FCC / ISED Test Report

FOR:

Geoforce Inc.

Model Name:

Geoforce GT2

Product Description:

GNSS enabled logistics modem

FCC ID: OWA00GT2X
IC ID: 10540A-00GT2X

Applied Rules and Standards:
47 CFR Part 15.247 (DTS)
RSS-247 Issue 2 (DTSs) & RSS-Gen Issue 5

REPORT #: EMC_Geoforce_GT2_15.247_WiFi

DATE: 2020-04-20

A2LA Accredited

IC recognized # 3462B-1

***CETECOM* Inc.**
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TABLE OF CONTENTS

1 Assessment

The following device was evaluated against the applicable criteria specified in FCC rules Parts 15.247 of Title 47 of the Code of Federal Regulations and the relevant ISED Canada standard RSS-247.

No deviations were ascertained.

Company	Description	Marketing Name	Model #
Geoforce Inc.	GNSS enabled logistics modem	Geoforce GT2	OWAC00 OWAS86 OWAH86

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2020-04-20	Compliance	Cindy Li (EMC Lab Manager)	Cindy Li Digitally signed by cindy.li@cetecom.com DN: CN=cindy.li@cetecom.com Reason: I am approving this document Location: Date: 2020-04-20 14:43:12

Responsible for the Report:

Date	Section	Name	Signature
2020-04-20	Compliance	Kevin Wang (Senior EMC Engineer)	Kevin Wang Digitally signed by: Kevin Wang DN: CN = Kevin Wang email = Kevin.wang@cetecom.com C = US O = Cetecom Inc. Date: 2020.04.20 10:12:50 -07'00'

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
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EMC Lab Manger:	Cindy Li
Responsible Project Leader:	Sangeetha Sivaraman

2.2 Identification of the Client

Applicant's Name:	Geoforce Inc.
Street Address:	5830 Granite Parkway, Suite 1200
City/Zip Code	Plano, TX 75024
Country	United States

2.3 Identification of the Manufacturer

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

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Marketing Name:	Geoforce GT2
Model No:	OWAC00 OWAS86 OWAH86
HW Version :	R1
SW Version :	0.4.T (Test supporting software version)
FCC-ID :	OWA00GT2X
IC-ID:	10540A-00GT2X
FWIN:	0.4.T
HVIN:	R1
PMN:	Geoforce GT2
Product Description:	GNSS enabled logistics modem, the difference for each Model are: OWAC00 (Cellular Only, BLE+WIFI) OWAS86 (Sat Only, BLE+WIFI) OWAH86 (Sat and Cellular, BLE+WIFI) Model OWAH86 was used for all tests as the worst case configuration.
Radio Technology:	Zentri, AMW007, 802.11b/g/n FCC ID: 2ABPY-5B9198
Frequency Range / number of channels:	Nominal band: 2400 MHz – 2483.5 MHz; 11 Channels
Type(s) of Modulation:	802.11 b/g/n
Modes of Operation:	normal operation mode
Antenna Information as declared:	max gain 3 dBi
Max. Peak Output Power:	Conducted Power 22.35 dBm
Power Supply/ Rated Operating Voltage Range:	Dedicated Battery Pack Vmin: 1.8 VDC/ Vnom: 3.6 VDC / Vmax: 3.7 VDC
Operating Temperature Range	-40 ºC to 85 ºC
Other Radios included in the device:	Nordic, nRF52840, BLE Iridium 9603N, Iridium Nordic, nRF9160, Cat M1 & NB-IoT (pending) u-blox, ZOE-M8, GNSS
Sample Revision	☐Prototype Unit; ■Production Unit; ☐Pre-Production

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	00092018	R1	0.4.T	Bluetooth LE Conducted Sample
2	00092021	R1	0.4.T	Bluetooth LE Radiated Sample
3	00092016	R1	0.4.T	GPS/WiFi/Iridium Conducted Sample
4	00092042	R1	0.4.T	GPS/WiFi/Iridium Radiated Sample

3.3 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	Serial Number
1	J-Link	J-Link	Segger	N/A
2	Laptop	ENVY dv4	HP	geoforce 10178
3	Laptop AC adaptor	PPP009D	HP	WBGSV0ACX0NR54

3.4 Test Sample Configuration

EUT Set-up #	Combination of AE used for test set up	Comments
1	EUT#4+AE#1+AE#2+AE#3	The radio of the EUT was configured to a fixed channel transmission through a supported AP. Based on customer information, the Wi-Fi module will only be used to scan for access points and will never connect to them. Then Windows Command Ping was sufficient to exercising the transmission channel.

3.5 Justification for Worst Case Mode of Operation

During the testing process, the EUT was tested with transmitter sets on low, mid and high channels, and highest possible duty cycle. For radiated measurements, all data in this report shows the worst case between horizontal and vertical antenna polarizations and for all orientations of the EUT.

Based on the Wi-Fi module test report, the worst case was 802.11b mode.

4 Subject of Investigation

The objective of the measurements done by CETECOM Inc. was to assess the performance of the EUT according to the relevant requirements specified in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations and Radio Standard Specification RSS-247 of ISED Canada.

This test report is to support a request for new equipment authorization under the

- FCC ID: OWA00GT2X
- IC ID: 10540A-00GT2X

Testing procedures are based on 558074 D01 DTS Meas Guidance v04 – "GUIDANCE FOR PERFORMING COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEMS (DTS) OPERATING UNDER SECTION 15.247" - April 5, 2017, by the Federal Communications Commission, Office of Engineering and Technology, Laboratory Division.

5 Measurement Results Summary

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	NA	NP	Result
§15.247(a)(1) RSS-247 5.2(a)	Emission Bandwidth	Nominal	-	☐	☐	■	Note 2
§15.247(e) RSS-247 5.2(b)	Power Spectral Density	Nominal	-	☐	☐	■	Note 2
§15.247(b)(1) RSS-247 5.4(d)	Maximum Conducted Output Power and EIRP	Nominal	-	☐	☐	■	Note 2
§15.247(d) RSS-247 5.5	Band edge compliance Unrestricted Band Edges	Nominal	-	☐	☐	■	Note 2
§15.247; 15.209; 15.205 RSS-Gen 8.9; 8.10	Band edge compliance Restricted Band Edges	Nominal	-	☐	☐	■	Note 2
§15.247(d); §15.209 RSS-Gen 6.13	TX Spurious emissions-Radiated	Nominal	802.11b	■	☐	☐	Complies
§15.207(a) RSS Gen 8.8	AC Conducted Emissions	Nominal	-	☐	■	☐	NA

Note: NA= Not Applicable; NP= Not Performed.
Note2: Please refer to the module test report, the module FCC ID is 2ABPY-5B9198

6 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=1.

Radiated measurement

9 kHz to 30 MHz	±2.5 dB (Magnetic Loop Antenna)
30 MHz to 1000 MHz	±2.0 dB (Biconilog Antenna)
1 GHz to 40 GHz	±2.3 dB (Horn Antenna)

Conducted measurement

150 kHz to 30 MHz	±0.7 dB (LISN)
RF conducted measurement	±0.5 dB

According to TR 102 273 a multiplicative propagation of error is assumed for RF measurement systems. For this reason the RMS method is applied to dB values and not to linear values as appropriate for additive propagation of error. Also used: http://physics.nist.gov/cuu/Uncertainty/typeb.html. The above calculated uncertainties apply to direct application of the Substitution method. The Substitution method is always used when the EUT comes closer than 3 dB to the limit.

6.1 Environmental Conditions During Testing:

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

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

6.2 Dates of Testing:

03/03/2020 - 03/04/2020

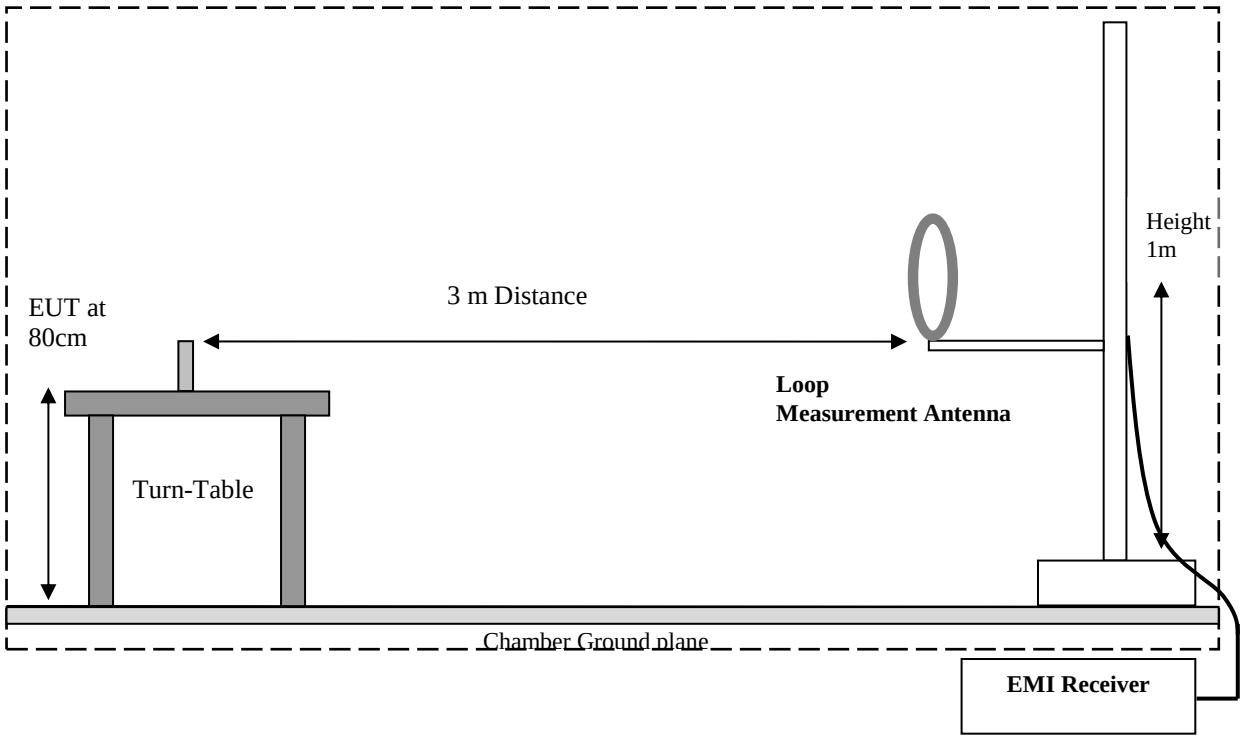
7 Measurement Procedures

7.1 Radiated Measurement

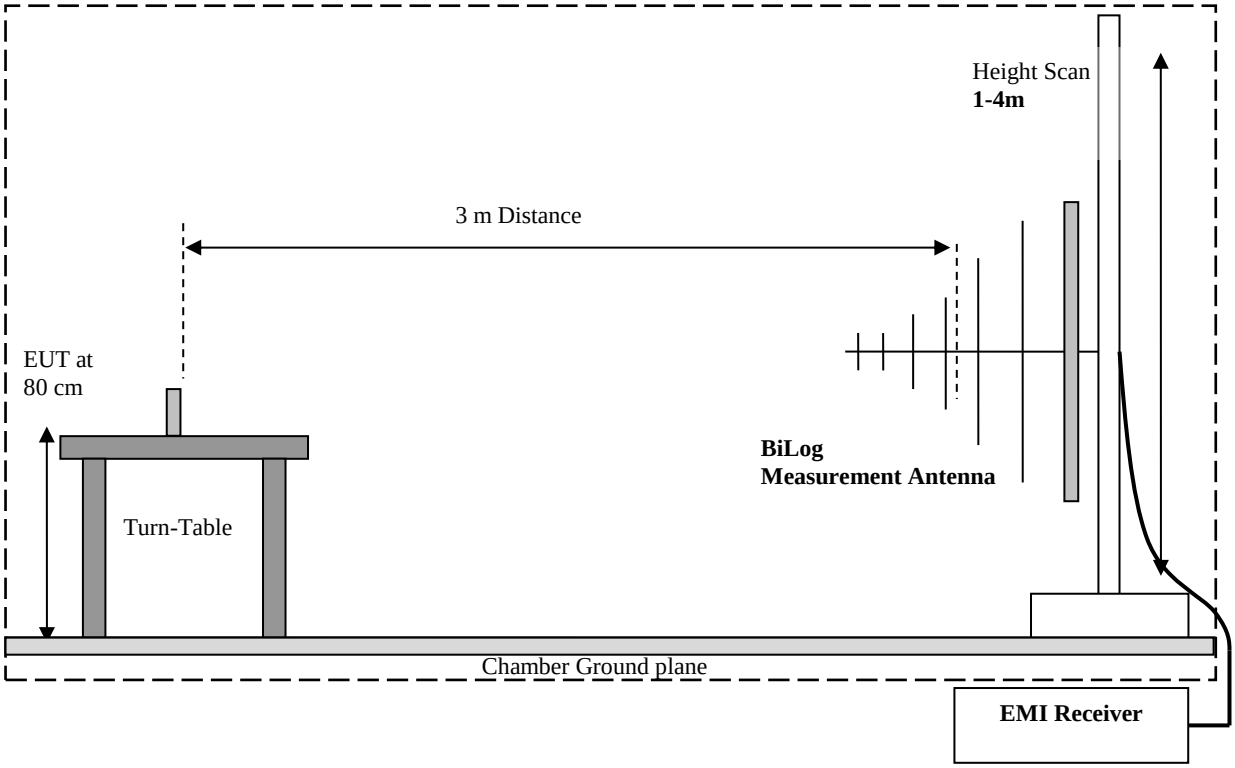
The radiated measurement is performed according to ANSI C63.10 (2013)

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions 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 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- 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.

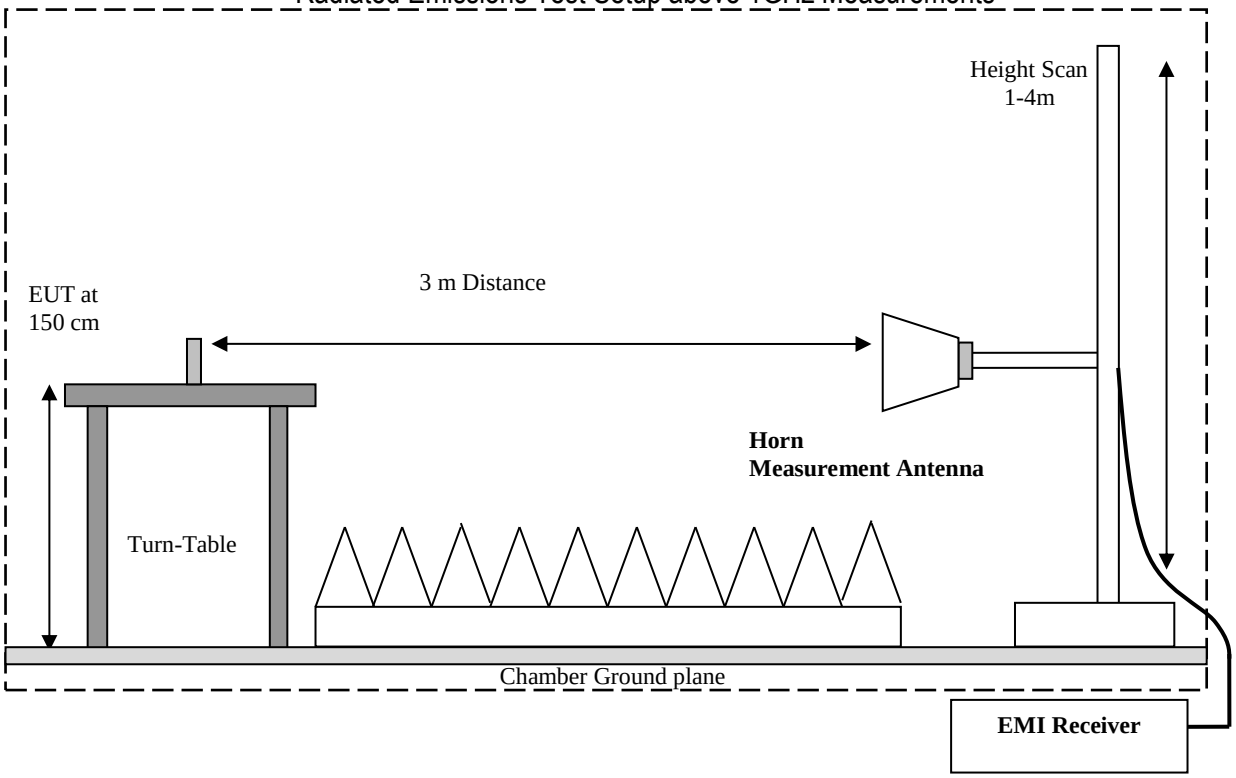
Radiated Emissions Test Setup below 30MHz Measurements



Radiated Emissions Test Setup 30MHz-1GHz Measurements



Radiated Emissions Test Setup above 1GHz Measurements



7.1.1 Sample Calculations for Field Strength Measurements

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

1. Measured reading in dBµV
2. Cable Loss between the receiving antenna and SA in dB and
3. 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 (dBµV/m) = Measured Value on SA (dBµV)- Cable Loss (dB)+ Antenna Factor (dB/m)

Example:

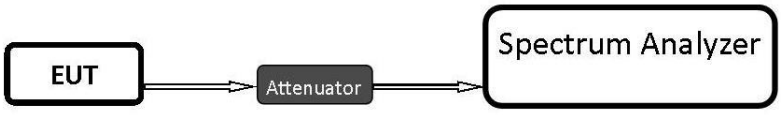
Frequency (MHz)	Measured SA (dBµV)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dBµV/m)
1000	80.5	3.5	14	98.0

7.2 Power Line Conducted Measurement Procedure

AC Power Line conducted emissions measurements performed according to: ANSI C63.4 (2014)

7.3 RF Conducted Measurement Procedure

Testing procedures are based on 558074 D01 DTS Meas Guidance v04 – "GUIDANCE FOR PERFORMING COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEMS (DTS) OPERATING UNDER SECTION 15.247" - April 5, 2017, by the Federal Communications Commission, Office of Engineering and Technology, Laboratory Division.



- Connect the equipment as shown in the above diagram.
- Adjust the settings of the SA (Rohde-Schwarz Spectrum Analyzer) to connect the EUT at the required mode of test.
- Measurements are to be performed with the EUT set to the low, middle and high channels and for worst case modulation schemes.

8 Test Result Data

8.1 Radiated Transmitter Spurious Emissions and Restricted Bands

8.1.1 Measurement according to ANSI C63.10 (2013)

Spectrum Analyzer Settings:

- Frequency = 9 KHz – 30 MHz
- RBW = 9 KHz
- Detector: Peak

- Frequency = 30 MHz – 1 GHz
- Detector = Peak / Quasi-Peak
- RBW= 120 KHz (<1GHz)

- Frequency > 1 GHz
- Detector = Peak / Average
- RBW = 1 MHz

- Radiated spurious emissions shall be measured for the transmit frequencies, transmit power, and data rate for the lowest, middle and highest channel in each frequency band of operation and for the highest gain antenna for each antenna type, and using the appropriate parameters and test requirements.
- The highest (or worst-case) data rate shall be recorded for each measurement.
- For testing at distance other than the specified in the standard, the limit conversion is calculated by using 40 dB/decade extrapolation factor as follow: Conversion factor (CF) = 40 log (D/d) = 40 log (300m / 3m) = 80dB

8.1.2 Limits:

FCC §15.247

- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

FCC §15.209 & RSS-Gen 8.9

- Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency of emission (MHz)	Field strength (µV/m)	Measurement Distance (m)	Field strength @ 3m (dBµV/m)
0.009–0.490	2400/F(kHz) / ---------	300	-
0.490–1.705	24000/F(kHz) / --------	30	-
1.705–30.0	30 / (29.5)	30	-
30–88	100	3	40 dBµV/m
88–216	150	3	43.5 dBµV/m
216–960	200	3	46 dBµV/m
Above 960	500	3	54 dBµV/m

FCC §15.205 & RSS-Gen 8.10

- Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

- Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
  *PEAK LIMIT= 74 dBµV/m
  *AVG. LIMIT= 54 dBµV/m

8.1.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
22° C	1	802.11b	3.3 VDC

8.1.4 Measurement result:

Plot #	Channel #	Scan Frequency	Limit	Result
1-3	Low	30 MHz – 18 GHz	See section 8.5.2	Pass
4-8	Mid	9 kHz – 26 GHz	See section 8.5.2	Pass
9-11	High	30 MHz – 18 GHz	See section 8.5.2	Pass

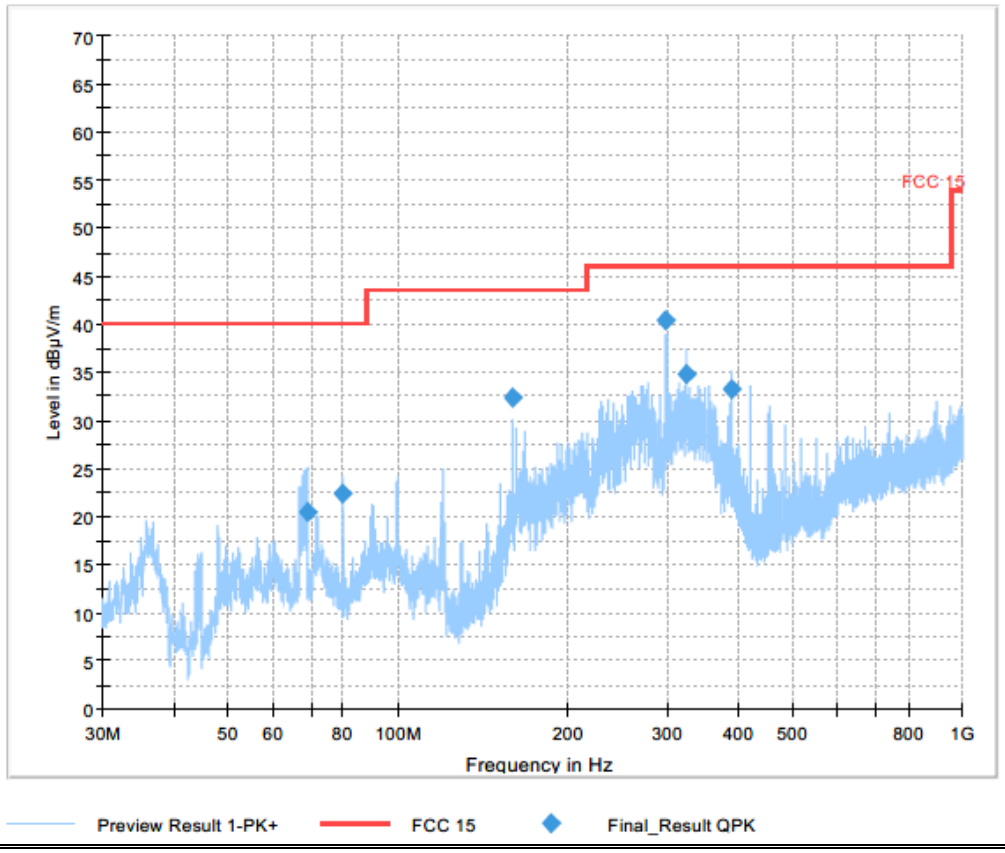
8.1.5 Measurement Plots:

Plot #1 Radiated Emissions: 30 MHz – 1GHz

Modulation: 802.11b | **Channel: Low**

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)
68.996	20.47	40.00	19.53	200.0	120.000	233.0	V	209.0	7.5
79.969	22.36	40.00	17.64	200.0	120.000	209.0	V	196.0	9.1
159.984	32.30	43.52	11.23	200.0	120.000	196.0	H	305.0	13.2
298.754	40.44	46.02	5.58	200.0	120.000	152.0	H	300.0	14.7
324.077	34.91	46.02	11.11	200.0	120.000	182.0	V	328.0	15.4
388.868	33.18	46.02	12.84	200.0	120.000	171.0	V	240.0	18.4

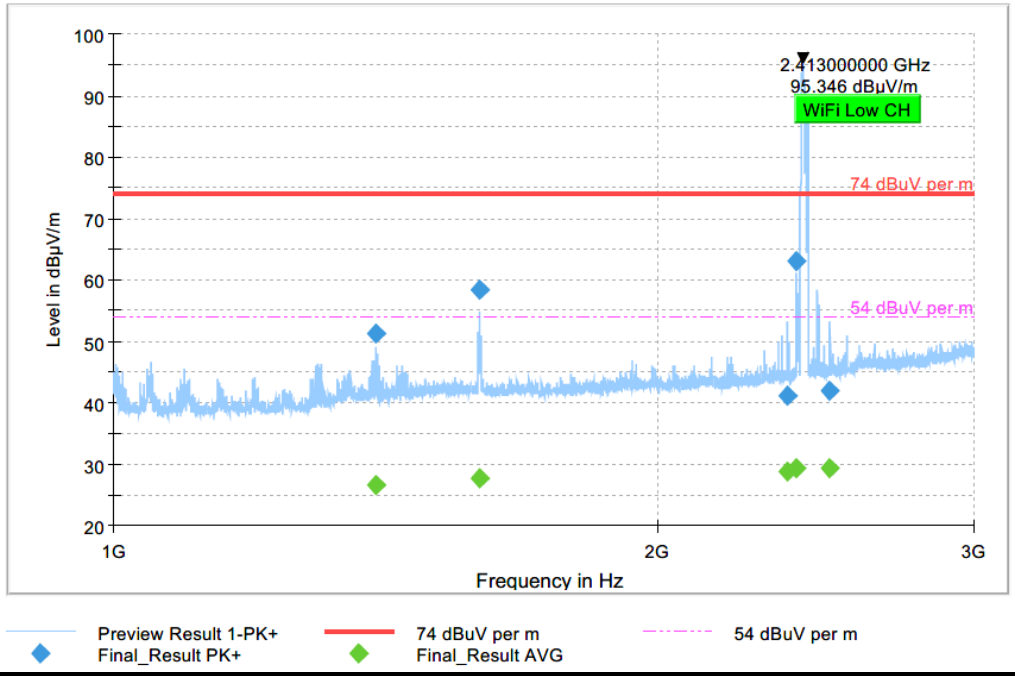


Plot # 2 Radiated Emissions: 1-3 GHz

Modulation: 802.11b | **Channel: Low**

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
1397.860	---	26.48	54.00	27.52	200.0	1000.000	157.0	V
1397.860	51.26	---	74.00	22.74	200.0	1000.000	157.0	V
1597.398	---	27.79	54.00	26.21	200.0	1000.000	161.0	V
1597.398	58.40	---	74.00	15.60	200.0	1000.000	161.0	V
2364.630	---	28.85	54.00	25.15	200.0	1000.000	161.0	H
2364.630	41.01	---	74.00	32.99	200.0	1000.000	161.0	H
2391.682	---	29.28	54.00	24.72	200.0	1000.000	271.0	V
2391.682	63.00	---	74.00	11.00	200.0	1000.000	271.0	V
2497.092	---	29.22	54.00	24.78	200.0	1000.000	155.0	H
2497.092	41.98	---	74.00	32.02	200.0	1000.000	155.0	H

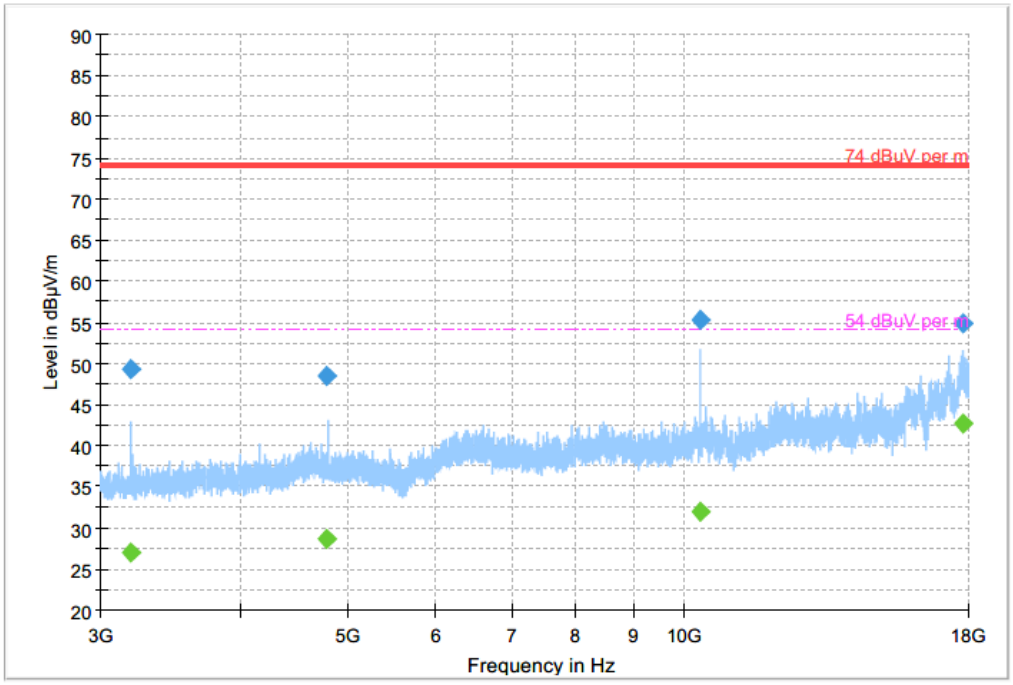


Plot # 3 Radiated Emissions: 3-18 GHz

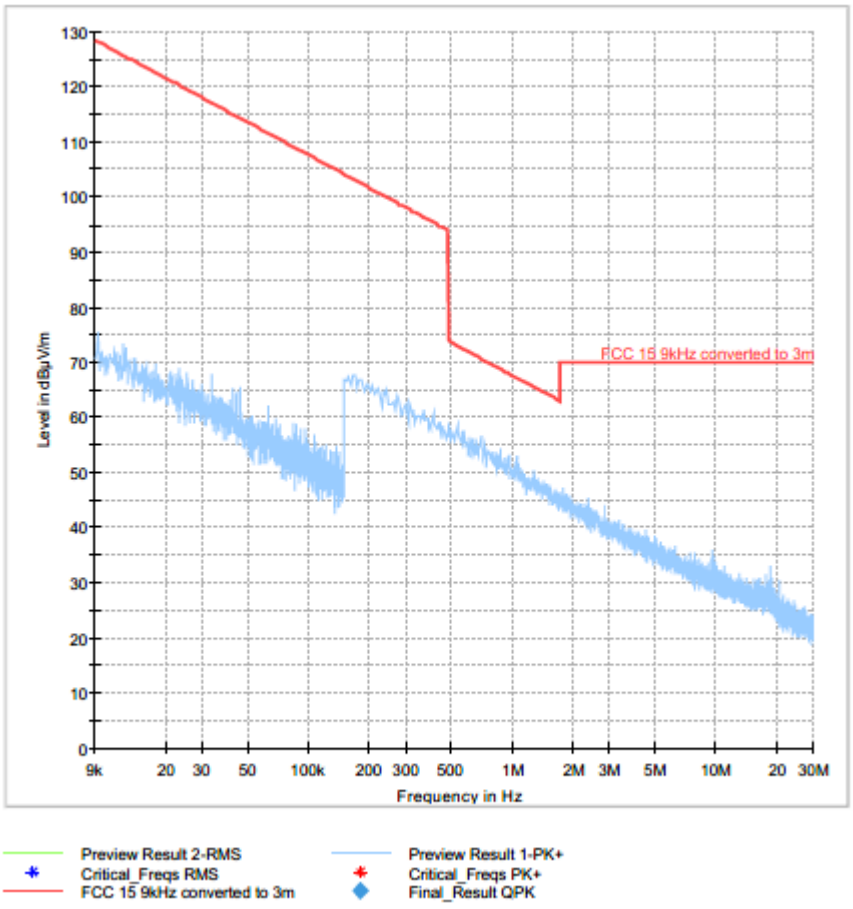
Modulation: 802.11b | **Channel: Low**

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
3197.081	---	27.07	54.00	26.93	200.0	1000.000	291.0	V
3197.081	49.22	---	74.00	24.78	200.0	1000.000	291.0	V
4788.963	---	28.77	54.00	25.23	200.0	1000.000	158.0	V
4788.963	48.43	---	74.00	25.57	200.0	1000.000	158.0	V
10353.185	---	31.92	54.00	22.08	200.0	1000.000	210.0	H
10353.185	55.33	---	74.00	18.67	200.0	1000.000	210.0	H
17795.202	---	42.74	54.00	11.26	200.0	1000.000	190.0	V
17795.202	54.86	---	74.00	19.14	200.0	1000.000	190.0	V



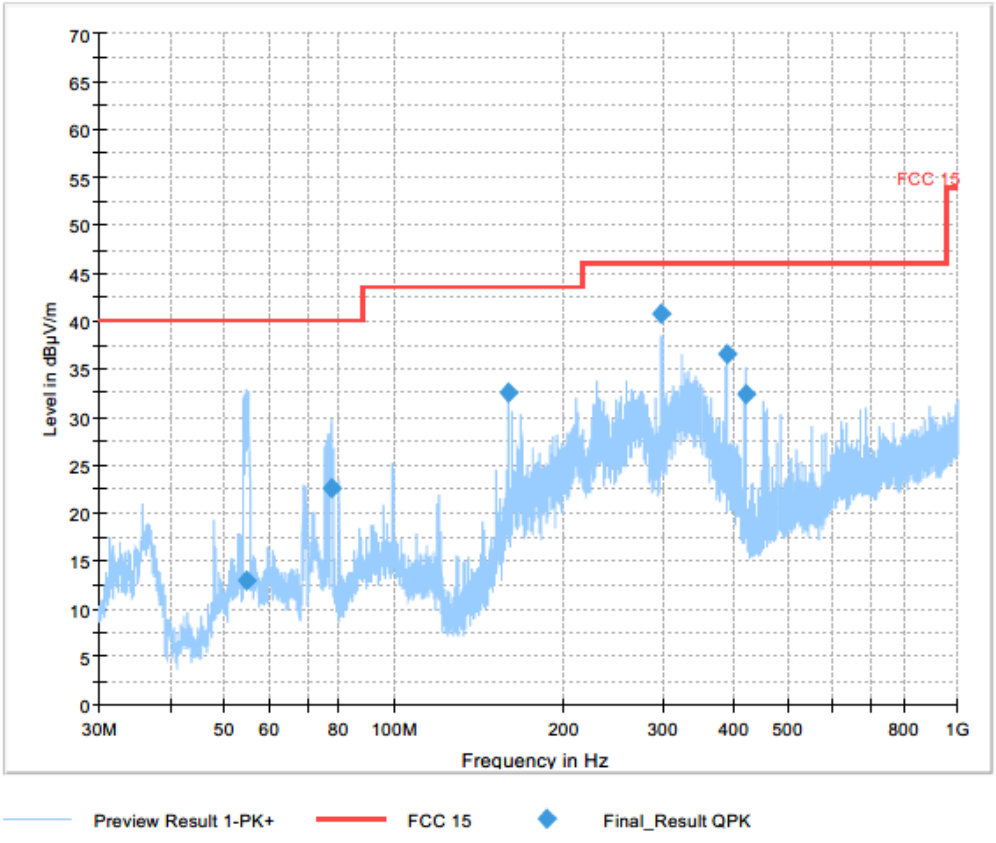
Plot # 4 Radiated Emissions: 9 KHz – 30 MHz		
Modulation: 802.11b	**Channel: Mid**	



Plot #5 Radiated Emissions: 30 MHz – 1GHz		
Modulation: 802.11b	**Channel: Mid**	

Final Result

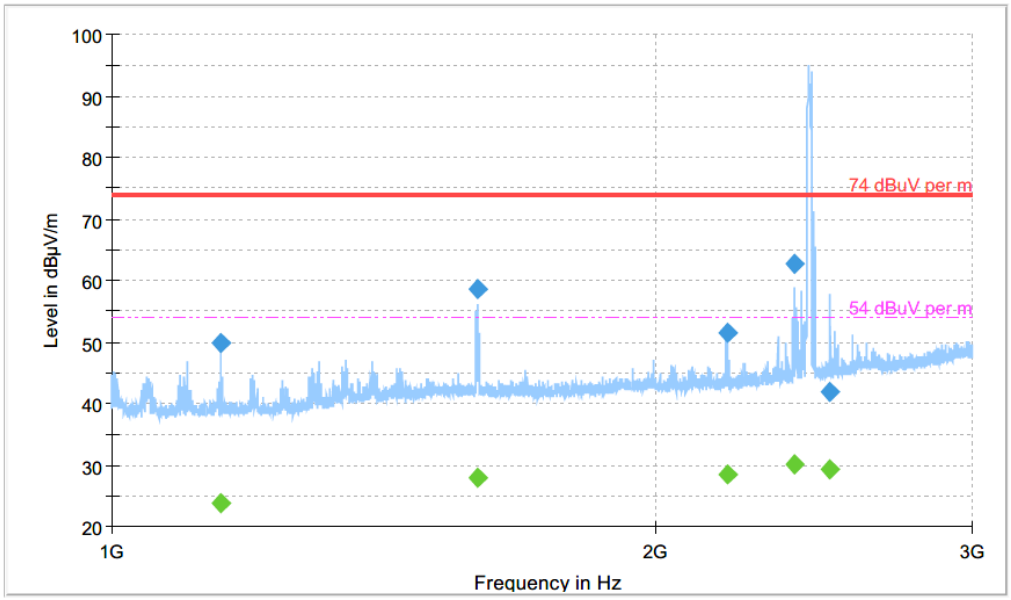
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
54.684	12.97	40.00	27.03	200.0	120.000	207.0	V	100.0	5.9
77.276	22.58	40.00	17.42	200.0	120.000	325.0	V	40.0	8.8
160.007	32.61	43.52	10.91	200.0	120.000	208.0	H	306.0	13.2
298.770	40.81	46.02	5.21	200.0	120.000	140.0	H	310.0	14.7
388.786	36.59	46.02	9.43	200.0	120.000	260.0	H	247.0	18.4
420.864	32.40	46.02	13.62	200.0	120.000	183.0	V	19.0	18.0



Plot #6 Radiated Emissions: 1-3 GHz		
Modulation: 802.11b	**Channel: Mid**	

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
1149.509	---	23.87	54.00	30.13	200.0	1000.000	181.0	V
1149.509	49.93	---	74.00	24.07	200.0	1000.000	181.0	V
1594.182	---	28.06	54.00	25.94	200.0	1000.000	154.0	V
1594.182	58.54	---	74.00	15.46	200.0	1000.000	154.0	V
2196.659	---	28.56	54.00	25.44	200.0	1000.000	152.0	V
2196.659	51.61	---	74.00	22.39	200.0	1000.000	152.0	V
2389.539	---	30.10	54.00	23.90	200.0	1000.000	275.0	V
2389.539	62.84	---	74.00	11.16	200.0	1000.000	275.0	V
2500.469	---	29.40	54.00	24.60	200.0	1000.000	205.0	H
2500.469	42.05	---	74.00	31.95	200.0	1000.000	205.0	H

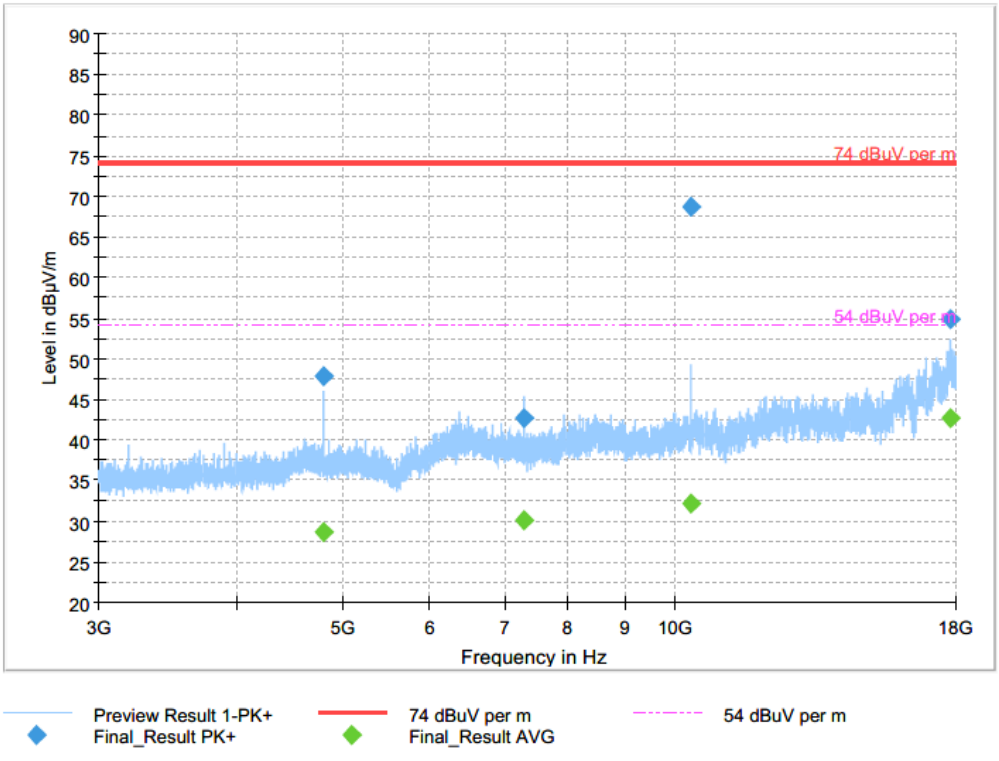


Plot #7 Radiated Emissions: 3-18 GHz

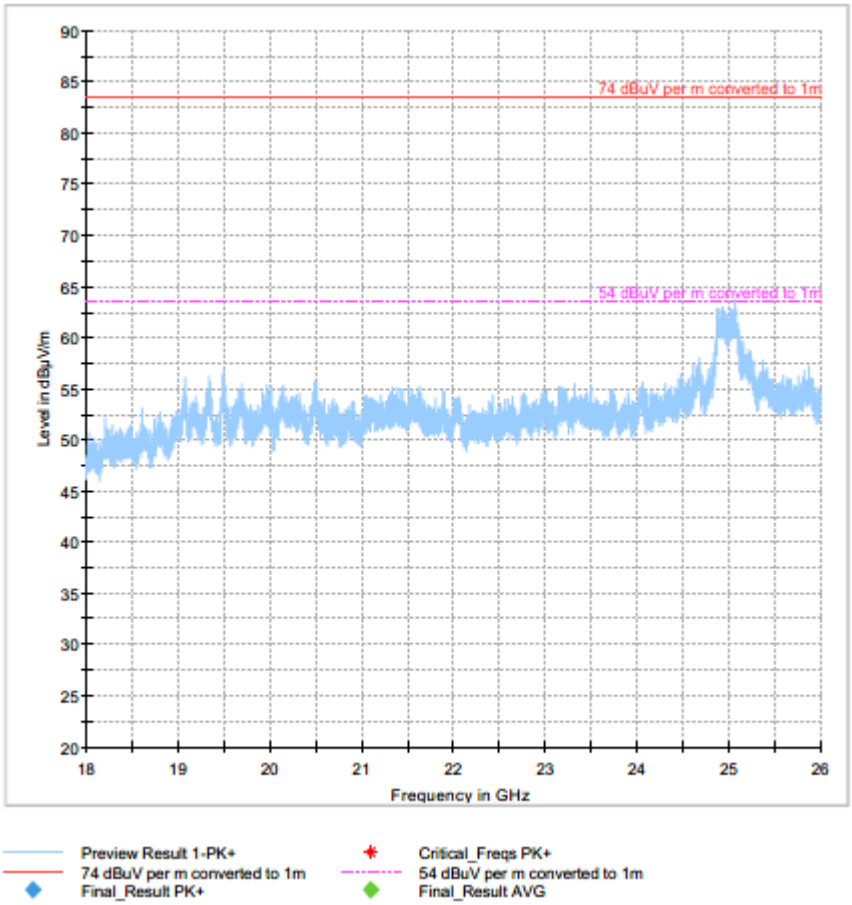
Modulation: 802.11b | **Channel: Mid**

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
4799.058	---	28.76	54.00	25.24	200.0	1000.000	154.0	V
4799.058	47.89	---	74.00	26.11	200.0	1000.000	154.0	V
7299.772	---	30.14	54.00	23.86	200.0	1000.000	226.0	V
7299.772	42.77	---	74.00	31.23	200.0	1000.000	226.0	V
10348.556	---	32.16	54.00	21.84	200.0	1000.000	278.0	V
10348.556	68.83	---	74.00	5.17	200.0	1000.000	278.0	V
17815.268	---	42.65	54.00	11.35	200.0	1000.000	226.0	H
17815.268	54.95	---	74.00	19.05	200.0	1000.000	226.0	H



Plot #8 Radiated Emissions: 18-26 GHz		
Modulation: 802.11b	**Channel: Mid**	

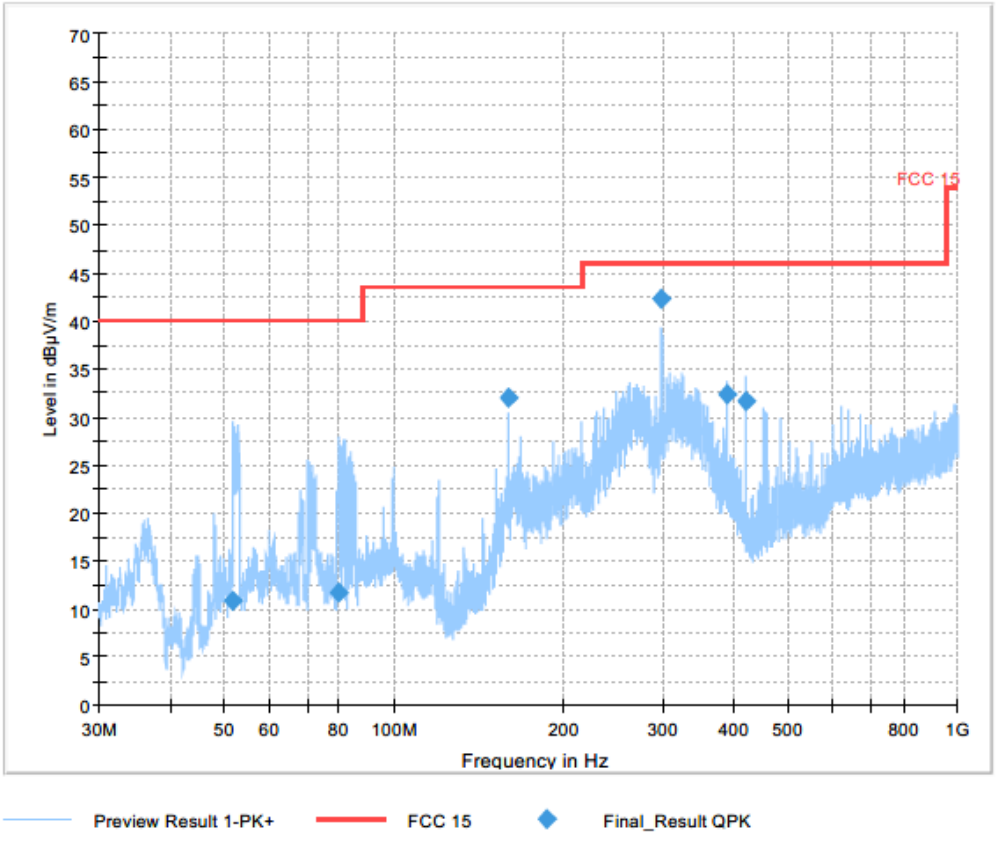


Plot # 9 Radiated Emissions: 30 MHz – 1GHz

Modulation: 802.11b | **Channel: High**

Final Result

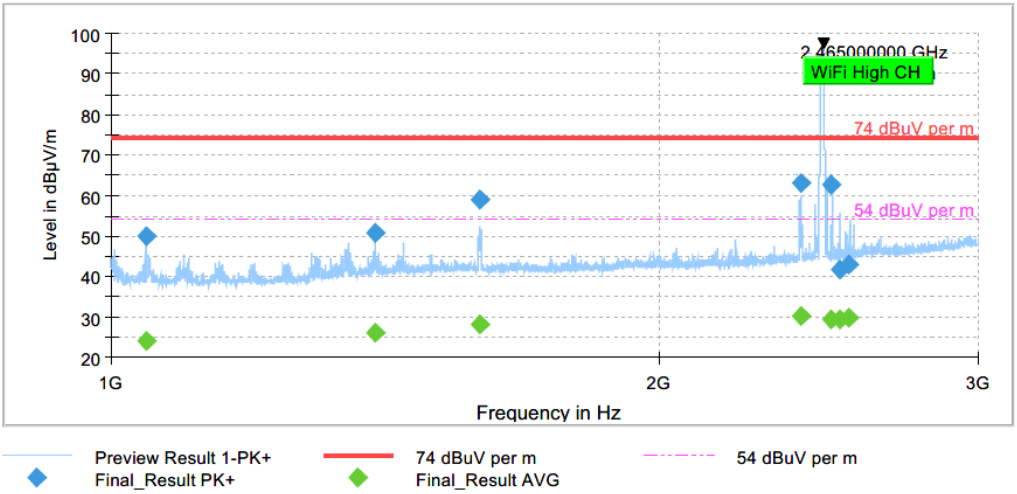
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
51.836	10.84	40.00	29.16	200.0	120.000	190.0	V	70.0	5.3
79.563	11.74	40.00	28.26	200.0	120.000	151.0	V	91.0	9.0
160.027	32.11	43.52	11.41	200.0	120.000	189.0	H	305.0	13.2
298.773	42.30	46.02	3.72	200.0	120.000	140.0	H	312.0	14.7
388.814	32.42	46.02	13.60	200.0	120.000	194.0	V	241.0	18.4
421.319	31.64	46.02	14.38	200.0	120.000	172.0	V	31.0	18.0



Plot #10 Radiated Emissions: 1-3 GHz		
Modulation: 802.11b	Channel: High	

Final Result

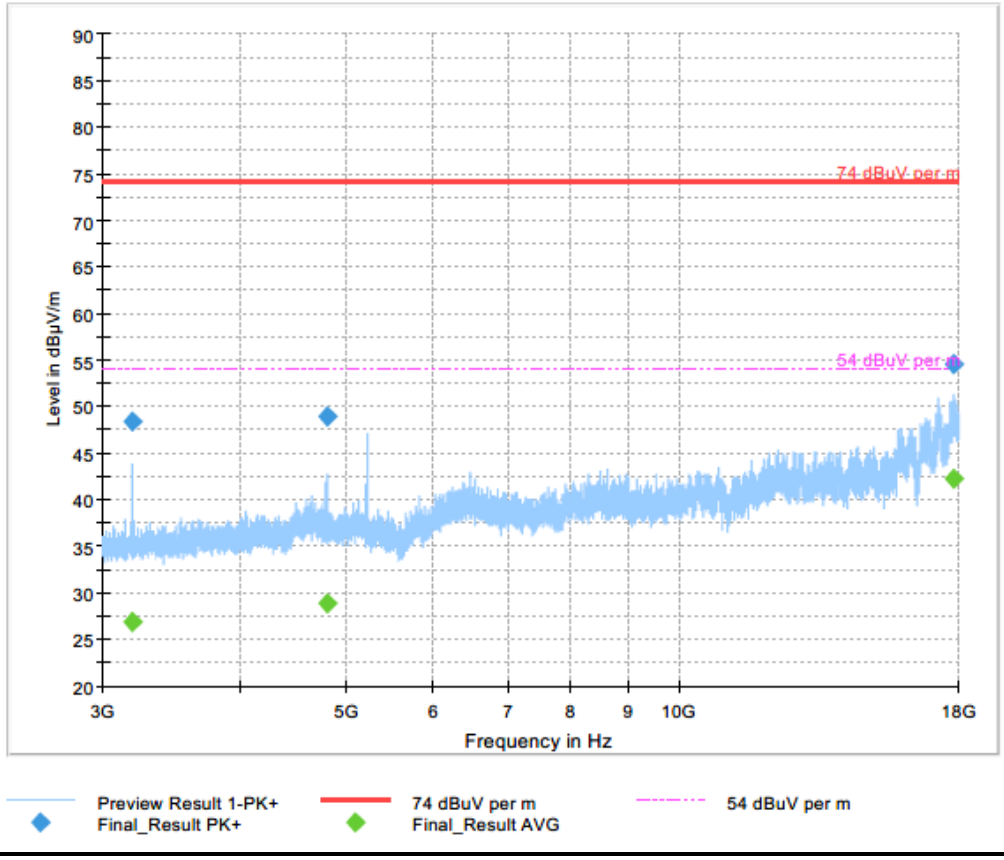
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
1044.821	---	24.04	54.00	29.96	200.0	1000.000	175.0	V
1044.821	50.07	---	74.00	23.93	200.0	1000.000	175.0	V
1397.716	---	26.31	54.00	27.69	200.0	1000.000	168.0	V
1397.716	50.64	---	74.00	23.36	200.0	1000.000	168.0	V
1596.328	---	28.09	54.00	25.91	200.0	1000.000	161.0	V
1596.328	59.17	---	74.00	14.83	200.0	1000.000	161.0	V
2395.901	---	30.17	54.00	23.83	200.0	1000.000	154.0	V
2395.901	63.00	---	74.00	11.00	200.0	1000.000	154.0	V
2492.393	---	29.52	54.00	24.48	200.0	1000.000	168.0	V
2492.393	62.82	---	74.00	11.18	200.0	1000.000	168.0	V
2515.718	---	29.54	54.00	24.46	200.0	1000.000	149.0	V
2515.718	41.72	---	74.00	32.28	200.0	1000.000	149.0	V
2548.336	---	29.75	54.00	24.25	200.0	1000.000	325.0	H
2548.336	42.98	---	74.00	31.02	200.0	1000.000	325.0	H



Plot #11 Radiated Emissions: 3-18 GHz		
Modulation: 802.11b	**Channel: High**	

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
3185.969	---	26.84	54.00	27.16	200.0	1000.000	292.0	V
3185.969	48.43	---	74.00	25.57	200.0	1000.000	292.0	V
4795.468	---	28.89	54.00	25.11	200.0	1000.000	151.0	V
4795.468	48.87	---	74.00	25.13	200.0	1000.000	151.0	V
17825.633	---	42.33	54.00	11.67	200.0	1000.000	267.0	H
17825.633	54.57	---	74.00	19.43	200.0	1000.000	267.0	H



9 Test setup photos

Setup photos are included in supporting file name: "EMC_Geoforce_GT2_FCC_Setup_Photos.pdf"

10 Test Equipment And Ancillaries Used For Testing

Model No.	Description	Serial number	Manufacture	Calibration Date	Due
FSV40	Signal Analyzer	101022	Rohde & Schwarz	7/16/2019	7/16/2022
Loop antenna 6512	Loop antenna	16498	ETS Lindgren	8/8/2017	8/8/2020
Bilog antenna CBL6141B	Bilog antenna	41106	Teseq	11/1/2017	11/1/2020
Horn-3115	Horn antenna	00035111	ETS Lindgren	4/17/2019	4/17/2022
Horn 3117-PA	Horn antenna	169547	ETS Lindgren	8/8/2017	8/8/2020
Horn 3116C-PA	Horn antenna	169535	ETS Lindgren	9/24/2017	9/24/2020
OSP130	OSP130	100185	Rohde & Schwarz	N/A	N/A
OSP150	OSP150	100016	Rohde & Schwarz	N/A	N/A
Digital Thermometer	Model:36934-164	181230565	Control company	4/27/2018	4/27/2020
maturo NCD	Antenna Mast	N/A	maturo GmbH	N/A	N/A
Maturo control unit	turn table	N/A	maturo GmbH	N/A	N/A
FSU26	Spectrum Analyzer FSU26	200065	Rohde & Schwarz	7/16/2019	7/16/2022
Digital Thermometer	Model:36934-164	191871994	Control company	1/10/2019	1/10/2021

Note:

1. 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 cal status either do not specifically require calibration or is internally characterized before use.

11 History

Date	Report Name	Changes to report	Report prepared by
2020-04-20	EMC_Geoforce_GT2_15.247_WiFi	Initial Version	Kevin Wang

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