

Index du dossier de réception d'une homologation par type en application d'un Règlement
Index to the information package of a type approval with regard to a Regulation

Dernière Série d'amendements applicable <i>Last applicable Series of amendments</i>	N° de la réception de base et mise à jour <i>Base approval and update No</i>	Extension N° <i>Extension No</i>	Révision N° <i>Revision No</i>	Date d'émission <i>Issue date</i>	Fiche de renseignements <i>Information document</i>	
					Référence <i>Reference</i>	Nombre de pages <i>Number of pages</i>
10-04	00	-	-	15.11.2013	JLUEN DIAMONDBACK / 00	77

Vu pour être annexé à la fiche de réception,
Approved and to be attached to the approval certificate,
 Le Conseiller,
The Advisor,



ir. A. DESCAMPS

N° d'homologation mis à jour : <i>Updated Approval No</i>	E6-10R-040462	BEVASYS :	201307661
Mise à jour N° : <i>Update No</i>	00	Date d'émission : <i>Issue date</i>	15.11.2013
		P 1	

COMMUNICATION CONCERNANT L'HOMOLOGATION D'UN TYPE
COMMUNICATION CONCERNING THE APPROVAL OF A TYPE OF ELECTRICAL / ELECTRONIC¹ SUB-ASSEMBLY
DE SOUS-ENSEMBLE ÉLECTRIQUE / ÉLECTRONIQUE¹ EN CE QUI CONCERNE LE REGLEMENT N° 10-04
WITH REGARD TO REGULATION No. 10-04.

N° d'homologation : E6-10R-040462

Approval No.

1. Fabricant (marque commerciale du constructeur) : JULUEN
1. Make (trade name of manufacturer)
2. Type et dénomination(s) commerciale(s) générale(s) : DIAMONDBACK, DB
2. Type and general commercial description(s)
3. Moyens d'identification du type, s'ils sont marqués sur le véhicule / composant / ~~entité technique~~¹ :
3. Means of identification of type, if marked on the ~~vehicle~~ / component / ~~separate technical unit~~¹
 - 3.1. Emplacement de ce marquage : on the lamp
3.1. Location of that marking
4. Catégorie du véhicule : -
4. Category of vehicle
5. Nom et adresse du constructeur :
5. Name and address of manufacturer

JULUEN Enterprise Co., Ltd.
8F-1, No.502, Da An Rd., Shulin Dist.,New Taipei City 23849, Taiwan
6. Dans le cas de composants ou d'entités techniques, emplacement et procédé de fixation de la marque de réception CEE :
6. In the case of components and separate technical units, location and method of affixing of the ECE approval mark

Adhesive label, on the lamp.
7. Adresse(s) de l' (des) usine(s) d'assemblage :
7. Address(es) of assembly plant(s)

8F-1, No. 502, Da An Rd. Shulin District, New Taipei City 23849, Taiwan
8. Informations supplémentaires (s'il y a lieu) : Voir appendice
8. Additional information (where applicable) : See appendix

¹ Biffer la mention inutile - *Strike out what does not apply*

9. Service technique responsable de l'exécution des essais :
9. *Technical service responsible for carrying out the tests*

AIB VINCOTTE INTERNATIONAL
Jan Olieslagerslaan 35
1800 VILVOORDE
BELGIUM

10. Date du rapport d'essai : 15.11.2013
10. *Date of test report*
11. Numéro du rapport d'essai : H1360395647/376
11. *Number of test report*
12. Remarques (s'il y a lieu) : Voir appendice
12. *Remarks (if any) : See appendix*
13. Lieu : Bruxelles.
13. *Place*
14. Date : 15.11.2013
14. *Date*
15. Signature :
15. *Signature*

AU NOM DU MINISTRE :
ON BEHALF OF THE MINISTER
Pour le Directeur Général,
For the Director General
Le Conseiller,
The Advisor,



ir. A. DESCAMPS

16. L'index de l'ensemble des renseignements déposé chez l'autorité de réception, qui peut être obtenu sur demande, est joint.
16. *The index to the information package lodged with the approval authority, which may be obtained on request, is attached.*
17. Raison de l'extension : -
17. *Reasons for extension*

Appendice au certificat d'homologation par type N° E6-10R-0400462

Appendix to type-approval communication form No ...

concernant l'homologation d'un type d'un sous-ensemble électrique / électronique¹ selon le Règlement No 10-04
concerning the type-approval of an electrical / electronic¹ sub-assembly under Regulation No. 10-04

1. INFORMATIONS SUPPLEMENTAIRES

1. *ADDITIONAL INFORMATION*

1.1. Tension nominale du système électrique: 12V / 24V, masse positive/négative⁺
1.1. *Electrical system rated voltage :* 12V / 24V, pos/neg⁺ ground

1.2. Ce SEEE peut être utilisé sur n'importe quel type de véhicule avec les restrictions suivantes : -
1.2. *This ESA can be used on any vehicle type with the following restrictions :*

1.2.1. Conditions d'installation, s'il y a lieu : -
1.2.1. *Installation conditions, if any :*

1.3. Ce SEEE peut seulement être utilisé sur les types de véhicule suivants : -
1.3. *This ESA can be used only on the following vehicle types :*

1.3.1. Conditions d'installation, s'il y a lieu : -
1.3.1. *Installation conditions, if any :*

1.4. La (les) méthode(s) spécifique(s) d'essais utilisée(s) et les bandes de fréquences couvertes pour déterminer l'immunité étai(ent) : (indiquez s'il vous plaît à partir de l'annexe 9 la méthode précise utilisée) :
1.4. *The specific test method(s) used and the frequency ranges covered to determine immunity were : (Please specify precise method used from Annex 9) : see test report H1360395647/376*

1.5. Laboratoire accrédité au titre de la norme ISO 17025 et reconnu par l'autorité d'homologation chargée d'effectuer les essais :
1.5. *Laboratory accredited to ISO 17025 and recognized by the approval authority responsible for carrying out the tests :*

Hsinchu EMC Laboratory
No.75-2, 3rd Lin, Wangkye Keng, Yonghxing Tsuen,
Qionglin Shiang, Hsinchu County 307, Taiwan

2. Commentaires : -
2. *Remarks :*

¹ Biffer la mention inutile - *Strike out what does not apply*



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Safety, quality and environmental services

ISO/IEC 17020 Accredited inspection body - Accreditation certificate BELAC No. 016-INSP

AUTOMOTIVE CERTIFICATION

Business Class Kantorenpark – Jan Olieslagerslaan 35 – B-1800 Vilvoorde

Telephone : +32 (0)2/674.58.85 – Fax : +32 (0)2/674.59.62

E-mail: homologation@vincotte.be

1. **SUBJECT : RADIO INTERFERENCE (EMC)**

~~72/245/EEC~~ 2009/19/EC & R10-04

2. **REF. :** Report number : **H1360395647/376** No. of pages : 1 of 11 No. of annexes : -
Bevasys : 201307661 Approval No. : 0462 00 Update : 00

3. **GENERALITIES :**

Make of the ESA : JULUEN

Type of the ESA : DIAMONDBACK, DB

Brief description of the ESA : Special Warning Lamp

Name and address of the manufacturer :

JULUEN Enterprise Co., Ltd.

8F-1, No.502, Da An Rd., Shulin Dist., New Taipei City 23849, Taiwan

4. **TESTS :** Date and place : 2012.03.21~2013.07.11 Hsinchu EMC Laboratory - Taiwan

Applied document(s) : JULUEN DIAMONDBACK / 00

AVI Inspector : D.ROOSELEERS

Manufacturer's representative : S. CHEN (Hsinchu EMC Laboratory)

Location of E-mark : On the lamp

5. **CONCLUSIONS :**

The tests were carried out according to the following specifications :

- ~~Commission Directive 2009/19/EC of 12 March 2009 adapting to technical progress Council Directive 72/245/EEC of 20 June 1972~~
- UNECE Regulation No. 10 incorporating supplement 1 to the 04 series of amendments

The models presented comply with the requirements to be applied.

Date : 2013.11.15

Signature :



METHOD OF MEASUREMENT OF RADIATED BROADBAND ELECTROMAGNETIC EMISSIONS FROM ELECTRICAL/ELECTRONIC SUB-ASSEMBLIES (ANNEX 7)

Characteristics concerned and prescriptions to apply	References D : Directive R : Regulation	Conformity	Not applicated	Value
<p>General</p> <p>The test method described in this annex may be applied to ESAs, which may be subsequently fitted to vehicles, which comply with Annex 4.</p> <p><u>Test method</u></p> <p>If not otherwise stated test performed according to :</p> <p style="padding-left: 20px;">- CISPR 25 (second edition 2002 and Corrigendum 2004).</p> <p>ESA state during tests</p> <p>ESA under test in normal operation mode, preferably in maximum load.</p> <p>Test arrangements</p> <p>Test performed according to CISPR 25 (second edition 2002 and Corrigendum 2004) clause 6.4. - ALSE method.</p> <p><u>Alternative measuring location</u></p> <p>As an alternative to an absorber lined shielded enclosure (ALSE) an open area test site (OATS), which complies with the requirements of CISPR 16-1-4 (third edition 2010) may be used (see Appendix 1 of this annex).</p> <p><u>Ambient</u></p> <p>To ensure that there is no extraneous noise or signal of a magnitude sufficient to affect materially the measurement, measurements shall be taken before or after the main test. In this measurement, the extraneous noise or signal shall be at least 6 dB below the limits of interference given in 6.5.2.1.of Annex I of the Directive / paragraph 6.5.2.1. of the Regulation, except for intentional narrowband ambient transmissions.</p>	<p>1.</p> <p>1.1.</p> <p>1.2.</p> <p>2.</p> <p>2.1.</p> <p>3.</p> <p>3.1.</p> <p>3.2.</p> <p>3.3.</p>	<p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>	<p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p>x</p> <p></p>	<p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p>

Characteristics concerned and prescriptions to apply	References D : Directive R : Regulation	Conformity	Not applied	Value
<p>Test requirements</p> <p>The limits apply throughout the frequency range 30 to 1000 MHz for measurements performed</p> <ul style="list-style-type: none"> - in a semi anechoic chamber - on an outdoor test site <p>Measurements can be performed with either</p> <ul style="list-style-type: none"> - a quasi-peak detector - a peak detector (using correction factor of 20 dB as defined in CISPR 12 (fifth edition 2001 and Amd1:2005)) <p><u>Measurements</u></p> <p>Test performed at the intervals specified in the CISPR 25 (fifth edition 2001 and Amd1:2005) standard throughout the frequency range 30 to 1,000 MHz.</p> <p>Alternatively, if the manufacturer provides measurement to data for the whole frequency band from a test laboratory accredited to the applicable parts of ISO 17025 (second edition 2005 and Corrigendum:2006) and recognized by the Approval Authority, the Technical Service may divide the frequency range in 14 frequency bands 30-34, 34-45, 45-60, 60-80, 80-100, 100-130, 130-170, 170-225, 225-300, 300-400, 400-525, 525-700, 700-850, 850-1,000 MHz and perform tests at the 14 frequencies giving the highest emission levels within each band to confirm that the ESA meets the requirements of this annex.</p> <p><u>Readings</u></p> <p>The maximum of the readings relative to the limit (horizontal/vertical polarization) in each of the 14 frequency bands shall be taken as the characteristic reading at the frequency at which the measurements were made.</p>	<p>4.</p> <p>4.1.</p> <p>4.2.</p> <p>4.3.</p> <p>4.4.</p>	<p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>	<p>x</p> <p>x</p> <p>x</p> <p>x</p>	

FACILITIES AND EQUIPMENT

The facilities and equipment used to carry out the inspections are in compliance with the requirements of the applied Regulatory Act(s).

RESULT OF THE MEASUREMENT OF RADIATED BROADBAND ELECTROMAGNETIC EMISSIONS

See test report No.136367S (Appendix 2 of the information document JULUEN DIAMONDBACK / 00)

Requirements

Measured values expressed in dB micro-volts/m below the type-approval limits.

In the event that the limit is exceeded during the test, investigations shall be made to ensure that this is due to the ESA and not to background radiation.

Result : satisfactory

METHOD OF MEASUREMENT OF RADIATED NARROWBAND ELECTROMAGNETIC EMISSIONS FROM ELECTRICAL/ELECTRONIC SUB-ASSEMBLIES (ANNEX 8)

Characteristics concerned and prescriptions to apply	References D : Directive R : Regulation	Conformity	Not applicated	Value
<p>General</p> <p>The test method described in this annex may be applied to ESAs, which may be subsequently fitted to vehicles, which comply with Annex 4.</p> <p><u>Test method</u></p> <p>If not otherwise stated test performed according to :</p> <p>- CISPR 25 (second edition 2002 and Corrigendum: 2004).</p> <p>ESA state during tests</p> <p>ESA under test in normal operation mode</p> <p>Test arrangements</p> <p>Test performed according to CISPR 25 (second edition 2002 and Corrigendum: 2004) clause 6.4. - ALSE method.</p> <p><u>Alternative measuring location</u></p> <p>As an alternative to an absorber lined shielded enclosure (ALSE) an open area test site (OATS), which complies with the requirements of CISPR 16-1-4 (third edition 2010) may be used (see Appendix 1 of this annex).</p> <p><u>Ambient</u></p> <p>To ensure that there is no extraneous noise or signal of a magnitude sufficient to affect materially the measurement, measurements shall be taken before or after the main test. In this measurement, the extraneous noise or signal shall be at least 6 dB below the limits of interference given in paragraph 6.6.2.1. of Annex I of the Directive / paragraph 6.6.2.1. of the Regulation, except for intentional narrowband ambient transmissions.</p>	<p>1.</p> <p>1.1.</p> <p>1.2.</p> <p>2.</p> <p>2.1.</p> <p>3.</p> <p>3.1.</p> <p>3.2.</p> <p>3.3.</p>	<p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>	<p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p>x</p> <p></p>	<p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p>

Characteristics concerned and prescriptions to apply	References D : Directive R : Regulation	Conformity	Not applied	Value
<p>Test requirements</p> <p>The limits apply throughout the frequency range 30 to 1000 MHz for measurements performed</p> <ul style="list-style-type: none"> - in a semi anechoic chamber - on an outdoor test site <p>Measurements performed with an average detector.</p> <p><u>Measurements</u></p> <p>Test performed at the intervals specified in the CISPR 12 (fifth edition 2001 and Amd 1: 2005) standard throughout the frequency range 30 to 1000 MHz.</p> <p>Alternatively, if the manufacturer provides measurement to data for the whole frequency band from a test laboratory accredited to the applicable parts of ISO 17025 (second edition 2005 and corrigendum: 2006) and recognized by the Approval Authority, the Technical Service may divide the frequency range in 14 frequency bands 30-34, 34-45, 45-60, 60-80, 80-100, 100-130, 130-170, 170-225, 225-300, 300-400, 400-525, 525-700, 700-850, 850-1,000 MHz and perform tests at the 14 frequencies giving the highest emission levels within each band to confirm that the ESA meets the requirements of this annex.</p> <p><u>Readings</u></p> <p>The maximum of the readings relative to the limit (horizontal/vertical polarisation) in each of the 13 frequency bands shall be taken as the characteristic reading at the frequency at which the measurements were made.</p>	<p>4.</p> <p>4.1.</p> <p>4.2</p> <p>4.3.</p> <p>4.4</p>	<p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>	<p>x</p> <p>x</p> <p>x</p>	

FACILITIES AND EQUIPMENT

The facilities and equipment used to carry out the inspections are in compliance with the requirements of the applied Regulatory Act(s).

RESULT OF THE MEASUREMENT OF RADIATED NARROWBAND ELECTROMAGNETIC EMISSIONS

See test report No.136367S (Appendix 2 of the information document JULUEN DIAMONDBACK / 00)

Requirements :

Measured values expressed in dB micro-volts/m below the type-approval limits.

In the event that the limit is exceeded during the test, investigation shall be made to ensure that this is due to the vehicle and not to background radiation including broadband radiation from any ESA.

Result : satisfactory

METHOD OF TESTING FOR IMMUNITY OF ELECTRICAL/ELECTRONIC SUB-ASSEMBLIES TO ELECTROMAGNETIC RADIATION (ANNEX 9)

Characteristics concerned and prescriptions to apply	References D : Directive R : Regulation	Conformity	Not applied	Value
<p>General</p> <p>The test method(s) described in this annex applies to ESAs.</p> <p><u>Test methods</u></p> <p>ESAs may comply with the requirements of any combination of the following test methods at the manufacturer's discretion provided that this results in the full frequency range specified in paragraph 3.1. of this annex being covered:</p> <ul style="list-style-type: none"> - Absorber chamber test according ISO 11452-2, second edition 2004; - TEM cell testing according ISO 11452-3, third edition 2001 (Regulation), 2nd edition (Directive) - Bulk current injection testing according ISO 11452-4, third edition 2005 and Corrigendum1: 2009; - Stripline testing according ISO 11452-5, second edition 2002; - 800 mm stripline according paragraph 5. of this annex. <p>Frequency range and general test conditions based on ISO 11452-1, third edition 2005 and Amd1: 2008).</p> <p>State of ESA during tests</p> <p>Test conditions according ISO 11452-1, third edition 2005 and Amd1: 2008.</p> <p>The ESA under test shall be switched on and must be stimulated to be in normal operation condition. It shall be arranged as defined in this annex unless individual test methods dictate otherwise.</p> <p>Any extraneous equipment required to operate the ESA under test shall not be in place during the calibration phase. No extraneous equipment shall be closer than 1 m from the reference point during calibration.</p> <p>To ensure reproducible measurement results are obtained when tests and measurements are repeated, the test signal generating equipment and its layout shall be to the same specification as that used during each appropriate calibration phase.</p> <p>If the ESA under test consists of more than one unit, the interconnecting cables should ideally be the wiring harnesses as intended for use in the vehicle. If these are not available, the length between the electronic control unit and the AN shall be as defined in the standard. All cables in the wiring harness should be terminated as realistically as possible and preferably with real loads and actuators.</p>	<p>1.</p> <p>1.1.</p> <p>1.2.</p> <p>1.2.1</p> <p>2.</p> <p>2.1.</p> <p>2.2.</p> <p>2.3.</p> <p>2.4.</p> <p>2.5</p>	<p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>	<p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>	

Characteristics concerned and prescriptions to apply	References D : Directive R : Regulation	Conformity	Not applied	Value
<p>General test requirements</p> <p><u>Frequency range, dwell times</u></p> <p>Measurements shall be made in the 20 to 2,000 MHz frequency range with frequency steps according to ISO 11452-1, third edition 2005 and Amd1: 2008.</p> <p>Test signal modulation (if not otherwise agreed between Technical Service and ESA manufacturer.)</p> <ul style="list-style-type: none"> - AM, with 1 kHz modulation and 80% modulation depth in 20-800 MHz frequency range, and - PM, t on 577 μs, period 4600 μs in the 800-2000 MHz frequency range <p>Frequency step size and dwell time according to ISO 11452-1, third edition 2005 and Amd1: 2008.</p> <p>Test performed at the intervals specified in ISO 11452-1, third edition 2005 and Amd1: 2008 throughout the frequency range 20 to 2,000 MHz.</p> <p>Alternatively, if the manufacturer provides measurement to data for the whole frequency band from a test laboratory accredited to the applicable parts of ISO 17025, second edition 2005 and Corrigendum: 2006 and recognized by the Approval Authority, the Technical Service may choose a reduced number of spot frequencies in the range, e.g. 27, 45, 65, 90, 120, 150, 190, 230, 280, 380, 450, 600, 750, 900, 1,300, and 1,800 MHz to confirm that the ESA meets the requirements of this annex.</p>	<p>3.</p> <p>3.1</p> <p>3.2</p>	<p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>	<p></p> <p></p> <p>x</p> <p></p>	<p></p> <p></p> <p></p> <p></p>

Characteristics concerned and prescriptions to apply	References D : Directive R : Regulation	Conformity	Not applied	Value
Specific test requirements	4.			
<u>Absorber chamber test</u>	4.1.			
Test method	4.1.1.	x		
Test methodology	4.1.2.	x		
The "substitution method" used to establish the test field conditions according ISO 11452-2, second edition 2004.				
The test performed with vertical polarization.				
<u>TEM cell testing</u>	4.2.		x	
Test method	4.2.1.			
Test methodology	4.2.2.			
The test performed according ISO 11452-3, third edition 2001.				
Depending on the ESA to be tested the Technical Service shall chose :				
<ul style="list-style-type: none"> - the method of maximum field coupling to the ESA or - to the wiring harness inside the TEM-cell. 				
<u>Bulk current injection testing</u>	4.3.			
Test method	4.3.1.	x		
Test methodology	4.3.2.			
The test performed according to ISO 11452-4, third edition 2005 and Corrigendum 1:2009 on a test bench.		x		
As an alternative the ESA may be tested while installed in the vehicle according to ISO 11451-4 (first edition 1995) with the following characteristics:			x	
<ul style="list-style-type: none"> - the injection probe shall be positioned in 150 mm distance to the ESA to be tested; - the reference method shall be used to calculate injected currents from forward power; - the frequency range of the method is limited by the injection probe specification. 				
<u>Stripline testing</u>	4.4.		x	
Test method	4.4.1.			
Test methodology	4.4.2.			
The test performed according ISO 11452-5, second edition 2002.				

Characteristics concerned and prescriptions to apply	References D : Directive R : Regulation	Conformity	Not applied	Value
<p><u>800 mm stripline testing</u></p> <p>Test method</p> <p>Test methodology</p> <p>Positioning of stripline</p> <p>The stripline shall be housed in a screened room (to prevent external emissions) and positioned 2 m away from walls and any metallic enclosure to prevent electromagnetic reflections. RF absorber material may be used to damp these reflections. The stripline shall be placed on non-conducting supports at least 0.4 m above the floor.</p> <p>Calibration of the stripline</p> <p>A field-measuring probe shall be positioned within the central one-third of the longitudinal, vertical and transverse dimensions of the space between the parallel plates with the system under test absent.</p> <p>The associated measuring equipment shall be sited outside the screen room. At each desired test frequency, a level of power shall be fed into the stripline to produce the required field strength at the antenna. This level of forward power, or another parameter directly related to the forward power required to define the field, shall be used for type approval tests unless changes occur in the facilities or equipment, which necessitate this procedure being repeated.</p> <p>Installation of the ESA under test</p> <p>The main control unit shall be positioned within the central one third of the longitudinal, vertical and transverse dimensions of the space between the parallel plates. It shall be supported on a stand made from non-conducting material.</p> <p>Main wiring loom and sensor/actuator cables</p> <p>The main wiring loom and any sensor/actuator cables shall rise vertically from the control unit to the top ground plate (this helps to maximize coupling with the electromagnetic field). Then they shall follow the underside of the plate to one of its free edges where they shall loop over and follow the top of the ground plate as far as the connections to the stripline feed. The cables shall then be routed to the associated equipment, which shall be sited in an area outside the influence of the electromagnetic field, e.g.: on the floor of the screened room 1 m longitudinally away from the stripline.</p>	<p>4.5.</p> <p>4.5.1.</p> <p>4.5.2.</p> <p>4.5.2.1.</p> <p>4.5.2.2.</p> <p>4.5.2.3.</p> <p>4.5.2.4.</p>		<p>x</p>	

FACILITIES AND EQUIPMENT

The facilities and equipment used to carry out the inspections are in compliance with the requirements of the applied Regulatory Act(s).

RESULTS AND TEST REQUIREMENTS IMMUNITY TO ELECTROMAGNETIC RADIATION

See test report No.136367S (Appendix 2 of the information document JULUEN DIAMONDBACK / 00)

Requirements :

The immunity test levels :

- 60 volts/m rms for the 150 mm stripline testing method
- 15 volts/m rms for the 800 mm stripline testing method
- 75 volts/m rms for the Transverse Electromagnetic Mode (TEM) cell testing method
- 60 mA rms for the bulk current injection (BCI) testing method
- 30 volts/m rms for the free field testing method

in over 90 per cent of the 20 to 2,000 MHz frequency band

Minimum of:

- 50 volts/m rms for the 150 mm stripline testing method
- 12.5 volts/m rms for the 800 mm stripline testing method
- 62.5 volts/m rms, for the TEM cell testing method
- 50 mA rms for the bulk current injection (BCI) testing method
- 25 volts/m rms for the free field testing method

over the whole 20 to 2,000 MHz frequency band.

No degradation of performance of "immunity related functions" during the tests

If a vehicle fails the test defined in this Annex, it must be verified as having failed under the relevant test conditions and not as a result of the generation of uncontrolled fields.

Result : satisfactory

METHOD OF TESTING FOR IMMUNITY TO AND EMISSION OF TRANSIENTS OF ELECTRICAL/ELECTRONIC SUB-ASSEMBLIES (ANNEX 10)

Characteristics concerned and prescriptions to apply	References D : Directive R : Regulation	Conformity	Not applied	Value
<p>General</p> <p>Immunity against disturbances conducted along supply lines Application of the test pulses 1, 2a, 2b, 3a, 3b and 4 according to ISO 7637-2 (second edition 2004 and Amd: 2008) to the supply lines as well as to other connections of ESAs which may be operationally connected to supply lines.</p> <p>Emission of conducted disturbances along supply lines Measurement according to ISO 7637-2 (second edition 2004 and Amd1:2008) on supply lines as well as to other connections of ESAs which may be operationally connected to supply lines.</p>	<p>1.</p> <p>2.</p> <p>3.</p>	<p>x</p> <p>x</p>		

FACILITIES AND EQUIPMENT

The facilities and equipment used to carry out the inspections are in compliance with the requirements of the applied Regulatory Act(s).

RESULTS IMMUNITY TO AND EMISSION OF TRANSIENTS OF ELECTRICAL/ELECTRONIC SUB-ASSEMBLIES

See test report No.136367S (Appendix 2 of the information document JULUEN DIAMONDBACK / 00)

Requirements :

Immunity test levels and functional status of the system according to table 1 of the Regulation/table 1 of Annex I of the Directive Operation of the equipment without any disturbances.

Emissions tested for the levels given in table 2 of the Regulation/table 2 of Annex I of the Directive Measured peak amplitude below the maximum allowed pulse amplitude.

Result : satisfactory

ESA SUBMITTED FOR TESTS

Model : See attached report No.136367S

JULUEN Enterprise Co., Ltd.
8F-1, No. 502, Da An Rd. Shulin District,
New Taipei City 23849, Taiwan

**FOR TYPE APPROVAL OF AN ELECTRIC/ELECTRONIC
SUB-ASSEMBLY WITH RESPECT
TO ELECTROMAGNETIC COMPATIBILITY**

~~Directive 72/245/EEC, as last amended by 2009/19/EC~~
UN/ECE Regulation 10.04

JULUEN DIAMONDBACK

Application:	Date:
Original	July 08,2013

Contents list	Number of pages:
Information document:	2
Appendix 1: Description of the ESA chosen to represent the type (electronic block diagram and list of main component constituting the ESA (e.g. make and type of microprocessor, crystal, etc.))	2
Attachment 1: Drawing(s)	11
Appendix 2: Test report	62

Total number of pages : 77



AUTOMOTIVE certification
Business Class Kantorenpark
Jan Olieslagerslaan 35
B-1800 Vilvoorde
E-mail: homologation@vincotte.be
2013.11.15

1. **Make (trade name of manufacturer) :**
JULUEN
2. **Type :**
DIAMONDBACK; DB
3. **Means of identification of type, if marked on the component / technical unit:**
Adhesive Label on the lamp
- 3.1. **Location of that marking:**
On the lamp
4. **Name and address of manufacturer:**
JULUEN Enterprise Co., Ltd.
8F-1, No. 502, Da An Rd. Shulin District, New Taipei City 23849, Taiwan

Name and address of authorized representative, if any:

-

5. **In the case of components and separate technical units, location and method of affixing of the approval mark:**
Location: On the lamp
Method: Adhesive Label
6. **Address(es) of assembly plant(s):**
8F-1, No. 502, Da An Rd. Shulin District, New Taipei City 23849, Taiwan
7. **This ESA shall be approved as a component / STU**
Function: Special Warning Lamp
8. **Any restrictions of use and conditions of fitting:**
-
9. **Electrical system rated voltage:** DC positive / ~~negative~~ ground
12V / 24V

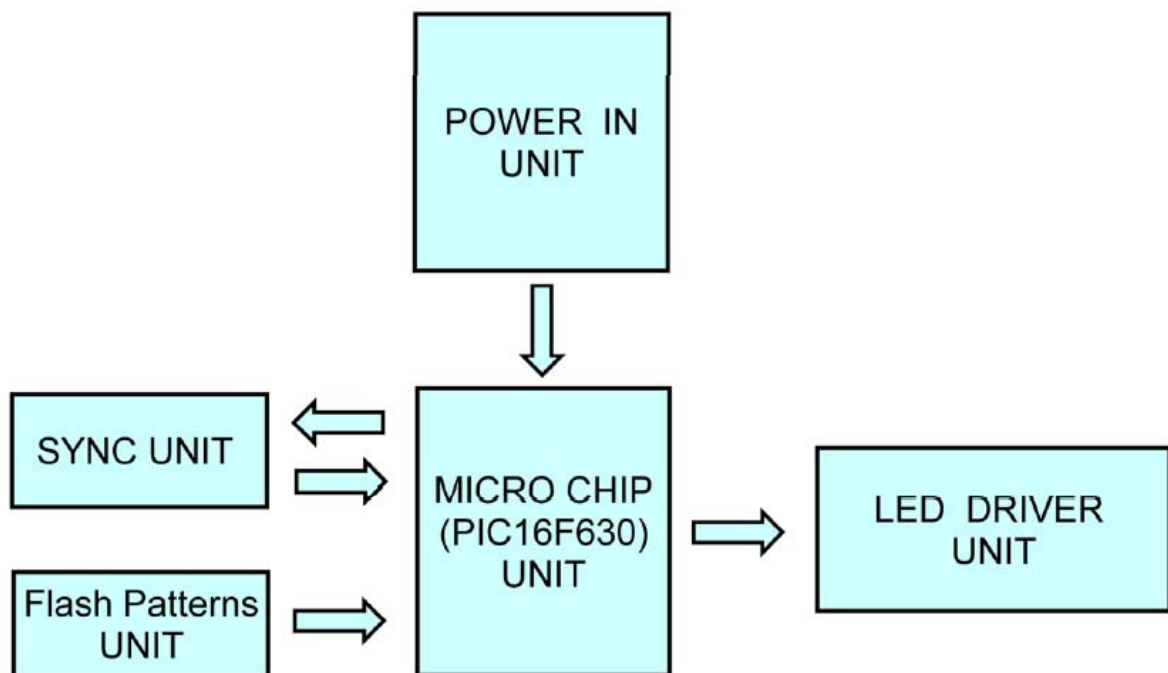


Appendix 1

Description of the ESA chosen to represent the type (electronic block diagram and list of the main components constituting the ESA (e.g. make and type of the microprocessor, crystal, etc...))


Brief description of the ESA: Special Warning Lamp

Block diagram:




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2013.11.15

Component list:

 巨輪興業有限公司 JULUEN ENTERPRISE CO.,LTD.		Title	L04		
		Document No.	YPCB-L04-CTR-D3		
		Rev.	1.0	Page	1/2
REFERENCE	PART NUMBER	SPEC.	OSCILLATOR		
Q1, Q2, Q6, Q7	SOT-223 GL9971	MOS			
Q5	SOT-23 BTC2411N3	TR			
U1	SOP-14 PIC16F630	IC MICRO CHIP	4MHz		
U2	SOP-8 LM78L05	IC REGULATOR			

JULUEN Enterprise Co.,Ltd.
DIAMONDBACK - BOM 1

 巨輪興業有限公司 JULUEN ENTERPRISE CO.,LTD.		Title	L04		
		Document No.	YPCB-L04-LED6-D3-□		
		Rev.	1.0	Page	1/1
REFERENCE	PART NUMBER	SPEC.	OSCILLATOR		
U1	SOP-8 AX3007SA	IC DC/DC CONVERTER	150KHz		

JULUEN Enterprise Co.,Ltd.
DIAMONDBACK - BOM 2



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 E-mail: homologation@vincotte.be
 2013.11.15

Attachment 1 (page 6 to 16)

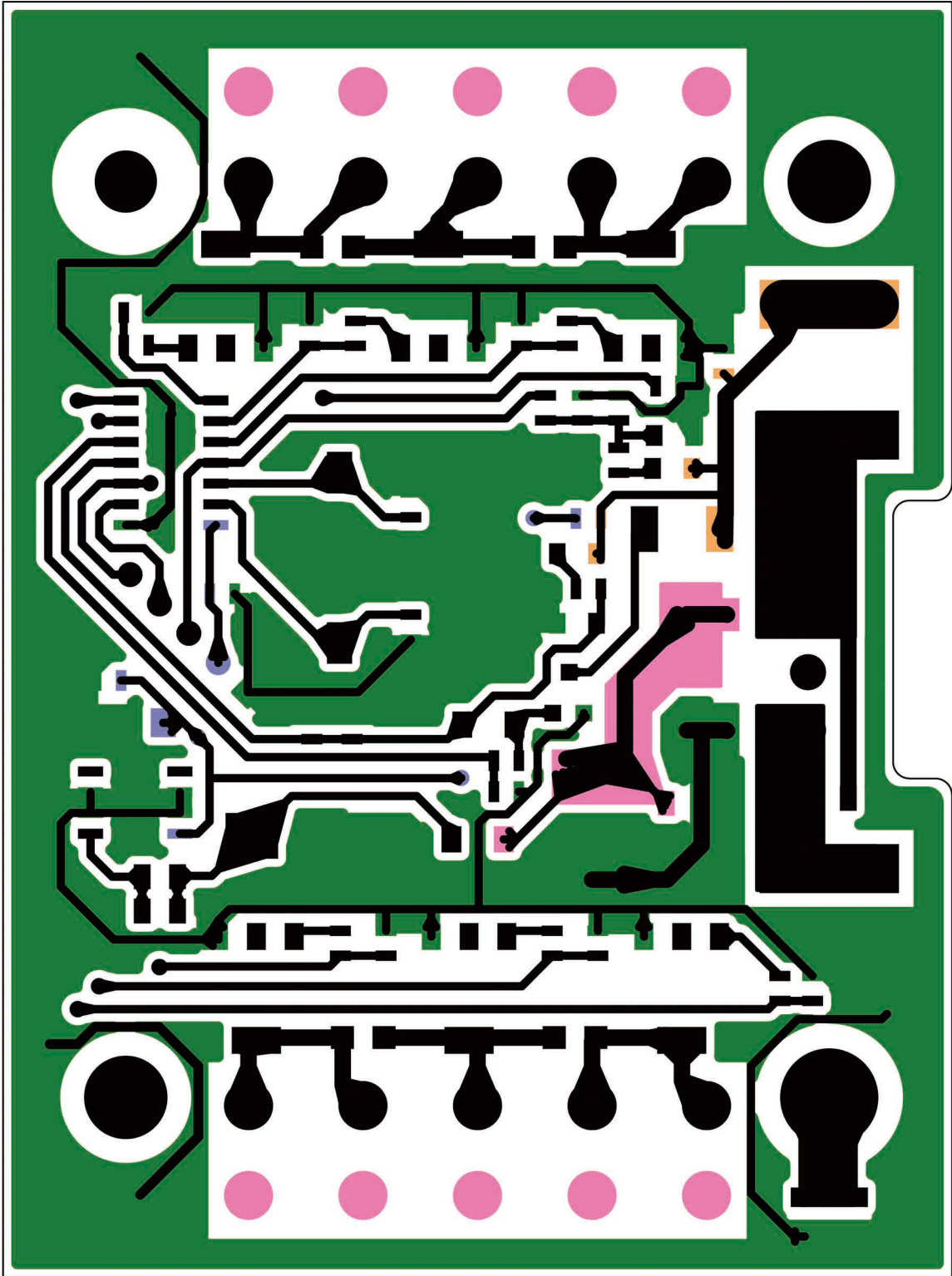
Drawing(s) + Circuit diagram(s)


Appendix 2

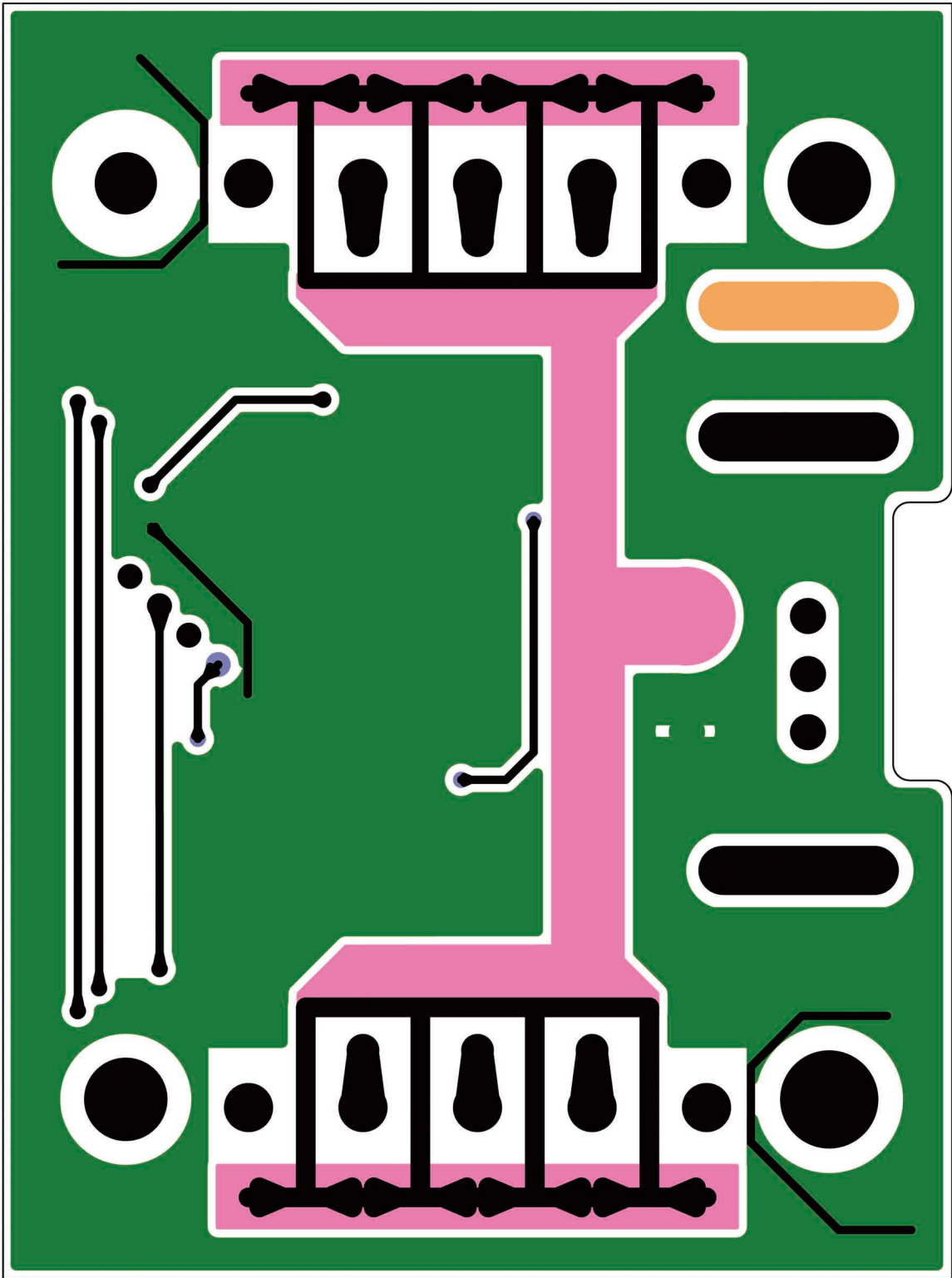
Relevant test report(s) supplied by the manufacturer from a test laboratory accredited to ISO 17025


Test report No.136367S V2.0

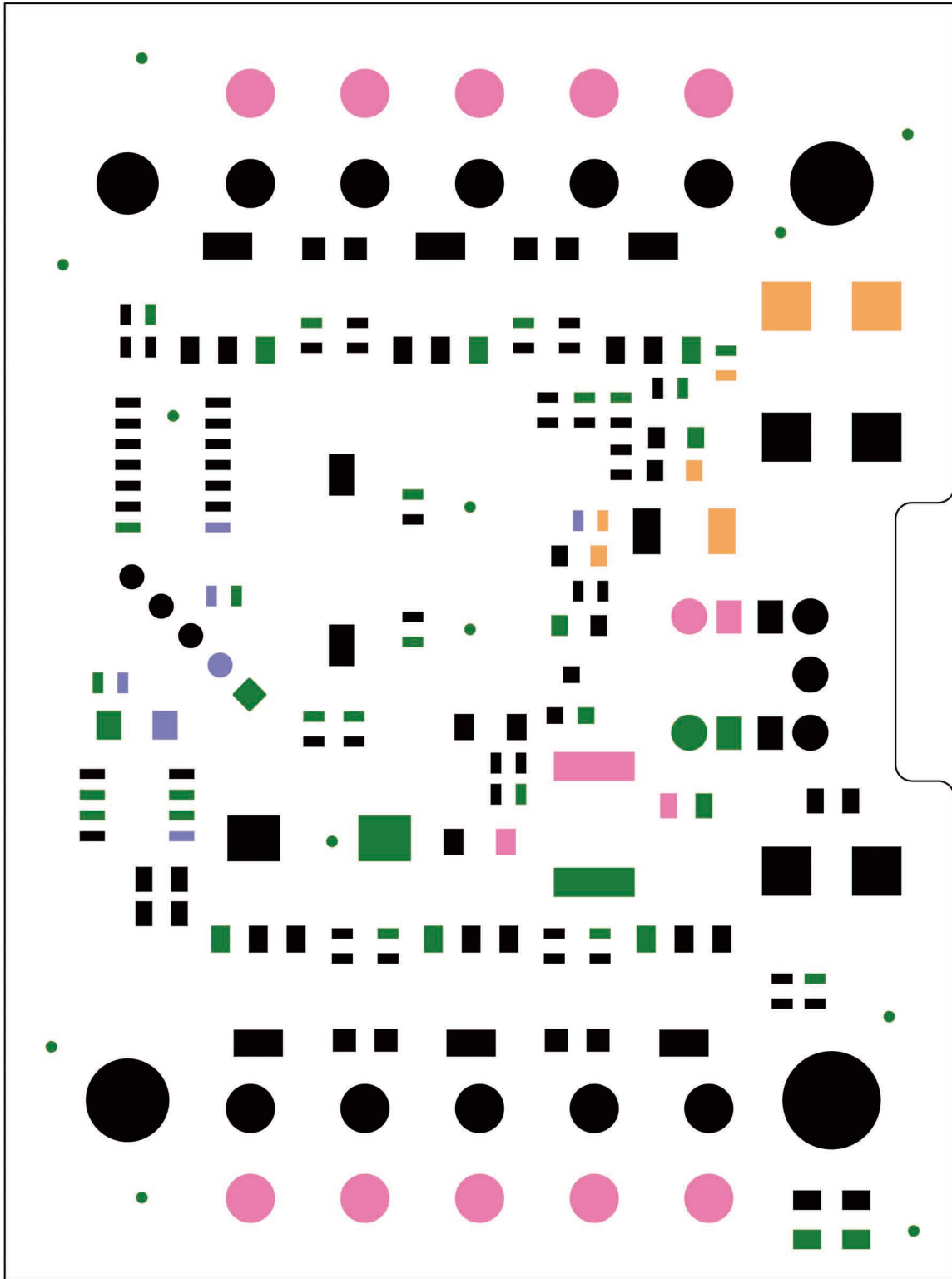





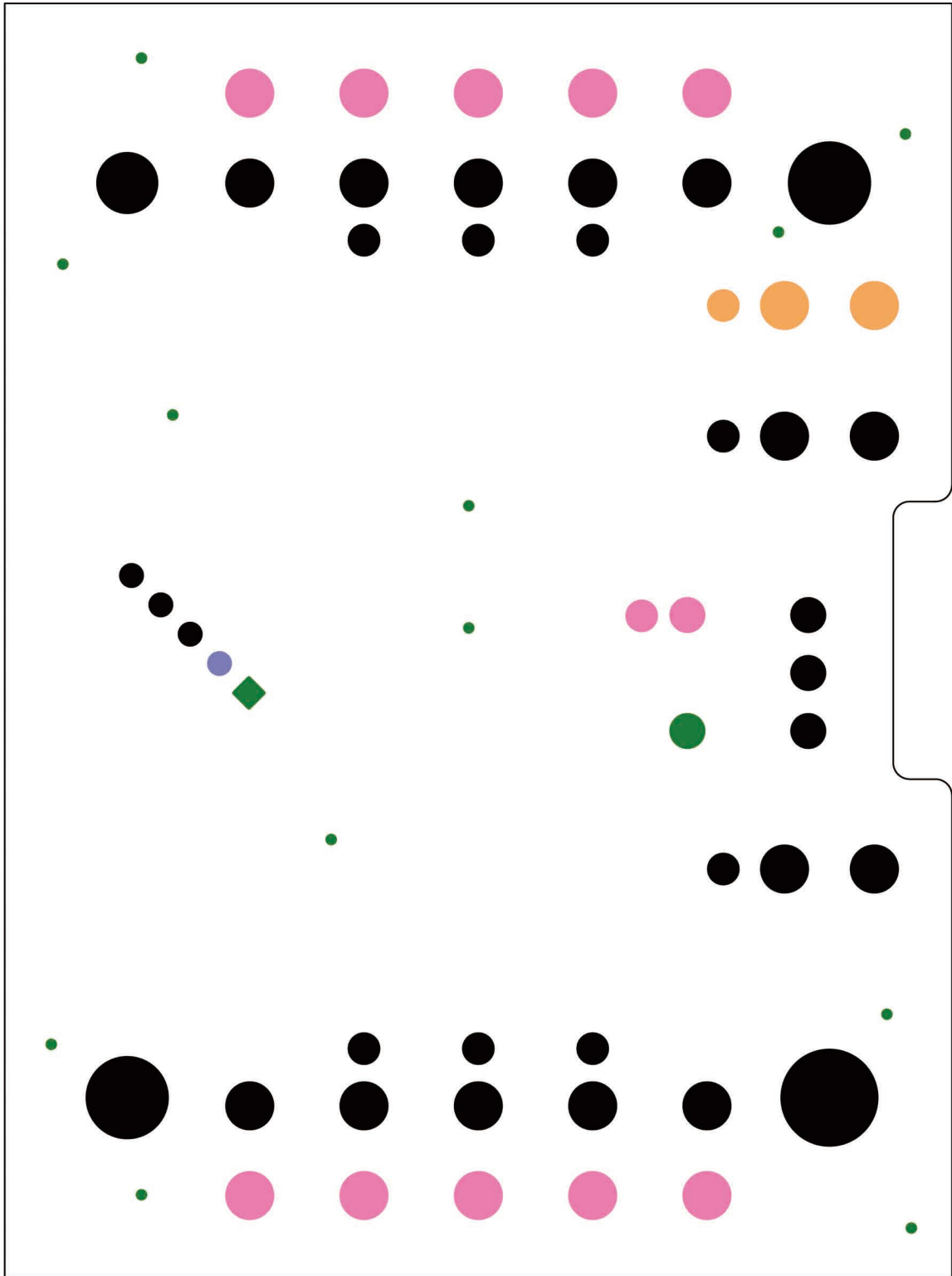
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Document No.	ZPC-L04-CTR-D3	Rev 1.0
Description	TOP_LAYER	




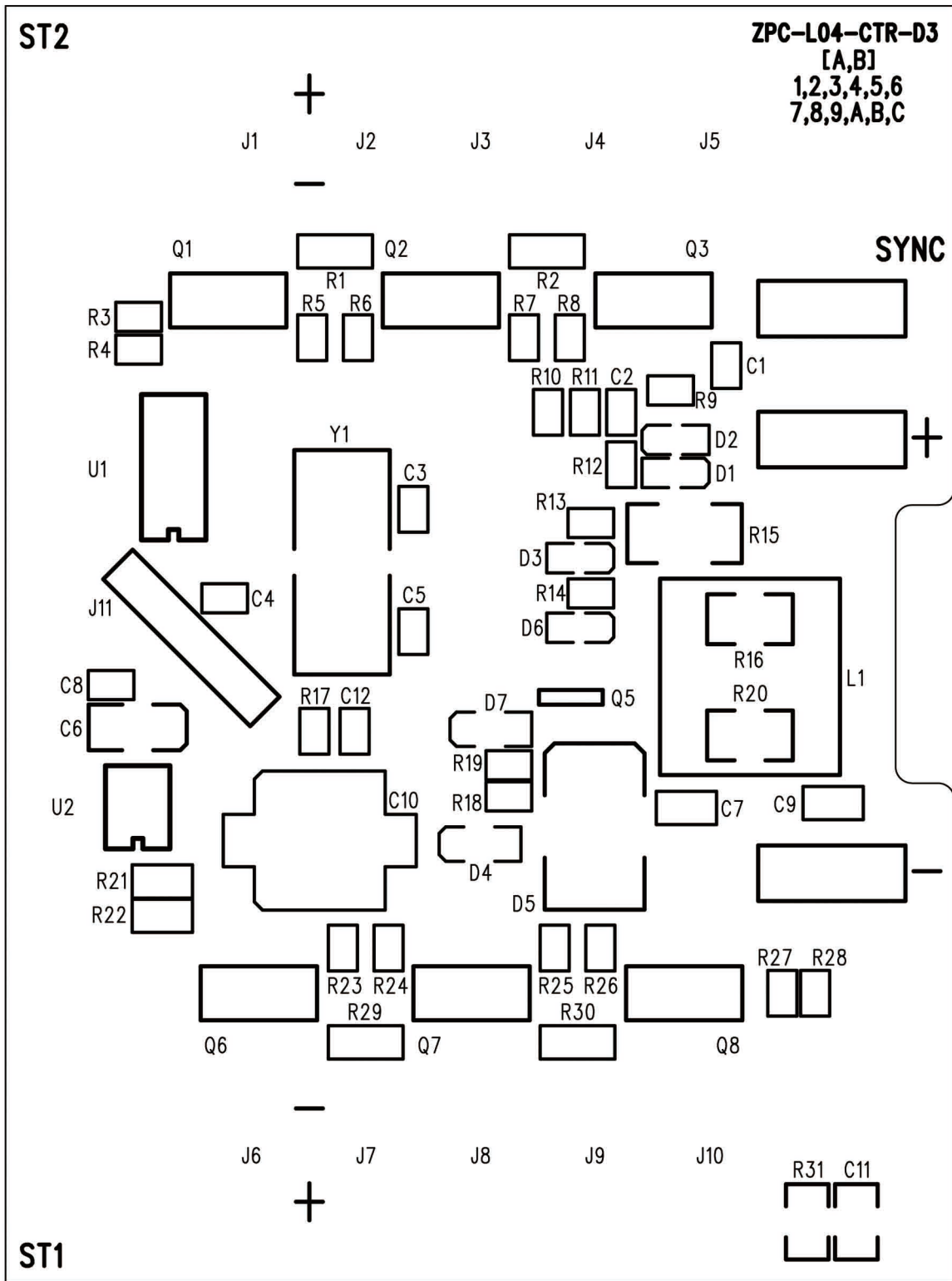
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Document No.	ZPC-L04-CTR-D3	Rev 1.0
Description	BOTTOM_LAYER	



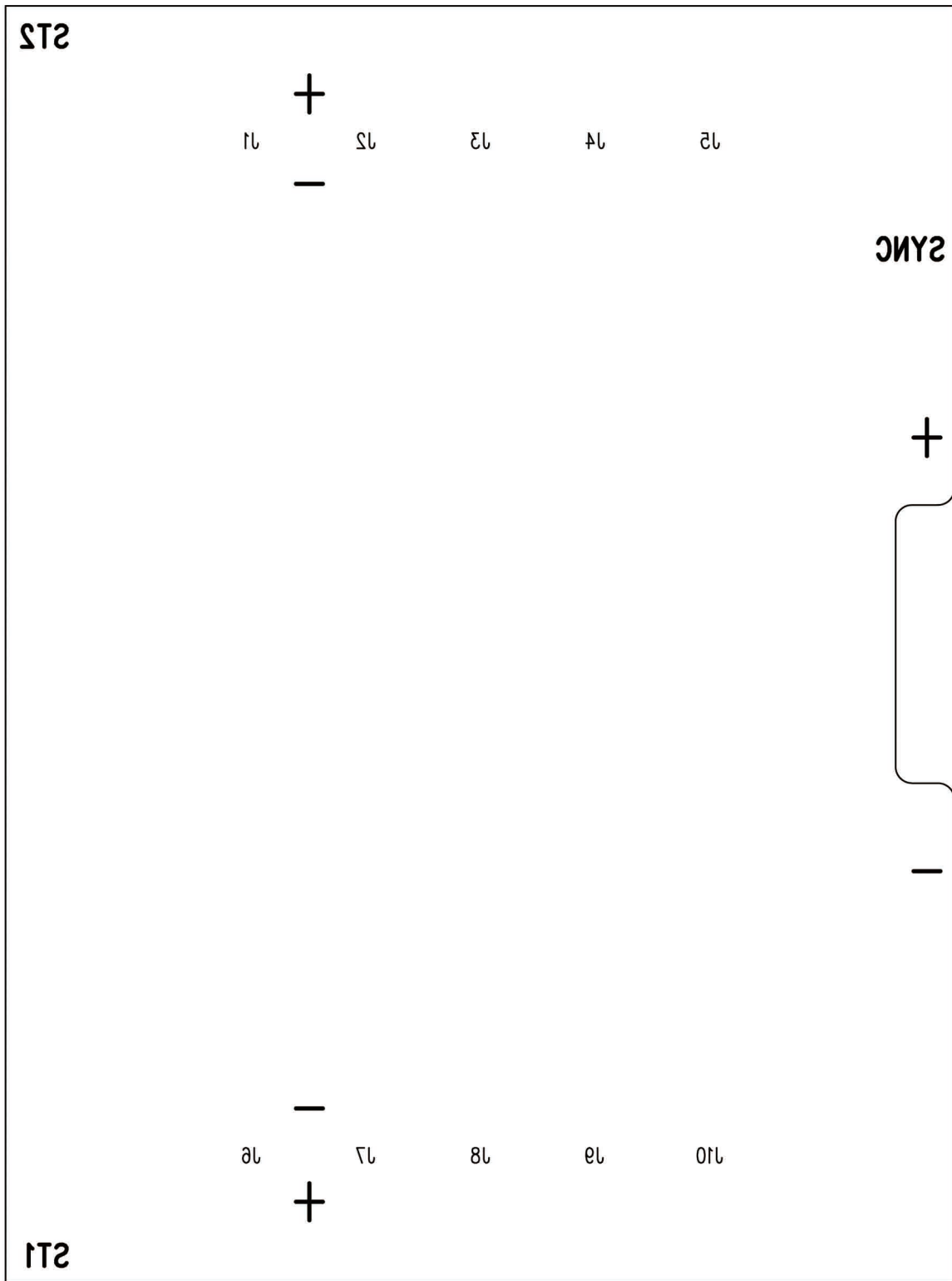
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Document No.	ZPC-L04-CTR-D3	Rev 1.0
Description	SOLDER_MASK_TOP	




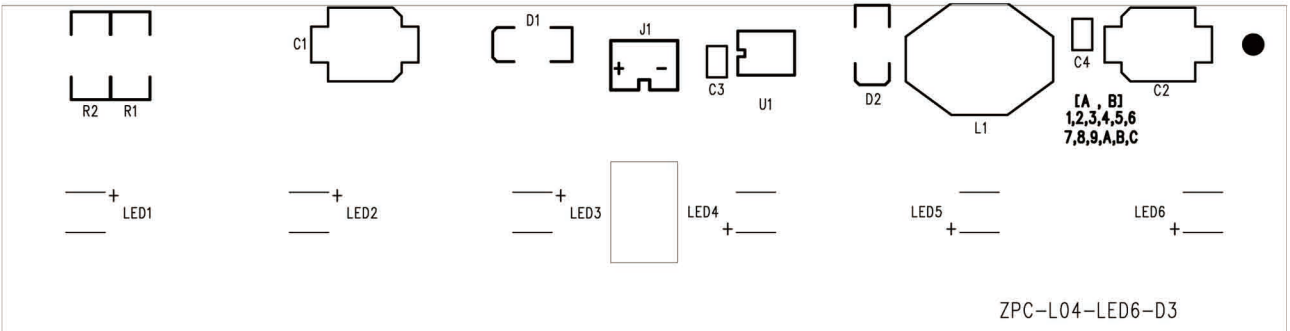
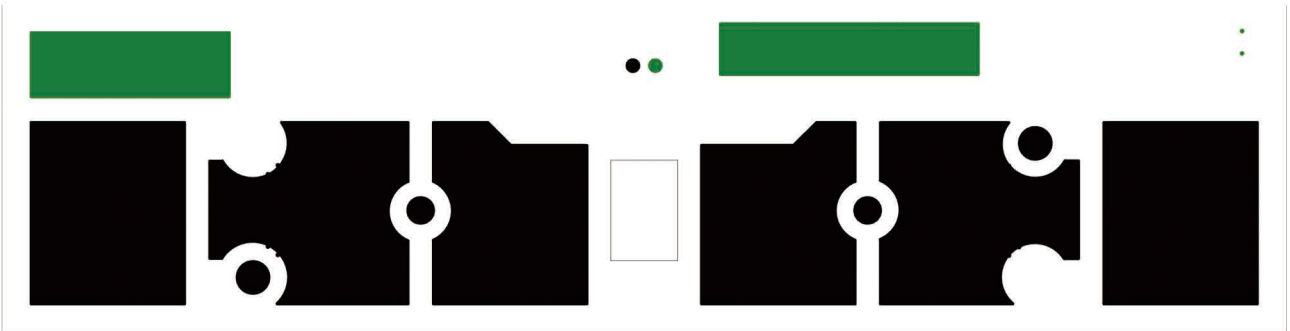
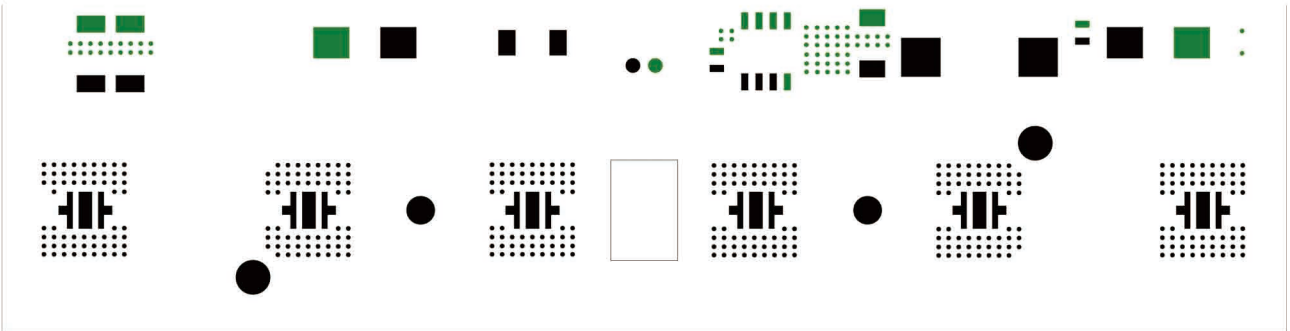
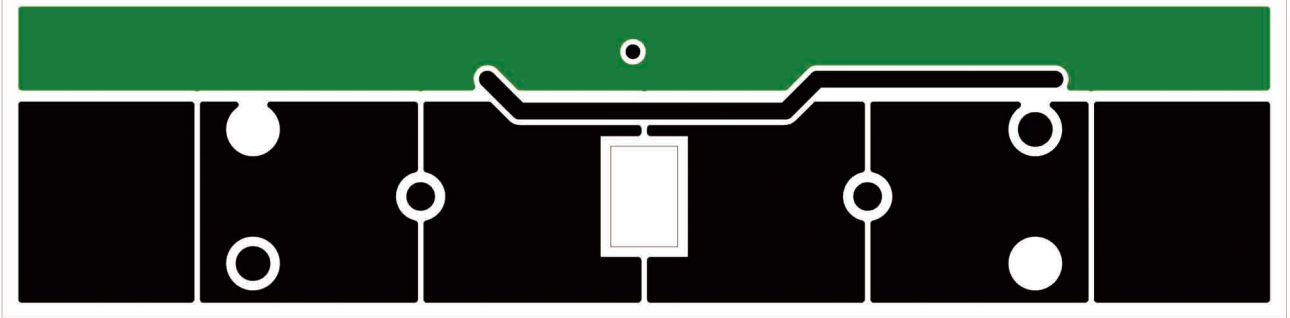
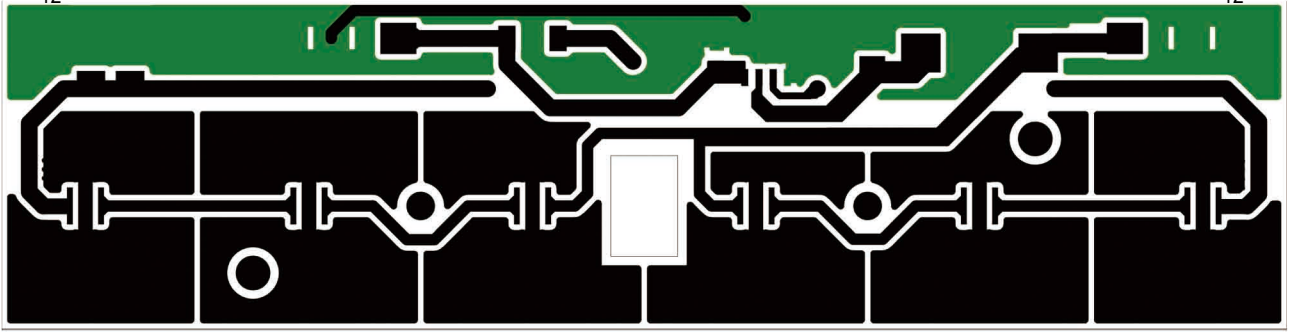
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Title	L04
Document No.	ZPC-L04-CTR-D3
Description	SOLDER_MASK_BOTTOM
Rev	1.0



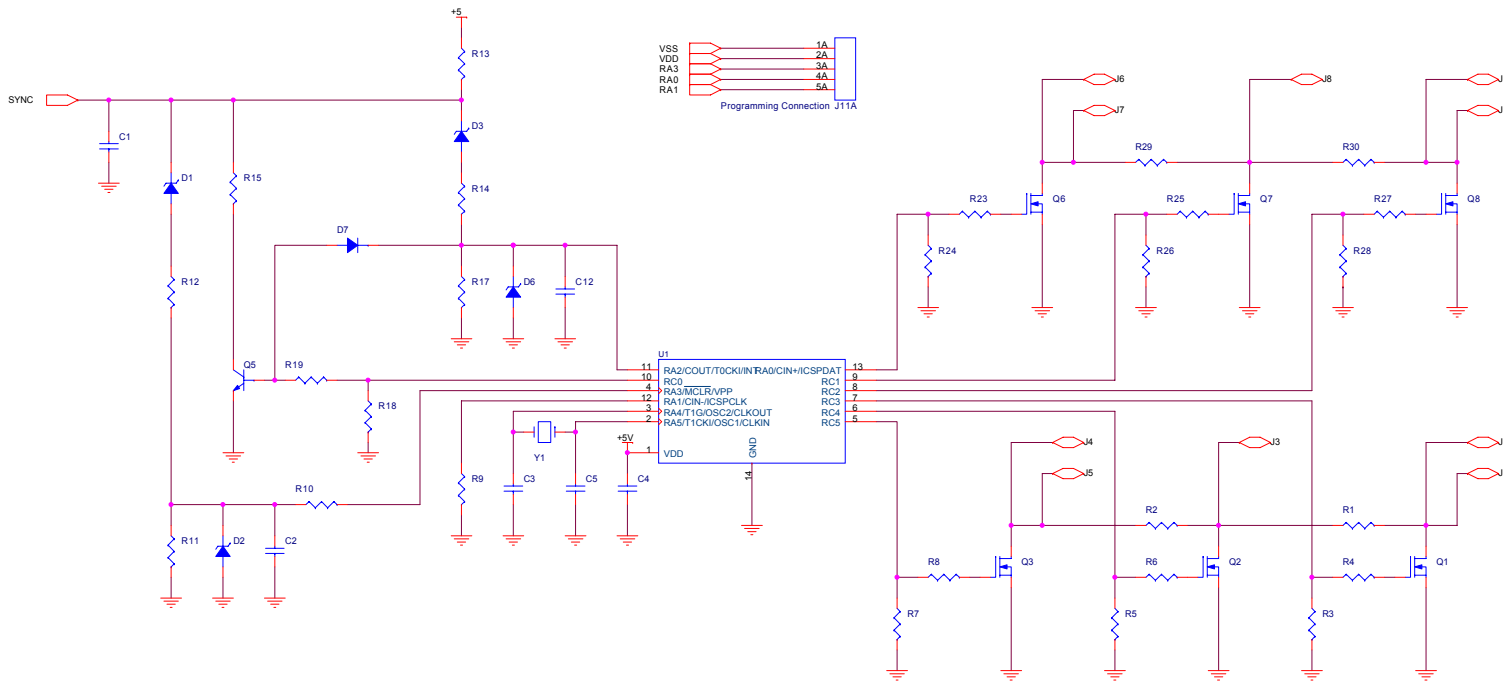
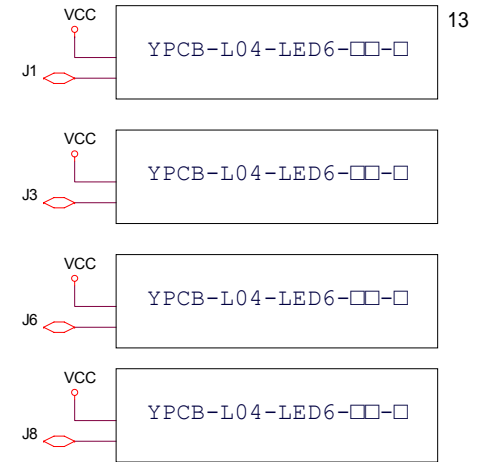
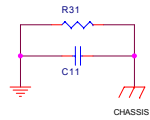
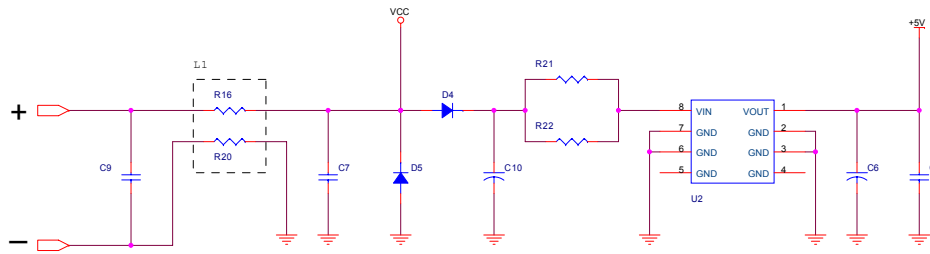
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Document No.	ZPC-L04-CTR-D3
Description	SILKSCREEN_TOP
Rev	1.0



 JULUEN Enterprise Co.,Ltd.	
Title	L04
Document No.	ZPC-L04-CTR-D3
Description	SILKSCREEN_BOTTOM
Rev	1.0

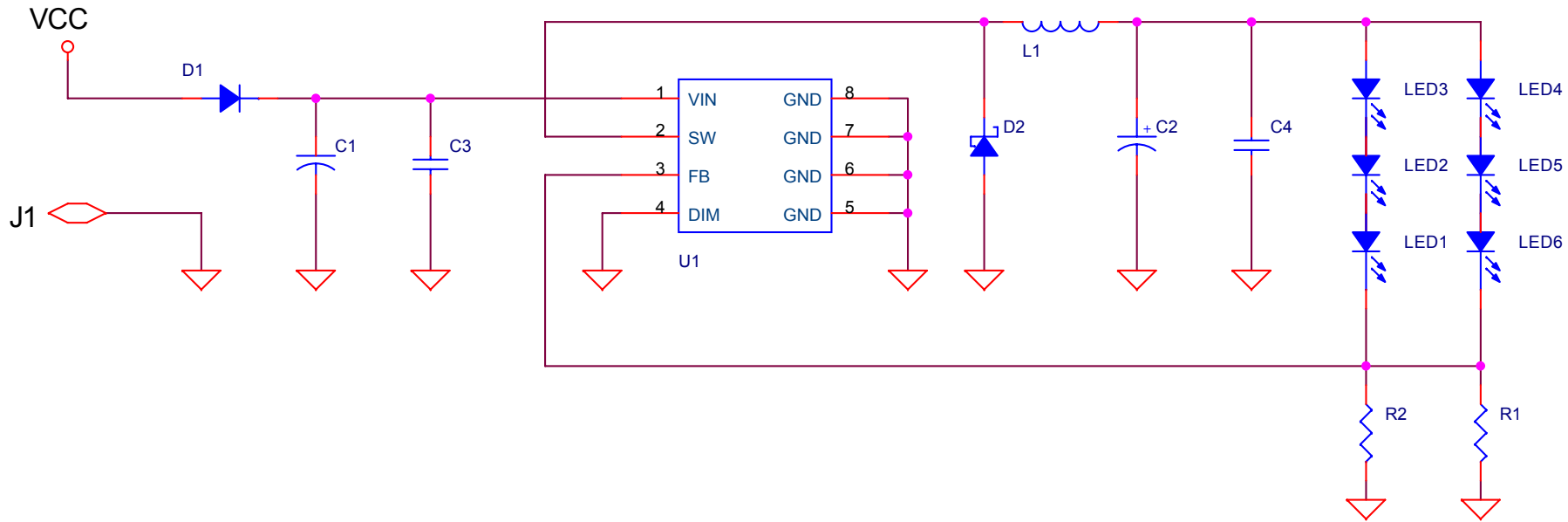


JULUEN Enterprise Co.,Ltd.		
Title	L04	
Document No.	ZPC-L04-LED6-D3	Rev 1.0
Description		




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 E-mail: homologation@vincotte.be
 2013.11.15

JULUEN Enterprise Co.,Ltd.		
file	L04	
Size	Document Number	Rev
C	YPCB-L04-CTR-D3	1.0
Date:	Monday, July 08, 2013	Sheet 1 of 1



JULUEN Enterprise Co., Ltd.
 DIAMONDBACK - Circuit Diagram 2



JULUEN Enterprise Co.,Ltd.		
Title L04		
Size A	Document Number YPCB-L04-LED6-D3-□	Rev 1.0
Date:	Monday, July 08, 2013	Sheet 1 of 1

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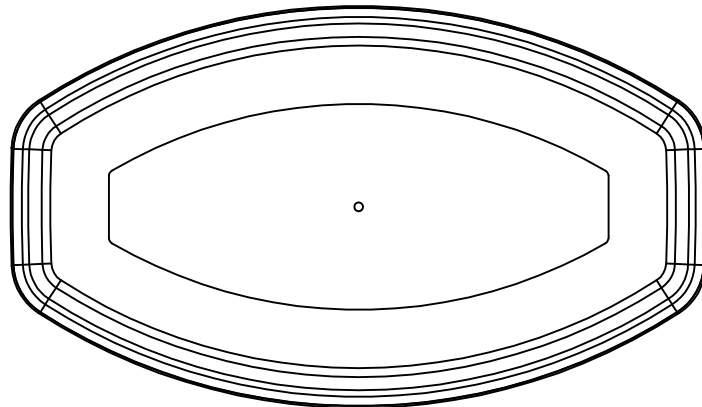
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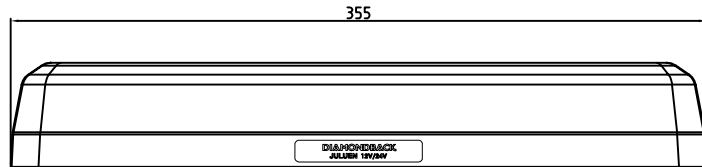
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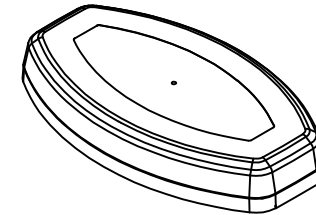
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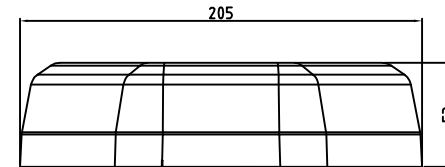
TOP VIEW



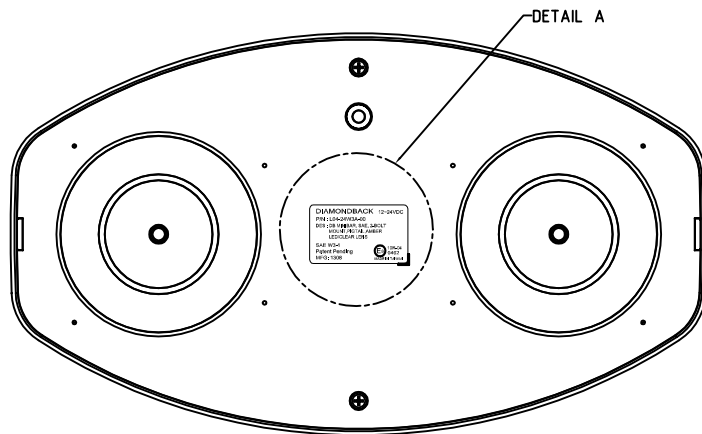
MAIN VIEW



SCALE 1:2



SIDE VIEW



Bottom VIEW



DETAIL A
SCALE 2:1



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E-mail: homologation@vincotte.be
2013.11.15

JULUEN Enterprise Co.,Ltd.
DIAMONDBACK - Certificate Drawing

NOTE:
1. LENS AND HOUSING ARE SECURED WITH SCREWS.
2. MATERIAL:LENS:POLYCARBONATE,HOUSING:POLYCARBONAT



巨輪興業有限公司
JULUEN Enterprise Co.,Ltd.

					MODEL	L04	TITLE	L04 MINIBAR				
					MATERIAL		PR.NO	DIAMONDBACK				
					APPROVAL	OSCAR	DATE	2013/11/06	PROJECTION			
					CHECK		DATE		SCALE	1 : 1	UNIT	mm
					DESIGNER	KEVIN	DATE	2013/11/06	SHEET	1 / 1	REV	1.0
					重點尺寸	ITEM	MODIFY	DATE				

1 2 3 4 5 6

16 1 2 3 4 5 6 16

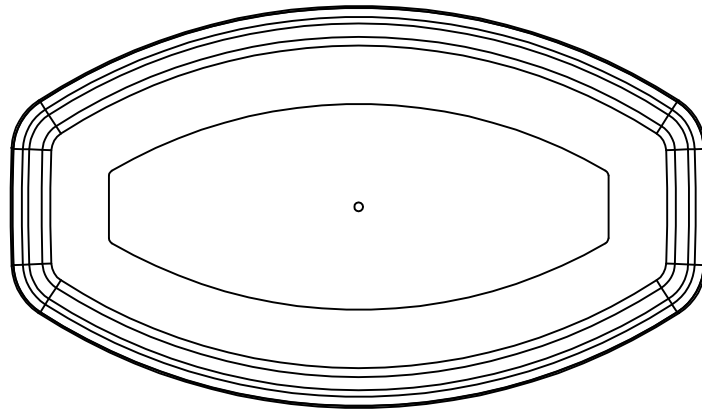
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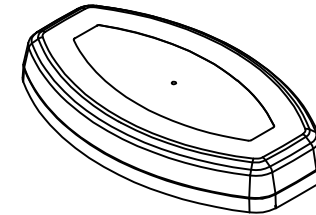
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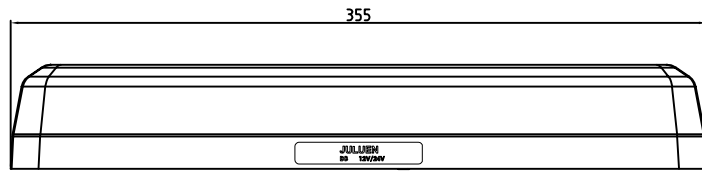
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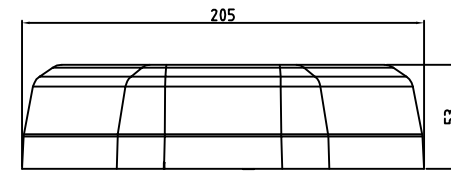
TOP VIEW



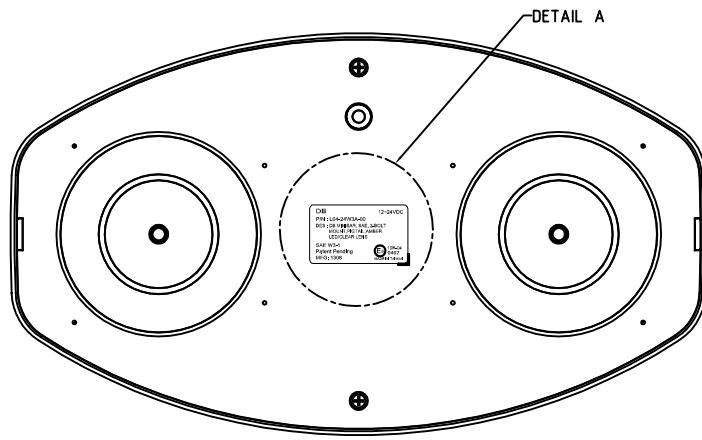
SCALE 1:2



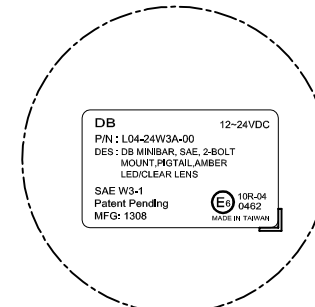
MAIN VIEW



SIDE VIEW



Bottom VIEW



DETAIL A
SCALE 2:1



AUTOMOTIVE certification
 Business Class Kantorenpark
 Jan Olieslagerslaan 35
 B-1800 Vilvoorde
 E-mail: homologation@vincotte.be
 2013.11.15

JULUEN Enterprise Co.,Ltd.
 DIAMONDBACK - Certificate Drawing

NOTE:
 1. LENS AND HOUSING ARE SECURED WITH SCREWS.
 2. MATERIAL:LENS:POLYCARBONATE,HOUSING:POLYCARBONAT



巨輪興業有限公司
 JULUEN Enterprise Co.,Ltd.

					MODEL	L04	TITLE	L04 MINIBAR		
					MATERIAL		PR.NO	DB		
					APPROVAL	OSCAR	DATE	201311/06	PROJECTION	
					CHECK		DATE	SCALE	1 : 1	UNITL mm
					DESIGNER	KEVIN	DATE	2013/11/06	SHEET	1 / 1
								REV	1.0	

Ⓟ 重點尺寸

ITEM MODIFY DATE

1 2 3 4 5 6



Electromagnetic Compatibility (EMC)

Test Report

Product Name : Special Warning Lamp

Model No. : DIAMONDBACK, DB

Applicant : JULUEN ENTERPRISE CO., LTD.

Address : 8F-1, No. 502, Da An Rd., Shulin Dist., New Taipei City 23849, Taiwan

Date of Receipt : 2012/03/21

Issued Date : 2013/07/11

Report No. : 136367S

Report Version : V2.0


The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.


Issued Date : 2013/07/11
 Report No. : 136367S

Quietek


Product Name : Special Warning Lamp
 Applicant : JULUEN ENTERPRISE CO., LTD.
 Address : 8F-1, No.502, Da An Rd., Shulin Dist., New Taipei City
 : 23849, Taiwan
 Manufacturer : JULUEN ENTERPRISE CO., LTD.
 Model No. : DIAMONDBACK, DB
 EUT Voltage : DC 13.5V
 : DC 27V
 Trade Name : JULUEN
 Applicable Standard : ECE R10 Rev.4
 : CISPR 25: 2nd edition 2002
 : ISO 7637-2: 2nd edition 2004
 : ISO 11452-2: 2nd edition 2004
 : ISO 11452-4: 3rd edition 2005
 Test Result : Complied
 : Hsinchu EMC Laboratory
 Performed Location : No. 75-2, 3rd Lin, Wangye Keng, Yonghxing Tsuen,
 : Qionglin Shiang, Hsinchu County 307, Taiwan
 : TEL:+886-3-592-8858 / FAX:+886-3-592-8859

Documented By : 

 (Fonbo Fang / Engineering Adm. Assistant)

Reviewed By : 

 (Hala Chen / Senior Engineer)

Approved By : 

 (Steven Chen / Manager)

Laboratory Information

We , **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scopes:

Taiwan R.O.C.	:	BSMI, NCC, TAF
Germany	:	TUV Rheinland
Norway	:	DNV
USA	:	FCC
Japan	:	VCCI

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site :

<http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site :

<http://www.quietek.com/>

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

HsinChu Testing Laboratory :

No.75-2, 3rd Lin, Wangye Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan
 TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : service@quietek.com

LinKou Testing Laboratory :

No. 5, Ruei-Shu Valley, Ruei-Ping Tsuen, Lin-Kou Shiang, Taipei, Taiwan
 TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : service@quietek.com

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1. EUT General Information**1.1. EUT Description**

Product Name	Special Warning Lamp
Trade Name	JULUEN
Model No.	DIAMONDBACK, DB

Note:

1. This EUT is a Special Warning Lamp.
2. The variation of model number is for different strategy of marketing.

1.2. Mode of Operation

Quietek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode
Mode 1: Normal operation (13.5V System)
Mode 2: Normal operation (27V System)
Final Test Mode
Mode 1: Normal operation (13.5V System)
Mode 2: Normal operation (27V System)

2. Technical Test

2.1. Summary of Test Result

- No deviations from the test standards
- Deviations from the test standards as below description

Performed Item	Normative References	Test Performed	Deviation
ESA broadband/ narrowband	CISPR 25	Yes	No
Voltage Transient Emission	ISO 7637-2	Yes	No
Transient Immunity	ISO 7637-2	Yes	No
Immunity to Radio Frequency Radiated Field (400 MHz~2000 MHz)	ISO 11452-2	Yes	No
Immunity to Bulk Current Injection (20 MHz~400 MHz)	ISO 11452-4	Yes	No

2.2. Test Environment

Performed Item	Items	Value	Actual
ESA broadband/ narrowband	Temperature (°C)	18-28	23
Transient Emission	Temperature (°C)	18-28	21
Transient Immunity	Temperature (°C)	18-28	23
Immunity to Radio Frequency Radiated Field	Temperature (°C)	18-28	21
Immunity to Bulk Current Injection	Temperature (°C)	18-28	21

2.3. List of Test Equipment

ESA broadband/ narrowband type test / Chmaber1

Instrument	Manufacturer	Model No.	Serial No.	Next Cal. Date
Bi-Conical Antenna	Schwarzbeck	VHA 9103	2493	2013/08/28
EMI Receiver	R&S	ESCI	100796	2013/08/28
LISN	Schwarzbeck	8126F	8126F125	2013/11/01
LISN	Schwarzbeck	8126F	8126F112	2013/11/01
LPDA Antenna	Schwarzbeck	UHALP 9108-A	243	2013/08/28

Voltage Transient Immunity Test / Shielded Room 4

Instrument	Manufacturer	Model No.	Serial No.	Next Cal. Date
Transient generator	Schaffner	MT5511	1290	2013/11/11
Burst Generator	Schaffner	NSG5530	74	2013/11/11
Load Dump Generator	Schaffner	LD5505	35	2013/11/11
Impedance Module	Schaffner	RM5505	14	2013/11/11
Function Generator & Power Amplifier	Schaffner	PA5840-75	581-005	2013/11/11
Function Generator & Power Amplifier	Schaffner	FG5620	35	2013/11/11

Transient Emission Test / Shielded Room 4

Instrument	Manufacturer	Model No.	Serial No.	Next Cal. Date
Transient generator	Schaffner	MT5511	1290	2013/11/11
Burst Generator	Schaffner	NSG5530	74	2013/11/11
Load Dump Generator	Schaffner	LD5505	35	2013/11/11
Impedance Module	Schaffner	RM5505	14	2013/11/11
Function Generator & Power Amplifier	Schaffner	PA5840-75	581-005	2013/11/11
Function Generator & Power Amplifier	Schaffner	FG5620	35	2013/11/11
Digital Oscilloscope	Yokogawa	DL9240	91EC33127	2014/5/15
Transient Emission Measurement	EM-TEST	AN200 B S1	V0627101568	2013/12/6

Immunity to Radio Frequency Radiated Field / Chmaber3

Instrument	Manufacturer	Model No.	Serial No.	Next Cal. Date
Power Meter	BOONTON	4232A	42201	2013/11/19
Power Sensor	BOONTON	51011-EMC	31507	2013/11/19
Power Sensor	BOONTON	51011-EMC	34359	2013/11/19
Field strength Meter	Narda	EMR-20	BA-0097	2014/4/7
Signal Generator	R&S	SML03	103300	2014/4/24
Bi-log Antenna	FRANKONIA	BTA-M	06001M	N/A
Horn Antenna	Schwarzbeck	BBHA 9120E	286	N/A
Power Amplifier	FRANKONIA	FLH200B	1022	N/A
Power Amplifier	FRANKONIA	FLG-50C	1009	N/A
LISN	Schwarzbeck	8126F	8126F125	2013/11/1
LISN	Schwarzbeck	8126F	8126F112	2013/11/1

Immunity to Bulk Current Injection / Shielded Room 6

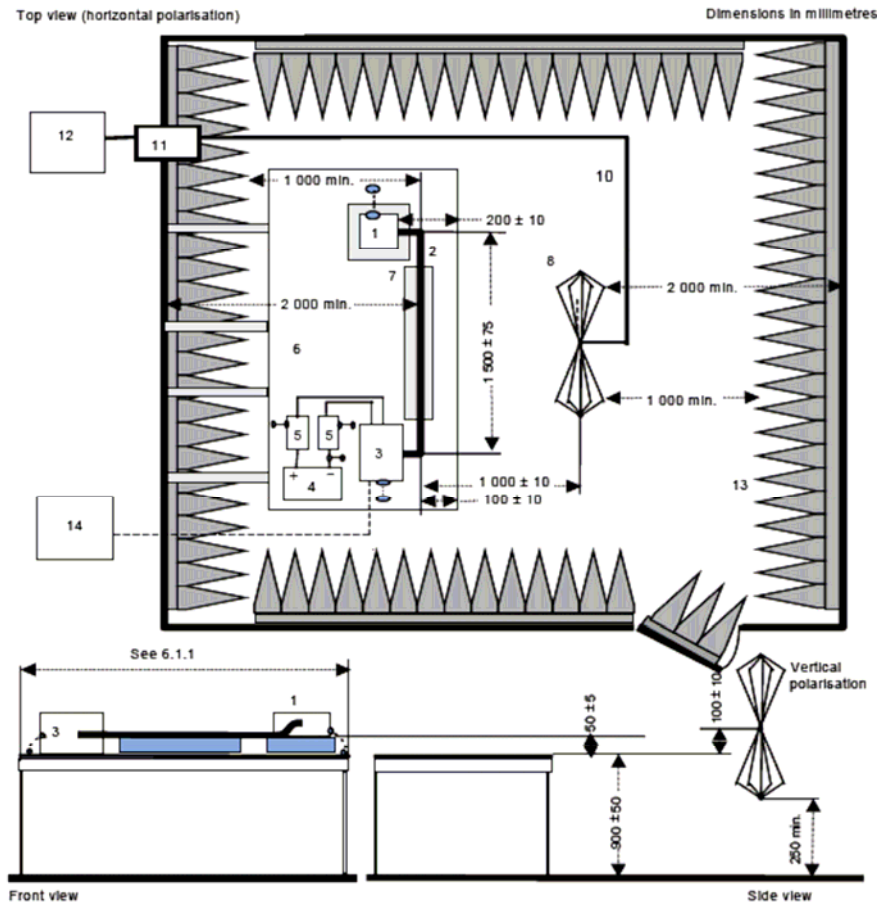
Instrument	Manufacturer	Model No.	Serial No.	Next Cal. Date
Power Meter	BOONTON	4232A	42201	2013/11/19
Power Sensor	BOONTON	51011-EMC	31507	2013/11/19
Power Sensor	BOONTON	51011-EMC	34359	2013/11/19
Signal Generator	R&S	SML03	103300	2014/4/24
Power Amplifier	FRANKONIA	FLH200B	1022	N/A
V-Network	R&S	ESH3-Z6	1000027	2013/8/30
V-Network	R&S	ESH3-Z6	1000367	2013/8/30
Bulk current injection probe	FCC	F-140	611	2013/9/25

3. ESA Broadband/ Narrowband Type Test

3.1. Test Specification

According to EMC Standard: CISPR25 (second edition 2002) clause 6.4. ALSE method.

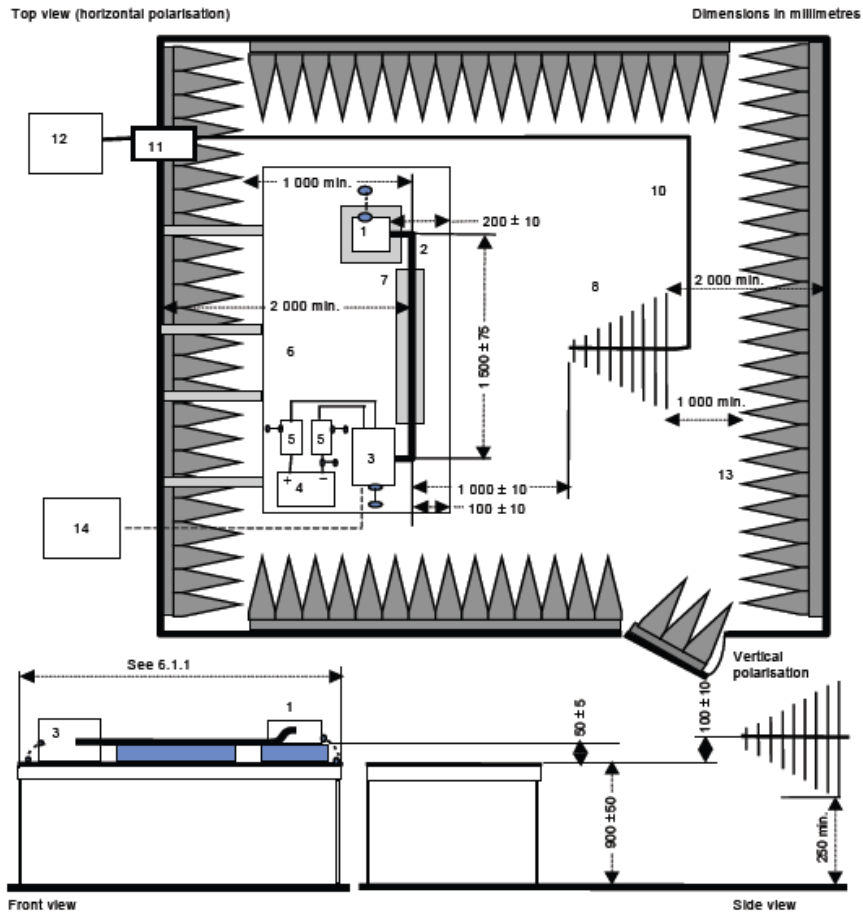
3.2. Test Setup



Key

- | | | | |
|---|---|----|---|
| 1 | EUT (grounded locally if required in test plan) | 8 | Biconical antenna |
| 2 | Test harness | - | - |
| 3 | Load simulator (placement and ground connection according to 6.4.2.5) | 10 | High quality double-shielded coaxial cable (50 Ω) |
| 4 | Power supply (location optional) | 11 | Bulkhead connector |
| 5 | Artificial network (AN) | 12 | Measuring instrument |
| 6 | Ground plane (bonded to shielded enclosure) | 13 | RF absorber material |
| 7 | Low relative permittivity support ($\epsilon_r \leq 1,4$) | 14 | Stimulation and monitoring system |

Figure 1 – Test set up –biconical antenna (30 MHz~ 300 MHz)



Key

- | | | | |
|---|---|----|---|
| 1 | EUT (grounded locally if required in test plan) | 8 | Log-periodic antenna |
| 2 | Test harness | - | - |
| 3 | Load simulator (placement and ground connection according to 6.4.2.5) | 10 | High quality double-shielded coaxial cable (50 Ω) |
| 4 | Power supply (location optional) | 11 | Bulkhead connector |
| 5 | Artificial network (AN) | 12 | Measuring instrument |
| 6 | Ground plane (bonded to shielded enclosure) | 13 | RF absorber material |
| 7 | Low relative permittivity support ($\epsilon_r \leq 1,4$) | 14 | Stimulation and monitoring system |

Figure 2-Test set up –log-periodic antenna (300 MHz~ 1000 MHz)

3.3. Limit

3.3.1 Broadband reference limits

Limit E (dBµV/m) at frequency F (MHz)		
30 - 75 MHz	75 - 400 MHz	400 – 1,000 MHz
$E = 62 - 25.13 \log (F/30)$	$E = 52 + 15.13 \log (F/75)$	$E = 63$

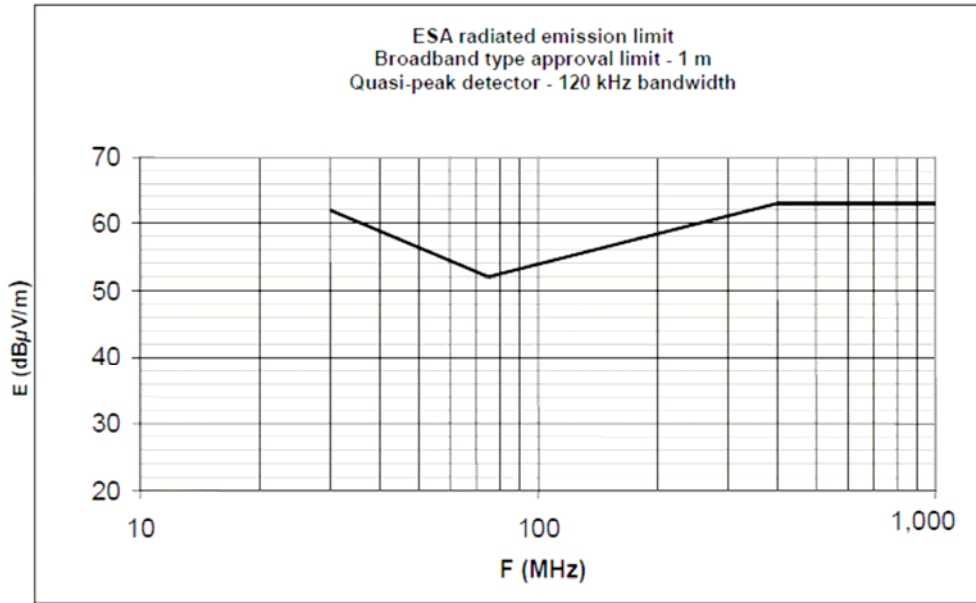


Figure 3-Electrical/electronic sub-assembly Broadband reference limits

3.3.2 Narrowband reference limits

Limit E (dBµV/m) at frequency F (MHz)		
30 - 75 MHz	75 - 400 MHz	400 – 1,000 MHz
$E = 52 - 25.13 \log (F/30)$	$E = 42 + 15.13 \log (F/75)$	$E = 53$

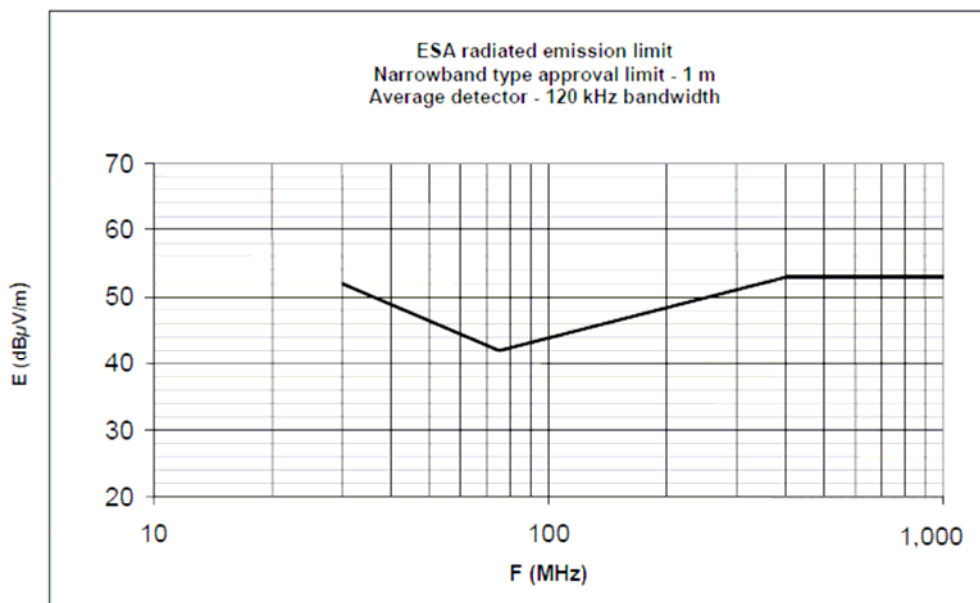


Figure 4-Electrical/electronic sub-assembly Narrowband reference limits

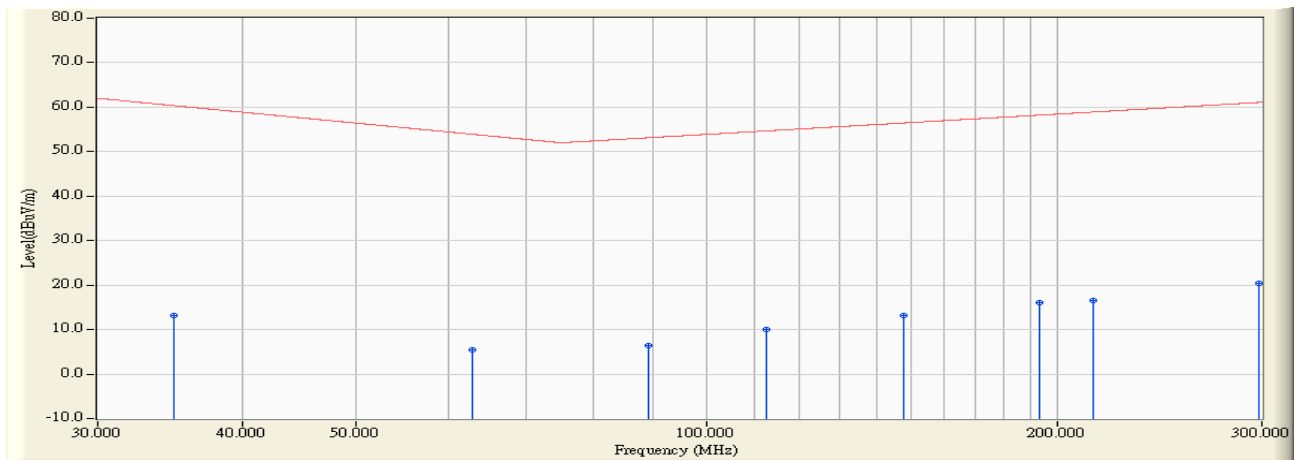
3.4. Test Procedure

- a. Turn on the measurement equipment and allow a sufficient time for stabilization.
- b. Calibration. Perform the measurement system check using the measurement system check setup.
- c. Turn on the EUT and allow a sufficient time for stabilization.
- d. EUT testing. Perform emission data scans using the measurement setup.

3.5. ESA Broadband/ Narrowband Type Result

3.5.1 ESA Broadband Test Result

Site : QTKCB1	Time : 2013/06/22 - 13:33
Limit : ECER10_ESA_01M_QP	Margin : 0
Probe : Biconical-2-0912 - HORIZONTAL	Power : DC 13.5V
EUT : Special Warning Lamp	Note : Mode 1: Normal operation (13.5V System)

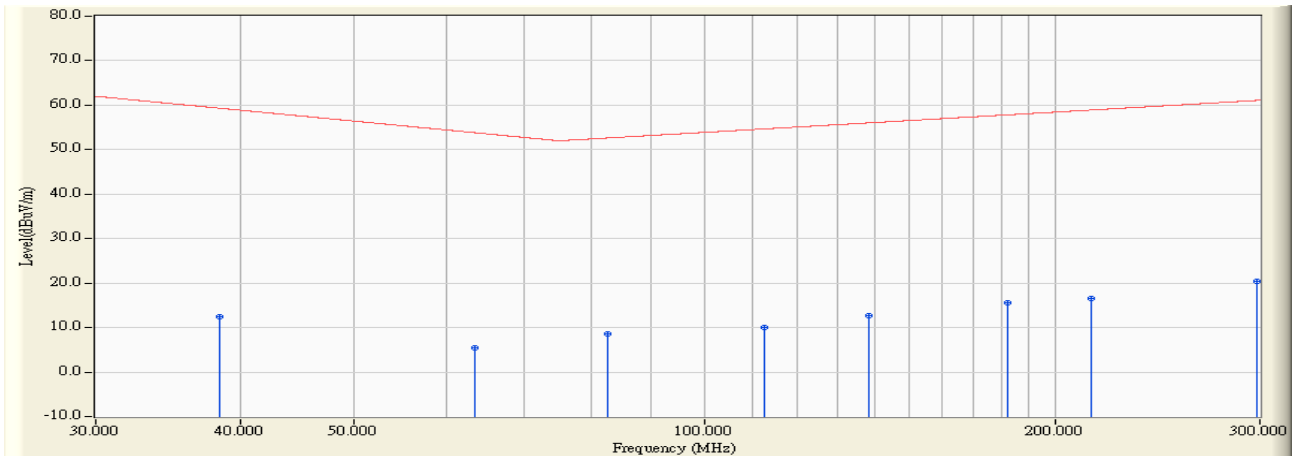


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	34.920	-5.797	18.907	13.110	-47.233	60.343	QUASIPeAK
2	62.880	-13.625	19.130	5.504	-48.419	53.923	QUASIPeAK
3	89.240	-12.429	18.739	6.310	-46.832	53.142	QUASIPeAK
4	112.600	-8.649	18.671	10.021	-44.649	54.670	QUASIPeAK
5	147.840	-5.560	18.696	13.136	-43.323	56.459	QUASIPeAK
6	193.240	-3.210	19.186	15.977	-42.242	58.219	QUASIPeAK
7	215.160	-2.503	19.056	16.554	-42.371	58.925	QUASIPeAK
8	* 298.000	1.650	18.645	20.295	-40.770	61.065	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:29
Limit : ECER10_ESA_01M_QP	Margin : 0
Probe : Biconical-2-0912 - VERTICAL	Power : DC 13.5V
EUT : Special Warning Lamp	Note : Mode 1: Normal operation (13.5V System)

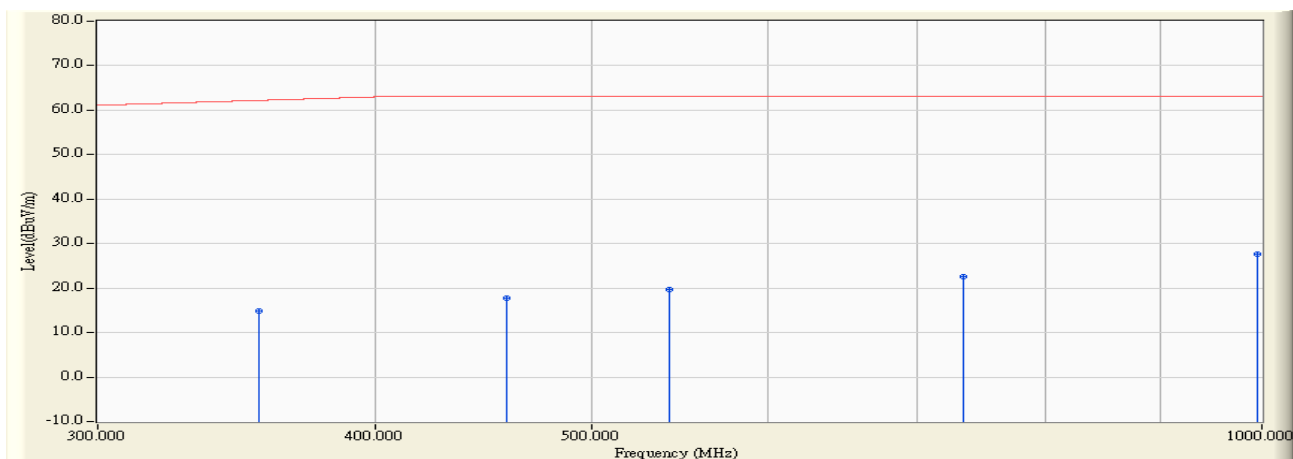


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	38.280	-6.433	18.781	12.349	-46.991	59.340	QUASIPeAK
2	63.480	-13.741	19.105	5.364	-48.456	53.820	QUASIPeAK
3	82.640	-13.543	22.049	8.506	-44.131	52.637	QUASIPeAK
4	112.680	-8.639	18.688	10.049	-44.626	54.675	QUASIPeAK
5	138.400	-6.090	18.671	12.581	-43.445	56.026	QUASIPeAK
6	181.960	-3.716	19.354	15.638	-42.186	57.824	QUASIPeAK
7	215.160	-2.503	19.040	16.537	-42.388	58.925	QUASIPeAK
8	* 298.320	1.673	18.756	20.430	-40.642	61.072	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:24
Limit : ECER10_ESA_01M_QP	Margin : 0
Probe : Log-Periodic-2-0912 - HORIZONTAL	Power : DC 13.5V
EUT : Special Warning Lamp	Note : Mode 1: Normal operation (13.5V System)

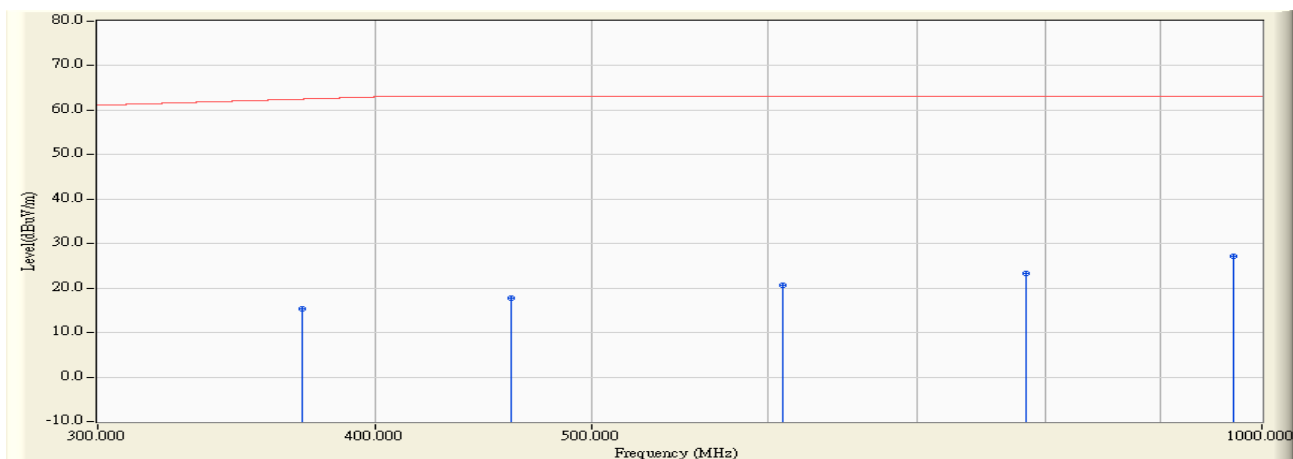


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		354.200	-3.611	18.498	14.886	-47.314	62.200	QUASPEAK
2		457.760	-0.844	18.489	17.644	-45.356	63.000	QUASPEAK
3		541.880	0.838	18.781	19.619	-43.381	63.000	QUASPEAK
4		734.560	3.576	18.916	22.492	-40.508	63.000	QUASPEAK
5	*	994.640	7.788	19.936	27.723	-35.277	63.000	QUASPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:21
Limit : ECER10_ESA_01M_QP	Margin : 0
Probe : Log-Periodic-2-0912 - VERTICAL	Power : DC 13.5V
EUT : Special Warning Lamp	Note : Mode 1: Normal operation (13.5V System)

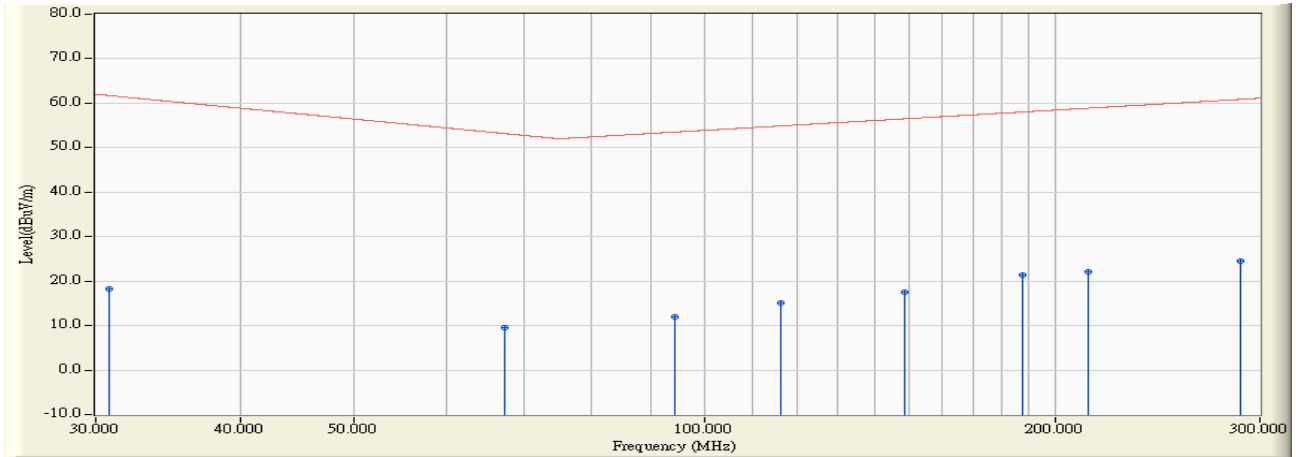


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		370.720	-3.066	18.498	15.431	-47.069	62.500	QUASPEAK
2		459.840	-0.803	18.471	17.668	-45.332	63.000	QUASPEAK
3		609.360	1.831	18.916	20.747	-42.253	63.000	QUASPEAK
4		783.600	4.170	19.186	23.357	-39.643	63.000	QUASPEAK
5	*	971.080	7.292	19.809	27.102	-35.898	63.000	QUASPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:46
Limit : ECER10_ESA_01M_QP	Margin : 0
Probe : Biconical-2-0912 - HORIZONTAL	Power : DC 27V
EUT : Special Warning Lamp	Note : Mode 2: Normal operation (27V System)

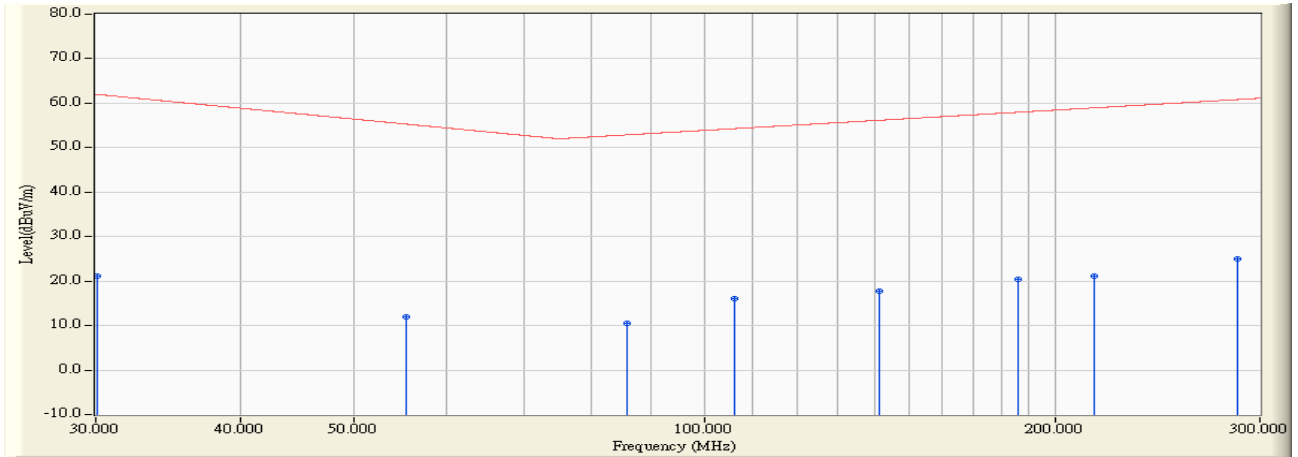


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	30.840	-5.467	23.606	18.139	-43.560	61.699	QUASPEAK
2	67.400	-14.502	24.013	9.512	-43.654	53.166	QUASPEAK
3	94.440	-11.412	23.380	11.968	-41.546	53.514	QUASPEAK
4	116.160	-8.183	23.336	15.153	-39.722	54.875	QUASPEAK
5	148.480	-5.528	23.021	17.494	-38.994	56.488	QUASPEAK
6	187.360	-3.445	24.740	21.296	-36.720	58.016	QUASPEAK
7	213.840	-2.606	24.762	22.155	-36.730	58.885	QUASPEAK
8	* 288.800	0.984	23.493	24.477	-36.382	60.859	QUASPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:43
Limit : ECER10_ESA_01M_QP	Margin : 0
Probe : Biconical-2-0912 - VERTICAL	Power : DC 27V
EUT : Special Warning Lamp	Note : Mode 2: Normal operation (27V System)

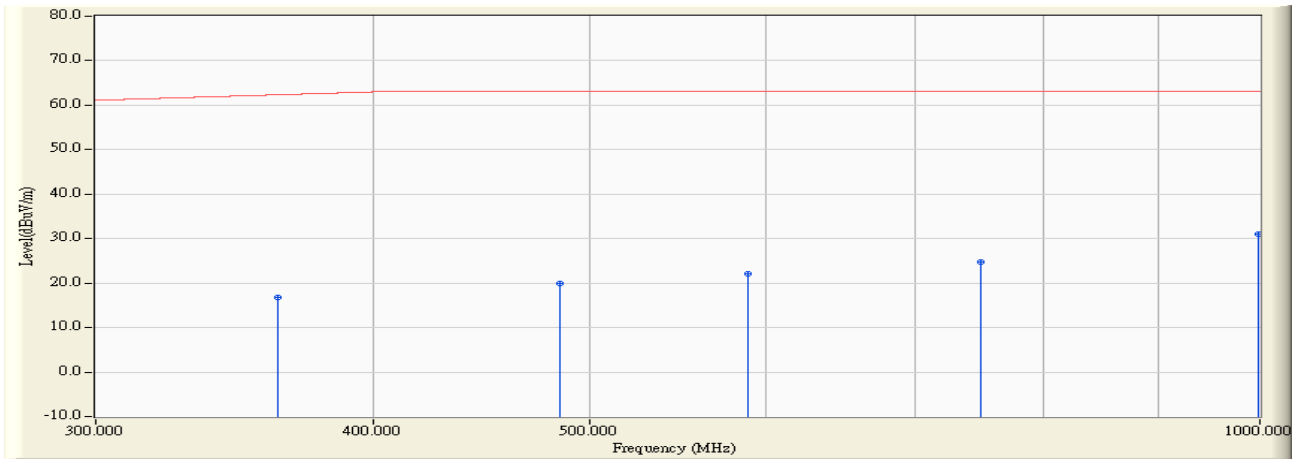


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	30.080	-5.406	26.480	21.074	-40.897	61.971	QUASIPeAK
2	55.440	-11.345	23.214	11.869	-43.429	55.298	QUASIPeAK
3	85.800	-13.014	23.585	10.571	-42.313	52.884	QUASIPeAK
4	106.120	-9.498	25.441	15.942	-38.339	54.281	QUASIPeAK
5	141.400	-5.889	23.634	17.745	-38.422	56.167	QUASIPeAK
6	185.720	-3.528	23.857	20.329	-37.629	57.958	QUASIPeAK
7	216.480	-2.397	23.597	21.199	-37.766	58.965	QUASIPeAK
8	* 286.640	0.866	24.222	25.087	-35.723	60.810	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:57
Limit : ECER10_ESA_01M_QP	Margin : 0
Probe : Log-Periodic-2-0912 - HORIZONTAL	Power : DC 27V
EUT : Special Warning Lamp	Note : Mode 2: Normal operation (27V System)

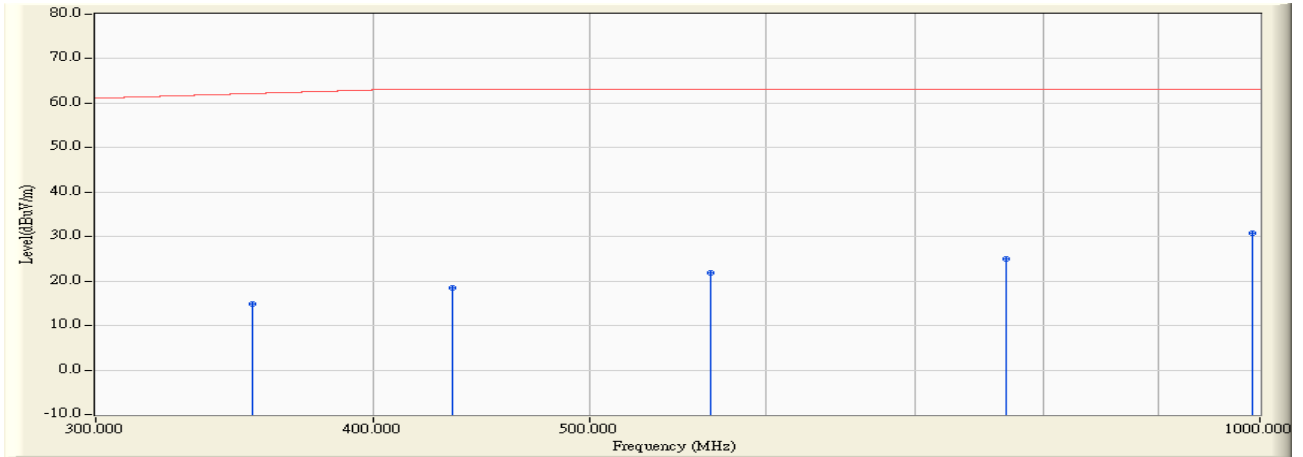


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		362.000	-3.354	20.066	16.712	-45.632	62.344	QUASIPeAK
2		484.840	-0.303	20.307	20.004	-42.996	63.000	QUASIPeAK
3		589.320	1.551	20.569	22.120	-40.880	63.000	QUASIPeAK
4		749.280	3.695	20.999	24.693	-38.307	63.000	QUASIPeAK
5	*	998.560	7.870	23.165	31.035	-31.965	63.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:54
Limit : ECER10_ESA_01M_QP	Margin : 0
Probe : Log-Periodic-2-0912 - VERTICAL	Power : DC 27V
EUT : Special Warning Lamp	Note : Mode 2: Normal operation (27V System)



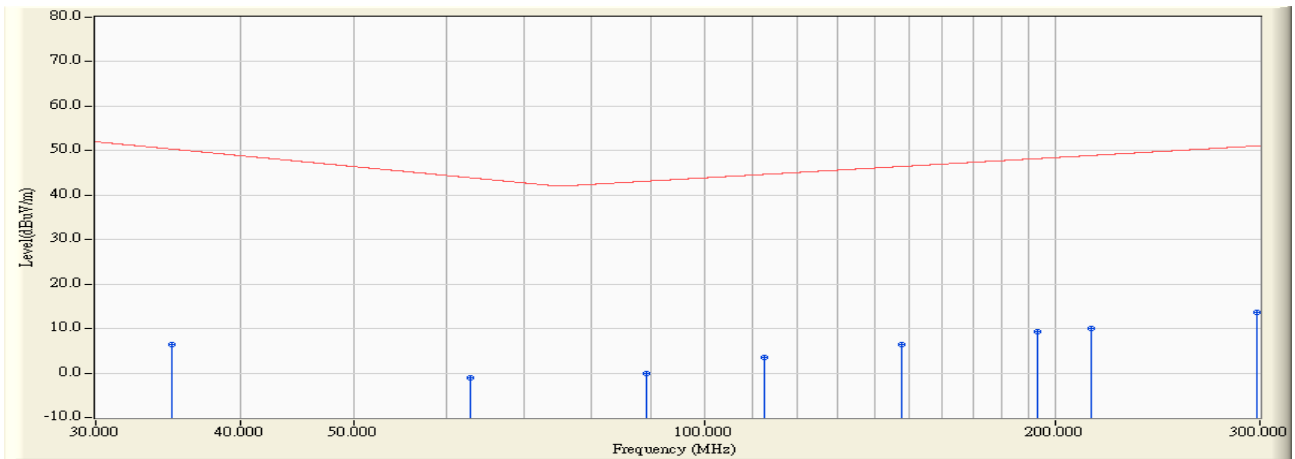
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		352.560	-3.665	18.572	14.906	-47.264	62.170	QUASPEAK
2		433.800	-1.356	19.906	18.550	-44.450	63.000	QUASPEAK
3		566.840	1.236	20.595	21.831	-41.169	63.000	QUASPEAK
4		769.320	3.971	20.963	24.934	-38.066	63.000	QUASPEAK
5	*	992.280	7.738	23.038	30.776	-32.224	63.000	QUASPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3.5.2 ESA Narrowband Test Result

Site : QTKCB1	Time : 2013/06/22 - 13:33
Limit : ECER10_ESA_01M_AV	Margin : 0
Probe : Biconical-2-0912 - HORIZONTAL	Power : DC 13.5V
EUT : Special Warning Lamp	Note : Mode 1: Normal operation (13.5V System)

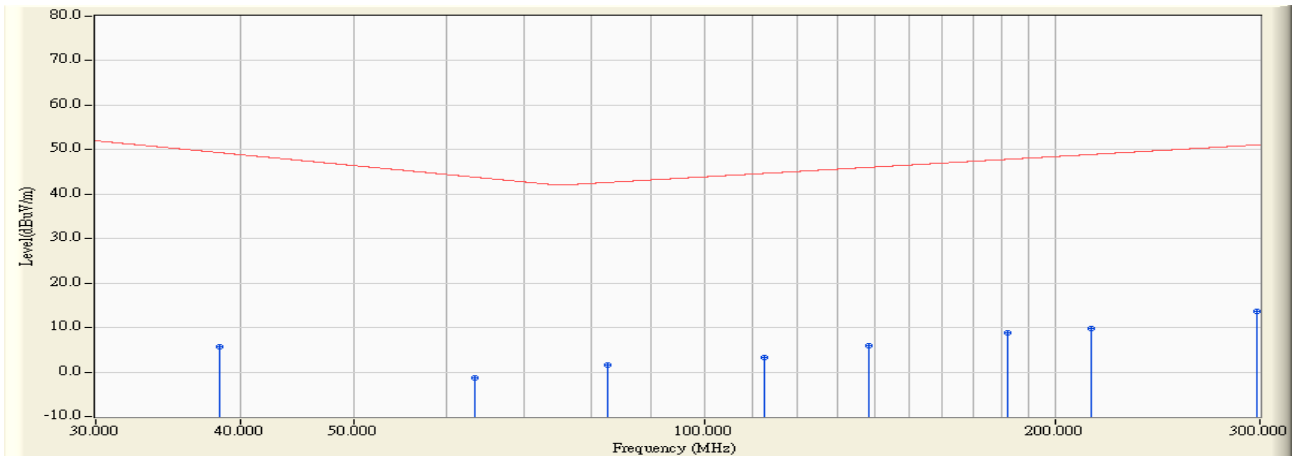


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		34.920	-5.797	12.235	6.438	-43.905	50.343	AVERAGE
2		62.880	-13.625	12.437	-1.188	-45.111	43.923	AVERAGE
3		89.240	-12.429	12.215	-0.214	-43.356	43.142	AVERAGE
4		112.600	-8.649	12.062	3.413	-41.257	44.670	AVERAGE
5		147.840	-5.560	12.074	6.513	-39.946	46.459	AVERAGE
6		193.240	-3.210	12.491	9.281	-38.938	48.219	AVERAGE
7		215.160	-2.503	12.411	9.909	-39.016	48.925	AVERAGE
8	*	298.000	1.650	12.060	13.710	-37.355	51.065	AVERAGE

Note:

1. All Reading Levels are Average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:29
Limit : ECER10_ESA_01M_AV	Margin : 0
Probe : Biconical-2-0912 - VERTICAL	Power : DC 13.5V
EUT : Special Warning Lamp	Note : Mode 1: Normal operation (13.5V System)

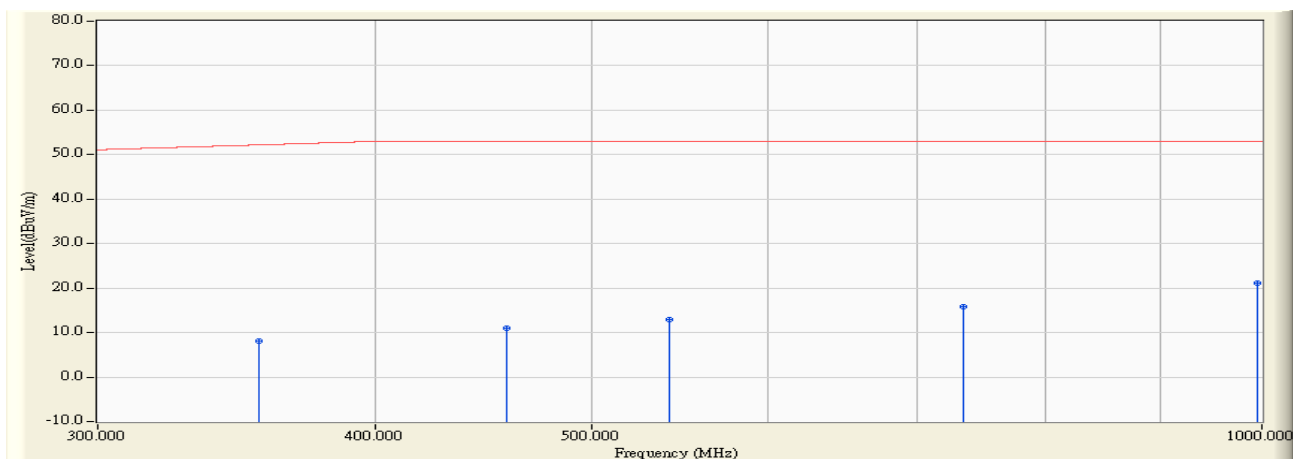


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		38.280	-6.433	12.112	5.680	-43.660	49.340	AVERAGE
2		63.480	-13.741	12.509	-1.232	-45.052	43.820	AVERAGE
3		82.640	-13.543	15.131	1.588	-41.049	42.637	AVERAGE
4		112.680	-8.639	12.009	3.370	-41.305	44.675	AVERAGE
5		138.400	-6.090	12.025	5.935	-40.091	46.026	AVERAGE
6		181.960	-3.716	12.624	8.908	-38.916	47.824	AVERAGE
7		215.160	-2.503	12.300	9.797	-39.128	48.925	AVERAGE
8	*	298.320	1.673	12.087	13.761	-37.311	51.072	AVERAGE

Note:

1. All Reading Levels are Average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:24
Limit : ECER10_ESA_01M_AV	Margin : 0
Probe : Log-Periodic-2-0912 - HORIZONTAL	Power : DC 13.5V
EUT : Special Warning Lamp	Note : Mode 1: Normal operation (13.5V System)

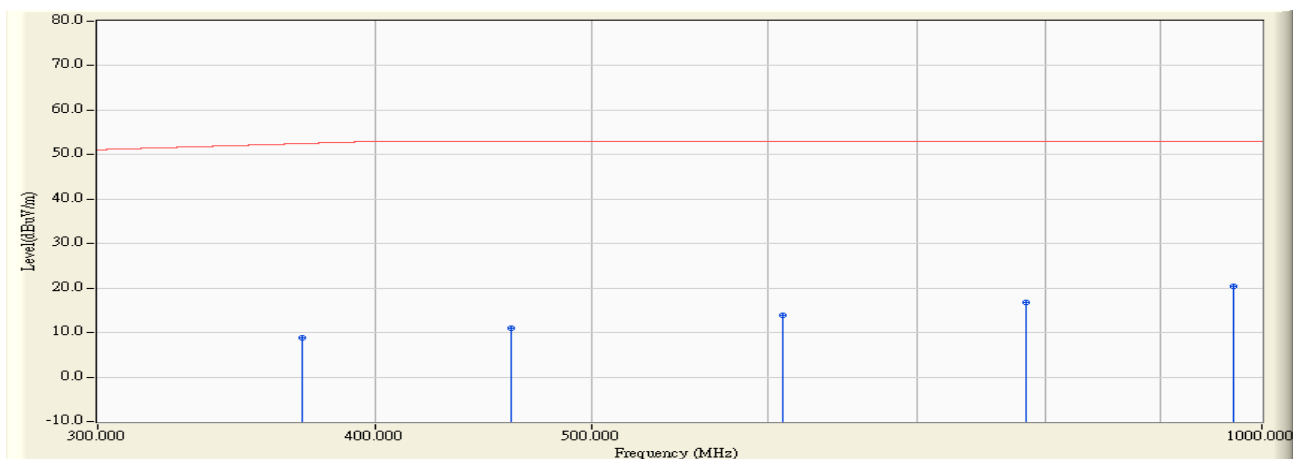


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		354.200	-3.611	11.828	8.217	-43.983	52.200	AVERAGE
2		457.760	-0.844	11.873	11.028	-41.972	53.000	AVERAGE
3		541.880	0.838	12.073	12.911	-40.089	53.000	AVERAGE
4		734.560	3.576	12.252	15.828	-37.172	53.000	AVERAGE
5	*	994.640	7.788	13.286	21.074	-31.926	53.000	AVERAGE

Note:

1. All Reading Levels are Average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:21
Limit : ECER10_ESA_01M_AV	Margin : 0
Probe : Log-Periodic-2-0912 - VERTICAL	Power : DC 13.5V
EUT : Special Warning Lamp	Note : Mode 1: Normal operation (13.5V System)

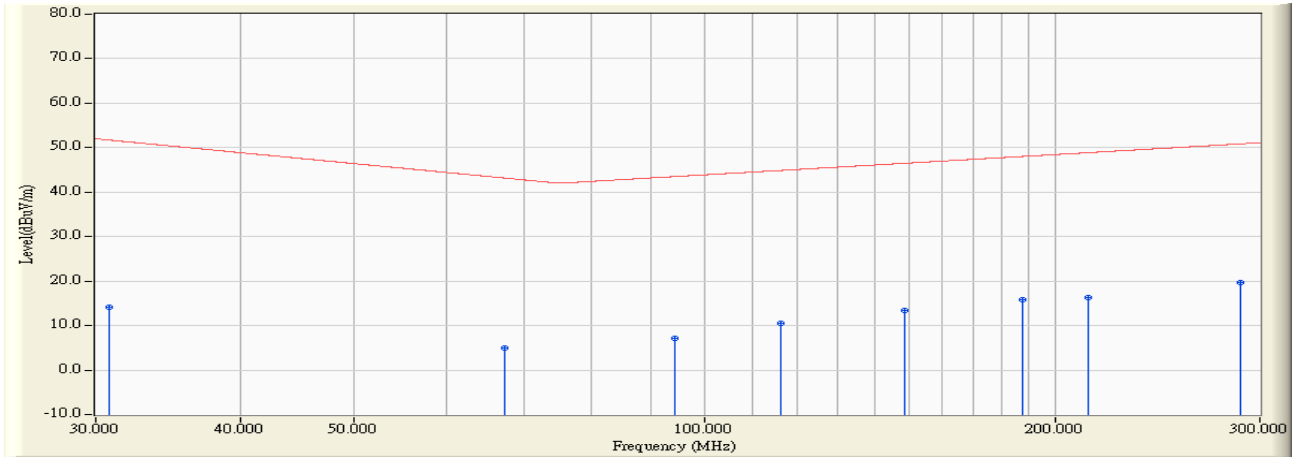


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		370.720	-3.066	11.781	8.714	-43.786	52.500	AVERAGE
2		459.840	-0.803	11.877	11.073	-41.927	53.000	AVERAGE
3		609.360	1.831	12.169	14.000	-39.000	53.000	AVERAGE
4		783.600	4.170	12.534	16.704	-36.296	53.000	AVERAGE
5	*	971.080	7.292	13.079	20.371	-32.629	53.000	AVERAGE

Note:

1. All Reading Levels are Average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:46
Limit : ECER10_ESA_01M_AV	Margin : 0
Probe : Biconical-2-0912 - HORIZONTAL	Power : DC 27V
EUT : Special Warning Lamp	Note : Mode 2: Normal operation (27V System)

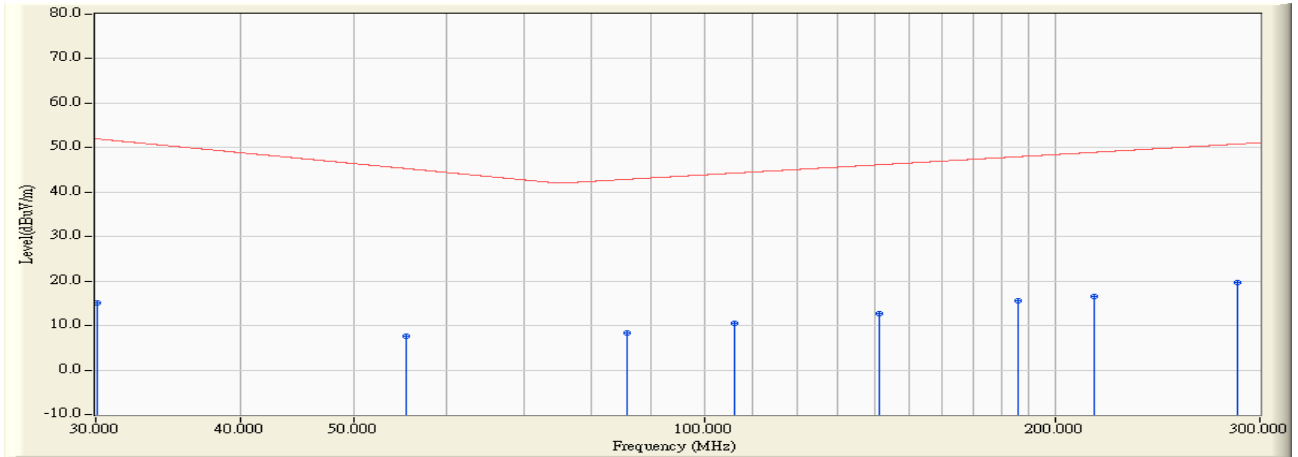


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		30.840	-5.467	19.688	14.221	-37.478	51.699	AVERAGE
2		67.400	-14.502	19.409	4.908	-38.258	43.166	AVERAGE
3		94.440	-11.412	18.585	7.173	-36.341	43.514	AVERAGE
4		116.160	-8.183	18.807	10.624	-34.251	44.875	AVERAGE
5		148.480	-5.528	18.857	13.330	-33.158	46.488	AVERAGE
6		187.360	-3.445	19.283	15.838	-32.178	48.016	AVERAGE
7		213.840	-2.606	18.965	16.359	-32.526	48.885	AVERAGE
8	*	288.800	0.984	18.679	19.663	-31.196	50.859	AVERAGE

Note:

1. All Reading Levels are Average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:43
Limit : ECER10_ESA_01M_AV	Margin : 0
Probe : Biconical-2-0912 - VERTICAL	Power : DC 27V
EUT : Special Warning Lamp	Note : Mode 2: Normal operation (27V System)

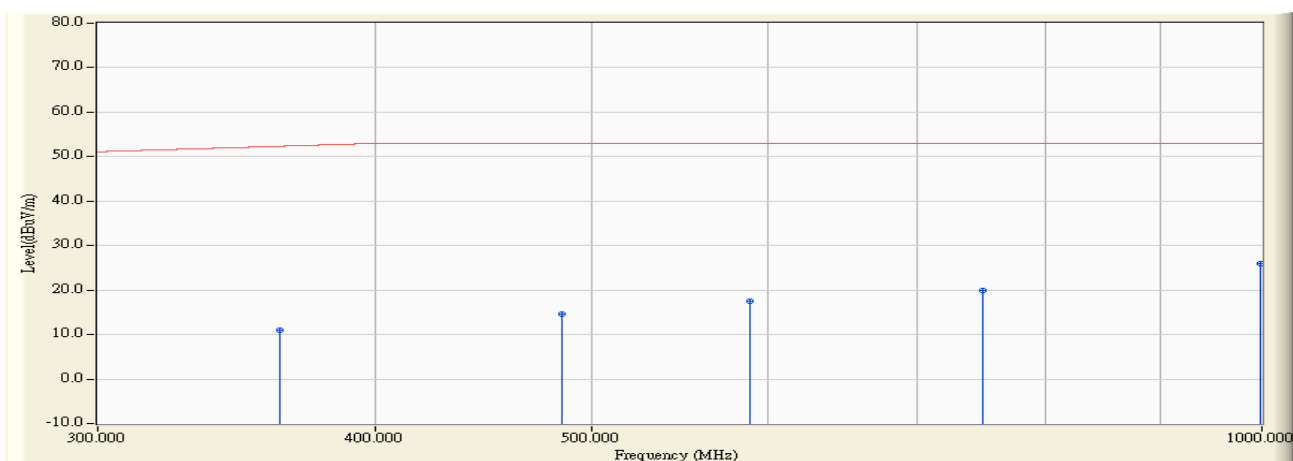


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		30.080	-5.406	20.480	15.074	-36.897	51.971	AVERAGE
2		55.440	-11.345	18.874	7.529	-37.769	45.298	AVERAGE
3		85.800	-13.014	21.404	8.390	-34.494	42.884	AVERAGE
4		106.120	-9.498	20.090	10.592	-33.689	44.281	AVERAGE
5		141.400	-5.889	18.576	12.687	-33.480	46.167	AVERAGE
6		185.720	-3.528	19.162	15.634	-32.324	47.958	AVERAGE
7		216.480	-2.397	18.957	16.559	-32.406	48.965	AVERAGE
8	*	286.640	0.866	18.815	19.680	-31.130	50.810	AVERAGE

Note:

1. All Reading Levels are Average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:57
Limit : ECER10_ESA_01M_AV	Margin : 0
Probe : Log-Periodic-2-0912 - HORIZONTAL	Power : DC 27V
EUT : Special Warning Lamp	Note : Mode 2: Normal operation (27V System)

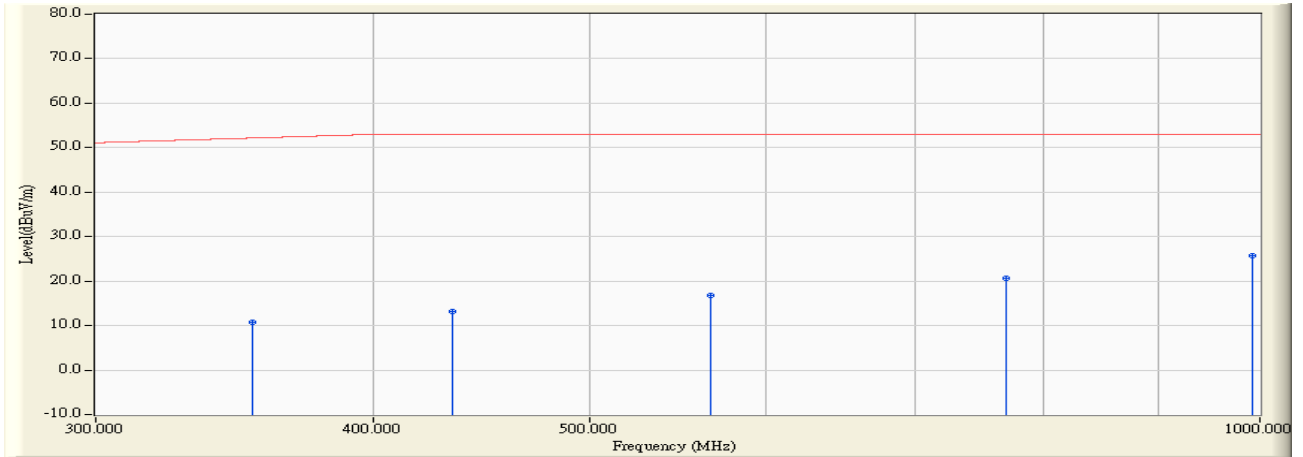


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		362.000	-3.354	14.454	11.100	-41.244	52.344	AVERAGE
2		484.840	-0.303	14.848	14.545	-38.455	53.000	AVERAGE
3		589.320	1.551	16.016	17.567	-35.433	53.000	AVERAGE
4		749.280	3.695	16.223	19.917	-33.083	53.000	AVERAGE
5	*	998.560	7.870	18.022	25.891	-27.109	53.000	AVERAGE

Note:

1. All Reading Levels are Average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : QTKCB1	Time : 2013/06/22 - 13:54
Limit : ECER10_ESA_01M_AV	Margin : 0
Probe : Log-Periodic-2-0912 - VERTICAL	Power : DC 27V
EUT : Special Warning Lamp	Note : Mode 2: Normal operation (27V System)



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		352.560	-3.665	14.398	10.732	-41.438	52.170	AVERAGE
2		433.800	-1.356	14.564	13.208	-39.792	53.000	AVERAGE
3		566.840	1.236	15.648	16.884	-36.116	53.000	AVERAGE
4		769.320	3.971	16.698	20.669	-32.331	53.000	AVERAGE
5	*	992.280	7.738	17.938	25.676	-27.324	53.000	AVERAGE

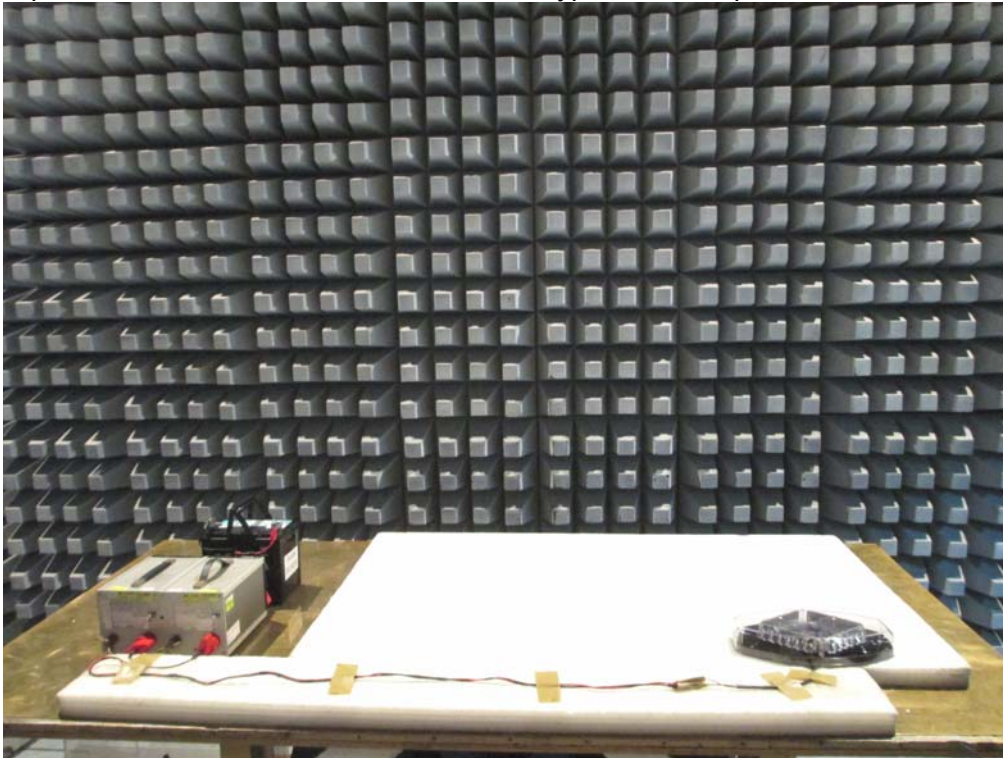
Note:

1. All Reading Levels are Average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

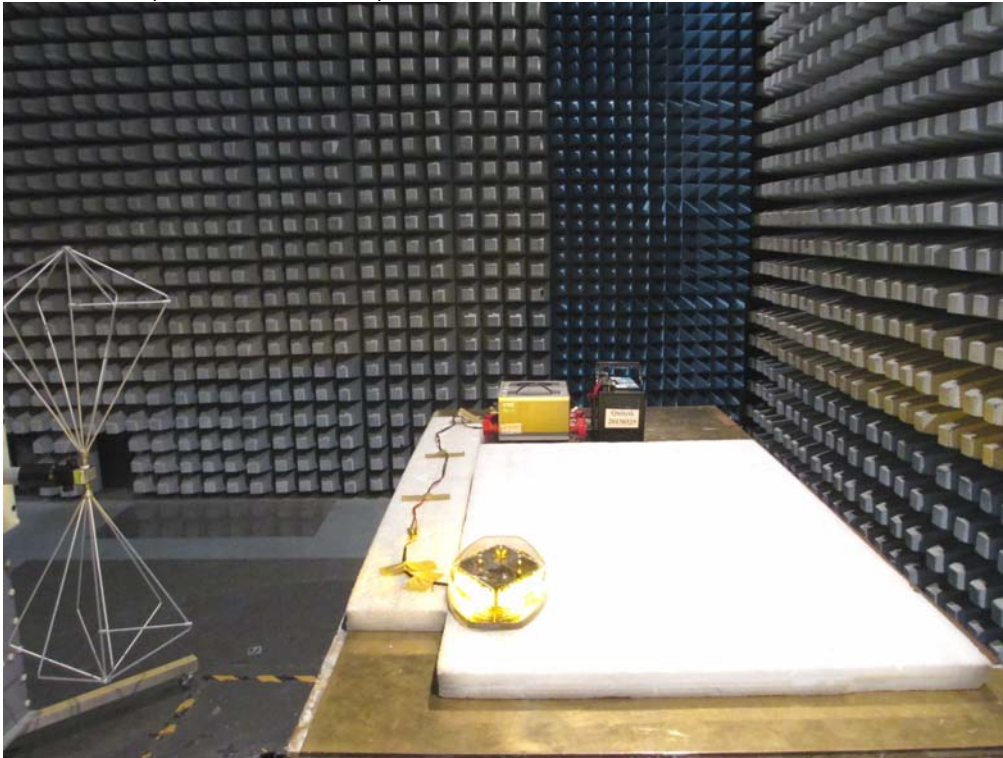
3.6 Test Photo

Test Mode : Mode 1: Normal operation (13.5V System)

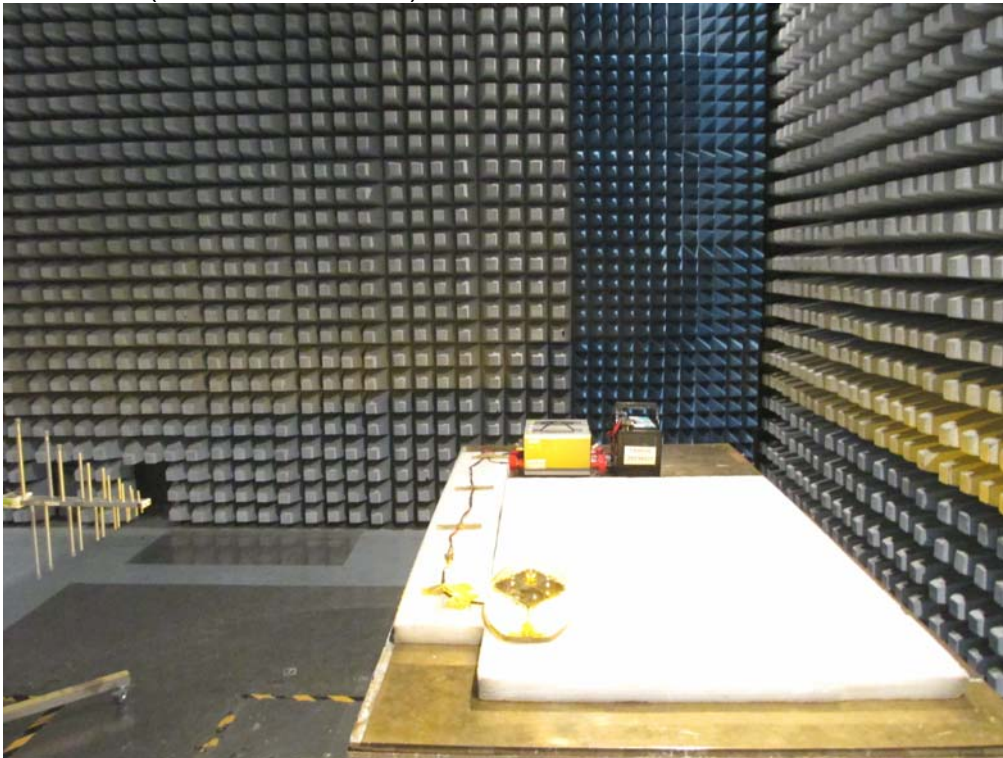
Description : ESA Broadband/ Narrowband Type Test Setup



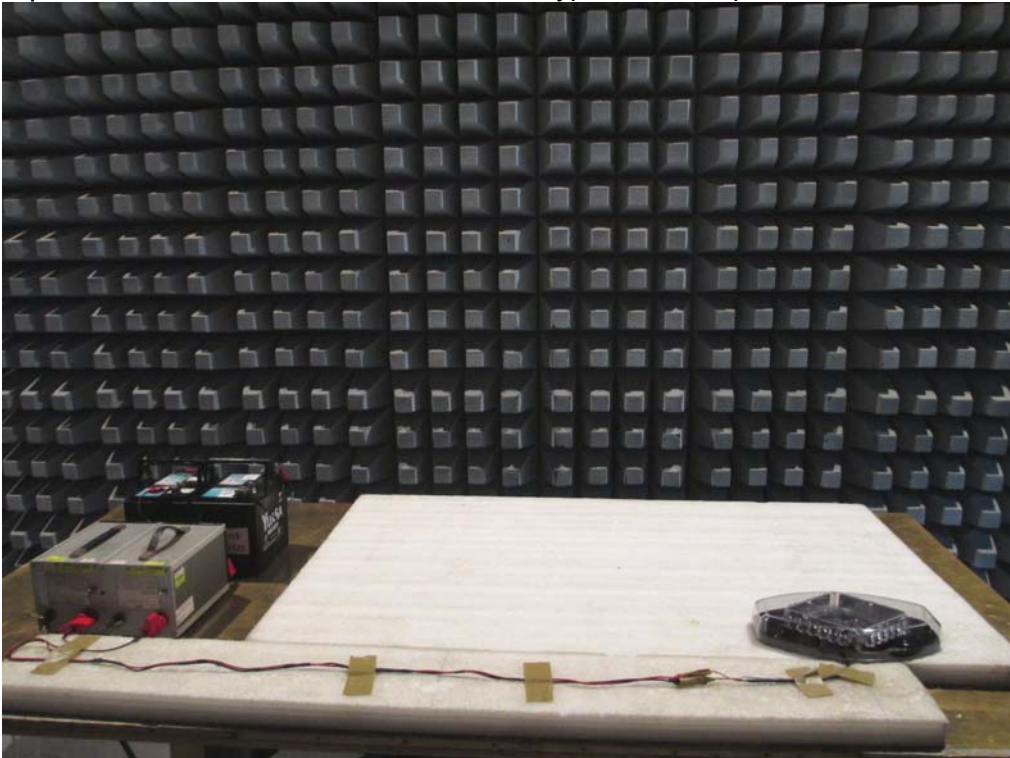
Test Mode : Mode 1: Normal operation (13.5V System)
Description : ESA Broadband/ Narrowband Type Test Setup
(30MHz~300MHz)



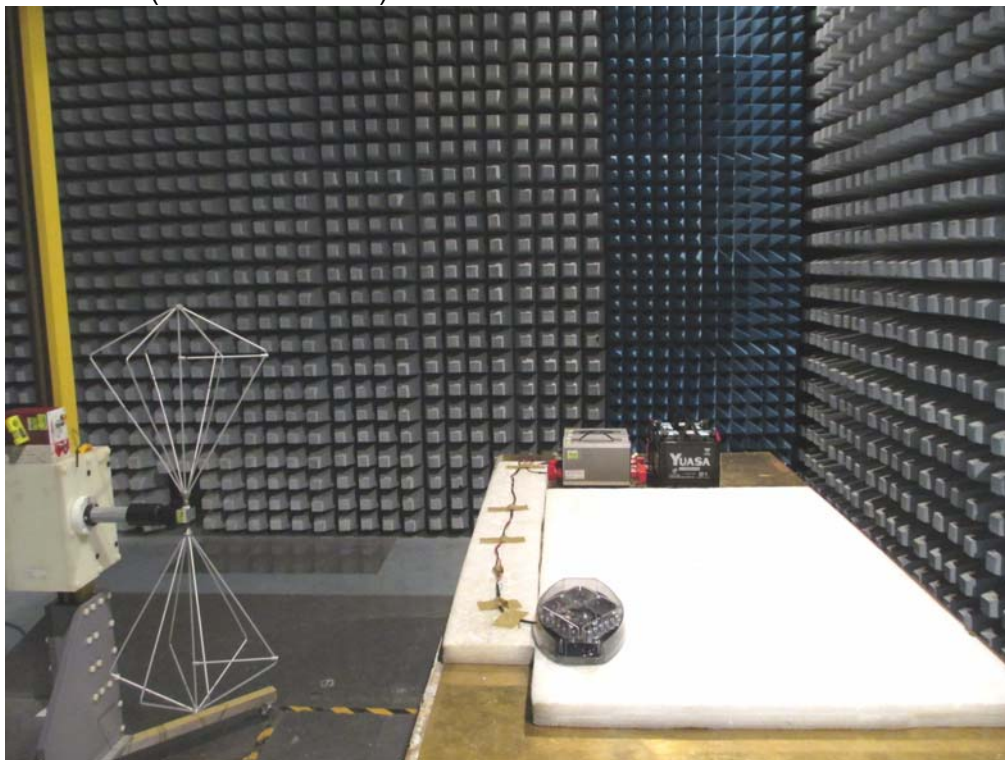
Test Mode : Mode 1: Normal operation (13.5V System)
Description : ESA Broadband/ Narrowband Type Test Setup
(300MHz~1000MHz)



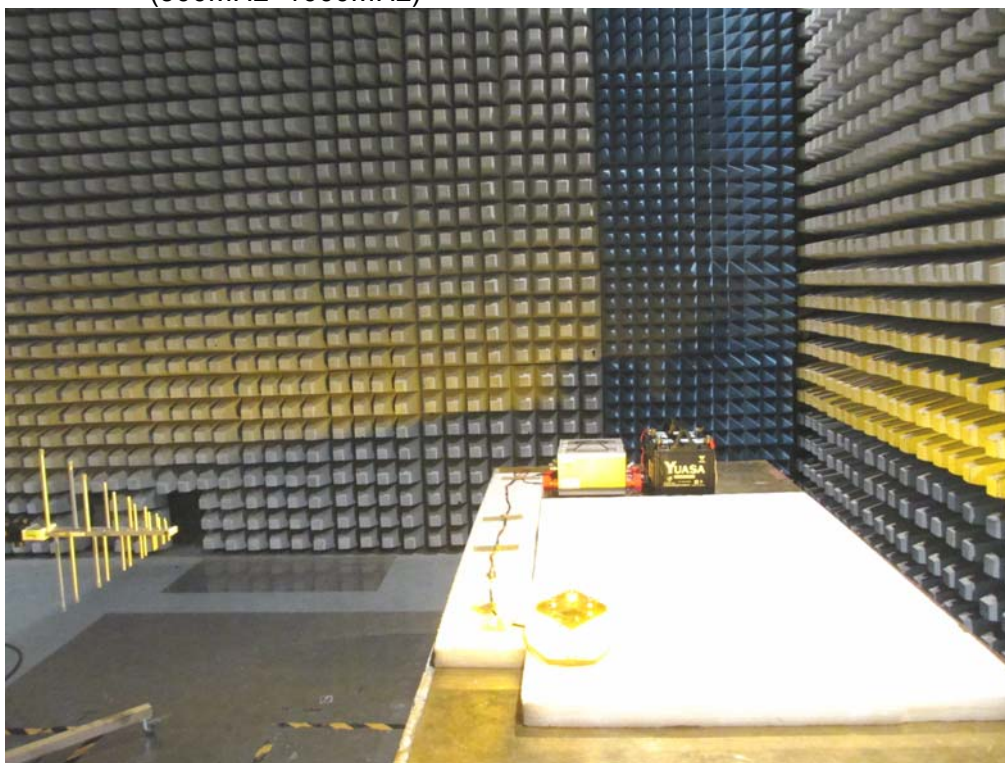
Test Mode : Mode 2: Normal operation (27V System)
Description : ESA Broadband/ Narrowband Type Test Setup



Test Mode : Mode 2: Normal operation (27V System)
Description : ESA Broadband/ Narrowband Type Test Setup
(30MHz~300MHz)



Test Mode : Mode 2: Normal operation (27V System)
Description : ESA Broadband/ Narrowband Type Test Setup
(300MHz~1000MHz)

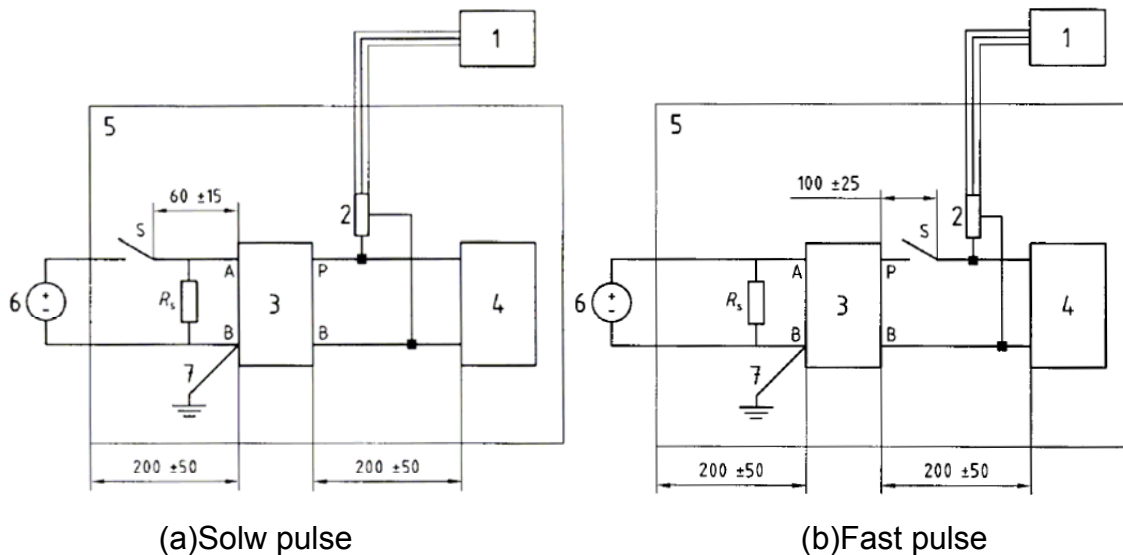


4. Voltage Transient Emissions Test

4.1. Test Specification

According to EMC Standard: ISO 7637-2(second edition 2004) clause 4.3.Voltage transient emissions test.

4.2. Setup



Key

- | | |
|------------------------------|--------------------------------------|
| 1 oscilloscope or equivalent | 5 ground plane |
| 2 voltage probe | 6 power supply |
| 3 artificial network | 7 Ground connection; length < 100 mm |
| 4 DUT (source of transient) | |

Figure 5- Transient emissions test set-up

4.3. Limit

	Maximum allowed pulse amplitude for	
Polarity of pulse amplitude	Vehicles with 12 V systems	Vehicles with 24 V systems
Positive	+75	+150
Negative	-100	-450

4.4. Test Procedure

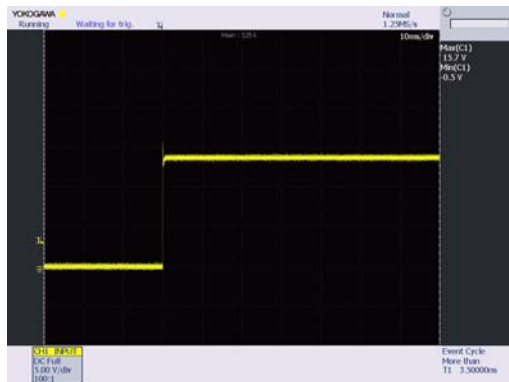
- a. Turn on the measurement equipment and allow a sufficient time for stabilization.
- b. Calibration. Perform the measurement system check using the measurement system check setup.
- c. Turn on the EUT and allow a sufficient time for stabilization.
- d. EUT testing. Perform emission data scans using the measurement setup.

4.5. Voltage Transient Emissions Test Result

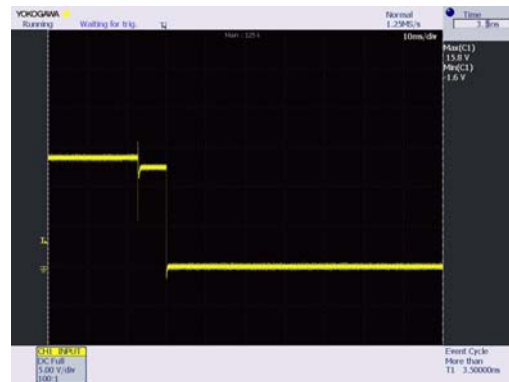
Product	Special Warning Lamp		
Test Item	Voltage Transient Emissions		
Test Mode	Mode 1: Normal operation (13.5V System)		
Date of Test	2013/06/22	Test Site	SR4

Polarity of pulse amplitude		Maximum allowed pulse amplitude for vehicles with 12V systems (V)	Test results	
			Slow pulse (V)	Fast pulse (V)
SW On-Off	Positive	+ 75	+2.3	+0.8
	Negative	- 100	-15.1	-11
SW Off-On	Positive	+ 75	+2.2	+1.4
	Negative	- 100	-14	-19.9

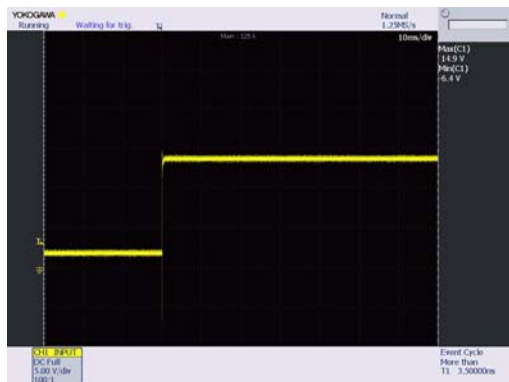
Slow off-on



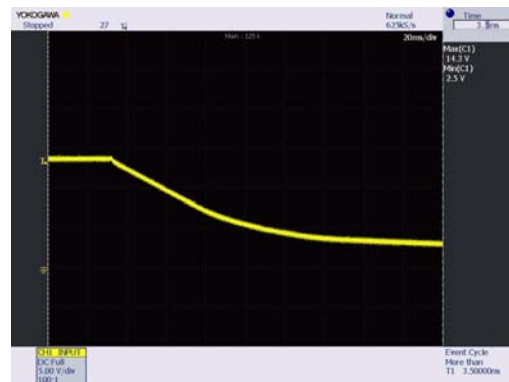
Slow on-off



Fast off-on



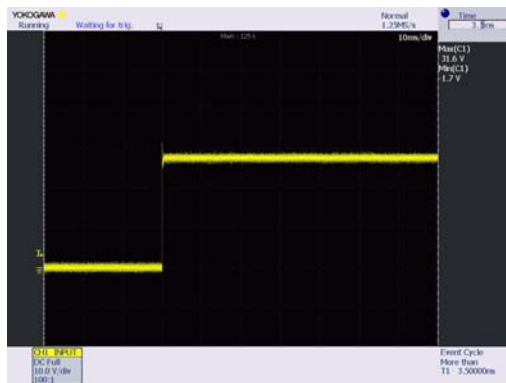
Fast on-off



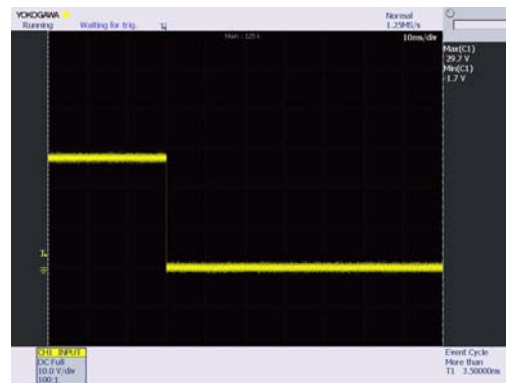
Product	Special Warning Lamp		
Test Item	Voltage Transient Emissions		
Test Mode	Mode 2: Normal operation (27V System)		
Date of Test	2013/06/22	Test Site	SR4

Polarity of pulse amplitude		Maximum allowed pulse amplitude for vehicles with 24V systems (V)	Test results	
			Slow pulse (V)	Fast pulse (V)
SW On-Off	Positive	+ 150	+2.7	+2.7
	Negative	- 450	-28.7	-26
SW Off-On	Positive	+ 150	+4.6	+3.1
	Negative	- 450	-28.7	-23.6

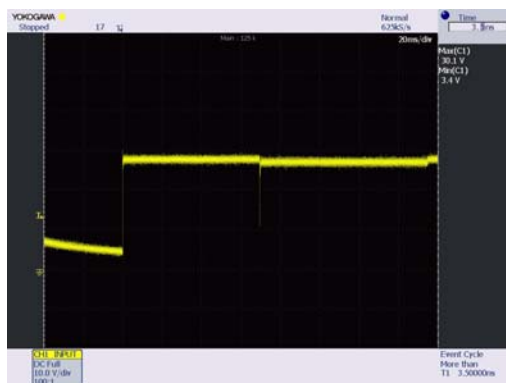
Slow off-on



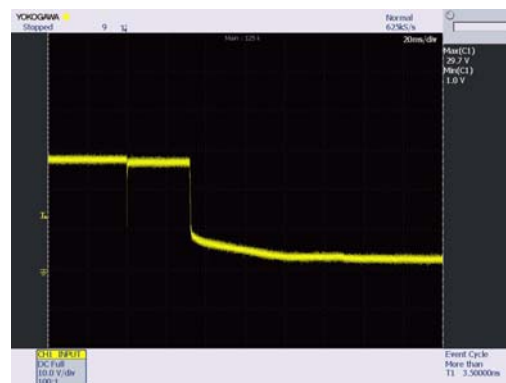
Slow on-off



Fast off-on



Fast on-off



4.6. Test Photo

Test Mode : Mode 1: Normal operation (13.5V System)

Description : Front View of Voltage Transient Emissions Test Setup-Slow



Test Mode : Mode 1: Normal operation (13.5V System)

Description : Front View of Voltage Transient Emissions Test Setup-Fast



Test Mode : Mode 2: Normal operation (27V System)

Description : Front View of Voltage Transient Emissions Test Setup-Slow



Test Mode : Mode 2: Normal operation (27V System)

Description : Back View of Voltage Transient Emissions Test Setup-Fast

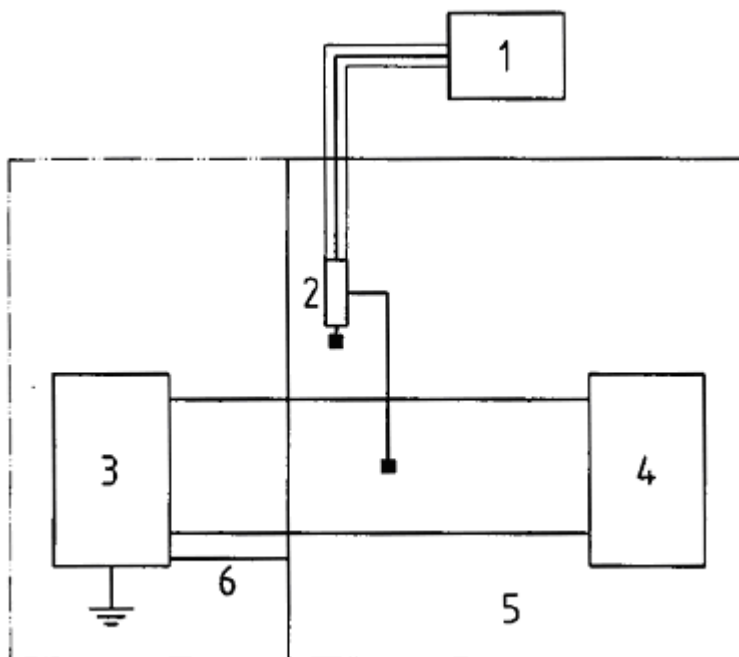


5. Transient Immunity Test

5.1. Test Specification

According to EMC Standard: ISO 7637-2(second edition 2004) clause 4.4.transient immunity test.

5.2. Setup



Key

- | | | | |
|---|--|---|--|
| 1 | oscilloscope or equivalent | 5 | ground plane |
| 2 | voltage probe | 6 | Ground connection (maximum length for test pulse |
| 3 | test pulse generator with internal power supply resistance R_i | | 3: 100 mm) |
| 4 | DUT | | |

Figure 6- Transient immunity test set-up

5.3. Limit

The immunity of ESA representative of its type shall be tested by the method(s) according to ISO 7637-2, second edition 2004 as described in Annex 10 with the test levels given in following table.

Test pulse number	Immunity test level	Functional status for systems:	
		Related to immunity related functions	Not related to immunity related functions
1	III	C	D
2a	III	B	D
2b	III	C	D
3a/3b	III	A	D
4	III	B (for ESA which must be operational during engine start phases) C (for other ESA)	D

5.4. Test Procedure

- a. Turn on the measurement equipment and allow a sufficient time for stabilization.
- b. Calibration. Perform the measurement system check using the measurement system check setup.
- c. Turn on the EUT and allow a sufficient time for stabilization.
- d. EUT testing. Perform emission data scans using the measurement setup.

5.5. Transient Immunity Test Result

Product	Special Warning Lamp		
Test Item	Transient Immunity Test		
Test Mode	Mode 1: Normal operation (13.5V System)		
Date of Test	2012/03/21	Test Site	SR4

Test Pulse 1

12V System			
U_s	-75 V	t_1	0.5 s
R_i	10 Ω	t_2	200 ms
t_d	2 ms	t_3	< 100 μ s
t_r	$(1^{+0}_{-0.5}) \mu$ s	Number of Pulse	5000
Complied to Criteria		<input type="checkbox"/> A, <input type="checkbox"/> B, <input checked="" type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E	

Test Pulse 2a

12V System			
U_s	+37 V	t_r	$(1^{+0}_{-0.5}) \mu$ s
R_i	2 Ω	t_1	0.5 s
t_d	0.05 ms	Number of Pulse	5000
Complied to Criteria		<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E	

Test Pulse 2b

12V System			
U_s	+10 V	t_{12}	1 ms \pm 0.5 ms
R_i	0 Ω	t_r	1 ms \pm 0.5 ms
t_d	0.2 s	Number of Pulse	10
t_6	1 ms \pm 0.5 ms		
Complied to Criteria		<input type="checkbox"/> A, <input type="checkbox"/> B, <input checked="" type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E	

Test Pulse 3a

12V System			
U_s	-112 V	t_r	5 ns \pm 1.5 ns
t_5	90 ms	t_1	100 μ s
R_i	50 Ω	t_4	10 ms
t_d	$(0.1^{+0.1}_0) \mu$ s	Test time	60 minutes
Complied to Criteria		<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E	

Test Pulse 3b

12V System			
U_s	+75 V	t_r	5 ns ±1.5 ns
t_5	90 ms	t_1	100 μs
R_i	50 Ω	t_4	10 ms
t_d	$(0.1^{+0.1}_0) \mu s$	Test time	60 minutes
Complied to Criteria		<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E	

Test Pulse 4

12V System			
U_s	-6 V	t_8	≤ 50 ms
U_a	-2.5 V with $ U_a \leq U_s $	t_9	5 s
		Number of Pulse	1
R_i	0 Ω to 0.02 Ω	t_{10}	5 ms
t_7	15 ms	t_{11}	5 ms
Complied to Criteria		<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E	

Remark:

Pulse 1 \ 2b During the test, The EUT turn off, And EUT work normally after the test.

- 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.
- 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.

Product	Special Warning Lamp		
Test Item	Transient Immunity Test		
Test Mode	Mode 2: Normal operation (27V System)		
Date of Test	2012/03/21	Test Site	SR4

Test Pulse 1

24V System			
U_s	-450 V	t_1	0.5 s
R_i	50 Ω	t_2	200 ms
t_d	1 ms	t_3	< 100 μ s
t_r	$(3^{+0}_{-1.5}) \mu$ s	Number of Pulse	5000
Complied to Criteria	<input type="checkbox"/> A, <input type="checkbox"/> B, <input checked="" type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E		

Test Pulse 2a

24V System			
U_s	+37 V	t_r	$(1^{+0}_{-0.5}) \mu$ s
R_i	2 Ω	t_1	0.5 s
t_d	0.05 ms	Number of Pulse	5000
Complied to Criteria	<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E		

Test Pulse 2b

24V System			
U_s	+20 V	t_{12}	1 ms \pm 0.5 ms
R_i	0 Ω	t_r	1 ms \pm 0.5 ms
t_d	0.2 s	Number of Pulse	10
t_6	1 ms \pm 0.5 ms		
Complied to Criteria	<input type="checkbox"/> A, <input type="checkbox"/> B, <input checked="" type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E		

Test Pulse 3a

24V System			
U_s	-150 V	t_r	5 ns \pm 1.5 ns
t_5	90 ms	t_1	100 μ s
R_i	50 Ω	t_4	10 ms
t_d	$(0.1^{+0.1}_0) \mu$ s	Test time	60 minutes
Complied to Criteria	<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E		

Test Pulse 3b

24V System			
U _s	+150 V	t _r	5 ns ±1.5 ns
t ₅	90 ms	t ₁	100 μs
R _i	50 Ω	t ₄	10 ms
t _d	(0.1 ^{+0.1} ₀) μs	Test time	60 minutes
Complied to Criteria		<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E	

Test Pulse 4

24V System			
U _s	-12 V	t ₈	≤ 50 ms
U _a	-5 V with U _a ≤ U _s	t ₉	5 s
		Number of Pulse	>1
R _i	0 Ω to 0.02 Ω	t ₁₀	10 ms
t ₇	50 ms	t ₁₁	10 ms
Complied to Criteria		<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E	

Remark:

Pulse 1、2b During the test, The EUT turn off, And EUT work normally after the test.

- 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.
- 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.

5.6. Test Photo

Test Mode : Mode 1: Normal operation (13.5V System)

Description : Transient Immunity Test Setup



Test Mode : Mode 2: Normal operation (27V System)

Description : Transient Immunity Test Setup

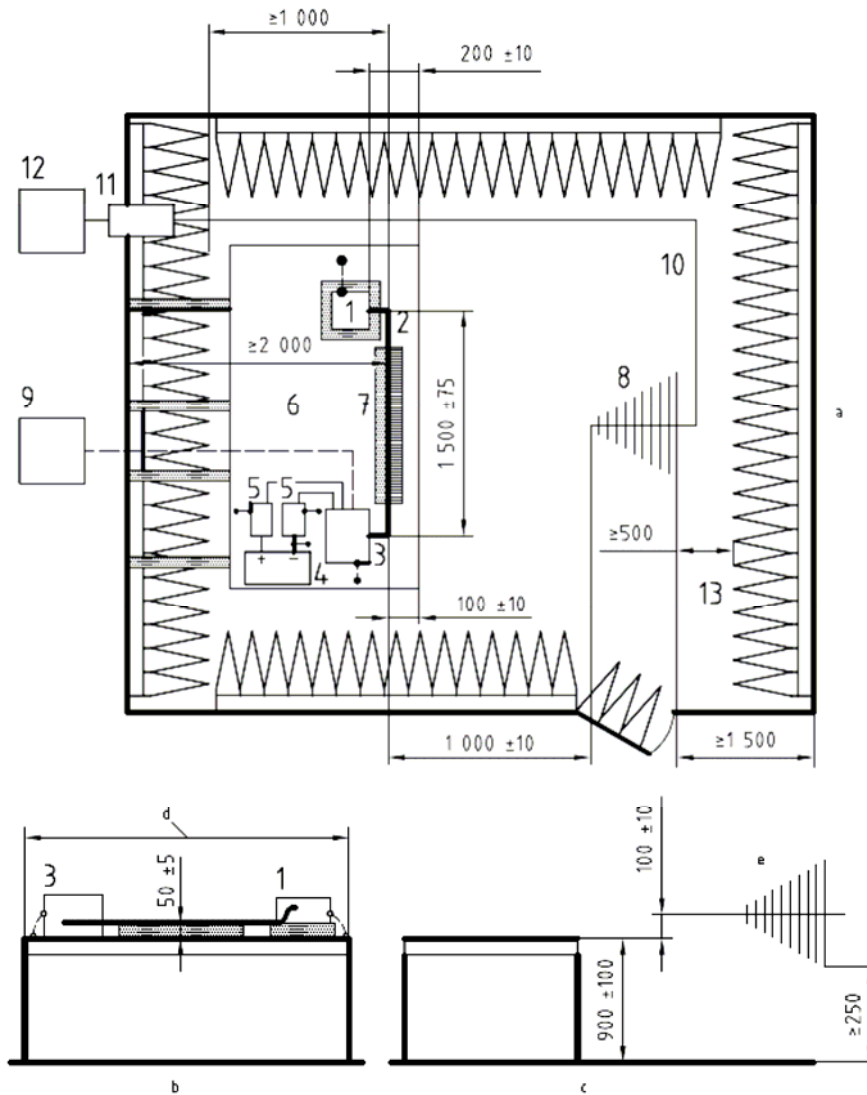


6. Immunity to Radio Frequency Radiated Field (400 MHz~2000 MHz)

6.1. Test Specification

According to EMC Standard: ISO11452-2 (second edition 2004).

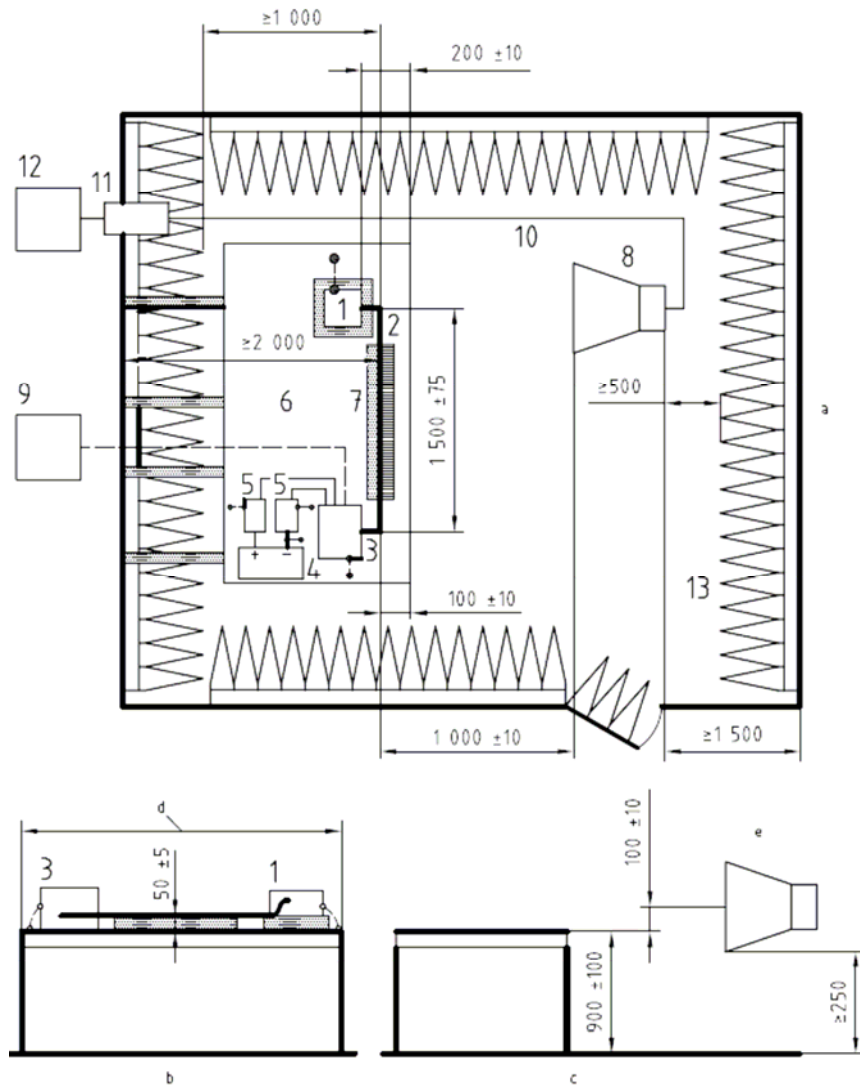
6.2. Test Setup



Key

- | | | |
|--|---|--|
| 1 DUT (grounded locally if required in test plan) | 6 ground plane (bonded to shielded enclosure) | 10 high quality double-shielded coaxial cable (50 Ω) |
| 2 test harness | 7 low relative permittivity support ($\epsilon_r \leq 1.4$) | 11 bulkhead connector |
| 3 load simulator (placement and ground: connection according to 7.5) | 8 antenna | 12 RF signal generator and amplifier |
| 4 power supply (location optional) | 9 stimulation and monitoring system | 13 RF absorber material |
| 5 artificial network (AN) | | |
| a Upper view (horizontal polarisation). | c Side view. | e Vertical polarization. |
| b Front view. | d See 7.1. | |

Figure 7 – Test set up for frequencies under 1 GHz (400MHz~ 1000MHz)



Key

- | | |
|--|---|
| 1 DUT (grounded locally if required in test plan) | 7 low relative permittivity support ($\epsilon_r \leq 1,4$) |
| 2 test harness | 8 horn antenna |
| 3 load simulator (placement and ground: connection according to 7.5) | 9 stimulation and monitoring system |
| 4 power supply (location optional) | 10 high quality double-shielded coaxial cable (50 Ω) |
| 5 artificial network (AN) | 11 bulkhead connector |
| 6 ground plane (bonded to shielded enclosure) | 12 RF signal generator and amplifier |
| a Upper view (horizontal polarisation). | 13 RF absorber material |
| b Front view. | d See 7.1. |
| c Side view. | e Vertical polarization. |

Figure 8 – Test set up for frequencies above 1 GHz (1000MHz~ 2000MHz)

6.3. ESA immunity type approval limits

There shall be no degradation of performance of immunity related functions.

ISO 11452-2		
Frequency (MHz)	Modulation	Antenna Polarization
400~800	Amplitude	Vertical
800~2000	Pulse	Vertical

6.4. Test Procedure

- a. Turn on the measurement equipment and allow a sufficient time for stabilization.
- b. Calibration. Perform the measurement system check using the measurement system check setup.
- c. Turn on the EUT and allow a sufficient time for stabilization.
- d. EUT testing. Perform the immunity interfere with the test and record the status of the EUT.

6.5. Immunity to Radio Frequency Radiated Field Test Result

Product	Special Warning Lamp		
Test Item	Immunity to Radio Frequency Radiated Field Test		
Test Mode	Mode 1: Normal operation (13.5V System)		
Date of Test	2013/06/22	Test Site	CB3

Frequency Range (MHz)	Modulation	Polarity (H or V)	Field Strength (V/m)	Complied to Criteria
400-800	AM	V	30	<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E
800-2000	PM	V	30	<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E

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

Class B: all functions of a device or 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 or 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 or 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.

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

Product	Special Warning Lamp		
Test Item	Immunity to Radio Frequency Radiated Field Test		
Test Mode	Mode 2: Normal operation (27V System)		
Date of Test	2013/06/22	Test Site	CB3

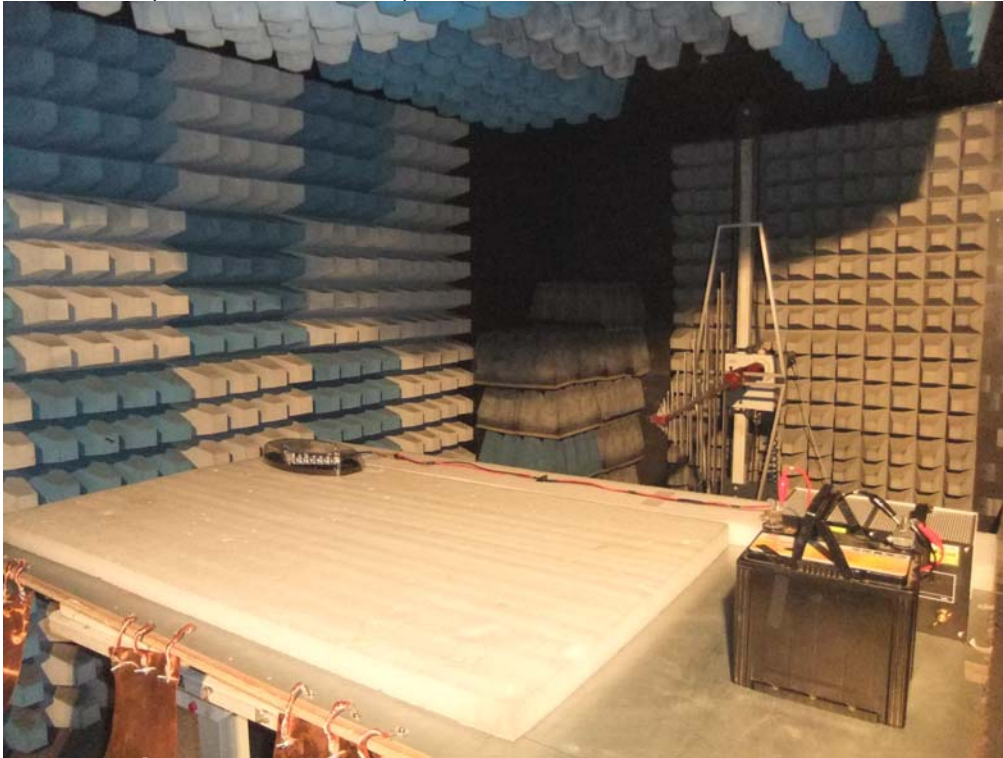
Frequency Range (MHz)	Modulation	Polarity (H or V)	Field Strength (V/m)	Complied to Criteria
400-800	AM	V	30	<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E
800-2000	PM	V	30	<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E

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

6.6. Test Photo

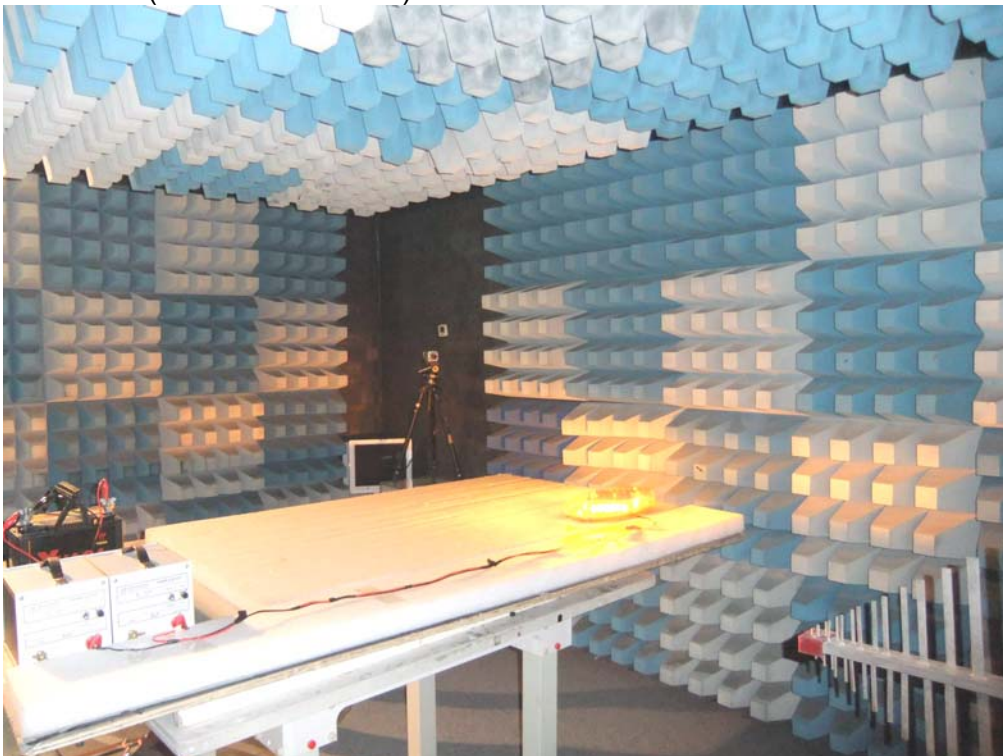
Test Mode : Mode 1: Normal operation (13.5V System)

Description : Immunity to Radio Frequency Radiated Field Test Setup (400MHz-1000MHz)

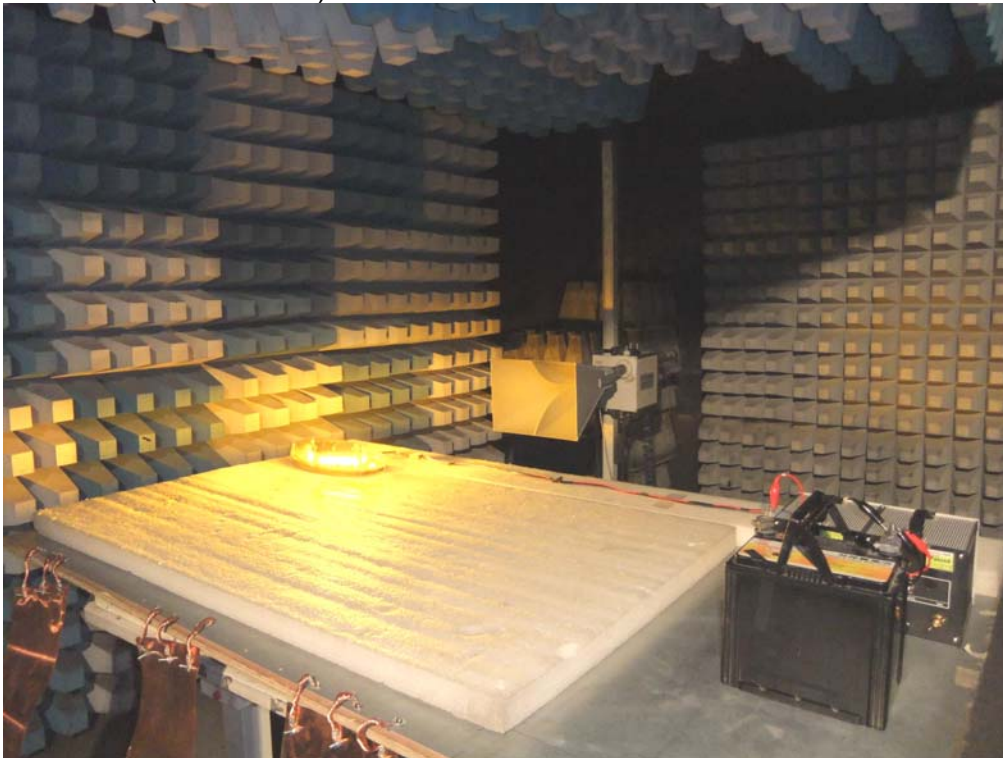


Test Mode : Mode 1: Normal operation (13.5V System)

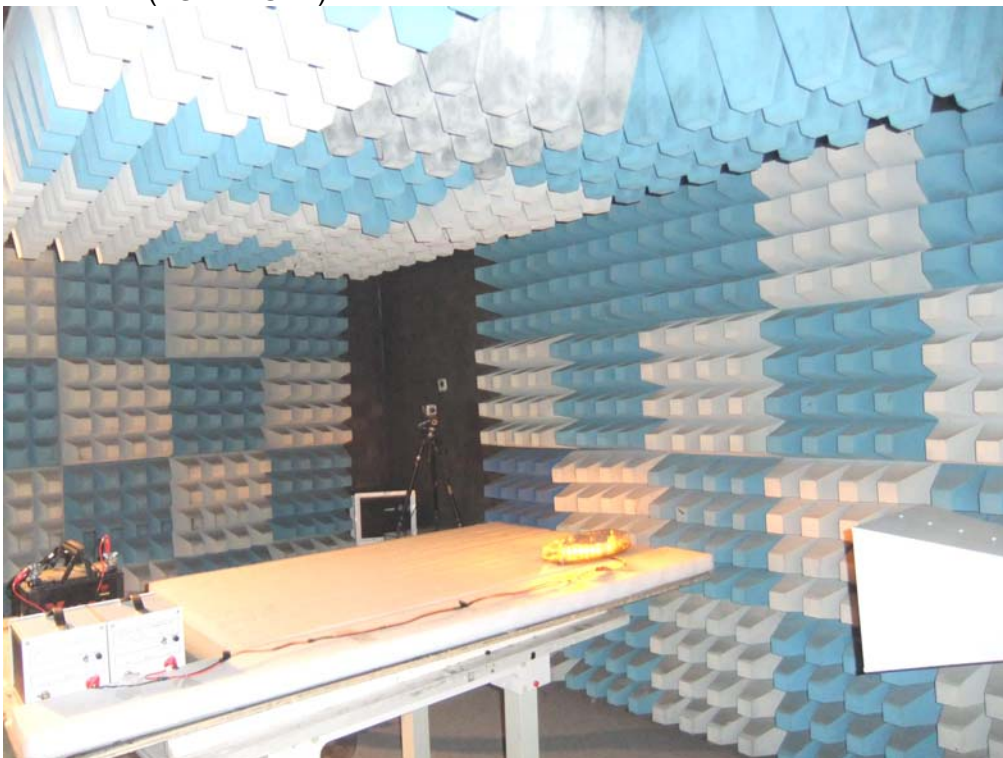
Description : Immunity to Radio Frequency Radiated Field Test Setup (400MHz-1000MHz)



Test Mode : Mode 1: Normal operation (13.5V System)
Description : Immunity to Radio Frequency Radiated Field Test Setup (1GHz-2GHz)

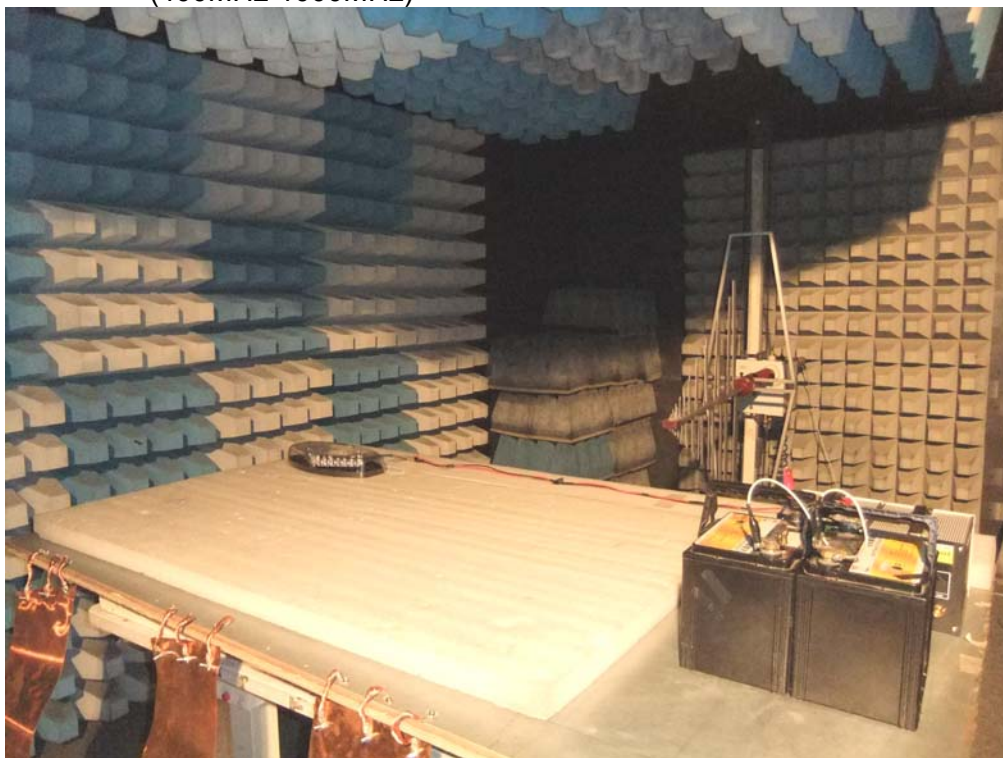


Test Mode : Mode 1: Normal operation (13.5V System)
Description : Immunity to Radio Frequency Radiated Field Test Setup (1GHz-2GHz)



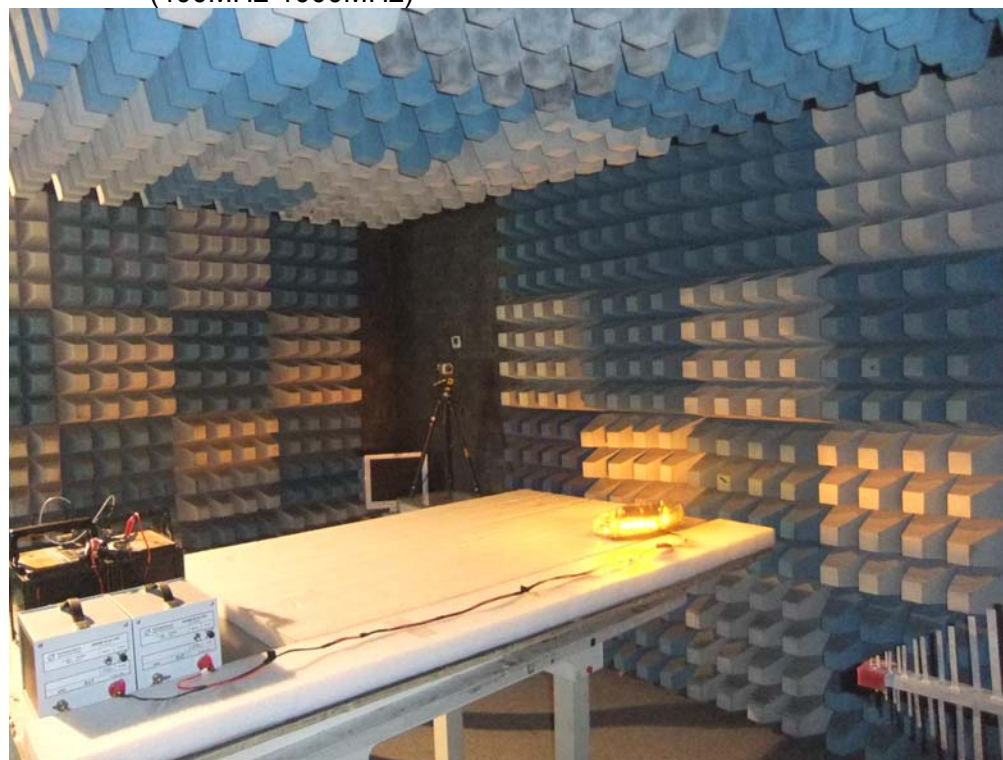
Test Mode : Mode 2: Normal operation (27V System)

Description : Immunity to Radio Frequency Radiated Field Test Setup (400MHz-1000MHz)



Test Mode : Mode 2: Normal operation (27V System)

Description : Immunity to Radio Frequency Radiated Field Test Setup (400MHz-1000MHz)



Test Mode : Mode 2: Normal operation (27V System)
Description : Immunity to Radio Frequency Radiated Field Test Setup
(1GHz-2GHz)



Test Mode : Mode 2: Normal operation (27V System)
Description : Immunity to Radio Frequency Radiated Field Test Setup
(1GHz-2GHz)

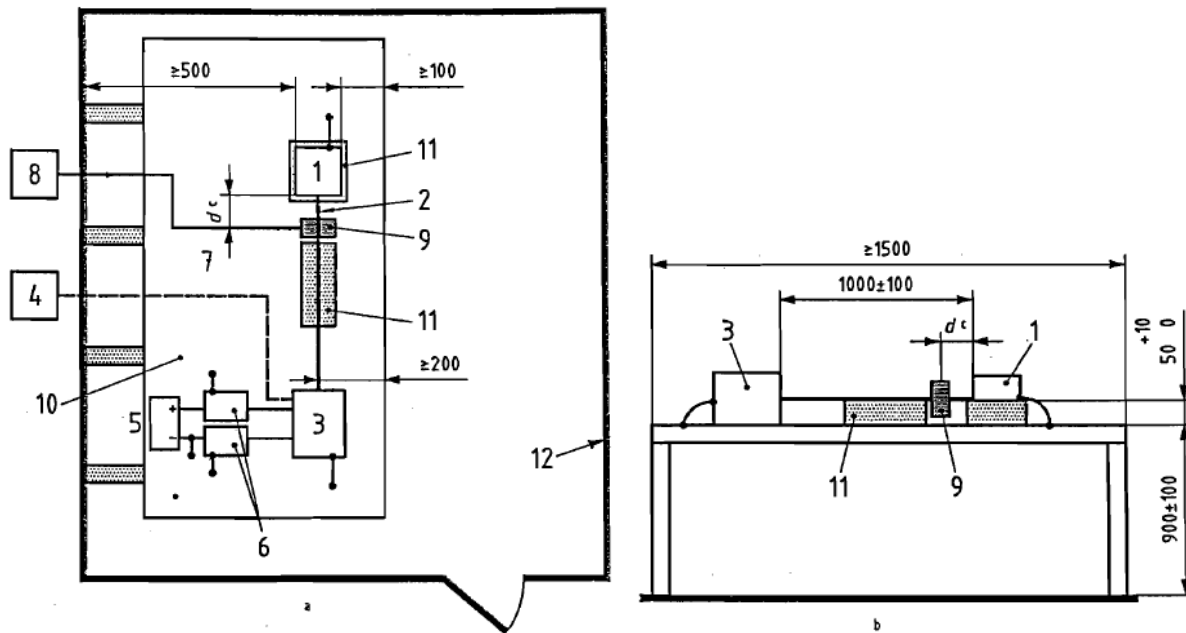


7. Immunity to Bulk Current Injection (20 MHz~400 MHz)

7.1. Test Specification

According to EMC Standard: ISO11452-4 (third edition 2005).

7.2. Test Setup



Key

- | | |
|--|--|
| 1 DUT (grounded if required in test plan) | 7 optical fibres |
| 2 test harness | 8 high-frequency equipment |
| 3 load simulator (placement and ground: connection according to 7.5) | 9 injection probe |
| 4 stimulation and monitoring system | 10 ground plane (bonded to shielded enclosure) |
| 5 power supply | 11 low relative permittivity support ($\epsilon_r \leq 1,4$) |
| 6 artificial network (AN) | 12 Shielded enclosure |

a Upper view. b Side view. c 150 mm

Figure 9 –BCI test set up-substitution method (20 MHz~ 400 MHz)

7.3. ESA immunity type approval limits

There shall be no degradation of performance of immunity related functions.

ISO 11452-4		
Frequency (MHz)	Modulation	Distance (mm)
20~400	Amplitude	150

7.4. Test Procedure

- a. Turn on the measurement equipment and allow a sufficient time for stabilization.
- b. Calibration. Perform the measurement system check using the measurement system check setup.
- c. Turn on the EUT and allow a sufficient time for stabilization.
- d. EUT testing. Perform the immunity interfere with the test and record the status of the EUT.

7.5. Immunity to Bulk Current Injection Test Result

Product	Special Warning Lamp		
Test Item	Immunity to Bulk Current Injection Test		
Test Mode	Mode 1: Normal operation (13.5V System)		
Date of Test	2013/06/24	Test Site	SR6

Frequency (MHz)	Distance (mm)	Field Strength (mA)	Modulation	Complied to Criteria
20-400	150	60	AM	<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E

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

Product	Special Warning Lamp		
Test Item	Immunity to Bulk Current Injection Test		
Test Mode	Mode 2: Normal operation (27V System)		
Date of Test	2013/06/24	Test Site	SR6

Frequency (MHz)	Distance (mm)	Field Strength (mA)	Modulation	Complied to Criteria
20-400	150	60	AM	<input checked="" type="checkbox"/> A, <input type="checkbox"/> B, <input type="checkbox"/> C, <input type="checkbox"/> D, <input type="checkbox"/> E

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

7.6. Test Photo

Test Mode : Mode 1: Normal operation (13.5V System)

Description : Front View of Immunity to Bulk Current Injection Test Setup



Test Mode : Mode 1: Normal operation (13.5V System)

Description : Back View of Immunity to Bulk Current Injection Test Setup



Test Mode : Mode 2: Normal operation (27V System)

Description : Front View of Immunity to Bulk Current Injection Test Setup



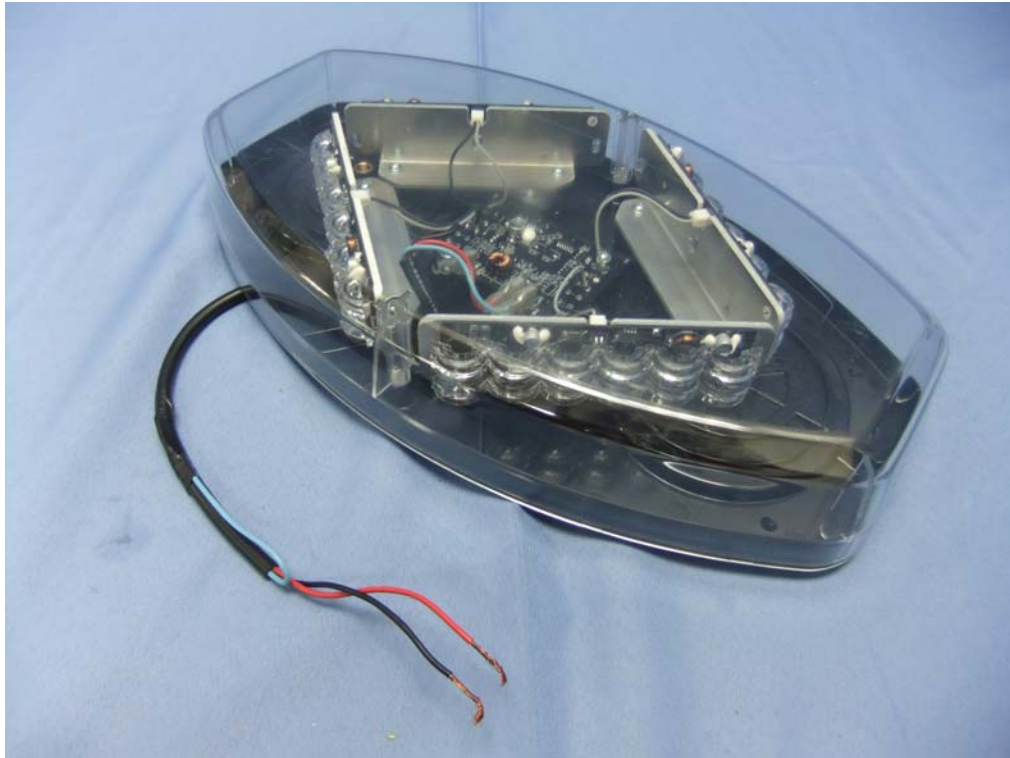
Test Mode : Mode 2: Normal operation (27V System)

Description : Back View of Immunity to Bulk Current Injection Test Setup



8. EUT Photograph

(1) EUT Photo



(2) EUT Photo

