DTM800-A Specification

Application Information

01-DTM800-A-V0.1
JAN.2012

AnyDATA CDMA Module Series Reference Design Specification

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Contents

1. Introduction

1.1 Revision History

The revision history for this document is shown in Table 1-1.

This is temporary version,

Version	Date	Description
0.1	JAN. 2012	Initial Release

Table 1-1 Revision history

2. Overview

2.1 Application Descriptions

The DTM800-A Module is a complex consumer communications instrument that relies heavily on both digital signal and embedded processor technologies. The Wireless Data Module manufactured by AnyDATA.NET supports not only Code-Division-Multiple-Access(CDMA) and GPS(Global Positioning System)

This operates in the CDMA450 “A-block “ spectrum band.

In a continuing effort to simplify the design and to reduce the production cost of the Wireless Data Module, AnyDATA.NET has successfully developed the DTM800-A. The DTM800-A is AnyDATA.NET’s latest compact Wireless Data Module contains complete digital modulation and demodulation system for CDMA standards as specified in IS-98 A/B, IS-2000(C.S0011)and 1xEV-DO rev 0/A/B (IS-856), GPS standards (C.S0036).

The subsystem within the DTM800-A includes processor (MDM6600), and 60-pins board to board connector for external interface. This external interface are inculde usb, RS-232 communication function pins and other external function pins.

2.2 Technical Specifications

- NMT450 is BC5.

2.2.1 General Specifications

Parameters	Descriptions
Mechanical Interface	60-pins board to board connector
	Include USB 2.0/ 4-pin UART/ AT command , etc
Operating Voltage	3.4~4.2 V Battery for main power and 5V for USB communications
Size (max)	40 * 30 * 4.1
Weight	9.3g
Operating Temperature	-20ºC ~ +50ºC
LED Indicator	IDLE/BUSY/SMS 3LED control
External interface	RS-232, R-UIM, USB2.0, GPIOs

Table 2.2.1-A General Specifications

Parameters	Descriptions	
RF technology	All	Zero Intermediate Frequency
External Access	CDMA EvDO	Code-Division-Multiple-Access Evolution-Data Optimized
	GPS	Global Positioning System
Protocol	CDMA / EvDO	IS-95 A/B, IS-98A, IS-637A, IS-707A, IS-2000, IS-835, IS-856, IS-866, IS-890
	GPS	TIA-916

Table 2.2.1-B General Specifications(Continued)

Parameters	Descriptions	
Data Rate (max)	EvDO Rev B	Phase I : Forward link : 9.3Mbps reverse link : 5.4Mbps max Phase II: Forward link : 14.7Mbps reverse link : 5.4Mbps max
Transmit/Receive Frequency Interval	CDMA / EvDO	10MHz(BC5), 90MHz(BC6)
Frequency Stability	CDMA / EvDO	±300Hz

Table 2.2.1-C General Specifications(Continued)

2.2.2 Receive Specifications

- **for CDMA**

Parameters	Descriptions
Frequency Range	463.0 MHz ~ 467.475 MHz
Sensitivity	Below –104 dBm
Interference Rejection	Single tone (-30dBm @ ±900KHz) : Below –101dBm Two tone (-43 dBm @±900KHz and ±1700KHz) : Below –101dBm
	Two tone (-48 dBm @±2.5MHz and ±4.9MHz) : Below –101dBm
Spurious Wave Suppression	Below –80dBc
Input Dynamic Range	-25 dBm ~ -104dBm

Table 2.2.2-A CDMA Receive Spec

- **GPS**

Parameters	Descriptions
Frequency Range	1.575GHz
Sensitivity	Signal Level : -149 dBm

Table 2.2.2-D GPS Receive Spec

2.2.3 Transmit Specifications

- **for CDMA**

Parameters	Descriptions
Frequency Range	453.0 MHz ~ 457.475 MHz
Nominal Power	0.32 W
Minimum Controlled Output Power	Below –50dBm
Max Power Spurious	±900KHz : Below –42dBc/30KHz ±1.98MHz : Below –54dBc/30KHz

Table 2.2.3-A CDMA Transmit Spec

2.2.4 MDM6600 Chipset Highlights

Enhanced Processing power	a. Industry standard ARM1136JS™-embedded microprocessor subsystem b. Two QDSP4™ cores for modem and application DSP
Radio-One ZIF Architecture Support	a. Saves board space b. Integrated solution
High Data Rates	a. CDMA2000 1xEVDO Rev. 0,A,B support b. Receive diversity on CDMA2000 1X and 1xEVDO systems c. GSM/GPRS/EGPRS support
Multi-mode Solution	a. 1X / 1xEVDO(r0, rA, rB) b. Diversity RX (BC5 in this module) c. GSM/GPRS/EGPRS d. GPS

Table 2.2.4 MDM6600 Chipset Highlights

2.3 Standards

- **for CDMA / EvDO**

IS-98F	
IS-637	Short Message Service
IS-707	Data Service
Built-in TCP/IP	AnyDATA proprietary software
IS-657	Packet data

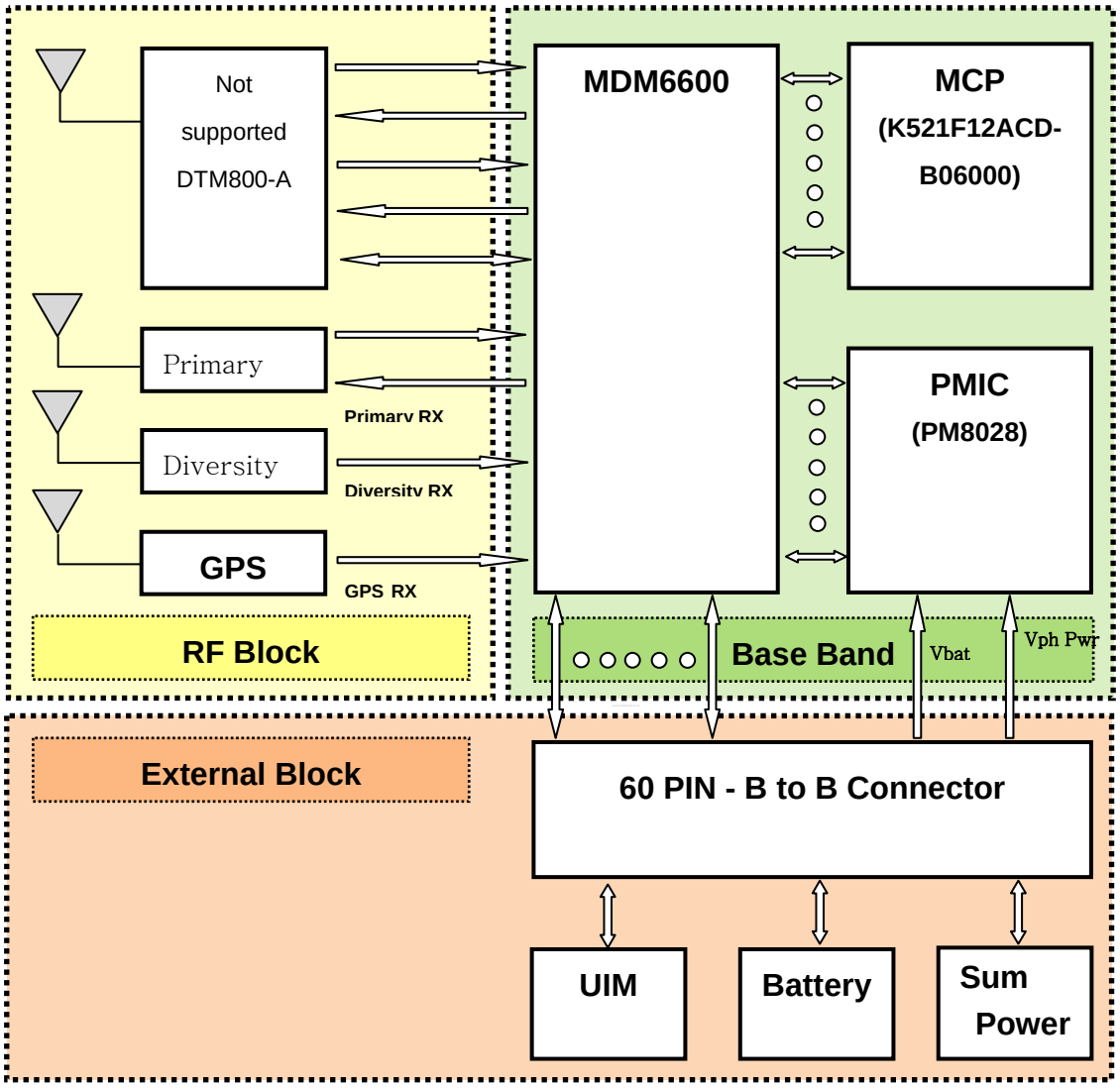
Table 2.3-A CMDA Standard

- **for GPS**

3GPP2 C.S0036-0	TIA-916

Table 2.3-C GPS Standard

2.4 Block Diagram



[Figure2.4. DTM800-W Block Diagram]

Will be updated in next version

3. PIN Description

3.1 Pin Map

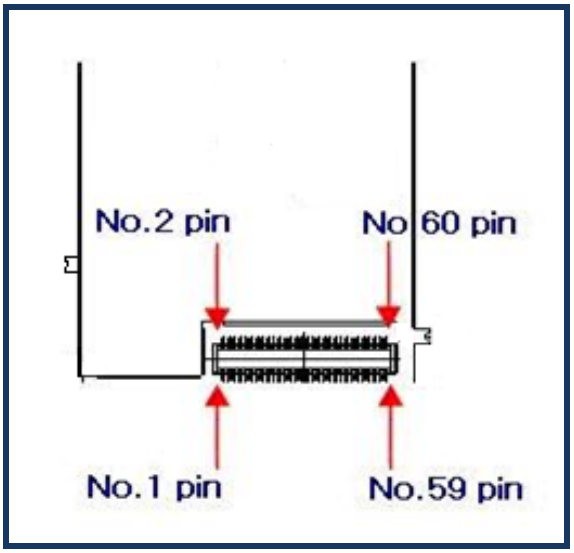
- Be left open not used pins
- MDM6600 UART is 4-pin UART, (TXD, RXD, RFR, CTS)
- 7- pin UART is reserved (RI, DCD, DTR)
- If used only battery power as main power, VBAT short to VPH_PWR
- **As needed, this pin map could changed**

Pin No	Pin-Name	Type		Descriptions
1	GND		Power	to be Ground
2	GND		Power	to be Ground
3	UART_TXD	1.8V, PD	GSBI	for UART communications
4	UART_RXD	1.8V, PD	GSBI	for UART communications
5	DP_TXD	1.8V, PD	GSBI	for Debugging, using if necessary
6	DP_RXD	1.8V, PD	GSBI	for Debugging, using if necessary
7	UIM_CLK		R-UIM	for UIM
8	UIM_RESET		R-UIM	for UIM
9	UIM_DATA		R-UIM	for UIM
10	VREG_UIM	Vout, 2.85V	R-UIM	for UIM
11	GPIO_43	1.8V, PD	GPIO	for some extra function (MDM GPIO)
12	NC		NC	NC
13	GPIO_56	2.85V, PD	GPIO	for some extra function (MDM GPIO)
14	GPIO_40	1.8V, PD	GPIO	for some extra function (MDM GPIO)
15	GPIO_37	1.8V, PD	GPIO	for some extra function (MDM GPIO)
16	GPIO_36	1.8V, PD	GPIO	for some extra function (MDM GPIO)
17	GPIO_55	2.85, PD	GPIO	for some extra function (MDM GPIO)
18	UART_CTS	1.8V, PD	UART	for UART communications
19	UART_RFR	1.8V, PD	UART	for UART communications
20	GPIO_42	1.8V, PD	GPIO	for some extra function (MDM GPIO)
21	GPIO_41	1.8V, PD	GPIO	for some extra function (MDM GPIO)
22	KEY_PWR_N		Power SW	Power On Switch, If without switch, must to be short with GND
23	NC		NC	NC
24	USB_ID		USB ID	for USB ID, when not used, to be opened
25	BAT_FET_N		NC	NC, reserved

26	GPIO_53	2.85V, PD	GPIO	for some extra function (MDM GPIO)
Pin No	**Pin-Name**	**Type**		**Descriptions**
27	TRST		JTAG	for J-TAG
28	TCK		JTAG	for J-TAG
29	TMS		JTAG	for J-TAG
30	TDI		JTAG	for J-TAG
31	TDO		JTAG	for J-TAG
32	RTCK		JTAG	for J-TAG
33	VREG_MSME	Vout, 1.8V	1.8V	for J-TAG
34	JTAG_RESOUT		JTAG	for J-TAG
35	PS_HOLD	1.8V	reset	for J-TAG, External RESET (ACTIVE LOW)
36	VBAT_THERM		NC	for battery therm pin, optional
37	C_LED	1.8V, PU	1.8V LED	for BUSY LED (all supported band Busy LED, except GPS)
38	SMS LED	1.8V, PU	1.8V LED	for IDLE LED (all supported band IDLE LED, except GPS)
39	GND		Power	to be Ground
40	GND		Power	to be Ground
41	U_LED	1.8V, PU	1.8V LED	for SMS LED (all supported band SMS LED)
42	Module_State	1.8V, PD	GPIO	for some extra function (MDM GPIO)
43	GPIO_58	2.85V, PD	GPIO	for some extra function (MDM GPIO)
44	UART_DCD	1.8V, PD	UART	for UART communications
45	UART_DTR	1.8V, PD	UART	for UART communications
46	UART_RI	1.8V, PD	UART	for UART communications
47	GPIO_54	2.85V, PD	GPIO	for some extra function (MDM GPIO)
48	GPIO_57	2.85V, PD	GPIO	for some extra function (MDM GPIO)
49	USB_D_P		USB	USB 2.0 Data Plus line (D+)
50	USB_D_M		USB	USB 2.0 Data Minus line (D-)
51	USB_VBUS	Vin, 5V	USB Power	USB Power, only workind USB commnunications
52	VBAT	Vin, 3.7V	main Power	Battery power 3.4V ~ 4.2V, 3.7V nominal Li-ion
53	VCHG	NC	NC	for extra function (MDM GPIO)
54	VBAT	Vin, 3.7V	main Power	Battery power 3.4V ~ 4.2V, 3.7V nominal Li-ion
55	VCHG	NC	NC	for extra function (MDM GPIO)
56	VPH_PWR	Vin, 3.7V	main Power	Battery Power or Static power (3.4V~4.2V)
57	VPH_PWR	Vin, 3.7V	main Power	Battery Power or Static power (3.4V~4.2V)
58	VPH_PWR	Vin, 3.7V	main Power	Battery Power or Static power (3.4V~4.2V)
59	GND		Power	to be Ground
60	GND		Power	to be Ground

Table 3.1 60-Pin Descriptions

3.2 60-Pin Standard



[Figure3.2. DTM800-W 60-Pin Standard]

4. Interface Descriptions

4.1 Overview

This chapter covers information required to design the DTM800-W into a subscriber unit application. In addition, some of the internal blocks of the device that are necessary for complete understanding of the various interfaces are described.

4.2 External Interface

4.2.1 UART Interface

The Universal Asynchronous Receiver Transmitter (UART) communicates with serial data that conforms to the RS-232 Interface protocol. The module has 3 UARTs which provides 3.0V CMOS level outputs and 3.0V CMOS input levels. All the control signals of the RS-232 are active low, however the data signals, RXD and TXD, are active high.

UART1 which has 512 bytes for Tx and Rx FIFO, supports high speed data communication up to 230.4kbps, program download and diagnostic monitor function.

UART2 which 64 bytes for T/Rx FIFO, support low speed data communication up to 115.2kbps, program download and diagnostic monitor function.

The UART features hardware handshaking, programmable data sizes, programmable stop bits, and odd, even, no parity.

Pin No	Pin-Name	Type		Descriptions
3	UART_TXD	1.8V, PD	GSBI	for UART communications
4	UART_RXD	1.8V, PD	GSBI	for UART communications
18	UART_CTS	1.8V, PD	UART	for UART communications
19	UART_RFR	1.8V, PD	UART	for UART communications

Table 4.2.1 4-Pin UART Interface

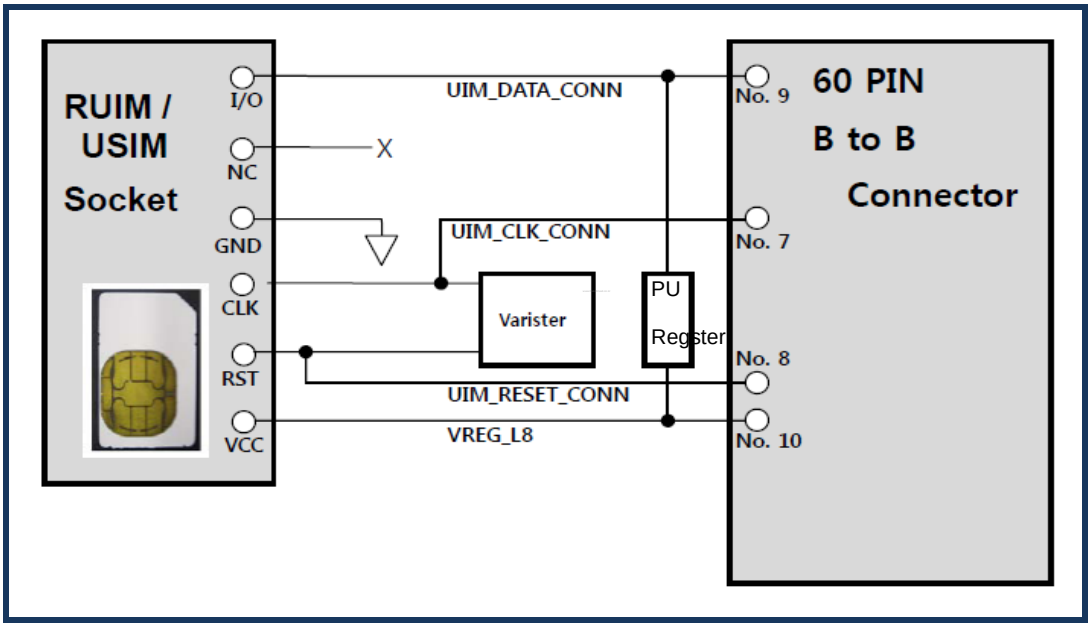
4.2.2 USB Interface

No.	Name	Type		Descriptions
49	USB_D_P	-	USB	USB 2.0 Data Plus line (D+)
50	USB_D_M	-	USB	USB 2.0 Data Minus line (D-)
51	USB_VBUS	Vin, 5V	USB Power	USB Power, only workind USB commnunications
59	GND	-	Power	to be Ground

Table 4.2.2 USB 2.0 Interface

4.2.3 UIM Inteface

Supports CDMA(optional) / UMTS simultaneously



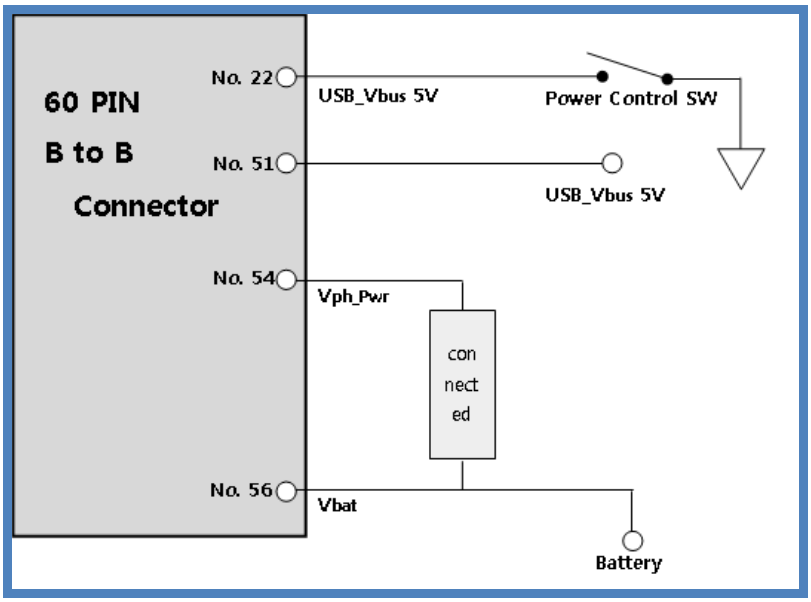
[Figure 4.2.3. DTM800-W UIM Interface]

Pin No	Pin-Name	Type		Descriptions
7	UIM_CLK	-	R-UIM	for UIM
8	UIM_RESET	-	R-UIM	for UIM
9	UIM_DATA	-	R-UIM	for UIM
10	VREG_UIM	Vout, 2.85V	R-UIM	for UIM

Table 4.2.3 UIM Interface

4.2.4 Power Supply Interface

There are two ways to power up the module and customers may choose one of the two ways to power up DTM800-W module



[Figure4.2.4. DTM800-W Power Supply Inteface]

5. Electrical Specifications

Operating the modem under conditions that exceed those listed in the Absolute Maximum. The Ratings table may result in damage to the modem. Absolute Maximum Ratings may be considered as limiting values, and are considered individually. While all other parameters are within their specified operating ranges, the functional operation of the modem under any of the conditions in the Absolute Maximum Ratings table is not implied.

5.1 Absolute Maximum Ratings

Parameter	min	max	units
Storage Temperature	-30	70	ºC
Voltage On Any Input or Output Pin	-0.5	3.7	V
Supply Voltage	-0.3	6	V
Initializing Current	100		mA
Drop	No damages after 60-Inch drop over concrete floor		

Table 5.1 Absolute Maximum Rating

5.2 Recommended Operating Conditions

Parameter	Minimum	Maximum	Units
Supply Voltage	3.4	4.2	V
Operating Temperature	-20	50	ºC
Operating Humidity	65%(60ºC) / 0%(-20ºC) Relative Humidity		

Table 5.2 Recommended Operating conditions

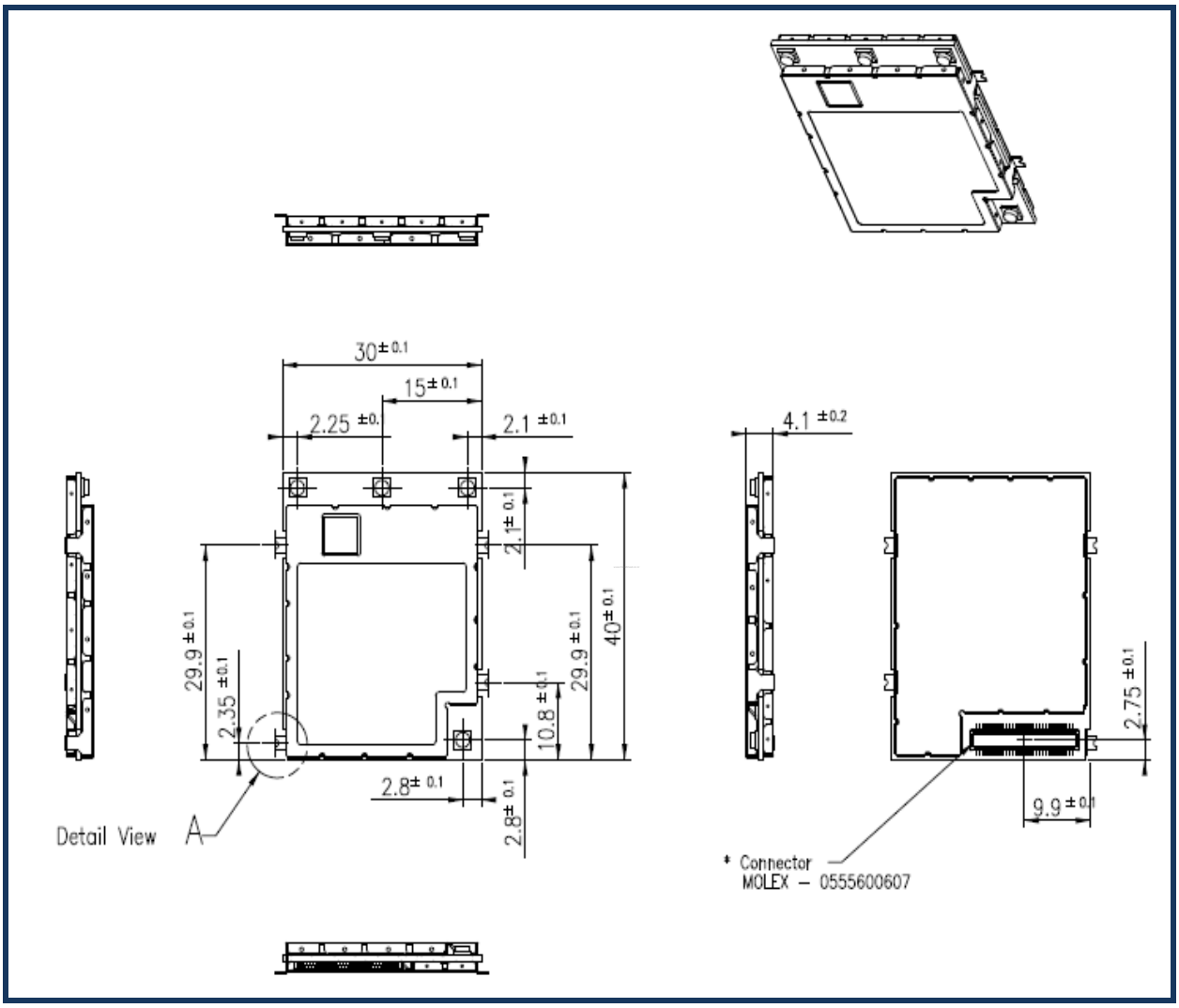
5.3 Power Consumption

Conversation (Busy)	Standby	
	Idle	Sleep
600mA @ 24.0 dBm, 3.7V	150mA @3.7V	Below 2mA @CDMA

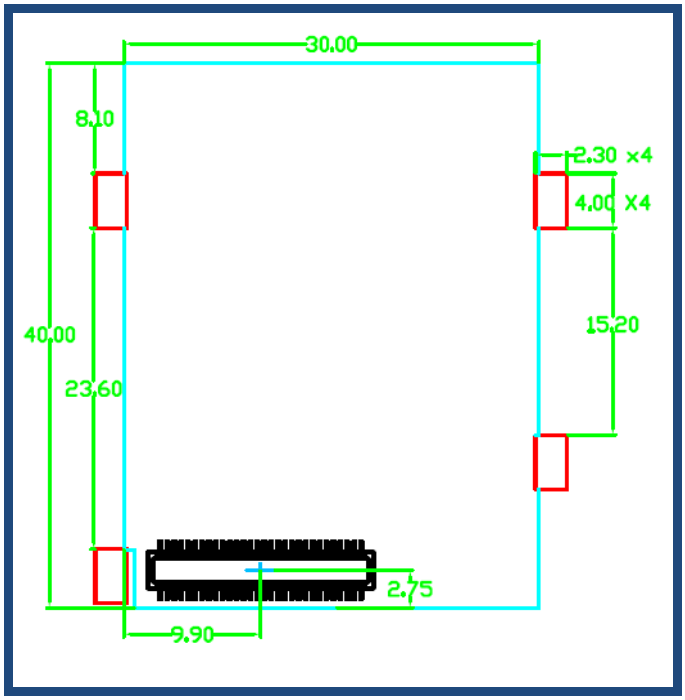
Table 5.3 Power Consumption

6. Mechanical Dimensions

6.1 Outline & Solder Mask

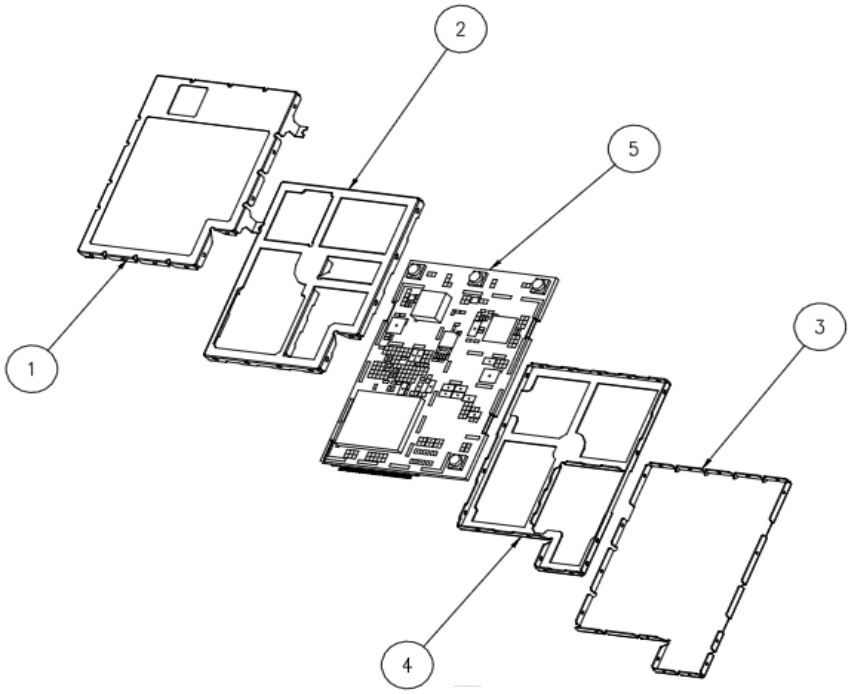


[Figure6.1.1. DTM800-W Outline, Unit : mm]



[Figure6.1.2. DTM800-W Solder mask , Unit : mm]

6.2 Assembly



5		PCBA		1		
4	A300182	BOTTOM_SHIELD_FRAME	C7521(NSP), t=0.2	1	ECT	
3	A300181	BOTTOM_SHIELD_COVER	SUS 304, t=0.15	1	ECT	
2	A300180	TOP_SHIELD_FRAME	C7521(NSP), t=0.2	1	ECT	
1	A300179	TOP_SHIELD_COVER	SUS 304, t=0.15	1	ECT	
NO	PART_NO	PART_NAME	DESCRIPTION	Q'TY	VENDOR	REMARK

TOLERANCES UNLESS OTHERWISE SPECIFIED		NAME OR TITLE		AnyDATA.NET	
ANGULAR	±0.2°	EXPLODED VIEW			
DECIMAL	±0.1	FIRST USED IN ASSEMBLY	MODULE	MATERIAL	
	Q'TY/SET	FIRST MADE FOR	AnyDATA.NET	END FINISH	
	1 / 1	CONSTRACT OR CUSTOMER NO.	DTM800-W	DO NOT SCALE DRAWING	DIMENSIONS ARE IN (MM), INCH

DESIGNED BY	CHECKED BY	APPROVED BY	SCALE	DRAWING PART NO.	REV.
W.S.YOON	HY.JUNG	J.T.LEE	1 : 1		00
2011.05.02	2011.05.02	2011.05.02			

[Figure6.2. DTM800-W Assembly]

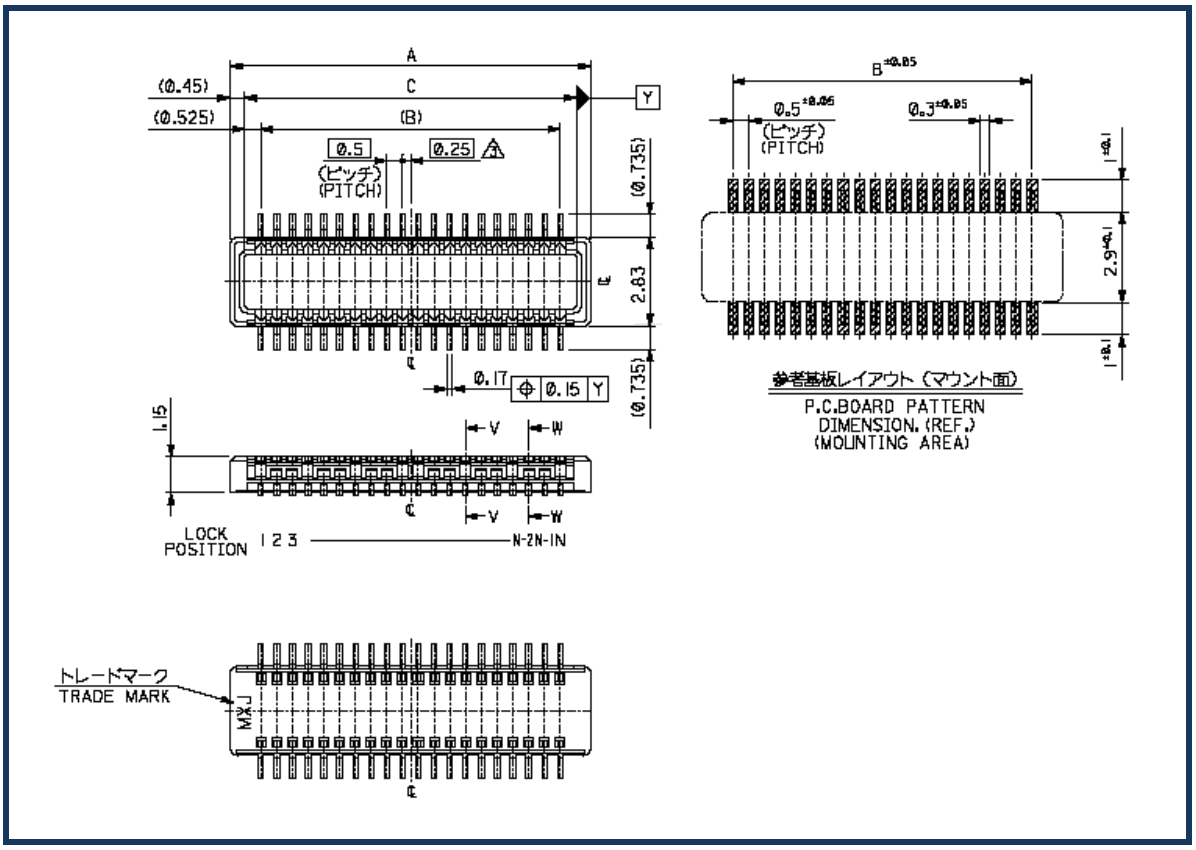
6.3 60-Pin Connector

6.3.1 PLUG

- Part Name: Plug pin connector (0.5mm pitch, straight, dual row)
- Part Number: 55560-0601
- Manufacture : MOLEX

Note: For more information on the 60-pins Plug connector,

Please refer to: http://www.molex.com/ , click connector, and search part number "55560_0601"



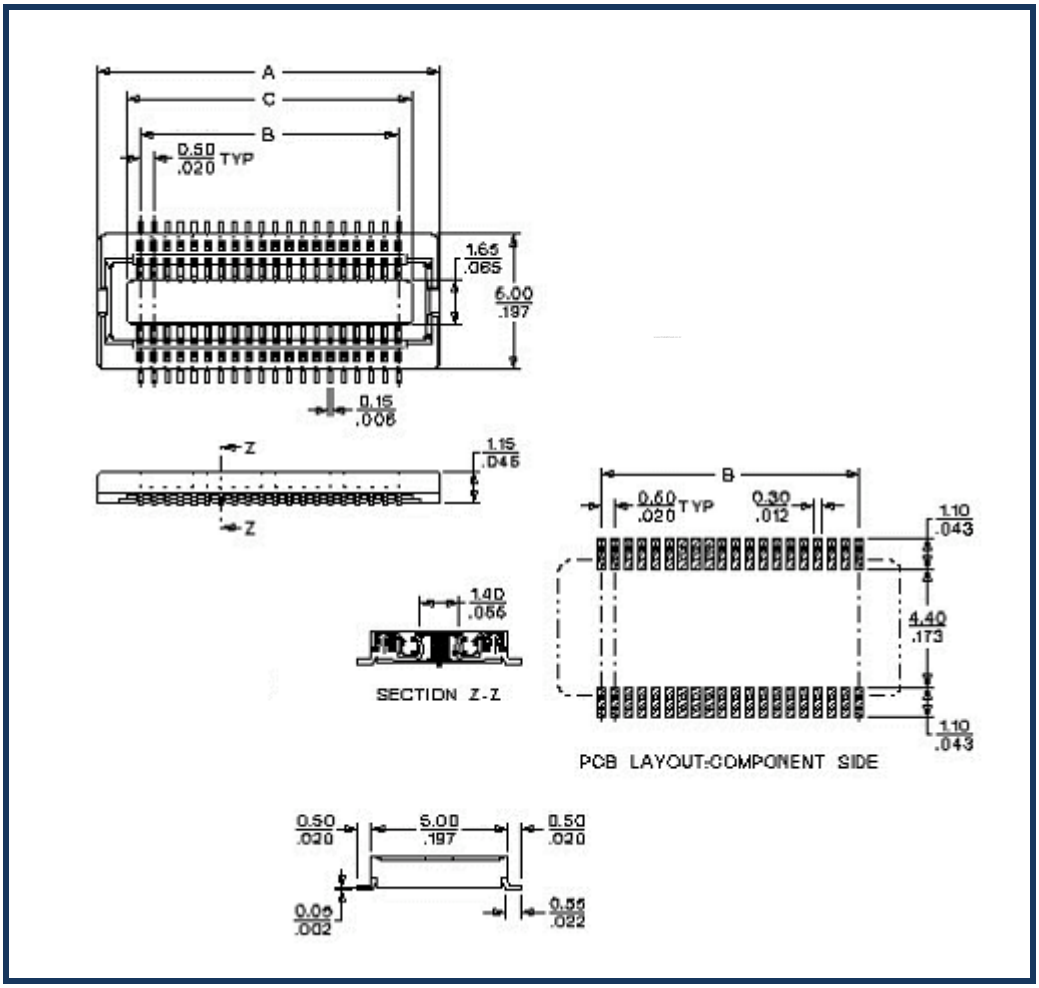
[Figure6.3.1. 60-Pin PLUG, Unit: mm]

6.3.2 REC

- Part Name: Socket pin connector (0.5mm pitch, straight, dual row)
- Part Number: 54722_0601
- Manufacture : MOLEX

Note: For more information on the 60-pins socket connector,

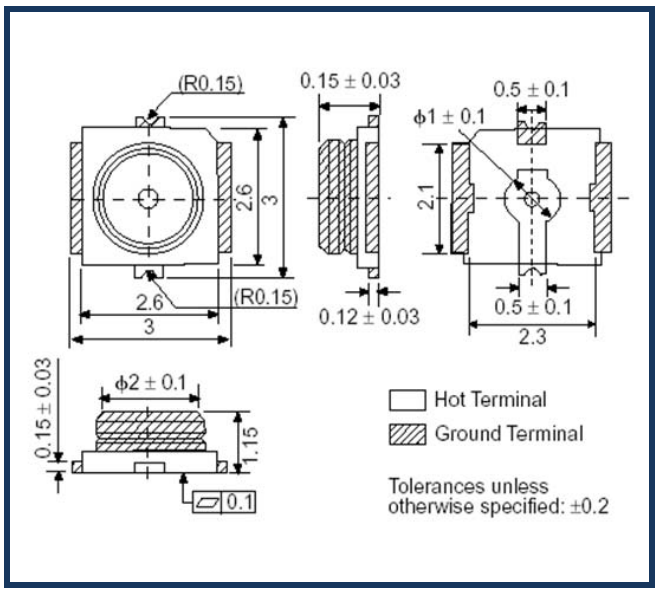
Please refer to: http://www.molex.com/ , click connector, and search part number "54722_0601"



[Figure6.3.2. 60-Pin REC, Unit: mm]

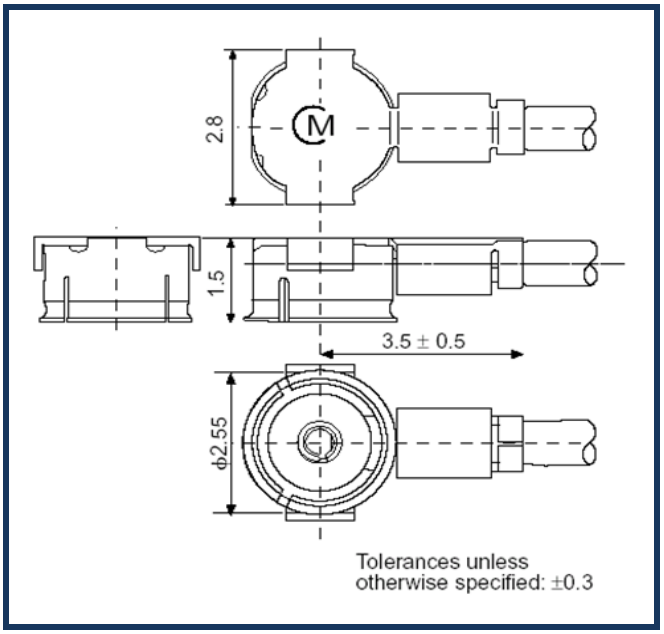
6.4 RF Connector

- **Part Number : MM9329-2700**



[Figure6.4-A. RF Connector, GSC Type, Unit: mm]

Test Cable : used to connect the MM9329-2700 connector



[Figure6.4-B. Cable Harness Assembly Unit: mm]

Note: For more information about the RF connector parts, please refer to the file found at

http://www.murata.com/catalog/o30e5.pdf

7. CDK

User Manual and Schematic.

If you have a problem of in designing refer to the schematic

Next ->

DTM800-W Test Board

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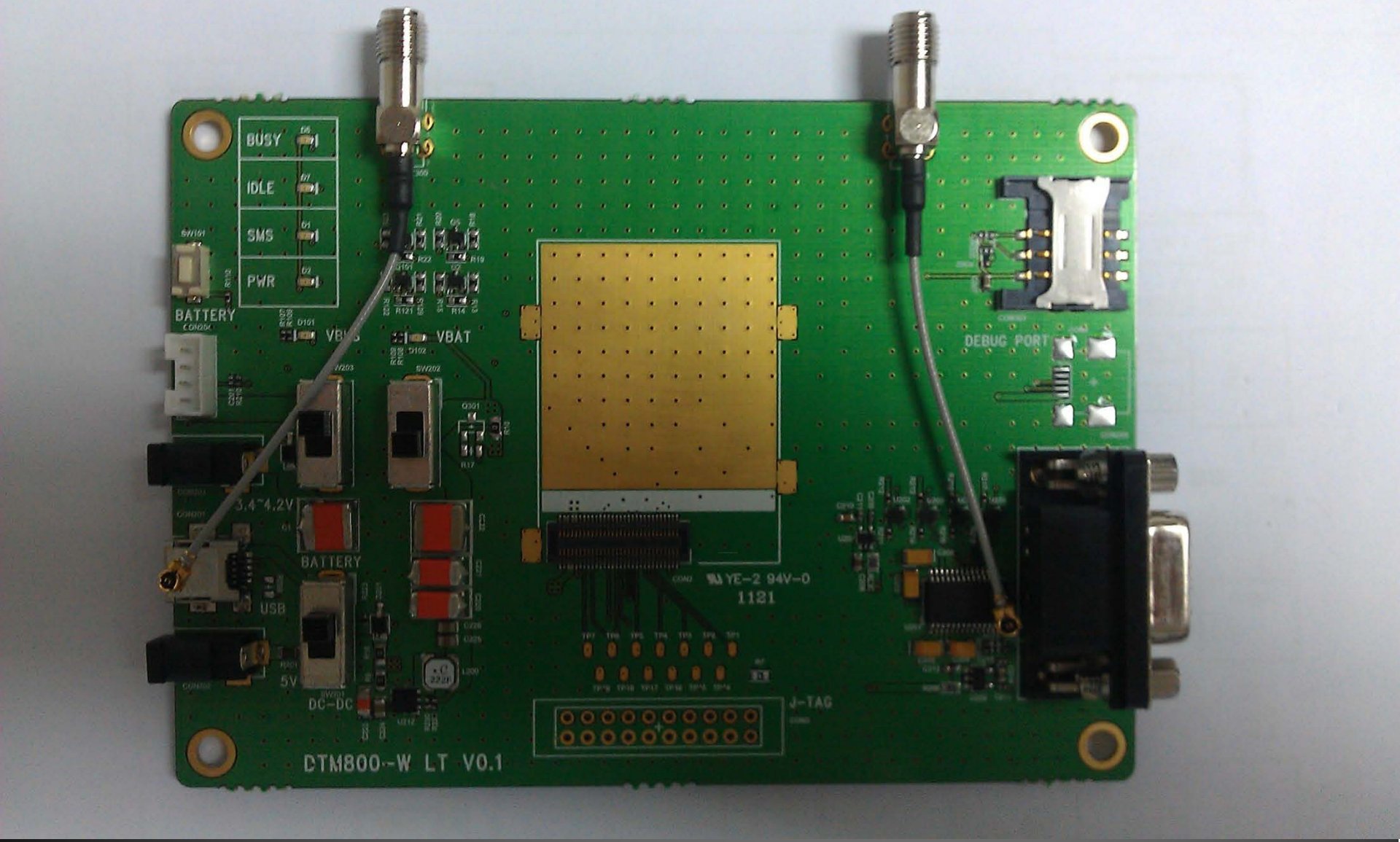

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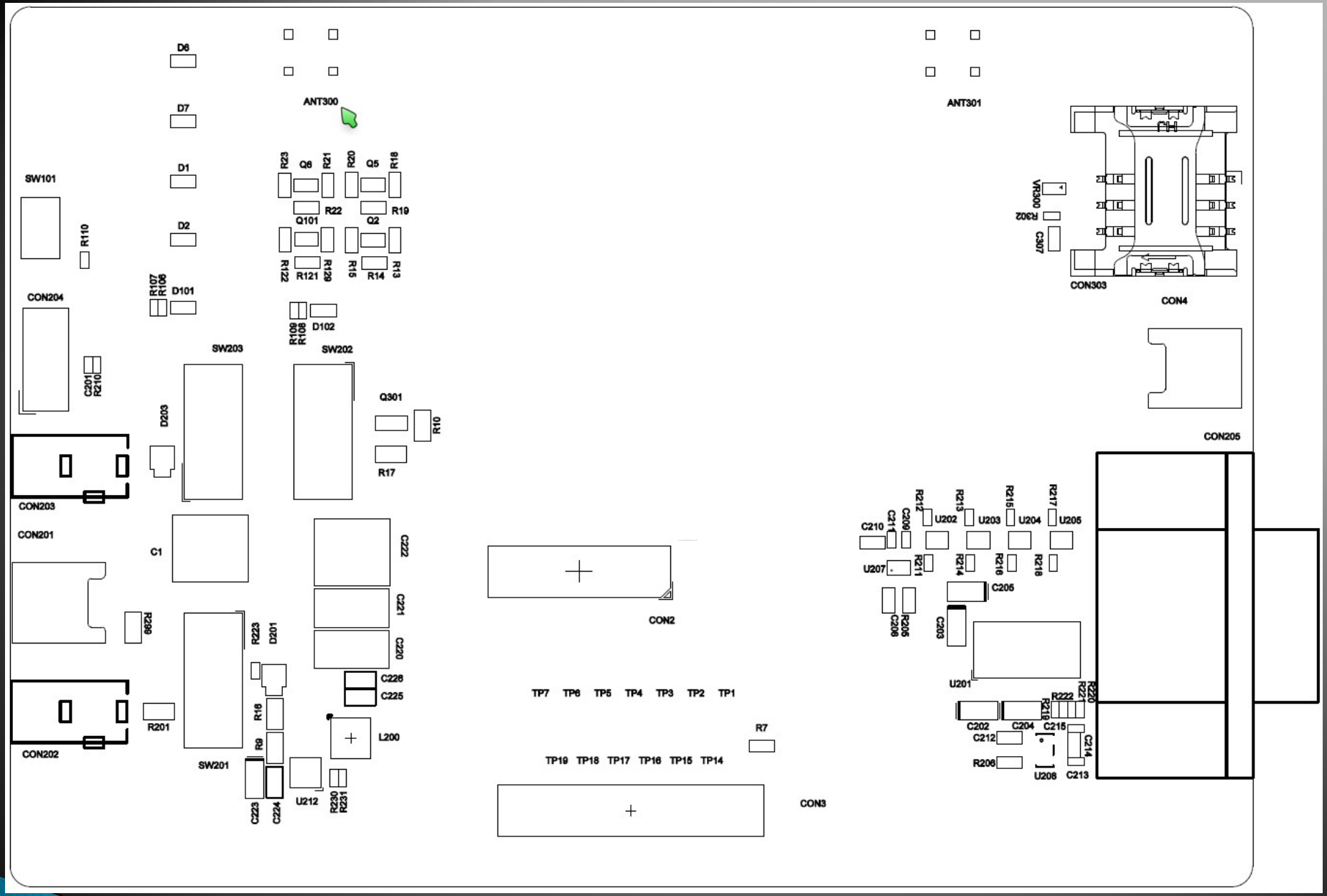
Test Board



AnyDATA®

Test Board, MAP

Descriptions

Name	Descriptions	
ANT300	ANT connector, for Primary	
ANT301	ANT connector, for Diversity and GPS	
SW101	Power On Switch	
CON2	60-pins module connector	
CON303	SIM connector (for UMTS and CDMA)	
CON4	Debug port for development	
CON206	4-pin UART connector	
CON	for J-TAG connector	
CON204	Real battery connector	3.7V nominal
CON203	static battery power(DC-Power)	3.4~4.2 V
CON201	USB Connector	
CON202	DC Power	5V
SW203	Seleting Real battery (CON204) or DC-battery power(CON203)	
SW202	Seleting Vbat (CON204/203) or DC-static power(CON201/202)	
D6	BUSY LED	
D7	IDLE LED	
D1	SMS LED	
D2	Power LED	
D101	5V DC power LED	
D102	3.7V Vbat LED	

Power Up Sequence(Using 5V DC Power)

1. Connect DTM800-W on CON2
2. Connect 5V DC Power in CON202
3. Direction of SW201 and SW202 are Down
4. Push SW101

Power Up Sequence(Using 3.7V battery Power)

1. Connect DTM800-W on CON2
2. Connect 3.7V DC Power in CON203 or 3.7V Battery in CON201
3. Direction of SW203 is UP
4. IF using CON201, Direction of SW 203 is UP, otherwise Down.
5. Push SW101

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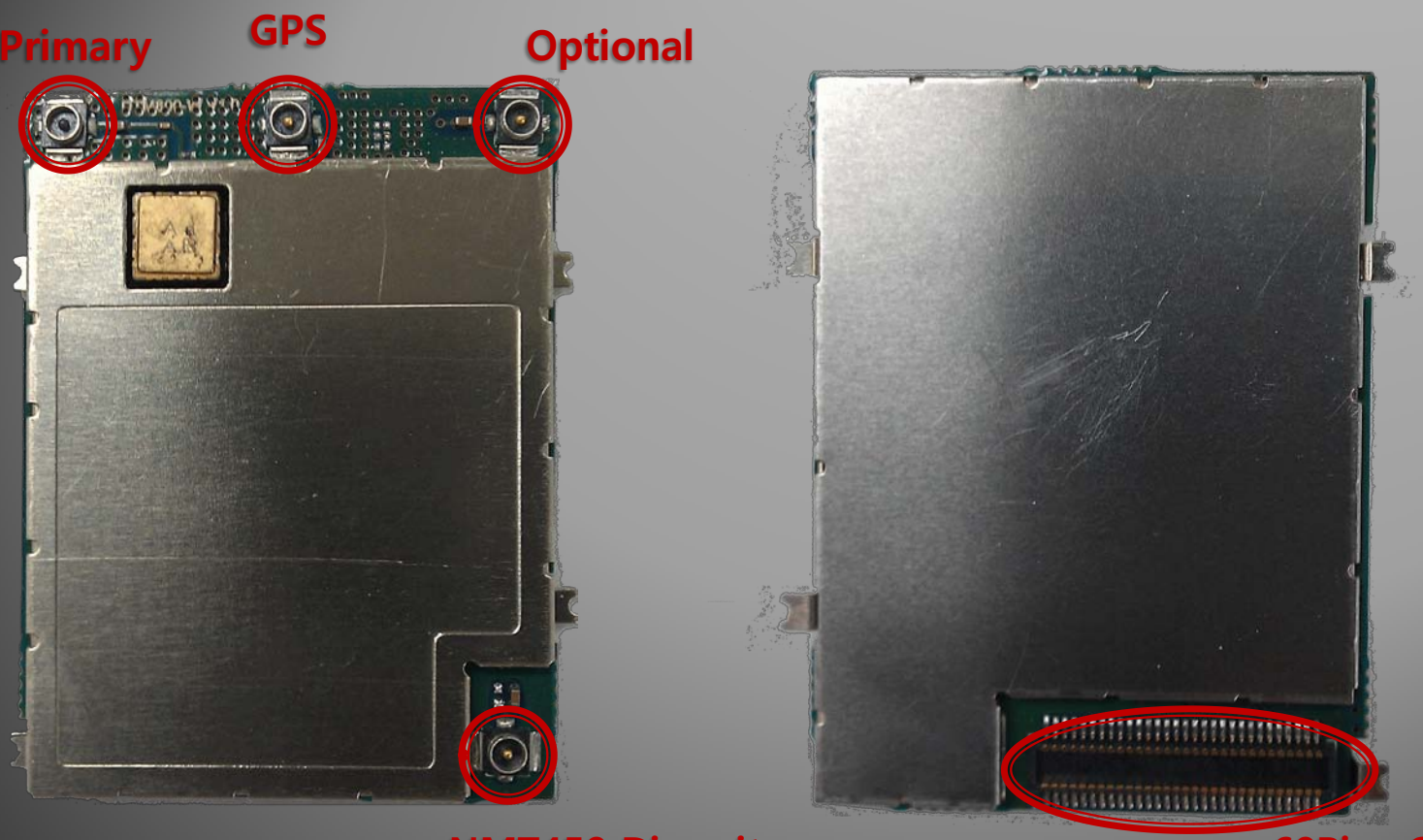

DTM800-W

Antenna SW and 60 Pin Connector

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