
# Report On

Application for Grant of Equipment Authorization of the
Inseego Corp.
MIFI8000 Wireless Hotspot Modem

FCC CFR 47 Part 2 and 90: 2018
RSS-140 Issue 1: 2018

**Report No. 72142923C** **May 2019**

| | |
|---|---|
| **REPORT ON** | Radio Testing of the<br>Inseego Corp.<br>MIFI8000 Wireless Hotspot Modem |
| **TEST REPORT NUMBER** | 72142923C |
| **PREPARED FOR** | Inseego Corp.<br>9605 Scranton Road, Suite 300<br>San Diego, CA 92121<br>USA |
| **CONTACT PERSON** | Roman Olmos<br>Senior Regulatory Enigneer<br>(858) 812-0606<br>roman.olmos@inseego.com |
| **PREPARED BY** | Xiaoying Zhang<br>**Name**<br>Authorized Signatory<br>Title: EMC/Wireless Test Engineer |
| **APPROVED BY** | Ferdinand S. Custodio<br>**Name**<br>Authorized Signatory<br>Title: Senior EMC Test Engineer/Wireless Team Lead |
| **DATED** | May 16, 2019 |



TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

**Revision History**

| 72142923C<br>Inseego Corp.<br>MIFI8000 Wireless Hotspot Modem | | | | | |
|---|---|---|---|---|---|
| DATE | OLD REVISION | NEW REVISION | REASON | PAGES AFFECTED | APPROVED BY |
| 05/16/2019 | - | Initial Release | | | Ferdinand Custodio |
| | | | | | |
| | | | | | |
| | | | | | |

**CONTENTS**

**SECTION 1**

**REPORT SUMMARY**

Radio Testing of the
Inseego Corp.
MIFI8000 Wireless Hotspot Modem

## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Inseego Corp. MIFI8000 Wireless Hotspot Modem to the requirements of the following:

- FCC CFR 47 Part 2 and 90: 2018
- RSS-140 Issue 1, 2018

| | |
|---|---|
| Objective | To perform Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out. |
| Manufacturer | Inseego Corp. |
| Product Marketing Name | MiFi 8000 |
| Model Number(s) | MIFI8000 |
| FCC ID Number | PKRISGMIFI8000 |
| IC Number | 3229A-MIFI8000 |
| Serial Number(s) | AT071218B00062 (MIFI8000)<br>AZ280418A00044 (MIFI8800L) |
| Number of Samples Tested | 2 |
| Test Specification/Issue/Date | • FCC CFR 47 Part 2 and 90 (October 1, 2018)<br>• KDB412172 D01 Determining ERP and EIRP v01r01 August 07, 2015: Guidelines for determining the Effective Radiated Power (ERP) and Equivalent Isotropically Radiated Power (EIRP) of an RF transmitting system<br>• KDB971168 D01 Power Meas License Digital Systems v03r01: April 9 2018: Measurement guidance for certification of licensed digital transmitters<br>• RSS-140 issue 1 April 2018: Equipment Operating in the Public Safety Broadband Frequency Bands 758-768 MHz and 788-798 MHz<br>• RSS-Gen Issue 5 Amendment 1: March 2019 - General Requirements for Compliance of Radio Apparatus<br>• ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services |
| Start of Test | February 28, 2019 |
| Finish of Test | April 26, 2019 |
| Name of Engineer(s) | Xiaoying Zhang |
| Related Document(s) | Supporting documents for EUT certification are separate exhibits. |

## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 2 and 90: 2018 with cross-reference to the corresponding ISED RSS standard is shown below.

| Section | FCC Part Sections(s) | RSS Section(s) | Test Description | Result |
|---|---|---|---|---|
| 2.1 | 2.1046 | RSS-140 (4.3) | Transmitter Conducted Output Power | Compliant |
| 2.2 | 2.1046<br>90.542(a)(7)<br>90.635(b) | RSS-140 (6.5) | Effective Radiated Power | Compliant |
| 2.3 | 2.1049 | RSS-Gen (6.7) | Occupied Bandwidth | Compliant |
| 2.4 | - | RSS-140 (4.3) | Peak-Average Ratio | Compliant |
| 2.5 | 2.1051<br>90.543(e)(3)(5)<br>90.691 | RSS-140 (4.4) | Band Edge | Compliant |
| 2.6 | 2.1051<br>90.543(e)(2)(3)(4)(5)(f)<br>90.691 | RSS-140 (4.4) | Conducted Spurious Emissions | Compliant |
| 2.7 | 2.1053<br>90.543(e)<br>90.691 | RSS-140 (4.4) | Field Strength of Spurious Radiation | Compliant |
| 2.8 | 2.1055<br>90.539<br>90.213 | RSS-140 (4.2) | Frequency Stability | Compliant |
| - | - | RSS-Gen 7.4 | Receiver Spurious Emissions | N/A* |
| 2.9 | - | RSS-GEN 8.8 | Power Line Conducted Emissions | Compliant |

N/A* Not Applicable. No stand-alone receiver.

## 1.3 PRODUCT INFORMATION

### 1.3.1 EUT General Description

The Equipment Under Test (EUT) was a Inseego Corp. MIFI8000 Wireless Hotspot Modem. The EUT is a Wireless Hotspot Modem supporting 2G/3G/4G Technologies. The EUT comes with a USB Port.

### 1.3.2 Technical Description

| | |
|---|---|
| EUT Description | Wireless Hotspot Modem |
| Product Marketing Name | MiFi 8000 |
| Model Number(s) | MIFI8000 |
| Rated Voltage | 3.7V, 4400mAh (Rechargeable Li-Ion battery pack)<br>Input 100-240VAC, Output 5V (External AC-DC Power Adapter) |
| Mode Verified | *LTE Band 14: 788-798 MHz<br>(* All the test data for LTE Band 14 are from previous testing of model MIFI8800L which shares the same board and architecture with the only exception of different cell bands support)<br>LTE Band 26: 814-824MHz |
| Capability | WCDMA Band 2, 4, 5, LTE Band 2, 4, 5, 7, 12, 13, 14, 17, 25, 26, 41, 48, 66 and 802.11 a/b/g/n/ac |
| Primary Unit (EUT) | ☐ Production<br>☒ Pre-Production<br>☐ Engineering |
| Manufacturer Declared Voltage Range | 3.3 V – 4.3 VDC |

(Client declaration, max. antenna gain covered under this test report)

| LTE Bands | Frequency(ies) | Antenna Gains |
|---|---|---|
| Band 14 | 788-798 MHz | -0.6 dBi |
| Band 26 | 814-824 MHz | -0.5 dBi |

### 1.3.3 Transmit Frequency Table

| LTE Band 14 | | | | | |
|---|---|---|---|---|---|
| Modulation | Bandwidth (MHz) | Tx Frequency (MHz) | Emission Designator | ERP | |
| | | | | Max Power (dBm) | Max Power (mW) |
| QPSK | 5 | 788 – 798 | 4M49G7D | 21.13 | 129.72 |
| | 10 | | 8M95G7D | 21.10 | 128.82 |
| 16QAM | 5 | | 4M48W7D | 20.23 | 105.44 |
| | 10 | | 8M95W7D | 20.22 | 105.20 |

| LTE Band 26 (814-824 MHz) | | | | | |
|---|---|---|---|---|---|
| Modulation | Bandwidth (MHz) | Tx Frequency (MHz) | Emission Designator | ERP | |
| | | | | Max Power (dBm) | Max Power (mW) |
| QPSK | 1.4 | 814 – 824 | 1M09G7D | 21.17 | 130.92 |
| | 3 | | 2M68G7D | 21.19 | 131.52 |
| | 5 | | 4M48G7D | 21.26 | 133.66 |
| | 10 | | 8M92G7D | 21.19 | 131.52 |
| 16QAM | 1.4 | | 1M08W7D | 20.23 | 105.44 |
| | 3 | | 2M68W7D | 20.25 | 105.93 |
| | 5 | | 4M47W7D | 20.47 | 111.43 |
| | 10 | | 8M94W7D | 20.26 | 106.17 |

## 1.4 EUT TEST CONFIGURATION

### 1.4.1 Test Configuration Description

| Test Configuration | Description |
|---|---|
| A | Conducted antenna port measurement. EUT Tx at a max power and powered by the internal battery and/or USB via AC Adapter. |
| B | Radiated test setup / case spurious emissions. The EUT is connected to the call box in radiated way or connect to the call box with antenna port terminated by the call box. |

### 1.4.2 EUT Exercise Software

EUT is controlled by a CMW 500 Wideband Radio Communication Tester. There are no other test software used during verification.

### 1.4.3 Support Equipment and I/O cables

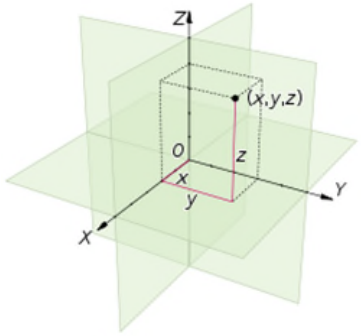
| Manufacturer | Equipment/Cable | Description |
|---|---|---|
| Inseego Corp. | USB Cable | Standard USB Type A to USB Type C |
| Inseego Corp. | External AC-DC Power Adapter | Model: SSW-2783, PN: 40123126.01<br>Input: 100-240VAC, 50/60Hz, 0.5A<br>Ouput: 5VDC, max. 2A |

### 1.4.4 Worst Case Configuration

Worst-case configuration used in this test report as per output power measurements:

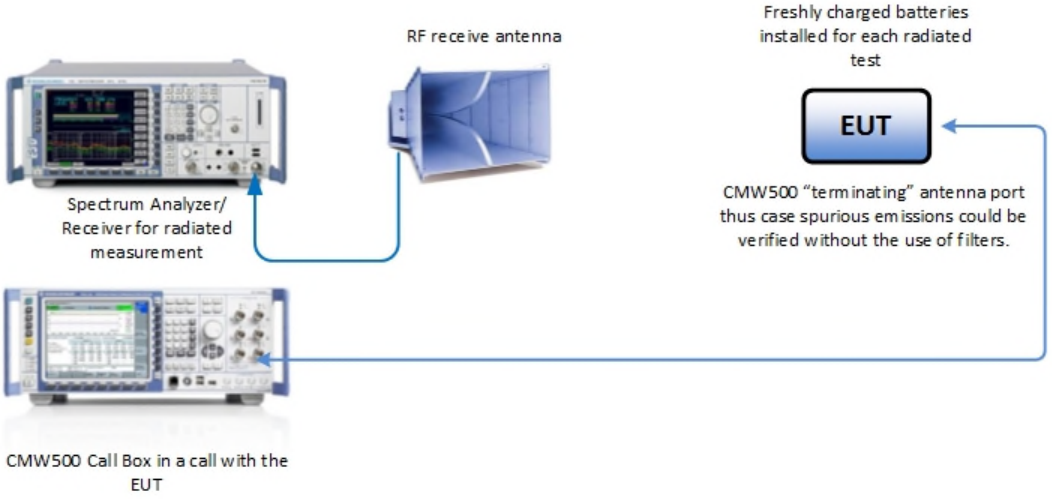
| LTE Band | Channel BW | Modulation | RB Size/Offset |
|---|---|---|---|
| Band 14 | 5 MHz | QPSK | 1/0 |
| Band 26 (814-824MHz) | 5 MHz | QPSK | 1/12 |

For radiated measurements X, Y, and Z orientations were verified. The verification was determined “Y” as worst case configuration.

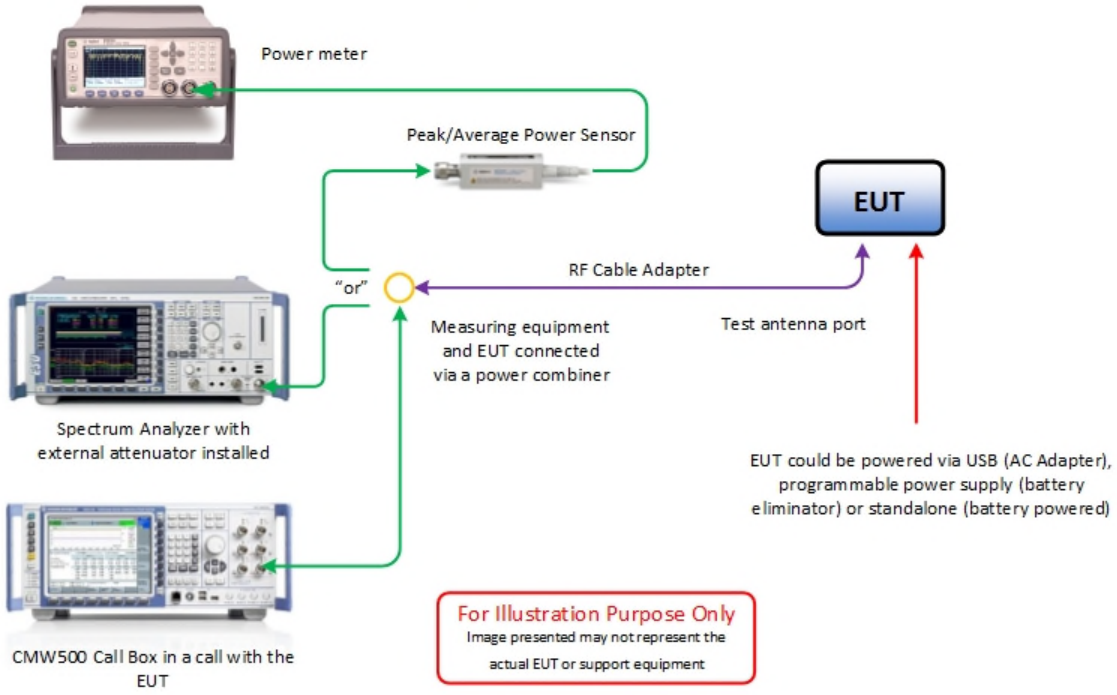


### 1.4.5 Simplified Test Configuration Diagram

**Radiated Test Configuration**




**Conducted (Antenna Port) Test Configuration**



## 1.5 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

## 1.6 MODIFICATION RECORD

| Description of Modification | Modification Fitted By | Date Modification Fitted |
|---|---|---|
| Serial Number: AT071218B00062 (MIFI8000), AZ280418A00044 (MIFI8800L) | | |
| None | — | — |

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

## 1.7 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.26-2015, American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

For conducted and radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

## 1.8 TEST FACILITY LOCATION

### 1.8.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: 858 678 1400 FAX: 858 546 0364

### 1.8.2 TÜV SÜD America Inc. (Rancho Bernardo)

16936 Via Del Campo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: (858) 678-1400 Fax: (858) 546-0364.

## 1.9 TEST FACILITY REGISTRATION

### 1.9.1 FCC – Designation No.: US1146

TUV SUD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Designation is US1146.

### 1.9.2 Innovation, Science and Economic Development Canada (IC) Registration No.: 3067A-1 & 22806-1

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego Rancho Bernardo) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 3067A-1.

The 3m Semi-anechoic chamber of TUV SUD America Inc. (San Diego Mira Mesa) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 22806-1.

### 1.9.3 BSMI – Laboratory Code: SL2-IN-E-028R (US0102)

TUV Product Service Inc. (San Diego) is a recognized EMC testing laboratory by the BSMI under the MRA (Mutual Recognition Arrangement) with the United States. Accreditation includes CNS 13438 up to 6GHz.

### 1.9.4 NCC (National Communications Commission - US0102)

TUV SUD America Inc. (San Diego) is listed as a Foreign Recognized Telecommunication Equipment Testing Laboratory and is accredited to ISO/IEC 17025 (A2LA Certificate No.2955.13) which under APEC TEL MRA Phase 1 was designated as a Conformity Assessment Body competent to perform testing of equipment subject to the Technical Regulations covered under its scope of accreditation including RTTE01, PLMN01 and PLMN08 for TTE type of testing and LP002 for Low-Power RF Device type of testing.

### 1.9.5 VCCI – Registration No. A-0280 and A-0281

TUV SUD America Inc. (San Diego) is a VCCI registered measurement facility which includes radiated field strength measurement, radiated field strength measurement above 1GHz, mains port interference measurement and telecommunication port interference measurement.

### 1.9.6 RRA – Identification No. US0102

TUV SUD America Inc. (San Diego) is National Radio Research Agency (RRA) recognized laboratory under Phase I of the APEC Tel MRA.

### 1.9.7 OFCA – U.S. Identification No. US0102

TUV SUD America Inc. (San Diego) is recognized by Office of the Communications Authority (OFCA) under Appendix B, Phase I of the APEC Tel MRA.

## 1.10 SAMPLE CALCULATIONS

### 1.10.1 LTE Emission Designator (QPSK)

Emission Designator = 4M51G7D
G = Phase Modulation
7= Quantized/Digital Info
D = Data Transmission, telemetry, telecommand

### 1.10.2 LTE Emission Designator (16QAM)

Emission Designator = 4M50W7D
W = Frequency Modulation
7= Quantized/Digital Info
D = Data Transmission, telemetry, telecommand

### 1.10.3 Spurious Radiated Emission (below 1GHz)

| | | | |
|---|---|---|---|
| Measuring equipment raw measurement (dbµV) @ 30 MHz | | | 24.4 |
| Correction Factor (dB) | Asset# 1066 (cable) | 0.3 | -12.6 |
| | Asset# 1172 (cable) | 0.3 | |
| | Asset# 1016 (preamplifier) | -30.7 | |
| | Asset# 1175(cable) | 0.3 | |
| | Asset# 1002 (antenna) | 17.2 | |
| **Reported QuasiPeak Final Measurement (dbµV/m) @ 30MHz** | | | **11.8** |

### 1.10.4 Spurious Radiated Emission – Substitution Method

Example = 84dBµV/m @ 1413 MHz (numerical sample only)

The field strength reading of 84dBµV/m @ 1413 MHz (2nd Harmonic of 706.5 MHz) is the maximized measurement when the EUT is on the turntable measured at 3 meters. The gain of the substituted antenna is 7.8dBi while the transmit cable loss is 1.0 dB (cable between signal generator and the substituted antenna). The signal generator level is adjusted until the 84dBµV/m level at the receiving end is replicated (identical test setup, i.e. same antenna, cable/s and preamp). If the adjusted signal generator level is -18dBm, then we have the following for both EIRP and ERP as required:

$P_{EIRP}$ = -18 dBm + 7.8 dBi – 1dB
= 11.2 dBm
$P_{ERP}$ = $P_{EIRP}$ – 2.15 dB
= 11.2 dBm – 2.15 dB
= 9.05 dBm

**SECTION 2**

**TEST DETAILS**

Radio Testing of the
Inseego Corp.
MIFI8000 Wireless Hotspot Modem



TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

## 2.1 TRANSMITTER CONDUCTED POWER MEASUREMENTS

### 2.1.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1046
RSS-140, Clause 4.3

### 2.1.2 Standard Applicable

The conducted power mesurements were made in accordance to FCC Part 2 Clasue 2.1046 and RSS-140 Clause 4.3.

### 2.1.3 Equipment Under Test and Modification State

Serial No: AT071218B00062 (MIFI8000), AZ280418A00044 (MIFI8800L) / Test Configuration A

### 2.1.4 Date of Test/Initial of test personnel who performed the test

February 28 and March 01, 2019 / XYZ
June 20, 2018 / XYZ

### 2.1.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.1.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

| | |
|---|---|
| Ambient Temperature | 21.6 - 24.0 °C |
| Relative Humidity | 44.0 - 54.6 % |
| ATM Pressure | 99.1 - 99.4 kPa |

### 2.1.7 Additional Observations

- This is a conducted test using Power Meter.
- The path loss were measured and entered as a level offset.
- Low, Middle and High channels for all bandwidths with different RB size and RB offset and modulations were verified and reported.

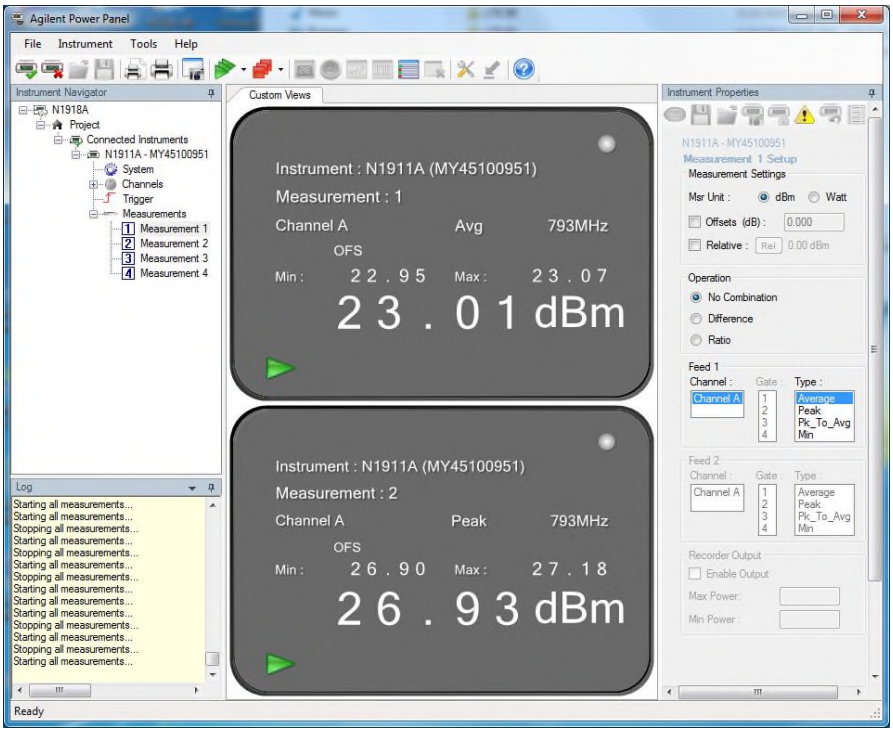
### 2.1.8 Test Results

| LTE Band 14 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bandwidth (MHz) | Channel | Frequency (MHz) | Modulation | No. RB | RB Start | Average Power (dBm) | Peak Power (dBm) |
| 5 | 23305 | 790.5 | QPSK | **1** | **0** | **23.88** | **27.25** |
| | | | | 1 | 13 | 23.82 | 26.87 |
| | | | | 1 | 24 | 23.68 | 27.02 |
| | | | | 25 | 0 | 22.98 | 26.22 |
| | | | 16QAM | **1** | **0** | **22.98** | **27.85** |
| | | | | 1 | 13 | 22.81 | 26.48 |
| | | | | 1 | 24 | 22.77 | 27.76 |
| | | | | 25 | 0 | 21.97 | 26.19 |
| | 23330 | 793 | QPSK | **1** | **0** | **23.81** | **26.9** |
| | | | | 1 | 13 | 23.61 | 26.77 |
| | | | | 1 | 24 | 23.36 | 26.59 |
| | | | | 25 | 0 | 23.01 | 26.93 |
| | | | 16QAM | 1 | 0 | 22.98 | 27.27 |
| | | | | **1** | **13** | **22.97** | **27.63** |
| | | | | 1 | 24 | 22.81 | 27.43 |
| | | | | 25 | 0 | 21.94 | 26.99 |
| | 23355 | 795.5 | QPSK | **1** | **0** | **23.73** | **26.97** |
| | | | | 1 | 13 | 23.68 | 26.67 |
| | | | | 1 | 24 | 23.58 | 26.81 |
| | | | | 25 | 0 | 23.0 | 27.78 |
| | | | 16QAM | **1** | **0** | **22.85** | **27.62** |
| | | | | 1 | 13 | 22.82 | 27.36 |
| | | | | 1 | 24 | 22.73 | 27.43 |
| | | | | 25 | 0 | 22.06 | 27.92 |

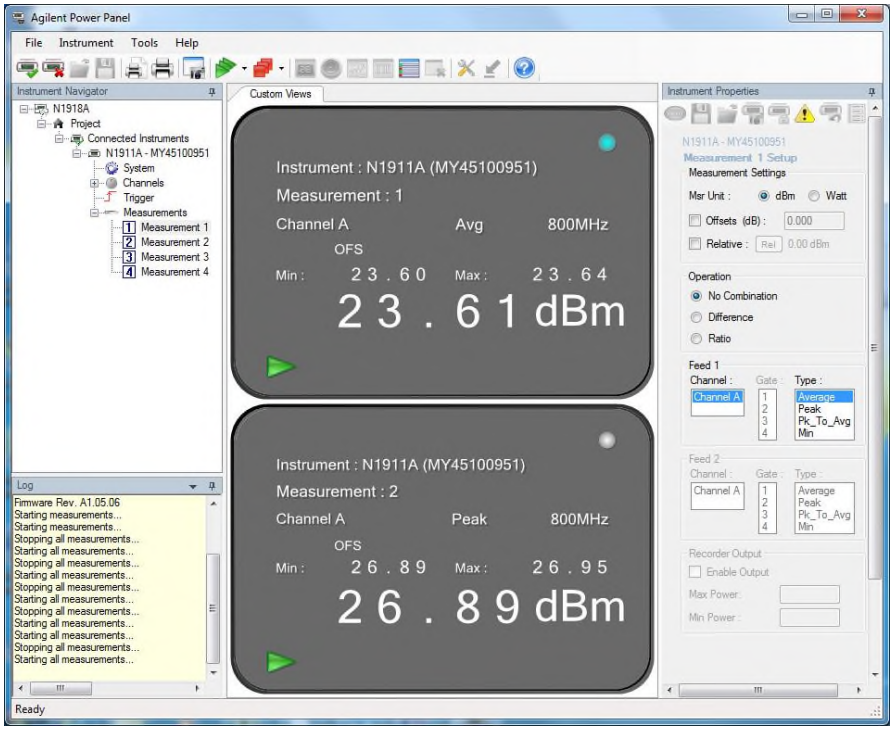
| LTE Band 14 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bandwidth (MHz) | Channel | Frequency (MHz) | Modulation | No. RB | RB Start | Average Power (dBm) | Peak Power (dBm) |
| 10 | 23330 | 793 | QPSK | **1** | **0** | **23.85** | **27.18** |
| | | | | 1 | 25 | 23.52 | 26.68 |
| | | | | 1 | 49 | 23.56 | 26.75 |
| | | | | 50 | 0 | 23.08 | 27.74 |
| | | | 16QAM | **1** | **0** | **22.97** | **26.87** |
| | | | | 1 | 25 | 22.86 | 27.65 |
| | | | | 1 | 49 | 22.72 | 27.45 |
| | | | | 50 | 0 | 22.02 | 27.88 |

| LTE Band 26 (814 – 824 MHz) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Bandwidth (MHz)** | **Channel** | **Frequency (MHz)** | **Modulation** | **No. RB** | **RB Start** | **Average Power (dBm)** | **Peak Power (dBm)** |
| 1.4 | 26697 | 814.7 | QPSK | 1 | 3 | 23.82 | 27.10 |
| | 26740 | 819 | | 1 | 3 | 23.56 | 26.95 |
| | 26783 | 823.3 | | 1 | 3 | 23.70 | 26.98 |
| | 26697 | 814.7 | 16QAM | 1 | 3 | 22.88 | 27.53 |
| | 26740 | 819 | | 1 | 3 | 22.65 | 27.48 |
| | 26783 | 823.3 | | 1 | 3 | 22.74 | 27.45 |
| 3 | 26705 | 815.5 | QPSK | 1 | 7 | 23.84 | 27.10 |
| | 26740 | 819 | | 1 | 7 | 23.56 | 26.86 |
| | 26775 | 822.5 | | 1 | 7 | 23.74 | 29.93 |
| | 26705 | 815.5 | 16QAM | 1 | 7 | 22.90 | 27.62 |
| | 26740 | 819 | | 1 | 7 | 22.64 | 26.87 |
| | 26775 | 822.5 | | 1 | 7 | 22.77 | 27.45 |
| 5 | 26715 | 816.5 | QPSK | **1** | **12** | **23.91** | **27.06** |
| | 26740 | 819 | | 1 | 12 | 23.61 | 26.89 |
| | 26765 | 821.5 | | 1 | 12 | 23.81 | 26.98 |
| | 26715 | 816.5 | 16QAM | 1 | 12 | 23.12 | 27.61 |
| | 26740 | 819 | | 1 | 12 | 22.72 | 27.48 |
| | 26765 | 821.5 | | 1 | 12 | 22.90 | 27.48 |
| 10 | 26740 | 819 | QPSK | 1 | 25 | 23.84 | 27.13 |
| | 26740 | 819 | 16QAM | 1 | 25 | 22.91 | 27.69 |

### 2.1.9 Sample Test Measurement Screen




**LTE Band 14 5M Bandwidth Middle Chanel QPSK Full RB**




**LTE Band 26_5M Bandwidth Middle Chanel QPSK 1 RB 12 Offset**

## 2.2 EFFECTIVE RADIATED POWER

### 2.2.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1046
FCC 47 CFR Part 90, Clause 90.542 (a)(7)
FCC 47 CFR Part 90, Clause 90.635 (b)
RSS-140, Clause 4.3

### 2.2.2 Standard Applicable

FCC 47 CFR Part 90, Clause 90.542 (a)
(7) Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

FCC 47 CFR Part 90, Clause 90.635:
(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

RSS-140, Clause 4.3:
The e.r.p for portable equipment including handheld devices shall not exceed 3 W.

### 2.2.3 Equipment Under Test and Modification State

Serial No: AT071218B00062 (MIFI8000), AZ280418A00044 (MIFI8800L) / Test Configuration (N/A, calculation only)

### 2.2.4 Date of Test/Initial of test personnel who performed the test

February 28 and March 01, 2019 / XYZ
June 20, 2018 / XYZ

### 2.2.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.2.6 Additional Observations

- ERP was calculated as per Section 1.2 and 1.3 of KDB412172 D01 (Determining ERP and EIRP v01r01).
- Calculation formula in logarithmic terms:

$$\mathbf{ERP = P_T + G_T - L_C - 2.15dB}$$

Where:

$P_T$ = transmitter conducted output power dBm (Section 2.1 of this test report)
$G_T$ = gain of the transmitting antenna, in dBi (EIRP: the -2.15 in the formula is to convert EIRP to ERP);
$L_C$ = signal attenuation in the connecting cable between the transmitter and antenna, in dB (EUT configuration during verification is mounted on an interface board with short direct connection to the antenna port. The loss between the EUT and the antenna port is considered negligible).

### 2.2.7 Test Results

| LTE Band 14 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Modulation** | **Bandwidth (MHz)** | **RB Size/Offset** | **Channels** | **Frequency (MHz)** | **Tx Average Power (dBm)** | **Antenna Gain (dBi)** | **ERP (dBm)** | **Limit (dBm)** | **Margin (dBm)** |
| QPSK | 5 | **1 / 0** | **23305** | **790.5** | **23.88** | **-0.6** | **21.13** | **34.77** | **13.64** |
| | | 1 / 0 | 23330 | 793 | 23.81 | -0.6 | 21.06 | 34.77 | 13.71 |
| | | 1 / 0 | 23355 | 795.5 | 23.73 | -0.6 | 20.98 | 34.77 | 13.79 |
| | 10 | - | - | - | - | - | - | - | - |
| | | **1 / 0** | **23330** | **793** | **23.85** | **-0.6** | **21.1** | **34.77** | **13.67** |
| | | - | - | - | - | - | - | - | - |
| 16QAM | 5 | **1 / 0** | **23305** | **790.5** | **22.98** | **-0.6** | **20.23** | **34.77** | **14.54** |
| | | 1 / 13 | 23330 | 793 | 22.97 | -0.6 | 20.22 | 34.77 | 14.55 |
| | | 1 / 0 | 23355 | 795.5 | 22.85 | -0.6 | 20.1 | 34.77 | 14.67 |
| | 10 | - | - | - | - | - | - | - | - |
| | | **1 / 0** | **23330** | **793** | **22.97** | **-0.6** | **20.22** | **34.77** | **14.55** |
| | | - | - | - | - | - | - | - | - |

| LTE Band 26 (814 – 824 MHz) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Modulation** | **Bandwidth (MHz)** | **RB Size/Offset** | **Channels** | **Frequency (MHz)** | **Tx Average Power (dBm)** | **Antenna Gain (dBi)** | **ERP (dBm)** | **Limit (dBm)** | **Margin (dBm)** |
| QPSK | 1.4 | **1 / 3** | **26697** | **814.7** | **23.82** | **-0.5** | **21.17** | **50** | **28.83** |
| | | 1 / 3 | 26740 | 819 | 23.56 | -0.5 | 20.91 | 50 | 29.09 |
| | | 1 / 3 | 26783 | 823.3 | 23.70 | -0.5 | 21.05 | 50 | 28.95 |
| | 3 | **1 / 7** | **26705** | **815.5** | **23.84** | **-0.5** | **21.19** | **50** | **28.81** |
| | | 1 / 7 | 26740 | 819 | 23.56 | -0.5 | 20.91 | 50 | 29.09 |
| | | 1 / 7 | 26775 | 822.5 | 23.74 | -0.5 | 21.09 | 50 | 28.91 |
| | 5 | **1 / 12** | **26705** | **815.5** | **23.91** | **-0.5** | **21.26** | **50** | **28.74** |
| | | 1 / 12 | 26740 | 819 | 23.61 | -0.5 | 20.96 | 50 | 29.04 |
| | | 1 / 12 | 26775 | 822.5 | 23.81 | -0.5 | 21.16 | 50 | 28.84 |
| | 10 | - | - | - | - | - | - | - | - |
| | | **1 / 25** | **26740** | **819** | **23.84** | **-0.5** | **21.19** | **50** | **28.81** |
| | | - | - | - | - | - | - | - | - |
| 16QAM | 1.4 | **1 / 3** | **26697** | **814.7** | **22.88** | **-0.5** | **20.23** | **50** | **29.77** |
| | | 1 / 3 | 26740 | 819 | 22.65 | -0.5 | 20 | 50 | 30 |
| | | 1 / 3 | 26783 | 823.3 | 22.74 | -0.5 | 20.09 | 50 | 29.91 |
| | 3 | **1 / 7** | **26705** | **815.5** | **22.90** | **-0.5** | **20.25** | **50** | **29.75** |
| | | 1 / 7 | 26740 | 819 | 22.64 | -0.5 | 19.99 | 50 | 30.01 |
| | | 1 / 7 | 26775 | 822.5 | 22.77 | -0.5 | 20.12 | 50 | 29.88 |
| | 5 | **1 / 12** | **26705** | **815.5** | **23.12** | **-0.5** | **20.47** | **50** | **29.53** |
| | | 1 / 12 | 26740 | 819 | 22.72 | -0.5 | 20.07 | 50 | 29.93 |
| | | 1 / 12 | 26775 | 822.5 | 22.90 | -0.5 | 20.25 | 50 | 29.75 |
| | 10 | - | - | - | - | - | - | - | - |
| | | **1 / 25** | **26740** | **819** | **22.91** | **-0.5** | **20.26** | **50** | **29.74** |
| | | - | - | - | - | - | - | - | - |

## 2.3 OCCUPIED BANDWIDTH

### 2.3.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1049
RSS-GEN 6.7

### 2.3.2 Standard Applicable

The transmitted signal bandwidth shall be reported as the 99% emission bandwidth, that is the frequency bandwidth suuch that, below its lower and above its upper frequency limits, the mean powers radiated are eqch equal to 0.5 percent of the total mean power radiated by a give emission.
26dB Bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated by at least 26 dB below the transmitter power.
Using the occupied bandwidth meansurement function in the spectrum analyzer, the 99% occupied bandwith was measured.
In addition, the 26dB bandwidth was measured in accorance with FCC KDB 971168 D01 V0202 Clause 4.1 using the ndB measurement function in the spectrum analyzer.

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be at least 3x RBW.

### 2.3.3 Equipment Under Test and Modification State

Serial No: AT071218B00062 (MIFI8000), AZ280418A00044 (MIFI8800L) / Test Configuration A

### 2.3.4 Date of Test/Initial of test personnel who performed the test

March 25, 2019 / XYZ
June 11, 2018 / XYZ

### 2.3.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.3.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

| | |
|---|---|
| Ambient Temperature | 21.5 - 25.7 °C |
| Relative Humidity | 46.4 - 51.3 % |
| ATM Pressure | 98.5 - 99.4 kPa |

### 2.3.7 Additional Observations

- This is a conducted test. Both 26dB bandwidth and 99% bandwidth presented.
- Using the occupied bandwidth meansurement function in the spectrum analyzer, the 99% occupied bandwith was measured.
- The 26dB bandwidth was measured in accorance with ANSI C63.26 clause 5.4.3 using the ndB measurement function in the spectrum analyzer.
- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be at least 3x RBW.
- Low, Middle and High channels for all bandwidths and modulations were verified. Test results of Middle channel were presented as representative.

### 2.3.8 Test Results

| LTE Band 14 | | | | | |
|---|---|---|---|---|---|
| ***Modulation*** | ***Bandwidth (MHz)*** | ***Channel*** | ***Frequency (MHz)*** | ***99% OBW (MHz)*** | ***26dB BW (MHz)*** |
| QPSK | 5 | 23330 | 793.0 | 4.49 | 4.95 |
| | 10 | | | 8.95 | 9.68 |
| 16QAM | 5 | 23330 | 793.0 | 4.48 | 4.93 |
| | 10 | | | 8.95 | 9.64 |

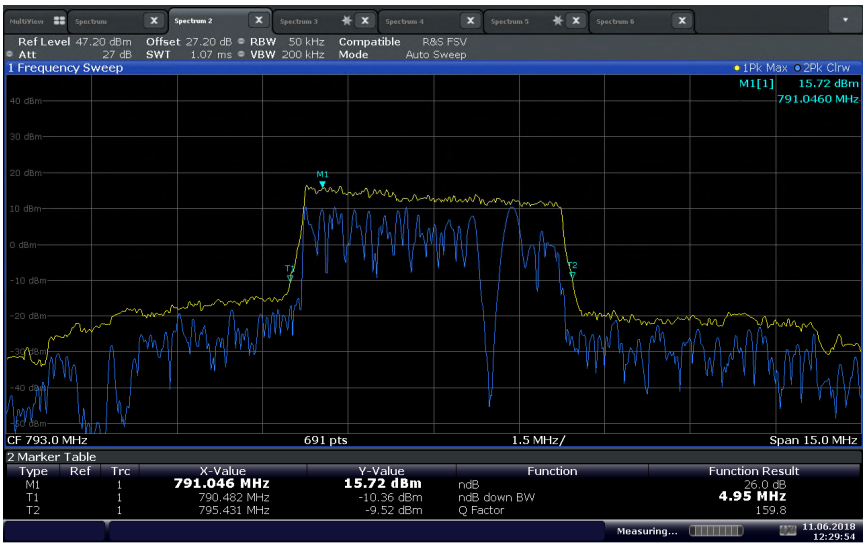
| LTE Band 26 (814 – 824 MHz) | | | | | |
|---|---|---|---|---|---|
| ***Modulation*** | ***Bandwidth (MHz)*** | ***Channel*** | ***Frequency (MHz)*** | ***99% OBW (MHz)*** | ***26dB BW (MHz)*** |
| QPSK | 1.4 | 26740 | 819.0 | 1.09 | 1.24 |
| | 3 | | | 2.68 | 3.02 |
| | 5 | | | 4.48 | 5.05 |
| | 10 | | | 8.92 | 9.68 |
| 16QAM | 1.4 | 26740 | 819.0 | 1.08 | 1.24 |
| | 3 | | | 2.68 | 2.94 |
| | 5 | | | 4.47 | 4.91 |
| | 10 | | | 8.94 | 9.64 |

### 2.3.9 Example Test Plots

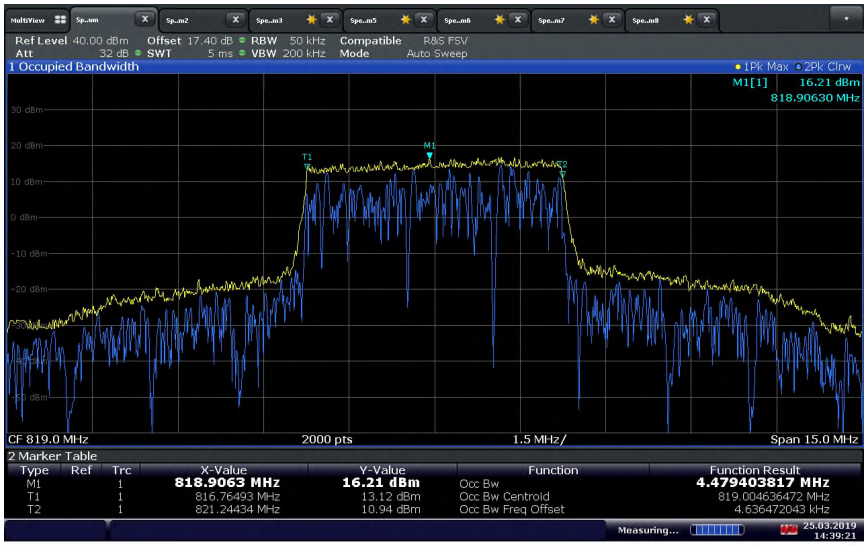
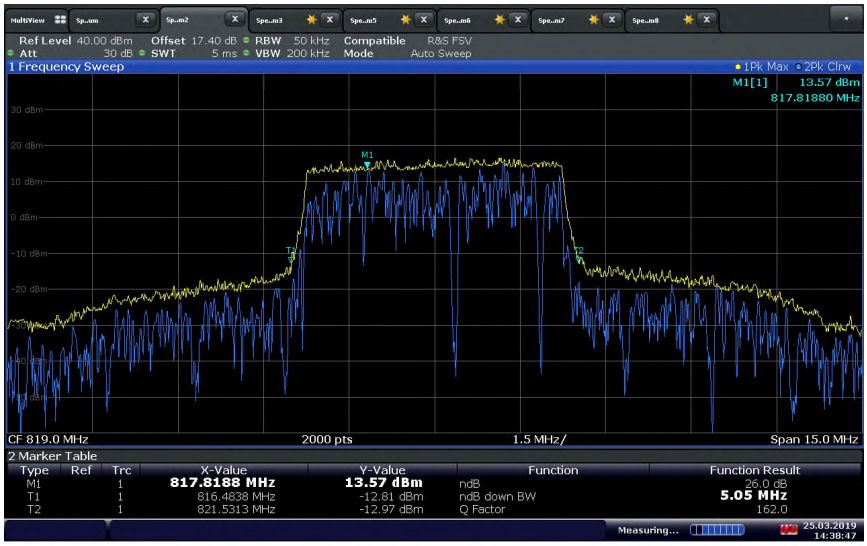
**LTE Band 14 (5 MHz BW) / Middle Channel 793.0 MHz / QPSK / 99%OBW**


11:57:39 11.06.2018

**LTE Band 14 (5 MHz BW) / Middle Channel 793.0 MHz / QPSK / 26dB BW**




12:29:54 11.06.2018

| LTE Band 26 (814 – 824 MHz) (5 MHz BW) / Middle Channel 819.0 MHz / QPSK / 99%OBW |
|---|
|  <br>14:39:21 25.03.2019 |
| **LTE Band 26 (814 – 824 MHz) (5 MHz BW) / Middle Channel 819.0 MHz / QPSK / 26dB BW** |
|  <br>14:38:48 25.03.2019 |

## 2.4 PEAK-AVERAGE POWER RATIO

### 2.4.1 Specification Reference

RSS-140, Clause 4.3

### 2.4.2 Standard Applicable

RSS-140, Clause 4.3:
The equivalent radiated power (e.r.p.) for control and mobile equipment shall not exceed 30 W. The e.r.p. for portable equipment including handheld devices shall not exceed 3 W.

Fixed and base sation equipment shall comply with the e.r.p limits in SRSP-540.

In addition, the peak-to-average power ratio (PAPR) of the equipmet shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.

### 2.4.3 Equipment Under Test and Modification State

Serial No: AZ280418A00044 (MIFI8800L) / Test Configuration A

### 2.4.4 Date of Test/Initial of test personnel who performed the test

June 13, 2018 / XYZ

### 2.4.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.4.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

| | |
|---|---|
| Ambient Temperature | 24.9 °C |
| Relative Humidity | 54.2 % |
| ATM Pressure | 98.5 kPa |

### 2.4.7 Additional Observations

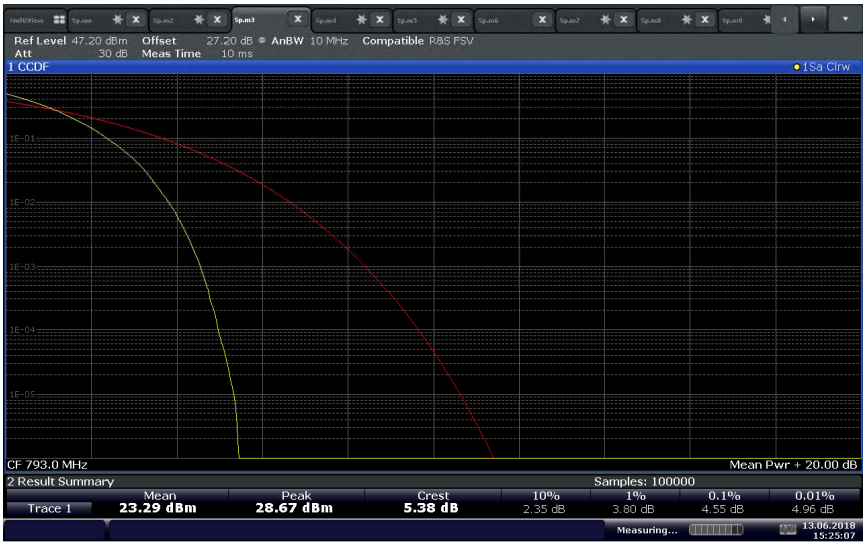
- This is a conducted test.
- As per FCC KDB 971168 D01 v03r01 clause 5.7, the PAPR was measured in accorance with ANSI C63.26 clause 5.2.3.4.
- Measurement was done using the Spectrum Analyzer's Complementary Cumulative Distribution Function (CCDF) measurement profile. The built-in function is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth (crest factor or peak-to-average ratio) A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth.
- Low, Middle and High channels for all bandwidths and modulations were verified.
- The path loss for was measured and entered as a level offset.
- There are no measured PAR levels greater than 13dB.

### 2.4.8 Test Results

| LTE Band 14 | | | | | |
|---|---|---|---|---|---|
| **Modulation** | ***Bandwidth (MHz)*** | **Channels** | **Frequency (MHz)** | **PAR (dB)** | **Limit for PAR (dB)** |
| QPSK | 5 | 23305 | 790.5 | 4.42 | 13 |
| | | 23330 | 793 | 5.38 | 13 |
| | | 23355 | 795.5 | 5.19 | 13 |
| | 10 | - | - | - | 13 |
| | | 23330 | 793 | 5.37 | 13 |
| | | - | - | - | 13 |
| 16QAM | 5 | 23305 | 790.5 | 5.62 | 13 |
| | | 23330 | 793 | 6.49 | 13 |
| | | 23355 | 795.5 | 5.9 | 13 |
| | 10 | - | - | - | 13 |
| | | 23330 | 793 | 6.66 | 13 |
| | | - | - | - | 13 |

### 2.4.9 Example Test Plots

**LTE Band 14 (5 MHz BW) / Middle Channel 793 MHz / QPSK**




15:25:07 13.06.2018

**LTE Band 14 (5 MHz BW) / Middle Channel 793 MHz / 16QAM**


15:26:19 13.06.2018

## 2.5 BAND EDGE

### 2.5.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 90, Clause 90.543 (e)(3)(5)
FCC 47 CFR Part 90, Clause 90.691
RSS-140, Clause 4.4

### 2.5.2 Standard Applicable

FCC 47 CFR Part 90.543:
(e) For operations in the 758 – 768 MHz and the 788 – 798 MHz bands, the power of any emission outside the licnsees frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(3) on any frequency between 775-778 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.
(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

FCC 47 CFR Part 90.691:
(a) Out of Band emission requirement shall apply only to the "outer" cahnnels included in an EA license and to spectrum adjacent to interiror channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenudated below the transmitter power (P) in watts by at least 116 $Log_{10}(f/6.1)$ decibels or 50 + $10Log_{10}(P)$ decibels or 80 decibels, which ever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + $10Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

RSS-140, Clause 4.4:
The power of any unwanted emission outside the bands 758-768 MHz band and the 788-798 MHz shall be attenuated below the transmitter output power P in dBw as follows, where p is the transmitter output power in watts:

a) For any frequency between 769-775 MHz and 799-806 MHz:
   ii) 65 + 10 log (p), dB in a 6.25 kHz band for mobile and portable/hand-held equipment
b) For any frequeny between 775–788 MHz, above 806 MHz, and below 758 MHz:
   43 + 10 log (P), dB in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjactent to the frequency bands 758-768 MHz and 788-798 MHz, a resolution bandwidth of 30 kHz may be employed.

In addition, the equivalent isotropically radiated power (e.i.r.p.) of all emissions, including harmonics in the band 1559-1610 MHz, shall not exceed −70 dBW/MHz for wideband emissions, and −80 dBW/kHz for discrete emissions of less than 700 Hz bandwidth.

### 2.5.3 Equipment Under Test and Modification State

Serial No: AT071218B00062 (MIFI8000), AZ280418A00044 (MIFI8800L) / Test Configuration A

### 2.5.4 Date of Test/Initial of test personnel who performed the test

March 26, 2019 / XYZ
July 17, 2018 / XYZ

### 2.5.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.5.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

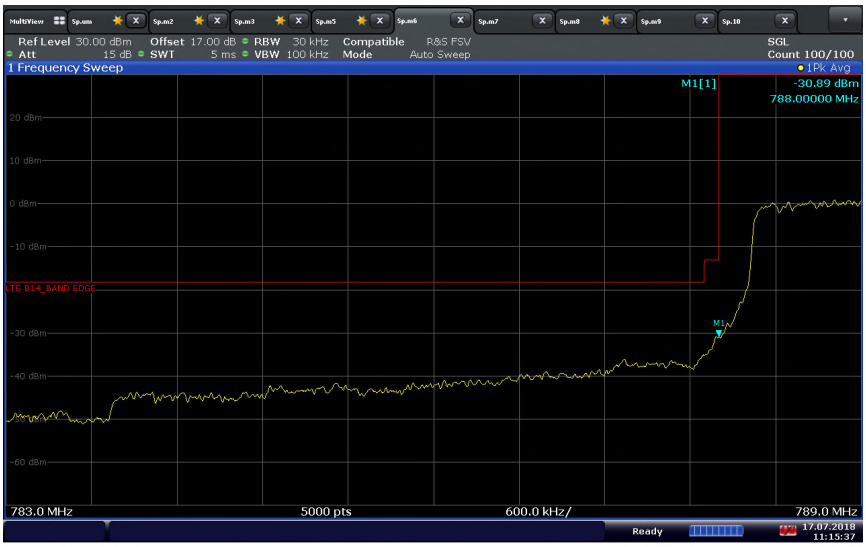
| | |
|---|---|
| Ambient Temperature | 22.6 - 24.9 °C |
| Relative Humidity | 48.7 - 53.7 % |
| ATM Pressure | 99.0 - 99.2 kPa |

### 2.5.7 Additional Observations

- This is a conducted test.
- The path loss were measured and entered as a level offset.
- For LTE Band 14, RBW is set to 30 kHz and VBW is set to 3 x RBW. for emissions more than 1.0 MHz outside the equipment's operating frequency block, the limit is set to:
  -13 + 10lg (30k/100k) dBm.
- For LTE Band 26, RBW is set to 1% of Emission Bandwidth and VBW is set to 3 x RBW. For emissions more than 3.75 kHz outside the equipment's operating frequency block, the limit is set to:
  -13 + 10lg ($RBW_{used}$/100kHz) dBm.
- All RB size available verified and only the worst case modulation (QPSK) for band edge verification presented in this test report.

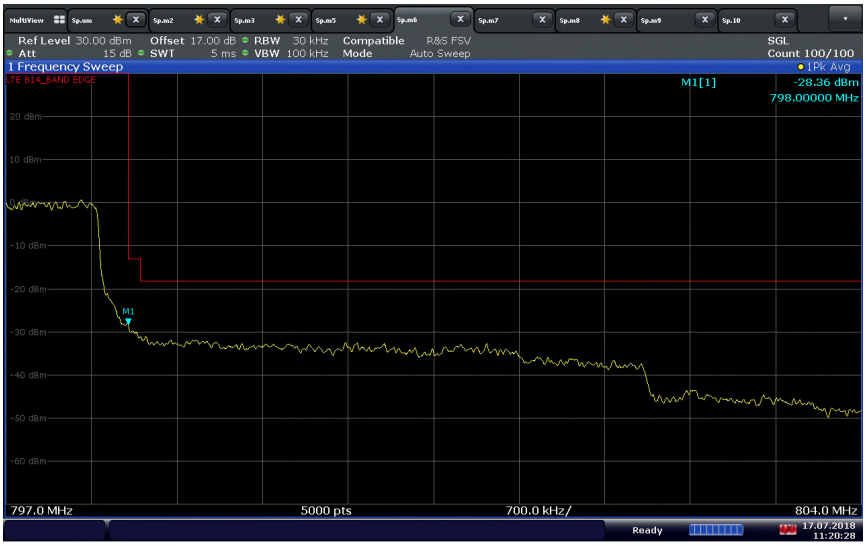
### 2.5.8 Test Results

**LTE Band 14 (5 MHz BW)/QPSK/Low Channel 790.5 MHz/Full RB Band Edge @788 MHz**

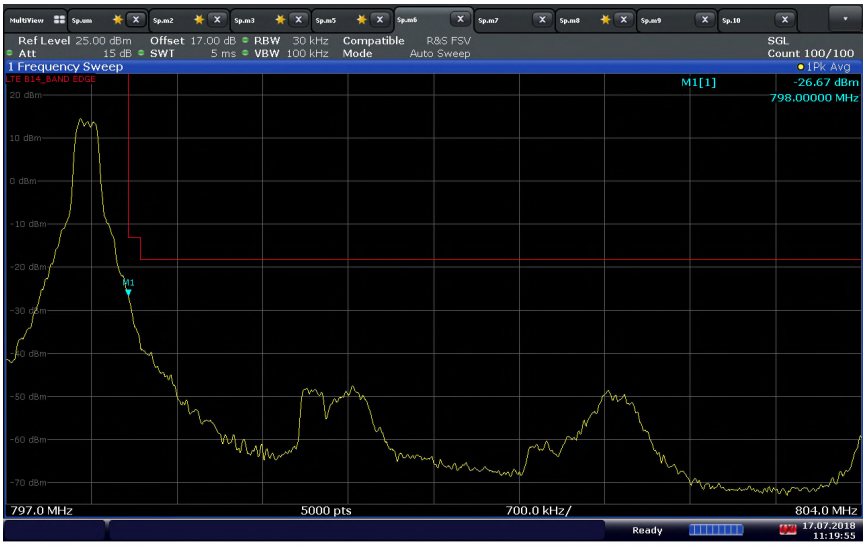



11:15:38 17.07.2018

**LTE Band 14 (5 MHz BW)/QPSK/High Channel 795.5 MHz/Full RB Band Edge @798 MHz**



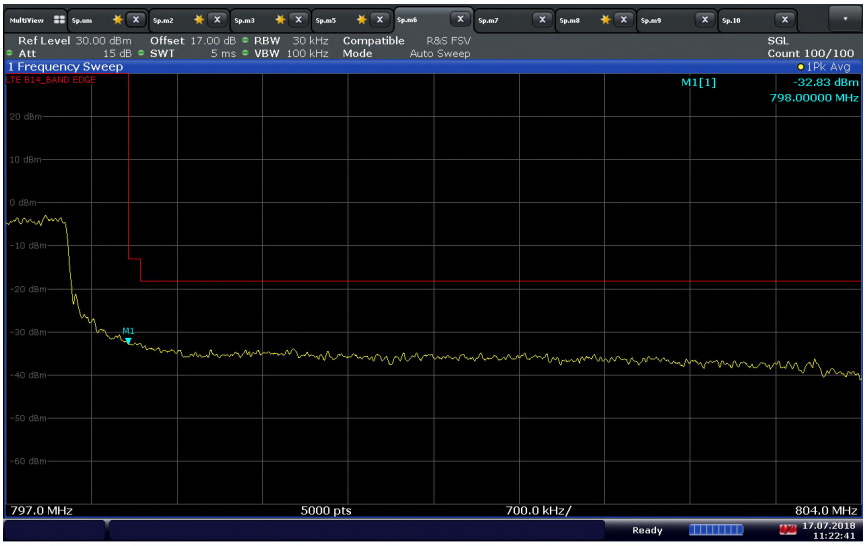

11:20:29 17.07.2018

| LTE Band 14 (5 MHz BW)/QPSK/Low Channel 790.5 MHz/1 RB 0 offset Band Edge @777 MHz |
|---|
|  <br>11:16:19 17.07.2018 |
| **LTE Band 14 (5 MHz BW)/QPSK/High Channel 795.5 MHz/1 RB 24 offset Band Edge @787 MHz** |
|  <br>11:19:55 17.07.2018 |

**LTE Band 14 (10 MHz BW)/QPSK/Middle Channel 793 MHz/Full RB Low Band Edge @788 MHz**

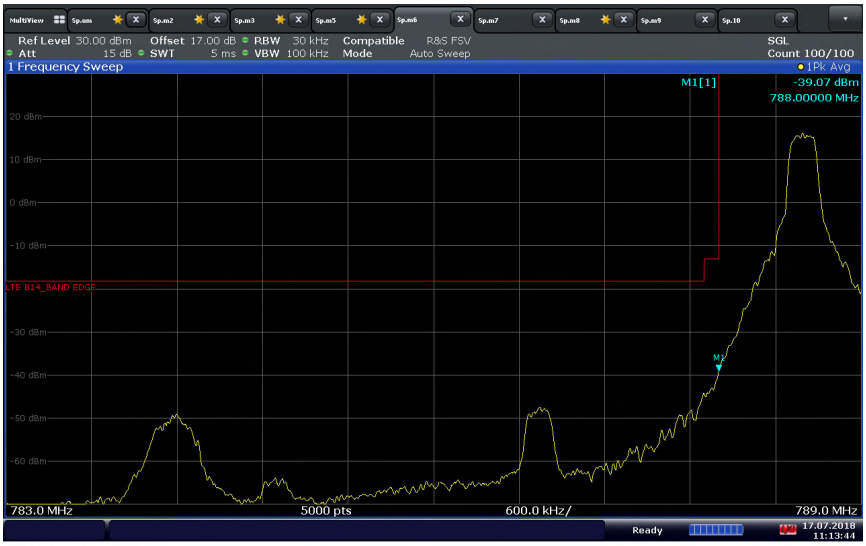

11:12:38 17.07.2018

**LTE Band 14 (10 MHz BW)/QPSK/Middle Channel 793 MHz/Full RB High Band Edge @798 MHz**




11:22:42 17.07.2018

**LTE Band 14 (10 MHz BW)/QPSK/Middle Channel 793 MHz/1 RB 0 offset Low Band Edge @788 MHz**




11:13:44 17.07.2018

**LTE Band 14 (10 MHz BW)/QPSK/Middle Channel 793 MHz/1 RB 49 offset Low Band Edge @798 MHz**


11:22:10 17.07.2018

**LTE Band 26 (814-824 MHz) (1.4 MHz BW)/QPSK/Low Channel 814.7 MHz/Full RB Band Edge @814 MHz**


14:13:07 26.03.2019

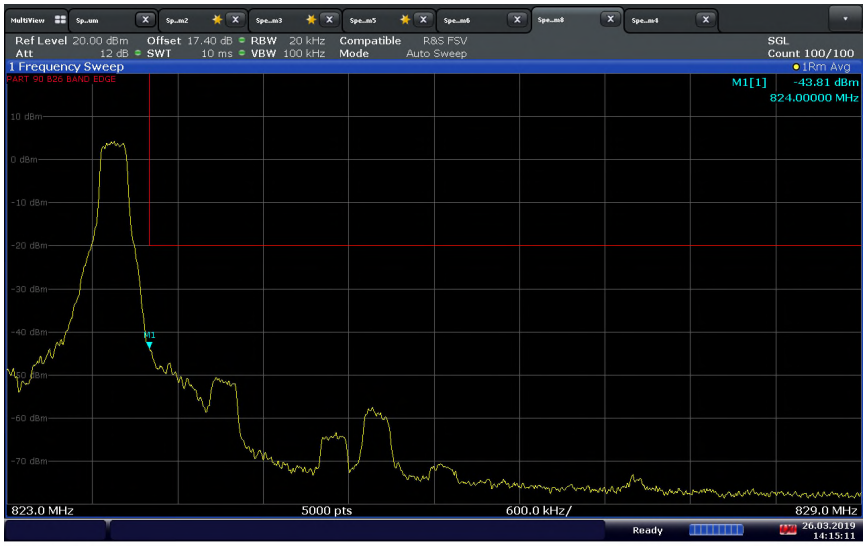
**LTE Band 26 (814-824 MHz) (1.4 MHz BW)/QPSK/High Channel 823.3 MHz/Full RB Band Edge @824 MHz**


14:14:34 26.03.2019

**LTE Band 26 (814-824 MHz) (1.4 MHz BW)/QPSK/Low Channel 814.7 MHz/1 RB 0 offset Band Edge @814 MHz**


14:12:31 26.03.2019

**LTE Band 26 (814-824 MHz) (1.4 MHz BW)/QPSK/High Channel 823.3 MHz/1 RB 5 offset Band Edge @824 MHz**




14:15:11 26.03.2019

**LTE Band 26 (814-824 MHz) (3 MHz BW)/QPSK/Low Channel 815.5 MHz/Full RB Band Edge @814 MHz**


14:08:36 26.03.2019

**LTE Band 26 (814-824 MHz) (3 MHz BW)/QPSK/High Channel 822.5 MHz/Full RB Band Edge @824 MHz**


14:07:28 26.03.2019

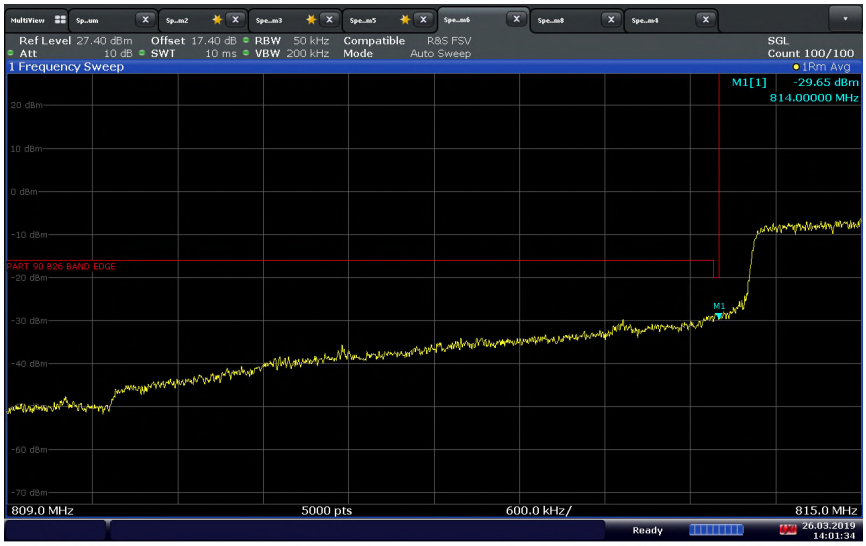
**LTE Band 26 (814-824 MHz) (3 MHz BW)/QPSK/Low Channel 815.5 MHz/1 RB 0 offset Band Edge @814 MHz**


14:09:55 26.03.2019

**LTE Band 26 (814-824 MHz) (3 MHz BW)/QPSK/High Channel 822.5 MHz/1 RB 14 offset Band Edge @824 MHz**

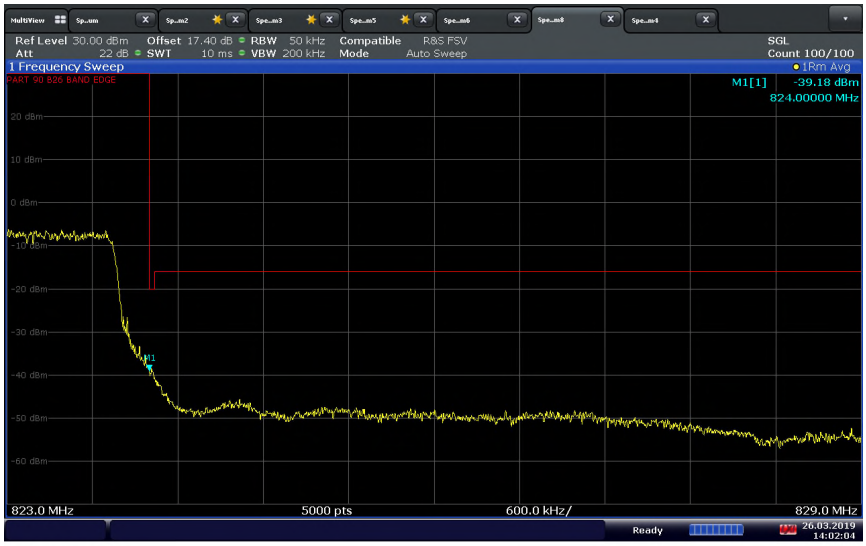

14:05:52 26.03.2019

**LTE Band 26 (814-824 MHz) (5 MHz BW)/QPSK/Low Channel 816.5 MHz/Full RB Band Edge @814 MHz**



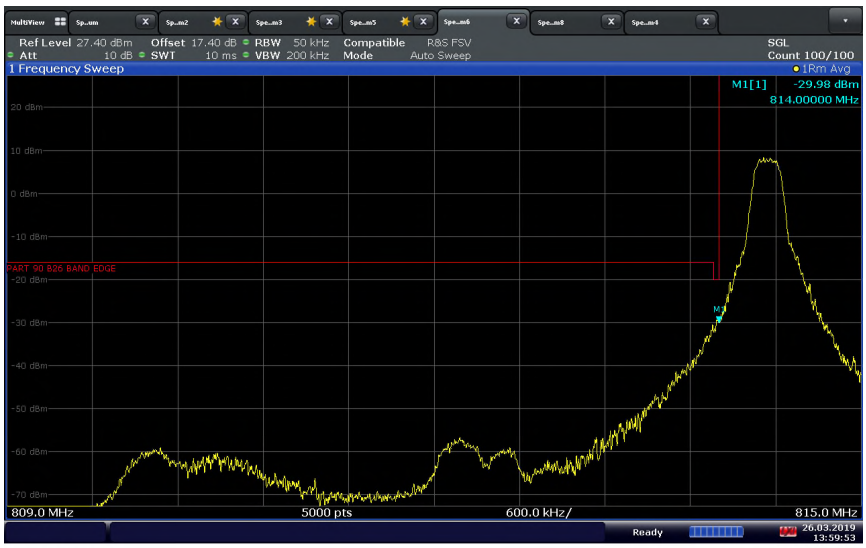

14:01:34 26.03.2019

**LTE Band 26 (814-824 MHz) (5 MHz BW)/QPSK/High Channel 821.5 MHz/Full RB Band Edge @824 MHz**



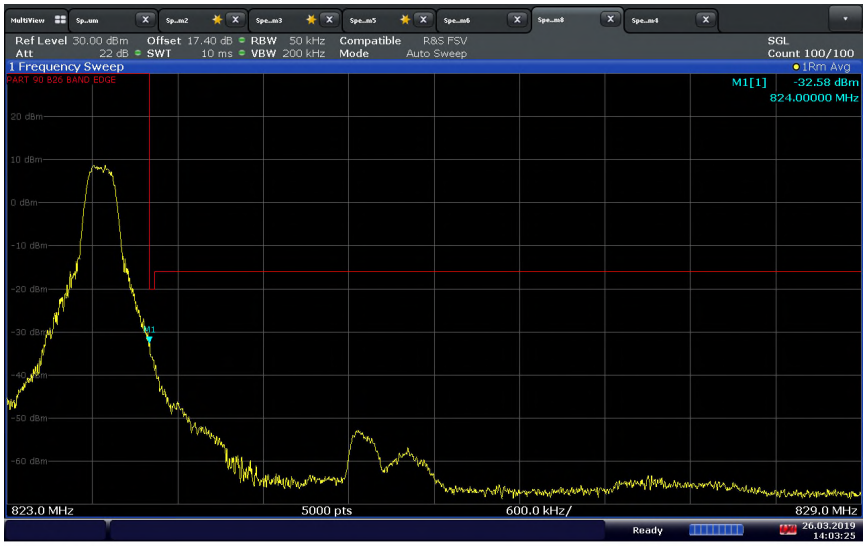

14:02:05 26.03.2019

**LTE Band 26 (814-824 MHz) (5 MHz BW)/QPSK/Low Channel 816.5 MHz/1 RB 0 offset Band Edge @814 MHz**



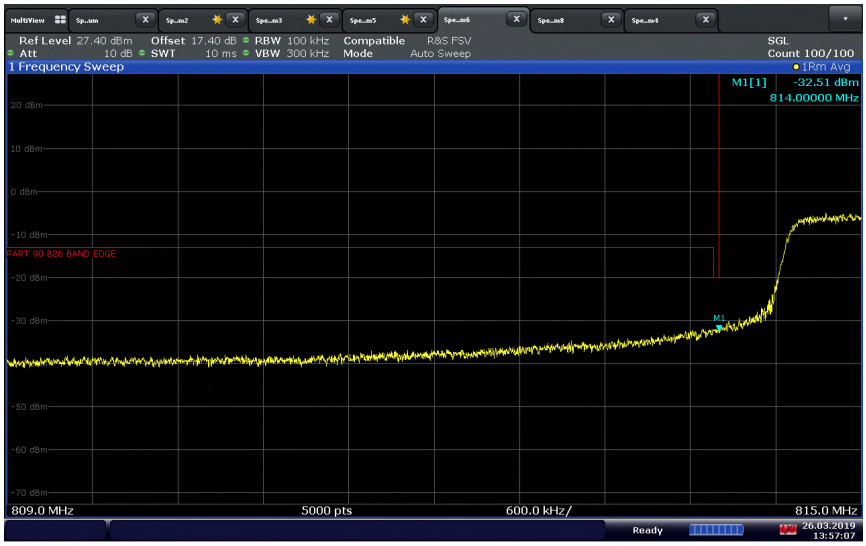

13:59:53 26.03.2019

**LTE Band 26 (814-824 MHz) (5 MHz BW)/QPSK/High Channel 821.5 MHz/1 RB 24 offset Band Edge @824 MHz**



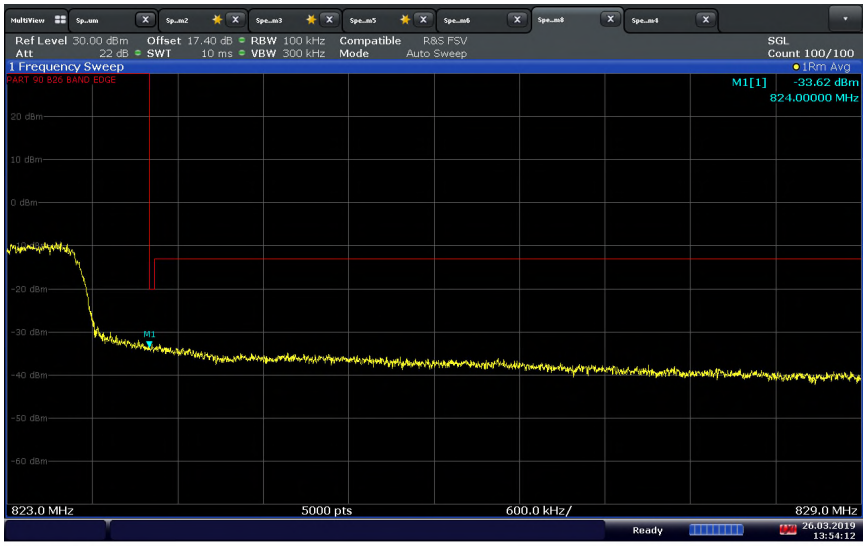

14:03:26 26.03.2019

**LTE Band 26 (814-824 MHz) (10 MHz BW)/QPSK/Middle Channel 819 MHz/Full RB Low Band Edge @814 MHz**

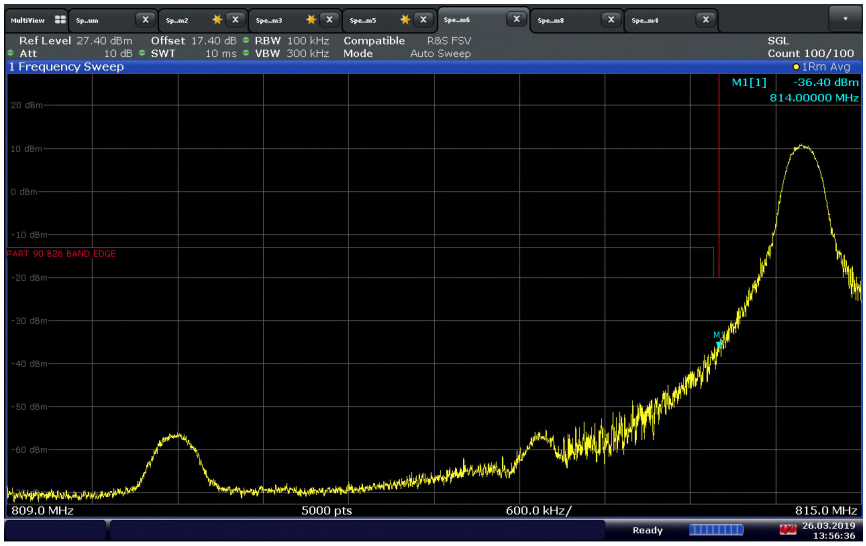
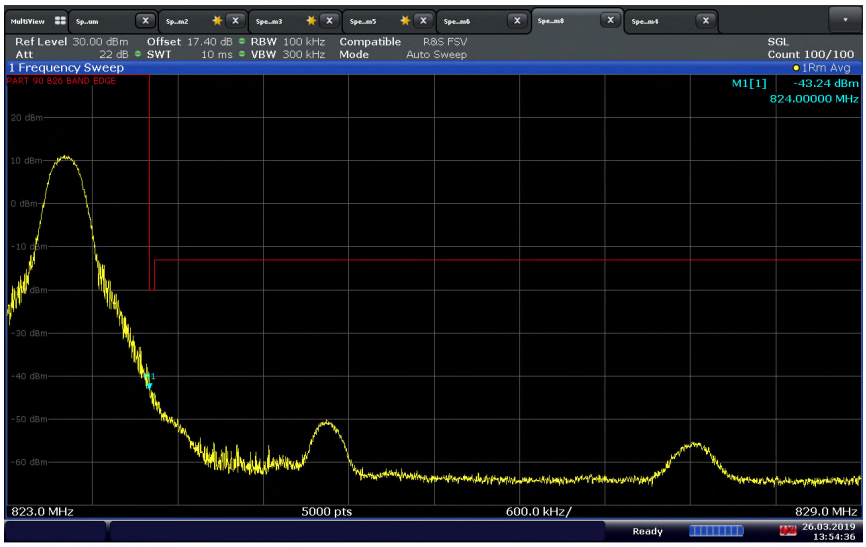



13:57:08 26.03.2019

**LTE Band 26 (814-824 MHz) (10 MHz BW)/QPSK/Middle Channel 819 MHz/Full RB High Band Edge @824 MHz**




13:54:13 26.03.2019

| LTE Band 26 (814-824 MHz) (10 MHz BW)/QPSK/Middle Channel 819 MHz/1 RB 0 offset Low Band Edge @814 MHz |
|---|
|  <br>13:56:37 26.03.2019 |
| **LTE Band 26 (814-824 MHz) (10 MHz BW)/QPSK/Middle Channel 819 MHz/1 RB 49 offset Low Band Edge @824 MHz** |
|  <br>13:54:37 26.03.2019 |

## 2.6 CONDUCTED SPURIOUS EMISSIONS

### 2.6.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 90, Clause 90.543 (e)(2)(3)(4)(5)(f)
FCC 47 CFR Part 90, Clause 90.691(a)
RSS-140, Clause 4.4

### 2.6.2 Standard Applicable

FCC 47 CFR Part 90.543:
(e) For operations in the 758 – 768 MHz and the 788 – 798 MHz bands, the power of any emission outside the licnsees frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) on any frequency between 775-778 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

(f) For operations in the 758–775 MHz and 788–805 MHz bands, all emissions including harmonics in the band 1559–1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

FCC 47 CFR Part 90.691:
(a) Out of Band emission requirement shall apply only to the “outer” cahnnels included in an EA license and to spectrum adjacent to interiror channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee’s frequency block by up to and including 37.5 kHz, the power of any emission shall be attenudated below the transmitter power (P) in watts by at least 116 $Log_{10}(f/6.1)$ decibels or 50 + $10Log_{10}(P)$ decibels or 80 decibels, which ever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee’s frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + $10Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

RSS-140, Clause 4.4:
The power of any unwanted emission outside the bands 758-768 MHz band and the 788-798 MHz shall be attenuated below the transmitter output power P in dBw as follows, where p is the transmitter output power in watts:

c) For any frequency between 769-775 MHz and 799-806 MHz:
ii) 65 + 10 log (p), dB in a 6.25 kHz band for mobile and portable/hand-held equipment

d) For any frequeny between 775–788 MHz, above 806 MHz, and below 758 MHz:
43 + 10 log (P), dB in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjactent to the frequency bands 758-768 MHz and 788-798 MHz, a resolution bandwidth of 30 kHz may be employed.

In addition, the equivalent isotropically radiated power (e.i.r.p.) of all emissions, including harmonics in the band 1559-1610 MHz, shall not exceed −70 dBW/MHz for wideband emissions, and −80 dBW/kHz for discrete emissions of less than 700 Hz bandwidth.

### 2.6.3 Equipment Under Test and Modification State

AT071218B00062 (MIFI8000), AZ280418A00044 (MIFI8800L) / Test Configuration A

### 2.6.4 Date of Test/Initial of test personnel who performed the test

March 26, 2019 / ZXY
June 23, 2018 / ZXY

### 2.6.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.6.6 Environmental Conditions/ Test Location

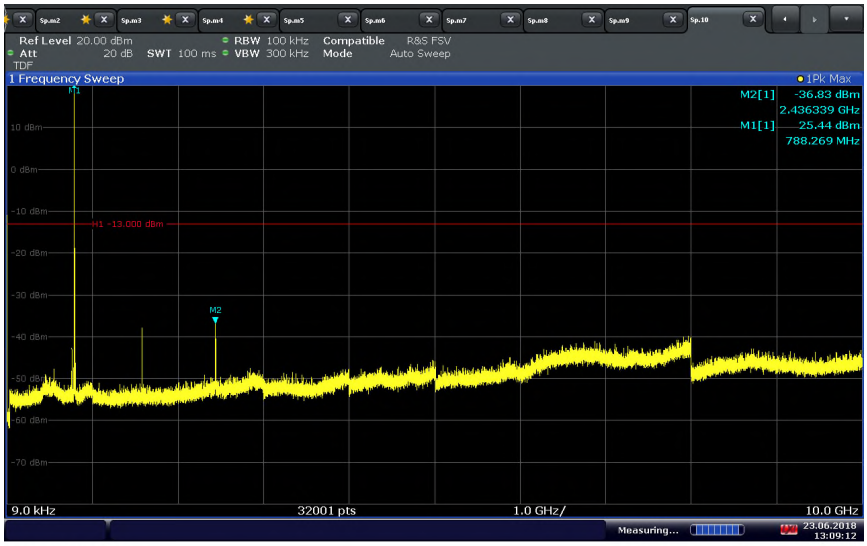
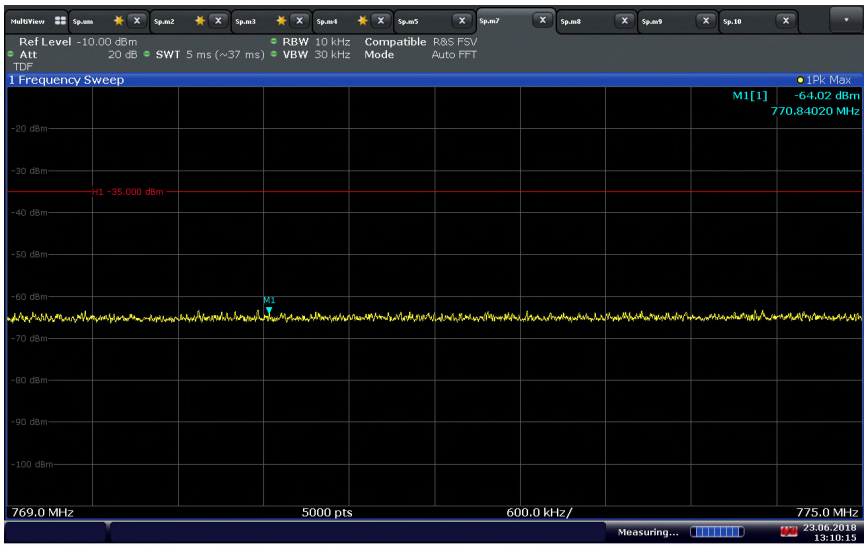
Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

| | |
|---|---|
| Ambient Temperature | 22.6 - 25.6 °C |
| Relative Humidity | 48.7 - 51.6 % |
| ATM Pressure | 98.6 - 99.2 kPa |

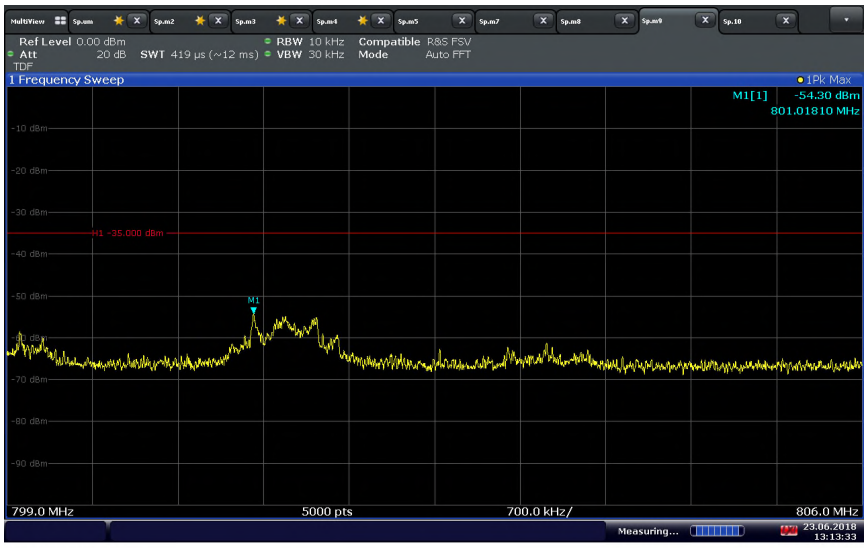
### 2.6.7 Additional Observations

- This is a conducted test.
- The path loss was measured and entered as a transducer factor (TDF).
- The spectrum was searched from 30MHz to the 10$^{th}$ harmonic (10GHz).
- Low, Middle and High channels on all channel bandwidth and modulation are verified. Only the worst case channel of each band presented.

### 2.6.8 Example Test Results

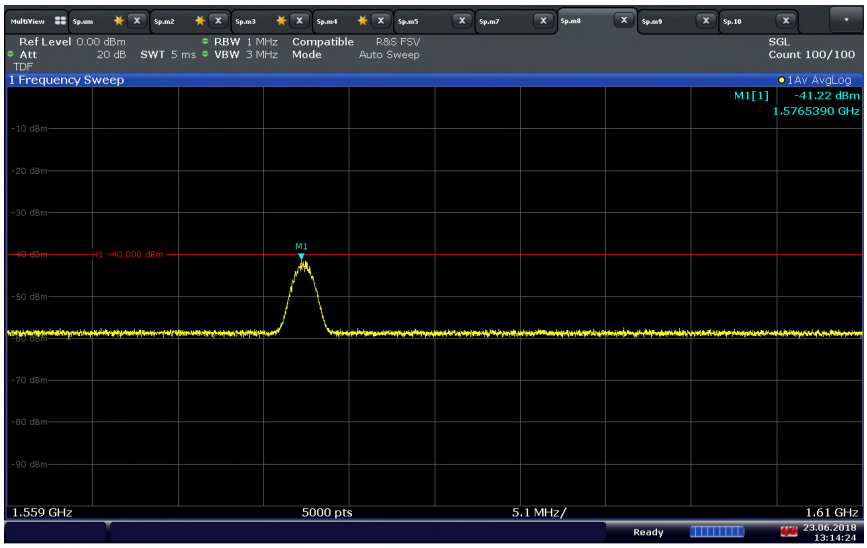
| LTE Band 14 (5 MHz BW)/QPSK/Low Channel 790.5 MHz |
|---|
|  <br>13:09:13 23.06.2018 |
| **LTE Band 14 (5 MHz BW)/QPSK/Low Channel 790.5 MHz Conducted Spurious Emissions (769-775 MHz)** |
|  <br>13:10:16 23.06.2018 |

**LTE Band 14 (5 MHz BW)/QPSK/Low Channel 790.5 MHz Conducted Spurious Emissions (799-806 MHz)**



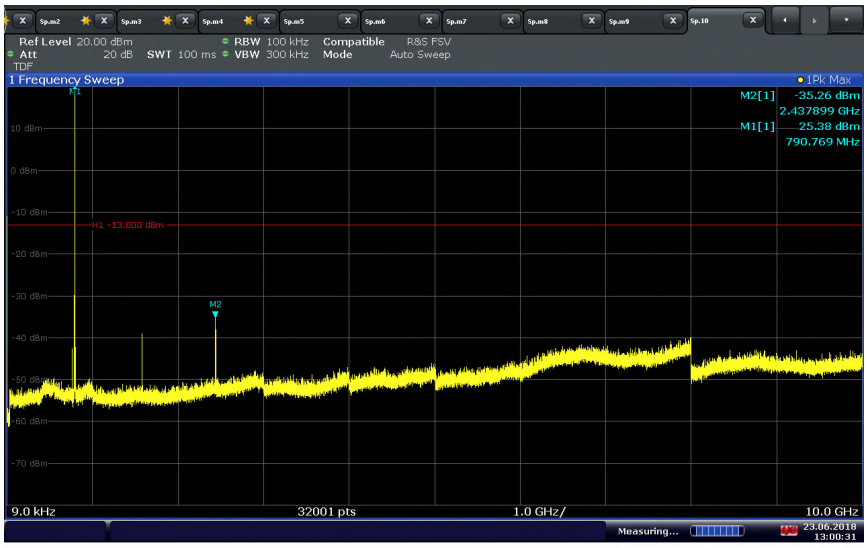

13:13:33 23.06.2018

**LTE Band 14 (5 MHz BW)/QPSK/Low Channel 790.5 MHz Conducted Spurious Emissions (1559-1610 MHz)**



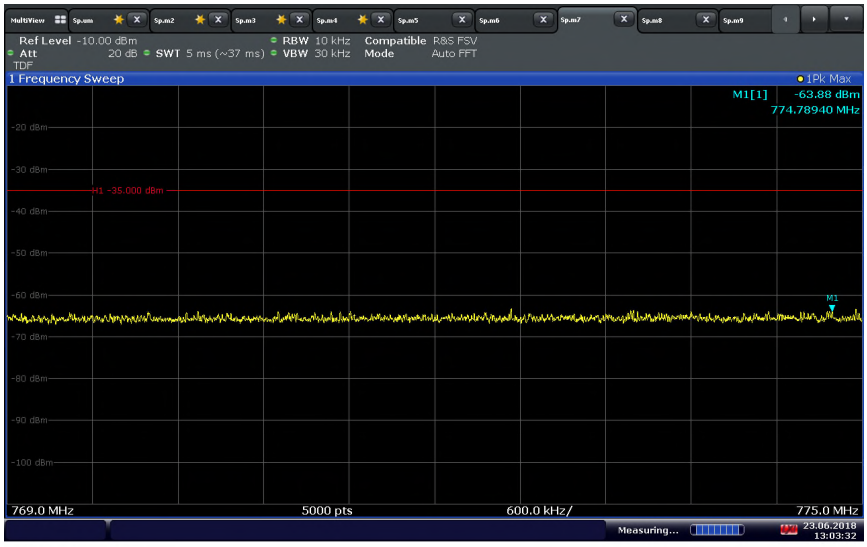

13:14:24 23.06.2018

**LTE Band 14 (5 MHz BW)/QPSK/Middle Channel 793 MHz**



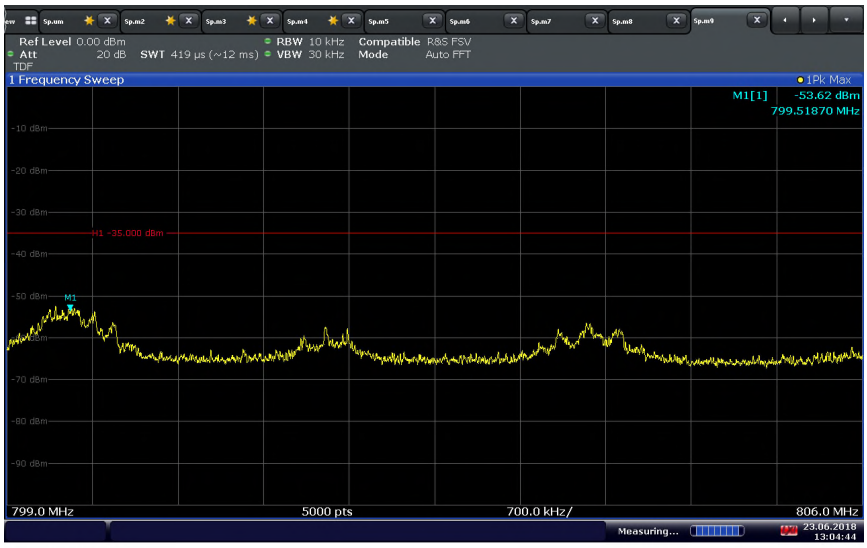

13:00:32 23.06.2018

**LTE Band 14 (5 MHz BW)/QPSK/Middle Channel 793 MHz Conducted Spurious Emissions (769-775 MHz)**



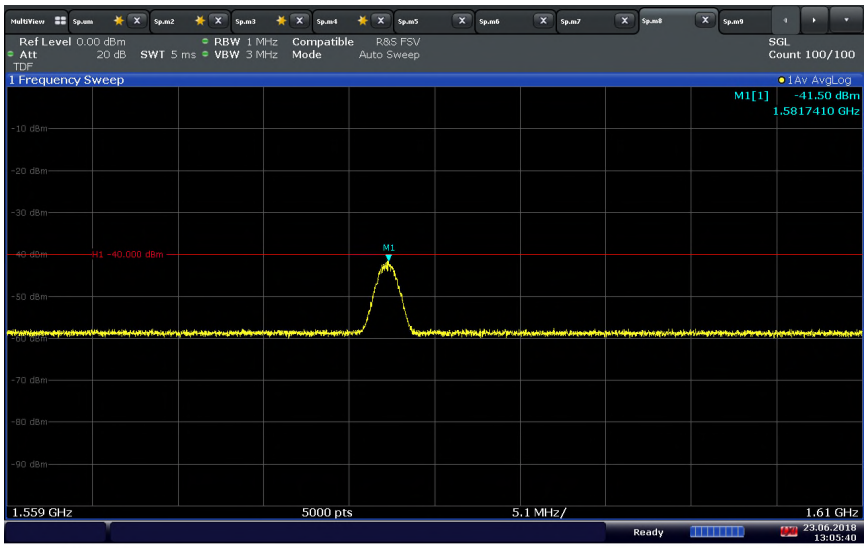

13:03:32 23.06.2018

**LTE Band 14 (5 MHz BW)/QPSK/Middle Channel 793 MHz Conducted Spurious Emissions (799-806 MHz)**

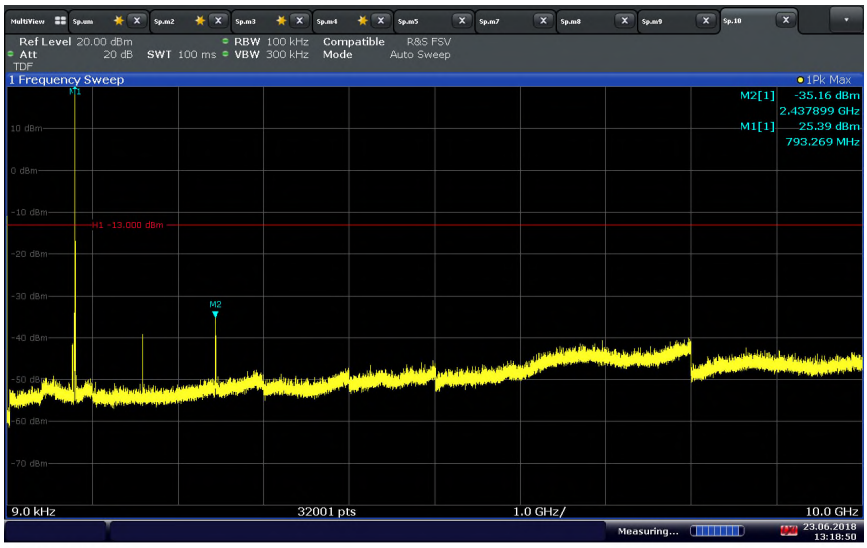
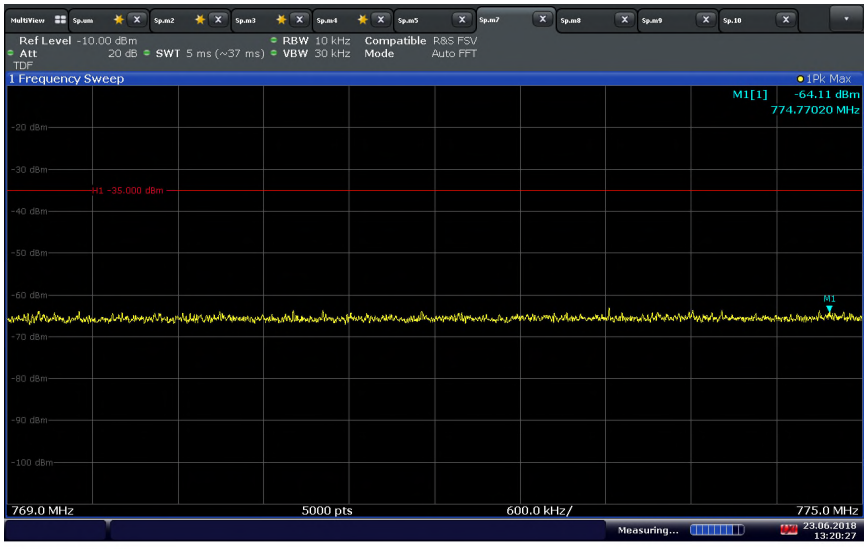


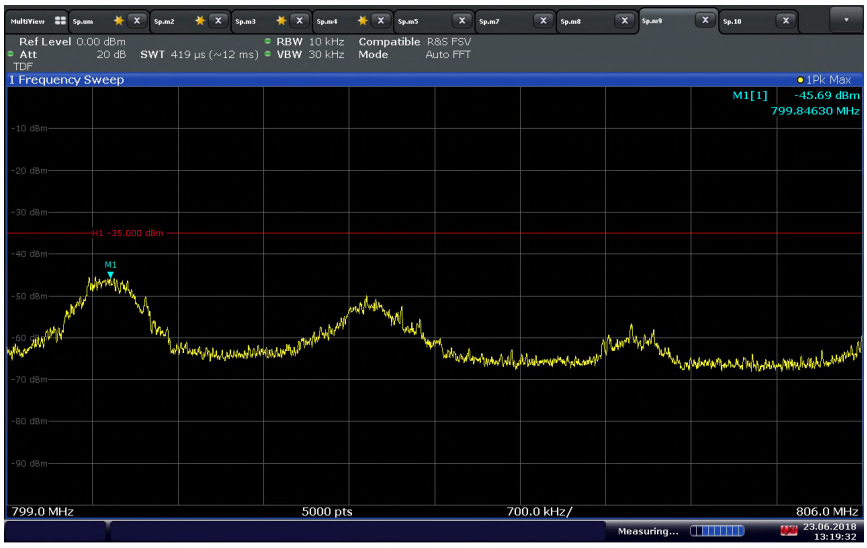
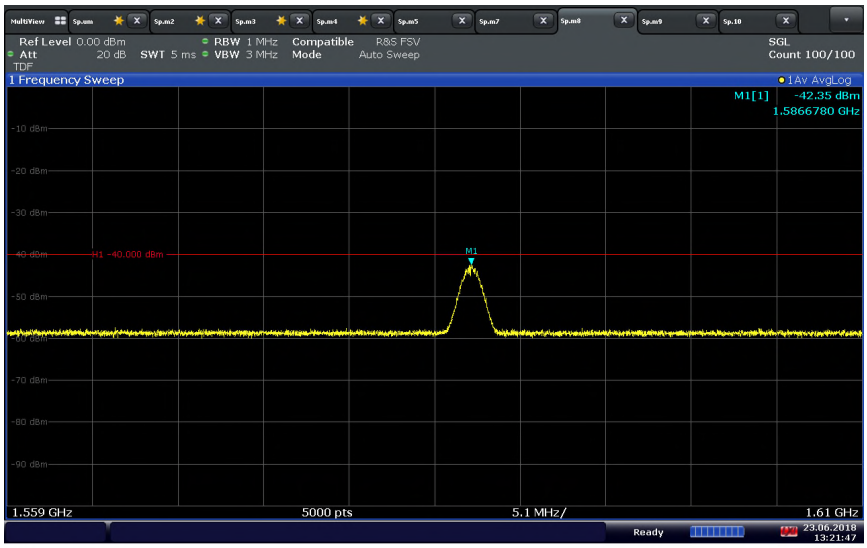

13:04:44 23.06.2018

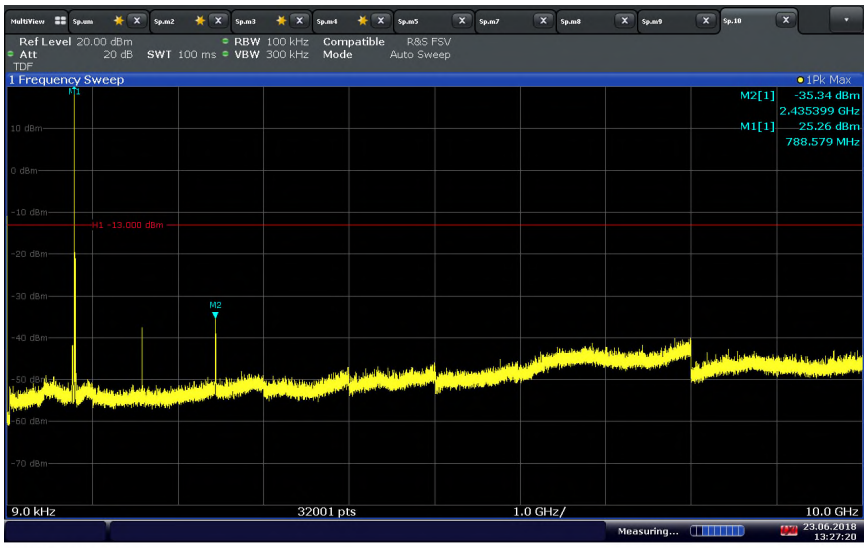
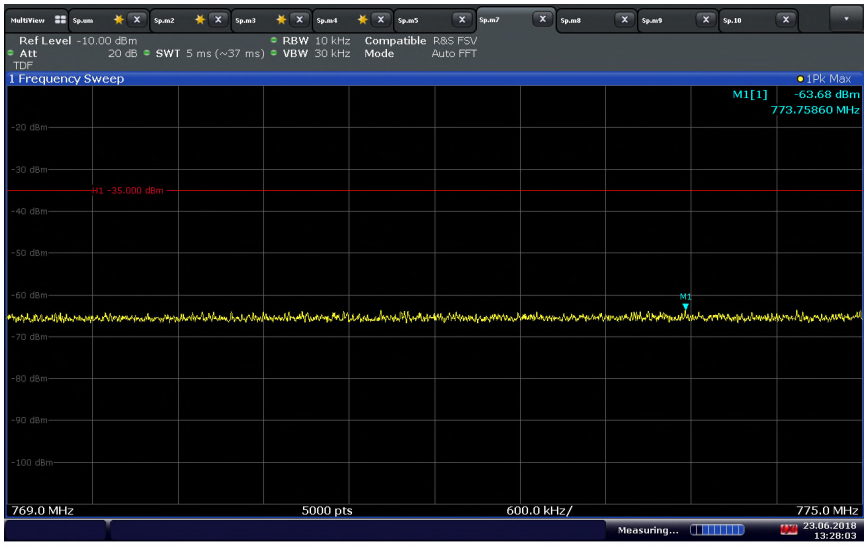
**LTE Band 14 (5 MHz BW)/QPSK/Middle Channel 793 MHz Conducted Spurious Emissions (1559-1610 MHz)**



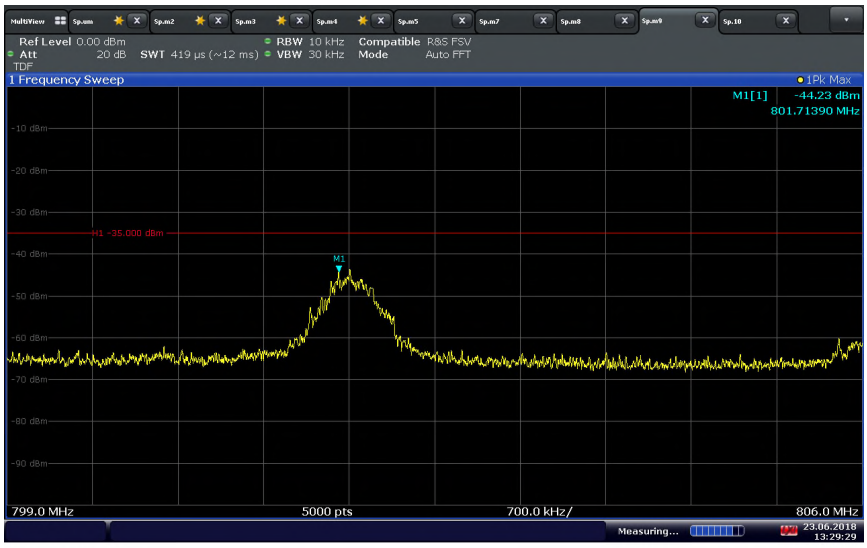

13:05:41 23.06.2018

| LTE Band 14 (5 MHz BW)/QPSK/High Channel 795.5 MHz |
|---|
|  |
| **LTE Band 14 (5 MHz BW)/QPSK/High Channel 795.5 MHz Conducted Spurious Emissions (769-775 MHz)** |
|  |

| LTE Band 14 (5 MHz BW)/QPSK/High Channel 795.5 MHz Conducted Spurious Emissions (799-806 MHz) |
|---|
|  <br>13:19:33 23.06.2018 |
| LTE Band 14 (5 MHz BW)/QPSK/High Channel 795.5 MHz Conducted Spurious Emissions (1559-1610 MHz) |
|  <br>13:21:47 23.06.2018 |

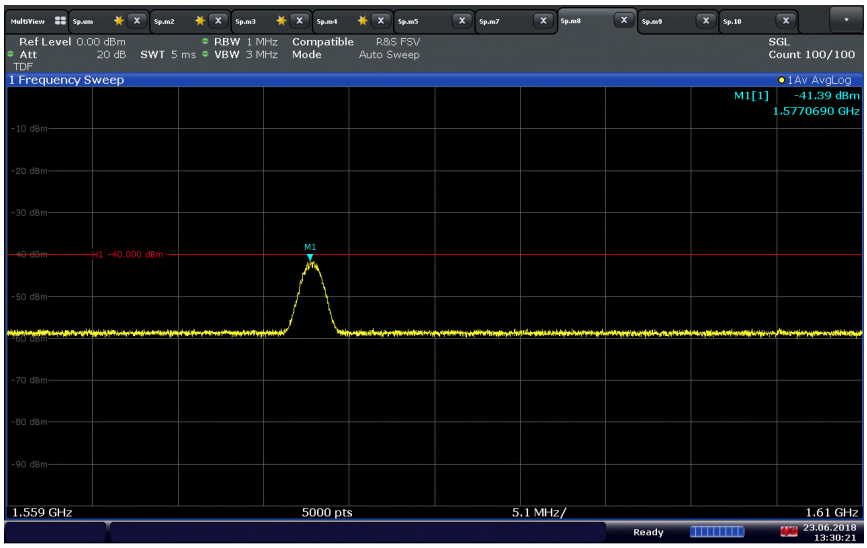
| LTE Band 14 (10 MHz BW)/QPSK/Middle Channel 793 MHz |
|---|
|  |
| **LTE Band 14 (10 MHz BW)/QPSK/Middle Channel 793 MHz Conducted Spurious Emissions (769-775 MHz)** |
|  |

**LTE Band 14 (10 MHz BW)/QPSK/Middle Channel 793 MHz Conducted Spurious Emissions (799-806 MHz)**

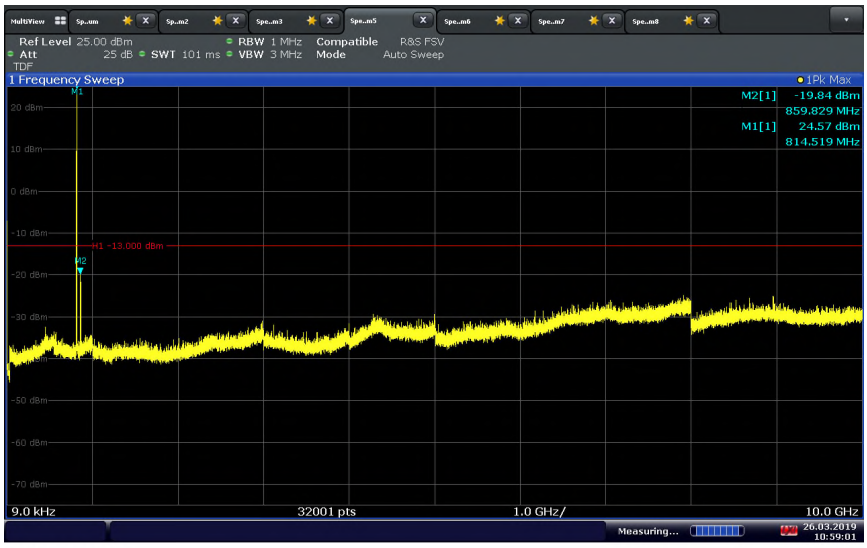


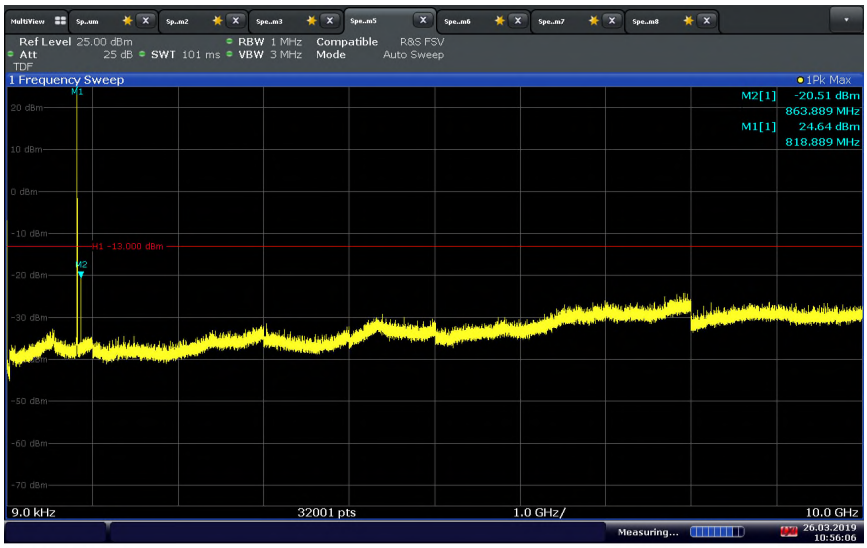

13:29:30 23.06.2018

**LTE Band 14 (10 MHz BW)/QPSK/Middle Channel 793 MHz Conducted Spurious Emissions (1559-1610 MHz)**




13:30:22 23.06.2018

| LTE Band 26 (814 – 824 MHz) (1.4 MHz BW)/QPSK/Low Channel 814.7 MHz Conducted Spurious Emissions |
|---|
|  <br>10:59:01 26.03.2019 |

| LTE Band 26 (816 – 824 MHz) (1.4 MHz BW)/QPSK/Middle Channel 819 MHz Conducted Spurious Emissions |
|---|
|  <br>10:56:06 26.03.2019 |

**LTE Band 26 (816 – 824 MHz) (1.4 MHz BW)/QPSK/High Channel 823.3 MHz Conducted Spurious Emissions**


10:59:38 26.03.2019

## 2.7 FIELD STRENGTH OF SPURIOUS RADIATION

### 2.7.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1053
FCC 47 CFR Part 90, Clause 90.543(e)
FCC 47 CFR Part 90, Clause 90.691
RSS-140, Clause 4.4

### 2.7.2 Standard Applicable

FCC 47 CFR Part 90.543
(e) For operations in the 758 – 768 MHz and the 788 – 798 MHz bands, the power of any emission outside the licnsees frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769 – 775 MHz and 799 – 805 MHz, by a factor not less than 76 + 10 log(P) dB in a 6.25 kHz band segment, for base and fiexed stations.
(2) On all frequency between 769 – 775 MHz and 799 – 805 MHz, by a factor not less than 65 + 10 log(P) dB in a 6.25 kHz band segment, for mobile and portable stations.
(3) On any frequency between 775 – 788 MHz, above 805 MHz, and below 758 MHz, by at leaset 43 + 10 log(P) dB.

FCC 47 CFR Part 90.691:
(a) Out of Band emission requirement shall apply only to the “outer” cahnnels included in an EA license and to spectrum adjacent to interiror channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee’s frequency block by up to and including 37.5 kHz, the power of any emission shall be attenudated below the transmitter power (P) in watts by at least 116 $Log_{10}(f/6.1)$ decibels or 50 + $10Log_{10}(P)$ decibels or 80 decibels, which ever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee’s frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + $10Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

RSS-140, Clause 4.4:
The power of any unwanted emission outside the bands 758 – 768 MHz and 788 – 798 MHz shall be attenuated below the transmitter output ower P in dBW as follows, where p is the transmitter output power in watts:

a) For any frequency between 769 – 775 MHz and 799 – 806 MHz:
i) 76 + 10 $\log_{10}$ P, dB in a 6.25 kHz band for fixed and base station equipment
ii) 65 + 10 log10 P, dB in a 6.25 kHz band for mobile and portable/hand-held equipment.

b) For any frequency between 775 – 788 MHz, above 806 MHz, and below 758 MHz:
43 + 10 $\log_{10}(P)$, dB in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency bands 758 – 768 MHz and 788 – 798 MHz, a resolution bandwidth of 30 kHz may be employed.

### 2.7.3 Equipment Under Test and Modification State

Serial No: AT071218B00062 (MIFI8000), AZ280418A00044 (MIFI8800L) / Test Configuration B

### 2.7.4 Date of Test/Initial of test personnel who performed the test

April 01, 2019 / XYZ
July 14 and 18, 2018 / XYZ

### 2.7.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.7.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

| | |
|---|---|
| Ambient Temperature | 24.7 - 25.7°C |
| Relative Humidity | 29.6 - 54.8 % |
| ATM Pressure | 98.7 - 99.1 kPa |

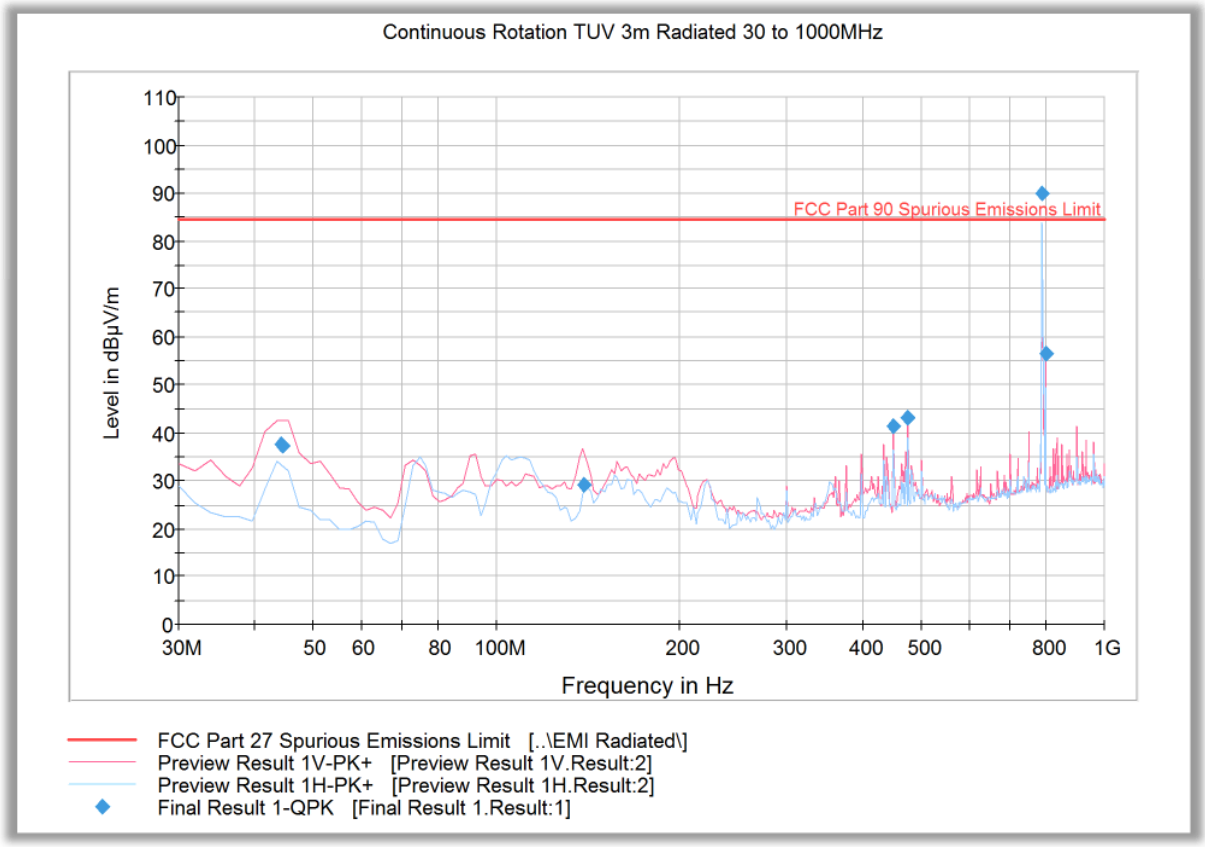
### 2.7.7 Additional Observations

- This is a radiated test using substitution method as per Unwanted Emissions: Radiated Spurious method of measurement of ANSI/TIA/EIA-603-C 2004, August 17, 2004.
- Emissions within 6dB of the limit will be proven by substitution method.
- This is cabinet spurious emissions testing. Main antenna port was terminated during the test. Fundamental frequency measurement will be ignored for this test.
- Only the worst case configuration presented in this test report.
- There are no emissions found that doesn't comply with -13dBW limit in the 788-798 MHz frequency range. This limit corresponds to 84.4dBµV/m @ 3 meters.
- Measurement was done using EMC32 V8.53 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

### 2.7.8 Test Results

Compliant. See attached plots.

### 2.7.9 Radiated Emission Test Results Below 1GHz – Worst Case LTE Band 14_5MHz Bandwidth_Low Channel 790.5 MHz_1 RB 0 offset_QPSK

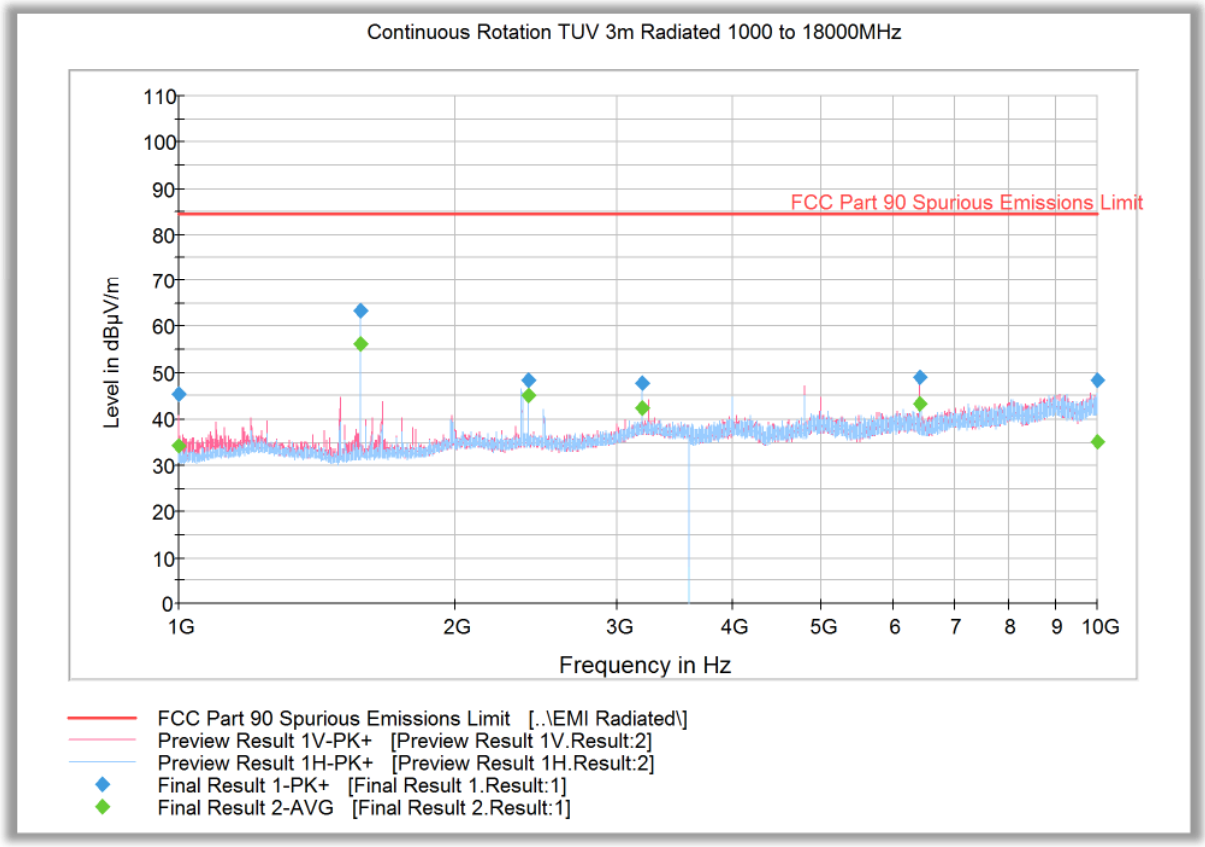



**Quasi Peak Data**

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 44.223327 | 37.8 | 1000.0 | 120.000 | 100.0 | V | 154.0 | -13.8 | 46.6 | 84.4 |
| 44.471102 | 37.4 | 1000.0 | 120.000 | 100.0 | V | 75.0 | -13.8 | 47.0 | 84.4 |
| 138.897715 | 29.2 | 1000.0 | 120.000 | 100.0 | V | 275.0 | -15.1 | 55.2 | 84.4 |
| 449.999760 | 41.4 | 1000.0 | 120.000 | 201.0 | V | 93.0 | -3.1 | 43.0 | 84.4 |
| 474.990301 | 43.0 | 1000.0 | 120.000 | 201.0 | V | 113.0 | -1.4 | 41.4 | 84.4 |
| 788.356232 | 89.9 | 1000.0 | 120.000 | 100.0 | H | 134.0 | 4.3 | Fundamental Carrier* | |
| 800.003447 | 56.5 | 1000.0 | 120.000 | 100.0 | V | 185.0 | 4.1 | 27.9 | 84.4 |

***** This is the fundamental frequency not part of spurious emission evaluation. Data provided for information purpose only.

### 2.7.10 Radiated Emission Test Results Above 1GHz – Worst Case LTE Band 14_5MHz Bandwidth_Low Channel 790.5 MHz_1 RB 0 offset_QPSK



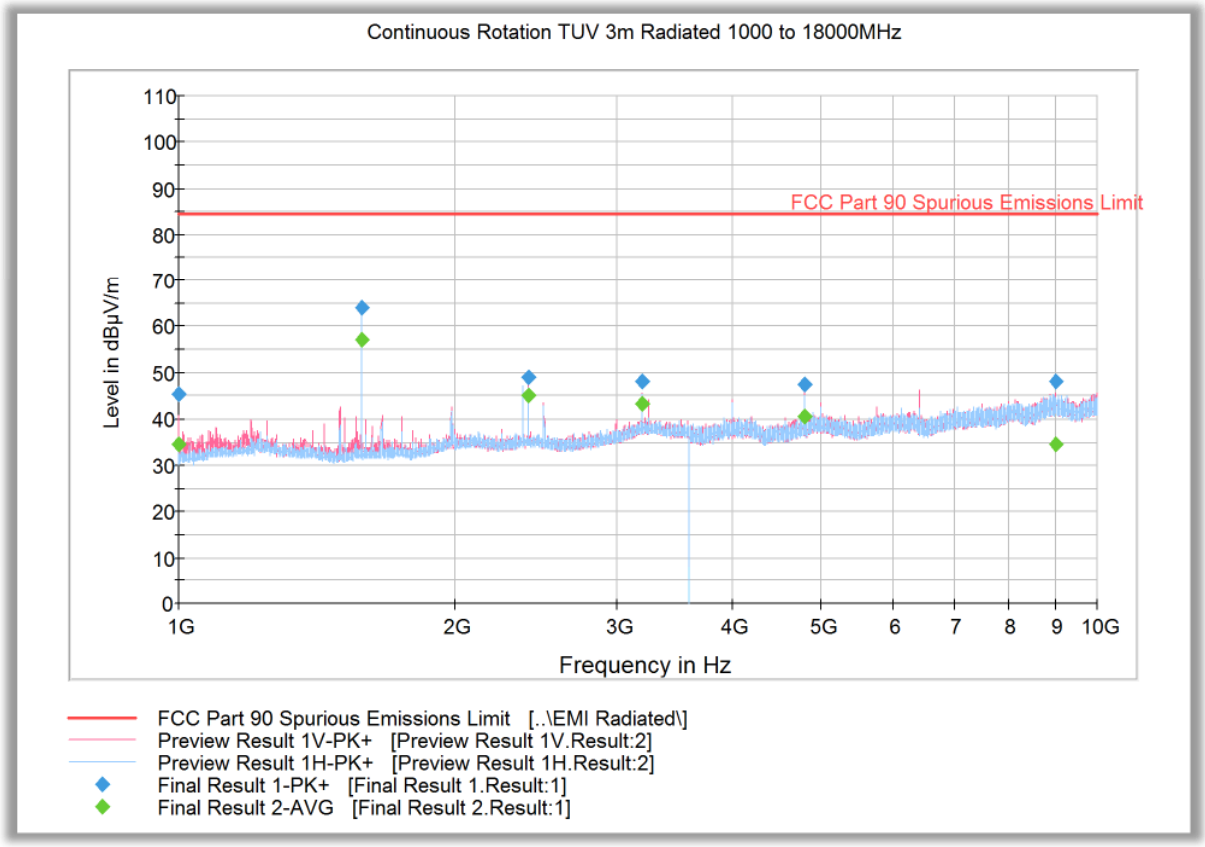

**Peak Data**

| Frequency (MHz) | MaxPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1000.000000 | 45.3 | 1000.0 | 1000.000 | 226.4 | V | 200.0 | -10.7 | 39.0 | 84.4 |
| 1576.800000 | 63.5 | 1000.0 | 1000.000 | 187.5 | H | 192.0 | -8.5 | 20.9 | 84.4 |
| 2400.000000 | 48.4 | 1000.0 | 1000.000 | 103.7 | H | 264.0 | -4.8 | 35.9 | 84.4 |
| 3200.300000 | 47.7 | 1000.0 | 1000.000 | 191.5 | H | 237.0 | -1.1 | 36.6 | 84.4 |
| 6399.800000 | 48.9 | 1000.0 | 1000.000 | 306.2 | V | 230.0 | 4.6 | 35.5 | 84.4 |
| 9986.300000 | 48.3 | 1000.0 | 1000.000 | 227.4 | H | 347.0 | 10.3 | 36.1 | 84.4 |

**Average Data**

| Frequency (MHz) | Average (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1000.000000 | 34.4 | 1000.0 | 1000.000 | 226.4 | V | 200.0 | -10.7 | 50.0 | 84.4 |
| 1576.800000 | 56.3 | 1000.0 | 1000.000 | 187.5 | H | 192.0 | -8.5 | 28.1 | 84.4 |
| 2400.000000 | 45.1 | 1000.0 | 1000.000 | 103.7 | H | 264.0 | -4.8 | 39.3 | 84.4 |
| 3200.300000 | 42.2 | 1000.0 | 1000.000 | 191.5 | H | 237.0 | -1.1 | 42.1 | 84.4 |
| 6399.800000 | 43.3 | 1000.0 | 1000.000 | 306.2 | V | 230.0 | 4.6 | 41.1 | 84.4 |
| 9986.300000 | 35.3 | 1000.0 | 1000.000 | 227.4 | H | 347.0 | 10.3 | 49.1 | 84.4 |

### 2.7.11 Radiated Emission Test Results Above 1GHz – Worst Case LTE Band 14_5MHz Bandwidth_Middle Channel 793 MHz_1 RB 0 offset_QPSK



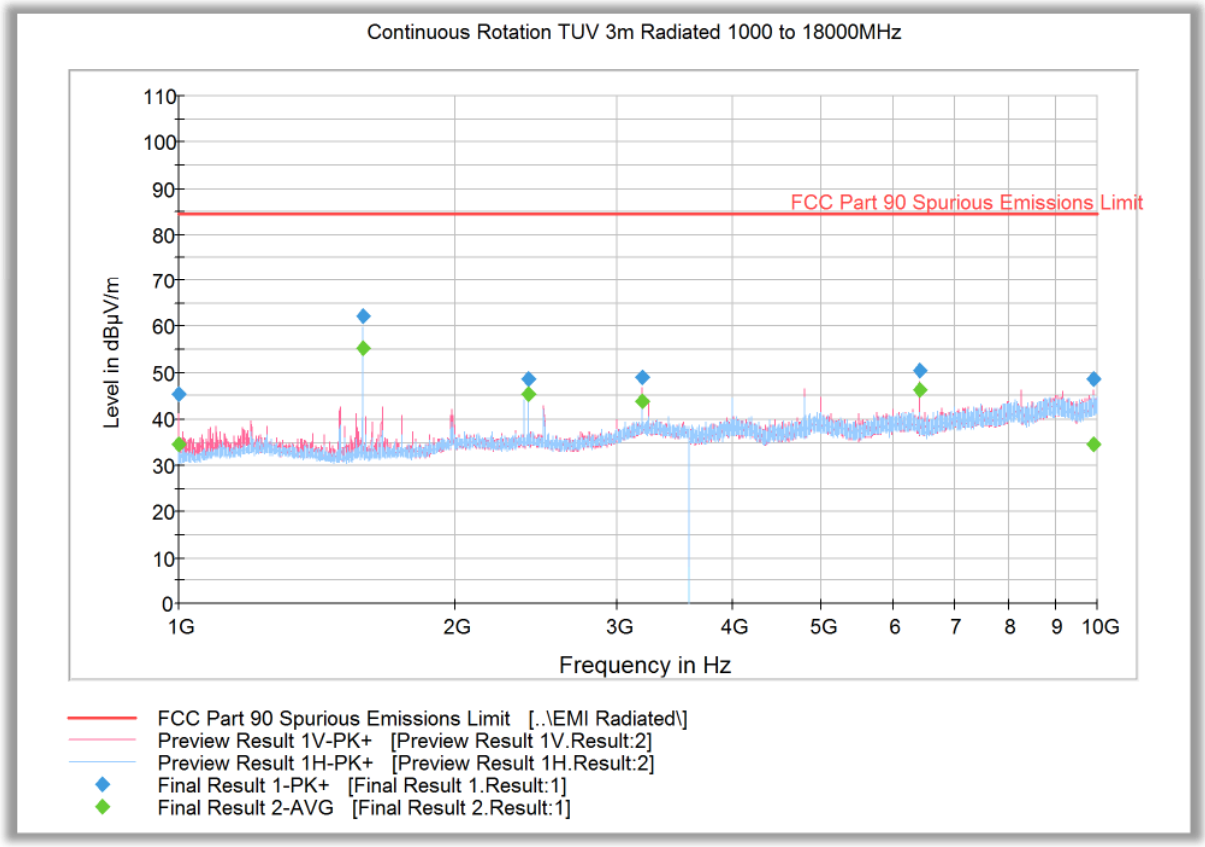

**Peak Data**

| Frequency (MHz) | MaxPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1000.000000 | 45.5 | 1000.0 | 1000.000 | 208.4 | V | 186.0 | -10.7 | 38.9 | 84.4 |
| 1581.600000 | 64.1 | 1000.0 | 1000.000 | 187.5 | H | 191.0 | -8.5 | 20.3 | 84.4 |
| 2400.000000 | 48.9 | 1000.0 | 1000.000 | 291.2 | V | 133.0 | -4.8 | 35.5 | 84.4 |
| 3200.100000 | 48.1 | 1000.0 | 1000.000 | 199.4 | V | 255.0 | -1.1 | 36.2 | 84.4 |
| 4799.800000 | 47.4 | 1000.0 | 1000.000 | 112.7 | V | 184.0 | 2.2 | 36.9 | 84.4 |
| 9017.700000 | 48.2 | 1000.0 | 1000.000 | 116.7 | V | 162.0 | 9.4 | 36.2 | 84.4 |

**Average Data**

| Frequency (MHz) | Average (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1000.000000 | 34.5 | 1000.0 | 1000.000 | 208.4 | V | 186.0 | -10.7 | 49.9 | 84.4 |
| 1581.600000 | 57.2 | 1000.0 | 1000.000 | 187.5 | H | 191.0 | -8.5 | 27.2 | 84.4 |
| 2400.000000 | 45.1 | 1000.0 | 1000.000 | 291.2 | V | 133.0 | -4.8 | 39.3 | 84.4 |
| 3200.100000 | 43.4 | 1000.0 | 1000.000 | 199.4 | V | 255.0 | -1.1 | 41.0 | 84.4 |
| 4799.800000 | 40.6 | 1000.0 | 1000.000 | 112.7 | V | 184.0 | 2.2 | 43.7 | 84.4 |
| 9017.700000 | 34.7 | 1000.0 | 1000.000 | 116.7 | V | 162.0 | 9.4 | 49.7 | 84.4 |

### 2.7.12 Radiated Emission Test Results Above 1GHz – Worst Case LTE Band 14_5MHz Bandwidth_High Channel 795.5 MHz_1 RB 0 offset_QPSK



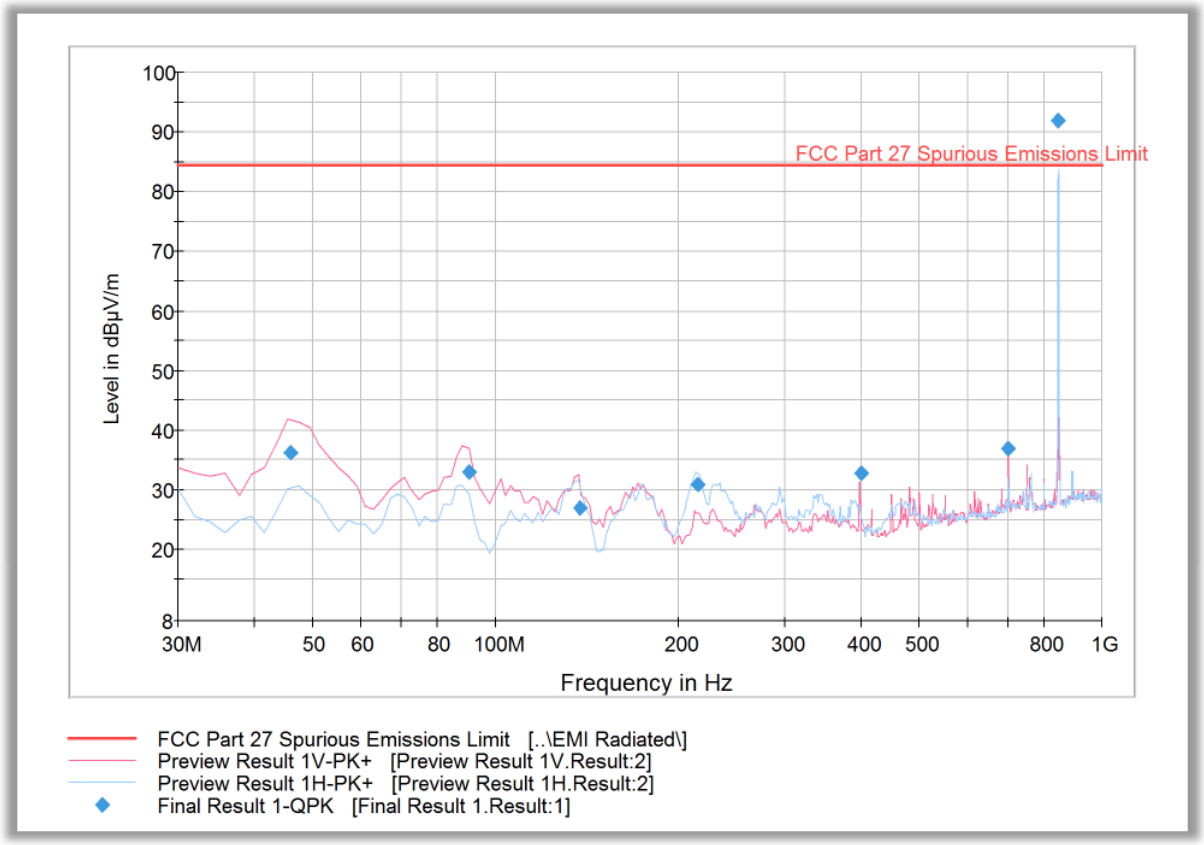

**Peak Data**

| Frequency (MHz) | MaxPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1000.000000 | 45.5 | 1000.0 | 1000.000 | 227.4 | V | 190.0 | -10.7 | 38.9 | 84.4 |
| 1586.600000 | 62.1 | 1000.0 | 1000.000 | 182.5 | H | 190.0 | -8.4 | 22.3 | 84.4 |
| 2400.000000 | 48.7 | 1000.0 | 1000.000 | 113.7 | H | 263.0 | -4.8 | 35.7 | 84.4 |
| 3200.100000 | 48.9 | 1000.0 | 1000.000 | 200.5 | V | 257.0 | -1.1 | 35.5 | 84.4 |
| 6399.800000 | 50.6 | 1000.0 | 1000.000 | 291.2 | V | 235.0 | 4.6 | 33.8 | 84.4 |
| 9883.800000 | 48.8 | 1000.0 | 1000.000 | 208.4 | V | 156.0 | 10.2 | 35.6 | 84.4 |

**Average Data**

| Frequency (MHz) | Average (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1000.000000 | 34.6 | 1000.0 | 1000.000 | 227.4 | V | 190.0 | -10.7 | 49.8 | 84.4 |
| 1586.600000 | 55.2 | 1000.0 | 1000.000 | 182.5 | H | 190.0 | -8.4 | 29.2 | 84.4 |
| 2400.000000 | 45.4 | 1000.0 | 1000.000 | 113.7 | H | 263.0 | -4.8 | 39.0 | 84.4 |
| 3200.100000 | 43.9 | 1000.0 | 1000.000 | 200.5 | V | 257.0 | -1.1 | 40.5 | 84.4 |
| 6399.800000 | 46.2 | 1000.0 | 1000.000 | 291.2 | V | 235.0 | 4.6 | 38.2 | 84.4 |
| 9883.800000 | 34.6 | 1000.0 | 1000.000 | 208.4 | V | 156.0 | 10.2 | 49.7 | 84.4 |

### 2.7.13 Radiated Emission Test Results Below 1GHz – Worst Case LTE Band 26 (814 – 824 MHz)_5MHz Bandwidth_High Channel 821.5 MHz_1 RB 12 offset_QPSK

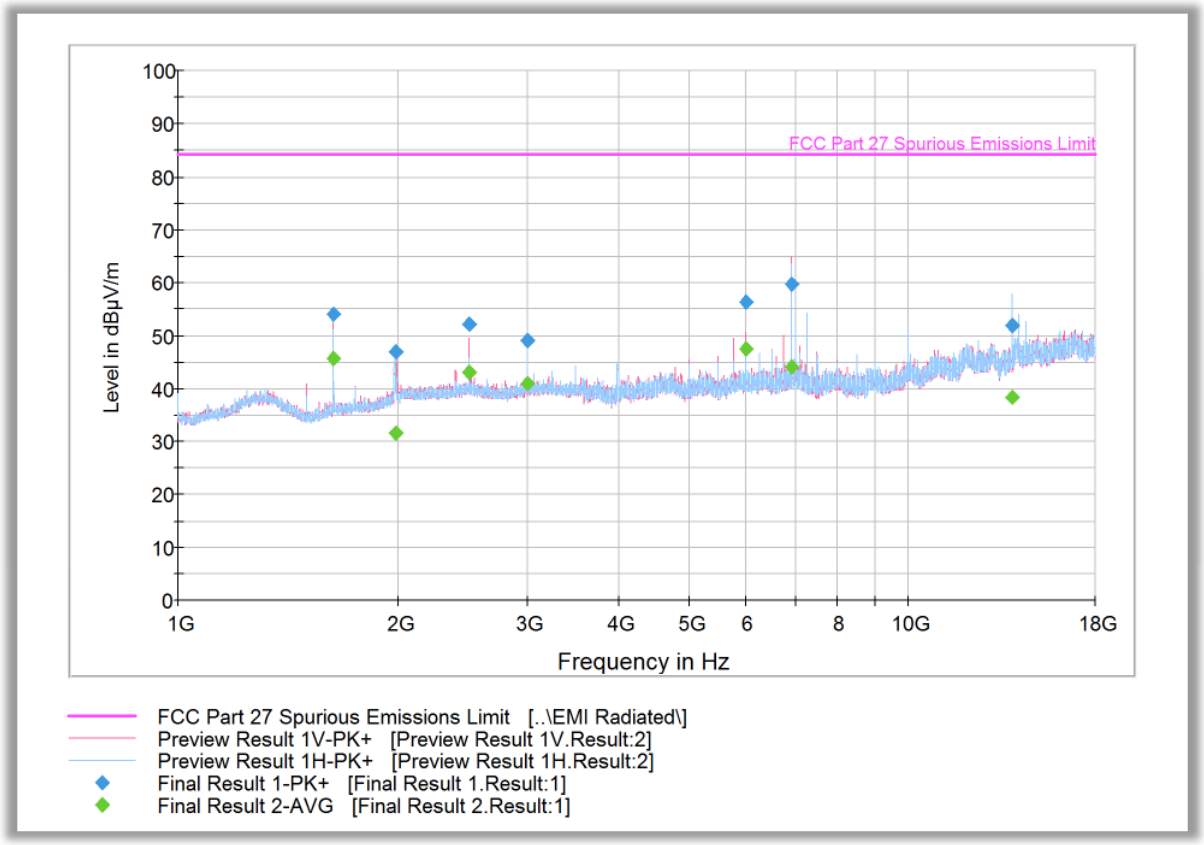



**Quasi Peak Data**

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 45.911102 | 36.3 | 1000.0 | 120.000 | 100.0 | V | 3.0 | -13.8 | 48.1 | 84.4 |
| 90.436633 | 32.9 | 1000.0 | 120.000 | 100.0 | V | 85.0 | -14.9 | 51.5 | 84.4 |
| 137.913828 | 26.9 | 1000.0 | 120.000 | 100.0 | V | 179.0 | -14.0 | 57.5 | 84.4 |
| 215.189339 | 31.0 | 1000.0 | 120.000 | 115.0 | H | 95.0 | -9.8 | 53.4 | 84.4 |
| 400.018677 | 32.8 | 1000.0 | 120.000 | 100.0 | V | 203.0 | -4.4 | 51.6 | 84.4 |
| 700.001283 | 37.0 | 1000.0 | 120.000 | 164.0 | V | 44.0 | 2.7 | 47.4 | 84.4 |
| 820.656754 | 91.9 | 1000.0 | 120.000 | 159.0 | V | 46.0 | 4.2 | Fundamental Carrier* | |

***** This is the fundamental frequency not part of spurious emission evaluation. Data provided for information purpose only.

### 2.7.14 Radiated Emission Test Results Above 1GHz – Worst Case LTE Band 26 (814 – 824 MHz)_5MHz Bandwidth_Low Channel 816.5 MHz_1 RB 12 offset_QPSK



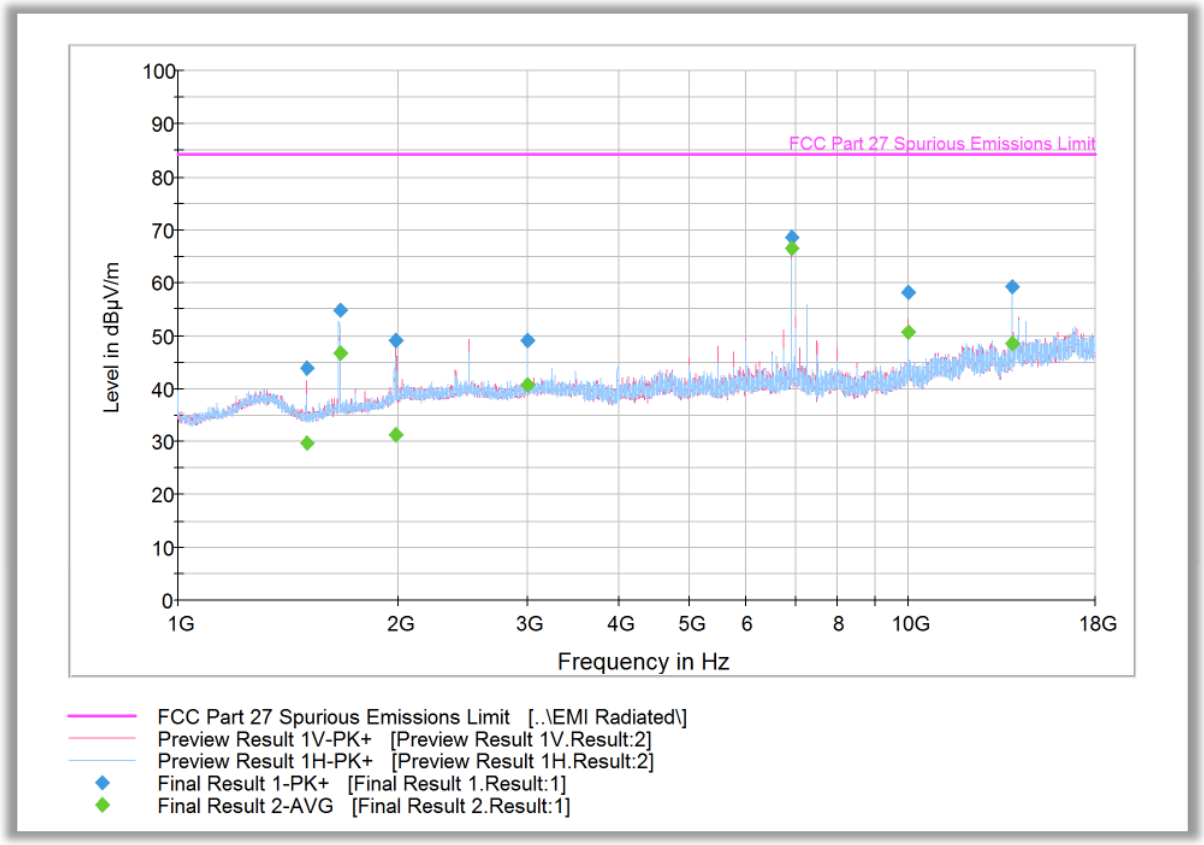

**Peak Data**

| Frequency (MHz) | MaxPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1633.566667 | 53.9 | 1000.0 | 1000.000 | 186.5 | V | 74.0 | -5.5 | 30.5 | 84.4 |
| 1987.000000 | 47.0 | 1000.0 | 1000.000 | 103.7 | V | 321.0 | -2.3 | 37.4 | 84.4 |
| 2500.166667 | 52.3 | 1000.0 | 1000.000 | 103.7 | V | 178.0 | -0.3 | 32.1 | 84.4 |
| 2999.966667 | 49.1 | 1000.0 | 1000.000 | 160.6 | H | 49.0 | 0.9 | 35.3 | 84.4 |
| 5999.900000 | 56.4 | 1000.0 | 1000.000 | 327.2 | V | 210.0 | 5.7 | 28.0 | 84.4 |
| 6915.300000 | 59.9 | 1000.0 | 1000.000 | 312.2 | V | 105.0 | 6.7 | 24.5 | 84.4 |
| 13830.333333 | 51.9 | 1000.0 | 1000.000 | 275.3 | H | 222.0 | 14.1 | 32.5 | 84.4 |

**Average Data**

| Frequency (MHz) | Average (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1633.566667 | 45.7 | 1000.0 | 1000.000 | 186.5 | V | 74.0 | -5.5 | 38.7 | 84.4 |
| 1987.000000 | 31.7 | 1000.0 | 1000.000 | 103.7 | V | 321.0 | -2.3 | 52.7 | 84.4 |
| 2500.166667 | 43.0 | 1000.0 | 1000.000 | 103.7 | V | 178.0 | -0.3 | 41.4 | 84.4 |
| 2999.966667 | 40.9 | 1000.0 | 1000.000 | 160.6 | H | 49.0 | 0.9 | 43.5 | 84.4 |
| 5999.900000 | 47.6 | 1000.0 | 1000.000 | 327.2 | V | 210.0 | 5.7 | 36.8 | 84.4 |
| 6915.300000 | 44.2 | 1000.0 | 1000.000 | 312.2 | V | 105.0 | 6.7 | 40.2 | 84.4 |
| 13830.333333 | 38.5 | 1000.0 | 1000.000 | 275.3 | H | 222.0 | 14.1 | 45.9 | 84.4 |

### 2.7.15 Radiated Emission Test Results Above 1GHz – Worst Case LTE Band 26 (814 – 824 MHz)_5MHz Bandwidth_Middle Channel 819 MHz_1 RB 12 offset_QPSK



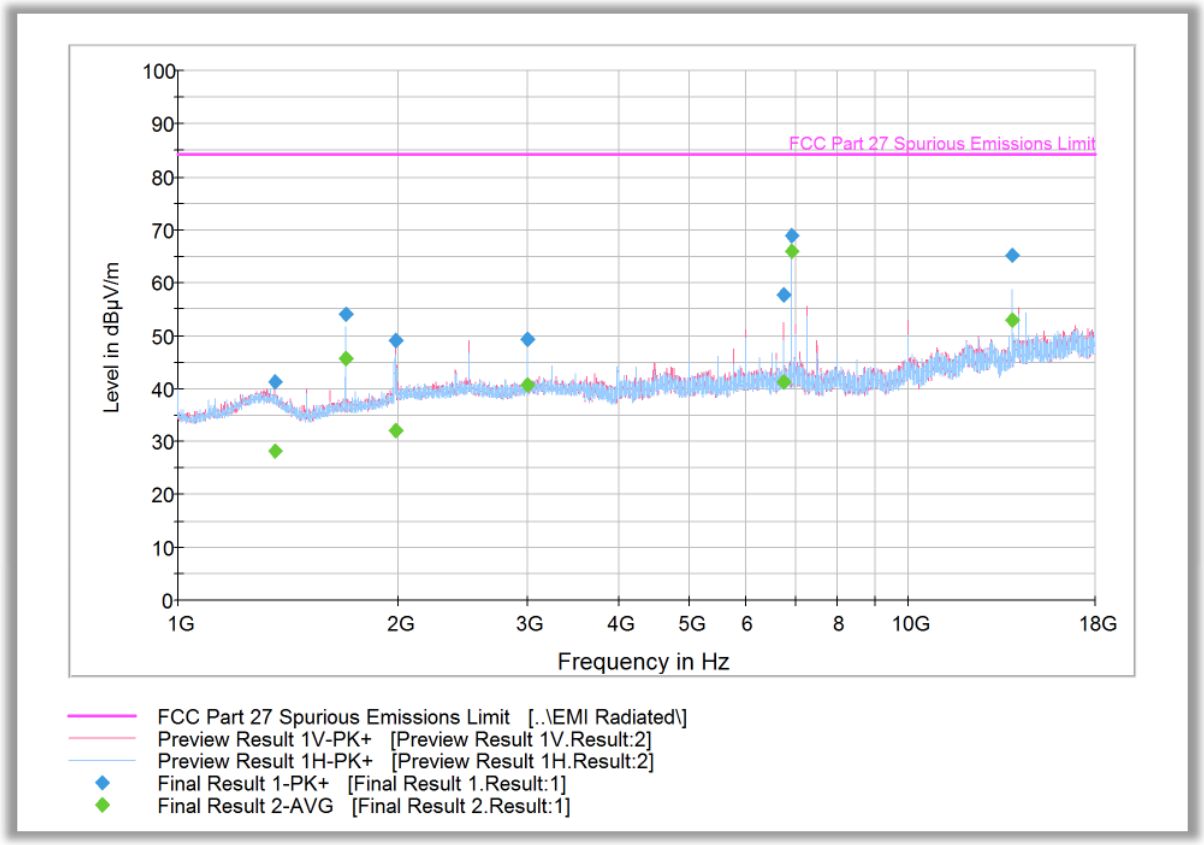

**Peak Data**

| Frequency (MHz) | MaxPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1500.033333 | 43.8 | 1000.0 | 1000.000 | 265.3 | V | 352.0 | -6.1 | 40.6 | 84.4 |
| 1663.200000 | 54.7 | 1000.0 | 1000.000 | 151.2 | H | -7.0 | -5.2 | 29.7 | 84.4 |
| 1986.966667 | 49.1 | 1000.0 | 1000.000 | 120.7 | V | 216.0 | -2.3 | 35.3 | 84.4 |
| 2999.966667 | 49.1 | 1000.0 | 1000.000 | 291.2 | H | 55.0 | 0.9 | 35.3 | 84.4 |
| 6914.866667 | 68.7 | 1000.0 | 1000.000 | 301.2 | V | 106.0 | 6.7 | 15.7 | 84.4 |
| 10000.000000 | 58.2 | 1000.0 | 1000.000 | 301.2 | V | 96.0 | 9.6 | 26.2 | 84.4 |
| 13829.866667 | 59.4 | 1000.0 | 1000.000 | 252.3 | H | -16.0 | 14.1 | 25.0 | 84.4 |

**Average Data**

| Frequency (MHz) | Average (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1500.033333 | 29.8 | 1000.0 | 1000.000 | 265.3 | V | 352.0 | -6.1 | 54.6 | 84.4 |
| 1663.200000 | 46.8 | 1000.0 | 1000.000 | 151.2 | H | -7.0 | -5.2 | 37.6 | 84.4 |
| 1986.966667 | 31.4 | 1000.0 | 1000.000 | 120.7 | V | 216.0 | -2.3 | 53.0 | 84.4 |
| 2999.966667 | 40.8 | 1000.0 | 1000.000 | 291.2 | H | 55.0 | 0.9 | 43.6 | 84.4 |
| 6914.866667 | 66.5 | 1000.0 | 1000.000 | 301.2 | V | 106.0 | 6.7 | 17.9 | 84.4 |
| 10000.000000 | 50.8 | 1000.0 | 1000.000 | 301.2 | V | 96.0 | 9.6 | 33.6 | 84.4 |
| 13829.866667 | 48.5 | 1000.0 | 1000.000 | 252.3 | H | -16.0 | 14.1 | 35.9 | 84.4 |

### 2.7.16 Radiated Emission Test Results Above 1GHz – Worst Case LTE Band 26 (814 – 824 MHz)_5MHz Bandwidth_High Channel 821.5 MHz_1 RB 12 offset_QPSK




**Peak Data**

| Frequency (MHz) | MaxPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1355.266667 | 41.3 | 1000.0 | 1000.000 | 112.8 | V | 205.0 | -5.1 | 43.1 | 84.4 |
| 1693.233333 | 54.0 | 1000.0 | 1000.000 | 151.2 | H | -7.0 | -5.0 | 30.4 | 84.4 |
| 1986.433333 | 49.2 | 1000.0 | 1000.000 | 103.7 | V | 333.0 | -2.3 | 35.2 | 84.4 |
| 2999.966667 | 49.3 | 1000.0 | 1000.000 | 265.3 | H | 55.0 | 0.9 | 35.1 | 84.4 |
| 6750.166667 | 57.8 | 1000.0 | 1000.000 | 306.2 | V | 68.0 | 6.4 | 26.6 | 84.4 |
| 6916.366667 | 69.0 | 1000.0 | 1000.000 | 300.2 | V | 106.0 | 6.7 | 15.4 | 84.4 |
| 13833.833333 | 65.3 | 1000.0 | 1000.000 | 303.2 | H | 338.0 | 14.1 | 19.1 | 84.4 |

**Average Data**

| Frequency (MHz) | Average (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 1355.266667 | 28.3 | 1000.0 | 1000.000 | 112.8 | V | 205.0 | -5.1 | 56.1 | 84.4 |
| 1693.233333 | 45.8 | 1000.0 | 1000.000 | 151.2 | H | -7.0 | -5.0 | 38.6 | 84.4 |
| 1986.433333 | 32.2 | 1000.0 | 1000.000 | 103.7 | V | 333.0 | -2.3 | 52.2 | 84.4 |
| 2999.966667 | 40.7 | 1000.0 | 1000.000 | 265.3 | H | 55.0 | 0.9 | 43.7 | 84.4 |
| 6750.166667 | 41.3 | 1000.0 | 1000.000 | 306.2 | V | 68.0 | 6.4 | 43.1 | 84.4 |
| 6916.366667 | 66.2 | 1000.0 | 1000.000 | 300.2 | V | 106.0 | 6.7 | 18.2 | 84.4 |
| 13833.833333 | 53.0 | 1000.0 | 1000.000 | 303.2 | H | 338.0 | 14.1 | 31.4 | 84.4 |

## 2.8 FREQUENCY STABILITY

### 2.8.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1055
FCC 47 CFR Part 90, Clause 90.539
RSS-140, Clause 4.2

### 2.8.2 Standard Applicable

FCC Part 90, Clause 90.539:
(e) The frequency stability of mobile, portable, and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a ase staion, and 5 parts per million or better when AFC is not locked.

FCC 47 CFR Part 90.213
(a) Unless noted elsewhere, transmitters used in the services governed by this part must have a minimum frequency stability as specified in the following table.

MINIMUM FREQUENCY STABILITY
[Parts per million (ppm)]

| Frequency range (MHz) | Fixed and base stations | Mobile stations | |
|---|---|---|---|
| | | Over 2 watts output power | 2 watts or less output power |
| Below 25 | [1 2 3] 100 | 100 | 200 |
| 25–50 | 20 | 20 | 50 |
| 72–76 | 5 | ..... | 50 |
| 150–174 | [5 11] 5 | [6] 5 | [4 6] 50 |
| 216–220 | 1.0 | ..... | 1.0 |
| 220–222 [12] | 0.1 | 1.5 | 1.5 |
| 421–512 | [7 11 14] 2.5 | [8] 5 | [8] 5 |
| 806–809 | [14] 1.0 | 1.5 | 1.5 |
| 809–824 | [14] 1.5 | 2.5 | 2.5 |
| 851–854 | 1.0 | 1.5 | 1.5 |
| 854–869 | 1.5 | 2.5 | 2.5 |
| 896–901 | [14] 0.1 | 1.5 | 1.5 |
| 902–928 | 2.5 | 2.5 | 2.5 |
| 902–928 [13] | 2.5 | 2.5 | 2.5 |
| 929–930 | 1.5 | ..... | ..... |
| 935–940 | 0.1 | 1.5 | 1.5 |
| 1427–1435 | [9] 300 | 300 | 300 |
| Above 2450 [10] | ..... | ..... | ..... |

RSS-140, Clause 4.2:
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

### 2.8.3 Equipment Under Test and Modification State

Serial No: AT071218B00062 (MIFI8000), AZ280418A00044 (MIFI8800L) / Test Configuration A

### 2.8.4 Date of Test/Initial of test personnel who performed the test

April 19, 2019 / XYZ
July 3, and 11, 2018 / XYZ

### 2.8.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.8.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

| | |
|---|---|
| Ambient Temperature | 25.6 - 26.8°C |
| Relative Humidity | 44.4 - 54.1% |
| ATM Pressure | 98.7 - 99.0 kPa |

### 2.8.7 Additional Observations

- This is a conducted test. The EUT was operated at 3.7VDC nominal voltage and was placed in the temperature chamber for this evaluation. The EUT was controlled by a CMW500 and utilizing a spectrum analyzer for measurement.
- Test performed in 5 MHz Bandwidth Middle channel as the representative configuration.
- Measurement was done using the CMW 500 measurement function.
- The EUT was tested over the temperature -30°C to +50°C in 10°C steps and allowed to sit for 1 hour to allow the equipment and chamber temperature to stabilize. The measurements were then performed.
- Voltage variation was also performed at voltage 3.3VDC and higher 4.3VDC of the nominal voltage at 20°C.

### 2.8.8 Test Results

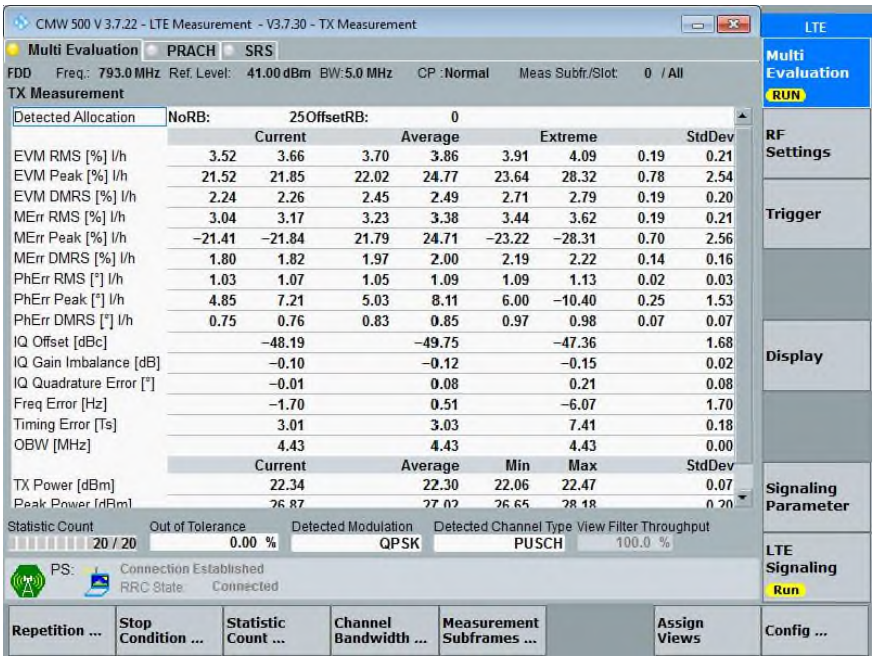
| LTE Band 14 – QPSK 5 MHz BW-Middle Channel 793 MHz | | | | |
|---|---|---|---|---|
| **Voltage (VDC)** | **Temperature (°C)** | **Frequency Error (Hz)** | **Frequency Error (ppm)** | **Limit (ppm)** |
| 3.7 | -30 | -11.09 | -0.014 | ± 1.25 |
| | -20 | 8.71 | 0.011 | ± 1.25 |
| | -10 | 11.72 | 0.015 | ± 1.25 |
| | 0 | 8.64 | 0.011 | ± 1.25 |
| | +10 | -6.59 | -0.008 | ± 1.25 |
| | +20 | -6.07 | -0.008 | ± 1.25 |
| | +30 | 7.62 | 0.010 | ± 1.25 |
| | +40 | 7.4 | 0.009 | ± 1.25 |
| | +50 | 8.44 | 0.011 | ± 1.25 |
| 3.3 | 20 | -8.37 | -0.011 | ± 1.25 |
| 4.3 | | -6.84 | -0.009 | ± 1.25 |

The frequency stability of the EUT is sufficient to keep it within the authorised frequency ranges at any temperature interval and voltage variations across the measured range.

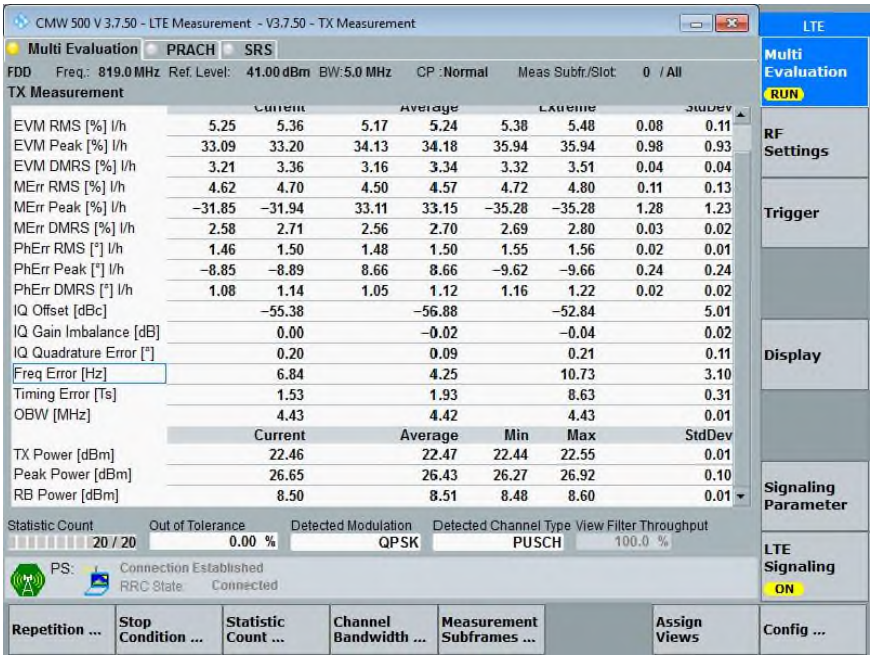
| LTE Band 26 (814 – 824 MHz) – QPSK 5 MHz BW-Middle Channel 819 MHz | | | | |
|---|---|---|---|---|
| **Voltage (VDC)** | **Temperature (°C)** | **Frequency Error (Hz)** | **Frequency Error (ppm)** | **Limit (ppm)** |
| 3.7 | -30 | 13.29 | 0.016 | ± 1.25 |
| | -20 | 11.72 | 0.014 | ± 1.25 |
| | -10 | 12.10 | 0.015 | ± 1.25 |
| | 0 | 11.94 | 0.015 | ± 1.25 |
| | +10 | 12.19 | 0.015 | ± 1.25 |
| | +20 | 10.73 | 0.013 | ± 1.25 |
| | +30 | 11.64 | 0.014 | ± 1.25 |
| | +40 | 10.14 | 0.012 | ± 1.25 |
| | +50 | 10.70 | 0.013 | ± 1.25 |
| 3.3 | 20 | 11.24 | 0.014 | ± 1.25 |
| 4.3 | | 10.96 | 0.013 | ± 1.25 |

The frequency stability of the EUT is sufficient to keep it within the authorised frequency ranges at any temperature interval and voltage variations across the measured range.

### 2.8.9 Sample Test plot




**LTE Band 14_5 MHz Bandwidth_Middle Channel @20°C**




**LTE Band 26 (814 – 824 MHz)_5 MHz Bandwidth_Middle Channel @20°C**

## 2.9 CONDUCTED EMISSIONS

### 2.9.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.207(a)
RSS-Gen, Section 8.8

### 2.9.2 Standard Applicable

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN).

| Frequency of emission (MHz) | Conducted limit (dBµV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15–0.5 | 66 to 56* | 56 to 46* |
| 0.5–5 | 56 | 46 |
| 5–30 | 60 | 50 |

**Decreases with the logarithm of the frequency.*

### 2.9.3 Equipment Under Test and Modification State

Serial No: AZ280418A00044 (MIFI8800L) / Test Configuration B

### 2.9.4 Date of Test/Initial of test personnel who performed the test

April 26, 2019 / XYZ

### 2.9.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.9.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

| | |
|---|---|
| Ambient Temperature | 23.1 °C |
| Relative Humidity | 53.6 % |
| ATM Pressure | 99.1 kPa |

### 2.9.7 Additional Observations

Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.1.8 for sample computation.

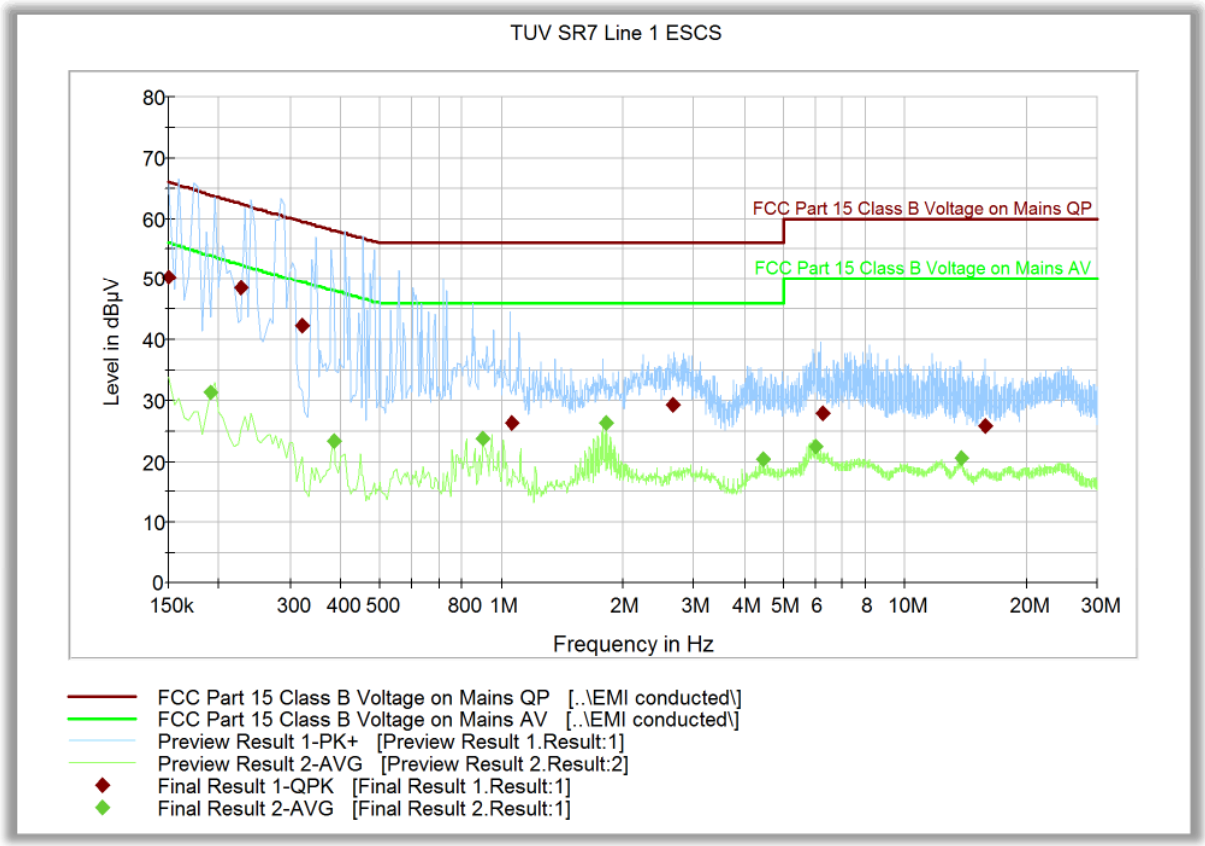
### 2.9.8 Sample Computation (Conducted Emission – Quasi Peak)

| | | | |
|---|---|---|---|
| Measuring equipment raw measurement (dbµV) @ 150kHz | | | 5.5 |
| Correction Factor (dB) | Asset# 8607 (20 dB attenuator) | 19.9 | 20.7 |
| | Asset# 1177 (cable) | 0.15 | |
| | Asset# 1176 (cable) | 0.35 | |
| | Asset# 7568 (LISN) | 0.30 | |
| **Reported QuasiPeak Final Measurement (dbµV) @ 150kHz** | | | **26.2** |

### 2.9.9 Test Results

Compliant. See attached plots and tables.

### 2.9.10 MIFI8000 120VAC 60Hz (Line 1)



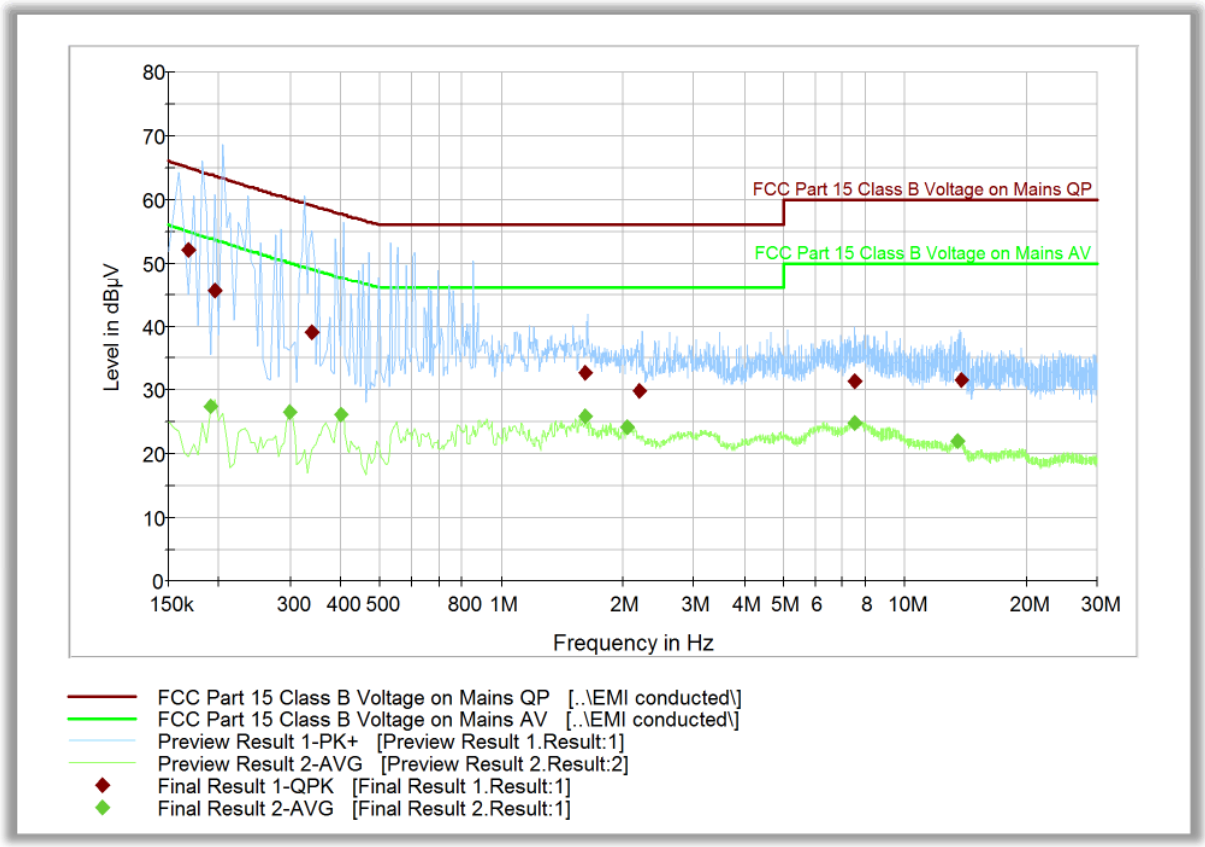

**Quasi Peak**

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBµV) |
|---|---|---|---|---|---|---|---|---|
| 0.150000 | 50.4 | 1000.0 | 9.000 | Off | L1 | 20.3 | 15.6 | 66.0 |
| 0.226500 | 48.5 | 1000.0 | 9.000 | Off | L1 | 20.2 | 13.9 | 62.4 |
| 0.321000 | 42.4 | 1000.0 | 9.000 | Off | L1 | 20.2 | 17.1 | 59.5 |
| 1.059000 | 26.4 | 1000.0 | 9.000 | Off | L1 | 20.1 | 29.6 | 56.0 |
| 2.656500 | 29.3 | 1000.0 | 9.000 | Off | L1 | 20.4 | 26.7 | 56.0 |
| 6.247500 | 27.8 | 1000.0 | 9.000 | Off | L1 | 20.4 | 32.2 | 60.0 |
| 15.819000 | 25.9 | 1000.0 | 9.000 | Off | L1 | 20.7 | 34.1 | 60.0 |

**Average**

| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - Ave (dB) | Limit - Ave (dBµV) |
|---|---|---|---|---|---|---|---|---|
| 0.190500 | 31.4 | 1000.0 | 9.000 | Off | L1 | 20.3 | 22.5 | 53.9 |
| 0.384000 | 23.3 | 1000.0 | 9.000 | Off | L1 | 20.3 | 24.8 | 48.0 |
| 0.901500 | 23.8 | 1000.0 | 9.000 | Off | L1 | 20.2 | 22.2 | 46.0 |
| 1.824000 | 26.4 | 1000.0 | 9.000 | Off | L1 | 20.0 | 19.6 | 46.0 |
| 4.465500 | 20.3 | 1000.0 | 9.000 | Off | L1 | 20.4 | 25.7 | 46.0 |
| 5.991000 | 22.4 | 1000.0 | 9.000 | Off | L1 | 20.4 | 27.6 | 50.0 |
| 13.762500 | 20.6 | 1000.0 | 9.000 | Off | L1 | 20.7 | 29.4 | 50.0 |

### 2.9.11 MIFI8000 120VAC 60Hz (Line 2)




**Quasi Peak**

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBµV) |
|---|---|---|---|---|---|---|---|---|
| 0.168000 | 52.1 | 1000.0 | 9.000 | Off | N | 20.2 | 12.9 | 65.0 |
| 0.195000 | 45.5 | 1000.0 | 9.000 | Off | N | 20.2 | 18.2 | 63.7 |
| 0.339000 | 39.0 | 1000.0 | 9.000 | Off | N | 20.2 | 20.0 | 59.0 |
| 1.608000 | 32.7 | 1000.0 | 9.000 | Off | N | 20.1 | 23.3 | 56.0 |
| 2.197500 | 29.8 | 1000.0 | 9.000 | Off | N | 20.4 | 26.2 | 56.0 |
| 7.498500 | 31.3 | 1000.0 | 9.000 | Off | N | 20.5 | 28.7 | 60.0 |
| 13.834500 | 31.6 | 1000.0 | 9.000 | Off | N | 20.7 | 28.4 | 60.0 |

**Average**

| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - Ave (dB) | Limit - Ave (dBµV) |
|---|---|---|---|---|---|---|---|---|
| 0.190500 | 27.5 | 1000.0 | 9.000 | Off | N | 20.1 | 26.3 | 53.9 |
| 0.298500 | 26.7 | 1000.0 | 9.000 | Off | N | 20.1 | 23.3 | 50.0 |
| 0.402000 | 26.1 | 1000.0 | 9.000 | Off | N | 20.1 | 21.6 | 47.7 |
| 1.612500 | 26.0 | 1000.0 | 9.000 | Off | N | 20.1 | 20.0 | 46.0 |
| 2.053500 | 24.2 | 1000.0 | 9.000 | Off | N | 20.2 | 21.8 | 46.0 |
| 7.530000 | 24.9 | 1000.0 | 9.000 | Off | N | 20.5 | 25.1 | 50.0 |
| 13.483500 | 22.1 | 1000.0 | 9.000 | Off | N | 20.7 | 27.9 | 50.0 |

**SECTION 3**

**TEST EQUIPMENT USED**

## 3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

| ID Number (SDGE/SDRB) | Test Equipment | Type | Serial Number | Manufacturer | Cal Date | Cal Due Date |
|---|---|---|---|---|---|---|
| Antenna Conducted Port Setup | | | | | | |
| 7662 | P-Series Power Meter | N1911A | MY45100951 | Agilent | 06/15/18 | 06/15/19 |
| 7661 | 50MHz-18GHz Wideband Power Sensor | N1921A | MY45241383 | Agilent | 06/15/18 | 06/15/19 |
| 7608 | Vector Signal Generator | SMBV100A | 259021 | Rhode & Schwarz | 09/19/17 | 09/19/19 |
| 7582 | Signal/Spectrum Analyzer | FSW26 | 101614 | Rhode & Schwarz | 01/07/19 | 01/07/20 |
| - | Wideband Radio Communication Tester | CMW 500 | 165085 | Rhode & Schwarz | 07/17/18 | 07/17/19 |
| 8825 | 20dB Attenuator | 46-20-34 | BK5773 | Weinschel Corp. | Verified by 7608 and 7582 | |
| - | 10dB Attenuator | VAT-10W2+2W | N/A | MCL | Verified by 7608 and 7582 | |
| AC Conducted Emissions Test Setup | | | | | | |
| 1024 | EMI Test Receiver | ESCS 30 | 847793/001 | Rhode & Schwarz | 09/19/18 | 09/19/19 |
| 7567 | LISN | FCC-LISN-50-25-2 | 120304 | Fischer Custom Comm. | 12/14/17 | 12/14/19 |
| 8822 | 20dB Attenuator | 34-20-34 | N/A | MCE / Weinschel | Verified by 7608 and 7582 | |
| 8824 | 20dB Attenuator | 34-20-34 | N/A | MCE / Weinschel | Verified by 7608 and 7582 | |
| 7608 | Vector Signal Generator | SMBV100A | 259021 | Rhode & Schwarz | 09/19/17 | 09/19/19 |
| 7582 | Signal/Spectrum Analyzer | FSW26 | 101614 | Rhode & Schwarz | 01/07/19 | 01/07/20 |
| - | Wideband Radio Communication Tester | CMW 500 | 165085 | Rhode & Schwarz | 07/17/18 | 07/17/19 |
| Radiated Test Setup | | | | | | |
| 7582 | Signal/Spectrum Analyzer | FSW26 | 101614 | Rhode & Schwarz | 01/07/19 | 01/07/20 |
| 7608 | Vector Signal Generator | SMBV100A | 259021 | Rhode & Schwarz | 09/19/17 | 09/19/19 |
| 1002 | Bilog Antenna | 3142C | 00058717 | ETS-Lindgren | 11/20/17 | 11/20/19 |
| 7575 | Double-ridged waveguide horn antenna | 3117 | 00155511 | EMCO | 06/16/18 | 06/16/20 |
| 1016 | Pre-amplifier | PAM-0202 | 187 | A.H. Systems, Inc. | 03/08/19 | 03/08/20 |
| 8921 | High-frequency cable | SucoFlex 100 SX | N/A | Suhner | Verified by 7608 and 7582 | |
| 8923 | High-frequency cable | Micropore 19057793 | N/A | United Microwave Products | Verified by 7608 and 7582 | |
| 1040 | EMI Test Receiver | ESIB40 | 100292 | Rhode & Schwarz | 10/15/18 | 10/15/19 |
| 1049 | EMI Test Receiver | ESU | 100133 | Rhode & Schwarz | 07/13/18 | 07/13/19 |
| 8628 | Pre-amplifier | QLI-01182835-JO | 8986002 | Quinstar | 03/07/19 | 03/07/20 |
| - | Wideband Radio Communication Tester | CMW 500 | 165085 | Rhode & Schwarz | 07/17/18 | 07/17/19 |

| Miscellaneous | | | | | | |
|---|---|---|---|---|---|---|
| 6708 | Multimeter | 34401A | US36086974 | Hewlett Packard | 07/18/18 | 07/18/19 |
| 7579 | Temperature Chamber | 115 | 151617 | TestQuity | 08/24/18 | 08/24/19 |
| 7554 | Barometer/Temperature /Humidity Transmitter | iBTHX-W | 0400706 | Omega | 05/25/18 | 05/25/19 |
| | Test Software | EMC32 | V8.53 | Rhode & Schwarz | N/A | |

## 3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

### 3.2.1 Conducted Antenna Port Measurement

| | Input Quantity (Contribution) $X_i$ | Value | | Prob. Dist. | Divisor | $u_i(x)$ | $u_i(x)^2$ |
|---|---|---|---|---|---|---|---|
| 1 | Receiver reading | 0.10 | dB | Normal, k=1 | 1.000 | 0.10 | 0.01 |
| 2 | Cable attenuation | 1.00 | dB | Normal, k=2 | 2.000 | 0.50 | 0.25 |
| 3 | Receiver sinewave accuracy | 0.08 | dB | Normal, k=2 | 2.000 | 0.04 | 0.00 |
| 4 | Receiver pulse amplitude | 0.00 | dB | Rectangular | 1.732 | 0.00 | 0.00 |
| 5 | Receiver pulse repetition rate | 0.00 | dB | Rectangular | 1.732 | 0.00 | 0.00 |
| 6 | Noise floor proximity | 0.00 | dB | Rectangular | 1.732 | 0.00 | 0.00 |
| 7 | Frequency interpolation | 0.10 | dB | Rectangular | 1.732 | 0.06 | 0.00 |
| 8 | Mismatch | 0.07 | dB | U-shaped | 1.414 | 0.05 | 0.00 |
| | Combined standard uncertainty | | | Normal | | 0.52 | dB |
| | **Expanded uncertainty** | | | Normal, k=2 | | **1.03** | **dB** |

### 3.2.2 Radiated Emission Measurements (Below 1GHz)

| | Input Quantity (Contribution) $X_i$ | Value | | Prob. Dist. | Divisor | $u_i(x)$ | $u_i(x)^2$ |
|---|---|---|---|---|---|---|---|
| 1 | Receiver reading | 0.10 | dB | Normal, k=1 | 1.000 | 0.10 | 0.01 |
| 2 | Attenuation: antenna-receiver | 0.20 | dB | Normal, k=2 | 2.000 | 0.10 | 0.01 |
| 3 | Antenna factor AF | 0.75 | dB | Normal, k=2 | 2.000 | 0.38 | 0.14 |
| 4 | Receiver sinewave accuracy | 0.45 | dB | Normal, k=2 | 2.000 | 0.23 | 0.05 |
| 5 | Receiver pulse amplitude | 1.50 | dB | Rectangular | 1.732 | 0.87 | 0.75 |
| 6 | Receiver pulse repetition rate | 1.50 | dB | Rectangular | 1.732 | 0.87 | 0.75 |
| 7 | Noise floor proximity | 0.50 | dB | Rectangular | 1.732 | 0.29 | 0.08 |
| 8 | Mismatch: antenna-receiver | 0.95 | dB | U-shaped | 1.414 | 0.67 | 0.45 |
| 9 | AF frequency interpolation | 0.30 | dB | Rectangular | 1.732 | 0.17 | 0.03 |
| 10 | AF height deviations | 0.10 | dB | Rectangular | 1.732 | 0.06 | 0.00 |
| 11 | Directivity difference at 3 m | 3.12 | dB | Rectangular | 1.732 | 1.80 | 3.24 |
| 12 | Phase center location at 3 m | 1.00 | dB | Rectangular | 1.732 | 0.58 | 0.33 |
| 13 | Cross-polarisation | 0.90 | dB | Rectangular | 1.732 | 0.52 | 0.27 |
| 14 | Balance | 0.00 | dB | Rectangular | 1.732 | 0.00 | 0.00 |
| 15 | Site imperfections | 3.76 | dB | Triangular | 2.449 | 1.54 | 2.36 |
| 16 | Separation distance at 3 m | 0.30 | dB | Rectangular | 1.732 | 0.17 | 0.03 |
| 17 | Effect of setup table material | 0.77 | dB | Rectangular | 1.732 | 0.44 | 0.20 |
| 18 | Table height at 3 m | 0.10 | dB | Normal, k=2 | 2.000 | 0.05 | 0.00 |
| 19 | Near-field effects | 0.00 | dB | Triangular | 2.449 | 0.00 | 0.00 |
| 20 | Effect of ambient noise on OATS | 0.00 | dB | | | | 0.00 |
| | Combined standard uncertainty | | | Normal | | 2.95 | dB |
| | **Expanded uncertainty** | | | Normal, k=2 | | **5.90** | **dB** |

### 3.2.3 Radiated Emission Measurements (Above 1GHz)

| | Input Quantity (Contribution) $X_i$ | Value | | Prob. Dist. | Divisor | $u_i(x)$ | $u_i(x)^2$ |
|---|---|---|---|---|---|---|---|
| 1 | Receiver reading | 0.10 | dB | Normal, k=1 | 1.000 | 0.10 | 0.01 |
| 2 | Attenuation: antenna-receiver | 0.20 | dB | Normal, k=2 | 2.000 | 0.10 | 0.01 |
| 3 | Antenna factor AF | 0.75 | dB | Normal, k=2 | 2.000 | 0.38 | 0.14 |
| 4 | Receiver sinewave accuracy | 0.45 | dB | Normal, k=2 | 2.000 | 0.23 | 0.05 |
| 5 | Receiver pulse amplitude | 1.50 | dB | Rectangular | 1.732 | 0.87 | 0.75 |
| 6 | Receiver pulse repetition rate | 1.50 | dB | Rectangular | 1.732 | 0.87 | 0.75 |
| 7 | Noise floor proximity | 0.50 | dB | Rectangular | 1.732 | 0.29 | 0.08 |
| 8 | Mismatch: antenna-receiver | 0.95 | dB | U-shaped | 1.414 | 0.67 | 0.45 |
| 9 | AF frequency interpolation | 0.30 | dB | Rectangular | 1.732 | 0.17 | 0.03 |
| 10 | AF height deviations | 0.10 | dB | Rectangular | 1.732 | 0.06 | 0.00 |
| 11 | Directivity difference at 3 m | 3.12 | dB | Rectangular | 1.732 | 1.80 | 3.24 |
| 12 | Phase center location at 3 m | 1.00 | dB | Rectangular | 1.732 | 0.58 | 0.33 |
| 13 | Cross-polarisation | 0.90 | dB | Rectangular | 1.732 | 0.52 | 0.27 |
| 14 | Balance | 0.00 | dB | Rectangular | 1.732 | 0.00 | 0.00 |
| 15 | Site imperfections | 3.25 | dB | Triangular | 2.449 | 1.33 | 1.76 |
| 16 | Separation distance at 3 m | 0.30 | dB | Rectangular | 1.732 | 0.17 | 0.03 |
| 17 | Effect of setup table material | 0.77 | dB | Rectangular | 1.732 | 0.44 | 0.20 |
| 18 | Table height at 3 m | 0.10 | dB | Normal, k=2 | 2.000 | 0.05 | 0.00 |
| 19 | Near-field effects | 0.00 | dB | Triangular | 2.449 | 0.00 | 0.00 |
| 20 | Effect of ambient noise on OATS | 0.00 | dB | | | | 0.00 |
| | Combined standard uncertainty | | | Normal | 2.85 | dB | |
| | **Expanded uncertainty** | | | Normal, k=2 | **5.70** | **dB** | |

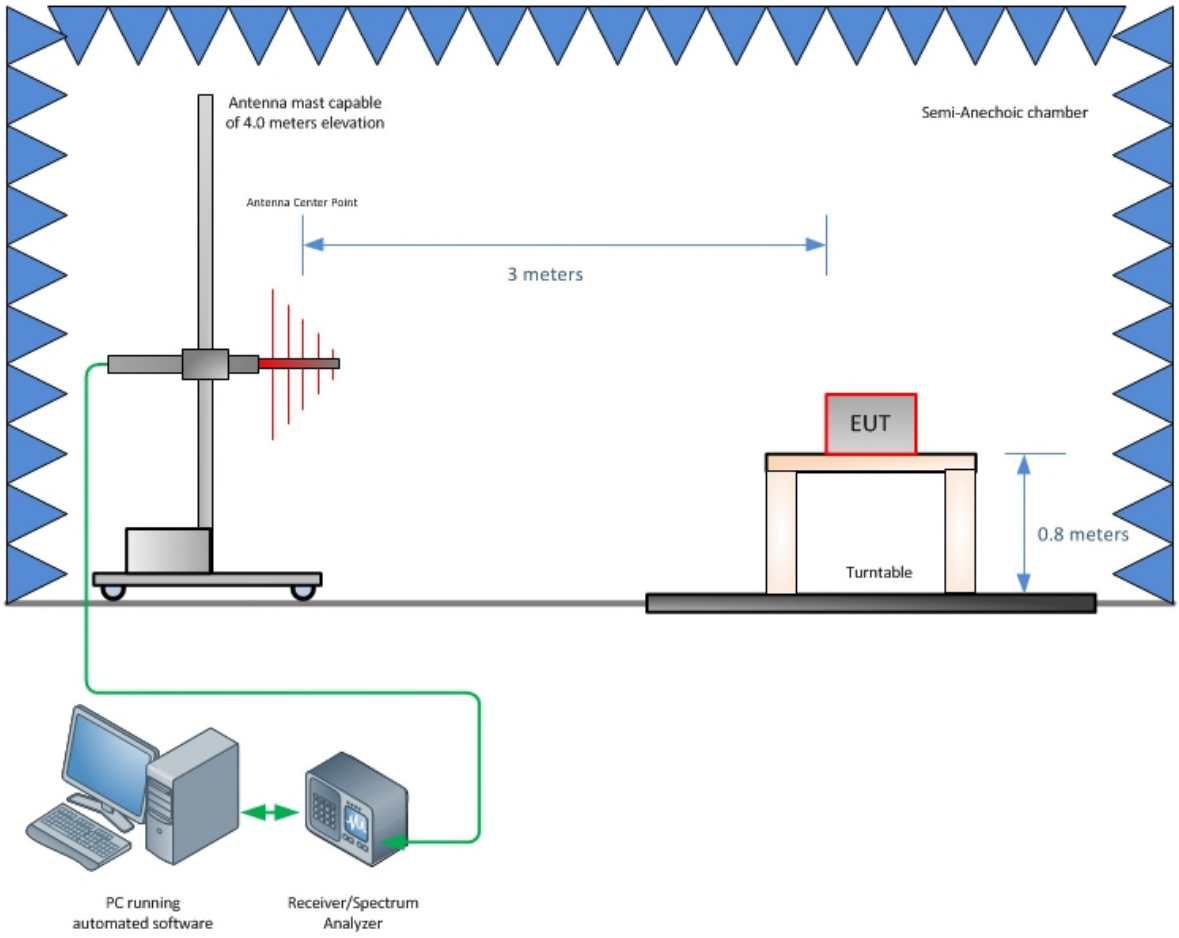
### 3.2.4 Conducted Measurements

| | Input Quantity (Contribution) $X_i$ | Value | | Prob. Dist. | Divisor | $u_i(x)$ | $u_i(x)^2$ |
|---|---|---|---|---|---|---|---|
| 1 | Receiver reading | 0.10 | dB | Normal, k=1 | 1.000 | 0.10 | 0.01 |
| 2 | LISN-receiver attenuation | 0.10 | dB | Normal, k=2 | 2.000 | 0.05 | 0.00 |
| 3 | LISN voltage division factor | 0.30 | dB | Normal, k=2 | 2.000 | 0.15 | 0.02 |
| 4 | Receiver sinewave accuracy | 0.36 | dB | Normal, k=2 | 2.000 | 0.18 | 0.03 |
| 5 | Receiver pulse amplitude | 1.50 | dB | Rectangular | 1.732 | 0.87 | 0.75 |
| 6 | Receiver pulse repetition rate | 1.50 | dB | Rectangular | 1.732 | 0.87 | 0.75 |
| 7 | Noise floor proximity | 0.00 | dB | Rectangular | 1.732 | 0.00 | 0.00 |
| 8 | AMN VDF frequency interpolation | 0.10 | dB | Rectangular | 1.732 | 0.06 | 0.00 |
| 9 | Mismatch | 0.07 | dB | U-shaped | 1.414 | 0.05 | 0.00 |
| 10 | LISN impedance | 2.65 | dB | Triangular | 2.449 | 1.08 | 1.17 |
| 11 | Effect of mains disturbance | 0.00 | dB | | | 0.00 | 0.00 |
| 12 | Effect of the environment | | | | | | |
| | Combined standard uncertainty | | | Normal | 1.66 | dB | |
| | **Expanded uncertainty** | | | **Normal, k=2** | **3.31** | **dB** | |

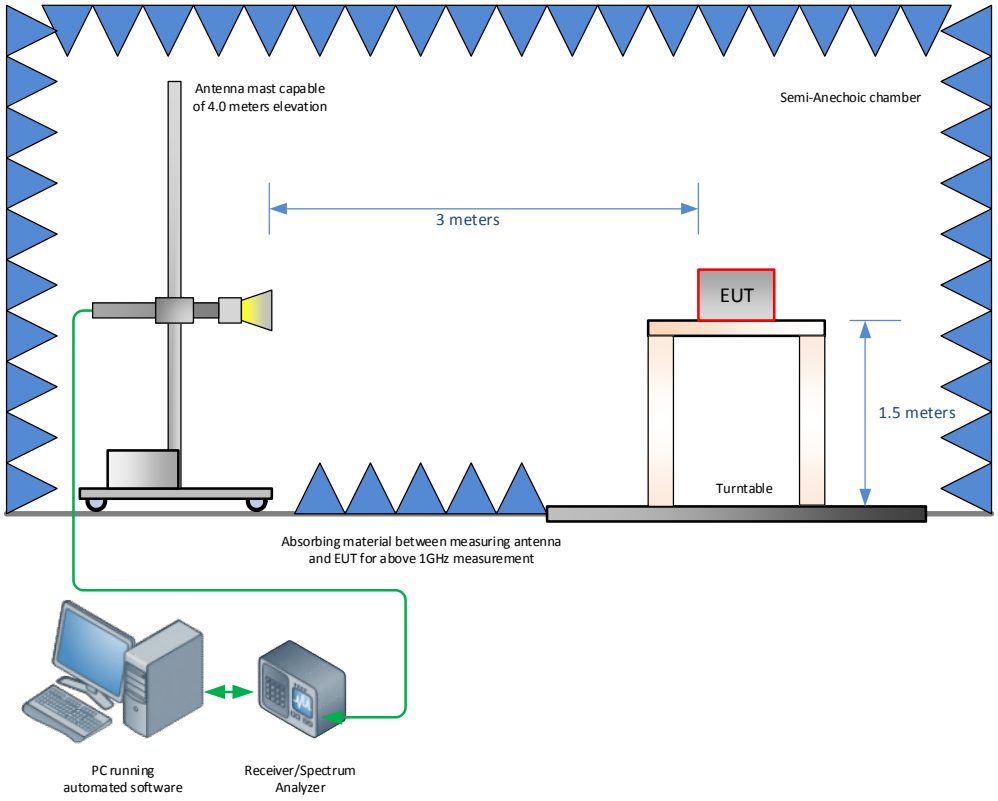
**SECTION 4**

**DIAGRAM OF TEST SETUP**

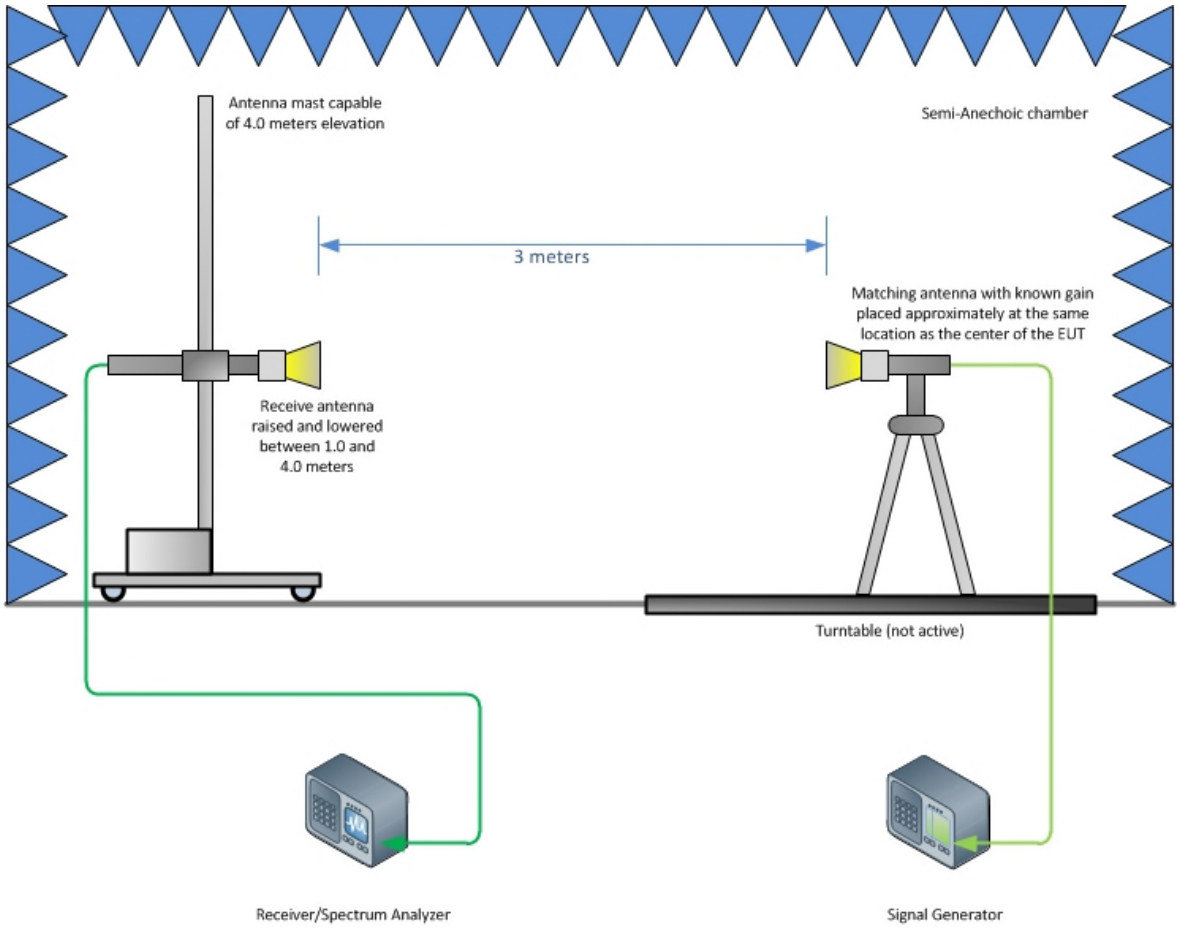
## 4.1 TEST SETUP DIAGRAM



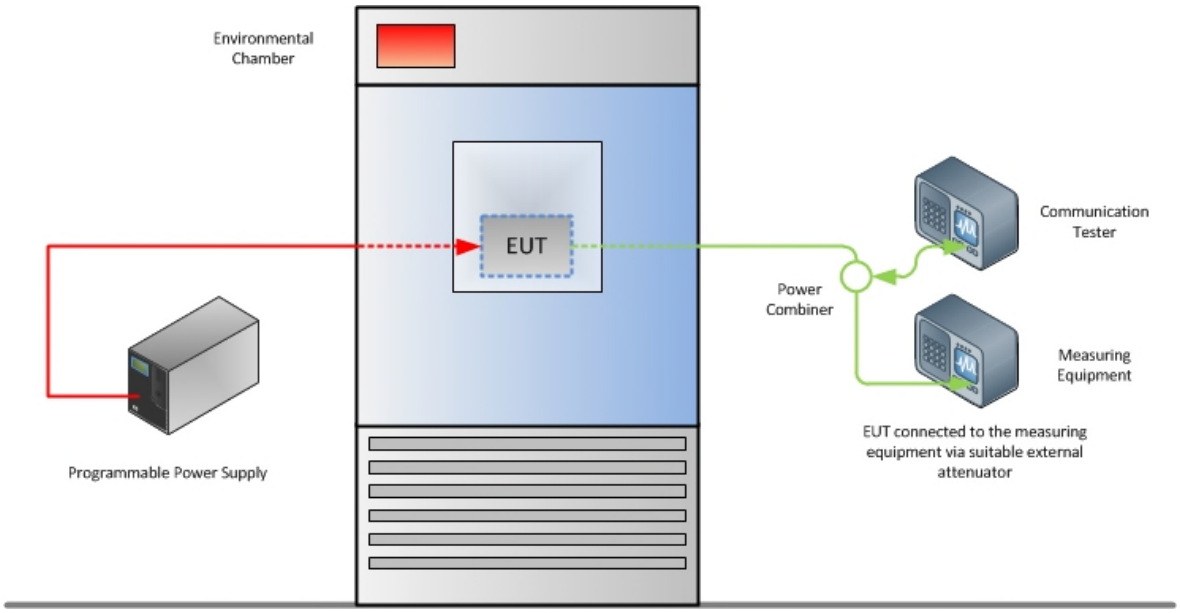

**Radiated Emission Test Setup (Below 1GHz)**




**Radiated Emission Test Setup (Above 1GHz)**




**Substitution Test Method (Above 1GHz)**




**Frequency Stability Test Comfiguration**

**SECTION 5**

**ACCREDITATION, DISCLAIMERS AND COPYRIGHT**

## 5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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