PRODUCT CHANGE DOCUMENT

Project Name: StarComm 120897

Product: GENUS TSN-1, FC ID: OBW120897

Change ID: *PCD0004*

1. Product Change document originator (HW / EMECH / SW):	
Name and title	Jukka Miettunen, BB team leader
Phone/Email	+358 40 3442 308/ jukka.miettunen@elektrobit.com
Date of Product Change	30.09.2009, **03.11.2009**

2. Version information	
Old SW release version	
New SW release version	
Old HW ID version	FF2.1
New HW ID version	FF2.2

3. List of changes (task / error / CR)			
Type	**Related ID**	**Title**	**Description (incl. cost effect)**
Enh	HW "FF2.1 to FF2.2 CR_list.xls" Change #1, Change #2, Change #3, Change #4, Change #5, Change #6, Change #7, Change #8	RF filtering improvement in power lines, Satellite BB	• PA power bypass capacitors: Change C7207, C7211, C7266 8p2 --> 10p (7111730) • PA power bypass capacitors: Change C7206, C7210 10p --> 100n (7117770) • PA power line filtering: Change R7247, R7267, R7284 0R --> L7247, L7267, L7284 27nH (6101128) • V_DET filtering: Change R7278 0R --> L7278 12nH (6101108A) • Pa VC_bias filtering: Add 27nH (6101128) coil (L7202) before10uF capacitor (a.k.a regulator side) • PA VCC1 and VCC2 filtering: Add ferrite (6701647) before 10uF capacitor (a.k.a regulator side). Separately for both voltages (L7200,L7201) • PA VC_Bias bypass: Add one

			10pF (7111730) capacitor and one 10uF capacitor (7129940) close to pin and other 10pF capacitor before 27nH coil (C7296, C7285, C7215) • PA VREF2 filtering: Add ferrite (6701633) (L7203) before N7211 input bypass capacitors C7280 and C7283
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #9, Change #10, Change #18	EMI reduction, Satellite BB	• N7100 (LTC3425) input filtering : Add two pieces of ferrite (6701647) parallel between N7100 circuitry and Battery connector. (L7104, 7105) • RF_VBAT filtering Add four 3.3nF (7115500) capacitors to RF_VBAT near each 2u2 coil (L7100-L7103) (C7164, C7163, C7162, C7161) • Add 10pF (7111730) capacitors to volume UP, DOWN and MUTE buttons' pins as shown in figure. (a.k.a. capacitor from to 1&3 to GND and from 2&4 to GND) (C1880,C1877, C1878, C1875, C1878,C1876, C1879)
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #12, Change #16	Satellite RF PA step-up converter pulse response improvements	• RF_VBAT filtering Add 22uF (7139961) capacitor (C7169) to RF_VBAT near N7100 • Disable burst mode : R7110 NA --> 0R (8110070), R7109 200k --> NA. This increases little bit power consumption
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #11	Emi reduction/ Satellite RF PA step-up converter pulse response improvements	RF_VBAT filtering Add two pieces 100nF (7117770) cap (C7168, C7167) to RF_VBAT near 2u2 coils (L7100- L7103)
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #13,	EMI reduction, Satellite BB	• DC_SAT_PA filtering: Add two 3.3nF (7115500) capacitors (C7172, C7171) • DC_SAT_PA filtering: Add one

ℰℬ

	Change #14		100nF (7117770) capacitors to DC_SAT_PA (C7173)
Cos	HW "FF2.1 to FF2.2 CR_list.xls": Change #15	Save board space: testpoint TP7100 not used.	N7100: Remove TP7100
Cos	HW "FF2.1 to FF2.2 CR_list.xls": Change #17	Wrong component value, should be Not Assembled	Change: C7267 to 0402 NA capacitor (7119999)
COS	HW "FF2.1 to FF2.2 CR_list.xls": Change #20	Component reduction: Satellite RF PA already has internal DC blocking capacitors.	Remove R7200 and R7216
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #21	Component reduction: Not needed and may impact TX trace impendances	Remove R7201, R7202 and C7239.
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #22	Satellite RF PA dc-dc converter pulse response improvement	Add 0402 NA capacitor parallel with R7111 (C7177)
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #23	Sync signal not usable (voltage levels incompatible), needs to be removed	Remove trace "SAT_SWITCHER_CLK" and Resistor R7104
Cos	HW "FF2.1 to FF2.2 CR_list.xls": Change #24	Reduce capacitor types from partlist, use same capacitor type as used already for other blocks having same performance.	Change: C7014, C7018, C7025, C7027 and C7032 to code: 7111730
Enh	HW "FF2.1 to FF2.2 CR_list.xls":	GPS, bluetooth/Wi-Fi and Satellite antenna	• Antenna change from E000118 REV D to E000118 REV E • Antenna change from E000114

ꓭꓭ

	Change #25, Change #26, Change #27	performance optimization	REV F to E000114 REV G • Antenna change from E000112 REV E to E000112 REV F
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #30, Change #32, Change #33, Change #42, Change #43, Change #44, Change #45	Satellite BB layout improvements	• Layer 2, moved signals SAT_FPGA_DONE, SAT_M_IQ and SAT_MQSPI1_CS2 away under side switch. • S_VGEN isolation improved. • S_VIOHI isolation improved. • Add solder mask opening in top side to Mech Gasket area. • Move Z6232 in bottom side to testpoint area. • Add solder mask opening in bottom side to testpoint area. • Move R1007 down.
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #28, Change #31, Change #38, Change #40	Satellite RF powering layout improvements	• Rotate component C7204 and L7200 90 decree • VBAT moved away from the bottom off C7116. • More isolation added for VDD_SAT_LNA and DC_SAT_PA traces.
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #29, Change #34, Change #35, Change #36, Change #37, Change #39, Change #41	Satellite RF layout improvements	• Area fill SW1 isolation improved and area fill SW2 isolation improved. • SW1 area fill in layer 5 cut off top on SW2 area fill in layer 4. • Isolate and add ground vias a round EXT ANTENNA trace. • Routed SAT TX trace a bit more in bottom side layer 12 to make it more accessible. • Add ground vias to the space between RF_VBAT and SW1. • Add more ground vias in edge of board in pifa area.
Enh	HW "FF2.1 to FF2.2 CR_list.xls": Change #46	Adjust of LED current	R3434 820Ohm ==> 2k2
Bug	HW	Not used in current	Remove V6344 (diode)

ꓝꓚ

	"FF2.1 to FF2.2 CR_list.xls": Change #47	design - fix for PLMN search	
Bug	HW "FF2.1 to FF2.2 CR_list.xls": Change #48, Change #49	Speed up rise time of RF switches controls by changing pull-up resistor values	• Replace REFs R7228, R7251, R7329 8116270 with 8114765 (10k => 1k) • Remove C7219, C7220, C7257, C7265, C7295
Bug	HW "FF2.1 to FF2.2 CR_list.xls": Change #50	Satellite RF PA output power detection improvement (VDET voltage scaling)	Changes L7278 12nH 6101108A to 100R 8113250 (R7278)

Type:
Enh: Enhancement
New: New Feature
Bug: Bug Fixing
Cos: Cosmetic

4. Change will have an effect on the following:		
	(yes/no)	Effect (incl. all information related to change e.g. new document version IDs)
SW design	No	
SW modem design	Yes	Fix for PLMN search expected.
HW design	Yes	SAT RF and BB block layout and schematics improvements
Mechanics design	No	Separate Mech change document done that describes mech changes
Product Description	No	No feature changes
Manufacturing	Yes	Manufacturing documents updated.
ProductionTesting		
Sourcing	Yes	Changes updated to contract manufacturers' build follow-up file (CTB) to ensure the availability. Changes updated to Sourcing BOM version 0.0.14 to ensure correct pricing information of the product.
Product Structure	No	PS unreleased
AMS	No	
PVV	Yes	FCC testing. This document is needed for TCB

		analysis.
Product Documentation	No	
Accessories	No	

5. Conclusions

The product release is stored in the XXXXX system, available with the label: **xx.yy.z1**; the improvement and new features descriptions are stored in the Product Change System, and available at our database.

All this facts are compliant **in accordance with the** certified ISO9001:2000 applied Quality procedure to design and project process.

FCC testing for SAT functionality requires retesting.

6. Product Change Approval by Program Management

Name and title	Antti Räty, Program Manager
Phone/Email	+358 40 344 3426, antti.raty@elektrobit.com
Date of Approval	16th November 2009

Signature of Program Manager