



VDLM2 Implementation Plan

AFC Spring 2015

Scope

- Background on VDLM2 frequency planning
- Details of AFC plan
- Progress update from respective organizations
- Future work requiring a decision

Background



- ARINC/RC and SITA formally requested additional VDLM2 channels in 2014
 - Future capacity required for AOC data growth
 - DataComm service requirements
- AFC channel plan created in 2010 for VDLM2 networks
 - Utilizes the upper 136 MHz band
 - Dedicated frequency for each DSP
 - Options for additional capacity
- VDLM2 signal not compatible with adjacent VDLM2/ACARS/Voice assignments
 - VDLM2 co-site interferes with adjacent users

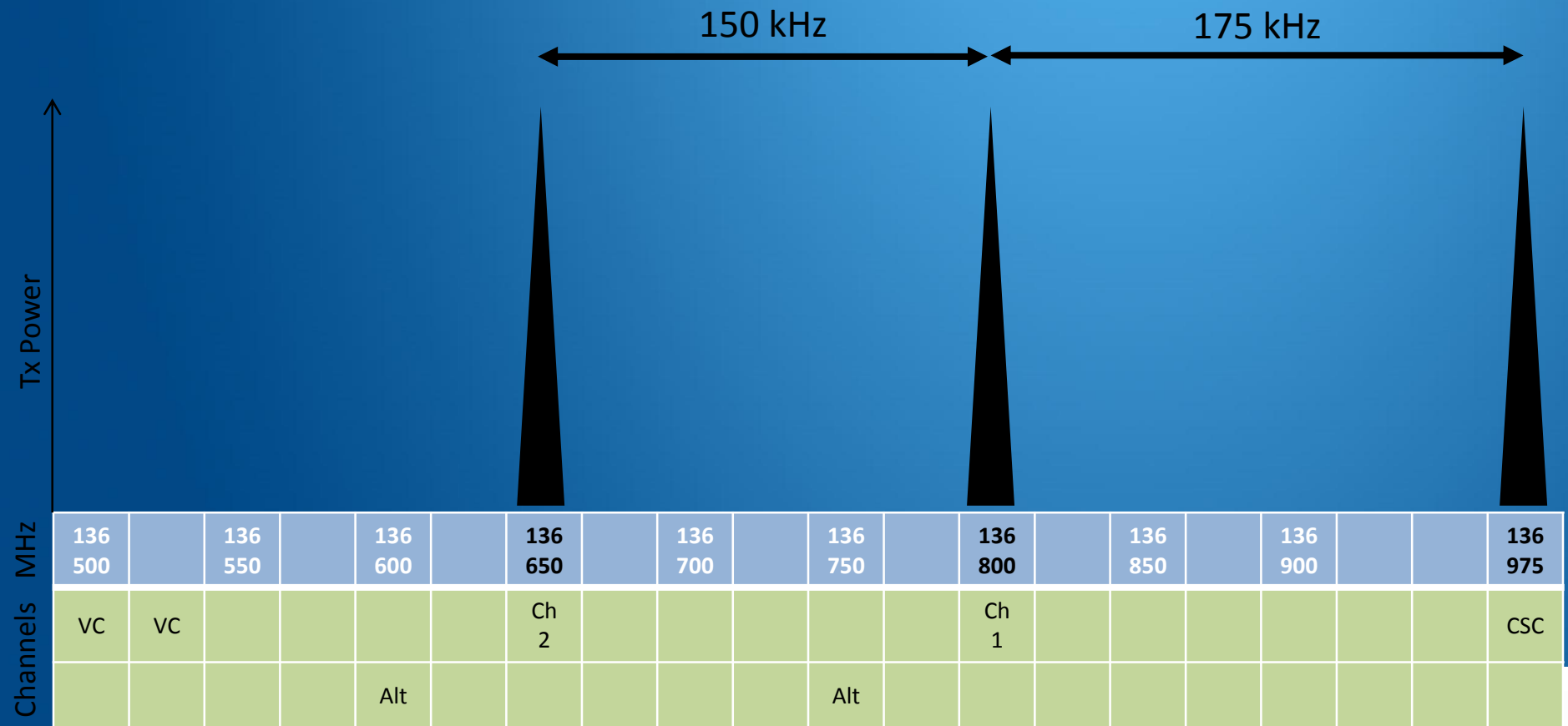
Current VDLM2 Channel Plan



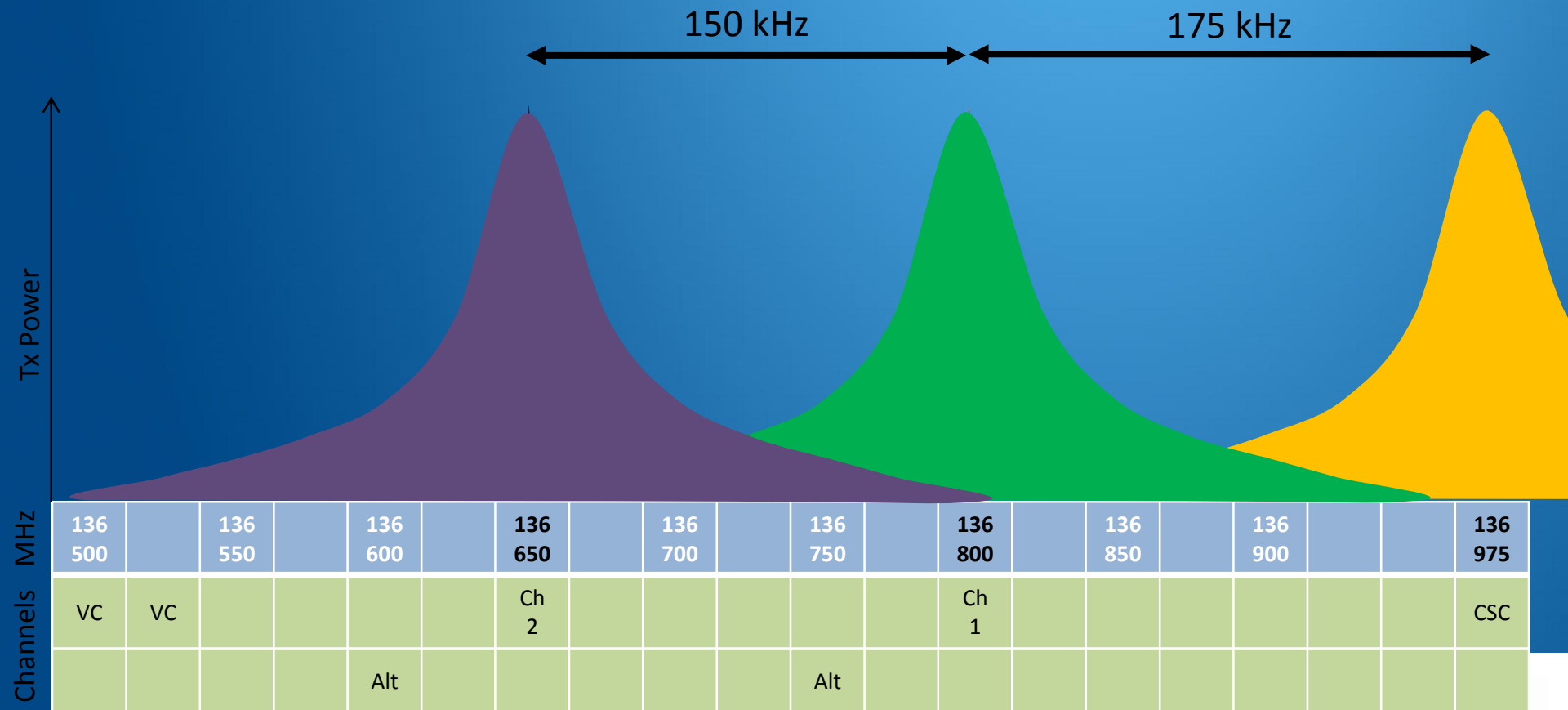
Frequency (MHz)	Allocation	Notes
136.975	Common VDLM2 Channel	Already assigned nationally to VDLM2
136.950	Guard Band Channel	
136.925	Guard Band Channel	
136.900	Guard Band Channel	
136.875	Guard Band Channel	
136.850	Guard Band Channel	
136.825	Guard Band Channel	
136.800	VDLM2 Ground SITA	On-site - Planned for national US deployment
136.775	Guard Band Channel	
136.750	VDLM2 Enroute SITA	Off-site - Planned for national US deployment
136.725	Guard Band Channel	
136.700	Guard Band Channel	
136.675	Guard Band Channel	
136.650	VDLM2 Ground ARINC/RC	On-site - Planned for national US deployment
136.625	Guard Band Channel	
136.600	VDLM2 Enroute ARINC/RC	Off-site - Planned for national US deployment
136.575	Guard Band Channel	
136.550	Guard Band Channel	
136.525	Voice users	Select US areas only
136.500	Voice users	Select US areas only

- Implementation option using AFC agreed channel plan in 2010
- Ground frequency co-site is the key planning consideration
 - Minimum of 150 kHz offset required (with filtering)
 - 50 kHz + 1 mile separation need for enroute channels
 - Operators will have the 50kHz pairs to minimize interference between them.
- SITA selected for .800/.750 due to SITA ACARS on .850
 - Will allow ARINC/RC to deploy earlier
- Some voice users remaining on lower frequencies
 - Prevents congestion in lower band
 - Other users may be added depending on role/location

VDLM2 Co-site Coordination



VDLM2 Co-site Coordination



VDLM2 Implementation Planning



- ASRI proposed an implementation method after working with both DSPs.
 - Assign new VDLM2 channels while minimizing impact on existing users
- Planning for 4 phase process from initiation on 1 Jul 2014
 1. Reorganize lower AOC voice users
 2. Migrate affected voice users from upper AOC
 3. Migrate ACARS networks
 - a) Secondary ACARS networks (3)
 - b) SITA ACARS base frequency
 4. Assign new VDLM2 frequencies
 - a) Upper 136 MHz band (AFC)
 - b) Lower 136 MHz band (FAA)

The Plan - Timeline



Frequencies	2014	2015		2016		2017	
(MHz)	07/01	01/01	07/01	01/01	07/01	01/01	07/01
136.550-136.950	Clearing Voice*		All Adjacent Channels Cleared				
136.575	ACARS	ACARS Migration**	Cleared				
131.725	Clearing Voice	↪	ACARS**				
136.650	ACARS	ACARS Migration	VDLM2 ARINC/RC				
129.350	Clearing Voice	↪	ACARS				
136.800	ACARS			ACARS Migration	VDLM2 SITA		
129.525	Clearing De-icing Usage			↪	ACARS		
136.850	ACARS	ACARS Migration***				Cleared	
131.725	Clearing Voice	↪				ACARS**	

*Some voice users will be moved to 136.500 and 136.525 MHz.

**While consolidating 136.575 and 136.850 MHz into 131.725 MHz, any additional capacity assignments required will be made on 131.650 MHz. This will be available from the 1 Jul 2015.

***Date and actions subject to change until approved by AFC.

Progress update



- Review of different phases by the responsible organizations

Phase 1 - ASRI



Lower AOC band voice user reorganization

- Agreed AFC Spring 2014 Meeting
 - 129.525 (de-icing), 129.350, 131.650, & 131.725 MHz voice users cleared by Q1 2015

Phase 2 - ASRI



Migration of upper AOC band voice users

- Agreed AFC Spring 2014 Meeting
 - Majority of voice users in upper 136 MHz band moved by Q1 2015 (except 136.500, and 136.525 MHz)



Migration of secondary ACARS networks in upper AOC band

- Agreed AFC Fall 2014 Meeting
- SITA
 - 136.575, & 136.650 MHz ACARS users to be moved by Q3 2015
- ARINC/RC
 - 136.800 MHz ACARS users to be moved by Q1 2017

Phase 3B - SITA



Migration of SITA ACARS base frequency

- TBC at this meeting
- 136.850 MHz ACARS addressed by Q3 2017

Phase 4 - ASRI



- Assignment of VDLM2 frequencies
 - Upper 136 MHz channel plan confirmed
 - Lower 136 MHz plan being discussed with the FAA

Last AFC Meeting



- AFC reviewed current progress
 - SITA presented on considerations with base frequency move for ACARS
 - Vote on the move was delayed to this meeting to confirm details.
- Action items
 - AA/USA and DL to provide an opinion of the SITA ACARS base frequency move
 - SITA/Harris investigate possible duplicate message issue with ACARS processor
 - SITA to seek opinions from international airlines on ACARS base frequency move
 - SITA to contact all airframers (Airbus, Boeing, Bombardier, Embraer) concerning actions required on frequency change

SITA ACARS base frequency



- SITA currently operating a regional base frequency network on 136.850 MHz
 - Only 50kHz away from AFC's VDLM2 channel plan
 - AFC SWG work calculated >1 mile separation required for this spacing (Tx OOB/Filtering requirements)
- AFC needs to consider how to deal with the issue
 - Delay beyond this meeting could delay aspects of DataComm
 - Two options presented today

Frequency (MHz)	Allocation
136.875	Guard Band Channel
136.850	SITA ACARS Base Frequency
136.825	Guard Band Channel
136.800	VDLM2 Ground SITA
136.775	Guard Band Channel
136.750	VDLM2 Enroute SITA
136.725	Guard Band Channel

Option 1 - Moving SITA to 131.725 MHz



- Original plan with ASRI, SITA, ARINC/RC and Harris focused on moving SITA to 131.725 MHz
 - 131.725 MHz is SITA's existing worldwide base frequency
 - Planned over an extended period to allow network buildout and avionics migration (estimated 2 years)
- Plan would begin Q3 2015
 - Voice users already cleared from 131.725 MHz with assistance from SITA
 - A SITA secondary ACARS frequency would move first to provide a suitable foundation
 - A second frequency would be made available for additional capacity
 - ASRI would license both frequencies for approx. 1 year to allow airlines to migrate

Option 1 – Moving SITA to 131.725 MHz



- Benefits
 - Worldwide SITA base frequency of 131.725 MHz
 - Would allow AFC VDLM2 plan to be implemented as intended by AFC
 - Can be theoretically implemented within 2 years beginning immediately
 - No additional modifications required to other ASRI voice/VDL users
- Disadvantages
 - Would require some airlines to update avionics' frequency tables
 - Cost to SITA to deploy a new network
 - Canadian coordination to ensure regional harmonization

Option 2 – SITA Alternative plan



Required Vote



- Discussion and clarification required
- Voting for the required options

Ad-hoc VDLM2 Spectral Coordination Group



- Proposed composition
 - FAA Data Comm Engineering/spectrum office
 - Harris
 - Rockwell Collins/ARINC
 - SITA
 - ASRI
- Charter
 - To ensure spectrum availability for Data Comm and efficient use of VDL-2 spectrum
- Schedule
 - Proposed to align with ASRI AFC meetings
 - Request near-term focus to support Key Topics
- Key Topics
 - Spectrum request criterion
 - Coordinated spectrum plans for both ASRI and FAA bands
 - Spectrum request process and time line
- Report back to AFC on a regular basis

Ad-hoc VDLM2 Spectral Coordination Group



- Feedback from last few meetings
 - Two Telcons and one formal AFC meeting



Questions?