Report No.: DDT-R21061703-2E02

Issued Date: Jul. 27, 2021

# FCC CERTIFICATION TEST REPORT

## FOR

| | | |
|---|---|---|
| **Applicant** | : | Dongguan Angwei Electronic Technology Co. , Ltd. |
| **Address** | : | Room 701, building 1,17 Tianheng Road, Changping, Dongguan City, Guangdong Province |
| **Equipment under Test** | : | Car Navigation |
| **Model No.** | : | HA5010, HA5XXX (XXX=000-999) |
| **Trade Mark** | : | N/A |
| **FCC ID** | : | 2A2QH-HA5010 |
| **Manufacturer** | : | Dongguan Angwei Electronic Technology Co. , Ltd. |
| **Address** | : | Room 701, building 1,17 Tianheng Road, Changping, Dongguan City, Guangdong Province |


**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

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


REPORT

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# Test Report Declare

| | | |
|---|---|---|
| **Applicant** | : | Dongguan Angwei Electronic Technology Co. , Ltd. |
| **Address** | : | Room 701, building 1,17 Tianheng Road, Changping, Dongguan City, Guangdong Province |
| **Equipment under Test** | : | Car Navigation |
| **Model No.** | : | HA5010, HA5XXX (XXX=000-999) |
| **Trade Mark** | : | N/A |
| **Manufacturer** | : | Dongguan Angwei Electronic Technology Co. , Ltd. |
| **Address** | : | Room 701, building 1,17 Tianheng Road, Changping, Dongguan City, Guangdong Province |

**Test Standard Used:** FCC Rules and Regulations Part 15 Subpart C.

**Test procedure used:** ANSI C63.10:2013, 558074 D01 15.247 Meas Guidance v05r02,

**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 standards.**

| | | | |
|---|---|---|---|
| **Report No:** | DDT-R21061703-2E02 | | |
| **Date of Receipt:** | Jun. 17, 2021 | **Date of Test:** | Jun. 17, 2021~ Jul. 27, 2021 |

***Prepared By:***

Johnny Wang

***Johnny Wang/Engineer***

***Approved By:***

DONGGUAN DONGDIAN TESTING SERVICE CO., LTD. APPROVED

Damon Hu

***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 | Jul. 27, 2021 | |
| | | | |

# 1. Summary of Test Results

| The EUT have been tested according to the applicable standards as referenced below. | | |
|---|---|---|
| **Description of Test Item** | **Standard** | **Verdict** |
| 6dB Bandwidth and 99% Bandwidth | FCC 15.247 (a) | Pass |
| Conducted Output Power | FCC 15.247 (b) (3) | Pass |
| Power Spectral Density | FCC 15.247 (e) | Pass |
| Band-edge and Spurious Emissions (Conducted) | FCC 15.247 (d) | Pass |
| Radiated Spurious Emissions | FCC 15.247 (d)<br>FCC 15.209<br>FCC 15.205 | Pass |
| Radiated Band Edge Compliance | FCC 15.247 (d)<br>FCC 15.209<br>FCC 15.205 | Pass |
| Power Line Conducted Emission | FCC 15.207 | N/A |
| Antenna Requirement | FCC 15.203 | Pass |
| Note: N/A is an abbreviation for Not Applicable and means this test item is not applicable for this device according to the technology characteristic of device. | | |

# 2. General Test Information

## 2.1. Description of EUT

| | | |
|---|---|---|
| EUT* Name | : | Car Navigation |
| Model Number | : | HA5010, HA5XXX (XXX=000-999) |
| Difference of models | : | Above models are identical in schematic and structure, only the name and appearance are different for all the models, therefore the test performed on the model HA5010. |
| EUT Function Description | : | Please reference user manual of this device |
| Power Supply | : | DC 12V |
| 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: OFDM (64QAM, 16QAM, QPSK, BPSK)<br>IEEE 802.11n 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 Gain | : | 0 dBi |
| Serial Number | : | N/A |

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

| 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 |
|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A |

## 2.3. Assistant equipment used for test

| Assistant equipment | Manufacturer | Model number | EMC Compliance | SN |
|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A |

## 2.4. Block diagram of EUT configuration for test

DC Main —— EUT

EUT was connected to control to provide by manufacturer which has a standard USB PORT connector to connect to Notebook, and the Notebook will run a special test software “REALTEK 11n 8188EUS USB WLAN NIC Massproduction Kit” 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 Ant | data rate (Mbps) (see Note) | Channel | Frequency (MHz) |
| IEEE 802.11b | 45 | 11 | LCH: CH1 | 2412 |
| | 45 | 11 | MCH: CH6 | 2437 |
| | 45 | 11 | HCH: CH11 | 2462 |
| IEEE 802.11g | 45 | 54 | LCH: CH1 | 2412 |
| | 45 | 54 | MCH: CH6 | 2437 |
| | 45 | 54 | HCH: CH11 | 2462 |
| IEEE 802.11n HT20 | 45 | MCS 7 | LCH: CH1 | 2412 |
| | 45 | MCS 7 | MCH: CH6 | 2437 |
| | 45 | MCS 7 | HCH: CH11 | 2462 |
| IEEE 802.11n HT40 | 45 | MCS 7 | LCH: CH3 | 2422 |
| | 45 | MCS 7 | MCH: CH6 | 2437 |
| | 45 | 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 Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, G-20118

## 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 | $6.7 \times 10^{-8}$ (Antenna couple method) |
| | $5.5 \times 10^{-8}$ (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 | .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. | |

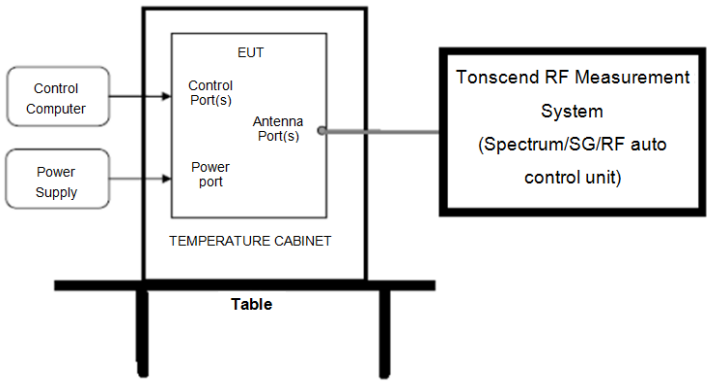
# 3. Equipment Used During Test

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|
| **☐RF Connected Test (Tonscend RF Measurement System 1#)** | | | | | |
| Spectrum analyzer | R&S | FSU26 | 200071 | Sep. 25, 2020 | 1 Year |
| Wideband Radio Communication tester | R&S | CMW500 | 117491 | Jun. 01, 2021 | 1 Year |
| Vector Signal Generator | Agilent | E8267D | US49060192 | Sep. 24, 2020 | 1 Year |
| Vector Signal Generator | Agilent | N5182A | MY48180737 | Jun. 01, 2021 | 1 Year |
| RF Control Unit | Tonsend | JS0806-2 | DDT-ZC0290 | Jun. 01, 2021 | 1 Year |
| Temp&Humi Programmable | ZHIXIANG | ZXGDJS-150L | ZX170110-A | Jun. 01, 2021 | 1 Year |
| Test Software | JS Tonscend | JS1120-3 | Ver.2.7 | N/A | N/A |
| **☒RF Connected Test (Tonscend RF Measurement System 2#)** | | | | | |
| Spectrum analyzer | R&S | FSU26 | 101472 | Jun. 01, 2021 | 1 Year |
| Wideband Radio Communication tester | R&S | CMW500 | 120259 | Jan. 19, 2021 | 1 Year |
| Vector Signal Generator | Agilent | N5182A | MY19060405 | Jun. 01, 2021 | 1 Year |
| Vector Signal Generator | Agilent | N5182A | MY48180912 | Jun. 01, 2021 | 1 Year |
| RF Control Unit | Tonsend | JS0806-2 | DDT-ZC01449 | Jun. 01, 2021 | 1 Year |
| Temp&Humi Programmable | ZHIXIANG | ZXGDJS-150L | ZX170110-A | Jun. 01, 2021 | 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 | Sep. 24, 2020 | 1 Year |
| Spectrum analyzer | Agilent | E4447A | MY50180031 | Jun. 01, 2021 | 1 Year |
| Trilog Broadband Antenna | Schwarzbeck | VULB9163 | 9163-462 | Nov. 13, 2020 | 1 Year |
| Active Loop antenna | Schwarzbeck | FMZB-1519 | 1519-038 | Nov. 18, 2020 | 1 Year |
| Double Ridged Horn Antenna | R&S | HF907 | 100276 | Nov. 13, 2020 | 1 Year |
| Broad Band Horn Antenna | Schwarzbeck | BBHA 9170 | 790 | May 07, 2021 | 1 Year |
| Pre-amplifier | A.H. | PAM-0118 | 360 | Sep. 28, 2020 | 1 Year |
| RF Cable | HUBSER | CP-X2+ CP-X1 | W11.03+ W12.02 | Sep. 24, 2020 | 1 Year |
| RF Cable | N/A | 5m+6m+1m | 06270619 | Sep. 30, 2020 | 1 Year |
| MI Cable | HUBSER | C10-01-01-1M | 1091629 | Sep. 30, 2020 | 1 Year |
| Test software | Audix | E3 | V 6.11111b | N/A | N/A |
| **☒Radiation 2#chamber** | | | | | |
| EMI Test Receiver | R&S | ESCI | 101364 | Sep. 28, 2020 | 1 Year |
| Spectrum analyzer | Agilent | E4447A | MY50180031 | Jun. 01, 2021 | 1 Year |

| | | | | | |
|---|---|---|---|---|---|
| Trilog Broadband Antenna | Schwarzbeck | VULB 9163 | 9163-994 | Nov. 13, 2020 | 1 Year |
| Active Loop antenna | Schwarzbeck | FMZB-1519 | 1519-038 | Nov. 18, 2020 | 1 Year |
| Double Ridged Horn Antenna | Schwarzbeck | BBHA9120 | 02108 | Jul. 17, 2021 | 1 Year |
| Broad Band Horn Antenna | Schwarzbeck | BBHA 9170 | 790 | May 07, 2021 | 1 Year |
| Pre-amplifier | TERA-MW | TRLA-0040G35 | 1013 03 | Sep. 28, 2020 | 1 Year |
| RF Cable | N/A | 14+1.5m | 06270619 | Sep. 28, 2020 | 1 Year |
| Test software | Audix | E3 | V 6.11111b | N/A | N/A |
| **☐Power Line Conducted Emissions Test 1#** | | | | | |
| EMI Test Receiver | R&S | ESU8 | 100316 | Sep. 24, 2020 | 1 Year |
| LISN 1 | R&S | ENV216 | 101109 | Sep. 28, 2020 | 1 Year |
| LISN 2 | R&S | ESH2-Z5 | 100309 | Sep. 28, 2020 | 1 Year |
| Pulse Limiter | R&S | ESH3-Z2 | 101242 | Sep. 24, 2020 | 1 Year |
| CE Cable 1 | HUBSER | N/A | W10.01 | Sep. 24, 2020 | 1 Year |
| Test software | Audix | E3 | V 6.11111b | N/A | N/A |
| **☐Power Line Conducted Emissions Test 2#** | | | | | |
| Test Receiver | R&S | ESPI | 101761 | Sep. 24, 2020 | 1 Year |
| LISN 1 | R&S | ENV216 | 101170 | Sep. 28, 2020 | 1 Year |
| LISN 2 | R&S | ESH2-Z5 | 100309 | Sep. 28, 2020 | 1 Year |
| Pulse Limiter | R&S | KH43101 | 431011801568-12# | Jun. 01, 2021 | 1 Year |
| CE Cable 2 | HUBSER | N/A | W11.02 | Sep. 24, 2020 | 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/1MHz |
| VBW: | 1 MHz/3MHz |
| 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

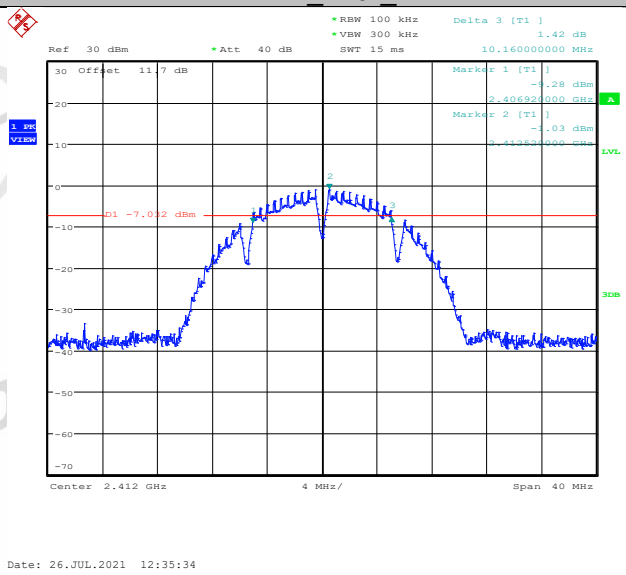
| Test Mode | Test | Ant | 6dB Bandwidth (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|---|
| 11B | 2412 | Ant1 | 10.160 | 0.5 | Pass |
| 11B | 2437 | Ant1 | 10.160 | 0.5 | Pass |
| 11B | 2462 | Ant1 | 9.600 | 0.5 | Pass |
| 11G | 2412 | Ant1 | 16.600 | 0.5 | Pass |
| 11G | 2437 | Ant1 | 16.640 | 0.5 | Pass |
| 11G | 2462 | Ant1 | 16.640 | 0.5 | Pass |
| 11N20 | 2412 | Ant1 | 17.800 | 0.5 | Pass |
| 11N20 | 2437 | Ant1 | 17.840 | 0.5 | Pass |
| 11N20 | 2462 | Ant1 | 17.880 | 0.5 | Pass |
| 11N40 | 2422 | Ant1 | 36.080 | 0.5 | Pass |
| 11N40 | 2437 | Ant1 | 36.480 | 0.5 | Pass |
| 11N40 | 2452 | Ant1 | 36.480 | 0.5 | Pass |

| Test Mode | Test | Ant | 99% OBW (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|---|
| 11B | 2412 | Ant1 | 15.64 | --- | Pass |
| 11B | 2437 | Ant1 | 15.12 | --- | Pass |
| 11B | 2462 | Ant1 | 14.88 | --- | Pass |
| 11G | 2412 | Ant1 | 17.44 | --- | Pass |
| 11G | 2437 | Ant1 | 17.52 | --- | Pass |
| 11G | 2462 | Ant1 | 17.36 | --- | Pass |
| 11N20 | 2412 | Ant1 | 18.24 | --- | Pass |
| 11N20 | 2437 | Ant1 | 18.32 | --- | Pass |
| 11N20 | 2462 | Ant1 | 18.16 | --- | Pass |
| 11N40 | 2422 | Ant1 | 36.16 | --- | Pass |
| 11N40 | 2437 | Ant1 | 36.48 | --- | Pass |
| 11N40 | 2452 | Ant1 | 36.32 | --- | Pass |

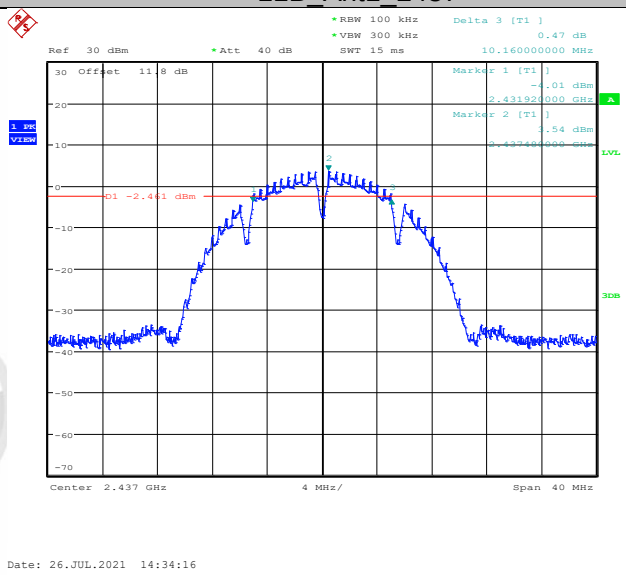
## 4.5. original test data

6dB Bandwidth:

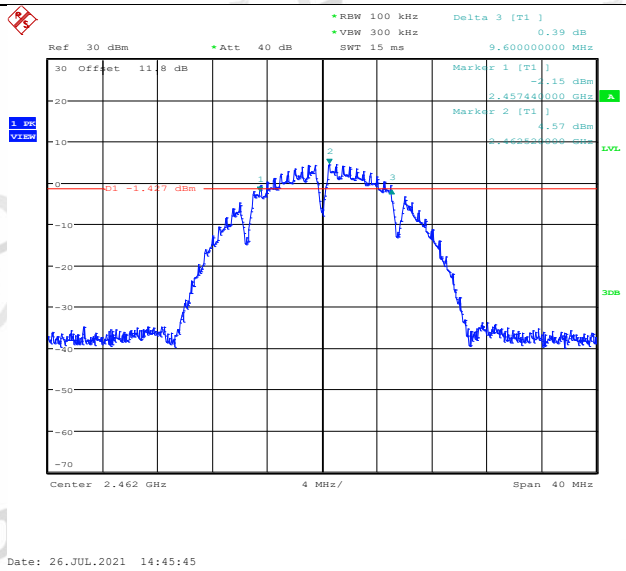
11B_Ant1_2412



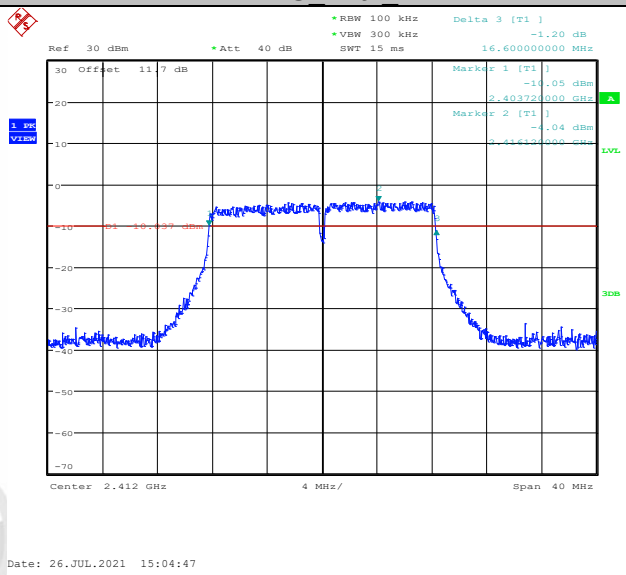

11B_Ant1_2437



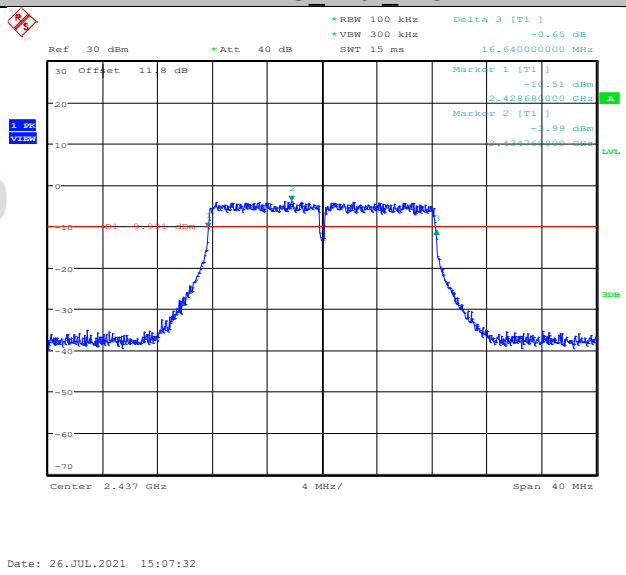

11B_Ant1_2462



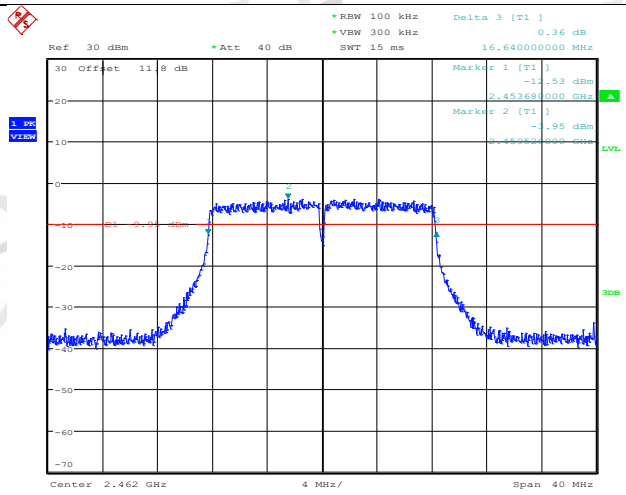

11G_Ant1_2412



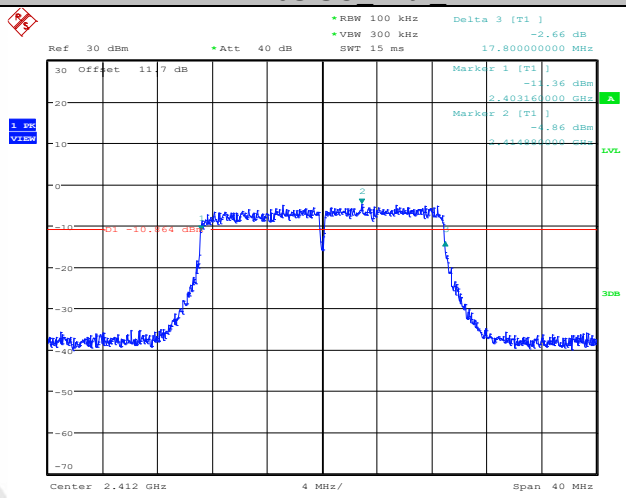

11G_Ant1_2437



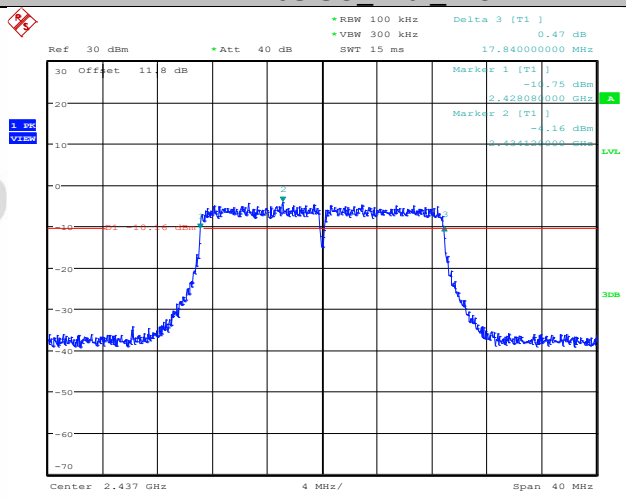

11G_Ant1_2462



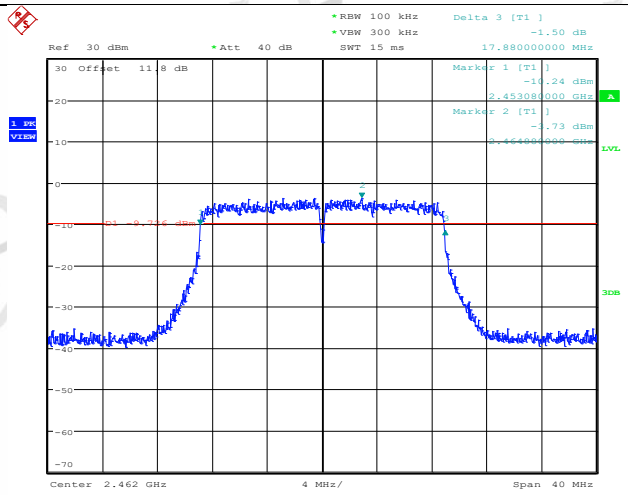

11N20SISO_Ant1_2412



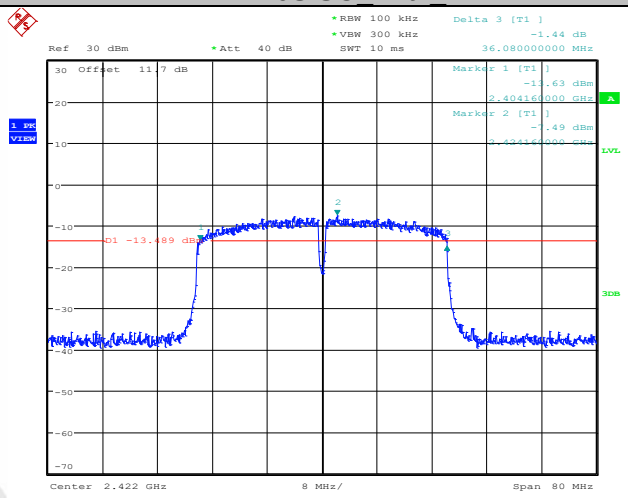

11N20SISO_Ant1_2437



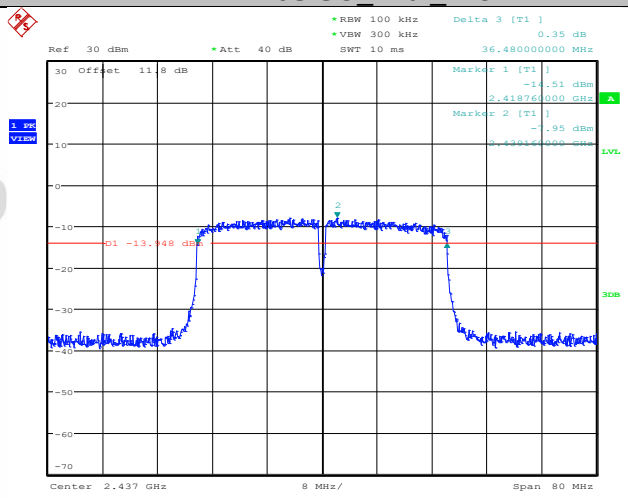

11N20SISO_Ant1_2462



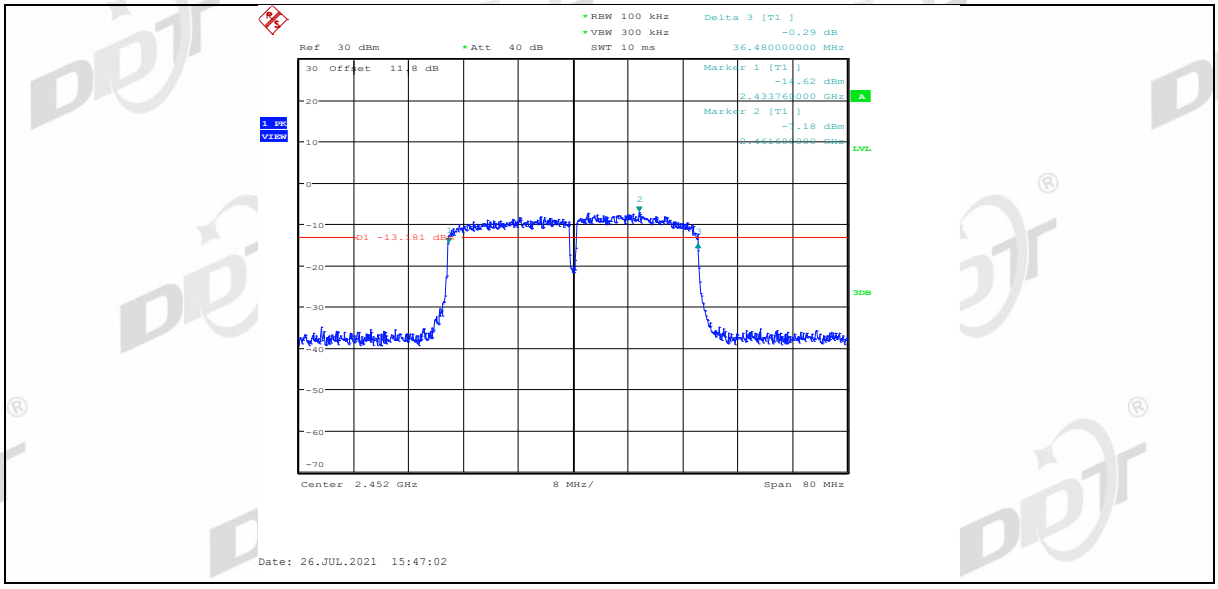

11N40SISO_Ant1_2422




11N40SISO_Ant1_2437

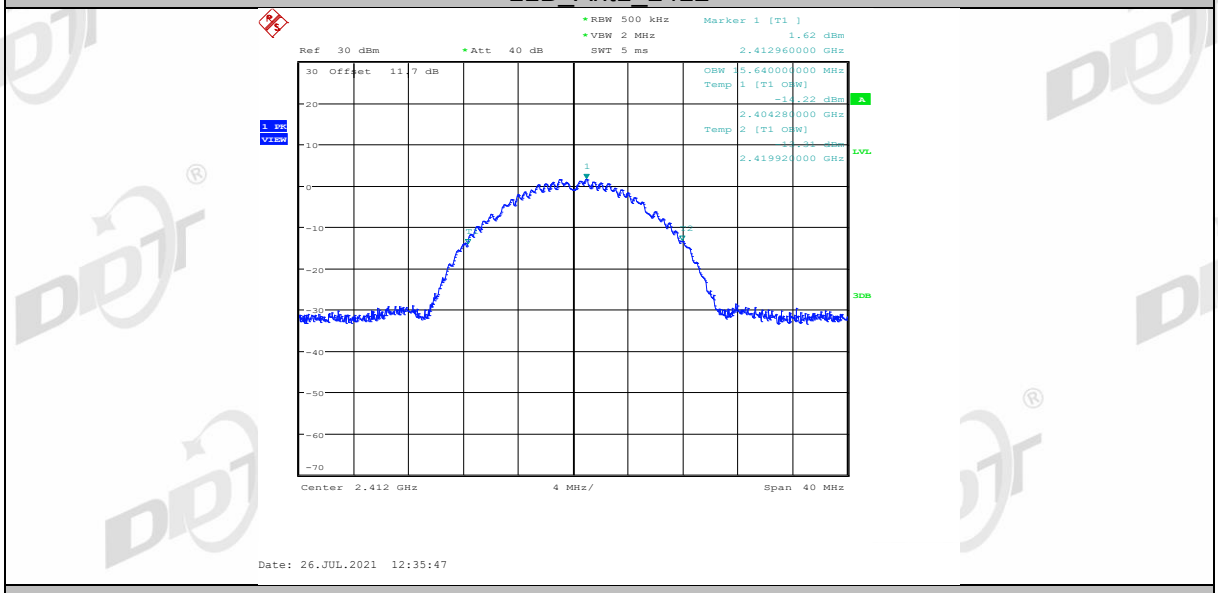



11N40SISO_Ant1_2452

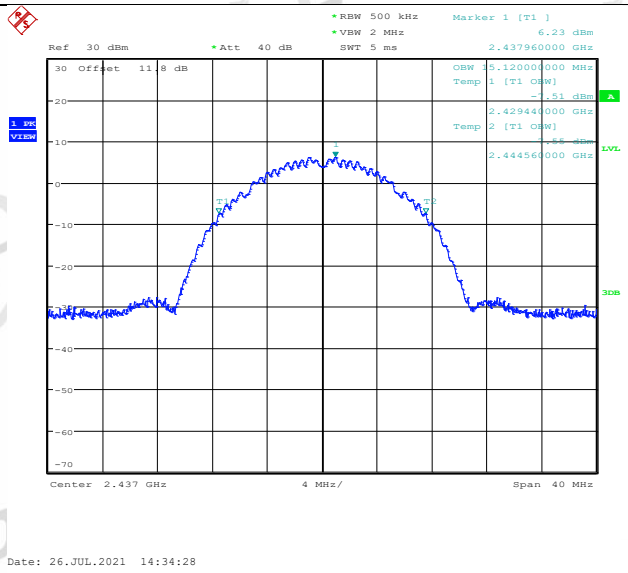



99% Bandwidth

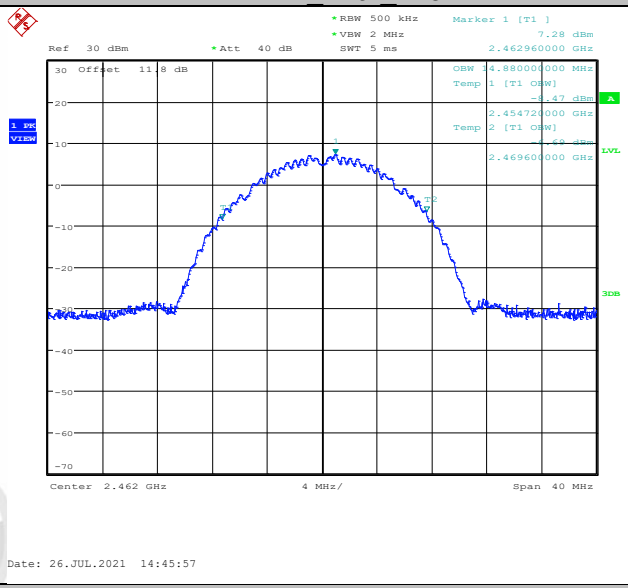
11B_Ant1_2412



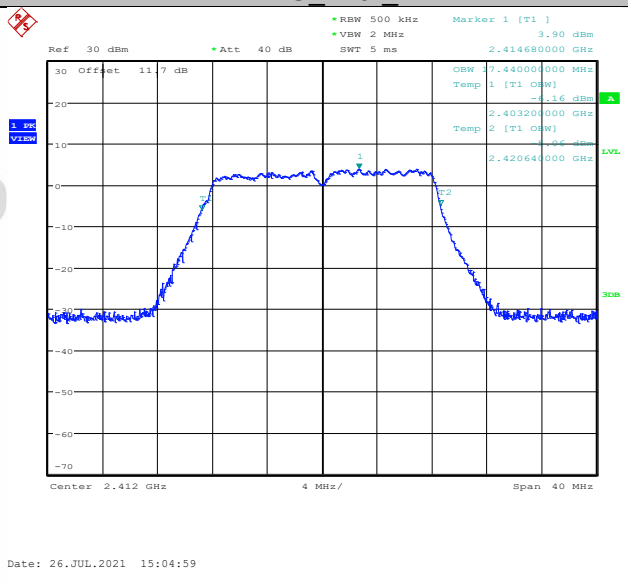

11B_Ant1_2437



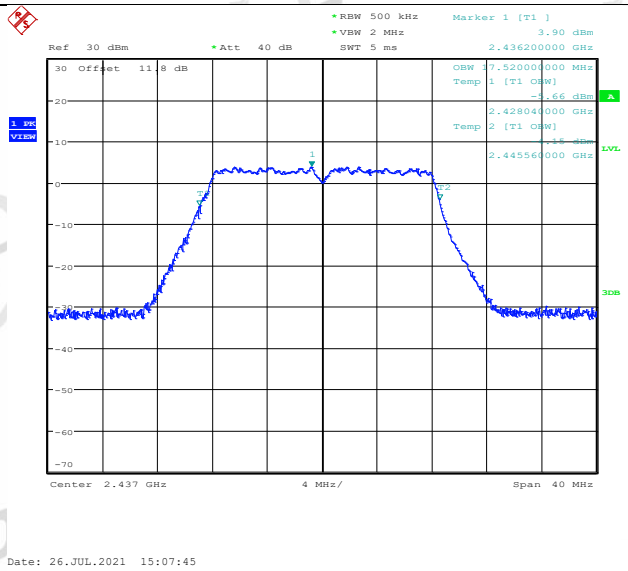

11B_Ant1_2462



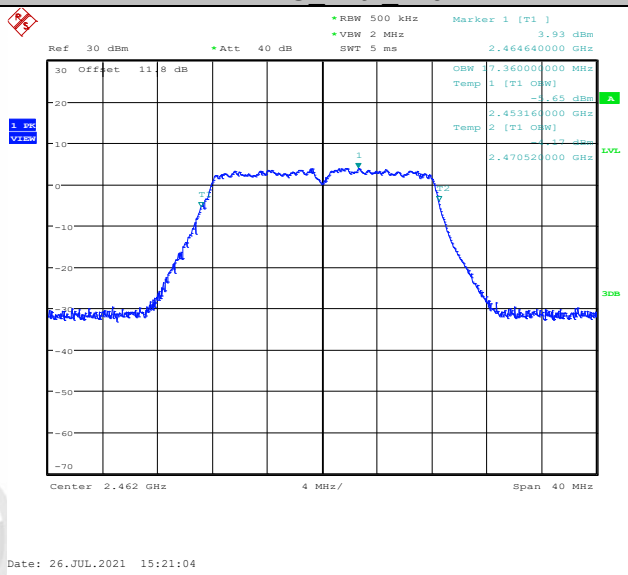

11G_Ant1_2412



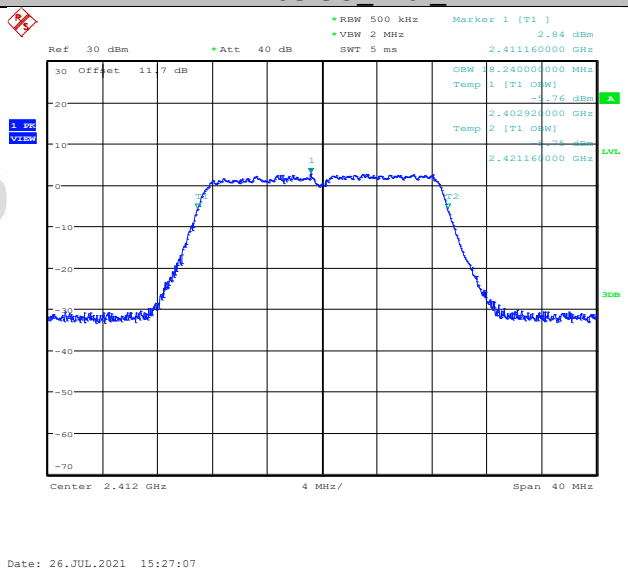

11G_Ant1_2437



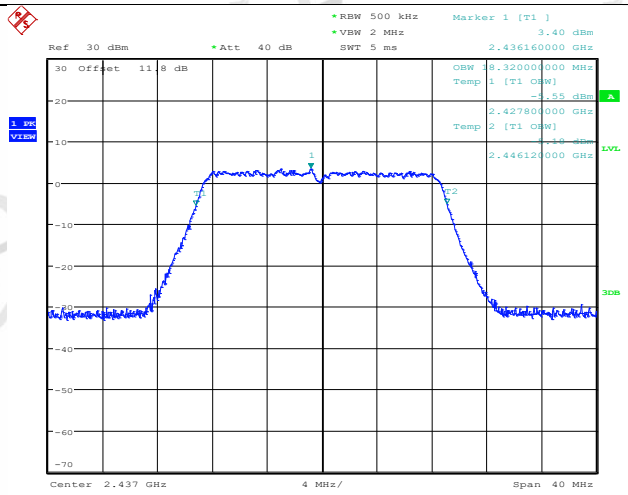

11G_Ant1_2462




11N20SISO_Ant1_2412




11N20SISO_Ant1_2437

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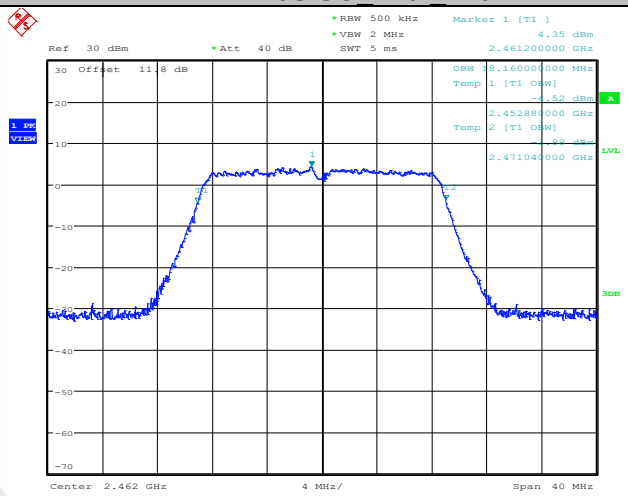
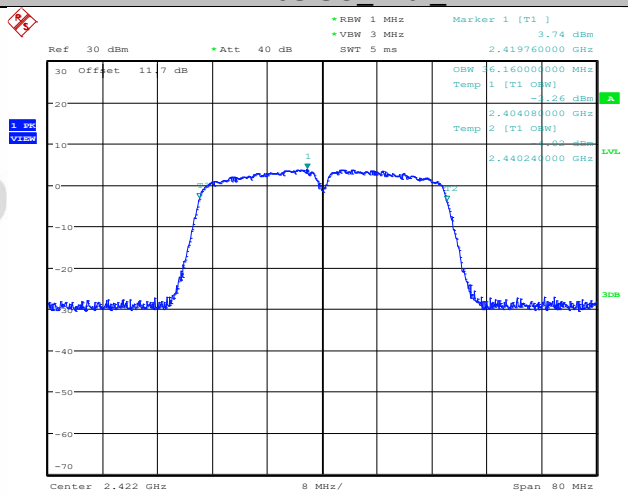
11N20SISO_Ant1_2462



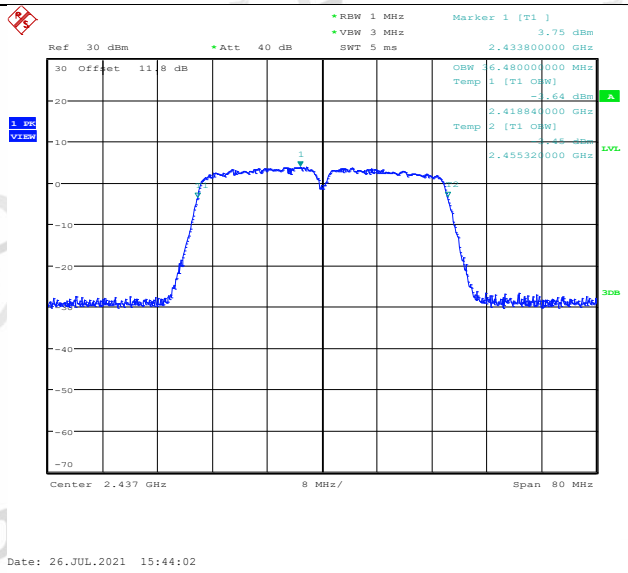

Date: 26.JUL.2021 15:35:03

11N40SISO_Ant1_2422

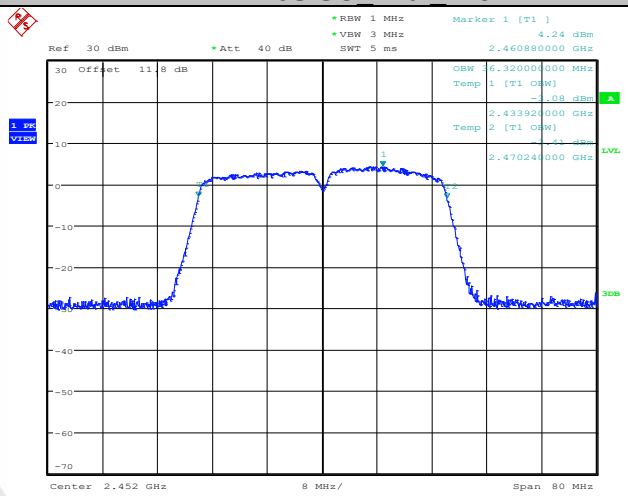



Date: 26.JUL.2021 15:38:27

11N40SISO_Ant1_2437




11N40SISO_Ant1_2452



# 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 power meter.

## 5.4. Test result

| Test Mode | Test Channel | Ant | Power (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|
| 11B | 2412 | ANT1 | 12.71 | 30 | Pass |
| 11B | 2437 | ANT1 | **13.80** | 30 | Pass |
| 11B | 2462 | ANT1 | 13.02 | 30 | Pass |
| 11G | 2412 | ANT1 | 10.04 | 30 | Pass |
| 11G | 2437 | ANT1 | 10.71 | 30 | Pass |
| 11G | 2462 | ANT1 | 10.69 | 30 | Pass |
| 11N20 | 2412 | ANT1 | 10.00 | 30 | Pass |
| 11N20 | 2437 | ANT1 | 10.90 | 30 | Pass |
| 11N20 | 2462 | ANT1 | 10.73 | 30 | Pass |
| 11N40 | 2422 | ANT1 | 9.21 | 30 | Pass |
| 11N40 | 2437 | ANT1 | 9.75 | 30 | Pass |
| 11N40 | 2452 | ANT1 | 9.40 | 30 | Pass |

# 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.

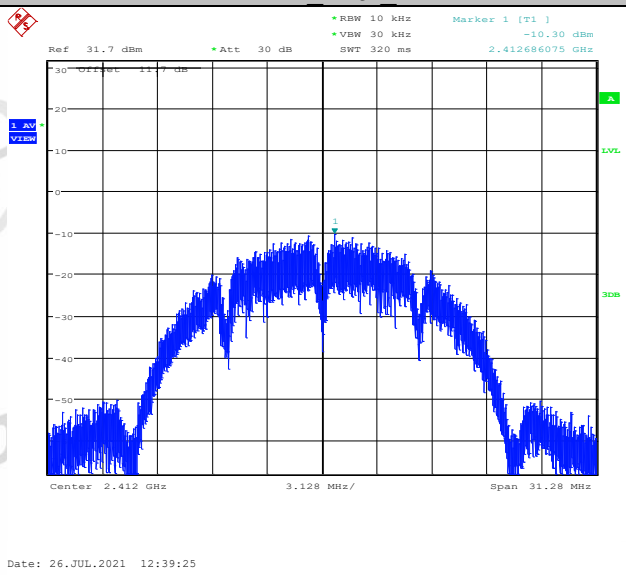
(4) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

## 6.4. Test result

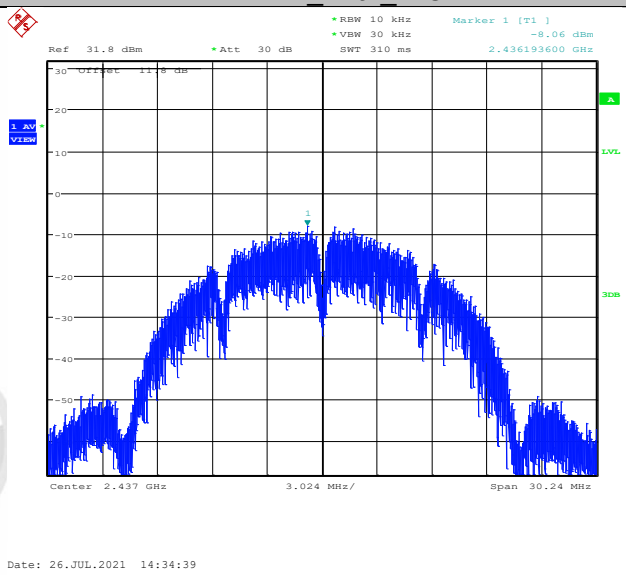
| Test Mode | Test Channel | Ant | PSD (dBm/3KHz) | Limit (dBm/3kHz) | Verdict |
|---|---|---|---|---|---|
| 11B | 2412 | ANT1 | -10.30 | 8.00 | Pass |
| 11B | 2437 | ANT1 | -8.06 | 8.00 | Pass |
| 11B | 2462 | ANT1 | -7.83 | 8.00 | Pass |
| 11G | 2412 | ANT1 | -13.17 | 8.00 | Pass |
| 11G | 2437 | ANT1 | -12.99 | 8.00 | Pass |
| 11G | 2462 | ANT1 | -13.94 | 8.00 | Pass |
| 11N20 | 2412 | ANT1 | -14.45 | 8.00 | Pass |
| 11N20 | 2437 | ANT1 | -14.01 | 8.00 | Pass |
| 11N20 | 2462 | ANT1 | -12.98 | 8.00 | Pass |
| 11N40 | 2422 | ANT1 | -16.16 | 8.00 | Pass |
| 11N40 | 2437 | ANT1 | -15.53 | 8.00 | Pass |
| 11N40 | 2452 | ANT1 | -16.66 | 8.00 | Pass |

## 6.5. original test data

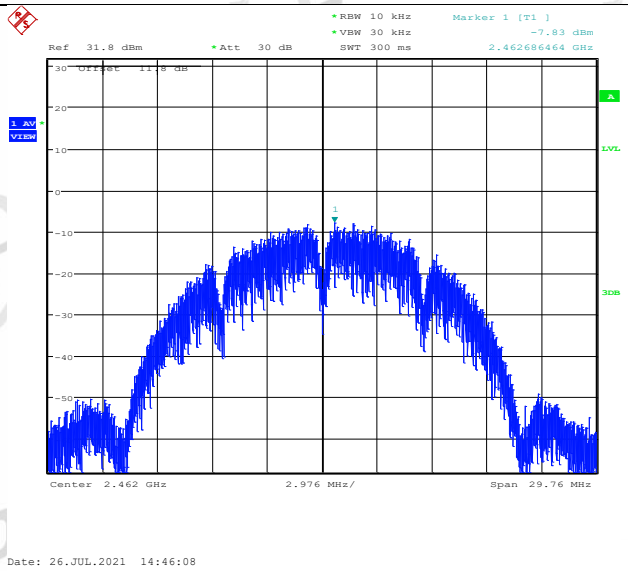
11B_Ant1_2412



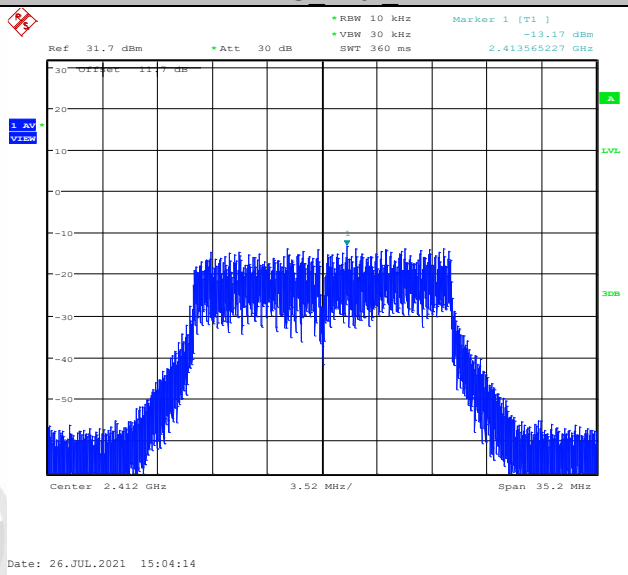

11B_Ant1_2437



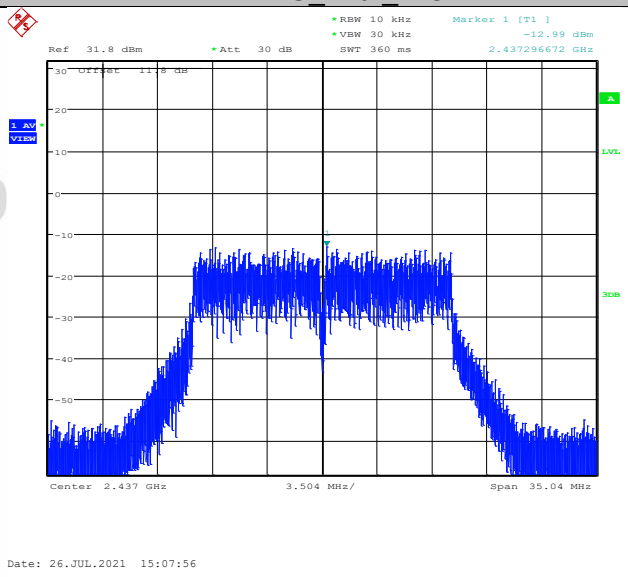

11B_Ant1_2462



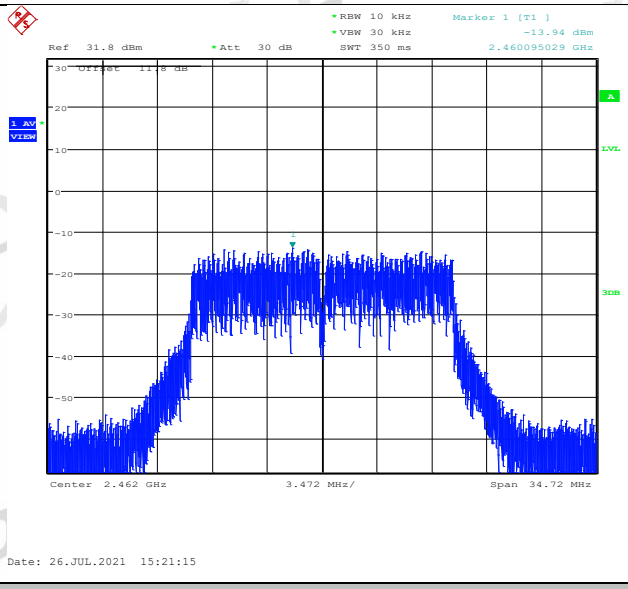

11G_Ant1_2412



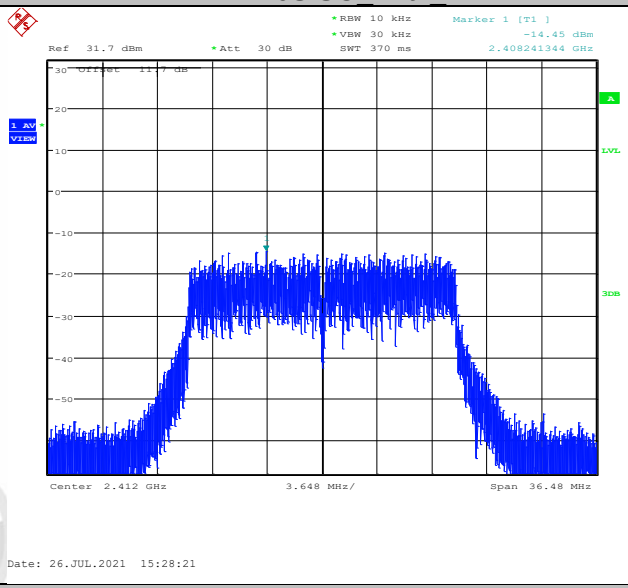

11G_Ant1_2437




11G_Ant1_2462




11N20SISO_Ant1_2412

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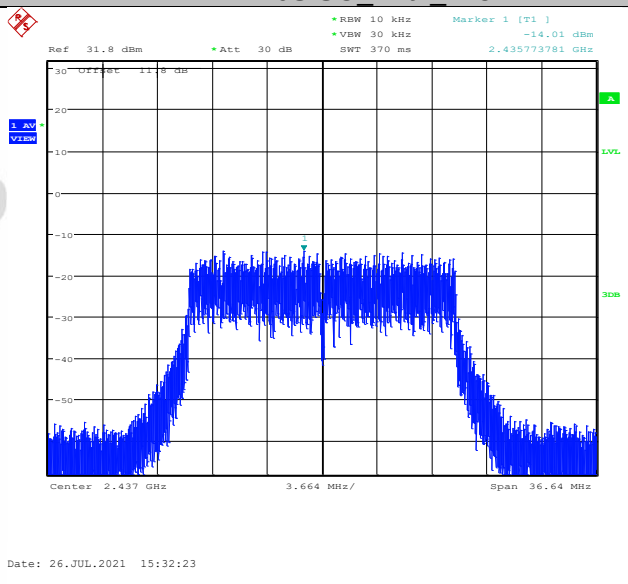


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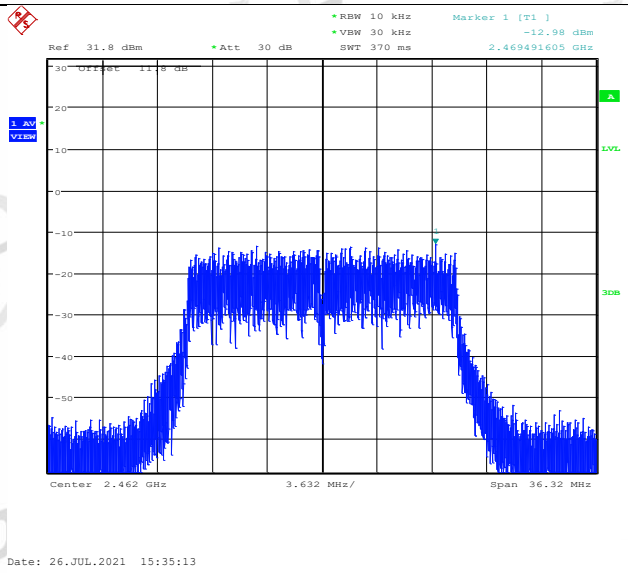
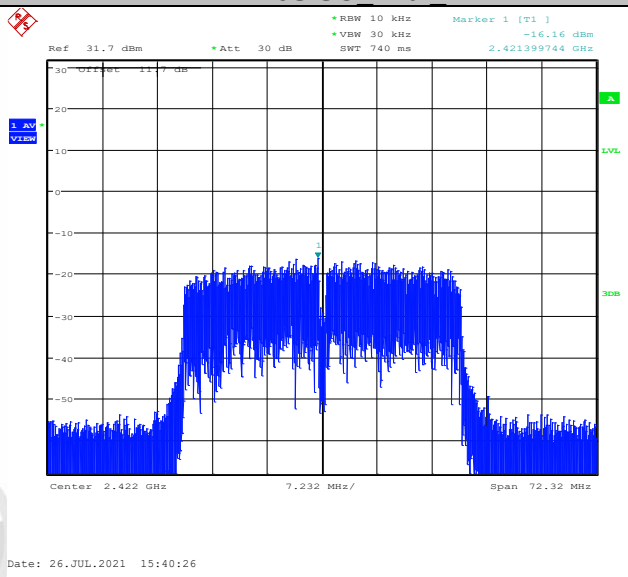
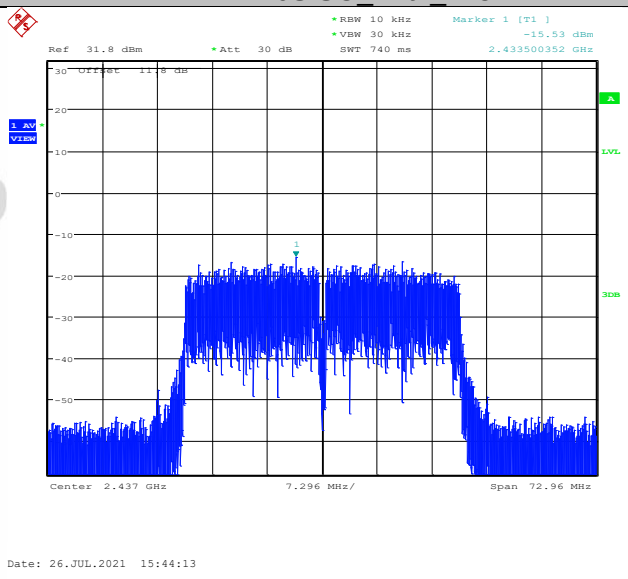


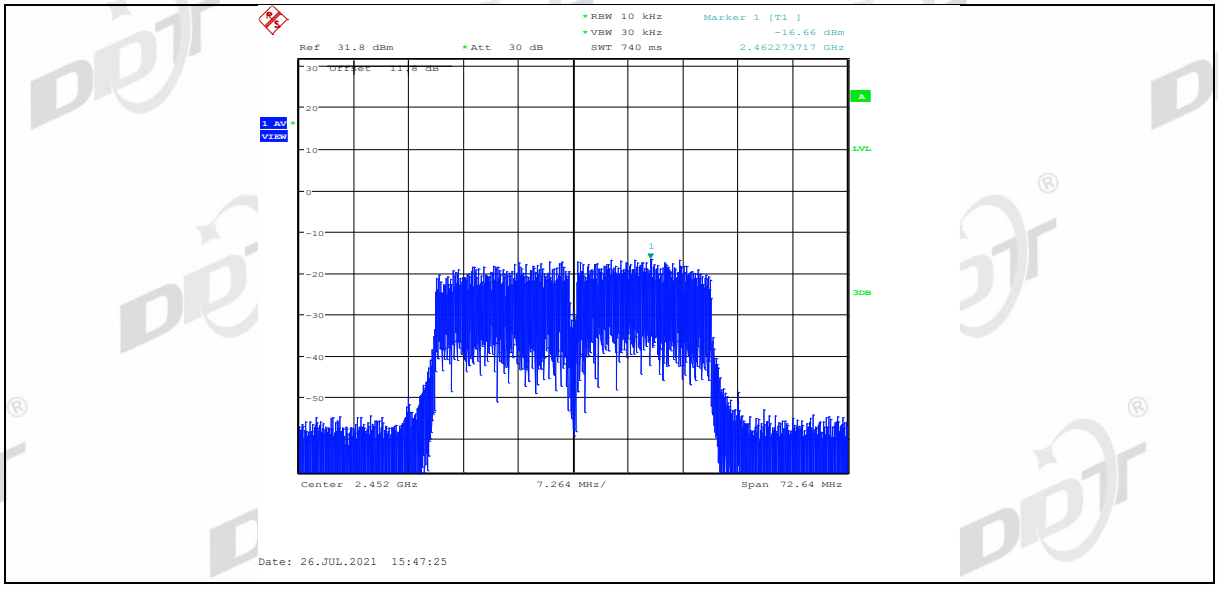

11N40SISO_Ant1_2422




11N40SISO_Ant1_2437




11N40SISO_Ant1_2452


RBW 10 kHz
VBW 30 kHz
SWT 740 ms
Marker 1 [T1 ]
-16.66 dBm
2.462273717 GHz
Ref 31.8 dBm
Att 30 dB
Offset 11.8 dB
1 AV
VIEW
A
LVL
3DB
Center 2.452 GHz
7.264 MHz/
Span 72.64 MHz
Date: 26.JUL.2021 15:47:25

# 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

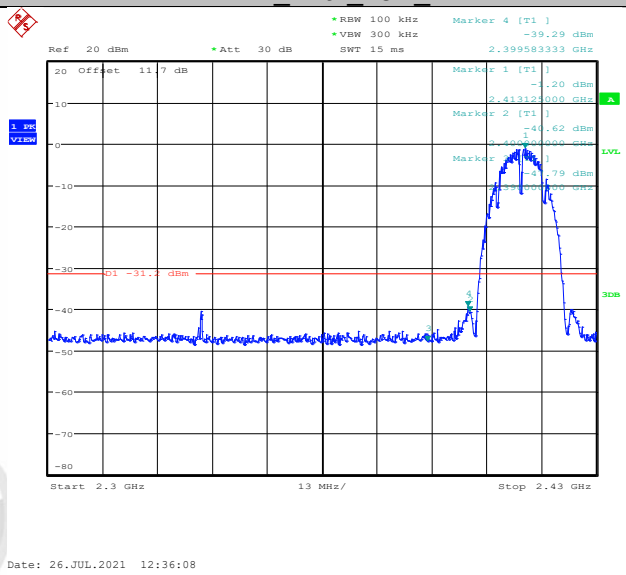
## 7.4. Test result

| EUT Set Mode | CH or Frequency | Result (dBm) | EUT Set Mode | CH or Frequency | 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 |

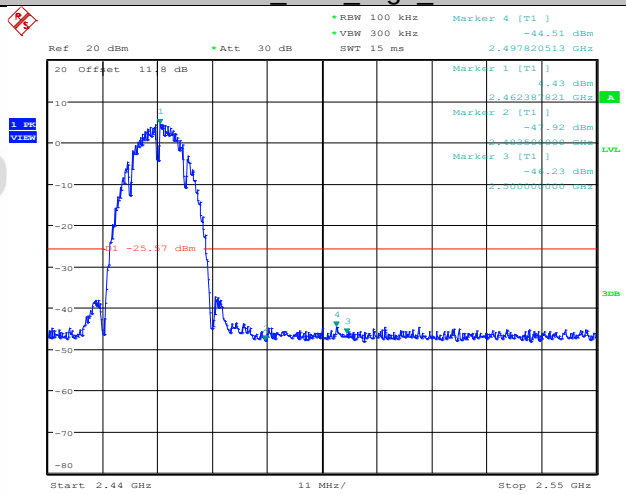
## 7.5. original test data

Band Edge

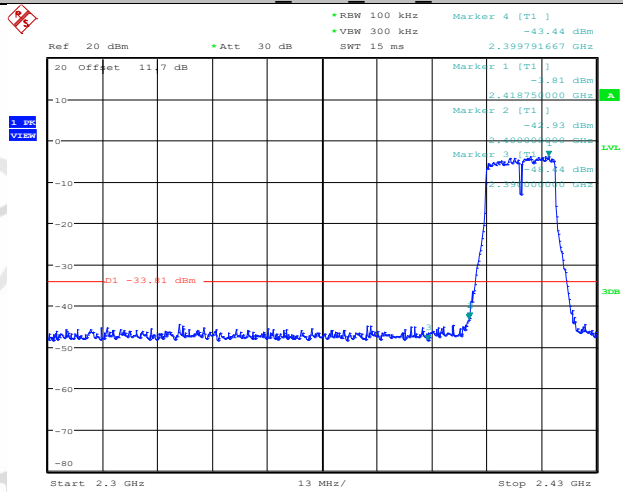
11B_Ant1_Low_2412




11B_Ant1_High_2462

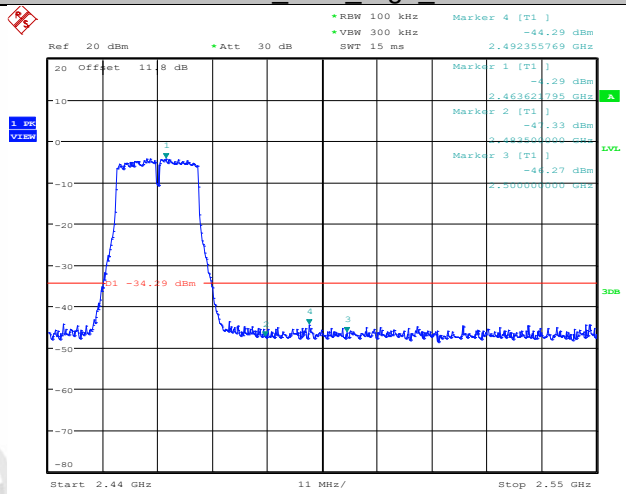


## 11G_Ant1_Low_2412



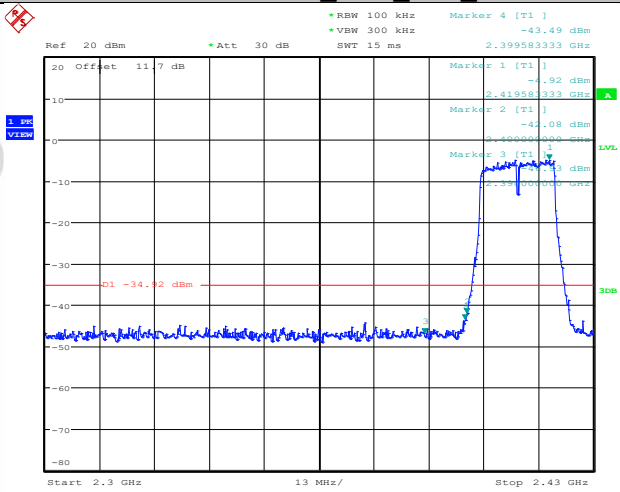

Date: 26.JUL.2021 15:04:25

## 11G_Ant1_High_2462



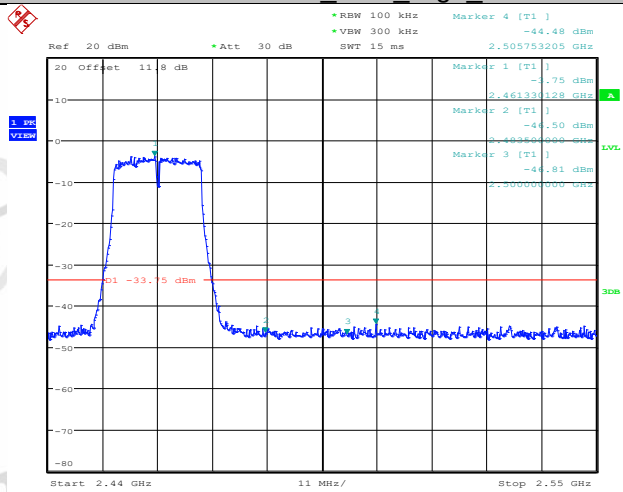

Date: 26.JUL.2021 15:21:25

## 11N20SISO_Ant1_Low_2412



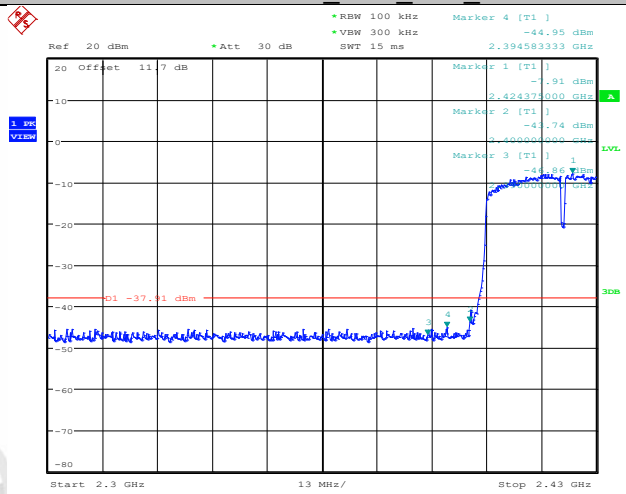

Date: 26.JUL.2021 15:28:32

## 11N20SISO_Ant1_High_2462



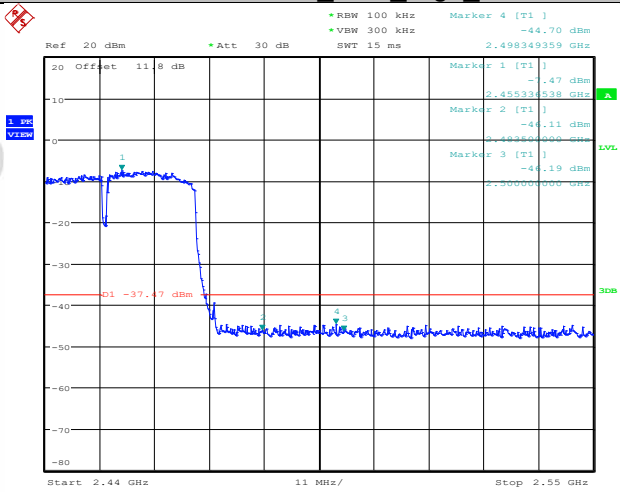

Date: 26.JUL.2021 15:35:24

## 11N40SISO_Ant1_Low_2422




Date: 26.JUL.2021 15:40:36

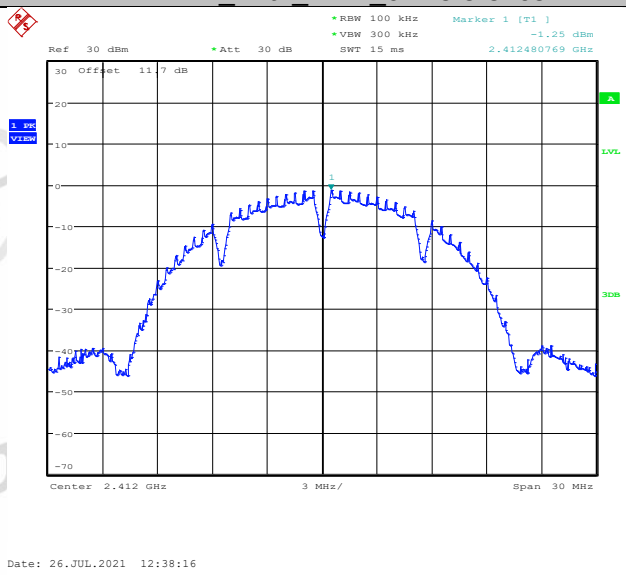
## 11N40SISO_Ant1_High_2452



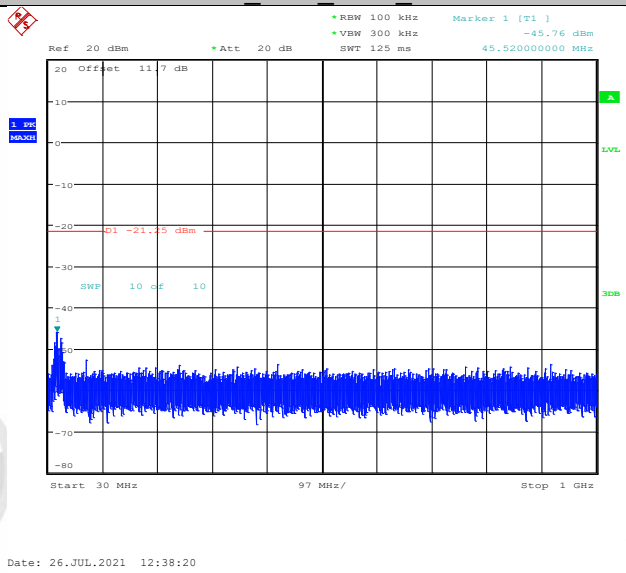

Date: 26.JUL.2021 15:47:36

Spurious Emissions

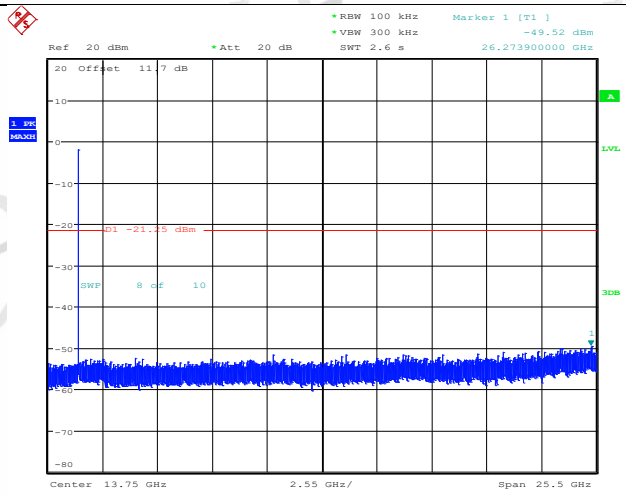
11B_Ant1_2412_0~Reference



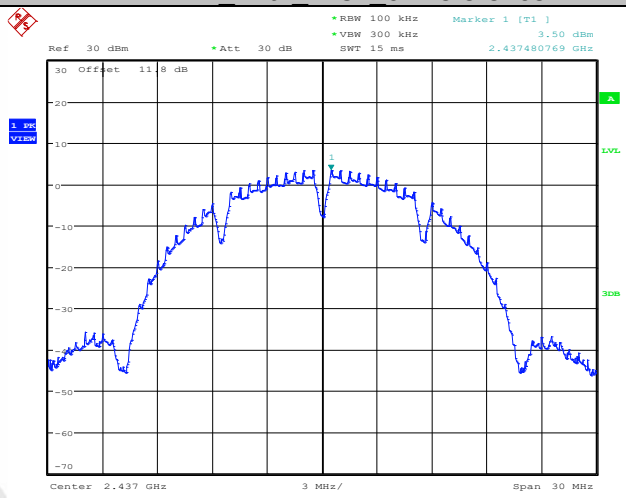

11B_Ant1_2412_30~1000



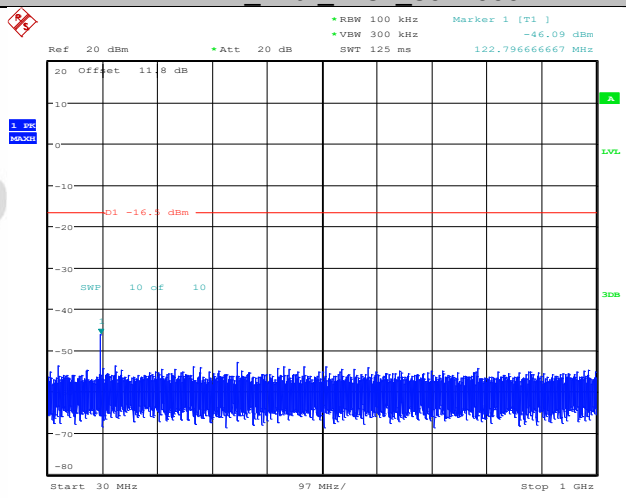

11B_Ant1_2412_1000~26500



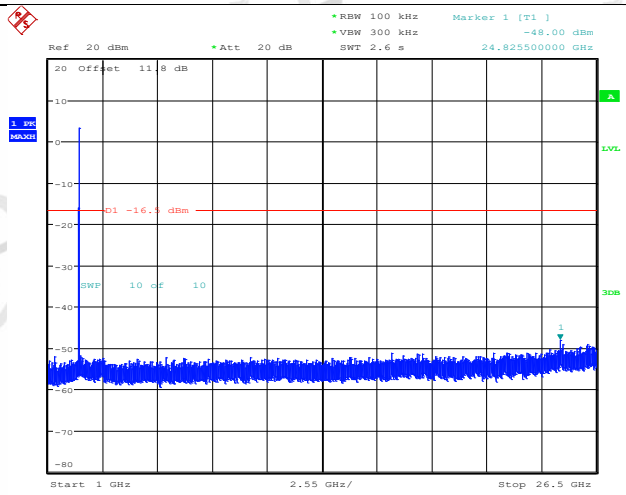

11B_Ant1_2437_0~Reference



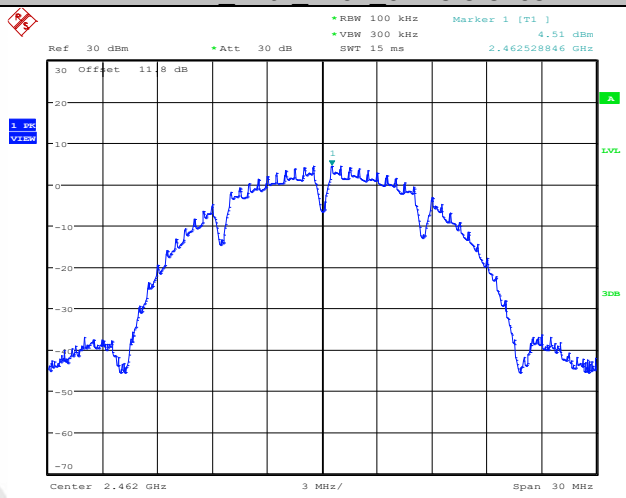

11B_Ant1_2437_30~1000



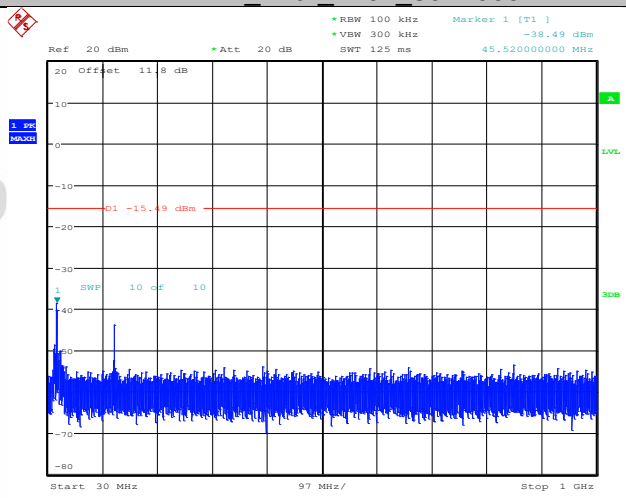

11B_Ant1_2437_1000~26500




11B_Ant1_2462_0~Reference




11B_Ant1_2462_30~1000

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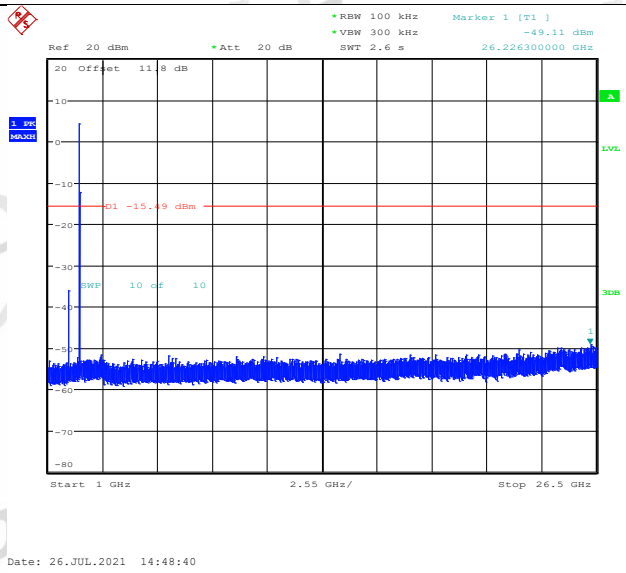
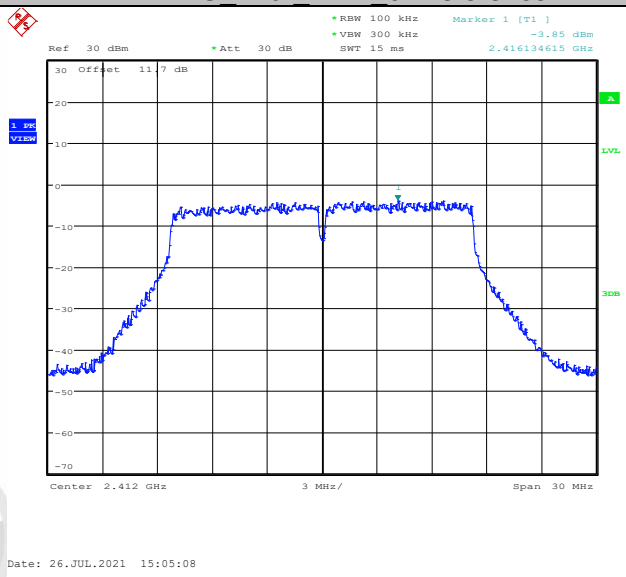



11G_Ant1_2412_0~Reference

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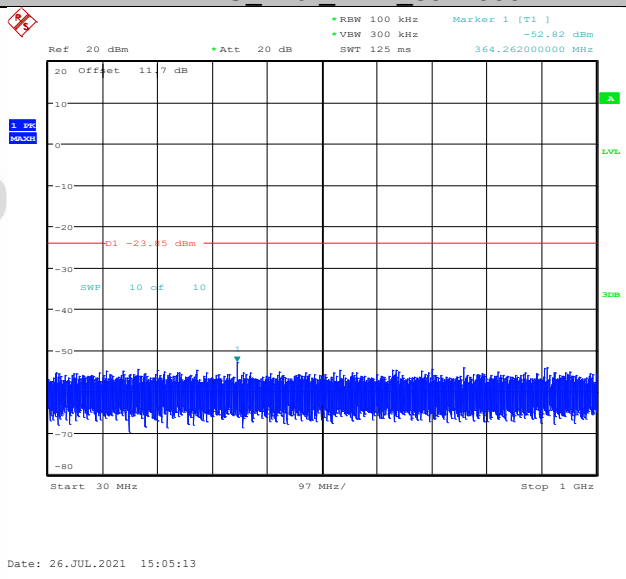


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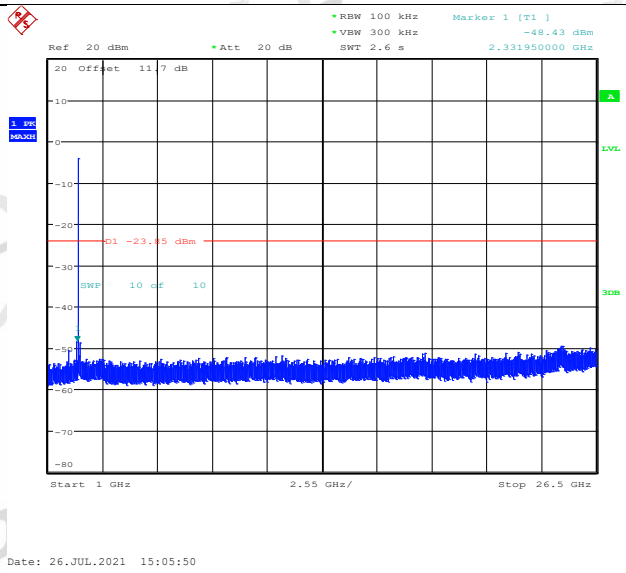
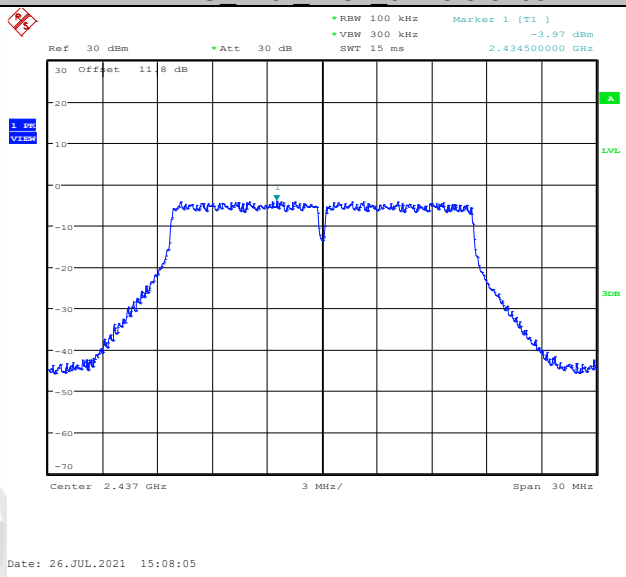



11G_Ant1_2437_0~Reference

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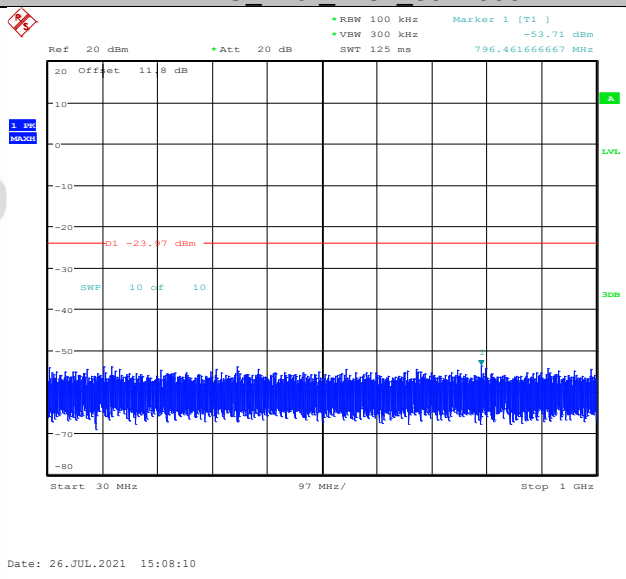
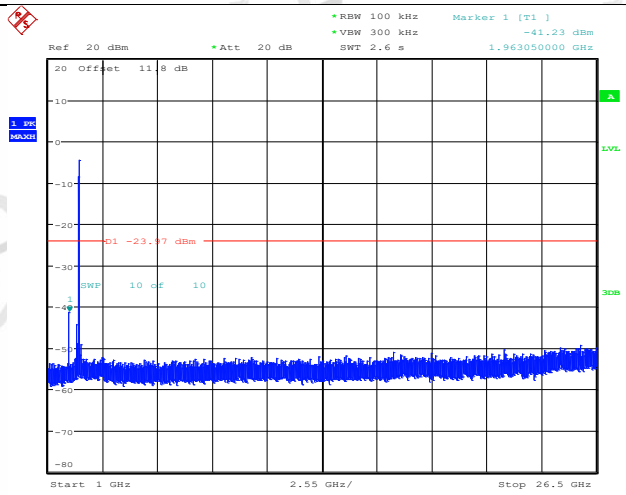



11G_Ant1_2437_1000~26500

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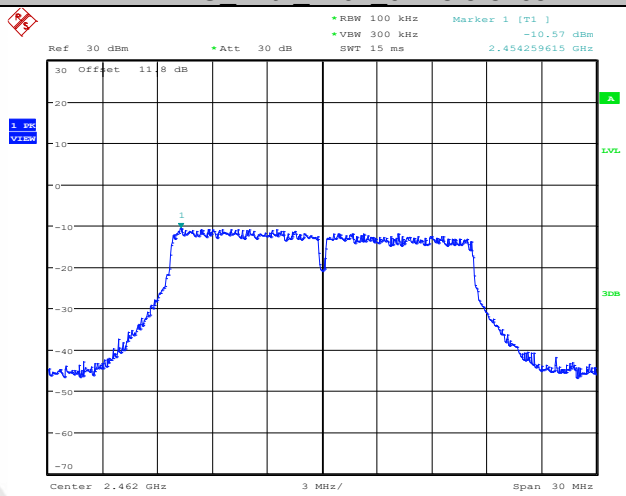


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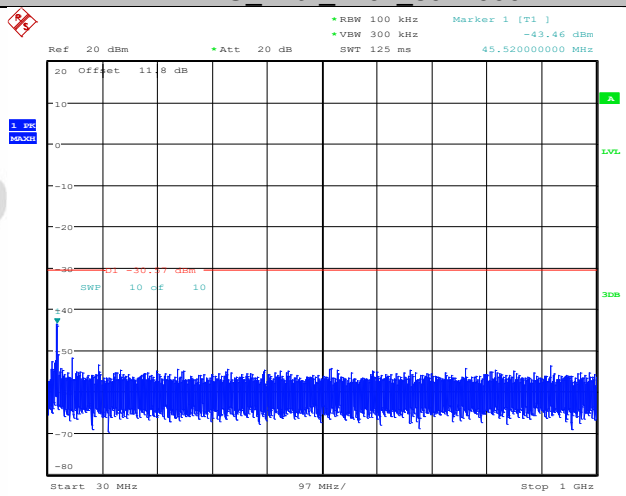
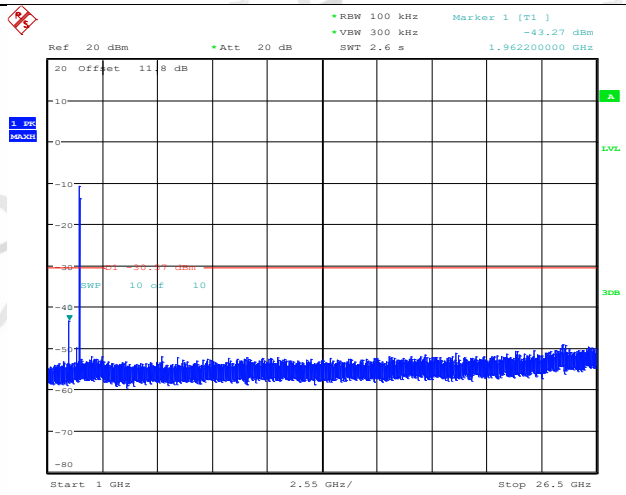



11G_Ant1_2462_1000~26500

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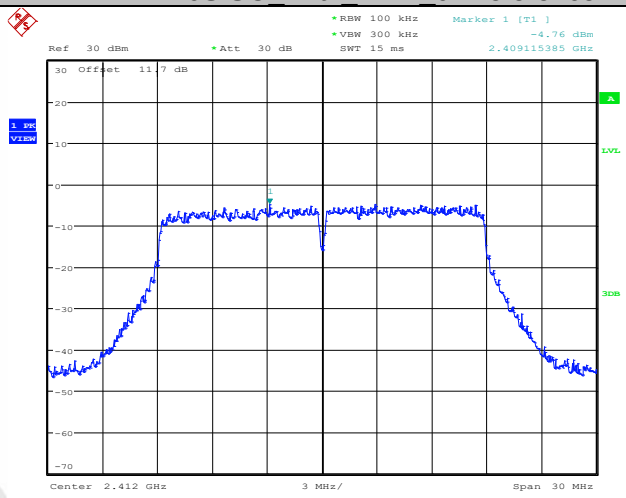


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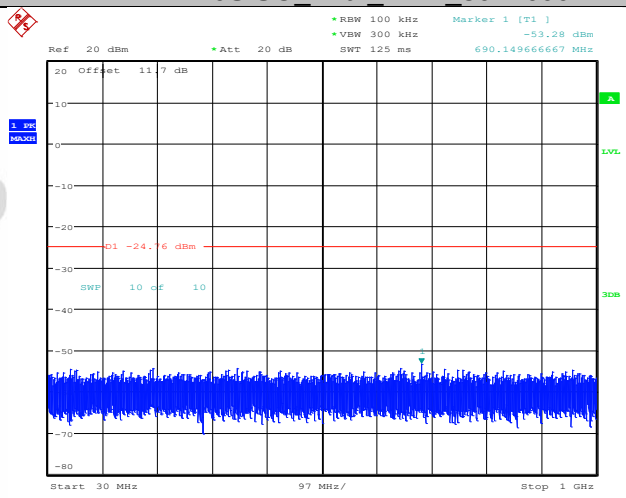
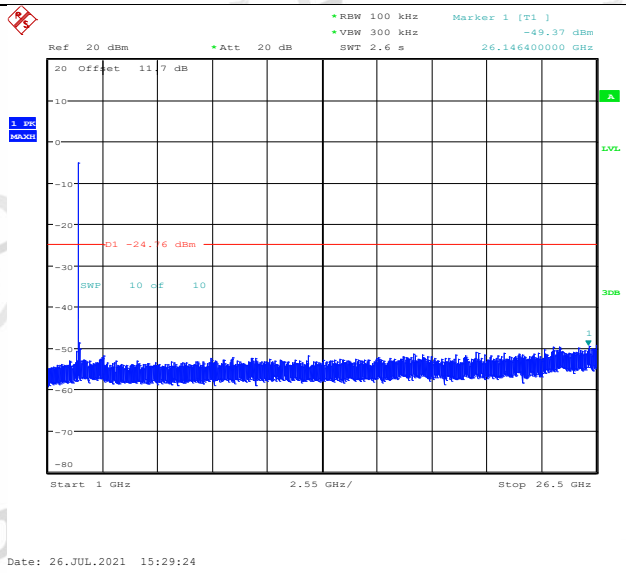



11N20SISO_Ant1_2412_1000~26500

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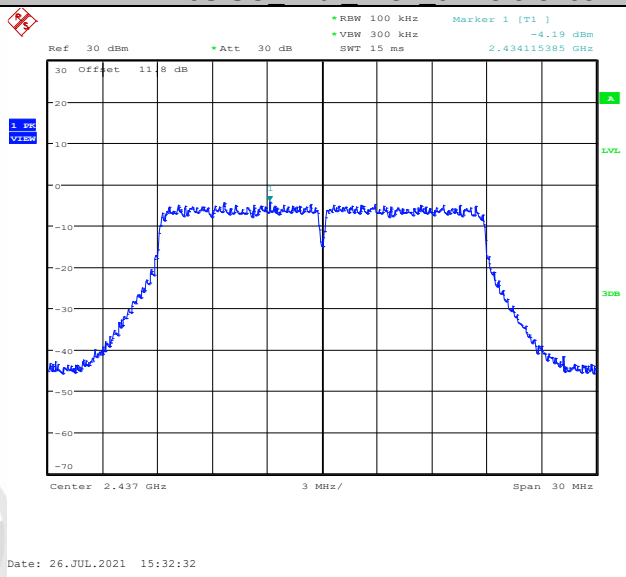
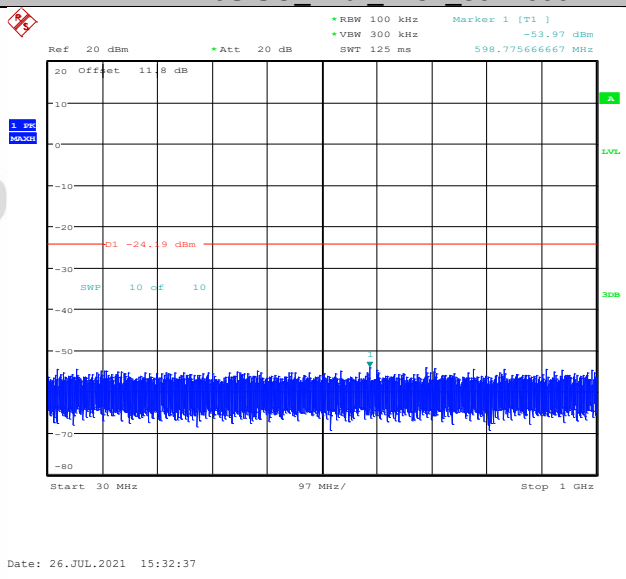
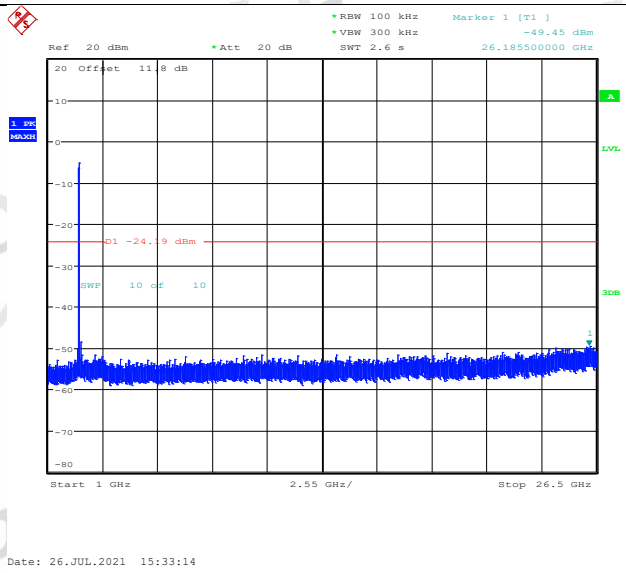



11N20SISO_Ant1_2437_30~1000




11N20SISO_Ant1_2437_1000~26500

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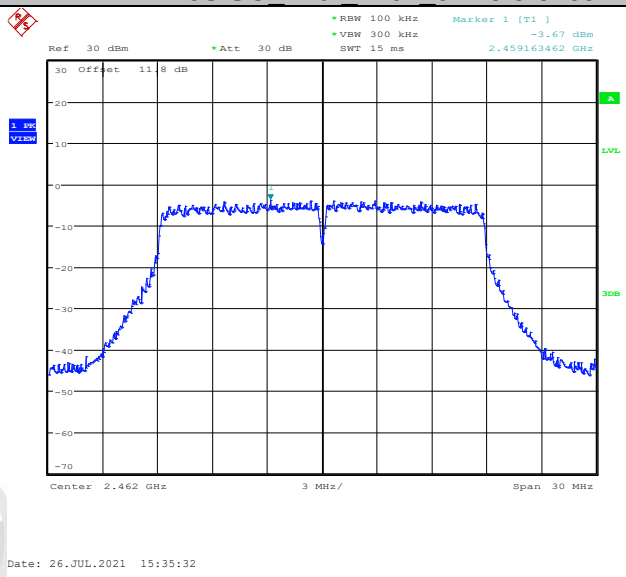
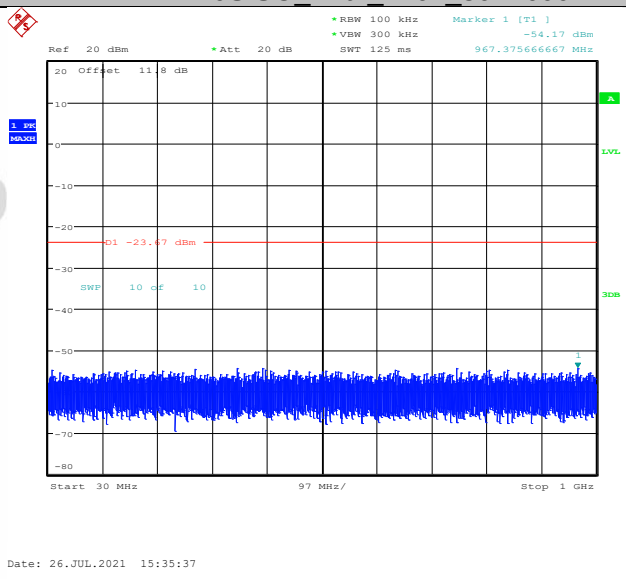



11N20SISO_Ant1_2462_30~1000

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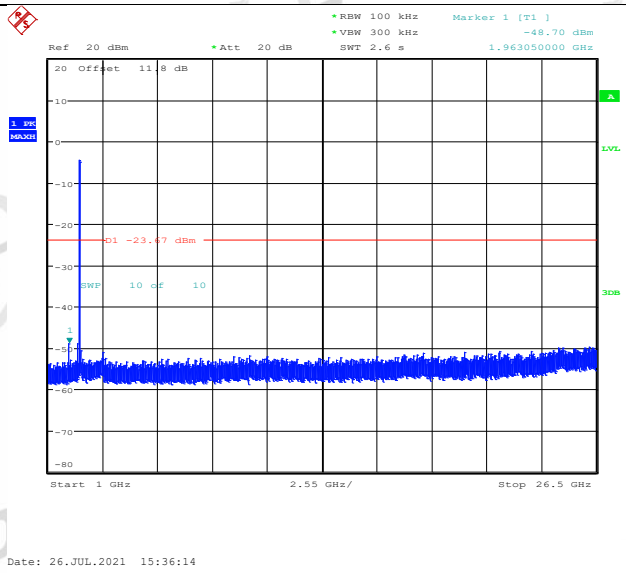


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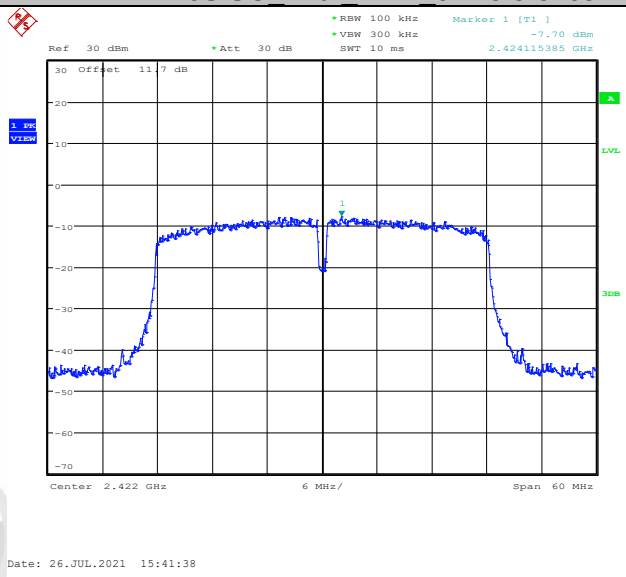


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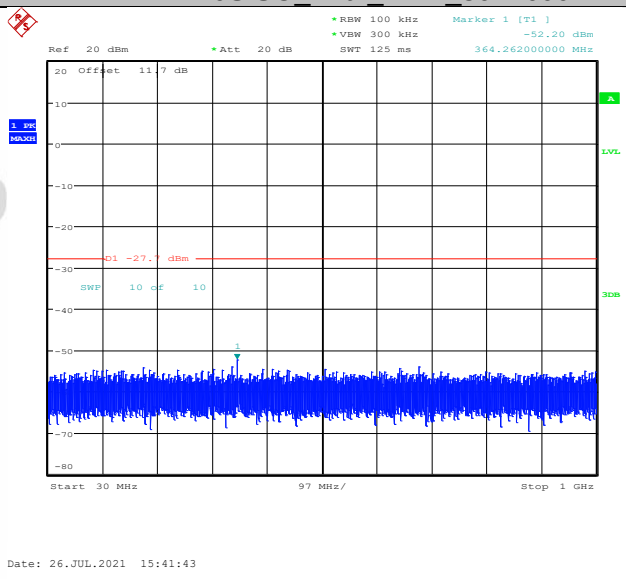
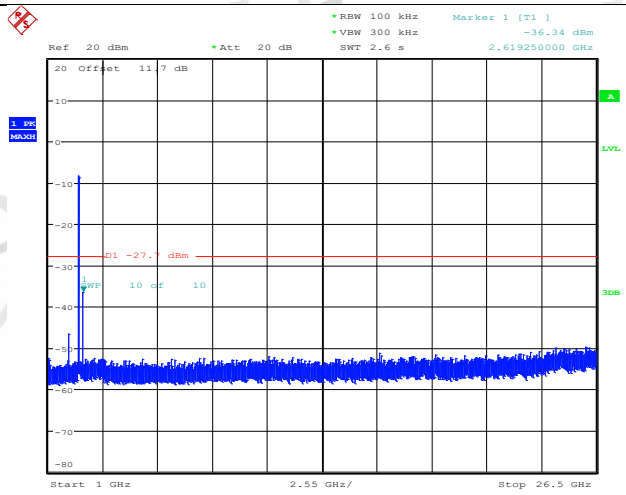



11N40SISO_Ant1_2422_1000~26500




Date: 26.JUL.2021 15:42:20

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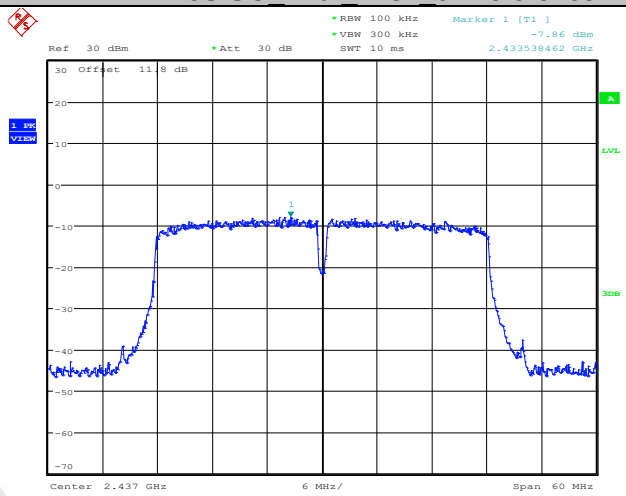
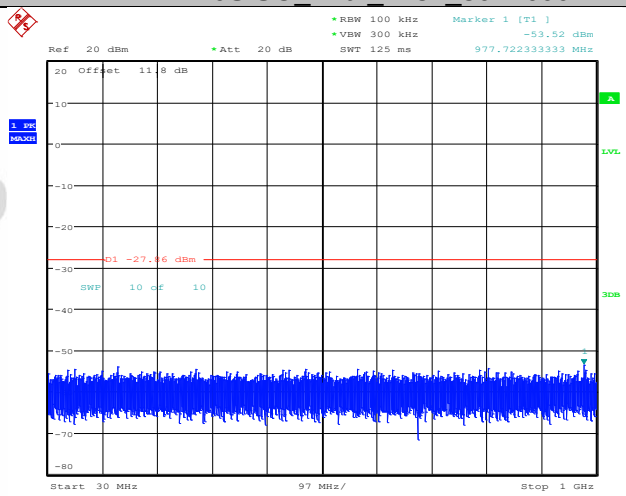



Date: 26.JUL.2021 15:44:49

11N40SISO_Ant1_2437_30~1000

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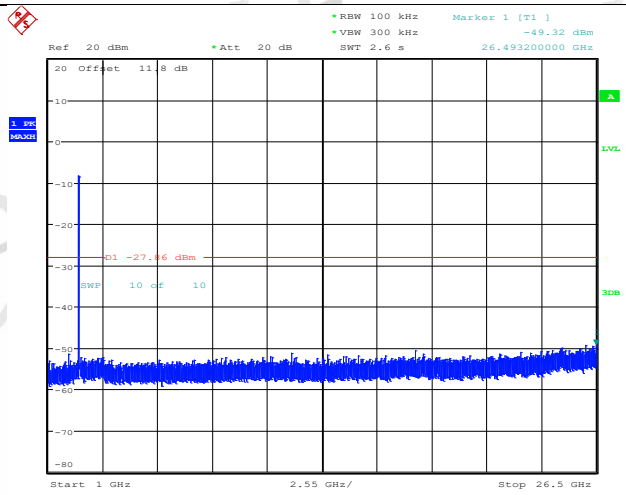
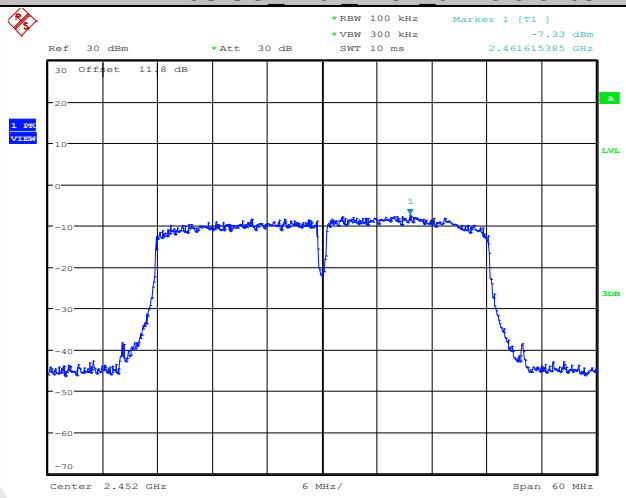
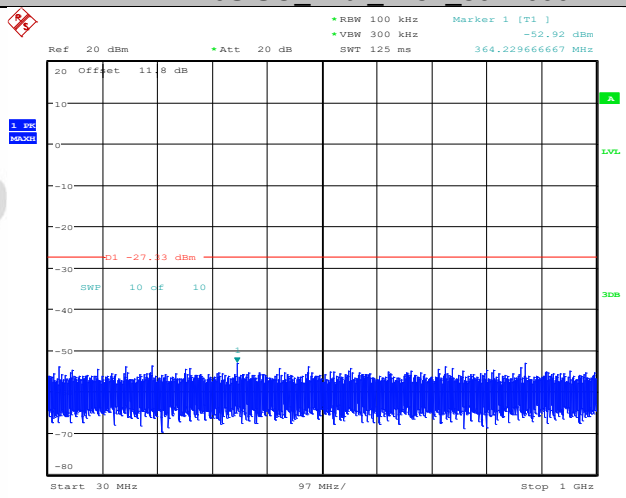
11N40SISO_Ant1_2437_1000~26500



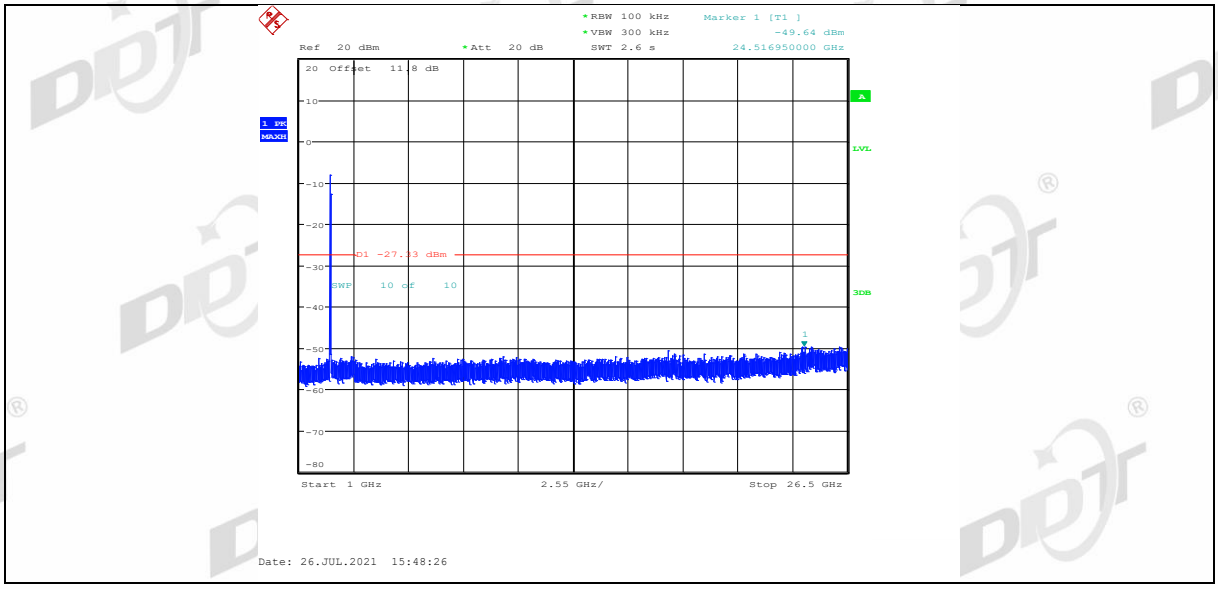

11N40SISO_Ant1_2452_0~Reference




11N40SISO_Ant1_2452_30~1000



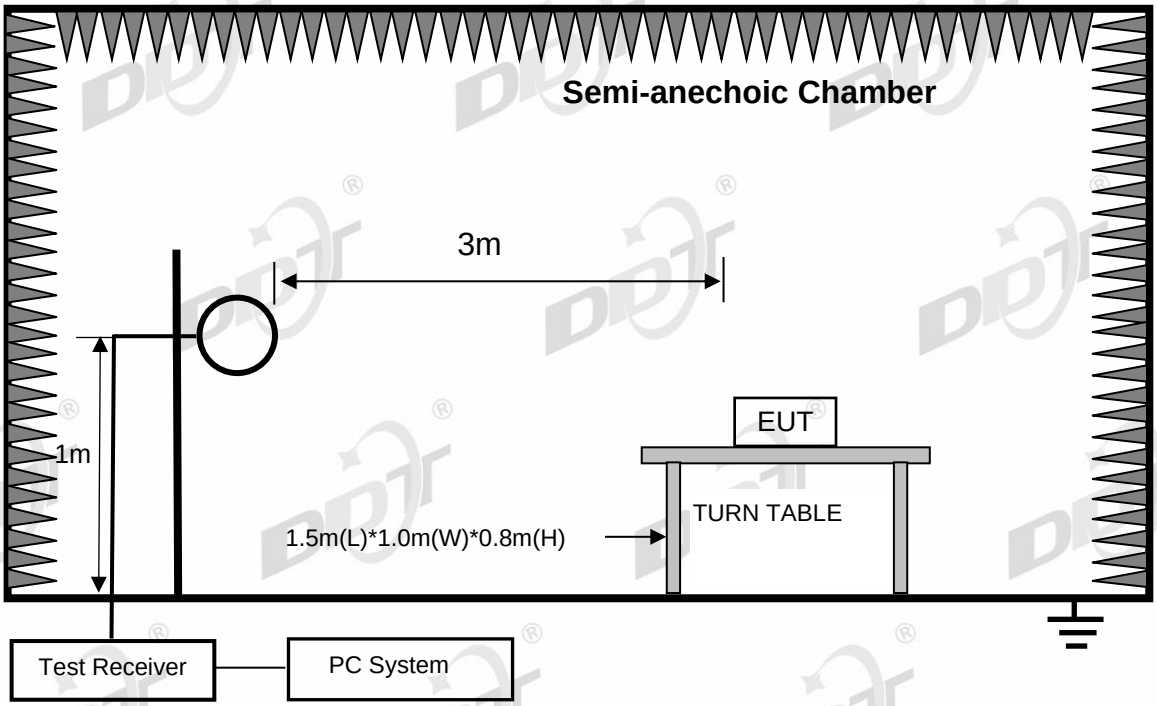

11N40SISO_Ant1_2452_1000~26500


RBW 100 kHz
VBW 300 kHz
SWT 2.6 s
Marker 1 [T1 ]
-49.64 dBm
24.516950000 GHz
Ref 20 dBm
Att 20 dB
20 Offset 11.8 dB
D1 -27.33 dBm
SWP 10 of 10
Start 1 GHz
2.55 GHz/
Stop 26.5 GHz
Date: 26.JUL.2021 15:48:26

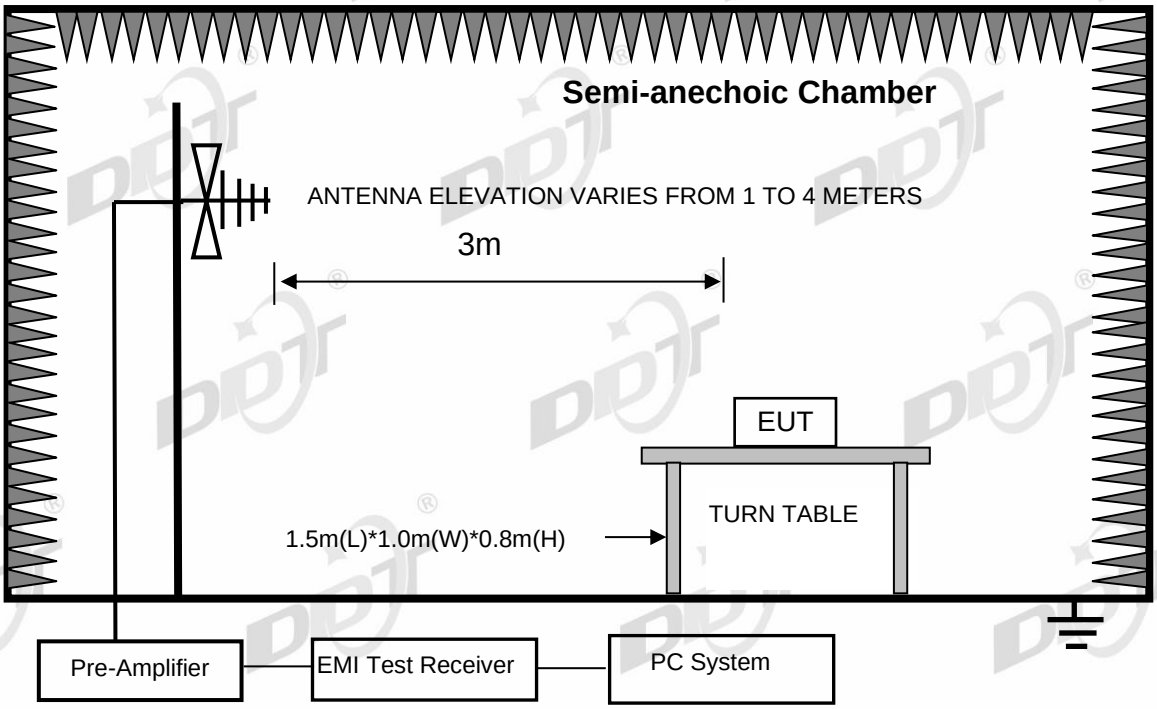
# 8. Radiated Spurious Emissions

## 8.1. Block diagram of test setup

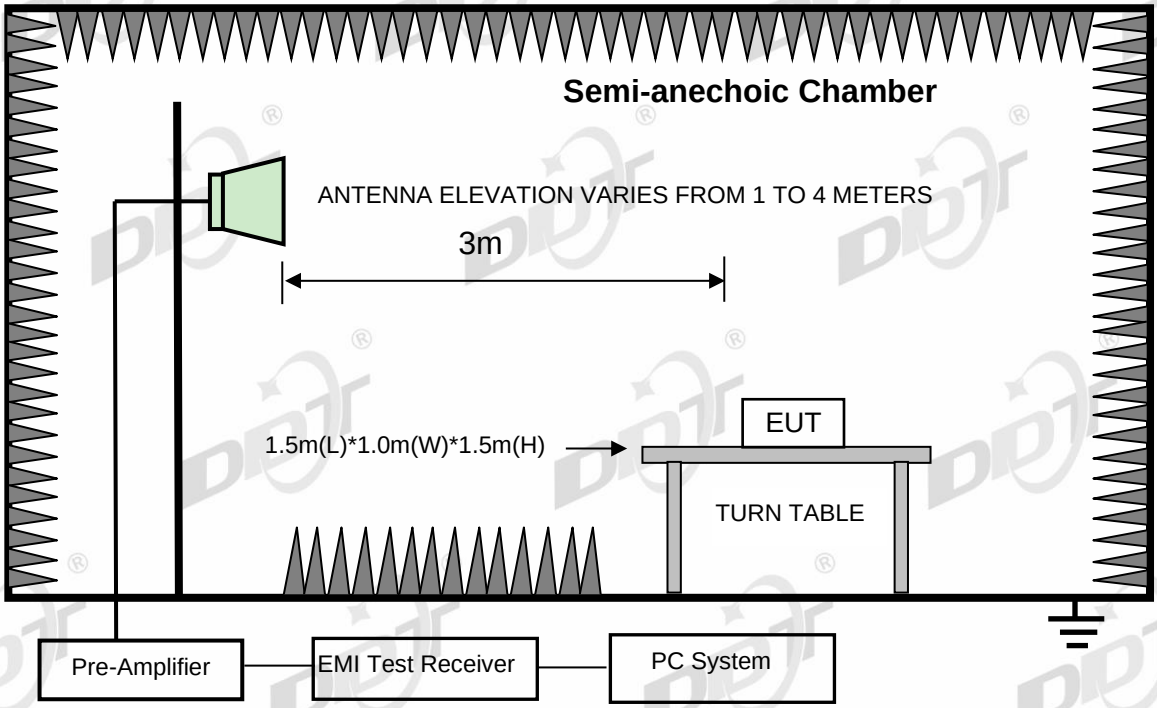
In 3 m Anechoic Chamber, test setup diagram for 9 kHz - 30 MHz:




In 3 m Anechoic Chamber, test setup diagram for 30 MHz - 1 GHz:



In 3 m Anechoic Chamber, test setup diagram for frequency above 1 GHz:




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 |
| [1]0.495-0.505 | 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 | | | |

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2]Above 38.6

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.

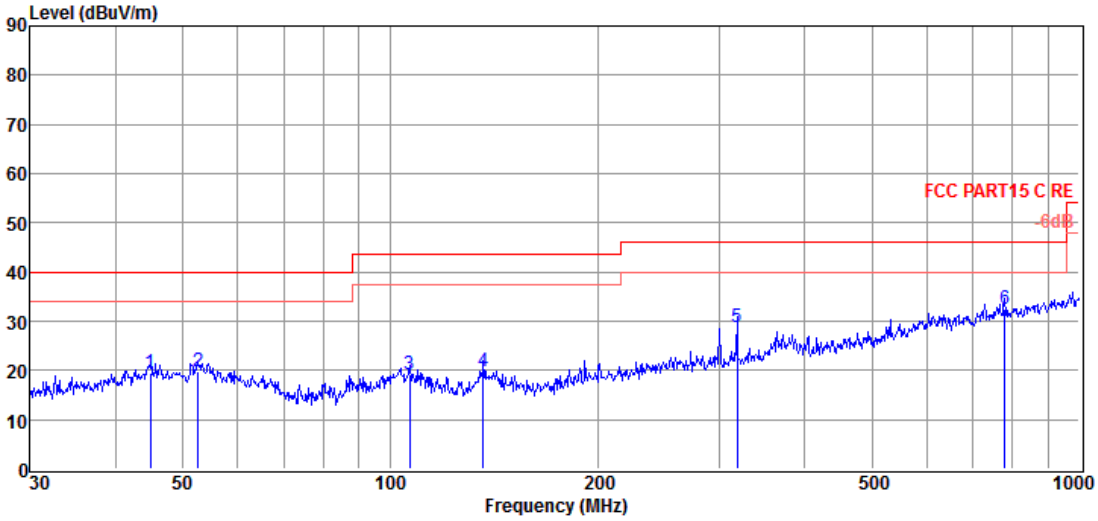
Note1: According exploratory test, the emission levels are 20 dB below the limit detected from 9 kHz to 30 MHz and 18 GHz to 25 GHz, so the final test was performed with frequency range from 30 MHz to 18 GHz and recorded in below.

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 the worst case.

## Radiated Emission test (below 1GHz)

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

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 2# | D:\2021 RE2# Report Data\Q21061703-2E\FCC BELOW1G 4E.EM6 | |
| **Test Date** | : 2021-07-19 | **Tested By** | : Bairong |
| **EUT** | : Car Navigation | **Model Number** | : HA5010 |
| **Power Supply** | : DC 12V | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5°C,Humi:55%,Press:100.1kPa | **Antenna/Distance** | : 2020 VULB 9163 2#/3m/HORIZONTAL |
| **Memo** | : WIFI | | |

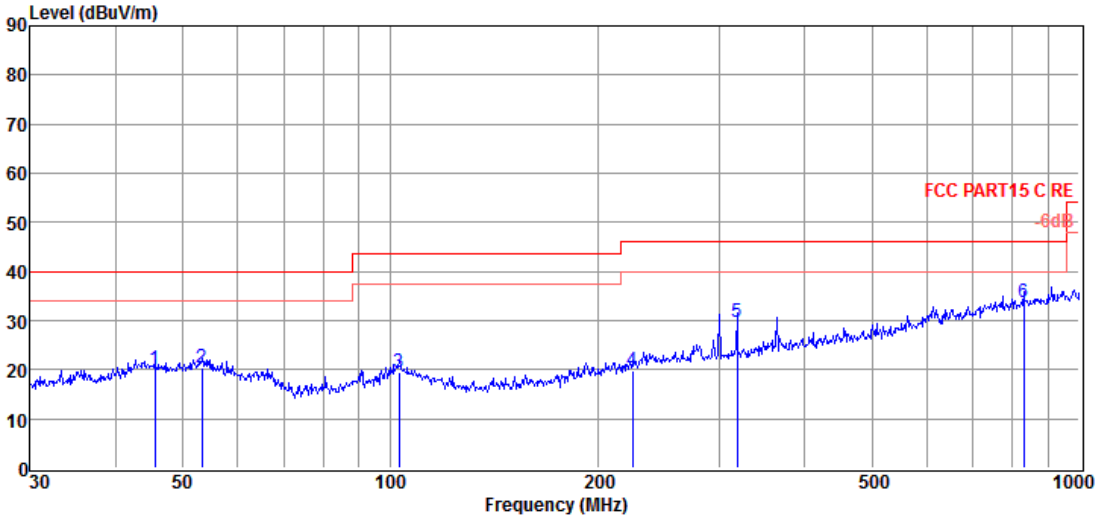



| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 44.90 | 2.74 | 12.99 | 3.81 | 19.54 | 40.00 | -20.46 | QP | HORIZONTAL |
| 2 | 52.58 | 2.21 | 13.59 | 3.88 | 19.68 | 40.00 | -20.32 | QP | HORIZONTAL |
| 3 | 106.76 | 3.43 | 11.28 | 4.46 | 19.17 | 43.50 | -24.33 | QP | HORIZONTAL |
| 4 | 136.46 | 7.66 | 7.60 | 4.67 | 19.93 | 43.50 | -23.57 | QP | HORIZONTAL |
| 5 | 318.82 | 9.28 | 13.97 | 5.57 | 28.82 | 46.00 | -17.18 | QP | HORIZONTAL |
| 6 | 779.61 | 4.34 | 20.86 | 7.30 | 32.50 | 46.00 | -13.50 | 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.

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

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 2# | D:\2021 RE2# Report Data\Q21061703-2E\FCC BELOW1G 4E.EM6 | |
| **Test Date** | : 2021-07-19 | **Tested By** | : Bairong |
| **EUT** | : Car Navigation | **Model Number** | : HA5010 |
| **Power Supply** | : DC 12V | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.5°C,Humi:55%,Press:100.1kPa | **Antenna/Distance** | : 2020 VULB 9163 2#/3m/VERTICAL |
| **Memo** | : WIFI | | |




| 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 | 45.54 | 3.23 | 12.95 | 3.81 | 19.99 | 40.00 | -20.01 | QP | VERTICAL |
| 2 | 53.32 | 2.84 | 13.64 | 3.89 | 20.37 | 40.00 | -19.63 | QP | VERTICAL |
| 3 | 103.08 | 3.10 | 12.08 | 4.43 | 19.61 | 43.50 | -23.89 | QP | VERTICAL |
| 4 | 224.52 | 3.33 | 11.46 | 5.16 | 19.95 | 46.00 | -26.05 | QP | VERTICAL |
| 5 | 318.82 | 10.12 | 13.97 | 5.57 | 29.66 | 46.00 | -16.34 | QP | VERTICAL |
| 6 | 830.40 | 5.20 | 21.15 | 7.46 | 33.81 | 46.00 | -12.19 | 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.

## 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 |
|---|---|---|---|---|---|---|---|---|---|
| **11b CH1** | | | | | | | | | |
| 4825.00 | 51.19 | 34.16 | 42.78 | 5.55 | 48.12 | 74.00 | -25.88 | Peak | HORIZONTAL |
| 6525.00 | 46.10 | 35.52 | 42.83 | 6.65 | 45.44 | 74.00 | -28.56 | Peak | HORIZONTAL |
| 9534.00 | 44.76 | 38.16 | 41.38 | 7.79 | 49.33 | 74.00 | -24.67 | Peak | HORIZONTAL |
| 12050.00 | 45.48 | 38.00 | 41.06 | 9.58 | 52.00 | 74.00 | -22.00 | Peak | HORIZONTAL |
| 13376.00 | 45.09 | 38.83 | 41.85 | 10.71 | 52.78 | 74.00 | -21.22 | Peak | HORIZONTAL |
| 17405.00 | 41.60 | 43.17 | 39.87 | 10.51 | 55.41 | 74.00 | -18.59 | Peak | HORIZONTAL |
| 17405.00 | 35.63 | 43.17 | 39.87 | 10.51 | 49.44 | 54.00 | -4.56 | Average | HORIZONTAL |
| 4825.00 | 52.99 | 34.16 | 42.78 | 5.55 | 49.92 | 74.00 | -24.08 | Peak | VERTICAL |
| 5981.00 | 46.81 | 34.99 | 43.09 | 6.66 | 45.37 | 74.00 | -28.63 | Peak | VERTICAL |
| 9500.00 | 44.82 | 38.10 | 41.36 | 7.79 | 49.35 | 74.00 | -24.65 | Peak | VERTICAL |
| 11999.00 | 45.02 | 38.00 | 41.00 | 9.54 | 51.56 | 74.00 | -22.44 | Peak | VERTICAL |
| 14294.00 | 43.58 | 39.94 | 41.36 | 11.04 | 53.20 | 74.00 | -20.80 | Peak | VERTICAL |
| 17541.00 | 41.83 | 43.39 | 39.76 | 10.55 | 56.01 | 74.00 | -17.99 | Peak | VERTICAL |
| 17541.00 | 36.26 | 43.39 | 39.76 | 10.55 | 50.44 | 54.00 | -3.56 | Average | VERTICAL |
| **11b CH6** | | | | | | | | | |
| 4876.00 | 58.78 | 34.26 | 42.76 | 5.58 | 55.86 | 74.00 | -18.14 | Peak | HORIZONTAL |
| 4876.00 | 53.13 | 34.26 | 42.76 | 5.58 | 50.21 | 54.00 | -3.79 | Average | HORIZONTAL |
| 7834.00 | 44.91 | 36.34 | 42.26 | 7.05 | 46.04 | 74.00 | -27.96 | Peak | HORIZONTAL |
| 10146.00 | 45.19 | 38.60 | 41.82 | 7.98 | 49.95 | 74.00 | -24.05 | Peak | HORIZONTAL |
| 12084.00 | 45.37 | 38.00 | 41.10 | 9.62 | 51.89 | 74.00 | -22.11 | Peak | HORIZONTAL |
| 13376.00 | 45.08 | 38.83 | 41.85 | 10.71 | 52.77 | 74.00 | -21.23 | Peak | HORIZONTAL |
| 16606.00 | 43.32 | 42.36 | 40.63 | 10.31 | 55.36 | 74.00 | -18.64 | Peak | HORIZONTAL |
| 16606.00 | 38.21 | 42.36 | 40.63 | 10.31 | 50.25 | 54.00 | -3.75 | Average | HORIZONTAL |
| 4876.00 | 56.76 | 34.26 | 42.76 | 5.58 | 53.84 | 74.00 | -20.16 | Peak | VERTICAL |
| 5981.00 | 47.50 | 34.99 | 43.09 | 6.66 | 46.06 | 74.00 | -27.94 | Peak | VERTICAL |
| 9364.00 | 44.66 | 37.81 | 41.26 | 7.78 | 48.99 | 74.00 | -25.01 | Peak | VERTICAL |
| 12016.00 | 45.50 | 38.00 | 41.02 | 9.55 | 52.03 | 74.00 | -21.97 | Peak | VERTICAL |
| 13614.00 | 44.77 | 39.08 | 41.64 | 10.90 | 53.11 | 74.00 | -20.89 | Peak | VERTICAL |
| 14685.00 | 43.96 | 40.25 | 41.44 | 10.82 | 53.59 | 74.00 | -20.41 | Peak | VERTICAL |
| **11b CH11** | | | | | | | | | |
| 4910.00 | 53.86 | 34.33 | 42.74 | 5.60 | 51.05 | 74.00 | -22.95 | Peak | HORIZONTAL |
| 7919.00 | 44.42 | 36.37 | 42.23 | 7.09 | 45.65 | 74.00 | -28.35 | Peak | HORIZONTAL |
| 10316.00 | 45.22 | 38.26 | 41.96 | 8.13 | 49.65 | 74.00 | -24.35 | Peak | HORIZONTAL |
| 12050.00 | 45.44 | 38.00 | 41.06 | 9.58 | 51.96 | 74.00 | -22.04 | Peak | HORIZONTAL |
| 13444.00 | 45.17 | 38.87 | 41.79 | 10.76 | 53.01 | 74.00 | -20.99 | Peak | HORIZONTAL |
| 14311.00 | 43.91 | 39.95 | 41.36 | 11.03 | 53.53 | 74.00 | -20.47 | Peak | HORIZONTAL |
| 4910.00 | 56.53 | 34.33 | 42.74 | 5.60 | 53.72 | 74.00 | -20.28 | Peak | VERTICAL |
| 5981.00 | 48.17 | 34.99 | 43.09 | 6.66 | 46.73 | 74.00 | -27.27 | Peak | VERTICAL |
| 9534.00 | 44.69 | 38.16 | 41.38 | 7.79 | 49.26 | 74.00 | -24.74 | Peak | VERTICAL |
| 11761.00 | 46.00 | 37.91 | 41.35 | 9.35 | 51.91 | 74.00 | -22.09 | Peak | VERTICAL |
| 13971.00 | 43.87 | 39.65 | 41.33 | 11.18 | 53.37 | 74.00 | -20.63 | Peak | VERTICAL |
| 16385.00 | 43.92 | 42.12 | 40.87 | 10.25 | 55.42 | 74.00 | -18.58 | Peak | VERTICAL |
| 16385.00 | 36.23 | 42.12 | 40.87 | 10.25 | 47.73 | 54.00 | -6.27 | Average | VERTICAL |

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

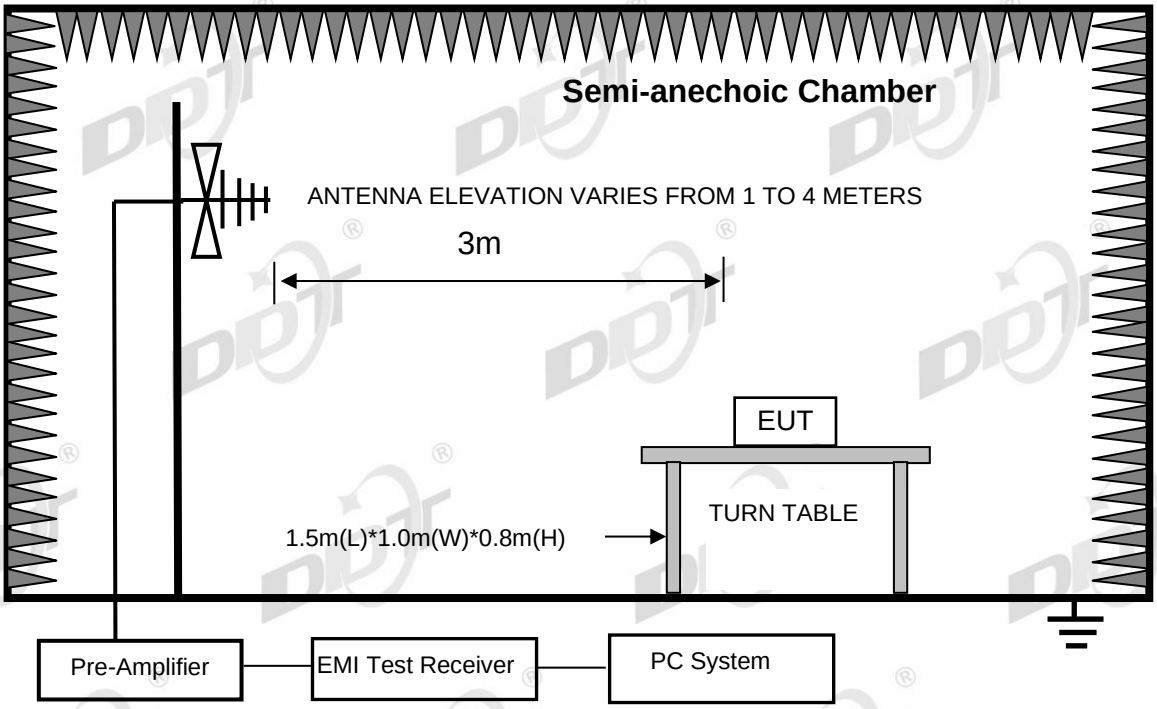
2. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

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 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 2450 MHz to 2500 MHz, 2310 MHz to 2450 MHz and 2430 MHz to 2500MHz.

Remark: All restriction band have been tested, and shown in report.

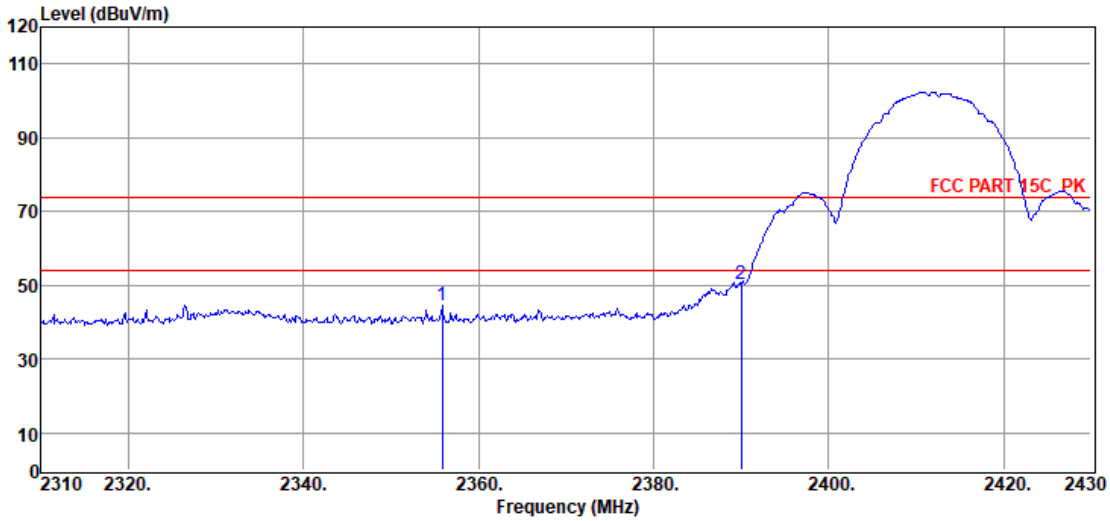
## 9.4. Test result

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

Note: All mode was test and record this report.

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

| | | | |
|---|---|---|---|
| **Test Site** | : DDT 3m Chamber 1# | D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6 | |
| **Test Date** | : 2021-07-18 | **Tested By** | : Bairong |
| **EUT** | : Car Navigation | **Model Number** | : HA5010 |
| **Power Supply** | : DC 12V | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.1'C,Humi:56%,Press:100.1kPa | **Antenna/Distance** | : 2020 HF907/3m/HORIZONTAL |
| **Memo** | : 11b 2412 | | |

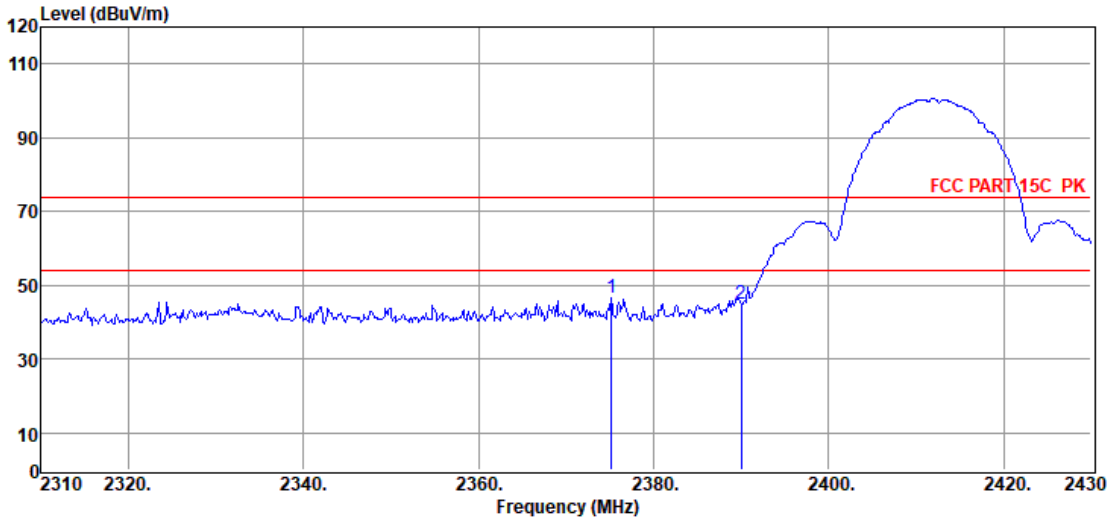



| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2355.84 | 54.11 | 28.91 | 42.38 | 3.83 | 44.47 | 74.00 | -29.53 | Peak | HORIZONTAL |
| 2 | 2390.00 | 59.79 | 28.98 | 42.43 | 3.86 | 50.20 | 74.00 | -23.80 | 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:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6 | |
| **Test Date** | : 2021-07-18 | **Tested By** | : Bairong |
| **EUT** | : Car Navigation | **Model Number** | : HA5010 |
| **Power Supply** | : DC 12V | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.1'C,Humi:56%,Press:100.1kPa | **Antenna/Distance** | : 2020 HF907/3m/VERTICAL |
| **Memo** | : 11b 2412 | | |

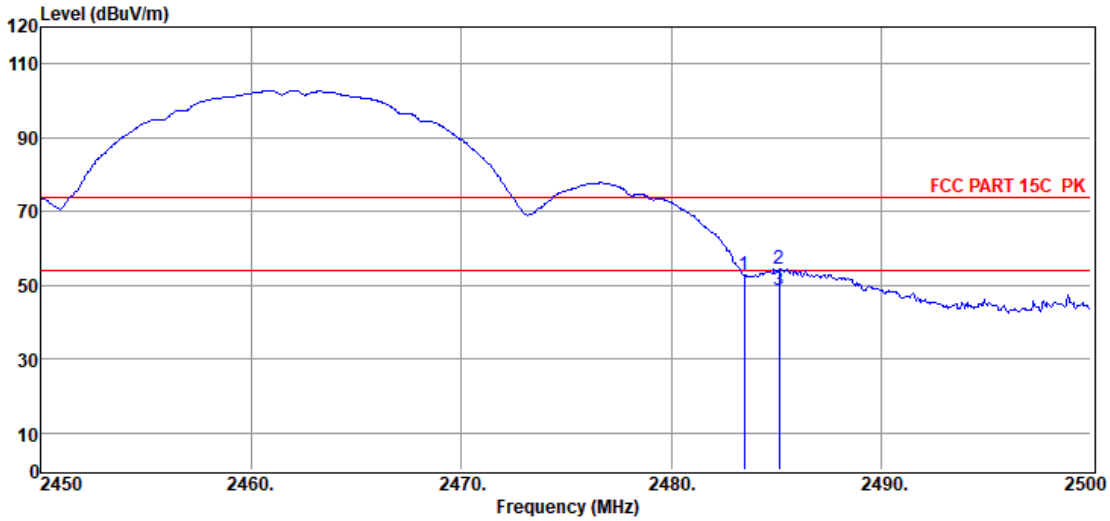



| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2375.16 | 56.06 | 28.95 | 42.41 | 3.85 | 46.45 | 74.00 | -27.55 | Peak | VERTICAL |
| 2 | 2390.00 | 54.59 | 28.98 | 42.43 | 3.86 | 45.00 | 74.00 | -29.00 | 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:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6 | |
| **Test Date** | : 2021-07-18 | **Tested By** | : Bairong |
| **EUT** | : Car Navigation | **Model Number** | : HA5010 |
| **Power Supply** | : DC 12V | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.1'C,Humi:56%,Press:100.1kPa | **Antenna/Distance** | : 2020 HF907/3m/HORIZONTAL |
| **Memo** | : 11b 2462 | | |

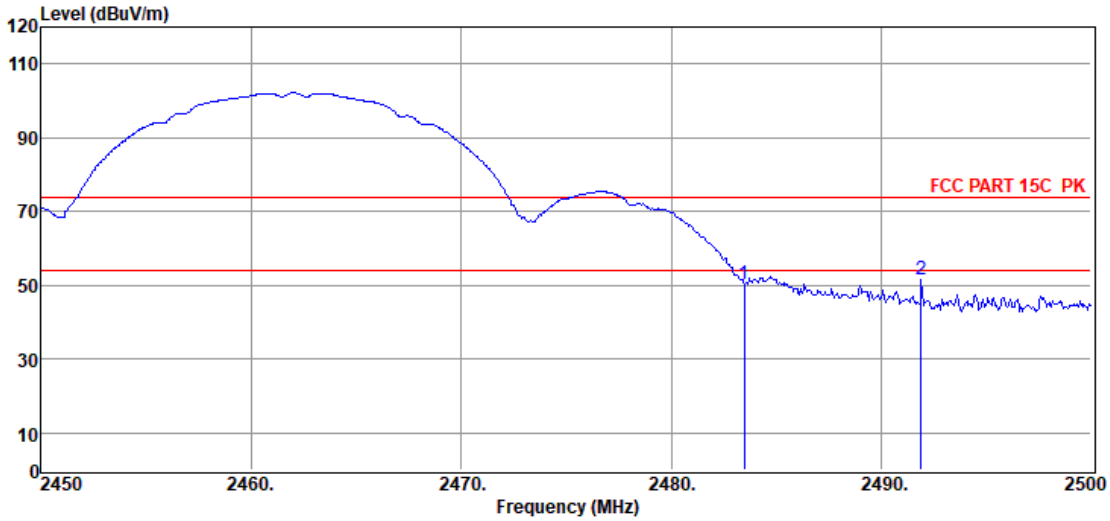



| Item (Mark) | Freq. (MHz) | Read Level (dBµV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBµV/m) | Limit Line (dBµV/m) | Over Limit (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 62.34 | 29.17 | 42.54 | 3.93 | 52.90 | 74.00 | -21.10 | Peak | HORIZONTAL |
| 2 | 2485.15 | 63.85 | 29.17 | 42.54 | 3.93 | 54.41 | 74.00 | -19.59 | Peak | HORIZONTAL |
| 3 | 2485.15 | 58.14 | 29.17 | 42.54 | 3.93 | 48.70 | 54.00 | -5.30 | Average | 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:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6 | |
| **Test Date** | : 2021-07-18 | **Tested By** | : Bairong |
| **EUT** | : Car Navigation | **Model Number** | : HA5010 |
| **Power Supply** | : DC 12V | **Test Mode** | : Tx mode |
| **Condition** | : Temp:24.1'C,Humi:56%,Press:100.1kPa | **Antenna/Distance** | : 2020 HF907/3m/VERTICAL |
| **Memo** | : 11b 2462 | | |




| 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 | 59.73 | 29.17 | 42.54 | 3.93 | 50.29 | 74.00 | -23.71 | Peak | VERTICAL |
| 2 | 2491.90 | 61.16 | 29.18 | 42.55 | 3.94 | 51.73 | 74.00 | -22.27 | 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.