




Prüfbericht-Nr.: <i>Test Report No.:</i>	CN21JG3V 001	Auftrags-Nr.: <i>Order No.:</i>	168327717	Seite 1 von 13 Page 1 of 13
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	2317999	Auftragsdatum: <i>Order date.:</i>	20 July 2021	
Auftraggeber: <i>Client:</i>	Ring Automotive Ltd Volvox House, Geldered Road, Leeds LS12 6NA United Kingdom			
Prüfgegenstand: <i>Test item:</i>	Battery Analyser			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	OBAG900			
Auftrags-Inhalt: <i>Order content:</i>	TUV Rheinland - EMC service			
Prüfgrundlage: <i>Test specification:</i>	EN 50498:2010			
Wareneingangsdatum: <i>Date of receipt:</i>	30 July 2021			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A003100151-001			
Prüfzeitraum: <i>Testing period:</i>	Refer to test report			
Ort der Prüfung: <i>Place of testing:</i>	Refer to section 2.1			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i> Meijuan Qiu		genehmigt von: <i>authorized by:</i> Dylan Yang		
Datum: <i>Date:</i> 2021-08-30		Ausstellungsdatum: <i>Issue date:</i> 2021-08-30		
Stellung / Position:	Project Engineer	Stellung / Position:	Technical Certifier	
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

v05

TEST SUMMARY

5.1.1 BROADBAND AND NARROWBAND RADIATED ELECTROMAGNETIC DISTURBANCES

RESULT: Pass

5.1.2 CONDUCTED TRANSIENT DISTURBANCES

RESULT: Pass

5.2.1 CONDUCTED TRANSIENT IMMUNITY

RESULT: Pass

Contents

1.	GENERAL REMARKS	4
1.1	COMPLEMENTARY MATERIALS	4
2.	TEST SITES	4
2.1	TEST FACILITIES	4
2.2	LIST OF TEST AND MEASUREMENT INSTRUMENTS	5
3.	GENERAL PRODUCT INFORMATION	6
3.1	PRODUCT FUNCTION AND INTENDED USE	6
3.2	RATINGS AND SYSTEM DETAILS	6
3.3	INDEPENDENT OPERATION MODES	6
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS	6
3.5	SUBMITTED DOCUMENTS	6
4.	TEST SET-UP AND OPERATION MODES	7
4.1	PRINCIPLE OF CONFIGURATION SELECTION	7
4.2	TEST OPERATION AND TEST SOFTWARE	7
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	7
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE	7
5.	NECESSARY TEST ACCORDING TO EN 50498	8
5.1	TEST RESULTS EMISSION	8
5.1.1	<i>Broadband and Narrowband Radiated Electromagnetic Disturbances</i>	<i>8</i>
5.1.2	<i>Conducted Transient Disturbances</i>	<i>9</i>
5.2	TEST RESULTS IMMUNITY	10
5.2.1	<i>Conducted Transient Immunity</i>	<i>10</i>
6.	PHOTOGRAPHS OF THE TEST SET-UP	11
7.	LIST OF TABLES	13
8.	LIST OF PHOTOGRAPHS	13

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test result

Appendix 2: Measurement uncertainties

2. Test Sites

2.1 Test Facilities

Shenzhen QC Testing Laboratory Co., Ltd

1F, Building 10, Tiegang Reservoir Road, Xinghong Science Park, Xixiang Sub-district , Bao'an District, Shenzhen City, China.

The tests at the test site has been conducted under the supervision of a TÜV engineer.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Broadband & Narrowband Radiated Electromagnetic Disturbances(QC)				
EMI Test Receiver	R&S	ESIB 7	2277573376	2022-2-28
Single Power Conductor Module	R&S	NNB8125	8125449	2022-2-28
Single Power Conductor Module	R&S	NNB8125	8125450	2022-2-28
High Field Biconical Antenna	SCHWARZBECK	VHBB9124	1275	2022-3-6
Log Periodic Antenna	SCHWARZBECK	VUSLP911B	414	2022-3-6
Conducted Transient Disturbances(QC)				
Automotive electronic transient interference tester	3Ctest	VTE 743T1	EC9801701	2022-2-28
Oscilloscope	Tektronix	TDS3052B	B024197	2022-3-14
Immunity to Transient Disturbance(QC)				
Transient pulse jamming simulator	3Ctest	TIS 700	ES0711604	2022-2-28
Vehicle power supply voltage change simulator	3Ctest	APS 40C20	ES0761601	2022-2-28
Vehicle electronic throwing load simulator	3Ctest	LDS 200	ES0761606	2022-2-28
Automotive electronic transient interference tester	3Ctest	VTE 743T1	EC9801701	2022-2-28
Oscilloscope	Tektronix	TDS3052B	B024197	2022-3-14

3. General Product Information

3.1 Product Function and Intended Use

The **EUT (Equipment Under Test)** is Battery Analyser can provide a complete health check of the battery and electrical systems in 12V & 24V vehicles, such as motorcycles, cars & trucks.

For details refer to the Circuit Diagram & Instruction Manual.

3.2 Ratings and System Details

System input:	12V/24Vdc
Frequency:	---
Protection class:	III

3.3 Independent Operation Modes

The basic operation modes are:

- A. On
- B. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- | | |
|----------------------|----------------|
| - Circuit Diagram | - PCB Layout |
| - Instruction Manual | - Rating Label |

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Immunity: The EUT was configured to have their highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. Pre-test in all operation modes, and find out the worst case for compliance test.

4.3 Special Accessories and Auxiliary Equipment

None.

4.4 Countermeasures to achieve EMC Compliance

The test sample, which has been tested, contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

5. Necessary Test According to EN 50498

5.1 Test Results EMISSION

5.1.1 Broadband and Narrowband Radiated Electromagnetic Disturbances

RESULT: **Pass**

Test Specification

Basic standard : EN 50498: 2010
Test procedure : EN 50498: 2010, Clause 7.1 & Clause 7.2
Limits : Clause 7.1, Table 1 and Clause 7.2, Table 2

Test Setup

Date of testing : Refer to Appendix 1
Input voltage : DC 13.5V&27V
Operation mode : A
Temperature : 25°C
Humidity : 54%
Air pressure : 101kPa

Refer to attached Appendix 1.

5.1.2 Conducted Transient Disturbances

RESULT:
Pass

Test Specification

Basic standard : EN 50498: 2010
 Test procedure : EN 50498: 2010, Clause 7.3
 Limits : Clause 7.3, Table 3

Test Setup

Date of testing : 2021-08-06
 Input voltage : DC 13.5V&27V
 Operation mode : A
 Temperature : 25°C
 Humidity : 54%
 Air pressure : 101kPa

DC 12 systemy					
Pulse Type		limited	Time Base	Test Values (Max)	Result
Fast Pulse	Positive	+75V	100ms/div	+13.9V	Pass
	Negative	-100V	100ms/div	-0.5V	Pass
Slow Pulse	Positive	+75V	100ms/div	+13.8V	Pass
	Negative	-100V	100ms/div	-0.5V	Pass

DC 24V systemy					
Pulse Type		limited	Time Base	Test Values (Max)	Result
Fast Pulse	Positive	+150V	100ms/div	+28V	Pass
	Negative	-450V	100ms/div	-1.4V	Pass
Slow Pulse	Positive	+150V	100ms/div	+28.6V	Pass
	Negative	-450V	100ms/div	-1.2V	Pass

5.2 Test Results IMMUNITY

5.2.1 Conducted Transient Immunity

RESULT: **Pass**

Test Specification

Family standard : EN 50498: 2010
 Test procedure : EN 50498: 2010, Clause 7.4
 Basic standard : ISO 7637-2:2004
 Immunity test level : III
 Test Pulse : 1, 2a, 2b, 3a/3b, 4
 Performance criterion : D

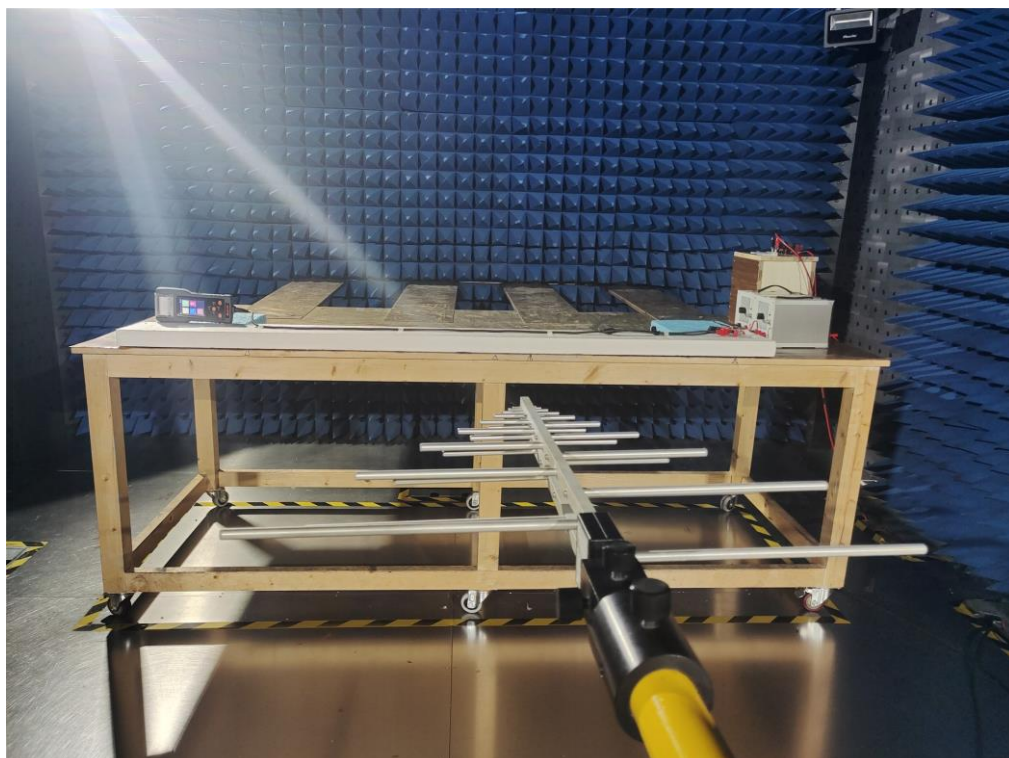
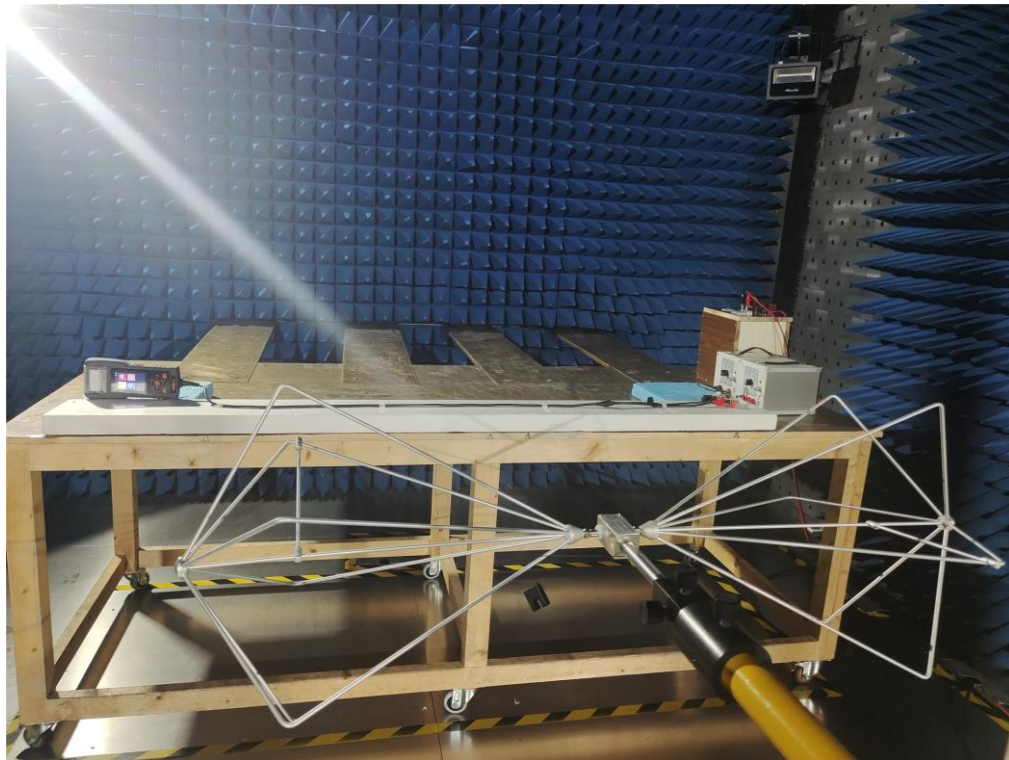
Test Setup

Date of testing : 2021-08-06
 Input voltage : DC 13.5V&27V
 Operation mode : A
 Temperature : 25°C
 Humidity : 54%
 Air pressure : 101kPa

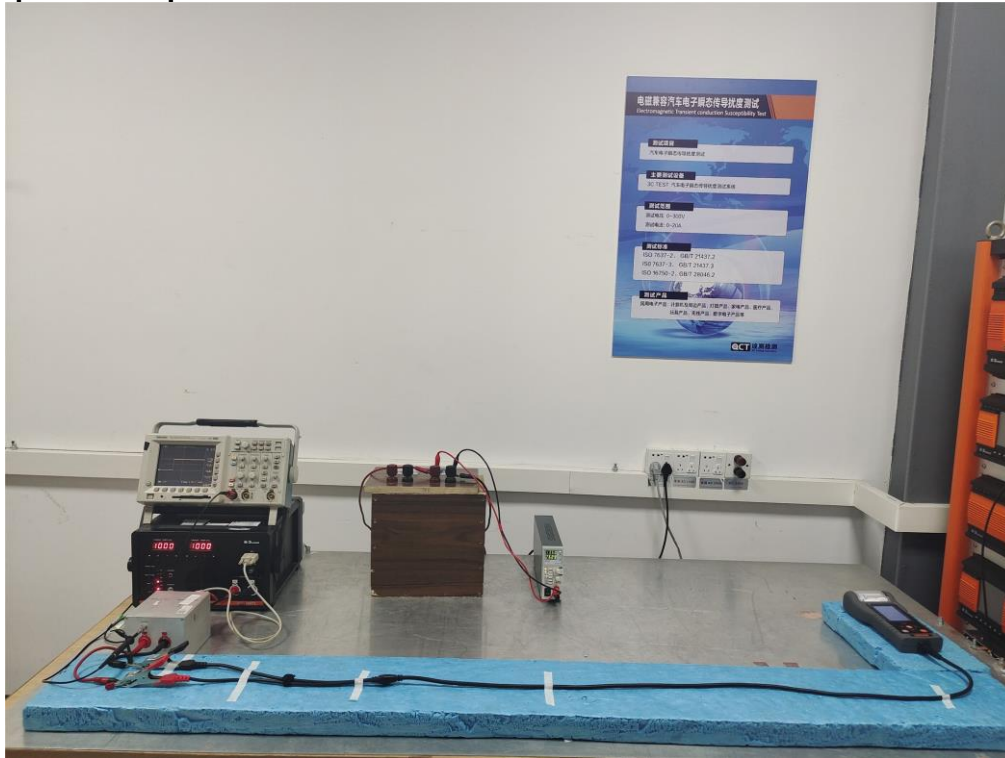
Test Pulse	Test Level DC 12V systemy	Test Level DC 24V systemy	Number of pulses/test time	Required Criterion	Result
1	-75V	-450V	5000 pulses	D	Pass
2a	+37V	+37V	5000 pulses	D	Pass
2b	+10V	+20V	10 pulses	D	Pass
3a	-112V	US=-150V	1h	D	Pass
3b	+75V	US=+150V	1h	D	Pass
4	-6V	US=-12V	1 pulses	D	Pass

6. Photographs of the Test Set-Up

Photograph 1: Set-up for Broadband and Narrowband Radiated Electromagnetic Disturbances



Photograph 2: Set-up for Conducted Transient Disturbances



Photograph 3: Set-up for Conducted Transient Immunity



7. List of Tables

Table 1: List of Test and Measurement Equipment.....5

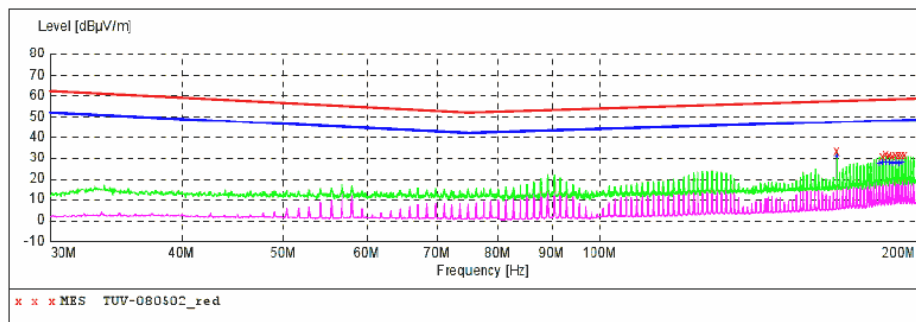
8. List of Photographs

Photograph 1: Set-up for Broadband and Narrowband Radiated Electromagnetic Disturbances11
Photograph 2: Set-up for Conducted Transient Disturbances.....12
Photograph 3: Set-up for Conducted Transient Immunity12

Company Name Shenzhen QC Test Laboratory Co., Ltd

Radiation Emissions : EN 50498:2010

EUT: M/N: OBAG900
 Manufacturer: TUV
 Operating Condition: ON
 Test Site: 2# CHAMBER
 Operator: Tan
 Test Specification: DC 13.5V
 Comment: Polarisation:H
 Start of Test: 2021-8-5 / 19:16:45



MEASUREMENT RESULT: "TUV-080502_red"

2021-8-5 19:17

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
168.000000	33.30	15.0	57.3	24.0	---	100.0	0.00	HORIZONTAL
186.100000	30.80	15.8	58.0	27.2	---	100.0	0.00	HORIZONTAL
187.400000	31.50	15.9	58.0	26.5	---	100.0	0.00	HORIZONTAL
188.750000	31.20	16.0	58.1	26.9	---	100.0	0.00	HORIZONTAL
190.000000	30.80	16.0	58.1	27.3	---	100.0	0.00	HORIZONTAL
191.300000	30.90	16.1	58.2	27.3	---	100.0	0.00	HORIZONTAL
192.600000	30.90	16.2	58.2	27.3	---	100.0	0.00	HORIZONTAL
193.800000	30.90	16.3	58.2	27.3	---	100.0	0.00	HORIZONTAL
195.050000	31.10	16.4	58.3	27.2	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "TUV-080502_red2"

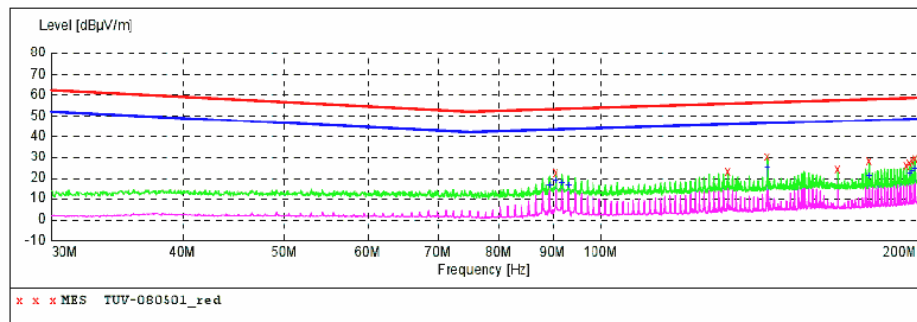
2021-8-5 19:17

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
168.000000	30.80	15.0	47.3	16.5	---	100.0	0.00	HORIZONTAL
184.800000	27.00	15.8	47.9	20.9	---	100.0	0.00	HORIZONTAL
186.100000	27.20	15.8	48.0	20.8	---	100.0	0.00	HORIZONTAL
187.350000	27.10	15.9	48.0	20.9	---	100.0	0.00	HORIZONTAL
188.700000	27.20	16.0	48.1	20.9	---	100.0	0.00	HORIZONTAL
190.000000	26.90	16.0	48.1	21.2	---	100.0	0.00	HORIZONTAL
191.300000	27.20	16.1	48.2	21.0	---	100.0	0.00	HORIZONTAL
192.550000	27.00	16.2	48.2	21.2	---	100.0	0.00	HORIZONTAL
193.800000	27.40	16.3	48.2	20.8	---	100.0	0.00	HORIZONTAL

Company Name Shenzhen QC Test Laboratory Co., Ltd

Radiation Emissions : EN 50498:2010

EUT: M/N: OBAG900
 Manufacturer: TUV
 Operating Condition: ON
 Test Site: 2# CHAMBER
 Operator: Tan
 Test Specification: DC 13.5V
 Comment: Polarisation:V
 Start of Test: 2021-8-5 / 19:14:08



MEASUREMENT RESULT: "TUV-080501_red"

2021-8-5 19:14

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
90.650000	22.60	11.3	53.2	30.6	---	100.0	0.00	VERTICAL
132.100000	23.00	13.3	55.7	32.7	---	100.0	0.00	VERTICAL
144.000000	29.90	13.9	56.3	26.4	---	100.0	0.00	VERTICAL
168.000000	24.00	15.0	57.3	33.3	---	100.0	0.00	VERTICAL
180.000000	28.00	15.5	57.8	29.8	---	100.0	0.00	VERTICAL
195.350000	25.80	16.4	58.3	32.5	---	100.0	0.00	VERTICAL
196.650000	26.70	16.5	58.3	31.6	---	100.0	0.00	VERTICAL
198.050000	27.80	16.6	58.4	30.6	---	100.0	0.00	VERTICAL
199.450000	28.70	16.6	58.4	29.7	---	100.0	0.00	VERTICAL

MEASUREMENT RESULT: "TUV-080501_red2"

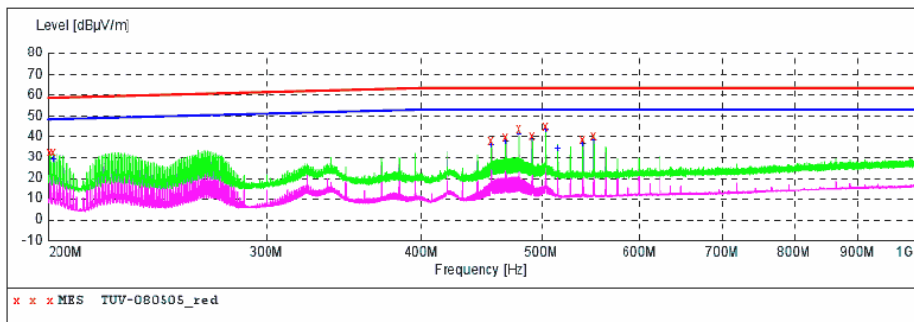
2021-8-5 19:14

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
89.350000	16.00	11.2	43.2	27.2	---	100.0	0.00	VERTICAL
90.650000	18.60	11.3	43.2	24.6	---	100.0	0.00	VERTICAL
91.950000	17.60	11.3	43.3	25.7	---	100.0	0.00	VERTICAL
93.250000	16.10	11.4	43.4	27.3	---	100.0	0.00	VERTICAL
144.000000	24.40	13.9	46.3	21.9	---	100.0	0.00	VERTICAL
180.000000	20.90	15.5	47.8	26.9	---	100.0	0.00	VERTICAL
196.700000	21.90	16.5	48.3	26.4	---	100.0	0.00	VERTICAL
198.000000	22.80	16.6	48.4	25.6	---	100.0	0.00	VERTICAL
199.250000	24.00	16.6	48.4	24.4	---	100.0	0.00	VERTICAL

Company Name Shenzhen QC Test Laboratory Co., Ltd

Radiation Emissions : EN 50498:2010

EUT: M/N: OBAG900
 Manufacturer: TUV
 Operating Condition: ON
 Test Site: 2# CHAMBER
 Operator: Tan
 Test Specification: DC 13.5V
 Comment: Polarisation:H
 Start of Test: 2021-8-5 / 19:27:53



MEASUREMENT RESULT: "TUV-080505_red"

2021-8-5 19:29

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
200.550000	32.20	15.8	58.5	26.3	---	100.0	0.00	HORIZONTAL
201.800000	32.20	15.8	58.5	26.3	---	100.0	0.00	HORIZONTAL
456.000000	37.70	19.8	63.0	25.3	---	100.0	0.00	HORIZONTAL
468.000000	39.50	20.0	63.0	23.5	---	100.0	0.00	HORIZONTAL
480.000000	43.20	20.3	63.0	19.8	---	100.0	0.00	HORIZONTAL
492.000000	39.90	20.5	63.0	23.1	---	100.0	0.00	HORIZONTAL
504.000000	44.40	20.6	63.0	18.6	---	100.0	0.00	HORIZONTAL
540.000000	38.50	20.8	63.0	24.5	---	100.0	0.00	HORIZONTAL
552.000000	39.90	21.0	63.0	23.1	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "TUV-080505_red2"

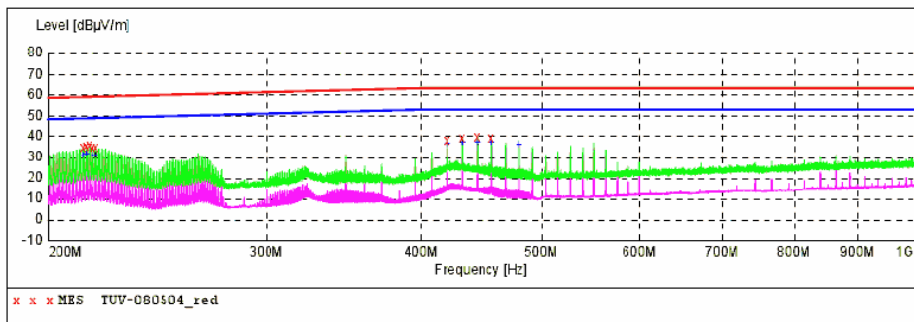
2021-8-5 19:29

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
201.850000	28.30	15.8	48.5	20.2	---	100.0	0.00	HORIZONTAL
456.000000	35.70	19.8	53.0	17.3	---	100.0	0.00	HORIZONTAL
468.000000	37.40	20.0	53.0	15.6	---	100.0	0.00	HORIZONTAL
480.000000	40.60	20.3	53.0	12.4	---	100.0	0.00	HORIZONTAL
492.000000	38.10	20.5	53.0	14.9	---	100.0	0.00	HORIZONTAL
504.000000	42.80	20.6	53.0	10.2	---	100.0	0.00	HORIZONTAL
516.000000	33.80	20.7	53.0	19.2	---	100.0	0.00	HORIZONTAL
540.000000	36.00	20.8	53.0	17.0	---	100.0	0.00	HORIZONTAL
552.000000	37.60	21.0	53.0	15.4	---	100.0	0.00	HORIZONTAL

Company Name Shenzhen QC Test Laboratory Co., Ltd

Radiation Emissions : EN 50498:2010

EUT: M/N: OBAG900
 Manufacturer: TUV
 Operating Condition: ON
 Test Site: 2# CHAMBER
 Operator: Tan
 Test Specification: DC 13.5V
 Comment: Polarisation:V
 Start of Test: 2021-8-5 / 19:23:36



MEASUREMENT RESULT: "TUV-080504_red"

2021-8-5 19:25

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
213.450000	34.60	15.5	58.9	24.3	---	100.0	0.00	VERTICAL
214.700000	35.00	15.5	58.9	23.9	---	100.0	0.00	VERTICAL
216.000000	35.50	15.5	59.0	23.5	---	100.0	0.00	VERTICAL
217.350000	34.70	15.5	59.0	24.3	---	100.0	0.00	VERTICAL
218.650000	34.50	15.5	59.0	24.5	---	100.0	0.00	VERTICAL
420.000000	38.10	19.4	63.0	24.9	---	100.0	0.00	VERTICAL
432.000000	38.90	19.5	63.0	24.1	---	100.0	0.00	VERTICAL
444.000000	39.50	19.6	63.0	23.5	---	100.0	0.00	VERTICAL
456.000000	38.70	19.8	63.0	24.3	---	100.0	0.00	VERTICAL

MEASUREMENT RESULT: "TUV-080504_red2"

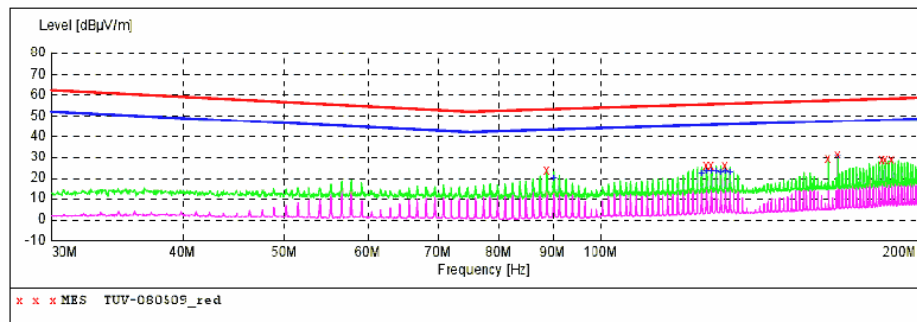
2021-8-5 19:25

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
213.450000	30.80	15.5	48.9	18.1	---	100.0	0.00	VERTICAL
214.700000	31.20	15.5	48.9	17.7	---	100.0	0.00	VERTICAL
217.350000	30.80	15.5	49.0	18.2	---	100.0	0.00	VERTICAL
218.650000	30.80	15.5	49.0	18.2	---	100.0	0.00	VERTICAL
420.000000	36.00	19.4	53.0	17.0	---	100.0	0.00	VERTICAL
432.000000	36.50	19.5	53.0	16.5	---	100.0	0.00	VERTICAL
444.000000	37.00	19.6	53.0	16.0	---	100.0	0.00	VERTICAL
456.000000	37.00	19.8	53.0	16.0	---	100.0	0.00	VERTICAL
480.000000	35.60	20.3	53.0	17.4	---	100.0	0.00	VERTICAL

Company Name Shenzhen QC Test Laboratory Co., Ltd

Radiation Emissions : EN 50498:2010

EUT: M/N: OBAG900
 Manufacturer: TUV
 Operating Condition: ON
 Test Site: 2# CHAMBER
 Operator: Tan
 Test Specification: DC 27V
 Comment: Polarisation:H
 Start of Test: 2021-8-5 / 19:48:51



MEASUREMENT RESULT: "TUV-080509_red"

2021-8-5 19:49

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
88.850000	23.40	11.2	53.1	29.7	---	100.0	0.00	HORIZONTAL
126.200000	25.70	13.0	55.4	29.7	---	100.0	0.00	HORIZONTAL
127.500000	25.60	13.0	55.5	29.9	---	100.0	0.00	HORIZONTAL
131.350000	25.90	13.2	55.7	29.8	---	100.0	0.00	HORIZONTAL
164.600000	29.00	14.9	57.2	28.2	---	100.0	0.00	HORIZONTAL
168.000000	31.30	15.0	57.3	26.0	---	100.0	0.00	HORIZONTAL
185.400000	28.40	15.8	57.9	29.5	---	100.0	0.00	HORIZONTAL
186.700000	28.40	15.9	58.0	29.6	---	100.0	0.00	HORIZONTAL
189.300000	28.30	16.0	58.1	29.8	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "TUV-080509_red2"

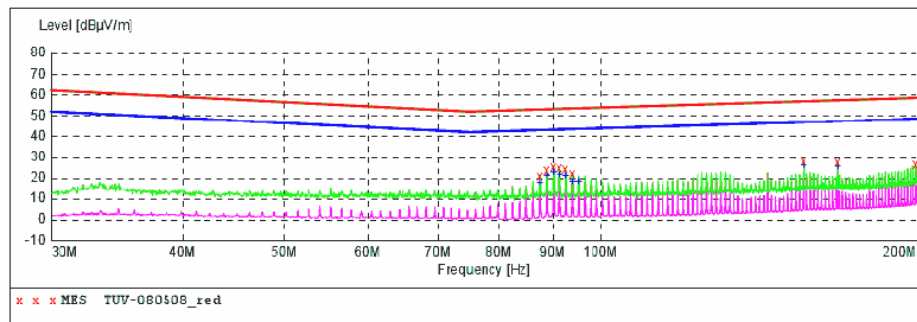
2021-8-5 19:49

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
90.150000	19.70	11.3	43.2	23.5	---	100.0	0.00	HORIZONTAL
124.900000	21.80	12.9	45.4	23.6	---	100.0	0.00	HORIZONTAL
126.200000	22.60	13.0	45.4	22.8	---	100.0	0.00	HORIZONTAL
127.500000	22.80	13.0	45.5	22.7	---	100.0	0.00	HORIZONTAL
128.800000	22.60	13.1	45.6	23.0	---	100.0	0.00	HORIZONTAL
130.050000	22.40	13.1	45.6	23.2	---	100.0	0.00	HORIZONTAL
131.350000	22.90	13.2	45.7	22.8	---	100.0	0.00	HORIZONTAL
132.650000	22.10	13.3	45.7	23.6	---	100.0	0.00	HORIZONTAL
168.000000	29.80	15.0	47.3	17.5	---	100.0	0.00	HORIZONTAL

Company Name Shenzhen QC Test Laboratory Co., Ltd

Radiation Emissions : EN 50498:2010

EUT: M/N: OBAG900
 Manufacturer: TUV
 Operating Condition: ON
 Test Site: 2# CHAMBER
 Operator: Tan
 Test Specification: DC 27V
 Comment: Polarisation:V
 Start of Test: 2021-8-5 / 19:46:20



MEASUREMENT RESULT: "TUV-080508_red"

2021-8-5 19:47

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
87.550000	20.70	11.2	53.0	32.3	---	100.0	0.00	VERTICAL
88.850000	23.30	11.2	53.1	29.8	---	100.0	0.00	VERTICAL
90.150000	25.10	11.3	53.2	28.1	---	100.0	0.00	VERTICAL
91.450000	24.30	11.3	53.3	29.0	---	100.0	0.00	VERTICAL
92.700000	23.80	11.4	53.4	29.6	---	100.0	0.00	VERTICAL
94.050000	22.10	11.4	53.5	31.4	---	100.0	0.00	VERTICAL
156.000000	27.80	14.5	56.8	29.0	---	100.0	0.00	VERTICAL
168.000000	27.10	15.0	57.3	30.2	---	100.0	0.00	VERTICAL
199.700000	26.10	16.7	58.4	32.3	---	100.0	0.00	VERTICAL

MEASUREMENT RESULT: "TUV-080508_red2"

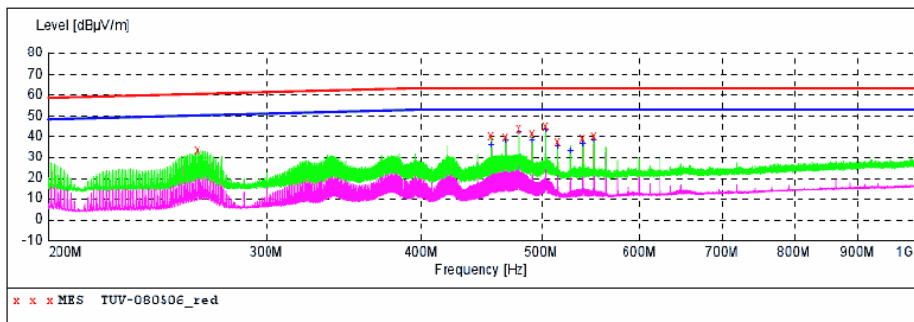
2021-8-5 19:47

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
87.550000	17.40	11.2	43.0	25.6	---	100.0	0.00	VERTICAL
88.850000	20.70	11.2	43.1	22.4	---	100.0	0.00	VERTICAL
90.150000	22.20	11.3	43.2	21.0	---	100.0	0.00	VERTICAL
91.450000	21.40	11.3	43.3	21.9	---	100.0	0.00	VERTICAL
92.700000	20.50	11.4	43.4	22.9	---	100.0	0.00	VERTICAL
94.050000	17.80	11.4	43.5	25.7	---	100.0	0.00	VERTICAL
95.300000	17.80	11.4	43.6	25.8	---	100.0	0.00	VERTICAL
156.000000	25.50	14.5	46.8	21.3	---	100.0	0.00	VERTICAL
168.000000	25.00	15.0	47.3	22.3	---	100.0	0.00	VERTICAL

Company Name Shenzhen QC Test Laboratory Co., Ltd

Radiation Emissions : EN 50498:2010

EUT: M/N: OBAG900
 Manufacturer: TUV
 Operating Condition: ON
 Test Site: 2# CHAMBER
 Operator: Tan
 Test Specification: DC 27V
 Comment: Polarisation:H
 Start of Test: 2021-8-5 / 19:39:02



MEASUREMENT RESULT: "TUV-080506_red"

2021-8-5 19:40

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
264.000000	33.60	16.4	60.3	26.7	---	100.0	0.00	HORIZONTAL
456.000000	39.80	19.8	63.0	23.2	---	100.0	0.00	HORIZONTAL
468.000000	39.50	20.0	63.0	23.5	---	100.0	0.00	HORIZONTAL
480.000000	43.50	20.3	63.0	19.5	---	100.0	0.00	HORIZONTAL
492.000000	40.90	20.5	63.0	22.1	---	100.0	0.00	HORIZONTAL
504.000000	44.60	20.6	63.0	18.4	---	100.0	0.00	HORIZONTAL
516.000000	37.20	20.7	63.0	25.8	---	100.0	0.00	HORIZONTAL
540.000000	38.90	20.8	63.0	24.1	---	100.0	0.00	HORIZONTAL
552.050000	40.20	21.0	63.0	22.8	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "TUV-080506_red2"

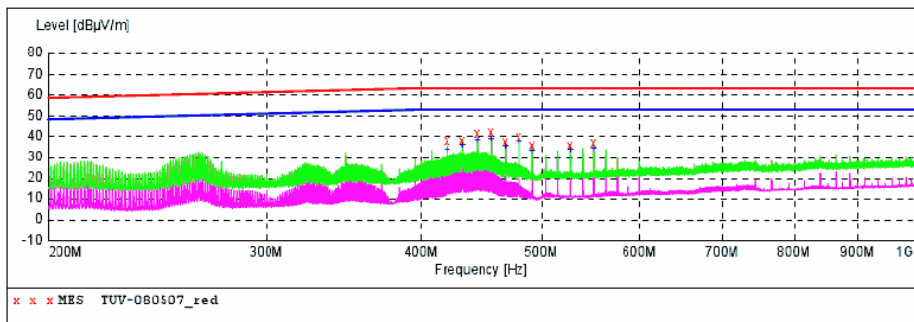
2021-8-5 19:40

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
456.000000	35.80	19.8	53.0	17.2	---	100.0	0.00	HORIZONTAL
468.000000	37.50	20.0	53.0	15.5	---	100.0	0.00	HORIZONTAL
480.000000	41.40	20.3	53.0	11.6	---	100.0	0.00	HORIZONTAL
492.000000	38.00	20.5	53.0	15.0	---	100.0	0.00	HORIZONTAL
504.000000	42.90	20.6	53.0	10.1	---	100.0	0.00	HORIZONTAL
516.000000	35.00	20.7	53.0	18.0	---	100.0	0.00	HORIZONTAL
528.000000	32.70	20.7	53.0	20.3	---	100.0	0.00	HORIZONTAL
540.000000	36.00	20.8	53.0	17.0	---	100.0	0.00	HORIZONTAL
552.000000	37.90	21.0	53.0	15.1	---	100.0	0.00	HORIZONTAL

Company Name Shenzhen QC Test Laboratory Co., Ltd

Radiation Emissions : EN 50498:2010

EUT: M/N: OBAG900
 Manufacturer: TUV
 Operating Condition: ON
 Test Site: 2# CHAMBER
 Operator: Tan
 Test Specification: DC 27V
 Comment: Polarisation:V
 Start of Test: 2021-8-5 / 19:42:29



MEASUREMENT RESULT: "TUV-080507_red"

2021-8-5 19:44

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
420.000000	37.70	19.4	63.0	25.3	---	100.0	0.00	VERTICAL
432.000000	37.90	19.5	63.0	25.1	---	100.0	0.00	VERTICAL
444.000000	41.30	19.6	63.0	21.7	---	100.0	0.00	VERTICAL
456.000000	41.90	19.8	63.0	21.1	---	100.0	0.00	VERTICAL
468.050000	37.40	20.0	63.0	25.6	---	100.0	0.00	VERTICAL
480.000000	39.40	20.3	63.0	23.6	---	100.0	0.00	VERTICAL
492.000000	35.50	20.5	63.0	27.5	---	100.0	0.00	VERTICAL
528.000000	35.60	20.7	63.0	27.4	---	100.0	0.00	VERTICAL
552.000000	36.50	21.0	63.0	26.5	---	100.0	0.00	VERTICAL

MEASUREMENT RESULT: "TUV-080507_red2"

2021-8-5 19:44

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
420.000000	33.60	19.4	53.0	19.4	---	100.0	0.00	VERTICAL
432.000000	35.70	19.5	53.0	17.3	---	100.0	0.00	VERTICAL
444.000000	37.60	19.6	53.0	15.4	---	100.0	0.00	VERTICAL
456.000000	38.50	19.8	53.0	14.5	---	100.0	0.00	VERTICAL
468.000000	34.90	20.0	53.0	18.1	---	100.0	0.00	VERTICAL
480.000000	37.40	20.3	53.0	15.6	---	100.0	0.00	VERTICAL
492.000000	32.80	20.5	53.0	20.2	---	100.0	0.00	VERTICAL
528.000000	33.10	20.7	53.0	19.9	---	100.0	0.00	VERTICAL
552.000000	34.10	21.0	53.0	18.9	---	100.0	0.00	VERTICAL

Measurement Uncertainties

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Table 1: Measurement Uncertainty levels

Test	Parameters	Expanded uncertainty (U_{lab})	Expanded uncertainty (U_{cispr})
Conducted Emission	Level accuracy (9kHz to 150kHz)	± 2.42 dB	± 3.8 dB
	(150kHz to 30MHz)	± 2.42 dB	± 3.4 dB
Electromagnetic Radiated Emission (Triple-loop)	Level accuracy (9kHz to 30MHz)	± 1.60 dB	N/A
Radiated Emission (3m SAC)	Level accuracy (30MHz to 1000MHz)	± 3.10 dB	± 6.3 dB
	Level accuracy (above 1000MHz)	± 4.35 dB	N/A

As U_{lab} in all applicable tests listed above are less than U_{cispr} according to CISPR 16-4-2:2011,

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.