



Telecom Technical
Regulations
Test Specification

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July 15, 2020

Local Multipoint Distribution Service(LMDS) Microwave Base Station RF Equipment Type Approval Technical Specifications

National Communications Commission

July 15, 2020

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Local Multipoint Distribution Service Microwave Base Station RF Equipment

Type Approval Technical Specifications

1. Legal Base

The regulations hereunder are stipulated pursuant to paragraph 2 of Article 66 of the Telecommunications Management Act .

2. Scope

This specification is applicable to the type approval test of the RF equipments of LMDS Microwave Base Station using certain frequency in the 24- 42GHz frequency band.

3. Technical Standards

This specification is established in reference to the US FCC 47 CFR Part 101, the European Union ETSI EN 302 326 and EN 301 126-2-3; and other international technical standards.

4. Test Items and Conformance Requirement

4.1 Operating Frequency Band:

The working frequency is in the band of 24GHz to 42GHz.

4.2 Frequency Stability:

Under normal rated voltage, the temperature varies between -20°C and 50°C and the carrier center frequency deviation shall be less than $\pm 0.003\%$.

4.3 Conducted Power Limit:

Conducted power must not exceed 10W.

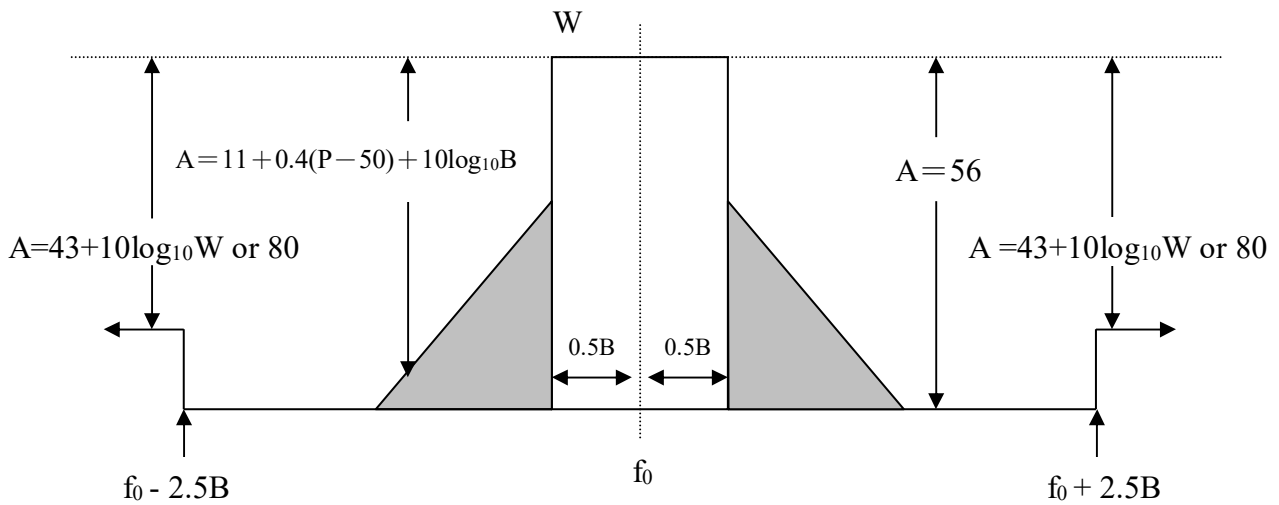
4.4 Conducted emission Mask:

Shall comply with any one of the following conducted emission mask rules:

- (1) Radiation Mask 1 (Refer to FCC 47 CFR Part 101, as in appendix 1).
- (2) Radiation Mask 2 (Refer to European Union ETSI EN 302 326, as in appendix 2)

Appendix 1: Conducted emission Mask (Refer to FCC 47 CFR Part 101)

Conducted emission Mask Diagram



Description:

:

1. At the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 250 percent of the authorized bandwidth, the attenuation in any 1 MHz band shall be more than or equal to "A", as specified by the following equation but in no event less than 11 decibels.

$$A = 11 + 0.4(P - 50) + 10 \log_{10} B \text{ dB; the maximum value is 56 dB.}$$

2. The attenuation of the power level, measured outside 2.5 times of the bandwidth centered at the carrier frequency (f_0) and based on any frequencies that can be inspected with 4KHz resolution bandwidth, shall be at least $43 + 10 \log_{10}(\text{average output power [W]})$ or 80dB, whichever is the lesser attenuation.

3. Symbol Description:

W: conducted average output power

A: the attenuation below the conducted average output power in dB

P: the percentage ratio between the difference of the inspected frequency and the carrier center frequency, and the bandwidth of the equipment under approval.

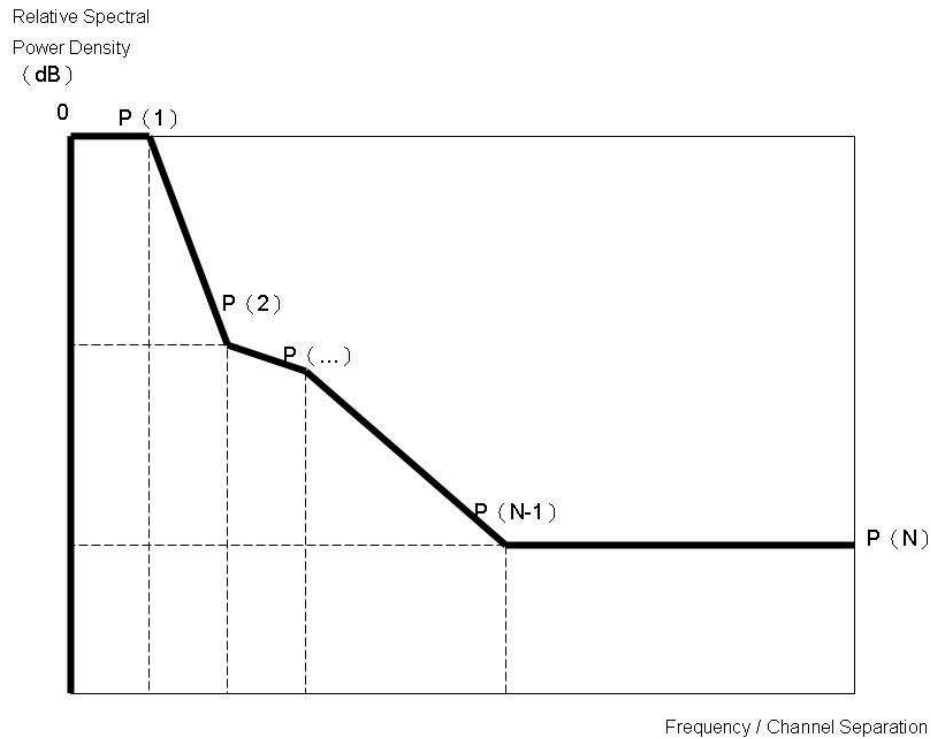
B: the bandwidth of equipment under test for type approval application in MHz

4. Tested channels are lowest, medium and highest channels; the equipment under test based on different bandwidth and the maximum modulation level (including modulation methods and coding rate) shall be respectively tested.

Appendix 2: Radiation Mask (Refer to EU ETSI EN 302 326)

1. Power Spectrum Mask

(1) Power Spectrum Mask Diagram



$P(1), P(2), \dots, P(N)$ refer to turning points of the emission power spectrum mask. Different wireless communications systems will have different turning points.

(2) The regulated values of emission power spectrum mask of mobile communications system:

TDMA System								
Turning Points	$P(1) \sim P(N)$							
Frequency / Channel Separation	0	0.43	0.5	0.5	0.8	1.06	2	2.5
Equivalent Modulation Level								
2	0dB	0dB			-27dB	-27dB	-45dB	-45dB
4	0dB	0dB			-32dB	-37dB	-45dB	-45dB
6	0dB	0dB	0dB	-13dB	-34dB	-42dB	-45dB	-45dB

CDMA (DS-CDMA or FH-CDMA) System						
Turning Points	P(1)~P(N)					
Frequency t/Channel Separation	0	0.5	0.8	1.0	1.5	2.5
Limitation Values	0dB	0dB	-25dB	-25dB	-45dB	-45dB

TDMA-OFDMA System							
Turning Points	P(1)~P(N)						
Frequency/Channel Separation	0	0.5	0.5	0.71	1.06	2	2.5
Equivalent Modulation Level							
2	0dB	0dB	-8dB	-25dB	-27dB	-50dB	-50dB
4	0dB	0dB	-8dB	-27dB	-32dB	-50dB	-50dB
6	0dB	0dB	-8dB	-32dB	-38dB	-50dB	-50dB

MC-TDMA System								
Turning Points	P(1)~P(N)							
Frequency /Channel Separation	0	0.5	0.5	0.54	0.64	1	2	2.5
Equivalent Modulation Level								
2	0dB	0dB	-8dB	-18dB	-23dB	-23dB	-45dB	-45dB
4	0dB	0dB	-10dB	-23dB	-32dB	-37dB	-45dB	-45dB
6	0dB	0dB	-13dB	-26dB	-37dB	-42dB	-45dB	-45dB

FDMA System							
Turning Points	P(1)~P(N)						
Frequency/Channel Separation							
Equivalent Modulation Level	0	0.5	0.5	0.6	0.85	1.5	2.5
2	0dB	0dB	-23dB	-25dB	-25dB	-45dB	-45dB
3	0dB	0dB	-27dB	-29dB	-29dB	-45dB	-45dB
4 or 6	0dB	0dB	-31dB	-33dB	-33dB	-45dB	-45dB

Description:

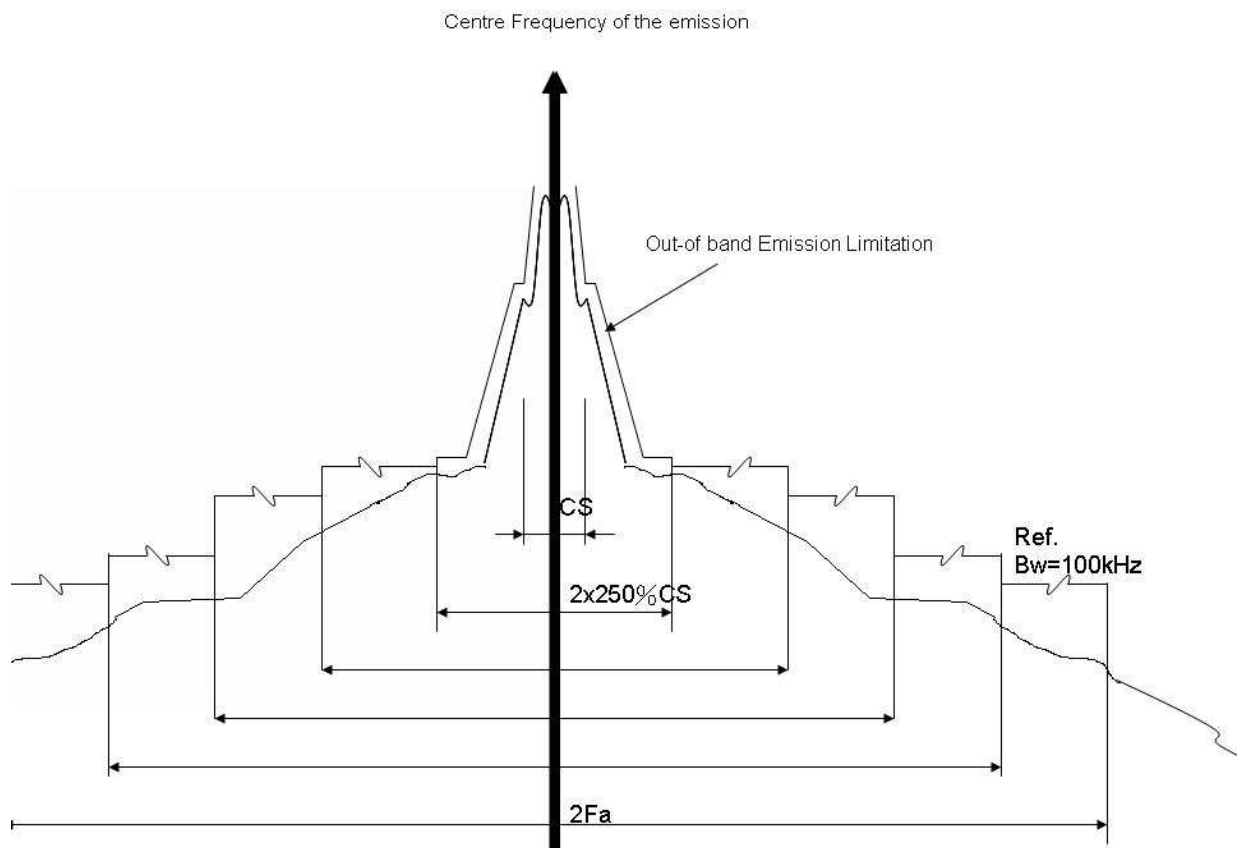
1. Definition of Equivalent Modulation Level

- (1) To a modulator/demodulator, equivalent modulation level is defined as the number of discrete levels that each symbol can be assigned. It is the number of bits of information that each symbol can carry. Given that N is the allowed number of levels that can be assigned to each symbol in modulator/demodulator, its equivalent modulation level is $\log_2(N)$.
- (2) In the current digital communications system, the number of bits of information carried by each symbol is not determined by modulator/demodulator. The effect of Forward Error Correction Code (FEC) must also be taken into consideration. The following are examples describing how to the effect of FEC code modifies equivalent modulation level:
 - (a) To 16QAM and 3/4 rate convolutional code digital communications systems, the equivalent modulation level is $3/4 * \log_2(16) = 3$.
 - (b) To the digital communications systems of 16QAM, 1/2 rate convolutional code, and 204/188 Reed-Solomon code, the equivalent modulation level is $188/204 * 1/2 * \log_2(16) = 1.843$. This system's equivalent modulation level could lie between the two equivalent modulation levels and correspond to appendix 2: The equivalent modulation level of regulated power spectrum mask shall comply with the specification of higher equivalent modulation level.

2. Tested channels are lowest, medium and highest channels; the equipment under test with different working bandwidth and the maximum modulation level (including modulation methods and coding rate) shall be respectively tested according to the related test methods in ETSI EN 301 126-2-3.

2. Transmitter Spurious Emissions Spectrum Mask

(1) Transmitter Spurious Emissions Spectrum Mask



(2) Regulated Values of Transmitter Spurious Emissions

Frequency Range	Limit (Traffic Mode)
$30 \text{ MHz} < f < 1 \text{ GHz}$	-30 dBm/100 kHz
$1\text{GHz} < f < 2^{\text{nd}} \text{ harmonic}$	-30 dBm/1 MHz

(3) Reference Bandwidth of Transmitter Spurious Emissions Spectrum Mask

Channel Separation (CS) (MHz)	Symbol Rate (Fs) (~Mbaud/s)	Fa [Reference Bandwidth 100 kHz] (MHz)
$1 \leq CS < 10$	$F_s \div 0.6-8$	70
$CS \geq 10$	$F_s \sim > 6$	-