**Report No.:** DDT-R18112315-1E6

**Issued Date:** Jun. 12, 2019

# FCC AND IC CERTIFICATION TEST REPORT

## FOR

| | | |
|---|---|---|
| **Applicant** | : | Harman International Industries, Inc. |
| **Address** | : | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES |
| **Equipment under Test** | : | JBL Bar 5.1 Surround with wireless subwoofer |
| **Model No.** | : | BAR 5.1 CNTR |
| **Trade Mark** | : | JBL |
| **FCC ID** | : | APIBAR51CNTR |
| **IC** | : | 6132A-BAR51CNTR |
| **Manufacturer** | : | Harman International Industries, Inc. |
| **Address** | : | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES |


**Issued By: Dongguan Dongdian Testing Service Co., Ltd.**

**Add:** No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

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REPORT

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# TEST REPORT DECLARE

| | | |
|---|---|---|
| **Applicant** | : | Harman International Industries, Inc. |
| **Address** | : | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES |
| **Equipment under Test** | : | JBL Bar 5.1 Surround with wireless subwoofer |
| **Model No** | : | BAR 5.1 CNTR |
| **Trade Mark** | : | JBL |
| **Manufacturer** | : | Harman International Industries, Inc. |
| **Address** | : | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES |

**Test Standard Used:** FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 2 February 2017.

**Test procedure used:** ANSI C63.10:2013, RSS-Gen Issue 5, Apr. 2018, 558074 D01 15.247 Meas Guidance v05r02, 662911 D01 Multiple Transmitter Output v02r01

**We Declare:**

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

**After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC&IC standards.**

| | | | |
|---|---|---|---|
| **Report No:** | DDT-R18112315-1E6 | | |
| **Date of Receipt:** | Apr. 01, 2019 | **Date of Test:** | Apr. 01, 2019 ~ Jun. 12, 2019 |

***Prepared By:*** ***Approved By:***

Sam Li Damon Hu

***Sam Li/Engineer*** ***Damon Hu/EMC Manager***

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

# Revision history

| Rev. | Revisions | Issue Date | Revised By |
|---|---|---|---|
| --- | Initial issue | Jun. 12, 2019 | |
| | | | |

# 1. Summary of test results

| The EUT have been tested according to the applicable standards as referenced below. | | |
|---|---|---|
| **Description of Test Item** | **Standard** | **Results** |
| 6dB Bandwidth and 99% Bandwidth | FCC 15.247 (a) (2)<br>RSS-247 Clause 5.2 (a) | PASS |
| Conducted Output Power | FCC 15.247 (b) (3)<br>RSS-247 Clause 5.4 (e) | PASS |
| Power Spectral Density | FCC 15.247 (e)<br>RSS-247 Clause 5.2 (b) | PASS |
| Band-edge and Spurious Emissions (Conducted) | FCC 15.247 (d)<br>RSS-247 Clause 5.5 | PASS |
| Radiated Spurious Emissions | FCC 15.247 (d)<br>FCC 15.209<br>FCC 15.205<br>RSS-247 Clause 5.5<br>RSS-GEN Clause 8.9 | PASS |
| Radiated Band Edge Compliance | FCC 15.247 (d)<br>FCC 15.209<br>FCC 15.205<br>RSS-247 Clause 5.5<br>RSS-GEN Clause 8.9 | PASS |
| Power Line Conducted Emission | FCC 15.207<br>RSS-GEN Clause 8.8 | PASS |
| Antenna requirement | FCC 15.203<br>RSS-GEN Clause 8.3 | PASS |

# 2. General test information

## 2.1. Description of EUT

| | | |
|---|---|---|
| EUT* Name | : | JBL Bar 5.1 Surround with wireless subwoofer |
| Model Number | : | BAR 5.1 CNTR |
| EUT function description | : | Please reference user manual of this device |
| Power supply | : | 100-240V~, 50/60Hz, 175W |
| Radio Technology | : | IEEE 802.11b/g/n |
| FCC Operation frequency | : | IEEE 802.11b: 2412MHz-2462MHz<br>IEEE 802.11g: 2412MHz-2462MHz<br>IEEE 802.11n HT20: 2412MHz-2462MHz<br>IEEE 802.11n HT40: 2422MHz-2452MHz |
| Modulation | : | IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)<br>IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)<br>IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK) |
| Transmitter rate | : | IEEE 802.11b: 1, 2, 5.5, 11 Mbps<br>IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>IEEE 802.11n HT20: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps<br>IEEE 802.11n HT40: 13.5, 27, 40.5, 54, 81, 108, 121.5, 135 Mbps |
| Antenna Type | : | Antenna 1: External FPC antenna, maximum PK gain: 2.97 dBi<br>Antenna 2: External FPC antenna, maximum PK gain: 2.36 dBi |
| Sample Type | : | Series production |

Note: EUT is the ab. of equipment under test.

| Antenna information | | | |
|---|---|---|---|
| | Ant1 gain | Ant2 gain | MIMO |
| IEEE 802.11b | 2.97 | 2.36 | / |
| IEEE 802.11g | 2.97 | 2.36 | / |
| IEEE 802.11n HT20 | 2.97 | 2.36 | 5.69 |
| IEEE 802.11n HT40 | 2.97 | 2.36 | 5.69 |

| Channel information | | | | | |
|---|---|---|---|---|---|
| CH | Frequency (MHz) | CH | Frequency (MHz) | CH | Frequency (MHz) |
| 1 | 2412 | 5 | 2432 | 9 | 2452 |
| 2 | 2417 | 6 | 2437 | 10 | 2457 |
| 3 | 2422 | 7 | 2442 | 11 | 2462 |
| 4 | 2427 | 8 | 2447 | / | / |

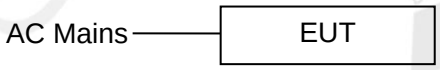
## 2.2. Accessories of EUT

| Description of Accessories | Manufacturer | Model number | Serial No. | Other |
|---|---|---|---|---|
| AC cable | Harman | N/A | N/A | Length: 1.5m, unshielded |
| HDMI cable | Harman | N/A | N/A | Length: 1.2m, shielded, two core |

## 2.3. Assistant equipment used for test

| Assistant equipment | Manufacturer | Model number | EMC Compliance | SN |
|---|---|---|---|---|
| Notebook | DELL | Latitude D610 | FCC DOC | 00045-534-136-300 |

## 2.4. Block diagram of EUT configuration for test




EUT was connected to control to provide by manufacturer which has a standard LAN PORT connector to connect to Notebook, and the Notebook will run a special test software “adb.EXE” provided by manufacturer to control EUT work in Continuous Tx mode (>98% duty cycle), and select test channel, wireless mode and data rate.

| Tested mode, channel, and data rate information | | | | |
|---|---|---|---|---|
| Mode | Setting Tx Power | data rate (Mbps) (see Note) | Channel | Frequency (MHz) |
| IEEE 802.11b | / | 11 | LCH: CH1 | 2412 |
| | / | 11 | MCH: CH6 | 2437 |
| | / | 11 | HCH: CH11 | 2462 |
| IEEE 802.11g | / | 54 | LCH: CH1 | 2412 |
| | / | 54 | MCH: CH6 | 2437 |
| | / | 54 | HCH: CH11 | 2462 |
| IEEE 802.11n HT20 | 15 | MCS 7 | LCH: CH1 | 2412 |
| | 15 | MCS 7 | MCH: CH6 | 2437 |
| | 15 | MCS 7 | HCH: CH11 | 2462 |
| IEEE 802.11n HT40 | 13 | MCS 7 | LCH: CH3 | 2422 |
| | 13 | MCS 7 | MCH: CH6 | 2437 |
| | 13 | MCS 7 | HCH: CH9 | 2452 |
| Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test. | | | | |

## 2.5. Deviations of test standard

No Deviation

## 2.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|---|---|
| Temperature range: | 21-25℃ |
| Humidity range: | 40-75% |
| Pressure range: | 86-106kPa |

## 2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel: +86-0769-38826678, http://www.dgddt.com, Email: ddt@dgddt.com

CNAS Accreditation No. L6451; A2LA Accreditation No. 3870.01

Designation Number: CN1182; Test Firm Registration Number: 540522

Industry Canada site registration number: 10288A-1

## 2.8. Measurement uncertainty

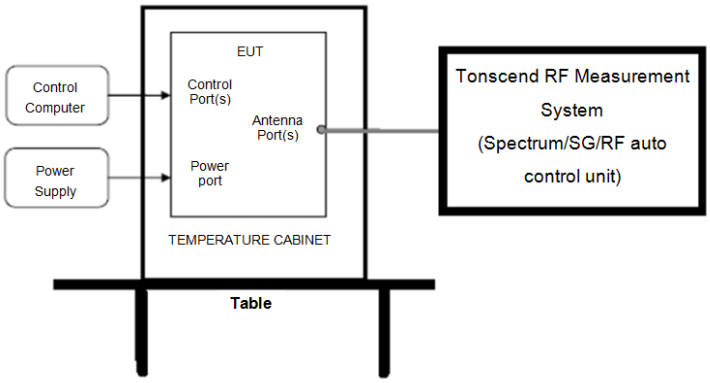
| Test Item | Uncertainty |
|---|---|
| Bandwidth | 1.1% |
| Peak Output Power (Conducted) (Spectrum analyzer) | 0.86 dB (10 MHz ≤ f < 3.6 GHz); |
| | 1.38 dB (3.6 GHz ≤ f < 8 GHz) |
| Peak Output Power (Conducted) (Power Sensor) | 0.74 dB |
| Power Spectral Density | 0.74 dB (10 MHz ≤ f < 3.6 GHz); |
| | 1.38 dB (3.6 GHz ≤ f < 8 GHz) |
| Frequencies Stability | 6.7 x $10^{-8}$ (Antenna couple method) |
| | 5.5 x $10^{-8}$ (Conducted method) |
| Conducted spurious emissions | 0.86 dB (10 MHz ≤ f < 3.6 GHz); |
| | 1.40 dB (3.6 GHz ≤ f < 8 GHz) |
| | 1.66 dB (8 GHz≤ f < 22 GHz) |
| Uncertainty for radio frequency (RBW<20 kHz) | $3\times10^{-8}$ |
| Temperature | 0.4℃ |
| Humidity | 2% |
| Uncertainty for Radiation Emission test (30 MHz-1 GHz) | 4.70 dB (Antenna Polarize: V) |
| | 4.84 dB (Antenna Polarize: H) |
| Uncertainty for Radiation Emission test (1 GHz-40 GHz) | 4.10 dB (1-6 GHz) |
| | 4.40 dB (6 GHz-18 GHz) |
| | 3.54 dB (18 GHz-26 GHz) |
| | 4.30 dB (26 GHz-40 GHz) |
| Uncertainty for Power line conduction emission test | 3.32 dB (150 kHz-30 MHz) |
| Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2. | |

## 3. Equipment used during test

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|
| **RF Connected Test (Tonscend RF Measurement System)** | | | | | |
| Spectrum analyzer | R&S | FSU26 | 200071 | Oct. 12, 2018 | 1 Year |
| Wideband Radio Communication tester | R&S | CMW500 | 117491 | Jun. 29, 2018 | 1 Year |
| Vector Signal Generator | Agilent | E8267D | US49060192 | Oct. 12, 2018 | 1 Year |
| Vector Signal Generator | Agilent | N5182A | MY48180737 | Jun. 29, 2018 | 1 Year |
| Power Sensor | Agilent | U2021XA | MY55150010 | Oct. 21, 2018 | 1 Year |
| Power Sensor | Agilent | U2021XA | MY55150011 | Oct. 23, 2018 | 1 Year |
| DC Power Source | MATRIS | MPS-3005L-3 | D813058W | Aug. 18, 2018 | 1 Year |
| Attenuator | Mini-Circuits | BW-S10W2 | 101109 | Aug. 18, 2018 | 1 Year |
| RF Cable | Micable | C10-01-01-1 | 100309 | Oct. 21, 2018 | 1 Year |
| Temp&Humi Programmable | ZHIXIANG | ZXGDJS-150L | ZX170110-A | Oct. 21, 2018 | 1 Year |
| Test Software | JS Tonscend | JS1120-3 | Ver.2.7 | N/A | N/A |
| **Radiation 1#chamber** | | | | | |
| EMI Test Receiver | R&S | ESU8 | 100316 | Oct. 12, 2018 | 1 Year |
| Spectrum analyzer | Agilent | E4447A | MY50180031 | Jun. 29, 2018 | 1 Year |
| Trilog Broadband Antenna | Schwarzbeck | VULB9163 | 9163-462 | Nov. 09, 2018 | 1 Year |
| Active Loop antenna | Schwarzbeck | FMZB-1519 | 1519-038 | Oct. 20, 2018 | 1 Year |
| Double Ridged Horn Antenna | R&S | HF907 | 100276 | Nov. 16, 2018 | 1 Year |
| Broad Band Horn Antenna | Schwarzbeck | BBHA 9170 | 790 | Oct. 25, 2018 | 1 Year |
| Pre-amplifier | A.H. | PAM-0118 | 360 | Oct. 12, 2018 | 1 Year |
| Pre-amplifier | TERA-MW | TRLA-0040 G35 | 101303 | Oct. 12, 2018 | 1 Year |
| RF Cable | HUBSER | CP-X2+ CP-X1 | W11.03+ W12.02 | Oct. 21, 2018 | 1 Year |
| RF Cable | N/A | SMAJ-SMA J-1M+ 11M | 17070133+17070131 | Nov. 08, 2018 | 1 Year |
| MI Cable | HUBSER | C10-01-01-1 M | 1091629 | Oct. 21, 2018 | 1 Year |
| Test software | Audix | E3 | V 6.11111b | N/A | N/A |
| **Power Line Conducted Emissions Test** | | | | | |
| EMI Test Receiver | R&S | ESU8 | 100316 | Oct. 21, 2018 | 1 Year |
| LISN 1 | R&S | ENV216 | 101109 | Oct. 21, 2018 | 1 Year |
| LISN 2 | R&S | ESH2-Z5 | 100309 | Oct. 21, 2018 | 1 Year |
| Pulse Limiter | R&S | ESH3-Z2 | 101242 | Oct. 21, 2018 | 1 Year |
| CE Cable 1 | HUBSER | N/A | W10.01 | Oct. 21, 2018 | 1 Year |
| Test software | Audix | E3 | V 6.11111b | N/A | N/A |

# 4. 6dB Bandwidth and 99% Bandwidth

## 4.1. Block diagram of test setup




## 4.2. Limits

For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz

## 4.3. Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) 99% Bandwidth set the spectrum analyzer as follows:

| | |
|---|---|
| RBW: | 300 kHz |
| VBW: | 1 MHz |
| Detector Mode: | Peak |
| Sweep time: | auto |
| Trace mode | Max hold |

(3) 6dB Bandwidth set the spectrum analyzer as follows:

| | |
|---|---|
| RBW: | 100 kHz |
| VBW: | 300 kHz |
| Detector Mode: | Peak |
| Sweep time: | auto |
| Trace mode | Max hold |

(4) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

## 4.4. Test Result

| Test Mode | Test | Ant | 6dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|---|---|---|---|---|---|
| 11B | 2412 | Ant1 | 9.120 | 0.5 | PASS |

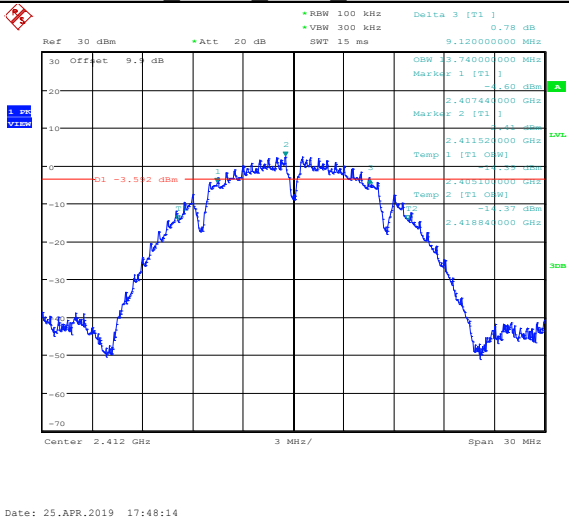
| | | | | | |
|---|---|---|---|---|---|
| 11B | 2412 | Ant2 | 9.150 | 0.5 | PASS |
| 11B | 2437 | Ant1 | 9.090 | 0.5 | PASS |
| 11B | 2437 | Ant2 | 9.120 | 0.5 | PASS |
| 11B | 2462 | Ant1 | 9.090 | 0.5 | PASS |
| 11B | 2462 | Ant2 | 9.120 | 0.5 | PASS |
| 11G | 2412 | Ant1 | 15.150 | 0.5 | PASS |
| 11G | 2412 | Ant2 | 15.480 | 0.5 | PASS |
| 11G | 2437 | Ant1 | 15.090 | 0.5 | PASS |
| 11G | 2437 | Ant2 | 15.180 | 0.5 | PASS |
| 11G | 2462 | Ant1 | 15.030 | 0.5 | PASS |
| 11G | 2462 | Ant2 | 15.390 | 0.5 | PASS |
| 11N20MIMO | 2412 | Ant1 | 15.030 | 0.5 | PASS |
| 11N20MIMO | 2412 | Ant2 | 16.320 | 0.5 | PASS |
| 11N20MIMO | 2437 | Ant1 | 15.030 | 0.5 | PASS |
| 11N20MIMO | 2437 | Ant2 | 15.150 | 0.5 | PASS |
| 11N20MIMO | 2462 | Ant1 | 15.120 | 0.5 | PASS |
| 11N20MIMO | 2462 | Ant2 | 15.750 | 0.5 | PASS |
| 11N40MIMO | 2422 | Ant1 | 35.220 | 0.5 | PASS |
| 11N40MIMO | 2422 | Ant2 | 35.220 | 0.5 | PASS |
| 11N40MIMO | 2437 | Ant1 | 35.160 | 0.5 | PASS |
| 11N40MIMO | 2437 | Ant2 | 33.960 | 0.5 | PASS |
| 11N40MIMO | 2452 | Ant1 | 35.160 | 0.5 | PASS |
| 11N40MIMO | 2452 | Ant2 | 35.220 | 0.5 | PASS |

| Test Mode | Test | Ant | 99% OBW [MHz] | Limit [MHz] | Verdict |
|---|---|---|---|---|---|
| 11B | 2412 | Ant1 | 13.27 | --- | PASS |
| 11B | 2412 | Ant2 | 13.37 | --- | PASS |
| 11B | 2437 | Ant1 | 13.27 | --- | PASS |
| 11B | 2437 | Ant2 | 13.37 | --- | PASS |
| 11B | 2462 | Ant1 | 13.27 | --- | PASS |
| 11B | 2462 | Ant2 | 13.46 | --- | PASS |
| 11G | 2412 | Ant1 | 16.63 | --- | PASS |
| 11G | 2412 | Ant2 | 16.63 | --- | PASS |
| 11G | 2437 | Ant1 | 16.59 | --- | PASS |
| 11G | 2437 | Ant2 | 16.54 | --- | PASS |
| 11G | 2462 | Ant1 | 16.63 | --- | PASS |
| 11G | 2462 | Ant2 | 16.63 | --- | PASS |
| 11N20MIMO | 2412 | Ant1 | 17.74 | --- | PASS |
| 11N20MIMO | 2412 | Ant2 | 17.74 | --- | PASS |

| | | | | | |
|---|---|---|---|---|---|
| 11N20MIMO | 2437 | Ant1 | 17.74 | --- | PASS |
| 11N20MIMO | 2437 | Ant2 | 17.74 | --- | PASS |
| 11N20MIMO | 2462 | Ant1 | 17.74 | --- | PASS |
| 11N20MIMO | 2462 | Ant2 | 17.74 | --- | PASS |
| 11N40MIMO | 2422 | Ant1 | 36.54 | --- | PASS |
| 11N40MIMO | 2422 | Ant2 | 36.44 | --- | PASS |
| 11N40MIMO | 2437 | Ant1 | 36.44 | --- | PASS |
| 11N40MIMO | 2437 | Ant2 | 36.54 | --- | PASS |
| 11N40MIMO | 2452 | Ant1 | 36.35 | --- | PASS |
| 11N40MIMO | 2452 | Ant2 | 36.54 | --- | PASS |

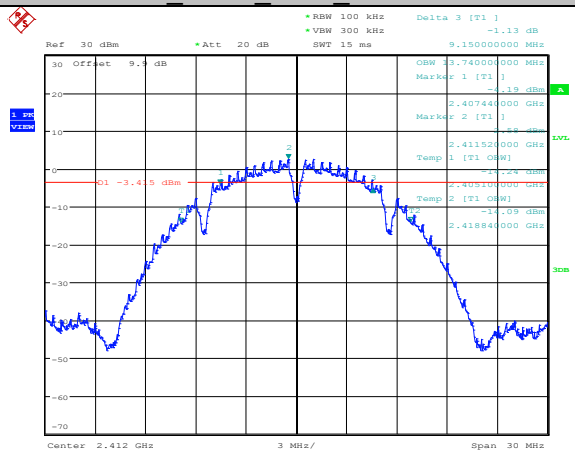
## 4.5. original test data

11B_ANT1_2412_6dB Bandwidth



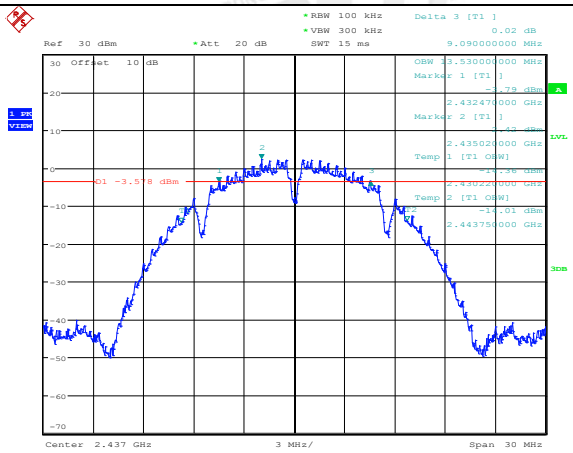

Date: 25.APR.2019 17:48:14

11B_ANT2_2412_6dB Bandwidth

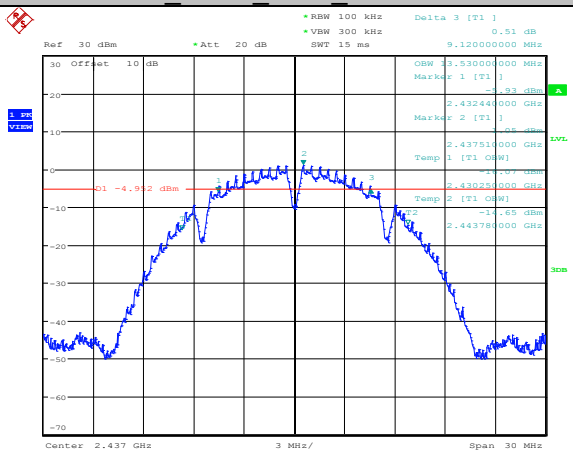



Date: 25.APR.2019 17:51:37

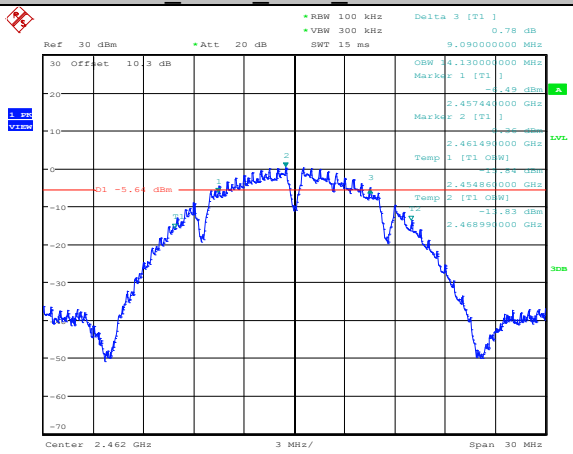
11B_ANT1_2437_6dB Bandwidth



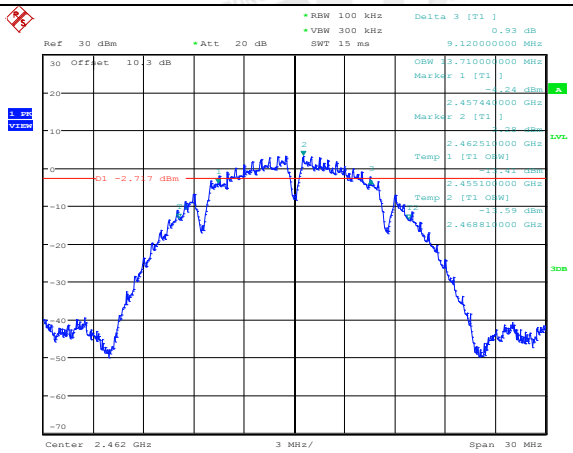

11B_ANT2_2437_6dB Bandwidth



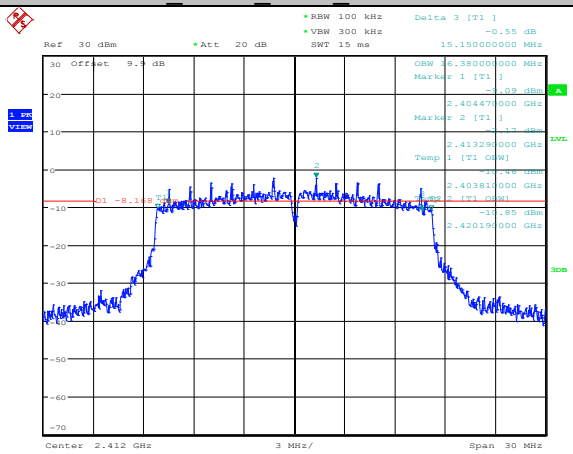

11B_ANT1_2462_6dB Bandwidth



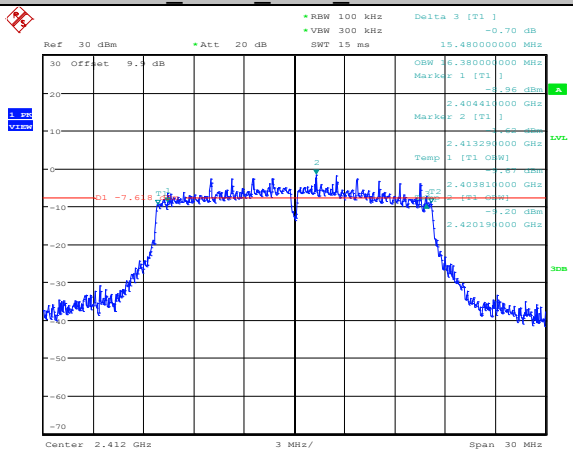

11B_ANT2_2462_6dB Bandwidth



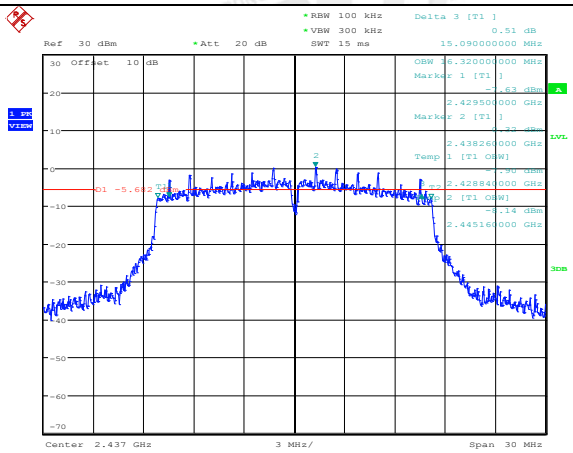

## 11G_ANT1_2412_6dB Bandwidth




## 11G_ANT2_2412_6dB Bandwidth




## 11G_ANT1_2437_6dB Bandwidth

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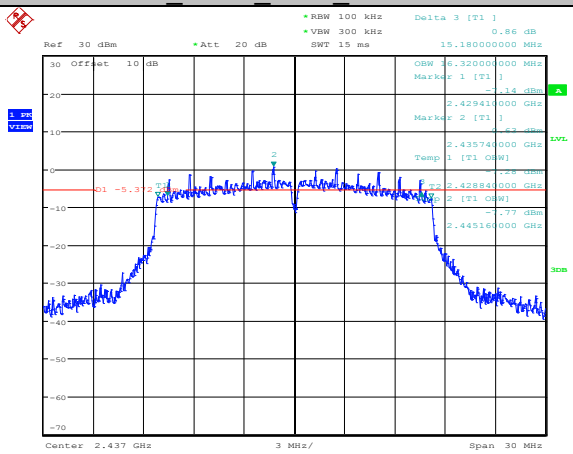


Date: 25.APR.2019 18:24:24

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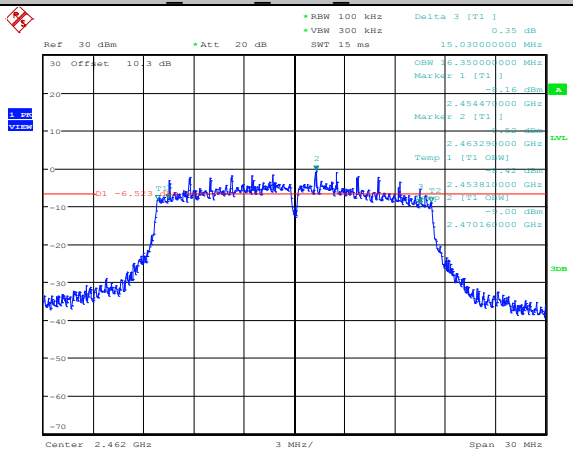


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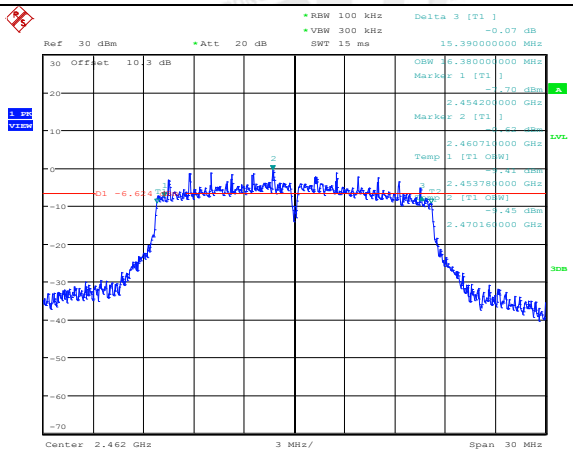


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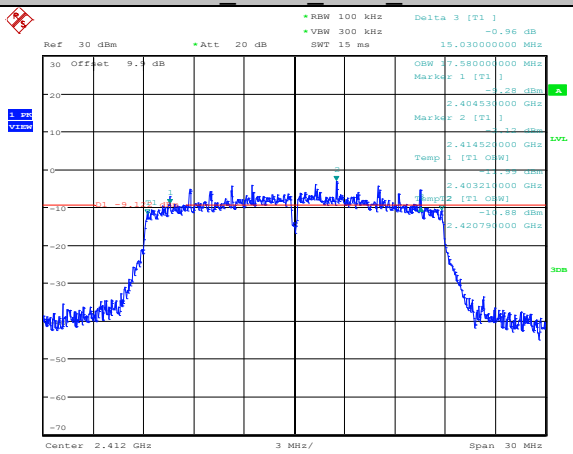


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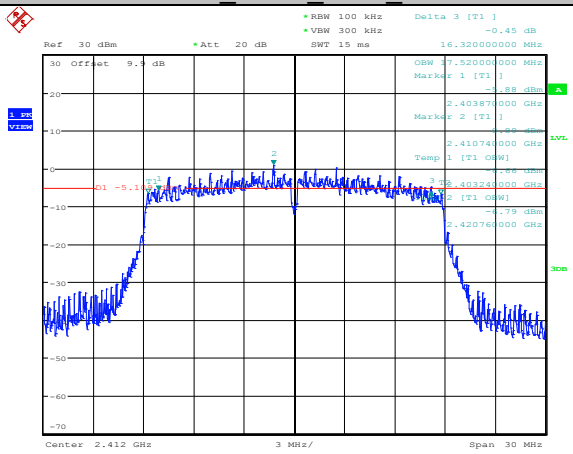


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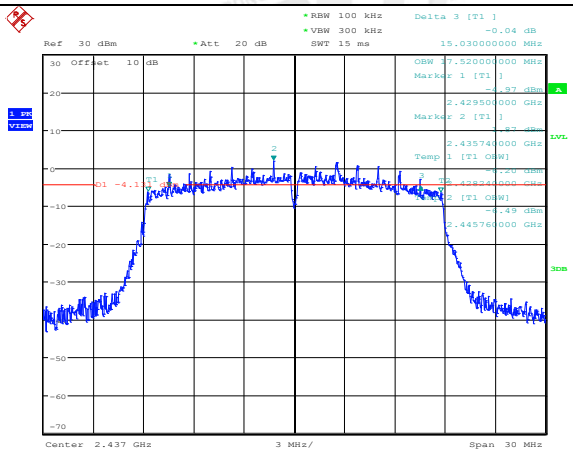


Date: 26.APR.2019 21:53:05

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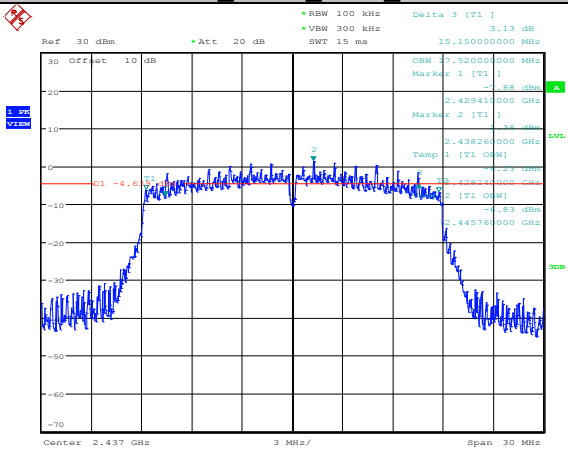


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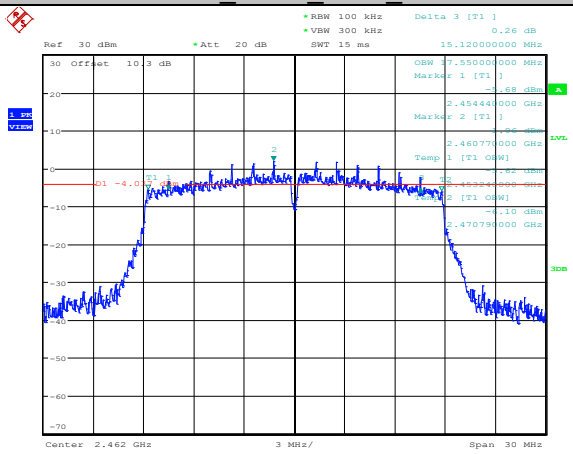


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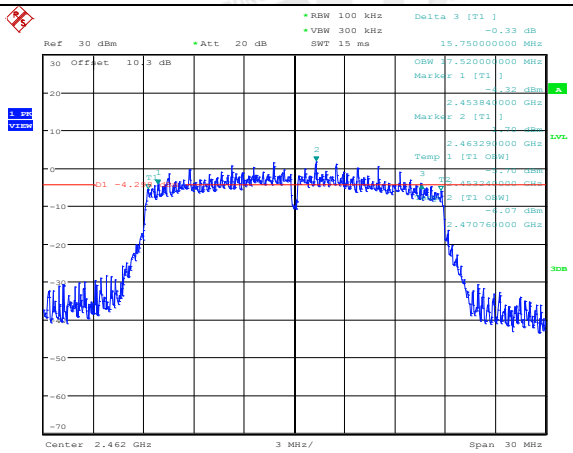


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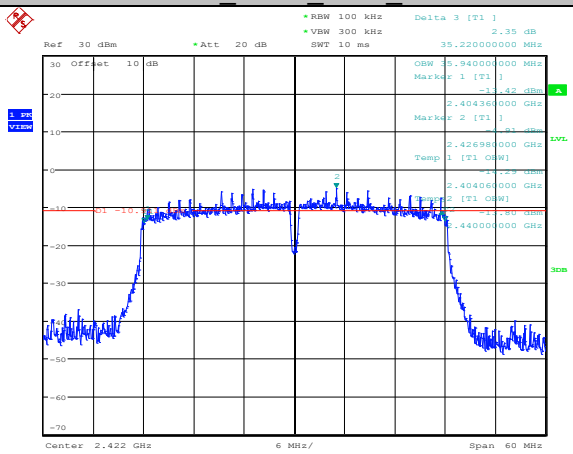


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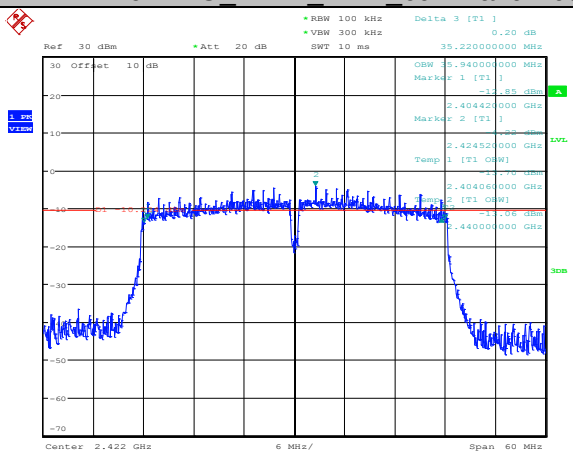


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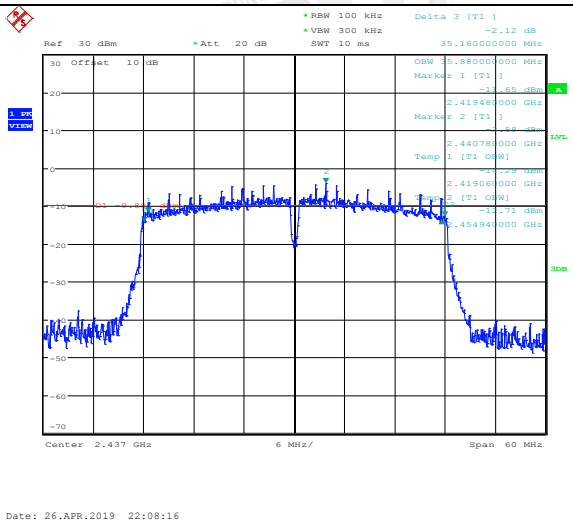


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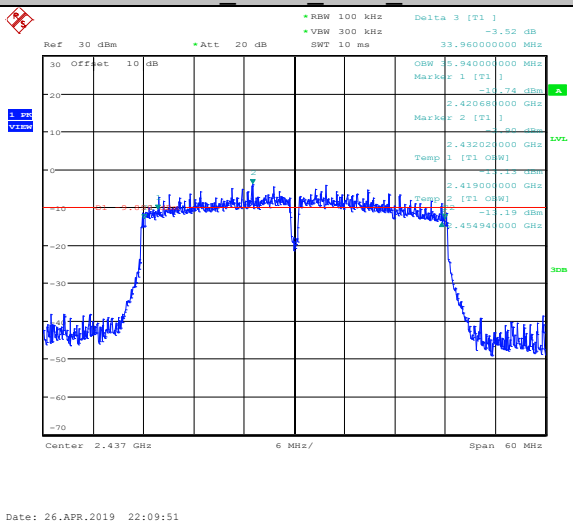


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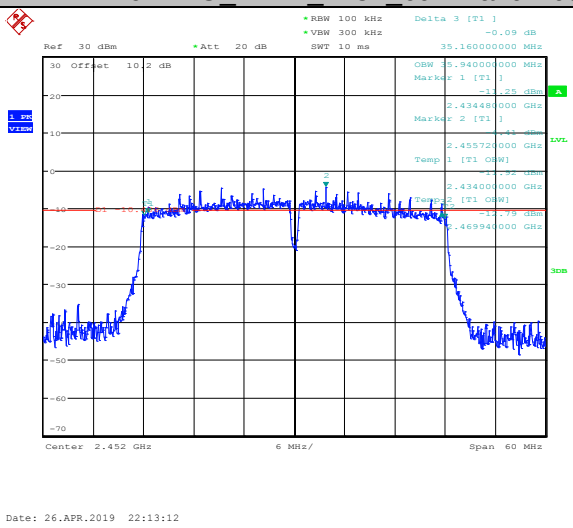


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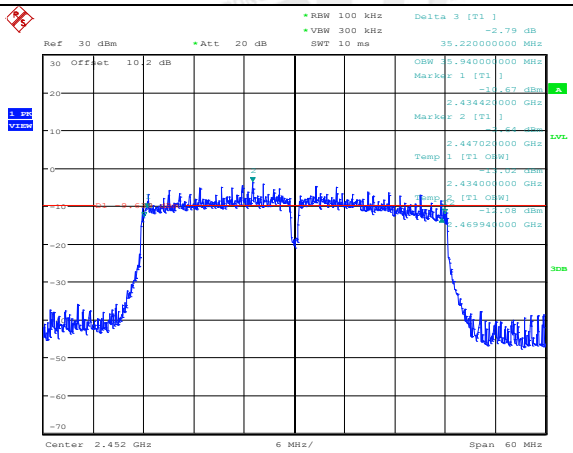


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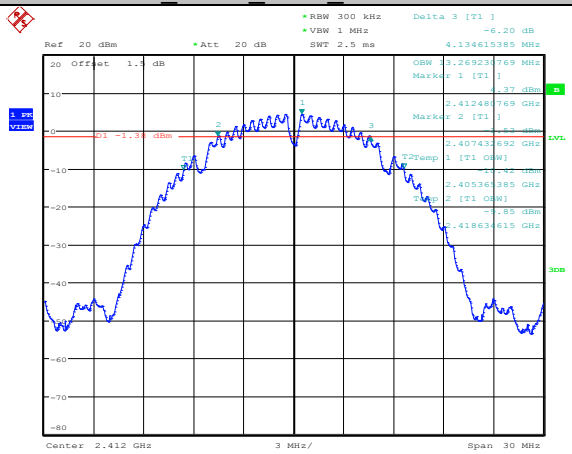


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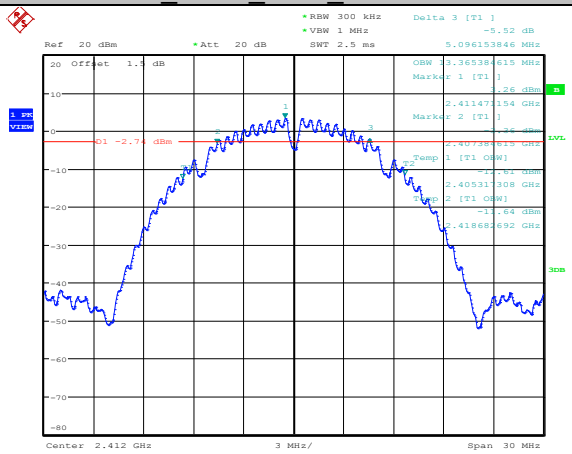


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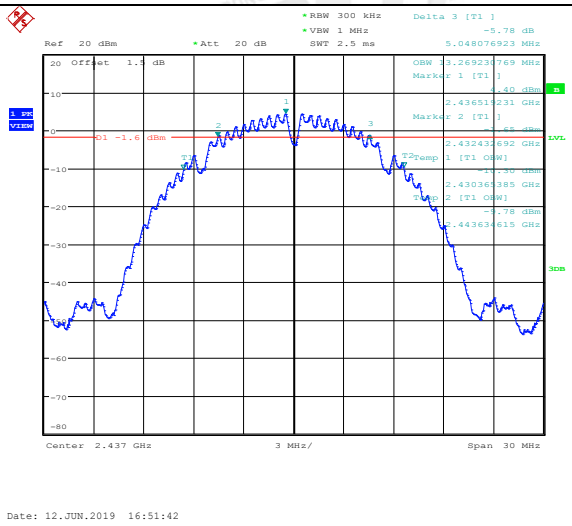


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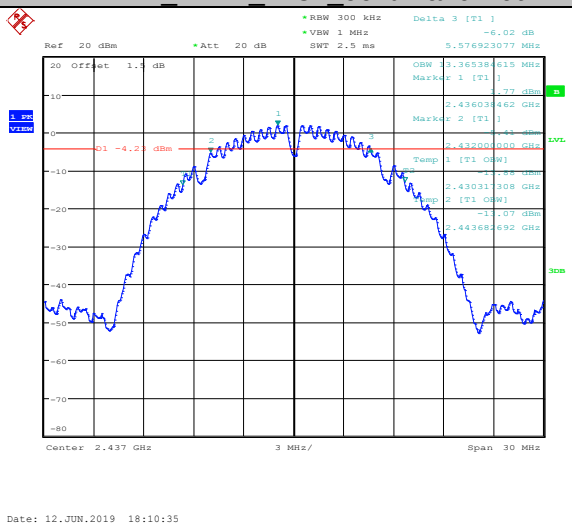


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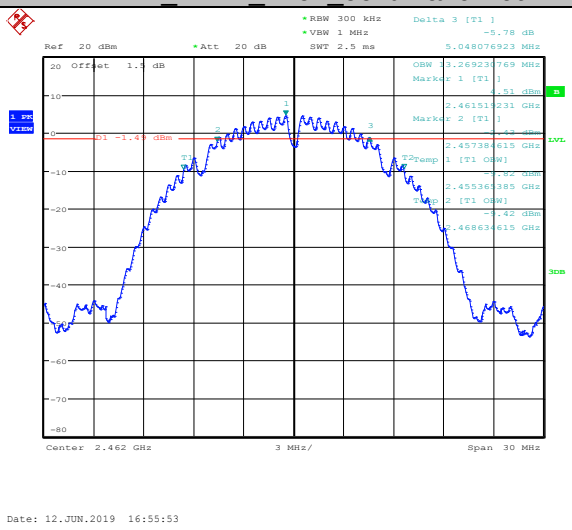


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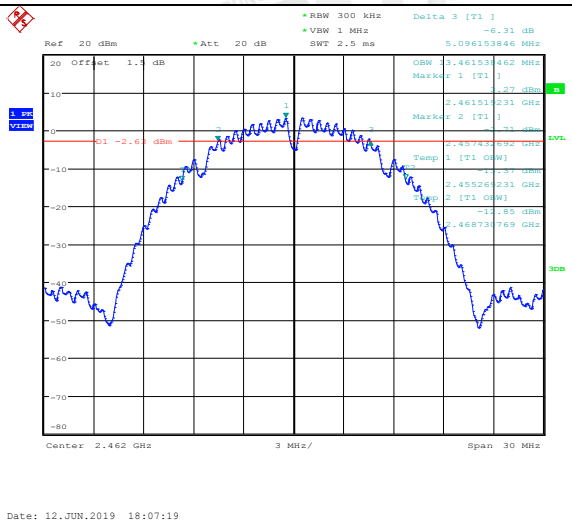


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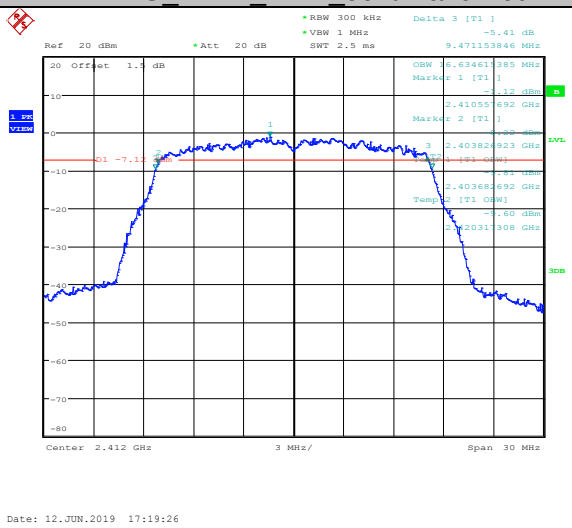


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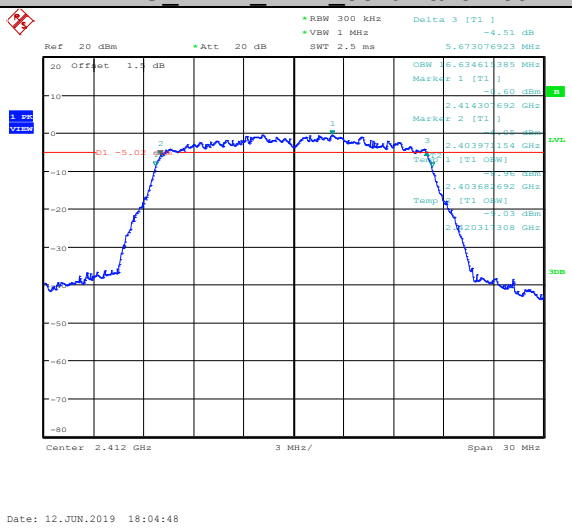


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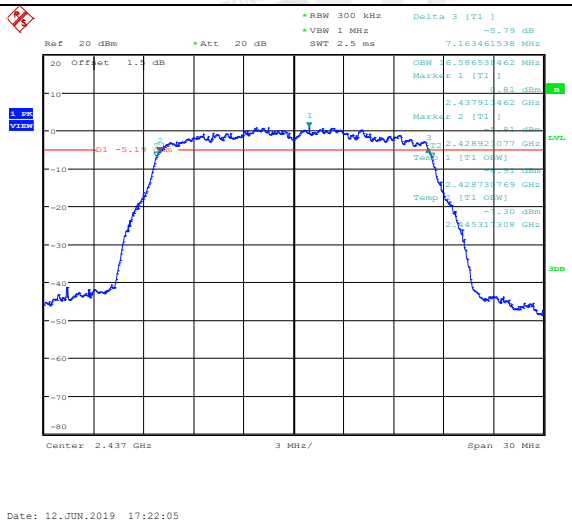


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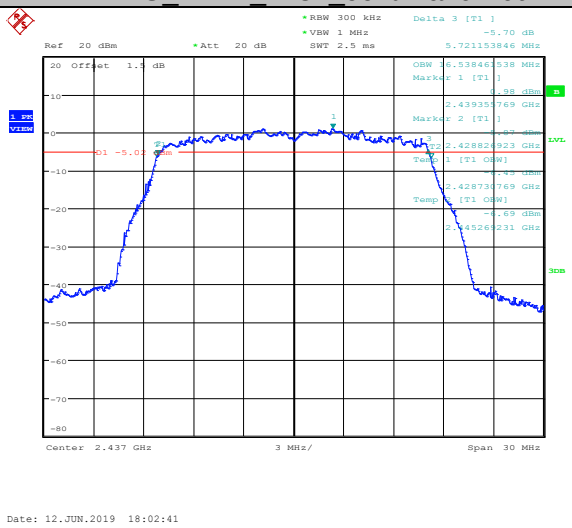


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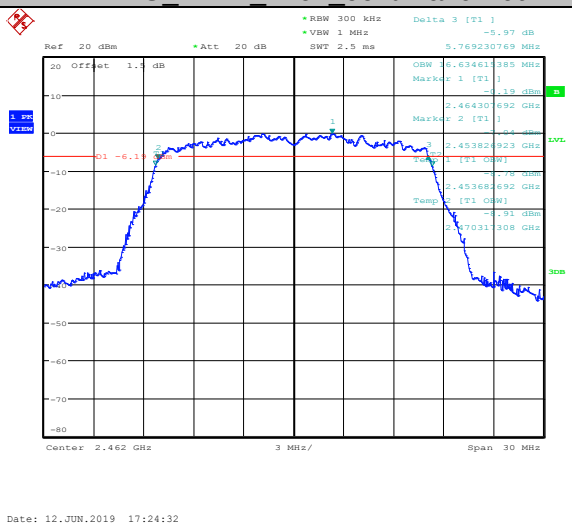


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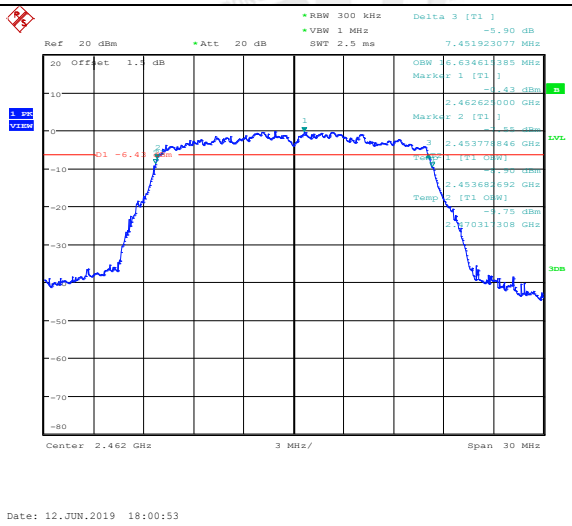


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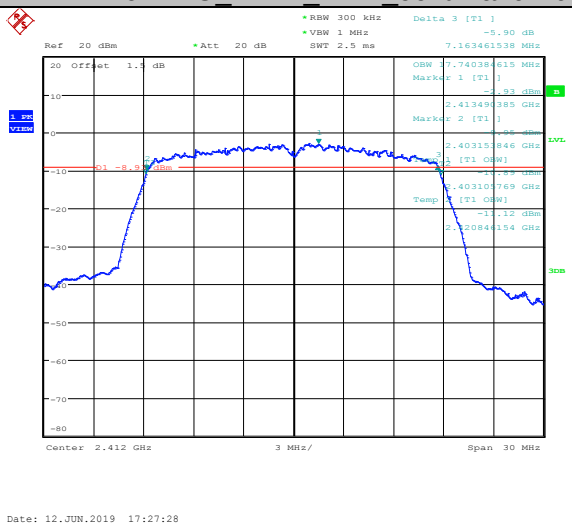


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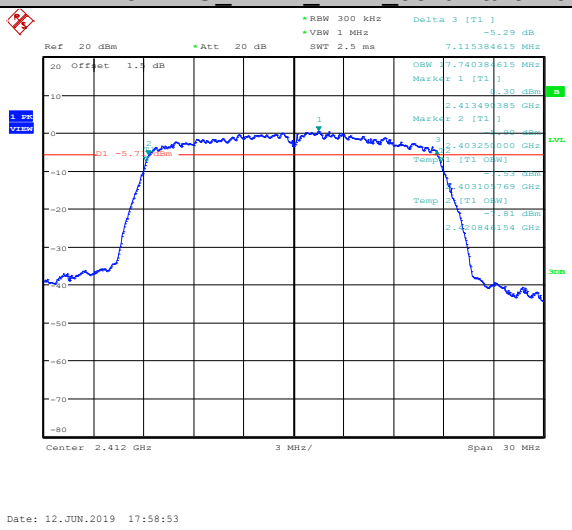


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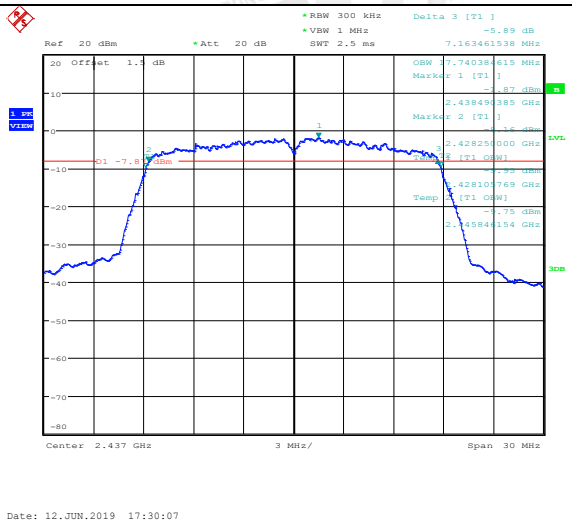


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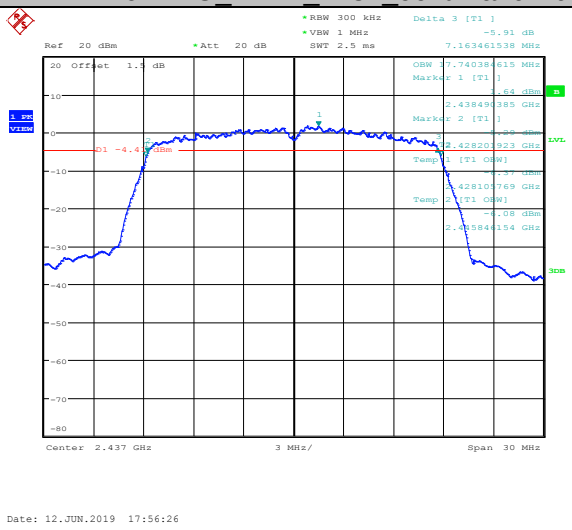


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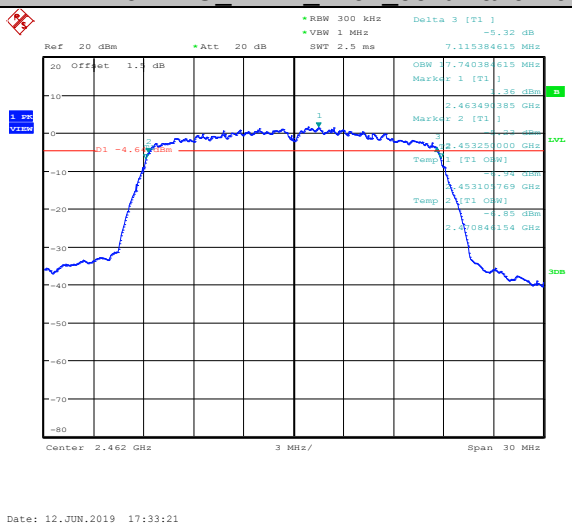


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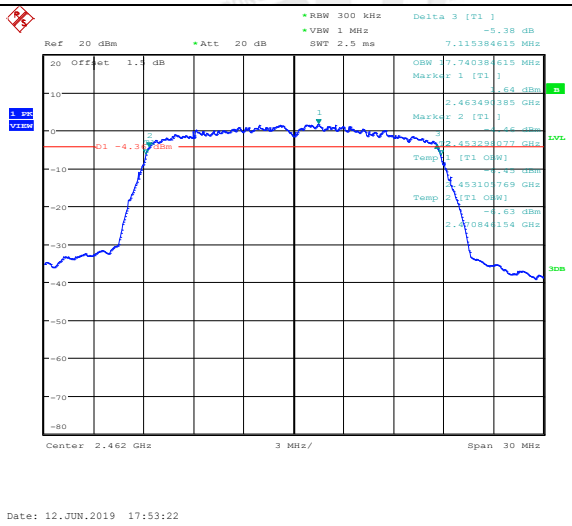


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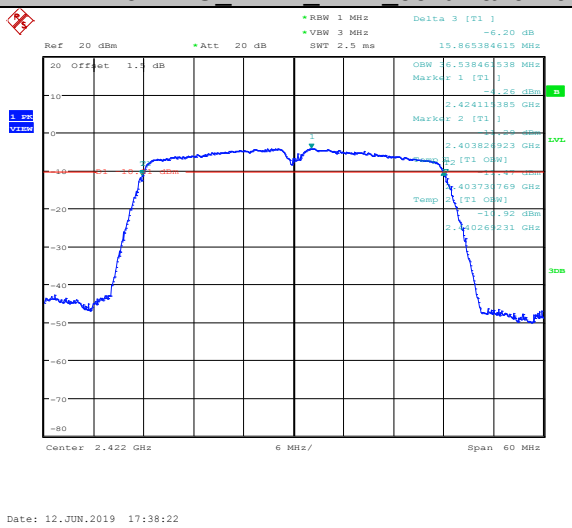


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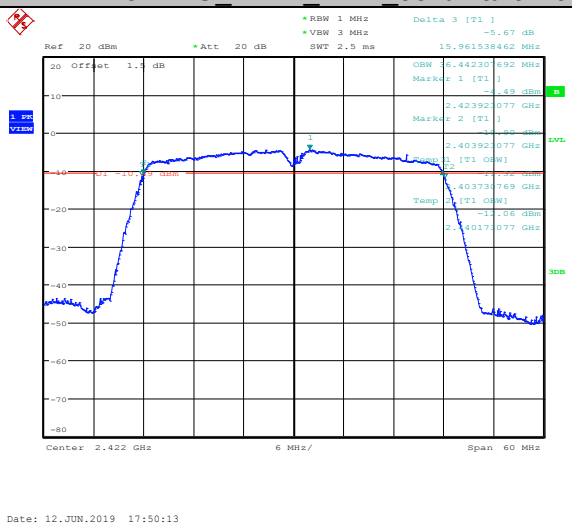


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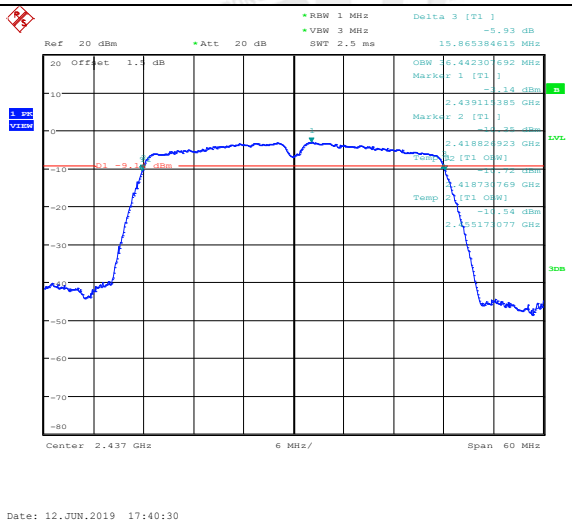


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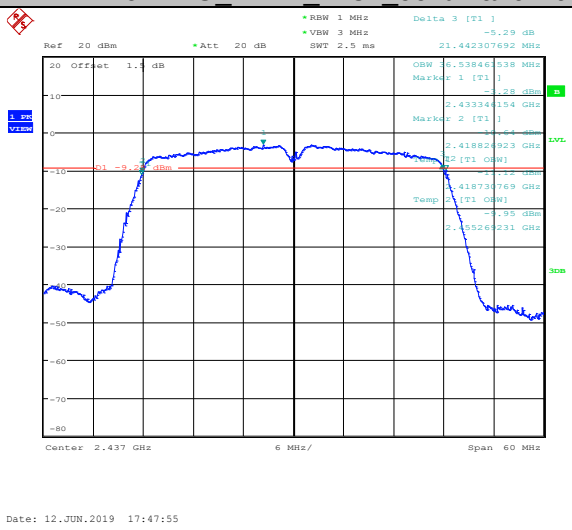


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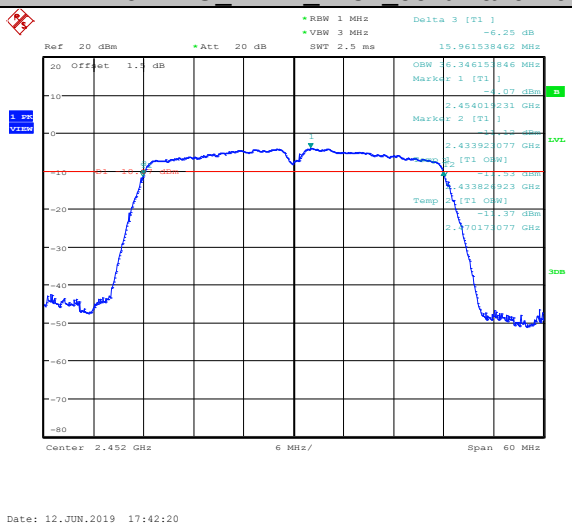
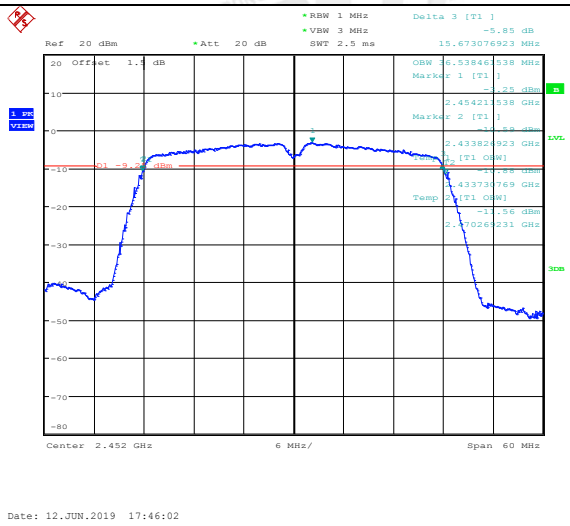



11N40MIMO_ANT2_2452_99% Bandwidth


RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms
Ref 20 dBm
Att 20 dB
Offset 1.5 dB
Delta 3 [T1 ]
-5.85 dB
15.673076923 MHz
OBW 16.538461538 MHz
Marker 1 [T1 ]
-1.25 dBm
2.454211538 GHz
Marker 2 [T1 ]
2.433826923 GHz
Temp 1 [T1 OBW]
-11.56 dBm
2.470269231 GHz
Center 2.452 GHz
6 MHz/
Span 60 MHz
Date: 12.JUN.2019 17:46:02

# 5. Conducted peak Output Power

## 5.1. Block diagram of test setup

Same as section 4.1

## 5.2. Limits

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

## 5.3. Test Procedure

Connect each EUT's antenna output to power sensor by RF cable and attenuator

Measure the PK output power of each antenna port by Spectrum Analyzer.

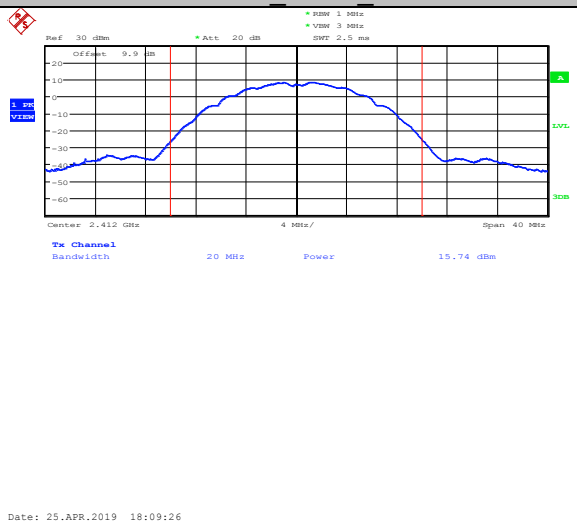
## 5.4. Test Result

| Test Mode | Test Channel | Ant | Power[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|
| 11B | 2412 | ANT1 | 15.74 | 30 | PASS |
| 11B | 2412 | ANT2 | 16.13 | 30 | PASS |
| 11B | 2437 | ANT1 | 16.89 | 30 | PASS |
| 11B | 2437 | ANT2 | 16.82 | 30 | PASS |
| 11B | 2462 | ANT1 | 16.40 | 30 | PASS |
| 11B | 2462 | ANT2 | 16.26 | 30 | PASS |
| 11G | 2412 | ANT1 | 15.91 | 30 | PASS |
| 11G | 2412 | ANT2 | 16.72 | 30 | PASS |
| 11G | 2437 | ANT1 | 18.41 | 30 | PASS |
| 11G | 2437 | ANT2 | 18.52 | 30 | PASS |
| 11G | 2462 | ANT1 | 17.75 | 30 | PASS |
| 11G | 2462 | ANT2 | 17.44 | 30 | PASS |
| 11N20MIMO | 2412 | ANT1 | 20.39 | 30 | PASS |
| 11N20MIMO | 2412 | ANT2 | 19.98 | 30 | PASS |
| 11N20MIMO | 2412 | total | 23.21 | 30 | PASS |
| 11N20MIMO | 2437 | ANT1 | 20.31 | 30 | PASS |
| 11N20MIMO | 2437 | ANT2 | 20.29 | 30 | PASS |
| 11N20MIMO | 2437 | total | 23.31 | 30 | PASS |
| 11N20MIMO | 2462 | ANT1 | 20.59 | 30 | PASS |
| 11N20MIMO | 2462 | ANT2 | 20.62 | 30 | PASS |
| 11N20MIMO | 2462 | total | 23.61 | 30 | PASS |

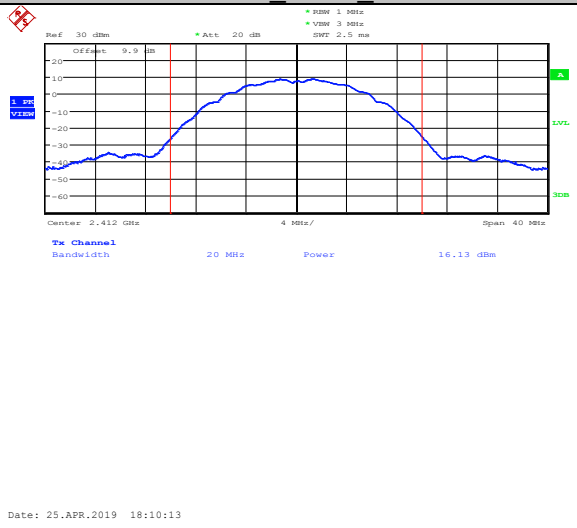
| | | | | | |
|---|---|---|---|---|---|
| 11N40MIMO | 2422 | ANT1 | 16.97 | 30 | PASS |
| 11N40MIMO | 2422 | ANT2 | 17.47 | 30 | PASS |
| 11N40MIMO | 2422 | total | 20.27 | 30 | PASS |
| 11N40MIMO | 2437 | ANT1 | 17.31 | 30 | PASS |
| 11N40MIMO | 2437 | ANT2 | 17.58 | 30 | PASS |
| 11N40MIMO | 2437 | total | 20.46 | 30 | PASS |
| 11N40MIMO | 2452 | ANT1 | 17.54 | 30 | PASS |
| 11N40MIMO | 2452 | ANT2 | 17.59 | 30 | PASS |
| 11N40MIMO | 2452 | total | 20.56 | 30 | PASS |

## 5.5. original test data

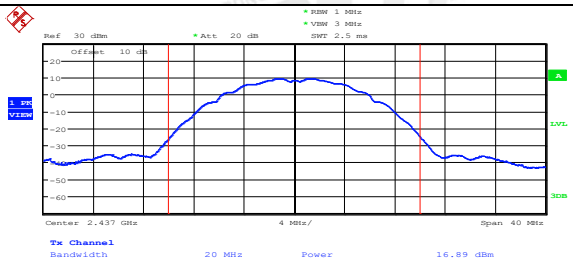
11B_ANT1_2412




11B_ANT2_2412




11B_ANT1_2437

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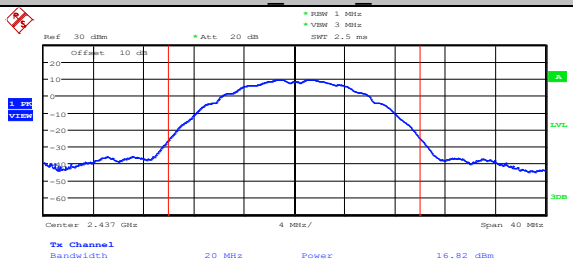


Date: 25.APR.2019 18:15:09

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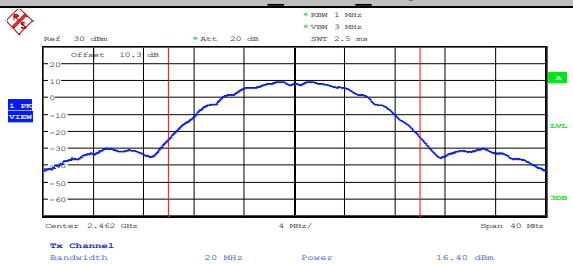


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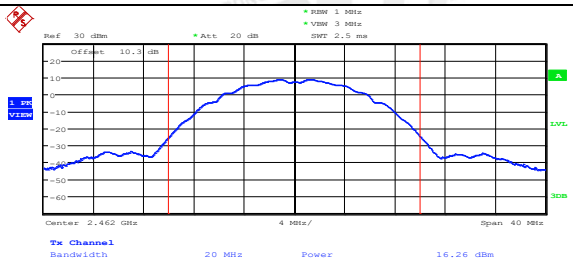


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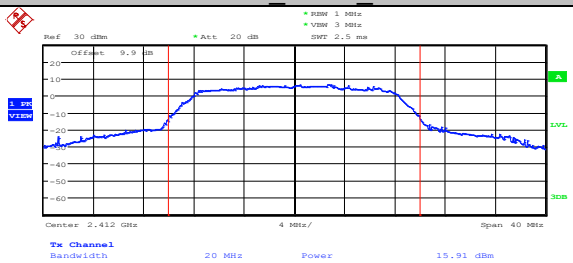


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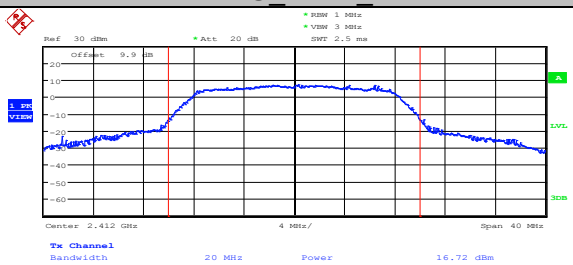


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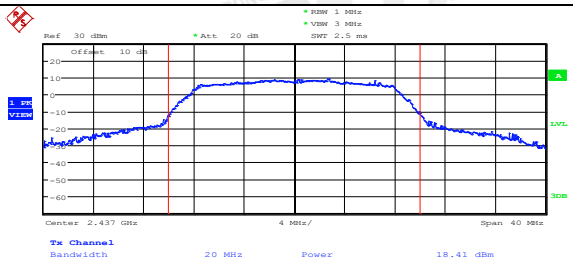


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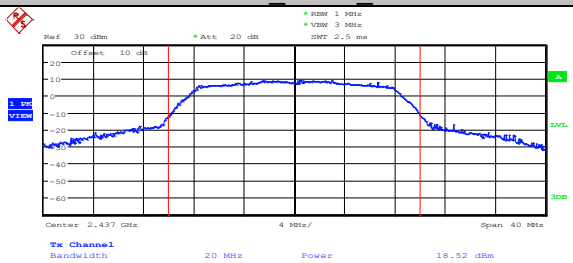


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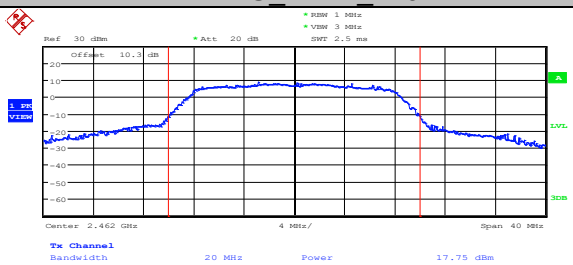


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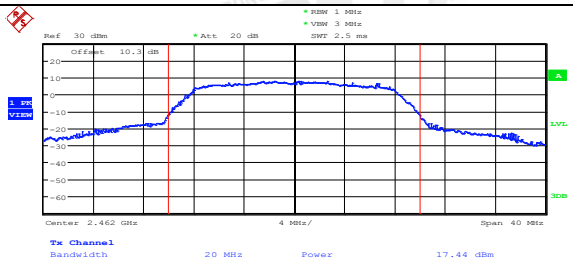


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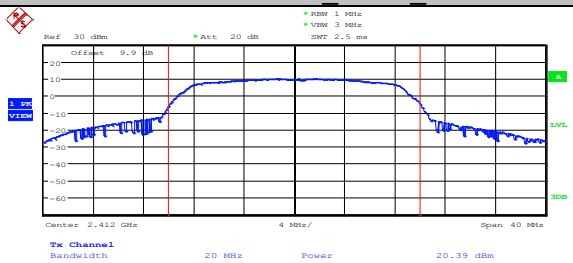


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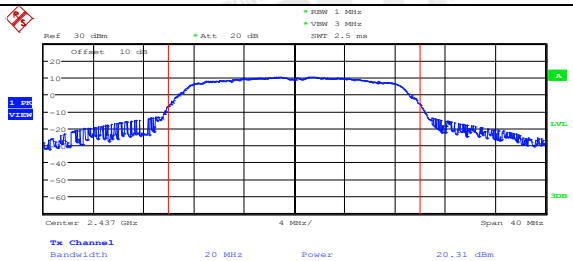


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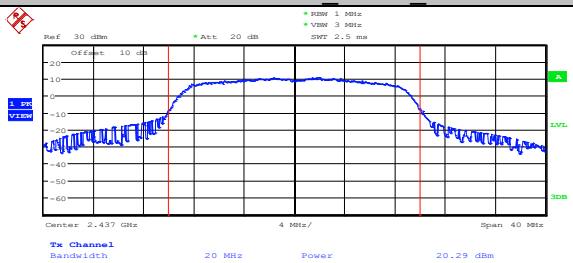


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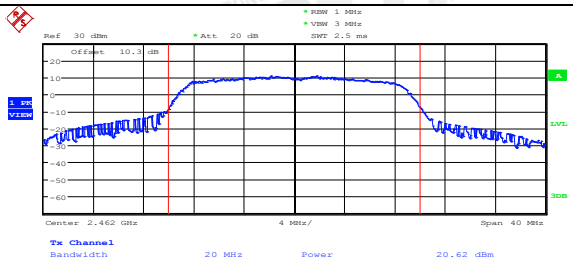


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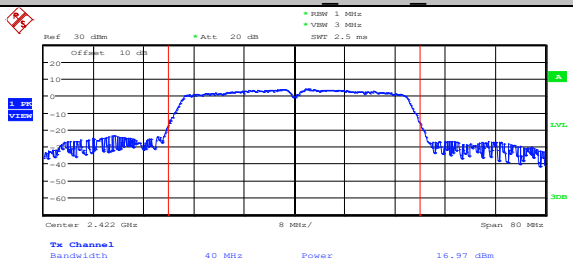


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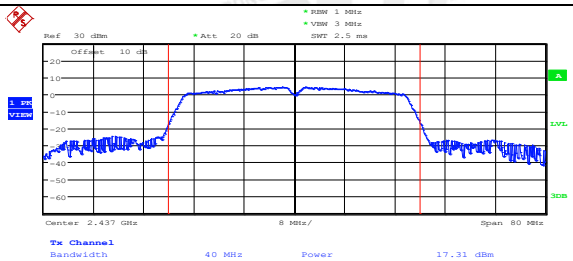


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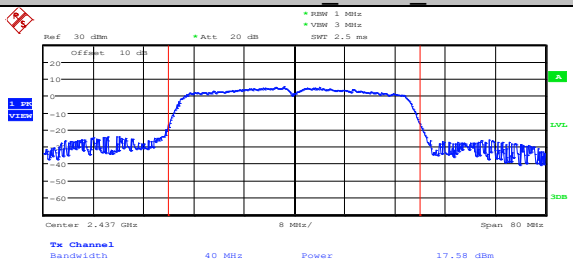


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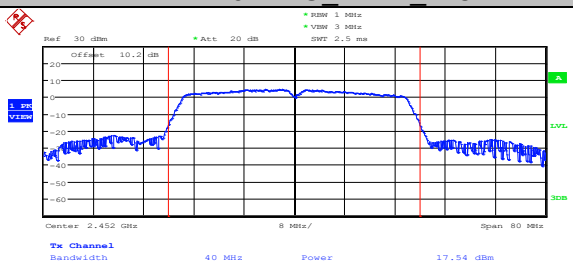


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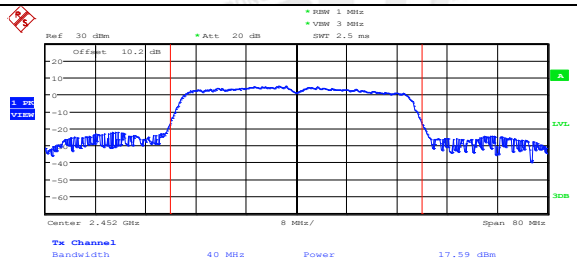



Date: 26.APR.2019 22:18:10

# 6. Power Spectral Density

## 6.1. Block diagram of test setup

Same as section 4.1

## 6.2. Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## 6.3. Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows:

| | |
|---|---|
| Center frequency | DTS Channel center frequency |
| RBW: | 3 kHz ≤ RBW ≤ 100 kHz |
| VBW: | ≥ 3RBW |
| Span | 1.5 times the DTS bandwidth |
| Detector Mode: | RMS |
| Sweep time: | auto |
| Trace mode | Max hold |

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.

(4) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

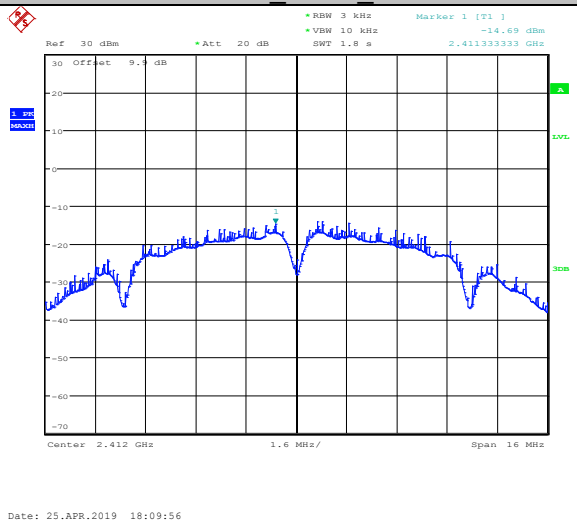
## 6.4. Test Result

| Test Mode | Test Channel | Ant | PSD [dBm] | Limit[dBm/kHz] | Verdict |
|---|---|---|---|---|---|
| 11B | 2412 | ANT1 | -14.69 | 8.00 | PASS |
| 11B | 2412 | ANT2 | -12.98 | 8.00 | PASS |
| 11B | 2437 | ANT1 | -10.86 | 8.00 | PASS |
| 11B | 2437 | ANT2 | -12.73 | 8.00 | PASS |
| 11B | 2462 | ANT1 | -11.19 | 8.00 | PASS |
| 11B | 2462 | ANT2 | -13.89 | 8.00 | PASS |
| 11G | 2412 | ANT1 | -18.62 | 8.00 | PASS |
| 11G | 2412 | ANT2 | -17.45 | 8.00 | PASS |
| 11G | 2437 | ANT1 | -15.46 | 8.00 | PASS |
| 11G | 2437 | ANT2 | -15.51 | 8.00 | PASS |
| 11G | 2462 | ANT1 | -16.65 | 8.00 | PASS |
| 11G | 2462 | ANT2 | -16.23 | 8.00 | PASS |

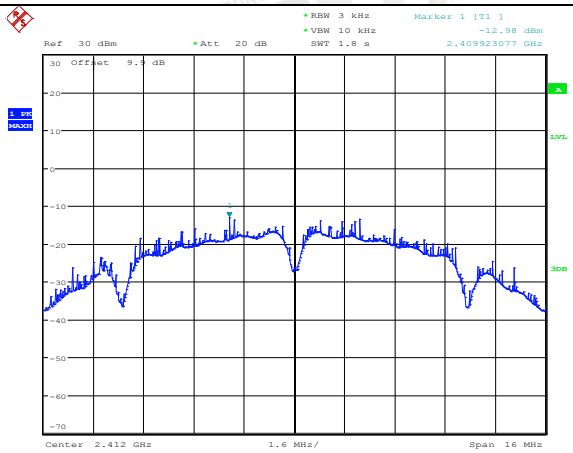
| | | | | | |
|---|---|---|---|---|---|
| 11N20MIMO | 2412 | ANT1 | -14.64 | 8.00 | PASS |
| 11N20MIMO | 2412 | ANT2 | -12.70 | 8.00 | PASS |
| 11N20MIMO | 2412 | total | -10.55 | 8.00 | PASS |
| 11N20MIMO | 2437 | ANT1 | -13.95 | 8.00 | PASS |
| 11N20MIMO | 2437 | ANT2 | -14.94 | 8.00 | PASS |
| 11N20MIMO | 2437 | total | -11.41 | 8.00 | PASS |
| 11N20MIMO | 2462 | ANT1 | -14.51 | 8.00 | PASS |
| 11N20MIMO | 2462 | ANT2 | -14.23 | 8.00 | PASS |
| 11N20MIMO | 2462 | total | -11.36 | 8.00 | PASS |
| 11N40MIMO | 2422 | ANT1 | -21.05 | 8.00 | PASS |
| 11N40MIMO | 2422 | ANT2 | -20.82 | 8.00 | PASS |
| 11N40MIMO | 2422 | total | -17.92 | 8.00 | PASS |
| 11N40MIMO | 2437 | ANT1 | -19.60 | 8.00 | PASS |
| 11N40MIMO | 2437 | ANT2 | -20.70 | 8.00 | PASS |
| 11N40MIMO | 2437 | total | -17.10 | 8.00 | PASS |
| 11N40MIMO | 2452 | ANT1 | -19.75 | 8.00 | PASS |
| 11N40MIMO | 2452 | ANT2 | -20.11 | 8.00 | PASS |
| 11N40MIMO | 2452 | total | -16.92 | 8.00 | PASS |

## 6.5. original test data

11B_ANT1_2412




11B_ANT2_2412

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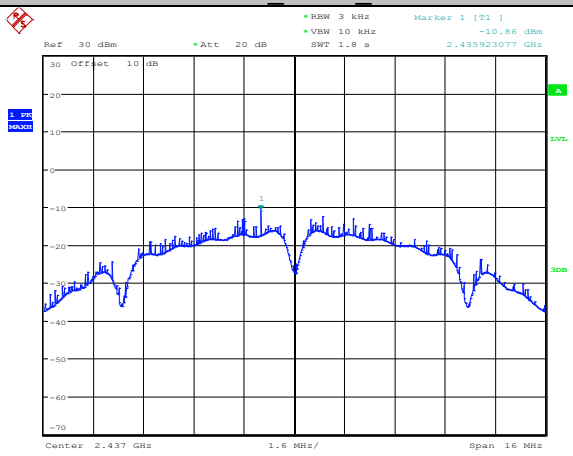


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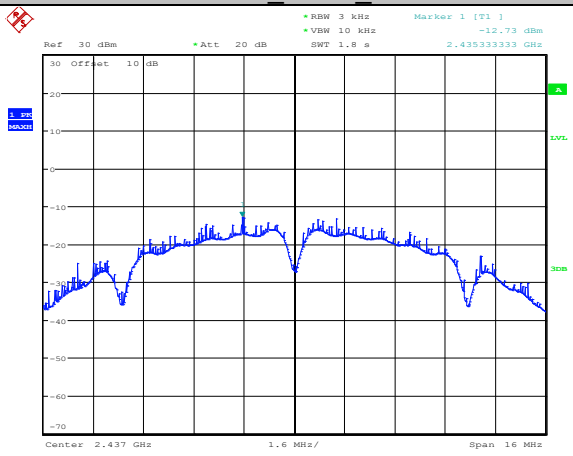


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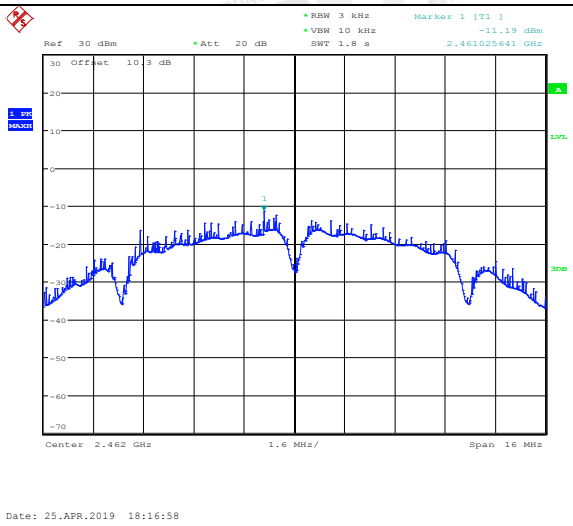


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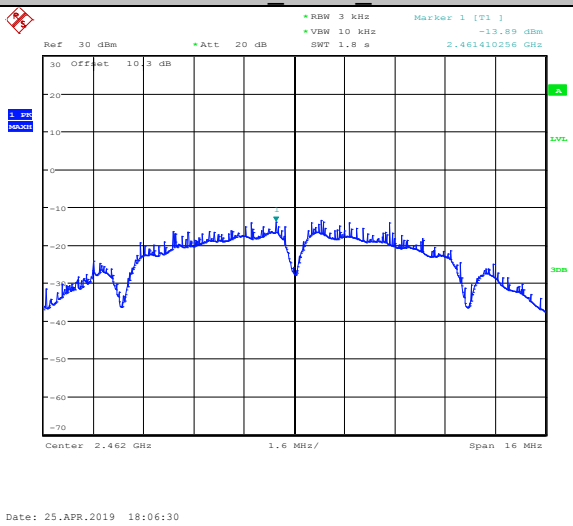


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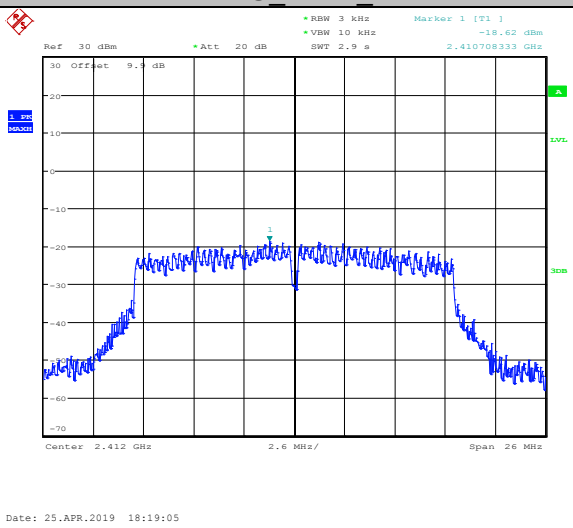


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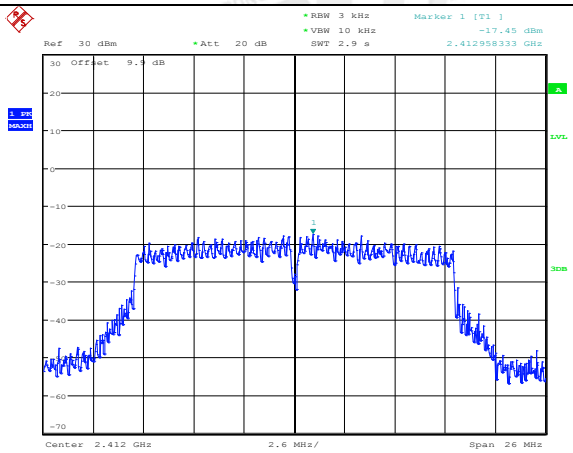


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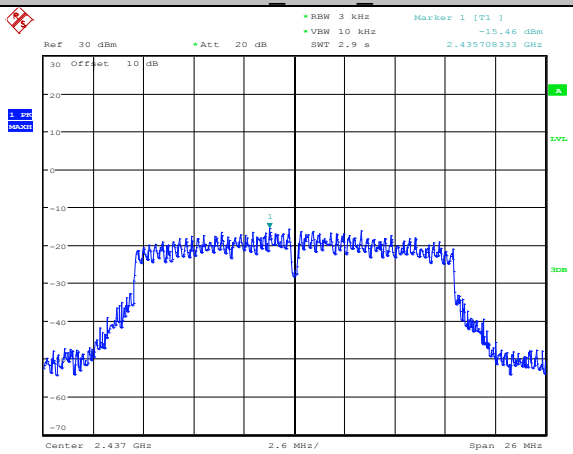


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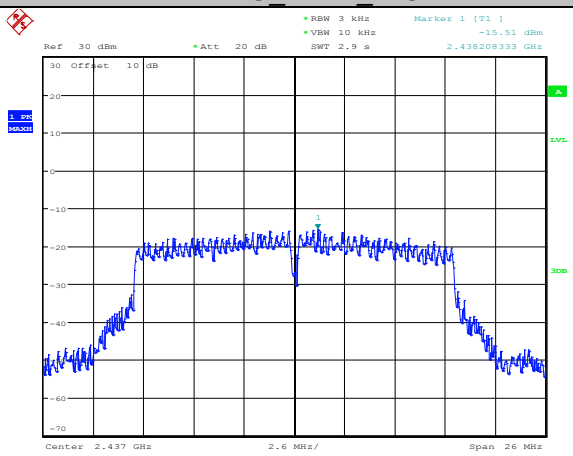


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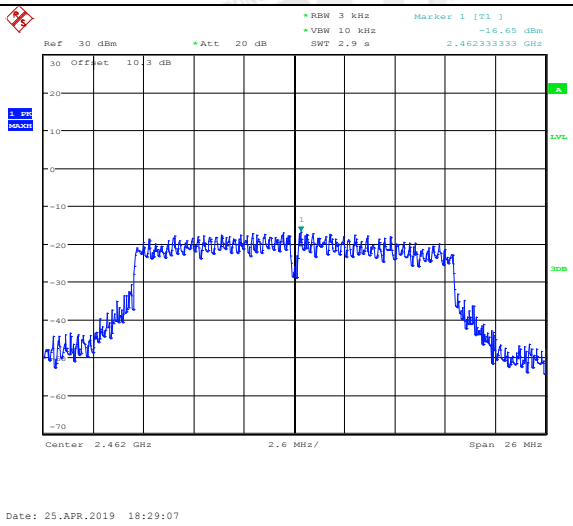


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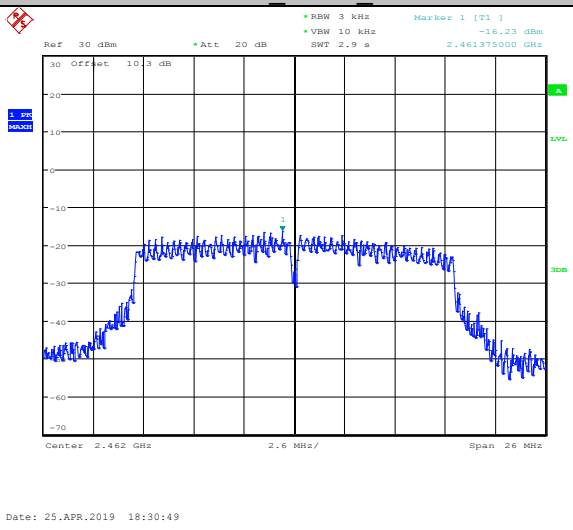


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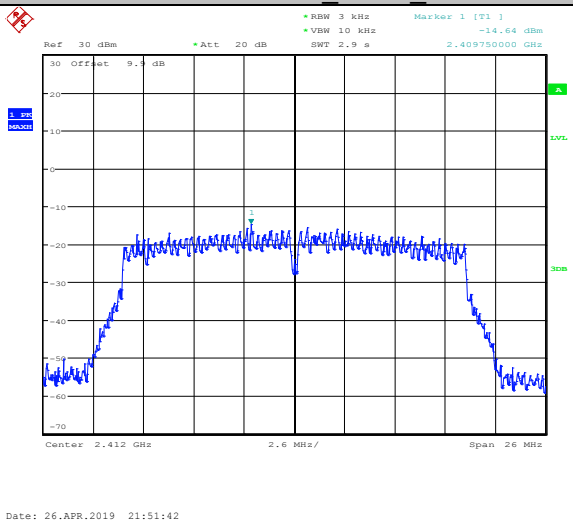


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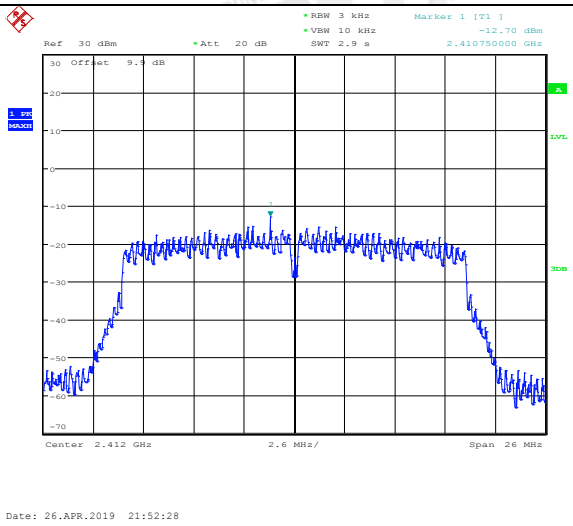


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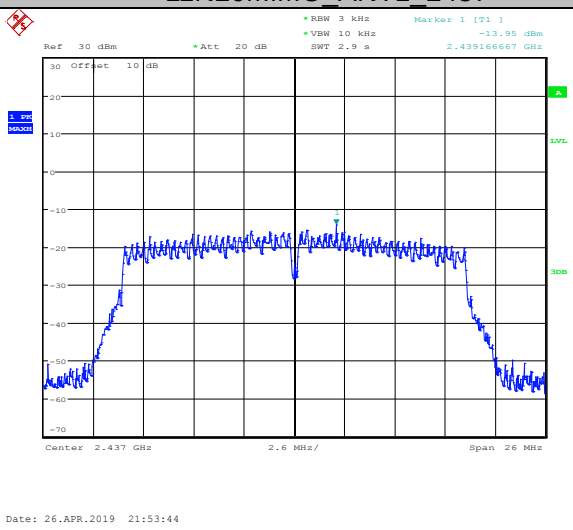


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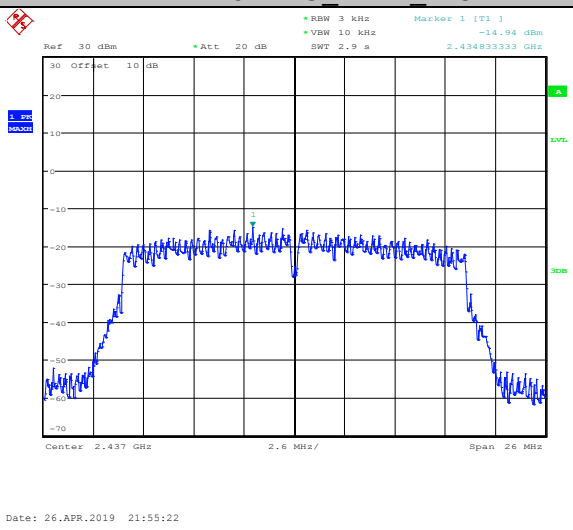


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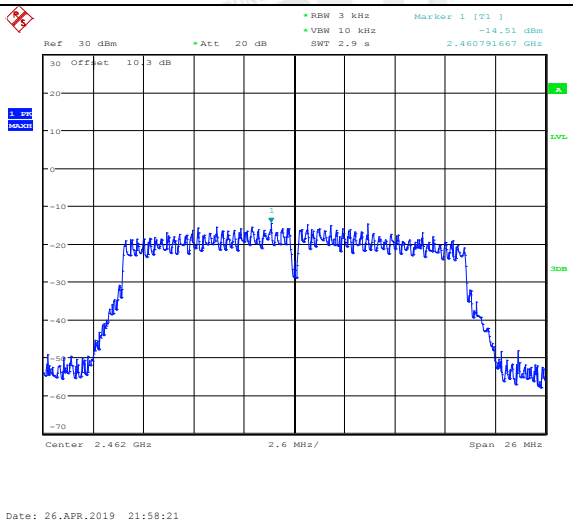


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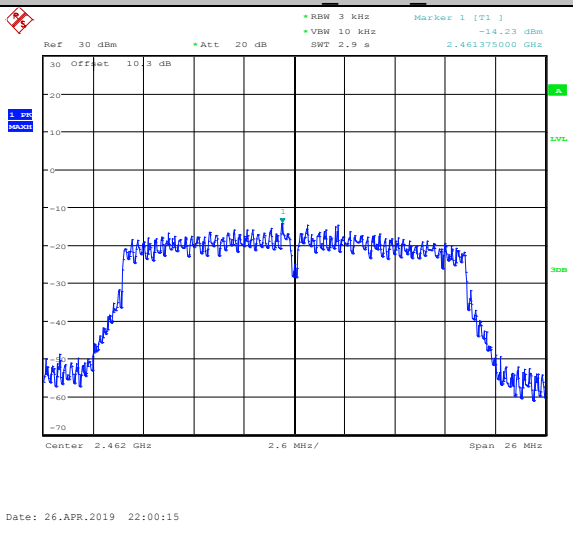


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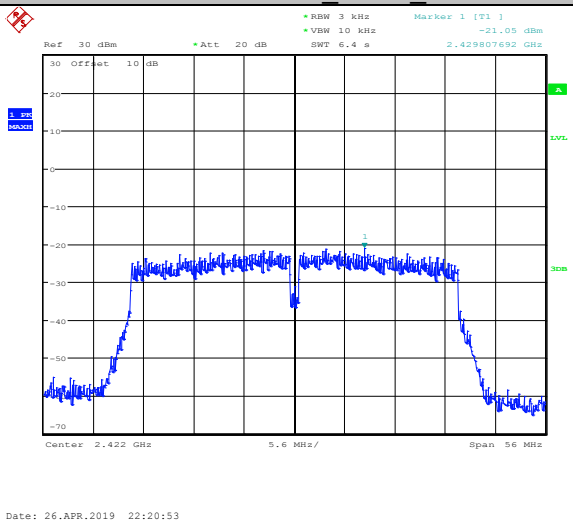


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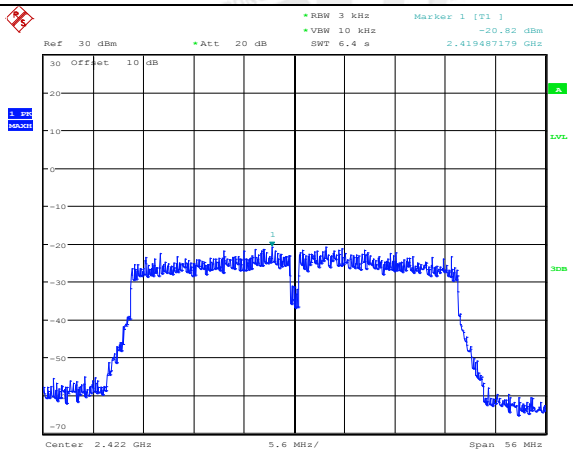


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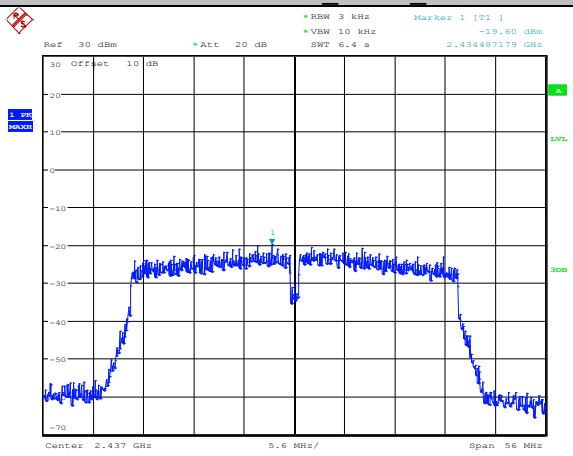


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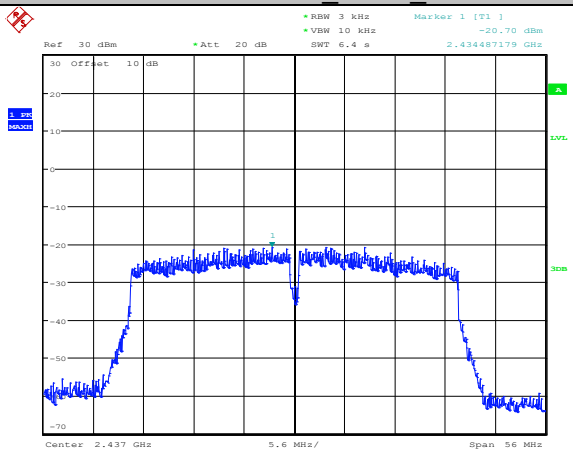


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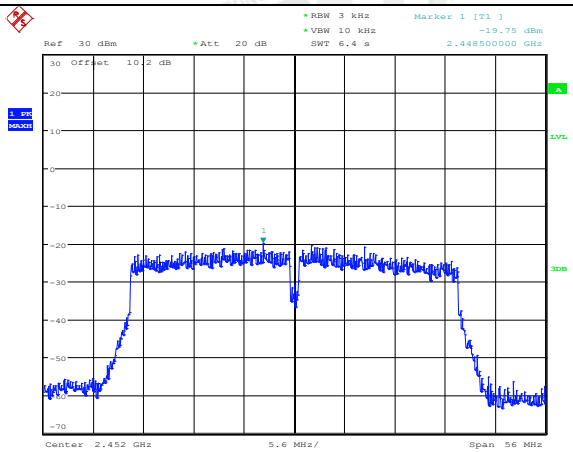


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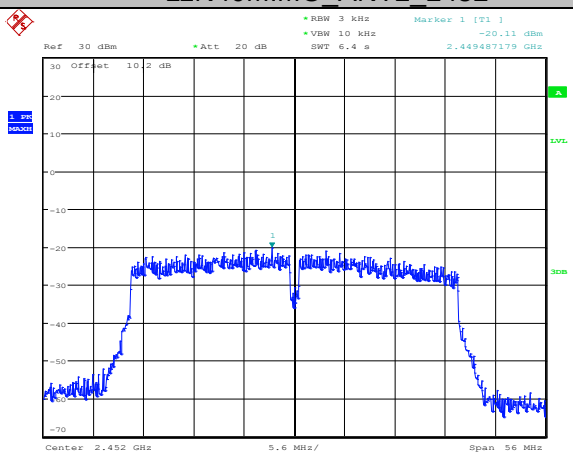

# 7. Band Edge and Spurious Emissions (Conducted)

## 7.1. Block diagram of test setup

Same as section 4.1

## 7.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

## 7.3. Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

| | |
|---|---|
| Center frequency | DTS Channel center frequency |
| RBW: | 100 kHz |
| VBW: | 300 kHz |
| Span | 1.5 times the DTS bandwidth |
| Detector Mode: | Peak |
| Sweep time: | auto |
| Trace mode | Max hold |

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

| | |
|---|---|
| RBW: | 100 kHz |
| VBW: | 300 kHz |
| Span | Encompass frequency range to be measured |
| Number of measurement points | ≥span/RBW |
| Detector Mode: | Peak |
| Sweep time: | auto |
| Trace mode | Max hold |

(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

## 7.4. Test Result

| EUT Set Mode | CH or Frequency | Ant1 Result (dBm) | EUT Set Mode | CH or Frequency | Ant1 Result Result (dBm) |
|---|---|---|---|---|---|
| 11b | CH1 | PASS | 11n HT 20 | CH1 | PASS |
| | CH6 | PASS | | CH6 | PASS |
| | CH11 | PASS | | CH11 | PASS |
| 11g | CH1 | PASS | 11n HT 40 | CH3 | PASS |
| | CH6 | PASS | | CH6 | PASS |
| | CH11 | PASS | | CH9 | PASS |

| EUT Set Mode | CH or Frequency | Ant2 Result (dBm) | EUT Set Mode | CH or Frequency | Ant2 Result (dBm) |
|---|---|---|---|---|---|
| 11b | CH1 | PASS | 11n HT 20 | CH1 | PASS |
| | CH6 | PASS | | CH6 | PASS |
| | CH11 | PASS | | CH11 | PASS |
| 11g | CH1 | PASS | 11n HT 40 | CH3 | PASS |
| | CH6 | PASS | | CH6 | PASS |
| | CH11 | PASS | | CH9 | PASS |

## 7.5. original test data

Band Edge

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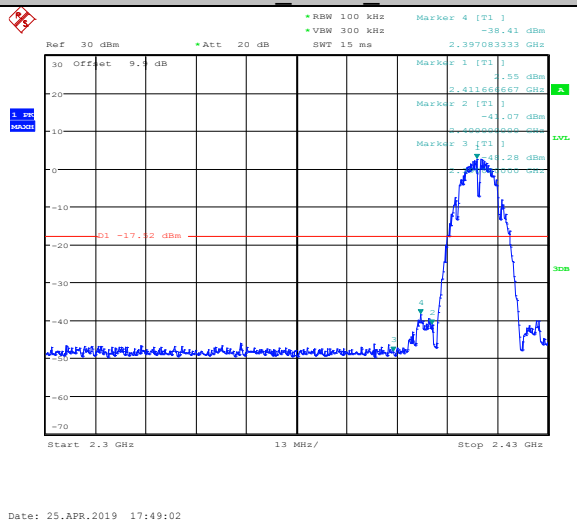
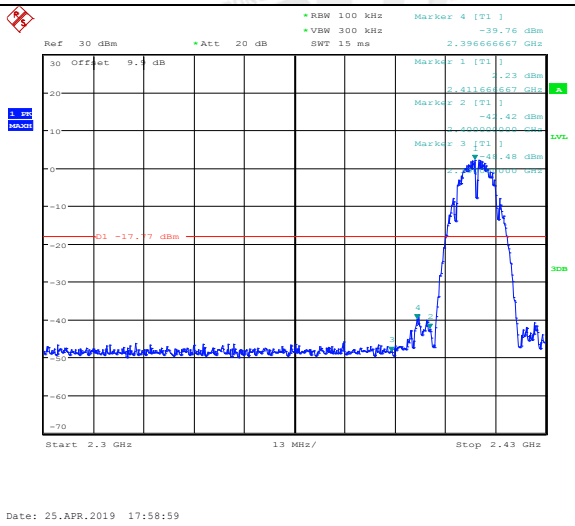
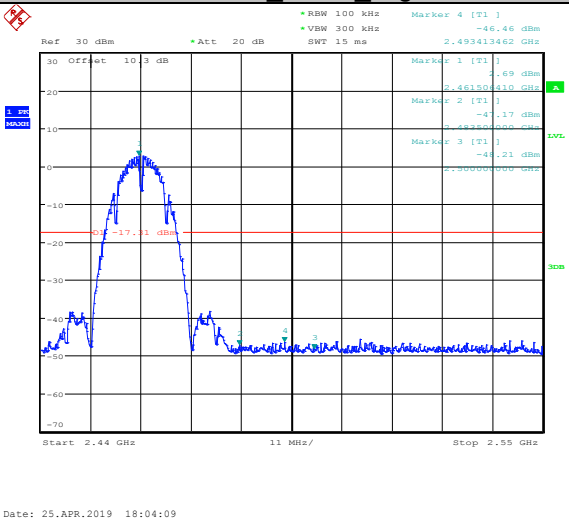



11B_ANT2_Low




11B_ANT1_High

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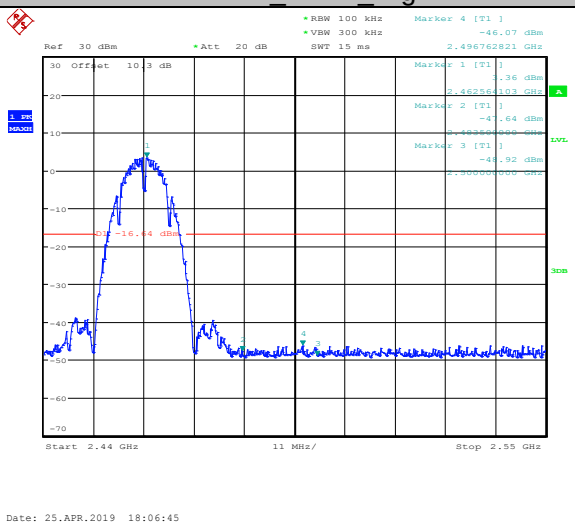
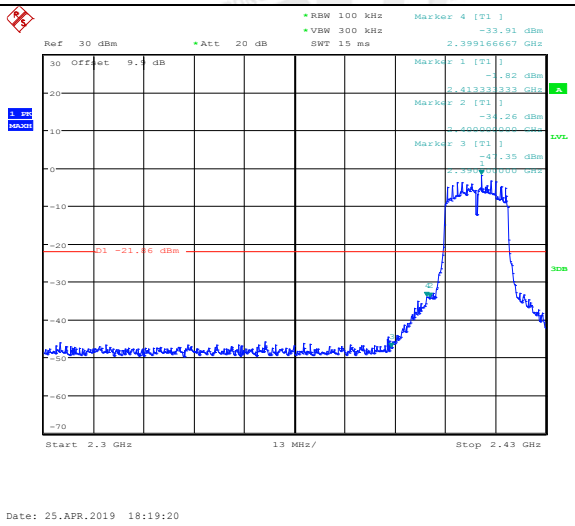



11G_ANT1_Low

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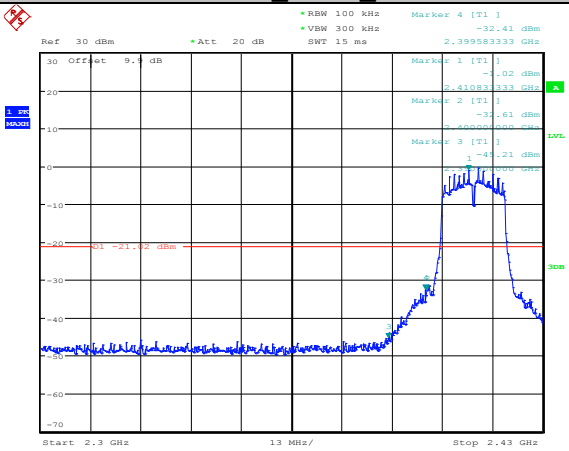


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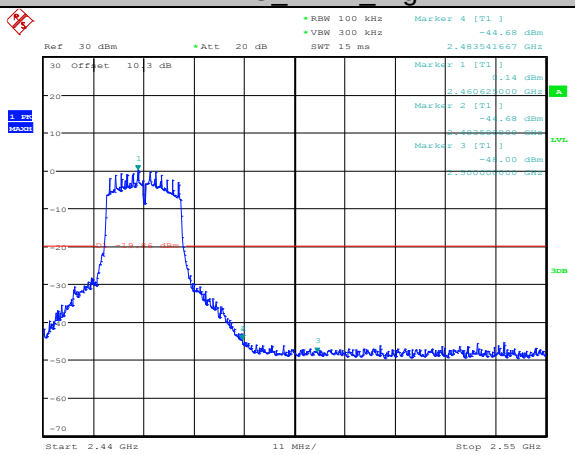


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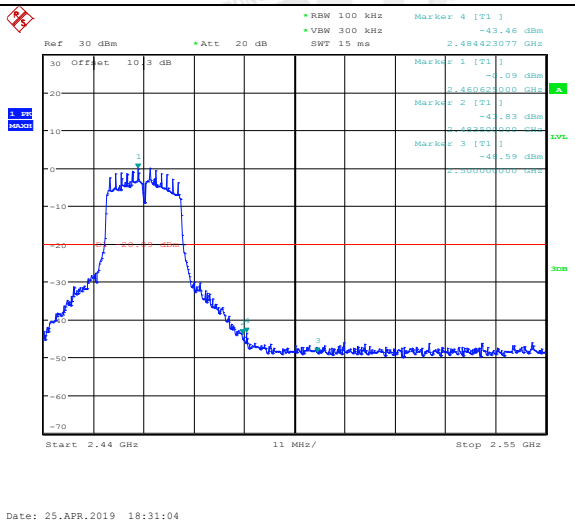
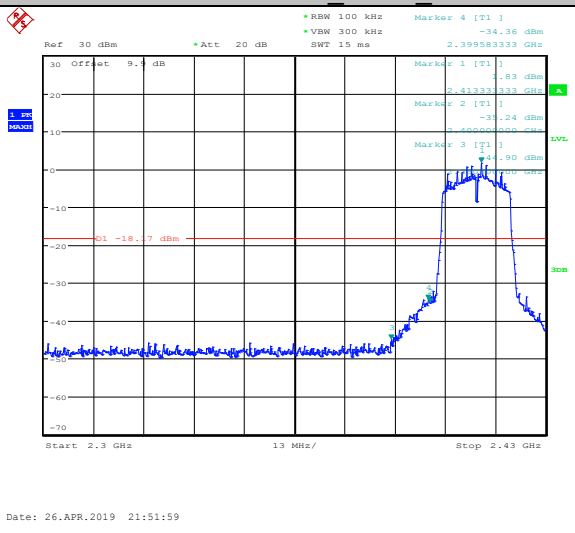



11N20MIMO_ANT1_Low

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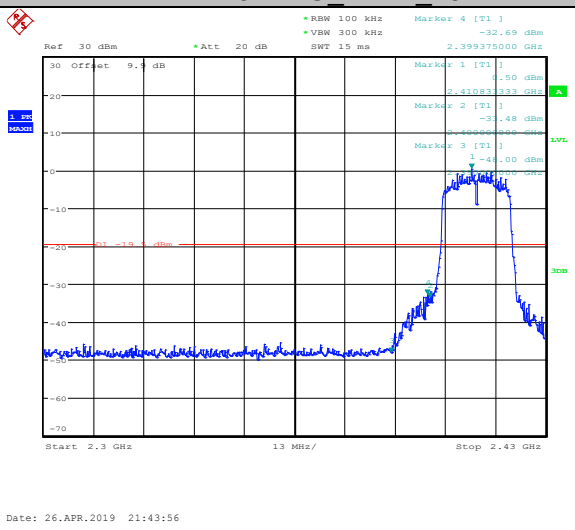


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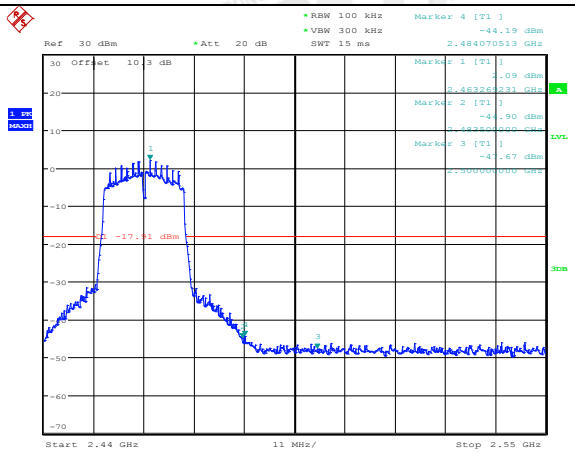


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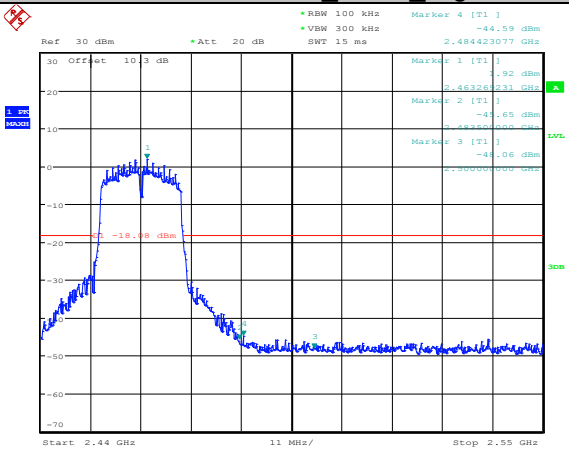


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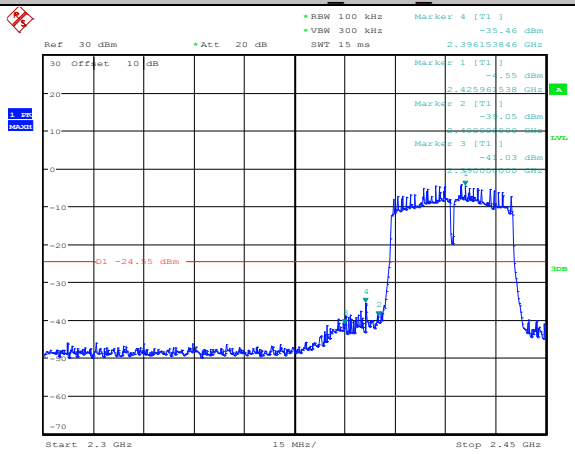


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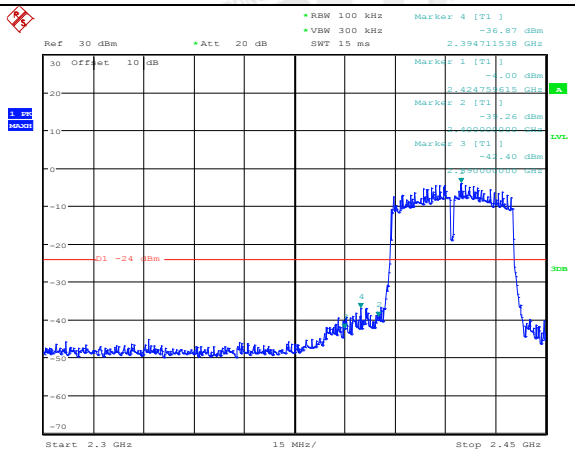


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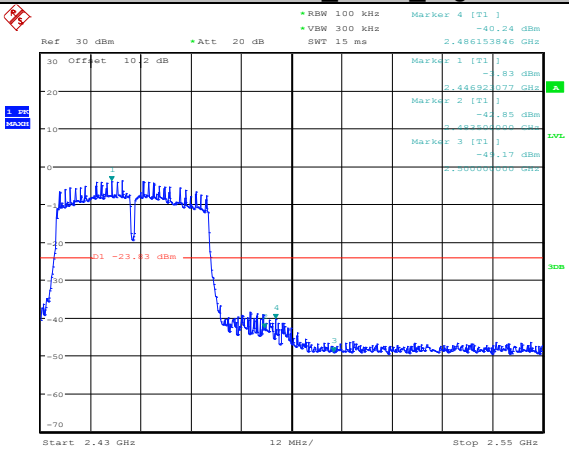


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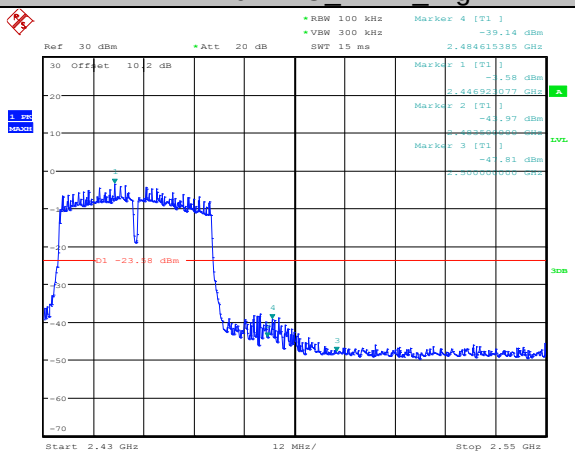


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Spurious Emissions

| 11B_ANT1_2412_Ref |
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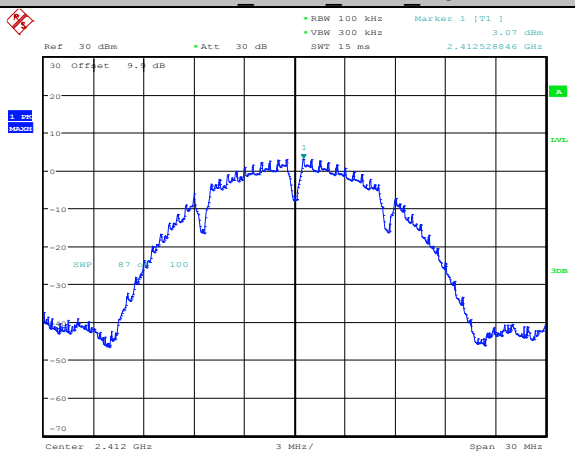
|   Date: 25.APR.2019 17:49:47 |
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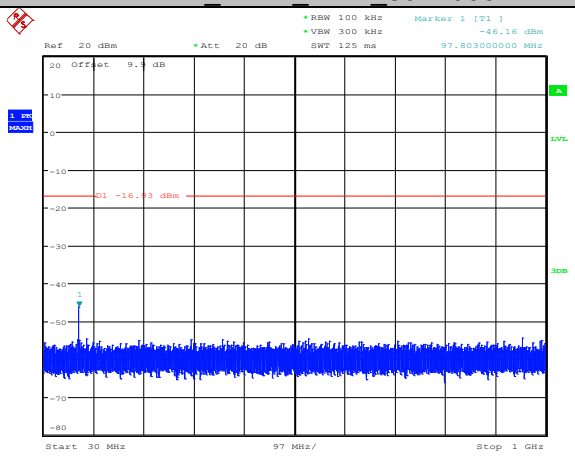
|   Date: 25.APR.2019 17:49:56 |
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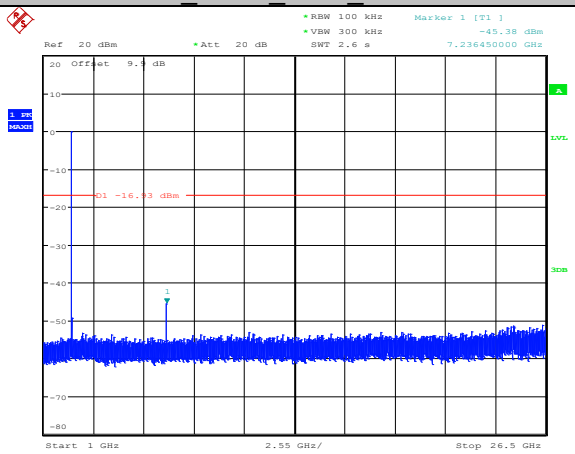
|   Date: 25.APR.2019 17:50:09 |
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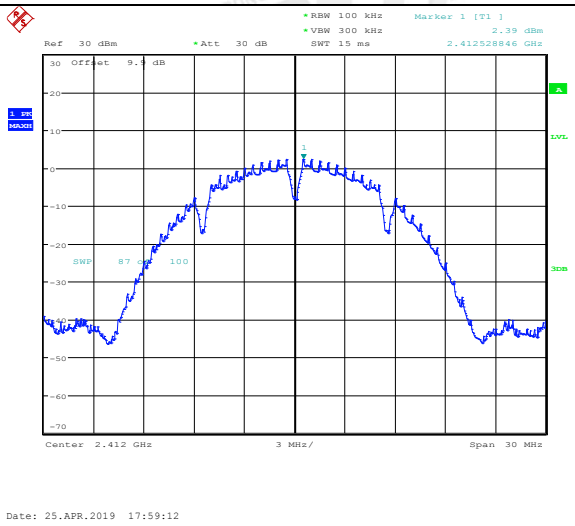


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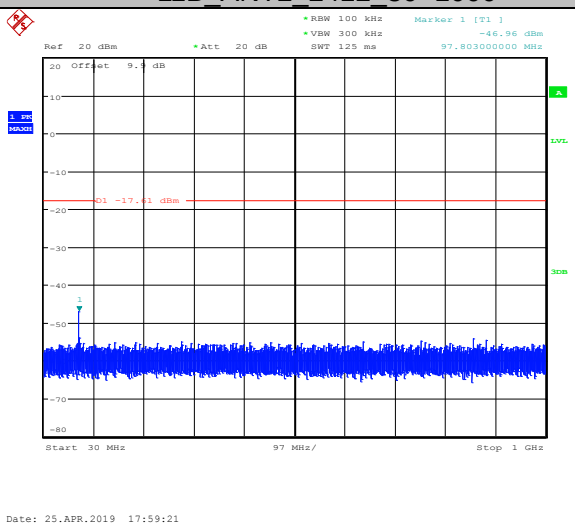


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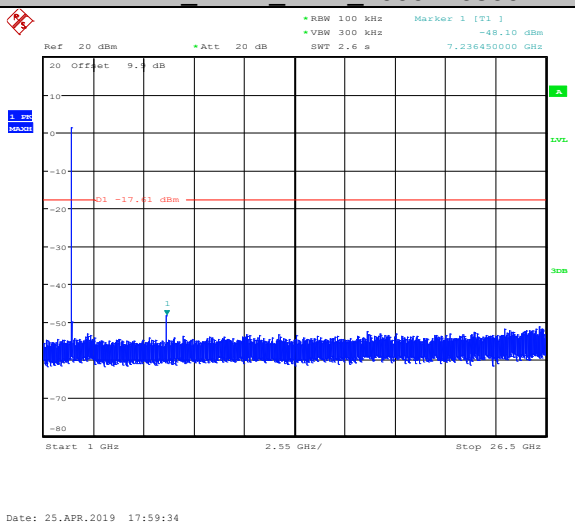


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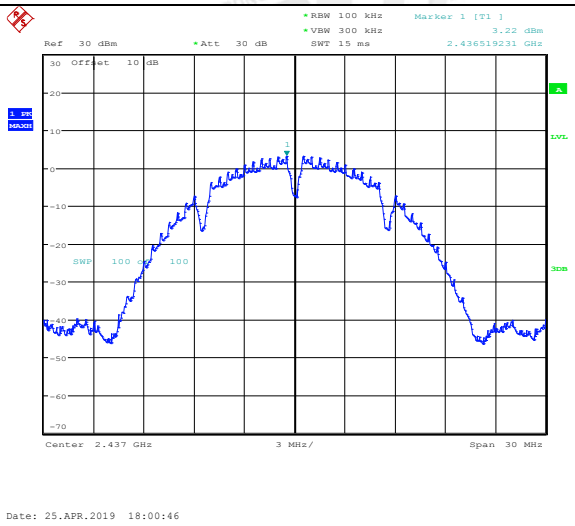


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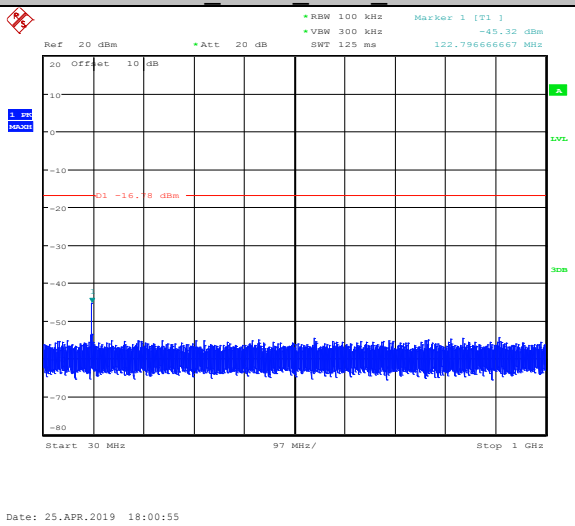


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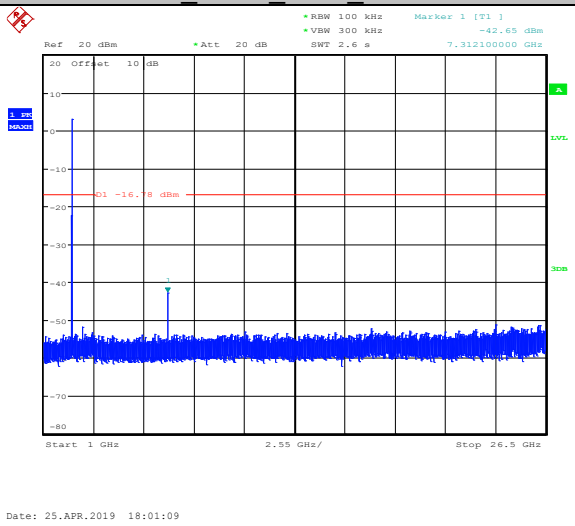


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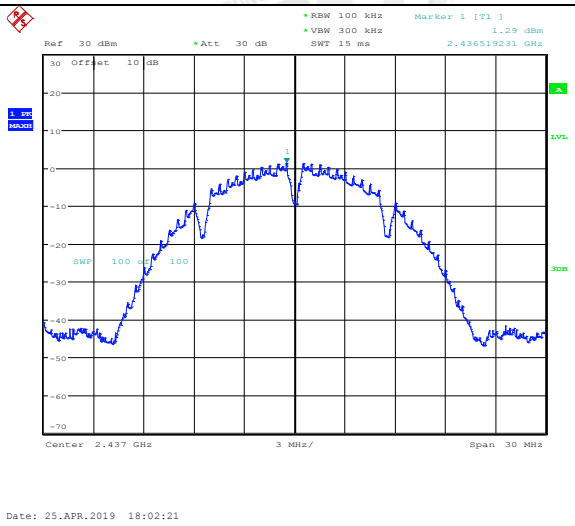


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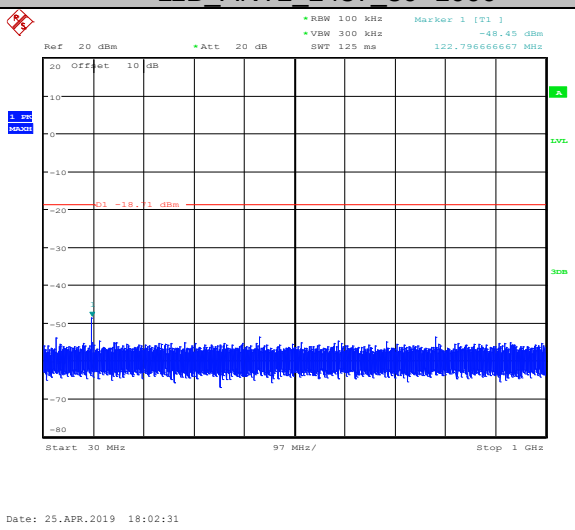


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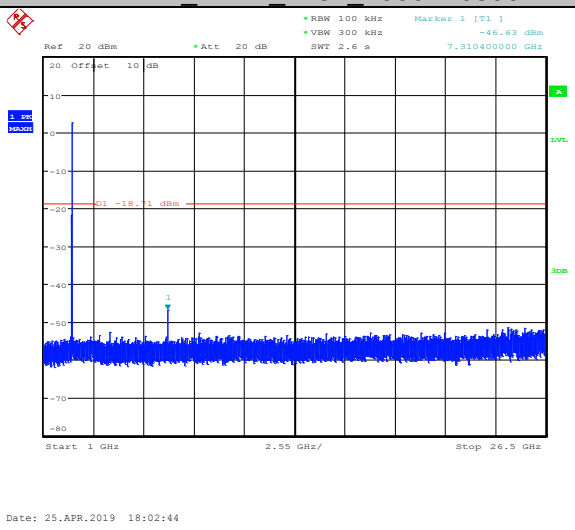


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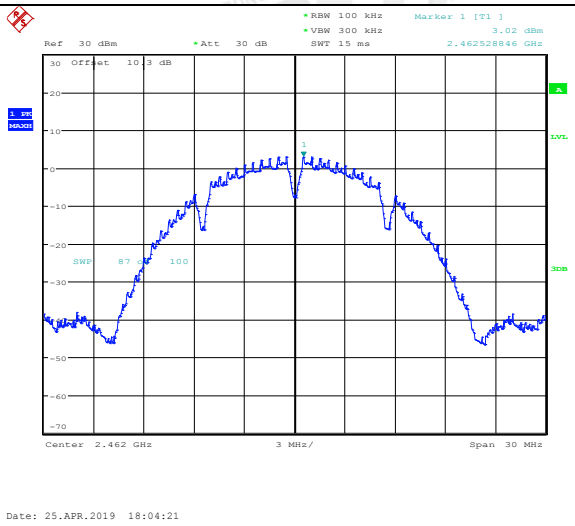


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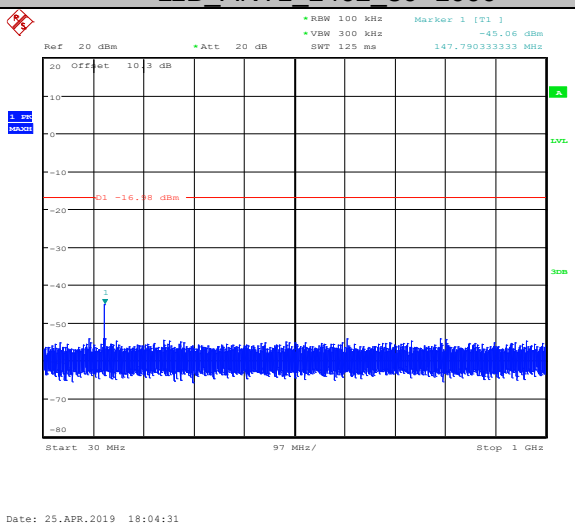


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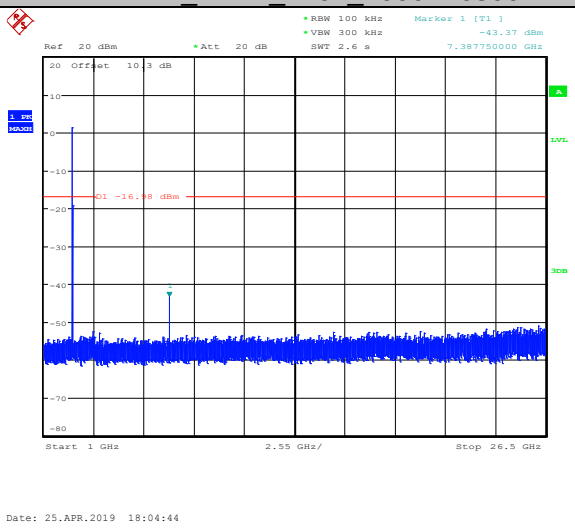


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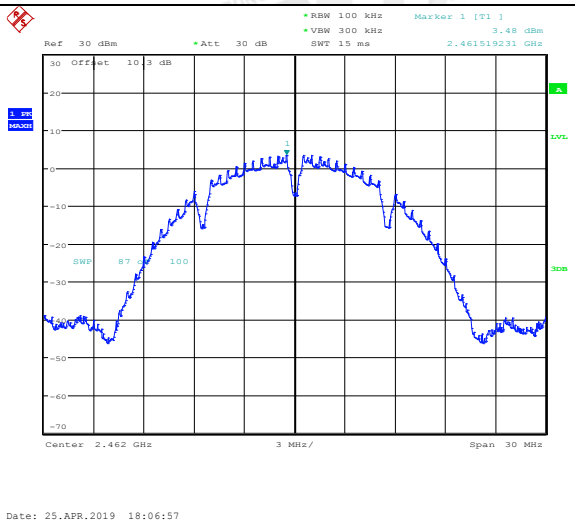


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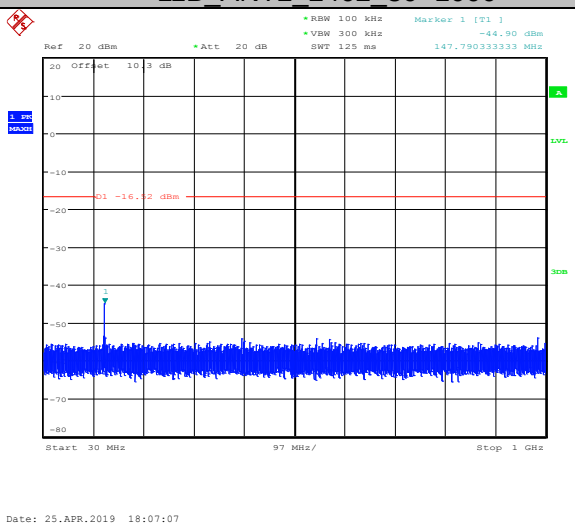


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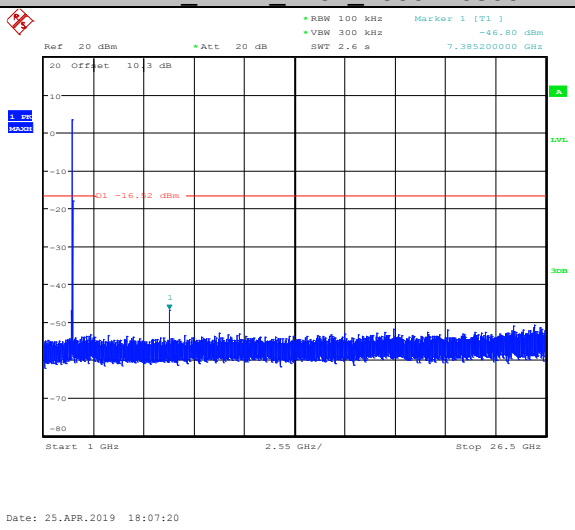
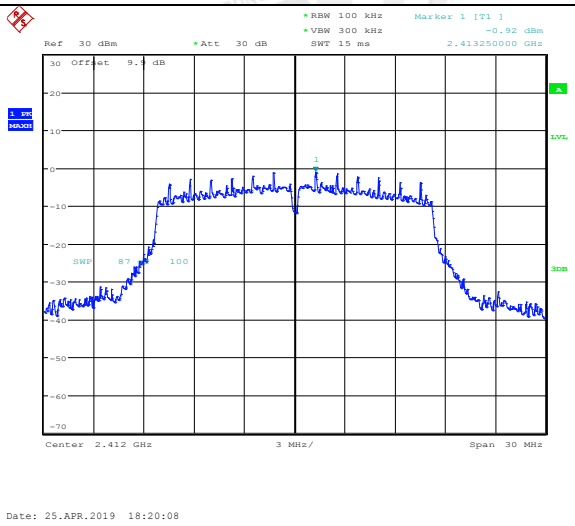
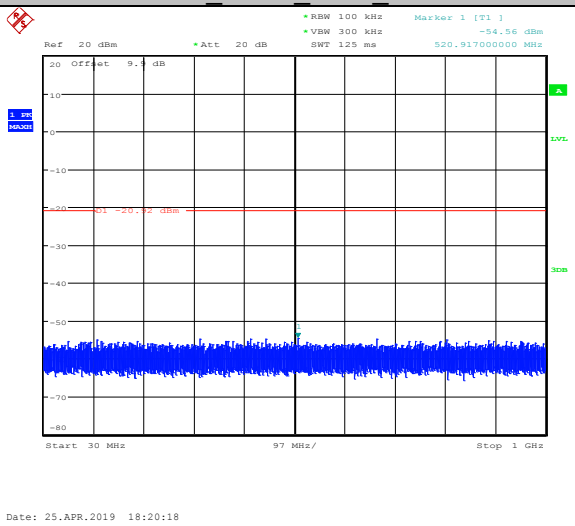


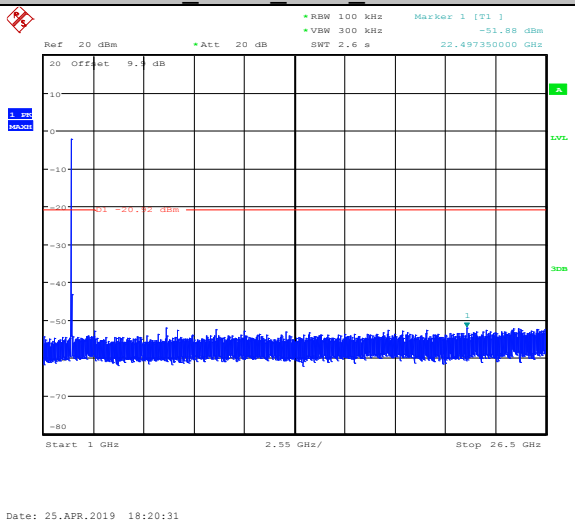

11G_ANT1_2412_Ref



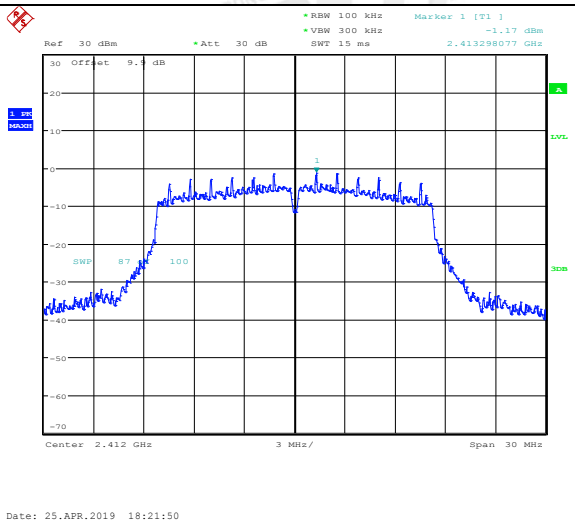

11G_ANT1_2412_30~1000




11G_ANT1_2412_1000~26500




11G_ANT2_2412_Ref

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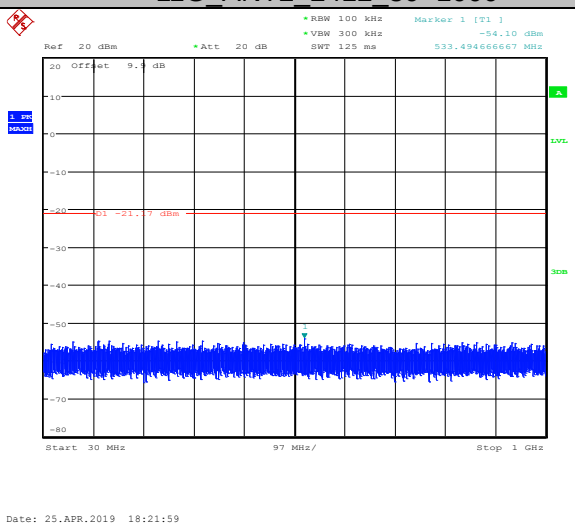


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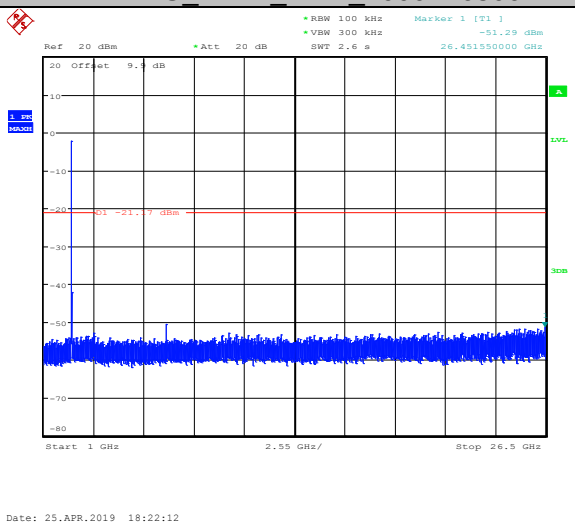
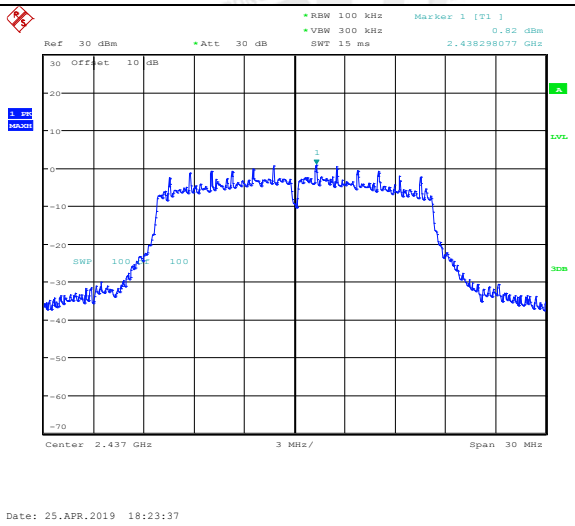
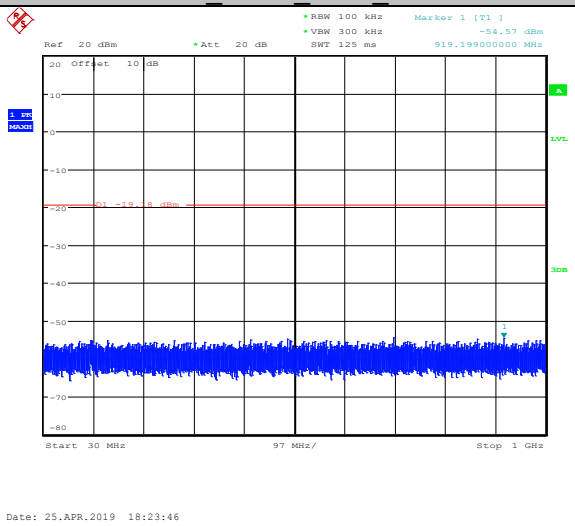


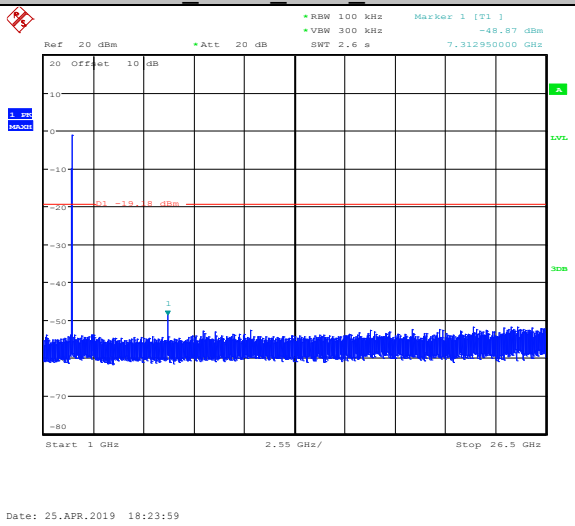

11G_ANT1_2437_Ref



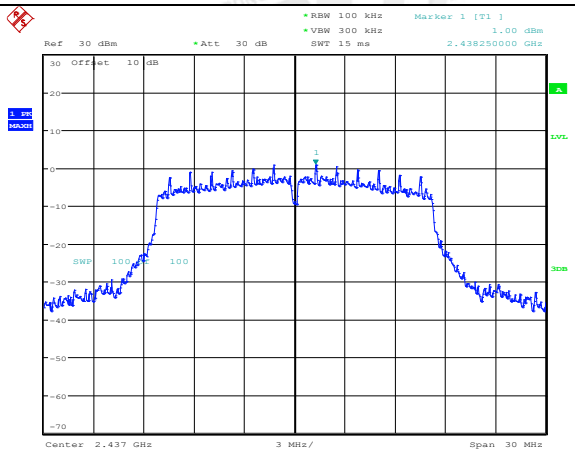

11G_ANT1_2437_30~1000



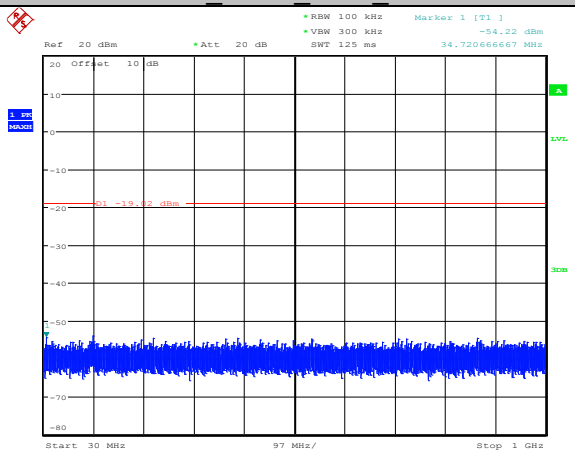

11G_ANT1_2437_1000~26500



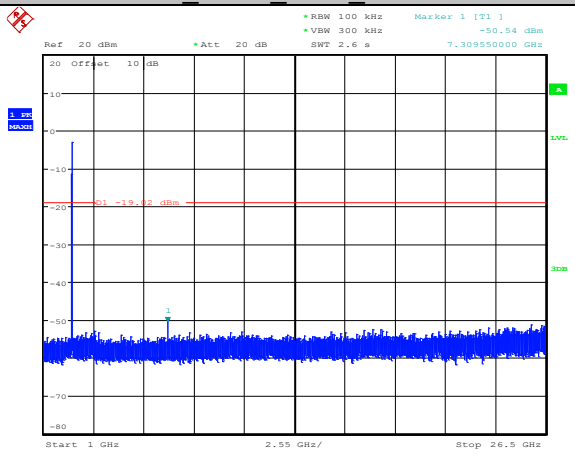

11G_ANT2_2437_Ref



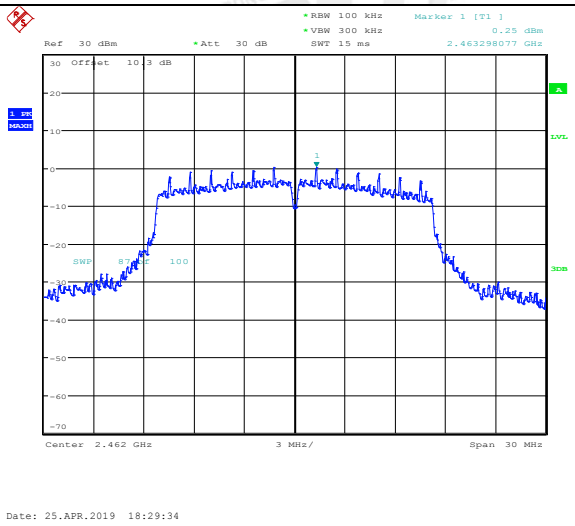

11G_ANT2_2437_30~1000




11G_ANT2_2437_1000~26500




11G_ANT1_2462_Ref

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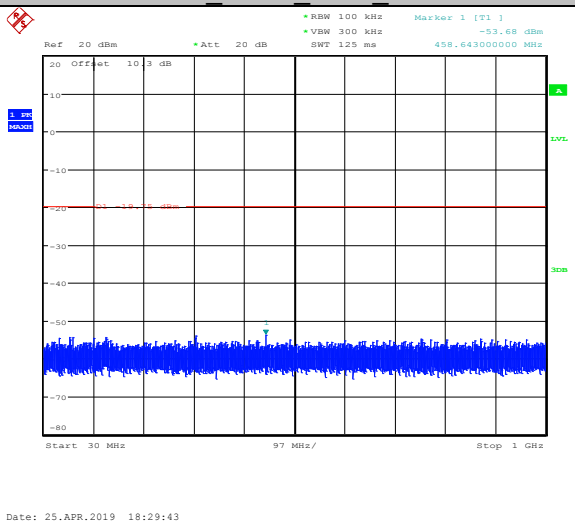


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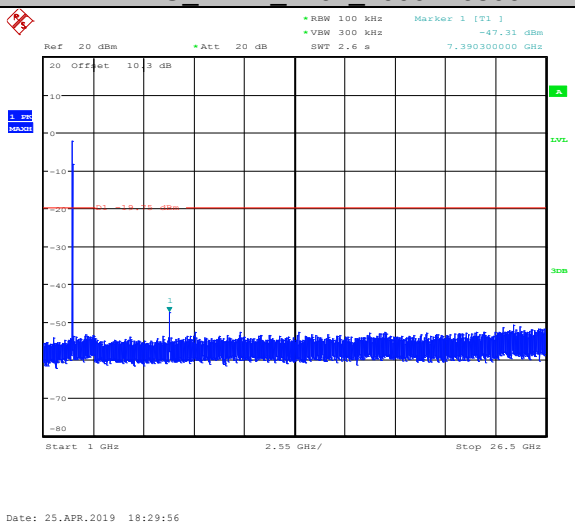


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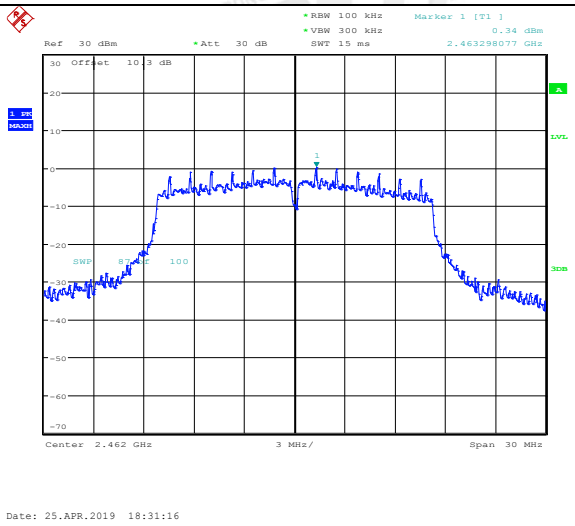


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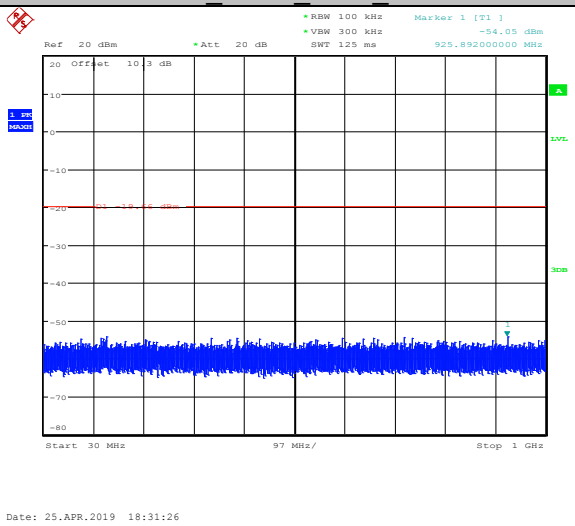


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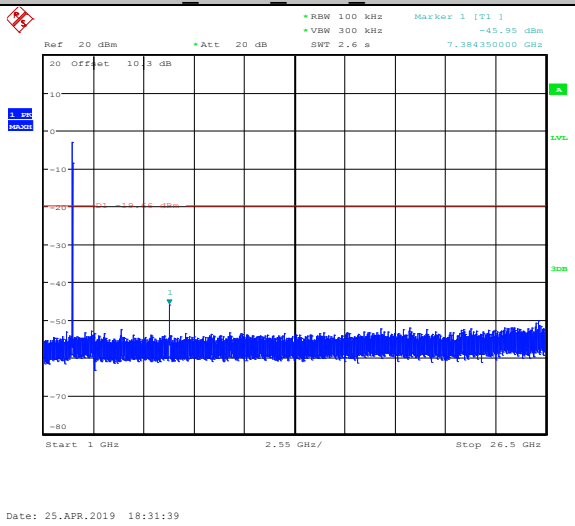


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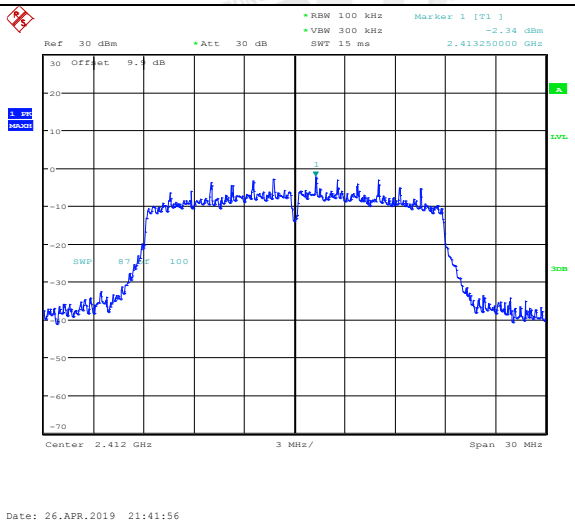


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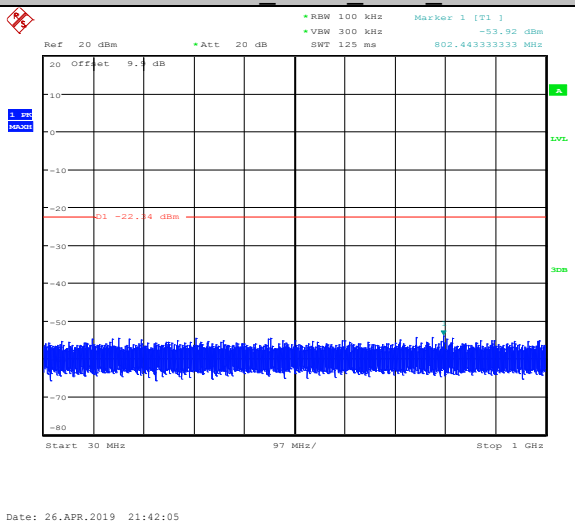


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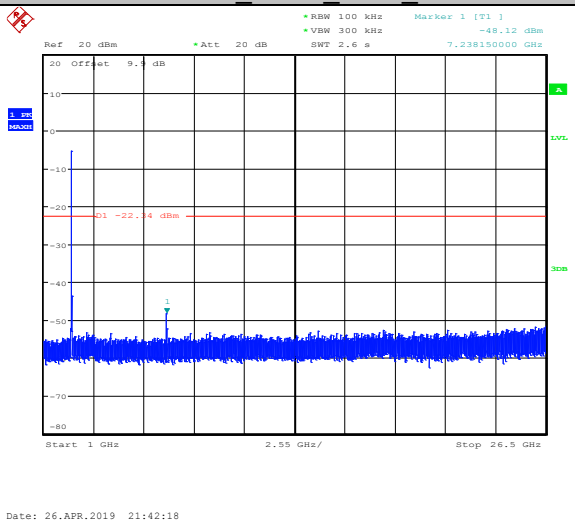


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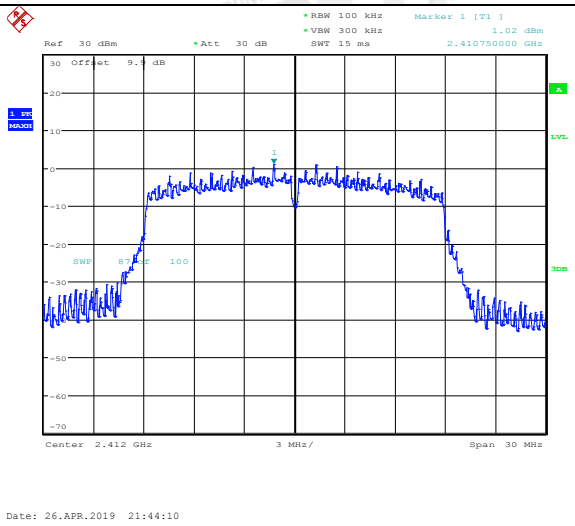


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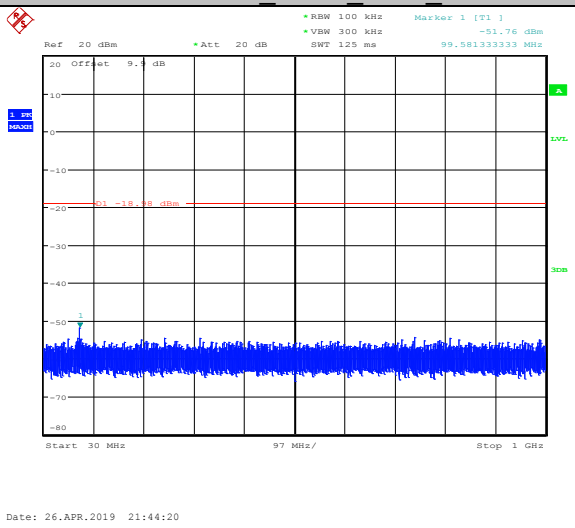


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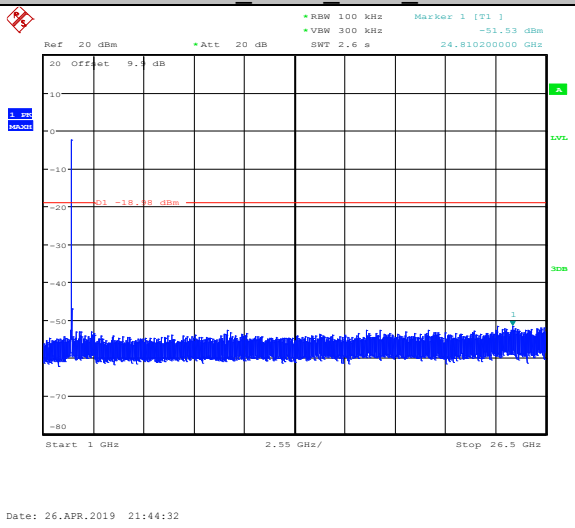


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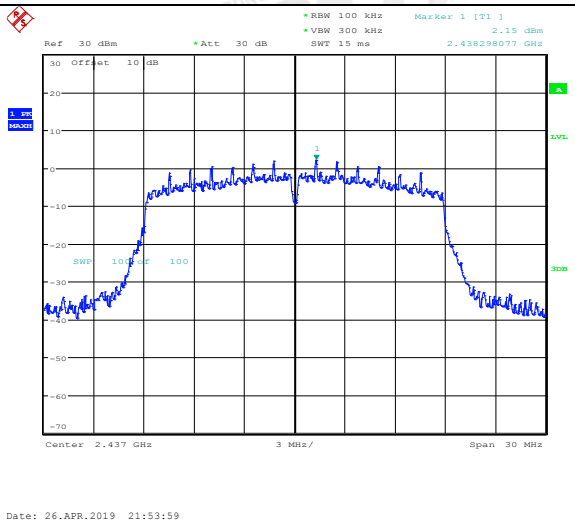


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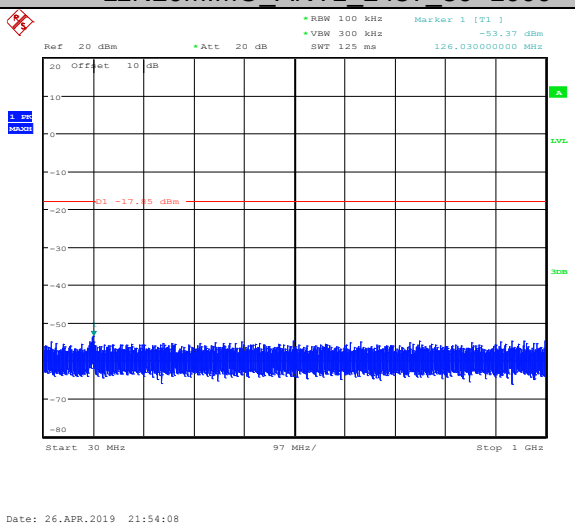


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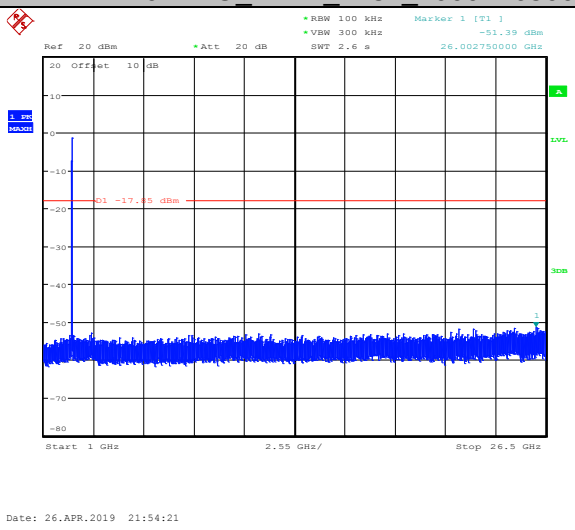


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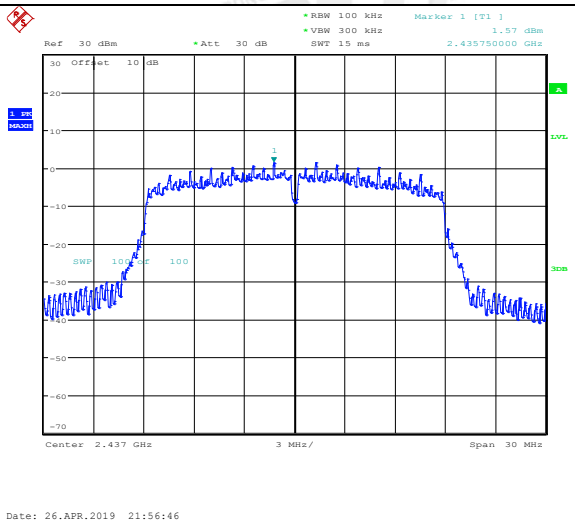


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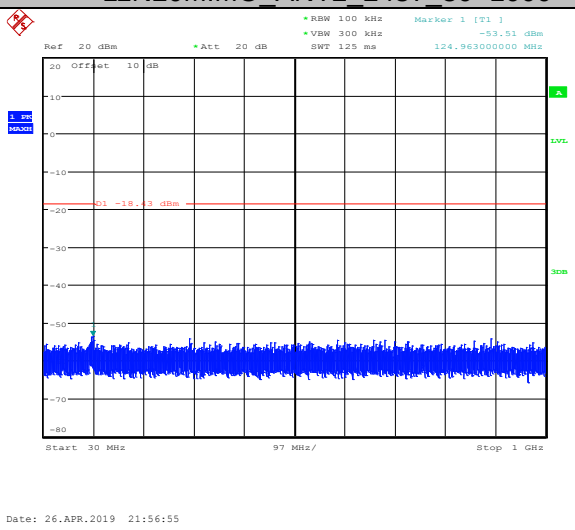


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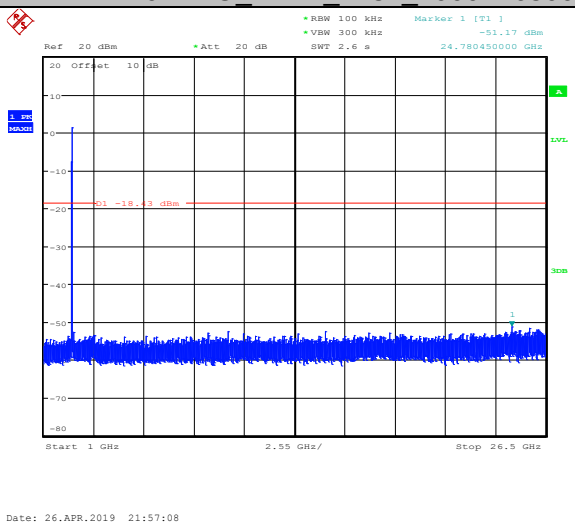


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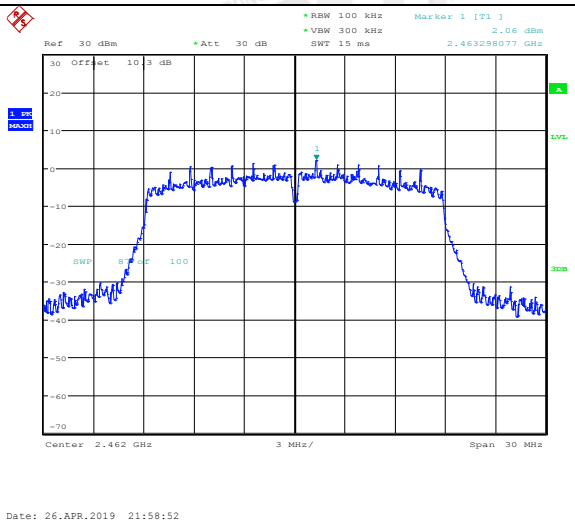


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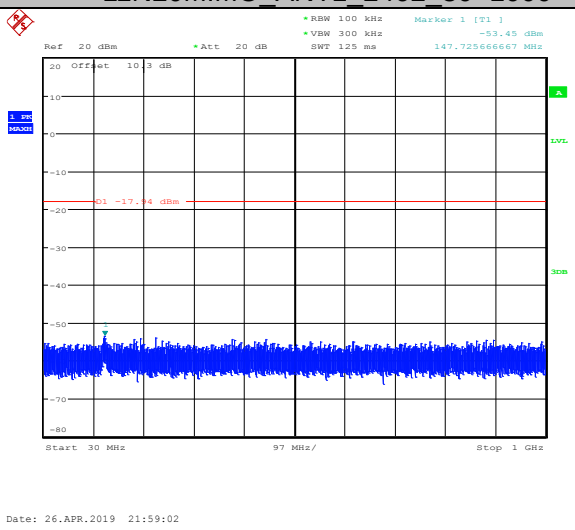


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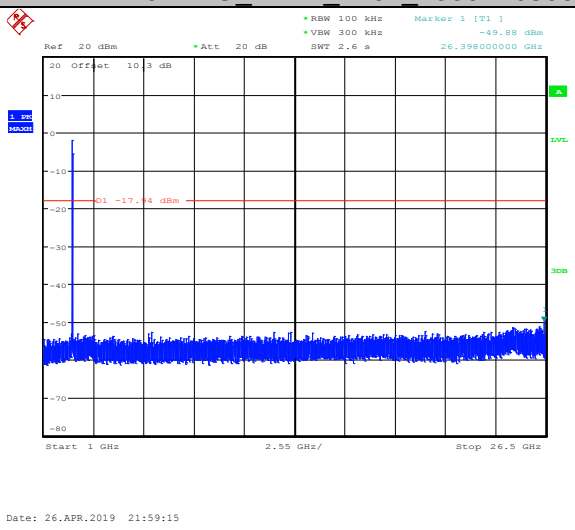


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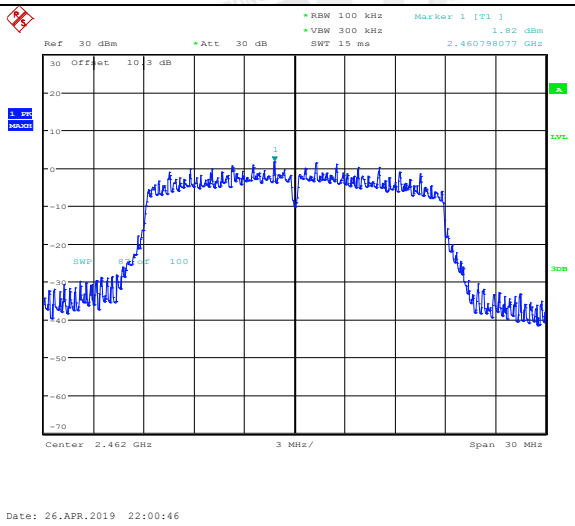


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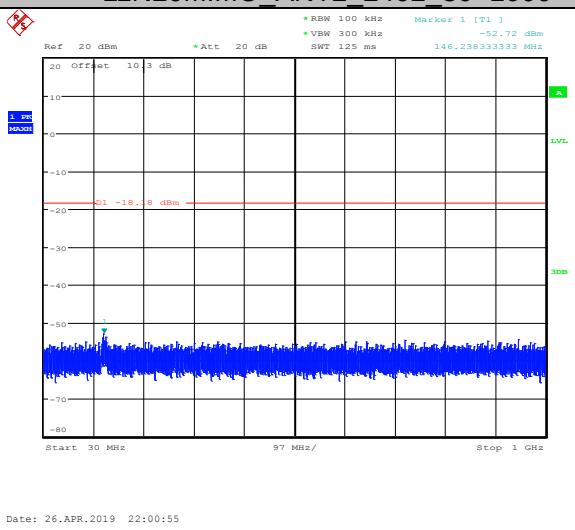


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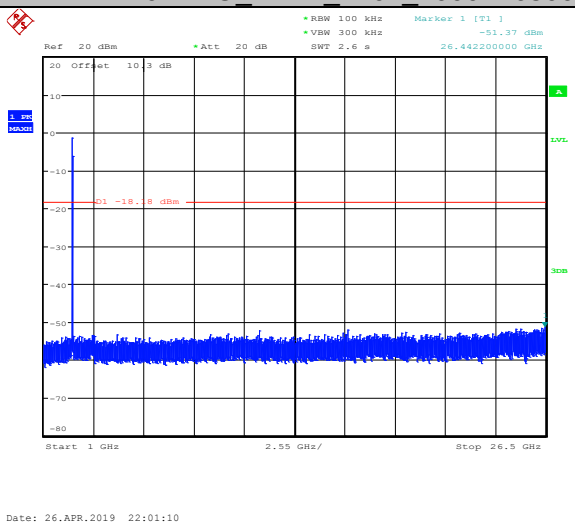


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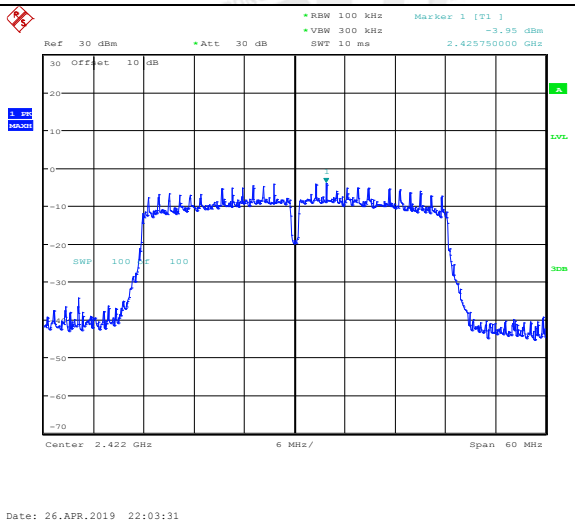


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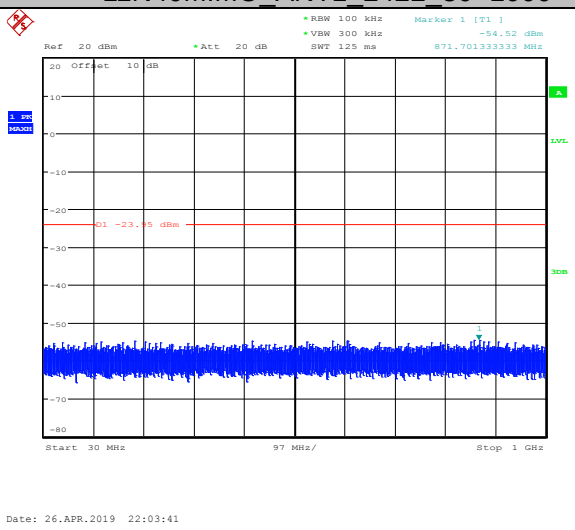


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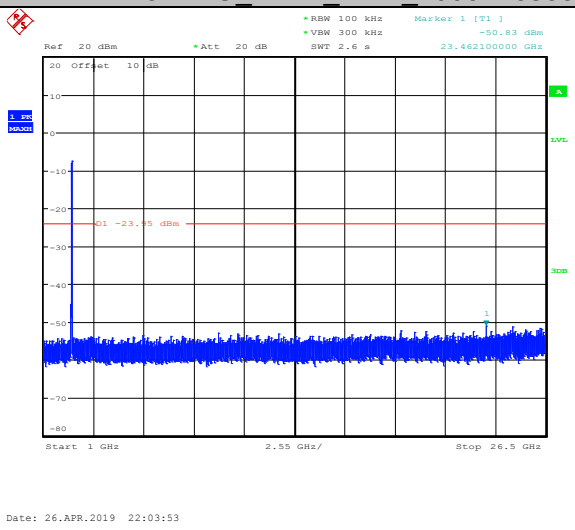


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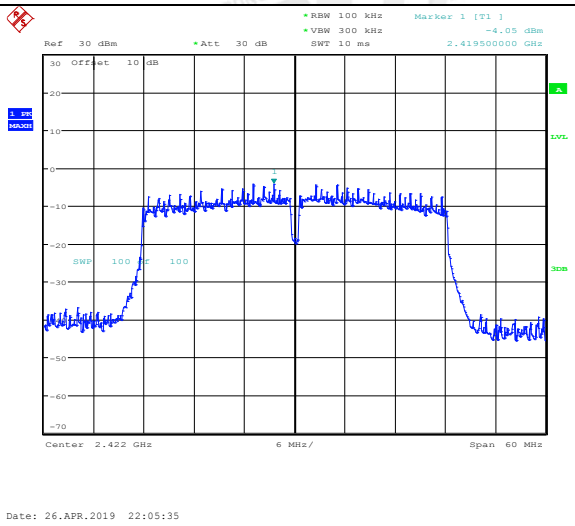


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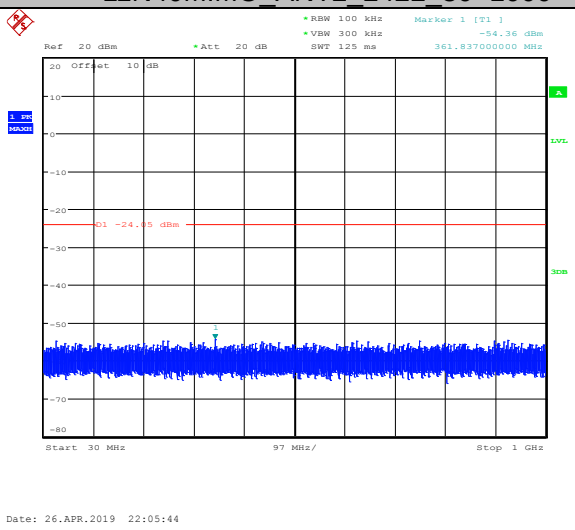


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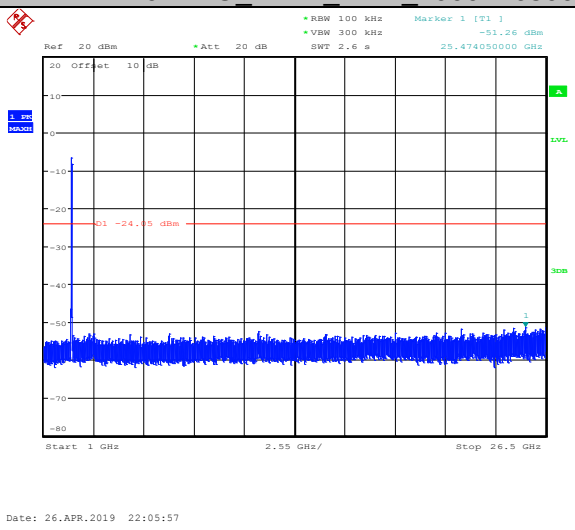


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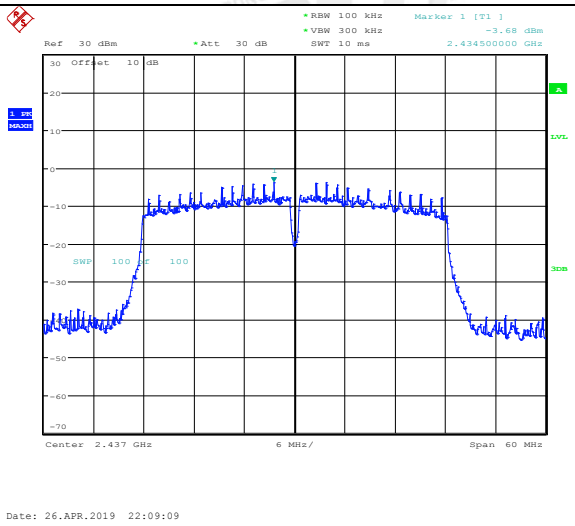


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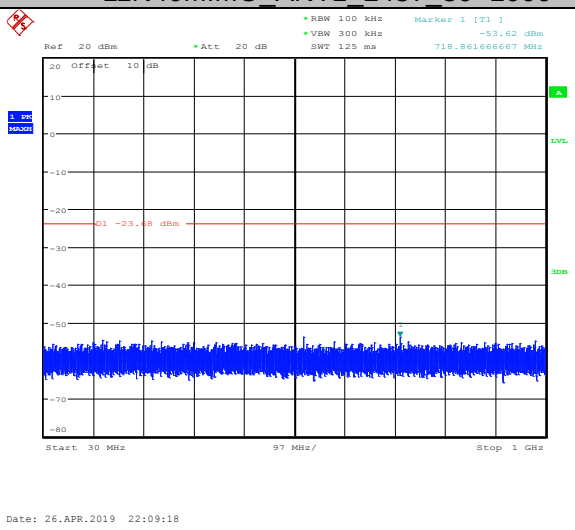


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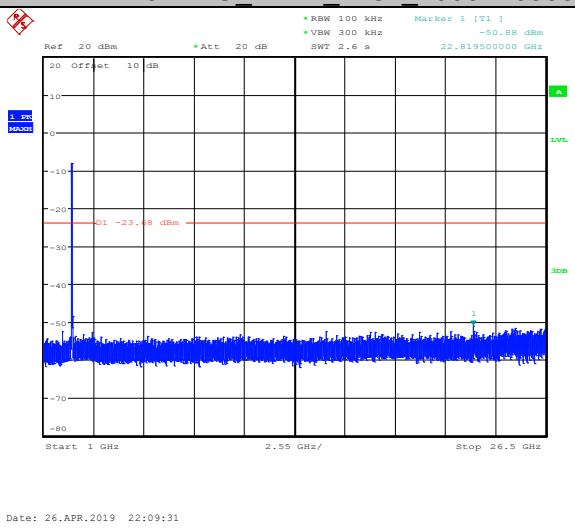


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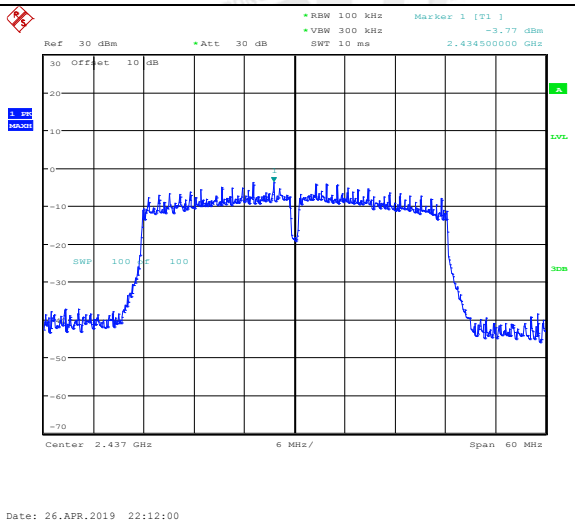


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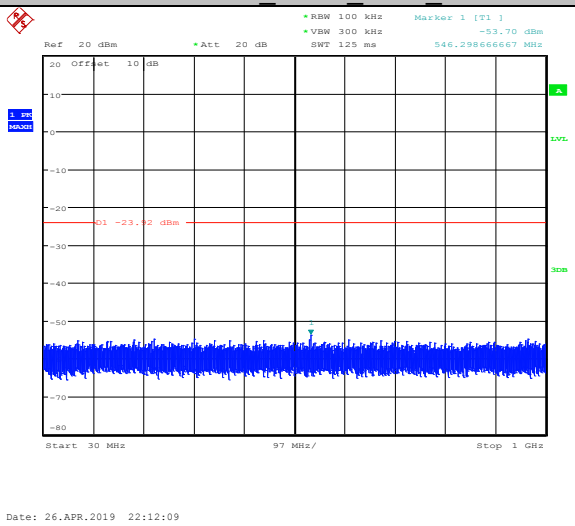


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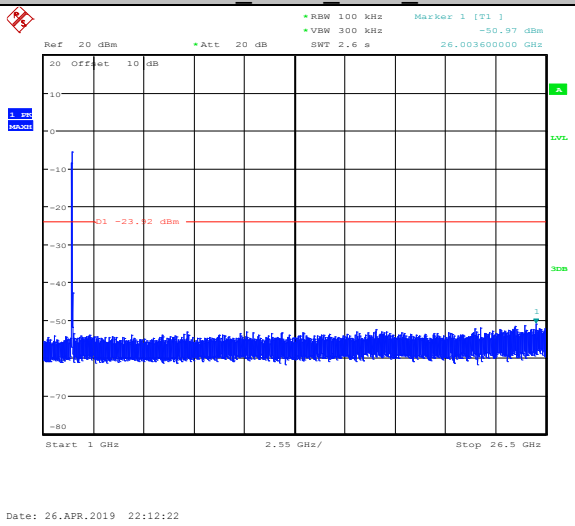


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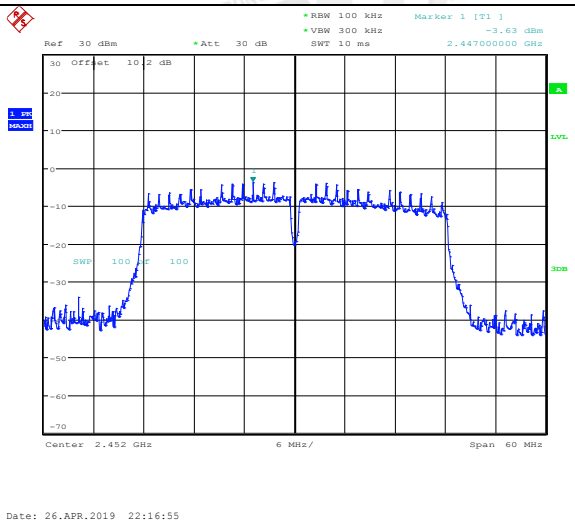


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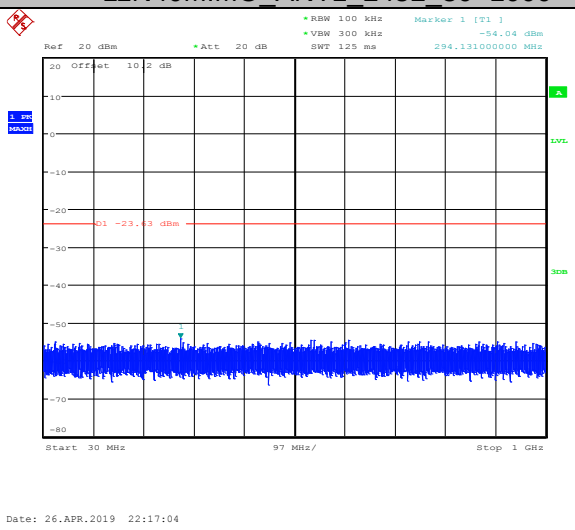


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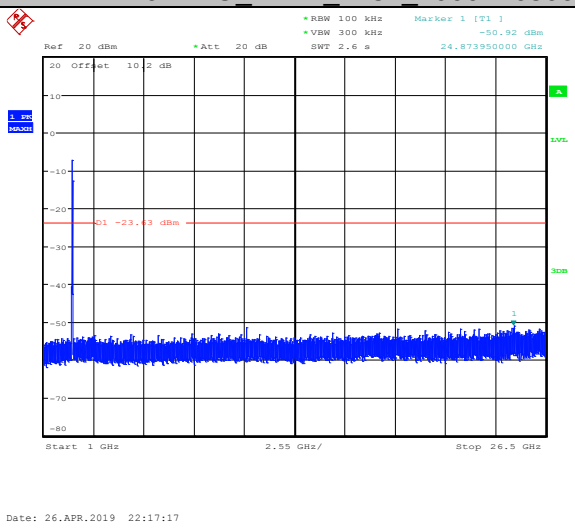


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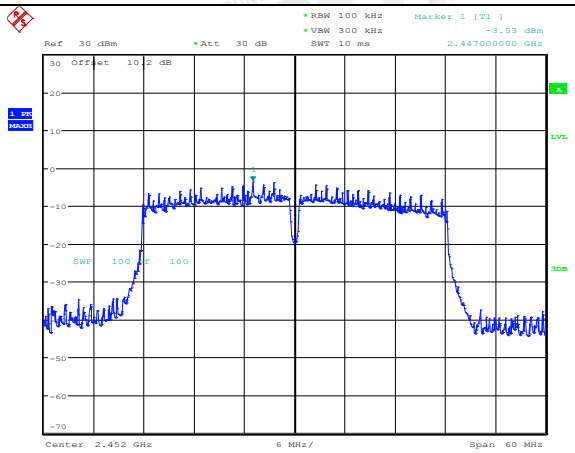


Date: 26.APR.2019 22:18:53

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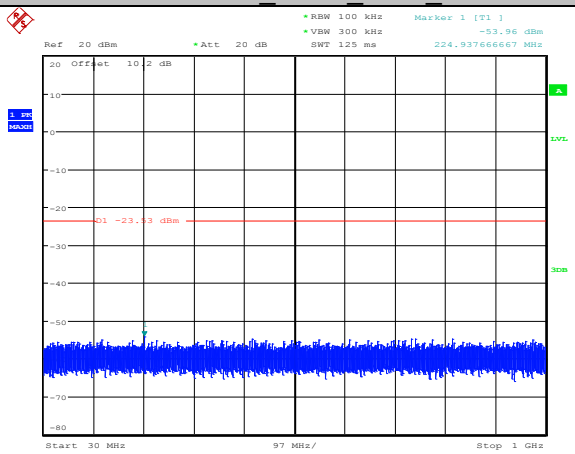


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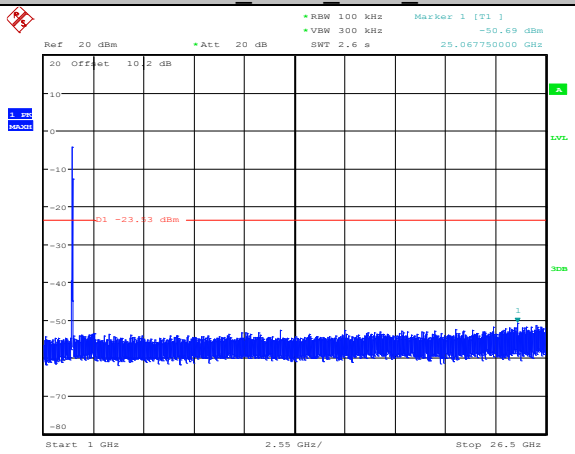
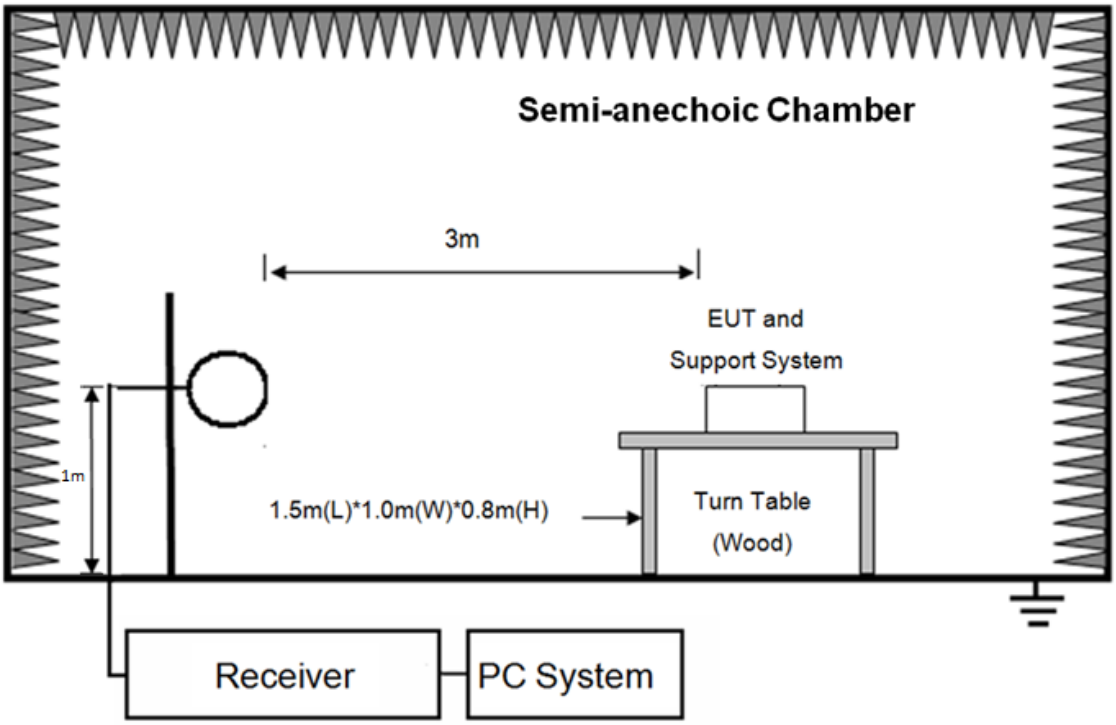



Date: 26.APR.2019 22:19:15

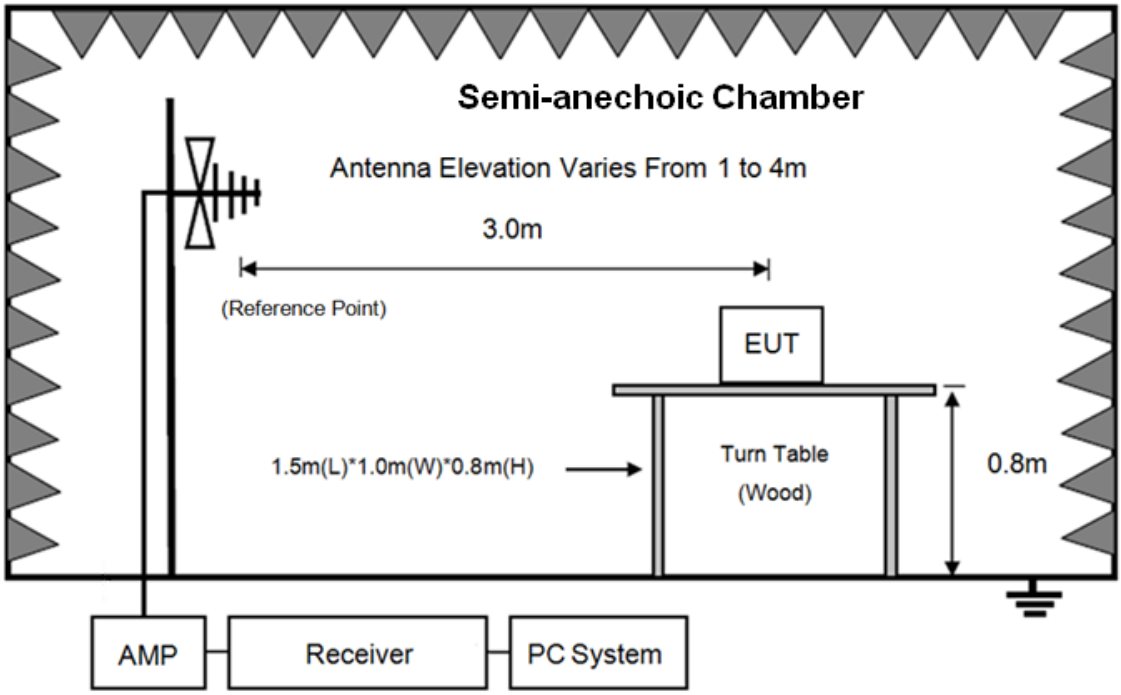
# 8. Radiated Spurious Emissions

## 8.1. Block diagram of test setup

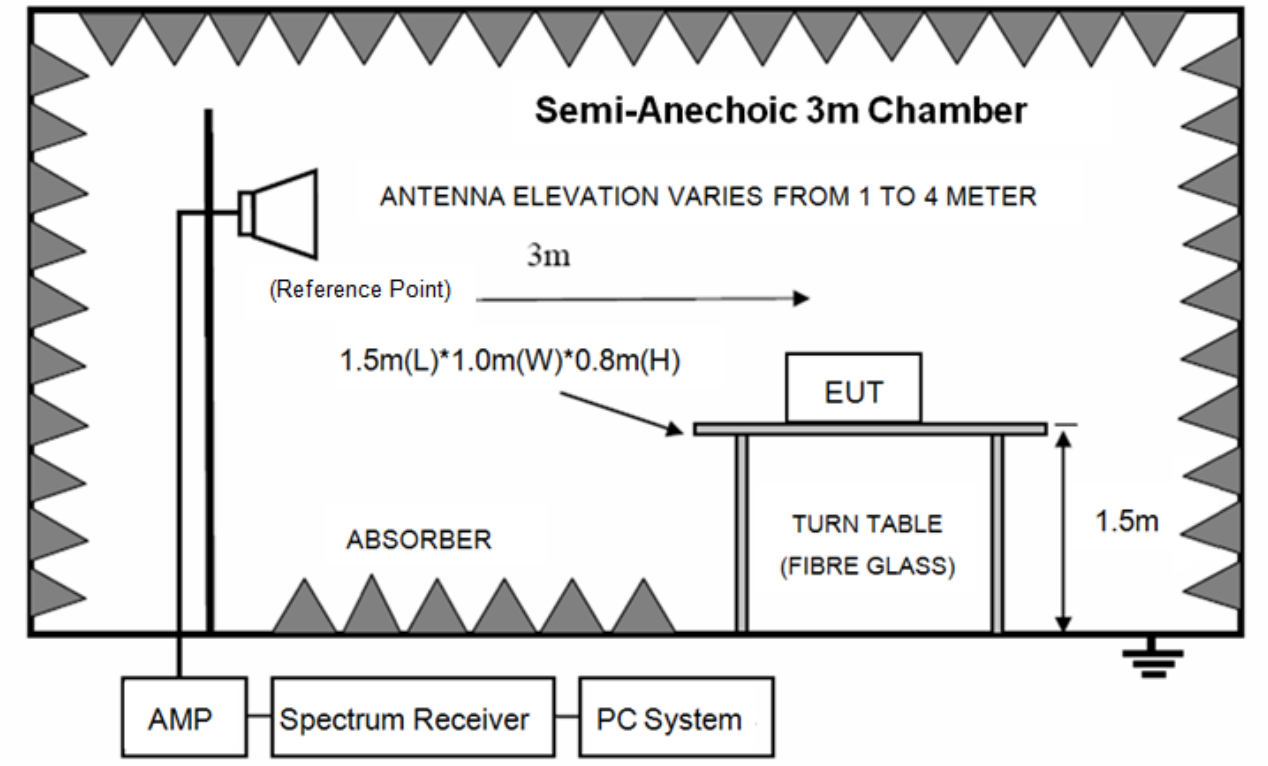
In 3m Anechoic Chamber Test Setup Diagram for 9 kHz-30 MHz




In 3m Anechoic Chamber Test Setup Diagram for 30MHz-1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz




Note: For harmonic emissions test an appropriate high pass filter was inserted in the input port of AMP.

## 8.2. Limit

8.2.1 FCC 15.205 Restricted frequency band

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| 10.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.1772&4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.2072&4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.215-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | ([2]) |
| 13.36-13.41 | | | |

8.2.2 FCC 15.209 Limit.

| FREQUENCY MHz | DISTANCE Meters | FIELD STRENGTHS LIMIT | |
|---|---|---|---|
| | | μV/m | dB(μV)/m |
| 0.009 ~ 0.490 | 300 | 2400/F(kHz) | 67.6-20log(F) |
| 0.490 ~ 1.705 | 30 | 24000/F(kHz) | 87.6-20log(F) |
| 1.705 ~ 30.0 | 30 | 30 | 29.54 |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | 74.0 dB(μV)/m (Peak)<br>54.0 dB(μV)/m (Average) | |

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$Limit_{3m}(dBuV/m) = Limit_{30m}(dBuV/m) + 40Log(30m/3m)$$

8.2.3 Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions or comply with 15.209 limits.

## 8.3. Test Procedure

(1) EUT height should be 0.8 m for below 1 GHz at a semi‐anechoic chamber while EUT height should be 1.5 m for above 1 GHz at full chamber or semi‐anechoic chamber ground with absorbers.

(2) The antenna used as below table.

| Test frequency range | Test antenna used | Measuring distance |
|---|---|---|
| 9 kHz-30 MHz | Active Loop antenna | 3 m |
| 30 MHz-1 GHz | Trilog Broadband Antenna | 3 m |
| 1 GHz-18 GHz | Double Ridged Horn Antenna(1GHz-18GHz) | 3 m |
| 18 GHz-40 GHz | Horn Antenna(18GHz-40GHz) | 1 m |

According ANSI C63.10:2013 clause 6.4.4.2 and 6,5.3, for measurements below 30 MHz, the

loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30 MHz, the Trilog Broadband Antenna or Horn Antenna was located 3 m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 25 GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1 m to 4 m (Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9 kHz to 25 GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18GHz to 25GHz, so below final test was performed with frequency range from 9kHz to 18GHz.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.

(5) The emissions from 9 kHz to 1 GHz were measured based on CISPR QP detector except for the frequency bands 9-90 kHz, 110-490 kHz, for emissions from 9 kHz-90 kHz,110 kHz-490 kHz and above 1 GHz were measured based on average detector, for emissions above 1 GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9 kHz to 1 GHz, QP or average values were measured with EMI receiver with below RBW

| Frequency band | RBW |
|---|---|
| 9 kHz-150 kHz | 200 Hz |
| 150 kHz-30 MHz | 9 kHz |
| 30 MHz-1 GHz | 120 kHz |

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz, VBW is set at 3 MHz for Peak measure; RMS

detector RBW 1 MHz VBW 10 Hz for Average measure (according ANSI C63.10:2013 clause 4.2.3.2.3 procedure for average measure).

## 8.4. Test result

### PASS. (See below detailed test result)

All the emissions except fundamental emission from 9 kHz to 25 GHz were comply with 15.209 limit.

Note1: According exploratory test no any obvious emission was detected from 9 kHz to 30 MHz and 18 GHz to 25 GHz, so the final test was performed with frequency range from 30 MHz to 18 GHz and recorded in below.

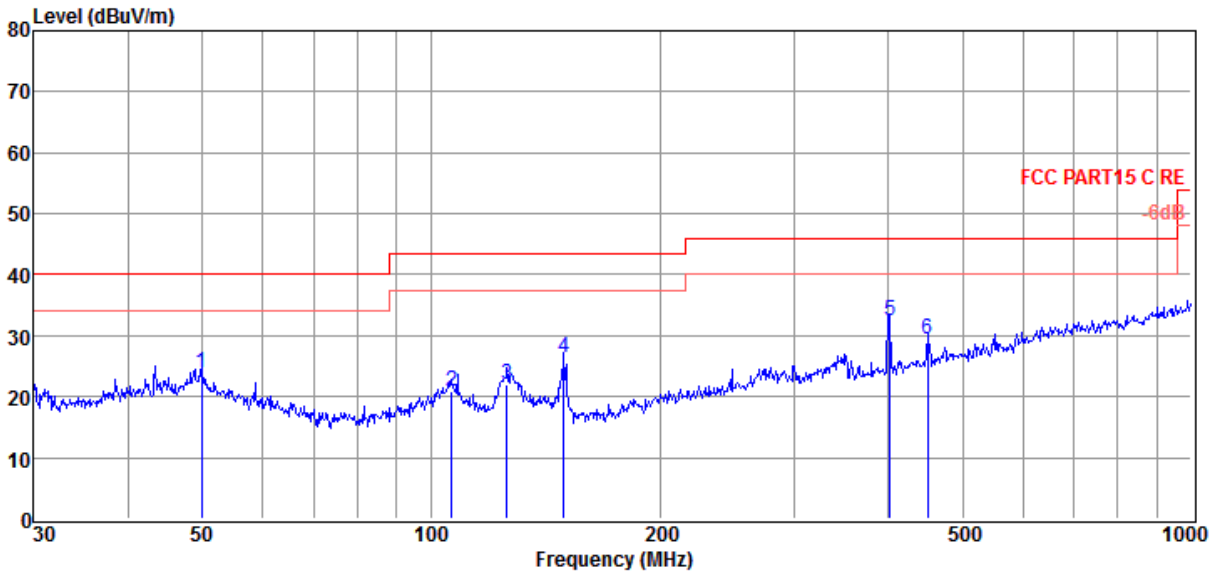
Note2: For emissions below 1 GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in ANT1, 11n HT20, Tx CH11 mode.

## Radiated Emission test (below 1GHz)

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2018 RE1# Report Data\Q18112315-1EE\RE-1.EM6 | |
| **Test Date** | : 2019-05-20 | **Tested By** | : Elosky |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:100.1kPa | **Antenna/Distance** | : 2018 VULB 9163 1#/3m/VERTICAL |
| **Memo** | : | | |

Data: 147



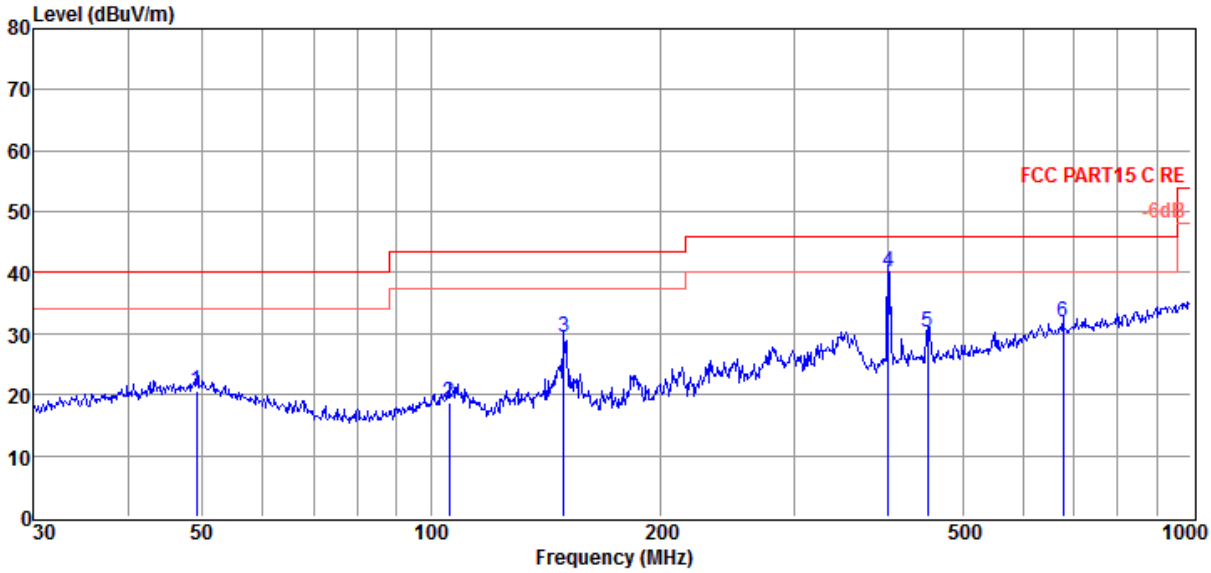

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 49.88 | 5.37 | 14.59 | 3.87 | 23.83 | 40.00 | -16.17 | QP | VERTICAL |
| 2 | 106.39 | 4.78 | 11.76 | 4.24 | 20.78 | 43.50 | -22.72 | QP | VERTICAL |
| 3 | 125.89 | 7.97 | 9.58 | 4.33 | 21.88 | 43.50 | -21.62 | QP | VERTICAL |
| 4 | 149.49 | 13.35 | 8.41 | 4.51 | 26.27 | 43.50 | -17.23 | QP | VERTICAL |
| 5 | 401.84 | 11.41 | 15.63 | 5.52 | 32.56 | 46.00 | -13.44 | QP | VERTICAL |
| 6 | 449.56 | 7.33 | 16.39 | 5.67 | 29.39 | 46.00 | -16.61 | QP | VERTICAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2018 RE1# Report Data\Q18112315-1EE\RE-1.EM6 | |
| **Test Date** | : 2019-05-20 | **Tested By** | : Elosky |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:100.1kPa | **Antenna/Distance** | : 2018 VULB 9163 1#/3m/HORIZONTAL |
| **Memo** | : | | |

Data: 148




| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 49.19 | 2.19 | 14.51 | 3.86 | 20.56 | 40.00 | -19.44 | QP | HORIZONTAL |
| 2 | 105.64 | 2.70 | 11.76 | 4.23 | 18.69 | 43.50 | -24.81 | QP | HORIZONTAL |
| 3 | 149.49 | 16.63 | 8.41 | 4.51 | 29.55 | 43.50 | -13.95 | QP | HORIZONTAL |
| 4 | 399.03 | 19.11 | 15.59 | 5.51 | 40.21 | 46.00 | -5.79 | QP | HORIZONTAL |
| 5 | 449.56 | 8.09 | 16.39 | 5.67 | 30.15 | 46.00 | -15.85 | QP | HORIZONTAL |
| 6 | 677.58 | 5.88 | 19.76 | 6.31 | 31.95 | 46.00 | -14.05 | QP | HORIZONTAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

## Radiated Emission test (above 1GHz)

| Freq (MHz) | Read level (dBμV) | Antenna Factor (dB/m) | PRM Factor(dB) | Cable Loss (dB) | Result Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector type | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| **11n HT20 CH1** | | | | | | | | | |
| 6797.00 | 43.56 | 35.48 | 43.61 | 12.35 | 47.78 | 74.00 | -26.22 | Peak | HORIZONTAL |
| 8871.00 | 42.65 | 36.80 | 43.56 | 13.99 | 49.88 | 74.00 | -24.12 | Peak | HORIZONTAL |
| 10656.00 | 42.76 | 37.64 | 43.91 | 15.81 | 52.30 | 74.00 | -21.70 | Peak | HORIZONTAL |
| 11761.00 | 38.26 | 38.28 | 43.62 | 17.45 | 50.37 | 74.00 | -23.63 | Peak | HORIZONTAL |
| 13478.00 | 36.79 | 38.97 | 43.22 | 19.51 | 52.05 | 74.00 | -21.95 | Peak | HORIZONTAL |
| 15144.00 | 34.28 | 40.64 | 42.81 | 20.39 | 52.50 | 74.00 | -21.50 | Peak | HORIZONTAL |
| 6729.00 | 43.82 | 35.44 | 43.64 | 12.15 | 47.77 | 74.00 | -26.23 | Peak | VERTICAL |
| 8412.00 | 42.52 | 36.71 | 43.33 | 13.62 | 49.52 | 74.00 | -24.48 | Peak | VERTICAL |
| 10350.00 | 41.68 | 37.61 | 44.00 | 15.42 | 50.71 | 74.00 | -23.29 | Peak | VERTICAL |
| 11727.00 | 38.85 | 38.32 | 43.63 | 17.40 | 50.94 | 74.00 | -23.06 | Peak | VERTICAL |
| 13410.00 | 36.75 | 38.88 | 43.23 | 19.42 | 51.82 | 74.00 | -22.18 | Peak | VERTICAL |
| 15127.00 | 32.75 | 40.65 | 42.82 | 20.35 | 50.93 | 74.00 | -23.07 | Peak | VERTICAL |
| **11n HT20 CH6** | | | | | | | | | |
| 6406.00 | 44.07 | 35.19 | 43.80 | 12.06 | 47.52 | 74.00 | -26.48 | Peak | HORIZONTAL |
| 8939.00 | 43.16 | 36.80 | 43.60 | 14.12 | 50.48 | 74.00 | -23.52 | Peak | HORIZONTAL |
| 10690.00 | 42.07 | 37.62 | 43.90 | 15.85 | 51.64 | 74.00 | -22.36 | Peak | HORIZONTAL |
| 13206.00 | 37.97 | 38.59 | 43.28 | 19.14 | 52.42 | 74.00 | -21.58 | Peak | HORIZONTAL |
| 15161.00 | 33.46 | 40.63 | 42.80 | 20.43 | 51.72 | 74.00 | -22.28 | Peak | HORIZONTAL |
| 16657.00 | 28.58 | 42.35 | 41.92 | 22.71 | 51.72 | 74.00 | -22.28 | Peak | HORIZONTAL |
| 6848.00 | 44.37 | 35.51 | 43.59 | 12.34 | 48.63 | 74.00 | -25.37 | Peak | VERTICAL |
| 9415.00 | 44.07 | 37.06 | 43.83 | 14.85 | 52.15 | 74.00 | -21.85 | Peak | VERTICAL |
| 10758.00 | 41.06 | 37.60 | 43.88 | 15.93 | 50.71 | 74.00 | -23.29 | Peak | VERTICAL |
| 12747.00 | 37.83 | 38.20 | 43.38 | 18.60 | 51.25 | 74.00 | -22.75 | Peak | VERTICAL |
| 14124.00 | 34.62 | 40.23 | 43.08 | 20.20 | 51.97 | 74.00 | -22.03 | Peak | VERTICAL |
| 15892.00 | 31.28 | 41.05 | 42.36 | 22.16 | 52.13 | 74.00 | -21.87 | Peak | VERTICAL |
| **11n HT20 CH11** | | | | | | | | | |
| 5556.00 | 46.56 | 34.35 | 44.08 | 11.06 | 47.89 | 74.00 | -26.11 | Peak | HORIZONTAL |
| 7409.00 | 44.35 | 35.85 | 43.34 | 13.09 | 49.95 | 74.00 | -24.05 | Peak | HORIZONTAL |
| 9483.00 | 44.53 | 37.10 | 43.86 | 14.65 | 52.42 | 74.00 | -21.58 | Peak | HORIZONTAL |
| 11727.00 | 37.60 | 38.32 | 43.63 | 17.40 | 49.69 | 74.00 | -24.31 | Peak | HORIZONTAL |
| 13274.00 | 36.52 | 38.69 | 43.26 | 19.23 | 51.18 | 74.00 | -22.82 | Peak | HORIZONTAL |
| 15178.00 | 33.09 | 40.63 | 42.79 | 20.47 | 51.40 | 74.00 | -22.60 | Peak | HORIZONTAL |
| 6950.00 | 44.12 | 35.57 | 43.54 | 12.48 | 48.63 | 74.00 | -25.37 | Peak | VERTICAL |
| 8395.00 | 42.80 | 36.70 | 43.32 | 13.55 | 49.73 | 74.00 | -24.27 | Peak | VERTICAL |
| 10656.00 | 42.83 | 37.64 | 43.91 | 15.81 | 52.37 | 74.00 | -21.63 | Peak | VERTICAL |
| 12764.00 | 37.85 | 38.21 | 43.38 | 18.62 | 51.30 | 74.00 | -22.70 | Peak | VERTICAL |
| 14124.00 | 35.05 | 40.23 | 43.08 | 20.20 | 52.40 | 74.00 | -21.60 | Peak | VERTICAL |
| 16147.00 | 30.30 | 41.44 | 42.21 | 22.48 | 52.01 | 74.00 | -21.99 | Peak | VERTICAL |

Note: 1.30MHz~25GHz: (Scan with 11b mode ANT 1 and ANT 2, 11g mode ANT 1 and ANT 2, 11n HT20 mode ANT 1 and ANT 2, 11n HT40 mode ANT 1 and ANT 2, the worst case is 11n HT20 ANT 1 mode)

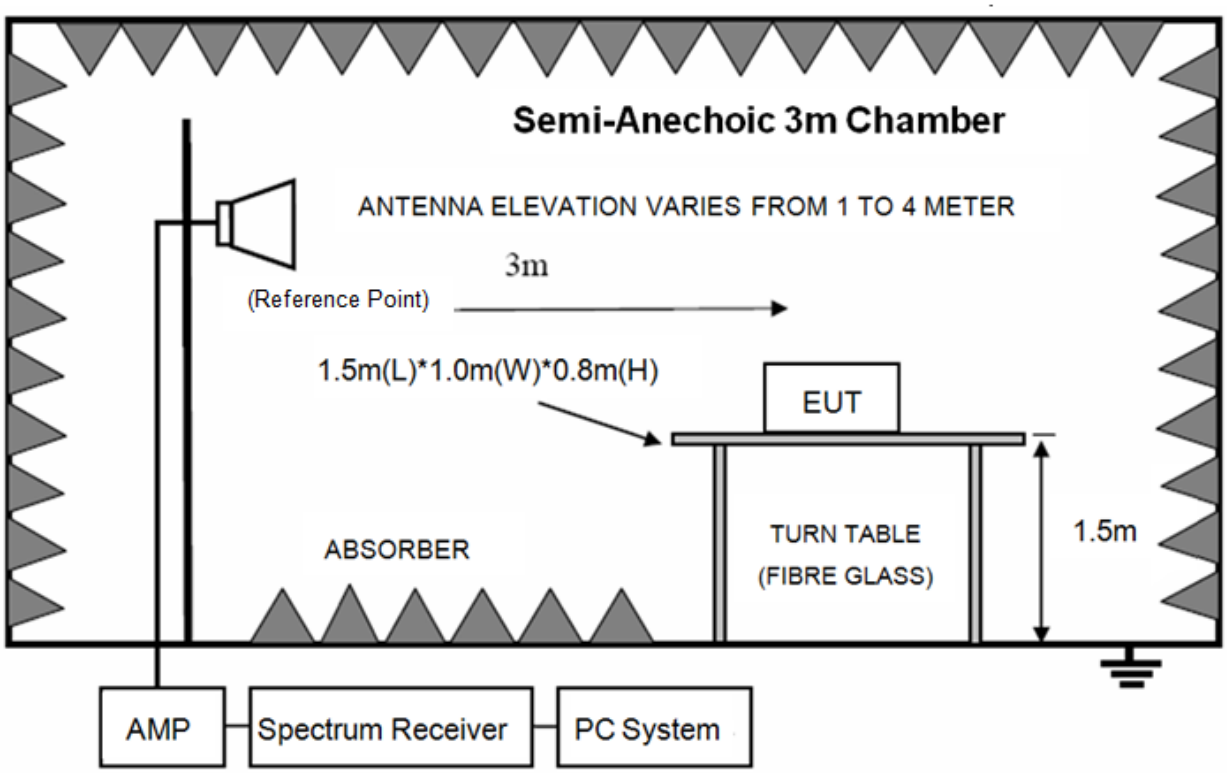
2. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. For emissions above 1GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

# 9. Radiated Band Edge Compliance

## 9.1. Block diagram of test setup




## 9.2. Limit

All restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400 MHz to 2483.5 MHz shall be at least 20dB below the fundamental emissions or comply with RSS-Gen Issue 3 clause 7.2.5 (Same as FCC 15.209) limits.

## 9.3. Test Procedure

Same with clause 8.3 except change investigated frequency range from 2310 MHz to 2430 MHz and 2445 MHz to 2500 MHz, 2310 MHz to 2450 MHz and 2425 MHz to 2500MHz.

Remark: All restriction band have been tested, and only the worst case is shown in report.

## 9.4. Test result

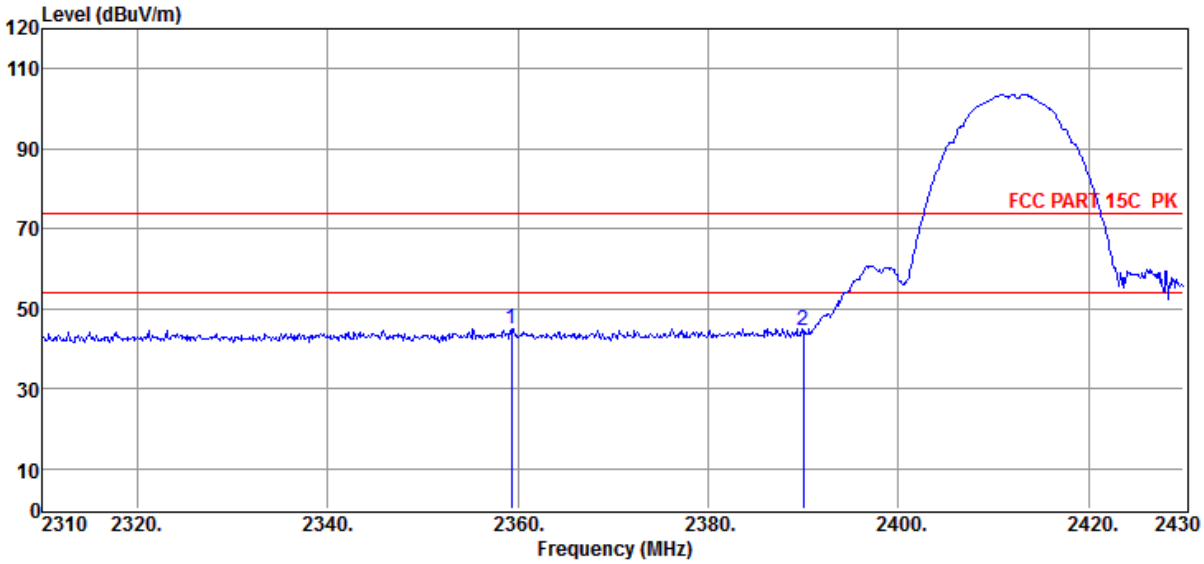
**PASS. (See below detailed test result)**

Note: 11b, 11g, n20 mode ANT 1 and ANT 2 mode all have been tested, only Ant 1 mode is worse case and reported.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/HORIZONTAL |
| **Memo** | : 11b 2412MHz | | |

Data: 25



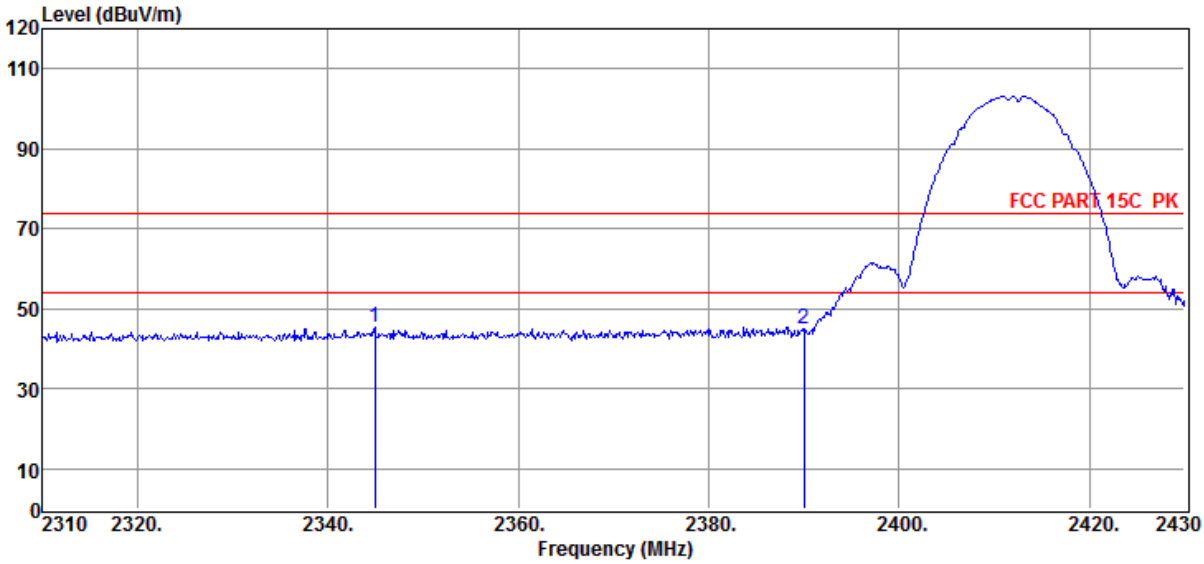

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2359.32 | 55.39 | 29.04 | 44.16 | 4.58 | 44.85 | 74.00 | -29.15 | Peak | HORIZONTAL |
| 2 | 2390.00 | 54.96 | 29.10 | 44.18 | 4.56 | 44.44 | 74.00 | -29.56 | Peak | HORIZONTAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/VERTICAL |
| **Memo** | : 11b 2412MHz | | |

Data: 26



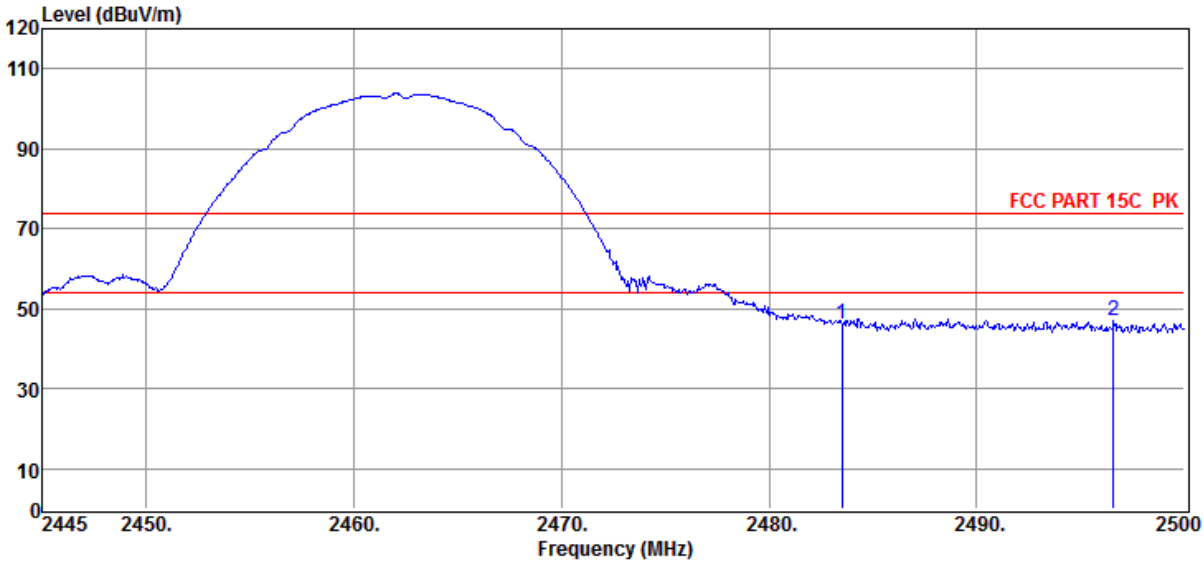

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2344.92 | 55.82 | 29.01 | 44.16 | 4.58 | 45.25 | 74.00 | -28.75 | Peak | VERTICAL |
| 2 | 2390.00 | 55.41 | 29.10 | 44.18 | 4.56 | 44.89 | 74.00 | -29.11 | Peak | VERTICAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/HORIZONTAL |
| **Memo** | : 11b 2462MHz | | |

Data: 27



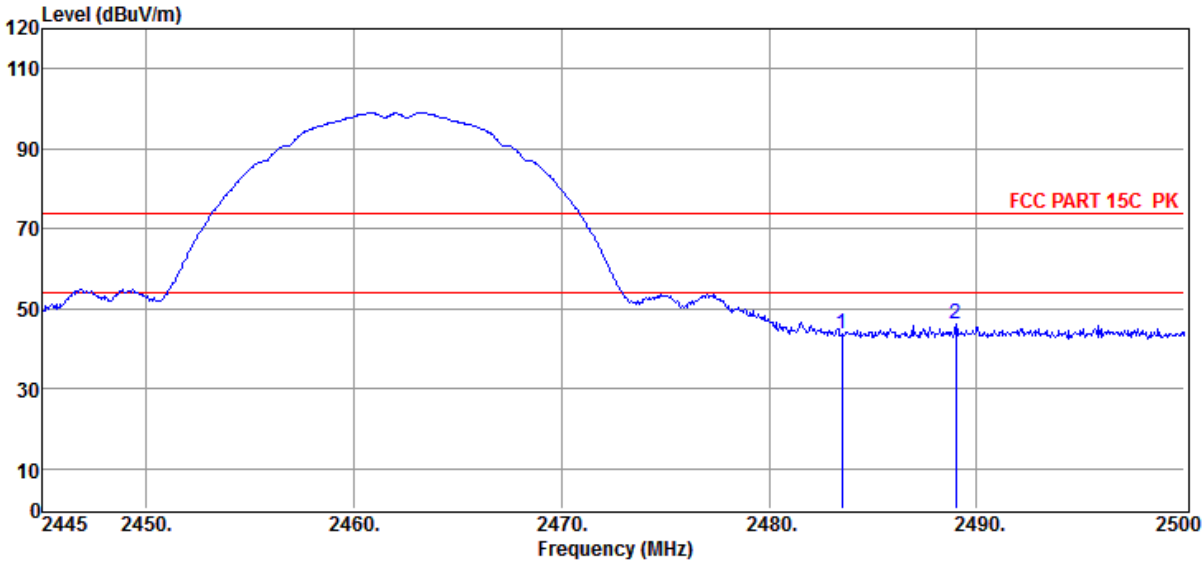

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 56.28 | 29.27 | 44.21 | 4.89 | 46.23 | 74.00 | -27.77 | Peak | HORIZONTAL |
| 2 | 2496.59 | 57.14 | 29.29 | 44.22 | 4.95 | 47.16 | 74.00 | -26.84 | Peak | HORIZONTAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/VERTICAL |
| **Memo** | : 11b 2462MHz | | |

Data: 28



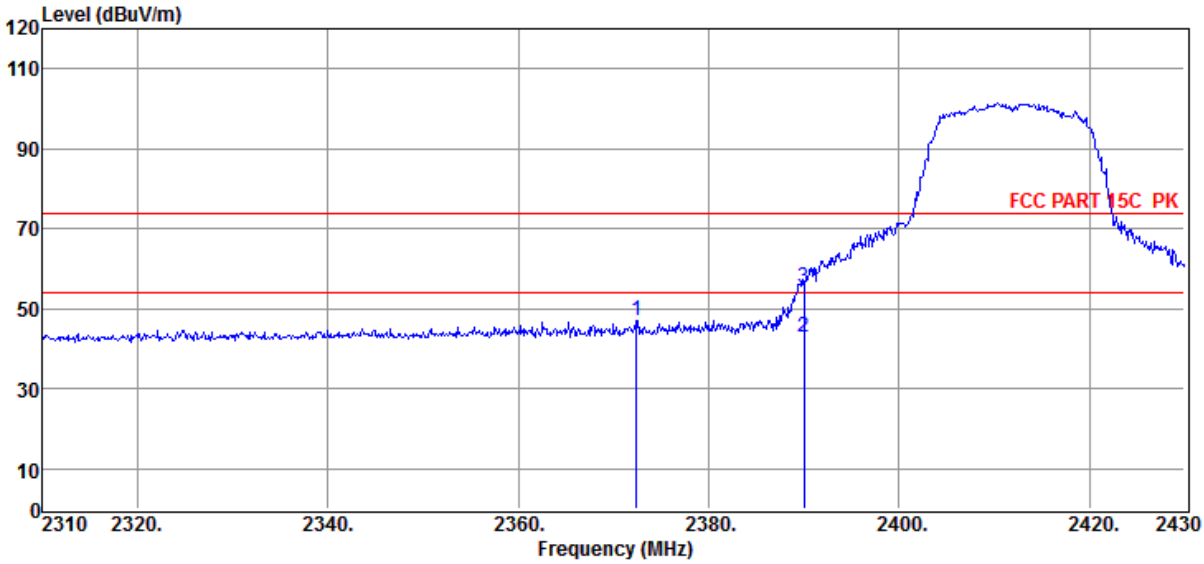

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 53.82 | 29.27 | 44.21 | 4.89 | 43.77 | 74.00 | -30.23 | Peak | VERTICAL |
| 2 | 2489.00 | 56.01 | 29.28 | 44.22 | 4.92 | 45.99 | 74.00 | -28.01 | Peak | VERTICAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/HORIZONTAL |
| **Memo** | : 11g 2412MHz | | |

Data: 29



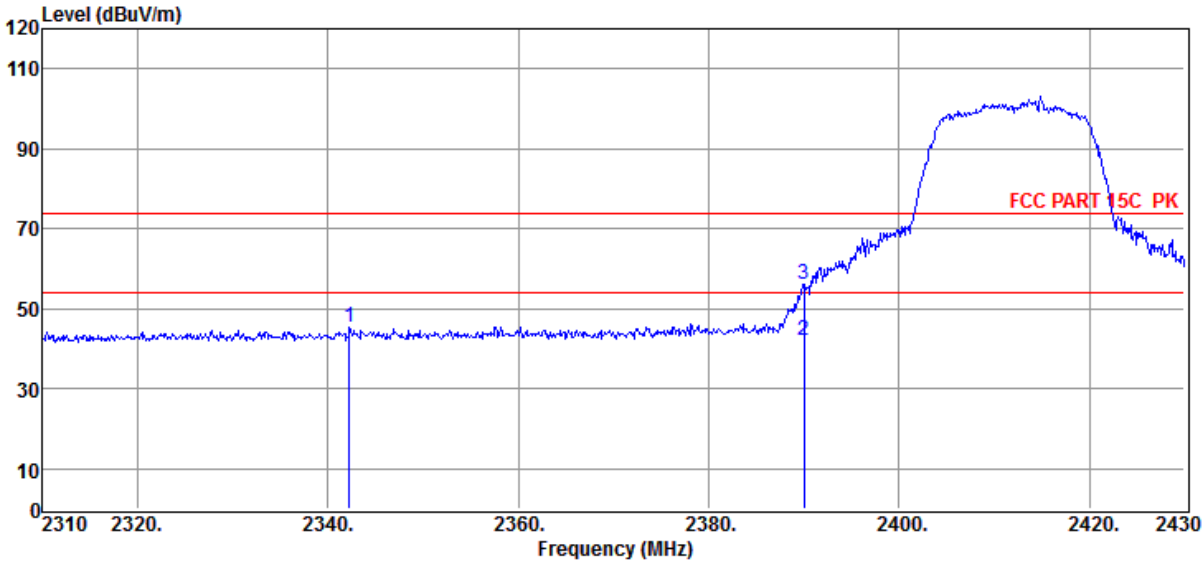

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2372.40 | 57.44 | 29.07 | 44.17 | 4.57 | 46.91 | 74.00 | -27.09 | Peak | HORIZONTAL |
| 2 | 2390.00 | 53.37 | 29.10 | 44.18 | 4.56 | 42.85 | 54.00 | -11.15 | Average | HORIZONTAL |
| 3 | 2390.00 | 65.92 | 29.10 | 44.18 | 4.56 | 55.40 | 74.00 | -18.60 | Peak | HORIZONTAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/VERTICAL |
| **Memo** | : 11g 2412MHz | | |

Data: 30



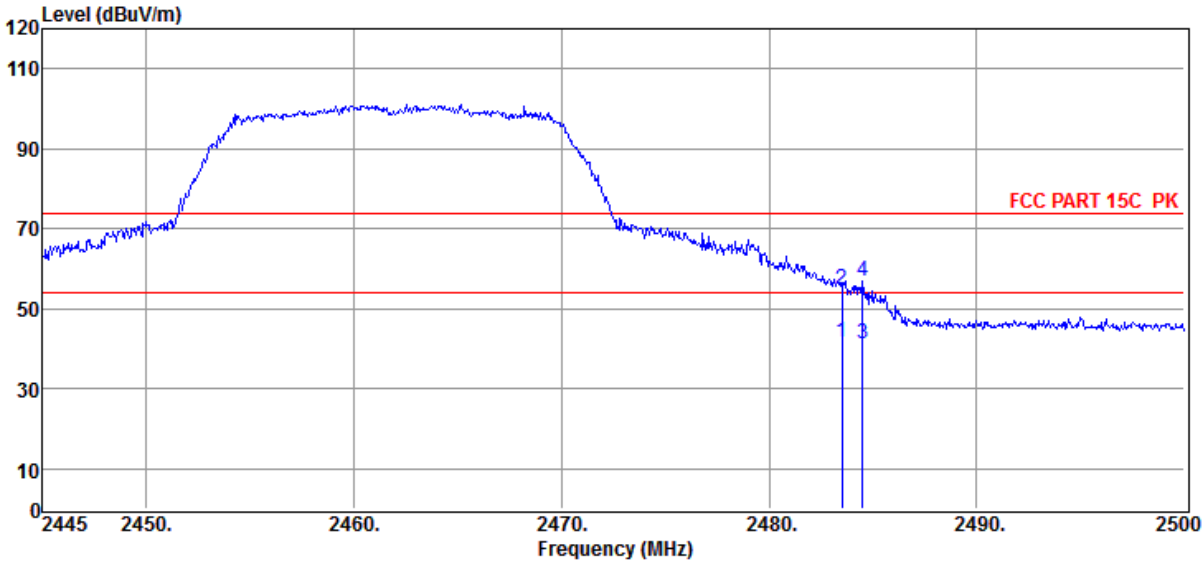

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2342.28 | 55.98 | 29.01 | 44.16 | 4.58 | 45.41 | 74.00 | -28.59 | Peak | VERTICAL |
| 2 | 2390.00 | 52.65 | 29.10 | 44.18 | 4.56 | 42.13 | 54.00 | -11.87 | Average | VERTICAL |
| 3 | 2390.00 | 66.49 | 29.10 | 44.18 | 4.56 | 55.97 | 74.00 | -18.03 | Peak | VERTICAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/VERTICAL |
| **Memo** | : 11g 2462MHz | | |

Data: 31



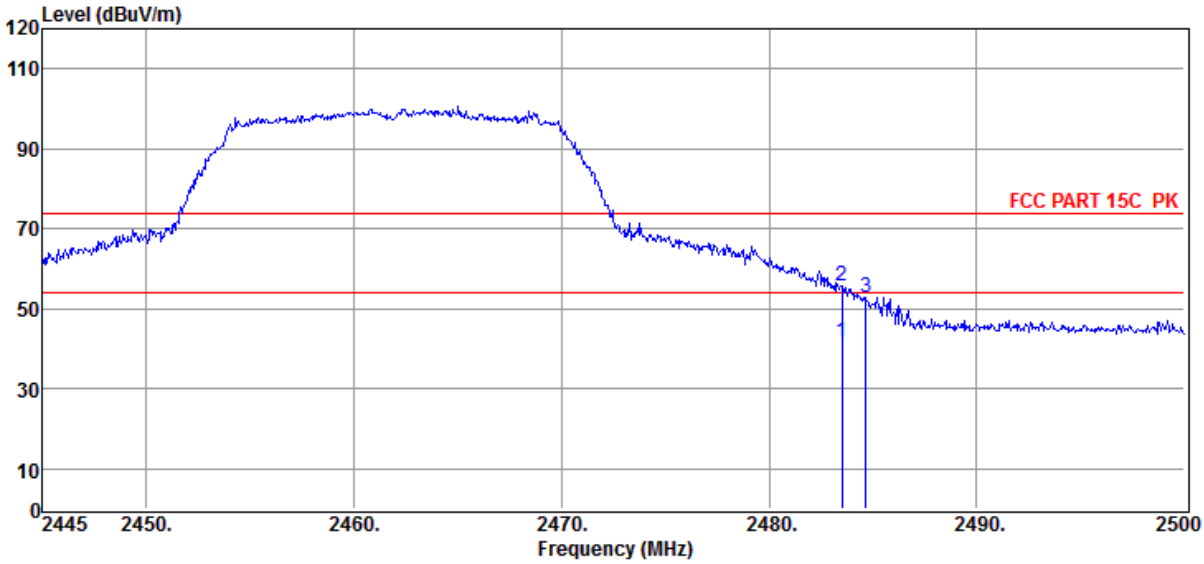

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 51.79 | 29.27 | 44.21 | 4.89 | 41.74 | 54.00 | -12.26 | Average | VERTICAL |
| 2 | 2483.50 | 64.86 | 29.27 | 44.21 | 4.89 | 54.81 | 74.00 | -19.19 | Peak | VERTICAL |
| 3 | 2484.49 | 51.38 | 29.27 | 44.21 | 4.90 | 41.34 | 54.00 | -12.66 | Average | VERTICAL |
| 4 | 2484.49 | 66.75 | 29.27 | 44.21 | 4.90 | 56.71 | 74.00 | -17.29 | Peak | VERTICAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/HORIZONTAL |
| **Memo** | : 11g 2462MHz | | |

Data: 32



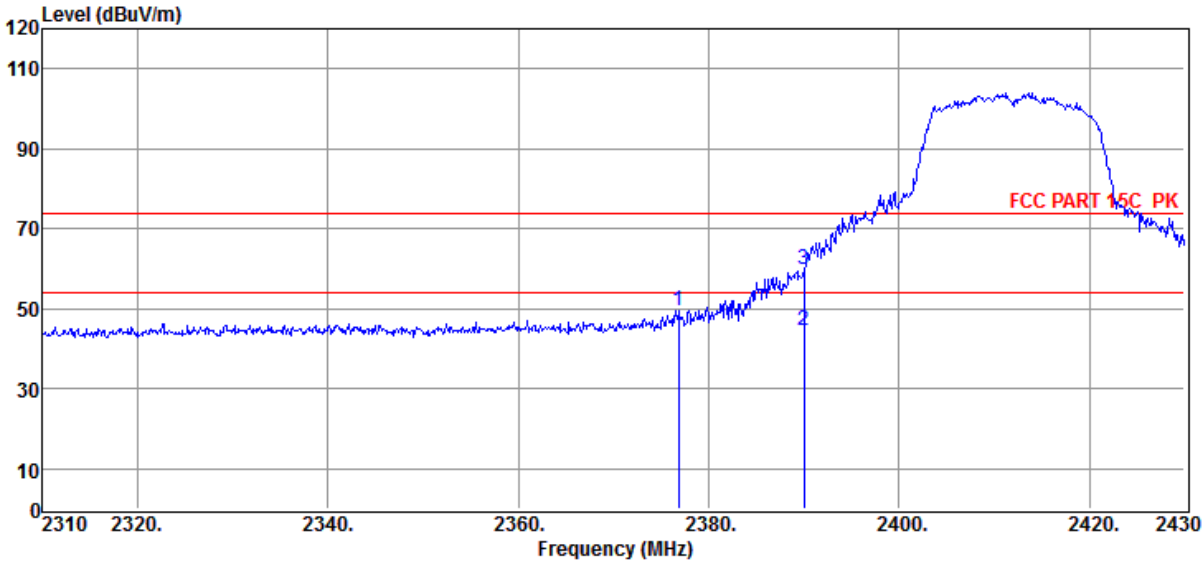

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 51.83 | 29.27 | 44.21 | 4.89 | 41.78 | 54.00 | -12.22 | Average | HORIZONTAL |
| 2 | 2483.50 | 65.61 | 29.27 | 44.21 | 4.89 | 55.56 | 74.00 | -18.44 | Peak | HORIZONTAL |
| 3 | 2484.66 | 62.80 | 29.27 | 44.21 | 4.90 | 52.76 | 74.00 | -21.24 | Peak | HORIZONTAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/HORIZONTAL |
| **Memo** | : 11n20 2412MHz | | |

Data: 33



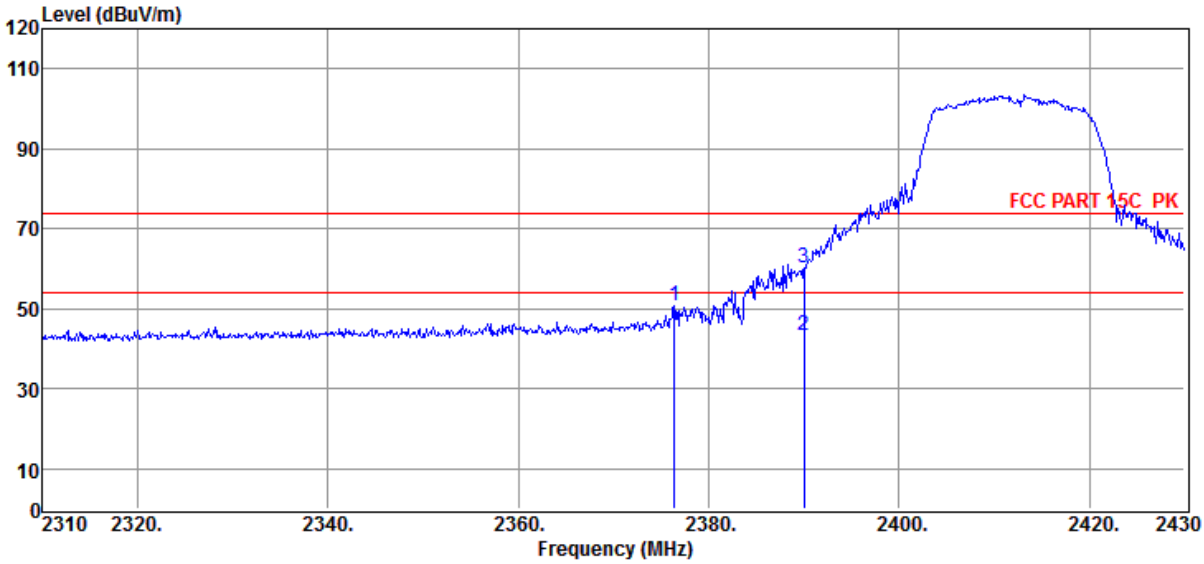

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2376.84 | 59.99 | 29.07 | 44.17 | 4.57 | 49.46 | 74.00 | -24.54 | Peak | HORIZONTAL |
| 2 | 2390.00 | 55.01 | 29.10 | 44.18 | 4.56 | 44.49 | 54.00 | -9.51 | Average | HORIZONTAL |
| 3 | 2390.00 | 70.31 | 29.10 | 44.18 | 4.56 | 59.79 | 74.00 | -14.21 | Peak | HORIZONTAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/VERTICAL |
| **Memo** | : 11n20 2412MHz | | |

Data: 34



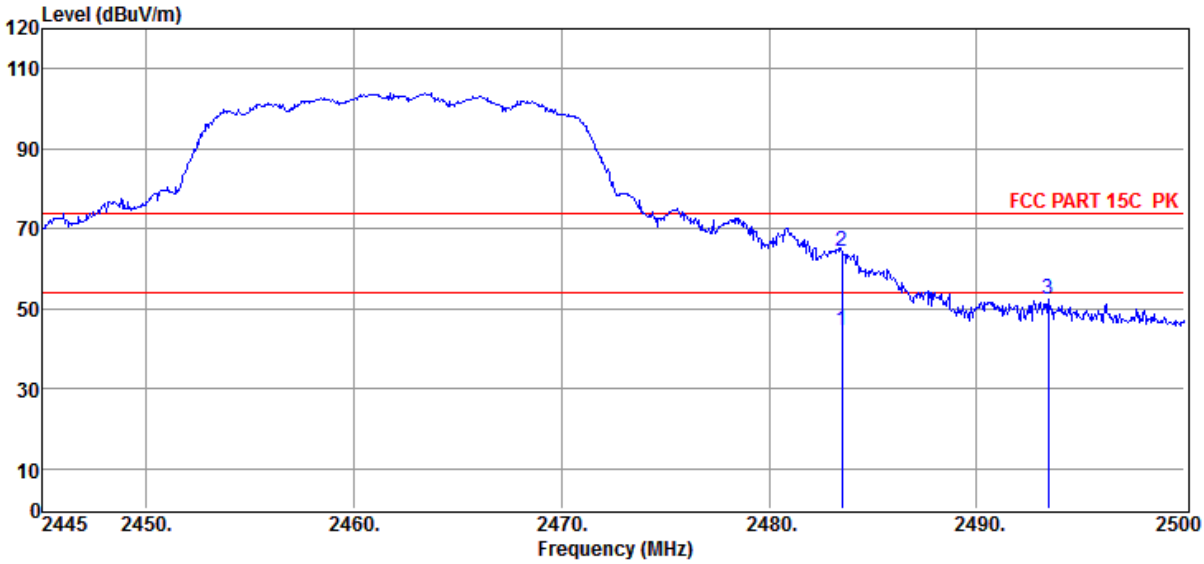

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2376.36 | 61.10 | 29.07 | 44.17 | 4.57 | 50.57 | 74.00 | -23.43 | Peak | VERTICAL |
| 2 | 2390.00 | 54.01 | 29.10 | 44.18 | 4.56 | 43.49 | 54.00 | -10.51 | Average | VERTICAL |
| 3 | 2390.00 | 70.71 | 29.10 | 44.18 | 4.56 | 60.19 | 74.00 | -13.81 | Peak | VERTICAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/HORIZONTAL |
| **Memo** | : 11n20 2462MHz | | |

Data: 35



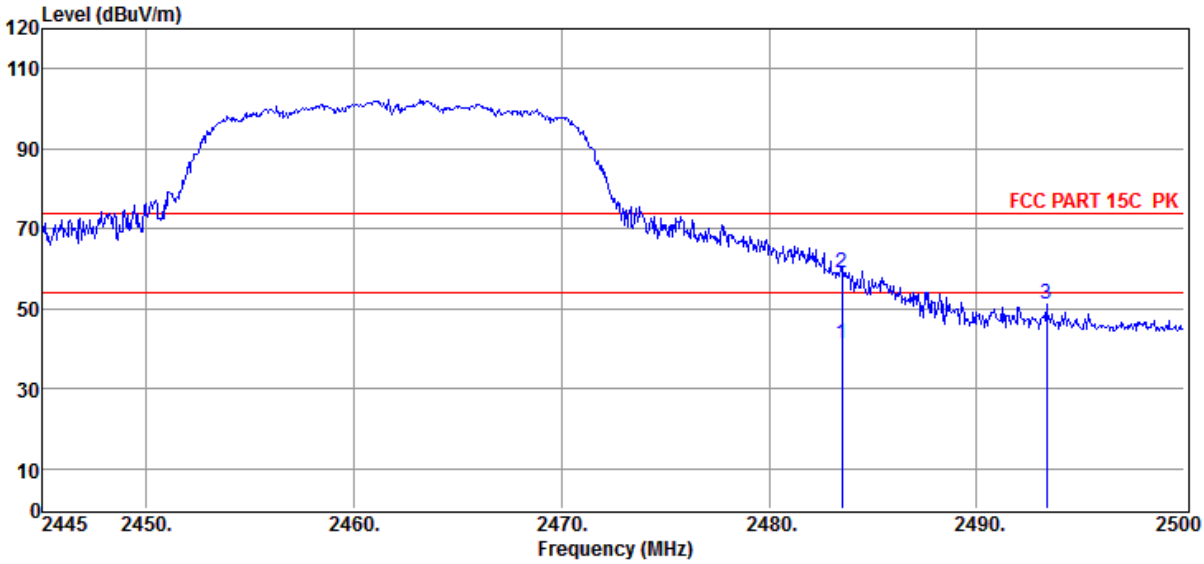

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 54.66 | 29.27 | 44.21 | 4.89 | 44.61 | 54.00 | -9.39 | Average | HORIZONTAL |
| 2 | 2483.50 | 74.23 | 29.27 | 44.21 | 4.89 | 64.18 | 74.00 | -9.82 | Peak | HORIZONTAL |
| 3 | 2493.46 | 62.42 | 29.29 | 44.22 | 4.93 | 52.42 | 74.00 | -21.58 | Peak | HORIZONTAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/VERTICAL |
| **Memo** | : 11n20 2462MHz | | |

Data: 36



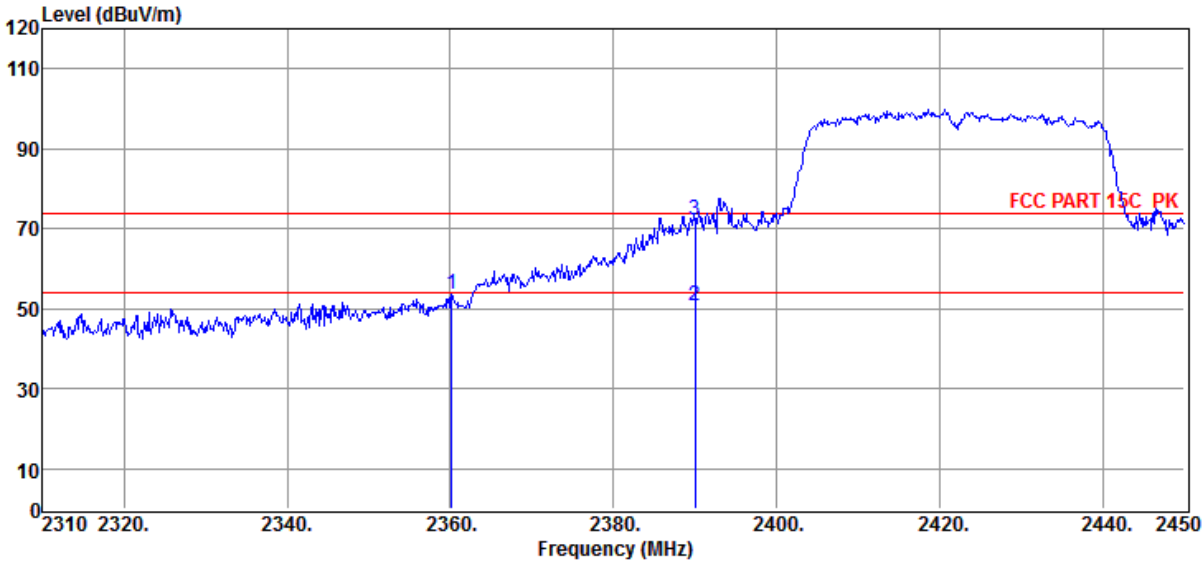

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 51.46 | 29.27 | 44.21 | 4.89 | 41.41 | 54.00 | -12.59 | Average | VERTICAL |
| 2 | 2483.50 | 69.10 | 29.27 | 44.21 | 4.89 | 59.05 | 74.00 | -14.95 | Peak | VERTICAL |
| 3 | 2493.35 | 61.22 | 29.29 | 44.22 | 4.93 | 51.22 | 74.00 | -22.78 | Peak | VERTICAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/HORIZONTAL |
| **Memo** | : 11n40 2422MHz | | |

Data: 37



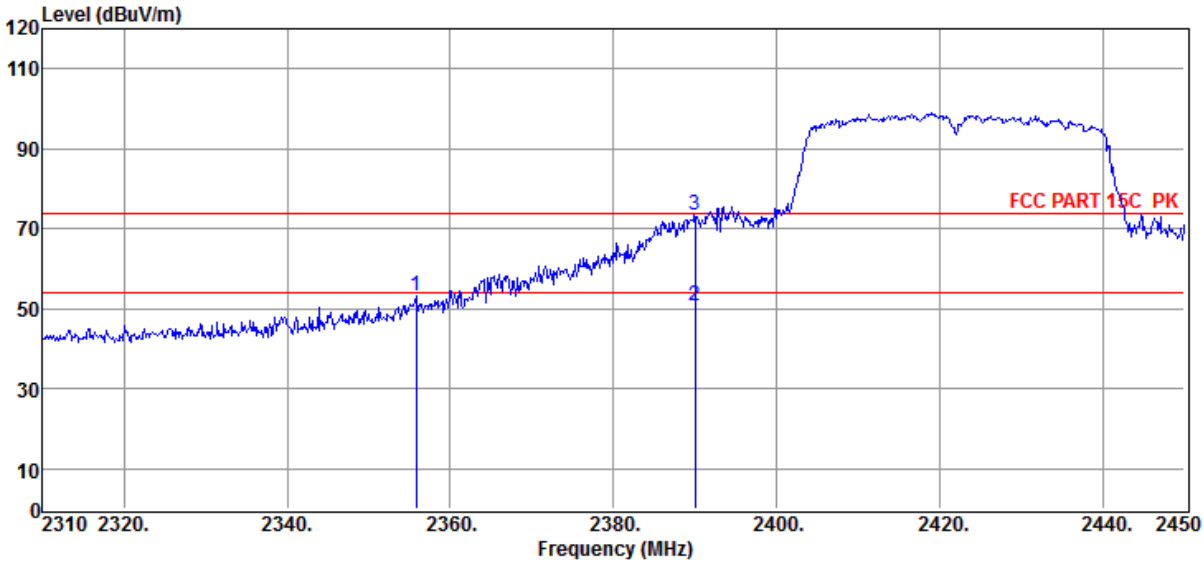

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2360.12 | 64.02 | 29.04 | 44.16 | 4.58 | 53.48 | 74.00 | -20.52 | Peak | HORIZONTAL |
| 2 | 2390.00 | 61.33 | 29.10 | 44.18 | 4.56 | 50.81 | 54.00 | -3.19 | Average | HORIZONTAL |
| 3 | 2390.00 | 82.55 | 29.10 | 44.18 | 4.56 | 72.03 | 74.00 | -1.97 | Peak | HORIZONTAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/VERTICAL |
| **Memo** | : 11n40 2422MHz | | |

Data: 38



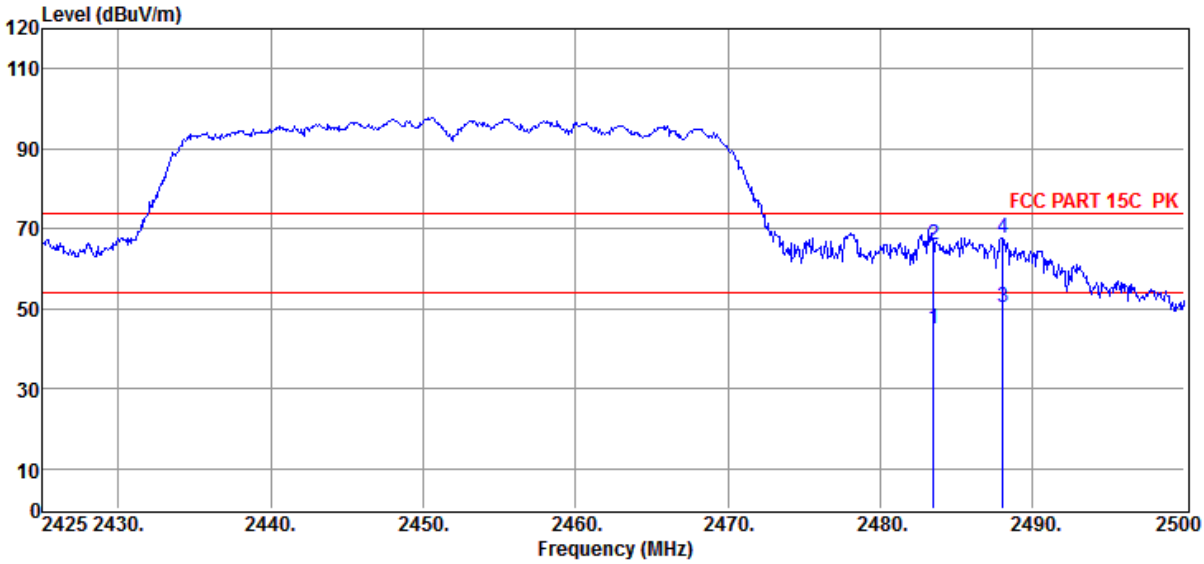

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2355.78 | 63.80 | 29.03 | 44.16 | 4.58 | 53.25 | 74.00 | -20.75 | Peak | VERTICAL |
| 2 | 2390.00 | 61.21 | 29.10 | 44.18 | 4.56 | 50.69 | 54.00 | -3.31 | Average | VERTICAL |
| 3 | 2390.00 | 84.10 | 29.10 | 44.18 | 4.56 | 73.58 | 74.00 | -0.42 | Peak | VERTICAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/HORIZONTAL |
| **Memo** | : 11n40 2452MHz | | |

Data: 39



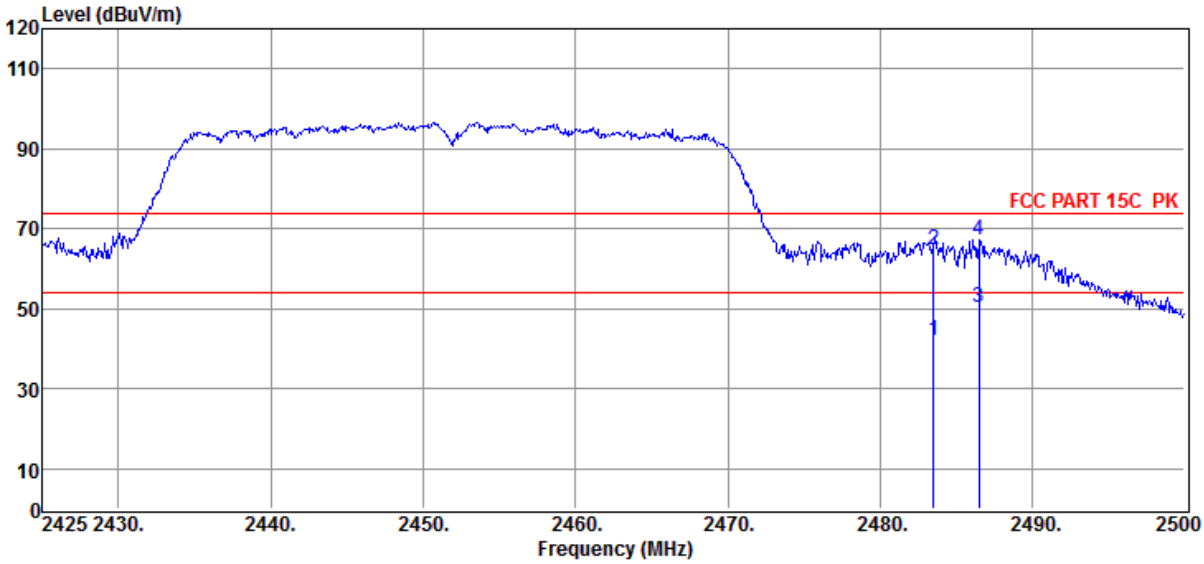

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 55.00 | 29.27 | 44.21 | 4.89 | 44.95 | 54.00 | -9.05 | Average | HORIZONTAL |
| 2 | 2483.50 | 76.10 | 29.27 | 44.21 | 4.89 | 66.05 | 74.00 | -7.95 | Peak | HORIZONTAL |
| 3 | 2488.08 | 60.25 | 29.28 | 44.22 | 4.91 | 50.22 | 54.00 | -3.78 | Average | HORIZONTAL |
| 4 | 2488.08 | 77.65 | 29.28 | 44.22 | 4.91 | 67.62 | 74.00 | -6.38 | Peak | HORIZONTAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2019 RE1# Test Data\T\TCL\20190418 TCL Bar5.1.EM6 | |
| **Test Date** | : 2019-04-18 | **Tested By** | : Sunny |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:101.4kPa | **Antenna/Distance** | : 2018 HF 907/3m/VERTICAL |
| **Memo** | : 11n40 2452MHz | | |

Data: 40

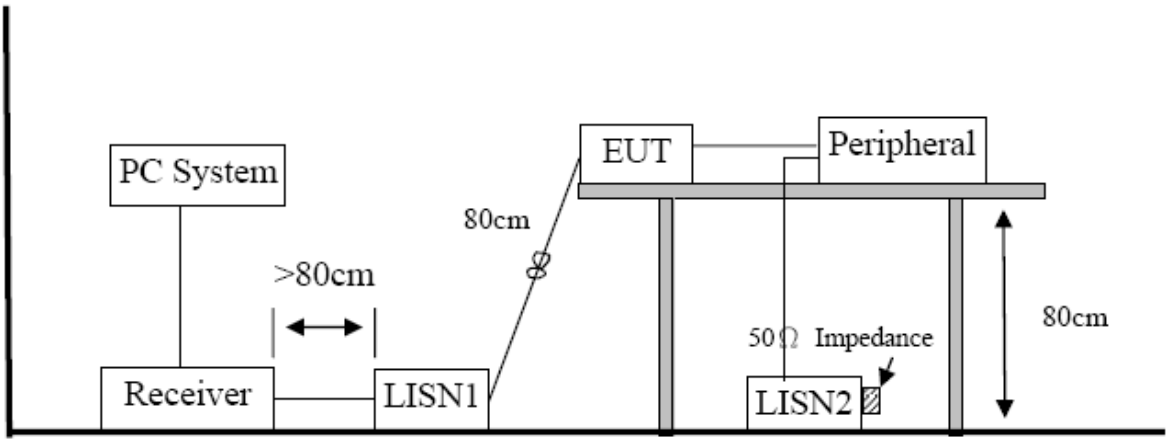



| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 52.00 | 29.27 | 44.21 | 4.89 | 41.95 | 54.00 | -12.05 | Average | VERTICAL |
| 2 | 2483.50 | 74.83 | 29.27 | 44.21 | 4.89 | 64.78 | 74.00 | -9.22 | Peak | VERTICAL |
| 3 | 2486.50 | 60.22 | 29.28 | 44.21 | 4.91 | 50.20 | 54.00 | -3.80 | Average | VERTICAL |
| 4 | 2486.50 | 77.32 | 29.28 | 44.21 | 4.91 | 67.30 | 74.00 | -6.70 | Peak | VERTICAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# 10. Power Line Conducted Emission

## 10.1. Block diagram of test setup




## 10.2. Power Line Conducted Emission Limits (Class B)

| Frequency | Quasi-Peak Level dB(μV) | Average Level dB(μV) |
|---|---|---|
| 150 kHz ~ 500 kHz | 66 ~ 56* | 56 ~ 46* |
| 500 kHz ~ 5 MHz | 56 | 46 |
| 5 MHz ~ 30 MHz | 60 | 50 |

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

## 10.3. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

## 10.4. Test Result

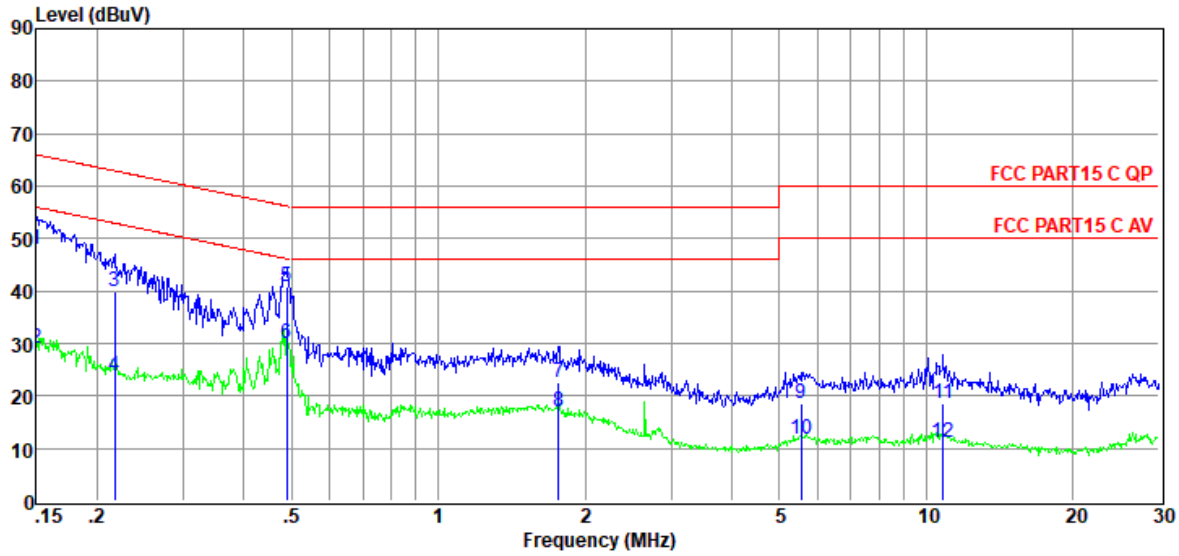
## PASS. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.
Note2: "-----" means peak detection; "-----" means average detection
Note3: Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/60Hz, recorded worse case (AC 120V/60Hz).

# TR-4-E-010 Conducted Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 1# Shield Room | D:\2018 CE report data\Q18112315-1E\CE.EM6 | |
| **Test Date** | : 2019-05-20 | **Tested By** | : Aaron |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:100.1KPa | **LISN** | : 2018 ENV216/LINE |
| **Memo** | : | | |

Data: 82



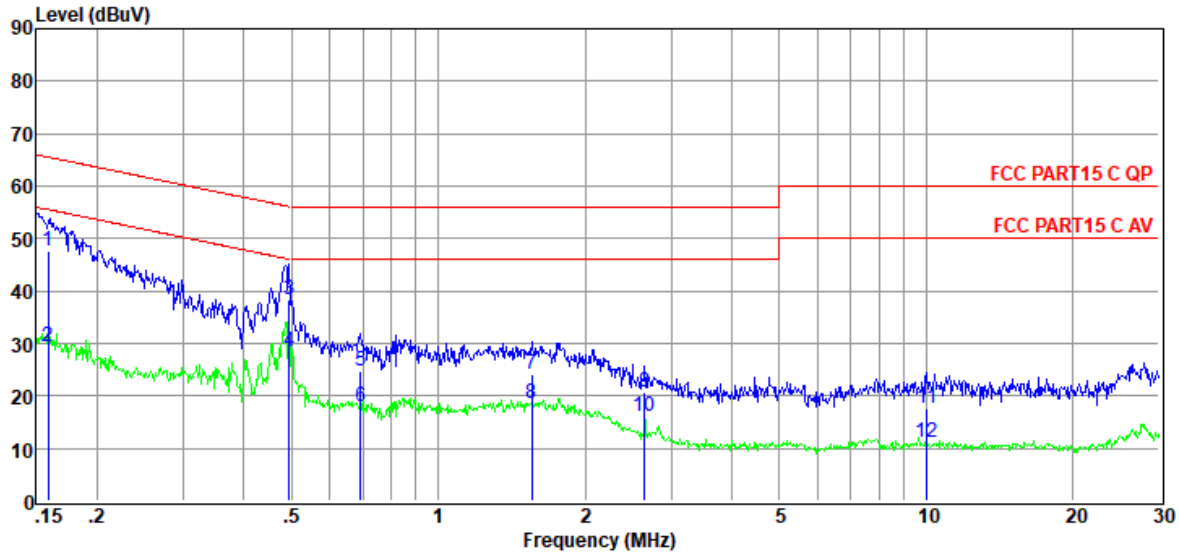

| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | LISN Factor (dB) | Cable Loss (dB) | Pulse Limiter Factor (dB) | Result Level (dBµV) | Limit Line (dBµV) | Over Limit (dB) | Detector | Phase |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.15 | 28.51 | 9.63 | 0.02 | 9.86 | 48.02 | 66.00 | -17.98 | QP | LINE |
| 2 | 0.15 | 9.60 | 9.63 | 0.02 | 9.86 | 29.11 | 56.00 | -26.89 | Average | LINE |
| 3 | 0.22 | 20.32 | 9.63 | 0.02 | 9.86 | 39.83 | 62.92 | -23.09 | QP | LINE |
| 4 | 0.22 | 4.43 | 9.63 | 0.02 | 9.86 | 23.94 | 52.92 | -28.98 | Average | LINE |
| 5 | 0.49 | 21.16 | 9.64 | 0.02 | 9.86 | 40.68 | 56.19 | -15.51 | QP | LINE |
| 6 | 0.49 | 10.35 | 9.64 | 0.02 | 9.86 | 29.87 | 46.19 | -16.32 | Average | LINE |
| 7 | 1.76 | 2.85 | 9.65 | 0.06 | 9.87 | 22.43 | 56.00 | -33.57 | QP | LINE |
| 8 | 1.76 | -2.51 | 9.65 | 0.06 | 9.87 | 17.07 | 46.00 | -28.93 | Average | LINE |
| 9 | 5.54 | -1.03 | 9.70 | 0.07 | 9.88 | 18.62 | 60.00 | -41.38 | QP | LINE |
| 10 | 5.54 | -7.78 | 9.70 | 0.07 | 9.88 | 11.87 | 50.00 | -38.13 | Average | LINE |
| 11 | 10.85 | -1.41 | 9.87 | 0.12 | 9.91 | 18.49 | 60.00 | -41.51 | QP | LINE |
| 12 | 10.85 | -8.66 | 9.87 | 0.12 | 9.91 | 11.24 | 50.00 | -38.76 | Average | LINE |

Note: 1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

# TR-4-E-010 Conducted Emission Test Result

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 1# Shield Room | D:\2018 CE report data\Q18112315-1E\CE.EM6 | |
| **Test Date** | : 2019-05-20 | **Tested By** | : Aaron |
| **EUT** | : JBL Bar 5.1 Surround with wireless subwoofer | **Model Number** | : BAR 5.1 CNTR |
| **Power Supply** | : AC 120V/60Hz | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5'C, Humi:55%, Press:100.1KPa | **LISN** | : 2018 ENV216/NEUTRAL |
| **Memo** | : | | |

Data: 84




| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | LISN Factor (dB) | Cable Loss (dB) | Pulse Limiter Factor (dB) | Result Level (dBµV) | Limit Line (dBµV) | Over Limit (dB) | Detector | Phase |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.16 | 28.06 | 9.64 | 0.02 | 9.86 | 47.58 | 65.52 | -17.94 | QP | NEUTRAL |
| 2 | 0.16 | 9.81 | 9.64 | 0.02 | 9.86 | 29.33 | 55.52 | -26.19 | Average | NEUTRAL |
| 3 | 0.49 | 18.76 | 9.64 | 0.02 | 9.86 | 38.28 | 56.10 | -17.82 | QP | NEUTRAL |
| 4 | 0.49 | 8.90 | 9.64 | 0.02 | 9.86 | 28.42 | 46.10 | -17.68 | Average | NEUTRAL |
| 5 | 0.69 | 5.14 | 9.64 | 0.04 | 9.86 | 24.68 | 56.00 | -31.32 | QP | NEUTRAL |
| 6 | 0.69 | -1.67 | 9.64 | 0.04 | 9.86 | 17.87 | 46.00 | -28.13 | Average | NEUTRAL |
| 7 | 1.55 | 4.53 | 9.66 | 0.07 | 9.87 | 24.13 | 56.00 | -31.87 | QP | NEUTRAL |
| 8 | 1.55 | -1.13 | 9.66 | 0.07 | 9.87 | 18.47 | 46.00 | -27.53 | Average | NEUTRAL |
| 9 | 2.65 | 1.16 | 9.68 | 0.04 | 9.87 | 20.75 | 56.00 | -35.25 | QP | NEUTRAL |
| 10 | 2.65 | -3.36 | 9.68 | 0.04 | 9.87 | 16.23 | 46.00 | -29.77 | Average | NEUTRAL |
| 11 | 10.02 | -2.24 | 9.81 | 0.12 | 9.90 | 17.59 | 60.00 | -42.41 | QP | NEUTRAL |
| 12 | 10.02 | -8.62 | 9.81 | 0.12 | 9.90 | 11.21 | 50.00 | -38.79 | Average | NEUTRAL |

Note: 1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

# 11. Antenna Requirements

## 11.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

## 11.2. Result

The antennas used for this product are integrated antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 5.69 dBi.

**END OF REPORT**