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Abstract

CDMA cellular mobile systems find acceptance particularly in regional centers where there are large geographical areas to cover. The capacity of a CDMA system is limited by the reverse link. The reverse link uses uncorrelated, non-orthogonal PN codes, which makes it limited by interference from other users. In order to achieve an increased capacity, the interference from users needs to be reduced. This can be achieved by monitoring the voice activity detection (VAD) so that the transmitter is switched off during periods of no voice activity. This reduces the effective interference level by the reduced duty cycle of the transmitted signal. The interference can also be reduced by using antenna sectorization.

The capacity of a CDMA cellular system is investigated taking into consideration both single cell and multicell. Adaptive sectorisation is attempted with finite beam switching as a means of improving the cell capacity. Results are obtained using a simulation that takes into account of the random nature of user population both in single cell and multicell.

تجريد

تحظى الشبكات المستخدمة لنظام تعدد الوصول بواسطة التقسيم بالشفرة بقبول خاصة فى المناطق الاقليمية ذات المساحات الجغرافية الواسعة التى تتطلب التغطية.

سعة هذه الانظمة تحد بواسطة الوصلة العكسية, لان الوصلة العكسية تستخدم الشفرة الكاذبة الغير مترابطة مما يؤدى الى التداخل من باقى المستخدمين, و للحصول على زيادة السعة لهذه الانظمة يجب اذ قاص التداخل.

و تم الحصول على زيادة السعة بواسطة ضبط فعالية الصوت بحيث اغلق المرسل فى الفترات التى لايوجد فيها نشاط صوتى مما ادى الى اذ قاص مستوى التداخل المؤثر بواسطة اذ قاص دورة عمل الاشارات المرسلة.

تم اذ قاص التداخل ايضا بواسطة تجزئة مساحة التغطية للهوائيات.

اخضعت سعة هذا النظام للدراسة اخذين فىالاعتبار الخلية المفردة و الخلايا المتعددة.

تم استخدام التقسيم التكيفى لا قطاعات بواسطة جهاز لتحديد مساحة حزمة التغطية كوسيلة لزيادة سعة الخلية.

تم الحصول على النتائج باخذ نموذج محاكاة من النظام و أخذ فى الاعتبار الخلية المفردة و الخلايا المتعددة.

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Abbreviations:

AM	Amplitude Modulation
AMPS	Advanced Mobile Phone System
AWGN	Additive White Gaussian Noise
BER	Bit-Error-Rate
BS	Base Station
BSC	Base Station controller
CDM	Code Division Multiplexing
CDMA	Code Division Multiple Access
CIR	Carrier-to-Interference Ratio
CW	Continuous-Wave
DS	Direct Sequence
E_b/N_o	Energy per bit to noise energy ratio
FDM	Frequency Division Multiplexing
FDMA	Frequency Division Multiple Access
FM	Frequency Modulation
FDX	Full Duplex
FSK	Frequency Shift Keying
GSM	Global System Mobile
HDX	Half Duplex

HS	Hot Spot
MS	Mobile Station
MTSO	Mobile Telephone Switching Office
PAM	Pulse Amplitude Modulation
PCS	Personal Communication System
PDC	Personal Digital Cellular
PM	Phase Modulation
PN	Pseudo-Noise
PSK	Phase Shift Keying
PSTN	Public Switched Telephone Network
RFI	Radio Frequency Interference
SDM	Space Division Multiplexing
SNR	Signal-to-Noise ratio
SS	Spread Spectrum
SX	Simplex
TDM	Time Division Multiplexing
TDMA	Time Division Multiple Access
VAD	Voice Activity Detection
WCDMA	Wideband Code Division Multiple Access

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