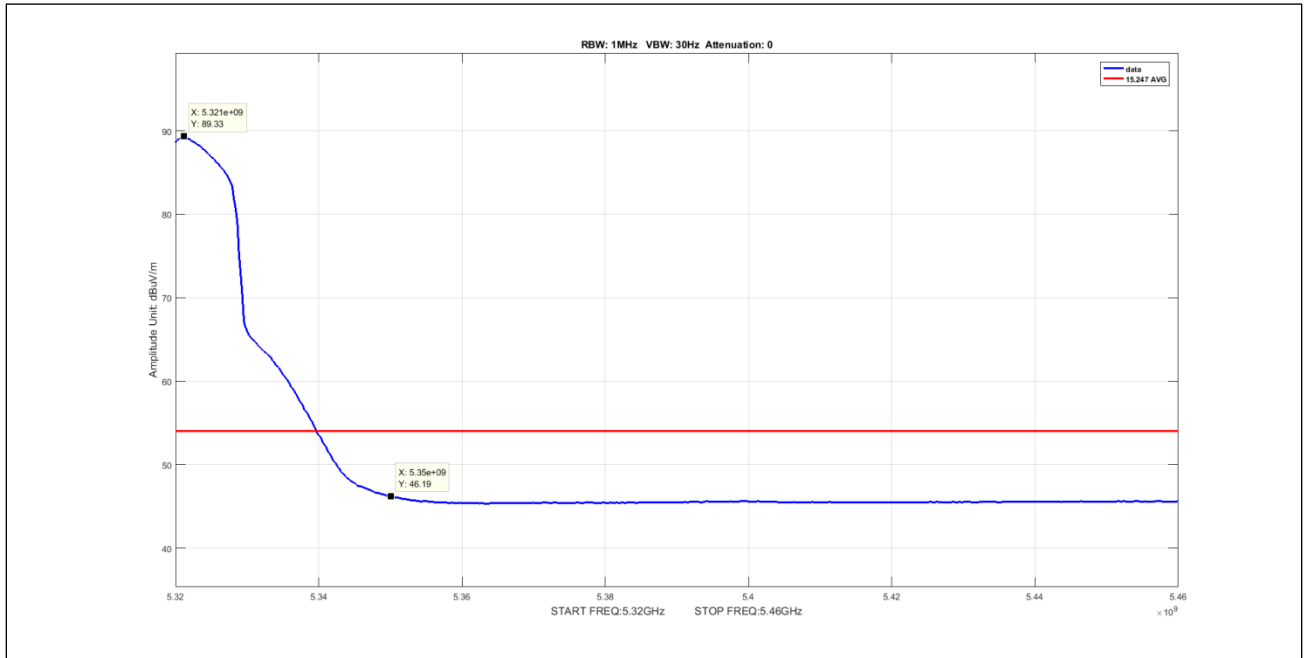
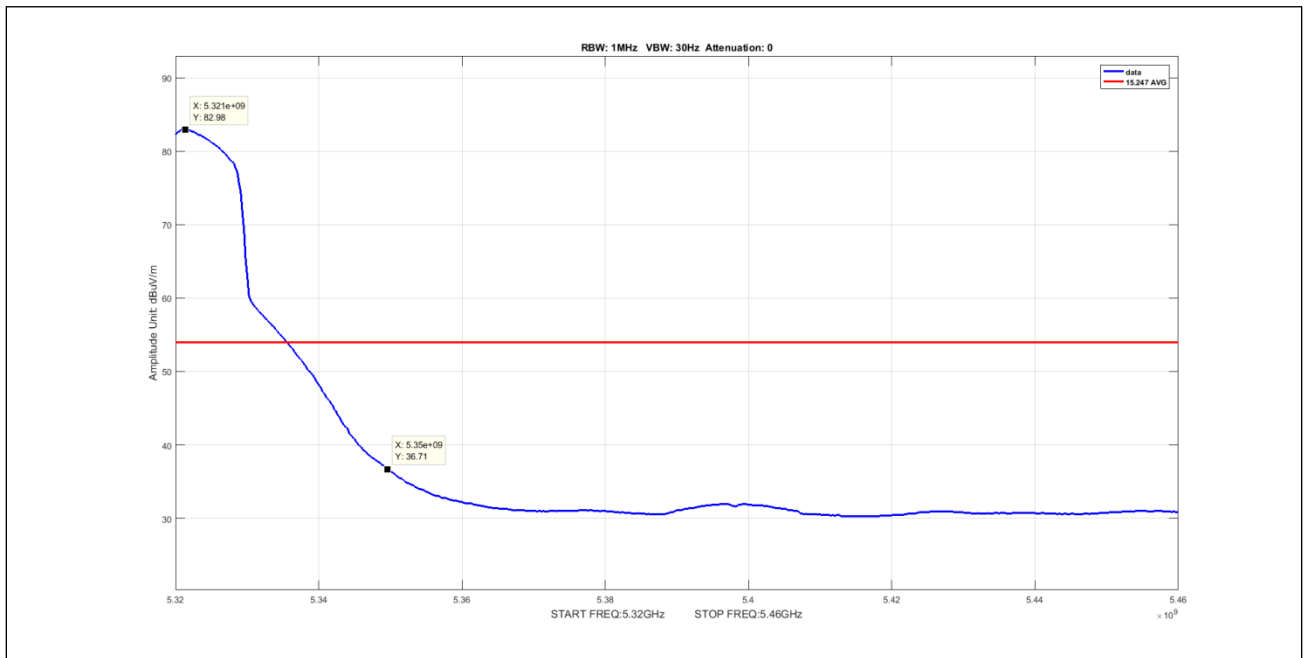


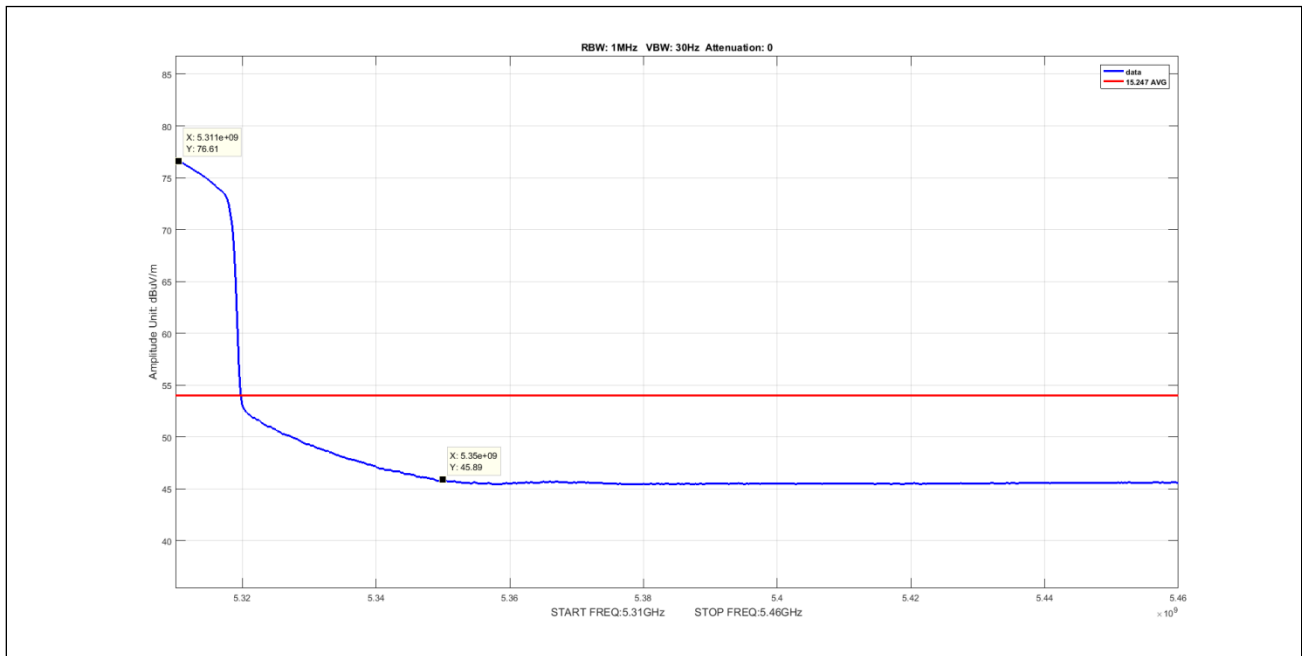
## Radiated Band Edge



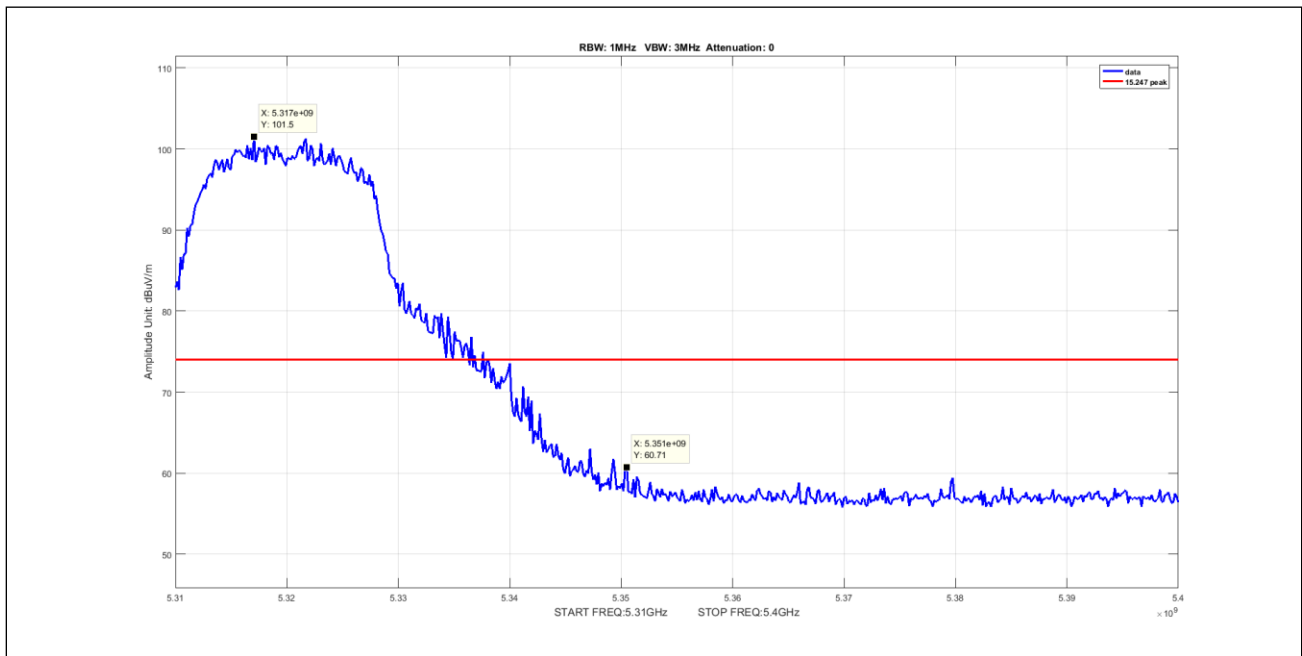
**Plot 111. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5320M, A Mode Port 1**



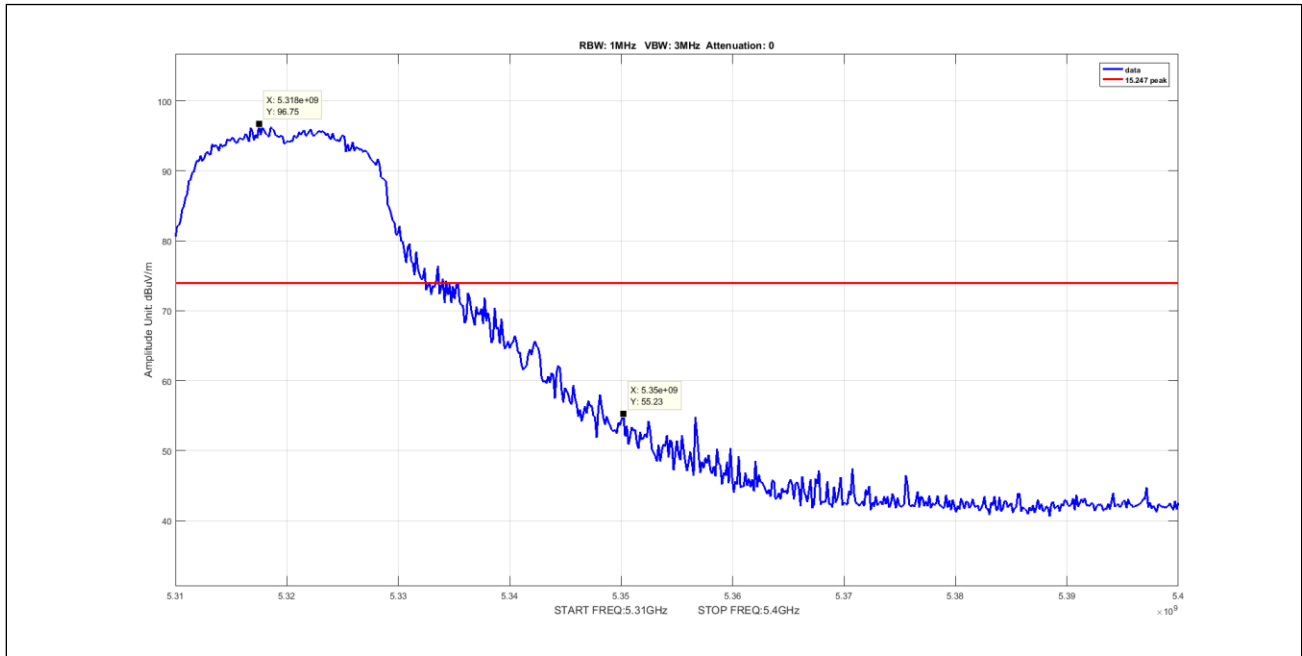
**Plot 112. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5320M, N Mode Port 1**



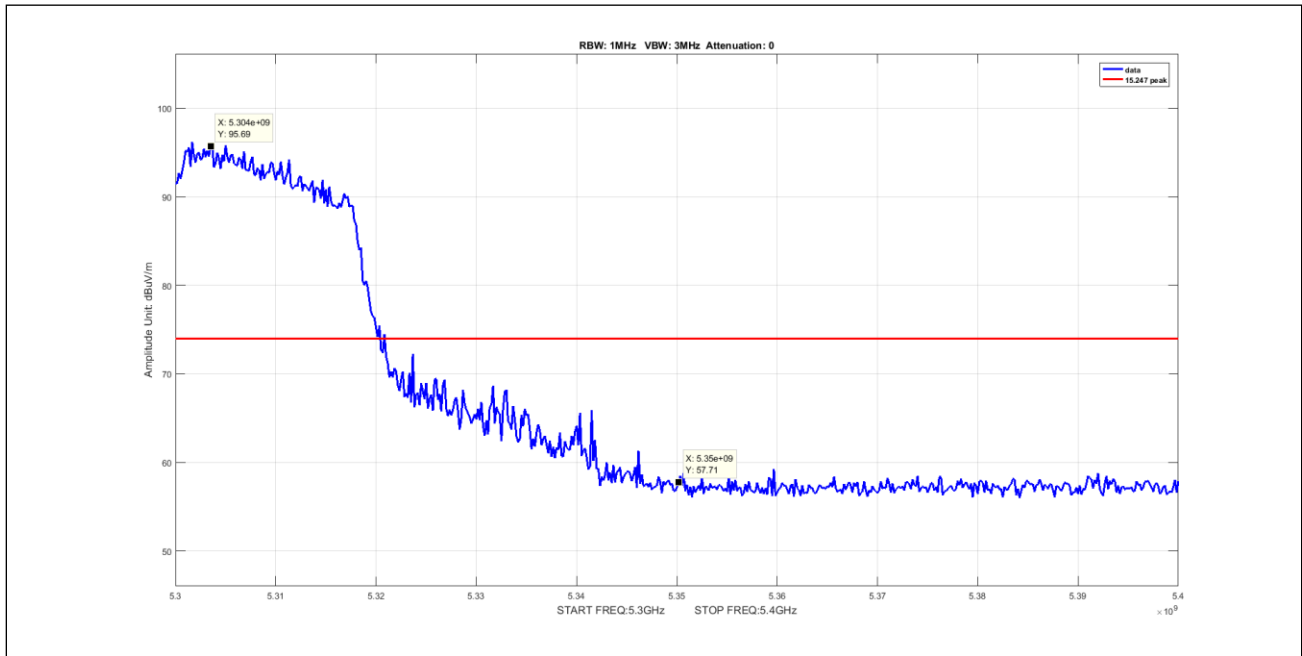
**Plot 113. Undesirable Emissions, Average Band Edge Spurious, BW 40M, Ch 5310M, N Mode Port 1**



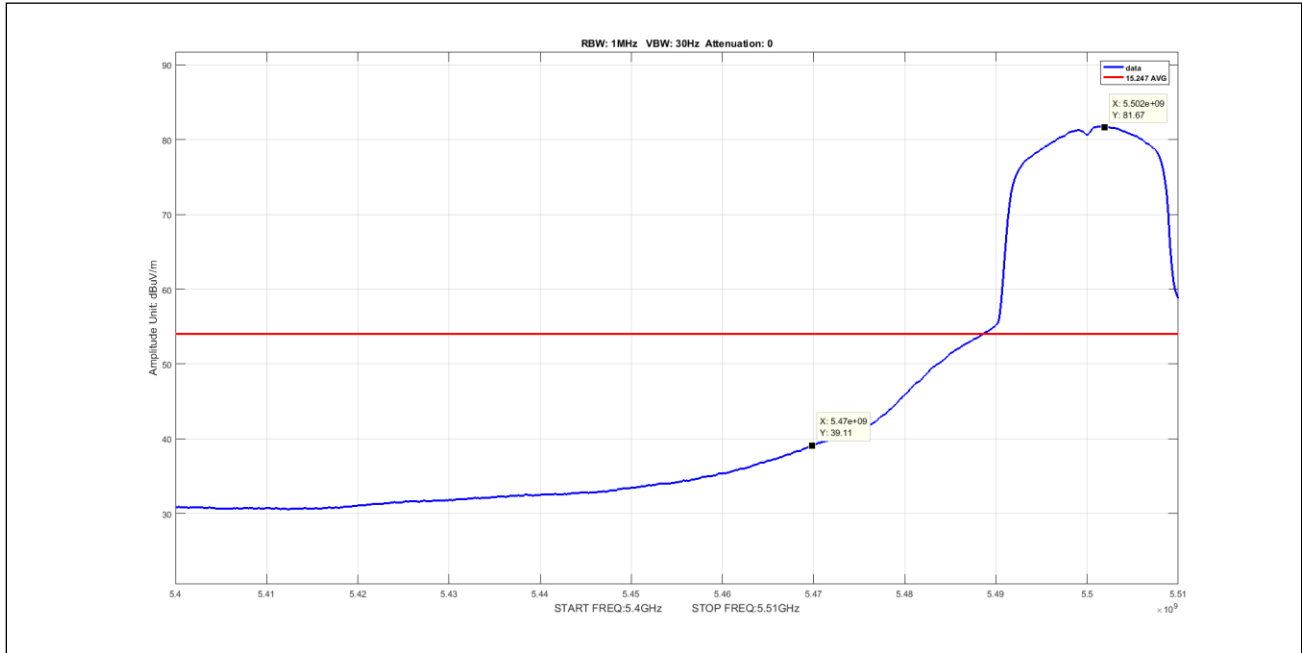
**Plot 114. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5320M, A Mode Port 1**



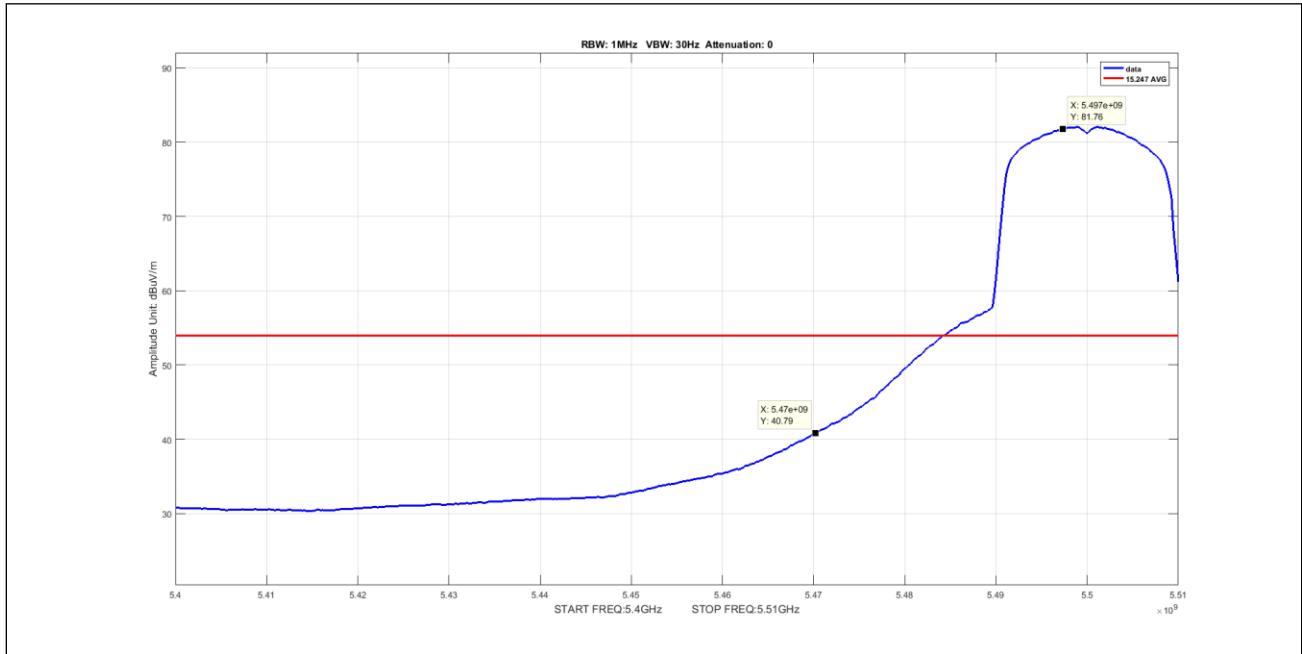
**Plot 115. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5320M, N Mode Port 1**



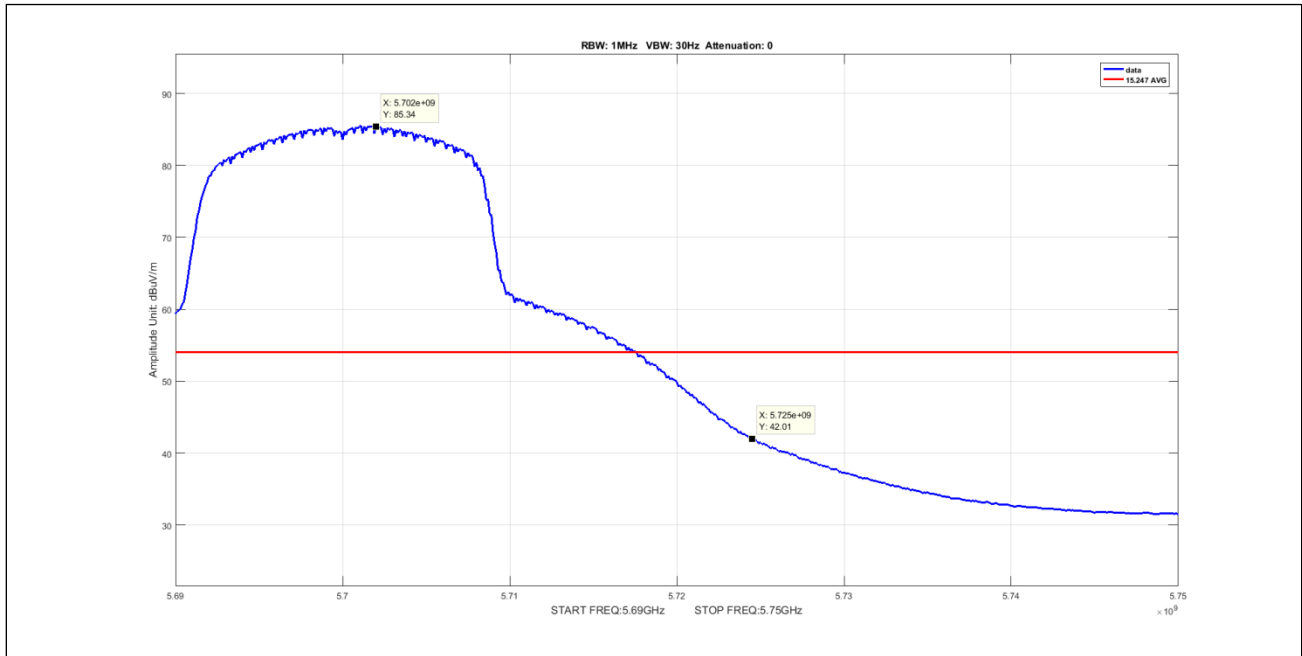
**Plot 116. Undesirable Emissions, Peak Band Edge Spurious, BW 40M, Ch 5310M, N Mode Port 1**



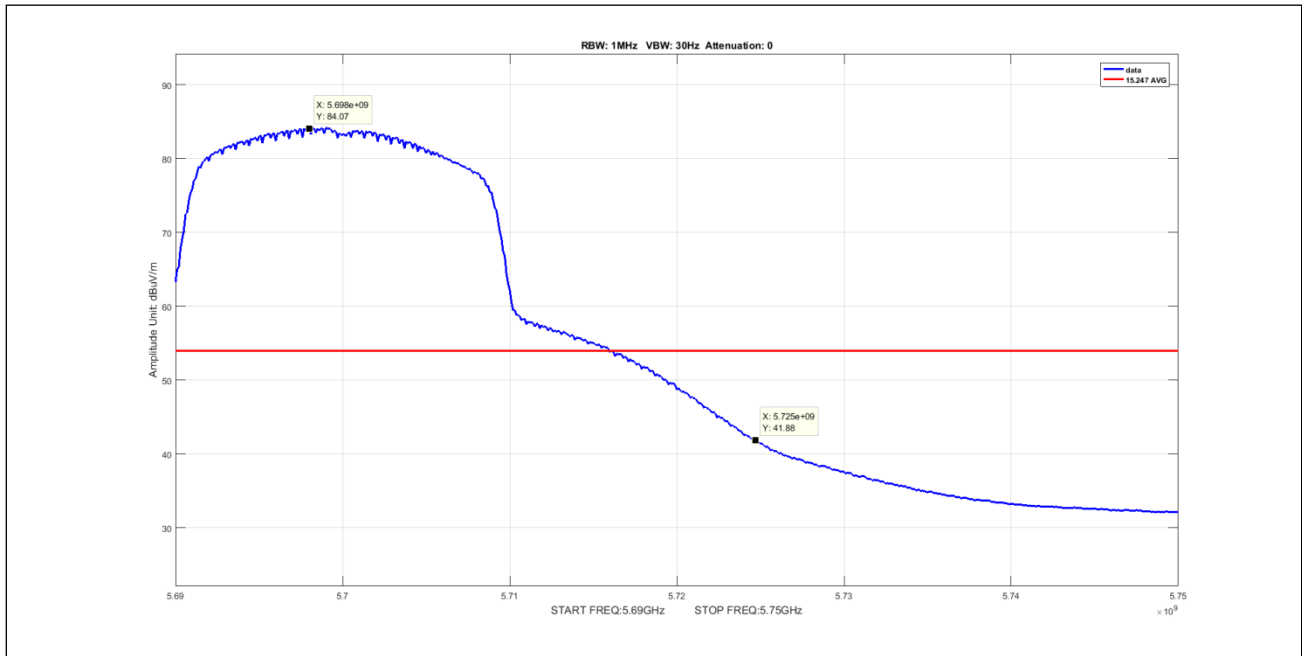
**Plot 117. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5500M, A Mode Port 1**



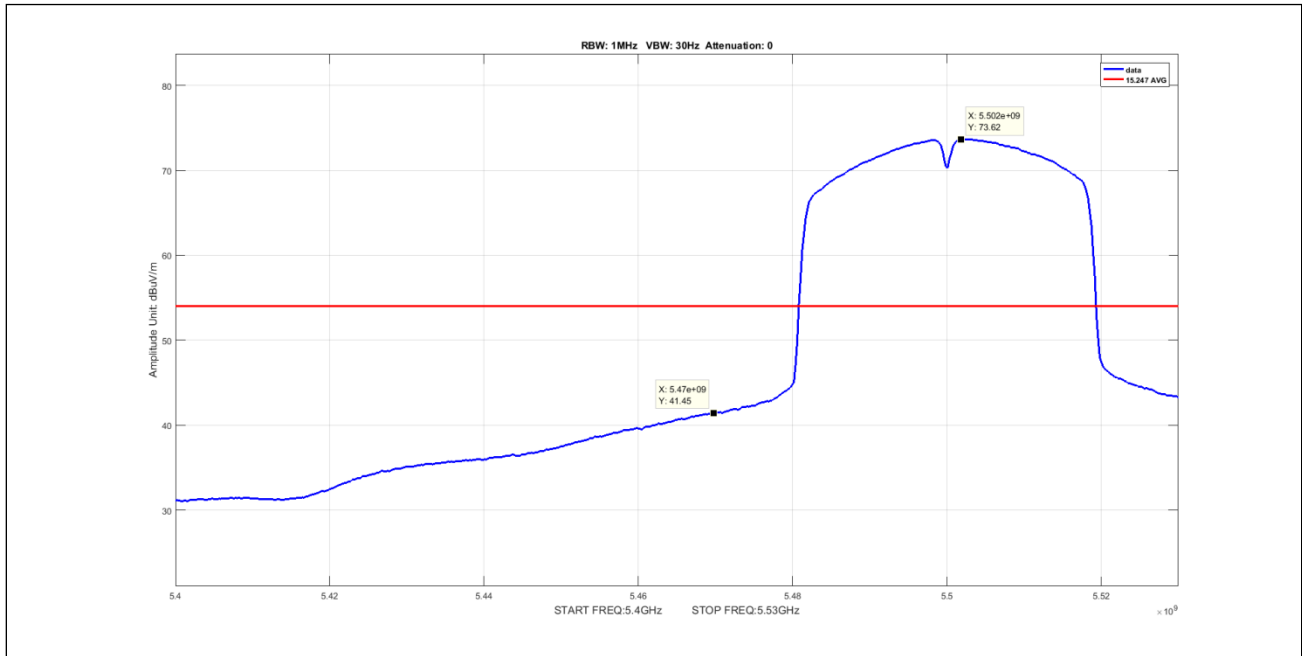
**Plot 118. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5500M, N Mode Port 1**



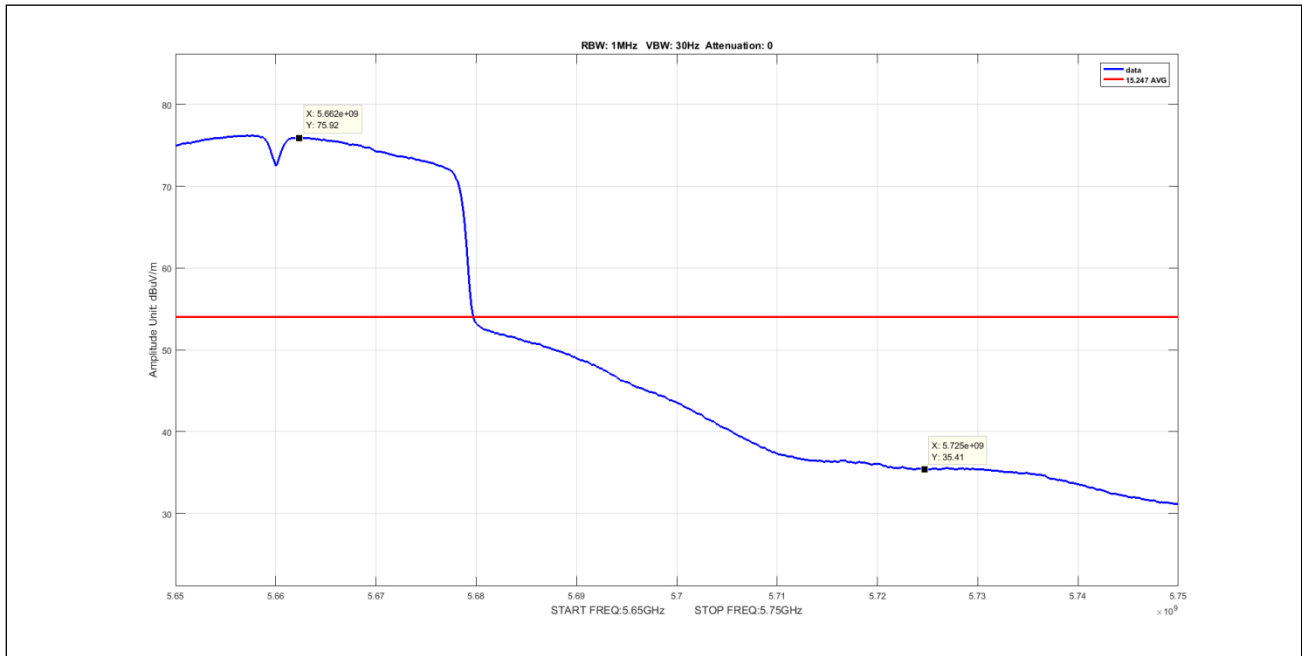
**Plot 119. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5700M, A Mode Port 1**



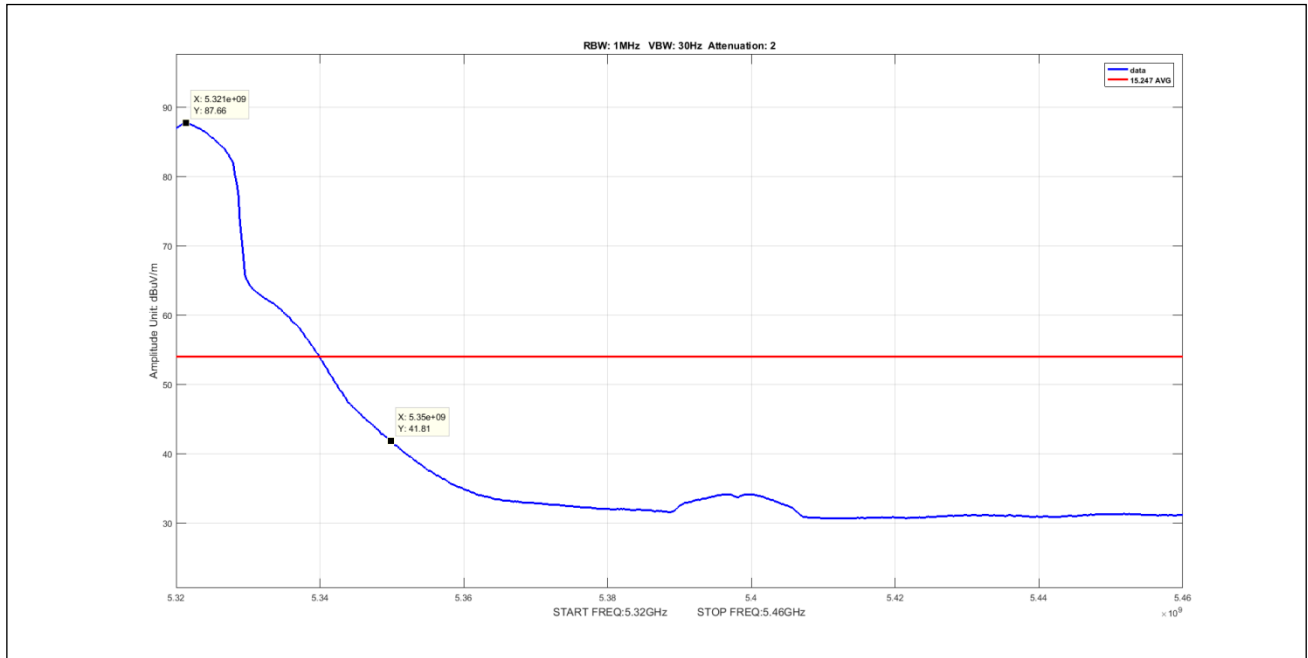
**Plot 120. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5700M, N Mode Port 1**



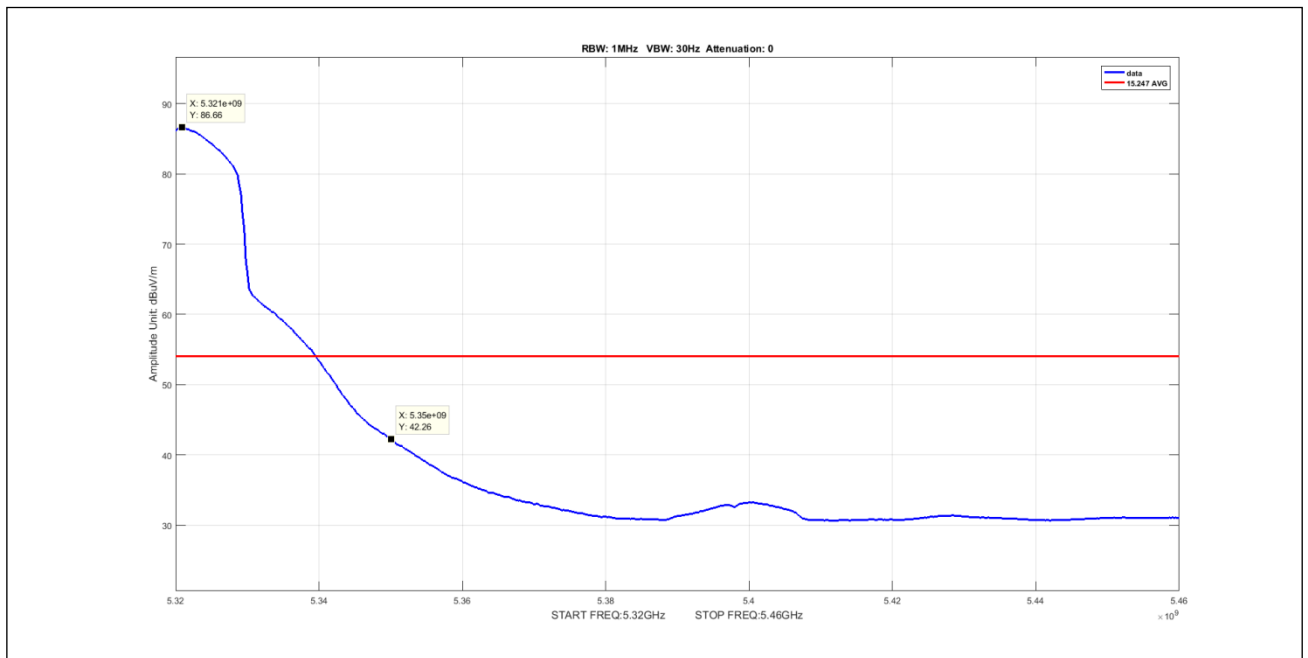
**Plot 121. Undesirable Emissions, Average Band Edge Spurious, BW 40M, Ch 5510M, N Mode Port 1**



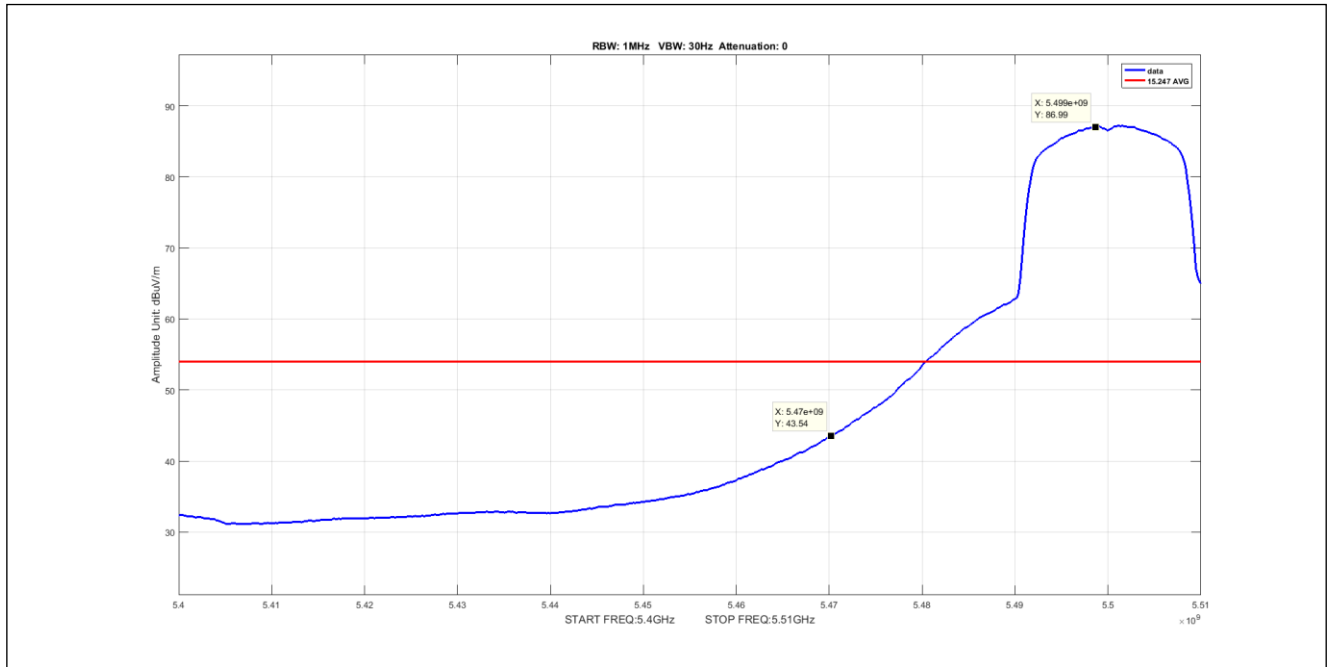
**Plot 122. Undesirable Emissions, Average Band Edge Spurious, BW 40M, Ch 5670M, N Mode Port 1**



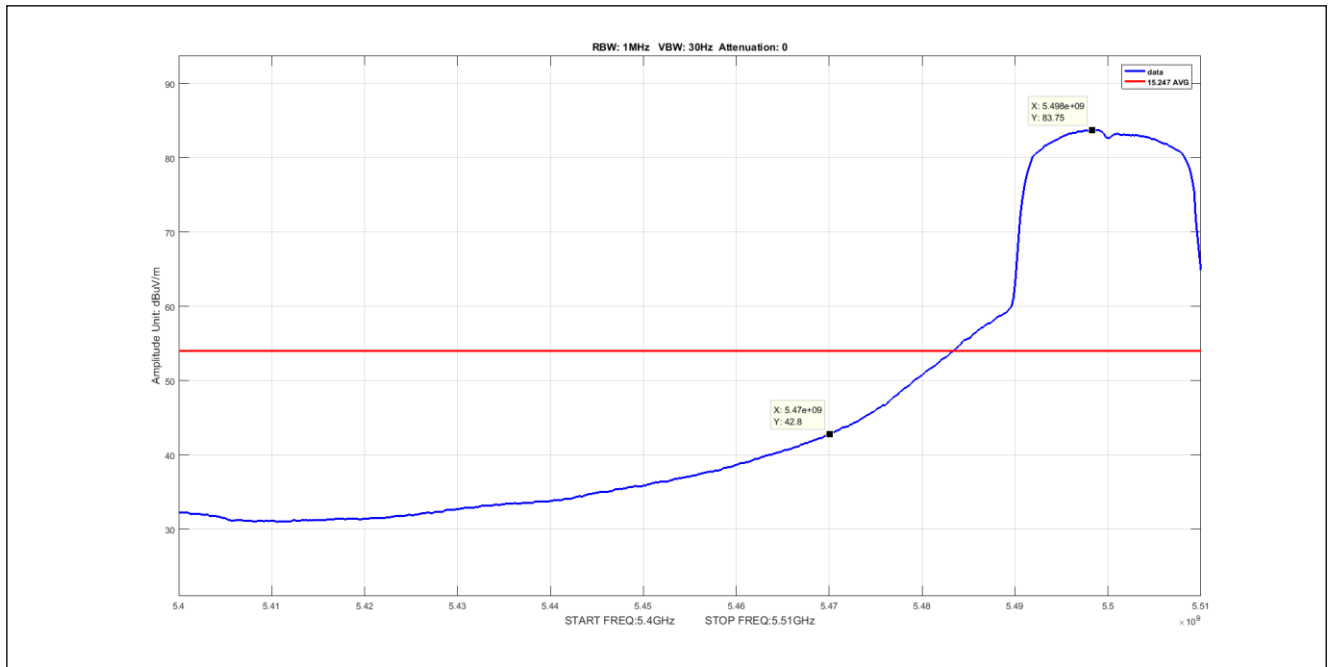
**Plot 123. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5320M, A Mode Port 2**



**Plot 124. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5320M, N Mode Port 2**

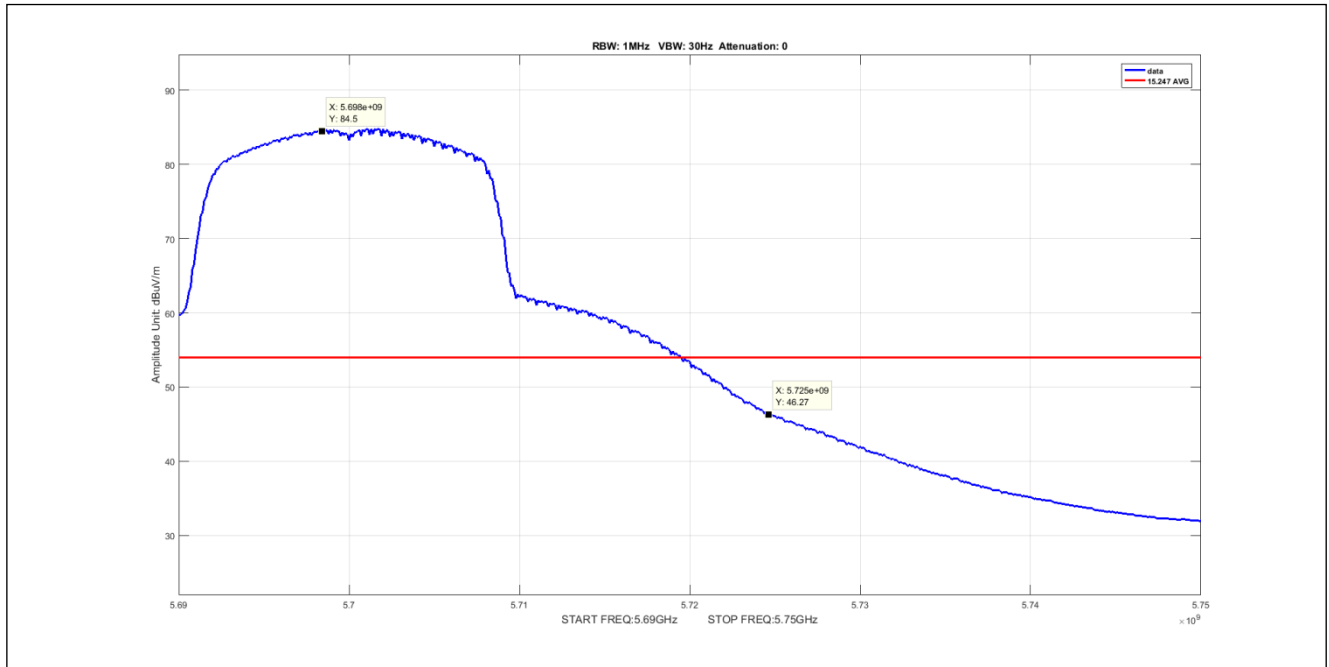


**Plot 125. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5500M, A Mode Port 2**

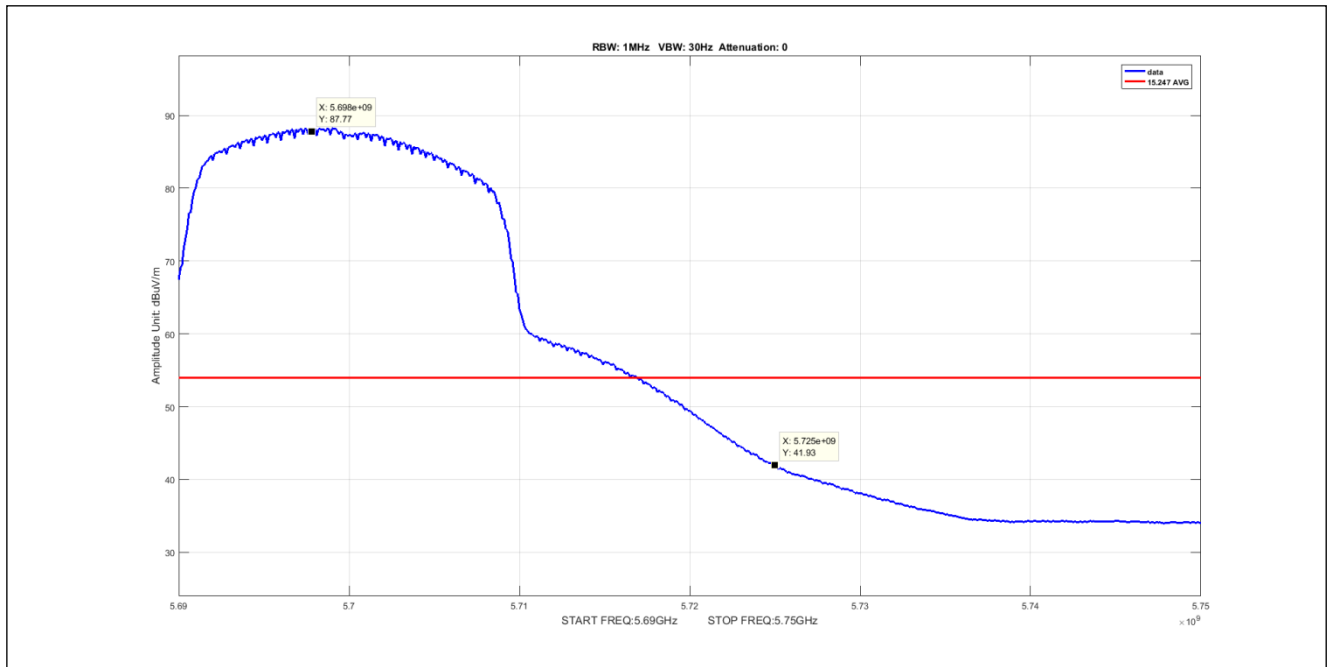


**Plot 126. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5320M, N Mode Port 2**

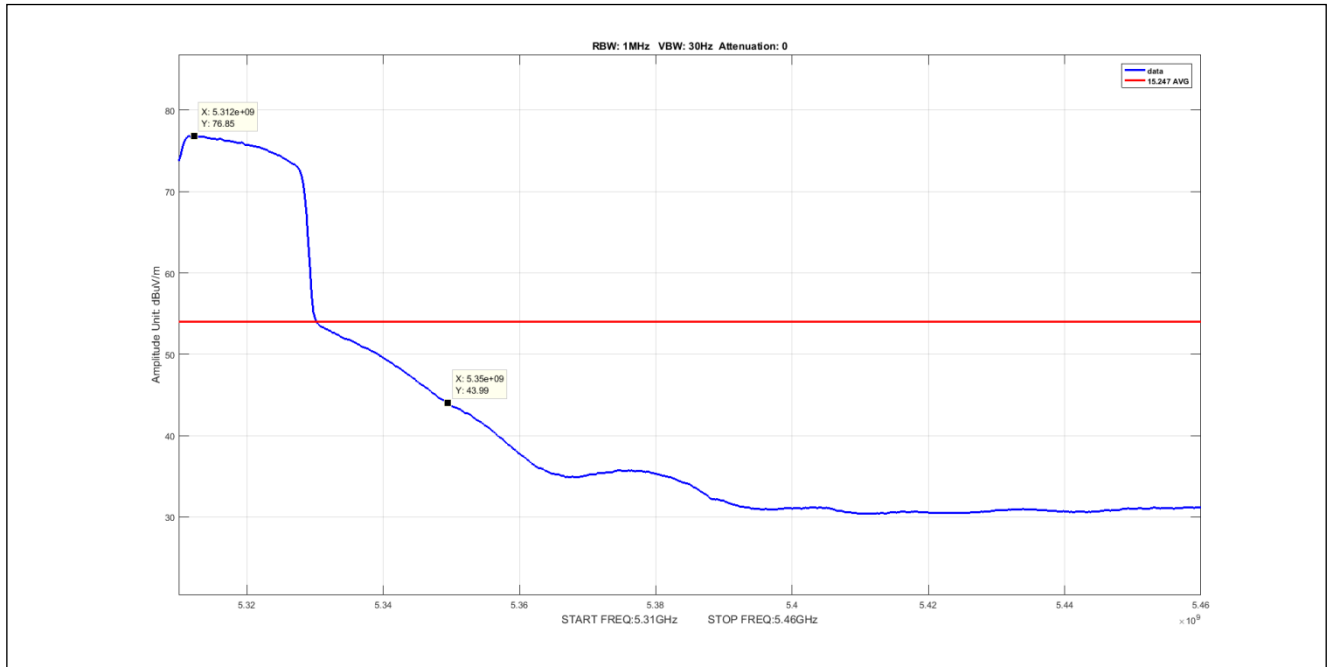




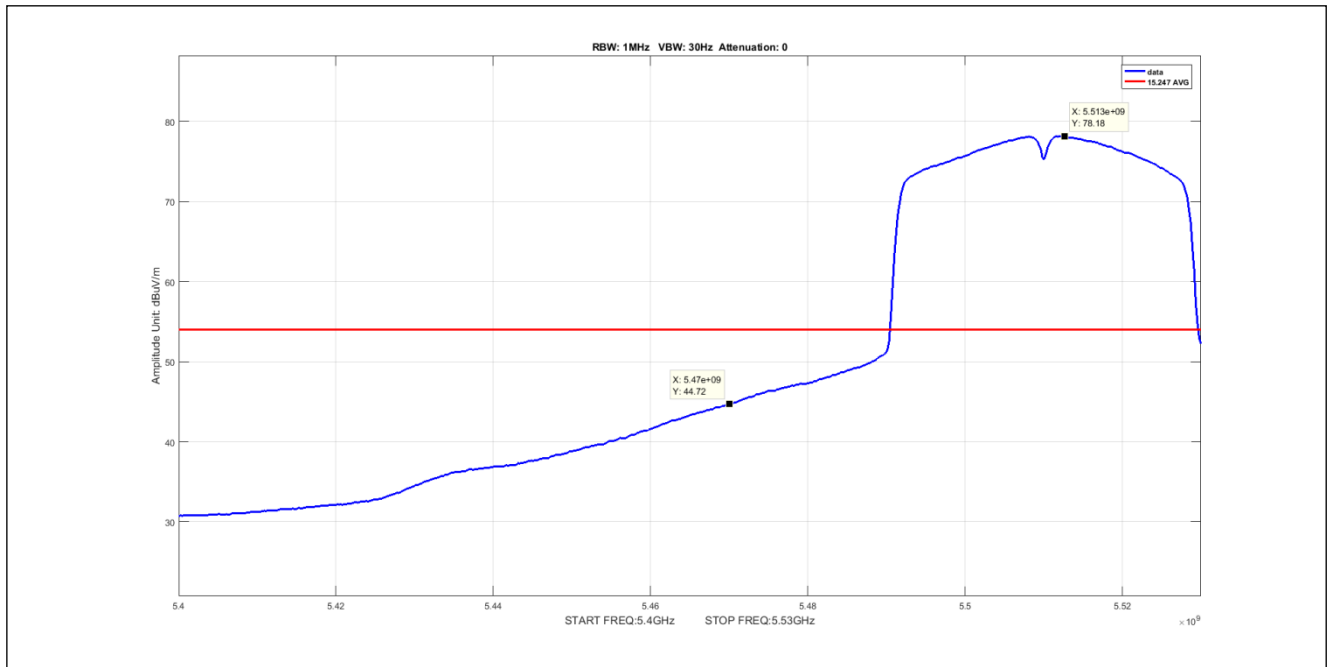
**Plot 127. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5700M, A Mode Port 2**



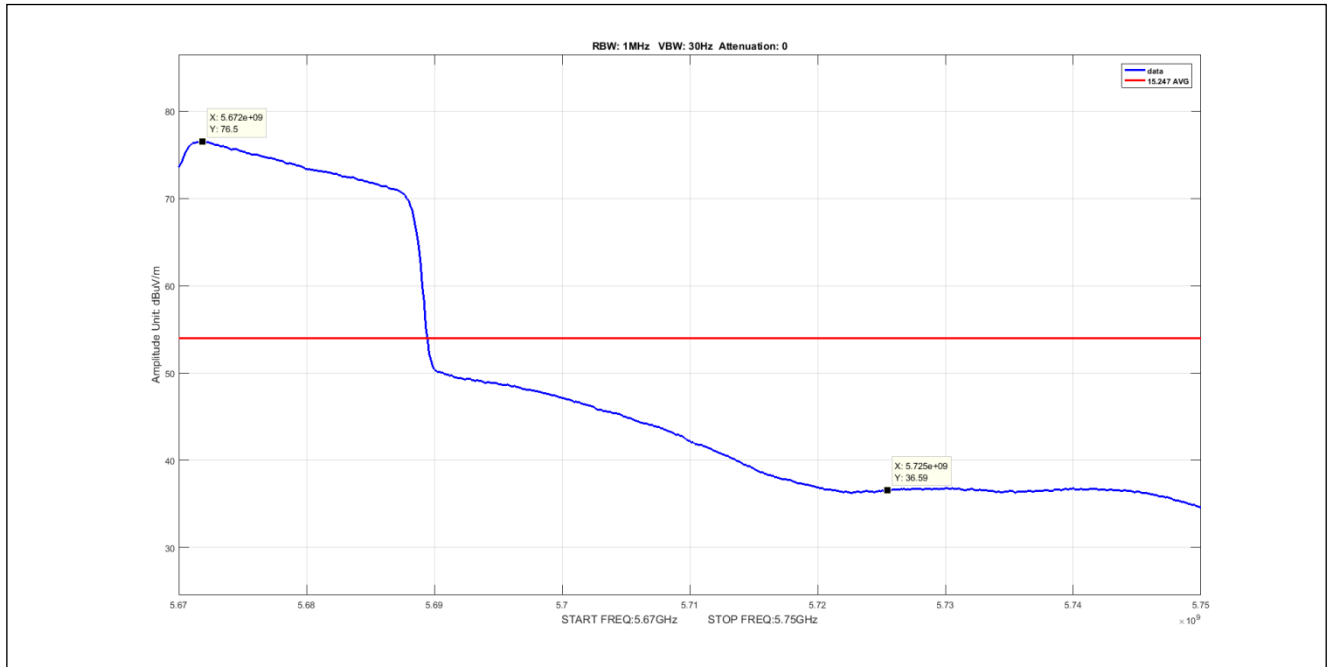
**Plot 128. Undesirable Emissions, Average Band Edge Spurious, BW 20M, Ch 5700M, N Mode Port 2**



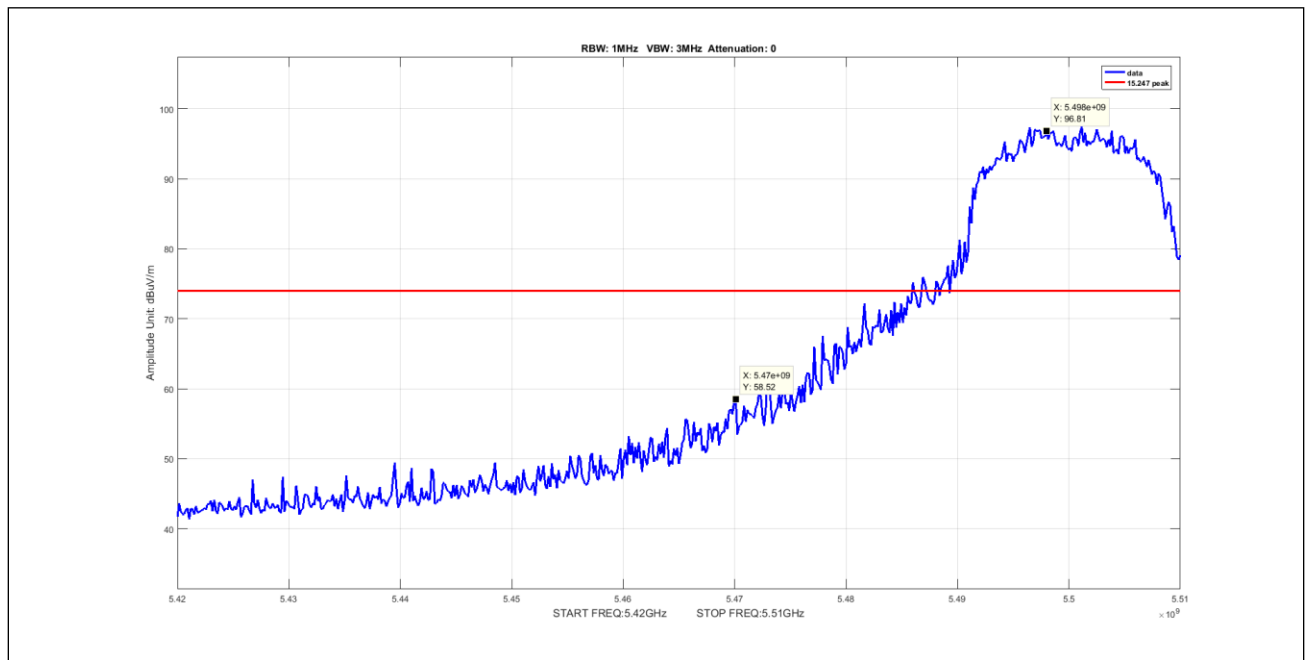
**Plot 129. Undesirable Emissions, Average Band Edge Spurious, BW 40M, Ch 5310M, N Mode Port 2**



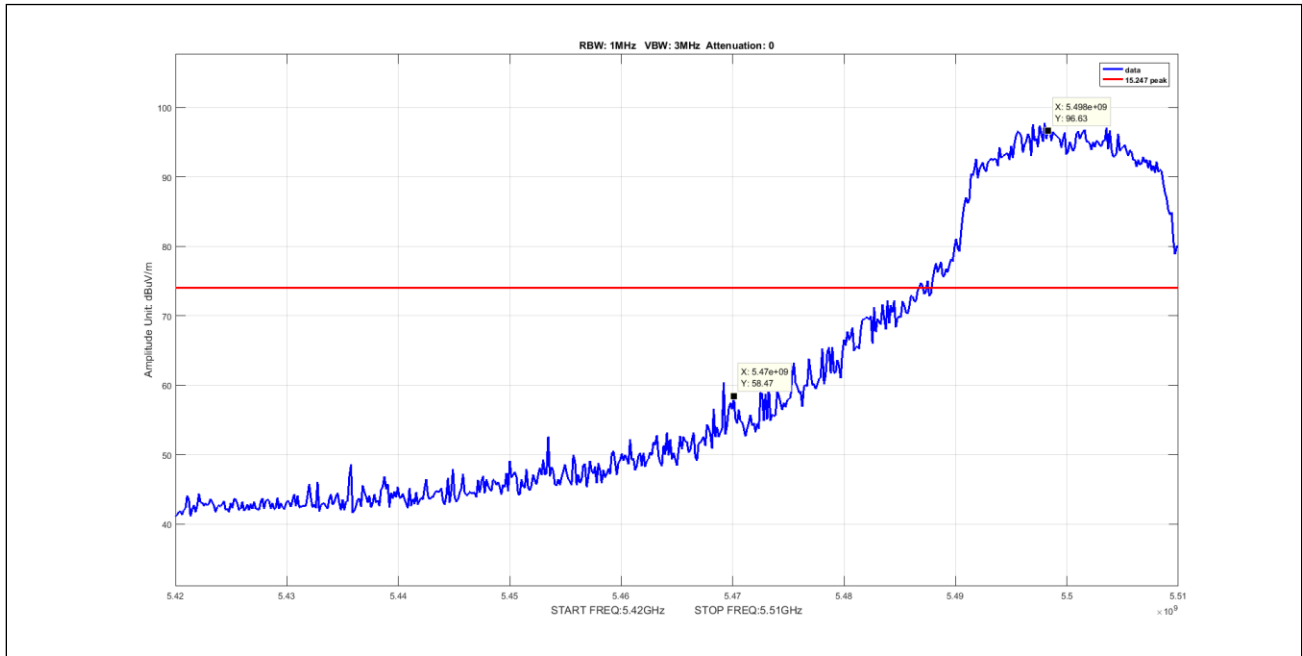
**Plot 130. Undesirable Emissions, Average Band Edge Spurious, BW 40M, Ch 5510M, N Mode Port 2**



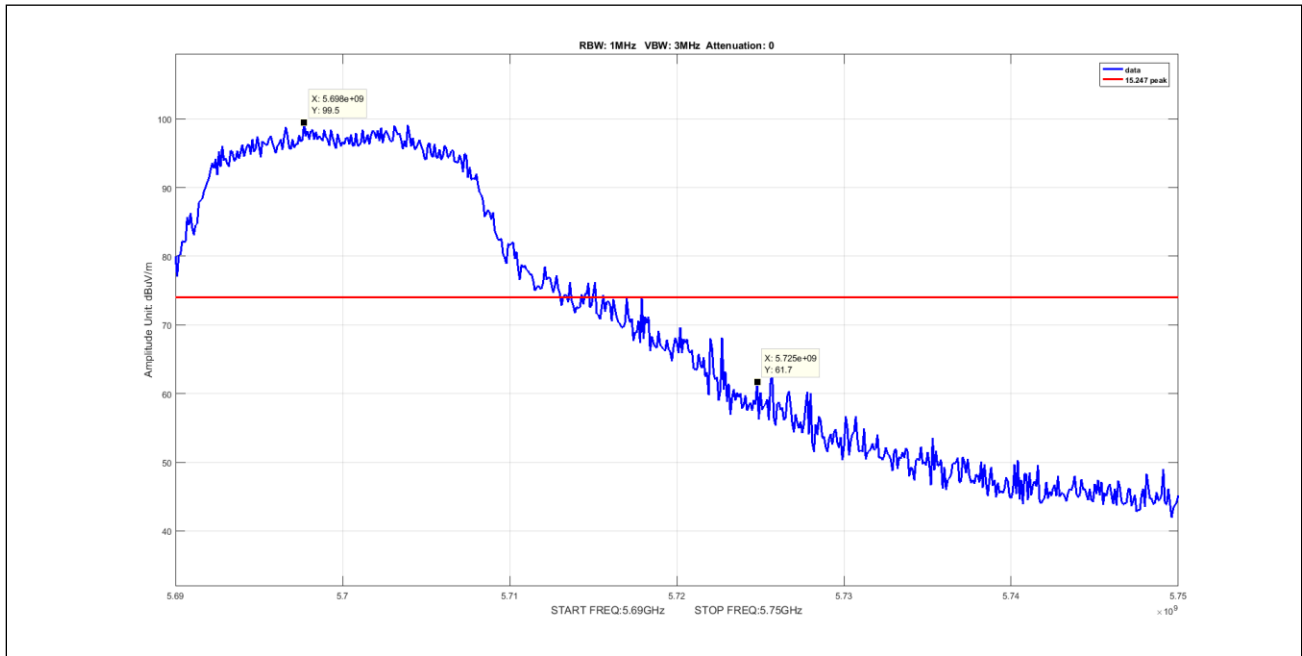
**Plot 131. Undesirable Emissions, Average Band Edge Spurious, BW 40M, Ch 5670M, N Mode Port 2**



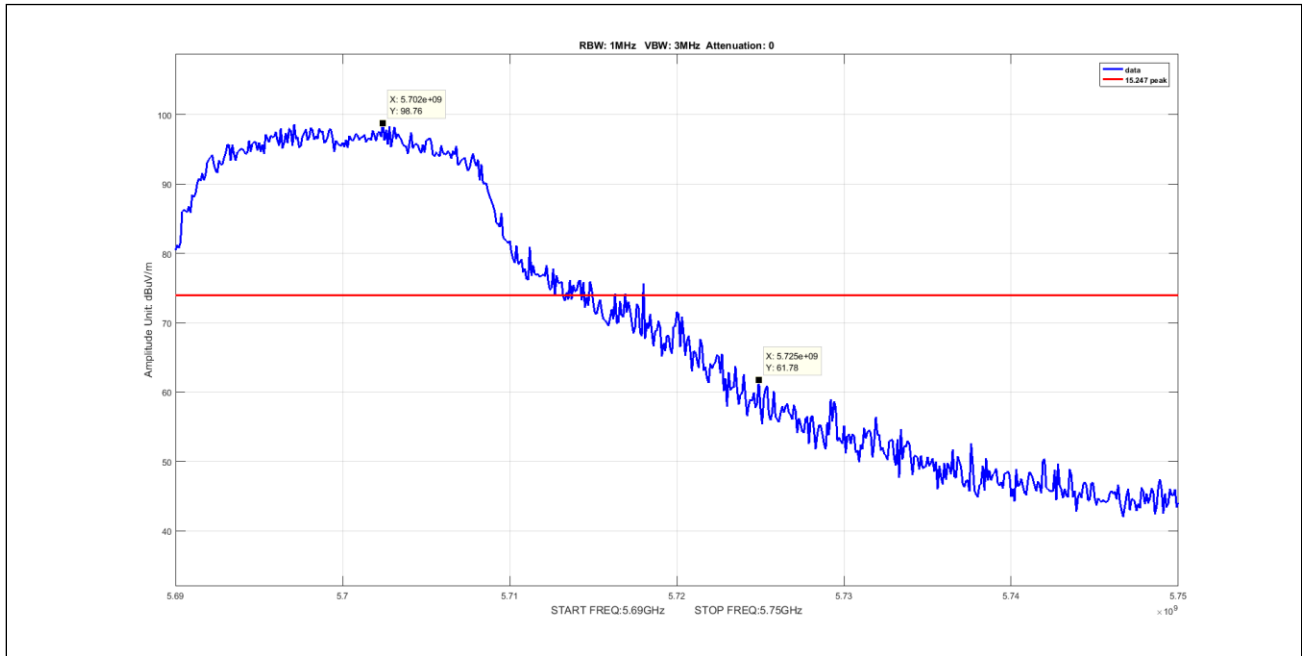
**Plot 132. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5500M, A Mode Port 1**



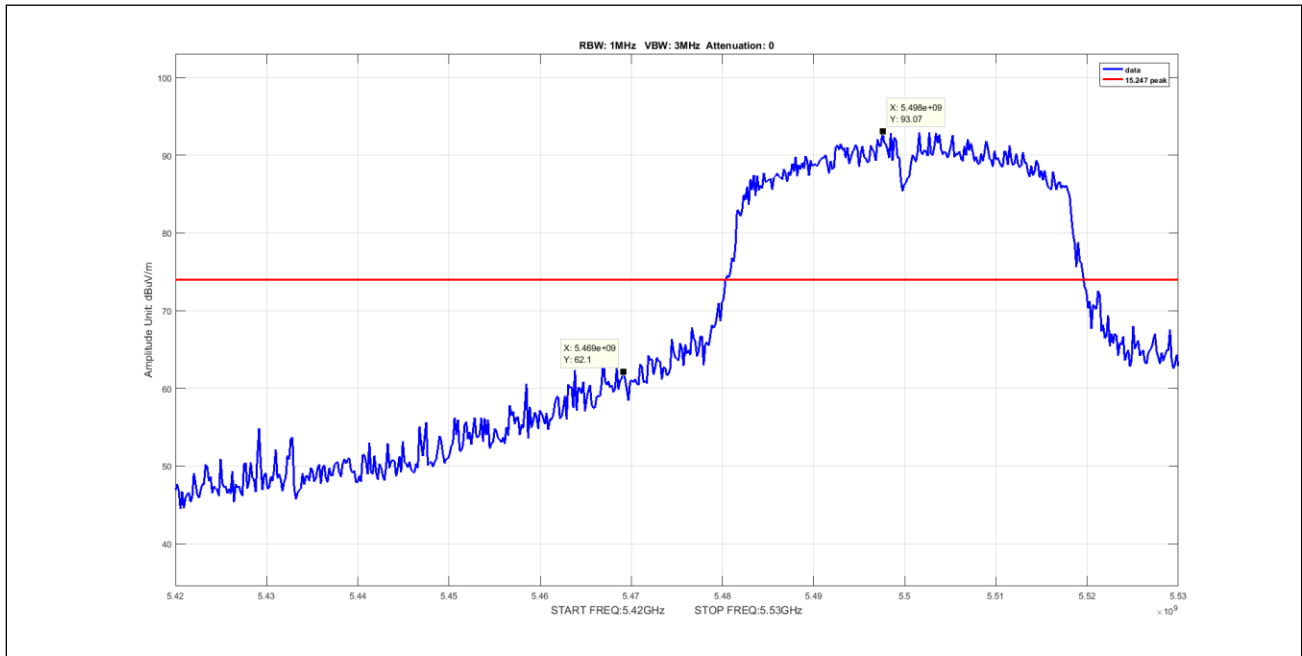
**Plot 133. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5500M, N Mode Port 1**



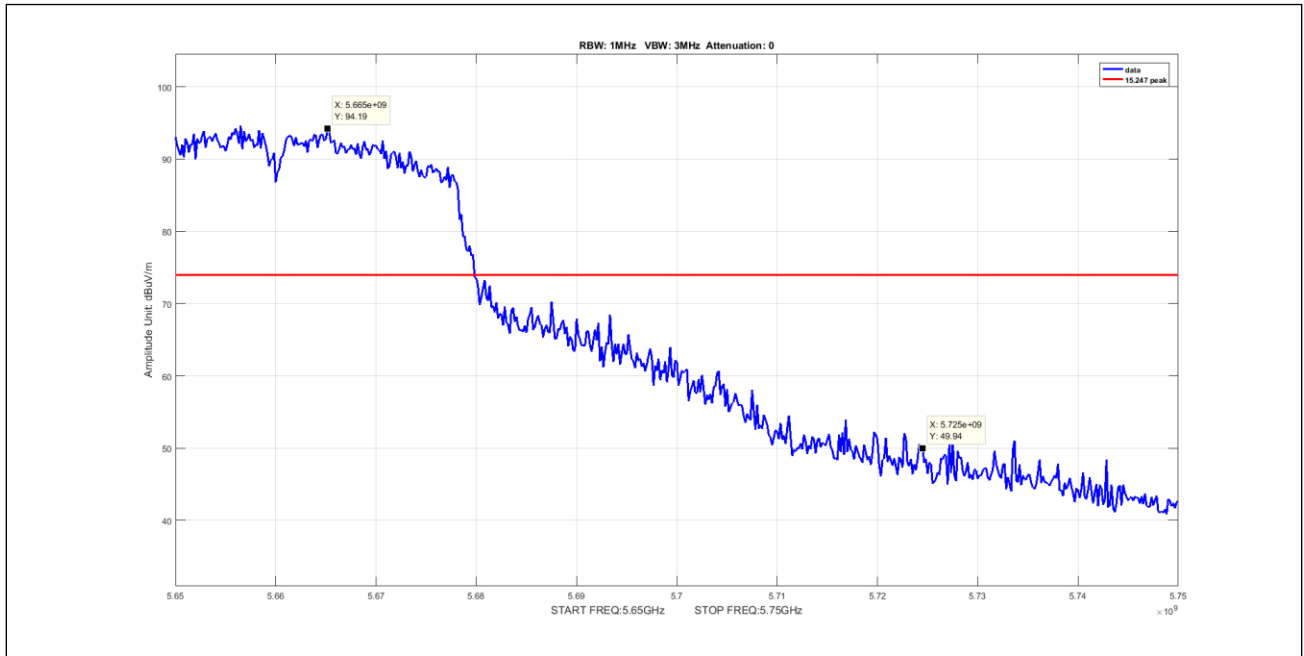
**Plot 134. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5700M, A Mode Port 1**



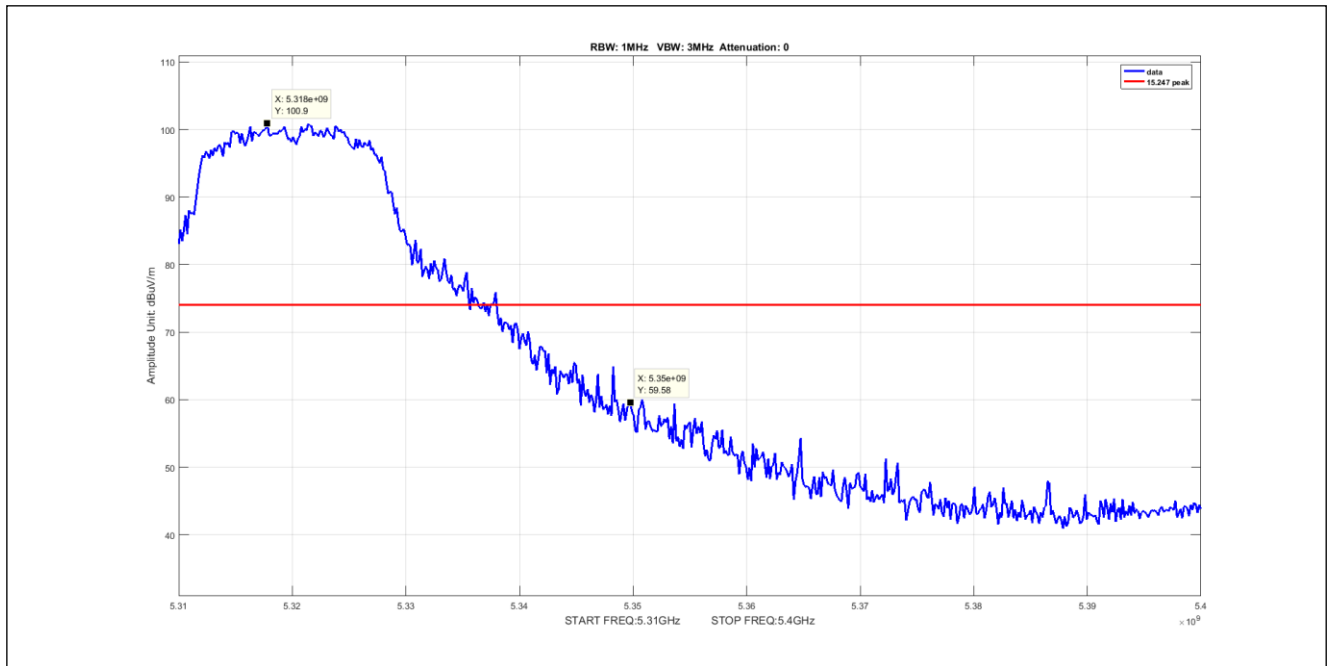
**Plot 135. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5700M, N Mode Port 1**



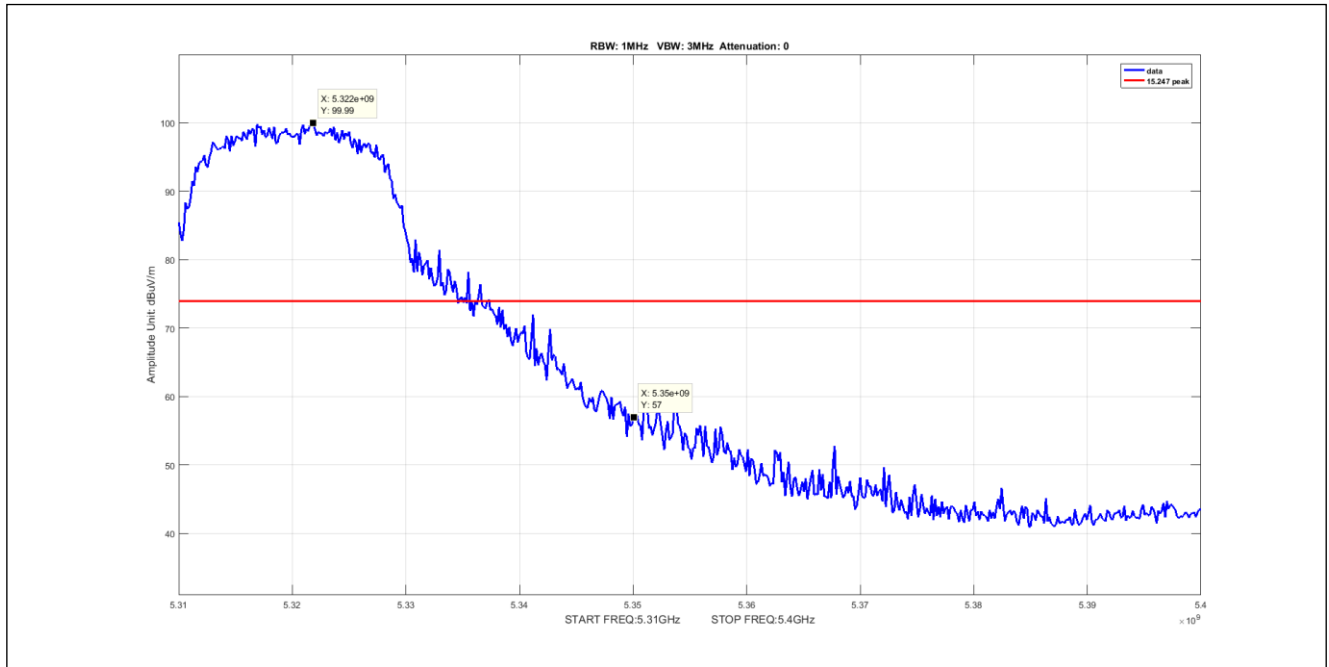
**Plot 136. Undesirable Emissions, Peak Band Edge Spurious, BW 40M, Ch 5510M, N Mode Port 1**



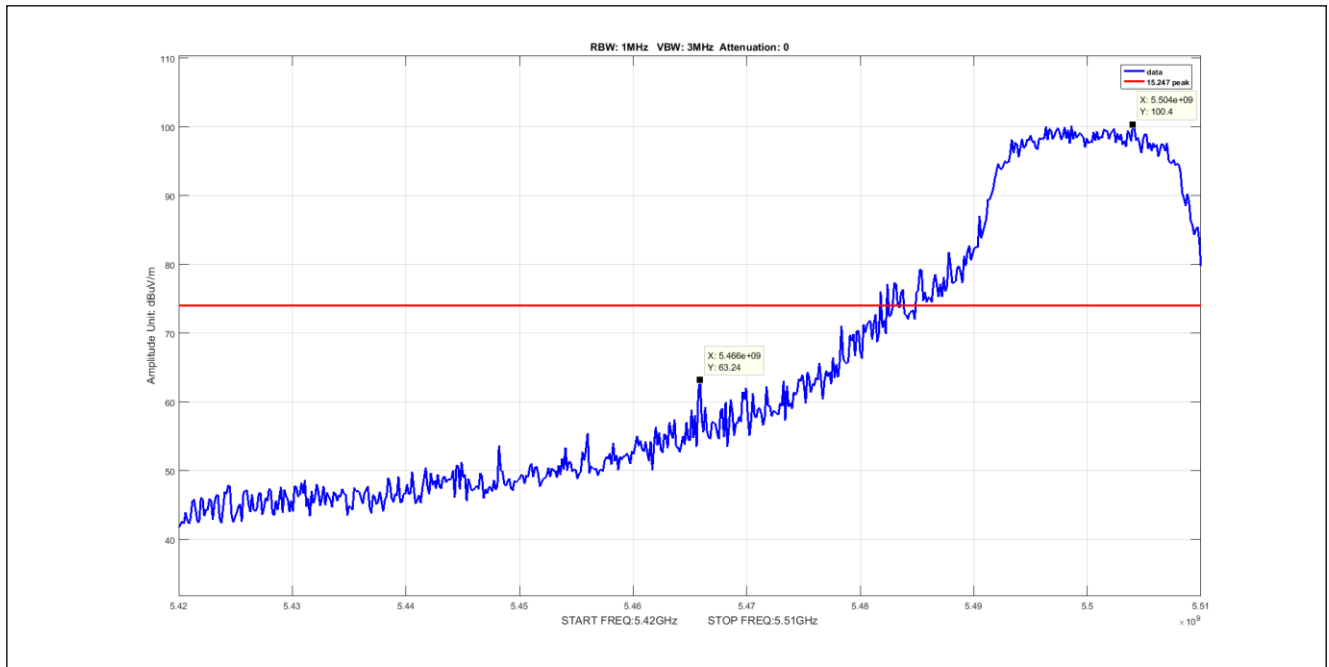
**Plot 137. Undesirable Emissions, Peak Band Edge Spurious, BW 40M, Ch 5670M, N Mode Port 1**



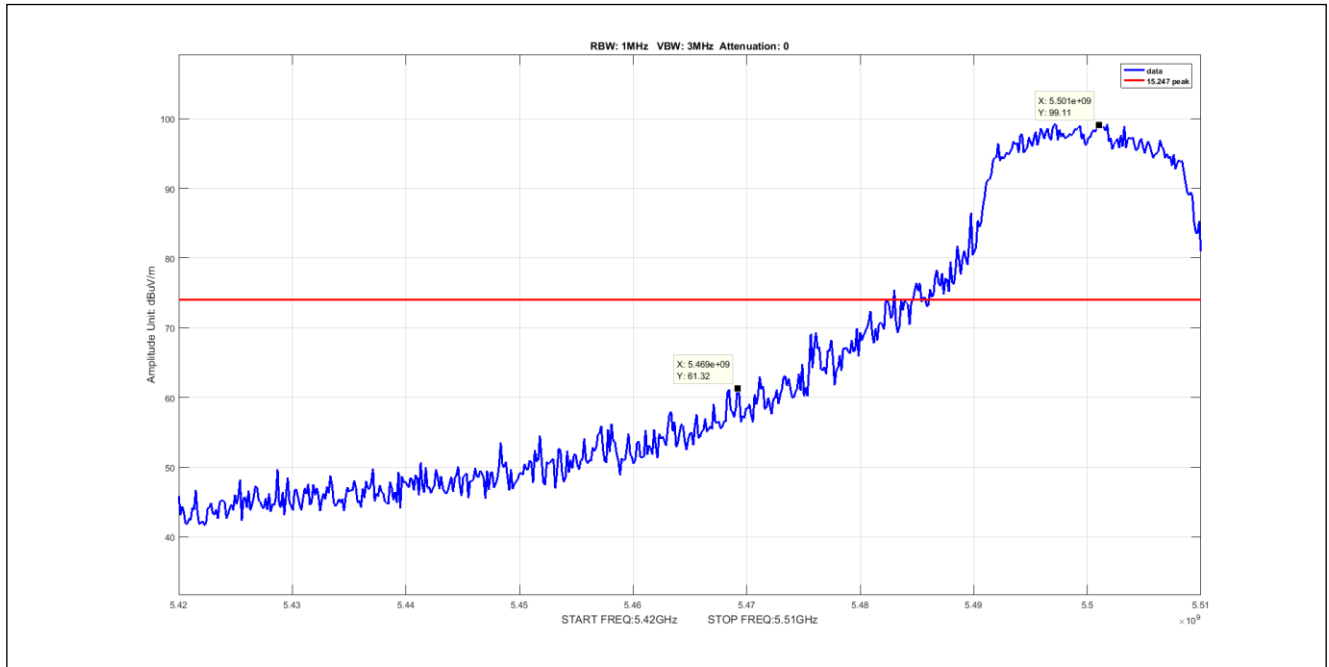
**Plot 138. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5320M, A Mode Port 2**



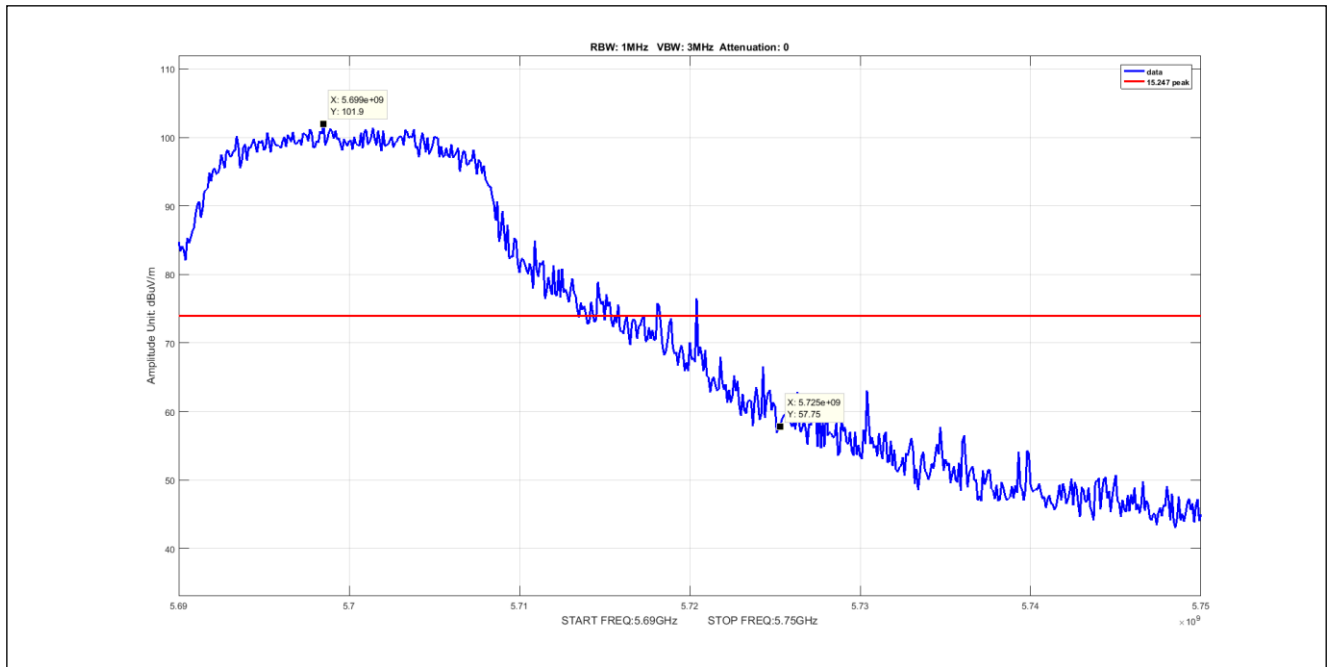
**Plot 139. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5320M, N Mode Port 2**



**Plot 140. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5500M, A Mode Port 2**

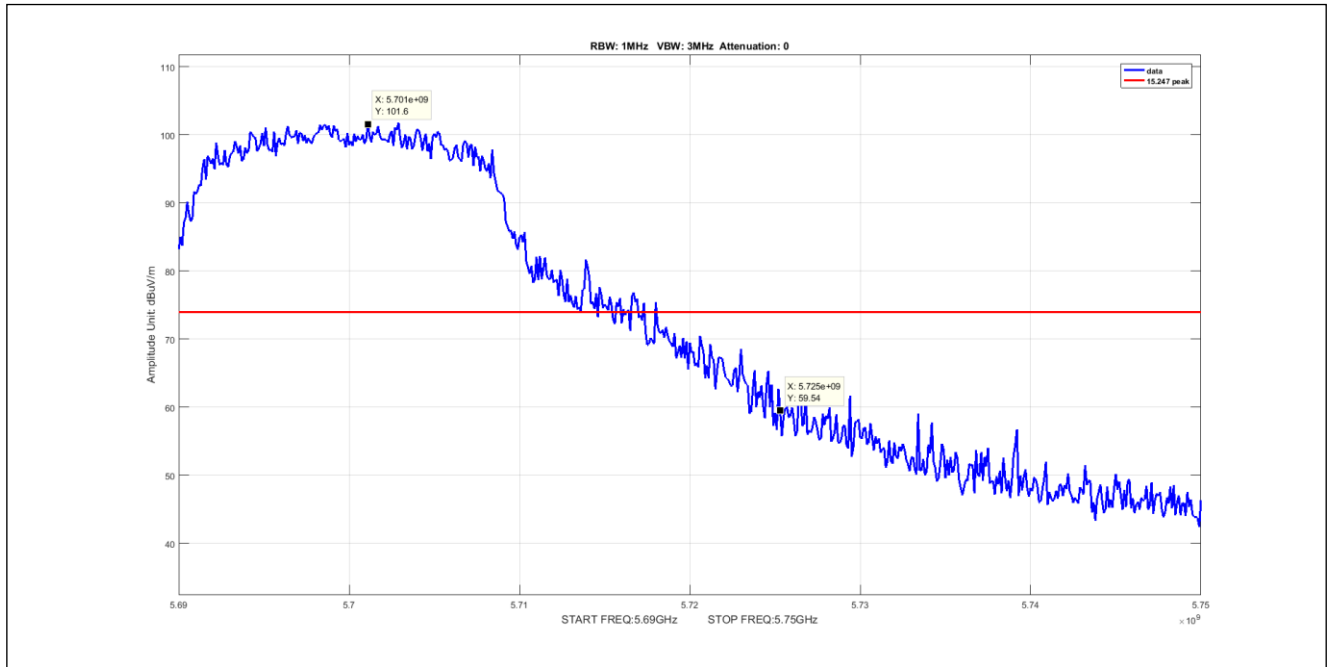


**Plot 141. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5500M, N Mode Port 2**

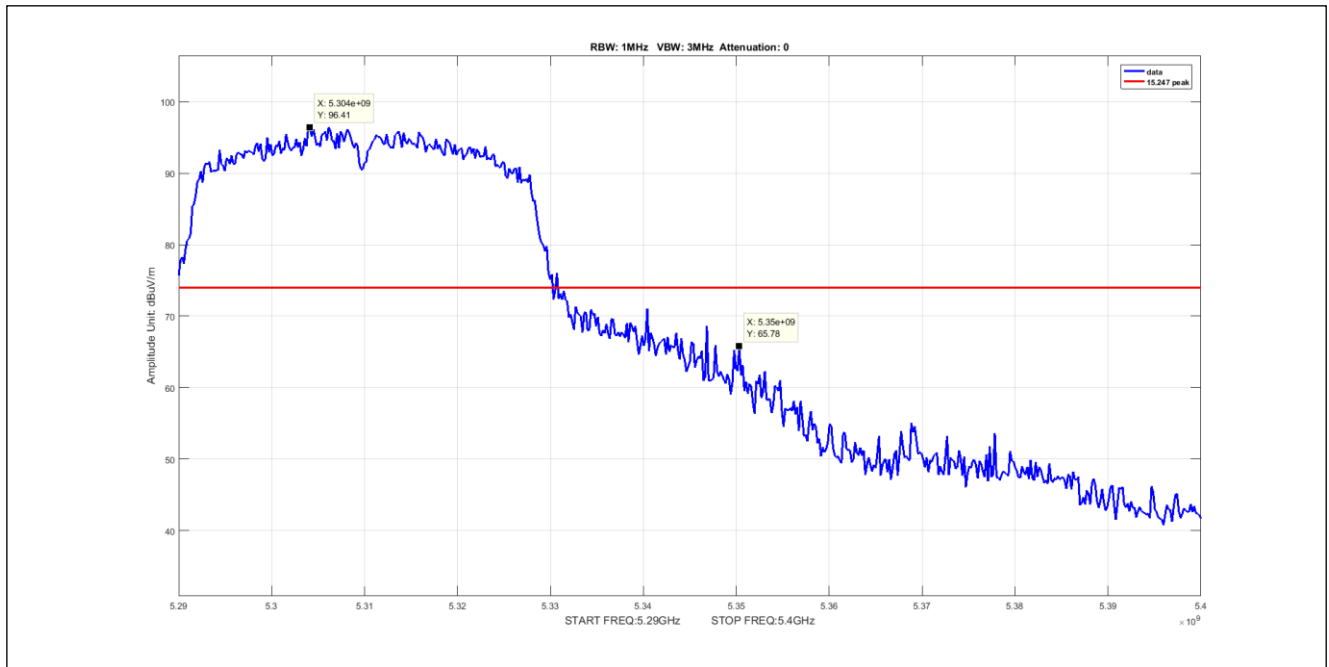


**Plot 142. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5700M, A Mode Port 2**

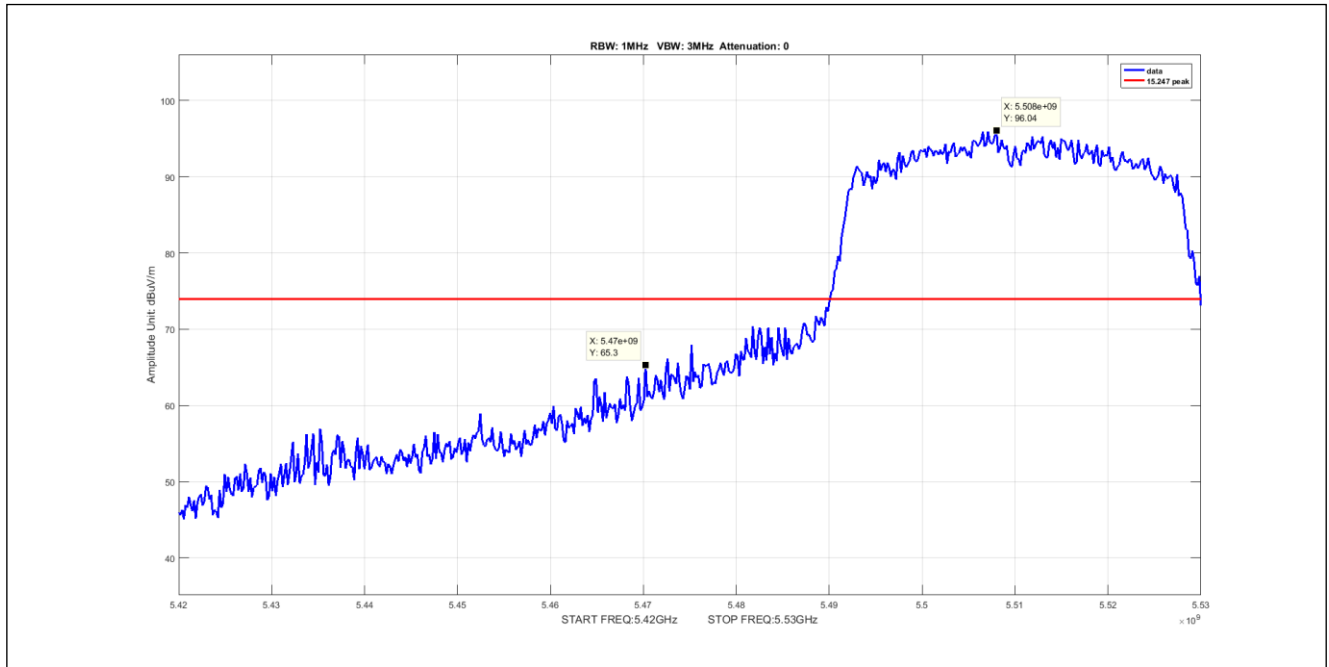




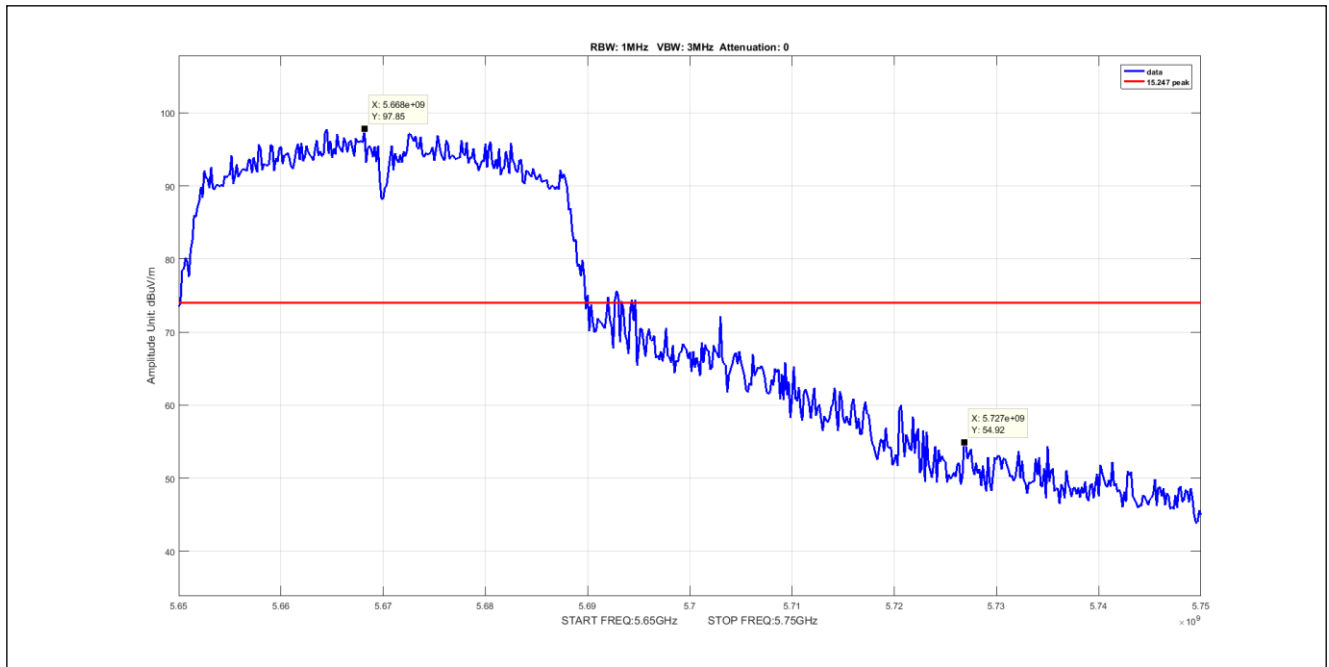
**Plot 143. Undesirable Emissions, Peak Band Edge Spurious, BW 20M, Ch 5700M, N Mode Port 2**



**Plot 144. Undesirable Emissions, Peak Band Edge Spurious, BW 40M, Ch 5310M, N Mode Port 2**

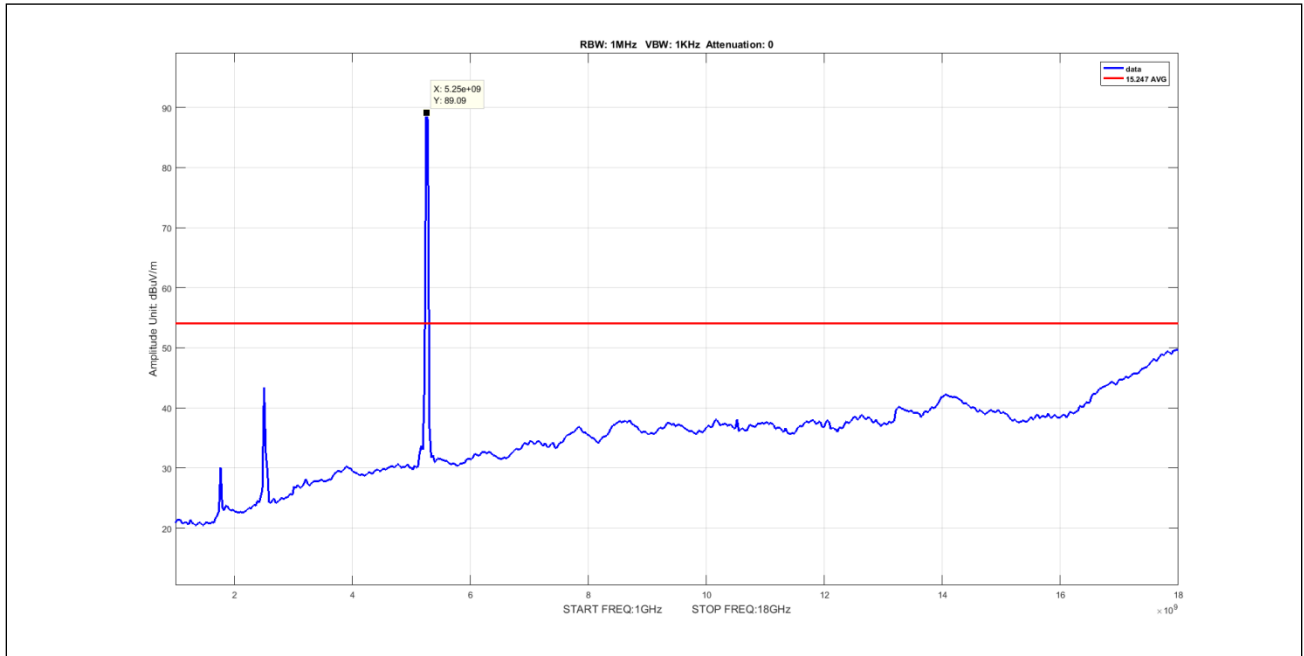


**Plot 145. Undesirable Emissions, Peak Band Edge Spurious, BW 40M, Ch 5510M, N Mode Port 2**

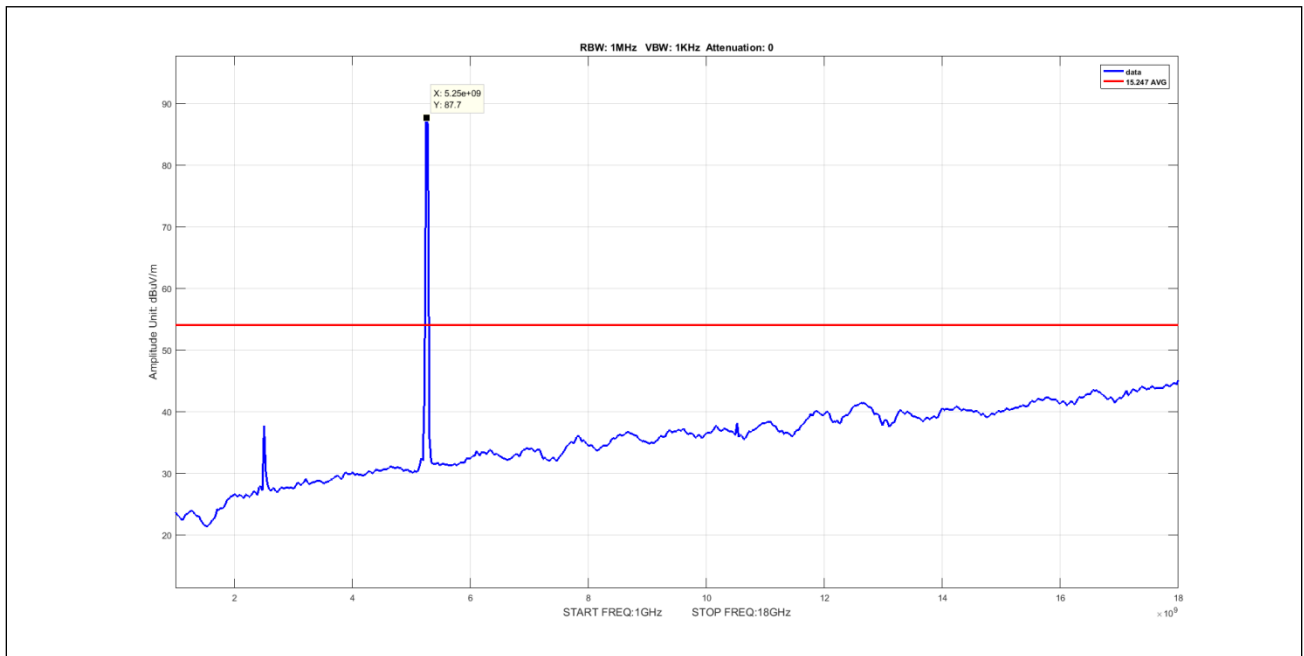


**Plot 146. Undesirable Emissions, Peak Band Edge Spurious, BW 40M, Ch 5670M, N Mode Port 2**

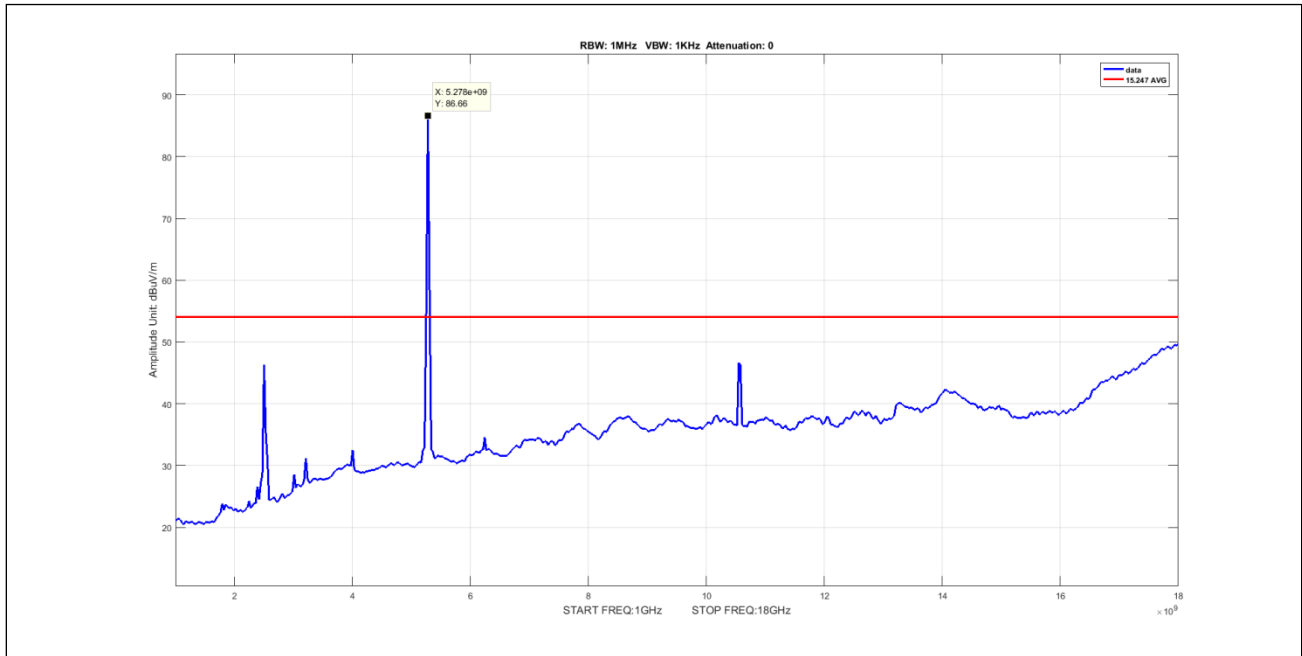
## Spurious Emissions



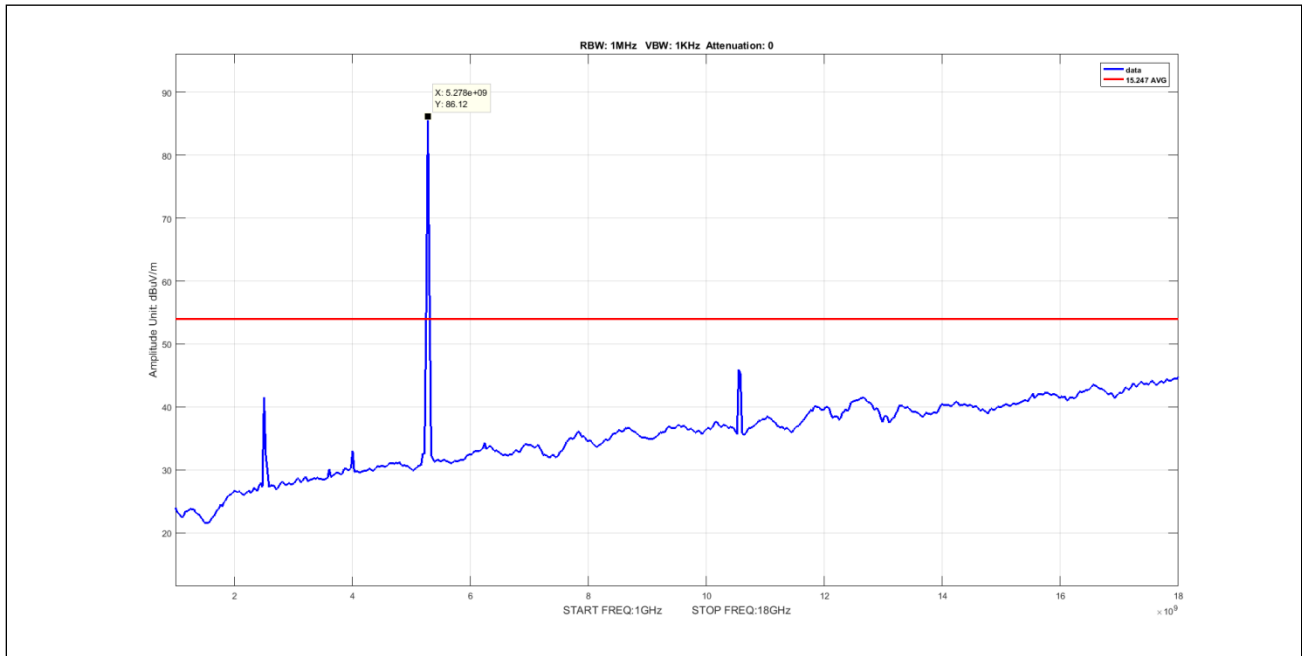
**Plot 147. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5260M, A Mode Port 1**



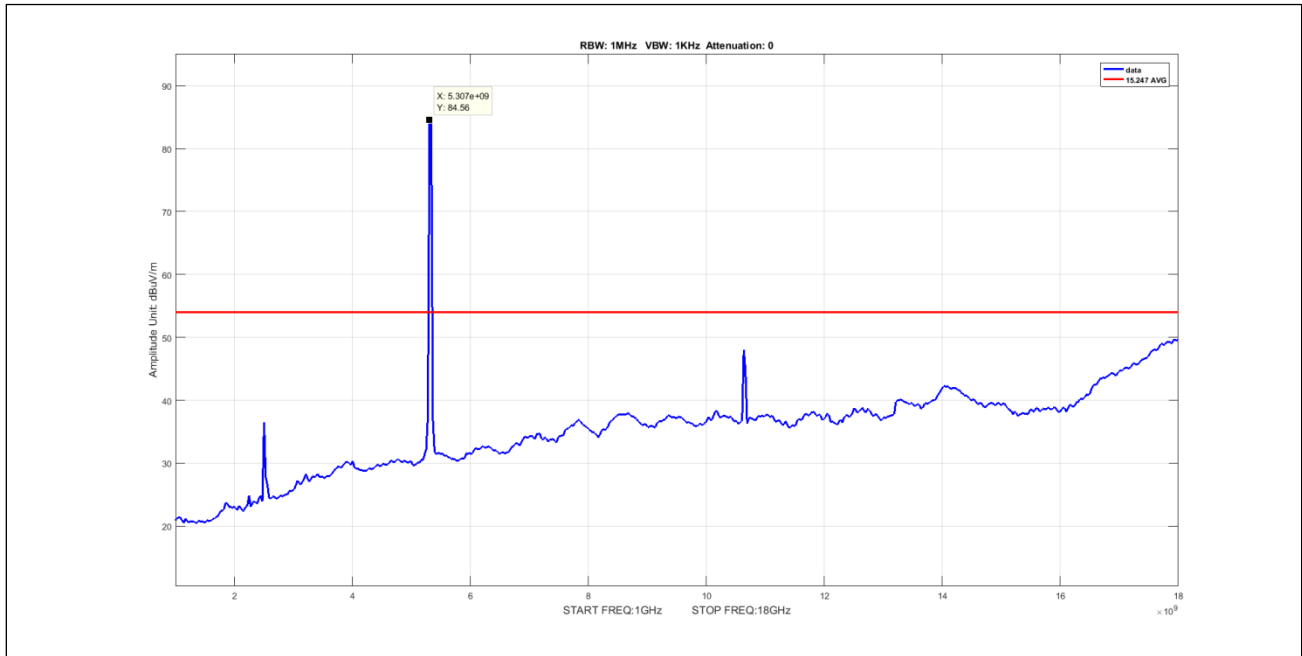
**Plot 148. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5260M, N Mode Port 1**



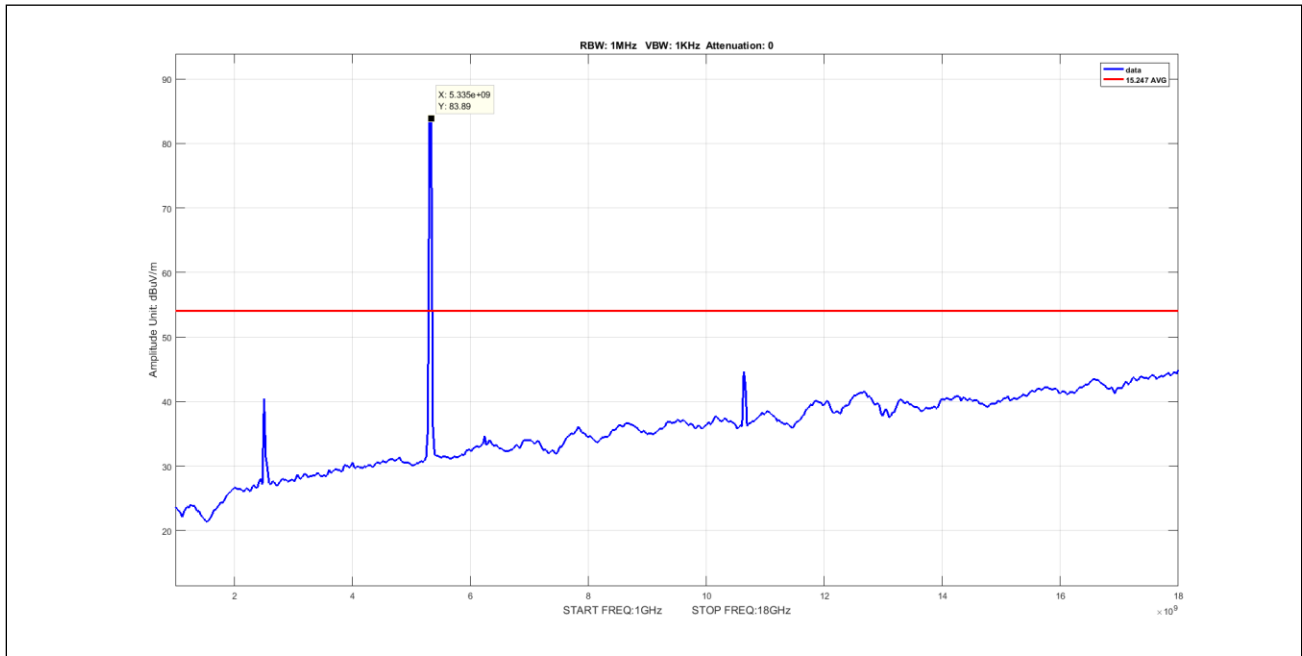
**Plot 149. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5280M, A Mode Port 1**



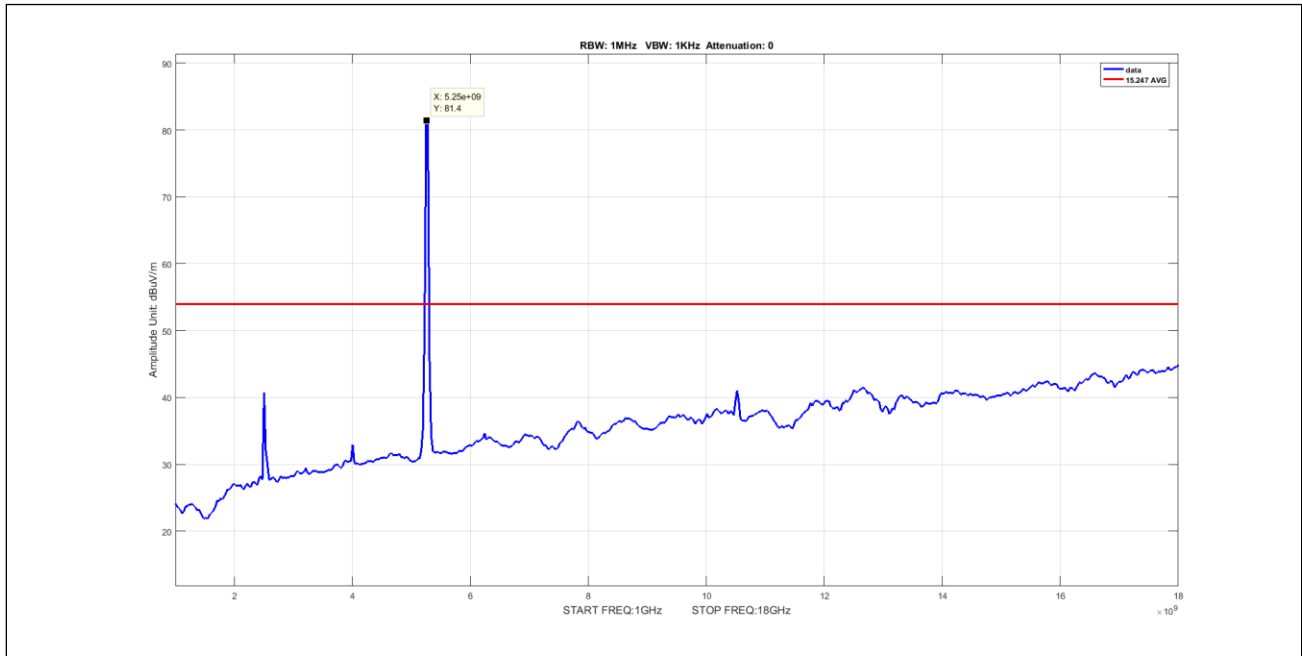
**Plot 150. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5280M, N Mode Port 1**



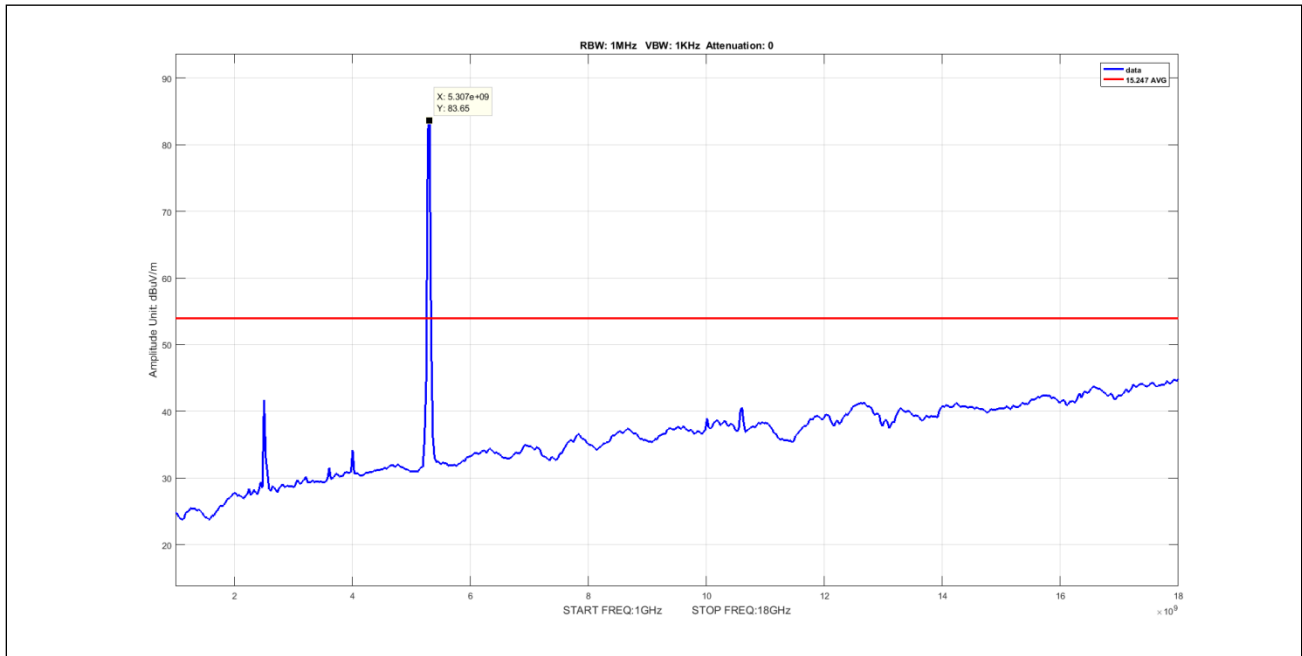
**Plot 151. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5320M, A Mode Port 1**



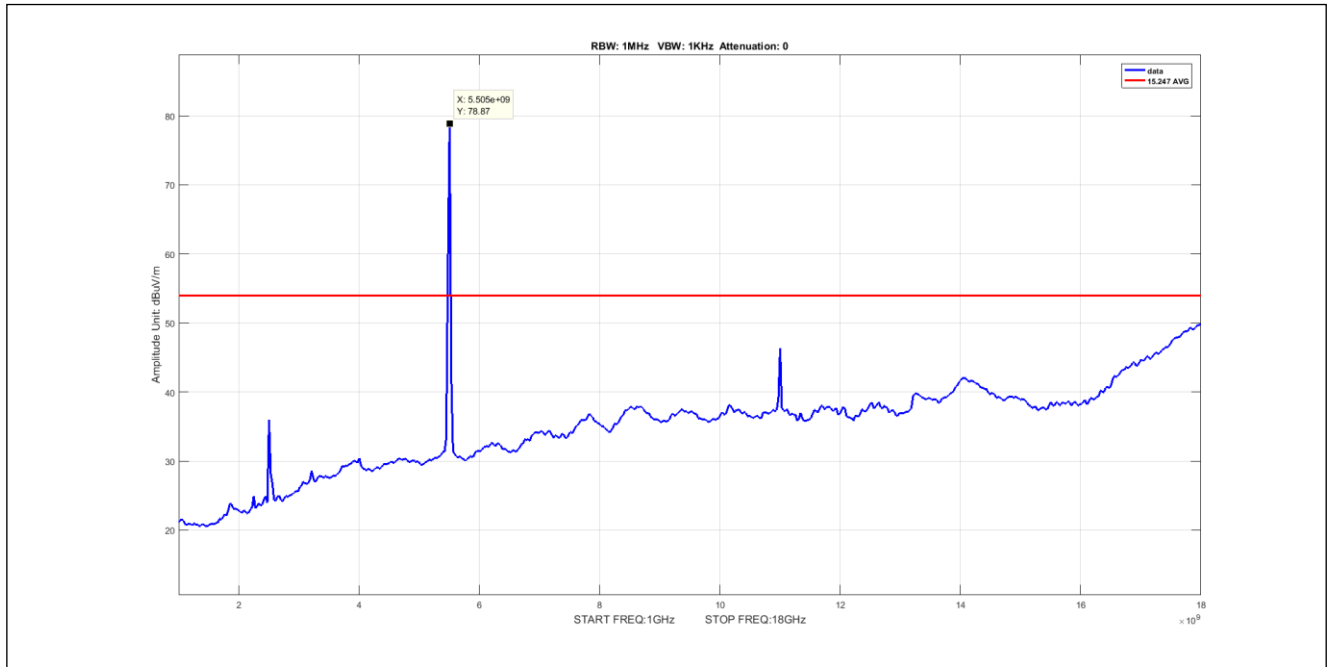
**Plot 152. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5320M, N Mode Port 1**



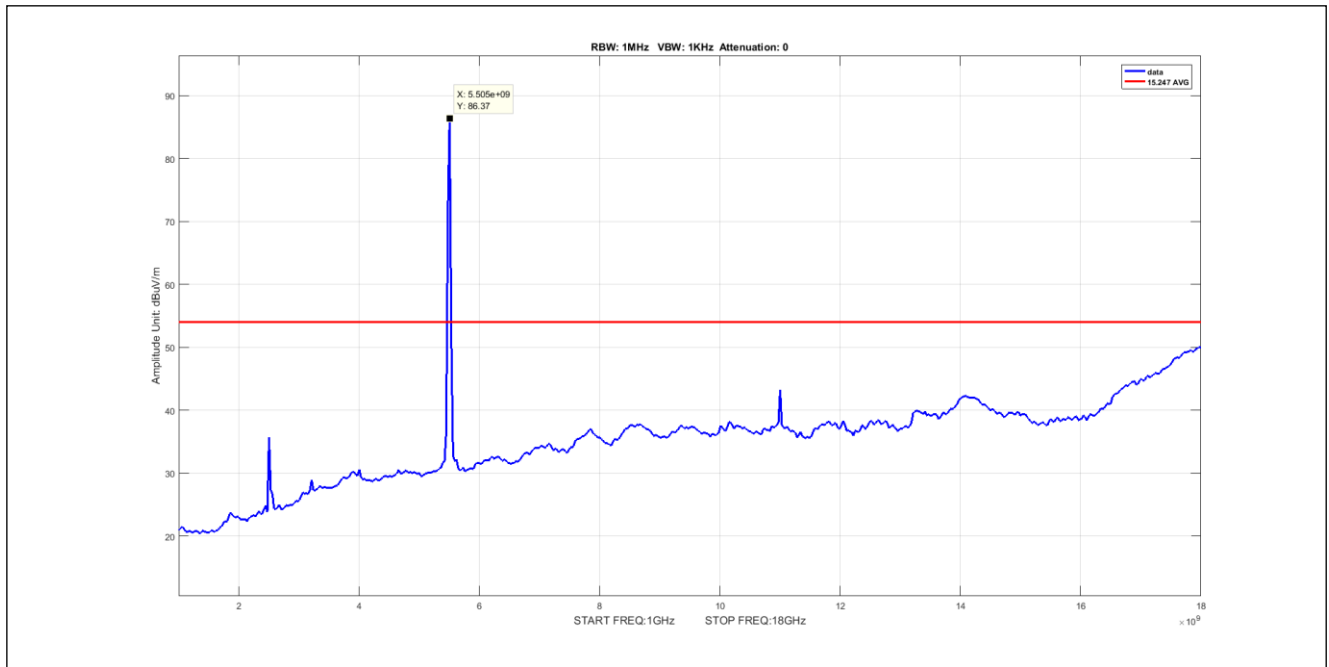
**Plot 153. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 40M, Ch 5270M, N Mode Port 1**



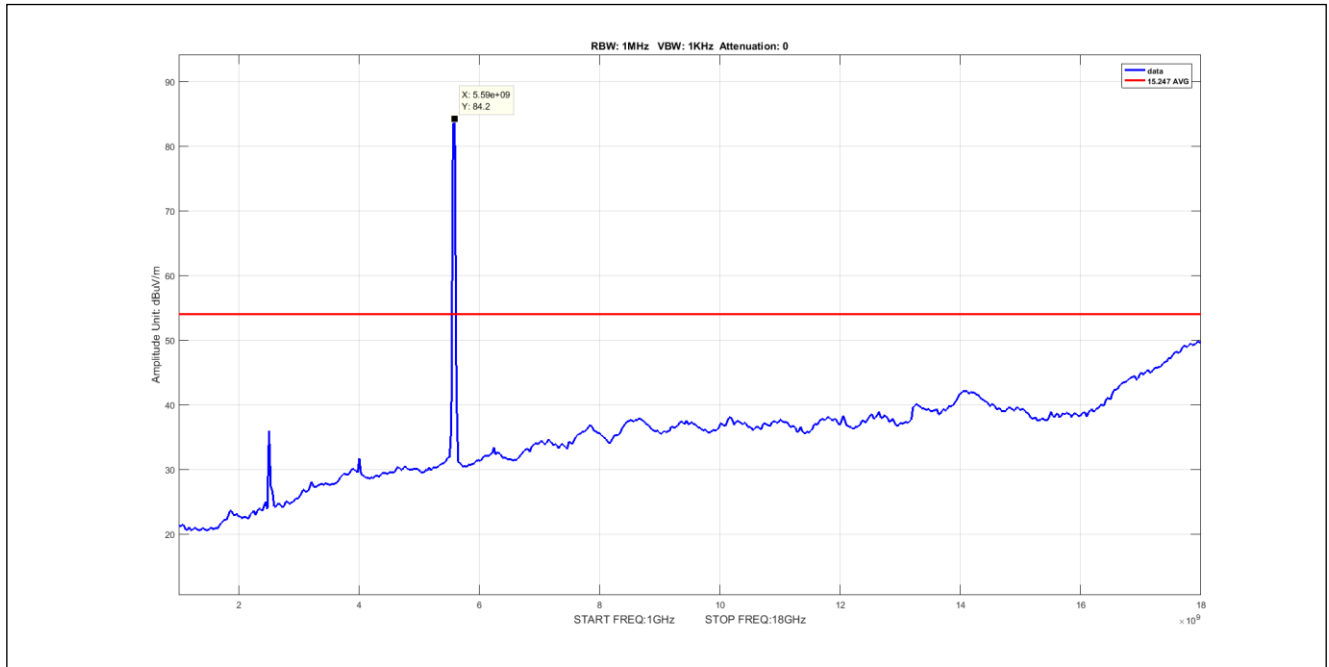
**Plot 154. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 40M, Ch 5310M, N Mode Port 1**



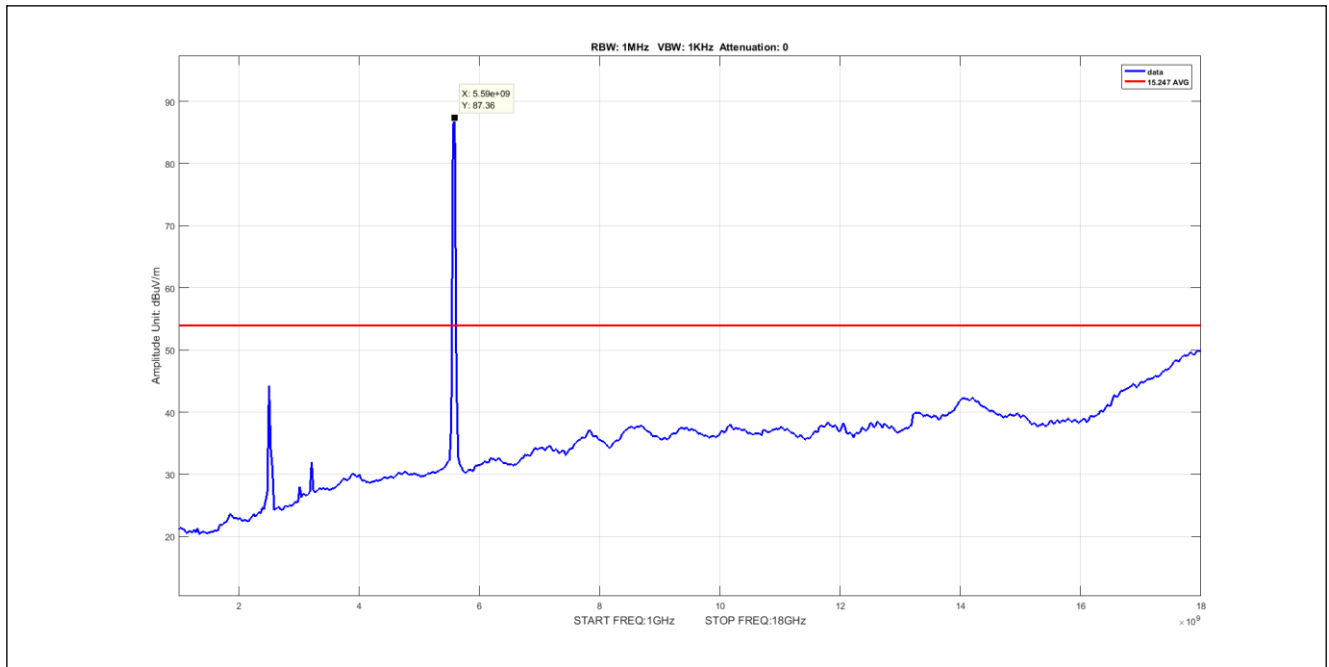
**Plot 155. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5500M, A Mode Port 1**



**Plot 156. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5500M, N Mode Port 1**

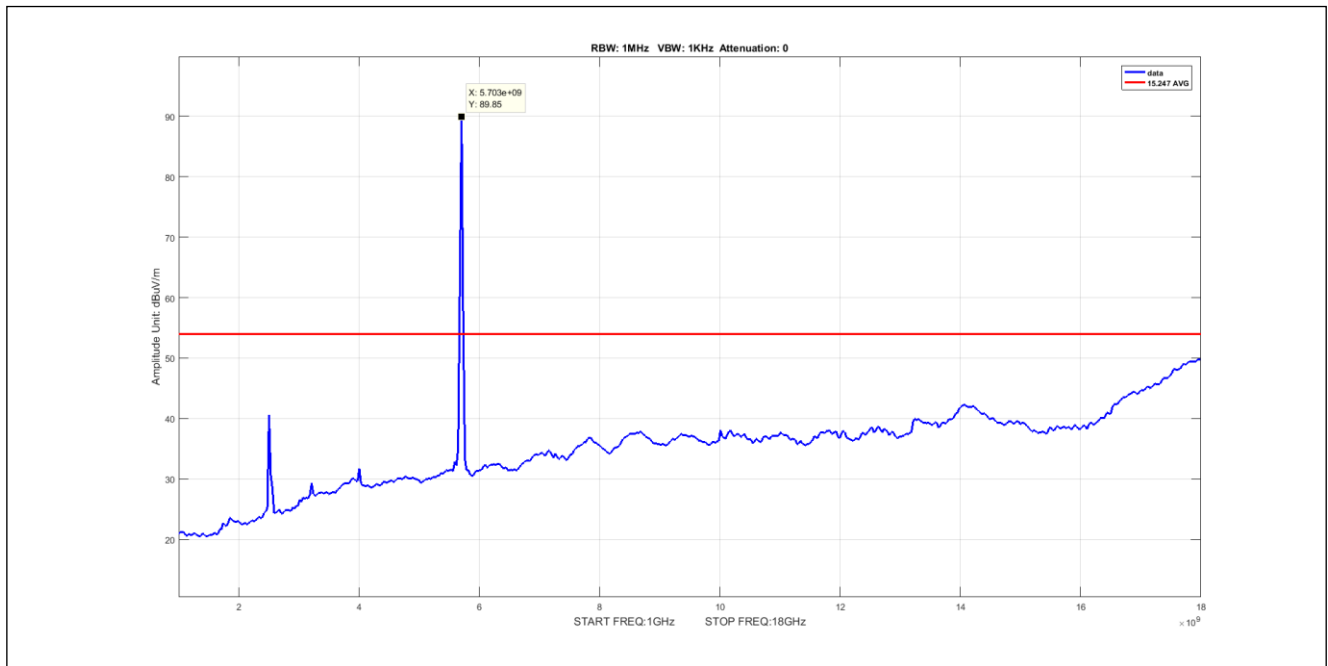


**Plot 157. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5580M, A Mode Port 1**

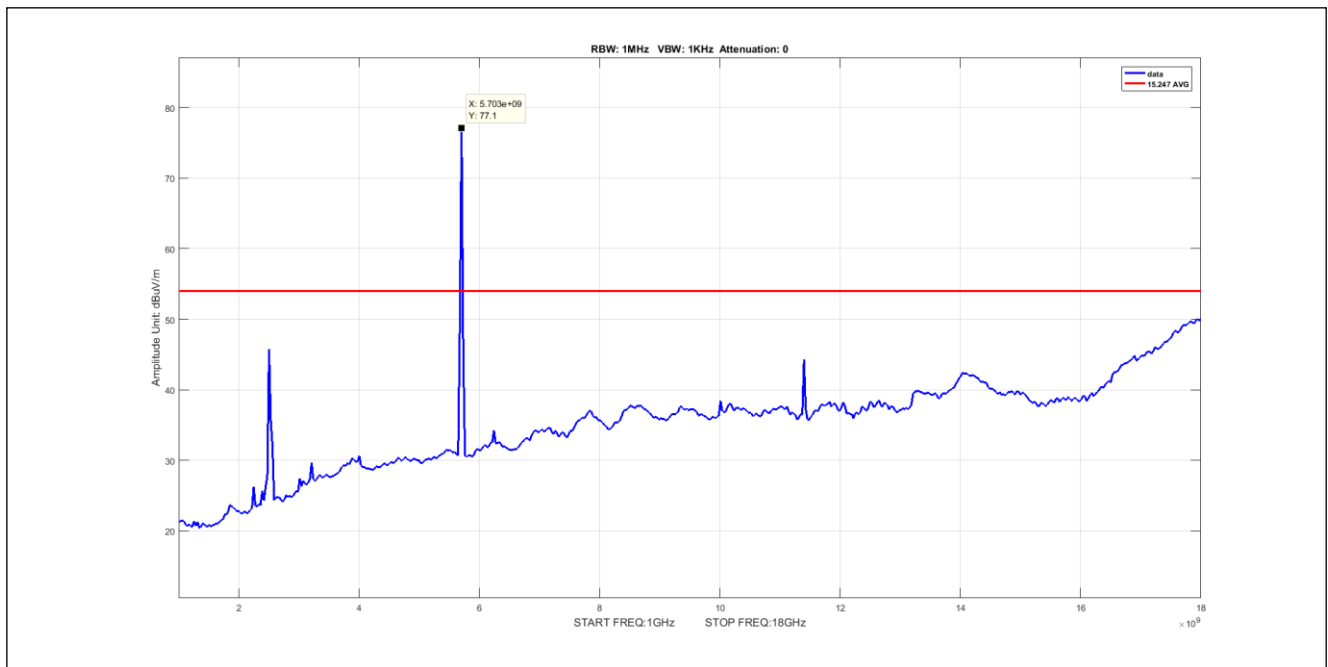


**Plot 158. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5580M, N Mode Port 1**

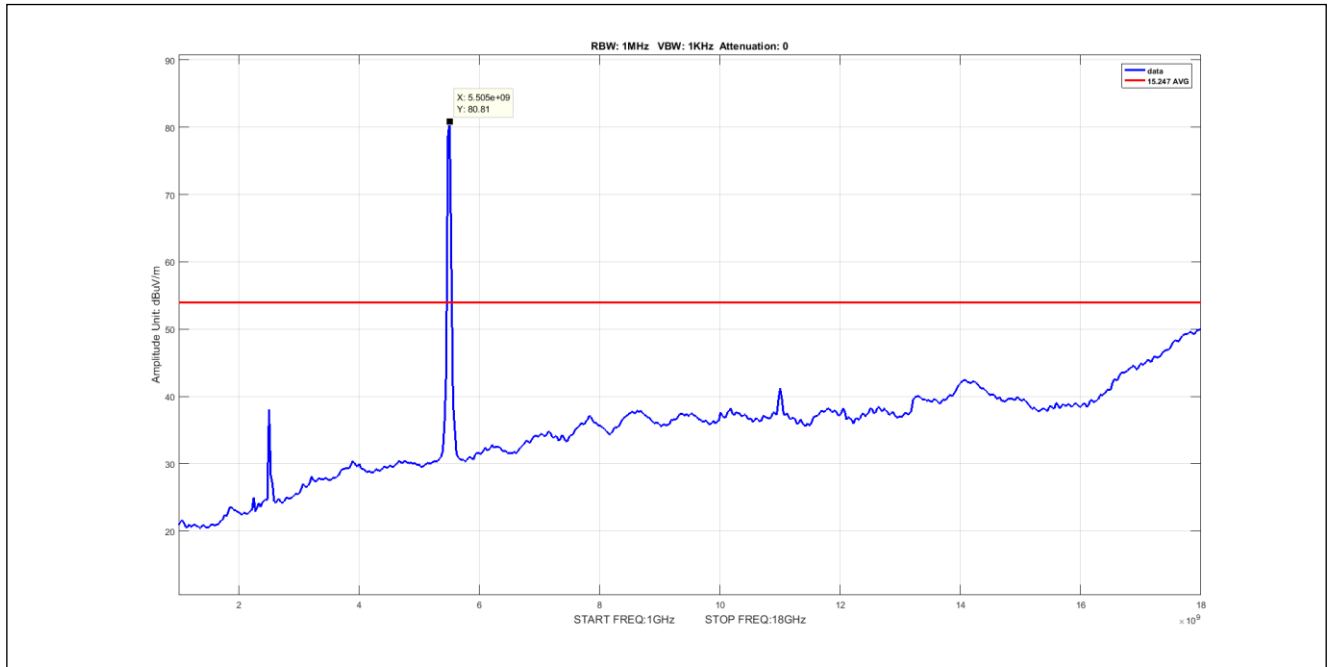




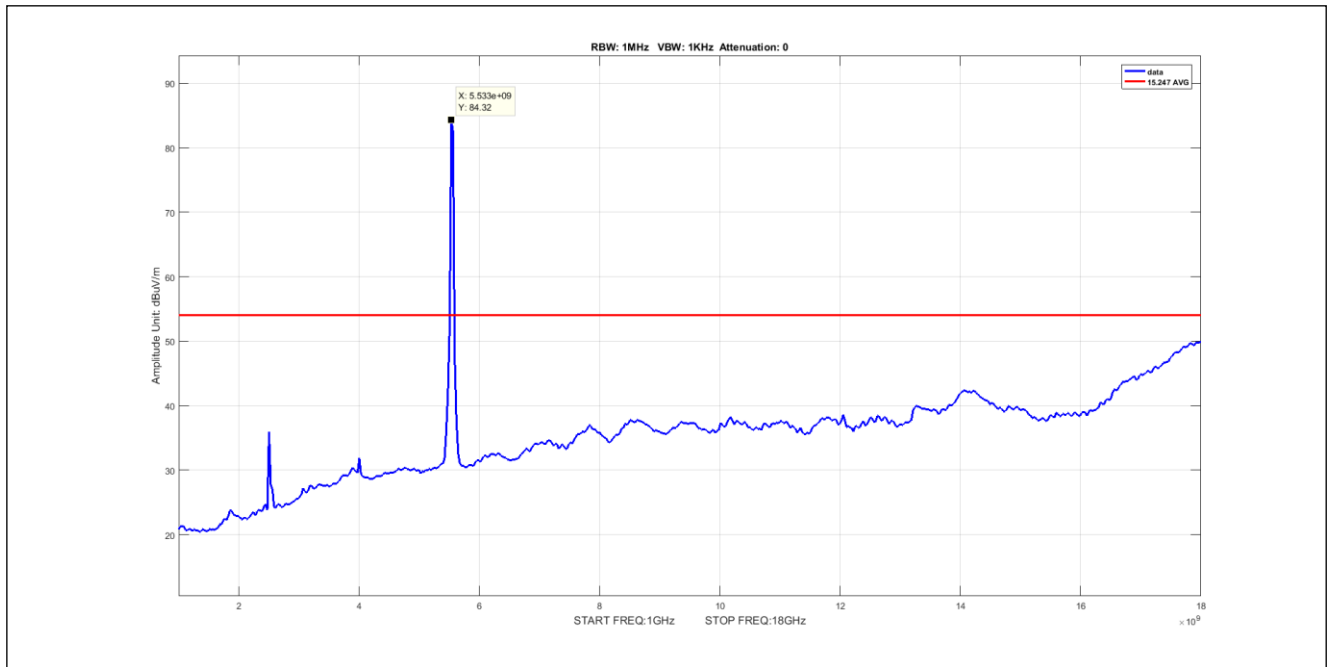
**Plot 159. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5700M, A Mode Port 1**



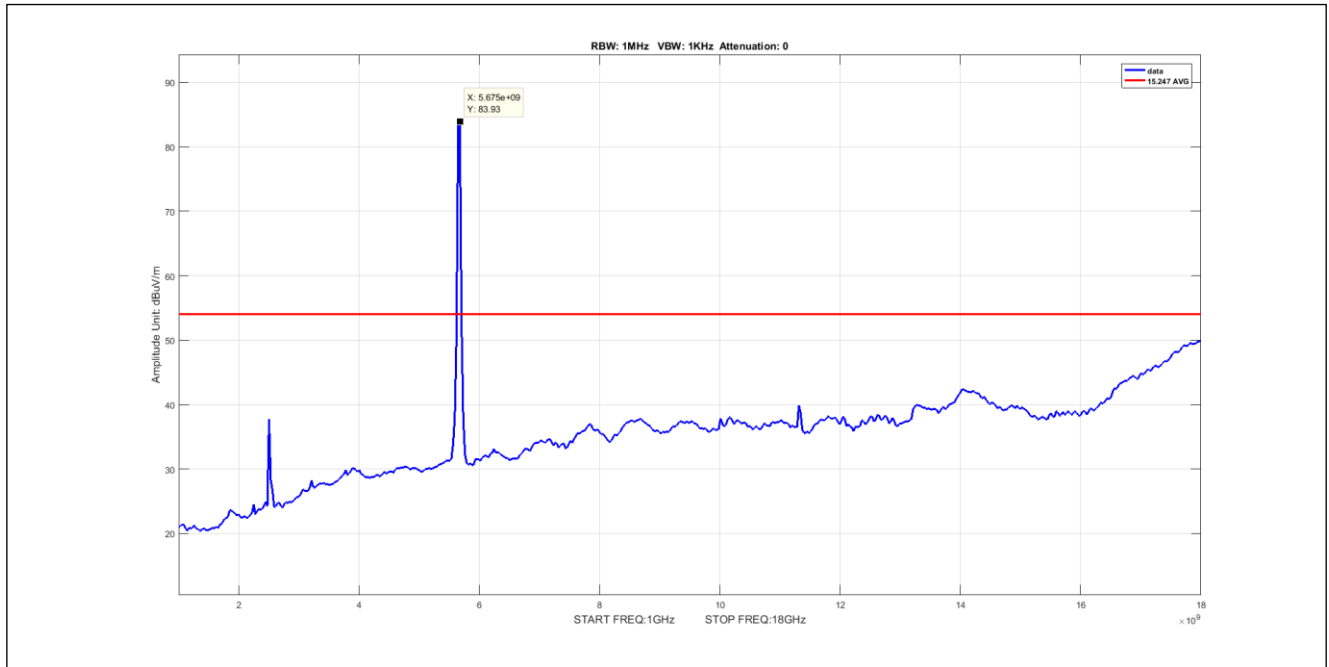
**Plot 160. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5700M, N Mode Port 1**



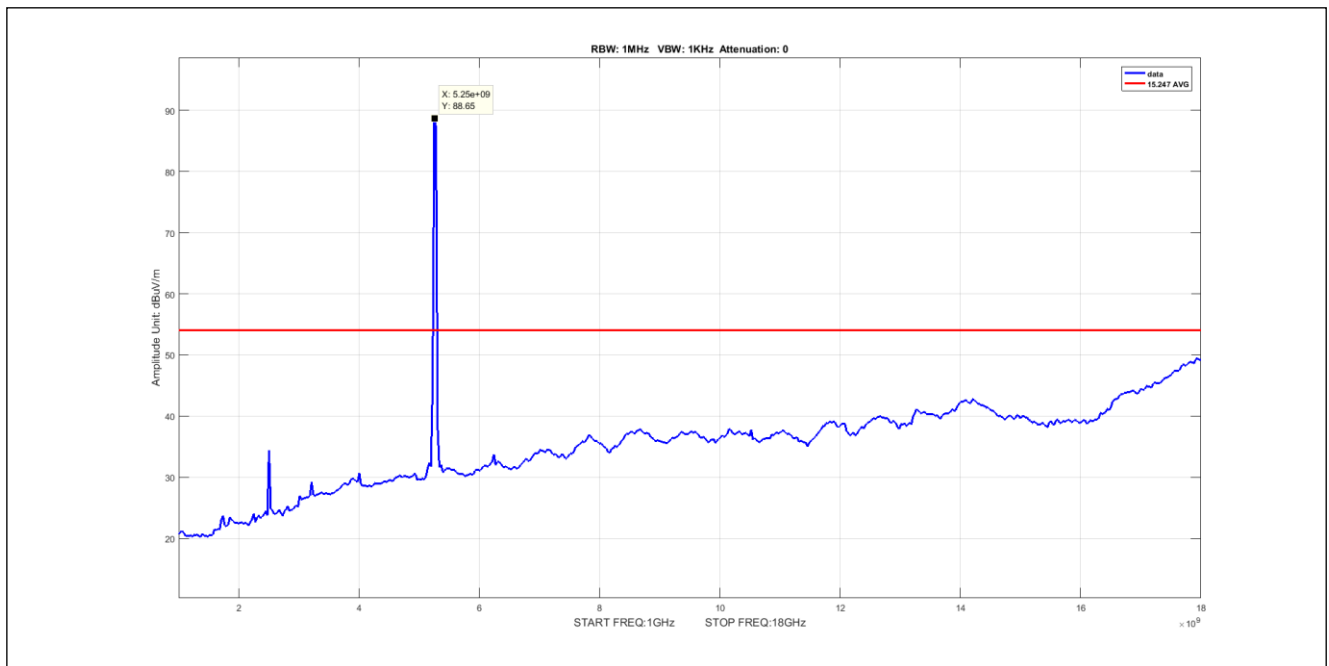
**Plot 161. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 40M, Ch 5510M, N Mode Port 1**



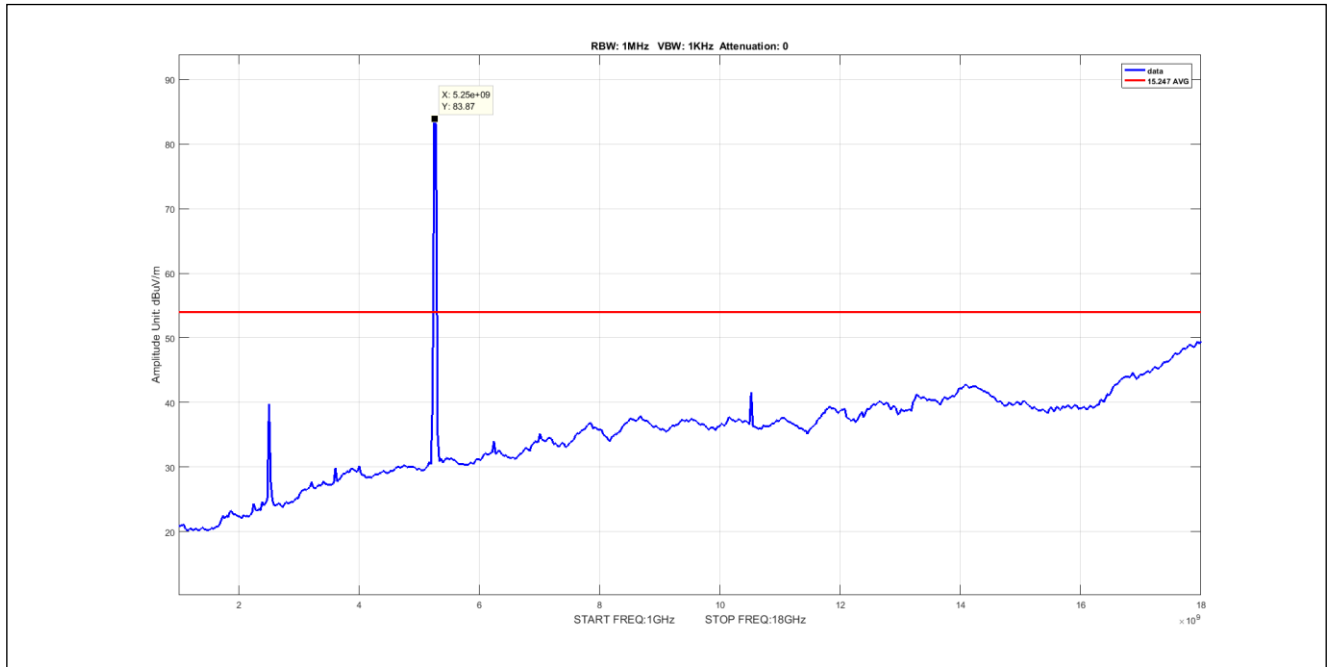
**Plot 162. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 40M, Ch 5550M, N Mode Port 1**



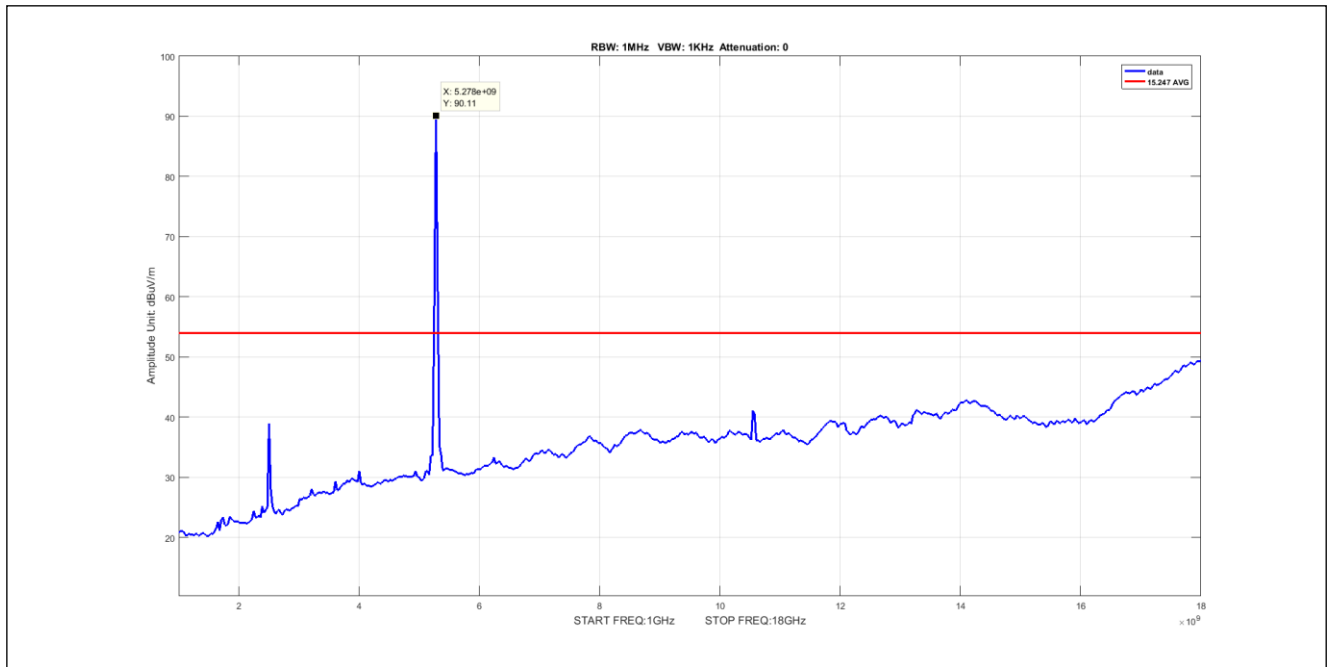
**Plot 163. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 40M, Ch 5670M, N Mode Port 1**



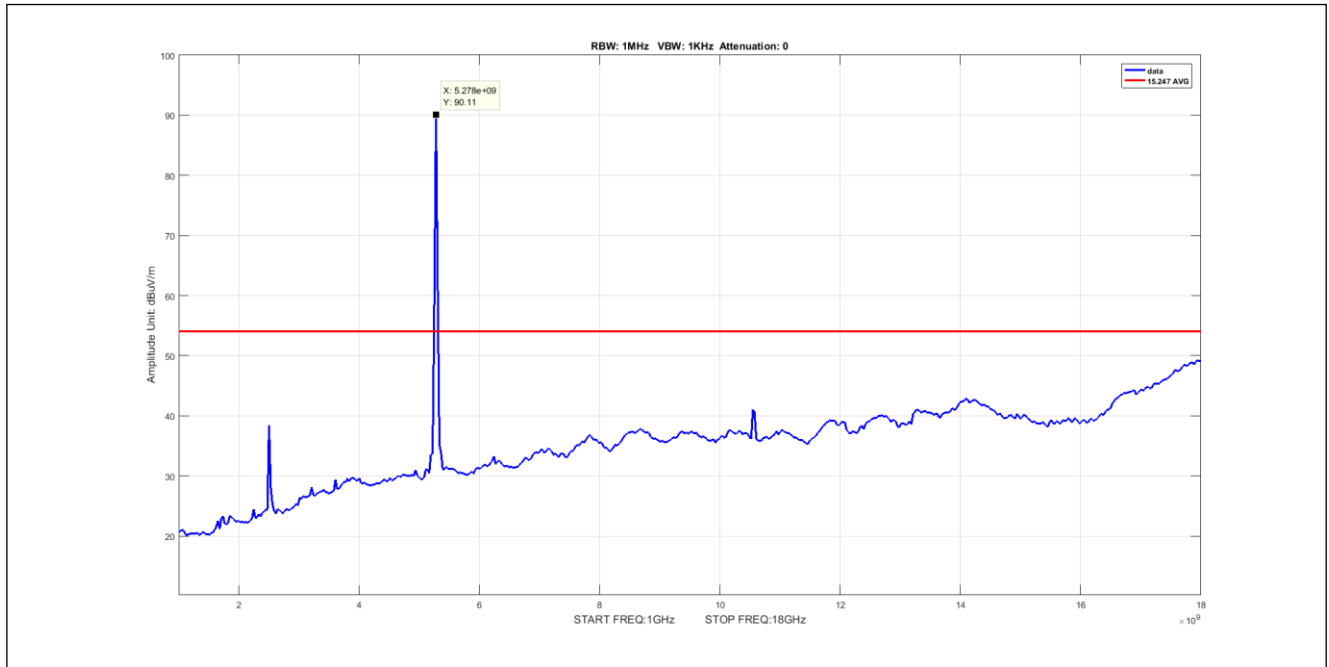
**Plot 164. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5260M, A Mode Port 2**



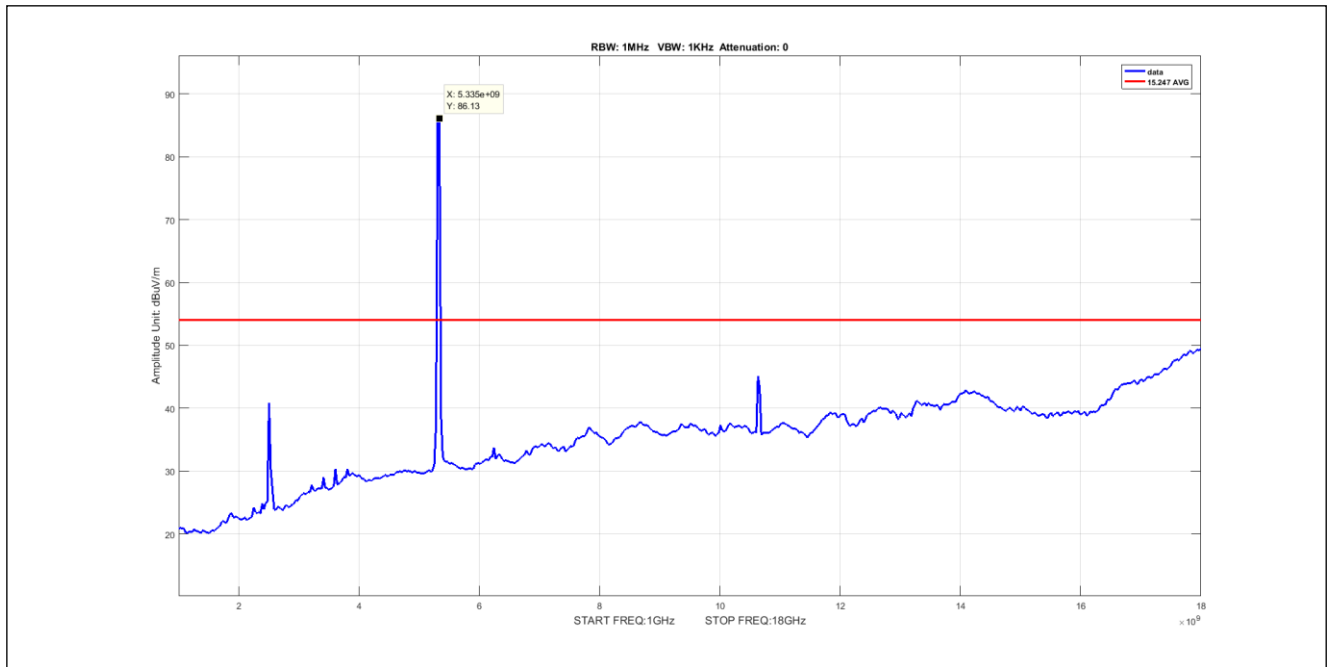
**Plot 165. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5260M, N Mode Port 2**



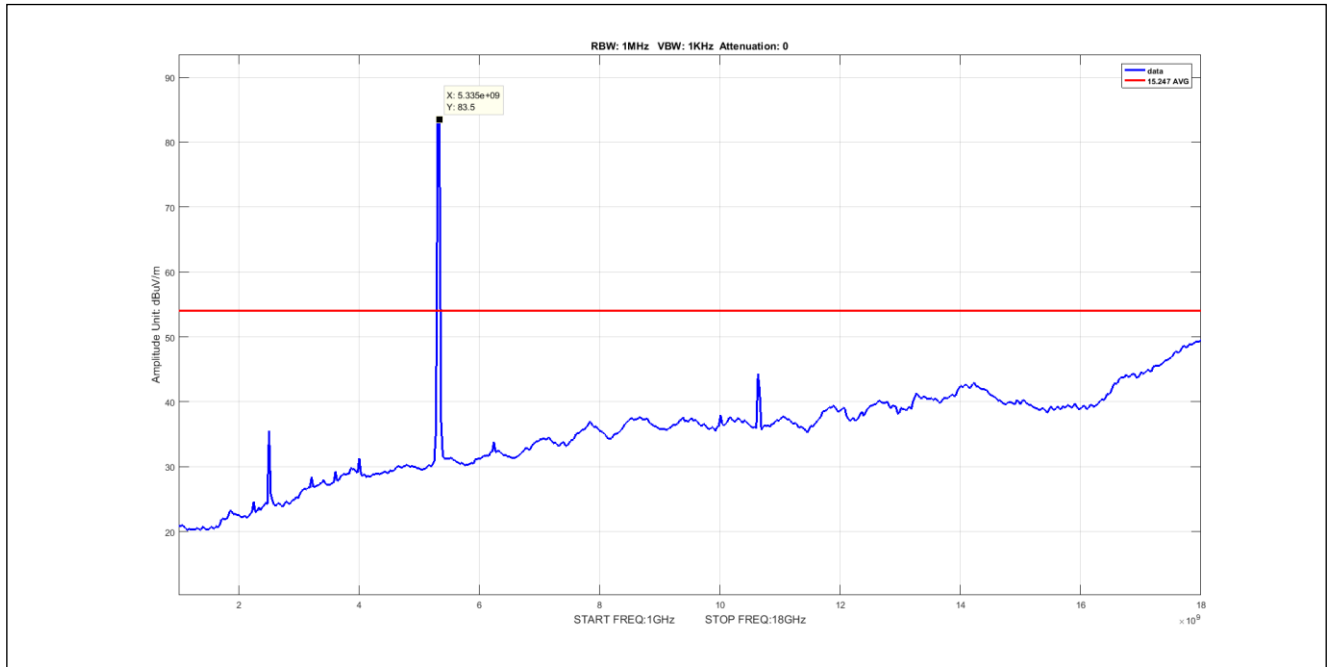
**Plot 166. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5280M, A Mode Port 2**



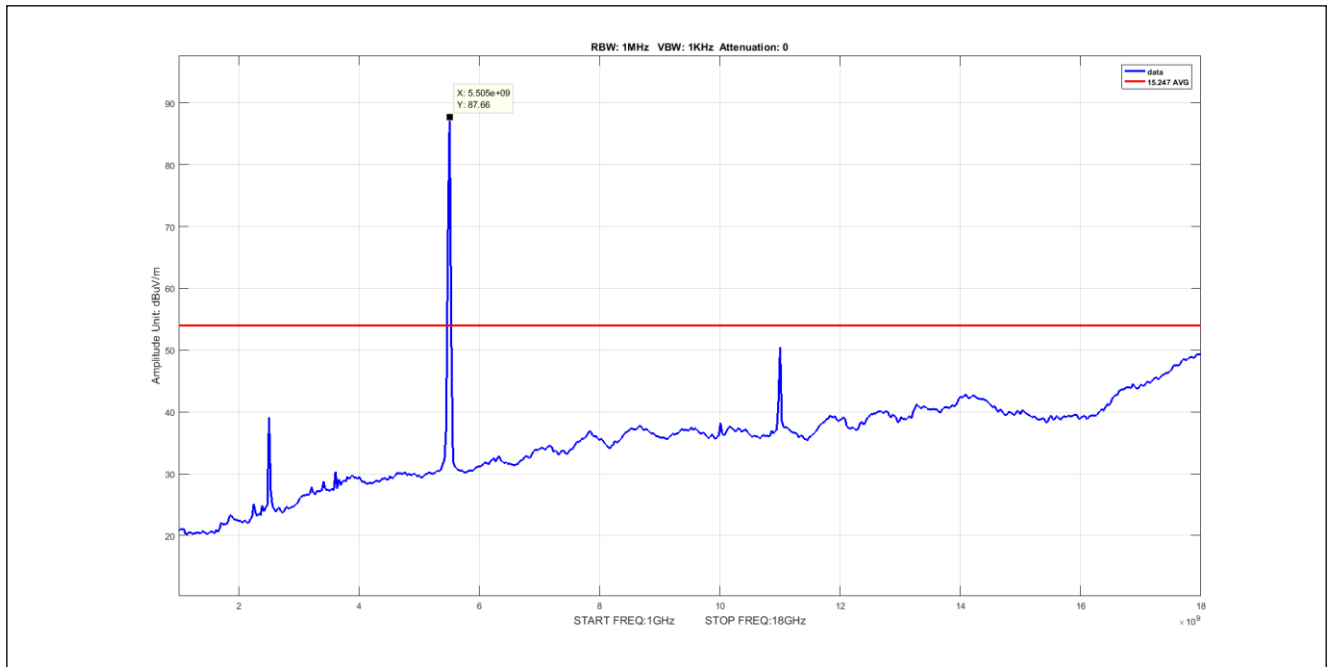
**Plot 167. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5280M, N Mode Port 2**



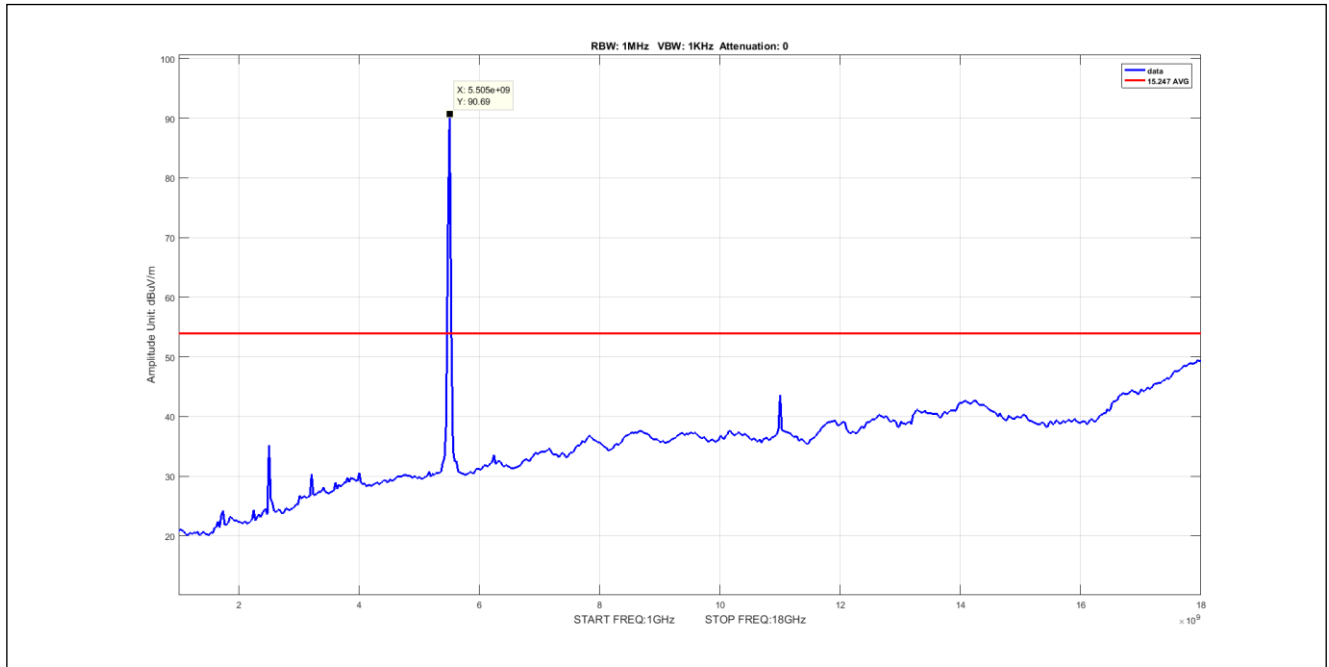
**Plot 168. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5320M, A Mode Port 2**



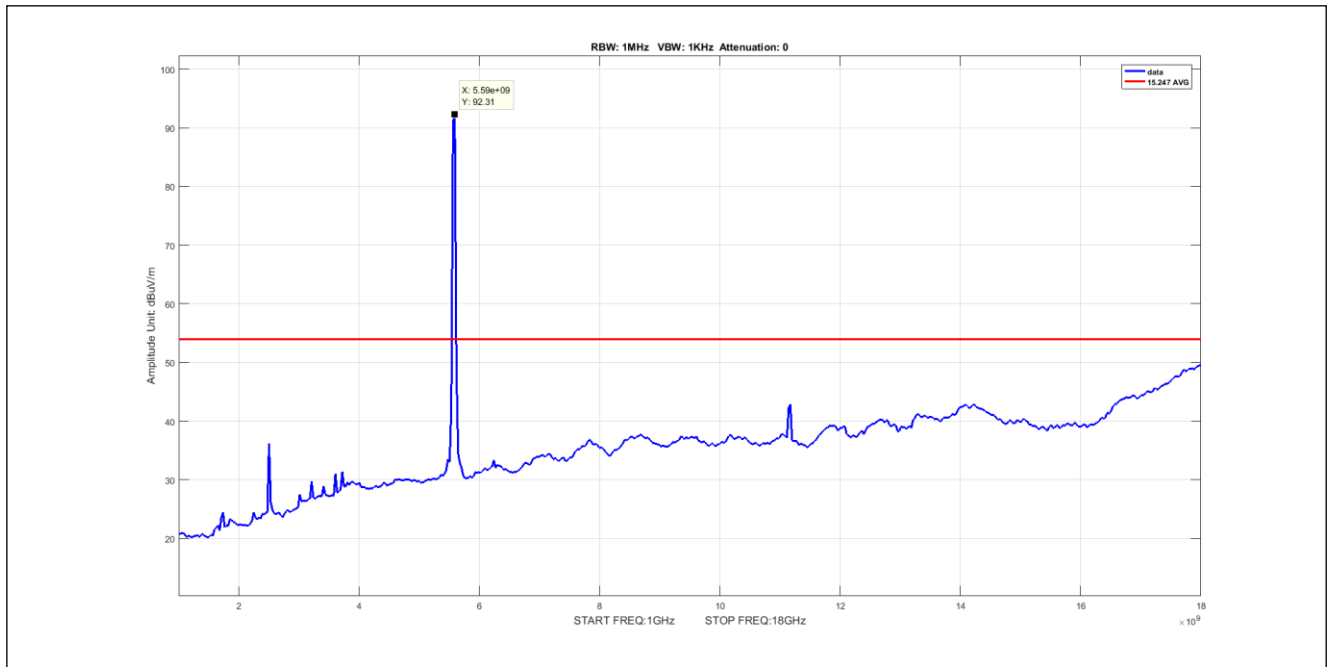
**Plot 169. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5320M, N Mode Port 2**



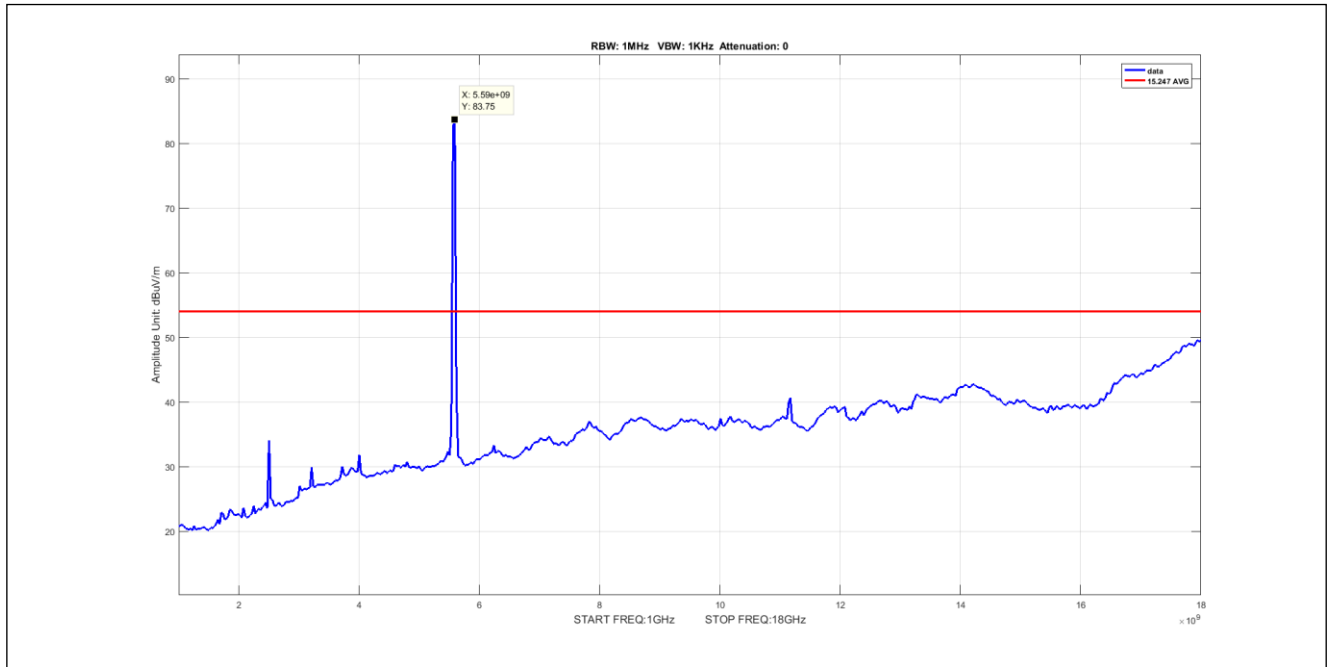
**Plot 170. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5500M, A Mode Port 2**



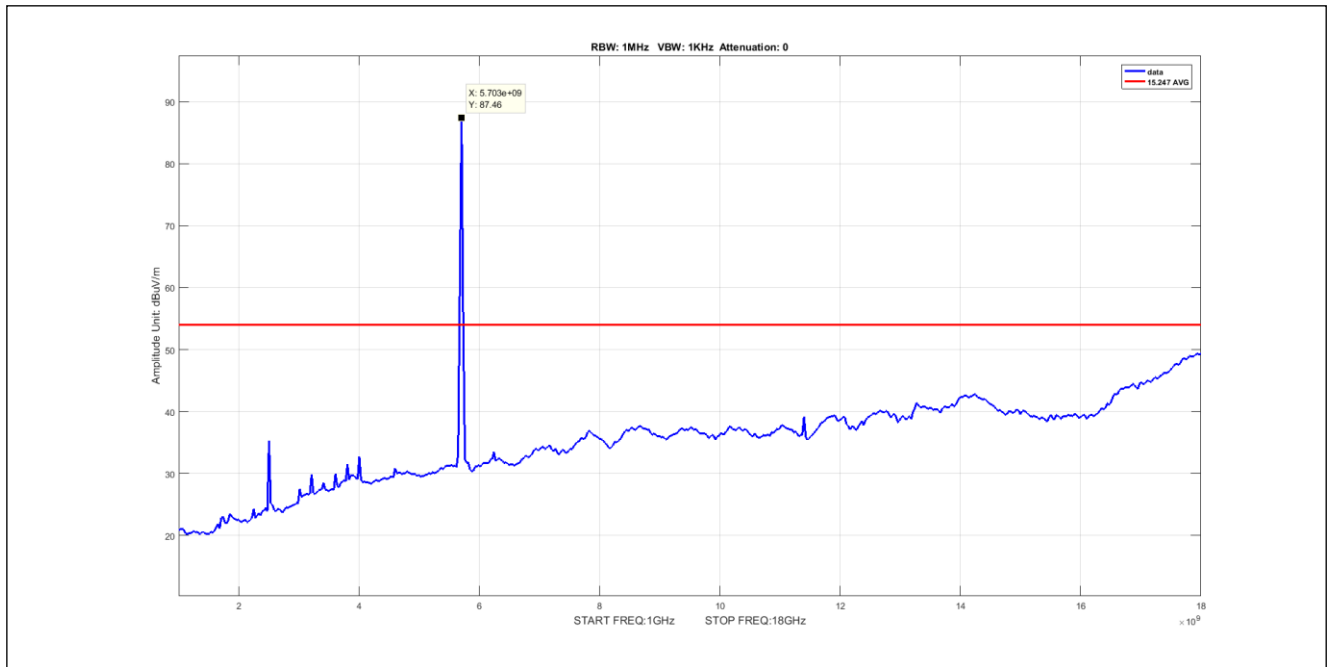
**Plot 171. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5500M, N Mode Port 2**



**Plot 172. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5580M, A Mode Port 2**

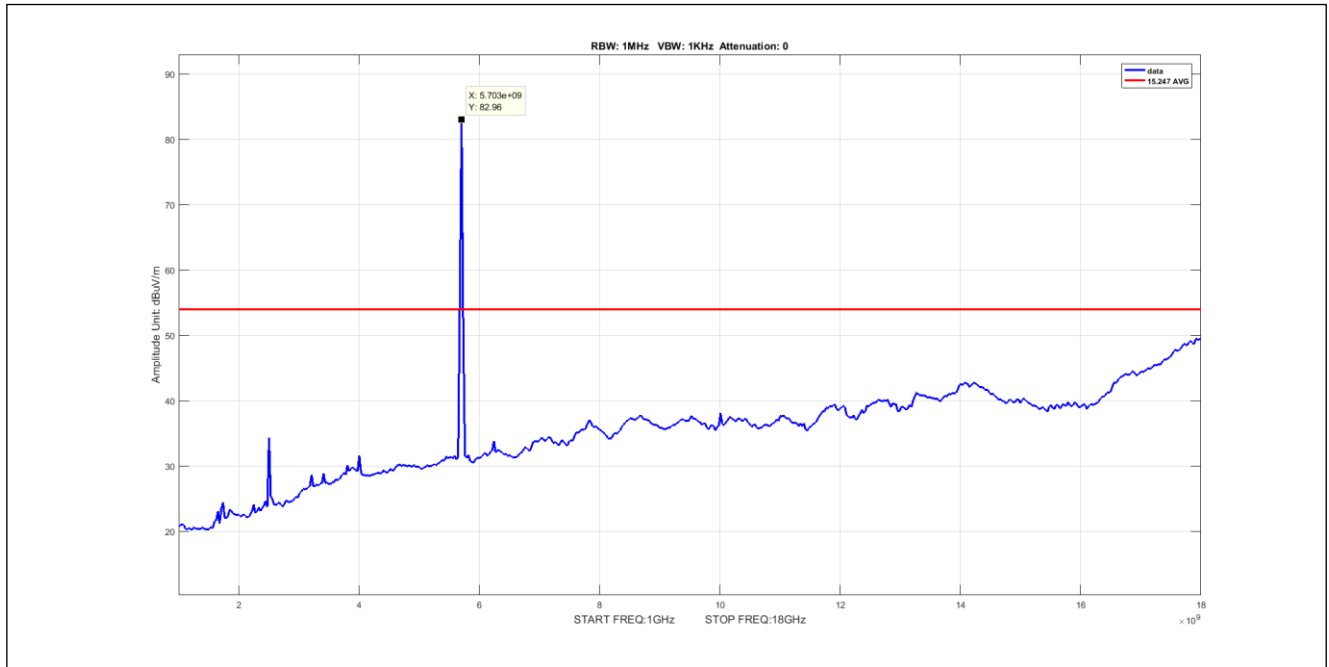


**Plot 173. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5580M, N Mode Port 2**

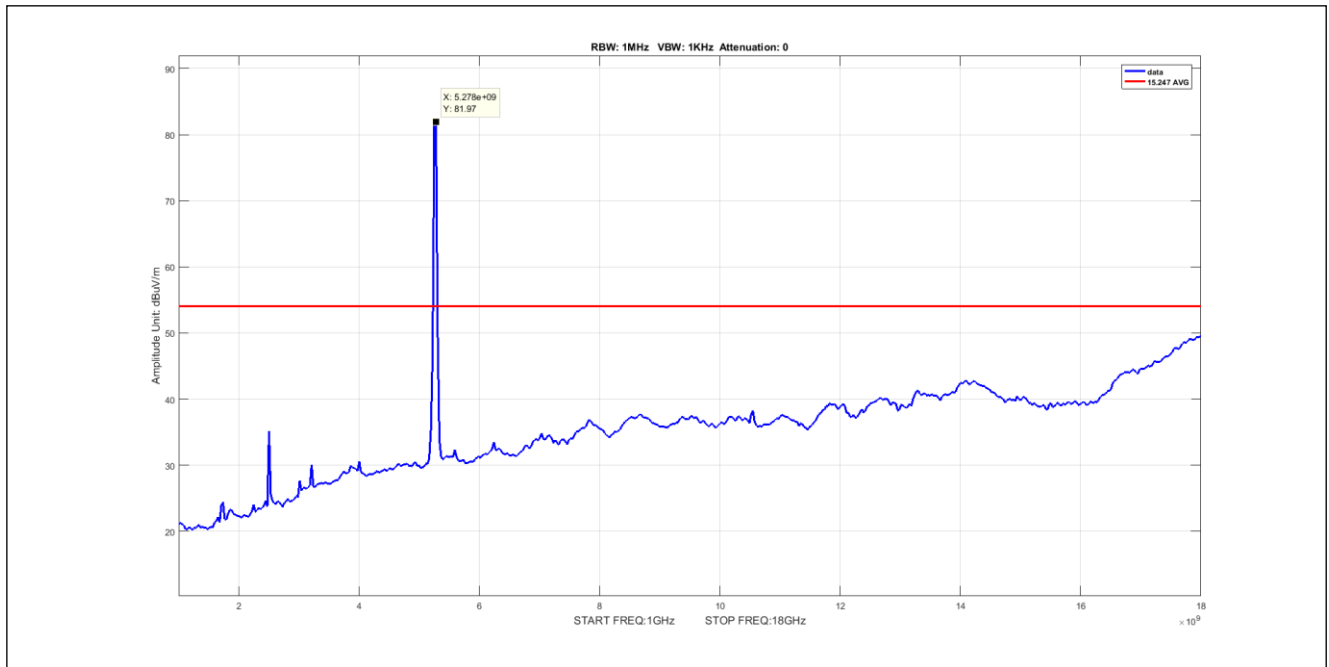


**Plot 174. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5700M, A Mode Port 2**

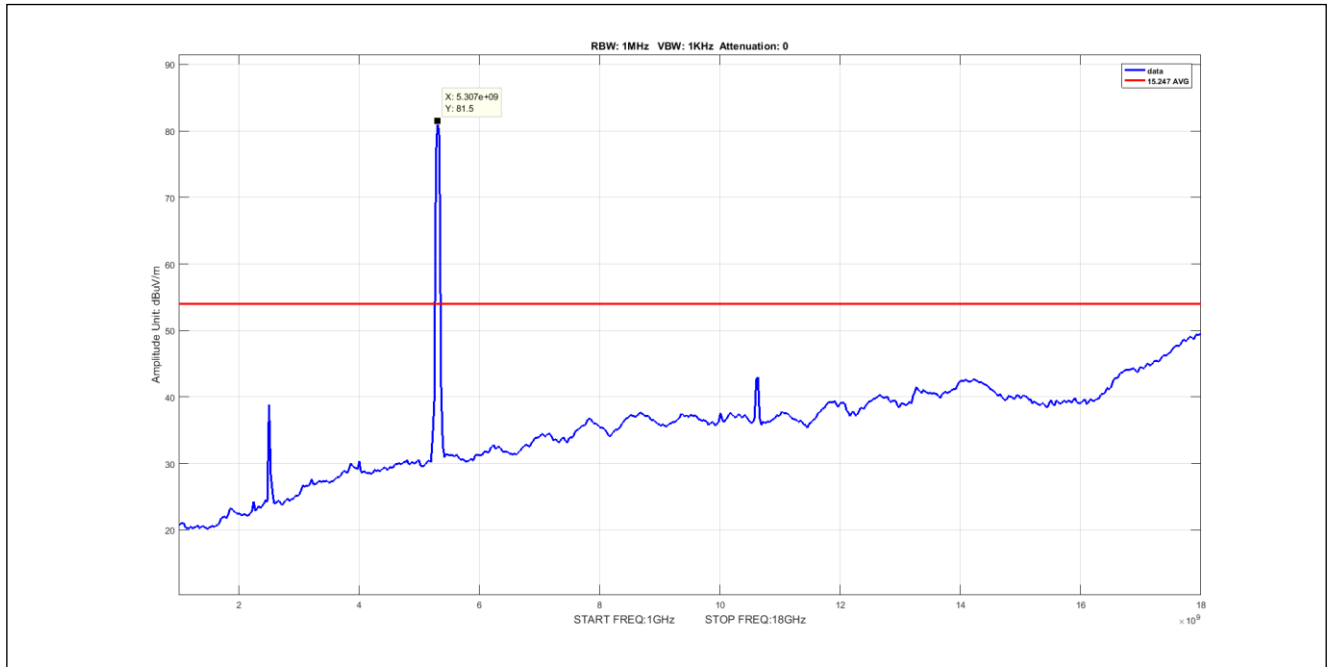




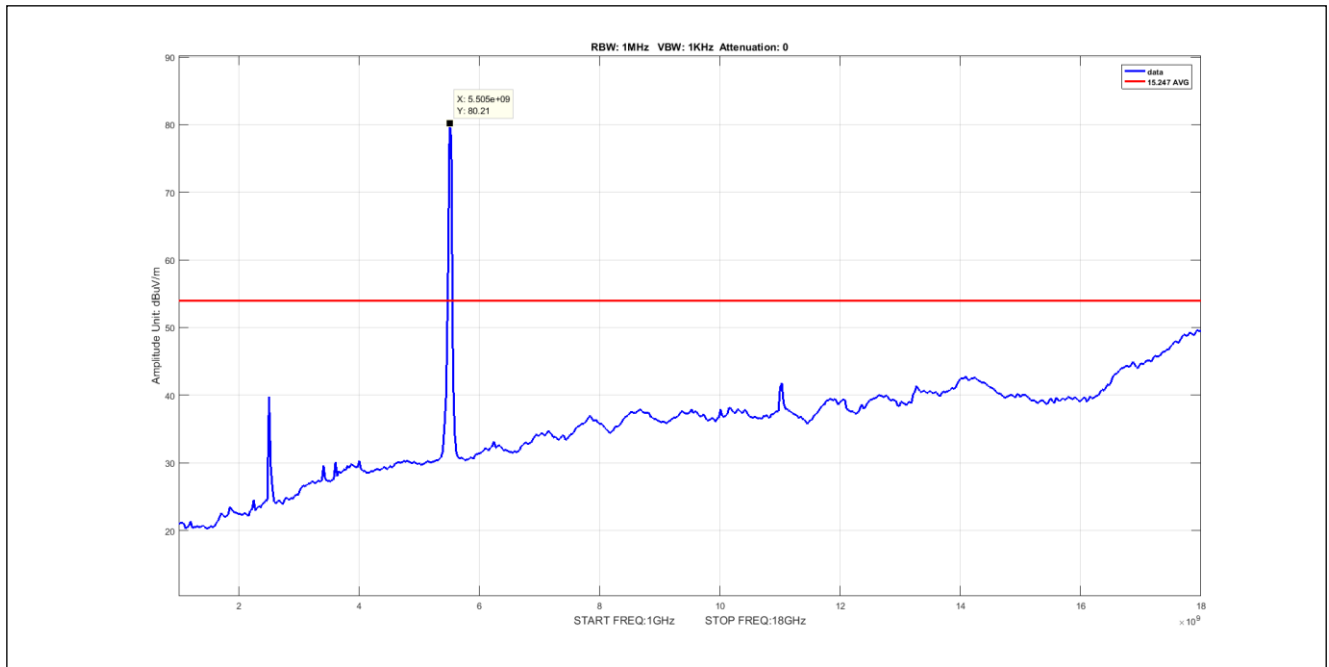
**Plot 175. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 20M, Ch 5700M, N Mode Port 2**



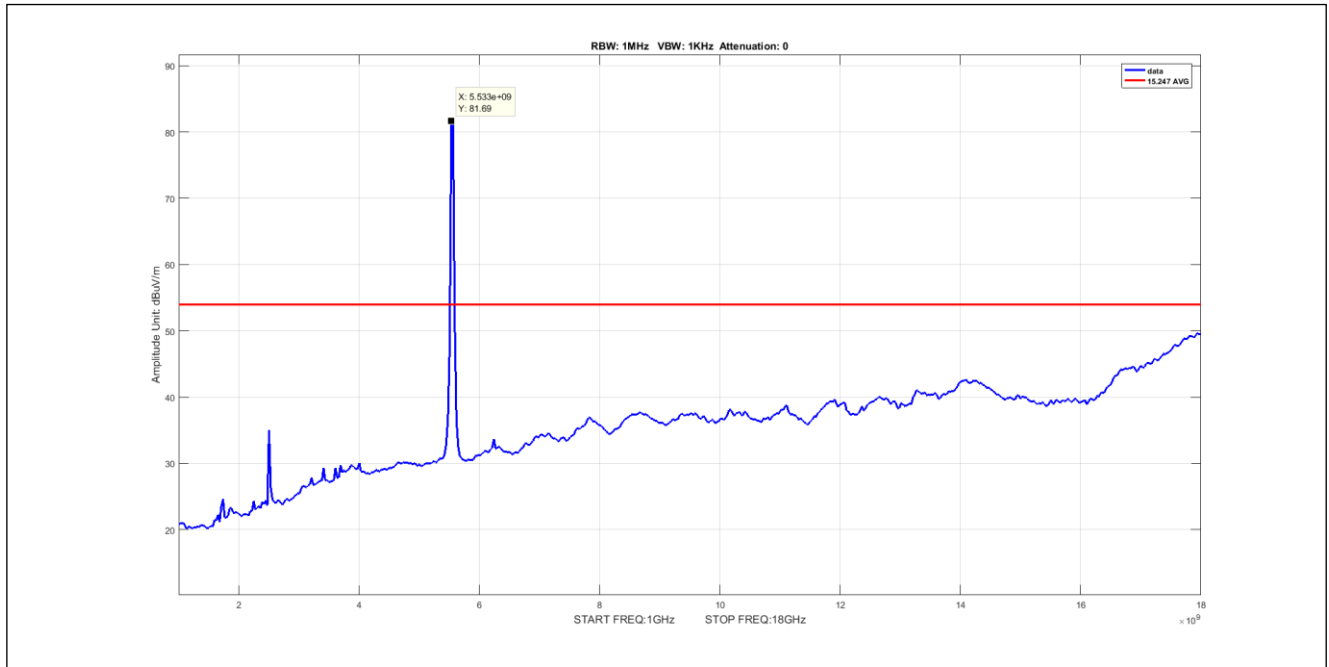
**Plot 176. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 40M, Ch 5270M, N Mode Port 2**



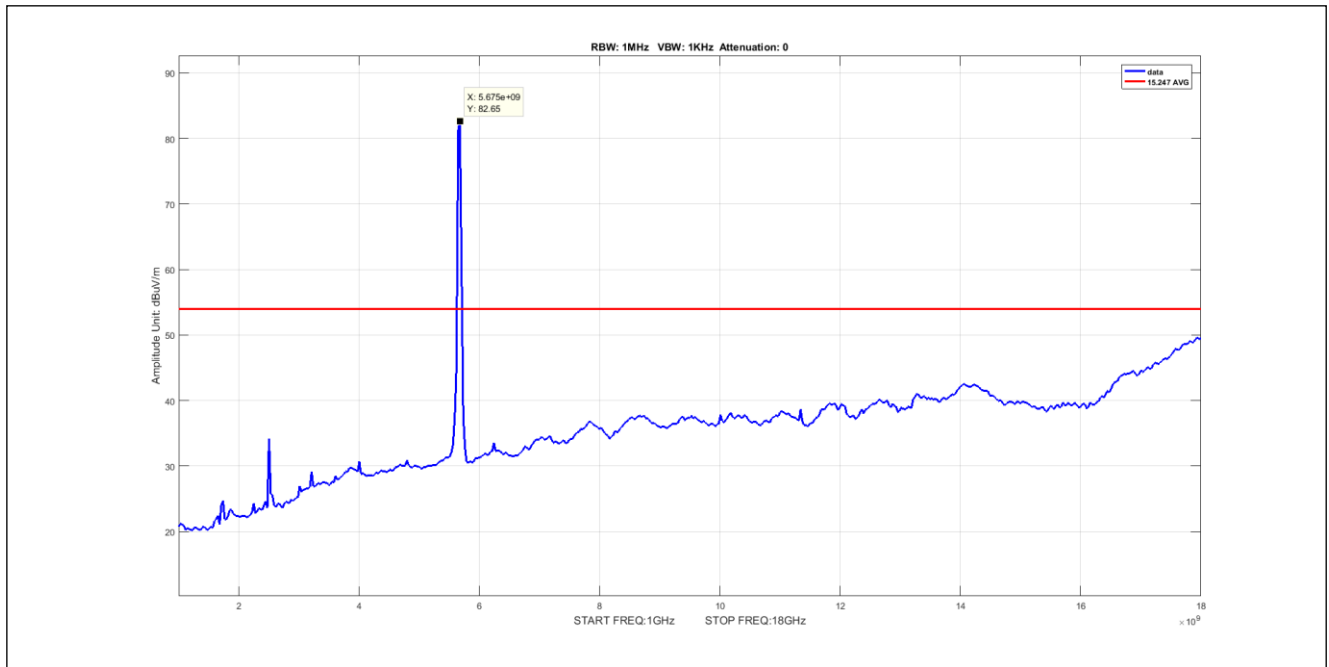
**Plot 177. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 40M, Ch 5310M, N Mode Port 2**



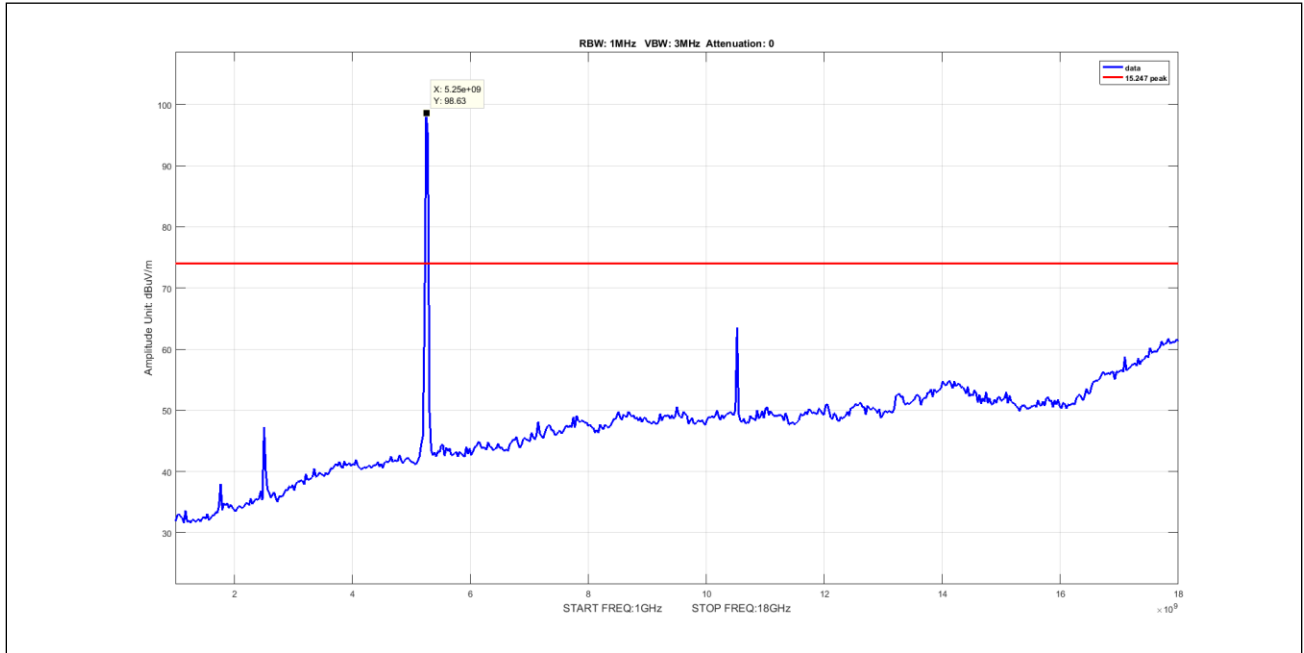
**Plot 178. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 40M, Ch 5510M, N Mode Port 2**



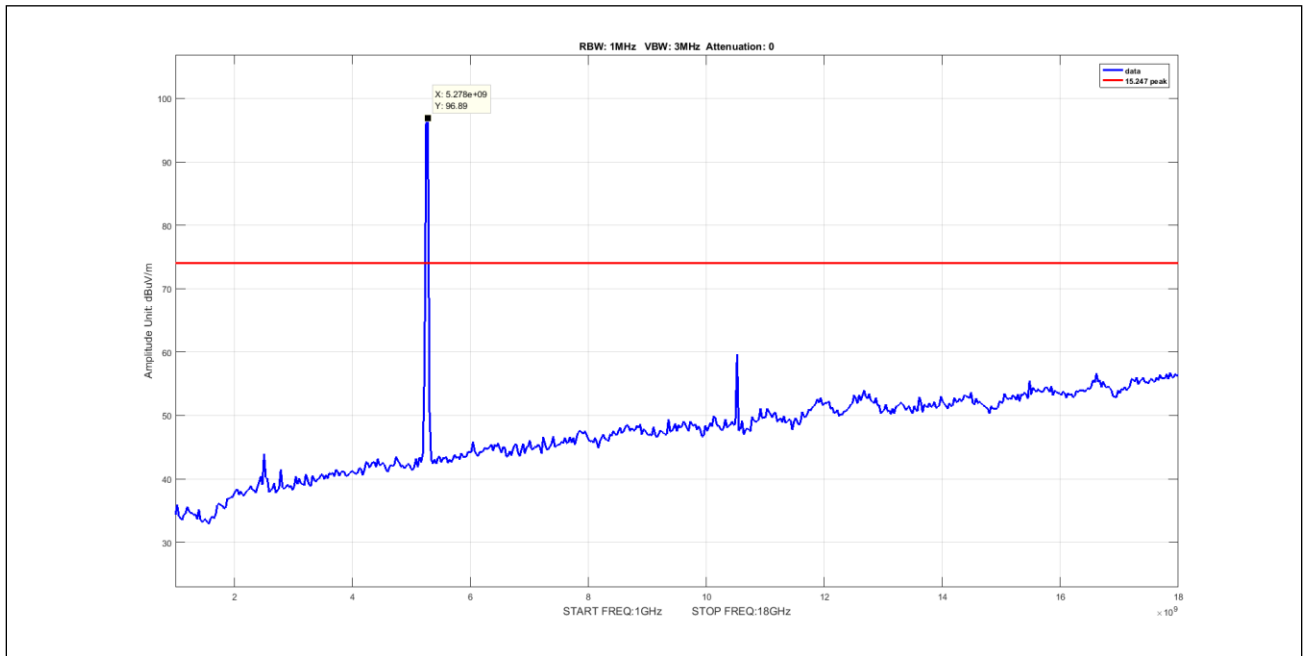
**Plot 179. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 40M, Ch 5500M, N Mode Port 2**



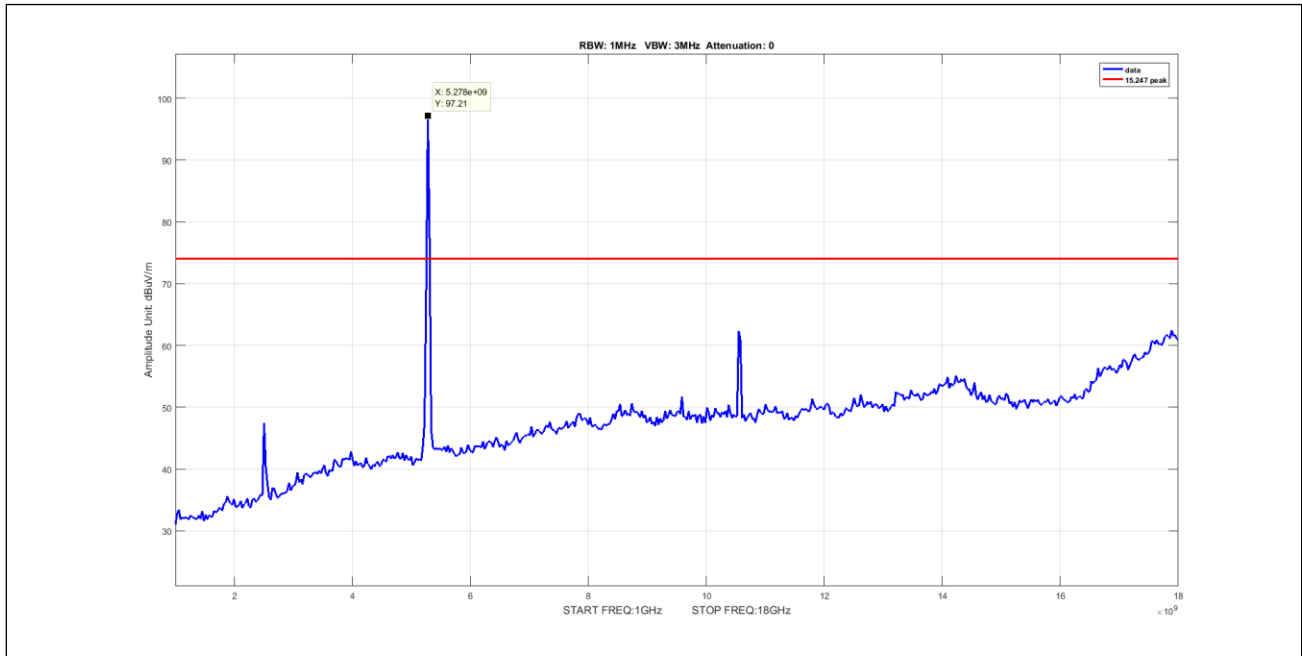
**Plot 180. Undesirable Emissions, Average Spurious Emission 1-18GHz, BW 40M, Ch 5670M, N Mode Port 2**



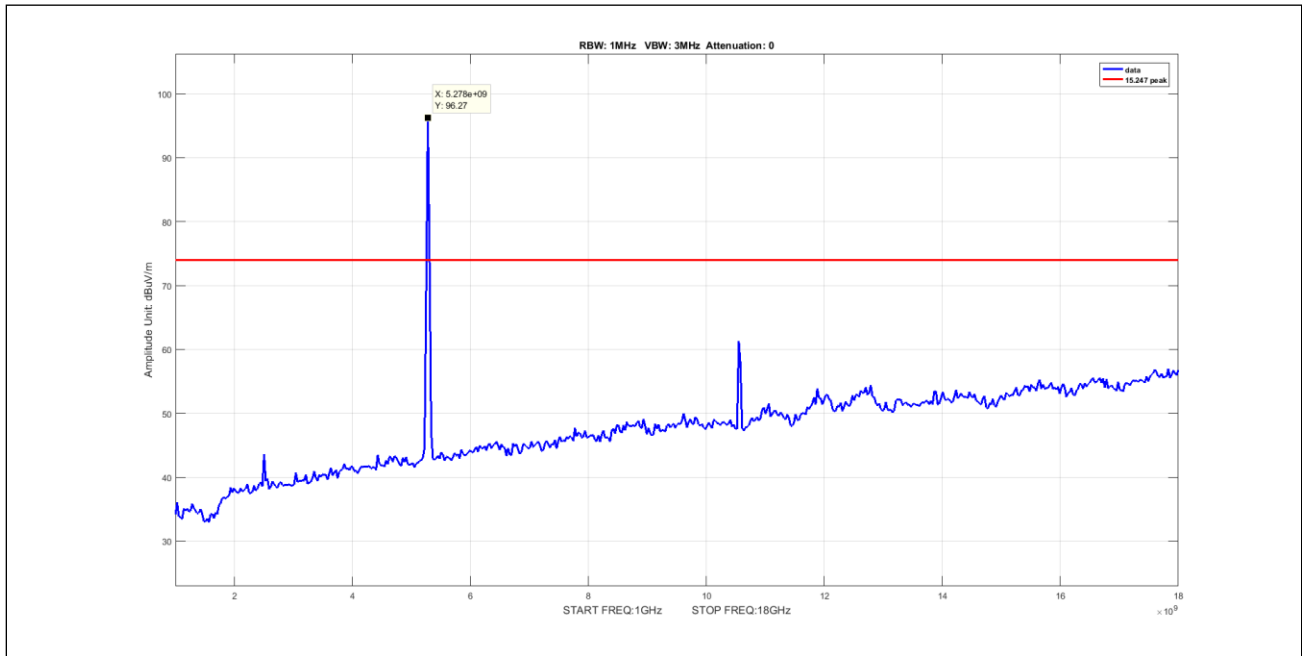
**Plot 181. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5260M, A Mode Port 1**



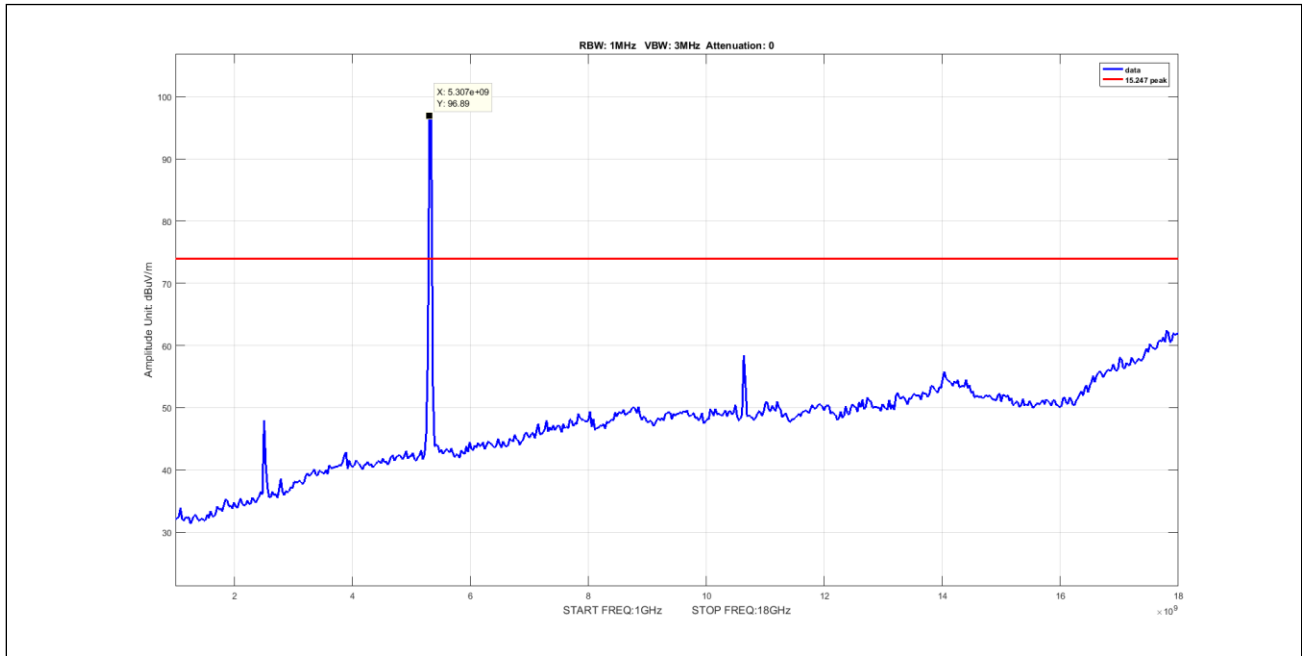
**Plot 182. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5260M, N Mode Port 1**



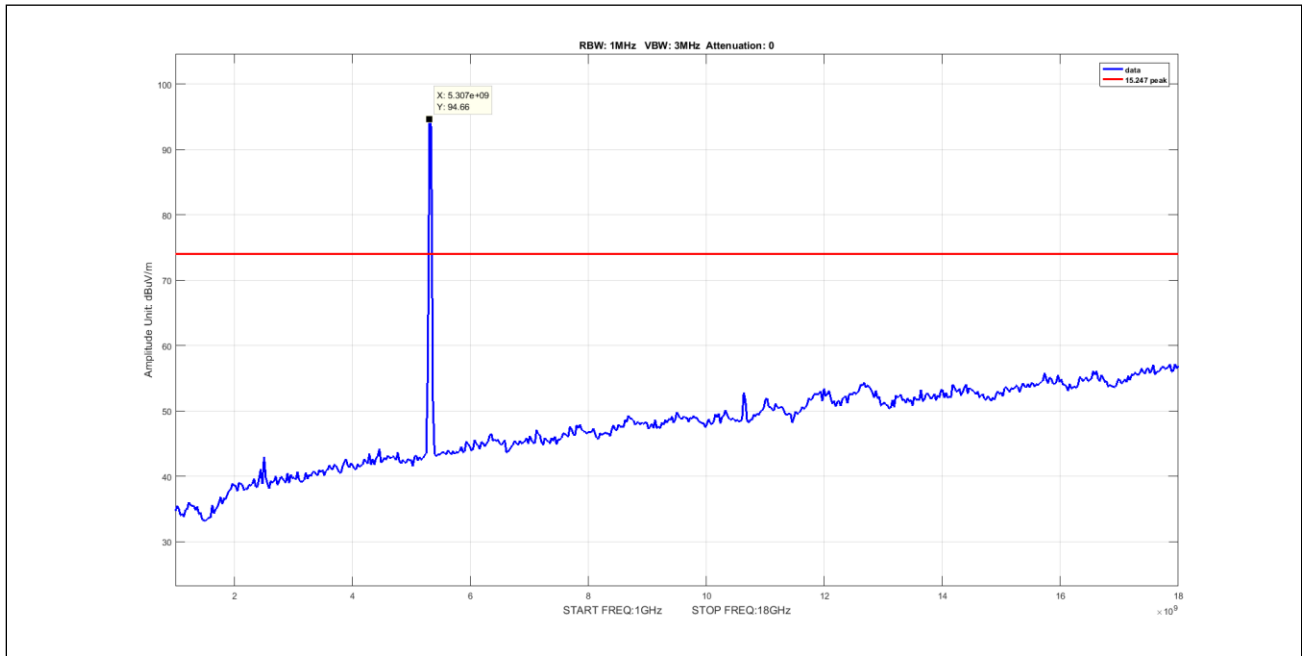
**Plot 183. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5280M, A Mode Port 1**



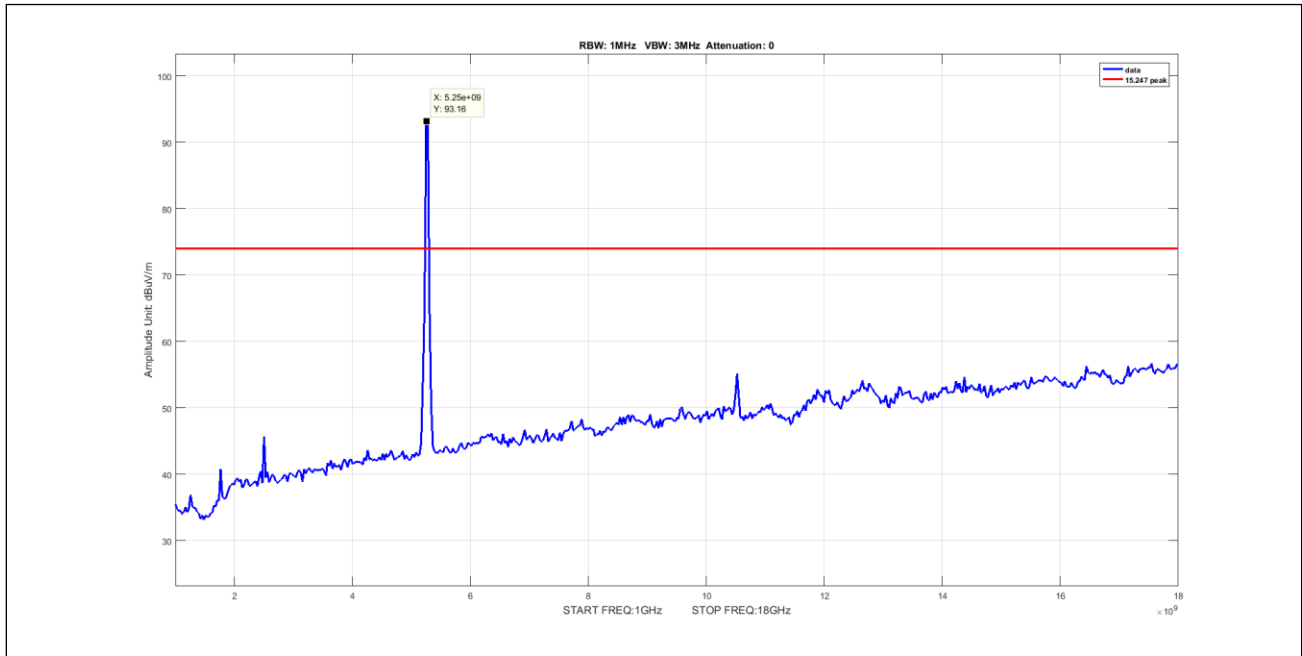
**Plot 184. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5280M, N Mode Port 1**



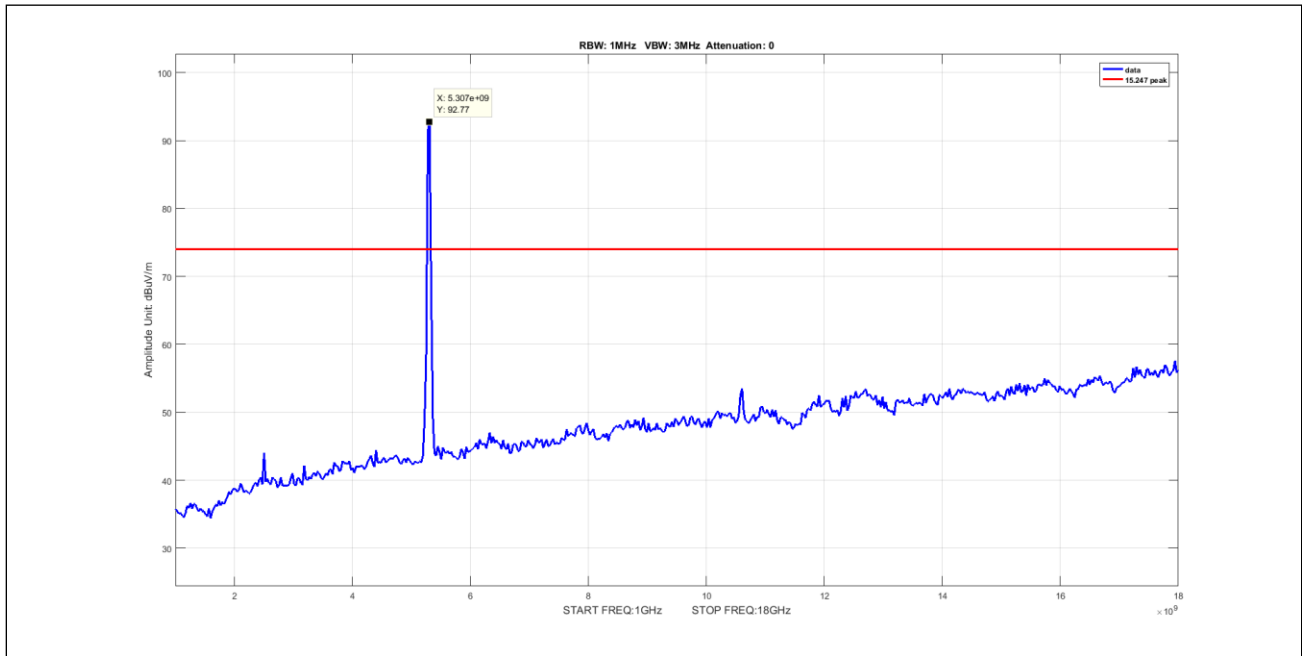
**Plot 185. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5320M, A Mode Port 1**



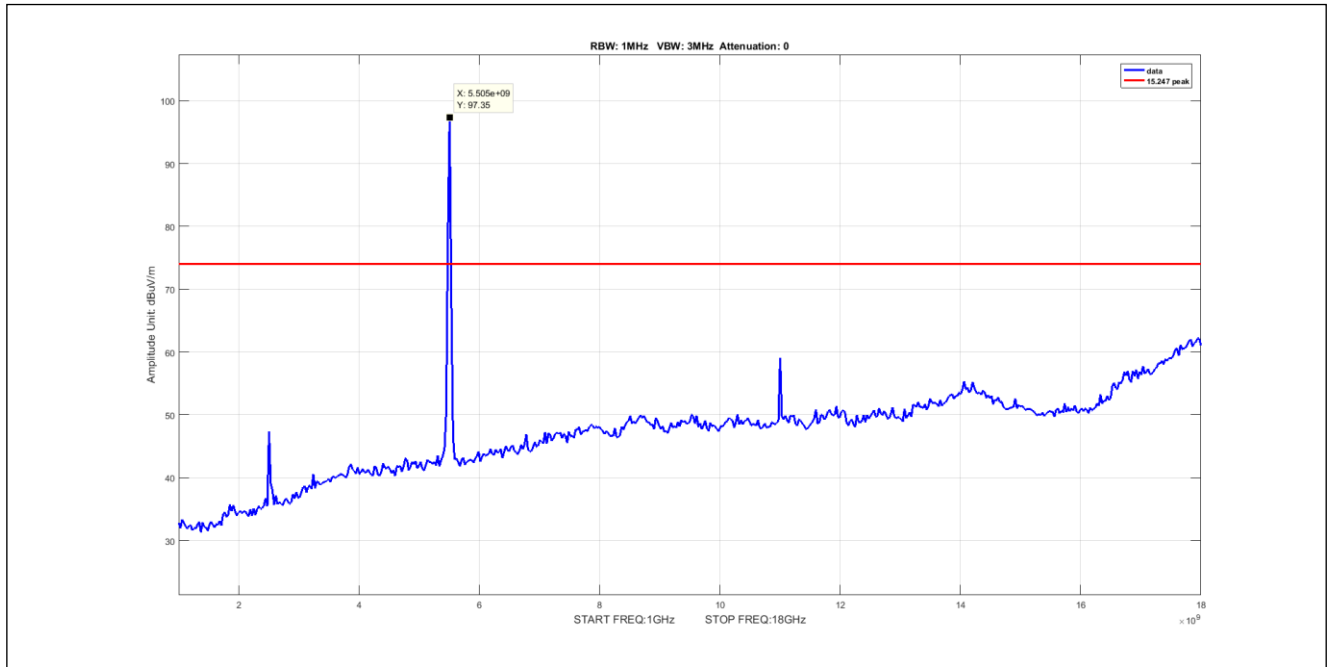
**Plot 186. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5320M, N Mode Port 1**



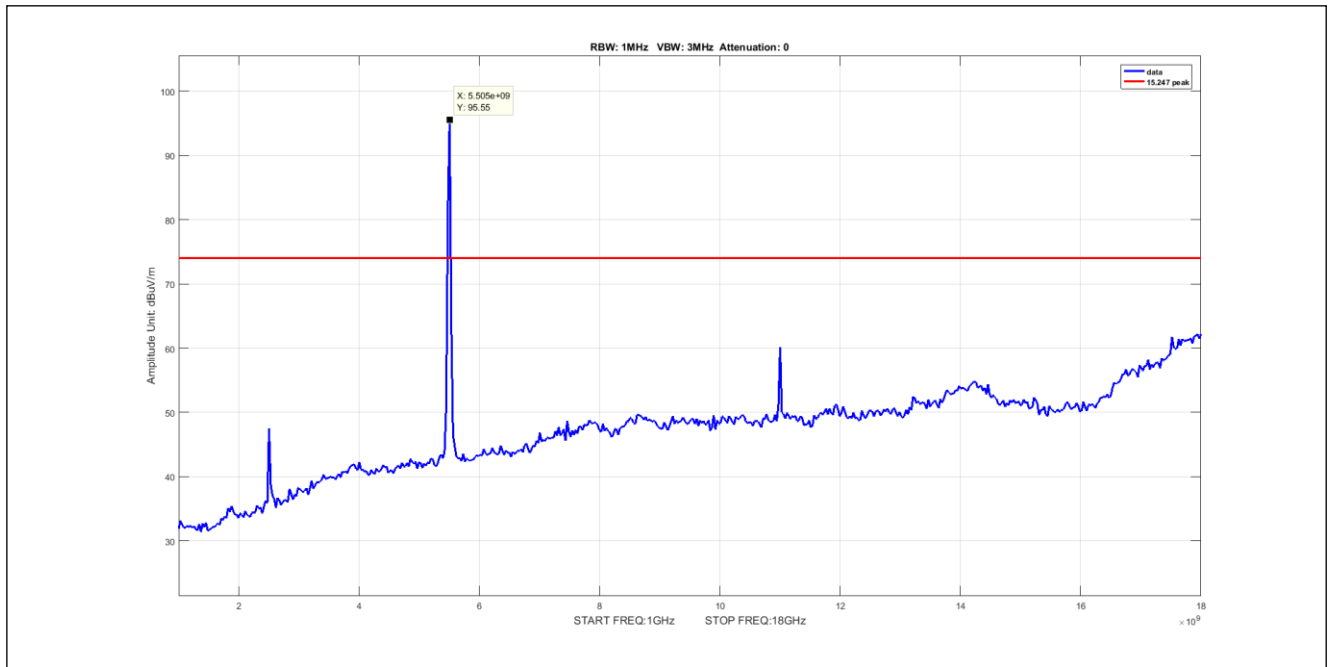
**Plot 187. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 40M, Ch 5270M, N Mode Port 1**



**Plot 188. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 40M, Ch 5310M, N Mode Port 1**

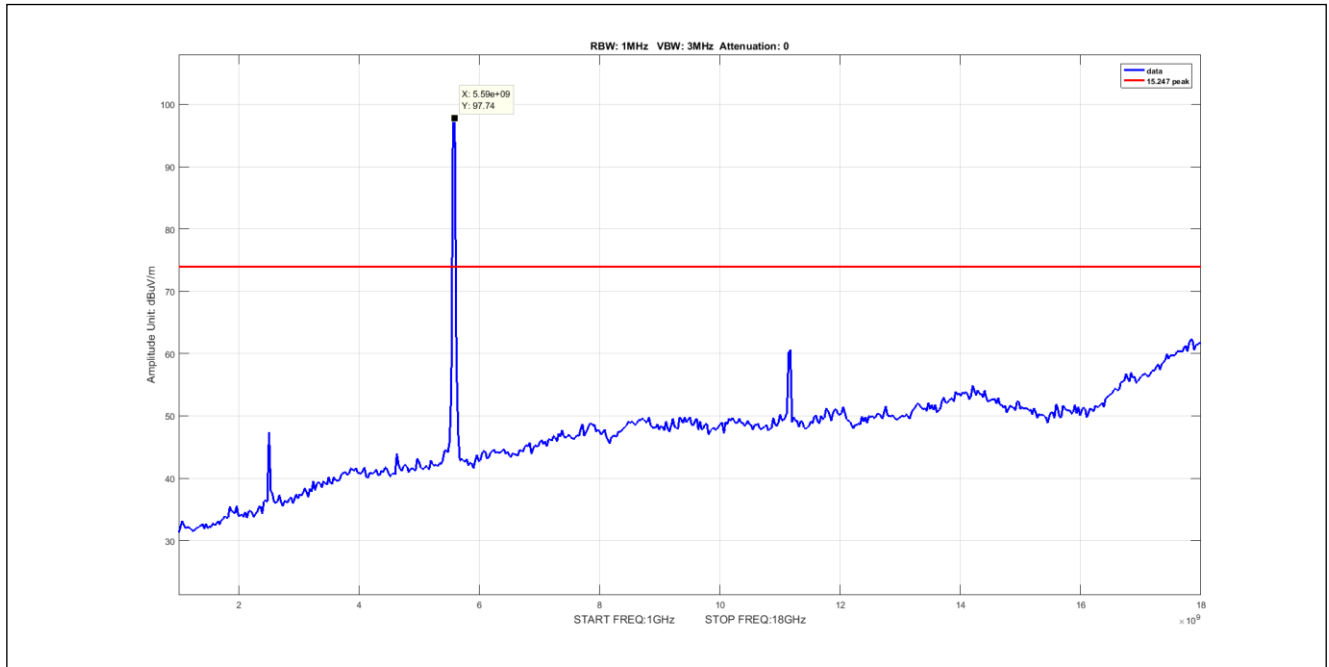


**Plot 189. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5500M, A Mode Port 1**

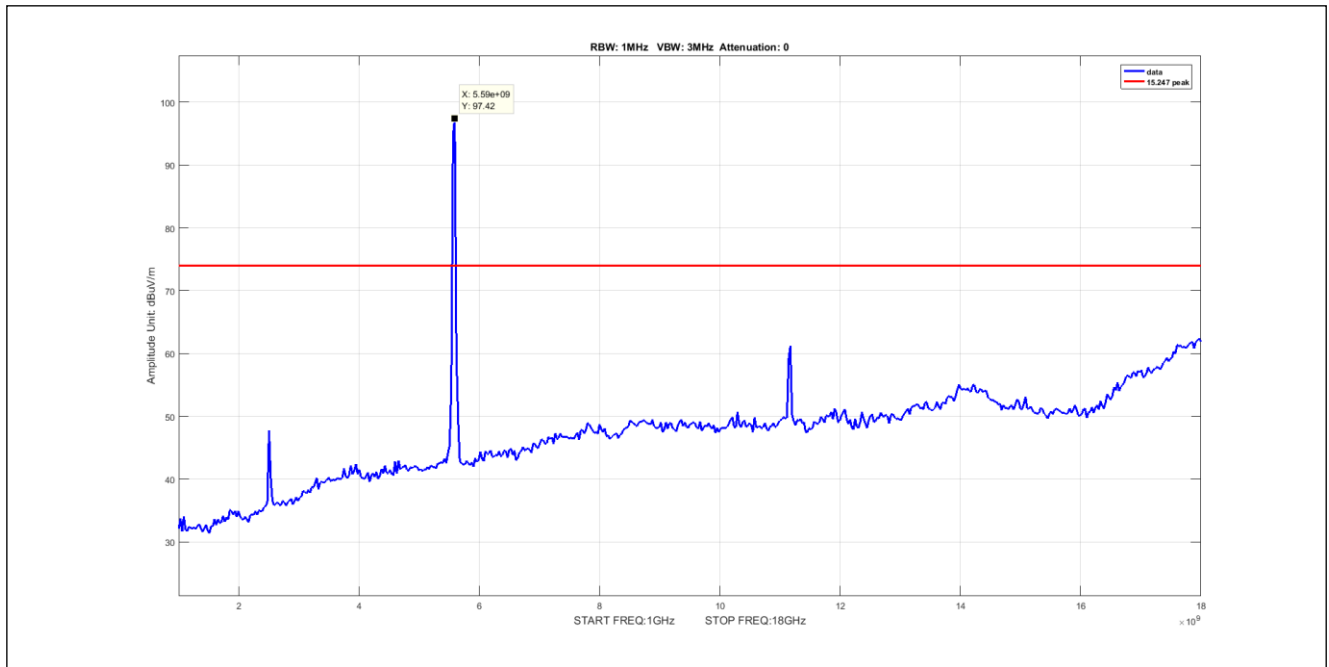


**Plot 190. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5500M, N Mode Port 1**

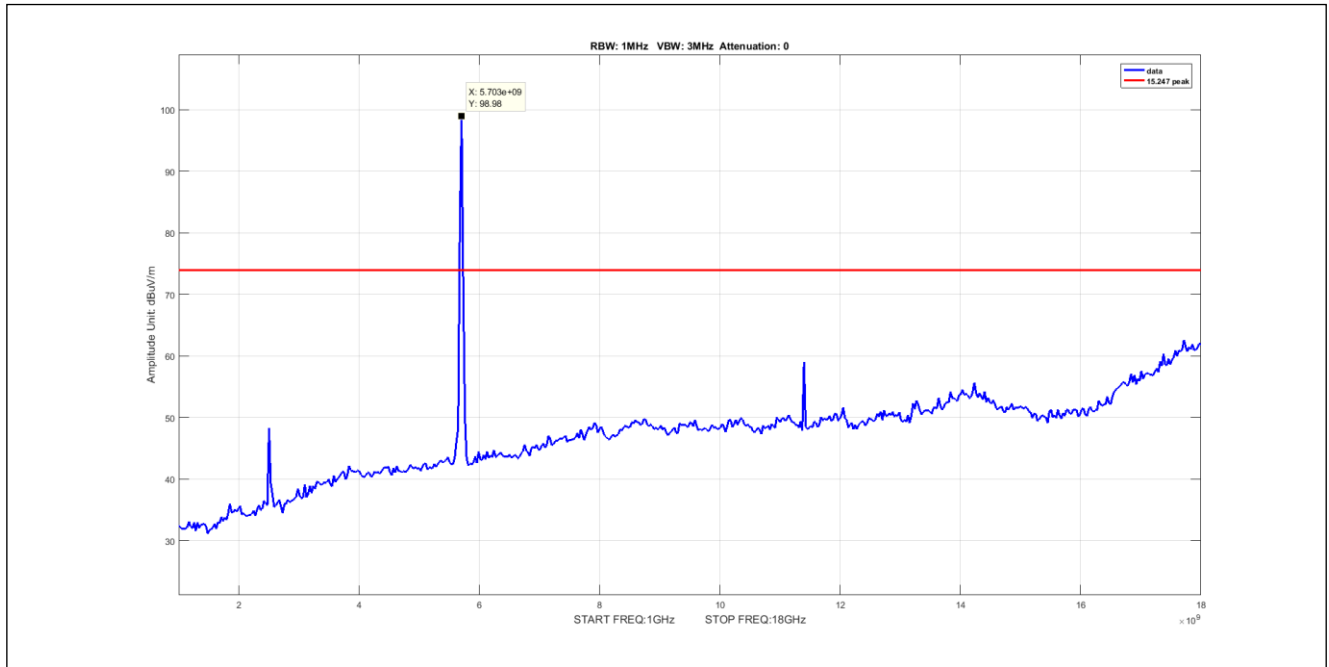




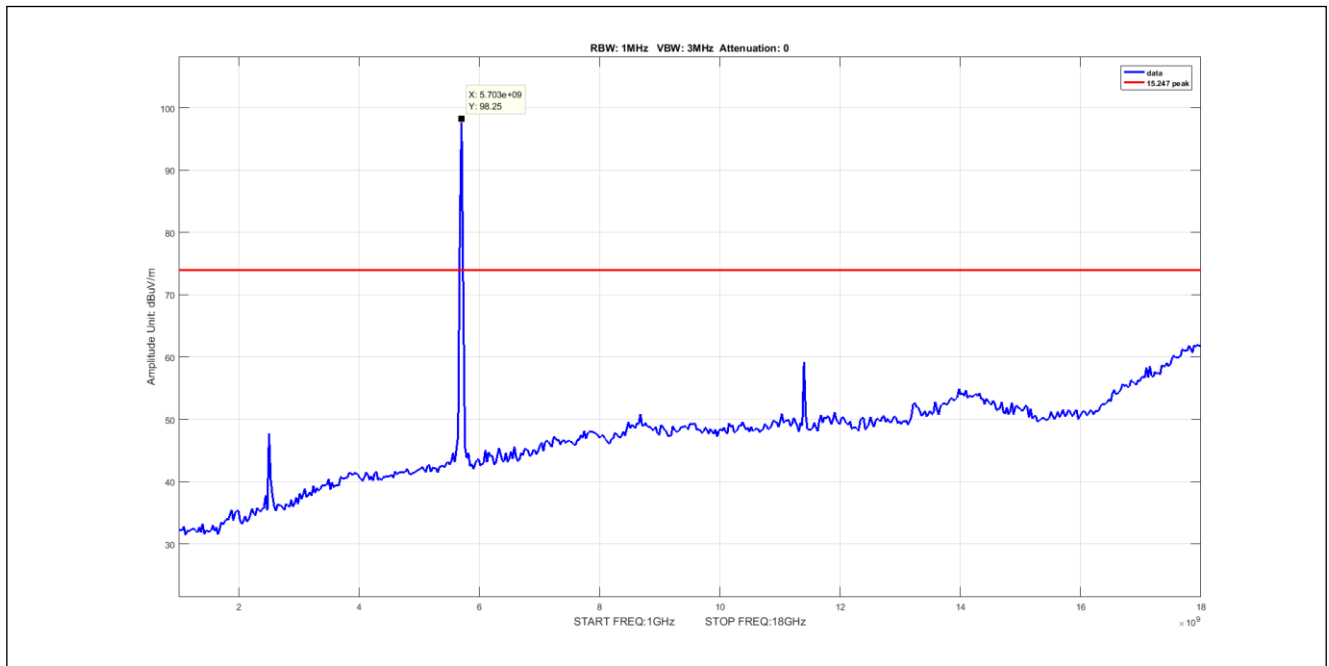
**Plot 191. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5580M, A Mode Port 1**



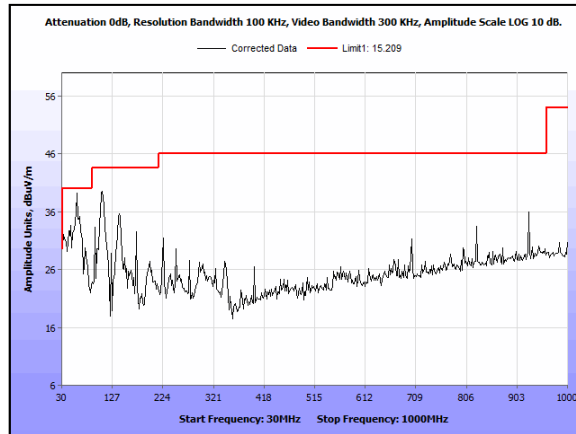
**Plot 192. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5580M, N Mode Port 1**



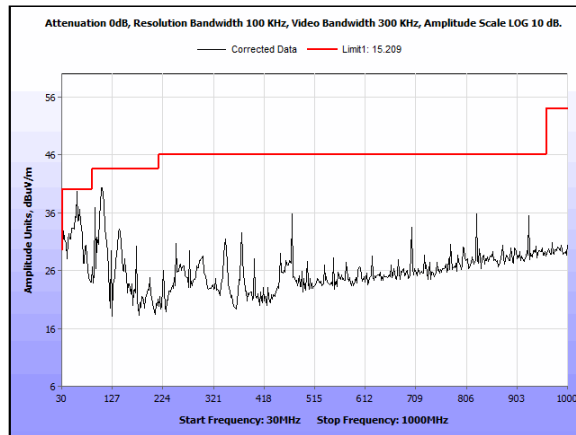
**Plot 193. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5700M, A Mode Port 1**



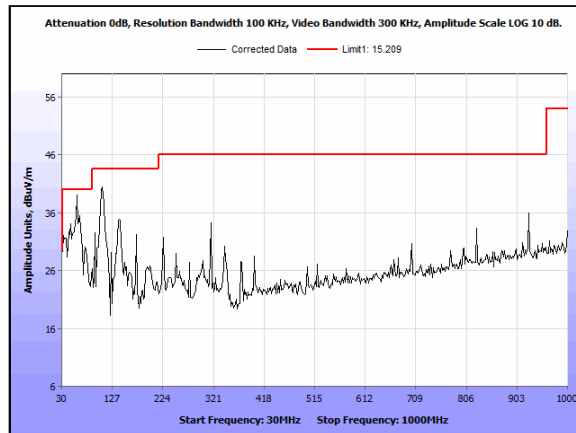
**Plot 194. Undesirable Emissions, Peak Spurious Emission 1-18GHz, BW 20M, Ch 5700M, N Mode Port 1**



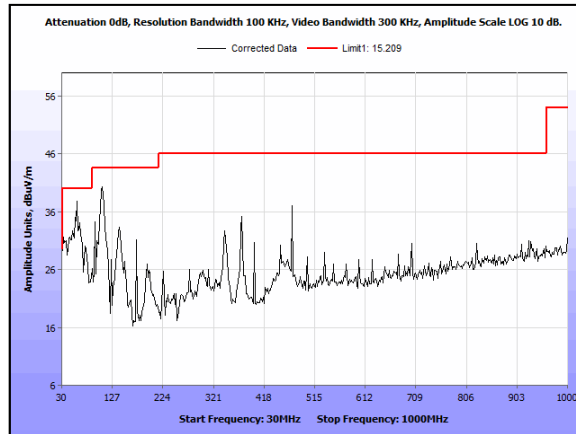
Plot 195. Undesirable Emissions, 30 MHz - 1 GHz 5260 MHz A Mode 20 MHz Port 1



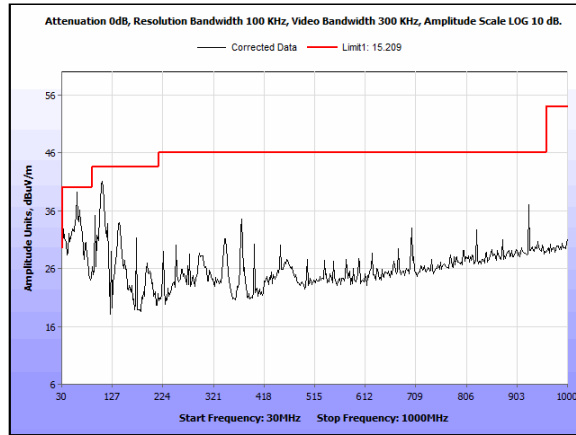
Plot 196. Undesirable Emissions, 30 MHz - 1 GHz 5260 MHz A Mode 20 MHz Port 2



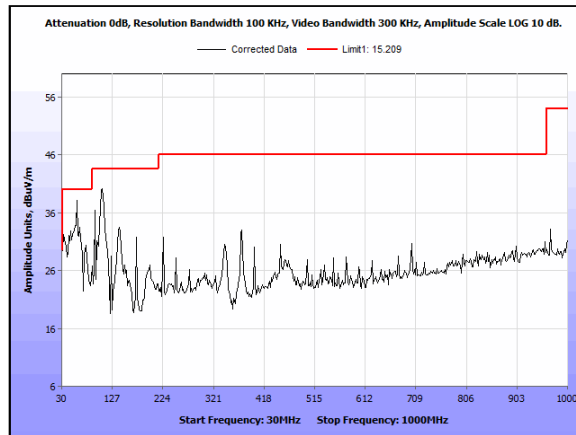
Plot 197. Undesirable Emissions, 30 MHz - 1 GHz 5260 MHz N Mode 20 MHz Port 1



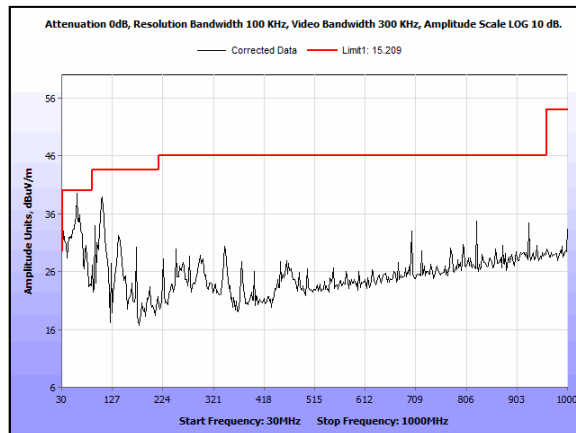
**Plot 198. Undesirable Emissions, 30 MHz - 1 GHz 5260 MHz N Mode 20 MHz Port 2**



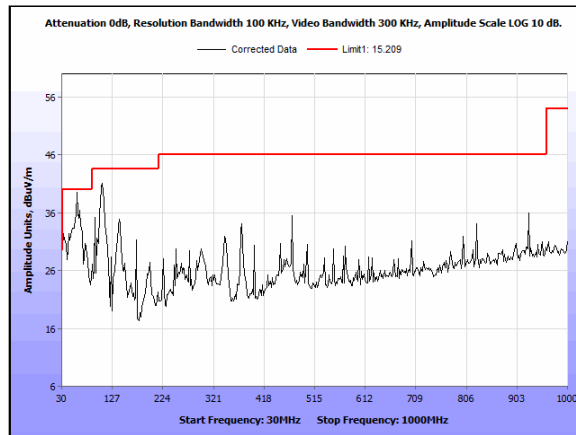
**Plot 199. Undesirable Emissions, 30 MHz - 1 GHz 5270 MHz N Mode 40 MHz Port 1**



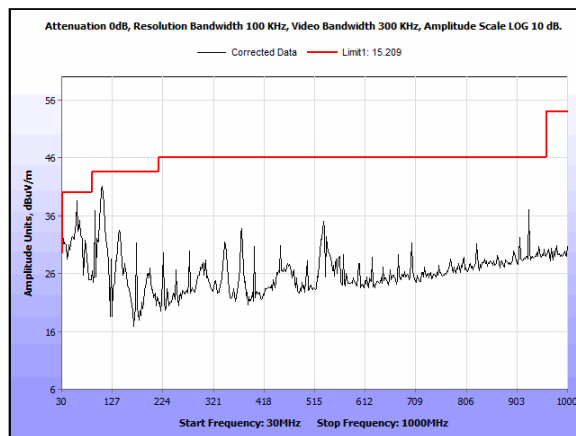
**Plot 200. Undesirable Emissions, 30 MHz - 1 GHz 5270 MHz N Mode 40 MHz Port 2**



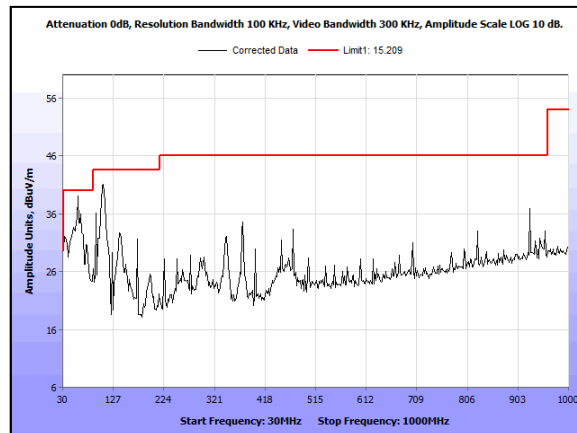
Plot 201. Undesirable Emissions, 30 MHz - 1 GHz 5280 MHz A Mode 20 MHz Port 1



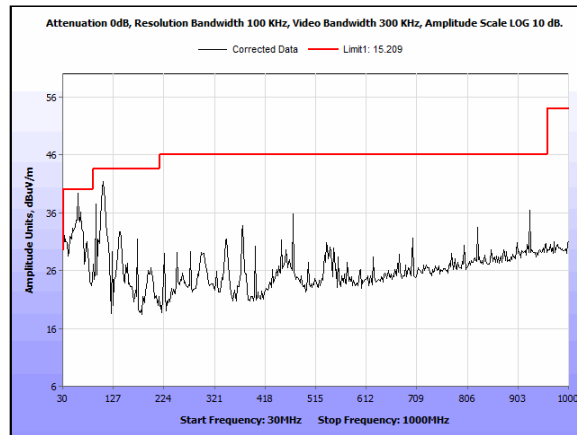
Plot 202. Undesirable Emissions, 30 MHz - 1 GHz 5280 MHz A Mode 20 MHz Port 2



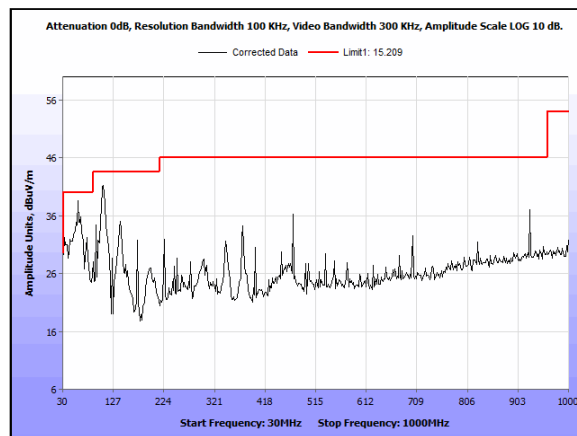
Plot 203. Undesirable Emissions, 30 MHz - 1 GHz 5280 MHz N Mode 20 MHz Port 1



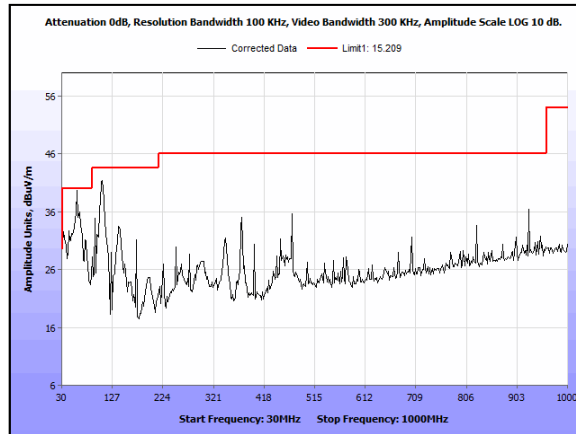
Plot 204. Undesirable Emissions, 30 MHz - 1 GHz 5280 MHz N Mode 20 MHz Port 2



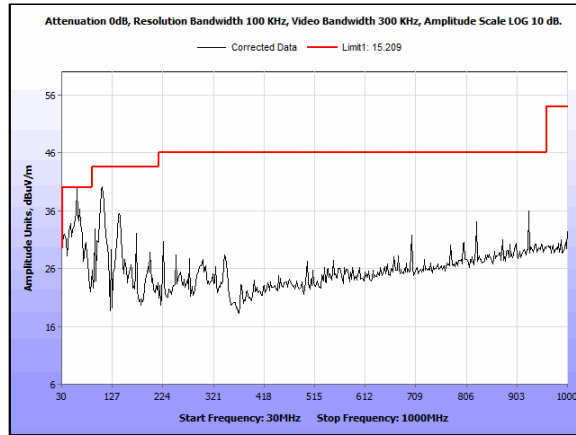
Plot 205. Undesirable Emissions, 30 MHz - 1 GHz 5310 MHz N Mode 40 MHz Port 1



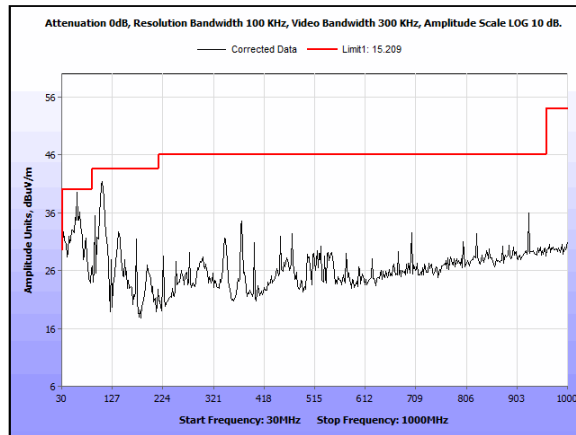
Plot 206. Undesirable Emissions, 30 MHz - 1 GHz 5310 MHz N Mode 40 MHz Port 2



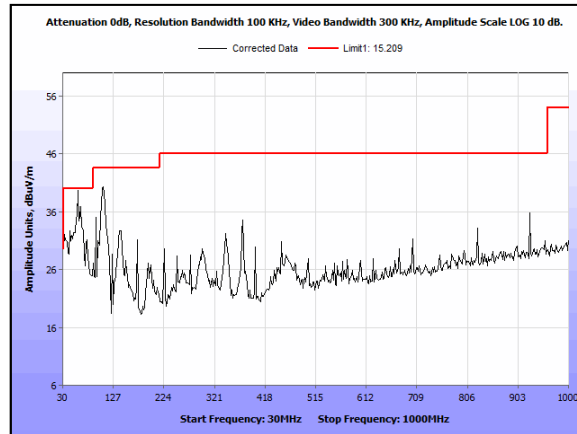
Plot 207. Undesirable Emissions, 30 MHz - 1 GHz 5320 MHz A Mode 20 MHz Port 1



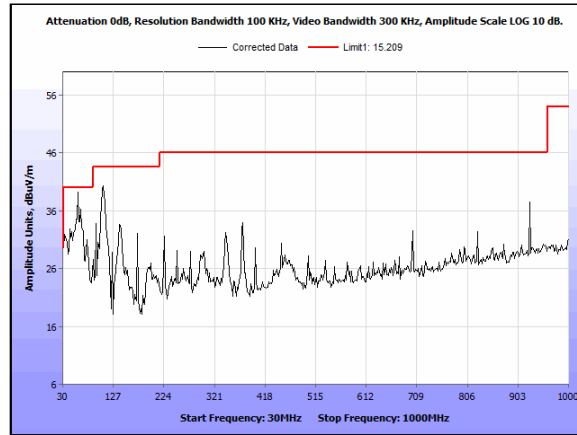
Plot 208. Undesirable Emissions, 30 MHz - 1 GHz 5320 MHz A Mode 20 MHz Port 2



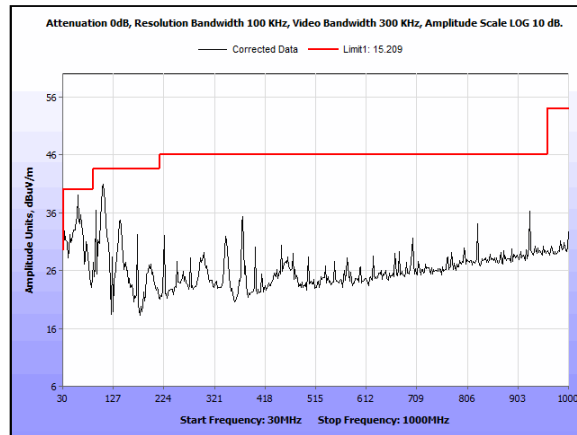
Plot 209. Undesirable Emissions, 30 MHz - 1 GHz 5320 MHz N Mode Port 1



Plot 210. Undesirable Emissions, 30 MHz - 1 GHz 5320 MHz N Mode 20 MHz Port 2

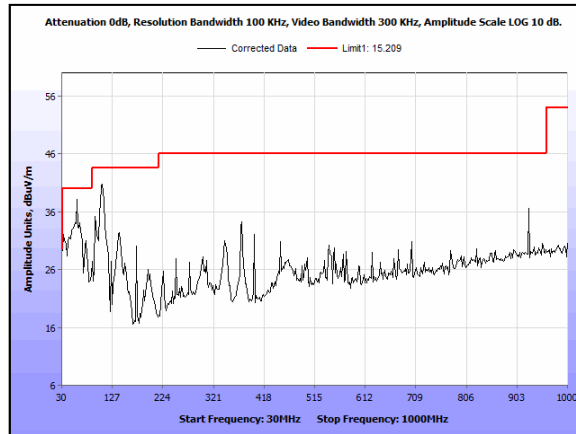


Plot 211. Undesirable Emissions, 30 MHz - 1 GHz 5500 MHz A Mode 20 MHz Port 1

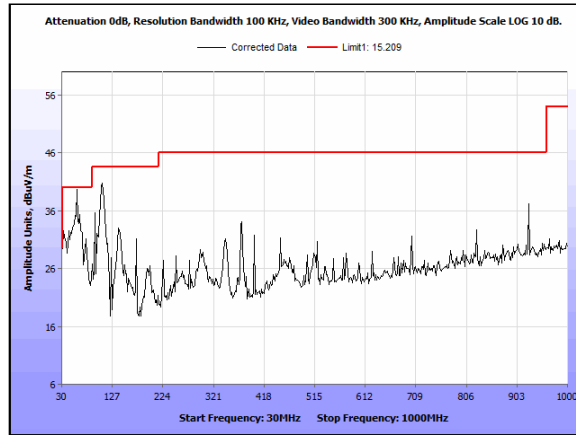


Plot 212. Undesirable Emissions, 30 MHz - 1 GHz 5500 MHz A Mode 20 MHz Port 2

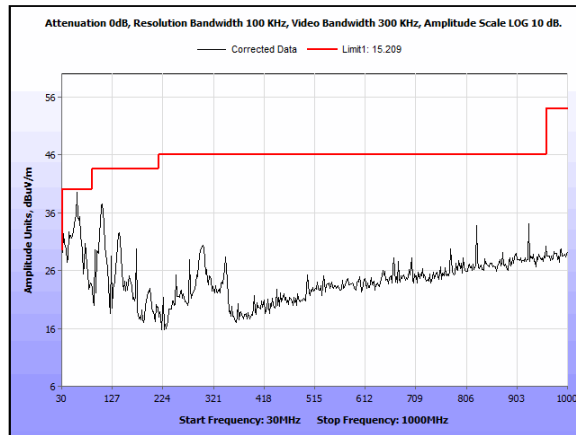




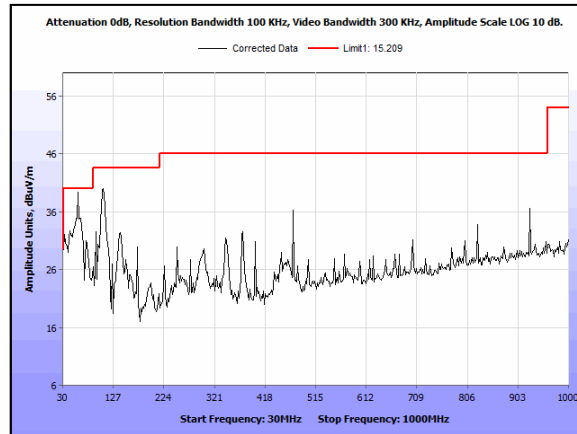
Plot 213. Undesirable Emissions, 30 MHz - 1 GHz 5500 MHz N Mode 20 MHz Port 1



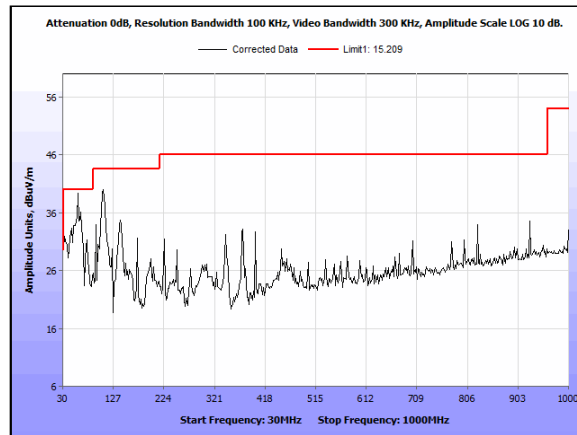
Plot 214. Undesirable Emissions, 30 MHz - 1 GHz 5500 MHz N Mode 20 MHz Port 2



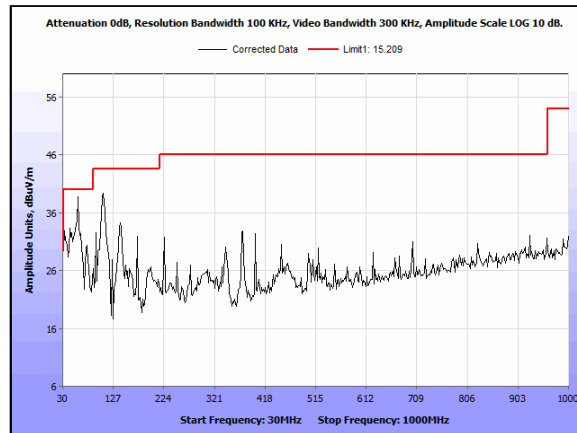
Plot 215. Undesirable Emissions, 30 MHz - 1 GHz 5510 MHz N Mode 40 MHz Port 1



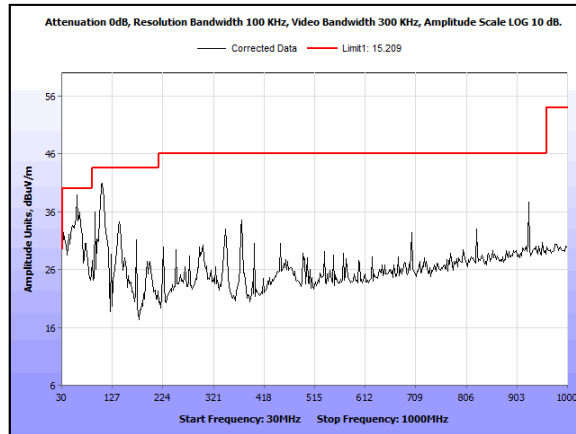
Plot 216. Undesirable Emissions, 30 MHz - 1 GHz 5510 MHz N Mode 40 MHz Port 2



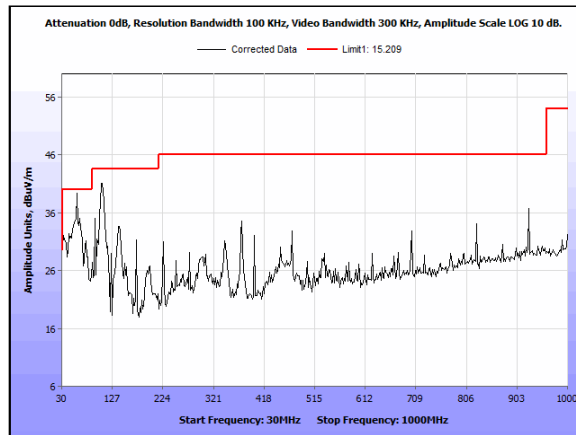
Plot 217. Undesirable Emissions, 30 MHz - 1 GHz 5550 MHz N Mode 40 MHz Port 1



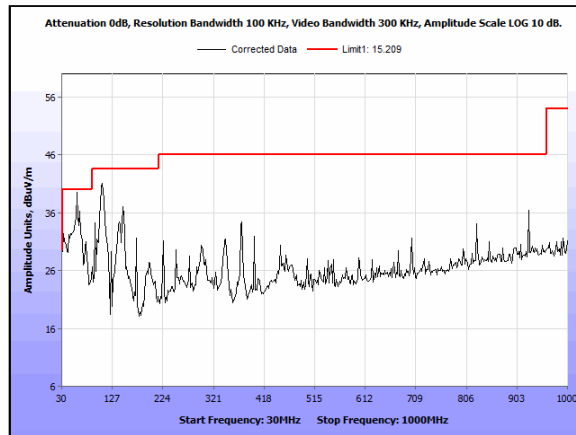
Plot 218. Undesirable Emissions, 30 MHz - 1 GHz 5550 MHz N Mode 40 MHz Port 2



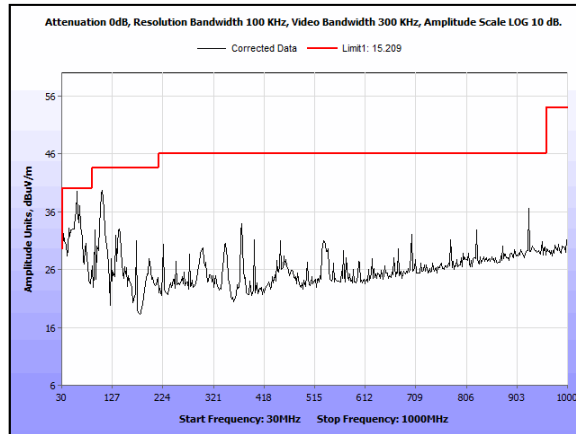
Plot 219. Undesirable Emissions, 30 MHz - 1 GHz 5580 MHz A Mode 20 MHz Port 1



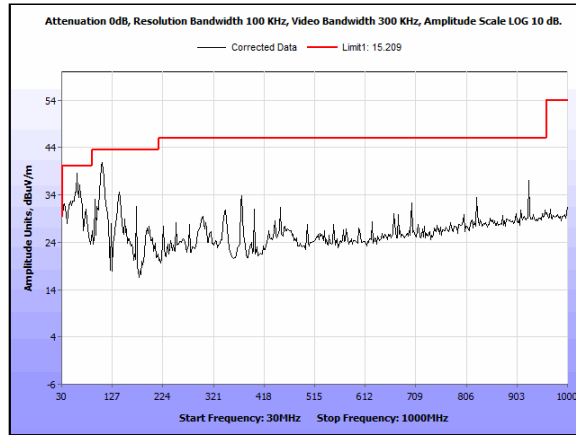
Plot 220. Undesirable Emissions, 30 MHz - 1 GHz 5580 MHz A Mode 20 MHz Port 2



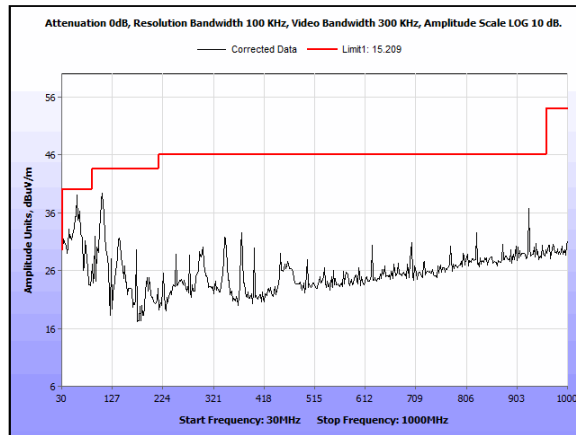
Plot 221. Undesirable Emissions, 30 MHz - 1 GHz 5580 MHz N Mode 20 MHz Port 1



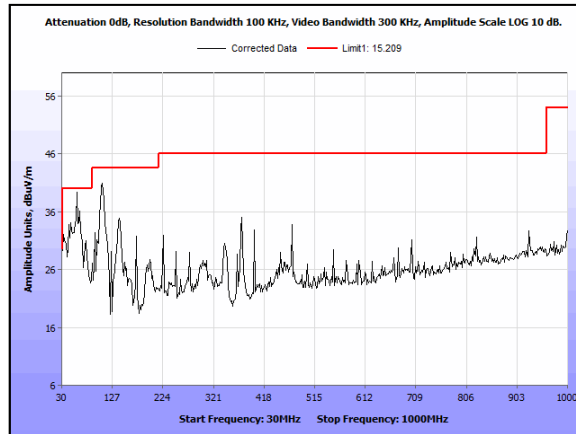
Plot 222. Undesirable Emissions, 30 MHz - 1 GHz 5580 MHz N Mode 20 MHz Port 2



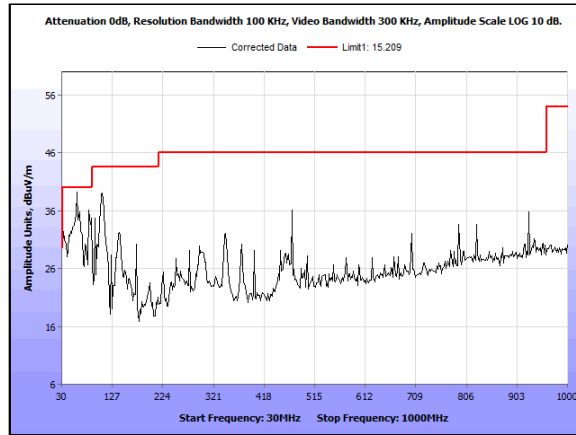
Plot 223. Undesirable Emissions, 30 MHz - 1 GHz 5670 MHz N Mode 40 MHz Port 1



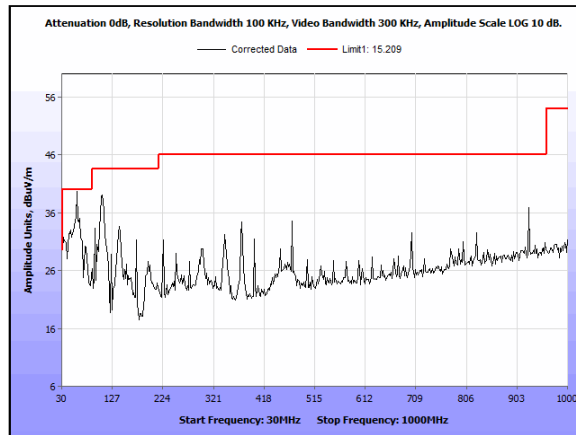
Plot 224. Undesirable Emissions, 30 MHz - 1 GHz 5670 MHz N Mode 40 MHz Port 2



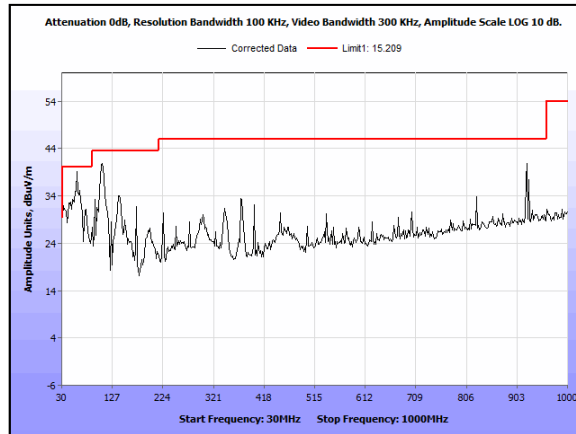
Plot 225. Undesirable Emissions, 30 MHz - 1 GHz 5700 MHz A Mode 20 MHz Port 1



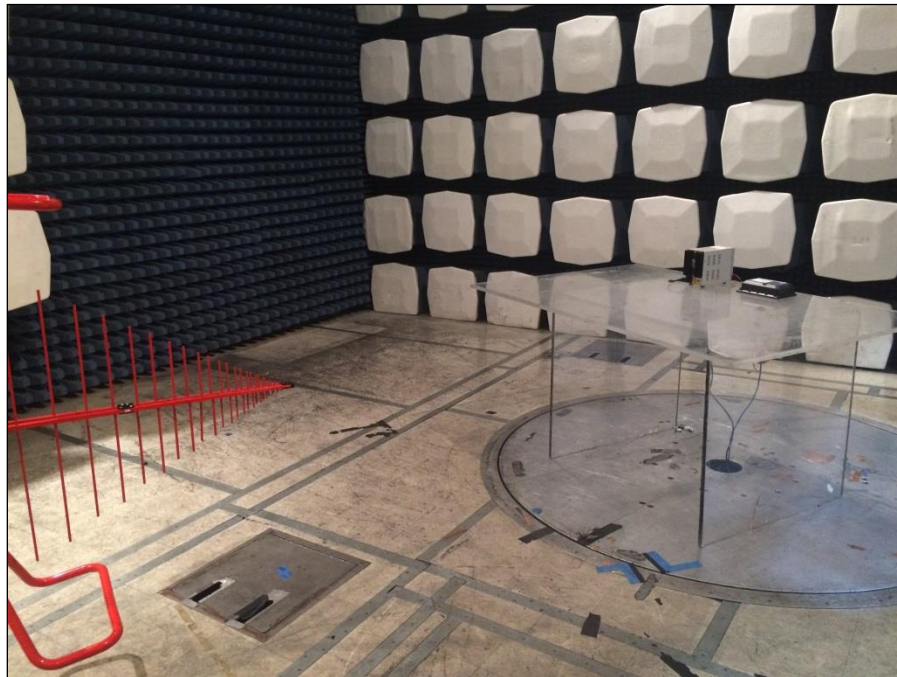
Plot 226. Undesirable Emissions, 30 MHz - 1 GHz 5700 MHz A Mode 20 MHz Port 2



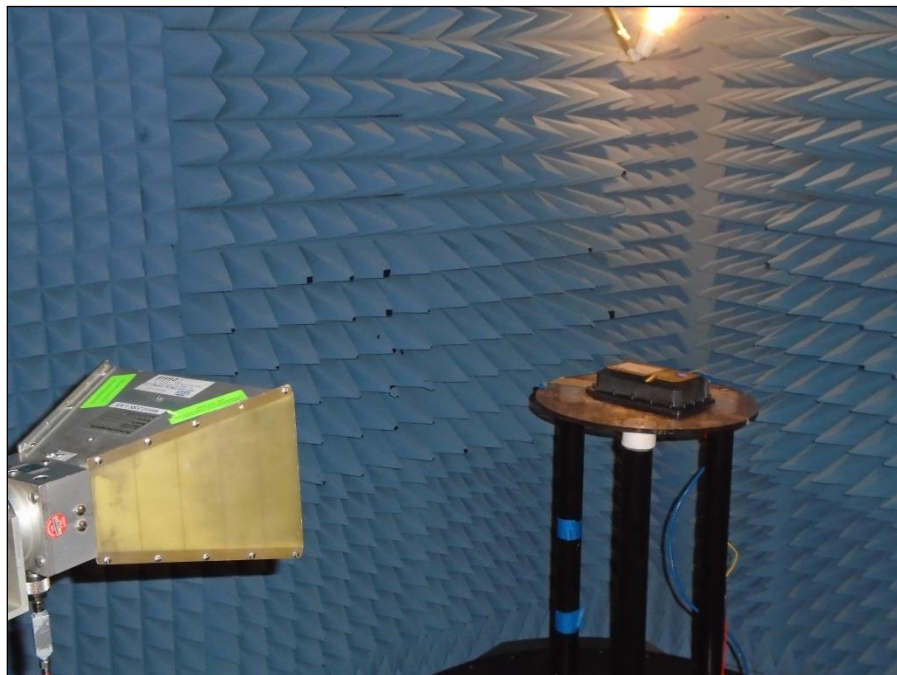
Plot 227. Undesirable Emissions, 30 MHz - 1 GHz 5700 MHz N Mode 20 MHz Port 1



**Plot 228. Undesirable Emissions, 30 MHz - 1 GHz 5700 MHz N Mode 20 MHz Port 2**



**Photograph 1. Undesirable Emissions, Radiated Emission Set up Below 1 GHz**



**Photograph 2. Radiated Emissions, Above 1GHz, Test Results**

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.407(b)(6) Conducted Emissions

**Test Requirement(s):** § 15.407 (b)(6): Any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

§ 15.207 (a): 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 30MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu\Omega$ /50  $\Sigma$  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 the frequency ranges.

Frequency range (MHz)	§ 15.207(a), Conducted Limit (dB $\mu$ V)	
	Quasi-Peak	Average
* 0.15- 0.45	66 – 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

**Table 13. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)**

**Test Procedure:** The EUT was placed on a non-metallic table 80 cm tall inside a screen room. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50  $\Omega$ /50  $\mu$ H Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.10-2013 " American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices "*. Scans were performed with the transmitter on.

**Test Results:** The EUT was not applicable with requirements of this section.

EUT utilizes DC power supply.



## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.407(f) Maximum Permissible Exposure

**Test Requirement(s):** §15.407(f): U-NII devices are subject to the radio frequency radiation exposure requirements specified in §1.1307(b), §2.1091 and §2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a “general population/uncontrolled” environment.

**RF Exposure Requirements:** §1.1307(b)(1) and §1.1307(b)(2): Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission’s guidelines.

**RF Radiation Exposure Limit:** §1.1310: As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

MPE Limit: EUT’s operating frequencies @ 5250-5350 MHz and 5470 – 5725 MHz; **Limit for Uncontrolled exposure: 1 mW/cm<sup>2</sup> or 10 W/m<sup>2</sup>**

Equation from page 18 of OET 65, Edition 97-01

$$S = PG / 4\pi R^2 \quad \text{or} \quad R = \sqrt{PG / 4\pi S}$$

where, S = Power Density (mW/cm<sup>2</sup>)  
P = Power Input to antenna (mW)  
G = Antenna Gain (numeric value)  
R = Distance (cm)

#### Test Results:

Note : Tolerance = 1dB.

FCC									
Frequency (MHz)	Con. Pwr. (dBm)	Con. Pwr. (mW)	Ant. Gain (dBi)	Ant. Gain numeric	Pwr. Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Margin	Distance (cm)	Result
5280	17.82	60.534	4.5	2.818	0.03394	1	0.96606	20	Pass

The safe distance where Power Density is less than the MPE Limit listed above was found to be 20 cm.

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.407(g) Frequency Stability

**Test Requirements:** Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

**Test Procedure:** The EUT was connected directly to a spectrum analyzer through an attenuator. The 1<sup>st</sup> trace of the Spectrum Analyzer was taken at ambient conditions and used as a reference. A 2<sup>nd</sup> trace was used to show the drift of the carrier at extreme conditions. A delta marker was used to find the drift at a given extreme condition.

**Test Results:** EUT is complaint with Frequency Stability Test as per the FCC ID: Z64-WL18DBMOD. Module identified by the FCC ID mentioned above is used in the EUT.

**Test Date:** January 23, 2018

## IV. Test Equipment

## Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

Asset	Equipment	Manufacturer	Model	Calibration Date	Calibration Due Date
1T4612	Spectrum Analyzer	Agilent Technologies	E4407B	3/30/2017	9/30/2018
1T4771	PSA Spectrum Analyzer	Agilent Technologies	E4446A	8/10/2016	2/10/2018
1T4149	High-Frequency Anechoic Chamber	Ray Proof	81	Not Required	
1T4442	Pre-amplifier, Microwave	Miteq	AFS42-01001800-30-10P	See Note	
1T4483	Antenna; Horn	ETS-Lindgren	3117	4/19/2017	10/19/2018
1T4745	Antenna, Horn	ETS-Lindgren	3116	1/21/2017	7/21/2018
1T4752	Pre-Amplifier	Miteq	JS44-18004000-35-8P	See Note	
1T4300A	SEMI-ANECHOIC CHAMBER # 1 (FCC)	EMC TEST SYSTEMS	NONE	1/31/2016	1/31/2019
1T4753	Antenna - Bilog	Sunol Sciences	JB6	10/24/2016	4/24/2018
1T4409	EMI Receiver	Rohde & Schwarz	ESIB7	12/7/2016	12/7/2018
1T4910	Digital Barometer, Hygrometer, Thermometer	Control Company	06-662-4	1/15/2016	1/15/2018

**Table 14. Test Equipment List**

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

## **V. Certification & User's Manual Information**

## Certification & User's Manual Information

### M. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

#### § 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

- (a) The various types of radio communication transmitting devices described throughout this chapter.
- (b) *The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.*
- (c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.
- (d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

#### § 2.803 Marketing of radio frequency devices prior to equipment authorization.

- (a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:
  - (1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or
  - (2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.
- (d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

- (e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:
- (i) *Compliance testing;*
  - (ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;
  - (iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;
  - (iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or
  - (v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.
- (e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.
- (f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

## Certification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

### § 2.901 Basis and Purpose

- (a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.<sup>1</sup> *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.*
- (b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

### § 2.907 Certification.

- (a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.
- (b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

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<sup>1</sup> In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.



## Certification & User's Manual Information

### § 2.948 Description of measurement facilities.

- (a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.
  - (1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.
    - (i) *If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.*
    - (ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.
  - (2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

## Certification & User's Manual Information

### Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

#### § 15.19 Labeling requirements.

(a) *In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:*

- (1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

*This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.*

- (2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

*This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.*

- (3) All other devices shall bear the following statement in a conspicuous location on the device:

*This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

- (4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

- (5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

#### § 15.21 Information to user.

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

### § 15.105 Information to the user.

- (a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

- (b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.