



TEST REPORT


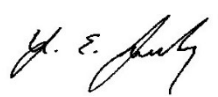
Applicant	Controlid Industria e Comercio de Hardware e Servicos De Tecnologia Ltda
Address	Rua Hungria, 888, 8th Floor Sao Paulo SP, 01455000 - Brazil

FCC ID	2AKJ4-IDFACEFPA
ISED Canada IC	22235-IDFACEFPA
Product Description	Facial Recognition Access Controller with 125kHz RFID
PMN Model/HVIN FVIN	IDFACEFPA IDFACEFPA N/A
Additional Models	None
Date of tests	May 22, 2023 through Sep 19, 2023
FCC Test Firm DN Canada CABID	US1028 US0106

The tests have been carried out according to the requirements of the following standard:

- ☒ FCC Part 15, Subpart C, Section 15.209
- ☒ ISED Canada RSS-210 Issue 10 Section 7.3

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Bryan Valcourt EMC Engineer	Approved by Yunus Faziloglu Wireless Manager
	
Report Issue Date: Sep 21, 2023	Issue Number: 2

This report is governed by, and incorporates by reference, CPS Conditions of Service as posted at the date of issuance of this report at <https://www.cps.bureauveritas.com/terms-conditions> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

TABLE OF CONTENTS

RELEASE CONTROL RECORD	4
1 SUMMARY OF TEST RESULTS	5
2 MEASUREMENT UNCERTAINTY	6
3 GENERAL INFORMATION	7
3.1 GENERAL DESCRIPTION OF EUT	7
3.2 DESCRIPTION OF TEST MODES	8
3.3 MEASUREMENT PROCEDURES USED	10
3.4 DESCRIPTION OF SUPPORT EQUIPMENT	10
4 TEST RESULTS	11
4.1 AC SIDE OF DC CONDUCTED EMISSIONS	11
4.1.1 LIMITS	11
4.1.2 TEST EQUIPMENT USED	11
4.1.3 TEST PROCEDURES	12
4.1.4 DEVIATIONS	12
4.1.5 TEST SETUP	13
4.1.6 EUT OPERATING CONDITIONS	13
4.1.7 TEST RESULTS	14
4.2 FUNDAMENTAL FIELD STRENGTH	18
4.2.1 LIMITS	18
4.2.2 TEST SETUP	18
4.2.3 TEST EQUIPMENT USED	18
4.2.4 TEST PROCEDURES	18
4.2.5 DEVIATIONS	18
4.2.6 EUT OPERATING CONDITIONS	18
4.2.7 TEST RESULTS	19
4.3 RADIATED SPURIOUS EMISSIONS	20
4.3.1 LIMITS	20
4.3.2 TEST EQUIPMENT USED	21
4.3.3 TEST PROCEDURES	22
4.3.4 DEVIATIONS	23
4.3.5 TEST SETUP	23
4.3.6 EUT OPERATING CONDITIONS	24
4.3.7 TEST RESULTS	25
4.4 OCCUPIED BANDWIDTH (99%)	35
4.4.1 LIMITS	35



**Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda
Report No. EX0375-2 Issue 2**



4.4.2	TEST SETUP	35
4.4.3	TEST EQUIPMENT USED	35
4.4.4	TEST PROCEDURES	35
4.4.5	DEVIATIONS	35
4.4.6	EUT OPERATING CONDITIONS	35
4.4.7	TEST RESULTS	36
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	37
6	APPENDIX A – MODIFICATIONS	37



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
1	Original release	Jul 28, 2023
2	To address TCB comments: <ul style="list-style-type: none">• CEMI plots and data tables edited to remove references to CISPR 16-2-1• Measurement settings clarified in Section 4.3.3• 99% OBW measurement repeated• Company name correction on headers of each page	Sep 21, 2023

1 SUMMARY OF TEST RESULTS

EUT was tested against the following requirements:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.209), RSS-Gen				
STANDARD SECTION		TEST TYPE AND LIMIT	APPLICABLE	RESULT
47 CFR	RSS			
15.207	Gen 8.8	AC Side of DC Mains Power Line Conducted Emissions	Y	Pass
15.205 15.209	Gen 8.9 Gen 8.10	Radiated Spurious Emissions	Y	PASS
15.209	210 7.3 Gen 8.9	Fundamental Field Strength	Y	PASS
--	Gen 6.7	99% Occupied Bandwidth	Y	PASS
15.203	Gen 6.8	Antenna Requirement	Y	PASS

Note 1: EUT is DC powered.

2 MEASUREMENT UNCERTAINTY

The listed uncertainties are the worst-case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results. Values for measurement uncertainty are calculated per ETSI TR 100 028 (2001).

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radio frequency (@ 2.4GHz)	3.23×10^{-8}	1×10^{-7}
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation: Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

NOMINAL VOLTAGE	12VDC
MODULATION TYPES	ASK
DATA RATES	3.906kbps
OPERATING FREQUENCY	125kHz
EUT Power Setting	Maximum (default)
FUNDAMENTAL FIELD STRENGTH	78.5dBµV/m at 3m
ANTENNA TYPE	Inductor coil

EUT Ports:									
Port Label	Port Type	No. of ports	No. Populated	Cable Type	Shielded	Ferrites	Length	Max Length	In/Out Type
Power In (on EAM)	2 Pin	1	1	Copper Wire	No	No	3m	3m	In
Wiegand Input and Output (on EAM)	5 Pin	1	1	Copper Wire	No	No	3m	3m	In
Relay, Door Sensor and Pish Button (on EAM)	6 Pin	1	1	Copper Wire	No	No	3m	3m	In
Power Out for ID Face (on EAM)	4 Pin	1	1	Copper Wire	No	No	3m	3m	In
Power In (on ID Face)	4 Pin	1	1	Copper Wire	No	No	3m	3m	In
Ethernet (on ID Face)	Ethernet	1	1	Copper Wire	No	No	3m	3m	In
Communications Line (on ID Face)	8 Pin Connector	1	1	Copper Wire	No	No	3m	3m	In
USB	USB	1	0	USB	Yes	No	3	5	For Programming Only

Lowest clock frequency in the device (used/generated): 0.032768MHz

Highest clock frequency in the device (used/generated): 1080MHz

NOTES:

- For a more detailed description of the EUT, please refer to the manufacturer's specifications or the user's manual.
- For photos of the EUT, please refer to External and Internal Photos exhibits.

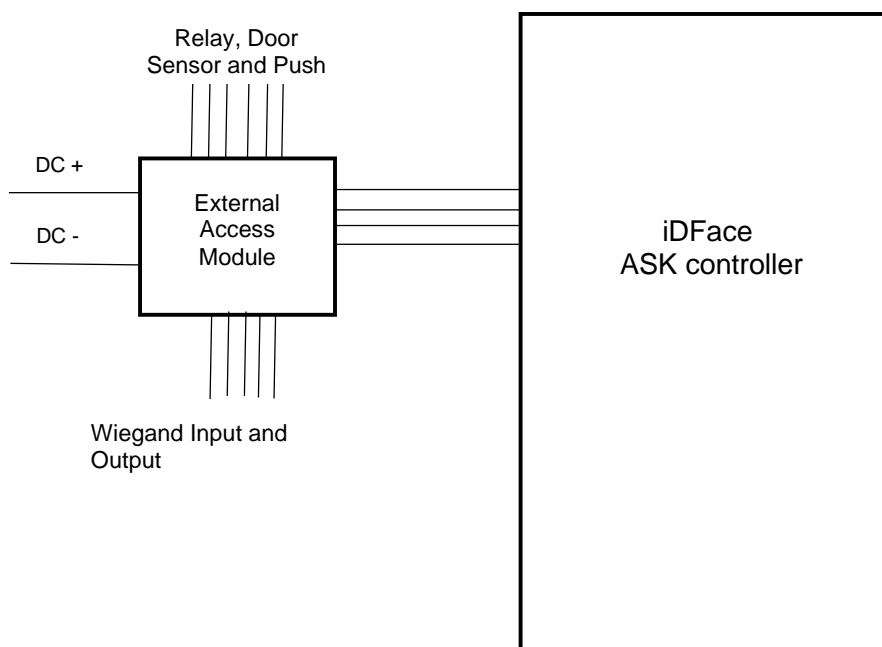
3.2 DESCRIPTION OF TEST MODES

EUT operates at a single channel at 125kHz. EUT was powered by an AC to DC power adapter. EUT starts transmitting as soon as powered up.

EUT configuration modes:

TEST MODE	DESCRIPTION
A	Continuous Transmit at 3.906kbps (Duty-cycle: 100%)

EUT SETUP BLOCK DIAGRAMS



Following channels/modes were selected for the applicable tests below.

TEST	TEST MODE	AVAILABLE CHANNELS	TESTED CHANNEL	MODULATION TYPE	DATA RATE (kbps)	Notes
FFS	A	1	1	ASK	3.906	1
OBW	A	1	1	ASK	3.906	1
RSE (9k-30M)	A	1	1	ASK	3.906	1
RSE (30M-1G)	A	1	1	ASK	3.906	1
RSE ≥ 1G	A	1	1	ASK	3.906	1
PLCE	A	1	1	ASK	3.906	1

Note 1: EUT was tested in its single installation orientation as seen in the test setup photos exhibit.

FFS: Fundamental Field Strength

OBW: 99% Occupied Bandwidth

RSE (9k-30M): Radiated Spurious Emissions (9kHz-30MHz)

RSE (30M-1G): Radiated Spurious Emissions (30MHz-1GHz)

RSE ≥ 1G: Radiated Spurious Emissions Above 1GHz

PLCE: Power Line Conducted Emissions

TEST CONDITIONS:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TESTED BY	DATE OF TEST
OBW	21.2 °C, 52.1% RH, 1017 mbar	Bryan Valcourt	Sep 19, 2023
FFS	21.8 °C, 53% RH, 1021 mbar	Bryan Valcourt	May 23, 2023
RSE	21.8 °C, 49.4% RH, 1010 mbar	Ryan Brown	May 25, 2023
RSE	21.9 °C, 54.7% RH, 1016 mbar	Ryan Brown	May 30, 2023
PLCE	21.6 °C, 56.6% RH, 1009 mbar	Bryan Valcourt	May 24, 2023



3.3 MEASUREMENT PROCEDURES USED

All tests were performed in accordance with the following measurement procedures:

ANSI C63.10-2013

RSS-Gen Issue 5

3.4 DESCRIPTION OF SUPPORT EQUIPMENT

Support Equipment	Model #	Serial #
None		

4 TEST RESULTS

4.1 AC SIDE OF DC CONDUCTED EMISSIONS

4.1.1 LIMITS

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE: 1. Lower limit applies at the transition frequencies.
2. Limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.1.2 TEST EQUIPMENT USED

Rev. 5/4/2023									
Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Rental MXE EMI Receiver(1168255)	20Hz-8.4GHz	N9038A	Agilent	MY53290009	1168255	I	8/12/2023	8/12/2022	
LISNs/Measurement Probes	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
LISN Asset 2708	9KHz-30MHz	LI-220C	Corn-Power	20070054	2708	I	2/7/2024	2/7/2023	
Conducted Test Sites (Mains / Telco)	FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on	
CEMI 5	719150		A-0015			III	NA	N/A	
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	12/15/2025	12/15/2022	
Asset #2657		1235C97	Control Company	200435369	2657	I	8/18/2025	8/18/2022	
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on	
CEMI-04	9kHz - 2GHz		C-S			II	2/14/2024	2/14/2023	
Attenuators	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
20dB Attenuator-64	9kHz-2GHz			N/A		II	8/3/2023	8/3/2022	

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



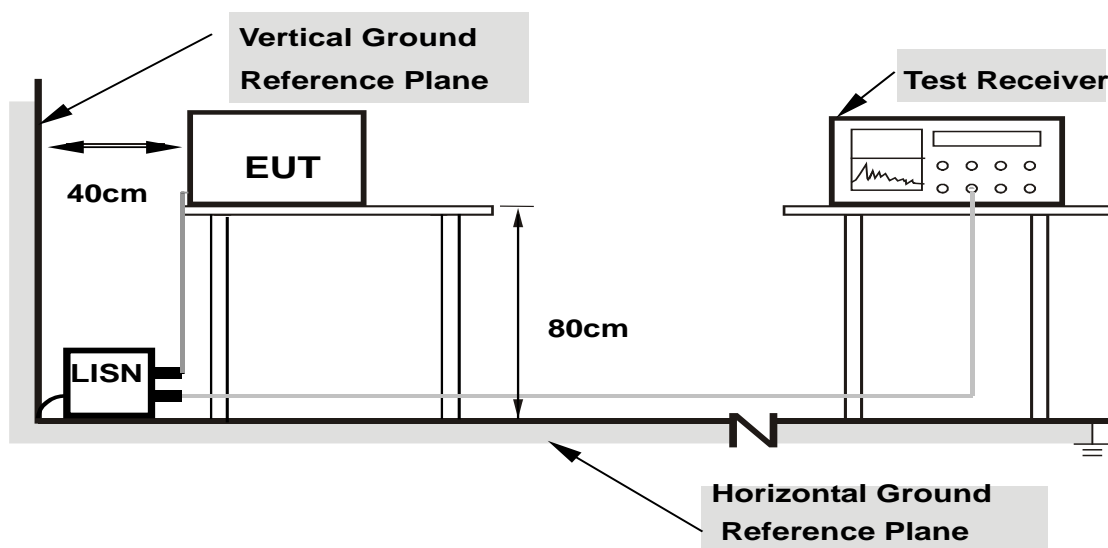
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded. RBW of 9kHz and VBW of 30kHz were used during measurement.

4.1.4 DEVIATIONS

No deviations from the standard.

4.1.5 TEST SETUP



- Note:** 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to Test Setup Photos exhibit.

4.1.6 EUT OPERATING CONDITIONS

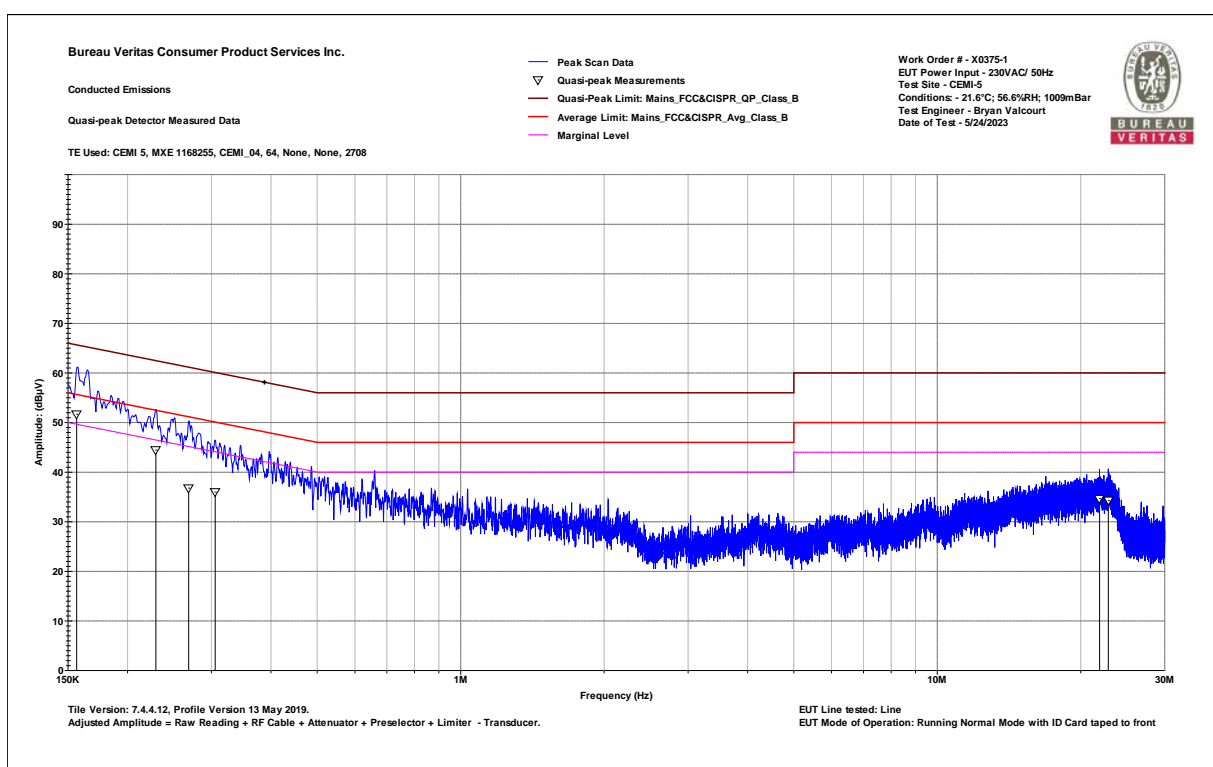
EUT was operated according to manufacturer's specifications.

4.1.7 TEST RESULTS

Bureau Veritas Consumer Product Services Inc.	Work Order # - X0375-1
Conducted Emissions	EUT Power Input - 230VAC/ 50Hz
Quasi-peak Detector Data	Test Site - CEMI-5
Notes:	Conditions: - 21.6°C; 56.6%RH; 1009mBar
EUT Line tested: Line	Test Engineer - Bryan Valcourt
EUT Mode of Operation: Running Normal Mode with ID Card taped to front	Date of Test - 5/24/2023

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB)	Adjusted QP Amplitude (dBμV)	QP Lim: Mains_FCC,ICES- 003,&CISPR_QP_ Class_B (dBμV)	Margin to QP Limit (dB)	QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.156	31.643	20	51.6	65.7	-14	PASS	-14
0.229	24.388	20.1	44.5	62.5	-18	PASS	
0.269	16.707	20.1	36.8	61.2	-24.4	PASS	
0.306	15.901	20.1	36	60.1	-24.1	PASS	
21.906	14.492	20.2	34.7	60	-25.3	PASS	
22.847	14.113	20.1	34.3	60	-25.7	PASS	

Line Quasi Peak Table



Line Quasi Peak Graph

Bureau Veritas Consumer Product Services Inc.

Conducted Emissions

Final Average Detector Data

Notes:

EUT Line tested: Line

EUT Mode of Operation: Running Normal Mode with ID Card taped to front Date of Test - 5/24/2023

Work Order # - X0375-1

EUT Power Input - 230VAC/ 50Hz

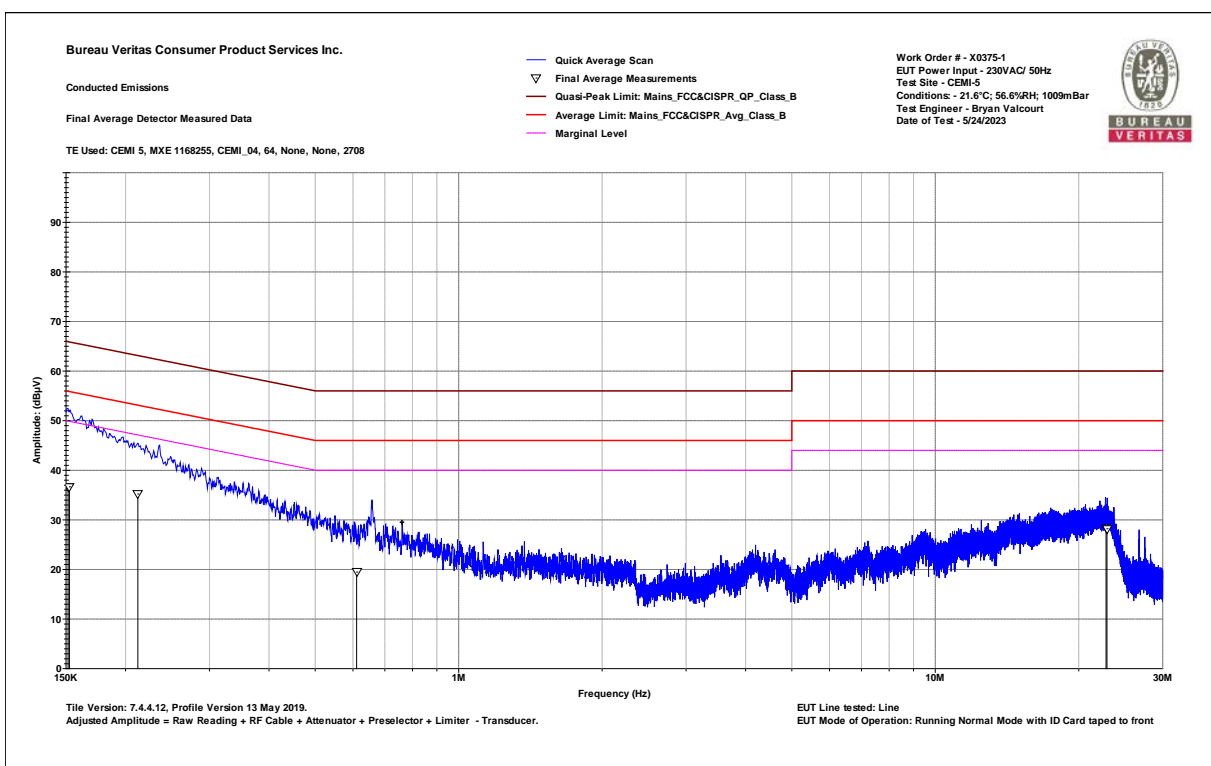
Test Site - CEMI-5

Conditions: - 21.6°C; 56.6%RH; 1009mBar

Test Engineer - Bryan Valcourt

Frequency (MHz)	Raw Avg Reading (dBμV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBμV)	Av Lim: Mains_FCC,ICES- 003,&CISPR_Avg _Class_B (dBμV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.152	16.6	20	36.6	55.9	-19.3	PASS	
0.152	16.6	20	36.6	55.9	-19.2	PASS	
0.212	15.1	20.1	35.2	53.1	-17.9	PASS	-17.9
0.611	-0.7	20.1	19.5	46	-26.5	PASS	
22.815	8.1	20.1	28.3	50	-21.7	PASS	
22.92	8.1	20.1	28.2	50	-21.8	PASS	

Line Average Table



Line Average Graph



**Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda**
Report No. EX0375-2 Issue 2



Bureau Veritas Consumer Product Services Inc.

Conducted Emissions

Quasi-peak Detector Data

Notes:

EUT Line tested: Neutral

EUT Mode of Operation: Running Normal Mode with ID Card taped to front Date of Test - 5/24/2023

Work Order # - X0375-1

EUT Power Input - 230VAC/ 50Hz

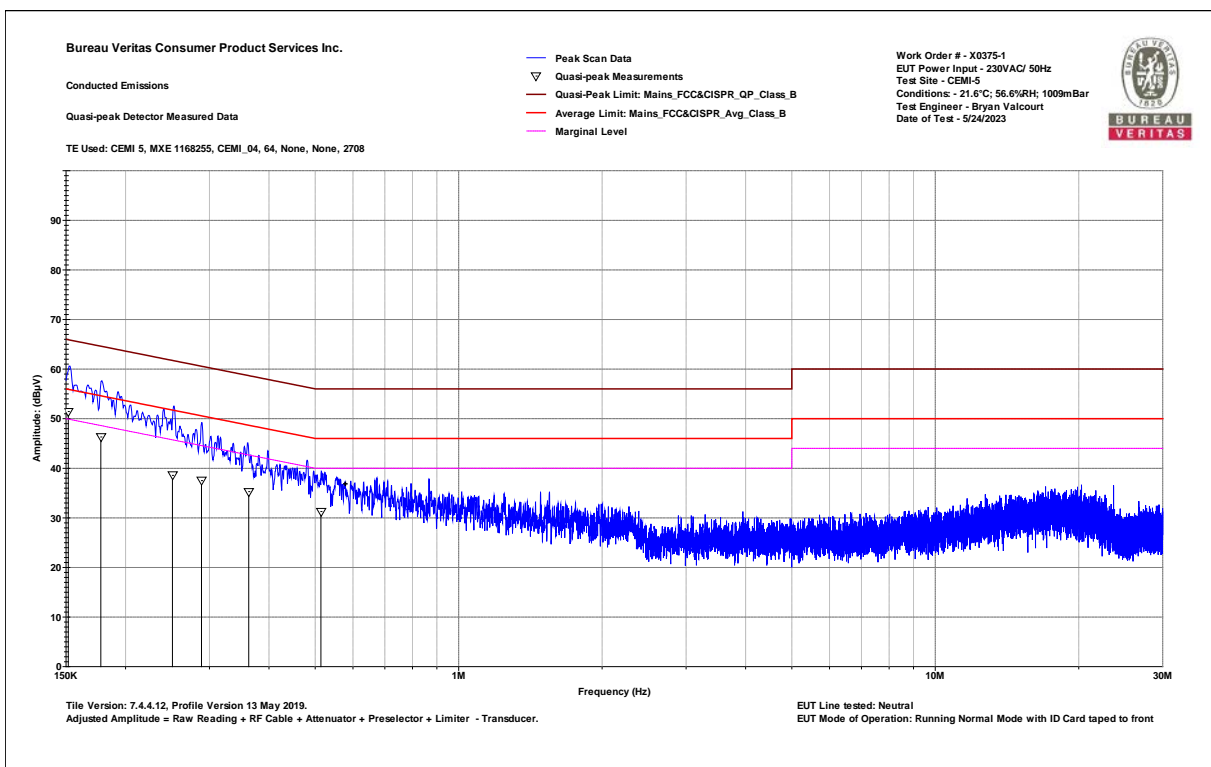
Test Site - CEMI-5

Conditions: - 21.6°C; 56.6%RH; 1009mBar

Test Engineer - Bryan Valcourt

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB)	Adjusted QP Amplitude (dBμV)	QP Lim: Mains_FCC,ICES- 003,&CISPR_QP_ Class_B (dBμV)	Margin to QP Limit (dB)	QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)
0.152	31.438	20	51.4	65.9	-14.5	PASS	-14.5
0.178	26.282	20	46.3	64.6	-18.3	PASS	
0.251	18.516	20	38.6	61.7	-23.2	PASS	
0.289	17.43	20.1	37.5	60.6	-23.1	PASS	
0.363	15.258	20	35.3	58.7	-23.4	PASS	
0.514	11.152	20.1	31.3	56	-24.7	PASS	

Neutral Quasi Peak Table



Neutral Quasi Peak Graph



Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda
Report No. EX0375-2 Issue 2



Bureau Veritas Consumer Product Services Inc.

Conducted Emissions

Final Average Detector Data

Notes:

EUT Line tested: Neutral

EUT Mode of Operation: Running Normal Mode with ID Card taped to front Date of Test - 5/24/2023

Work Order # - X0375-1

EUT Power Input - 230VAC/ 50Hz

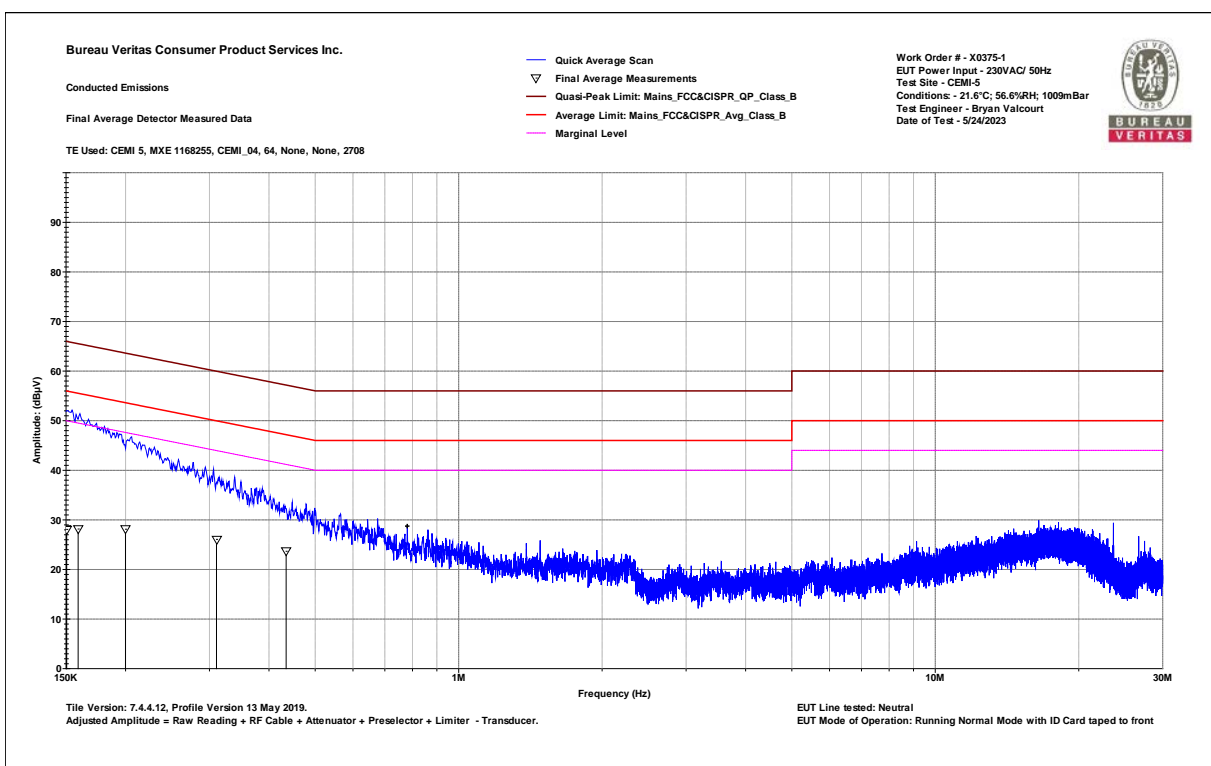
Test Site - CEMI-5

Conditions: - 21.6°C; 56.6%RH; 1009mBar

Test Engineer - Bryan Valcourt

Frequency (MHz)	Raw Avg Reading (dBμV)	Correction Factor (dB)	Adjusted Avg Amplitude (dBμV)	Av Lim: Mains_FCC,ICES- 003,&CISPR_Avg _Class_B (dBμV)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
0.15	8.1	20	28.1	56	-27.9	PASS	
0.151	8.1	20	28.1	56	-27.9	PASS	
0.159	8.1	20	28.1	55.5	-27.4	PASS	
0.2	8.1	20	28.1	53.6	-25.5	PASS	
0.31	6	20	26.1	50	-23.9	PASS	
0.434	3.5	20.1	23.6	47.2	-23.5	PASS	-23.5

Neutral Average Table



Neutral Average Graph

4.2 FUNDAMENTAL FIELD STRENGTH

4.2.1 LIMITS

EUT must meet FCC 15.209 and RSS-Gen Issue 5 Section 8.9 Table 6 limit at its fundamental frequency.

Limit conversion below 30MHz is done by using the square of an inverse linear distance extrapolation factor (40 dB/decade) as allowed in FCC 15.31(f)(2).

Limit (3m) = Limit (30m) + 40*log(30/3) = Limit (30m) + 40

Limit (3m) = Limit (300m) + 40*log(300/3) = Limit (300m) + 80

4.2.2 TEST SETUP

Same as radiated spurious emissions setup below 30MHz (Section 4.3.5).

4.2.3 TEST EQUIPMENT USED

Rev. 5/1/2023

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	3/30/2024	3/30/2023
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	1686	I	12/28/2024	12/28/2022
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
8447F Rental PA	9KHz-1.3GHz	84477F	HP	3113A05395		II	10/17/2023	10/17/2022
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Large Loop	20Hz-5MHz	6511	EMCO	9704-1154	67	I	8/22/2024	8/22/2022
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	12/15/2025	12/15/2022
Asset #2654		1235C97	Control Company	200477432	2654	I	8/18/2025	8/18/2022
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2468	9KHz-18GHz		MegaPhase			II	11/1/2023	11/1/2022
Asset #2608	9KHz-18GHz		Pasternack			II	11/1/2023	11/1/2022
Asset #2681	9KHz-18GHz		Pasternack			II	12/13/2023	12/13/2022

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

4.2.4 TEST PROCEDURES

Same as Section 4.3.3.

4.2.5 DEVIATIONS

No deviations from the standard.

4.2.6 EUT OPERATING CONDITIONS

EUT was operated according to manufacturer's specifications.



**Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda**
Report No. EX0375-2 Issue 2



4.2.7 TEST RESULTS

Radiated Emissions Table												
Date: 23-May-23			Company: Control iD						Work Order: X0375			
Engineer: Bryan Valcourt			EUT Desc: FP ASK Control Module and External Access Module						EUT Operating Voltage/Frequency: 12VDC			
Temp: 21.8°C			Humidity: 53%			Pressure: 1021mbar						
Frequency Range: 125kHz Fundamental								Measurement Distance: 3 m				
Notes: Peak max-hold readings								EUT Max Freq: 125kHz				
Antenna Polarization (0° - 90°)	Frequency (MHz)	Reading (dBµV)		Correction Factor (dBµV)		Adjusted Reading (dBµV/m)				FCC Part 15.209		
										Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
Parallel	0.125	58.2		20.3		78.5	---	---	---	105.7	-27.2	Pass
Perpendicular	0.125	55.4		20.3		75.7	---	---	---	105.7	-30.0	Pass
Parallel to Floor	0.125	50.9		20.3		71.2	---	---	---	105.7	-34.5	Pass
Table Result: Pass by -27.2 dB								Worst Freq: 0.125 MHz				
Test Site: EMI Chamber 2			Cable 1: Asset #2681				Cable 2: Asset #2608			Cable 3: Asset #2468		
Analyzer: 2093			Preamp: 8447F				Antenna: Lg Loop			Preselector: ---		
CSsoft Radiated Emissions Calculator v 1.017.225												
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor												
Copyright Curtis-Straus LLC 2000												

4.3 RADIATED SPURIOUS EMISSIONS

4.3.1 LIMITS

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emissions limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

- Lower limit applies at the transition frequencies.
- $\text{dB}\mu\text{V/m} = 20 \cdot \log(\mu\text{V/m})$.
- As specified in 15.35(b), for frequencies above 1000MHz, field strength limits are based on the use of measurement instrumentation employing an average detector function. However, there is also a limit on the peak level of the emissions that is 20 dB above the maximum permitted average emission limit.
- Limit conversion below 30MHz is done by using the square of an inverse linear distance extrapolation factor (40 dB/decade) as allowed in FCC 15.31(f)(2).
 $\text{Limit (3m)} = \text{Limit (30m)} + 40 \cdot \log(30/3) = \text{Limit (30m)} + 40$
 $\text{Limit (3m)} = \text{Limit (300m)} + 40 \cdot \log(300/3) = \text{Limit (300m)} + 80$
- RSS-GEN Table 6 H-field limits are 51.5dB lower than FCC 15.209(a) E-field limits. Measurements are performed in terms of magnetic field and converted to electric field using the free space impedance of 377Ω ($\text{E-field} = \text{H-field} + 51.5$). Therefore resulting pass/fail margin would be the same if an E-field reading is compared to an E-field limit or an H-field reading is compared to an H-field limit.



Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda
Report No. EX0375-2 Issue 2



4.3.2 TEST EQUIPMENT USED

Rev. 6/27/2023

Spectrum Analyzers / Receivers /Preselectors
2093 MXE EMI Receiver

Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	3/30/2024	3/30/2023

Radiated Emissions Sites

FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
719150	2762A-7	A-0015	30-1000MHz	1686	I	12/28/2024	12/28/2022
719150	2762A-7	A-0015	1-18GHz	1686	I	12/28/2024	12/28/2022

Antennas

Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
20Hz-5MHz	6511	EMCO	9704-1154	67	I	8/22/2024	8/22/2022
10kHz-30MHz	PLA-130/A	ARA	1024	755	I	9/12/2024	9/12/2022
30-2000MHz	JB1	Sunol	A091604-1	1105	I	10/25/2023	10/25/2021
1-18GHz	3117	ETS	157647	1861	I	3/27/2025	3/27/2023

Preamps /Couplers Attenuators / Filters

Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
9KHz-1.3GHz	84477F	HP	3113A05395		II	10/17/2023	10/17/2022
1-18GHz	8449B	Agilent	1149055		II	11/1/2023	11/1/2022

Cables

Range	Mfr	Cat	Calibration Due	Calibrated on
9KHz-18GHz	MegaPhase	II	11/1/2023	11/1/2022
9KHz-18GHz	Pasternack	II	11/1/2023	11/1/2022
9KHz-18GHz	Pasternack	II	10/6/2023	10/6/2022

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

4.3.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber.
- b. For below 30MHz, a loop antenna with its lowest point 1m above the ground was placed 3m away from the EUT and it was rotated 0 and 90 degrees around its vertical axis.
- c. In 30MHz-1GHz range, a BiConiLog antenna was mounted on a variable-height antenna tower and placed 3m away from the EUT. Antenna height was varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were investigated. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. In 1GHz-6GHz range, a horn antenna was mounted on a variable-height antenna tower and placed 3m away from the EUT. Antenna height was varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were investigated. The table was rotated 360 degrees to determine the position of the highest radiation.
- e. Following bandwidths were used during emissions testing:

Freq. (MHz)	RBW	VBW	Pre-scan	Final
0.009-0.15	200Hz	1kHz	Peak	Quasi Peak and RMS Power Avg (Trace Avg)
0.15-30	9kHz	30kHz	Peak	Quasi Peak and RMS Power Avg (Trace Avg)
30-1000	120kHz	300kHz	Peak	Quasi Peak
>1000	1MHz	3MHz	Peak	Peak Max Hold and RMS Power Avg (Trace Avg)

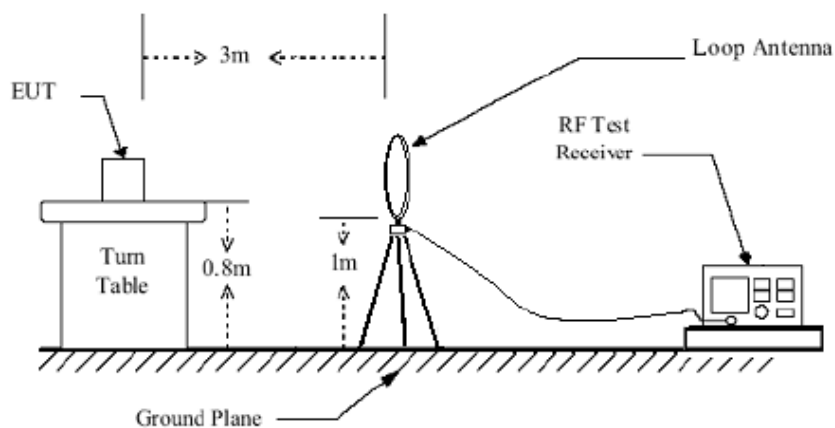
Per FCC §15.209(d), limits §15.209(a) are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. If peak measurements in these frequency bands were below the applicable limits, QPk and RMS measurements were not performed.

4.3.4 DEVIATIONS

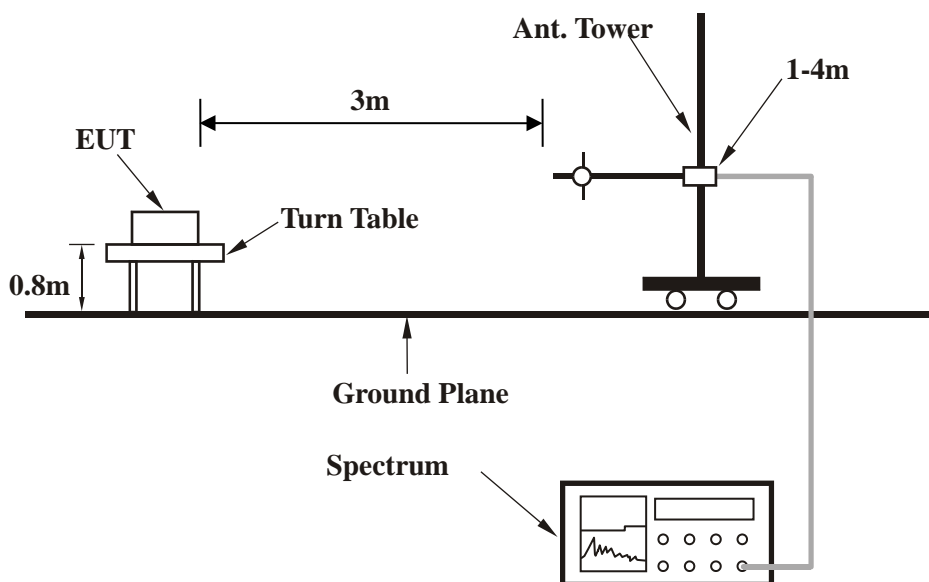
No deviations from the standard.

4.3.5 TEST SETUP

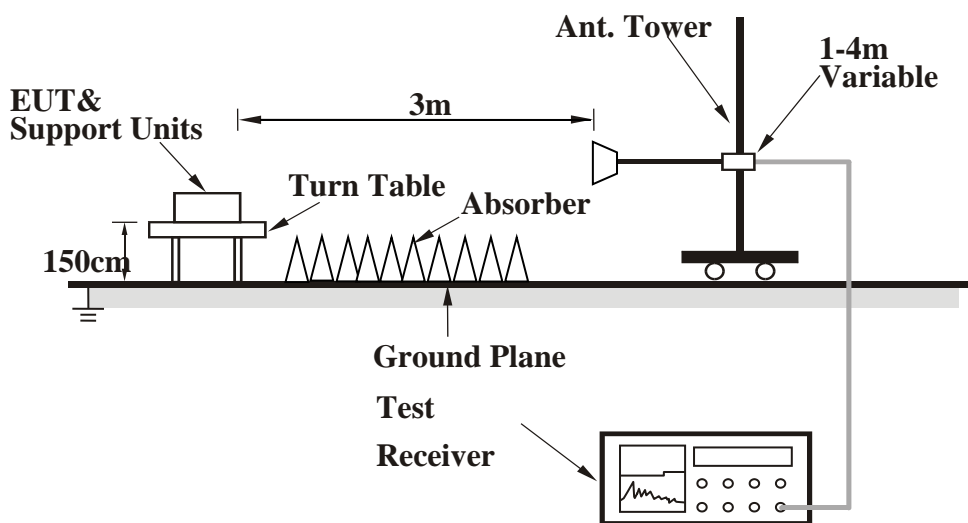
Below 30MHz Test Setup



30MHz - 1GHz Test Setup



1GHz – 6GHz Test Setup



Note: For the actual test configuration, please refer to the Test Setup Photos exhibit.

4.3.6 EUT OPERATING CONDITIONS

EUT was operated according to the manufacturer's specifications.



Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda
Report No. EX0375-2 Issue 2



4.3.7 TEST RESULTS

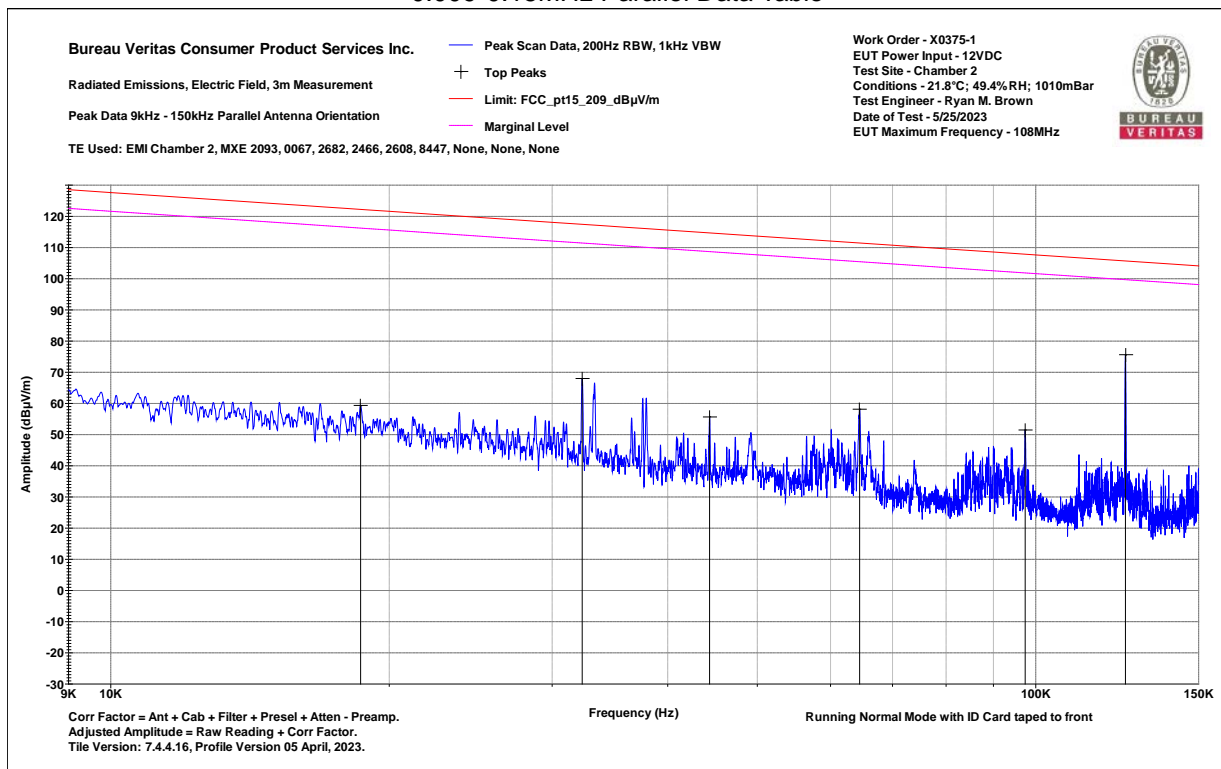
Emissions below 1GHz

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions, Electric Field, 3m Measurement
Top Peaks Parallel 9-150kHz
Notes:
Running Normal Mode with ID Card taped to front

Work Order - X0375-1
EUT Power Input - 12VDC
Test Site - Chamber 2
Conditions - 21.8°C; 49.4%RH; 1010mBar
Test Engineer - Ryan M. Brown
Date of Test - 5/25/2023

Frequency (MHz)	Raw Peak Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Lim: FCC_pt15_20 9_dBμV/m (dBμV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
0.018623	26	33.3	59.2	122.2	-63	PASS		135
0.032336	39.1	28.9	68	117.4	-49.4	PASS		180
0.044402	29.5	26.2	55.7	114.7	-59	PASS		45
0.064508	35.1	23	58.1	111.4	-53.3	PASS		0
0.097411	30.6	20.9	51.5	107.8	-56.4	PASS		315
0.125011	55.2	20.3	75.5	105.7	-30.2	PASS	-30.2	0

0.009-0.15MHz Parallel Data Table



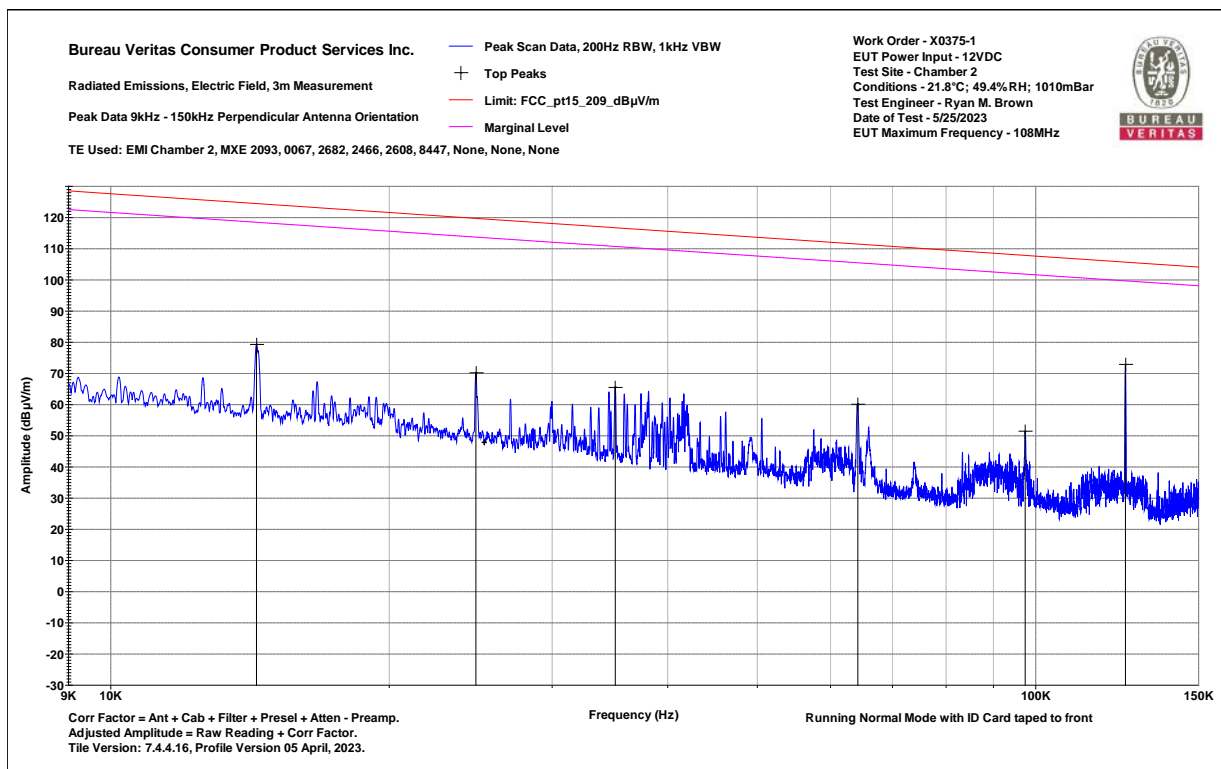
0.009-0.15MHz Parallel Graph

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions, Electric Field, 3m Measurement
Top Peaks Perpendicular 9-150kHz
Notes:
Running Normal Mode with ID Card taped to front

Work Order - X0375-1
EUT Power Input - 12VDC
Test Site - Chamber 2
Conditions - 21.8°C; 49.4%RH; 1010mBar
Test Engineer - Ryan M. Brown
Date of Test - 5/25/2023

Frequency (MHz)	Raw Peak Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Lim: FCC_pt15_20 9_dBμV/m (dBμV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
0.014372	44.2	35.1	79.3	124.5	-45.1	PASS		0
0.024817	39.1	31.1	70.2	119.7	-49.5	PASS		270
0.035106	37.4	28.2	65.6	116.7	-51.1	PASS		180
0.064216	37.1	23.1	60.2	111.5	-51.3	PASS		180
0.097407	30.5	20.9	51.4	107.8	-56.5	PASS		225
0.125011	52.6	20.3	72.8	105.7	-32.9	PASS	-32.9	90

0.009-0.15MHz Perpendicular Data Table



0.009-0.15MHz Perpendicular Graph



Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda
Report No. EX0375-2 Issue 2

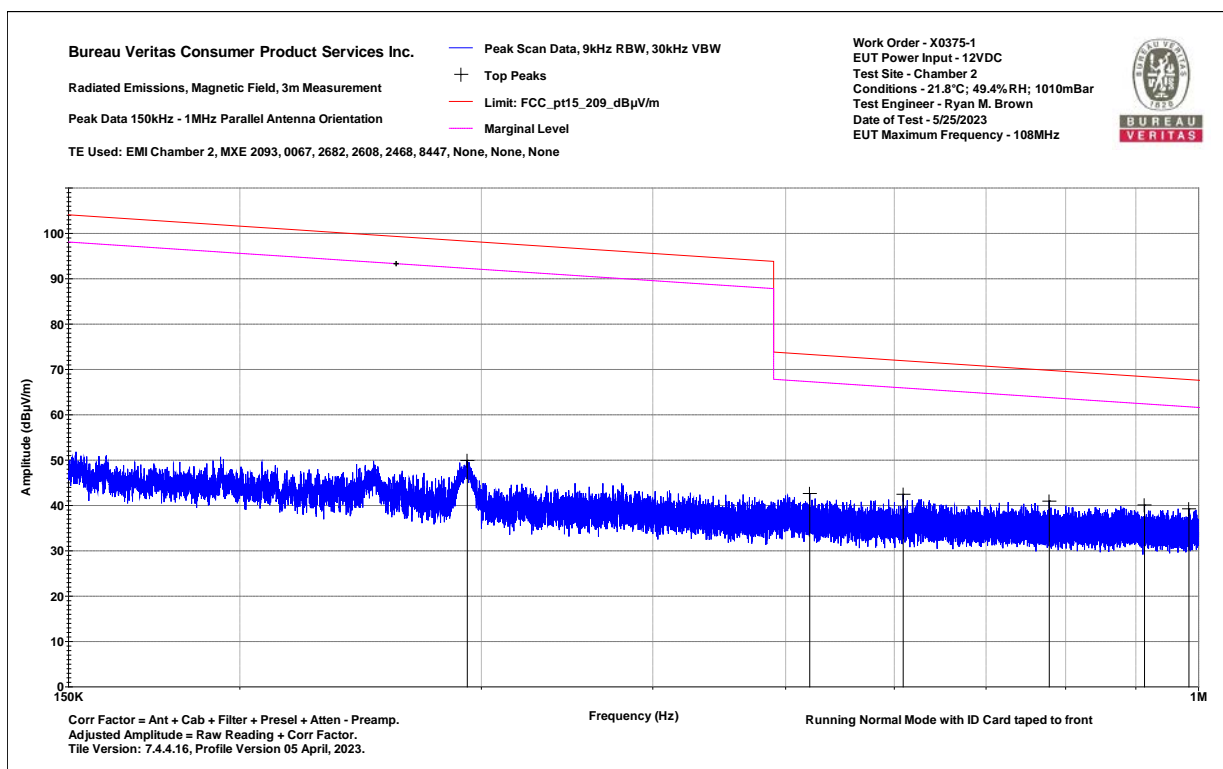


Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Magnetic Field 3m Distance
Top Peaks Parallel 150-1000kHz
Notes:
Running Normal Mode with ID Card taped to front

Work Order - X0375-1
EUT Power Input - 12VDC
Test Site - Chamber 2
Conditions - 21.8°C; 49.4%RH; 1010mBar
Test Engineer - Ryan M. Brown
Date of Test - 5/25/2023

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim: FCC_pt15_20 9_dBµV/m (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
0.293	30.9	19	49.9	98.3	-48.3	PASS		0
0.521	23.8	18.8	42.6	73.3	-30.7	PASS		45
0.609	23.7	18.7	42.4	71.9	-29.5	PASS		45
0.778	22.2	18.8	41	69.8	-28.8	PASS		45
0.913	21.3	18.8	40.1	68.4	-28.3	PASS	-28.3	45
0.984	20.5	18.8	39.2	67.8	-28.5	PASS		225

0.15-1MHz Parallel Data Table



0.15-1MHz Parallel Graph



Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda
Report No. EX0375-2 Issue 2

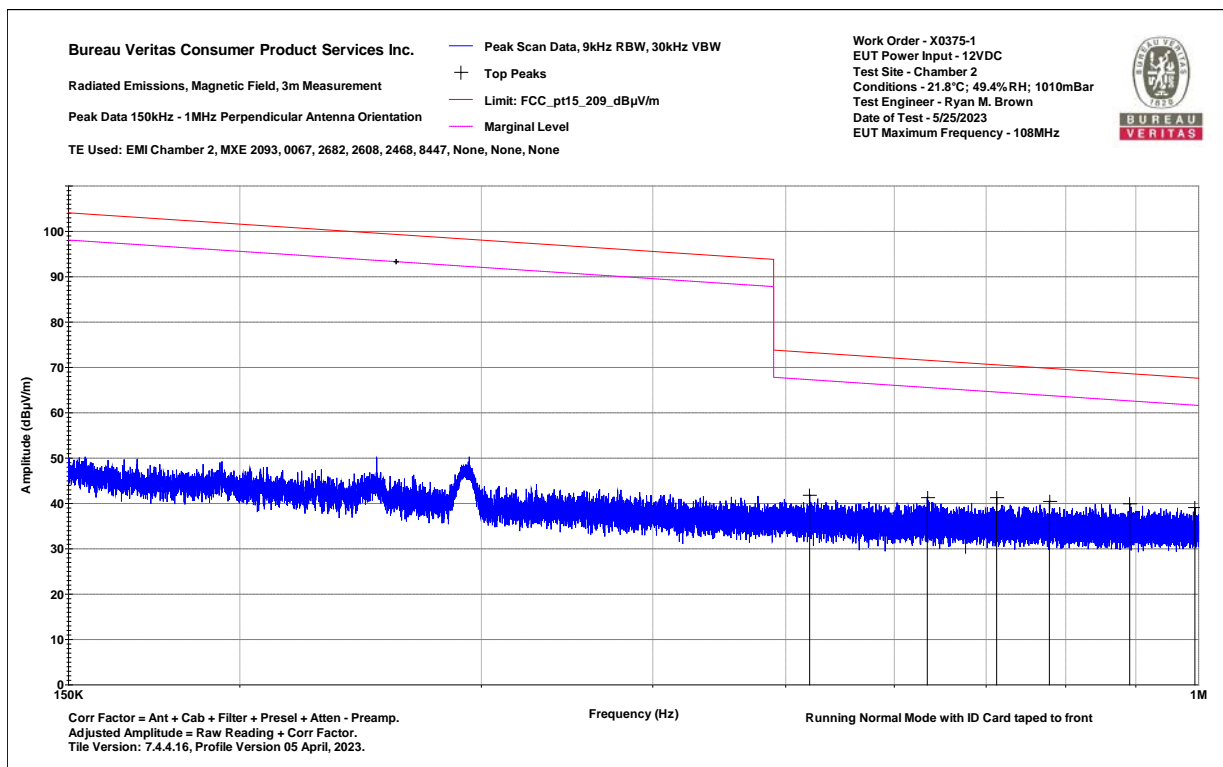


Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Magnetic Field 3m Distance
Top Peaks Perpendicular 150-1000kHz
Notes:
Running Normal Mode with ID Card taped to front

Work Order - X0375-1
EUT Power Input - 12VDC
Test Site - Chamber 2
Conditions - 21.8°C; 49.4%RH; 1010mBar
Test Engineer - Ryan M. Brown
Date of Test - 5/25/2023

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim: FCC_pt15_20 9_dBµV/m (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
0.521	23	18.8	41.8	73.3	-31.5	PASS		90
0.634	22.6	18.7	41.3	71.6	-30.2	PASS		45
0.712	22.5	18.8	41.3	70.6	-29.3	PASS		0
0.778	21.7	18.8	40.5	69.8	-29.3	PASS		135
0.891	21.1	18.8	39.9	68.6	-28.7	PASS		135
0.994	20.3	18.8	39.1	67.7	-28.6	PASS	-28.6	0

0.15-1MHz Perpendicular Data Table



0.15-1MHz Perpendicular Graph



Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda
Report No. EX0375-2 Issue 2

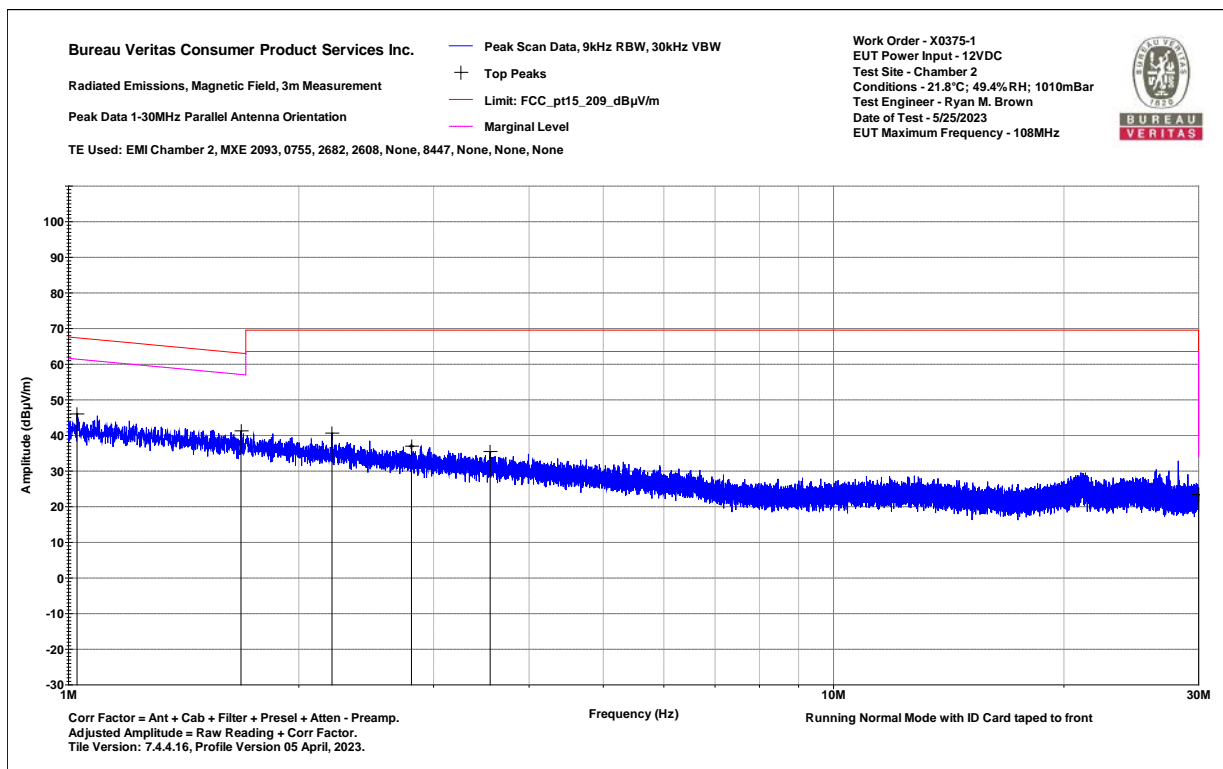


Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Magnetic Field 3m Distance
Top Peaks Parallel 1-30MHz
Notes:
Running Normal Mode with ID Card taped to front

Work Order - X0375-1
EUT Power Input - 12VDC
Test Site - Chamber 2
Conditions - 21.8°C; 49.4%RH; 1010mBar
Test Engineer - Ryan M. Brown
Date of Test - 5/25/2023

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim: FCC_pt15_20 9_dBµV/m (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
1.026	18.7	27.3	46.1	67.4	-21.3	PASS		315
1.681	17.5	23.7	41.2	63.1	-21.9	PASS		180
2.21	19.3	21.3	40.6	69.5	-28.9	PASS		225
2.807	17.7	19.2	36.9	69.5	-32.6	PASS		135
3.557	18	17.3	35.4	69.5	-34.2	PASS		135
30	14.9	8.4	23.3	40	-16.7	PASS	-16.7	45

1-30MHz Parallel Data Table



1-30MHz Parallel Graph



Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda
Report No. EX0375-2 Issue 2

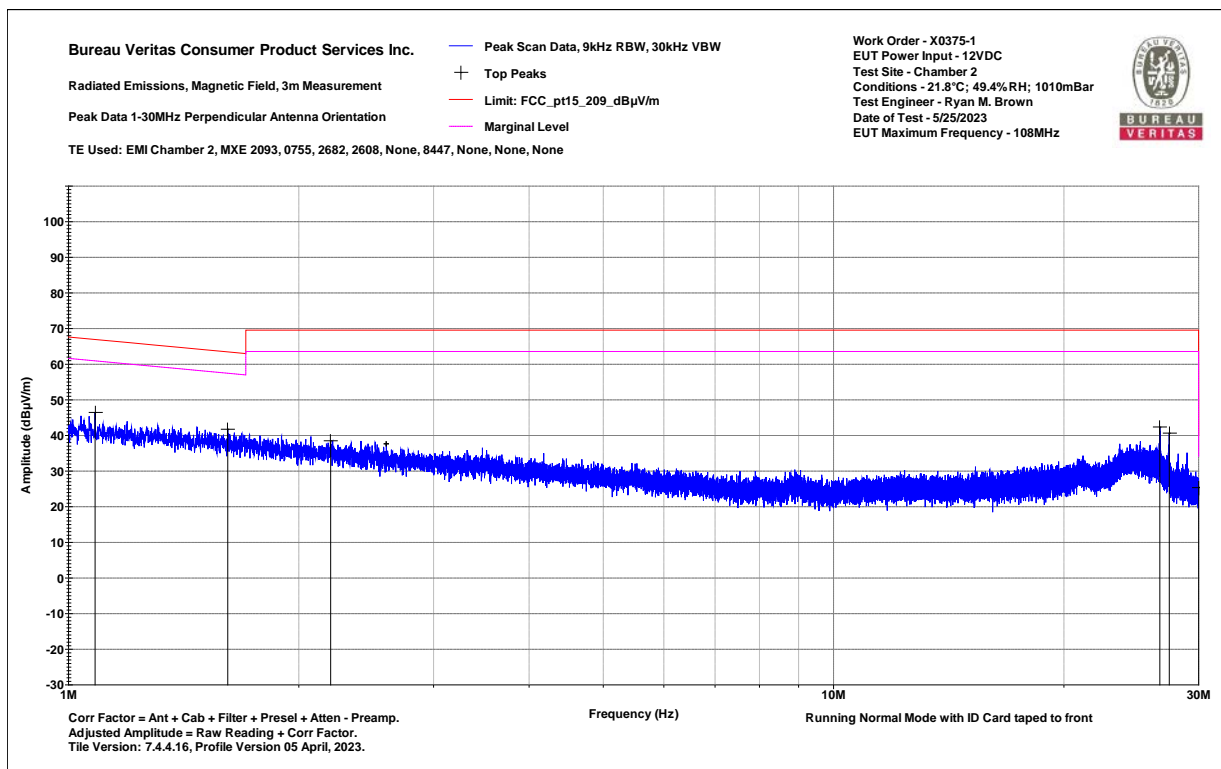


Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Magnetic Field 3m Distance
Top Peaks Perpendicular 1-30MHz
Notes:
Running Normal Mode with ID Card taped to front

Work Order - X0375-1
EUT Power Input - 12VDC
Test Site - Chamber 2
Conditions - 21.8°C; 49.4%RH; 1010mBar
Test Engineer - Ryan M. Brown
Date of Test - 5/25/2023

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim: FCC_pt15_20 9_dBµV/m (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Margin (dB)	EUT Azimuth (degrees)
1.083	19.4	27	46.4	66.9	-20.5	PASS		135
1.615	17.6	24.1	41.7	63.4	-21.7	PASS		90
2.201	17.2	21.3	38.5	69.5	-31.1	PASS		270
26.695	33.9	8.4	42.3	69.5	-27.2	PASS		90
27.462	32.2	8.4	40.6	69.5	-28.9	PASS		270
30	17	8.4	25.4	40	-14.6	PASS	-14.6	225

1-30MHz Perpendicular Data Table



1-30MHz Perpendicular Graph

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
30-1000MHz Vertical Data

Notes:

Running Normal Mode without the ID Card

Work Order - X0375-1

EUT Power Input - 12VDC

Test Site - Chamber 2

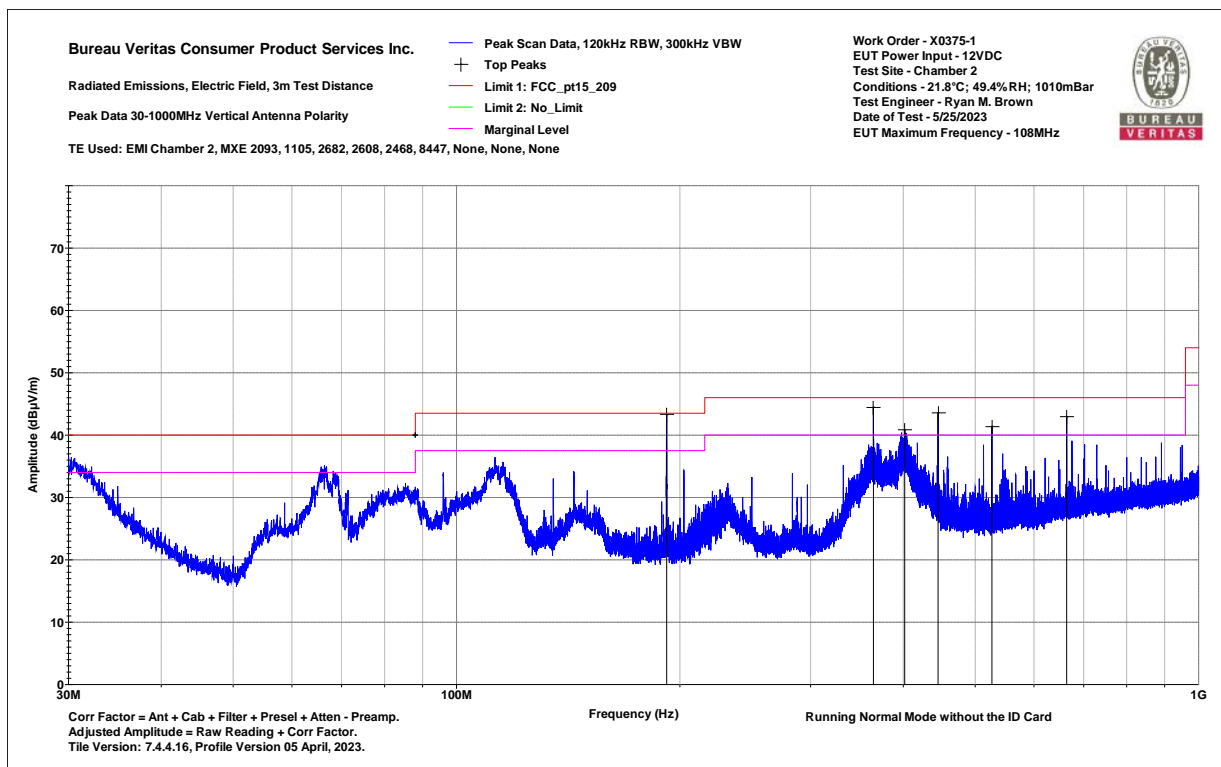
Conditions - 21.8°C; 49.4%RH; 1010mBar

Test Engineer - Ryan M. Brown

Date of Test - 5/25/2023

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBμV/m)	Lim1: FCC_pt15_20 9 (dBμV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
192.026	51.2	-8.5	42.7	43.5	-0.8	PASS	-0.8	102	330
363.767	37.2	-4.7	32.5	46	-13.5	PASS		175	0
402.37	37.7	-4.5	33.2	46	-12.8	PASS		161	280
445.572	43	-3.7	39.4	46	-6.6	PASS		100	206
525.619	27.9	-2.8	25.1	46	-20.9	PASS		100	33
664.056	44	0.2	44.2	46	-1.8	PASS		146	7

30-1000MHz Vertical Data Table



30-1000MHz Vertical Graph



Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda
Report No. EX0375-2 Issue 2



Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
30-1000MHz Horizontal Data

Notes:

Running Normal Mode without the ID Card

Work Order - X0375-1

EUT Power Input - 12VDC

Test Site - Chamber 2

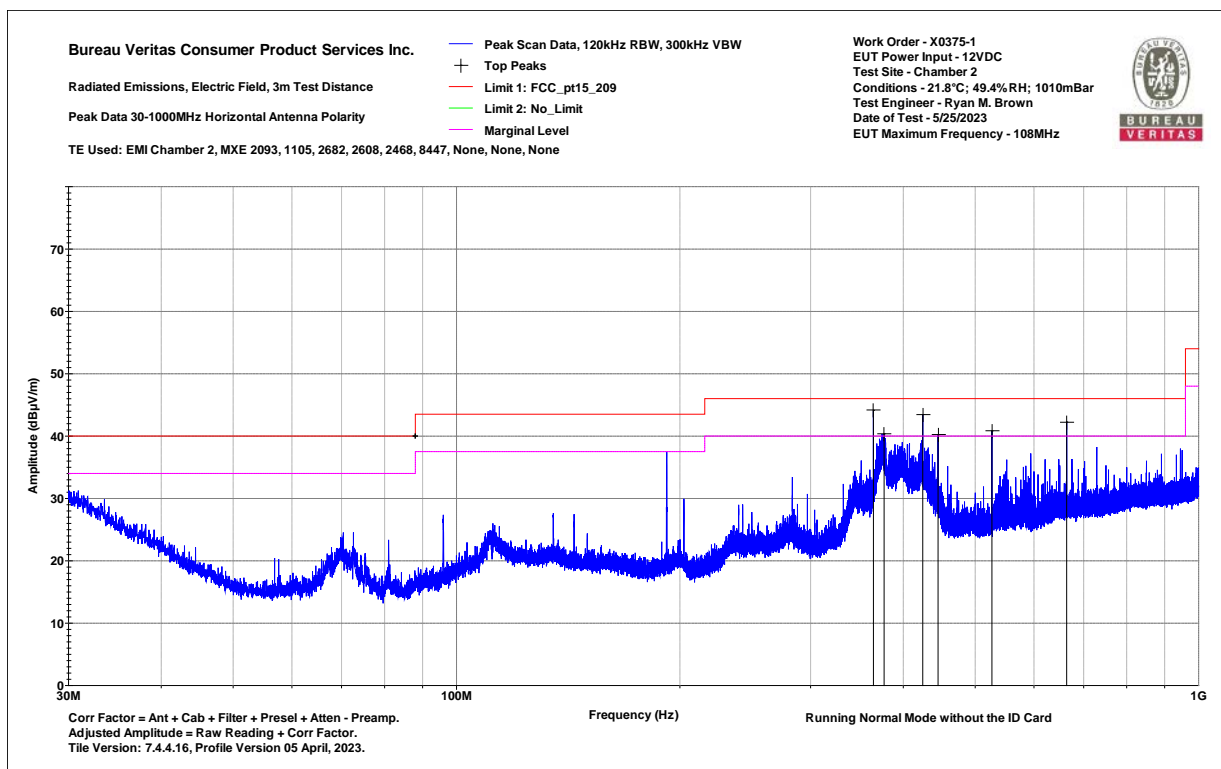
Conditions - 21.8°C; 49.4%RH; 1010mBar

Test Engineer - Ryan M. Brown

Date of Test - 5/25/2023

Frequency (MHz)	Raw QP Reading (dBμV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBμV/m)	Lim1: FCC_pt15_20 9 (dBμV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
364.533	49.4	-4.7	44.7	46	-1.3	PASS	-1.3	125	340
376.067	39.2	-4.6	34.5	46	-11.5	PASS		118	218
424.944	37.7	-3.9	33.8	46	-12.2	PASS		114	238
445.046	26	-3.7	22.3	46	-23.7	PASS		125	25
526.564	44.1	-2.8	41.3	46	-4.7	PASS		175	262
664.056	42.7	0.2	42.8	46	-3.2	PASS		246	138

30-1000MHz Horizontal Data Table



30-1000MHz Horizontal Plot

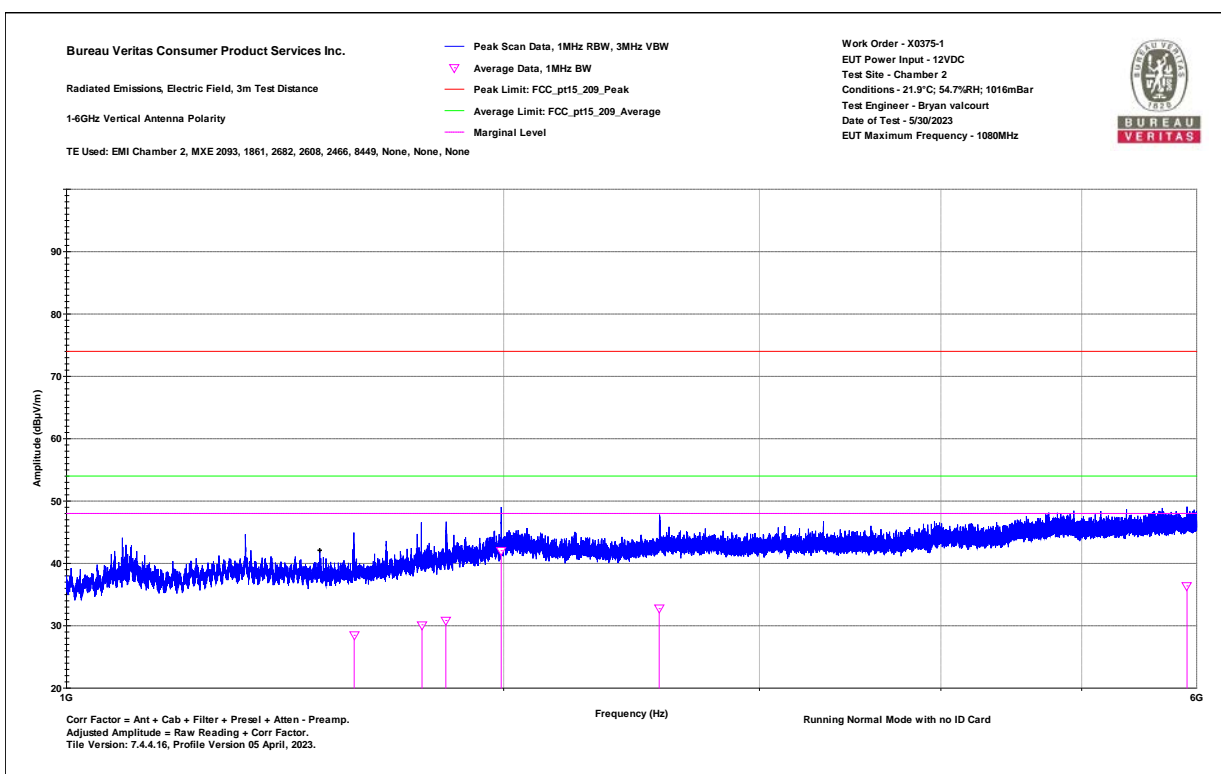
Emissions above 1GHz

Bureau Veritas Consumer Product Services Inc.
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Notes:
Running Normal Mode with no ID Card

Work Order - X0375-1
EUT Power Input - 12VDC
Test Site - Chamber 2
Conditions - 21.9°C; 54.7%RH; 1016mBar
Test Engineer - Bryan valcourt
Date of Test - 5/30/2023

Frequency (MHz)	Raw Peak Reading (dBμV)	Raw Avg Reading (dBμV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBμV/m)	Pk Lim: FCC_pt15_20 9_Peak (dBμV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBμV/m)	Av Lim: FCC_pt15_20 9_Average (dBμV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1577.9	44.1	35.6	-7.1	36.9	74	-37.1	PASS		28.5	54	-25.5	PASS		175	53
1757.2	43.7	35.7	-5.6	38.2	74	-35.8	PASS		30.1	54	-23.9	PASS		109	230
1824.8	44	35.6	-4.8	39.2	74	-34.8	PASS		30.8	54	-23.2	PASS		100	181
1992	49.4	44.4	-2.4	47	74	-27	PASS	-27	42	54	-12	PASS	-12	189	199
2559.1	44.2	34.1	-1.4	42.8	74	-31.2	PASS		32.7	54	-21.3	PASS		293	224
5909.6	42.4	32.9	3.5	45.9	74	-28.1	PASS		36.4	54	-17.6	PASS		225	153

1-6GHz Vertical Data Table



1-6GHz Vertical Plot



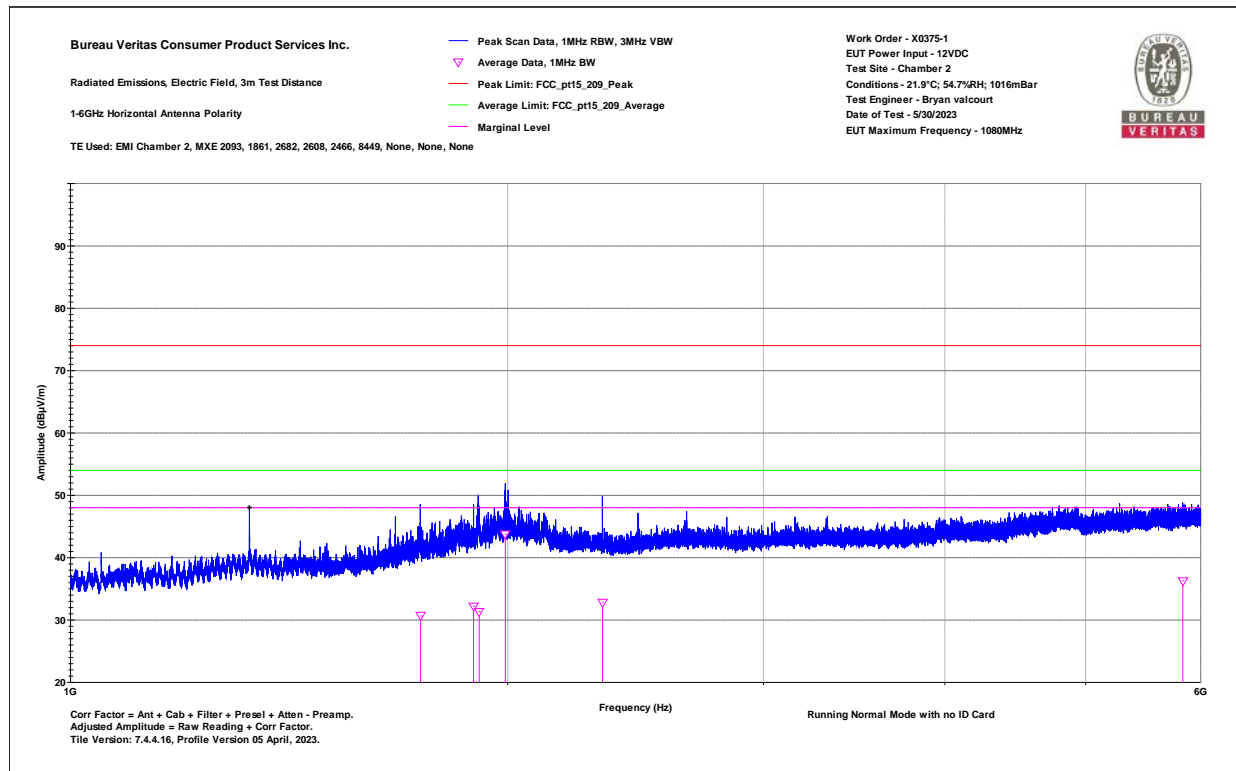
Test Report for Controlid Industria e Comercio de Hardware e
Servicos De Tecnologia Ltda
Report No. EX0375-2 Issue 2



Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 1-6GHz Horizontal Data Notes: Running Normal Mode with no ID Card	Work Order - X0375-1 EUT Power Input - 12VDC Test Site - Chamber 2 Conditions - 21.9°C; 54.7%RH; 1016mBar Test Engineer - Bryan valcourt Date of Test - 5/30/2023
---	--

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_20 9_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_20 9_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1742.2	47	36.4	-5.8	41.2	74	-32.8	PASS		30.6	54	-23.4	PASS		216	220
1894.7	44.3	36.2	-4	40.3	74	-33.7	PASS		32.2	54	-21.8	PASS		297	264
1911.7	48.1	35.3	-4	44.1	74	-29.9	PASS		31.3	54	-22.7	PASS		125	70
1992.4	50	46.1	-2.4	47.6	74	-26.4	PASS	-26.4	43.8	54	-10.2	PASS	-10.2	183	311
2324.5	44.2	35.4	-2.5	41.7	74	-32.3	PASS		32.9	54	-21.1	PASS		299	253
5832.6	42.1	32.8	3.5	45.6	74	-28.4	PASS		36.3	54	-17.7	PASS		275	146

1-6GHz Horizontal Data Table



1-6GHz Horizontal Plot



4.4 OCCUPIED BANDWIDTH (99%)

4.4.1 LIMITS

When an occupied bandwidth is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is its 99% emission bandwidth, as calculated or measured. [RSS-Gen Issue 5 Section 6.7].

4.4.2 TEST SETUP

Same as radiated spurious emissions setup below 30MHz (Section 4.3.5).

4.4.3 TEST EQUIPMENT USED

Rev. 9/1/2023

Cables Asset #2596	Range 9KHz-40GHz	Mfr Carlisle	Cat II	Calibration Due 4/20/2024	Calibrated on 4/20/2023
Spectrum Analyzers / Receivers /Preselectors FSV40 Spectrum Analyzer	Range 10Hz-40GHz	MN FSV40	Mfr ROHDE & SCHWARZ	SN 101551	Asset Cat 2200 I
Antennas 2615 Active Loop Antenna	Range 9KHz-30MHz	MN 6502	Mfr EMCO	SN 2049	Asset Cat 2615 I
				Calibration Due 10/11/2023	Calibrated on 10/11/2022
				Calibration Due 1/18/2025	Calibrated on 1/18/2023

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

4.4.4 TEST PROCEDURES

Per RSS-Gen Issue 5 Section 6.7.

4.4.5 DEVIATIONS

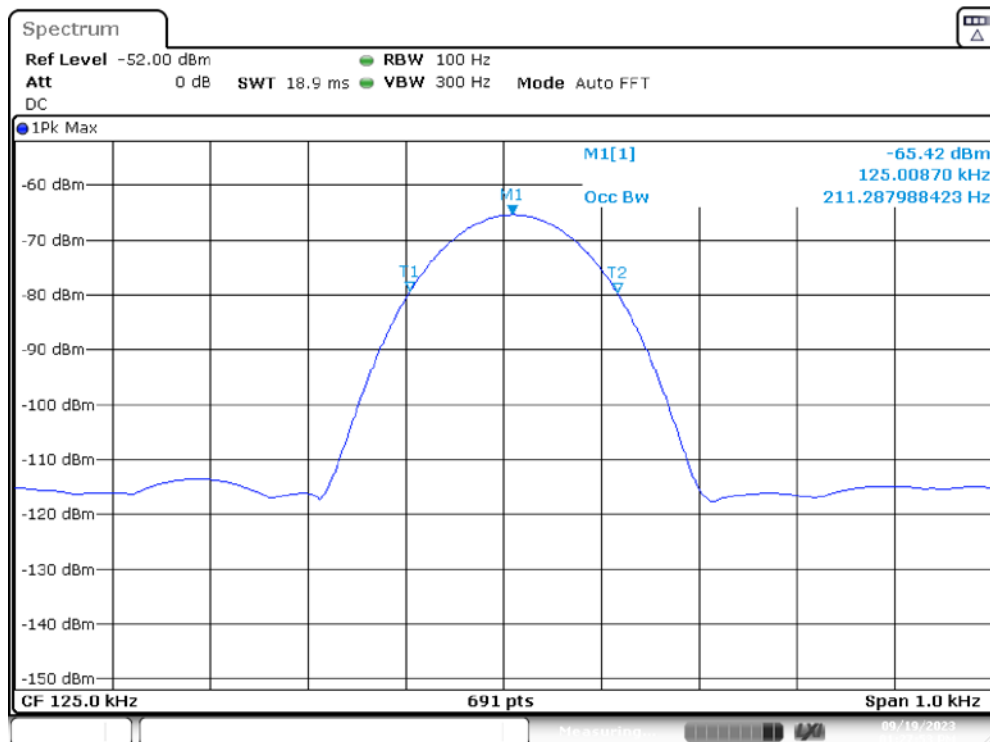
No deviations from the standard.

4.4.6 EUT OPERATING CONDITIONS

EUT was operated according to manufacturer's specifications.

4.4.7 TEST RESULTS

Measured 99% OBW: 211.3Hz



Date: 19.SEP.2023 13:27:53

99% OBW Plot



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the Test Setup Photos exhibit.

6 APPENDIX A – MODIFICATIONS

Following modification was needed during Radiated Emissions testing:

Ferrite #044164281 was installed on the Ethernet cable.

---END OF REPORT---