

# NSAI

## ECE TYPE-APPROVAL CERTIFICATE



Communication Concerning:<sup>2</sup> ~~Approval granted~~  
~~Approval extended~~  
~~Approval refused~~  
~~Approval withdrawn~~  
~~Production definitively discontinued~~

Of a type of ~~vehicle~~/component/~~separate technical unit~~<sup>2</sup> with regard to Regulation No. 10.  
Of a type of electrical/electronic sub-assembly<sup>2</sup> with regard to Regulation No.10.

Approval No: **E24\*10R06/02\*4590\*00**

Reason for extension:

*-N/A*

1. Make (trade name of manufacturer):

***DFI, ITOX***

2. Type and general commercial description:

***VC900-M8M***  
***Embedded System***

Variant(s):

***Variant A: VC900-M8M***  
***Variant B: VC900-M8M???????????????***

3. Means of identification of type, if marked on the ~~vehicle~~/  
component/separate technical unit<sup>2</sup>:

***Variant designation***

3.1 Location of that marking:

***On the back of the unit***

4. Category of vehicle:

***N/A***

5. Name and address of manufacturer:

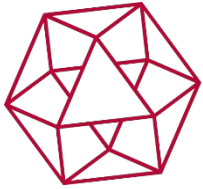
***DFI Inc.***  
***10F., No. 97, Sec. 1, Xintai 5th Rd., Xizhi***  
***Dist., New Taipei City 22175, Taiwan***

6. In the case of components and separate technical units,  
location and method of affixing of the approval mark:

***Label affixed on the back of the unit***

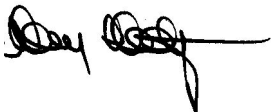
7. Address(es) of assembly plant(s):

***DFI Inc.***  
***No.157, Shanying Rd., Gueishan Dist.,***  
***Taoyuan City 333424, Taiwan***



# NSAI

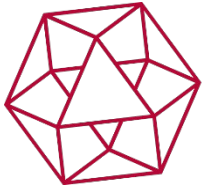
Approval No: E24\*10R06/02\*4590\*00

- |  |  |
|--|--|
| 8. Additional information (where applicable):  | <i>See appendix below</i>                                    |
| 9. Technical service responsible for carrying out the tests:                                     | <b>SGS-TUV Saar GmbH</b><br><b>Am TUV 1 D-66280 Sulzbach</b> |
| 10. Date of test report:   | <b>28.03.2023</b>  |
| 11. Number of test report:   | <b>TMXD2301000248DV</b>                                      |
| 12. Remarks (if any):  | <i>See Appendix below</i>                                    |
| 13. Place:   | <b>Dublin</b>  |
| 14. Date:  | <b>15<sup>th</sup> May, 2023</b>                             |
| 15. Signature:  |  |



16. The index to the information package lodged with the approval authority, which may be obtained on Request, is attached.

- 
1. Distinguishing number of the country which issued/extended/refused or withdrawn approval. (see Regulation, provisions on approval).
  2. Strike out what does not apply.



# NSAI

Approval No: E24\*10R06/02\*4590\*00

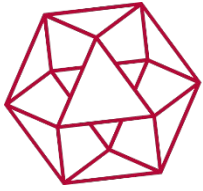
## Appendix

To type-approval communication concerning the type approval of an electrical/electronic sub-assembly under Regulation No.10.

1. Additional information
  - 1.1. Electrical system rated voltage: *DC 12/24V, negative ground*
  - 1.2. This ESA can be used on any vehicle type with the following restrictions: *See manufacturer's specifications.*
    - 1.2.1 Installation conditions, if any: *See manufacturer's specifications.*
  - 1.3. This ESA can only be used on the following vehicle types: *N/A*
    - 1.3.1 Installation conditions, if any: *N/A*
  - 1.4. The specific test method(s) used and the frequency ranges covered to determine immunity were: *N/A*
  - 1.5. Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests: *SGS-TUV Saar GmbH*
2. Remarks: *N/A*

Appendix to type-approval communication concerning the type approval of a vehicle under Regulation No.10.

1. Additional information
2. Electrical system rated voltage: *N/A*
3. Type of bodywork: *N/A*
4. List of electronic systems installed in the tested vehicle(s) not limited to the items in the information document: *N/A*
  - 4.1. Vehicle equipped with 24 GHz short-range radar equipment (yes/no/optional)<sup>2</sup>: *N/A*
5. Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests: *N/A*
6. Remarks: *N/A*



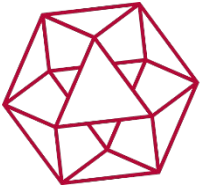
# NSAI

Approval No: E24\*10R06/02\*4590\*00

## Index to the Information Package

Date of issue:	<i>15<sup>th</sup> May, 2023</i>
Date of latest amendment:	<i>N/A</i>
Reason for extension/revision:	<i>N/A</i>
1. Additional conditions, and advisory notes on legal alternatives.	
2. Test report(s)	
- numbers(s):	<i>TMXD2301000248DV</i>
- date of issue:	<i>28.03.2023</i>
- date of latest amendment:	<i>N/A</i>
3. Information document	
- number(s):	<i>IF_TMXD2301000248DV</i>
- date of issue:	<i>28.03.2023</i>
- date of latest amendment:	<i>N/A</i>
Documentation:	<i>175 pages</i>





# NSAI

Approval No: E24\*10R06/02\*4590\*00

## Appendix: **Additional conditions, and advisory notes on legal alternatives**

### A: Additional conditions:

1. The attached technical report, with any of its attachments, forms part of this Type Approval certificate.
2. Each device from series production shall be to the measurements specified in the attached drawings, and shall be manufactured only from the materials specified in the Approval documents.
3. Changes in the type are permitted only with the explicit permission of NSAI. Breaches of this requirement will lead to a withdrawal of the Type Approval, and in addition may be subject to criminal prosecution.
4. At regular intervals, any tests or associated checks prescribed by the applicable legislation to verify continued conformity with the approved type shall be carried out. The manufacturer shall demonstrate compliance with this by submitting to NSAI evidence of adequate arrangements and documented control plans for each type approved.
5. Any set of samples or test pieces showing evidence of non-conformity shall give rise to further sampling and testing and all steps shall be taken to restore conformity of production.
6. This Type Approval will expire when it is surrendered by the holder, or withdrawn by NSAI, or when the approved type no longer conforms to legal requirements. The recall of the Type Approval can be issued by NSAI when the conditions required for the issuing or continuation of the Type Approval are no longer current, or when the Approval holder is in breach of the duties attached to the Type Approval, or when it is established that the approved type no longer meets the requirements of traffic safety.
7. Changes in the company name, address or manufacturing site, as well as in any of the sales or other agents specified in the issuing of the approval must immediately be notified to NSAI.
8. The duties imposed by the issuing of this certificate are not transferable. The legal protection of third parties is not affected by this certificate.
9. When the manufacture or sale of the system, component or separate technical unit has not been started within one year of the date of issue of this certificate, then NSAI is to be informed. This requirement also applies when the manufacture or sale has been halted for more than one year, or when it ought to have been halted for more than one year. The initial commencement of manufacture or sale, or the resumption of manufacture or sale, shall then be notified to NSAI within one month of commencement or resumption.

### B: Legal Options:

Any objection to the requirements set out in this certificate shall be made within one month of the date of issue. The objection shall be made, in writing, to NSAI in Dublin.

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# Technical Report / *Technischer Bericht*

V00

Test standard / *Prüfgrundlage*:  
**UN-R 010**

Level of amendment / *Änderungsstand*:  
**06 Series of Amendments, Supplement 2**

Title / *Titel*  
**Electromagnetic compatibility**

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Manufacturer / *Hersteller*:  
**DFI Inc.**

Type / *Typ*:  
**VC900-M8M**

---

Subject of testing / *Gegenstand der Prüfung*:  
**Component**

**0 General / Allgemeine Angaben:**

0.1	<p>Make (trade name of manufacturer) / <i>Fabrikmarke</i> (Firmenname des Herstellers):</p>	DFI, ITOX
0.2	<p>Type / <i>Typ:</i></p>	<p>VC900-M8M</p> <p>Variant A: VC900-M8M Variant B: VC900-M8M????????????? (? = A ~ Z, a ~ z, 0 ~ 9, -, blank, or any character)</p> <p>Explanation: for marketing purpose only</p>
0.2.1	<p>Commercial description(s) / <i>Handelsname(n):</i></p>	Embedded System
0.3	<p>Means of identification of type, if marked on the vehicle / component / technical unit / <i>Merkmale zur Typidentifizierung, sofern am Fahrzeug / Bauteil / an der selbständigen technischen Einheit vorhanden:</i></p>	Variant designation
0.3.1	<p>Location of that markings / <i>Anbringungsstelle dieser Merkmale:</i></p>	On the back of the unit
0.4	<p>Category of vehicle / <i>Fahrzeugklasse:</i></p>	-
0.5	<p>Manufacturer's name and address / <i>Name und Anschrift des Herstellers:</i></p>	<p>DFI Inc. 10F., No. 97, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22175, Taiwan</p>
0.8	<p>Address of assembly plant / <i>Name(n) und Anschrift(en) der Fertigungsstätte(n):</i></p>	<p>DFI Inc. No.157, Shanying Rd., Gueishan Dist., Taoyuan City 333424, Taiwan</p>
0.9	<p>Name and address of representative / <i>Name und Anschrift des Beauftragten:</i></p>	-
0.10	<p>Location of the approval mark / <i>Anbringungsstelle des Genehmigungszeichens:</i></p>	Label affixed on the back of the unit

**1 Appendices / Anhänge:**

1.1 Test record / *Prüfprotokoll:* -

See appendix A /  
*Siehe Anhang A*

1.2 List of modifications /  
 Liste der Änderungen n.a.

See appendix B /  
*Siehe Anhang B*

**2 Attachments / Anlagen:**

2.1 Information folder /  
*Beschreibungsmappe:* No. / Nr.: IF\_TMxD2301000248DV

Date of issue /  
*Ausgabedatum:* 28.03.2023

2.2 Further enclosures  
*Sonstige Anlagen* Test report / *Prüfbericht:*

No. / Nr.: TRS\_TMxD2301000248DV

Date of issue /  
*Ausgabedatum:* 28.03.2023

**3 Statement of conformity / Schlussbescheinigung:**

The information folder as mentioned under no. 2.2 and the type described therein are in compliance with the test standard mentioned above. With regard to the required level of performance to be achieved, the test specimen were representative for the type to be approved. /

*Die unter Nr. 2.2 angegebene Beschreibungsmappe und der darin beschriebene Typ entsprechen der oben aufgeführten Prüfgrundlage. Die verwendeten Prüfmuster waren im Hinblick auf das erforderliche Leistungsniveau für den zu genehmigenden Typ repräsentativ.*

The tests were carried out in accordance to the relevant requirements of the  
*Die Durchführung der Prüfungen entsprach den relevanten Anforderungen der*

EN ISO/IEC 17025

EN ISO/IEC 17020

**Test Laboratory / Prüflaboratorium**

**SGS-TÜV Saar GmbH**

notified by  
*benannt durch*

Kraftfahrt-Bundesamt (KBA),  
Federal Republic of Germany

National Standards  
Authority of Ireland (NSAI)

Rijksdienst voor het Wegverkeer  
(RDW),  
The Netherlands

**No. KBA - P 00084 – 10**

**No. 101**

**No. 99050064 00**

Formal Review (Conformity Check) by /  
*Konformitätsprüfung durch diger*

Authorized by the Responsible expert /  
*Verantwortlicher Sachverständiger*





Victor Wen

Calvin Tzou

Taipei, 28.03.2023

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To assess the conformity, the laboratory refers to the "scope classification" of the Kraftfahrt-Bundesamt (KBA) – Federal Motor Transport Authority (in its valid version at the time of testing) and the specified consideration of the measurement uncertainty for the related test procedure.

In case the measurement uncertainty does not need to be considered according to the scope classification, the laboratory considers the result conform if its measured value is within the specification.

In case the measurement uncertainty does need to be considered according to the scope classification, the laboratory considers the result conform if its value incl. its measurement uncertainty is within the specification.

**Test record / Prüfprotokoll**

**1 Test conditions / Prüfbedingungen**

1.1 Test component / *Geprüftes Bauteil*

1.1.1 Function description / *Funktionsbeschreibung* Embedded System

1.1.2 Type / *Typ* VC900-M8M

1.1.3 ESA(s) / variants Variant A: VC900-M8M

1.1.4 Tested operating mode(s) / *geprüfte(r) Betriebszustand(-zustände)* See test report of the enclosure./  
*Siehe Prüfbericht in der Anlage.*

1.1.5 Tested rated voltage(s) / *geprüfte Nennspannung(en)* 12 V / 24V

1.1.6 The approval object is ... / *Bei dem Genehmigungsobjekt handelt es sich um ...*

an ESA that is not related to a connection system for charging a REESS / *eine EUB, die nicht im Zusammenhang mit einem Anschlussystem zum Laden eines REESS steht*  yes / *ja*  
 no / *nein*

a complete connection system for charging a REESS / *ein vollständiges Anschlussystem zum Laden eines REESS*  yes / *ja*  
 no / *nein*

a component of a connection system for charging a REESS / *eine Komponente eines Anschlussystems zum Laden eines REESS*  yes / *ja*  
 no / *nein*

Have the HV voltages and HV currents been taken into account in the tests and measurements? / *Wurden die HV-Spannungen und HV-Ströme bei den Prüfungen bzw. Messungen berücksichtigt?*  yes / *ja*  
 no / *nein*  
 n.a.

a light source or a part of a light source acc. to item 3.2.10 of the Regulation / *Handelt es sich um ein Gerät, das die Anforderungen des Punktes 3.2.10 der Regelung erfüllt?* (Beleuchtung)  yes / *ja*  
 no / *nein*

Approval number or number of test report / *Genehmigungsnummer oder Nummer des Prüfberichts*  n.a.

- 
- 1.1.7 Do the devices of the type have immunity related functions? / *Haben die Geräte des Typs Funktionen im Zusammenhang mit der Störfestigkeit?*  yes / ja  
 no / nein  
Reason if necessary / *Ggf. Begründung:*  n.a.
- 1.1.8 Do the devices of the type have to be in operation during the engine start phase? / *Müssen die Geräte des Typs während der Motorstartphase in Betrieb sein?*  yes / ja  
 no / nein
- 1.1.9 Photo documentation of the examinee including existing labels / *Fotodokumentation des Prüflings inkl. vorhandener Aufschriften* See test report of the enclosure./ *Siehe Prüfbericht in der Anlage.*
- 1.1.10 Remarks / *Bemerkungen:*  n.a.  
The tested ESA is a DC 12V/24V device, the energy efficiency in-vehicle telematics system assists smart vehicles in collecting data, including vehicle speed, engine speed, network packet records, etc., and finally uploads them to cloud storage through 4G synchronously for daily data analysis and services. That doesn't have immunity related functions.  
Variant A: VC900-M8M full test was performed. Variant B for marketing purpose only, not affect EMC characteristic, no necessary to perform test.
- 1.2 Test equipment / *Prüfeinrichtungen*  
Parameter of the test area / *Prüfortparameter:* The equipment, on which the tests were carried out, fulfilled the requirements of the Regulation. / *Die Prüfungen wurden auf Anlagen durchgeführt, die den Anforderungen der Regelung entsprechen.*

**2 Test Results / Prüfergebnisse**

- |                                     |  |   |                                     |                            |                          |                                      |                          |      |
|-------------------------------------|--|---|-------------------------------------|----------------------------|--------------------------|--------------------------------------|--------------------------|------|
| 2.1                                 | <p>Test results in configurations <u>other</u> than „REESS charging mode coupled of the power grid / <i>Prüfergebnisse für <u>andere</u> Konfigurationen als “REESS im Ladebetrieb mit dem Versorgungsnetz gekoppelt”</i></p> <p>Remarks / <i>Bemerkungen:</i></p>   | <table border="0"> <tr> <td style="border: 1px solid black; text-align: center; width: 20px; height: 15px;"><input checked="" type="checkbox"/></td> <td>fulfilled / <i>erfüllt</i></td> </tr> <tr> <td style="border: 1px solid black; text-align: center; width: 20px; height: 15px;"><input type="checkbox"/></td> <td>not fulfilled / <i>nicht erfüllt</i></td> </tr> <tr> <td style="border: 1px solid black; text-align: center; width: 20px; height: 15px;"><input type="checkbox"/></td> <td>n.a.</td> </tr> </table> <p style="margin-top: 10px;"><input checked="" type="checkbox"/> n.a.</p> | <input checked="" type="checkbox"/> | fulfilled / <i>erfüllt</i> | <input type="checkbox"/> | not fulfilled / <i>nicht erfüllt</i> | <input type="checkbox"/> | n.a. |
| <input checked="" type="checkbox"/> | fulfilled / <i>erfüllt</i>   |   |                                     |                            |                          |                                      |                          |      |
| <input type="checkbox"/>            | not fulfilled / <i>nicht erfüllt</i>   |   |                                     |                            |                          |                                      |                          |      |
| <input type="checkbox"/>            | n.a.   |   |                                     |                            |                          |                                      |                          |      |
| 2.1.1                               | <p>Measurement of <u>radiated broadband</u> electromagnetic emissions from electrical/ electronic subassemblies according to item 6.5 of the Regulation / <i>Messungen von <u>gestrahlten breitbandigen</u> elektromagnetischen Störungen aus elektrischen/ elektronischen Unterbaugruppen gemäß Punkt 6.5 der Regelung:</i></p> | <table border="0"> <tr> <td style="border: 1px solid black; text-align: center; width: 20px; height: 15px;"><input checked="" type="checkbox"/></td> <td>fulfilled / <i>erfüllt</i></td> </tr> <tr> <td style="border: 1px solid black; text-align: center; width: 20px; height: 15px;"><input type="checkbox"/></td> <td>not fulfilled / <i>nicht erfüllt</i></td> </tr> <tr> <td style="border: 1px solid black; text-align: center; width: 20px; height: 15px;"><input type="checkbox"/></td> <td>n.a.</td> </tr> </table>   | <input checked="" type="checkbox"/> | fulfilled / <i>erfüllt</i> | <input type="checkbox"/> | not fulfilled / <i>nicht erfüllt</i> | <input type="checkbox"/> | n.a. |
| <input checked="" type="checkbox"/> | fulfilled / <i>erfüllt</i>   |   |                                     |                            |                          |                                      |                          |      |
| <input type="checkbox"/>            | not fulfilled / <i>nicht erfüllt</i>   |   |                                     |                            |                          |                                      |                          |      |
| <input type="checkbox"/>            | n.a.   |   |                                     |                            |                          |                                      |                          |      |
| 2.1.1.1                             | <p>Measurement procedure / <i>Messverfahren:</i></p>   | <p>Quasi-peak-detector<br/><i>Quasi-Spitzenwert-Detektor</i></p>  |                                     |                            |                          |                                      |                          |      |
| 2.1.1.2                             | <p>Measurement setup / <i>Messaufbau:</i></p>  | <p>Anechoic chamber<br/><i>Absorberhalle</i></p>  |                                     |                            |                          |                                      |                          |      |
| 2.1.1.3                             | <p>Measurement results / <i>Messergebnisse:</i></p>  | <p>The measured values, expressed in dB <math>\mu</math>V/m, are below the reference limits. See test report of the enclosure./<br/><i>Die gemessenen Werte bleiben, ausgedrückt in dB <math>\mu</math>V/m, unter den Grenzwerten. Siehe Prüfbericht in der Anlage.</i></p>   |                                     |                            |                          |                                      |                          |      |
| 2.1.1.4                             | <p>Photo documentation of the measurement setup (if applicable) / <i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i></p>  | <p>See test report of the enclosure./<br/><i>Siehe Prüfbericht in der Anlage.</i></p>   |                                     |                            |                          |                                      |                          |      |
| 2.1.1.5                             | <p>Remarks / <i>Bemerkungen:</i></p>   | <p><input checked="" type="checkbox"/> n.a.</p>   |                                     |                            |                          |                                      |                          |      |



- |         |   |   |
|---------|---|---|
| 2.1.2   | Measurement of <u>radiated narrowband</u> electromagnetic emissions from electrical/ electronic subassemblies according to item 6.6 of the Regulation /<br><i>Messungen von <u>gestrahlten schmalbandigen</u> elektromagnetischen Störungen aus elektrischen/ elektronischen Unterbau-gruppen gemäß Punkt 6.6 der Regelung:</i> | <input checked="" type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input type="checkbox"/> n.a.  |
| 2.1.2.1 | Measurement procedure /<br><i>Messverfahren:</i>  | Average-detector<br><i>Mittelwert-Detektor</i>  |
| 2.1.2.2 | Measurement setup /<br><i>Messaufbau:</i>   | Anechoic chamber<br><i>Absorberhalle</i>  |
| 2.1.2.3 | Measurement results /<br><i>Messergebnisse:</i>   | The measured values, expressed in dB $\mu$ V/m, are below the reference limits. See test report of the enclosure./<br><i>Die gemessenen Werte bleiben, ausgedrückt in dB <math>\mu</math>V/m, unter den Grenzwerten. Siehe Prüfbericht in der Anlage.</i> |
| 2.1.2.4 | Photo documentation of the measurement setup (if applicable) /<br><i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i>   | See test report of the enclosure./<br><i>Siehe Prüfbericht in der Anlage.</i>   |
| 2.1.2.5 | Remarks / <i>Bemerkungen:</i>   | <input checked="" type="checkbox"/> n.a.  |

- 
- |                                     |   |   |                                     |                     |                          |                               |                          |      |
|-------------------------------------|---|---|-------------------------------------|---------------------|--------------------------|-------------------------------|--------------------------|------|
| 2.1.3                               | <p>Testing for <u>emission of transient conducted disturbances</u> of electrical/electronic subassemblies on 12/24 V supply lines according to item 6.7 of the Regulation /<br/> <i>Prüfung der <u>leitungsgeführten Störaussendungen</u> von elektrischen/elektronischen Unterbaugruppen auf 12/24 V Versorgungsleitungen gemäß Punkt 6.7 der Regelung</i></p> | <table border="0"> <tr> <td style="border: 1px solid black; text-align: center; width: 20px; height: 15px;"><input checked="" type="checkbox"/></td> <td>fulfilled / erfüllt</td> </tr> <tr> <td style="border: 1px solid black; text-align: center; width: 20px; height: 15px;"><input type="checkbox"/></td> <td>not fulfilled / nicht erfüllt</td> </tr> <tr> <td style="border: 1px solid black; text-align: center; width: 20px; height: 15px;"><input type="checkbox"/></td> <td>n.a.</td> </tr> </table> | <input checked="" type="checkbox"/> | fulfilled / erfüllt | <input type="checkbox"/> | not fulfilled / nicht erfüllt | <input type="checkbox"/> | n.a. |
| <input checked="" type="checkbox"/> | fulfilled / erfüllt   |   |                                     |                     |                          |                               |                          |      |
| <input type="checkbox"/>            | not fulfilled / nicht erfüllt   |   |                                     |                     |                          |                               |                          |      |
| <input type="checkbox"/>            | n.a.  |   |                                     |                     |                          |                               |                          |      |
| 2.1.3.1                             | <p>Test results /<br/> <i>Prüfergebnisse:</i></p>   | <p>The limits are kept. See test report of the enclosure./<br/> <i>Die Grenzwerte wurden eingehalten. Siehe Prüfbericht in der Anlage.</i></p>  |                                     |                     |                          |                               |                          |      |
| 2.1.3.2                             | <p>Photo documentation of the measurement setup (if applicable) /<br/> <i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i></p>  | <p>See test report of the enclosure. /<br/> <i>Siehe Prüfbericht in der Anlage.</i></p>   |                                     |                     |                          |                               |                          |      |
| 2.1.3.3                             | <p>Remarks /<br/> <i>Bemerkungen:</i></p>   | <table border="0"> <tr> <td style="border: 1px solid black; text-align: center; width: 20px; height: 15px;"><input checked="" type="checkbox"/></td> <td>n.a.</td> </tr> </table>   | <input checked="" type="checkbox"/> | n.a.                |                          |                               |                          |      |
| <input checked="" type="checkbox"/> | n.a.  |   |                                     |                     |                          |                               |                          |      |

2.1.4	<p>Testing for <u>radiated immunity</u> of electrical/ electronic subassemblies to electromagnetic radiation according to item 6.8 of the Regulation /</p> <p><i>Prüfung der <u>gestrahlten Störfestigkeit</u> von elektrischen/ elektronischen Unterbaugruppen gegenüber eingestrahlten elektromagnetischen Feldern gemäß Punkt 6.8 der Regelung:</i></p>	<input type="checkbox"/> fulfilled / <i>erfüllt</i> <input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i> <input checked="" type="checkbox"/> n.a.
2.1.4.1	<p>Test procedure /</p> <p><i>Prüfverfahren:</i></p>	<input checked="" type="checkbox"/> n.a.
2.1.4.2	<p>Test setup /</p> <p><i>Prüfaufbau:</i></p>	<input checked="" type="checkbox"/> n.a.
2.1.4.3	<p>Test results /</p> <p><i>Prüfergebnisse:</i></p>	<input checked="" type="checkbox"/> n.a.
2.1.4.4	<p>Photo documentation of the measurement setup (if applicable) /</p> <p><i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i></p>	<input checked="" type="checkbox"/> n.a.
2.1.4.5	<p>Remarks / <i>Bemerkungen:</i></p>	<input type="checkbox"/> n.a. <p>ESA not safety-related according to item 2.12 of the Regulation. / <i>EUB nicht sicherheitsrelevant nach Punkt 2.12 der Regelung.</i></p> <p>The tested ESA is a DC 12V/24V device, the energy efficiency in-vehicle telematics system assists smart vehicles in collecting data, including vehicle speed, engine speed, network packet records, etc., and finally uploads them to cloud storage through 4G synchronously for daily data analysis and services. That doesn't have immunity related functions according to item 2.12 of the Regulation.</p>

- |         |  |  |
|---------|--|--|
| 2.1.5   | <p>Testing for <u>immunity to transient disturbances</u> conducted along on 12/24 V supply lines of electrical/electronic subassemblies according to item 6.9 of the Regulation /<br/> <i>Prüfung der <u>Störfestigkeit gegen leitungsgeführte transiente Störungen</u> auf 12/24 V Versorgungsleitungen von elektrischen/elektronischen Unterbaugruppen gemäß Punkt 6.9 der Regelung:</i></p> | <input checked="" type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input type="checkbox"/> n.a.   |
| 2.1.5.1 | <p>Test results /<br/> <i>Prüfergebnisse:</i></p>  | <p>During the test was no unacceptable degradation. See test report of the enclosure./<br/> <i>Während der Prüfung trat keine unzulässige Beeinträchtigung auf. Siehe Prüfbericht in der Anlage.</i></p> |
| 2.1.5.2 | <p>Photo documentation of the measurement setup (if applicable) /<br/> <i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i></p>   | <p>See test report of the enclosure./<br/> <i>Siehe Prüfbericht in der Anlage.</i></p>   |
| 2.1.5.3 | <p>Remarks / <i>Bemerkungen:</i></p>   | <input checked="" type="checkbox"/> n.a.   |

- |         |  |  |
|---------|--|--|
| 2.2     | <p>Test results in configurations „REESS charging mode coupled of the power grid / <i>Prüfergebnisse für Konfigurationen “REESS im Ladebetrieb mit dem Versorgungsnetz gekoppelt”</i></p> <p>Remarks / <i>Bemerkungen:</i></p>   | <input type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input checked="" type="checkbox"/> n.a. |
|         |  | <input type="checkbox"/> n.a.<br>Test component not related to REESS / <i>Geprüftes Bauteil nicht in Zusammenhang mit REESS</i>                                  |
| 2.2.1   | <p>Measurement of <u>radiated broadband</u> electromagnetic emissions from electrical/ electronic subassemblies according to item 7.10 of the Regulation / <i>Messungen von <u>gestrahlten breitbandigen</u> elektromagnetischen Störungen aus elektrischen/ elektronischen Unterbaugruppen gemäß Punkt 7.10 der Regelung:</i></p> | <input type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input checked="" type="checkbox"/> n.a. |
| 2.2.1.1 | <p>Measurement procedure / <i>Messverfahren:</i></p>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.1.2 | <p>Measurement setup / <i>Messaufbau:</i></p>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.1.3 | <p>Test results / <i>Prüfergebnisse:</i></p>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.1.4 | <p>Photo documentation of the measurement setup (if applicable) / <i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i></p>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.1.5 | <p>Remarks / <i>Bemerkungen:</i></p>   | <input checked="" type="checkbox"/> n.a.   |

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|---------|--|--|
| 2.2.2   | Measurement of emissions of <u>harmonics</u> on AC power lines from electrical/ electronic subassemblies according to item 7.11 of the regulation / <i>Messungen der <u>Oberwellen</u> auf AC-Versorgungsleitungen von elektrischen/ elektronischen Unterbaugruppen gemäß Punkt 7.11 der Regelung</i>  | <input type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input checked="" type="checkbox"/> n.a. |
| 2.2.2.1 | Measurement results / <i>Messergebnisse:</i>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.2.2 | Photo documentation of the measurement setup (if applicable) / <i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.2.3 | Remarks / <i>Bemerkungen:</i>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.3   | Measurement of <u>emission of voltages changes, voltage fluctuation</u> and <u>flicker</u> on AC power lines from ESAs according to item 7.12 of the Regulation / <i>Messungen von <u>Spannungsänderungen, Spannungsschwankungen</u> und <u>Flicker</u> auf AC-Versorgungsleitungen von elektrischen/ elektronischen Unterbaugruppen gemäß Punkt 7.12 der Regelung</i> | <input type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input checked="" type="checkbox"/> n.a. |
| 2.2.3.1 | Test results / <i>Prüfergebnisse:</i>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.3.2 | Photo documentation of the measurement setup (if applicable) / <i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.3.4 | Remarks / <i>Bemerkungen:</i>  | <input checked="" type="checkbox"/> n.a.   |

- |         |   |  |
|---------|---|--|
| 2.2.4   | <p>Measurement of <u>emission of radiofrequency conducted disturbances</u> on AC or DC power lines from ESAs according to item 7.13 of the Regulation /<br/> <i>Messungen von <u>hochfrequenten Störungen</u> auf AC- oder DC-Versorgungsleitungen von elektrischen/ elektronischen Unterbaugruppen gemäß Punkt 7.13 der Regelung</i></p> | <input type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input checked="" type="checkbox"/> n.a. |
| 2.2.4.1 | <p>Measurement procedure /<br/> <i>Messverfahren:</i></p>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.4.2 | <p>Measurement results /<br/> <i>Messergebnisse:</i></p>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.4.3 | <p>Photo documentation of the measurement setup (if applicable) /<br/> <i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i></p>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.4.4 | <p>Remarks / <i>Bemerkungen:</i></p>  | <input checked="" type="checkbox"/> n.a.   |

- |         |  |   |  |
|---------|--|---|--|
| 2.2.5   | <u>Measurement of emission of radiofrequency conducted disturbances on network or telecommunication access from ESAs according to item 7.14 of the Regulation /</u><br><u>Messungen von hochfrequenten Störungen auf Netzwerk- oder Kommunikationsleitungen von elektrischen/ elektronischen Unterbaugruppen gemäß Punkt 7.14 der Regelung</u> | <input type="checkbox"/><br><input type="checkbox"/><br><input checked="" type="checkbox"/> | fulfilled / <i>erfüllt</i><br>not fulfilled / <i>nicht erfüllt</i><br>n.a. |
| 2.2.5.1 | Measurement procedure /<br><i>Messverfahren:</i>   | <input checked="" type="checkbox"/>   | n.a.   |
| 2.2.5.2 | Measurement results /<br><i>Messergebnisse:</i>  | <input checked="" type="checkbox"/>   | n.a.   |
| 2.2.5.3 | Photo documentation of the measurement setup (if applicable) /<br><i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i>  | <input checked="" type="checkbox"/>   | n.a.   |
| 2.2.5.4 | Remarks / <i>Bemerkungen:</i>  | <input checked="" type="checkbox"/>   | n.a.   |



- |         |  |  |
|---------|--|--|
| 2.2.6   | <p>Measurement of <u>immunity</u> of ESAs to <u>electrical transient/burst disturbances</u> conducted along AC and DC power lines according to item 7.15 of the regulation / <i>Prüfung der <u>Störfestigkeit</u> von elektrischen/elektronischen Unterbaugruppen <u>gegenüber schnellen Transienten/Burst</u> auf AC- und DC-Versorgungsleitungen gemäß Punkt 7.15 der Regelung</i></p> | <input type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input checked="" type="checkbox"/> n.a. |
| 2.2.6.1 | <p>Photo documentation of the measurement setup (if applicable) / <i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i></p>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.6.2 | <p>Test results / <i>Prüfergebnisse:</i></p>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.6.3 | <p>Remarks / <i>Bemerkungen:</i></p>   | <input checked="" type="checkbox"/> n.a.   |

- |         |  |  |
|---------|--|--|
| 2.2.7   | Measurement of <u>immunity</u> of ESAs to <u>surge</u> conducted along AC and DC power lines according to item 7.16 of the Regulation / <i>Prüfung der <u>Störfestigkeit</u> von elektrischen/elektronischen Unterbaugruppen gegenüber <u>Surge-Impulsen</u> auf AC- und DC-Versorgungsleitungen gemäß Punkt 7.16 der Regelung</i> | <input type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input checked="" type="checkbox"/> n.a. |
| 2.2.7.1 | Photo documentation of the measurement setup (if applicable) / <i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.7.2 | Test results / <i>Prüfergebnisse:</i>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.7.3 | Remarks / <i>Bemerkungen:</i>  | <input checked="" type="checkbox"/> n.a.   |

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|---------|--|--|
| 2.2.8   | Testing for <u>emission of transient conducted disturbances</u> of electrical/electronic subassemblies on 12/24 V supply lines according to item 7.17 of the Regulation /<br><i>Prüfung der <u>leitungsgeführten Störaussendungen</u> von elektrischen/elektronischen Unterbaugruppen auf 12/24 V Versorgungsleitungen gemäß Punkt 7.17 der Regelung</i> | <input type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input checked="" type="checkbox"/> n.a. |
| 2.2.8.1 | Test results /<br><i>Prüfergebnisse:</i>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.8.2 | Photo documentation of the measurement setup (if applicable) /<br><i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.8.3 | Remarks / <i>Bemerkungen:</i>  | <input checked="" type="checkbox"/> n.a.   |

- |         |  |  |
|---------|--|--|
| 2.2.9   | <p>Testing for <u>radiated immunity</u> of electrical/ electronic subassemblies to electromagnetic radiation according to item 7.18 of the Regulation /</p> <p><i>Prüfung der <u>gestrahlten Störfestigkeit</u> von elektrischen/ elektronischen Unterbaugruppen gegenüber eingestrahlten elektromagnetischen Feldern gemäß Punkt 7.18 der Regelung:</i></p> | <input type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input checked="" type="checkbox"/> n.a. |
| 2.2.9.1 | <p>Test procedure /</p> <p><i>Prüfverfahren:</i></p>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.9.2 | <p>Test setup /</p> <p><i>Prüfaufbau:</i></p>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.9.3 | <p>Test results /</p> <p><i>Prüfergebnisse:</i></p>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.9.4 | <p>Photo documentation of the measurement setup (if applicable) /</p> <p><i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i></p>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.9.5 | <p>Remarks / <i>Bemerkungen:</i></p>   | <input checked="" type="checkbox"/> n.a.   |

- |          |  |  |
|----------|--|--|
| 2.2.10   | <p>Testing for <u>immunity to transient disturbances</u> conducted along on 12/24 V supply lines of electrical/electronic subassemblies according to item 7.19 of the Regulation /<br/> <i>Prüfung der <u>Störfestigkeit gegen leitungsgeführte transiente Störungen</u> auf 12/24 V Versorgungsleitungen von elektrischen/elektronischen Unterbaugruppen gemäß Punkt 7.19 der Regelung:</i></p> | <input type="checkbox"/> fulfilled / <i>erfüllt</i><br><input type="checkbox"/> not fulfilled / <i>nicht erfüllt</i><br><input checked="" type="checkbox"/> n.a. |
| 2.2.10.1 | <p>Test results /<br/> <i>Prüfergebnisse:</i></p>  | <input checked="" type="checkbox"/> n.a.   |
| 2.2.10.2 | <p>Photo documentation of the measurement setup (if applicable) /<br/> <i>Fotodokumentation des Messaufbaus (sofern erforderlich):</i></p>   | <input checked="" type="checkbox"/> n.a.   |
| 2.2.10.3 | <p>Remarks / <i>Bemerkungen:</i></p>   | <input checked="" type="checkbox"/> n.a.   |





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**List of modifications /**  
**Liste der Änderungen:**

- |   |   |   |
|---|---|---|
| 1 | Correction of /<br><i>Es wird berichtigt:</i> | - |
| 2 | Modification of /<br><i>Es wird geändert:</i> | - |
| 3 | Addition of /<br><i>Es wird hinzugefügt:</i>  | - |
| 4 | Deletion of /<br><i>Es entfällt:</i>          | - |

- End of the Technical Report -

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# Test Report

V00

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF VEHICLES  
WITH REGARD TO ELECTROMAGNETIC COMPATIBILITY

Test standard:

**UN-R 010**

Level of amendment:

**06 Series of Amendments, Supplement 2**

Title

**Electromagnetic compatibility**

---

Manufacturer:

**DFI Inc.**

Type:

**VC900-M8M**

---

Subject of testing / *Gegenstand der Prüfung:*

**Component**



**0 General :**

- |     |                                      |   |
|-----|--------------------------------------|---|
| 0.1 | Make<br>(trade name of manufacturer) | DFI; ITOX   |
| 0.2 | Type                                 | VC900-M8M<br>Variant A: VC900-M8M   |
| 0.3 | Manufacturer's name and address      | DFI Inc.<br>10F., No. 97, Sec. 1, Xintai 5th Rd., Xizhi<br>Dist., New Taipei City, Taiwan, R.O.C. |
| 0.4 | Present persons (Testing/Witnessed)  | Testing: Angus Chen<br>Witnessed: Victor Wen  |



**2      Test record**

**2.1      Test equipment:**

The equipment, on which the tests are carried out, fulfilled the requirements of the above mentioned directive.

**Executed tests:**

- Measurement of radiated broadband electromagnetic emissions from electrical/electronic subassemblies according to UN-R 010, 06 Series of Amendments, Annex 7.
- Measurement of radiated narrowband electromagnetic emissions from electrical/electronic subassemblies according to UN-R 010, 06 Series of Amendments, Annex 8.
- Testing for immunity to and emission of transients of electrical/electronic subassemblies according to UN-R 010, 06 Series of Amendments, Annex 10.

**Environment:**

- Temperature:                    20.9 – 23.9 °C
- Relative humidity:            48 - 55 %
- Details of mains power:    DC 13.5V/27V

**2.2      Test Results:**

At all performed tests, the requirements of the Regulation UN-R 010, 06 Series of Amendments, were fulfilled.  
The detailed results are given in the appendix 1 to 3

**2.3      Other information:**

Compliance Certification Services Inc.  
Xindian Lab.

**Place of testing:**

No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan.

**Test period:**

Start: 17.02.2023  
End: 23.02.2023

**2.4      Remarks:**

n.a.

**3**      **Appendix:**

- |                                 |  |
|---------------------------------|--|
| <b>1. Appendix test result:</b> | Measurement of radiated broadband and narrowband electromagnetic emissions from electrical/electronic subassemblies according to UN-R 010, 06 Series of Amendments, Annex 7 and 8. |
| <b>2. Appendix test result:</b> | Testing for immunity of electrical/electronic subassemblies against disturbances conducted along supply lines according to UN-R 010, 06 Series of Amendments, Annex 10, item 2.    |
| <b>3. Appendix test result:</b> | Measurement of conducted emission of transients along supply lines of electrical/electronic subassemblies according to UN-R 010, 06 Series of Amendments, Annex 10, item 3.        |
| <b>4. Appendix:</b>             | Photo documentation of the ESA.  |
| <b>5. Disclaimer:</b>           | Disclaimer document.   |

4. **Statement of conformity:**

With regard to the required level of performance to be achieved, the tested items were representative for the type to be approved (see 1.2).  
The tests were carried out in accordance with the relevant requirements of EN ISO/IEC 17025:2005.

This Test Report comprises pages 1 to 6.  
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Duplication and publishing in extracts of the Test Report is allowed only by written permission of the Test Laboratory.

Report No.: TRS\_TMXD2301000247DV

Place: Taipei

Date: 28.03.2023

Technical Responsibility for Area of Testing



Name / name: Victor Wen

EMC Lab. Technical Assistant Manager

Test Operator



Name / name: Angus Chen

EMC Lab. test engineer

**Measurement of radiated broadband and narrowband electromagnetic Emissions from electrical/electronic subassemblies according to UN-R 010, 06 Series of Amendments, Annex 7 and 8**

**Appendix 1**

<b>Test Procedure:</b>	CISPR 25: Second edition 2002 and corrigendum 2004.
<b>Antenna distance:</b>	1m
<b>Antenna height:</b>	1m
<b>Mounting of ESA:</b>	On a wooden table (height 0.9 m) with metal plate. Wiring harness and ESA placed on insulating material with a thickness of 5 cm (see pictures).
<b>Detector:</b>	Average (narrowband) Quasi-peak (broadband)
<b>Operation mode:</b>	The test was performed with DC 13.5V/27V test voltage
<b>Test results:</b>	<p>Indicate the maximum values of the measuring over the frequency domain of 30 -1000 MHz (horizontal and vertical polarization / bandwidth 120 kHz, 50 kHz steps, 1s(QP) / 5ms(Avg) dwell time); they have to be compared with the limits</p> <p><u>Results:</u></p> <p>The measurement results are below the specified limits for the ESAs, so the test is passed.</p>
<b>Remark:</b>	Tested with requirements for a DC 12V/24V device

**Test equipment:**  
**Equipment Used for Radiation Emission Measurement**

966 Chamber B (CISPR 25)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI	101202	08/05/2022	08/04/2023
Antenna	Schwarzbeck	BBA 9106 (VHBB 9124)	749RX	01/07/2023	01/06/2024
Antenna	Schwarzbeck	VUSLP 9111	405RX	01/07/2023	01/06/2024
N-Type Cable	EMEC	CFD400NL-LW	SD-R048	04/18/2022	04/17/2023
Pre-Amplifier	EMCI	EMC330H	980111	08/11/2022	08/10/2023
Thermo-Hygro Meter	Wisewind	N/A	SD-R027	08/23/2022	08/22/2023
LISN	Schwarzbeck	NNBM 8124	01734	01/11/2023	01/10/2024
LISN	Schwarzbeck	NNBM 8124	01735	01/11/2023	01/10/2024
Software	EZ-EMC Ver.CCS-03A1				

**The measurement uncertainty**

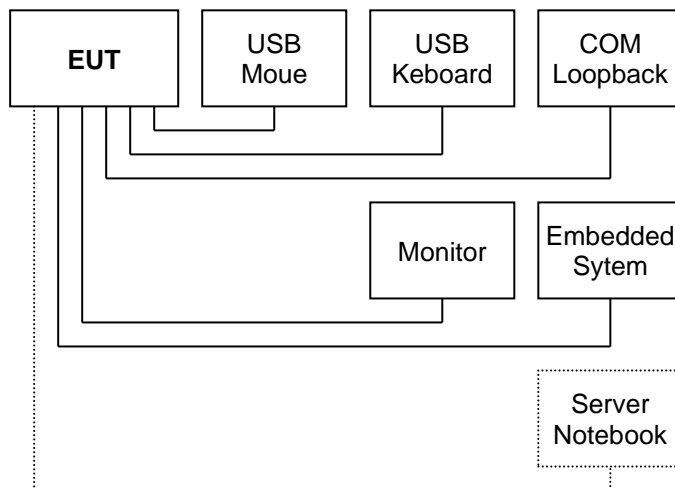
Test Site	Frequency (MHz)	Expanded Uncertainty
966 Chamber	30 ~ 200	± 2.8 dB
	200 ~ 1000	± 2.8 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

**Setup diagram:**

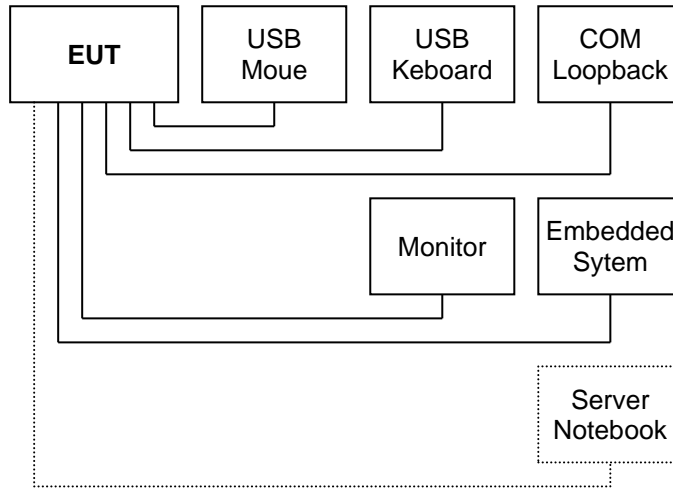
**Mode 1:**

Normal Operation (DC 12V)



Mode 2:

Normal Operation (DC 24V)



Simulator stable state:

During test, Setup whole system for test, refer to Appendix 1, Page 2 of 21 and Page 3 of 21 setup diagram. Turn on power and perform operations software to test (Step: 1. Lan port; 2. CAN BUS; 3. COM 1; 4. COM 2; 5. COM 3; 6. COM 4; 7. SD Card; 8. Wi-Fi; 9. BT; 10. LTE).



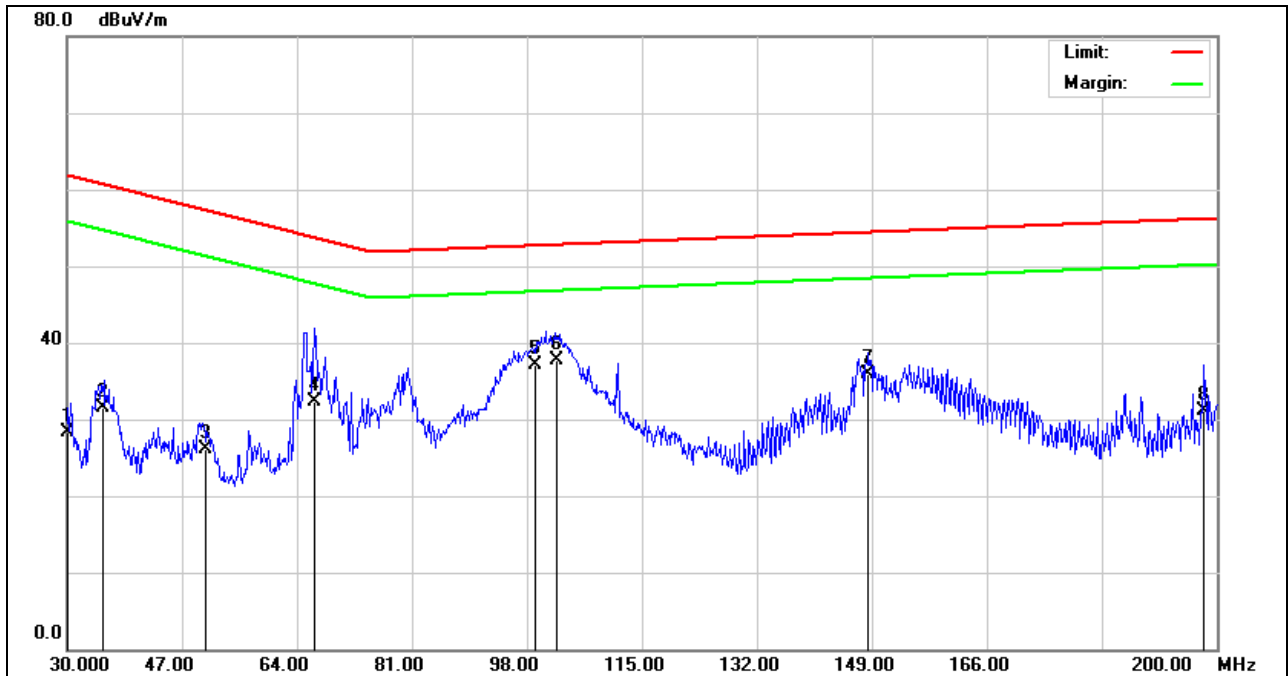
**Measurement graphs and final result**

**Variant A: VC900-M8M**

**Mode 1: Normal Operation (DC 12V)**

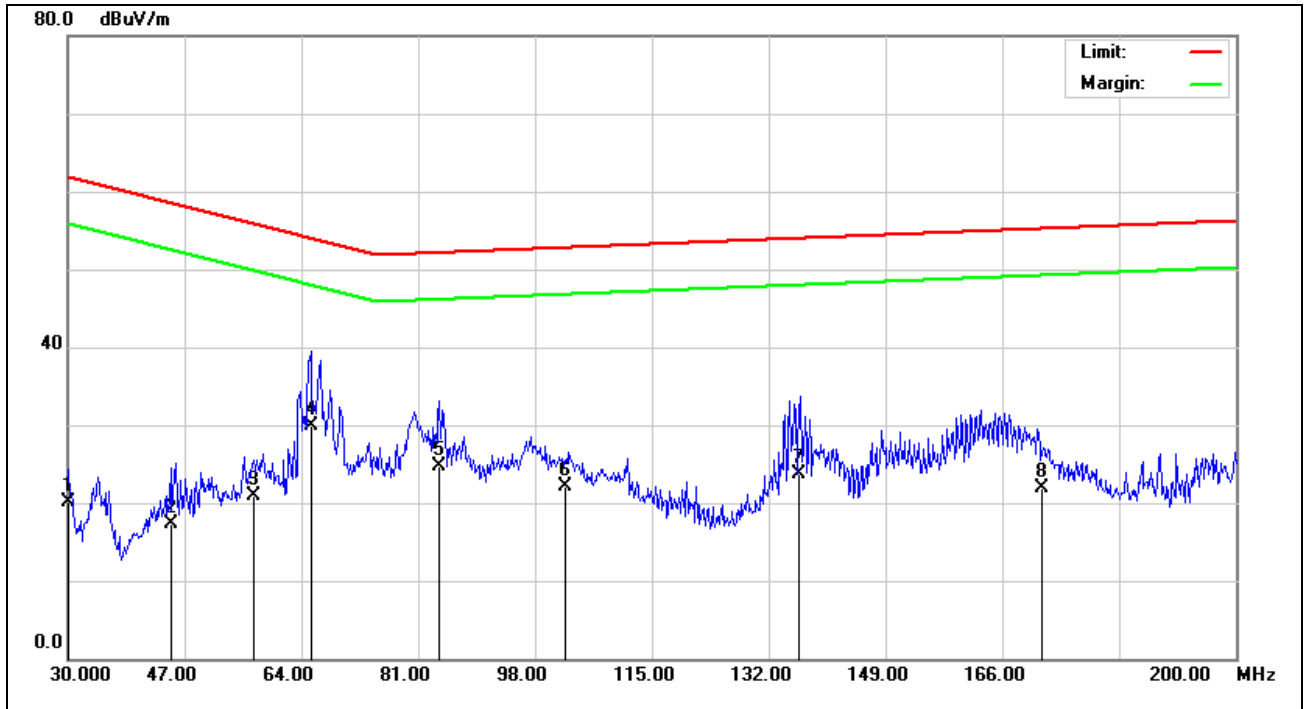
**BROADBAND:**

Model No.	VC900-M8M	Polarization:	Vertical
Test item:	Radiation Test	Power Source:	DC 13.5V
Temp.(°C)/Hum.(%):	22.3(°C)/55%	Engineer Signature:	Angus Chen
Date of Test:	2023/2/18	Test Frequency:	30MHz to 200MHz



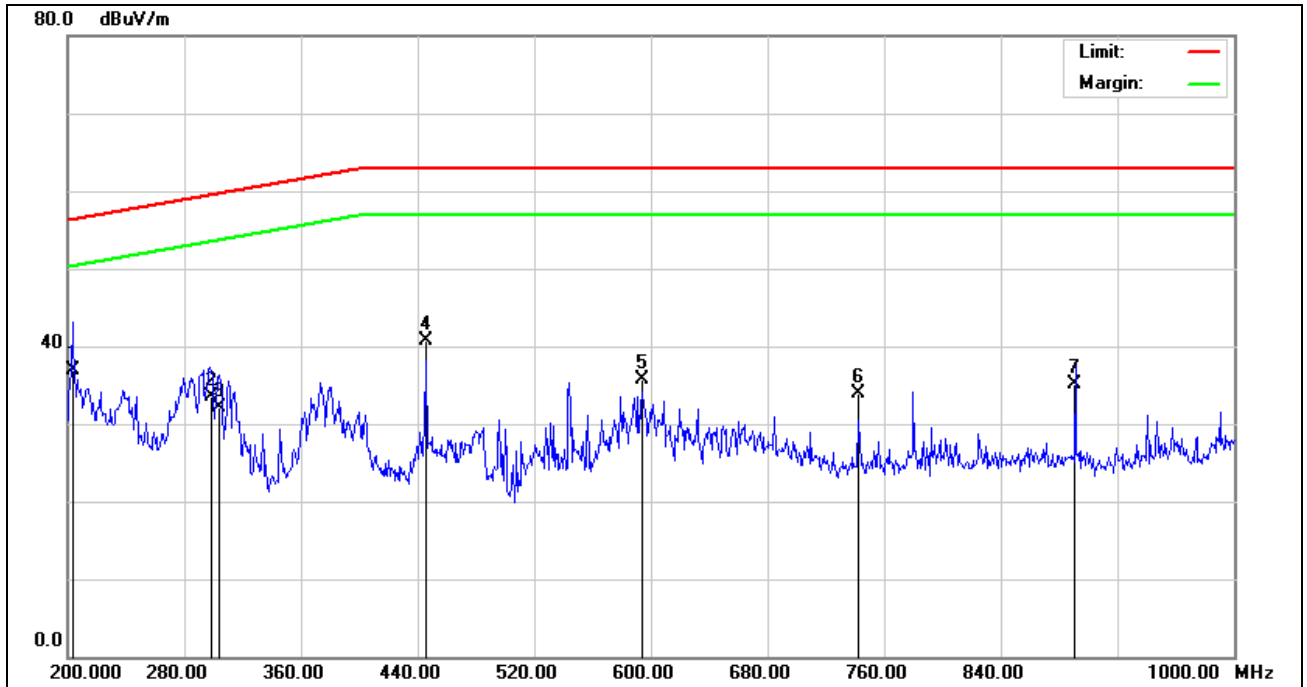
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (QP)	P/F (V/H)	Remark
1	30.1900	46.10	-17.89	28.21	61.96	-33.75	QP	V	
2	35.4300	49.40	-17.99	31.41	60.79	-29.38	QP	V	
3	50.4300	44.60	-18.49	26.11	57.46	-31.35	QP	V	
4	66.6400	52.20	-19.94	32.26	53.86	-21.60	QP	V	
5	99.3000	56.70	-19.68	37.02	52.82	-15.80	QP	V	
6	102.4600	57.30	-19.53	37.77	52.93	-15.16	QP	V	
7	148.4800	53.40	-17.52	35.88	54.49	-18.61	QP	V	
8	198.0200	45.70	-14.59	31.11	56.16	-25.05	QP	V	

<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Horizontal</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 13.5V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>22.3(°C)/55%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/18</b>	<b>Test Frequency:</b>	<b>30MHz to 200MHz</b>



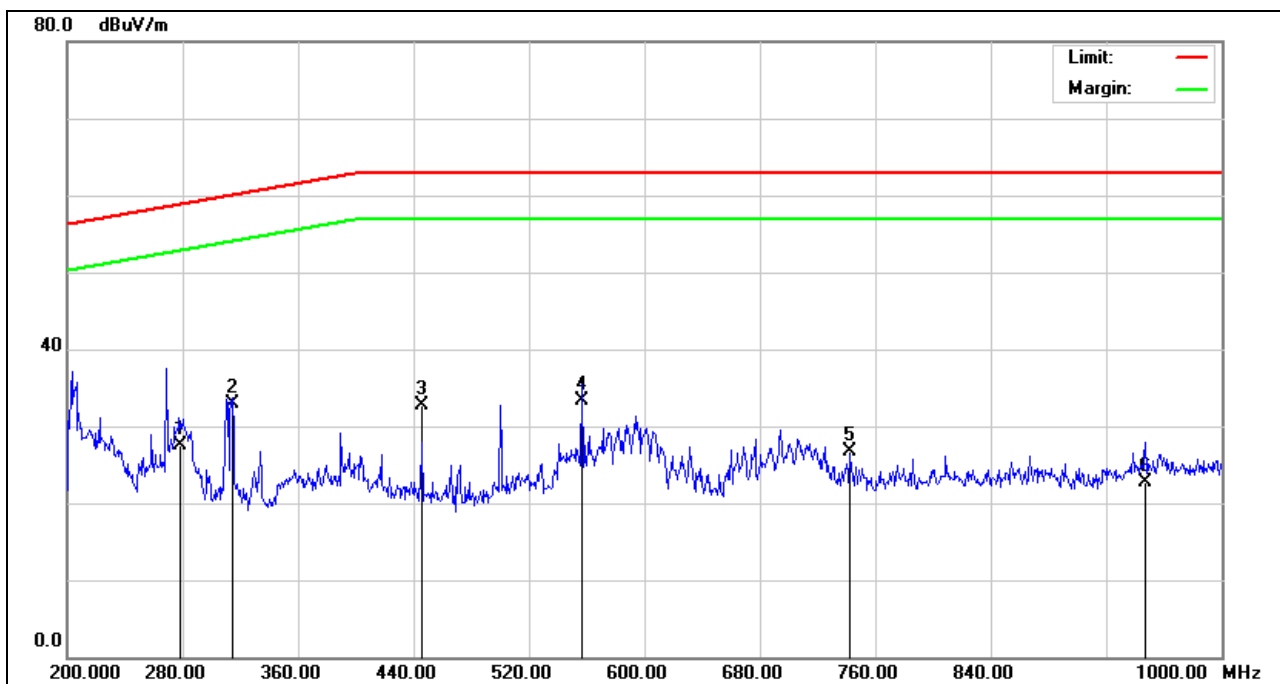
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (QP)	P/F (V/H)	Remark
1	30.0800	37.90	-17.89	20.01	61.98	-41.97	QP	H	
2	44.9700	35.50	-18.15	17.35	58.67	-41.32	QP	H	
3	57.0600	40.10	-19.20	20.90	55.99	-35.09	QP	H	
4	65.3800	49.70	-19.86	29.84	54.14	-24.30	QP	H	
5	83.9600	45.10	-20.30	24.80	52.30	-27.50	QP	H	
6	102.4600	41.70	-19.53	22.17	52.93	-30.76	QP	H	
7	136.4400	41.60	-17.94	23.66	54.08	-30.42	QP	H	
8	171.6799	38.10	-16.17	21.93	55.27	-33.34	QP	H	

<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Vertical</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 13.5V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>22.3(°C)/55%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/18</b>	<b>Test Frequency:</b>	<b>200MHz to 1GHz</b>



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (QP)	P/F (V/H)	Remark
1	204.0000	48.20	-11.33	36.87	56.37	-19.50	QP	V	
2	298.2000	48.00	-14.42	33.58	59.55	-25.97	QP	V	
3	304.1000	46.30	-14.16	32.14	59.75	-27.61	QP	V	
4	445.5000	52.30	-11.58	40.72	63.00	-22.28	QP	V	
5	593.9500	45.40	-9.62	35.78	63.00	-27.22	QP	V	
6	742.4500	40.90	-6.92	33.98	63.00	-29.02	QP	V	
7	891.0200	41.30	-6.10	35.20	63.00	-27.80	QP	V	

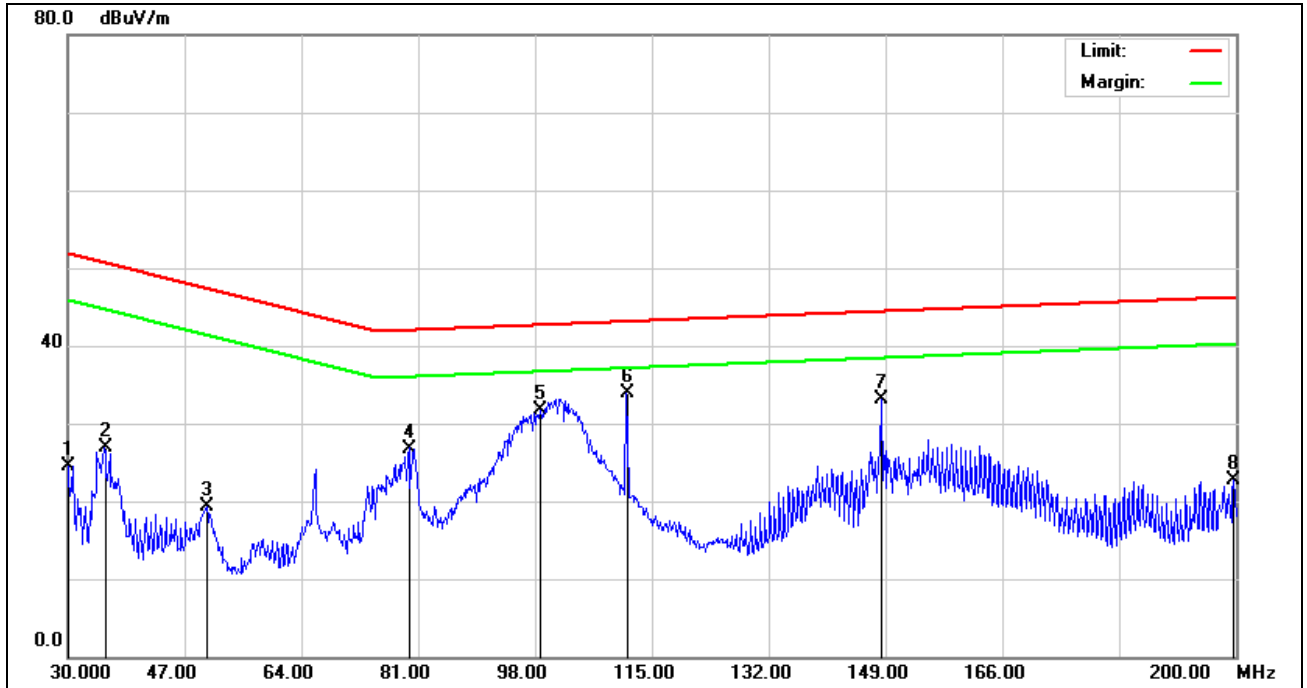
<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Horizontal</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 13.5V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>22.3(°C)/55%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/18</b>	<b>Test Frequency:</b>	<b>200MHz to 1GHz</b>



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (QP)	P/F (V/H)	Remark
1	278.9200	42.30	-14.78	27.52	58.90	-31.38	QP	H	
2	314.5000	46.80	-13.81	32.99	60.11	-27.12	QP	H	
3	445.5000	44.20	-11.58	32.62	63.00	-30.38	QP	H	
4	556.8500	43.50	-10.18	33.32	63.00	-29.68	QP	H	
5	742.4500	33.70	-6.92	26.78	63.00	-36.22	QP	H	
6	946.7500	27.90	-5.20	22.70	63.00	-40.30	QP	H	

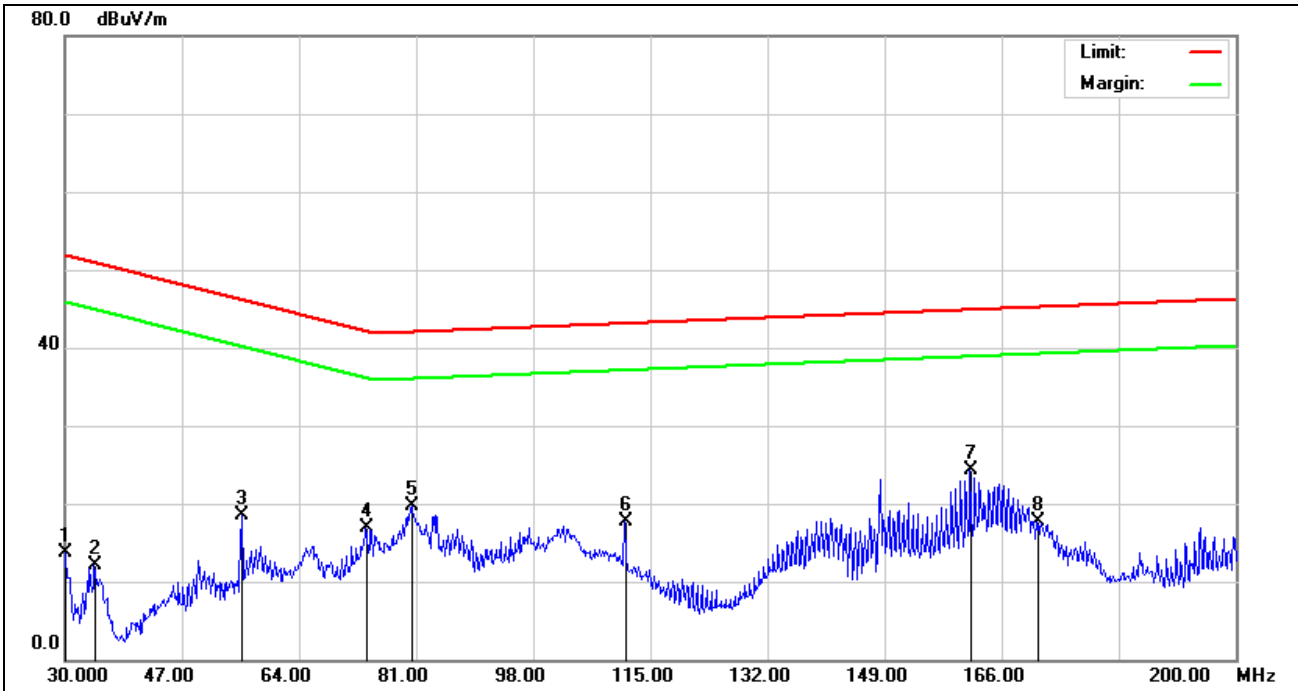
**NARROWBAND:**

Model No.	VC900-M8M	Polarization:	Vertical
Test item:	Radiation Test	Power Source:	DC 13.5V
Temp.(°C)/Hum.(%):	22.3(°C)/55%	Engineer Signature:	Angus Chen
Date of Test:	2023/2/18	Test Frequency:	30MHz to 200MHz



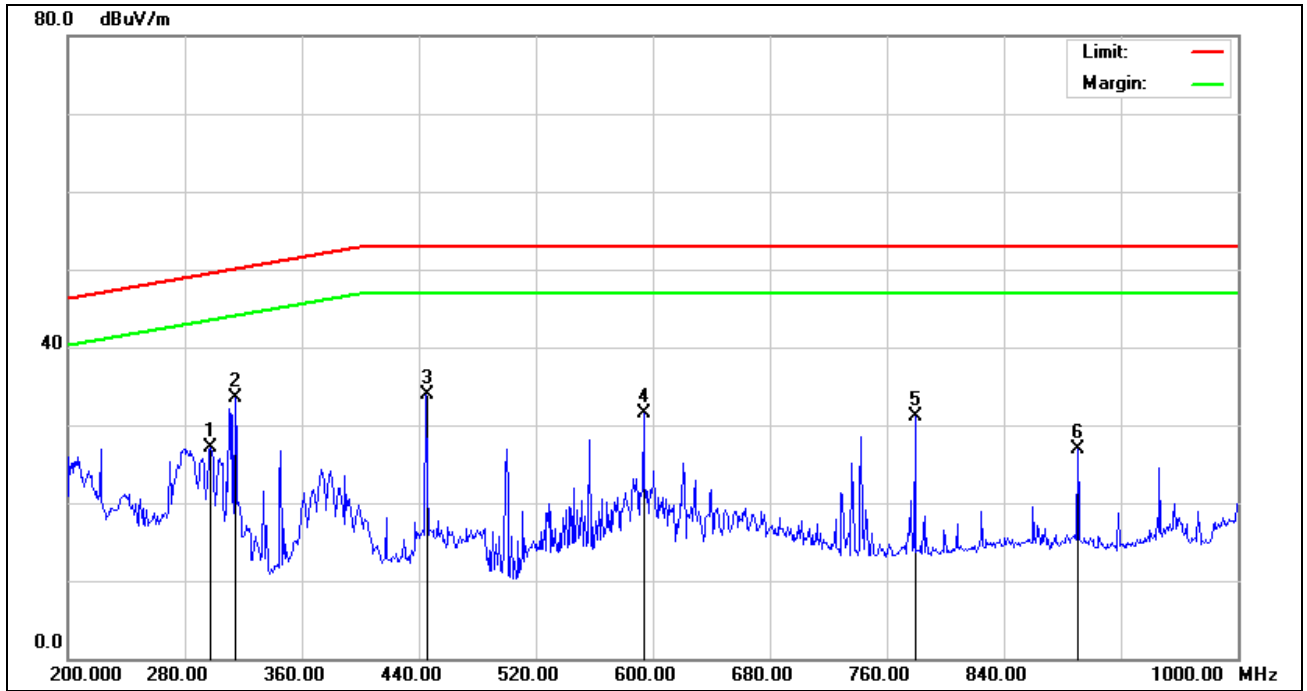
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (AVG)	P/F (V/H)	Remark
1	30.0000	42.36	-17.89	24.47	52.00	-27.53	AVG	V	
2	35.4400	44.88	-17.99	26.89	50.79	-23.90	AVG	V	
3	50.2400	37.69	-18.47	19.22	47.50	-28.28	AVG	V	
4	79.6400	47.21	-20.41	26.80	42.16	-15.36	AVG	V	
5	98.6800	51.37	-19.70	31.67	42.80	-11.13	AVG	V	
6	111.4000	53.08	-19.12	33.96	43.23	-9.27	AVG	V	
7	148.5200	50.60	-17.51	33.09	44.49	-11.40	AVG	V	
8	199.7200	37.14	-14.49	22.65	46.22	-23.57	AVG	V	

<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Horizontal</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 13.5V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>22.3(°C)/55%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/18</b>	<b>Test Frequency:</b>	<b>30MHz to 200MHz</b>



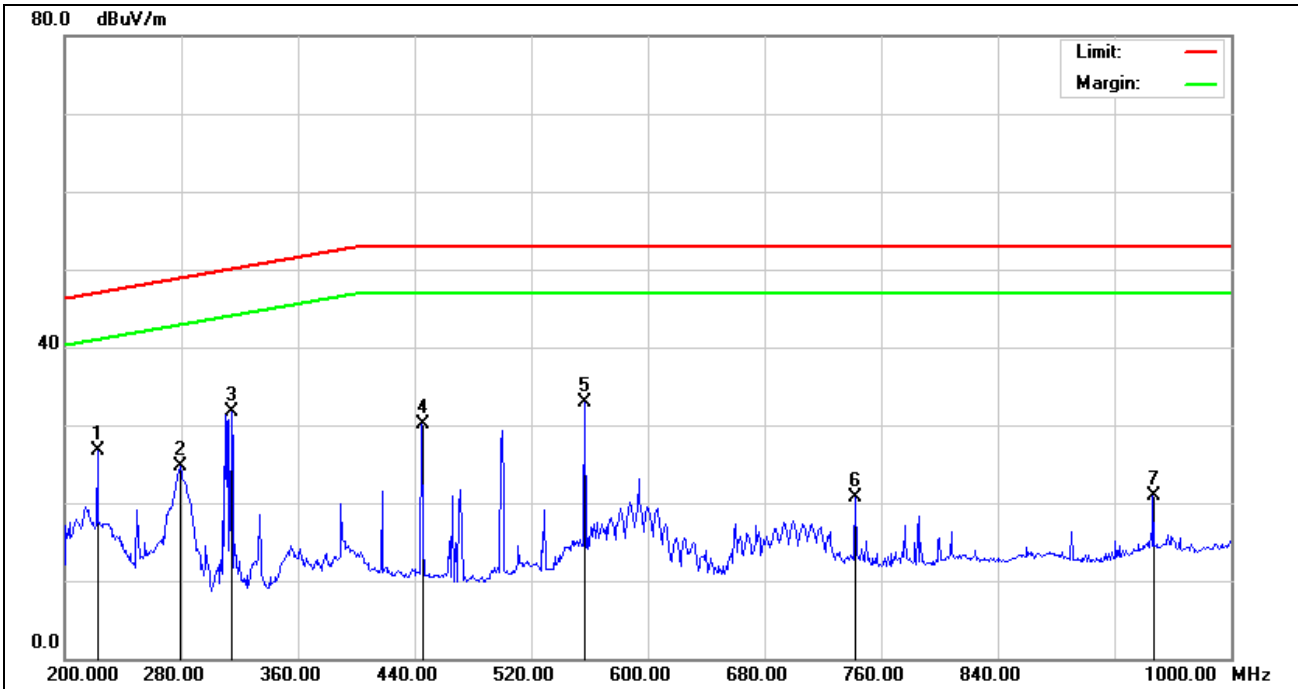
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (AVG)	P/F (V/H)	Remark
1	30.0000	31.62	-17.89	13.73	52.00	-38.27	AVG	H	
2	34.3998	30.08	-17.96	12.12	51.02	-38.90	AVG	H	
3	55.6799	37.62	-19.05	18.57	46.29	-27.72	AVG	H	
4	73.8399	37.25	-20.27	16.98	42.26	-25.28	AVG	H	
5	80.4000	40.10	-20.41	19.69	42.18	-22.49	AVG	H	
6	111.4000	36.83	-19.12	17.71	43.23	-25.52	AVG	H	
7	161.5200	41.02	-16.79	24.23	44.93	-20.70	AVG	H	
8	171.2400	33.98	-16.19	17.79	45.26	-27.47	AVG	H	

Model No.	VC900-M8M	Polarization:	Vertical
Test item:	Radiation Test	Power Source:	DC 13.5V
Temp.(°C)/Hum.(%):	22.3(°C)/55%	Engineer Signature:	Angus Chen
Date of Test:	2023/2/18	Test Frequency:	200MHz to 1GHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (AVG)	P/F (V/H)	Remark
1	297.7600	41.52	-14.46	27.06	49.54	-22.48	AVG	V	
2	314.5200	47.38	-13.81	33.57	50.11	-16.54	AVG	V	
3	445.4800	45.40	-11.58	33.82	53.00	-19.18	AVG	V	
4	594.0000	41.05	-9.62	31.43	53.00	-21.57	AVG	V	
5	779.6400	37.74	-6.65	31.09	53.00	-21.91	AVG	V	
6	891.0000	33.02	-6.10	26.92	53.00	-26.08	AVG	V	

<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Horizontal</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 13.5V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>22.3(°C)/55%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/18</b>	<b>Test Frequency:</b>	<b>200MHz to 1GHz</b>



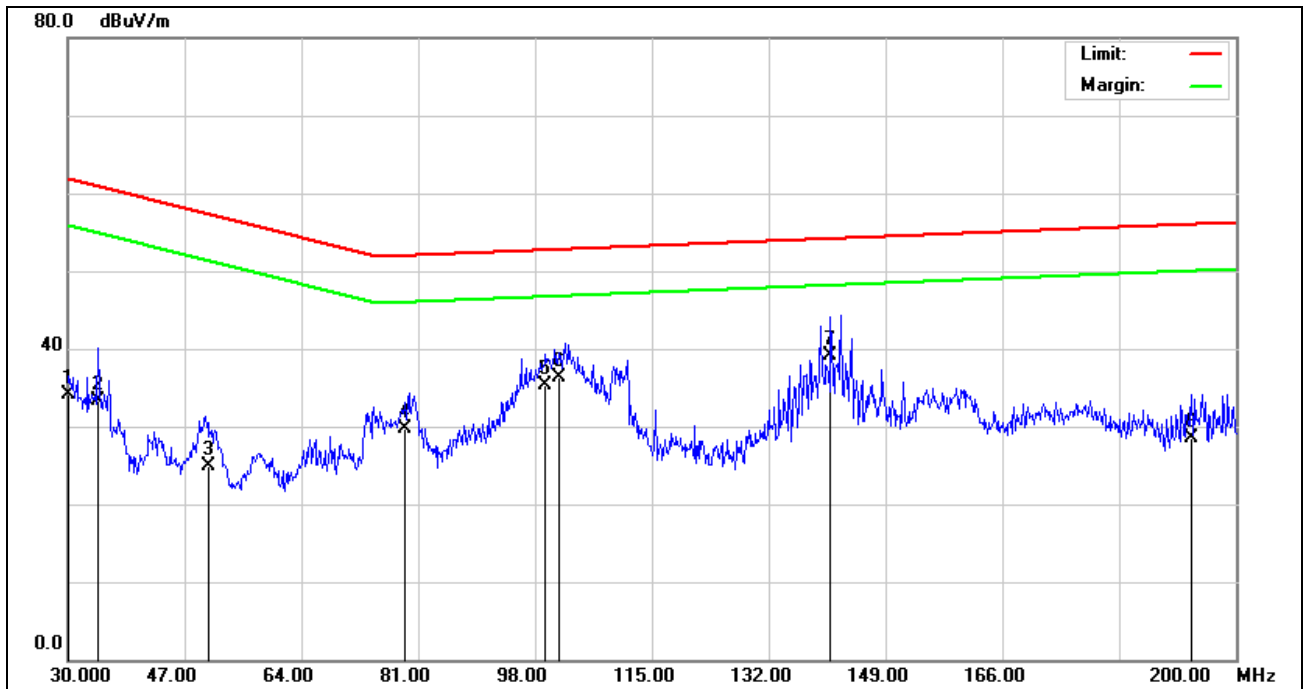
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (AVG)	P/F (V/H)	Remark
1	222.7600	40.77	-14.16	26.61	47.00	-20.39	AVG	H	
2	279.8000	39.41	-14.77	24.64	48.93	-24.29	AVG	H	
3	314.5200	45.47	-13.81	31.66	50.11	-18.45	AVG	H	
4	445.4800	41.65	-11.58	30.07	53.00	-22.93	AVG	H	
5	556.8800	43.08	-10.18	32.90	53.00	-20.10	AVG	H	
6	742.4800	27.65	-6.92	20.73	53.00	-32.27	AVG	H	
7	946.6800	26.11	-5.20	20.91	53.00	-32.09	AVG	H	



**Mode 2: Normal Operation (DC 24V)**

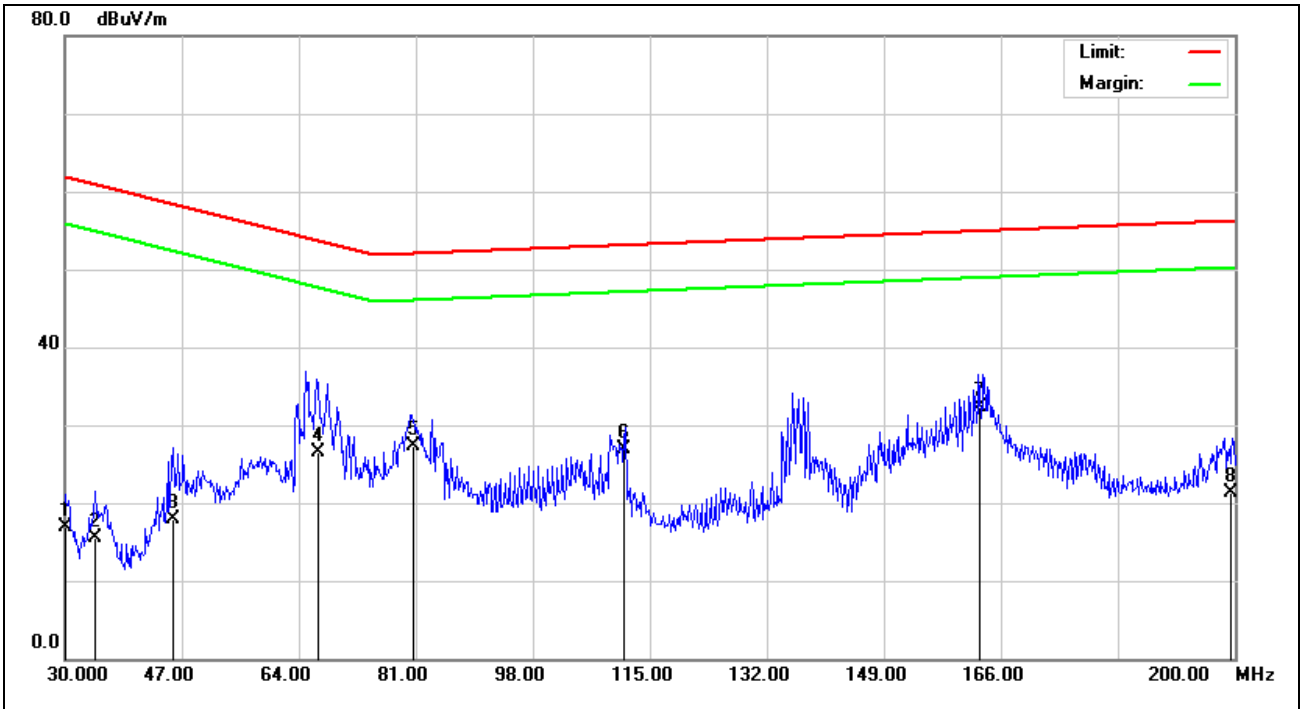
**BROADBAND:**

Model No.	VC900-M8M	Polarization:	Vertical
Test item:	Radiation Test	Power Source:	DC 27V
Temp.(°C)/Hum.(%):	23.9(°C)/54%	Engineer Signature:	Angus Chen
Date of Test:	2023/2/17	Test Frequency:	30MHz to 200MHz



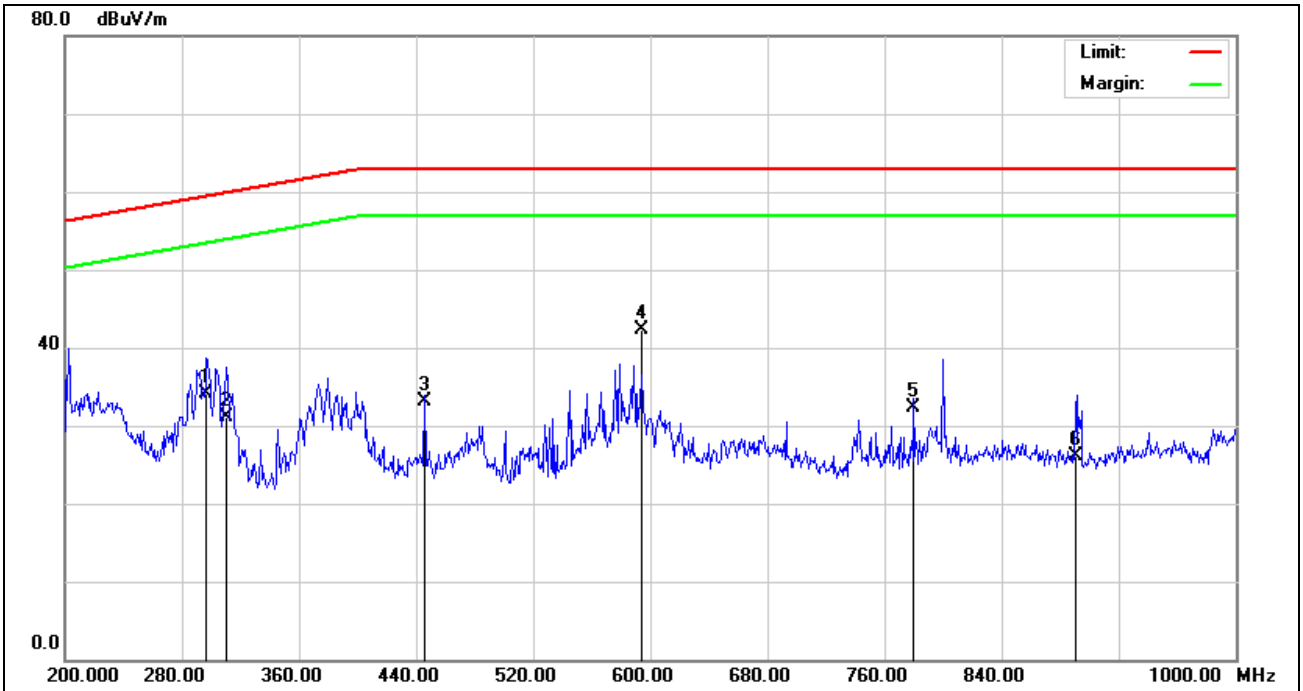
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (QP)	P/F (V/H)	Remark
1	30.0600	51.90	-17.81	34.09	61.99	-27.90	QP	V	
2	34.4700	51.20	-17.87	33.33	61.01	-27.68	QP	V	
3	50.5900	43.20	-18.39	24.81	57.42	-32.61	QP	V	
4	79.1600	49.90	-20.26	29.64	52.14	-22.50	QP	V	
5	99.4800	54.90	-19.50	35.40	52.83	-17.43	QP	V	
6	101.5899	55.70	-19.41	36.29	52.90	-16.61	QP	V	
7	141.0000	56.60	-17.58	39.02	54.23	-15.21	QP	V	
8	193.5200	43.10	-14.63	28.47	56.01	-27.54	QP	V	

<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Horizontal</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 27V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>23.9(°C)/54%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/17</b>	<b>Test Frequency:</b>	<b>30MHz to 200MHz</b>



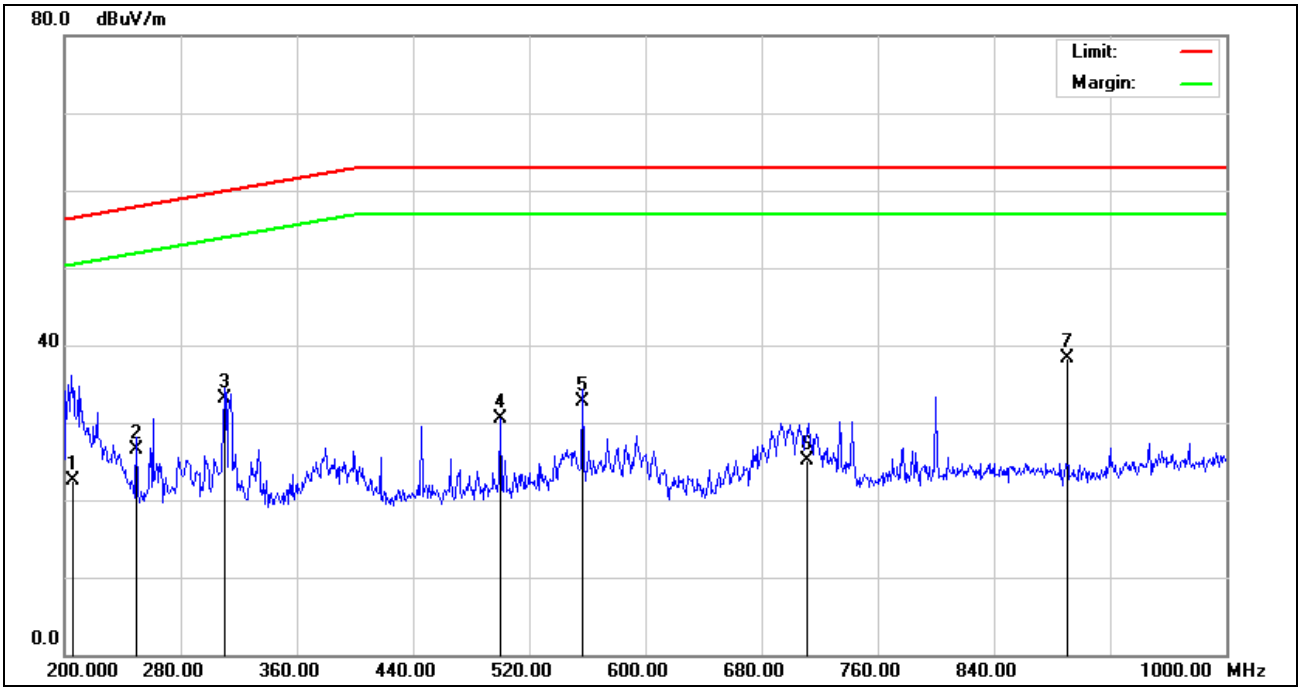
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (QP)	P/F (V/H)	Remark
1	30.1500	34.70	-17.81	16.89	61.97	-45.08	QP	H	
2	34.5099	33.40	-17.87	15.53	61.00	-45.47	QP	H	
3	45.8500	35.89	-18.08	17.81	58.48	-40.67	QP	H	
4	66.8399	46.30	-19.81	26.49	53.81	-27.32	QP	H	
5	80.5800	47.60	-20.27	27.33	52.19	-24.86	QP	H	
6	111.3700	45.80	-18.95	26.85	53.23	-26.38	QP	H	
7	162.8400	48.90	-16.52	32.38	54.97	-22.59	QP	H	
8	199.4600	35.60	-14.27	21.33	56.21	-34.88	QP	H	

<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Vertical</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 27V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>23.9(°C)/54%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/17</b>	<b>Test Frequency:</b>	<b>200MHz to 1GHz</b>



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (QP)	P/F (V/H)	Remark
1	297.0000	48.40	-14.24	34.16	59.51	-25.35	QP	V	
2	310.4000	44.80	-13.66	31.14	59.97	-28.83	QP	V	
3	445.5100	44.41	-11.23	33.18	63.00	-29.82	QP	V	
4	594.0100	51.60	-9.25	42.35	63.00	-20.65	QP	V	
5	779.6200	38.40	-6.19	32.21	63.00	-30.79	QP	V	
6	891.0500	31.70	-5.64	26.06	63.00	-36.94	QP	V	

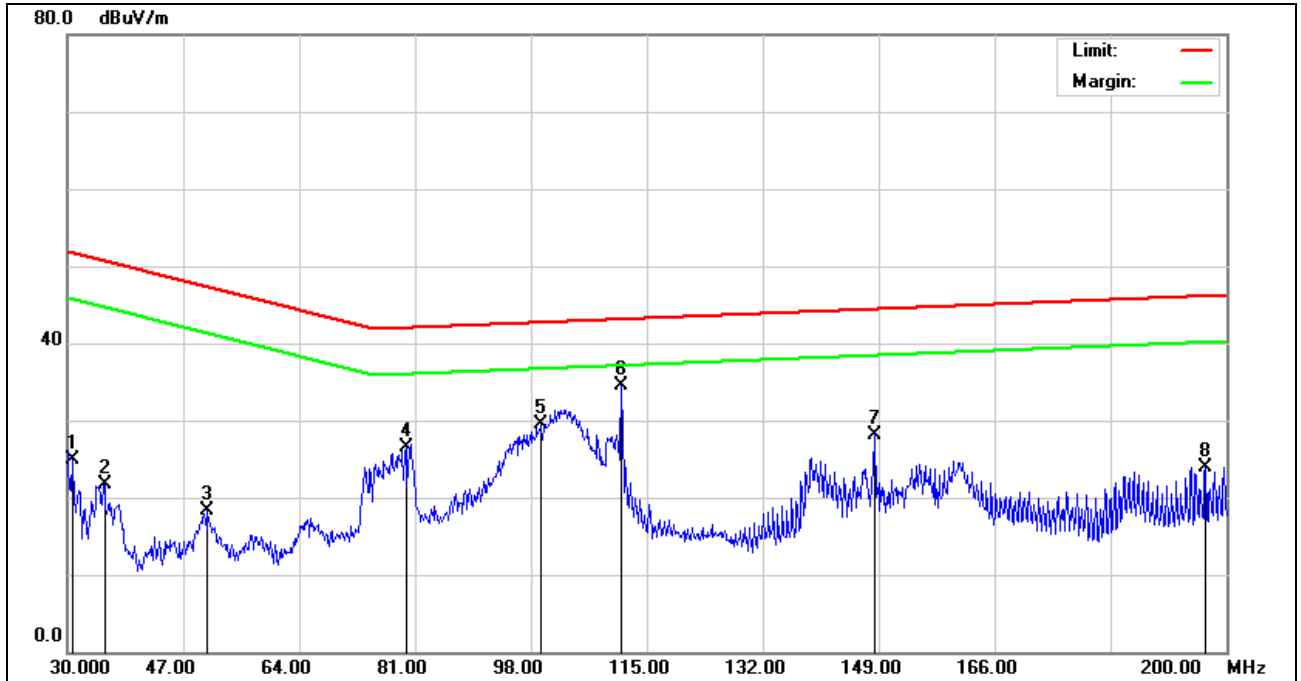
<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Horizontal</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 27V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>23.9(°C)/54%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/17</b>	<b>Test Frequency:</b>	<b>200MHz to 1GHz</b>



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (QP)	P/F (V/H)	Remark
1	205.4000	34.00	-11.49	22.51	56.41	-33.90	QP	H	
2	249.9700	41.80	-15.27	26.53	57.92	-31.39	QP	H	
3	310.5000	46.80	-13.64	33.16	59.97	-26.81	QP	H	
4	500.0000	41.10	-10.56	30.54	63.00	-32.46	QP	H	
5	556.8500	42.40	-9.77	32.63	63.00	-30.37	QP	H	
6	711.7000	32.30	-7.29	25.01	63.00	-37.99	QP	H	
7	890.3500	43.90	-5.65	38.25	63.00	-24.75	QP	H	

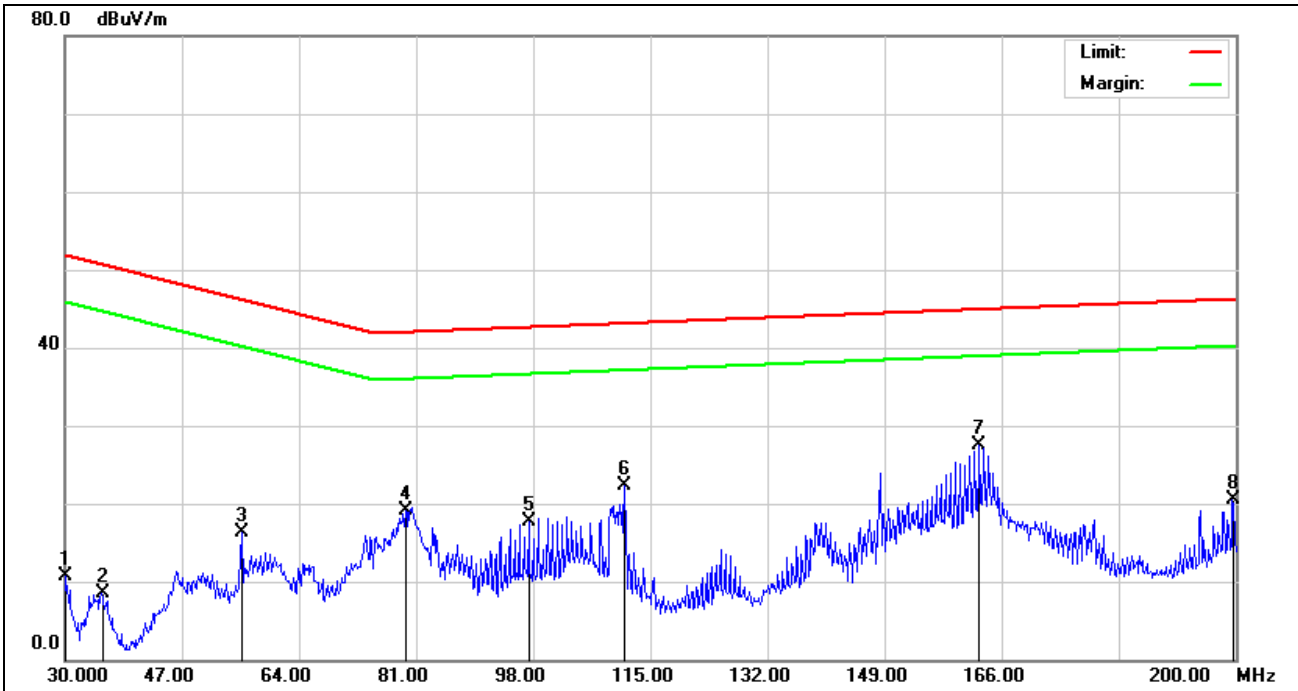
**NARROWBAND:**

<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Vertical</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 27V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>23.9(°C)/54%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/17</b>	<b>Test Frequency:</b>	<b>30MHz to 200MHz</b>



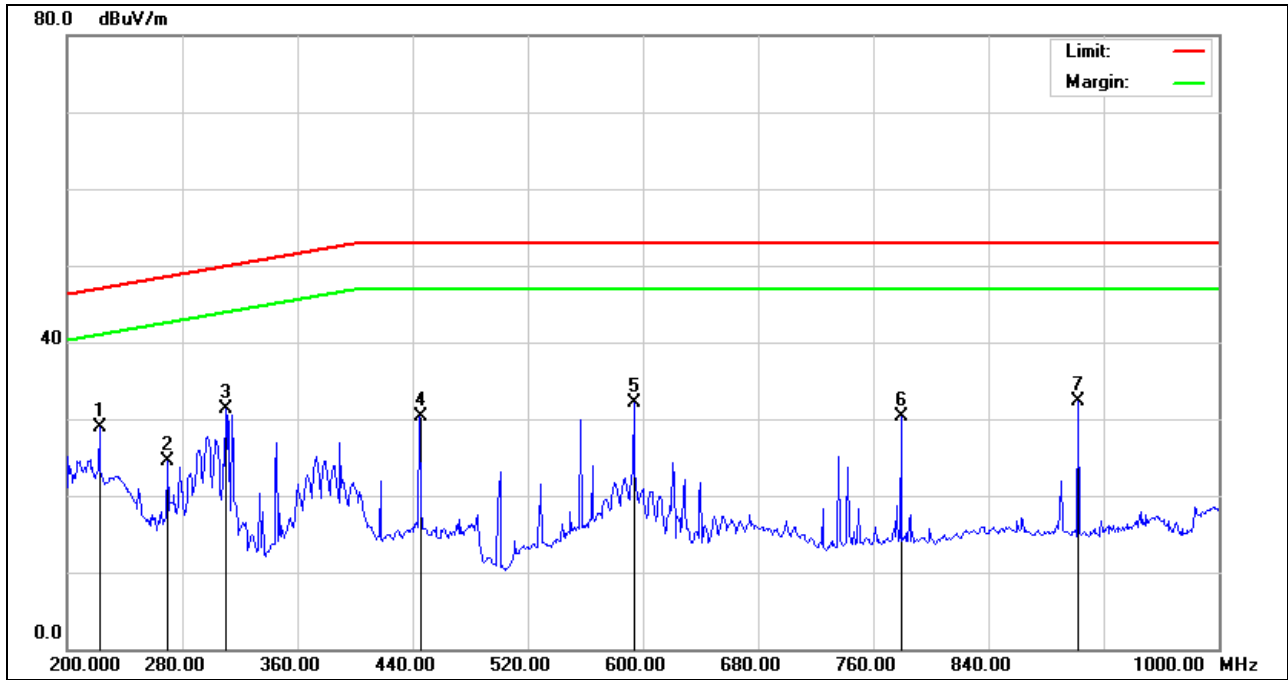
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (AVG)	P/F (V/H)	Remark
1	30.8000	42.81	-17.83	24.98	51.82	-26.84	AVG	V	
2	35.4800	39.64	-17.89	21.75	50.78	-29.03	AVG	V	
3	50.6000	36.63	-18.39	18.24	47.42	-29.18	AVG	V	
4	79.6400	46.88	-20.28	26.60	42.16	-15.56	AVG	V	
5	99.5600	49.00	-19.50	29.50	42.83	-13.33	AVG	V	
6	111.3600	53.47	-18.95	34.52	43.23	-8.71	AVG	V	
7	148.5200	45.51	-17.31	28.20	44.49	-16.29	AVG	V	
8	196.9600	38.30	-14.42	23.88	46.13	-22.25	AVG	V	

<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Horizontal</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 27V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>23.9(°C)/54%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/17</b>	<b>Test Frequency:</b>	<b>30MHz to 200MHz</b>



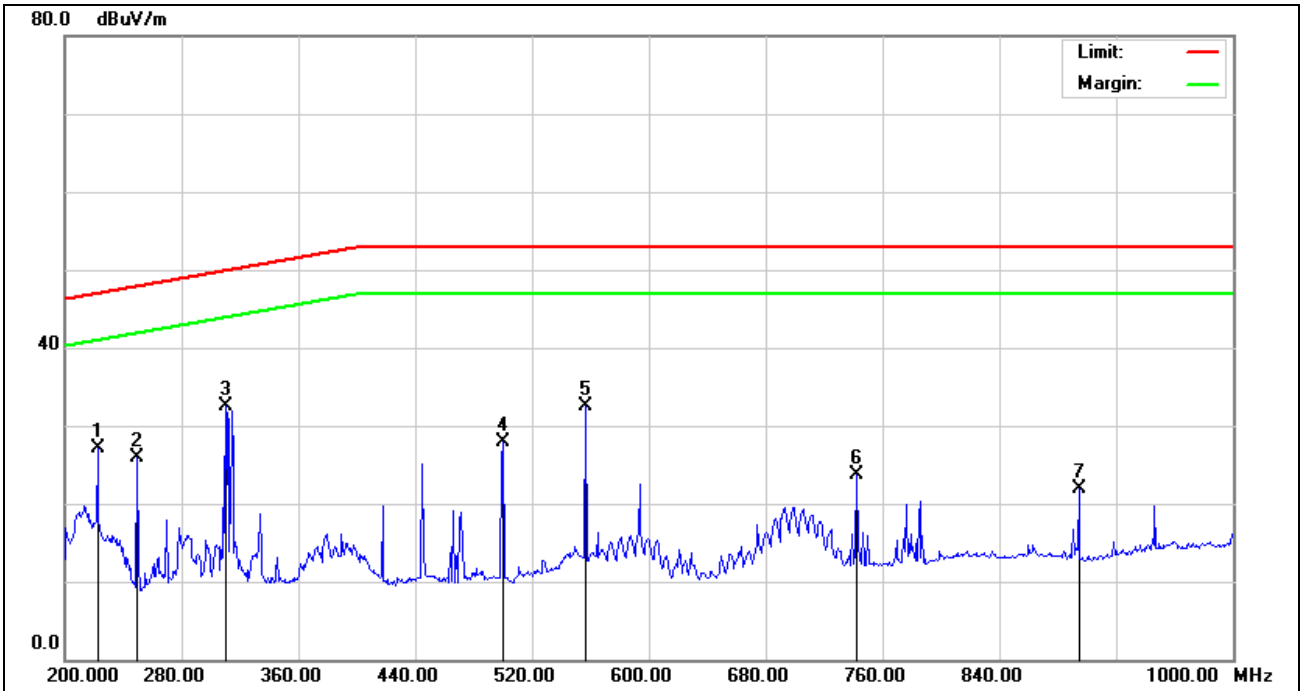
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (AVG)	P/F (V/H)	Remark
1	30.0000	28.56	-17.81	10.75	52.00	-41.25	AVG	H	
2	35.4400	26.47	-17.89	8.58	50.79	-42.21	AVG	H	
3	55.6800	35.24	-18.93	16.31	46.29	-29.98	AVG	H	
4	79.5999	39.29	-20.28	19.01	42.16	-23.15	AVG	H	
5	97.4000	37.24	-19.60	17.64	42.76	-25.12	AVG	H	
6	111.3600	41.20	-18.95	22.25	43.23	-20.98	AVG	H	
7	162.8000	44.11	-16.52	27.59	44.97	-17.38	AVG	H	
8	199.6400	34.70	-14.26	20.44	46.22	-25.78	AVG	H	

<b>Model No.</b>	<b>VC900-M8M</b>	<b>Polarization:</b>	<b>Vertical</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Power Source:</b>	<b>DC 27V</b>
<b>Temp.(°C)/Hum.(%):</b>	<b>23.9(°C)/54%</b>	<b>Engineer Signature:</b>	<b>Angus Chen</b>
<b>Date of Test:</b>	<b>2023/2/17</b>	<b>Test Frequency:</b>	<b>200MHz to 1GHz</b>



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (AVG)	P/F (V/H)	Remark
1	222.7600	42.78	-13.92	28.86	47.00	-18.14	AVG	V	
2	269.9200	39.28	-14.69	24.59	48.60	-24.01	AVG	V	
3	310.4800	45.00	-13.65	31.35	49.97	-18.62	AVG	V	
4	445.5200	41.57	-11.22	30.35	53.00	-22.65	AVG	V	
5	594.0000	41.31	-9.25	32.06	53.00	-20.94	AVG	V	
6	779.6400	36.55	-6.19	30.36	53.00	-22.64	AVG	V	
7	902.7200	37.90	-5.57	32.33	53.00	-20.67	AVG	V	

Model No.	VC900-M8M	Polarization:	Horizontal
Test item:	Radiation Test	Power Source:	DC 27V
Temp.(°C)/Hum.(%):	23.9(°C)/54%	Engineer Signature:	Angus Chen
Date of Test:	2023/2/17	Test Frequency:	200MHz to 1GHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (AVG)	P/F (V/H)	Remark
1	222.7600	40.94	-13.92	27.02	47.00	-19.98	AVG	H	
2	250.0000	41.14	-15.27	25.87	47.92	-22.05	AVG	H	
3	310.4800	46.07	-13.65	32.42	49.97	-17.55	AVG	H	
4	500.0000	38.47	-10.56	27.91	53.00	-25.09	AVG	H	
5	556.8800	42.23	-9.77	32.46	53.00	-20.54	AVG	H	
6	742.4800	30.19	-6.46	23.73	53.00	-29.27	AVG	H	
7	894.6000	27.63	-5.63	22.00	53.00	-31.00	AVG	H	

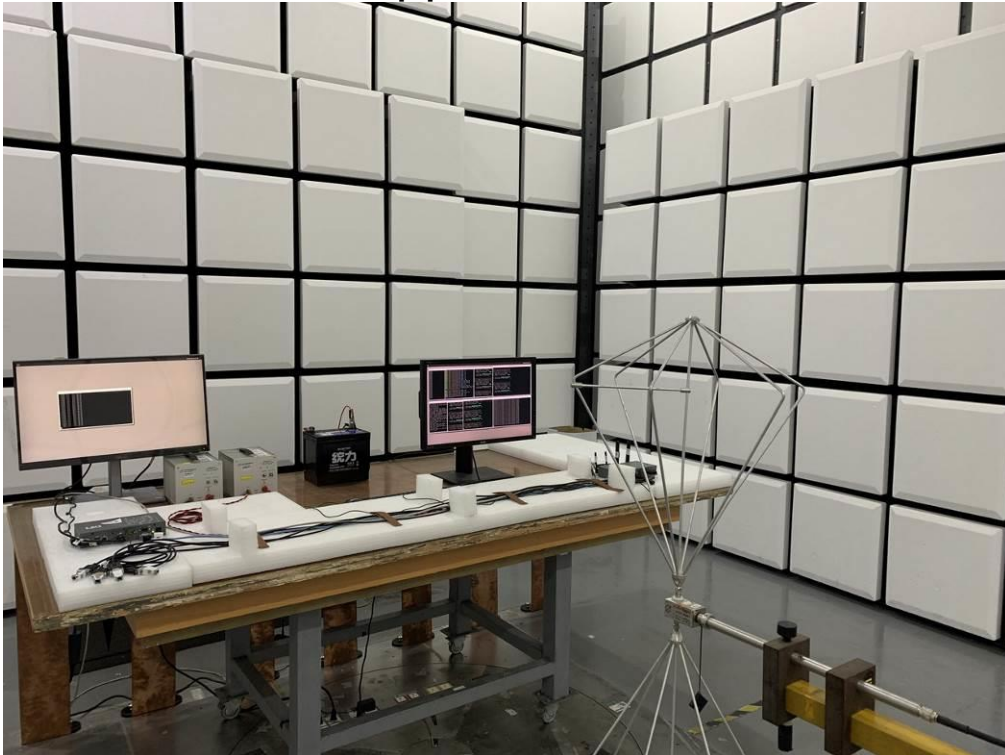


**Photo documentation of test set-up**

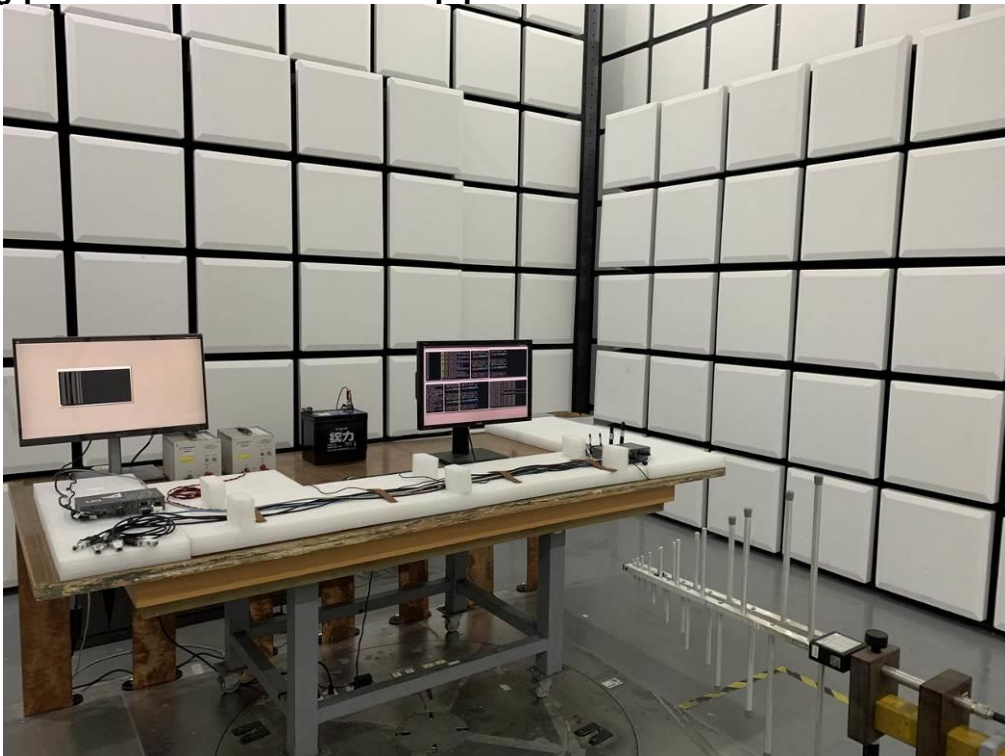
**Variant A: VC900-M8M**

**Mode 1: Normal Operation (DC 12V)**

**Biconical Antenna test set up photo in the anechoic chamber**

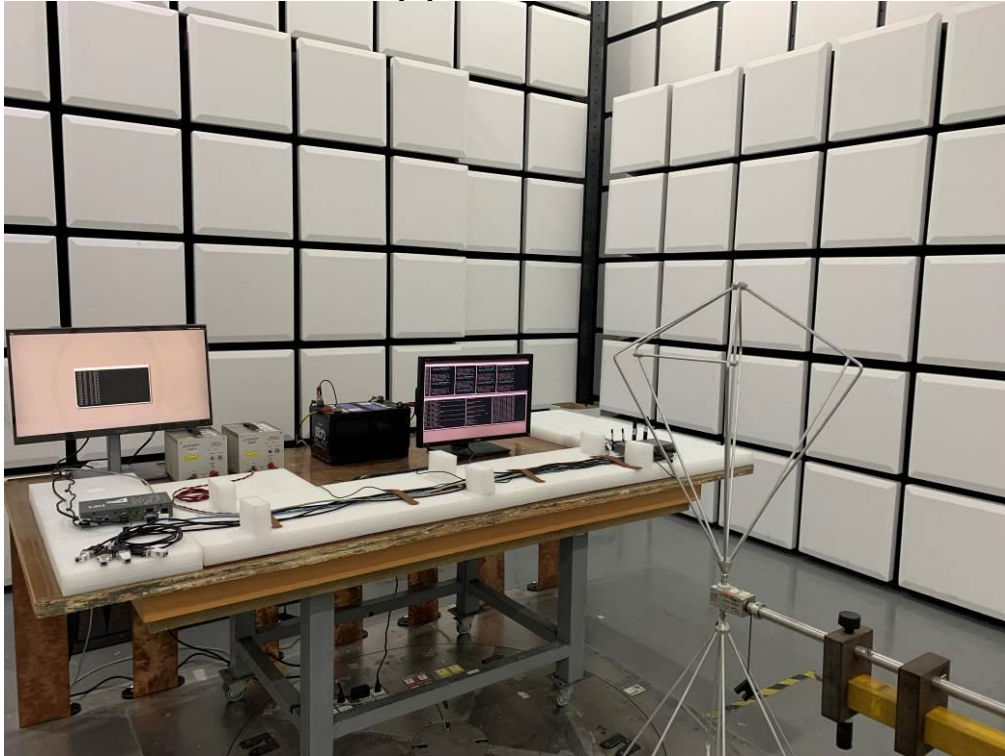


**Log-periodic Antenna test set up photo in the anechoic chamber**



**Mode 2: Normal Operation (DC 24V)**

**Biconical Antenna test set up photo in the anechoic chamber**



**Log-periodic Antenna test set up photo in the anechoic chamber**



**Testing for immunity of electrical/electronic subassemblies against disturbances conducted along supply lines according to UN-R 010, 06 Series of Amendments, Annex 10, Chapter 2.**

Appendix 2

**Test Procedure:** ISO 7637-2: Second edition 2004

**Immunity Test Level:** Level III

**Requirements:**

DC 12V

Suggested test levels for 12 V system

Test pulse <sup>a</sup>	Selected test level <sup>b</sup>	Test level, $U_s$ <sup>c</sup>				Minimum number of pulses or test time <sup>f</sup>	Burst cycle/pulse repetition time	
		I	II	III min.	IV max.		min.	max.
1		9	9	- 75	- 100	5 000 pulses	0,5 s	5 s
2a		9	9	+ 37	+ 50	5 000 pulses	0,2 s	5 s
2b		9	9	+ 10	+ 10	10 pulses	0,5 s	5 s
3a		9	9	- 112	- 150	1 h	90 ms	100 ms
3b		9	9	+ 75	+ 100	1 h	90 ms	100 ms
4		9	9	- 6	- 7	> 1 pulse	d	d
5 <sup>e</sup>		9	9	+ 65	+ 87	> 1 pulse	d	d

<sup>a</sup> Test pulses as in 5.6.  
<sup>b</sup> Values agreed to between vehicle manufacturer and equipment supplier.  
<sup>c</sup> The amplitudes are the values of  $U_s$  as defined for each test pulse in 5.6.  
<sup>d</sup> Since the minimum number of test pulses is 1, no pulse cycle time is given. When several pulses are to be applied, a minimum delay of 1 min between pulses shall be allowed.  
<sup>e</sup> See 5.6.5 c). The test levels reflect the situation of load dump at generator rated speed. If a central load dump protection is used, apply test pulse 5b as defined in Figure 12 and use the values in Table 10.  
<sup>f</sup> The number of pulses/time is for durability test purposes.  
<sup>g</sup> The former levels I and II were deleted because they do not ensure sufficient immunity in road vehicles.

DC 24V

Suggested test levels for 24 V system

Test pulse <sup>a</sup>	Selected test level <sup>b</sup>	Test level, $U_s$ <sup>c</sup>				Minimum number of pulses or test time <sup>f</sup>	Burst cycle/pulse repetition time	
		I	II	III min.	IV max.		min.	max.
1		9	9	- 450	- 600	5 000 pulses	0,5 s	5 s
2a		9	9	+ 37	+ 50	5 000 pulses	0,2 s	5 s
2b		9	9	+ 20	+ 20	10 pulses	0,5 s	5 s
3a		9	9	- 150	- 200	1 h	90 ms	100 ms
3b		9	9	+ 150	+ 200	1 h	90 ms	100 ms
4		9	9	- 12	- 16	> 1 pulse	d	d
5 <sup>e</sup>		9	9	+ 123	+ 173	> 1 pulse	d	d

<sup>a</sup> Test pulses as in 5.6.  
<sup>b</sup> Values agreed to between vehicle manufacturer and equipment supplier.  
<sup>c</sup> The amplitudes are the values of  $U_s$  as defined for each test pulse in 5.6.  
<sup>d</sup> Since the minimum number of test pulses is 1, no pulse cycle time is given. When several pulses are to be applied, a minimum delay of 1 min between pulses shall be allowed.  
<sup>e</sup> See 5.6.5 c). The test levels reflect the situation of load dump at generator rated speed. If a central load dump protection is used, apply test pulse 5b as defined in Figure 12 and use the values in Table 10.  
<sup>f</sup> The number of pulses/time is for durability test purposes.  
<sup>g</sup> The former levels I and II were deleted because they do not ensure sufficient immunity in road vehicles.

Note: Pulse 5 not applicable according to UN-R 010 requirement.

**Test results:**

Puls / Pulse	Required functional status for not safety-relevant ESA	Result Mode 1 (DC 12V)	Result Mode 2 (DC 24V)
1	D	D	D
2a	D	A	A
2b	D	D	D
3a	D	A	A
3b	D	A	A
4	D	D	A

During test, monitoring the operation function (1. Lan port; 2. CAN BUS; 3. COM 1; 4. COM 2; 5. COM 3; 6. COM 4; 7. SD Card; 8. Wi-Fi; 9. BT; 10. LTE) status of EUT.

**Classification of functional status**

All classifications are for the total device/system functional status.

**Class A:** all functions of a device/system perform as designed during and after exposure to disturbance.

**Class B:** all functions of a device/system perform as designed during exposure. However, one or more of them can go beyond specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain class A.

**Class C:** one or more functions of a device/system do not perform as designed during exposure but return automatically to normal operation after exposure is removed.

**Class D:** one or more functions of a device/system do not perform as designed during exposure and do not return to normal operation until exposure is removed and the device/system is reset by simple “operator/use” action.  
 During test, the EUT loss of power and can not auto recover.  
 After test, the EUT is reset by simple operator action then can return to normal intended function.

**Class E:** one or more functions of a device/system do not perform as designed during and after exposure and cannot be returned to proper operation without repairing or replacing the device/system.

**Note :** The word “function” in this context refers only to the function performed by the electronic system

**Remark:** The device was tested with requirements to Pulse 1, 2a, 2b, 3a, 3b, 4 for DC 12V/24V system.



Test Overview – Immunity against transient disturbances	
Test Procedure	ISO 7637-2: Second edition 2004
Operator:	Angus Chen
Manufacturer	DFI Inc.
Variant A	VC900-M8M
Operating Mode	Mode 1: Normal Operation (DC 12V)
Date of Test	22.02.2023
Nominal Voltage	12.0 Volt (DC)
Test Voltage	13.5 Volt (DC)
Shunt resistor Rs	No Shunt
Test Level	Level III
Test Results	Pulse 1: Pass, Class D is fulfilled
	Pulse 2a: Pass, Class A is fulfilled
	Pulse 2b: Pass, Class D is fulfilled
	Pulse 3a: Pass, Class A is fulfilled
	Pulse 3b: Pass, Class A is fulfilled
	Pulse 4: Pass, Class D is fulfilled

Pulse	Us/Vs	Ri	Test parameters	No. of Pulses or time	Rep. ime, Delay	Figure
	12 V					
ISO 7637-2: 2004 – Pulse 1	-75 V	10 Ω	td = 2 ms tr = 1 μs t1 = 0.5 s, t2 = 200 ms t3 = 100 μs	5000 P.	0.5 s	
ISO 7637-2: 2004 – Pulse 2a	+37 V	2 Ω	td = 0.05 ms tr = 1 μs t1 = 0.2 s	5000 P.	0.2 s	
ISO 7637-2: 2004 – Pulse 2b	+10 V	0 Ω	td = 0.2 s t12 = 1 ms tr = 1 ms, t6 = 1 ms	10 P.	0.5 s	
ISO 7637-2: 2004 – Pulse 3a	-112 V	50 Ω	td = 0.1 μs tr = 5 ns t1 = 100 μs, t4 = 10 ms t5 = 90 ms	1 Hour	90 ms	
ISO 7637-2: 2004 – Pulse 3b	+75 V	50 Ω	td = 0.1 μs tr = 5 ns t1 = 100 μs, t4 = 10 ms t5 = 90 ms	1 Hour	90 ms	
ISO 7637-2: 2004 – Pulse 4	-6 V	0 Ω	Ua = -2.5 V t7 = 15 ms, t8 = 50 ms, t9 = 0.5 s, t10 = 5 ms, t11 = 5 ms	1 P.	0 s	

Test Overview – Immunity against transient disturbances	
Test Procedure	ISO 7637-2: Second edition 2004
Operator:	Angus Chen
Manufacturer	DFI Inc.
Variant A	VC900-M8M
Operating Mode	Mode 2: Normal Operation (DC 24V)
Date of Test	23.02.2023
Nominal Voltage	24.0 Volt (DC)
Test Voltage	27.0 Volt (DC)
Shunt resistor Rs	No Shunt
Test Level	Level III
Test Results	Pulse 1: Pass, Class D is fulfilled
	Pulse 2a: Pass, Class A is fulfilled
	Pulse 2b: Pass, Class D is fulfilled
	Pulse 3a: Pass, Class A is fulfilled
	Pulse 3b: Pass, Class A is fulfilled
	Pulse 4: Pass, Class A is fulfilled

Pulse	Us/Vs	Ri	Test parameters	No. of Pulses	Delay	Figure
	24V					
ISO 7637-2 (2004) – Pulse 1	-450V	50 Ohms	td = 2ms, t1 = 0.5secs, t2 = 200ms	5000 P.	0.0 s	
ISO 7637-2 (2004) – Pulse 2a	37V	2 Ohms	td = 50us, t1 = 0.2secs	5000 P.	0.0 s	
ISO 7637-2 (2004) – Pulse 2b	20V	0 Ohms	td = 200ms,	10 P.	60.0 s	
ISO 7637-2 (2004) – Pulse 3a	-150V	50. Ohms	t1 = 10kHz, t4 = 10ms, t5 = 0.09 Seconds	1 Hours	0.0 s	
ISO 7637-2 (2004) – Pulse 3b	150V	50 Ohms	t1 = 10kHz, t4 = 10ms, t5 = 0.09 Seconds	1 Hours	0.0 s	
ISO 7637-2 (2004) – Pulse 4	-12V	0.0 Ohms	Ua = -4.0V, t7 = 30.0ms, t8 = 30.0ms, t9 = 10.0s, t10 = 5.0ms, t11 = 50.0ms	1 P.	60.0 s	



**Test equipment:**

**Equipment Used for Transient Immunity Measurement**

<b>Transients And Surge In The Vehicular Environment Test Site (ISO 7637-2)</b>					
<b>Name of Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due</b>
Transient Immunity Tests	Teseq	NSG 5500	1543	12/29/2022	12/28/2023
Power Amplifier	Teseq	PA 5840	4106	12/29/2022	12/28/2023
Software	Autostar7 V2.0.0.0				

**Photo documentation of test set-up**

**Variant A: VC900-M8M**

**Mode 1: Normal Operation (DC 12V)**

**Pulse 1, 2a, 2b, 3a, 3b, 4**



**Mode 2: Normal Operation (DC 24V)**

**Pulse 1, 2a, 2b, 3a, 3b, 4**



Measurement of conducted emissions of transients along supply lines of electrical/electronic subassemblies according to UN-R 010, 06 Series of Amendments, Annex 10, item 3.

Appendix 3

Test Procedure: ISO 7637-2: Second edition 2004

Tested by: Angus Chen

Tested date: 23.02.2023

Remark: The device were tested with requirements to a DC 12V/24V system

Test results:

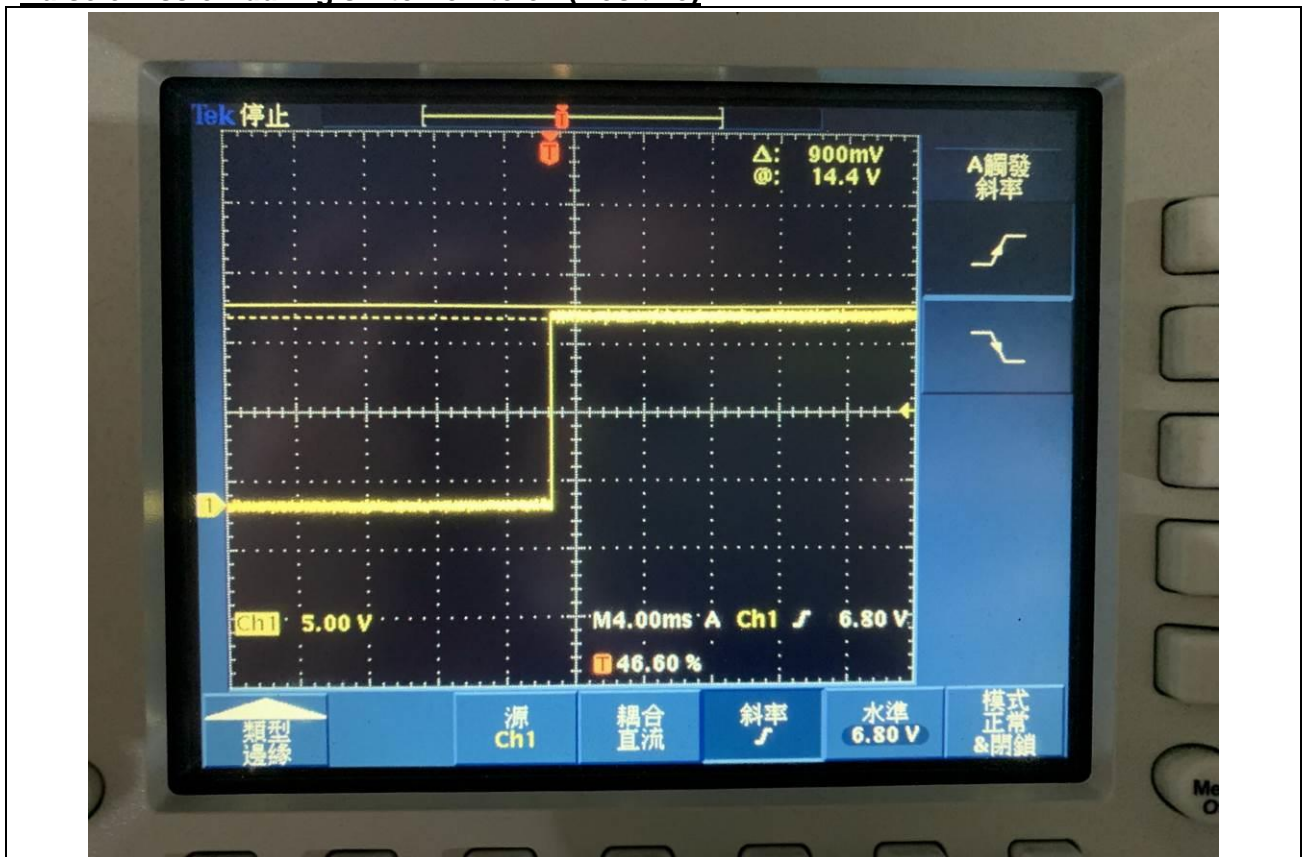
Variant A: VC900-M8M

Mode 1: Normal Operation (DC 12V)

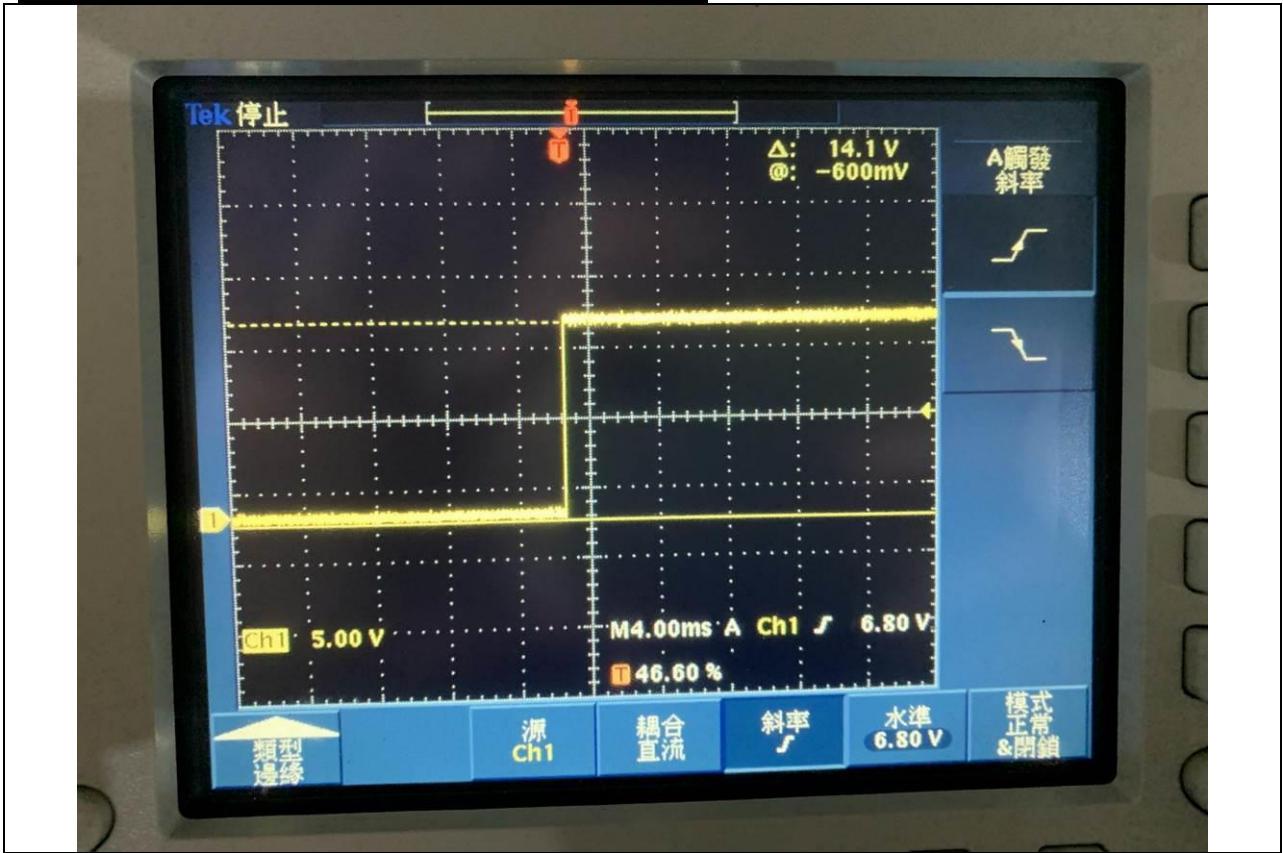
Fast

DC 12V

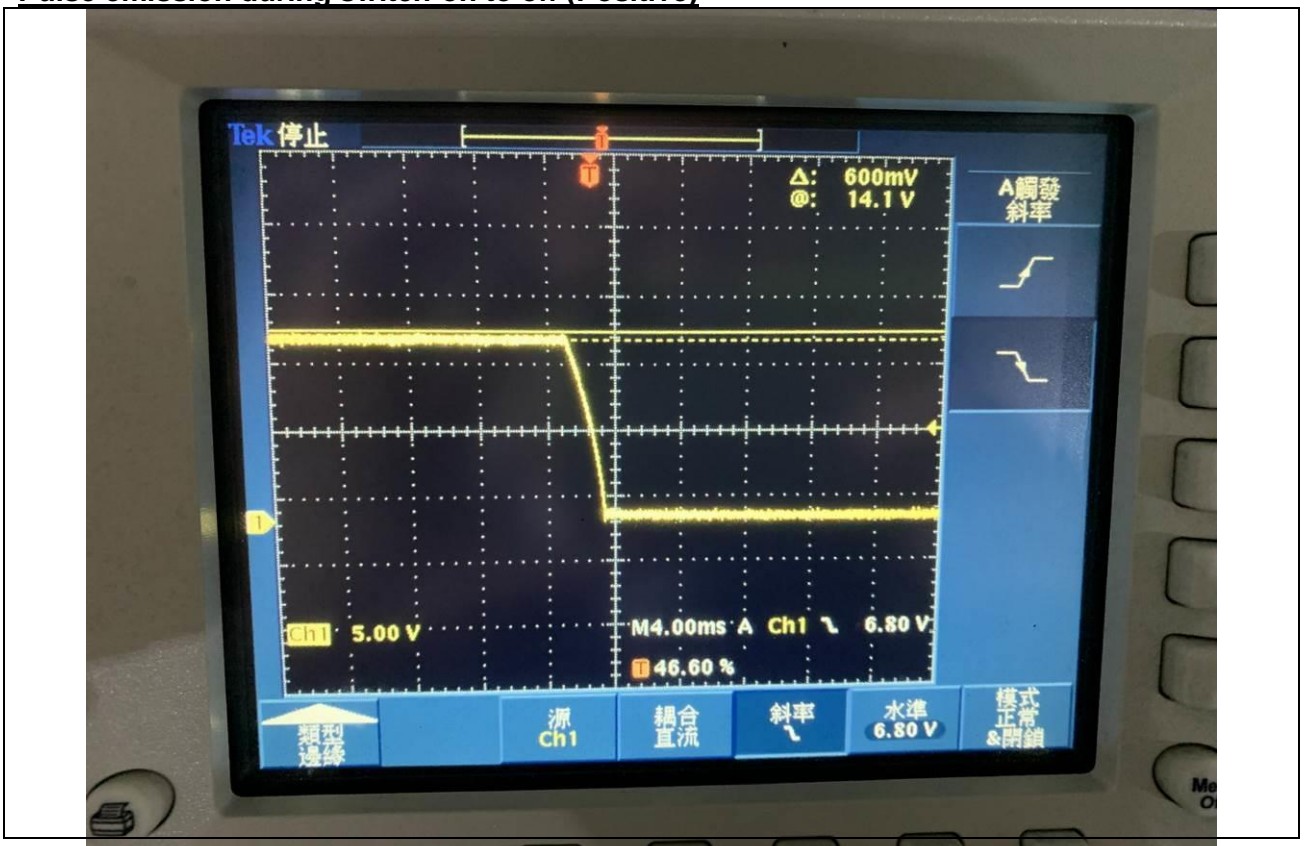
Pulse emission during switch-off to on (Positive)



### Pulse emission during switch-off to on (Negative)



### Pulse emission during switch-on to off (Positive)

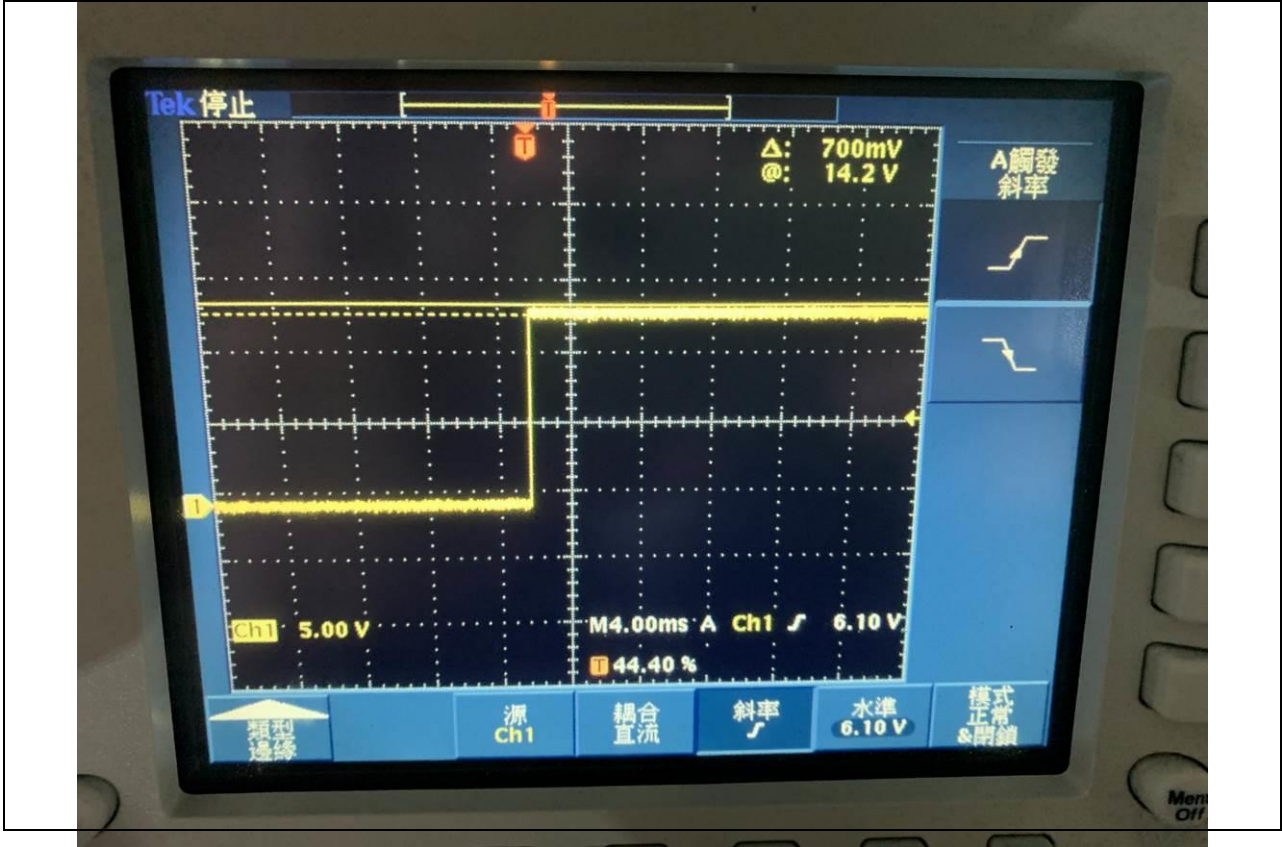




### Pulse emission during switch-on to off (Negative)



**Slow**  
**Pulse emission during switch-off to on (Positive)**

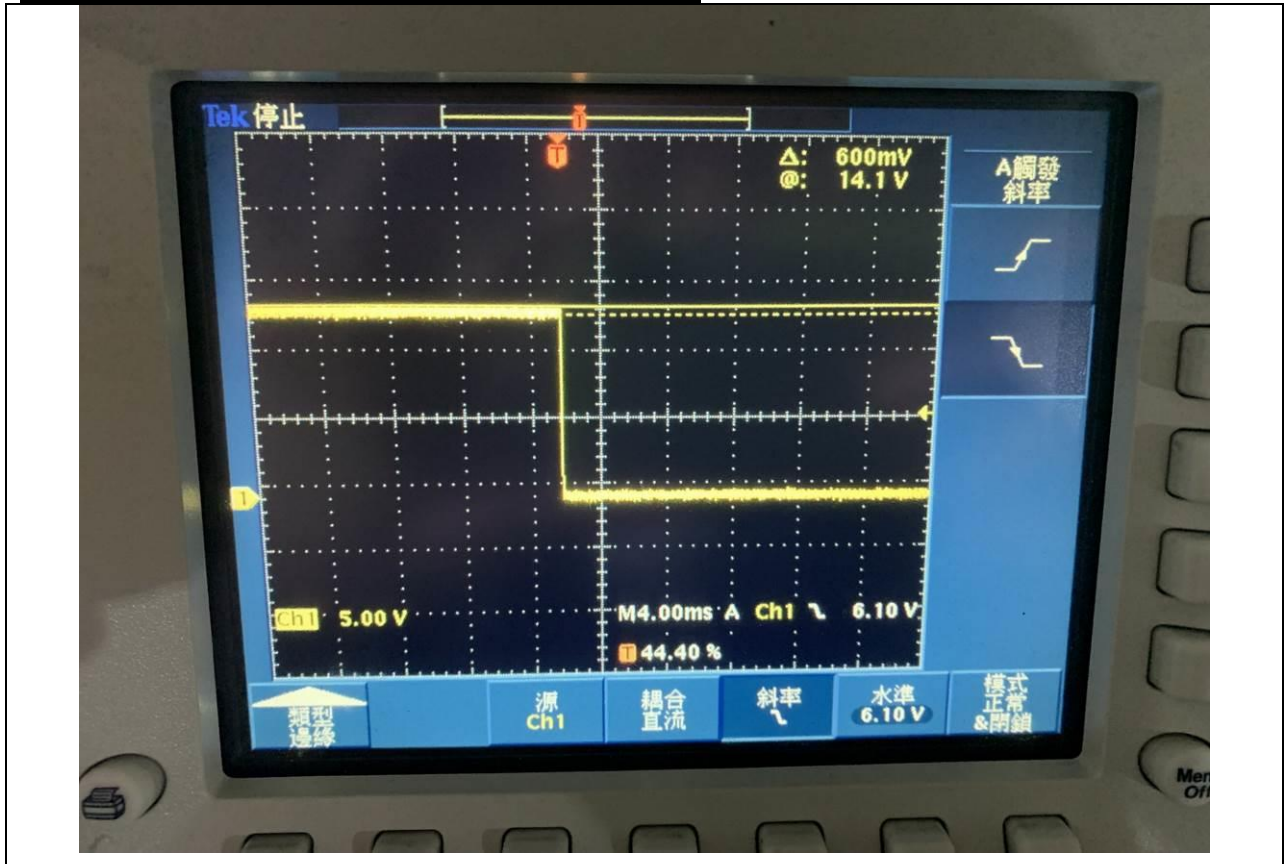


**Pulse emission during switch-off to on (Negative)**

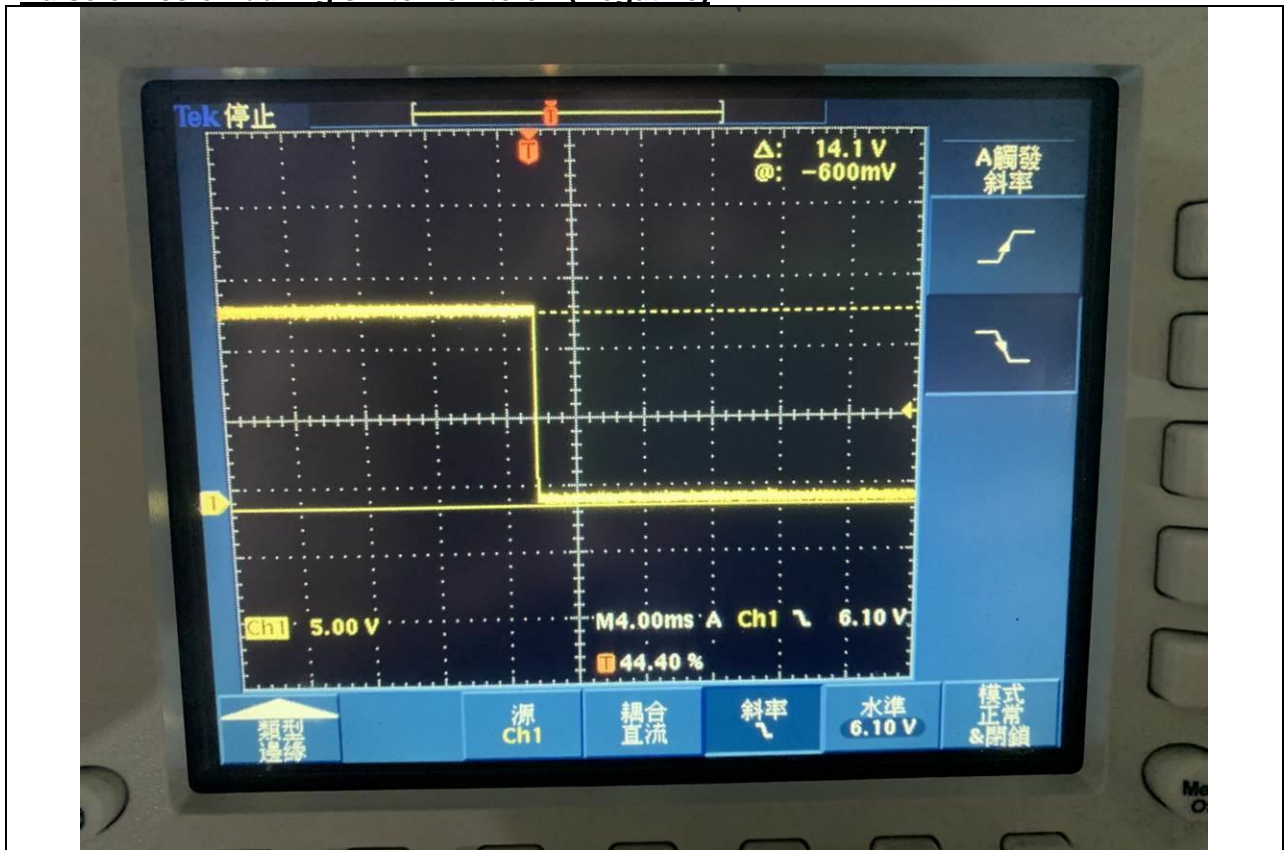




**Pulse emission during switch-on to off (Positive)**



**Pulse emission during switch-on to off (Negative)**

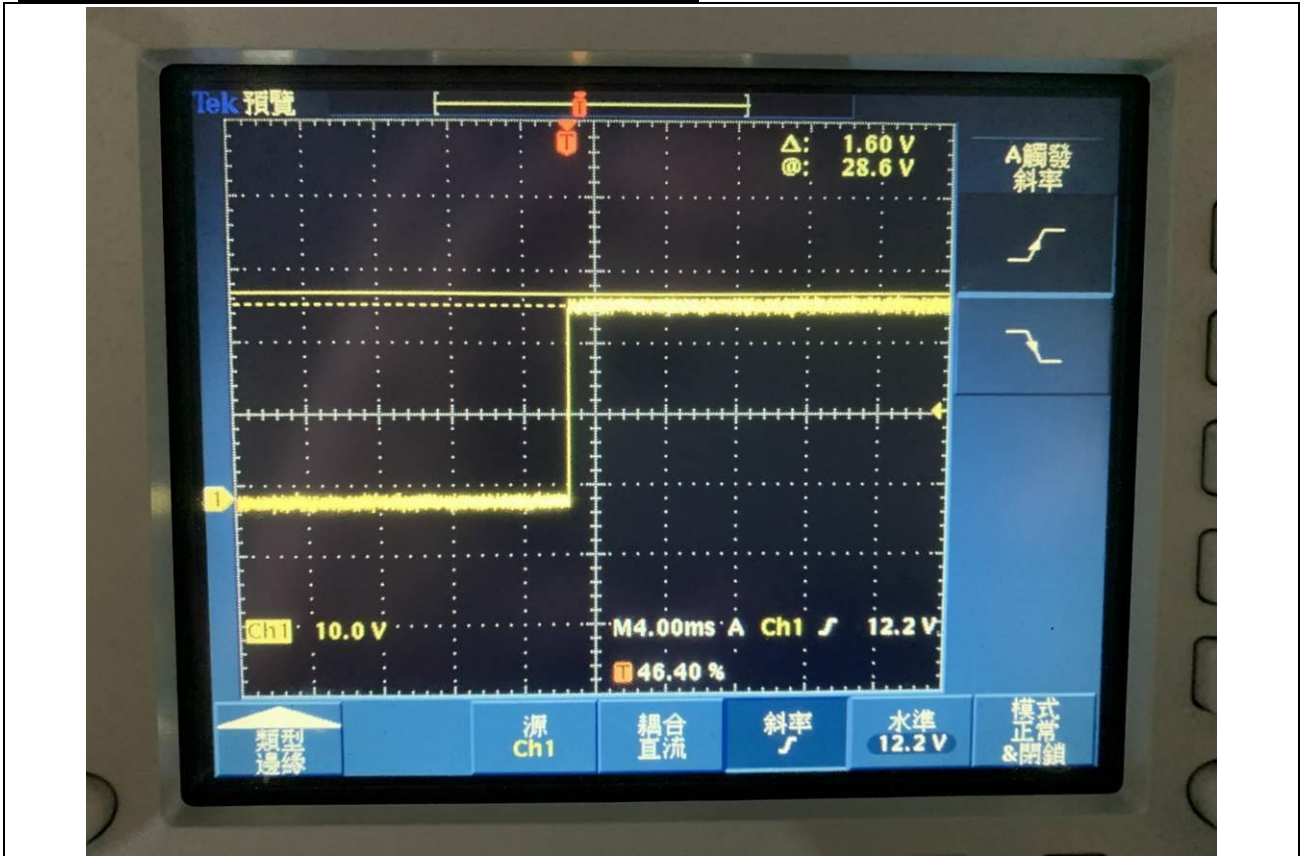


**Mode 2: Normal Operation (DC 24V)**

**Fast**

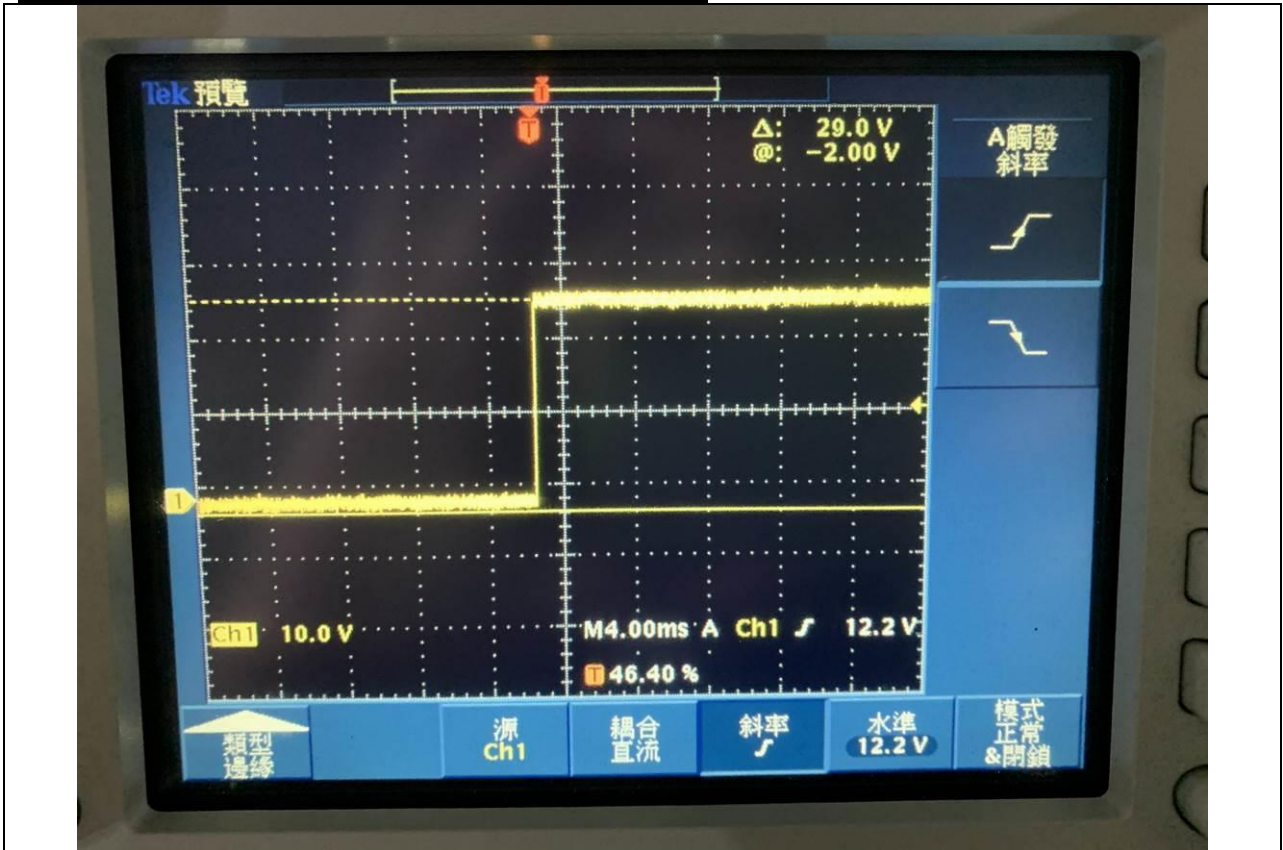
**DC 24V**

**Pulse emission during switch-off to on (Positive)**

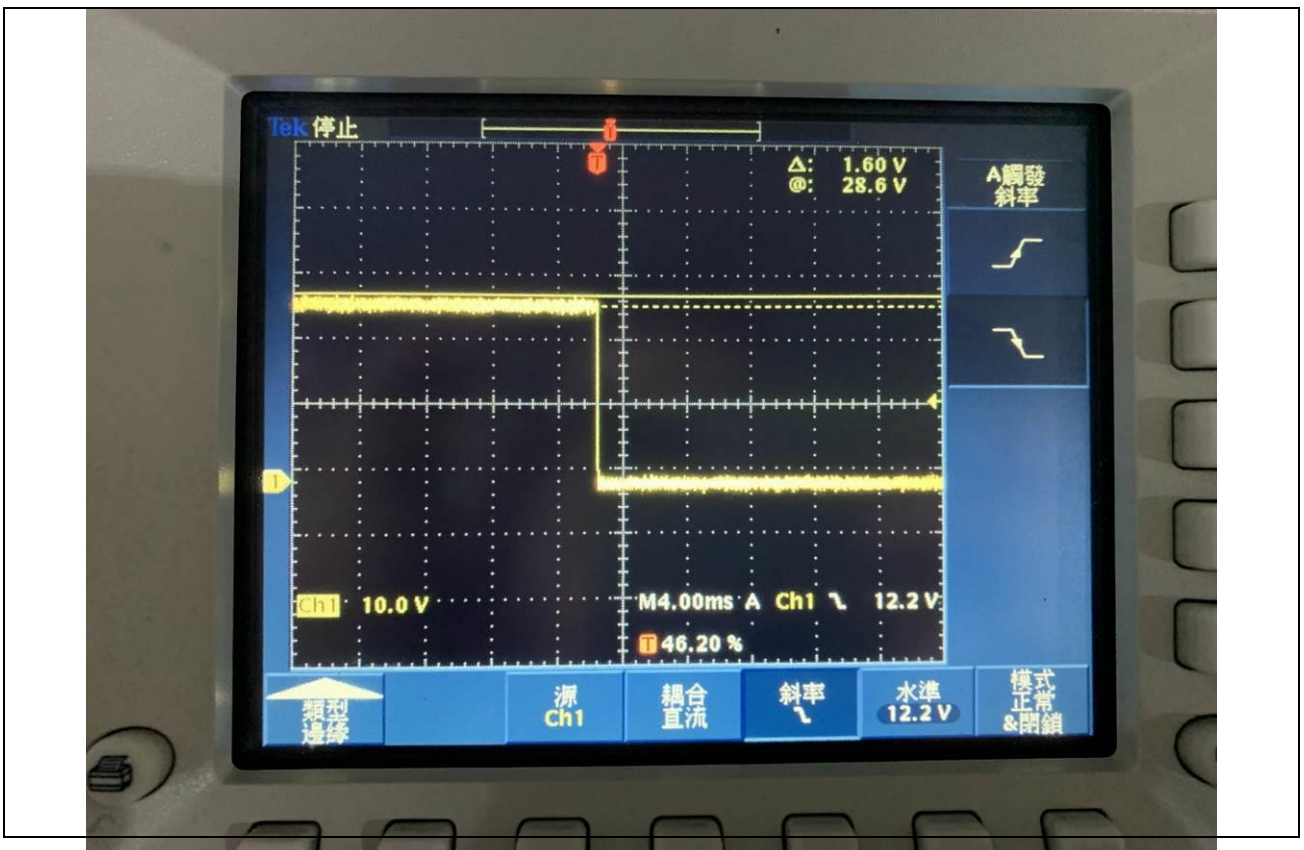




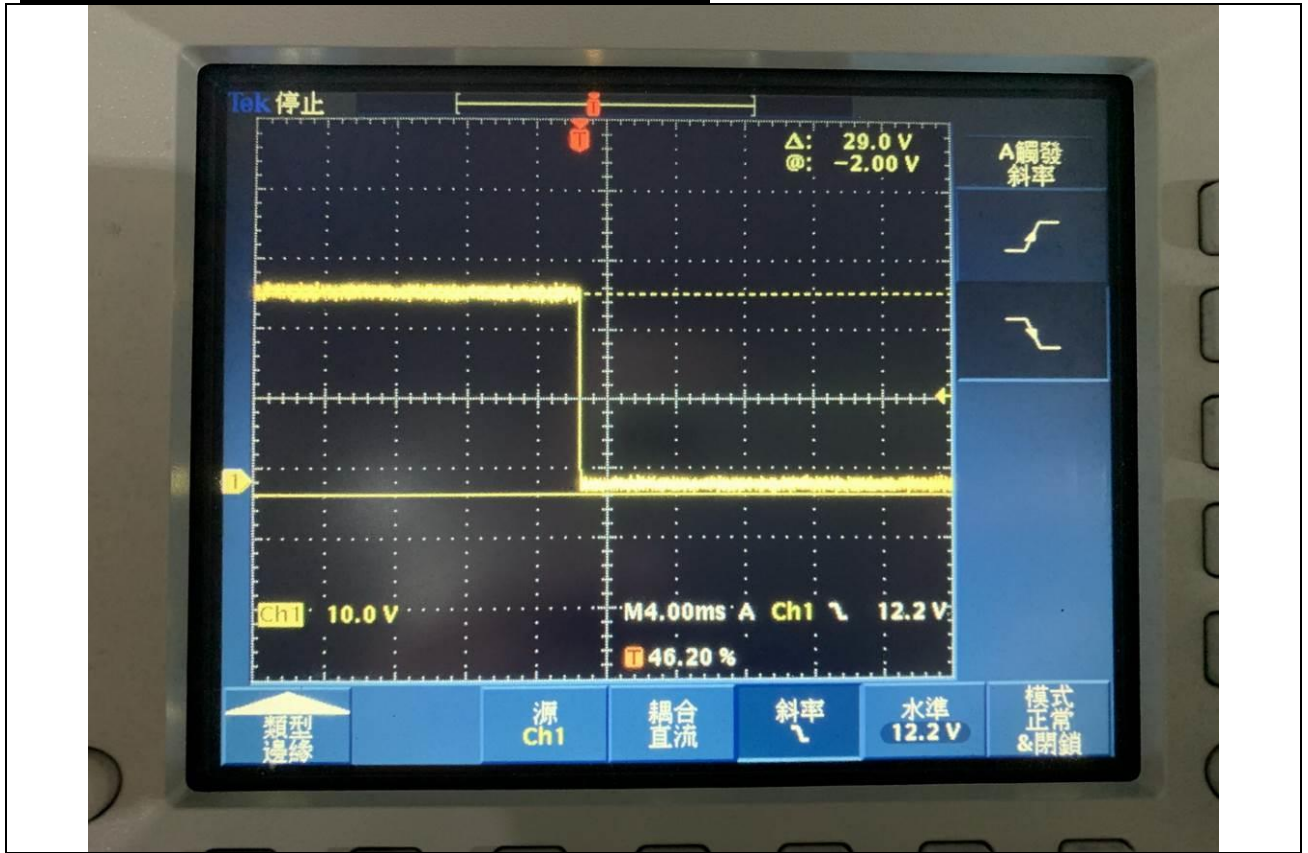
**Pulse emission during switch-off to on (Negative)**



**Pulse emission during switch-on to off (Positive)**

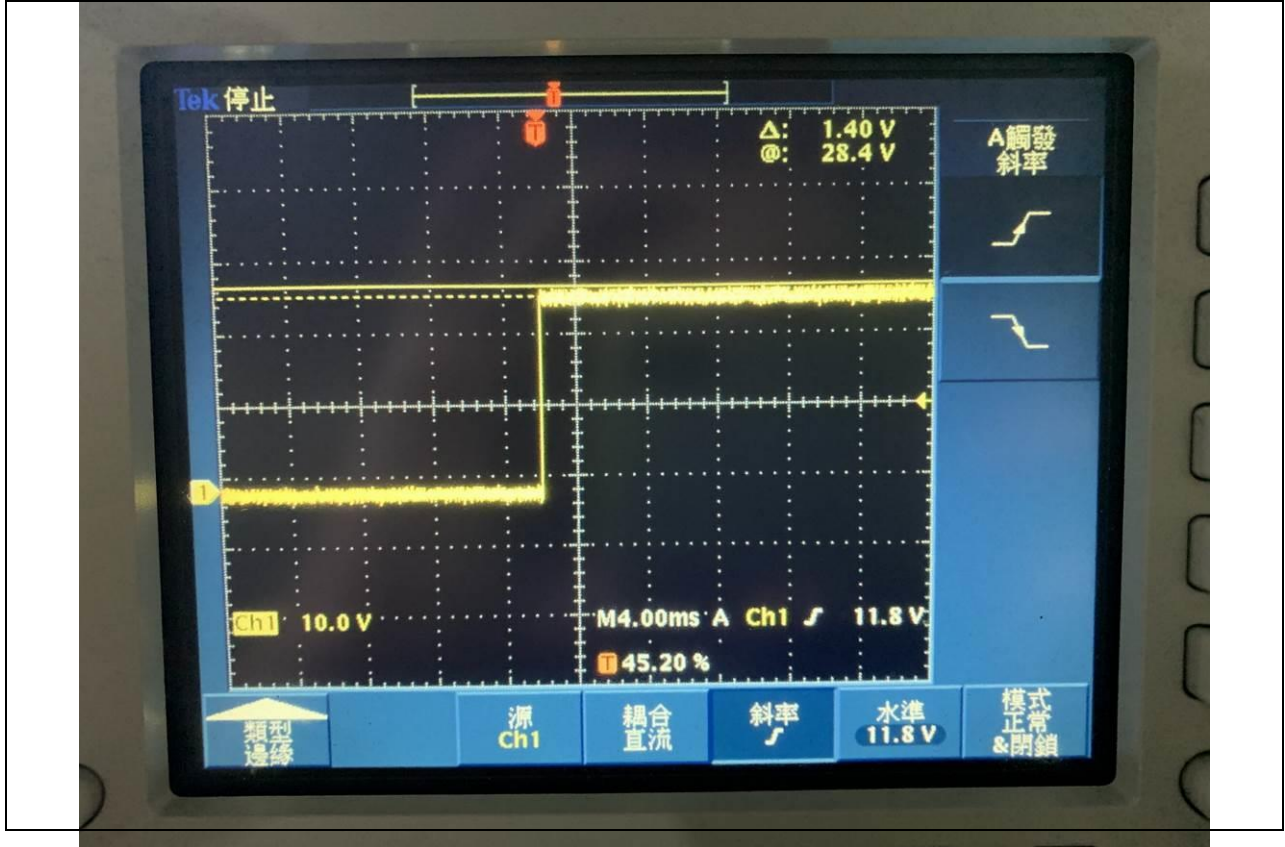


### Pulse emission during switch-on to off (Negative)

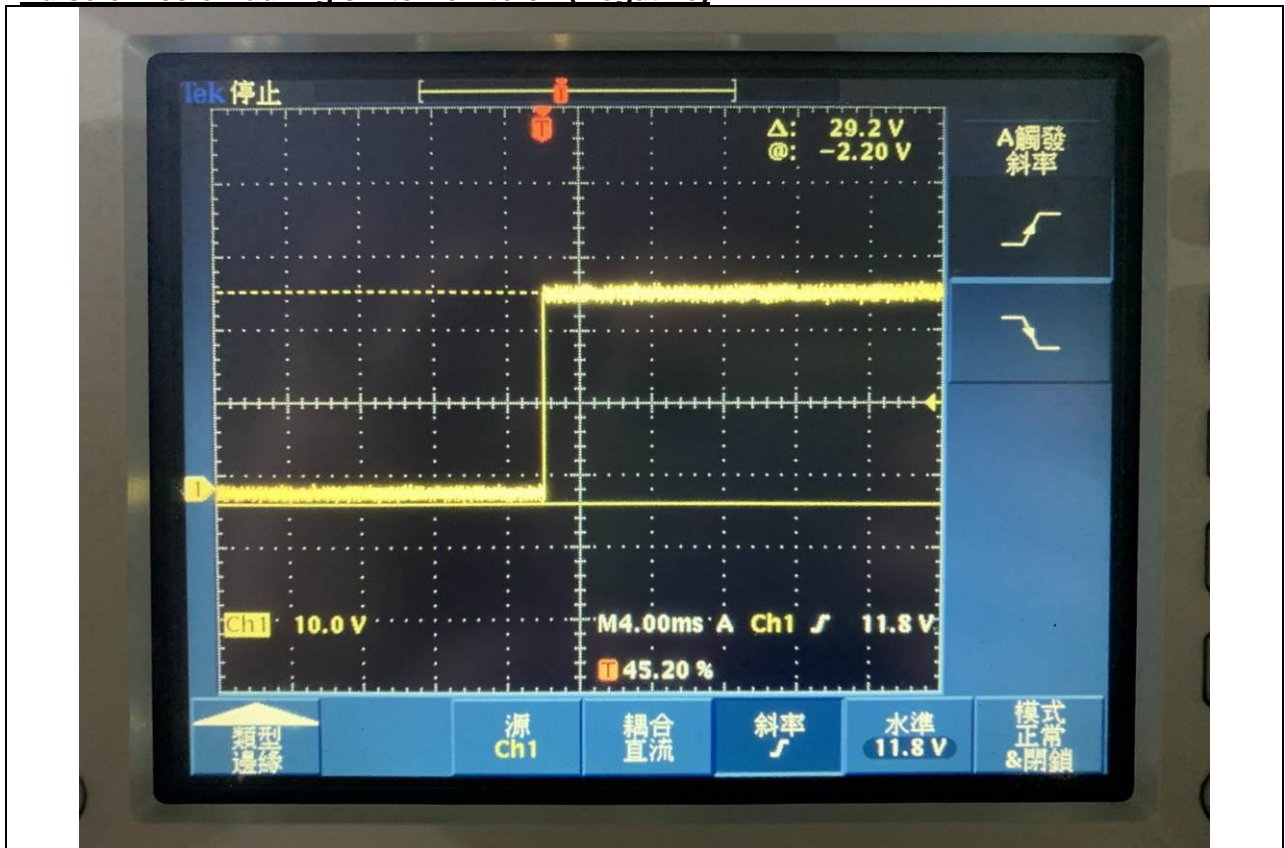




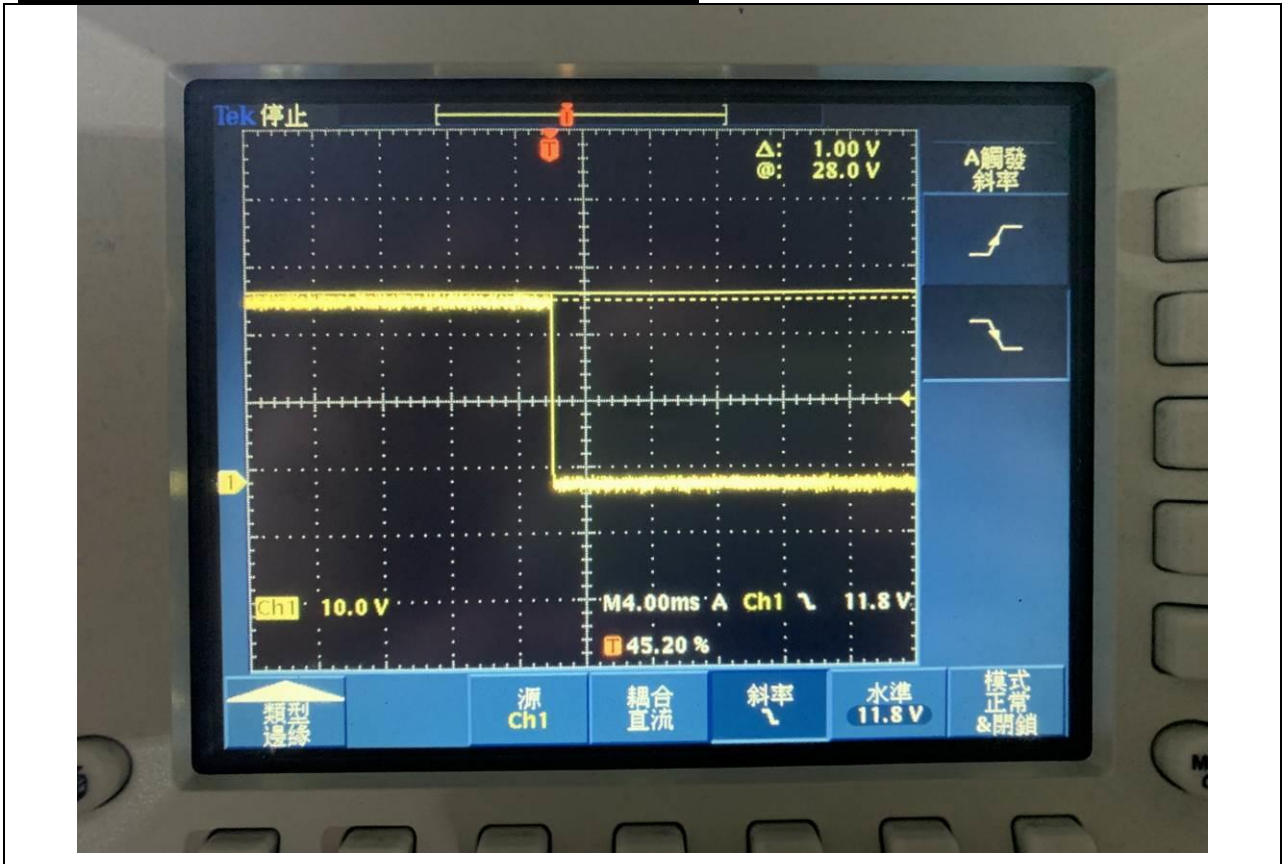
**Slow**  
**Pulse emission during switch-off to on (Positive)**



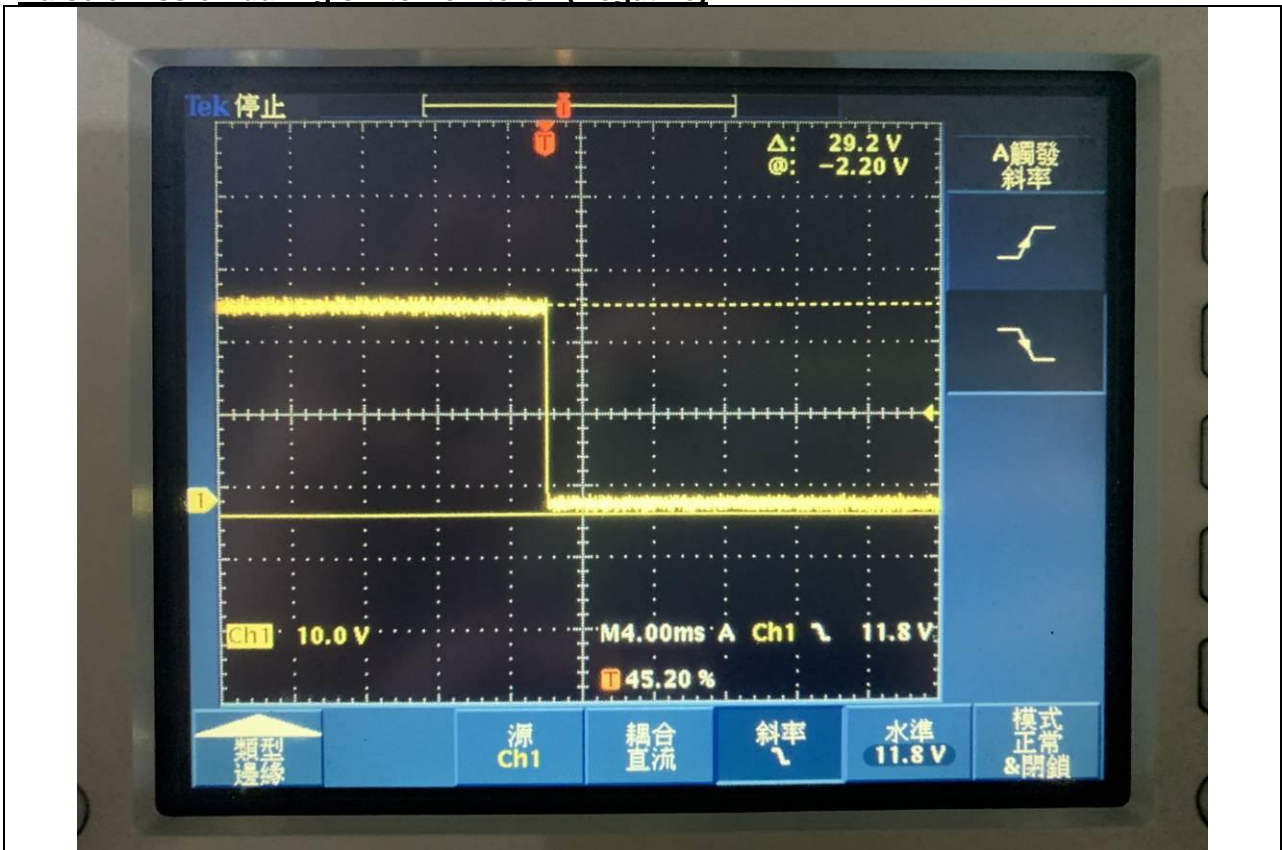
**Pulse emission during switch-off to on (Negative)**



**Pulse emission during switch-on to off (Positive)**



**Pulse emission during switch-on to off (Negative)**



**Result Overview:**

**Variant A: VC900-M8M**

**Mode 1: Normal Operation (DC 12V)**

12V (Mode 1)				
Limit Value [V]	Measured Value [V]			
	Fast, ON	Fast, OFF	Slow, ON	Slow, OFF
<b>+75</b>	<b>+0.9</b>	<b>+0.6</b>	<b>+0.7</b>	<b>+0.6</b>
<b>-100</b>	<b>-14.1</b>	<b>-13.8</b>	<b>-14.1</b>	<b>-14.1</b>

**Mode 2: Normal Operation (DC 24V)**

24V (Mode 2)				
Limit Value [V]	Measured Value [V]			
	Fast, ON	Fast, OFF	Slow, ON	Slow, OFF
<b>+150</b>	<b>+1.6</b>	<b>+1.6</b>	<b>+1.4</b>	<b>+1.0</b>
<b>-450</b>	<b>-29.0</b>	<b>-29.0</b>	<b>-29.2</b>	<b>-29.2</b>

**Test equipment:**

**Equipment Used for Transient Emissions Measurement**

<b>Transients And Surge In The Vehicular Environment Test Site (ISO 7637-1/-2)</b>					
<b>Name of Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due</b>
Electronic Switch	EM TEST	BS 200B	V0812103560	08/19/2022	08/18/2023
Digital Phosphor Oscilloscope	TEKTRONIX	TDS 3054C	C013600	06/01/2022	05/31/2023
LISN	SHWARZBECK	NNBM8125	81251525	05/27/2022	05/26/2023
High Voltage Probe	Tektronix	Tek P5100	SD-S053	06/01/2022	05/31/2023



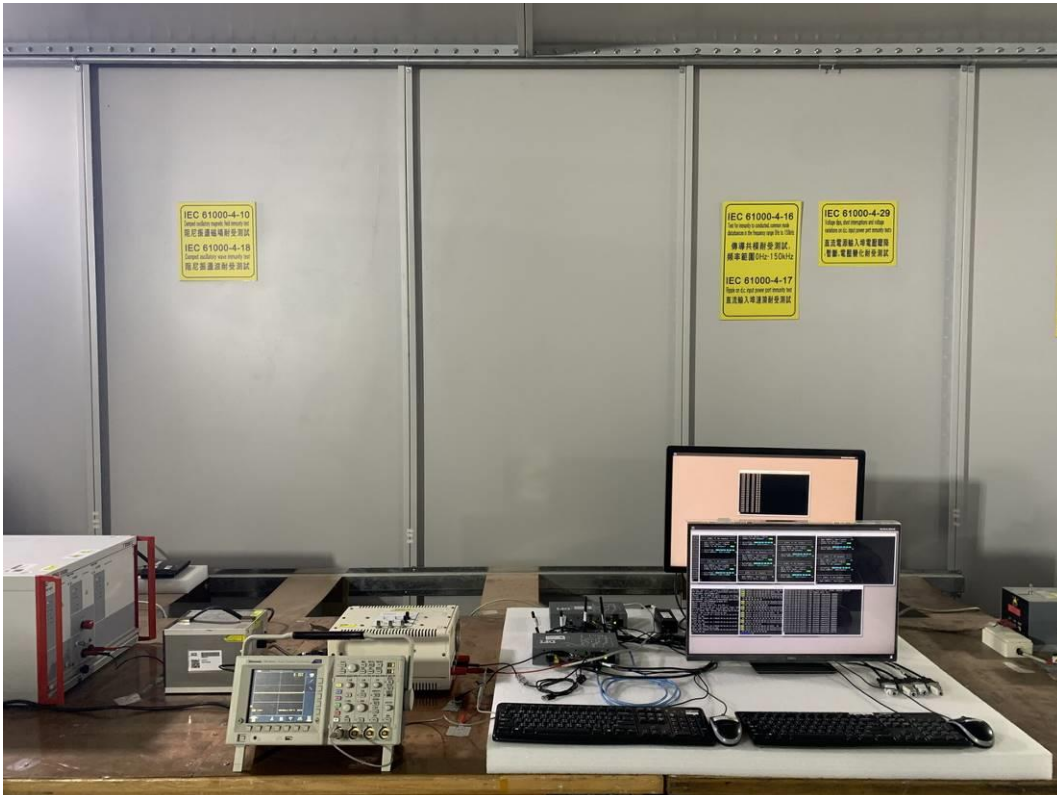
## Photo documentation of test set-up

Variant A: VC900-M8M  
Mode 1: Normal Operation (DC 12V)

Fast



Slow



## Mode 2: Normal Operation (DC 24V)

### Fast



### Slow

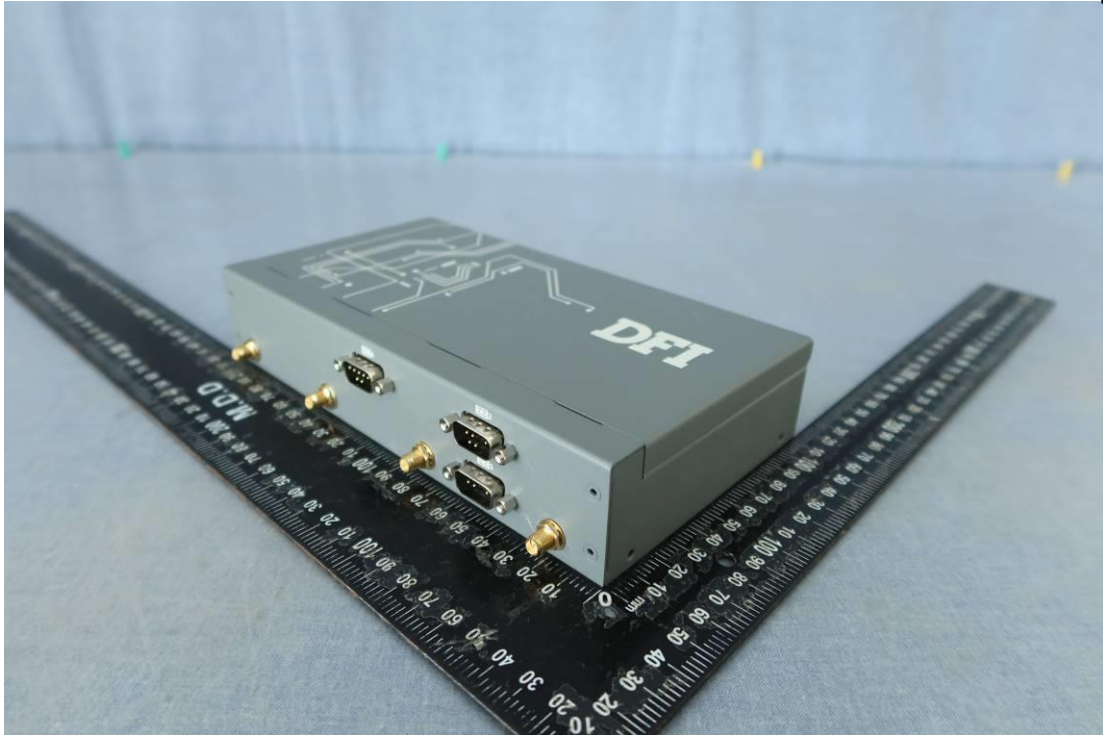


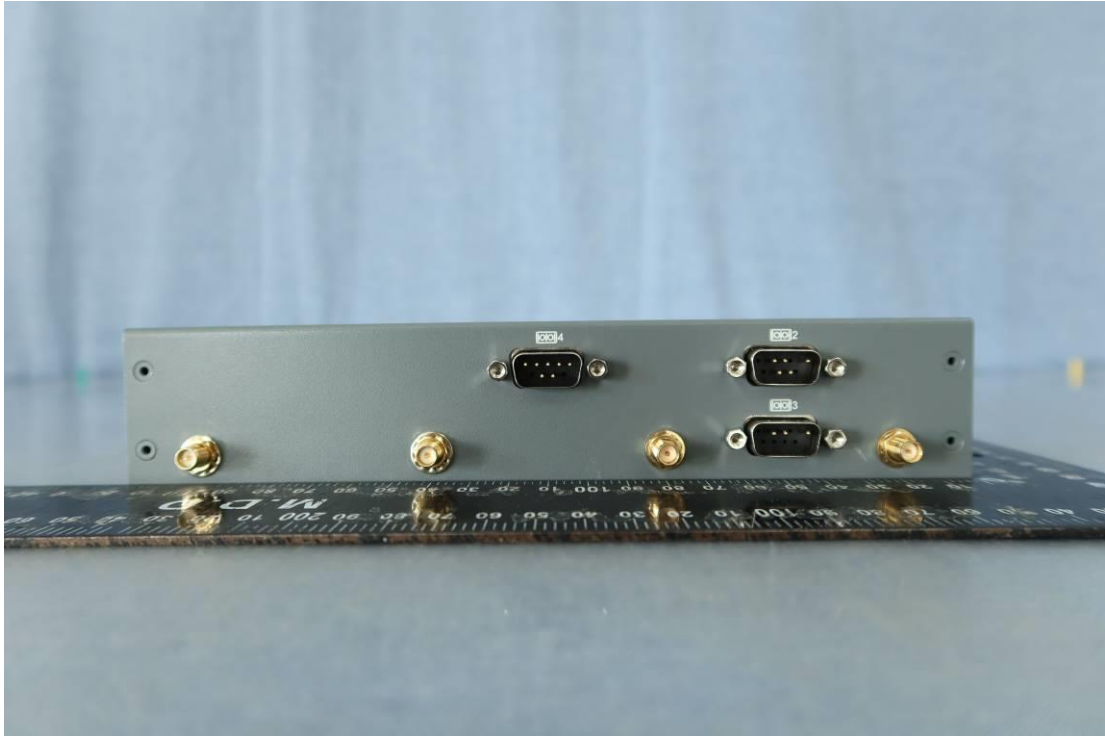


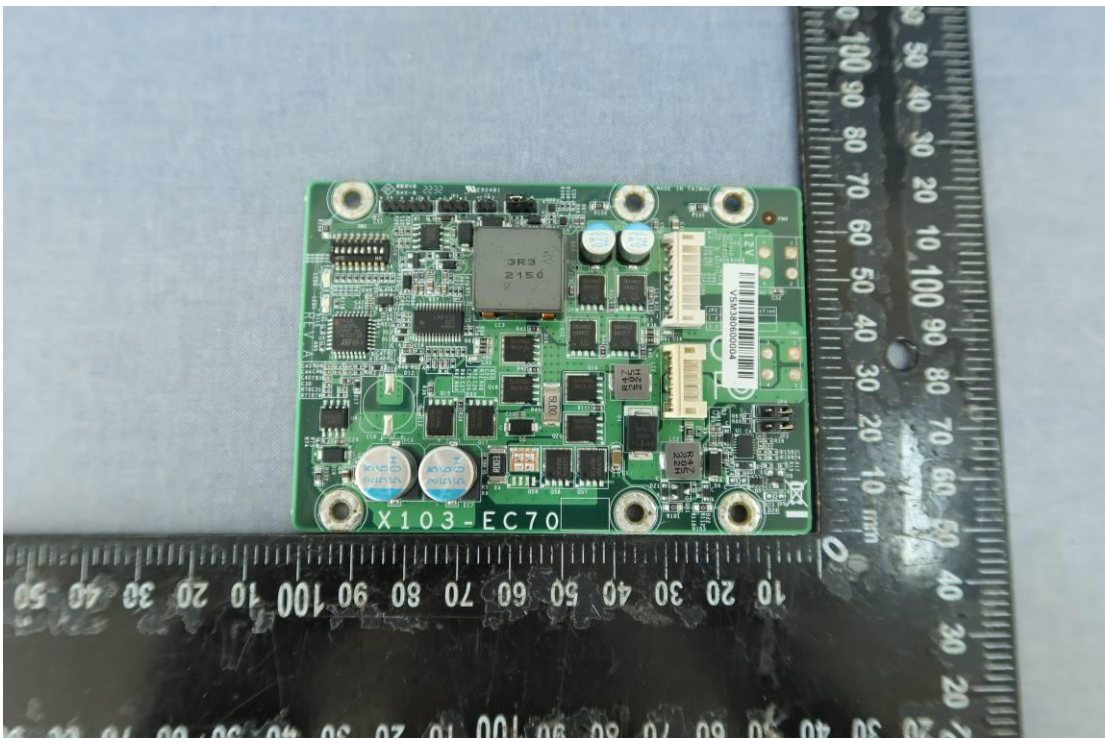
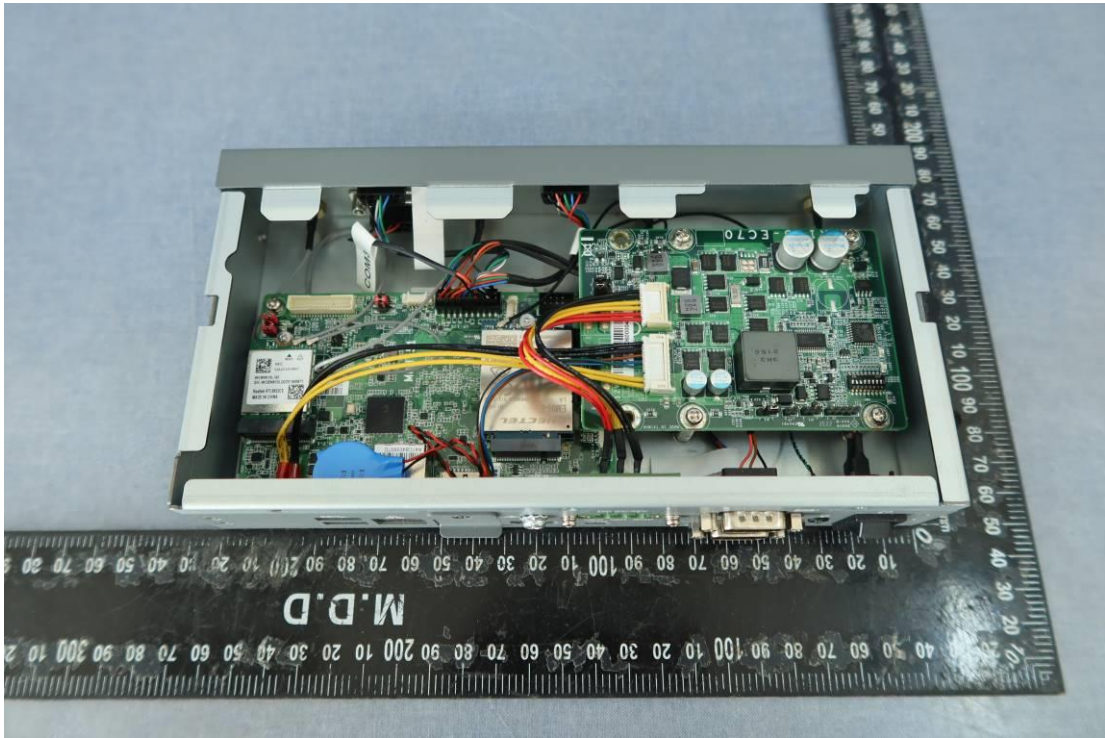
Photo documentation of the ESA

Variant A: VC900-M8M

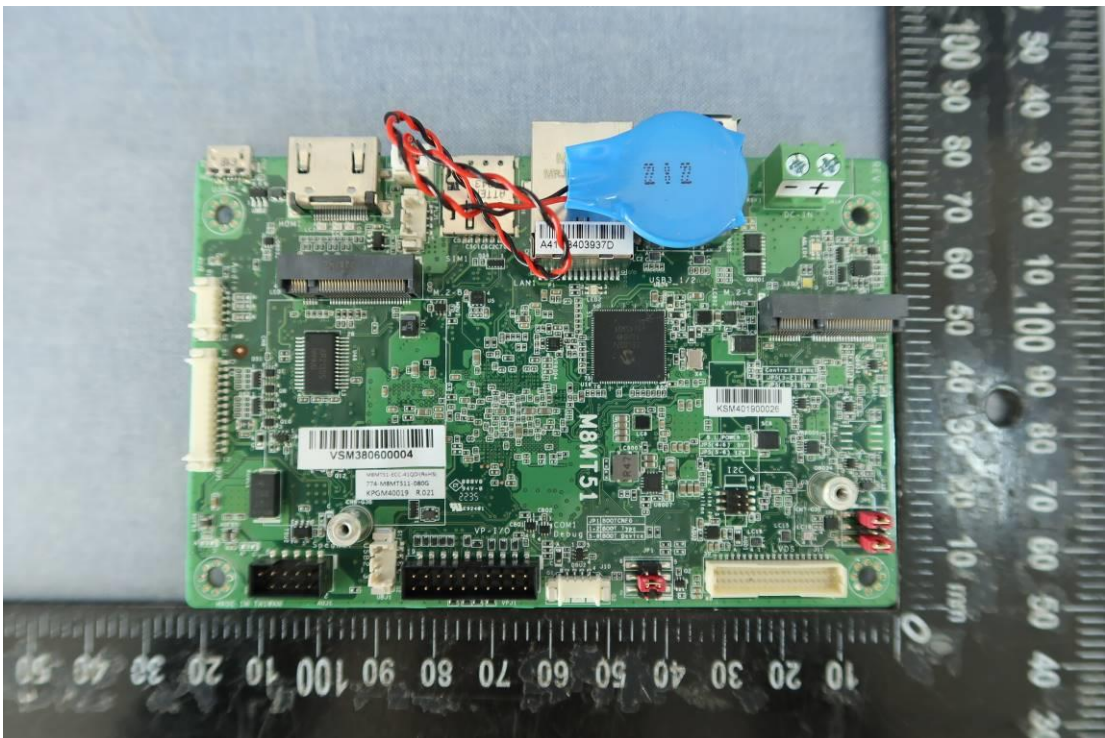
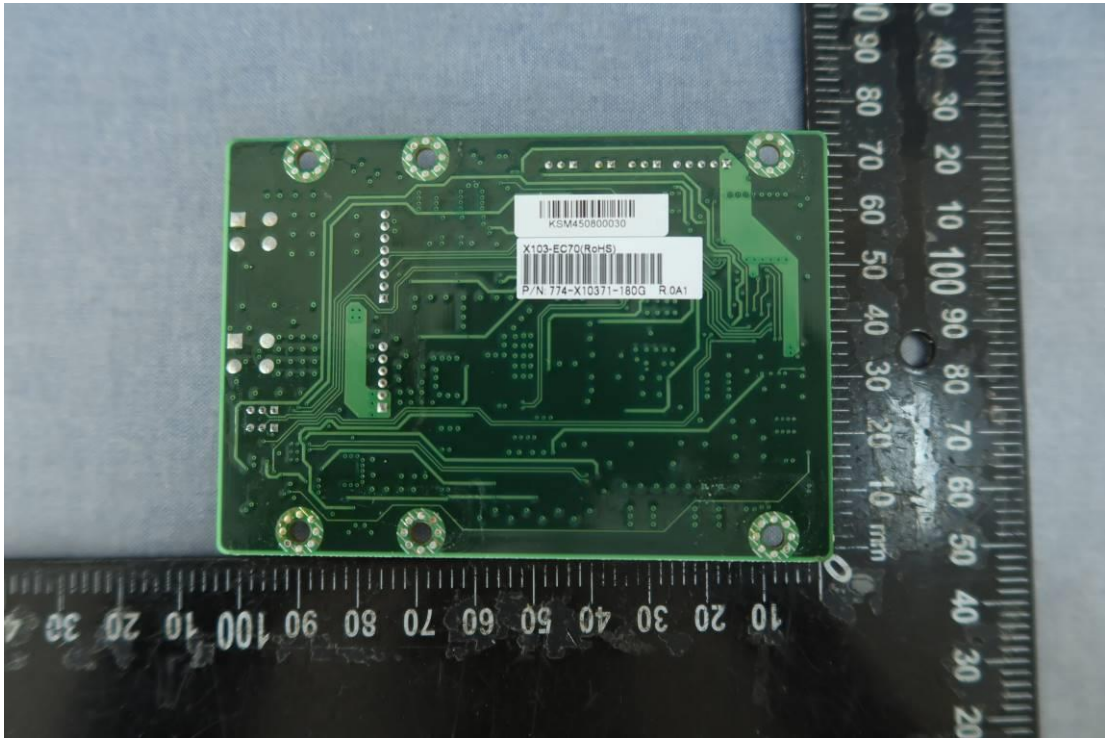
Appendix 4

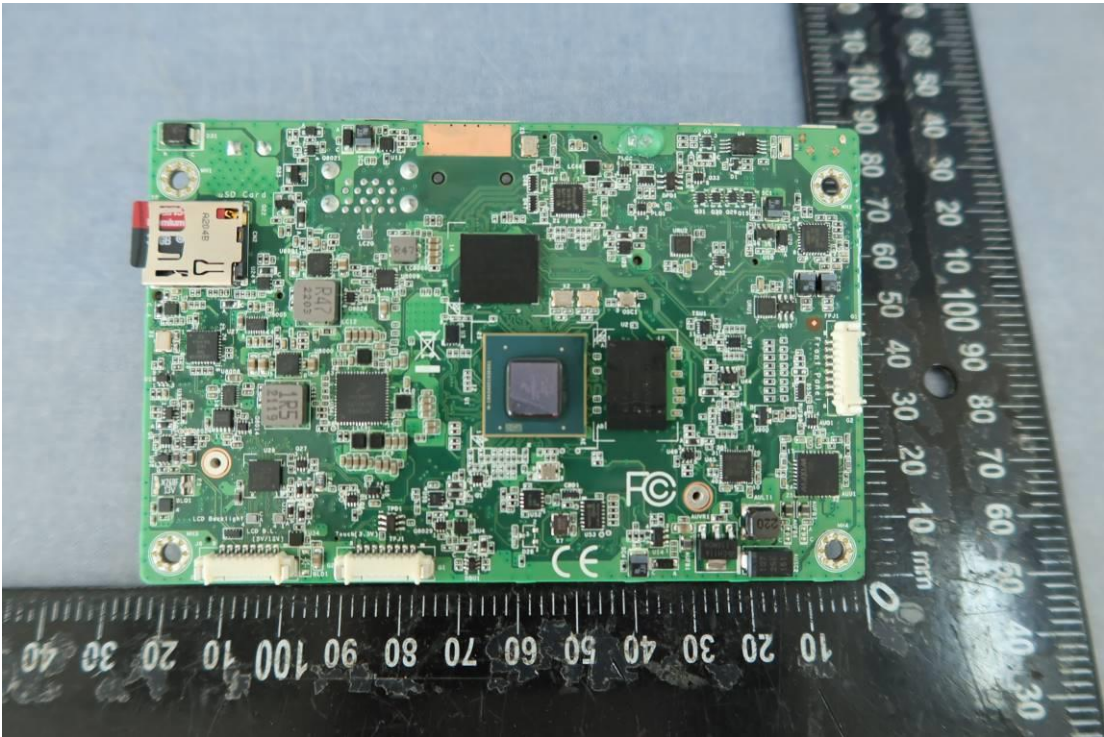
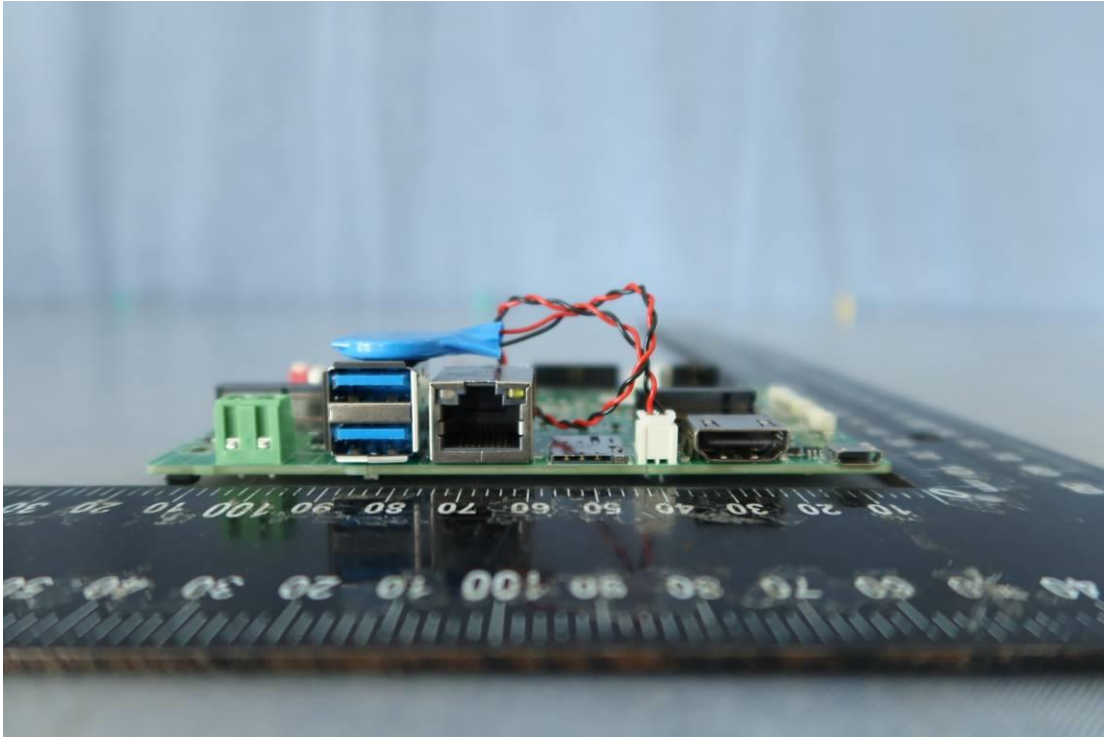




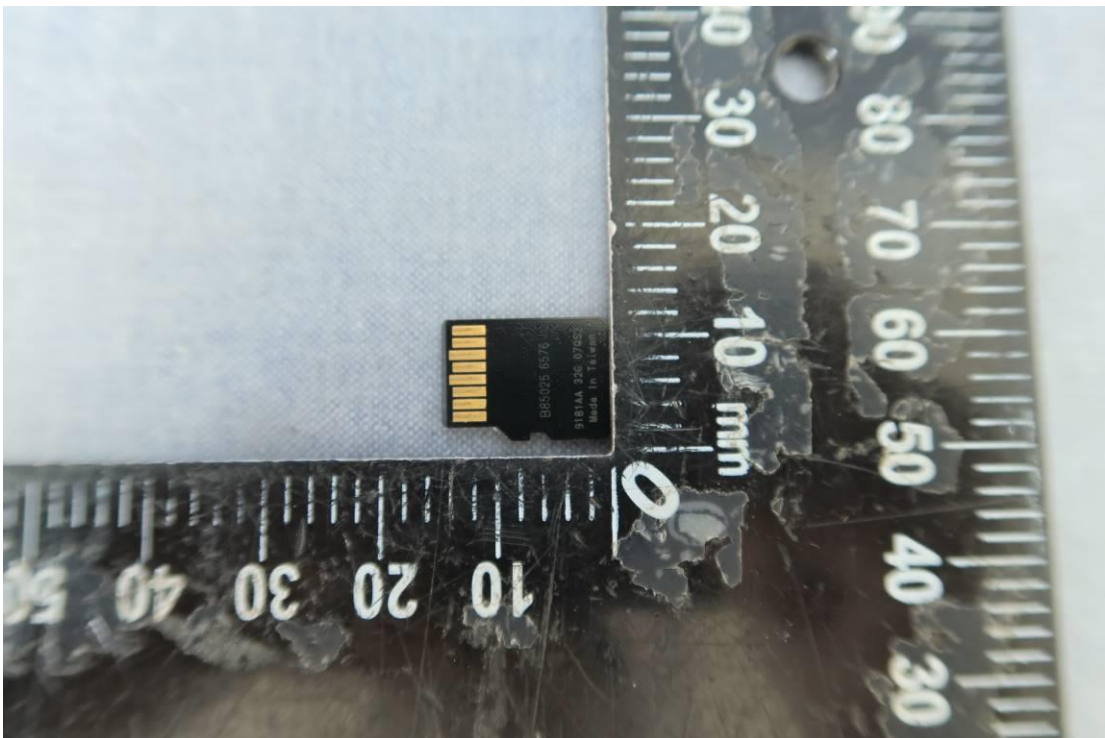
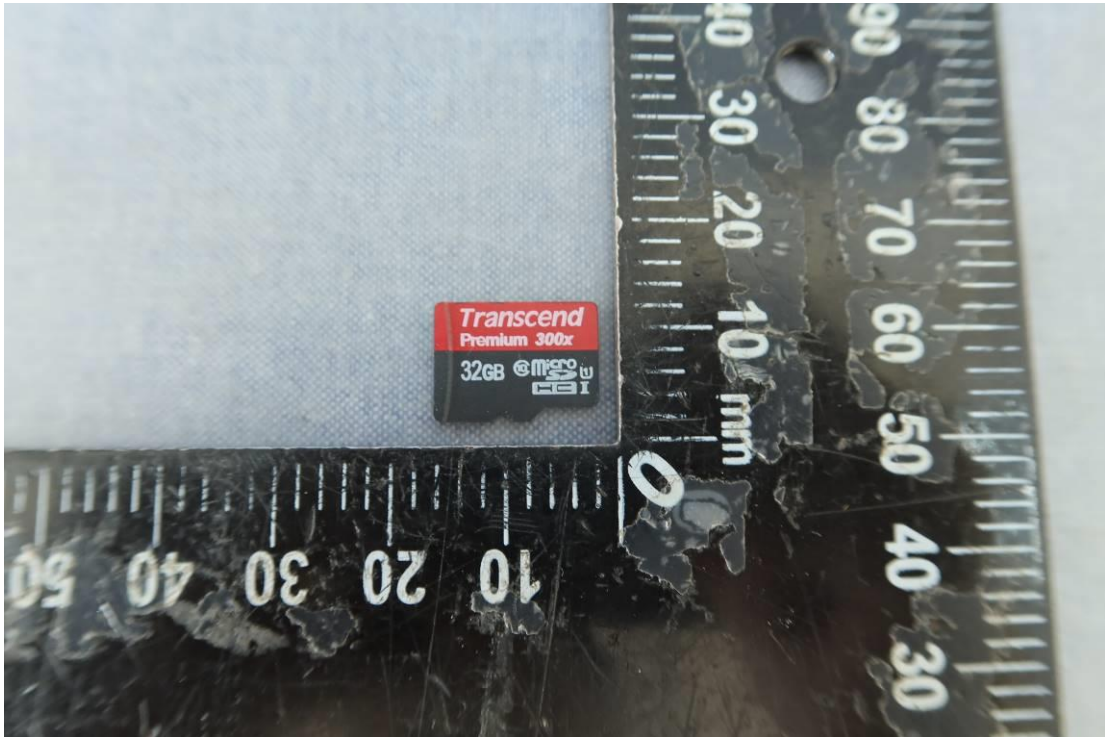


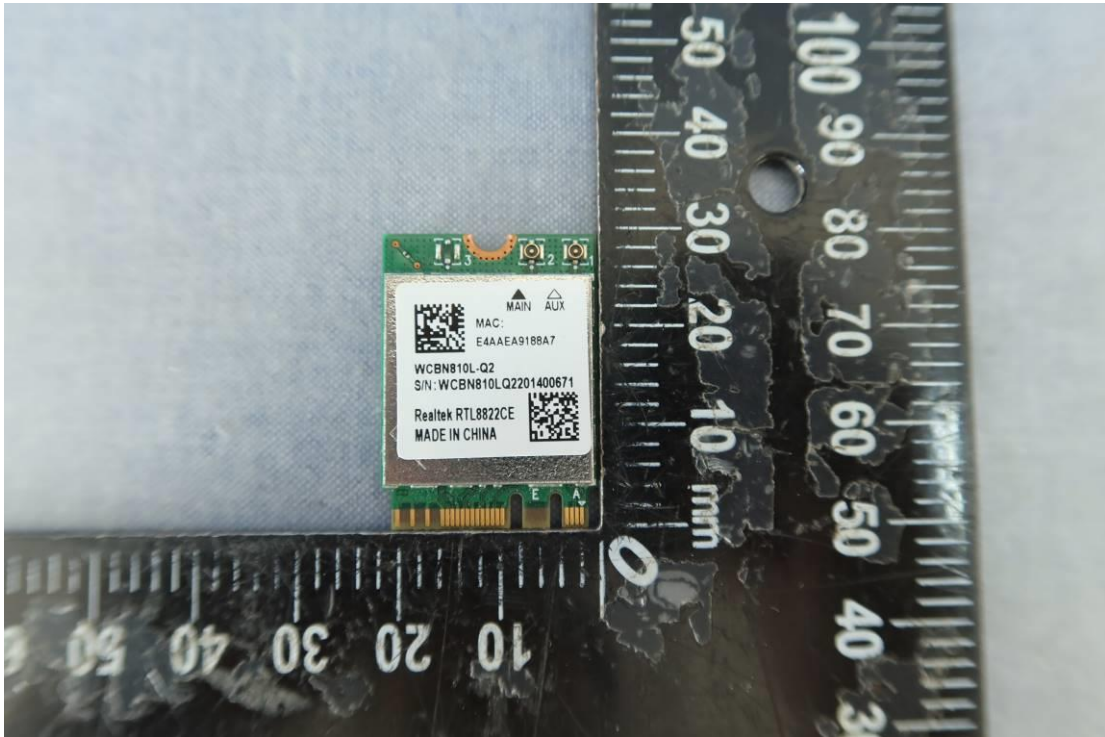




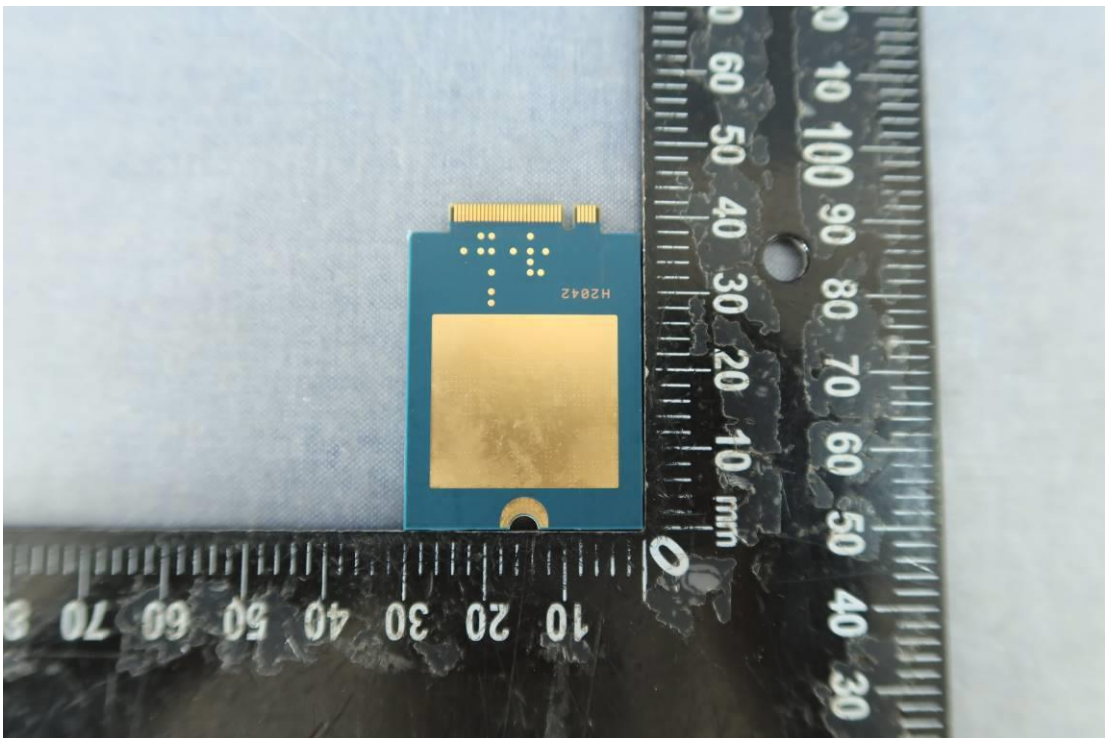
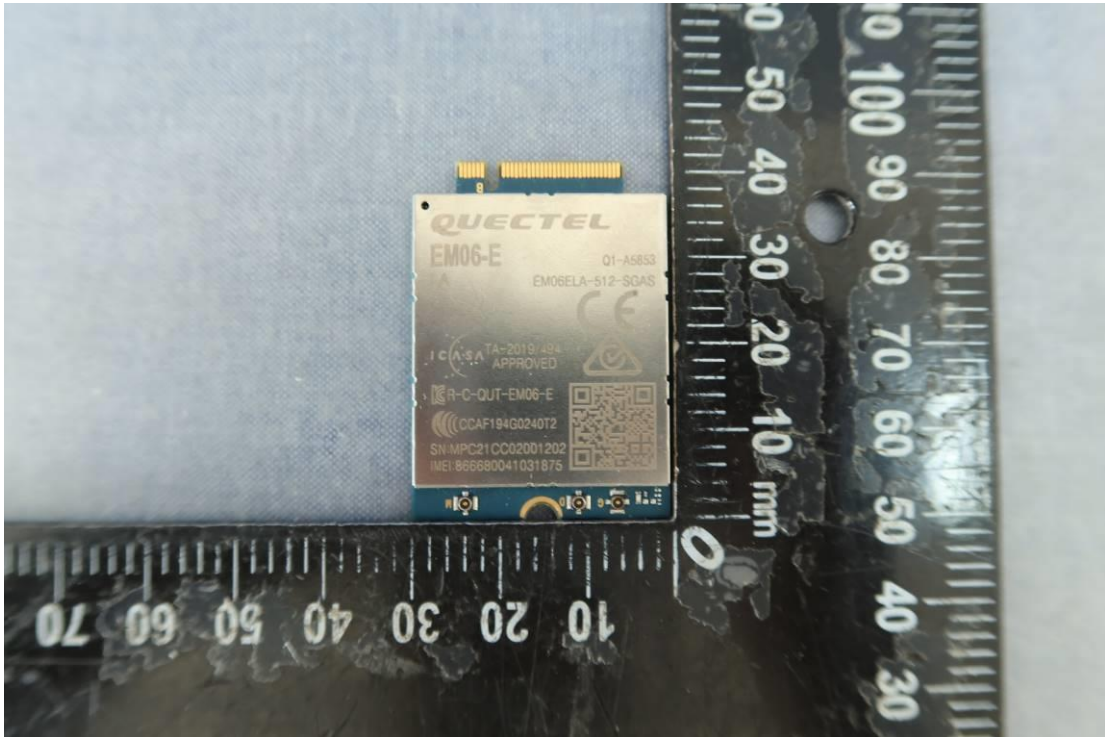




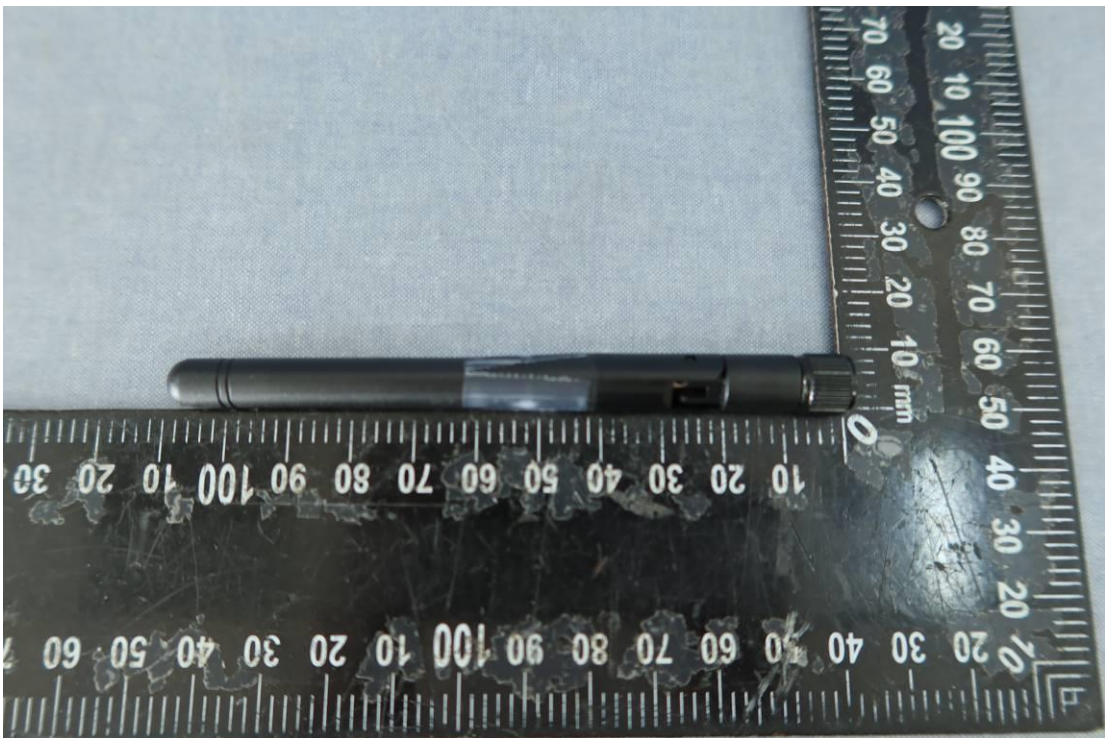














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## Beschreibungsbogen / Information Document

### UN Regelung Nr. 10 (UN-R 010) / UN Regulation No. 10 (UN-R 010)

#### Änderungsserie 06, Ergänzung 2 / 06 Series of Amendments, Supplement 2

<b>Nr.</b> <i>No.</i>	IF_TMxD2301000248DV
<b>Ausgabedatum</b> <i>Date of issue</i>	28.03.2023
<b>Letztes Änderungsdatum</b> <i>Date of last change</i>	-
1. <b>Marke (Handelsmarke des Herstellers)</b> <i>Make (Trade name of manufacturer)</i>	DFI, ITOX
2. <b>Typ</b> <i>Type</i>	VC900-M8M
<b>Ausführung(en)</b> <i>Variant(s)</i>	Variant A: VC900-M8M Variant B: VC900-M8M???????????? (? = A ~ Z, a ~ z, 0 ~ 9, -, blank, or any character)
	Explanation: for marketing purpose only
<b>Handelsbezeichnung(en)</b> <i>Commercial description(s)</i>	Embedded System
3. <b>Art der Kennzeichnung des Typs</b> <i>Means of identification of type</i>	Variant designation
3.1. <b>Stelle, an der die Kennzeichnung angebracht ist</b> <i>Location of that marking</i>	On the back of the unit
4. <b>Name und Anschrift des Herstellers</b> <i>Name and address of manufacturer</i>	DFI Inc. 10F., No. 97, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22175, Taiwan
<b>Name und Adresse des bevollmächtigten Vertreters, sofern zutreffend</b> <i>Name and address of authorized representative, if any</i>	-
5. <b>Stelle an der das Genehmigungszeichen angebracht wird und Art der Anbringung</b> <i>Location and method of affixing of the approval mark</i>	Label affixed on the back of the unit
6. <b>Anschriften des Montagebetriebs (Anschriften der Montagebetriebe)</b> <i>Address(es) of assembly plant(s)</i>	DFI Inc. No.157, Shanying Rd., Gueishan Dist., Taoyuan City 333424, Taiwan

7. **Diese EUB wird als Bauteil/STE genehmigt<sup>(1)</sup>**  
*This ESA shall be approved as a component/STU<sup>(1)</sup>*

<sup>(1)</sup> **Nichtzutreffendes streichen.** / Delete where not applicable.

8. **Beschränkung hinsichtlich der Verwendung und Einbaubedingungen** -  
*Any restrictions of use and conditions for fitting*
9. **Nennspannung der elektrischen Anlage**  12V  24V  12V/24V  
*Electrical system rated voltage* Anschluss an Masse negativ / negative ground
- Nur zutreffend für Ladesysteme  
*Only applicable for charging systems:*
10. Ladegerät an Bord / extern n.a.  
*Charger on board / external*
11. Ladestrom: Gleichstrom / Wechselstrom n.a.  
 (Anzahl Phasen, Frequenz)  
*Charging current: direct / alternating current*  
 (number of phases / frequency)
12. Maximaler Nennstrom (jeder Modus, falls notwendig) n.a.  
*Maximal nominal current (in each mode if necessary)*
13. Nominale Nennspannung n.a.  
*Nominal charging voltage*
14. Grundfunktionen der EUB-Schnittstelle n.a.  
 (z.B. L1/L2/L3/N/PE/Control Pilot)  
*Basic ESA interface functions (ex. L1/L2/L3/N/PE/control pilot)*
15. Minimaler  $R_{sce}$ -Wert n.a.  
*Minimum  $R_{sce}$ -value*



## **VC900-M8M**

NXP i.MX8 Series

ARM-Based In-vehicle System

User's Manual

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## Trademarks

Product names or trademarks appearing in this manual are for identification purpose only and are the properties of the respective owners.

## FCC and DOC Statement on Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

## Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

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## About this Manual

This manual can be retrieved from the website.

The manual is subject to change and update without notice, and may be based on editions that do not resemble your actual products. Please visit our website or contact our sales representatives for the latest editions.

## Warranty

1. Warranty does not cover damages or failures that arises from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or consequential damages to the product that has been modified or altered.

## About this Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- 1 x VC900-M8M system unit
- 1 x 3-pole terminal block cable for power input
- 1 x Wall mount bracket/screw pack
- 1 x Quick installation guide

Note: The items are subject to change in the developing stage.

The product and accessories in the package may not come similar to the information listed above. This may differ in accordance with the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.



## Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.



### Important:

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

## Safety Precautions

- Use the correct DC / AC input voltage range.
- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging in the power cord.
- There is danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent specifications of batteries recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.
- Keep this system away from humid environments.
- Make sure the system is placed or mounted correctly and stably to prevent the chance of dropping or falling may cause damage.
- The openings on the system shall not be blocked and shall be kept in distance from

other objects to make sure of proper air ventilation to protect the system from overheating.

- Dress the cables, especially the power cord, so they will not be stepped on, in contact with high temperature surfaces, or cause any tripping hazards.
- Do not place anything on top of the power cord. Use a power cord that has been approved for use with the system and is compliant with the voltage and current ranges required by the system's electrical specifications.
- If the system is to be unused or stored for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- If one of the following occurs, consult a service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated the system.
  - The system has been exposed to moisture.
  - The system is not working properly.
  - The system is physically damaged.
- The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace the outlet.
- Disconnect the system from the electricity outlet before cleaning. Use a damp cloth for cleaning the surface. Do not use liquid or spray detergents for cleaning.
- Before connecting, make sure that the power supply voltage is correct. The device is connected to a power outlet which should be grounded connection.



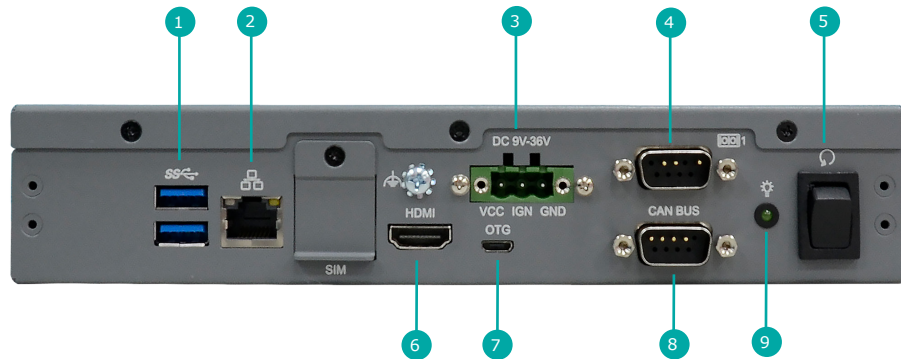
The system may burn fingers while running.

Wait for 30 minutes to handle electronic parts after power off.

## Chapter 1 - Introduction

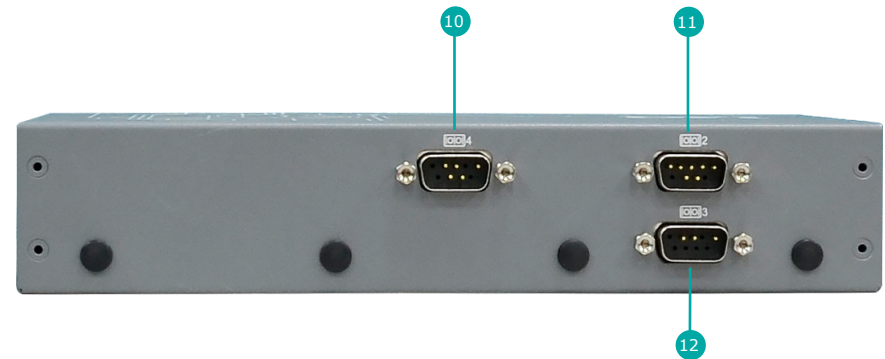
### ► Overview

Front View

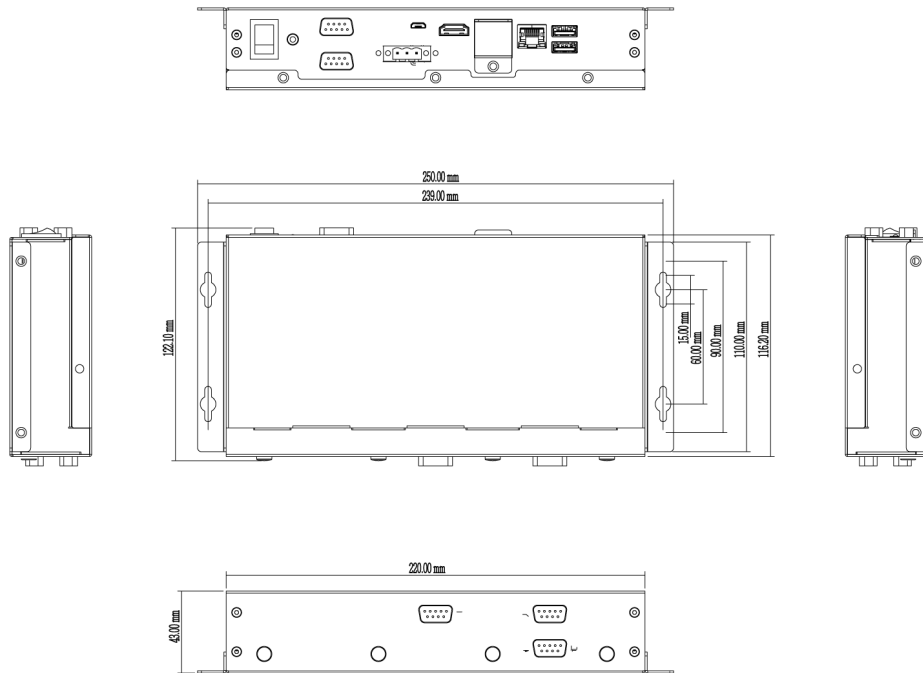


- 1 USB 3.0
- 2 LAN
- 3 Power Input
- 4 COM 1
- 5 Reset Button
- 6 HDMI
- 7 OTG
- 8 CAN BUS
- 9 Status LED

Rear View



- 10 COM 4
- 11 COM 2
- 12 COM 3

**► Dimensions****► Key Features****ARM-Based System:**

Support Yocto Linux 2.5 and Android 9.0 (Optional)

**Storage Choice:**

16GB/64GB eMMC and Micro SD card slot

**Rich I/O Connectivity:**

1 GbE, 4 COM, 1 CAN Bus, 2 USB 3.0, 1 Micro USB (OTG)

**Wide-Voltage:**

9~36V vehicle power input with ACC/IGN function

**Wide-Temperature:**

-20°C~65°C operation without active fan

- The energy efficiency in-vehicle telematics system assists smart vehicles in collecting data, including vehicle speed, engine speed, network packet records, etc., and finally uploads them to cloud storage through 4G synchronously for daily data analysis and services.

**► Specifications**

<b>SYSTEM</b>	<b>Processor</b>	NXP i.MX8M Quad, Cortex-A53 1.3GHz (by model) NXP i.MX8M Dual, Cortex-A53 1.3GHz (by model)
	<b>Memory</b>	On board memory 2GB/4GB (by model) Single channel LPDDR4 up to 3200 MHz
<b>GRAPHICS</b>	<b>Display</b>	1 x HDMI Resolution up to 1920x1080 @ 60 Hz
<b>STORAGE</b>	<b>External</b>	Micro SD card slot
	<b>Internal</b>	eMMC 5.1 16GB on board, support up to 64GB (optional)
<b>EXPANSION</b>	<b>M.2</b>	1 x M.2 2242/3042 B Key (USB 3.1 Gen1), Nano SIM Slot support 1 x M.2 2230 E Key (PCIex1/USB2.0)
<b>SENSOR</b>	<b>Sensor</b>	6 axis IMU (3 Accelerometer + 3 Gyroscope)
<b>LED</b>	<b>Indicators</b>	1 x Status LED
<b>Front I/O</b>	<b>Ethernet</b>	1 x Giga LAN, RJ-45
	<b>Serial</b>	1 x RS-232/422/485 (COM1)
	<b>USB</b>	2 x USB 3.0, type A 1 x OTG, micro USB
	<b>Display</b>	1 x HDMI
	<b>Audio</b>	with Amplifier to support 2W speaker (optional) 1 x Line-out & 1 x MIC-in (internal header)
	<b>Buttons</b>	1 x Power reset button
	<b>CANbus</b>	1 x CANbus, DB-9

<b>Rear I/O</b>	<b>Antenna</b>	4 x Antenna holes for LTE 4G, WiFi and GPS
	<b>Serial</b>	1 x RS-232(TX,RX,RTS,CTS) (COM2, COM3, COM4)
<b>POWER</b>	<b>Type</b>	Wide range 9~36V with ACC/IGN function
	<b>Connector</b>	3-pole terminal block
<b>OS SUPPORT</b>	<b>Linux</b>	Yocto Linux 2.5
	<b>Android</b>	Android 9.0 (option)
<b>MECHANISM</b>	<b>Construction</b>	Sheet Metal
	<b>Color</b>	Black
	<b>Mounting</b>	DIN-Rail mount Wall mount
	<b>Dimensions (W x H x D)</b>	200 x 120 x 45mm
	<b>Weight</b>	1.9kg
<b>ENVIRONMENT</b>	<b>Operating Temperature</b>	-20 to 65°C
	<b>Storage Tem- perature</b>	-40 to 85°C
	<b>Relative Humidity</b>	10 to 90% RH (non-condensing)
<b>STANDARDS AND CERTIFICATIONS</b>	<b>Shock</b>	Operating/non-operating: MIL-STD-810G Method 516.6, Procedure 1
	<b>Vibration</b>	Operating/non-operating: MIL-STD-810G Method 514.6, Category 4
	<b>Certifications</b>	CE, FCC, E-Mark R10

## Chapter 2 - Hardware Installations

### ► Removing the Chassis Cover

Please observe the following guidelines and follow the instructions to open the system.

1. Make sure the system and all other peripheral devices connected to it have been powered off.
2. Disconnect all power cords and cables.

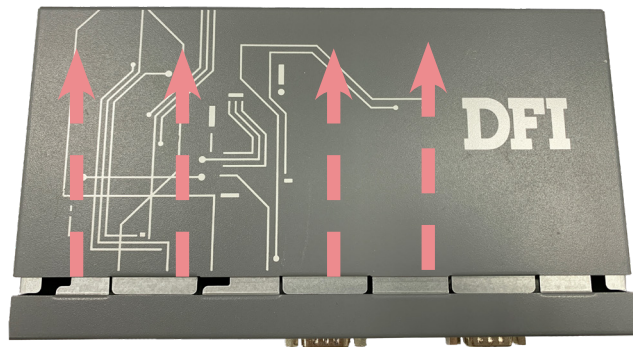
#### Step 1:

The 3 screws on the side of the system are used to secure the cover to the chassis. Remove the screws and put them in a safe place for later use.



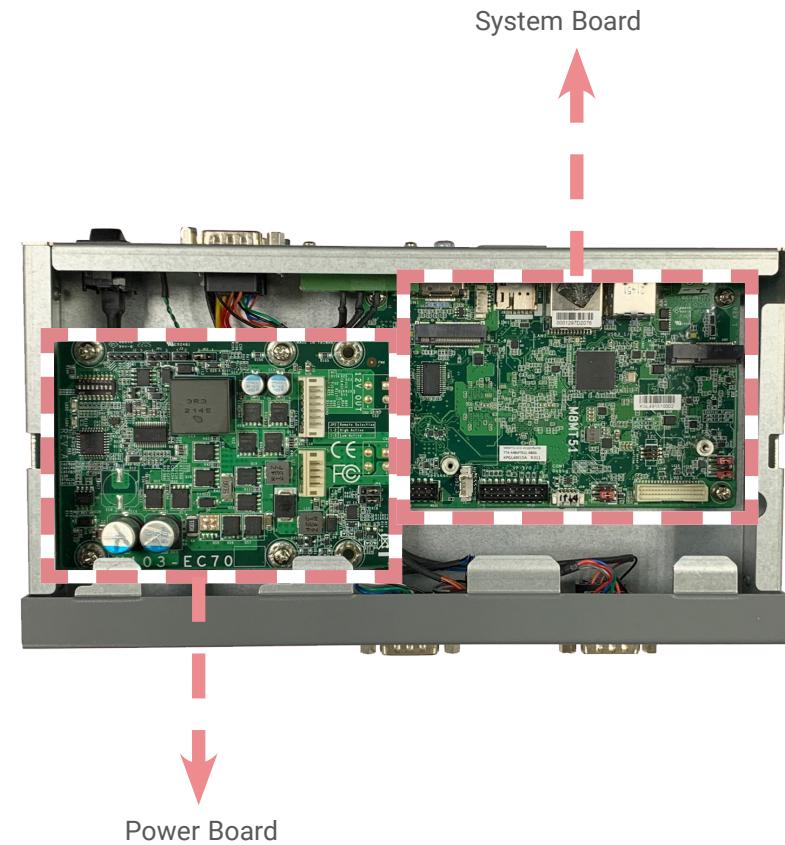
#### Step 2:

Slide the cover to open the system.



#### Step 3:

The boards can be easily accessed after the chassis cover is removed.

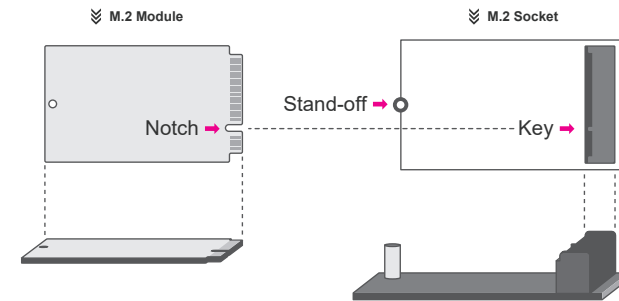
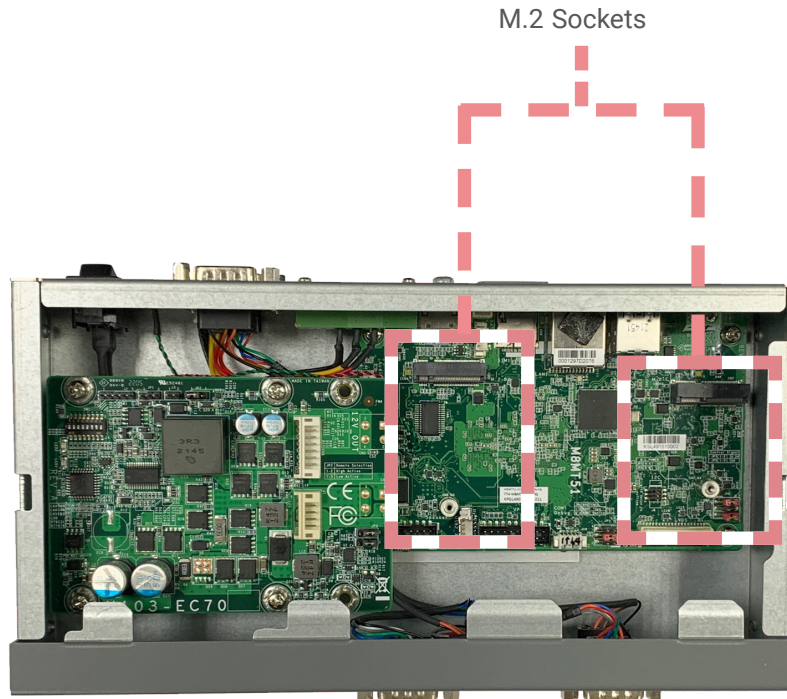


**► Installing an M.2 Card**

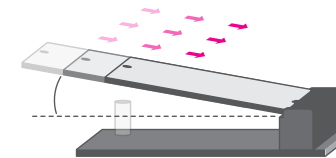
Please follow the steps below to install the card into the socket.

**Step 1:**

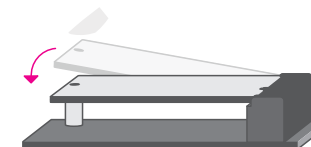
Insert the card into the socket at an angle while making sure the notch and key are perfectly aligned.

**Step 2:**

Press the end of the card far from the socket down until against the stand-off.

**Step 3:**

Screw tight the card onto the stand-off with a screw driver and a stand-off screw until the gap between the card and the stand-off closes up. The card should be lying parallel to the board when it's correctly mounted.



## ► Installing an Antenna

Before installing the antenna, please make sure that the following safety cautions are wellattended.

1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.

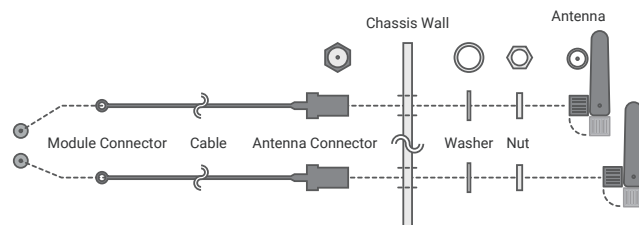
### Step 1:

There are antenna holes reserved on the right side of the system and by default covered by rubber plugs. Please remove the plug prior to installing an antenna.



### Step 2:

Connect the internal cable to the board's antenna connector, screw the antenna connector through the antenna hole with washers and nuts, and screw on the antenna as illustrated below.

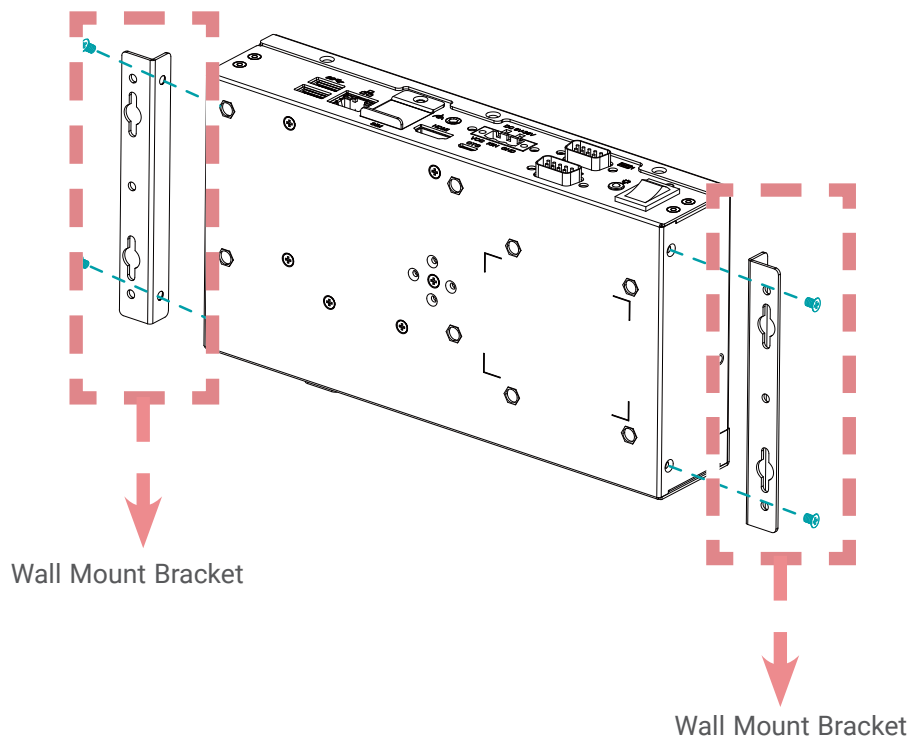




## ► Mounting Options

### Wall Mount

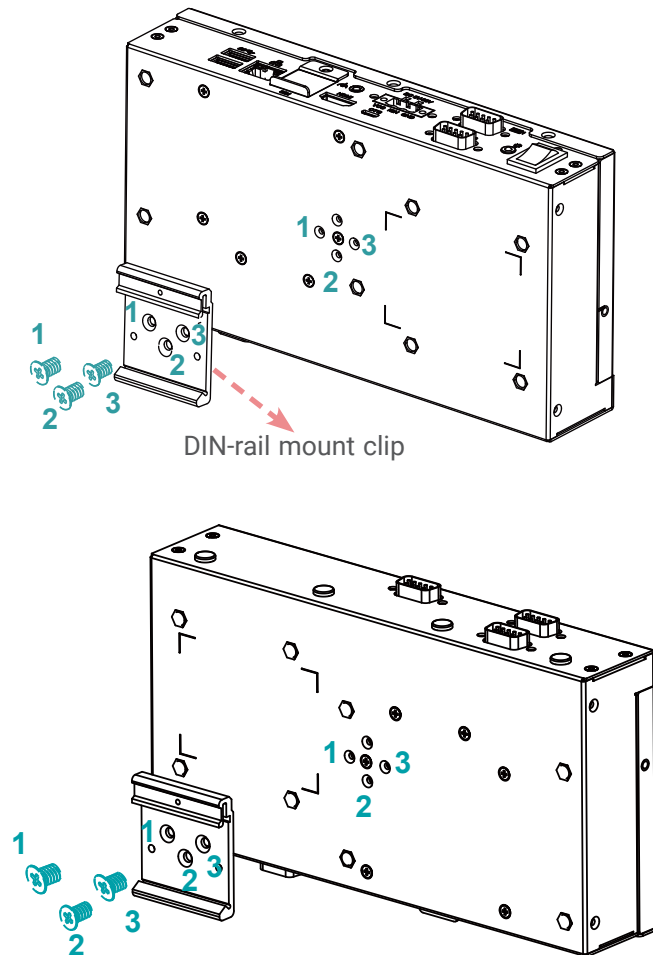
The wall mount kit containing two mounting brackets – purchased as optional items – can be attached to the bottom of the system for mounting onto desired locations, such as walls, stands, or shelves. Locate the mounting holes on the bottom of the system as shown in the photo. Screw on the two brackets onto the system with four screws as illustrated below.



### DIN Rail Mount

The DIN Rail Mount kit comes with one DIN Rail clip and screws. Please follow the steps to mount the system onto a DIN Rail.

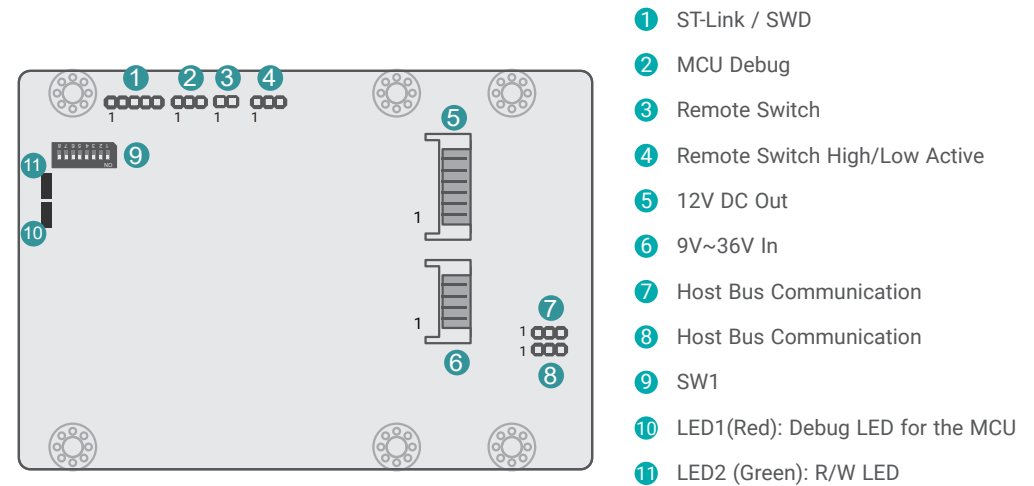
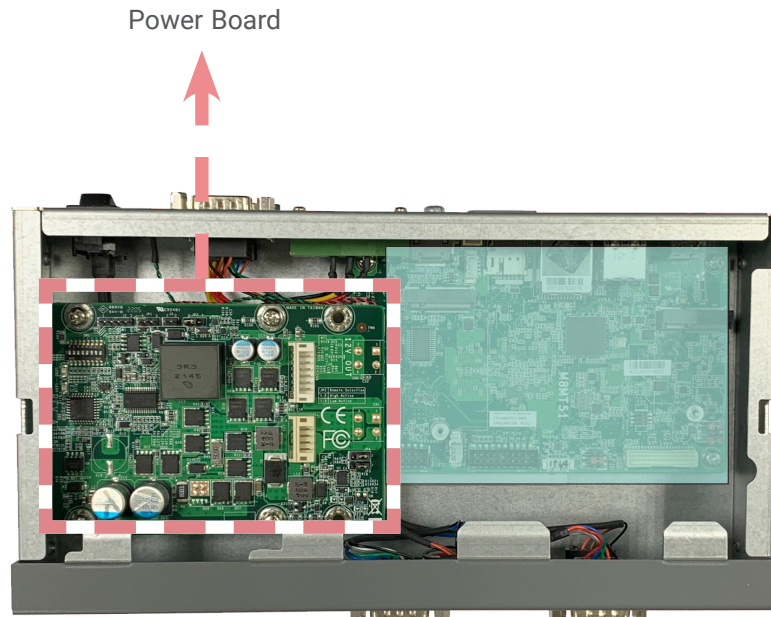
1. Locate the mounting screws for mounting the din-rail bracket on the chassis cover.
2. Align the mounting holes on the system and then use the screws to secure the DIN-rail mount clip in place.



## Chapter 3 - System Settings

### ► Board Layout

#### Power Board

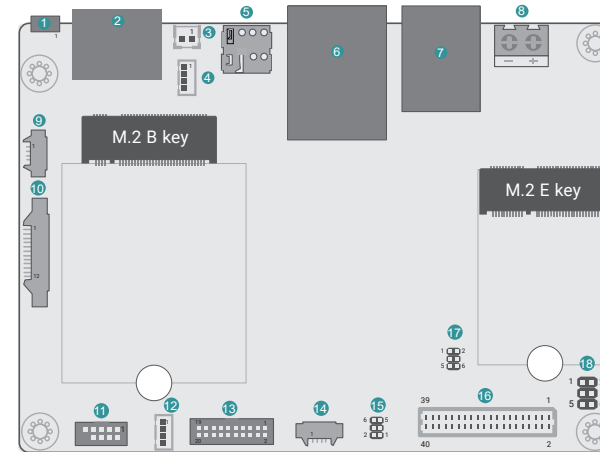
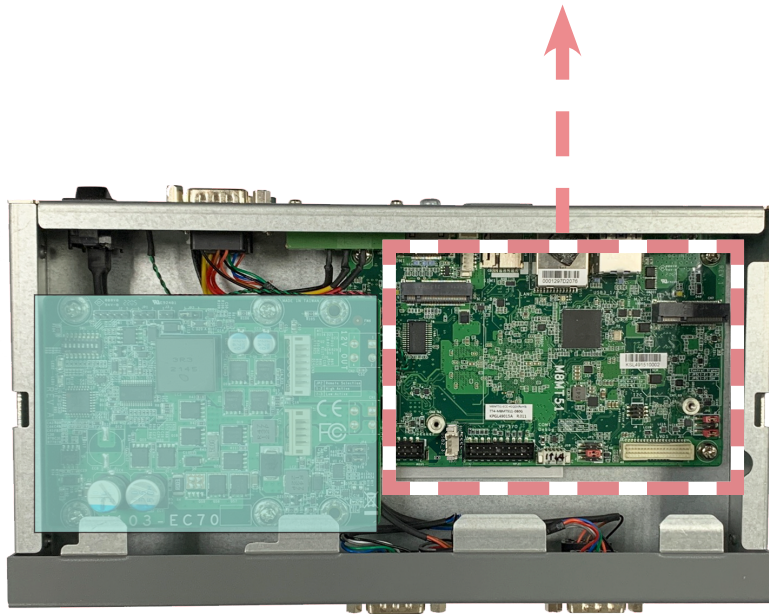


**Important:**

Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

System Board

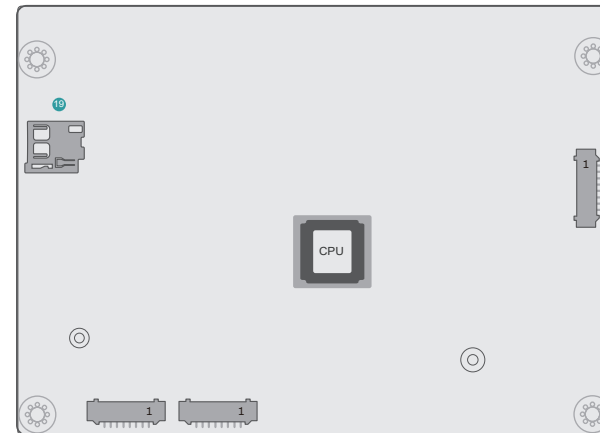
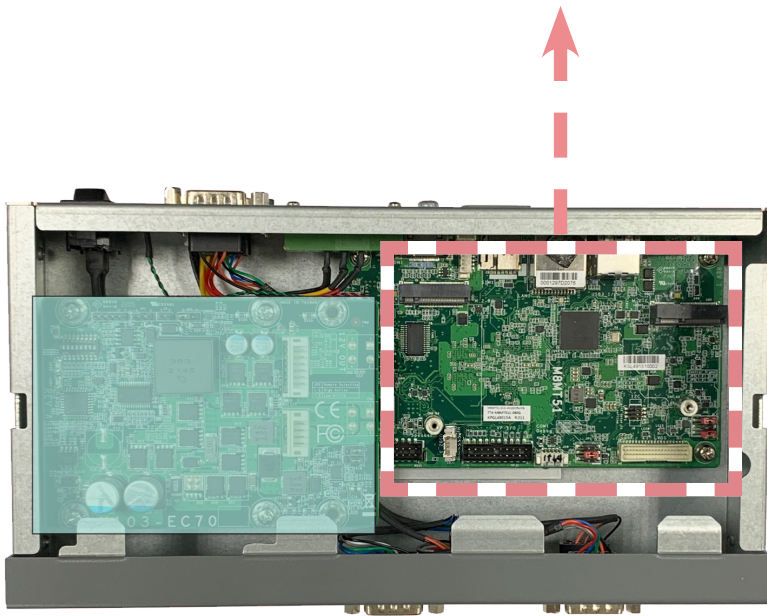
System Board



- |              |                  |
|--------------|------------------|
| 1 USB2_4     | 12 USB2_3        |
| 2 HDMI       | 13 VP IO         |
| 3 Battery    | 14 COM1 Debug    |
| 4 Power Link | 15 Boot CFG      |
| 5 SIM Slot   | 16 LVDS          |
| 6 LAN        | 17 I2C           |
| 7 USB3.0     | 18 LED Backlight |
| 8 DC-IN      |                  |
| 9 Audio      |                  |
| 10 DIO       |                  |
| 11 Speaker   |                  |

System Board - uSD Card Slot

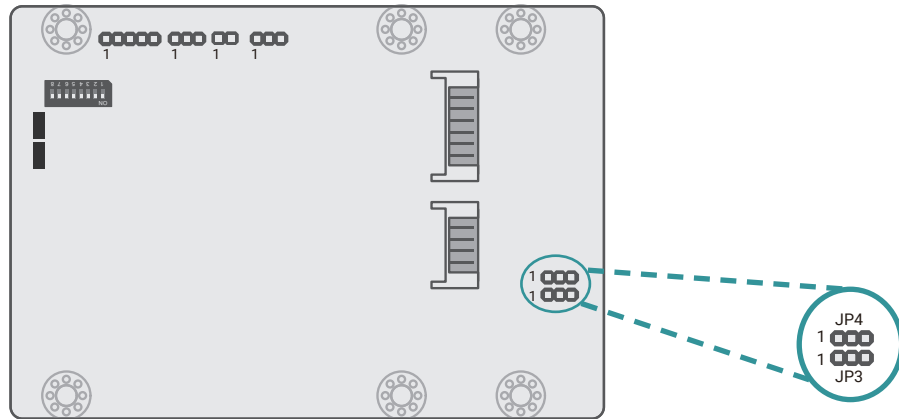
System Board



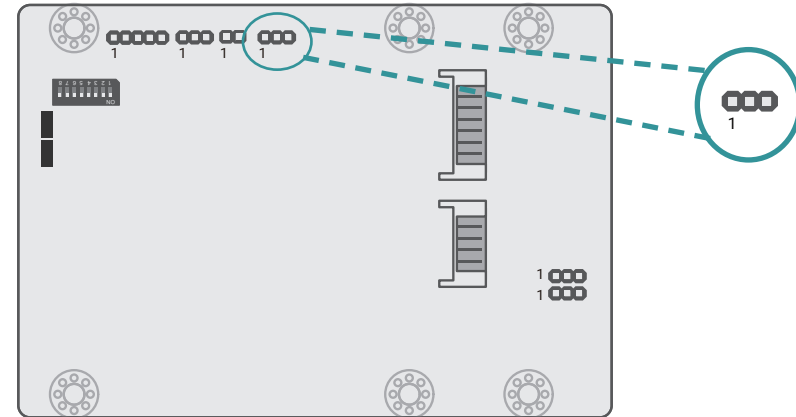
19 uSD Card Slot

► **Jumper Settings- Power Board**

Host Bus Communication (JP3, JP4)



Remote Switch High/Low Active (JP2)



■ 1-2 On: Reserved



■ 2-3 On: TX/RX UART (default)

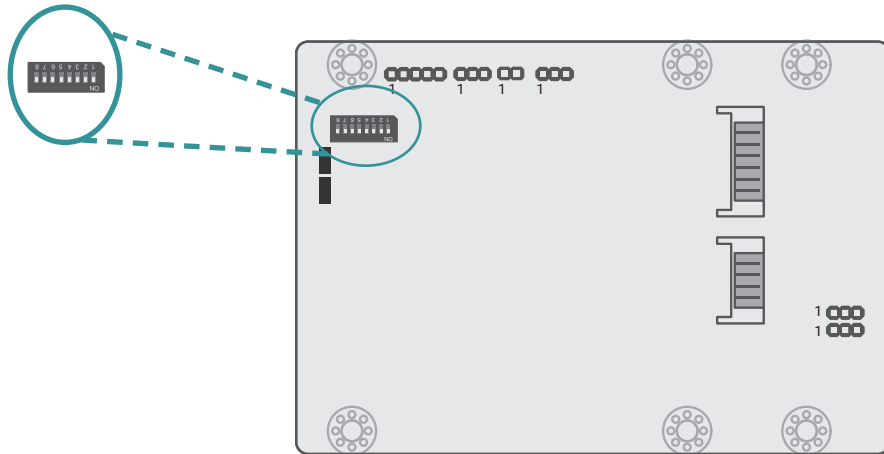


■ 1-2 On: High Active (default)



■ 2-3 On: Low Active

SW1

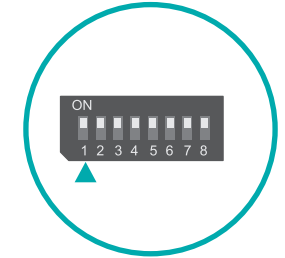


24V / 12V Select

1 Output Voltage

On 12V (default)

Off 24V

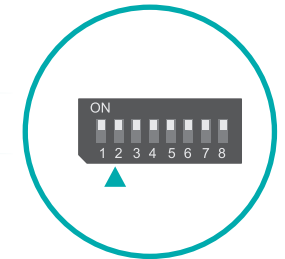


POWER ON Delay Switch

2 Delay On/Off

On On, delay duration defined by 4 and 5

Off Off, delay = 3 seconds by default

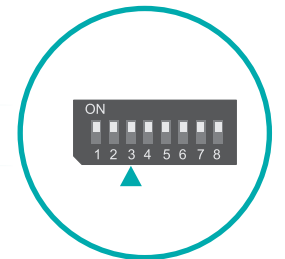


POWER OFF Delay Switch

3 Delay On/Off

On On, delay duration defined by 6, 7, and 8

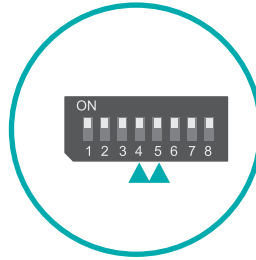
Off Off, delay = 0 second by default



**Important:**  
Power-off the system and then unplug the power cord prior to setting the switches. Failure to do so will cause severe damage to the system and components.

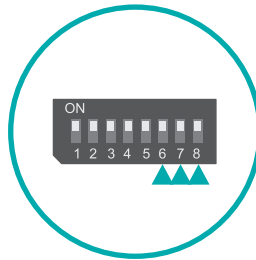
### POWER ON Delay Time Select

5	4	Delay Duration
On	On	10 seconds (default)
On	Off	30 seconds
Off	On	1 minute
Off	Off	5 minutes



### POWER OFF Delay Time Select

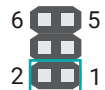
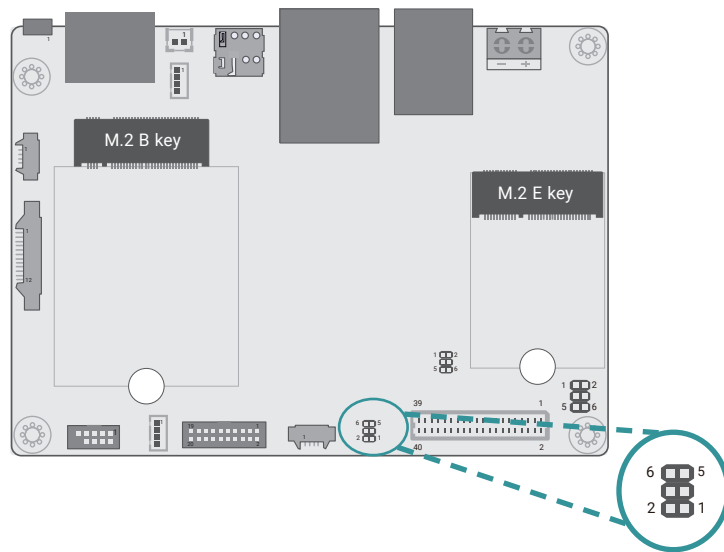
8	7	6	Delay Duration
On	On	On	30 seconds (default)
On	On	Off	1 minute
On	Off	On	3 minutes
On	Off	Off	5 minutes
Off	On	On	10 minutes
Off	On	Off	15 minutes
Off	Off	On	30 minutes
Off	Off	Off	1 hour



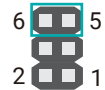


► **Jumper Settings- System Board**

Boot Config (JP1)

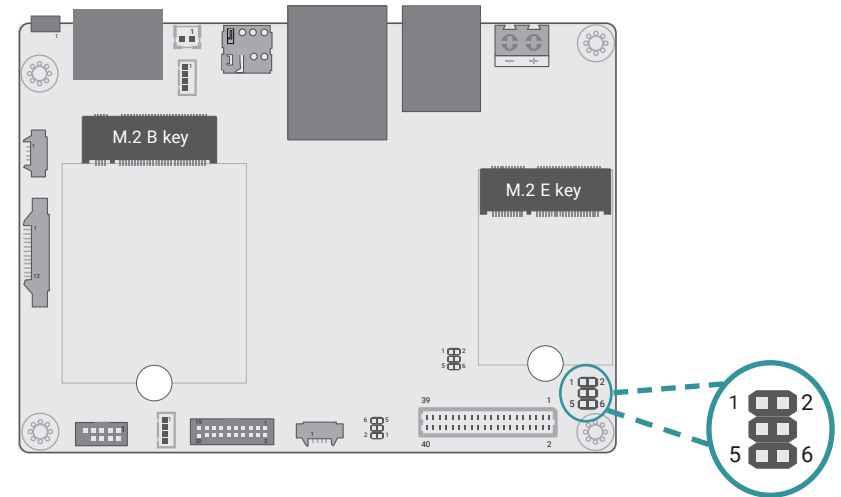


- 1-2 Off: Internal Boot (default)
- 1-2 On: Serial Downloader

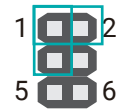


- 5-6 Off: EMMC@eSDHC3 (default)
- 5-6 On: uSD@eSDHC2

LED Backlight (JP5)

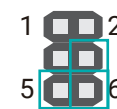


For VEN & VPWM



- 1-2 On: 3.3V (Default)
- 1-3 On: 5V

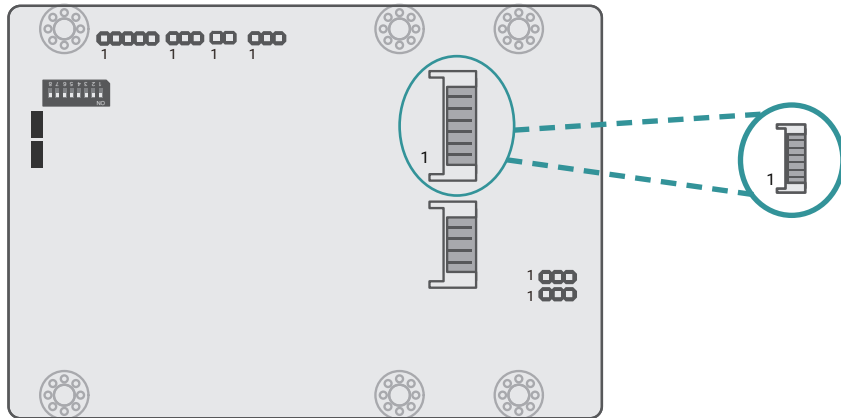
For VLED Backlight



- 5-6 On: Backlight Power 12V (default)
- 4-6 On: Backlight Power 5V

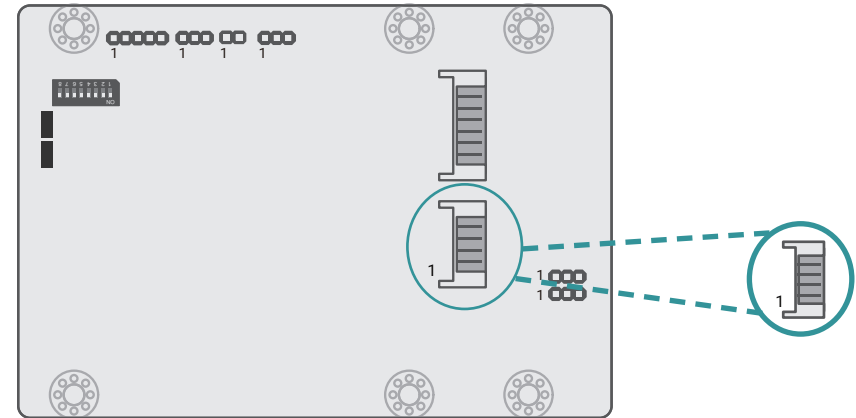
► **Pin Assignment- Power Board**

12V DC-Out (CN3)



Pin	Assignment
1	GND
2	GND
3	Power Button
4	Host TX
5	Host RX
6	12VSB
7	12VSB
8	12VSB

9V~36V In (J1)



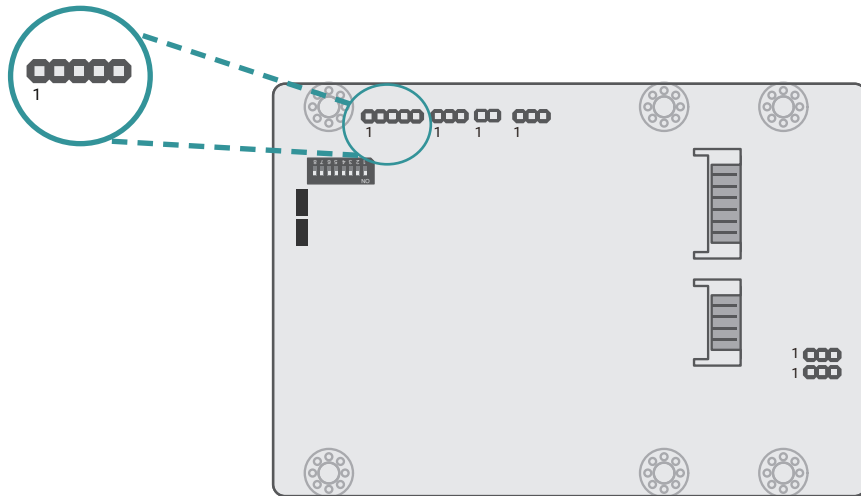
Pin	Assignment
1	V_In
2	V_In
3	Ignition
4	Ignition
5	GND
6	GND

The 9V~36V In box headers are for ignition and power input to the power board, which then converts to 12VDC for output to the system board.

**Jumper Settings**

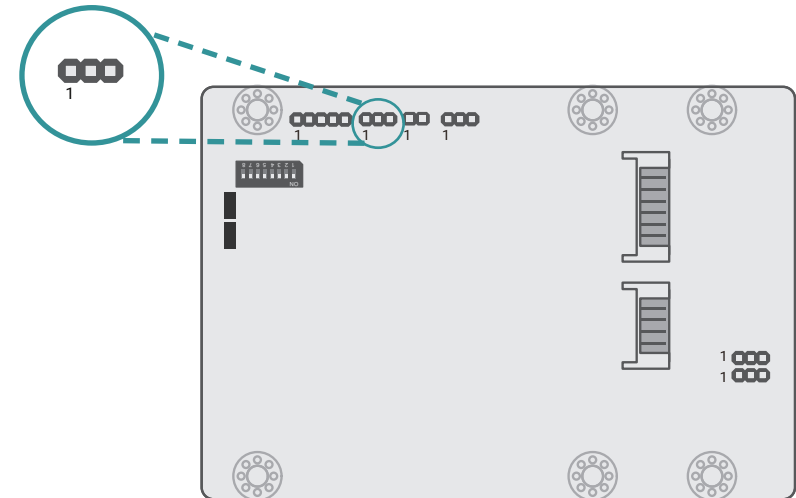
Power on/off, delay time, and other power related aspects can be configured via SW1 as previously instructed in this chapter.

MCU Connector (J2)



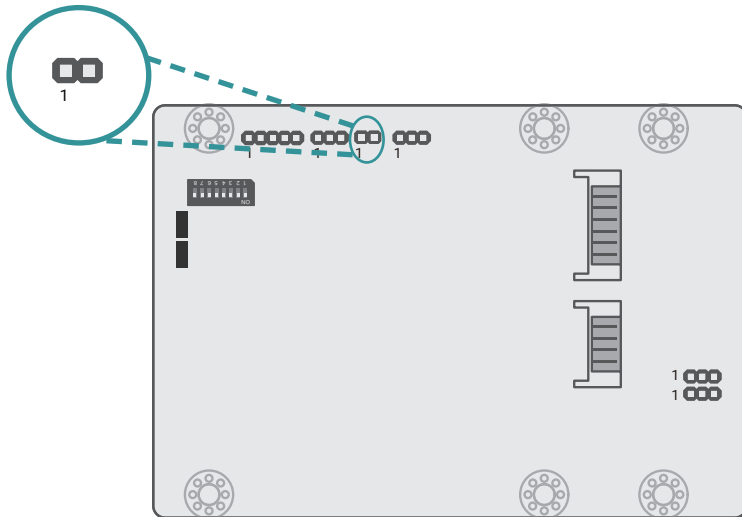
Pin	Assignment
1	3V
2	GND
3	SYS_SWDIO
4	SYS_SWCLK
5	STMCU_RST#

MCU Debug (JP1)



Pin	Assignment
1	UART_TX
2	UART_RX
3	GND

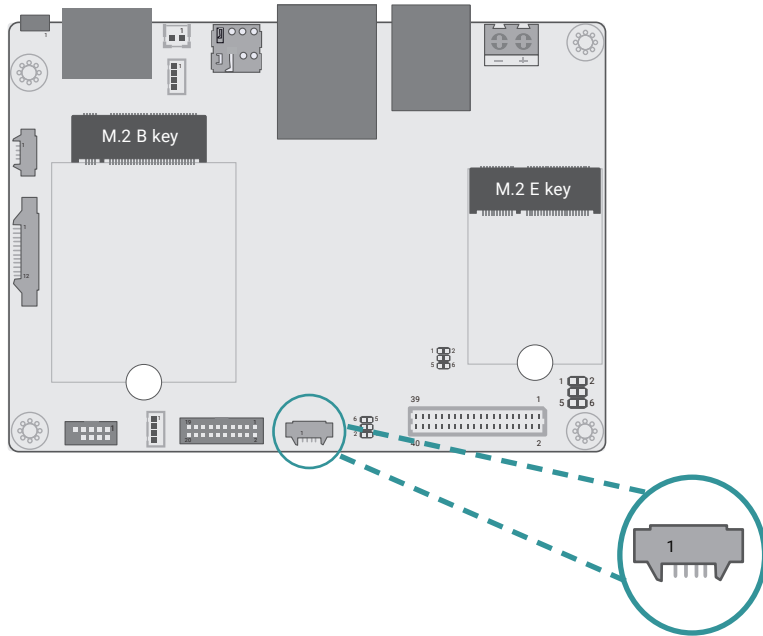
Remote Switch (J3)



Pin	Assignment
1	Power Button
2	GND

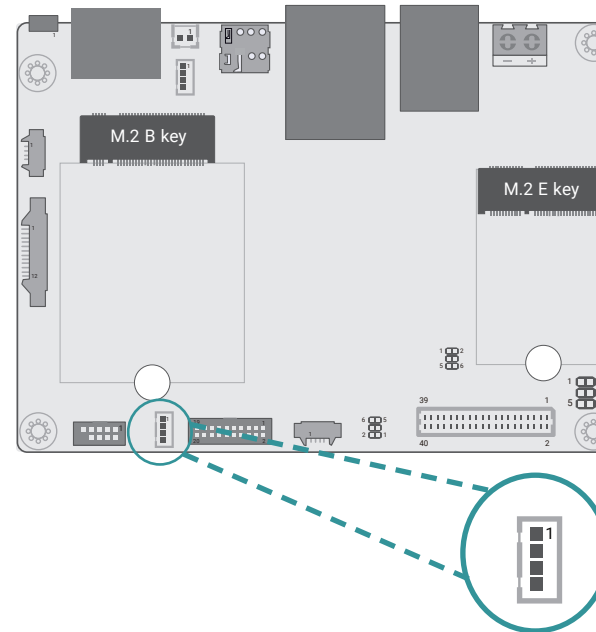
► Pin Assignment- System Board

COM1 Debug (J10)



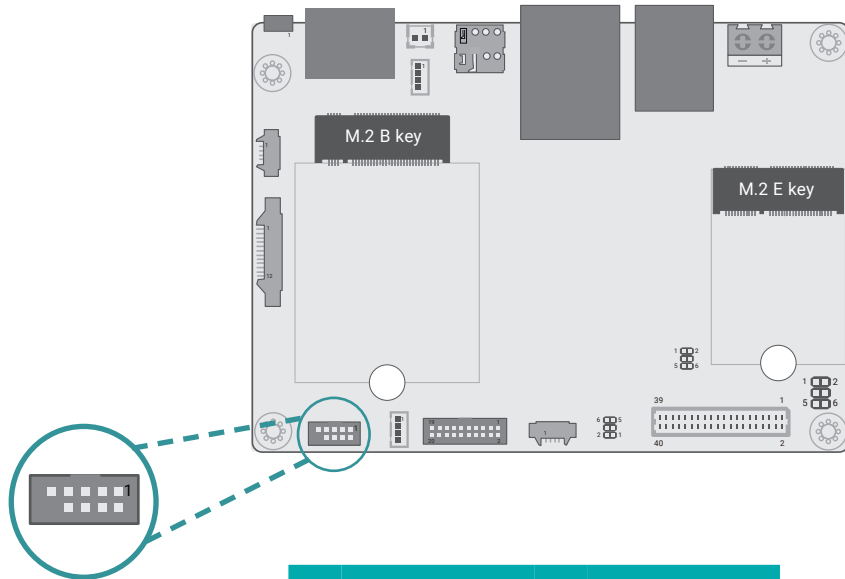
Pin	Assignment
1	+3.3V
2	UART1_RX
3	UART1_TX
4	GND

USB2\_3 (UBJ1)



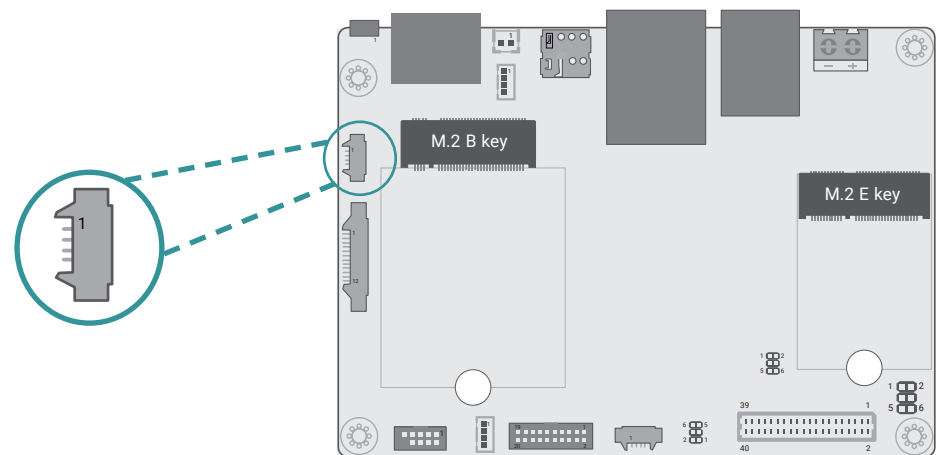
Pin	Assignment
1	+5V
2	USBDN
3	USBDP
4	GND

Speaker (AUJ1)



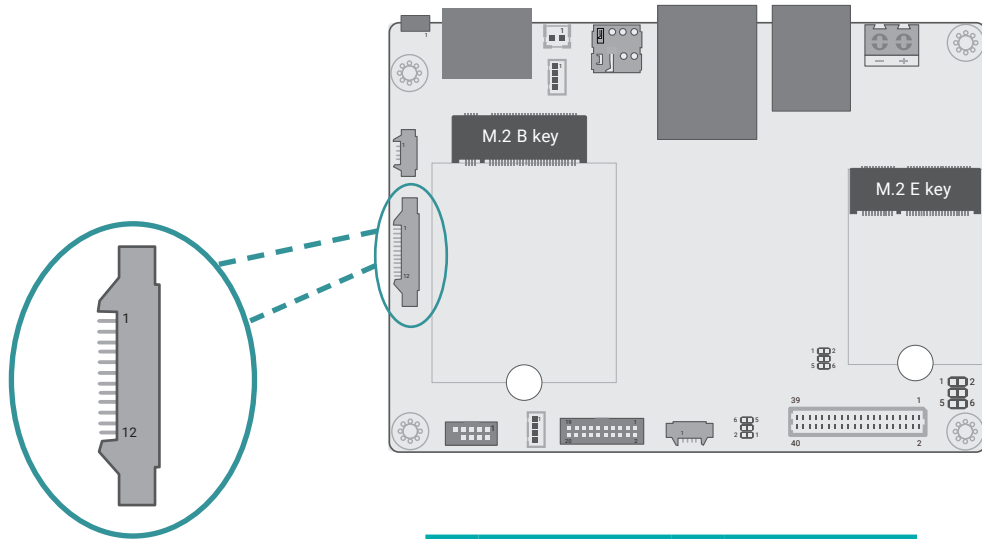
Pin	Assignment	Pin	Assignment
1	NC	2	SPK_R-
3	NC	4	SPK_R+
5	NC	6	SPK_L+
7	NC	8	SPK_L-
9	NC		

Audio (AUJ2)



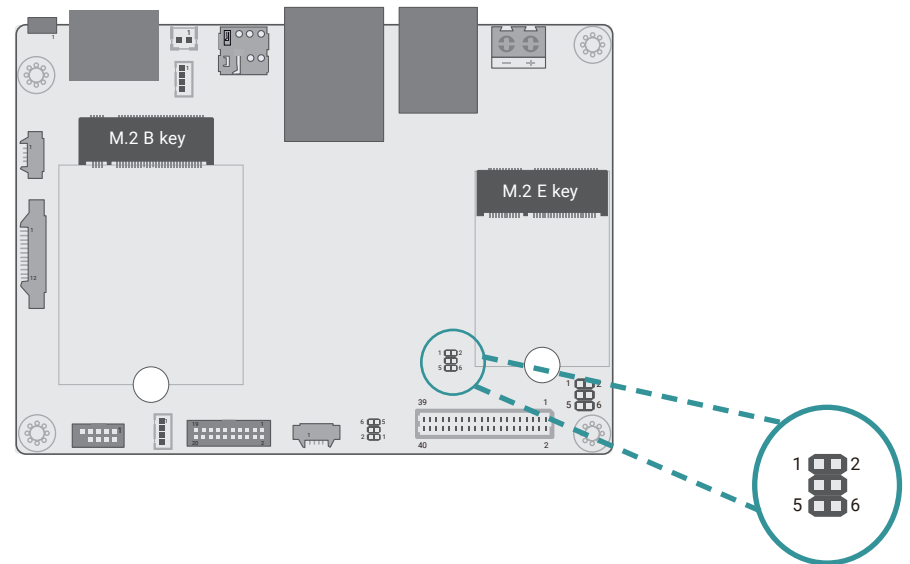
Pin	Assignment
1	LOUT_L
2	LOUT_R
3	AGND
4	MIC_IN

DIO (IOJ1)



Pin	Assignment	Pin	Assignment
1	DIO0	2	DIO1
3	DIO2	4	DIO3
5	DIO4	6	DIO5
7	DIO6	8	DIO7
9	+5V	10	PWM
11	GND	12	GND

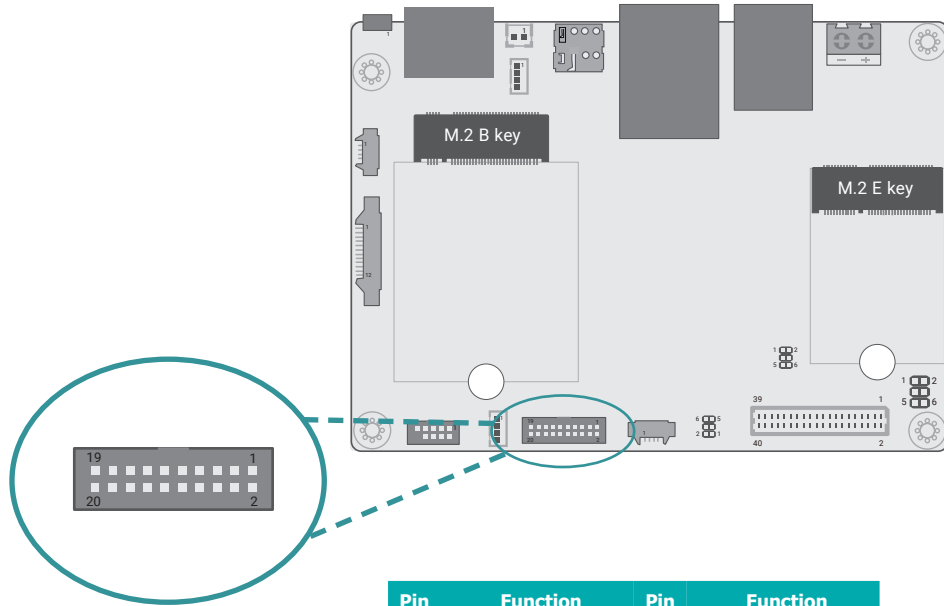
I2C (J8)



Pin	Assignment	Pin	Assignment
1	+3.3V_TP	2	GND
3	TP_SCL	4	TP_ALT#
5	TP_SDA	6	TP_RST#

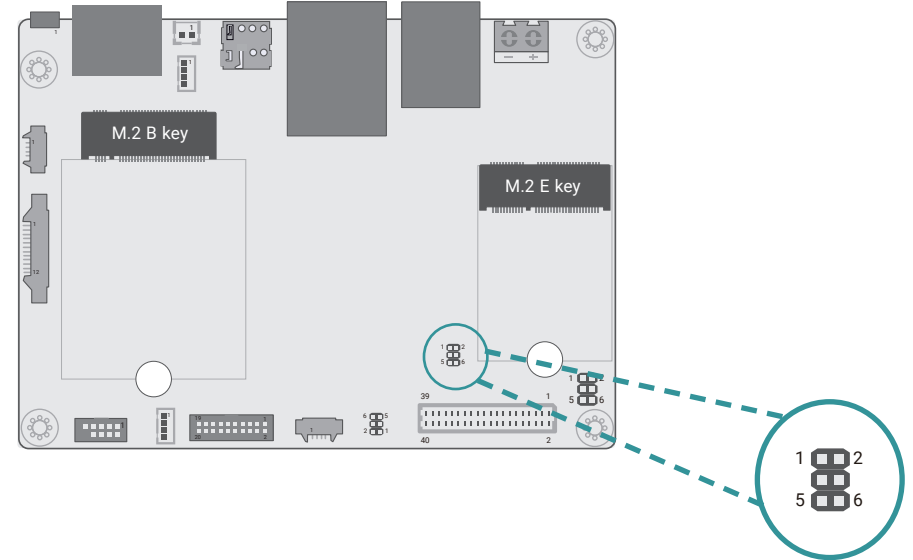


VP IO (VPJ1)



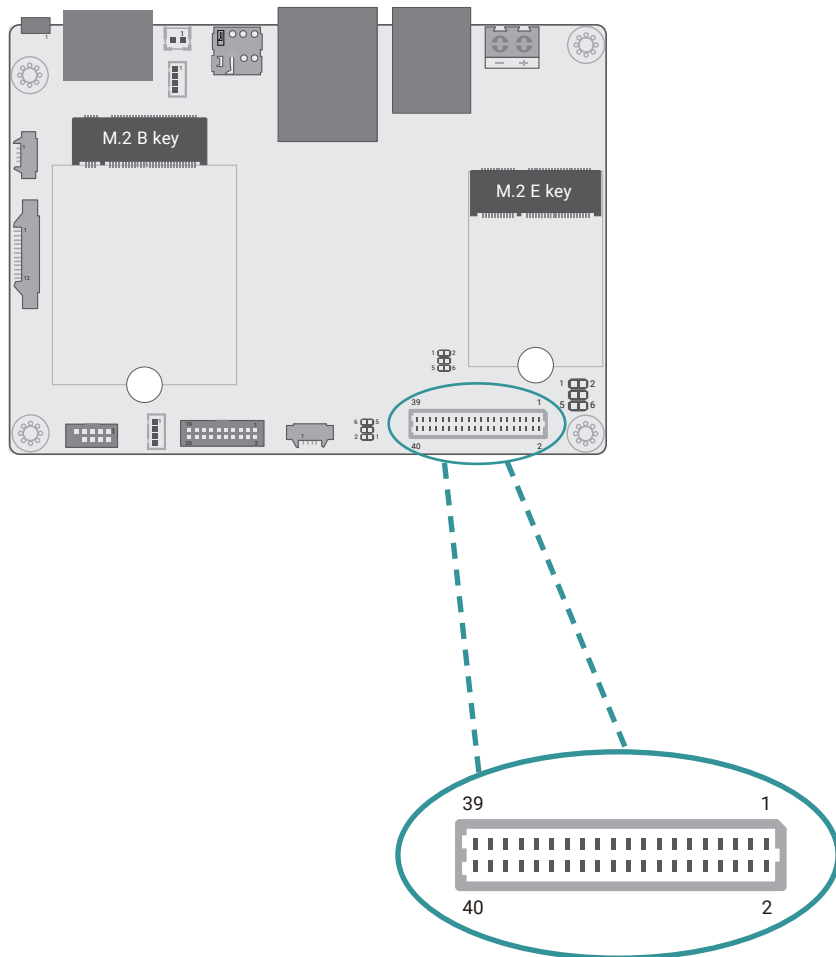
Pin	Function	Pin	Function
1	+5V	2	CAN_GND
3	SOUTN3	4	CAN_H
5	LVDS_A2+	6	CAN_L
7	SINN3	8	UR1_TX_232
9	SINN4	10	UR1_RX_232
11	SOUTN4	12	RTSN2
13	DTRN4	14	CTSN2
15	RTSN4	16	SOUTN2
17	CTSN4	18	SINN2
19	GND	20	GND

I2C (J8)



Pin	Assignment	Pin	Assignment
1	+3.3V_TP	2	GND
3	TP_SCL	4	TP_ALT#
5	TP_SDA	6	TP_RST#

LVDS (J11)

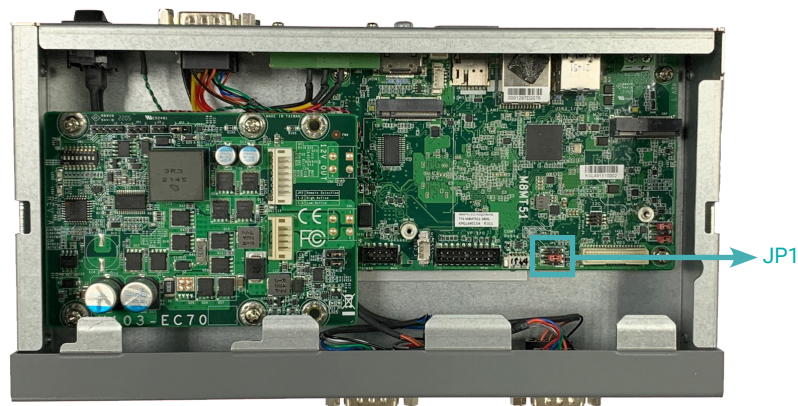


Pin	Function	Pin	Function
1	GND	2	GND
3	LVDS_A2-	4	LVDS_B3+
5	LVDS_A2+	6	LVDS_B3-
7	GND	8	GND
9	LVDS_A3-	10	LVDS_B2+
11	LVDS_A3+	12	LVDS_B2-
13	GND	14	GND
15	LVDS_A0-	16	LVDS_B1+
17	LVDS_A0+	18	LVDS_B1-
19	GND	20	GND
21	LVDS_A1-	22	LVDS_B0+
23	LVDS_A1+	24	LVDS_B0-
25	GND	26	GND
27	LVDS_A_CLK-	28	LVDS_B_CLK-
29	LVDS_A_CLK+	30	LVDS_B_CLK+
31	GND	32	GND
33	GND	34	GND
35	+VDD_3.3V	36	+VDD_5V
37	+VDD_3.3V	38	+VDD_5V
39	+VDD_3.3V	40	+VDD_5V

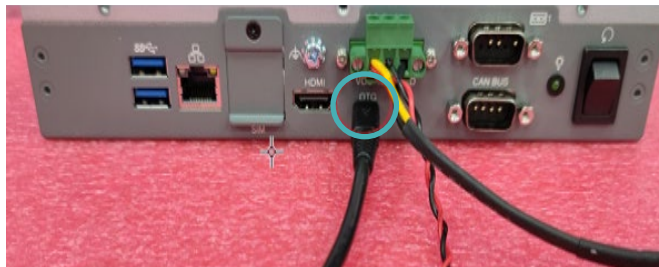
## Chapter 4 - Software User Guide

### ► Flash Images into eMMC/SD card using UUU tool

1. Before flashing images into VC900 device via UUU tool, user must configure **BOOTCNFG** to **BOOT Type**, also enter Serial Download mode by plugging one jumper into JP1 (short pin1 and pin2) as picture shown below.



2. Connect Micro USB cable to PC.



3. Connect with **12V** adapter

4. Press power button to turn on VC900



5.
  - Open the Command Prompt in Windows 10, or open the Terminal in Ubuntu when the necessary preparations are done.
  - Unzip M8MT51\_YQ\_x\_y\_nnn\_yymmdd\_0000.zip image package and enter unzipped image package folder.
  - Execute the following command, then wait for the process to complete.

**For Windows 10****Command of flash all images into eMMC**

```
uuu uuu_emmc_M8MT51_uboot-kernel-rootfs-HDMI.uuu
(or uuu_emmc_M8MT51_uboot-kernel-rootfs-LVDS.uuu)
```

**Command of flash necessary images except rootfs image into eMMC**

```
uuu uuu_emmc_M8MT51_uboot-kernel-HDMI.uuu
(or uuu uuu_emmc_M8MT51_uboot-kernel-LVDS.uuu)
```

The messages of flash image in Windows:

```
C:\work\mfgtools-uuu_M8MT51>uuu uuu_emmc_M8MT51_uboot-kernel-rootfs-HDMI.uuu
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.2.135-0-gacaf035
Success 1 Failure 0
2:1 22/22 [Done] FBK: DONE
C:\work\mfgtools-uuu_M8MT51>
```

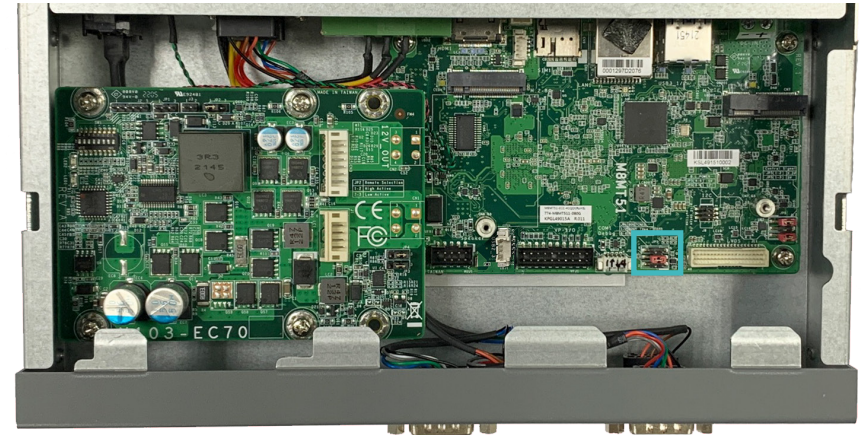
**For Ubuntu****Command of flash all images into eMMC**

```
sudo ./uuu uuu_emmc_M8MT51_uboot-kernel-rootfs-HDMI.uuu
(or sudo ./uuu uuu_emmc_M8MT51_uboot-kernel-rootfs-LVDS.uuu )
```

**Command of flash necessary images except rootfs image into eMMC**

```
sudo ./uuu uuu_emmc_M8MT51_uboot-kernel-HDMI.uuu
(or sudo ./uuu uuu_emmc_M8MT51_uboot-kernel-LVDS.uuu)
```

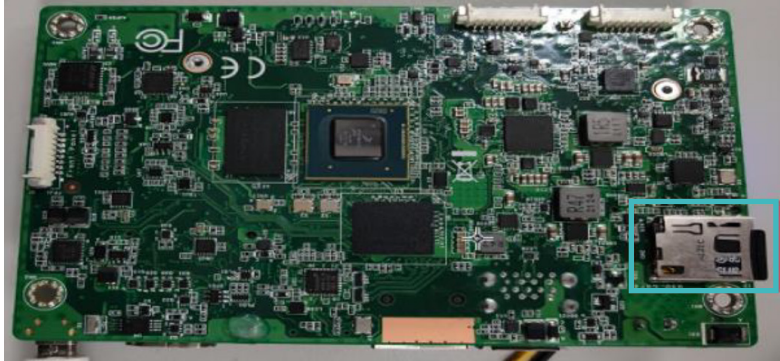
6. • Turn off the device after flashing process completes
- Switch **BOOTCNFG** to **BOOT Device**, also enter **Normal mode** by removing pin1/pin2 jumper from JP1



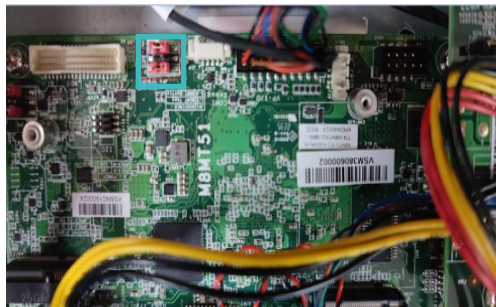
7. Turn on the device

## 8. Flash Image Into SD Card

## 8.1 Insert SD card into SD socket on the back side of M8MT51 board.



## 8.2 Connect JP1 as picture shown below and power on the device to force the device to enter SD card download mode.



## 8.3 SD card flash commands in Ubuntu

· **Flash u-boot/kernel/rootfs images:**

```
$ sudo ./uuu uuu_sdcard_M8MT51_uboot-kernel-rootfs-HDMI.uuu
```

· **Flash u-boot/kernel images:**

```
$ sudo ./uuu uuu_sdcard_M8MT51_uboot-kernel-HDMI.uuu
```

## 8.4 SD card flash commands in windows

· **Flash u-boot/kernel/rootfs images:**

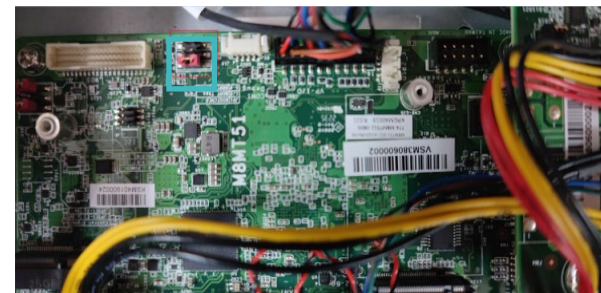
```
> uuu uuu_sdcard_M8MT51_uboot-kernel-rootfs-HDMI.uuu
```

· **Flash u-boot/kernel images:**

```
> uuu uuu_sdcard_M8MT51_uboot-kernel-HDMI.uuu
```

8.5 **SD boot mode configuration**

Connect JP1 as picture shown below and power on the device to force the device to enter SD card boot mode.





## ► Software Features

### General Support List

(\*) is depended on the NXP support.

Component	Name	Base-Line Feature
General	OS Support	Yocto 2.5 (Default Preloaded on eMMC), Kernel 4.14.98 Android 9.0 (Optional), Kernel 4.14.98
	Firmware Upgrade (*)	NXP uuu firmware update tool
Misc	Utilities (*)	Hardware diagnostic utilities

### Linux AP/API Support List

(\*) is depended on the NXP support.

Component	Description	Detail	Release Schedule
Linux	Yocto 2.5 Kernel 4.14.98	It's an open-source project that delivers a set of tools that create operating system images for embedded Linux systems. Support Wayland demo image only (*).	2021, Q1
Linux AP/API	NXP iMX8M Yocto 2.5 BSP Support Wayland Window Support BitBake build tool	1. All library and utility should support (*). 2. Source code package (support by request).	2021, Q1
	Support I2C, Watchdog, GPIO, LVDS brightness control	Provide support console for i.MX8M platform.	2021, Q1
Android	Android 9.0 - Kernel 4.14.98	Support Demo image.	2021, Q3
Android AP/API	NXP iMX8M Android 9.0 NXP BSP Support Android AOSP launcher Support Android ADB shell Support Android APK install	1. All library, utility and Android apk should support (*). 2. Source code package (support by request).	2021, Q3
	Support GPIO, LVDS brightness control	Provide support console for i.MX8M platform.	2021, Q3

### Yocto Support List

(\*) is depended on the NXP support.

Component	Support Status
Yocto Version	2.5
Kernel Version	4.14.98
Window System	Wayland without QT5 build
eMMC	Support eMMC boot , eMMC v5.1, Linux ext4 file system
HDMI Video output	Support single display function, need to plug in HDMI cable before power on, resolution 4K@60. Support single display function.
LVDS Panel	Support Panel: AM-1024600DTZQW Support single display function.
LVDS Backlight (PWM)	Support control by Linux device node, level value 0~100.
I2C Touch	Support Touch: ILI2301S+ILIM2V.
Ethernet LAN1	Support "ping", "ifconfig" console commands verify, static IP/DHCP Dynamic IP. Support writeable MAC address (In eMMC). Support Iperf3 bandwidth test tool (Not build-in).
Micro USB 2.0 HOST	1. Support USB HID Keyboard and Mouse Device. 2. Support USB Mass Storage by "mount" console command, EXT3/EXT4/FAT filesystem.
Micro USB 2.0 Device	1. Support connects to PC to update image by NXP iMX.8M uuu tool.
TYPE A USB 3.0 HOST	1. Support USB HID Keyboard and Mouse Device. 2. Support USB Mass Storage by "mount" console command, EXT3/EXT4/FAT filesystem.
I2S-Audio	1. Support system sound output to LINE OUT Connector. 2. Support adjusts sound volume by console command. 3. Support audio plays console command for test play MP3/WAV file (16 bit, 44.1 kHz sample rate, CD quality). 4. Support audio recording console command for test recording WAV file with Mono MIC_IN audio, file store to eMMC.
M.2 2242/3042 B key	Support "lspci" console command for check PCIe card status. Support "lsusb" console command for check PCIe card status. 4GLTE module: Quectel EM06



<b>M.2 2230 E key</b>	Support "lspci" console command for check PCIe card status. Support "lsusb" console command for check PCIe card status.  WiFi/BT module: RTL8822CE	<b>Wifi /BT</b>	Support WiFi/BT module: RTL8822CE 1. RTL8822CE WiFi: Support Wifi STA Mode (connect Wifi AP), use ifconfig, wpa_supplicant console commands, use ping console commands verify WiFi function. Soft AP Mode option. 2. RTL8822CE BT: Support files transfer protocol only (BT OBEX protocol), use obexctl console commands.
<b>UART1 - RS232 (Debug serial port)</b>	Support output Linux Uboot and kernel debug log, use PC serial terminal tool read log (ex. PuTTY), BR 115200.	<b>LTE and SIM slot</b>	Support 4GLTE module: Quectel EM06 Support data-link only, use ping console commands verify function.
<b>UART2 - RS232</b>	For M.2 Support DTE mode, BR 115200 with CTS/RTS follow control loopback test, BR 115200 (need DFI Linux user space utility).	<b>Image Size</b>	1. flash.bin : Around 1.05 MB 2. Image: Around 25.1 MB 3. rootfs.tar.bz2: compressed: Around 481 MB
<b>UART3 - RS485</b>	Support Loopback test, BR 115200 (need DFI Linux user space utility).	<b>Free storage size</b>	Around 11.7 GB free space (eMMC size 16GB, around 2.3GB used of 14GB file system size, /dev/root)
<b>UART4 - RS232</b>	Support DTE mode, BR 115200 with CTS/RTS follow control loopback test, BR 115200 (need DFI Linux user space utility).		
<b>UART4 - RS422</b>	Support Loopback test, BR 115200 (need DFI Linux user space utility).		
<b>UART4 - RS485</b>	Support Loopback test, BR 115200 (need DFI Linux user space utility).		
<b>DIO</b>	Support read input high/low status, set output voltage high/low status, control by Linux device node, 8 pins.		
<b>DIO-PWM</b>	Support control by Linux device node.		
<b>CAN Bus</b>	Support "cansend", "candump" console commands for test send/read data.		
<b>Micro SD Card (SD slot)</b>	Support SD card boot, support SD storage, EXT4/EXT3/FAT filesystem. (Support Kingston, micro SDHC 4GB class 4, 4GB/16GB). For standard product, We don't porting any SDIO module.		
<b>Reset / Power on Key</b>	HW control.		
<b>I2C-RTC</b>	Support Linux "date -s" and "hwclock -w" console commands to set system time.		
<b>I2C-Thermal sensor</b>	Support read device temperature (degrees C) by Linux device node.		
<b>Play Video</b>	Support play 4K MPEG4 H.264 and H.265 file (use NXP gstreamer tool).		
<b>Watch Dog</b>	Support NXP utility "wdt_driver_test.out"(*) to test Watch Dog reboot function.		
<b>Secure Boot</b>	Support(Optional)		
<b>OS Suspend</b>	Not support suspend.		
<b>Package manager</b>	N/A, For standard product, We didn't build in package manager.		

## Android Support List

(\* ) is depended on the NXP support.

Component	Support Status
<b>Android Version</b>	9.0
<b>Kernel Version</b>	4.14.98
<b>eMMC</b>	Support eMMC boot , eMMC v5.1, Linux ext4 file system
<b>HDMI Video output</b>	Support single display function, need to plug in HDMI cable before power on, resolution 4K@60. Support single display function.
<b>LVDS Panel</b>	Support Panel: AM-1024600DTZQW Support single display function.
<b>LVDS Backlight (PWM)</b>	Support control by Linux device node, level value 0~100.
<b>I2C Touch</b>	Support Touch: ILI2301S+ILIM2V.
<b>Ethernet LAN1</b>	Support "ping", "ifconfig" console commands verify, static IP/DHCP Dynamic IP. Support fixed MAC address (In eMMC). Support Iperf3 app (Not build-in).
<b>Micro USB 2.0 HOST</b>	1. Support USB HID Keyboard and Mouse Device. 2. Support USB Mass Storage with FAT32/Ext3/Ext4 filesystem.
<b>Micro USB 2.0 Device</b>	1. Support connects to PC to update image by NXP iMX.8M uuu tool.
<b>TYPE A USB 3.0 HOST</b>	1. Support USB HID Keyboard and Mouse Device. 2. Support USB Mass Storage with FAT32/Ext3/Ext4 filesystem.
<b>I2S-Audio</b>	1. Support system sound output to LINE OUT Connector. 2. Support adjusts sound volume by OS setting UI. 3. Support Music app for test play MP3/WAV file (16 bit, 44.1 kHz sample rate, CD quality). 4. Support sound recorder for test recording PCM file with Mono MIC_IN audio, file store to eMMC.
<b>M.2 2242/3042 B key</b>	Support "lspci" console command for check PCIe card status. Support "lsusb" console command for check PCIe card status. 4GLTE module: Quectel EM06

<b>M.2 2230 E key</b>	Support "lspci" console command for check PCIe card status. Support "lsusb" console command for check PCIe card status. WiFi/BT module: RTL8822CE
<b>UART1 - RS232 (Debug serial port)</b>	Support output Linux kernel debug log, use PC serial terminal tool read log (ex. PuTTY), BR 115200.
<b>UART2 - RS232</b>	For M.2 Support DTE mode, BR 115200 with CTS/RTS follow control loopback test (need DFI Android test utility).
<b>UART3 - RS485</b>	Support Loopback test, BR 115200 (need DFI Android test utility).
<b>UART4 - RS232</b>	Support DTE mode, BR 115200 with CTS/RTS follow control loopback test (need DFI Android test utility).
<b>UART4 - RS422</b>	Support Loopback test, BR 115200 (need DFI Android test utility).
<b>UART4 - RS485</b>	Support Loopback test, BR 115200 (need DFI Android test utility).
<b>DIO</b>	Support read input high/low status, set output voltage high/low status, control by Linux device node, 8 pins.
<b>DIO-PWM</b>	Support control by Linux device node.
<b>CAN Bus</b>	Support "cansend", "candump" console commands for test send/read data.
<b>Micro SD Card (SD slot)</b>	Support SD storage with FAT32/Ext3/Ext4 filesystem. (Support Kingston, micro SDHC 4GB class 4, 4GB/16GB). For standard product, We don't port any SDIO module.
<b>Reset / Power on Key</b>	HW control.
<b>I2C-RTC</b>	Support Linux "date -s"and "hwclock -w" console commands to set system time.
<b>I2C-Thermal sensor</b>	Support read device temperature (degrees C) by Linux device node.
<b>Secure Boot</b>	Not Support
<b>Wifi / BT</b>	Support WiFi/BT module: RTL8822CE 1.RTL8822CE WiFi: Support Wifi STA and AP Mode 2.RTL8822CE BT: Support Bluetooth Tethering mode
<b>LTE and SIM slot</b>	Support 4GLTE module: Quectel EM06 Support data-link only.
<b>Android Build Type</b>	ENG Build without SELinux.
<b>Android ADB</b>	Support

<b>Android Factory Reset</b>	Support
<b>Android Fastboot</b>	Support
<b>Android OTA</b>	No Support
<b>Android CTS</b>	No Support
<b>Android GMS/GTS</b>	No Support
<b>Android Suspend</b>	No support suspend, set never to suspend by default.
<b>UART4 - RS485</b>	Support Loopback test, BR 115200 (need DFI Android test utility).
<b>Preload Android APPs</b>	<ol style="list-style-type: none"> <li>1. AOSP WebView Browser Tester: Browser APP.</li> <li>2. AOSP Calculator: Calculator APP.</li> <li>3. AOSP Calendar: Calendar APP.</li> <li>4. AOSP Clock: Clock APP, support alarm wake-up.</li> <li>5. AOSP Contacts: Function not ready.</li> <li>6. AOSP Email: E-Mail APP.</li> <li>7. AOSP Gallery: Gallery APP (JPEG).</li> <li>8. AOSP Music: Play music APP (MP3).</li> <li>9. AOSP Phone: Function not ready.</li> <li>10. AOSP Settings: Android Settings APP.</li> <li>11. AOSP Sound Recorder: Sound Recorder APP. Function not ready, preload for AOSP Audio module test in the future.</li> <li>12. NXP Ethernet (*): Ethernet settings APP.</li> <li>13. AOSP Files APP.</li> <li>14. Cactus Player APP.</li> <li>15. Camera APP.</li> <li>16. Search APP.</li> </ol>
<b>Image Size</b>	<ol style="list-style-type: none"> <li>1. u-boot image: Around 1188 KB</li> <li>2. boot image: Around 50 MB</li> <li>3. recovery image: Around 7.5 MB</li> <li>4. system image: Around 1195 MB</li> </ol>
<b>Free storage size</b>	<ol style="list-style-type: none"> <li>1. Data partition: Around 6.98 GB free space</li> <li>2. System partition: Around 1410 MB free space</li> <li>3. Cache partition: Around 2238 MB free space</li> </ol>

# VC900-M8M

**NXP i.MX8M**  
ARM-Based In-vehicle System



## KEY FEATURES



### ARM-Based System

Support Yocto Linux 2.5 and Android 9.0



### 6-axis IMU Sensor

3 Accelerometer + 3 Gyroscope



### Rich I/O Connectivity

1 GbE, 4 COM, 1 CAN Bus, 2 USB 3.0, 1 Micro USB (OTG)



### Wide-Voltage

9~36V vehicle power input with ACC/IGN function

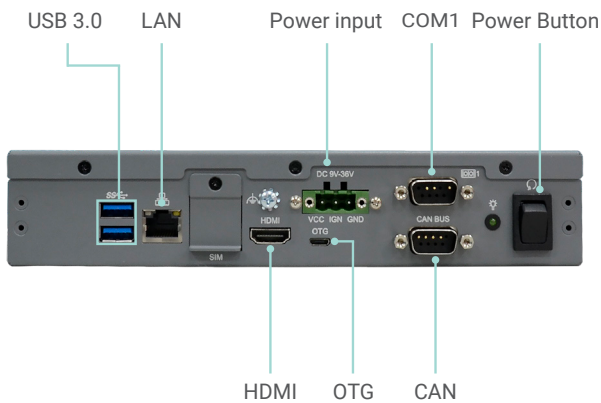


### Wide-Temperature

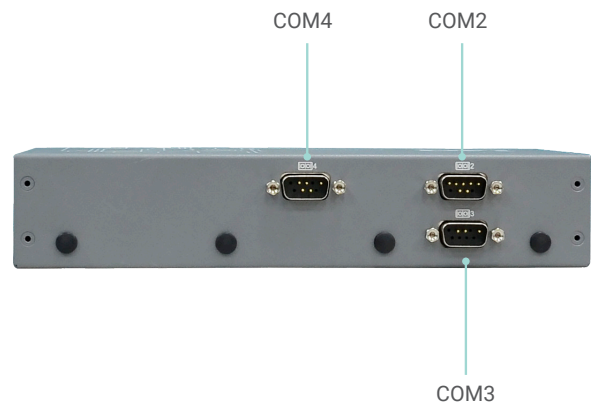
-20°C~65°C operation without active fan



## PANEL



Front View



Rear View

## SPECIFICATION

<b>SYSTEM</b>	<b>Processor</b>	NXP i.MX8M Quad, Cortex-A53 1.3GHz (by model) NXP i.MX8M Dual, Cortex-A53 1.3GHz (by model)	
	<b>Memory</b>	On board memory 2GB/4GB (by model) Single channel LPDDR4 up to 3200 MHz	
<b>GRAPHICS</b>	<b>Display</b>	1 x HDMI	resolution up to 1920x1080 @ 60 Hz
<b>STORAGE</b>	<b>External</b>	Micro SD card slot	
	<b>Internal</b>	eMMC 5.1 16GB on board, support up to 64GB (optional)	
<b>LED</b>	<b>Indicators</b>	1 x Status LED	
<b>EXPANSION</b>	<b>M.2</b>	1 x M.2 2242/3042 B Key (USB 3.1 Gen1), Nano SIM Slot support 1 x M.2 2230 E Key (PCIex1/USB2.0)	
<b>SENSOR</b>	<b>Sensor</b>	6 axis IMU (3 Accelerometer + 3 Gyroscope)	
<b>FRONT I/O</b>	<b>Ethernet</b>	1 x Giga LAN, RJ-45	
	<b>Serial</b>	1 x RS-232/422/485 (COM1)	
	<b>USB</b>	2 x USB 3.0, type A 1 x OTG, micro USB	
	<b>Display</b>	1 x HDMI	
	<b>Audio</b>	with Amplifier to support 2W speaker (optional) 1 x Line-out & 1 x MIC-in (internal header)	
	<b>Buttons</b>	1 x Power reset button	
	<b>CANbus</b>	1 x CANbus, DB-9	
<b>REAR I/O</b>	<b>Antenna</b>	4 x Antenna holes for LTE 4G, WiFi and GPS	
	<b>Serial</b>	1 x RS-232(TX,RX,RTS,CTS) (COM2) 2 x RS-232(TX,RX) (COM3/COM4)	
<b>POWER</b>	<b>Type</b>	Wide range 9~36V with ACC/IGN function	
	<b>Connector</b>	3-pole terminal block	
<b>OS SUPPORT</b>	<b>Linux</b>	Yocto Linux 2.5	
	<b>Android</b>	Android 9.0 (option)	
<b>MECHANISM</b>	<b>Construction</b>	Sheet Metal	
	<b>Color</b>	Black	
	<b>Mounting</b>	DIN-Rail mount Wall mount	
	<b>Dimensions (W x H x D)</b>	200 x 120 x 45mm	
	<b>Weight</b>	1.9kg	
<b>ENVIRONMENT</b>	<b>Operating Temperature</b>	-20 to 65°C	
	<b>Storage Temperature</b>	-40 to 85°C	
	<b>Relative Humidity</b>	10 to 90% RH (non-condensing)	
<b>STANDARDS AND CERTIFICATIONS</b>	<b>Shock</b>	Operating/non-operating: MIL-STD-810G Method 516.6, Procedure 1	
	<b>Vibration</b>	Operating/non-operating: MIL-STD-810G Method 514.6, Category 4	
	<b>Certification</b>	CE, FCC, E-Mark R10, RoHS, UKCA	

## ORDERING INFORMATION

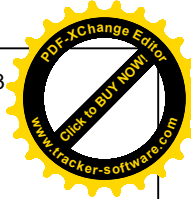
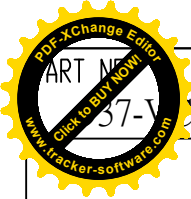
Model Name	Part Number	Description
VC900-M8M	750-VC9000-000G	VC900-M8M: Fanless, i.MX8M Quad, 4GB memory, 16GB eMMC, 1 LAN, 1 HDMI, 1 CAN, 4 COM, 2 USB 3.0, F/G RoHS
VC900-M8M	750-VC9000-100G	VC900-M8M: Fanless, i.MX8M Dual, 2GB memory, 16GB eMMC, 1 LAN, 1 HDMI, 1 CAN, 4 COM, 2 USB 3.0, F/G RoHS

## OPTIONAL ITEMS

Optional Items	Part Number	Description
LTE 4G	761-0EM06E-000G	4G Module Kit, Quectel LTE-A Cat 6 M.2 Module, EM06-E
WiFi + BT	612-RTL882-000G	Wi-Fi+BT, ENLI M.2 2230 Combo Module Card, RTL8822CE

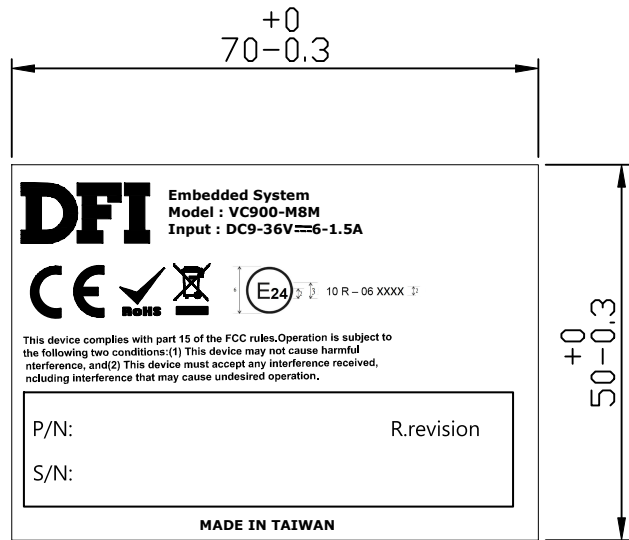
## PACKING LIST

1 x VC900-M8M system unit
1 x 3-pole terminal block cable for power input
1 x Wall mount bracket/screw pack
1 x Quick installation guide



ART NO: 9000-000G  
 57-V

IF\_TMxD2301000248DV



Bar Code Number : \*adding later\*

**NOTE:**

1. 材質: 50# 白色特多龍, 加上光(使用UL合格之材質)
2. 印刷: 採背面印刷處理(圖示為正面)
3. 印刷顏色: 底色白(字體圖形為黑色)
4. 文字: 線條清晰不可缺劃斷線
5. 字稿需經擔當工程師確認才可製版
6. 背面印膠加離型紙

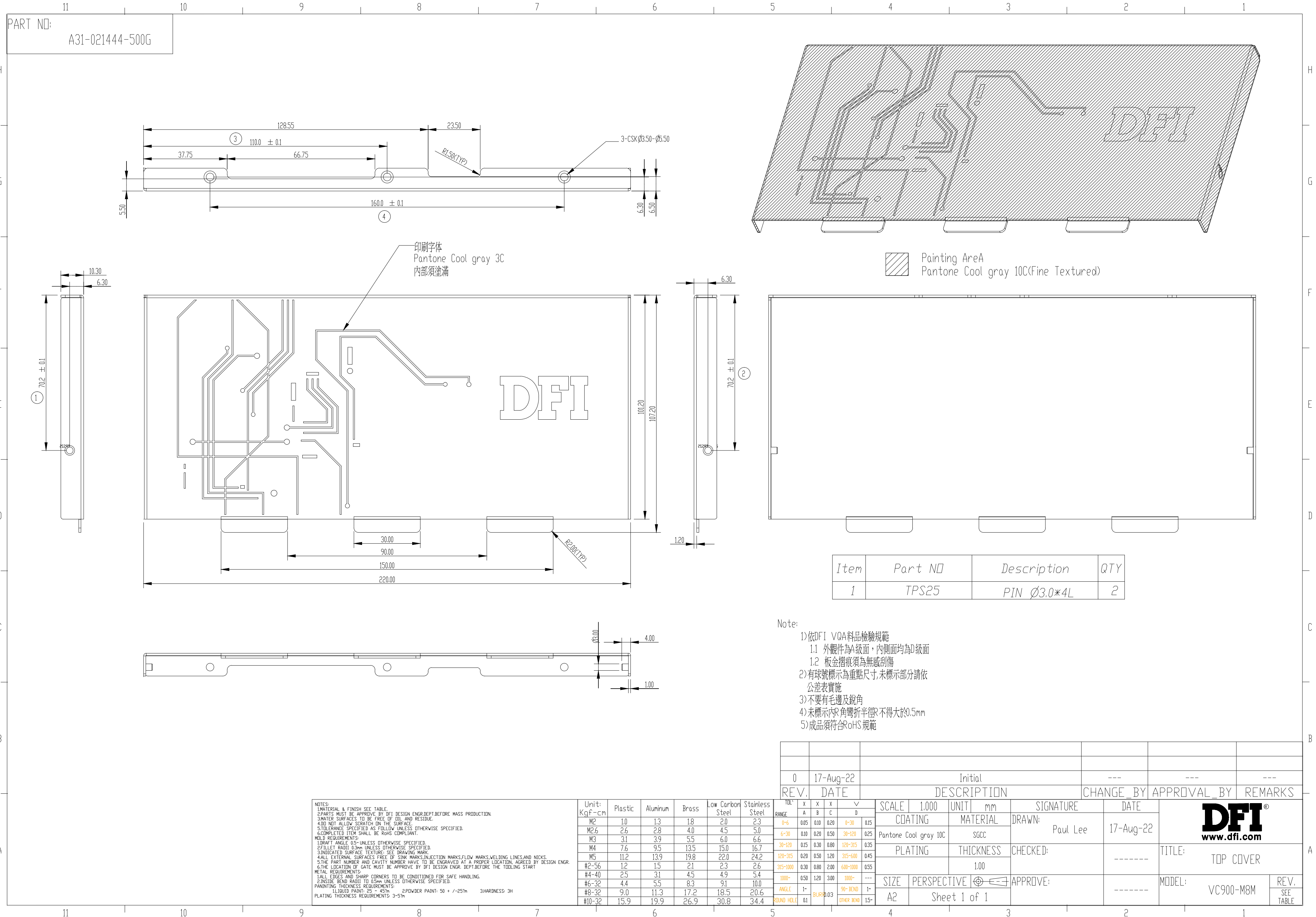
REV.	DATE	DESCRIPTION	CHANGE_BY	APPROVAL_BY	REMARKS
A00	03-Feb-2023	Initial	---	---	---

**NOTES:**  
 1. MATERIAL & FINISH SEE TABLE.  
 2. PARTS MUST BE APPROVED BY DFI DESIGN ENGR. DEPT. BEFORE MASS PRODUCTION.  
 3. MATEL SURFACES TO BE FREE OF OIL AND RESIDUE.  
 4. NO NET ALLOW SCRATCH ON THE SURFACE.  
 5. TOLERANCE SPECIFIED AS FOLLOU UNLESS OTHERWISE SPECIFIED.  
 6. COMPLETED ITEM SHALL BE ROHS COMPLIANT.  
**WELD REQUIREMENTS:**  
 1. DRIFT ANGLE 0.5 ° UNLESS OTHERWISE SPECIFIED.  
 2. FILLET RADI 0.3mm UNLESS OTHERWISE SPECIFIED.  
 3. INDICATED SURFACE TEXTURES SEE DRAWING MARK.  
 4. ALL EXTERNAL SURFACES FREE OF SINK MARKS, INJECTION MARKS, FLOW MARKS, WELDING LINES AND NICKS.  
 5. THE PART NUMBER AND CAVITY NUMBER HAVE TO BE ENGRAVED AT A PROPER LOCATION, AGREED BY DESIGN ENGR.  
 6. THE LOCATION OF GATE MUST BE APPROVE BY DFI DESIGN ENGR. DEPT. BEFORE THE TOOLING START.  
**METAL REQUIREMENTS:**  
 1. ALL EDGES AND SHARP CORNERS TO BE CONDITIONED FOR SAFE HANDLING.  
 2. INSIDE BEND RADI TO 0.5mm UNLESS OTHERWISE SPECIFIED.  
**PAINTING THICKNESS REQUIREMENTS:**  
 1. LIQUID PAINT: 25 ~ 45µm 2. POWDER PAINT: 50 + / - 25µm 3. HARDNESS: 3H  
**PLATING THICKNESS REQUIREMENTS:** 3 ~ 5µm

Units Kg/cm	Plastic	Aluminum	Brass	Low Carbon Steel	Stainless Steel	TOL±					
						A	B	C	D	∇	
M2	1.0	1.3	1.8	2.0	2.3	0-6	0.05	0.10	0.20	0-30	0.15
M2.6	2.6	2.8	4.0	4.5	5.0	6-30	0.10	0.20	0.50	30-120	0.25
M3	3.1	3.9	5.5	6.0	6.6	30-120	0.15	0.30	0.80	120-315	0.35
M4	7.6	9.5	13.5	15.0	16.7	120-315	0.20	0.50	1.20	315-600	0.45
M5	11.2	13.9	19.8	22.0	24.2	315-1000	0.30	0.80	2.00	600-1000	0.55
M2-56	1.2	1.5	2.1	2.3	2.6	1000-	0.50	1.20	3.00	1000-	---
M4-40	2.5	3.1	4.5	4.9	5.4	ANGLE	1°			90° BEND	1°
M6-32	4.4	5.5	8.3	9.1	10.0	ROUND HOLE	0.1	BURR	0.03	OTHER BEND	1.5°
M8-32	9.0	11.3	17.2	18.5	20.6						
M10-32	15.9	19.9	26.9	30.8	34.4						

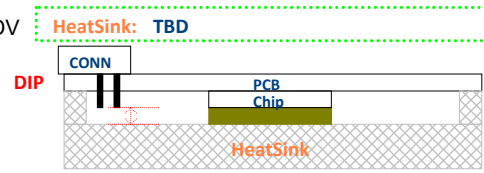
SCALE	1.000	UNIT	mm	SIGNATURE	DATE	 <b>www.dfi.com</b>	<b>TITLE:</b> Safety Label	<b>MODEL:</b> VC900-M8M	<b>REV.</b> SEE TABLE
COATING		MATERIAL		DRAWN:	03-Feb-2023				
PLATING		THICKNESS		CHECKED:	-----				
SIZE	PERSPECTIVE			APPROVE:	-----				
A4	Sheet 1 of 1								

E24\*10R06/02\*4590\*00





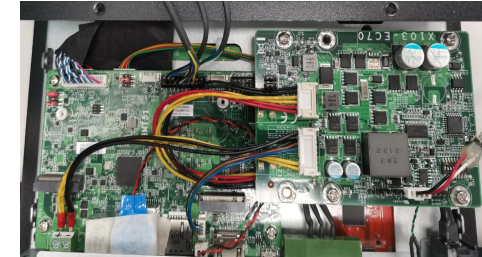




774-M8MT511-080G/180G for VP070P-M8M W36 & VC900-M8M

with Power Board - X103-EC70: 9V~36V DC Power Input with ACC/IGN control

Product Line	LCD Size	Touchscreen	-	Platform	Power Range
VP	070: 7"	P	-	M8M	W36
KS: Fanless Panel PC	070: 7"	R: Resistive Touch		AL: Apollo Lake	AC: AC
TPC: Smart fan Panel PC	084: 8.4"	P: Projected Capacitive		BT: Bay Trail	D12: DC 12V
BPC: Bar Type Panel PC	101: 10.1"	G: Glass		SD: Sky Lake	D24: DC 24V
VP: Vehicle Panel PC	121: 12.1"			M8M: NXP i.MX8M	W24: x to 24V DC
KXS: Extreme Panel PC	150: 15"				W36: x to 36V DC



774-X10371-180G

Type	Series	Total Expansion	PCIE Solts	-	Platform
VC	9	0	0	-	M8M
VC: Vehicle system	9	0:No expansion	0:No expansion		M8M: NXP i.MX8M

180G(Dual) 143-701301-400G MIMX8MD6CVAHZAB -40~105度(1.3GHz)

080G(Quad) 143-701300-400G MIMX8MQ6CVAHZAB -40~105度(1.3GHz)

Page Index:

- 1 Title Page
- 2 Block Diagram
- 3 Power Delivery System
- 4 Power/Reset Sequence
- 5 Clock Topology
- 6 SMBUS Topology/Address
- 7 PCIe/HSIO/USB I/O CFG.
- 8 i.MX8M CPU\_PWR
- 9 i.MX8M CPU\_LPDDR4
- 10 i.MX8M CPU\_IO1/Boot-CFG
- 11 i.MX8M CPU\_IO2/MISC
- 12 i.MX8M CPU\_PHY
- 13 eMMC5.0/uSD3.0
- 14 USB3.0 & USB2.0
- 15 USB3.0 Hub(USB5807C)
- 16 HDMI2.0a TX
- 17 I2S Codec(SGTL5000)
- 18 RGMII GbE(AR8035)
- 19 M.2 2230(E) & 3042(B)
- 20 DSI to LVDS(SN65DSI85)
- 21 B.L./F.P./DIOs/I2C
- 22 RS232/422/485
- 23 UART-Link / CAN2.0
- 24 PMIC(MC34PF4210)
- 25 Amplifier(3W+3W)
- 26 DC\_IN & PWR-STBY
- 27 PWR-Main
- 28 Test Pad for Power Sequence
- 29 Revision History
- 30 Design Info.
- 31 POWER DISTRIBUTION.
- 32 A+G(LSM6DSOX)

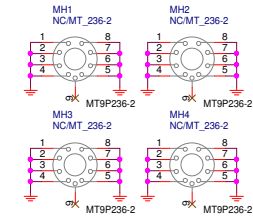
THICKNESS ±1.6mm +10%			Er	Refer	single end	single end	different pair	different pair	different pair
Stack up				Layer	42ohms±10%	50ohms±10%	85ohms±10%	90ohms±10%	100ohms±10%
	SolderMask	0.6	4						
1	TOP	0.5oz+Plating	1.5	L2	6 mil (42.90)	4.2 mil (50.59)	4.5 / 5.5 mil (85.00)	4 / 6 mil (90.52)	3.5 / 8.5 mil (100.59)
	Prepreg		3						
2	GND1	1.0oz	1.3						
	0.004" 1/1	4.00	4						
3	VCC1	1.0oz	1.3						
	Prepreg		5						
4	VCC2	1.0oz	1.3						
	0.004" 1/1	4.00	4						
5	GND2	1.0oz	1.3						
	Prepreg		5						
6	IN1	1.0oz	1.3	L7	4.6 mil (42.72)	3 mil (51.33)	4.5 / 5 mil (82.15)	3.5 / 7 mil (91.01)	3 / 9.5 mil (99.84)
	0.004" 1/1	4.00	4						
7	GND3	1.0oz	1.3						
	Prepreg		5						
8	IN2	1.0oz	1.3	L9	4.6 mil (42.72)	3 mil (51.33)	4.5 / 5 mil (82.15)	3.5 / 7 mil (91.01)	3 / 9.5 mil (99.84)
	0.004" 1/1	4.00	4						
9	GND4	1.0oz	1.3						
	Prepreg		5						
10	IN3	1.0oz	1.3	L11	4.6 mil (42.72)	3 mil (51.33)	4.5 / 5 mil (82.15)	3.5 / 7 mil (91.01)	3 / 9.5 mil (99.84)
	0.004" 1/1	4.00	4						
11	GND5	1.0oz	1.3						
	Prepreg		3						
12	Bottom	0.5oz+Plating	1.5	L11	6 mil (42.90)	4.2 mil (50.59)	4.5 / 5.5 mil (85.00)	4 / 6 mil (90.52)	3.5 / 8.5 mil (100.59)
	SolderMask	0.6	4						

Layout:  
eMMC BGA update: C10 -> C12.  
LPDDR4 BGA update: C14 -> C13.  
\*Ball to Trace spacing >= 3.3-mil,  
Ball to VIA spacing >= 3.3-mil,  
VIA -> 14D8(~0.5A).

12-Layer

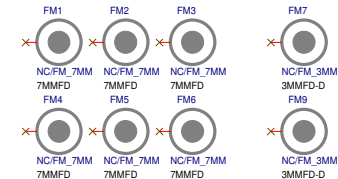
PCB: 314-M8MT511-029G  
Stack up: CIRCUITECH(峻新)

Mouting Hole (236/126-mils)



Fiducial Mark

Fiducial Mark(連板)



DFI®

Title : Title Page

Size : Document Number : E24\*10R0602\*4599\*00

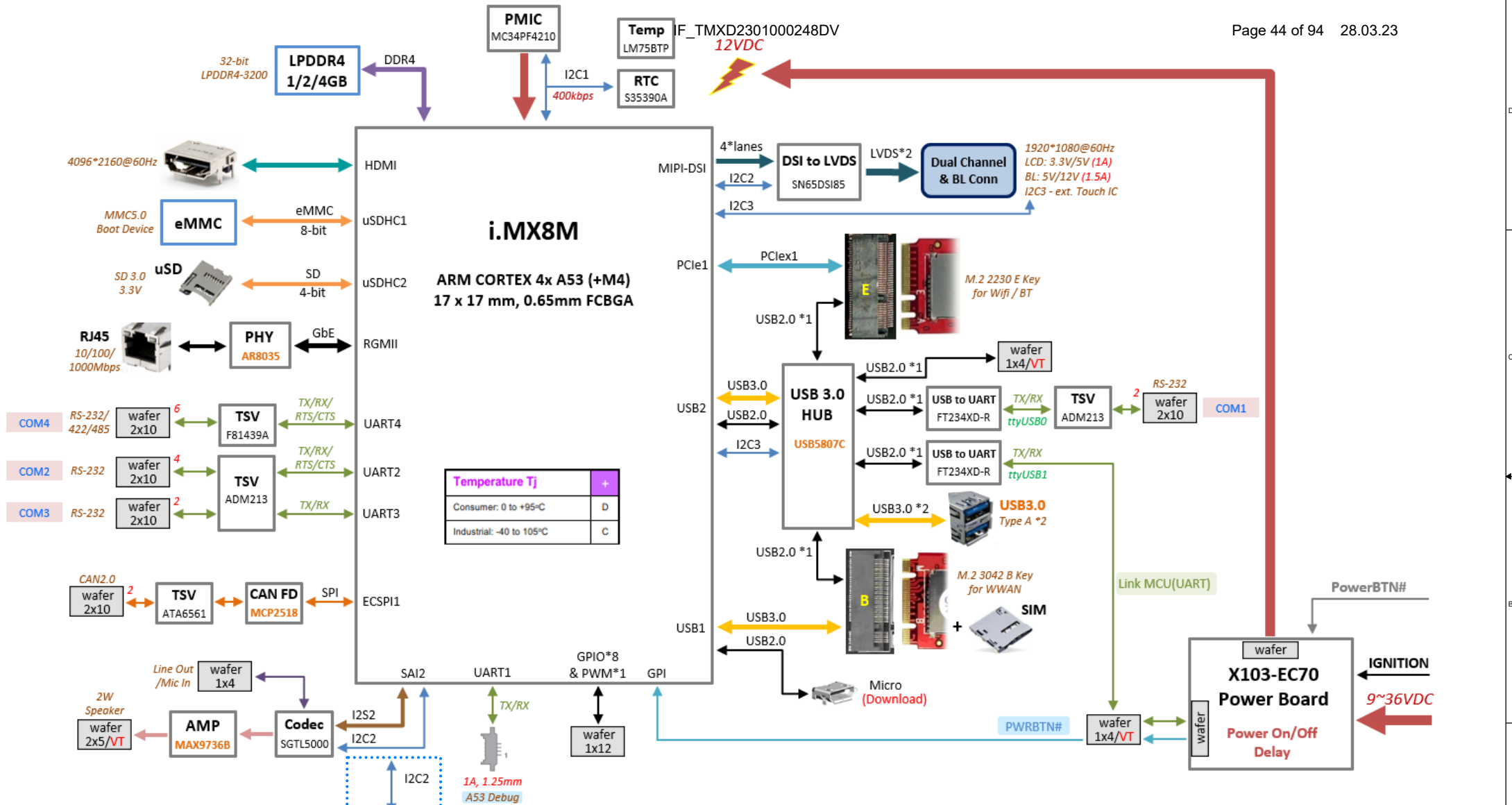
Custom : M8MT51

Date : Monday, August 15, 2022

Rev : 1

Page : 1



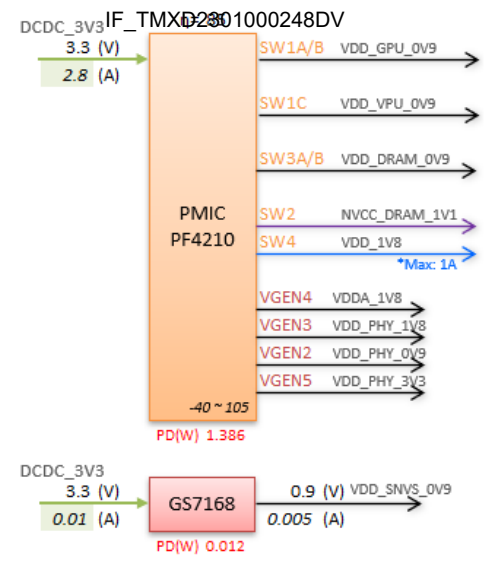
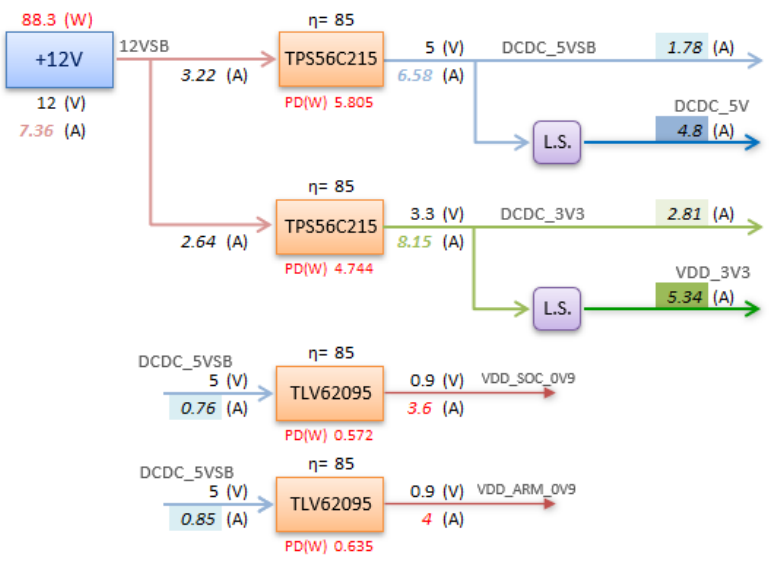


Temperature Tj	
Consumer: 0 to +95°C	D
Industrial: -40 to 105°C	C

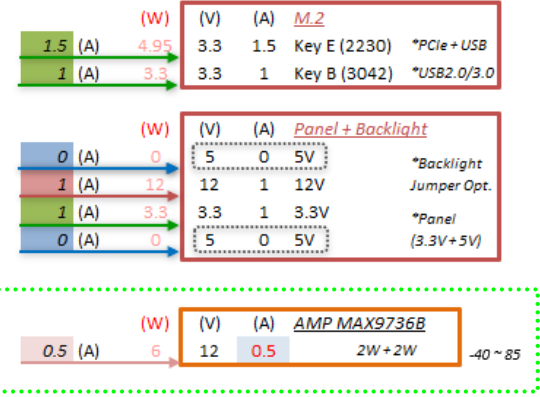
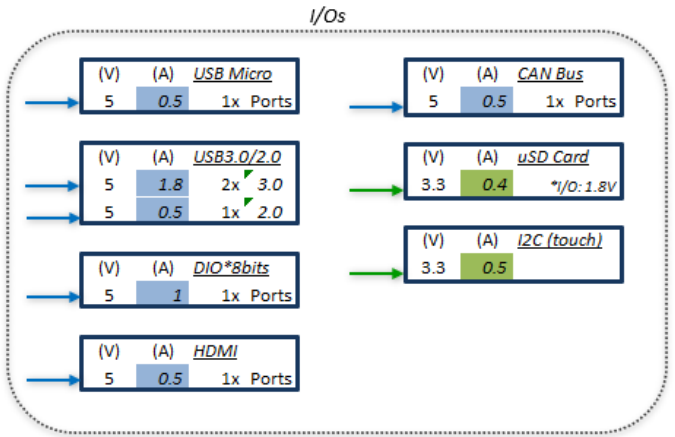
DFI-P/N	Commercial	Silicon Rev: 1.1 (B)
143-701500-401G	MIMX8MQ6DVAJZAB	Quad core & VPU+HDR+GPU & 0~95度(1.5GHz)
143-701501-400G	MIMX8MD6DVAJZAB	Dual core & VPU+HDR+GPU & 0~95度(1.5GHz)
143-701502-400G	MIMX8MQ5DVAJZAB	Quad Lite & GPU & 0~95度(1.5GHz)
DFI-P/N	Industrial	Silicon Rev: 1.1 (B)
143-701300-400G	MIMX8MQ6CVAHZAB	Quad core & VPU+HDR+GPU & -40~105度(1.3GHz)
143-701301-400G	MIMX8MD6CVAHZAB	Dual core & VPU+HDR+GPU & -40~105度(1.3GHz)

Title : **Block Diagram**

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Output	(V)	(A)	Component
VDD_SOC_0V9	0.9	3.6	@VDD_SOC/VDDA_OP9
VDD_ARM_0V9	0.9	4	@VDD_ARM
VDD_GPU_0V9	0.9	2	@VDD_GPU 1A/B
VDD_VPU_0V9	0.9	1	@VDD_VPU 1C
VDD_DRAM_0V9	1	2.5	@VDD_DRAM 3A/B
NVCC_DRAM_1V1	1.1	1	@NVCC_DRAM 2
VDD_1V8	1.8	0.1	@NVCC_SD1 4
VDDA_1V8	1.8	0.3	@VDDA_1P8/DRAM
VDD_PHY_1V8	1.8	0.05	@1.8V PHY
VDD_PHY_0V9	0.9	0.25	@0.9V PHY
VDD_PHY_3V3	3.3	0.1	@3.3V PHY
VDD_3V3	3.3	0.2	@NVCC_3V3
NVCC_DRAM_1V1	1.1	0.46	LPDDR4 (1024M32) VDD2+VDDQ 2
VDD_1V8	1.8	0.01	VDD1 4
VDD_1V8	1.8	0.4	eMMC5.1 (64G) VCCQ 2
VDD_1V8	3.3	0.45	VCC *with HS400
VDD_1V8	1.8	0.2	LVDS SN65DSI85 VCC 1920*1080
VDD_1V8	3.3	0.17	LAN AR8035-ALIB VDD33/AVDD33
VDD_PHY_1V8	3.3	0.02	Codec SGLT5000 VDDIO/VDDA
VDD_PHY_1V8	1.8	0.01	VDDD
VDD_1V8	3.3	0.1	HUB 5807C VDD33
VDD_1V8	1.2	0.6	VDD12



**DFI**

Title : **Power Delivery System**

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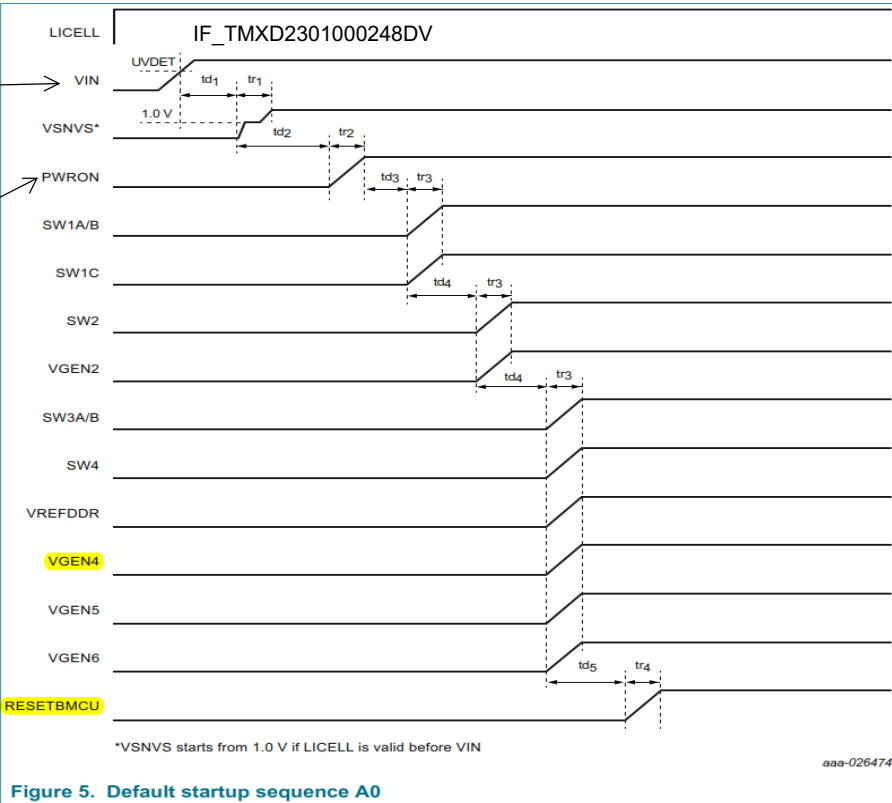
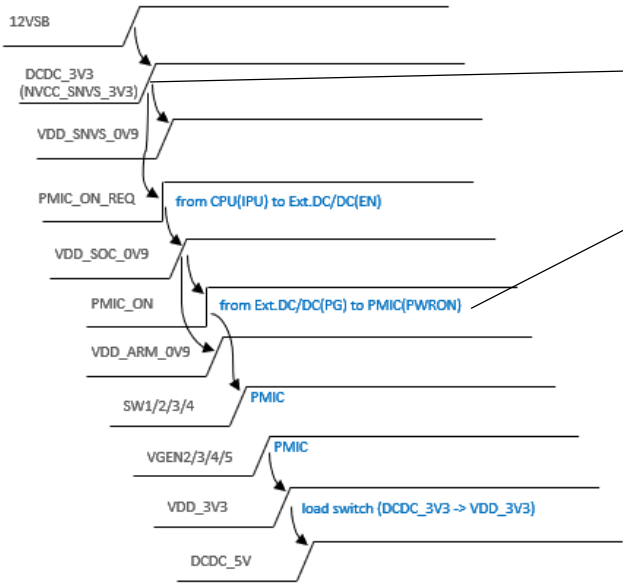


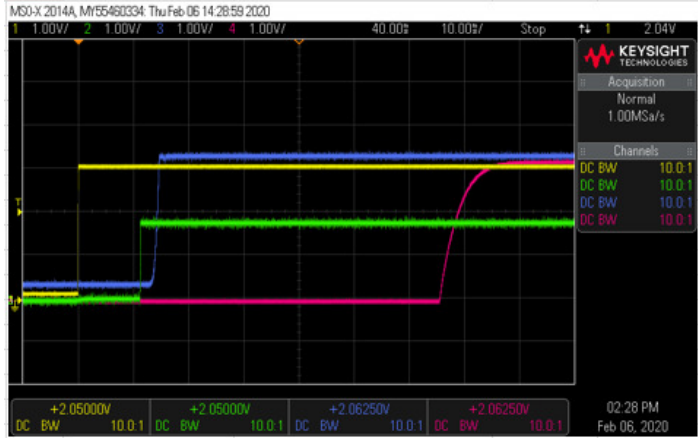
Figure 5. Default startup sequence A0

Table 9. Default startup sequence timing

Parameter	Description	Min	Typ	Max	Unit
t <sub>D1</sub>	Turn-on delay of VSNVS <sup>[1]</sup>	—	5.0	—	ms
t <sub>R1</sub>	Rise time of VSNVS	—	3.0	—	ms
t <sub>D2</sub>	User determined delay	—	1.0	—	ms
t <sub>R2</sub>	Rise time of PWRON	—	<sup>[2]</sup>	—	ms
t <sub>D3</sub>	Turn-on delay of first regulator SEQ_CLK_SPEED[1:0] = 00 SEQ_CLK_SPEED[1:0] = 01 <sup>[3]</sup> SEQ_CLK_SPEED[1:0] = 10 SEQ_CLK_SPEED[1:0] = 11	—	2.0 2.5 4.0 7.0	—	ms
t <sub>R3</sub>	Rise time of regulators <sup>[4]</sup>	—	0.2	—	ms
t <sub>D4</sub>	Delay between regulators SEQ_CLK_SPEED[1:0] = 00 SEQ_CLK_SPEED[1:0] = 01 SEQ_CLK_SPEED[1:0] = 10 SEQ_CLK_SPEED[1:0] = 11	—	0.5 1.0 2.0 4.0	—	ms
t <sub>R4</sub>	Rise time of RESETBMCU	—	0.2	—	ms
t <sub>D5</sub>	Turn-on delay of RESETBMCU	—	2.0	—	ms

[1] Assume LICELL voltage is valid before VIN is applied. If LICELL is not valid before VIN is applied, then VSNVS turn on delay may extend to a maximum of 24 ms.  
 [2] Depends on the external signal driving PWRON.  
 [3] Default configuration  
 [4] Rise time is a function of slew rate of regulators and nominal voltage selected.

CH	Net	Note
CH1	PMIC_ON	PMIC PWRON(#56)
CH2	VDDA_1V8	from PMIC(LDO-VGEN4)
CH3	VDD_3V3	Gate/Load Switch
CH4	POR_B	Global RST#



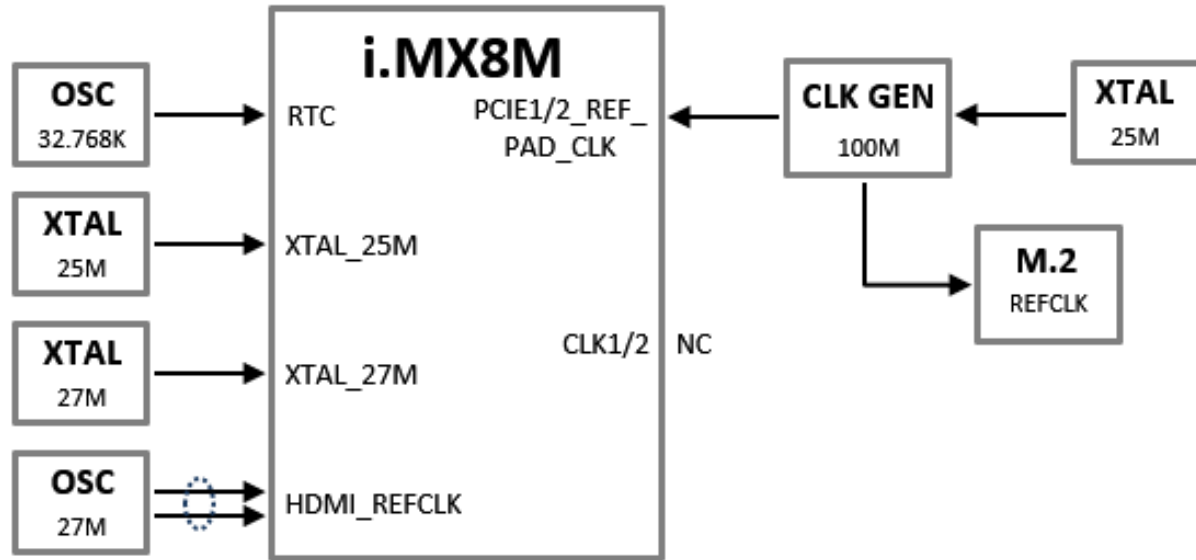
**DFI**


**Title : Power/Reset Sequence**

Size : Document Number : Rev : 2

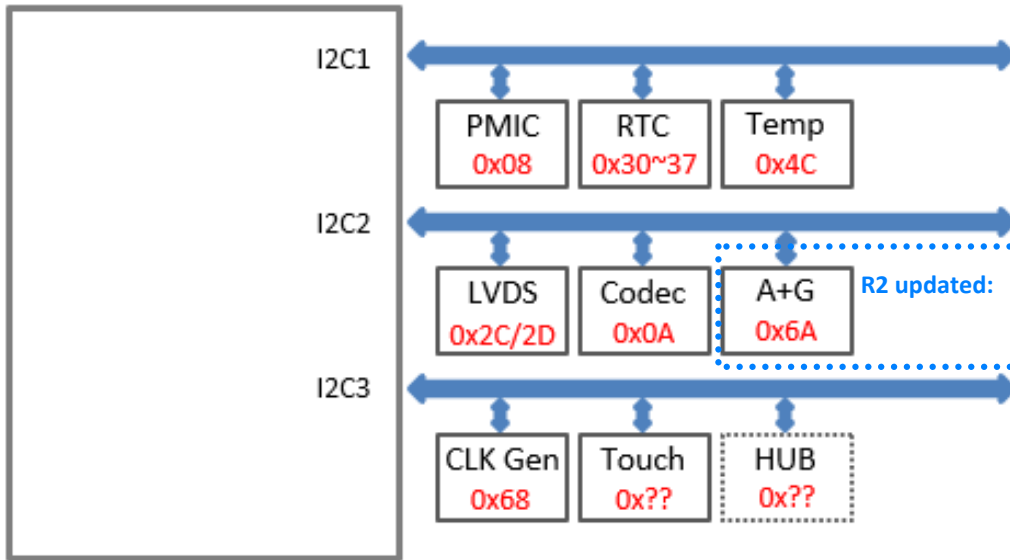
M8MT51

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Title : <b>Clock Topology</b>		
Size : A	Document Number : <b>M8MT51</b>	Rev : <b>2</b>
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**E24-10R06/02-4590-00**



RISC(ARM) 不看 R/W bit.  
e.g. EEPROM = 0x5X.

<b>DFI<sup>®</sup></b>		
Title : SMBUS Topology/Address		
Size : A	Document Number : <b>M8MT51</b>	Rev : <b>2</b>
Date : Monday, August 15, 2022		Page : 6 / 32
<b>E24-10R06/02-4590-00</b>		



# I/O Functions

IF\_TMxD2301000248

# GPIOs of M8M051 & M8MT51

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Pin Name (Package)	IO PAD	Power Group	Ait0	Ait1	Ait2	Ait5
GPIO1_I000	GPIO1_I000	NVCC_GPIO1	gpio1.I0[0]	comsec_gpio1:ENET_PHY_REF_CLK_ROOT	anamix_REF_CLK_32K	
GPIO1_I001	GPIO1_I001	NVCC_GPIO1	gpio1.I0[1]	pwm1.OUT	anamix_REF_CLK_24M	
GPIO1_I002	GPIO1_I002	NVCC_GPIO1	gpio1.I0[2]	wdog1.WDOG_B	wdog1.WDOG_ANY	
GPIO1_I003	GPIO1_I003	NVCC_GPIO1	gpio1.I0[3]	usdhc1_VSELECT	sdm1_EXT_EVENT[0]	
GPIO1_I004	GPIO1_I004	NVCC_GPIO1	gpio1.I0[4]	usdhc2_VSELECT	sdm1_EXT_EVENT[1]	
GPIO1_I005	GPIO1_I005	NVCC_GPIO1	gpio1.I0[5]	nv4.NMI	comsec_gpio1:CMC_READ0	
GPIO1_I006	GPIO1_I006	NVCC_GPIO1	gpio1.I0[6]	enet1.MDC	usdhc1_CD_B	
GPIO1_I007	GPIO1_I007	NVCC_GPIO1	gpio1.I0[7]	enet1.MDIO	usdhc1_WP	
GPIO1_I008	GPIO1_I008	NVCC_GPIO1	gpio1.I0[8]	enet1_1588_EVENT0_IN	usdhc2_RESET_B	
GPIO1_I009	GPIO1_I009	NVCC_GPIO1	gpio1.I0[9]	enet1_1588_EVENT0_OUT	sdm2_EXT_EVENT[0]	
GPIO1_I010	GPIO1_I010	NVCC_GPIO1	gpio1.I0[10]	usb1_OTG_ID	comsec_gpio1:CMC_READ0	
GPIO1_I011	GPIO1_I011	NVCC_GPIO1	gpio1.I0[11]	usb2_OTG_ID	comsec_gpio1:CMC_READ0	
GPIO1_I012	GPIO1_I012	NVCC_GPIO1	gpio1.I0[12]	usb1_OTG_PWR	pwm3.OUT	
GPIO1_I013	GPIO1_I013	NVCC_GPIO1	gpio1.I0[13]	usb1_OTG_DWC	pwm2.OUT	
GPIO1_I014	GPIO1_I014	NVCC_GPIO1	gpio1.I0[14]	usb2_OTG_PWR	pwm3.OUT	
GPIO1_I015	GPIO1_I015	NVCC_GPIO1	gpio1.I0[15]	usb2_OTG_DWC	pwm4.OUT	
NAND_ALE	NAND_ALE	NVCC_NAND	rawnand.ALE	qspi.A_SCLK	gpio3.I0[0]	
NAND_CE0_B	NAND_CE0_B	NVCC_NAND	rawnand.CE0_B	qspi.A_SS0_B	gpio3.I0[1]	
NAND_CE1_B	NAND_CE1_B	NVCC_NAND	rawnand.CE1_B	qspi.A_SS1_B	gpio3.I0[2]	
NAND_CE2_B	NAND_CE2_B	NVCC_NAND	rawnand.CE2_B	qspi.B_SS0_B	gpio3.I0[3]	
NAND_CE3_B	NAND_CE3_B	NVCC_NAND	rawnand.CE3_B	qspi.B_SS1_B	gpio3.I0[4]	
NAND_CLE	NAND_CLE	NVCC_NAND	rawnand.CLE	qspi.B_SCLK	gpio3.I0[5]	
NAND_DATA00	NAND_DATA00	NVCC_NAND	rawnand.DATA00	qspi.A_DATA[0]	gpio3.I0[6]	
NAND_DATA01	NAND_DATA01	NVCC_NAND	rawnand.DATA01	qspi.A_DATA[1]	gpio3.I0[7]	
NAND_DATA02	NAND_DATA02	NVCC_NAND	rawnand.DATA02	qspi.A_DATA[2]	gpio3.I0[8]	
NAND_DATA03	NAND_DATA03	NVCC_NAND	rawnand.DATA03	qspi.A_DATA[3]	gpio3.I0[9]	
NAND_DATA04	NAND_DATA04	NVCC_NAND	rawnand.DATA04	qspi.B_DATA[0]	gpio3.I0[10]	
NAND_DATA05	NAND_DATA05	NVCC_NAND	rawnand.DATA05	qspi.B_DATA[1]	gpio3.I0[11]	
NAND_DATA06	NAND_DATA06	NVCC_NAND	rawnand.DATA06	qspi.B_DATA[2]	gpio3.I0[12]	
NAND_DATA07	NAND_DATA07	NVCC_NAND	rawnand.DATA07	qspi.B_DATA[3]	gpio3.I0[13]	
NAND_DQS	NAND_DQS	NVCC_NAND	rawnand.DQS	qspi.B_DQS	gpio3.I0[14]	
NAND_RE_B	NAND_RE_B	NVCC_NAND	rawnand.RE_B	qspi.B_DQS	gpio3.I0[15]	
NAND_READY_B	NAND_READY_B	NVCC_NAND	rawnand.READY_B	qspi.B_DQS	gpio3.I0[16]	
NAND_WE_B	NAND_WE_B	NVCC_NAND	rawnand.WE_B	qspi.B_DQS	gpio3.I0[17]	
NAND_WP_B	NAND_WP_B	NVCC_NAND	rawnand.WP_B	qspi.B_DQS	gpio3.I0[18]	
SAIS_RXFS	SAIS_RXFS	NVCC_SAI5	saif.RX_SYNC	saif1.TX_DATA[0]	gpio3.I0[19]	
SAIS_RXC	SAIS_RXC	NVCC_SAI5	saif.RX_BCLK	saif1.TX_DATA[1]	gpio3.I0[20]	
SAIS_RXD0	SAIS_RXD0	NVCC_SAI5	saif.RX_DATA[0]	saif1.TX_DATA[2]	gpio3.I0[21]	
SAIS_RXD1	SAIS_RXD1	NVCC_SAI5	saif.RX_DATA[1]	saif1.TX_DATA[3]	gpio3.I0[22]	
SAIS_RXD2	SAIS_RXD2	NVCC_SAI5	saif.RX_DATA[2]	saif1.TX_DATA[4]	gpio3.I0[23]	
SAIS_RXD3	SAIS_RXD3	NVCC_SAI5	saif.RX_DATA[3]	saif1.TX_DATA[5]	gpio3.I0[24]	
SAIS_MCLK	SAIS_MCLK	NVCC_SAI5	saif.MCLK	saif1.TX_BCLK	gpio3.I0[25]	
SPDIF_TX	SPDIF_TX	NVCC_SAI3	spdif1.OUT	pwm3.OUT		
SPDIF_RX	SPDIF_RX	NVCC_SAI3	spdif1.IN	pwm2.OUT		
SPDIF_EXT_CLK	SPDIF_EXT_CLK	NVCC_SAI3	spdif1.EXT_CLK	pwm1.OUT		
ECSPH_SCLK	ECSPH_SCLK	NVCC_ECSPH	ecsp1.SCLK	uart3.RX		
ECSPH_MOSI	ECSPH_MOSI	NVCC_ECSPH	ecsp1.MOSI	uart3.TX		
ECSPH_MISO	ECSPH_MISO	NVCC_ECSPH	ecsp1.MISO	uart3.CTS_B		
ECSPH_SS0	ECSPH_SS0	NVCC_ECSPH	ecsp1.SS0	uart3.RTS_B		
ECSPH2_SCLK(C5)	ECSPH2_SCLK	NVCC_ECSPH	ecsp2.SCLK	uart4.RX		
ECSPH2_MOSI(B5)	ECSPH2_MOSI	NVCC_ECSPH	ecsp2.MOSI	uart4.TX		
ECSPH2_MISO(B5)	ECSPH2_MISO	NVCC_ECSPH	ecsp2.MISO	uart4.CTS_B		
ECSPH2_SS0(A5)	ECSPH2_SS0	NVCC_ECSPH	ecsp2.SS0	uart4.RTS_B		
I2C1_SCL	I2C1_SCL	NVCC_I2C	i2c1.SCL	enet1.MDC		
I2C1_SDA	I2C1_SDA	NVCC_I2C	i2c1.SDA	enet1.MDIO		
I2C2_SCL	I2C2_SCL	NVCC_I2C	i2c2.SCL	enet1_1588_EVENT0_IN		
I2C2_SDA	I2C2_SDA	NVCC_I2C	i2c2.SDA	enet1_1588_EVENT0_OUT		
I2C3_SCL	I2C3_SCL	NVCC_I2C	i2c3.SCL	pwm4.OUT	gpt2.CLK	
I2C3_SDA	I2C3_SDA	NVCC_I2C	i2c3.SDA	pwm3.OUT	opt3.CLK	
I2C4_SCL	I2C4_SCL	NVCC_I2C	i2c4.SCL	pwm2.OUT	pcie1.CLKREQ_B	
I2C4_SDA	I2C4_SDA	NVCC_I2C	i2c4.SDA	pwm1.OUT	pcie2.CLKREQ_B	
UART1_RXD	UART1_RXD	NVCC_UART	uart1.RX	ecsp3.SCLK		
UART1_TXD	UART1_TXD	NVCC_UART	uart1.TX	ecsp3.MOSI		
UART2_RXD	UART2_RXD	NVCC_UART	uart2.RX	ecsp3.MISO		
UART2_TXD	UART2_TXD	NVCC_UART	uart2.TX	ecsp3.SS0		
UART3_RXD	UART3_RXD	NVCC_UART	uart3.RX	uart1.CTS_B		
UART3_TXD	UART3_TXD	NVCC_UART	uart3.TX	uart1.RTS_B		
UART4_RXD(C6)	UART4_RXD	NVCC_UART	uart4.RX	pcie1.CLKREQ_B		
UART4_TXD(D7)	UART4_TXD	NVCC_UART	uart4.TX	pcie2.CLKREQ_B		

R2 updated:

Pin Name (Ball)	Power Group	AltX	CRB	M8M051	I/O	Ext.PU/PD	M8M051 Signal Desc.
GPIO1_I000(T6)	NVCC_GPIO1	gpio1.I0[0]	REF_CLK_32K	LVDS_VDD_EN	0	PD	LVDS_VDD Power Enable
GPIO1_I001(T7)	NVCC_GPIO1	pwm1.OUT	DS1_P2_PWM	LVDS_PWM1_BL	0	PD	PWM for LVDS_Backlight Dimming
GPIO1_I002(R4)	NVCC_GPIO1	wdog1.WDOG_B	nWDG0G		0		*follow EVK
GPIO1_I004(P5)	NVCC_GPIO1	usdhc2_VSELECT	SD2_VSELECT	SD2_VSELECT	0	PD	*follow EVK, high=1.8V, low=3.3V
GPIO1_I005(P7)	NVCC_GPIO1	gpio1.I0[5]	CSI_P2_PWDN	GPIO1_usD_ON	0	PU	(NC) usD Conn Power Enable (1.PU)
GPIO1_I006(N5)	NVCC_GPIO1	gpio1.I0[6]	CSI_nRST	WWAN_nRST	0	PD	RESET# WWAN to M.2(Key-B)
GPIO1_I007(N6)	NVCC_GPIO1	gpio1.I0[7]	PMIC_nINT	PMIC_nINT	0		*follow EVK
GPIO1_I008(N7)	NVCC_GPIO1	gpio1.I0[8]	usdhc_nMUTE	LVDS_Bl_EN	0	PD	LVDS_Backlight Power Enable
GPIO1_I009(M6)	NVCC_GPIO1	gpio1.I0[9]	ENET_nRST	ENET_nRST	0		*follow EVK
GPIO1_I011(L6)	NVCC_GPIO1	gpio1.I0[11]	ENET_nINT	ENET_nINT	0		*follow EVK
GPIO1_I012(L7)	NVCC_GPIO1	gpio1.I0[12]	IR_CAP	GPO_Debug_LED	0	PU	Debug LED (Power On = high/LED On)
GPIO1_I013(K6)	NVCC_GPIO1	gpio1.I0[13]	PWM_LED	PWM_LED	0	PD	*follow EVK
GPIO1_I014(K7)	NVCC_GPIO1	gpio1.I0[14]	CLKO_25KHz	RTC_THM_IRQ#	1	PU	INT# from Thermal or RTC IC
GPIO1_I015(J6)	NVCC_GPIO1	gpio1.I0[15]	CLKO2K	GPIO1_DIMM_DC	0	PD	High-DIMMING as DC Mode
NAND_ALE(G19)	NVCC_NAND	gpio3.I0[0]	QSPIA_SCLK	PCIe_nDIS	0	PU	Disable# Wi-Fi from M.2(Key-E) & Power
NAND_CE0_B(H19)	NVCC_NAND	gpio3.I0[1]	QSPIA_nSS0	PCIe_nRST	0	PD	RESET# Wi-Fi/BT to M.2(Key-E)
NAND_CE1_B(G21)	NVCC_NAND	gpio3.I0[2]	BT_DEV_WAKE	BT_DEV_nWAKE (禁用)	1	PU	BT-WAKE# from M.2(Key-E)
NAND_CE2_B(F21)	NVCC_NAND	gpio3.I0[3]	TCPC_nINT	I2C3_ALERT#	1/0	PU	I2C_Alert# from/to Touch
NAND_CE3_B(H20)	NVCC_NAND	gpio3.I0[4]	NAND_nCES3	COM_PWR_EN	0	PD	COM2 & COM4 Power Enable
NAND_CLE(H21)	NVCC_NAND	gpio3.I0[5]	BT_REG_ON	BT_nDIS	0	PU	Disable# BT of M.2(Key-E)
NAND_DATA00(G20)	NVCC_NAND	gpio3.I0[6]	NAND/QSPIA_DATA0	GPIO3_DIO0			
NAND_DATA01(J20)	NVCC_NAND	gpio3.I0[7]	NAND/QSPIA_DATA1	GPIO3_DIO1			
NAND_DATA02(H22)	NVCC_NAND	gpio3.I0[8]	NAND/QSPIA_DATA2	GPIO3_DIO2			
NAND_DATA03(J21)	NVCC_NAND	gpio3.I0[9]	NAND/QSPIA_DATA3	GPIO3_DIO3			
NAND_DATA04(K21)	NVCC_NAND	gpio3.I0[10]	NAND_DATA4	GPIO3_DIO4	I/O	PU	DIQ[7:0] with LS. to 5V
NAND_DATA05(J22)	NVCC_NAND	gpio3.I0[11]	NAND_DATA5	GPIO3_DIO5			
NAND_DATA06(L19)	NVCC_NAND	gpio3.I0[12]	NAND_DATA6	GPIO3_DIO6			
NAND_DATA07(M19)	NVCC_NAND	gpio3.I0[13]	NAND_DATA7	GPIO3_DIO7			
NAND_RE(BK19)	NVCC_NAND	gpio3.I0[15]	BT_HOST_WAKE	PCIe_nWAKE (禁用)	1	PU	PCIe-WAKE# from M.2(Key-E)
NAND_READY_B(K20)	NVCC_NAND	gpio3.I0[16]	USB1_SS_SEL	INT#_CAN1	1		INT# from CAN(SPI to CAN)
NAND_WE_B(K22)	NVCC_NAND	gpio3.I0[17]	NAND_nREADY	F81499A_MODE2	0		
NAND_WP_B(K23)	NVCC_NAND	gpio3.I0[18]	NAND_nWE	F81499A_MODE0	0	PU	F81499A Mode Control[2:0]
SAIS_RXFS(N4)	NVCC_SAI5	gpio3.I0[19]	SAIS_RXFS(N4)	USBT_CEN	0	PD	(NC) USB Type-C Power Enable
SAIS_RXC(L5)	NVCC_SAI5	gpio3.I0[20]	SAIS_RXC(L5)	USBT_AEN	0	PD	(NC) USB 2.0 Conn(R/A) Power Enable
SAIS_RXD0(M5)	NVCC_SAI5	gpio3.I0[21]	SAIS_RXD0(M5)	USBHdr_EN	0	PD	(NC) USB 2.0 Header(V/T) Power Enable
SAIS_RXD1(L4)	NVCC_SAI5	gpio3.I0[22]	SAIS_RXD1(L4)	USBT_OC#	1	PU	USB Type-C Over-Current
SAIS_RXD2(M4)	NVCC_SAI5	gpio3.I0[23]	SAIS_RXD2(M4)	USBT_OC#	1	PU	USB 2.0 Conn(R/A) Over-Current
SAIS_RXD3(K5)	NVCC_SAI5	gpio3.I0[24]	SAIS_RXD3(K5)	USBHdr_OC#	1	PU	USB 2.0 Header(V/T) Over-Current
SAIS_MCLK(K4)	NVCC_SAI5	gpio3.I0[25]	SAIS_MCLK(K4)	RSV_GPI#	1	PU	(NC) Reserved for GPIO(low active)
SPDIF_TX(F6)	NVCC_SAI3	pwm3.OUT	SPDIF_TX(F6)	PWM3	0		PWM/GPO function to FrontPanel
SPDIF_RX(G6)	NVCC_SAI3	pwm2.OUT	SPDIF_RX(G6)	PWM2	0		PWM/GPO function to DIO Conn
SAI3_TXD(C3)	NVCC_SAI3	gpio5.I0[1]	SAI3_TXD(C3)	LVDS_DS1_EN	0	PD	high to EN MIPI-DS1 Chip
SAI3_TXFS(G3)	NVCC_SAI3	gpio4.I0[31]	SAI3_TXFS(G3)	WWAN_nDIS	0	PU	Disable# WWAN of M.2(Key-B) & Power
SPDIF_EXT_CLK(E6)	NVCC_SAI3	gpio5.I0[5]	SPDIF_EXT_CLK(E6)	GPIO5_HUB_EN	0	PD	(NC) low to Reset USB2.0 HUB
ECSPH1_SCLK(D5)	NVCC_ECSPH	ecsp1.SCLK	DS1_EN	ESPI1_SCLK			
ECSPH1_MOSI(A4)	NVCC_ECSPH	ecsp1.MOSI	DS1_TS_nINT	ESPI1_MOSI			SPI to CAN Bus
ECSPH1_MISO(B4)	NVCC_ECSPH	ecsp1.MISO	UART3_CTS	ESPI1_MISO			
ECSPH1_SS0(D4)	NVCC_ECSPH	ecsp1.SS0	UART3_CTS	ESPI1_SS0			
ECSPH2_SCLK(C5)	NVCC_ECSPH	uart4.RX	PCIe_nDIS	UART4_RXD			
ECSPH2_MOSI(E5)	NVCC_ECSPH	uart4.TX	PCIe_nWAKE	UART4_TXD			UART4 with 485-Autoflow Control(CTS)
ECSPH2_MISO(B5)	NVCC_ECSPH	uart4.CTS_B	PCIe_nRST	UART4_CTS			
ECSPH2_SS0(A5)	NVCC_ECSPH	uart4.RTS_B	PCIe_nPME	UART4_RTS			
Pin Name	Power Group	AltX	CRB	M8M051.RA	I/O	Ext.PU/PD	M8M051 Signal Desc.
GPIO1_I003(P4)	NVCC_GPIO1	gpio1.I0[3]	CSI_P1_PWDN	RSV_GPIO	1/0	PU/PD	Reserved for GPIO or Jumper.
GPIO1_I010(M7)	NVCC_GPIO1	gpio1.I0[10]	ENET_VoL	USB_ID_C	1	PU	high: Download, low: OTG(cable to GND).
SAI3_MCLK(D3)	NVCC_SAI3	gpio5.I0[2]	SAI3_MCLK(D3)	ID[0]	1	PU/PD	BOM opt. for ID[2:0]
SAI3_RXFS(G4)	NVCC_SAI3	gpio4.I0[28]	SAI3_RXFS(G4)	ID[1]	1	PU/PD	BOM opt. for ID[2:0]
SAI3_RXC(F4)	NVCC_SAI3	gpio4.I0[29]	SAI3_RXC(F4)	ID[2]	1	PU/PD	BOM opt. for ID[2:0]
Pin Name	Power Group	AltX	CRB	M8MT51	I/O	Ext.PU/PD	M8MT51 Signal Desc.
NAND_DQS(M20)	NVCC_NAND	GPIO3.I0[14]	BT_HOST_WAKE	PCIe_nWAKE (禁用)	1	PU	PowerBTN# Form MCU @Power Board
NAND_CE1_B(G21)	NVCC_NAND	GPIO3.I0[2]	BT_DEV_WAKE	BT_DEV_nWAKE (禁用)	0	PD	CPU_GPO to power-down Wifi Module.
SAI3_RXD(F3)	NVCC_SAI3	GPIO4.I0[30]	SAI3_RXD	LED_BL_PWR	0	PD	high to EN BL Power (5V/12V)
SAI2_RXFS(L4)	NVCC_SAI2	GPIO4.I0[21]	SAI2_RXFS	GPO_AMP_RUN	0	PD	AMP - MUTER/#0#
SAI3_TXC(C4)	NVCC_SAI3	GPIO5.I0[0]	SAI3_TXC	GPO_UR1_EN	0	PU	USB to UART1 - EN
SAI2_RXC(H3)	NVCC_SAI2	GPIO4.I0[22]	SAI2_RXC	GPO_UR2_EN	0	PU	USB to UART2 - EN
Pin Name	Power Group	AltX	CRB	M8MT51.R2	I/O	Ext.PU/PD	M8MT51 Signal Desc.
GPIO1_I003(P4)	NVCC_GPIO1	gpio1.I0[3]	RSV_GPIO (禁用)		0	PU	CAN Bus termination,high = 120-Ohm)
SAI3_MCLK(K4)	NVCC_SAI5	gpio3.I0[25]	RSV_GPI# (禁用)		1	PU	A+G INT#

**DFI**

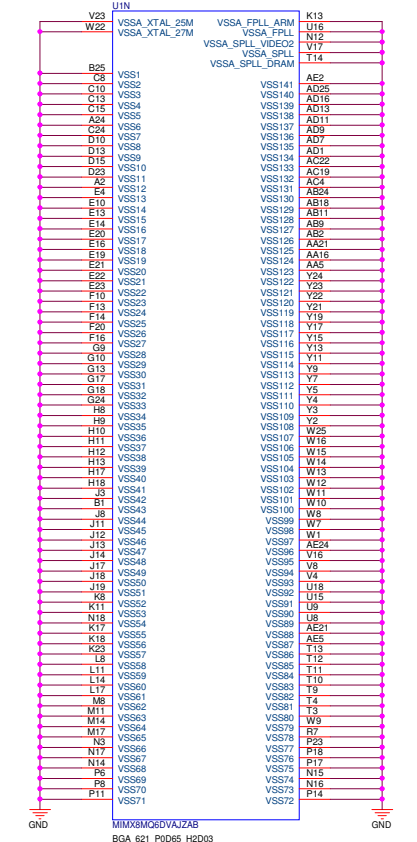
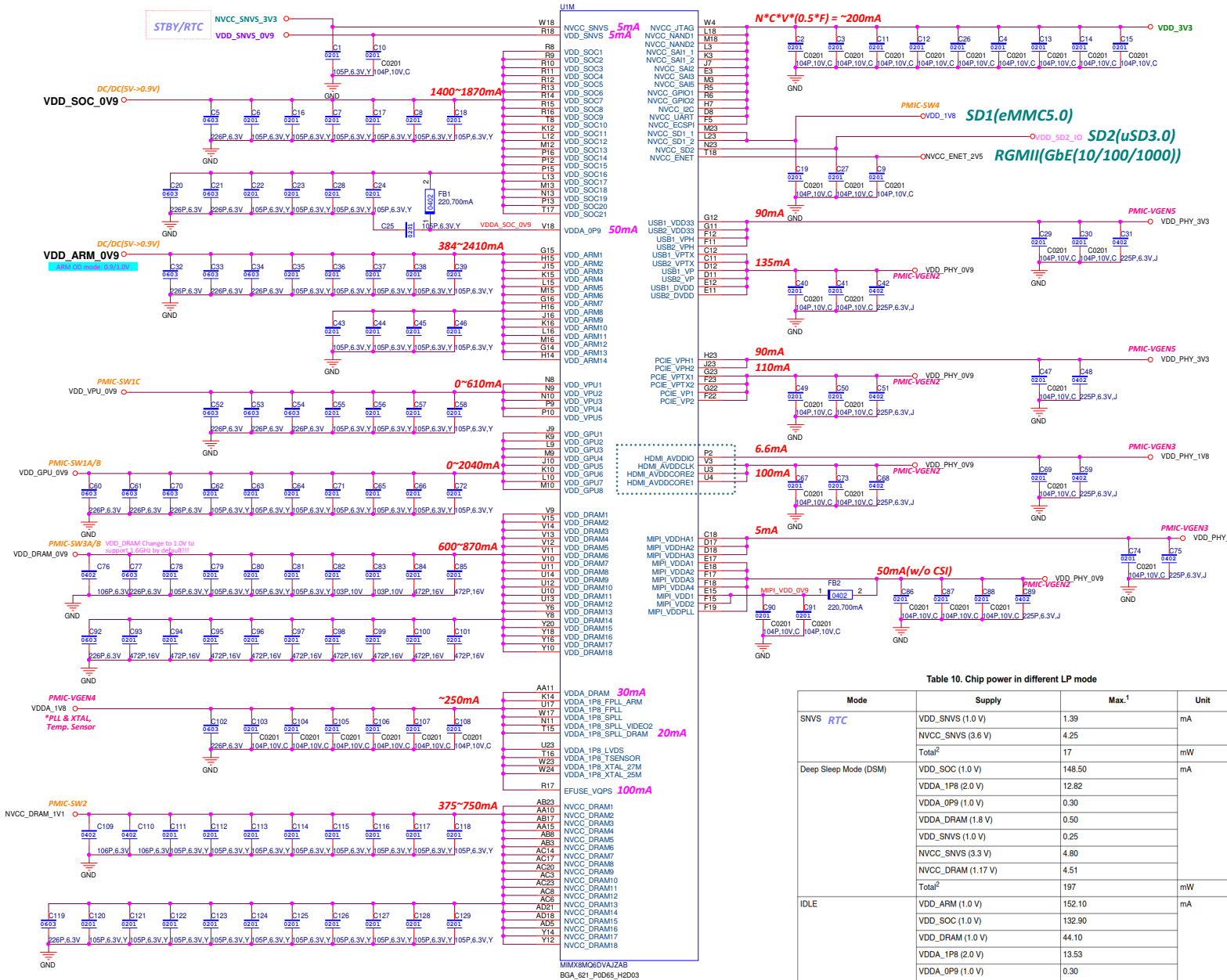
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Size: Document Number: M8MT51

Custom: 2

Rev: 2

E2410R061024590100



**Table 10. Chip power in different LP mode**

BGA\_621\_P0D65\_H2D03

Function	Ball name	Recommendation if unused
HDMI	HDMI_AVDDIO, HDMI_AVDDCLK, HDMI_AVDDCORE1	Tie to the ground

**DFI**

Title: **i.MX8M CPU\_PWR**

Size: Document Number: **E24\*10R06\*02-4590\*00**

Date: Monday, August 15, 2022

Rev: 32

<sup>1</sup> All the power numbers defined in the table are based on typical silicon at 25°C. Use case dependent

<sup>2</sup> Sum of the listed supply rails.

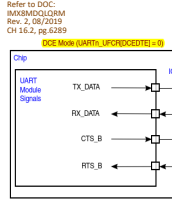
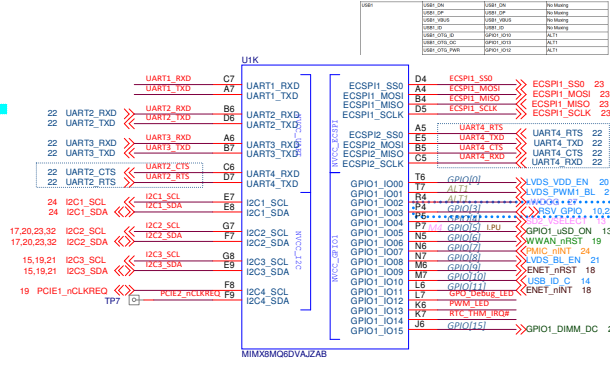




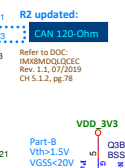


UART1-TX/RX  
A53 Debug  
UART2-TX/RX/RTS/CTS  
RS-232  
UART3-TX/RX  
RS-232

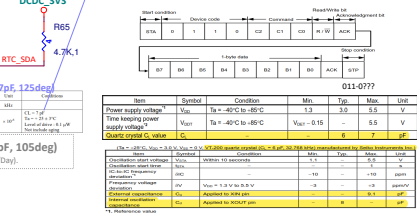
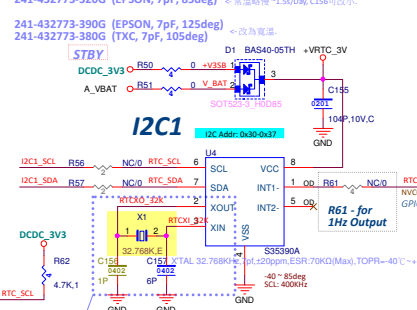
I2C1~3  
(2.1)



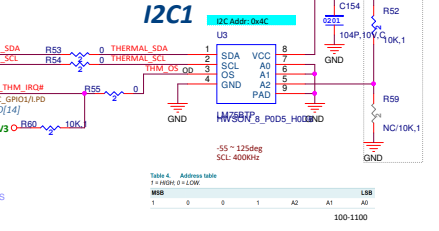
eCSPI1-CAN(2.0)  
RS-232/422/485



RTC  
IF\_TMxD2301000248DV

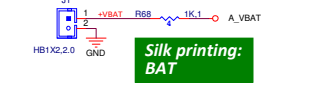


Thermal Sensor



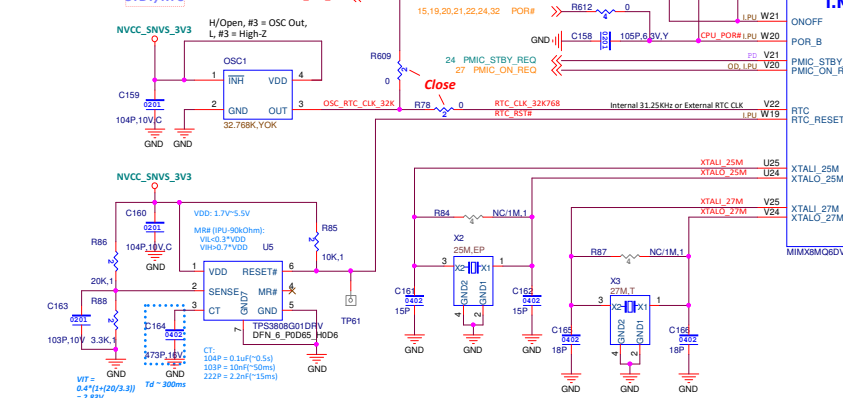
BAT

622-010150-000G  
BATTERY CR2032W 3V  
210mAh, -40~125,W/CABLE(L=150mm&TAPE)

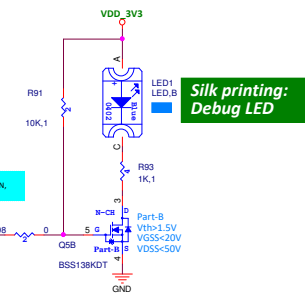


MISC

242-232773-210G (HELE, 85deg)  
242-232773-250G (YOKE, 125deg)  
242-232773-240G (MEC, 105deg)



Debug LED



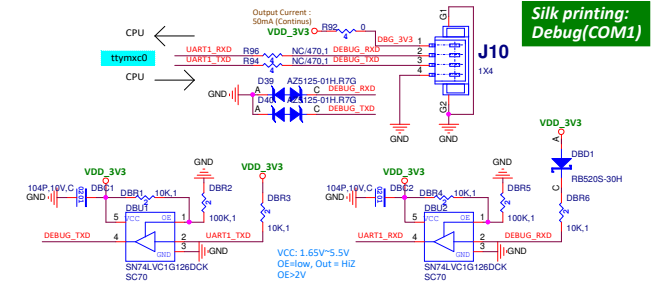
JTAG

Silk printing: JTAG



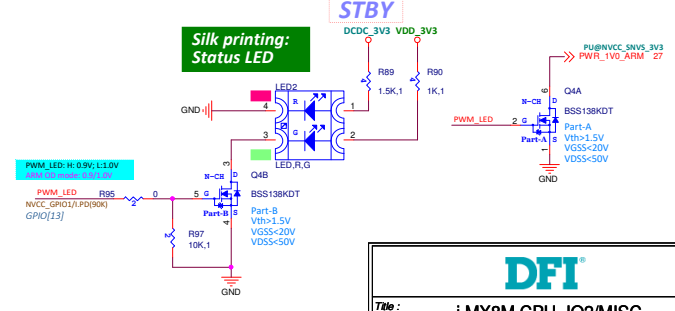
Debug UART1

Silk printing: Debug(COM1)



Status LED

Silk printing: Status LED



**DFI**

Title: i.MX8M CPU\_IO2/MISC

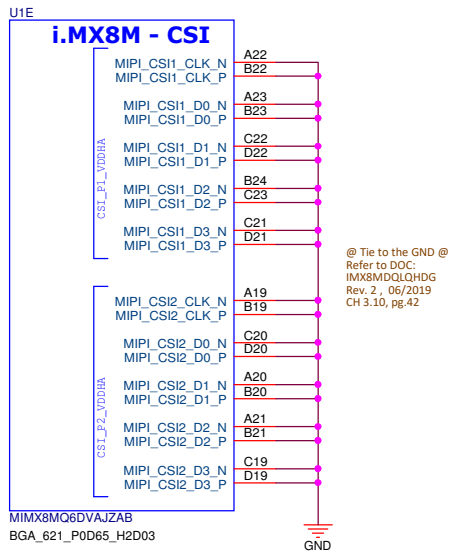
Size: E24\*10R06/02\*4590

Custom:  Rev:

Date: Monday, August 15, 2022 | Page: 11 / 32

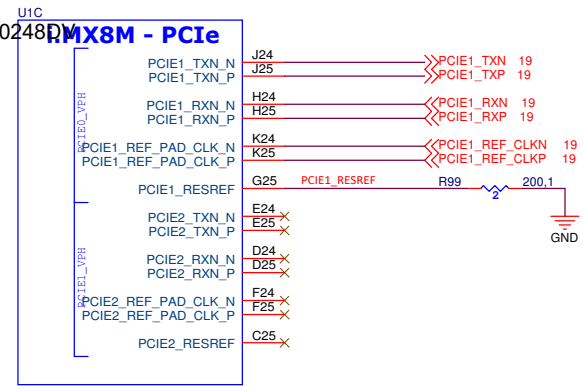
# PHY

IF\_TMxD2301000248



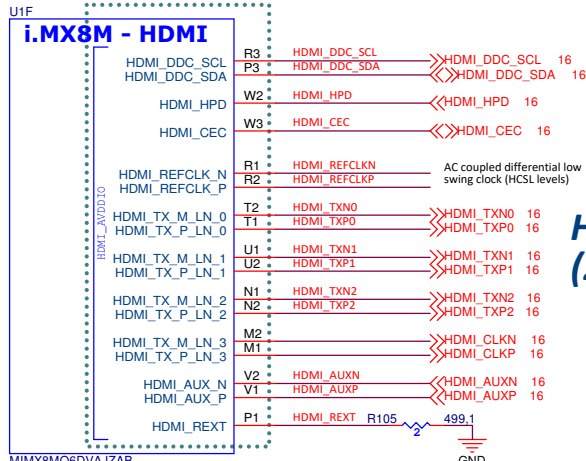
USB\_RESREF: Attach a 200-Ohm(1%) 100-ppm/C precision resistor-to-ground on the board.  
 MIPI\_DSI\_REXT: 15K-Ohm  
 PCIe: 200-Ohm(1%) 100-ppm/C precision resistor-to-ground on the board.  
 HDMI:a 499-Ohm (1%) resistor-to-ground on the board.

@ Tie to the GND @  
 Refer to DOC:  
 IMX8MDQLQHDG  
 Rev. 2, 06/2019  
 CH 3.10, pg.42

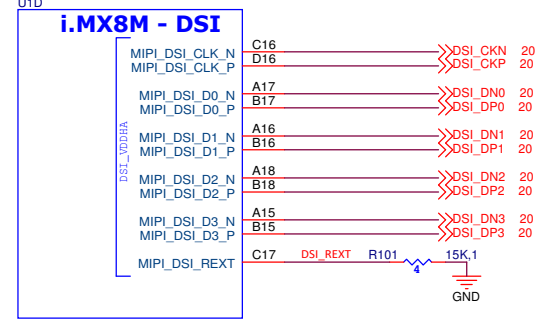


**PCIe1(2.0, 1-lane)-M.2 Key E**

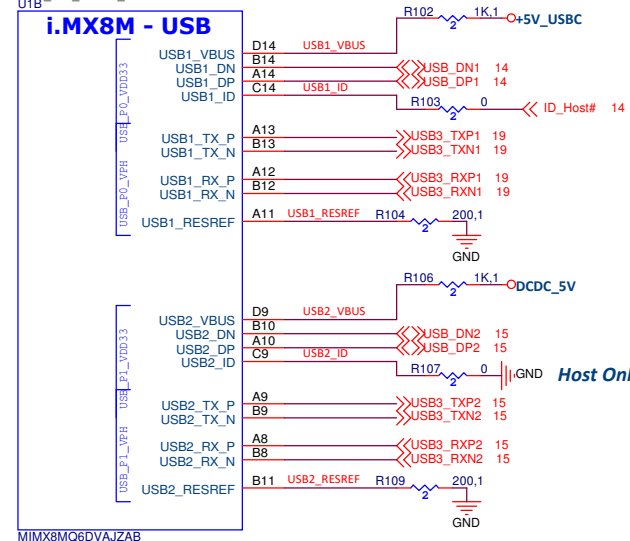
**PCIe2(2.0, 1-lane)-Reserved**



**HDMI Tx (2.0a)**



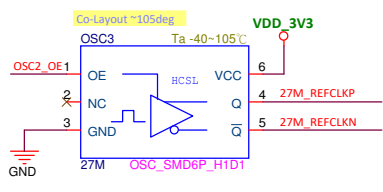
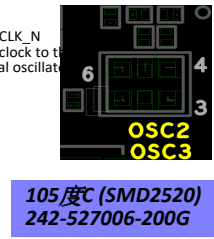
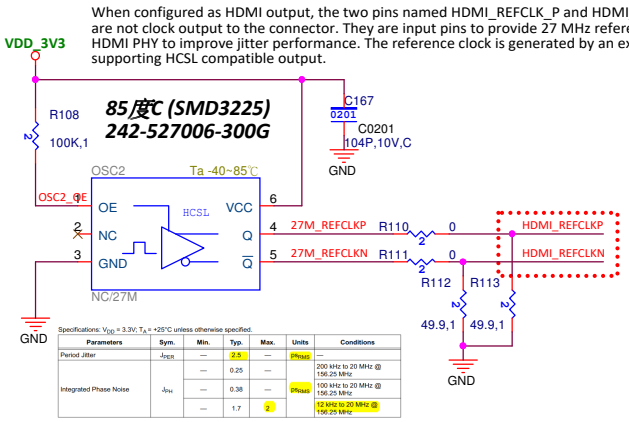
**MIPI DSI(4-lane)-LVDS(Dual Ch.)**



**Download low = Host, floating = Serial Download**

**USB3.0-WWAN**

**USB3.0 HUB**



Function	Ball name	Recommendation if unused
HDMI	HDMI_DDC_SCL, HDMI_DDC_SDA, HDMI_HPD, HDMI_CEC, HDMI_REFCLK_P/N, HDMI_TX_P/N, HDMI_AUX_P/N	Leave unconnected
	HDMI_REXT	Tie to the ground

**DFI**

**Title :** i.MX8M CPU\_PHY

**Size :** Document Number : M8MT51

**Custom :** 4590\*00

**Rev :** 2

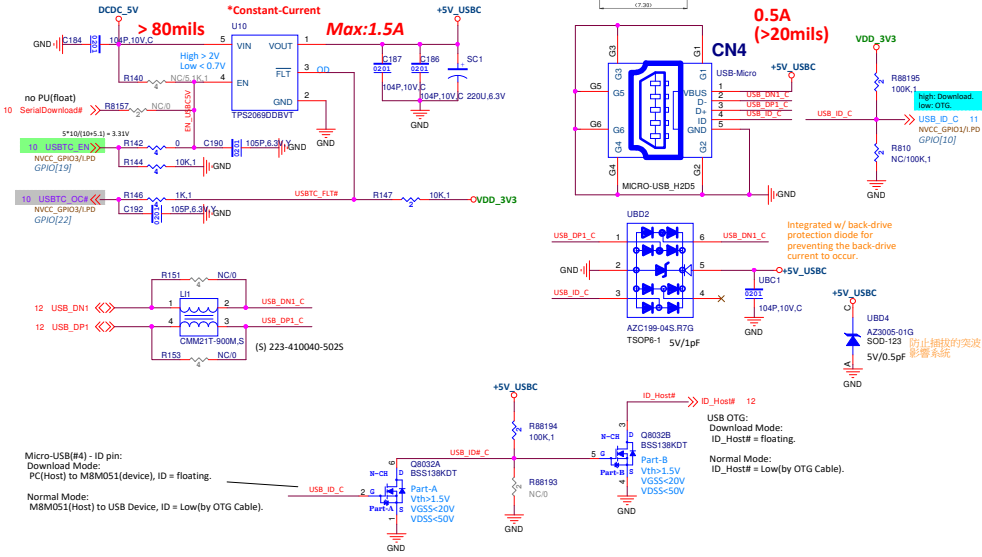
Page : 12 / 32



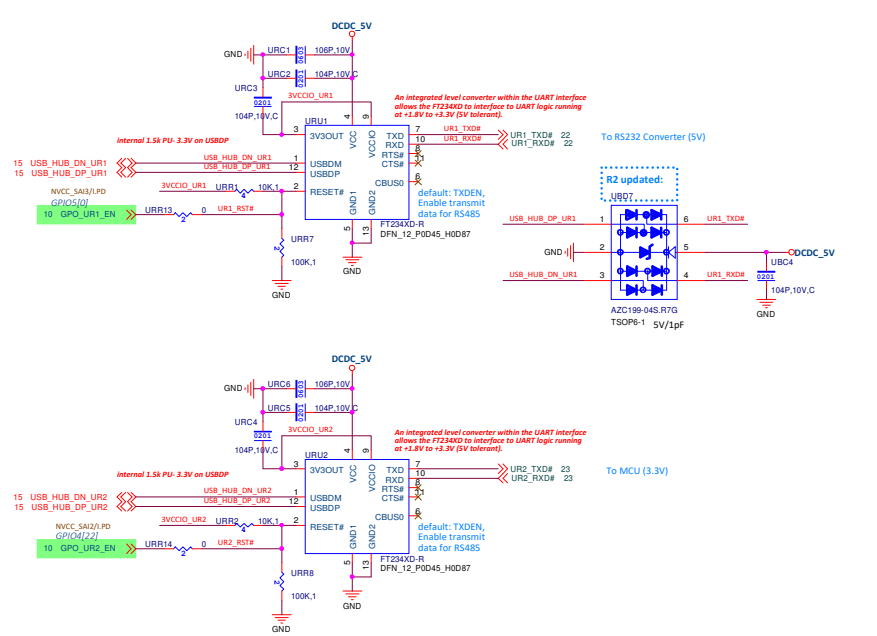


# USB 2.0 (Download)

GPO(hgh) to Enable OTG-Power

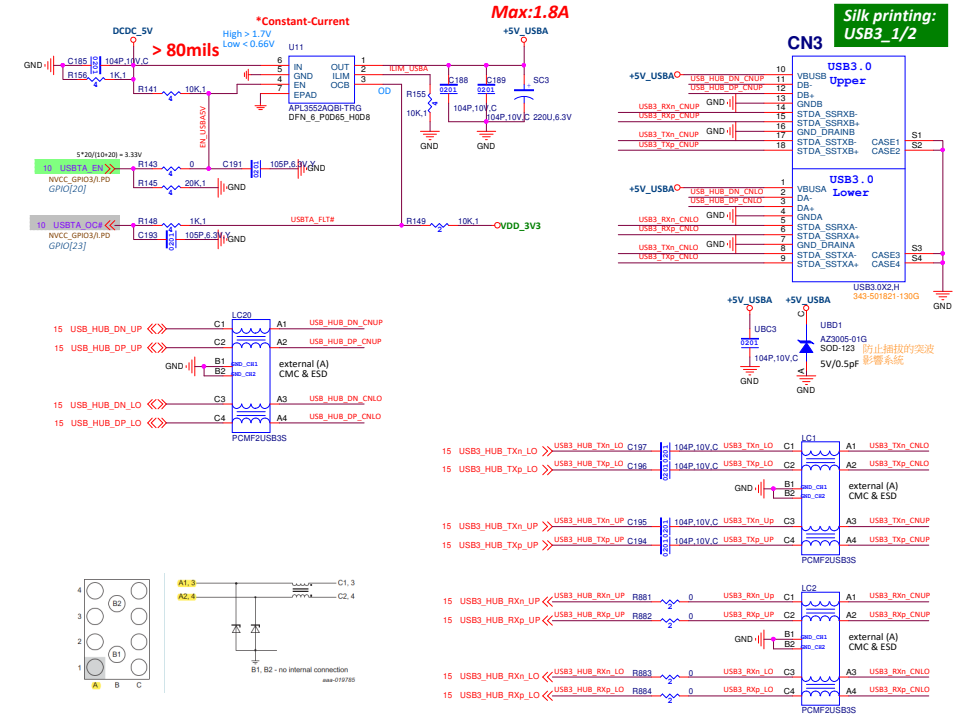


# USB 2.0 -> UART(TX/RX/RTS/CTS)



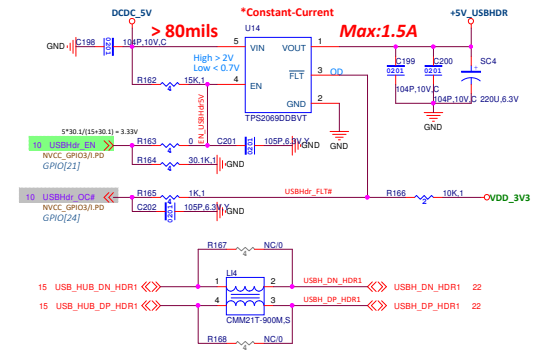
IF\_TMXP2301000248DV

# USB 3.0-TypeA Page 56 of 94 28.03.23



# USB 2.0-HDR

Silk printing: USB2\_3



**DFI**

Title: USB3.0 / USB2.0

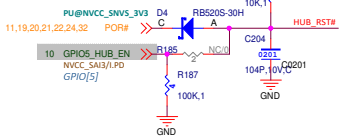
Size: Document Number: MBMT51

Rev: 2

E24\*10R06102\*4590\*00 Page 14 / 32

# USB3.0 HUB

When using legacy USB Type-A and Type-B connectors, pull these pins to 3.3V to permanently enable all USB 3.1 PHYs.



No battery charging  
All ports removable  
PD-10k: Port 1,2 non-removable

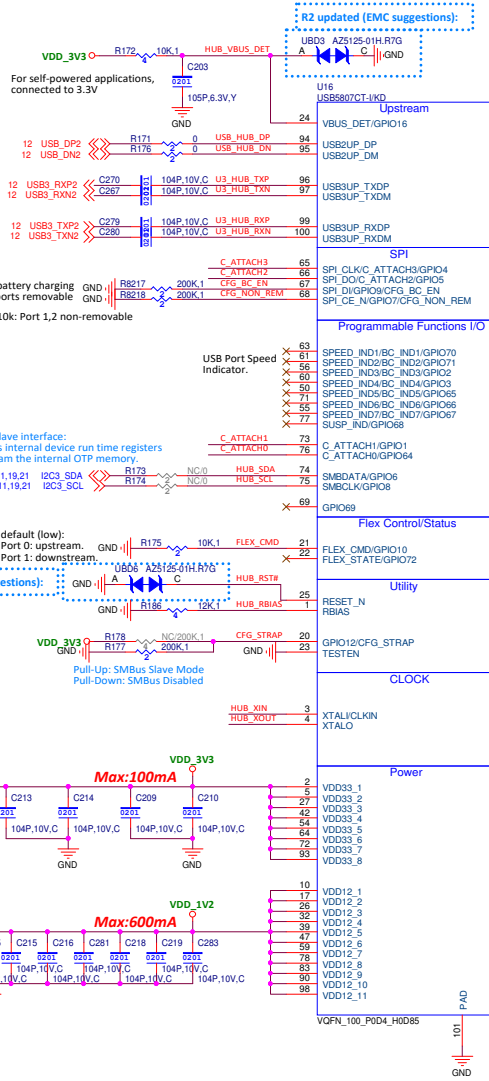
SMBus slave interface:  
to access internal device run time registers  
or program the internal OTP memory.

default (low):  
Port 0: upstream  
Port 1: downstream

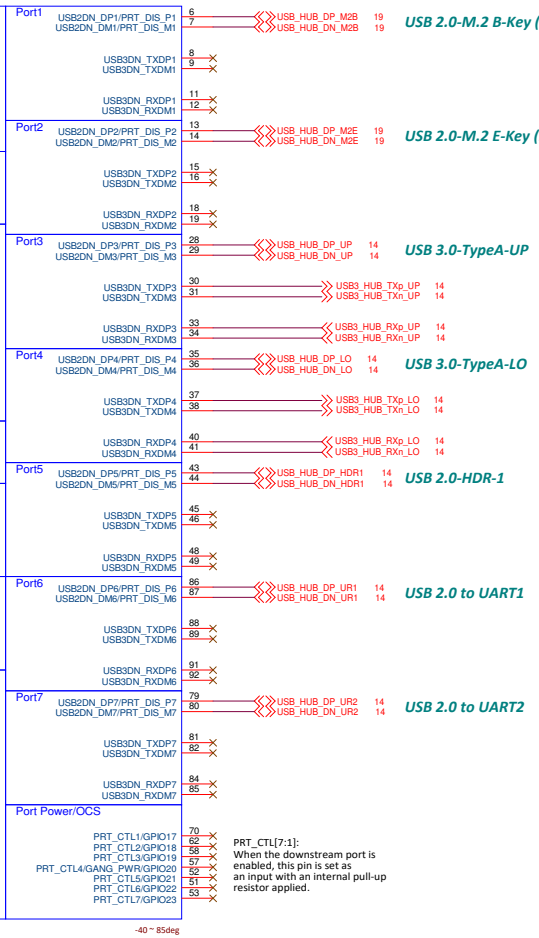
R2 updated (EMC suggestions):

Max: 100mA

Max: 600mA



## IF\_TMxD2301000248DV

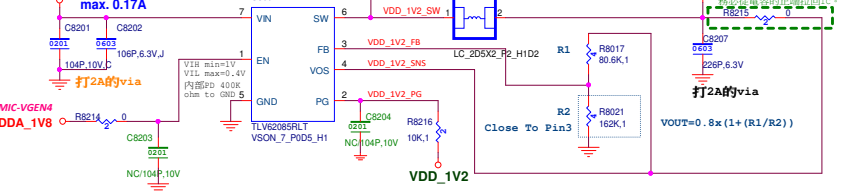


PRT\_CTL[7:1]:  
When the downstream port is enabled, this pin is set as an input with an internal pull-up resistor applied.

**USB5807C-1/KD 100 VQFN 12X12X0.9mm (I-grade)**  
**USB5807C/KD 100 VQFN 12X12X0.9mm (C-grade)**

Fsw=2.4MHz  
ΔI=0.81A  
max. 0.6A

### DCDC\_5VSB



VDD33 should rise after or at the same rate as VDD12.  
Similarly, RESET\_N and/or VBUS\_DET should rise after or at the same rate as VDD33.  
VBUS\_DET and RESET\_N do not have any other timing dependencies.

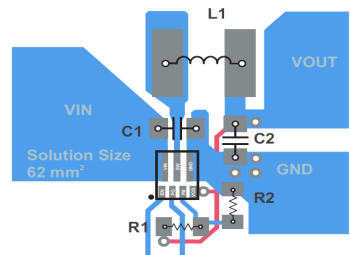


Figure 22. PCB Layout Recommendation

FIGURE 10-2: POWER SUPPLY AND RESET\_N SEQUENCE TIMING Page 57 of 94 28.03.23

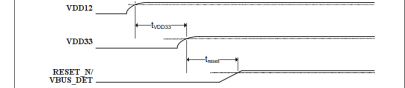


FIGURE 10-3: POWER-ON CONFIGURATION STRAP VALID TIMING

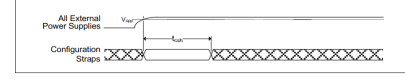
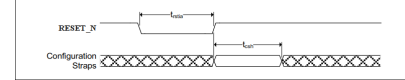
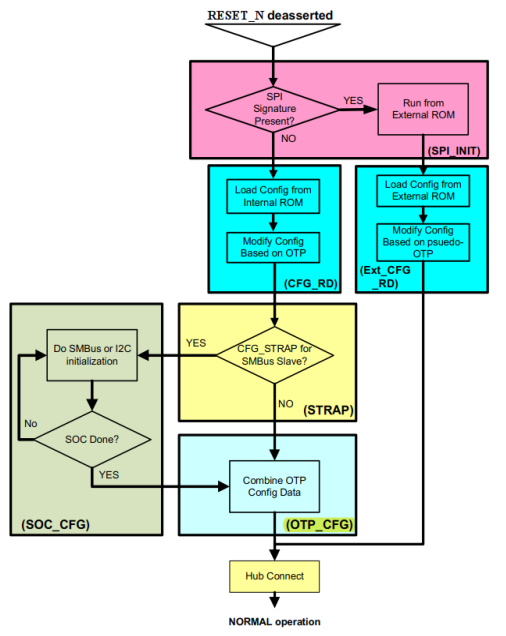


FIGURE 10-4: RESET\_N CONFIGURATION STRAP TIMING



- 1) update SPI flash from USB Host(2.0).
- 2) update OTP ROM via USB Host(2.0).
- 3) update OTP ROM via SMBus Host(100KHz). <- SOC\_CFG stage (SMB PU-10K)



**DFI**

Title : **USB3.0 Hub(USB5807C)**

Size : Document Number : **MP1551** Rev : **2**

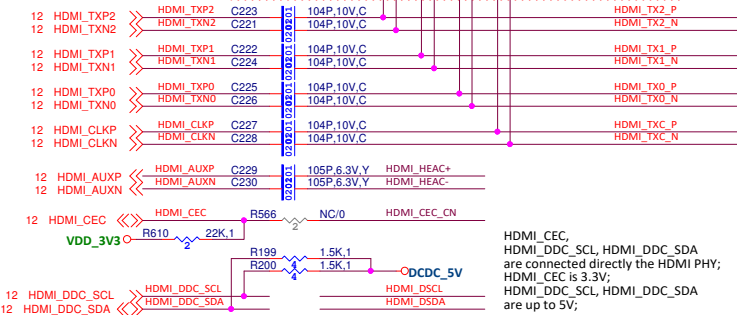
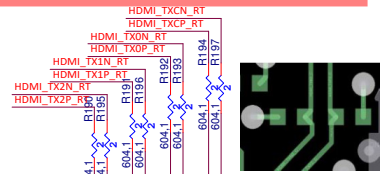
**E24\*10R06\*02\*4590\*00**

Date : Monday, August 15, 2022 Page : 13 / 32

# HDMI2.0a

TMXD2301000248DV

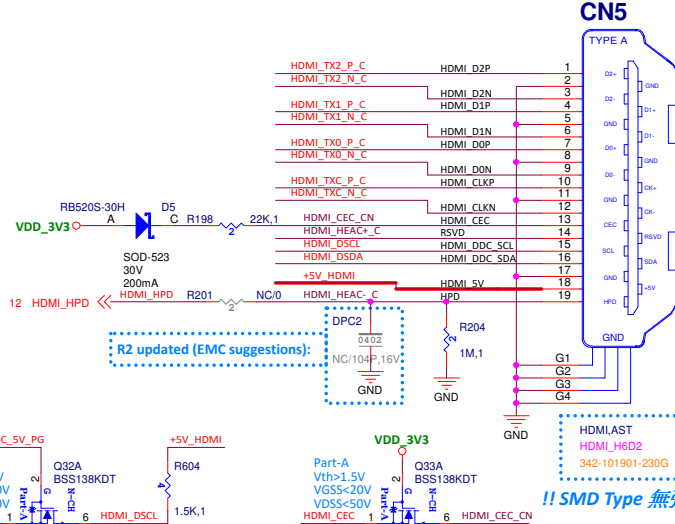
Layout: 604-Ohm directly on the signal trace



HDMI\_CEC, HDMI\_DDC\_SCL, HDMI\_DDC\_SDA are connected directly to the HDMI PHY; HDMI\_CEC is 3.3V; HDMI\_DDC\_SDA are up to 5V;

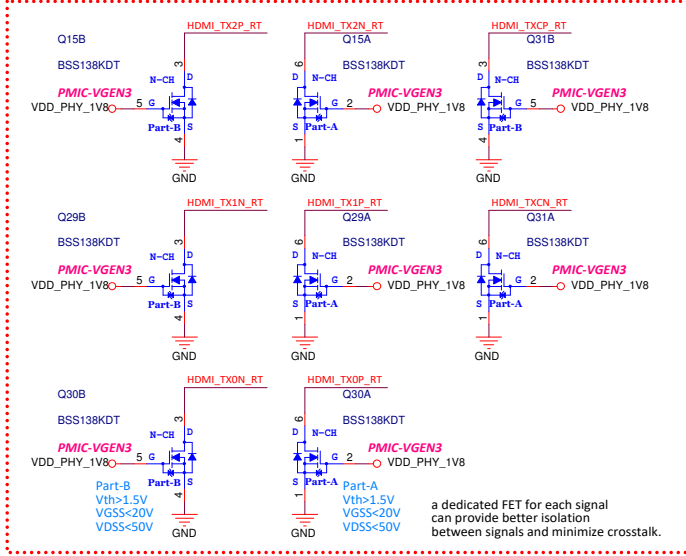
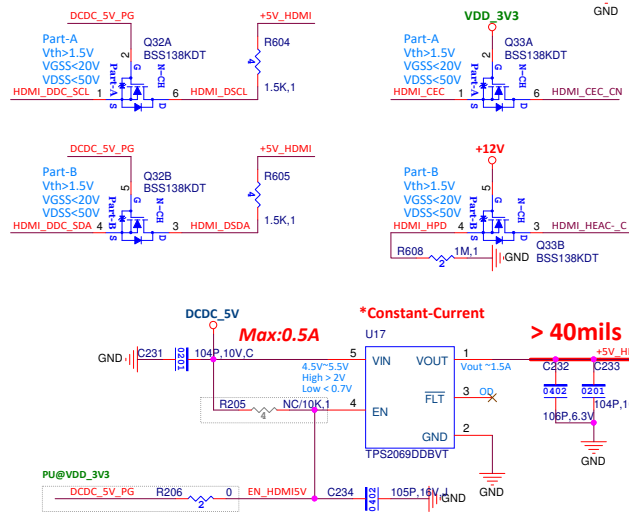
Layout: HDMI 100 ohm differential pairs

Silk printing: HDMI1

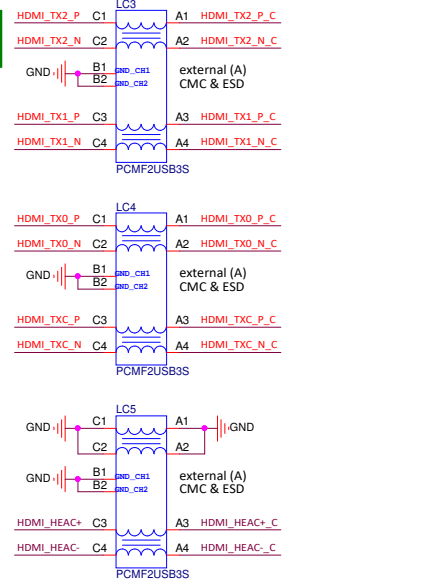


R2 updated (EMC suggestions):

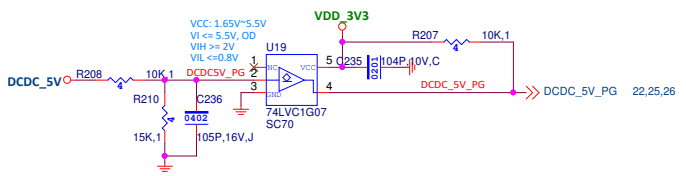
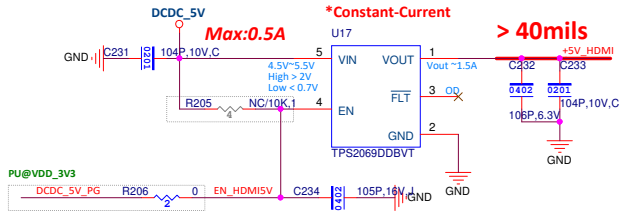
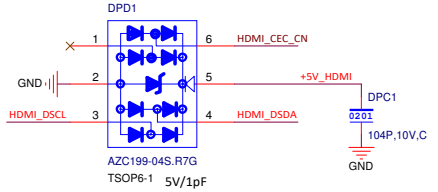
!! SMD Type 無彈片 !!



a dedicated FET for each signal can provide better isolation between signals and minimize crosstalk.



Integrated w/ back-drive protection diode for preventing the back-drive current to occur.



**DFI**

Title: HDMI2.0a TX

Size: Document Number: **M8MT51**

Custom: **F24\*10R06/02\*4590\*00**

Date: Monday, August 15, 2022

Rev: 10 / 32

# I2S Codec

--- New Part / Package ---

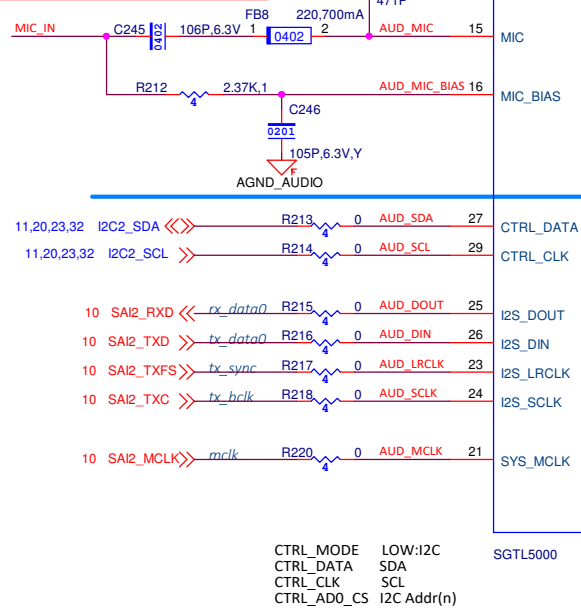
## I2C2

I2C Addr: 0x0A

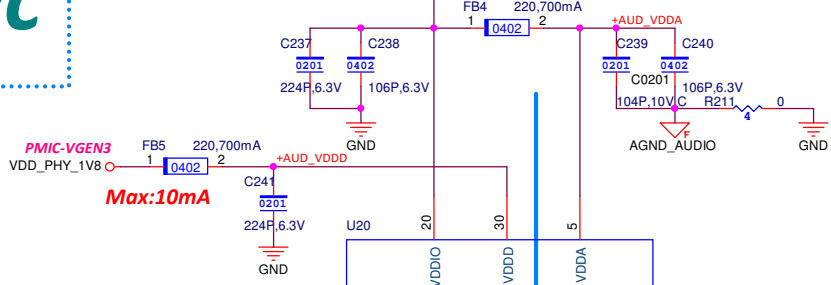
For the 32 QFN version of the SGT5000, the I<sup>2</sup>C device address is 0n01010(R/W) where n is determined by I2C\_ADR0\_CS and R/W is the read/write bit from the I<sup>2</sup>C protocol.

0n0-1010

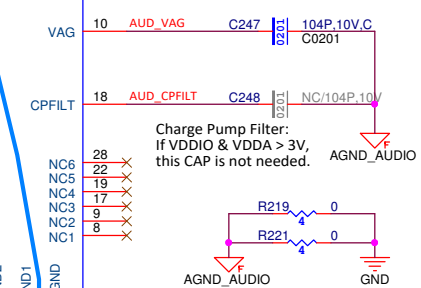
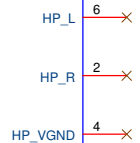
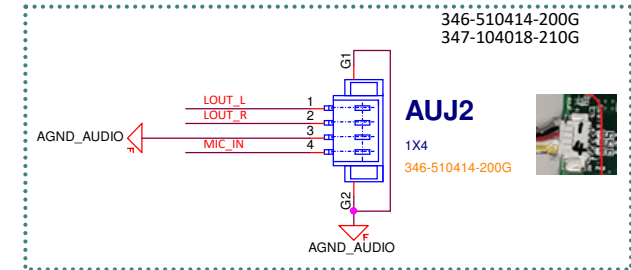
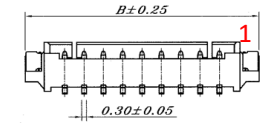
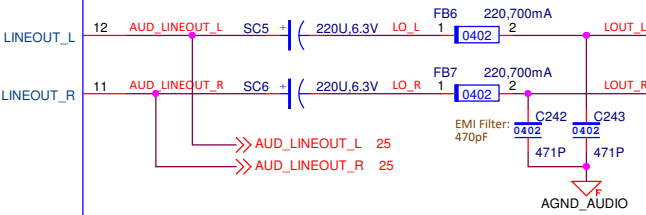
Layout: Analog Trace, >8mils



> 20mils VDD\_3V3 Max:20mA IF\_TMxD2301000248DV



Layout: Analog Trace, >8mils



AGND: Star connected to the jack GND.  
\*via to GND plane at a single point.

<b>DFI</b>		
Title : I2S Codec(SGTL5000)		
Size : Document Number :	M8MT51	
Date : Monday, August 15, 2022	Page : 17 / 32	Rev : 2









# DSI to LVDS

one Display, up to 1920\*1080 (60Hz)

IF\_TMxD2301000248DV

# LCD Module

(3.3V & 5V)

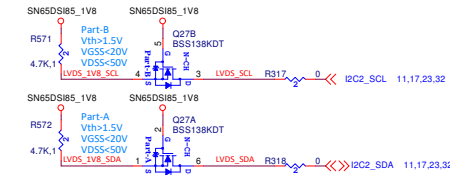
## I2C2

HW Implementation Guide: I2C Addr: 0x58/59

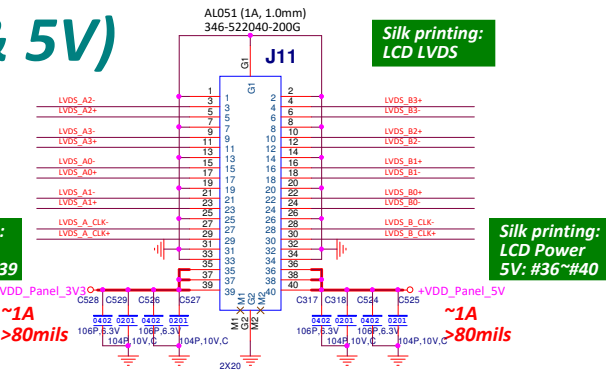
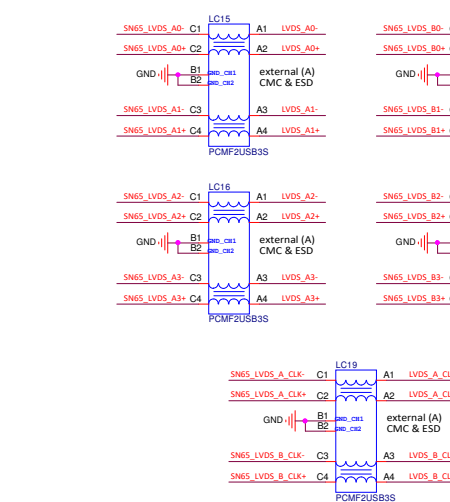
Table 6. SN65DS185 FC Target Address Description (1) (2)

BIT 7 (MSB)	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0 (LSB)
0	1	0	1	1	0	0	0/1

(1) When ADDR=1, Address Cycle is Data (Write) and 0x58 (Read)  
(2) When ADDR=0, Address Cycle is Data (Write) and 0x59 (Read)



Layout: LVDS 100 ohm differential pairs  
angle of the bends must be >=135 deg.



Layout: For all differential pairs (DSI and LVDS) in this design follow the guidelines described below:  
Route together with controlled differential 100ohm impedance.  
Keep away from other high speed signals. Keep lengths within 5mil of each other.  
Keep traces on layers adjacent to the ground plane. Keep the number of VIAS to minimum.  
If VIAS are used, make it symmetrical through all signals.  
Keep diff pairs separated at least by x3 of the trace width. NO STUBS on the signal path.  
Components should be placed such that the signals can routed in pass-through manner..

### 121-003552-200G\_APL3552AQBI

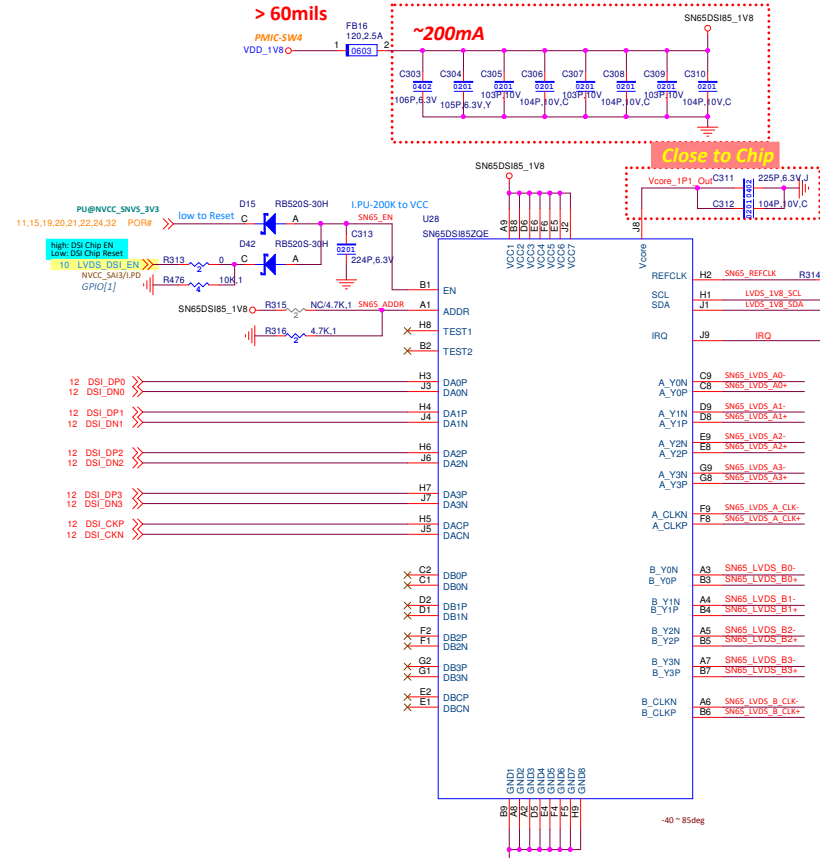
CURRENT LIMIT		R <sub>th(j-c)</sub> =10K		2.1		2.8		3.2		A	
Maximum Current-limit set point											
I <sub>lim</sub>	Current Limit Threshold	V <sub>in</sub> =2.7V to 5.5V T <sub>a</sub> =40 ~ 85°C	R <sub>th(j-c)</sub> =15KΩ	1.4	1.7	2					
			R <sub>th(j-c)</sub> =20KΩ	1.101	1.295	1.489					
			R <sub>th(j-c)</sub> =49.9KΩ	0.442	0.52	0.598					
			R <sub>th(j-c)</sub> =150KΩ	0.11	0.15	0.2					

### 121-007111-401G\_JW7111SDFNB

CURRENT LIMIT		R <sub>th(j-c)</sub> =10K		2.2		2.4		2.6		A	
Maximum Current-limit set point											
I <sub>lim</sub>	Current Limit Threshold	V <sub>in</sub> =2.7V to 5.5V T <sub>a</sub> =40 ~ 85°C	R <sub>th(j-c)</sub> =15KΩ	1.4	1.6	1.8					
			R <sub>th(j-c)</sub> =20KΩ	1.0	1.2	1.4					
			R <sub>th(j-c)</sub> =49.9KΩ	0.45	0.55	0.7					
			R <sub>th(j-c)</sub> =150KΩ	0.11	0.15	0.2					

### 121-051711-400G\_G517AL1RB1D

CURRENT LIMIT		R <sub>th(j-c)</sub> =10K		2.58		2.87		3.16		A	
Maximum Current-limit set point											
I <sub>lim</sub>	Current Limit Threshold	V <sub>in</sub> =2.7V to 5.5V T <sub>a</sub> =40 ~ 85°C	R <sub>th(j-c)</sub> =15KΩ	2.25	2.5	2.75					
			R <sub>th(j-c)</sub> =24.9KΩ	0.9	1.1	1.1					
			R <sub>th(j-c)</sub> =37.4KΩ	0.6	0.7	0.8					
			R <sub>th(j-c)</sub> =49.9KΩ	0.425	0.5	0.575					
			R <sub>th(j-c)</sub> =79KΩ	0.264	0.33	0.4					
			R <sub>th(j-c)</sub> =100KΩ	0.175	0.25	0.325					

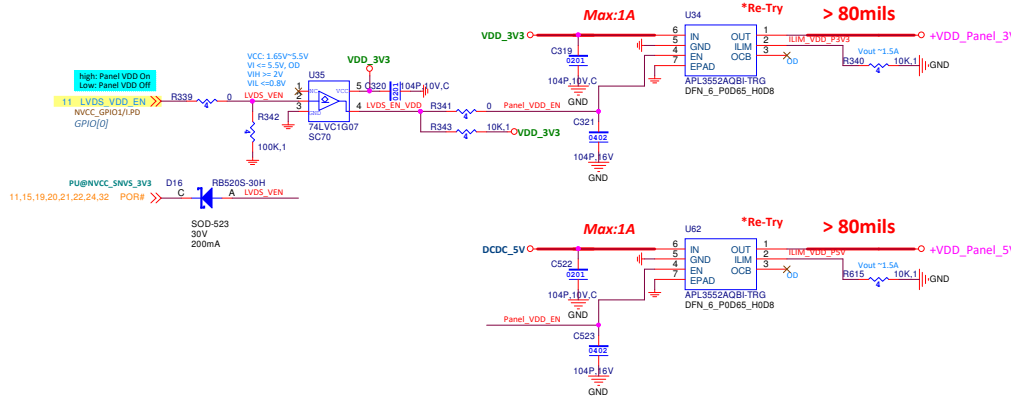


When the SN65DS185 is reset while VCC is high, the EN pin must be held low for at least 10ms before being asserted high as described in Table 5 to be sure that the device is properly reset.

Table 5. Initialization Sequence

INITIALIZATION SEQUENCE NUMBER	INITIALIZATION SEQUENCE DESCRIPTION
Init seq 1	Power on
Init seq 2	After power is applied and stable, the DSI CLK lanes MUST be in HS state and the DSI data lanes MUST be driven to LP11 state
Init seq 3	Set EN pin to Low
Wait 10 ms (1)	
Init seq 4	Tie EN pin to High
Wait 10 ms (1)	
Init seq 5	Initialize all CSR registers to their appropriate values based on the implementation (The SN65DS18x is not functional until the CSR registers are initialized)
Init seq 6	Set the PLL_EN bit (CSR 0x0D.0)
Wait 10 ms (1)	
Init seq 7	Set the SOFT_RESET bit (CSR 0x09.0)
Wait 10 ms (1)	
Init seq 8	Change DSI data lanes to HS state and start DSI video stream
Wait 5 ms (1)	
Init seq 9	Read back all resistors and confirm they were correctly written
Init seq 10	Write 0xFF to CSR 0xE5 and CSR 0xE6 to clear the error registers
Wait 1 ms (1)	
Init seq 11	Read CSR 0xE5 and CSR 0xE6. If CSR 0xE5 and CSR 0xE6 != 0x00, then go back to step #2 and re-initialize

(1) Minimum recommended delay. It is fine to exceed these.



**DFI**

Title : DSI to LVDS(SN65DS185)

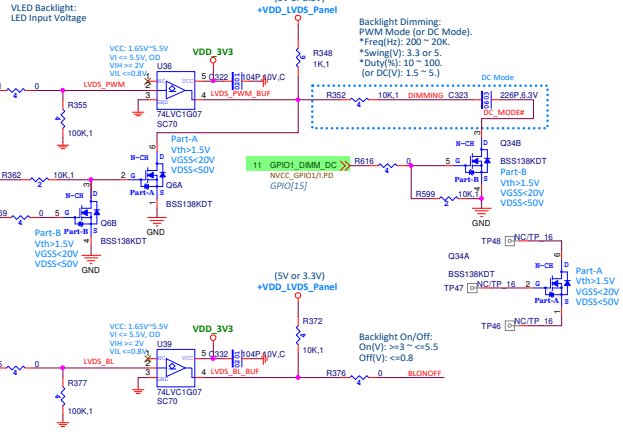
Size : Document Number : M8MT51

Customer : M8MT51

Date : Monday, August 15, 2022

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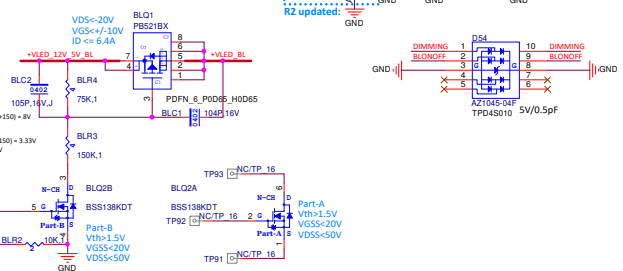
# LED Backlight 5V/12V



**Silk printing:**  
Control Signal Voltage  
JP5(1-3): 5V  
JP5(1-2): 3.3V \*

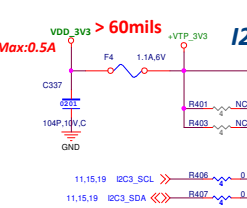


**Silk printing:**  
B.L. Power  
JP5(5-6): 12V \*  
JP5(4-6): 5V  
344-002003-610G  
Mini JUMPER RED 2.0mm



## I2C / Touch

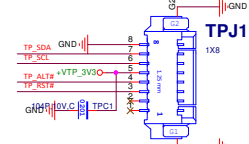
**RISC(ARM):**  
i2c detect the EEPROM = 0x50~0x57.  
實際地址為 A0/A1, 7bit.



**Cable 為 180 度**

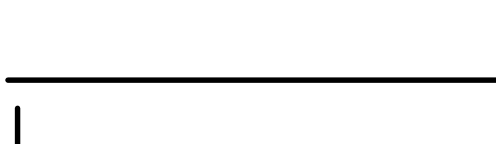
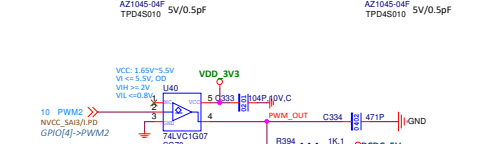
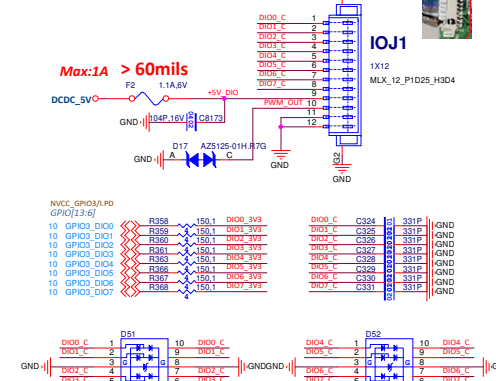
**Silk printing:**  
I2C

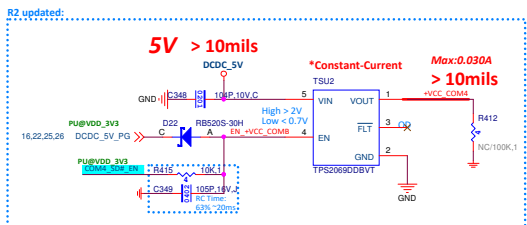
**Silk printing:**  
Touch(3.3V)



BOX HEADER, 1\*8P1.25mm, F, 90D, NATURAL, SMT, A1250WR-S-08PJUNION TECH|Rohs

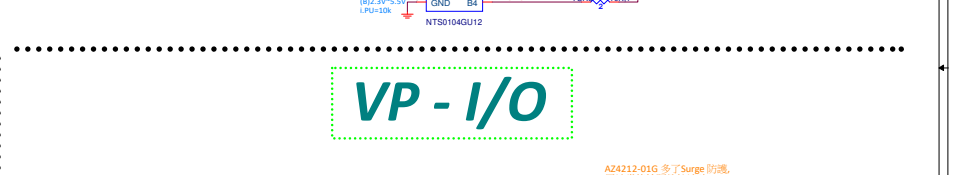
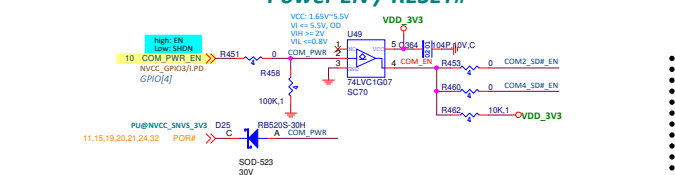
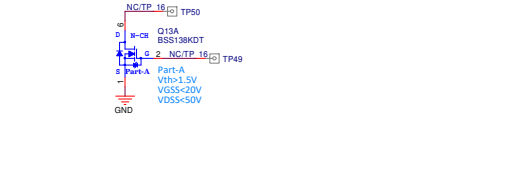
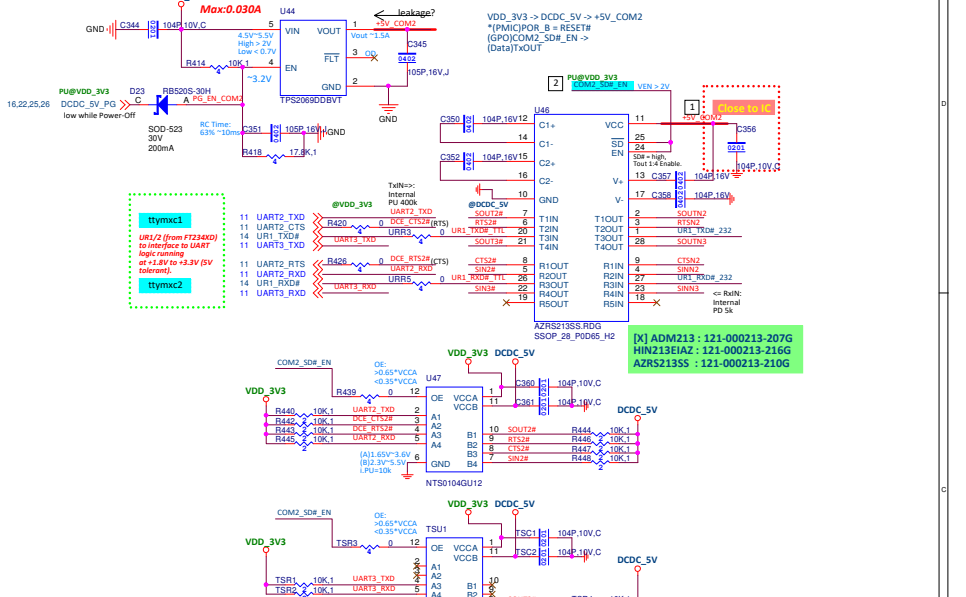
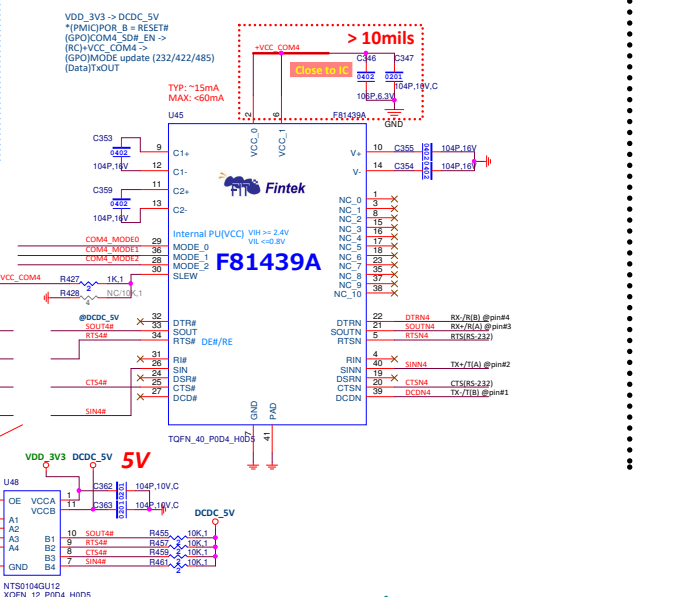
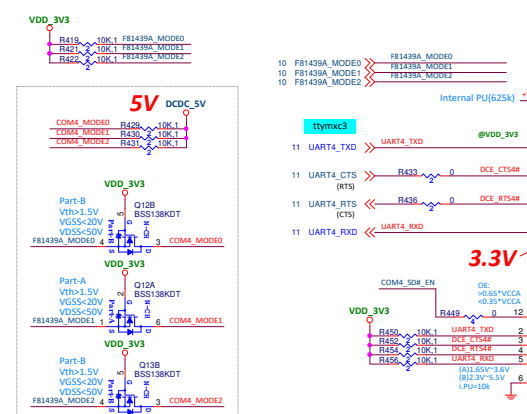
**Silk printing:**  
DIO(5V)





# RS-232/422/485

IF\_TMxD2301000248DV



**DCE Mode:**  
 #34 as DE# (TX Enable Low Active) for RS485  
 Low: TXD => T(A/B)  
 High: RXD <= R(A/B)

## [F81439] RS-232/424/485

TABLE 1: Mode Select Configuration for F81439

Pin 29 MODE 0	Pin 36 MODE 1	Pin 28 MODE 2	Mode	Status
0	0	0	RS-422 Full Duplex	RS-422 Full Duplex
0	0	1	Pure RS-232	RS-232 (default)
0	1	0	RS-485 Half Duplex	RS-485 Half Duplex
0	1	1	RS-485 Half Duplex	RS-485 Half Duplex
1	0	0	RS-422 Full Duplex	RS-422 Full Duplex
1	0	1	Pure RS-232	RS-232
1	1	0	RS-485 Half Duplex	RS-485 Half Duplex
1	1	1	Low Power Shutdown	All I/O pins are High Impedance

COM4 (RS-232/422/485)

J9	RS-232	RS-422	RS-485
#07	n.a.	TX-	DATA-
#08	RX	TX+	DATA+
#09	RTS		
#10	TX	RX+	
#11	CTS		
#12	n.a.	RX-	

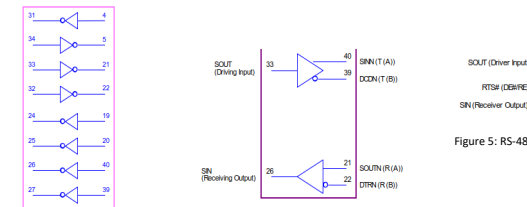


Figure 3: RS-232 Mode (Mode 001)

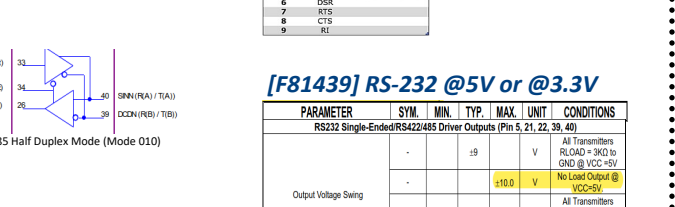


Figure 5: RS-485 Half Duplex Mode (Mode 010)

[F81439] RS-232 @5V or @3.3V

PARAMETER	SYM	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Output Voltage Swing			±10.0		V	All Transmitters RLOAD = 3KΩ to GND @ VCC=5V No Load Output @ VCC=5V
			±8.0		V	All Transmitters RLOAD = 3KΩ to GND @ VCC=3.3V No Load Output @ VCC=3.3V

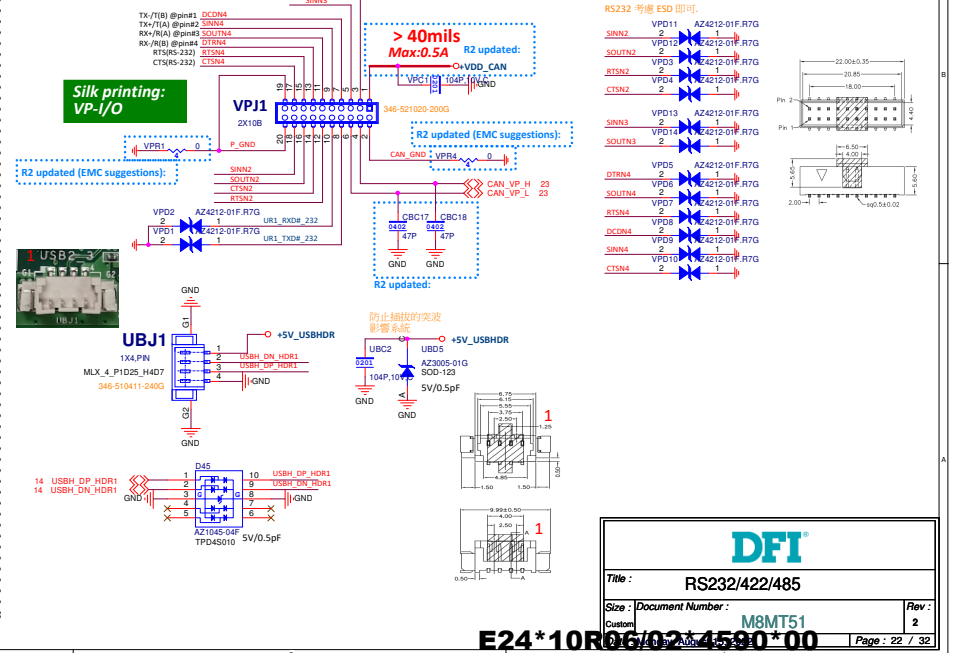


Figure 6: RS-232 Mode (Mode 001)

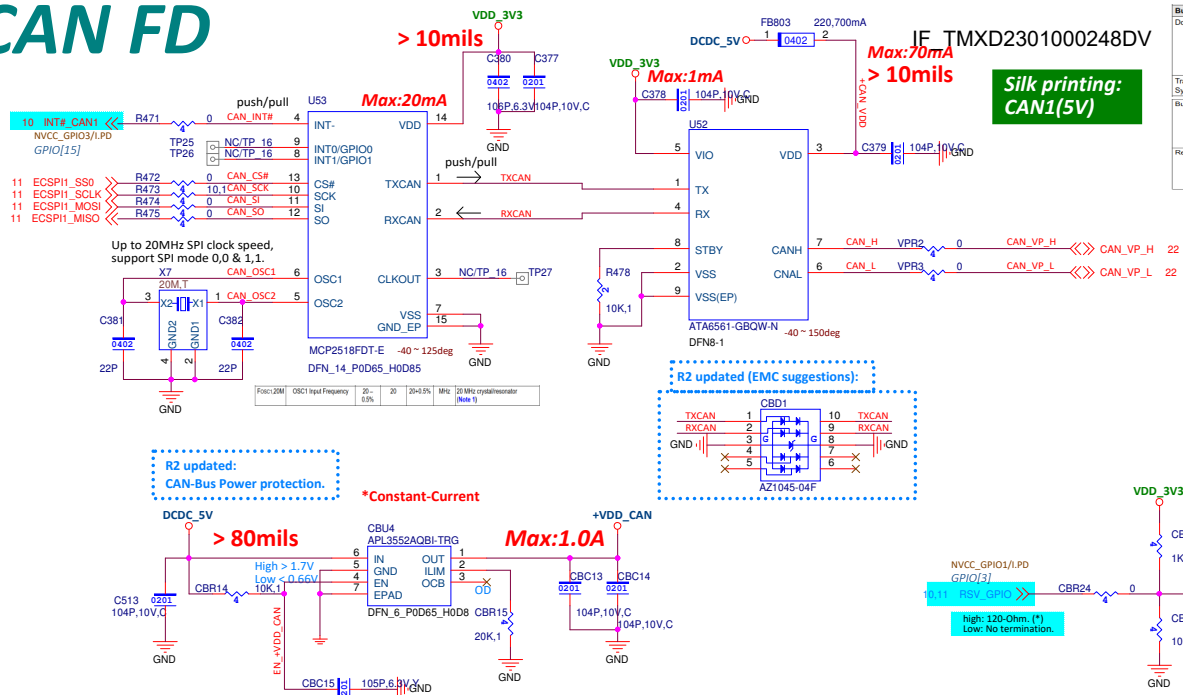
**DFI**

Title: RS232/422/485

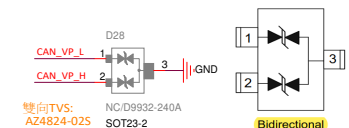
Size: Document Number: M8MT51

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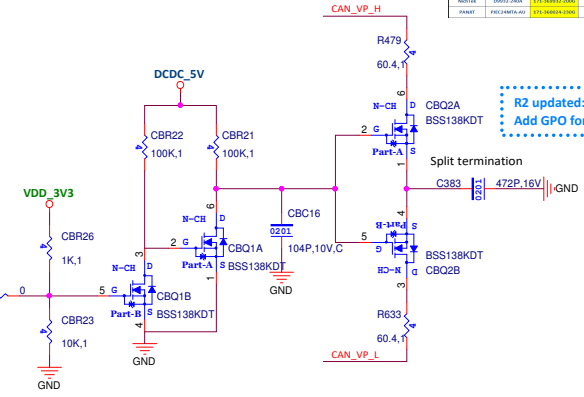
# CAN FD



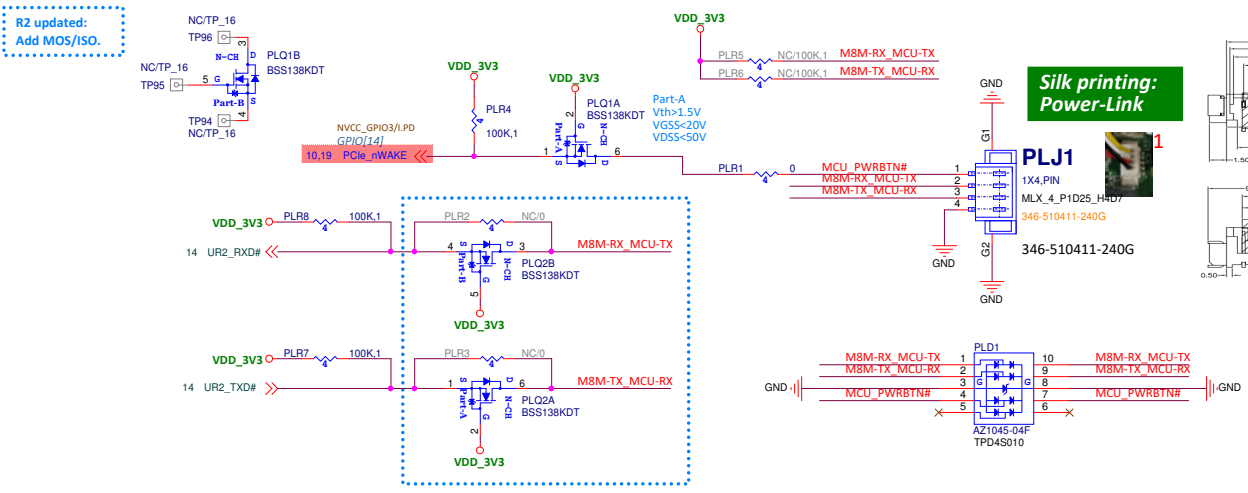
Bus Lines, Pins CANH and CANL		V <sub>VDD</sub> = 0V	
Dominant Output Voltage	I <sub>DO</sub>	2.75	4.5
Transmitter Dominant Voltage Symmetry	V <sub>OUT(Dom)</sub>	0.9 × V <sub>VDD</sub>	1.1 × V <sub>VDD</sub>
	V <sub>OUT(Sil)</sub>	—	—
Recessive Output Voltage	V <sub>OUT(Rec)</sub>	2	3



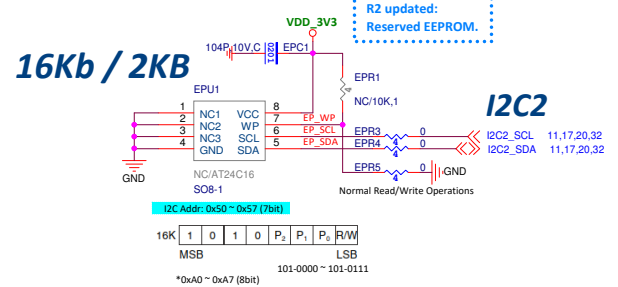
Part Number	Uni / Bi Direction	Marking Code	Reverse Stand off Voltage (V)	Minimum Breakdown Voltage (V)	Maximum Peak Pulse Current (mA)	Maximum Clamping Voltage (V)	Maximum Reverse Leakage (µA)	Typical Capacitance (pF)	Maximum Capacitance (pF)
D9932-240A	Bi	CB2	24	26.7	6	40	1	15	18



# M8M UART-Link to Power Board



# EEPROM



**DFI**

**Title: UART-Link / CAN2.0**

**Size: Document Number: M8MT51**

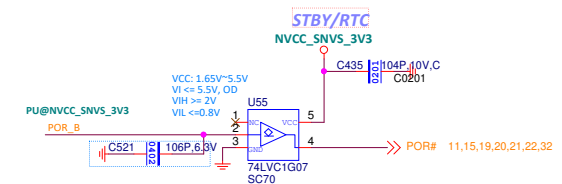
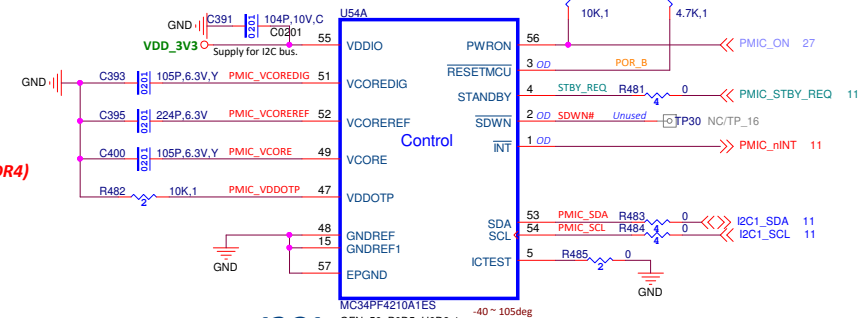
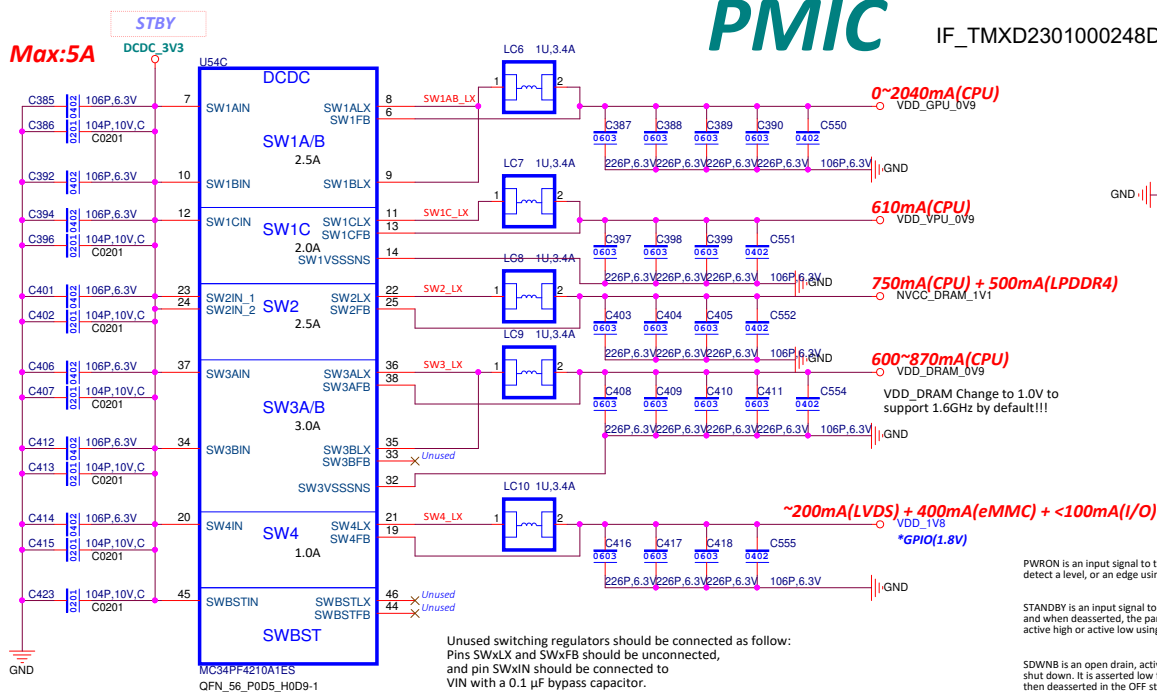
**Rev: 2**

**Date: Monday, August 15, 2022**

**Page: 23 / 32**

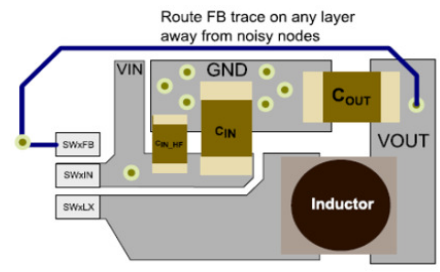
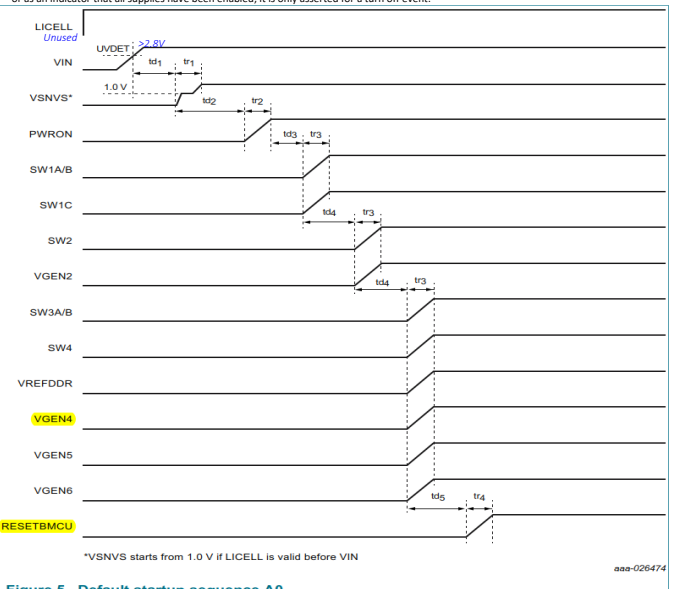
Table 12. PWRON configuration

PWRON_CFG	Mode
0	PWRON pin HIGH = ON PWRON pin LOW = OFF or sleep mode PWRON pin pulled LOW momentarily = ON PWRON pin LOW for 4.0 seconds = OFF or sleep mode
1	



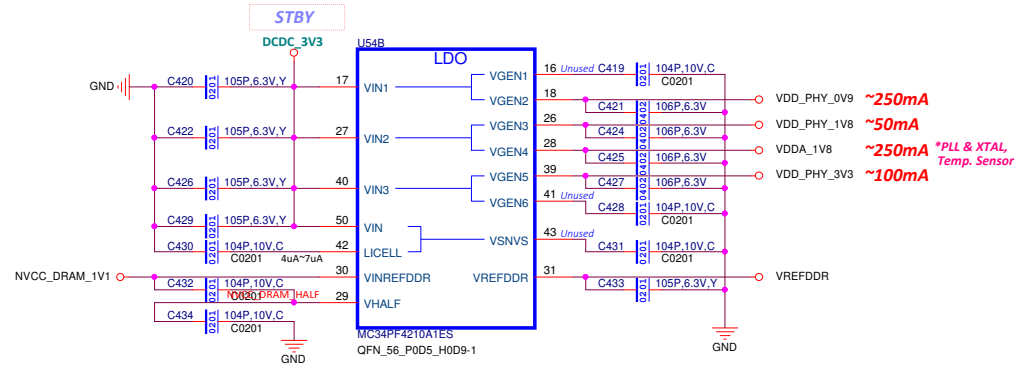
RESETBMCU is an open drain, active low output configurable for two modes of operation. In default mode, it is deasserted 2.0 ms to 4.0 ms after the last regulator - if the startup sequence is enabled (see Figure 5).

In this mode, the signal can be used to bring the processor out of reset, or as an indicator that all supplies have been enabled; it is only asserted for a turn off event.



i.MX8M PWR

SEQ	PWR	MIN	TYP	MAX	Curr(mA)
1	NVCC_SNV3	3	3.3	3.6	2
2	VDD_SNV3	0.81	0.9	0.99	2
3	RTN_RESET_B				
3	VDD_SOC/VDDA_0P9	0.81	0.9	0.99	3600
4	VDD_GPU	0.81	0.9/1.0	1.1	2000
4	VDD_VPU	0.81	0.9/1.0	1.1	1000
4	VDD_DRAM	0.81	1.0	1.05	2500
4	VDD_ARM	0.81	0.9/1.0	1.1	4000
5	VDDA_1P8_xxx	1.62	1.8	1.89	250
5	VDDA_DRAM	1.71	1.8	1.89	50
6	NVCC_DRAM		1.1/1.2/1.35		2170
6	NVCC_3V3	3	3.3	3.6	100
6	NVCC_1V8	1.65	1.8	1.95	450
7	3.3V PHY	3.069	3.3	3.63	100
7	1.8V PHY	1.674	1.8	1.98	50
7	0.9V PHY	0.837	0.9	0.99	250



**DFI**

Title: **PMIC(MC34PF4210)**

Size: Document Number: **M8MT51** Rev: **2**

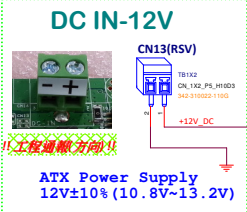
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Date: Monday, August 15, 2022 Page: 24 / 32

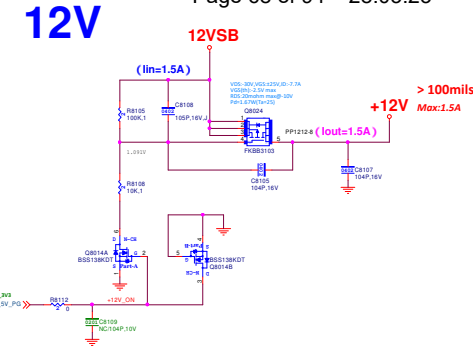
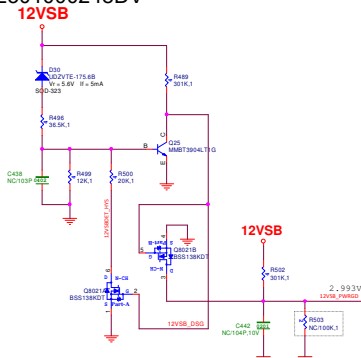
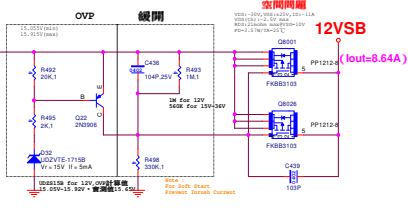








## DC IN-12V



## 12V to 5V(STBY)

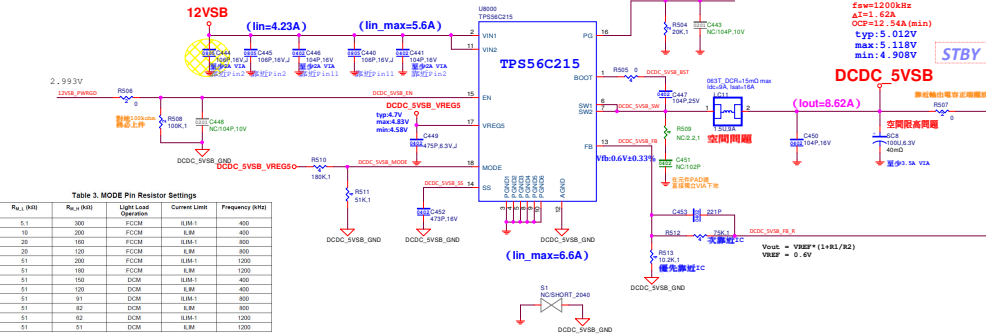


Table 3. MODE Pin Resistor Settings

R <sub>1</sub> (kΩ)	R <sub>2</sub> (kΩ)	Light Load Operation	Current Limit	Frequency (kHz)
5.1	200	FCOM	ILIM1	400
20	200	FCOM	ILIM	400
20	100	FCOM	ILIM1	800
20	100	FCOM	ILIM	800
51	200	FCOM	ILIM1	1300
51	100	FCOM	ILIM	1300
51	100	DCM	ILIM1	400
51	120	DCM	ILIM	400
51	91	DCM	ILIM1	800
51	82	DCM	ILIM	800
51	62	DCM	ILIM1	1300
51	51	DCM	ILIM	1300

CURRENT LIMIT

V <sub>OL</sub>	Current Limit (Low side sourcing)	ILIM1 option, Valley Current	9.775	11.5	13.225	A
	Current Limit (Low side sourcing)	ILIM option, Valley Current	11.73	13.8	15.87	A
	Current Limit (Low side negative)	Valley Current	4			A

## 12V to 3.3V(STBY)

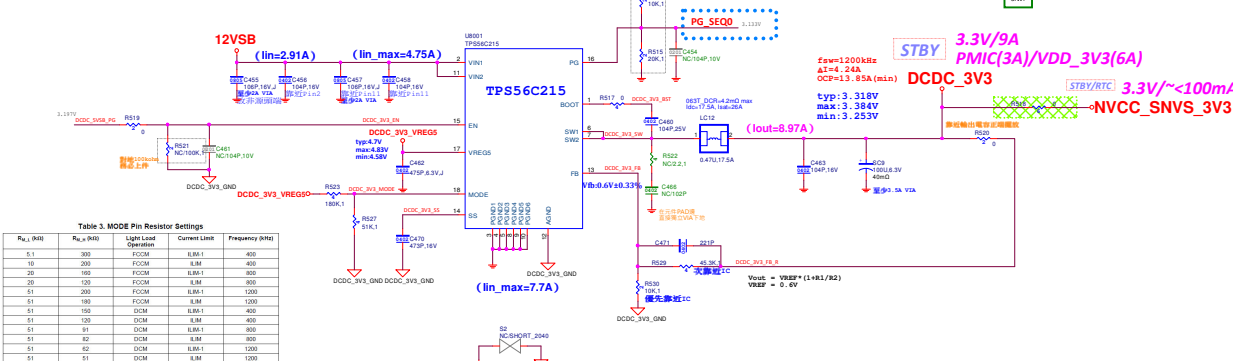


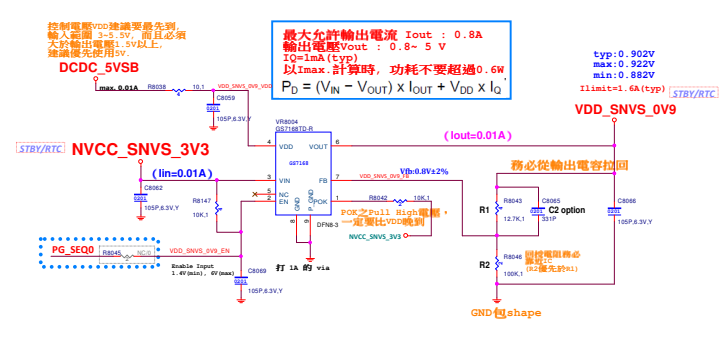
Table 3. MODE Pin Resistor Settings

R <sub>1</sub> (kΩ)	R <sub>2</sub> (kΩ)	Light Load Operation	Current Limit	Frequency (kHz)
5.1	200	FCOM	ILIM1	400
10	200	FCOM	ILIM	400
20	100	FCOM	ILIM1	800
20	100	FCOM	ILIM	800
51	200	FCOM	ILIM1	1300
51	100	FCOM	ILIM	1300
51	100	DCM	ILIM1	400
51	120	DCM	ILIM	400
51	91	DCM	ILIM1	800
51	82	DCM	ILIM	800
51	62	DCM	ILIM1	1300
51	51	DCM	ILIM	1300

CURRENT LIMIT

V <sub>OL</sub>	Current Limit (Low side sourcing)	ILIM1 option, Valley Current	9.775	11.5	13.225	A
	Current Limit (Low side sourcing)	ILIM option, Valley Current	11.73	13.8	15.87	A
	Current Limit (Low side negative)	Valley Current	4			A

## VDD\_SNVS\_OV9(STBY)



控制電壓VDD建議要最先到輸入端腳 2-5.5V, 而且必須大於輸出電壓VDD以上, 建議優先使用5V.

最大允許輸出電流 I<sub>out</sub> : 0.8A  
輸出電壓V<sub>out</sub> : 0.8-5V  
I<sub>Q</sub>=1mA (typ)  
P<sub>D</sub> = (V<sub>IN</sub> - V<sub>OUT</sub>) x I<sub>out</sub> + V<sub>DD</sub> x I<sub>Q</sub>  
功耗不要超過0.6W

typ: 0.902V  
max: 0.922V  
min: 0.882V  
I<sub>limit</sub>: 1.6A (typ) [STBY/RTC]

務必從輸出電容拉回

GND創shape

**DFI**

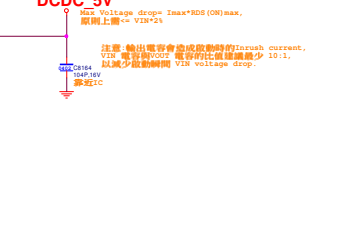
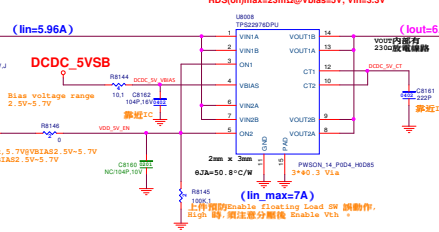
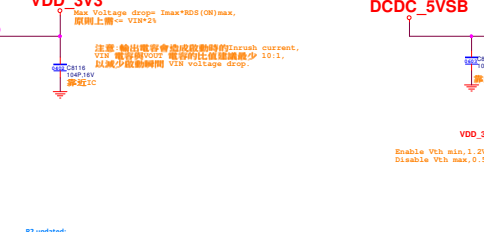
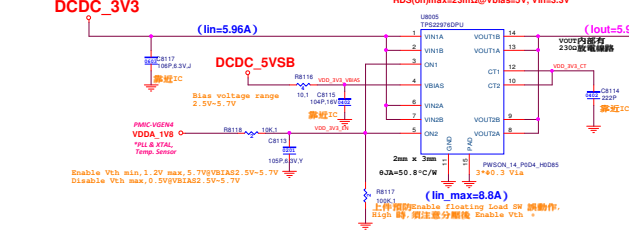
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Doc: Document Number: M8MT51

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0.9V(Main-SOC)

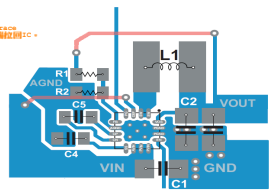
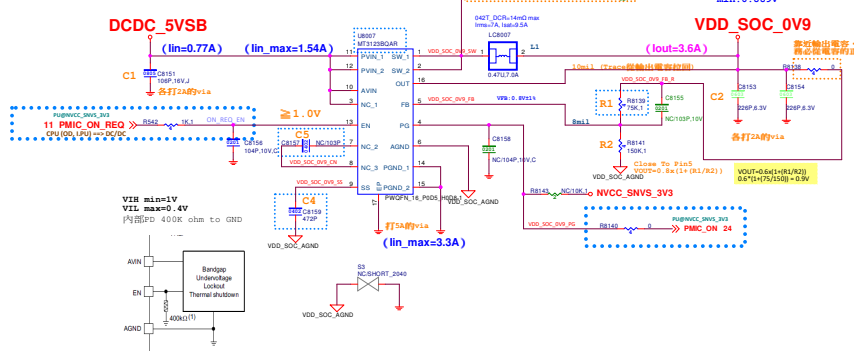
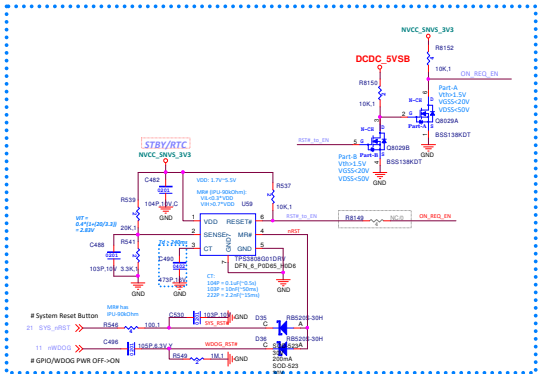


Figure 23. TLV62095 PCB Layout



# System Reset Button  
The above all voltages to be put to their initial default power-on state when depressing the reset button.  
To power down the VDD\_SOC\_0V9 (B.PMIC\_ON pull-down).  
Since PMIC\_ON serves as the enable signal of PMIC and other discrete power supply chips,  
all the power supplies except for the 3V3S domain will be OFF.  
After RTN to EN is released, the power supplies will start to ramp up in defined sequence.  
When all the power supplies have reached their operating voltages,  
PMIC\_ON will be de-asserted, and the CPU may begin booting from reset.

0.9V(Main-ARM)

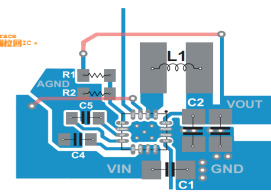
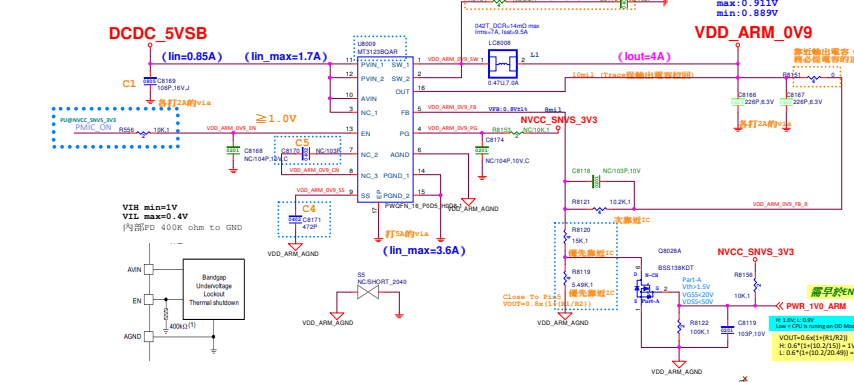


Figure 23. TLV62095 PCB Layout

Turn-On Time	$t_{on}$	$V_{in}=3.0V, R_L=150\Omega$	-	20	ns
Turn-Off Time	$t_{off}$	$V_{in}=3.0V, R_L=150\Omega$	-	40	ns

# Test Pad for Power Sequence

IF\_TMxD2301000248DV

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D

D

C

C

B

B

A

A



Title : Test Pad for Power Sequence

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E24\*10R06/02\*4590\*00

5

4


3

2

1

# Revision History

Date	PCB Revision	Modified Page	Programmable Logic Impact (No or BIOS/EC/SW/FPGA)	Modify function and Purpose (What & Why)	Change Detail (How)	Update By or Note (Bug#)
2022/8/1	R2	22	No	Update COM4 power control circuit.	Add TSU2 for 5V with GPO to EN.	sherlock.hsia
2022/8/1	R2	22, 23	No	Update CAN-Bus Power protection.	Add CBU4...etc for OCP/避免Cable誤插燒毀.	sherlock.hsia
2022/8/1	R2	23	No	Reserved EEPROM.	Add EPU1...etc (I2C2).	sherlock.hsia
2022/8/1	R2	23	No	Add ISO/MOS for UART-Link to board board.	Add PLQ2...etc, 隔離Power Board端PU.	sherlock.hsia
2022/8/1	R2	25	No	Add LDO(LPF) for Amplifier +12V Power.	Add AUVR1...etc for PSRR, 改善 Audio Power.	sherlock.hsia
2022/8/1	R2	footprint	No	small-pitch SMT 製程考量, 簡化文字框/油墨量, 降低高度/厚度, 避免上錫不均, 影響錫量控制.	簡化 U1, U2, U6 文字框/油墨量.	sherlock.hsia
2022/8/1	R2	32	SW	Add A+G function.	Add AGU1...etc, LSM6DSOX via I2C2(reserved I2C3).	sherlock.hsia

		
Title : Revision History		
Size : B	Document Number : M8MT51	Rev : 2
Date : Monday, August 15, 2022		Page : 29 / 32

## Design Target:

ID	Category	Spec
1	Operating temperature	-5~65°C
3	Operating temp (Wide)	-30~80°C
2	MTBF	90000Hr
3	Service life	10Yr

## Reference Design:

ID	Reference Design	Reference Part
1	M8M051_RA_20210128	Main Board
2	NXP's EVB - SPF-38820_A1	Main Chip



Title : Design Info.

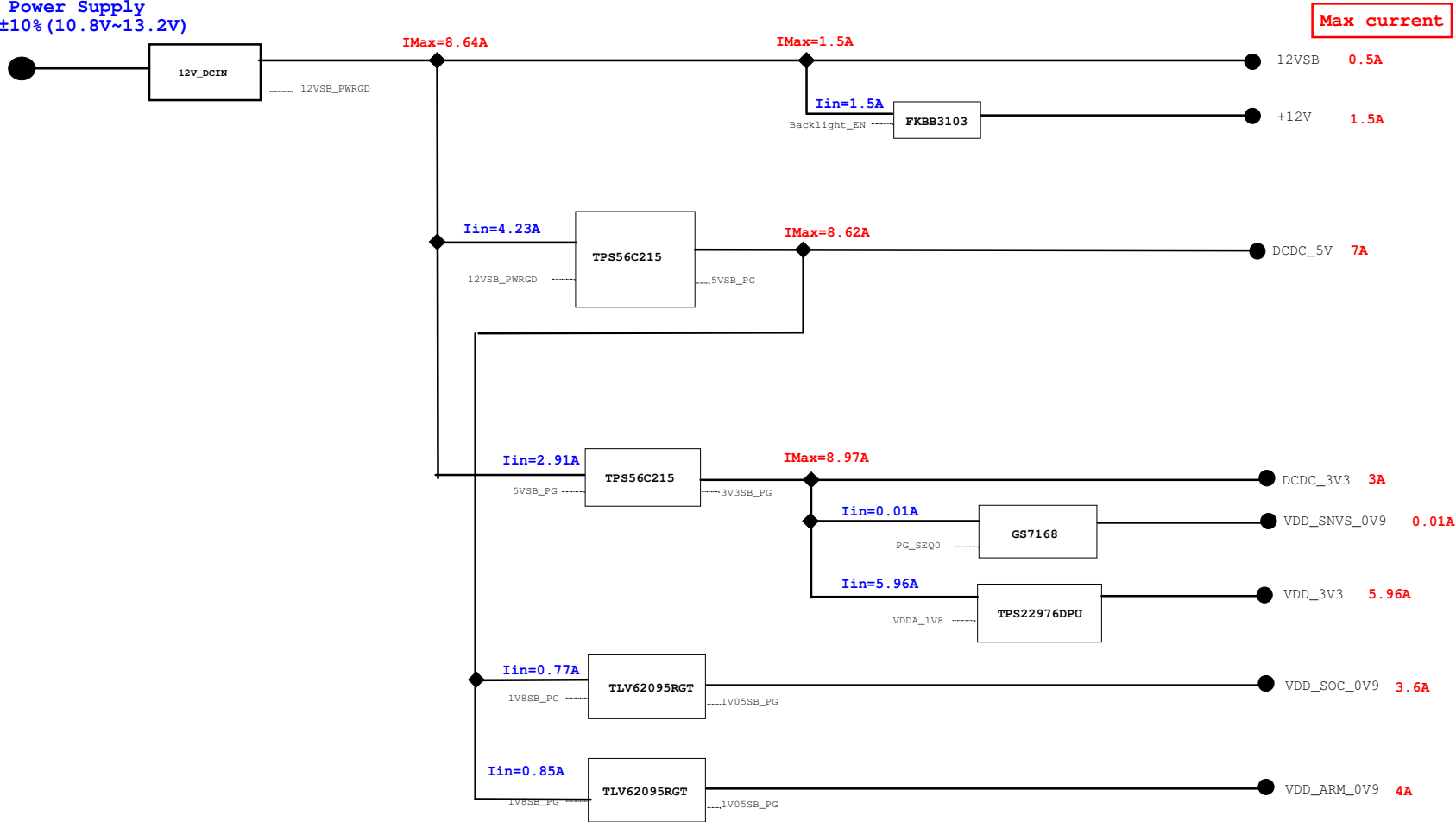
Size : Document Number : M8MT51 Rev : 2

Date : Monday, August 15, 2022 E24\*10R06/02-4590-00 Page 30 / 32

# Power Budget/Distribution

**Note : Max. current means possible peak instantaneous current but not max. continuous current.**

ATX Power Supply  
12V±10% (10.8V~13.2V)



<b>DFI</b>	
Title : POWER DISTRIBUTION	
Size : Document Number :	Rev : 2
Custom : M8MT51	
Date : Monday, August 15, 2022	
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# LSM6DSOX - 3D accelerometer and 3D gyroscope

IF\_IMXD2301000248DV

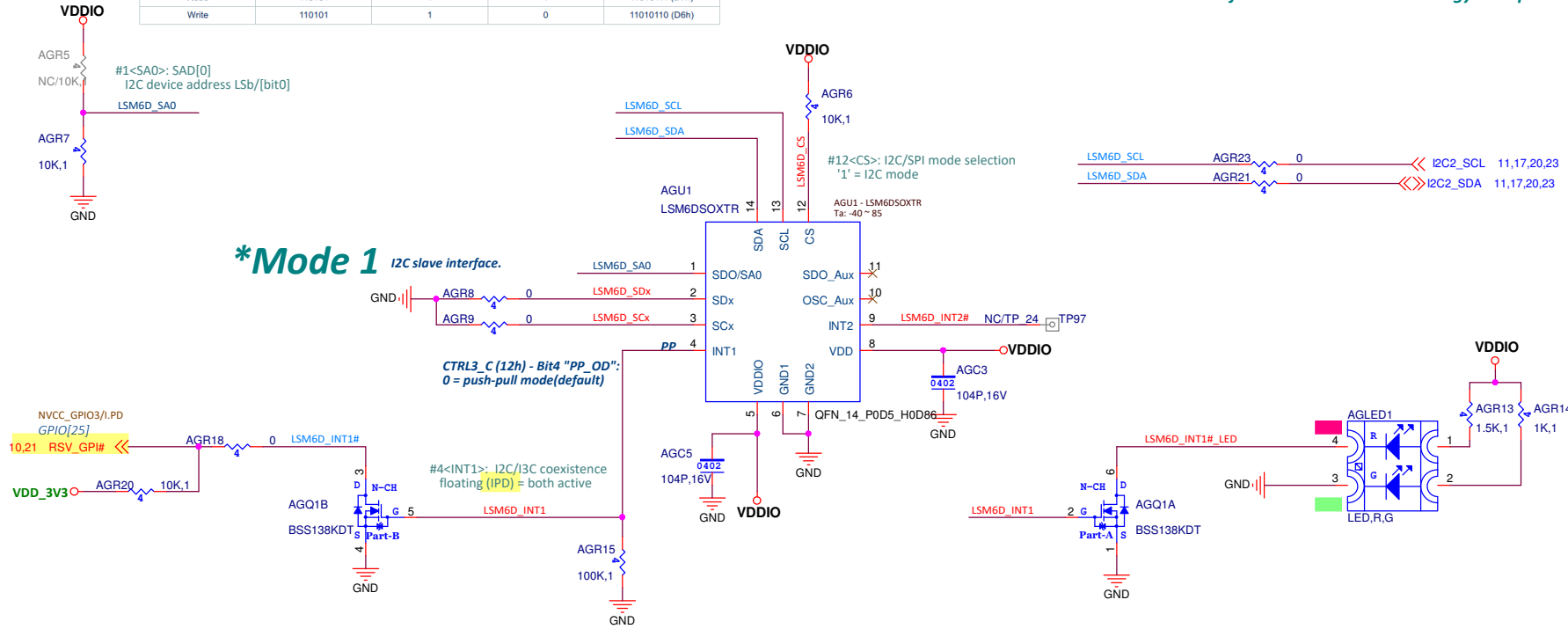
R2 updated add A+G

I2C Addr(0x6A): D5h/D4h, clock Max: 400KHz

Table 10. SAD+Read/Write patterns

Command	SAD[6:1]	SAD[0] = SA0	R/W	SAD+R/W
Read	110101	0	1	11010101 (D5h)
Write	110101	0	0	11010100 (D4h)
Read	110101	1	1	11010111 (D7h)
Write	110101	1	0	11010110 (D6h)

- Mode 1: I2C / MIPI I3CSM slave interface or SPI (3- and 4-wire) serial interface is available;
- Mode 2: I2C / MIPI I3CSM slave interface or SPI (3- and 4-wire) serial interface and I2C interface master for external sensor connections are available;
- Mode 3: I2C / MIPI I3CSM slave interface or SPI (3- and 4-wire) serial interface is available for the application processor interface while an auxiliary SPI (3- and 4-wire) serial interface for external sensor connections is available for the gyroscope ONLY;
- Mode 4: I2C / MIPI I3CSM slave interface or SPI (3- and 4-wire) serial interface is available for the application processor interface while an auxiliary SPI (3- and 4-wire) serial interface for external sensor connections is available for the accelerometer and gyroscope.



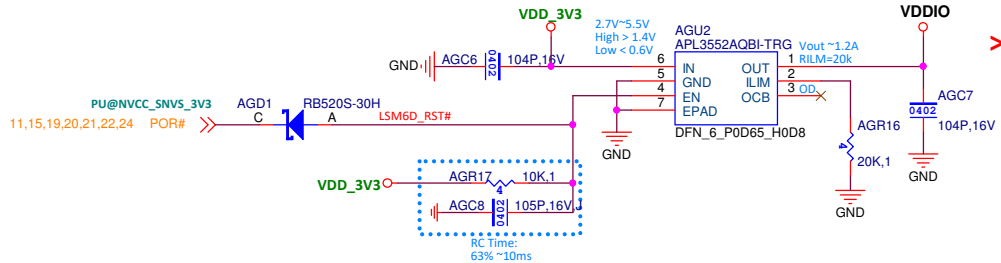
## \*Mode 1 I2C slave interface.

CTRL3\_C (12h) - Bit4 "PP\_OD":  
0 = push-pull mode(default)

#4<INT1>: I2C/I3C coexistence  
floating (IPD) = both active

## \*Constant-Current

> 10mils



Title : **A+G(LSM6DSOX)**

Size : Document Number : **M8MT51** Rev : **2**

Date : Monday, August 15, 2022 Page : 32 / 32

# X103-EC70

## Power Modular

### Revision 2

Project Code : S184710

IF\_TMXD2301000248DV

### Page Description

01\_COVER PAGE  
02\_BLOCK DIAGRAM  
03\_9~48V INPUT\_LT4363  
04\_12VSB\_LM5176  
05\_MCU\_STM32L051K8  
06\_HISTORY

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**DFI**<sup>®</sup>

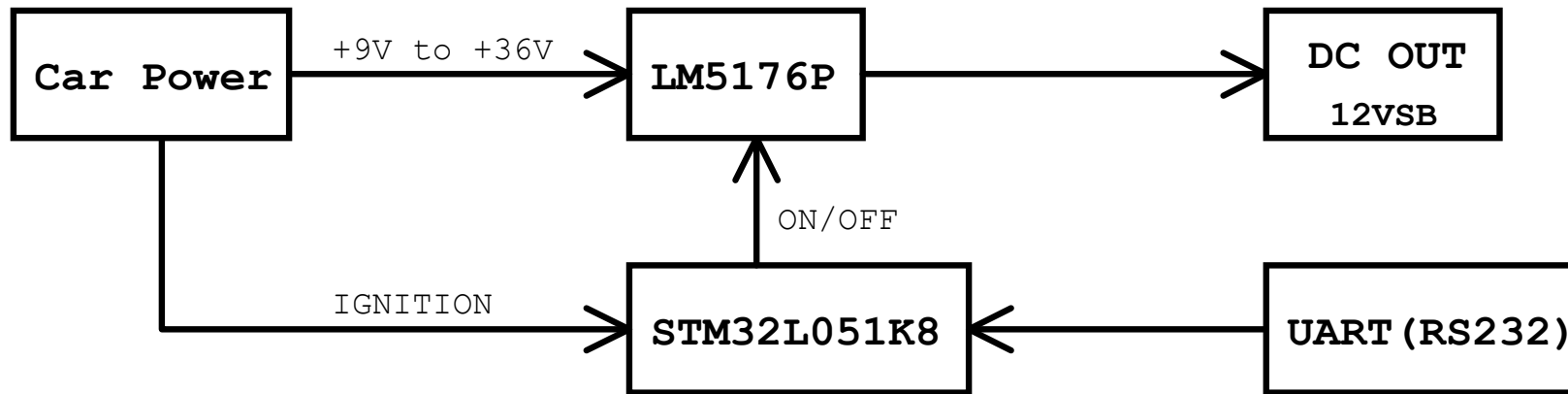
Title : 01\_Cover Page

Size : B Document Number : X103-EC70 Rev : A

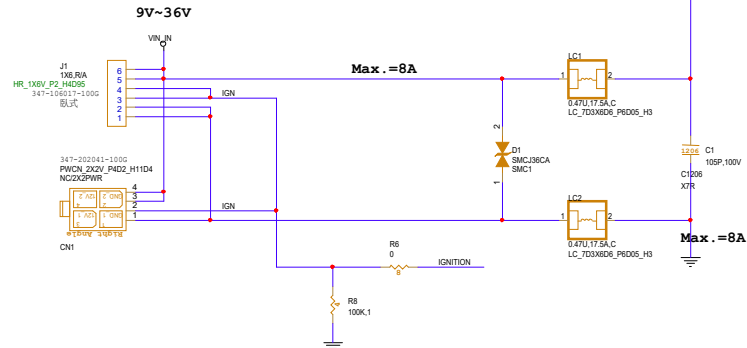
Date : Tuesday, June 30, 2020 Page : 1 / 6

E24\*10R06/02\*4590\*00

# BLOCK DIAGRAM FOR X103-EC70

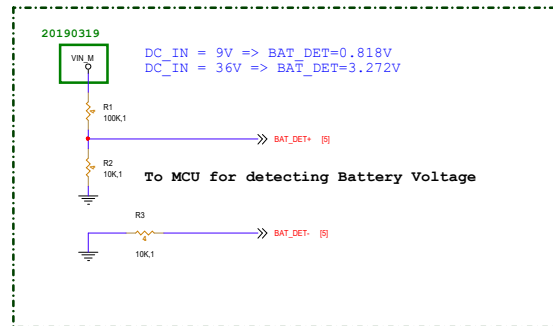


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Size : A	Document Number : <b>X103-EC70</b>	Rev : A
Date : Tuesday, June 30, 2020	E24*10R06/02-4596*00	Page 2 of 6

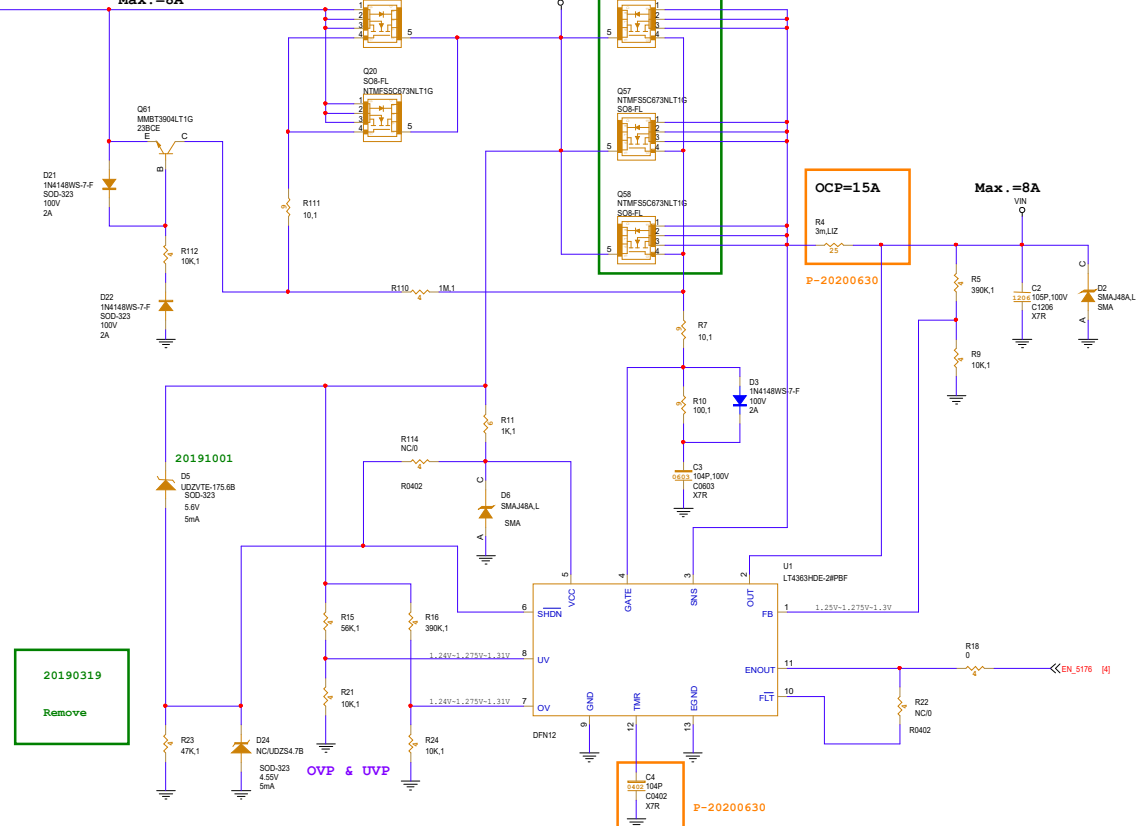


請於主板上加ESD Protection保護  
正，負兩端都需要加

From EC (Delay ON/OFF)

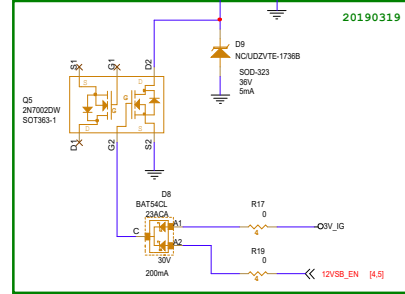
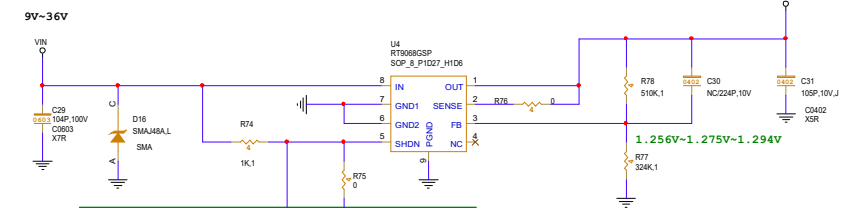
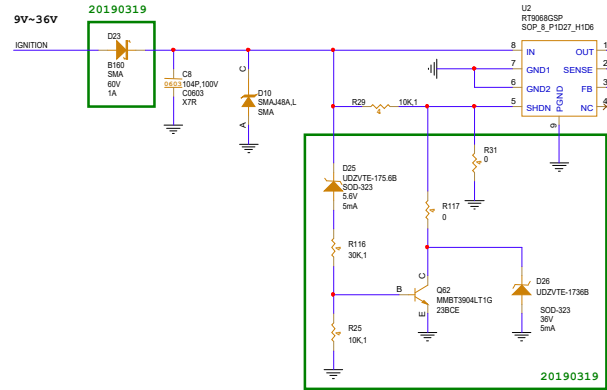


IF\_TMxD2301000248DV  
Max. = 8A



20190319  
Remove

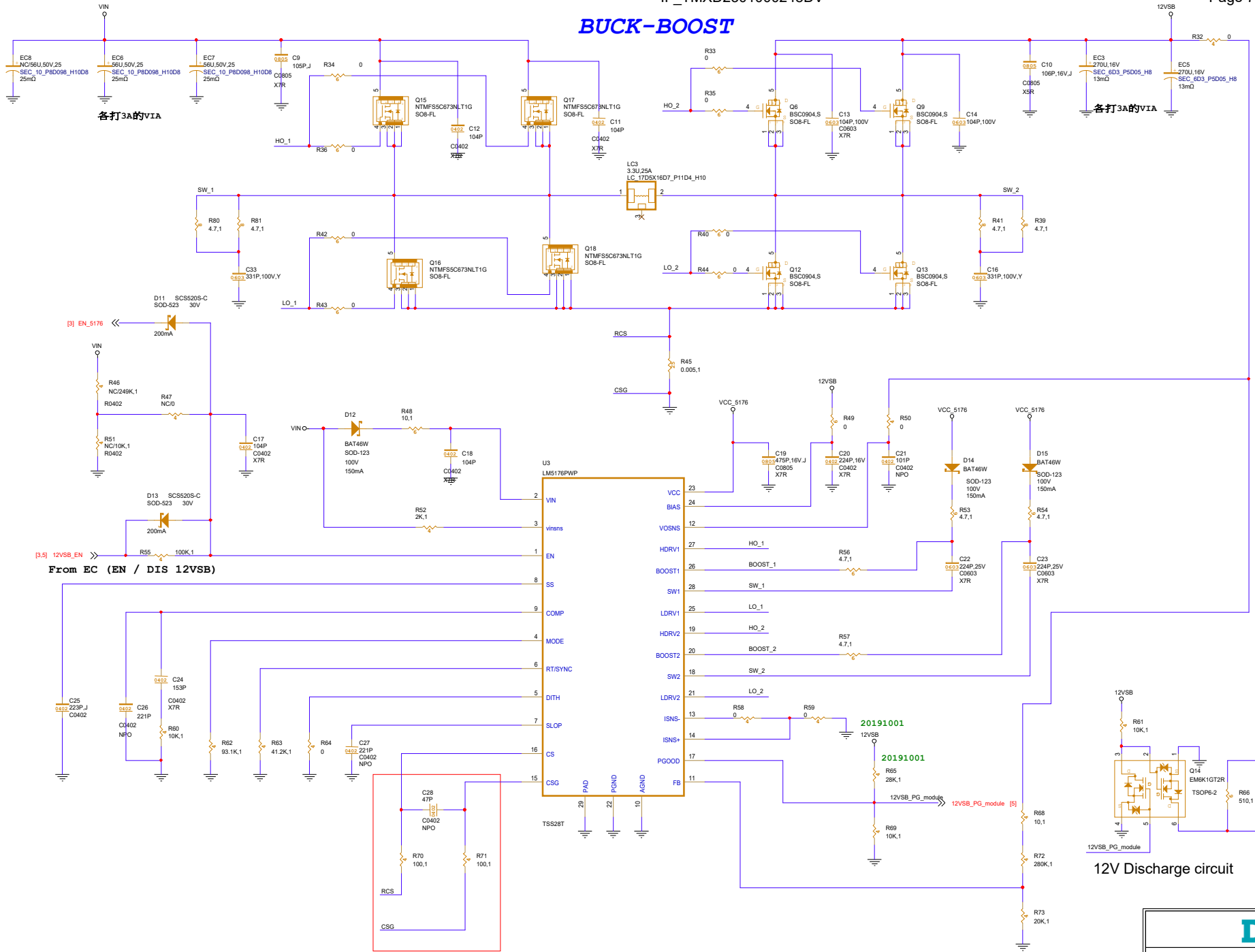
max. 2mA  
To EC (Ignition)  
IGN\_DET [S]



EC Power  
max. 10mA  
3V\_EC

<b>DFI</b>		
Title :	03_9-48V INPUT_LT4363	
Size :	Document Number :	X103-EC70
A2	Rev :	A

# BUCK-BOOST



各打3A的VIA

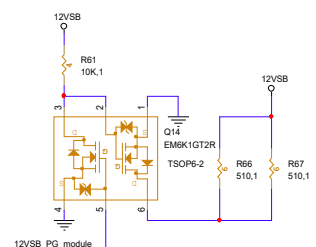
各打3A的VIA

[3] EN\_5176

From EC (EN / DIS 12VSB)

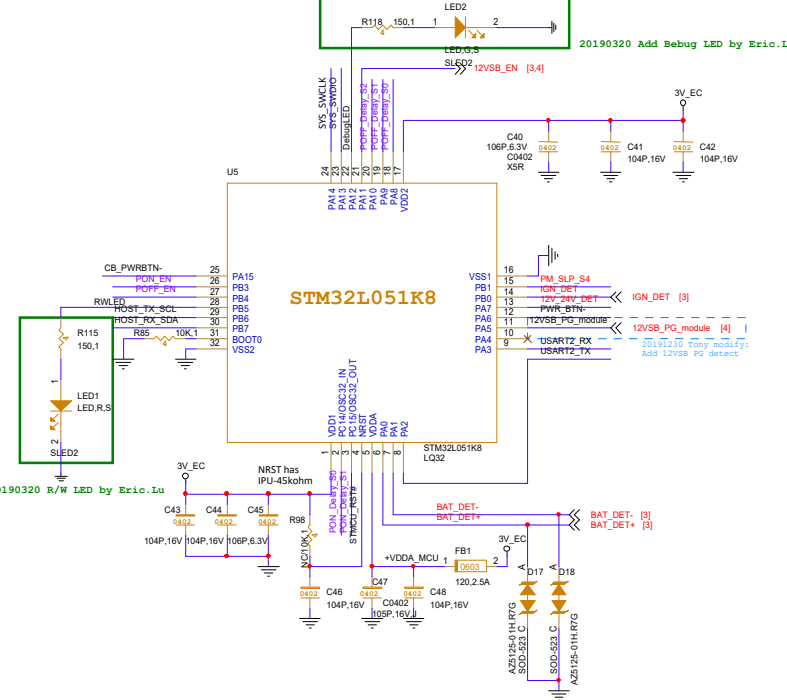
Closely to IC

12V Discharge circuit

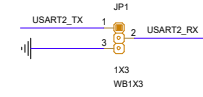


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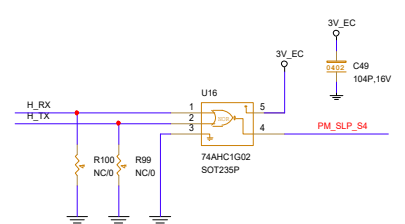
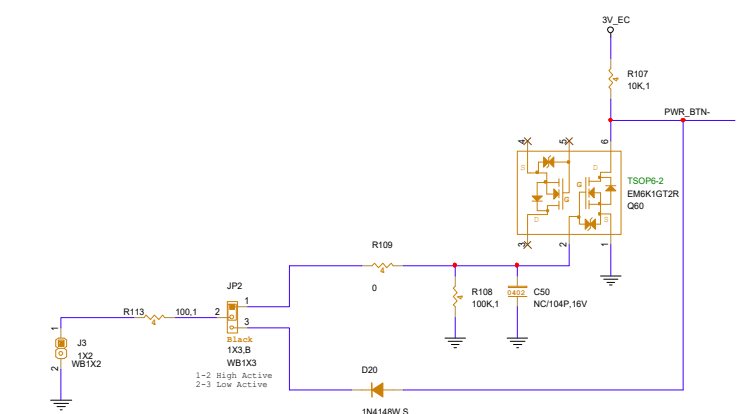
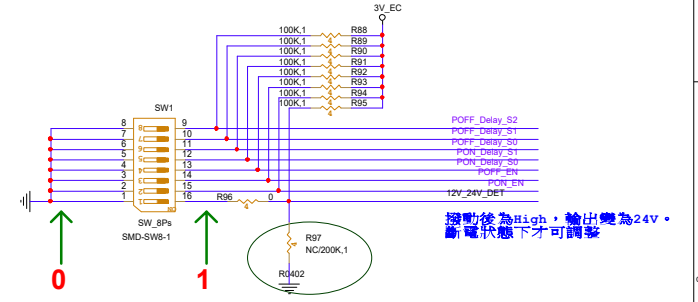
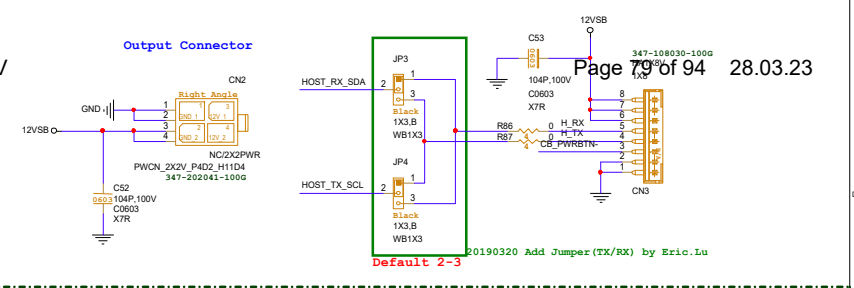
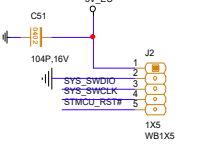
Title : 04 12VSB LM5176  
 Size : Document Number : X103-EC70 Rev :  
**E24\*10R06102\*4590\*00** A  
 Date : Tuesday, June 30, 2020 Page : 4 / 6



**MCU Debug**



**ST-Link / SWD**



**24V / 12V Select**

24V_SEL Pin 1	Output Voltage
0 (ON)	12V
1	24V

**POWER OFF Delay ON/OFF**

POFF_EN Pin 3	ON/OFF
0 (ON)	Enable (Define on the Table)
1	Disable (Default delay 0 Sec)

**POWER ON Delay ON/OFF**

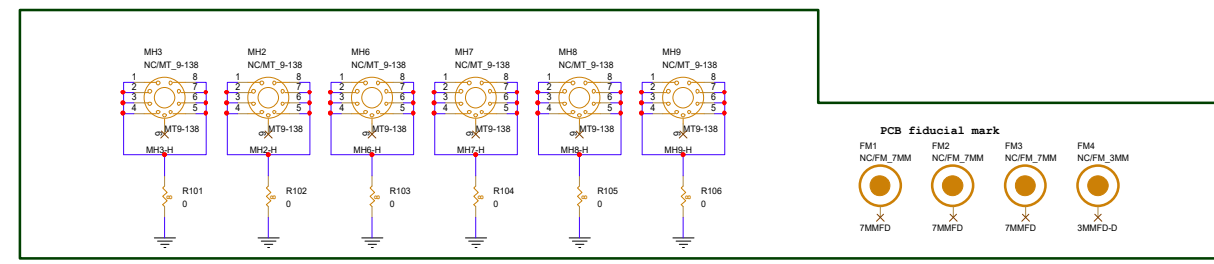
PON_EN Pin 2	ON/OFF
0 (ON)	Enable (Define on the Table)
1	Disable (Default delay 3 Sec)

**POWER OFF Delay Time Select**

POFF_Delay_S2 Pin 8	POFF_Delay_S1 Pin 7	POFF_Delay_S0 Pin 6	DELAY_TIME
0 (ON)	0 (ON)	0 (ON)	30 Sec @
0	0	1	1 min
0	1	0	3 min
0	1	1	5 min
1	0	0	10 Min
1	0	1	15 Min
1	1	0	30 Min
1	1	1	1 Hr

**POWER ON Delay Time Select**

PON_Delay_S1 Pin 5	PON_Delay_S0 Pin 4	DELAY_TIME
0 (ON)	0 (ON)	10 Sec @
0	1	30 Sec
1	0	1 min
1	1	5 min





2018/11/30 Revision 1 - EVT

2019/3/21 Revision 2 - EVT1

2019/10/03 Revision 3 - DVT

MODIFY HISTORY

Page	Modify Item	Issue	Rev.
1	3	<b>**Modify - 20190319</b> Circuit modify in the green box CN1 NC	Power-TOM BOM select
2	5	<b>**Modify - 20190321</b> Add R/W LED & Debug LED - LED1/LED2/R115/R118 Add Jumper(TX/RX) - JP3/JP4 R97 NC CN2 NC	For Debug by FOX  12V/24V select BOM select
1	3	<b>**Modify - 20191003</b> Change D5 8.2B to 5.6B -By Power Tom	9V can't not work
1	4	<b>**Modify - 20191003</b> Change R65 12K to 28K and PU power VCC_5176 to 12VSB - By power Tom	follow power module SCH

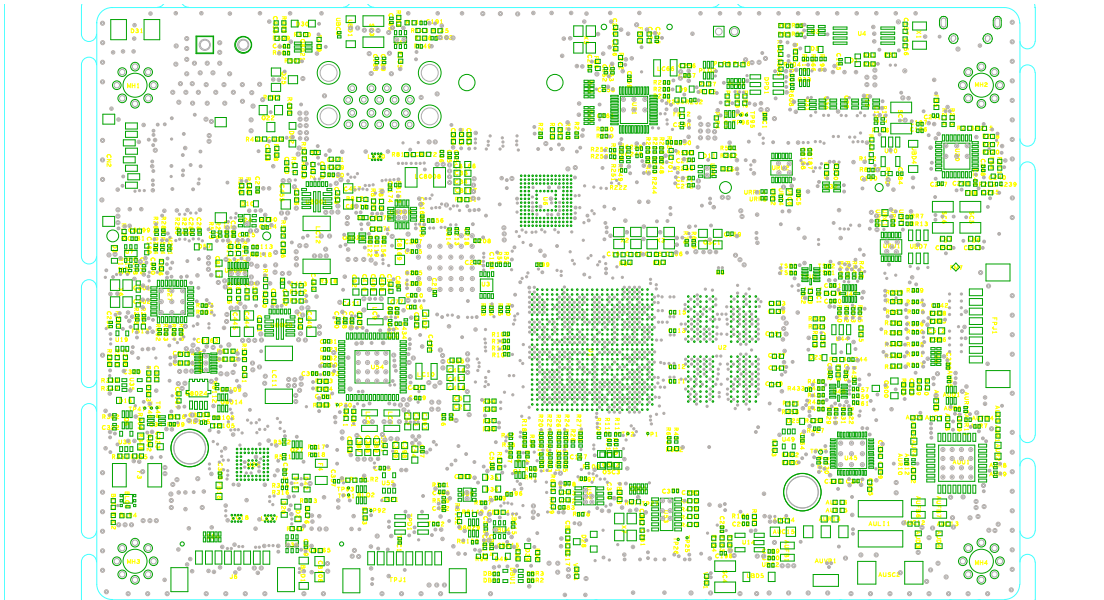
**DFI**

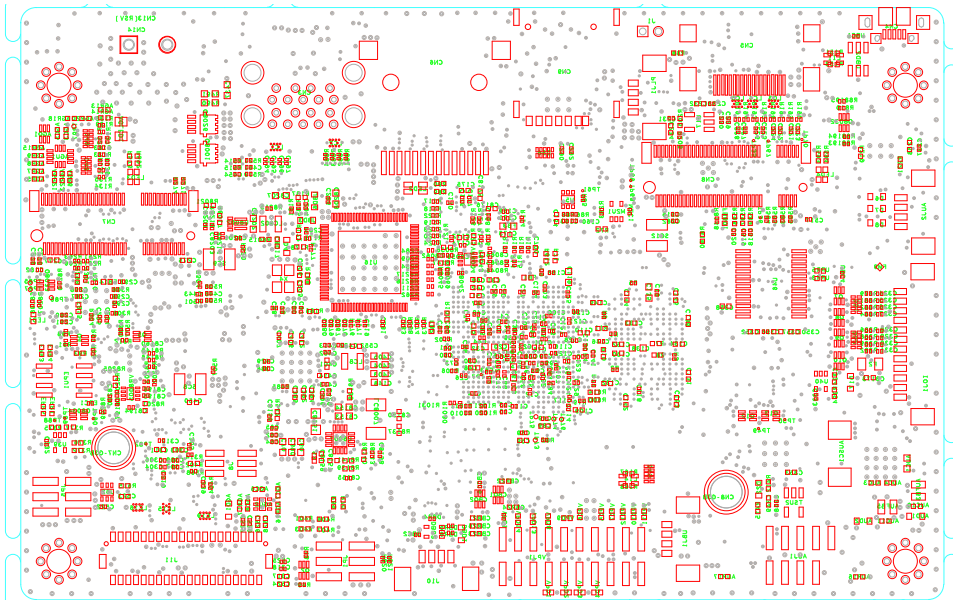
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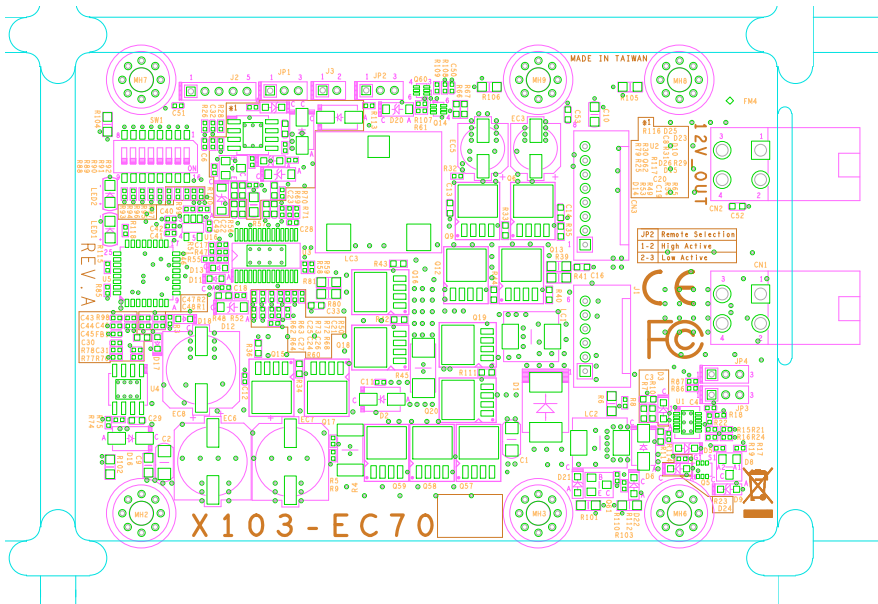
Size : Document Number : X103-EC70 Rev : A

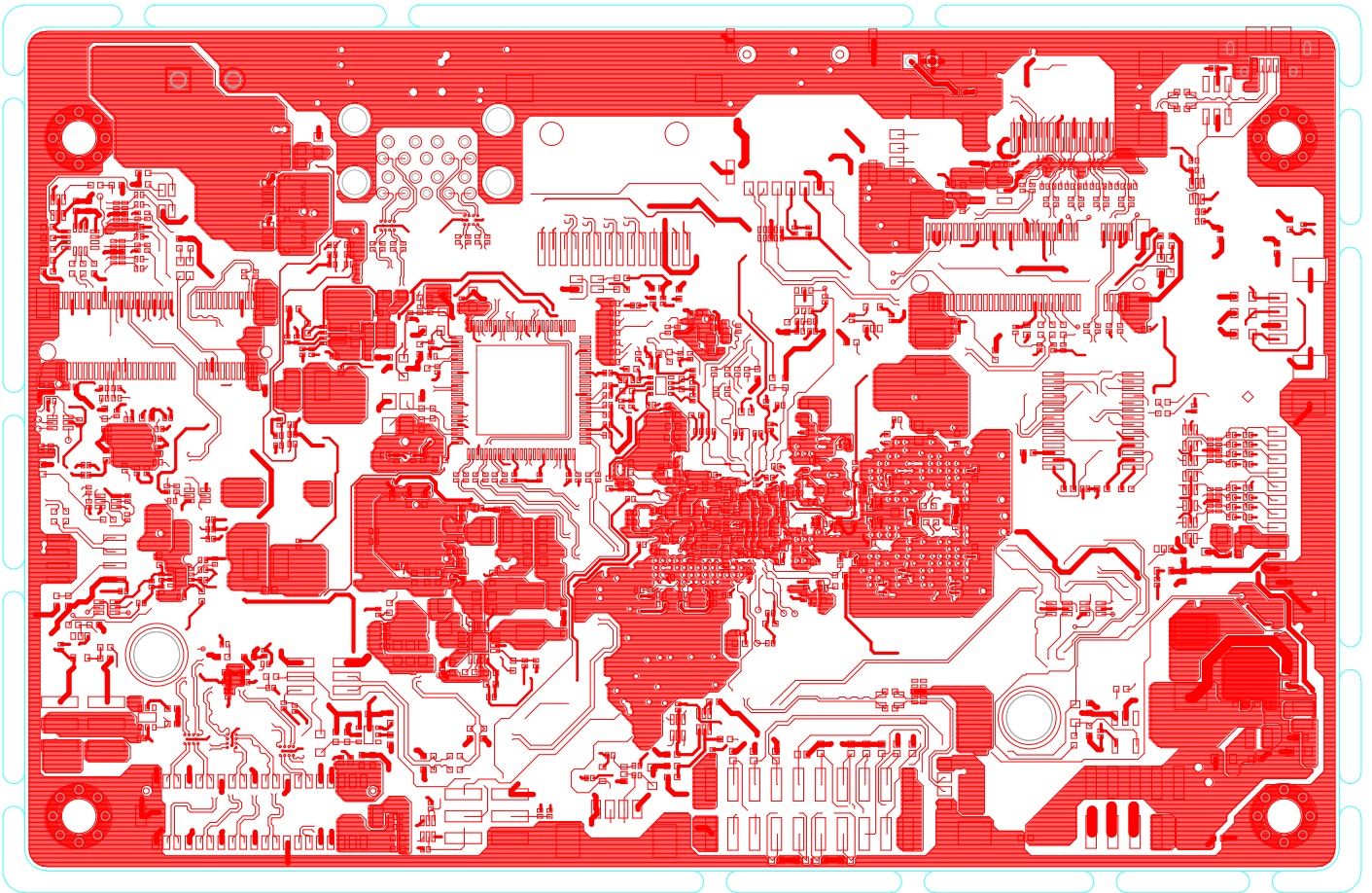
**E24\*10R06/02\*4590\*00**

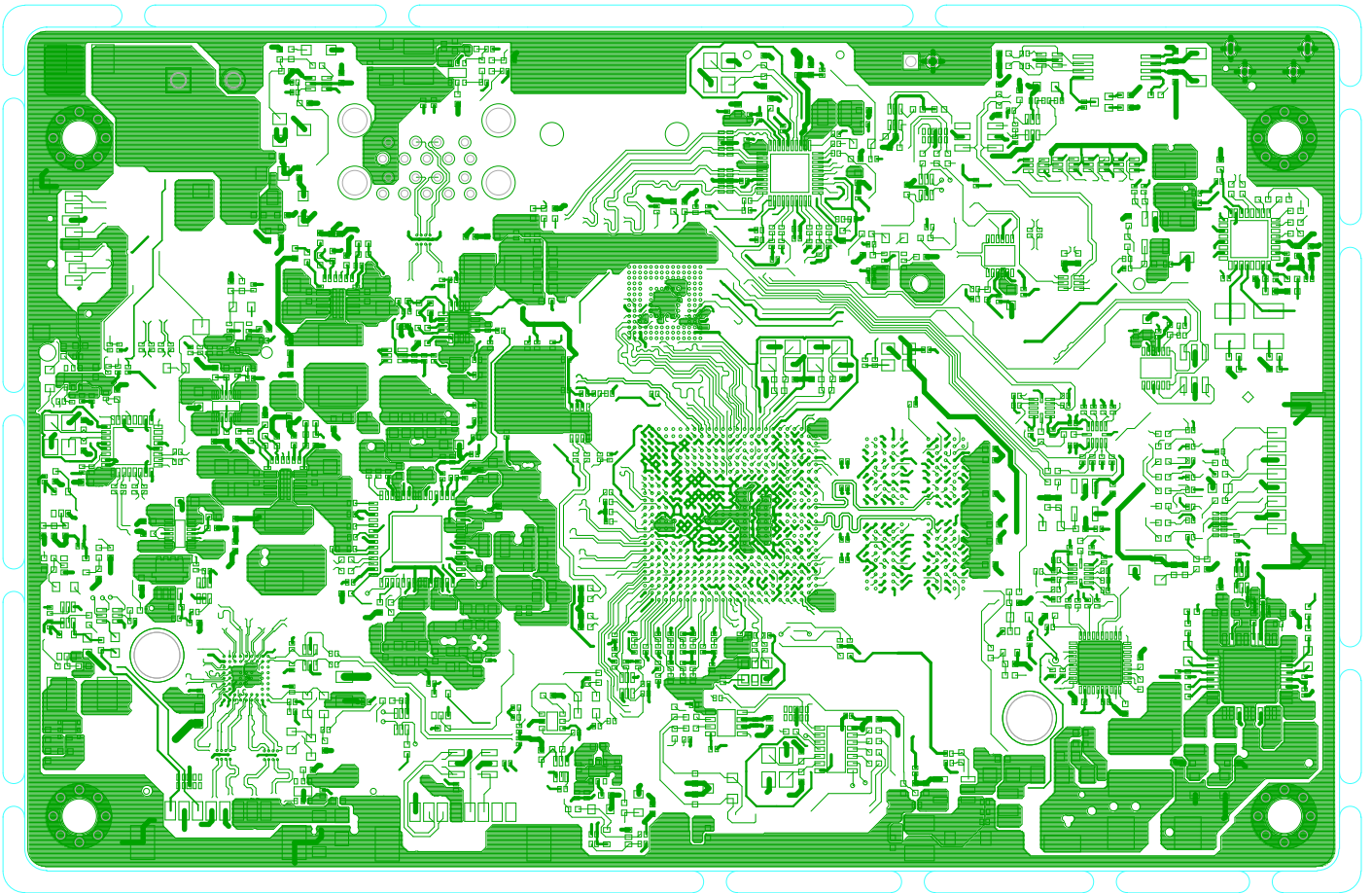
Date : Tuesday, June 30, 2020 Page : 6 / 6



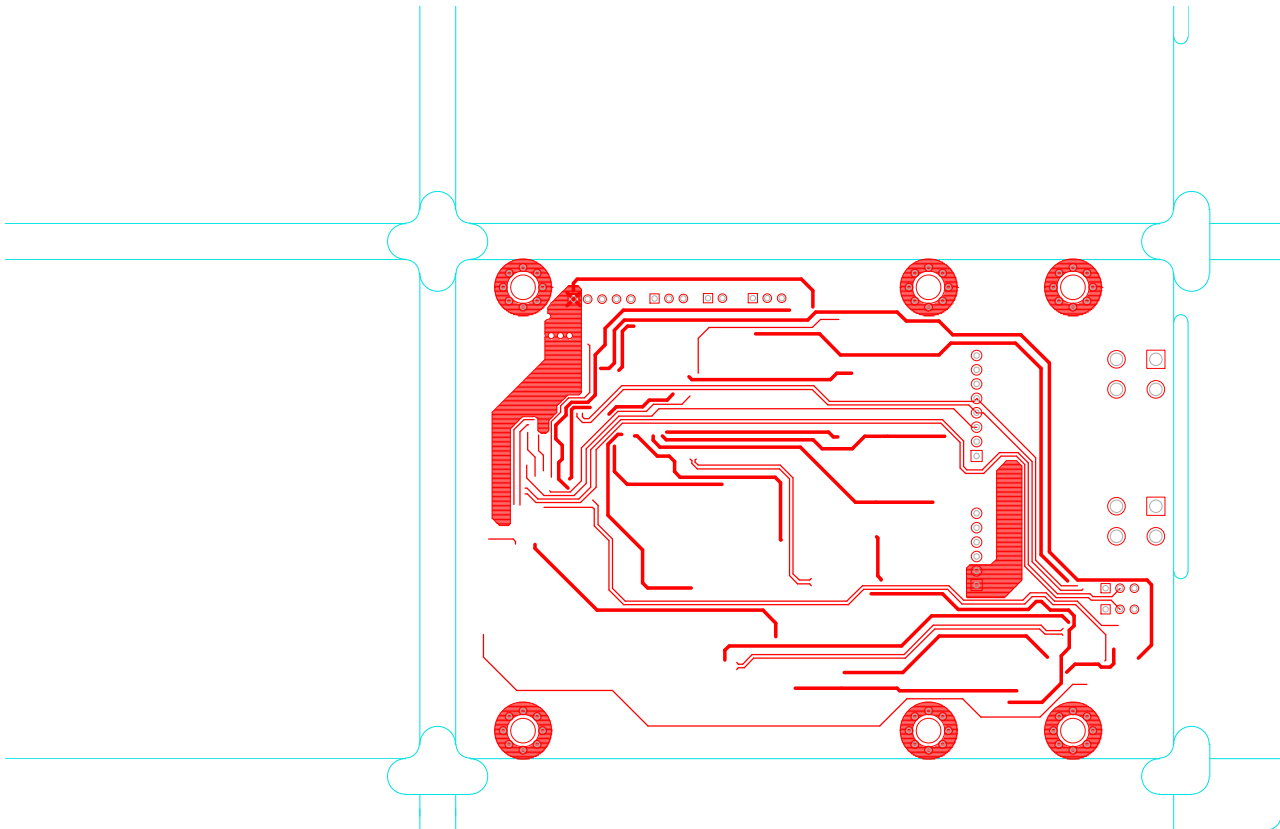




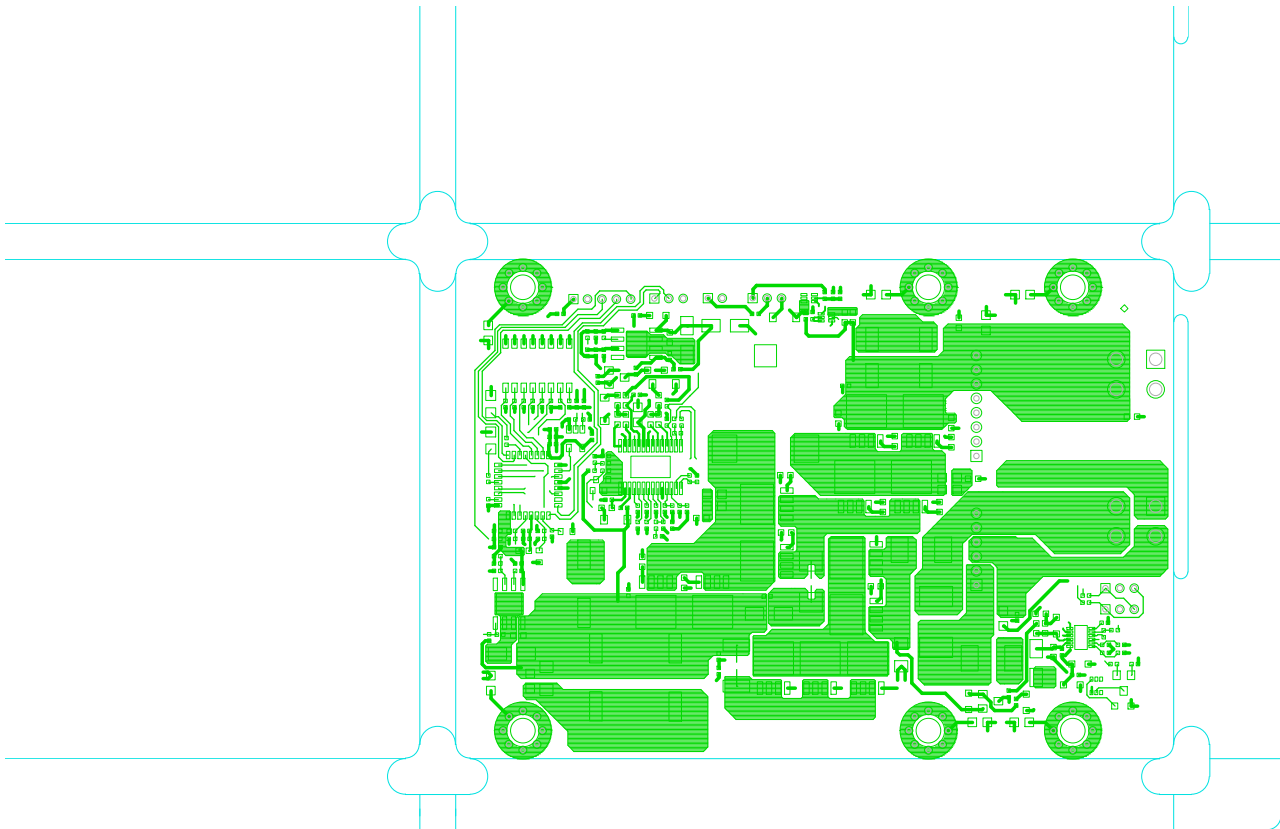




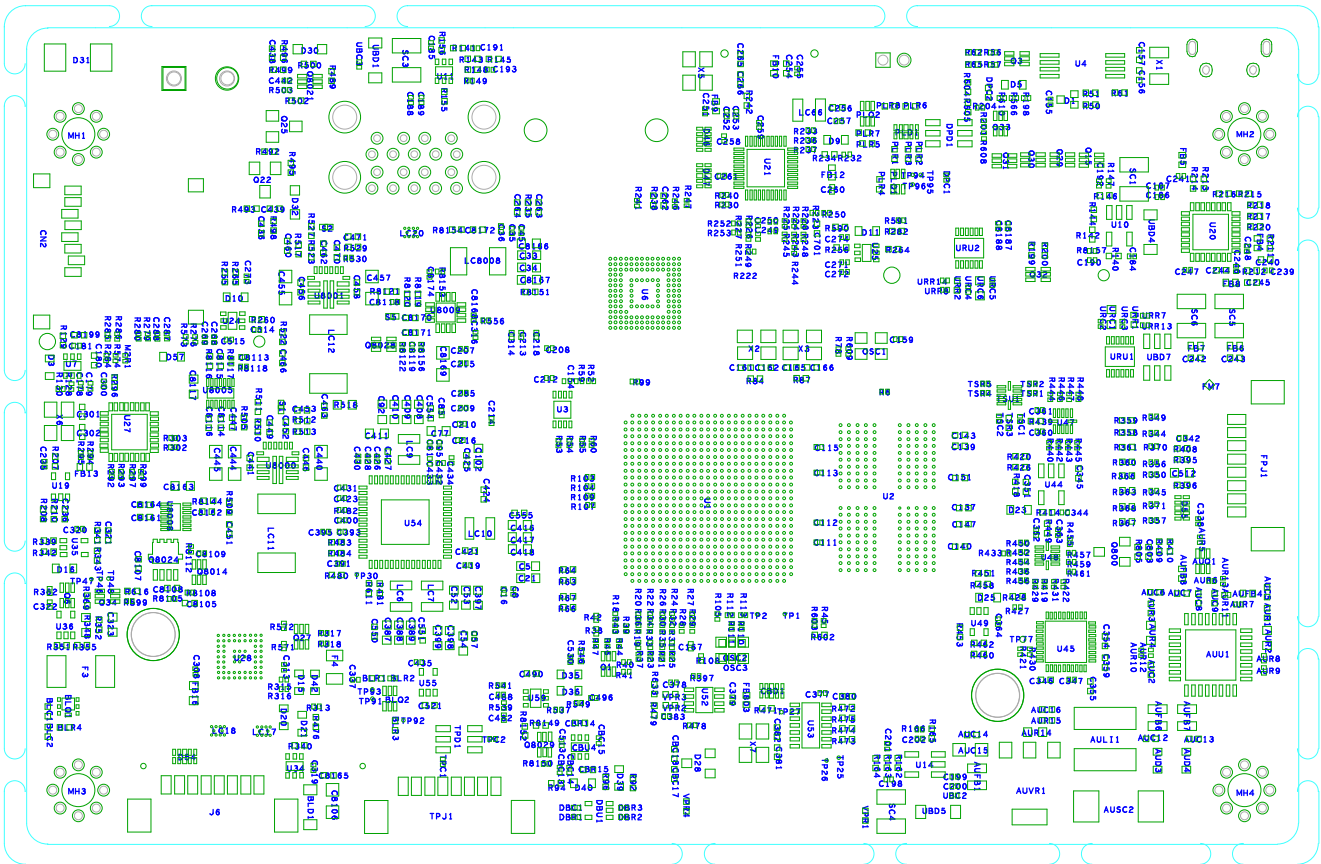


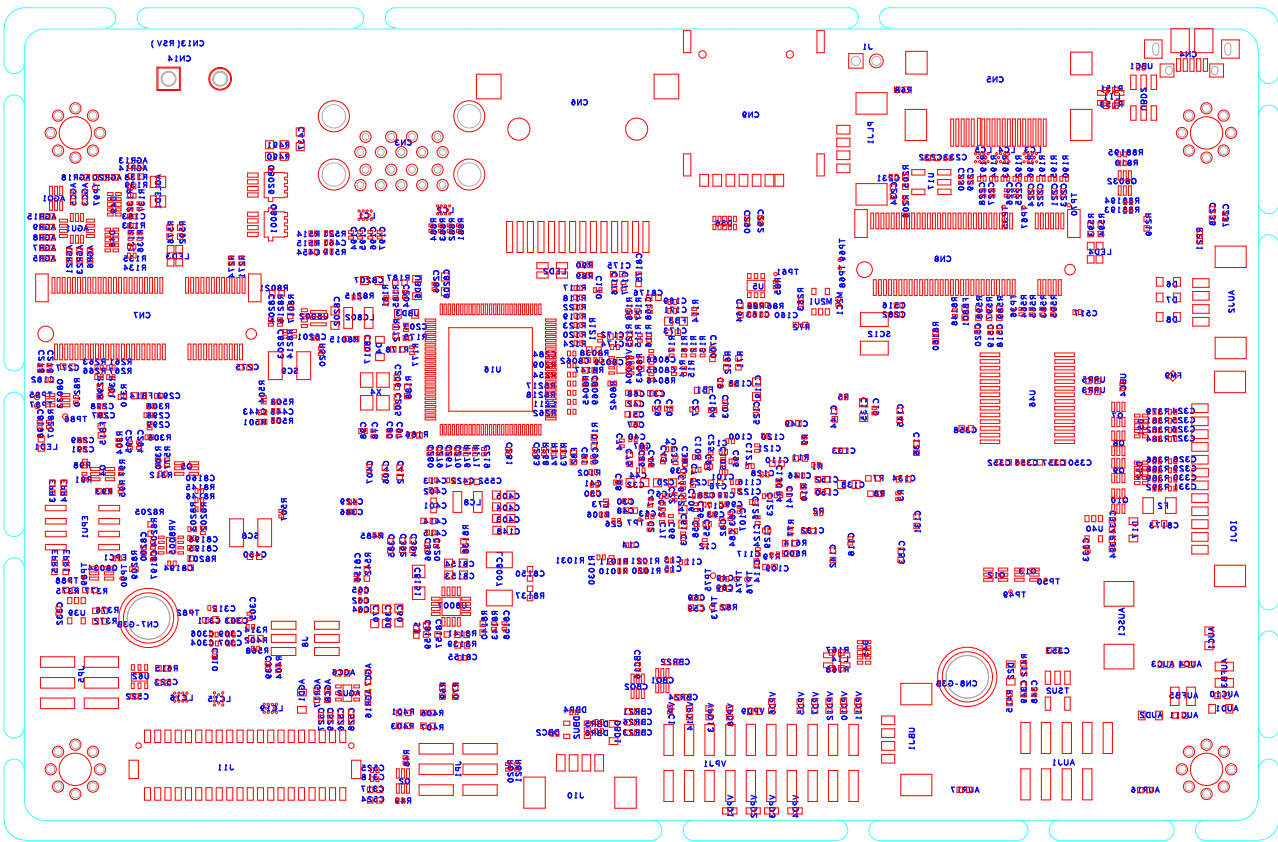


DF1 INC.



DF1 INC.





LM

Item No	Sub Assembly	Master Sub	Item Number	Description	Quantity	Unit Price	Fixed Lot	Multiplier	Minimum Order	Alt Prio	Alt Part	Alt Date	Alt Creation Date
2	774-M8MT511-080G	M	A33-72001A-060G	STANDOFF M2*6.7L SMD,H55M20E40-	2	60		1200					5-Jun-18
3	774-M8MT511-080G	M	344-002003-610G	Mini JUMPER RED 2.0mm,200-72	3	50		1000					4-Feb-15
4	774-M8MT511-080G	M	314-M8MT511-029G	PCB M8MT51 R.2(12L)	1	45				Y			23-Aug-22
5	774-M8MT511-080G	M	622-010150-000G	BATTERY CR2032W(MURATA) 3V	1	215		700					11-Jun-16
6	774-M8MT511-080G	M	143-701300-400G	CPU i.MX 8M Quad 1.3GHz	1	705		90					1-Jul-19
7	774-M8MT511-080G	M	131-566032-105G	LPDDR4-3733 SDRAM 32Gb(1G*32)-	1	65				Y			11-Sep-20
-	774-M8MT511-080G	S	131-566032-101G	LPDDR4/4X-3733 SDRAM	1	1004		2000					1-Jul-19
8	774-M8MT511-080G	M	147-068850-400G	DSI to FlatLink	1	1004		2500					22-Mar-19
-	774-M8MT511-080G	S	147-068850-400GZ	Dual Channel DSI to Dual-Link LVDS	1	19				Y			16-Apr-21
-	774-M8MT511-080G	S	147-068850-400GZ	DSI to FlatLink	1					Y			16-Apr-21
-	774-M8MT511-080G	S	147-068850-400G	Dual Channel DSI to Dual-Link LVDS	1	180		2500		Y			19-Mar-21
9	774-M8MT511-080G	M	121-003552-200G	IC Power Distribution	8	125		3000		Y			19-Aug-19
-	774-M8MT511-080G	S	121-003552-200G	IC Power Distribution	8	125		3000		Y			5-Aug-21
-	774-M8MT511-080G	S	121-007111-401G	IC Power Switch with	8	135		3000		Y			5-Aug-21
-	774-M8MT511-080G	S	121-003552-200GZ	IC Power Distribution	8					Y			11-Jun-21
10	972-X10371-000G	M	941-112012-000G	無鉛錫膏 Sn96.5/Ag3.0/Cu0.5 S3X58-	0.6	35		1					23-Dec-15
10	975-X10371-000G	M	941-111002-000S	無鉛錫膏 Sn96.5/Ag3.0/Cu0.5;	0.9	35		1					16-Jan-14
-	774-M8MT511-080G	M	121-000213-210G	IC RS232 Transceivers	1	185		2000					15-May-18
-	774-M8MT511-080G	S	121-000213-207G	IC RS232	1	330		47					23-Sep-09
-	774-M8MT511-080G	S	121-000213-216GZ	IC RS232 Transceivers,HIN213EIAZ-	1								21-Nov-17
-	774-M8MT511-080G	S	121-000213-216G	IC RS232 Transceivers,HIN213EIAZ-	1	265		2000					14-Sep-11
10	975-M8MT511-000G	M	941-111002-000S	無鉛錫膏 Sn96.5/Ag3.0/Cu0.5;	8.6	35		1					16-Jan-14
10	972-X10371-000G	M	941-112012-000G	無鉛錫膏 Sn96.5/Ag3.0/Cu0.5 S3X58-	3	35		1					23-Dec-15
10	755-VC9000-000G	M	774-M8MT511-080G	M8MT51-ECC-410D: i.MX8M Quad,	1					Y			31-Aug-21
10	750-VC9000-000G	M	755-VC9000-000G	VC900-M8M: VC900-M8M-Q, Fanless,	1					Y			25-Mar-22
10	762-X10371-180A	M	136-332050-400G	ARM Cortex*-M0 32-bit MCU,64Kb	1	265		1500					28-Apr-17
-	762-X10371-180A	S	136-332050-400GZ	ARM Cortex*-M0 32-bit MCU,64Kb	1	205				Y			25-Aug-21
-	762-X10371-180A	S	136-332050-410GZ	ARM Cortex*-M0 32-bit MCU,64Kb	1	205				Y			28-Jul-21
-	762-X10371-180A	S	136-332050-410G	ARM Cortex*-M0 32-bit MCU,64Kb	1	265		1500					18-Oct-18
10	774-X10371-180G	M	762-X10371-180A	燒錄後 SMT 打件, Firmware file name:	1					Y			16-Aug-22
11	774-M8MT511-080G	M	121-006561-400G	IC CAN Transceiver,ATA6561-GBQW-	1	280		6000					3-Jul-19
-	774-M8MT511-080G	S	121-006561-410G	IC CAN Transceiver,ATA6561-	1	705		6000					21-Jan-20
-	774-M8MT511-080G	S	121-006561-400GZ	IC CAN Transceiver,ATA6561-GBQW-	1					Y			22-Jul-19
12	774-M8MT511-080G	M	231-031230-400G	PWM REGULATOR MT3123BQAR/QFN	2	155		5000		Y			6-Dec-21
13	774-M8MT511-080G	M	263-185491-210C	RES 5.49KΩ,F(1%),SMD,0402,(None)	1	65		10000					10-Aug-11
-	774-M8MT511-080G	S	263-185491-210J	RES 5.49KΩ,F(1%),SMD,0402,(JP)RoHS	1	95		10000					10-Aug-11
14	774-M8MT511-080G	M	348-850063-210G	NANO SIM CARD CONN, PUSH PUSH	1	65		3000		Y			7-Jan-22
-	774-M8MT511-080G	S	348-850063-200G	NANO SIM CARD CONN, PUSH PUSH	1	1004		1500		Y			30-Jun-20
15	774-M8MT511-080G	M	213-151505-200C	MLCC	8	65		10000					9-Aug-11
-	774-M8MT511-080G	S	213-151505-216S	MLCC	8	85		10000					23-Dec-08
-	774-M8MT511-080G	S	213-151505-200J	MLCC	8	85		10000					9-Aug-11
16	774-M8MT511-080G	M	122-105000-201G	AUDIO CODEC	1	265		490		Y			21-Sep-22
-	774-M8MT511-080G	S	122-105000-200GZ	AUDIO CODEC	1			1					8-Oct-14
-	774-M8MT511-080G	S	122-105000-200G	AUDIO CODEC	1	1004		5000					12-Jan-12
20	972-X10371-000G	M	941-330039-000G	特殊耐高溫標籤	1.25	25		1					27-May-11
20	975-X10371-000G	M	941-111003-000S	無鉛錫膏 Sn97/Ag3; SAC300(Alpha)	1.1	35		1					16-Jan-14
-	774-M8MT511-080G	M	213-251049-270J	MLCC	6	80		100000					24-Nov-11
-	774-M8MT511-080G	S	213-251049-276SZ	MLCC	6	105		10000					21-Sep-18
-	774-M8MT511-080G	S	213-251049-270JZ	MLCC	6	105		10000					13-Apr-18
-	774-M8MT511-080G	S	213-251049-270C	MLCC	6	75		10000					24-Nov-11
-	774-M8MT511-080G	S	213-251049-276S	MLCC	6	105		100000					26-Aug-13
20	975-M8MT511-000G	M	941-111003-000S	無鉛錫膏 Sn97/Ag3; SAC300(Alpha)	11.4	35		1					16-Jan-14
20	972-M8MT511-000G	M	941-330039-000G	特殊耐高溫標籤	2	25		1					27-May-11
20	774-X10371-180G	M	346-510820-100G	BOX HEADER	1	50		1000					14-Apr-16
20	755-VC9000-000G	M	774-X10371-180G	X103-EC70 - In-Vehcle Power Board,	1					Y			11-Apr-22
20	750-VC9000-000G	M	A81-006065-016G	SWITCH CABLE, Switch Bottom to	1	75				Y			18-May-21
25	774-M8MT511-080G	M	213-251059-330J	MLCC	1	95		40000					9-Aug-11
-	774-M8MT511-080G	S	213-251059-330JZ	MLCC	1	105		10000					28-Mar-18
-	774-M8MT511-080G	S	213-251059-330C	MLCC	1	110		4000					9-Aug-11
30	975-X10371-000G	M	941-121005-000S	助焊劑 EF8000(ALPHA)	2.4	25		1					16-Jan-14
30	975-M8MT511-000G	M	941-121005-000S	助焊劑 EF8000(ALPHA)	20	25		1					16-Jan-14
-	774-X10371-180G	M	213-251058-630J	MLCC	2	115		2000					18-Jun-13
-	774-X10371-180G	S	213-251058-630C	MLCC	2	65		4000					12-Sep-16
30	750-VC9000-000G	M	671-106012-000G	POWER ADAPTER,60W,EA10681N-	1	155		1					2-Oct-15
30	774-M8MT511-080G	M	213-251059-230J	MLCC	13	75		100000					4-Aug-11
-	774-M8MT511-080G	S	213-251059-235SZ	MLCC	13	105		10000					16-Apr-18
-	774-M8MT511-080G	S	213-251059-235S	MLCC	13	90		10000					6-Apr-12
-	774-M8MT511-080G	S	213-251059-230C	MLCC	13	75		10000					4-Aug-11
-	774-M8MT511-080G	S	213-251059-230CZ	MLCC	13	35		10000					6-Mar-18
-	774-M8MT511-080G	S	213-251059-230JZ	MLCC	13	105		10000					30-Nov-17
40	774-M8MT511-080G	M	213-153319-200C	MLCC	4	75		10000					9-Aug-11
-	774-M8MT511-080G	S	213-153319-200CZ	MLCC	4	35		10000					29-Mar-18
-	774-M8MT511-080G	S	213-153319-200J	MLCC	4	90		10000					9-Aug-11
40	975-M8MT511-000G	M	941-111012-000G	無鉛抗氧化錫膏	0.12	35				Y			20-Jul-20
40	774-X10371-180G	M	213-251049-380J	MLCC	7	115		4000					25-Aug-11
-	774-X10371-180G	S	213-251049-380JZ	MLCC	7	105		10000					23-Jul-18
-	774-X10371-180G	S	213-251049-380C	MLCC	7	75		4000					25-Aug-11
40	975-X10371-000G	M	941-111012-000G	無鉛抗氧化錫膏	0.012	35				Y			20-Jul-20
40	755-VC9000-000G	M	A53-000177-000G	THERMAL PAD, PB80B,	1	55				Y			15-Nov-21
40	750-VC9000-000G	M	332-700010-201G	POWER CORD L=1830mm SVT	1	75		1					2-Dec-11
50	774-M8MT511-080G	M	251-912100-500G	FERRITE BEAD 120Ω±	5	190		4000					16-Apr-13
-	774-M8MT511-080G	S	251-912100-500GZ	FERRITE BEAD 120Ω±	5	60		4000					7-Jan-14
50	750-VC9000-000G	M	A62-C8200-200G	PIZZA BOX	1	25		1					25-Nov-10
50	755-VC9000-000G	M	A53-000195-000G	THERMAL PAD, XR-HL 16*12*2.5mm,	2	55				Y			13-May-22
60	774-X10371-180G	M	213-251049-200J	MLCC	8	95		100000					9-Aug-11
-	774-X10371-180G	S	213-251049-200CZ	MLCC	8	35		10000					12-Jul-18
-	774-X10371-180G	S	213-251049-216S	MLCC	8	90		10000					20-Jul-07
-	774-X10371-180G	S	213-251049-200JZ	MLCC	8	105		10000					26-Dec-17
-	774-X10371-180G	S	213-251049-216SZ	MLCC	8	105		10000					

110	750-VC9000-000G	M	A32-11201F-040G	SCREW M2x4 MM I HEAD 0D=4.5mm	1	330	2500	2500	26-Oct-18
120	774-M8MT511-080G	M	123-097360-200G	IC Audio Power	1				23-Sep-08
-	774-M8MT511-080G	S	123-097360-200GZ	IC Audio Power	1				7-Dec-16
120	774-X10371-180G	M	213-252249-270J	MLCC	1	80	100000	100000	13-Apr-12
-	774-X10371-180G	S	213-252249-270JZ	MLCC	1	105	10000	10000	27-Feb-18
-	774-X10371-180G	S	213-252249-270C	MLCC	1	75	10000	10000	13-Sep-16
120	755-VC9000-000G	M	531-700280-000G	SCREW M2.5*6mm W/SPRING	2	40		2000	13-May-08
120	750-VC9000-000G	M	A32-61301D-050G	SCREW F-HEAD PHILLIPS M3*P0.5*1.5	4	40		2000	19-Oct-18
130	774-X10371-180G	M	213-151015-200C	MLCC	1	75		10000	9-Aug-11
-	774-X10371-180G	S	213-151015-200J	MLCC	1	90	100000	100000	9-Aug-11
-	774-X10371-180G	S	213-151015-200JZ	MLCC	1	170			13-Dec-18
-	774-X10371-180G	S	213-151015-200CZ	MLCC	1	35	10000	10000	29-Mar-18
130	774-M8MT511-080G	M	213-251049-200J	MLCC	31	95	100000	100000	9-Aug-11
-	774-M8MT511-080G	S	213-251049-2165Z	MLCC	31	105	10000	10000	6-Jul-18
-	774-M8MT511-080G	S	213-251049-200CZ	MLCC	31	35	10000	10000	12-Jul-18
-	774-M8MT511-080G	S	213-251049-200JZ	MLCC	31	105	10000	10000	26-Dec-17
-	774-M8MT511-080G	S	213-251049-2165	MLCC	31	90	10000	10000	20-Jul-07
-	774-M8MT511-080G	S	213-251049-200C	MLCC	31	75	10000	10000	9-Aug-11
130	750-VC9000-000G	M	A31-028H35-100G	CHASSIS WALL BRACKET, SPCC	2	55		100 Y	24-Aug-22
140	774-M8MT511-080G	M	172-305120-200G	MOSFET P-Ch,VDS:-20V,ID:-8A,VGS:±	1	65	3000	3000	13-Nov-18
140	774-X10371-180G	M	213-252249-330C	MLCC	2	75	4000	4000	10-Aug-11
-	774-X10371-180G	S	213-252249-330JZ	MLCC	2	105	10000	10000	21-Feb-18
-	774-X10371-180G	S	213-252249-330J	MLCC	2	105	4000	4000	10-Aug-11
-	774-X10371-180G	S	213-252249-330CZ	MLCC	2	35	10000	10000	21-Feb-18
150	774-X10371-180G	M	213-251538-210C	MLCC	1	35	10000	10000	15-Aug-11
-	774-X10371-180G	S	213-251538-210J	MLCC	1	85	10000	10000	15-Aug-11
150	755-VC9000-000G	M	A32-E14012-060G	SCREW P/W M4*0.7P L=6mm Zn	1	40		6000	11-Aug-17
150	774-M8MT511-080G	M	263-180005-200C	RES 0Ω,(5%),SMD,0402,(None)	69	75	10000	10000	2-Aug-11
-	774-M8MT511-080G	S	263-180005-200J	RES 0Ω,,SMD,0402 (JP)RoHS	69	90	10000	10000	2-Aug-11
160	774-X10371-180G	M	213-252239-220J	MLCC	1	80	100000	100000	30-Apr-14
-	774-X10371-180G	S	213-252239-220C	MLCC	1	110	10000	10000	20-Sep-18
-	774-X10371-180G	S	213-252239-220JZ	MLCC	1	105	10000	10000	25-Oct-18
160	755-VC9000-000G	M	A33-5B201C-040G	STANDOFF #4-40*H4.75 mm LEAD-	10	25		1000	24-Oct-18
160	774-M8MT511-080G	M	263-181002-110C	RES 10KΩ,F(1%),SMD,0201,(None)	125	75	10000	10000	23-May-12
170	774-M8MT511-080G	M	263-181503-210C	RES 150KΩ,F(1%),SMD,0402,(None)	2	80	10000	10000	4-Aug-11
-	774-M8MT511-080G	S	263-181503-210J	RES 150KΩ,F(1%),SMD,0402 (JP)RoHS	2	95	10000	10000	4-Aug-11
170	774-X10371-180G	M	213-152215-200C	MLCC	2	75	10000	10000	9-Aug-11
-	774-X10371-180G	S	213-152215-200J	MLCC	2	90	10000	10000	9-Aug-11
-	774-X10371-180G	S	213-152215-200CZ	MLCC	2	35	10000	10000	29-Mar-18
170	755-VC9000-000G	M	A31-021444-500G	CHASSIS TOP COVER, SGCC T=1.0mm,	1	55		100 Y	24-Aug-22
180	774-M8MT511-080G	M	263-187502-210C	RES 75KΩ,F(1%),SMD,0402,(None)	3	105	10000	10000	5-Aug-11
-	774-M8MT511-080G	S	263-187502-210J	RES 75KΩ,F(1%),SMD,0402 (JP)RoHS	3	105	10000	10000	5-Aug-11
180	774-X10371-180G	M	213-154705-200C	MLCC	1	65	10000	10000	9-Aug-11
-	774-X10371-180G	S	213-154705-200JZ	MLCC	1				23-Aug-19
-	774-X10371-180G	S	213-154705-200J	MLCC	1	105	100000	100000	9-Aug-11
180	755-VC9000-000G	M	A31-022409-500G	CHASSIS BOTTOM CASE, SECC T=1mm,	1	55		100 Y	24-Aug-22
190	774-M8MT511-080G	M	348-850081-200G	SD CARD	1	75	5600	5600	17-May-13
190	774-X10371-180G	M	213-251059-220J	MLCC	2	115	100000	100000	9-Aug-11
-	774-X10371-180G	S	213-251059-220JZ	MLCC	2	105	10000	10000	26-Dec-17
-	774-X10371-180G	S	213-251059-220C	MLCC	2	75	10000	10000	9-Aug-11
190	755-VC9000-000G	M	A31-033221-500G	CHASSIS SIM COVER, SGCC T=1mm,	1	55		100 Y	24-Aug-22
200	774-M8MT511-080G	M	343-501821-130G	USB 3.0 CONN*2, 18P, A Type, BLUE, F,	1	45	2000	2000	28-May-19
200	774-X10371-180G	M	213-251068-200J	MLCC	2	75	10000	10000	3-Oct-11
-	774-X10371-180G	S	213-251068-200JZ	MLCC	2	105	10000	10000	18-Apr-18
-	774-X10371-180G	S	213-251068-200C	MLCC	2	75	10000	10000	3-Oct-11
210	774-M8MT511-080G	M	343-500501-200G	USB CONN Micro	1	75	1350	10800	21-Jun-16
210	774-X10371-180G	M	213-251059-230J	MLCC	1	75	100000	100000	4-Aug-11
-	774-X10371-180G	S	213-251059-235S2	MLCC	1	105	10000	10000	16-Apr-18
-	774-X10371-180G	S	213-251059-235S	MLCC	1	90	10000	10000	6-Apr-12
-	774-X10371-180G	S	213-251059-230JZ	MLCC	1	105	10000	10000	30-Nov-17
-	774-X10371-180G	S	213-251059-230CZ	MLCC	1	35	10000	10000	6-Mar-18
-	774-X10371-180G	S	213-251059-230C	MLCC	1	75	10000	10000	4-Aug-11
210	755-VC9000-000G	M	A81-004293-016G	POWER CABLE, JST 1*6P/2.0mm to	1	75		100 Y	7-Jul-22
220	774-M8MT511-080G	M	342-101901-230G	(HS)HDMI CONN(A TYPE), 19P, 6.2H, F,	1	45	500	2000 Y	6-Aug-20
220	774-X10371-180G	M	171-360360-200G	DIODE TVS,36V	1	300	3000	3000	27-Feb-14
220	755-VC9000-000G	M	A81-004288-016G	POWER CABLE, JST 1*8P/2.0mm to	1	75		100 Y	14-Jun-22
230	774-M8MT511-080G	M	343-501402-200G	Giga LAN CONN	1	105	720	720	10-Jul-17
230	755-VC9000-000G	M	A81-006070-016G	SWITCH RESET CABLE, RESET SWITCH,	1	75		100 Y	14-Jun-22
240	774-M8MT511-080G	M	348-307050-280G	NGFF CONN 67P/0.5mm,H=8.5mm,E	1	75	550	3850	27-Nov-17
240	774-X10371-180G	M	171-224148-309G	DIODE Switching,1N4148WS-7-	3	155	3000	3000	12-Oct-11
240	755-VC9000-000G	M	A81-015107-016G	COM PORT Cable, COM and CAN,	1	75		100 Y	14-Jun-22
250	774-M8MT511-080G	M	348-307050-240G	NGFF CONN 67P/0.5mm,H=8.5mm,B	1	45	550	4400	16-Feb-16
260	774-X10371-180G	M	171-505430-204G	DIODE SCHOTTKY	1	185	3000	3000	18-Jan-18
-	774-X10371-180G	S	171-505430-207GZ	DIODE SCHOTTKY BARRIER	1				30-Jan-18
-	774-X10371-180G	S	171-505430-207G	DIODE SCHOTTKY	1	500	3000	3000	11-Mar-15
280	774-M8MT511-080G	M	342-310022-110G	Screw CONN, Terminal	1	125	1000	1000	5-May-15
280	774-X10371-180G	M	171-200520-200G	DIODE SCHOTTKY BARRIER	2	105	3000	3000	30-Jan-18
-	774-X10371-180G	S	171-205200-210S	DIODE SCHOTTKY BARRIER	2	165	8000	8000	18-Oct-13
-	774-X10371-180G	S	171-205200-220G	DIODE SCHOTTKY,30V,200mA,RB520S-	2	65	3000	3000 Y	22-Jul-19
290	774-X10371-180G	M	171-200046-201G	DIODE SCHOTTKY BARRIER	3	165	3000	3000	17-Jan-18
-	774-X10371-180G	S	171-200046-200GZ	DIODE	3	25	3000	3000	1-Sep-14
-	774-X10371-180G	S	171-200046-200G	DIODE	3	185	3000	3000	25-Apr-13
290	774-M8MT511-080G	M	213-251059-109G	MLCC	93	75	15000	15000	16-Feb-15
300	774-X10371-180G	M	171-365125-200G	DIODE TVS,5V,AZ5125-01H.R7G/SOD-	2	65	3000	3000	25-Dec-15
300	774-M8MT511-080G	M	213-251049-130C	MLCC	191	65	15000	15000	9-Aug-11
-	774-M8MT511-080G	S	213-251049-130J	MLCC	191	90	150000	150000	9-Aug-11
-	774-M8MT511-080G	S	213-251049-130JZ	MLCC	191	105	10000	10000	29-Dec-17
310	774-M8MT511-080G	M	213-252268-310J	MLCC	43	75	4000	40000	6-Jan-12
-	774-M8MT511-080G	S	213-252268-310JZ	MLCC	43	105	10000	10000	27-Mar-18
-	774-M8MT511-080G	S	213-252268-310C	MLCC	43	75	3000	3000	20-Dec-17
310	774-X10371-180G	M	171-214148-503S	DIODE Switching,SMD,1N4148W-TG-	1	65	3000	3000	6-Apr-12
320	774-M8MT511-080G	M	213-252259-200J	MLCC	10	90	100000	100000	10-Aug-11
-	774-M8MT511-080G	S	213-252259-200C	MLCC	10	110	10000	10000	10-Aug-11
-	774-M8MT511-080G	S	213-252259-200JZ	MLCC	10	105	10000	10000	18-Apr-18
320	774-X10371-180G	M	212-127144-200G	SOLID CAP,270uF/16V,13m	2	155	900	900	13-May-16
330	774-M8MT511-080G	M	213-251068-200J	MLCC	39	75	10000	10000	3-Oct-11
-	774-M8MT511-080G	S	213-251068-200C	MLCC	39	75	10000	10000	3-Oct-11
-	774-M8MT511-080G	S	213-251068-200JZ	MLCC	39	105	10000	10000	18-Apr-18
330	774-X10371-180G	M	212-156076-200G	HYBRID ELEC CAP 56uF/50V,25m	2	275	500	500	9-Dec-10
-	774-X10371-180G	S	212-156076-200GZ	SOLID CAP,56uF/50V,25m	2	155	1000	1000	4-Jan-11
340	774-M8MT511-080G	M							

390	774-M8MT511-080G	S	213-151805-200JZ	MLCC	2	75	1000	1000	29-Mar-18
	774-X10371-180G	M	223-047122-620G	CHOKE 0.47uH,M(20%),RDC<4.2m	2	65	1000	1000	15-May-17
	774-X10371-180G	S	223-047122-610G	CHOKE 0.47uH,M(20%),RDC<4.2mΩ	2	75	3000	3000	2-Sep-16
400	774-M8MT511-080G	M	213-254739-210C	MLCC	4	75	10000	10000	10-Aug-11
	774-M8MT511-080G	S	213-254739-210JZ	MLCC	4	105	10000	10000	15-Nov-18
	774-M8MT511-080G	S	213-254739-210J	MLCC	4	90	100000	100000	10-Aug-11
400	774-X10371-180G	M	223-033223-800G	CHOKE 3.3uH,M(20%),DCR<1.8m	1	105	250	5000	7-Dec-15
410	774-X10371-180G	M	172-207002-309G	MOSFET Dual N-	1	105	3000	3000	28-May-12
420	774-M8MT511-080G	M	213-252249-140C	MLCC	15	75	15000	15000	22-Aug-11
	774-M8MT511-080G	S	213-252249-140J	MLCC	15	105	150000	150000	22-Aug-11
	774-M8MT511-080G	S	213-252249-140JZ	MLCC	15	105	10000	10000	7-Dec-17
	774-M8MT511-080G	S	213-252249-140CZ	MLCC	15	35	10000	10000	20-Mar-18
420	774-X10371-180G	M	172-309040-200S	MOSFET N-Ch,VDS:30V,ID:78A,VGS:±	4	265	5000	5000	22-May-12
430	774-M8MT511-080G	M	213-254715-200C	MLCC	7	75	10000	10000	10-Aug-11
	774-M8MT511-080G	S	213-254715-200J	MLCC	7	105	100000	100000	10-Aug-11
	774-M8MT511-080G	S	213-254715-200CZ	MLCC	7	35	10000	10000	29-Mar-18
	774-M8MT511-080G	S	213-254715-200JZ	MLCC	7	105	10000	10000	4-Jan-18
430	774-X10371-180G	M	172-301380-220G	MOSFET Dual N-	2	65	4000	4000	7-Aug-19
	774-X10371-180G	S	172-300612-200GZ	MOSFET Dual N-Ch,VDS:30V,VGS:±	2	25			1-Mar-16
	774-X10371-180G	S	172-301380-221G	MOSFET Dual N-	2	155	4000	4000	27-Nov-19
	774-X10371-180G	S	172-300612-200G	MOSFET Dual N-Ch,VDS:30V,VGS:±	2	265	8000	8000	12-Jan-16
440	774-M8MT511-080G	M	213-152205-200C	MLCC	2	75	10000	10000	9-Aug-11
	774-M8MT511-080G	S	213-152205-216SZ	MLCC	2	105	10000	10000	9-Nov-18
	774-M8MT511-080G	S	213-152205-200J	MLCC	2	95	100000	100000	9-Aug-11
	774-M8MT511-080G	S	213-152205-216S	MLCC	2	90	100000	100000	27-Jun-07
	774-M8MT511-080G	S	213-152205-200JZ	MLCC	2	105	10000	10000	23-Jan-18
	774-M8MT511-080G	S	213-152205-200CZ	MLCC	2	35	10000	10000	9-Aug-18
440	774-X10371-180G	M	172-356730-200G	MOSFET N-Ch,VDS:60V,ID:50A,VGS:±	8	375	1500	1500	6-Feb-18
	774-X10371-180G	S	172-309060-200G	MOSFET N-Ch,VDS:60V,ID:60A,VGS:±	8	165			6-Apr-21
	774-X10371-180G	S	172-318534-200G	MOSFET N-Ch,VDS:60V,ID:50A,VGS:±	8	295	2500	2500	27-Dec-13
	774-X10371-180G	S	172-356701-200G	MOSFET N-Ch,VDS:60V,ID:71A,VGS:±	8	315	1500	1500	18-May-21
450	774-M8MT511-080G	M	213-253319-100C	MLCC	10	75	1000	1000	19-Dec-19
	774-M8MT511-080G	S	213-253319-100CZ	MLCC	10	35			10-Mar-21
460	774-M8MT511-080G	M	213-251038-250C	MLCC	2	75	10000	10000	15-Aug-11
	774-M8MT511-080G	S	213-251038-250J	MLCC	2	90	100000	100000	15-Aug-11
	774-M8MT511-080G	S	213-251038-256SZ	MLCC	2	175	10000	10000	1-Nov-18
	774-M8MT511-080G	S	213-251038-256S	MLCC	2	90	10000	10000	21-Jul-11
	774-M8MT511-080G	S	213-251038-250JZ	MLCC	2	15	10000	10000	23-Aug-19
460	774-X10371-180G	M	172-223904-203S	TRANSISTOR	2	205	3000	3000	3-Jul-07
	774-X10371-180G	S	172-223904-206S	TRANSISTOR	2	390	5000	5000	13-Jun-12
470	774-X10371-180G	M	263-181003-210C	RES 100KΩ,F(1%),SMD,0402,(None)	12	75	10000	10000	3-Aug-11
	774-X10371-180G	S	263-181003-210J	RES 100KΩ,F(1%),SMD,0402,(IP)RoHS	12	90	10000	10000	3-Aug-11
470	774-M8MT511-080G	M	213-251069-540J	MLCC	9	115	3000	3000	10-Aug-11
	774-M8MT511-080G	S	213-251069-540JZ	MLCC	9	105	10000	10000	29-Dec-17
	774-M8MT511-080G	S	213-251069-540C	MLCC	9	75	3000	3000	10-Aug-11
480	774-M8MT511-080G	M	213-152215-200C	MLCC	2	75	10000	10000	9-Aug-11
	774-M8MT511-080G	S	213-152215-200J	MLCC	2	90	10000	10000	9-Aug-11
	774-M8MT511-080G	S	213-152215-200CZ	MLCC	2	35	10000	10000	29-Mar-18
480	774-X10371-180G	M	263-181002-210C	RES 10KΩ,F(1%),SMD,0402,(None)	13	75	10000	10000	3-Aug-11
	774-X10371-180G	S	263-181002-210J	RES 10KΩ,F(1%),SMD,0402,(IP)RoHS	13	90	10000	10000	3-Aug-11
490	774-M8MT511-080G	M	213-152205-110C	MLCC 22pF/25V,NPO,J(5%),SMD	3	35	15000	15000	11-Oct-12
	774-M8MT511-080G	S	213-152205-119SG	MLCC 22pF/25V,NPO,J(5%),SMD	3	110	15000	15000	1-Nov-16
	774-M8MT511-080G	S	213-152205-110J	MLCC 22pF/25V,NPO,J(5%),SMD	3	110	15000	15000	26-Apr-16
490	774-X10371-180G	M	263-120057-812G	PMS RES,5m	1	95	2000	2000	14-Feb-12
	774-X10371-180G	S	263-120057-812GZ	PMS RES,5m	1	35	5000	5000	13-Mar-18
500	774-M8MT511-080G	M	213-150470-200C	MLCC	2	35	10000	10000	8-Aug-11
	774-M8MT511-080G	S	213-150470-200J	MLCC	2	40	10000	10000	8-Aug-11
	774-M8MT511-080G	S	213-150470-200CZ	MLCC	2	35			23-Aug-21
500	774-X10371-180G	M	263-183903-210C	RES 390KΩ,F(1%),SMD,0402,(None)	2	35	10000	10000	8-Aug-11
	774-X10371-180G	S	263-183903-210J	RES 390KΩ,F(1%),SMD,0402,(IP)RoHS	2	35	10000	10000	8-Aug-11
510	774-M8MT511-080G	M	213-252229-200C	MLCC	2	75	10000	10000	10-Aug-11
	774-M8MT511-080G	S	213-252229-200CZ	MLCC	2	35	10000	10000	26-Apr-21
	774-M8MT511-080G	S	213-252229-200JZ	MLCC	2	15	10000	10000	13-Dec-18
	774-M8MT511-080G	S	213-252229-200J	MLCC	2	95	100000	100000	10-Aug-11
510	774-X10371-180G	M	263-180005-500C	RES 0Ω,J(5%),SMD,0805,(None)	7	75	5000	5000	3-Aug-11
	774-X10371-180G	S	263-180005-500J	RES 0Ω,J(5%),SMD,0805,(IP)RoHS	7	90	5000	5000	3-Aug-11
520	774-M8MT511-080G	M	213-251068-300J	MLCC	3	95	40000	40000	10-Aug-11
	774-M8MT511-080G	S	213-251068-300C	MLCC	3	75	4000	4000	10-Aug-11
	774-M8MT511-080G	S	213-251068-300JZ	MLCC	3	105	10000	10000	7-Dec-17
	774-M8MT511-080G	S	213-251068-300CZ	MLCC	3	35	4000	4000	8-Apr-19
520	774-X10371-180G	M	263-180100-310C	RES 100Ω,F(1%),SMD,0603,(None)	3	75	5000	5000	3-Aug-11
	774-X10371-180G	S	263-180100-310J	RES 100Ω,F(1%),SMD,0603,(IP)RoHS	3	90	5000	5000	3-Aug-11
530	774-X10371-180G	M	263-181000-310C	RES 100Ω,F(1%),SMD,0603,(None)	1	75	5000	5000	3-Aug-11
	774-X10371-180G	S	263-181000-310J	RES 100Ω,F(1%),SMD,0603,(IP)RoHS	1	90	5000	5000	3-Aug-11
530	774-M8MT511-080G	M	171-361990-200G	DIODE TVS,5V,4-CHANNEL ESD	4	65	3000	12000	4-Jan-16
	774-M8MT511-080G	S	171-365506-200G	DIODE TVS 5V,50W,L05LV0C6-	4	185		5000	17-Sep-18
540	774-M8MT511-080G	M	171-204005-230G	DIODE SCHOTTKY,40V,200mA,BAS40-	1	65	4000	4000	28-Aug-20
	774-X10371-180G	M	263-181001-310C	RES 1KΩ,F(1%),SMD,0603,(None)	1	110	5000	5000	3-Aug-11
	774-X10371-180G	S	263-181001-310J	RES 1KΩ,F(1%),SMD,0603,(IP)RoHS	1	105	5000	5000	3-Aug-11
550	774-X10371-180G	M	263-185602-210C	RES 56KΩ,F(1%),SMD,0402,(None)	1	80	10000	10000	11-Aug-11
	774-X10371-180G	S	263-185602-210J	RES 56KΩ,F(1%),SMD,0402,(IP)RoHS	1	95	10000	10000	11-Aug-11
550	774-M8MT511-080G	M	171-205200-220G	DIODE SCHOTTKY,30V,200mA,RB520S-	19	65	3000	3000	22-Jul-19
	774-M8MT511-080G	S	171-201790-200S	DIODE	19	165	3000	3000	1-Oct-13
560	774-X10371-180G	M	263-180005-200C	RES 0Ω,J(5%),SMD,0402,(None)	18	75	10000	10000	2-Aug-11
	774-X10371-180G	S	263-180005-200J	RES 0Ω,SMD,0402,(IP)RoHS	18	90	10000	10000	2-Aug-11
560	774-M8MT511-080G	M	171-365125-200G	DIODE TVS,5V,AZ5125-01H,R7G/SOD-	5	65	3000	3000	25-Dec-15
570	774-X10371-180G	M	263-184702-210C	RES 47KΩ,F(1%),SMD,0402,(None)	1	75	10000	10000	9-Aug-11
	774-X10371-180G	S	263-184702-210CZ	RES 47KΩ,F(1%),SMD,0402,(None)	1	15	10000	10000	26-Mar-20
	774-X10371-180G	S	263-184702-210J	RES 47KΩ,F(1%),SMD,0402,(IP)RoHS	1	90	10000	10000	9-Aug-11
580	774-M8MT511-080G	M	171-451756-200G	DIODE	1	265	3000	3000	7-Oct-15
	774-M8MT511-080G	S	171-450056-200G	DIODE	1	265	3000	3000	26-Sep-14
590	774-M8MT511-080G	M	171-360120-500G	DIODE	1	180	3000	3000	13-Sep-13
	774-M8MT511-080G	S	171-360120-500GZ	DIODE	1				8-Apr-20
590	774-X10371-180G	M	263-180005-300C	RES 0Ω,J(5%),SMD,0603,(None)	9	75	5000	5000	3-Aug-11
	774-X10371-180G	S	263-180005-300J	RES 0Ω,J(5%),SMD,0603,(IP)RoHS	9	90	5000	5000	3-Aug-11
600	774-M8MT511-080G	M	171-451715-200G	DIODE Zener,15V,Vz=14.34V ~	1	265	3000	3000	9-May-18
	774-M8MT511-080G	S	171-451715-200GZ	DIODE Zener,15V,Vz=14.34V ~	1				25-May-18
600	774-X10371-180G	M	263-180479-510C	RES 4.7Ω,F(1%),SMD,0805,(None)	4	35	5000	5000	3-Aug-11
	774-X10371-180G	S	263-180479-510J	RES 4.7Ω,F(					



690	774-X10371-180G	M	263-182803-210C	RES 280KQ,F(1%),SMD,0402,(None)	1	65	10000	10000	8-Aug-11
-	774-X10371-180G	S	263-182803-210J	RES 280KQ,F(1%),SMD,0402,(JP)RoHS	1	35	10000	10000	8-Aug-11
700	774-M8MT511-080G	M	346-510414-200G	BOX HEADER 1*4P,F,90D	2	65	1000	1000	12-Feb-18
-	774-M8MT511-080G	S	347-104018-210G	BOX HEADER	2	55	1500	4500	2-Mar-16
700	774-X10371-180G	M	263-182002-210C	RES 20KQ,F(1%),SMD,0402,(None)	1	65	10000	10000	5-Aug-11
-	774-X10371-180G	S	263-182002-210J	RES 20KQ,F(1%),SMD,0402,(JP)RoHS	1	90	10000	10000	5-Aug-11
710	774-M8MT511-080G	M	346-522040-200G	BOX HEADER	1	45	1000	1000	29-Dec-16
720	774-M8MT511-080G	M	223-523000-410G	CM FILTER Cd=0.25pF, Rs=3	11	75	4500	4500	6-Feb-17
720	774-X10371-180G	M	263-181004-210C	RES 1MΩ,F(1%),SMD,0402,(None)	1	65	10000	10000	3-Aug-11
-	774-X10371-180G	S	263-181004-210J	RES 1MΩ,F(1%),SMDM0402,(JP)RoHS	1	90	10000	10000	3-Aug-11
730	774-M8MT511-080G	M	223-010270-830G	CHOKE 1uH,M(20%),DCR:41m	5	90	3000	3000	24-Oct-19
730	774-X10371-180G	M	393-130800-240G	DIP SWITCH 8Ps BDS-DHN-(08)(F)-T-V-	1	105	4000	4000	7-Sep-17
740	774-M8MT511-080G	M	223-015222-610G	CHOKE 1.5uH,M(20%),RDC<=15m	1	85	1000	1000	17-Jan-14
-	774-M8MT511-080G	S	223-015222-620G	CHOKE 1.5uH,M(20%),RDC<=14m	1	75	1000	1000	15-May-17
740	774-X10371-180G	M	231-104363-200G	IC OVERTVOLTAGE PROTECTION	1	265	910	2500	24-Apr-15
-	774-X10371-180G	S	231-104363-200GZ	IC OVERTVOLTAGE PROTECTION	1	265	910	2500	26-Aug-20
750	774-M8MT511-080G	M	223-047122-610G	CHOKE 0.47uH,M(20%),RDC<=4.2mΩ	1	65	3000	3000	2-Sep-16
-	774-M8MT511-080G	S	223-047122-620G	CHOKE 0.47uH,M(20%),RDC<=4.2mΩ	1	75	1000	1000	15-May-17
750	774-X10371-180G	M	231-109668-200G	Low-Dropout,Linear	2	215	2500	2500	10-Jan-18
-	774-X10371-180G	S	231-109668-200GZ	Low-Dropout,Linear	2	215	2500	2500	30-Jul-18
760	774-M8MT511-080G	M	223-047220-800G	CHOKE	1	75	3000	3000	4-Aug-20
760	774-X10371-180G	M	141-051760-200G	IC Synchronous 4-Switch Buck-Boost	1	180	2000	2000	16-Jan-18
-	774-X10371-180G	S	141-051760-200GZ	IC Synchronous 4-Switch Buck-Boost	1	180	2000	2000	18-Nov-21
770	774-M8MT511-080G	M	223-047120-830G	CHOKE 0.47uH,M(20%),DCR:23mΩ	1	85	3000	3000	24-Oct-19
780	774-M8MT511-080G	M	223-047121-700G	CHOKE 0.47uH,M(20%),RDC<=14m	2	65	4000	2000	11-Nov-13
-	774-M8MT511-080G	S	223-047121-710G	CHOKE 0.47uH,M(20%),RDC:12.5m	2	65	2000	2000	16-May-17
780	774-X10371-180G	M	113-500002-210G	IC TTL Single 2-Input Positive-NOR	1	395	3000	3000	8-Nov-05
790	774-M8MT511-080G	M	174-210030-201G	LED,BLUE,SMD(0402)[1*0.6mm],SMLP	1	185	5000	5000	26-Nov-18
-	774-M8MT511-080G	S	174-210030-201GZ	LED,BLUE,SMD(0402)[1*0.6mm],SMLP	1	185	5000	5000	27-May-19
800	774-M8MT511-080G	M	174-310042-900G	LED,RED/GREEN,SMD1.6*1.5mm,19-	2	125	2000	2000	30-Apr-14
810	774-M8MT511-080G	M	174-210012-900G	LED,WHITE+RED,SMD1.6x1.5mm,[4PA	2	85	3000	3000	13-Feb-18
820	774-M8MT511-080G	M	223-410040-501S	COMMON CHOKE 90Ω,M(20%),ld<=	2	130	2000	2000	27-Jun-07
-	774-M8MT511-080G	S	223-410040-502S	COMMON CHOKE 90Ω,Irated<=	2	90	2000	2000	17-Aug-12
820	774-X10371-180G	M	972-X10371-000G	翻料 X103-EC70 SMD RoHS	1	95	3000	3000	11-Mar-19
830	774-M8MT511-080G	M	242-232773-250G	OSC	1	95	3000	3000	6-Jan-21
-	774-M8MT511-080G	S	242-232773-240G	OSC	1	105	3000	3000	6-Jan-21
830	774-X10371-180G	M	975-X10371-000G	翻料 X103-EC70 MI RoHS	1	95	3000	3000	11-Mar-19
840	774-M8MT511-080G	M	242-527006-200G	OSC(HCSL)	1	95	3000	3000	12-Jan-21
840	774-X10371-180G	M	171-360048-201G	DIODE TVS,48V	4	1004	5000	5000	12-Feb-18
-	774-X10371-180G	S	171-365093-210G	DIODE	4	75	5000	5000	23-Apr-21
-	774-X10371-180G	S	171-360048-200G	DIODE TVS,48V	4	65	5000	5000	23-Jan-18
850	774-M8MT511-080G	M	346-510411-240G	BOX HEADER, 1*4P/1.25mm, F,	2	50	900	4500	14-Aug-20
850	774-X10371-180G	M	171-201600-200G	DIODE SCHOTTKY BARRIER	1	125	5000	5000	16-Aug-16
-	774-X10371-180G	S	171-200016-200G	DIODE SCHOTTKY BARRIER	1	85	1800	1800	1-Jun-21
860	774-X10371-180G	M	171-451756-200G	DIODE	2	265	3000	3000	7-Oct-15
-	774-X10371-180G	S	171-450056-200G	DIODE	2	265	3000	3000	26-Sep-14
870	774-M8MT511-080G	M	172-223906-207S	TRANSISTOR	1	265	3000	3000	16-Jan-13
-	774-M8MT511-080G	S	172-223906-206S	TRANSISTOR	1	265	3000	3000	25-Dec-13
870	774-X10371-180G	M	171-451736-200G	DIODE Zener,36V,Vz=35.07V ~	1	265	3000	3000	8-Dec-16
880	774-X10371-180G	M	686-110322-100G	PIN PLUG	3	40	1000	10000	24-Oct-17
880	774-M8MT511-080G	M	172-223904-203S	TRANSISTOR	1	205	3000	3000	3-Jul-07
-	774-M8MT511-080G	S	172-223904-206S	TRANSISTOR	1	390	5000	5000	13-Jun-12
890	774-X10371-180G	M	174-210010-500S	LED,RED,SMD0805,17-	1	195	3000	3000	16-Jul-12
890	774-M8MT511-080G	M	172-305050-200G	MOSFET P-Ch,VDS:-20V,ID:-4A,VGS:±	1	65	3000	3000	17-Sep-18
-	774-M8MT511-080G	S	172-304402-200G	MOSFET P-Ch,VDS:-20V,ID:-4A,VGS:±	1	65	3000	3000	9-May-16
900	774-X10371-180G	M	174-210070-530S	LED,GREEN,SMD0805,17-	1	195	3000	3000	6-Apr-12
900	774-M8MT511-080G	M	172-331030-200G	MOSFET P-Ch,VDS:-30V,ID:-7.7A,VGS:±	3	265	3000	3000	9-May-18
-	774-M8MT511-080G	S	172-304435-200G	MOSFET P-Ch,VDS:-30V,ID:-11A,VGS:±	3	265	6000	6000	5-May-16
-	774-M8MT511-080G	S	172-304435-200GZ	MOSFET P-Ch,VDS:-30V,ID:-11A,VGS:±	3	265	6000	6000	31-Mar-21
910	774-M8MT511-080G	M	263-182400-110C	RES 240Q,F(1%),SMD,0201,(None)	3	80	10000	10000	23-May-12
910	774-X10371-180G	M	263-183243-210C	RES 324KQ,F(1%),SMD,0402,(None)	2	35	10000	10000	4-Aug-11
-	774-X10371-180G	S	263-183243-210J	RES 324KQ,F(1%),SMD,0402,(JP)RoHS	2	35	10000	10000	4-Aug-11
920	774-M8MT511-080G	M	263-181500-210C	RES 150Q,F(1%),SMD,0402,(None)	11	75	10000	10000	4-Aug-11
-	774-M8MT511-080G	S	263-181500-210J	RES 150Q,F(1%),SMD,0402,(JP)RoHS	11	90	10000	10000	4-Aug-11
920	774-X10371-180G	M	263-181001-210C	RES 1KQ,F(1%),SMD,0402,(None)	11	75	10000	10000	3-Aug-11
-	774-X10371-180G	S	263-181001-210J	RES 1KQ,F(1%),SMD,0402,(JP)RoHS	11	90	10000	10000	3-Aug-11
930	774-X10371-180G	M	263-185103-210C	RES 510KQ,F(1%),SMD,0402,(None)	1	75	10000	10000	10-Aug-11
-	774-X10371-180G	S	263-185103-210J	RES 510KQ,F(1%),SMD,0402,(JP)RoHS	2	90	10000	10000	10-Aug-11
930	774-M8MT511-080G	M	263-181501-210C	RES 1.5KQ,F(1%),SMD,0402,(None)	11	75	10000	10000	4-Aug-11
-	774-M8MT511-080G	S	263-181501-210J	RES 1.5KQ,F(1%),SMD,0402,(JP)RoHS	11	80	10000	10000	4-Aug-11
940	774-M8MT511-080G	M	263-180220-110C	RES 22Q,F(1%),SMD,0201,(None)	13	75	10000	10000	28-Apr-15
940	774-X10371-180G	M	263-181500-210C	RES 150Q,F(1%),SMD,0402,(None)	2	75	10000	10000	4-Aug-11
-	774-X10371-180G	S	263-181500-210J	RES 150Q,F(1%),SMD,0402,(JP)RoHS	2	90	10000	10000	4-Aug-11
950	774-M8MT511-080G	M	263-181001-110C	RES 1KQ,F(1%),SMD,0201,(None)	14	75	10000	10000	3-Aug-11
-	774-M8MT511-080G	S	263-181001-110J	RES 1KQ,F(1%),SMD,0201,(JP)RoHS	14	80	10000	10000	3-Aug-11
950	774-X10371-180G	M	263-183002-210C	RES 30KQ,F(1%),SMD,0402,(None)	1	75	10000	10000	3-Aug-11
-	774-X10371-180G	S	263-183002-210J	RES 30KQ,F(1%),SMD,0402,(JP)RoHS	1	95	10000	10000	3-Aug-11
960	774-M8MT511-080G	M	263-184701-210C	RES 4.7KQ,F(1%),SMD,0402,(None)	11	75	10000	10000	9-Aug-11
-	774-M8MT511-080G	S	263-184701-210J	RES 4.7KQ,F(1%),SMD,0402,(JP)RoHS	11	90	10000	10000	9-Aug-11
970	774-X10371-180G	M	314-X10371-109G	PCB X103-EC70 R A 6L	1	45	750	750	7-Jul-20
970	774-M8MT511-080G	M	263-181001-210C	RES 1KQ,F(1%),SMD,0402,(None)	13	75	10000	10000	3-Aug-11
-	774-M8MT511-080G	S	263-181001-210J	RES 1KQ,F(1%),SMD,0402,(JP)RoHS	13	90	10000	10000	3-Aug-11
980	774-X10371-180G	M	263-120037-81HG	PMS RES 2W,3m	1	105	4000	4000	25-Mar-20
980	774-M8MT511-080G	M	263-181003-210C	RES 100KQ,F(1%),SMD,0402,(None)	14	75	10000	10000	3-Aug-11
-	774-M8MT511-080G	S	263-181003-210J	RES 100KQ,F(1%),SMD,0402,(JP)RoHS	14	90	10000	10000	3-Aug-11
990	774-M8MT511-080G	M	263-182002-110C	RES 20KQ,F(1%),SMD,0201,(None)	4	80	10000	10000	8-Jul-15
-	774-X10371-180G	M	263-182802-210C	RES 28KQ,F(1%),SMD,0402,(None)	1	35	10000	10000	8-Aug-11
-	774-X10371-180G	S	263-182802-210J	RES 28KQ,F(1%),SMD,0402,(JP)RoHS	1	35	10000	10000	8-Aug-11
1000	774-M8MT511-080G	M	263-183301-110C	RES 3.3KQ,F(1%),SMD,0201,(None)	2	80	10000	10000	23-Oct-14
1020	774-M8MT511-080G	M	263-182000-110C	RES 200Q,F(1%),SMD,0201,(None)	3	75	10000	10000	6-Nov-12
-	774-M8MT511-080G	S	263-182000-110CZ	RES 200Q,F(1%),SMD,0201,(None)	3	35	10000	10000	8-Mar-18
1030	774-M8MT511-080G	M	263-181502-210C	RES 15KQ,F(1%),SMD,0402,(None)	4	75	10000	10000	4-Aug-11
-	774-M8MT511-080G	S	263-181502-210J	RES 15KQ,F(1%),SMD,0402,(JP)RoHS	4	90	10000	10000	4-Aug-11
1040	774-M8MT511-080G	M	263-184990-110C	RES 499Q					

1260	774-M8MT511-080G	M	263-182001-210C	RES 2K0,F(1%),SMD,0402,(None)	1	95	10000	10000	5-Aug-11
-	774-M8MT511-080G	S	263-182001-210J	RES 2K0,F(1%),SMD,0402,(JPI)RoHS	1	95	10000	10000	5-Aug-11
1270	774-M8MT511-080G	M	263-183652-210C	RES 36.5KQ,F(1%),SMD,0402,(None)	1	65	10000	10000	8-Aug-11
-	774-M8MT511-080G	S	263-183652-210J	RES 36.5KQ,F(1%),SMD,0402,(JPI)RoHS	1	110	10000	10000	8-Aug-11
1280	774-M8MT511-080G	M	263-183303-210C	RES 330KQ,F(1%),SMD,0402,(None)	1	75	10000	10000	15-Apr-13
-	774-M8MT511-080G	S	263-183303-210J	RES 330KQ,F(1%),SMD,0402,(JPI)RoHS	1	105	10000	10000	20-Sep-18
1290	774-M8MT511-080G	M	263-181803-210C	RES 180KQ,F(1%),SMD,0402,(None)	2	65	10000	10000	6-Aug-15
1300	774-M8MT511-080G	M	263-185102-210C	RES 51KQ,F(1%),SMD,0402,(None)	2	75	10000	10000	10-Aug-11
-	774-M8MT511-080G	S	263-185102-210J	RES 51KQ,F(1%),SMD,0402,(JPI)RoHS	2	90	10000	10000	10-Aug-11
1310	774-M8MT511-080G	M	263-181022-210C	RES 10.2KQ,F(1%),SMD,0402,(None)	2	75	10000	10000	3-Aug-11
-	774-M8MT511-080G	S	263-181022-210J	RES 10.2KQ,F(1%),SMD,0402,(JPI)RoHS	2	95	10000	10000	3-Aug-11
1320	774-M8MT511-080G	M	263-180005-300C	RES 0Q,(5%),SMD,0603,(None)	1	75	5000	5000	3-Aug-11
-	774-M8MT511-080G	S	263-180005-300J	RES 0Q,(5%),SMD,0603,(JPI)RoHS	1	90	5000	5000	3-Aug-11
1330	774-M8MT511-080G	M	263-184532-210C	RES 45.3KQ,F(1%),SMD,0402,(None)	1	75	10000	10000	9-Aug-11
-	774-M8MT511-080G	S	263-184532-210J	RES 45.3KQ,F(1%),SMD,0402,(JPI)RoHS	1	90	10000	10000	9-Aug-11
1340	774-M8MT511-080G	M	263-180220-210C	RES 22Q,F(1%),SMD,0402,(None)	3	75	10000	10000	3-Aug-11
-	774-M8MT511-080G	S	263-180220-210J	RES 22Q,F(1%),SMD,0402,(JPI)RoHS	3	90	10000	10000	3-Aug-11
1350	774-M8MT511-080G	M	263-188062-210C	RES 80.6KQ,F(1%),SMD,0402,(None)	1	75	10000	10000	8-Aug-11
-	774-M8MT511-080G	S	263-188062-210J	RES 80.6KQ,F(1%),SMD,0402,(JPI)RoHS	1	105	10000	10000	8-Aug-11
1360	774-M8MT511-080G	M	263-181623-210C	RES 162KQ,F(1%),SMD,0402,(None)	1	75	10000	10000	5-Aug-11
-	774-M8MT511-080G	S	263-181623-210J	RES 162KQ,F(1%),SMD,0402,(JPI)RoHS	1	90	10000	10000	5-Aug-11
-	774-M8MT511-080G	S	263-181623-210CZ	RES 162KQ,F(1%),SMD,0402,(None)	1	35		Y	26-Aug-20
1370	774-M8MT511-080G	M	263-181272-210C	RES 12.7KQ,F(1%),SMD,0402,(None)	1	80	10000	10000	4-Aug-11
-	774-M8MT511-080G	S	263-181272-210J	RES 12.7KQ,F(1%),SMD,0402,(JPI)RoHS	1	95	10000	10000	4-Aug-11
-	774-M8MT511-080G	S	263-181272-210CZ	RES 12.7KQ,F(1%),SMD,0402,(None)	1	35	10000	10000	13-Mar-18
1410	774-M8MT511-080G	M	263-184992-110C	RES 49.9KQ,F(1%),SMD,0201,(None)	1	85	10000	10000	30-May-12
1420	774-M8MT511-080G	M	263-181602-210C	RES 16KQ,F(1%),SMD,0402,(None)	1	80	10000	10000	5-Aug-11
-	774-M8MT511-080G	S	263-181602-210J	RES 16KQ,F(1%),SMD,0402,(JPI)RoHS	1	95	10000	10000	5-Aug-11
1430	774-M8MT511-080G	M	263-183302-110C	RES 33KQ,F(1%),SMD,0201,(None)	1	80	10000	10000	23-Oct-14
1440	774-M8MT511-080G	M	217-302278-326G	POLYMER(TAN)CAP 220uF/6.3V,45m	6	105	2000	2000	27-Jul-11
-	774-M8MT511-080G	S	217-302278-326GZ	POLYMER(TAN)CAP 220uF/6.3V,45m	6	25	2000	2000	28-Aug-17
-	774-M8MT511-080G	S	217-332278-410G	POLYMER(TAN)CAP 220uF/6.3V,35m	6	170	2000	2000	7-Nov-18
-	774-M8MT511-080G	S	217-332278-430G	POLYMER(TAN)CAP 220uF/6.3V,35m	6	170		Y	23-Jun-21
1450	774-M8MT511-080G	M	217-301078-325G	POLYMER(TAN)CAP 100uF/6.3V,40m	2	105	2000	2000	15-Jul-08
1460	774-M8MT511-080G	M	171-363005-200G	DIODE TVS AZ3005-01G,R7G/SOD-	3	65	3000	3000	28-Aug-15
1470	774-M8MT511-080G	M	213-251069-320J	MLCC	2	80	40000	40000	2-Dec-11
-	774-M8MT511-080G	S	213-251069-326G	MLCC	2	90	40000	40000	18-Feb-14
-	774-M8MT511-080G	S	213-251069-320JZ	MLCC	2	105	10000	10000	9-Apr-18
-	774-M8MT511-080G	S	213-251069-320C	MLCC	2	75	4000	4000	20-Dec-17
-	774-M8MT511-080G	S	213-251069-320CZ	MLCC	2	35	10000	10000	9-Apr-18
-	774-M8MT511-080G	S	213-251069-326GZ	MLCC	2	15	4000	4000	18-Jan-19
1480	774-M8MT511-080G	M	121-000234-400G	IC USB TO BASIC UART,FT234XD-	2	105	3000	3000	3-Apr-29
1510	774-M8MT511-080G	M	121-000075-230G	Digital Temperature	1	265	4000	4000	16-Sep-14
-	774-M8MT511-080G	S	121-000075-230GZ	Digital Temperature	1		2500		25-Nov-14
1520	774-M8MT511-080G	M	121-035390-200G	Real Time Clock,S-35390A-	1	145	3000	3000	18-Nov-10
1530	774-M8MT511-080G	M	121-380801-400G	IC Programmable-Delay Supervisory	2	425	3000	3000	7-May-21
-	774-M8MT511-080G	S	121-380801-400GZ	IC Programmable-Delay Supervisory	2			Y	10-May-21
-	774-M8MT511-080G	S	121-000308-400G	IC Programmable-Delay Supervisory	2	265	3000	3000	14-May-21
1540	774-M8MT511-080G	M	148-100416-400G	eMMC 5.1,16G,-25°C	1	105	152	152	19-Oct-18
1560	774-M8MT511-080G	M	121-002069-200G	IC Power-Distribution	5	415	250	250	14-Feb-19
-	774-M8MT511-080G	S	121-002069-200GZ	IC Power-Distribution	5			Y	15-Oct-21
-	774-M8MT511-080G	S	121-003553-200G	IC USB Power-Distribution	5	125	3000	3000	19-Aug-19
-	774-M8MT511-080G	S	121-003553-200GZ	IC USB Power-Distribution	5			Y	21-Oct-21
1570	774-M8MT511-080G	M	141-058070-410G	IC USB 3.0 Hub CTRL 7	1	265	168	168	11-Aug-20
1580	774-M8MT511-080G	M	113-500007-210S	IC TTL_Single Buffer/Driver With Open-	8	395	3000	3000	16-Jan-13
-	774-M8MT511-080G	S	113-500007-213S	IC TTL_Buffer with open-drain	8	255	3000	3000	25-Dec-13
-	774-M8MT511-080G	S	113-500007-213SZ	IC TTL_Buffer with open-drain	8			Y	24-Aug-22
1600	774-M8MT511-080G	M	147-080350-200G	IC CHIP,Integrated 10/100/1000 Mbps	1	285	2000	4000	26-Aug-20
-	774-M8MT511-080G	S	147-080350-200GZ	IC CHIP,Integrated 10/100/1000 Mbps	1	19		Y	19-Oct-20
1610	774-M8MT511-080G	M	151-090441-200G	LOW POWER PCIE GEN 1-4 CLOCK	1	705	490	490	23-Nov-18
-	774-M8MT511-080G	S	151-090441-200GZ	LOW POWER PCIE GEN 1-4 CLOCK	1			Y	31-Jul-19
1630	774-M8MT511-080G	M	121-081439-401G	IC Single 3.3V or 5V	1	135	490	490	26-Feb-19
-	774-M8MT511-080G	S	121-081439-401GZ	IC Single 3.3V or 5V	1			Y	8-Jul-21
1650	774-M8MT511-080G	M	121-000104-420G	IC 4-BIT BIDIRECTIONAL VOLTAGE-	3	265	4000	4000	18-Dec-13
-	774-M8MT511-080G	S	121-000104-420GZ	IC 4-BIT BIDIRECTIONAL VOLTAGE-	3			Y	18-Jun-21
1670	774-M8MT511-080G	M	141-025180-400G	External CAN FD CONTROLLER,	1	705	6000	6000	17-Jan-20
1680	774-M8MT511-080G	M	141-042100-400G	IC Power Management Integrated	1	705	260	260	26-Nov-18
-	774-M8MT511-080G	S	141-042100-400GZ	IC Power	1			Y	5-Aug-19
1690	774-M8MT511-080G	M	231-002822-400G	12A,17V,High Efficiency Synchronous	2	205	1500	1500	8-Apr-22
-	774-M8MT511-080G	S	141-562150-400GZ	IC Synchronous Step-down	2			Y	23-Mar-21
-	774-M8MT511-080G	S	141-562150-400G	IC Synchronous Step-down	2	135	250	250	7-Apr-16
1700	774-M8MT511-080G	M	141-620850-200G	IC Synchronous Buck Converter,2.5-	1	265	3000	3000	27-Jul-16
-	774-M8MT511-080G	S	141-620850-201G	IC Synchronous Buck	1	265		Y	6-May-21
-	774-M8MT511-080G	S	141-620850-201GZ	IC Synchronous Buck	1			Y	7-May-21
-	774-M8MT511-080G	S	141-620850-200GZ	IC Synchronous Buck Converter,2.5-	1			Y	5-May-21
1710	774-M8MT511-080G	M	121-022976-200G	IC Switch,5.7-V,6-A,14-mQ On-	2	180	3000	3000	7-Jul-17
-	774-M8MT511-080G	S	121-022976-200GZ	IC Switch,5.7-V,6-A,14-mQ On-	2			Y	29-Jul-21
-	774-M8MT511-080G	S	121-005209-200G	IC Switch,5.5-V,6-A,20-mQ On-	2	205	3000	3000	24-Aug-21
1730	774-M8MT511-080G	M	171-364212-210G	DIODE TVS 12V Bidirectional,AZ4212-	14	65	12000	12000	28-Jan-19
1750	774-M8MT511-080G	M	231-107168-200G	REGULATOR 0.8A,GS7168TD-	2	125	3000	3000	22-Apr-15
-	774-M8MT511-080G	S	231-107168-200GZ	REGULATOR 0.8A,GS7168TD-	2			Y	12-Mar-18
1760	774-M8MT511-080G	M	241-432773-390G	X'TAL 32.768KHz,7pf,±20ppm,ESR:70K	1	110	3000	3000	11-Apr-19
1770	774-M8MT511-080G	M	241-225006-3B1G	X'TAL 25MHz,12pf±10ppm,ESR:30Q	4	65	3000	3000	12-Oct-21
-	774-M8MT511-080G	S	241-225006-3B0G	X'TAL 25MHz,12pf±10ppm,ESR:30Q	4	120	2000	2000	4-Sep-19
-	774-M8MT511-080G	S	241-225006-3J0G	X'TAL 25,000MHz,12pf,10ppm,IOPR=-	4	145	3000	3000	30-Aug-21
1780	774-M8MT511-080G	M	241-227006-360G	X'TAL 27MHz,18pf,±30ppm,ESR:50Q	1	105	3000	3000	7-Sep-17
-	774-M8MT511-080G	S	241-227006-361G	X'TAL 27MHz,18pf,±30ppm,ESR:50Q	1	105	3000	3000	1-Dec-21
1790	774-M8MT511-080G	M	241-220006-302G	X'TAL 20MHz,12pf,±30ppm,ESR:60Q	1	115	3000	3000	3-Jan-18
1800	774-M8MT511-080G	M	972-M8MT511-000G	輔料 M8MT51 SMD RoHS	1			Y	10-Sep-21
1810	774-M8MT511-080G	M	975-M8MT511-000G	輔料 M8MT51 MI RoHS	1			Y	10-Sep-21
1820	774-M8MT511-080G	M	346-520521-200G	BOX HEADER, 2*5P-1(K10)/2mm, F.	1	50	400	3200	21-Nov-19
-	774-M8MT511-080G	S	346-520520-200G	BOX	1	55	700	2800	21-Apr-15
1830	774-M8MT511-080G	M	263-182002-310C	RES 20KQ,F(1%),SMD,0603,(None)	2	75	5000	5000	5-Aug-11
-	774-M8MT511-080G	S	263-182002-310J	RES 20KQ,F(1%),SMD,0603,(JPI)RoHS	2	90	5000	5000	5-Aug-11
1850	774-M8MT511-080G	M	113-500126-300G	IC TTL_Single Bus Buffer	2	400	3000	3000	31-Aug-10
1860	774-M8MT511-080G	M	346-511211-200G	BOX HEADER 1*12P.F.90D,	1	65	1000	1000	6-Feb-18
1890	774-M8MT511-080G	M	346-521020-200G	BOX	1	50	700	2800	21-Apr-15
1900	774-M8MT511-080G	M	121-000006-910G	IC 3D accelerometer and 3D	1	255	5000	5000	3-Aug-22
1910	774-M8MT511-080G	M	223-322322-200G	INDUCTOR 22uH,MI(20%),Rdc<163m	1	55	1500	1500	23-Jan-18
1920	774-M8MT511-080G	M	263-181200-310C	RES 120Q,F(1%),SMD,0603,(None)	1	35	5000	5000	4-Aug-11
-	774-M8MT511-080G	S	263-181200-310J	RES 120Q,F(1%),SMD,0603,(JPI)RoHS	1	95	5000	5000	4-Aug-11
1930	774-M8MT511-080G	M	263-189310-210C	RES 931Q,F(1%),SMD,0402,(None)	1	65	10000	10000	10-Aug-11
-	774-M8MT511-080G	S	263-189310-210J	RES 931Q,F(1%),SMD,0402,(JPI)RoHS	1	35	10000	10000	10-Aug-11
1940	774-M8MT511-080G	M	231-111700-210S	REGULATOR AZ1117H-	1	125	4000	4000	6-Apr-12
-	774-M8MT511-080G	S	231-111700-210SZ	REGULATOR AZ1117H-	1			Y	23-Aug-22
1950	774-M8MT511-080G	M	213-154705-200C	MLCC	2	6			