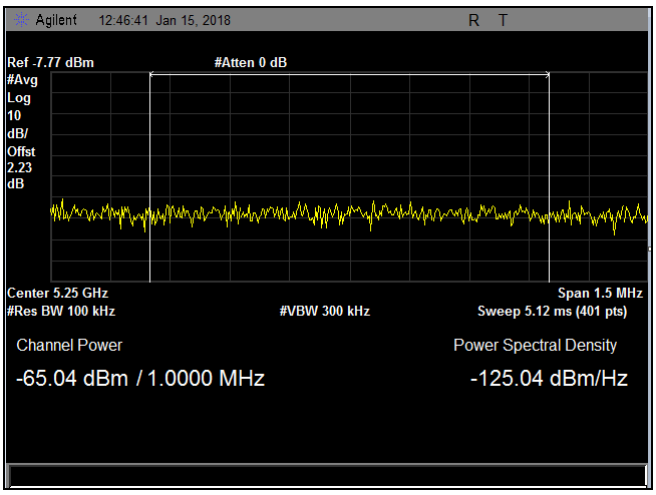
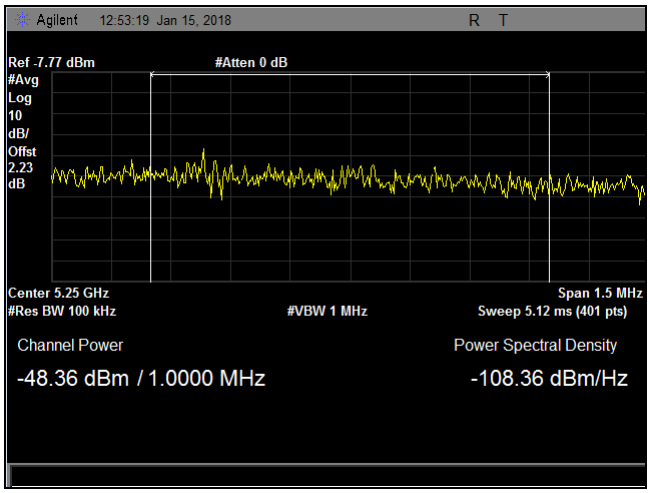
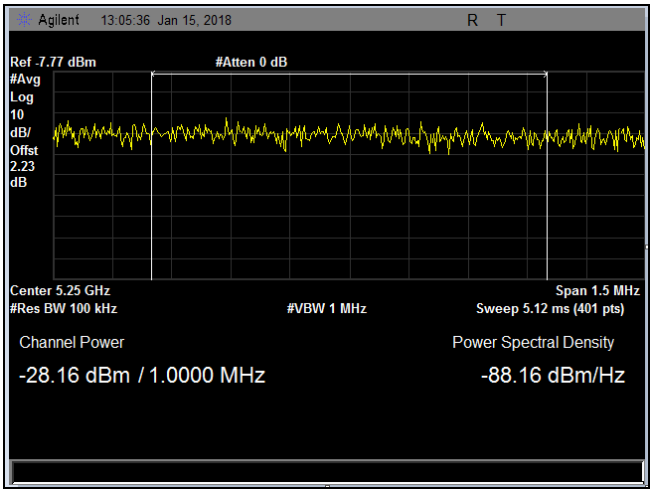
Radiated Band Edge



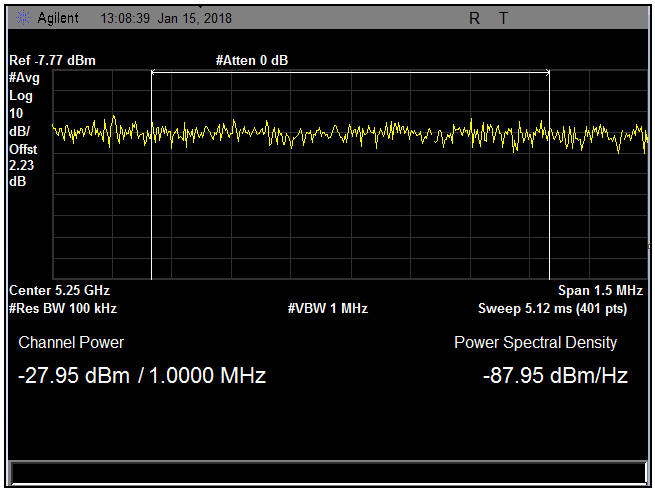
Plot 91. Undesirable Emissions, Radiated Band Edge, -27, 5M, Channel 48, 5240, pow21



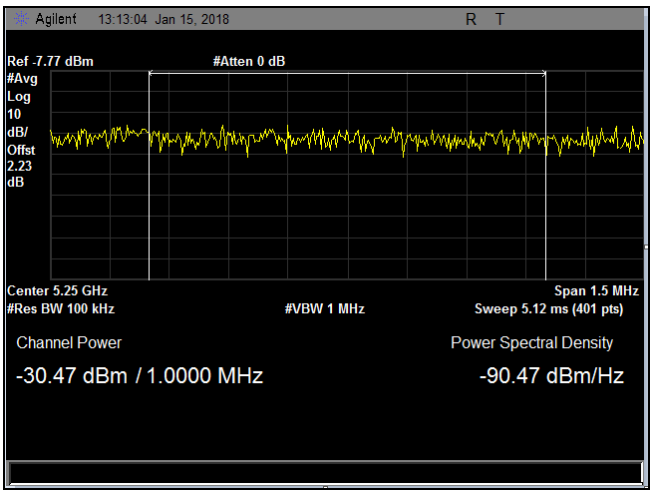
Plot 92. Undesirable Emissions, Radiated Band Edge, -27, 10M, Channel 48, 5240, power 24



Plot 93. Undesirable Emissions, Radiated Band Edge, -27, 20M, Channel 48, 5240, pow 26

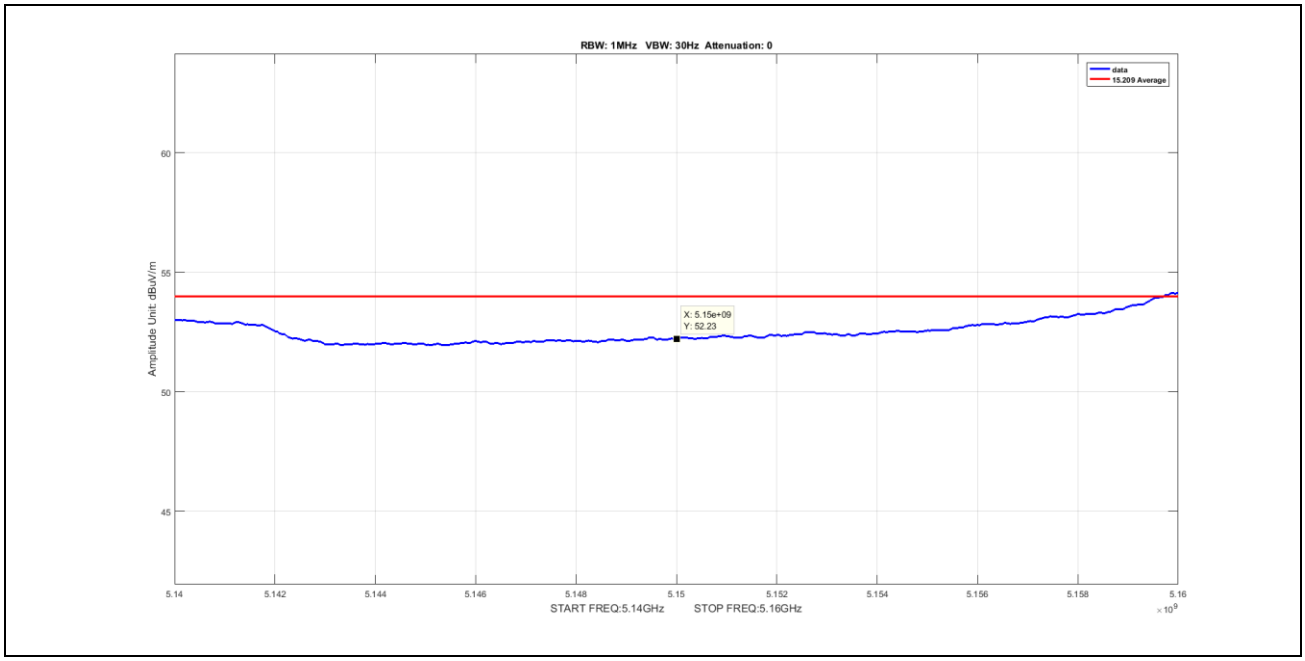


Plot 94. Undesirable Emissions, Radiated Band Edge, -27, 20M, n, Channel 48, 5240, pow26

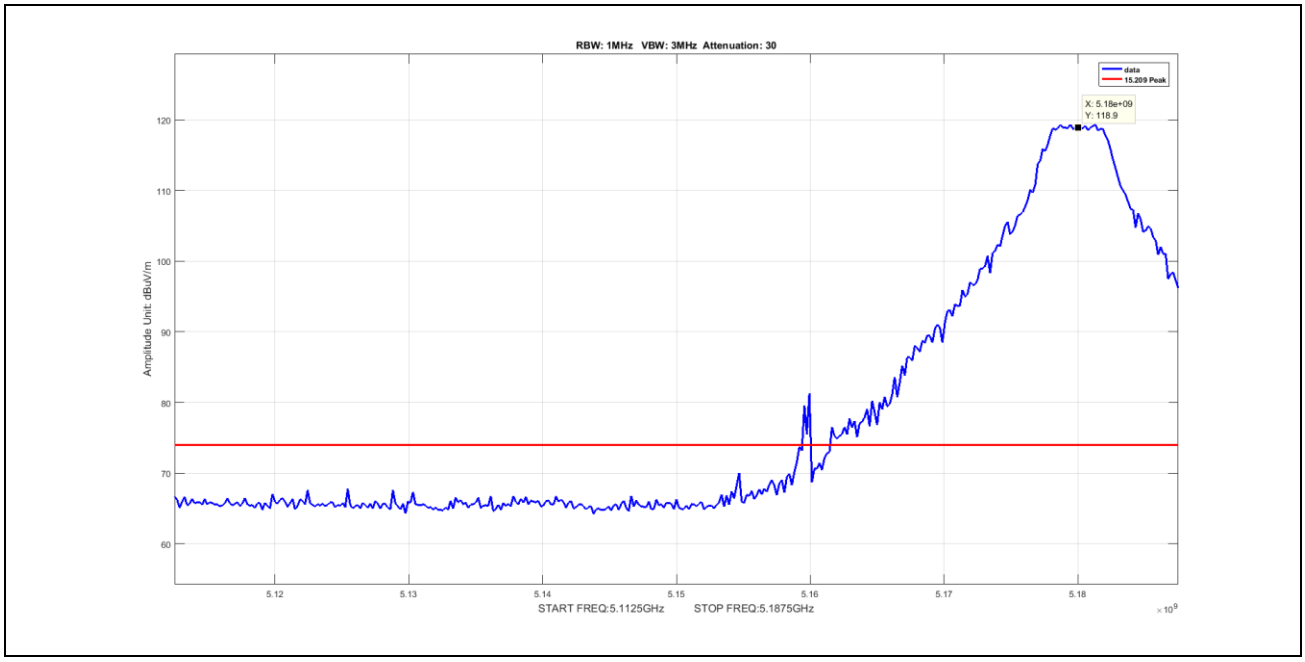


Plot 95. Undesirable Emissions, Radiated Band Edge, -27, 40M, Channel 48, 5230, pow26

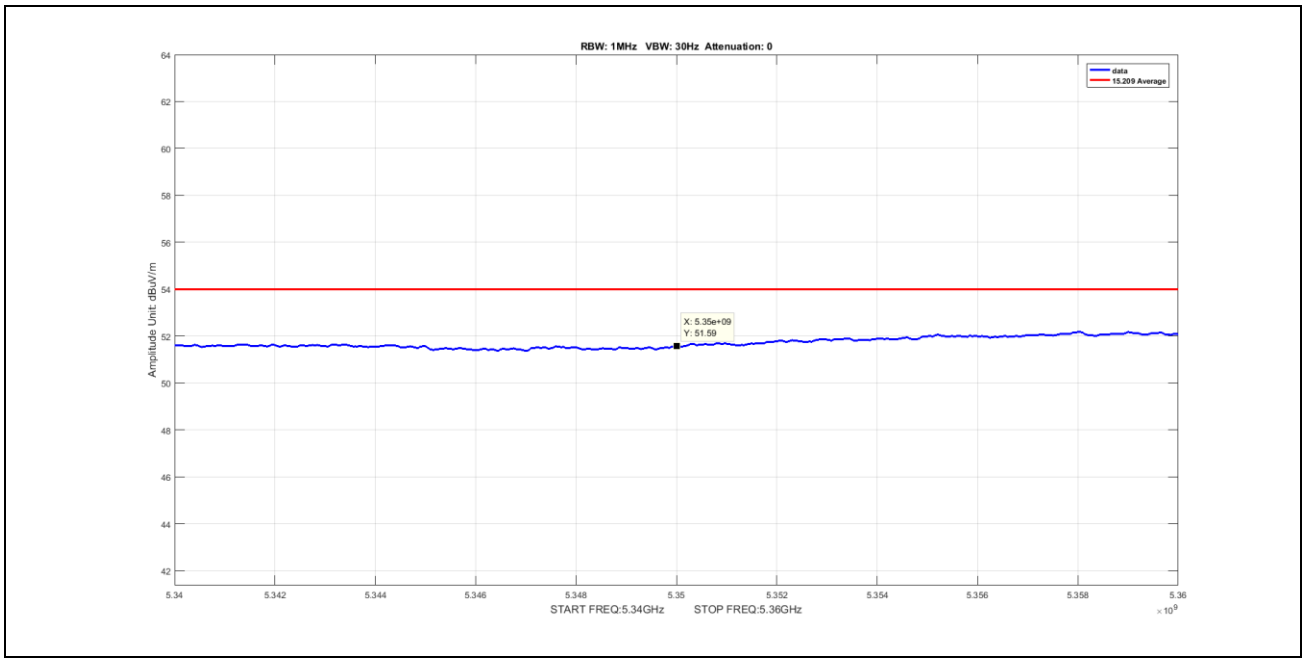
Radiated Spurious Emissions, 5 MHz



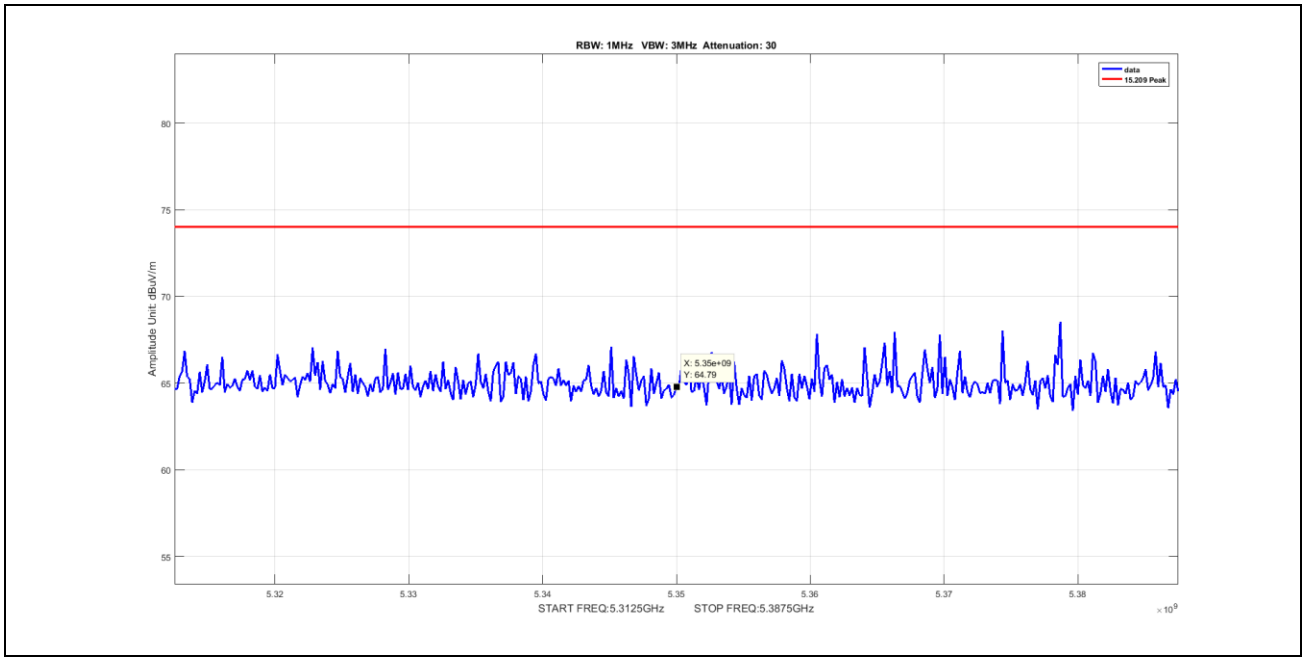
Plot 96. Radiated Spurious Emissions, 5 MHz, 5180 MHz, Channel 36, Power 29, Average



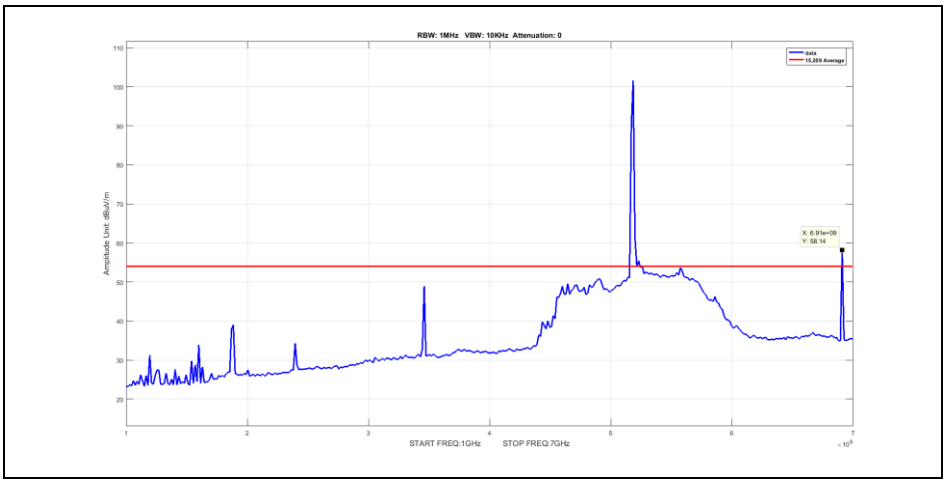
Plot 97. Radiated Spurious Emissions, 5 MHz, 5180 MHz, Channel 36, Power 29, Peak



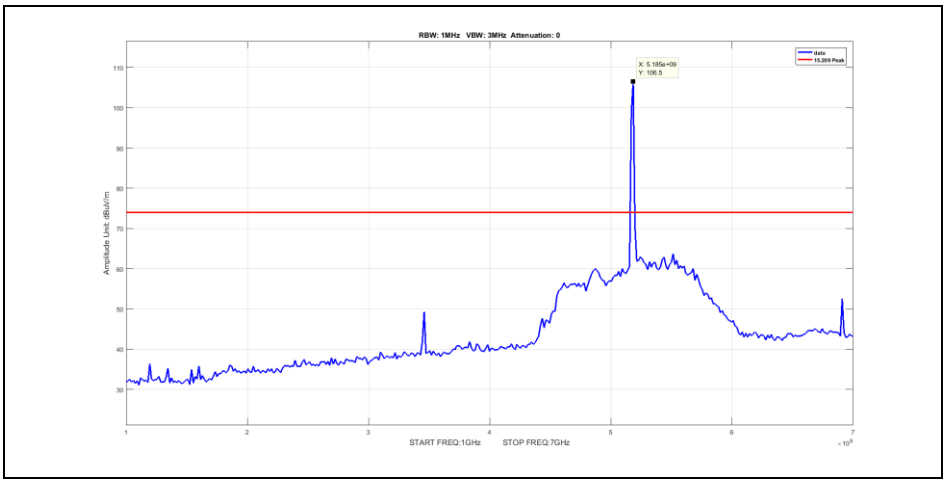
Plot 98. Radiated Spurious Emissions, 5 MHz, 5350 MHz, Channel 48, Power 29, Average



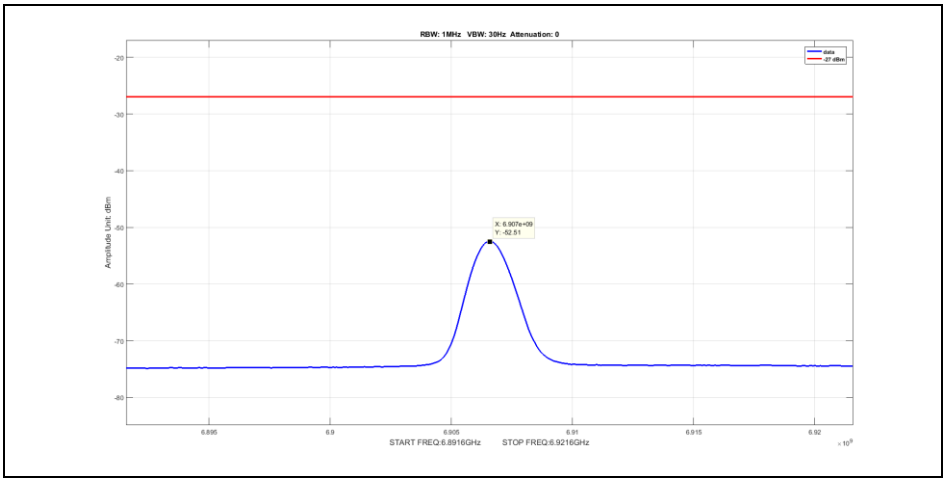
Plot 99. Radiated Spurious Emissions, 5 MHz, 5350 MHz, Channel 48, Power 29, Peak



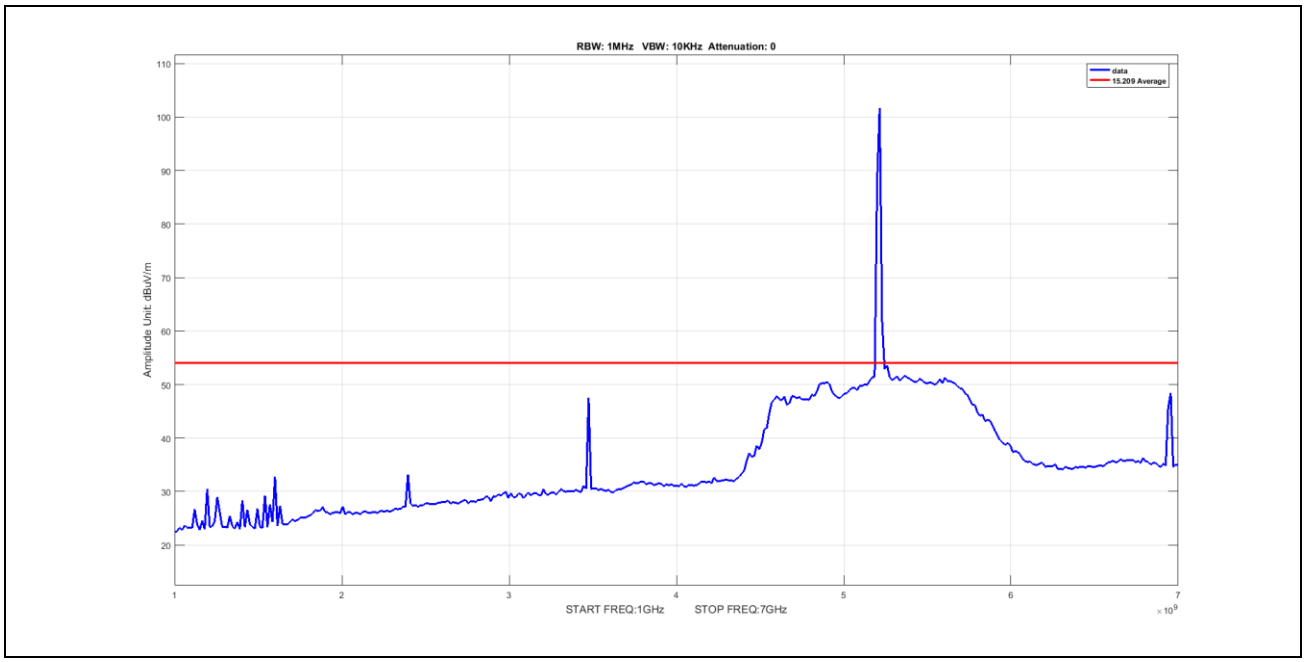
Plot 100. Radiated Spurious Emissions, 5 MHz, 5180 MHz, Channel 36, Power 24, Average, 1 GHz – 7 GHz, Low



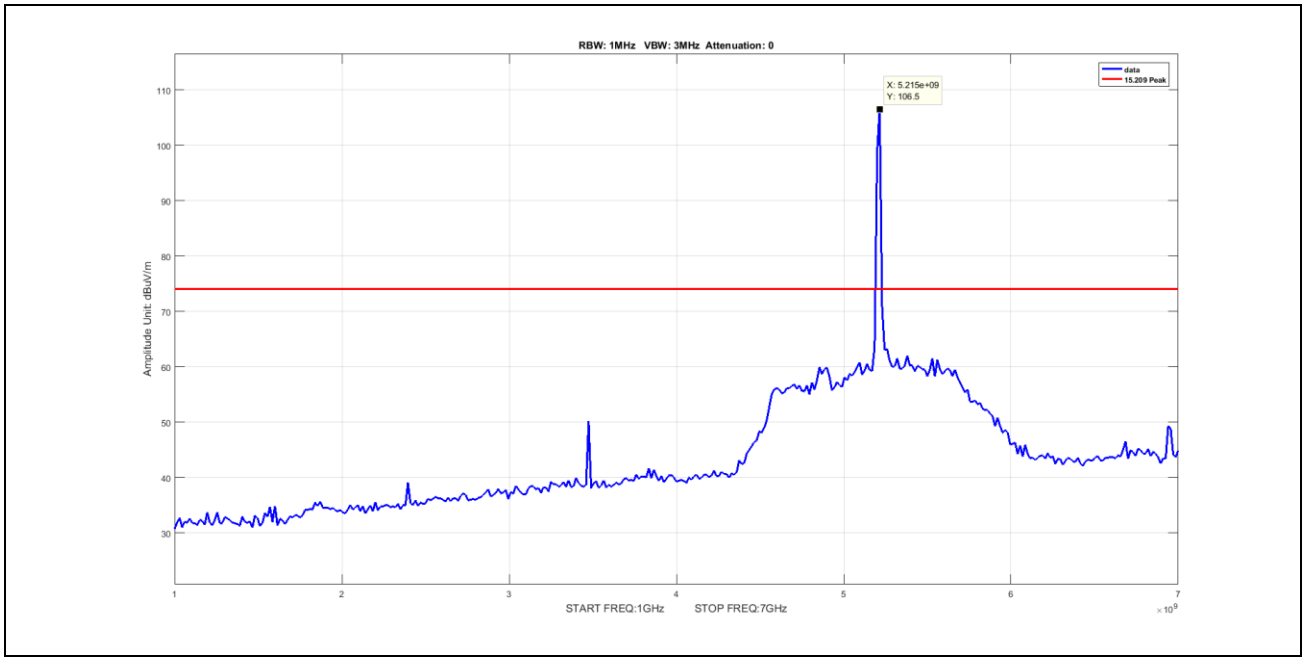
Plot 101. Radiated Spurious Emissions, 5 MHz, 5180 MHz, Channel 36, Power 24, Peak, 1 GHz – 7 GHz, Low



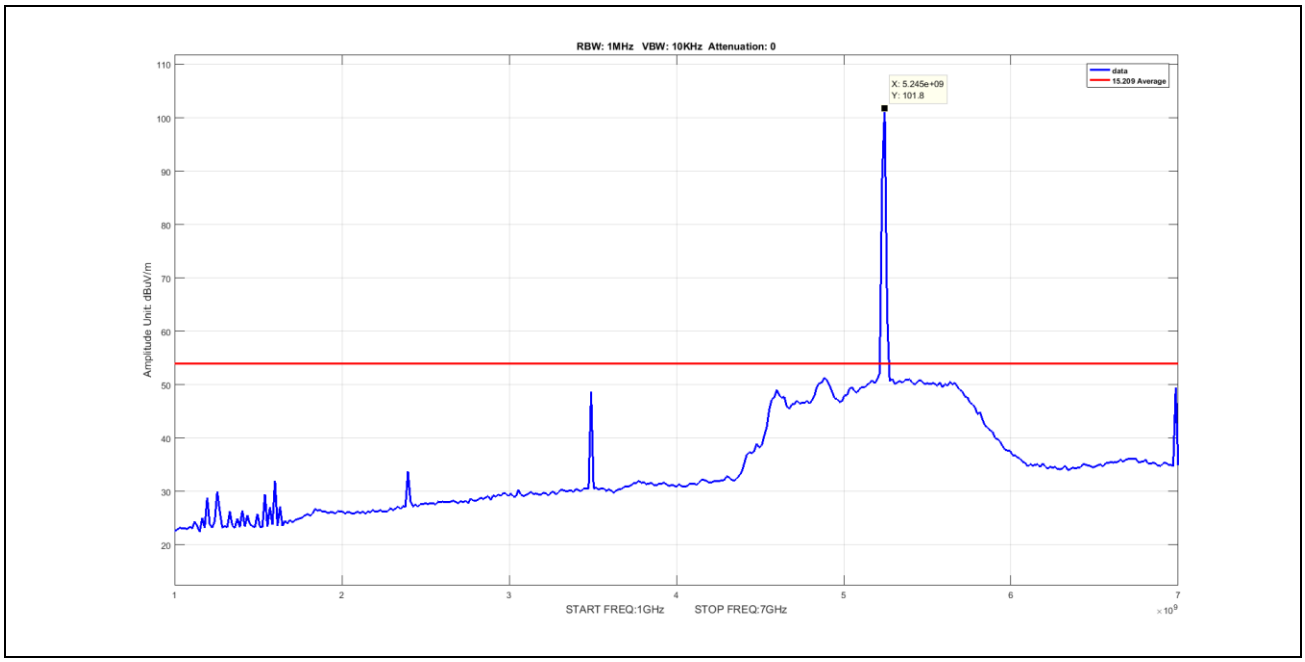
Plot 102. Radiated Spurious Emissions, 5 MHz, 5180 MHz, Channel 36, Power 24, Average, 1 GHz – 7 GHz, Low, Zoom



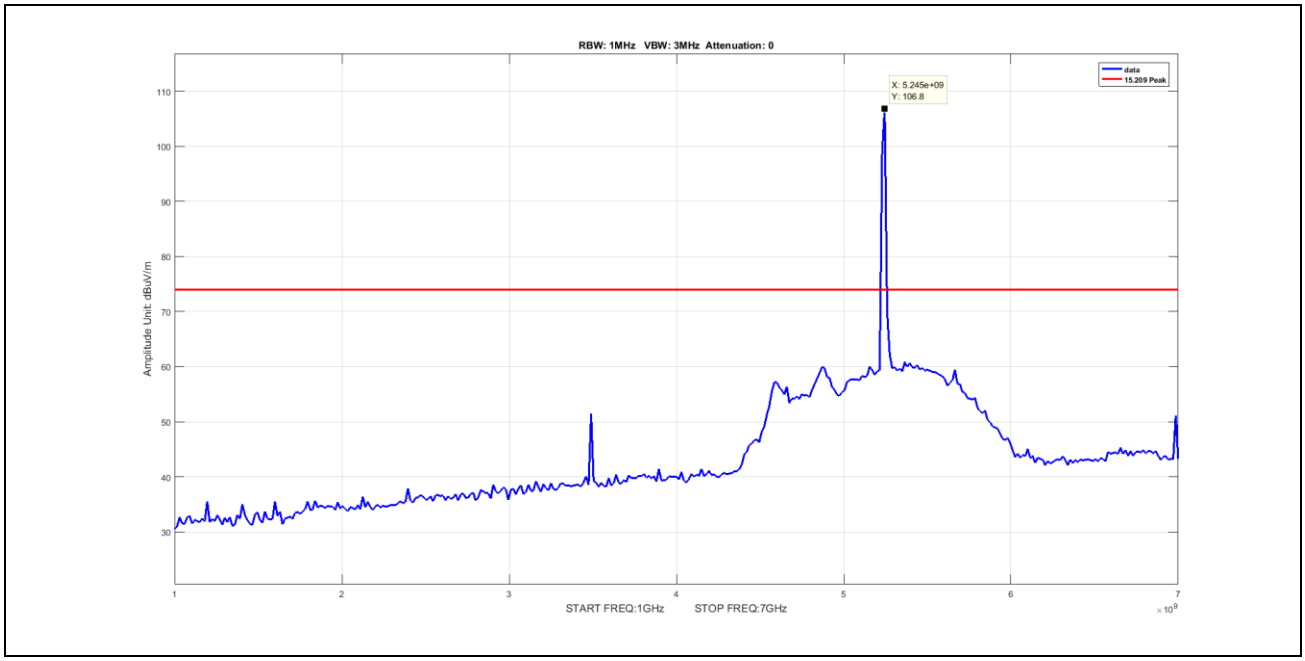
Plot 103. Radiated Spurious Emissions, 5 MHz, 5210 MHz, Channel 42, Power 24, Average, 1 GHz – 7 GHz, Mid



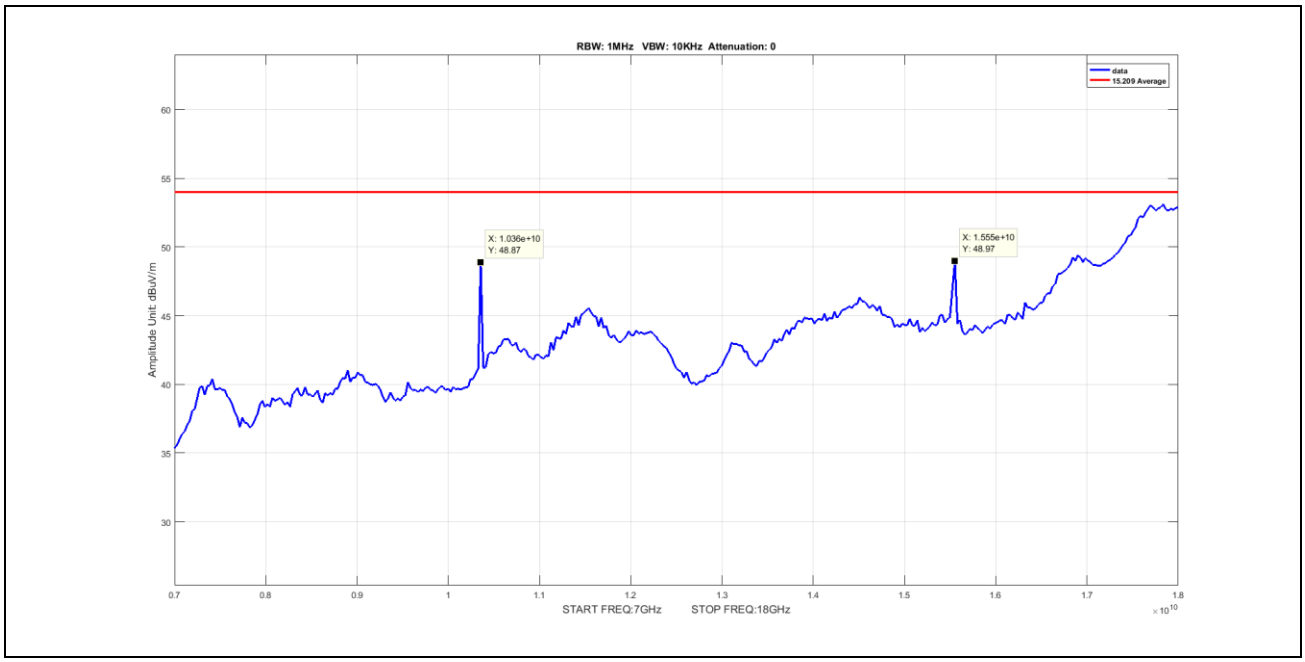
Plot 104. Radiated Spurious Emissions, 5 MHz, 5210 MHz, Channel 42, Power 24, Peak, 1 GHz – 7 GHz, Mid



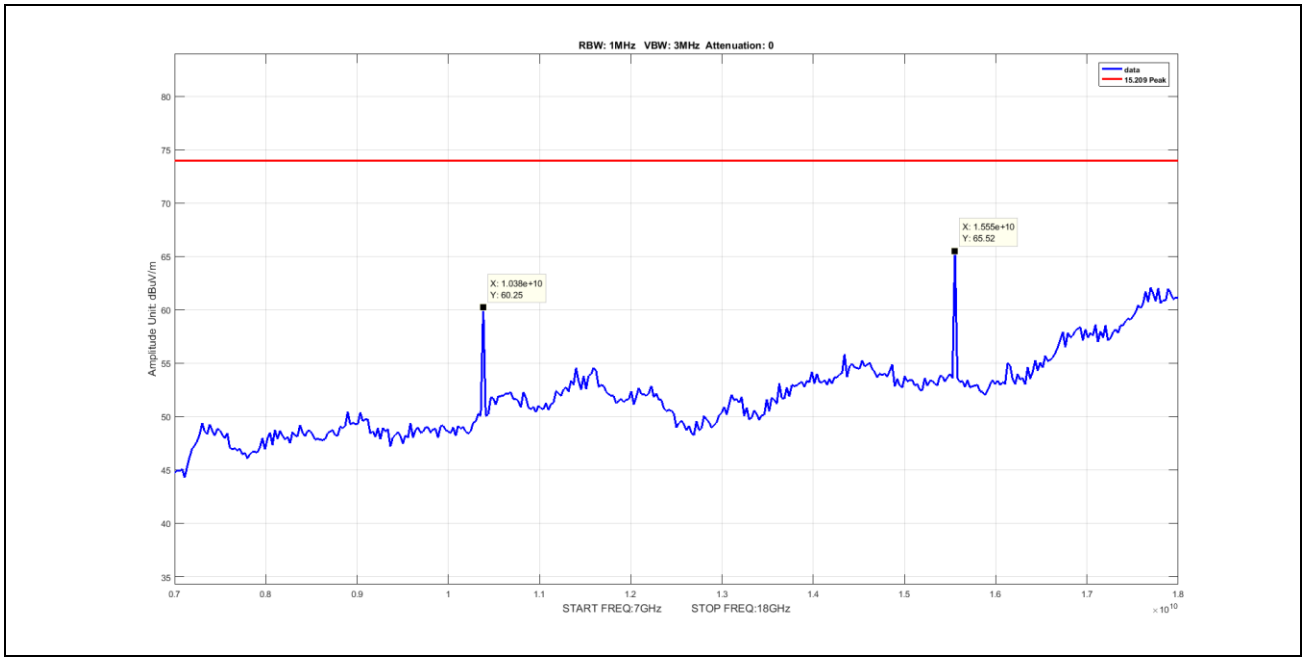
Plot 105. Radiated Spurious Emissions, 5 MHz, 5240 MHz, Channel 48, Power 23, Average, 1 GHz – 7 GHz, High



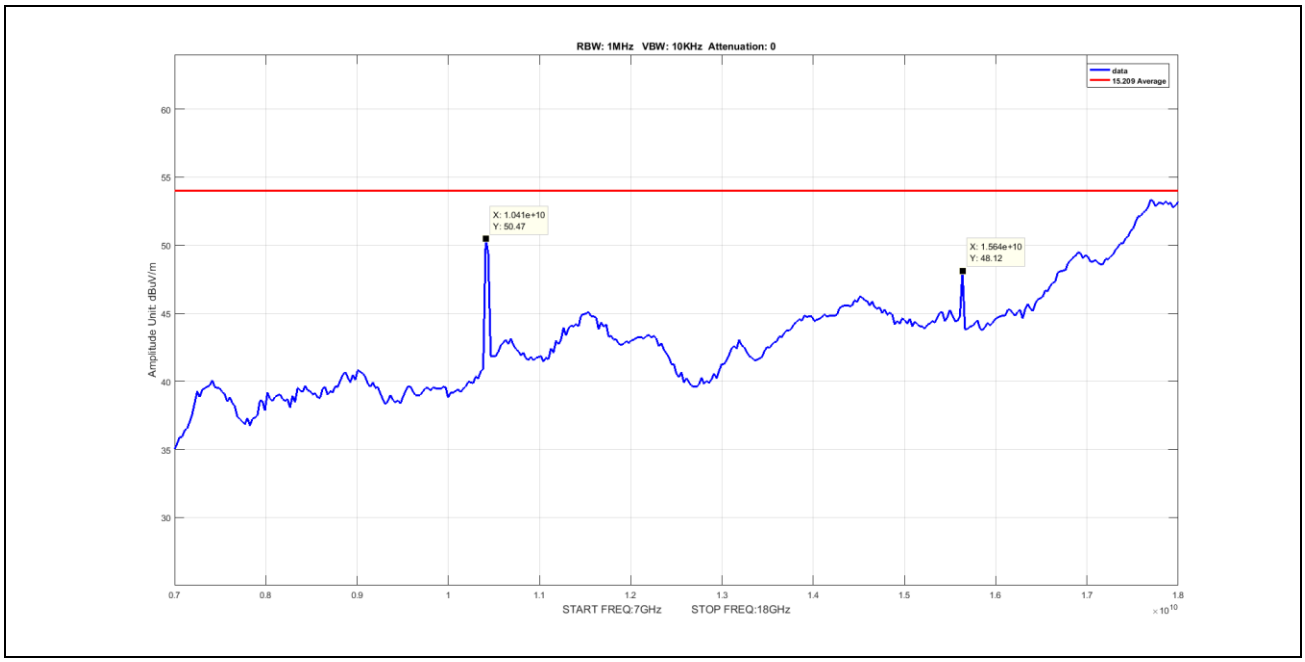
Plot 106. Radiated Spurious Emissions, 5 MHz, 5240 MHz, Channel 48, Power 23, Peak, 1 GHz – 7 GHz, High



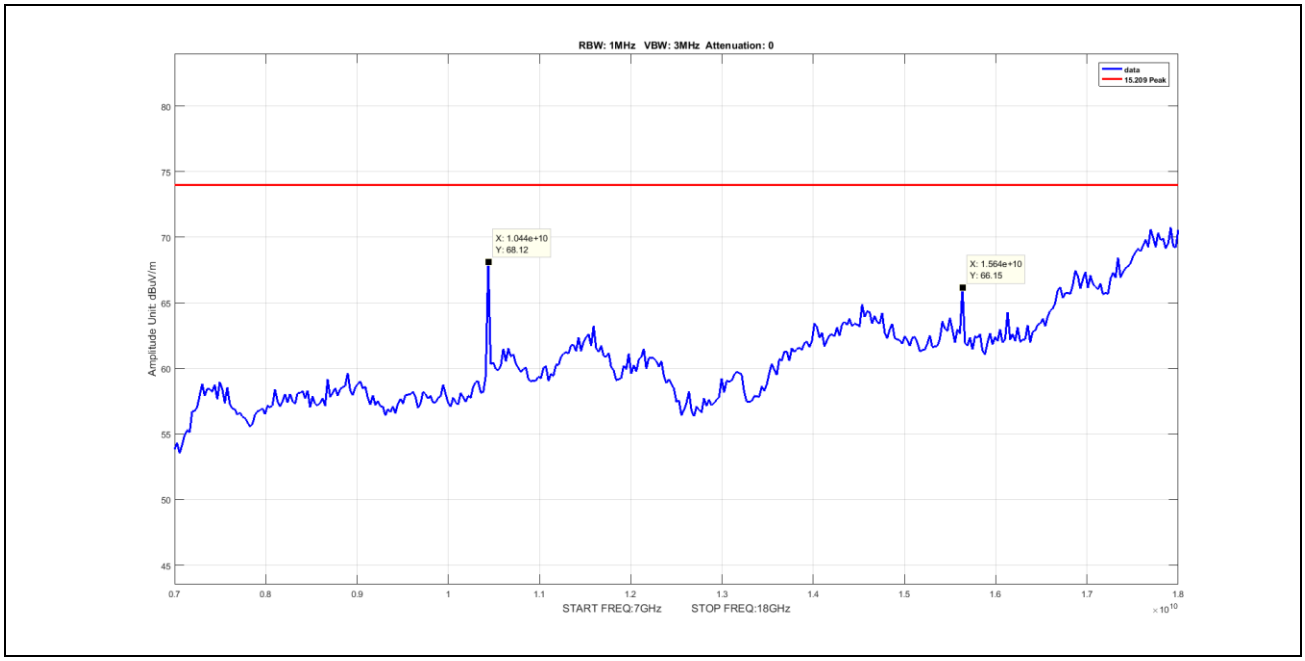
Plot 107. Radiated Spurious Emissions, 5 MHz, 5180 MHz, Channel 36, Power 24, Average, 7 GHz – 18 GHz, Low



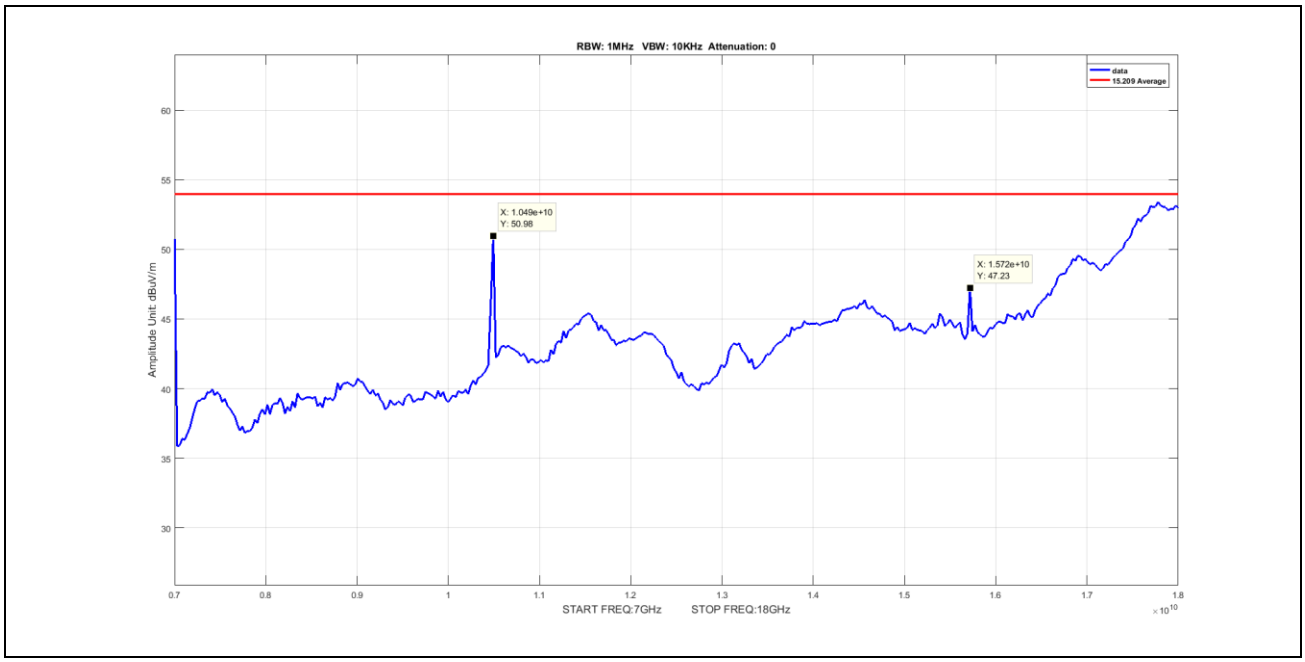
Plot 108. Radiated Spurious Emissions, 5 MHz, 5180 MHz, Channel 36, Power 24, Peak, 7 GHz – 18 GHz, Low



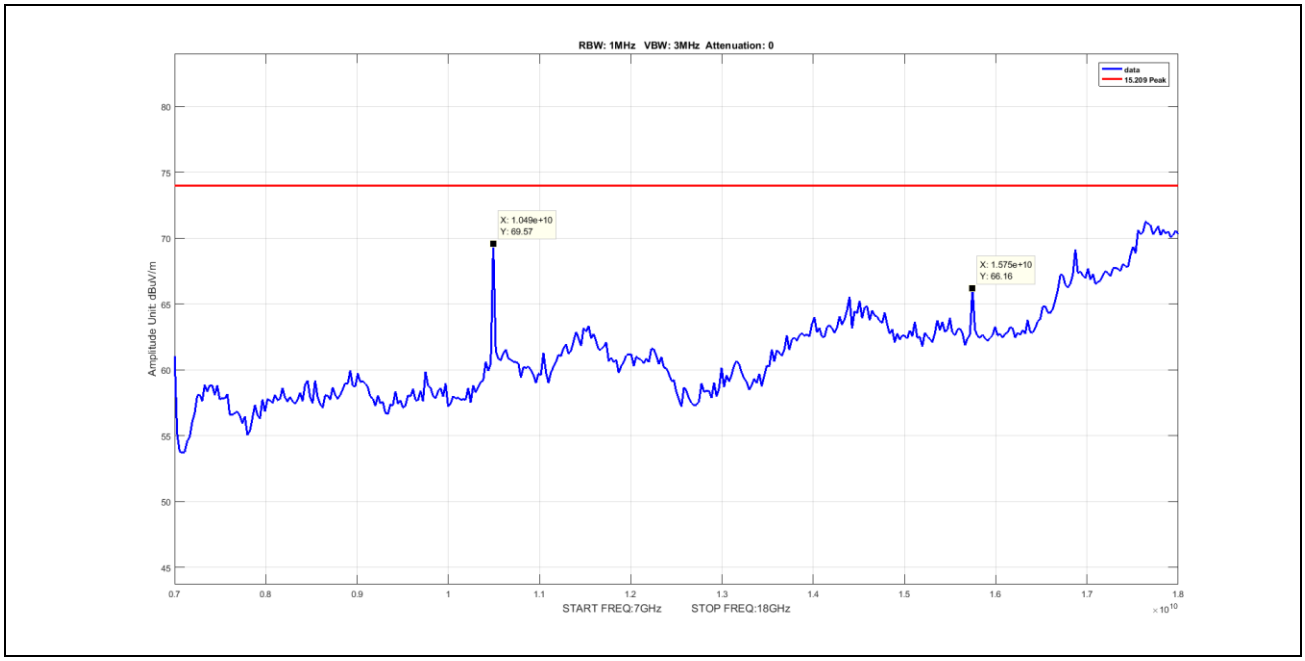
Plot 109. Radiated Spurious Emissions, 5 MHz, 5210 MHz, Channel 42, Power 24, Average, 7 GHz – 18 GHz, Mid



Plot 110. Radiated Spurious Emissions, 5 MHz, 5210 MHz, Channel 42, Power 24, Peak, 7 GHz – 18 GHz, Mid

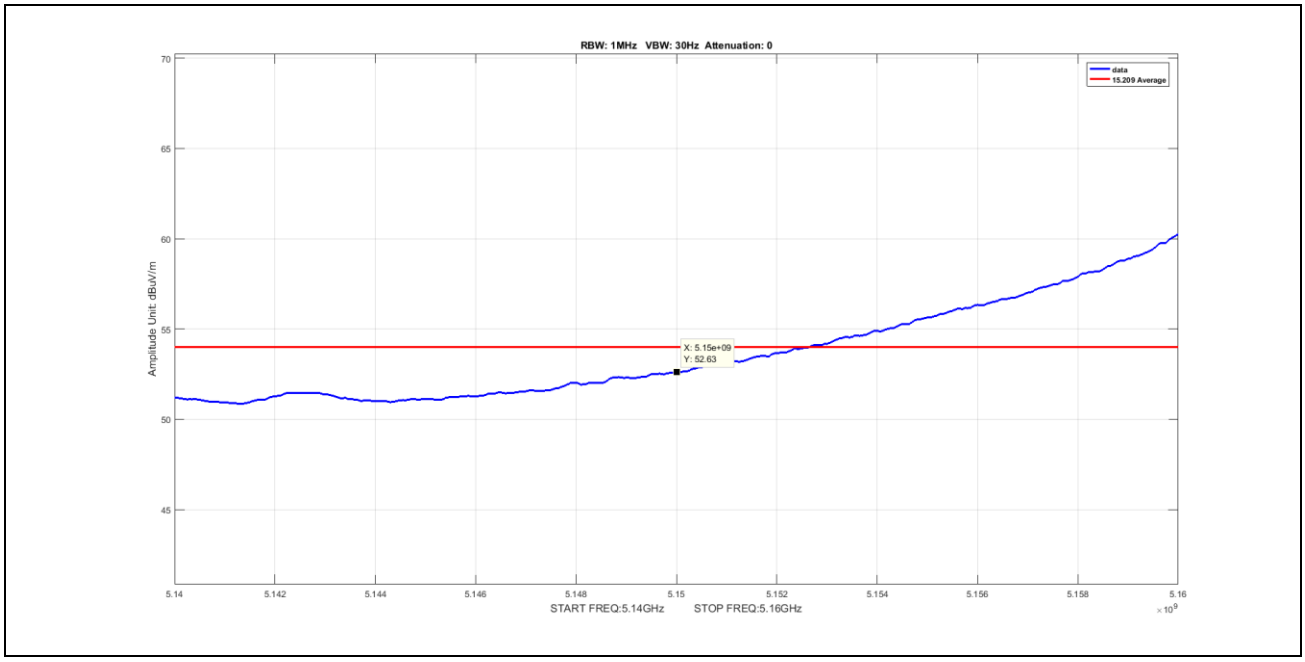


Plot 111. Radiated Spurious Emissions, 5 MHz, 5240 MHz, Channel 48, Power 23, Average, 7 GHz – 18 GHz, High

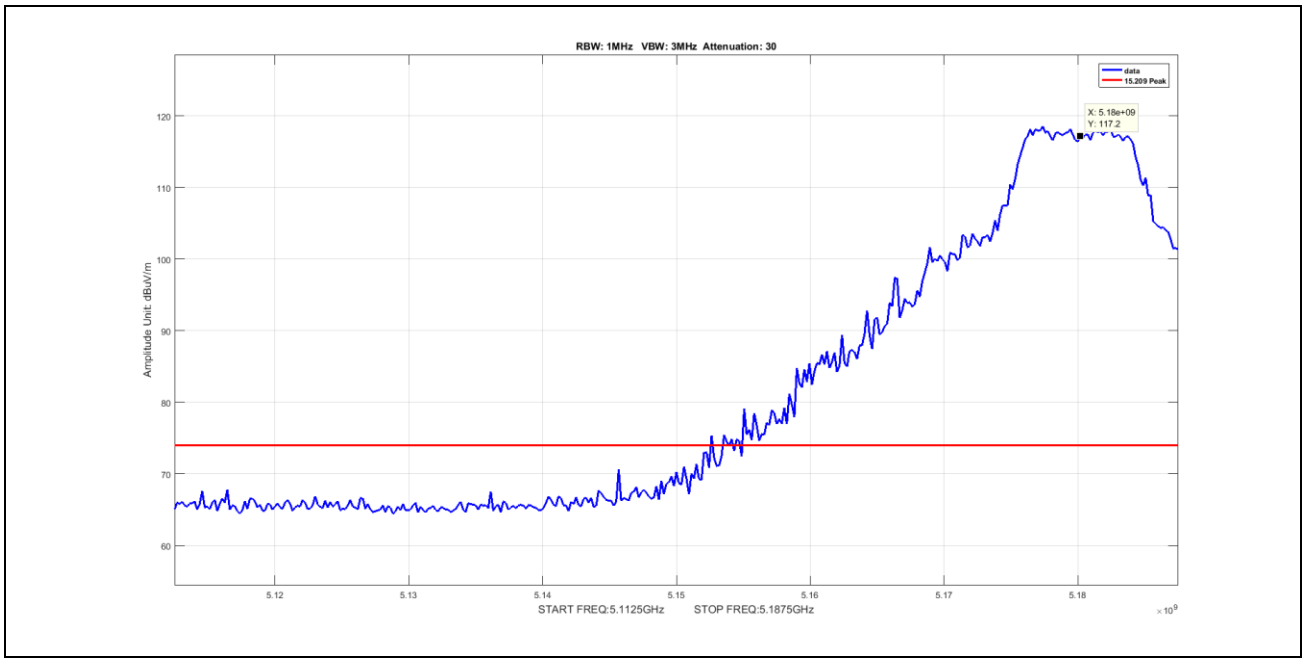


Plot 112. Radiated Spurious Emissions, 5 MHz, 5240 MHz, Channel 48, Power 23, Peak, 7 GHz – 18 GHz, High

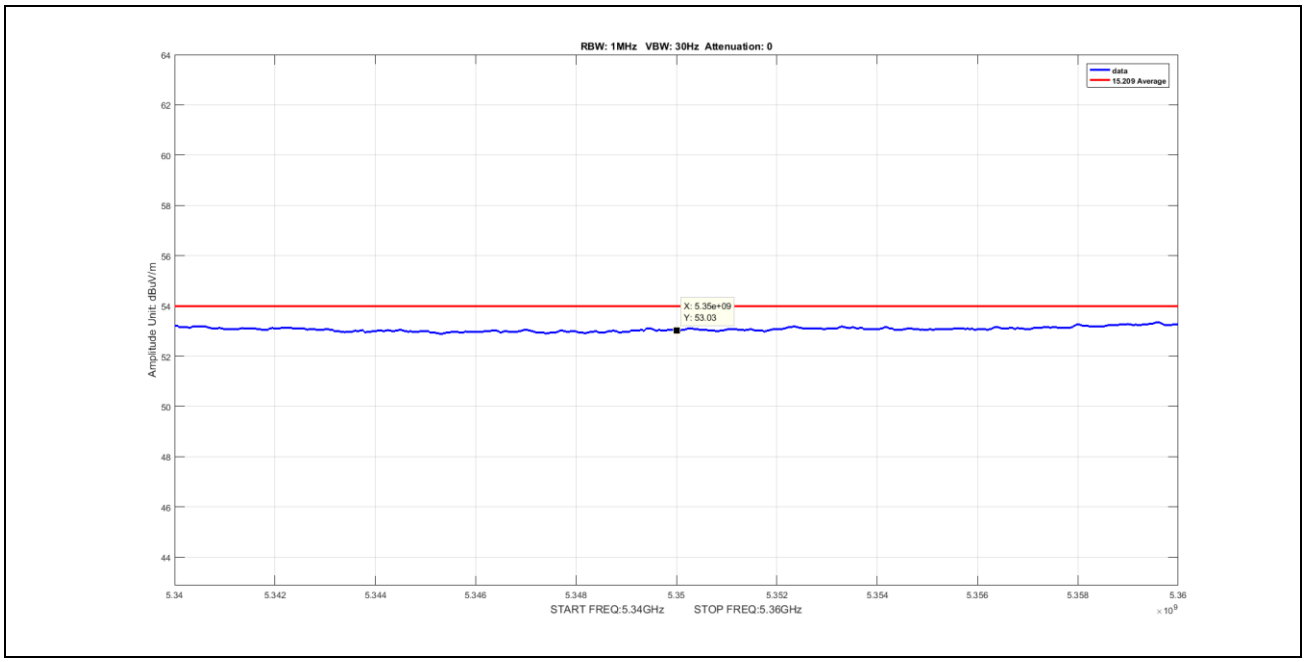
Radiated Spurious Emissions, 10 MHz



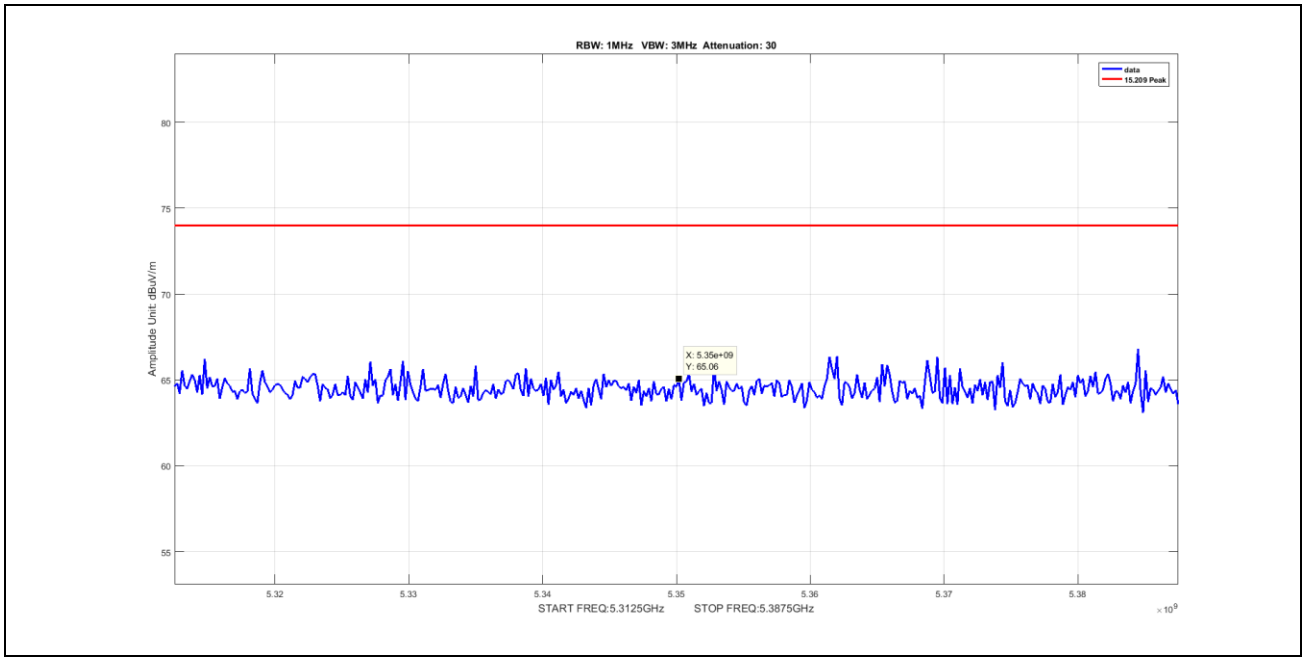
Plot 113. Radiated Spurious Emissions, 10 MHz, 5180 MHz, Channel 36, Power 27, Average



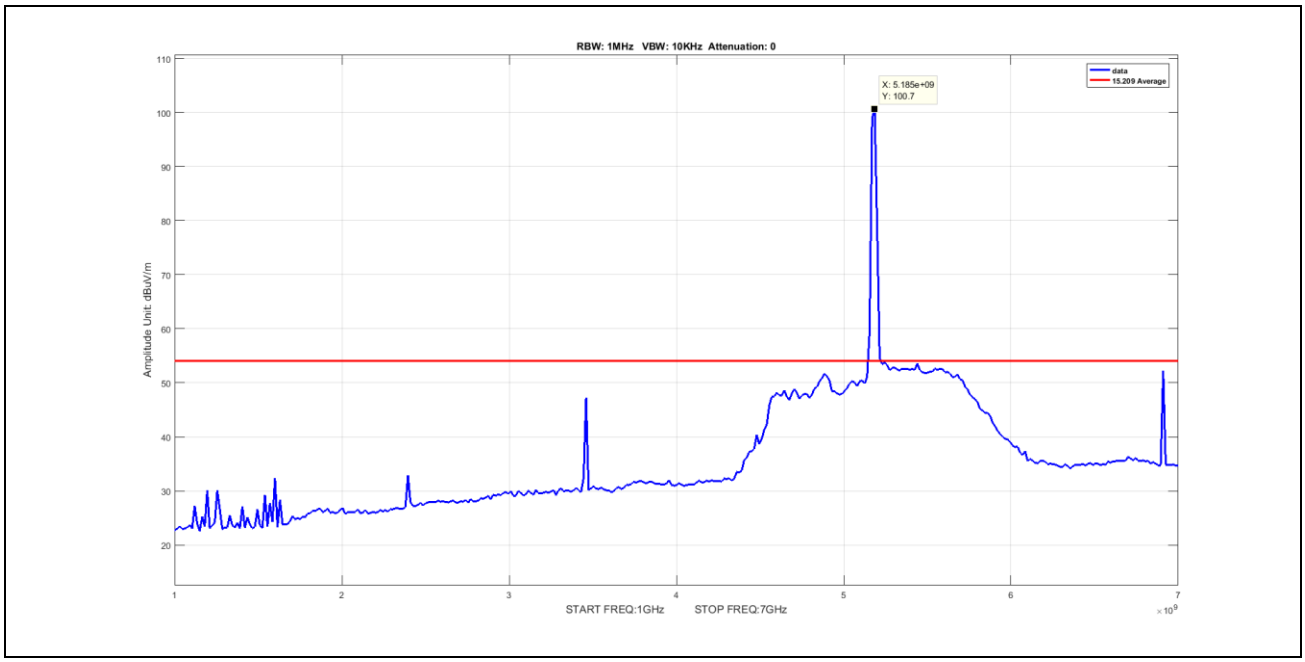
Plot 114. Radiated Spurious Emissions, 10 MHz, 5180 MHz, Channel 36, Power 28, Peak



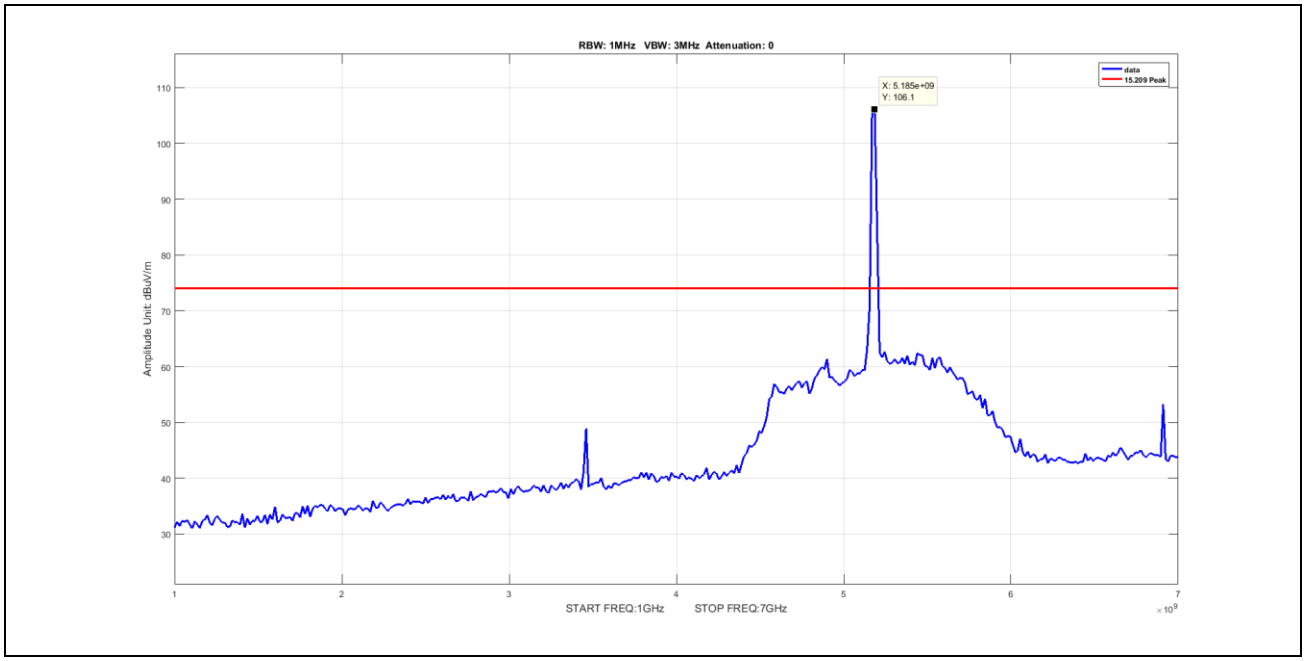
Plot 115. Radiated Spurious Emissions, 10 MHz, 5350 MHz, Channel 48, Power 29, Average



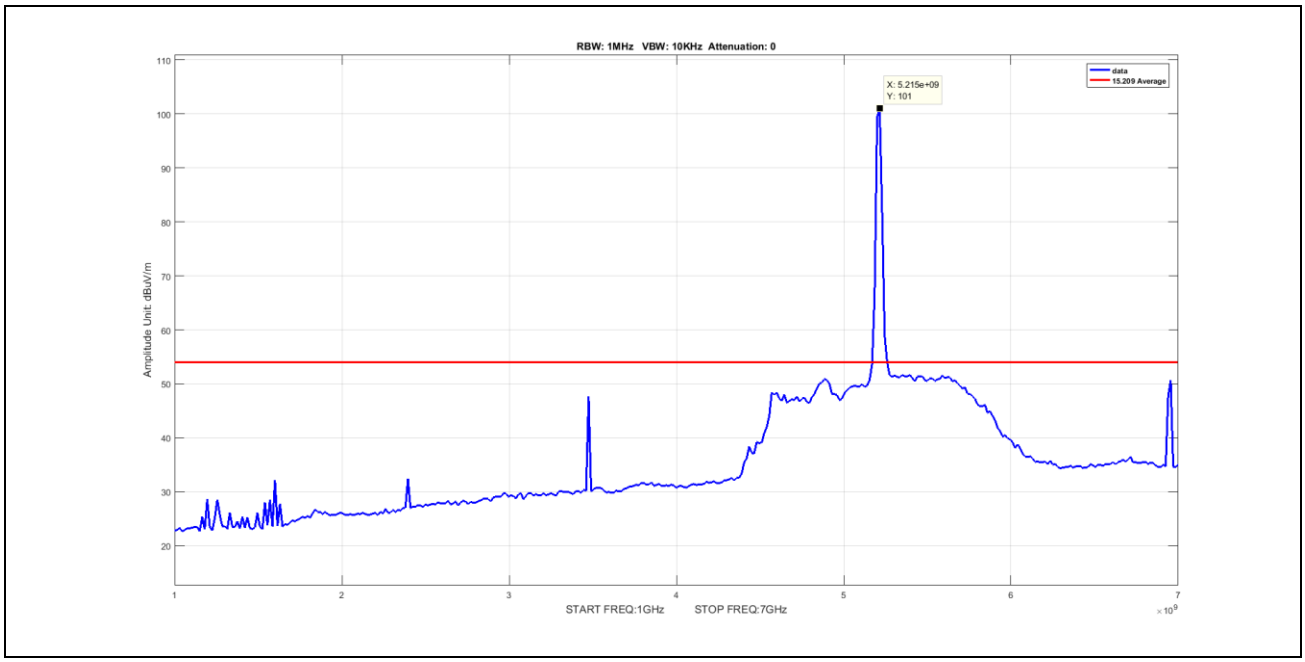
Plot 116. Radiated Spurious Emissions, 10 MHz, 5350 MHz, Channel 48, Power 29, Peak



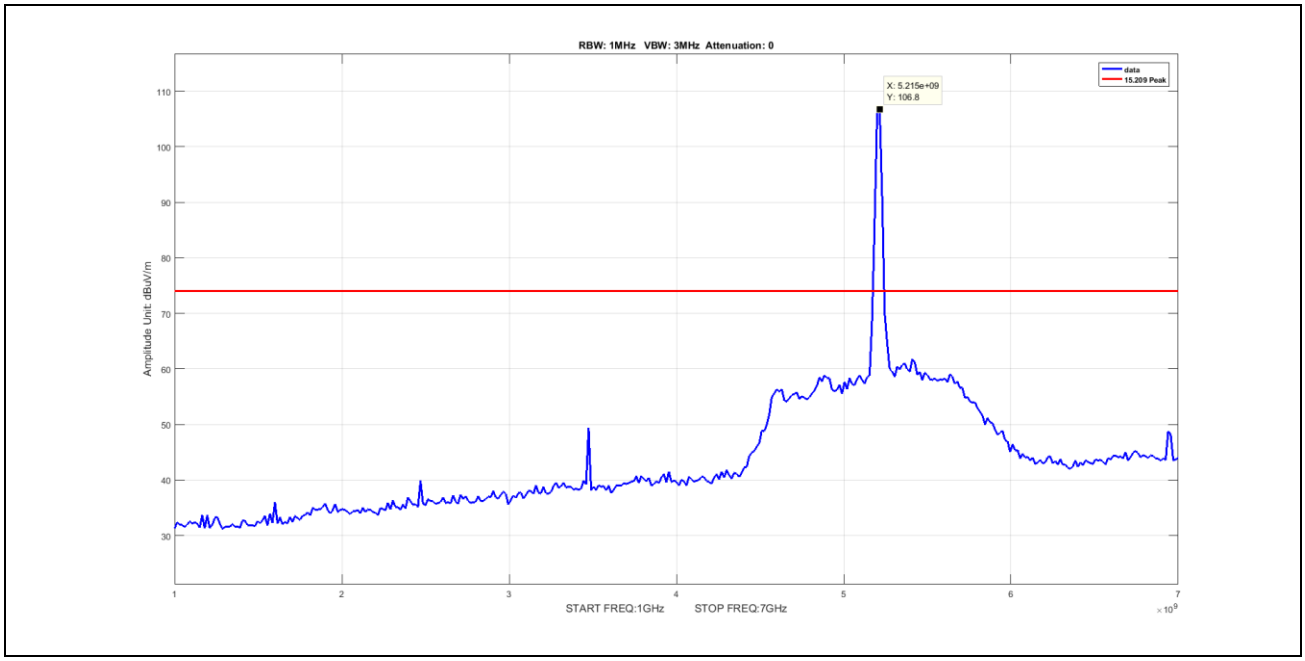
Plot 117. Radiated Spurious Emissions, 10 MHz, 5180 MHz, Channel 36, Power 24, Average, 1 GHz – 7 GHz, Low



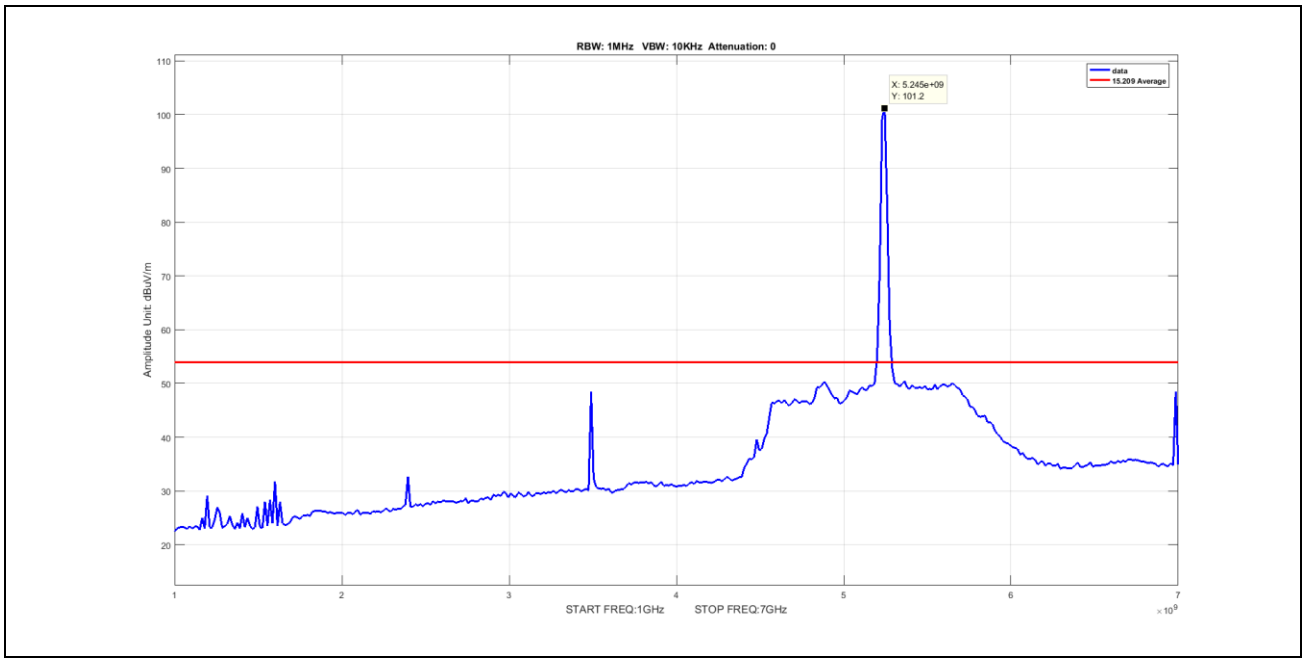
Plot 118. Radiated Spurious Emissions, 10 MHz, 5180 MHz, Channel 36, Power 24, Peak, 1 GHz – 7 GHz, Low



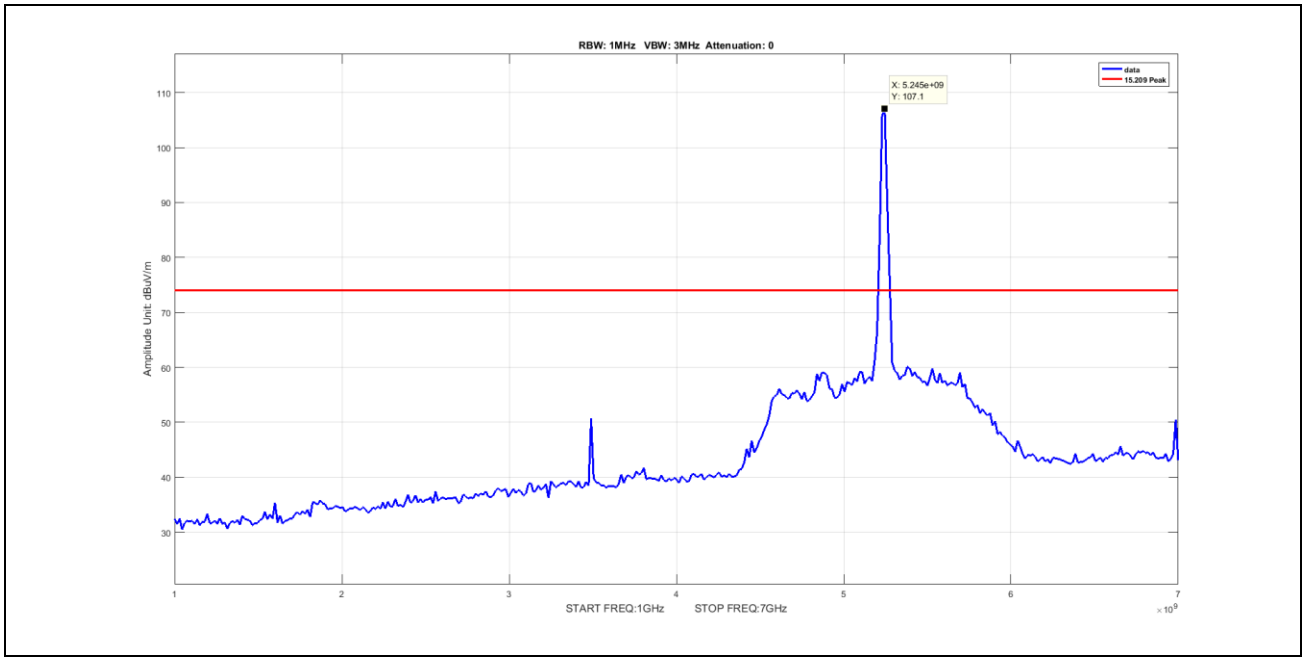
Plot 119. Radiated Spurious Emissions, 10 MHz, 5210 MHz, Channel 42, Power 27, Average, 1 GHz – 7 GHz, Mid



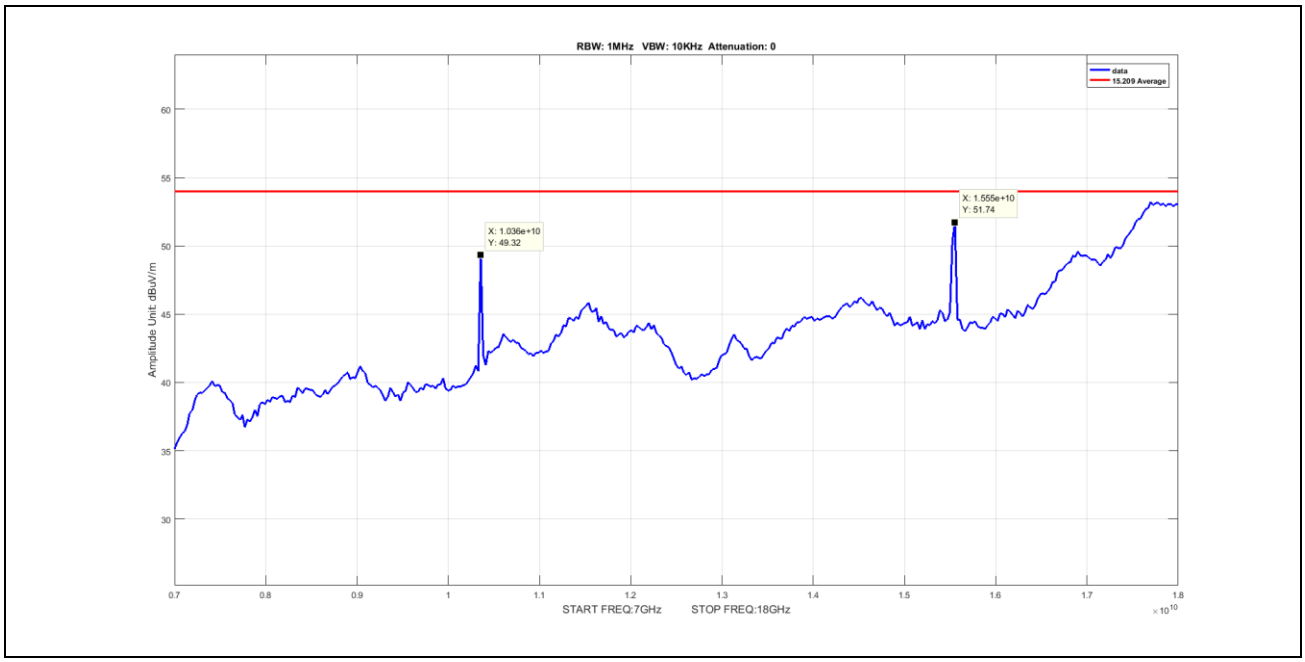
Plot 120. Radiated Spurious Emissions, 10 MHz, 5210 MHz, Channel 42, Power 27, Peak, 1 GHz – 7 GHz, Mid



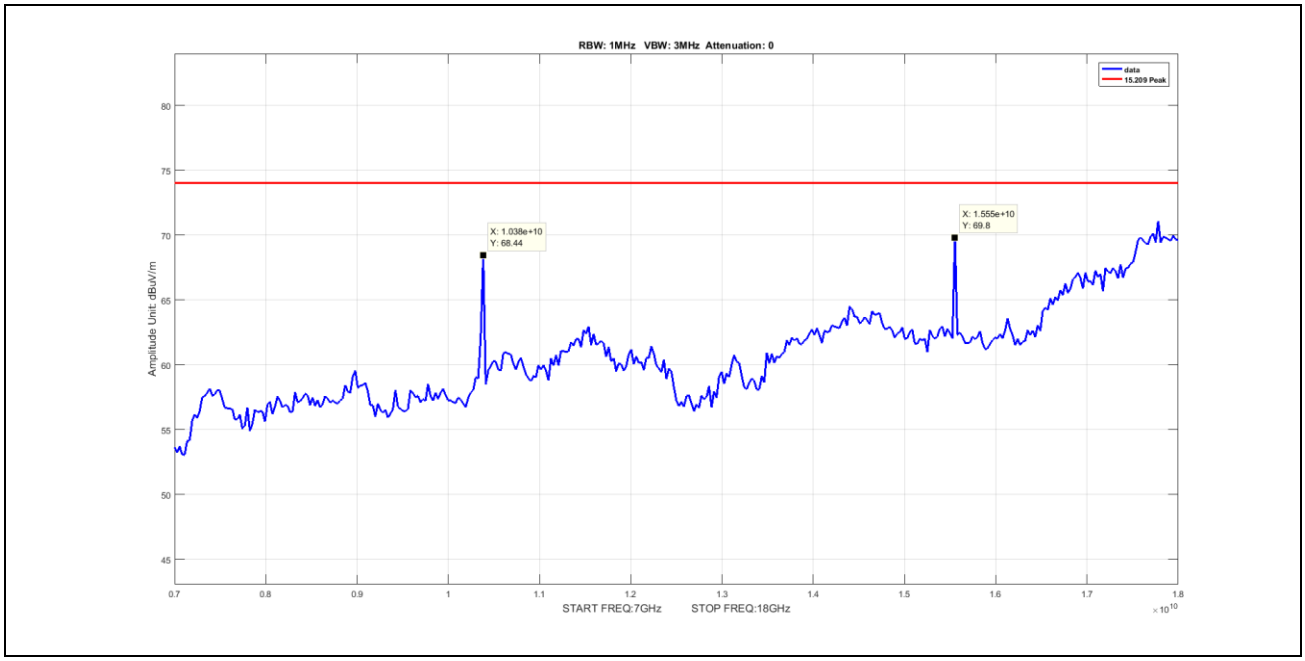
Plot 121. Radiated Spurious Emissions, 10 MHz, 5240 MHz, Channel 48, Power 27, Average, 1 GHz – 7 GHz, High



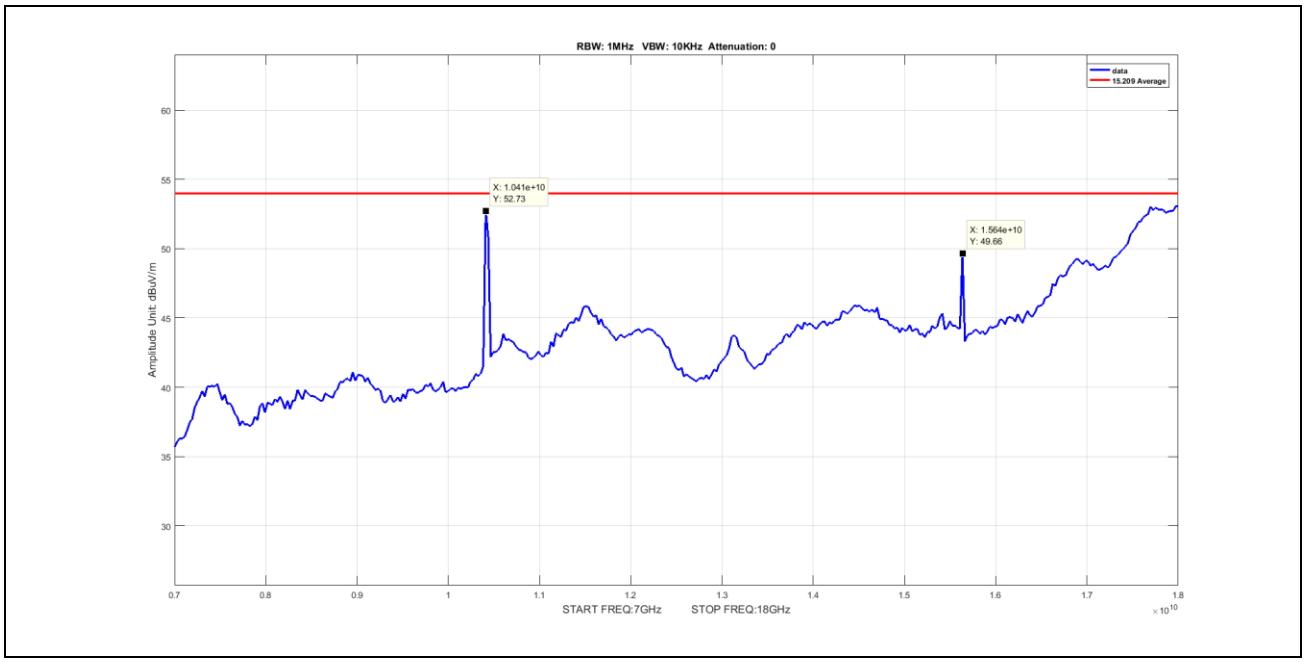
Plot 122. Radiated Spurious Emissions, 10 MHz, 5240 MHz, Channel 48, Power 27, Peak, 1 GHz – 7 GHz, High



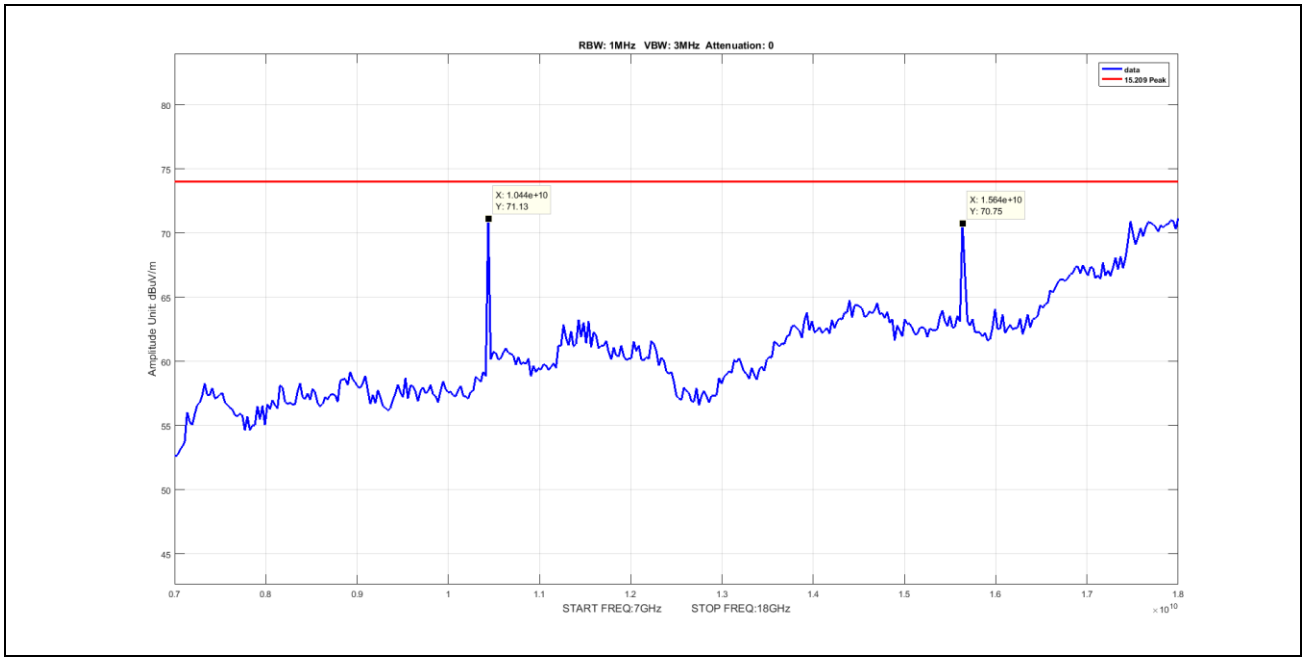
Plot 123. Radiated Spurious Emissions, 10 MHz, 5180 MHz, Channel 36, Power 24, Average, 7 GHz – 18 GHz, Low



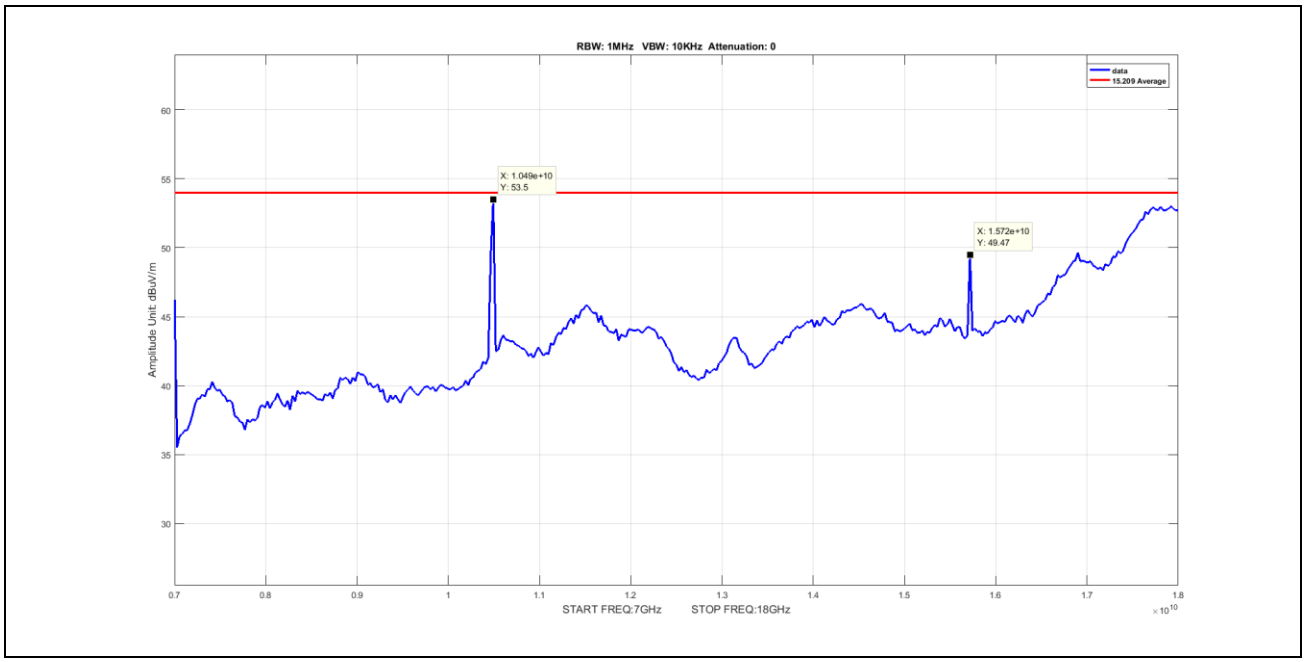
Plot 124. Radiated Spurious Emissions, 10 MHz, 5180 MHz, Channel 36, Power 24, Peak, 7 GHz – 18 GHz, Low



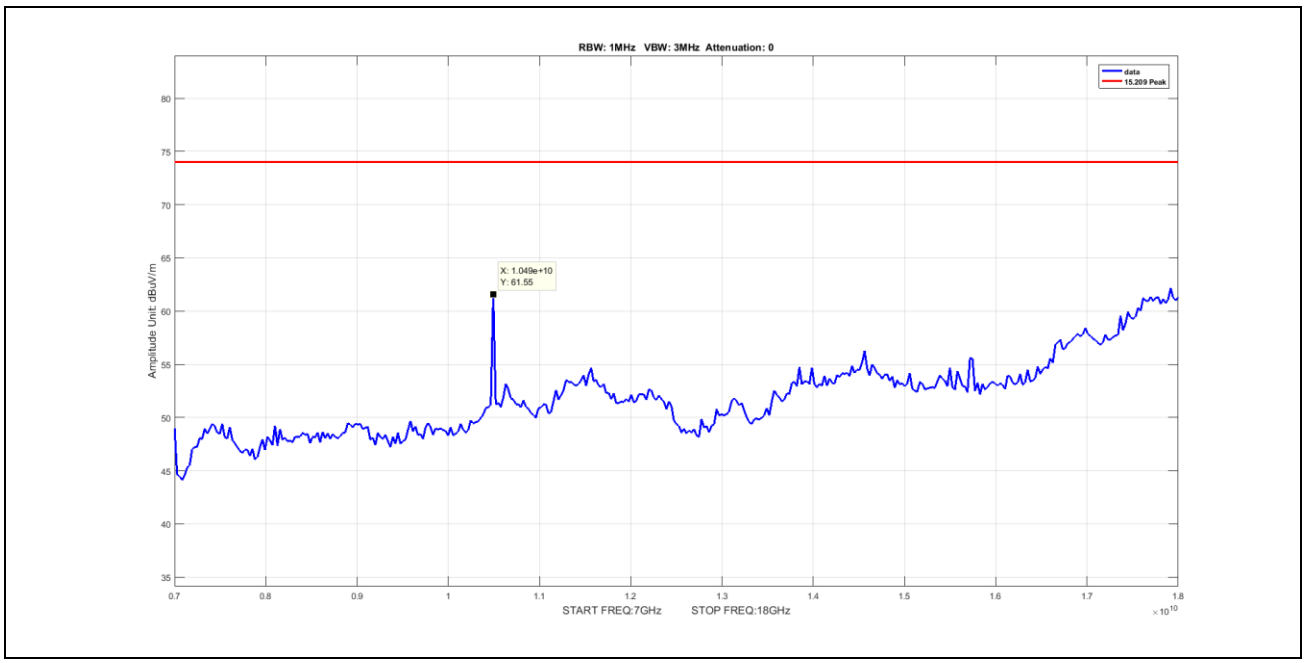
Plot 125. Radiated Spurious Emissions, 10 MHz, 5210 MHz, Channel 42, Power 24, Average, 7 GHz – 18 GHz, Mid



Plot 126. Radiated Spurious Emissions, 10 MHz, 5210 MHz, Channel 42, Power 27, Peak, 7 GHz – 18 GHz, Mid

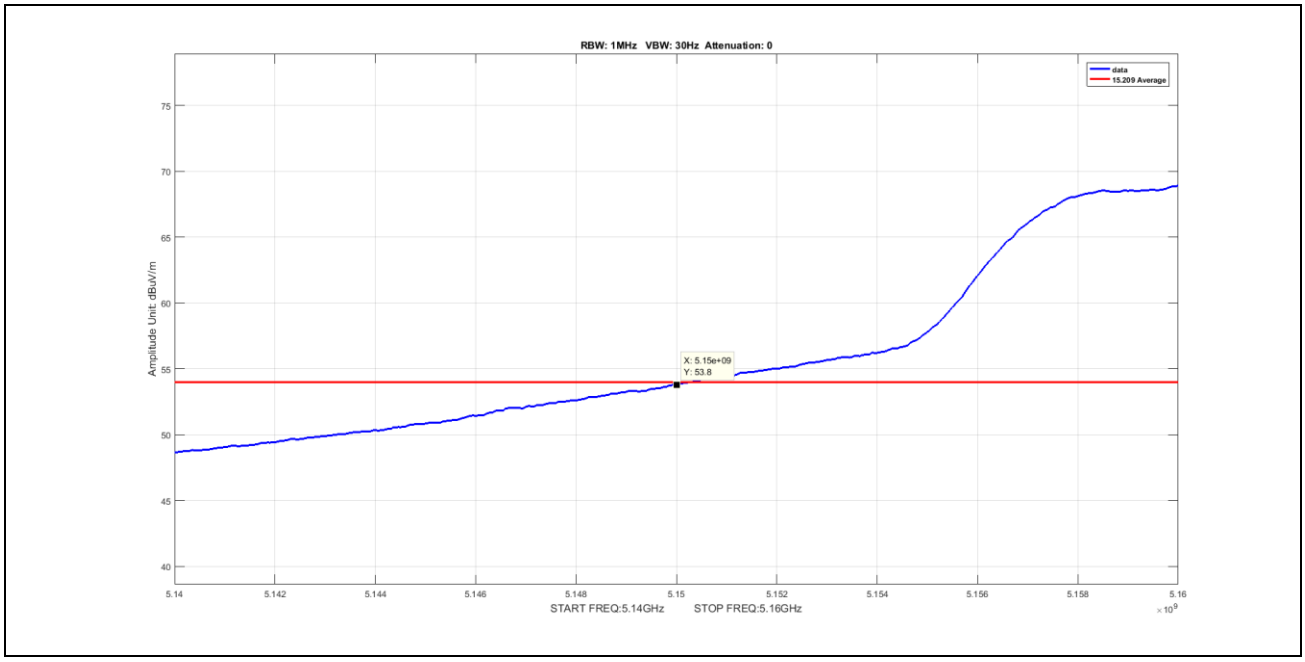


Plot 127. Radiated Spurious Emissions, 10 MHz, 5240 MHz, Channel 48, Power 27, Average, 7 GHz – 18 GHz, High

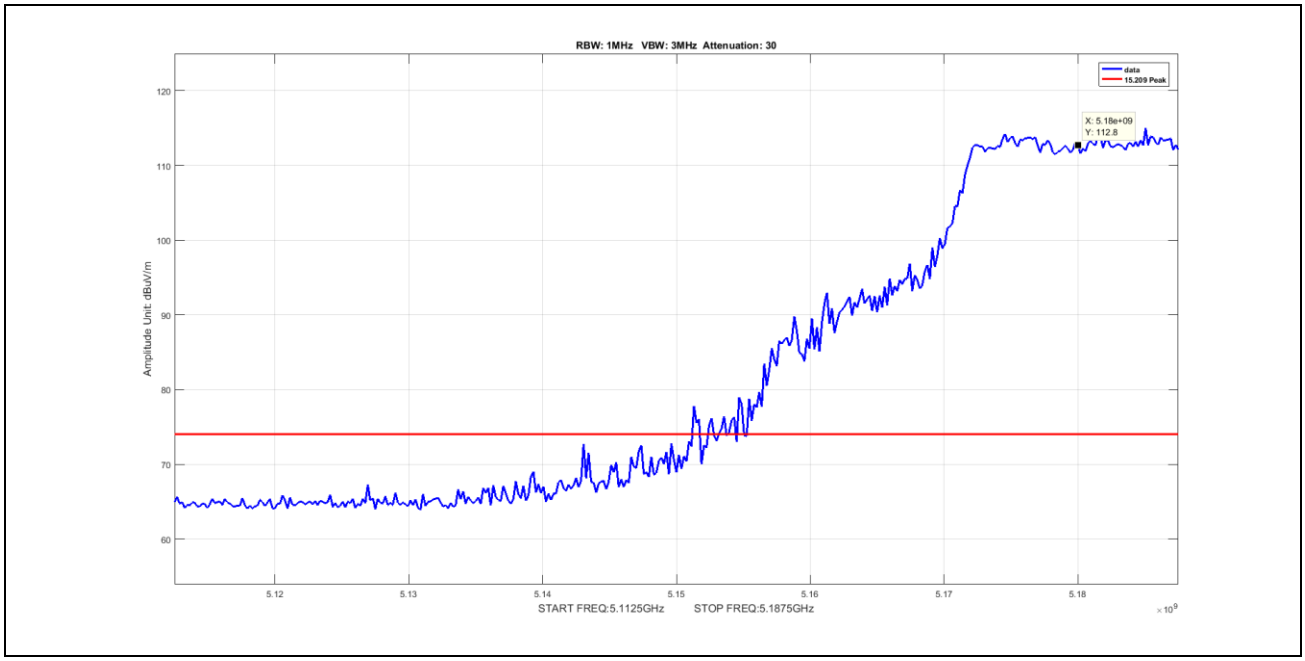


Plot 128. Radiated Spurious Emissions, 10 MHz, 5240 MHz, Channel 48, Power 27, Peak, 7 GHz – 18 GHz, High

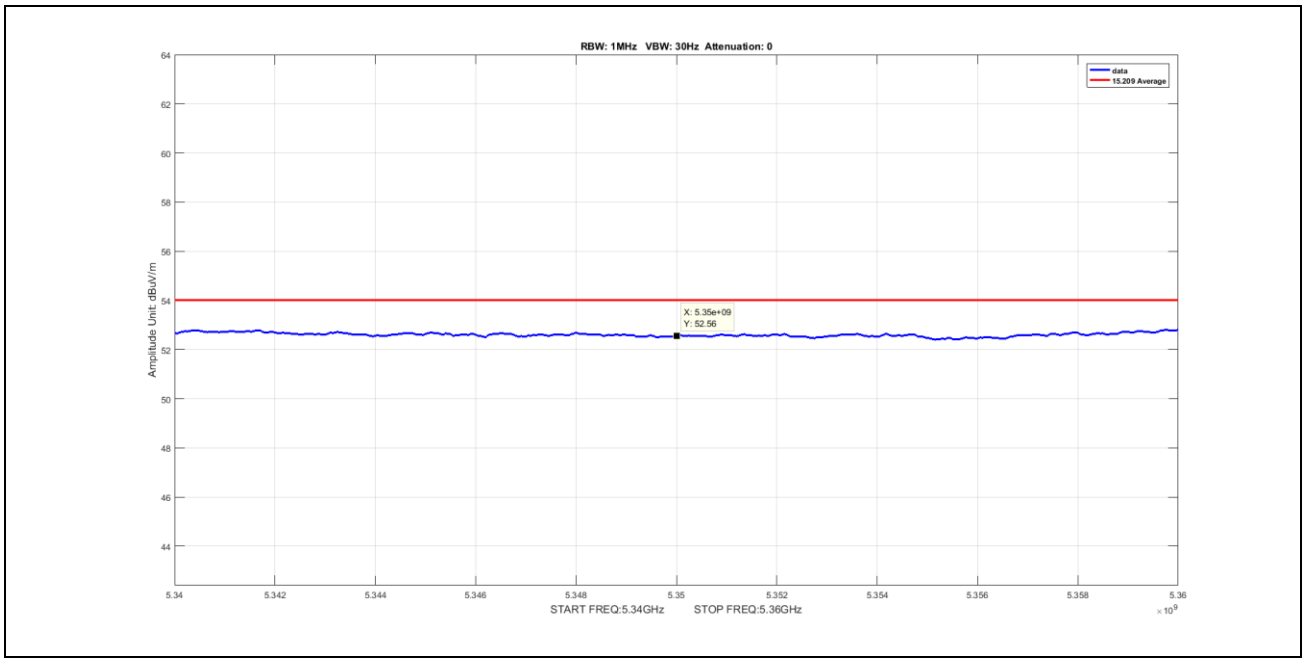
Radiated Spurious Emissions, 20 MHz



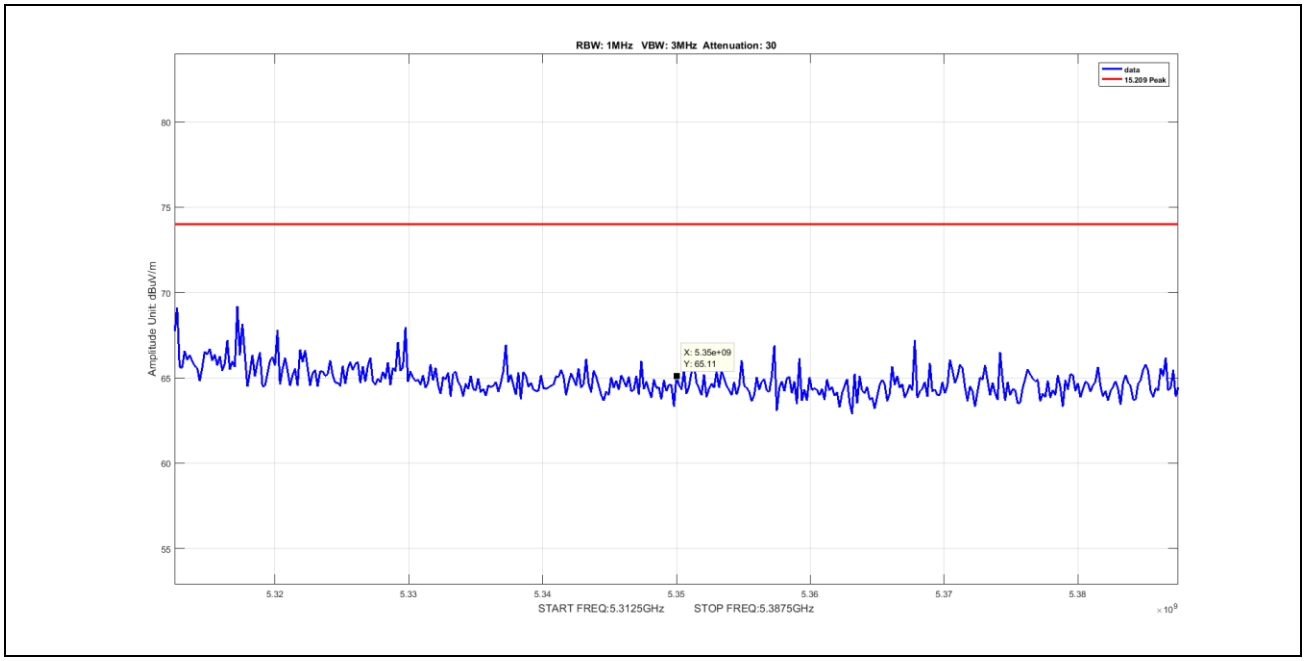
Plot 129. Radiated Spurious Emissions, 20 MHz, 5180 MHz, Channel 36, Power 20, Average



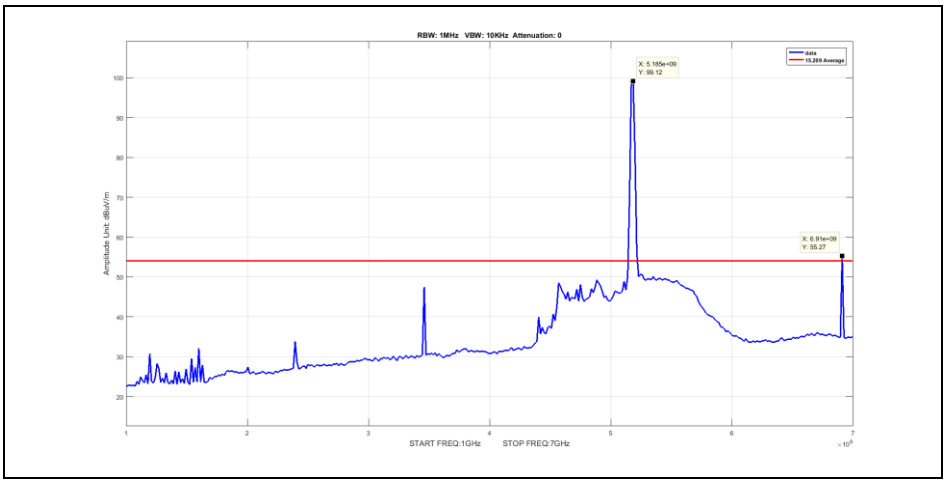
Plot 130. Radiated Spurious Emissions, 20 MHz, 5180 MHz, Channel 36, Power 22, Peak



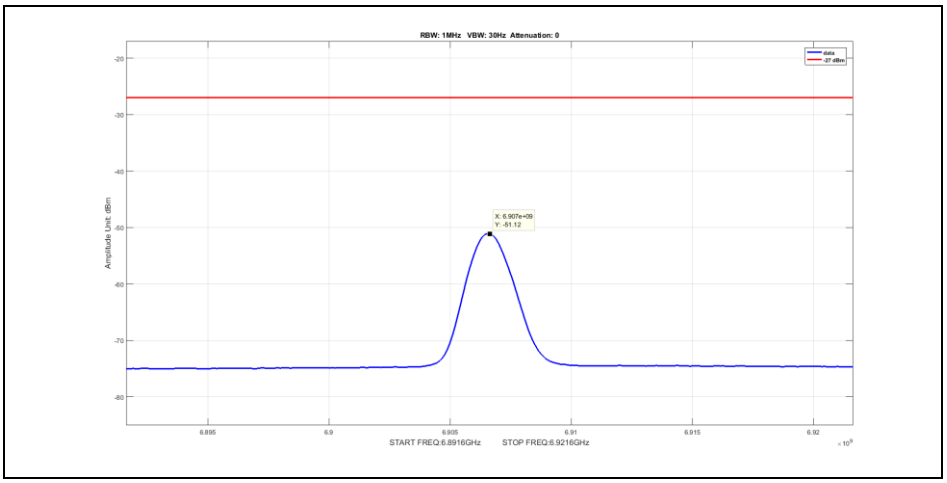
Plot 131. Radiated Spurious Emissions, 20 MHz, 5350 MHz, Channel 48, Power 29, Average



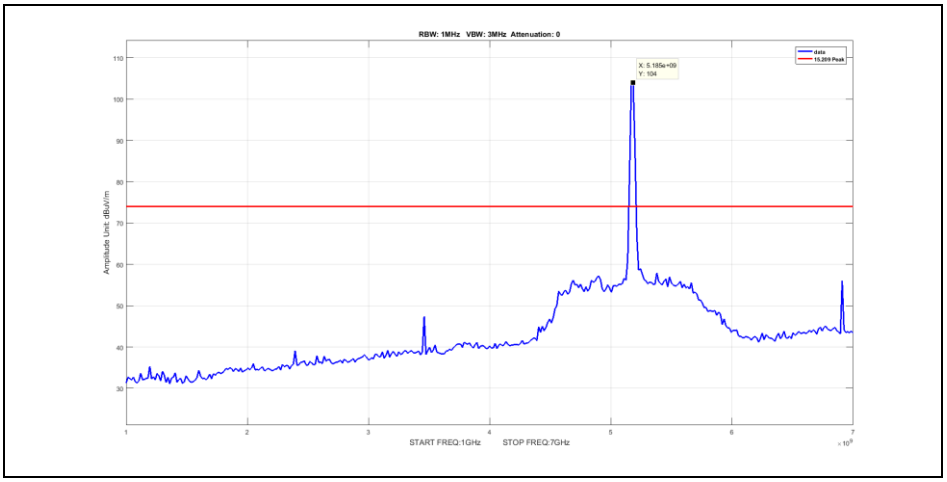
Plot 132. Radiated Spurious Emissions, 20 MHz, 5350 MHz, Channel 48, Power 29, Peak



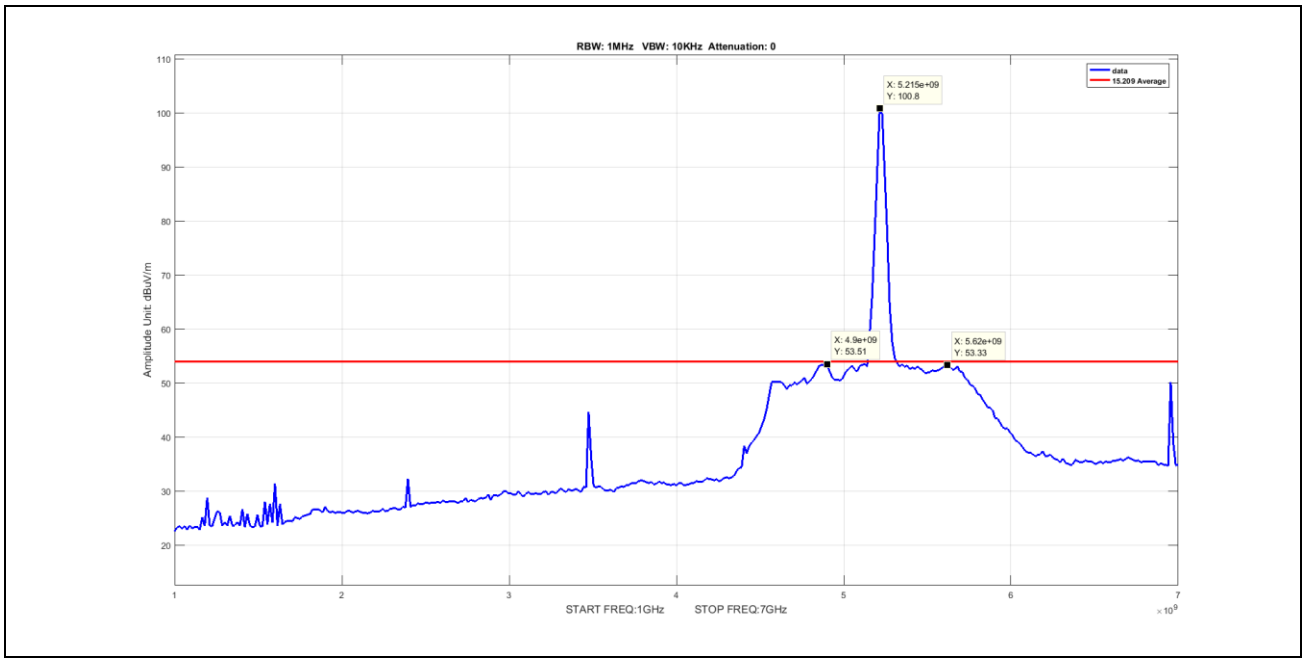
Plot 133. Radiated Spurious Emissions, 20 MHz, 5180 MHz, Channel 36, Power 20, Average, 1 GHz – 7 GHz, Low



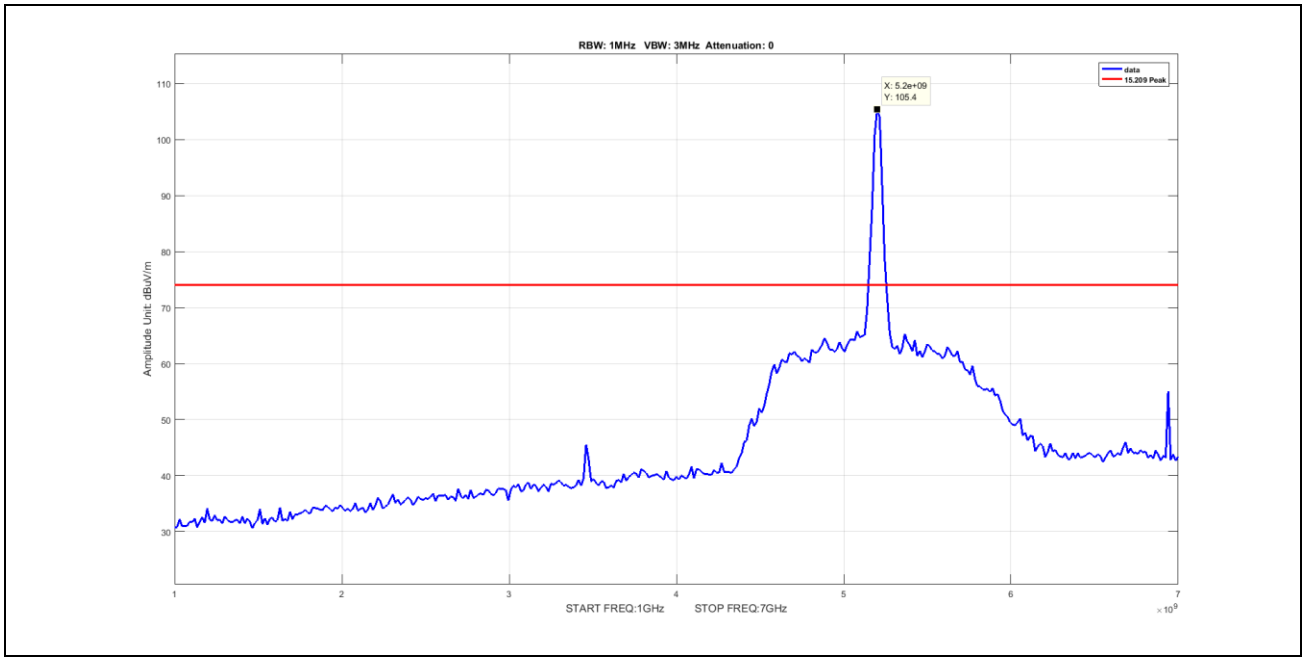
Plot 134. Radiated Spurious Emissions, 20 MHz, 5180 MHz, Channel 36, Power 20, Average, 1 GHz – 7 GHz, Low, Zoom



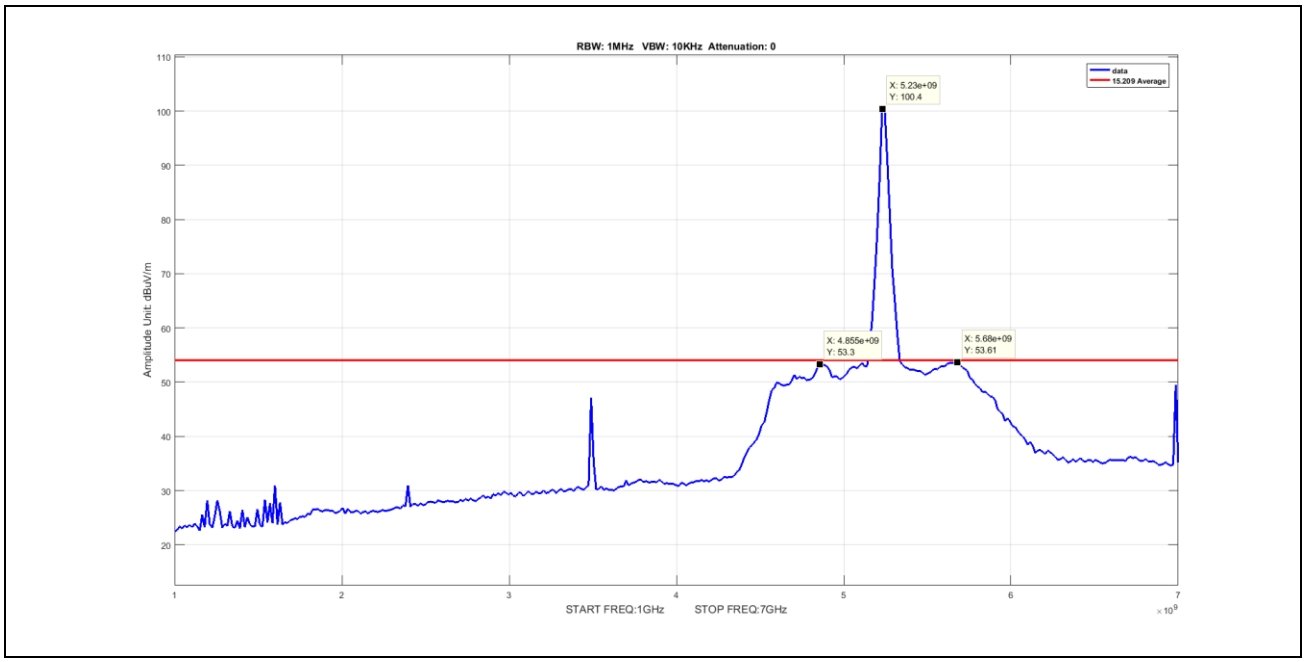
Plot 135. Radiated Spurious Emissions, 20 MHz, 5180 MHz, Channel 36, Power 20, Peak, 1 GHz – 7 GHz, Low



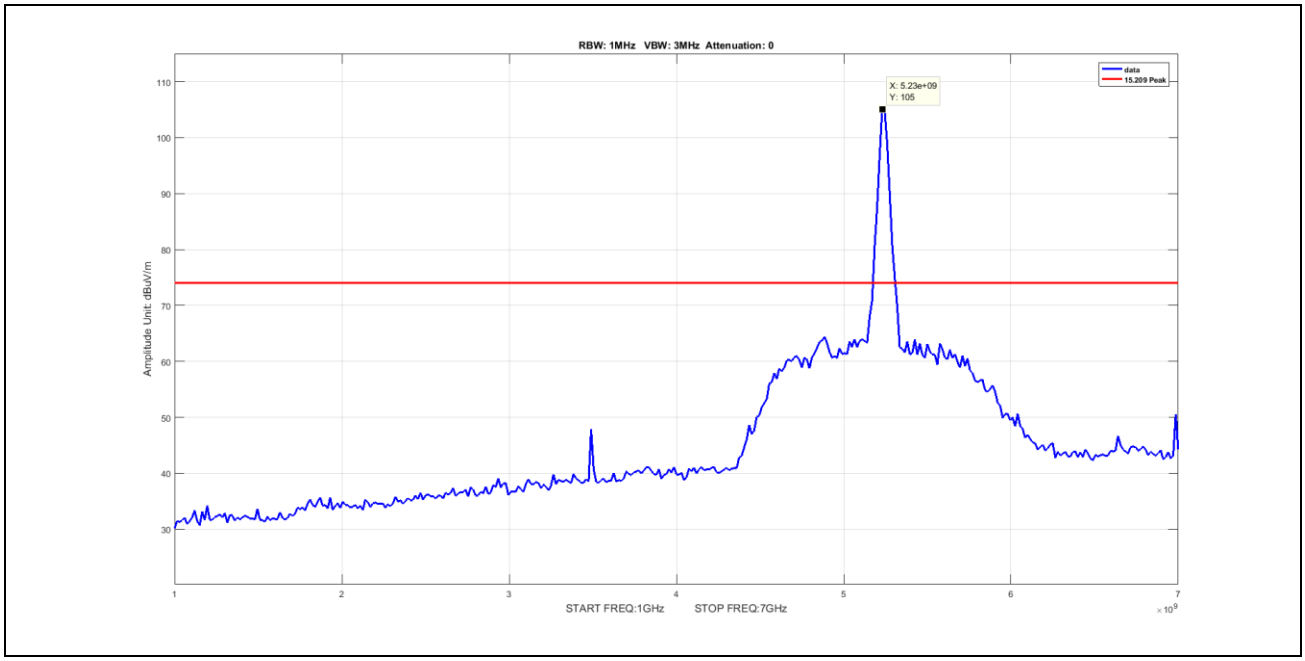
Plot 136. Radiated Spurious Emissions, 20 MHz, 5220 MHz, Channel 44, Power 29, Average, 1 GHz – 7 GHz, Mid



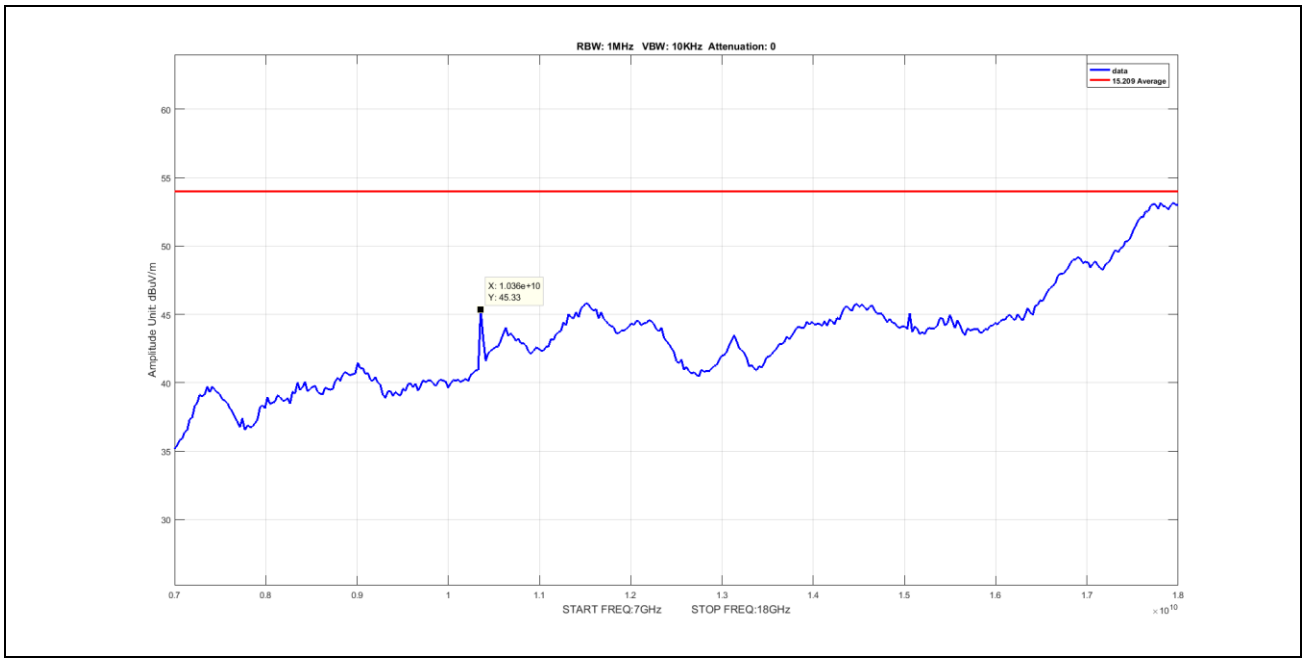
Plot 137. Radiated Spurious Emissions, 20 MHz, 5200 MHz, Channel 40, Power 29, Peak, 1 GHz – 7 GHz, Mid



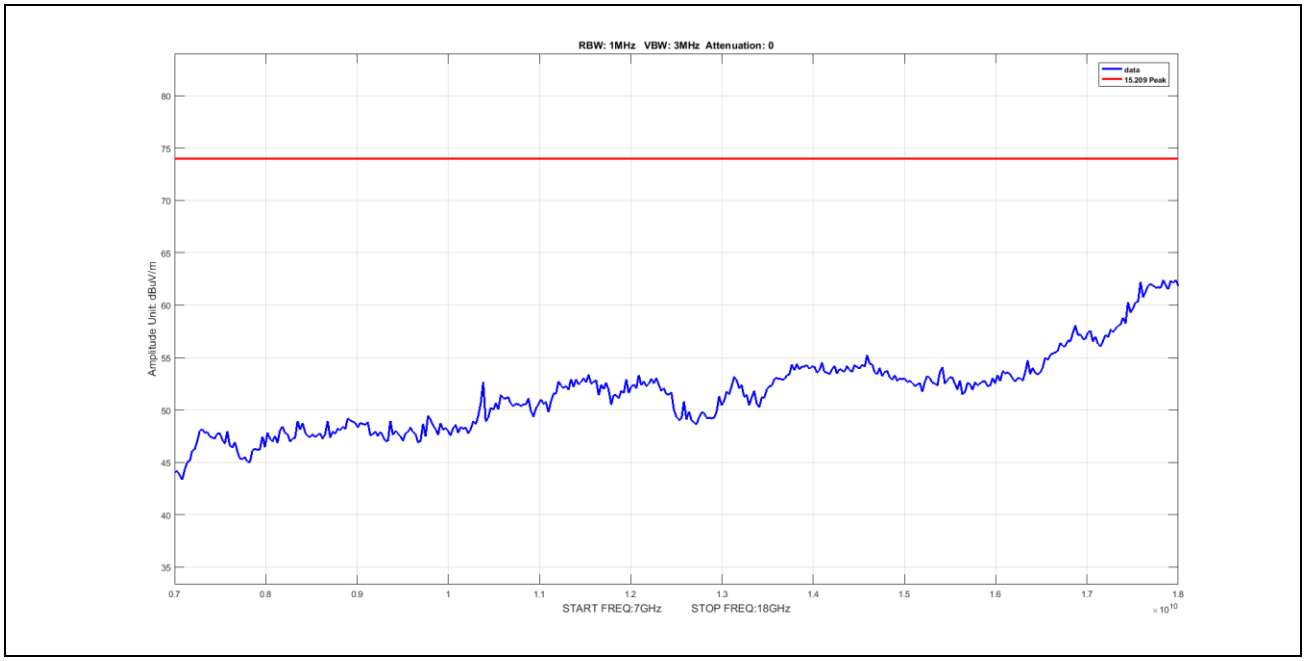
Plot 138. Radiated Spurious Emissions, 20 MHz, 5240 MHz, Channel 48, Power 29, Average, 1 GHz – 7 GHz, High



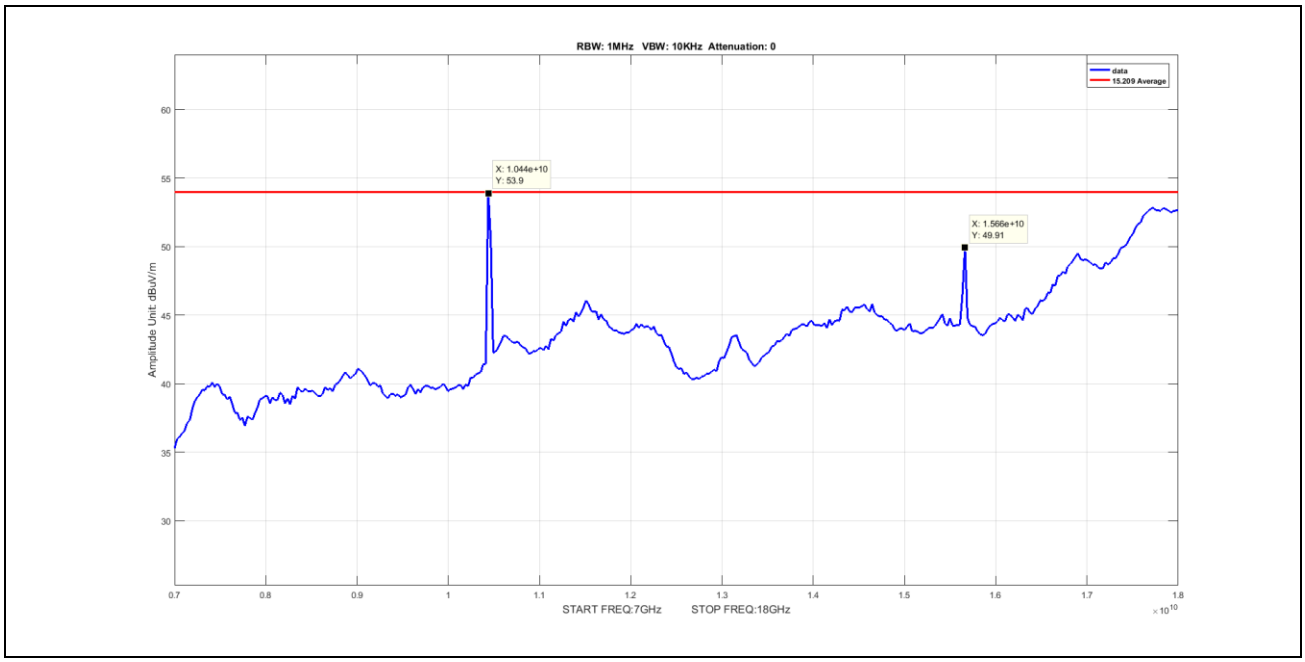
Plot 139. Radiated Spurious Emissions, 20 MHz, 5240 MHz, Channel 48, Power 29, Peak, 1 GHz – 7 GHz, High



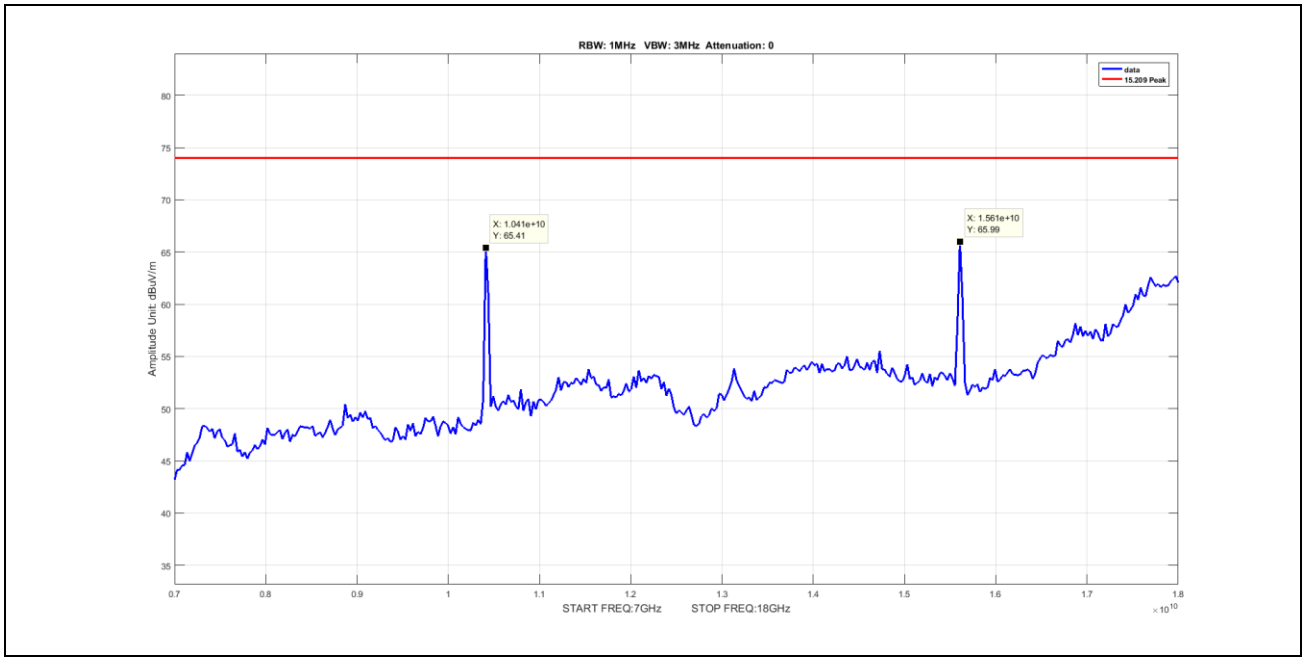
Plot 140. Radiated Spurious Emissions, 20 MHz, 5180 MHz, Channel 36, Power 20, Average, 7 GHz – 18 GHz, Low



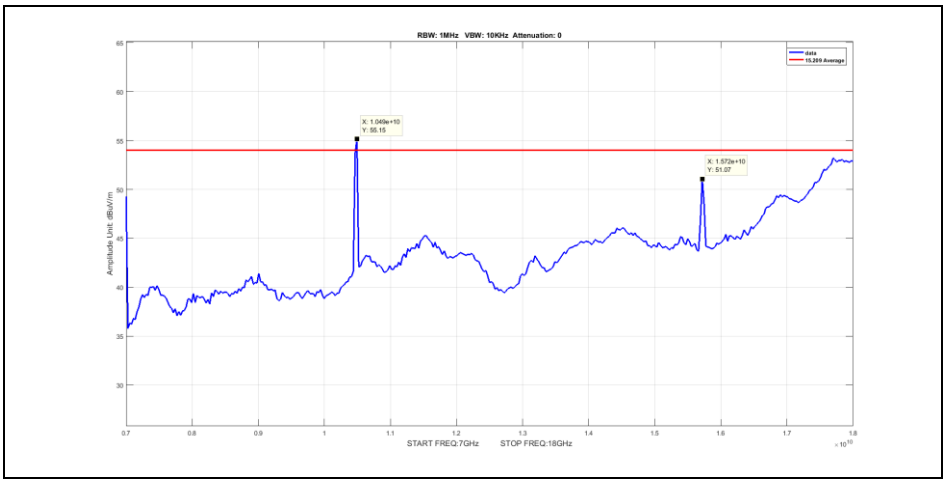
Plot 141. Radiated Spurious Emissions, 20 MHz, 5180 MHz, Channel 36, Power 20, Peak, 7 GHz – 18 GHz, Low



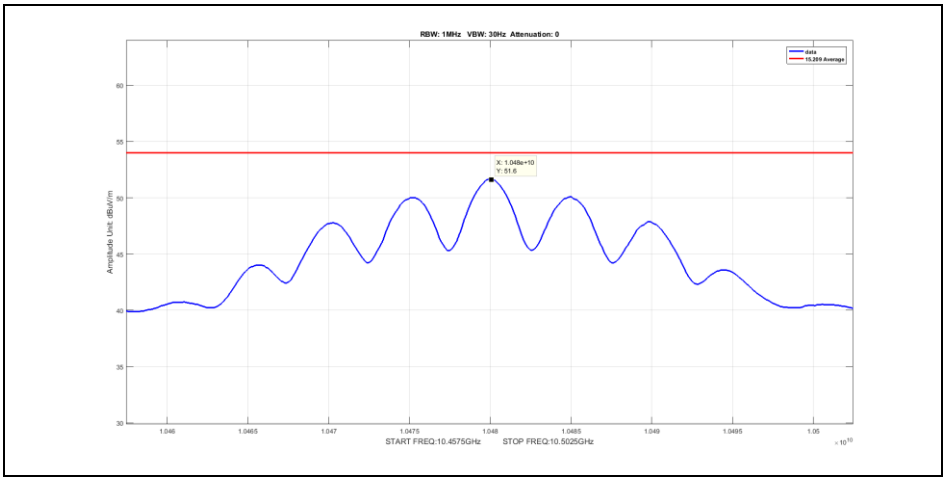
Plot 142. Radiated Spurious Emissions, 20 MHz, 5220 MHz, Channel 44, Power 29, Average, 7 GHz – 18 GHz, Mid



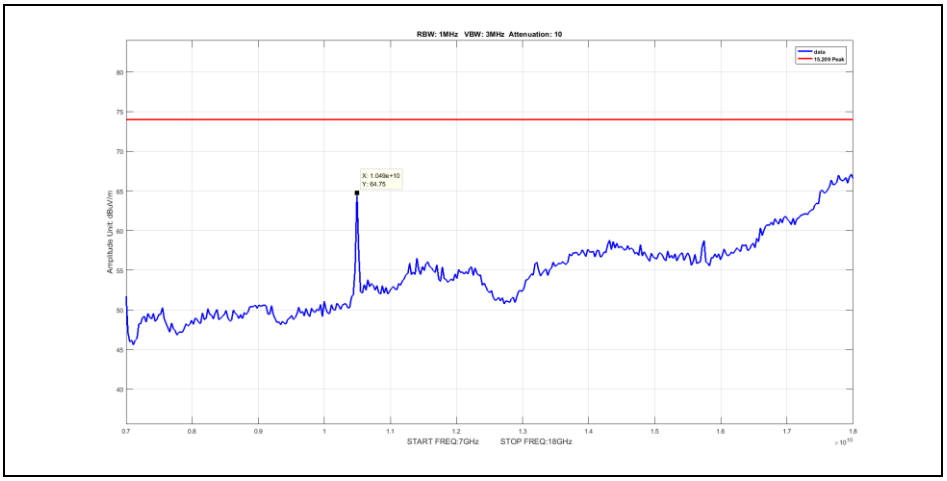
Plot 143. Radiated Spurious Emissions, 20 MHz, 5200 MHz, Channel 40, Power 29, Peak, 7 GHz – 18 GHz, Mid



Plot 144. Radiated Spurious Emissions, 20 MHz, 5240 MHz, Channel 48, Power 29, Average, 7 GHz – 18 GHz, High

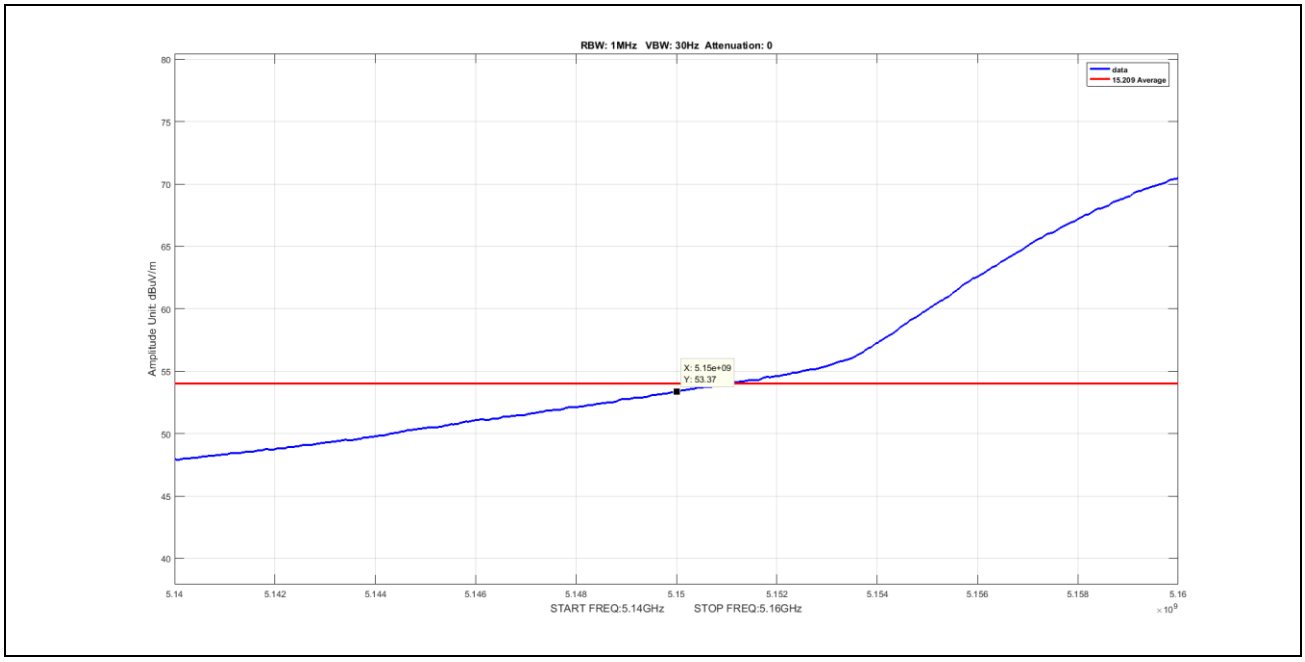


Plot 145. Radiated Spurious Emissions, 20 MHz, 5240 MHz, Channel 48, Power 29, Average, 7 GHz – 18 GHz, High, Zoom

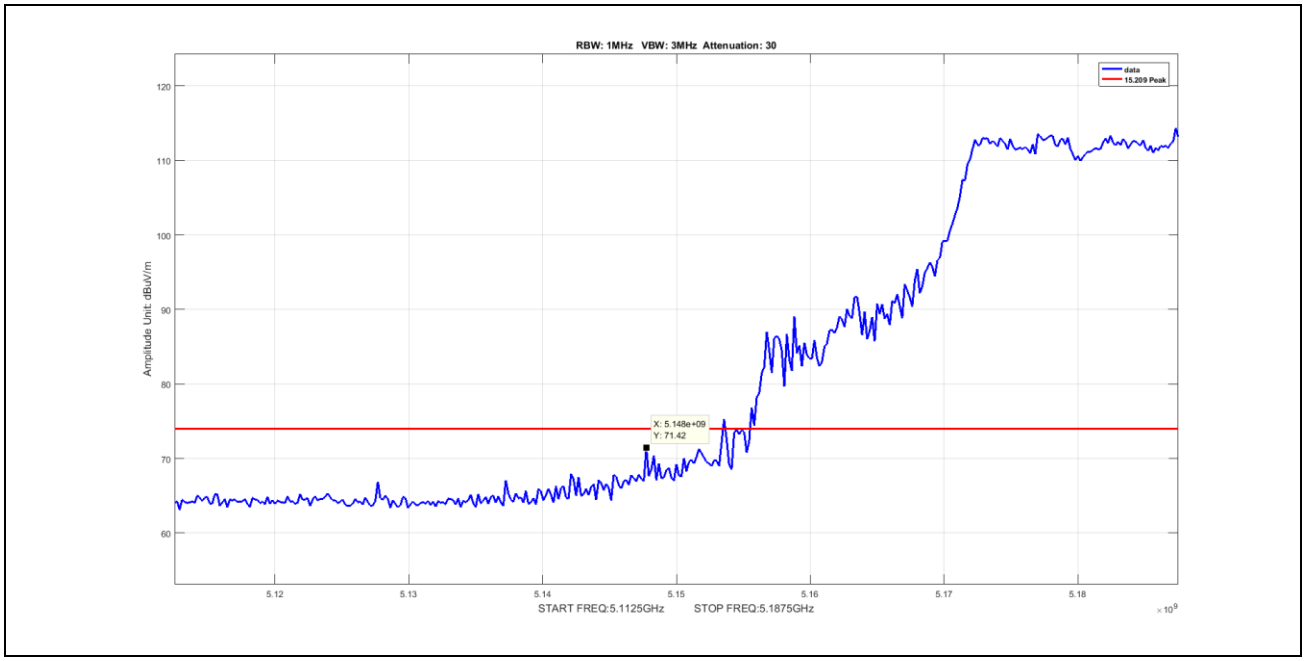


Plot 146. Radiated Spurious Emissions, 20 MHz, 5240 MHz, Channel 48, Power 29, Peak, 7 GHz – 18 GHz, High

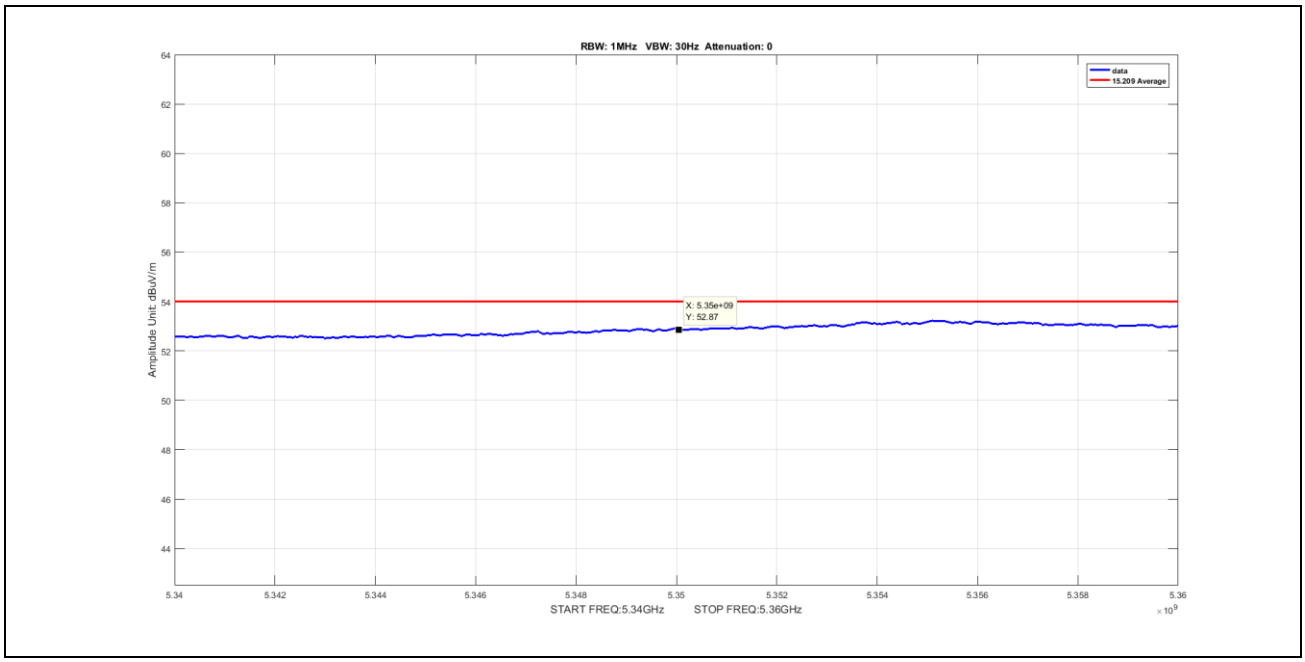
Radiated Spurious Emissions, 802.11n 20 MHz



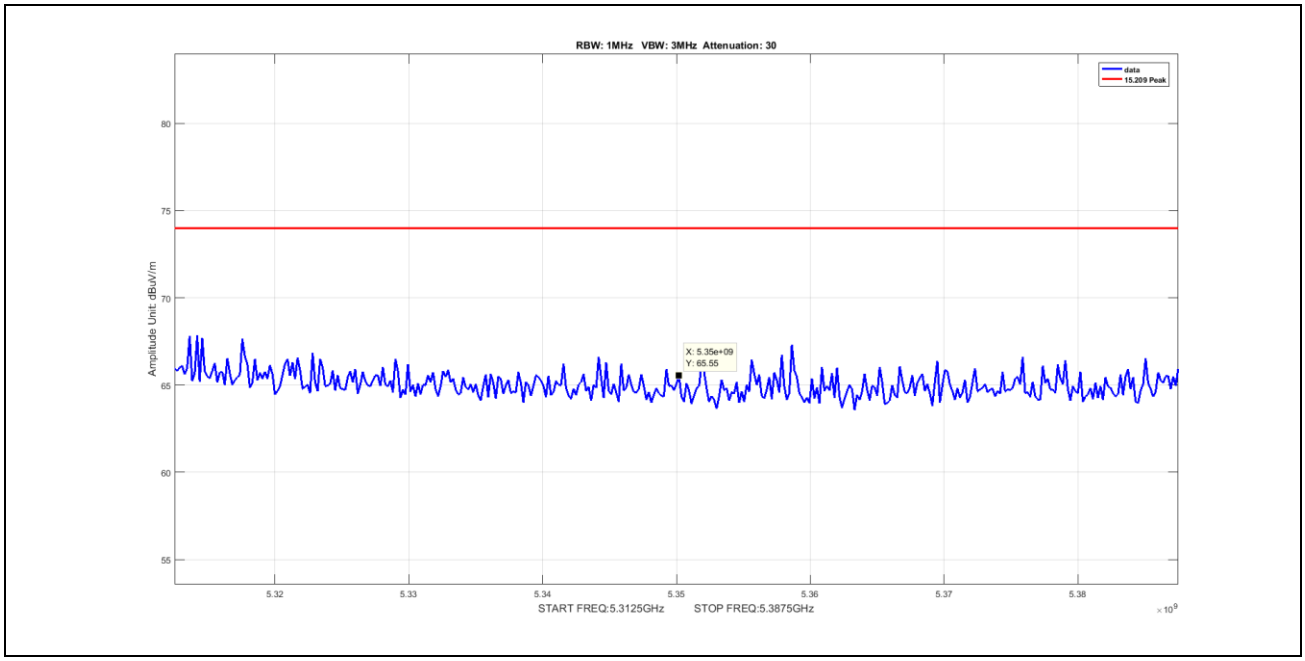
Plot 147. Radiated Spurious Emissions, 802.11n 20 MHz, 5180 MHz, Channel 36, Power 21, Average



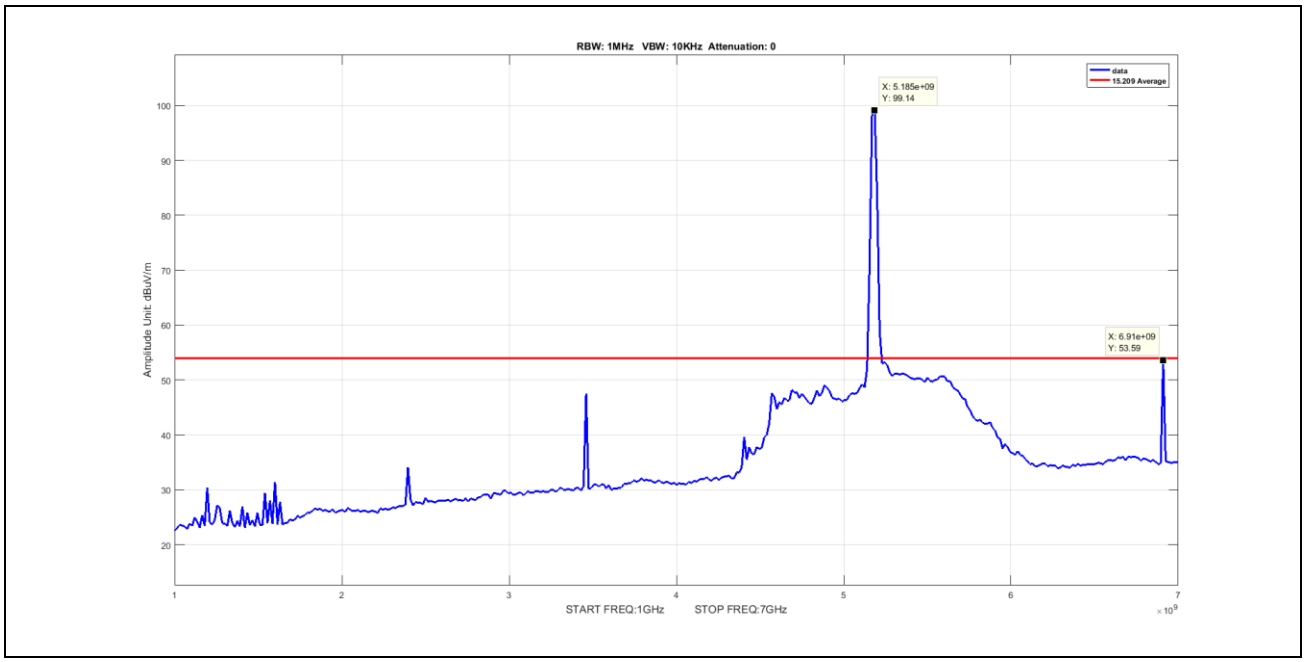
Plot 148. Radiated Spurious Emissions, 802.11n 20 MHz, 5180 MHz, Channel 36, Power 21, Peak



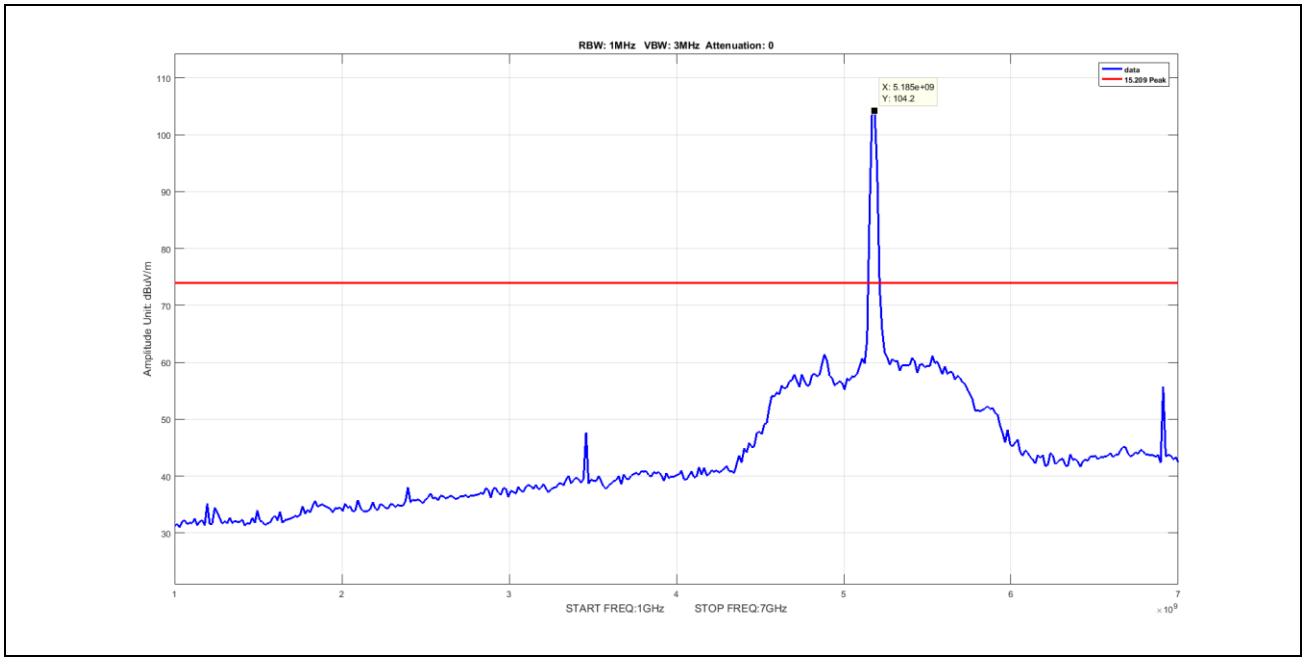
Plot 149. Radiated Spurious Emissions, 802.11n 20 MHz, 5350 MHz, Channel 48, Power 29, Average



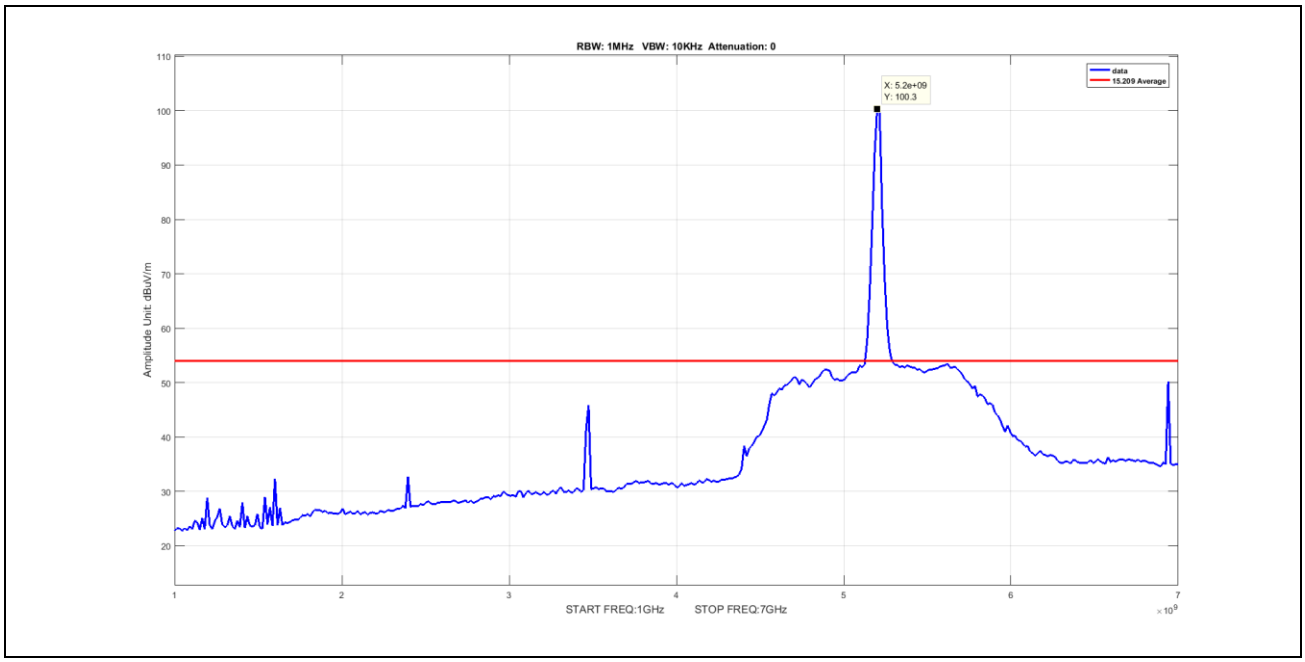
Plot 150. Radiated Spurious Emissions, 802.11n 20 MHz, 5350 MHz, Channel 48, Power 29, Peak



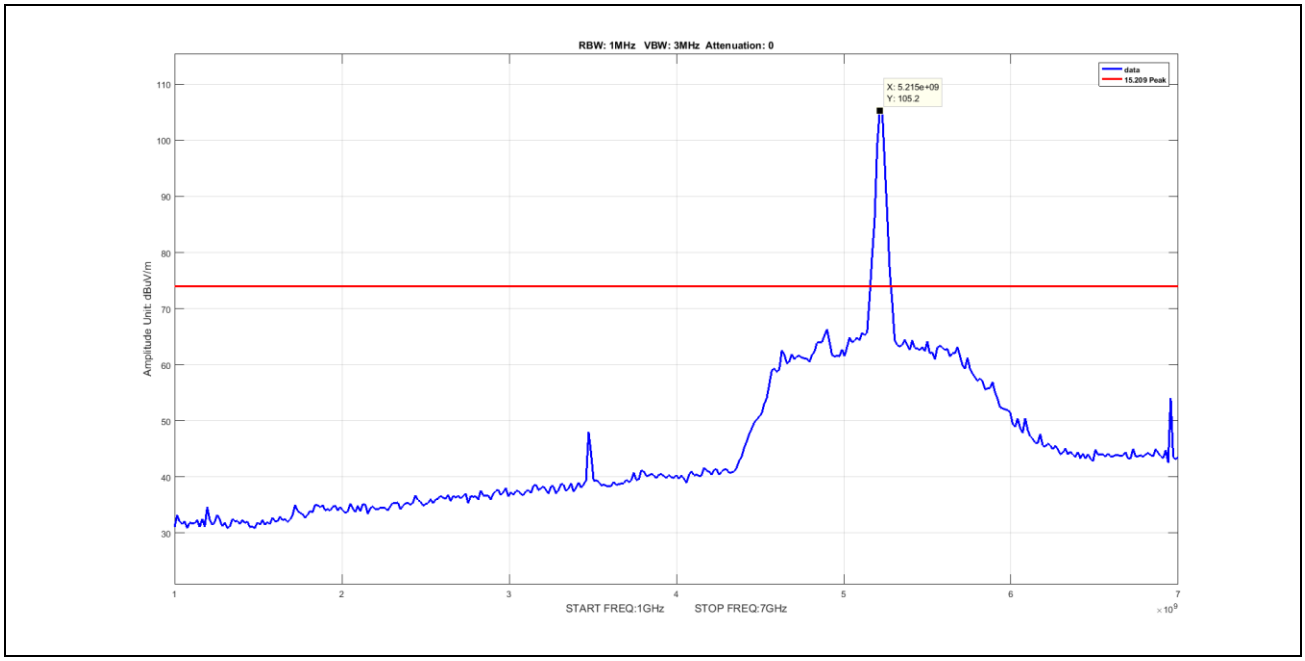
Plot 151. Radiated Spurious Emissions, 802.11n 20 MHz, 5180 MHz, Channel 36, Power 21, Average, 1 GHz – 7 GHz, Low



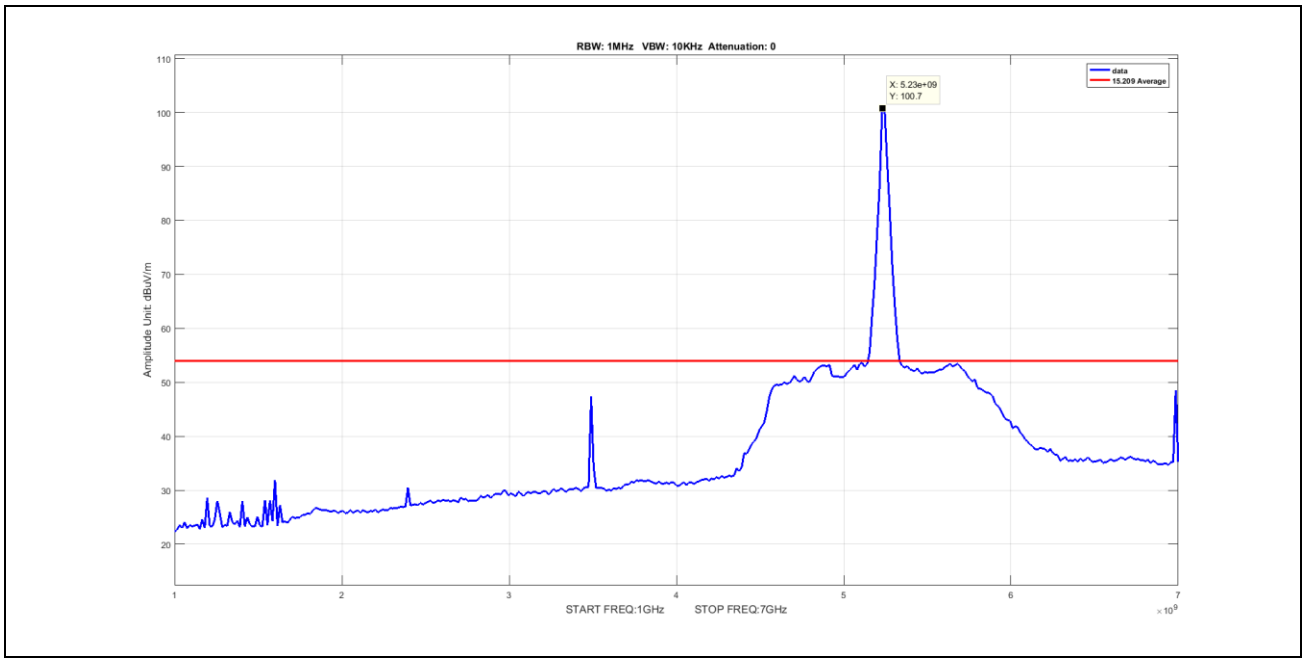
Plot 152. Radiated Spurious Emissions, 802.11n 20 MHz, 5180 MHz, Channel 36, Power 21, Peak, 1 GHz – 7 GHz, Low



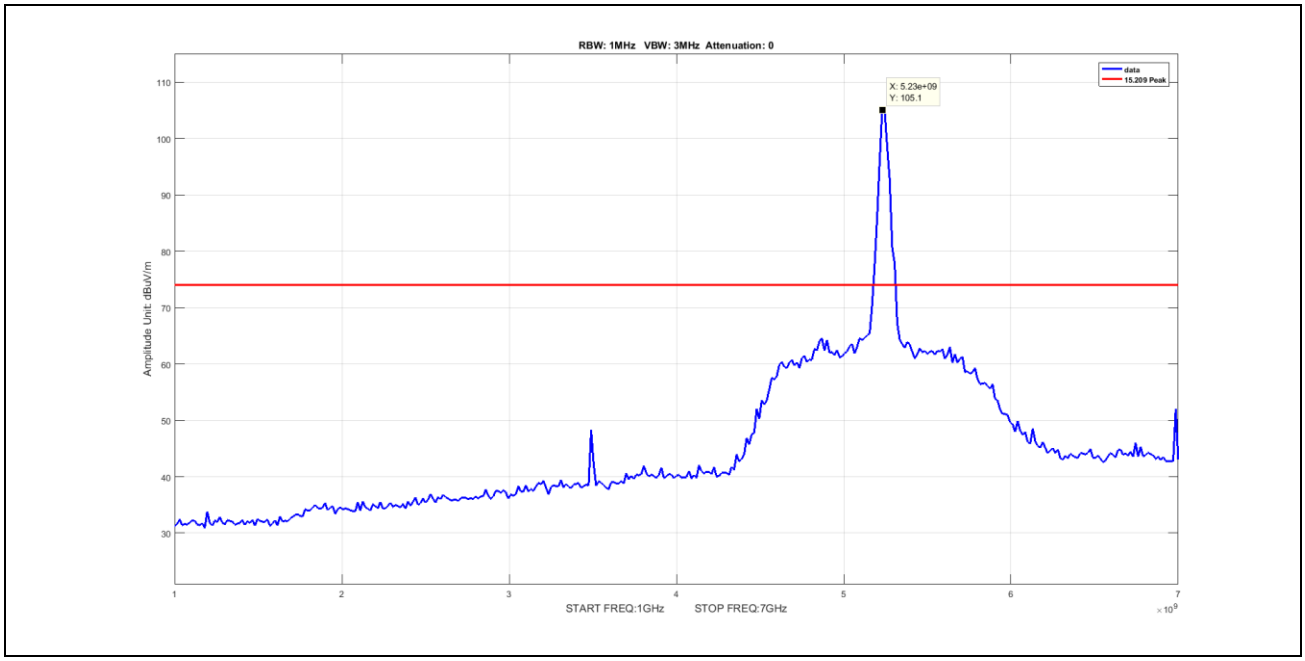
Plot 153. Radiated Spurious Emissions, 802.11n 20 MHz, 5200 MHz, Channel 40, Power 28, Average, 1 GHz – 7 GHz, Mid



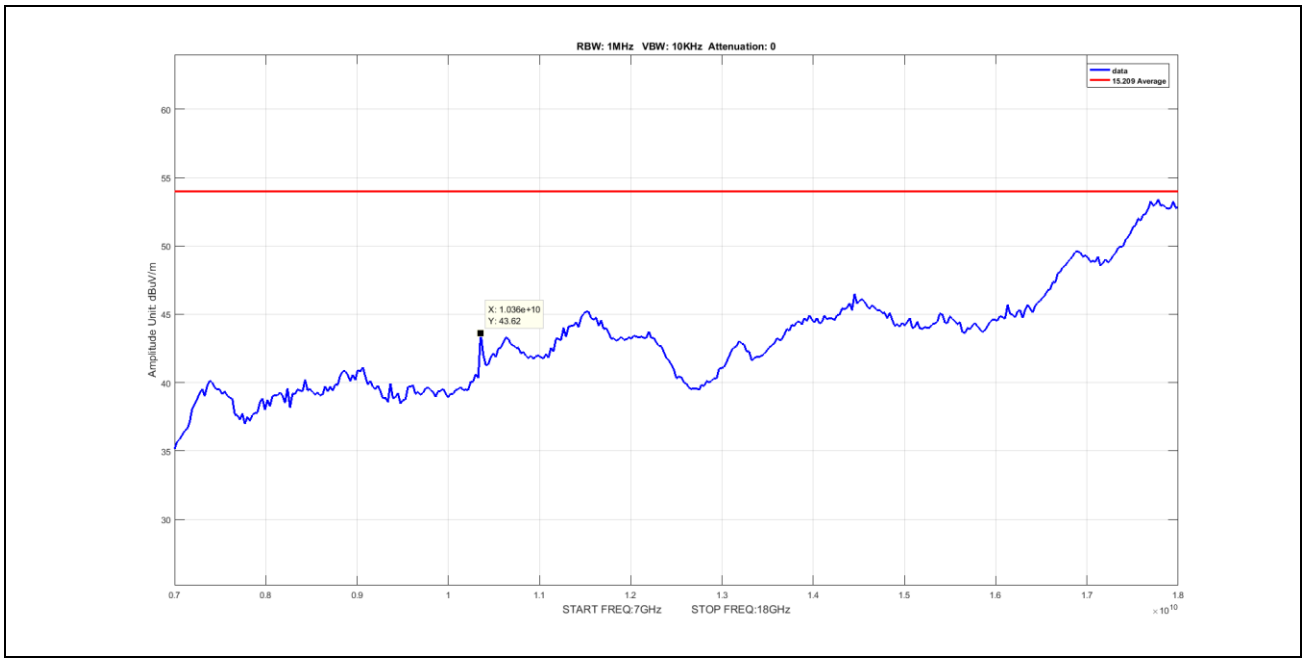
Plot 154. Radiated Spurious Emissions, 802.11n 20 MHz, 5220 MHz, Channel 44, Power 29, Peak, 1 GHz – 7 GHz, Mid



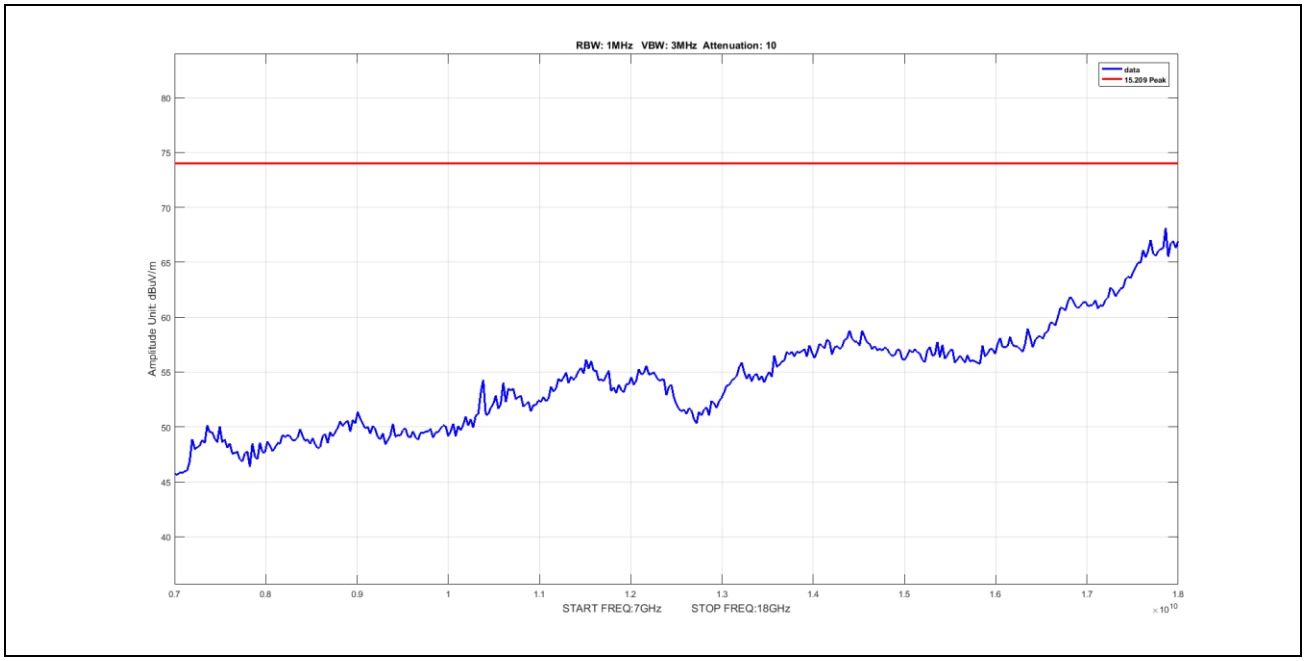
Plot 155. Radiated Spurious Emissions, 802.11n 20 MHz, 5240 MHz, Channel 48, Power 29, Average, 1 GHz – 7 GHz, High



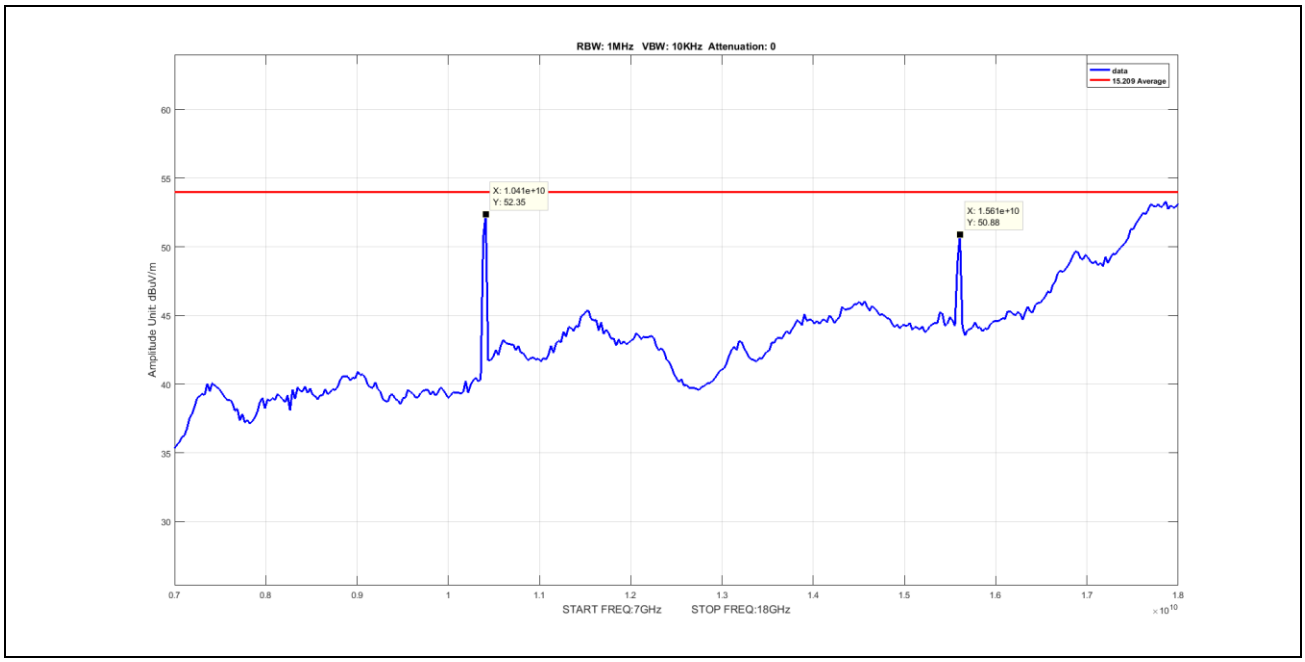
Plot 156. Radiated Spurious Emissions, 802.11n 20 MHz, 5240 MHz, Channel 48, Power 29, Peak, 1 GHz – 7 GHz, High



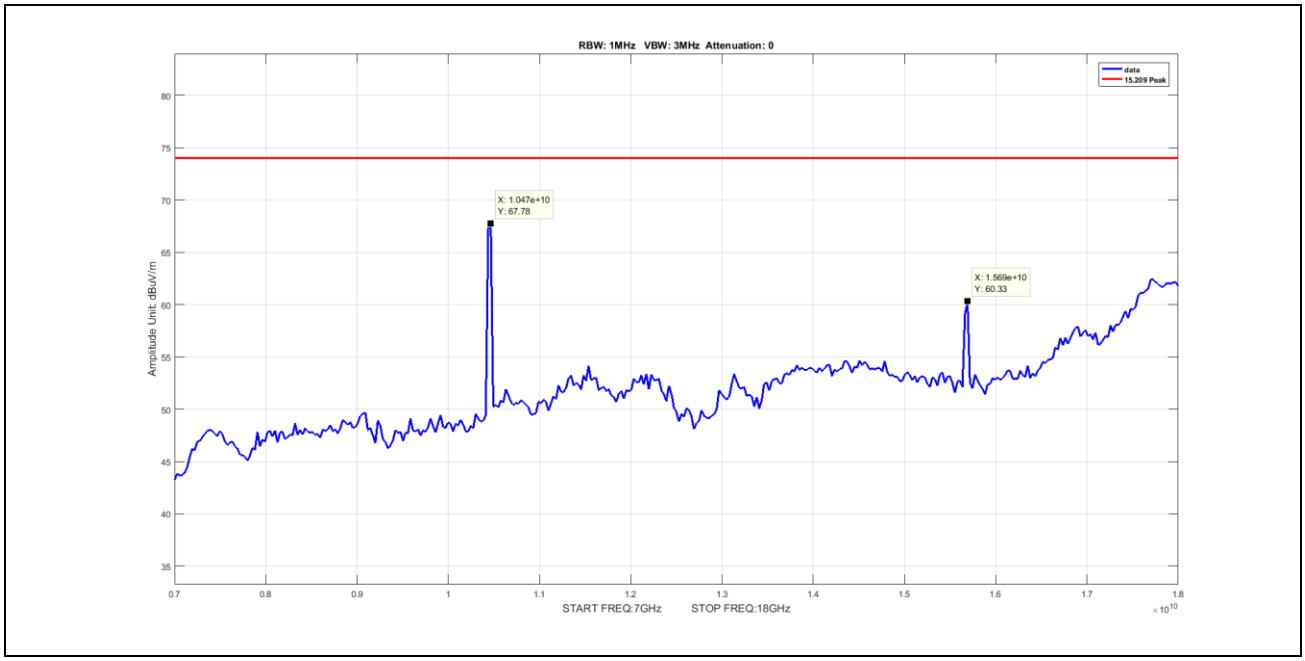
Plot 157. Radiated Spurious Emissions, 802.11n 20 MHz, 5180 MHz, Channel 36, Power 21, Average, 7 GHz – 18 GHz, Low



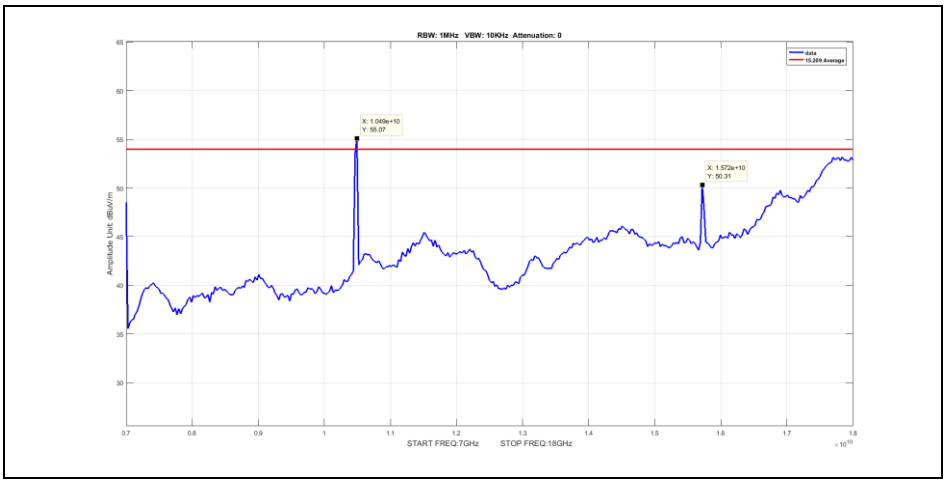
Plot 158. Radiated Spurious Emissions, 802.11n 20 MHz, 5180 MHz, Channel 36, Power 21, Peak, 7 GHz – 18 GHz, Low



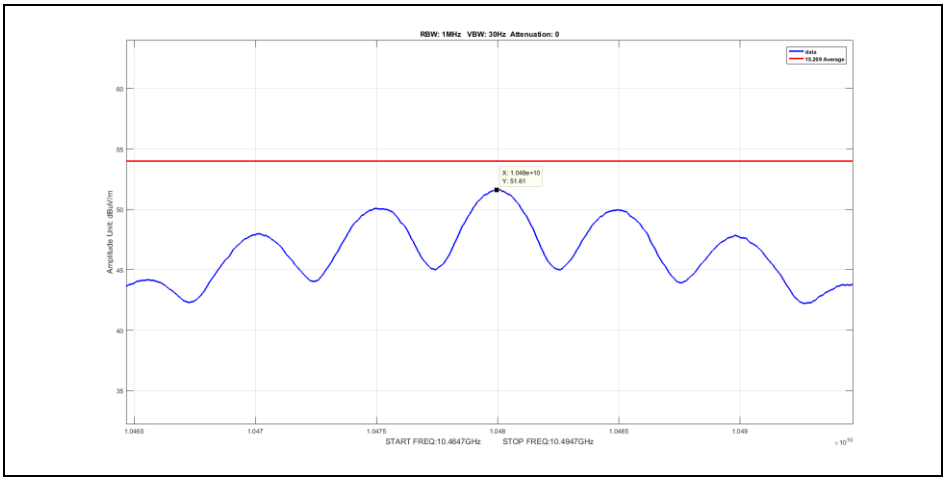
Plot 159. Radiated Spurious Emissions, 802.11n 20 MHz, 5200 MHz, Channel 40, Power 28, Average, 7 GHz – 18 GHz, Mid



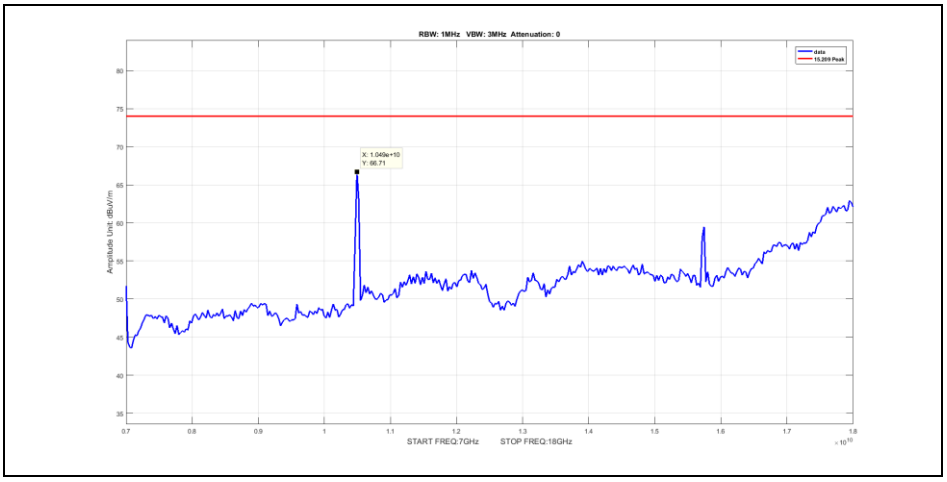
Plot 160. Radiated Spurious Emissions, 802.11n 20 MHz 5220 MHz, Channel 44, Power 29, Peak, 7 GHz – 18 GHz, Mid



Plot 161. Radiated Spurious Emissions, 802.11n 20 MHz, 5240 MHz, Channel 48, Power 29, Average, 7 GHz – 18 GHz, High

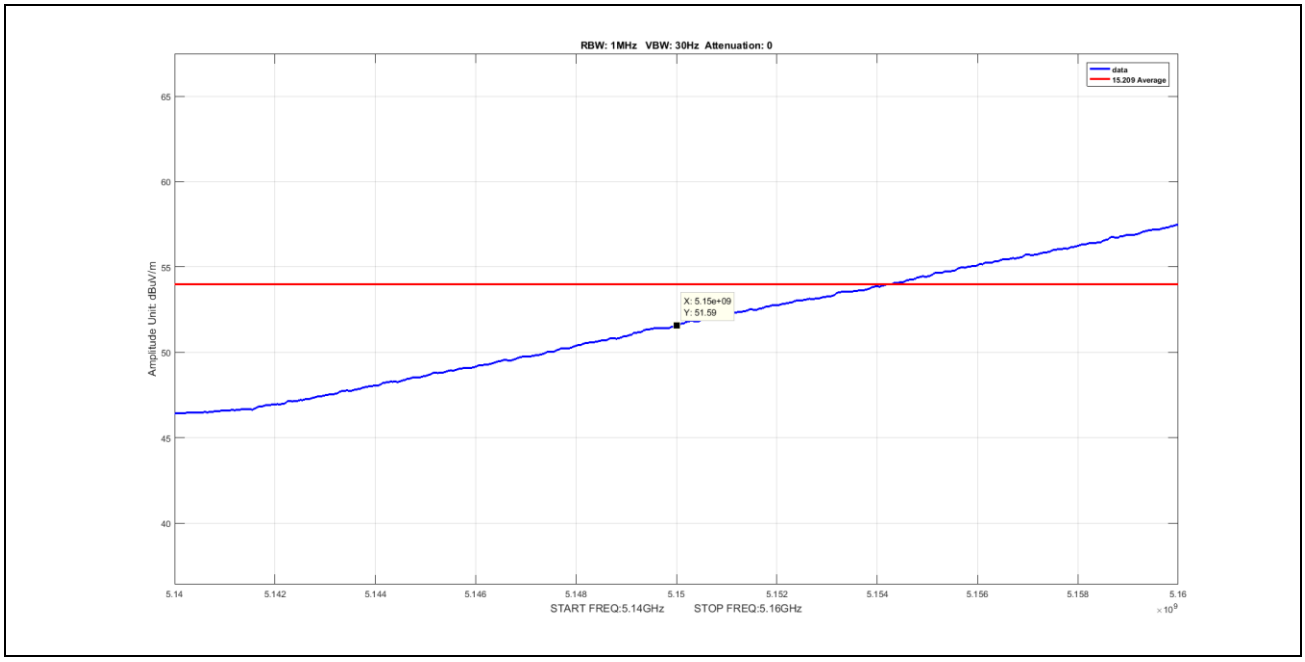


Plot 162. Radiated Spurious Emissions, 802.11n 20 MHz, 5240 MHz, Channel 48, Power 29, Average, 7 GHz – 18 GHz, High, Zoom

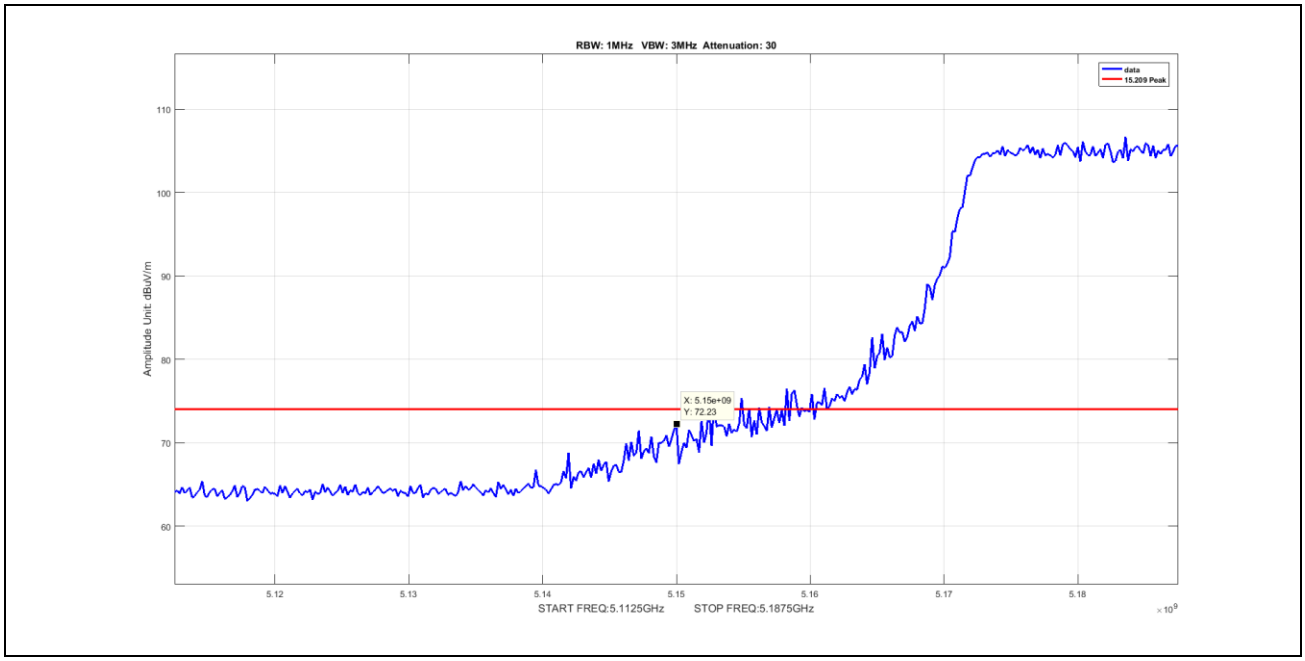


Plot 163. Radiated Spurious Emissions, 802.11n 20 MHz, 5240 MHz, Channel 48, Power 29, Peak, 7 GHz – 18 GHz, High

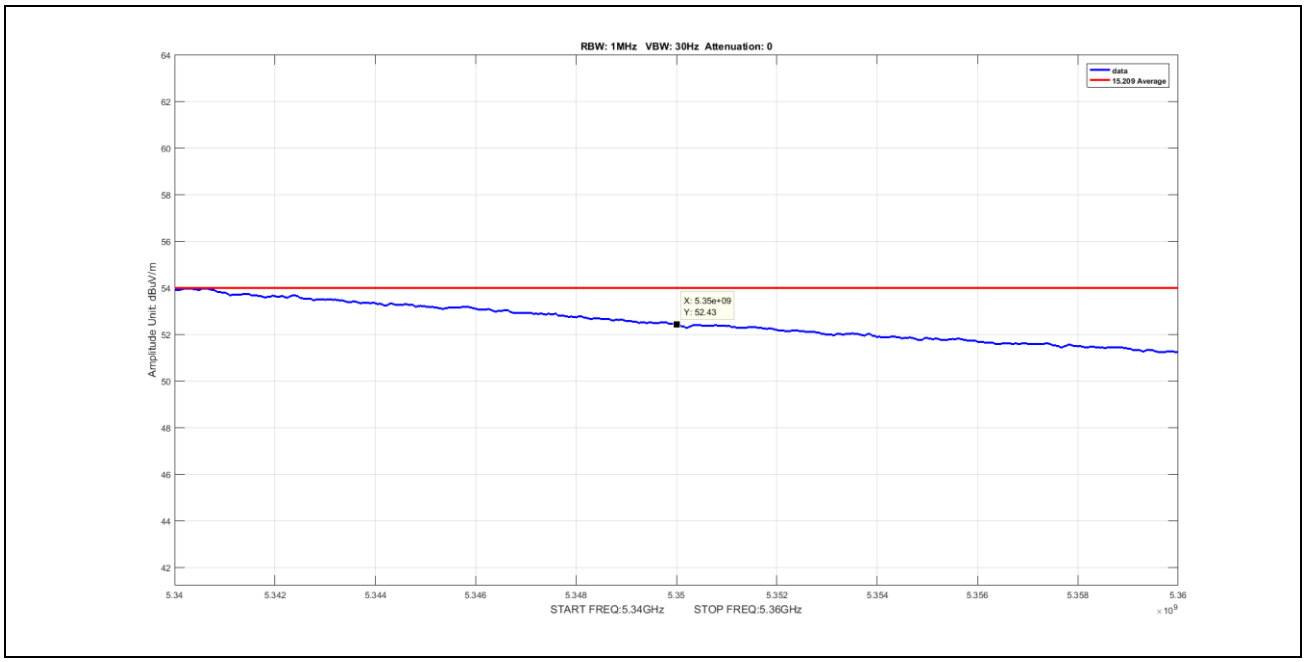
Radiated Spurious Emissions, 802.11n 40 MHz



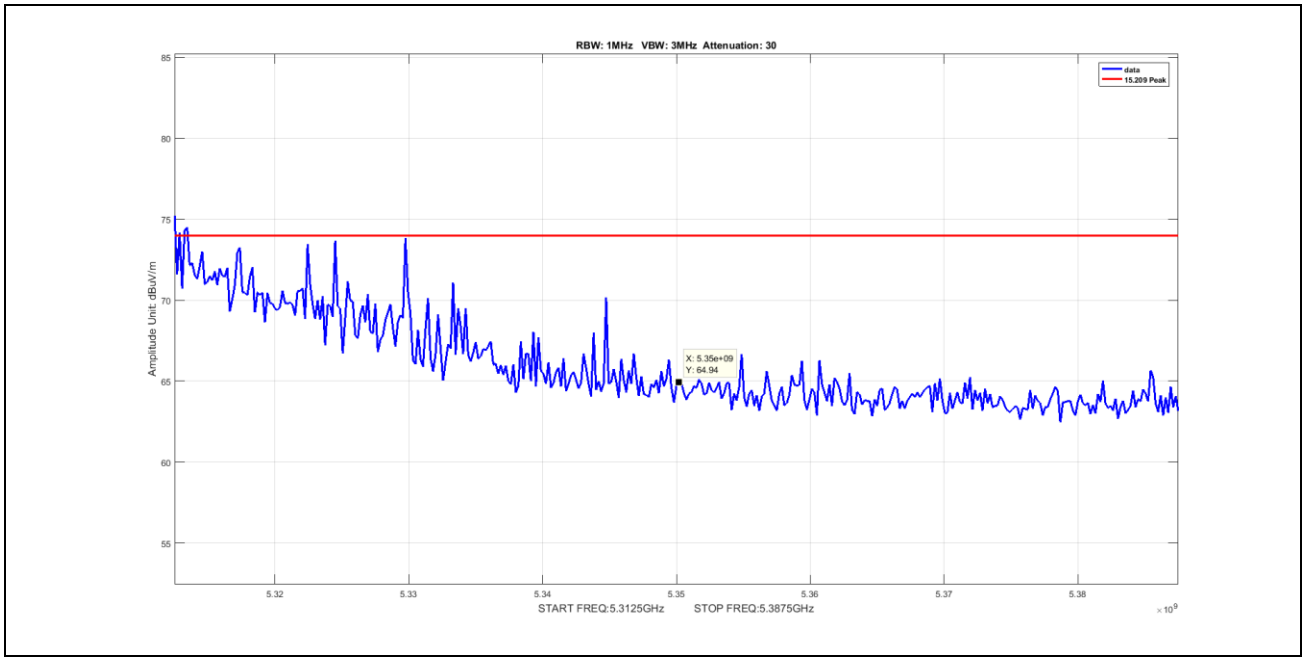
Plot 164. Radiated Spurious Emissions, 802.11n 40 MHz, 5180 MHz, Channel 36, Power 16, Average



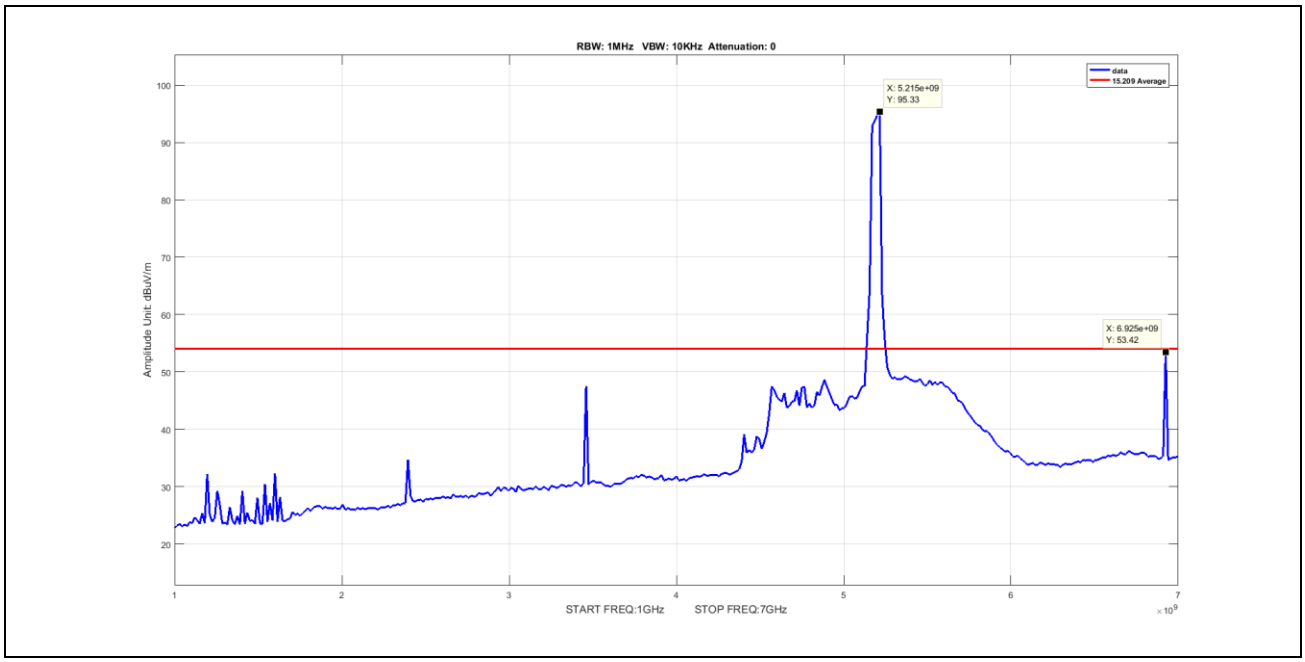
Plot 165. Radiated Spurious Emissions, 802.11n 40 MHz, 5180 MHz, Channel 36, Power 16, Peak



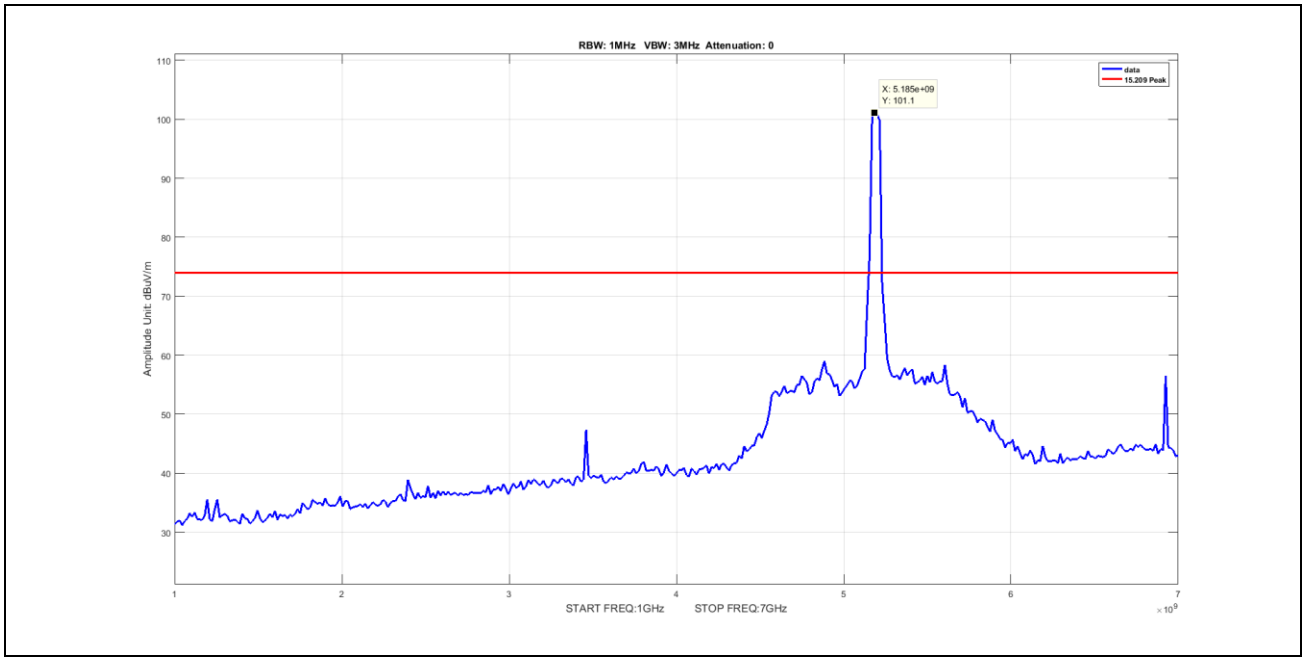
Plot 166. Radiated Spurious Emissions, 802.11n 40 MHz, 5350 MHz, Channel 48, Power 26, Average



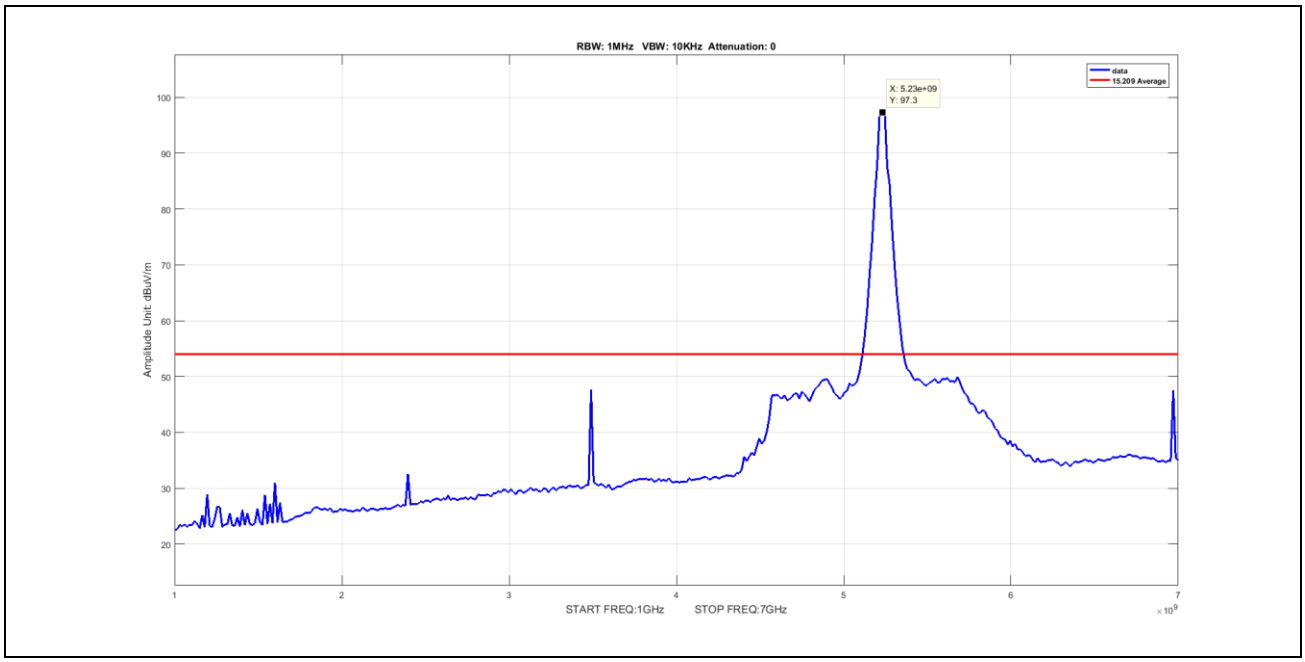
Plot 167. Radiated Spurious Emissions, 802.11n 40 MHz, 5350 MHz, Channel 48, Power 26, Peak



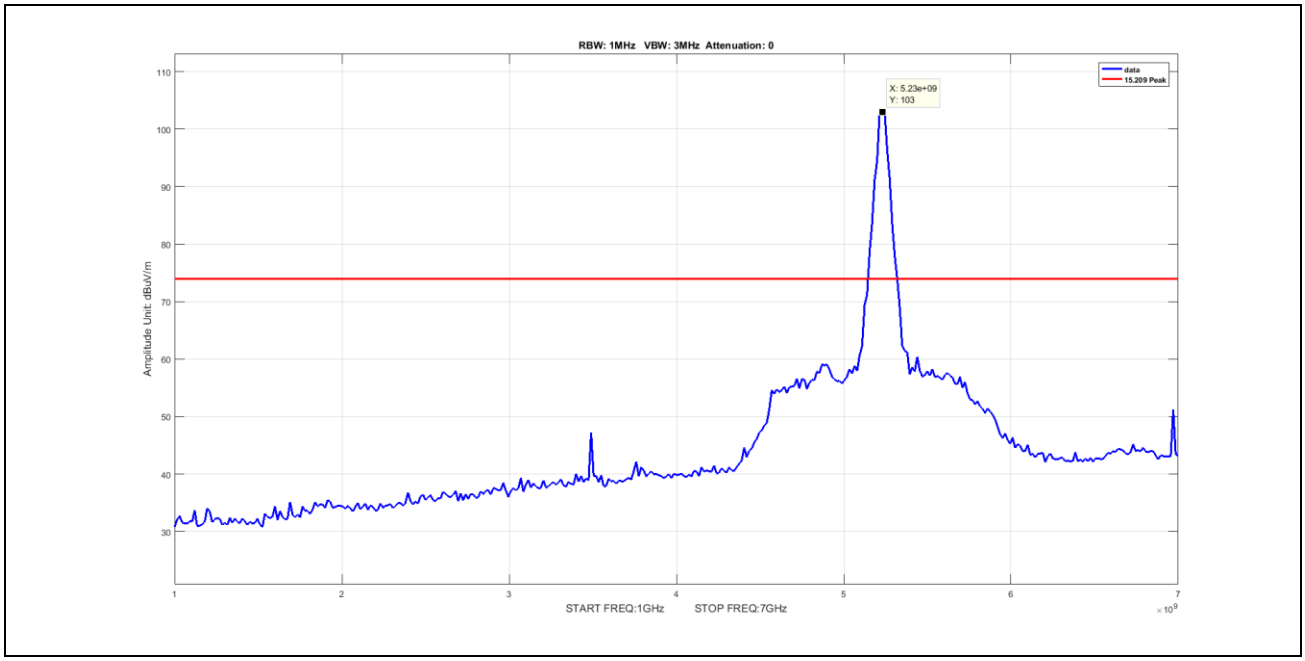
Plot 168. Radiated Spurious Emissions, 802.11n 40 MHz, 5190 MHz, Channel 36, Power 16, Average, 1 GHz – 7 GHz, Low



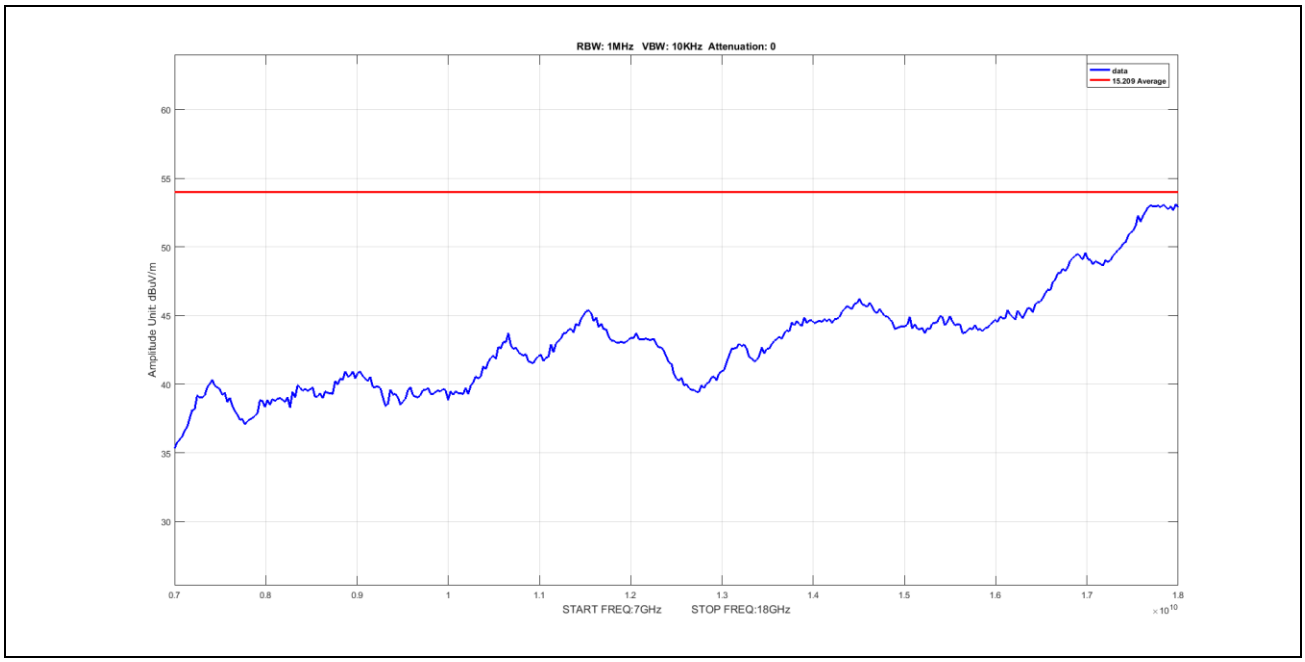
Plot 169. Radiated Spurious Emissions, 802.11n 40 MHz, 5180 MHz, Channel 36, Power 16, Peak, 1 GHz – 7 GHz, Low



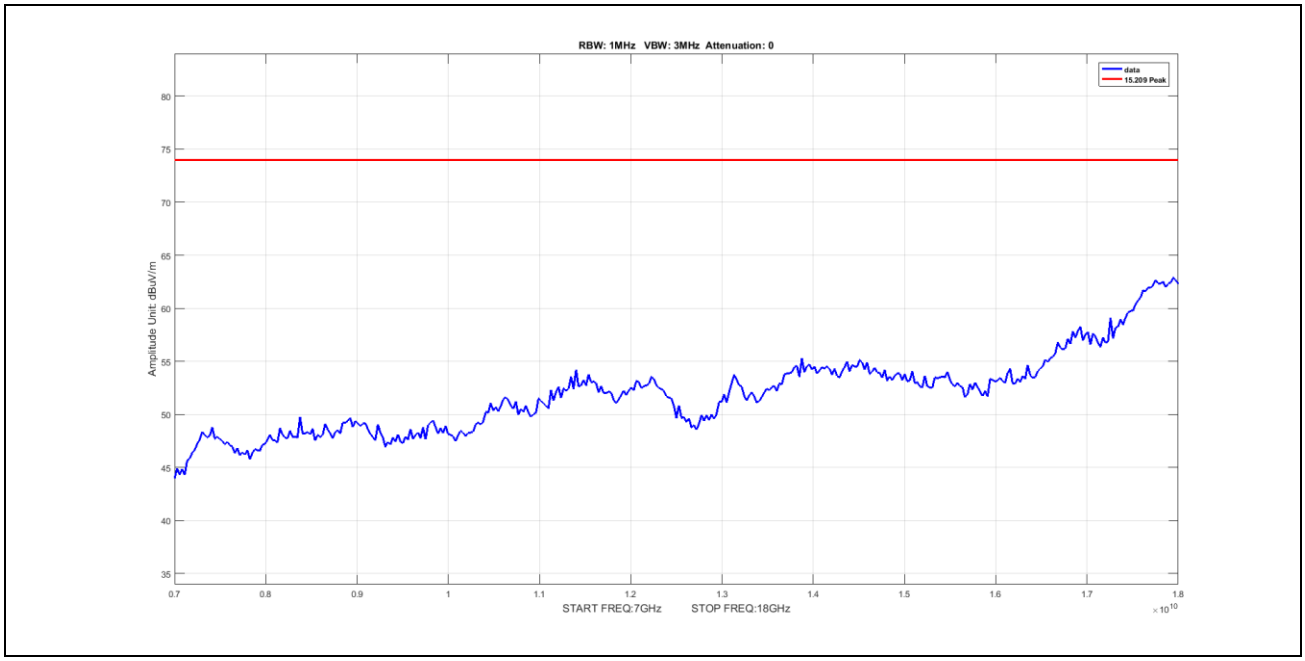
Plot 170. Radiated Spurious Emissions, 802.11n 40 MHz, 5230 MHz, Channel 48, Power 26, Average, 1 GHz – 7 GHz, High



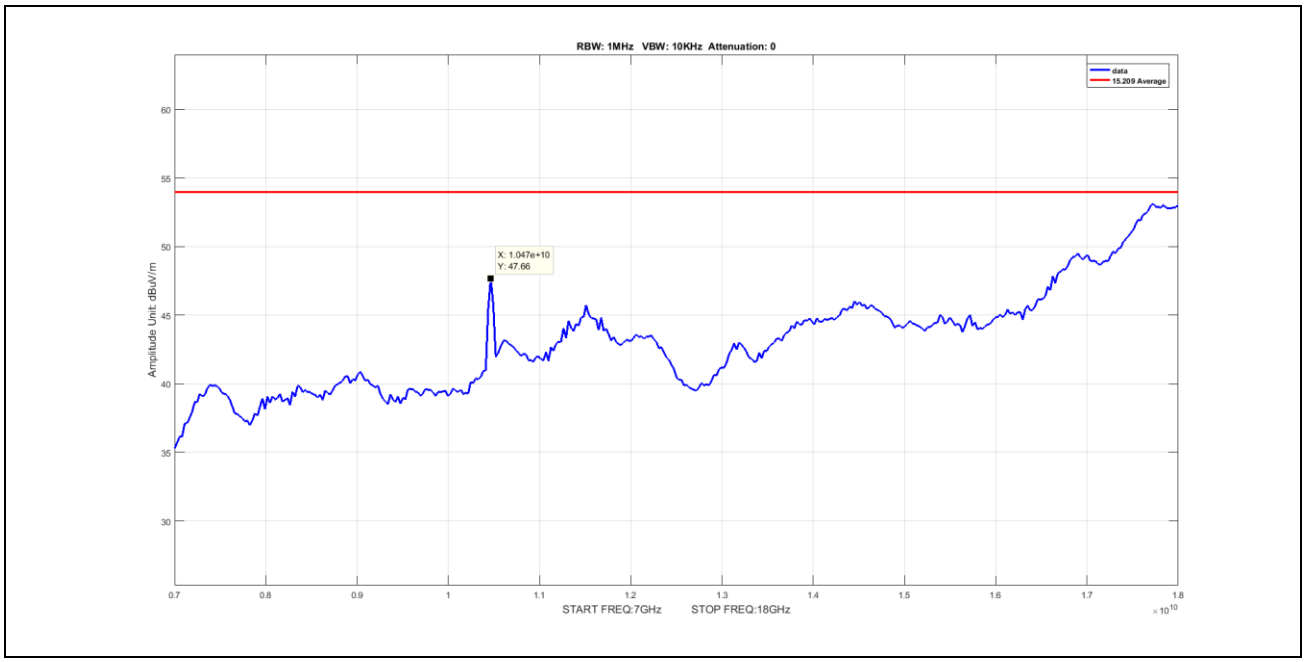
Plot 171. Radiated Spurious Emissions, 802.11n 40 MHz, 5240 MHz, Channel 48, Power 26, Peak, 1 GHz – 7 GHz, High



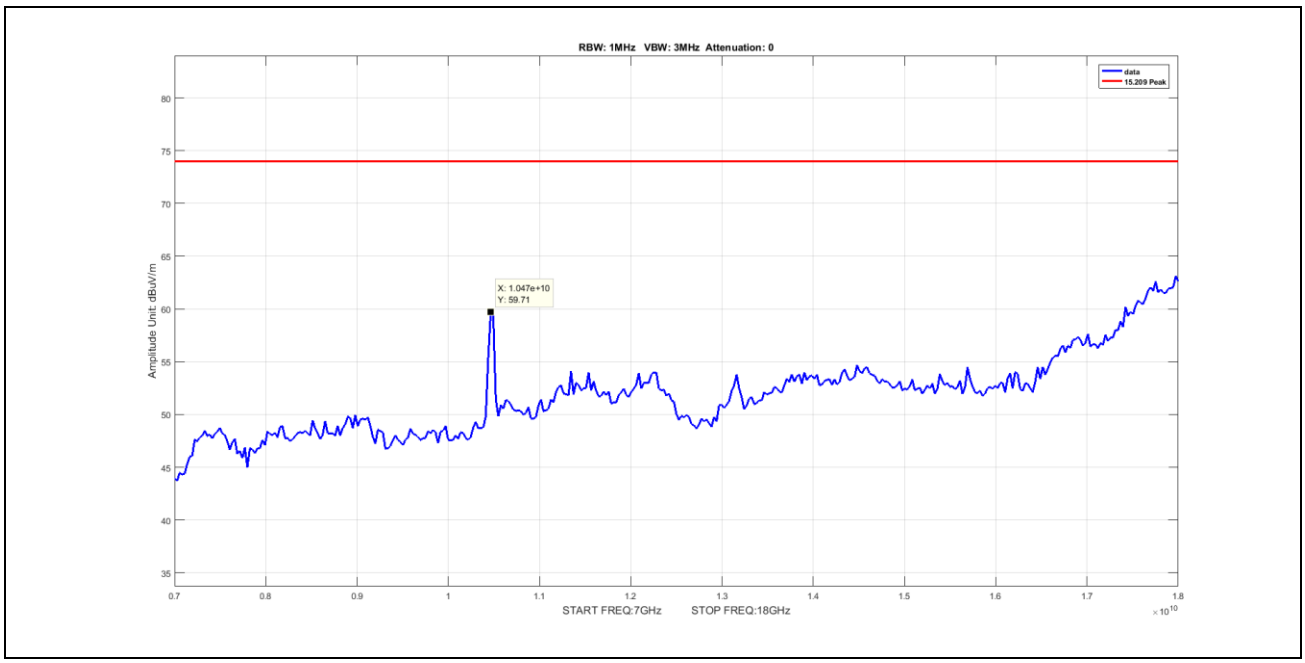
Plot 172. Radiated Spurious Emissions, 802.11n 40 MHz, 5190 MHz, Channel 36, Power 16, Average, 7 GHz – 18 GHz, Low



Plot 173. Radiated Spurious Emissions, 802.11n 40 MHz, 5180 MHz, Channel 36, Power 16, Peak, 7 GHz – 18 GHz, Low



Plot 174. Radiated Spurious Emissions, 802.11n 40 MHz, 5230 MHz, Channel 48, Power 26, Average, 7 GHz – 18 GHz, High

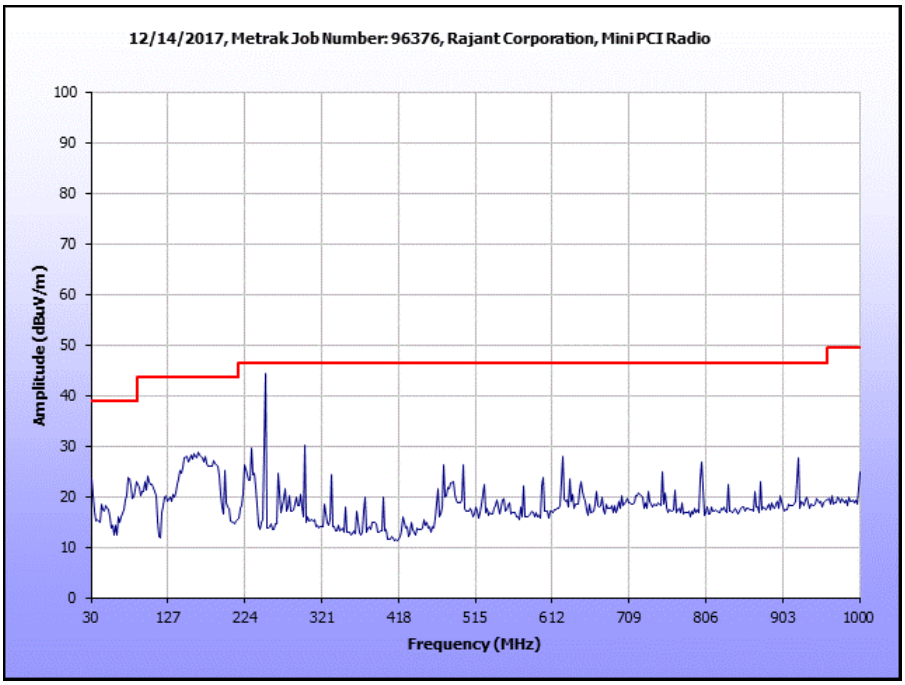


Plot 175. Radiated Spurious Emissions, 802.11n 40 MHz, 5240 MHz, Channel 48, Power 26, Peak, 7 GHz – 18 GHz, High

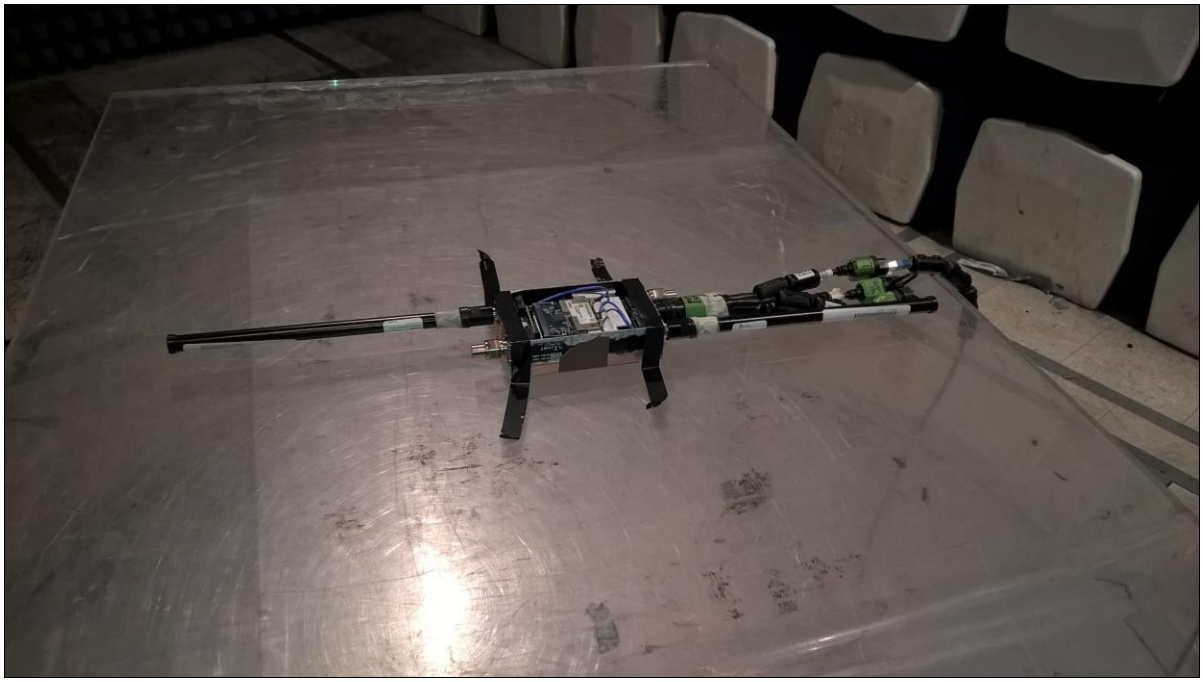
Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss/Pre-amp (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
*249.98701	59	H	0.9778	40.72	12.40	1.63	10.46	44.29	46.4	-2.11
249.98701	319	V	1.2813	28.93	12.40	1.63	10.46	32.50	46.4	-13.90
166.17986	264	H	2.3421	21.4	12.88	1.38	10.46	25.20	43.5	-18.30
166.17986	175	V	2.4856	16.41	12.88	1.38	10.46	20.21	43.5	-23.29

Plot 176. Radiated Emissions, 30 MHz - 1 GHz, Test Results

Note 1: * - At this frequency, the measured electric-field strength exhibits a margin of compliance that is less than 3 dB below the specification limit. We recommend that every emission measured, have at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.



Plot 177. Radiated Spurious Emissions, 30 MHz -1 GHz, Module Inside Host, No Lid



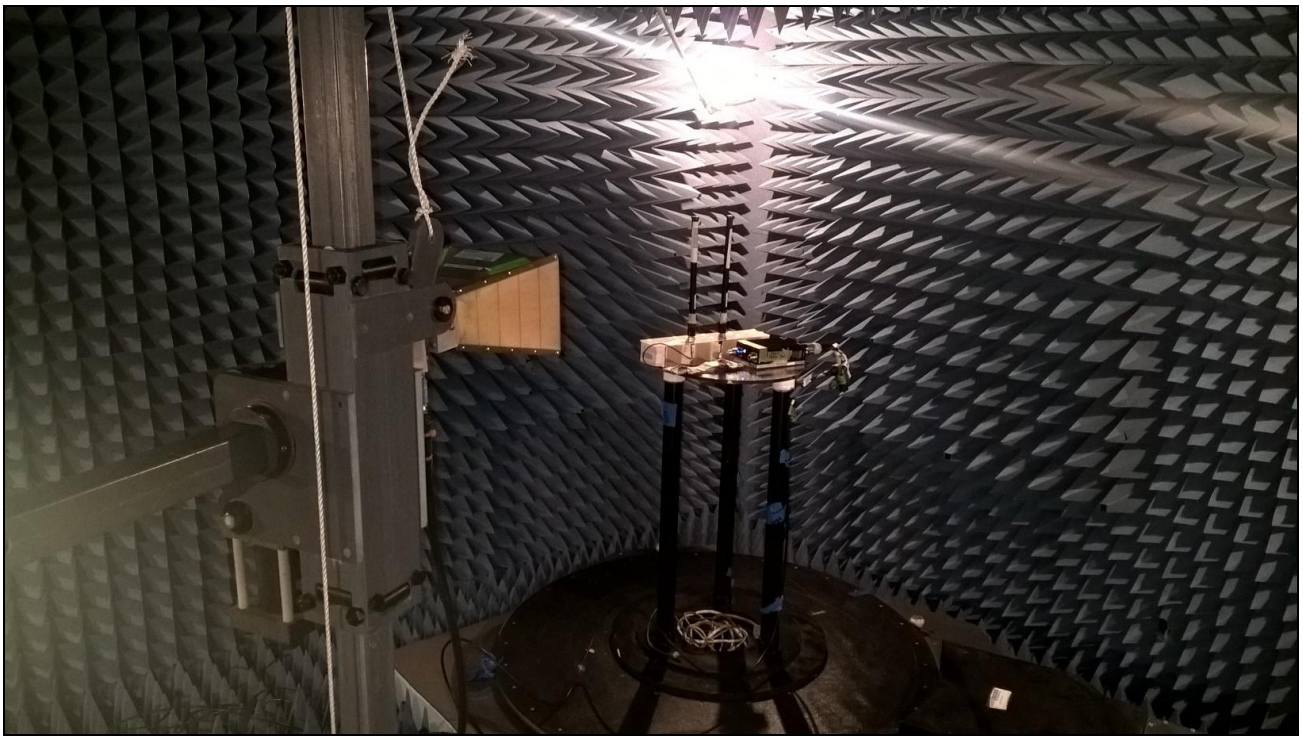
Photograph 1. Radiated Emissions Below 1 GHz, Modification to Support Equipment 1

Photograph 2. Radiated Emissions Below 1 GHz, Modification to Support Equipment 2

Photograph 3. Radiated Emissions Below 1 GHz, Modification to Support Equipment 3

Photograph 4. Radiated Emissions Below 1 GHz, Modification to Support Equipment 4

Photograph 5. Radiated Emissions Below 1 GHz, Modification to Support Equipment 5



Photograph 6. Radiated Spurious Emissions, Test Setup

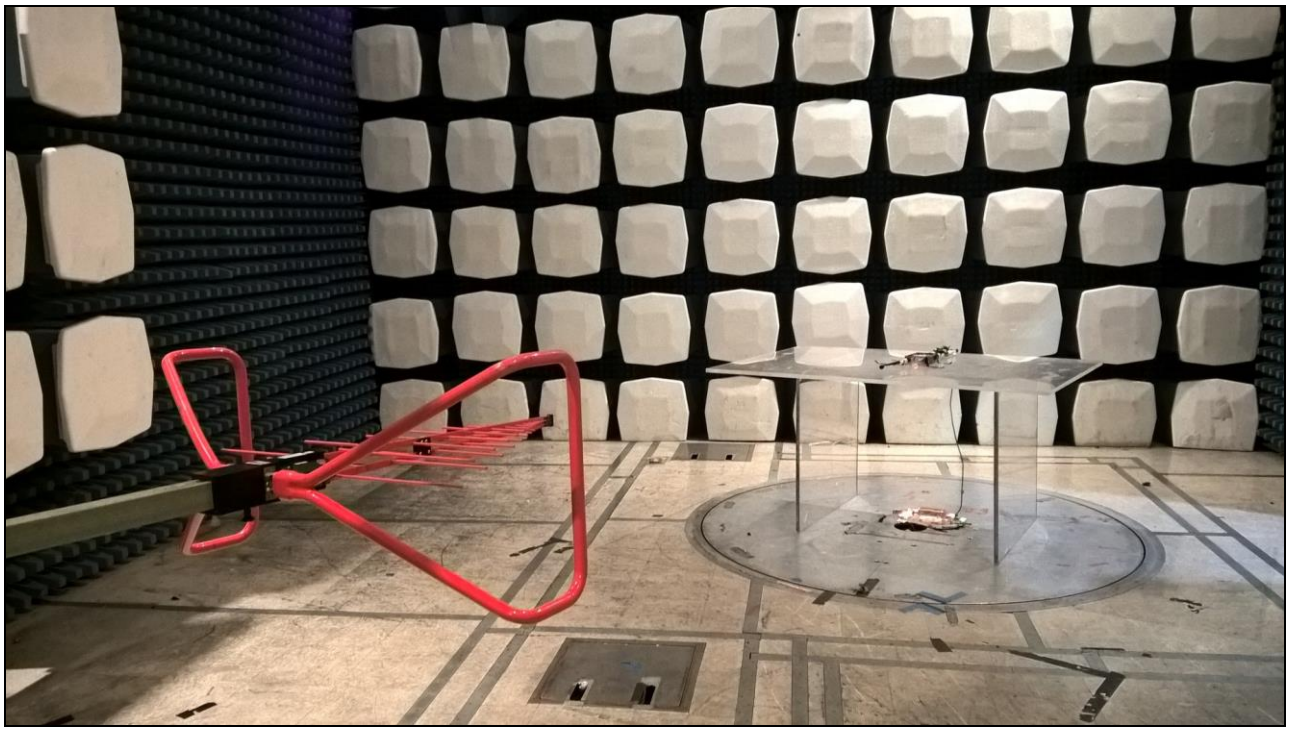


Table 18. Radiated Emissions, Below 1 GHz, Test Setup

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 μH/50 Σ 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 (dBμV)	
	Quasi-Peak	Average
* 0.15- 0.45	66 – 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

Table 19. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

Test Procedure: The EUT was placed on a non-metallic table 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 Ω/50 μH 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 C63.4-2014 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. Scans were performed with the transmitter on.

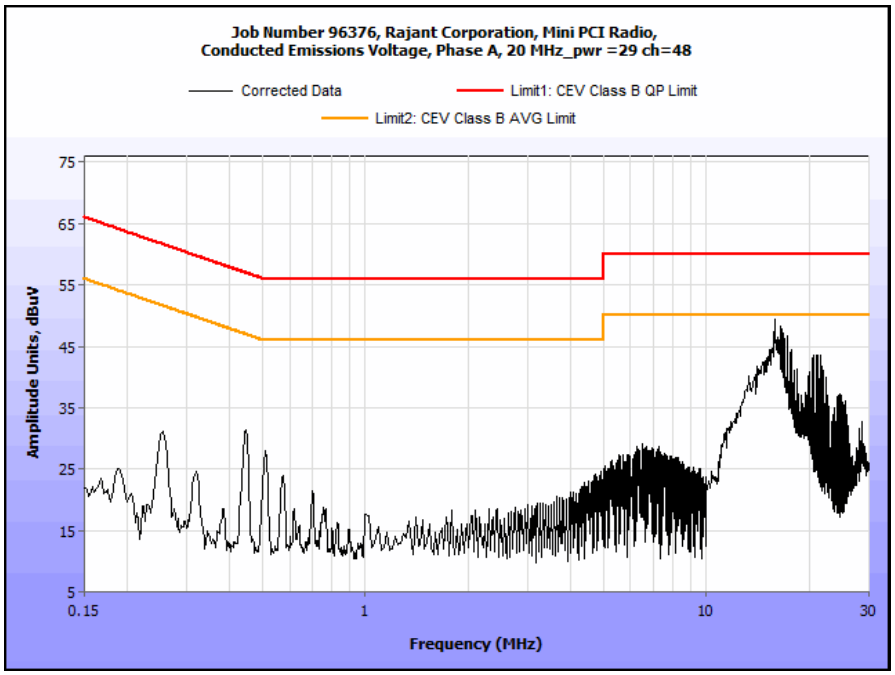
Test Results: The EUT was compliant with requirements of this section.

Test Engineer(s): Bradley Jones

Test Date(s): 10/23/17

Frequency (MHz)	Uncorrected Meter Reading (dBµV) QP	Cable Loss (dB)	Corrected Measurement (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBµV) Avg.	Cable Loss (dB)	Corrected Measurement (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
16.43	47.72	0.13	47.85	60	-12.15	41.1	0.13	41.23	50	-8.77
21.25	42.14	0.18	42.32	60	-17.68	38.74	0.18	38.92	50	-11.08

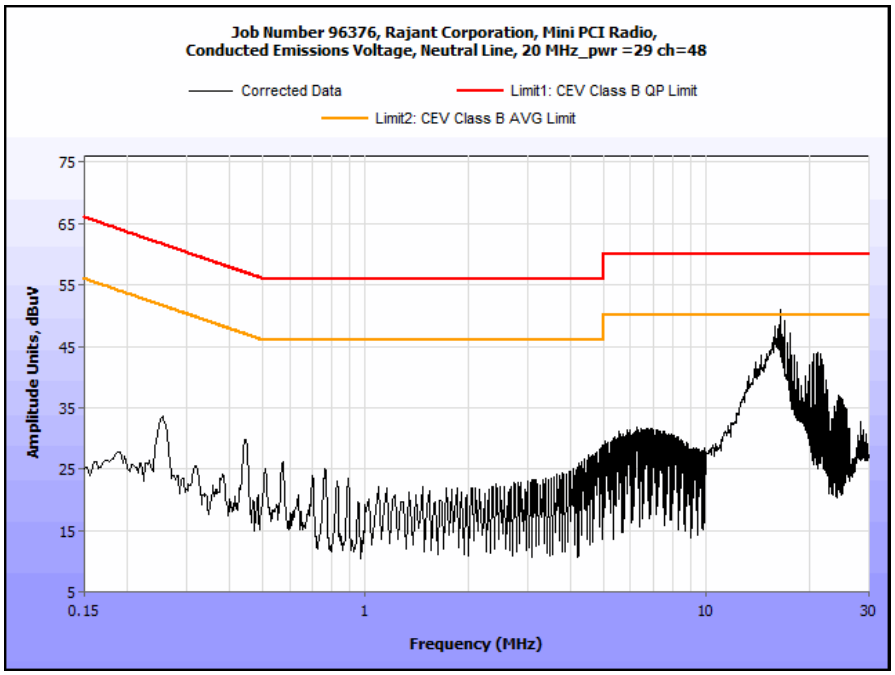
Table 20. Conducted Emissions, Phase Line, Test Results



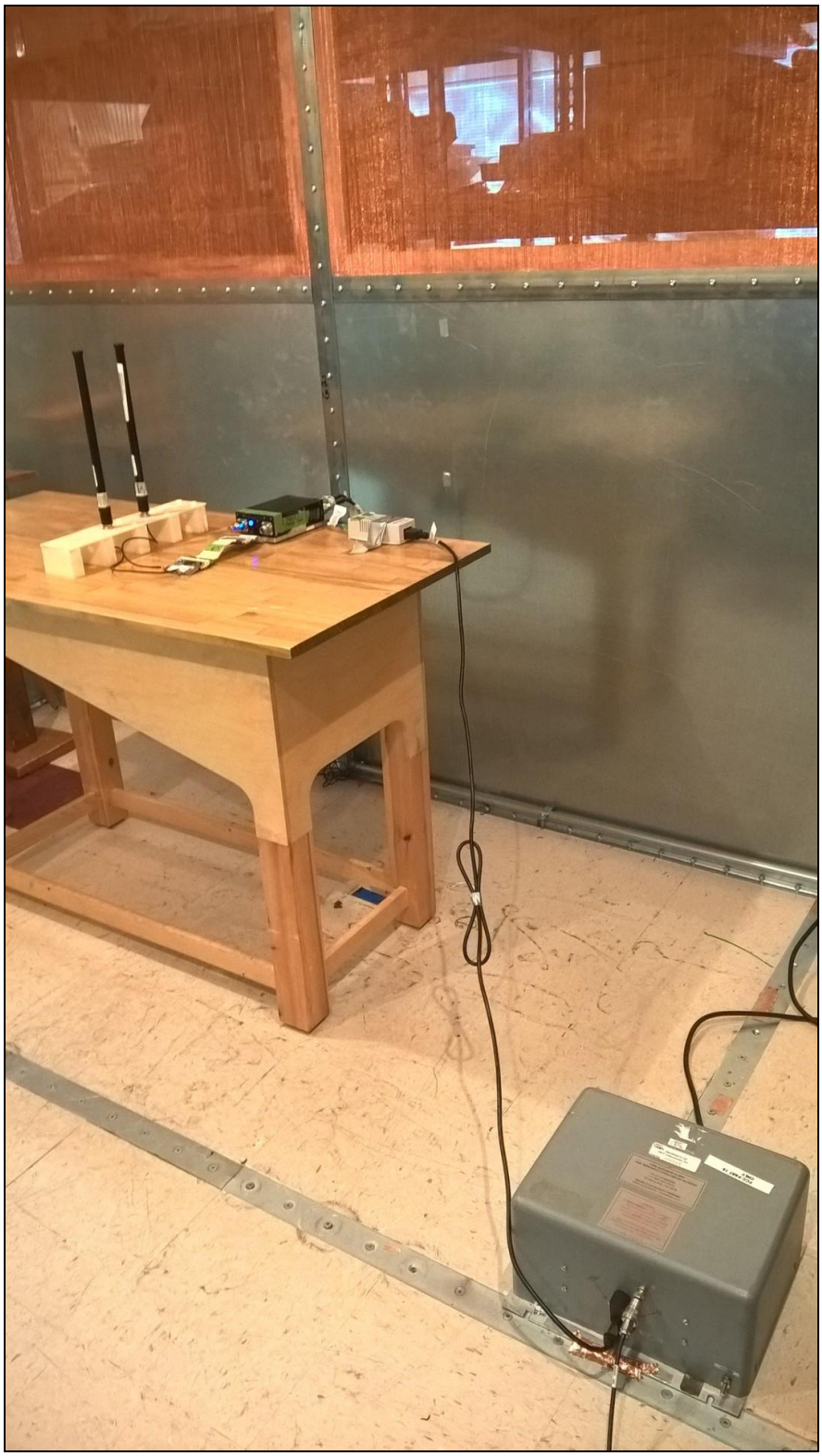
Plot 178. Conducted Emissions, Phase Line

Frequency (MHz)	Uncorrected Meter Reading (dBµV) QP	Cable Loss (dB)	Corrected Measurement (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBµV) Avg.	Cable Loss (dB)	Corrected Measurement (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
16.42	48.5	0.13	48.63	60	-11.37	44.97	0.13	45.1	50	-4.9
21.24	42.41	0.18	42.59	60	-17.41	42.04	0.18	42.22	50	-7.78

Table 21. Conducted Emissions, Neutral Line, Test Results



Plot 179. Conducted Emissions, Neutral Line



Photograph 7. Conducted Emissions, Test Setup

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 @ 5150-5250 MHz; **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

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^2)
P = Power Input to antenna (mW)
G = Antenna Gain (numeric value)
R = Distance (cm)

Test Results:

FCC									
Frequency (MHz)	**Con. Pwr. (dBm)**	**Con. Pwr. (mW)**	**Ant. Gain (dBi)**	**Ant. Gain numeric**	**Pwr. Density (mW/cm^2)**	**Limit (mW/cm^2)**	**Margin**	**Distance (cm)**	**Result**
5240	26.11	408.319	9	7.943	0.64525	1	0.35475	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 1st trace of the Spectrum Analyzer was taken at ambient conditions and used as a reference. A 2nd 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: The EUT was not applicable with the requirements of this section.

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.

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1T8818	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4407B	2/24/2017	2/24/2018
1T4149	HIGH-FREQUENCY ANECHOIC CHAMBER	RAY PROOF	81	NOT REQUIRED	
1T4442	PRE-AMPLIFIER, MICROWAVE	MITEQ	AFS42-01001800-30-10P	SEE NOTE	
1T2665	ANTENNA; HORN	EMCO	3115	6/22/2017	12/22/2018

Table 22. 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

K. 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.[1] *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.

[1] 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 users 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.

