

**COMMERCIAL IN CONFIDENCE**

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Abstract:

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Change History:

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## 1 INTRODUCTION

This document details the changes between Dustin B2.1-2 hardware release which is the original documentation passed to 7 Layers and the Final Release hardware B2.1-5 which incorporates fixes for some hardware Issues. Changes are listed in the summary in Section 2 and detailed in section 3. The Working Paper:-

WP\_0051\_Dustin\_Performance\_Checks\_on\_B2\_1\_5.doc details measurements carried out to demonstrate that these changes have had only a minimal affect on the Radio Performance.

The changes are detailed in the form of ECR's (Engineering Change Requests).

### 1.1 REFERENCES

1. WP\_0051\_Dustin\_Performance\_Checks\_on\_B2\_1\_5.doc

## 2 ECR SUMMARY

The table below lists the changes between Hardware Issues. The changes are covered by ECRs 185 to 191. Section 3 details the ECR's

Table 1 Summary of ECR's

| ECR No | Summary                      | Hardware Status                        |
|--------|------------------------------|--|
| 185    | 7 <sup>th</sup> Harmonic     | In Build B2.1-2 via Hochruesliste      |
| 186    | 48MHz Noise                  | In Build B2.1-2 via Hochruesliste      |
| 187    | PC Start-up Issue            | In Build B2.1-2 via Hochruesliste      |
| 188    | Edge EVM                     | In Build B2.1-3                        |
| 189    | SIM Resistor                 | In Build B2.1-4 (incorporates 185-189) |
| 190    | Out of Band Blocking Filter  | In Build B2.1-5                        |
| 191    | ID SEL                       | In Build B2.1-5                        |
| 192    | Clear Tracks From Drill Hole | In Build B2.1-5                        |
| 193    | Remove C1                    | In Build B2.1-5 via Hochruesliste      |

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### 3 ECR'S

|  |  |                                       |
|--|--|---------------------------------------|
| <b>Project:</b> Dustin   | <b>ECR Ref:</b> Dustin_ECR_185         |                                       |
| <b>Item Description:</b> Fit the harmonic filter on the output of the GSM900 PA  |  |                                       |
| <b>Item Reference:</b>   | <b>Issue No Before Change:</b> B 2.1-2 | <b>Issue No After Change:</b> B 2.1-4 |
| <b>Originator Name:</b> Michael Lavocah  | <b>Dept:</b> Waves                     | <b>Date:</b> 20/03/06                 |
| <b>Reason For Change: (e.g. list of associated Problem Reports)</b><br><p>The GSM 900 transmitter is failing the transmit spurious test in type approval. The 7<sup>th</sup> harmonic is 2dB above the spec limit. This change adds a harmonic filter LC between the GSM 850/900 PA and the FEM. Only GSM 850 and 900 trasmit paths are affected and power increased slightly in GSM 900. This will be recompensated with Calibration.</p> |  |                                       |
| <b>Details of Change: (e.g. sections of document that have changed)</b><br><p>Change C504 from 100pF 0402 to: 1n9 Coilcraft 0402CS1N9XJBW (SAP No A5B00075402624) (already on the B1.2 BOM as L1559, L1535 US variant).</p> <p>Change C503 from NB to 0p5 0402 (SAP No A5B00026920529).</p> <p>This filtering improves the harmonic filtering at 7f by over 20dB and actually increased the output power.</p>                              |  |                                       |
| <b>Approved By:</b><br>(Project Manager)   | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Actioned By:</b>  | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Confirmed By:</b>   | <b>Date:</b>                           |                                       |

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|---|--|---------------------------------------|
| <b>Project:</b> Dustin  | <b>ECR Ref:</b> Dustin_ECR_186         |                                       |
| <b>Item Description:</b> Fit a harmonic filter to the output of the 48 MHz clock oscillator.  |  |                                       |
| <b>Item Reference:</b>  | <b>Issue No Before Change:</b> B 2.1-2 | <b>Issue No After Change:</b> B 2.1-4 |
| <b>Originator Name:</b> Richard Meyers  | <b>Dept:</b> Waves                     | <b>Date:</b> 24/03/06                 |
| <b>Reason For Change:</b> (e.g. list of associated Problem Reports)<br><br>The type approval test of radiated spurious emissions in GSM 900/1800 idle mode failed due to high levels of the 9 <sup>th</sup> , 11 <sup>th</sup> and 13 <sup>th</sup> harmonics of the 48 MHz clock. The worst of these was the 11 <sup>th</sup> harmonic which was out of spec by 11 dB. The Filter is for the Basband only and has no affect on the Radio part. |  |                                       |
| <b>Details of Change:</b> (e.g. sections of document that have changed)<br><br>Change R1916 from 0R to 100R 0201 resistor (SAP number A5B00026478494)<br>Change NB_C4561 to a fitted 22pF 0201 capacitor (SAP number A5B00026923026)<br>Change R1925 from 3K3 to 470R 0201 (SAP number A5B00026478670)<br>Change R1943 from 4K7 to 470R 0201 (SAP number A5B00026478670)  |  |                                       |
| <b>Approved By:</b><br>(Project Manager)  | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Actioned By:</b>   | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Confirmed By:</b>  | <b>Date:</b>                           |                                       |

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| <b>Project:</b> Dustin   | <b>ECR Ref:</b> Dustin_ECR_187         |                                       |
| <b>Item Description:</b> Change Resistor Option to CDMA PA Supply .  |  |                                       |
| <b>Item Reference:</b>   | <b>Issue No Before Change:</b> B 2.1-2 | <b>Issue No After Change:</b> B 2.1-4 |
| <b>Originator Name:</b> Chris Edwards  | <b>Dept:</b> Waves                     | <b>Date:</b> 27/03/06                 |
| <b>Reason For Change: (e.g. list of associated Problem Reports)</b>  |  |                                       |
| <p>Resistor options were added (ECR168) and used so that on one FET switch was in line to the CDMA PA. However this caused problems with Booting of the card when the Laptop was switched on with a card inserted. This was corrected by reverting to the original configuration where the Input to the CDMA PA supply switch comes from 3V3. This will have a very slight effect on the Voltage level as 2 FETs are in series causing a vry small voltage drop, but as we now have some margin on CDMA Power this should be OK.</p> |  |                                       |
| <b>Details of Change: (e.g. sections of document that have changed)</b>  |  |                                       |
| <p>Change NB_R2065 to Build SAP No A5B00026464535</p> <p>Change R2070 to No Build SAP No A5B00026464535</p>  |  |                                       |
| <b>Approved By:</b><br>(Project Manager)   | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Actioned By:</b>  | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Confirmed By:</b>   | <b>Date:</b>                           |                                       |

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| <b>Project:</b> Dustin  | <b>ECR Ref:</b> Dustin_ECR_188         |                                       |
| <b>Item Description:</b> Improve the power supply decoupling on the 19.2 MHz reference oscillator   |  |                                       |
| <b>Item Reference:</b>  | <b>Issue No Before Change:</b> B 2.1-2 | <b>Issue No After Change:</b> B 2.1-3 |
| <b>Originator Name:</b> Richard Meyers  | <b>Dept:</b> Waves                     | <b>Date:</b> 6/04/06                  |
| <b>Reason For Change: (e.g. list of associated Problem Reports)</b>   |  |                                       |
| Boards were failing type approval due to high values of GSM phase error and EDGE EVM. These parameters were brought within specification by improving the power supply decoupling on the 19.2 MHz reference oscillator. |  |                                       |
| <b>Details of Change: (e.g. sections of document that have changed)</b>   |  |                                       |
| Fit a 10µF 0603 shunt capacitor (A5B00075461785) and a 33 ohm 0201 series resistor (A5B00026478549) to the power supply pin of the 19.2 MHz VCTCXO (Z5).  |  |                                       |
| See page 2 for details.   |  |                                       |
| <b>Approved By:</b><br>(Project Manager)  | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Actioned By:</b>   | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Confirmed By:</b>  | <b>Date:</b>                           |                                       |

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| <b>Project:</b> Dustin   | <b>ECR Ref:</b> Dustin_ECR_189         |                                       |
| <b>Item Description:</b> Change SIM_IO pull-up resistor  |  |                                       |
| <b>Item Reference:</b>   | <b>Issue No Before Change:</b> B 2.1-2 | <b>Issue No After Change:</b> B 2.1-4 |
| <b>Originator Name:</b> Michael Lavocah  | <b>Dept:</b> Waves                     | <b>Date:</b> 25/04/06                 |
| <b>Reason For Change: (e.g. list of associated Problem Reports)</b><br><br>Boards were failing type approval due to drawing excess current from SIM terminal C7. This is caused by the pull-up resistor R1001 whose value is too low.<br>This will have no affect on the Radio Parameters. |  |                                       |
| <b>Details of Change: (e.g. sections of document that have changed)</b><br><br>Change R1001 from 4k7 to 15k (SAP No A5B00026478824)  |  |                                       |
| <b>Approved By:</b><br>(Project Manager)   | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Actioned By:</b>  | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Confirmed By:</b>   |  |                                       |

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| <b>Project:</b> Dustin  | <b>ECR Ref:</b> Dustin_ECR_190         |                                       |
| <b>Item Description:</b> Add low pass filter before FEM, and rematch GSM high band PA   |  |                                       |
| <b>Item Reference:</b>  | <b>Issue No Before Change:</b> B 2.1-4 | <b>Issue No After Change:</b> B 2.1-5 |
| <b>Originator Name:</b><br>Richard Meyers<br><br>Michael Lavocah  | <b>Dept:</b> Waves                     | <b>Date:</b> 25/5/6                   |
| <b>Reason For Change:</b> (e.g. list of associated Problem Reports)   |  |                                       |
| <p>Boards were failing type approval due to blocking in the FEM (Front End Module) at 4090 MHz and 6040 MHz. A low pass filter is fitted before the FEM to protect it from these signals, and the antenna matching network is reconfigured to maintain a dc ground path for the spark gap SP14 when no RF connector is inserted in X1508.</p> <p>The addition of the low pass filter changes the impedance seen by the GSM high band PA N1, and the PA is rematched.</p> <p>This modification is in the Transmit and Receive path for all Band and Performance validation is covered in WP_0051</p> |  |                                       |
| <b>Details of Change:</b> (e.g. sections of document that have changed)   |  |                                       |
| <p>a) low pass filter</p> <p>L753 was 27n inductor -&gt; 1.2 pF 0402 COG capacitor A5B00026918098</p> <p>C15 was NB -&gt; 1.2 pF 0402 COG capacitor A5B00026918098</p> <p>C4423 was 100 pF 0402 capacitor -&gt; 3.3 nH Coilcraft inductor 0402CS3N3XJBW A5B00026213680</p> <p>b) antenna matching network</p> <p>C13, C14 were 100 pF 0402 capacitor -&gt; 0R 0402 resistor A5B00021837660</p> <p>c) GSM high band PA rematch</p> <p>NB_C506 was 10 pF capacitor (no build) -&gt; 5.6 nH 0402 inductor A5B00026212987</p>   |  |                                       |
| <b>Approved By:</b><br>(Project Manager)  | <b>Dept:</b>                           | <b>Date:</b>                          |
| <b>Actioned By:</b>   | <b>Dept:</b>                           | <b>Date:</b>                          |

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| <b>Project:</b> Dustin | <b>ECR Ref:</b> Dustin_ECR_191 |

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| <b>Item Description:</b> Connect IDSEL line on the NEC USB Host Controller chip to the Cardbus connector   |                                |                               |
| <b>Item Reference:</b>   | <b>Issue No Before Change:</b> | <b>Issue No After Change:</b> |
| <b>Originator Name:</b><br>Russell Taylor<br><br>Michael Lavocah   | <b>Dept:</b><br>Waves          | <b>Date:</b><br>25/5/6        |
| <b>Reason For Change: (e.g. list of associated Problem Reports)</b><br><br>4G have allocated pin 18 of the Cardbus connector (Vpp1) to the function IDSEL. This pin must therefore be routed to the IDSEL line on the NEC USB Host Controller chip.<br><br>This has no Affect on the Radio Performance.  |                                |                               |
| <b>Details of Change: (e.g. sections of document that have changed)</b><br><br>Disconnect R2071 pin 2 from the net 3.3V_IN and route instead to pin B3 (92) of D731 (NEC µPD720101 USB Host Controller).<br><br>Change R2071 from 47k to 0R 0201<br><br>R2071 is No Build for the PC card Variant and fitted for the Router Variant (Variant A) as shown in the figures on the following page. |                                |                               |
| <b>Approved By:</b><br>(Project Manager)   | <b>Dept:</b>                   | <b>Date:</b>                  |
| <b>Actioned By:</b>  | <b>Dept:</b>                   | <b>Date:</b>                  |
| <b>Confirmed By:</b>   | <b>Date:</b>                   |                               |

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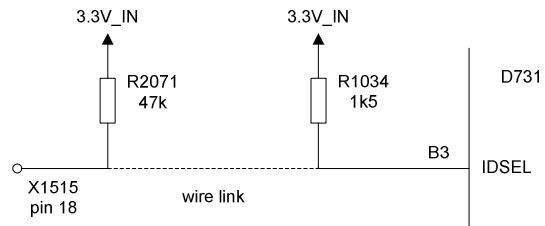


Figure 1: present arrangement

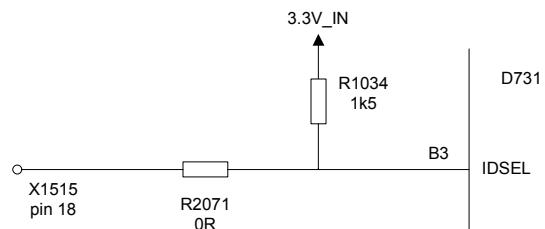


Figure 2: Router variant (variant A): R2071 fitted

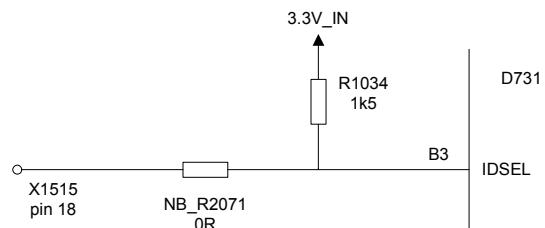


Figure 3: PC card variant: R2071 not fitted (NB)

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| <b>Project:</b> Dustin   | <b>ECR Ref:</b> Dustin_ECR_192 |                               |
| <b>Item Description:</b> Clear tracks from drill hole  |                                |                               |
| <b>Item Reference:</b>   | Issue No Before Change: B2.1-4 | Issue No After Change: B2.1-5 |
| <b>Originator Name:</b><br>Dirk Berger<br><br>Michael Lavocah  | <b>Dept:</b> Waves             | <b>Date:</b> 31/5/6           |
| <b>Reason For Change:</b> (e.g. list of associated Problem Reports)<br><br>In the last sample run, 3 tracks to the Cardbus connector failed due to small surface cracks on the circumference of the drill hole next to the Cardbus connector. This is the large mounting hole nearest 1500µF capacitor C4463.<br><br>This has no affect on RF Performance. |                                |                               |
| <b>Details of Change:</b> (e.g. sections of document that have changed)<br><br>Route these tracks further from the connector   |                                |                               |
| <b>Approved By:</b><br>(Project Manager)   | <b>Dept:</b>                   | <b>Date:</b>                  |
| <b>Actioned By:</b>  | <b>Dept:</b>                   | <b>Date:</b>                  |
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| <b>Project:</b> Dustin | <b>ECR Ref:</b> Dustin_ECR_193 |
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|---|---------------------------------------|--------------------------------------|
| <b>Item Description:</b> Change C1 to No-Build  |                                       |                                      |
| <b>Item Reference:</b>  | <b>Issue No Before Change:</b> B2.1-5 | <b>Issue No After Change:</b> B2.1-5 |
| <b>Originator Name:</b> Chris Edwards   | <b>Dept:</b> Waves                    | <b>Date:</b> 6/7/06                  |
| <b>Reason For Change: (e.g. list of associated Problem Reports)</b><br><br>A small RMS Phase Error instability was noticed at high temperature (75degrees C) and although this is well above the temperature range of the PCCard it was found that this was caused by the loading of the TCXO and was corrected by the removal of C1. |                                       |                                      |
| <b>Details of Change: (e.g. sections of document that have changed)</b><br><br>Change C1(Capacitor 100pF) SAP no A5B00026922982 to No-Build   |                                       |                                      |
| <b>Approved By:</b><br>(Project Manager)  | <b>Dept:</b>                          | <b>Date:</b>                         |
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