FCC / ISED Test Report

FOR
Juniper Systems, Inc.

Model Name
MS3

Product Description
Ultra handheld computer for field data collection.

FCC ID: VSFMS3
IC ID: 7980A-MS3

Applied Rules and Standards
47 CFR Part 15.247 (DSS)
RSS-247 Issue 2 (FHSs) & RSS-Gen Issue 5

REPORT #: EMC_JUNIP_036_19001_FCC_15.247_ISED_RFID_DSS_Rev1

DATE: 2/6/2020

A2LA Accredited

IC recognized #
3462B-1
3462B-2

***CETECOM* Inc.**
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CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

TABLE OF CONTENTS

1 Assessment

The following device as further described in section 3 of this report was evaluated for radiated spurious emissions for unlicensed radio according to criteria specified in FCC rules 15.247 of Title 47 of the Code of Federal Regulations and the relevant ISED Canada standard RSS-GEN and RSS-247.

No deviations were ascertained.

According to section 5 of this report, the overall result is PASS.

Company	Description	Model #
Juniper Systems, Inc.	Ultra handheld computer for field data collection.	MS3

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2/6/2020	Compliance	Cindy Li (Lab Manager)	Cindy Li

Responsible for the Report:

Date	Section	Name	Signature
2/6/2020	Compliance	Issa Ghanma (EMC Engineer)	Digitally signed by: Issa W Ghanma DN: CN = Issa W Ghanma email = Issaghanma@cetecom.com C = US O = CETECOM Inc. OU = EMC Date: 2020.02.06 16:23:08 -08'00'

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

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

2.2 Identification of the Client

Applicant's Name:	Juniper Systems, Inc.
Street Address:	1132 W 1700 N
City/Zip Code	Logan, UT 84321
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as client.
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Model #:	MS3
Firmware Version Identification Number (FVIN):	MS3_SW_00
Hardware Version Identification Number (HVIN):	MS3
Product Marketing Name (PMN):	MS3
Power Supply/ Rated Operating Voltage Range:	Low 11 VDC, Nominal 12 VDC, High 15 VDC
Operating Temperature Range:	Low -20 ºC, High 50 ºC
Sample Revision:	☐Prototype Unit; ■Production Unit; ☐Pre-Production
EUT Dimensions [H x W x D]:	8.5" x 5.5" x 1.4"
Weight [Lbs.]:	2
EUT Diameter:	■ < 60 cm ☐ Other _____

RFID Module Information	
Manufacturer:	TransCore
Model:	76007
FCC ID:	FIH76007
IC ID:	1548A-76007
Other Radios included in the device:	❖ Cellular: • Sierra Wireless EM7455 o FCC ID: Manufacturer: N7NEM7455 o IC ID: 2417C-EM7455 ❖ Ampak HS2B56: • BT BDR/EDR • BLE • Wi-Fi 2.4/5G a/b/g/n/ac+HT20/40/80MHz MIMO, client device. ❖ GPS: • U-blox AG NEO-M8N
Frequency Range / number of channels:	917.4 – 927.2 MHz

Type(s) of Modulation:	PR-ASK, PWM
Modes of Operation:	Hopping
Antenna Information as declared:	Internal, Passive, loop, -0.3 dBi at 902 MHz
Max. declared output Powers in modular grant:	1 Watts

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes / Comments
1	MS3P172	MS3T_00	MS3_SW_00	Radiated Emissions

3.3 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	Comments
1	AC/DC Power Adapter	PSAA30R-120	Phihong Technology Co., Ltd	Switching power supply • Input :100-240V • Output :12V --- 2.5A
2	Optical Mouse	MS116t	DELL	Will not come packaged with MS3. Used to exercise the USB port
3	3.5mm Audio Jack	Generic Wired Headphones	Motorola	Will not come packaged with MS3. Used to exercise the audio jack.

3.4 Test Sample Configuration

Set-up #	Combination of AE used for test set up	Comments
1	EUT#1 + AE#1 + AE#2 + AE#3	-

3.5 Mode of Operation details

Mode of Operation	Description of Operating modes	Additional Information
Op. 1	RFID PR-ASK Co-TX with Wi-Fi	Pre-installed software programs were installed on the EUT by the client, that will not be available to the end user, that provides the ability to configure the radio to: • Continuous transmit modulated and CW • Select TX fixed channel. • Maximum duty cycle. For Radiated measurements: The internal antenna was connected.

3.6 Justification for Worst Case Mode of Operation

During the testing process the EUT was tested with transmitter sets on low, Mid and high channels, simultaneously with Wi-Fi g mode. The RFID radio configured to highest duty cycle, maximum output power and worst case of modulations supported based on the maximum conducted output power in modular grant and reports.

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.

Note: Based on client declaration; RFID duty cycle will be limited to 30% in 100 millisecond frame, and duty cycle correction factor were applied on the test results in this document section 8.1.5

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 15.247 of Title 47 of the Code of Federal Regulations and Radio Standard Specification RSS-247 Issue 2 and RSS-GEN Issue 5 of ISED Canada.

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

- FCC ID: VSFMS3
- IC ID: 7980A-MS3

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(b) RSS-247 5.4(a)	Maximum Peak Conducted Output Power	-	-	☐	☐	■	Note 1 Note 2
§15.247(d) §15.205 RSS-247 5.5 RSS-Gen 8.10	Band Edge Compliance	-	-	☐	☐	■	Note 1 Note 2
§15.247(a) RSS-247 5.1(c)	Spectrum Bandwidth	-	-	☐	☐	■	Note 1 Note 2
§15.247(a) RSS-247 5.1(c)	Carrier Frequency Separation	-	-	☐	☐	■	Note 1 Note 2
§15.247(a) RSS-247 5.1(c)	Number of Hopping Channels	-	-	☐	☐	■	Note 1 Note 2
§15.247(a) RSS-247 5.1(c)	Time of occupancy	-	-	☐	☐	■	Note 1 Note 2
§15.247(d) §15.209 (a) RSS-Gen 6.13	TX Spurious emissions-Radiated	Nominal	PR-ASK	■	☐	☐	Complies
§15.207(a) RSS-Gen 8.8	AC Conducted Emissions	Nominal	PR-ASK	■	☐	☐	Complies

Note 1: NA= Not Applicable; NP= Not Performed.
Note 2: Leveraged from module certification TransCore FCC/IC ID: FIH76007 / 1548A-76007

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:

10/21/2019 – 10/28/2019

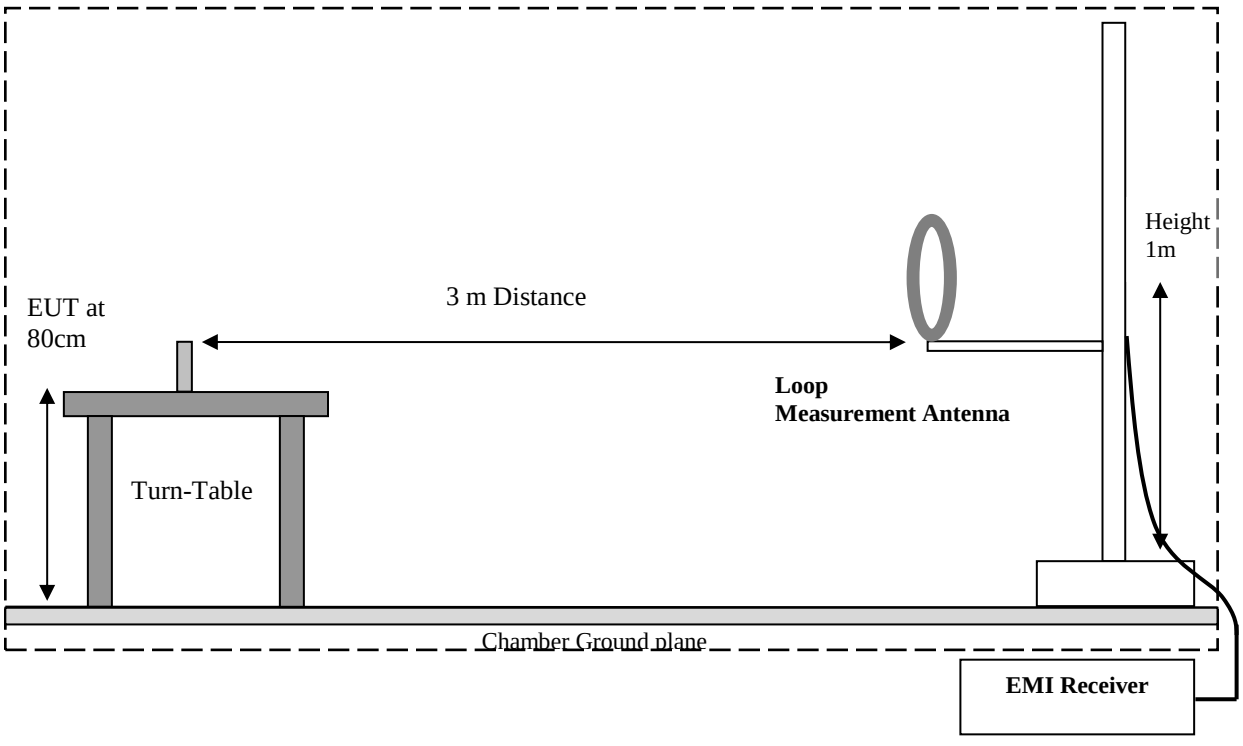
7 Measurement Procedures

7.1 Radiated Measurement

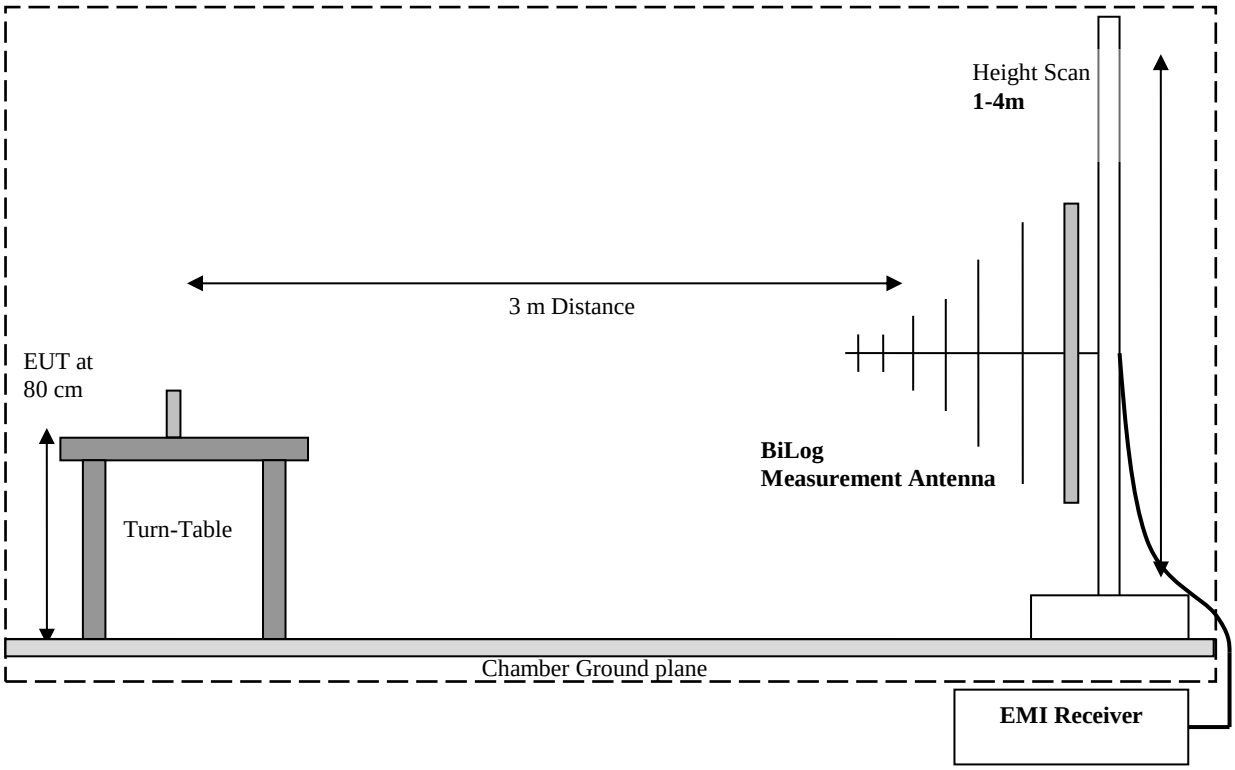
The radiated measurement is performed according to ANSI C63.10 (2013)

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 360º continuous measurement of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The 10 highest emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 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.

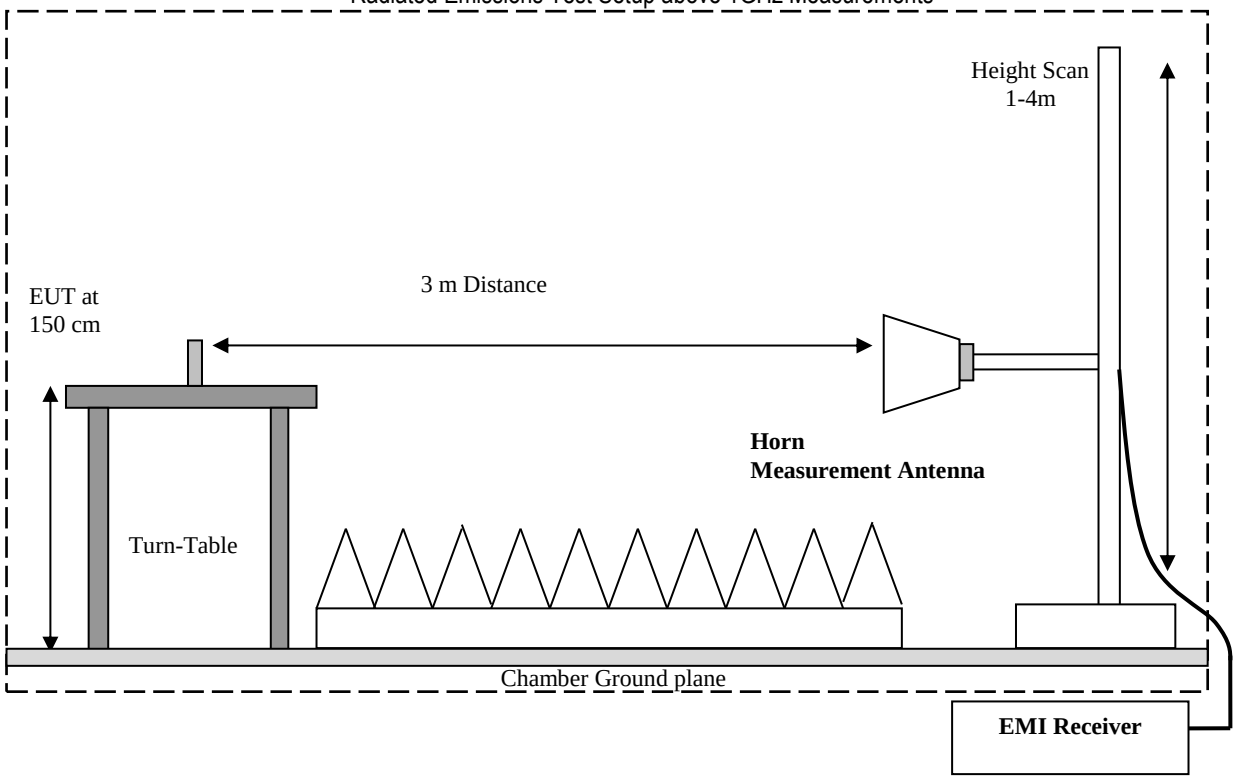
Radiated Emissions Test Setup below 30MHz Measurements



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

8 Test Result Data

8.1 Transmitter Spurious Emissions and Restricted Bands

8.1.1 Measurement according to ANSI C63.10

Analyzer Settings:

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

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

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

Plots reported here represent the worst case emissions for horizontal and vertical antenna polarizations and for three orientations of the EUT. Unless mentioned otherwise, the emissions outside the limit lines in the plots are from the transmit signal.

8.1.2 Limits: FCC 15.247(d)/15.209(a) /RSS-Gen 6.13

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= 74dB µV/m
- AVG. LIMIT= 54dB µV/m

- Except as shown in CFR 47 Part 15.205 paragraph (d), only spurious emissions are permitted in any of the frequency bands listed below

Frequency (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

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 described in 5.4.
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 as follow:

Conversion factor (CF) = 40 log (D/d) = 40 log (300 m / 3 m) = 80 dB

8.1.3 Test conditions and setup:

Ambient Temperature	EUT operating mode	Power Input
22° C	Op.1	12 VDC

8.1.4 Measurement result:

Plot #	EUT #	Channel #	Scan Frequency	Critical Frequency [MHz]	Emission level [dBµV/m]	Limit	Result
1 – 3	1	Low	30 MHz – 10 GHz	2751.736	53.079	See section 8.1.2	Pass
4	1	Mid	9 KHz – 30 MHz	101.396	46.936	See section 8.1.2	Pass
5 – 7	1	High	30 MHz – 10 GHz	2751.736	51.634	See section 8.1.2	Pass

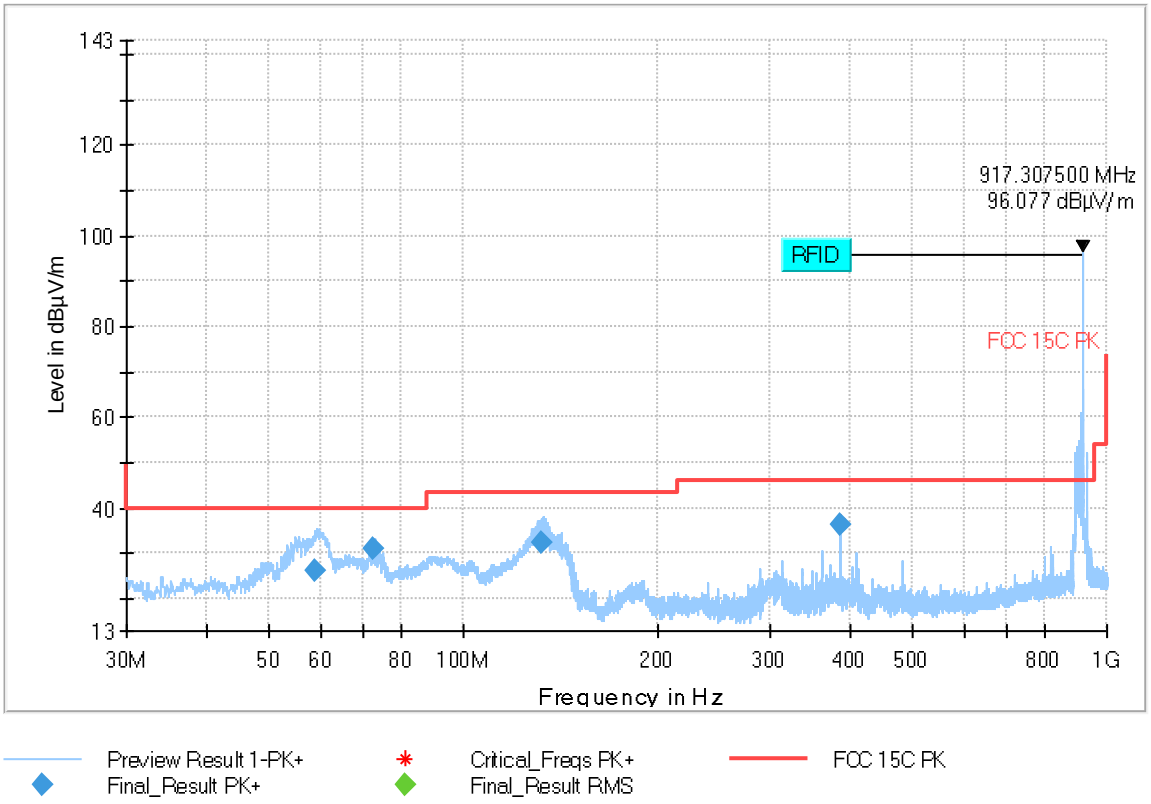
8.1.5 Measurement Plots:

Plot # 1 Radiated Emissions: 30 MHz – 1 GHz

Channel: Low

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
58.992	26.397	40.00	13.60	100.0	100.000	254.0	V	165.0	-22.1	4:10:06 PM - 10/21/2019
72.596	31.147	40.00	8.85	100.0	100.000	107.0	V	204.0	-24.8	4:13:03 PM - 10/21/2019
132.227	32.213	43.50	11.29	100.0	100.000	252.0	V	189.0	-18.7	4:15:20 PM - 10/21/2019
384.436	36.261	46.00	9.74	100.0	100.000	107.0	H	99.0	-15.0	4:07:28 PM - 10/21/2019



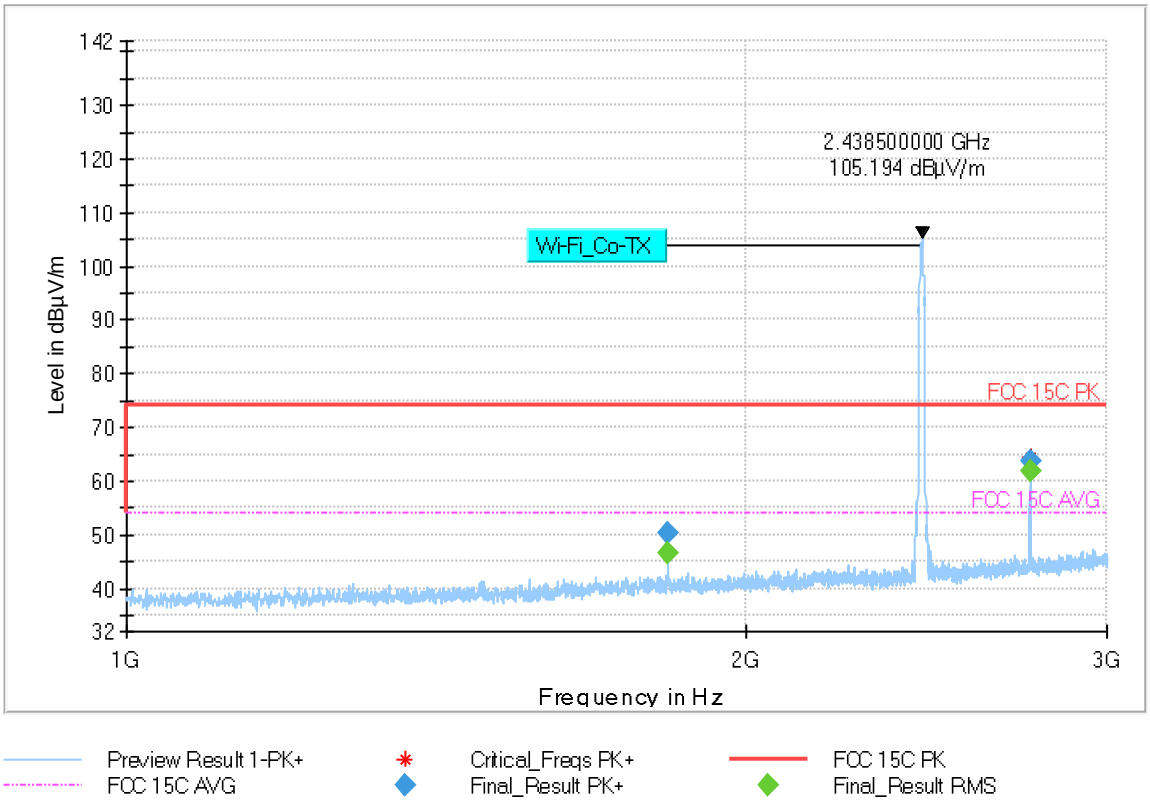
Plot # 2 Radiated Emissions: 1 – 3 GHz

Channel: Low

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
1834.400	---	46.459	53.98	7.52	300.0	1000.000	265.0	V	305.0	5.1	8:24:55 PM - 10/21/2019
1834.400	50.305	---	74.00	23.69	300.0	1000.000	265.0	V	305.0	5.1	8:24:55 PM - 10/21/2019
2751.736	---	61.940	53.98	-7.96	300.0	1000.000	142.0	V	21.0	7.9	8:28:06 PM - 10/21/2019
2751.736	63.536	---	73.99	10.46	300.0	1000.000	142.0	V	21.0	7.9	8:28:06 PM - 10/21/2019

Frequency (MHz)	MaxPeak (dBµV/m)	Corrected MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1834.400	50.305	39.848	53.98	14.132
2751.736	63.536	53.079	53.98	0.901



According to FCC Basics of Unlicensed transmitters and ANSI C63.10 Section 7.5;

Determining the duty cycle correction factor (in dB) using $20*\text{Log}_{10}$ * (Duty cycle %), and apply it to the peak pulse.

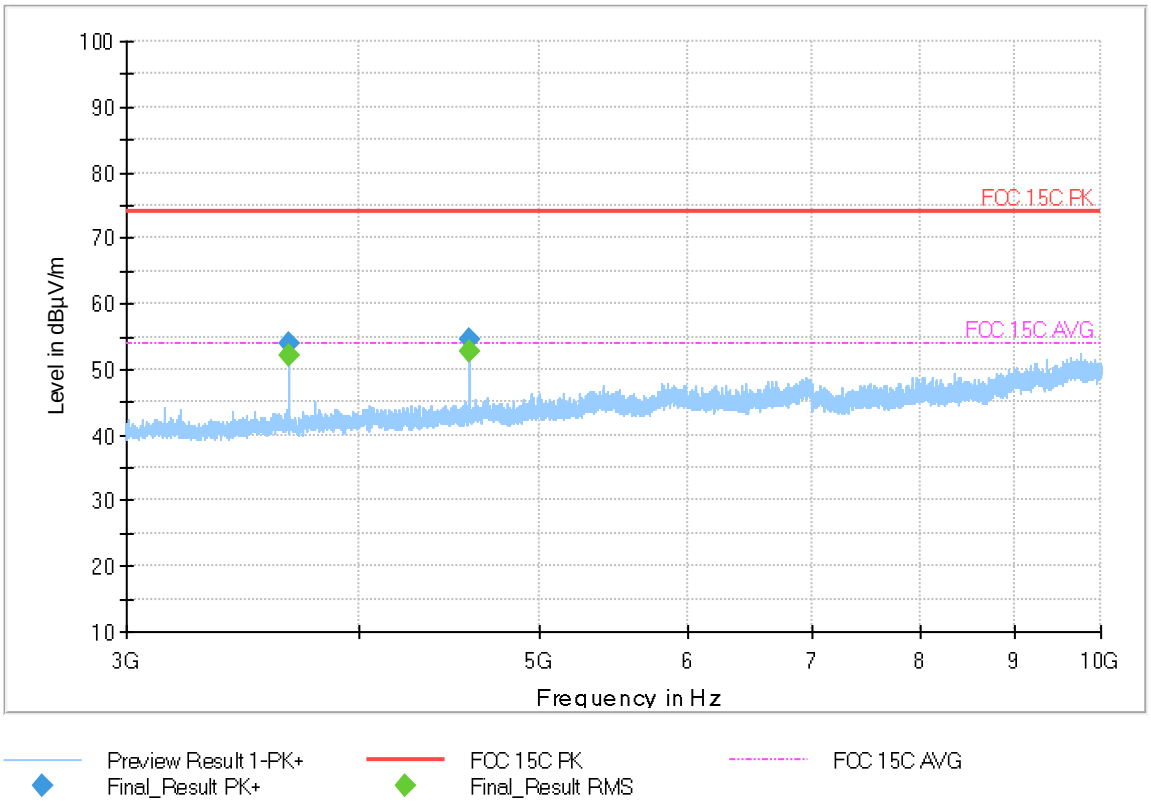
20 * Log10 * (30%) ≈ -10.457

Plot # 3 Radiated Emissions: 3 – 10 GHz

Channel: Low

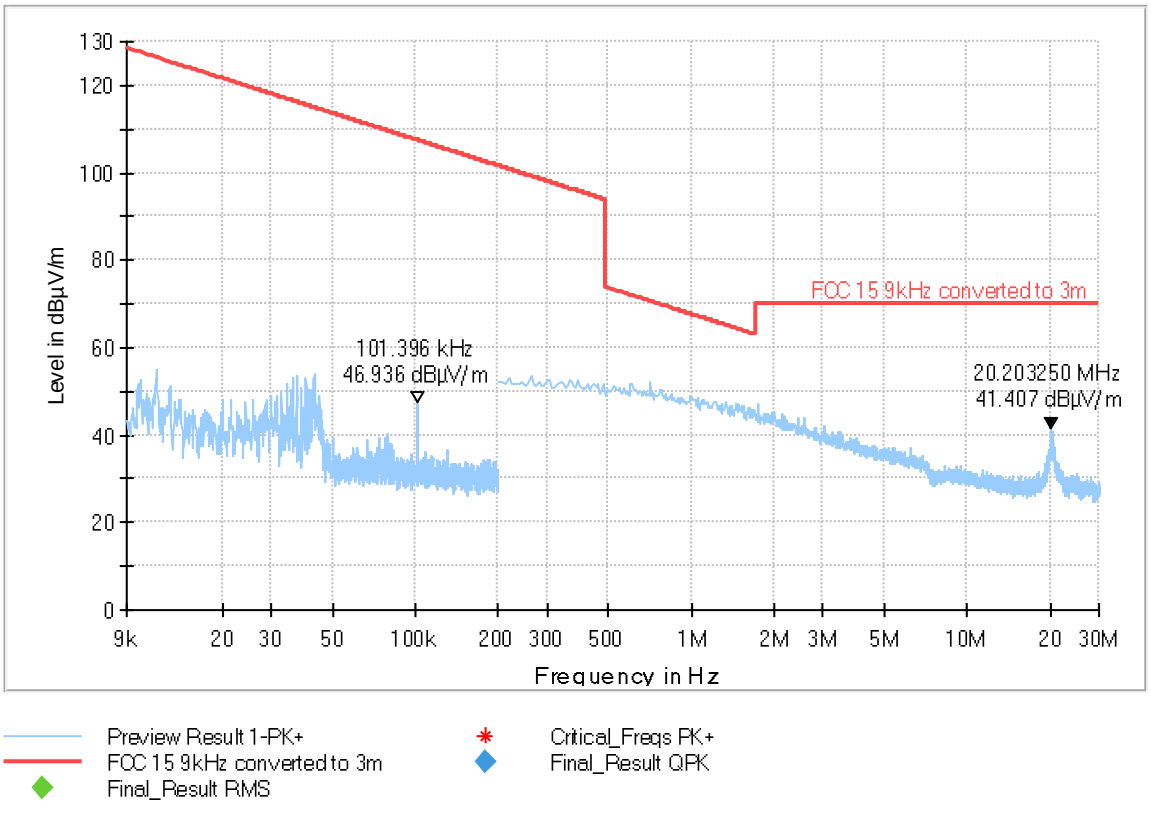
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3668.969	---	52.042	53.98	1.94	200.0	1000.000	145.0	H	122.0	-7.7	7:58:04 PM - 10/28/2019
3668.969	54.068	---	73.99	19.92	200.0	1000.000	145.0	H	122.0	-7.7	7:58:04 PM - 10/28/2019
4586.299	---	52.664	53.98	1.32	200.0	1000.000	305.0	H	109.0	-6.0	8:09:18 PM - 10/28/2019
4586.299	54.561	---	73.99	19.43	200.0	1000.000	305.0	H	109.0	-6.0	8:09:18 PM - 10/28/2019



Plot # 4 Radiated Emissions: 9 KHz – 30 MHz

Channel: Mid

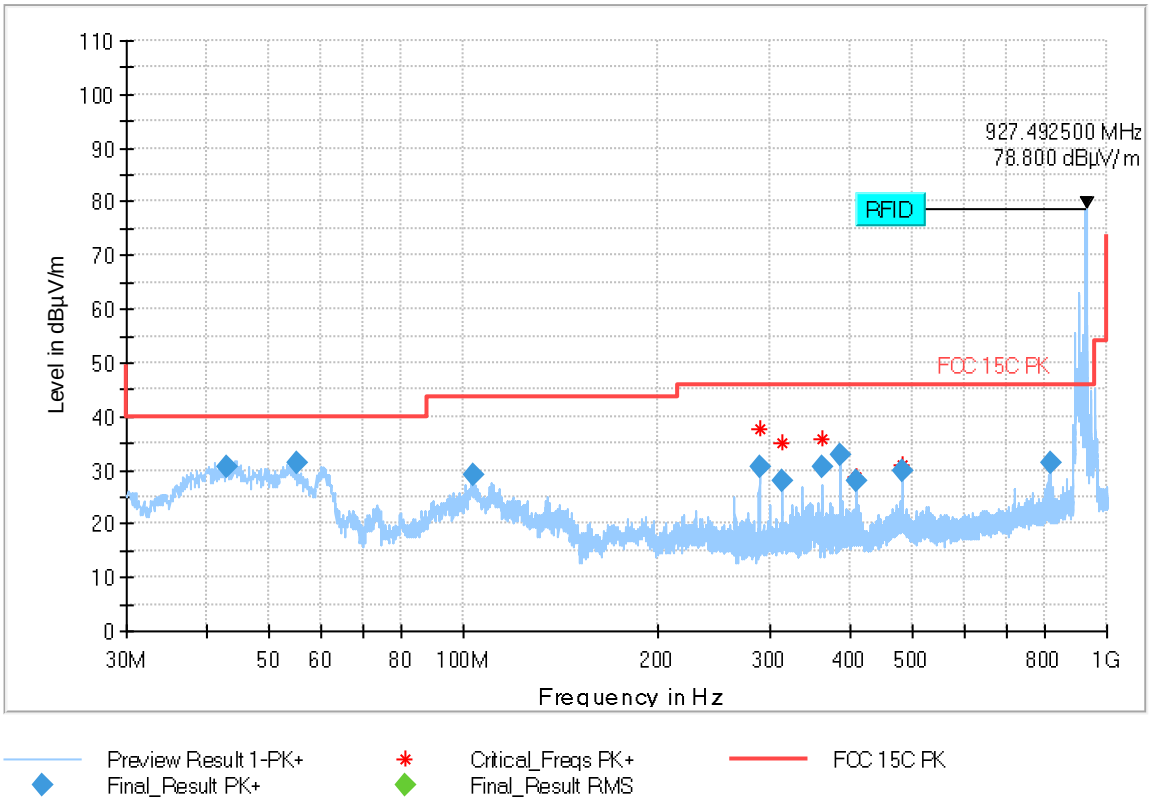


Plot # 5 Radiated Emissions: 30 MHz – 1 GHz

Channel: High

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
42.967	30.687	40.00	9.31	100.0	100.000	107.0	V	341.0	-15.8	4:54:00 PM - 10/21/2019
55.312	31.177	40.00	8.82	100.0	100.000	107.0	V	358.0	-20.6	4:56:28 PM - 10/21/2019
104.014	28.973	43.50	14.53	100.0	100.000	107.0	V	144.0	-20.4	4:59:15 PM - 10/21/2019
288.288	30.706	46.00	15.29	100.0	100.000	144.0	H	94.0	-17.9	5:01:59 PM - 10/21/2019
312.374	27.995	46.00	18.00	100.0	100.000	126.0	H	228.0	-16.8	5:04:44 PM - 10/21/2019
360.379	30.496	46.00	15.50	100.0	100.000	100.0	H	115.0	-15.7	5:07:27 PM - 10/21/2019
384.473	32.725	46.00	13.28	100.0	100.000	100.0	H	122.0	-15.0	5:09:51 PM - 10/21/2019
408.530	28.032	46.00	17.97	100.0	100.000	107.0	H	119.0	-13.7	5:12:16 PM - 10/21/2019
480.027	29.878	46.00	16.12	100.0	100.000	300.0	V	171.0	-13.1	5:14:58 PM - 10/21/2019
817.017	31.428	46.00	14.57	100.0	100.000	118.0	H	-15.0	-7.3	5:18:05 PM - 10/21/2019



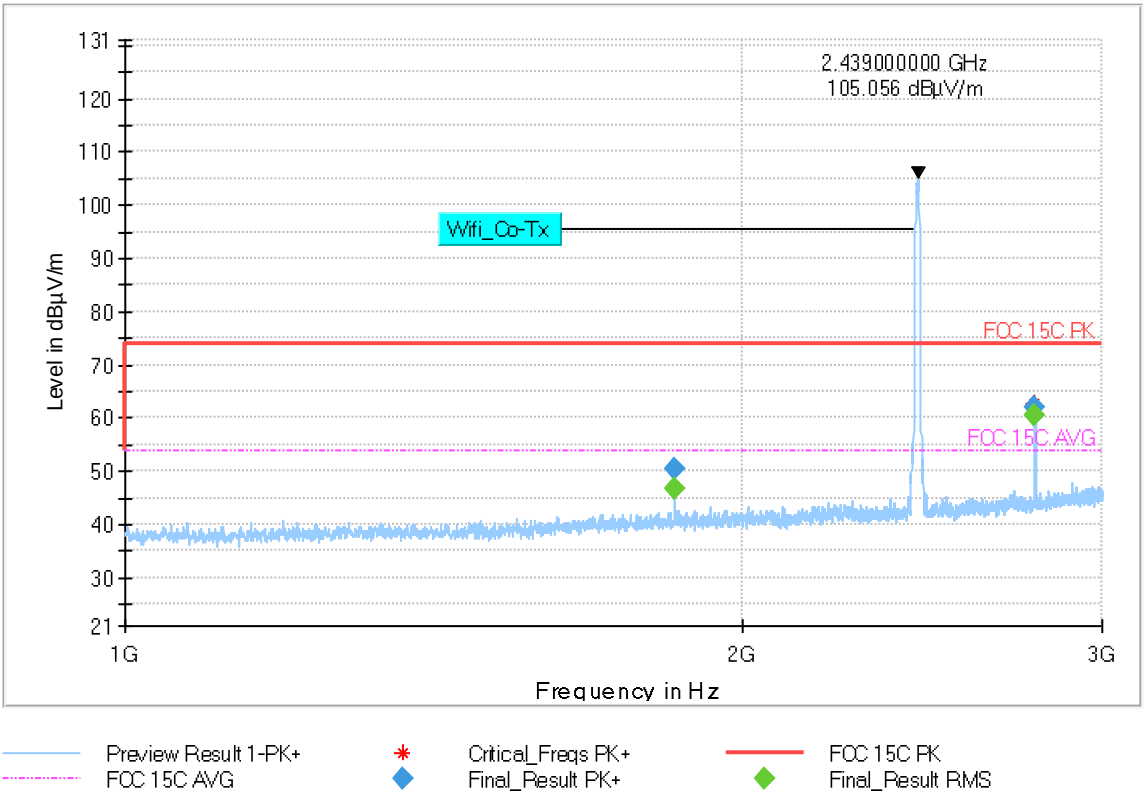
Plot # 6 Radiated Emissions: 1 – 3 GHz

Channel: High

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
1854.556	---	46.675	53.98	7.30	300.0	1000.000	265.0	H	263.0	5.2	8:44:40 PM - 10/21/2019
1854.556	50.290	---	74.00	23.71	300.0	1000.000	265.0	H	263.0	5.2	8:44:39 PM - 10/21/2019
2781.748	---	60.516	53.98	-6.54	300.0	1000.000	284.0	H	308.0	8.1	8:47:29 PM - 10/21/2019
2781.748	62.091	---	73.99	11.90	300.0	1000.000	284.0	H	308.0	8.1	8:47:29 PM - 10/21/2019

Frequency (MHz)	MaxPeak (dBµV/m)	Corrected MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1834.400	50.290	39.833	53.98	14.147
2751.736	62.091	51.634	53.98	2.346



According to FCC Basics of Unlicensed transmitters and ANSI C63.10 Section 7.5;

Determining the duty cycle correction factor (in dB) using 20*Log10 * (Duty cycle %), and apply it to the peak pulse.

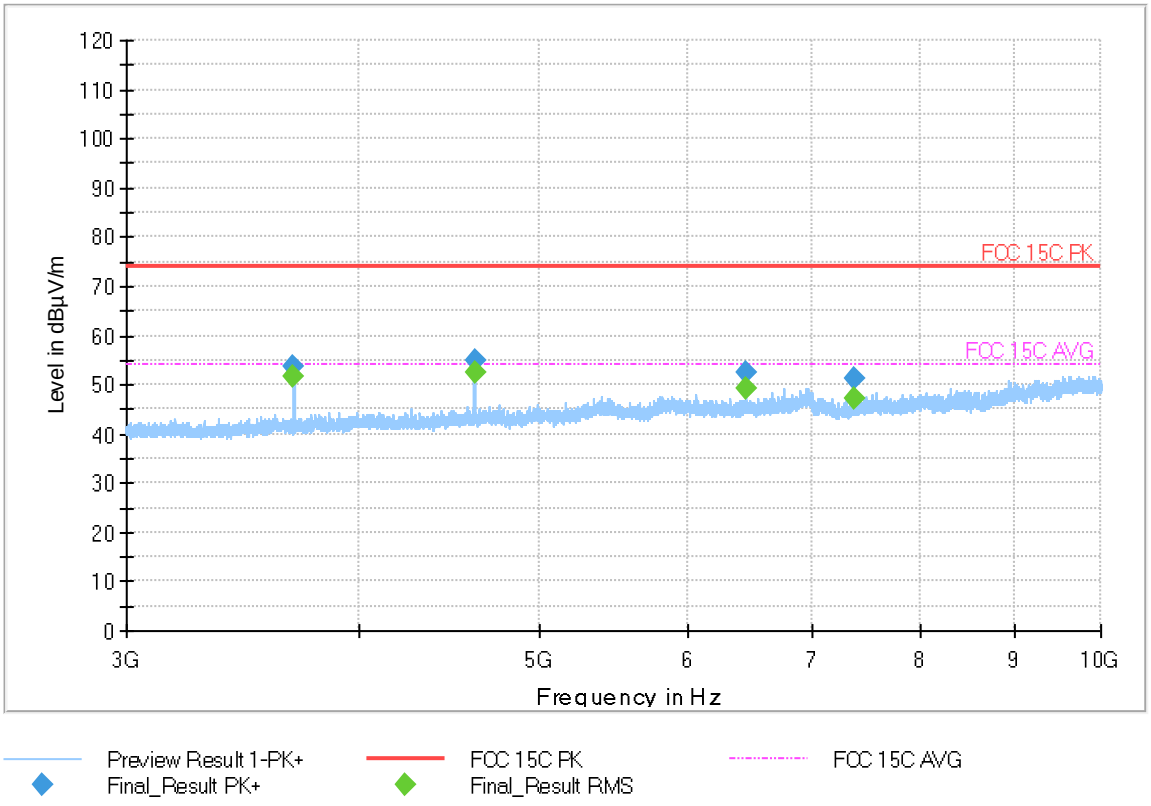
20 * Log10 * (30%) ≈ -10.457

Plot # 7 Radiated Emissions: 3 – 10GHz

Channel: High

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
3689.009	---	51.721	53.98	2.26	200.0	1000.000	236.0	H	47.0	-7.8	8:20:19 PM - 10/28/19
3689.009	53.581	---	73.99	20.41	200.0	1000.000	236.0	H	47.0	-7.8	8:20:19 PM - 10/28/19
4611.159	---	52.465	53.98	1.51	200.0	1000.000	151.0	H	91.0	-5.8	8:23:22 PM - 10/28/19
4611.159	54.804	---	73.99	19.18	200.0	1000.000	151.0	H	91.0	-5.8	8:23:22 PM - 10/28/19
6455.748	52.277	---	73.99	21.71	200.0	1000.000	157.0	V	351.0	-3.0	8:29:17 PM - 10/28/19
6455.748	---	49.138	53.98	4.84	200.0	1000.000	157.0	V	351.0	-3.0	8:29:17 PM - 10/28/19
7377.812	51.127	---	73.99	22.86	200.0	1000.000	132.0	H	359.0	-2.5	8:26:28 PM - 10/28/19
7377.812	---	47.278	53.98	6.70	200.0	1000.000	132.0	H	359.0	-2.5	8:26:28 PM - 10/28/19



8.2 AC Power Line Conducted Emissions

8.2.1 Measurement according to ANSI C63.4

Analyzer Settings:

- RBW = 9 KHz (CISPR Bandwidth)
- Detector: Peak / Average for Pre-scan
- Quasi-Peak/Average for Final Measurements

8.2.2 Limits: §15.207 & RSS-Gen 8.8

FCC §15.207(a) & RSS-Gen 8.8

- Except as shown in paragraphs (b) and (c) of this section of the CFR, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table (1), as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between frequency ranges.

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

*Decreases with the logarithm of the frequency.

8.2.3 Test conditions and setup:

Ambient Temperature ©	Power line (L1, L2, L3, N)	Power Input
22° C	Line & Neutral	110V / 60Hz

8.2.4 Measurement Result:

Plot #	EUT Set-Up #:	EUT operating mode	Scan Frequency	Limit	Result
1	1	Op.1	150 kHz – 30 MHz	See section 8.2.2	Pass

8.2.5 Measurement Plots:

Plot # 1

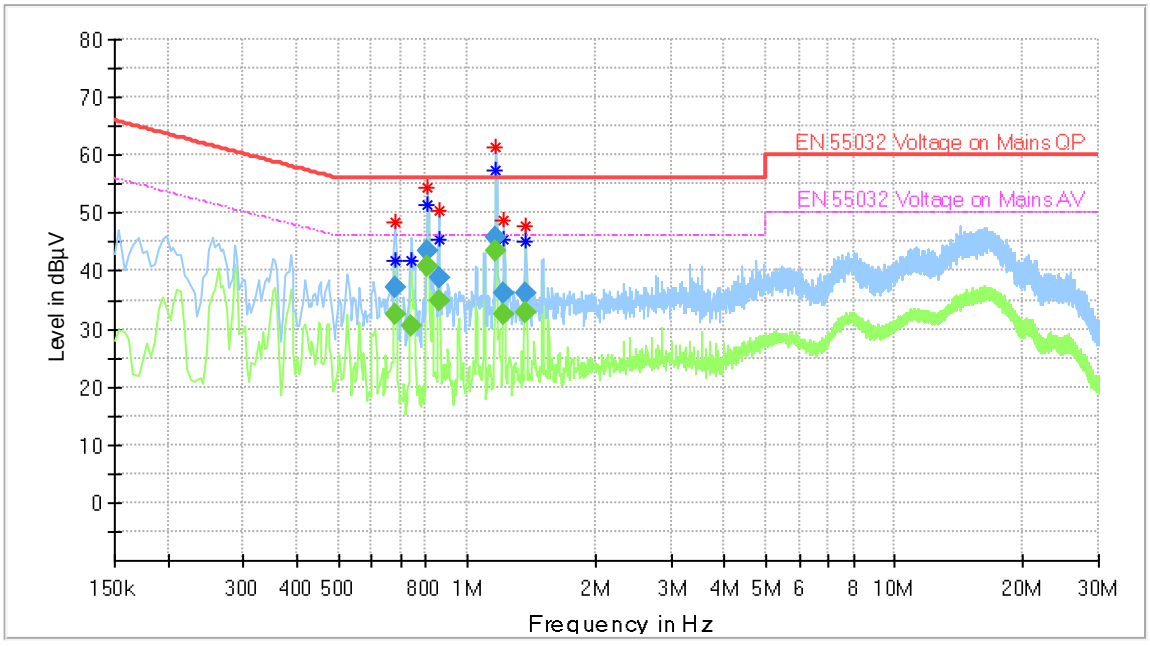
EUT Information

EUT Name:	MS3
Manufacturer:	Juniper
IMEI Number:	015356000102458
Serial Number:	MS3P172
HVIN:	MS3
Comment:	73.9F, 42.1%RH, 110VAC

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)	Comment
0.678000	---	32.52	46.00	13.48	500.0	9.000	L1	GND	10.2	2:27:43 PM - 10/23/2019
0.678000	37.32	---	56.00	18.68	500.0	9.000	L1	GND	10.2	2:27:17 PM - 10/23/2019
0.742000	---	30.57	46.00	15.43	500.0	9.000	L1	GND	10.3	2:27:47 PM - 10/23/2019
0.810000	43.59	---	56.00	12.41	500.0	9.000	L1	GND	10.3	2:27:22 PM - 10/23/2019
0.810000	---	40.93	46.00	5.07	500.0	9.000	L1	GND	10.3	2:27:51 PM - 10/23/2019
0.858000	---	34.92	46.00	11.08	500.0	9.000	L1	GND	10.3	2:27:55 PM - 10/23/2019
0.862000	38.76	---	56.00	17.24	500.0	9.000	L1	GND	10.3	2:27:26 PM - 10/23/2019
1.170000	45.90	---	56.00	10.10	500.0	9.000	L1	GND	10.3	2:27:30 PM - 10/23/2019
1.170000	---	43.33	46.00	2.67	500.0	9.000	L1	GND	10.3	2:27:59 PM - 10/23/2019
1.218000	---	32.51	46.00	13.49	500.0	9.000	L1	GND	10.3	2:28:04 PM - 10/23/2019
1.218000	36.01	---	56.00	19.99	500.0	9.000	L1	GND	10.3	2:27:34 PM - 10/23/2019
1.370000	---	32.99	46.00	13.01	500.0	9.000	L1	GND	10.3	2:28:08 PM - 10/23/2019
1.370000	36.27	---	56.00	19.73	500.0	9.000	L1	GND	10.3	2:27:39 PM - 10/23/2019

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



9 Test setup photos

Setup photos are included in supporting file name: "EMC_JUNIP_036_19001_FCC_15.247_ISED_RFID_DSS_Setup_Photos.pdf"

10 Test Equipment And Ancillaries Used For Testing

Item Name	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
LOOP ANTENNA	ETS.LINDGREN	6507	161344	3 YEARS	10/26/2017
BILOG ANTENNA	TESEO	CBL 6141B	41106	3 YEARS	11/01/2017
HORN ANTENNA	ETS.LINDGREN	3115	00035111	3 YEARS	04/17/2019
HORN ANTENNA	ETS.LINDGREN	3117	00167061	3 YEARS	08/08/2017
SIGNAL ANALYZER	R&S	FSV 40	101022	3 YEARS	07/15/2019
EMI Test Receiver	Rohde & Schwarz	ESU40	100251	3 YEARS	07/16/2019
Data Logger	Dickson	TM325	15040157	1 YEARS	04/02/2019
FCC LISN	FCC	LISN FCC-LISN-50-25-2-08	8014	1 YEARS	07/19/2019

Note: 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 Revision History

Date	Report Name	Changes to report	Report prepared by
2/4/2020	EMC_JUNIP_036_19001_FCC_15.247_ISED_RFID_DSS	Initial Version	Issa Ghanma
2/6/2020	EMC_JUNIP_036_19001_FCC_15.247_ISED_RFID_DSS_Rev1	• Add calibration date for Loop antenna. Section 10 • Correction on thermometer. Section 10	Issa Ghanma

<<The End>>