



THE UNITED KINGDOM VEHICLE APPROVAL AUTHORITY

COMMUNICATION CONCERNING APPROVAL GRANTED ⁽¹⁾ / ~~APPROVAL EXTENDED ⁽⁴⁾ /~~
~~APPROVAL REFUSED ⁽⁴⁾ / APPROVAL WITHDRAWN ⁽⁴⁾ / PRODUCTION DEFINITELY~~
~~DISCONTINUED ⁽⁴⁾~~ OF A TYPE OF ELECTRICAL / ~~ELECTRONIC SUB-ASSEMBLY ⁽⁴⁾~~ WITH
REGARD TO REGULATION NO. 10.06



Approval No: E11*10R06/02*12930*00

1. Make (trade name of manufacturer): **JUNCH**
2. Type and general commercial description(s): PC12000B322
3. Means of identification of type, if marked on the ~~vehicle / component / separate technical unit ⁽⁴⁾~~:
 - 3.1. Location of that marking: On surface of the motor case
4. Category of vehicle: Not applicable
5. Name and address of manufacturer:

Shanghai Junch Industries Development Co., Ltd.
No.951, Qiangye Road
Songjiang District
Shanghai
People's Republic of China
6. In the case of components and separate technical units, location and method of affixing of the approval mark: Print on the motor surface
7. Address(es) of assembly plant(s): Same as item 5 above
8. Additional information (where applicable): See appendix below

9. Technical Service responsible for carrying out the tests: Vehicle Certification Agency
10. Date of test report: 24 June 2024
11. No. of test report: CSB628601
12. Remarks (if any): See appendix below
13. Place: BRISTOL
14. Date: 01 August 2024
15. Signature:



C McCABE
Chief Technical and Statutory Operations Officer

16. The index to the information package lodged with the Approval Authority, which may be obtained on request, is attached.
17. Reasons for extension: Not applicable

Appendix

to type-approval communication form No. E11*10R06/02*12930*00
concerning the type-approval of an electrical /~~electronic~~ sub-assembly under Regulation No. 10.06

1. Additional information:
 - 1.1. Electrical system rated voltage: 24V DC, only positive and negative, no ground
 - 1.2. This ESA can be used on any vehicle type with the following restrictions: Not applicable
 - 1.2.1. Installation conditions, if any: Not applicable
 - 1.3. This ESA can be used only on the following vehicle types: Not applicable
 - 1.3.1. Installation conditions, if any: Not applicable
 - 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):

BCI: 20-400MHz
Free field: 200-2000MHz
 - 1.5. Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests:

Shanghai Motor Vehicle Inspection Certification & Tech Innovation Center Co., Ltd. (SMVIC)
2. Remarks: Variants: PC22000B418
 - (1) Strike out what does not apply.



THE UNITED KINGDOM VEHICLE APPROVAL AUTHORITY

APPROVAL NUMBER: E11*10R06/02*12930*00

INFORMATION PACKAGE CONTENTS

INDEX REVISION NUMBER: 00

Conformity of Production (COP) Declaration COP Confirmed

Assessment Method COP Audit

Date of Initial Clearance March 2024

Date of Last Clearance March 2024

Total number of sheets: 9 (Nine)

Reasons for Revision: Not applicable

Revision Date
&
Office Stamp



INDEX OF DOCUMENTATION

<i>Page</i>	<i>Concept</i>	<i>Date</i>
2	GENERAL	Nov. 2023
3-6	DRAWING AND LOCATION OF THE ECE APPROVAL MARK	NOV. 2023
7	APPLICATION OF THE MOTOR	NOV. 2023
9	MOTOR SPECIFICATION AND MAIN COMPONENTS LIST	NOV. 2023

APPLICATION HISTORY

Extension No.	Extension Reasons	APPLICATION DATE
00	Not applicable(Base Approval)	NOV 2023

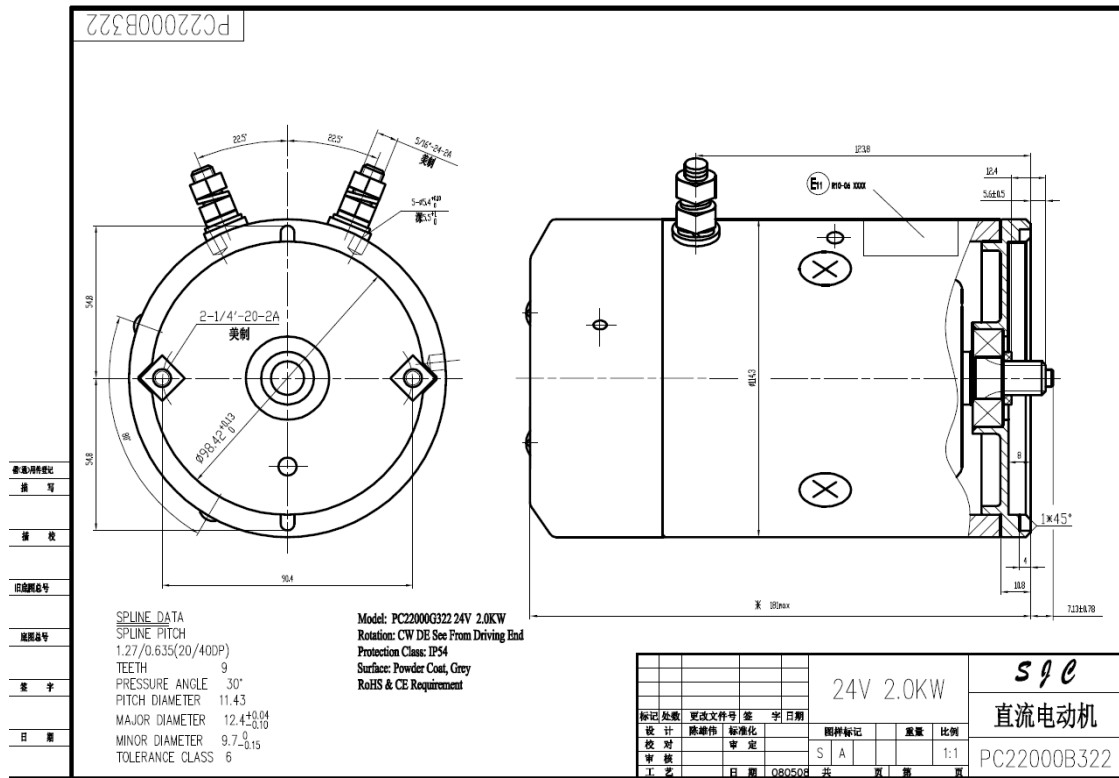


GENERAL

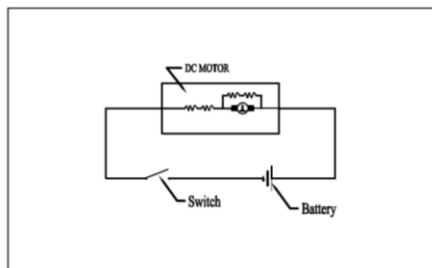
1. Make (trade name of manufacturer): **JUNCH**
2. Type: **PC22000B322**
3. Variants: **PC22000B418**
4. Commercial description(s): **DC MOTOR**
Function: FOR HYDRAULIC POWER UNIT.
5. Means of identification of type, if marked on the component/separate technical unit (a):
 - 5.1. Location of that marking: **On surface of the motor case.**
6. Name and address of manufacturer:
Shanghai Junch Industries Development Co., Ltd.
No.951, Qiangye Road, Songjiang District, Shanghai,China
7. Name and address of authorised representative, if any: **Not Applicable**
8. In the case of components and separate technical units, location and method of affixing of the EC approval mark: **Print on the motor surface.**
9. Address(es) of assembly plant(s):
Shanghai Junch Industries Development Co., Ltd.
No.951, Qiangye Road, Songjiang District, Shanghai,China
10. Any restrictions of use and conditions for fitting:
FOR HYDRAULIC POWER UNIT.
11. Electrical system rated voltage: V, positive/negative ground
24V DC, only positive and negative, no ground



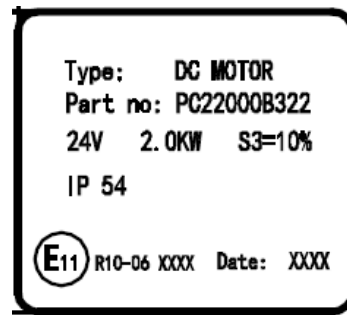
DRAWINGS OF THE MOTOR
MOTOR AND LOCATION OF THE ECE APPROVAL MARK
PC22000B322



CIRCUIT DIAGRAM

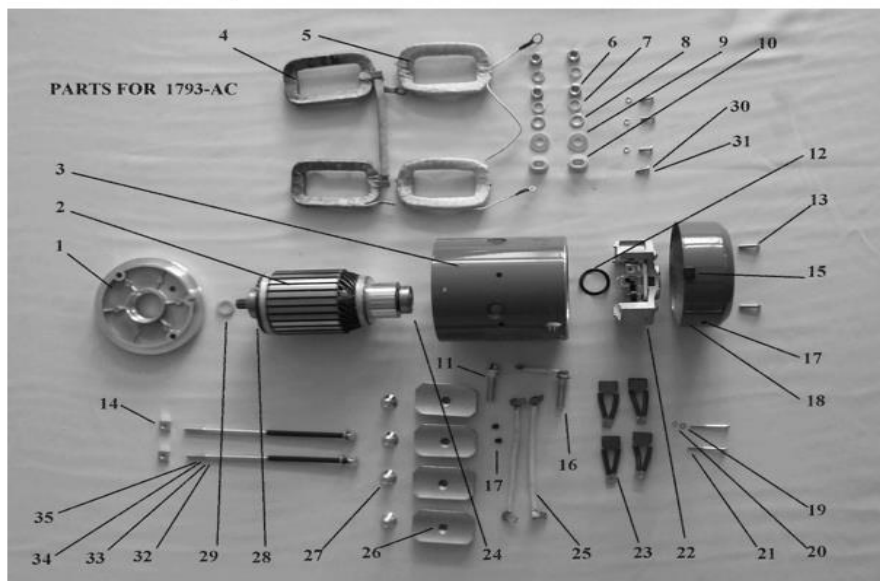


LABEL

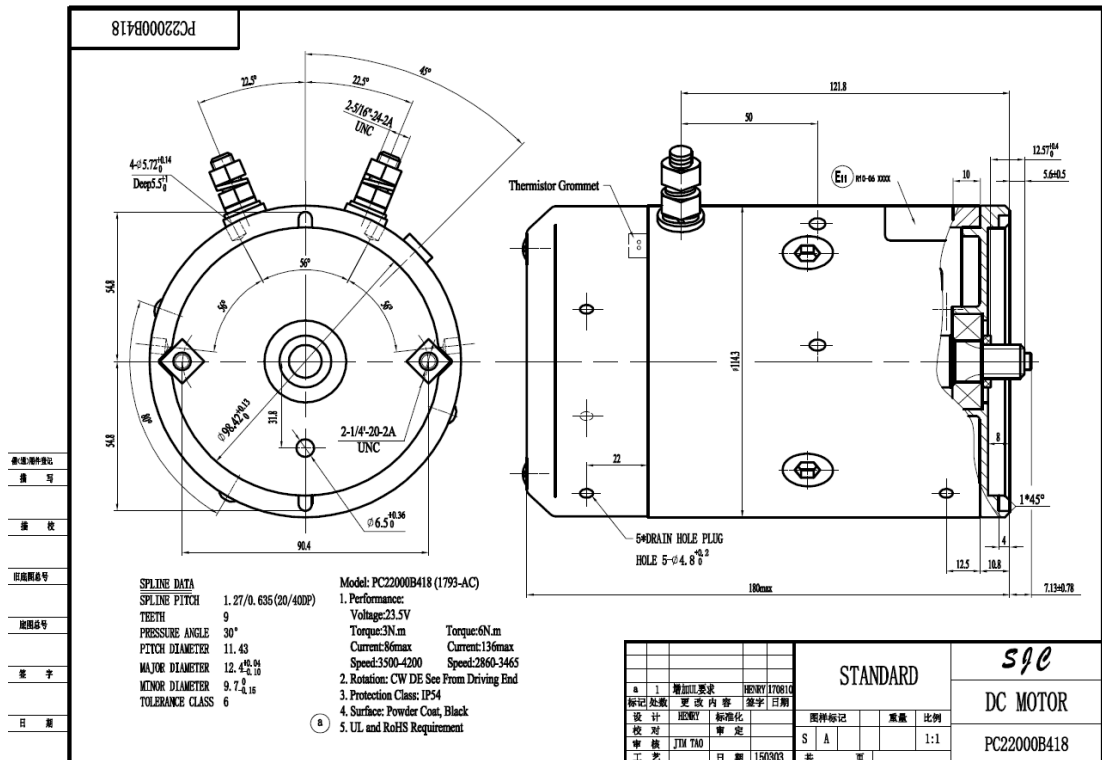


Bill of Material (BOM) for DC Motor (PC22000B322)				
No.	Part No.	Description	Material	Quantity
1	PC11000Z303401	Driving End Plate	Aluminum	1
2	PC21000Z307200	Armature	Copper, Steel, Insulation Paper	1
3	PC12000B377101	Yoke	Steel	1
4	PC22000B418110	Coil	Glass Tape, Copper, Insulation Paper	1
5	PC22000B418120	Coil	Glass Tape, Copper, Insulation Paper	1
6	PC11000Z303106	Nut	Steel	4
7	GB859	Spring Washer Φ8	Steel	4
8	GB848	Washer Φ8	Steel	2
9	PC11000Z303158	Insulation Washer	Fibre glass plate	2
10	PC21000Z307104	Isolator	Plastic	2
11	PC21000Z307181	Terminal Bolt	Steel	1
12	PC11000Z303011	Wave Spring Washer	Steel	1
13	PC11000B325006	Screw	Steel	2
14	PC11000Z303007	Nut	Steel	2
15	PC22000Z324012	Thermistor Grommet	Rubber	1
16	PC22000Z322181	Terminal Bolt	Steel	1
17	PC11000Z303005	Drain Hole Plug	Plastic	5
18	PC22000B324008	Cover	Steel	1
19	GB97.1	Washer Φ3	Steel	2
20	GB93	Spring Washer Φ3	Steel	2
21	PC12000G319005	Screw	Steel	2
22	PC12000G319300	Brush Holder ASSY	Steel, Plastic, Aluminum, Fibre Glass Plate	1
23	PC21000Z307003	Brush	Copper, Carbon	4
24	GB/T 276	Bearing 6201	Steel, Rubber, Oil	1
25	PC22000G315112	Connection Lead	Copper Glass Fiber	1
26	PC11000Z303102	Pole	Steel	4
27	GB2673	Screw M10*16	Steel	4
28	GB/T 276	Bearing 6202	Steel, Rubber, Oil	1
29	PC12000B303202	Washer	Plastic	1
30	GB818	Screw M4*12	Steel	4
31	GB93	Spring Washer Φ4	Steel	4
32	LRS-1	Shrinking Tube Φ7	Plastic	2
33	PC11000Z303009	Long Bolt	Steel	2
34	PC11000Z303002	Washer	Steel	1
35	GB859	Spring Washer Φ6	Steel	2

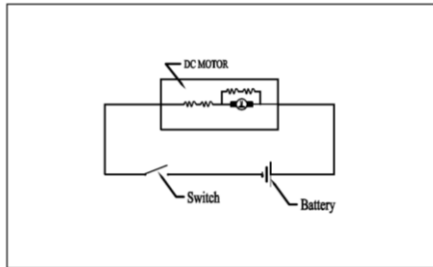
Exploded View of PC22000B322



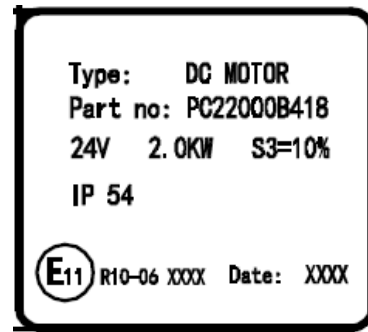
PC22000B418



CIRCUIT DIAGRAM

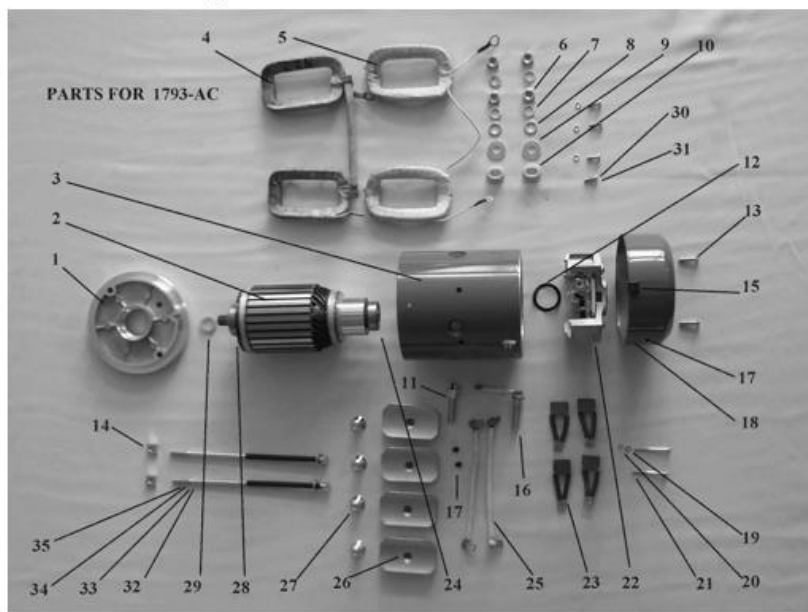


LABEL

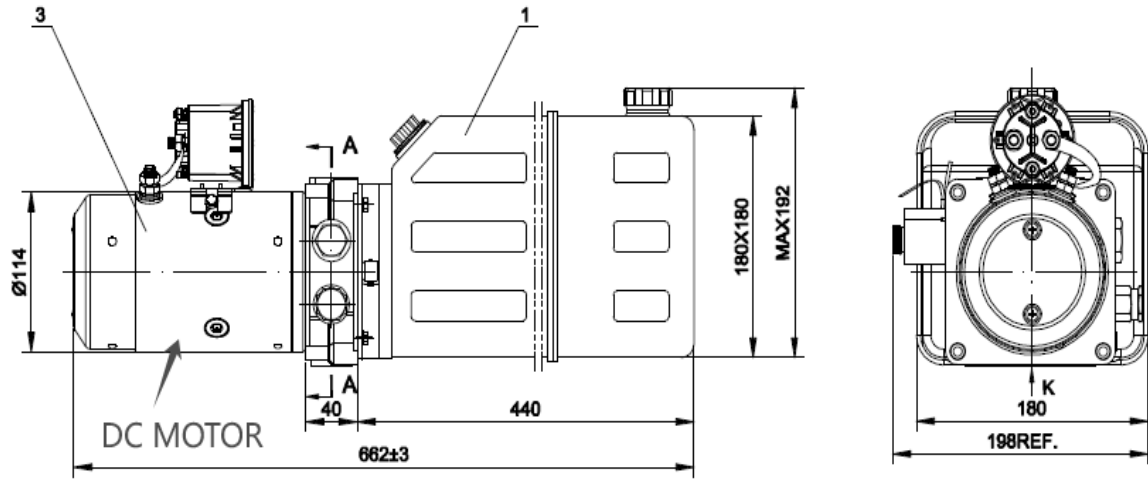


Bill of Material (BOM) for DC Motor (PC22000B418).				
No.	Part No.	Description.	Material.	Quantity.
1.	PC11000Z303401.	Driving End Plate.	Aluminum.	1.
2.	PC21000Z307200.	Armature.	Copper, Steel, Insulation Paper.	1.
3.	PC12000B377101.	Yoke.	Steel.	1.
4.	PC22000B418110.	Coil.	Glass Tape, Copper, Insulation Paper.	1.
5.	PC22000B418120.	Coil.	Glass Tape, Copper, Insulation Paper.	1.
6.	PC11000Z303106.	Nut.	Steel.	4.
7.	GB859.	Spring Washer Φ8.	Steel.	4.
8.	GB848.	Washer Φ8.	Steel.	2.
9.	PC11000Z303158.	Insulation Washer.	Fibre glass plate.	2.
10.	PC21000Z307104.	Isolator.	Plastic.	2.
11.	PC21000Z307181.	Terminal Bolt.	Steel.	1.
12.	PC11000Z303011.	Wave Spring Washer.	Steel.	1.
13.	PC11000B325006.	Screw.	Steel.	2.
14.	PC11000Z303007.	Nut.	Steel.	2.
15.	PC22000Z324012.	Thermistor Grommet.	Rubber.	1.
16.	PC22000Z322181.	Terminal Bolt.	Steel.	1.
17.	PC11000Z303005.	Drain Hole Plug.	Plastic.	5.
18.	PC22000B324008.	Cover.	Steel.	1.
19.	GB97.1.	Washer Φ3.	Steel.	2.
20.	GB93.	Spring Washer Φ3.	Steel.	2.
21.	PC12000G319005.	Screw.	Steel.	2.
22.	PC12000G319300.	Brush Holder ASSY.	Steel, Plastic, Aluminum, Fibre Glass Plate.	1.
23.	PC21000Z307003.	Brush.	Copper, Carbon.	4.
24.	GB/T 276.	Bearing 6201.	Steel, Rubber, Oil.	1.
25.	PC22000G315112.	Connection Lead.	Copper Glass Fiber.	1.
26.	PC11000Z303102.	Pole.	Steel.	4.
27.	GB2673.	Screw M10*16.	Steel.	4.
28.	GB/T 276.	Bearing 6202.	Steel, Rubber, Oil.	1.
29.	PC22000B418202.	Washer.	Plastic.	1.
30.	GB818.	Screw M4*12.	Steel.	4.
31.	GB93.	Spring Washer Φ4.	Steel.	4.
32.	LRS-1.	Shrinking Tube Φ7.	Plastic.	2.
33.	PC11000Z303009.	Long Bolt.	Steel.	2.
34.	PC11000Z303002.	Washer.	Steel.	1.
35.	GB859.	Spring Washer Φ6.	Steel.	2.

Exploded View of PC22000B418



MOTOR APPLICATION ON THE HYDRAULIC POWER UNIT



SPECIFICATION OF THE MOTOR

No.	Item	Condition
1	Rate Voltage (V)	DC24
2	No load Speed (rpm)	≥9000
3	Load Current (Amp)	≅ 130@6Nm
4	Load Speed (rpm)	≥2750
5	IP	IP45
6	Working Rate	S2=2.0; S3=10%
7	Environment Tem (°C)	-10°C-- +40°C
8	Storage Temp (°C)	-10°C-- +40°C
9	Voltage limit	The motor must be run on 20V-26V

APPEARANCE REQUEST

The motor surface must be clear, no damage, no wrinkle.

THE MOTOR DURABILITY

Minimum cycles is 40,000 @ 5scends on 25scends off a cycle.

Shanghai Junch Industries Development Co., Ltd.

2023/12/12





Inspection/Test Report: Electromagnetic Compatibility – ESA

Legislation

UNECE Regulation 10.06 to Supplement 2

Inspection/Test Details

Location of Inspection/Test: Shanghai Motor Vehicle Inspection Certification & Tech
Innovation Center Co., Ltd. (SMVIC)
Date(s) of Inspection/Test: 27 March 2024
VCA Representative(s): Beck Wang, Alfred Zhang
Inspectors Home Office Location: VCA China
Manufacturer's Representative(s): Jim Tao
Reason for Report: New Approval

Manufacturer Details

Name and Address: Shanghai Junch Industries Development Co., Ltd.
No.951, Qiangye Road, Songjiang District, Shanghai
People's Republic of China
Type: PC12000B322
Commercial Description: NA
Category: ESA

Conclusion

The above-mentioned vehicle / engine / component was tested in accordance with the above
mentioned legislation and was found to comply in all respects listed in this report. This report
relates only to the items tested.

Test Engineer
Signature:

Name: Beck Wang Alfred Zhang
Position: Type Approval Engineer Type Approval Engineer
Date: 24 June 2024 24 June 2024

List of Annexes

Annex	No of Pages	Subject
I	1	Test photos (<i>EC and ECE when needed</i>)
II	8	Test Result
III		
IV		





Issue Record

Issue 0 is original report

Note: Include reason for reissue, date of reissue, who has reissued.

Worst Case Rationale

New approval.

Note: Include information on variants and versions this report covers, as applicable. Supporting documents may be annexed to this report

Significant Interpretations, Alternative Test Methods, New Technologies

None

Inspection/Tests Required

Yes, NA, See Report ... / Approval ... / Annex ...

ESA specification	Yes
Radiated Emissions:	Yes
Radiated Immunity	Yes
BCI Immunity:	Yes
Free Field Immunity:	Yes
150 mm Stripline Immunity:	NA
800 mm Stripline Immunity:	NA
Transient Testing:	Yes

Component Specification

Component Part Number: PC22000B322

Manufacturer's Documentation

Manufacturer's documentation is complete and reflects the agreed specification for the vehicle / engine / component tested and covers all variants and versions agreed in the worst case rationale. Yes

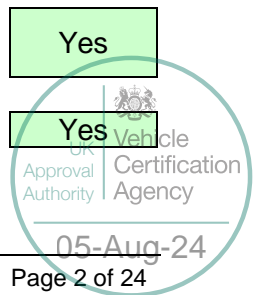
Information document uploaded to job folder and identified by job number. Yes

Facility and Equipment Checks

Facility Appraisal reference and date NA

Calibration certificates are traceable to national or international standards of measurement, where available: Yes

Calibration certificates checked and valid, recorded in the following table:





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Equipment

Description	Make	Model	Serial number	Calibration due date
EMI Receiver	ROHDE&SCHWARZ	ESW8	574-916	05 July 2024
Biconical antenna	ROHDE&SCHWARZ	HK116	574-072-02	13 April 2024
Log-periodic antenna	ROHDE&SCHWARZ	HL223	574-072-03	13 April 2024
Artificial Network	ROHDE&SCHWARZ	ESH3-Z6	574-095	07 October 2024
Artificial Network	ROHDE&SCHWARZ	ESH3-Z6	574-090	07 October 2024
Signal Generator	ROHDE&SCHWARZ	SMB100A	574-351-02	07 October 2024
Power Amplifier	AmpLord	ALA-80M-1G-1200	574-945	30 July 2024
Power Meter/Power Sensor	ROHDE&SCHWARZ	NRP/NRP-Z91	574-124-02	20 December 2024
Power Meter/Power Sensor	ROHDE&SCHWARZ	NRP/NRP-Z91	574-124-03	20 December 2024
Directional Coupler	AR	DC2035M4	574-124-07	26 October 2024
Field Probe	AR	FM7004A/FL7006	574-601	27 March 2025
Power Amplifier	AR	120S1G3	574-124-08	26 October 2024
Signal Generator	KEYSIGHT	N5171B	574-388	07 October 2024
Power Meter/Power Sensor	KEYSIGHT	N1914/E9304A	574-389	07 October 2024
Load Dump Generator	EM TEST	LD 200N	574-1178	20 December 2024
Quadrant Voltage Drop Simulator - Battery simulator and DC voltage source	EM TEST	VDS 200Q50.2-400	574-1180	20 December 2024
Generates and records automotive waveforms	EM TEST	AutoWave	574-1181	20 December 2024
Absorber-lined Shielded Enclosure	Albatross	3m-SAC	574-191	24 December 2024

*Specify calibrated date + (interval) or calibration due date.

Software used in Testing

Description	Make	Version





Inspection/Test Requirements		Complies Yes / NA
ESA specification		
3.2.1.	ESA classification is applicable to Regulation 10.	Yes
3.2.2.	The application for ESA approval is submitted by the vehicle manufacturer or by the manufacturer of the ESA.	Yes
3.2.3.	The model of information document shown in Annex 2B is used.	Yes
3.2.3.	In addition, the information document stipulates location and method of affixing of the approval mark	Yes
3.2.3.	In addition, the information document stipulates approval marking size as the circle diameter to be = 6mm minimum and capitol "E" = 3mm minimum and remaining text = 2mm minimum <i>(If the above dimensions are not possible due to the size of the component, then the markings should be as large as possible)</i>	Yes
3.2.6	The sample of the ESA under test (EUT) is clearly and indelibly marked with the manufacturer's trade name or mark and the type designation.	Yes
3.2.7.	All restrictions on use are identified and are included in Annexes 2B and/or 3B, where applicable.	Yes
3.2.8.	ESA is brought to the market as spare part and is marked accordingly.	NA
3.2.9.	For components sold as aftermarket equipment, a declaration is issued by the manufacturer that the ESA fulfils the requirements of this Regulation and in particular the limits defined in paragraphs 6.5., 6.6., 6.7., 6.8. and 6.9. of this Regulation.	NA
3.2.10.	ESAs which are part of a light source have approval number specified to correct Regulations or a test report is provided stating that the ESA is not mechanically interchangeable with any light source.	NA



Radiated Emissions

CISPR25, 4.5. Measuring equipment complies with CISPR 16-1-4 (2010). Yes

Types and calibration date:

ESW 8, calibration date: 06 July 2023

Test Location

Ann 7, 3.1. Test performed in: Yes
Ann 7, 3.3. - A.L.S.E (Absorber-lined Shielded Enclosure)*
- ~~O.A.T.S (Open Area Test Site)*~~
**Strikethrough, as appropriate.*

Ann 7, 3.3. O.A.T.S level is a clear area, free from electromagnetic reflecting surfaces, within a circle of 15 m minimum radius. NA

Ann 7, 3.3. Measuring equipment is outside 15 m minimum radius circle. NS

Ann 7, 3.4. Ambient noise is at least 6 dB below reference limits, in either case. NS

Test Arrangements

CISPR25, 4.4.2. EUT and antenna are more than 2 m from the walls and ceiling, and 1 m from the nearest absorber material. Yes

CISPR25, 6.1.1. Ground plane is 900 ± 50 mm high and made from 0.5 mm thick copper, brass or galvanised steel. Yes

CISPR25, 6.1.1. Ground plane is at least 2,000 mm length x 1,000 mm width. Yes

CISPR25, 6.4.2.3. ESA and harness are supported at 50 ± 5 mm above the ground plane on low relative permittivity material. Yes

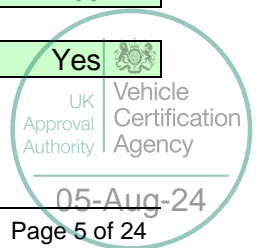
CISPR25, 6.4.2.3. Face of the ESA is within 200 mm ± 10 mm from the edge of the ground plane. Yes

CISPR25, 6.4.2.4. Length of test harness, parallel to the front of the ground plane, is 1,500 ± 75 mm and does not exceed 2,000 mm. Yes

CISPR25, 6.4.2.4. Long segment of test harness is located parallel to the edge of the ground plane, facing the antenna at a distance of 100 ± 10 mm from the edge. Yes

CISPR25, 6.1.2. Power supply is Artificial Network (AN) rated at 50 Ω/50 µH. Yes

CISPR25, 6.1.2. EUT is: Yes





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	<ul style="list-style-type: none"> - Remotely grounded (vehicle power return line longer than 200 mm): two artificial networks are required, one for the positive supply line and one for the power return line* - Locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required for the positive supply* <p><i>*Strikethrough, as appropriate.</i></p>	
CISPR25, 6.1.2.	<p>Case of the ESA is:</p> <ul style="list-style-type: none"> - Grounded, simulating actual vehicle configuration* - Not grounded, simulating actual vehicle configuration* <p><i>*Strikethrough, as appropriate.</i></p>	Yes
CISPR25, 6.1.2.	AN is electrically bonded to the ground plane.	Yes
	Antenna	
	Types and calibration date:	
	HL223, HK116, calibration date: 14 April 2023	
CISPR25, 6.4.2.6.	Height of the phase centre is 100 ± 10 mm above the ground plane.	Yes
CISPR25, 6.4.2.6.	No part of any antenna radiating element is closer than 250 mm to the floor.	Yes
CISPR25, 6.4.2.6.	Radiating elements of the measuring antenna are not closer than 1,000 mm to any absorber material, except that used on the floor, and are not closer than 2,000 mm to the walls or ceiling of the shielded enclosure.	Yes
CISPR25, 6.4.2.6.	Phase centre (for biconical) or tip (for log-periodic) is 1,000 ± 50 mm from the harness.	Yes
CISPR25, 6.4.2.6.	Antenna calibrated for this distance to correct measuring point (phase centre or tip).	Yes
CISPR25, 6.4.2.6.	Phase centre of the antenna is in line with the centre of the longitudinal part of the wiring harness.	Yes
Ann 7, Ann 8, 4.3.	Pre-test sweep supplied to show compliance throughout frequency range 30 to 1,000 MHz.	Yes
Ann 7, Ann 8, 4.3.	Test frequencies chosen from pre-test data.	Yes
	Narrowband Test Results	
Ann 8, 2.	Operational mode of ESA:	
	Normal operation	
Ann 8, 2.	Detector used and bandwidth:	





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Average detector, 120KHz

6.6.2. ESA meets narrowband emissions limits, with both vertical and horizontal polarisations. Yes

Broadband Test Results

Ann 7, 2. Operational mode of ESA:
Normal operation

Ann 7, 2. Detector used and bandwidth:
Quasi-peak detector, 120kHz

6.5.2. ESA meets broadband emissions limits, with both vertical and horizontal polarisations. Yes

Radiated Immunity

Test Method(s) used and Frequency Range(s)

ISO11452-4 BCI frequency range between 20 and 400 MHz: 20-200 MHz Yes

ISO11452-2 Free field frequency range between 80 and 2,000 MHz: 200-2000 MHz Yes

ISO11452-3 TEM cell frequency range between 20 and 200 MHz: NA MHz NA

ISO11452-5 150 mm stripline frequency range between 20 and 400 MHz: NA MHz NA

ISO11452-5 800 mm stripline frequency range between 20 and 2,000 MHz: NA MHz NA

Maximum frequency step sizes do not exceed:

Frequency Band (MHz)	Linear Steps (MHz)	Log Steps (%)	Actual Steps Used
20 - 200	5	5	5%
200 - 400	10	5	5%
400 - 1000	20	2	2%
1000 - 2000	40	2	2%

Test Arrangements (General)

Ann 9, 2.2. Operational mode of ESA:
Normal operation





Ann 9, 2.3.	No extraneous equipment in place during calibration.	Yes
Ann 9, 2.4.	Test equipment used is the same as for calibration.	Yes
Ann 9, 2.5.	Loads and actuators are as realistic as possible.	Yes
Ann 9, 2.5.	Case of ESA is: - Grounded, simulating actual vehicle configuration* - Not grounded, simulating actual vehicle configuration* <i>*Strikethrough, as appropriate.</i>	Yes
Ann 9, 3.1.	Test frequency range is 20 to 2,000 MHz.	Yes
Ann 9, 3.1.	Test signal is R.F. sine wave amplitude, modulated by a 1 kHz sine wave at a modulation depth of 0.8 ± 0.04 , in the 20 - 800 MHz band and pulse modulation (time on 577 μ s, period 4,600 μ s) in the 800 – 2,000 MHz band.	Yes
6.8.2.1.	Pre-test sweep supplied to show compliance throughout frequency range 20 to 2,000 MHz.	Yes
Ann 9, 3.2.	Test frequencies chosen from pre-test data.	Yes
6.8.2.2.	No degradation of immunity related functions during the tests.	Yes

BCI Immunity

	Calibration date: 25 December 2021, Valid for 3-5 years	
ISO11452-4, 5.	Shielded area used: Yes	
	Comments: None	
ISO11452-4, 8.3.2.1.	Forward power used to achieve specified current.	Yes

Installation of ESA under Test

Ann 9, 4.3.2.	Current probe located 150 ± 10 mm from ESA connectors or closed loop method used.	Yes
Ann 9, 4.3.2.	ESA installed: - In a vehicle, as per ISO 11451-4* - On a ground plane, as per ISO 11452-4* <i>*Strikethrough, as appropriate.</i>	Yes



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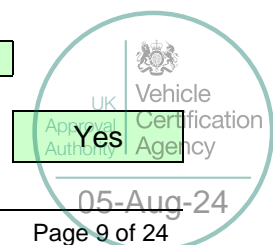
ISO11452-4, 7.1.	Ground plane is made from at least 0.5 mm thick copper, brass or galvanised steel.	Yes
ISO11452-4, 7.1.	Minimum width of the ground plane is 1,000 mm and the minimum length is 1,500 mm, or length of the entire underneath of equipment plus 200 mm, whichever is greater.	Yes
ISO11452-4, 7.1.	Height of the ground plane is 900 ± 100 mm.	Yes
ISO11452-4, 7.1.	Ground plane is bonded to the shielded enclosure, with the straps at a distance no greater than 300 mm apart.	Yes
ISO11452-4, 7.2.	<p>- ESA remotely grounded (vehicle power return line longer than 200 mm): two artificial networks are required, one for the positive supply line and one for the power return line)*</p> <p>- ESA locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required, for the positive supply*</p> <p>*Strikethrough, as appropriate.</p>	
ISO11452-4, 7.2.	Power supply is Artificial Network (AN) rated at 50 Ω/5 µH.	Yes
ISO11452-4, 7.3.	ESA and harness supported 50 ± 5 mm above ground plane, on low relative permittivity material.	Yes
ISO11452-4, 7.3.	Face of the ESA at least 100 mm from the edge of the ground plane.	Yes
ISO11452-4, 7.3.	Distance of at least 500 mm between ESA and any metal parts, such as the walls of the shielded enclosure (exception is ground plane).	Yes
ISO11452-4, 7.4.	Length of test harness is 1,000 ± 100 mm, unless specified.	Yes
	Actual wiring harness length: <input type="text" value="1"/> m	Yes

BCI Test Results

6.8.2.1.	No malfunction at 60 mA or below. Comments: <input type="text" value='There is no degradation of performance of "immunity related functions".'/>	Yes
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Free Field Immunity

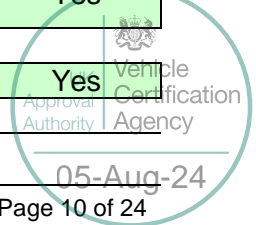
	Calibration date: <input type="text" value="25 December 2021, Valid for 3-5 years"/>
ISO11452-2, 5.	Semi-anechoic chamber used: <input type="text" value="Yes"/>
ISO11452-2, 8.3.1.	Test field defined by:





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	Forward power* - Another parameter, directly related* <i>*Strikethrough, as appropriate.</i>	
ISO11452-2, 8.3.2.	Antenna is at a distance of 1,000 ± 10 mm from the reference point.	Yes
ISO11452-2, 8.3.2.	Reference point is 150 ± 10 mm above the ground plane.	Yes
ISO11452-2, 8.3.2.	Reference point is 100 ± 10mm from the edge of the ground plane.	Yes
ISO11452-2, 8.3.2.	For frequencies from 80 - 1,000 MHz, the reference point is in the centre of the harness.	Yes
ISO11452-2, 8.3.2.	For frequencies from 1,000 - 2,000 MHz, the reference point is in line with the ESA.	Yes
Test Arrangements		
ISO11452-2, 7.1.	Ground plane is made from at least 0.5 mm thick copper, brass or galvanised steel.	Yes
ISO11452-2, 7.1.	Minimum width of the ground plane is 1,000 mm and the minimum length is 2,000 mm.	Yes
ISO11452-2, 7.1.	Height of the ground plane is 900 ± 100 mm.	Yes
ISO11452-2, 7.1.	Bonding straps are at a distance no greater than 300 mm apart.	Yes
ISO11452-2, 7.2.	Power supply is Artificial Network (AN) rated at 50 Ω/5 μH.	Yes
ISO11452-2, 7.2.	- ESA remotely grounded (vehicle power return line longer than 200 mm): two artificial networks are required, one for the positive supply line and one for the power return line)* - ESA locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required, for the positive supply* <i>*Strikethrough, as appropriate.</i>	
ISO11452-2, 7.3.	AN mounted directly on the ground plane and cases bonded to the ground plane.	Yes
ISO11452-2, 7.3.	ESA and harness supported 50 ± 5 mm above table, on low relative permittivity material.	Yes
ISO11452-2, 7.3.	Face of the ESA located 200 ± 10 mm from the edge of the ground plane.	Yes
ISO11452-2, 7.4.	Test harness parallel to the front edge of the ground plane.	Yes





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ISO11452-2, 7.4.	Total length of harness does not exceed 2,000 mm.	Yes
ISO11452-2, 7.4.	Actual wiring harness length: <input type="text" value="NA"/> m	NA
	or	
	Length is 1,500 ± 75 mm between DUT and AN.	Yes
ISO11452-2, 7.4.	Harness is at a distance of 100 ± 10 mm from the edge of the ground plane.	Yes
ISO11452-2, Fig 1	Front face of ESA is at least 1.0 m from all other conductive structures.	Yes
ISO11452-2, Fig 1	ESA harness is at least 2.0 m forward from the chamber wall.	Yes

Antenna Type(s) and Frequency Range(s)

Ann 9, 4.1.2.	Antenna is vertically polarised.	Yes
ISO11452-2, 7.6.	Antenna is in the same position as the calibration.	Yes
ISO11452-2, 7.6.	Phase centre is 100 ± 10 mm above the ground plane.	Yes
ISO11452-2, 7.6.	Antenna elements are no closer than 250 mm to the floor of the facility, no closer than 0.5 m to any radio absorbent material, and no closer than 1.5 m to the wall of the facility.	Yes
ISO11452-2, 7.6.	Distance between wiring harness and antenna is 1,000 mm ± 10 mm, measured from the phase-centre of the biconical antenna, or the nearest part of the log-periodic and horn antennas.	Yes
Ann 9, 3.1.	Test signal modulation is: - AM, 1 kHz modulation, 80 % depth in 20 - 800 MHz frequency range; - PM, ton 577 µs, period 4,600 µs in 800 - 2,000 MHz frequency range.	Yes

Free Field Immunity Test Results

6.8.2.	No malfunction at 30 V/m over 90% of 20-2,000MHZ Frequency band and a minimum of 25 V/m over the whole band. Comments: <input type="text" value='There is no degradation of performance of "immunity related functions".'/>	Yes
--------	---	-----

150 mm Stripline Immunity

Calibration date:





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ISO11452-5, 5.3.1. Stripline housed in a shielded room. NA

ISO11452-5, 6.2.2. Test field defined by: - Forward power* - Another parameter, directly related* *Strikethrough, as appropriate. NA

ISO11452-5, 6.2.3. Field probe in the centre of stripline. NA

Installation of ESA under Test

ISO11452-5, 5.3.1. ESA is 200 + 20 - 0 mm from the edge of the active conductor. NA

ISO11452-5, 5.3.1. Peripherals are a minimum of 200 mm from the edge of the active conductor. NA

ISO11452-5, 5.3.1. Harness supported 50 mm above the ground plane and is placed in the centre of the stripline. NA

ISO11452-5, 5.3.1. Actual wiring harness length: NA m or Minimum length under stripline is 1,000 mm. NA

ISO11452-5, 5.3.1. All wires in the harness are terminated or open, according to the vehicle application. NA

ISO11452-5, 5.3.1. Device and peripherals connected to the ground plane, as specified by the vehicle installation. NA

ISO11452-5, 5.3.1. Power supply is Artificial Network (AN) rated at 50 Ω/5 μH. NA

ISO11452-5, 5.3.1. - ESA remotely grounded (vehicle power return line longer than 200 mm): two artificial networks are required, one for the positive supply line and one for the power return line)* - ESA locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required, for the positive supply* *Strikethrough, as appropriate.

150 mm Stripline Test Results

6.8.2. No malfunction at 50 V/m or below. Comments: NA

800 mm Stripline Immunity

Calibration date:





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NA

Ann 9, 4.5.2.1. Stripline housed in a screened room. NA

Ann 9, 4.5.2.1. Stripline positioned a minimum of 2,000 mm from the walls or metallic enclosure. NA

Ann 9, 4.5.2.1. Stripline placed on non-conducting supports at least 400 mm above the floor. NA

Ann 9, 4.5.2.2. Field probe 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. NA

Ann 9, 4.5.2.2. Test field defined by:
- Forward power*
- Another parameter, directly related*
*Strikethrough, as appropriate. NA

Installation of ESA under Test

Ann 9, 4.5.2.3. ESA is within the central one-third of the stripline. NA

Ann 9, 4.5.2.3. ESA is supported on non-conducting material. NA

Ann 9, 4.5.2.4. Wiring loom is arranged as per Appendix 1, Figure 3. NA

Ann 9, 4.5.2.4. Associated equipment is a minimum of 1,000 mm from stripline. NA

800 mm Stripline Test Results

Frequency Suggested (MHz)	Frequency (MHz)	Forward Power		Output Level		Field Strength (V/m)
		Cal. (w)	Test (w)	Cal. (dBm)	Test (dBm)	

6.8.2. No malfunction at 12.5 V/m or below. NA

Comments:
NA





Transient Testing

Case of ESA is:

- Grounded, simulating actual vehicle configuration*
- ~~- Not grounded, simulating actual vehicle configuration*~~

*Strikethrough, as appropriate.

Transient Immunity

- 6.9.1. Test set up according to ISO 7637-2 (second edition 2004) Yes
- Ann 10, 2. Supply lines and other lines, which may be connected to supply lines, are tested. Yes
- Test voltage and time parameters are within allowed envelopes. Yes
- Test pulses and duration according to the following: Yes

Test Pulse	Immunity Test Level	Functional Status for Systems		Test Duration	
		Related to Immunity-related Functions	Not Related to Immunity-related Functions		
1	III	C	D	5000 pulses	C
2a	III	B	D	5000 pulses	A
2b	III	C	D	10 pulses	C
3a	III	A	D	1 hour	A
3b	III	A	D	1 hour	A
4	III	B (for ESA, which must be operational during engine start, or C, for other ESA)		1 pulse	B

- ESA operational after the tests, according to the above classification. Yes

Emission of Conducted Disturbances

- 6.9.1. Test set up according to ISO 7637-2. Yes
- Ann 10, 3. Supply lines and other lines, which may be connected to supply lines, are tested. Yes

Comments:

None





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Slow pulses and fast pulses tested on both powering up and powering down.

Yes

Polarity of Pulse Amplitude	Maximum Allowed Pulse Amplitude	
	Vehicles with 12 V systems	Vehicles with 24 V system
Positive	+ 75 V	+ 150 V
Negative	- 100 V	- 450 V

Notes

[Notes can be provided at the bottom if it is useful to provide additional information that is not covered by a compliance statement, for example glazing markings.]

Remarks

None

Note: no note needed.





Annex I Test photos



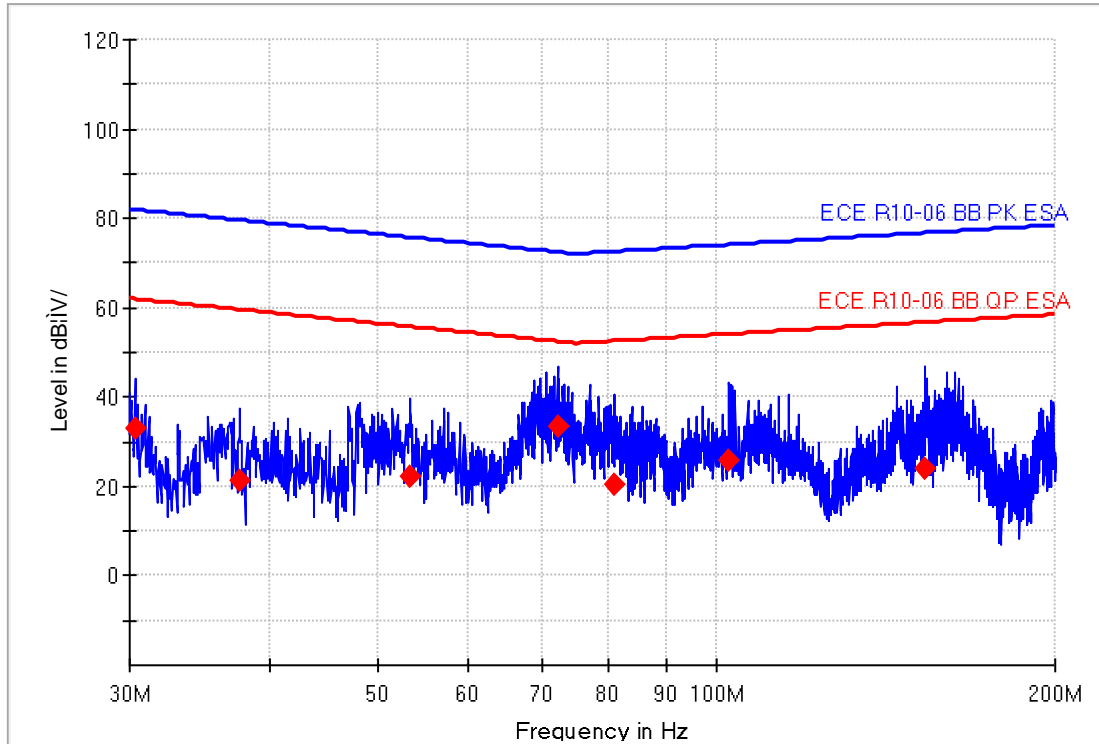


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Annex II Test Result

BB 30M200M H

Full Spectrum



— Preview Result 1-PK+ — ECE R10-06 BB QP ESA
— ECE R10-06 BB PK ESA ◆ Final_Result QPK

Final_Result

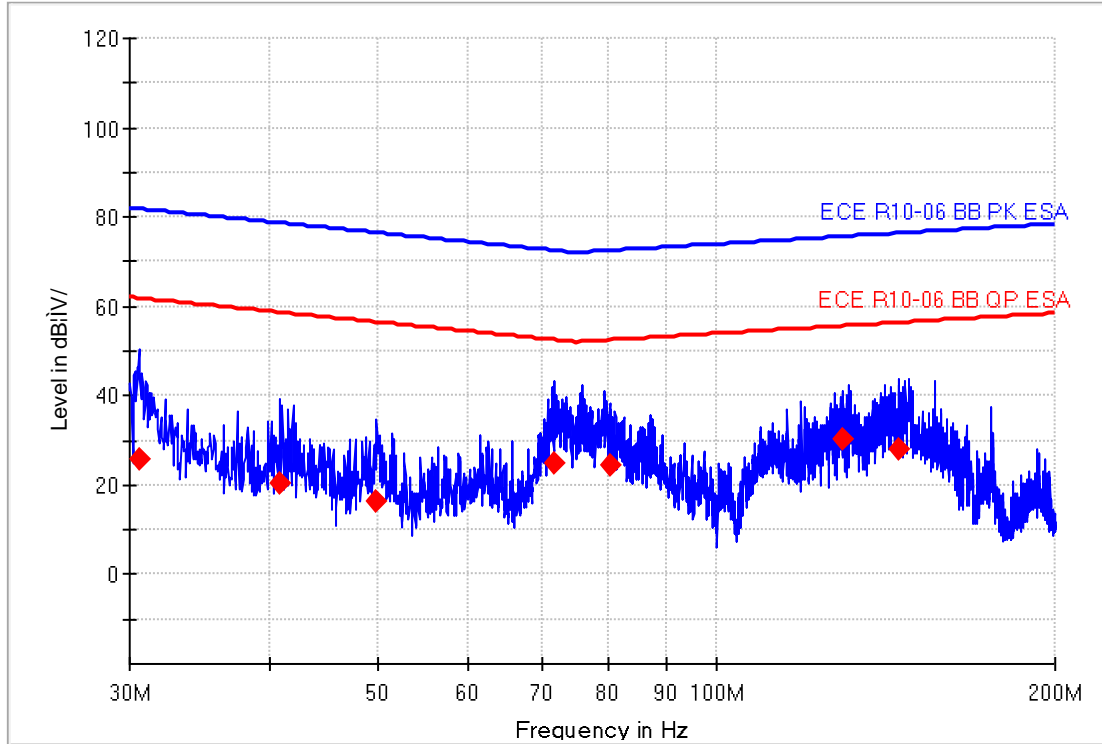
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Corr. (dB)
30.350000	32.93	61.87	28.95	-16.5
37.600000	21.28	59.54	38.25	-16.5
53.300000	22.32	55.73	33.40	-17.3
72.100000	33.47	52.43	18.96	-18.5
80.950000	20.40	52.50	32.10	-18.2
102.600000	25.96	54.06	28.10	-16.8
153.400000	23.95	56.70	32.76	-13.7





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BB 30M200M V
Full Spectrum



— Preview Result 1-PK+ — ECE R10-06 BB QP ESA
— ECE R10-06 BB PK ESA ◆ Final_Result QPK

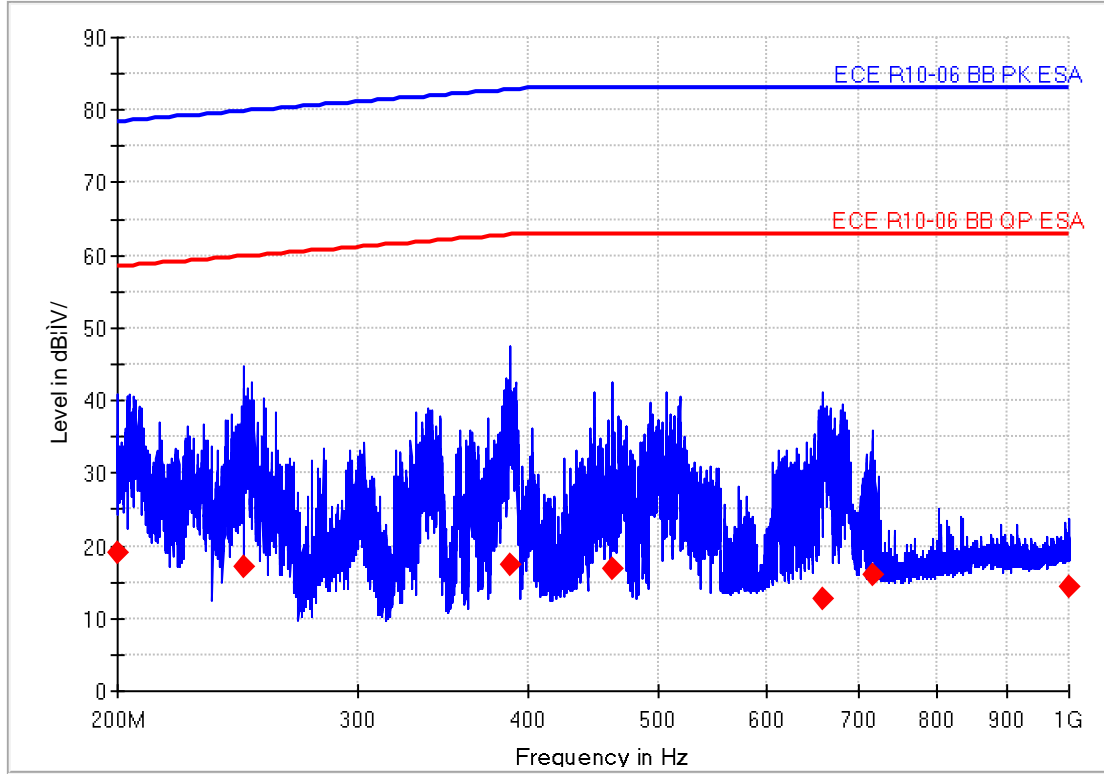
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Corr. (dB)
30.600000	25.63	61.78	36.15	-16.5
40.850000	20.40	58.63	38.23	-16.5
49.800000	16.45	56.47	40.02	-17.2
71.700000	24.76	52.49	27.73	-18.5
80.250000	24.53	52.45	27.91	-18.3
129.250000	30.20	55.58	25.38	-15.2
145.100000	27.98	56.34	28.36	-14.1



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BB 200M1000M H



— Preview Result 1-PK+ — ECE R10-06 BB QP ESA
— ECE R10-06 BB PK ESA ◆ Final_Result QPK

Final_Result

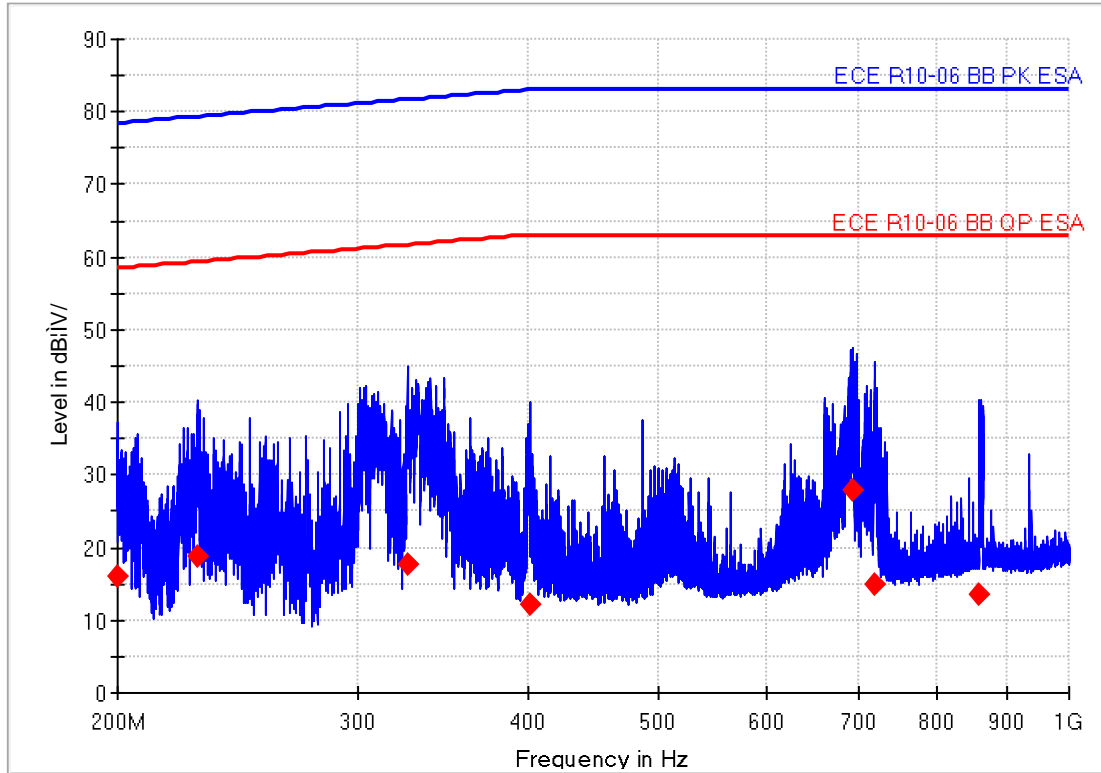
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Corr. (dB)
200.200000	19.16	58.45	39.30	-13.3
247.750000	17.15	59.85	42.70	-12.3
389.100000	17.31	62.82	45.51	-9.2
462.050000	16.87	63.00	46.13	-7.9
659.350000	12.82	63.00	50.18	-5.6
716.850000	16.09	63.00	46.91	-5.5
999.050000	14.32	63.00	48.68	-4.5





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BB 200M1000M V



— Preview Result 1-PK+ — ECE R10-06 BB QP ESA
— ECE R10-06 BB PK ESA ◆ Final_Result QPK

Final_Result

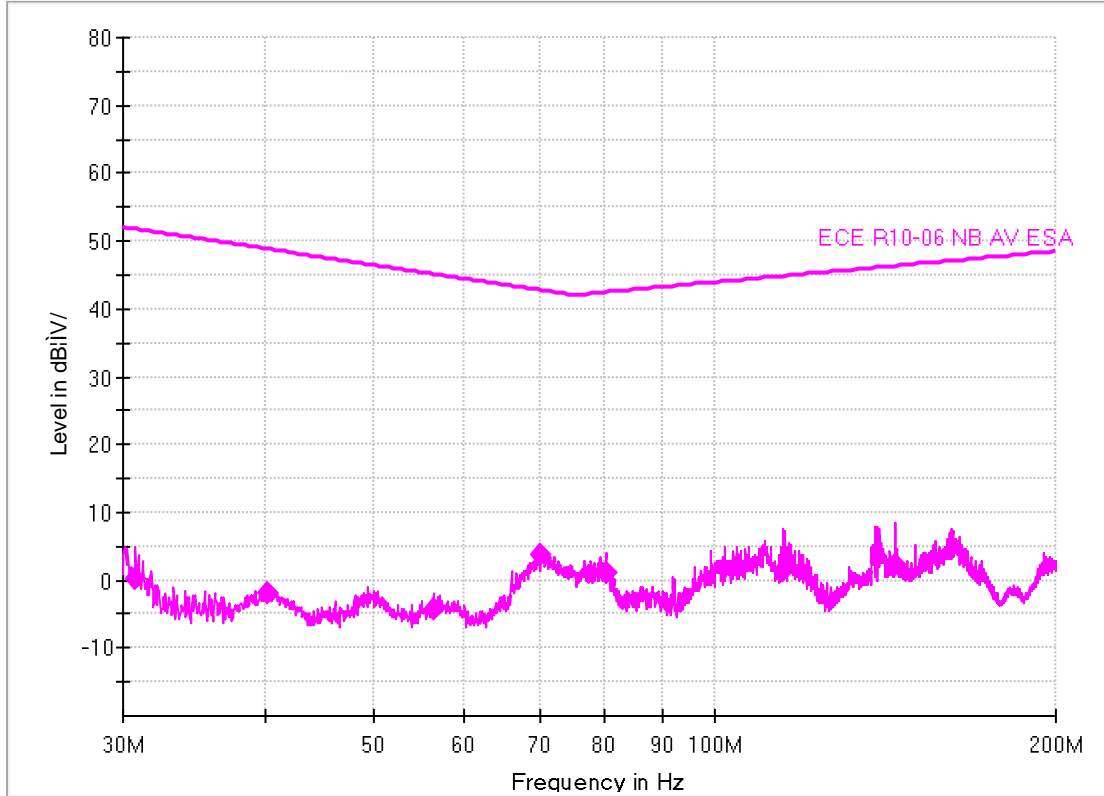
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Corr. (dB)
200.050000	15.98	58.45	42.47	-13.3
229.400000	18.79	59.35	40.56	-13.3
326.350000	17.59	61.66	44.08	-10.8
402.350000	12.25	63.00	50.75	-8.5
694.400000	27.95	63.00	35.05	-5.5
719.350000	15.03	63.00	47.97	-5.5
859.200000	13.42	63.00	49.58	-3.3





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NB 30M200M H



Preview Result 1-AVG ECE R10-06 NB AV ESA Final_Result AVG

Final_Result

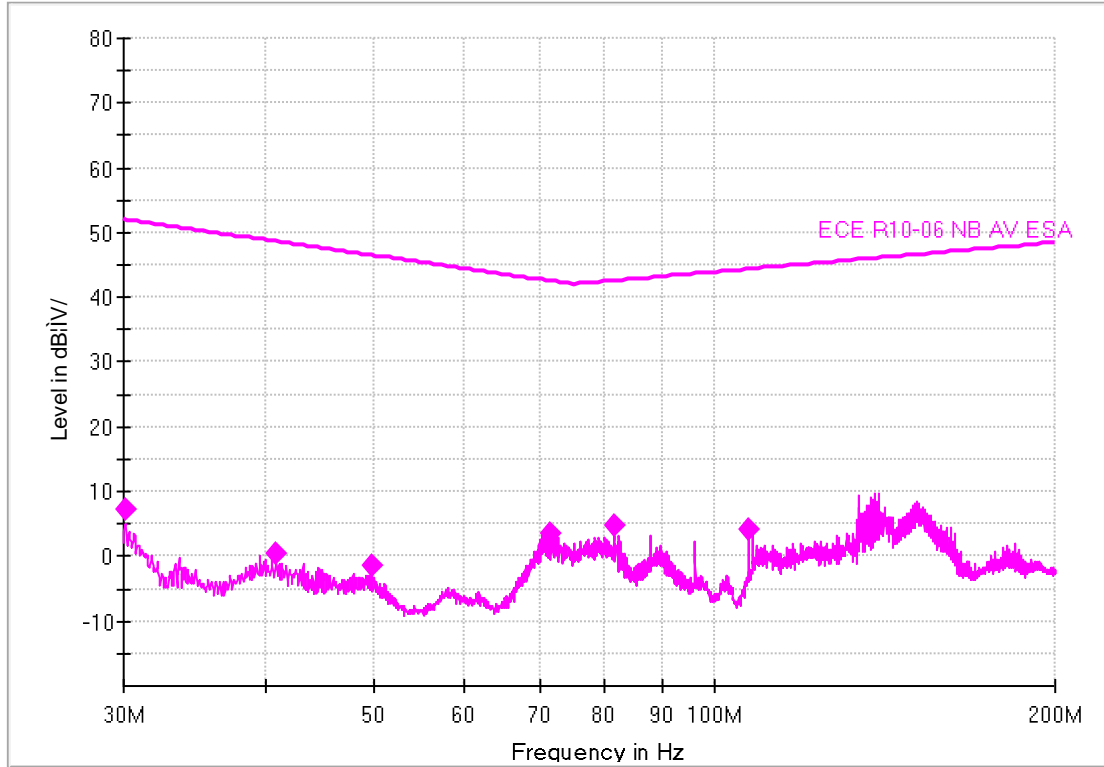
Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Corr. (dB)
30.800000	0.21	51.71	51.50	-16.5
40.200000	-1.85	48.81	50.66	-16.6
56.350000	-4.25	45.12	49.37	-17.8
70.150000	3.68	42.73	39.05	-18.6
80.100000	1.11	42.43	41.32	-18.3
114.650000	1.24	44.79	43.55	-16.2
144.450000	2.18	46.31	44.13	-14.2





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NB 30M200M V Full Spectrum



Preview Result 1-AVG ECE R10-06 NB AV ESA Final_Result AVG

Final_Result

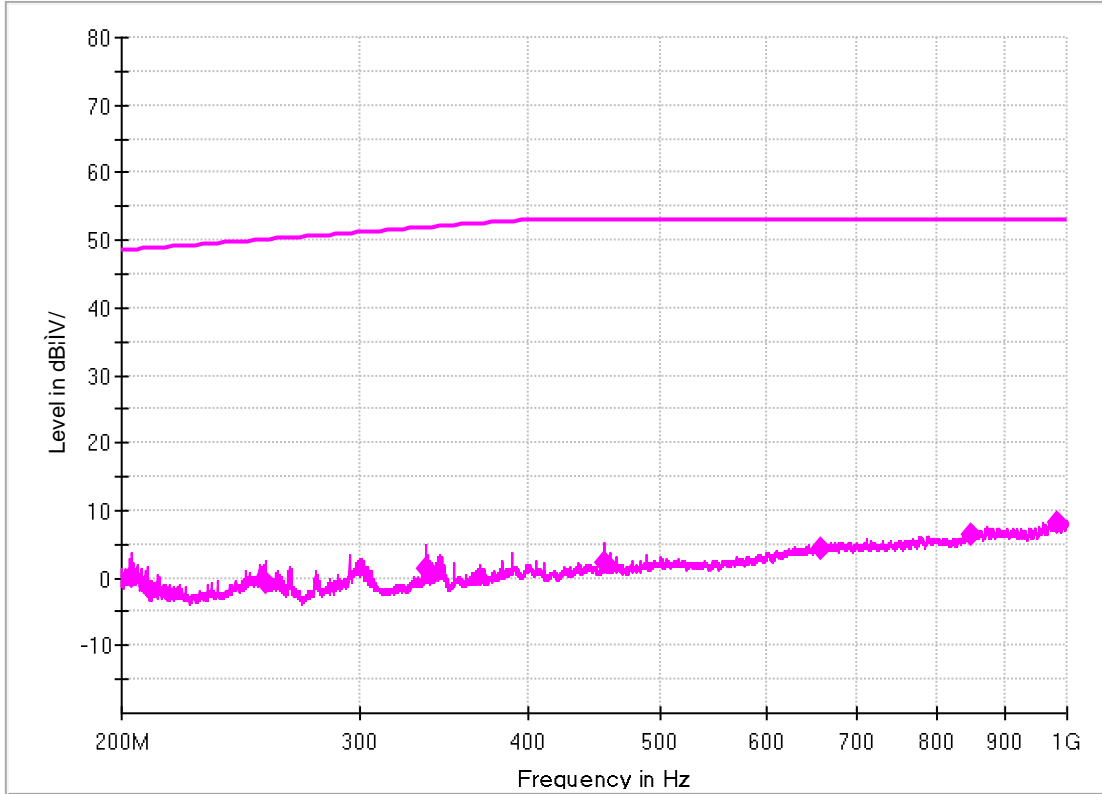
Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Corr. (dB)
30.100000	7.29	51.96	44.68	-16.5
40.900000	0.47	48.62	48.15	-16.5
49.800000	-1.47	46.47	47.94	-17.2
71.450000	3.41	42.53	39.12	-18.6
81.400000	4.77	42.54	37.76	-18.1
107.100000	4.28	44.34	40.06	-16.4
138.550000	6.13	46.03	39.91	-14.5





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NB 200M1000M H



Preview Result 1-AVG ECE R10-06 NB AV ESA Final_Result AVG

Final_Result

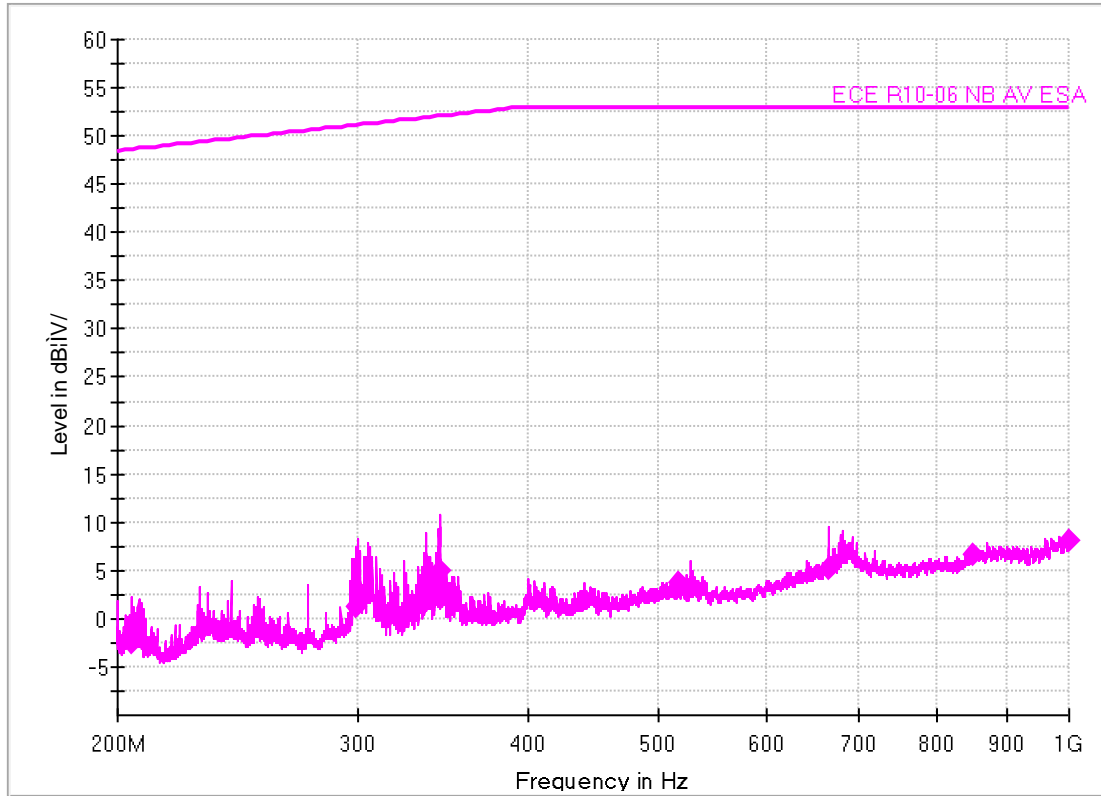
Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Corr. (dB)
203.150000	0.32	48.55	48.23	-13.4
255.900000	-0.71	50.07	50.77	-12.5
336.300000	1.31	51.86	50.55	-10.5
455.600000	2.18	53.00	50.82	-7.9
658.550000	4.36	53.00	48.64	-5.7
848.250000	6.49	53.00	46.51	-3.3
983.800000	8.27	53.00	44.74	-4.5





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NB 200M1000M V



Preview Result 1-AVG ECE R10-06 NB AV ESA Final_Result AVG

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Corr. (dB)
204.900000	-2.42	48.60	51.03	-13.4
299.100000	1.19	51.09	49.90	-11.4
344.900000	4.95	52.03	47.08	-10.1
516.900000	3.62	53.00	49.38	-7.3
666.800000	5.22	53.00	47.78	-5.5
849.050000	6.72	53.00	46.28	-3.3
999.500000	8.17	53.00	44.83	-4.5

