

There are Alternative Paths for Industry to Achieve Interoperability

Role of the Commission

- The Commission need not determine how to achieve interoperability in this proceeding, but should simply establish an interoperability requirement and provide a framework and timeframe to facilitate an industry solution for implementation in the Lower 700 MHz band

Role of Industry

- Industry will follow the framework rules established by the Commission and industry participants will then collectively determine how to best achieve interoperability in the Lower 700 MHz band
 - Industry will determine how to implement interoperability within the given time frame by evaluating the existing Band Class 12 band specification versus modifying Band Class 17 or implementing another potential band specification
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The 700 MHz NPRM Requested Measurement Data

WT Docket No. 12-69 was established to:

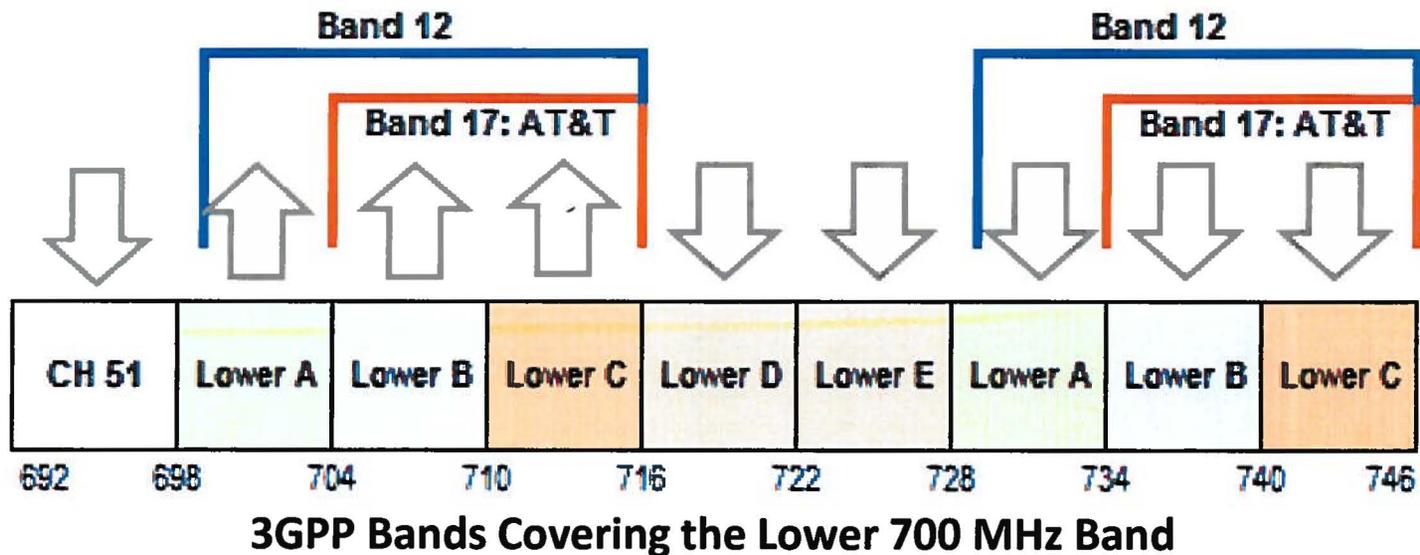
“Evaluate whether the *customers of Lower 700 MHz B and C Block licensees would experience harmful interference* - and if so, to what degree - if the Lower 700 MHz band were interoperable.” (NPRM at 5)

The scope is focused on devices:

“We focus the scope of this proceeding to interference to Lower 700 MHz B and C Block operations that may *result from the adoption of Band Class 12 devices* by Lower 700 MHz B and C licensees, whether voluntarily or by regulatory mandate.” (NPRM at 32)

The NPRM requested evidence of interference:

“We ask interested parties *to submit measurements and quantitative analyses* regarding the *magnitude and extent of the interference risk* from adjacent Channel 51 and Lower Block E transmissions for Band Class 12 devices operating in the Lower B and C Blocks.” (NPRM at 40)



Summary of Empirical Measurements

- Hyslop-Kolodzy and V-Comm provided the most complete test data of commercial LTE devices in the vicinity of Lower E Block and Channel 51 broadcast signals.

	Lower E Block		Channel 51	
	Lab Tests	Field Tests	Lab Tests	Field Tests
Hyslop-Kolodzy Report	Yes	Yes	Yes	Yes
V-Comm Report	Yes	Yes	Yes	Yes
AT&T Comments	No	No	Yes	No
Qualcomm Comments	No	MediaFLO	2 GHz	No

- The interoperability opponents' test data was flawed:
 - Qualcomm's Channel 51 tests used 2 GHz components, a configuration not representative of 700 MHz, and hypothetical, undocumented device performance assumptions.
 - AT&T's Channel 51 laboratory test plan specified inadequate control of emissions, which would invalidate the test results.
 - Neither AT&T nor Qualcomm tested devices to determine blocking performance relative to the Lower E Block.

Notes: (1) two devices were tested in Hyslop-Kolodzy Report
 (2) seven additional devices were tested in V-Comm Report
 (3) one device was tested by AT&T

Measurements Show No Channel 51 Interference

- Hyslop-Kolodzy and V-Comm measured LTE device performance in the presence of strong Channel 51 signals.
 - Several Band 12 and Band 17 devices were tested.
 - All results revealed that a Channel 51 signal would need to be unusually strong, greater than -13 dBm, to begin affecting Band 12 devices in the weakest LTE coverage.
 - As validated by the Atlanta measurements, such weak LTE coverage is only found within buildings or other obstructed areas, where the Channel 51 signal would be similarly weakened to well below -13 dBm.
- Hyslop-Kolodzy and V-COMM measured Channel 51 signal strength in Atlanta, Chicago, New Jersey, and Iowa, demonstrating that such strong Channel 51 signals rarely, if ever, occurred.
- The Hyslop-Kolodzy report also provided a simple operations workaround which would eliminate interference if it were to hypothetically exist, with no impact to cost, hardware, or software.

Based on the empirical data in the record, commercial Band 12 devices would not experience interference near Channel 51 stations.

Conclusions

- The NPRM for 700 MHz Interoperability requested measurements and analyses assessing whether Band 12 commercial devices operating in the Lower B and C Blocks would experience harmful interference relative to a Band 17 device.
 - The measurements in the record demonstrate that a Band 12 device would not experience interference in commercial LTE markets.
 - The record further demonstrates that Band 12 devices exceed the 3GPP Band 17 performance specifications.
 - Commercial Band 12 devices provide interference-free operation near Lower E Block and Channel 51 broadcast stations.
 - Band 17 is not necessary to protect against harmful interference.
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Interoperability Effect on Device Capabilities & Requirements

With interoperability, new mobile devices would be technically capable of communicating across any network that deploys A, B or C Block base stations. All existing mobile devices would be unaffected and continue to work as they do today.

Keys Components	Requirements Impact	Cost Impact
Antenna	No Change	None
Duplex Filter	New component becomes common to all Lower 700 MHz mobile devices	None – production and installation of alternative duplex filter imposes no additional costs at scale
Power Amplifier	No Change	None
Low Noise Amplifier	No Change	None
Base Band Hardware	No Change	None
Base Band Software	Band 12 vs. Band 17 Software	None – software loaded as part of manufacturing process

Interoperability Effect on Base Station Capabilities and Requirements

With interoperability, Lower 700 MHz base stations that operate on either A, B or C Blocks would be upgraded, via a routine software update, to enable communications with all Lower 700 MHz mobile devices supporting the same air interface technology.

Key Components	Requirements Impact	Cost Impact
Antenna	No Change	None
Duplex Filter	No Change	None
Power/Low Noise Amplifier	No Change	None
Base Band Hardware	No Change	None
Base Band Software	A one-time software upgrade to accept all A, B and C Block Channel Numbering	None – accomplished during routine software update cycle
Network Control	No Change	None

Interoperability Effect on Currently Deployed Network Capabilities & Requirements

- With interoperability, current network radio frequency designs and deployments would remain unchanged.
- All new Lower 700 MHz mobile devices would be technically capable of communicating with all A, B and C Block networks.

Deployment Considerations	Requirements Impact	Cost Impact
Cell Tower Proximity to Channel 51 Transmitters	No change – testing shows no changes required	None – Band 12 and Band 17 3GPP specifications are currently identical for managing potential interference from Channel 51 transmissions
Cell Tower Proximity to E Block Transmitters	No change – testing shows no changes required; Band 12 devices comply with Band 17 3GPP specifications with respect to E Block	None