FCC Part 101 Radio Certification file Update for HNS - PMP 24 GHz SUB ODU Radios

Tested at: **HNS Agency Certification Lab.**
Hughes Network Systems
11717 Exploration Lane, Germantown, MD 20876
Tested By: **Logi Balasingam**
Agency Certification Engineer.

Tested on: **Oct. 04 to Oct. 09**

Objective:

The objective of this testing is to make sure that HNS 24 GHz PMP SUB radios meet the new FCC 101 emission mask to the main carrier with all the modulation (QPSK, 16QAM, 64 QAM) scheme. The official filing with old mask requirement had been filed with FCC early this year. This support document is to update the existing 24 GHz PMP Agency Certification and FCC filing.

The testing was conducted with the PMP 24 GHz ODU configured with current version of CCM board (Rev. AD).

Summary:

In conclusion, the 24 GHz PMP ODU radios that manufactured by Hughes Network Systems comply with the FCC Part 101 new mask requirement for the QPSK, 16 QAM and 64 QAM modulation schemes. The out put power was calibrated to transmit 20 dBm at transmit and receive antenna port. Attached below plots would support to get the grant certification from FCC to the 24 GHz PMP product line for SUB ODU Radios.

Setup

The measurements were done using a HP 8564E series Spectrum Analyzer as the final measuring device. The output power was calibrated to transmit to 20 dBm at the output terminal. All the data plots will be captured via HP Bench screen capture software and saved as *.gif images which may then be inserted into test report documents digitally. The EUT is configured for transmission mode using custom software prepared by Hughes Network Systems for channel selection and simulation of the signals that are normally transmitted to the Hub terminal. In real software would maintain the output set power all the time and alarm if any deviation.

The equipment under test will be operated at different frequencies across the transmit frequency band (low end and high end). The modulated carrier will be examined and the spectrum mask will be viewed for compliance.

Spectrum Analyzer setup: Resolution Bandwidth – 100 KHz
Video Bandwidth – 100 KHz

The limit lines are adjusted according to the RBW that is used for the measurement.

Test Equipment:

Calibrated following test equipment are used to measure the spurious conducted emission with good engineering judgment.

HP Spectrum Analyzer (30 Hz to 40 GHz)	**Model HP8564E**	**Cal. Due: 12/16/2000**
HP Power Meter	**Model E4418A**	**Cal. Due: 08/17/2001**
HP Power Head (50 MHz to 50 GHz)	**Model HP 8487A**	**Cal. Due: 03/21/2001**

Equipment list

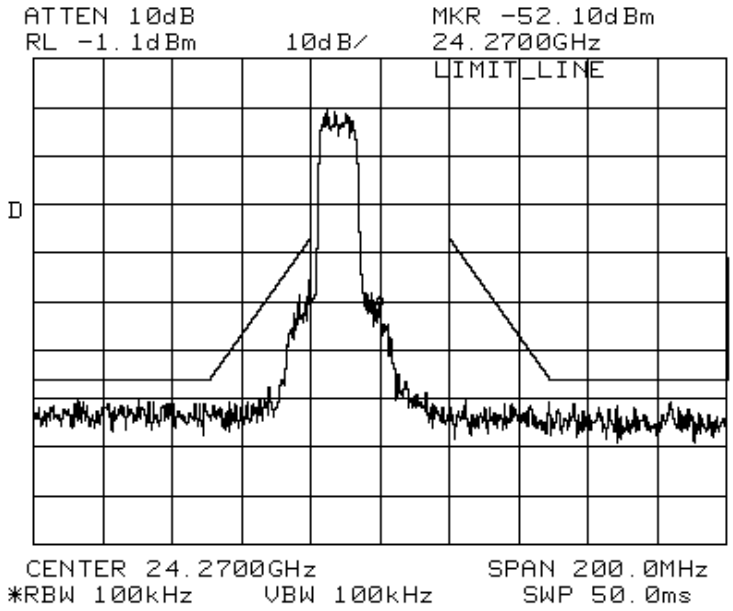
PART NUMBER	DESCRIPTION	SERIAL NUMBER	REVISION LEVEL
1026128-0008	24 GHz PMP Out Door unit ODU SUB	P1000214	A

Test Results

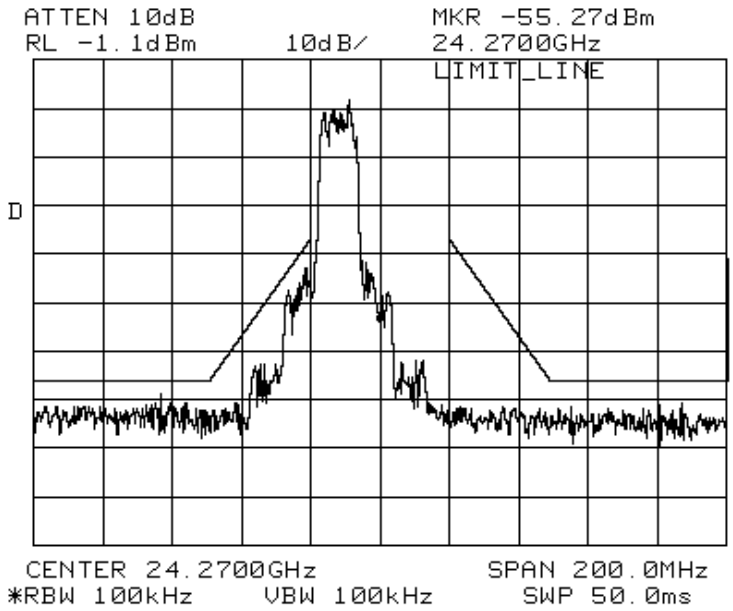
The graphs for the spectrum mask are shown in the following pages. The output transmitted channel power is 20 dBm. All the modulation schemes (QPSK, 64-QAM, and 16-QAM) are investigated. The graphs showed the set channel, power and with the associated limit.

PASS: X Fail:___

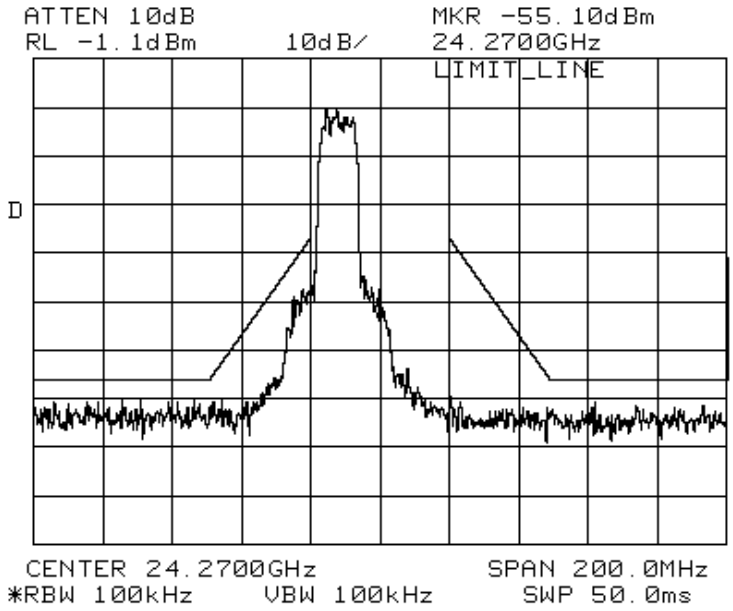
Sub Radio, CH 35A (lower 1st ch), QPSK Modulation, Output Power = 20 dBm



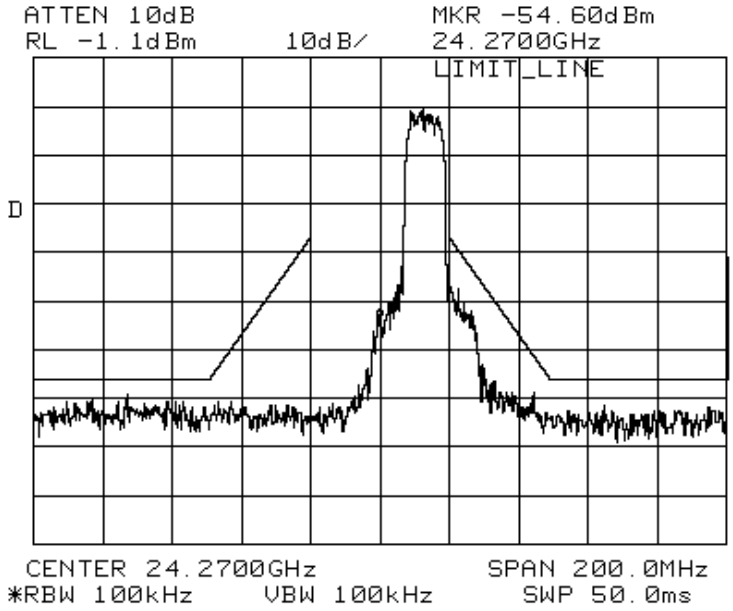
Sub Radio, CH 35A (lower 1st ch), 16 QAM Modulation, Output Power = 20 dBm



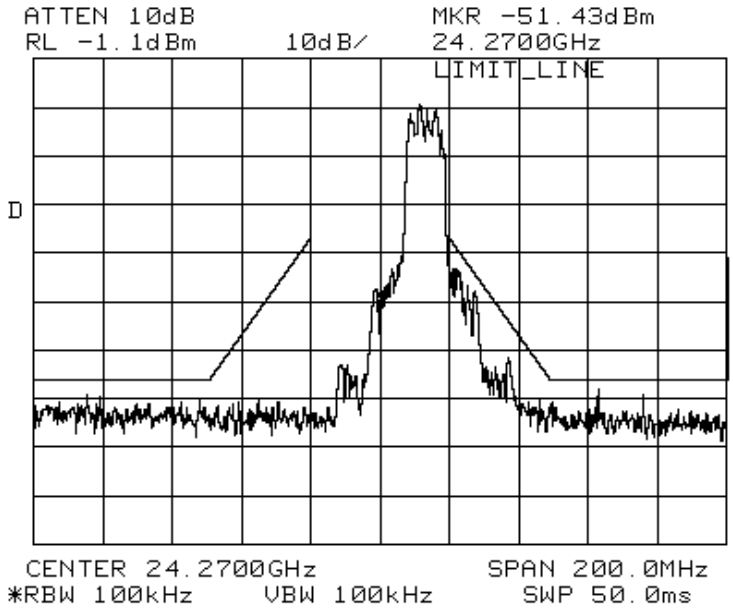
Sub Radio, CH 35A (lower 1st ch), 64 QAM Modulation, Output Power = 20 dBm



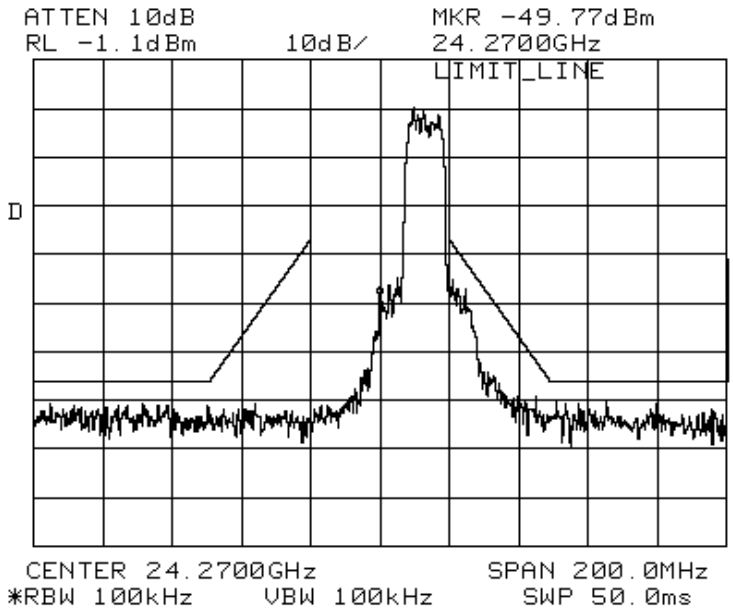
Sub Radio, CH 35C (lower 3rd ch), QPSK Modulation, Output Power = 20 dBm



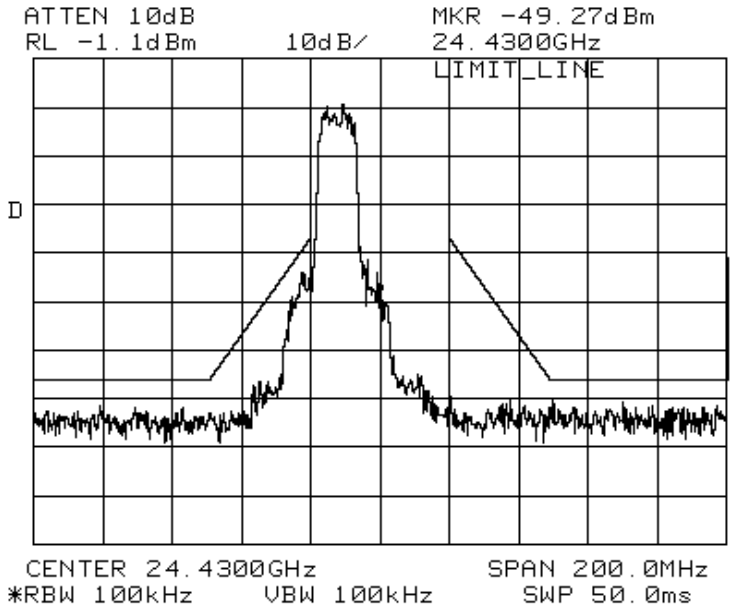
Sub Radio, CH 35C (lower 3rd ch), 16 QAM Modulation, Output Power = 20 dBm



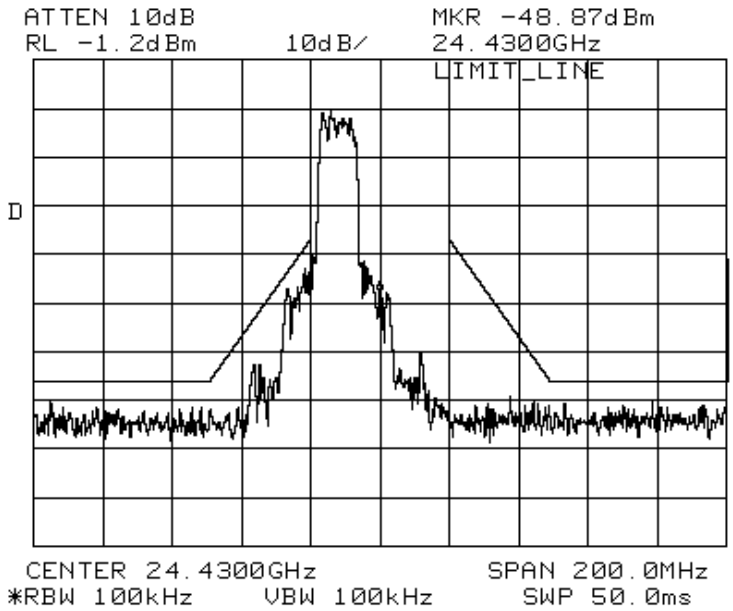
Sub Radio, CH 35C (lower 3rd ch), 64 QAM Modulation, Output Power = 20 dBm



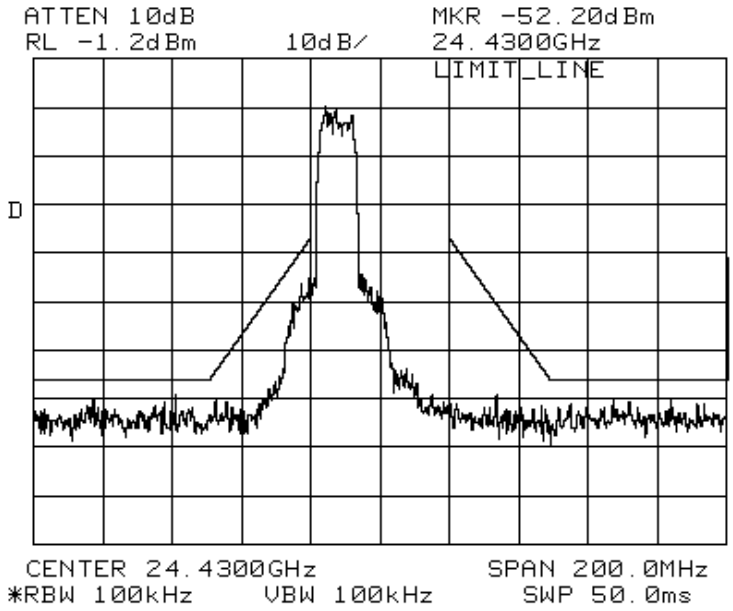
Sub Radio, CH 39A (higher 1st ch), QPSK Modulation, Output Power = 20 dBm



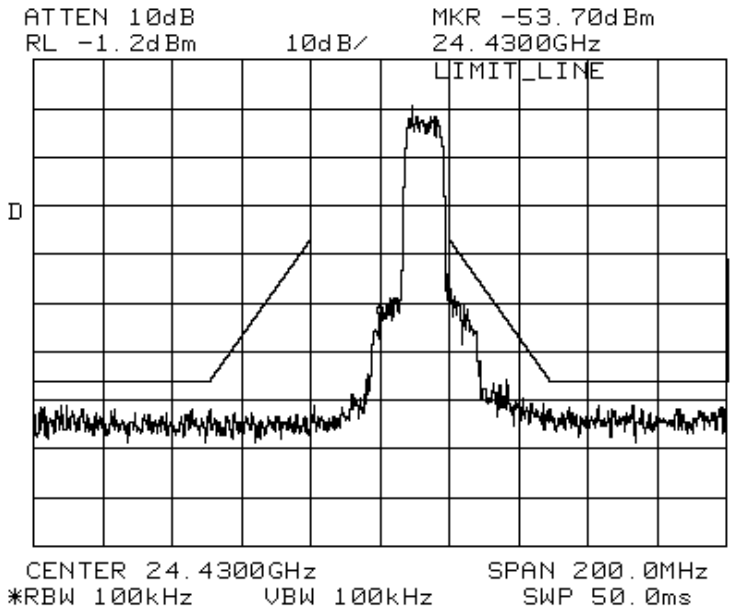
Sub Radio, CH 39A (higher 1st ch), 16 QAM Modulation, Output Power = 20 dBm



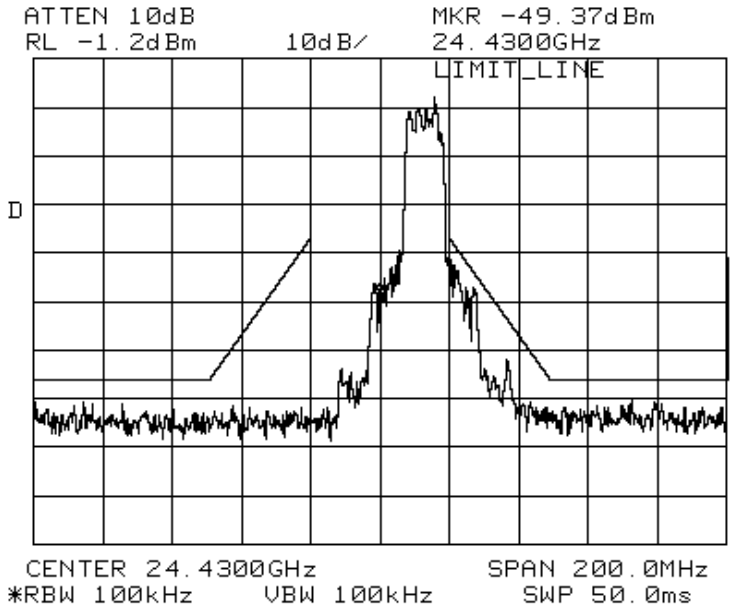
Sub Radio, CH 39A (higher 1st ch), 64 QAM Modulation, Output Power = 20 dBm



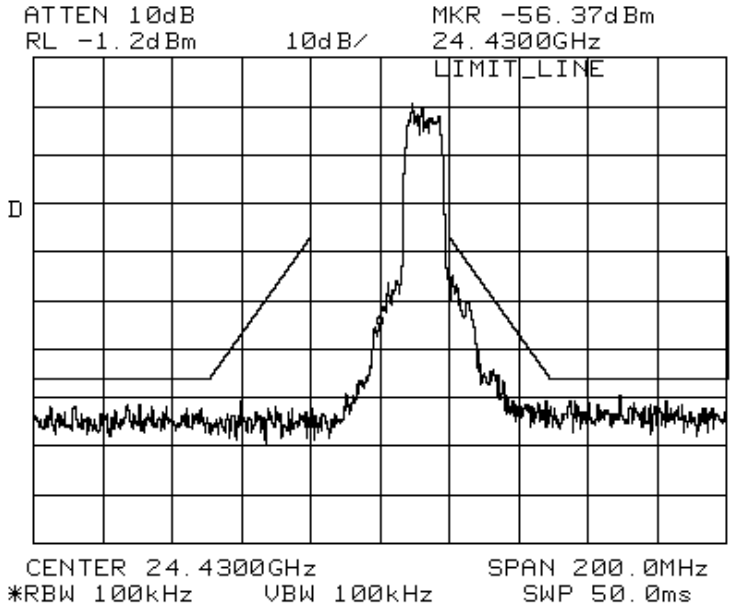
Sub Radio, CH 39C (higher 3rd ch), QPSK Modulation, Output Power = 20 dBm



<u>Sub Radio, CH 39C (higher 3rd ch), 16 QAM Modulation, Output Power = 20 dBm</u>



<u>Sub Radio, CH 39C (higher 3rd ch), 64 QAM Modulation, Output Power = 20 dBm</u>



<u>Sub Radio, CH 39C (higher 3rd ch), 64 QAM Modulation, Output Power = 20 dBm</u>

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