# TEST REPORT

| | | |
|---|---|---|
| **Reference No.** | : | WTX23X05117108W003 |
| **Manufacturer** | : | Xontel Technology Company |
| **Address** | : | Kuwait City Aladel Tower,F21 QIBLA |
| **Product Name** | : | WIFI Phone |
| **Model No.** | : | XT-16W |
| **Standards** | : | **ETSI EN 301 908-1 V15.2.1 (2023-01)**<br>**ETSI EN 301 908-13 V13.2.1 (2022-02)** |
| **Date of Receipt sample** | : | 2023-05-30 |
| **Date of Test** | : | 2023-05-30 to 2023-07-04 |
| **Date of Issue** | : | 2023-07-05 |
| **Test Report Form No.** | : | WTX_ETSI EN 301 908_1_2019W |
| **Test Result** | : | **Pass** |

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.


**Prepared By:**

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## Report version

| Version No. | Date of issue | Description |
|---|---|---|
| Rev.00 | 2023-12-11 | Original |
| / | / | / |

# 1. GENERAL INFORMATION

## 1.1 Product Description for Equipment Under Test (EUT)

| General Description of EUT | |
|---|---|
| Product Name: | WIFI Phone |
| Trade Name: | Xontel |
| Model No.: | XT-16W |
| Adding Model(s): | / |
| Rated Voltage: | DC3.7V |
| Battery Capacity: | 2000mAh |
| Adapter Model: | CT-083<br>Input:AC110-240 50/60Hz 0.2A<br>Output:DC5V1.0A |
| Software Version: | / |
| Hardware Version: | / |
| *Note: The test data is gathered from a production sample, provided by the manufacturer.* | |

| Technical Characteristics of EUT | |
|---|---|
| **4G** | |
| Support Bands: | FDD-LTE Band1, 3, 7, 8, 20, 28 TDD-LTE Band 38, 40 |
| Frequency Range: | FDD-LTE Band 1: Tx: 1920-1980MHz, Rx: 2110-2170MHz |
| | FDD-LTE Band 3: Tx: 1710-1785MHz, Rx: 1805-1880MHz |
| | FDD-LTE Band 7: Tx: 2500-2570MHz, Rx: 2620-2690MHz |
| | FDD-LTE Band 8: Tx: 880-915MHz, Rx: 925-960MHz |
| | FDD-LTE Band 20: Tx: 832-862MHz, Rx: 791-821MHz |
| | FDD-LTE Band 28: Tx: 703-748MHz, Rx: 758-803MHz |
| | TDD-LTE Band 38: Tx: 2570-2620MHz, Rx: 2570-2620MHz |
| | TDD-LTE Band 40: Tx: 2300-2400MHz, Rx: 2300-2400MHz |
| Max.RF Output Power: | FDD-LTE Band 1: 22.43dBm, FDD-LTE Band 3: 22.89dBm,<br>FDD-LTE Band 7: 23.89dBm, FDD-LTE Band 8: 22.95dBm,<br>FDD-LTE Band 20: 22.45dBm, FDD-LTE Band 28: 22.99dBm,<br>TDD-LTE Band 38: 21.75dBm,TDD-LTE Band 40: 21.72dBm |
| Modulation Type: | QPSK, 16QAM |
| Antenna Type: | Integral Antenna |
| Antenna Gain: | FDD-LTE Band 1: 1.14dBi, FDD-LTE Band 3: 1.14dBi,<br>FDD-LTE Band 7: 1.32dBi, FDD-LTE Band 8: 0.29dBi,<br>FDD-LTE Band 20: 0.37dBi,FDD-LTE Band 28: 1.34dBi,<br>TDD-LTE Band 38: 1.31dBi, TDD-LTE Band 40: 2.29dBi, |
| *Note: The Antenna Gain is provided by the customer and can affect the validity of results.* | |

## 1.2 Test Standards

The tests were performed according to following standards:

**ETSI EN 301 908-1 V15.2.1 (2023-01):** IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 1: Introduction and common requirements; Release 15
**ETSI EN 301 908-13 V13.2.1 (2022-02):** IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA)User Equipment (UE).
**ETSI TS 136 521-1 V14.3.0 (2017-08):** LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification;Radio transmission and reception;Part 1: Conformance testing(3GPP TS 36.521-1 version 14.3.0 Release 14).
**ETSI TS 136 508 V14.3.0 (2017-11):** LTE;Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common test environments for User Equipment (UE) conformance testing (3GPP TS 36.508 version 14.3.0 Release 14).

***Maintenance of compliance*** is the responsibility of the manufacturer. Any modification of the product which maybe results in lowering the emission/immunity should be checked to ensure that compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 908-1, ETSI EN 301 908-13
The equipment under test (EUT) was configured to measure its highest possible emission level. For more detail refer to the Operating Instructions.

## 1.4 Test Facility

**Address of the test laboratory**
Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.
Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

**FCC – Registration No.: 125990**
Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

**Industry Canada (IC) Registration No.: 11464A**
The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

## 1.5 EUT Setup and Test Mode

The EUT has been tested under typical operating condition. The Applicant provide software to control the EUT for staying in continuous transmitting and receiving mode for testing.

| **Test Mode List** | | |
|---|---|---|
| Test Mode | Description | Remark |
| TM1 | FDD Band 1 | Transmitting/ Receiving/Idle |
| TM2 | FDD Band 3 | Transmitting/ Receiving/Idle |
| TM3 | FDD Band 7 | Transmitting/ Receiving/Idle |
| TM4 | FDD Band 8 | Transmitting/ Receiving/Idle |
| TM5 | FDD Band 20 | Transmitting/ Receiving/Idle |
| TM6 | FDD Band 28 | Transmitting/ Receiving/Idle |
| TM7 | TDD Band 38 | Transmitting/ Receiving/Idle |
| TM8 | TDD Band 40 | Transmitting/ Receiving/Idle |
| Note: The Test EUT support two SIM card(SIM1, SIM2), so all the tests are performed at each SIM card (SIM1, SIM2) mode, the datum recorded is the worst case for all the mode at SIM1Card mode. | | |

| **Test Conditions** | | | | | |
|---|---|---|---|---|---|
| | NTNV | LTLV | LTHV | HTHV | HTLV |
| Temperature (°C) | 25 | -10 | -10 | 40 | 40 |
| Voltage (V) | 3.7 | 3.5 | 4.2 | 4.2 | 3.5 |
| Note: All the test conditions test have been done,only show the worst case in the test report. | | | | | |
| Temperature: | 25 °C | | | | |
| Relative Humidity: | 45 %. | | | | |
| ATM Pressure: | 1019 mbar | | | | |

| **EUT Cable List and Details** | | | |
|---|---|---|---|
| Cable Description | Length (m) | Shielded/Unshielded | With / Without Ferrite |
| / | / | / | / |

| **Accessories Cable List and Details** | | | |
|---|---|---|---|
| Cable Description | Length (m) | Shielded/Unshielded | With / Without Ferrite |
| / | / | / | / |

| **Auxiliary Equipment List and Details** | | | |
|---|---|---|---|
| Description | Manufacturer | Model | Serial Number |
| / | / | / | / |

## 1.6 Measurement Uncertainty

| **Measurement uncertainty** | | |
|---|---|---|
| Parameter | Uncertainty | Notes |
| Conducted RF Output Power | ±0.6dB | (1) |
| Transmitter spectrum emission mask | ±1.5dB | (1) |
| Conducted Transmitter spurious emissions | ±1.0dB | (1) |
| Transmitter minimum output power | ±1.0dB | (1) |
| Receiver adjacent channel selectivity | ±0.5dB | (1) |
| Receiver blocking characteristics | ±1.7dB | (1) |
| Receiver spurious response | ±1.7dB | (1) |
| Receiver intermodulation charactistics | ±1.3dB | (1) |
| Conducted Receiver spurious emissions | ±1.0dB | (1) |
| Transmitter adjacent channel power leakage ratio | ±0.8dB | (1) |
| Receiver Reference Sensitivity level | ±1.0dB | (1) |
| Radiated Spurious Emissions | 30-200MHz ±4.52dB | (1) |
| | 0.2-1GHz ±5.56dB | (1) |
| | 1-6GHz ±3.84dB | (1) |
| | 6-18GHz ±3.92dB | (1) |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

## 1.7 Test Equipment List and Details

| Description | Manufacturer | Model | Serial Number | Cal Date | Due Date |
|---|---|---|---|---|---|
| MXG Vector Signal Generator | Agilent | N5182A | MY47420108 | 2023-02-25 | 2024-02-24 |
| DC Power Supply | Agilent | E3634A | MY40009294 | 2023-02-25 | 2024-02-24 |
| EXG Analog Signal Generator | KEYSIGHT | N5173B | MY61252892 | 2023-02-25 | 2024-02-24 |
| Spectrum Analyzer | Rohde&Schwarz | FSV40-N | 101559 | 2023-02-25 | 2024-02-24 |
| Band Reject Filter Group | Tonscend | JS0806-F | 23A806F0658 | 2023-02-25 | 2024-02-24 |
| Temperature&Humidity Chamber | / | HTC-1 | / | 2023-02-25 | 2024-02-24 |
| Universal Radio Communication Tester | Rohde & Schwarz | CMW500 | 148650 | 2023-02-25 | 2024-02-24 |
| ☐Chamber A: Below 1GHz | | | | | |
| Spectrum Analyzer | Rohde & Schwarz | FSP30 | 836079/035 | 2023-02-25 | 2024-02-24 |
| EMI Test Receiver | Rohde & Schwarz | ESVB | 825471/005 | 2023-02-25 | 2024-02-24 |
| Amplifier | HP | 8447F | 2805A03475 | 2023-02-25 | 2024-02-24 |
| Loop Antenna | Schwarz beck | FMZB 1516 | 9773 | 2021-03-20 | 2024-03-19 |
| Trilog Broadband Antenna | Schwarz beck | VULB9163 | 9163-333 | 2023-03-20 | 2026-03-19 |
| ☐Chamber A: Above 1GHz | | | | | |
| Spectrum Analyzer | Rohde & Schwarz | FSP30 | 836079/035 | 2023-02-25 | 2024-02-24 |
| Spectrum Analyzer | Rohde & Schwarz | FSP40 | 100612 | 2023-02-25 | 2024-02-24 |
| EMI Test Receiver | Rohde & Schwarz | ESVB | 825471/005 | 2023-02-25 | 2024-02-24 |
| Amplifier | C&D | PAP-1G18 | 14918 | 2023-02-25 | 2024-02-24 |
| Horn Antenna | ETS | 3117 | 00086197 | 2021-03-19 | 2024-03-18 |
| DRG Horn Antenna | A.H. SYSTEMS | SAS-574 | 571 | 2021-03-19 | 2024-03-18 |
| Pre-amplifier | Schwarzbeck | BBV 9721 | 9721-031 | 2023-02-25 | 2024-02-24 |
| ☐Chamber B:Below 1GHz | | | | | |
| Trilog Broadband Antenna | Schwarz beck | VULB9163(B) | 9163-635 | 2021-04-09 | 2024-04-08 |
| Amplifier | Agilent | 8447D | 2944A10179 | 2023-02-25 | 2024-02-24 |
| EMI Test Receiver | Rohde & Schwarz | ESPI | 101391 | 2023-02-25 | 2024-02-24 |
| ☒Chamber C:Below 1GHz | | | | | |
| EMI Test Receiver | Rohde & Schwarz | ESIB 26 | 100401 | 2023-02-25 | 2024-02-24 |
| Trilog Broadband Antenna | Schwarz beck | VULB 9168 | 1194 | 2021-05-28 | 2024-05-27 |
| Amplifier | HP | 8447F | 2944A03869 | 2023-02-25 | 2024-02-24 |

| ☒Chamber C: Above 1GHz | | | | | |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESIB 26 | 100401 | 2023-02-25 | 2024-02-24 |
| Horn Antenna | POAM | RTF-11A | LP228060221 | 2023-03-10 | 2026-03-09 |
| Amplifier | Tonscend | TAP01018050 | AP22E806235 | 2023-02-25 | 2024-02-24 |

| Software List | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Version** |
| EMI Test Software (Radiated Emission)* | Farad | EZ-EMC | RA-03A1 |
| LTE Test System* | Tonscend | JS1120-1 | V2.5 |

*Remark: indicates software version used in the compliance certification testing.

## 2. SUMMARY OF TEST RESULTS

| Test Item | Test Requirement **EN301908-1** | | Test Conditions | Verdict | Note: |
|---|---|---|---|---|---|
| Radiated emissions (UE) | Section 4.2.2 | | NTNV | Pass | Reference to the section 3.12 |
| Control and monitoring functions (UE) | Section 4.2.4 | | NTNV | Pass | Reference to the section 3.13 |
| Test Item | Test Requirement **EN301908-13** | Test Method ETSI **TS136521-1** | Test Conditions | Verdict | Note: |
| Transmitter Maximum Output Power | Section 4.2.2 | Clause 6.2.2 | NTNV<br>LTLV<br>LTHV<br>HTLV<br>HTHV | Pass<br>Pass<br>Pass<br>Pass<br>Pass | Appendix |
| Transmitter Spectrum emission mask | Section 4.2.3 | Clause 6.6.2.1 | NTNV | Pass | Appendix |
| Transmitter Spurious Emissions | Section 4.2.4 | Clause 6.6.3.2 | NTNV | Pass | Appendix |
| Transmitter Minimum Output Power | Section 4.2.5 | Clause 6.3.2 | NTNV<br>LTLV<br>LTHV<br>HTLV<br>HTHV | Pass<br>Pass<br>Pass<br>Pass<br>Pass | Appendix |
| Receiver adjacent channel selectivity(ACS) | Section 4.2.6 | Clause 7.5 | NTNV | Pass | Appendix |
| Receiver Blocking Characteristics | Section 4.2.7 | Clause 7.6.1 | NT/NV | Pass | Appendix |
| Receiver Spurious Response | Section 4.2.8 | Clause 7.7 | NT/NV | Pass | Appendix |
| Receiver Intermodulation Characteristics | Section 4.2.9 | Clause 7.8 | NTNV | Pass | Appendix |
| Receiver Spurious Emissions | Section 4.2.10 | Clause 7.9 | NTNV | Pass | Appendix |
| Transmitter Adjacent Channel Leakage Power Ratio | Section 4.2.11 | Clause 6.6.2.3 | NTNV<br>LTLV<br>LTHV | Pass<br>Pass<br>Pass | Appendix |

| | | | | | |
|---|---|---|---|---|---|
| | | | HTLV<br>HTHV | Pass<br>Pass | |
| Receiver Reference Sensitivity Level | Section 4.2.12 | Clause 7.3 | NTNV<br>LTLV<br>LTHV<br>HTLV<br>HTHV | Pass<br>Pass<br>Pass<br>Pass<br>Pass | Appendix |
| Test Item | Test Requirement EN301908-13 | Test Method ETSI TS 137 544 | Test Conditions | Verdict | Note: |
| Receiver Total Radiated Sensitivity (TRS) | Section 4.2.13 | clause 7.1.5.4.2 and clause 7.1.6.4.2 | NT/NV | Pass | Appendix |
| Total Radiated Power (TRP) | Section 4.2.14 | clause 7.1.5.4.2 and clause 7.1.6.4.2 | NT/NV | Pass | Appendix |

# 3. Essential radio test suites

### 3.1 Transmitter maximum output power

Clause 6.2.2 of ETSI TS 136 521-1 applies.

RESULT: Pass

#### 3.1.1 Definition and applicability

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.
An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.
This test case applies to all types of E-UTRA UE release 8 and forward.

#### 3.1.2 Conformance requirements

Test environment: normal, TL/VL,TL/VH,TH/VL,TH/VH (see section 1.6).
Frequencies to be tested: low range, mid range, high range; as specified in TS 136 508 [2], clause 4.3.1.
Channel bandwidths to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect the SS to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
4) The UL Reference Measurement channels are set according to TS 136 521-1 [1].
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The UE maximum output power shall be within the shown value in table 4.2.2.1.2-1.

| E-UTRA Band | Power Class 3(dBm) | Tolerance(dB) |
|---|---|---|
| 1 | 23 | ±2.7 |
| 3 | 23 | ±2.7 (see note) |
| 7 | 23 | ±2.7 (see note) |
| 8 | 23 | ±2.7 (see note) |
| 20 | 23 | ±2.7 (see note) |
| 22 | 23 | +3.0/-4.5 |
| 28 | 23 | +2.7/-3.2 |
| 33 | 23 | ±2.7 |
| 34 | 23 | ±2.7 |
| 38 | 23 | ±2.7 |
| 40 | 23 | ±2.7 |
| 42 | 23 | +3.0/-4.0 |
| 43 | 23 | +3.0/-4.0 |
| NOTE: For transmission bandwidths (ETSI TS 136 521-1 [1], clause 5) confined within FUL_low and FUL_low + 4 MHz or FUL_high - 4 MHz and FUL_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB (tolerance = +2.7/-4.2). | | |

NOTE 1: These requirements do not take into account the maximum power reductions allowed to the UE in subject to certain transmission conditions specified in TS 136 101 [4], clauses 6.2.3 and 6.2.4.

NOTE 2: The range of UE maximum output power for the various power classes are specified in TS 136 101 [4], clause 6.2.2. The values in table 4.2.2.1.2-1 correspond to the measurement limits taking into account the measurement uncertainty of measurement equipment (see clause 5.2).

**3.1.3 Set up for testing**

1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to table 6.2.2.1.4.1-1 of TS 136 521-1 [1]. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
2) Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200 ms for the UE to reach PUMAX level.
3) Measure the mean power of the UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one sub-frame (1 ms). For TDD slots with transient periods are not under test.
4) Repeat for applicable test frequencies, channel bandwidths, operating band combinations and environmental conditions.

**3.1.4 Test result**

**Please refer to the Appendix**

### 3.2 Transmitter spectrum emission mask

Clause 6.6.2.1 of ETSI TS 136 521-1 applies.

RESULT: Pass

#### 3.2.1 Definition and applicability

Out of band emissions are unwanted emissions immediately outside the nominal channel resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a Spectrum Emission Mask and Adjacent Channel Leakage power Ratio.

This test case applies to all types of E-UTRA UE release 8 and forward.

#### 3.2.2 Conformance requirements

Test environment: normal (see section 1.6).
Frequencies to be tested: low range, mid range and high range; as specified in TS 136 508 [2], clause 4.3.1.
Channel bandwidths to be tested: lowest, 5 MHz, 10 MHZ and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect the SS to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
4) The UL Reference Measurement channels are set according to TS 136 521-1 [1].
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

The power of any UE emission shall fulfil requirements in tables 4.2.3.1.2-1 and 4.2.3.1.2-2.

Table 4.2.3.1.2-1: General E-UTRA spectrum emission mask, E UTRA bands≤3 GHz

| $\Delta f_{OOB}$ (MHz) | 1,4 MHz | 3,0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Measurement bandwidth |
|---|---|---|---|---|---|---|---|
| 0 to 1 | -8.5 | -11.5 | -13,5 | -16.5 | -18.5 | -19.5 | 30 kHz |
| 1 to 2,5 | -8.5 | -8.5 | -8.5 | -8.5 | -8.5 | -8.5 | 1 MHz |
| 2,5 to 2,8 | -23.5 | -8.5 | -8.5 | -8.5 | -8.5 | -8.5 | 1 MHz |
| 2,8 to 5 | | -8.5 | -8.5 | -8.5 | -8.5 | -8.5 | 1 MHz |
| 5 to 6 | | -23.5 | -11.5 | -11.5 | -11.5 | -11.5 | 1 MHz |
| 6 to 10 | | | -23.5 | -11.5 | -11.5 | -11.5 | 1 MHz |
| 10 to 15 | | | | -23.5 | -11.5 | -11.5 | 1 MHz |
| 15 to 20 | | | | | -23.5 | -11.5 | 1 MHz |
| 20 to 25 | | | | | | -23.5 | 1 MHz |

NOTE 1: The first and last measurement position with a 30kHz filter is at $\Delta f_{OOB}$ equals to 0.015MHz and 0.985MHz.

NOTE 2: The first and last measurement position with a 1MHz filter for 1MHz – 2.5MHz offset range is at $\Delta f_{OOB}$ equals to 1.5MHz and 2.0MHz. Similarly for other $\Delta f_{OOB}$ ranges.

NOTE 3: The measurements shall be performed above the upper edge of the channel and below the lower edge of the channel.

NOTE 4: For the 2.5MHz – 2.8MHz offset range with 1.4MHz channel bandwidth, the measurement position is at $\Delta f_{OOB}$ equals to 3MHz.

Table 4.2.3.1.2-2: General E-UTRA spectrum emission mask, 3GHz < E-UTRA bands≤ 4.2GHz

| | Spectrum emission limit (dBm)/Channel bandwidth | | | | | | |
|---|---|---|---|---|---|---|---|
| $\Delta f_{OOB}$ (MHz) | 1,4 MHz | 3,0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Measurement bandwidth |
| 0 to 1 | -8.2 | -11.2 | -13.2 | -16.2 | -18.2 | -19.2 | 30kHz |
| 1 to 2,5 | -8.2 | -8.2 | -8.2 | -8.2 | -8.2 | -8.2 | 1MHz |
| 2.5 to 2.8 | -23.2 | | | | | | 1MHz |
| 2.8 to 5 | | | | | | | 1MHz |
| 5 to 6 | | -23.2 | -11.2 | -11.2 | -11.2 | -11.2 | 1MHz |
| 6 to 10 | | | -23.2 | | | | 1MHz |
| 10 to 15 | | | | -23.2 | | | 1MHz |
| 15 to 20 | | | | | -23.2 | | 1MHz |
| 20 to 25 | | | | | | -23.2 | 1MHz |

NOTE 1: The first and last measurement position with a 30kHz filter is at $\Delta f_{OOB}$ equals to 0.015MHz and 0.985MHz.

NOTE 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.

NOTE 3: The measurements shall be performed above the upper edge of the channel and below the lower edge of the channel.

NOTE 4: For the 2.5-2.8MHz offset range with 1.4 MHzchannel bandwidth, the measurement position is at

### 3.2.3 Set up for testing

1) SS sends uplink scheduling information via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 6.6.2.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
2) Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at PUMAX level.
3) Measure the power of the transmitted signal with a measurement filter of bandwidths according to tables 4.2.3.1.2-1 or 4.2.3.1.2-2, as applicable. The center frequency of the filter shall be stepped in continuous steps according to the same table. The measured power shall be recorded for each step. The measurement period shall capture the active TSs.
4) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

### 3.2.4 Test result

**Please refer to the Appendix**

### 3.3 Transmitter spurious emissions

Clause 6.6.3 of ETSI ETSI TS 136 521-1 applies.

RESULT: Pass

#### 3.3.1 Definition and applicability

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions. The spurious emission limits are specified in terms of general requirements in line with Recommendation ITU-R SM.329-12 [i.5] and E-UTRA operating band requirement to address UE co-existence. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

#### 3.3.2 Conformance requirements

Test environment: normal condition (see section 1.6).
Frequencies to be tested: low range, mid range, high range; see TS 136 508 [2].
Channel bandwidth to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2].
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect the SS to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
4) The UL Reference Measurement channels are set according to TS 136 521-1 [1]. 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The spurious emission limits in table 4.2.4.1.2-2 apply for the frequency ranges that are more than ΔfOOB (MHz) from the edge of the channel bandwidth shown in table 4.2.4.1.2-1.
The measured average power of spurious emission for general requirements shall not exceed the described values in table 4.2.4.1.2-2.
The measured average power of spurious emission for E-UTRA operating band specific requirements to protected bands shall not exceed the described values in tables 4.2.4.1.2-3 and 4.2.4.1.2-4.
Table 4.2.4.1.2-1:
$\Delta f_{OOB}$ boundary between E-UTRA channel and spurious emission domain.

| Channel bandwidth | 1.4MHz | 3.0MHz | 5MHz | 10MHz | 15MHz | 20MHz |
|---|---|---|---|---|---|---|
| ΔfOOB (MHz) | 2.8 | 6 | 10 | 15 | 20 | 25 |

Table 4.2.4.1.2-2: General spurious emissions limits.

| Frequency range | Maximum level | Measurement bandwidth | Comment |
|---|---|---|---|
| 9kHz ≤ f < 150kHz | -36dBm | 1kHz | |
| 150kHz ≤ f < 30MHz | -36dBm | 10kHz | |
| 30MHz ≤ f < 1 000MHz | -36dBm | 100kHz | |
| 1GHz ≤ f < 12.75GHz | -30dBm | 1MHz | |
| 12.75GHz f < 5th harmonic of t≤he upper frequency edge of the UL operating band in GHz | -30dBm | 1MHz | See note |
| NOTE: Shall apply for Band 22, 42 and Band 43. | | | |

NOTE 1: In order that the measurement of spurious emissions falls within the frequency ranges that are more than ΔfOOB (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be $\Delta f_{OOB}$ + MBW/2. MBW denotes the measurement bandwidth defined in table 4.2.4.1.2-2.

The additional requirements in table 4.2.4.1.2-3 apply for the frequency ranges that are more and less than $\Delta f_{OOB}$ (MHz) from the edge of the channel bandwidth shown in table 4.2.4.1.2-1.

**3.3.3 Set up for testing**

1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 6.6.3.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
2) Send continuously Up power control commands in the uplink scheduling information to the UE until the UE transmits at PUMAX level.
3) For each applicable requirement in tables 4.2.4.1.2-2, 4.2.4.1.2-3 and 4.2.4.1.2-4; Measure the power of the transmitted signal with a measurement filter of bandwidths. The center frequency of the filter shall be stepped in contiguous steps according to the tables. The measured power shall be verified for each step. The measurement period shall capture the active time slots.
4) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

**3.3.4 Test result**

**Please refer to the Appendix**

### 3.4 Transmitter minimum output power

Clause 4.2.5 of EN 301 908-13 applies.

RESULT: Pass

#### 3.4.1 Definition and applicability

The minimum controlled output power of the UE is defined as the broadband transmit power of the UE, i.e. the power in the channel bandwidth for all transmit bandwidth configurations (resource blocks), when the power is set to a minimum value.

#### 3.4.2 Conformance requirements

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH (see section 1.6)
Frequencies to be tested: low range, mid range and high range; see TS 136 508 [2].
Channel bandwidths to be tested: lowest, 5 MHz and highest channel bandwidth, as specified in TS 136 508 [2], clause 4.3.1.
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect the SS to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
4) The UL Reference Measurement channels are set according to TS 136 521-1 [1].
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The minimum output power measured shall not exceed the values specified in table 4.2.5.1.2-1.
Table 4.2.5.1.2-1: Minimum output power

| | **Channel bandwidth/minimum output power/measurement bandwidth** | | | | | |
|---|---|---|---|---|---|---|
| | 1.4MHz | 3.0MHz | 5MHz | 10MHz | 15MHz | 20MHz |
| Minimum output power | For carrier frequency f ≤3.0GHz: ≤ -39dBm<br>For carrier frequency 3.0 GHz< f ≤ 4.2 G≤Hz: ≤-38.7dBm | | | | | |
| Measurement bandwidth | 1.08MHz | 2.7MHz | 4.5MHz | 9.0MH z | 13.5MHz | 18MHz |

### 3.4.3 Set up for testing

1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 6.3.2.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
2) Send continuous uplink power control "down" commands in the uplink scheduling information to the UE to ensure that the UE transmits at its minimum output power.
3) Measure the mean power of the UE in the associated measurement bandwidth specified in table 4.5.2.1-1 for the specific channel bandwidth under test. The period of measurement shall be the continuous duration of one sub-frame (1 ms). For TDD slots with transient periods are not under test.
4) Repeat for applicable test frequencies, channel bandwidths, operating band combinations and environmental conditions.
Details of the test method can be found in TS 136 521-1 [1], clause 6.3.2.

### 3.4.4 Test result

**Please refer to the Appendix**

### 3.5 Receiver adjacent channel selectivity

Clause 7.5 of ETSI TS 136 521-1 applies.

RESULT: Pass

#### 3.5.1 Definition and applicability

Adjacent Channel Selectivity (ACS) is a measure of a receiver's ability to receive an E-UTRA signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

#### 3.5.2 Conformance requirements

Test environment: normal (see section 1.6).
Frequencies to be tested: mid range see TS 136 508 [2].
Channel bandwidth to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect the SS and interfering source to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1], table 7.5.4.1-1.
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The throughput $R_{av}$ shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] under the conditions specified in table 4.2.6.2-2 and also under the conditions specified in table 4.2.6.2-3.

Table 4.2.6.1.2-1: Adjacent channel selectivity

| | | **Channel bandwidth** | | | | | |
|---|---|---|---|---|---|---|---|
| Rx Parameter | Units | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz |
| ACS | dB | 33.0 | 33.0 | 33.0 | 33.0 | 30 | 27 |

Table 4.2.6.1.2-2: Test parameters for Adjacent channel selectivity, Case 1

| Rx Parameter | Units | Channel bandwidth | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz |
| Power in Transmission Bandwidth Configuration | dBm | REFSENS + 14dB | | | | | |
| $P_{Interferer}$ | dBm | REFSENS +45.5dB | REFSENS +45.5dB | REFSENS +45.5dB | REFSENS +45.5dB | REFSENS +42.5dB | REFSENS +39.5dB |
| $BW_{Interferer}$ | MHz | 1.4 | 3 | 5 | 5 | 5 | 5 |
| $F_{Interferer}$ (offset) | MHz | 1.4025 | 3.0075 | 5.0025 | 7.5075 | 10.0125 | 12.5025 |
| NOTE 1: The transmitter shall be set to 4 dB below PCMAX_L or PCMAX_L_CA as defined in clause 6.2.5 in ETSI TS 136 101 [3].<br>NOTE 2: The interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with set-up according to clause C.3.1 of ETSI TS 136 521-1 [1].<br>NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1]. | | | | | | | |

Table 4.2.6.1.2-3: Test parameters for Adjacent channel selectivity, Case 2.

| Rx Parameter | Units | Channel bandwidth | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz |
| Power in Transmission Bandwidth Configuration | dBm | -56.5 | -56.5 | -56.5 | -56.5 | -53.5 | -50.5 |
| $P_{Interferer}$ | dBm | -25 | | | | | |
| $BW_{Interferer}$ | MHz | 1.4 | 3 | 5 | 5 | 5 | 5 |
| $F_{Interferer}$ (offset) | MHz | 1.4025 | 3.0075 | 5.0025 | 7.5075 | 10.0125 | 12.5025 |
| NOTE 1: The transmitter shall be set to 24 dB below PCMAX_L or PCMAX_L_CA as defined in clause 6.2.5 in ETSI TS 136 101 [3].<br>NOTE 2: The interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with set-up according to clause C.3.1 of ETSI TS 136 521-1 [1]. | | | | | | | |

### 3.5.3 Set up for testing

1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.5.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.5.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

3) Set the Downlink signal level to the value as defined in table 4.2.6.2-2 (Case 1). Send Uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3.4 dB of the target level in table 4.2.6.2-2 (Case 1) for carrier frequency f ≤ 3.0 GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0 GHz < f ≤ 4.2 GHz, for at least the duration of the Throughput measurement (obtain correct UE output power as specified in TS 136 521-1 [1]).
4) Set the Interferer signal level to the value as defined in table 4.2.6.2-2 (Case 1) and frequency below the wanted signal, using a modulated interferer as defined in TS 136 521-1 [1], annex D.
5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].
6) Set the Downlink signal level to the value as defined in table 4.2.6.2-3 (Case 2). Send Uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3.4 dB of the target level in table 4.2.6.2-3 (Case 2) for carrier frequency f ≤ 3.0 GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0 GHz < f ≤ 4.2 GHz, for at least the duration of the throughput measurement (obtain correct UE output power as specified in TS 136 521-1 [1]).
7) Set the Interferer signal level to the value as defined in table 4.2.6.2-3 (Case 2) and frequency below the wanted signal, using a modulated interferer as defined in TS 136 521-1 [1], annex D.
8) Measure the average throughput for a duration sufficient to achieve statistical significance according to TS 136 521-1 [1], annex G.
9) Repeat for applicable channel bandwidths in both Case 1 and Case 2.
10) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

**3.5.4 Test result**

**Please refer to the Appendix**

### 3.6 Receiver blocking characteristics

Clause 7.6 of ETSI TS 136 521-1 applies.

RESULT: Pass

#### 3.6.1 Definition and applicability

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.

#### 3.6.2 Conformance requirements

Test environment: normal (see section 1.6).
For In-band blocking, the frequencies to be tested are mid range as defined in TS 136 508 [2].
For Out of band blocking, the frequency to be tested is low or high range as defined in TS 136 508 [2].
For Narrow-band blocking, the frequencies to be tested are mid range as defined in TS 136 508 [2].
Channel bandwidth to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1. Range 3 of out-of-band blocking is tested only with highest bandwidth.
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect the SS to the UE antenna connectors. 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.1 and uplink signals according to clauses H.1 and H.3.0.
4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1], table 7.6.2.4.1-1.
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

With parameters specified in tables 4.2.7.2-1 and 4.2.7.2-2, the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1].
With parameters specified in tables 4.2.7.2-3 and 4.2.7.2-4, the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1], except for the spurious response frequencies.
For table 4.2.7.2-4 in frequency range 1, 2 and 3, up to ⌈⌉()6/6,24maxRBN· exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size, where RBN is the number of resource blocks in the downlink transmission bandwidth configuration. For these exceptions the requirements of clause 4.2.8 Spurious response are applicable.

With parameters specified in table 4.2.7.2-5, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1].

Table 4.2.7.1.2-1: In-band blocking parameters

| Rx Parameter | Units | Channel bandwidth | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz |
| Power n Transmission Bandwidth Configuration | dBm | REFSENS + channel bandwidth specific value below | | | | | |
| | | 6 | 6 | 6 | 6 | 7 | 9 |
| BWInterferer | MHz | 1.4 | 3 | 5 | 5 | 5 | 5 |
| FIoffset, case 1 | MHz | 2.1125 | 4.5075 | 7.5125 | 7.5025 | 7.5075 | 7.5125 |
| FIoffset, case 2 | MHz | 3.5075 | 7.5075 | 12.5075 | 12.5125 | 12.5025 | 12.5075 |
| NOTE 1: The transmitter shall be set to 4dB below $P_{CMAX\_L}$ at the minimum uplink configuration specified in TSI TS 136 101 [3] (table 7.3.1-2 with $P_{CMAX\_L}$ as defined in clause 6.2.5). | | | | | | | |
| NOTE 2: The interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with a set-up according to clause C.3.1 of ETSI TS 136 521-1 [1]. | | | | | | | |
| NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1]. | | | | | | | |

Table 4.2.7.1.2-2: In-band blocking

| E-UTRA band | Parameter | Units | Case 1 | Case 2 |
|---|---|---|---|---|
| | PInterferer | dBm | -56 | -44 |
| | F Interferer (Offset) | MHz | = -BW/2 - FIoffset, case 1 and= +BW/2 + FIoffset, case 1 | ≤ -BW/2 - FIoffset, case 2 and≥ +BW/2 + FIoffset, case 2 |
| 1, 3, 7, 8, 20, 22, 28, 33, 34, 38, 40, 42, 43 | FInterferer | MHz | (note 2) | FDL_low - 15 to FDL_high + 15 |
| NOTE 1: For certain bands, the unwanted modulated interfering signal may not fall inside the UE receive band, but within the first 15 MHz below or above the UE receive band. | | | | |
| NOTE 2: For each carrier frequency the requirement is valid for two frequencies:<br>a) the carrier frequency -BW/2 - FIoffset, case 1; and<br>b)the carrier frequency + BW/2 + FIoffset, case 1. | | | | |
| NOTE 3: FInterferer range values for unwanted modulated interfering signal are interferer centre frequencies. | | | | |

Table 4.2.7.1.2-3: Out-of-band blocking parameters.

| Rx Parameter | Units | Channel bandwidth | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1,4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| Power in Transmission Bandwidth Configuration | dBm | REFSENS + channel bandwidth specific value below | | | | | |
| | | 6 | 6 | 6 | 6 | 7 | 9 |
| NOTE 1: The transmitter shall be set to 4 dB below PCMAX_L at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with PCMAX_L as defined in clause 6.2.5).<br>NOTE 2: Reference measurement channel is clause A.3.2 of ETSI TS 136 521-1 [1].<br>NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1]. | | | | | | | |

Table 4.2.7.1.2-4: Out-of-band blocking

| E-UTRA band | Parameter | | Frequency | | |
|---|---|---|---|---|---|
| | | | Range 1 | Range 2 | Range 3 |
| | $P_{Interferer}$ | dBm | -44 | -30 | -15 |
| 1, 3, 7, 8, 20, 22, 28, 33, 34, 38, 40, 42 (NOTE 2), 43 (NOTE 2) | $F_{Interferer}$ (CW) | MHz | $F_{DL\_low}$ - 15 to $F_{DL\_low}$ - 60 | $F_{DL\_low}$ - 60 to $F_{DL\_low}$ - 85 | $F_{DL\_low}$ - 85 to1 MHz |
| | | | $F_{DL\_high}$+ 15 to $F_{DL\_high}$ + 60 | $F_{DL\_high}$+ 60 to $F_{DL\_high}$ + 85 | $F_{DL\_high}$+ 85 to +12 750 MHz |
| NOTE 1: Range 3 shall be tested only with the highest channel bandwidth.<br>NOTE 2: The power level of the interferer ($P_{Interferer}$) for Range 3 shall be modified to -20 dBm for $F_{Interferer}$ > 2 800 MHz and $F_{Interferer}$ < 4 400 MHz. | | | | | |

Table 4.2.7.1.2-5: Narrow-band blocking

| Parameter | Units | Channel Bandwidth | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz |
| Pw | dBm | PREFSENS + channel-bandwidth specific value below | | | | | |
| | | 22 | 18 | 16 | 13 | 14 | 16 |
| Puw (CW) | dBm | -55 | -55 | -55 | -55 | -55 | -55 |
| Fuw (offset for Δf = 15 kHz) | MHz | 0.9075 | 1.7025 | 2.7075 | 5.2125 | 7.7025 | 10.2075 |
| NOTE 1: The transmitter shall be set a 4 dB below PCMAX_L at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with PCMAX_L as defined in clause 6.2.5).<br>NOTE 2: Reference measurement channel is in clause A.3.2 of ETSI TS 136 521-1 [1].<br>NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1]. | | | | | | | |

### 3.6.3 Set up for testing

In-Of-Band Procedure

1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.6.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.

2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.6.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

3) Set the parameters of the signal generator for an interfering signal below the wanted signal in Case 1 according to tables 4.2.7.2-1 and 4.2.7.2-2 as specified in TS 136 521-1 [1].

4) Set the downlink signal level according to the table 4.2.7.2-1. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.7.2-1 for carrier frequency f ≤ 3,0 GHz or within +0, -4,0 dB of the target level for carrier frequency 3,0 GHz < f ≤ 4,2 GHz, for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].

5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].

6) Repeat steps from 3 to 5, using an interfering signal above the wanted signal in Case 1 at step 3.

7) Repeat steps from 3 to 6, using interfering signals in Case 2 at step 3) and 6). The ranges of case 2 are covered in steps equal to the interferer bandwidth. The test frequencies are chosen in analogy to TS 136 521-1 [1], table 7.6.1.4.2-1. 8) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

Out-Of-Band Procedure

1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.6.2.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.

2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.6.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

3) Set the parameters of the CW signal generator for an interfering signal according to table 4.2.7.2-4 as specified in TS 136 521-1 [1]. The frequency step size is 1 MHz.

4) Set the downlink signal level according to the table 4.2.7.2-3. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3.4 dB of the target level in table 4.2.7.2-3 for carrier frequency f ≤ 3.0 GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0 GHz < f ≤ 4.2 GHz, for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].

5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].

6) For table 4.2.7.2-4 record the frequencies for which the throughput does not meet the requirements. 7) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

Narrow-Band Procedure

1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136

521-1 [1], table 7.6.3.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.6.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
3) Set the parameters of the CW signal generator for an interfering signal below the wanted signal according to table 4.2.7.2-5 as specified in TS 136 521-1 [1].
4) Set the downlink signal level according to the table 4.2.7.2-5. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3.4 dB of the target level in table 4.2.7.2-5 for carrier frequency f ≤ 3,0 GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0 GHz < f ≤ 4.2 GHz, for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].
5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].
6) Repeat steps from 3 to 5, using an interfering signal above the wanted signal at step 3.
7) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

**3.6.4 Test result**

**Please refer to the Appendix**

### 3.7 Receiver spurious response

Clause 7.7 of ETSI TS 136 521-1 applies.

RESULT: Pass

#### 3.7.1 Definition and applicability

Spurious response is a measure of the receiver's ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the out-of-band blocking limit as specified in table 4.2.7.2-4 is not met.

#### 3.7.2 Conformance requirements

Test environment: normal (see section 1.6).
Frequencies to be tested: mid range; see TS 136 508 [2].
Channel bandwidths to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect the SS and interfering sources to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1, C.3.1 and uplink signals according to clauses H.1 and H.3.1.
4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1], table 7.8.4.1-1.
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] with parameters specified in tables 4.2.8.2-1 and 4.2.8.2-2.

Table 4.2.8.1.2-1: Spurious response parameters

| Rx Parameter | Units | Channel bandwidth | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz |
| Power in Transmission Bandwidth Configuration | dBm | REFSENS + channel bandwidth specific value below | | | | | |
| | | 6 | 6 | 6 | 6 | 7 | 9 |
| NOTE 1: The transmitter shall be set to 4 dB below PCMAX_L at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with PCMAX_L as defined in clause 6.2.5).<br>NOTE 2: Reference measurement channel is clause A.3.2 of ETSI TS 136 521-1 [1]. NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1]. | | | | | | | |

Table 4.2.8.1.2-2: Spurious Response

| Parameter | Units | Level |
|---|---|---|
| $P_{Interferer}$ (CW) | dBm | -44 |
| $F_{Interferer}$ | MHz | Spurious response frequencies |

**3.7.3 Set up for testing**

1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.6.2.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.6.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
3) Set the parameters of the CW signal generator for an interfering signal according to table 4.2.8.2-2. The spurious frequencies are taken from step 5) records in clause 5.3.6.1.2.
4) Set the downlink signal level according to the table 4.2.8.2-1. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3.4 dB of the target level in table 4.2.8.2-1 for carrier frequency f ≤ 3.0 GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0 GHz < f ≤ 4.2 GHz, for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].
5) For the spurious frequency, measure the average throughput for a duration sufficient to achieve statistical significance.

**3.7.3 Test result**

**Please refer to the Appendix**

### 3.8 Receiver intermodulation charactistics

Clause 6.7 of ETSI TS 136 521-1 applies.

RESULT: Pass

#### 3.8.1 Definition and applicability

Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

#### 3.8.2 Conformance requirements

Test environment: normal (see section 1.6).
Frequencies to be tested: mid range; see TS 136 508 [2].
Channel bandwidths to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect the SS and interfering sources to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1, C.3.1 and uplink signals according to clauses H.1 and H.3.1.
4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1], table 7.8.4.1-1.
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] with parameters specified in table 4.2.9.2-1 for the specified wanted signal mean power in the presence of two interfering signals.

Table 4.2.9.1.2-1: Test parameters for Wide band intermodulation.

| Rx Parameter | Units | Channel bandwidth | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz |
| Power in Transmission Bandwidth Configuration | dBm | REFSENS + channel bandwidth specific value below | | | | | |
| | | 12 | 8 | 6 | 6 | 7 | 9 |
| $P_{Interferer\ 1}$ (CW) | dBm | -46 | | | | | |
| $P_{Interferer\ 2}$ | dBm | -46 | | | | | |
| $BW_{Interferer\ 2}$ | | 1.4 | 3 | 5 | | | |
| $F_{Interferer\ 1}$ (Offset) | MHz | -BW/2 – 2.1 / +BW/2 + 2.1 | -BW/2 – 4.5 / +BW/2 + 4.5 | -BW/2 – 7.5 / +BW/2 + 7.5 | | | |
| $FI_{nterferer\ 2}$ (Offset) | MHz | 2 × FInterferer 1 | | | | | |

NOTE 1: The transmitter shall be set to 4 dB below PCMAX_L at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with PCMAX_L as defined in clause 6.2.5).

NOTE 2: Reference measurement channel is clause A.3.2 of ETSI TS 136 521-1 [1].

NOTE 3: The modulated interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with set-up according to clause C.3.1 of ETSI TS 136 521-1 [1].The interfering modulated signal is 5MHz E-UTRA signal as described in annex C of ETSI TS 136 521-1 [1] for channel bandwidth ≥ 5MHz.

NOTE 4: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].

### 3.8.3 Set up for testing

1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.8.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.

2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.8.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

3) Set the Downlink signal level to the value as defined in table 4.2.9.2-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, -3.4dB of the target level in table 4.2.9.2-1 for carrier frequency f ≤ 3.0 GHz or within +0, -4.0dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].

4) Set the Interfering signal levels to the values as defined in table 4.2.9.2-1, using a modulated interferer bandwidth as defined in annex D of TS 136 521-1 [1].

5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].

6) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

**3.8.4 Test result**

**Please refer to the Appendix**

### 3.9 Receiver spurious emissions

Clause 7.9 of ETSI TS 136 521-1 applies.

RESULT: Pass

#### 3.9.1 Definition and applicability

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the UE antenna connector.

#### 3.9.2 Conformance requirements

Test Environment: normal (see section 1.6).
Frequencies to be tested: low range, mid range and high range; as specified in TS 136 508 [2], clause 4.3.1.
Channel bandwidth to be tested: highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect a spectrum analyzer (or other suitable test equipment) to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.1.
4) The DL Reference Measurement channels are set according to TS 136 521-1 [1].
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

The power of any narrow band CW spurious emission shall not exceed the maximum level specified in Table 7.9.3-1

| Frequency Band | Measurement | Maximum | Note |
|---|---|---|---|
| 30MHz ≤ f < 1GHz | 100kHz | -57dBm | |
| 1GHz ≤ f ≤ 12.75GHz | 1MHz | -47dBm | |
| 12.75 GHz ≤ f ≤ 5th harmonic of the upper frequency edge of the DL operating band in GHz | 1MHz | -47dBm | Note 1 |
| NOTE 1: Shall apply only for Band 22, 42 and Band 43.<br>NOTE 2: Unused PDCCH resources are padded with resource element groups with power level given by PDCCH_RA/RB as defined in ETSI TS 136 101 [3], clause C.3.1. | | | |

### 3.9.3 Set up for testing

1) Sweep the spectrum analyser (or other suitable test equipment) over a frequency range from 30 MHz to 12,75 GHz and measure the average power of the spurious emissions.
2) Repeat step 1) for all E-UTRA Rx antennas of the UE. 3) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

Details of the test method can be found in TS 136 521-1 [1], clause 7.9.

### 3.9.4 Test result

**Please refer to the Appendix**

### 3.10 Transmitter adjacent channel power leakage ratio

Clause 4.2.11 of ETSI TS 136 521-1 applies.

RESULT: Pass

#### 3.10.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the filtered mean power centred on the assigned channel frequency to the filtered mean power centred on an adjacent channel frequency

#### 3.10.2 Conformance requirements

Test Environment: normal, TL/VL, TL/VH, TH/VL and TH/VH, as specified in(see section 1.6) .
Frequencies to be tested: low range, mid range and high range; see TS 136 508 [2].
Channel bandwidth to be tested: lowest, 5 MHz, 10 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect the SS to the UE to the UE antenna connectors.
2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
4) The UL Reference Measurement channels are set according to TS 136 521-1 [1].
5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

If the measured adjacent channel power is greater than -50 dBm then the measured E-UTRAACLR shall be higher than the limits in table 4.2.11.1.2-1.

Table 4.2.11.1.2-1: E-UTRA UE ACLR

| | **Channel bandwidth/E-UTRA$_{ACLR1}$/measurement bandwidth** | | | | | |
|---|---|---|---|---|---|---|
| | **1.4MHz** | **3.0MHz** | **5MHz** | **10MHz** | **15MHz** | **20MHz** |
| E-UTRAA$_{CLR1}$ | 29.2dB | 29.2dB | 29.2dB | 29.2dB | 29.2dB | 29.2dB |
| E-UTRA channel Measurement bandwidth | 1.08MHz | 2.7MHz | 4.5MHz | 9.0MHz | 13.5MHz | 18MHz |
| UE channel | +1.4MHz or -1.4MHz | +3MHz or -3MHz | +5MHz or -5MHz | +10MHz or -10MHz | +15MHz or -15MHz | +20MHz or -20MHz |

If the measured UTRA channel power is greater than -50 dBm then the measured UTRAACLR1, UTRAACLR2 shall be higher than the limits in table 4.2.11.1.2-2.

Table 4.2.11.1.2-2: UTRA UE ACLR

| | Channel bandwidth/UTRAACLR1/2/measurement bandwidth | | | | | |
|---|---|---|---|---|---|---|
| | **1.4MHz** | **3.0MHz** | **5MHz** | **10MHz** | **15MHz** | **20MHz** |
| UTRAACLR1 | 32.2dB | 32.2dB | 32.2dB | 32.2dB | 32.2dB | 32.2dB |
| Adjacent channel centre frequency offset (in MHz) | 0.7+$BW_{UTRA}$/2 / -0.7-$BW_{UTRA}$/2 | 1.5 + $BW_{UTRA}$/2 / -1.5 -$BW_{UTRA}$/2 | 2.5 + $BW_{UTRA}$/2 / -2.5 - $BW_{UTRA}$/2 | 5 +$BW_{UTRA}$/2 / -5-$BW_{UTRA}$/2 | 7.5+$BW_{UTRA}$/2 / -7.5 - $BW_{UTRA}$/2 | 10 + $BW_{UTRA}$/2 / -10 - $BW_{UTRA}$/2 |
| UTRAACLR2 | - | - | 35.2dB | 35.2dB | 35.2dB | 35.2dB |
| Adjacent channel centre frequency offset (in MHz) | - | - | 2.5 + 3 × $BW_{UTRA}$/2 / -2.5 - 3 × $BW_{UTRA}$/2 | 5 + 3 × $BW_{UTRA}$/2 / -5 - 3 × $BW_{UTRA}$/2 | 7.5 + 3 × $BW_{UTRA}$/2 / -7.5 - 3 × $BW_{UTRA}$/2 | 10 + 3 × $BW_{UTRA}$/2 / -10 - 3 × $BW_{UTRA}$/2 |
| E-UTRA channel Measurement bandwidth | 1.08MHz | 2.7MHz | 4.5MHz | 9.0MHz | 13.5MHz | 18MHz |
| UTRA 5 MHz channel Measurement bandwidth (see note 1) | 3.84MHz | 3.84MHz | 3.84MHz | 3.84MHz | 3.84MHz | 3.84MHz |
| UTRA 1,6 MHz channel measurement bandwidth (see note 2) | 1.28MHz | 1.28MHz | 1.28MHz | 1.28MHz | 1.28MHz | 1.28MHz |
| NOTE 1: Shall apply for E-UTRA FDD co-existence with UTRA FDD in paired spectrum.<br>NOTE 2: Shall apply for E-UTRA TDD co-existence with UTRA TDD in unpaired spectrum.<br>NOTE 3: $BW_{UTRA}$ for UTRA FDD shall be 5 MHz and for UTRA TDD shall be 1,6 MHz. | | | | | | |

**3.10.3 Set up for testing**

1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 6.6.2.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

2) Send continuous uplink power control "up" commands in the uplink scheduling information to the UE to ensure that the UE transmits at PUMAX level.

3) Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in tables 4.2.11.1.2-1 and 4.2.11.1.2-2. The period of the measurement shall be at least the continuous duration of one sub-frame (1 ms). For TDD slots with transient periods are not under test. 4) Measure the filtered mean power for E-UTRA.
5) Measure the filtered mean power of the first E-UTRA adjacent channel.
6) Measure the RRC filtered mean power of the first and the second UTRA adjacent channel.
7) Calculate the ratio of the power between the values measured in step 4) over step 5) for E-UTRAACLR.
8) Calculated the ratio of the power between the values measured in step 4) over step 6) for UTRAACLR1, UTRAACLR2.
9) Repeat for applicable test frequencies, channel bandwidths, operating band combinations and environmental conditions.

Details of the test method can be found in TS 136 521-1 [1], clause 6.6.2.3.

**3.10.4 Test result**

**Please refer to the Appendix**

### 3.11 Receiver Reference Sensitivity Level

Clause 7.3 of ETSI TS 136 521-1 applies.

RESULT: Pass

#### 3.11.1 Definition and applicability

Reference sensitivity measures the UE's ability to receive data with a given average throughput for a specified reference
measurement channel, under conditions of low signal level, ideal propagation and no added noise.
A UE unable to meet the throughput requirement under these conditions will decrease the effective coverage area of an e-NodeB.

#### 3.11.2 Conformance requirements

Test Environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; as specified in annex B.
Frequencies to be tested: low range, mid range, high range see ETSI TS 136 508 [2].
Channel bandwidth to be tested: lowest, 5 MHz and highest channel bandwidth as defined in ETSI TS 136 508 [2],
clause 4.3.1.
Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:
1) Connect the SS and interfering source to the UE antenna connectors.
2) The parameter settings for the cell are set up according to ETSI TS 136 508 [2], clause 4.4.3.
3) Downlink signals are initially set up according to ETSI TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.1.
4) The UL and DL Reference Measurement channels are set according to ETSI TS 136 521-1 [1], table 7.3.4.1-1.
5) Propagation conditions are set according to ETSI TS 136 521-1 [1], clause B.0.
6) Ensure the UE is in State 3A-RF according to ETSI TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in ETSI TS 136 521-1 [1], ETSI TS 136 508 [2] and ETSI TS 136 509 [i.10] respectively.

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in ETSI TS 136 521-1 [1], clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in ETSI TS 136 521-1 [1], clauses A.5.1.1/A.5.2.1) with parameters specified in table 4.2.12.1.2-1 and table 7.3.3-2.

### 3.11.3 Set up for testing

1) Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.3.
2) The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
3) Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
4) The UL and DL Reference Measurement channels are set according to Table 7.3.4.1-1.
5) Propagation conditions are set according to Annex B.0.
6) Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.3.4.3.

### 3.11.4 Test result

**Please refer to the Appendix**

### 3.12 Radiated emissions

Clause 4.2.2 of ETSI EN 301 908-1 applies.

RESULT: Pass

#### 3.12.1 Definition and applicability

This test assesses the ability of radio communications equipment and ancillary equipment to limit unwanted emissions from the enclosure port.

This test is applicable to radio communications equipment and ancillary equipment.

This test shall be performed on the radio communications equipment and/or a representative configuration of the ancillary equipment.

#### 3.12.2 Conformance requirements

The frequency boundary and reference bandwidths for the detailed transitions of the limits between the requirements for out of band emissions and spurious emissions are based on ITU-R Recommendations SM.329-10 [3] and SM.1539-1 [4].
The requirements shown in the following table are only applicable for frequencies in the spurious domain.

**Table 4.2.2.2-1: Radiated spurious emissions requirements (UE)**

| Frequency | Minimum requirement (e.r.p.)/ reference bandwidth idle mode | Minimum requirement (e.r.p.)/ reference bandwidth traffic mode | Applicability |
|---|---|---|---|
| 30 MHz ≤ f < 1 000 MHz | -57 dBm/100 kHz | -36 dBm/100 kHz | All |
| 1 GHz ≤ f < 12,75 GHz | -47 dBm/1 MHz | -30 dBm/1 MHz | All |
| 12,75 GHz ≤ f < 5th harmonic of the upper frequency edge of the Uplink operating band in GHz | -47 dBm/1 MHz | -30 dBm/1 MHz | All (note 3) |
| 12,75 GHz < f < 26 GHz | -47 dBm/1 MHz | -30 dBm/1 MHz | All (note 4) |
| fc - 2,5 × 5 MHz < f < fc + 2,5 × 5 MHz (note 1 and note 2) | Not defined | Not defined | UTRA FDD, UTRA TDD, 3,84 Mcps option, cdma2000, spreading rate 3 |
| fc - 2,5 × $BW_{Channel}$ MHz < f < fc + 2,5 × $BW_{Channel}$ MHz (note 1 and note 2) | Not defined | Not defined | E-UTRA FDD, E-UTRA TDD, Mobile WiMAX™ |
| fc - (1,5 x $BW_{Channel}$ + 5) MHz < f < fc + (1,5 x $BW_{Channel}$ + 5) MHz (note 1) | Not defined | Not defined | NR operating in FR1 |
| fc - 2,5 × 10 MHz < f < fc + 2,5 × 10 MHz (note 1 and note 2) | Not defined | Not defined | UTRA TDD, 7,68 Mcps option |
| fc - 4 MHz < f < fc + 4 MHz (note 1 and note 2) | Not defined | Not defined | UTRA TDD, 1,28 Mcps option cdma2000, spreading rate 1 |

NOTE 1: fc is the UE transmit centre frequency.
NOTE 2: This frequency range is not in the spurious domain, no requirement is then defined for this frequency range.
NOTE 3: Applies for Band that the upper frequency edge of the Uplink Band more than 2,69 GHz.
NOTE 4: Applies for Band that the upper frequency edge of the Uplink Band more than 5,2 GHz.

### 3.12.3 Set up for testing

Whenever possible the test site should be a fully anechoic chamber simulating the free-space conditions. EUT shall be placed on a non-conducting support. Mean power of any spurious components shall be detected by the test antenna and measuring receiver (e.g. a spectrum analyser).

At each frequency at which a component is detected, the EUT shall be rotated to obtain maximum response, and the effective radiated power (e.r.p.) of that component determined by a substitution measurement, which shall be the reference method. The measurement shall be repeated with the test antenna in the orthogonal polarization plane.
NOTE: Effective radiated power (e.r.p.) refers to the radiation of a half wave tuned dipole instead of an isotropic antenna. There is a constant difference of 2,15 dB between e.i.r.p. and e.r.p.
e.r.p. (dBm) = e.i.r.p. (dBm) - 2,15 (ITU-R Recommendation SM.329-10 [3], annex 1).

Measurements are made with a tuned dipole antenna or a reference antenna with a known gain referenced to an isotropic antenna. Unless otherwise stated, all measurements are done as mean power (RMS).

If a different test site or method is used, this shall be stated in the test report. The results shall be converted to the reference method values and the validity of the conversion shall be demonstrated.

### 3.12.4 Test result

Traffic Mode

| Frequency range | Max. measure value (dBm) | Test result |
|---|---|---|
| 30MHz to 1GHz | <-36 | Pass |
| 1GHz to 12.75GHz | <-30 | Pass |
| 12.75GHz to 5$^{th}$ | <-30 | Pass |

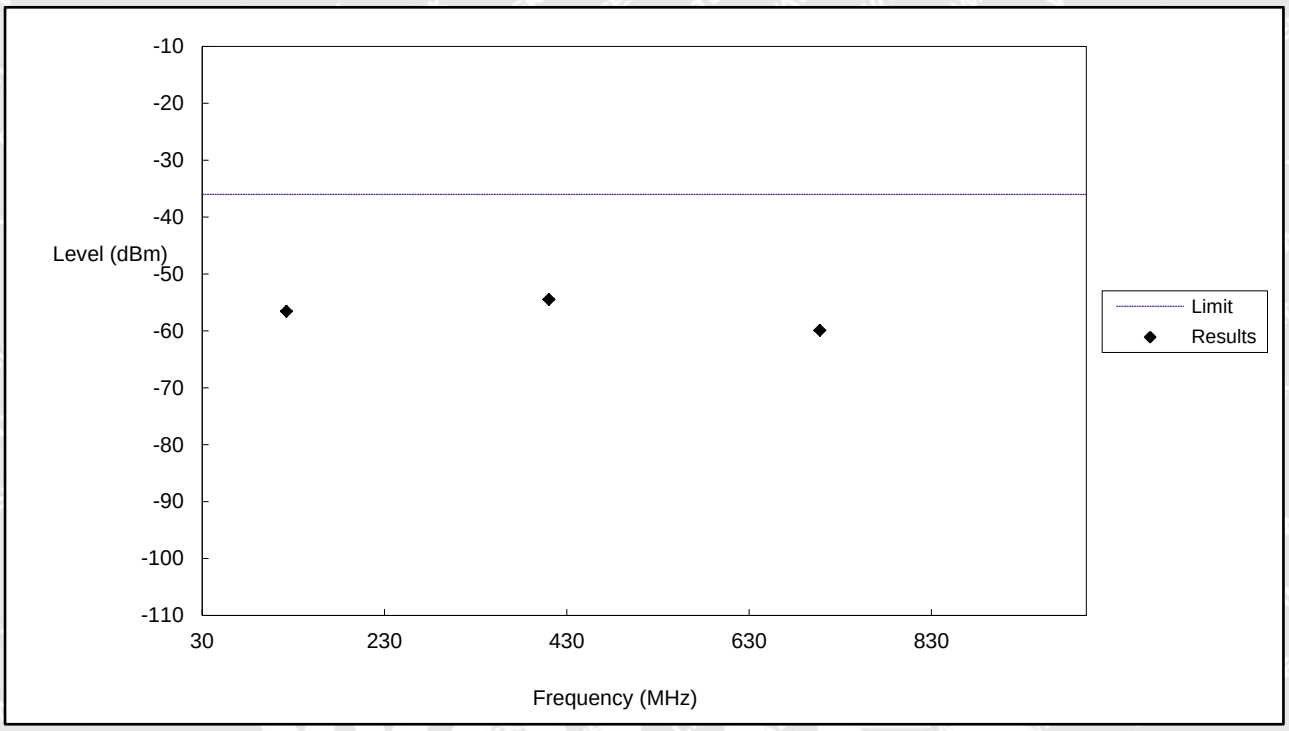
Idle Mode

| Frequency range | Max. measure value (dBm) | Test result |
|---|---|---|
| 30MHz to 1GHz | <-57 | Pass |
| 1GHz to 12.75GHz | <-47 | Pass |
| 12.75GHz to 5$^{th}$ | <-47 | Pass |

*Please refer to the following test plots and data*

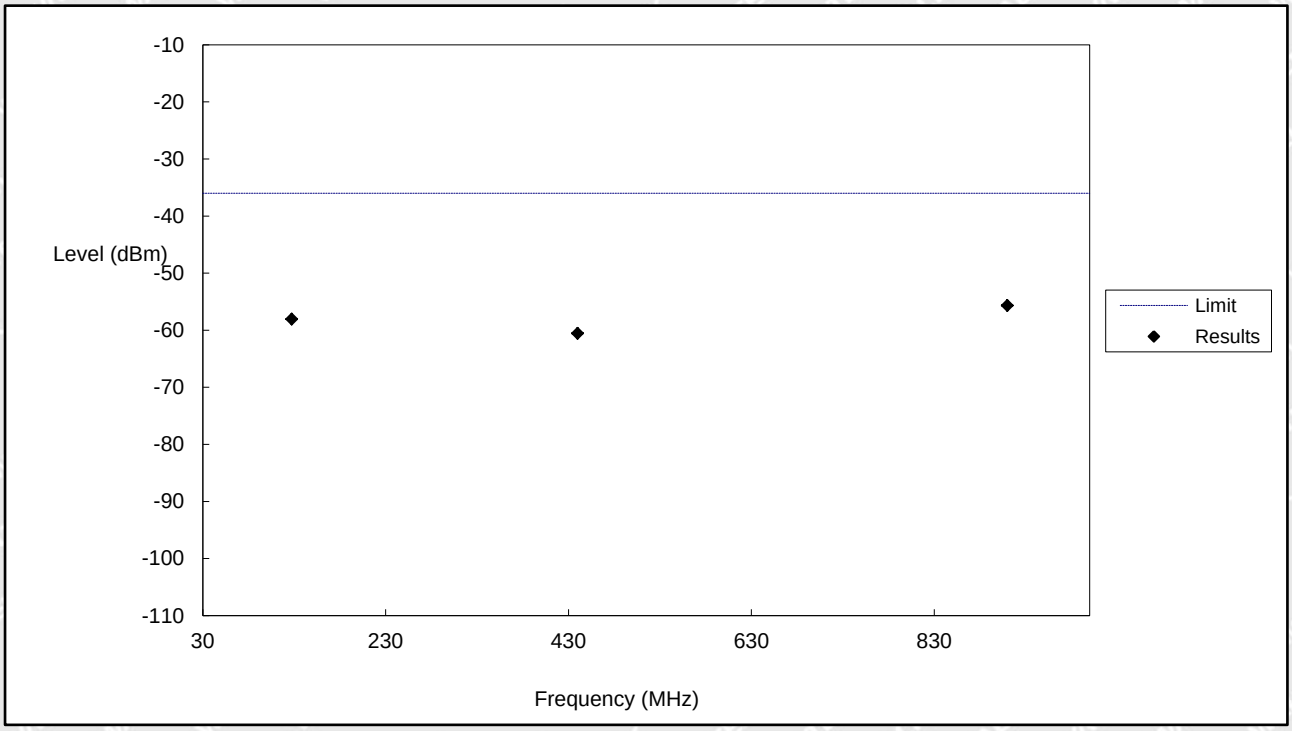
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 1 | | | |
|---|---|---|---|
| Test mode: | Traffic Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 122.50 | -56.57 | -36.00 | -20.57 | RMS |
| 2 | 410.40 | -54.48 | -36.00 | -18.48 | RMS |
| 3 | 707.69 | -59.91 | -36.00 | -23.91 | RMS |

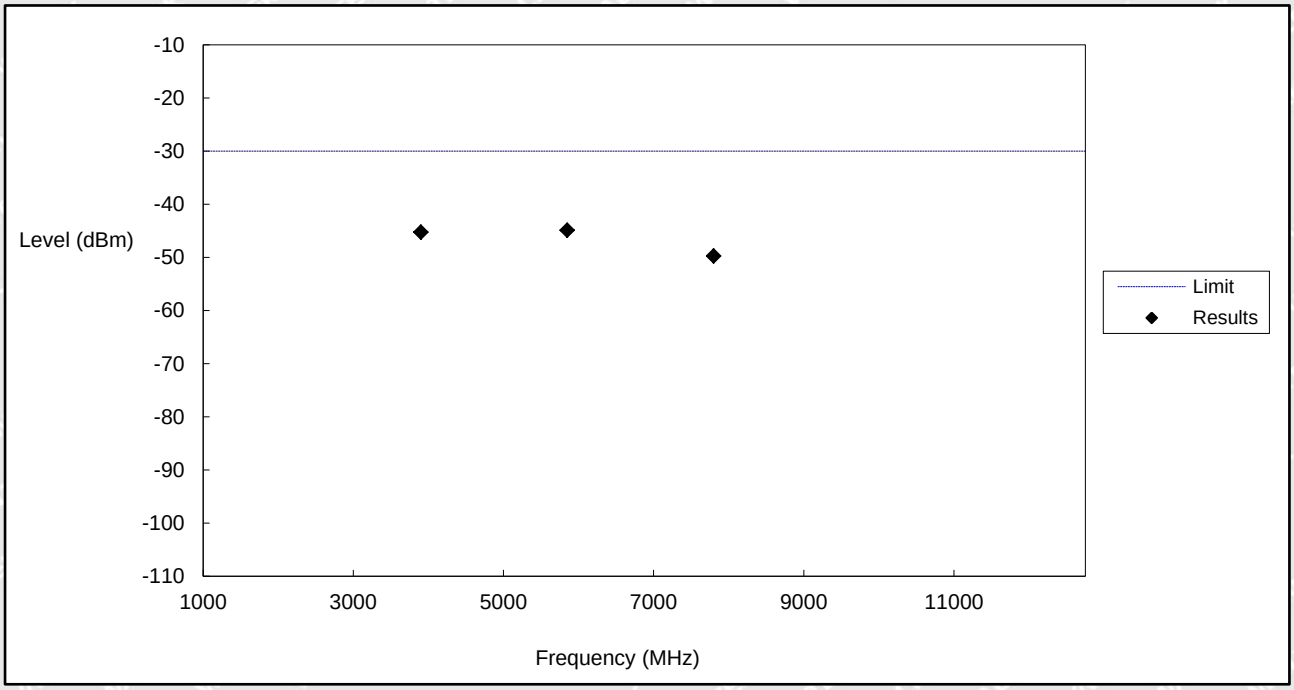
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 127.27 | -58.07 | -36.00 | -22.07 | RMS |
| 2 | 440.00 | -60.55 | -36.00 | -24.55 | RMS |
| 3 | 910.00 | -55.67 | -36.00 | -19.67 | RMS |

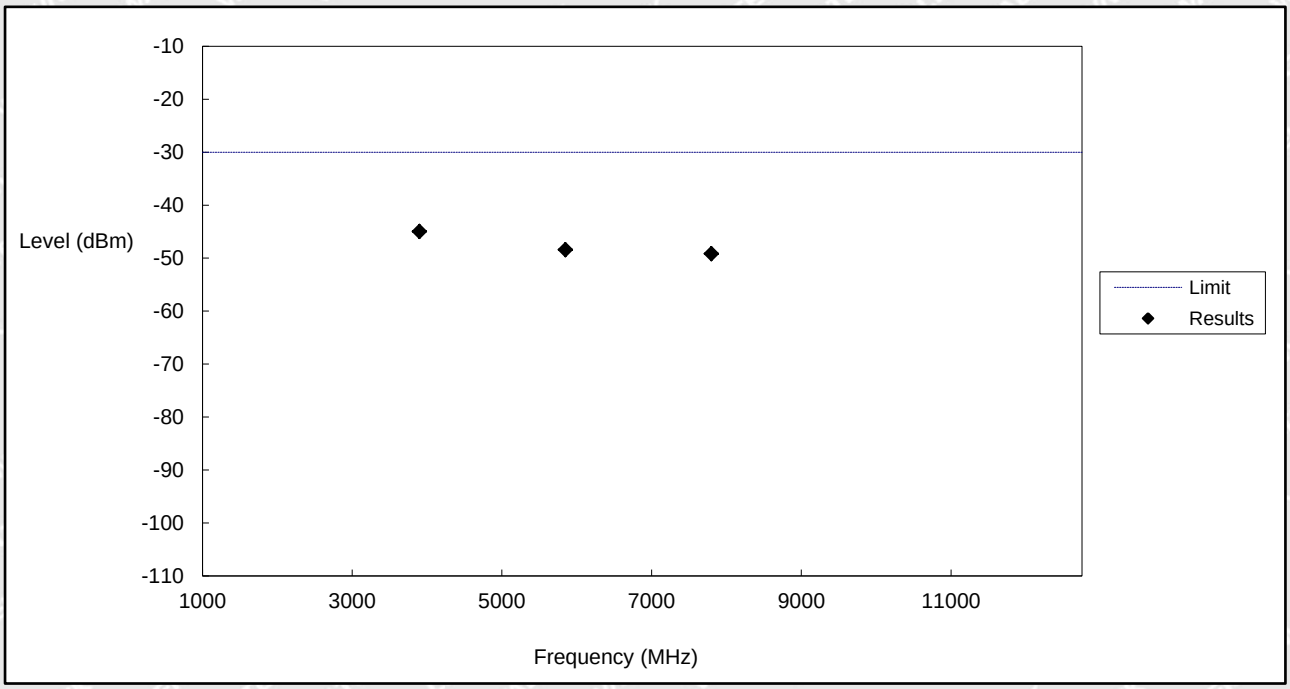
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Traffic Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 3900.00 | -45.23 | -30.00 | -15.23 | RMS |
| 2 | 5850.00 | -44.88 | -30.00 | -14.88 | RMS |
| 3 | 7800.00 | -49.72 | -30.00 | -19.72 | RMS |

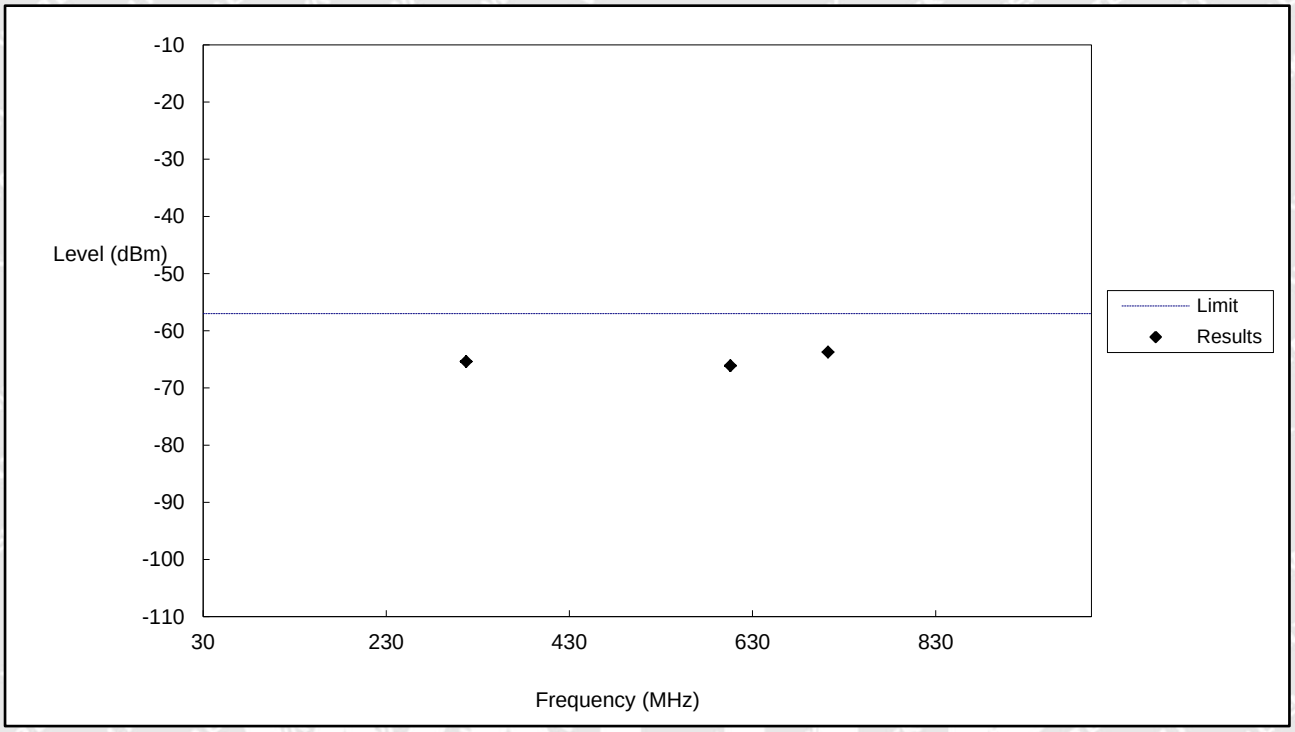
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 3900.00 | -44.97 | -30.00 | -14.97 | RMS |
| 2 | 5850.00 | -48.44 | -30.00 | -18.44 | RMS |
| 3 | 7800.00 | -49.17 | -30.00 | -19.17 | RMS |

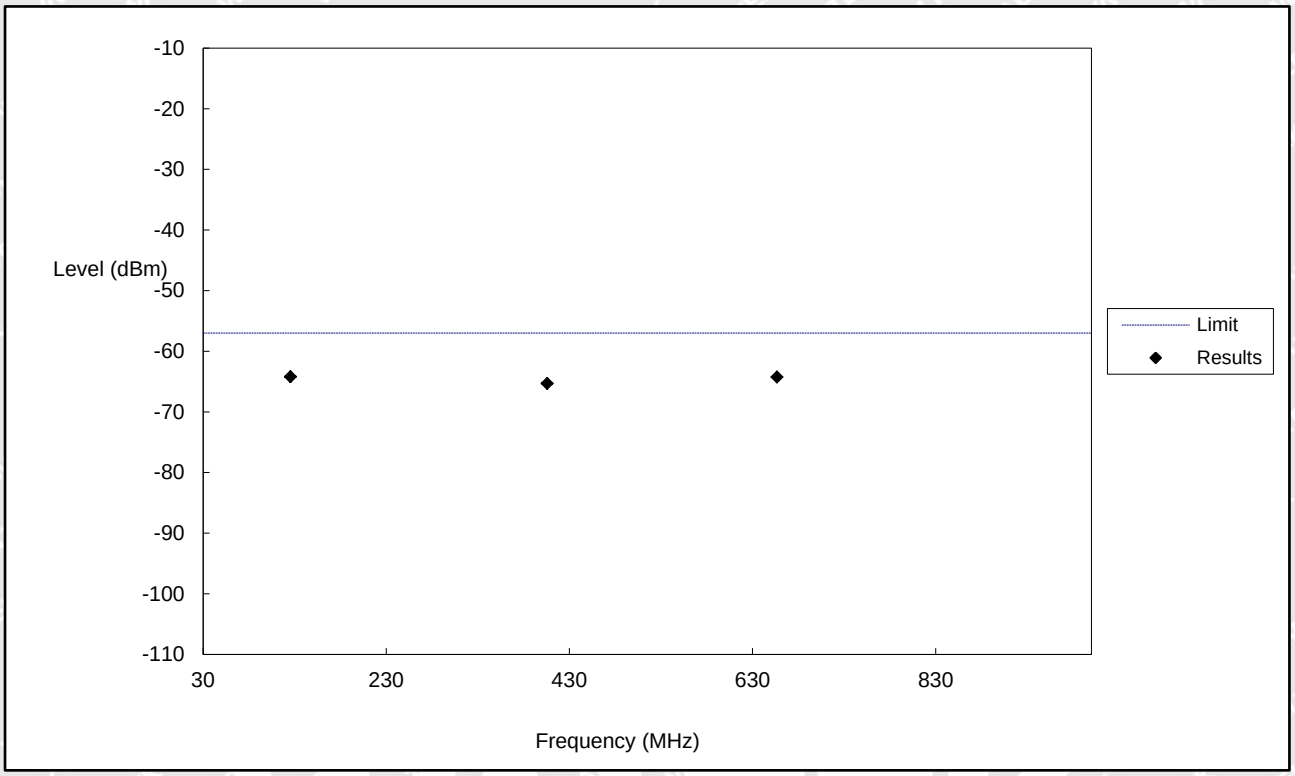
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 1 | | | |
|---|---|---|---|
| Test mode: | Idle Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 317.27 | -65.39 | -57.00 | -8.39 | RMS |
| 2 | 605.83 | -66.10 | -57.00 | -9.10 | RMS |
| 3 | 712.50 | -63.72 | -57.00 | -6.72 | RMS |

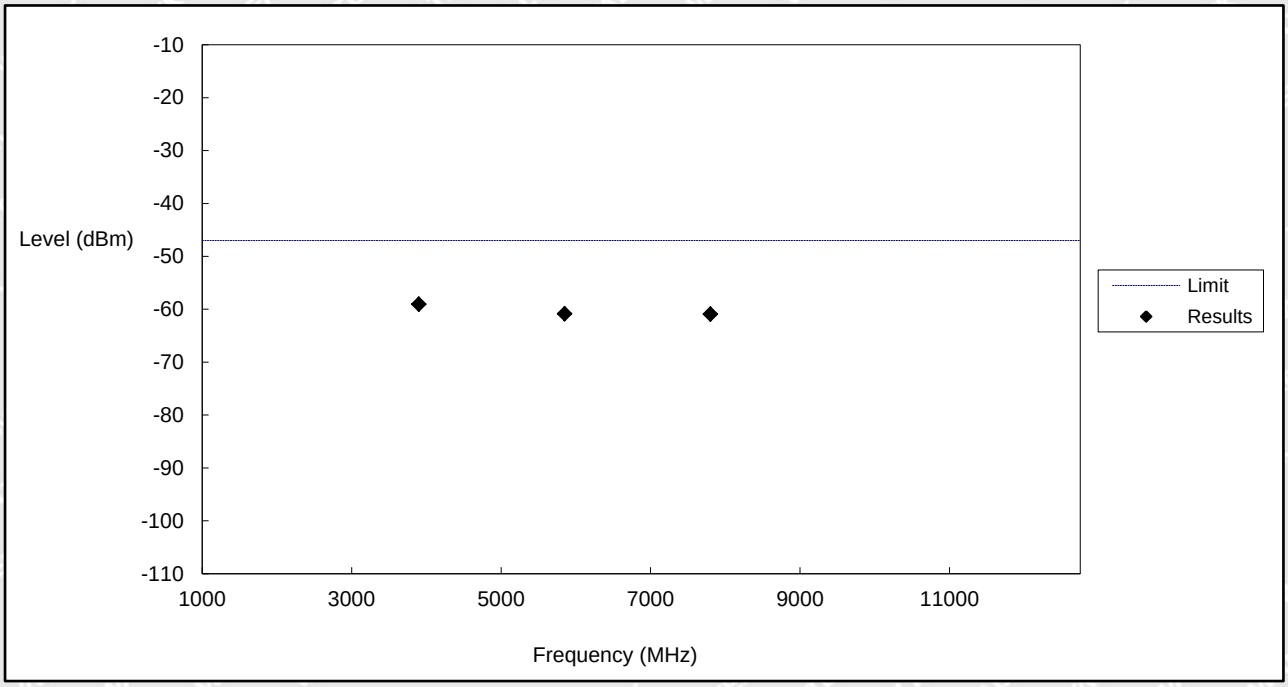
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 125.45 | -64.21 | -57.00 | -7.21 | RMS |
| 2 | 405.83 | -65.33 | -57.00 | -8.33 | RMS |
| 3 | 656.67 | -64.27 | -57.00 | -7.27 | RMS |

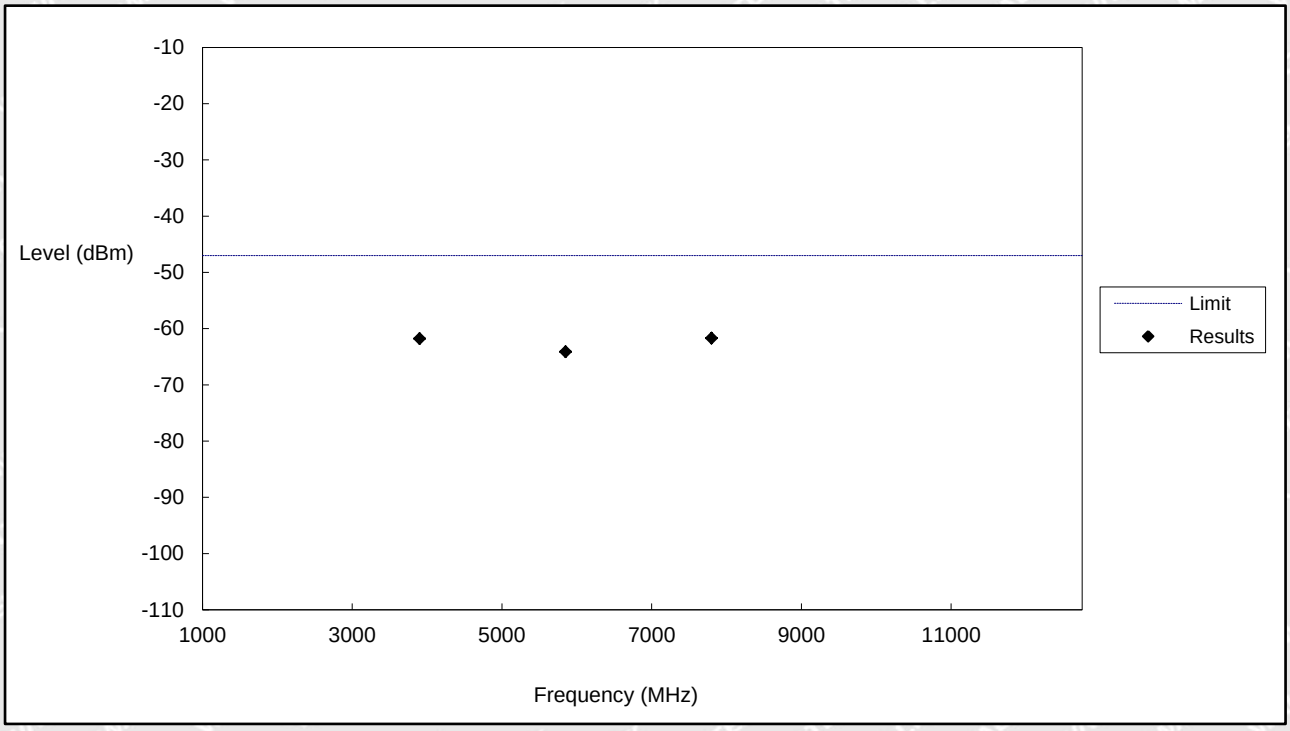
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Idle Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 3900.00 | -59.07 | -47.00 | -12.07 | RMS |
| 2 | 5850.00 | -60.87 | -47.00 | -13.87 | RMS |
| 3 | 7800.00 | -60.93 | -47.00 | -13.93 | RMS |

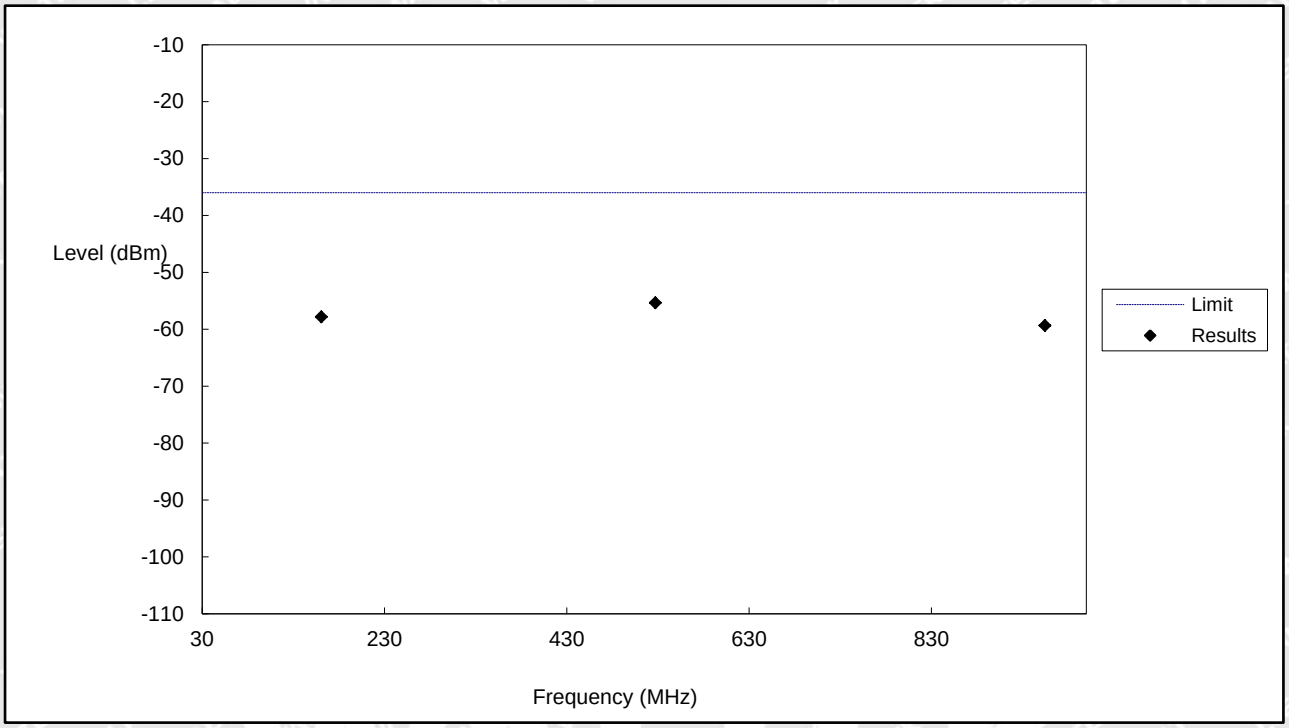
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 3900.00 | -61.80 | -47.00 | -14.80 | RMS |
| 2 | 5850.00 | -64.12 | -47.00 | -17.12 | RMS |
| 3 | 7800.00 | -61.71 | -47.00 | -14.71 | RMS |

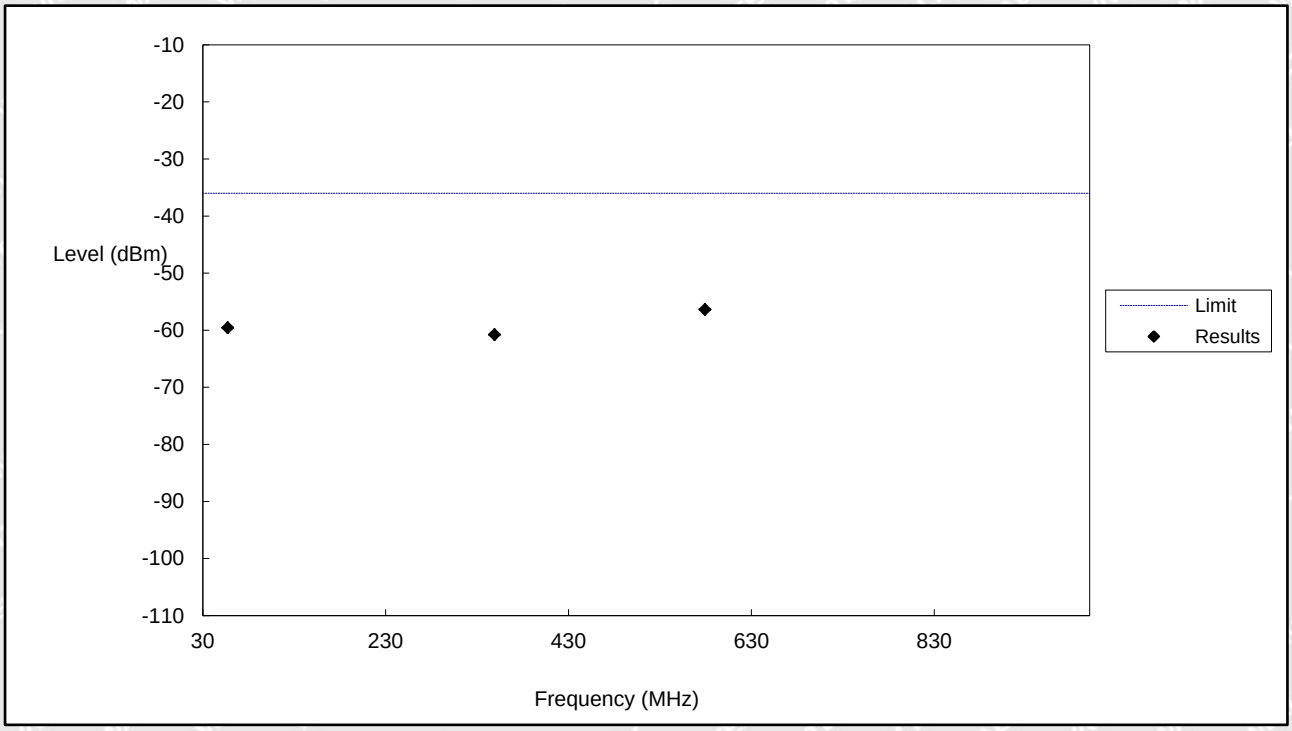
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 3 | | | |
|---|---|---|---|
| Test mode: | Traffic Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 160.83 | -57.85 | -36.00 | -21.85 | RMS |
| 2 | 527.20 | -55.35 | -36.00 | -19.35 | RMS |
| 3 | 954.62 | -59.36 | -36.00 | -23.36 | RMS |

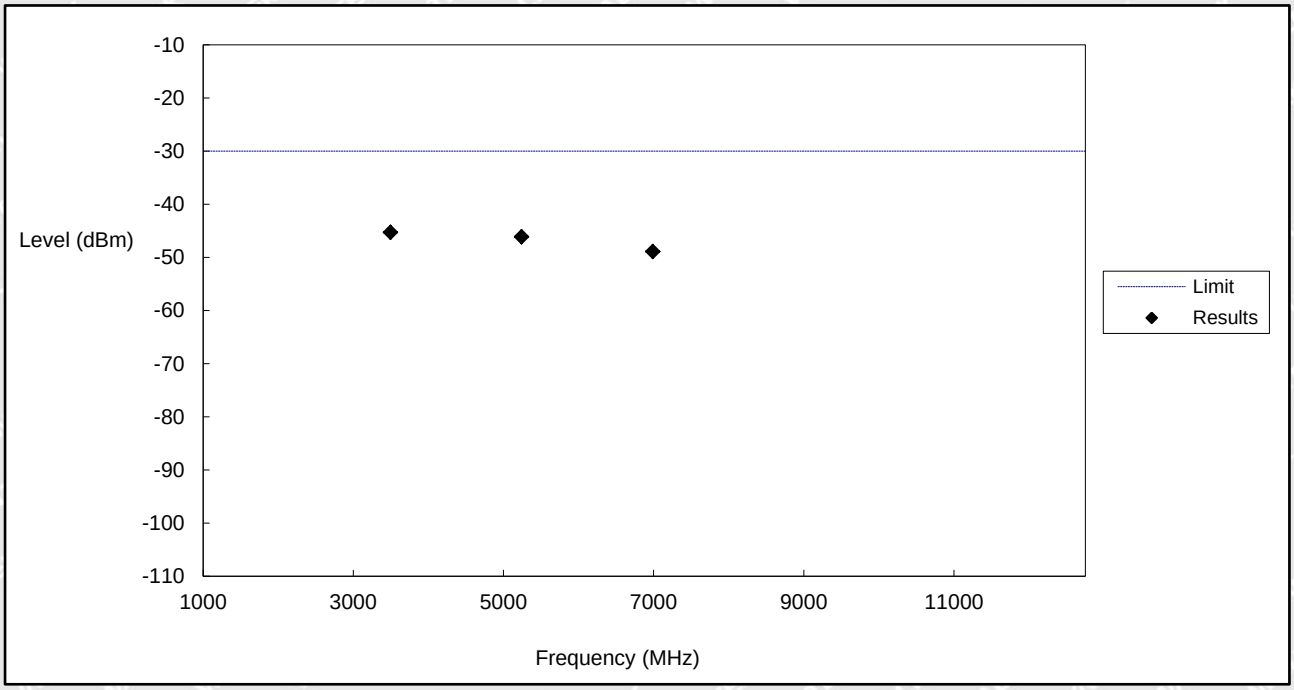
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 57.27 | -59.58 | -36.00 | -23.58 | RMS |
| 2 | 349.17 | -60.79 | -36.00 | -24.79 | RMS |
| 3 | 579.29 | -56.38 | -36.00 | -20.38 | RMS |

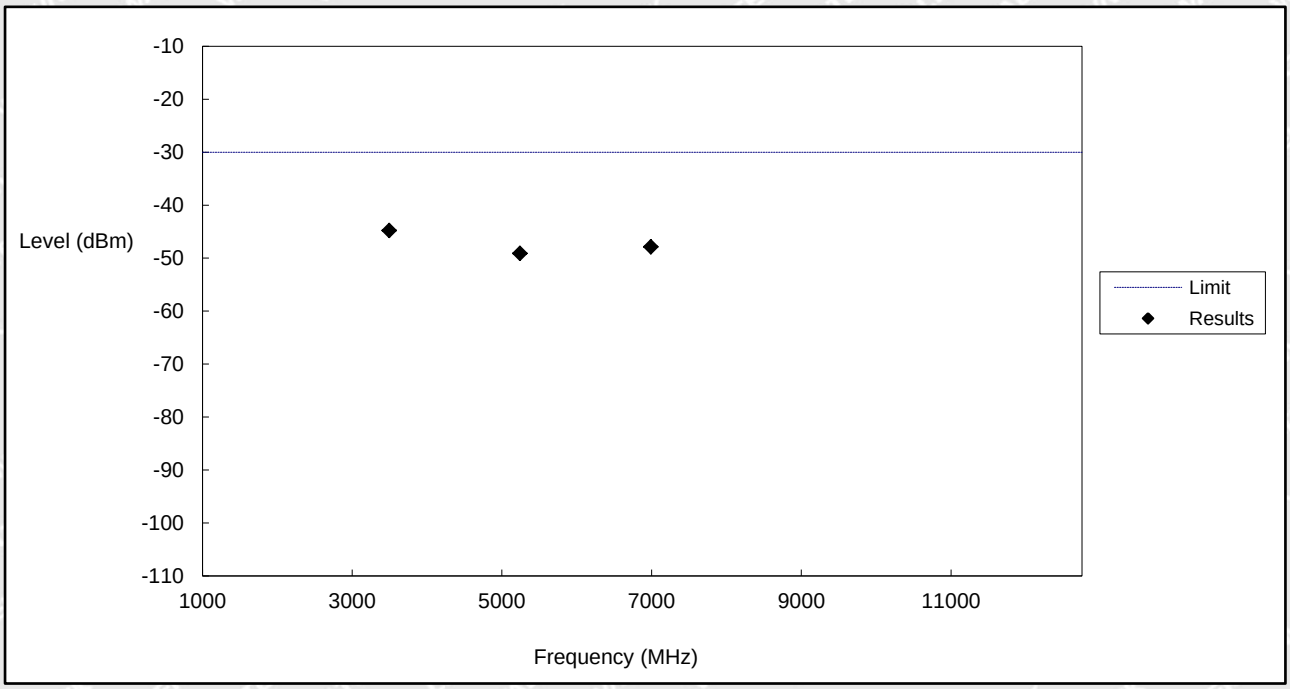
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Traffic Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 3495.00 | -45.26 | -30.00 | -15.26 | RMS |
| 2 | 5242.50 | -46.11 | -30.00 | -16.11 | RMS |
| 3 | 6990.00 | -48.88 | -30.00 | -18.88 | RMS |

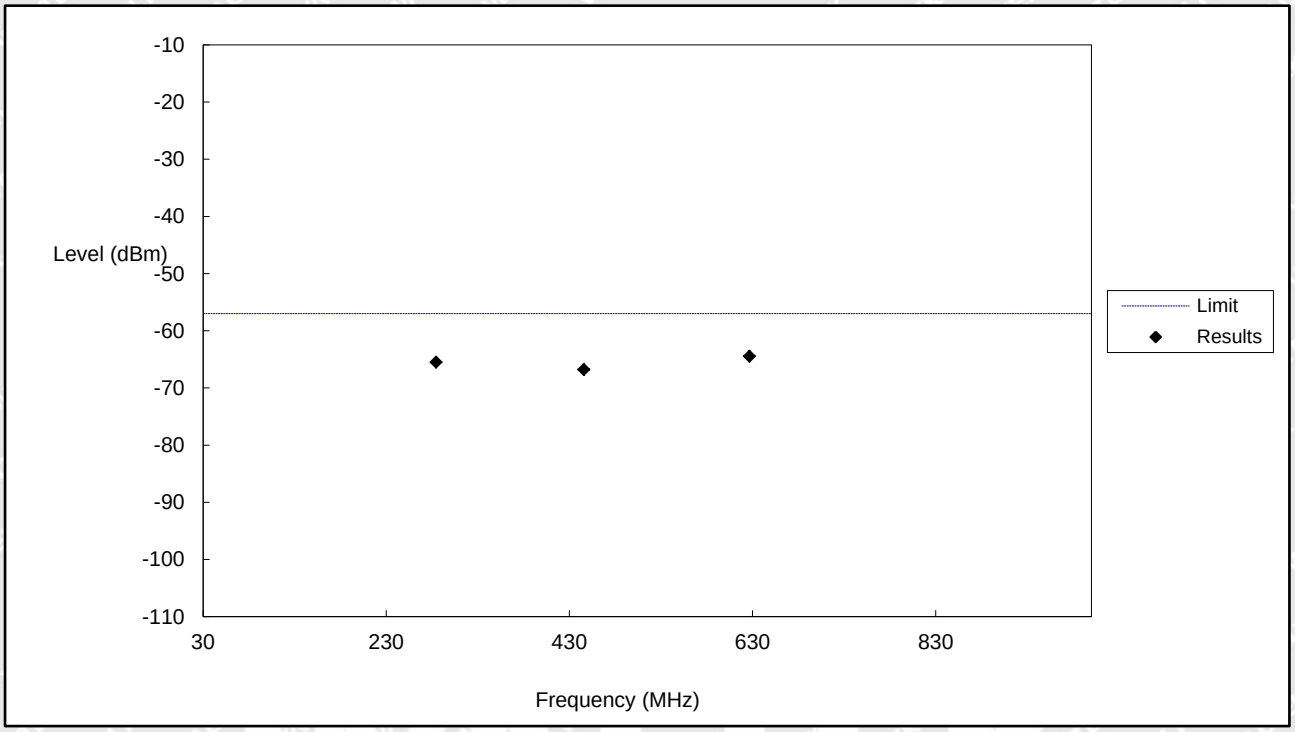
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 3495.00 | -44.81 | -30.00 | -14.81 | RMS |
| 2 | 5242.50 | -49.12 | -30.00 | -19.12 | RMS |
| 3 | 6990.00 | -47.89 | -30.00 | -17.89 | RMS |

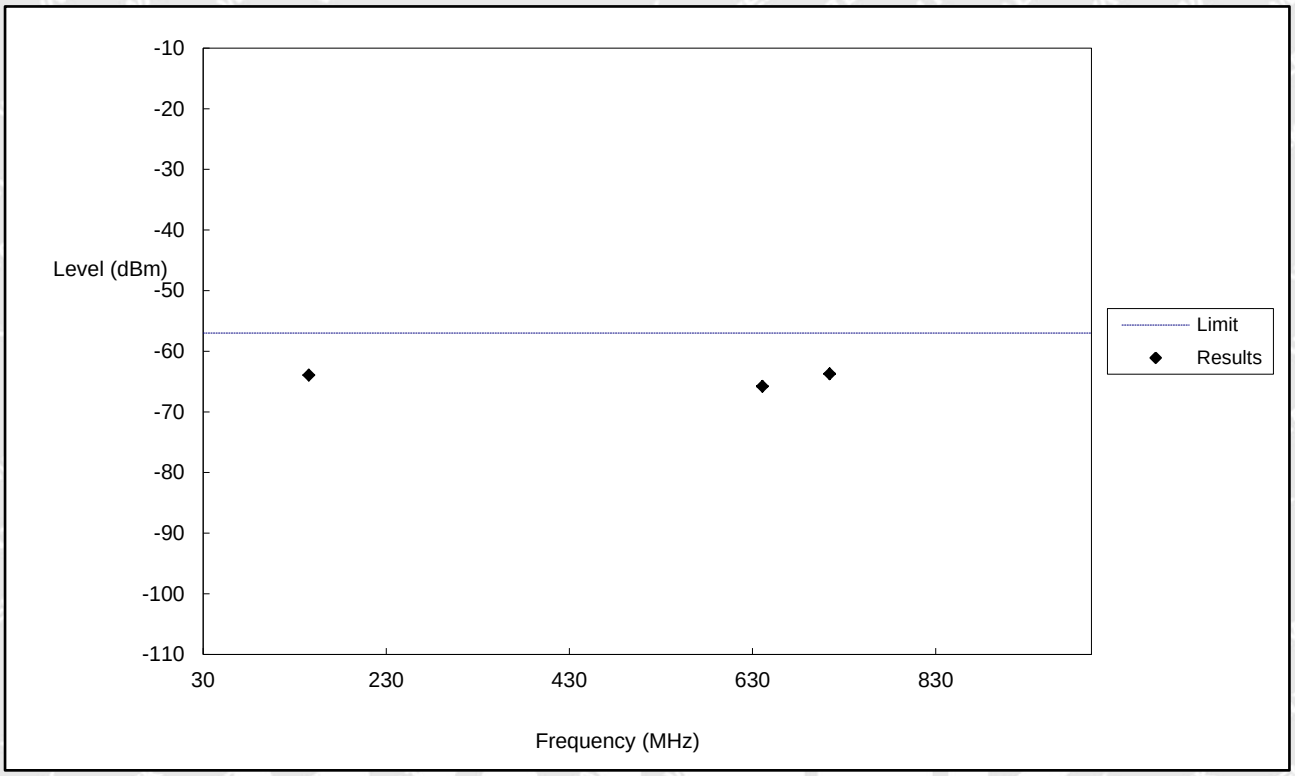
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 3 | | | |
|---|---|---|---|
| Test mode: | Idle Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 284.55 | -65.50 | -57.00 | -8.50 | RMS |
| 2 | 445.83 | -66.77 | -57.00 | -9.77 | RMS |
| 3 | 626.67 | -64.46 | -57.00 | -7.46 | RMS |

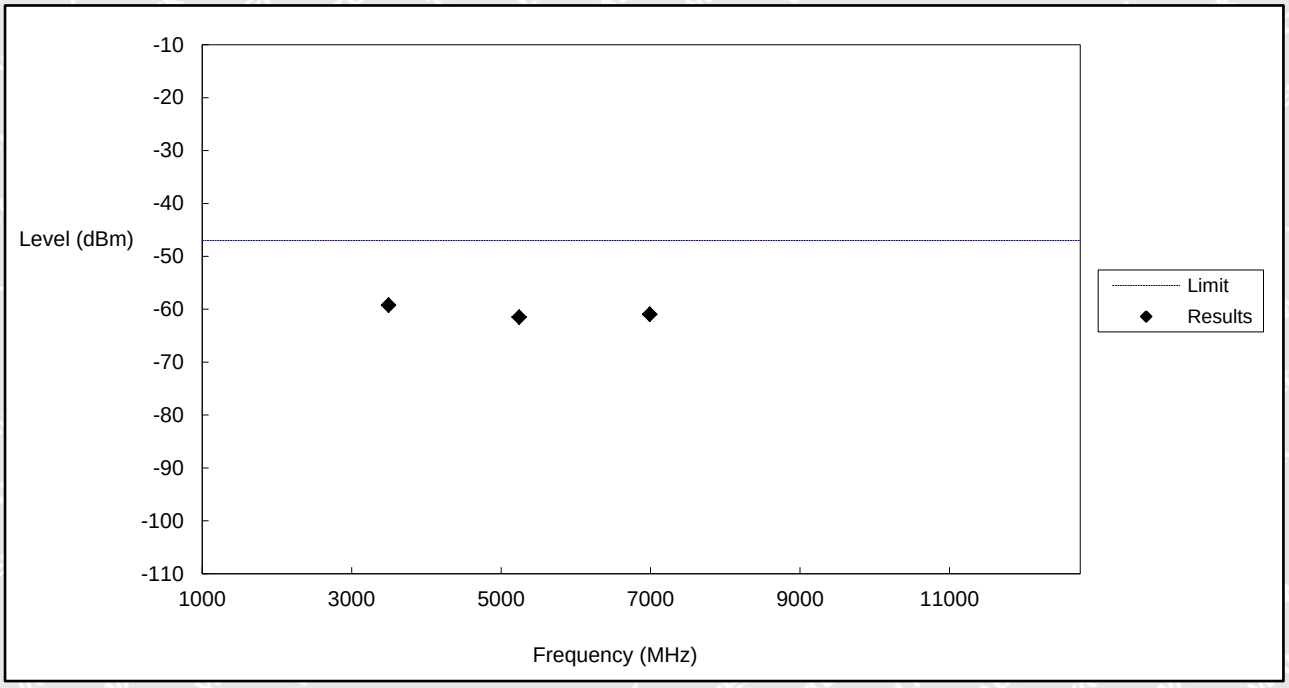
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 145.45 | -63.94 | -57.00 | -6.94 | RMS |
| 2 | 640.83 | -65.80 | -57.00 | -8.80 | RMS |
| 3 | 714.17 | -63.74 | -57.00 | -6.74 | RMS |

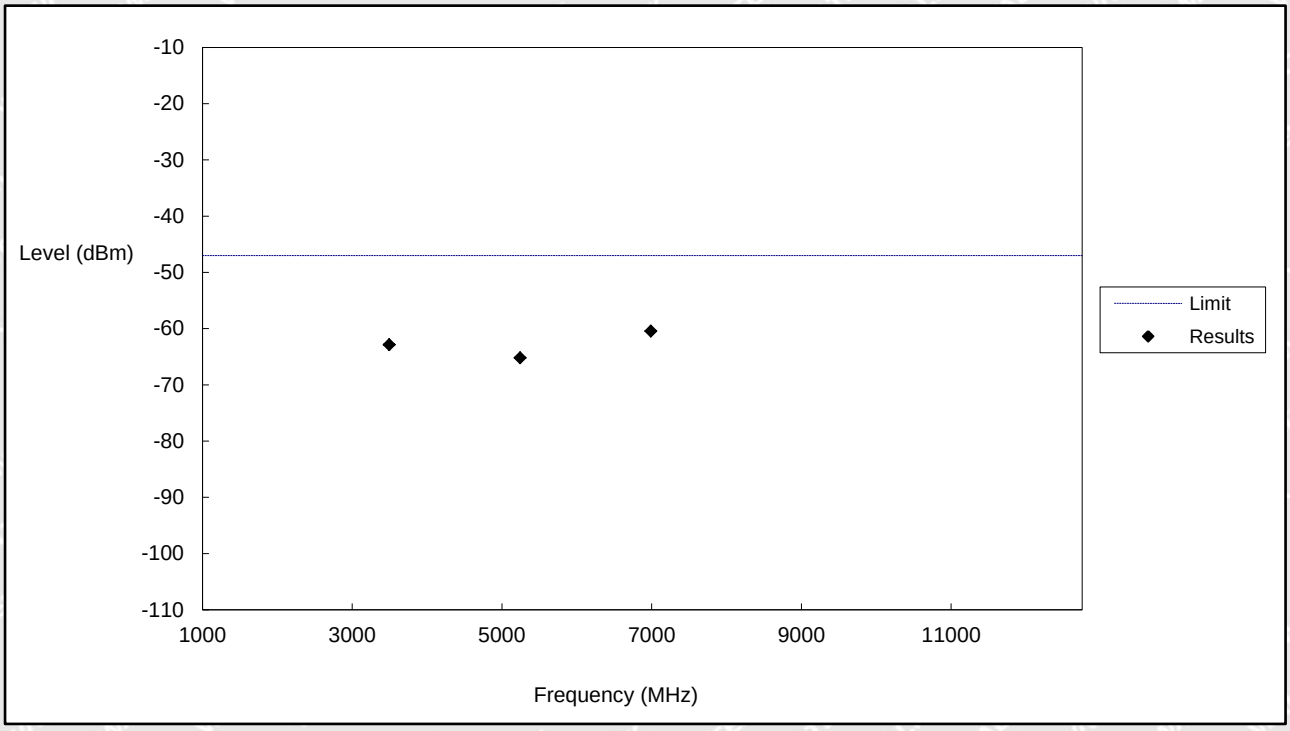
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Idle Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 3495.00 | -59.24 | -47.00 | -12.24 | RMS |
| 2 | 5242.50 | -61.53 | -47.00 | -14.53 | RMS |
| 3 | 6990.00 | -60.96 | -47.00 | -13.96 | RMS |

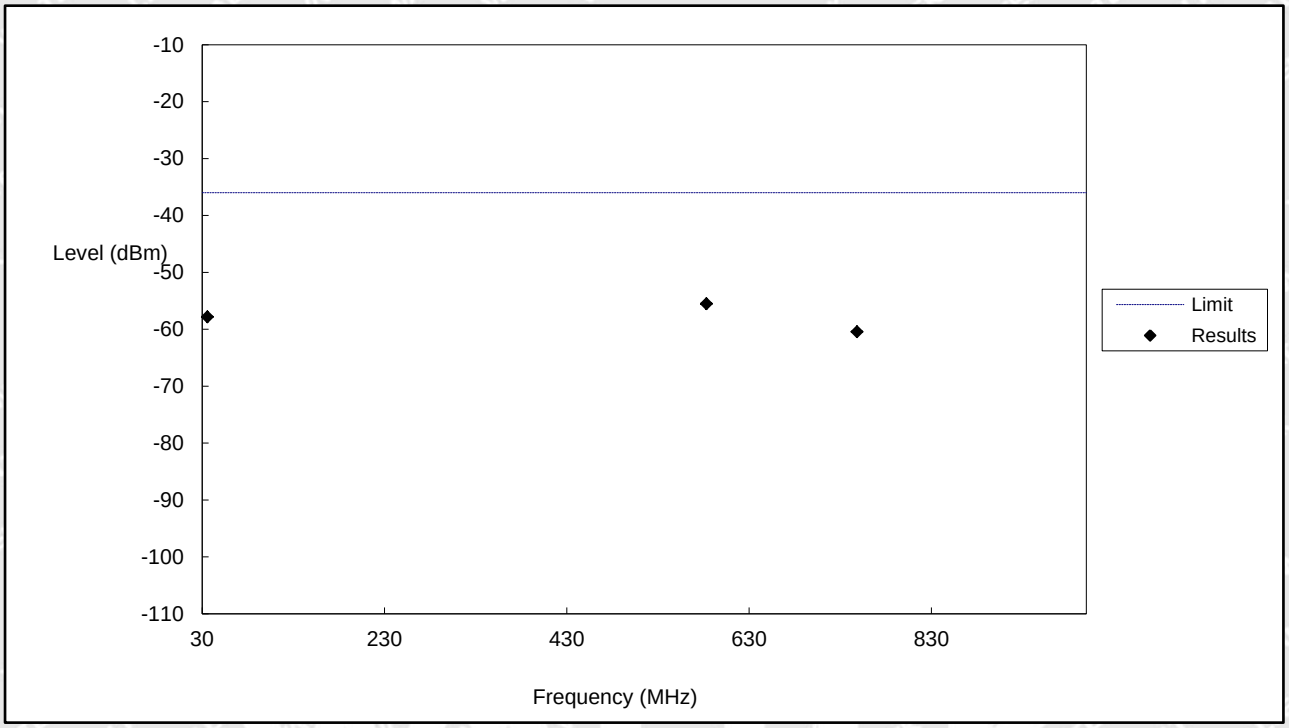
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 3495.00 | -62.87 | -47.00 | -15.87 | RMS |
| 2 | 5242.50 | -65.22 | -47.00 | -18.22 | RMS |
| 3 | 6990.00 | -60.45 | -47.00 | -13.45 | RMS |

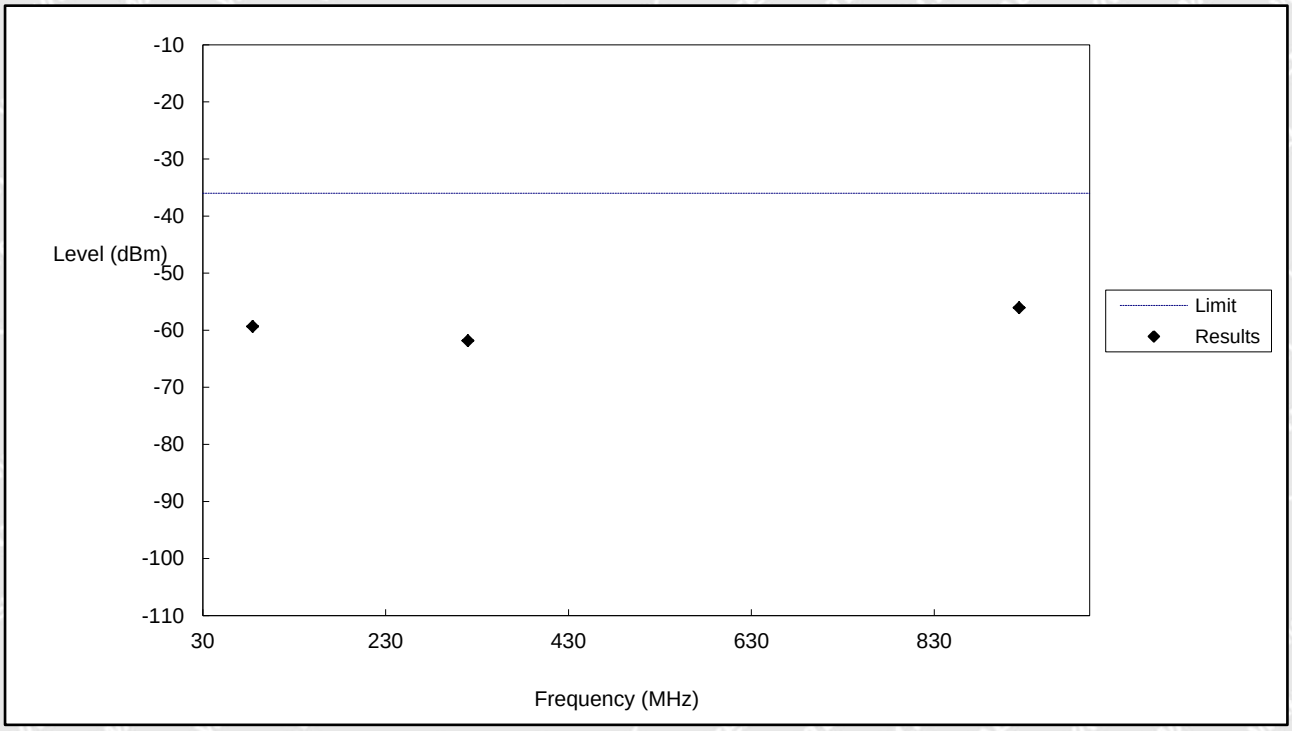
- Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 7 | | | |
|---|---|---|---|
| Test mode: | Traffic Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 35.83 | -57.84 | -36.00 | -21.84 | RMS |
| 2 | 583.20 | -55.53 | -36.00 | -19.53 | RMS |
| 3 | 748.46 | -60.44 | -36.00 | -24.44 | RMS |

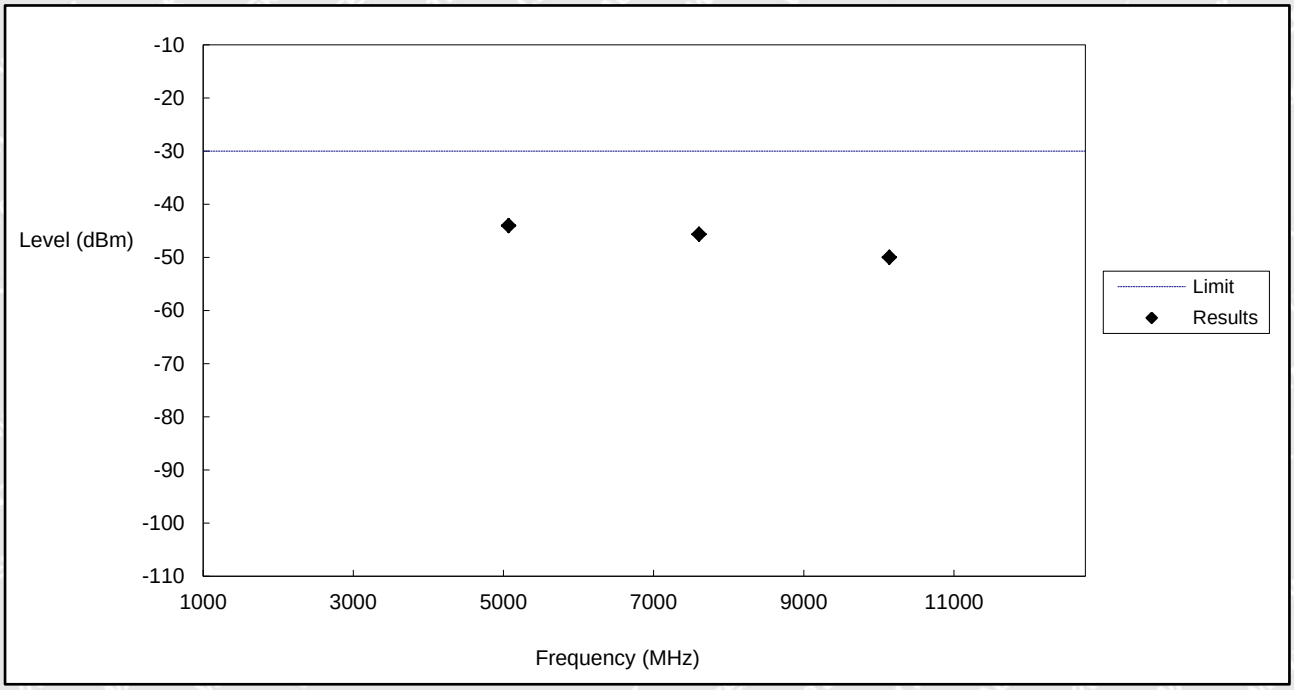
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 84.55 | -59.34 | -36.00 | -23.34 | RMS |
| 2 | 320.00 | -61.83 | -36.00 | -25.83 | RMS |
| 3 | 922.86 | -56.06 | -36.00 | -20.06 | RMS |

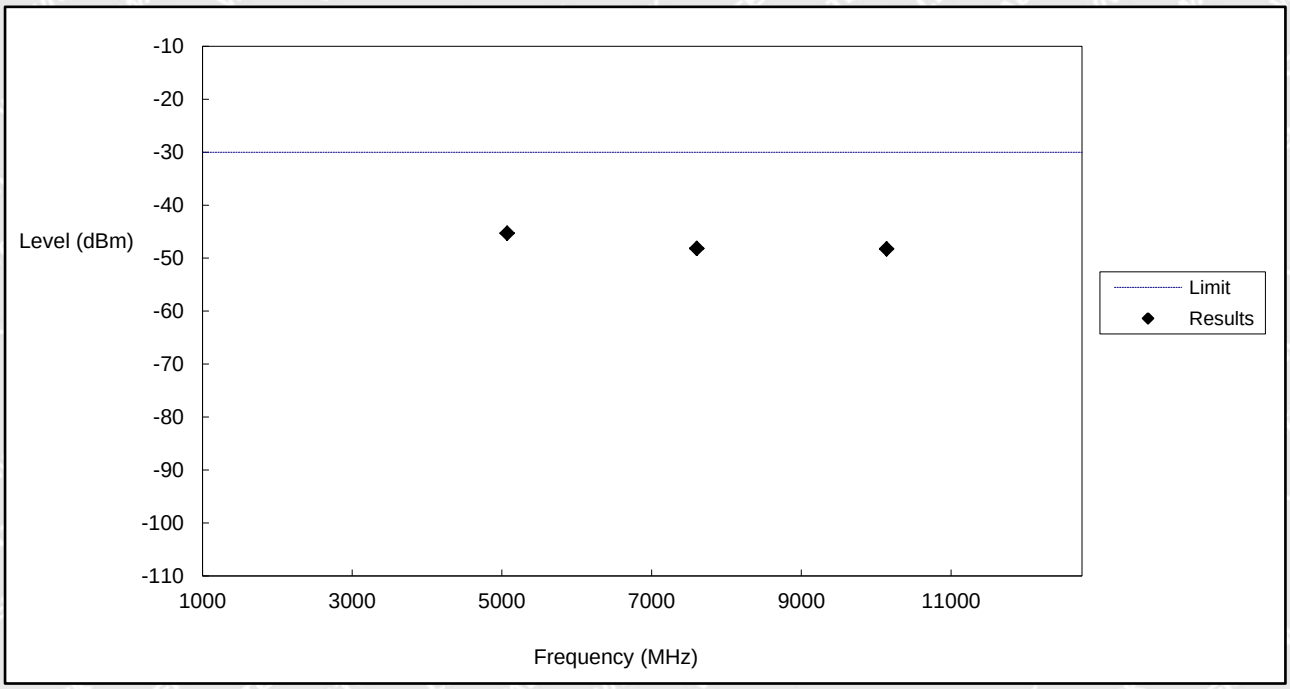
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Traffic Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 5070.00 | -44.02 | -30.00 | -14.02 | RMS |
| 2 | 7605.00 | -45.62 | -30.00 | -15.62 | RMS |
| 3 | 10140.00 | -49.96 | -30.00 | -19.96 | RMS |

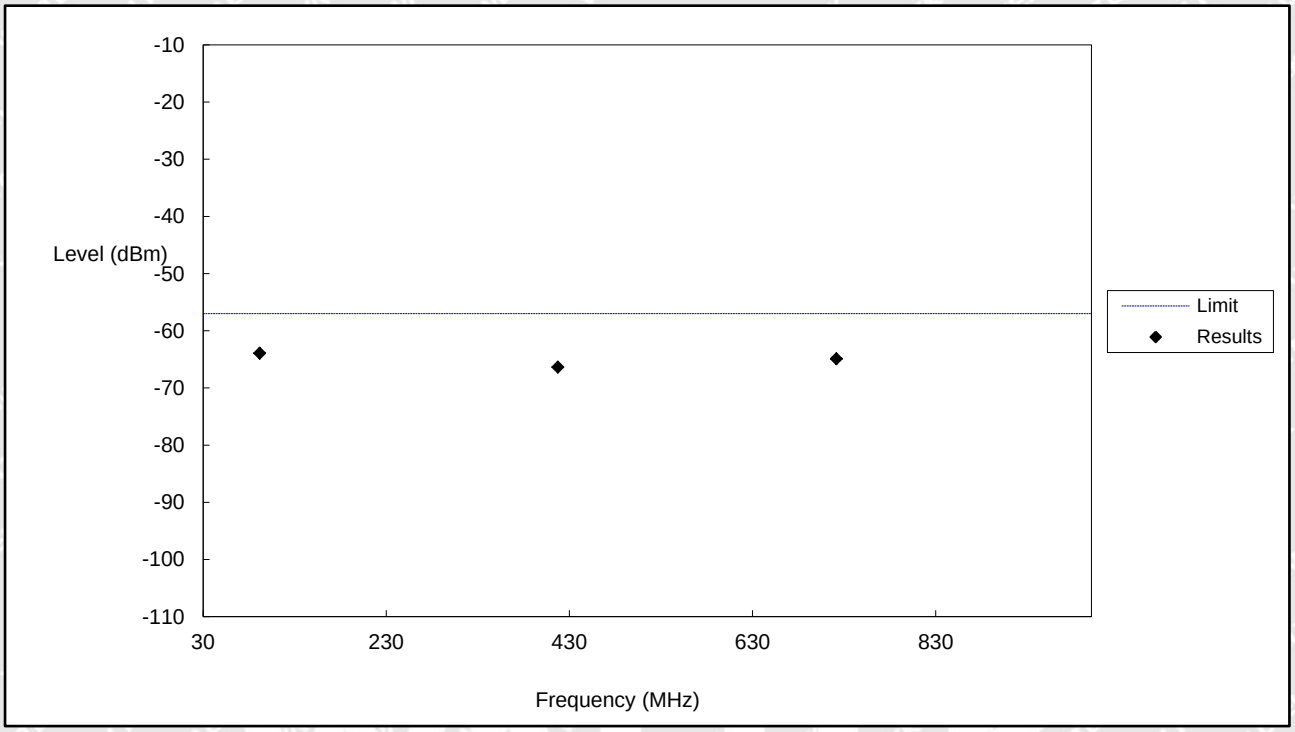
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 5070.00 | -45.33 | -30.00 | -15.33 | RMS |
| 2 | 7605.00 | -48.20 | -30.00 | -18.20 | RMS |
| 3 | 10140.00 | -48.28 | -30.00 | -18.28 | RMS |

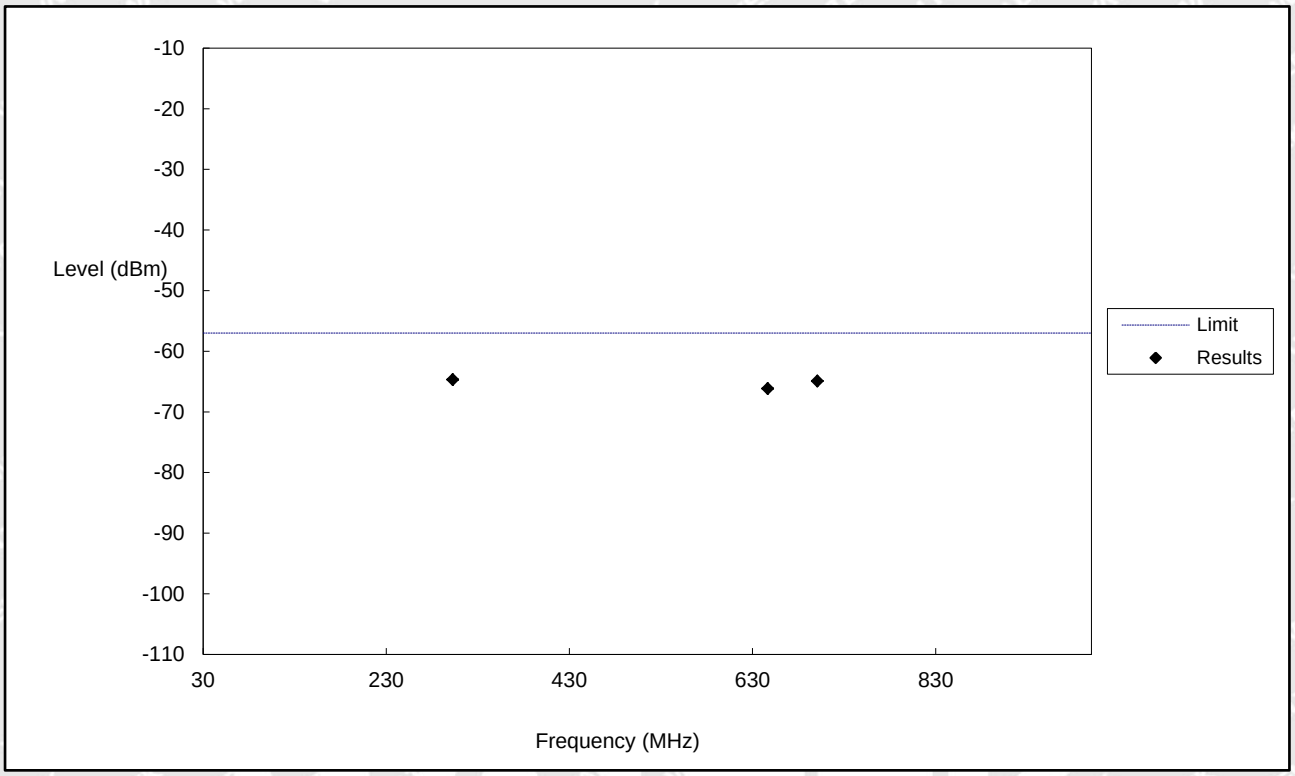
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 7 | | | |
|---|---|---|---|
| Test mode: | Idle Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 91.82 | -63.93 | -57.00 | -6.93 | RMS |
| 2 | 417.50 | -66.35 | -57.00 | -9.35 | RMS |
| 3 | 721.67 | -64.92 | -57.00 | -7.92 | RMS |

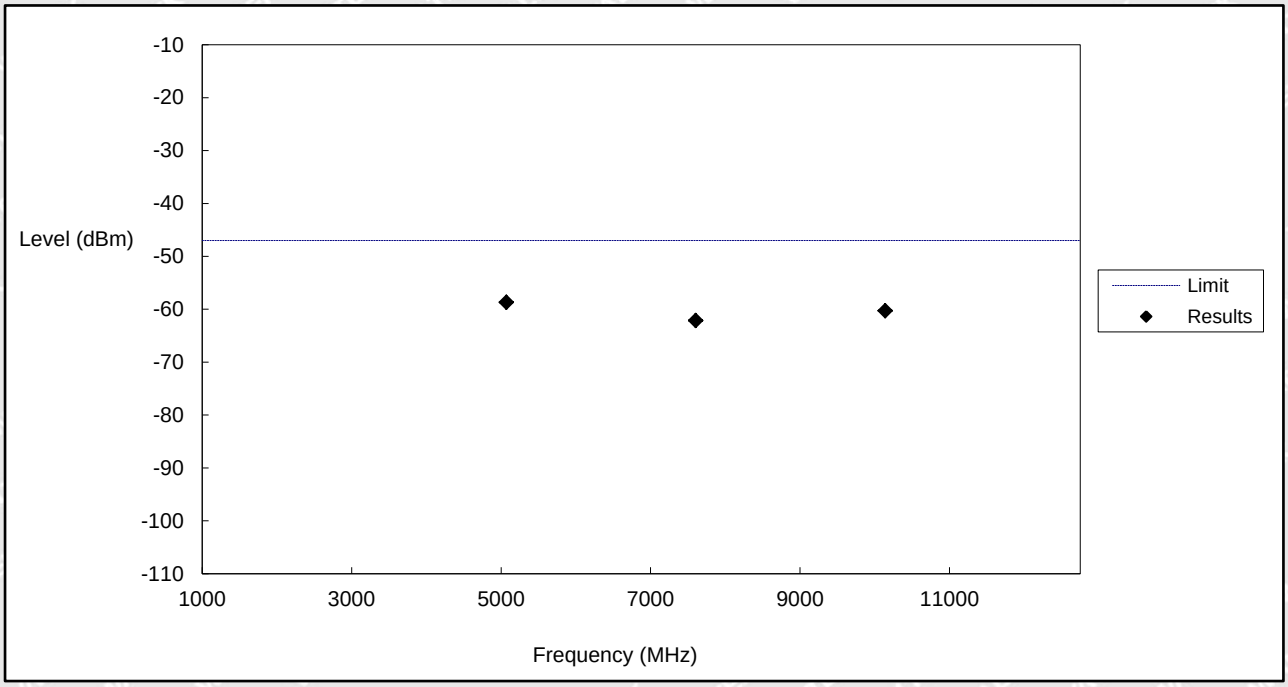
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 302.73 | -64.70 | -57.00 | -7.70 | RMS |
| 2 | 646.67 | -66.16 | -57.00 | -9.16 | RMS |
| 3 | 700.83 | -64.94 | -57.00 | -7.94 | RMS |

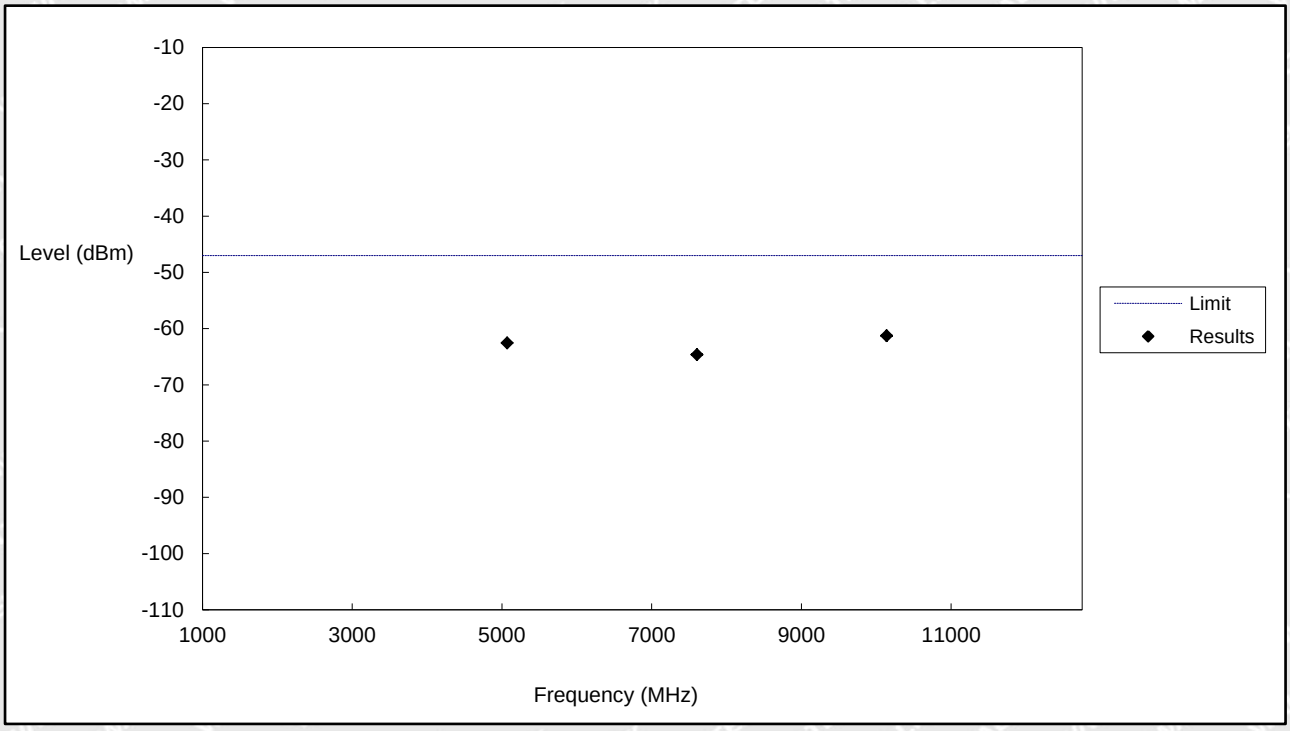
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Idle Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 5070.00 | -58.70 | -47.00 | -11.70 | RMS |
| 2 | 7605.00 | -62.15 | -47.00 | -15.15 | RMS |
| 3 | 10140.00 | -60.31 | -47.00 | -13.31 | RMS |

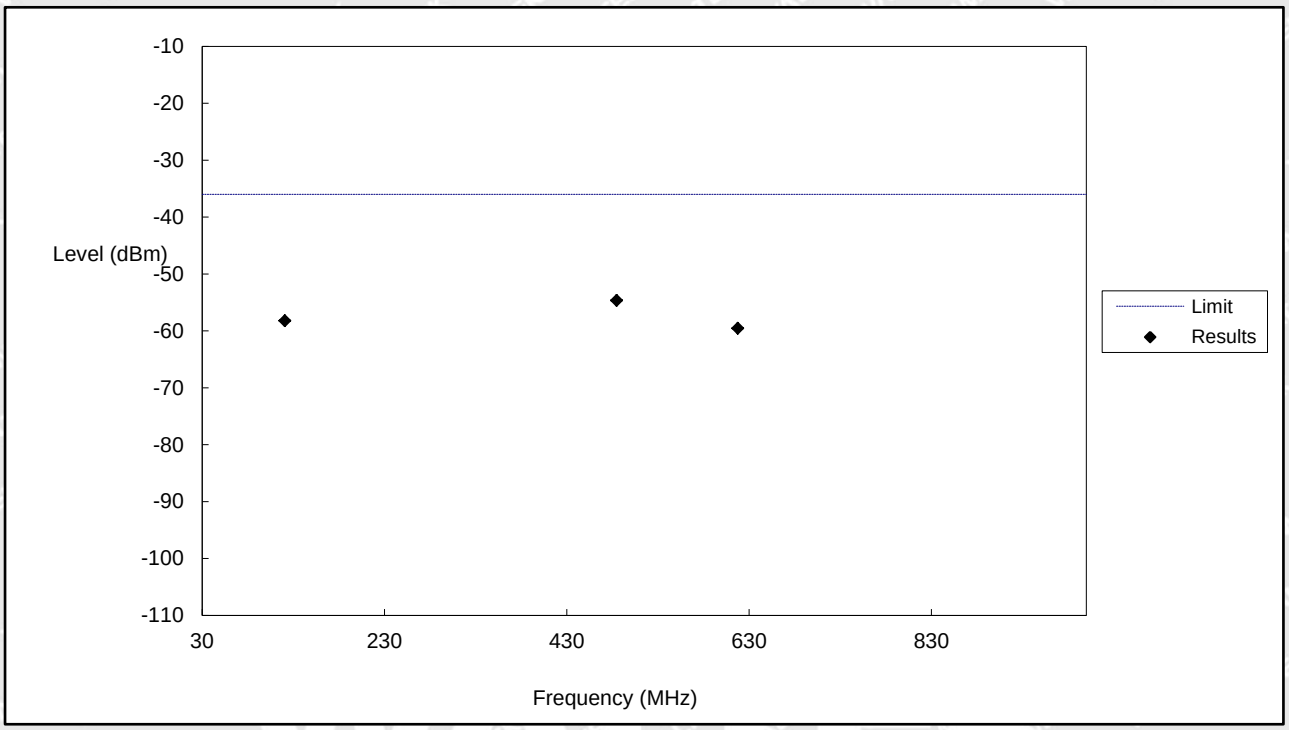
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 5070.00 | -62.56 | -47.00 | -15.56 | RMS |
| 2 | 7605.00 | -64.65 | -47.00 | -17.65 | RMS |
| 3 | 10140.00 | -61.30 | -47.00 | -14.30 | RMS |

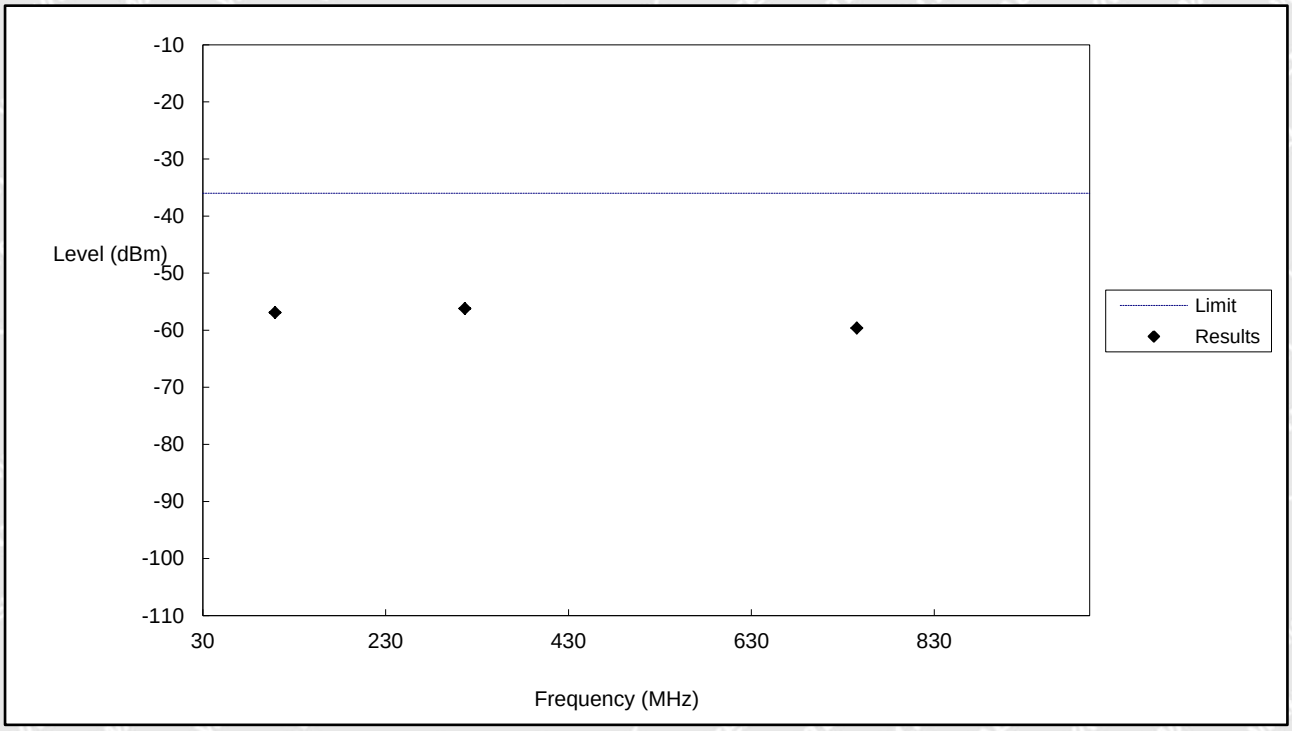
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 8 | | | |
|---|---|---|---|
| Test mode: | Traffic Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 120.83 | -58.24 | -36.00 | -22.24 | RMS |
| 2 | 484.80 | -54.65 | -36.00 | -18.65 | RMS |
| 3 | 617.69 | -59.55 | -36.00 | -23.55 | RMS |

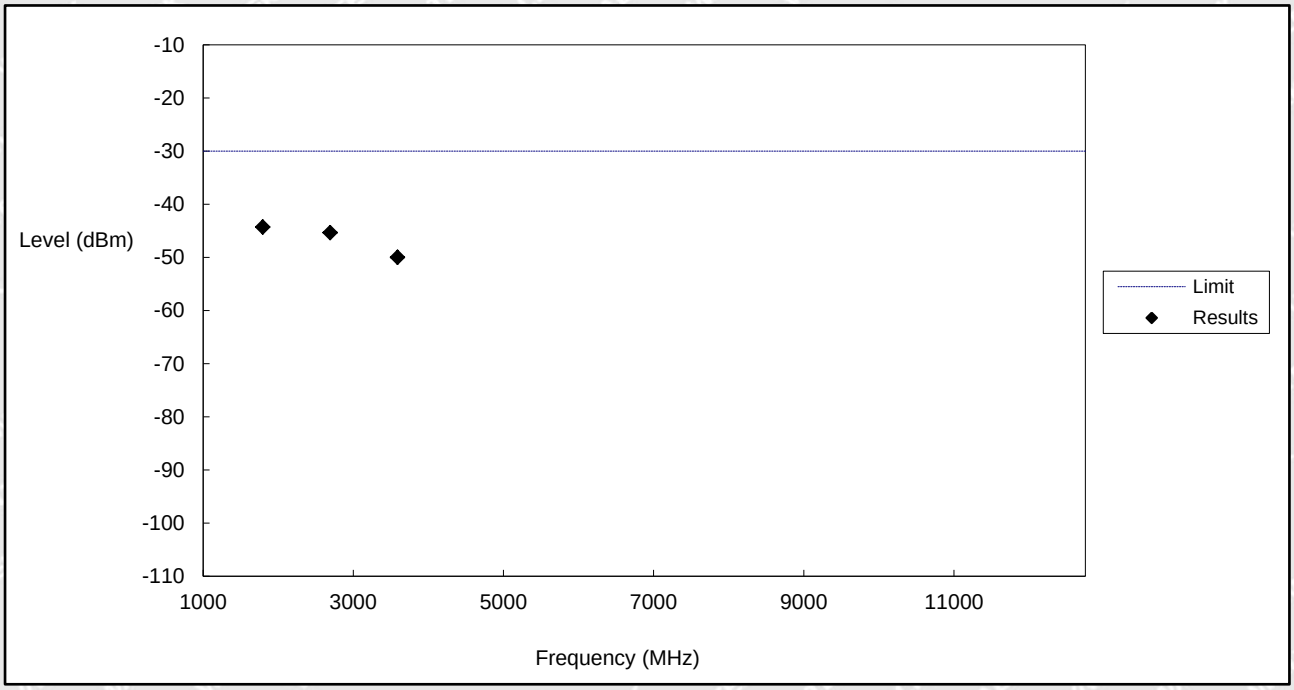
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 109.17 | -56.91 | -36.00 | -20.91 | RMS |
| 2 | 316.80 | -56.20 | -36.00 | -20.20 | RMS |
| 3 | 745.38 | -59.62 | -36.00 | -23.62 | RMS |

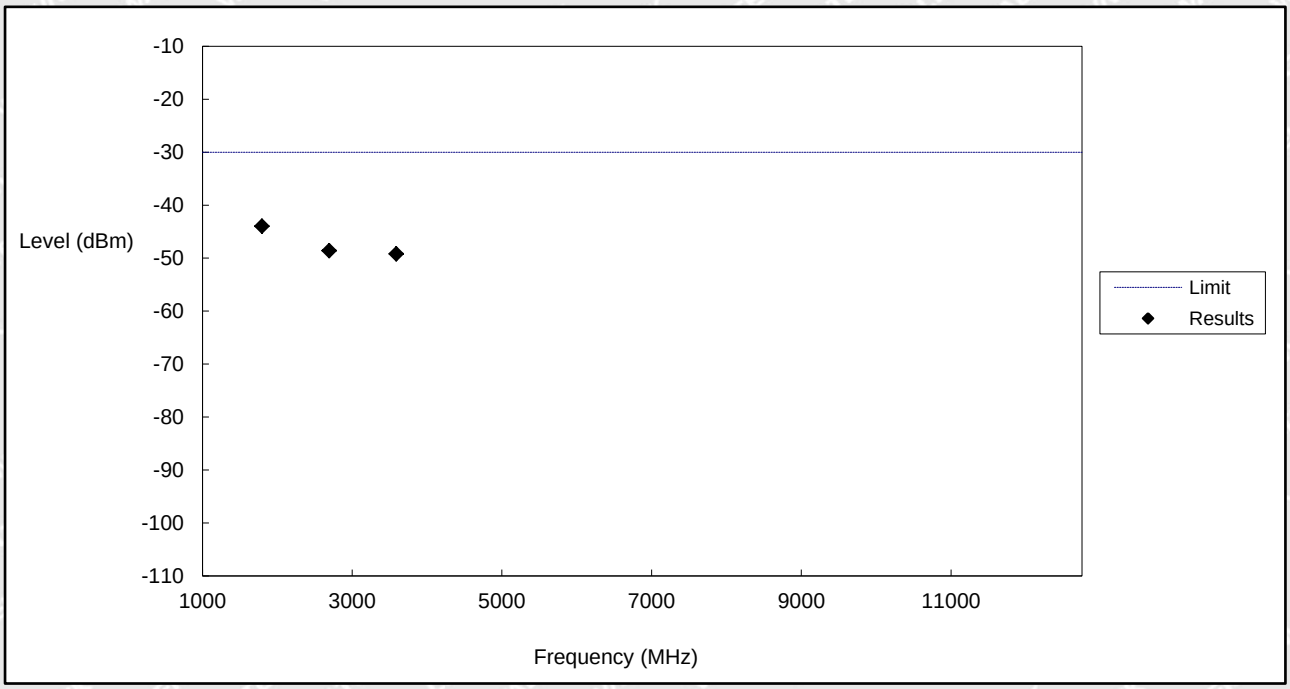
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Traffic Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1795.00 | -44.29 | -30.00 | -14.29 | RMS |
| 2 | 2692.50 | -45.32 | -30.00 | -15.32 | RMS |
| 3 | 3590.00 | -49.98 | -30.00 | -19.98 | RMS |

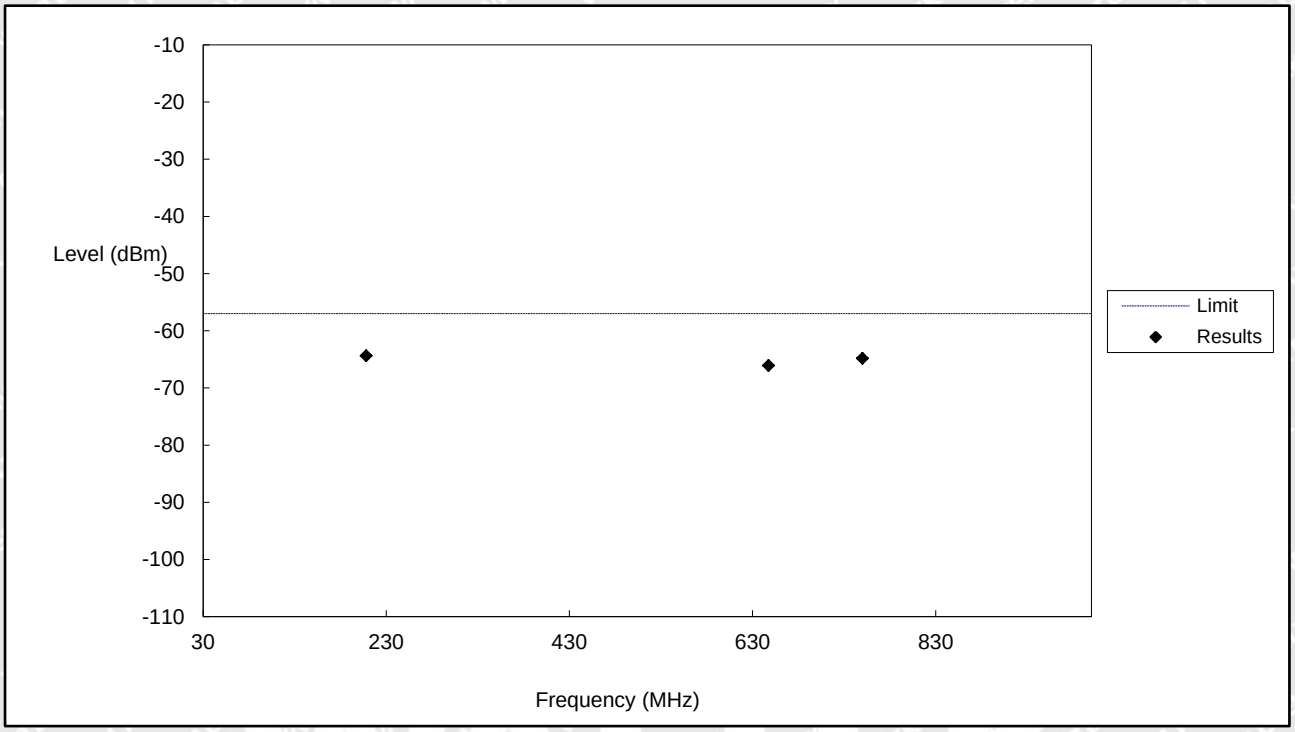
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1795.00 | -44.00 | -30.00 | -14.00 | RMS |
| 2 | 2692.50 | -48.60 | -30.00 | -18.60 | RMS |
| 3 | 3590.00 | -49.21 | -30.00 | -19.21 | RMS |

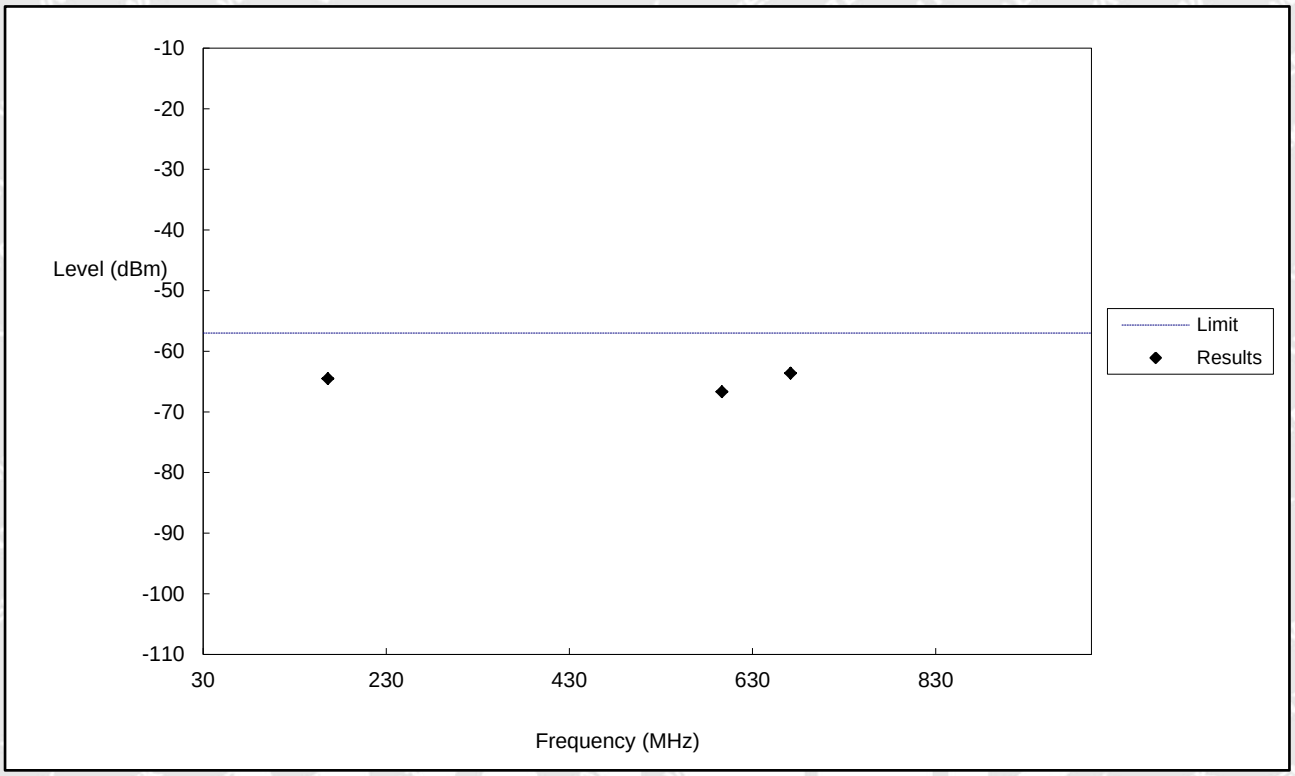
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 8 | | | |
|---|---|---|---|
| Test mode: | Idle Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 208.18 | -64.37 | -57.00 | -7.37 | RMS |
| 2 | 647.50 | -66.07 | -57.00 | -9.07 | RMS |
| 3 | 750.00 | -64.83 | -57.00 | -7.83 | RMS |

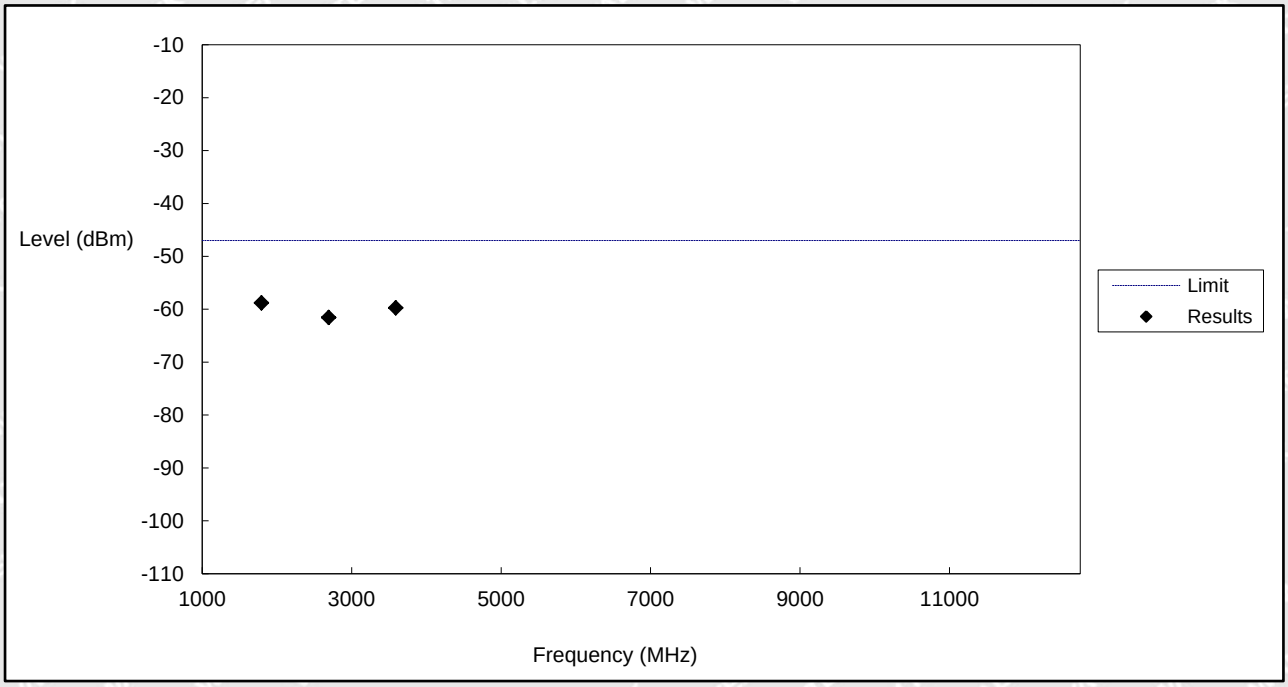
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 166.36 | -64.53 | -57.00 | -7.53 | RMS |
| 2 | 596.67 | -66.70 | -57.00 | -9.70 | RMS |
| 3 | 671.67 | -63.63 | -57.00 | -6.63 | RMS |

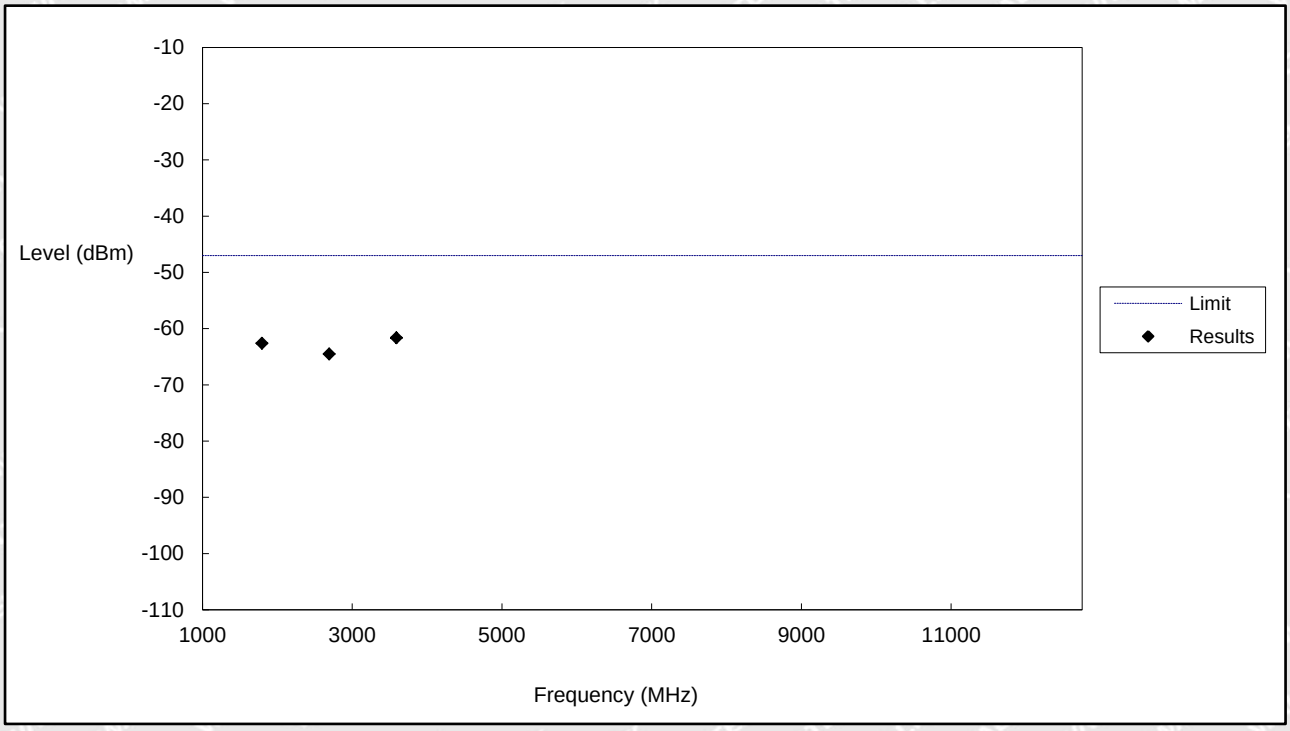
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Idle Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1795.00 | -58.83 | -47.00 | -11.83 | RMS |
| 2 | 2692.50 | -61.58 | -47.00 | -14.58 | RMS |
| 3 | 3590.00 | -59.77 | -47.00 | -12.77 | RMS |

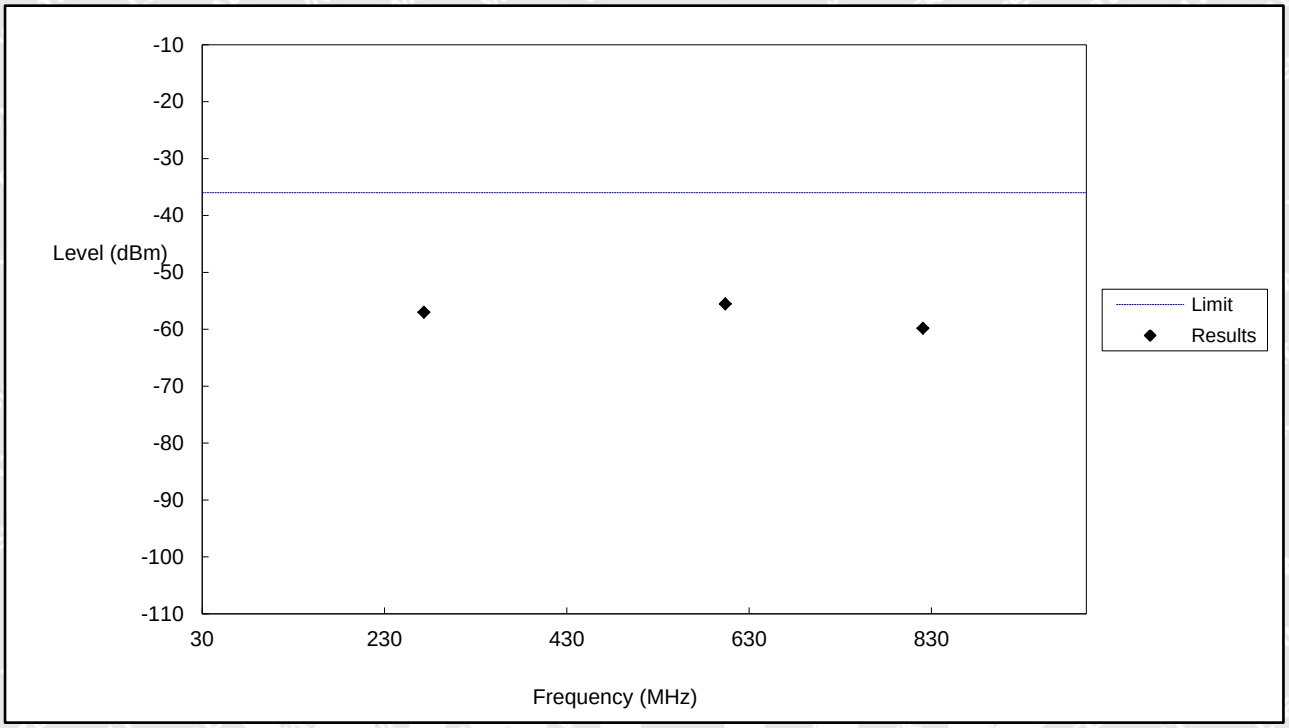
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1795.00 | -62.61 | -47.00 | -15.61 | RMS |
| 2 | 2692.50 | -64.52 | -47.00 | -17.52 | RMS |
| 3 | 3590.00 | -61.67 | -47.00 | -14.67 | RMS |

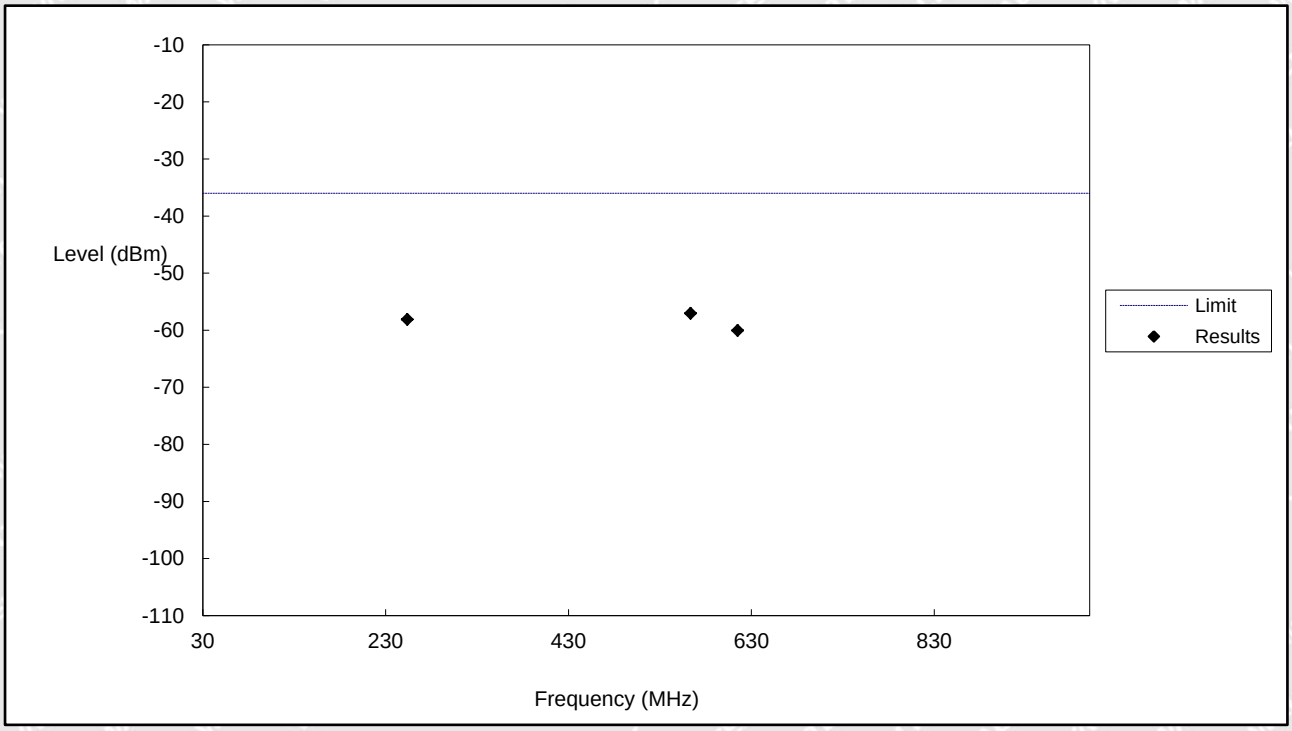
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 20 | | | |
|---|---|---|---|
| Test mode: | Traffic Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 273.33 | -57.01 | -36.00 | -21.01 | RMS |
| 2 | 604.00 | -55.57 | -36.00 | -19.57 | RMS |
| 3 | 820.77 | -59.84 | -36.00 | -23.84 | RMS |

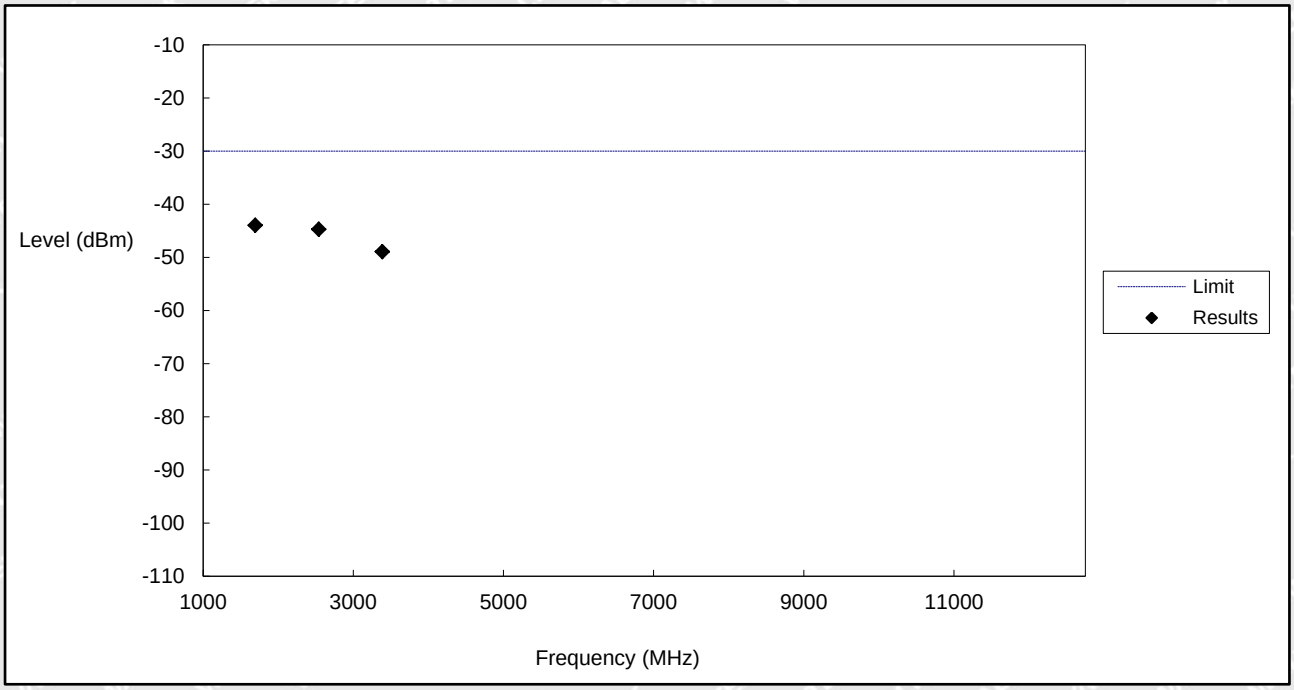
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 253.64 | -58.11 | -36.00 | -22.11 | RMS |
| 2 | 615.00 | -60.06 | -36.00 | -24.06 | RMS |
| 3 | 563.57 | -57.05 | -36.00 | -21.05 | RMS |

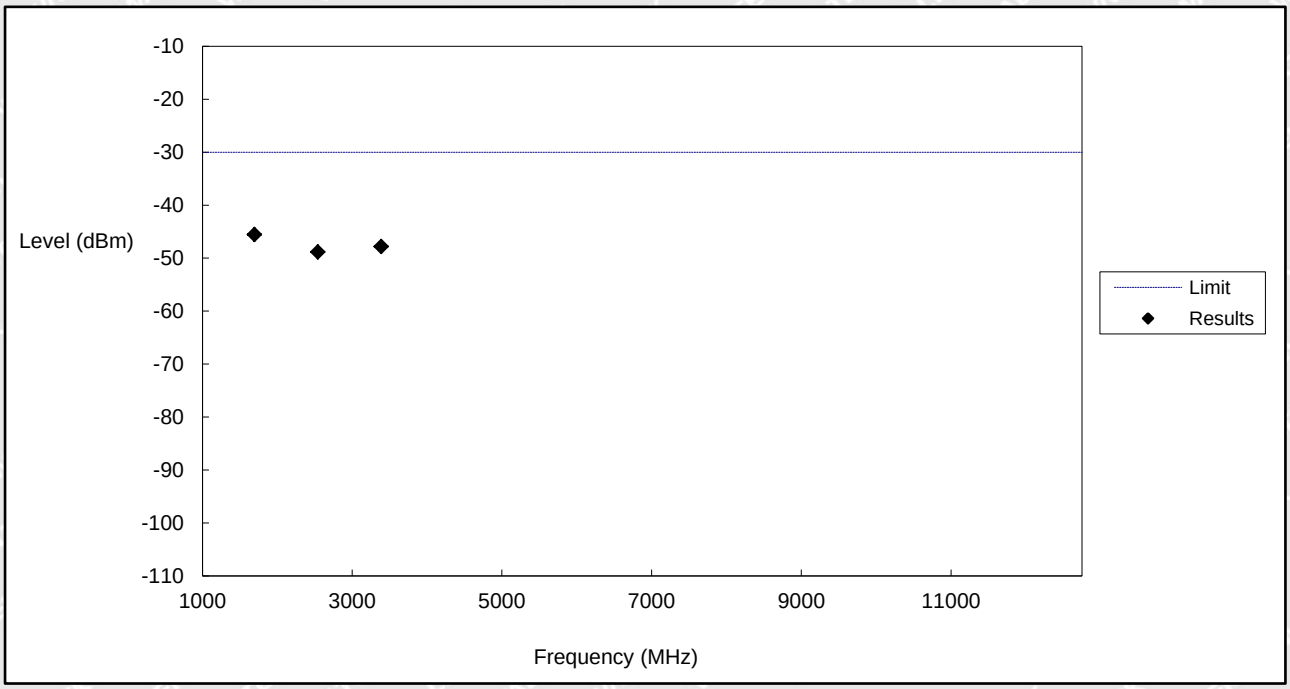
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Traffic Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1694.00 | -43.94 | -30.00 | -13.94 | RMS |
| 2 | 2541.00 | -44.70 | -30.00 | -14.70 | RMS |
| 3 | 3388.00 | -48.91 | -30.00 | -18.91 | RMS |

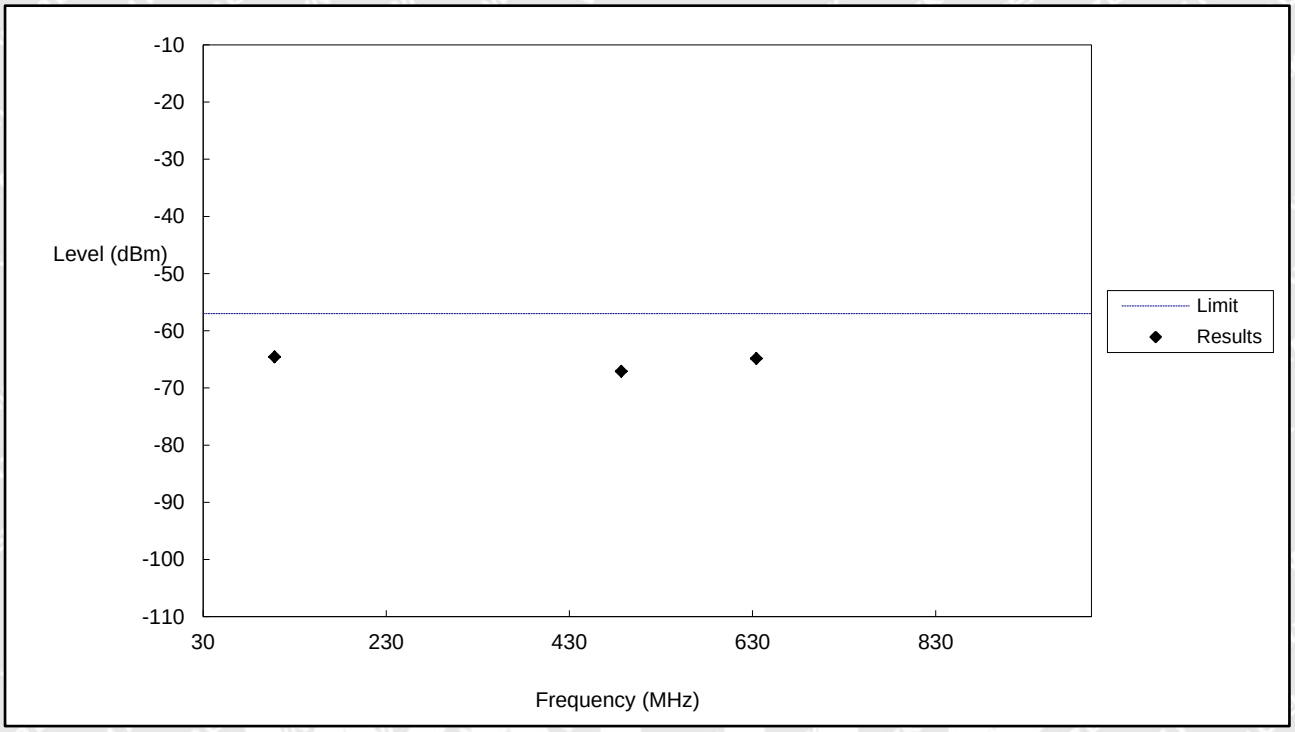
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1694.00 | -45.56 | -30.00 | -15.56 | RMS |
| 2 | 2541.00 | -48.85 | -30.00 | -18.85 | RMS |
| 3 | 3388.00 | -47.84 | -30.00 | -17.84 | RMS |

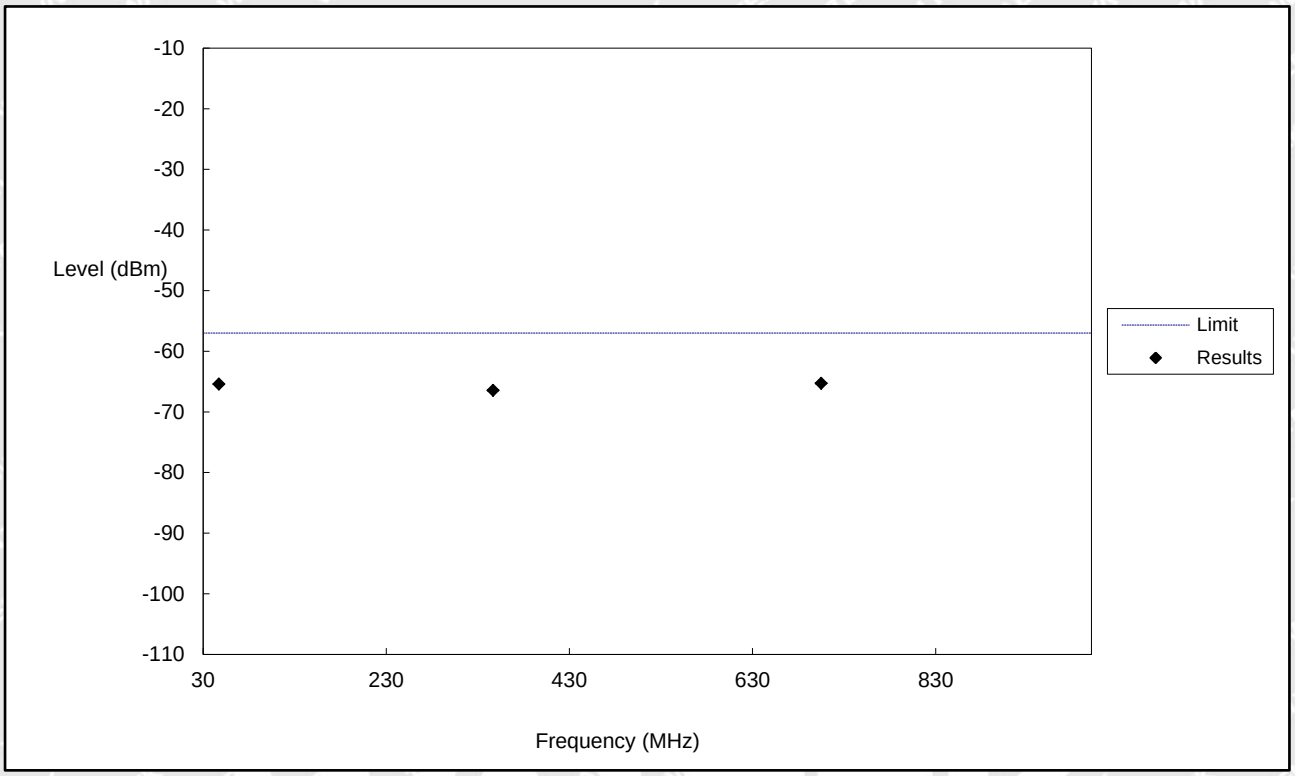
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 20 | | | |
|---|---|---|---|
| Test mode: | Idle Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 108.18 | -64.57 | -57.00 | -7.57 | RMS |
| 2 | 486.67 | -67.09 | -57.00 | -10.09 | RMS |
| 3 | 634.17 | -64.85 | -57.00 | -7.85 | RMS |

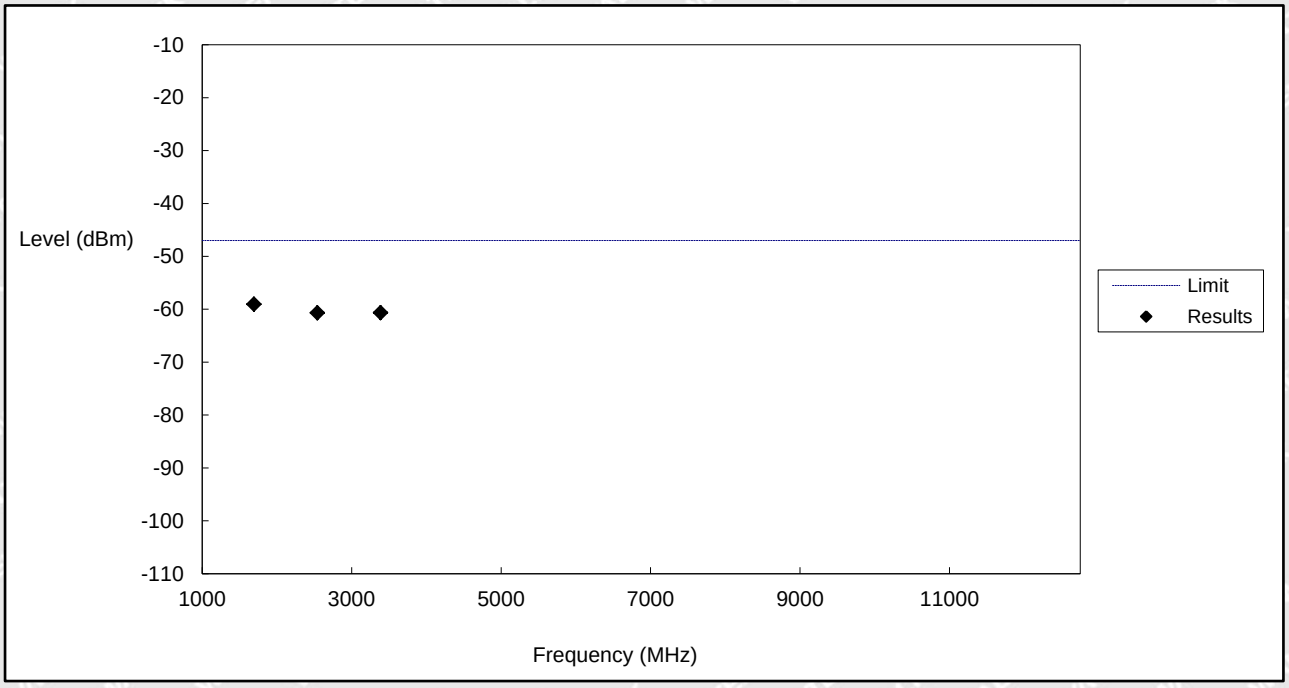
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 47.27 | -65.43 | -57.00 | -8.43 | RMS |
| 2 | 346.67 | -66.45 | -57.00 | -9.45 | RMS |
| 3 | 705.00 | -65.30 | -57.00 | -8.30 | RMS |

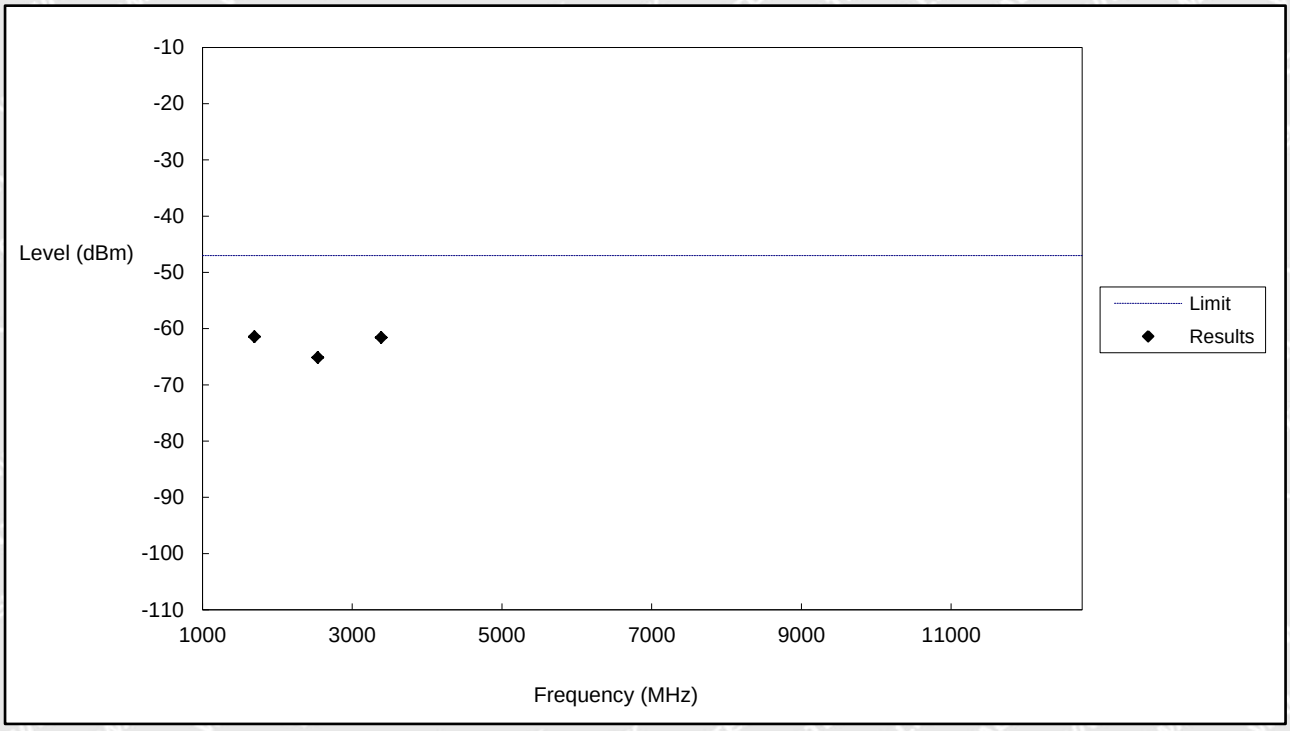
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Idle Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1694.00 | -59.07 | -47.00 | -12.07 | RMS |
| 2 | 2541.00 | -60.71 | -47.00 | -13.71 | RMS |
| 3 | 3388.00 | -60.66 | -47.00 | -13.66 | RMS |

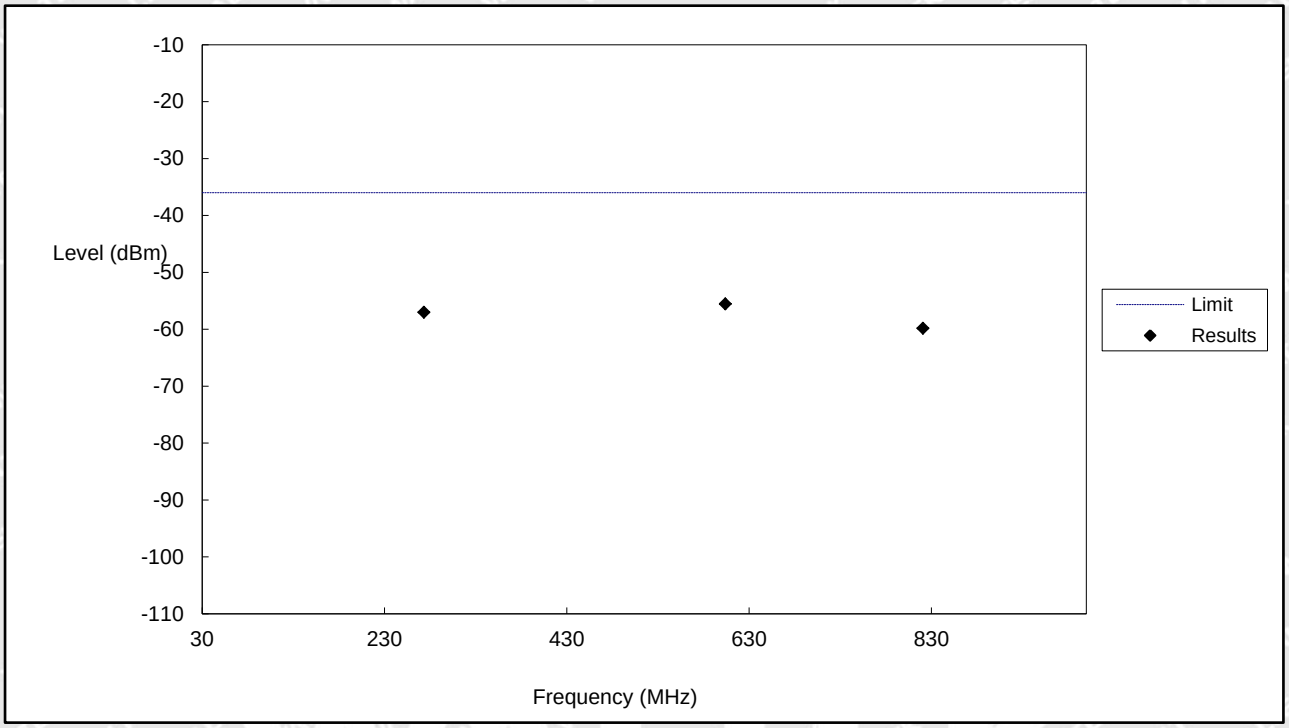
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1694.00 | -61.45 | -47.00 | -14.45 | RMS |
| 2 | 2541.00 | -65.17 | -47.00 | -18.17 | RMS |
| 3 | 3388.00 | -61.59 | -47.00 | -14.59 | RMS |

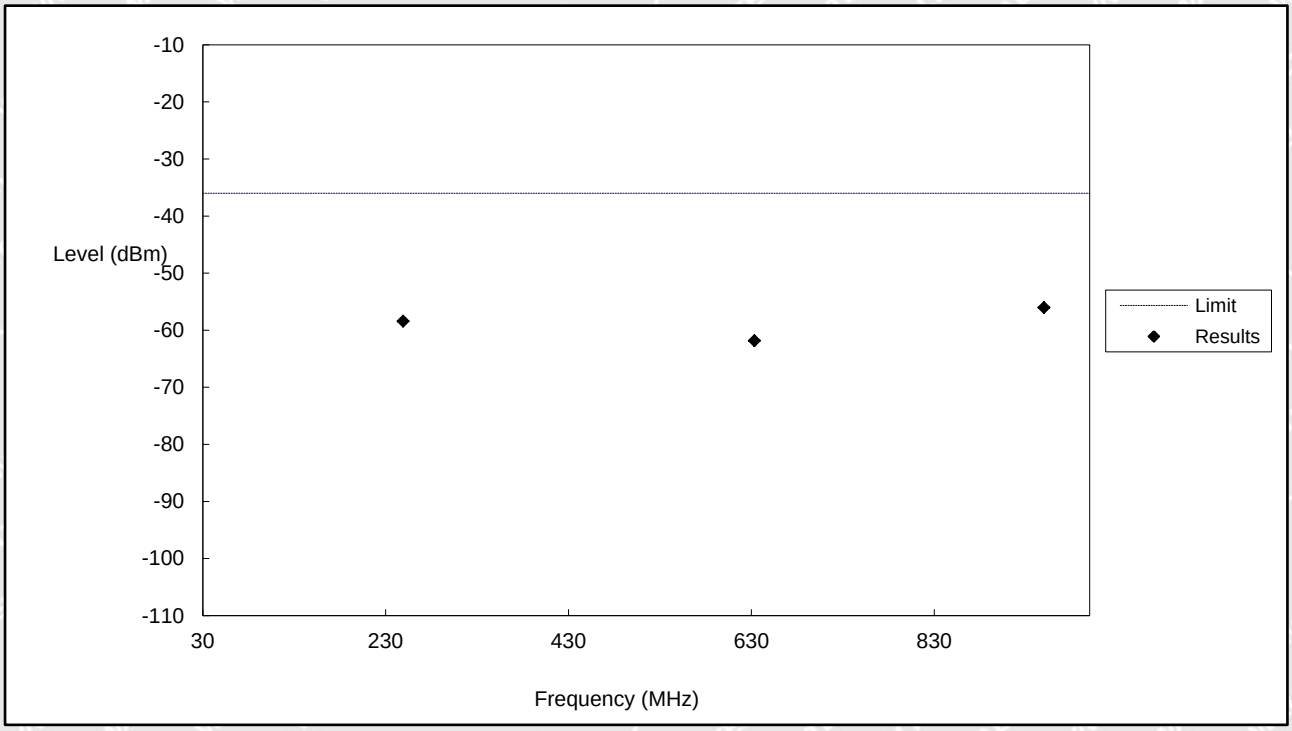
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 28 | | | |
|---|---|---|---|
| Test mode: | Traffic Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 65.83 | -57.97 | -36.00 | -21.97 | RMS |
| 2 | 367.20 | -55.35 | -36.00 | -19.35 | RMS |
| 3 | 639.23 | -60.39 | -36.00 | -24.39 | RMS |

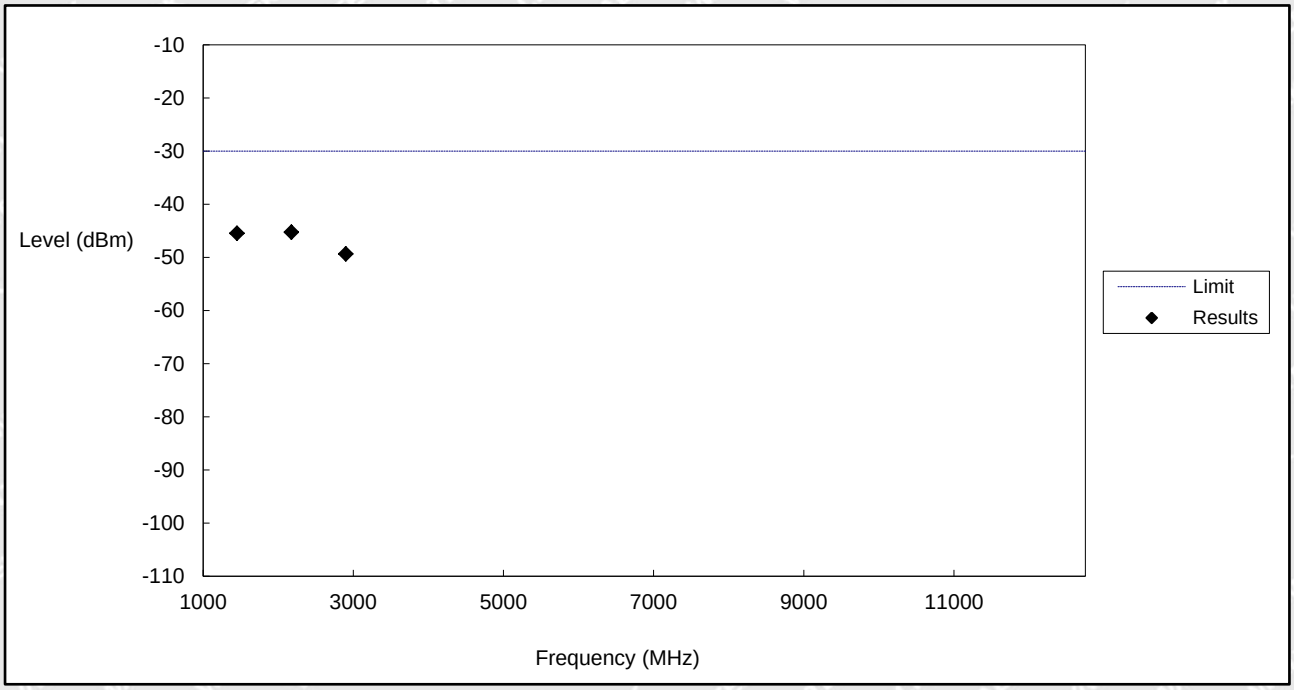
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 249.09 | -58.41 | -36.00 | -22.41 | RMS |
| 2 | 633.33 | -61.84 | -36.00 | -25.84 | RMS |
| 3 | 950.00 | -56.04 | -36.00 | -20.04 | RMS |

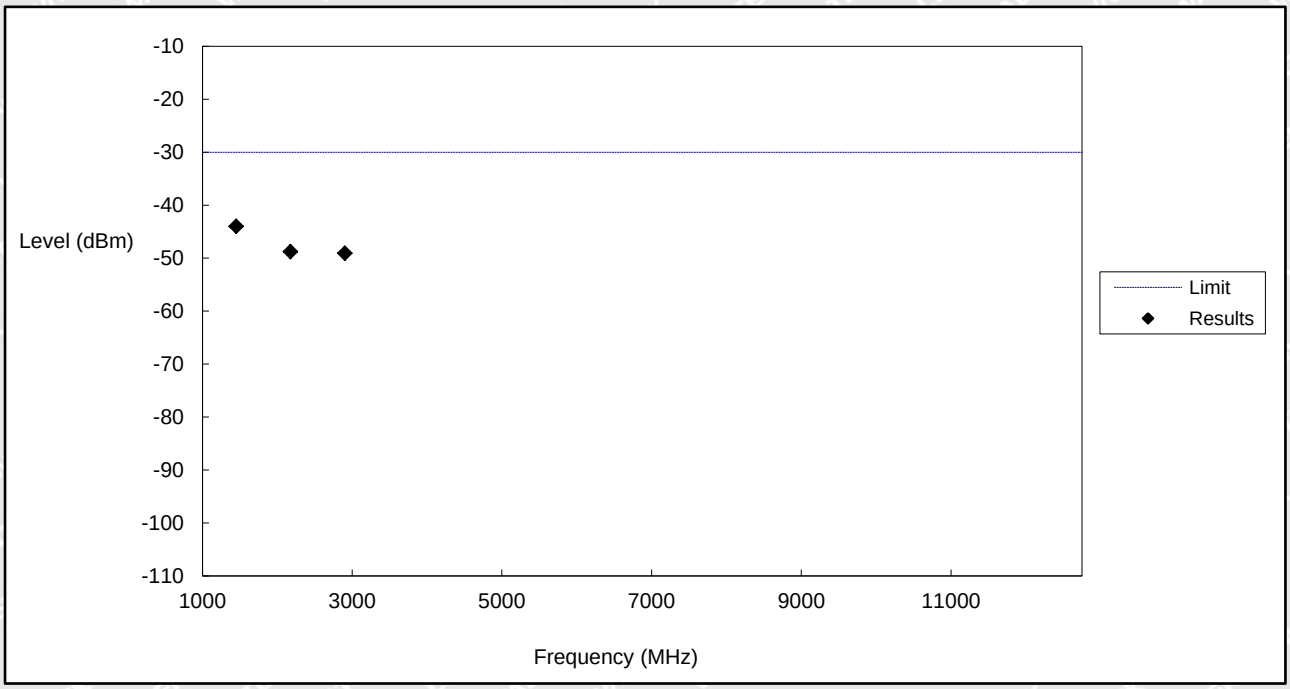
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Traffic Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1451.00 | -45.45 | -30.00 | -15.45 | RMS |
| 2 | 2176.50 | -45.23 | -30.00 | -15.23 | RMS |
| 3 | 2902.00 | -49.35 | -30.00 | -19.35 | RMS |

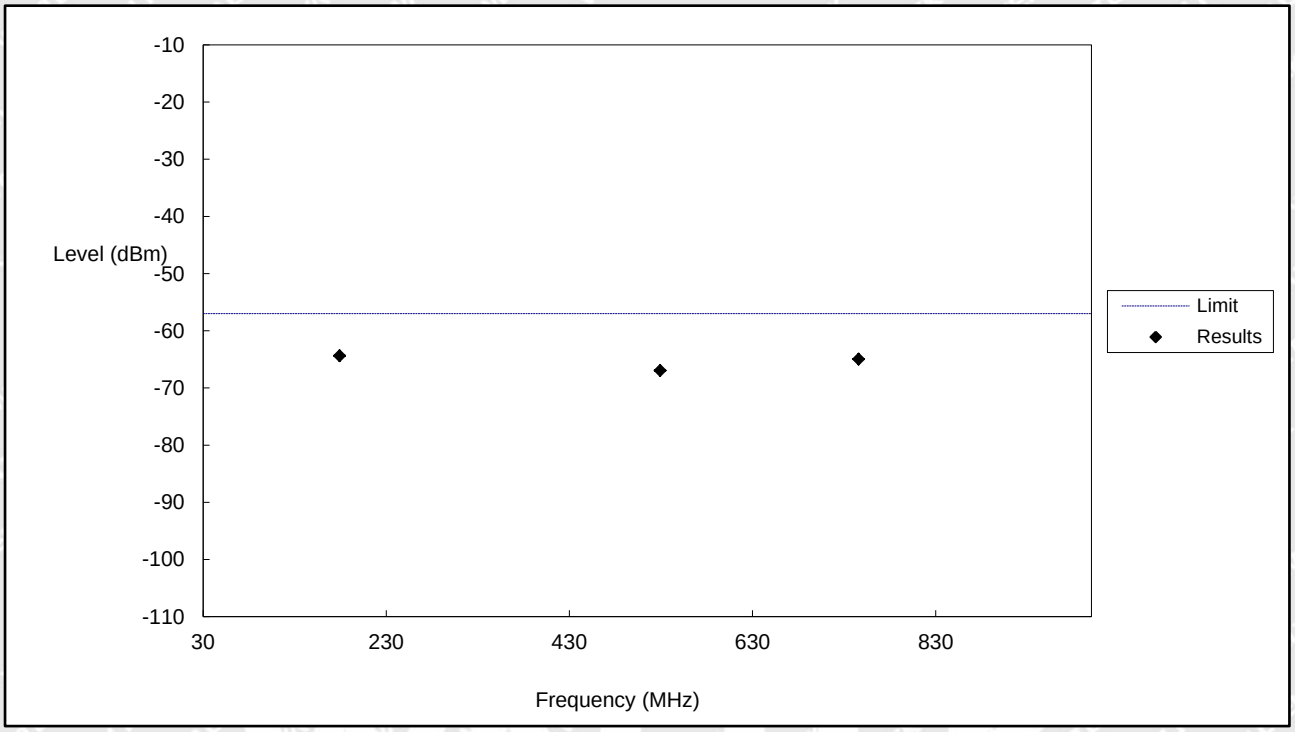
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1451.00 | -44.03 | -30.00 | -14.03 | RMS |
| 2 | 2176.50 | -48.79 | -30.00 | -18.79 | RMS |
| 3 | 2902.00 | -49.10 | -30.00 | -19.10 | RMS |

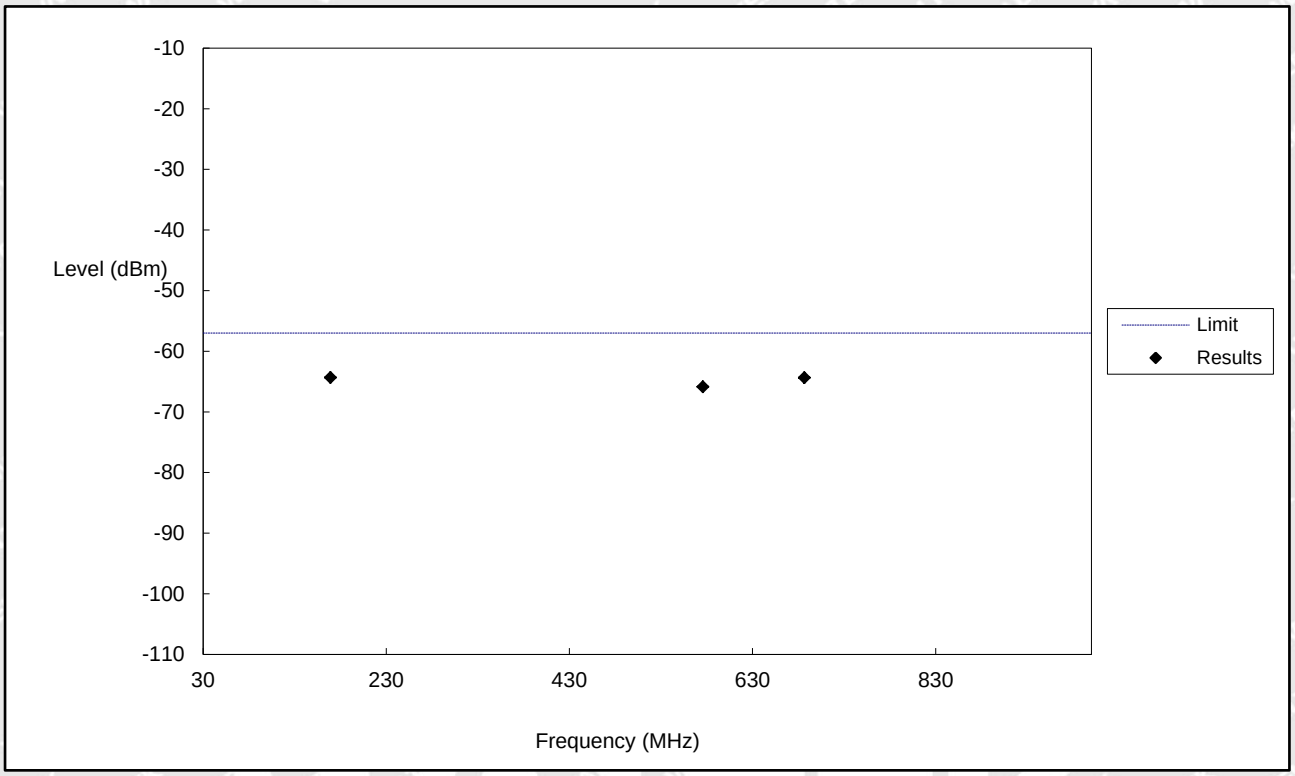
➢ Radiated Spurious Emissions(30MHz-1GHz)

| FDD Band 28 | | | |
|---|---|---|---|
| Test mode: | Idle Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 179.09 | -64.37 | -57.00 | -7.37 | RMS |
| 2 | 529.17 | -66.94 | -57.00 | -9.94 | RMS |
| 3 | 745.83 | -64.96 | -57.00 | -7.96 | RMS |

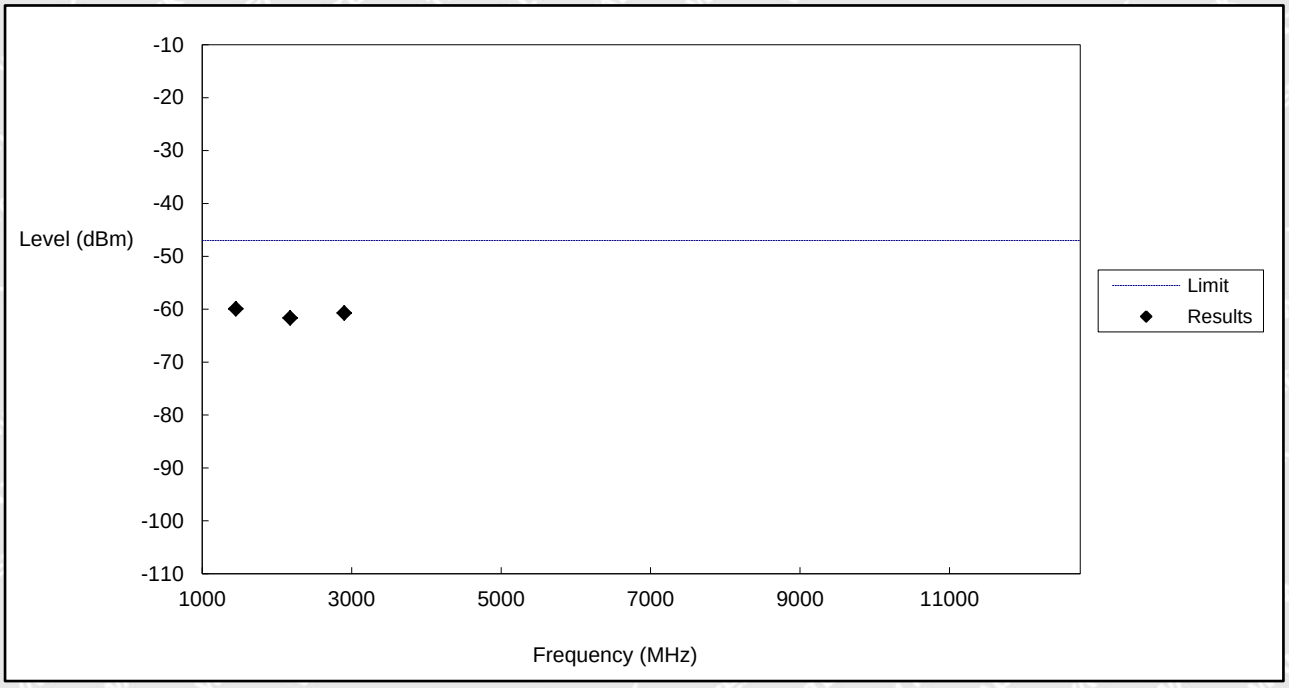
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 169.09 | -64.34 | -57.00 | -7.34 | RMS |
| 2 | 575.83 | -65.88 | -57.00 | -8.88 | RMS |
| 3 | 686.67 | -64.38 | -57.00 | -7.38 | RMS |

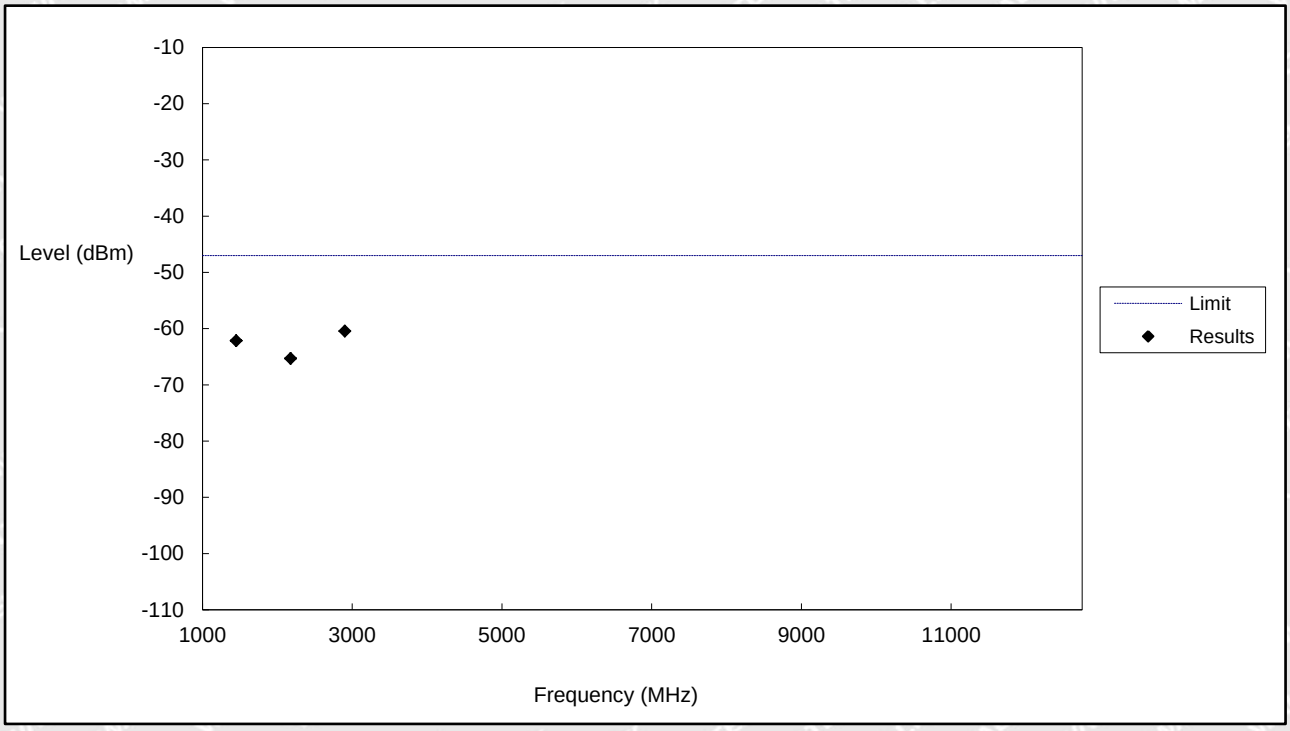
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Idle Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1451.00 | -59.94 | -47.00 | -12.94 | RMS |
| 2 | 2176.50 | -61.66 | -47.00 | -14.66 | RMS |
| 3 | 2902.00 | -60.73 | -47.00 | -13.73 | RMS |

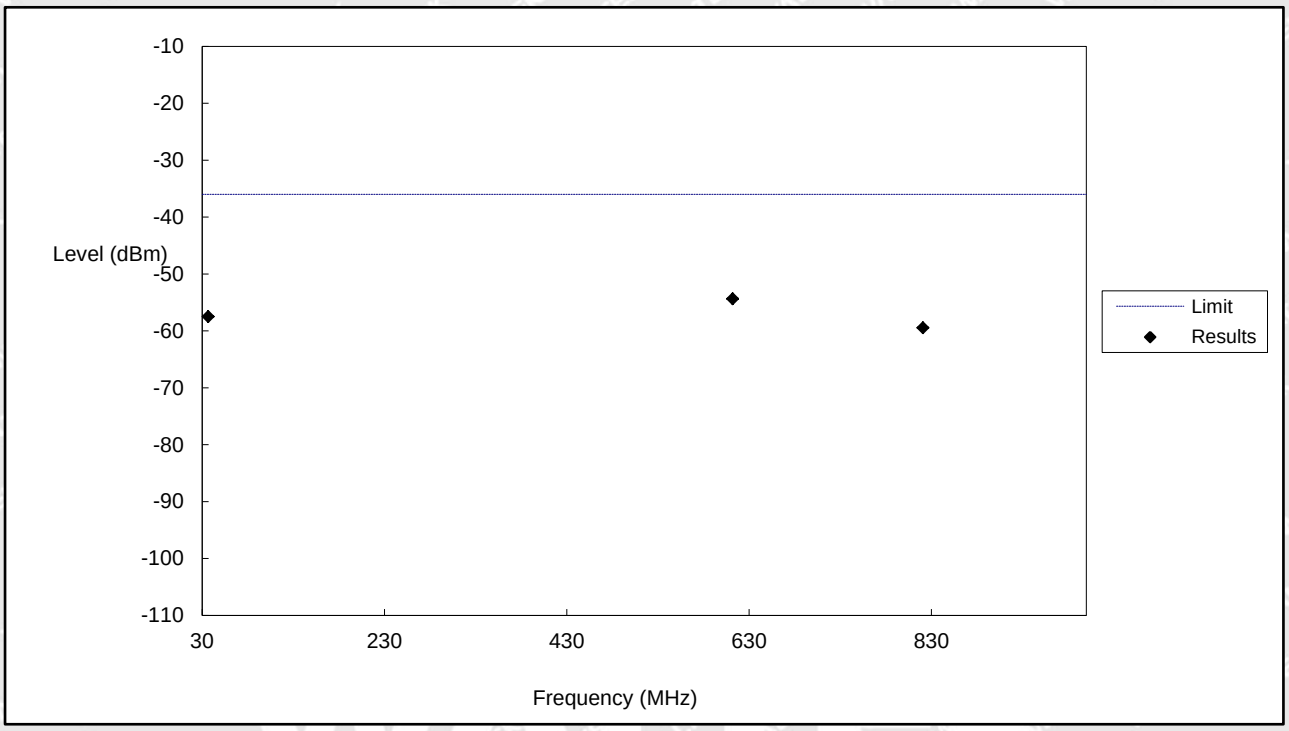
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 1451.00 | -62.18 | -47.00 | -15.18 | RMS |
| 2 | 2176.50 | -65.32 | -47.00 | -18.32 | RMS |
| 3 | 2902.00 | -60.47 | -47.00 | -13.47 | RMS |

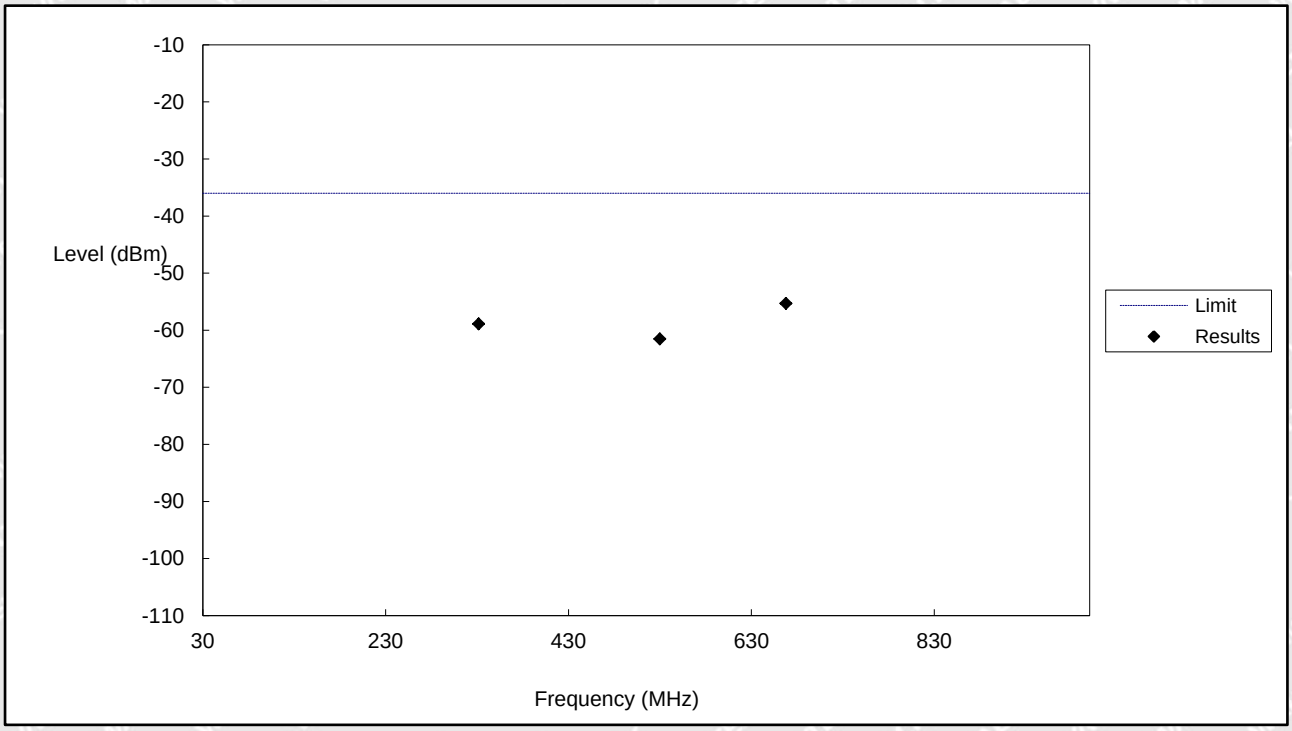
➢ Radiated Spurious Emissions(30MHz-1GHz)

| TDD Band 38 | | | |
|---|---|---|---|
| Test mode: | Traffic Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 36.67 | -57.50 | -36.00 | -21.50 | RMS |
| 2 | 612.00 | -54.37 | -36.00 | -18.37 | RMS |
| 3 | 820.77 | -59.48 | -36.00 | -23.48 | RMS |

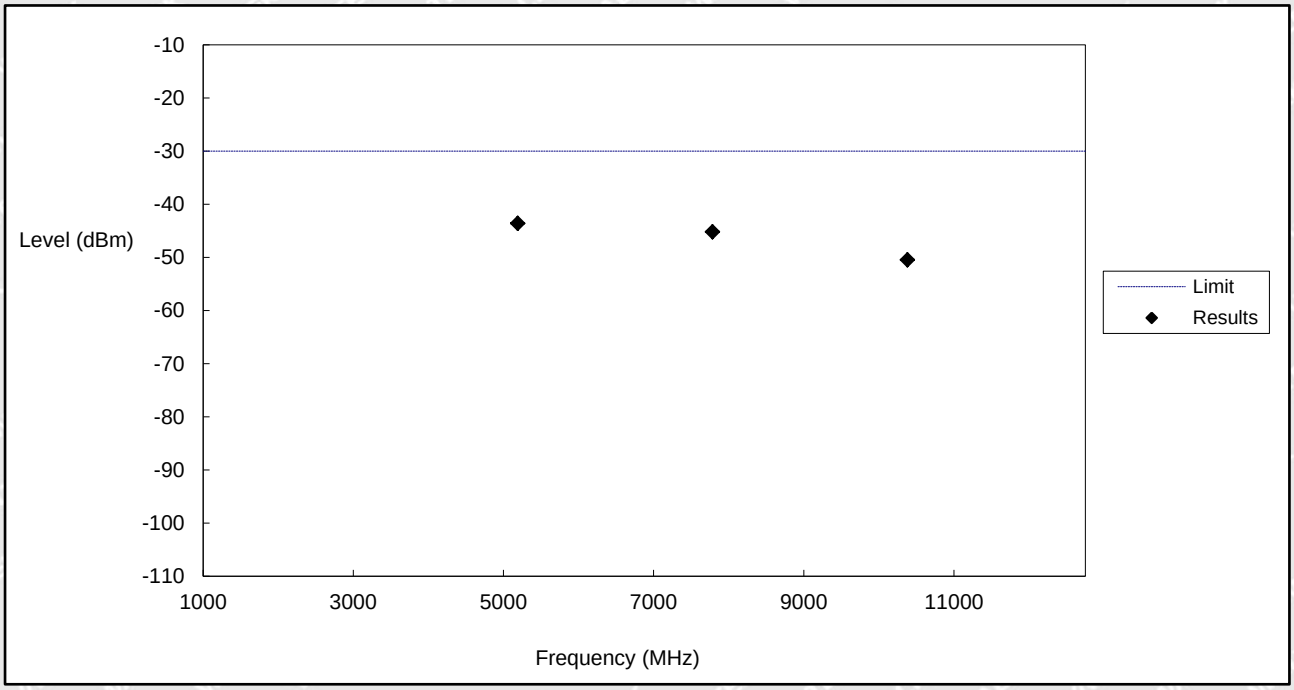
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 331.82 | -58.89 | -36.00 | -22.89 | RMS |
| 2 | 530.00 | -61.53 | -36.00 | -25.53 | RMS |
| 3 | 667.86 | -55.32 | -36.00 | -19.32 | RMS |

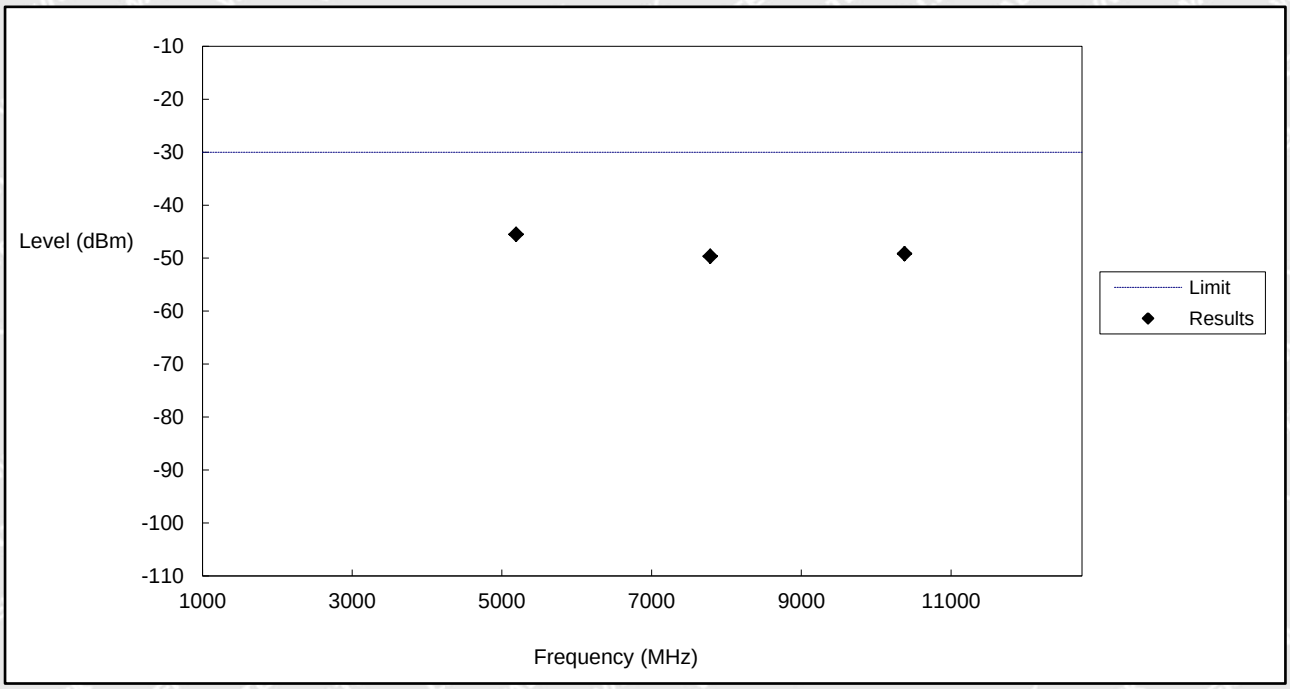
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Traffic Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 5190.00 | -43.59 | -30.00 | -13.59 | RMS |
| 2 | 7785.00 | -45.19 | -30.00 | -15.19 | RMS |
| 3 | 10380.00 | -50.44 | -30.00 | -20.44 | RMS |

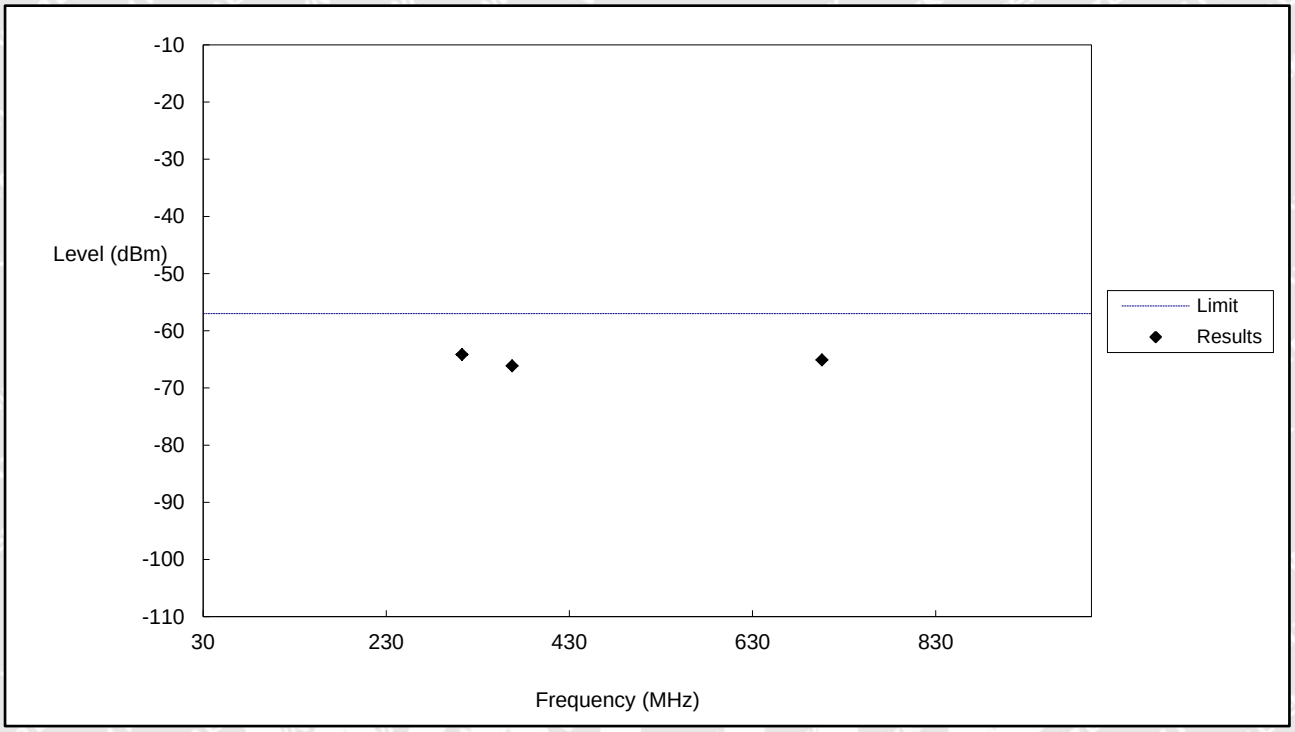
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 5190.00 | -45.53 | -30.00 | -15.53 | RMS |
| 2 | 7785.00 | -49.68 | -30.00 | -19.68 | RMS |
| 3 | 10380.00 | -49.18 | -30.00 | -19.18 | RMS |

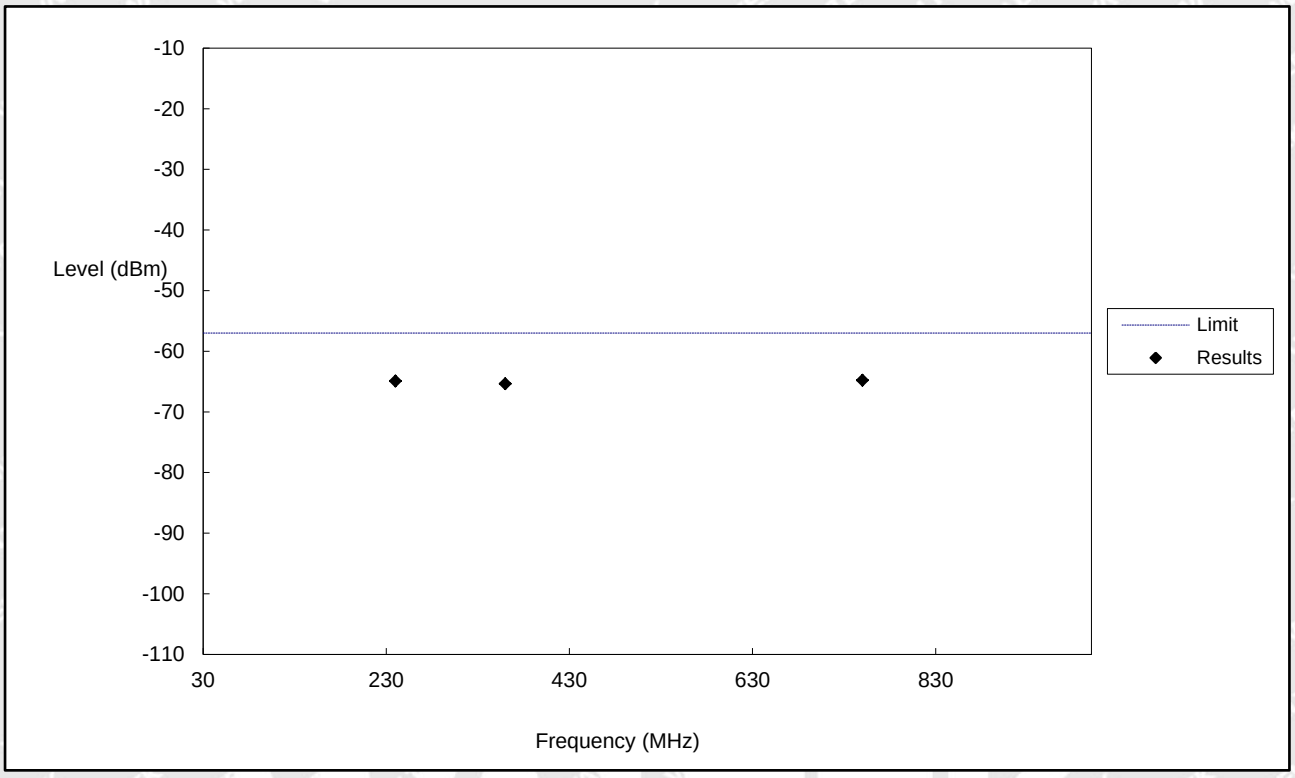
➢ Radiated Spurious Emissions(30MHz-1GHz)

| TDD Band 38 | | | |
|---|---|---|---|
| Test mode: | Idle Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 312.73 | -64.15 | -57.00 | -7.15 | RMS |
| 2 | 367.50 | -66.14 | -57.00 | -9.14 | RMS |
| 3 | 705.83 | -65.10 | -57.00 | -8.10 | RMS |

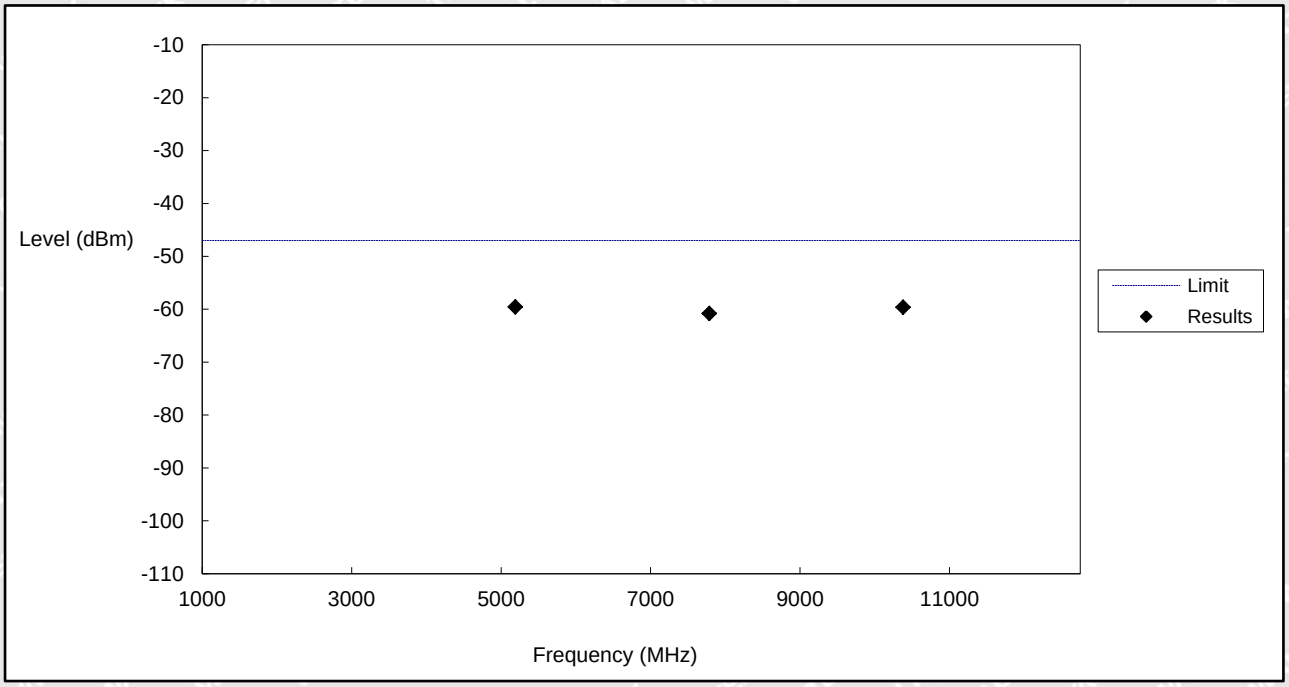
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 240.00 | -64.94 | -57.00 | -7.94 | RMS |
| 2 | 360.00 | -65.37 | -57.00 | -8.37 | RMS |
| 3 | 750.00 | -64.80 | -57.00 | -7.80 | RMS |

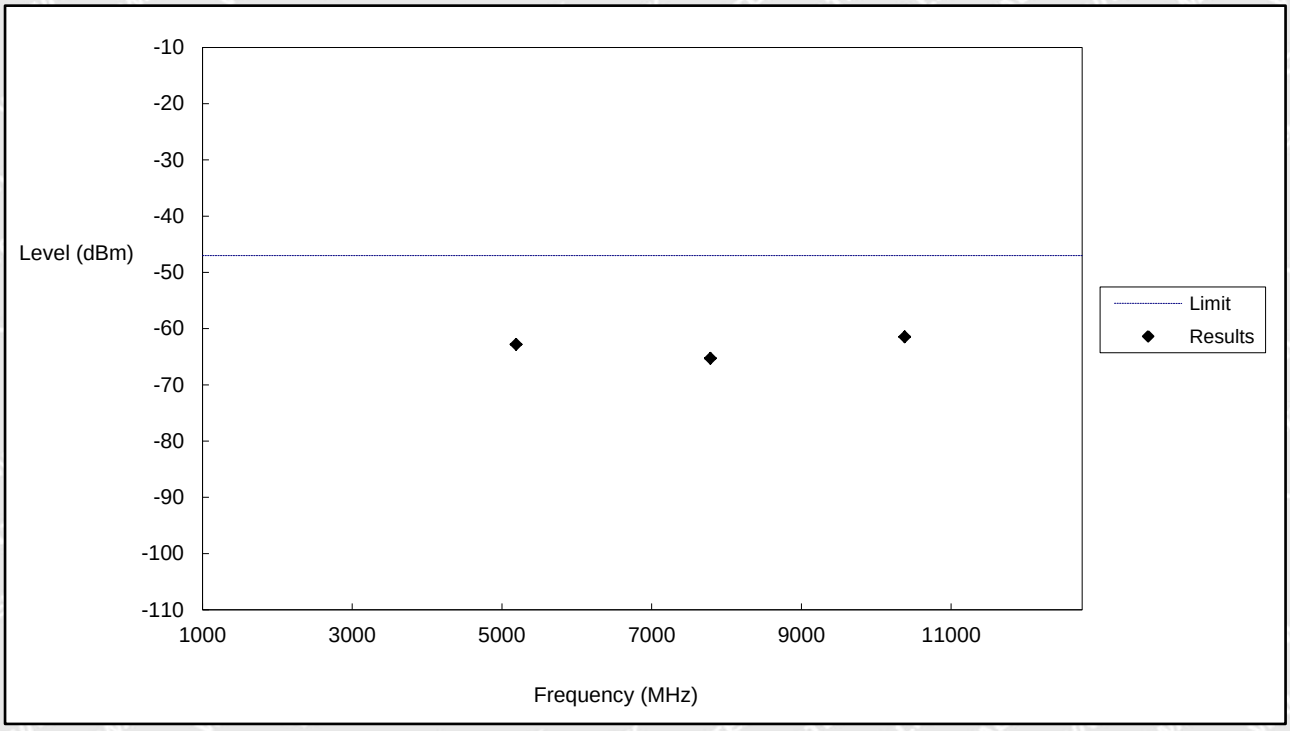
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Idle Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 5190.00 | -59.58 | -47.00 | -12.58 | RMS |
| 2 | 7785.00 | -60.81 | -47.00 | -13.81 | RMS |
| 3 | 10380.00 | -59.63 | -47.00 | -12.63 | RMS |

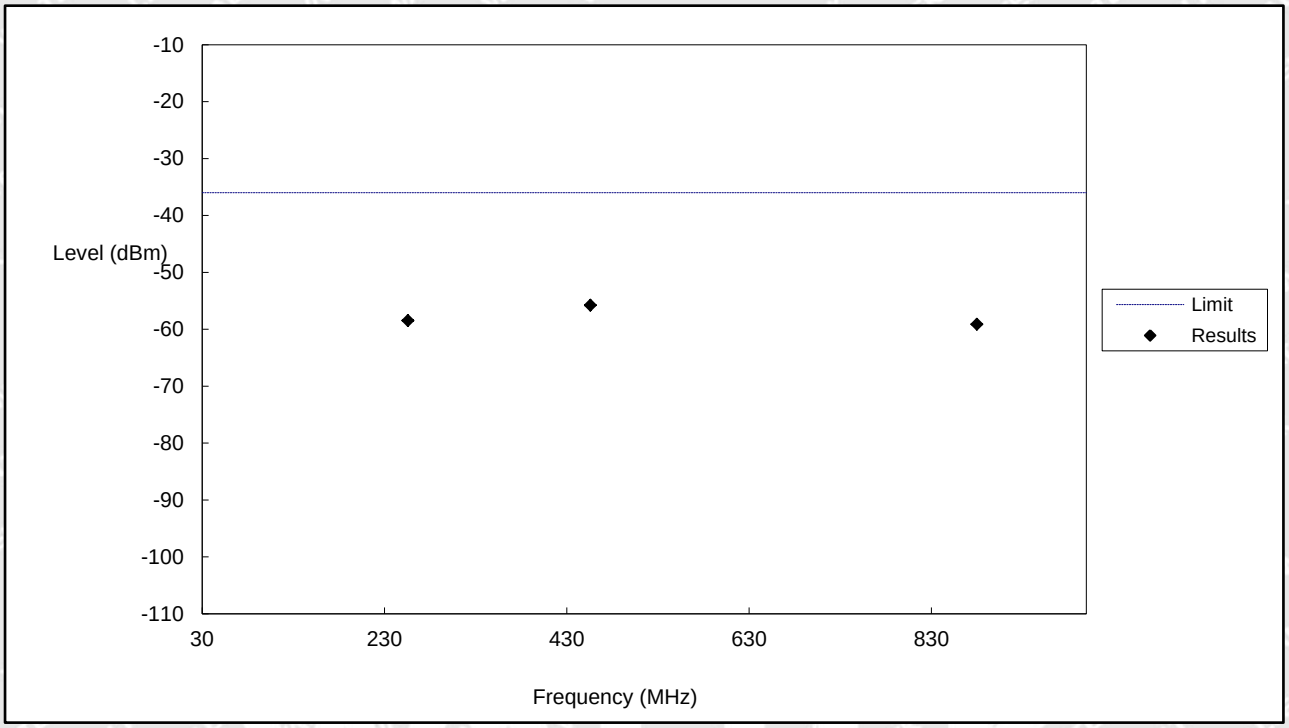
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 5190.00 | -62.83 | -47.00 | -15.83 | RMS |
| 2 | 7785.00 | -65.29 | -47.00 | -18.29 | RMS |
| 3 | 10380.00 | -61.48 | -47.00 | -14.48 | RMS |

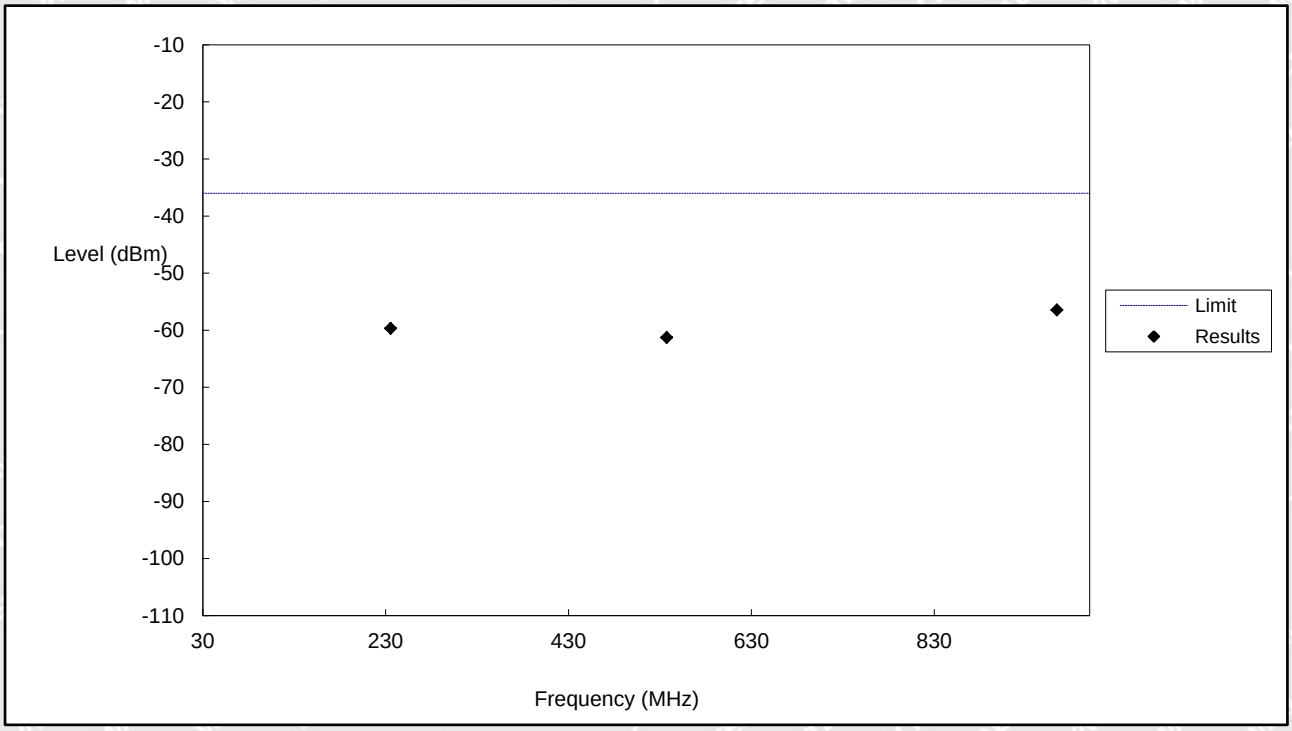
- Radiated Spurious Emissions(30MHz-1GHz)

| TDD Band 40 | | | |
|---|---|---|---|
| Test mode: | Traffic Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 255.83 | -58.47 | -36.00 | -22.47 | RMS |
| 2 | 456.00 | -55.78 | -36.00 | -19.78 | RMS |
| 3 | 880.00 | -59.13 | -36.00 | -23.13 | RMS |

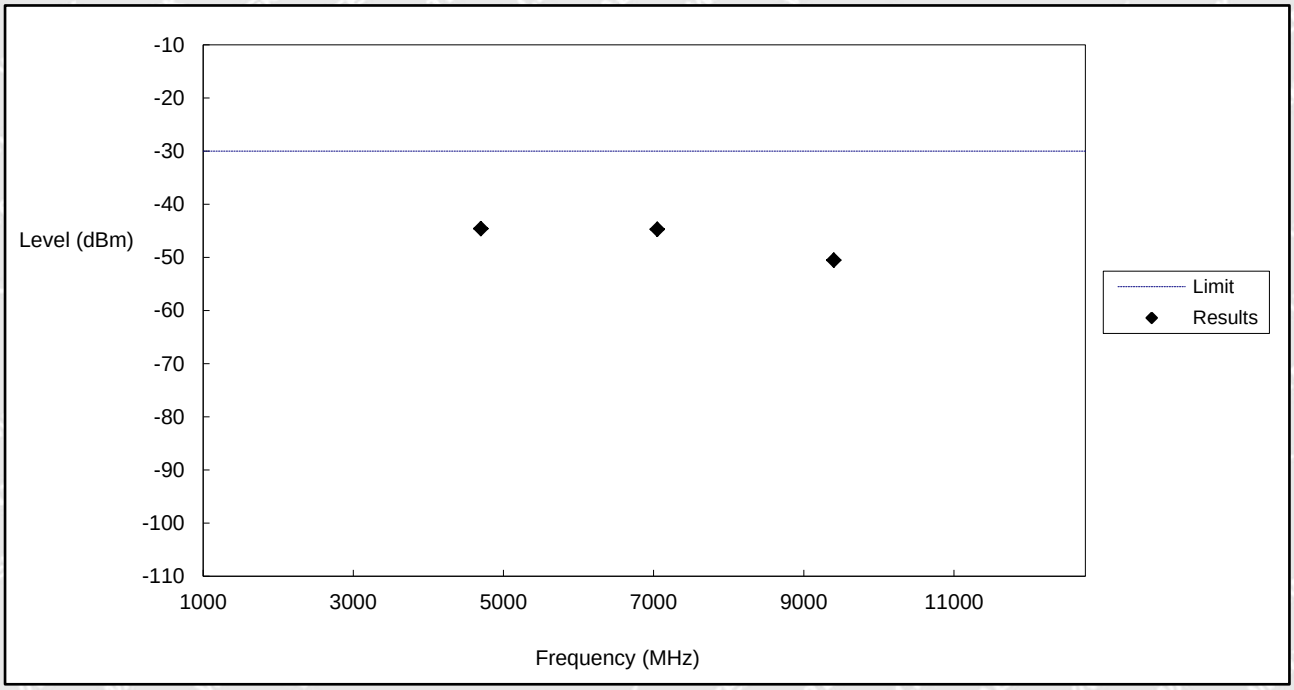
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 235.45 | -59.69 | -36.00 | -23.69 | RMS |
| 2 | 537.50 | -61.27 | -36.00 | -25.27 | RMS |
| 3 | 964.29 | -56.46 | -36.00 | -20.46 | RMS |

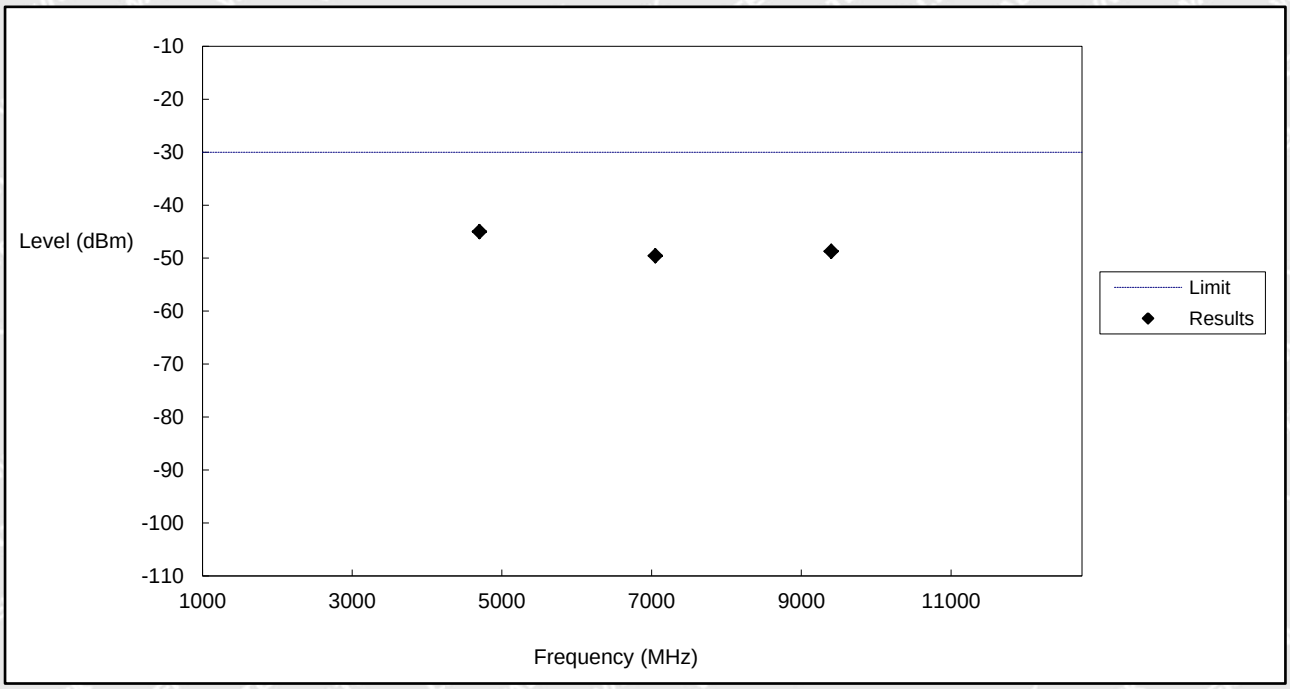
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Traffic Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 4700.00 | -44.58 | -30.00 | -14.58 | RMS |
| 2 | 7050.00 | -44.69 | -30.00 | -14.69 | RMS |
| 3 | 9400.00 | -50.50 | -30.00 | -20.50 | RMS |

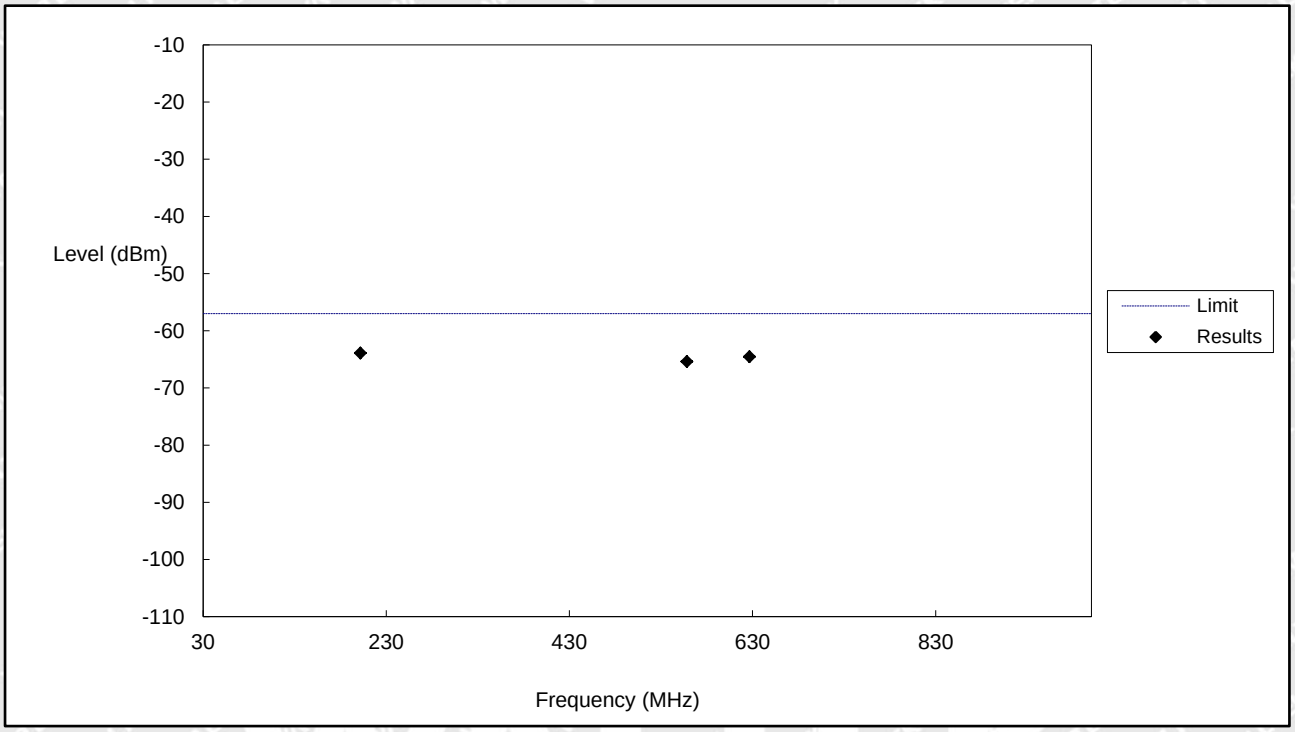
| Test mode: | Traffic Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 4700.00 | -45.03 | -30.00 | -15.03 | RMS |
| 2 | 7050.00 | -49.57 | -30.00 | -19.57 | RMS |
| 3 | 9400.00 | -48.74 | -30.00 | -18.74 | RMS |

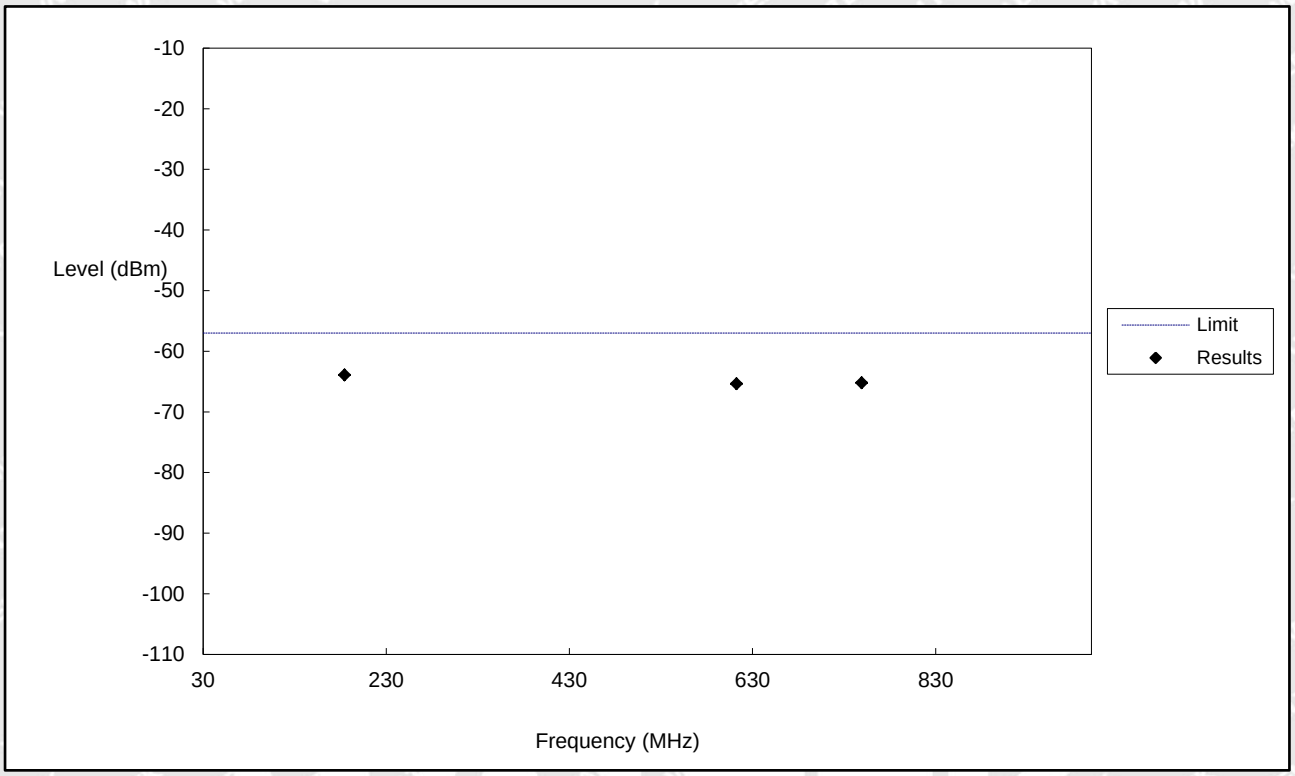
➢ Radiated Spurious Emissions(30MHz-1GHz)

| TDD Band 40 | | | |
|---|---|---|---|
| Test mode: | Idle Mode | Polarity: | Horizontal |




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 201.82 | -63.89 | -57.00 | -6.89 | RMS |
| 2 | 558.33 | -65.37 | -57.00 | -8.37 | RMS |
| 3 | 626.67 | -64.55 | -57.00 | -7.55 | RMS |

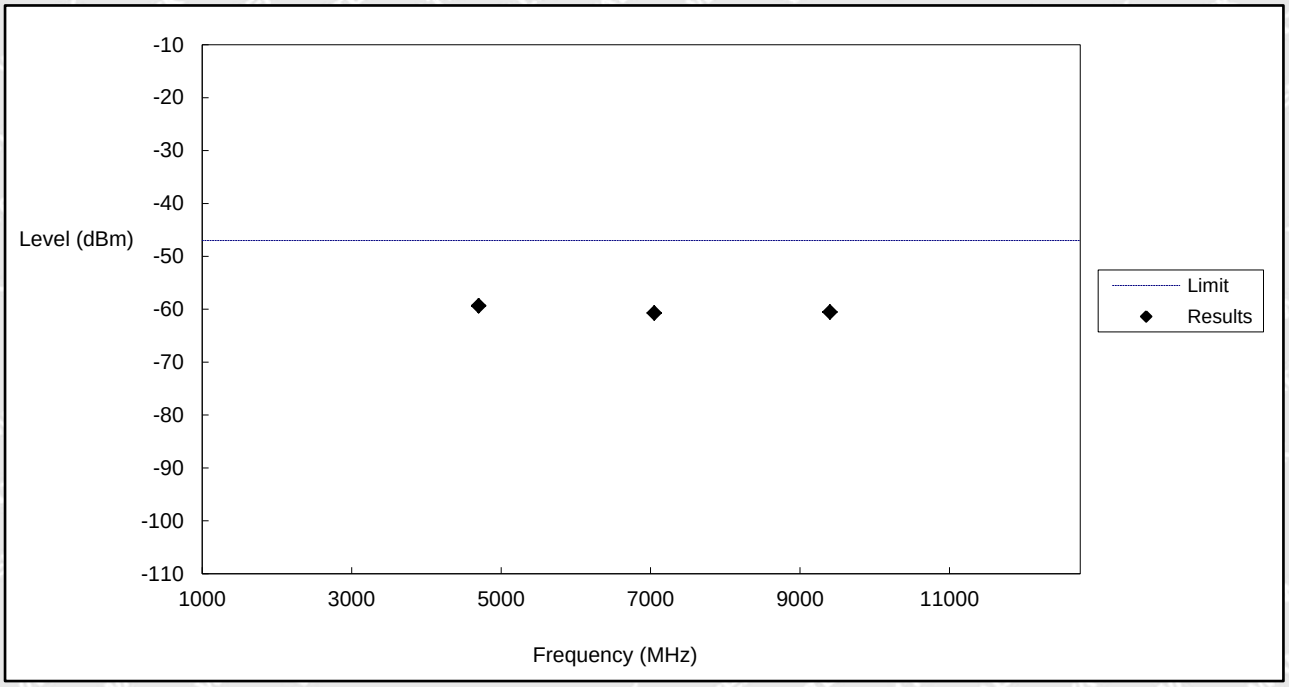
| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 184.55 | -63.92 | -57.00 | -6.92 | RMS |
| 2 | 612.50 | -65.38 | -57.00 | -8.38 | RMS |
| 3 | 749.17 | -65.23 | -57.00 | -8.23 | RMS |

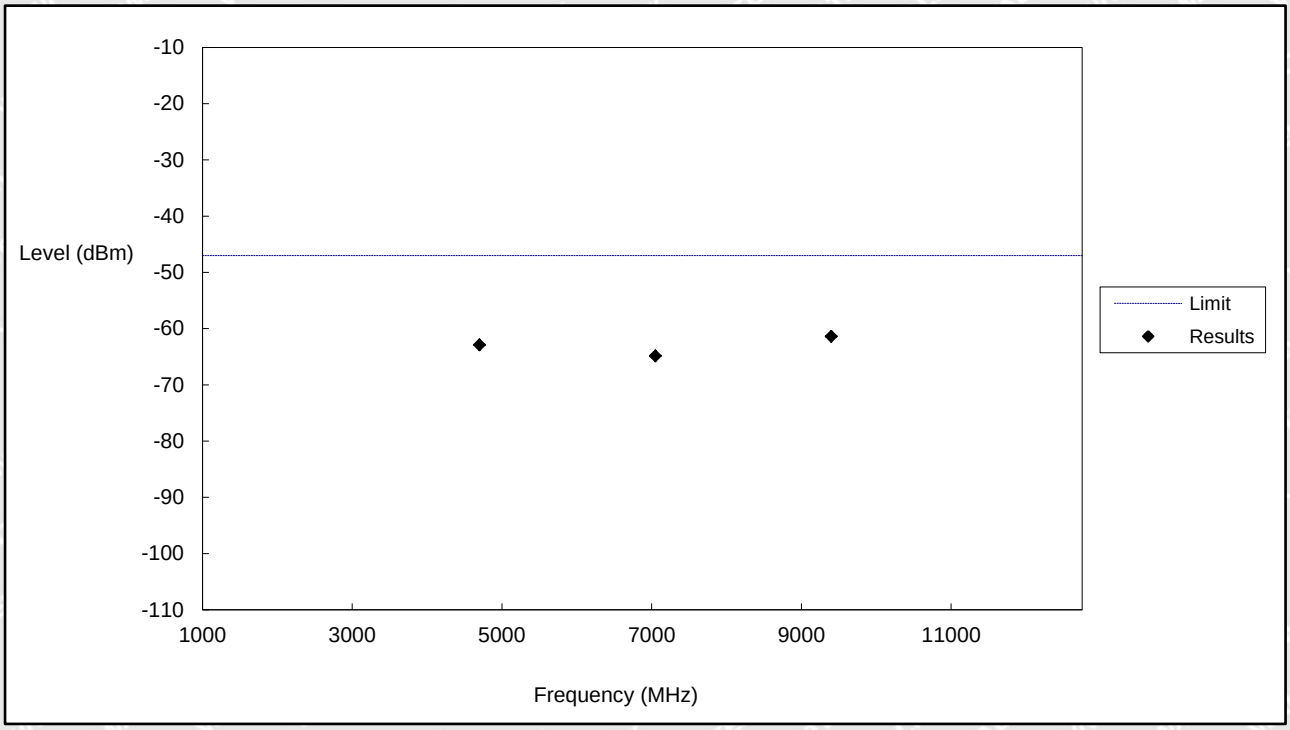
➢ Radiated Spurious Emissions(Above 1GHz)

| Test mode: | Idle Mode | Polarity: | Horizontal |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 4700.00 | -59.37 | -47.00 | -12.37 | RMS |
| 2 | 7050.00 | -60.72 | -47.00 | -13.72 | RMS |
| 3 | 9400.00 | -60.56 | -47.00 | -13.56 | RMS |

| Test mode: | Idle Mode | Polarity: | Vertical |
|---|---|---|---|




| No. | Frequency | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dB) | |
| 1 | 4700.00 | -62.91 | -47.00 | -15.91 | RMS |
| 2 | 7050.00 | -64.88 | -47.00 | -17.88 | RMS |
| 3 | 9400.00 | -61.40 | -47.00 | -14.40 | RMS |

*Note: Emissions attenuated more than 20 dB below the permissible value are not reported. There is only the base noise in frequency above 12.75GHz.*

### 3.13 Control and monitoring functions

Clause 4.2.4 of ETSI EN 301 908-1 applies.

RESULT: Pass

#### 3.13.1 Definition and applicability

This requirement, together with other control and monitoring technical requirements identified in the table of cross references in the applicable part, verifies that the control and monitoring functions of the UE prevent it from transmitting in the absence of a valid network.
This test is applicable to radio communications equipment and ancillary equipment in the operating band defined in the applicable part of this multipart harmonized standard.
This test shall be performed on the radio communications equipment and/or a representative configuration of the ancillary equipment.

#### 3.13.2 Conformance requirements

The maximum measured power during the duration of the test shall not exceed -30 dBm.

#### 3.13.3 Set up for testing

a) At the start of the test, the UE shall be switched off. The UE antenna connector shall be connected to a power measuring equipment, with the following characteristics:
- the RF bandwidth shall exceed the total operating transmit frequency range of the UE for operation with an applicable part;
- the response time of the power measuring equipment shall be such that the measured power has reached within 1 dB of its steady state value within 100 µs of a CW signal being applied;
- it shall record the maximum power measured.

NOTE: The equipment may include a video low pass filter to minimize its response to transients or Gaussian noise peaks.

b) The UE shall be switched on for a period of approximately fifteen minutes, and then switched off.

c) The EUT shall remain switched off for a period of at least thirty seconds, and shall then be switched on for a period of approximately one minute.

d) The maximum power emitted from the UE throughout the duration of the test shall be recorded.
The results obtained shall be compared to the limits in clause 3.13.2 in order to prove compliance.

### 3.13.4 Test result

| FDD-LTE Band 1 – Control and monitoring functions | | | | | | |
|---|---|---|---|---|---|---|
| Measured range | Test data (dBm) | | | | Limit (dBm) | Result |
| | 1st | 2nd | 3rd | 4th | | |
| FDD-LTE Band 1 1920MHz to 1980MHz | -42.29 | -42.42 | -43.57 | -43.60 | -30 | Pass |

| FDD-LTE Band 3 – Control and monitoring functions | | | | | | |
|---|---|---|---|---|---|---|
| Measured range | Test data (dBm) | | | | Limit (dBm) | Result |
| | 1st | 2nd | 3rd | 4th | | |
| FDD-LTE Band 3 1710MHz to 1785MHz | -42.31 | -42.57 | -41.32 | -44.32 | -30 | Pass |

| FDD-LTE Band 7 – Control and monitoring functions | | | | | | |
|---|---|---|---|---|---|---|
| Measured range | Test data (dBm) | | | | Limit (dBm) | Result |
| | 1st | 2nd | 3rd | 4th | | |
| FDD-LTE Band 7 2500MHz to 2570MHz | -42.13 | -41.16 | -42.57 | -41.26 | -30 | Pass |

| FDD-LTE Band8 – Control and monitoring functions | | | | | | |
|---|---|---|---|---|---|---|
| Measured range | Test data (dBm) | | | | Limit (dBm) | Result |
| | 1st | 2nd | 3rd | 4th | | |
| FDD-LTE Band 8 880MHz to 915MHz | -42.59 | -41.21 | -43.35 | -44.26 | -30 | Pass |

| FDD-LTE Band 20 – Control and monitoring functions | | | | | | |
|---|---|---|---|---|---|---|
| Measured range | Test data (dBm) | | | | Limit (dBm) | Result |
| | 1st | 2nd | 3rd | 4th | | |
| FDD-LTE Band 20 832MHz to 862MHz | -42.63 | -42.43 | -42.37 | -42.58 | -30 | Pass |

| FDD-LTE Band 28 – Control and monitoring functions | | | | | | |
|---|---|---|---|---|---|---|
| Measured range | Test data (dBm) | | | | Limit (dBm) | Result |
| | 1st | 2nd | 3rd | 4th | | |
| FDD-LTE Band 28 703MHz to 748MHz | -42.26 | -42.34 | -44.57 | -42.12 | -30 | Pass |

| TDD-LTE Band 38 – Control and monitoring functions | | | | | | |
|---|---|---|---|---|---|---|
| Measured range | Test data (dBm) | | | | Limit (dBm) | Result |
| | 1st | 2nd | 3rd | 4th | | |
| TDD-LTE Band 38 2570MHz to 2620MHz | -42.26 | -42.32 | -41.52 | -41.23 | -30 | Pass |

| TDD-LTE Band 40 – Control and monitoring functions | | | | | | |
|---|---|---|---|---|---|---|
| Measured range | Test data (dBm) | | | | Limit (dBm) | Result |
| | 1st | 2nd | 3rd | 4th | | |
| TDD-LTE Band 40 2300MHz to 2400MHz | -43.21 | -41.31 | -43.29 | -43.54 | -30 | Pass |

The equipment complied with the requirement of this clause.

### 3.14 Receiver Total Radiated Sensitivity (TRS)

Clause 4.2.13 of ETSI EN 301 908-13 applies.

#### 3.14.1 Definition and applicability

The present requirement applies to handheld phones/DUTs that are wider than or equal to 56 mm and narrower than or equal to 72 mm.

The Total Radiated Sensitivity is defined as:

$$TRS = \frac{4\pi}{\oint \left[ \frac{1}{EIS_\theta(\Omega; f)} + \frac{1}{EIS_\varphi(\Omega; f)} \right] d\Omega}$$

Where the Effective Isotropic Sensitivity (EIS) is defined as the power available at the antenna output such as the sensitivity threshold is achieved for each polarization. $\Omega$ is the solid angle describing the direction, $f$ is frequency. $\theta$ and $\varphi$ are the orthogonal polarizations.

$$TRS \approx \frac{2NM}{\pi \sum_{n=0}^{N-1} \sum_{m=0}^{M-1} \left[ \frac{1}{EIS_\theta(\theta_n, \varphi_m; f)} + \frac{1}{EIS_\varphi(\theta_n, \varphi_m; f)} \right] \sin(\theta_n)}$$

In these formulas, $N$ and $M$ are the number of sampling intervals for theta and phi. $\theta_n$ and $\varphi_m$ are the measurement angles. The sampling intervals are discussed further in clause 4.4 of ETSI TS 137 544 [6].

The TRS can also be calculated from measurements in a Rayleigh fading 3 dimensional isotropic environment within average uniform elevation and azimuth distribution. The calculation of the TRS is in this case based on searching for the lowest power received by the UE/MS for a discrete number of field combinations in the chamber that gives a BER that is better than the specified target BER level. By calibrating the average power transfer function, an absolute value of the TRS can be obtained. The following expression can be used to find the TRS.

$$TRS \approx 2N \frac{\left( \sum_{n=1}^{N} \left( C_n (1 - R_n) P_{thres,n} \right) \right)^{-1}}{\sum_{n=1}^{N} P_{ref,n}}$$

where $P_{ref,n}$ is the reference power transfer function for fixed measurement antenna n, $R_n$ is the reflection coefficient for fixed measurement antenna n and $C_n$ is the path loss in the cables connecting the measurement receiver to fixed measurement antenna n. These parameters are calculated from the calibration measurement and are further discussed in clause B.2 of ETSI TS 137 544 [6]. $P_{thres,n}$ is calculated by using the following equation:

$$P_{thres,n} = \frac{\sum_{m=1}^{M} \frac{1}{\left| S_{21,n,m}^{thres} \right|^2}}{M}$$

where $S_{21,n,m}^{thres}$ is the m:th value of the transfer function for fixed measurement antenna n, which gives the BER threshold. $M$ is the total number of values of the BER threshold power measured for each fixed measurement antenna.

### 3.14.2 Conformance requirements

The conformance tests for this requirement shall be as defined in clause 5.3.12 of the present document.

### 3.14.3 Set up for testing

Procedure is described in ETSI TS 137 544 [6], clause 7.1.5.4.2 for FDD and clause 7.1.6.4.2 for TDD systems.

In case devices support adaptive features that dynamically tune the RF front end and adjust TX power for optimum performance in its region of operation, the device being measured should be representative of the device configuration used by a consumer in that region. This could include setting the MCC value or another parameter to one used within the region.

### 3.14.4 Test result

Width greater than 72mm, not applicable.

### 3.15 Total Radiated Power (TRP)

Clause 4.2.14 of ETSI EN 301 908-13 applies.

#### 3.15.1 Definition and applicability

The present requirement applies to handheld phones/DUTs that are wider than or equal to 56 mm and narrower than or equal to 72 mm.

The Total Radiated Power (TRP) is a measure of how much power the DUT actually radiates. The TRP is defined as the integral of the power transmitted in different directions over the entire radiation sphere:

The Total Radiated Power (TRP) is a measure of how much power the DUT actually radiates. The TRP is defined as the integral of the power transmitted in different directions over the entire radiation sphere:

$$TRP = \frac{1}{4\pi}\oint\left(EIRP_{\theta}(\Omega, f) + EIRP_{\varphi}(\Omega, f)\right)d\Omega$$

Where $\Omega$ is the solid angle describing the direction, $f$ is frequency. $\theta$ and $\varphi$ are the orthogonal polarizations. $EIRP_{\theta}$ and $EIRP_{\varphi}$ are the actually transmitted power-levels in corresponding polarizations.

Thus:

$$TRP \approx \frac{\pi}{2NM}\sum_{n=0}^{N-1}\sum_{m=0}^{M-1}\left[EIRP_{\theta}(\theta_n, \varphi_m; f) + EIRP_{\varphi}(\theta_n, \varphi_m; f)\right]\sin(\theta_n)$$

In these formulas $N$ and $M$ are the number of sampling intervals for theta and phi. $\theta_n$ and $\varphi_m$ are the measurement angles. The sampling intervals are discussed further in clause 4.4 of ETSI TS 137 544 [6].

The TRP can also be calculated from Rayleigh faded samples of the total power transmitted from the UE. The measurement of transmitter performance in an isotropic Rayleigh fading environment is based on sampling the radiated power of the UE for a discrete number of field combinations in the chamber. The average value of these statistically distributed samples is proportional to the TRP and by calibrating the average power transfer function, an absolute value of the TRP can be obtained.

Thus:

$$TRP \approx \frac{\sum_{n=1}^{N}\left(\frac{P_n}{C_n(1-R_n)}\right)}{\sum_{n=1}^{N}P_{ref,n}}$$

where $P_{ref,n}$ is the reference power transfer function for fixed measurement antenna n, $R_n$ is the reflection coefficient for fixed measurement antenna n and $C_n$ is the path loss in the cables connecting the measurement receiver to fixed measurement antenna n. These parameters are calculated from the calibration measurement and are further discussed in clause B.2 of ETSI TS 137 544 [6]. $P_n$ is the average power measured by fixed measurement antenna n and can be calculated using the following expression:

$$P_n = \frac{\sum_{m=1}^{M}\left|S_{21,n,m}\right|^2}{M}$$

where $S_{21,n,m}$ is sample number m of the complex transfer function measured with fixed measurement antenna n and $M$ is the total number of samples measured for each fixed measurement antenna.

NOTE 1: All averaging shall be performed using linear power values (e.g. measurements in Watts).

NOTE 2: The requirements and this test apply to all types of UTRA for the FDD UE for Release 7 and later releases.

### 3.15.2 Set up for testing

Procedure is described in ETSI TS 137 544 [6], clause 6.1.5.4.2.for FDD and clause 6.1.6.4.2 for TDD systems.

In case devices support adaptive features that dynamically tune the RF front end and adjust TX power for optimum performance in its region of operation, the device being measured should be representative of the device configuration used by a consumer in that region. This could include setting the MCC value or another parameter to one used within the region.

For devices supporting transmit antenna switching using multiple TX antennas, the TRP should be measured for each transmit antenna individually. The antenna with the greater TRP should be used to determine the pass/fail compliance.

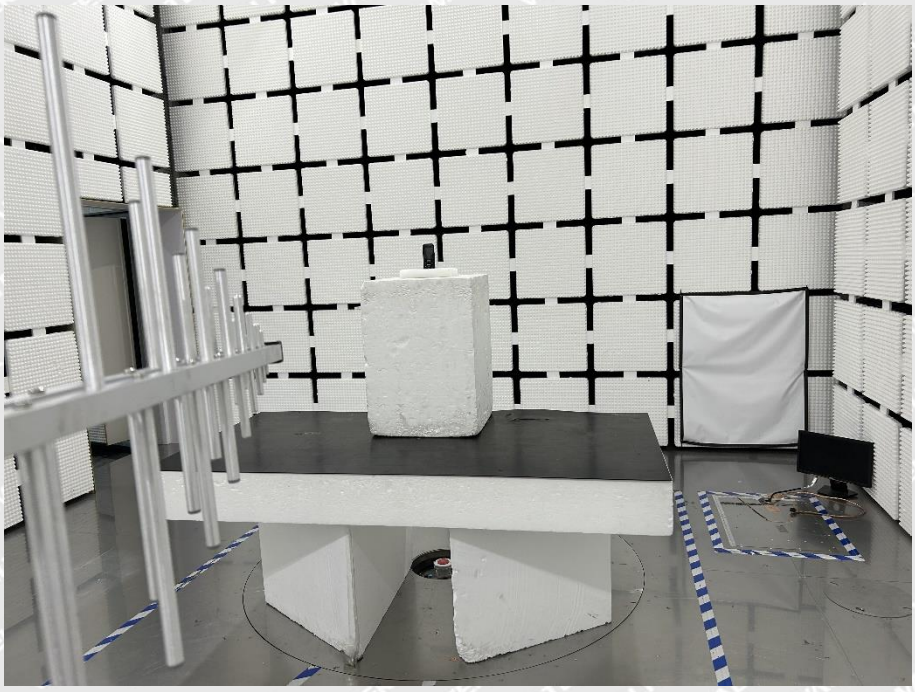
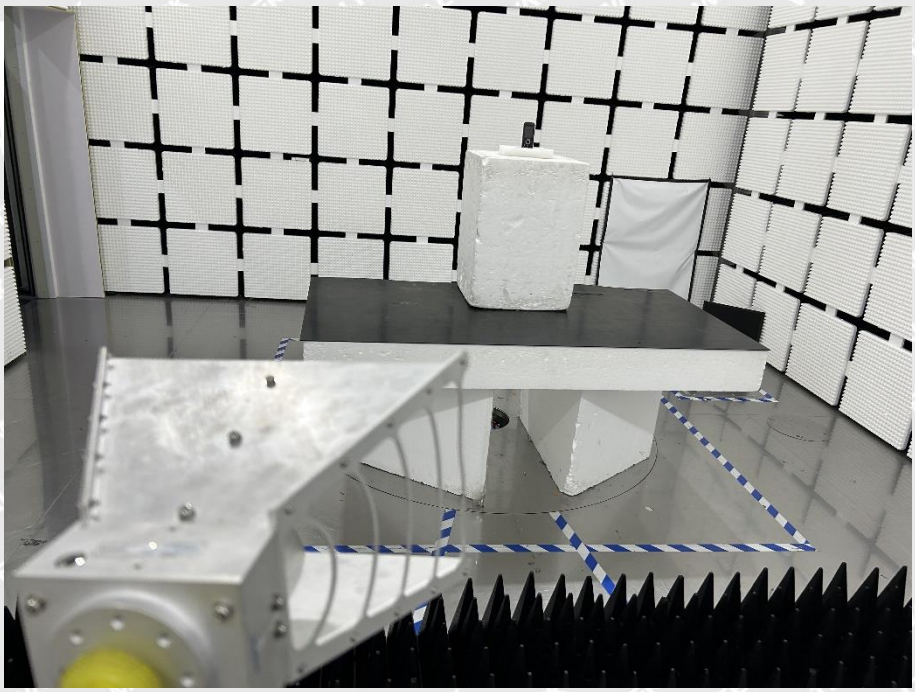
### 3.15.3 Test result

Width greater than 72mm, not applicable.

# EXHIBIT 1 - EUT PHOTOGRAPHS

**Please refer to “ANNEX”.**

# EXHIBIT 2 - TEST SETUP PHOTOGRAPHS

| | |
|---|---|
| **Spurious Emission Test Setup (Below 1GHz)** |  |
| **Spurious Emission Test Setup (Above 1GHz)** |  |

******* END OF REPORT *******