EMC Test Report

Project Number: 4793556 **Proposal:** SUW-202106001146

Report Number: 4793556EMC02 **Revision Level:** 2

Client: HBC-radiomatic GmbH

Equipment Under Test: Industrial Remote Control

Model: technos A

HVIN: TECA01

FCC ID: NO9TECA01

IC ID: 2977A-TECA01

Applicable Standards: 47 CFR FCC Part 15, Subpart B

ANSI C63.4: 2014

ICES-003, Issue 7

ICES-GEN, Issue 1

Report issued on: 16 September 2022

Test Result: Compliant

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01
This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the Federal Government.

Prepared by: Jeremy Pickens, RF Lab Manager

Reviewed by: Martin Taylor, Project Engineer

Remarks: This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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1 Summary of Test Results

Test	Classification	Test Result
Radiated Emissions	A	Compliant
Conducted Emissions	A	NA[1]

1) The device is battery-powered with no facility for connection to the AC mains.

1.1 *Modifications Required to Compliance*

None.

2 General Information

2.1 *Client Information*

Company Name:	HBC-radiomatic GmbH
Address:	Haller Strasse 45-53
City, State, Zip, Country:	Crailsheim 74564, Germany

2.2 *Test Laboratory*

Company Name:	SGS North America, Inc.
Address:	620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country:	Suwanee, GA 30024, USA
CAB Identifier:	US0186
Accrediting Body:	A2LA
Type of lab:	Testing Laboratory
Certificate Number:	3212.01

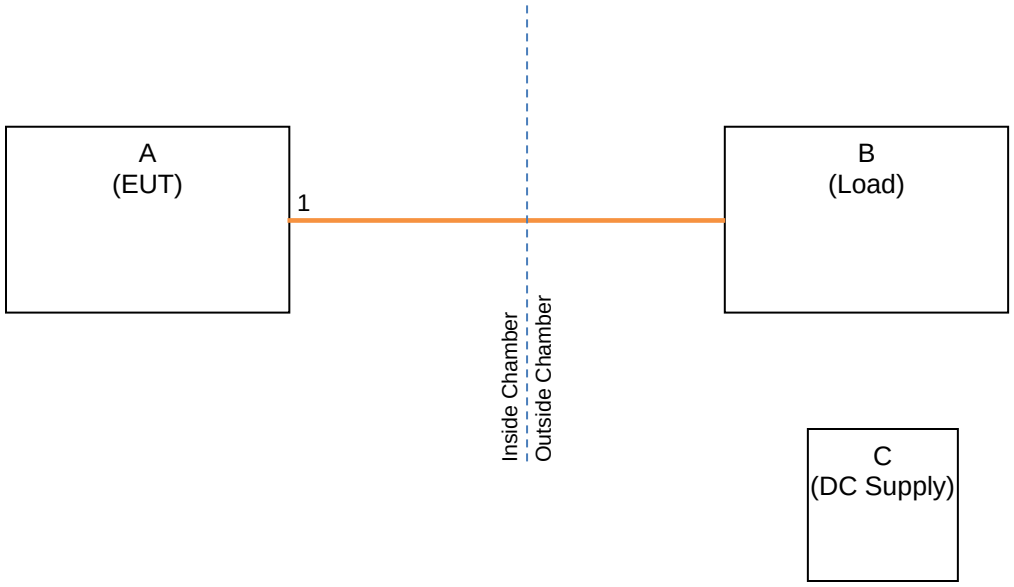
2.3 *General Information of EUT*

Equipment Under Test:	Industrial Remote Control
Model:	technos A
HVIN:	TECA01
Serial Number:	000-2100275
Rated Voltage:	3.6Vdc (Battery)
Test Voltage:	3.6Vdc (Battery)
Sample Received Date:	28 June 2021
Dates of testing:	16 July 2021

2.4 *Operating Modes and Conditions*

The EUT was connected via wired cabling to a remotely located load box which simulated a machine. Once powered on, the device began a constant communication with the load. Installing the cabled connection disabled the internal radios.

2.5 *EUT Connection Block Diagram*



2.6 *System Configurations*

Device reference	Manufacturer	Description	Model Number	Serial Number
A	HBC-radiomatic GmbH	Industrial Remote Control	technos A	000-2100275
B	HBC-radiomatic GmbH	Load Simulator	510	Zub #11
C	Rigol	DC Power Supply	DP711	DP7A202200419

2.7 *Cable List*

Cable reference	Port Name	Start	End	Cable Length (m)	Ferrite installed?	Shielded?
1	Controller Cable	EUT	Simulator	25	No	Yes

3 Radiated Emissions

3.1 *Test Result*

Test Description	Classification	Basic Standard	Test Result
Radiated Emissions	A	ANSI C63.4	Compliant

3.2 *Test Method*

Exploratory scans were performed over the frequency range as indicated in the tables below using the max hold function and incorporating a Peak detector and using TILE! software. The final test data was measured using a Quasi-Peak detector below 1GHz and a Peak and Average detector above 1GHz. The receiver's resolution bandwidth was set to 120 kHz for measurements taken in the 30MHz to 1GHz frequency range and 1MHz for measurements for 1GHz and higher. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency. The radiated measurements were recorded and compared to the limits indicated in the table below.

Frequency Range	Limits (dBuV/m)			Equipment Classification
	3m	10m	Detector	
30 to 88 MHz	49.6	39.1	QP	Class A
88 to 216 MHz	54	43.5	QP	
216 to 960 MHz	56.9	46.4	QP	
960 to 1000 MHz	60	49.5	QP	
Above 1000 MHz	60 80	49.5 69.5	Avg Pk	

Frequency Range	Limits (dBuV/m)			Equipment Classification
	3m	10m	Detector	
30 to 88 MHz	40	29.5	QP	Class B
88 to 216 MHz	43.5	33	QP	
216 to 960 MHz	46	35.5	QP	
960 to 1000 MHz	54	43.5	QP	
Above 1000 MHz	54 74	43.5 63.5	Avg Pk	

Alternatively, the following CISPR limits may be applied:

Frequency Range	Limits (dBuV/m)			Equipment Classification
	3m	10m	Detector	
30 to 230 MHz	50.5	40	QP	Class A
230 to 1000 MHz	57.5	47	QP	

Frequency Range	Limits (dBuV/m)			Equipment Classification
	3m	10m	Detector	
30 to 230 MHz	40.5	30	QP	Class B
230 to 1000 MHz	47.5	37	QP	

3.3 *Test Site*

10m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions

Temperature:	24.3 °C
Relative Humidity:	52.6 %
Atmospheric Pressure:	97.9 kPa

3.4 *Test Equipment*

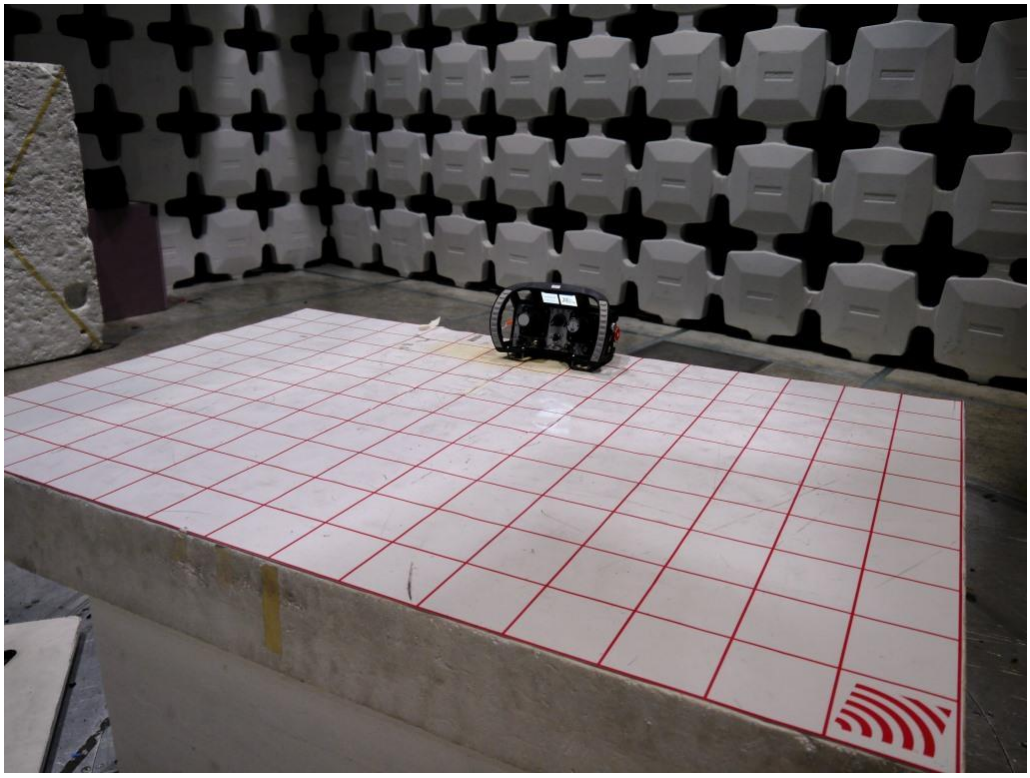
Test End Date: 16-Jul-2021 Tester: EW

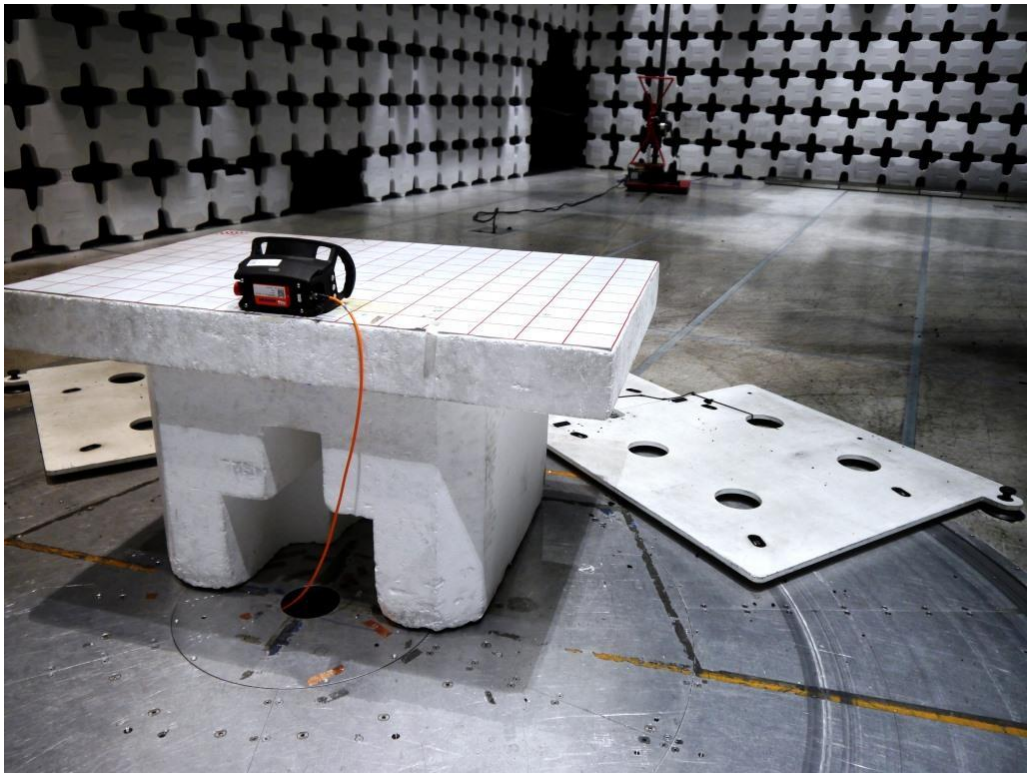
Equipment	Model	Manufacturer	Asset Number	Cal Date	Cal Due Date
RF Cable Nm to Nm, 0.01-18GHz	90-195-354	TELEDYNE STORM MICROWAVE	20119	18-Feb-2021	18-Feb-2022
RF Cable Nm to Nm, 0.01-18GHz	90-195-079	TELEDYNE STORM MICROWAVE	20124	17-Feb-2021	17-Feb-2022
RF CABLE, Nm to Nm.	90-195-276	TELEDYNE STORM MICROWAVE	21020	23-Nov-2020	26-Mar-2022
ANTENNA, BILOG	JB6	SUNOL	B079690	13-Jan-2021	13-Jan-2023
ANTENNA, DRG HORN (MEDIUM)	3117	ETS Lindgren	B079691	10-Aug-2020	10-Aug-2022
RF CABLE	SF106	HUBER & SUHNER	B079713	3-Sep-2020	3-Sep-2021
LOW NOISE AMPLIFIER	ZKL-2+	Mini-Circuits	B079817	28-Sep-2020	28-Sep-2021
EMI TEST RECEIVER	ESU8	ROHDE & SCHWARZ	B085759	7-May-2020	31-Jul-2021
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	B094463	7-Jul-2021	7-Jul-2022
RF CABLE	SUCOFLEX 100	Huber & Suhner	B108523	3-Sep-2020	3-Sep-2021

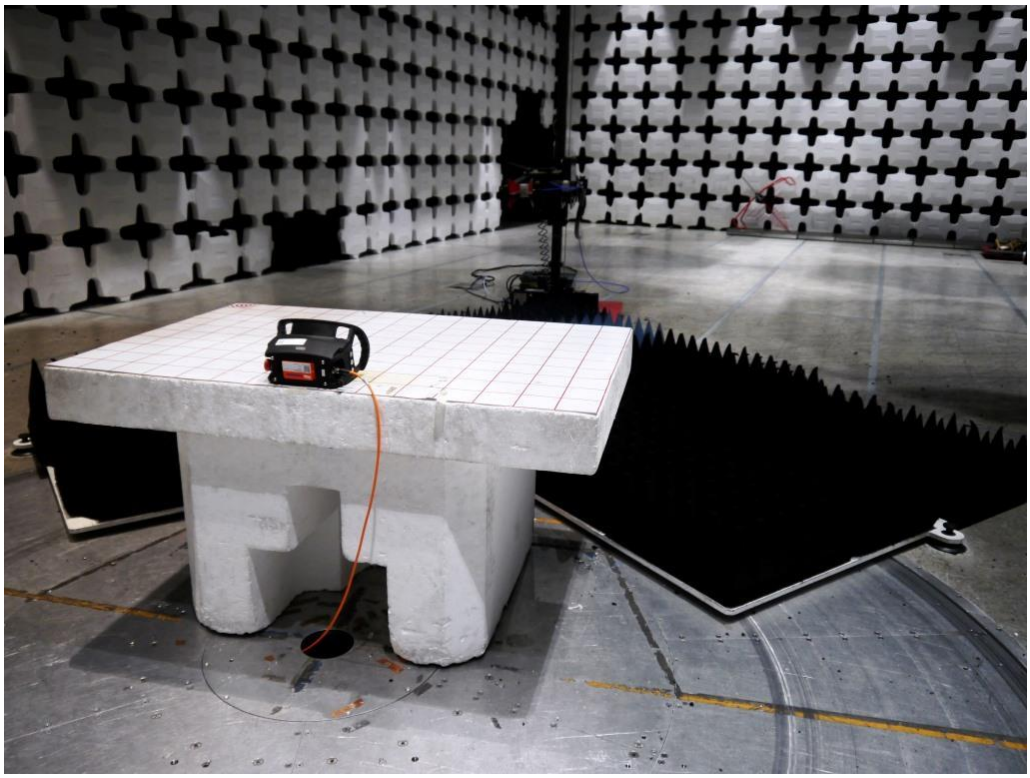
Note: Refer to the table for calibration intervals.

Software:
TILE! software profile “RE 30-1000 MHz TILE7 201007” dated 07 July 2020
TILE! software profile “RE 1-18 GHz TILE7 210119” dated 19 January 2021

3.5 *Test Setup Photographs*

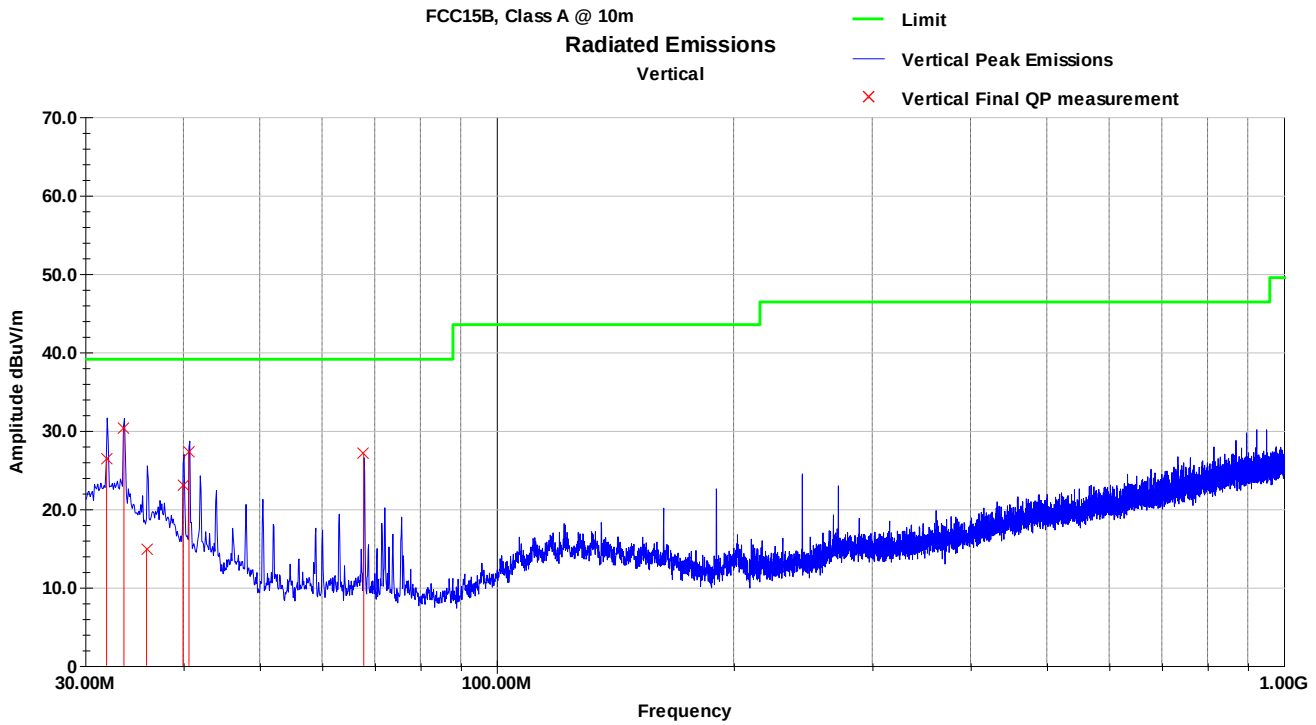






3.7 *Test Data*

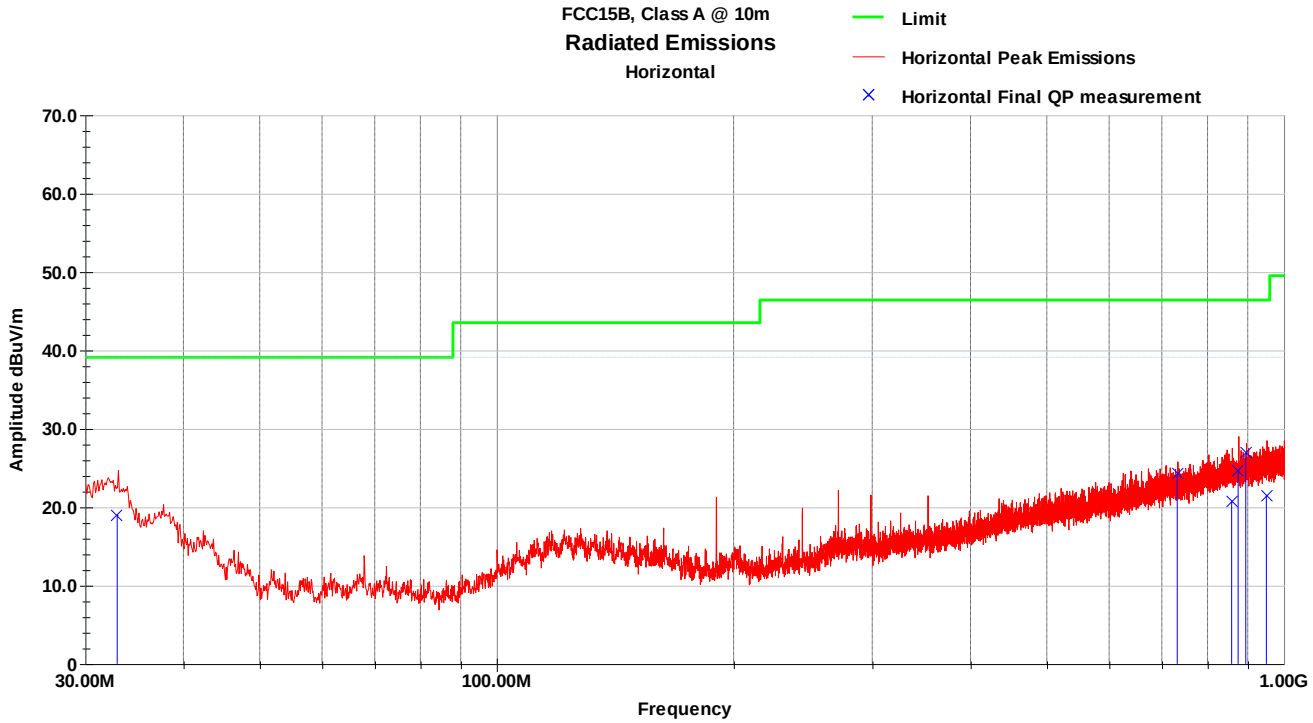
Vertical Radiated Emissions – Peak Plot



Vertical Radiated Emissions – Tabular Data

Frequency MHz	Raw QP (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
31.95	37.8	V	93.0	109.0	19.7	0.6	31.8	26.4	39.1	-12.7
33.61	42.8	V	180.0	100.0	18.6	0.7	31.8	30.3	39.1	-8.8
35.91	29.0	V	228.0	261.0	17.0	0.7	31.8	14.9	39.1	-24.2
39.95	40.2	V	251.0	111.0	13.9	0.7	31.8	23.0	39.1	-16.1
40.66	44.9	V	49.0	109.0	13.4	0.7	31.8	27.3	39.1	-11.8
67.78	50.0	V	104.0	100.0	7.9	1.0	31.8	27.0	39.1	-12.1
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

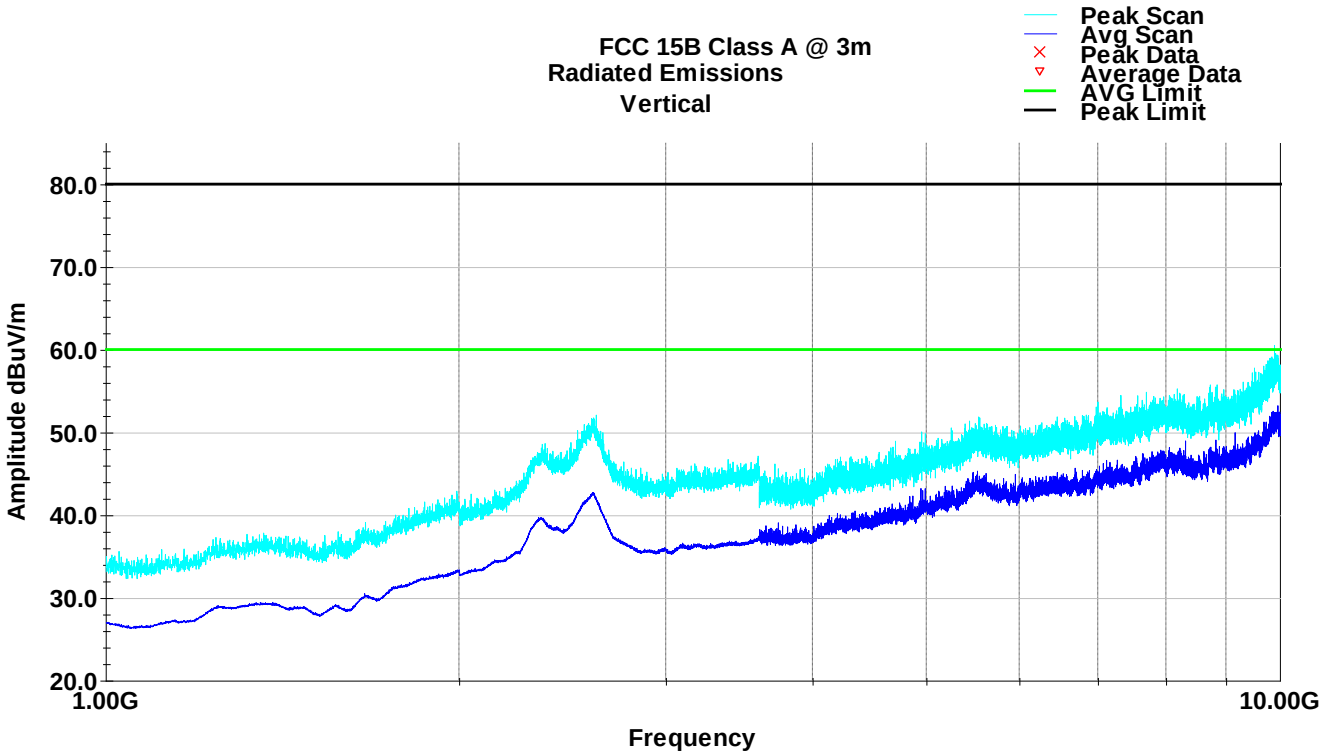
Horizontal Radiated Emissions – Peak Plot



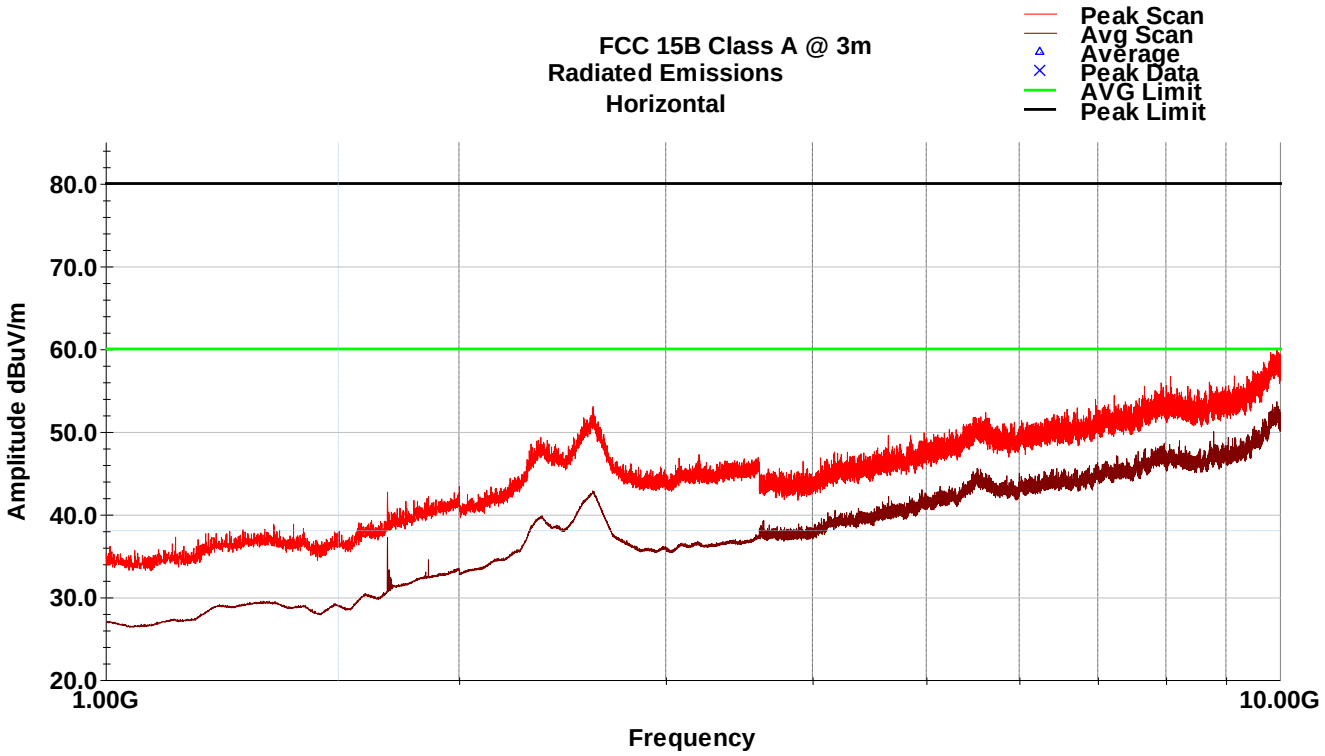
Horizontal Radiated Emissions – Tabular Data

Frequency MHz	Raw QP (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
32.96	31.1	H	166.0	142.0	19.0	0.7	31.8	19.0	39.1	-20.1
732.24	31.3	H	170.0	379.0	20.5	3.2	30.7	24.3	46.4	-22.1
858.57	25.7	H	53.0	270.0	22.0	3.5	30.5	20.7	46.4	-25.7
875.12	29.6	H	180.0	230.0	22.0	3.5	30.5	24.7	46.4	-21.7
894.91	31.6	H	337.0	315.0	22.2	3.6	30.4	27.0	46.4	-19.4
950.22	25.5	H	144.0	292.0	22.7	3.7	30.3	21.5	46.4	-24.9
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

Vertical Radiated Emissions >1GHz – Peak Plot



Horizontal Radiated Emissions >1GHz – Peak Plot



5 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	22 July 2021
1	- Added FCC/IC identifiers to the cover page - Updated HVIN/Model reference throughout report	22 July 2022
2	- Updated EUT description, Model and HVIN throughout report - Corrected FCC ID on title page	16 September 2022