

TEST REPORT

Ref. n.	FCCTR_185070-0	Issue Date:	21/06/2024	Pages:	16
Test object	Type test according to Standard FCC Cfr 47 part 15 - Subpart C - §15.209				
Applicant	M.A.E. ELETTRONICA S.r.l. Via Presolana 33/35 – 24030 Medolago – Bergamo – Italy				
Trade mark					
Manufacturer	M.A.E. ELETTRONICA S.r.l.				
Product	Dashboard with integrated vehicle immobilizer				
Tested model	RTADM003				
FCC ID	2AVGH-RTADM003				
Date of test samples receipt	23/05/2024				
No. of tested samples	1 – Sampled by the manufacturer				
Test date	28/05/2024				
Testing site	PRSLAB S.r.l. Unipersonale - Via Campagna 92 - 22020 Faloppio - Como - Italy				
FCC designation number	IT0012				
Test results	COMPLIANT				
Verifications carried out by	Daniele AOSANI Laboratory Engineer				
Approved by	Luana PARISI Reviewer				

The test results reported in this test report shall refer only to the samples tested.
 The sample has been provided by the customer and the results apply to the sample as received.
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 PRS refuses any responsibility about information provided by the customer contained in this test report.

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0. RELEASE CONTROL RECORD

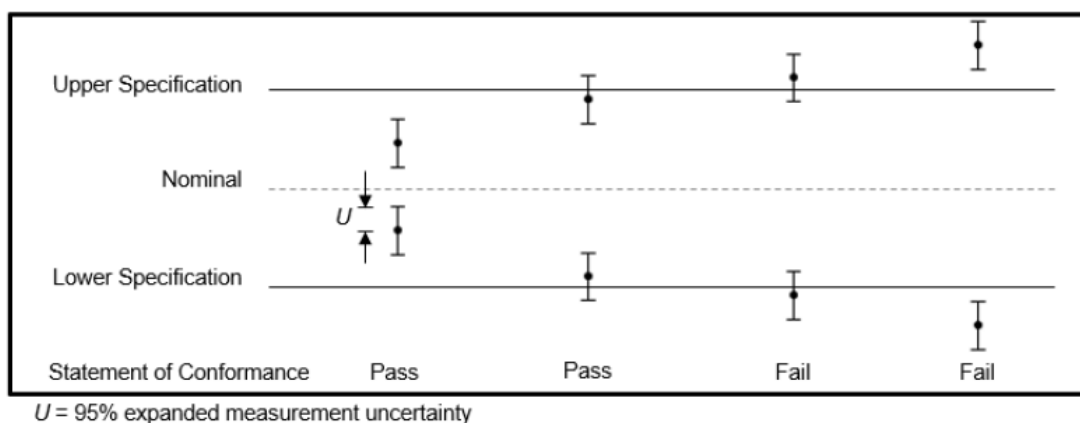
TEST REPORT NUMBER	REASON OF CHANGE	DATE OF ISSUE
FCCTR_185070-0	Original release	21/06/2024

This document is valid in last revision that deletes and replaces the previous one

1. DECISION RULE

PRS LAB specifies that, if the decision rules of conformity of the test results are not indicated in detail in the standard/s object of tests, it takes as a decision rule for the declaration of conformity the simple binary system ($w = 0$) stated in the ILAC-G8-09:2019 document.

The decision rule is applicable for all parts of standard



Statements of conformity are reported as:

- Pass: the measured value is below the acceptance limit, $AL=TL$.
- Fail: the measured value is above the acceptance limit, $AL=TL$.

Definitions

- Guard Band (w): interval between a tolerance limit and a corresponding acceptance limit where length $w=|TL-AL|$.
- Tolerance Limit (TL) (Specification Limit): specified upper or lower bound of permissible values of a property.
- Acceptance Limit (AL): specified upper or lower bound of permissible measured quantity values.

2. INFORMATION PROVIDED BY CUSTOMER

- None

3. GENERAL REMARKS

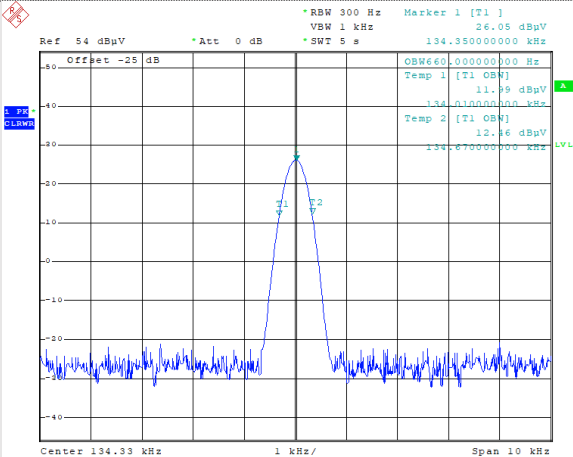
- None

4. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

4.1 EUT Identification

DESCRIPTION	Dashboard with integrated vehicle immobilizer
MODEL NAME	RTADM003
FCC ID	2AVGH-RTADM003
SERIAL NO.	MT240090650
PRS LAB INTERNAL REFERENCE	BC 138/2024 4/5
TRADEMARK	
MANUFACTURER	M.A.E. ELETTRONICA S.r.l.
COUNTRY OF MANUFACTURER	Italy
SINGLE UNIT OR SYSTEM	Single
POWER SOURCE	Vehicle battery
SUPPLY VOLTAGE	12Vdc
MAX POWER or MAX ABSORBED CURRENT	NA
OPERATING TEMPERATURE	-40°C ÷ +85°C
SOFTWARE VERSION (Information provided by Customer)	11a.08.08
HARDWARE VERSION (Information provided by Customer)	02.02
DIMENSIONS	19.5 x 9.5 x 4 cm
EUT STANDING	☐ WALL; ☐ CEILING; ☐ TABLE; ☐ FLOOR; ☐ RACK MOUNTED; ☐ BODY WORN; ☐ HANDELD; ☐ PORTABLE; ☐ MOBILE; ☒ VEHICLE
HIGHEST INTERNAL FREQUENCY (Information provided by Customer)	☒ <108MHz; ☐ 108MHz<F<500MHz; ☐ 500MHz<F<1GHz; ☐ F>1GHz

4.2 RFID module technical data

CHIP MANUFACTURER	 TEXAS INSTRUMENTS
CHIP MODEL	TMS3705
ETS CATEGORY	Radio-Frequency Identification (RFID)
FREQUENCY RANGE	100-148 kHz f. band
CENTER FREQUENCY	134.3kHz
TRANSMITTER MAX POWER	24.30dBμV/m Peak@3m distance
TYPE OF MODULATION	ASK
ANTENNA TYPE (Information provided by Customer)	Inductive loop coil
ANTENNA GAIN (Information provided by Customer)	NA
ANTENNA MODEL (Information provided by Customer)	EL216
ANTENNA MANUFACTURER (Information provided by Customer)	 ZADI
MEASURED 99% BW	 99%BW = 660Hz

4.3 Ports identification

	PORT	DESCRIPTION	CONNECTION	NOTES
☒	Enclosure	Plastic	Snap	---
☐	AC Power input	Port not present	---	---
☒	DC Power input	12Vdc	---	>3m
☒	Signal / Control port	CAN bus communication	---	---
☐	Telecomm.port	Port not present	---	---
☐	Antenna port	☒ Internal; ☐ External	---	---

Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.

4.4 Modifications incorporated in E.U.T.

The following items are the modifications introduced in the equipment under test:

- None

4.5 Auxiliary equipment

- None

5. REFERENCE STANDARDS

CODE OF FEDERAL REGULATIONS	DESCRIPTION
Title 47 Part 15 Subpart C	Radio frequency devices - Intentional Radiators
Title 47 Part 15 Subpart C § 15.209	Radio frequency devices - Intentional Radiators Radiated emission limits; general requirements.
ANSI C63.10:2013	American National Standard for Testing Unlicensed Wireless Devices

6. OPERATING MODES AND TEST CONDITIONS

In the following table there are the operating conditions adopted during tests identified by an indicator (#) at which has been referred the item "Operating condition of the equipment under test"

OPERATING CONDITION	DESCRIPTION
#1	EUT in maximum output power RFID detection.

Special Test Software: EUT configured in continuous modulated transmission specifically for testing.

Special Hardware Used: None

Transmitter Test Antenna: The EUT has been tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment as described with the test results.

7. UNITS OF MEASUREMENTS

Conducted EMI Data is in dB μ V; dB referenced to one microvolt

Radiated EMI Data is in dB μ V/m; dB/m referenced to one microvolt per meter

Sample Calculation:

RFS = Radiated Field Strength,

FSM = Field Strength Measured,

A.F. = Receive antenna factor,

Gain = amplification gains and/or cable losses.

$$\text{RFS (dB}\mu\text{V/m @ 3m)} = \text{FSM (dB}\mu\text{V)} + \text{A.F. (dB/m)} - \text{Gain (dB)}$$

8. SUMMARY OF TEST RESULTS

SUMMARY OF TEST RESULTS				
Port	Test	Reference Standard	Operating Condition ¹	Results
Antenna	Radiated Emissions 9kHz – 30MHz	Title 47 Part 15 Subpart C § 15.209	#1	Within the limits
	Radiated Emissions 30MHz – 1GHz		#1	Within the limits
	Restricted frequency bands	Title 47 Part 15 Subpart C § 15.205	#1	Within the limits
AC main	Conducted Emissions	Title 47 Part 15 Subpart C § 15.207	Not applicable ²	

¹ Ref. Tab. Of Section 6

² EUT is vehicle battery powered

9. TESTS RESULTS

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TEST 1.	RADIATED EMISSIONS – 9kHz to 1GHz
REFERENCE DOCUMENT	FCC Cfr 47 part 15 - Subpart C - §15.209

• TEST SETUP	Acc. To ref. Std.					
• TEST LOCATION	Semi-Anechoic Chamber					
• DISTANCE OF MEASUREMENT	3m					
• TEST EQUIPMENT USED FOR TEST	Instrument	Manufacturer	Model	Serial n°	Calibrated On	Due to
	Emi receiver	Rohde & Schwarz	ESU 40	100111	03/2024	03/2025
	MXE Emi Receiver	Keysight	N9038A	MY57290150	11/2023	11/2024
	Semi-Anechoic Chamber	Siemens	B83117-D6019-T232	003-005-134/94C	02/2024	02/2025
	Loop antenna	Rohde & Schwarz	HFH 2-Z2	841801/012	10/2023	10/2026
	Bi-log antenna	Chase	CBL6111C	2717	04/2022	04/2025
	Radiated Emission Cable (30MHz – 1GHz)	Sucoflex	Sucoflex 126	---	02/2024	02/2025
	Software EMC	Rohde & Schwarz	EMC32-E	V 8.40.0	N.A.	
• TESTED PORT	Enclosure port					
• TEST METHOD	ANSI C63.10:2013 section 6.5					
• FREQUENCY RANGE	9kHz – 1GHz					
• LIMITS	Acc. To § 15.209 (a)					
• UNCERTAINTY OF MEASURE	Level of confidence = 95% (k=2)					
	Expanded uncertainty 9kHz – 30MHz = 4,18 dB					
	Expanded uncertainty 30MHz – 1GHz = 5,72 dB					

TEST CONDITIONS	REQUIRED	MEASURED
Ambient temperature	23°C ± 5°C	23.6 °C
Ambient humidity	25 - 75%rH	45%
Pressure	85 - 106kPa (860mbar - 1060mbar)	1016 mbar
Voltage		12Vdc

OPERATING CONDITION: #1

RESULT: WITHIN THE LIMITS

MEASUREMENT PARAMETER – 9kHz – 150kHz

Resolution bandwidth	300Hz
Video bandwidth	1kHz
Span	141kHz
Sweep time	Auto couple
Detector	Peak
Trace-Mode	Max. hold

MEASUREMENT PARAMETER – 150kHz – 30MHz

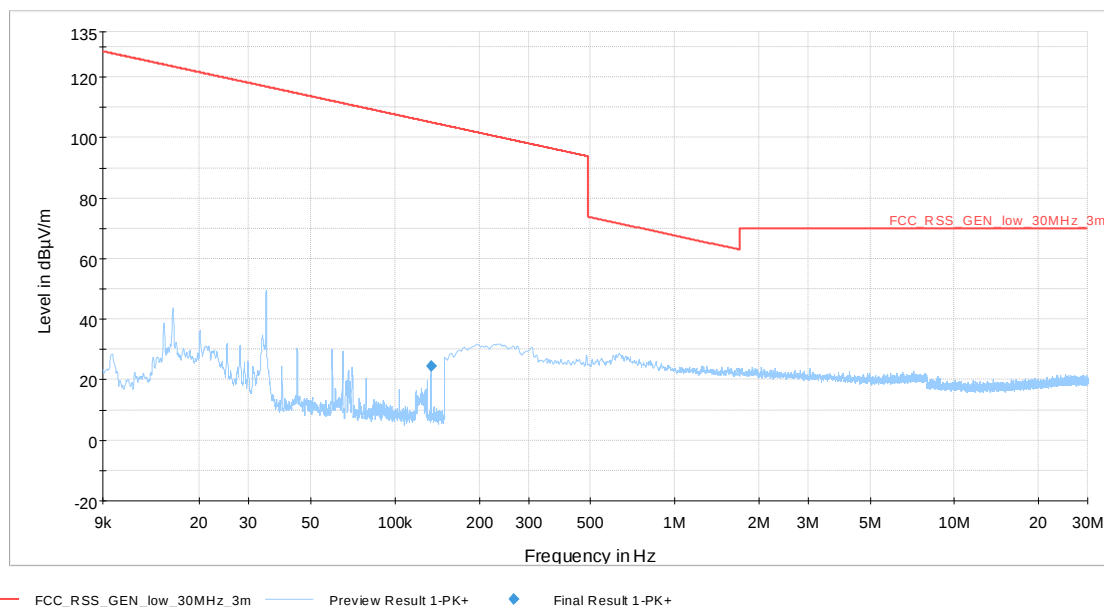
Resolution bandwidth	10kHz
Video bandwidth	30kHz
Span	29.850MHz
Sweep time	Auto couple
Detector	Peak
Trace-Mode	Max. hold

MEASUREMENT PARAMETER – 30MHz – 1GHz

Resolution bandwidth	120kHz
Video bandwidth	300kHz
Span	970MHz
Sweep time	Auto couple
Detector	Peak
Trace-Mode	Max. hold

TEST RESULTS

Frequency Range: 9kHz – 30MHz



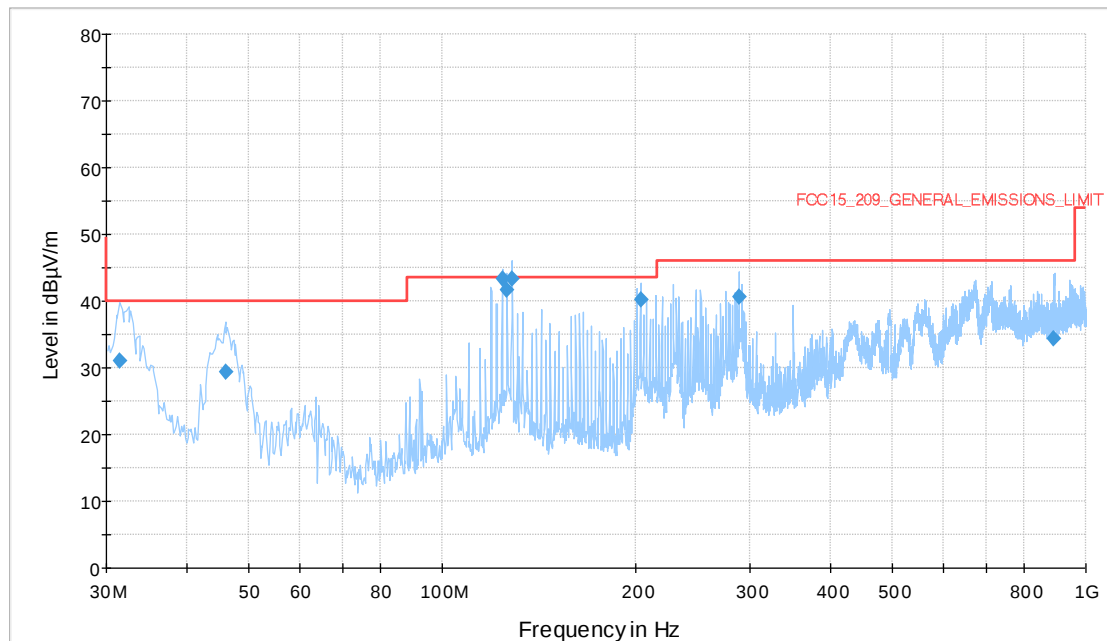
Final Results:

Frequency (MHz)	Average (dBμV/m)	Height (cm)	Axis	Azimuth (deg)	Margin (dB)	Limit (dBμV/m)
0.134300	24.3	104.7	V	180.0	80.7	105.0

NOTA: The results reported are for the worst axis only.

Frequency Range: 30MHz – 1GHz

Vertical polarization



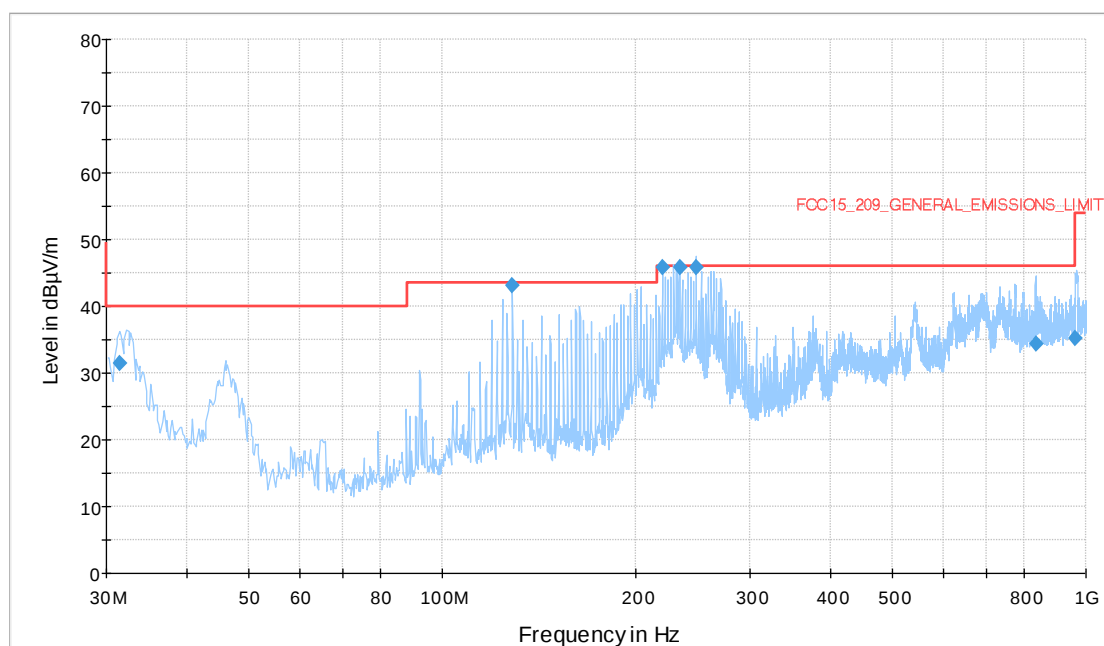
— FCC 15_209_GENERAL_EMISSIONS_LIMIT-CAR — MaxPeak-ClearWrite-PK+ ◆ Final Result 1-PK+

Final Results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBμV/m)
31.410000	31.0	99.8	7.0	9.00	40.00
46.050000	29.3	124.7	-8.0	10.70	40.00
123.690000	43.4	99.8	270.0	0.10	43.50
126.000000	41.7	99.8	277.0	1.80	43.50
128.310000	43.3	99.9	7.0	0.20	43.50
203.010000	40.3	99.7	176.0	3.20	43.50
289.290000	40.7	99.8	-8.0	5.30	46.00
891.510000	34.4	179.7	174.0	11.60	46.00

Frequency Range: 30MHz – 1GHz

Horizontal polarization



— FCC 15_209_GENERAL_EMISSIONS_LIMIT-CAR — MaxPeak-ClearWrite-PK+ ◆ Final Result 1-PK+

Final Results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBμV/m)
31.410000	31.5	203.8	176.0	8.50	40.00
128.430000	43.2	203.8	97.0	0.30	43.50
219.450000	45.7	124.8	277.0	0.30	46.00
233.460000	45.8	179.7	172.0	0.20	46.00
247.470000	45.9	99.8	266.0	0.10	46.00
835.020000	34.3	99.8	7.0	11.70	46.00
964.320000	35.1	207.8	262.0	18.90	54.00

TEST 2.	RESTRICTED FREQUENCY BAND
REFERENCE DOCUMENT	FCC Cfr 47 part 15 - Subpart C - §15.205 (a)

• TEST LOCATION	Semi-Anechoic Chamber					
• DISTANCE OF MEASUREMENT	3m					
• TYPE OF MEASUREMENT	Radiated					
• TEST EQUIPMENT USED FOR TEST	Instrument	Manufacturer	Model	Serial n°	Calibrated On	Due to
	Emi receiver	Rohde & Schwarz	ESU 40	100111	03/2024	03/2025
	MXE Emi Receiver	Keysight	N9038A	MY57290150	11/2023	11/2024
	Semi-Anechoic Chamber	Siemens	B83117-D6019-T232	003-005-134/94C	02/2024	02/2025
	Loop antenna	Rohde & Schwarz	HFH 2-Z2	841801/012	10/2023	10/2026
	Radiated Emission Cable (30MHz – 1GHz)	Sucoflex	Sucoflex 126	---	02/2024	02/2025
	Software EMC	Rohde & Schwarz	EMC32-E	V 8.40.0	N.A.	
• TESTED PORT	Enclosure					
• TEST METHOD	ANSI C63.10:2013 section 6.10					
• FREQUENCY RANGE	9kHz – 500kHz					
• LIMITS	Acc. To ref. Std.					
• UNCERTAINTY OF MEASURE	Level of confidence = 95% (k=2)					
	Expanded uncertainty 9kHz – 30MHz = 4,18 dB					

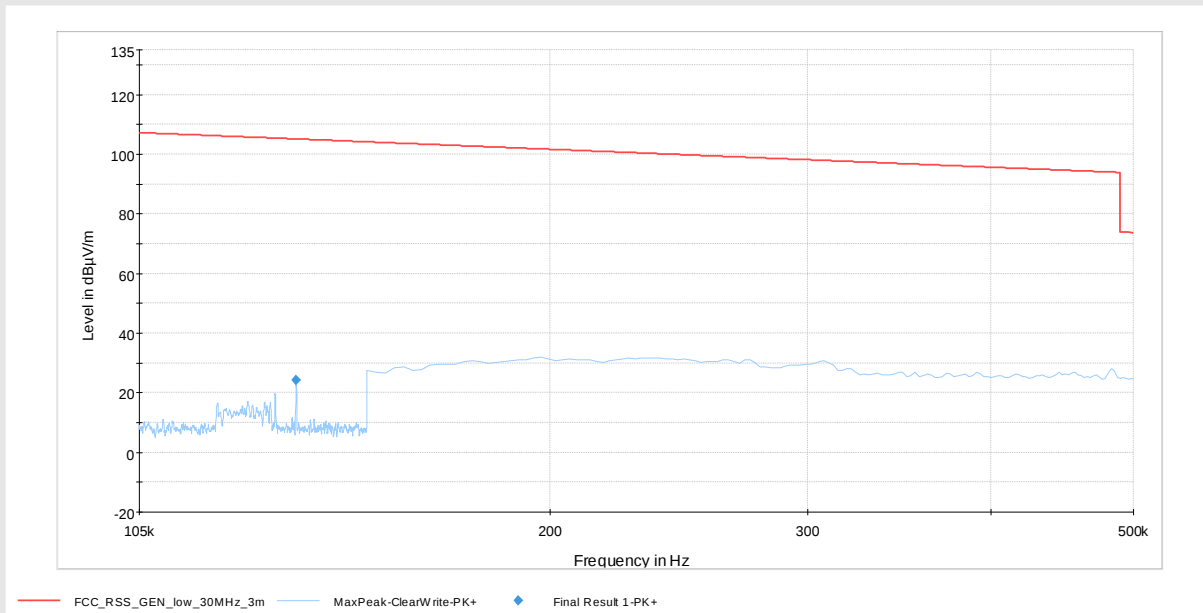
TEST CONDITIONS	REQUIRED	MEASURED
Ambient temperature	23°C ± 5°C	23 °C
Ambient humidity	25 - 75%rH	45%
Pressure	85 - 106kPa (860mbar - 1060mbar)	1016 mbar

OPERATING CONDITION: #1

RESULT: COMPLIANT

TEST RESULTS

RESTRICTED BAND



END OF TEST REPORT