Abbreviations $\sim X_1 = aenc((groupkey_request, sign(groupkey_request, \sim M_2), \sim M_3), \sim M$ = aenc((groupkey_request, sign(groupkey_request, attsk_3),cert(attvid_3,pk(attsk_3),cask_3)),pk(~M_8 = aenc(((groupkey_response,attvid_3,gsk(attvid_3,gmsk_4),gpk(gmsk_4)),sign((groupkey_response,attvid_3,gsk(attvid_3,g ~M_9 = aenc(((groupkey_response,vid_7,gsk(vid_7,gmsk_4),gpk(gmsk_4)),sign((groupkey_response,vid_7,gsk(vid_7,gsk(vid_7,gsk(vid_7,gsk(vid_7,gmsk_4)),cask_3)),pk(vsk_4)) \sim X_2 = (a_5,sign(a_5,a_6),pseudocert(pk(a_6),3-proj-4-tuple(1-proj-2-tuple(adec(\sim M_8, \sim M_2)))))
= (a_5,sign($a_5,a_6)$, pseudocert(pk(a_6), gsk(attvid_3, gmsk_4))) \sim M_10 = aenc(((pseudocert(pk(a_6),gsk(attvid_3, gmsk_4)),revoke_request),sign((pseudocert(pk(a_6), gsk(attvid_3,gmsk_4)),revoke_request),vsk_4),cert(vid_7,pk(vsk_4),cask_3)),pk(cask_3)) $\sim X_3 = aenc((pseudocert(a_8, 3-proj-4-tuple(1-proj-2-tuple($ adec(~M_8,~M_2)))),revoke_request),sign((pseudocert(Attacker \sim M = pk(cask_3) Beginning of process CARevoke **∼**M 9 ~X 3 ~M_10 {154}get revokedcerts(=vid_7): else branch taken

A trace has been found.

Honest Process {1}new gmsk_4 {2}new cask_3 {92} new attvid_4 {92}new attvid_3 {6}new vid_7 {93}new attsk_4 {93}new attsk_3 Beginning of process CA Beginning of process CA Beginning of process CARevoke {96} event AttackerGetsEnrollmentCertificate(attvid_4, {96} event AttackerGetsEnrollmentCertificate(attvid_3, pk(attsk_4)) pk(attsk_3)) $(\sim M_1, \sim M_2, \stackrel{\downarrow}{\sim} M_3) = (attvid_3, attsk_3, cert(attvid_3, pk(attsk_3), cask_3))$ $(\sim M_4, \sim M_5, \sim M_6) = (attvid_4, attsk_4, cert(attvid_4, pk(attsk_4), cask_3))$ Beginning of process Vehicle {15} event ValidGroupKeyRequestSent(vid_7) \sim M_7 = aenc((groupkey_request, sign(groupkey_request, vsk_4),cert(vid_7,pk(vsk_4),cask_3)),pk(cask_3)) {116}get revokedcerts(=attvid_3): else branch taken {109}event ValidGroupKeyRequestReceived(cask_3, attvid_3) {114}event ValidGroupPrivateKeySent(attvid_3,gsk(attvid_3,gmsk_4),gpk(gmsk_4)) ~M_7 = aenc((groupkey_request,sign(groupkey_request, vsk_4),cert(vid_7,pk(vsk_4),cask_3)),pk(cask_3)) {116}get revokedcerts(=vid_7): else branch taken {109}event ValidGroupKeyRequestReceived(cask_3, vid 7) {114}event ValidGroupPrivateKeySent(vid_7,gsk(vid_7,gmsk_4),gpk(gmsk_4)) \sim M_9 {22} event ValidGroupPrivateKeyReceived(vid_7,gsk(vid_7,gmsk_4),gpk(gmsk_4)) Beginning of process VehicleReport(vid_7, vsk_4, cert(vid_7,pk(vsk_4),cask_3), pk(cask_3), gpk(gmsk_4)) {48} event RevocationAsked(vid_7,cert(vid_7,pk(vsk_4),cask_3),pseudocert(pk(a_6),gsk(attvid_3,gmsk_4))) \sim M₁₀ {154}get revokedcerts(=attvid_4): else branch taken {127} event ValidRevocationReportReceived(pseudocert(a_8,gsk(attvid_3,gmsk_4)),cert(attvid_4,pk(attsk_4),cask_3)) {153}get revokedcerts(=attvid_3): else branch taken {130}event RevokedVid(attvid_3) {131}insert revokedcerts(attvid_3) {127} event ValidRevocationReportReceived(pseudocert(pk(a_6),gsk(attvid_3,gmsk_4)),cert(vid_7,pk(vsk_4),cask_3)) {153}get revokedcerts(attvid_3)