Continued from

EMC94059-FCC90Y Rev3 Part 1

Electromagnetic Compatibility Criteria for Intentional Radiators

§90.210(m) Transmitter Unwanted Emissions (Emissions Mask)

Test Requirements: **§90.210(m):** Emission Mask M. For high power transmitters (greater that 20 dBm) operating in the 4940-4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

(1) On any frequency removed from the assigned frequency between 0-45% of the authorized bandwidth (BW): 0 dB.

(2) On any frequency removed from the assigned frequency between 45-50% of the authorized bandwidth: 568 log (% of (BW)/45) dB.

(3) On any frequency removed from the assigned frequency between 50-55% of the authorized bandwidth: 26 + 145 log (% of BW/50) dB.

(4) On any frequency removed from the assigned frequency between 55-100% of the authorized bandwidth: 32 + 31 log (% of (BW)/55) dB.

(5) On any frequency removed from the assigned frequency between 100-150% of the authorized bandwidth: 40 + 57 log (% of (BW)/100) dB.

(6) On any frequency removed from the assigned frequency between above 150% of the authorized bandwidth: 50 dB or 55 + 10 log (P) dB, whichever is the lesser attenuation.

(7) The zero dB reference is measured relative to the highest average power of the fundamental emission measured across the designated channel bandwidth using a resolution bandwidth of at least one percent of the occupied bandwidth of the fundamental emission and a video bandwidth of 30 kHz. The power spectral density is the power measured within the resolution bandwidth of the measurement device divided by the resolution bandwidth of the measurement device. Emission levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least one percent of the occupied bandwidth.

Test Procedure: The EUT was tested according to the average power integration procedures of ANSI C63.26 5.2.4.4.1. The power measurement function of spectrum analyzer was used and configured in the following manner.

(a) Frequency = channel cf
(b) Span = Defined by the mask
(c) RBW = 50KHz (for 5MHz Channel),
100KHz (for 10MHz Channel),
200KHz (for 20MHz Channel)
(d) VBW = 30 KHz
(e) Sweep Time = Auto
(f) Detector = Peak

Conducted spurious emissions were measured as per 47 CFR 2.1051

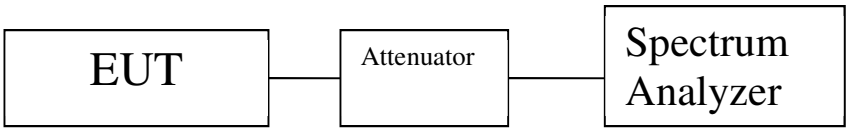
(a) Frequency = channel cf
(b) Span = 30MHz to 32GHz
(c) RBW = 1MHz
(d) VBW = 3MHz
(e) Sweep Time = Auto
(f) Detector = Peak
(g) Limit = -25dBm

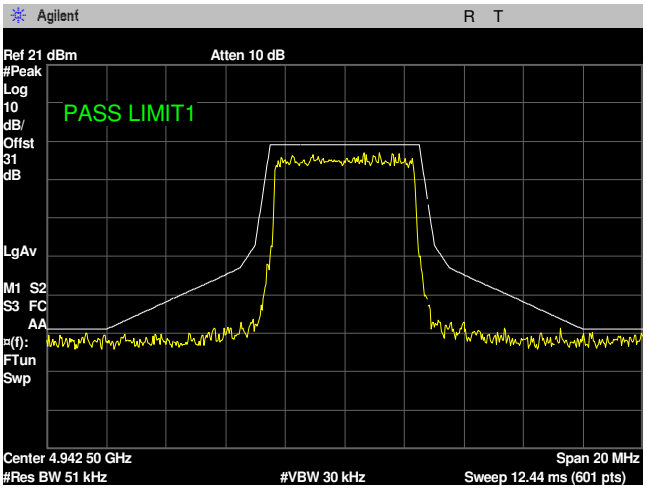
Test Results: The EUT as tested is compliant with the requirements of this section.

No anomalies detected.

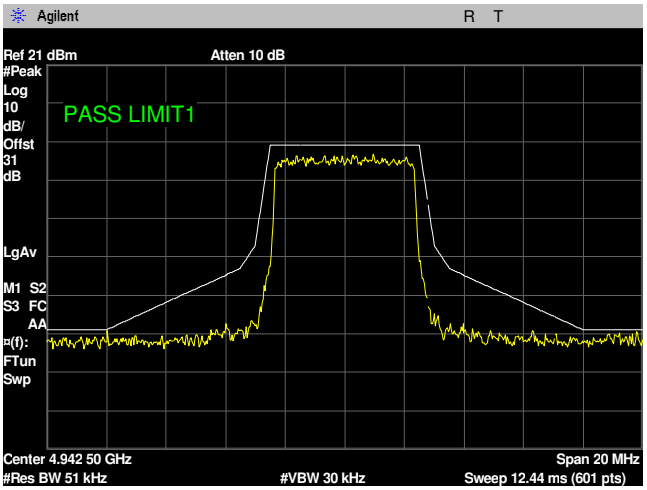
Test Engineer(s): Arsalan Hasan

Test Date(s): July 10, 2019

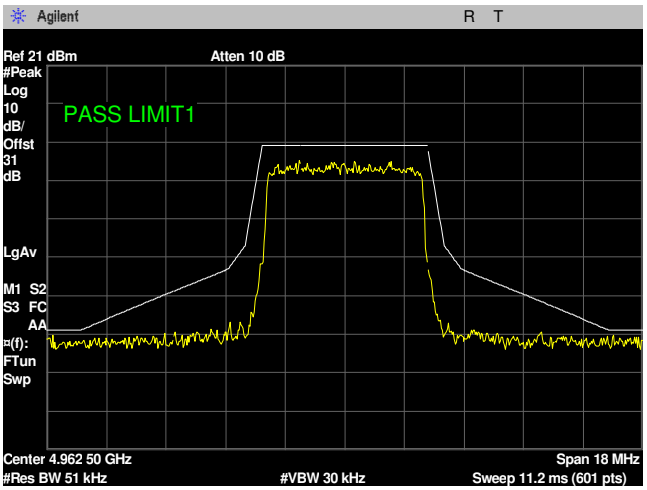




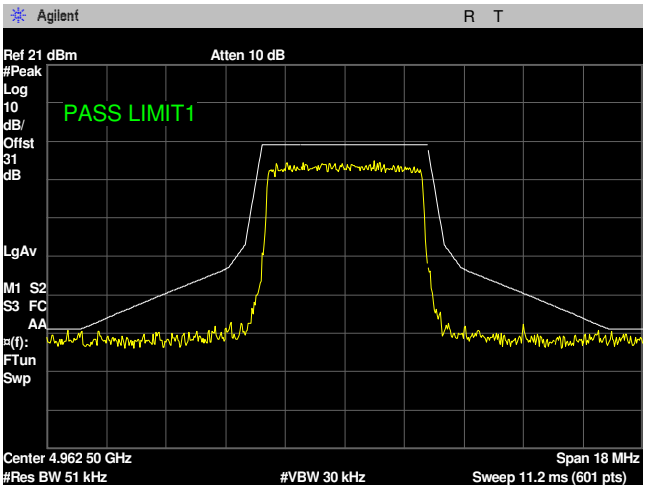
Plot 154. Emissions Mask, 5MHz, 4942.5MHz, 8Omni, Port 1



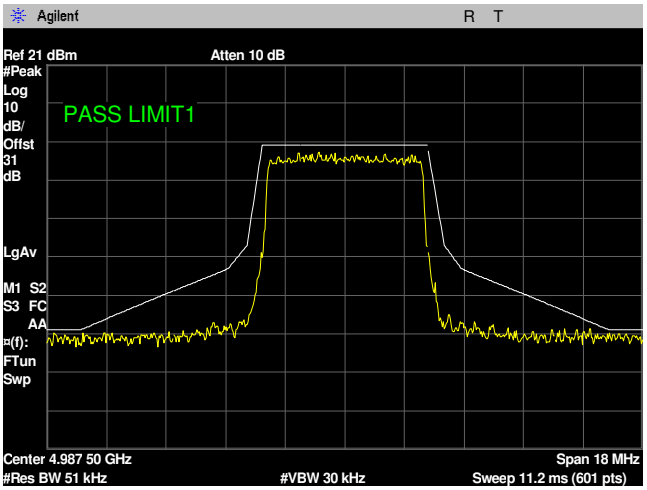
Plot 155. Emissions Mask, 5MHz, 4942.5MHz, 8Omni, Port 2



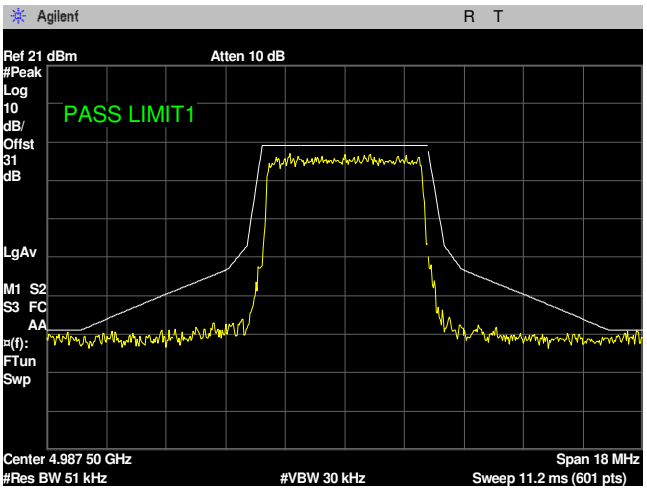
Plot 156. Emissions Mask, 5MHz, 4962.5MHz, 8Omni, Port 1



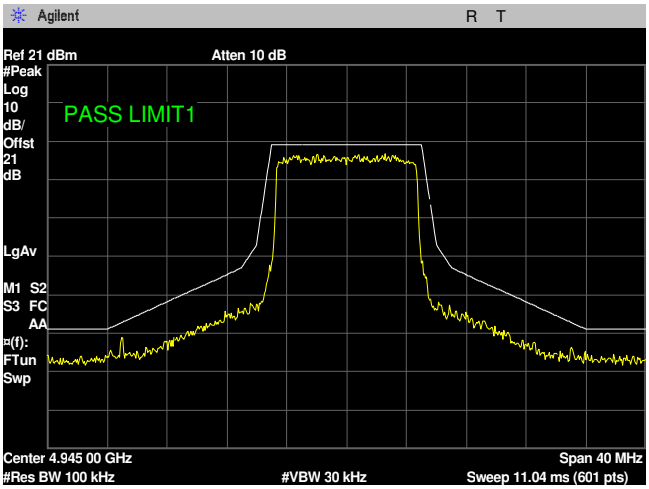
Plot 157. Emissions Mask, 5MHz, 4962.5MHz, 8Omni, Port 2



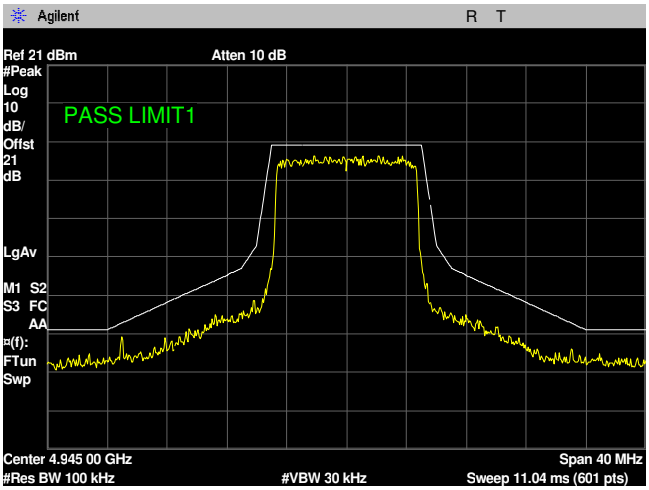
Plot 158. Emissions Mask, 5MHz, 4987.5MHz, 8Omni, Port 1



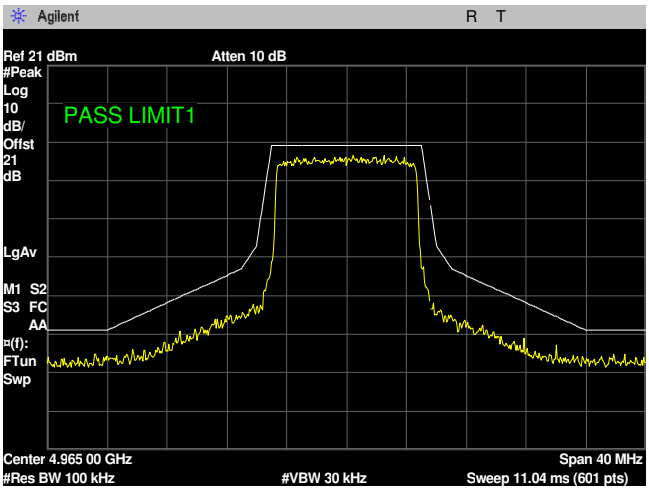
Plot 159. Emissions Mask, 5MHz, 4987.5MHz, 8Omni, Port 1



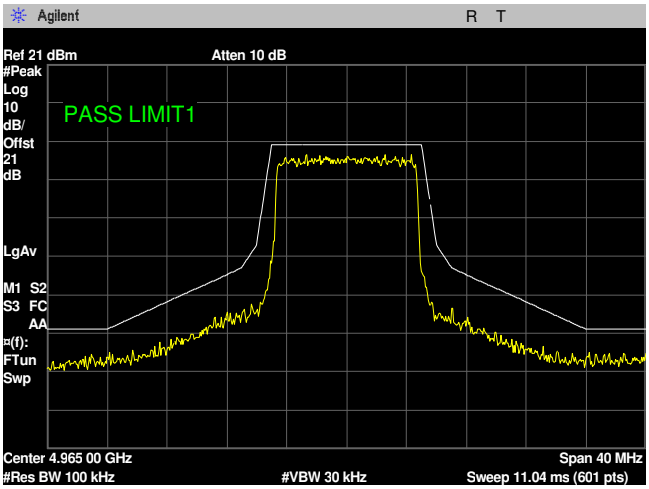
Plot 160. Emissions Mask, 10MHz, 4945MHz, 8Omni, Port 1



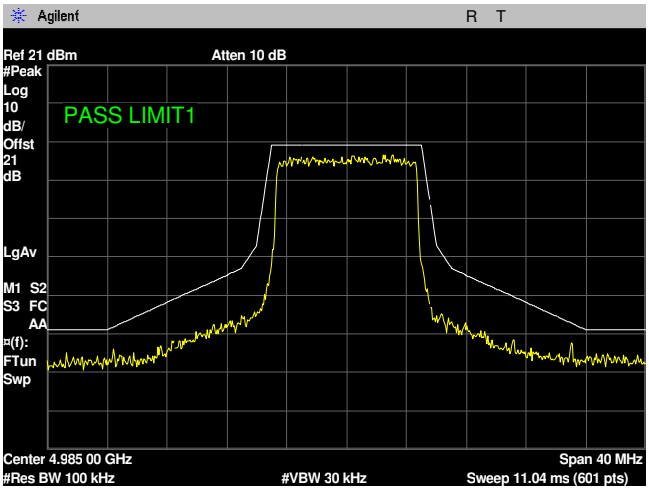
Plot 161. Emissions Mask, 10MHz, 4945MHz, 8Omni, Port 2



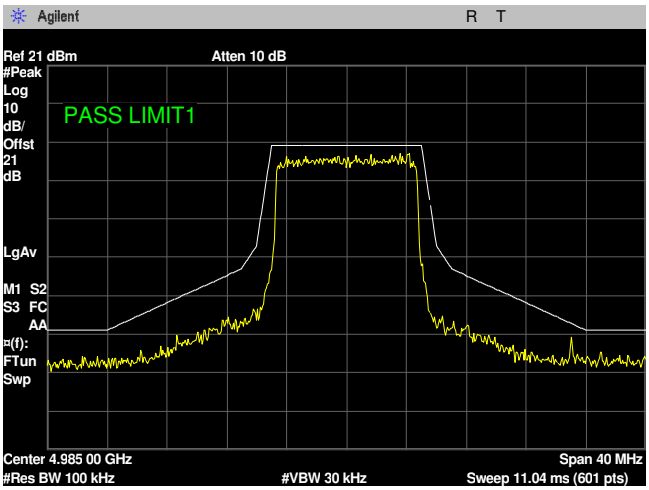
Plot 162. Emissions Mask, 10MHz, 4965MHz, 8Omni, Port 1



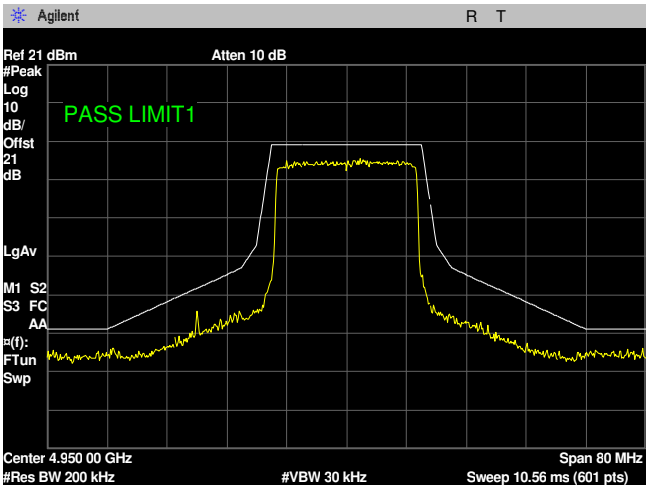
Plot 163. Emissions Mask, 10MHz, 4965MHz, 8Omni, Port 2



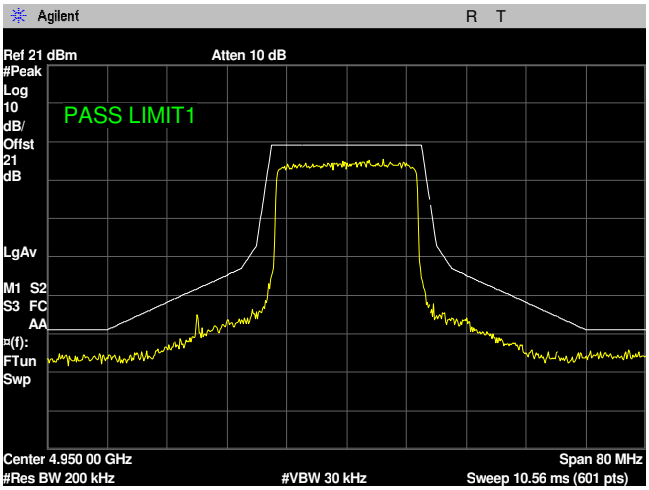
Plot 164. Emissions Mask, 10MHz, 4985MHz, 8Omni, Port 1



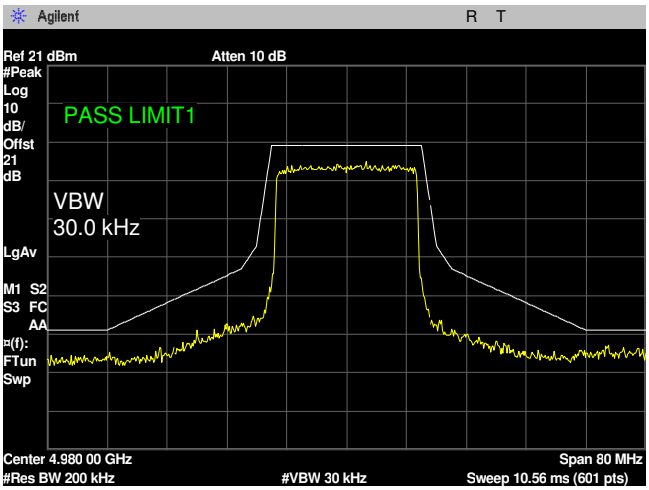
Plot 165. Emissions Mask, 10MHz, 4985MHz, 8Omni, Port 2



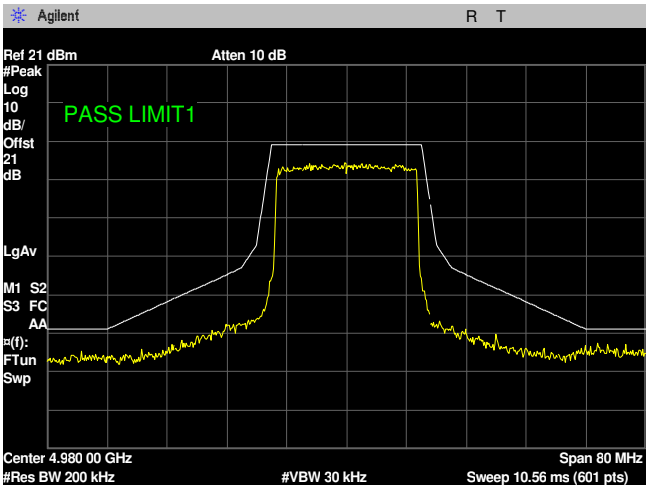
Plot 166. Emissions Mask, 20MHz, 4950MHz, 8Omni, Port 1



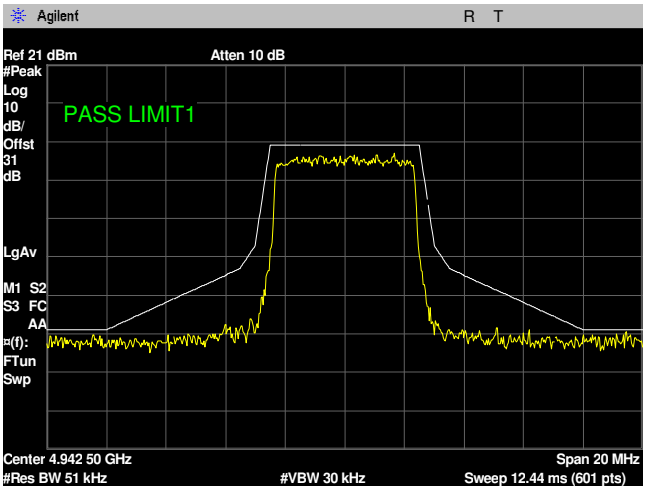
Plot 167. Emissions Mask, 20MHz, 4950MHz, 8Omni, Port 2



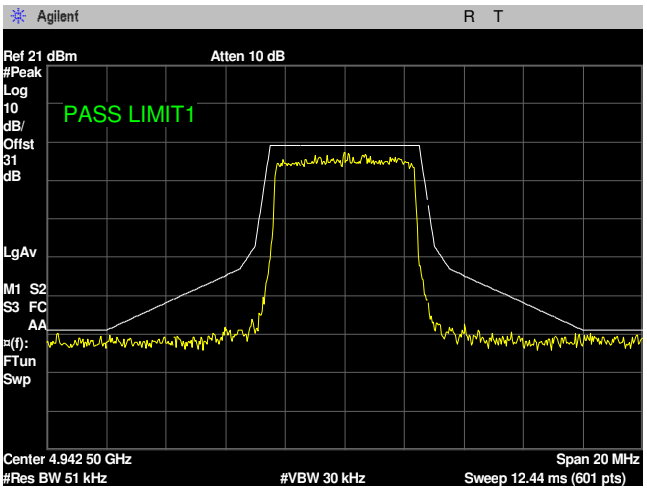
Plot 168. Emissions Mask, 20MHz, 4980MHz, 8Omni, Port 1



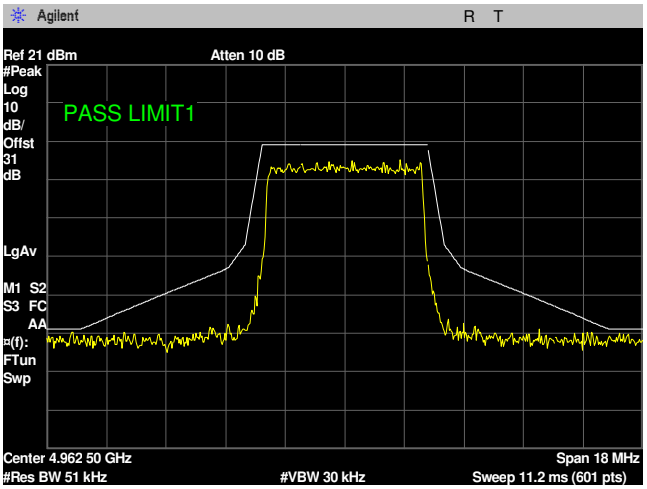
Plot 169. Emissions Mask, 20MHz, 4980MHz, 8Omni, Port 2



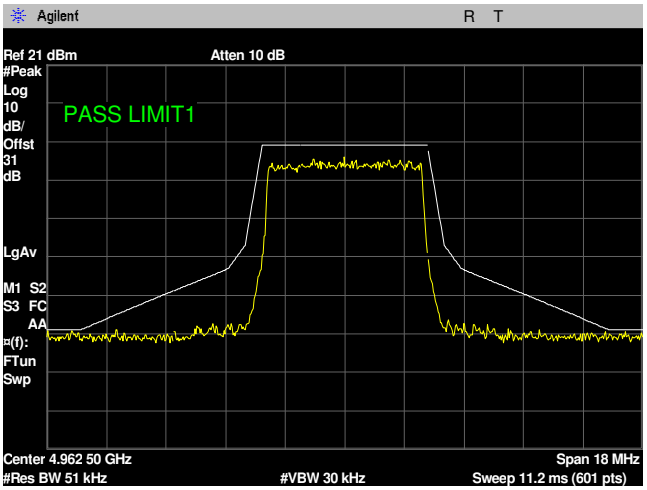
Plot 170. Emissions Mask, 5MHz, 4942.5MHz, 90Sector, Port 1



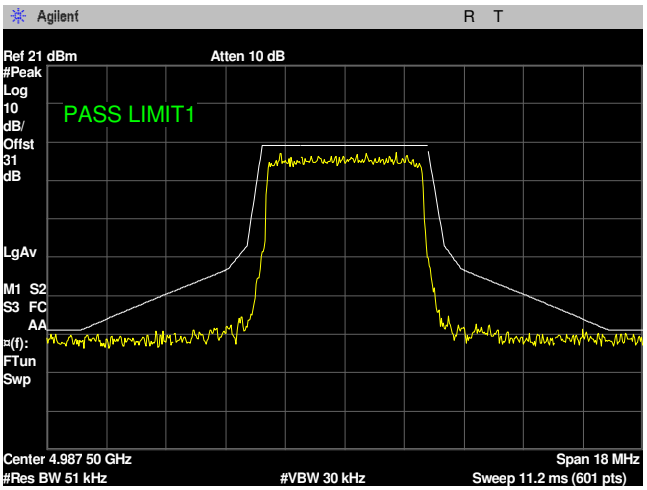
Plot 171. Emissions Mask, 5MHz, 4942.5MHz, 90Sector, Port 2



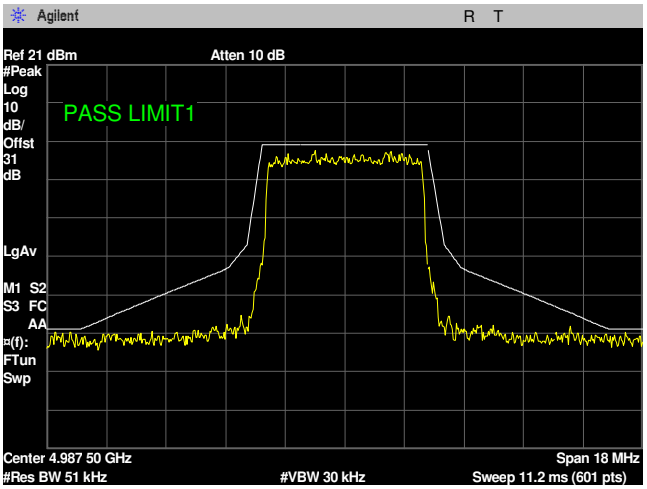
Plot 172. Emissions Mask, 5MHz, 4962.5MHz, 90Sector, Port 1



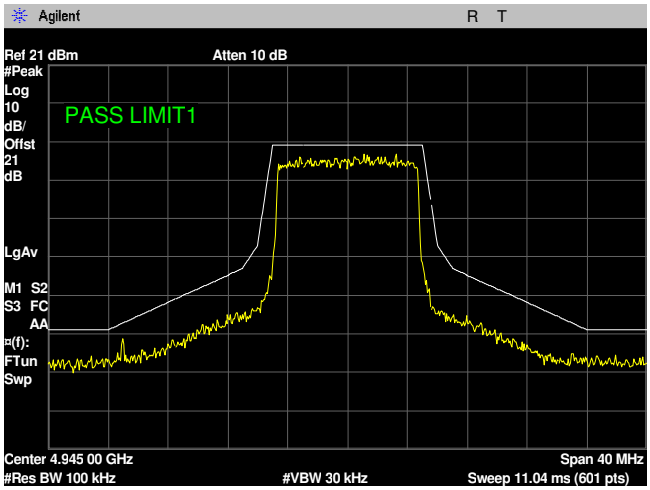
Plot 173. Emissions Mask, 5MHz, 4962.5MHz, 90Sector, Port 2



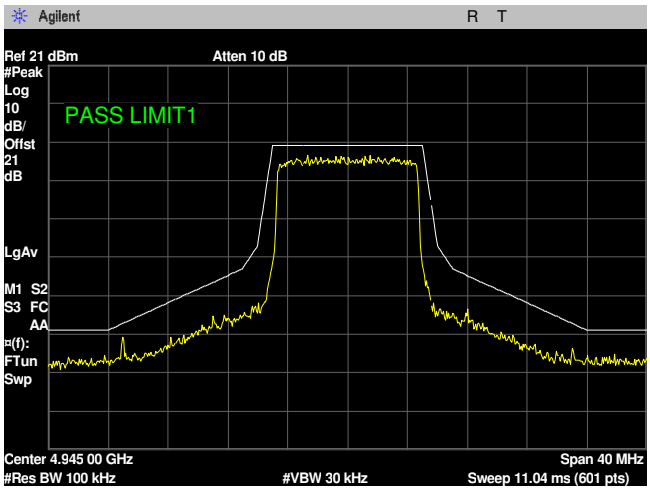
Plot 174. Emissions Mask, 5MHz, 4987.5MHz, 90Sector, Port 1



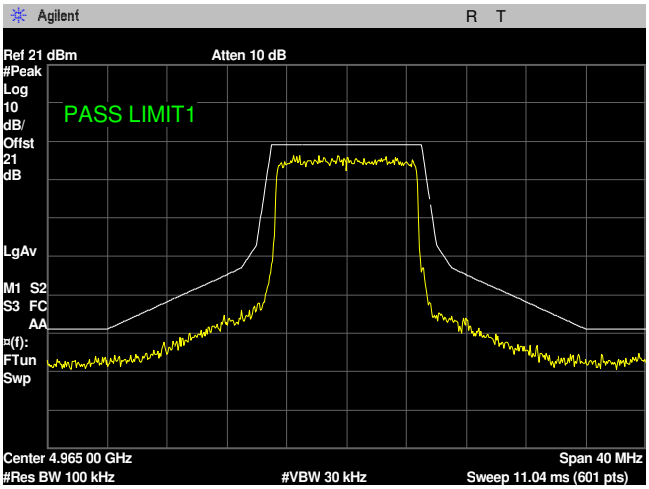
Plot 175. Emissions Mask, 5MHz, 4987.5MHz, 90Sector, Port 2



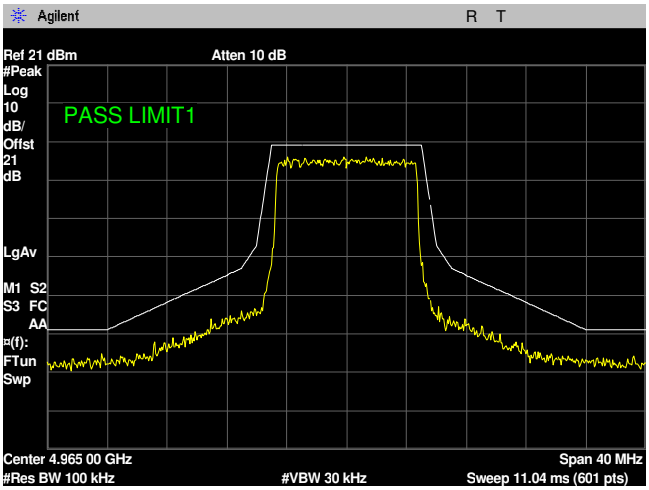
Plot 176. Emissions Mask, 10MHz, 4945MHz, 90Sector, Port 1



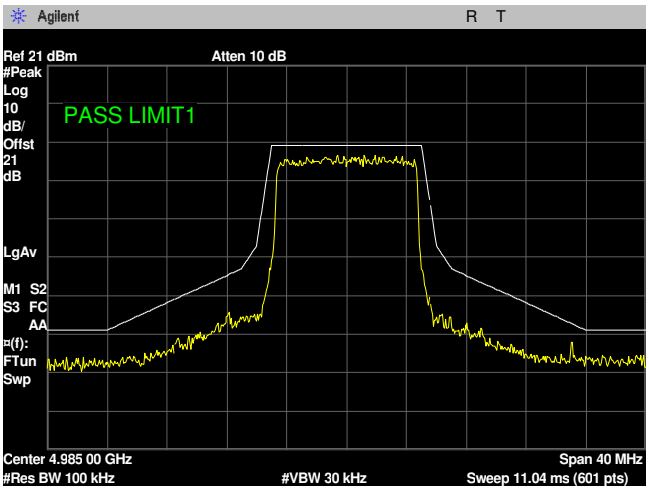
Plot 177. Emissions Mask, 10MHz, 4945MHz, 90Sector, Port 2



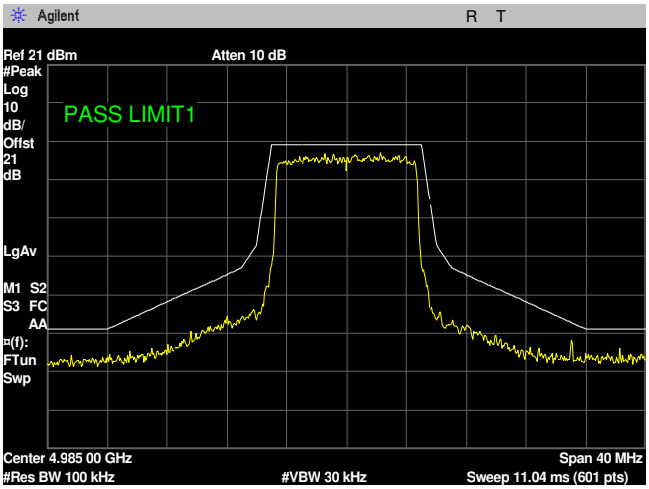
Plot 178. Emissions Mask, 10MHz, 4965MHz, 90Sector, Port 1



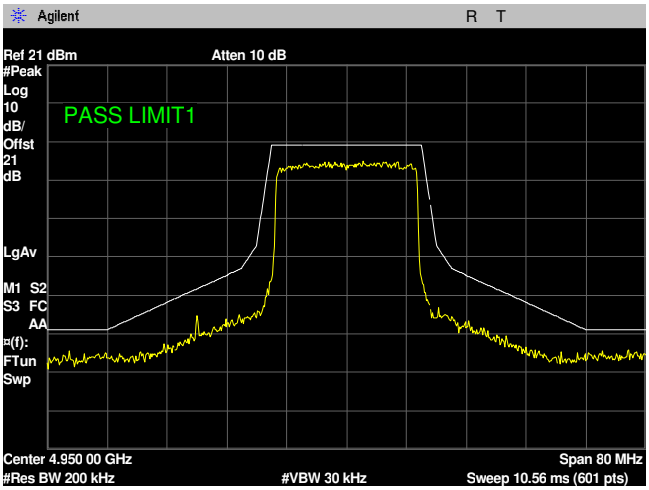
Plot 179. Emissions Mask, 10MHz, 4965MHz, 90Sector, Port 2



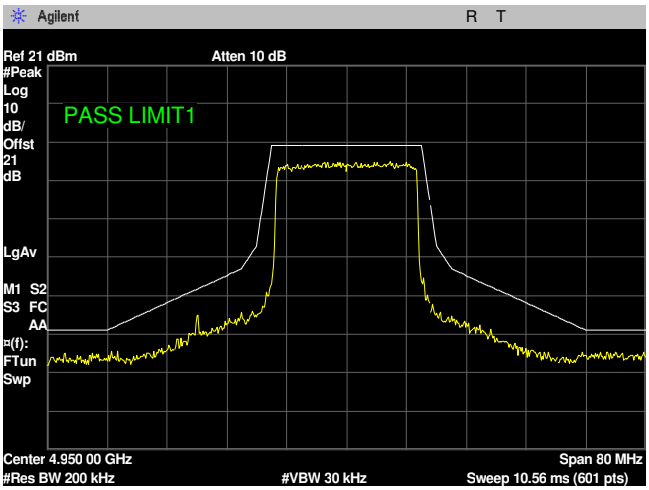
Plot 180. Emissions Mask, 10MHz, 4985MHz, 90Sector, Port 1



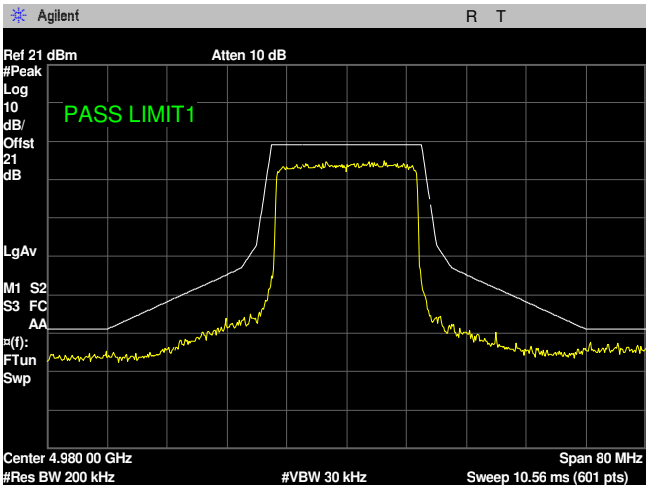
Plot 181. Emissions Mask, 10MHz, 4985MHz, 90Sector, Port 2



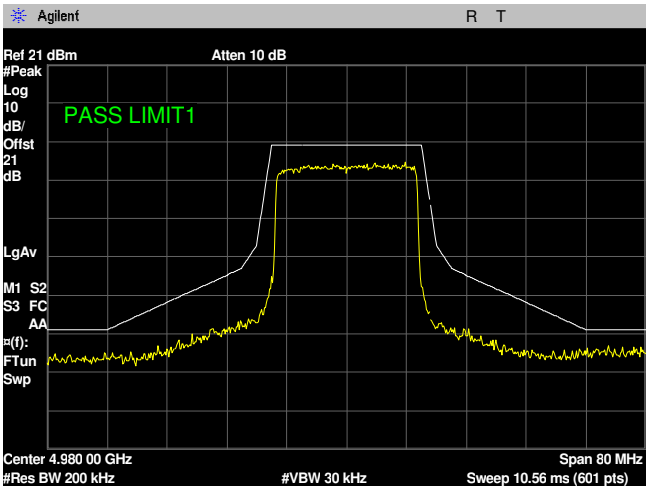
Plot 182. Emissions Mask, 20MHz, 4950MHz, 90Sector, Port 1



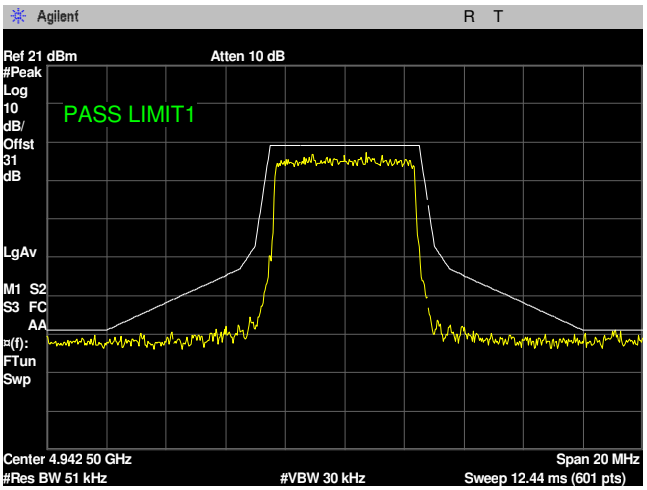
Plot 183. Emissions Mask, 20MHz, 4950MHz, 90Sector, Port 2



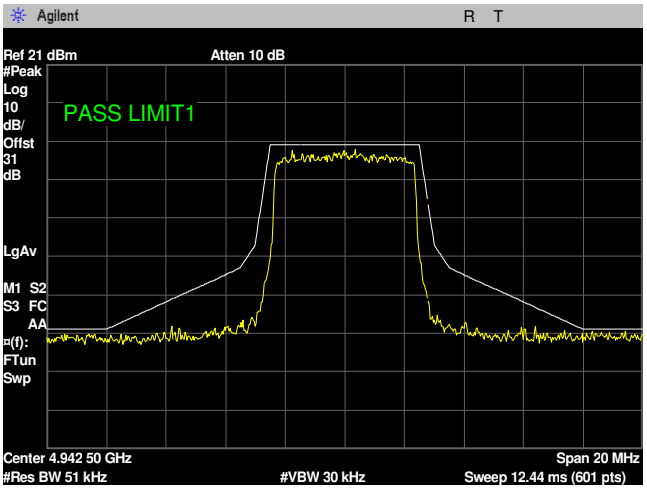
Plot 184. Emissions Mask, 20MHz, 4980MHz, 90Sector, Port 1



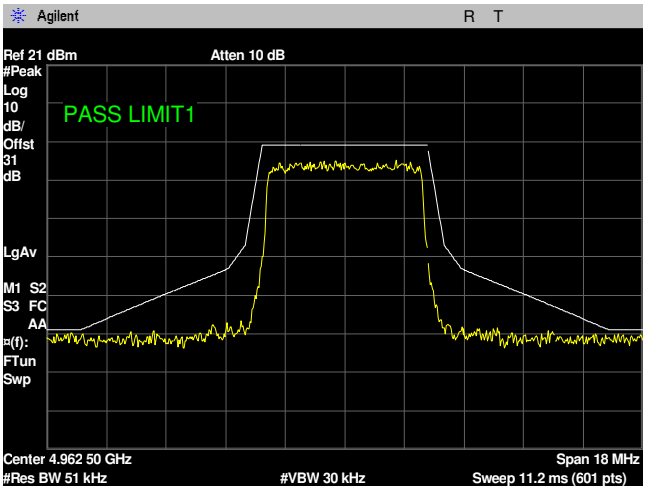
Plot 185. Emissions Mask, 20MHz, 4980MHz, 90Sector, Port 2



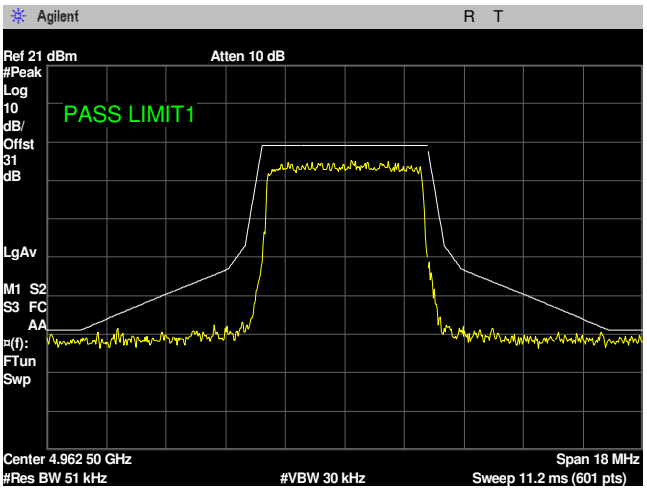
Plot 186. Emissions Mask, 5MHz, 4942.5MHz, 2Panel, Port 1



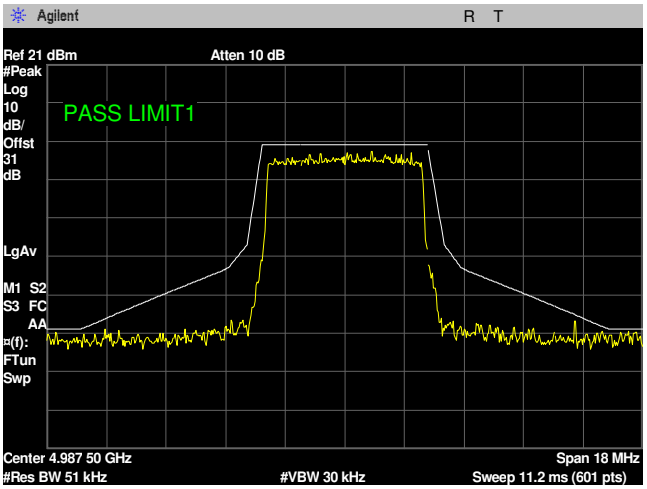
Plot 187. Emissions Mask, 5MHz, 4942.5MHz, 2Panel, Port 2



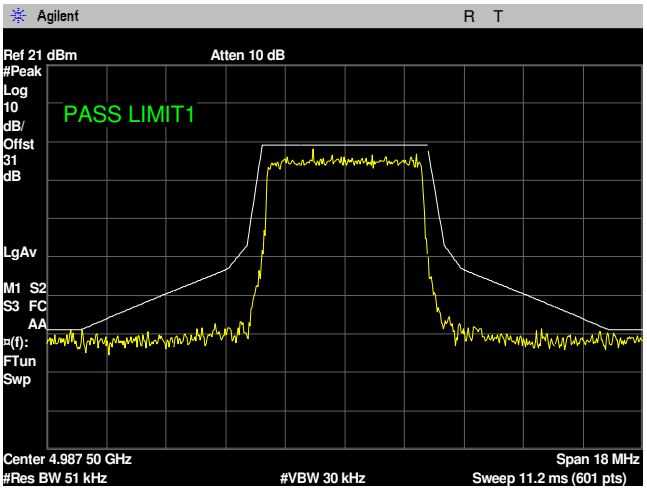
Plot 188. Emissions Mask, 5MHz, 4962.5MHz, 2Panel, Port 1



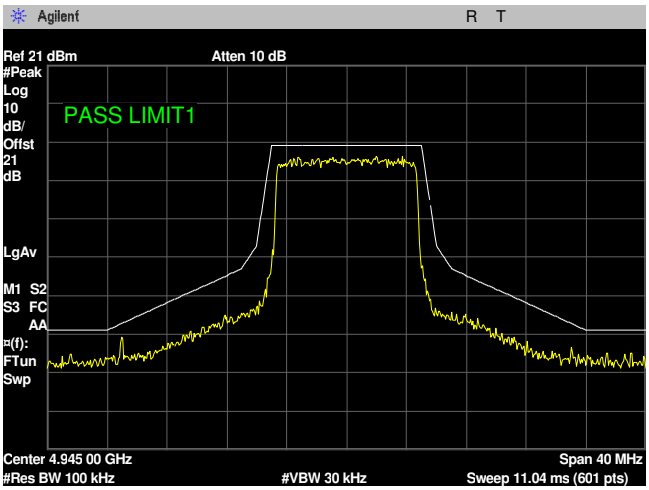
Plot 189. Emissions Mask, 5MHz, 4962.5MHz, 2Panel, Port 2



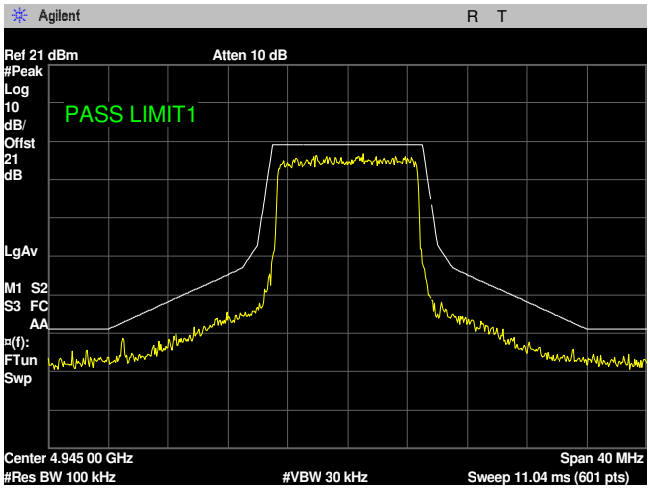
Plot 190. Emissions Mask, 5MHz, 4987.5MHz, 2Panel, Port 1



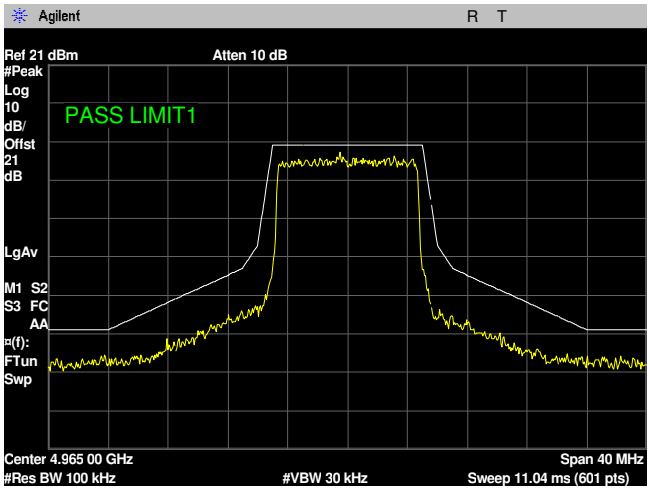
Plot 191. Emissions Mask, 5MHz, 4987.5MHz, 2Panel, Port 2



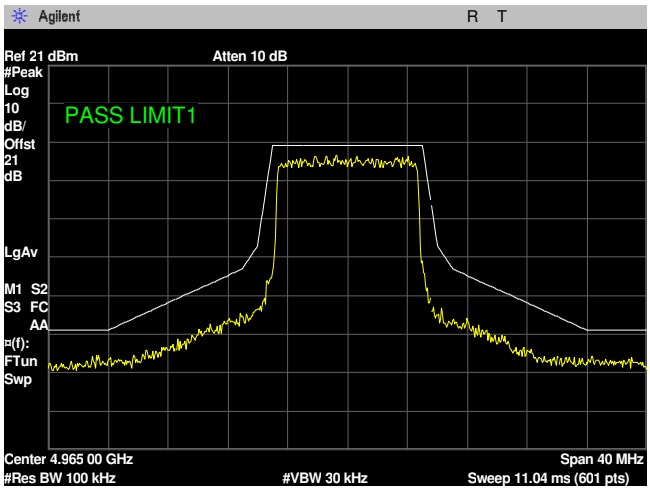
Plot 192. Emissions Mask, 10MHz, 4945MHz, 2Panel, Port 1



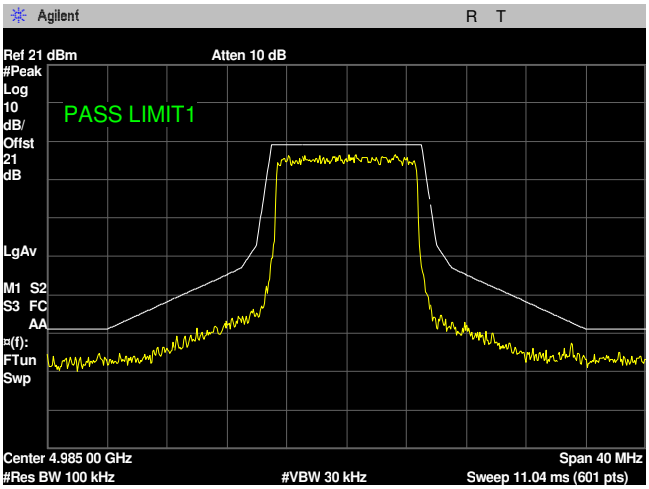
Plot 193. Emissions Mask, 10MHz, 4945MHz, 2Panel, Port 2



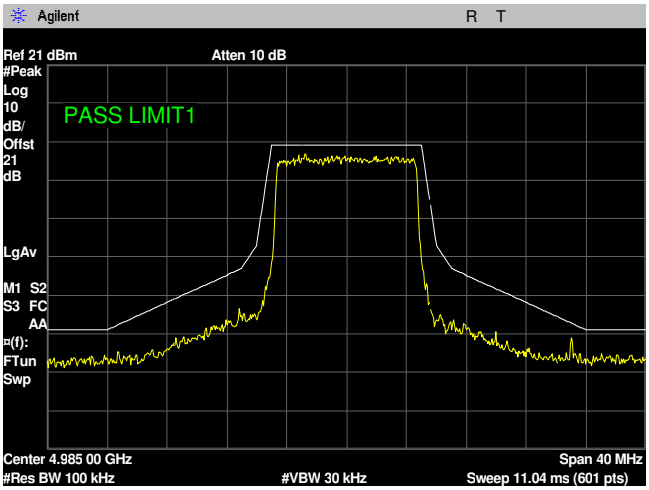
Plot 194. Emissions Mask, 10MHz, 4965MHz, 2Panel, Port 1



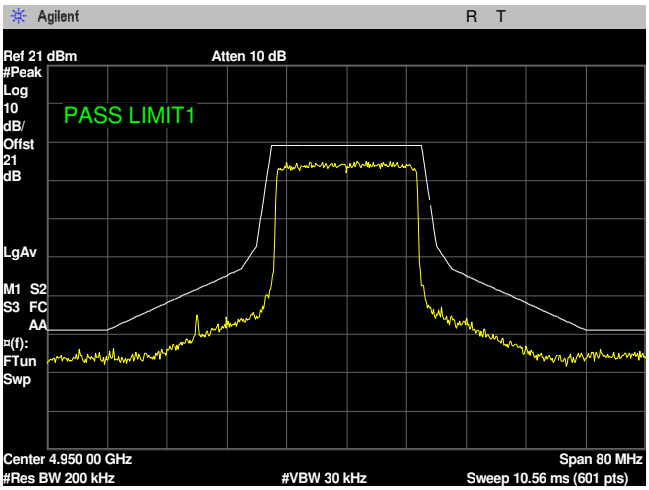
Plot 195. Emissions Mask, 10MHz, 4965MHz, 2Panel, Port 2



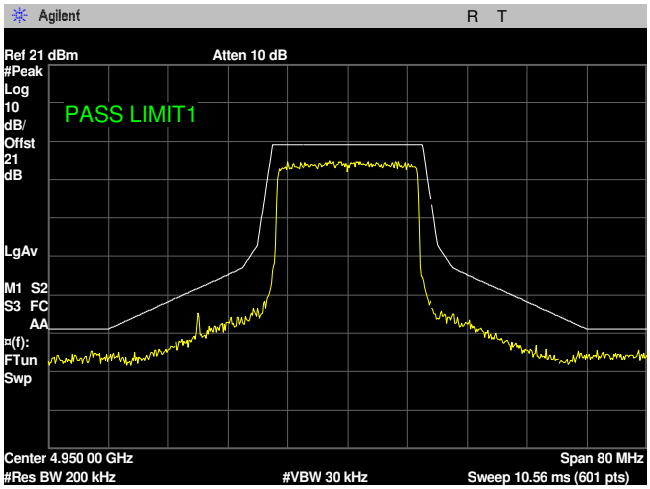
Plot 196. Emissions Mask, 10MHz, 4985MHz, 2Panel, Port 1



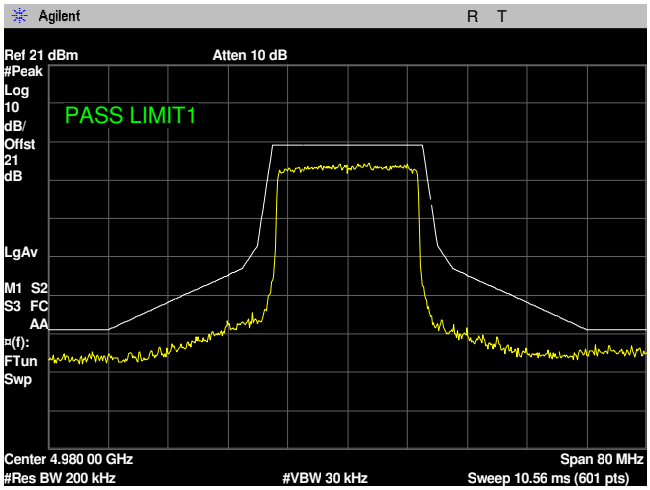
Plot 197. Emissions Mask, 10MHz, 4985MHz, 2Panel, Port 2



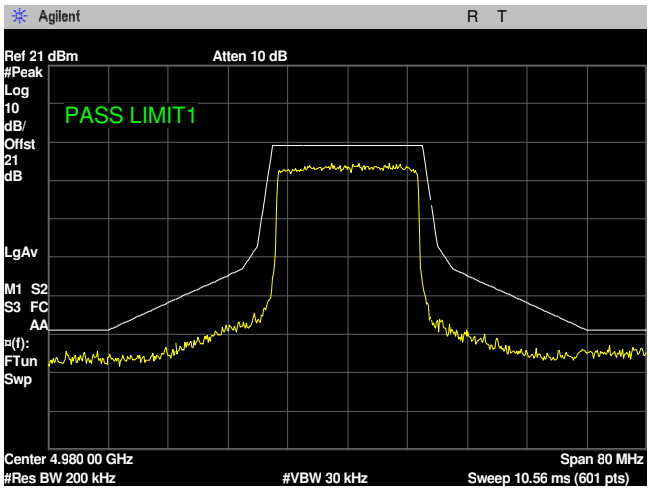
Plot 198. Emissions Mask, 20MHz, 4950MHz, 2Panel, Port 1



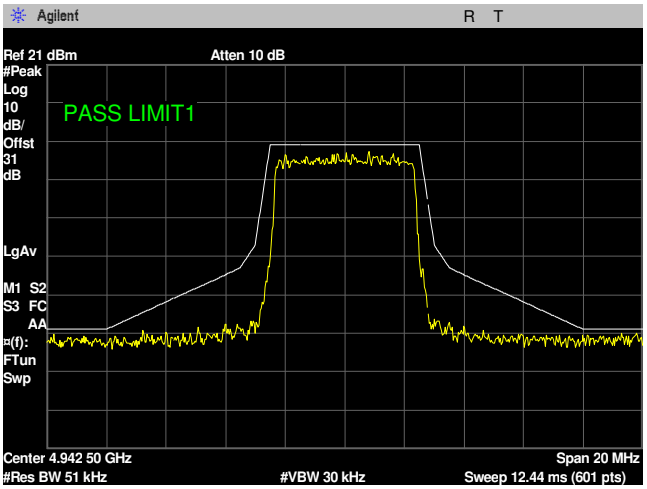
Plot 199. Emissions Mask, 20MHz, 4950MHz, 2Panel, Port 2



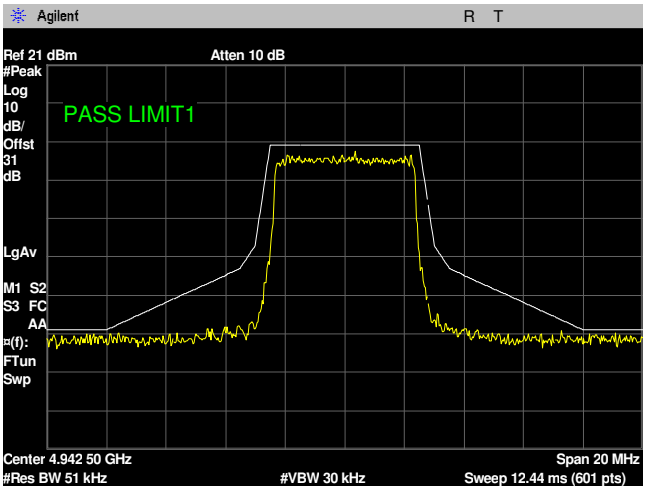
Plot 200. Emissions Mask, 20MHz, 4980MHz, 2Panel, Port 1



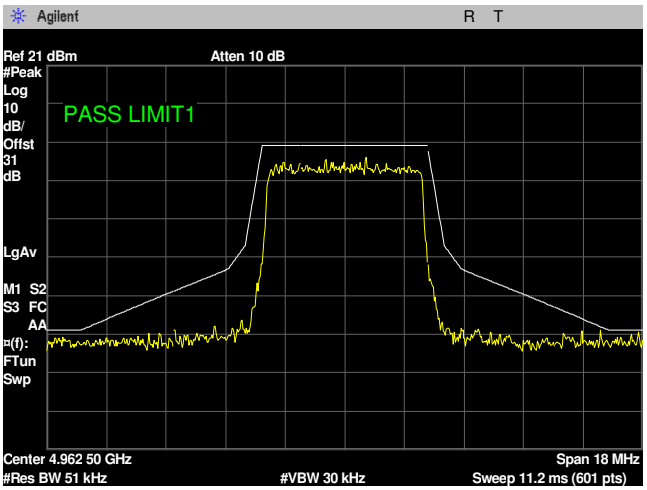
Plot 201. Emissions Mask, 20MHz, 4980MHz, 2Panel, Port 2



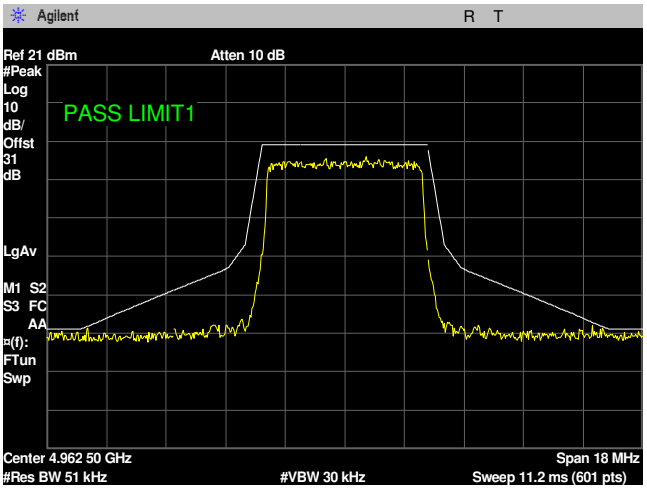
Plot 202. Emissions Mask, 5MHz, 4942.5MHz, 3Para, Port 1



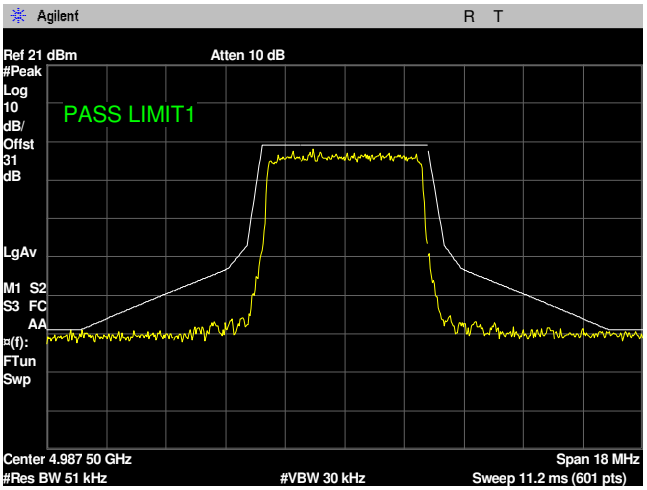
Plot 203. Emissions Mask, 5MHz, 4942.5MHz, 3Para, Port 2



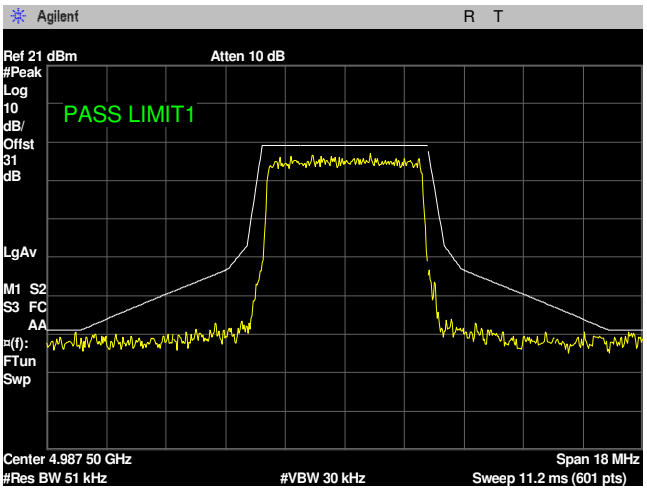
Plot 204. Emissions Mask, 5MHz, 4962.5MHz, 3Para, Port 1



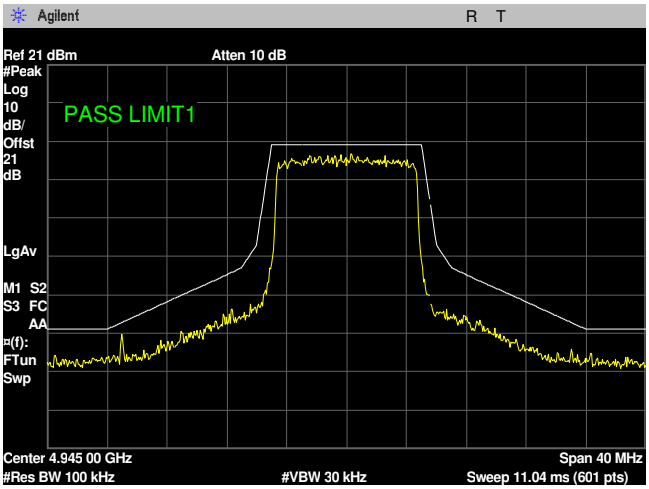
Plot 205. Emissions Mask, 5MHz, 4962.5MHz, 3Para, Port 2



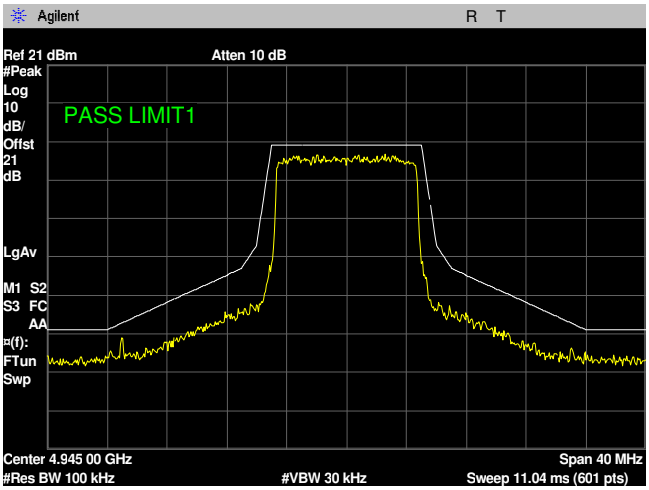
Plot 206. Emissions Mask, 5MHz, 4987.5MHz, 3Para, Port 1



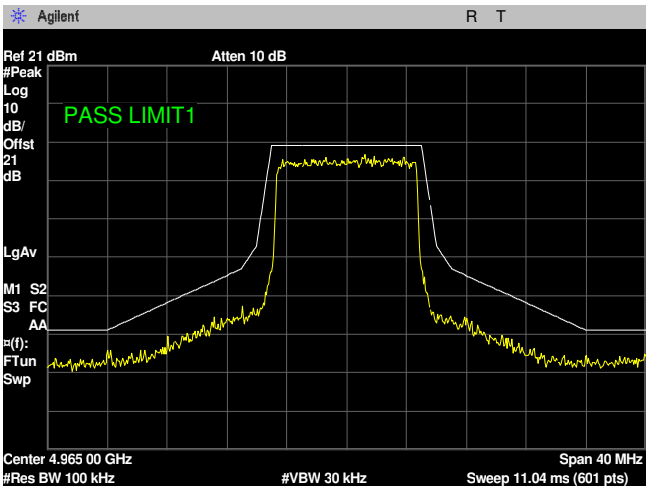
Plot 207. Emissions Mask, 5MHz, 4987.5MHz, 3Para, Port 2



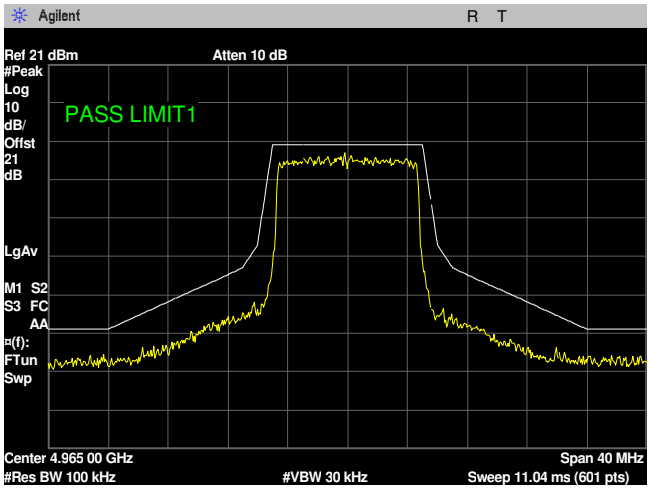
Plot 208. Emissions Mask, 10MHz, 4945MHz, 3Para, Port 1



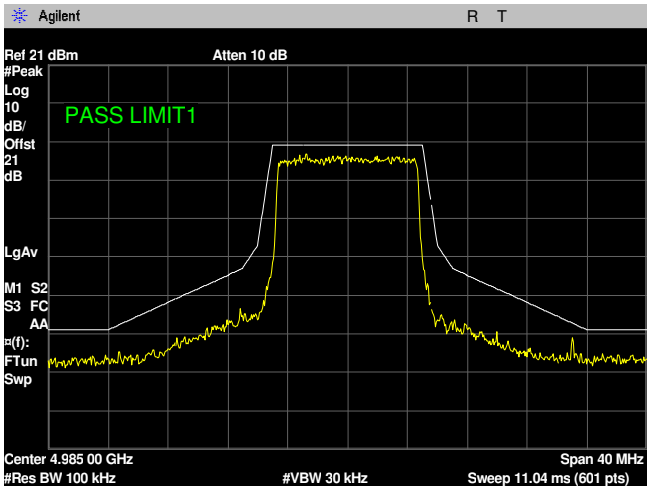
Plot 209. Emissions Mask, 10MHz, 4945MHz, 3Para, Port 2



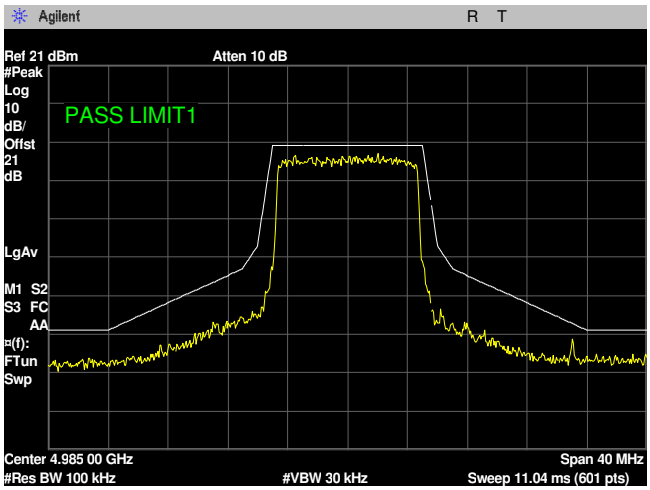
Plot 210. Emissions Mask, 10MHz, 4965MHz, 3Para, Port 1



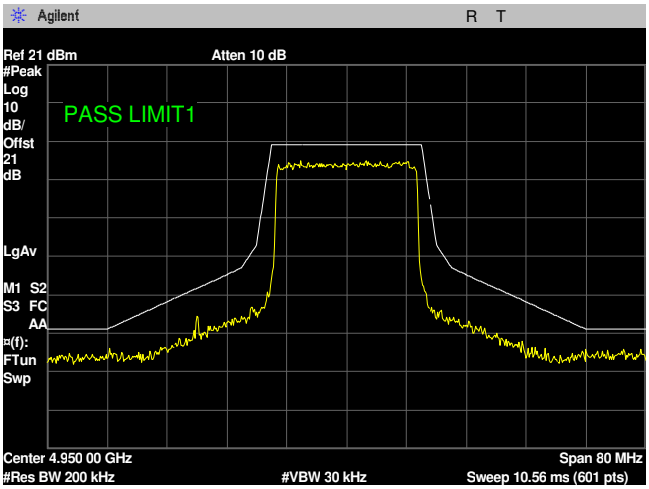
Plot 211. Emissions Mask, 10MHz, 4965MHz, 3Para, Port 2



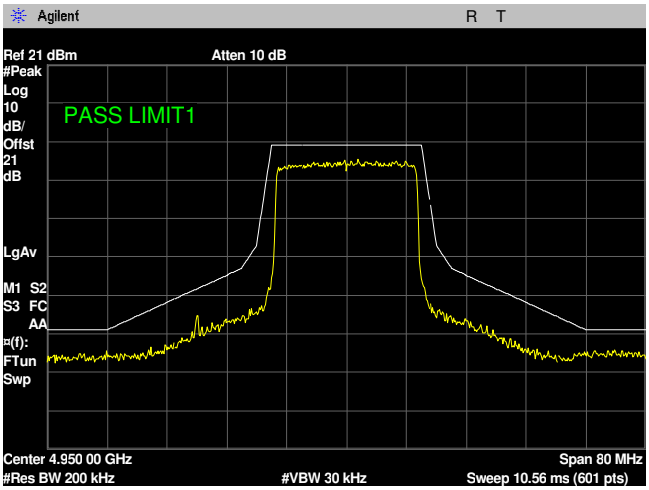
Plot 212. Emissions Mask, 10MHz, 4985MHz, 3Para, Port 1



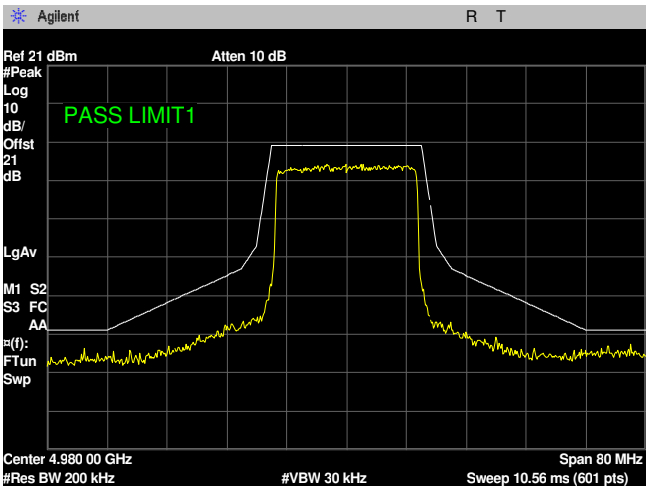
Plot 213. Emissions Mask, 10MHz, 4985MHz, 3Para, Port 2



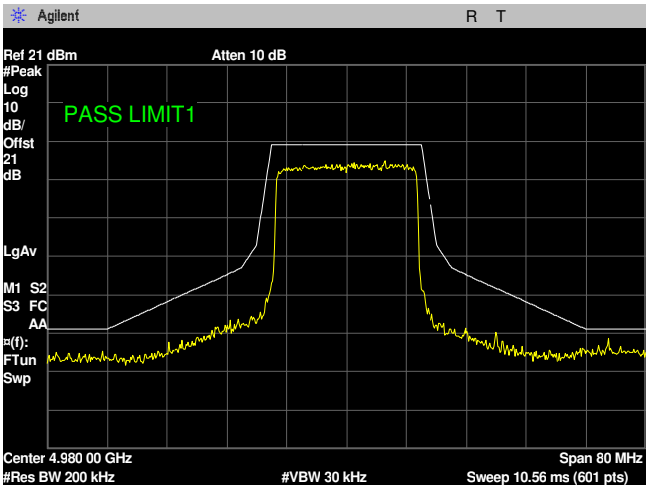
Plot 214. Emissions Mask, 20MHz, 4950MHz, 3Para, Port 1



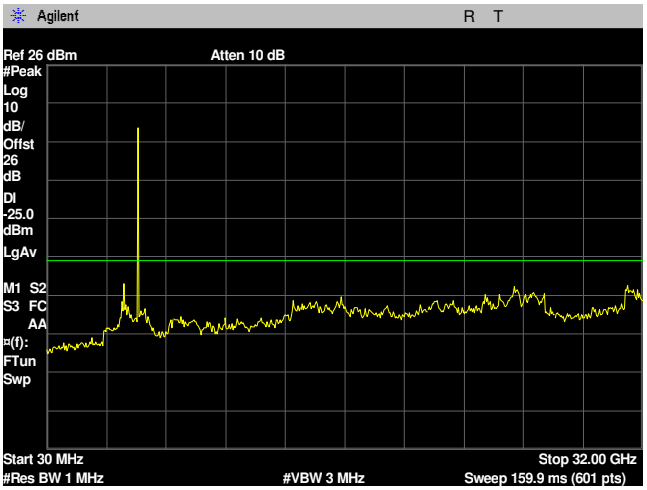
Plot 215. Emissions Mask, 20MHz, 4950MHz, 3Para, Port 2



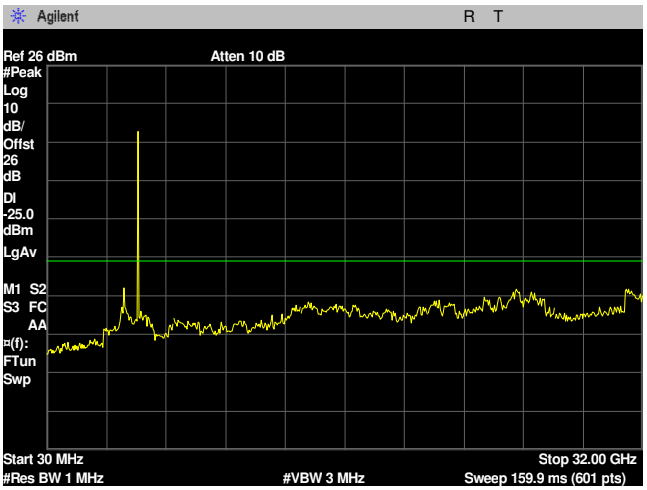
Plot 216. Emissions Mask, 20MHz, 4980MHz, 3Para, Port 1



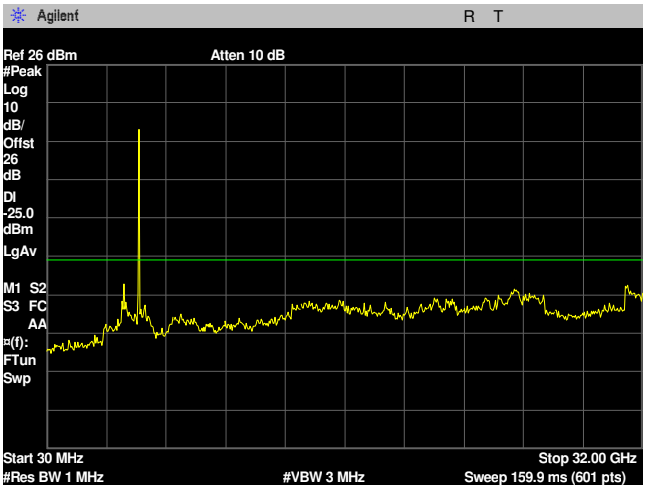
Plot 217. Emissions Mask, 20MHz, 4980MHz, 3Para, Port 2



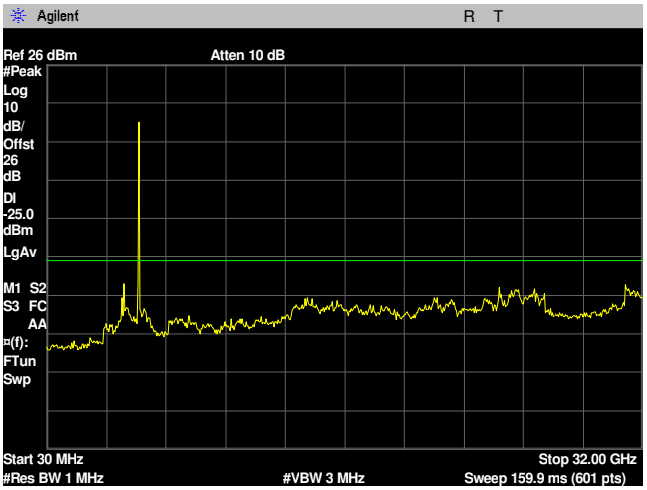
Plot 218. Conducted Spurious Emissions, 5MHz, 4942.5MHz, Port 1



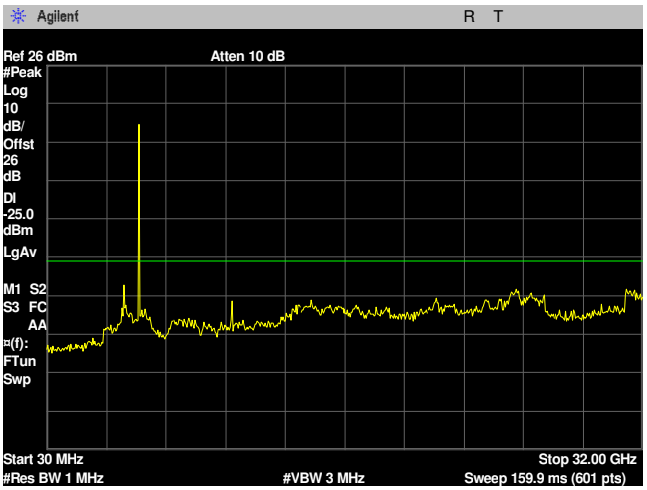
Plot 219. Conducted Spurious Emissions, 5MHz, 4942.5MHz, Port 2



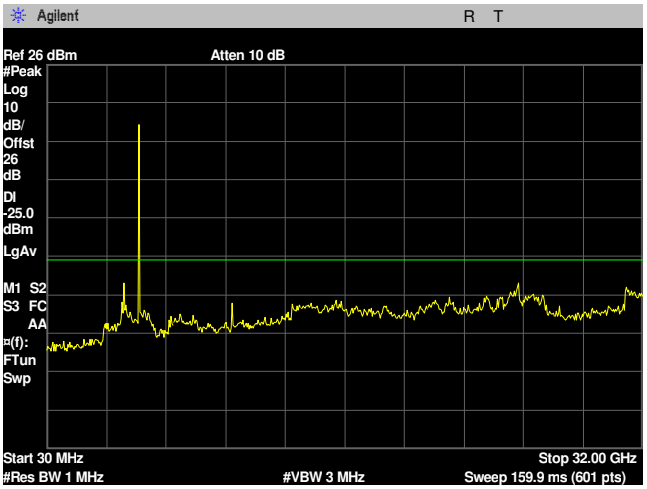
Plot 220. Conducted Spurious Emissions, 5MHz, 4962.5MHz, Port 1



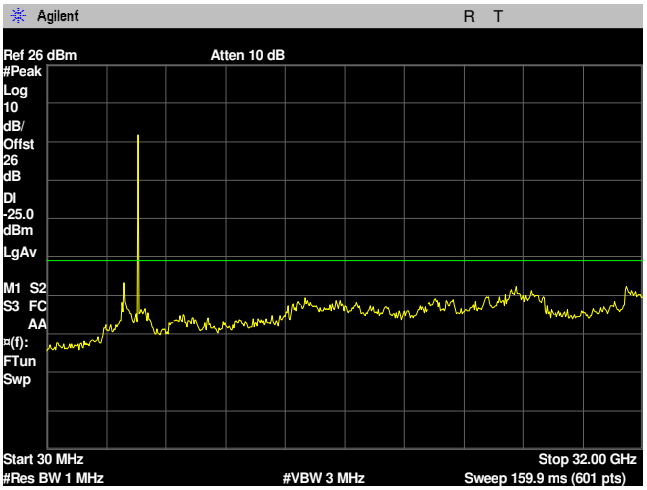
Plot 221. Conducted Spurious Emissions, 5MHz, 4962.5MHz, Port 2



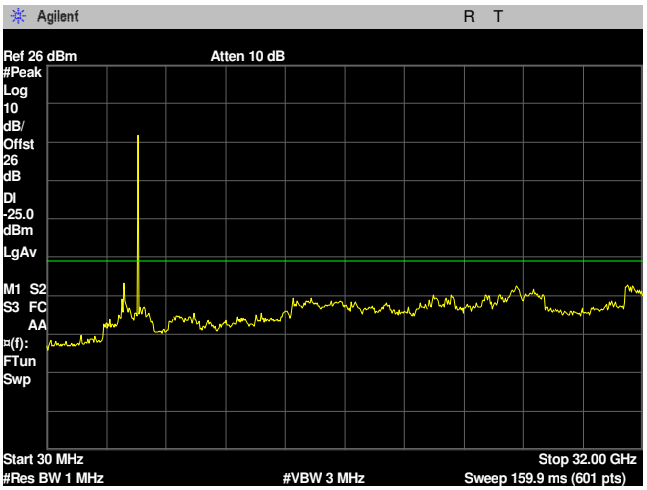
Plot 222. Conducted Spurious Emissions, 5MHz, 4987.5MHz, Port 1



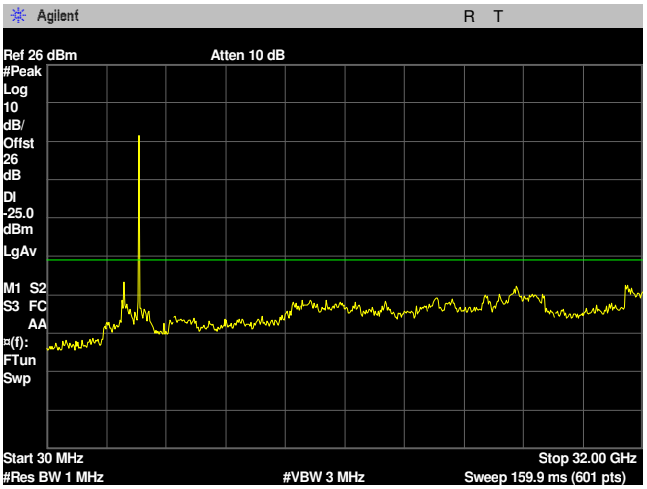
Plot 223. Conducted Spurious Emissions, 5MHz, 4987.5MHz, Port 2



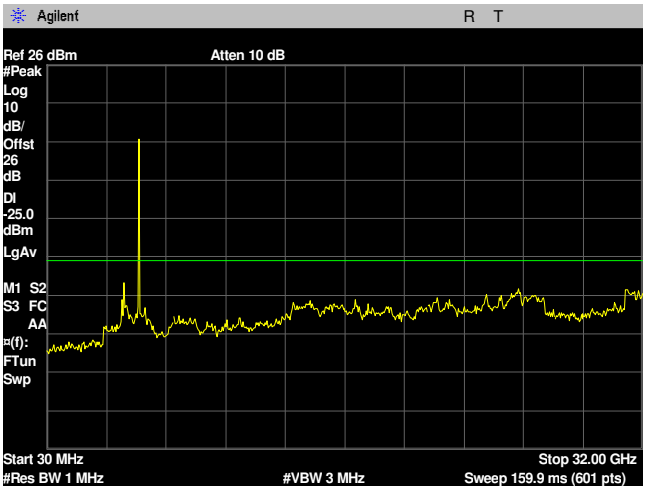
Plot 224. Conducted Spurious Emissions, 10MHz, 4945MHz, Port 1



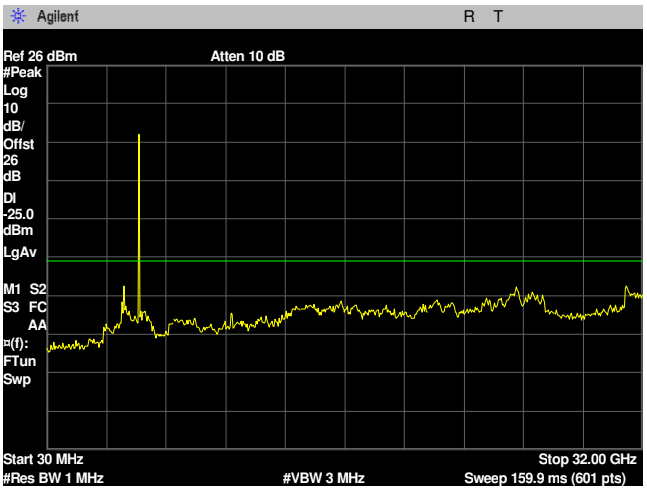
Plot 225. Conducted Spurious Emissions, 10MHz, 4945MHz, Port 2



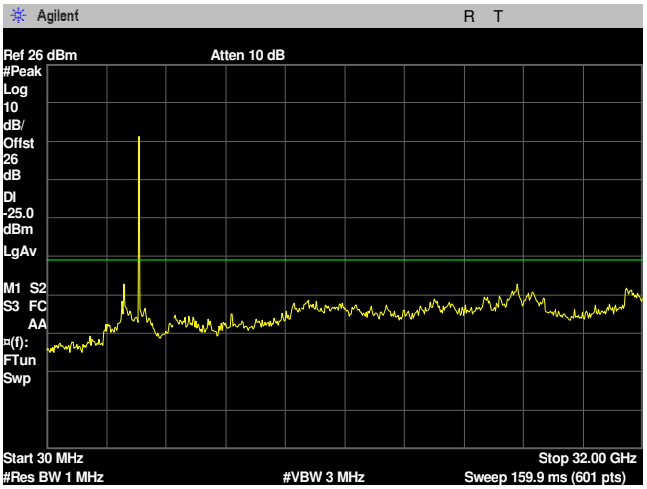
Plot 226. Conducted Spurious Emissions, 10MHz, 4965MHz, Port 1



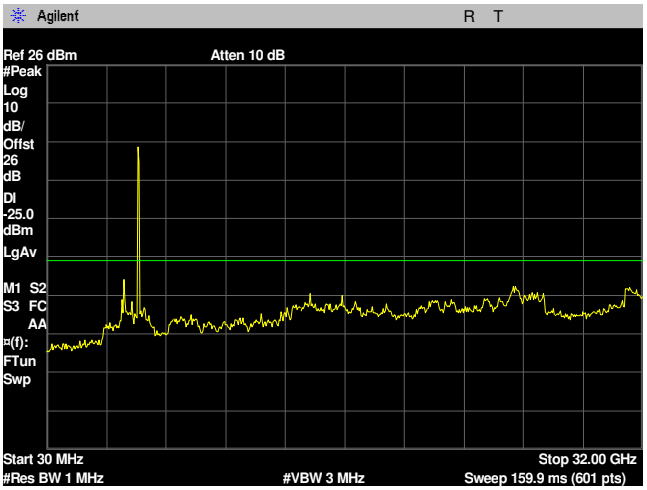
Plot 227. Conducted Spurious Emissions, 10MHz, 4965MHz, Port 2



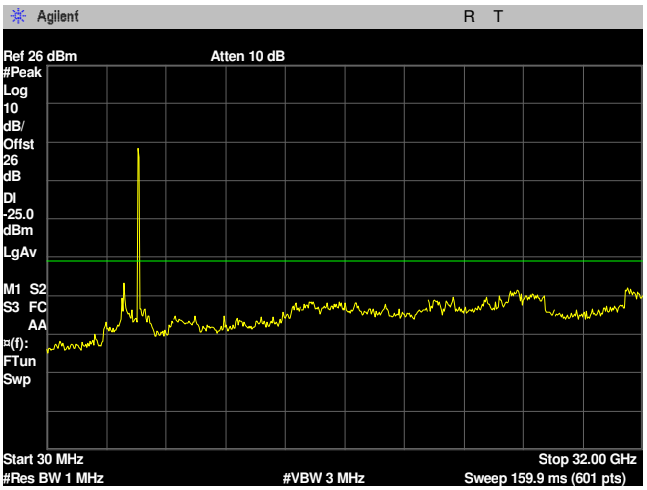
Plot 228. Conducted Spurious Emissions, 10MHz, 4985MHz, Port 1



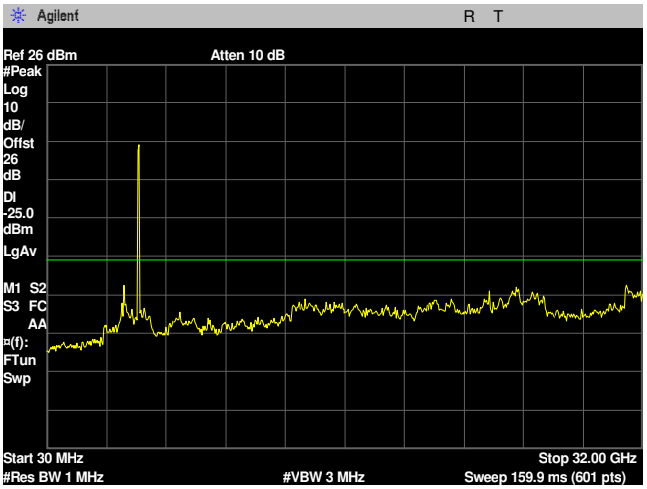
Plot 229. Conducted Spurious Emissions, 10MHz, 4985MHz, Port 2



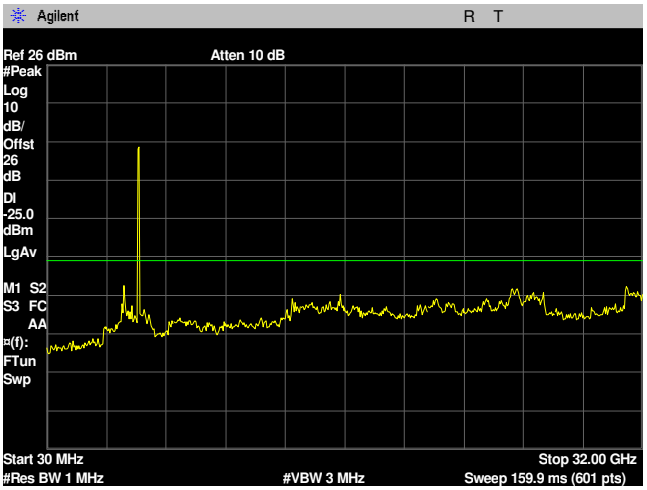
Plot 230. Conducted Spurious Emissions, 20MHz, 4950MHz, Port 1



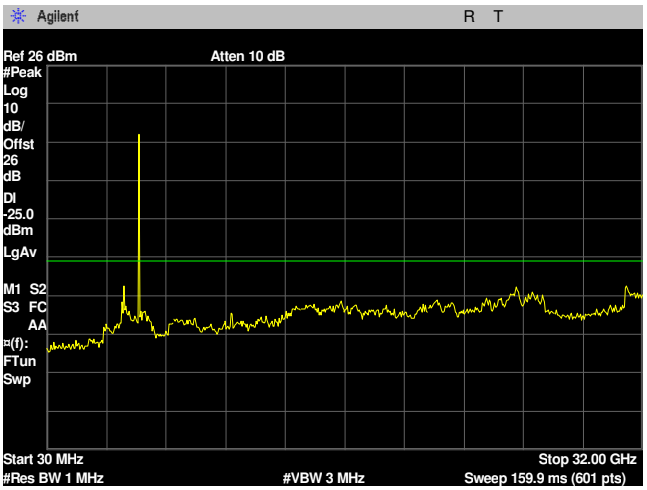
Plot 231. Conducted Spurious Emissions, 20MHz, 4950MHz, Port 2



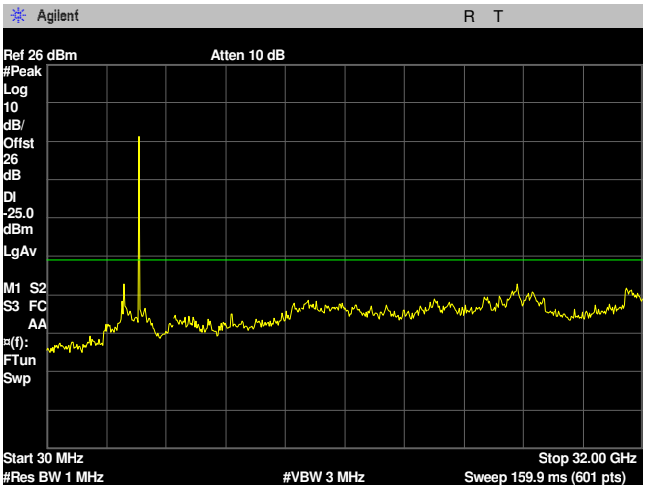
Plot 232. Conducted Spurious Emissions, 20MHz, 4965MHz, Port 1



Plot 233. Conducted Spurious Emissions, 20MHz, 4965MHz, Port 2



Plot 234. Conducted Spurious Emissions, 20MHz, 4980MHz, Port 1



Plot 235. Conducted Spurious Emissions, 20MHz, 4980MHz, Port 2

Electromagnetic Compatibility Radiated Emissions Requirements

Radiated Emissions

Test Requirement(s): **§2.1053 and §90.210**

(m) Emission Mask M. For high power transmitters (greater that 20 dBm) operating in the 4940-4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

(6) On any frequency removed from the assigned frequency between above 150% of the authorized bandwidth: 50 dB or 55 + 10 log (P) dB, whichever is the lesser attenuation.

Test Procedures: As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of TIA/EIA-603-A-2001 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 10 meter semi-anechoic chamber. The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360^0 and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated. The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10^{th} or 40GHz, which ever was the lesser, were investigated.

No peaks were found above 18 GHz.

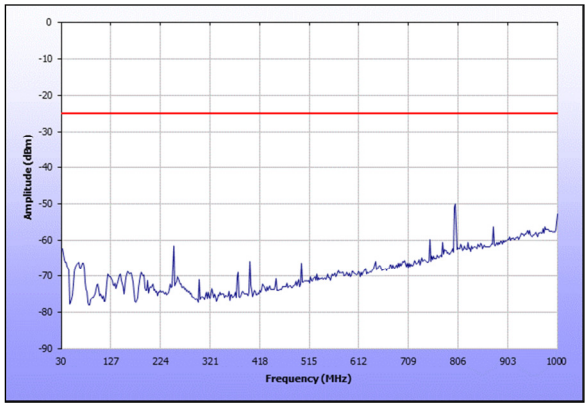
Note: only noise floor was measurable above 18GHz.

Test Results: Equipment is compliant with Section 2.1053 and 90.210.

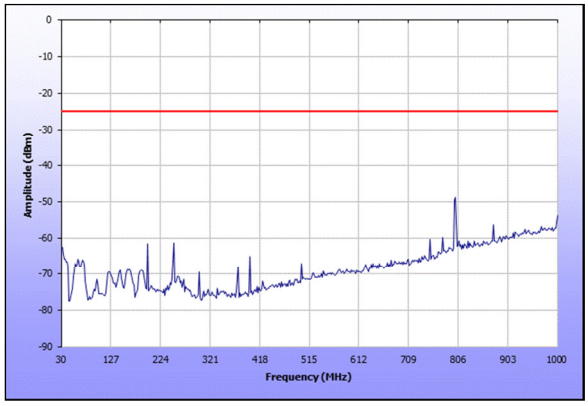
Test Engineer(s): Arsalan Hasan

Test Date(s): July 25, 2019

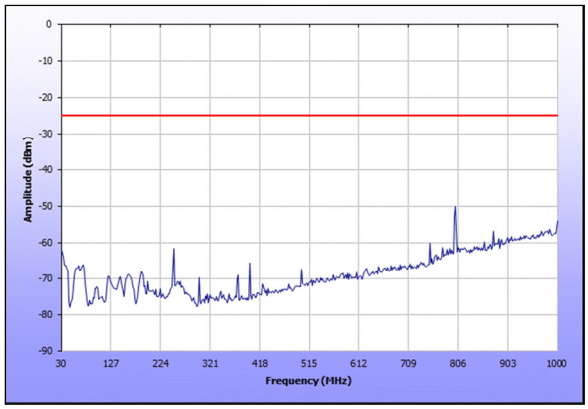
Radiated Spurious Emissions



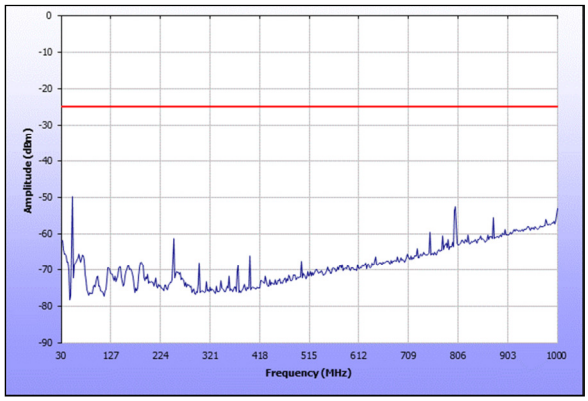
Plot 235. Radiated Spurious Emissions, 10M, High Channel, 30-1000MHz



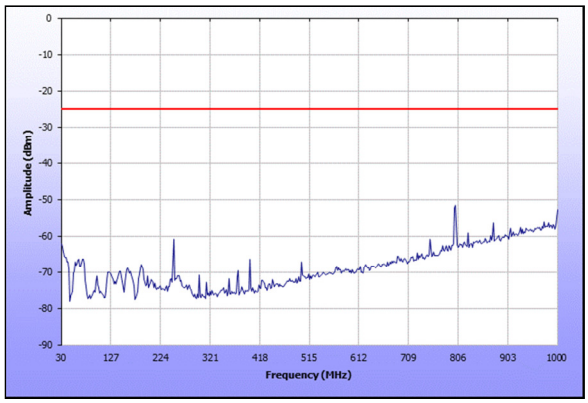
Plot 236. Radiated Spurious Emissions, 10M, low Channel, 30-1000MHz



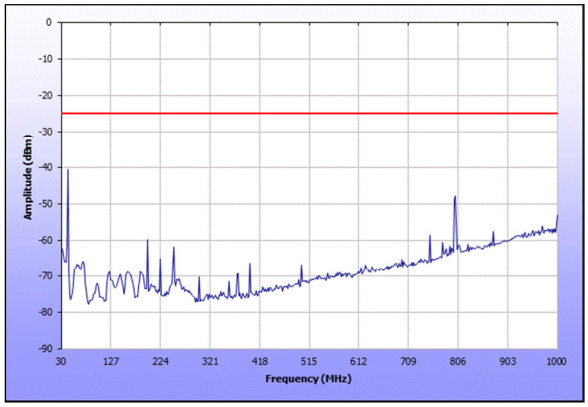
Plot 237. Radiated Spurious Emissions, 10M, mid Channel, 30-1000MHz



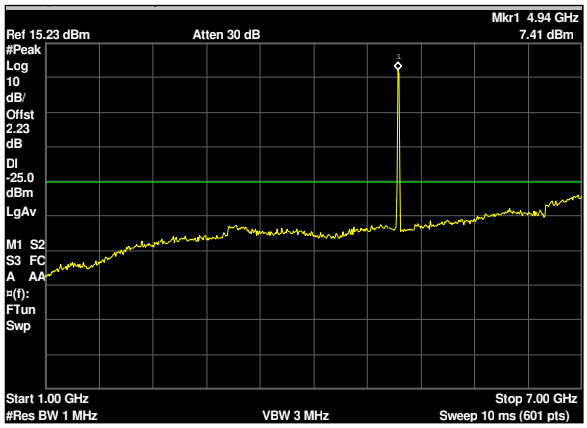
Plot238. Radiated Spurious Emissions, 20M, High Channel, 30-1000MHz



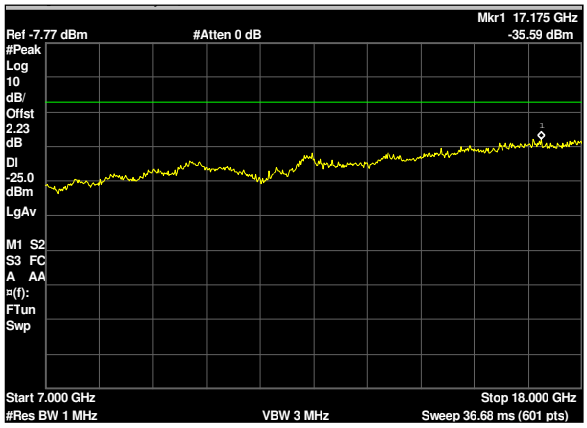
Plot239. Radiated Spurious Emissions, 20M, Low Channel, 30-1000MHz



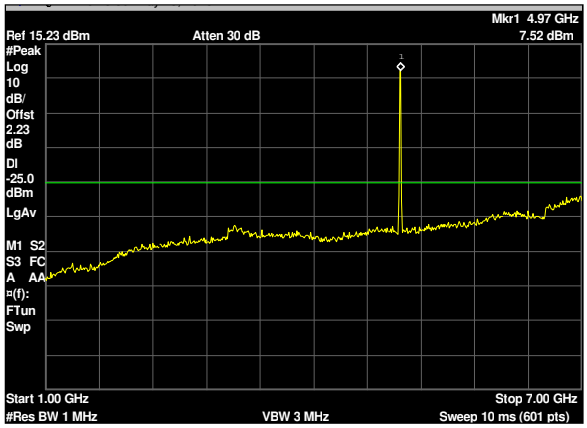
Plot240. Radiated Spurious Emissions, 20M, Mid Channel, 30-1000MHz



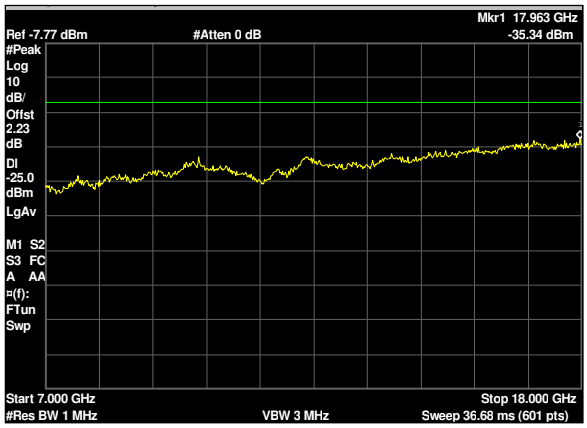
Plot241. Radiated Spurious Emissions, 10M, 4945M, 1 - 7 GHz



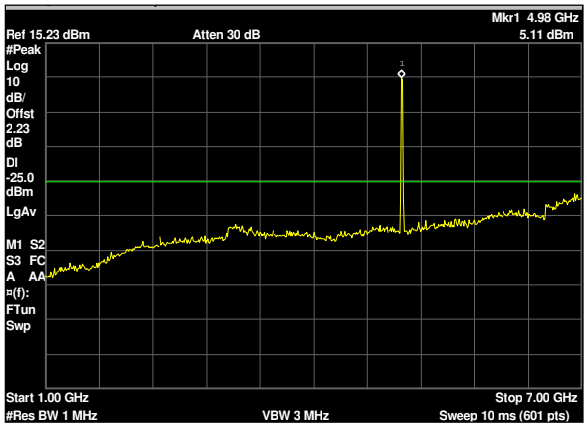
Plot242. Radiated Spurious Emissions, 10M, 4945M, 7 - 18 GHz



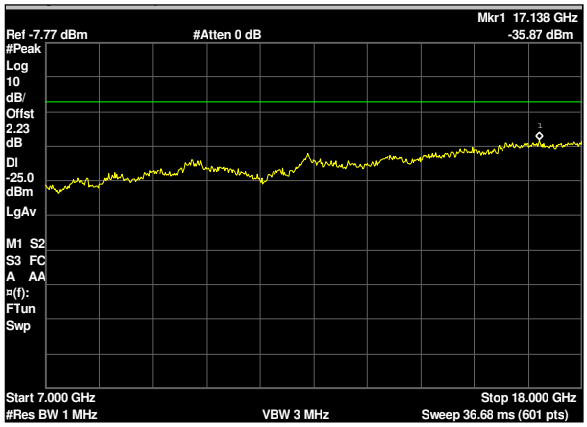
Plot243. Radiated Spurious Emissions, 10M, 4965M, 1 - 7 GHz



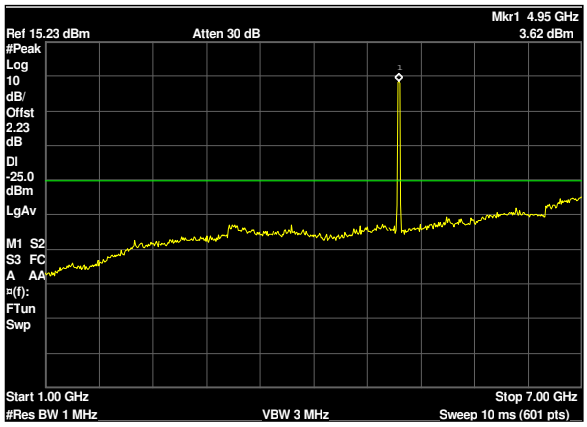
Plot244. Radiated Spurious Emissions, 10M, 4965M, 7 - 18 GHz



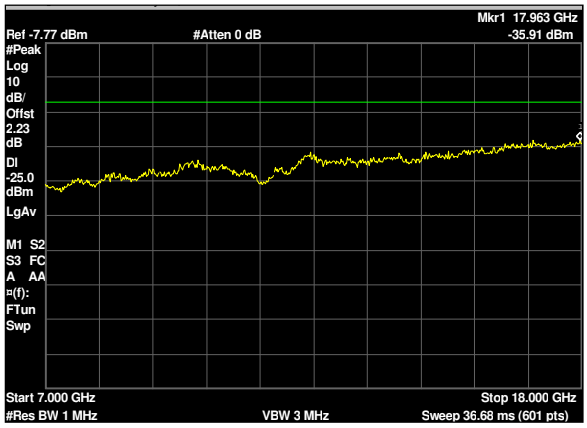
Plot245. Radiated Spurious Emissions, 10M, 4985M, 1 - 7 GHz



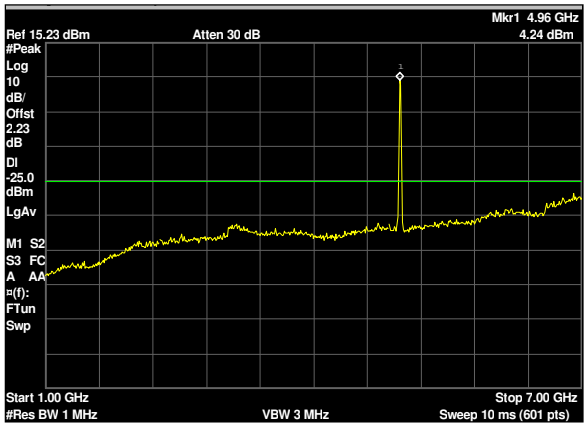
Plot246. Radiated Spurious Emissions, 10M, 4985M, 7 - 18 GHz



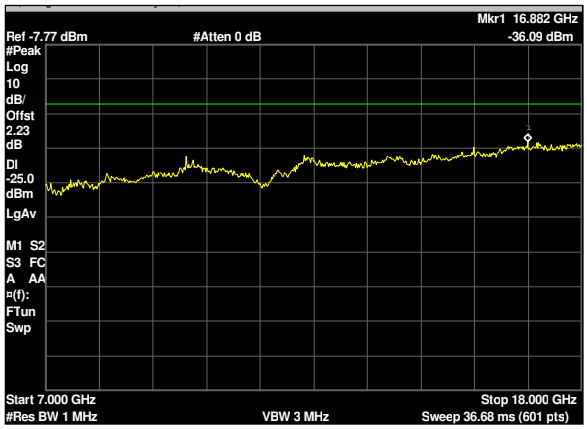
Plot247. Radiated Spurious Emissions, 20M, 4950M, 1 - 7 GHz



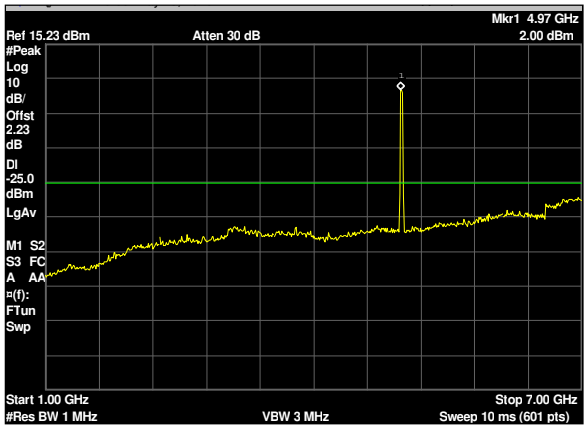
Plot248. Radiated Spurious Emissions, 20M, 4950M, 7 - 18 GHz



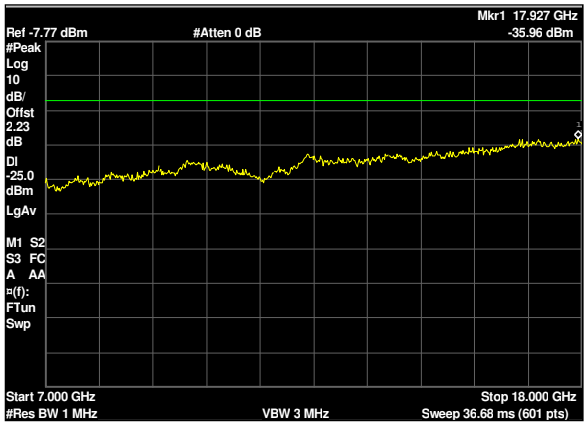
Plot249. Radiated Spurious Emissions, 20M, 4965M, 1 - 7 GHz



Plot250. Radiated Spurious Emissions, 20M, 4965M, 7 - 18 GHz



Plot251. Radiated Spurious Emissions, 20M, 4980M, 1 - 7 GHz



Plot252. Radiated Spurious Emissions, 20M, 4980M, 7 - 18 GHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§90.1215(e) Peak to Average power ratio (PAPR)

Test Requirements: **§90.1215(e):** The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

Test Procedure: The EUT was tested according to the average power integration procedures of ANSI C63.26 5.2.4.4.1. The power measurement function of spectrum analyzer was used and configured in the following manner.

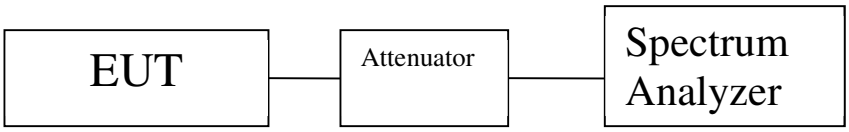
Complementary Cumulative Distribution Function (CCDF) of the spectrum analyzer was used to determine the PAPR. The 0.1% value is recorded as PAPR.

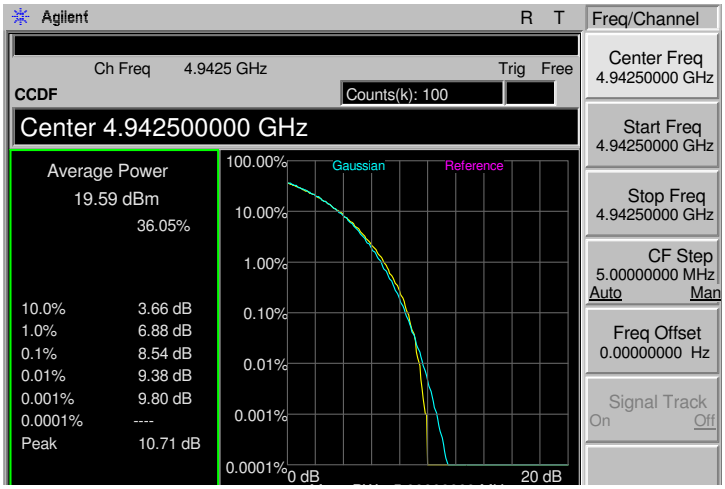
Test Results: The EUT as tested is compliant with the requirements of this section.

No anomalies detected.

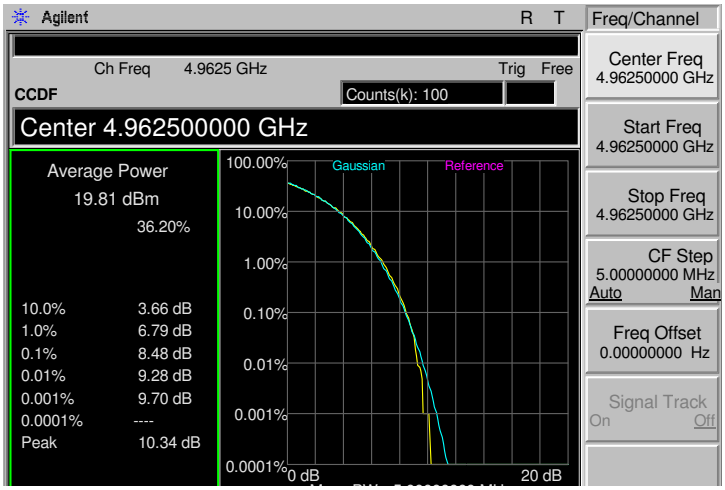
Test Engineer(s): Arsalan Hasan

Test Date(s): July 10, 2019

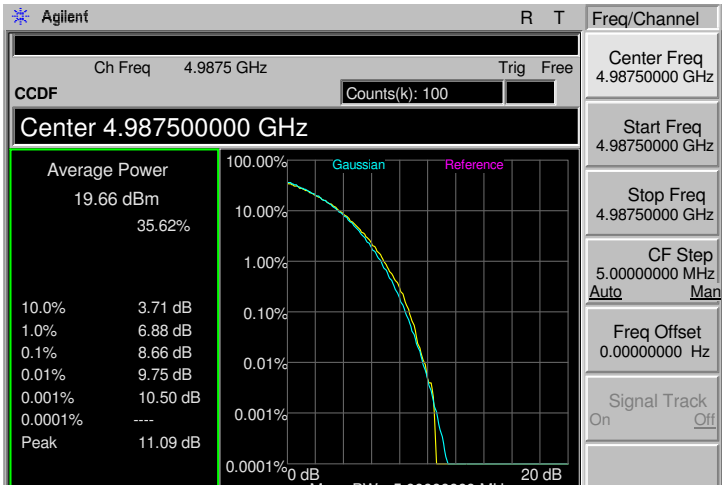




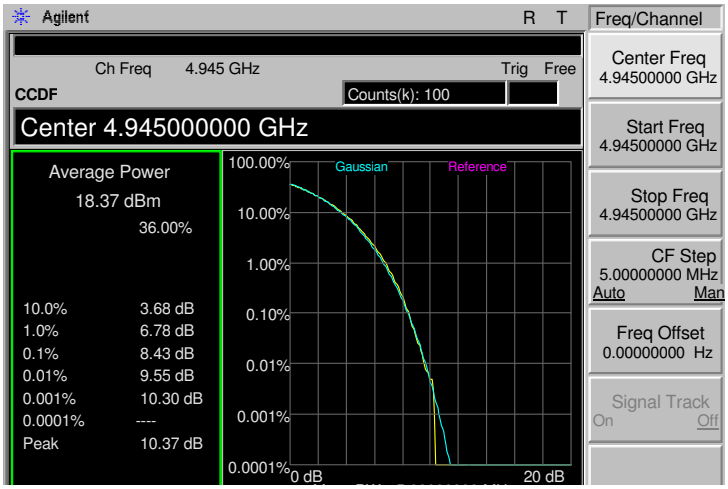
Plot 253. PAPR, 5MHz, 4942.5MHz



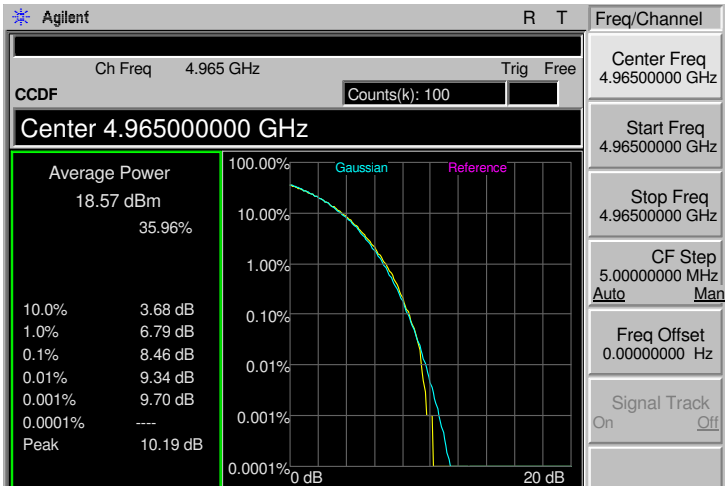
Plot 254. PAPR, 5MHz, 4962.5MHz



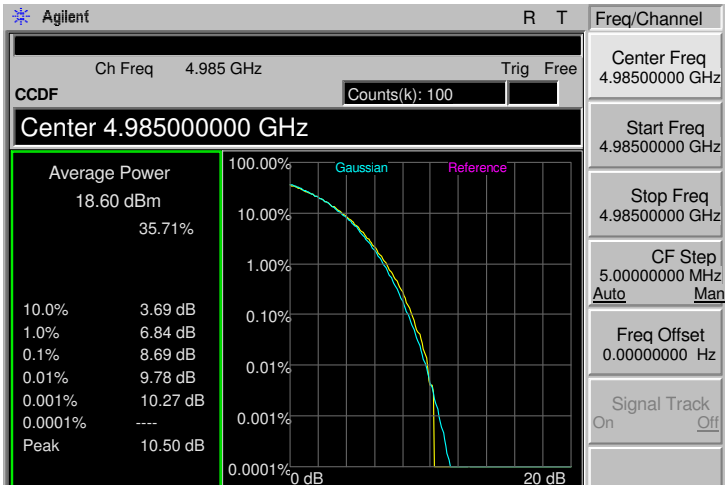
Plot 255. PAPR, 5MHz, 4987.5MHz



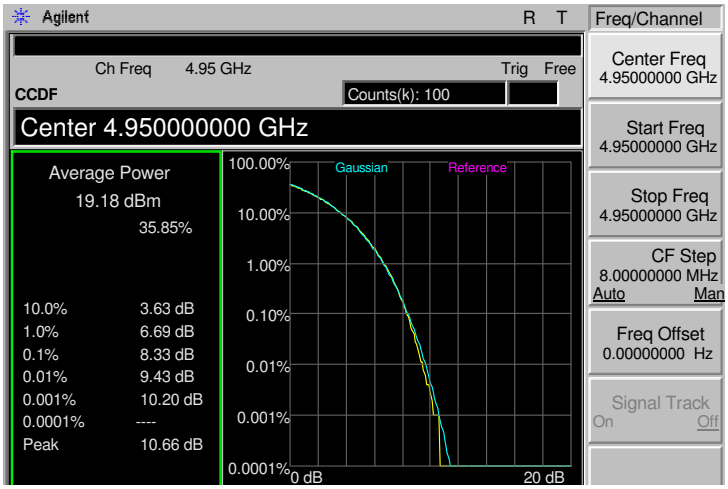
Plot 256. PAPR, 10MHz, 4945MHz



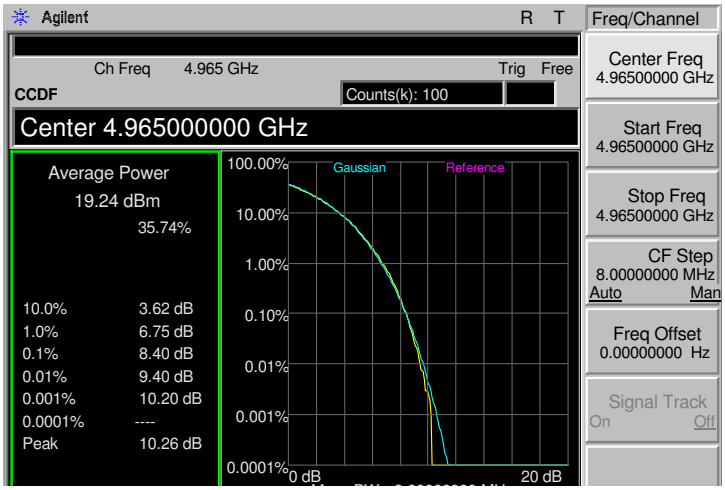
Plot 257. PAPR, 10MHz, 4965MHz



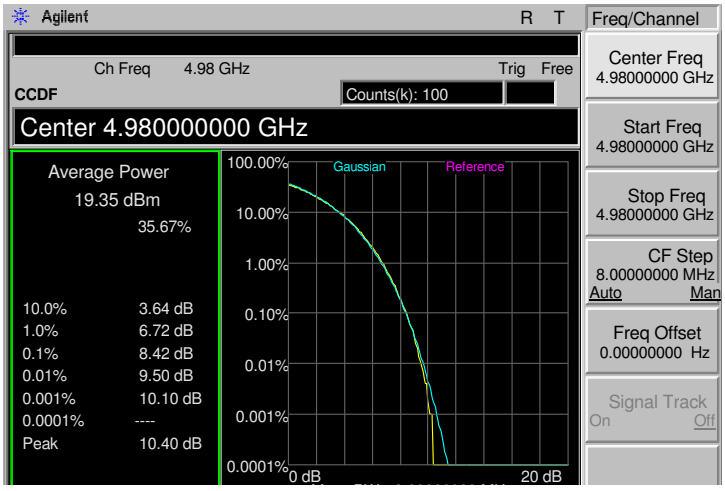
Plot 258. PAPR, 10MHz, 4985MHz



Plot 259. PAPR, 10MHz, 4950MHz



Plot 260. PAPR, 10MHz, 4965MHz



Plot 261. PAPR, 10MHz, 4980MHz

Electromagnetic Compatibility Frequency Stability Requirements

Frequency Stability

Test Requirement(s): **§2.1055 and §90.213**

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

(2) From −20° to + 50° centigrade for equipment to be licensed for use in the Maritime Services under part 80 of this chapter, except for Class A, B, and S Emergency Position Indicating Radiobeacons (EPIRBS), and equipment to be licensed for use above 952 MHz at operational fixed stations in all services, stations in the Local Television Transmission Service and Point-to-Point Microwave Radio Service under part 21 of this chapter, equipment licensed for use aboard aircraft in the Aviation Services under part 87 of this chapter, and equipment authorized for use in the Family Radio Service under part 95 of this chapter.

(3) From 0° to + 50° centigrade for equipment to be licensed for use in the Radio Broadcast Services under part 73 of this chapter.

Test Procedures: As required by 47 CFR 2.1055, *Frequency Stability measurements* were made at the RF output terminals using a Directional Coupler through a Spectrum Analyzer and Power Meter.

The EUT was placed in the Environmental Chamber and support equipments are outside the chamber on a table. The EUT was set to transmit a CW signal corresponding to the low, mid and high Channels for 5, 10, & 20MHz Bandwidths. The frequency counter option on the Spectrum Analyzer was used to measure frequency deviations. The frequency drift was investigated for every 10^{C} increment until the unit is stabilized then recorded the reading in tabular format with the temperature range of -40 to 60^{C}.

Voltage supplied to EUT is 120 VAC reference temperature was done at 20^{C}. The voltage was varied by ± 15 % of nominal.

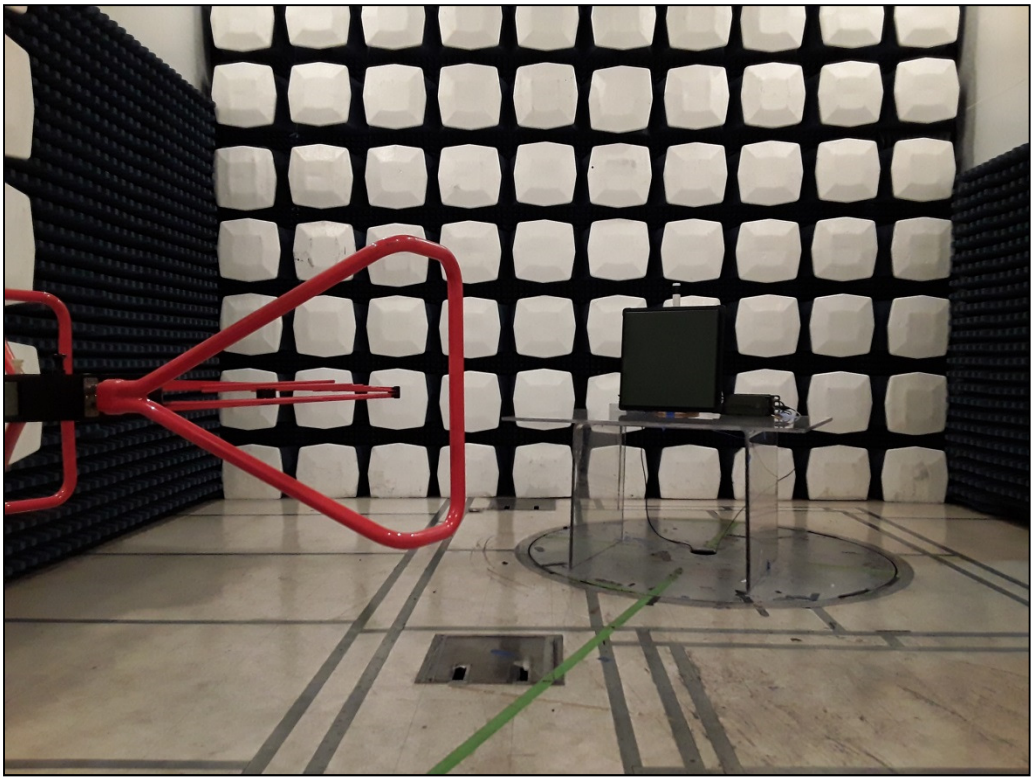
Test Results: Equipment is compliant with Section 2.1055 and 90.213.

Test Engineer(s): Arsalan Hasan

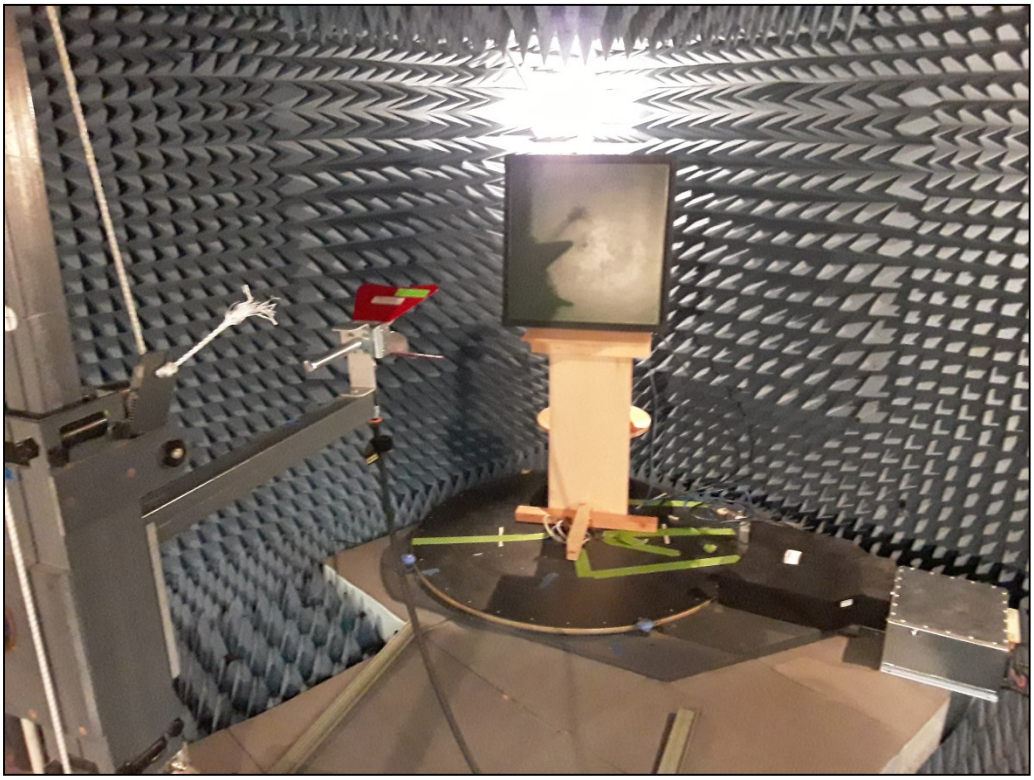
Test Date(s): Aug 1, 2019

Temperature (°C)	Frequency at Nominal Voltage (MHz)	Maximum deviation from frequency at 20°C (ppm)	Maximum deviation from frequency at 20°C (%)
Nominal frequency (MHz): 4945			
50	4945.025	8.08900	-0.00080890
40	4945.022	7.48233	-0.00074823
30	4944.992	1.41558	-0.00014156
20	4944.985	0.00000	0.00000000
10	4944.964	4.24673	0.00042467
0	4944.982	0.60668	0.00006067
-10	4944.979	1.21335	0.00012134
-20	4944.981	0.80890	0.00008089
-30	4944.975	2.02225	0.00020223

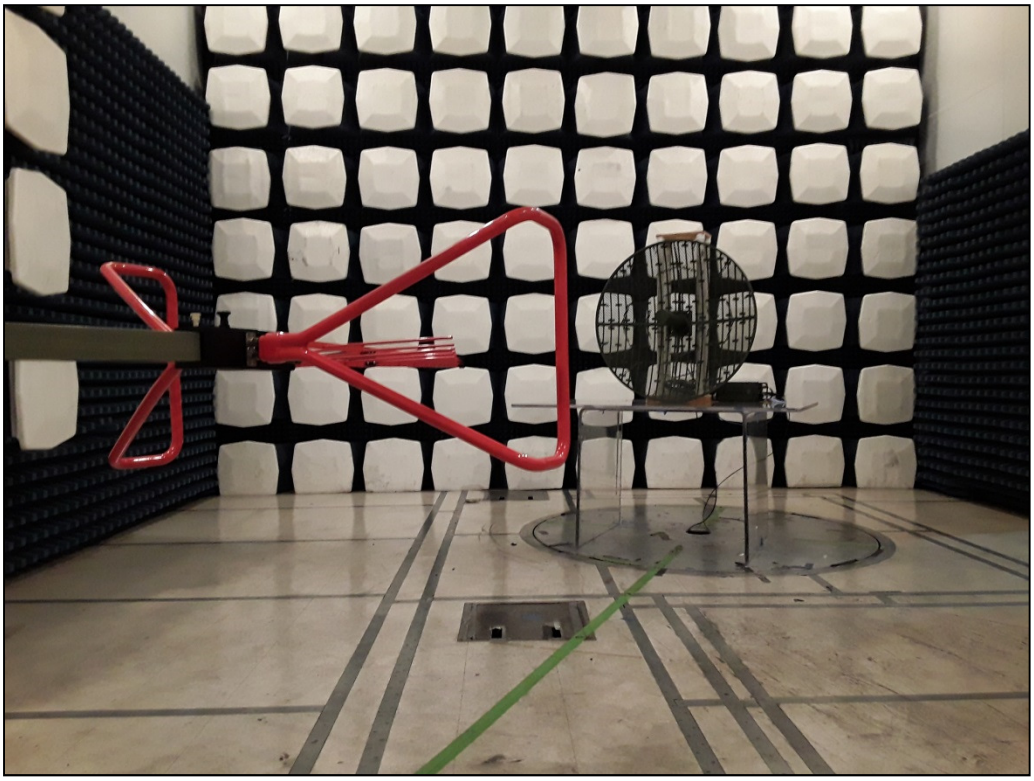
Table 21. Frequency Stability, 4980 – 20M, Test Results



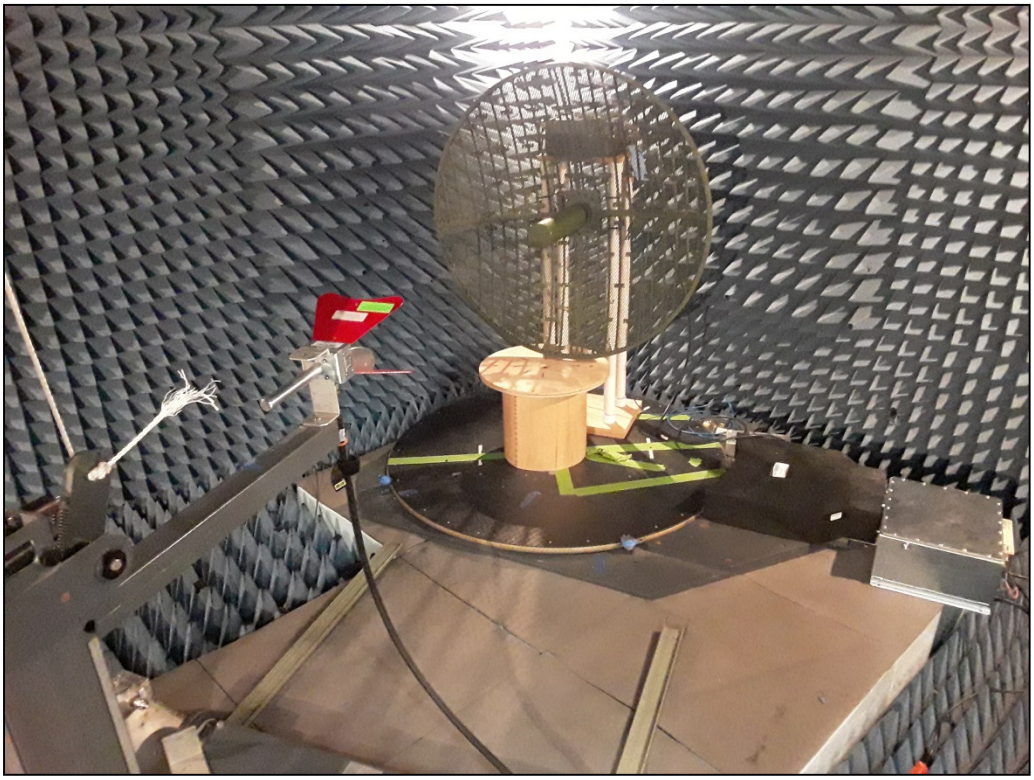
Photograph 1. Undesirable Emissions, 2' Panel below 1 GHz, Test Setup



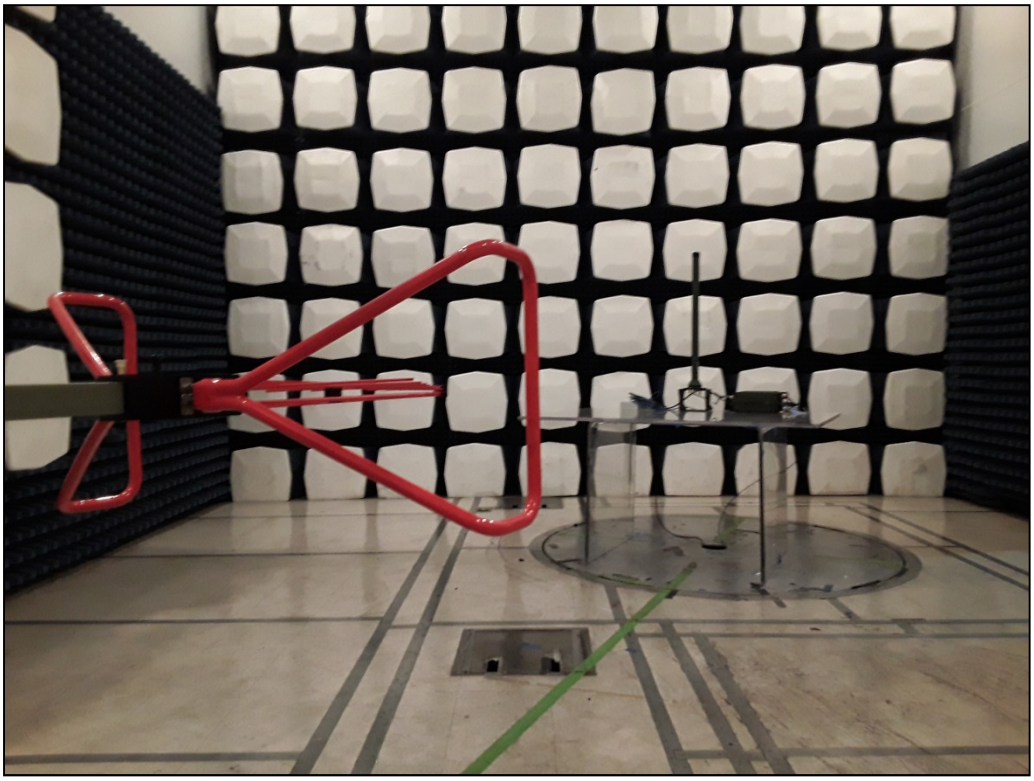
Photograph 2. Undesirable Emissions, 2' Panel above 1 GHz, Test Setup



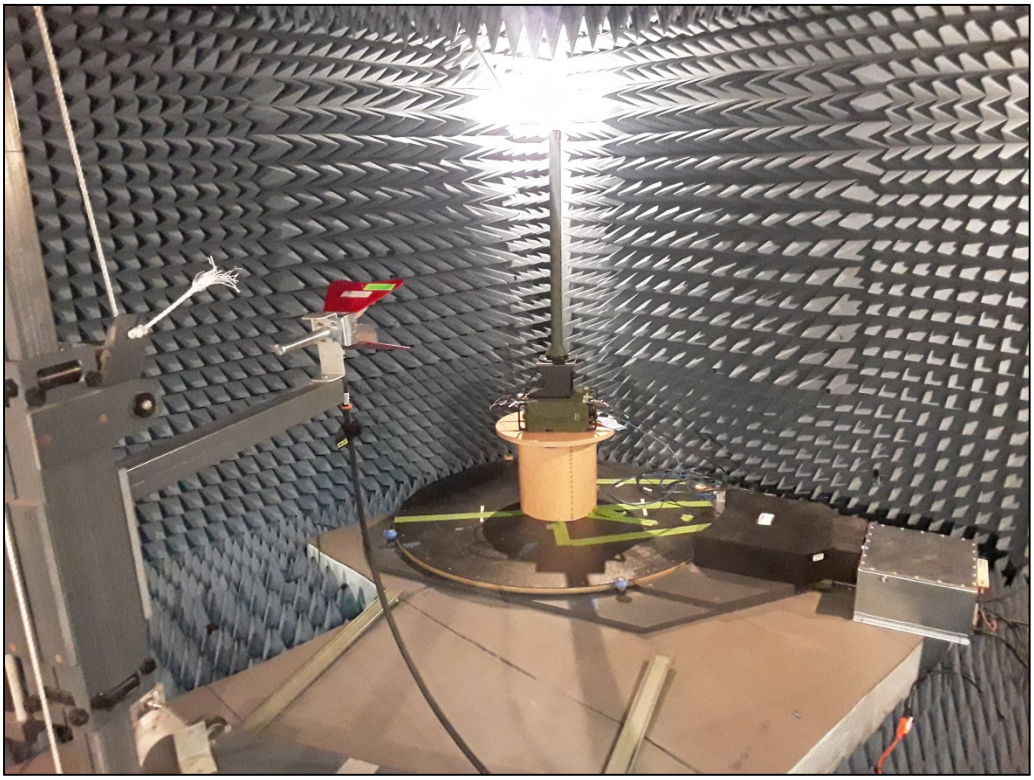
Photograph 3. Undesirable Emissions, Para below 1 GHz, Test Setup



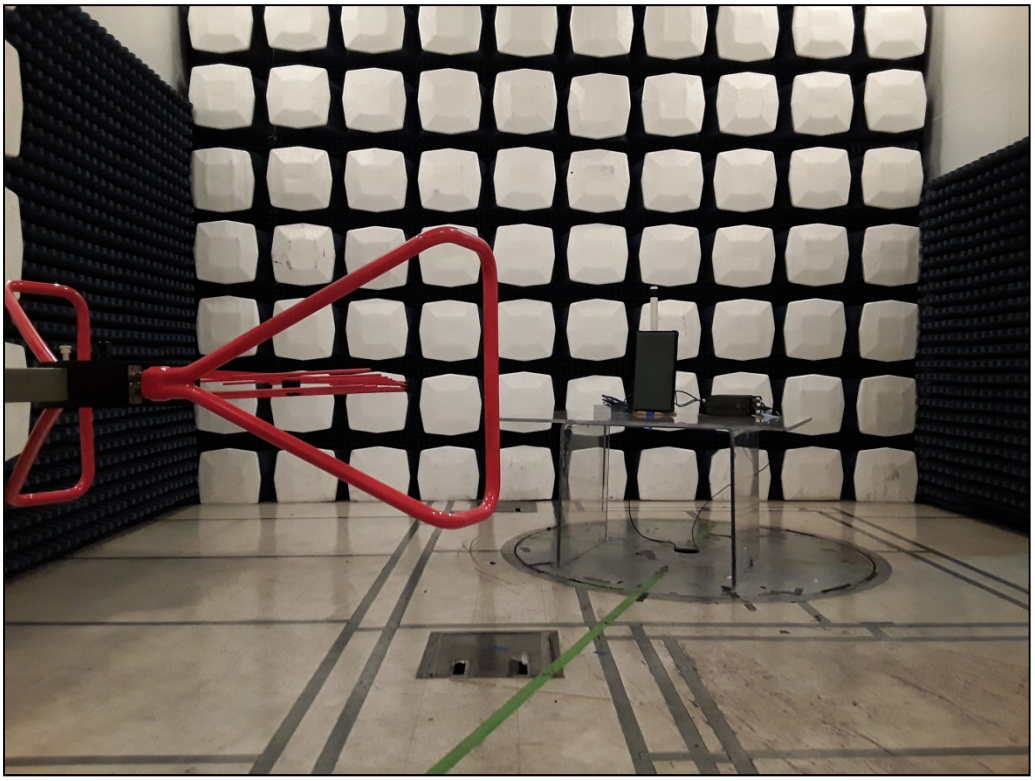
Photograph 4. Undesirable Emissions, Para above 1 GHz, Test Setup



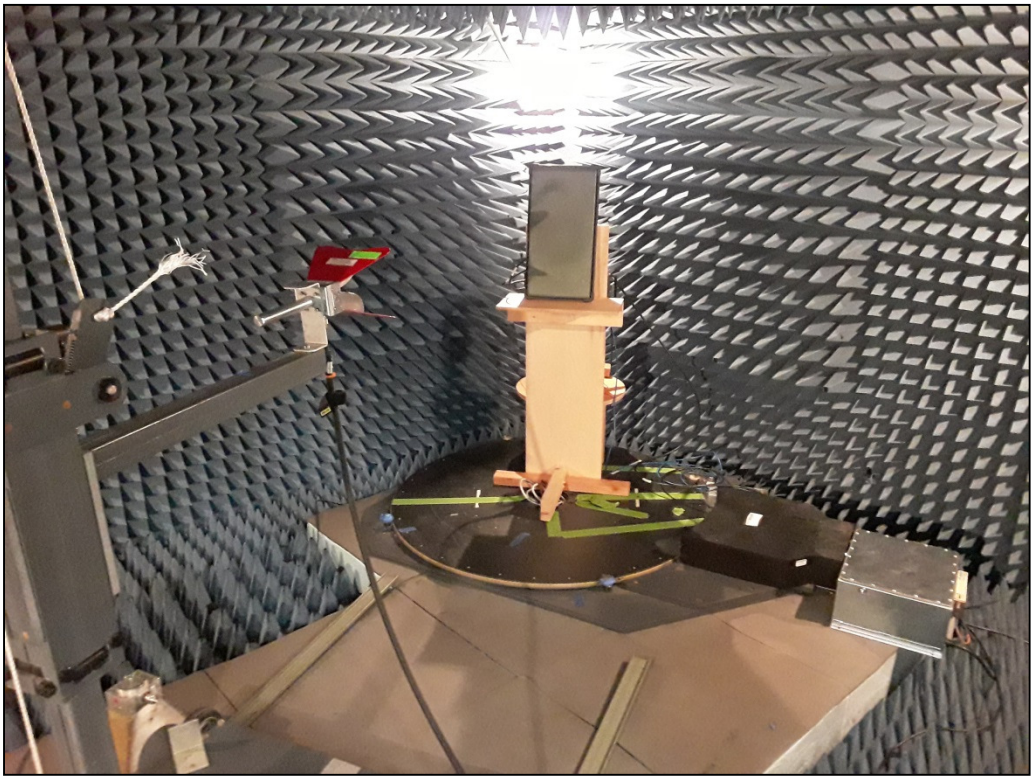
Photograph 5. Undesirable Emissions, 8 Omni below 1 GHz, Test Setup



Photograph 6. Undesirable Emissions, 8 Omni above 1 GHz, Test Setup



Photograph 7. Undesirable Emissions, 90 Sector below 1 GHz, Test Setup



Photograph 8. Undesirable Emissions, 90 Sector above 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 Ω 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 22. 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 is DC powered hence AC power conducted emissions were not applicable.

Test Engineer(s): Arsalan Hasan

Test Date(s): NA

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
1T4612	Spectrum Analyzer	Agilent Technologies	E4407B	03/30/2018	09/30/2019
1T4565	LISN (24 AMP)	Solar Electronics Company	9252-50-R-24-BNC	08/15/2019	08/15/2019
1T6658	Spectrum Analyzer	Agilent Technologies	E4407B	12/21/2018	12/21/2019
1T4771	PSA Spectrum Analyzer	Agilent Technologies	E4446A	8/10/2017	8/10/2019
1T4753	Antenna - Bilog	Sunol Sciences	JB6	10/24/2017	10/24/2019
1T4483	Antenna; Horn	ETS-Lindgren	3117	4/19/2017	10/19/2019
1T2665	Antenna; Horn	EMCO	3115	6/22/2018	12/22/2019
1T4442	Pre-amplifier, Microwave	Miteq	AFS42-01001800-30-10P	Func Verify	
1T4149	High-Frequency Anechoic Chamber	Ray Proof	81	Not Required	
1T4300	SEMI-ANECHOIC CHAMBER # 1 (NSA)	EMC TEST SYSTEMS	NONE	2/6/2018	2/6/2020

Table 23. 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

A. 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.

End of Report

