Project	**IEEE 802.20 Working Group on Mobile Broadband Wireless Access** **<http://grouper.ieee.org/groups/802/20/>**
Title	**MPS of 625k-MC Mode**
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Re:	The MBWA Minimum Performance project **(IEEE 802.20.3**)
Abstract	This contribution presents the minimum performance specification (MPS) for 625k-MC Mode in IEEE802.20.
Purpose	For consideration of 802.20 WG
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1 INTORODUCTION

The contribution covers the minimum performance specifications on the base station (BS) and User Terminal (UT) sides on the transmitter and the receiver. All the information in this document pertains to wide area networks and is based on the following definitions.

N_f:

The number of frequency carriers supported by a given 625K-MC system is designated N_f and depends on the allocated spectrum.

P_R:

Average SRRC filtered input power for a given carrier to a radio receiver. Input power is measured at the antenna, and is not reduced to account for cable losses. Averaging takes place between the start of the first useful symbol and the end of the last useful symbol of an uplink or downlink time slot. Ramp-up, ramp-down, and guard symbols are excluded.

P_{RAT}

The rated power per data stream P_{RAT} is defined as the highest SRRC-filtered power level such that when the base station opens a data stream with a user terminal, the power available to the new stream is at least P_{RAT} , while meeting all 625k-MC specifications. For the case of a multi-antenna base station, P_{RAT} is the incoherently summed power of signal for the new data stream from all antennas.

In all of the measurements described in the following clauses, the BS shall be configured to operate in Single Antenna Mode unless otherwise stated explicitly.

2 BASE STATION (BS) MPS

2.1 BS Receiver MPS

2.1.1 Receiver Sensitivity

2.1.1.1 Definition

Receiver sensitivity level requirements for the base station receiver are based on frame error rate (FER) in the presence of Additive Gaussian White Noise (AWGN). Signal power measurements are to be made on SRRC-filtered waveforms.

2.1.1.2 Method of Measurement

For every ModClass, the test shall be carried out as described below.

1. Configure the Base Station (BS) under test to function in single-antenna mode.
2. Connect the BS under test and a 625k-MC mode signal generator as shown in Figure 1: Functional Setup for Base Station Receiver Tests.
3. Disable both interference generator and AWGN generator by setting their output powers to zero.
4. Set the BS to receive the specified modulation class.

5. Adjust 625k-MC signal generator to deliver the specified modulation class signal and maintain its power at the receiver port of BS at the value as specified in Table 1.

6. Measure FER value.

2.1.1.3 Minimum Standard

The receiver sensitivity level of the Base Station receiver shall be no greater than the values specified in the Table 1 BS Receiver Sensitivity for FER = 10^{-2}

Table 1 BS Receiver Sensitivity for FER = 10^{-2}

Modulation Class	Receiver Sensitibity
Mod 0	-108.6
Mod 1	-107.0
Mod 2	-105.3
Mod 3	-102.4
Mod 4	-100.2
Mod 5	-97.9
Mod 6	-95.9
Mod 7	-94.6
Mod 8	-92.6
Mod 9	-90.6
Mod 10	-86.0

2.1.2 Adjacent Channel Selectivity

Adjacent channel selectivity (ACS) measures the receiver's ability to receive a desired signal on its assigned carrier in the presence of a modulated interfering signal on an adjacent carrier.

2.1.2.1 Definition

Given a single data stream active on carrier n:$0 \le n < N_f$, with 3 dB more received power than the tabulated value of receiver sensitivity for 10^{-2} FER and a second stream of uncorrelated data on carrier m:$m \ne n$, $0 \le m < N_f$, the ACS is defined as the ratio of input powers (expressed in dB) of stream m relative to stream n when the power of stream m is increased so that the FER for stream n is 10^{-2} .

2.1.2.2 Method of Measurement

1. Configure the Base Station (BS) under test to function in single-antenna mode.

2. Connect the BS under test and a 625k-MC mode signal generator as shown in Figure 1: Functional Setup for Base Station Receiver Tests.

3. Disable AWGN generator by setting their output powers to zero.

5. Adjust 625k-MC signal generator to deliver the specified modulation class signal and maintain it's power at the receiver port of BS **3 dB** more received power than at the value as specified in Table 1 BS Receiver Sensitivity for FER = 10–2.

6. Set Interference Generator to deliver the desired ModClass.

7. Measure FER value.

2.1.2.3 Minimum Standard

The ACS shall be at least 30 dB 625 kHz or more apart.

2.1.3 Maximum Non-Distortion Input Level

2.1.3.1 Definition

Non-distorting input power is defined as the maximum SRRC-filtered receive power at any antenna port such that the frame error rate (FER) does not exceed 10^{-2}.

2.1.3.2 Method of Measurement

1. Configure the Base Station (BS) under test to function in single-antenna mode.

2. Connect the BS under test and a 625k-MC mode signal generator as shown in Figure 1: Functional Setup for Base Station Receiver Tests.

3. Disable both interference generator and AWGN generator by setting their output powers to zero).

4. Set the BS to receive the specified modulation class.

5. Adjust 625k-MC signal generator to deliver the specified modulation class signal at a power of -45dBm.

6. Measure FER value.

2.1.3.3 Minimum Standard

The non-distorting input power shall be greater than -45 dBm.

2.1.4 DSSI Estimator Accuracy

2.1.4.1 Definition

The Desired Signal Strength Indicator (DSSI) is required to support open loop power control. The DSSI is an estimate of SRRC-filtered input power P_R for a given active data stream. The DSSI Estimator accuracy is expressed as a decibel ratio between the actual value of P_R and the estimated value.

2.1.4.2 Method of Measurement

1. Configure the Base Station (BS) under test to function in single-antenna mode.

2. Connect the BS under test and a 625k-MC mode signal generator as shown in Figure 1: Functional Setup for Base Station Receiver Tests.

3. Disable both interference generator and AWGN generator by setting their output powers to zero.

4. Set the BS to receive the correct modulation class.

5. Adjust 625k-MC signal generator to deliver the specified modulation class signal.

6. Measure DSSI.

2.1.4.3 Minimum Standard

DSSI Estimator Accuracy shall be within the permitted range as shown in the Table 2- Range of Acceptable DSSI Report Values..

Table 2- Range of Acceptable DSSI Report Values.

Input Power P_R [dBm]	Min DSSI Report	Max DSSI Report
$-45 < P_R$	-49	$P_R + 4$
$-105 < P_R \leq -45$	$P_R - 4$	$P_R + 4$
$-110 < P_R \leq -105$	$P_R - 6$	$P_R + 6$
$P_R \leq -110$	No minimum	-104

2.1.5 SINR Estimator Accuracy

2.1.5.1 Definition

The SINR estimator is used for closed loop power control. SINR estimator accuracy is defined as the difference between the output value of the SINR estimator and the received SINR at the antenna connector. TCH bursts from an established stream shall be present at the antenna (for testing purposes, the stream may or may not be communicating with the base station under test). The SRRC-filtered input power of the bursts and the SRRC-filtered input power of added Gaussian noise are measured independently of the base station. Then the SINR estimator accuracy is the decibel ratio of the externally measured burst to noise power and the base station SINR estimator output. SINR should be calculated from the training sequence portions of the bursts. The SINR estimator error is the difference between the output value of the SINR estimator and the SINR present at the antenna.

2.1.5.2 Method of Measurement

1. Configure the Base Station (BS) under test to function in single-antenna mode.

2. Connect the BS under test and a 625k-MC mode signal generator as shown in Figure 1: Functional Setup for Base Station Receiver Tests.

3. Disable interference generator by setting its output power to zero.

4. Set the BS to receive the correct modulation class.

5. 5. Set received power for specified modulation class in 625k-MC (Desire) generator.

6. Set 500 kHz band width in AWGN generator.

7. Measure SINR.

2.1.5.3 Minimum Standard

SINR Estimator Accuracy shall be within the permitted range of the template shown in the Table 3 - Range of Acceptable SINR Report Values.

Table 3 - Range of Acceptable SINR Report Values.

Input SINR [dB]	5th Percentile (dB)	95th Percentile(dB)
S < -5	No Minimum	-2 dB
-5 ≤ S < 29	S – 4 dB	S + 3 dB
29 ≤ S	26 dB	S + 3 dB

2.2 BS Transmitter MPS

2.2.1 Carrier Frequency Error

2.2.1.1 Definition

Carrier frequency error is the difference between the programmed and actual transmitted base station carrier frequency, measured in parts per million (PPM).

2.2.1.2 Method of Measurement

1. Configure the Base Station (BS) under test to function in single-antenna mode.

2. Connect the BS under test and a spectrum analyzer and vector signal analyzer as shown in Figure 2 – Functional Setup for Base Station Transmitter Tests.

3. Set the BS to transmit the desired modulation class.

4. Measure carrier frequency error by using Vector Signal Analyzer.

2.2.1.3 Minimum Standard

Carrier frequency error shall not exceed 0.05 PPM.

2.2.2 Modulation Accuracy

2.2.2.1 Definition

The modulation accuracy is the ratio of the root mean square error vector magnitude to the reference amplitude, averaged over the useful symbols of an uplink time slot. The error vector is the difference between the theoretically optimal desired waveform and the transmitted waveform at the symbol points, after receive SRRC filtering is applied to both waveforms and the initial phase, amplitude, frequency offset, and timing offset have been identified by a least-squares search.

Let a single stream be active on frequency carrier n, with transmitted power level P_{RAT} for the entire array. The MA for the array shall be the highest MA for the individual transmitters in that array.

2.2.2.2 Method of Measurement

1. Configure the base station under test to function in single-antenna mode.
2. Connect the BS under test and a spectrum analyzer and vector signal analyzer as shown in Figure 2 – Functional Setup for Base Station Transmitter Tests.
3. Set the BS to transmit the desired ModClass (modulation class).
4. Measure modulation accuracy with Vector Signal Analyzer.

2.2.2.3 Minimum Standard

The MA for the array shall not exceed 3.5% for all modulation classes with equal weighting over all *N* antennas and total transmitted power P_{RAT}.

2.2.3 Conducted Spurious Emission

2.2.3.1 Adjacent Carrier Power Ratio

2.2.3.1.1 Definition

Adjacent carrier power (ACP) is the SRRC filtered power radiated from all antennas on any carrier adjacent to carrier *n*, averaged over the entire downlink time slot *s*. The result is expressed in dBm.

2.2.3.1.2 Method of Measurement

1. Configure the base station under test to function in single-antenna mode.
2. Connect the BS under test and a spectrum analyzer and vector signal analyzer as shown in Figure 2 – Functional Setup for Base Station Transmitter Tests.
3. Set the BS to transmit the desired ModClass (modulation class).
4. Measure ACP with Spectrum Analyzer.

2.2.3.1.3 Minimum Standard

ACP shall be less than (P_{RAT} – 43) dBm in the adjacent carrier within the carrier allocation, and less than (P_{RAT} – 50) dBm for carriers with center frequency more than 625 kHz away from f_n .

2.2.3.2 Multi-carrier Inter-modulation Products

2.2.3.2.1 Definition

Given any unoccupied carrier, the multi-carrier inter-modulation product (MCIP) is defined as the highest SRRC filtered output power on that unoccupied carrier, summed over all antennas, with equal power on all other carriers and equal composite power on all antennas. The measurement is expressed in dBm.

2.2.3.2.2 Method of Measurement

1. Configure the base station under test to function in single-antenna mode.
2. Connect the BS under test and a spectrum analyzer and vector signal analyzer as shown in Figure 2 – Functional Setup for Base Station Transmitter Tests.
3. Setup BS to transmit the desired ModClass.
4. Measure MCIP in Spectrum Analyzer.

2.2.3.2.3 Minimum Standard

MCIP shall be less than (P_{RAT} – 40) dBm with one unoccupied carrier, equal power on all occupied carriers, and equal composite power on all antennas.

2.2.3.3 Out-of-Band Spurious Emissions

2.2.3.3.1 Definition

Out-of-band spurious performance is defined as any radio emanation outside the 625K-MC band allocated to the base station.

2.2.3.3.2 Method of Measurement

1. Configure the base station under test to function in single-antenna mode.
2. Connect the BS under test and a spectrum analyzer and vector signal analyzer as shown in Figure 2 – Functional Setup for Base Station Transmitter Tests.
3. Set the BS to transmit the desired ModClass (modulation class).
4. Measure Spurious Emission with Spectrum Analyzer.

2.2.3.3.3 Minimum Standard

The base station shall meet all regulatory requirements in the jurisdiction within which it is installed. Emissions shall not exceed the limits as specified in the Table 4 – Out-of-Band Spurious Emissions Limits.

Table 4 – Out-of-Band Spurious Emissions Limits.

Offset from nearest 625k-MC band edge	Emission limit
0 kHz to 500 kHz	-3 dBm / 100kHz
500 kHz to 5 MHz	-16 dBm / 100kHz

Beyond 5MHz	-20 dBm / 100kHz

3 USER TERMINAL (UT) MPS

3.1 UT Receiver MPS

3.1.1 Receiver Sensitivity

3.1.1.1 Definition

The receiver sensitivity level is that minimum SRRC-filtered receive power at the UT antenna port such that the frame error rate (FER) does not exceed a specific value.

3.1.1.2 Method of Measurement

1. Configure the User Terminal (UT) under test to function in single-antenna mode.

2. Connect the UT under test and a signal generator as shown in Figure 3 – Functional Setup for User Terminal Receiver Tests.

3. Disable both interference generator and AWGN generator by setting their output powers to zero.

4. Set the UT to receive the desired ModClass (modulation class).

5. Adjust 625k-MC signal generator to transmit the desired ModClass with the corresponding power level as defined in the Table 5。

6. Measure FER values.

3.1.1.3 Minimum Standard

The receiver sensitivity level of the user terminal receiver shall be no more than the values specified in the Table 5 UT Receiver Sensitivity for FER = 10^{-2}

Table 5 UT Receiver Sensitivity for FER = 10^{-2}

Modulation Class	Receiver Sensitibity
Mod 0	-107.5
Mod 1	-105.7
Mod 2	-104.2
Mod 3	-101.3
Mod 4	-100.1
Mod 5	-96.9
Mod 6	-94.8
Mod 7	-93.5
Mod 8	-91.6
Mod 9	-89.2
Mod 10	-86.2

3.1.2 Adjacent Channel Selectivity

3.1.2.1 Definition

Adjacent Channel Selectivity (ACS) measures the receiver's ability to receive a desired signal on its assigned carrier n:$0 \leq n < N_f$ in the presence of a modulated interfering signal on an adjacent carrier. The ACS is the ratio (in dB) of the interfering signal receive power at the UT antenna connector and desired signal receive power at the UT antenna connector when the desired signal receive power is at **3** dB above the receiver sensitivity values in Table 5 UT Receiver Sensitivity for FER = 10–2and the interfering signal power is such that the desired signal FER reaches 10^{-2} .

3.1.2.2 Method of Measurement

1. Configure the user terminal under test to function in single-antenna mode.

2. Connect the UT under test and a signal generator as shown in Figure 3 – Functional Setup for User Terminal Receiver Tests.

3. Disable the AWGN generator by setting its output powers to zero.

4. Set the UT to receive the desired ModClass (modulation class).

5. Set 625k-MC signal generator to the desired ModClass at a power level **3** dB greater than the corresponding value in the Receiver Sensitivity table.

6. Set Interference Generator to deliver the desired ModClass.

7. Measure FER.

3.1.2.3 Minimum Standard

Table 6 ACS Characteristics.

Desired signal modulation class	ACS
0-6	20 dB
7-8	17 dB
9-10	11 dB

3.1.3 Maximum Non-Distortion Input Level

3.1.3.1 Definition

The maximum receive power at the UT antenna port such that the frame error rate (FER) does not exceed 10^{-2}.

3.1.3.2 Method of Measurement

1. Configure the user terminal under test to function in single-antenna mode.

2. Connect the UT under test and a signal generator as shown in Figure 3 – Functional Setup for User Terminal Receiver Tests.

3. Disable the interference generator and AWGN generator (set their output powers to zero).

4. Set the UT to receive the desired ModClass.

5. Adjust 625k-MC Signal Generator to deliver the desired ModClass at -35dBm.

6. Measure FER.

3.1.3.3 Minimum Standard

The maximum input power of the UT shall be greater than –35 dBm.

3.1.4 Out-of-Band Blocking Characteristics

3.1.4.1 Definition

Out-of-Band Blocking measures the receiver's ability to receive a desired signal on its assigned carrier in the presence of a CW interfering signal in the vicinity of its assigned carrier. The out-of-band blocking performance is the power of the CW signal, expressed (in dBm) measured at the UT antenna connector, when the desired signal power at the UT antenna connector is fixed at **3** dB above the receiver sensitivity values in Table 5 UT Receiver Sensitivity for FER = 10–2 and when the CW signal power is such that the desired signal FER is 10^{-2}.

3.1.4.2 Method of Measurement

1. Configure the user terminal under test to function in single-antenna mode.

2. Connect the UT under test and a signal generator as shown in Figure 3 – Functional Setup for User Terminal Receiver Tests.

3. Disable the interference generator and AWGN generator (set their output powers to zero).

4. Set the UT to receive the desired ModClass.

5. Set 625k-MC signal generator to the desired ModClass at a power level **3** dB greater than the corresponding value in the Receiver Sensitivity table.

6. Set the Interference Generator in CW mode to generate the signal at the desired Power Level

7. Measure FER

3.1.4.3 Minimum Standard

The out-of-band blocking shall be as specified in the Table 7- Out-of-Band Blocking Characteristics.

Table 7- Out-of-Band Blocking Characteristics.

Parameter	Value

Desired Signal Power	Receiver Sensitivity + 1.8 dB		
Interference Signal Frequency	0.1 to (X – 15) MHz	(Y + 15) to 12750 MHz	Spurious frequencies
Interference Signal Power	≤ -23dBm	≤ -23dBm	≤ -40dBm

Where:

X – lower end of spectrum allocation.

Y – upper end of spectrum allocation.

3.1.5 DSSI Estimator Accuracy

3.1.5.1 Definition

The DSSI estimator is required to support open loop TX gain control. The difference between the output value of the Desired Signal Strength Indicator (DSSI) estimator and the RF input level of the UT receiver PR expressed in dB. The DSSI estimator reports a value of SRRC filtered RF power, at the antenna connector.

3.1.5.2 Method of Measurement

1. Configure the user terminal under test to function in single-antenna mode.
2. Connect the UT under test and a signal generator as shown in Figure 3 – Functional Setup for User Terminal Receiver Tests.
3. Disable the interference generator and AWGN generator (set their output powers to zero).
4. Set the UT to receive the desired ModClass.
5. Set 625k-MC signal generator to the desired ModClass.
6. Measure DSSI.

3.1.5.3 Minimum Standard

DSSI Estimator accuracy shall be within ±4 dB for signals having $\mathbf{P_R}$ greater between –105 dBm and –45 dBm. DSSI Estimator accuracy shall be within ±6 dB for signals having $\mathbf{P_R}$ between –110 dBm and –105 dBm. Refer to the Table 8 - Acceptable DSSI Report Values..

Table 8 - Acceptable DSSI Report Values.

Input Power P_R [dBm]	Min DSSI Report	Max DSSI Report
$-45 < P_R$	-49	$P_R + 4$
$-105 < P_R \le -45$	$P_R - 4$	$P_R + 4$
$-110 < P_R \le -105$	$P_R - 6$	$P_R + 6$
$P_R \le -110$	No minimum	-104

3.1.6 SINR Estimator Accuracy

3.1.6.1 Definition

The SINR Estimator is required for closed loop power control. The SINR Estimator Accuracy is the difference between the output value of the SINR estimator and the received SINR at the antenna connector. For bursts with training sequences, SINR should be calculated from the training sequences alone.

3.1.6.2 Method of Measurement

1. Configure the user terminal under test to function in single-antenna mode.
2. Connect the UT under test and a signal generator as shown in Figure 3 – Functional Setup for User Terminal Receiver Tests.
3. Disable the interference generator by setting their output powers to zero.
4. Set the UT to receive the desired ModClass.
5. Set 625k-MC signal generator to the desired ModClass.
6. Setup AWGN generator to deliver the noise of bandwidth 500KHz。
7. Measure SINR.

3.1.6.3 Minimum Standard

SINR Estimator Accuracy shall be within the permitted range of the template shown in the Table 9 - Range of Acceptable SINR Report Values.

Table 9 - Range of Acceptable SINR Report Values.

Input SINR [dB]	5^{th} Percentile (dB)	95^{th} Percentile(dB)
S < -3	No Minimum	0 dB
-3 ≤ S < 28	S – 3 dB	S + 3 dB
28 ≤ S	25 dB	S + 3 dB

3.2 UT Transmitter MPS

3.2.1 Nominal Output Power

3.2.1.1 Definition

Nominal output power is the SRRC-filtered transmit power that the UT supports, while meeting all 625k-MC protocol specifications. The nominal output power depends on the UT's power class.

3.2.1.2 Method of Measurement

1. Configure the user terminal under test to function in single-antenna mode.

2. Connect the UT under test and a spectrum analyzer and vector signal analyzer as shown in Figure 4 – Functional Setup for User Terminal Transmitter Tests.

3. Set UT to transmit the Desired ModClass signal.

4. Measure Output powers。

3.2.1.3 Minimum Standard

The following Table - Nominal UT transmit power per carrier for various modulation formats defines the nominal output power by class that the UT shall support. The UT transmit power shall not be less than 3 dB below the nominal power stated in Table 10- Nominal UT transmit power per carrier. A user terminal may restrict its transmit power to 6 dB less than the tabulated value when operating on carriers 0 (lowest carrier) or $N_f - 1$ (highest carrier) if this is needed to meet out-of-band emission requirements.

Table 10- Nominal UT transmit power per carrier

Modulation Format	Nominal Output Power		
	Power Class 1	Power Class 2	Power Class 3
64-QAM	29 dBm	24 dBm	19 dBm
32-QAM	29 dBm	24 dBm	19 dBm
24-QAM	29 dBm	24 dBm	19 dBm
16-QAM	30 dBm	25 dBm	20 dBm
12-QAM	30 dBm	25 dBm	20 dBm
8PSK	31 dBm	26 dBm	21 dBm
QPSK	31 dBm	26 dBm	21 dBm
π/2 BPSK	32 dBm	27 dBm	22 dBm

3.2.2 Carrier Frequency Error

3.2.2.1 Definition

The difference between the commanded and actual UT carrier frequency during any active uplink burst, using the received base station BCH frequency as a reference.

3.2.2.2 Method of Measurement

1. Configure the user terminal under test to function in single-antenna mode.

2. Connect the UT under test and a spectrum analyzer and vector signal analyzer as shown in Figure 4 – Functional Setup for User Terminal Transmitter Tests.

3. Set UT to transmit the Desired ModClass signal.

4. Measure carrier frequency error with Vector Signal Analyzer.

3.2.2.3 Minimum Standard

The carrier frequency error of the UT shall be within ±100 Hz.

3.2.3 Modulation Accuracy

3.2.3.1 Definition

The modulation accuracy is the ratio of the root mean square error vector magnitude to the reference amplitude, averaged over the useful symbols of an uplink time slot. The error vector is the difference between the theoretically optimal desired waveform and the transmitted waveform at the symbol points, after receive SRRC filtering is applied to both waveforms and the initial phase, amplitude, frequency offset, and timing offset have been identified by a least-squares search.

Let a single stream be active on frequency carrier n, with transmitted power level P_{RAT} for the entire array. The MA for the array shall be the highest MA for the individual transmitters in that array.

3.2.3.2 Method of Measurement

1. Configure the user terminal under test to function in single-antenna mode.
2. Connect the UT under test and a spectrum analyzer and vector signal analyzer as shown in Figure 4 – Functional Setup for User Terminal Transmitter Tests.
3. Set UT to transmit the Desired ModClass signal.
4. Measure modulation accuracy with Vector Signal Analyzer.

3.2.3.3 Minimum Standard

The modulation accuracy of the transmitter shall be in accordance with the specifications given in the Table 11- Modulation Accuracy for various Modulation Formats.

Table 11- Modulation Accuracy for various Modulation Formats

Modulation Format	Modulation Accuracy
64-QAM	< 4%
32-QAM	< 5.5%
24-QAM	< 6%
16-QAM	< 6%
12-QAM	< 7%
8PSK	< 9%
QPSK	< 10%
π/2 BPSK	< 10%

3.2.4 Conducted Spurious Emission

3.2.4.1 Adjacent Carrier Power Ratio

3.2.4.1.1 Definition

Adjacent Channel Power Ratio (ACPR) is expressed as a decibel ratio of undesired SRRC-filtered power transmitted by the UT on adjacent channels relative to the desired transmitted signal. The desired transmit signal power is averaged over the useful symbols of an uplink burst. Both the undesired and desired signals are measured as SRRC-filtered power.

3.2.4.1.2 Method of Measurement

1. Configure the user terminal under test to function in single-antenna mode.
2. Connect the UT under test and a spectrum analyzer and vector signal analyzer as shown in Figure 4 – Functional Setup for User Terminal Transmitter Tests.
3. Set UT to transmit the Desired ModClass signal.
4. Measure ACP with Spectrum Analyzer.

3.2.4.1.3 Minimum Standard

The ACPR for any carrier frequencies within the carrier allocation shall not exceed than the values in the Table 12 – Maximum ACPR when the transmit power is greater than +10 dBm.. If the ACPR limit in the table, together with the transmit power results in an ACPR limit less than -40 dBm, -40 dBm is applied as the limit instead of the tabulated value.

Table 12 – Maximum ACPR when the transmit power is greater than +10 dBm.

Carrier	Frequency Offset (Δf)	ACPR
First Adjacent Carrier	625 kHz	-35 dBc
Second Adjacent Carrier	1250 kHz	-45 dBc
Other Inband Carrier	1250 kHz < Δf < 5000kHz	-50 dBc

3.2.4.2 Out-of-Band Spurious Emissions

3.2.4.2.1 Definition

Out-of-band spurious emission performance is evaluated by measuring the peak transmit power over all the useful symbols of a burst, in which UT transmits at maximum power.

3.2.4.2.2 Method of Measurement

1. Configure the user terminal under test to function in single-antenna mode.
2. Connect the UT under test and a spectrum analyzer and vector signal analyzer as shown in Figure 4 – Functional Setup for User Terminal Transmitter Tests.
3. Set UT to transmit the Desired ModClass signal.

4. Measure Spurious Emission with Spectrum Analyzer.

3.2.4.2.3 Minimum Standard

♦ Out-of-band spurious emission of the UT shall be within local regulatory limits.

♦ UT out-of-band emissions at frequency offsets more than 4687.5 kHz from the edge of the nominal carrier bandwidth shall be less than –30 dBm, measured within a 1 MHz bandwidth.

4 FUNCTIONAL TEST SETUP

Figure 1 through Figure 4 illustrates the test setups used for Base Station and User Terminal testing. These are functional diagrams only. Actual test setups may differ provided the functionality remains the same.

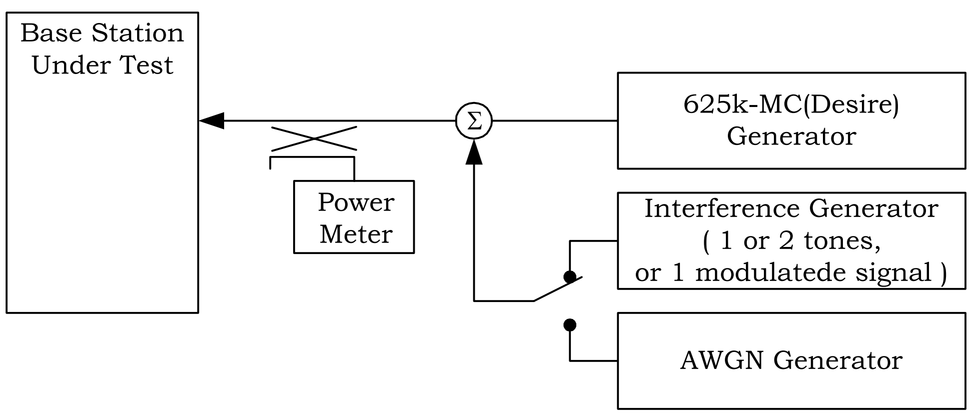

Figure 1: Functional Setup for Base Station Receiver Tests

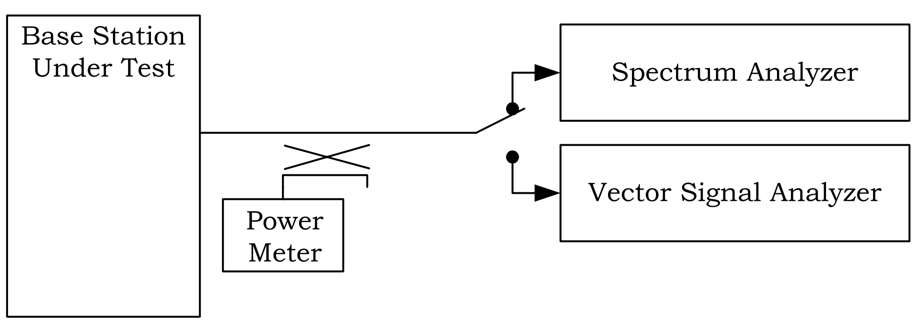

Figure 2: Functional Setup for Base Station Transmitter Tests

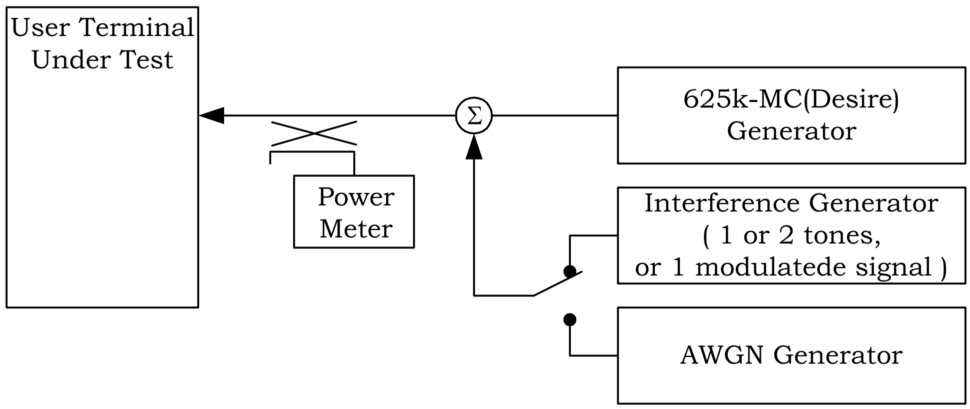

Figure 3: Functional Setup for User Terminal Receiver Tests

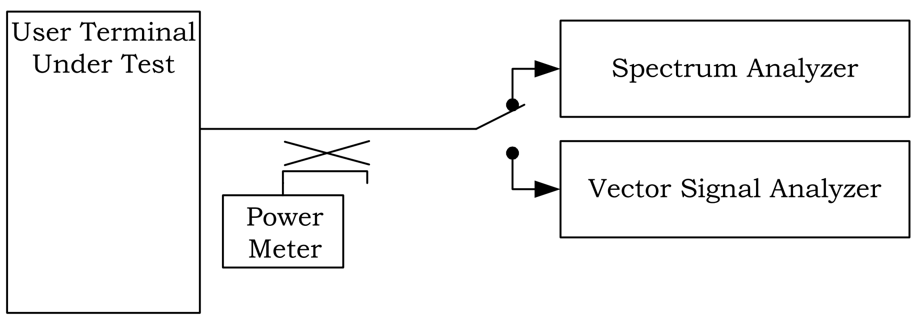

Figure 4: Functional Setup for User Terminal Transmitter Tests