



# RADIO COLLOCATION TEST REPORT



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**EMC Test Laboratory:** QAI Laboratories Ltd.  
**Address:** 3980 North Fraser Way, Burnaby, BC, V5J 5K5 Canada  
**Phone:** (604) 527-8378  
**Fax:** (604) 527-8368

## Laboratory Accreditations (per ISO/IEC 17025:2017)



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**Manufacturer:** **Textron Specialized Vehicles**  
**Address:** 1451 Marvin Griffin Rd  
Augusta GA, 30906, USA  
**Equipment Tested:** **TruPin**  
**Model Number(s):** 1004552  
**FCC ID:** 2BBDD-TRUPIN

# TEXTRON

## REVISION HISTORY

Date	Report Number	Details	Author's Initials
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July 27, 2023	E11308-2303_Textron_TruPin_Collocation_FCC_Rev1.1	Revision	AH
All previous versions of this report have been superseded by the latest dated revision as listed in the above table. Please dispose of all previous electronic and paper printed revisions accordingly.			

## REPORT AUTHORIZATION

The data documented in this report is for the test equipment provided by the manufacturer and the results relate only to the item tested. The tests were conducted on the sample equipment as requested by the manufacturer for the purpose of demonstrating compliance with the standards outlined in Section I of this report as agreed upon by the Manufacturer under the quote 23RH02221R1.

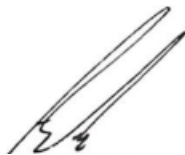
The Manufacturer is responsible for the tested product configurations, continued product compliance, and for the appropriate auditing of subsequent products as required.

This report may comprise a partial list of tests that are required for FCC and ISED certification. A Declaration of Conformity can only be produced by the manufacturer. This is to certify that the following report is true and correct to the best of our knowledge.

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Testing Performed by  
**Alireza Nezam**  
Senior RF/EMC Engineer



Report Prepared by  
**Alec Hope**  
Senior RF/EMC Engineer



Report Reviewed by  
**Parm Singh**  
Vice President EMC



## QAI FACILITIES

### British Columbia

**QAI Laboratories Inc.**  
**Main Laboratory/Headquarters**  
3980 North Fraser Way,  
Burnaby, BC V5J Canada

### Ontario

**QAI Laboratories Inc.**  
25 Royal Group Crescent #3,  
Vaughan,  
ON L4H 1X9 Canada

### Virginia

**QAI Laboratories Ltd.**  
1047 Zachary Taylor Hwy,  
Suite A Huntly,  
VA 22640 USA

### China

**QAI Laboratories Ltd**  
Room 408, No. 228, Jiangchang  
3<sup>rd</sup> Road Jing'An District,  
Shanghai, China 200436

### California

**QAI Laboratories Ltd.**  
8385 White Oak Avenue Rancho  
Cucamonga, CA 91730 USA

### Oklahoma

**QAI Laboratories Ltd.**  
5110 North Mingo Road  
Tulsa, OK 74117, USA

### Miami

**QAI Laboratories Ltd.**  
8148 NW 74th Ave,  
Medley, FL 33166 USA

### South Korea

**QAI Laboratories Ltd**  
#502, 8, Sanbon-ro 324beon-gil  
Gunpo-si, Gyeonggi-do, 15829,  
South Korea

## QAI EMC ACCREDITATION

QAI EMC is your one-stop regulatory compliance partner for electromagnetic compatibility (EMC) and electromagnetic interference (EMI). Products are tested to the latest and applicable EMC/EMI requirements for domestic and international markets. QAI EMC goes above and beyond being a testing facility—we are your regulatory compliance partner. QAI EMC has the capability to perform RF Emissions and Immunity for all types of electronics manufacturing including Industrial, Scientific, Medical, Information Technology, Telecom, Wireless, Automotive, Marine and Avionics.

EMC Laboratory Location	FCC Designation (3m SAC)	IC Registration (3m SAC)	A2LA Certificate
Burnaby, BC, Canada	CA9543	9543A	3657.02

### EMC Facility Burnaby BC, Canada





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# 1 EXECUTIVE SUMMARY

## 1.1 Purpose

The purpose of this report is to demonstrate and document the compliance of TruPin as per Sections 1.2 and 1.3.

## 1.2 Scope

The information documented in this report is based on the test methods and levels as per Quote 23RH02221R1:

**FCC Title 47 Part 15** – Radio Frequency Devices, Subpart C – Intentional Radiators

**FCC Title 47 Part 22** – Public Mobile Services

**FCC Title 47 Part 24** – Personal Communication Services

**FCC Title 47 Part 27** – Miscellaneous Wireless Communication Services

**FCC KDB 44498 D01: v06** – General RF Exposure Guidance





### 1.3 Summary of Results

The following testing was performed pursuant to FCC Title 47 Part 15 and Industry Canada ICES-003 to demonstrate the testimony to “FCC, IC, & CE” mark Electromagnetic Compatibility testing for the product.

No.	Test	Applicable Standard	Description	Result
1	Spurious Emissions & Radio Collocation	FCC 47 CFR Part 15.247 FCC 47 CFR Part 22.917 FCC 47 CFR Part 24.238 FCC 47 CFR Part 27.53	Radiated emissions requirements as stated in the standards.	Complies

Table 1: Applicable test standards and descriptions

Note: The gain of the antenna(s) is provided by the client to measure or calculate test results and is not independently measured by QAI.



## 2 GENERAL INFORMATION

### 2.1 Product Description

The information provided in this section is for the Equipment Under Test (EUT) and the corresponding Auxiliary Equipment needed to perform the tests as a complete system.



Figure 1: EUT

#### Equipment Under Test (EUT)

<b>Equipment</b>	TruPin
<b>Description</b>	GPS receiver containing preapproved wifi and cellular modules <sup>Note 1</sup>
<b>Manufacturer</b>	Textron Specialized Vehicles
<b>Model No.</b>	1004552
<b>Serial No.</b>	Sample 1
Clock frequencies tuned upon within the EUT: 90 kHz, 8 MHz, 80 MHz, 160 MHz, 240 MHz Highest frequency generated within the EUT: 2483.5 MHz Note 1: Contains two preapproved radio modules (SMA): FCC ID: RI7ME310G1WW, ISED ID: 5131A-ME310G1WW FCC ID: 2AC7Z-ESP32S2WROOM, ISED ID: 21098 -ESPS2WROOM	



### Equipment Under Test (EUT) – RF Information

<b>RF device type</b>	GPS receiver, wifi module, and LTE module
<b>Model No.</b>	1004552
<b>Operating frequency</b>	Wifi module: 2412-2462 MHz LTE Band 1: 1920-1980 UL, 2110-2170 DL LTE Band 2: 1850-1910 UL, 1930-1990 DL LTE Band 3: 1710-1785 UL, 1805-1880 DL LTE Band 4: 1710-1755 UL, 2110-2115 DL LTE Band 5: 824-249 UL, 869-894 DL LTE Band 8: 880-915 UL, 925-960 DL LTE Band 12: 699-716 UL, 729-746 DL LTE Band 13: 777-787 UL, 746-756 DL LTE Band 25: 1850-1915 UL, 1930-1995 DL LTE Band 26: 814-849 UL, 859-894 DL LTE Band 27: 807-824 UL, 852-869 DL LTE Band 71: 663-698 UL, 617-652 DL LTE Band 85: 698-716 UL, 728-746 DL
<b>Number of available channels</b>	Wifi module: 11
<b>Channel separation</b>	Wifi module: 5 MHz
<b>Channel bandwidth</b>	Wifi module: 10 MHz LTE module: 1.4 MHz
<b>Output Power</b>	Wifi module: 25 dBm LTE module: 33 dBm
<b>Modulation type</b>	Wifi module: DSSS, OFDM LTE Module: GMSK
<b>Data Rate Tested</b>	Wifi module: 1 Mbps
<b>Adaptive</b>	No
<b>Geo-location-capable</b>	Yes
<b>Number of antennas</b>	3
<b>Antenna type</b>	Wifi module: PCB antenna LTE module: Internal Ceramic antenna GPS receiver: External Patch antenna
<b>Antenna gain</b>	Wifi module: 3.4 dBi LTE module: -1.1 dBi GPS receiver: 2.44 dBi

Notes: None.

### Equipment Under Test (EUT) – General Information

<b>Tested as</b>	Tabletop
<b>Dimensions</b>	14.6 x 8.9 x 3.8 cm
<b>Declared operating temperature range:</b>	-4°F to +140°F
<b>Input power</b>	5 V, 0.5 A; 2.5 W
<b>Grounded</b>	No
<b>Device use</b>	Portable

Notes: None.

## Test Modes

Test	Transmitter State	Power
1	Wifi On; GSM B1 On	Battery
2	Wifi On; GSM B2 On	Battery
3	Wifi On; GSM B3 On	Battery
4	Wifi On; GSM B4 On	Battery
5	Wifi On; GSM B5 On	Battery
6	Wifi On; GSM B8 On	Battery
7	Wifi On; GSM B12 On	Battery
8	Wifi On; GSM B13 On	Battery
9	Wifi On; GSM B25 On	Battery
10	Wifi On; GSM B26 On	Battery
11	Wifi On; GSM B27 On	Battery
12	Wifi On; GSM B71 On	Battery
13	Wifi On; GSM B85 On	Battery

Note: Wifi mid channel power was measured as highest; all collocation testing was done with wifi radio transmitting on mid channel.

## Auxiliary Manufacturer Supplied Equipment

Equipment	Manufacturer	Product Description	Model No.
Cable	Textron Vehicle Systems	Programming Cable	Custom

## 2.2 Environmental Conditions

The equipment under test was operated and tested under the following environmental conditions:

Parameter	Conditions
Location	Indoors
Temperature	22 °C
Relative Humidity	48%

## 2.3 Measurement Uncertainty

Parameter	Uncertainty
Radiated Emissions, 30MHz-1GHz	± 2.40 dB
Radiated Emissions, 1GHz-40GHz	± 2.48 dB
Radio Frequency	±1.5 x 10 <sup>-5</sup> MHz
Total RF Power Conducted	±1.36 dB
Spurious Emissions, Conducted	±1.36 dB
RF Power Density, Conducted	±1.36 dB
Temperature	±1°C
Humidity	±5 %
DC and low frequency voltages	±3 %

## 2.4 Worst Test Case

Worst-case orientation was determined during the preliminary testing. The final radiated emissions were performed in the worst-case orientation.

## 2.5 Sample Calculations of Emissions Data

Radiated and conducted emissions were performed using EMC32 software developed by Rohde & Schwarz. Transducer factors such as antenna factors, cable losses and amplifier gains were stored in the test templates which are used to perform the emissions measurements. After the test is finished, data is generated from the EMC32 consisting of product details, emission plots and final data tables as shown below.

Frequency (MHz)	Q-Peak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Ant. Ht. (cm)	Pol	Turntable Position (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
42.663900	33.0	1000.000	120.000	100.0	H	70.0	13.2	7.5	40.5

Table 2: Sample Quasi-Peak Correction Data – Radiated

Quasi-Peak reading shown in the table above is already corrected by the software using the correction factor shown in column “Corr.” The correction factor listed under “Corr.” table calculated as:

$$\text{Corr. (dB)} = \text{Antenna factor} + \text{Cable loss}$$

Or

$$\text{Corr. (dB)} = \text{Antenna factor} + \text{Cable Loss} - \text{Amp gain (if pre-amplifier was used)}$$

The final Quasi peak reading shown in the data is calculated by the software using following equation:

$$\text{Corrected Quasi-Peak (dBμV/m)} = \text{Raw Quasi-Peak Reading} + \text{Antenna factor} + \text{Cable loss}$$

To obtain the final Quasi-Peak or Average reading during power line conducted emissions, transducer factors are included in the final measurement as shown below.

Frequency (MHz)	Q-Peak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150	44.3	1000.000	9.000	GND	0.6	21.7	66.0

Table 3: Sample Quasi-Peak Correction Data - Conducted Emissions

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150	27.2	1000.000	9.000	GND	0.6	28.8	56.0

Table 4: Sample Average Correction Data- Conducted Emissions



Quasi Peak or Average reading shown in the preceding table is already corrected by the software using the correction factor shown in column “Corr.” The correction factor listed under “Corr.” table calculated as:

$$\text{Corr. (dB)} = \text{Antenna factor} + \text{Cable loss}$$

The final Quasi-peak or Average reading shown in the data is calculated by the software using following equation:

$$\text{Corr. Quasi-Peak/Average Reading (dB}\mu\text{V)} = \text{Raw Quasi-Peak/Average Reading} + \text{Antenna factor} + \text{Cable loss}$$

The allowable margin from the limits, as per the standards, were calculated for both radiated and conducted emissions:

$$\text{Margin (dB)} = \text{Limit} - \text{Quasi-Peak or Average reading}$$



### 3 DATA & TEST RESULTS

#### 3.1 Radiated Emissions & Radio Collocation

<b>Date Performed:</b>	May 26, 2023 - July 5, 2023
<b>Test Standard:</b>	FCC 47 CFR Part 15.247 FCC 47 CFR Part 22.917 FCC 47 CFR Part 24.238 FCC 47 CFR Part 27.53
<b>Test Method:</b>	ANSI C63.10-2013 ANSI C63.26-2015
<b>Modifications:</b>	None
<b>Final Result:</b>	Complies

#### Applicable Standard:

FCC 47 CFR Part 15.247: Radiated Emission Limits, Additional Provisions – Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz:

- (d) 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.

FCC 47 CFR Part 22.917: Public Mobile Services – Emission limitations for cellular equipment

- (a) 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  $43 + 10\log_{10}(P)$  dB.

FCC 47 CFR Part 24.238: Broadband Personal Communications Services – Emission limits

- (a) 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  $43 + 10\log_{10}(P)$  dB.

FCC 47 CFR Part 27.53: Miscellaneous Wireless Communications Services – Emission limits

- (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operations shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:
  - 1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10\log_{10}(P)$  dB.
  - 2) On any frequency outside the 776-778 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10\log_{10}(P)$  dB.
  - 4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10\log_{10}(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations.
  - 5) Compliance with the provisions of (c)(1) and (c)(2) of this section is based on the use of measurement

- instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed.
- 6) Compliance with the provisions of (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.
- (e) For operations in the 775-776 MHz and 805-806 MHz bands, transmitters must comply with either (e)(1) to (e)(5) of this section or the ACP emission limitations set forth in (e)(6) to (e)(9) of this section.
- 2) On all frequencies between 758-775 MHz and 788-805 MHz, the power of any emission outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by a factor not less than  $65 + 10\log_{10}(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations.
  - 3) On any frequency outside the 775-776 MHz and 805-806 MHz bands, the power of any emission shall be attenuated outside the band below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10\log_{10}(P)$  dB.
  - 4) Compliance with the provisions of (e)(2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.
  - 5) Compliance with the provisions of (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed.
- (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz EIRP for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.
- (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10\log_{10}(P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.
- (h) AWS Emission limits –
- 1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10\log_{10}(P)$  dB.

#### Test Setup:

The EUT was tested in a 3m SAC and was positioned on the front of the turntable. The transmitters were set for continuous transmission. The radiated output of the device was measured for all emissions from 150 kHz up to the 10<sup>th</sup> harmonic of the highest fundamental frequency. The EUT was pre-scanned in 3 different orthogonal orientations and was found to radiate highest when placed as indicated in the test photos.



### 3.1.1 2100MHz Band (B1) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B1	1920 MHz – 1980 MHz	110.6 dBμV/m	101.5 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-133	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 5: 2100 MHz Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
31.1542	23.72	---	27.6	286	129	V	67.6	43.88	Complies
105.4818	16.97	---	19.0	124	184	H	67.6	50.63	Complies
202.5785	16.93	---	20.3	247	167	H	67.6	50.67	Complies
981.0222	27.99	---	32.0	169	204	H	67.6	39.61	Complies
1804.964	19.56	---	-2.0	199	183	H	67.6	48.04	Complies
4771.144	30.02	---	7.1	149	232	V	67.6	37.58	Complies
4858.576	---	15.40	7.0	249	238	H	58.5	43.1	Complies
6809.596	19.21	---	-6.0	307.0	203	H	67.6	48.39	Complies
13573.176	36.09	---	6.9	100.0	81	H	67.6	31.51	Complies
16461.272	41.25	---	12.7	189.0	0	V	67.6	26.35	Complies
17864.076	---	30.67	15.0	350.0	337	V	58.5	27.83	Complies
17873.192	43.39	---	15.0	300.0	225	V	67.6	24.21	Complies

<sup>1</sup> Tightest limit from Table 5 applied

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector

Table 6: 2100 MHz Band + Wifi Colocation Results

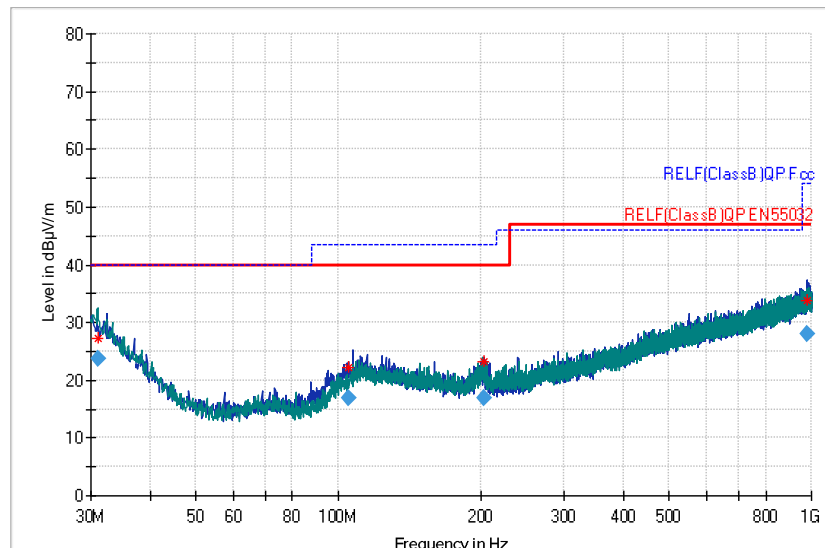


Figure 2: B1 and Wifi Radiated Emissions: 30 MHz - 1 GHz

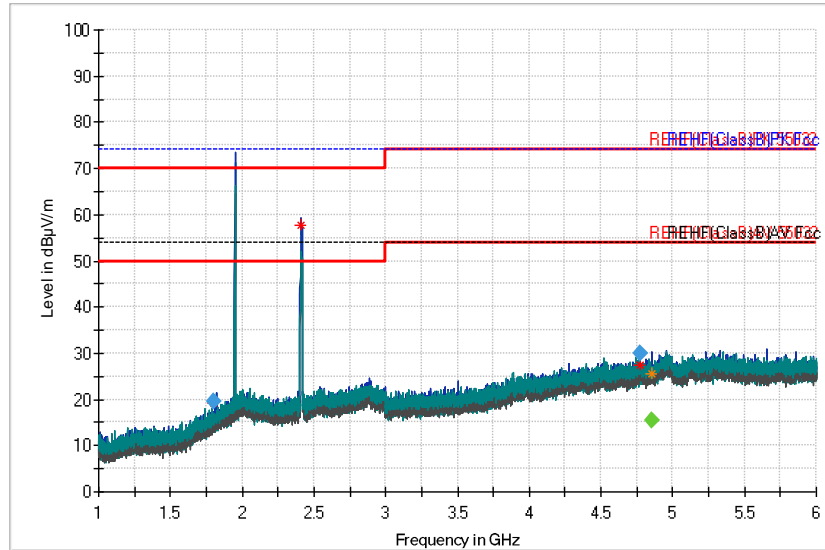


Figure 3: B1 and Wifi Radiated Emissions: 1 GHz - 6 GHz

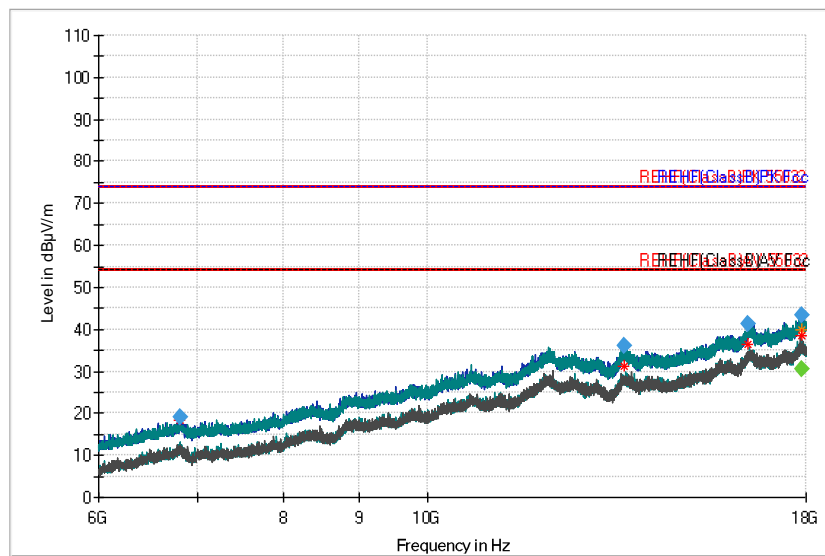
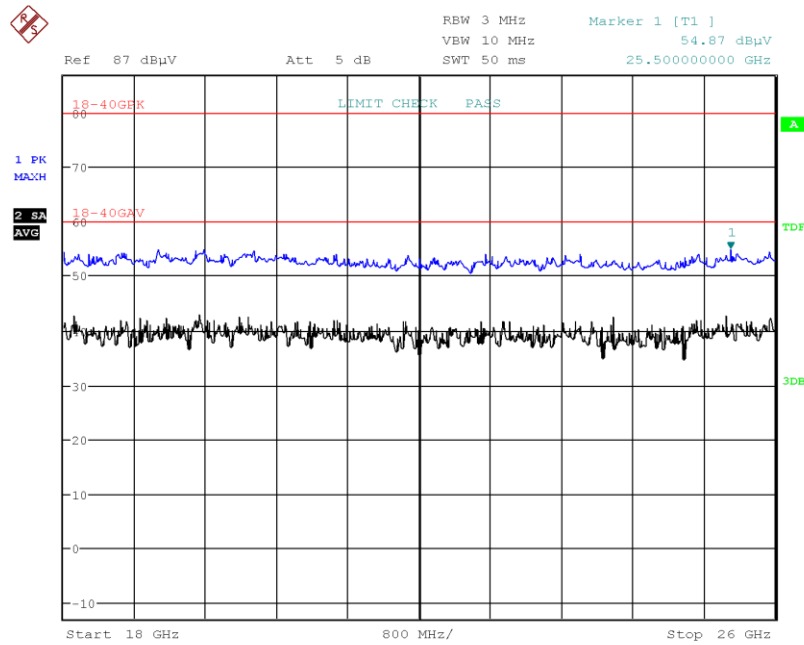


Figure 4: B1 and Wifi Radiated Emissions: 6 GHz - 18 GHz



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Figure 5: B1 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.2 1900 PCS Band (B2) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B2	1850 MHz – 1910 MHz	136.8 dBμV/m	126.6 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-133	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 7: 1900 PCS Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
30.0329	24.56	---	28.4	162.0	170	V	86.8	62.24	Complies
132.8030	14.95	---	21.0	237.0	137	V	86.8	71.85	Complies
199.0958	13.49	---	20.7	225.0	44	V	86.8	73.31	Complies
929.6078	27.50	---	31.7	325.0	0	V	86.8	59.3	Complies
1701.1440	24.49	---	-3.4	100.0	327	H	86.8	62.31	Complies
1701.2280	---	15.20	-3.4	100.0	327	H	83.6	68.4	Complies
2858.0000	24.85	---	1.3	100.0	318	V	86.8	61.95	Complies
3202.1240	---	7.92	2.1	399.0	321	V	83.6	75.68	Complies
3212.5440	22.73	---	2.1	399.0	321	V	86.8	64.07	Complies
12034.0520	29.92	---	8.2	140.0	0	H	86.8	56.88	Complies
13625.1960	30.68	---	6.8	350.0	160	H	86.8	56.12	Complies
16497.4520	36.01	---	12.9	162.0	21	H	86.8	50.79	Complies
17901.2480	---	37.87	15.1	281.0	84	V	83.6	45.73	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 8: 1900 PCS Band + Wifi Colocation Results

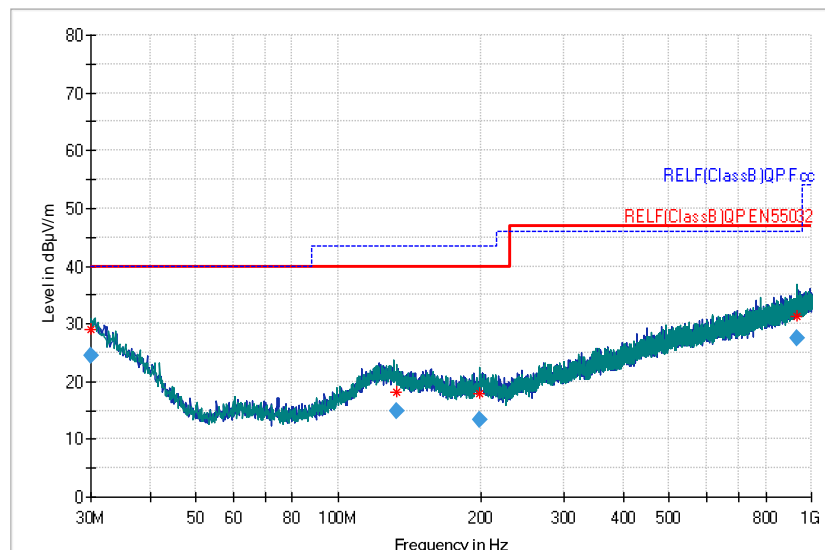


Figure 6: B2 and Wifi Radiated Emissions: 30 MHz - 1 GHz

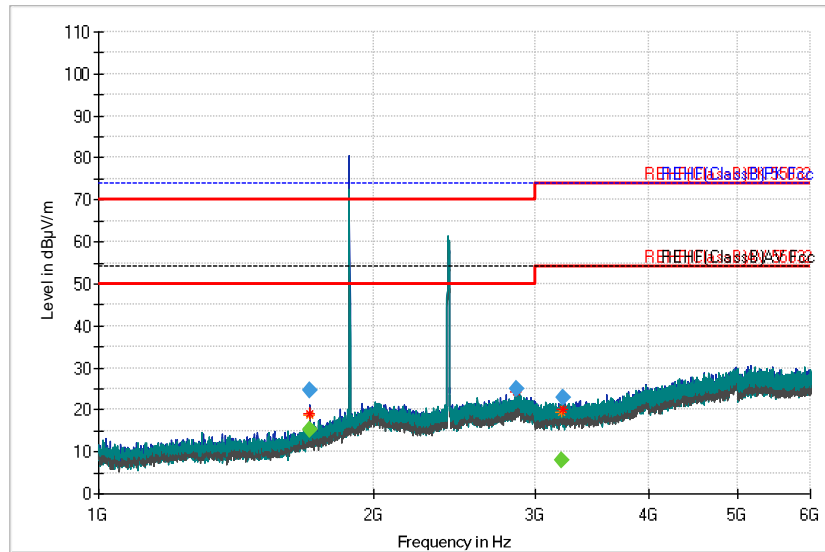


Figure 7: B2 and Wifi Radiated Emissions: 1 GHz - 6 GHz

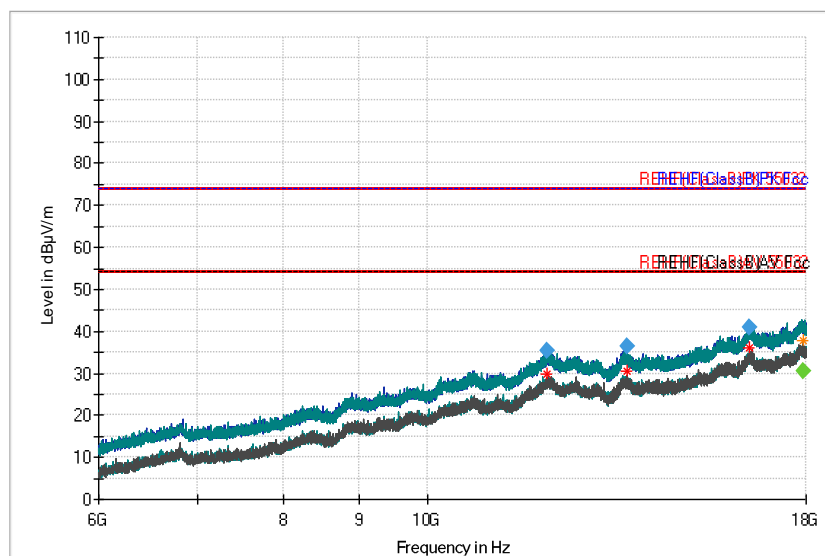
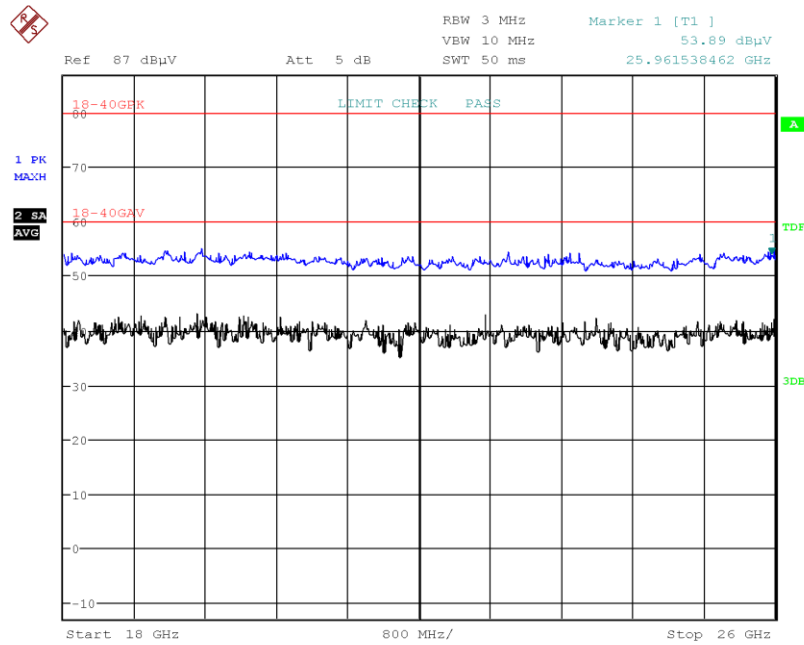


Figure 8: B2 and Wifi Radiated Emissions: 6 GHz - 18 GHz



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Figure 9: B2 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.3 1800 + Band (B3) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B3	1710 MHz – 1785 MHz	134.2 dBμV/m	124.8 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-133	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 9: 1800 + Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
32.7826	21.96	---	26.4	338.0	293	H	86.6	64.64	Complies
160.0059	26.46	---	19.9	234.0	309	H	86.6	60.14	Complies
200.0216	15.67	---	20.8	311.0	158	V	86.6	70.93	Complies
989.5330	28.39	---	32.3	270.0	74	V	86.6	58.21	Complies
3248.8560	22.78	---	2.2	299.0	185	V	86.6	63.82	Complies
3263.9120	23.44	---	2.3	399.0	337	H	86.6	63.16	Complies
4965.0760	31.49	---	6.9	100.0	250	H	86.6	55.11	Complies
8626.8840	22.65	---	-2.0	377.0	186	H	86.6	63.95	Complies
12078.7800	35.24	---	8.0	400.0	299	H	86.6	51.36	Complies
16463.1680	41.29	---	12.7	203.0	93	H	86.6	45.31	Complies
17842.9440	---	30.66	15.0	218.0	289	V	81.8	51.14	Complies
17914.5320	43.57	---	15.1	249.0	69	H	86.6	43.03	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 10: 1800 + Band + Wifi Colocation Results

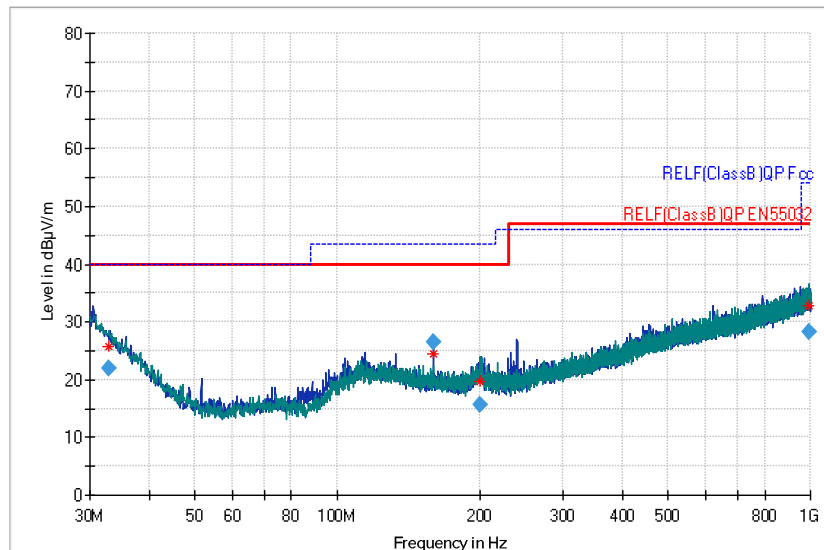


Figure 10: B3 and Wifi Radiated Emissions: 30 MHz - 1 GHz



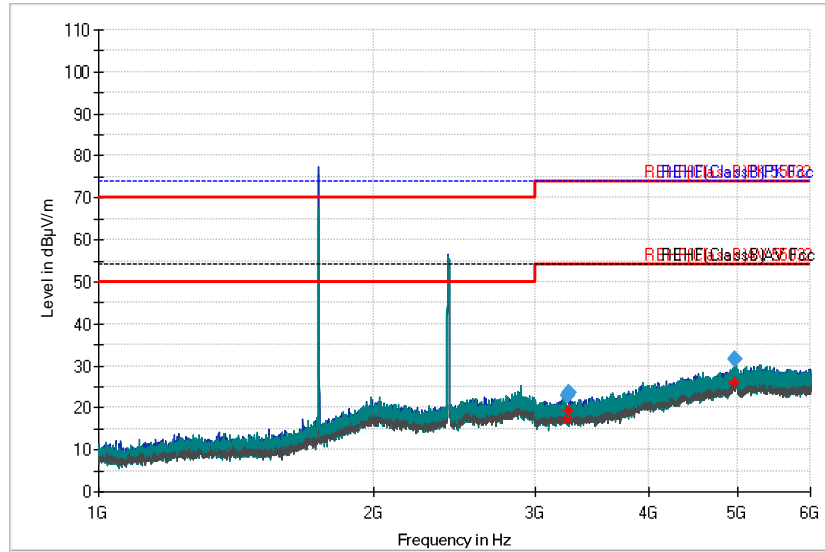


Figure 11: B3 and Wifi Radiated Emissions: 1 GHz - 6 GHz

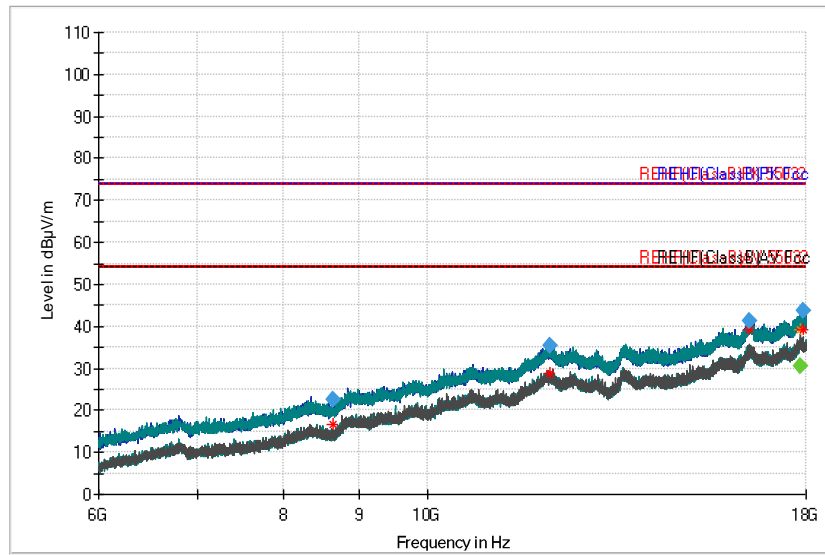
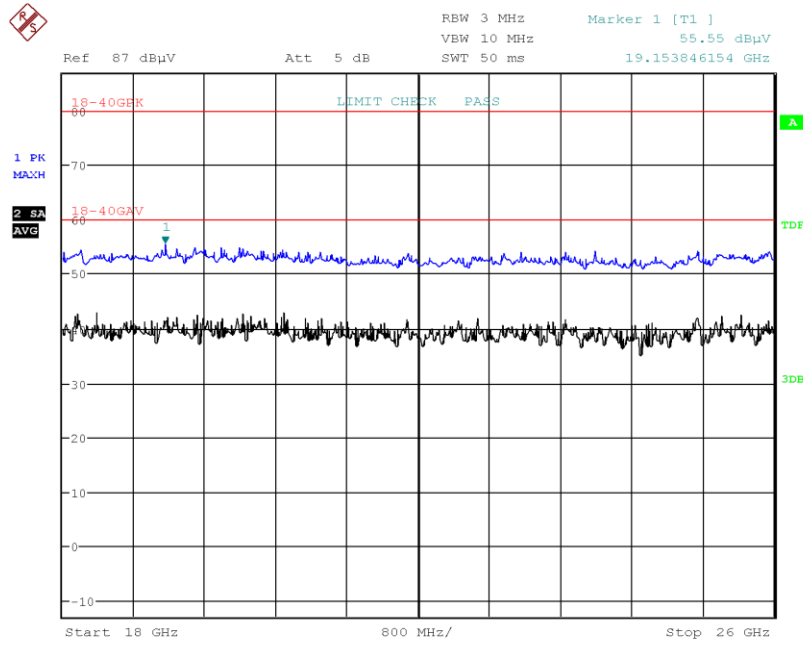


Figure 12: B3 and Wifi Radiated Emissions: 6 GHz - 18 GHz



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Figure 13: B3 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.4 AWS-1 Band (B4) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B4	1710 MHz – 1755 MHz	134.6 dBμV/m	125.2 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-133	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 11: AWS-1 Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
32.0474	22.73	---	27.0	225.0	45	H	86.6	63.87	Complies
201.7515	16.43	---	20.6	370.0	50	V	86.6	70.17	Complies
767.9938	33.09	---	29.7	100.0	301	V	86.6	53.51	Complies
992.9710	28.15	---	32.2	400.0	81	V	86.6	58.45	Complies
1411.0160	---	-1.20	-5.5	299.0	0	H	82.2	83.4	Complies
1428.1720	14.96	---	-5.5	299.0	0	H	86.6	71.64	Complies
1573.8160	---	-0.73	-4.7	100.0	295	H	82.2	82.93	Complies
1584.5000	19.18	---	-4.6	100.0	295	H	86.6	67.42	Complies
2876.5080	25.07	---	1.4	100.0	128	V	86.6	61.53	Complies
2892.4160	25.21	---	1.4	100.0	0	H	86.6	61.39	Complies
2893.8480	---	11.09	1.4	100.0	0	H	82.2	71.11	Complies
7697.4760	15.85	---	-4.1	283.0	165	H	86.6	70.75	Complies
12049.1920	31.43	---	8.1	112.0	162	V	86.6	55.17	Complies
16471.8280	36.99	---	12.7	267.0	206	H	86.6	49.61	Complies
17949.7240	---	40.22	15.1	311.0	0	V	82.2	41.98	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 12: AWS-1 Band + Wifi Colocation Results

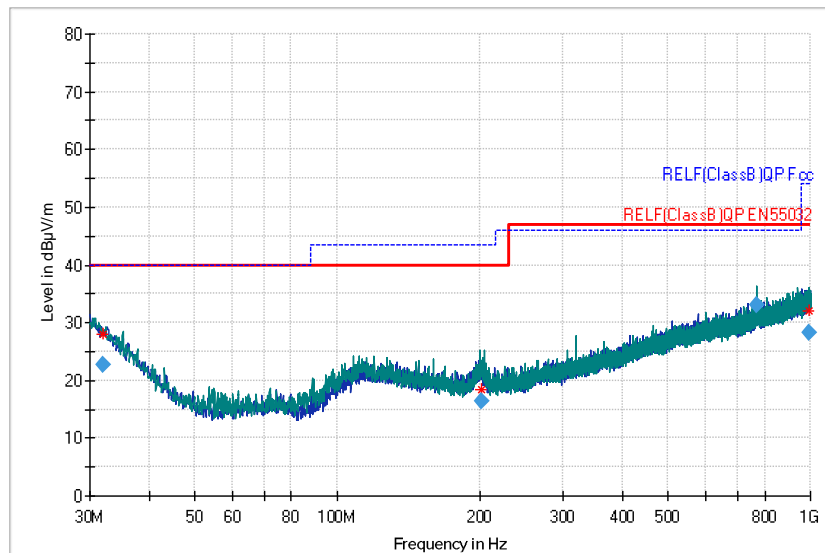


Figure 14: B4 and Wifi Radiated Emissions: 30 MHz - 1 GHz

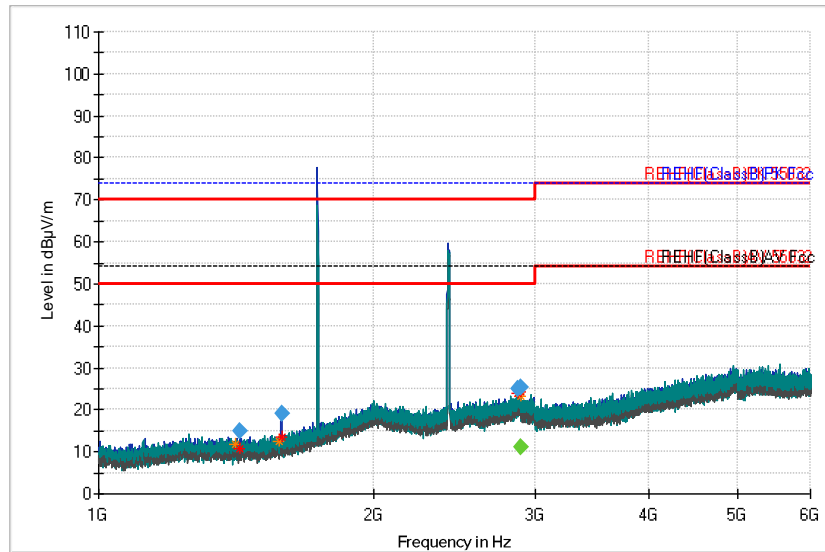


Figure 15: B4 and Wifi Radiated Emissions: 1 GHz - 6 GHz

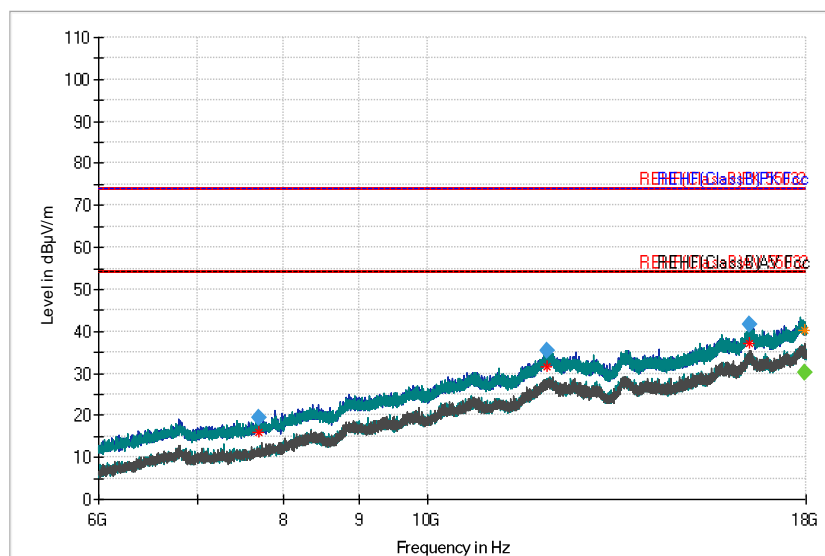
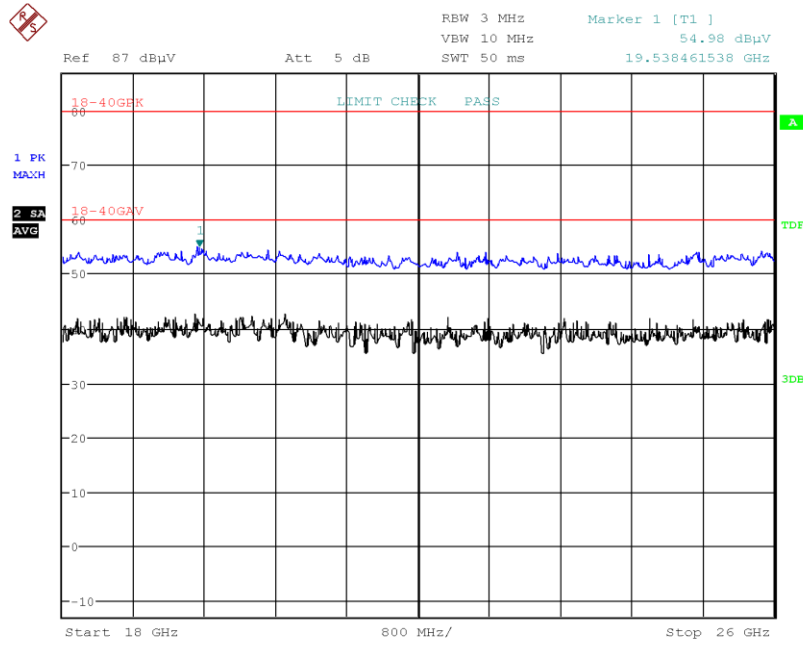


Figure 16: B4 and Wifi Radiated Emissions: 6 GHz - 18 GHz



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Figure 17: B4 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.5 850 MHz Band (B5) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B5	824 MHz – 849 MHz	101.96 dBμV/m	92.46 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-132	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 13: 850 MHz Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
31.1122	23.73	---	27.6	153.0	349	H	58.96	35.23	Complies
641.4986	26.73	---	28.2	296.0	259	H	58.96	32.23	Complies
814.8112	35.29	---	30.4	111.0	32	H	58.96	23.67	Complies
1145.3760	13.68	---	-6.3	399.0	27	V	58.96	45.28	Complies
3233.2280	---	7.81	2.2	100.0	93	V	49.46	41.65	Complies
3241.6520	22.78	---	2.2	100.0	93	V	58.96	36.18	Complies
5000.3600	30.27	---	6.9	299.0	194	V	58.96	28.69	Complies
12090.1160	35.50	---	7.9	228.0	264	H	58.96	23.46	Complies
16473.0480	41.03	---	12.7	350.0	98	H	58.96	17.93	Complies
17849.1160	---	30.67	15.0	146.0	115	V	49.46	18.79	Complies
17884.7600	44.02	---	15.0	122.0	330	V	58.96	14.94	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 14: 850 MHz Band + Wifi Colocation Results

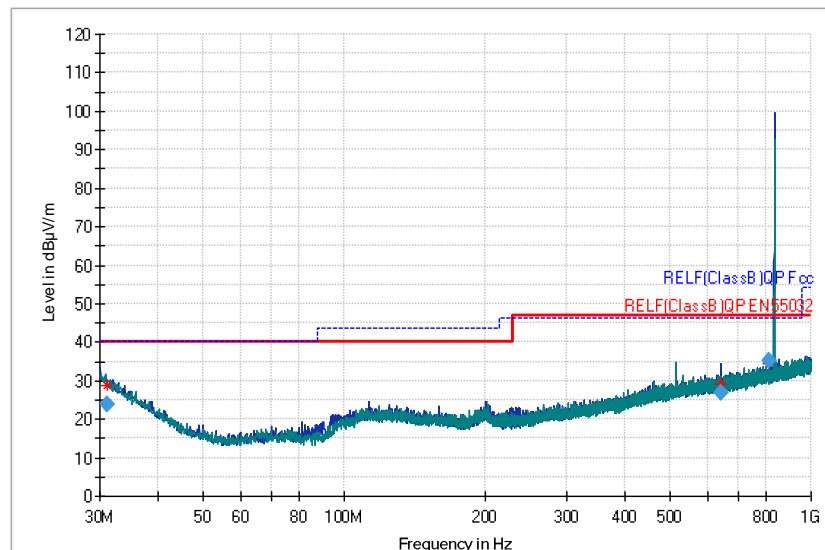


Figure 18: B5 and Wifi Radiated Emissions: 30 MHz - 1 GHz

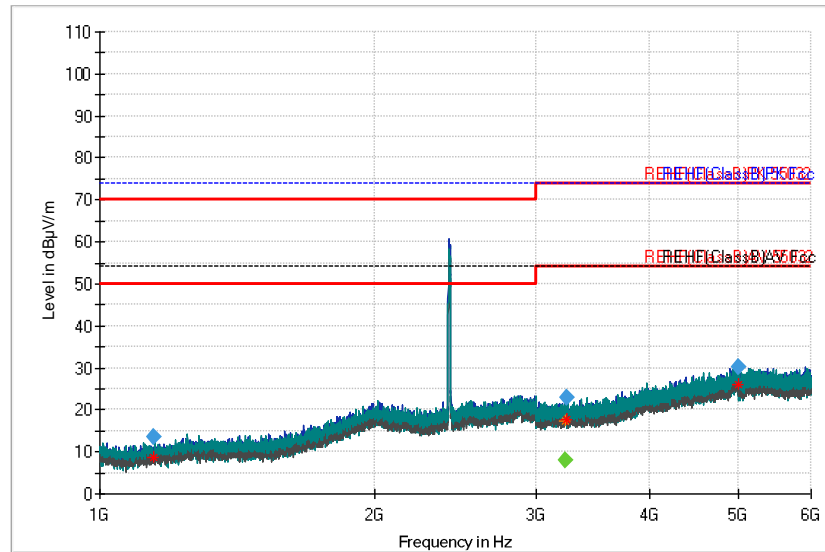


Figure 19: B5 and Wifi Radiated Emissions: 1 GHz - 6 GHz

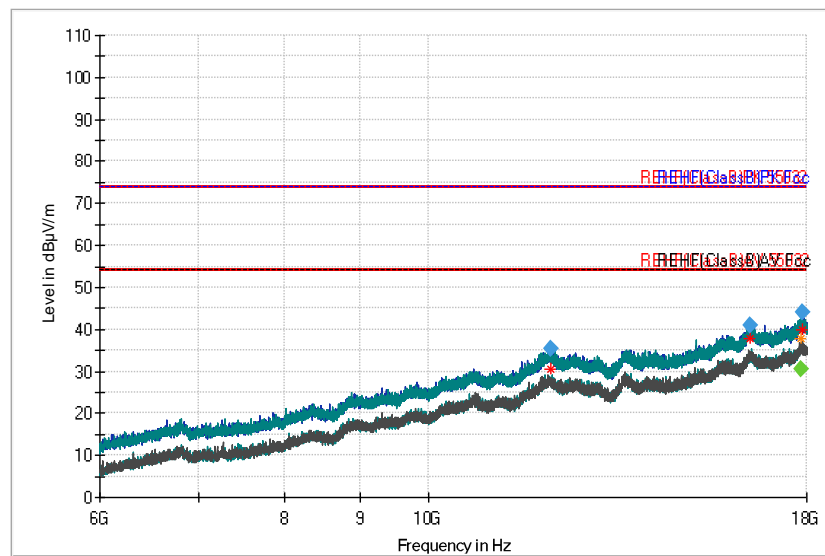
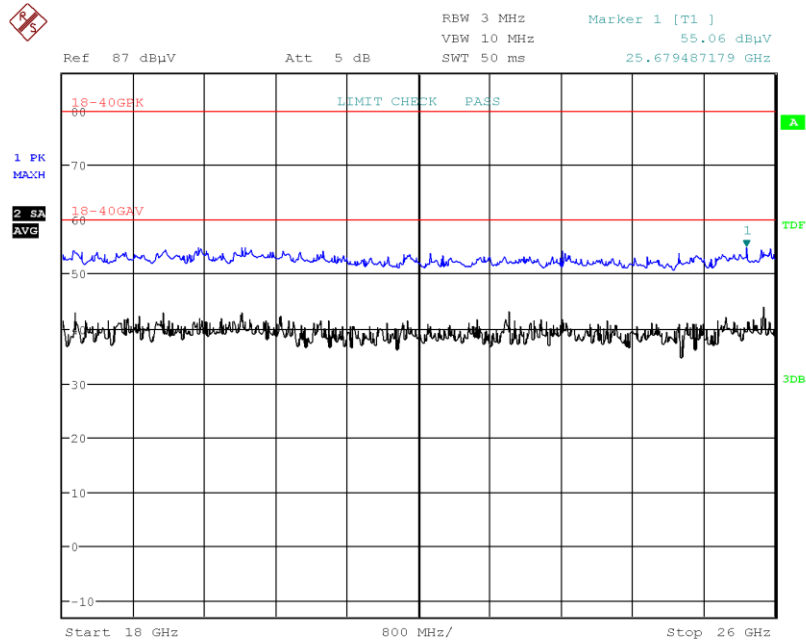


Figure 20: B5 and Wifi Radiated Emissions: 6 GHz - 18 GHz





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Figure 21: B5 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.6 900 MHz GSM Band (B8) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B8	880 MHz – 915 MHz	100.16 dBμV/m	90.16 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-132	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 15: 900 MHz GSM Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
31.2765	23.48	---	27.5	112.0	243	V	57.16	33.68	Complies
201.7384	16.57	---	20.6	247.0	162	H	57.16	40.59	Complies
875.8218	35.50	---	30.7	103.0	60	H	57.16	21.66	Complies
979.8960	27.87	---	32.0	225.0	57	V	57.16	29.29	Complies
2888.5200	26.15	---	1.4	399.0	138	H	57.16	31.01	Complies
4953.0640	30.67	---	6.9	399.0	168	H	57.16	26.49	Complies
4991.7280	31.38	---	6.9	100.0	131	H	57.16	25.78	Complies
6291.5640	15.70	---	-7.0	114.0	90	H	57.16	41.46	Complies
8092.9960	21.22	---	-3.4	300.0	201	V	57.16	35.94	Complies
9867.0720	27.68	---	1.9	179.0	281	V	57.16	29.48	Complies
17838.2600	---	30.66	15.0	295.0	269	H	47.16	16.5	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 16: 900 MHz GSM Band + Wifi Colocation Results

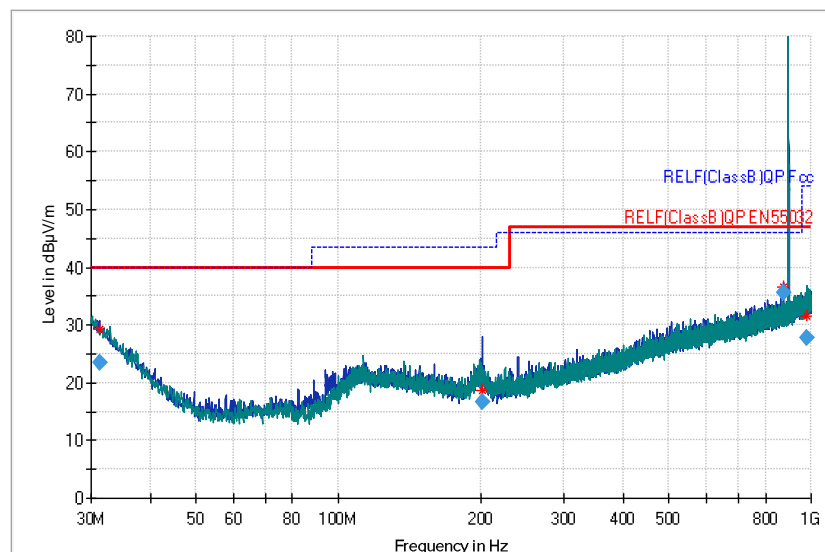


Figure 22: B8 and Wifi Radiated Emissions: 30 MHz - 1 GHz

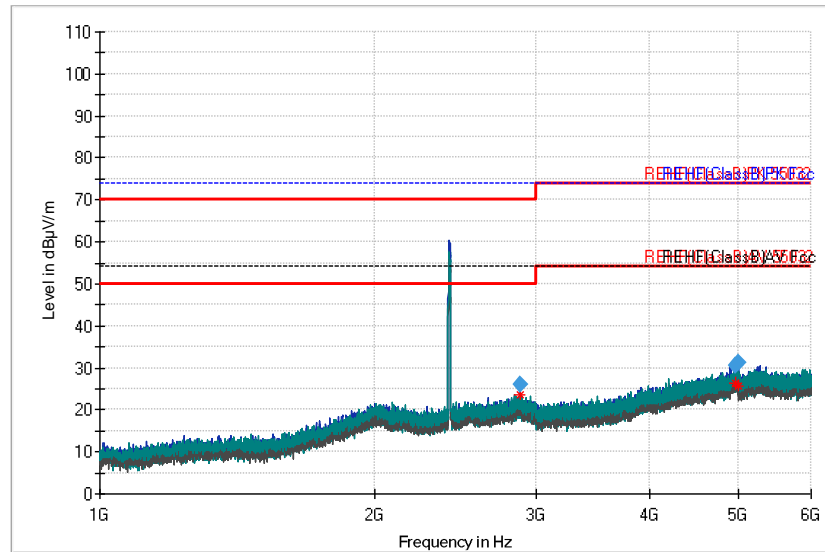


Figure 23: B8 and Wifi Radiated Emissions: 1 GHz - 6 GHz

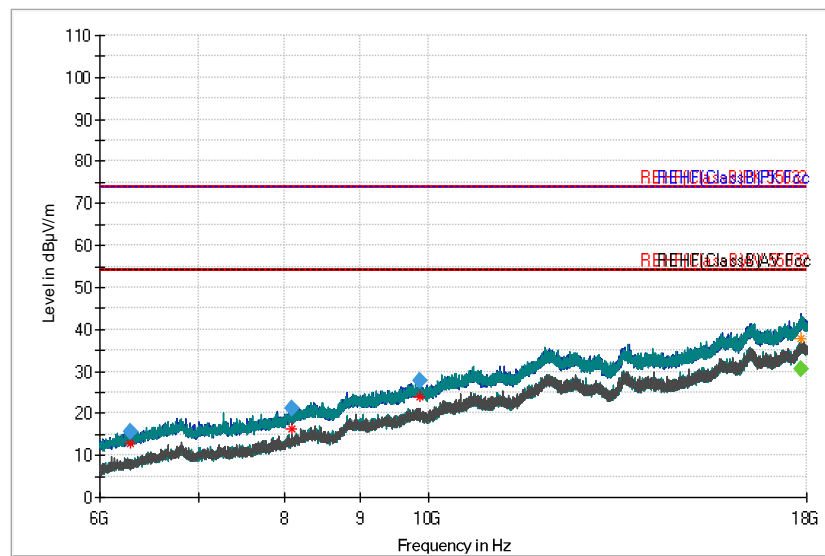
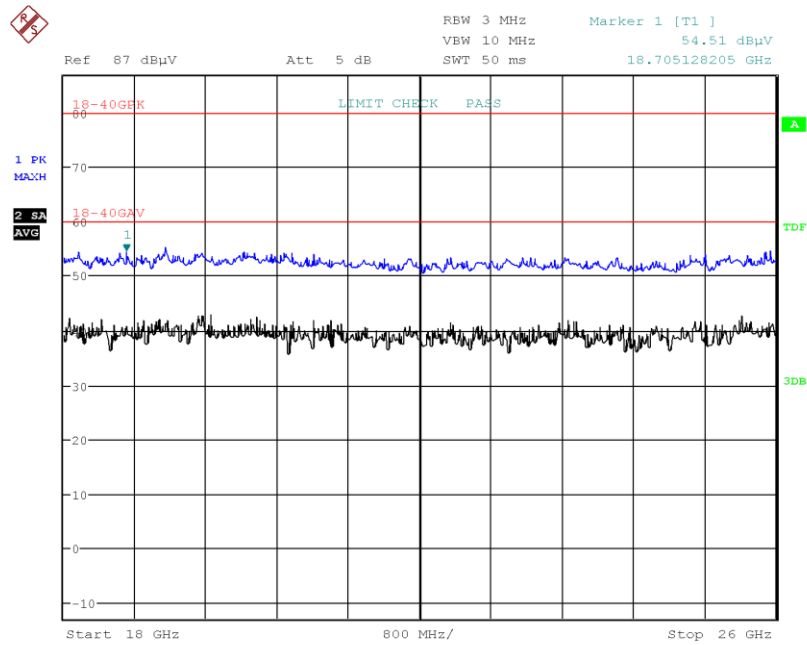


Figure 24: B8 and Wifi Radiated Emissions: 6 GHz - 18 GHz



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Figure 25: B8 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.7 700 a Band (B12) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B12	699 MHz – 716 MHz	109.66 dBμV/m	99.46 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-130	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 17: 700 a Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
30.4136	24.51	---	28.1	377.0	299	V	66.66	42.15	Complies
158.6456	13.72	---	19.9	130.0	191	H	66.66	52.94	Complies
653.9048	23.16	---	28.2	208.0	176	H	66.66	43.5	Complies
997.7798	28.23	---	32.3	111.0	180	V	66.66	38.43	Complies
1400.1080	---	-1.24	-5.5	100.0	153	H	56.46	57.7	Complies
1418.7480	15.48	---	-5.5	299.0	77	H	66.66	51.18	Complies
2702.9880	22.85	---	1.0	399.0	216	H	66.66	43.81	Complies
6508.0840	---	3.58	-6.6	286.0	113	H	56.46	52.88	Complies
7905.2920	---	7.12	-3.8	300.0	296	H	56.46	49.34	Complies
9303.8480	---	12.87	-0.2	229.0	191	V	56.46	43.59	Complies
9327.3920	26.28	---	-0.1	339.0	323	V	66.66	40.38	Complies
17868.0120	---	30.66	15.0	281.0	122	H	56.46	25.8	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 18: 700 a GSM Band + Wifi Colocation Results

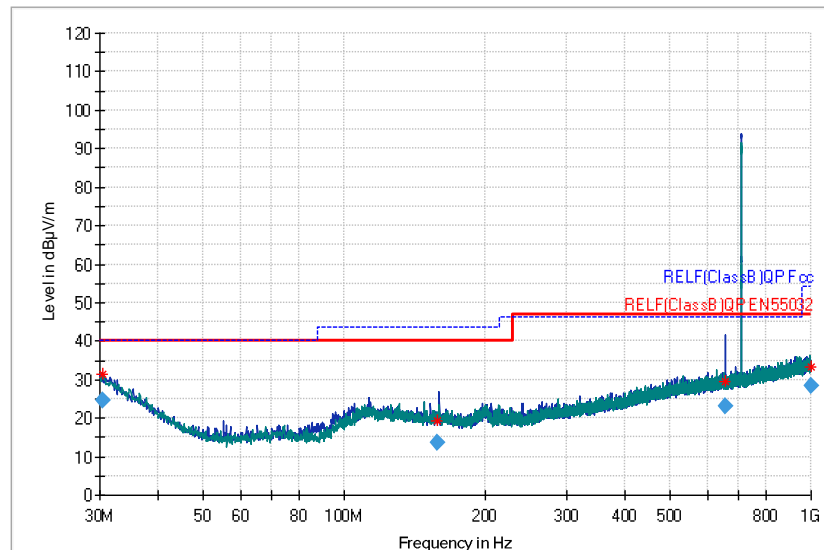


Figure 26: B12 and Wifi Radiated Emissions: 30 MHz - 1 GHz

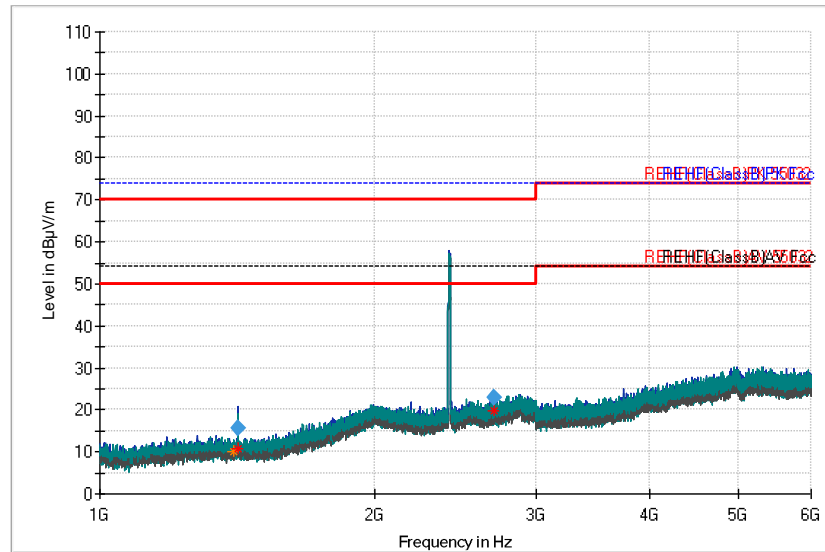


Figure 27: B12 and Wifi Radiated Emissions: 1 GHz - 6 GHz

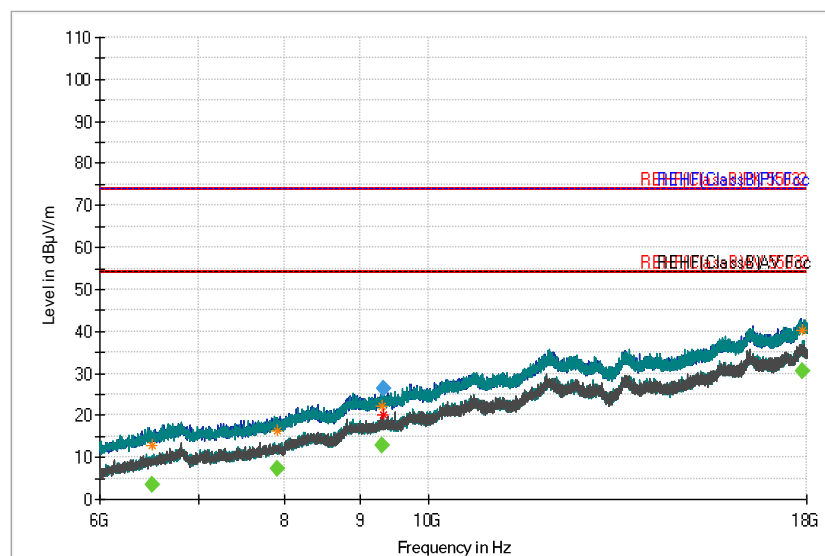


Figure 28: B12 and Wifi Radiated Emissions: 6 GHz - 18 GHz

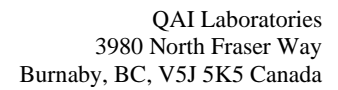


Figure 29: B12 and Wifi Radiated Emissions: 18 GHz - 26 GHz



### 3.1.8 700 c Band (B13) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Minimum Attenuation
		Peak	Average		
B13	777 MHz – 787 MHz	101.36 dBμV/m	90.86 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-130	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 19: 700 c Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
30.5801	24.19	---	28.0	272.0	189	H	58.36	34.17	Complies
480.0332	25.58	---	25.6	112.0	189	H	58.36	32.78	Complies
600.9029	22.87	---	27.3	275.0	72	H	58.36	35.49	Complies
720.7958	23.64	---	29.0	355.0	157	H	58.36	34.72	Complies
981.2118	27.88	---	32.0	332.0	152	V	58.36	30.48	Complies
1557.2280	---	2.60	-4.9	299.0	122	V	47.86	45.26	Complies
1562.1440	15.25	---	-4.9	100.0	147	H	58.36	43.11	Complies
1565.8960	15.32	---	-4.8	299.0	122	V	58.36	43.04	Complies
2891.2080	25.13	---	1.4	100.0	231	H	58.36	33.23	Complies
2902.0400	24.84	---	1.4	399.0	25	V	58.36	33.52	Complies
4760.9760	29.51	---	7.1	300.0	69	H	58.36	28.85	Complies
6454.9520	---	3.32	-6.6	218.0	112	V	47.86	44.54	Complies
6612.8680	17.43	---	-6.3	281.0	176	V	58.36	40.93	Complies
8047.3800	20.84	---	-3.5	258.0	300	V	58.36	37.52	Complies
9528.0000	25.63	---	0.6	371.0	254	H	58.36	32.73	Complies
15956.5760	---	26.02	12.0	176.0	17	H	47.86	21.84	Complies
17888.3400	---	30.57	15.0	338.0	290	V	47.86	17.29	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 20: 700 c Band + Wifi Collocation Results

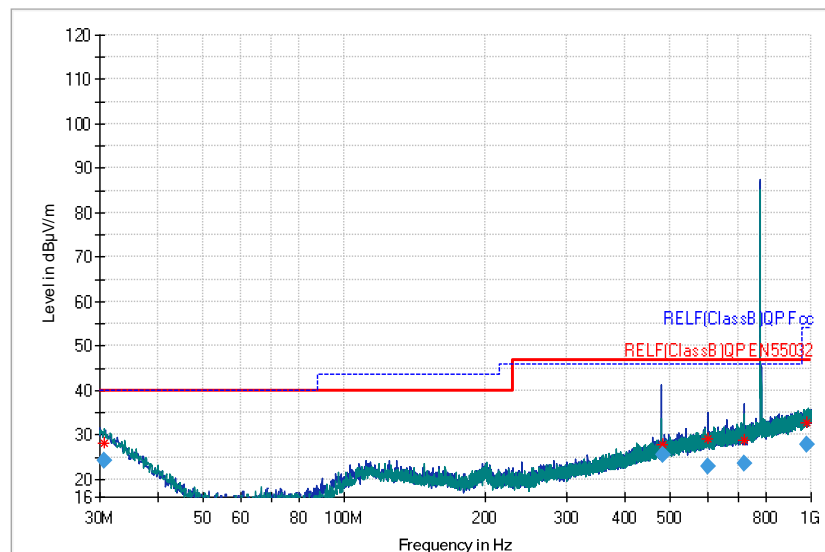


Figure 30: B13 and Wifi Radiated Emissions: 30 MHz - 1 GHz

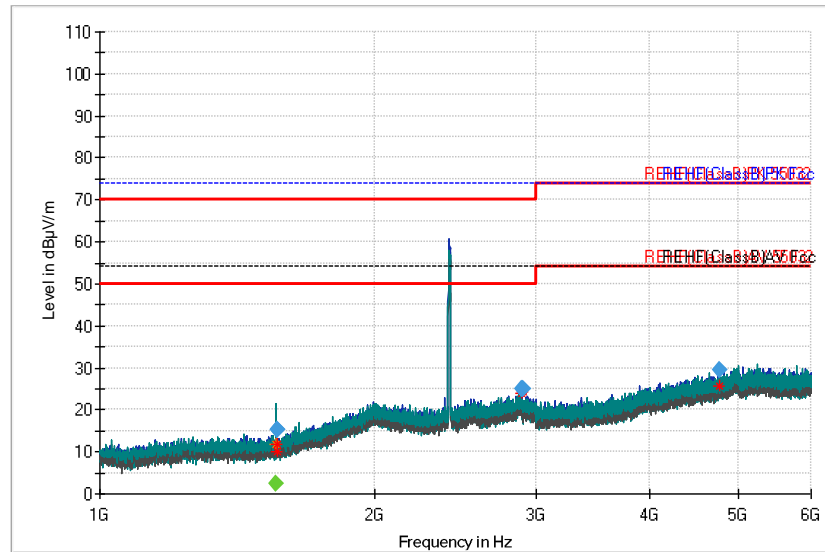


Figure 31: B13 and Wifi Radiated Emissions: 1 GHz - 6 GHz

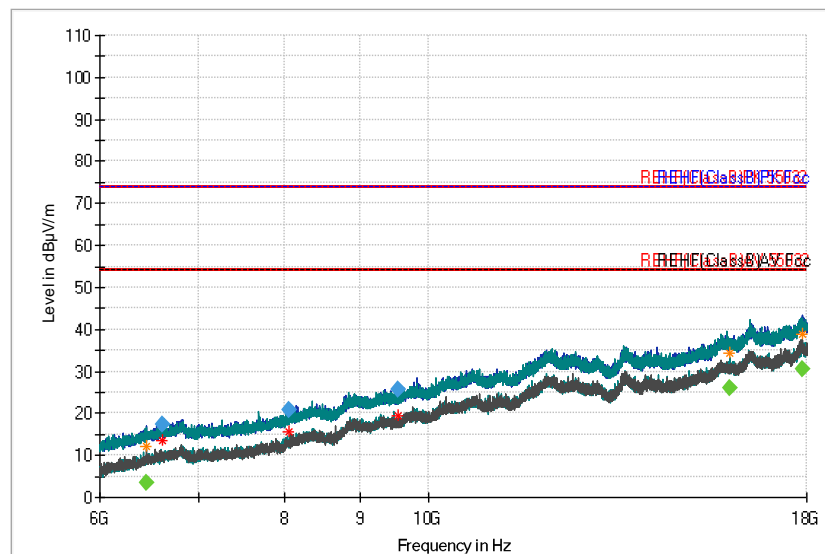


Figure 32: B13 and Wifi Radiated Emissions: 6 GHz - 18 GHz

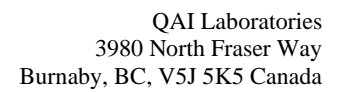


Figure 33: B13 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.9 1900 + Band (B25) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B25	1850 MHz – 1915 MHz	136.20 dBμV/m	126.30 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-133	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 21: 1900 + Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
30.2904	24.44	---	28.2	318.0	334	H	86.6	62.16	Complies
159.9963	25.10	---	19.9	250.0	349	V	86.6	61.5	Complies
206.1585	14.56	---	18.8	103.0	195	H	86.6	72.04	Complies
997.0241	28.17	---	32.3	114.0	119	V	86.6	58.43	Complies
1724.4440	---	15.81	-3.2	149.0	342	H	83.3	67.49	Complies
2713.9520	23.30	---	1.0	199.0	288	H	86.6	63.3	Complies
4894.5920	29.87	---	6.9	150.0	25	H	86.6	56.73	Complies
7608.3560	13.56	---	-4.3	296.0	41	V	86.6	73.04	Complies
10726.7240	24.96	---	4.4	368.0	45	V	86.6	61.64	Complies
16475.5480	35.93	---	12.8	260.0	153	H	86.6	50.67	Complies
17857.0520	---	39.01	15.0	279.0	248	H	83.3	44.29	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 22: 1900 + Band + Wifi Colocation Results

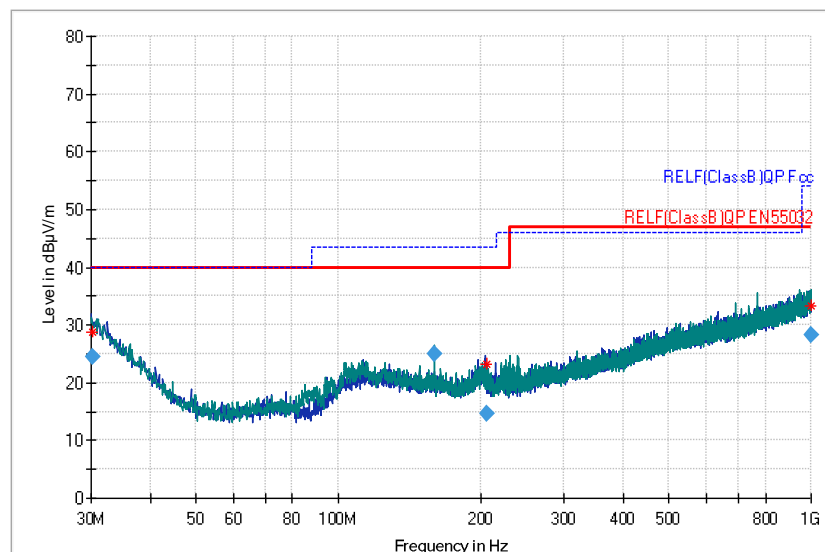


Figure 34: B25 and Wifi Radiated Emissions: 30 MHz - 1 GHz

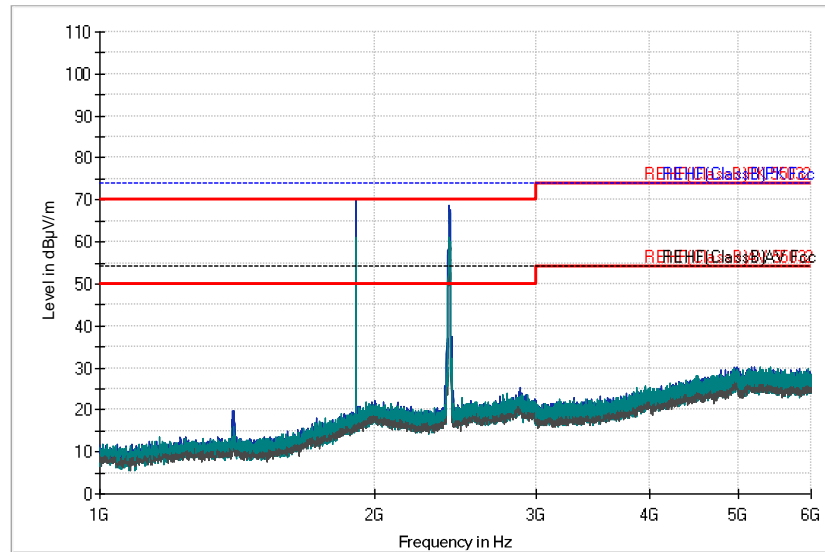


Figure 35: B25 and Wifi Radiated Emissions: 1 GHz - 6 GHz

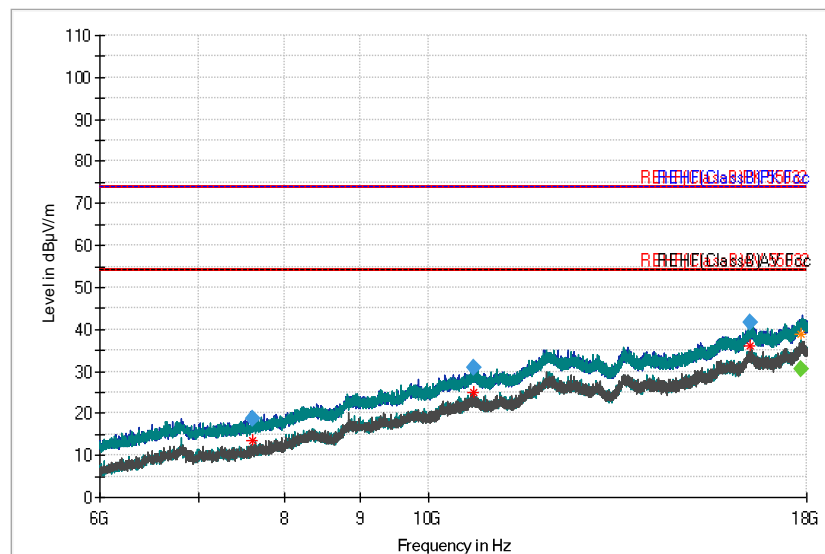
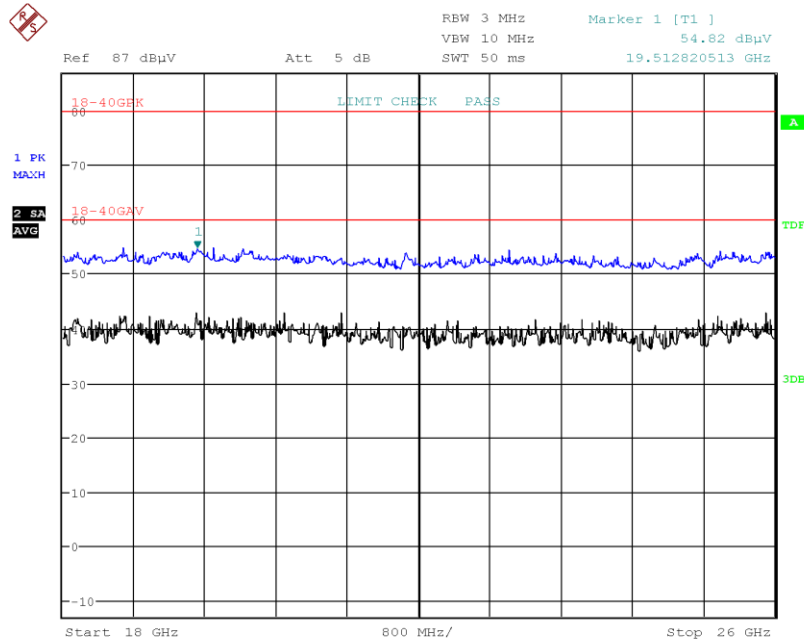


Figure 36: B25 and Wifi Radiated Emissions: 6 GHz - 18 GHz



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Figure 37: B25 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.10 850 + Band (B26) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B26	814 MHz – 849 MHz	102.36 dBμV/m	92.86 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-132	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 23: 850 + Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
595.1881	31.77	---	27.3	100.0	41	V	59.36	27.59	Complies
637.5604	23.03	---	28.3	185.0	323	H	59.36	36.33	Complies
764.1429	24.84	---	29.7	179.0	41	H	59.36	34.52	Complies
808.3085	25.56	---	30.3	221.0	131	H	59.36	33.8	Complies
810.8145	43.11	---	30.4	108.0	29	H	59.36	16.25	Complies
849.2135	38.13	---	30.4	105.0	37	H	59.36	21.23	Complies
2022.3600	23.71	---	1.4	249.0	312	H	59.36	35.65	Complies
4058.8200	26.58	---	4.9	199.0	194	V	59.36	32.78	Complies
4989.1200	---	17.40	6.9	249.0	349	V	49.86	32.46	Complies
6871.5800	18.17	---	-5.9	103.0	317	V	59.36	41.19	Complies
11965.7760	34.15	---	8.1	153.0	147	H	59.36	25.21	Complies
13544.9960	35.18	---	7.0	114.0	0	H	59.36	24.18	Complies
16452.8360	41.11	---	12.6	205.0	220	H	59.36	18.25	Complies
17956.4080	---	30.17	15.1	400.0	296	H	49.86	19.69	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 24: 850 + Band + Wifi Colocation Results

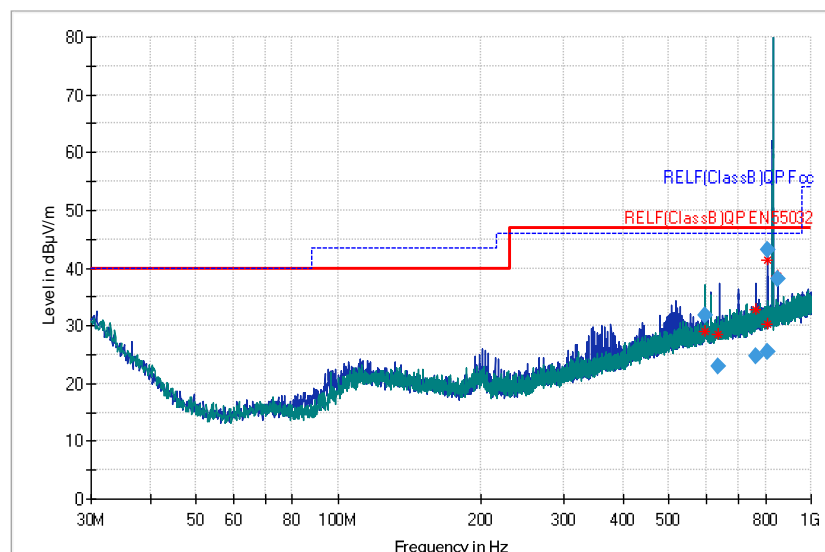


Figure 38: B26 and Wifi Radiated Emissions: 30 MHz - 1 GHz

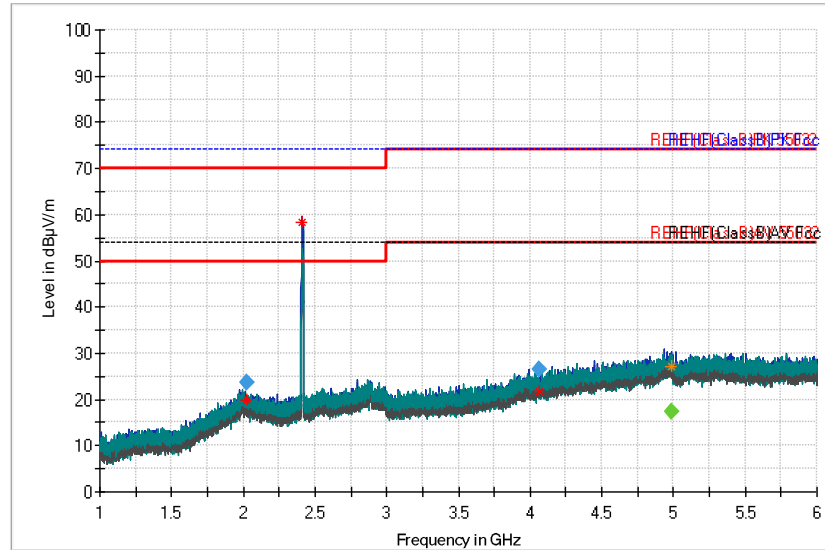


Figure 39: B26 and Wifi Radiated Emissions: 1 GHz - 6 GHz

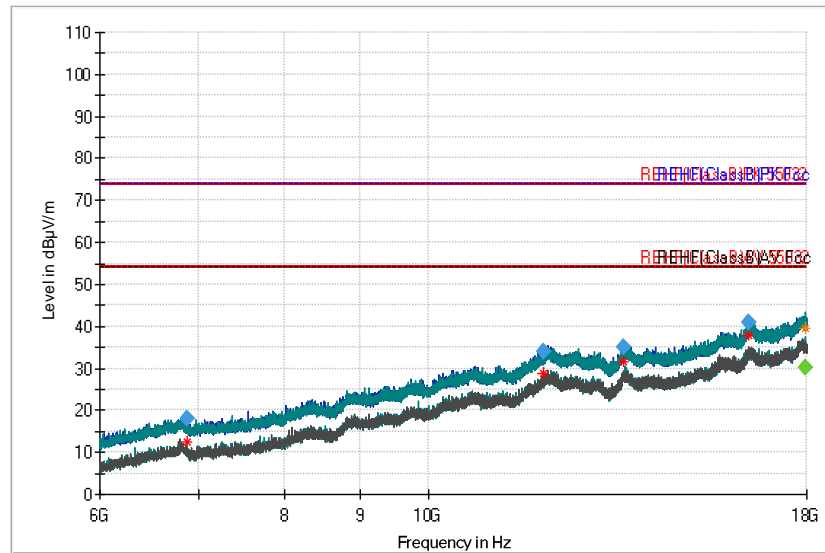
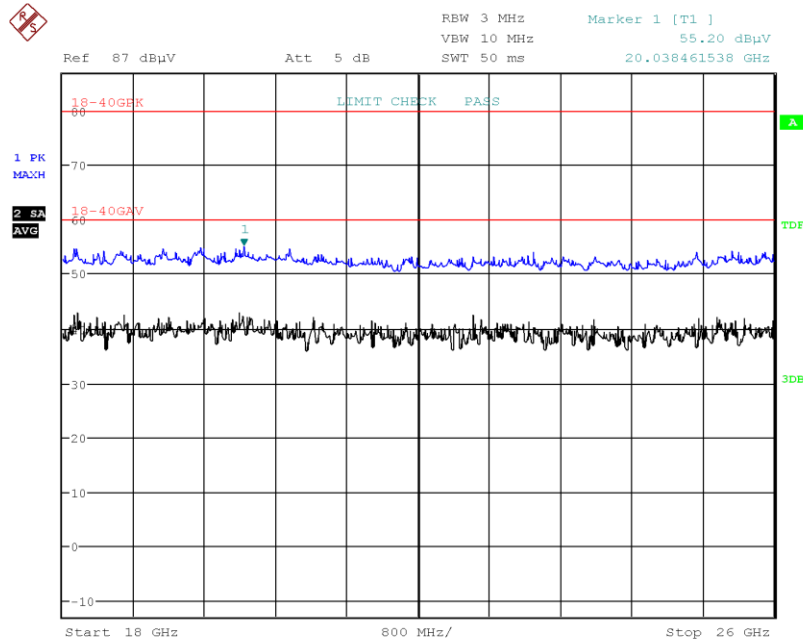


Figure 40: B26 and Wifi Radiated Emissions: 6 GHz - 18 GHz





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Figure 41: B26 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.11 850 SMR Band (B27) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B27	807 MHz – 824 MHz	104.46 dBμV/m	95.66 dBμV/m	FCC 47 CFR 22.917 FCC 47 CFR 24.238 FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43 10log <sub>10</sub> (P) - 43 10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247 RSS-247	P <sub>transmit</sub> – 20 dB P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 25: 850 SMR Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
30.2270	24.48	---	28.3	143.0	236	H	61.46	36.98	Complies
116.0649	14.83	---	20.7	337.0	147	H	61.46	46.63	Complies
989.0797	28.34	---	32.3	100.0	64	V	61.46	33.12	Complies
1749.7760	---	2.25	-2.9	149.0	35	V	52.66	50.41	Complies
2451.8800	---	6.47	0.3	149.0	206	V	52.66	46.19	Complies
4948.3040	---	17.37	6.9	149.0	0	H	52.66	35.29	Complies
5942.8680	31.02	---	8.4	249.0	294	H	61.46	30.44	Complies
6390.2640	16.63	---	-6.8	293.0	15	V	61.46	44.83	Complies
7888.4880	---	7.24	-3.8	179.0	114	H	52.66	45.42	Complies
9647.5600	26.52	---	1.0	195.0	261	V	61.46	34.94	Complies
10990.4240	30.13	---	4.5	146.0	180	V	61.46	31.33	Complies
17894.9600	---	30.52	15.0	400.0	33	V	52.66	22.14	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 26: 850 SMR Band + Wifi Colocation Results

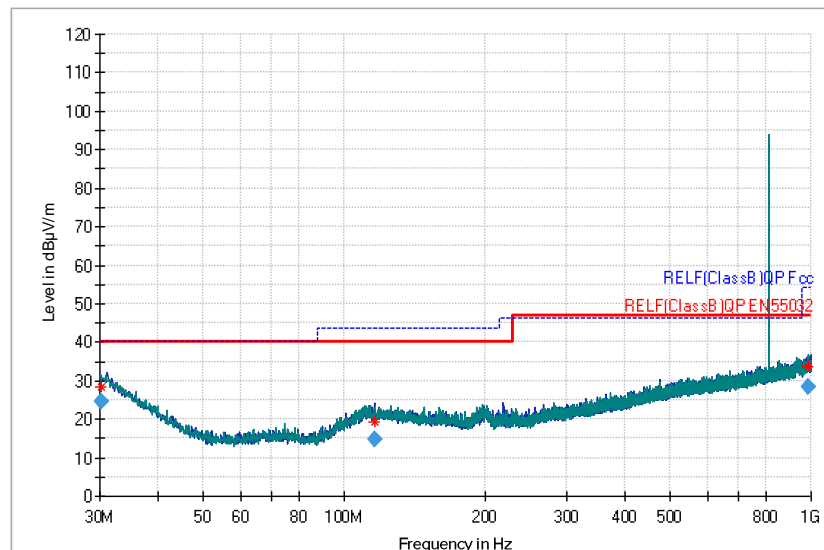


Figure 42: B27 and Wifi Radiated Emissions: 30 MHz - 1 GHz

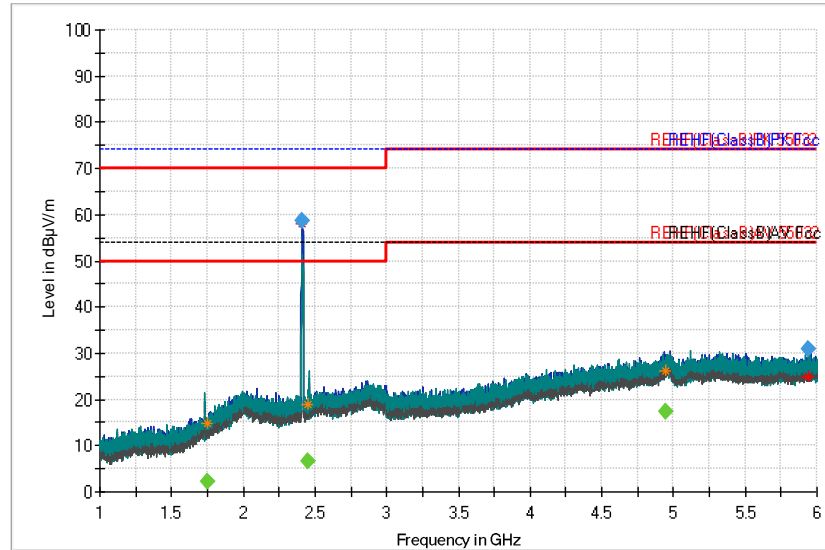


Figure 43: B27 and Wifi Radiated Emissions: 1 GHz - 6 GHz

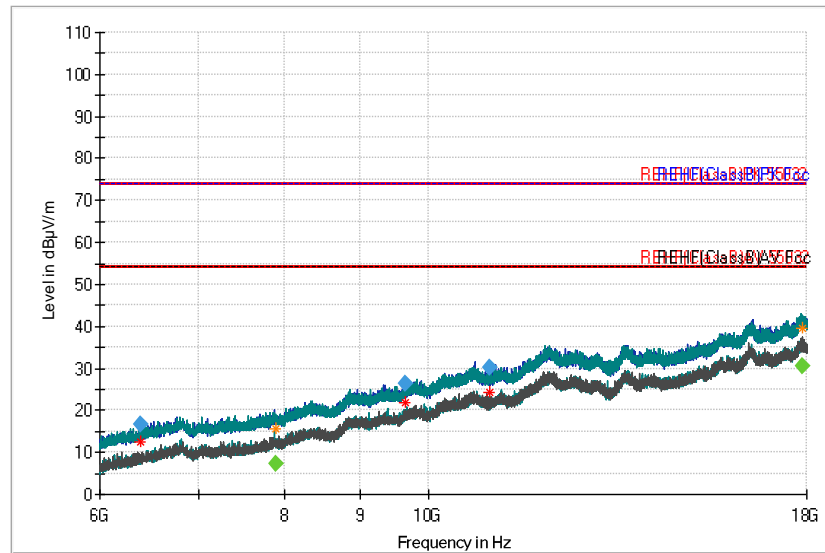


Figure 44: B27 and Wifi Radiated Emissions: 6 GHz - 18 GHz

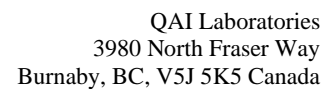


Figure 45: B27 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.12 600 MHz Band (B71) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B71	663 MHz – 698 MHz	101.16 dBμV/m	92.46 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-130	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 27: 600 MHz Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
30.0000	24.92	---	28.5	175.0	0	H	58.16	33.24	Complies
656.6061	39.78	---	28.2	182.0	229	V	58.16	18.38	Complies
695.0066	35.28	---	28.7	100.0	97	H	58.16	22.88	Complies
971.1365	27.39	---	31.9	103.0	331	V	58.16	30.77	Complies
2892.6960	26.18	---	1.4	299.0	0	V	58.16	31.98	Complies
4955.1760	31.30	---	6.9	149.0	42	V	58.16	26.86	Complies
5983.4192	30.29	---	8.4	150.0	0	H	58.16	27.87	Complies
6814.6200	19.28	---	-6.0	140.0	322	H	58.16	38.88	Complies
12055.4120	35.70	---	8.1	350.0	178	H	58.16	22.46	Complies
16483.2120	41.16	---	12.8	103.0	213	H	58.16	17	Complies
17859.2160	---	30.65	15.0	175.0	146	V	49.46	18.81	Complies
17861.7720	43.22	---	15.0	265.0	273	H	58.16	14.94	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 28: 600 MHz Band + Wifi Colocation Results

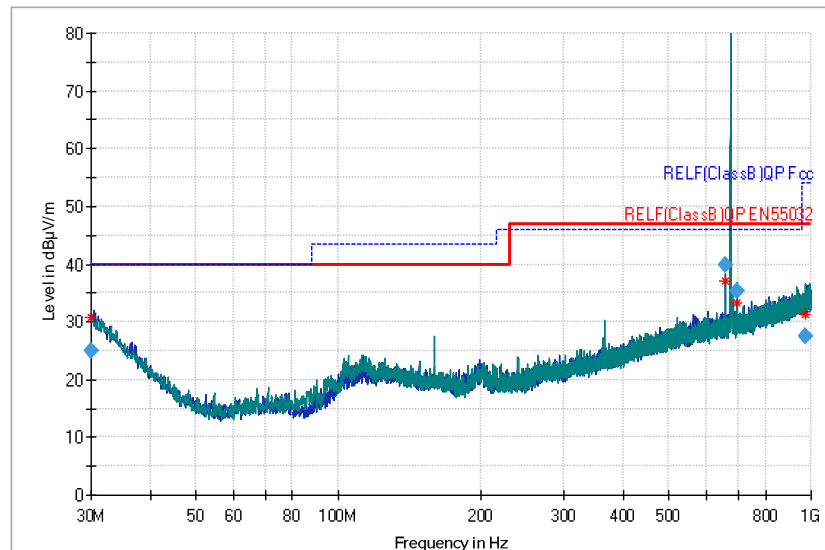


Figure 46: B71 and Wifi Radiated Emissions: 30 MHz - 1 GHz

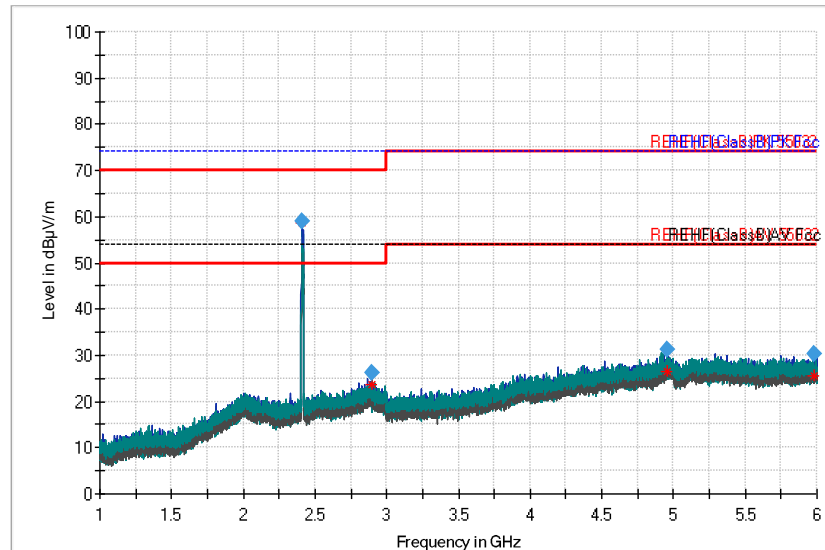


Figure 47: B71 and Wifi Radiated Emissions: 1 GHz - 6 GHz

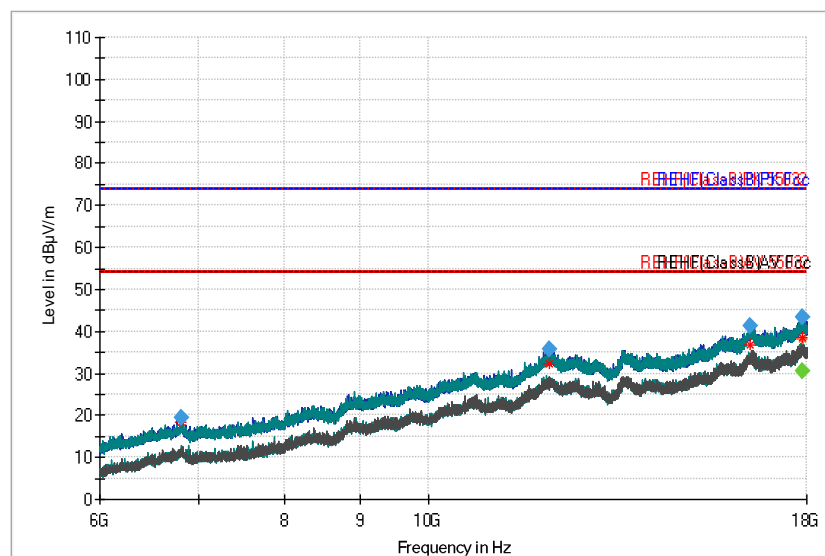
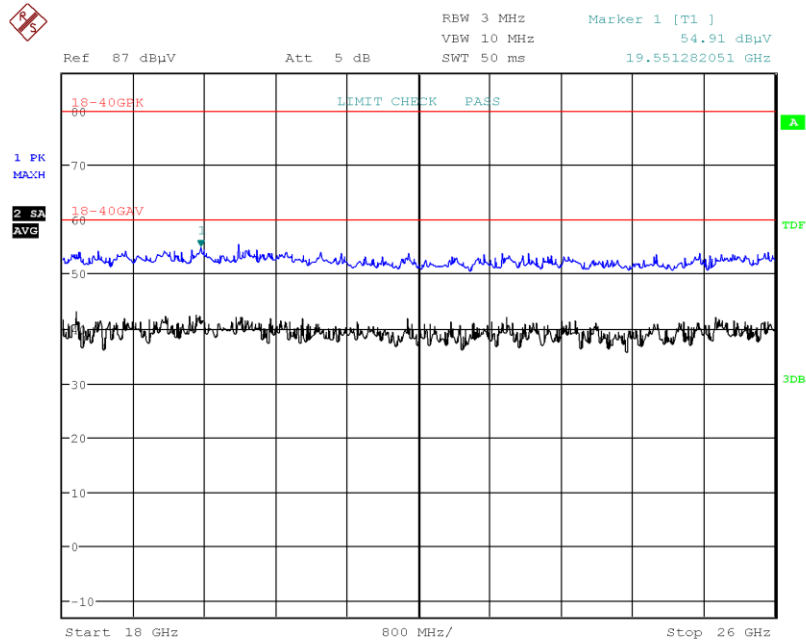


Figure 48: B71 and Wifi Radiated Emissions: 6 GHz - 18 GHz

Note: Emission at 2.412 GHz is the intentionally transmitted wifi signal.



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Figure 49: B71 and Wifi Radiated Emissions: 18 GHz - 26 GHz

### 3.1.13 700 a+ Band (B85) and Wifi

Signal	UL Frequency Range	Radiated Output Power <sup>1</sup>		Applicable Standard	Spurious Emissions Limit
		Peak	Average		
B85	698 MHz – 716 MHz	103.36 dBμV/m	94.26 dBμV/m	FCC 47 CFR 22.917	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 24.238	10log <sub>10</sub> (P) - 43
				FCC 47 CFR 27.53	10log <sub>10</sub> (P) - 43
				RSS-130	10log <sub>10</sub> (P) - 43
2.4 GHz Wifi 802.11 g	2401 MHz – 2483 MHz	106.6 dBμV/m	106.1 dBμV/m	FCC 47 CFR 15.247	P <sub>transmit</sub> – 20 dB
				RSS-247	P <sub>transmit</sub> – 20 dB

<sup>1</sup> Output power measured at 3m

Table 29: 700 a+ Band + Wifi Emissions Limits

Frequency (MHz)	Peak <sup>2</sup> (dBuV/m)	Average (dBuV/m)	Correction Factor (dB/m)	Height (cm)	Azimuth (°)	Pol	Limit <sup>1</sup> (dBuV/m)	Margin (dB)	Result
541.6192	21.46	---	26.5	225.0	173	V	60.36	38.9	Complies
614.4149	37.77	---	27.6	192.0	215	H	60.36	22.59	Complies
652.5912	31.36	---	28.2	115.0	287	V	60.36	29	Complies
687.8151	39.28	---	28.5	103.0	133	V	60.36	21.08	Complies
726.2175	39.73	---	29.0	100.0	73	V	60.36	20.63	Complies
3528.8480	23.65	---	3.1	200.0	0	H	60.36	36.71	Complies
4966.6720	---	17.41	6.9	200.0	131	H	51.26	33.85	Complies
6812.1800	19.17	---	-6.0	212.0	194	H	60.36	41.19	Complies
13581.1080	35.91	---	6.9	103.0	231	V	60.36	24.45	Complies
16483.5400	41.58	---	12.8	267.0	43	H	60.36	18.78	Complies
17904.3240	---	30.47	15.1	195.0	345	V	51.26	20.79	Complies
17923.3800	43.64	---	15.1	373.0	57	H	60.36	16.72	Complies

<sup>1</sup> Tightest limit from Table 5 applied.

<sup>2</sup> Measurements from 30 MHz to 1 GHz are based on use of quasi-peak detector, measurements above 1 GHz are based on use of peak detector.

Table 30: 700 a+ Band + Wifi Colocation Results

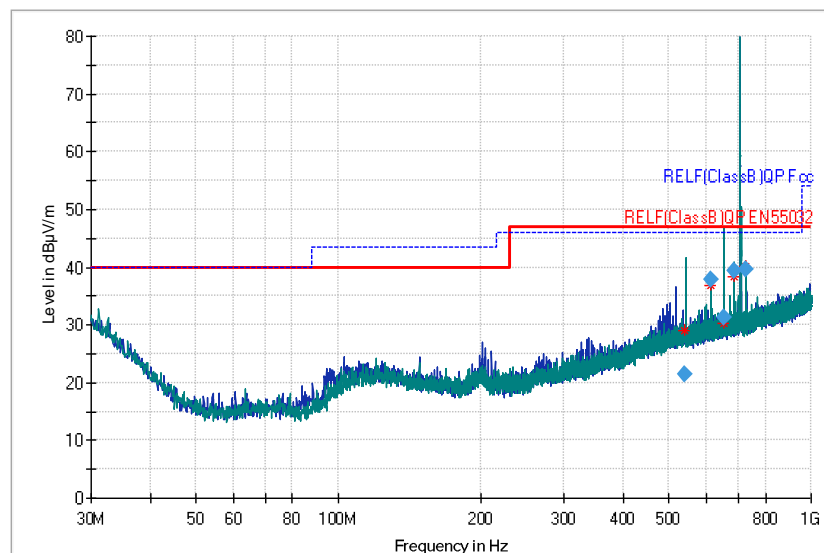


Figure 50: B85 and Wifi Radiated Emissions: 30 MHz - 1 GHz



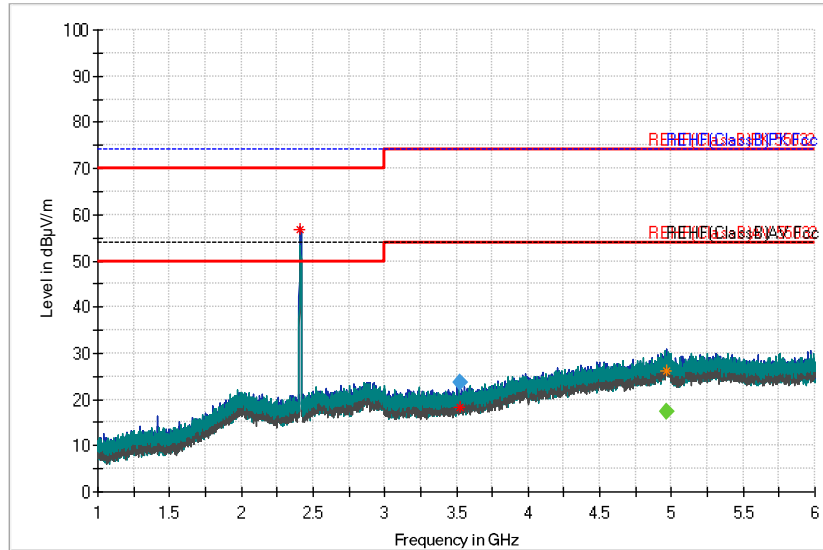


Figure 51: B85 and Wifi Radiated Emissions: 1 GHz - 6 GHz

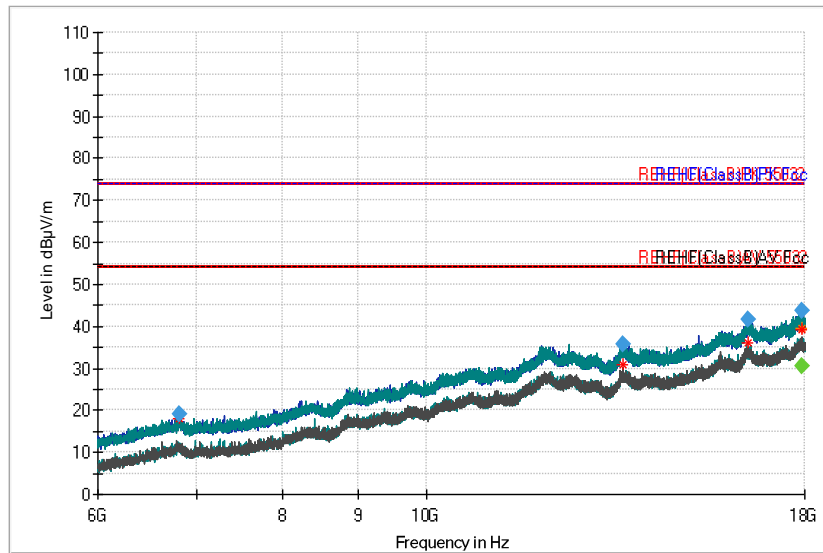
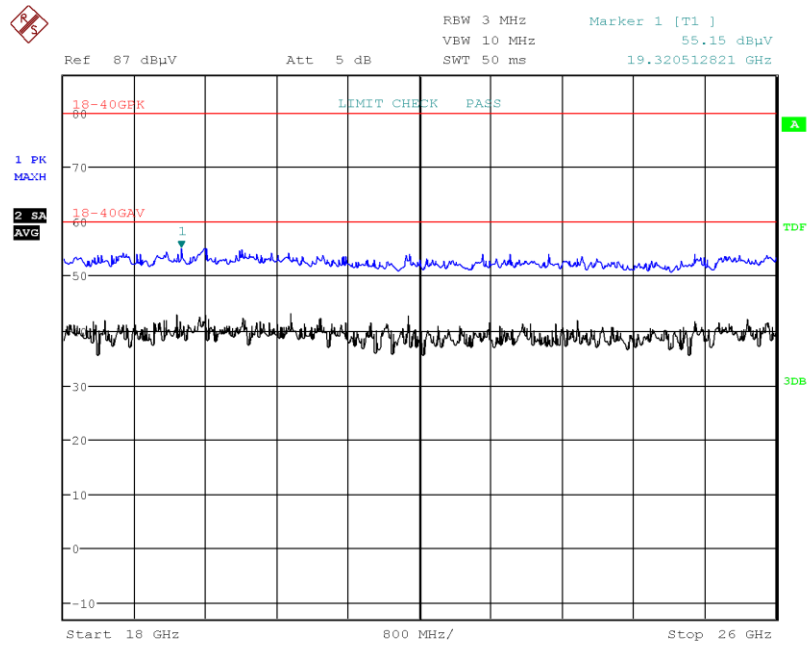


Figure 52: B85 and Wifi Radiated Emissions: 6 GHz - 18 GHz



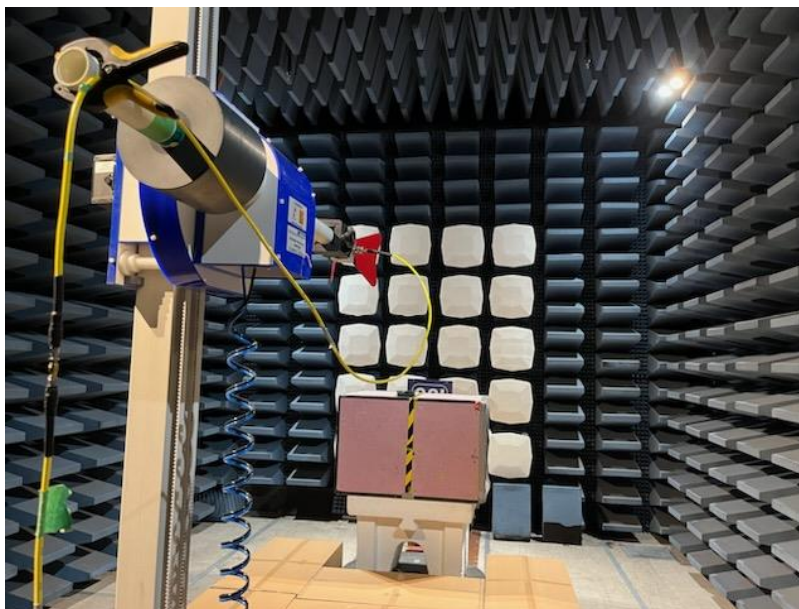
Date: 9.JUN.2023 16:10:12

Figure 53: B85 and Wifi Radiated Emissions: 18 GHz - 26 GHz

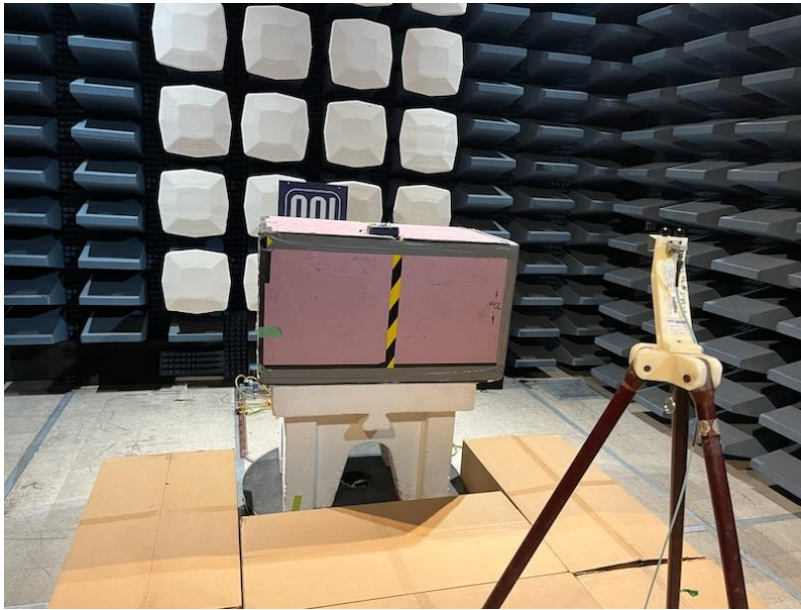
## Appendix A: SETUP PHOTOS



*Figure 54: Radiated Emissions, Below 1 GHz*



*Figure 55: Radiated Emissions, 1 GHz - 18 GHz*



*Figure 56: Radiated Emissions, Above 18 GHz*



## Appendix B: ABBREVIATIONS

Abbreviation	Definition
AC	Alternating Current
AM	Amplitude Modulation
CE	European Conformity
CISPR	Comité International Spécial des Perturbations Radioélectriques (International Special Committee on Radio Interference)
DC	Direct Current
EFT	Electrical Fast Transient
EMC	Electro Magnetic Compatibility
EMI	Electro Magnetic Interference
ESD	Electrostatic Discharge
EUT	Equipment Under Test
FCC	Federal Communications Commission
FVIN	Firmware Version Identification Number FVIN
IC	Industry Canada
ICES	Interference Causing Equipment Standard
IEC	International Electrotechnical Commission
LISN	Line Impedance Stabilizing Network
OATS	Open Area Test Site
RF	Radio Frequency
RMS	Root-Mean-Square
SAC	Semi-Anechoic Chamber

**END OF REPORT**