EMI/EMC Emissions test result Updates

IEEE 802.3dm

September, 2025

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Supporters

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Background

- This presentation is a compilation of the the CISPR EMC results that have been presented till the July 2025 802.3dm meeting, for TDD and ACT

- This contribution is focused on Emissions test results. This presentations contains side-by-side comparison of various tests.

- Authors recognize that more results are likely to be presented and will update the deck moving forward to provide a comprehensive comparison

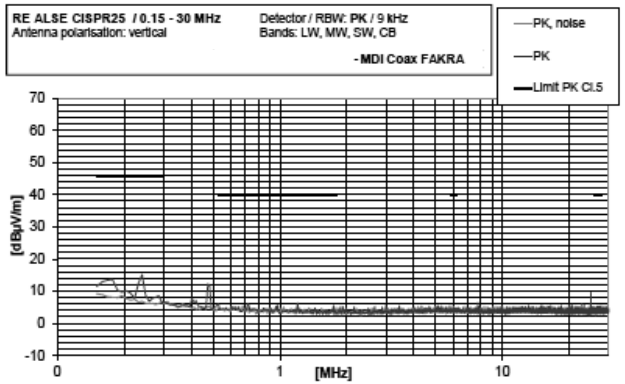
- It is readily observed that
  1. A high number of ACT emissions results are missing
  2. The partial emission results that have been presented so far show TDD has much better performance than ACT
  3. ACT tests results shared so far are NOT from an independent test house
  4. TDD results show complete and excellent Emissions performance.

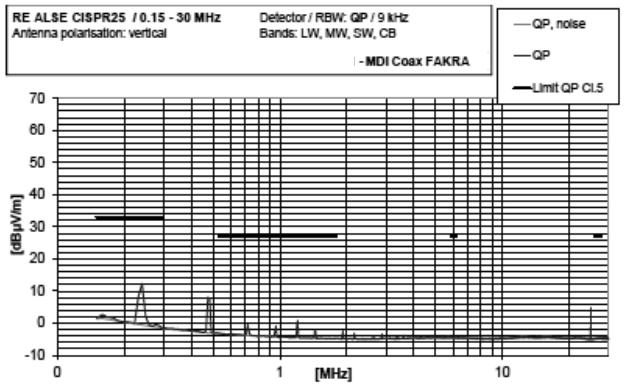
Presentations referred to in this contribution

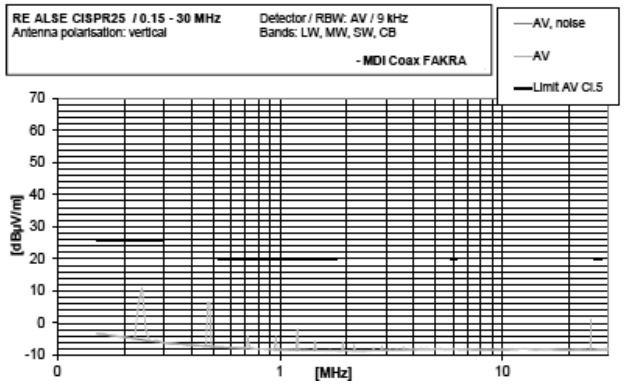
- https://www.ieee802.org/3/dm/public/041725/Dalmia_Ng_EMI_COAX_3dm_01_04172025.pdf
- https://www.ieee802.org/3/dm/public/041725/Dalmia_Ng_EMI_STP_3dm_01_04172025.pdf
- https://www.ieee802.org/3/dm/public/0725/wu_3dm_01a_072925.pdf

Results – COAX Emissions (0.15 – 30MHz)

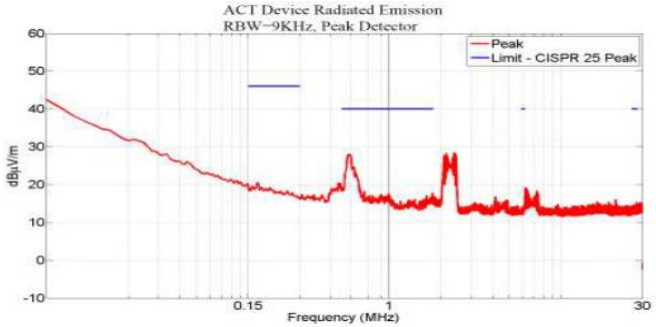
TDD







Peak



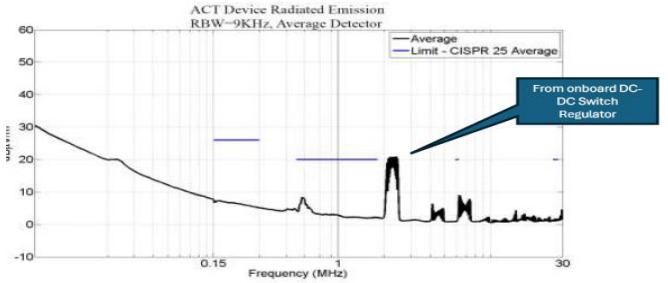
ACT

Lower margin

Quasi Peak

Not Shown

Average



Lower margin

Results – COAX (VHF, UHF, etc) - PK

TDD

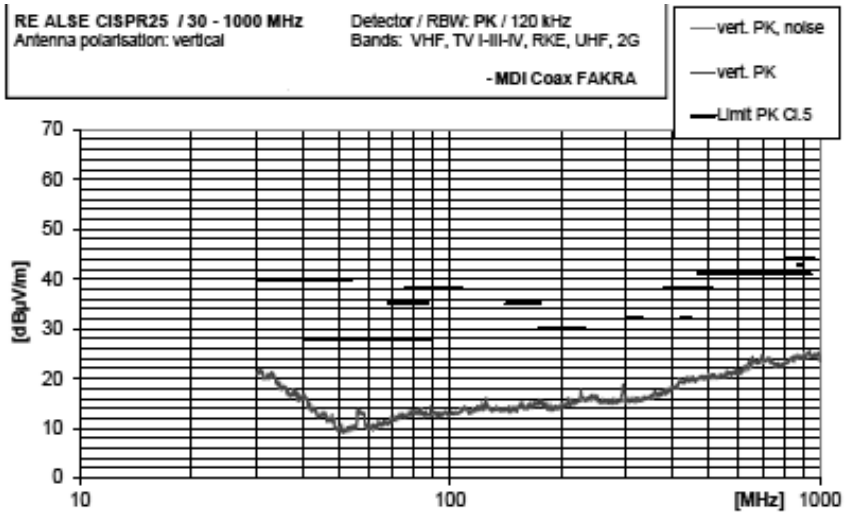
Test results (continue):

Bands
VHF, TV I-III-IV, RKE, UHF, 2G

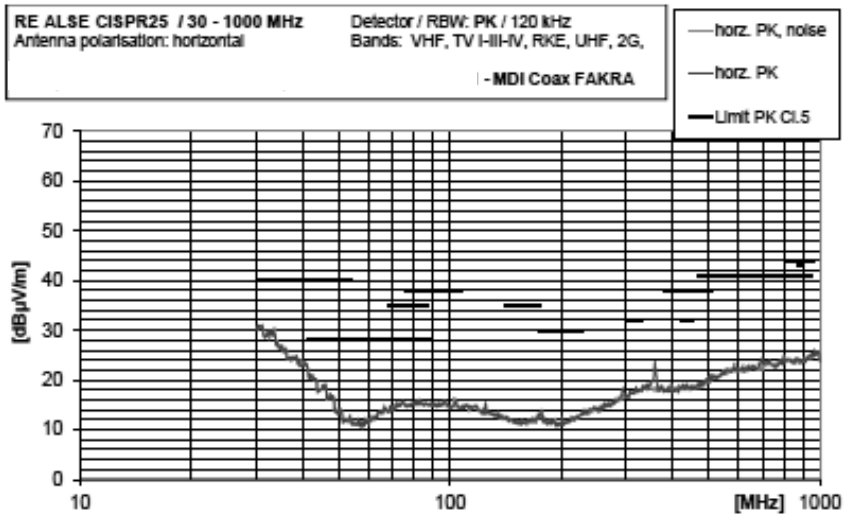
RBW
120 kHz

Detector
PK

Antenna polarization
vertical

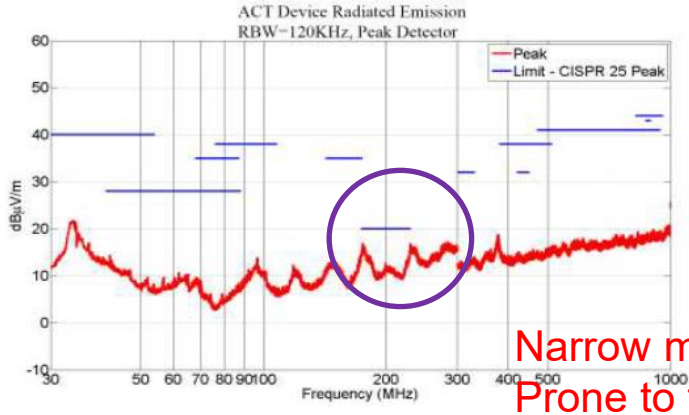


Antenna polarization
horizontal



ACT

Vertical Peak



Narrow margin!
Prone to failure in customer PCBs.

Horizontal Peak

Not Shown

Results - COAX (VHF, UHF etc) - QP

TDD

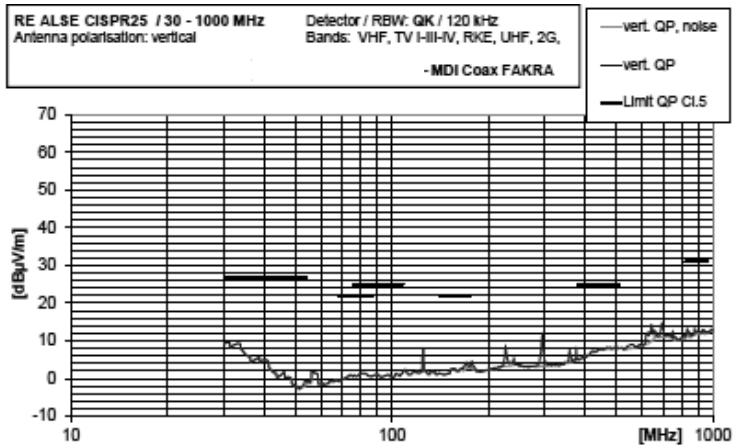
Test results (continue):

Bands
VHF, TV I-III-IV, RKE, UHF, 2G

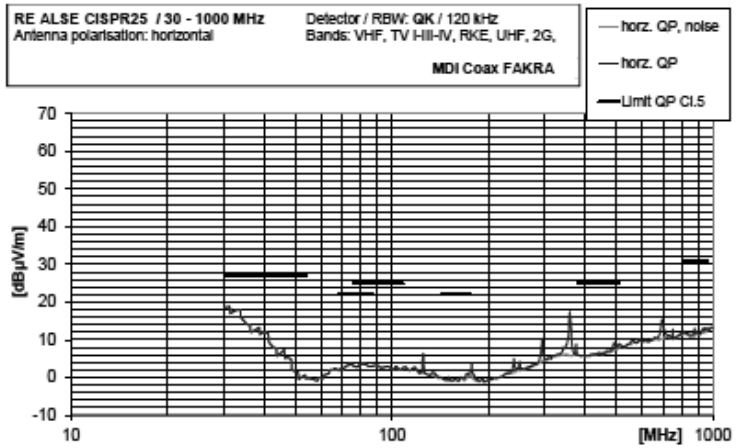
RBW
120 kHz

Detector
QP

Antenna polarization
vertical



Antenna polarization
horizontal



ACT

Vertical
Quasi Peak

Not Shown

Horizontal
Quasi Peak

Not Shown

Results - COAX (VHF, UHF etc) - AV

TDD

Test results (continue):

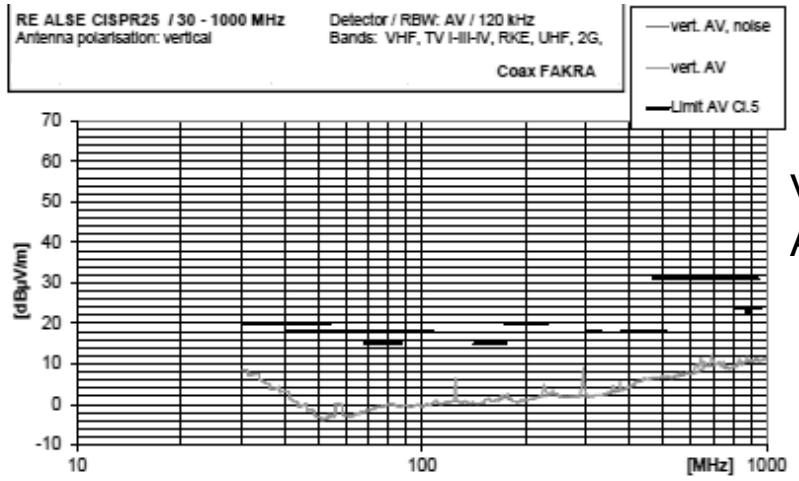
Bands
VHF, TV I-III-IV, RKE, UHF, 2G

RBW
120 kHz

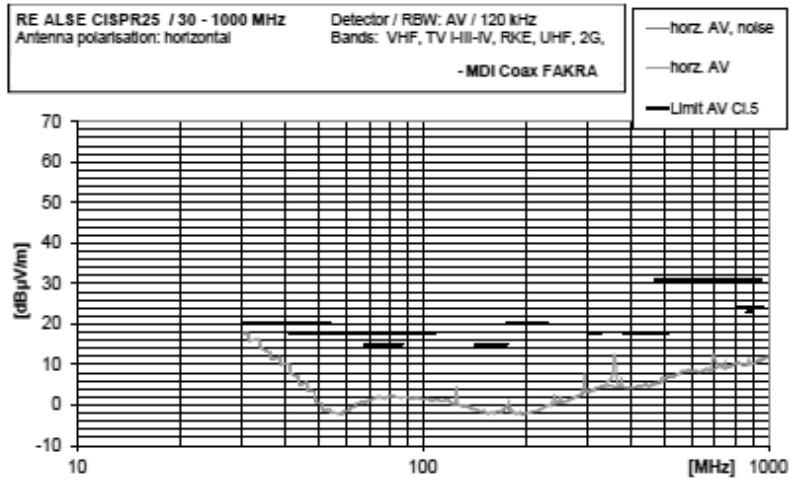
Detector
AV

Antenna polarization
vertical

Antenna polarization
horizontal

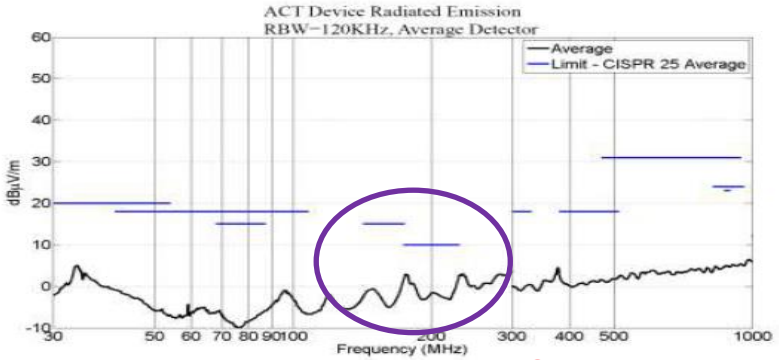


Vertical AV



Horizontal AV

ACT



Spikes are generally concerning

Not Shown

Results – COAX (DAB, TV etc) PK

TDD

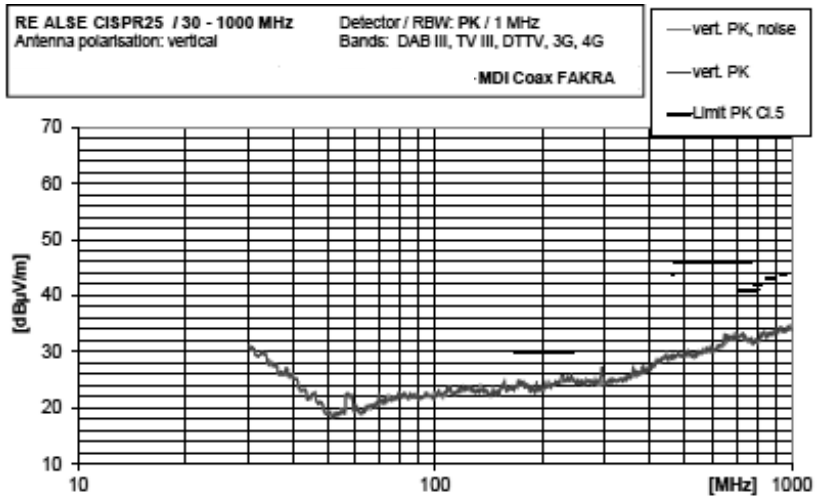
Test results (continue):

Bands
DAB III, TV III, DTTV, 3G, 4G

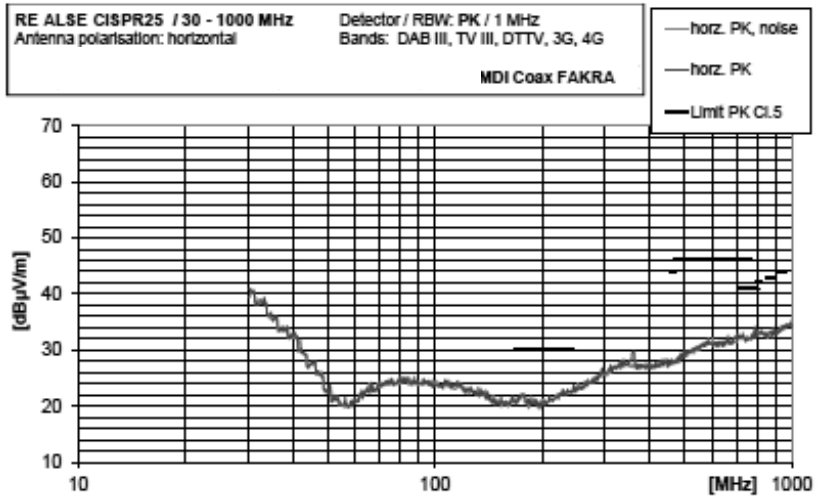
RBW
1 MHz

Detector
PK

Antenna polarization
vertical

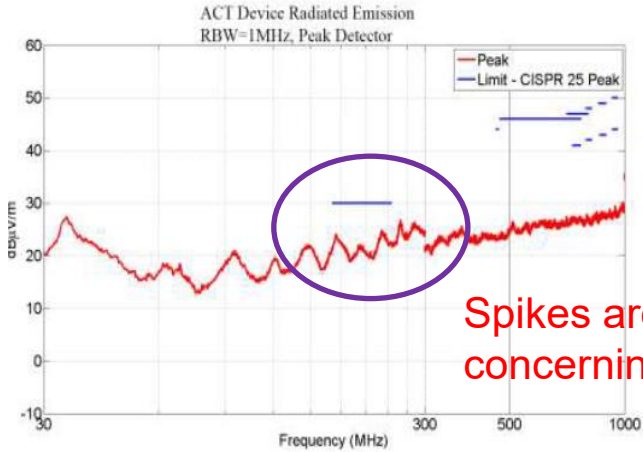


Antenna polarization
horizontal



ACT

Vertical Peak



Spikes are generally concerning

Horizontal Peak

Not Shown

Results - COAX GPS, BDS, GLONASS etc.

TDD

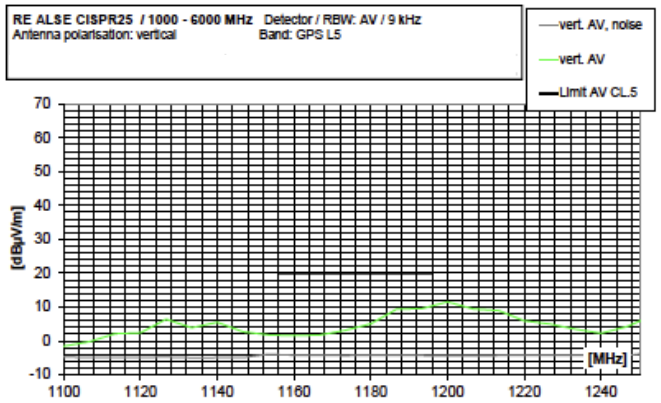
Test results (continue):

Bands
GPS L5

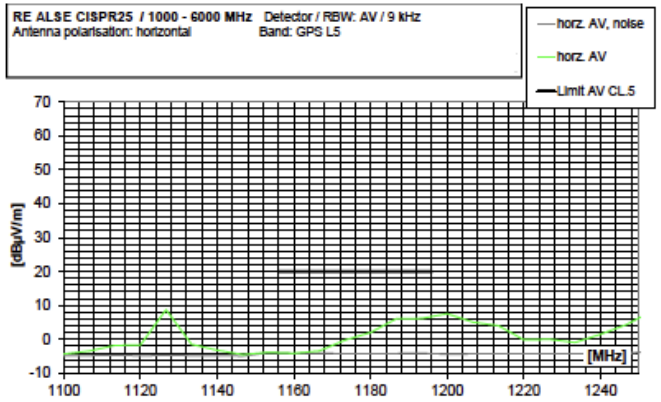
RBW
9 kHz

Detector
AV

Antenna polarization
vertical



Antenna polarization
horizontal



TDD

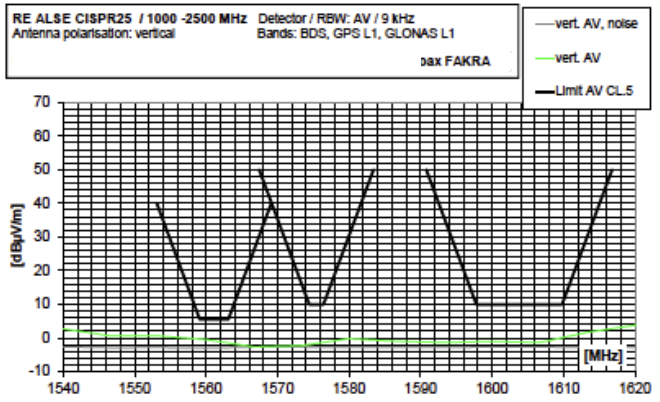
Test results (continue):

Bands
BDS, GPS L1,
GLONASS L1

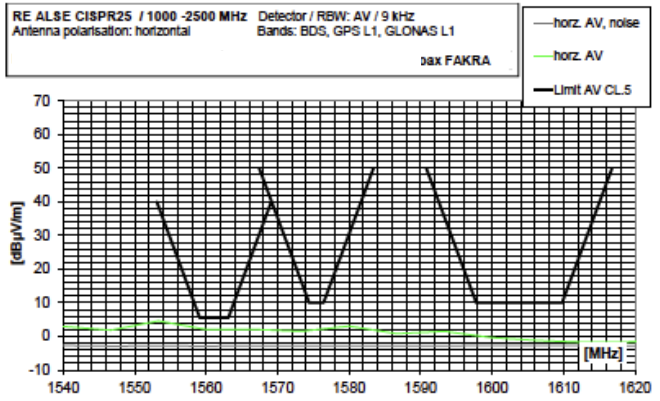
RBW
9 kHz

Detector
AV

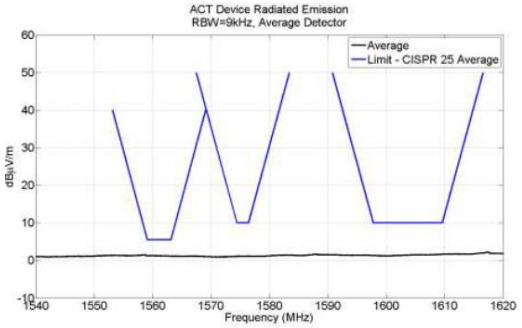
Antenna polarization
vertical

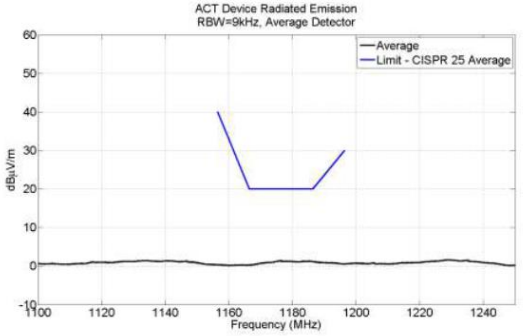


Antenna polarization
horizontal



ACT





Results – COAX 2G

TDD

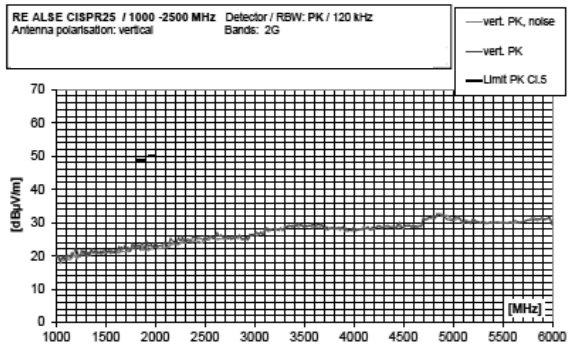
Test results (continue):

Bands
2G

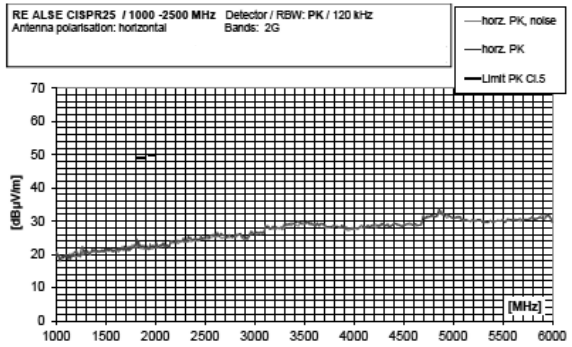
RBW
120 kHz

Detector
PK

Antenna polarization
vertical



Antenna polarization
horizontal



ACT

Not Shown

Not Shown

TDD

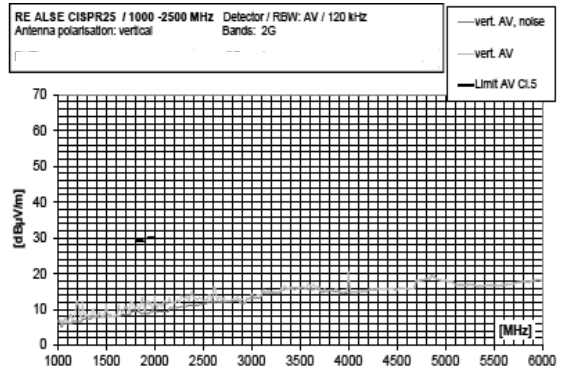
Test results (continue):

Bands
2G

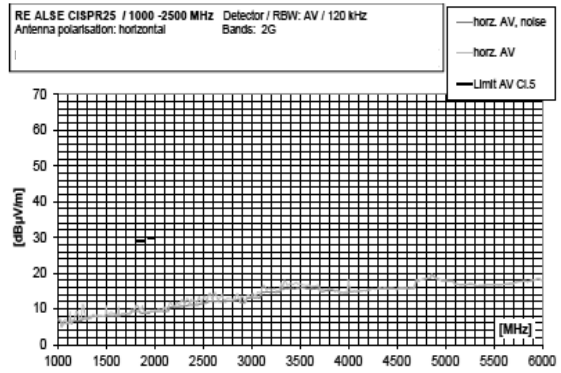
RBW
120 kHz

Detector
AV

Antenna polarization
vertical



Antenna polarization
horizontal



ACT

Not Shown

Not Shown

Results – COAX (3G, 4G etc)

TDD

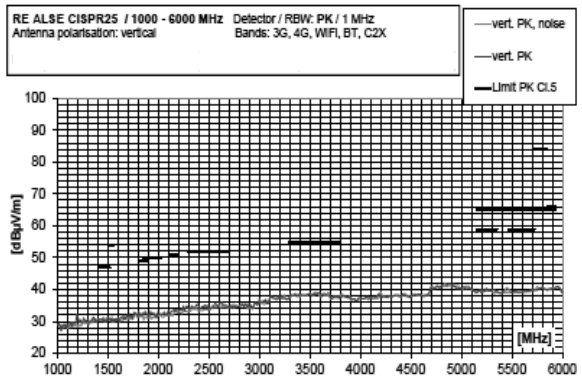
Test results (continue):

Bands
3G, 4G, WiFi, BT, C2X

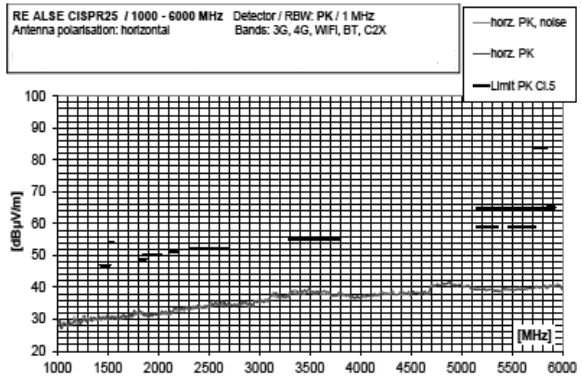
RBW
1 MHz

Detector
PK

Antenna polarization
vertical



Antenna polarization
horizontal



ACT

Not Shown

Not Shown

TDD

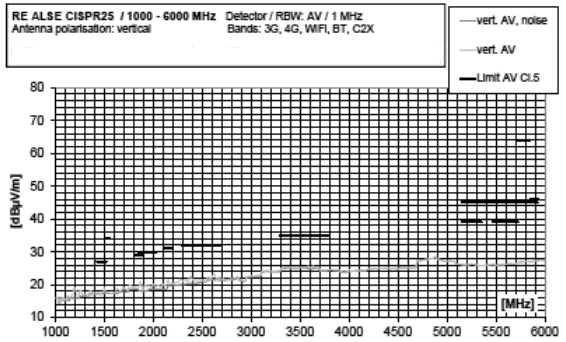
Test results (continue):

Bands
3G, 4G, WiFi, BT, C2X

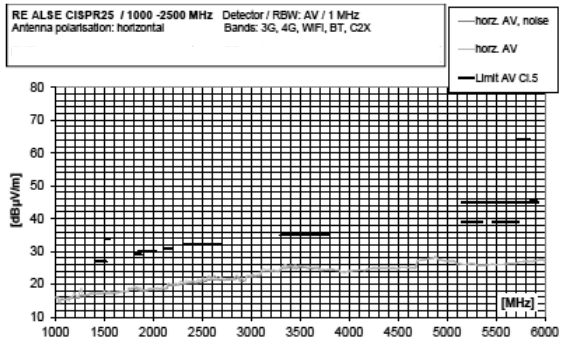
RBW
1 MHz

Detector
AV

Antenna polarization
vertical



Antenna polarization
horizontal



ACT

Not Shown

Not Shown

Results COAX – TDD ALL PASS Class 5!!

TDD →

Comprehensive Results

Frequency range	RBW	Band	Resulting Class for detector		
			PK	QP	AV
150 kHz to 30 MHz	9 kHz	LW	5	5	5
		MW	5	5	5
		SW	5	5	5
		CB	5	5	5
30 MHz to 1 GHz	120 kHz	VHF (1)	5	5	5
		TV I	5	-	5
		VHF (2)	5	5	5
		FM	5	5	5
		VHF (3)	5	5	5
		TV III	5	-	5
		RKE (1)	5	-	5
		Analogue UHF (1)	5	5	5
		RKE (2)	5	-	5
		TV IV	5	-	5
		Analogue UHF (2)	5	5	5
		2G (1)	5	-	5
		2G (2)	5	-	5
30 MHz to 1 GHz	1 MHz	DAB III	5	-	5
		TV III	5		5
		DTTV	5		5
		4G (1)	5		5
		4G (2)	5		5
		4G/3G (3)	5		5
		3G	5		5
		4G/3G (4)	5		5
		4G/3G (5)	5		5
1.15 GHz to 1,62 GHz	9 kHz	GPS L5	-		5
		BDS, B1I			5
		GPS L1 civil			5
		GLONASS L1			5
1.8 GHz to 2 GHz	120 kHz	2G (3)	5	-	5
		2G (4)	5	-	5
1.4 GHz to 6 GHz	1 MHz	4G/3G (6)	5	-	5
		4G (7)	5	-	5
		4G/3G (8)	5	-	5
		4G/3G (9)	5	-	5
		4G/3G (10)	5	-	5
		4G/3G (11)	5	-	5
		4G/3G (12)	5	-	5
		WiFi / Bluetooth	5	-	5
		4G/3G (13)	5	-	5
		WiFi	5	-	5
		C2X (WiFi)	5	-	5
		C2X (4G)	5	-	5

ACT

Very high number of tests missing!

Results STP – TDD ALL PASS Class 5!!

TDD

Frequency range	RBW	Band	Resulting Class for detector		
			PK	QP	AV
150 kHz to 30 MHz	9 kHz	LW	5	5	5
		MW	5	5	5
		SW	5	5	5
		CB	5	5	5
30 MHz to 1 GHz	120 kHz	VHF (1)	5	5	5
		TV I	5	-	5
		VHF (2)	5	5	5
		FM	5	5	5
		VHF (3)	5	5	5
		TV III	5	-	5
		RKE (1)	5	-	5
		Analogue UHF (1)	5	5	5
		RKE (2)	5	-	5
		TV IV	5	-	5
		Analogue UHF (2)	5	5	5
		2G (1)	5	-	5
		2G (2)	5	-	5
30 MHz to 1 GHz	1 MHz	DAB III	5	-	5
		TV III	5		5
		DTTV	5		5
		4G (1)	5		5
		4G (2)	5		5
		4G/3G (3)	5		5
		3G	5		5
		4G/3G (4)	5		5
		4G/3G (5)	5		5
1.15 GHz to 1,62 GHz	9 kHz	GPS L5	-		5
		BDS, B1I			5
		GPS L1 civil			5
		GLONASS L1			5
1,8 GHz to 2 GHz	120 kHz	2G (3)	5	-	5
		2G (4)	5	-	5
1.4 GHz to 6 GHz	1 MHz	4G/3G (6)	5	-	5
		4G (7)	5	-	5
		4G/3G (8)	5	-	5
		4G/3G (9)	5	-	5
		4G/3G (10)	5	-	5
		4G/3G (11)	5	-	5
		4G/3G (12)	5	-	5
		WIFI / Bluetooth	5	-	5
		4G/3G (13)	5	-	5
		WiFi	5	-	5
		C2X (WiFi)	5	-	5
		C2X (4G)	5	-	5

ACT

ENTIRE SET is missing!

Summary

- This presentation is a side-by-side comparison of the EMC results that have been presented till the July 2025 802.3dm meeting

- For **ACT**, It can be observed that
  1. A lot of ACT ***emissions*** results are **missing**
  2. Partial emission results that have been presented show that ACT has much ***lower margin***
  3. ACT tests results shared so far are ***NOT from an independent test house***

✓ **TDD** results show complete and excellent CISPR Emissions performance.

Thank You