

Michael D. Kotzin
2075 Jordan Terrace
Buffalo Grove, IL USA 60089

Work Experience

2009 – Present President, MDK Consulting, Inc.

Consulting expert on all aspects of wireless systems, products and technology.

1975 – 2009 Motorola, Inc.

2006 - 2009 Vice President of the Technical Staff, Corporate Law Department, Patent Operations

Developed and managed processes and corporate-wide teams related to creating and maintaining a patent portfolio - including decisions related to filing, foreign filing, annuity, acquisition and divestiture
Created technology portfolio strategy across businesses including quantitative goals for new and retained IP assets
Continued driver and innovator of new technology and advanced concepts across all business entities

1998 - 2007 Vice President of the Technical Staff, Office of the CTO, Mobile Devices Business

1989 – 1998 Vice President of the Technical Staff, Director of Research and Advanced Technology, Cellular Infrastructure and Networks Business

(Promoted to VP of the Technical Staff in 1997)

Provided leadership and key strategic directions for adoption and creation of new technology for handheld devices

Responsible to ensure best-of-class performance of Motorola's cellular infrastructure deployments
Directed the activities of three worldwide research organizations developing digital cellular technology
Coordinated, participated and led key setting activities
Worked independently and with others to innovate many new products and techniques enhancing customer satisfaction and reducing cost

1975 – 1989 Various Motorola Research Labs (Communications and Components)

Innovated in new technology developments related to private and public radio communication systems
the technology resulting from these activities formed the basis and was essential to several new digital radio systems (cellular, public safety, and private mobile)

Additional Experiences

Taught courses at Northwestern University as an adjunct professor
Served as chairman/member of numerous Motorola patent committees

Patents and Publications

134 Issued US Patents
More than 500 Issued Patents Worldwide
20 published articles and other public conference presentations

Awards and Recognition

Fellow of the IEEE

Samsung v. Four Batons
IPR2025-00494
Exhibit 1003

IEEE VTS “Avant Garde” – “for the pioneering leadership and continuing contributions in promoting new technology in the field of vehicular communications and electronics”
Amateur Radio Extra Class and General Radiotelephone License (w/ ship radar endorsement)
Dan Noble Fellow (the highest recognition Motorola bestows on a technologist)
Member of Eta Kappa Nu and Tau Beta Pi engineering honor societies
Distinguished and Master Innovator Awards (Motorola)
Science Advisory Board Associate (Motorola)
Special Intellectual Property Award for Defensive Contributions in the Interdigital Litigation (Motorola)
Several “Patent of the Year” awards (recognizing inventors of Motorola patents having proven business impact)
Standards impact award for successfully driving TIA adoption of standards key to Motorola’s business success

Education

'77-'81 Ph.D. Electrical Engineering and Computer Science - Northwestern University, Evanston
Dissertation: Short Range Communication Using Diffusely Scattered Infrared Radiation
'75-'77 MSEE - Northwestern University, Evanston
Project: Digital Filter Implementation Using Cascaded Microprocessors
'71-'75 BSEE - University of Illinois, Urbana
'71-'75 BSChem - University of Illinois, Urbana

Dr. Michael D. Kotzin – Papers and Presentations

- Kotzin, M.D. and A.P. van den Heuvel, “Dead Reckoning Vehicle Location Using a Solid State Rate Gyro”, IEEE Vehicular Technology Conference Proceedings, Vol. 28, Denver, March 1978.
 - This paper describes a design and prototype for a vehicular location system utilizing a vibrating bar rate gyroscope to determine the vehicle's direction of motion. The odometer provided distance traveled. The prototype was field tested and the vehicle's location was tracked at a central location using real time telemetered data via a radio link.
- Kotzin, M.D. and A.P. van den Heuvel, “Short Range IR Telephone”, Second Workshop - Electromagnetic, Propagation and Communications Affiliates Program, Univ. of Il., Urbana, Il., April 1980.
 - This presentation described the physics of infrared radiation in an enclosed space. In addition, the design and prototype of a four time slot full duplex voice communication system for short range applications was described.
- Kotzin, M.D. and A.P. van den Heuvel, “Tracking Phase Locked Oscillator”, Motorola Technical Developments, Vol. 1, No. 1, August 1980.
 - This paper describes a circuit design for a phase locked loop system that provided an improved drive signal for the sensing element of a vibrating bar rate gyroscope.
- Kotzin, M.D., Short Range Communication Using Diffusely Scattered Infrared Radiation, University Microfilms, 1981.
 - This is a publically published version of my doctoral thesis.
- Marhic, M.E., M.D. Kotzin, A.P. van den Heuvel, “Reflectors and Immersion Lenses for Detectors of Diffuse Radiation”, J. Opt. Soc. Am., Vol. 72, No. 3, pp. 352-355, March 1982.
 - This journal article describes the physics and use of optical lenses specifically optimized for the purpose of collecting scattered light.
- Kotzin, M.D. and A.P. van den Heuvel, “A Duplex Infra-Red System for In-Building Communications”, IEEE Vehicular Technology Conference Proceedings, Dallas, May 1986.
 - This conference paper describes the design and prototype of a four time slot full duplex voice communication system for short range applications.
- Cohn, Jona and Michael Kotzin, “The Impact of Technology on Future Land Mobile Radio Spectrum Requirements”, Spectrum 20/20, (A symposium on: Spectrum Usage - Future Directions in Canada), May 12 & 13, 1987, Montreal, Quebec, Canada.
 - This paper describes various new system, circuit and component technologies that would have a profound impact on the design, deployment and functionality of future spectrally efficient mobile radio systems.

- Kotzin, M.D. and L. Mohl, “Integrating Secure Communications into 800 MHz. Trunked Systems”, IEEE Vehicular Technology Conference Proceedings, Tampa, June 1-3, 1987.
 - This paper describes a methodology and prototype for adding digital speech encryption capability to an existing analog land mobile trunking system.
- Presentation: Trends in Digital Cellular Technology, IEEE/VTS Sponsored Seminar, Tel Aviv, Israel, September, 1989.
 - This presentation described the current state of global digital cellular developments as well as likely trends and future evolution. The presentation included a detailed description of the technologies used in each of the then proposed systems.
- Stimple, J., P. Bocci, M.D. Kotzin, and A. P. van den Heuvel, “The Future Noise Environment at 800 MHz.”, IEEE Vehicular Technology Conference Proceedings, Vol. 28, Denver, March 1978.
 - This paper describes the results of a radio signal measurement campaign to better understand the sources of noise and their impact on proposed communication systems anticipated to be implemented using newly allocated spectrum.
- Cohn, Jona and Michael Kotzin, “The Impact of Technology on Future Land Mobile Radio Spectrum Requirements”, Spectrum 20/20, (A symposium on: Spectrum Usage - Future Directions in Canada), May 12 & 13, 1987, Montreal, Quebec, Canada.
 - This paper describes various new system, circuit and component technologies that would have a profound impact on the design, deployment and functionality of future spectrally efficient mobile radio systems.
- Kotzin, M.D. and L. Mohl, “Integrating Secure Communications into 800 MHz. Trunked Systems”, IEEE Vehicular Technology Conference Proceedings, Tampa, June 1-3, 1987.
 - This paper describes a methodology and prototype for adding digital speech encryption capability to an existing analog land mobile trunking system.
- Kotzin, M.D. and M. Needham. “Synchronization for a Spectrally Efficient Modulated Signal”. Motorola Technical Developments, Vol. 10, March 1990.
 - This paper describes a methodology for establishing receiver synchronization for a new radio communication system employing a very efficient and unique orthogonal multi-frequency air interface.
- Freeburg, T. and M. D. Kotzin. “Technology Trends Impacting Land Mobile Radio Systems and Spectrum”, XXIIIrd General Assembly of the URSI, Prague, Czechoslovakia, August/September 1990.
 - This paper describes various new system, circuit and component technologies that would have a profound impact on the design, deployment and functionality of future spectrally

efficient mobile radio systems. This paper is an update of a presentation made several years prior to its publication.

- Customer Sales Book: “An Introduction to the Pan-European Digital Cellular Network - Groupe Special Mobile (GSM)”, Motorola ECID, 1990.
 - This is a customer brochure that contains a system description with technology details of the (yet to be deployed) GSM cellular system. A discussion of the benefits of the Motorola offering in the context of the basic system requirements is included.
- A.P. van den Heuvel, M.D. Kotzin, and D. Hong. “A Spectrum Efficient, Combined Speech and Channel Coding Method Providing High Voice Quality for Land Mobile Radio Systems”, Colloquium on Future Mobile Radio Trunking and Data Systems, IEEE, February 27, 1991.
 - This paper describes a fundamentally new proposal to enable very efficient use of spectrum for providing speech communication over radio. A unique speech coding and channel modulation scheme is described.
- Kotzin, M.D., A.P. van den Heuvel, and D. Hong. “A Novel Spectrum Efficient Land Mobile Radio Communication System”, IEEE Vehicular Technology Conference Proceedings, St. Louis, May 19-21, 1991.
 - This paper describes a fundamentally new proposal to enable very efficient use of spectrum for providing speech communication over radio. A unique speech coding and channel modulation scheme is described.
- D. Hong, M.D. Kotzin, and A.P. van den Heuvel. “Spectrum Efficient Speech Processing Method for Land Mobile Radio Systems”, IEEE Vehicular Technology Conference Proceedings, St. Louis, May 19-21, 1991.
 - This paper provides technical details of the aforementioned speech coding and channel modulation system. The description of a prototype system, as well as results of testing, is described.
- “The Pan-European Digital Cellular (GSM) System: Overview and Update”, Proceedings of the Workshop on Advanced Network and Technology Concepts for Mobile, Micro, and Personal Communications, NASA-JPL, Pasadena, Ca., May 30/31, 1991.
 - This paper provides a tutorial overview of GSM system operation and technology. An update on standards progress and deployments is offered.
- Kotzin, M.D. and J. Kay. “Cellular Systems Technology: Narrow Band Development and Digitally Enhanced Cellular Services”, Proceedings of the Pacific Telecommunications Council Fourteenth Annual Conference, Honolulu, HI, Jan. 12-15, 1992, pp. 917-921.
 - This paper describes the methodology, implementation and field test results of a unique analog narrowband cellular communication system developed by Motorola.

- “Expectations and Experiences with Digital Cellular – An Update of Systems, Field Tests, and Trials”, PIMRC'93 Hot Topic Panel, Yokohama, Japan, Sept. 9, 1993.
 - This paper provides an update on the status of digital cellular systems worldwide. Technology, standards progress, system deployment and testing results are discussed.
- “Hopping the Common Control Channel of a GSM system”, Proceedings of the Sixth Nordic Seminar on Digital Mobile Radio Communications, DMR VI, Stockholm, Sweden, June 13-15, 1994.
 - This paper describes a proposed methodology to enable frequency hopping of the common control channel in GSM. Such a method provides improvements in performance and system security.
- Invited Paper: Kotzin, M.D. and J. Kay, “Cellular Systems Technology: Narrow Band Development and Digitally Enhanced Cellular Services”, Annual Review of Communications - International Engineering Consortium, Volume 47, 1993-1994, pp. 632-636.
 - This paper describes the methodology, implementation and results of a unique analog narrowband cellular communication system developed by Motorola.

Dr. Michael D. Kotzin - List of US Patents
(through Feb. 1, 2018)

1. Apparatus and method for detecting the cessation of motion of a body (US4409836 issued Oct. 18, 1983)
2. Automatic gain control for a remote control system having symmetrical send / receive signaling circuits (US4627098 issued Dec. 2, 1986)
3. Remote control system having symmetrical tone, send/receive signaling circuits for radio communications (US4654881 issued Mar. 31, 1987)
4. Method and apparatus for time companding an analog signal (US4839923 issued Jun. 13, 1989)
5. Quality improvement for a digitally transmitted information signal (US4860312 issued Aug. 22, 1989)
6. Secure trunked communications system - (US4882751 issued Nov. 21, 1989)
7. Multiple control slot TDM/FDM communication system (US4942570 issued Jul. 17, 1990)
8. Spectrally efficient method for communicating an information signal (US4979188 issued Dec. 18, 1990)
9. Text modifier (US5014313 issued May 7, 1991)
10. TDM/FDM communication system supporting both TDM and FDM only communication units (US5038342 issued Aug. 6, 1991)
11. Subband decoding method and apparatus (US5054075 issued Oct. 1, 1991)
12. A method of simulating the state of a linear feedback shift register (US5073909 issued Dec. 17, 1991)
13. Data throughput enhancement (US5077741 issued Dec. 31, 1991)
14. Interconnecting and processing system for facilitating frequency hopping (US5081641 issued Jan. 14, 1992)
15. Text modifier (US5086468 issued Feb. 4, 1992)
16. Method for repeating TDM/TDMA frames (US5113394 issued May 12, 1992)
17. Speech quality improvement for voice coders and synthesizers (US5127054 issued Jun. 30, 1992)
18. Cellular radio system having reduced handover disruption and method for use in such a system (US5146609 issued Sep. 8, 1992)
19. Multiple user spread-spectrum communication system (US5210771 issued May 11, 1993)
20. Cellular TDM communication system employing offset frame synchronization (US5228029 issued Jul. 13, 1993)
21. A full-duplex communication system (US5231629 issued Jul. 27, 1993)

22. Method and apparatus for canceling spread spectrum noise (US5235612 issued Aug. 10, 1993)
23. Apparatus and method for equalizing a degraded signal in a TDMA receiver (US5251233 issued Oct. 5, 1993)
24. Multiple cavity tuning of a transmitter output in a communication system - (US5263047 issued Nov. 16, 1993)
25. Two way radio communication system (US5278990 issued Jan. 11, 1994)
26. Shared-carrier frequency hopping (US5301188 issued Apr. 5, 1994)
27. Signal processing in communication systems (US5313489 issued May 17, 1994)
28. Apparatus and method for conveying information in a communication system (US5363404 issued Nov. 8, 1994)
29. Method and apparatus for digitizing a wide frequency bandwidth signal (US5392044 issued Feb. 21, 1995)
30. Multiple cavity tuning of a transmitter output in a communication system (US5408495 issued Apr. 18, 1995)
31. Method and apparatus for receiving electromagnetic radiation within a frequency band (US5412690 issued May 2, 1995)
32. Method and apparatus for creating a composite waveform (US5418813 issued May 23, 1995)
33. Reduced interference through offset frequency partitioning (US5430761 issued Jul. 4, 1995)
34. Method of exchanging communicated signals between a remote base site and a central site in a communication system (US5442681 issued Aug. 15, 1995)
35. Performance through half-hopping and spatial diversity (US5455962 issued Oct. 3, 1995)
36. Cellular radio system using common radio backbone (US5506867 issued Apr. 9, 1996)
37. Method and apparatus for operating with a hopping control channel in a communication system (US5506863 issued Apr. 9, 1996)
38. Method and apparatus for selecting a spreading code in a spectrum spread communication system (US5515396 issued May 7, 1996)
39. Method and apparatus for mitigating speech loss in a communication system (US5555447 issued Sep. 10, 1996)
40. Method and apparatus for transferring information to a device in a communication system (US5604787 issued Feb. 18, 1997)
41. Method and apparatus for transmitting information for multiple independent users in a communication system (US5627830 issued May 6, 1997)
42. Method and apparatus communication handover in a communication system (US5682416 issued Oct. 28, 1997)

43. Reduced interference through frequency partitioning (US5708969 issued Jan. 13, 1998)
44. Method and apparatus for reducing self interference in a communication system (US5734967 issued Mar 31, 1998)
45. Method and apparatus for group encoding signals (US5761634 issued Jun. 2, 1998)
46. Method and apparatus for canceling interference in a spread-spectrum communication system (US5787130 issued Jul. 28, 1998)
47. Method and apparatus for dynamic load balancing using handoff (US5796722 issued Aug. 18, 1998)
48. Apparatus and method for mitigating excess time delay in a wireless communication system (US5819181 issued Oct. 6, 1998)
49. Method and apparatus for maintaining call in a communication system (US5822699 issued Oct. 13, 1998)
50. Method and mobile station for activating a playback device in a communication system (US5862488 issued Jan. 19, 1999)
51. Infrastructure transceiver and method for configuration based on location information (US5864764 issued Jan. 26, 1999)
52. Method and apparatus for analyzing a composite carrier signal (US5894498 issued Apr. 13, 1999)
53. Method and apparatus for canceling signals (US5894500 issued Apr. 13, 1999)
54. Method of dynamically establishing communication of incoming messages to one or more user devices presently available to an intended recipient (US5928325 issued Jul. 27, 1999)
55. Infrastructure transceiver and method for configuration based on RF operating circumstances (US5940768 issued Aug. 17, 1999)
56. Method and apparatus for producing delay of a carrier signal for implementing spatial diversity in a communications system (US5953659 issued Sep. 14, 1999)
57. System and method for facilitating a handoff of at least one mobile unit in a telecommunication system (US5956641 issued Sep. 21, 1999)
58. Method and apparatus for transmitting information in a communication network (US5959981 issued Sep. 28, 1999)
59. Transmission and reception of signals in a communication system (US5974319 issued Oct. 26, 1999)
60. Cellular radio system using common radio backbone (US5974325 issued Oct. 26, 1999)
61. Method and apparatus for subscriber power level adjustment in a communication system (US6018544 issued Jan. 25, 2000)
62. Method and apparatus for transmitting signals in a communication system (US6038263 issued Mar. 14, 2000)

63. Method and apparatus for handoff within a communication system (US6101175 issued Aug. 8, 2000)
64. Method of enabling handoff (US6108322 issued Aug. 22, 2000)
65. Method and apparatus for balancing uplink and downlink transmissions in a communication system (US6134444 issued Oct 17, 2000)
66. Method and apparatus for mitigating audio degradation in a communication system (US6134521 issued Oct. 17, 2000)
67. Method and apparatus for controlling transmit diversity in a communication system (US6141542 issued Oct. 31, 2000)
68. Method and apparatus for preempting burst frequency assignments in a frequency-hopping communication system (US6157669 issued Dec. 5, 2000)
69. Method and apparatus for creating a composite waveform (US6172994 issued Jan. 9, 2001)
70. Apparatus and method for transmitting signals in a communication system (US6173005 issued Jan. 9, 2001)
71. Method and system for aiding in the location of a subscriber unit in a spread spectrum communication system (US6226317 issued May 1, 2001)
72. Method and apparatus for GPS time determination (US6323804 issued Nov. 27, 2001)
73. GPS enabled mobile stations and location methods therefor (US6427077 issued Jul. 30, 2002)
74. Method and apparatus for location determination of a cellular telephone (US6438381 issued Aug 20, 2002)
75. Exploiting a broadcast system to enhance a wireless gaming experience using position holders to replace data (US6453160 issued Sep. 17, 2002)
76. Method and apparatus for remote multiple access to subscriber identity module (US6466804 issued Oct. 15, 2002)
77. Exploiting a broadcast system to enhance a wireless gaming experience (US6470180 issued Oct. 22, 2002)
78. Multiple frequency allocation radio frequency device and method (US6529488 issued Mar. 4, 2003)
79. Wireless device cradle with spatial antenna diversity capability (US6529746 issued Mar. 4, 2003)
80. Method and apparatus for distributing processing load for decoding paging messages in a radio communication system (US6553228 issued Mar. 22, 2003)
81. Method for improving dispatch response time (US6606557 issued Aug. 12, 2003)
82. Method and apparatus for wirelessly communicating different information streams (US6791968 issued Sep. 14, 2004)

83. Wireless communications device with network cache function (US6836663 issued Dec. 28, 2004)
84. Wireless radio architectures and methods therefor (US6865401 issued Mar. 8, 2005)
85. Communication controller and method for managing the traffic flow of a communication connection during a cell reselection (US6907019 issued Jun 14, 2005)
86. Method and apparatus for detecting software tampering in a subscriber device (US6917641 issued Jul. 1, 2005)
87. Method and apparatus for communication (US6925095 issued Aug. 2, 2005)
88. Method and device for choosing a system selection algorithm that is location dependent (US6954649 issued Oct. 11, 2005)
89. Disposable device with removable radio module (US6957092 issued Oct. 18, 2005)
90. Method and apparatus for aggregation of wireless resources of proximal wireless units to facilitate diversity signal combining (US6958984 issued Oct. 25, 2005)
91. Method and apparatus for providing dispatch calling through a wireless communication system infrastructure (US6965779 issued Nov. 15, 2005)
92. Method and apparatus for virtually expanding a display (US6977675 issued Dec. 20, 2005)
93. Method for enhancing the communication capability in a wireless telecommunication system (US6983162 issued Jan. 3, 2006)
94. Portable communication device and corresponding method of operation (US6992580 issued Jan. 31, 2006)
95. Method and apparatus for notifying a party of another party's location and estimated time of arrival at a predetermined destination (US6993490 issued Jan. 31, 2006)
96. Method and apparatus for communicating information by splitting information among a plurality of proximal units (US7002942 issued Feb. 21, 2006)
97. Method and apparatus for distributing information (US7023814 issued Apr. 4, 2006).
98. Method and apparatus for distributing processing load for decoding radio frequency transmissions (US7024196 issued Apr. 4, 2006).
99. Method and apparatus for partitioning billing charges for calls handled by a wireless subscriber unit (US7046988 issued May 16, 2006).
100. Method and apparatus for reducing communication latency in a wireless group call (US7058419 issued Jun. 6, 2006)
101. Method and apparatus using biometric sensors for controlling access to a wireless communication device (US7088220 issued Aug. 8, 2006)
102. Emergency deployable GPS antenna (US7098855 issued Aug. 29, 2006)
103. Method and apparatus for enabling and rewarding wireless resource sharing (US7113771 issued Sep. 26, 2006)

104. Apparatus for wireless device to alter performance of wireless communication link (US7146189 issued Dec. 5, 2006)
105. Method and apparatus for indicating a location of a person with respect to a video capturing volume of a camera (US7148917 issued Dec. 12, 2006)
106. Method and apparatus for selecting an alert mode based on user biometrics (US7170994 issued Jan. 30, 2007)
107. Method and apparatus in a wireless communication system for identifying who has received a group message (US7177657 issued Feb. 13, 2007).
108. Method and apparatus for providing secure assistance to a communications unit over a network (US7197463 issued Mar. 27, 2007).
109. Method and apparatus for providing a downlink performance benefit in a communications system (US7200119 issued Apr. 3, 2007)
110. Smart card with back up (US7206847 issued Apr. 17, 2007)
111. Method and apparatus for reducing communication latency in a wireless group call was (US7239867 issued Jul. 3, 2007)
112. Providing assistance to a subscriber device over a network (US7243072 issued Jul. 10, 2007)
113. Apparatus and method for operating a communication device on two networks (US7339909 issued Mar. 4, 2008)
114. Mobile wireless communications device enablement and methods therefor (US7373138 issued May 13, 2008)
115. Unsolicited wireless content delivery and billing apparatus and method (US7395048 issued Jul. 1, 2008).
116. Method for enhancing the communication capability in a wireless telecommunication system (US7492739 issued Feb. 17, 2009)
117. Neighbor-assisted handover in mobile communications systems (US7570951 issued Aug. 4, 2009)
118. Method and apparatus for broadcast in an ad hoc network using elected broadcast relay nodes (US7593376 issued Sep. 22, 2009)
119. Method and apparatus for implementing spatial division multiple access ("SDMA") to communicate user data and backhaul data with the same wireless time-frequency resources (US7606574 issued Oct. 20, 2009)
120. Method and apparatus for recording and editing digital broadcast content (US7643564 issued Jan. 5, 2010)
121. Subscriber device and method therein for enhancing interfaces (US7653413 issued Jan. 26, 2010)
122. Method and apparatus for establishing direct communication for mobiles in a radio communication system (US7684813 issued Mar. 23, 2010)

123. Dynamic wireless backhaul (US7688835 issued Mar. 30, 2010)
124. Method and apparatus for broadcast in an ad hoc network with dynamic selection of relay nodes (US7697450 issued Apr. 13, 2010)
125. Wide area network handset assisted content delivery system and method of using same (US7756538 issued Jul. 13, 2010)
126. Method and system for incentive-based ad hoc networking (US7788387 issued Aug. 31, 2010)
127. Method and system of providing navigation information (US7822544 issued Oct. 26, 2010)
128. Method and apparatus for cognitive radio policy change (US8010102 issued Aug. 30, 2011)
129. Method and apparatus for a wireless mobile device with SIM challenge modification capability (US8116733 issued Feb. 14, 2012)
130. Method and apparatus for storing a message for playback during a user-initiated emergency telephone call from a wireless device (US8374574 issued Feb. 12, 2013)
131. Method and system for managing access to presence attribute information (US8443115 issued May 14, 2013)
132. Method and apparatus for enabling and rewarding wireless resource sharing (US8532611 issued Sep. 10, 2013)
133. System for generating and distributing content editing information (US8788940 issued Jul. 22, 2014)
134. Method and apparatus for enabling content to be shared among multiple devices in a secure environment (US9864978 issued Jan. 9, 2018)