data comparisons

ISM14585 & DA14585 Range Testing

Field used for Measurements

Center line of field

Device Under Test

View from equipment table to end of field (100m away)

View from end of field to equipment table (100m away)

Zoom View of far end of field

ISM14585 & DA14585 Range Testing

Measured Data

Bluetooth Low Energy				
Range Testing (power in dbm at distance)				
Elevation:	1306 Feet			
Temp	62F			
Humidity	70%			
Testing App	LightBlue (iPhone), and	Wifi Analzer (Android)		
Free Space Path Loss (FSPL) Calculations				
Distance	DA14585	ISM14585	FSPL-0db	FSPL-2db
18" (0.64m)	-43	-38	-33	-31
10 yds (9.14m)	-70	-64	-59	-57
20 yds (18.29m)	-75	-68	-65	-63
30 yds(27.43m)	-76	-70	-69	-67
40 yds (36.58m)	-75	-71	-71	-69
50 yds (45.72m)	-78	-77	-73	-71
60 yds (54.86m)	-81	-77	-75	-73
70 yds (64.01m)	-83	-81	-76	-74
80 yds(73.15m)	-83	-79	-77	-75
90 yds (82.3m)	-85	-79	-78	-76
100 yds (91.44m)	-88	-83	-79	-77
110 yds (100.58m)	-94	-84	-80	-78

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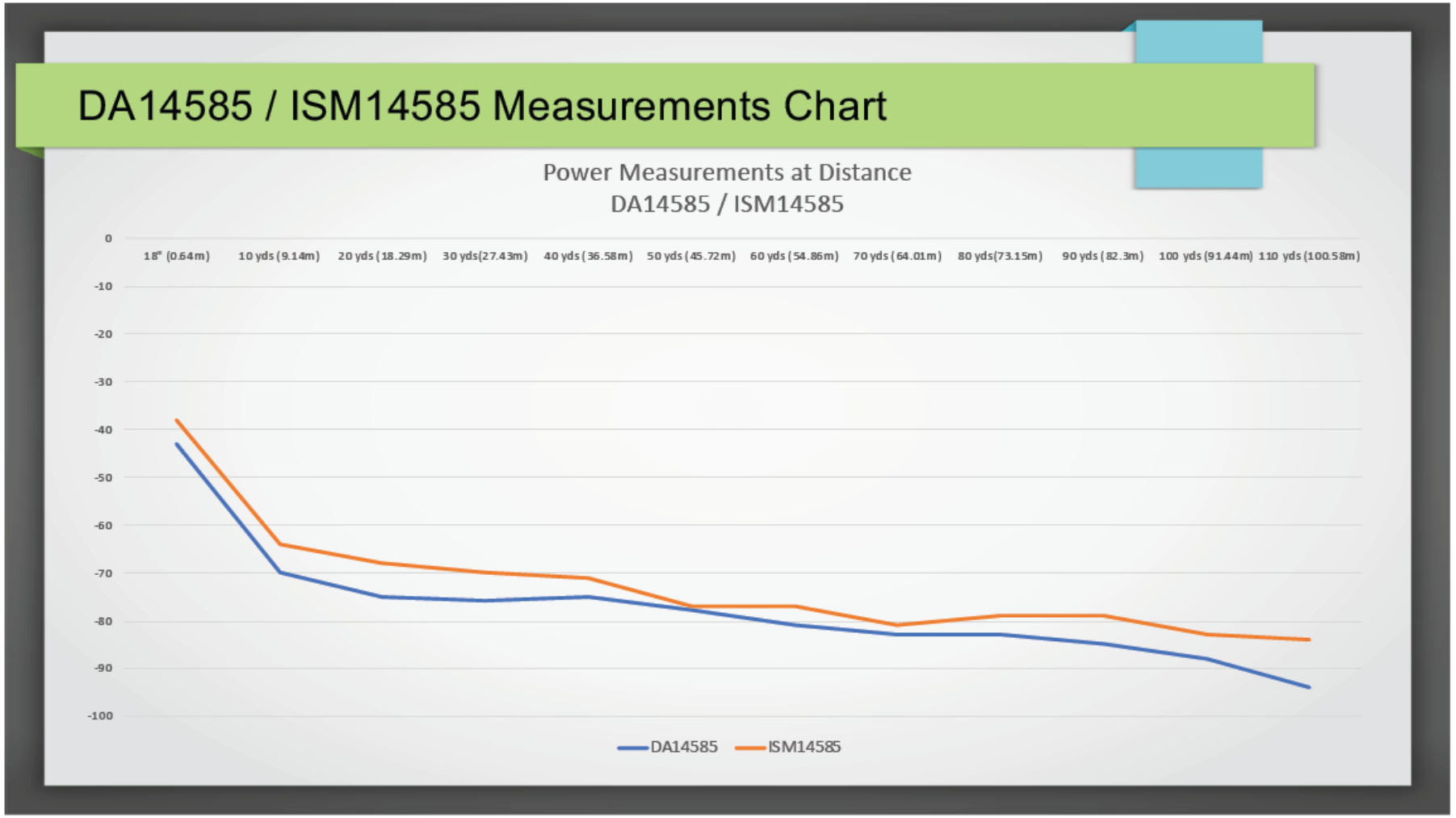
ISM14585 & DA14585 Range Testing



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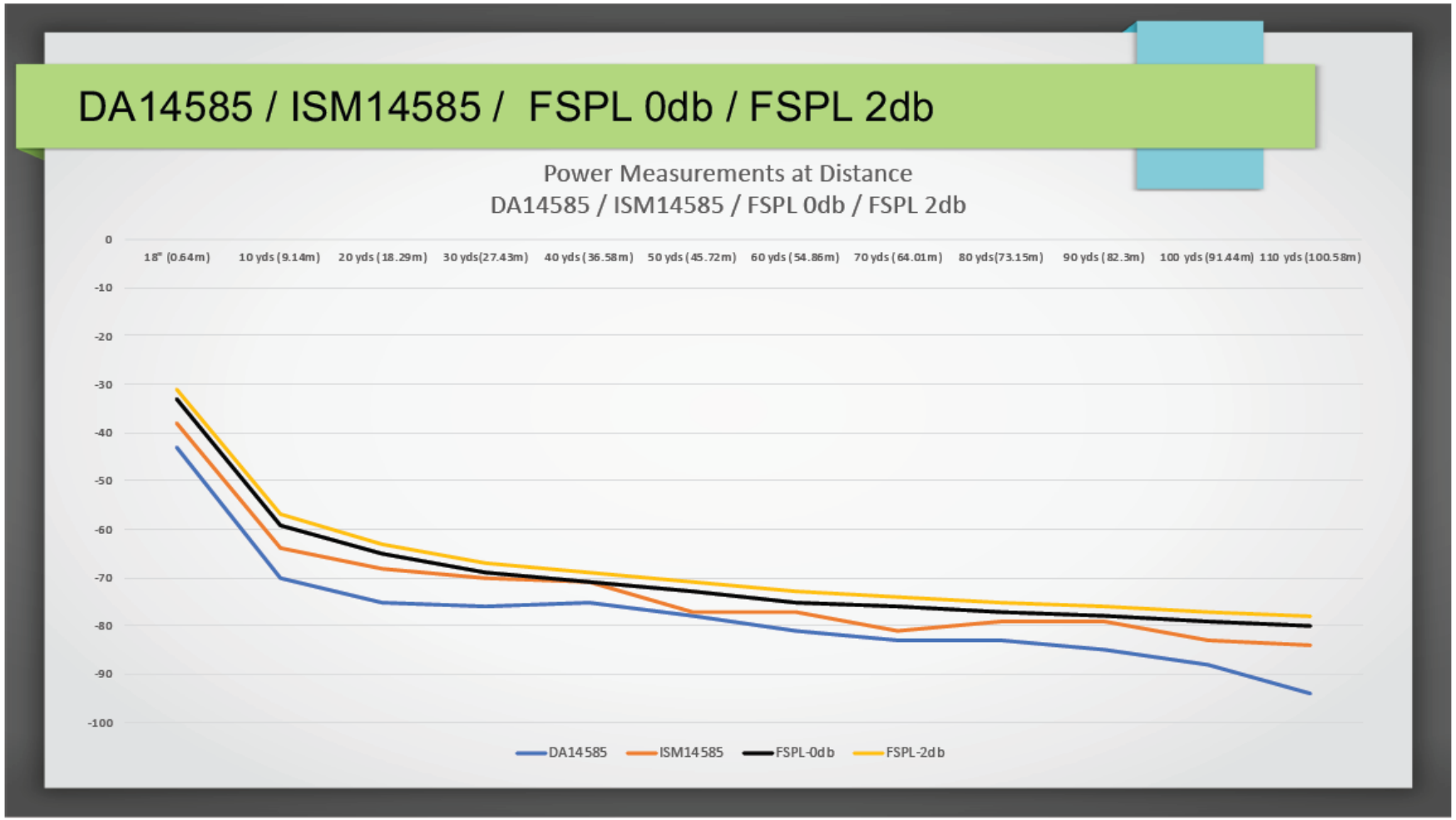
ISM14585 & DA14585 Range Testing



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Inventek ISM14585 Antenna Configuration options

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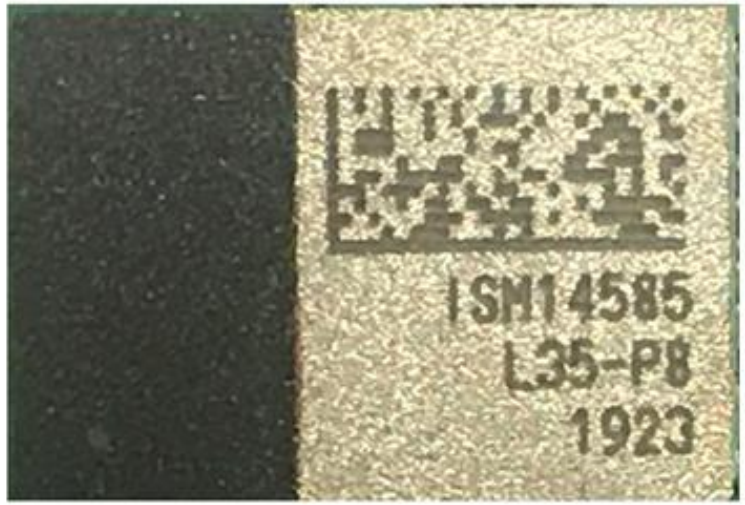
ISM14585 Antenna Configuration Options

Module Standard Ordering Number:

ISM14585-L35-P8



LGA 35, 6.0mm x 8.6mm x 1.2mm

Regulator	Status
FCC	**O7P-14585**
IC	**10147A-14585**
RoHS	Compliant

Evaluation Board Standard Ordering Numbers:

ISM14585-L35-P8-EVB: Internal Antenna EVB Option

ISM14585-L35-P8-EVB-W: External w.fl Antenna EVB Option

- ISM14585-L35-P8-EVB-W requires the Inventek **B24P-W** Certified w.fl External Antenna

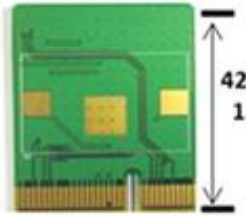
Evaluation Board Ordering Number:

ISM14585-EVB-X

Antenna:
- Blank = Internal Antenna
- W = w.fl External Antenna

TOP VIEW

BOTTOM VIEW



B24P-W Certified w.fl External Antenna to accompany the ISM14585-L35-P8-EVB-W w.fl External Antenna Evaluation Board option

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ISM14585 Antenna Configuration Options

- **ISM14585-L35-P8: Module** Complete Ordering P/N for either option of **Internal Certified Antenna** or **B24P w.fl External Certified Antenna**
- **ISM14585-L35-P8-EVB: Evaluation Board** Complete Ordering P/N for the Internal Certified Antenna EVB
- **ISM14585-L35-P8-EVB-W: Evaluation Board** Complete Ordering P/N for the **B24P-W** w.fl External Certified Antenna EVB

B24P-W
Certified
w.fl External Antenna

- Frequency Band: 2400MHz – 2500MHz frequencies
- Certified Antenna
- Dimensions: 30 x 5.0 x 0.5 (mm)
- Length: 102 mm (from middle of PCB to the connector, includes connector's length)
- Custom Length options available
- Coaxial cable: 0.81 mm OD

B24-SC
Surface Mount Ceramic
Chip Antenna

- Frequency Band: 2400MHz – 2500MHz frequencies
- Stable and reliable in performances
- Compact size and a low profile
- RoHS2.0 compliant
- SMT process compatible

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Inventek ISM14585 + Dialog DA14585 IoT Combo EVK Platform

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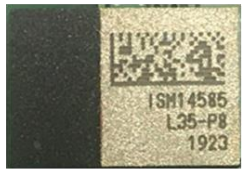
Inventek ISM14585 + Dialog DA14585 IoT Combo EVK Platform

IoTComboEVK-14585:

- Inventek **ISM14585-L35-P8-EVB** Evaluation Board
- Inventek **ISM14585-L35-P8** Module
- Dialog **DA14580DevKT-P EVB** Evaluation Board
- USB I/F Cable
- Coin Cell Battery



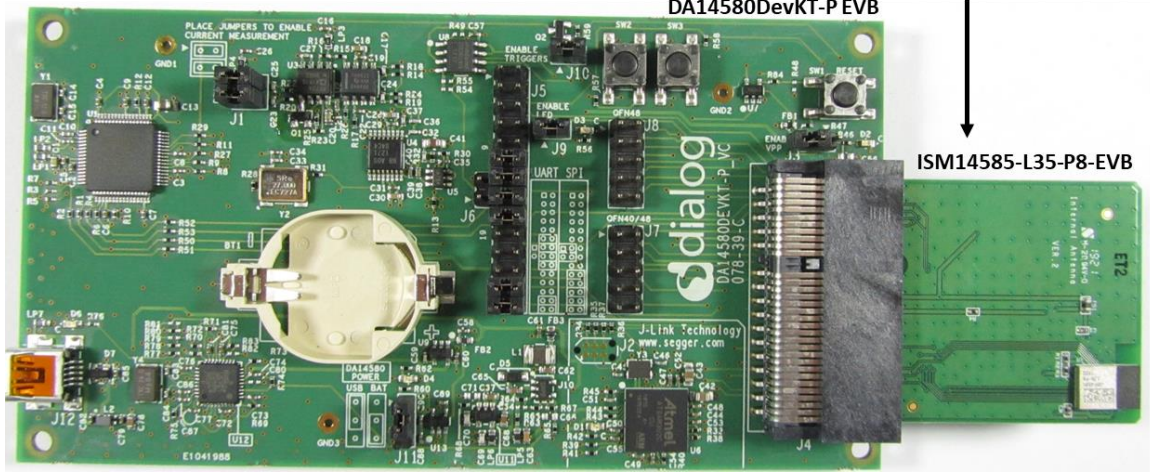
ISM14585-L35-P8 MODULE
Supports both Fully Certified Internal Antenna and B24P-W w.fl External Antenna option

- 6.0x8.6x1.2 (mm) LGA-35
- Cortex M0
- Integrated PA
- Integrated PMU
- Integrated 8Mb of Flash

ISM14585-L35-P8-EVB
Evaluation Board (Certified Internal Antenna)
Standard with **IoTComboEVK**

ISM14585-L35-P8-EVB-W
Evaluation Board (Certified w.fl External Antenna)
Requires the **B24P-W** w.fl Antenna

DA14580DevKT-P EVB



ISM14585-L35-P8-EVB

https://www.digikey.com/en/product-highlight/i/inventek-systems/iot-combo-eval-board

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Dialog's Production Line Test (PLT) Support

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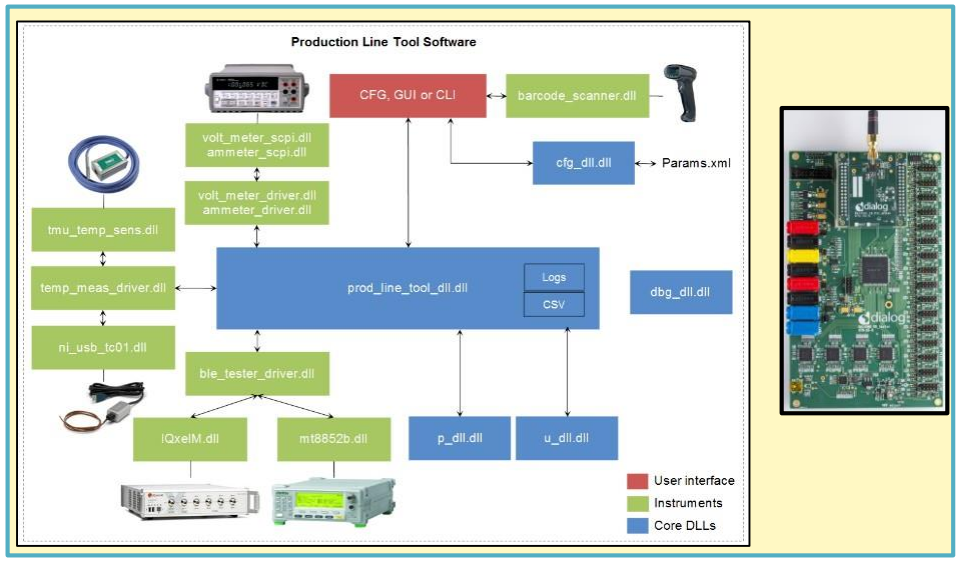
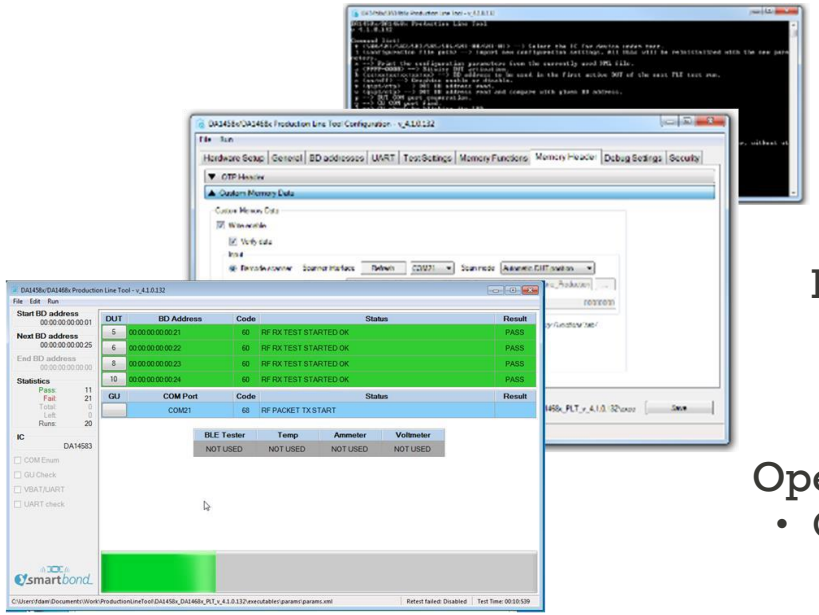
Every Second Counts $$$

Dialog's Production Line Test (PLT) Support





Development Engineer:
- CLI and console for integration of 3rd party production tools

Product Engineer:
- Configuration Tool

Operator:
- Graphical User Interface

	DA145xx	Competitor C	Competitor N
Programming/trimming and Testing Time per device	0.75 seconds	45 seconds	20 seconds
Contract Manufacturer Time Cost	$8/hour	$8/hour	$8/hour
Cost Per Device	**$0.002***	**$0.10**	**$0.04**

* Based on Dialog's PLT being able to program, trim and test 16 devices in 12 seconds

End Product Test Time Example (Per Unit)

Assessment of time spent on tester at end of production line for an example product

- Flash loading time (via UART @ 1Mbaud)
  - Stack & bootloader in Flash (180KB) — 1.8 sec
  - Stack in ROM — 0 sec
- Radio test time — 0.5 sec
- Xtal trimming — 0.25 sec
- Image download — 0.3 sec
- Sensor and GPIO testing — 0.1 sec
- Total test time:
  - Dialog silicon using Dialog production line tester: ~1 sec per product
  - Flash-based Stack competitor (best case): ~2.8 sec per product

Production Line Tool (PLT)

- PLT has been broadly adopted by Dialog customers, therefore highly optimized/robust
  - Majority of customer adopt without customizing – although this option is open
- Dialog has dedicated, internal engineering resources (both hardware and software) maintaining and continuously optimizing for customer production costs
- Dialog offers both the hardware solution and an open source software solution
- Dialog will additionally offer dedicated engineering resources for any custom PLT requirements
- Benchmark - 16 Devices tested in parallel, including
  - RF Testing
  - Crystal Trimming (supports less expensive crystal, with fast (~0.25sec/crystal) trimming)
  - Firmware download and verification
  - Total test and firmware load time - 12 seconds

THANK YOU!

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