An IIA Company

Test Report – FCC 15B Unintentional Radiator
Applicant: Icom Incorporated

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature 4/8/2022

Table of Contents

1. Customer Information

Applicant: Icom Incorporated
Address: 1-1-32 Kamininami, Hirano-Ku
Osaka, 547-0003, Japan

1.1 Test Result Summary

The following test procedure was used ANSI C63.4-2014. Full test results are available in this report.

No additions to the test methods were needed. There were no deviations, or exclusions from the test methods. No test results are from external providers or from the customer. The test results relate only to the items tested. Timco does not offer opinions and interpretations, only a pass/fail statement.

Clauses	Description of the Requirements	Result (Pass, Fail or N/A)
Applicable Clauses from FCC 15 B		
15.107	Conducted Emission Limits	N/A
15.109	Radiated Emission Limits	Pass

2. Location of Testing

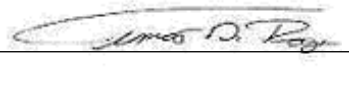
2.1 Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA"). Testing was performed at Timco's permanent laboratory located at 849 NW State Road 45, Newberry, Florida 32669

FCC test firm # 578780
FCC Designation # US1070
FCC site registration is under A2LA certificate # 0955.01
ISED Canada test site registration # 2056A
EU Notified Body # 1177
For all designations see A2LA scope # 0955.01

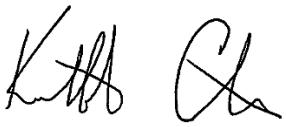
2.2 Testing was performed, reviewed by

Dates of Testing: 3/16/2022-3/22/2022

Signature:  Sr. EMC Engineer EMC-003838-NE

Name & Title: Tim Royer, EMC Engineer

Date of Signature 4/8/2022

Signature: 

Name & Title: Kristoffer Costa, EMC Technician

Date of Signature 4/8/2022

3. Test Sample(s) (EUT/DUT)

The test sample was received: 3/16/2022

3.1 Description of the EUT

A description as well as unambiguous identification of the EUT(s) tested. Where more than one sample is required for technical reasons (such as the use of connected units for the purpose of conducted output power testing where the product units will have integral antennas), each specific test shall identify which unit was tested.

Identification	
FCC ID:	AFJ325110
Brief Description	Mobile Analog Scanning Receiver
Model(s) #	IC-V3500
Firmware version	N/A
Software version	N/A
Serial Number	N/A

Technical Characteristics	
Technology	Mobile Analog Scanning Receiver
Frequency Range	136 MHz- 174 MHz
Antenna Connector	SO-239
Voltage Rating (AC or Batt.)	13.8VDC

Antenna Characteristics			
Antenna	Frequency Range	Mode / BW	Antenna Gain
1	n/a	n/a	0 dBi

- Note: Information such as antenna gain, firmware/software numbers are provided by manufacturer and cannot be validated by the test lab.

3.2 Configuration of EUT

Band (MHz)	Mode	Number of Ant.
136 MHz- 174 MHz	Receive	1

Operating conditions during Testing:

No modifications of the device under test (including firmware, specific software settings, and input/output signal levels to the EUT).

Peripherals used during Testing:

No peripherals used.

3.3 Test Setup of EUT

Equipment, antenna, and cable arrangement. The setup of the equipment and cable or wire placement on the test site that produces the highest radiated and the highest ac power-line conducted emissions shall be shown clearly and described. Information on the orientation of portable equipment during testing shall be included. Drawings or photographs may be used for this purpose.

Test Setups are included in the test report.

4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance

The measurement was performed as per FCC 15B. Full test results are available in this report.

Limits and Regulatory Limits:

1) FCC 15B

5. Measurement Uncertainty

Parameter	Uncertainty (dB)
Conducted Emissions	± 3.14 dB
Radiated Emissions (9kHz – 30 MHz)	± 3.08 dB
Radiated Emissions (30 – 200 MHz)	± 2.16 dB
Radiated Emissions (200 – 1000 MHz)	± 2.15 dB
Radiated Emissions (1 GHz – 18 GHz)	± 2.14 dB
Radiated Emissions (18 GHz – 40 GHz)	± 2.31 dB
Note: The uncertainties provided in this table represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of K=2.	

6. Environmental Conditions

Temperature & Humidity

Measurements performed at the test site did not exceed the following:

Parameter	Measurement
Temperature	23 C +/- 5%
Humidity	55% +/- 5%
Barometric Pressure	30.05 in Hg
Note: Specific environmental conditions that are applicable to a specific test are available in the test result section.	

7. List of Test Equipment and Test Facility

The test equipment used identified by type, manufacturer, serial number, or other identification and the date on which the next calibration or service check is due.

Description of the firmware or software used to operate EUT for testing purposes.

A complete list of all test equipment used shall be included with the test report. The manufacturer's model and serial numbers, and date of last calibration, and calibration interval shall be included. Measurement cable loss, measuring instrument bandwidth and detector function, video bandwidth, if appropriate, and antenna factors shall also be included where applicable.

List of Test Equipment

Test Equipment						
Type	Device	Manufacturer	Model	SN#	Current Cal	Cal Due
Antenna	Biconical 1057	Eaton	94455-1	1057	10/16/20	10/16/2023
Antenna, NSA	Log-Periodic 1243	Eaton	96005	1243	5/4/21	5/3/2024
CHAMBER	CHAMBER	Panashield	3M	N/A	3/12/19	3/11/2022
Receiver	EMI Test Receiver R&S ESW44	Rohde & Schwarz	ESW44	103049	10/13/21	10/12/2024

Software			
Software	Author	Version	Validation on
ESU Firmware	Rohde & Schwarz	4.43 SP3; BIOS v5.1-24-3	2018
RSCommander	Rohde & Schwarz	1.6.4	2014
ScopeExplorer	LeCroy	v2.25.0.0	2009
Field Strength	Timco	v4.10.7.0	2016

8. Test Results

The results of the test are usually indicated in the form of tables, spectrum analyzer plots, charts, sample calculations, as appropriate for each test procedure.

A description and/or a block diagram of the test setup is usually provided.

The measurement results, along with the appropriate limits for comparison, may be presented in tabular or graphical form. In addition, any variation in the measurement environment may be reported if applicable (e.g., a significant change of temperature that could affect the cable loss and amplifier response).

Units of measurement

Unless noted otherwise in the referenced standard, the measurements of ac power-line conducted emissions and conducted power output will be reported in units of dBµV. Unless noted otherwise in the referenced standard, the measurements of radiated emissions will be reported in units of decibels, referenced to one microvolt per meter (dBµV/m) for electric fields, or to one ampere per meter (dBA/m) for magnetic fields, at the distance specified in the appropriate standards or requirements. The measurements of antenna-conducted power for receivers may be reported in units of dBµV if the impedance of the measuring instrument is also reported. Otherwise, antenna-conducted power will be reported in units of decibels referenced to one milliwatt (dBm). All formulas for data conversions and conversion factors, if used, will be included in this measurement report.

Example:

Freq (MHz)	Meter Reading	+ ACF	+CL	= FS
33	20 dBµV	+ 10.36 dB/m	+0.40 dB	=30.36 dBµV/m @ 3m

EIRP = Pcond (dBm) + dBi

15.121 Statements of Compatibility with FCC Rules

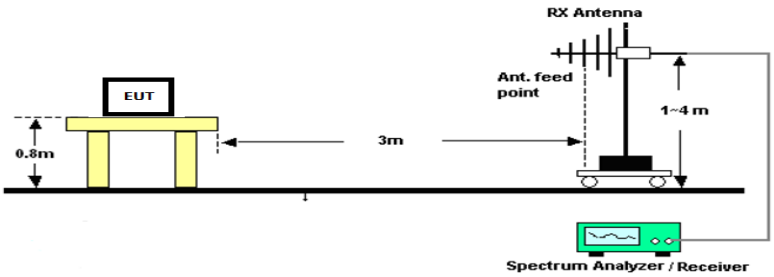
This scanning receiver cannot be used or modified to receive cellular radiotelephony frequencies. This is achieved by the key features described in detailed statements below. 1. Statement assessing the vulnerability of IC-T10 Analog Scanning Receiver to possible modifications and describing design steps taken to make the tuning, control and filtering circuitry inaccessible (15.121 (a)): The receiver portion of the equipment under this application scans the frequency bands 88MHz to 450 MHz. The receiver circuitry cannot be altered to enable it to scan the cellular bands by means of clipping the leads of components, installing a diode and/or jumper wire, or by any other such simple modification. Nor can the receiver be made to scan the cellular bands by replacing a plug-in semiconductor chip, because no such plug-in chips are utilized anywhere in the receiver. The semiconductor chips that are utilized in the tuning function of the equipment cannot be reprogrammed. The tuning, control and filtering circuitry of the receiver is controlled by a microprocessor firmware, which is unalterable by the user (and it is also unalterable by the manufacturer's own support and distribution staff, and their resellers). Any attempt to modify the circuitry cannot therefore result in achieving access to the cellular bands, but is likely to make the receiver inoperable.

2. Statement relating to cellular band rejection (15.121 (b)): The FCC requirement stipulates that scanning receivers shall reject any signals from the cellular radiotelephone service frequency bands that are 38dB or lower (at 12 dB SINAD). The construction of the equipment under this application is such that image rejection is typically 60 dB, therefore with a more than sufficient margin for adequate suppression of any image frequencies related to the cellular radiotelephone signals. This aspect was tested by the receiver placed in a scanning mode. There were no spurious responses detected within the entire frequency range of the receiver with a rejection ratio less than 44 dB. In view of the above, the equipment complies with part 15.121 of the FCC rules.

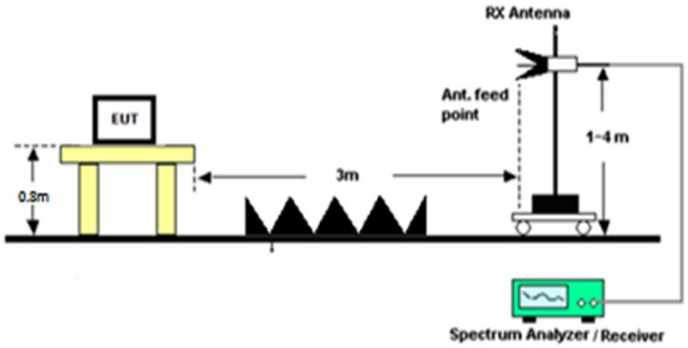
8.1 Radiated Emissions

Limits from FCC 15.109 and test procedure from ANSI C63.4-2014.

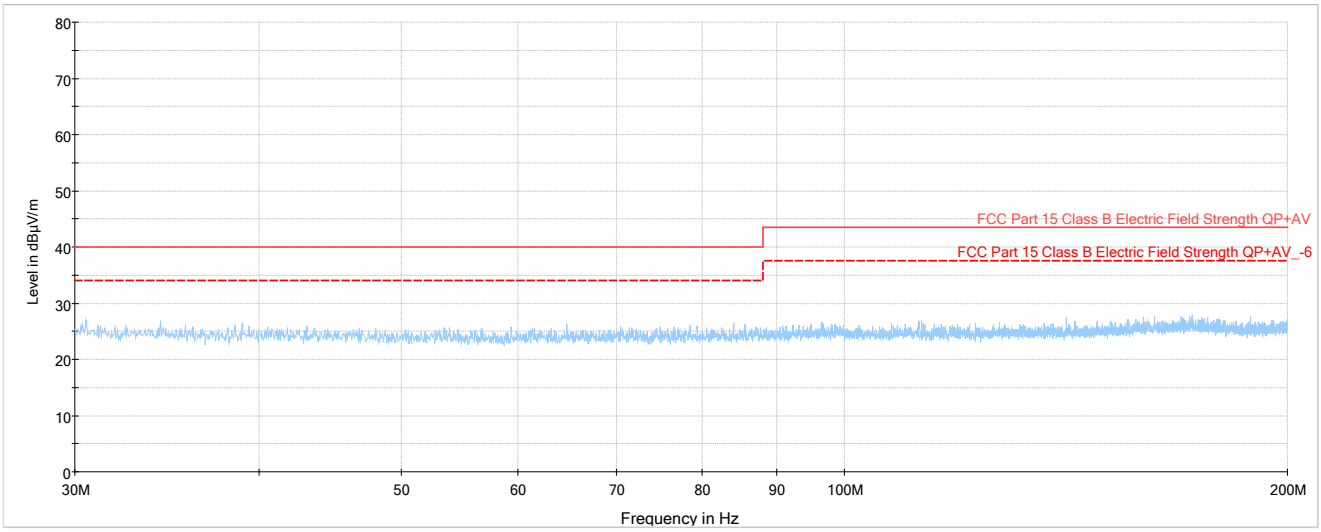
Radiated Test Setup, 30 – 1000 MHz



Radiated Test Setup, Above 1000 MHz



8.1.1 Scanning Receiver Function, 30 MHz to 200 MHz, Horizontal/ Vertical Polarity Plot



8.1.2 Scanning Receiver Function, 30 MHz to 200 MHz, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
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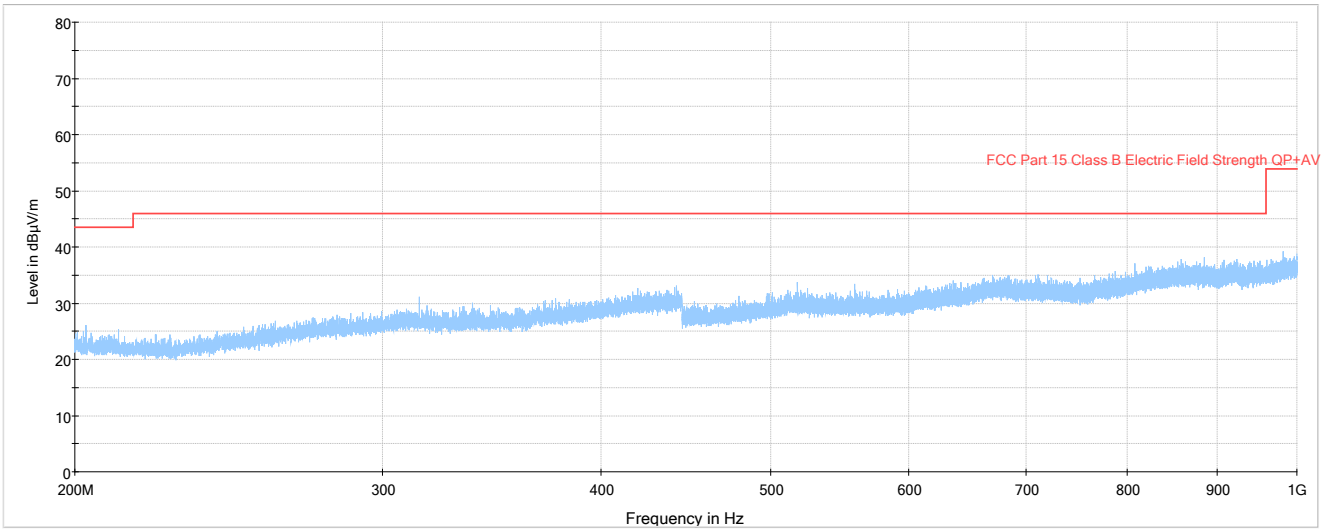
8.1.3 Scanning Receiver Function, 200 MHz to 1000 MHz, Horizontal/ Vertical Polarity Plot



8.1.4 Scanning Receiver Function, 200 MHz to 1000 MHz, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
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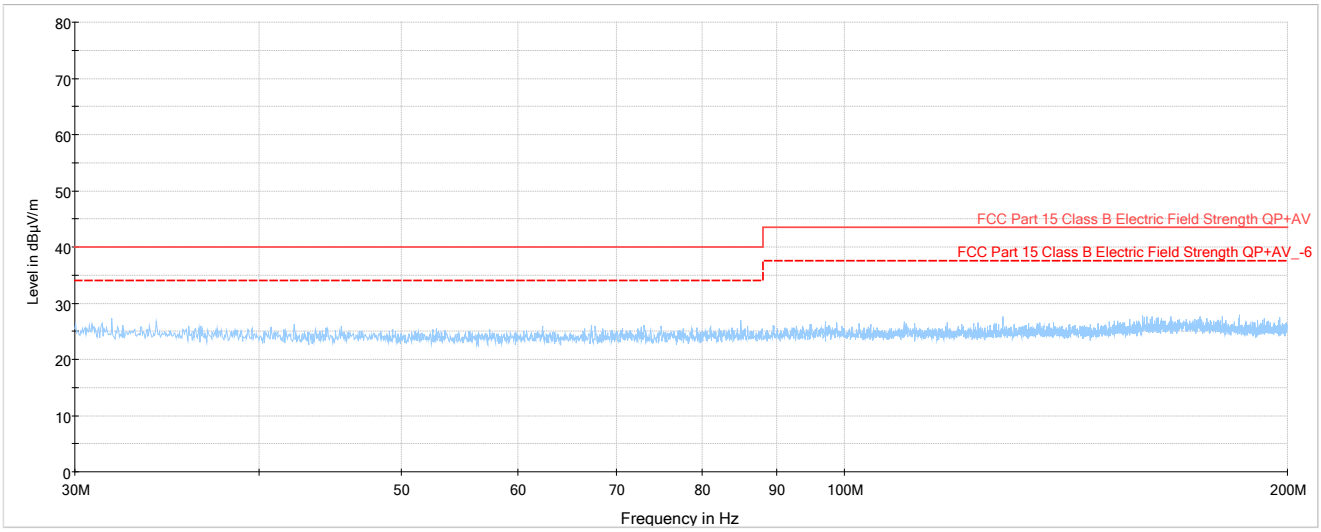
8.1.5 136.5 MHz, 30 MHz to 200 MHz, Horizontal/ Vertical Polarity Plot



8.1.6 136.5 MHz, 30 MHz to 200 MHz, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
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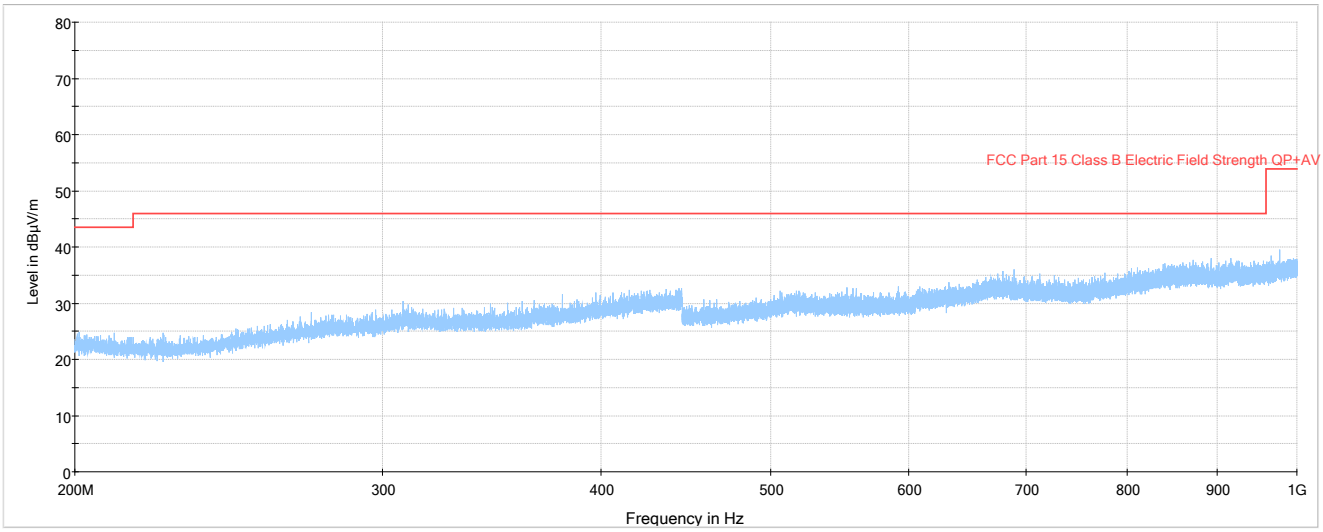
8.1.7 136.5 MHz, 200 MHz to 1000 MHz, Horizontal/ Vertical Polarity Plot



8.1.8 136.5 MHz, 200 MHz to 1000 MHz, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
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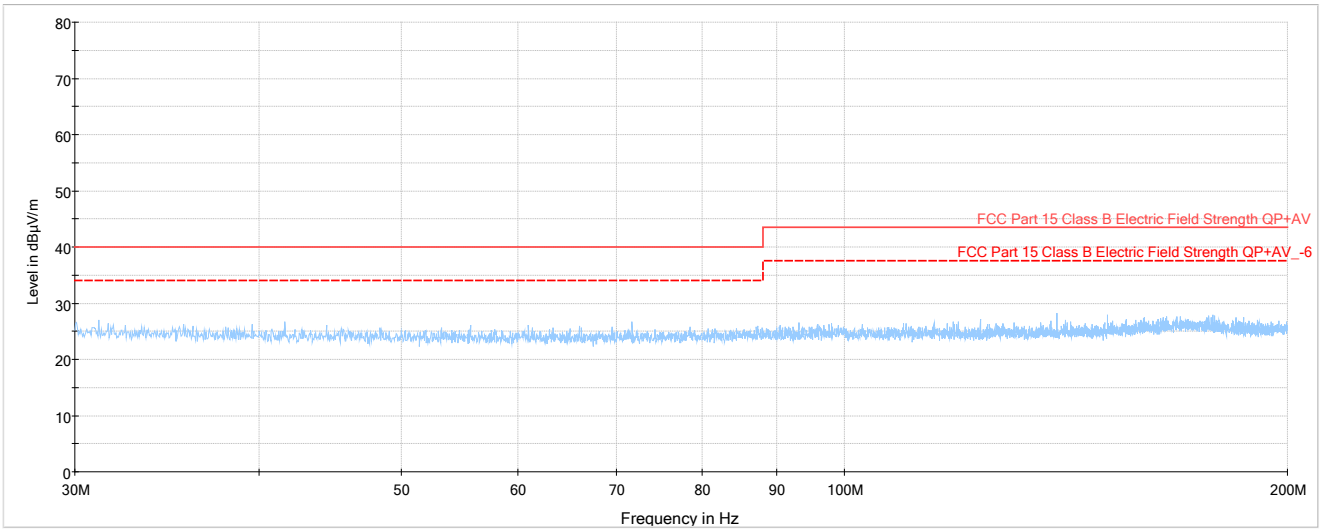
8.1.9 155 MHz, 30 MHz to 200 MHz, Horizontal/ Vertical Polarity Plot



8.1.10 155 MHz, 30 MHz to 200 MHz, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
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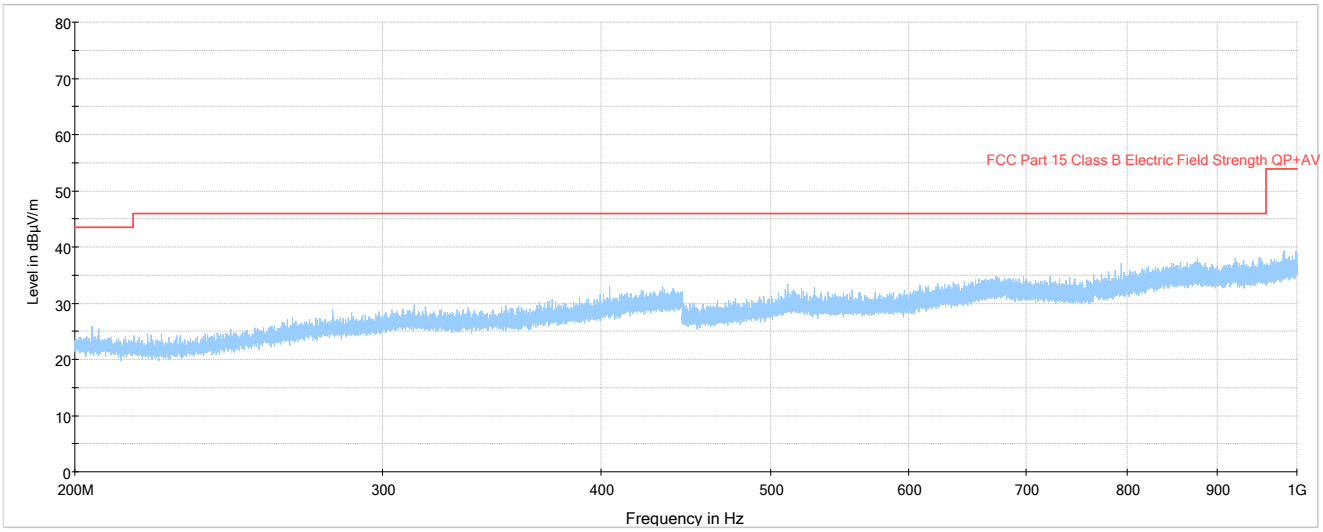
8.1.11 155 MHz, 200 MHz to 1000 MHz, Horizontal/ Vertical Polarity Plot



8.1.12 155 MHz, 200 MHz to 1000 MHz, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
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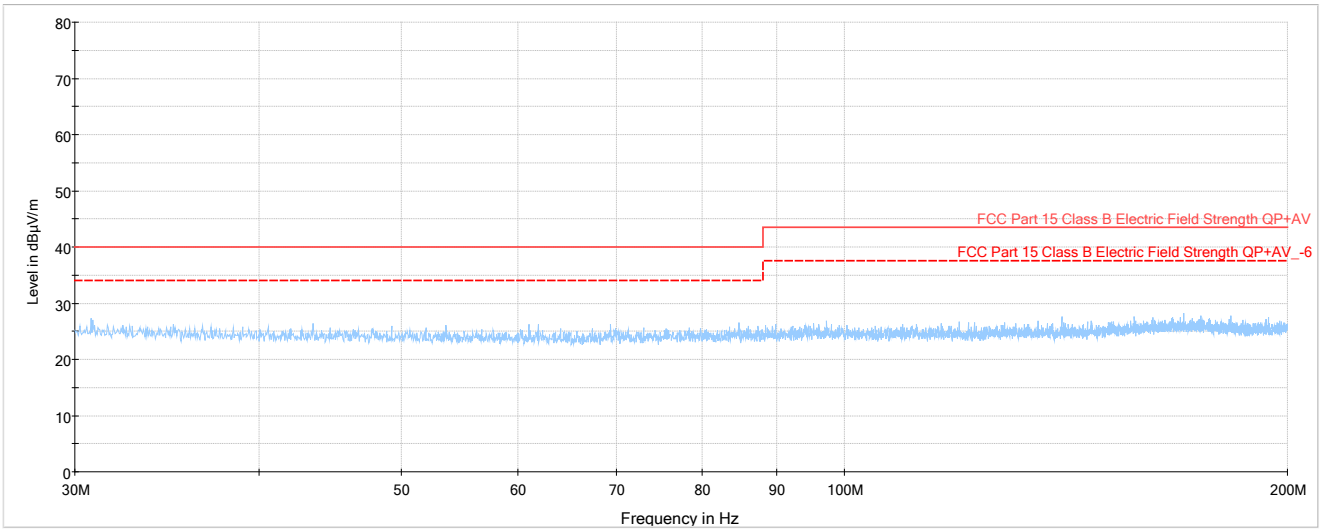
8.1.13 173.5 MHz, 30 MHz to 200 MHz, Horizontal/ Vertical Polarity Plot



8.1.14 173.5 MHz, 30 MHz to 200 MHz, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
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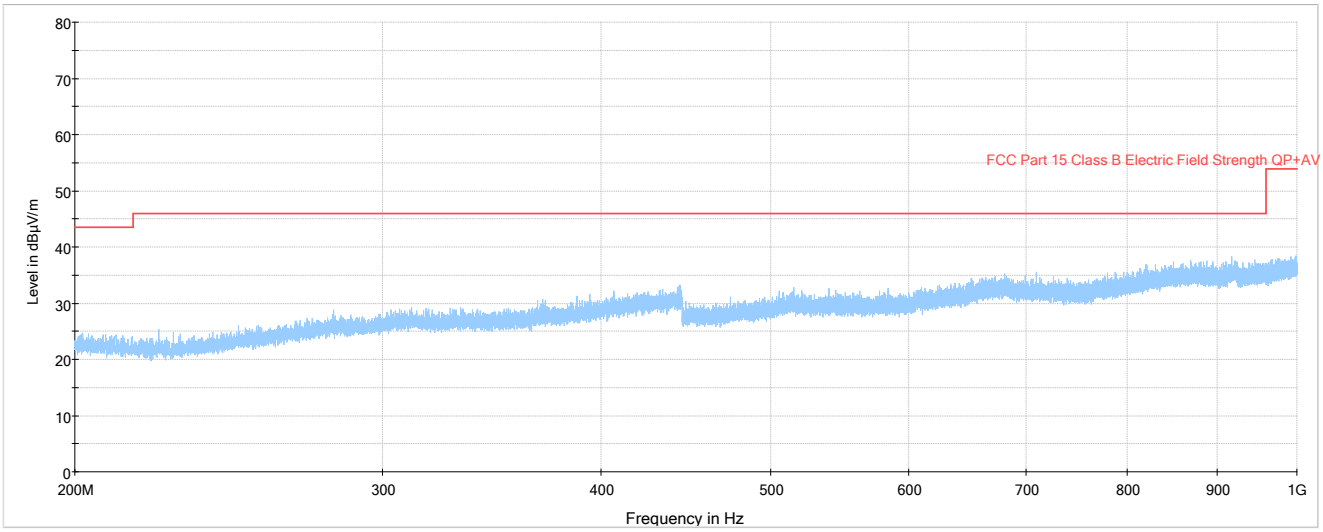
8.1.15 173.5 MHz, 200 MHz to 1000 MHz, Horizontal/ Vertical Polarity Plot



8.1.16 173.5 MHz, 200 MHz to 1000 MHz, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
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9. ANNEX-A - Photographs of the EUT

Photographs of the EUT and any manufacturer supplied accessories to be used with the EUT are in a separate document.

10. ANNEX-B – Test Setup Photographs

Test setup photographs are located in a separate document.

11. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_1311-22_FCC_15B_Scanning Receiver_	1	Initial release	3/22/2022

END OF TEST REPORT