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Push-To-Talk (PTT)

An introductory guide for businesses

Sponsored by Samsung Asia
and authored by Tech Research Asia

Introduction

This guide covers the fundamentals of Push-to-Talk (PTT) including the current state of the market, device characteristics, key players and some of the common use cases. It is designed as an introduction for people not familiar with PTT solutions or the market.

In January 2020 TRA conducted a survey of over 1300 businesses in eight countries (Australia, Indonesia, Malaysia, New Zealand, Philippines, Singapore, Thailand and Vietnam) to understand their usage and views of PTT. Throughout this guide, we will reference relevant data from that survey to provide additional insights.

Except where otherwise indicated, the information contained in this guide is based on TRA's research and survey.

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1 Executive Summary

Push-to-Talk (PTT) solutions that use contemporary rugged smartphones and tablets seek to replace Land Mobile Radio (LMR) devices like walkie-talkies.

The supply side of the market is evolving quickly with both traditional vendors, telco service providers and software startups driving awareness and investment.

PTT solutions are multi-purpose and offer far more opportunities to be productive with multimedia, location tracking and extensibility than traditional LMR systems. They work over broadband networks like LTE and WiFi.

The most likely adopters are in industries that have high safety requirements with hazardous environments or with large campus style environments.

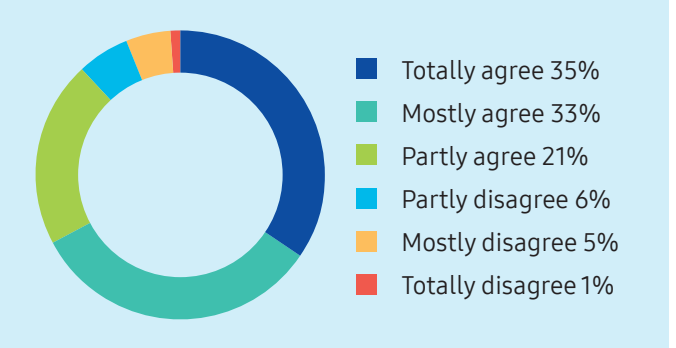
PTT investments are often driven by a desire for improved safety and while agile approaches to implementation are being sought, projects are often long and hampered by tender requirements.

The future of the PTT market is bright. We see significant interest in modern solutions to replace LMR systems. The technology will also evolve further to integrate artificial intelligence tools and wearable devices.

59% of companies surveyed across the region say they are currently using a push-to-talk (PTT) solution. However, adoption rates in our view are likely much lower with some misunderstanding of what PTT entails.

44% would prefer to use a smartphone for their PTT needs and 44% plan to adopt further PTT solutions in future.

"In today's business environment, rugged devices need to be capable of performing more than one dedicated role."



2 What is PTT?

Push-to-Talk (PTT) is a set of technologies that is used to equip modern mobile devices (and Personal Computers) with the capabilities of a "walkie-talkie".

There are important differences between what walkie-talkies can do and what modern PTT can achieve.

For example, with traditional walkie-talkie systems:

- Users called talk to each other with a single purpose device like a walkie-talkie, radio, etc using radio frequencies (in UHF and VHF bands). This is called a land mobile radio (LMR) system.
- The range of LMR devices is typically limited to around 30 to 50KM from a base station with line of sight. Although this can be extended with a repeater, dedicated infrastructure must be installed to enable a wide enough coverage area for the LMR to be useful. However, there are no additional call or data costs.
- Anyone that isn't within range is not able to communicate using the system.
- Although data can be sent over an LMR with digital modulation, the vast majority of communications are voice only.
- Frequencies that LMR systems use are typically overseen by government agencies and some spectrums are dedicated solely for military or public safety purposes while others are sold to commercial interests via a license.
- Interference can happen as a result of unauthorised or unlicensed use of a frequency.
- Monitoring of communications could also happen by third parties via "scanners". Encryption is relatively poor.

In comparison, modern PTT systems:

- Leverage cellular and mobile networks including 4G LTE, Wi-Fi, Satellite broadband, and Bluetooth to enable users to communicate with each other. This has led to other terms that are frequently used in the market:
  1. PTT over cellular or PoC.
  2. Broadband PTT.
  3. Mission Critical PTT or MCPTT (However, we will stick to just using PTT).
- Let anyone with an internet connection anywhere in the world – with the right permission – to join a PTT group or private conversation.
- Differ from walkie-talkies in that they are multi-purpose (video, voice and data) and not single-use voice only devices.
- Are most commonly used with rugged mobile devices like smartphones or tablets. They will usually have programmable quick access buttons and be able to be used with gloves in wet conditions. These can also be complemented by traditional radio devices or clip on devices that help with hands-free working.

- Are software driven and can be used on any device. Indeed, there are many free consumer-grade PTT apps on both the Android and iOS platforms. However, enterprise-class PTT solutions typically require much more rugged device specifications as they are used outdoors or in more demanding environments.

- Have standards that have been set by the global organisation 3GPP, especially for mission critical PTT. All enterprise-level PTT solutions should meet these standards.

- Changes the end user experience. The way it all works is they download the nominated PTT app (or have it installed for them by the IT department) to their device (likely a rugged smartphone or tablet). They will have contacts and groups set up on the app that are presented as icons. This allows them to simply "push" (or click) an icon or programmed device button where they can start talking to the person or group they want to speak to as long as they have an internet connection.

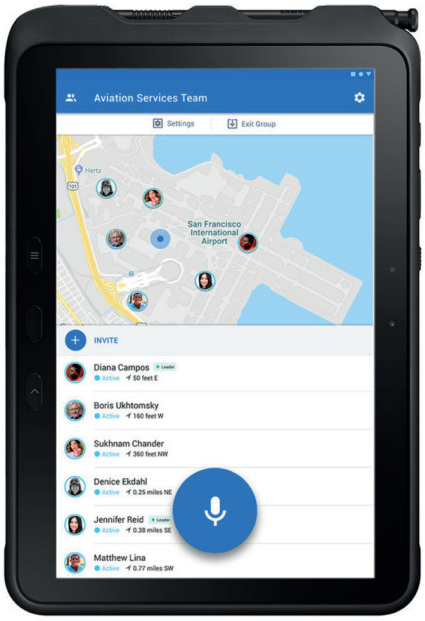


Figure 2 Samsung Galaxy Pro Active Tab with Orion PTT app

- The internet connectivity approach means they don't have to be physically within the range of an LMR network and it is easier to communicate with people in other organisations unlike with older walkie talkie systems which made this hard to achieve.

- Allow speaking to be one-to-one or one-to-many and is almost immediate (no waiting for a dial tone or call to connect). The conversation is like a walkie-talkie, meaning only one person speaks at a time but modern apps include queuing and often a hierarchy of speakers where those in critical control positions can override a conversation.

- Have multimedia communication where users can share video and data-heavy information in real-time.

- All communication can be encrypted with the highest standards.

- Include geolocation tracking of multiple assets with navigation capabilities.

- Integrate into existing dispatch systems or newer digital versions

- Integrate into productivity suites like Microsoft Teams application. For example, Samsung's walkie-talkie application leverages existing channels in a company's Teams site. It allows employees to use a Galaxy XCover Pro and talk to their existing contacts and groups in Teams in the same manner as a walkie-talkie.

- Integrate with artificial intelligence (AI) or machine learning-based workflows and translation.

- Integrate with wearable devices like smartwatches.

- At the back-end will require a server that controls the flow of traffic over the network. This may be a physical server that sits in an organisation's data centre or one hosted on a cloud computing platform like Amazon Web Services (AWS) or Azure. Increasingly, organisations do not need to set this up themselves but instead can take advantage of a PTT solution "as-a-service" where everything on the back-end is done for them.

- Offer a Management Console that enables administrators to control every aspect of the system: permissions, security, governance, updates, analytics, etc. This includes asset tracking of devices along with preventive maintenance.

- Offer APIs to allow 3rd party applications to be integrated

- Finally, it will also deliver interoperability with existing LMR or PTT solutions. This final point is important as it is highly unlikely that LMR systems will stop being used in the near future. They are too valuable (both as a primary and secondary option for emergency communications) and have too much existing investment in them. Modern PTT systems have to be able to bridge between LMR devices. Interoperability is often achieved by allowing a walkie-talkie or radio to connect to a portable base station. This then allows the user to communicate over their LMR network via their rugged device within the modern PTT app.

The characteristics of Land Mobile Radio and Push to Talk

Land Mobile Radio (LMR) 		 Push-to-Talk (PTT)
Type: Specific Design: Bulky PTT Button: Available Single use devices	**Device**	Type: Mobile device Design: Various PTT Button: Depends on device Rugged devices with voice, data and video capabilities
Type: DedicatedLMR Data: Unavailable	**Network**	Type: Commercial cellular Data: 3G/4G/5G/LTE/Wi-Fi
Area: Limited depends on radio network Additional costs: Yes (for repeater)	**Coverage**	Area: Wide, depends on cells & Wi-Fi network Additional costs: No
Frequently able to be monitored by 3rd parties	**Security**	Encryption possible at all levels
Quantity: Up to 70 Allocation method: Manual or computerized	**Channel**	Quantity: Almost limitless Allocation method: Computerized & cloud based
Built-in	**PTT Function**	Various PTT App Options
Wired headset	**Accessories**	Wired & Bluetooth headset Bluetooth speaker
N/A	**Others**	Location Tracking AI Workflows Software integregrations with APIs Custom applications

Source: TRA South East Asia & Oceania Rugged Study, 2020." To "Source: Tech Research Asia Ruggedized Smartphones & Tablets in Asia Pacific research, April 2020

3 What are the market trends?

PTT in the form of walkie-talkie systems have been around for a long time and have proven their worth, especially in industries that need these solutions (more on that later). However, there is now considerable growth and development happening in modern PTT systems that are tied to rugged devices.

TRA market analysis suggests the global PTT market will double in size by 2025, with Asia Pacific expected to be the fastest growing region. SEA markets – excluding Singapore – will be growing from a very low base so while the growth rate may be high, the actual volume will be low compared to other places like North America, Europe or Japan.

But why such strong global forecasts for growth? Several trends are driving investment from vendors and adoption by users including:

Samsung XCover Pro rugged device with PTT

- **Widespread adoption of smartphones**
  The widespread adoption of smartphones across the region and associated connectivity (eg. WiFi and 4G LTE) among business users is leading organisations to see how they can better leverage the technology. Instead of an employee having multiple devices (one being a walkie- talkie or LMR device) they are considering integrating everything onto the one rugged device.

- **Communication during Emergency**
  There is a perception and some indications that natural disasters, terrorism and crime rates are increasing. Responses to this requires cross-agency and -organisation coordination and communication. In the past, communication was sub-optimal during times of crisis. Modern PTT systems can provide a resolution.

- **Occupational health and safety**
  Contemporary technologies like PTT are proving that higher levels of safety for workers is possible especially in potentially dangerous situations. This is a focus for many companies that operate in harsh environments.

- **Smart Cities**
  Smart city initiatives often include budgets for increased public safety measures and data analytics programs. The location capabilities of PTT solutions and multimedia features on devices enable more opportunities to support such initiatives.

- **Productivity**
  There is an ongoing push to improve employee productivity and reduce manual interruptions to workflows in organisations of all types.

- **Voice Comms**
  Voice communication remains a desired part of day-to-day employee activities. As such, many are looking to how they can improve the voice experience.

4 What does the PTT vendor landscape look like?

The supply side of the PTT landscape remains somewhat fragmented with simple apps for consumers that want a walkie-talkie experience at one end, and full stack solutions for enterprises and governments at the other end. Leaving aside the consumer portion of the market, most PTT solutions are actually a combination of different vendor products and services. And modern solutions are evolving quickly, so there are several startups emerging and acquisitions taking place although little of this is originating in Southeast Asia and Oceania.

In one corner of the market are the telecom service providers like Telstra and Korea Telecom (along with many in North America, Japan and Europe). Generally speaking, telcos aim to boost the use of their networks and capture services revenue from PTT adoption. They will package everything together (devices, software, networks and backend infrastructure) and offer governments and enterprises an as-a-service solution.

1 **Telecom Service Providers**
Such as Korea Telecom, Telstra

2 **Software Vendors**
Such as Orion Labs, Zello, Virtual Trunk

3 **Hardware Device Manufacturers**
Such as Samsung Electronics

In another corner are the software application vendors. The focus of these vendors is typically to be a device and platform agnostic player that can integrate with older LMR systems. That said, recent trends are for many of these players to also offer their own rugged devices and evolve into a full stack provider. They often target their solutions at public safety agencies and also companies with hazardous environments while appealing to the workforce productivity angle. Examples of the software players include: Orion Labs, Zello and Virtual Trunk.

The final group of vendors are the device manufacturers or integrated players. There are a number of vendors in this space, some offering basic solutions and others (such as Samsung) that provide an integrated device and software platform. The survey data suggests that users are looking to vendors that provide an expansive device range that blends performance, aesthetics and security integration with consumer friendly usage.

5 Which market sectors or industries are most likely to adopt PTT?

Just as walkie-talkies can be used by any consumer or employee for voice communication in any situation, so too can PTT be used. However, while some vendors are marketing to both personal and professional situations, the main adoption of PTT at first will follow the same industries that have used LMR systems. These include:

Public Safety	for first responders like police, ambulance, fire brigade
Military	potentially in both operational theatres and non-operational
Transportation and logistics	for railways, airports, shipping, and automotive (e.g. towing)
Distribution and Warehousing	for pickers in warehouses to provide hands-free working
Manufacturing	in factories and tied to smart factory projects
Mining, Oil and Gas	on project sites
Healthcare	especially on large campuses like hospitals

Event Services	at convention centres and stadiums
Construction	particularly on large-scale projects such as infrastructure builds or greenfield housing developments
Utilities	for all types that have plants and in field workers across energy, water, waste management, etc
Field service workers	for maintenance or engineering of all types
Retail	particularly in large stores
Gaming and Hospitality	particularly for casinos and also hotels
Facilities management	including shopping centres and other commercial buildings

6 What are the business drivers for PTT?

LMR systems have been reliable and delivered benefits to users for many years – they are a fundamental technology for many different types of workers in many industries. So why move to PTT now? It is the question that many decision makers face today as more and more vendors promote newer solutions.

As with all technology investments there are common triggers that will lead to a PTT project.

The Standard Common Drivers

These range from a new leader bringing in a new strategy, an expansion/consolidation of an organisation's operations or a merger/acquisition, a productivity and/or cost saving drive, through to device end of life refresh cycles. All are valid drivers for PTT investments.

The Security and Safety Driver

However, in many circumstances PTT solutions are not implemented with a view to making a profit or a financial return on investment that frequently underpin the common drivers above. Yes, that is always welcome. But PTT is often aimed at mission critical environments where safety and security via communications are paramount.

We should note that PTT on smart devices is able to achieve higher levels of security with biometric access and encryption of data compared to LMR systems. This will often be the top driver and cannot be understated.

Digital Transformation

Other drivers will include, however, digital transformation programs that include some form of "Smart X". Sometimes this will also include newer innovation steps like hackathons or design thinking workshops where ideas of "how to work in future" are generated.

Smart Cities and Safer Events

Reactions to or planning for an increase in natural disaster, terrorism or crime events. Or other large-scale events being held in a city, for instance the SEA Games.

Greater visibility and insight that provides improved levels of management of operations is another factor that is included in PTT decision making.

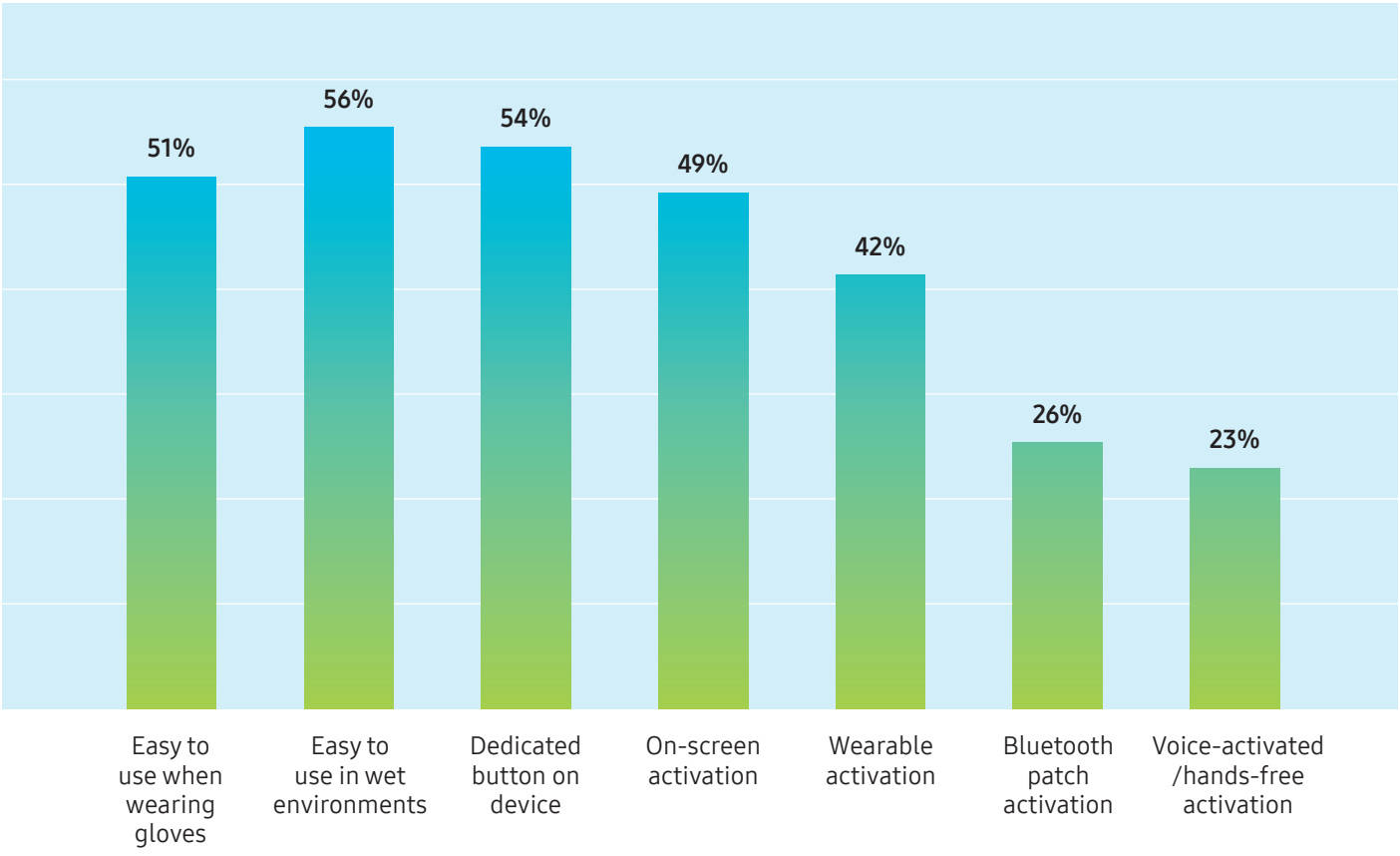
Data Privacy and Regulations

While not necessarily a direct driver there are also several data and privacy-related regulations across SEA and ANZ that are relevant to the adoption of PTT, especially if the solution includes broader feature sets like geolocation tracking. Furthermore, the systems will need to comply with any regulations regarding recording of communications.

7 What are the desired characteristics of a PTT solution?

We've already covered many of the features of PTT solutions above. However, the chart below outlines some of the factors that users in SEA and ANZ believe are important. Approximately 50% of respondents say they want it to be useful in a wet environment, have a dedicated button on the device, be easy to use with gloves on and have on-screen activation.

When using PTT, what factors are important?



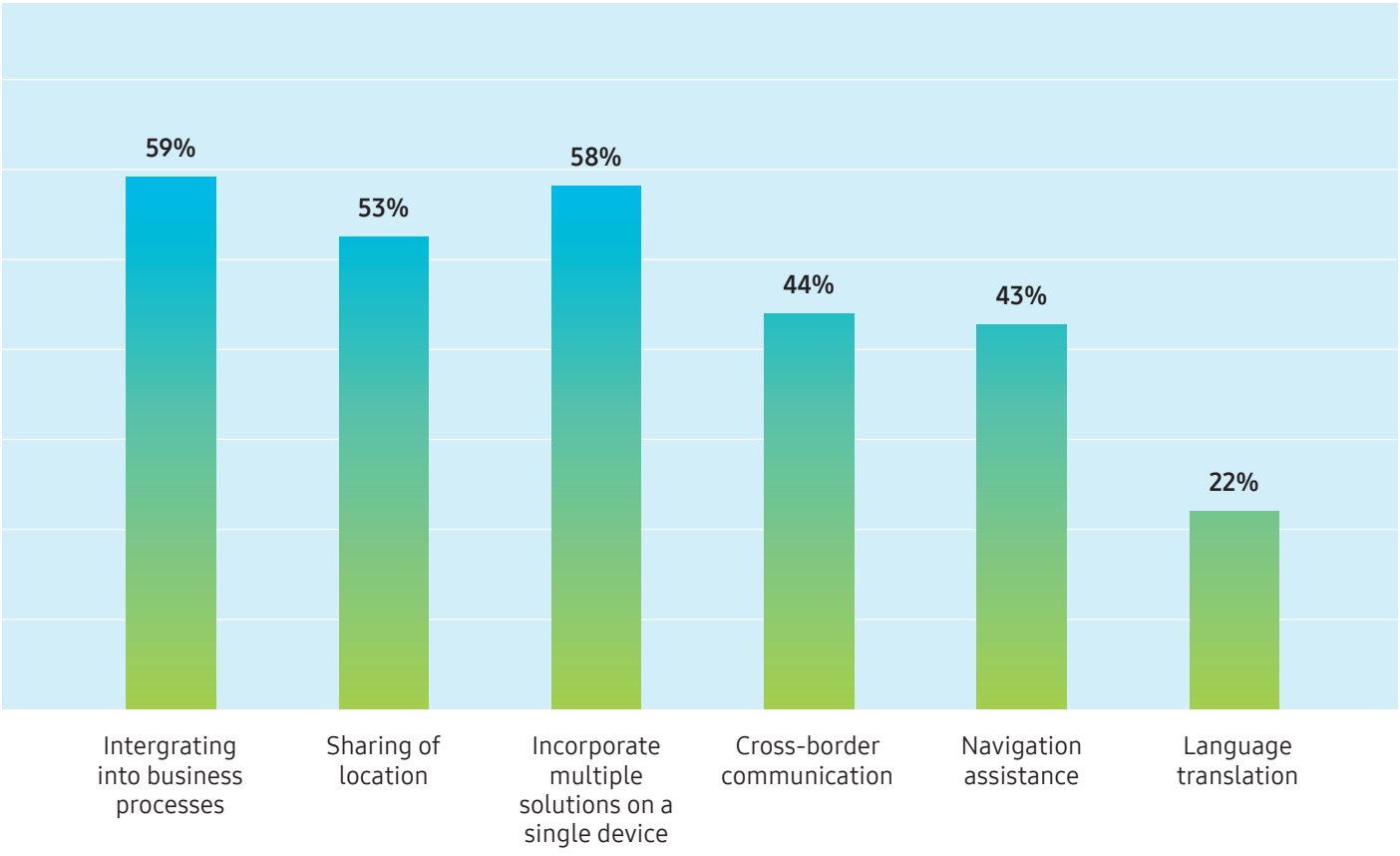
Furthermore, we also asked about devices and 44% of respondents said they would prefer a smartphone as a PTT device.

And when asked to rank the desired characteristics of a PTT device, respondents to our research indicated the following ranking:

Rank	Top 10 PTT device attributes
1	Connectivity.
2	Integrated security & device management.
3	IP Ratings.
4	Quick access button.
5	Device design.
6	Wireless charging.
7	Available accessories.
8	Scanning capability.
9	Using screen when wet.
10	Dual SIM.

Other desired characteristics are shown in the following chart:

What are the opportunities for PTT in your company, excluding 'walkie-talkies'? (Total All)



8 How are PTT projects implemented?

Implementation timelines for projects vary of course depending on the use case and size of the organisation. Due to the varied nature of SEA the adoption of PTT will be a mixture of replacement or modernisation endeavours and greenfield deployments. In ANZ (and Singapore) it is more likely to be the former alone.

Notably, there are many organisations – commercial and public and particularly in developed markets like Singapore, Australia and New Zealand – that are going agile with their IT investments. These organisations want fast proof of concepts, that can be quickly turned into a program of dedicated sprints undertaken quarterly.

Implementation timelines however are quite long and can extend longer than one year. Furthermore, PTT projects are frequently subject to slow and bureaucratic official tender processes across SEA and ANZ. This despite the as-a-service model and off the shelf solutions being available.

Use Case 1 – Mining Operations

This first mini-case study example is based on a global mining giant. They use a rugged device like the Samsung Galaxy Tab Active Pro with a PTT service that includes voice-powered automations to automate safety checklists for mine workers. With a lack of communications in some areas of the site, including in underground locations, they built out a site-wide WiFi network. Since then, they have been able to use PTT for general voice communications in a hazardous environment.

The miners were also able to use a voice-activated trigger to start a safety checklist. The AI-assistant converses with the worker until they are able to complete the checklist. This is then logged and distributed to management. This has now been done for several standard operating procedures. They have also enabled location tracking to ensure that workers are kept safe in the field and don't accidently walk or drive into danger. Overall the aim was to improve occupational health and safety.

Open Cut Mining PTT

Use Case 2 – Stadium Event Services

Whenever you have thousands of people attending a sporting or music event, you need a well-tuned communications system in order to coordinate the workers who make these make these events happen. Instead of, for example, food and beverage staff using loudspeaker systems or land lines to request additional help or stock when things get busy, with a PTT solution they could immediately request assistance by broadcasting to a dedicated group. Managers could also track where their employees are and dispatch staff to help. The same is true for security or law enforcement services at a venue. By using PTT on a rugged device, the officers can receive notifications, photos, video and mapping directions to the place they are needed most.

Samsung Public Safety Web Contents

Use Case 3 – First Responders

First responders like firefighters, emergency services, police and ambulatory services workers need business critical PTT in order to safely and productively do their jobs. Even when there are no emergencies, they need to be able to communicate immediately with dedicated groups and with each other. In the past, they would sometimes share different LMR systems and rely on alternate means of communication. Workers equipped with a rugged smartphone with PTT, however, can now not only use walkie-talkie functionality while wearing gloves but they can also quickly share their location and receive data and video information that might be critical to their efforts. Hands-free working is also feasible as is the use of AI-based assistants and translators.*

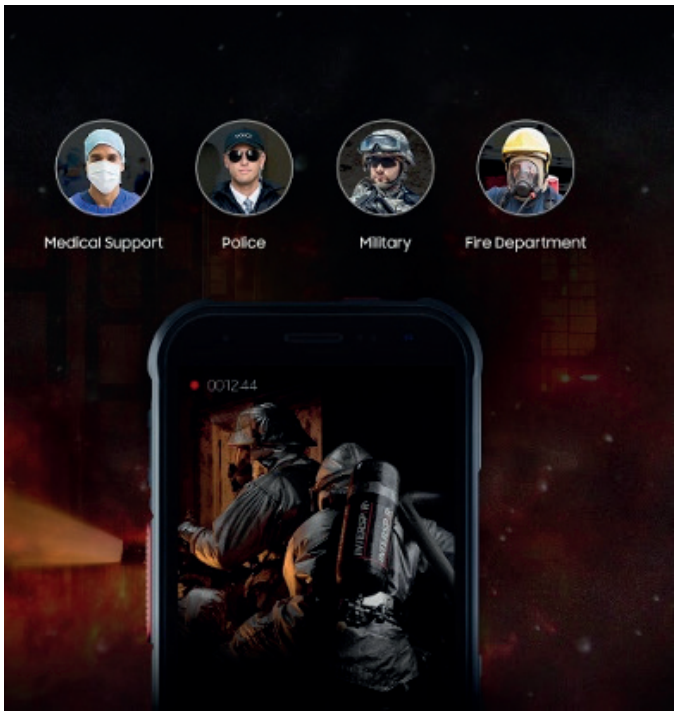
[*Regardless of activity, PTT competitors universally engage this segment with the term "mission critical" and standards also embrace this phrase.]

Other Use Cases

Field Force Services: Site inspection teams or maintenance staff in remote locations, in large indoor plants, or other wide areas can communicate immediately at the touch of a button for assistance or to check in. They can also integrate processes with voice activation.

Transport and Logistics: Users can search for or track the location and quantity of inventory via a voice-activated assistant (keeping their hands-free). They can then be guided to the right location with the built-in location and navigation (indoors or outdoors). Records can then be updated automatically, and other users receive a voice broadcast.

Cross Border Communication: Secure, instant and hands-free solution capability for logistics companies that operate fleets across multiple countries in Asia.



Samsung Public Safety

9 What are the outcomes that can be expected?

Over 60% of respondents in our research across SEA and ANZ say they haven't been able to measure specific benefits from their use of PTT. One reason this occurs is that PTT isn't directly tied to revenue generation or profit. As we have said earlier, it is about safety and security through better voice communications.

As such the expected or desired outcomes are often about reducing incident rates, improving response and coordination times, enabling cross-agency or -organisation capabilities, greater flexibility to include people not previously able to use LMR systems, and improving the ability of workers to make decisions and be productive.

Our survey research shows that there were the following perceived benefits:

10 What is the future of PTT?

The modern PTT market is still in its infancy and we expect it will take a couple of years before the technology becomes mainstream. Focus will be on the performance and reliability of PTT as compared with LMR. That said, we expect many examples of early adopters to be shared widely and to help accelerate adoption.

There are many opportunities to expand the PTT value proposition by including more API-driven partners, especially in terms of AI-based tools and services. We also expect a lot more focus on integration of complete end-to-end systems.

The technology itself will also start to move towards 5G networks and potentially with low-earth orbit satellite broadband services. Other potential developments include integration with security and video systems (e.g. body worn cameras) along with wearable devices like smartwatches and other monitoring sensors.

It is easy to see the potential benefits and future upside of PTT as compared to LMR today. We know safety will continue to be a mission critical aspect for many organisations, so demand will continue strongly and the market will evolve at a medium pace.

11 A checklist for businesses to consider if assessing PTT

The following is a list of questions that organisations should be asking while considering PTT. It is not comprehensive, but the intention is to provide a kick-start into a deeper discussion.

- Have you undertaken a process of discovery of PTT and related solutions with a cross section of your users?
- What is the longer-term vision for how you want your people to work and communicate?
- Will LMR systems be enough in future or will newer solutions offer more value and reliability?
- How well established is the company offering the PTT solution - how long have they been in business? Are they public or privately owned?
- What devices are they using, are they industry standard or proprietary?
- Can the device work in the conditions required: heat, humidity, vibration, gloves?
- How are devices offered: Lease, financed or purchased outright?
- Do they integrate with the PTT software of your choice?
- Do they have a market place of 3rd party providers so you can extend your value?
- Have you spoken with peers that have already piloted or rolled out PTT and understand the pros and cons?
- Are you and your providers compliant with all regulatory requirements?
- How fast can you all move together if you need to change?
- Are you intending to expand the role of your PTT device for other use cases as well?

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