

STATE OF ALABAMA RESPONSE TO FIRSTNET DATA ELEMENTS REQUEST SEPTEMBER 30, 2016

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Introduction

About the Project

The State of Alabama Public Safety Broadband (ALPSB) project represents the state's efforts to prepare for the implementation of FirstNet within the state. This project includes collecting user requirements, performing user population modeling and analysis, reviewing the state's public safety communications governance structure, and performing stakeholder outreach and education. Additionally, the state is supporting various FirstNet consultation activities, and preparing for the State Plan review and recommendation process.

This project is housed under the Alabama Law Enforcement Agency (ALEA), and incorporates the Alabama First Responder Wireless Commission (AFRWC) to provide guidance and leadership. It is funded through the United States National Telecommunications and Information Administration (NTIA) State and Local Implementation Grant Program (SLIGP), and through the direct in-kind contributions of statewide stakeholders.

The primary objective of this project is to ensure the successful implementation of the Nationwide Public Safety Broadband Network (NPSBN) in the State of Alabama, based on a comprehensive statement of Alabama stakeholder requirements for mission critical broadband data communications.

This Document

The ALPSB State Planning Report provides a summary of network requirements as determined through an extensive and inclusive data collection process, and expands on the information previously provided by Alabama in support of the FirstNet data elements request. This report documents Alabama's needs for FirstNet state planning purposes as of September 30, 2016.

Submission Overview

On March 23, 2015 FirstNet published the FirstNet Data Collection Elements that requested the States to provide information as part of the State and Local Implementation Grant Program (SLIGP). Collectively, the datasets became known as the FirstNet Data Elements. Of the five primary data elements, four were requested by September 30, 2015, and the fifth, documentation regarding the State Plan review process, was due not later than December 31, 2015. However, the fifth data element request was subsequently eliminated. An additional data submission was requested by FirstNet to be submitted by September 30, 2016, which is captured in the enclosed submission package for the State of Alabama.

The data FirstNet has requested is contained in Excel spreadsheets and PDF files that accompany this document. This document introduces those attachments and provides additional details regarding how that data package was completed, and other important information the State of Alabama would like to convey to FirstNet for possible inclusion into FirstNet's State Plan for Alabama where appropriate. As with all of the State's submissions to FirstNet, the State acknowledges that this submission is in continuation of an ongoing dialog with FirstNet to leverage this critical public safety broadband communications opportunity for the State of Alabama.



Summary of Data Set Submission

The table below summarizes the data sets that are provided in this submission and their associated file name. The State would like to draw attention to FirstNet that Alabama submitted the 1a: Coverage Objectives and the 1b: Phased Deployment network implementation strategy in November of 2015. The phased coverage maps and statement of coverage objectives are essential requirements of the State, and it is our expectation that this information will form the basis for the coverage plan offered through the FirstNet State Plan.

Table 1: FirstNet Data Set and File Name

FirstNet Dataset Number	Data Set File Name
1a: Coverage Objectives	The State of Alabama previously provide this information
1b: Phased Deployment	The State of Alabama previously provide this information
2a: PSE Info	ALPSB 2a PSE Info.xls
2b: Devices	ALPSB 2b Devices.xls
2c: Users & Devices Summary	ALPSB 2c Users and Devices Summary.xls
2d-i: Operational Areas	ALPSB 2d-i Operational Areas.xls / Operational Areas. pdf
2d-ii: Calls for Service	This data is not currently available
3a: Applications	ALPSB 3a Applications.xls
3b: Data Usage	ALPSB 3b Data Usage.xls
4a: Current Providers	ALPSB 4a Current Providers.xls
4b: Barriers	ALPSB 4b Barriers.xls

Online Surveys

The State of Alabama developed an online survey and provided access to the portal directly through the Alabama First Responder Wireless Commission (AFRWC) website to gather agency-by-agency input to pertinent topics of interest to FirstNet and the State. The survey was designed to collect data such as contact information for appropriate personnel, the number of staff in the respondent's agency, existing wireless data spending by carrier, and various other information as described within this report. The survey was designed to match the FirstNet data elements request, and was expanded to gather additional information of interest to the State. The data files provided in the attachments regarding the survey data also include descriptions of the data and information regarding how the Alabama surveys were matched to the FirstNet data fields.

The level of response to the survey tool, to date, resulted in the need to project data where no data is yet available. Whenever the surveyed data results in significant alteration of the information, the State will update the analysis. However, the underlying approach to project unavailable data provided is quite accurate. The project team has implemented several formulas based on US census data, correlated to actual survey responses to extrapolate to areas where no data is available.



The ALPSB survey can be found at: <http://afrwc.alabama.gov/alabama-userpop-survey-landing-page-2/>

Data Extrapolation

The project team delivered invitations to statewide Public Safety Entities (PSE) requesting their participation in the online survey. Due to the nature of survey research, response expectations are much lower than total participation, and the gaps in receiving responses from all PSEs within each service area, the State undertook a focused effort to gather a comprehensive response to the survey. This effort addressed a number of key data elements, with a particular focus on capturing the total number of employees and potential FirstNet subscribers within the jurisdiction. Therefore, the online survey was additionally supplemented by a telephone survey conducted with a representative subset of the statewide counties/cities.

The telephone interviews were designed to determine the total number of potential subscribers to the FirstNet network for all government PSEs within these representative counties/cities. The selection of the phone surveyed counties/cities spanned the range from small to large population communities to provide a realistic representation of urban and rural counties throughout the State. Table 2 lists the counties that were selected to participate in this survey.

County Name	Pop Rank	County Pop	Police Officers Only
Mobile	2	415,395	916
Montgomery	4	226,519	664
Calhoun	10	115,620	253
Limestone	15	91,663	95
Talladega	19	80,862	158
Chilton	29	43,943	73
Cherokee	41	25,859	40
Greene	67	8,479	23

Table 2: Representative Surveyed Counties

The State will continue to collect online survey data with the expectation of receiving requirements from the extended state, local and tribal community. Additional telephone and in person surveys will also be conducted where appropriate. The statement of stakeholder FirstNet requirements, and the associated market research derived through the survey is essential to the State’s planning efforts and our preparation for the State Plan review and decision process.

Survey Data Summaries

As described above, online surveys were distributed to collect data pertaining to the agencies’ current spending, purchasing habits, and potential barriers to wireless data adoption. As illustrated in Figure 1, the percentage of agency response by discipline, Law Enforcement (Sheriff and Police Departments) and Fire Department representatives provided the majority of the responses, followed by Emergency Medical, and Emergency Management. The Other category includes Transportation, Public Works, Parks and Recreation and other smaller agencies.

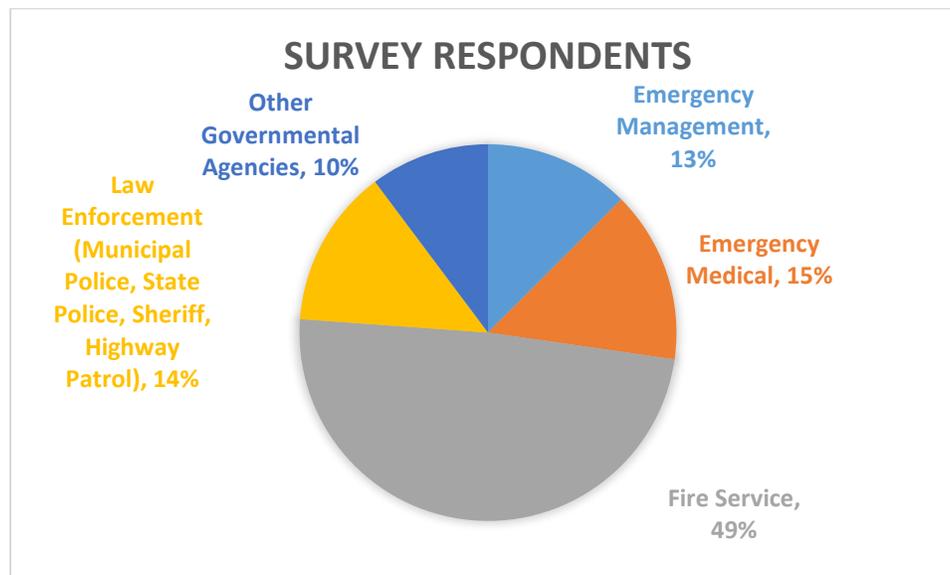


Figure 1: Survey Respondents by Discipline

The following sections present a summary of the survey data so far collected, including elements of the survey that expand on the FirstNet request. Alabama believes that these additional data sets are enlightening, and will help FirstNet understand the perspectives of the Alabama stakeholders and what it will take to be successful.

Element 2a: PSE Information

The Public Safety Entity (PSE) data provides a rough approximation of potential FirstNet subscribers within the State of Alabama based on a calculation of public safety personnel throughout the State. This data provides a summary of PSE's in Alabama along with their associated personnel counts and other required data. *Appendix I: Statewide Subscriber Estimation* provides a detailed list of the projected public safety portable and vehicular device requirements for FirstNet.

As described within the *Data Extrapolation* section above, an effort to supplement a limited number of survey responses to date, and to capture comprehensive data within a cross section of rural, suburban, and urban environments statewide was undertaken by the State. Various representative from Law Enforcement, Fire, Emergency Medical Services (EMS), and Emergency Manager Agency (EMA), together with county and city radio managers (inventory of both portable and mobile users), were contacted to document the number of government employees within each of their respective agencies¹. The end

¹ It is important to note that the totals provided for Fire Department personnel included volunteer, as well as full-time and part-time fire employees. In addition, school bus counts were collected for a range of counties, allowing for a correlation with county populations, against a total count of school buses derived from the Alabama Department of Education.



result of this effort was a determination of the actual number of public safety personnel from the counties/cities listed in Table 2.

With an actual count of public safety personnel, a process was developed to project total PSEs statewide. The method for projecting this data is based on the 2012 United States Census Bureau census of public employees. This is data collected by the Federal Government to provide statistics to Federal agencies and Congress. Utilizing the 2012 Census of Government Employment and Payroll, (<http://www.census.gov/govs/apes/index.html>), and applying a correlation factor to each type of PSE allowed county device counts to be calculated throughout the state.

The initial step in the data extrapolation process is to determine correlation factors for each Public Safety Entity (PSE). Using actual survey data from several jurisdictions, a comparison to the US Census data was conducted. The next step was to find the standard deviation between reported personnel counts and the Census data. After validating the personnel count, vehicle and device counts were validated from the reported data, and the associated correlation factors were then derived for each of the major disciplines. Once the factor for each of the respondent jurisdictions was derived, the factors could be applied to jurisdictions where census data is available. In this manner, correlation factors were derived for personnel and vehicle counts for Law Enforcement, Fire Service, and the Emergency Medical Service

Using these correlation results, we were then able to generate county level total subscriber equipment estimates. Where actual data was collected, this was inserted into the totals instead of modeled estimates. The collected county school bus counts were additionally added to these totals to generate a more comprehensive county subscriber total. Statewide, the county subscribers total to 74,786 subscribers.

The county totals do not include subscribers for statewide agencies. The statewide subscriber equipment numbers were provided through online surveys by the state agencies. The number of potential subscribers for statewide totaled to 9,427. Together the combined total is over 84,213 PSEs within the State of Alabama².

The total device count is then calculated to be the sum of the personnel and vehicle counts. It is important to note that a "to be determined percentage" of statewide personnel will carry multiple devices, such as a smartphone and a tablet, or a wireless card. FirstNet should therefore anticipate that some percentage of the state's public safety personnel will carry multiple devices.

The State of Alabama PSE data is located in the file ALPSB PSE Info.xls.

Element 2c: Users and Devices Summary

The determination of end user device type and requirements is valuable market research, and will assist FirstNet in driving device manufacturers to provide options and features that meet public safety

² It is important to note that the State expects a higher projection of potential FirstNet subscribers based on additional categories of government, non-government entities, public utilities (water and transportation), and others to be defined over the coming months based on regional outreach.



objectives. There is an equally strong requirement within the State for smartphone and mobile devices. Tablet and embedded personal computer modems are also key device types for Alabama, and there are expectations of Android and Apple operating system options. Figure 2 graphically illustrates the future device plans as described by the respondents, and as captured in the associated data file.

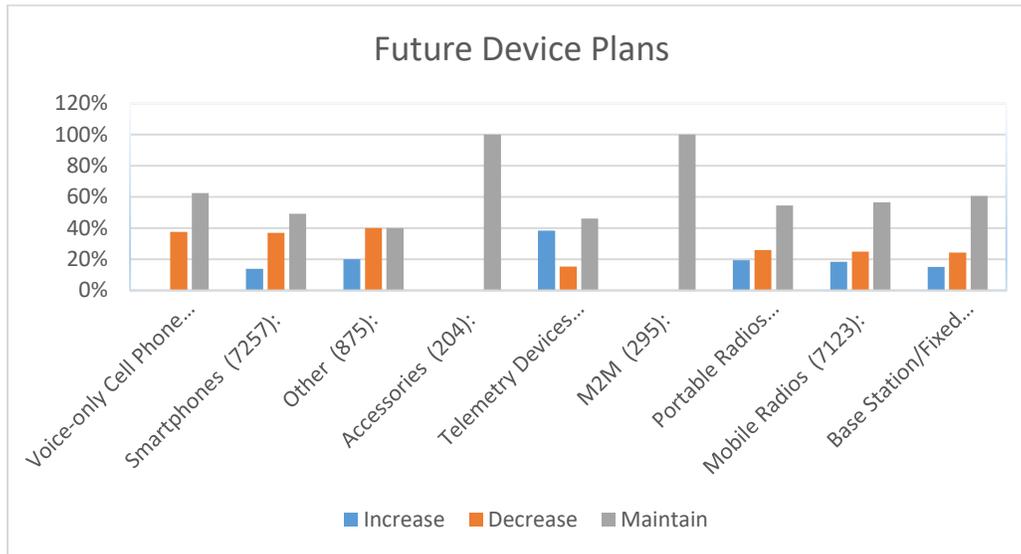


Figure 2: Future Device Plans

This data element is contained in the file ALPSB 2c Users and Devices Summary.xls.

2d-i: Operational Areas

As described within the *Element 2a: PSE Information* section, the State endeavored to identify potential FirstNet subscriber statewide based on an analytical interpolation of the actual public safety workforce population from a cross section of heavily, moderately, and sparsely populated areas in Alabama to the US Census government worker census data. The use of actual Alabama rural and urban populations to develop a representative sample to project potential FirstNet subscriber statewide is a rational methodology in the absence of a comprehensive public safety database. While there are potential flaws in this approach, we are confident that the project will provide First and the State a reasonable starting point.

We do expect the population to increase when consideration is given to other potential FirstNet subscribers. Additional categories of potential subscriber include executive agency leadership, government legislative personal, and many other potential government and non-government organizations (NGO), utilities, public transportation, and others users of government radio networks.

The 84,213 projected public safety entities (see Appendix I) were determined on a per county basis, with State government employees distributed throughout the State based on a population density analysis. Figure 3 illustrates the PSE Operational Areas based on the methodology employed in the calculation of public safety entities

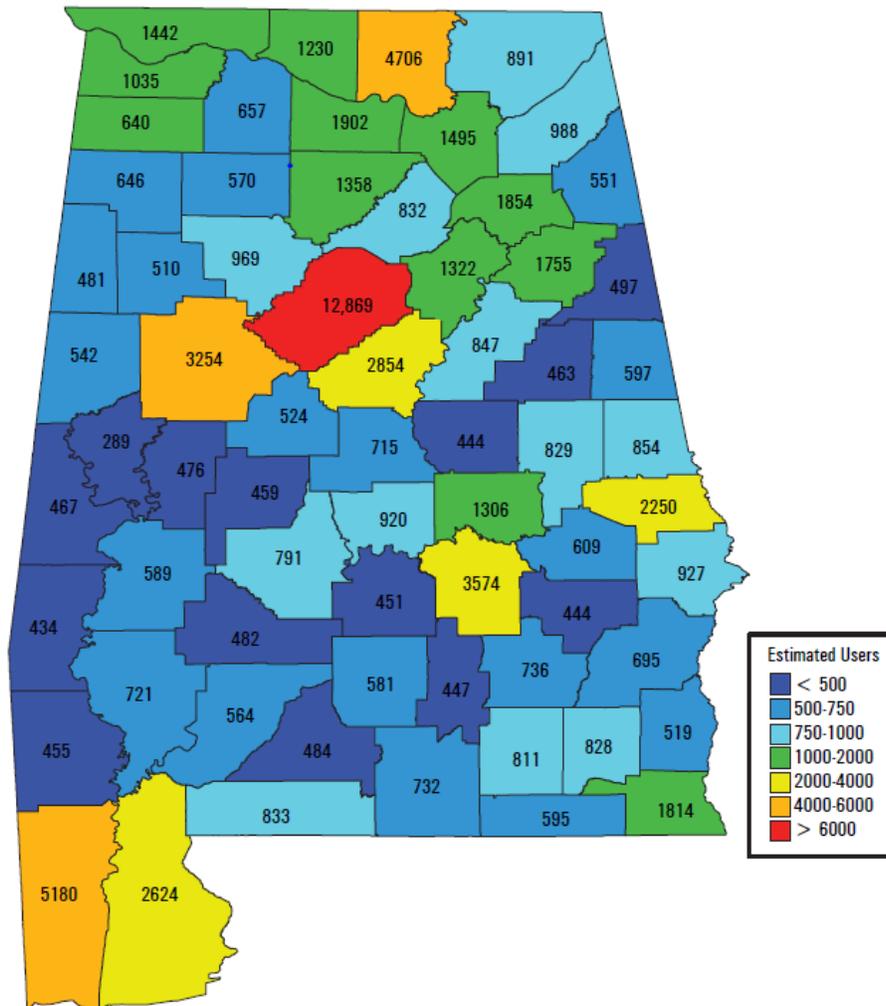


Figure 3: Public Safety Entity Service Areas Per County

This data element is contained in the file ALPSB 2d-i Operational Areas.xls and ALPSB 2d-1 Operational Areas.pdf

Element 3a: Applications

End users reported using many applications over broadband service during daily use today and projected various future requirements. As represented in Figure 3, the most prevalent low throughput applications in use today include text messaging, email, and Web browsing. Higher throughput applications such as streaming mobile video, mobile mapping and file transfer are employed today, and are expected to expand heavily in future years. All of these applications are dependent on reliable broadband service. Expected growth areas for applications include telemetry devices, body cameras, and others, all of which will also affect data usage.

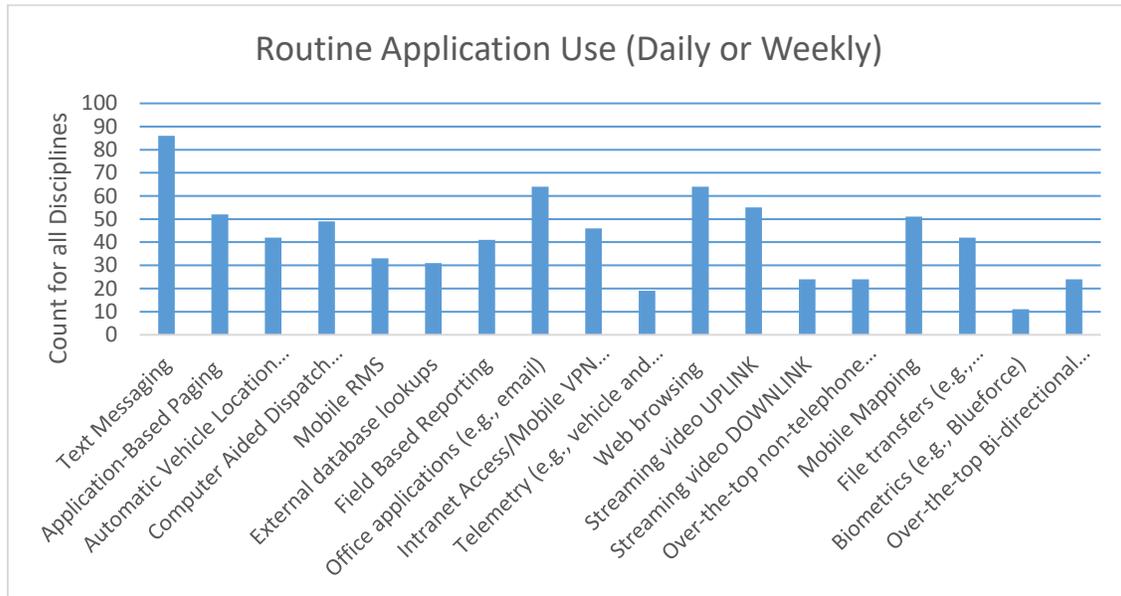


Figure 4: Routine Application Use

The application data requested is available in the attached file ALPSB 3a Applications.xls.

Element 3b: Data Usage

Data Usage responses derived from the survey (Figure 5) demonstrate that most of the respondents have unlimited data usage plans (59%), which the State believes is the best suited service options for statewide public safety subscribers to FirstNet.

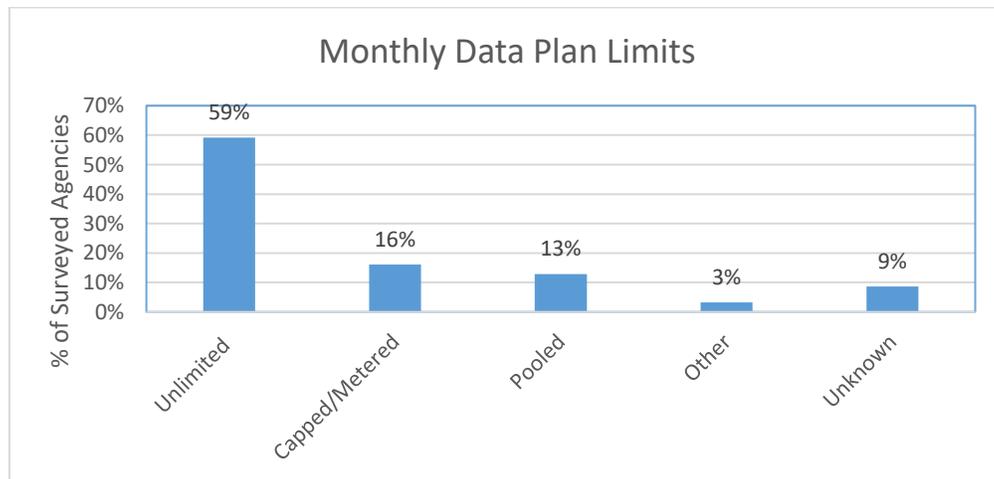


Figure 5: Monthly Data Plans

The Data Usage survey responses (Figure 6) indicate that most users do not have a clear understanding of how much data they are actually using. This is in part due to the fact that many commercial



subscriber have unlimited data plans, and do not have access to monthly data throughput usage numbers. Embedded in the results are responses of 900 and 6,000 GB per user/per month, which provide some range of usage from respondents who had access to this information. It is the State’s expectation that unlimited data usage plans are required and that usage trends will increase as data applications advance and proliferate throughout the public safety community.

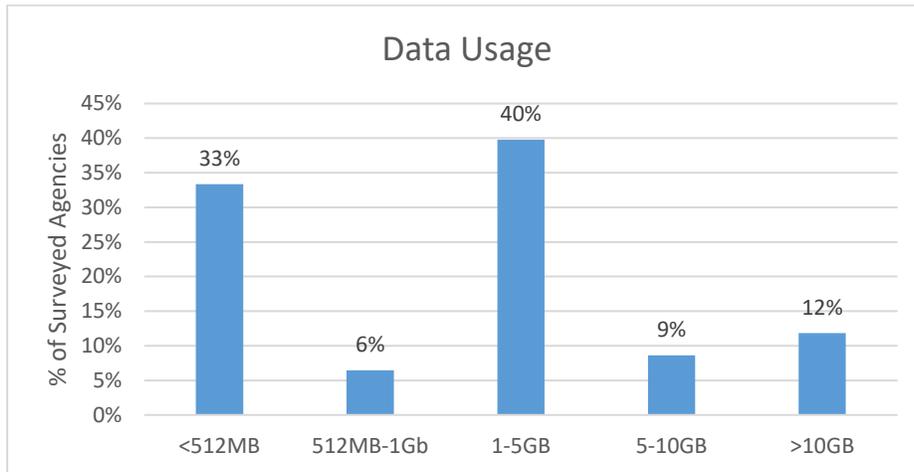


Figure 6: Data Usage

The State of Alabama will continue to survey application requirements and utilization today and projected for the future, and will provide this information to FirstNet when available. It is essential that the ALPSB be designed to support higher volumes of use in areas with the greatest need. The State will continue to gather, assess, and report this on capacity information.

Element 4a: Current Providers

The primary commercial service providers to public safety within the State of Alabama, in descending order, include Verizon Wireless, AT&T, SouthernLINC, and T-Mobile. Survey respondents had generally good experiences with their respective carriers, however, there are various issues with coverage in rural areas, and vendor service maps were noted as not providing a realistic statement of reliable coverage.

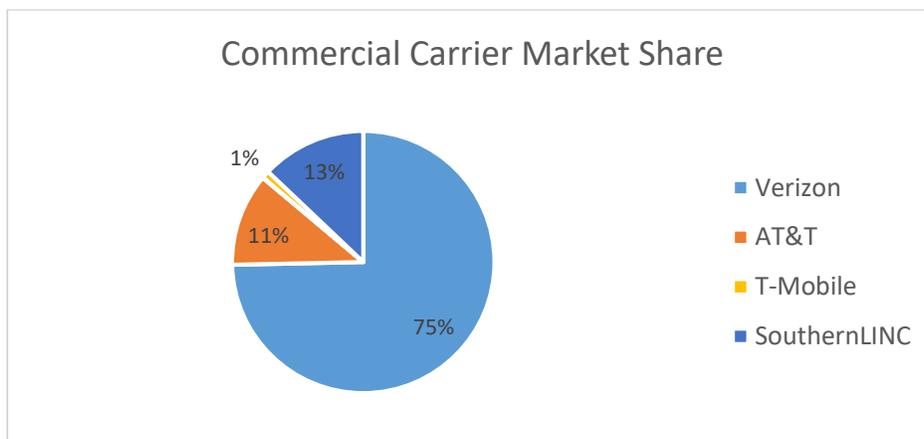


Figure 7: Commercial Carrier Market Share



Agency Commercial Carrier Subscriptions

As illustrated on Figure 8, some 87 percent of the survey respondents have their agency reimburse end users for their respective commercial service. Because the number of responses from Volunteer Fire Department (VFD), and Volunteer Emergency Medical (VEM) service agencies is low to date, we anticipate that actual number of paid agency service subscriptions is lower than currently represented. Greater efforts will be extended to increase the share of VFD and VEM survey responses.

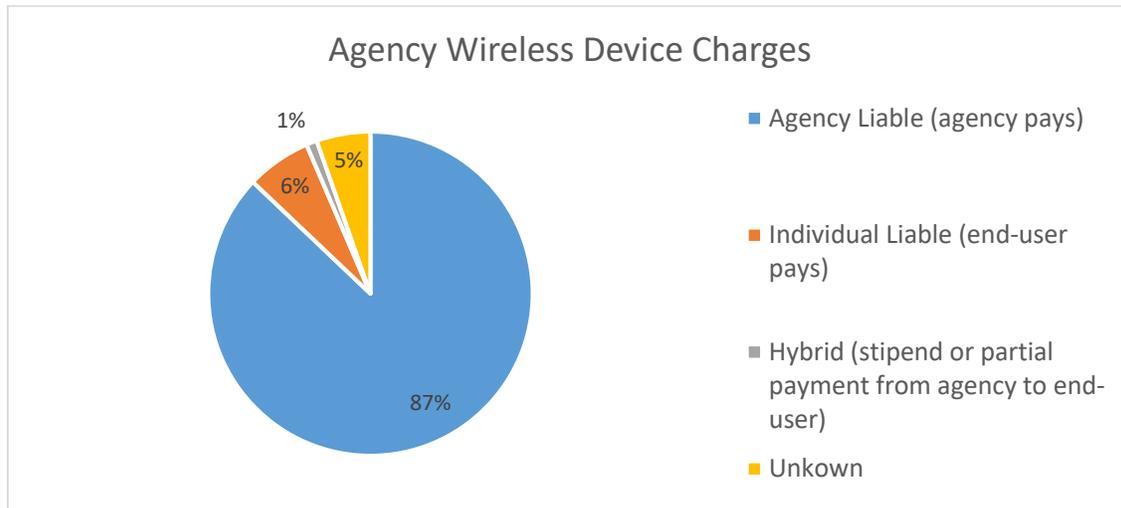


Figure 8: Reimbursement of Wireless Device Charges

Monthly Wireless Fees

The monthly fees that public safety agencies pay for voice/data and data vary slightly per agency as illustrated in Figure 9 and in Table 3, with a few anomalies for Other Agencies (transportation, public works). Variance in the subscription plans are related to commercial providers, contracting vehicles, data limits and others. It is important to note that due to the high cost of commercial service, the penetration into public safety has been limited. As detailed in various responses to the survey, FirstNet can significantly increase subscriptions by offering a very competitive pricing structure to public safety.

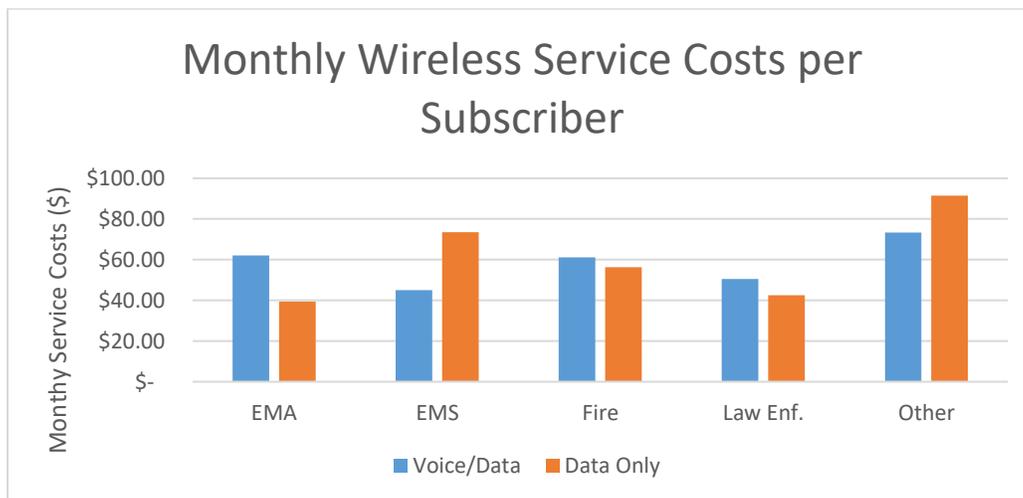


Figure 9: Average Monthly Wireless Costs Per Agency



Agency	Voice/Data	Data Only
EMA	\$62.03	\$39.35
EMS	\$45.08	\$73.44
Fire	\$61.17	\$56.29
Law Enforcement	\$50.42	\$42.60
Other	\$73.26	\$91.55

Table 3: Average Monthly Commercial Carrier Service Spending

Bring Your Own Device (BYOD)

As detailed in Figure 10, most agencies report allowing use of personally-owned devices for official purposes, particularly in the fire and EMS service. It is likely that all-or-primarily-volunteer services such as rural fire departments would have even higher levels of BYOD usage. The State encourages FirstNet to offer NPSBN services to public safety that emulate BYOD practices today, and that additionally include Family Plans, which are common offering to public safety practitioners who are not provided commercial devices from their respective agencies.

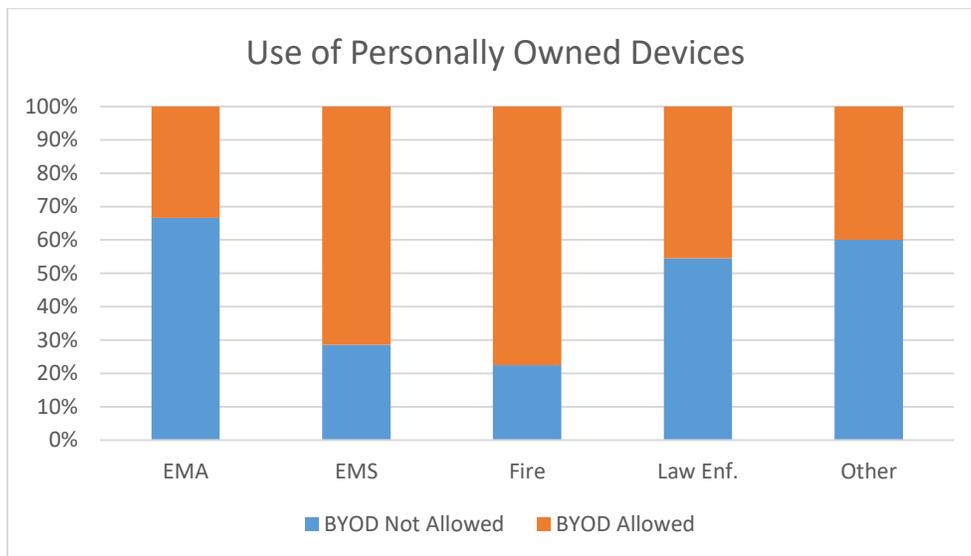


Figure 10: Bring Your Own Device (BYOD) Policy Per Agency

Commercial Carrier Contracting Vehicles

The survey made an effort to quantify the means by which agencies purchase their wireless services; the most predominate method was through price quotes from service providers. However, as can be observed in Figure 11, local individual and the master state contracts are common as well.

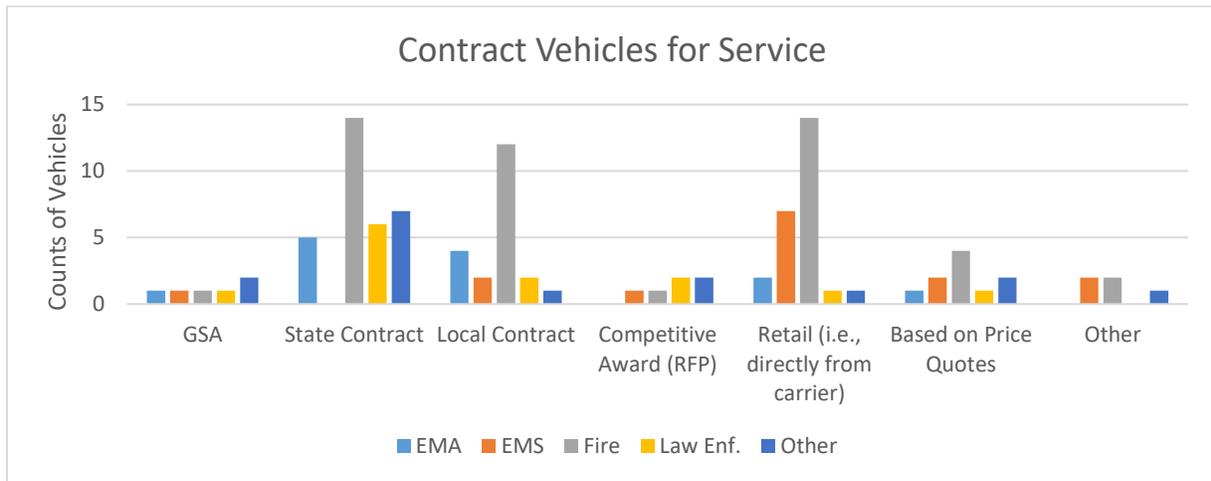


Figure 11: Purchasing Vehicles for Wireless Data Services

The data set for these elements is located in the file ALPSB 4a Current Providers.xls

Element 4b: Barriers to Adoption

The State of Alabama survey captured barriers that may prevent users from subscribing to wireless data service. Figure 12: Barrier to Wireless Adoption displays the percent of survey respondents who identified various barriers to their agencies' adoption of wireless service.

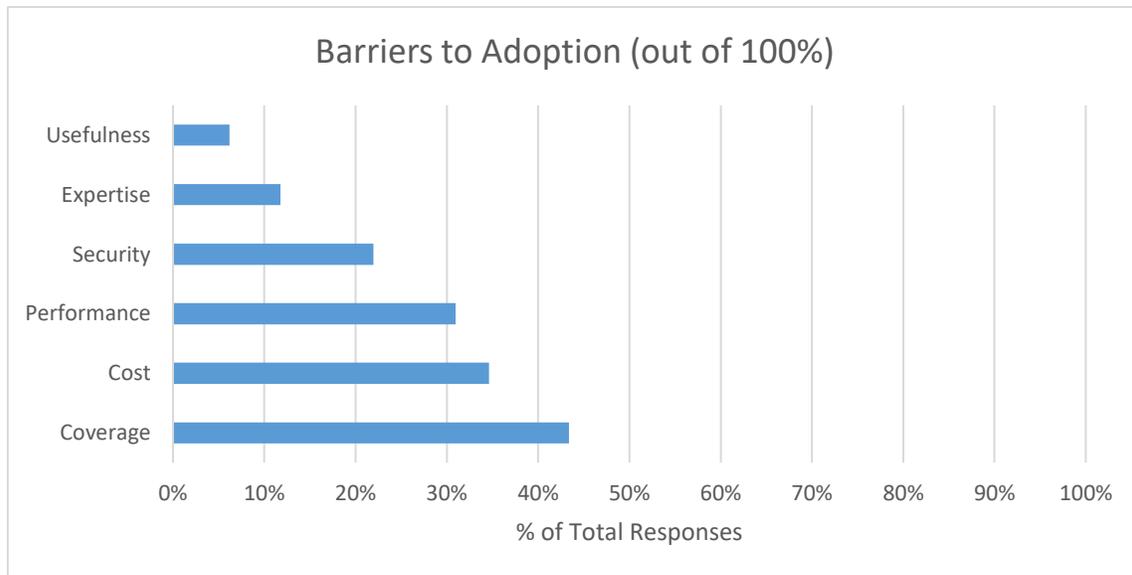


Figure 12: Barrier to Wireless Adoption

This data element is contained in the file ALPSB 2c users and devices summary.xls. The data set includes respondents broadband data use patterns and current devices, as well as future plans.



Conclusions

The State of Alabama extends its appreciation to FirstNet for the opportunity to submit the State's key data elements, and the associated data tables. The State trusts that this report, and supporting information, support our collective efforts to advance public safety communications for Alabama and nationwide public safety stakeholders. The State will continue supporting a productive collaboration with FirstNet to deliver this essential wireless broadband communications network for public safety. In support of these noble objectives, the State of Alabama offers its full support, and will continue to provide additional information and recommendations to assist FirstNet with the development of a State Plan that fully meets the State's requirements for mission critical broadband data.



Appendix I: Statewide Subscriber Estimation

The following table details the number of potential public safety FirstNet requirements for both portable and vehicular devices as derived from the approach described in the *Data Extrapolation* and *Element 2a: PSE Information* sections of this report. This calculation combines estimates for each county with statewide agency survey results. County specific calculations include volunteer firefighters, school buses and other public service subscribers.

County	Mobile			Portable			Buses	County Totals
	Fire Total	LE Total	Other Total	Fire Total	LE Total	Other Total		
AUTAUGA	99	129		295	183		107	813
BALDWIN	208	358		414	342	547	360	2229
BARBOUR	78	84		272	152		58	644
BIBB	58	24		255	91		52	480
BLOUNT	89	95		287	146		103	720
BULLOCK	51	11		247	83		31	423
BUTLER	65	50		261	119		47	542
CALHOUN	106		168	397	482	184	194	1531
CHAMBERS	95	134		288	200		71	788
CHEROKEE	74		11	255	100	4	57	501
CHILTON	121		2	325	90	4	88	630
CHOCTAW	49	3		246	74		36	408
CLARKE	81	97		274	166		55	673
CLAY	53	14		249	85		36	437
CLEBURNE	56	25		252	96		39	468
COFFEE	87	93		284	148		100	712
COLBERT	112	175		306	231		106	930
CONECUH	55	23		251	95		35	459
COOSA	51	11		247	83		31	423
COVINGTON	80	82		276	143		78	659
CRENSHAW	51	7		247	78		37	420
CULLMAN	124	190	46	321	233	132	153	1199
DALE	89	102		286	158		97	732
DALLAS	86	100		282	160		83	711
DE KALB	104	132		302	178		134	850
ELMORE	119	173	37	317	215	136	151	1148
ESCAMBIA	92	121		286	184		77	760

State of Alabama
FirstNet Data Element Submission



County	Mobile			Portable			Buses	County Totals
	Fire Total	LE Total	Other Total	Fire Total	LE Total	Other Total		
ETOWAH	176	342	105	368	379	163	121	1654
FAYETTE	58	27		253	97		42	477
FRANKLIN	70	56		267	119		67	579
GENEVA	66	45		262	111		59	543
GREENE	56		1	160	23	5	28	273
HALE	54	17		250	87		39	447
HENRY	59	30		254	100		43	486
HOUSTON	164	302	80	359	337	180	190	1612
JACKSON	96	122		292	177		102	789
JEFFERSON	1117	2963	857	1259	2812	1444	1136	11588
LAMAR	55	20		250	92		37	454
LAUDERDALE	129	196	35	327	233	171	171	1262
LAWRENCE	72	60		268	123		70	593
LEE	189	339	28	390	347	372	280	1945
LIMESTONE	158		38	451	206	30	169	1052
LOWNDES	52	14		247	87		31	431
MACON	69	62		263	132		46	572
MADISON	372	771	6	579	693	987	613	4021
MARENGO	66	53		261	123		47	550
MARION	71	60		267	124		65	587
MARSHALL	134	210	40	332	246	175	174	1311
MOBILE	538		171	672	1131	1132	730	4374
MONROE	63	41		259	109		50	522
MONTGOMERY	431		324	662	995	325	398	3135
MORGAN	167	299	57	364	326	241	216	1670
PERRY	53	18		248	91		30	440
PICKENS	61	33		257	102		49	502
PIKE	81	91		276	155		69	672
RANDOLPH	67	52		262	120		52	553
RUSSELL	105	144		301	197		64	811
SHELBY	233	437	13	436	422	540	368	2449
ST CLAIR	119	167	25	317	205	159	161	1153
SUMTER	53	16		249	88		36	442
TALLADEGA	57		34	171	202	78	148	690
TALLAPOOSA	91	115		285	176		83	750

State of Alabama
FirstNet Data Element Submission



County	Mobile			Portable			Buses	County Totals
	Fire Total	LE Total	Other Total	Fire Total	LE Total	Other Total		
TUSCALOOSA	291	632	134	483	628	456	234	2858
WALKER	103	133		300	182		124	842
WASHINGTON	51	6		248	75		42	422
WILCOX	55	25		251	98		32	461
WINSTON	63	40		260	107		54	524
							Counties Total:	74,786

Statewide Agencies	Mobile			Portable			Statewide Totals	
	Fire Total	LE Total	Other Total	Fire Total	LE Total	Other Total		
Alabama Law Enforcement Agency		2,569			900		3,469	
Corrections		399			3,400		3,799	
ALDOT			1,500			250	1,750	
Conservation - State Parks			23			23	46	
Alabama Dept of Agriculture and Industries			0			50	50	
Conservation-State Lands Division			9			9	18	
DCNR, Wildlife & Freshwater Fisheries, Law Enforcement			135			135	270	
Alabama Alcoholic Beverage Control Board			0			0	0	
State Fire Marshal's Office			25			0	25	
							Statewide Agencies Total:	9,427

Potential Subscribers Grand Total: 84,213