

Re: FCC ID MIJMILHUB-USA-01
Applicant: Motorola GSTG
Correspondence Reference Number: 11114
731 Confirmation Number: EA95370
Date of Original E-Mail: 12/20/1999
Date of Response: 1/21/2000

- 1.) *Please show the highest and lowest operating frequency that will satisfy the emissions limitations / mask.*

RESPONSE:

The frequencies that are to be used by the Millitech Band A HUB's are as follows:

- 28.143 GHz Data
- 28.155 GHz Data
- 28.167 GHz Data
- 27.644 GHz Pilot

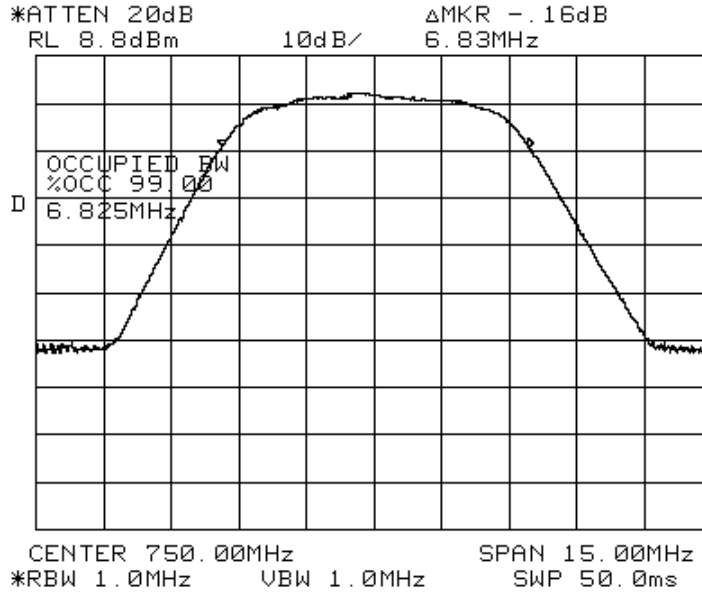
These HUB's were built for a specific site installation and are not to be used at any other locations or with any other frequencies of operations. None of the listed frequencies are near the edges of the allocated band (27.500 and 28.350 GHz).

Future Motorola LMDS equipment will more fully utilize the allocated frequency spectrum. For these equipment, emission limitation/masks will be measured at the highest and lowest operating frequency of the equipment.

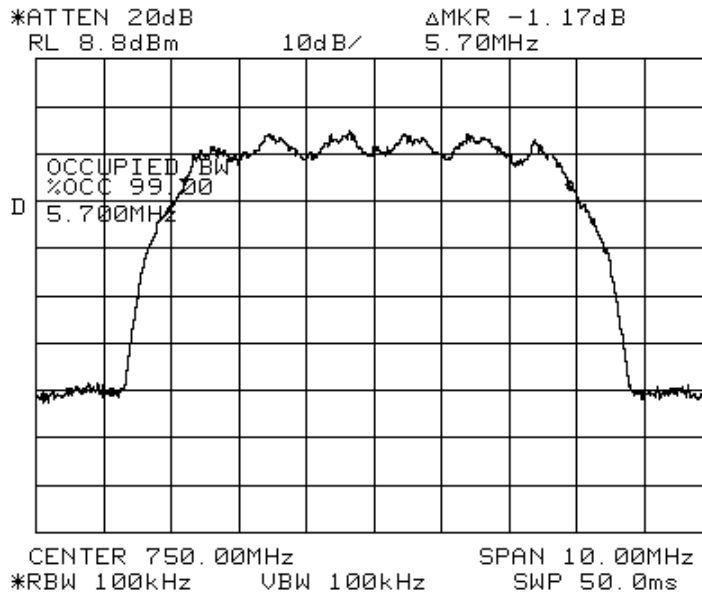
- 2.) *Please provide a determination of necessary or occupied bandwidth.*

RESPONSE:

The necessary or occupied bandwidth for the HUB is determined by the Data over Cable Interface System Specification (DOCSIS). The modulation used for the router end is 64QUAM at a symbol rate of 5.0MS/s with a filter alpha of 0.15. The following graphs are the measured occupied bandwidth at the output of the signal generator used to supply the IF input to the HUB measured with a 1 MHz and a 100 kHz resolution bandwidth. Because the HUB is simply a frequency translator the occupied bandwidth at the HUB's transmit frequency will be identical.

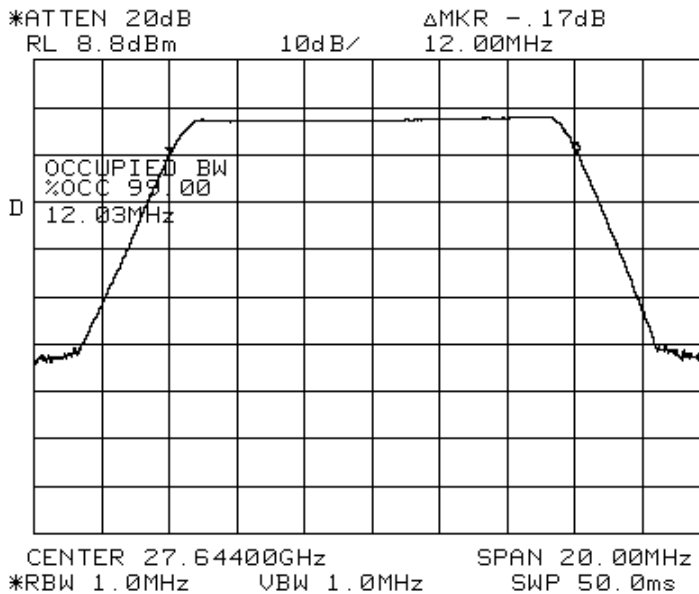


Data - Occupied bandwidth measured with a 1 MHz resolution bandwidth.

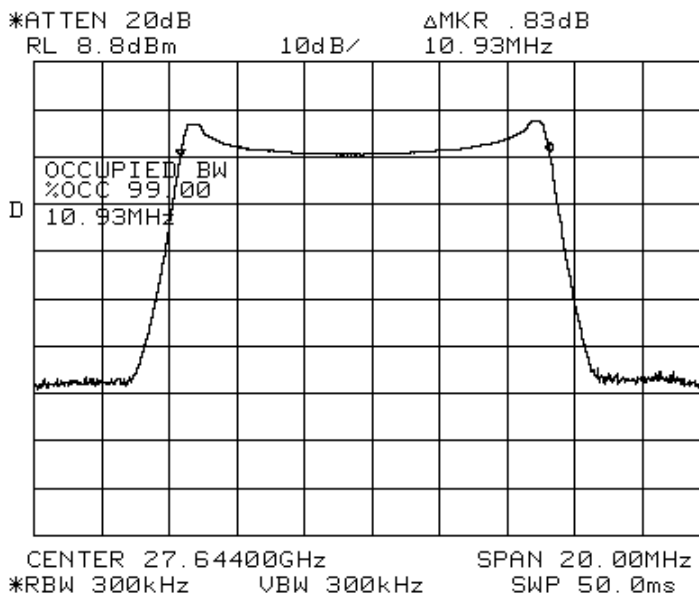


Data - Occupied bandwidth measured with a 100 kHz resolution bandwidth.

The HUB's Pilot signal is an FM modulated signal with FM deviation of 10 MHz and a modulation frequency of 24. The following graphs are the measured occupied bandwidth using a 1 MHz and a 300 kHz resolution bandwidth.



Pilot - Occupied bandwidth measured with a 1 MHz resolution bandwidth.



Pilot - Occupied bandwidth measured with a 300 kHz resolution bandwidth.

- 3.) Please supply measurement data showing the relative levels of spurious emissions at the output terminals as required by Section 2.1051 of the Commission's R&R.

RESPONSE:

At the time of test, the Millitech HUB antenna's could not be removed for purposes of conducted spurious emission tests. Therefore, all tests were performed in a radiated mode. The only spurious emissions detected were related to the harmonics of the HUB' data and pilot transmit frequencies. The measurement of the radiated harmonics relative to the intentional carriers are provided in Section 9.3 of Exhibit 9.

- 4.) Please provide measurement data showing the transmitter frequency stability for variations in temperature over the range -30 to +50 degrees C at 10 degree C intervals as required by Section 2.1055(b) of the Commission's R&R.

RESPONSE:

The HUB that was tested is no longer available for additional testing. The following tables are the measured frequency stability data for the data and pilot transmitters taken on a similar HUB (FCC ID: MIJTELHUB-USB-01). The frequency stability control for both HUB's are identical.

f ₀	31.048 GHz		% Error		FCC Limit
	°C	f @ -15% rated voltage in GHz	f @ +15% rated voltage in GHz	% Error @ -15% rated voltage	
-30	31.04799800	31.04799800	-0.00000644%	-0.00000644%	0.001%
-20	31.04799870	31.04799800	-0.00000419%	-0.00000644%	0.001%
-10	31.04799800	31.04799800	-0.00000644%	-0.00000644%	0.001%
0	31.04799730	31.04799730	-0.00000870%	-0.00000870%	0.001%
10	31.04799730	31.04799700	-0.00000870%	-0.00000966%	0.001%
20	31.04799674	31.04799670	-0.00001050%	-0.00001063%	0.001%
30	31.04799600	31.04799600	-0.00001288%	-0.00001288%	0.001%
40	31.04799530	31.04799530	-0.00001514%	-0.00001514%	0.001%
50	31.04799470	31.04799470	-0.00001707%	-0.00001707%	0.001%

Frequency Stability Data for HUB Data Transmitter

f_0	31.0015 GHz GHz		% Error		FCC Limit
°C	f @ -15% rated voltage in GHz	f @ +15% rated voltage in GHz	% Error @ -15% rated voltage	% Error @ +15% rated voltage	
-30	31.00249920	31.00249580	0.00001355%	0.00000258%	0.001%
-20	31.00250800	31.00250800	0.00004193%	0.00004193%	0.001%
-10	31.00249420	31.00249420	-0.00000258%	-0.00000258%	0.001%
0	31.00249420	31.00249420	-0.00000258%	-0.00000258%	0.001%
10	31.00249420	31.00249420	-0.00000258%	-0.00000258%	0.001%
20	31.00249580	31.00249750	0.00000258%	0.00000806%	0.001%
30	31.00249580	31.00249580	0.00000258%	0.00000258%	0.001%
40	31.00249500	31.00249080	0.00000000%	-0.00001355%	0.001%
50	31.00249420	31.00249420	-0.00000258%	-0.00000258%	0.001%

NOTE: Because the FM modulation could not be defeated, the frequency measurement was made at the upper peak of the FM waveform (31.002495 GHz).

Frequency Stability Data for HUB Pilot Transmitter