



FCC / ISED Test Report

For:
Visteon Corporation

Brand:
Visteon

Marketing Name:
CSCLG

Model Number:
CSCLG

Product Description:

Cell Supervisory Circuit (CSC) is a sensing circuit installed on or adjacent to the cell modules. Their main function is to measure cell voltages and temperatures, as well as perform cell-balancing operations.

FCC ID: NT8-CSCLG
IC: 3043A-CSCLG

Applied Rules and Standards:

Title 47 CFR Part 15B
ICES-003 Issue 7

REPORT #: EMC_VISTE_002_23001_FCC15B_ICES003_CSC_LG

DATE: 1/29/2024



A2LA Accredited

IC recognized #
3462B

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1 Assessment

The following equipment (as further described in section 3 of this report) was evaluated against the applicable criteria specified in the Code of Federal Regulations Title 47 CFR Part 15B, and the relevant Canada standard ICES-003 Issue 7.

Radiated and conducted Emission tests are carried out to show that the EUT complies with FCC 15.107; FCC 15.109 (a) and ICES-003, §3.2.1; §3.2.2 limits for Class B device.

No deficiencies were ascertained.

Company	Description	Model #
Visteon Corporation	Cell Supervisory Circuit (CSC) is a sensing circuit installed on or adjacent to the cell modules. Their main function is to measure cell voltages and temperatures, as well as perform cell-balancing operations.	CSCLG

Responsible for Testing Laboratory:

2024-01-29	Compliance	Issa Ghanma (Lab Manager)	
Date	Section	Name	Signature

Responsible for the Report:

2024-01-29	Compliance	Guangcheng Huang (Senior EMC Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section3.

CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.



2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
EMC Lab Manager:	Ghanma, Issa
Responsible Project Leader:	Baskaran, Akanksha

2.2 Identification of the Client

Applicant's Name:	Visteon Corporation
Street Address:	One Village Center Drive,
City/Zip Code	Van Buren Township, MI, 48111
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	-Same as Client-----
Manufacturers Address:	-----
City/Zip Code	-----
Country	-----

3 Equipment under Test (EUT)

3.1 EUT Specifications

Brand:	Visteon
Model No:	CSCLG
Marketing name:	CSCLG
FCC ID:	NT8-CSCLG
IC:	3043A-CSCLG
HW Version :	VPRE1F-12B684-FF
SW Version :	SWE202-28418-003F00
HVIN:	CSCLG
PMN:	CSCLG
HMN:	N/A
FVIN:	N/A
Product Description:	Cell Supervisory Circuit (CSC) is a sensing circuit installed on or adjacent to the cell modules. Their main function is to measure cell voltages and temperatures, as well as perform cell-balancing operations.
Radios included in the device(If any):	Proprietary Protocol: 802.15.4 2405 - 2480 MHz Channels 0-15
Power Specifications:	Min. 12.5 V, Nom. 29.6 V, Max. 36 V powered by the vehicle battery power system
Operating Temperature Range:	-40 °C to +85 °C
Sample Revision:	<input type="checkbox"/> Production Unit; <input checked="" type="checkbox"/> Pre-Production
Product dimensions [mm]:	30 mm x 278 mm x 5 mm
Note: The information of the EUT specifications in the table above is provided by the client.	

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	NA	VPRE1F-12B684-CF	SWE202-28418-003F00	Unintentional radiated emissions

NA: not applicable

3.3 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	S/N	Notes/Comments
1	USB cable	-	-	-	Data communication

3.4 Test Sample Configuration

Set-up #	EUT / AE used for set-up	Comments
1	EUT # 1 + AE1	-

3.5 Mode of Operation details

Mode of Operation	Description of Operating modes	Additional Information
Op. 1	Idle	EUT in fully functional mode, while radio idle

4 Subject of Investigation

The objective of the measurements done by CETECOM Inc. was to evaluate the compliance of the EUT against the relevant requirements specified in the Code of Federal Regulations Title 47 CFR Part 15B and the relevant Canada standard ICES-003 Issue 7.

Radiated and conducted Emission tests are carried out to show that the EUT complies with FCC 15.107; FCC 15.109 (b) and ICES-003, §3.2.1; §3.2.2 limits for Class B device.

4.1 Date of Testing:

1/9/2024

4.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus, with 95% confidence interval (in dB delta to result), based on a coverage factor k=2.

Measurement System	EMC 1	EMC 2
Conducted emissions (mains port)	1.12 dB	0.46 dB
Radiated emissions		
(< 30 MHz)	3.66 dB	3.88 dB
(30 MHz – 1GHz)	3.17 dB	3.34 dB
(1 GHz – 3 GHz)	5.01 dB	4.45 dB
(>3 GHz)	4.0 dB	4.79 dB

4.3 Environmental Conditions during Testing:

The following environmental conditions were maintained during the course of testing:

- Ambient Temperature: 20-25 °C
- Relative humidity: 40-60%

Deviating test conditions are indicated at individual test description where applicable.

4.1 Decision Rule:

Cetecom advanced follows ILAC G8:2019 chapter 4.2.1 (Simple Acceptance Rule).

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3. The measurement uncertainty is mentioned in this test report, See chapter 9, but is not taken into account – neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong.

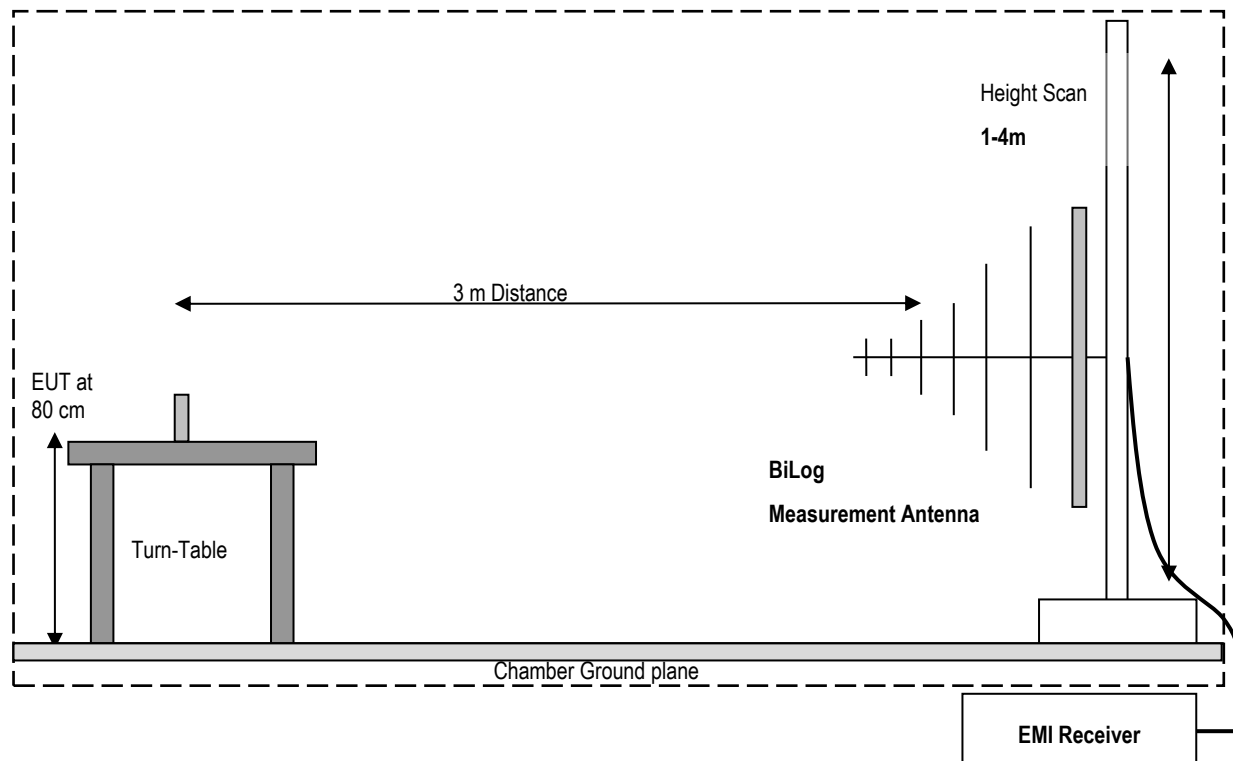
5 Measurement Procedures

Testing is performed according to the guidelines provided in ANSI C63.4-2014 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 30 MHz to 40 GHz

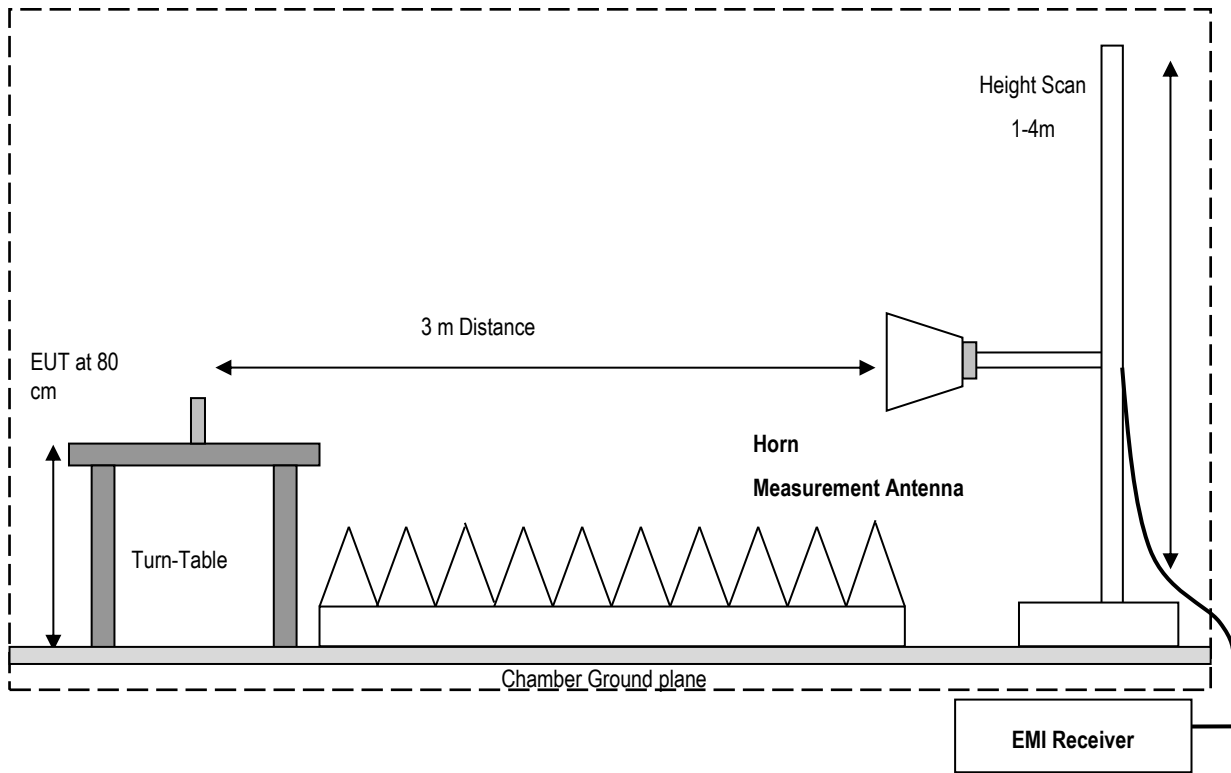
5.1 Radiated Measurement

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 360 ° continuous measurement of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The 10 highest emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90 deg range of the turntable, fine search in frequency domain and height scan between 1 m and 4 m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise floor level only the maximum trace is reported as described above.
- The results are split up into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a Biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.

Radiated Emissions Test Setup 30 MHz – 1 GHz Measurements



Radiated Emissions Test Setup 1 GHz – 18 GHz Measurements



5.2 Sample Calculations for Field Strength Measurements

Field Strength is calculated from the Spectrum Analyzer/ Receiver readings, taking into account the following parameters:

- Measured reading in dBµV
- Cable Loss between the receiving antenna and SA in dB and
- Antenna Factor in dB/m

All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the following equation:

$$FS \text{ (dB}\mu\text{V/m)} = \text{Measured Value on SA (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

Example:

Frequency (MHz)	Measured SA (dBµV)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dBµV/m)
1000	80.5	3.5	14	98.0

6 Measurement Results Summary

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	NA	NP	Result
FCC §15.109 ICES-003, §3.2.2	Radiated Emissions	Nominal	RX Mode	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Complies
FCC §15.107 ICES-003, §3.2.1	Conducted Emissions	Nominal	RX Mode	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note *

NA= Not Applicable; NP= Not Performed.

Note *: The EUT is a vehicular device powered by DC mains (battery); hence this test is not applicable.

7 Test Result Data

7.1 Radiated Emissions Measurement according to CFR 47 Part 15.109 and ICES-003 3.2.2

Spectrum Analyzer settings		
Sweep Frequency Range	30 MHz – 1 GHz	1 GHz – 40 GHz
Resolution Bandwidth	120 kHz	1 MHz
Detector (Exploratory Measurements)	Peak	Peak, Average
Detector (Final Measurements)	Quasi-Peak	Peak, Average
Trace Mode	Max Hold	Max Hold
Step Size	40 kHz	800 kHz
Measurement Time (Exploratory Measurements)	2 ms	2 ms
Measurement Time (Final Measurements)	100 ms	100 ms

7.1.1 Limits:

Class A Limits		
Frequency of emission (MHz)	Field Strength @ 10 m ($\mu\text{V}/\text{m}$)	Field Strength @ 3 m ($\text{dB}\mu\text{V}/\text{m}$)
30-88	90	49.5
88-216	150	54
216-960	210	56.9
Above 960	300	60

Class B Limits		
Frequency of emission (MHz)	Field Strength @ 3 m ($\mu\text{V}/\text{m}$)	Field Strength @ 3 m ($\text{dB}\mu\text{V}/\text{m}$)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Note: For measurements below 1 GHz, the limits above use a quasi-peak detector. For measurements above 1 GHz, the limits above use an average detector.



7.1.2 Test Summary:

Environmental Conditions	
Ambient Temperature:	23 °C
Relative Humidity:	42%
Atmospheric Pressure:	1010 mbar

Test Results					
Plot #	EUT Set-Up #	EUT operating mode	Scan Frequency	Lowes margin	Result
1 – 3	1	Op. 1	30 MHz – 18 GHz	3.19 dB	Pass

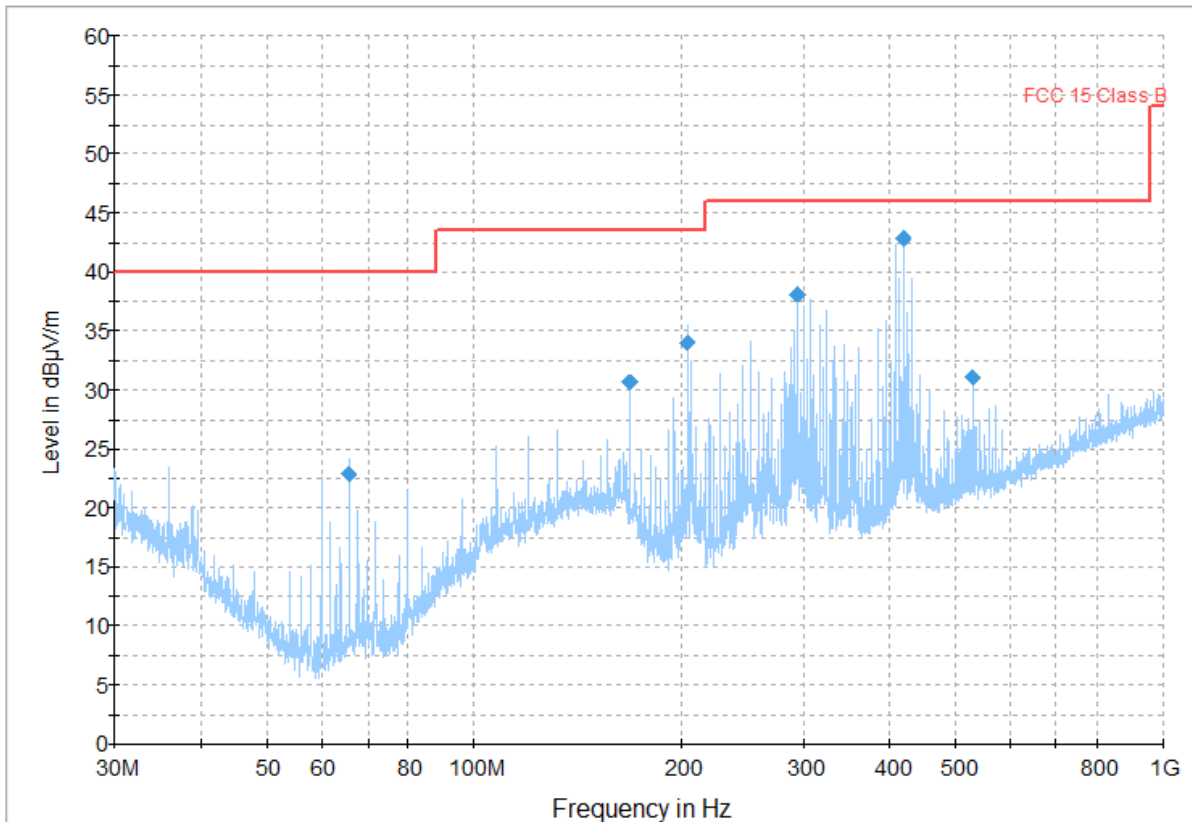
7.1.3 Measurement Plots:

Plot # 1

30 MHz – 1GHz

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)	Raw Rec (dBµV)
65.817	22.86	40.00	17.14	500.0	120.000	156.0	V	186.0	13.5	0.3	0.0	13.2	9.4
167.983	30.69	43.52	12.83	500.0	120.000	100.0	V	61.0	24.8	1.0	0.0	23.8	5.9
203.970	33.98	43.52	9.54	500.0	120.000	175.0	H	285.0	18.9	1.0	0.0	17.9	15.0
293.986	38.14	46.02	7.88	500.0	120.000	100.0	V	-8.0	21.5	1.2	0.0	20.3	16.6
419.989	42.83	46.02	3.19	500.0	120.000	100.0	H	149.0	24.3	1.6	0.0	22.7	18.5
527.974	30.98	46.02	15.04	500.0	120.000	124.0	V	192.0	26.0	2.0	0.0	24.1	4.9



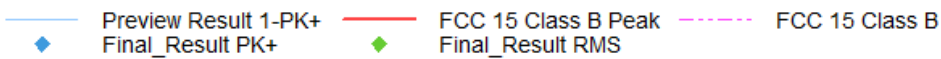
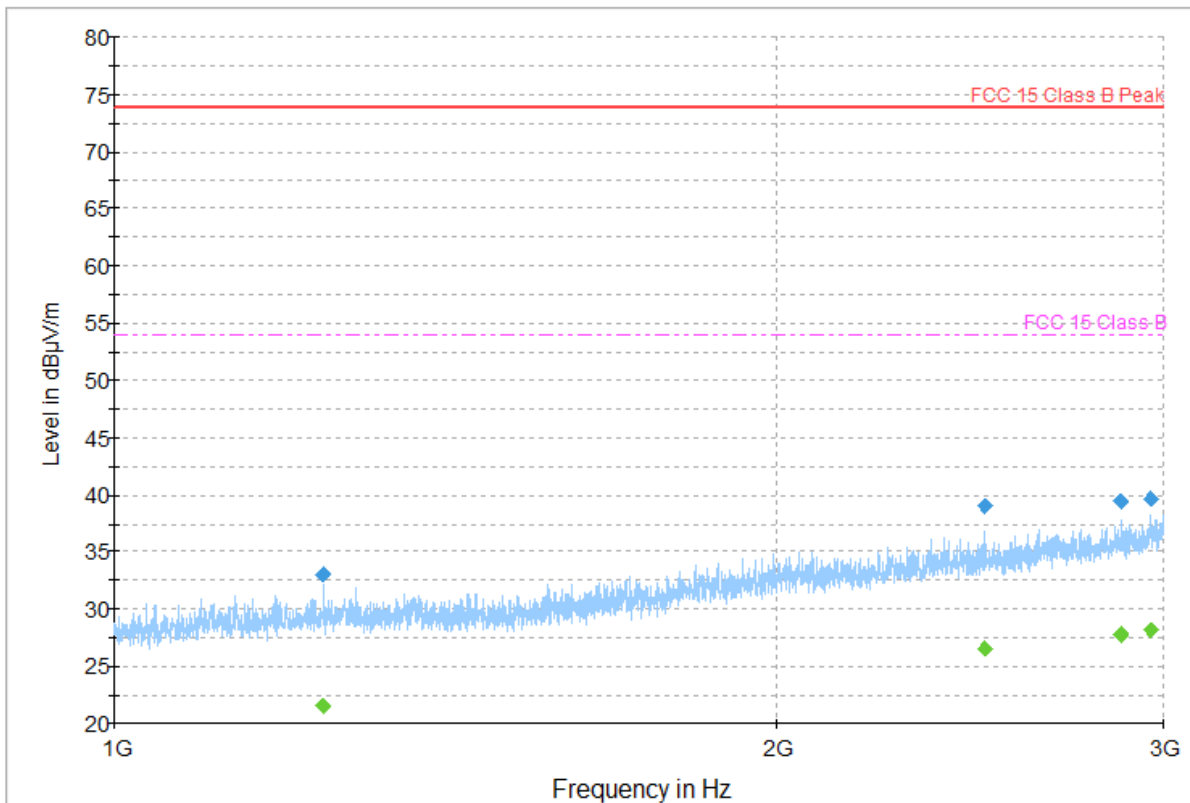
— Preview Result 1-PK+ — FCC 15 Class B ◆ Final_Result QPK

Plot # 2

1 – 3GHz

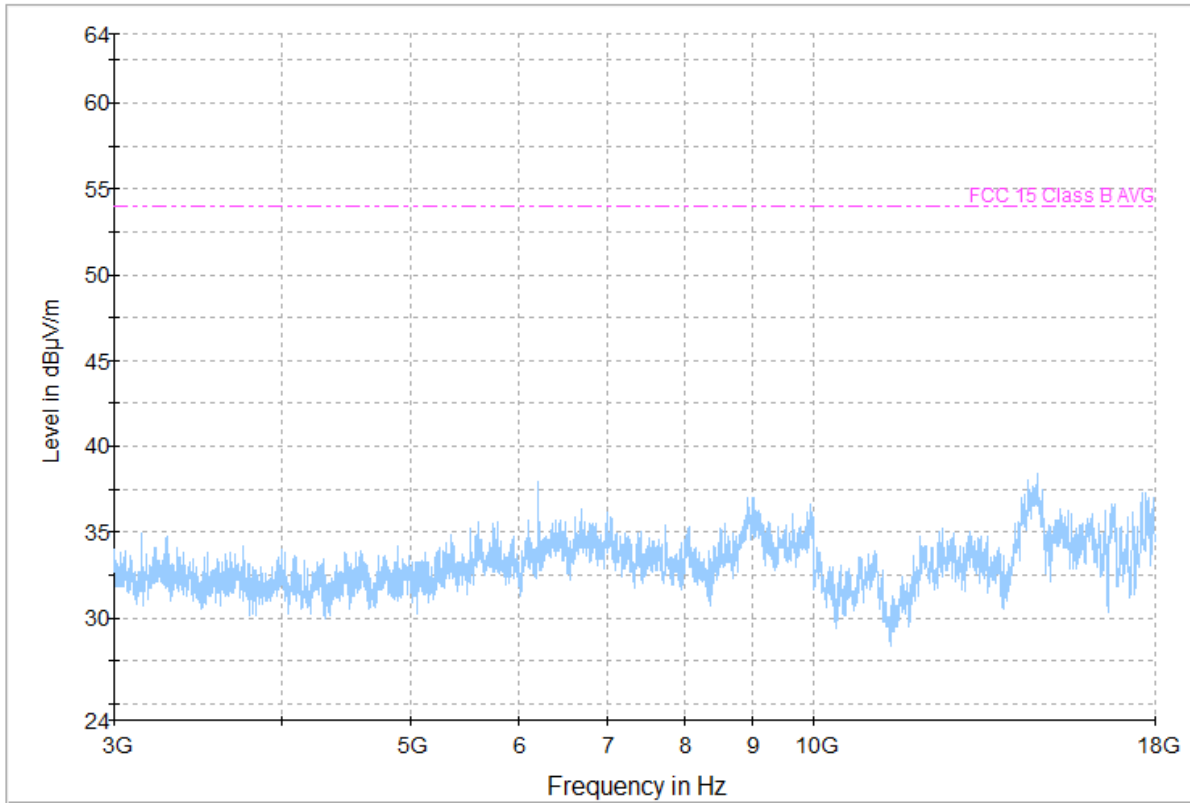
Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBµV)
1244.500	---	21.57	53.98	32.40	500.0	1000.000	173.0	H	85.0	-6.3	-31.3	0.0	25.1	27.8
1244.500	33.08	---	73.98	40.90	500.0	1000.000	173.0	H	85.0	-6.3	-31.3	0.0	25.1	39.3
2490.500	38.97	---	73.98	35.01	500.0	1000.000	229.0	V	283.0	-1.8	-30.1	0.0	28.3	40.7
2490.500	---	26.62	53.98	27.36	500.0	1000.000	229.0	V	283.0	-1.8	-30.1	0.0	28.3	28.4
2868.250	---	27.80	53.98	26.18	500.0	1000.000	385.0	H	136.0	-0.4	-29.6	0.0	29.2	28.2
2868.250	39.39	---	73.98	34.59	500.0	1000.000	385.0	H	136.0	-0.4	-29.6	0.0	29.2	39.8
2962.500	39.73	---	73.98	34.25	500.0	1000.000	249.0	V	78.0	0.1	-29.6	0.0	29.7	39.6
2962.500	---	28.25	53.98	25.73	500.0	1000.000	249.0	V	78.0	0.1	-29.6	0.0	29.7	28.2



Plot # 3

3 – 18GHz



Preview Result 1-PK+ Final_Result PK+ FCC 15 Class B Peak Final_Result RMS FCC 15 Class B AVG

Note: The limit for measurement with peak detector is at 73.98 dBµV/m.



8 Test Setup Photos

Setup photos are included in supporting file name: "EMC_VISTE_002_23001_FCC15B_Photos.pdf"

9 Test Equipment And Ancillaries Used For Testing

Item Name	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
LOOP ANTENNA	ETS LINDGREN	6512	00164698	3 YEARS	6/9/2023
BICONILOG ANTENNA	AH-Systems	BiLA2G	569	3 YEARS	10/30/2023
HORN ANTENNA	ETS LINDGREN	3115	00035111	3 YEARS	10/26/2023
HORN ANTENNA	ETS LINDGREN	3117-PA	167061	3 YEARS	9/25/2023
HORN ANTENNA	ETS LINDGREN	3116C-PA	00169535	3 YEARS	10/26/2023
EMI RECEIVER	R&S	ESW44	101715	3 YEARS	10/24/2023
DIGITAL THERMOMETER	CONTROL COMPANY	36934-164	191871986	3 YEARS	10/18/2023

Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.

Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated "N/A" for calibration status either do not specifically require calibration or is internally characterized before use.

10 Revision History

Date	Report Name	Changes to report	Report prepared by
1/29/2024	EMC_VISTE_002_23001_FCC15B_CSCLG	Initial version	Huang, Guangcheng [CETECOM]

<<The End>>
