

الإستهلال

قال تعالى :

يَرْحَمِ اللَّهُ الْمُرْتَدِينَ وَاللَّهُ مُتَوَكِّلٌ عَلَيْهِمْ
لِئَلَّا يَكُونَ لِلنَّاسِ بَأْسٌ
كُذِّبَتْكُمْ تَبِعْتُمْ أُولَئِكَ

التوبة (105)

صدق الله العظيم

DEDICATION

To

Endless love

Our mothers

To

Man who teach me to be man

Our fathers

To

Our brothers and Sisters

To

Our teachers &our colleagues

AKNOWLEDGMENT

First we need to thank our god (Allah) that without his blessing this work would not be complete.

Then all thanks for our supervisor Mr. Adel Akasha to his patience with us and countless hours and valuable efforts to guide and advise us to complete the work in his fair way.

Lastly we need to thank our teachers in electronic engineering school to their efforts in helping and support.

ABSTRACT

This thesis provides a detailed study in Two-way radio interconnection. Two-way radio interconnection refers to the ability of emergency response organizations to talk across disciplines and jurisdictions via radio communications systems when needed.

However there are difficulties that may face the interconnection operation, for example incompatible radio systems, incompatible frequency bands and different protocols that are used in two way radio, prevents the coordination and cooperation between organizations in emergency situations that considered very important in such situations.

In order to overcome the interconnection difficulties, an electrical analog circuit with analog components and relay switch is developed. This circuit works a repeater by applying the repeater concept to achieve the interconnection between public safety organizations with different frequency bands and infrastructure to work as if they are in one network. And this is done using simulation and testing several samples of audio and changing the parameters for analyzing the signals to get results.

المستخلص

تقدم هذه الأطروحة دراسة تفصيلية في الترابط بين انظمة راديو اللاسلكي. هذا الترابط يعني مقدره منظمات امن و سلامه المجتمع للتحدث عبر في مختلف التخصصات والاختصاصات عن طريق نظم الاتصالات اللاسلكية عند الحاجة. ولكن هنالك صعوبات قد تواجه عملية الربط، على سبيل المثال الأنظمة الراديوية الغير متوافقة، نطاقات التردد الغير متشابهة والبروتوكولات المختلفة التي تستخدم في راديو اللاسلكي، التي تمنع التنسيق والتعاون بين المنظمات في حالات الطوارئ و الذي يعتبر مهم جدا في مثل هذه الحالات .

من أجل التغلب على هذه الصعوبات، تم عمل دائرة تماثليه كهربيه بمكونات تناظرية والمفتاح المرحل . هذه الدائرة تعمل كمكرر اشارة من خلال تطبيق مفهوم مكرر الاشارة لتحقيق الترابط بين منظمات السلامة العامة ذات نطاقات ترددية و بنية تحتية مختلفة للعمل كما لو أنهم في شبكة واحدة. ويتم ذلك باستخدام المحاكاة واختبار عدة عينات للصوت والقيام بتغيير في معالم الاشارة لتحليل الإشارات و التغييرات التي تطرأ عليها والحصول على نتائج مختلفة.

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LIST OF ABBREVIATIONS

Org	Organization
RF	Radio Frequency
FCC	Federal Communications Commission
SNR	Signal to Noise Ratio
APCO	Association of Public-Safety Communications Officials
LEAA	Law Enforcement Assistance Administration
TIA	Telecommunications Industry Association
TETRA	Terrestrial Trunked Radio
ETSI	European Telecommunications Standards
PMR	Professional Mobile Radio
PAMR	Public Access Mobile Radio
MoU	Memorandum of Understanding
TDMA	Time Division Multiple Access
ITU	International Telecommunication Union
RR	Radio Regulations
ELF	Extremely Low Frequency
SLF	Super Low Frequency
ULF	Ultra Low Frequency
VLF	Very Low Frequency
LF	Low Frequency
MF	Medium Frequency
HF	High Frequency
VHF	Very High Frequency
UHF	Ultra High Frequency
SHF	Super High Frequency
EHF	Extremely High Frequency
THF	Tremendously High Frequency
AM	Amplitude Modulation
FM	Frequency Modulation
AF	Audio Frequency
PTT	Push-To-Talk