



FCC/IC Test Report

For:
I.D.Systems Inc.

Model Name:

MVAC3.0

Product Description:

OBDII Tracking Device

FCC ID: N5VMVAC30

IC ID: 3802A-MVAC30

Applied Rules and Standards:

47 CFR: Part 22, Part 24, Part 27,

RSS: 132 Issue 3, 133 Issue 6, 139 Issue 3

REPORT #: EMC_IDS1-002-17001_FCC_22_24_27

DATE: 2017-11-20



A2LA Accredited

IC recognized #
3462B-2

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

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1 Assessment

The following device as further described in section 3 of this report was evaluated against selected applicable criteria specified in the Code of Federal Regulations Title 47 parts 22, 24, 27, and Industry Canada Radio Standard Specifications RSS: 132 Issue 3, 133 Issue 6, 139 Issue 3.

No deficiencies were ascertained.

Company Name	Product Description	Model
I.D.Systems Inc.	OBDII Tracking Device	MVAC3.0

Responsible for Testing Laboratory:

2017-11-20	Compliance	James Donnellan (Lab Manager)	
Date	Section	Name	Signature

Responsible for the Report:

2017-11-20	Compliance	Kris Lazarov (EMC Engineer)	 Digitally signed by Kris Lazarov Date: 2017.11.20 10:01:40 -08'00'
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section 3.
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
Fax:	+1 (408) 586 6299
Director Radio Com. and EMC:	Peter Nevermann
Responsible Project Leader:	Kris Lazarov

2.2 Identification of the Client

Applicant's Name:	I.D.Systems Inc.
Street Address:	123 Tice Blvd, Suite 101
City/Zip Code	Woodcliff Lake, NJ 07677
Country	USA
Contact Person:	Gaurav Sheth
Phone No.	201-996-9000
e-mail:	gsheth@id-systems.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Creation Technologies
Manufacturers Address:	1001 Klein Suite 100
City/Zip Code	Plano, TX 75074
Country	USA

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Model No		MVAC3.0			
HW Version		900-00000466			
SW Version		M1.25			
FCC-ID		N5VMVAC30			
IC-ID:		3802A-MVAC30			
HVIN:		MVAC3.0			
PMN:		MVAC3.0			
Product Description		OBD Device			
Module Information		Module: Telit LE910-NA1		FCC-ID: RI7LE910NAV2	
Mode	LTE	Band	UL Frequency (MHz)	DL Frequency (MHz)	Modulation
		2	1850.7 – 1909.3	1930.7 – 1989.3	QPSK/16QAM
		4	1710.7 – 1754.3	2110.7 – 2154.3	QPSK/16QAM
		5	824.7 – 848.3	869.7 – 839.3	QPSK/16QAM
		12	699 – 716	729 - 746	QPSK/16QAM
	WCDMA	II	1852.4 – 1907.6	1932.2 – 1987.6	QPSK
		V	826.4 – 846.6	871.4 – 891.6	QPSK
Max. declared antenna gain		For all bends and modulation types = 2.14 dBi			
Max. declared average conducted output power including tune up		LTE Band 2 = 23.42 dBm / LTE Band 4 = 23.12 dBm LTE Band 5 = 22.90 dBm / LTE Band 12 = 22.85 dBm FDD Band II = 23.66 dBm / FDD Band V = 23.59 dBm			
Operating Voltage Range		Vmin: 7.0 VDC/ Vnom: 12 VDC / Vmax: 16 VDC			
Operating Temperature Range		-40 °C to 85 °C			
Other Radios included in the device		Bluetooth 4.0 Module: TI IC / Model # CC2640F128RHB 315/433 MHz ISM Radio: Model # STS1TX GPS Module: OrginGPS / Model # ORG1410-PM01			
Sample Revision		☐ Prototype ☒ Production ☐ Pre-Production			
EUT Dimensions		110 mm x 60 mm x 30 mm			
EUT Diameter		☒ < 60 cm ☐ Other _____			

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Comments
1	17-MV320570-CTD	900-00000466	M1.25	Radiated Emissions

3.3 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	Serial Number
1	N/A	N/A	N/A	N/A

3.4 Test Sample Configuration

Set-up #	EUT / AE used for set-up	Comments
1	EUT #1	Radiated Measurements

4 Subject of Investigation

The objective of the evaluation conducted by CETECOM Inc. is to support a request for new equipment authorization under FCC ID: N5VMVAC3.0 and IC ID: 3802A-MVAC3.0. Full Radiated Spurious Emissions test was conducted, per Code of Federal Regulations Title 47 parts 22, 24, 27, and Industry Canada Radio Standard Specifications RSS: 132 Issue 3, 133 Issue 6, and 139 Issue 3.

The module test data can be obtained under the FCC Filing ID: RI7LE910NAV2.

4.1 Dates of Testing:

09/10/2017 - 09/27/2017

4.2 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 30MHz	±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)
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RF conducted measurement	±0.5 dB
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4.3 Environmental Conditions during Testing:

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

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

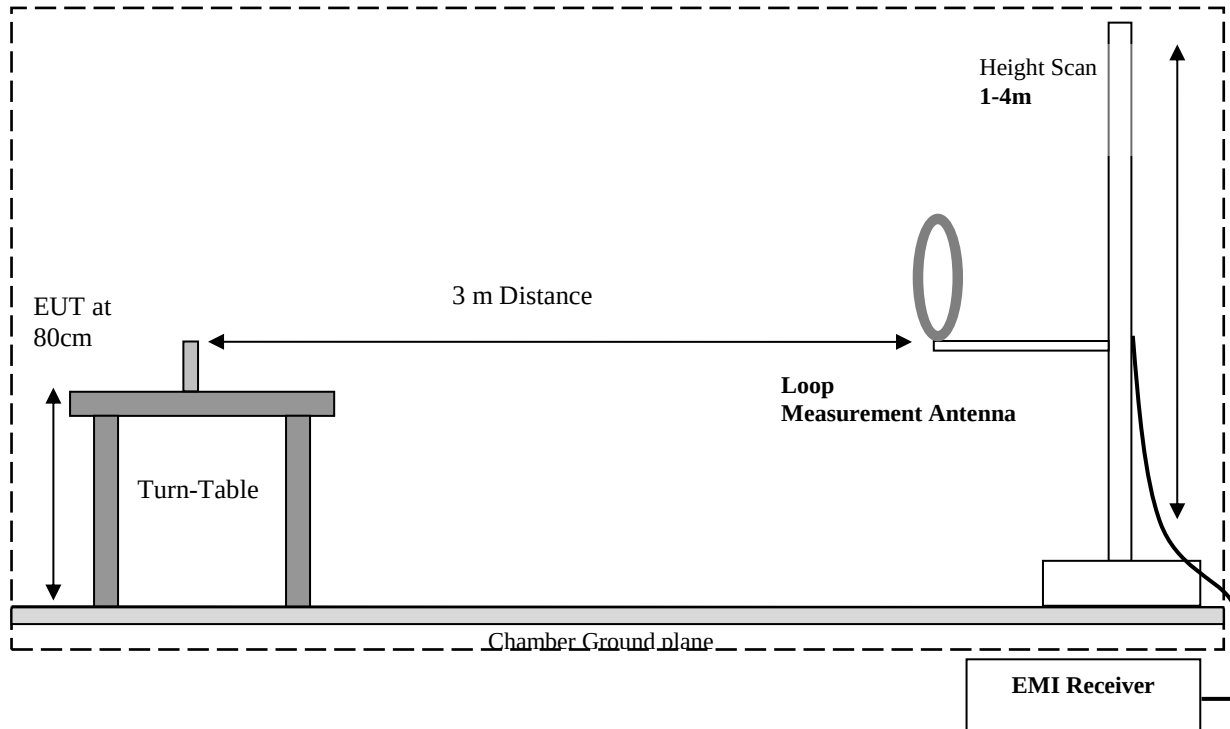
Deviating test conditions are indicated at individual test description where applicable.

5 Measurement Procedures

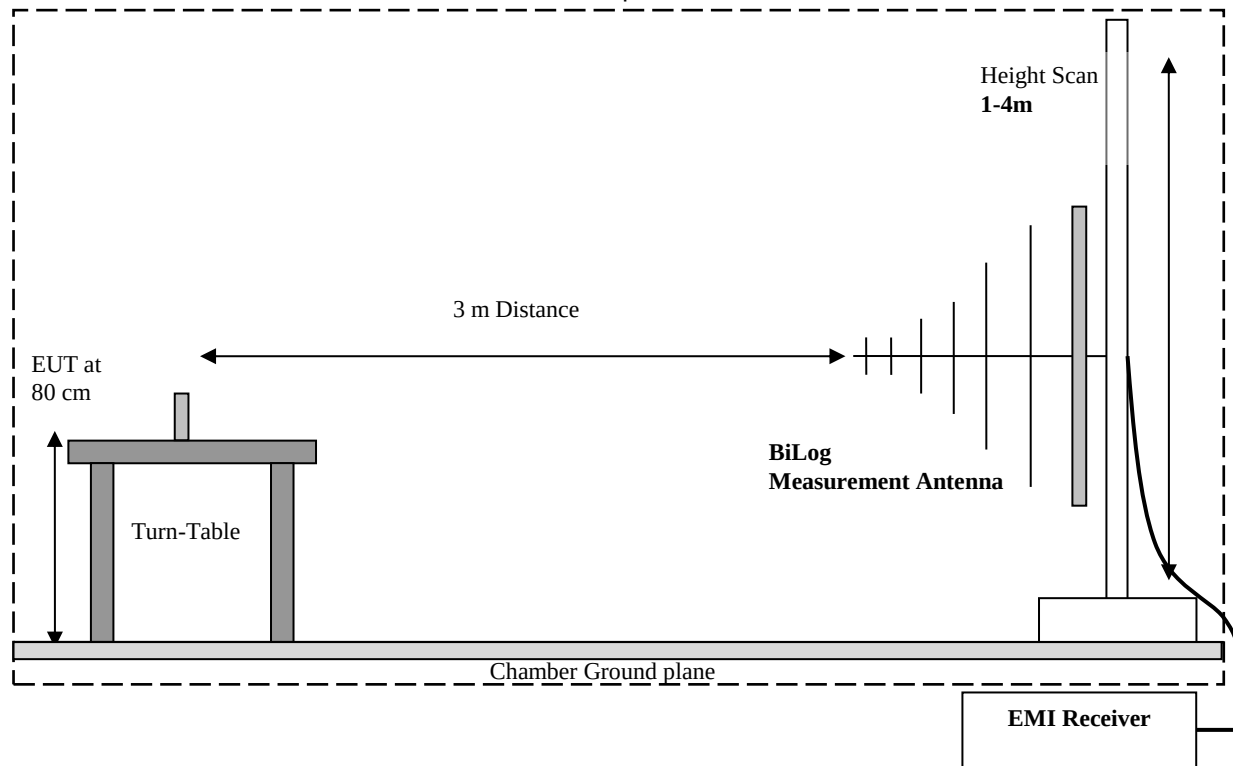
5.1 Radiated Measurement

- 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.

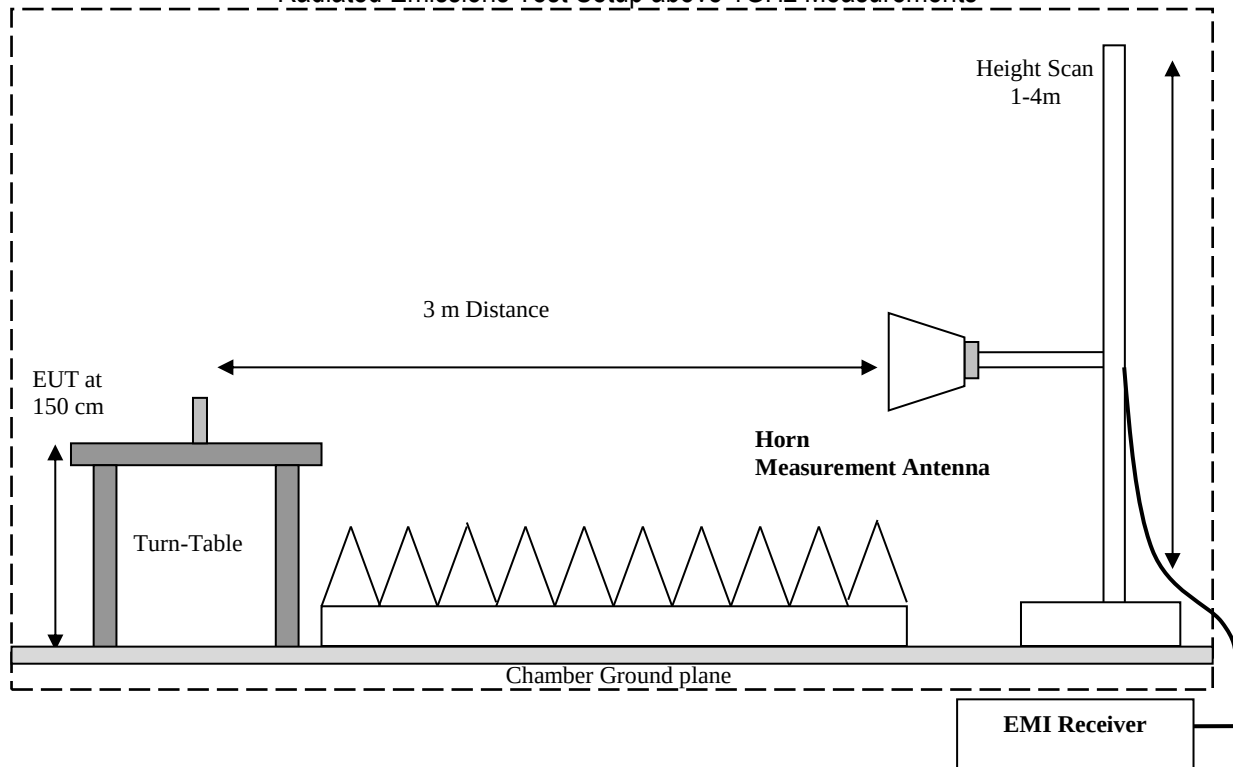
Radiated Emissions Test Setup below 30MHz Measurements



Radiated Emissions Test Setup 30MHz-1GHz Measurements



Radiated Emissions Test Setup above 1GHz Measurements



5.2 Sample Calculations for Field Strength Measurements

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

- Measured reading in dB μ V
- Cable Loss between the receiving antenna and SA in dB and
- 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:

$$FS \text{ (dB}\mu\text{V/m)} = \text{Measured Value on SA (dB}\mu\text{V)} - \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

Example:

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

6 Measurement Results Summary

6.1 FCC 22 / RSS-132:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046; §22.913 (a) RSS-132 5.4	RF Output Power	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1055; §22.355 RSS-132 5.3	Frequency Stability	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1049; §22.917 RSS-132 5.2	Occupied Bandwidth	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1051; §22.917 RSS-132 5.5	Band Edge Compliance	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1051; §22.917 RSS-132 5.5	Conducted Spurious Emissions	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1053; §22.917 RSS-132 5.5	Radiated Spurious Emissions	Nominal	GSM WCDMA	■	☐	☐	☐	Complies

Note 1: NA= Not Applicable; NP= Not Performed.

Note 2: Leveraged from module certification.

6.2 FCC 24 / RSS-133:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046; §24.232 (a); RSS-133 6.4	RF Output Power	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1055; §24.235; RSS-133 6.3	Frequency Stability	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1049; §24.238; RSS-133 6.2	Occupied Bandwidth	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1051; §24.238; RSS-133 6.5	Band Edge Compliance	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1051; §24.238; RSS-133 6.5	Conducted Spurious Emissions	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1053; §24.238; RSS-133 6.5	Radiated Spurious Emissions	Nominal	GSM WCDMA	■	☐	☐	☐	Complies

Note 1: NA= Not Applicable; NP= Not Performed.

Note 2: Leveraged from module certification.

6.3 FCC 27 / RSS-139:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046; §27.50 (d); RSS-139 6.5	RF Output Power	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1055; §27.54; RSS-139 6.4	Frequency Stability	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1049; §27.53; RSS-139 6.2	Occupied Bandwidth	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1051; §27.53; RSS-139 6.6	Band Edge Compliance	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1051; §27.53; RSS-139 6.6	Conducted Spurious Emissions	Nominal	GSM WCDMA	☐	☐	☐	■	Complies Note 2
§2.1053; §27.53; RSS-139 6.6	Radiated Spurious Emissions	Nominal	GSM WCDMA	■	☐	☐	☐	Complies

Note 1: NA= Not Applicable; NP= Not Performed.

Note 2: Leveraged from module certification.

7 Test Result Data

7.1 Radiated Spurious Emissions

7.1.1 Measurement according to FCC: CFR 47 Part 2.1053; CFR Part 22.917; Part 24.238; Part 27.53; RSS-132 5.5; RSS-133 6.5; RSS-139 6.6, utilizing KDB 971168 D01 Power Meas License Digital Systems v02r02, and according to TIA-603C 2004- 2.2.12

Spectrum Analyzer Settings for FCC 22

Frequency Range	30MHz – 1 GHz	1 – 1.58 GHz	1.58 – 9 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto

Spectrum Analyzer Settings for FCC 24 and 27

Frequency Range	30MHz – 1 GHz	1 – 2.7 GHz	2.7 – 18 GHz	18 – 19.1 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto	Auto

7.1.2 Limits:

7.1.2.1 FCC Part 22.917 (a), Part 24.238 (a), and Part 27.53 (h)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB = (-13dBm)

7.1.2.2 RSS-132 5.5; RSS-133 6.5; RSS-139 6.6

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

i. In the first 1.0 MHz band immediately outside and adjacent to each of the equipment's operating frequency block, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

ii. After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

7.1.3 Test conditions and setup:

Ambient Temperature (C)	EUT Set-Up #	EUT operating mode	Power Input
23	1	LTE B2 / B4 / B5 / B12 FDD II / FDD V	12V DC

7.1.4 Measurement result:

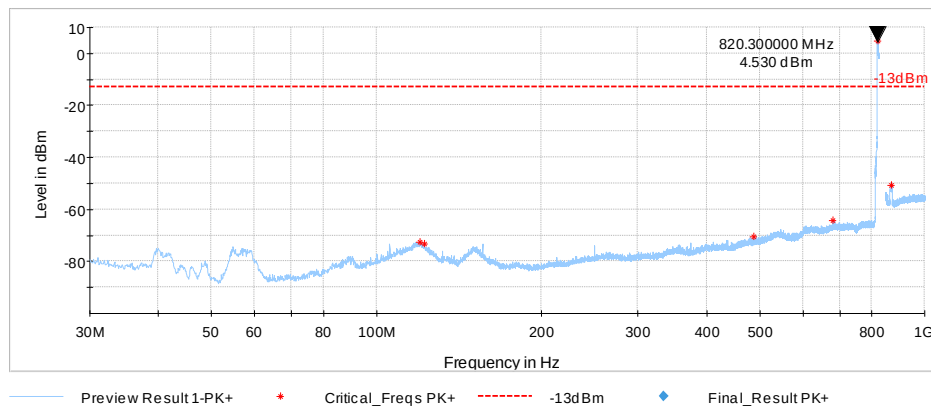
Plot #	Channel #	EUT operating mode	Scan Frequency	Limit (dBm)	Result
1-2	Low	LTE B5	30 MHz – 9 GHz	-13	Pass
3-5	Mid	LTE B5	9 kHz – 9 GHz	-13	Pass
6-7	High	LTE B5	30 MHz – 9 GHz	-13	Pass
8-9	Low	LTE B12	30 MHz – 9 GHz	-13	Pass
10-12	Mid	LTE B12	9 kHz – 9 GHz	-13	Pass
13-14	High	LTE B12	30 MHz – 9 GHz	-13	Pass
15-17	Low	LTE B2	30 MHz – 18 GHz	-13	Pass
18-22	Mid	LTE B2	9 kHz – 22 GHz	-13	Pass
23-25	High	LTE B2	30 MHz – 18 GHz	-13	Pass
26-28	Low	LTE B4	30 MHz – 18 GHz	-13	Pass
29-33	Mid	LTE B4	9 kHz – 22 GHz	-13	Pass
34-36	High	LTE B4	30 MHz – 18 GHz	-13	Pass
37-39	Low	FDD II	30 MHz – 18 GHz	-13	Pass
40-44	Mid	FDD II	9 kHz – 22 GHz	-13	Pass
45-47	High	FDD II	30 MHz – 18 GHz	-13	Pass
48-49	Low	FDD V	30 MHz – 9 GHz	-13	Pass
50-52	Mid	FDD V	9 kHz – 9 GHz	-13	Pass
53-54	High	FDD V	30 MHz – 9 GHz	-13	Pass

7.1.5 Measurement Plots:

LTE B5

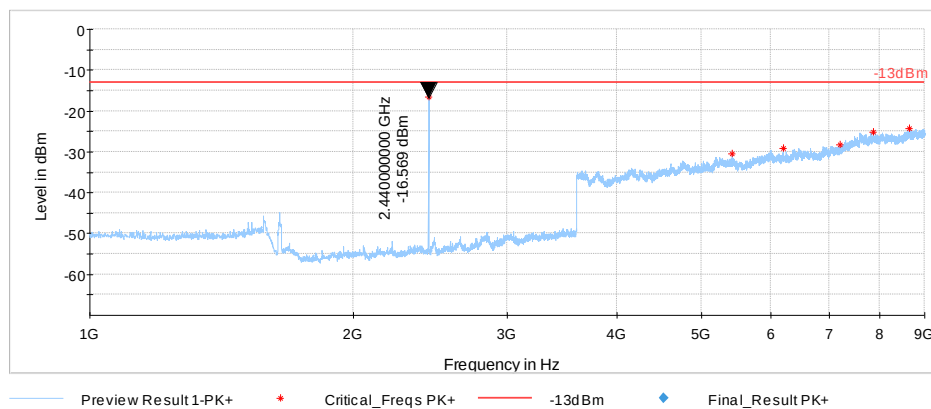
Plot #1 Radiated Emissions: 30 MHz – 1GHz

Channel: Low



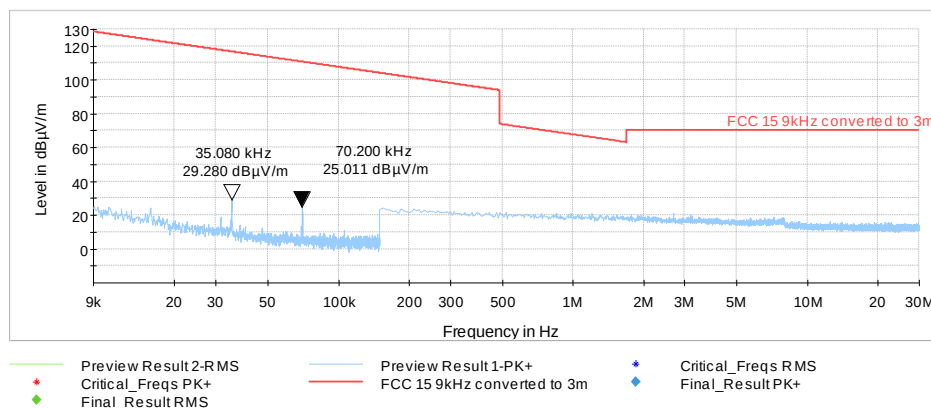
Plot # 2 Radiated Emissions: 1-9 GHz

Channel: Low



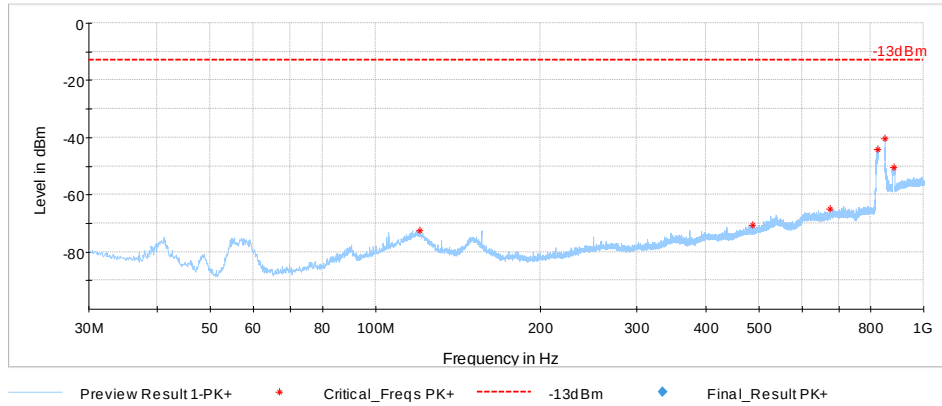
Plot # 3 Radiated Emissions: 9 kHz-30 MHz

Channel: Mid



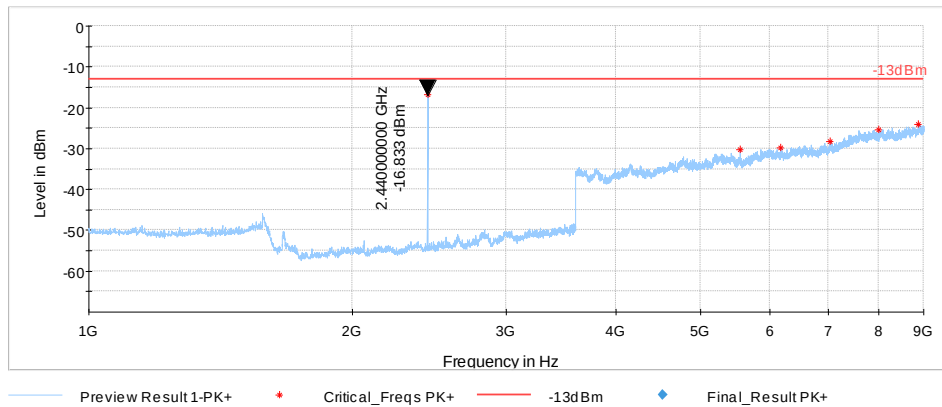
Plot #4 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid



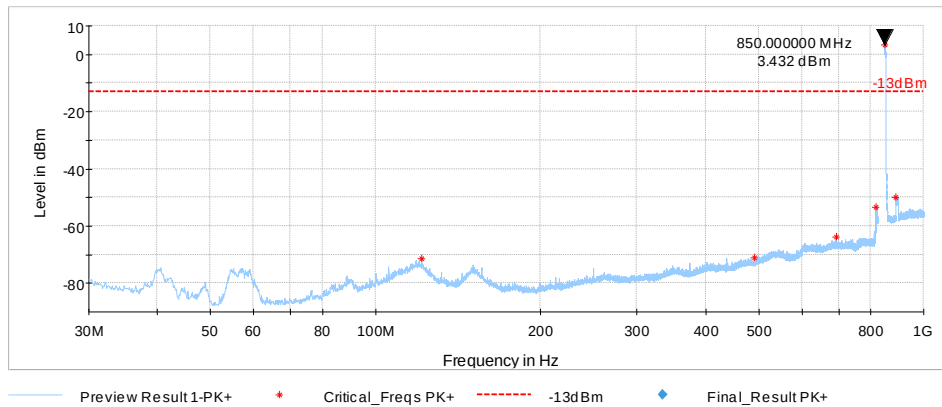
Plot #5 Radiated Emissions: 1-9 GHz

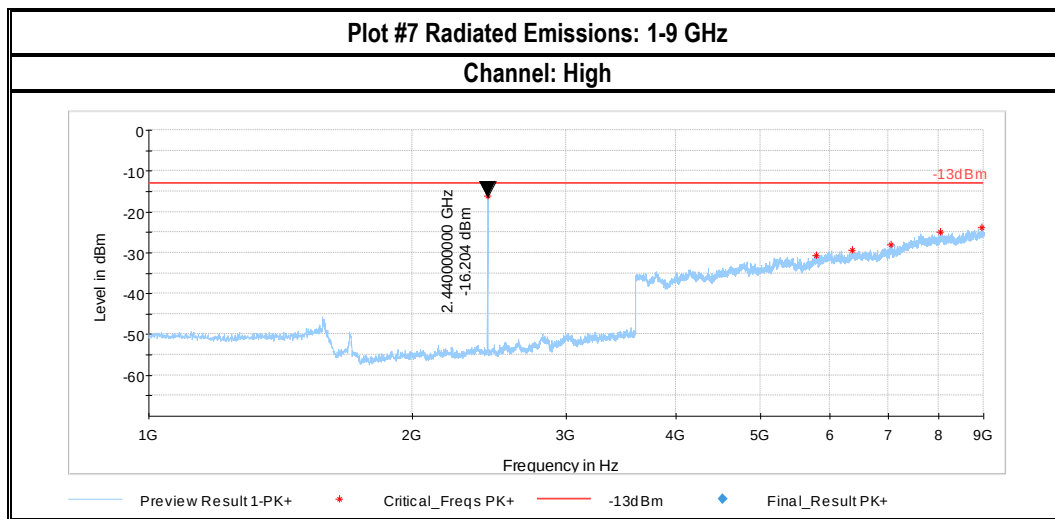
Channel: Mid



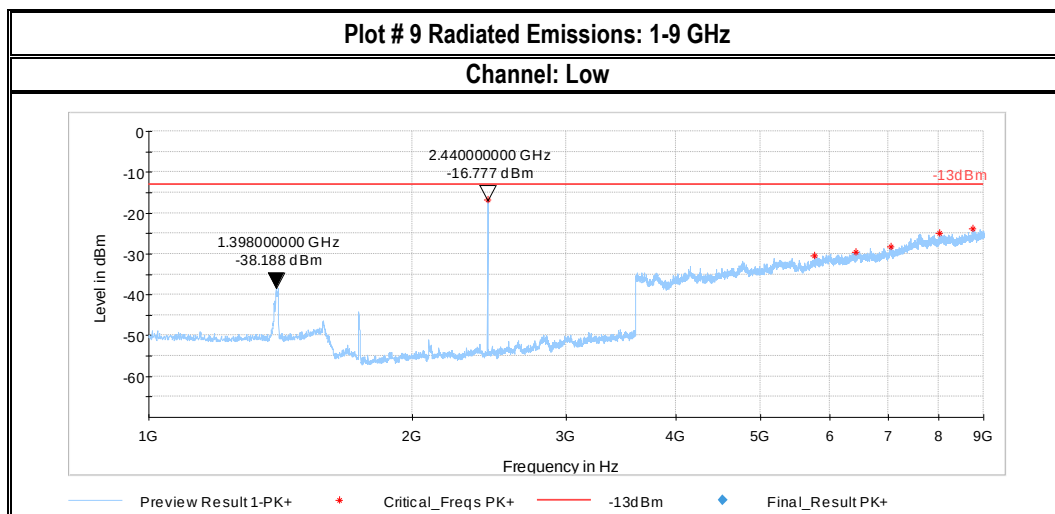
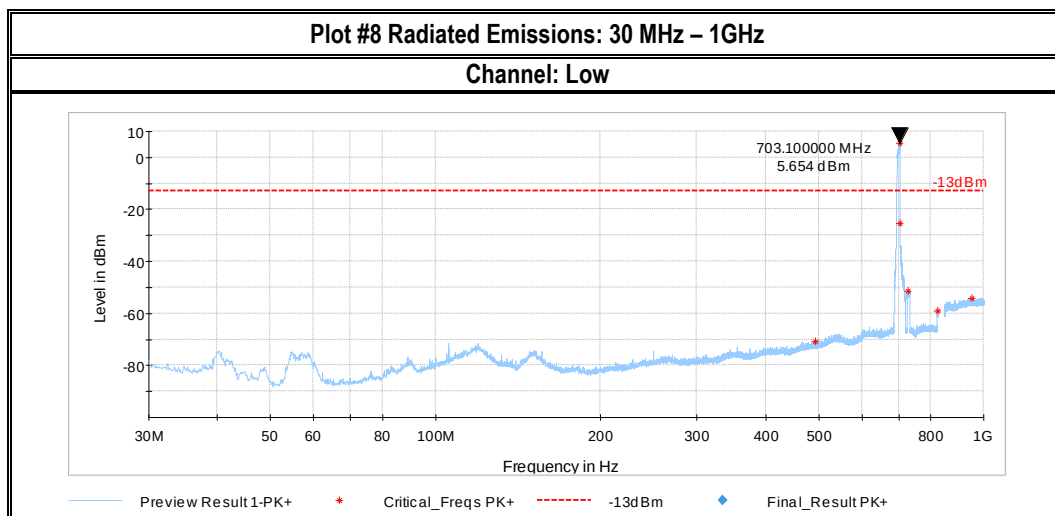
Plot #6 Radiated Emissions: 30 MHz – 1GHz

Channel: High



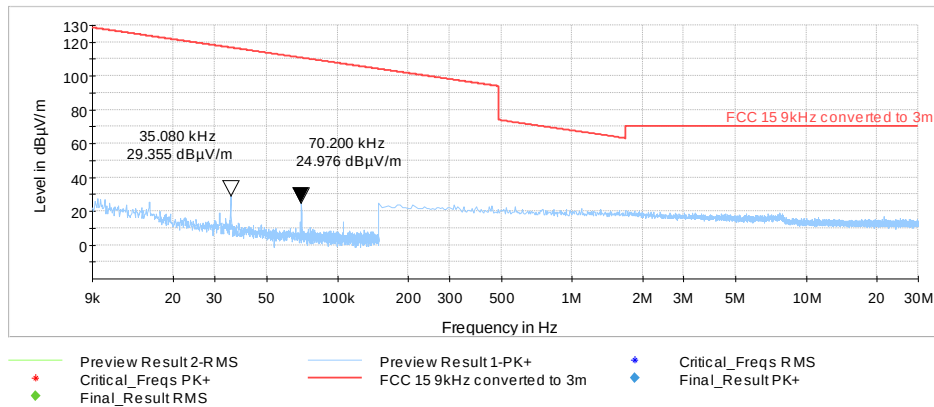


LTE 12



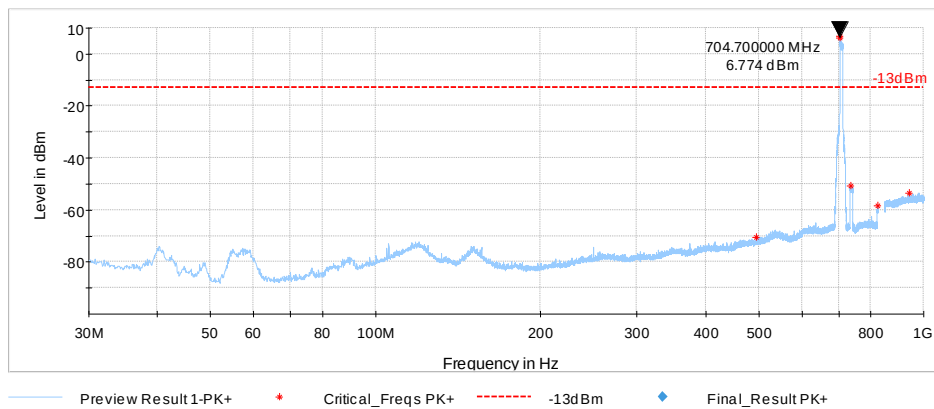
Plot # 10 Radiated Emissions: 9 kHz-30 MHz

Channel: Low



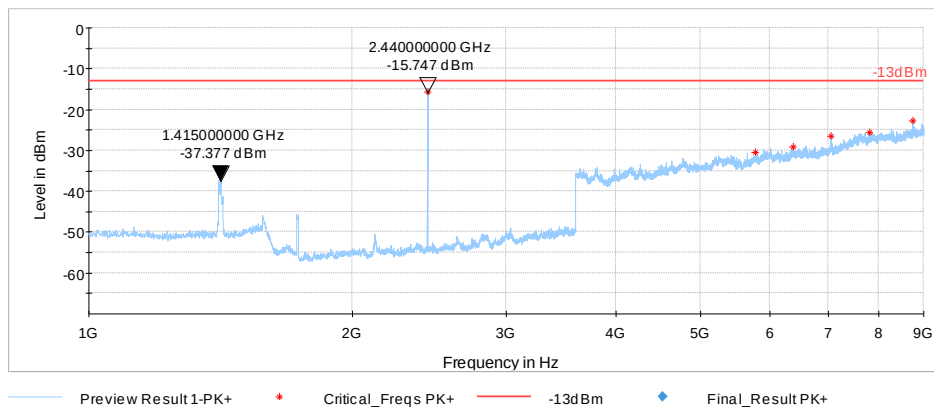
Plot # 11 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid



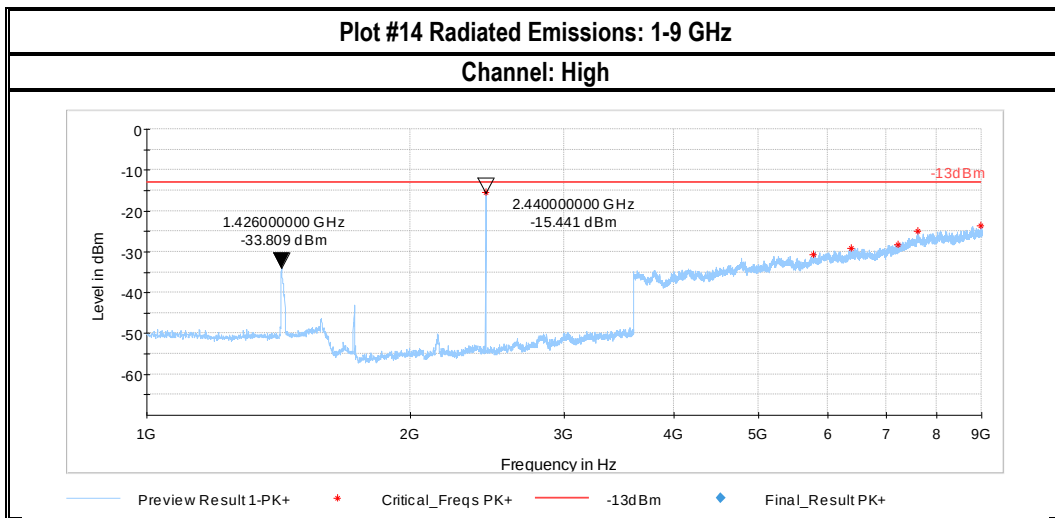
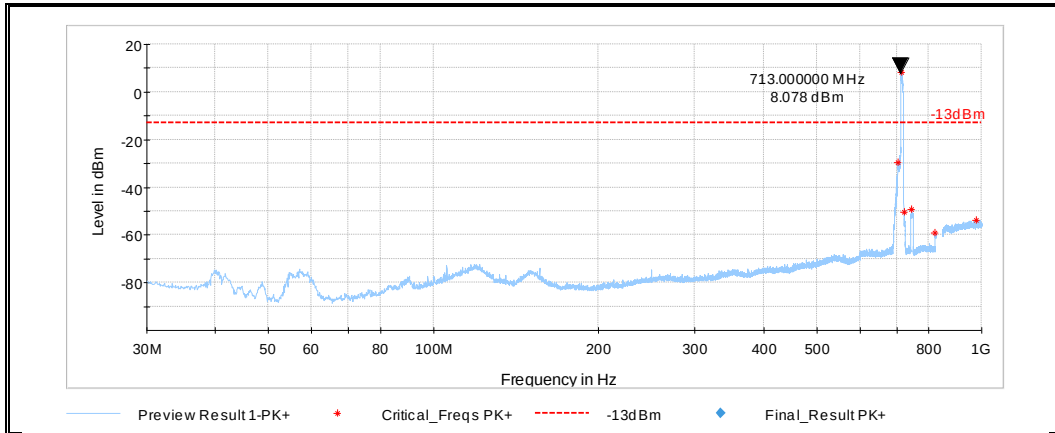
Plot #12 Radiated Emissions: 1-9 GHz

Channel: Mid

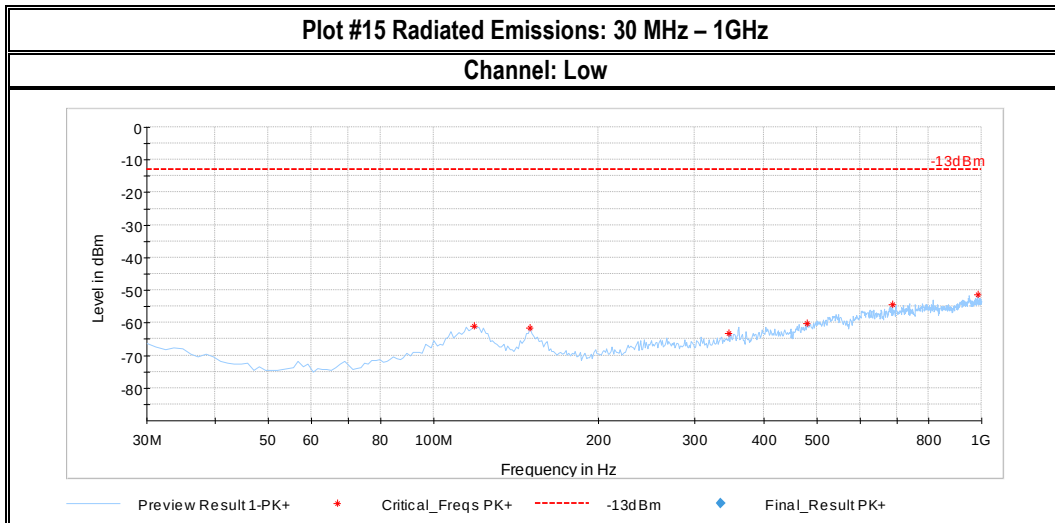


Plot #13 Radiated Emissions: 30 MHz – 1GHz

Channel: High

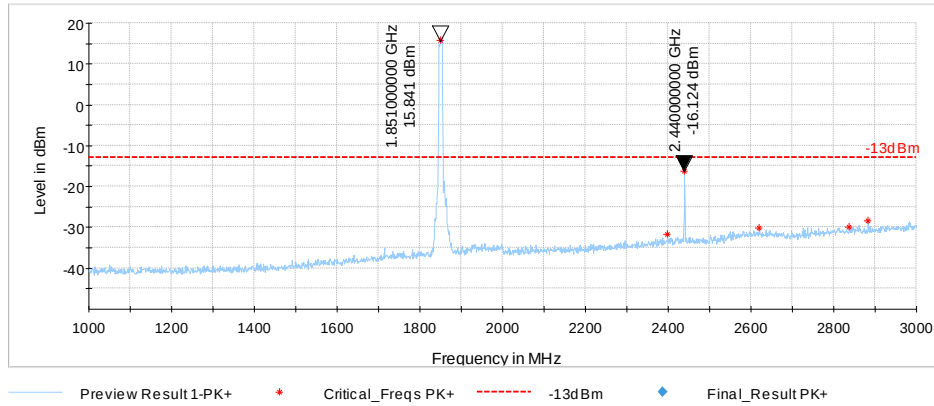


LTE B2



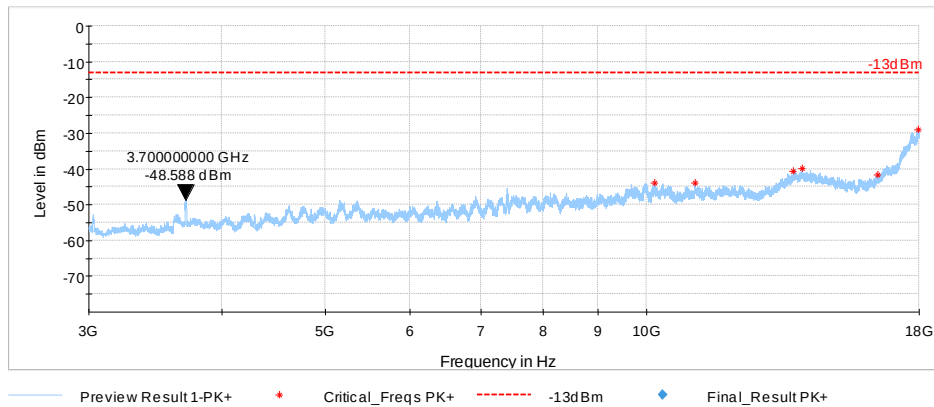
Plot # 16 Radiated Emissions: 1-3 GHz

Channel: Low



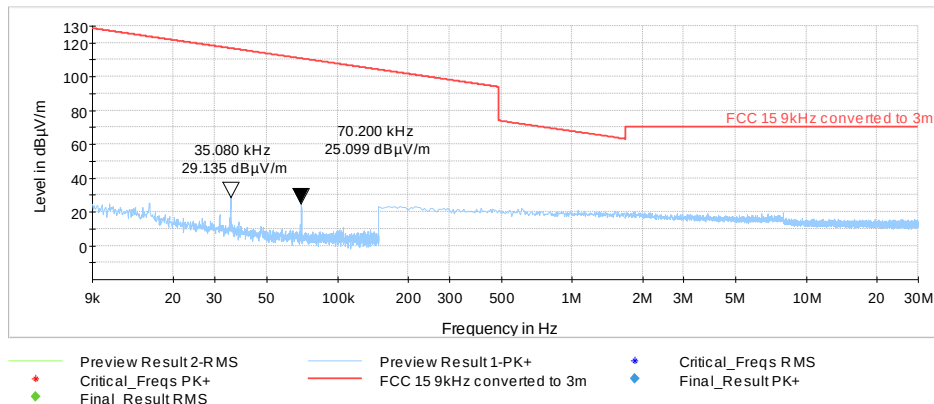
Plot # 17 Radiated Emissions: 3-18 GHz

Channel: Low



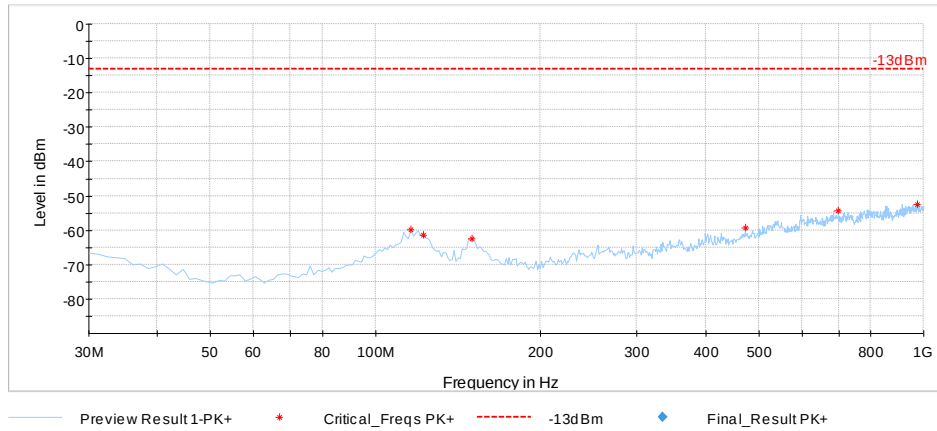
Plot # 18 Radiated Emissions: 9 kHz-30 MHz

Channel: Mid



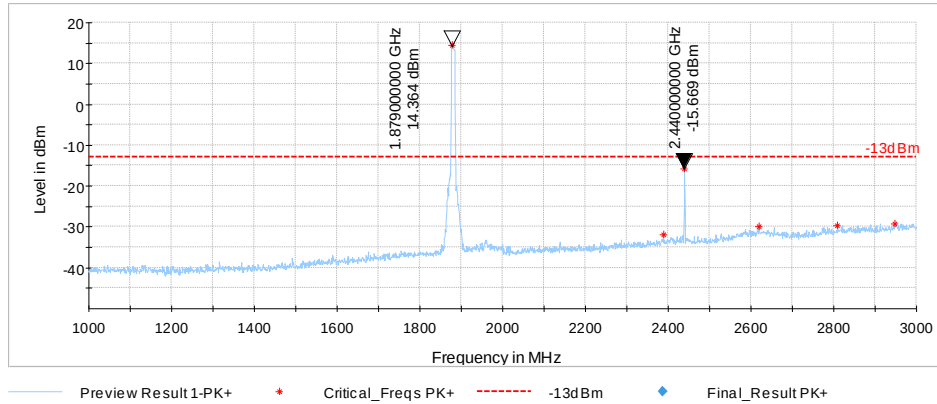
Plot #19 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid



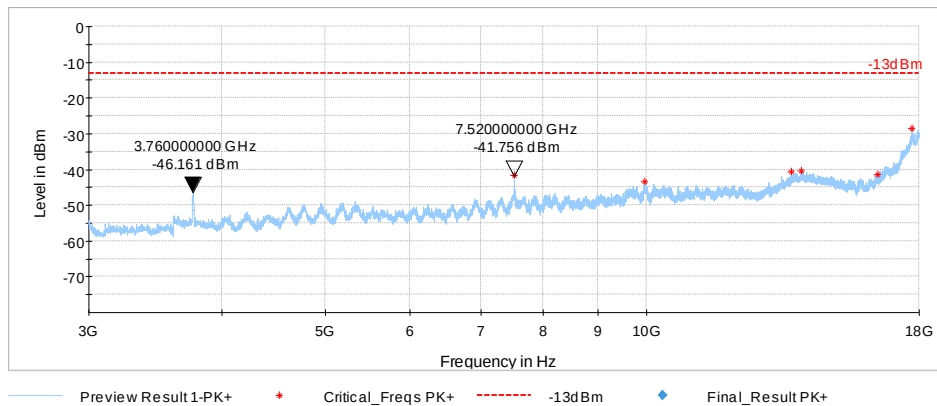
Plot #20 Radiated Emissions: 1-3 GHz

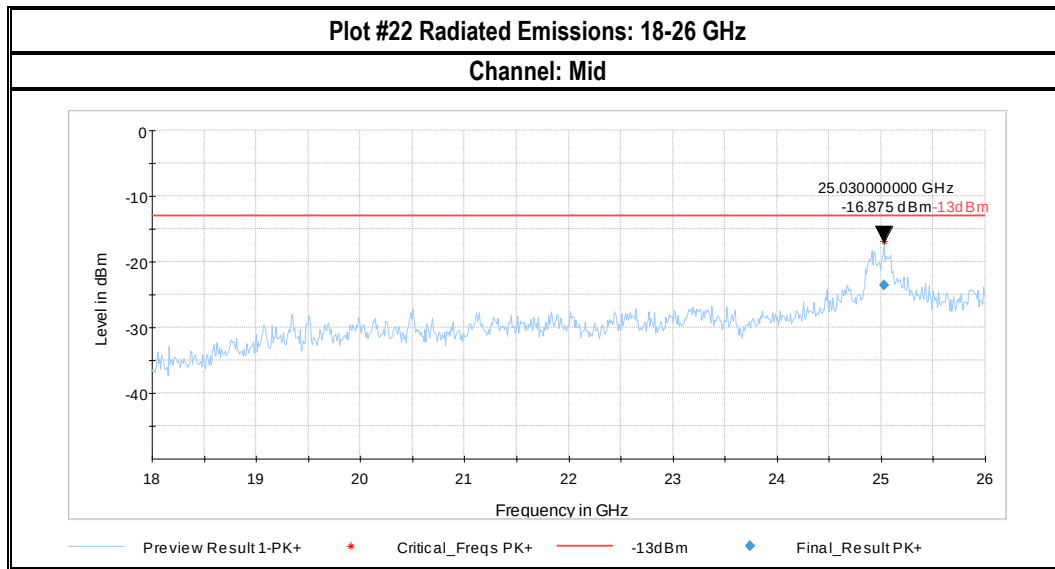
Channel: Mid



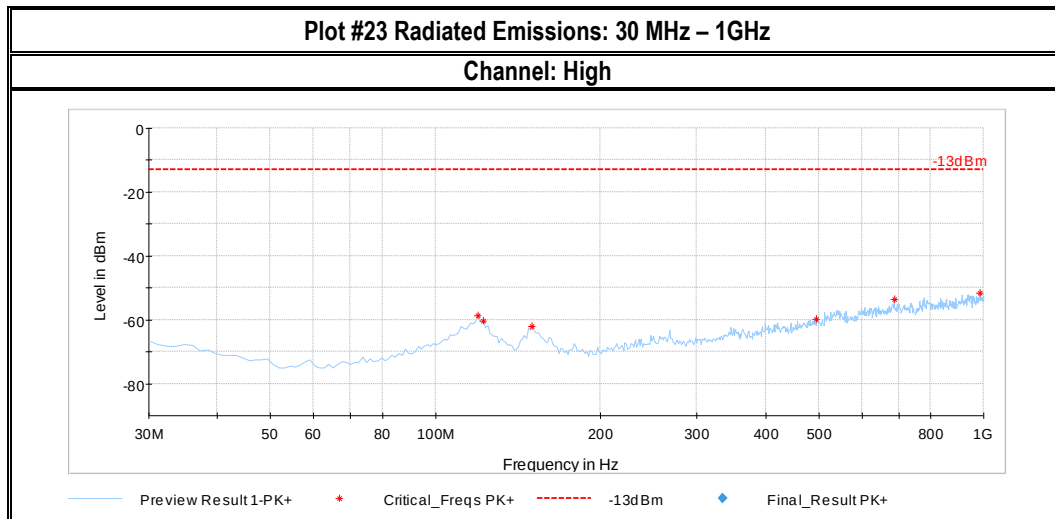
Plot #21 Radiated Emissions: 3-18 GHz

Channel: Mid



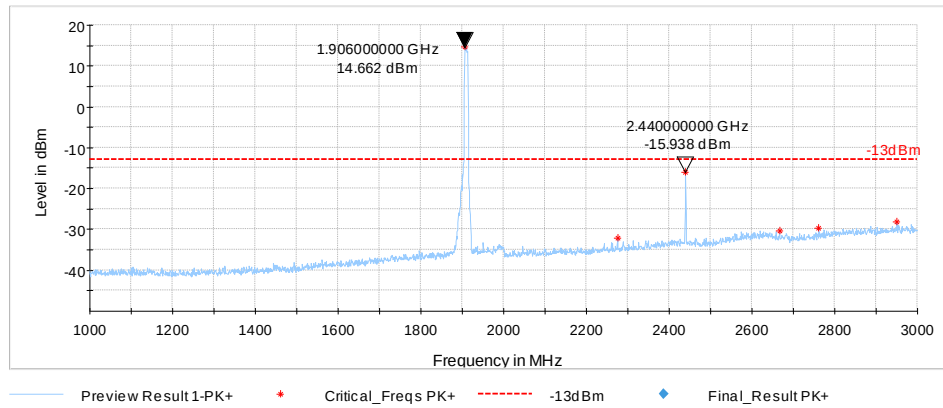


Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
25026.375000	-23.59	-13.00	10.59	2.0	1000.000	100.0	V	67.0	0.0	-74.3



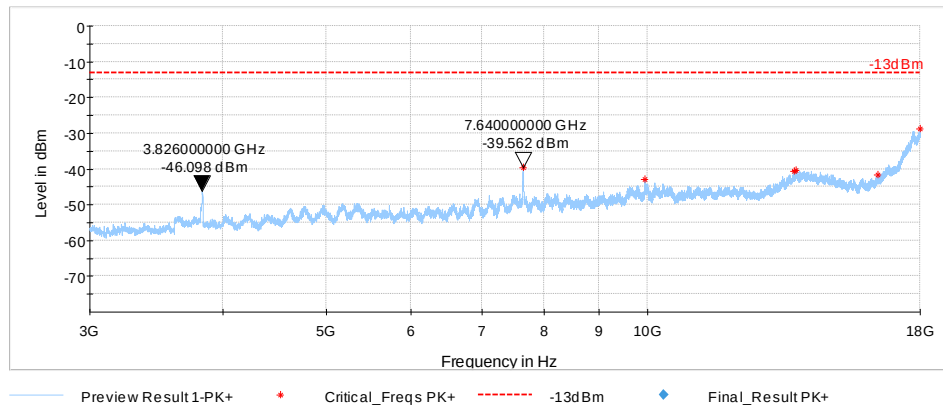
Plot #24 Radiated Emissions: 1-3 GHz

Channel: High



Plot #25 Radiated Emissions: 3-18 GHz

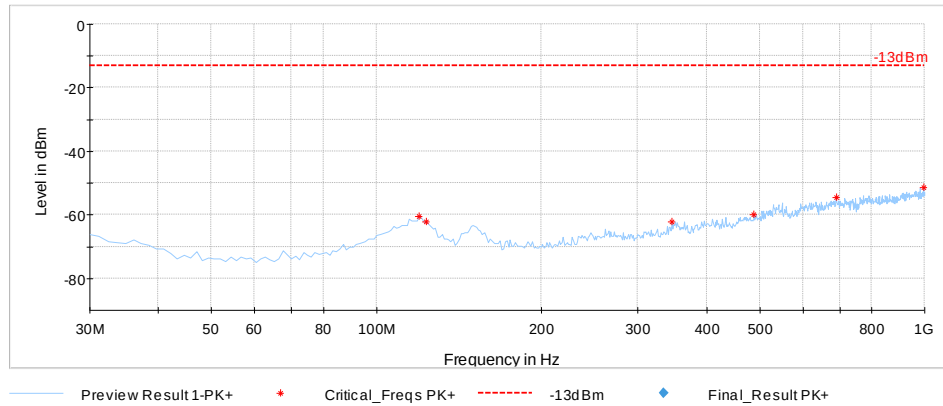
Channel: High



LTE B4

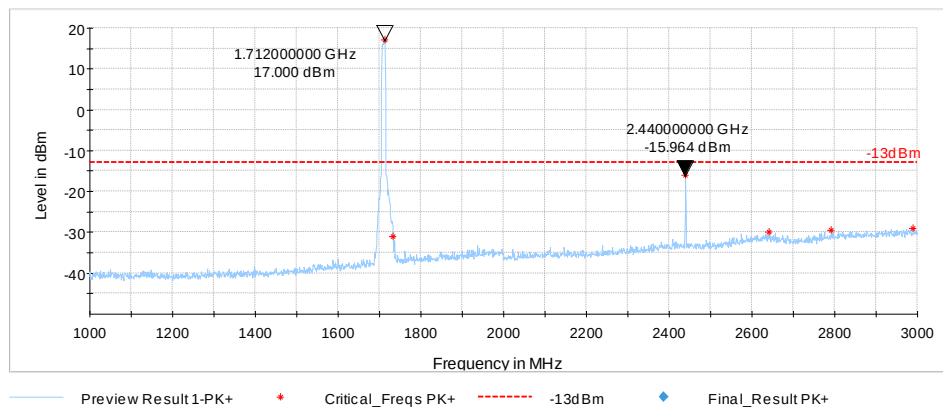
Plot #26 Radiated Emissions: 30 MHz – 1GHz

Channel: Low



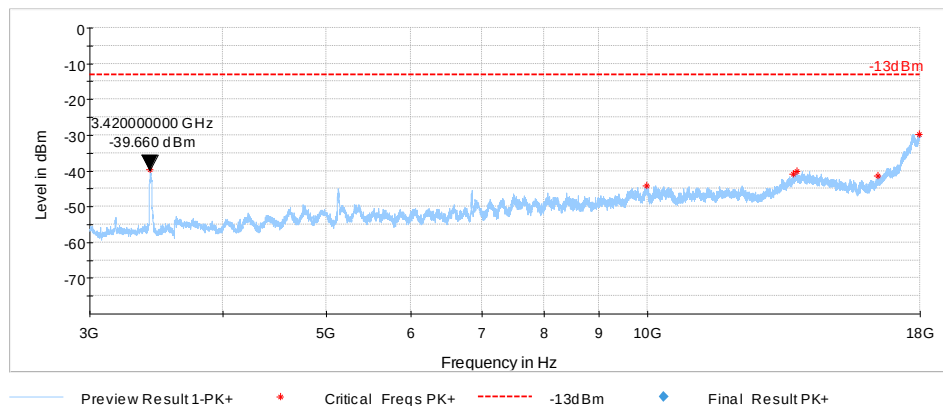
Plot # 27 Radiated Emissions: 1-3 GHz

Channel: Low



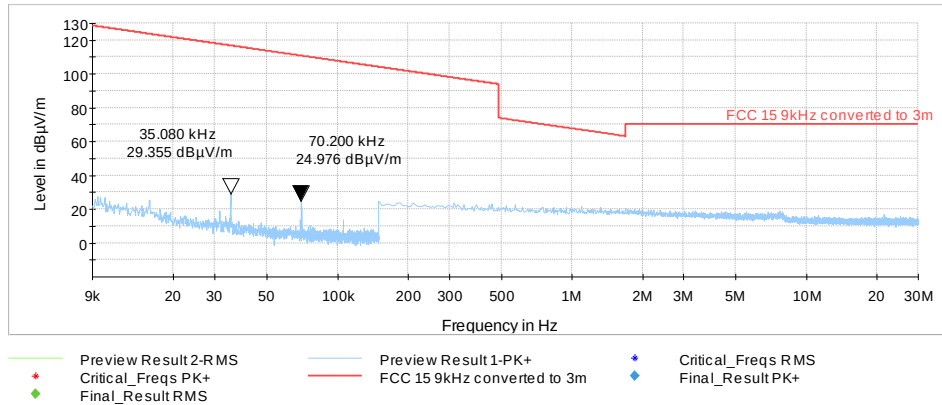
Plot # 28 Radiated Emissions: 3-18 GHz

Channel: Low



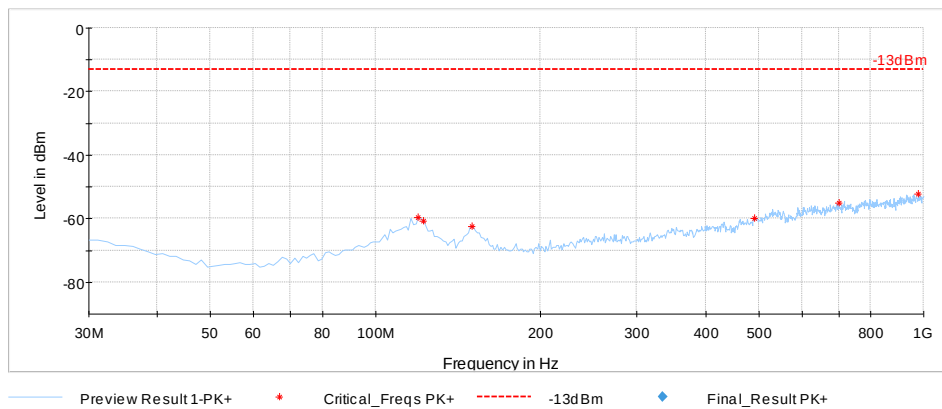
Plot # 29 Radiated Emissions: 9 kHz-30 MHz

Channel: Mid



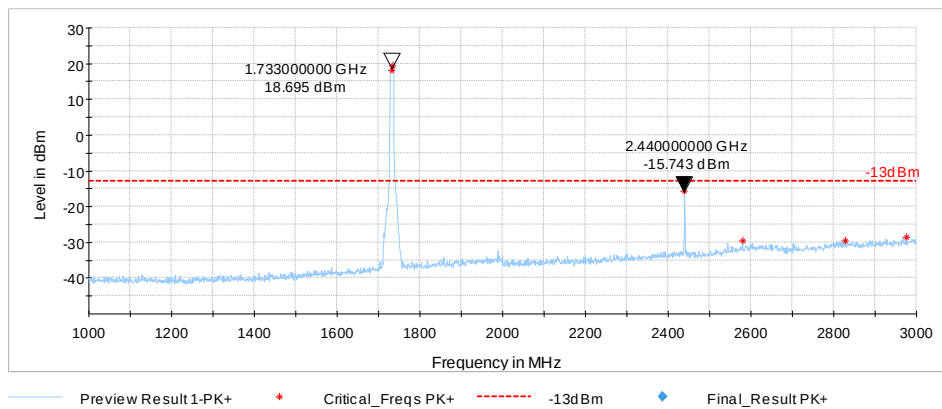
Plot # 30 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid



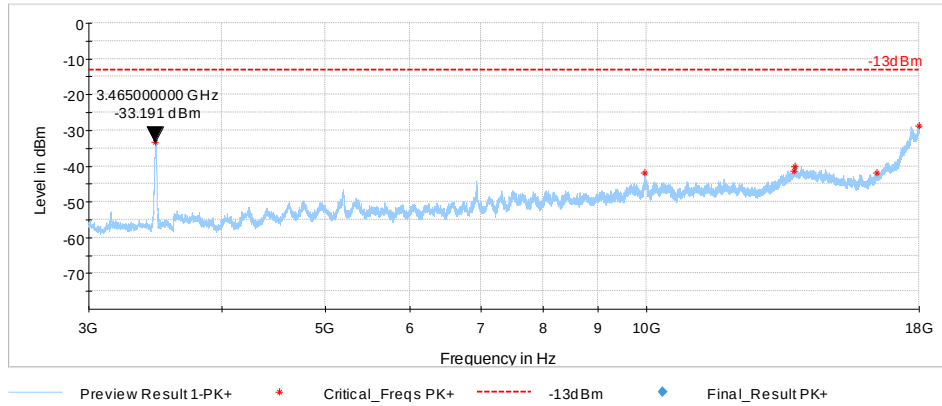
Plot #31 Radiated Emissions: 1-3 GHz

Channel: Mid



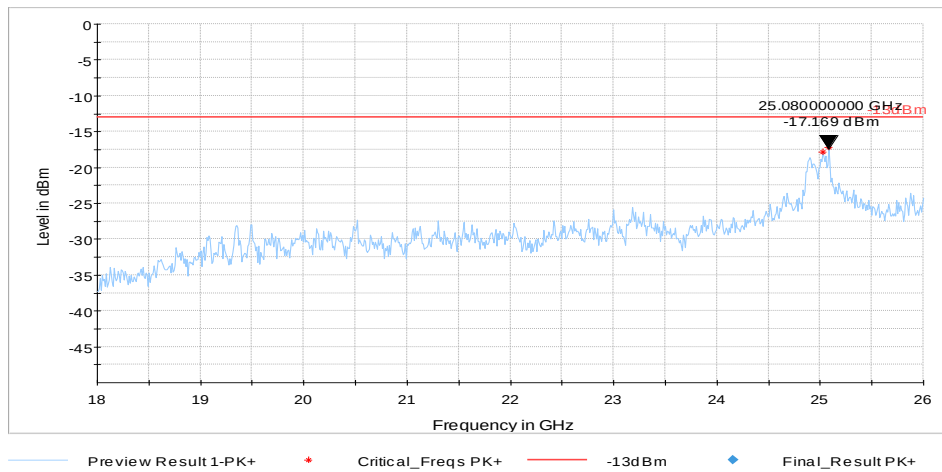
Plot # 32 Radiated Emissions: 3-18 GHz

Channel: Mid



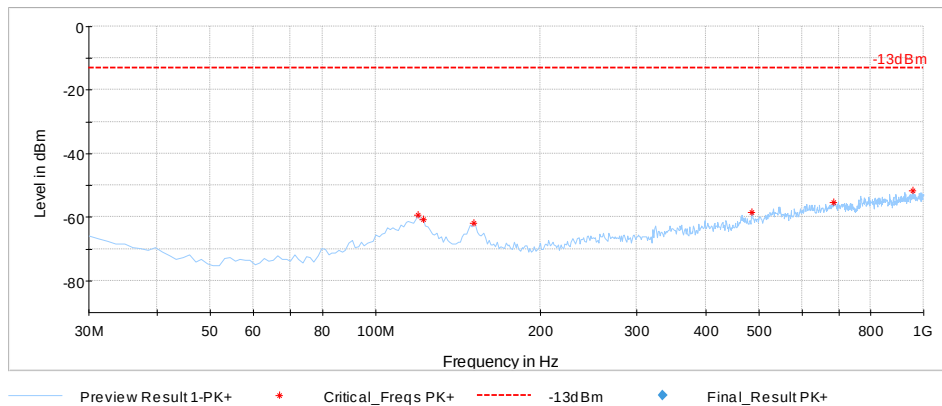
Plot #33 Radiated Emissions: 18-24 GHz

Channel: Mid



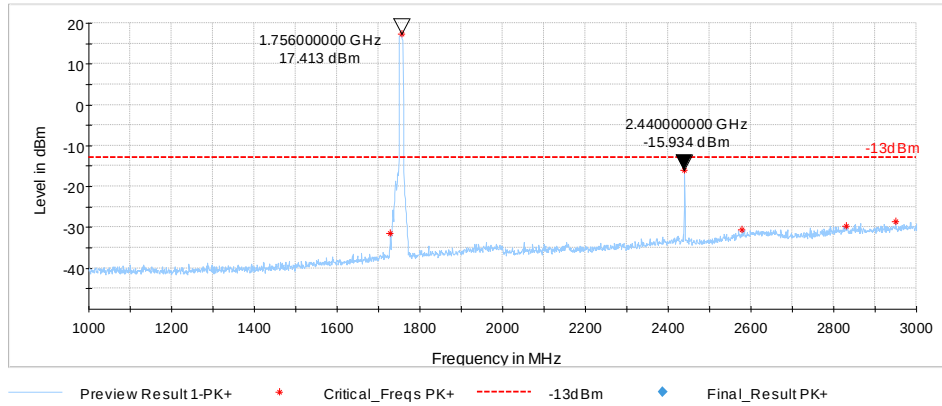
Plot #34 Radiated Emissions: 30 MHz – 1GHz

Channel: High



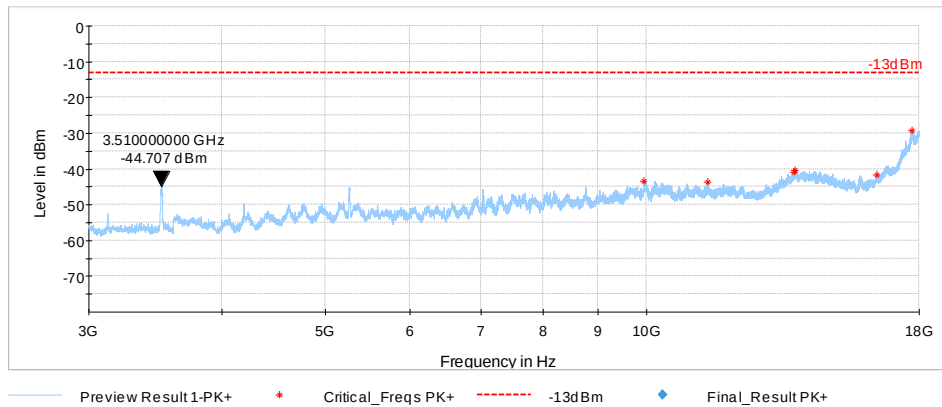
Plot #35 Radiated Emissions: 1-3 GHz

Channel: High



Plot #36 Radiated Emissions: 3-18 GHz

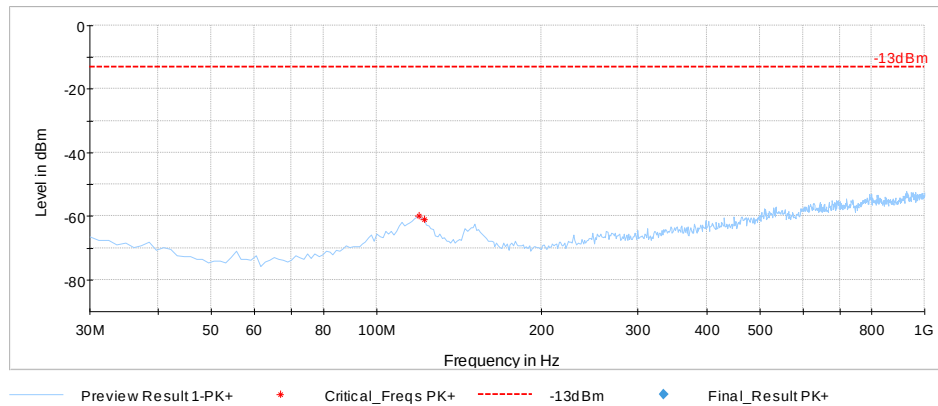
Channel: High



FDD II

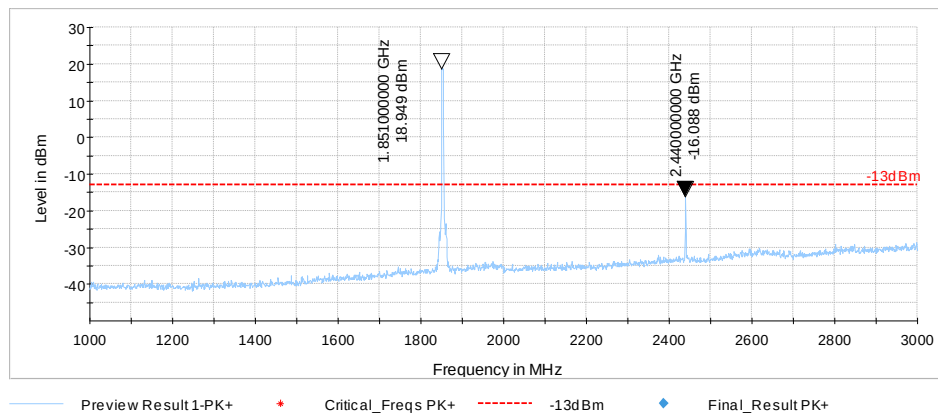
Plot #37 Radiated Emissions: 30 MHz – 1GHz

Channel: Low



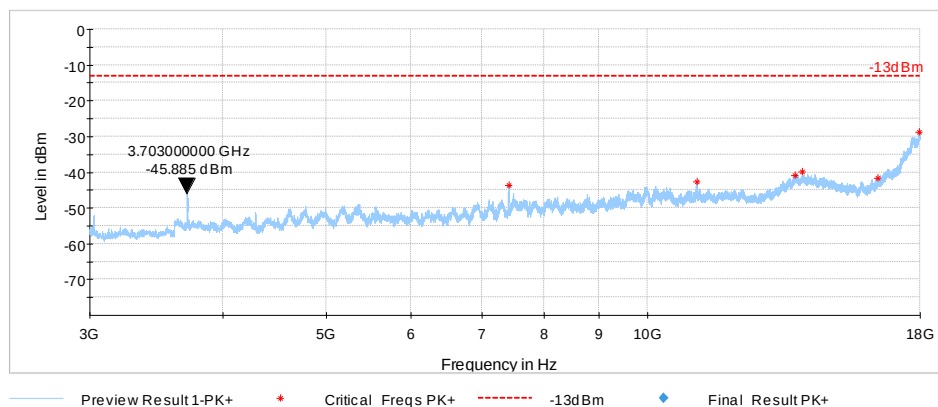
Plot # 38 Radiated Emissions: 1-3 GHz

Channel: Low



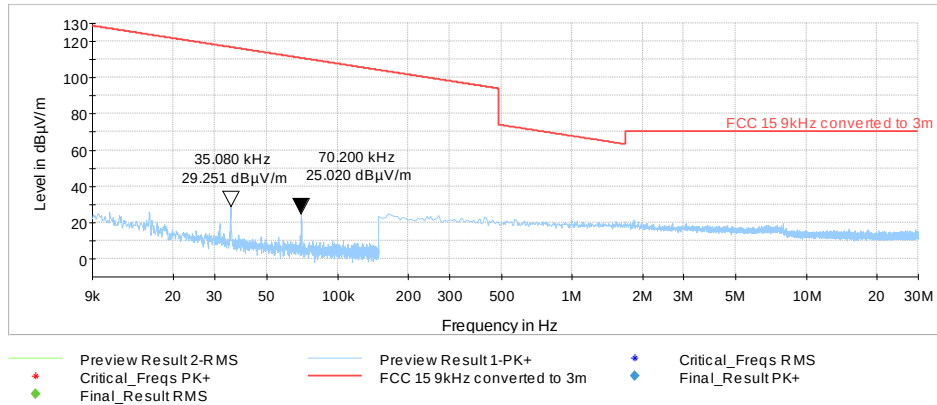
Plot # 39 Radiated Emissions: 3-18 GHz

Channel: Low



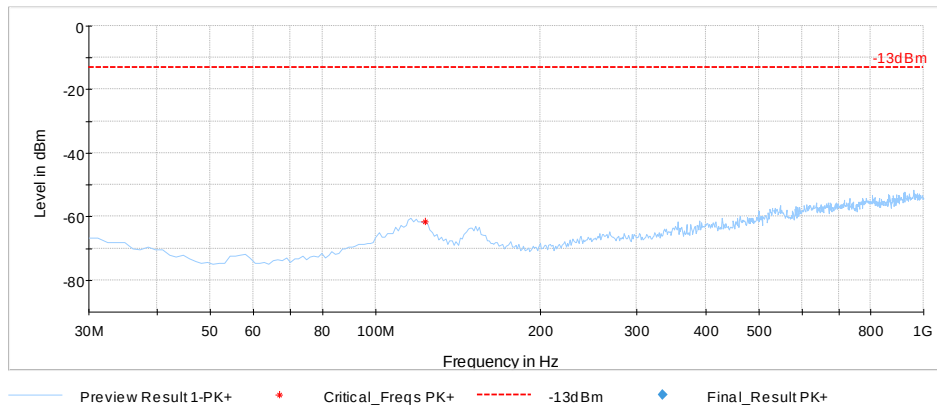
Plot # 40 Radiated Emissions: 9 kHz-30 MHz

Channel: Mid



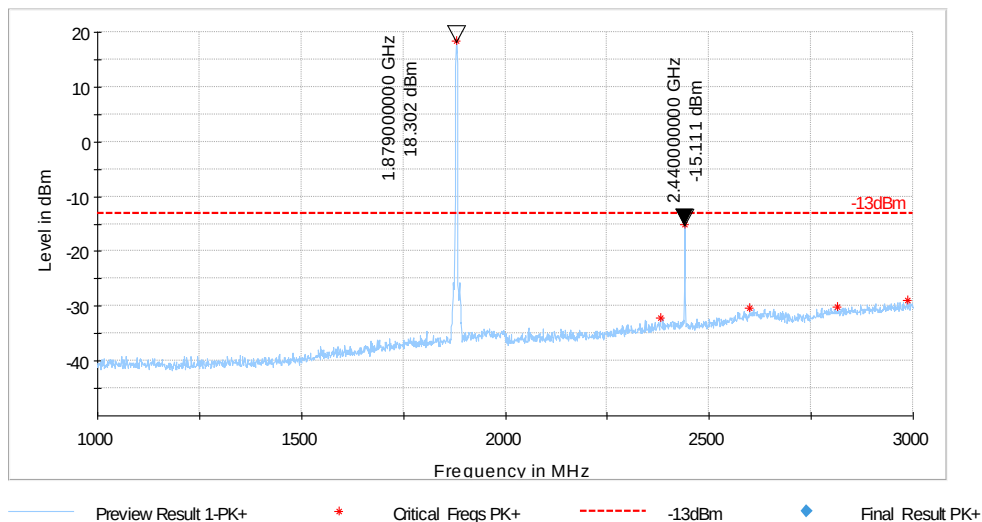
Plot #41 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid



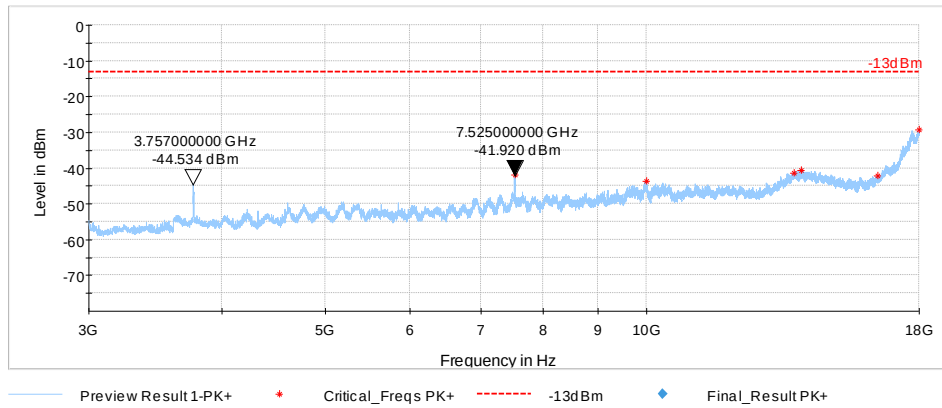
Plot #42 Radiated Emissions: 1-3 GHz

Channel: Mid



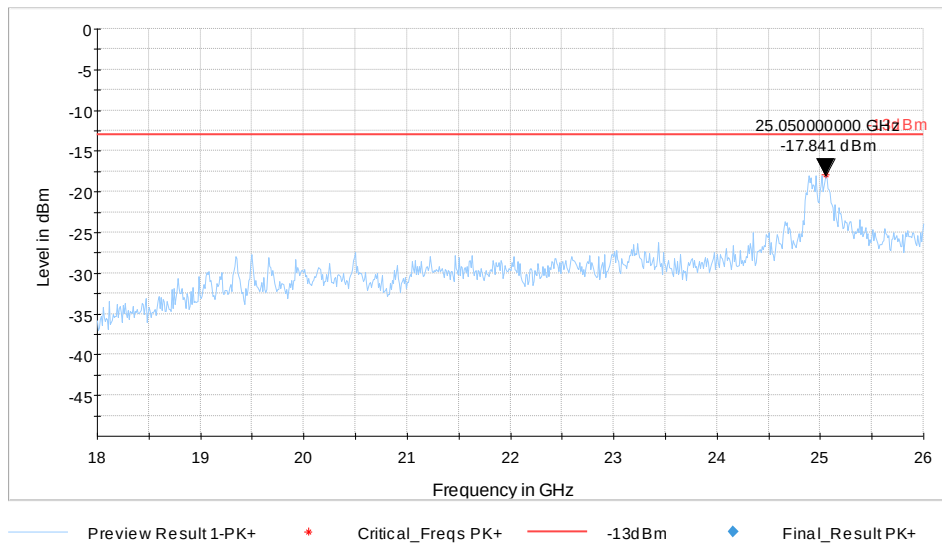
Plot #43 Radiated Emissions: 3-18 GHz

Channel: Mid



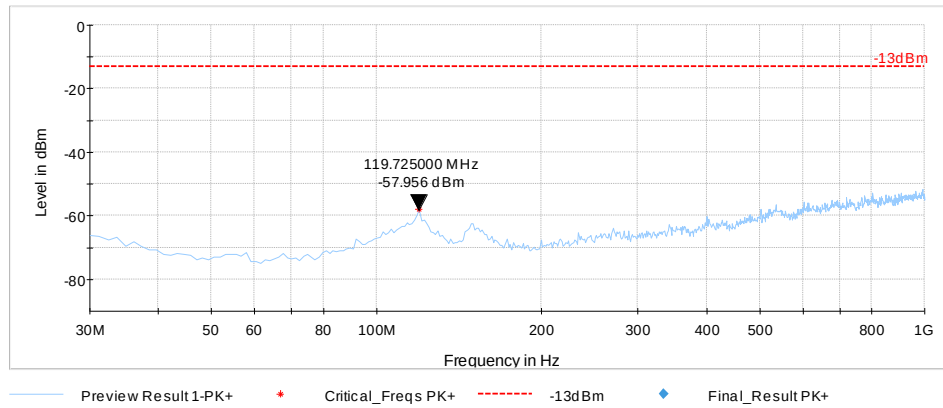
Plot #44 Radiated Emissions: 18-26 GHz

Channel: Mid



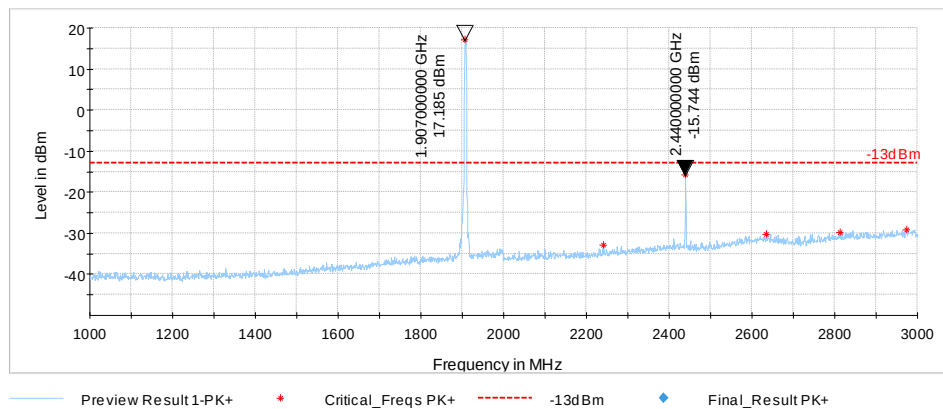
Plot #45 Radiated Emissions: 30 MHz – 1GHz

Channel: High



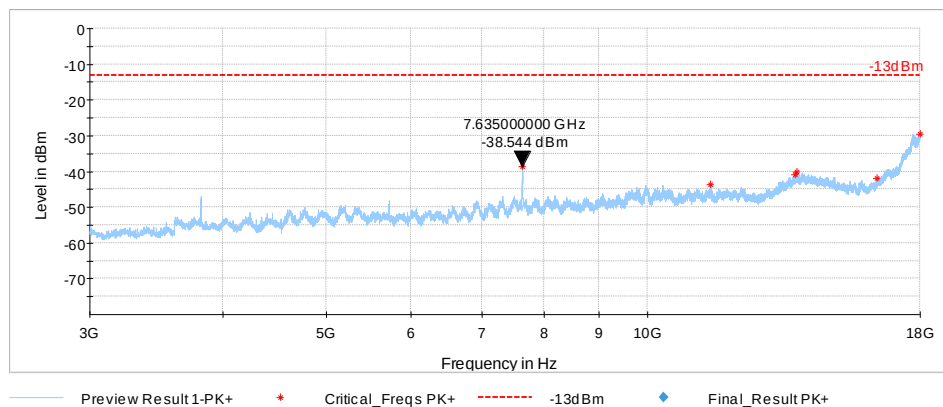
Plot #46 Radiated Emissions: 1-3 GHz

Channel: High



Plot #47 Radiated Emissions: 3-18 GHz

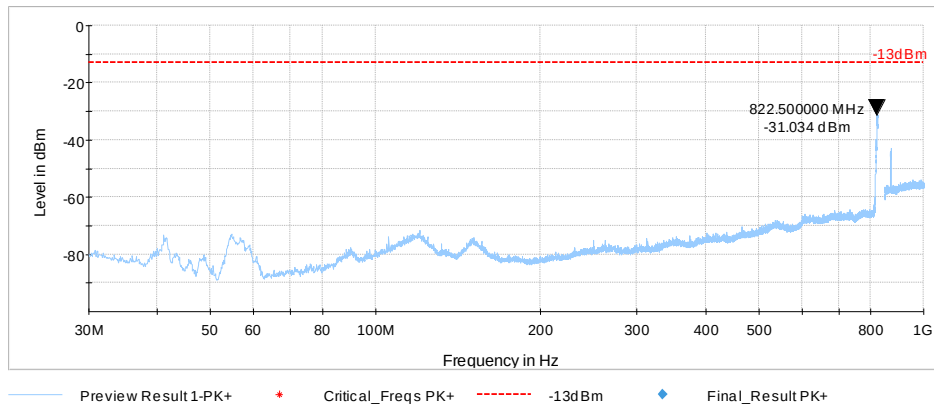
Channel: High



FDD V

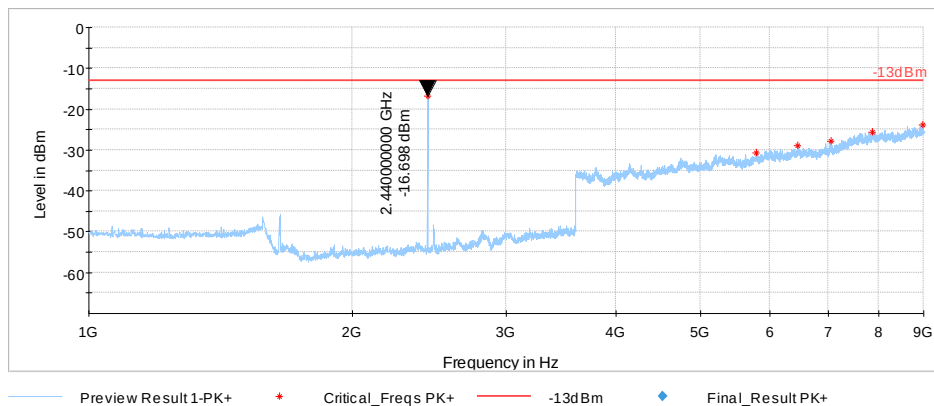
Plot #48 Radiated Emissions: 30 MHz – 1GHz

Channel: Low



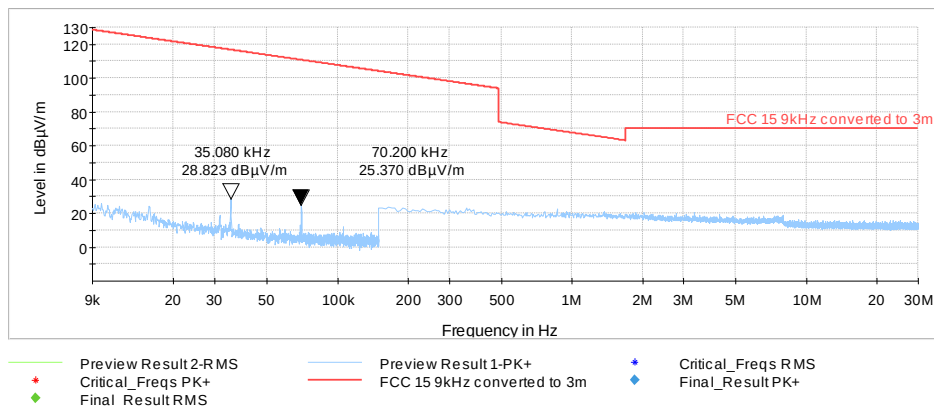
Plot # 49 Radiated Emissions: 1-9 GHz

Channel: Low



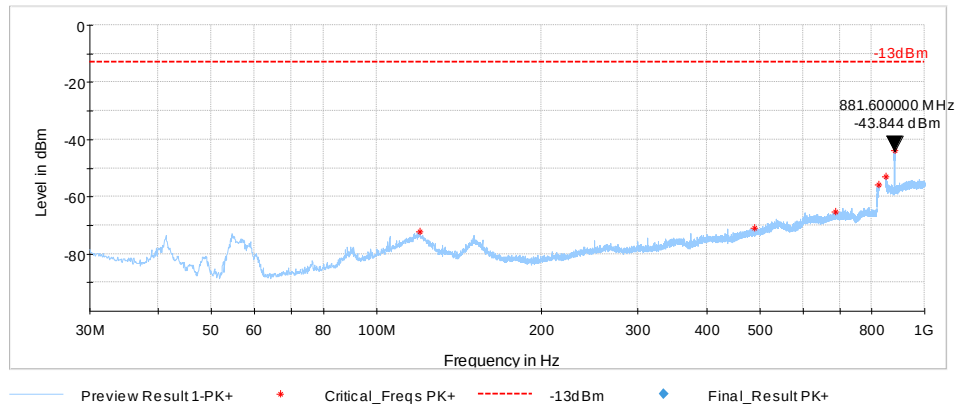
Plot # 50 Radiated Emissions: 9 kHz-30 MHz

Channel: Mid



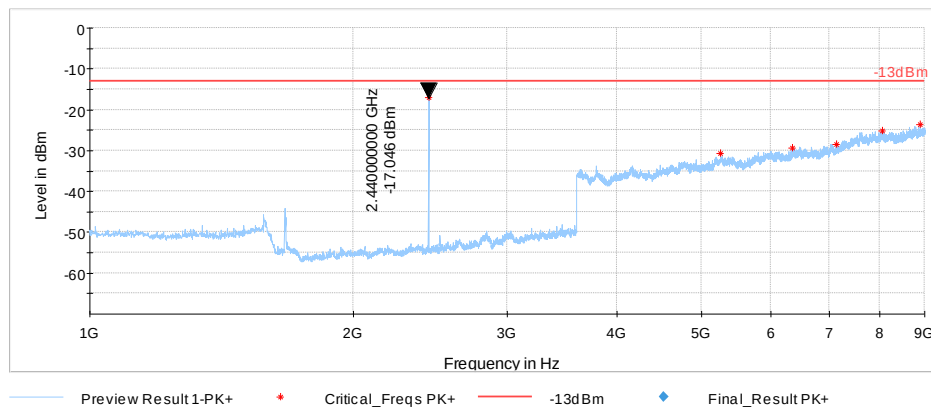
Plot # 51 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid



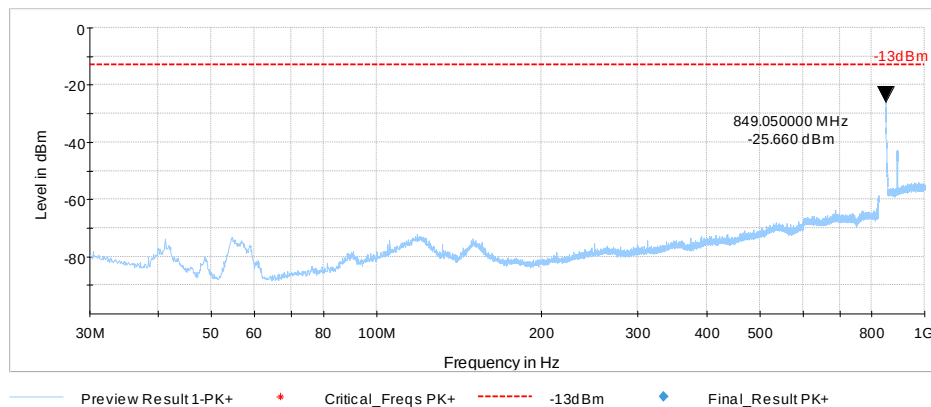
Plot # 52 Radiated Emissions: 1-9 GHz

Channel: Mid



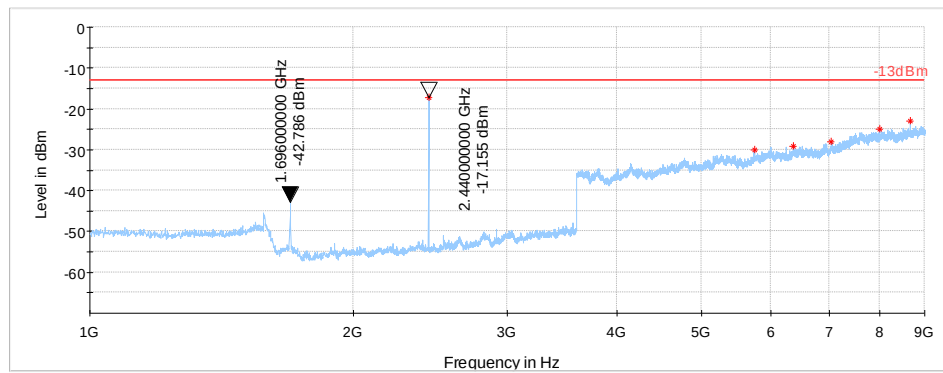
Plot # 53 Radiated Emissions: 30 MHz – 1GHz

Channel: High



Plot #45 Radiated Emissions: 1-9 GHz

Channel: High



8 Test setup photos

Setup photos are included in supporting file name: "EMC_IDS1-002-17001_FCC_22_24_27_Setup_Photos"

9 Test Equipment And Ancillaries Used For Testing

Item Name	Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
Antenna Biconilog 3142E	Biconilog Antenna	EMCO	3142E	166067	3 years	6/27/2017
Magnetic Loop Antenna	Loop Antenna	ETS Lindgren	6512	164698	3 years	7/8/2017
Antenna Horn 3117-PA	Horn Antenna	ETS Lindgren	3117-PA	169547	3 years	8/8/2017
Digital Barometer	Compact Digital Barometer	Control Company	35519-055	91119547	2 Years	6/8/2017
FSV40	Spectrum Analyzer	R&S	FSV40	101022	2 years	5/7/2017
FSU26	Spectrum Analyzer	R&S	FSU26	200302	2 years	7/5/2017
Thermometer Humidity TM320	Thermometer Humidity	Dickson	TM320	1625369	1 Year	6/1/2017

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.

10 Revision History

Date	Report Name	Changes to report	Report prepared by
2017-11-20	EMC_IDS1-002-17001_FCC_22_24_27	Initial Version	Kris Lazarov