R4-B26ah

Band 26 Duplexer Performance and Spurious emission Requirements (coexistence with protected APAC700)

R4-B26ah

TSG-RAN Working Group 4 (Radio) meeting B26ah
Jersey City, January 17-19 2012

Source: KDDI Corporation
Title: Band 26 Duplexer Performance and Spurious emission Requirements (coexistence with protected APAC700)

Agenda item: 4.2.1
Document for: Discussion

Band 26 Duplexer Performance

- Attenuation for 803MHz of APAC700 and lower side of the Band26 TxI.L. are trade-off.

- The frequency properties of duplexer change by temperature and mass production deviation.
  - The frequency drift is ±3MHz～±5.6MHz.

- If attenuation of 803 MHz shall be 30 dB, 815-MHz TxI.L will be 3～3.5dB, because 815-MHz TxI.L. is greatly deleted with the frequency drift of duplexer. (※Figure: duplexer A)
- On the other hand, if TxI.L of 2.2 dB of 815 becomes, 803MHz attenuation will be 12 dB. (※ Figure: duplexer B)

•. The characteristic of duplexerB is needed, in order to bring close to I.L. of Band5 as much as possible.

Figure. Duplexer A

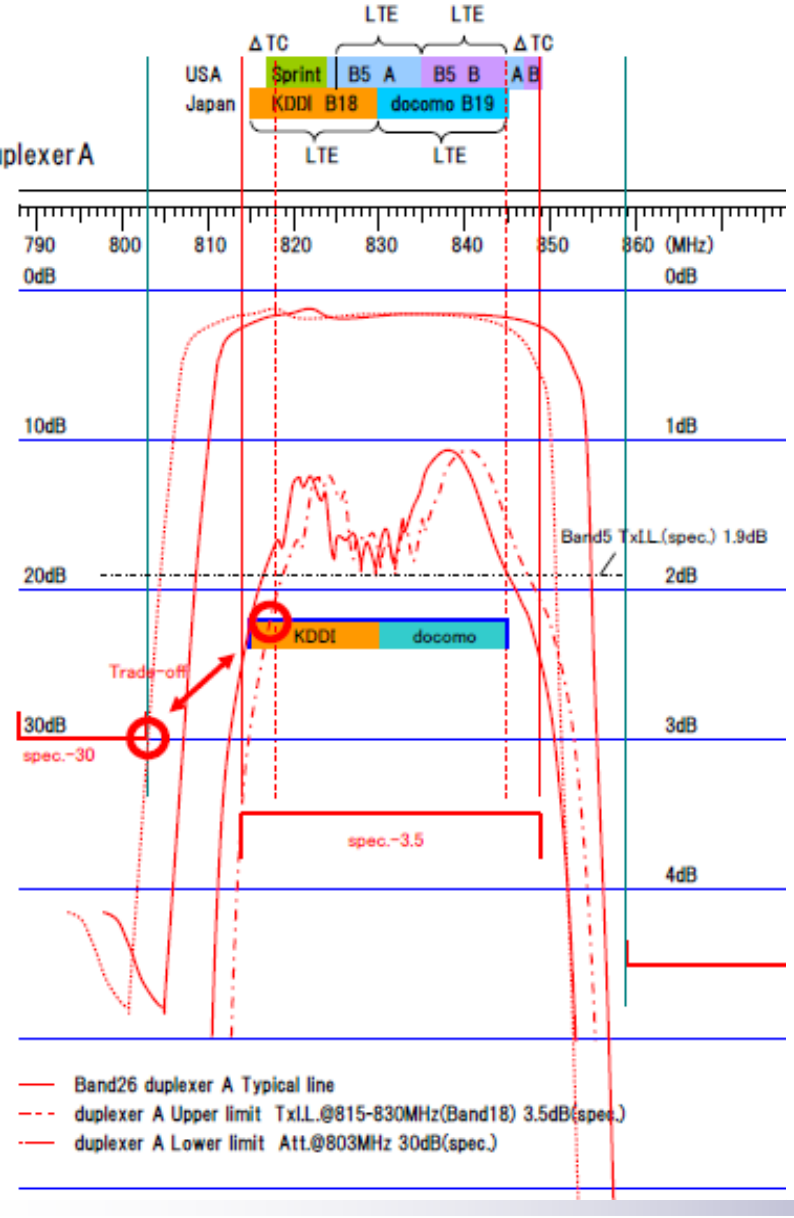
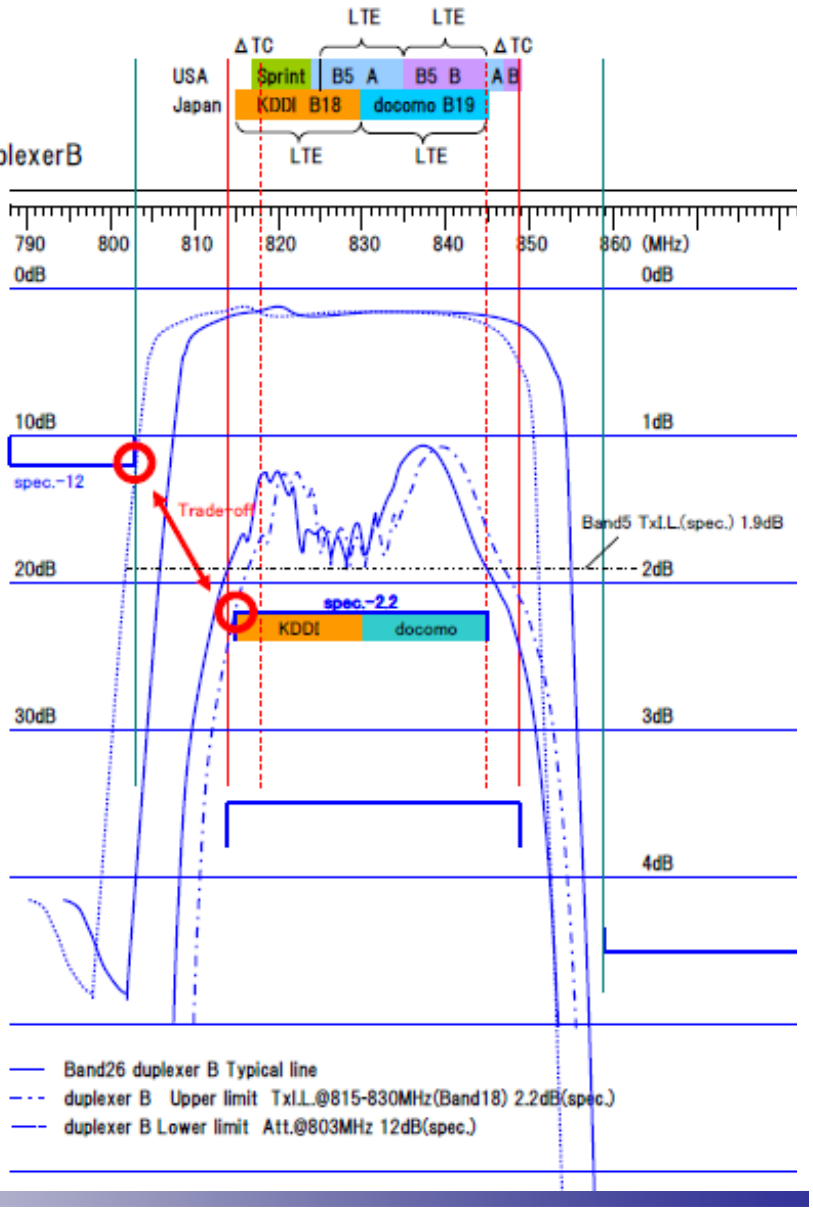


Figure. Duplexer B



A-MPR for B26@CBW15MHz

duplexer attenuation@803MHz		A-MPR (Modulator LO and image suppression 25dBc)					
		5dB(1RB)	4dB(1RB)	4dB(1RB)	4dB(1RB)	3dB(1RB)	3dB(1RB)
Spurious emission Requirements	50dBm/MHz	25dB	26dB	27dB	28dB	29dB	30dB
	40dBm/MHz	15dB	16dB	17dB	18dB	19dB	20dB
	35dBm/MHz	10dB	11dB	12dB	13dB	14dB	15dB
	30dBm/MHz	5dB	6dB	7dB	8dB	9dB	10dB
	25dBm/MHz	0dB	1dB	2dB	3dB	4dB	5dB

duplexer attenuation@803MHz		A-MPR (Modulator LO and image suppression 25dBc)					
		2dB(72≥RB)	1dB(72≥RB)	0dB(72≥RB)	0dB(72≥RB)	0dB(72≥RB)	0dB(72≥RB)
Spurious emission Requirements	50dBm/MHz	25dB	26dB	27dB	28dB	29dB	30dB
	40dBm/MHz	15dB	16dB	17dB	18dB	19dB	20dB
	35dBm/MHz	10dB	11dB	12dB	13dB	14dB	15dB
	30dBm/MHz	5dB	6dB	7dB	8dB	9dB	10dB
	25dBm/MHz	0dB	1dB	2dB	3dB	4dB	5dB

Spurious emission Requirements

- A base station is shared Band18 and Band26.
- As for UE, Band26 hardware and Band18 are shared.
- A-MPR in which Band26 differs from Band18 is not realistic employment in 5～6 dB.
- Therefore, the following proposals are performed.

Spurious emission band UE co-existence

Requirements

E-UTRA Band	Spurious emission						
	Protected band	Frequency range (MHz)			Maximum Level (dBm)	Measurement Bandwidth (MHz)	Comment
26	Frequency range (APAC700)	758	–	799	−50	1	
		799	–	803	−35	1	

※The intervals from Band26 to APAC700 are 11 MHz.

Requirements Plan

Table 1 Minimum requirement (network signalled value "NS_XX")

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)			Measurement bandwidth
	5MHz	10MHz	15MHz	
758 ≦ f ≦ 799	−50	−50	−50	1 MHz
799 < f ≦ 803	−35	−35	−35	1 MHz

Additional Maximum Power Reduction (A-MPR) / Spectrum Emission requirements

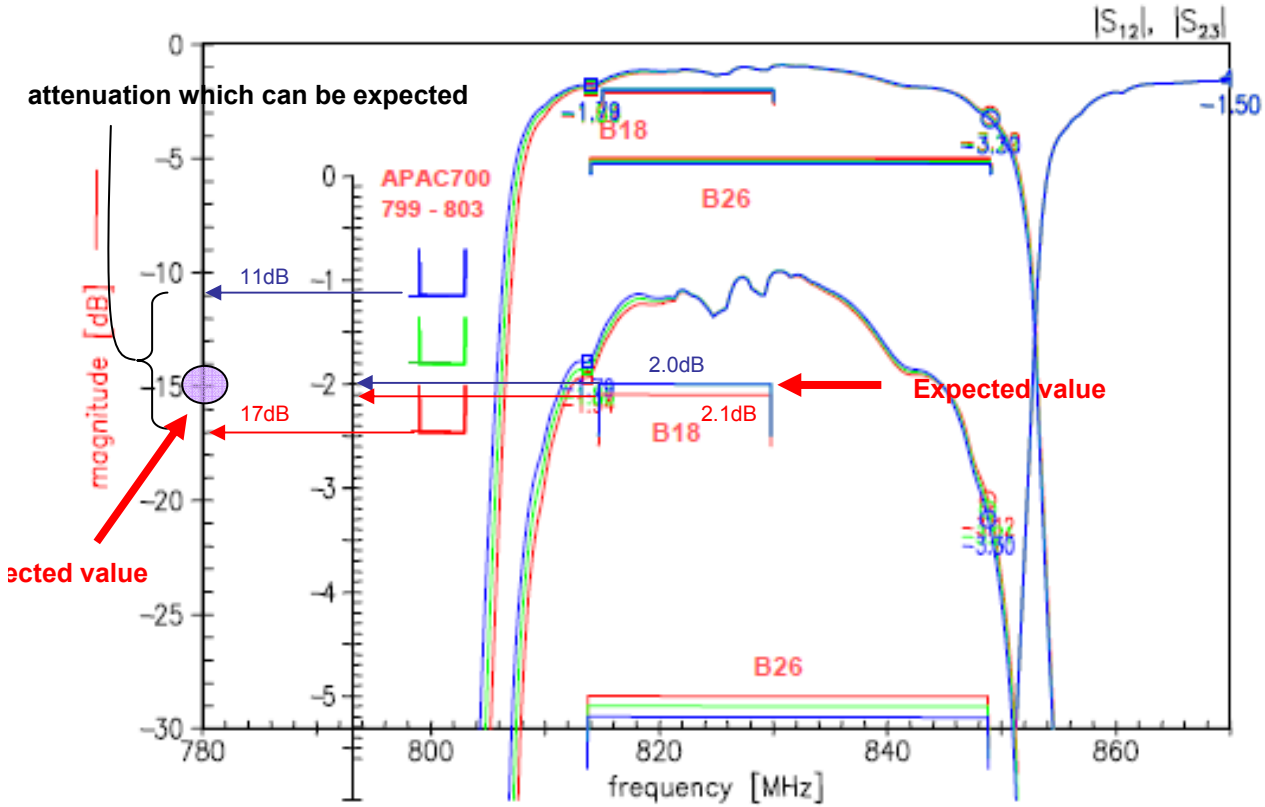
Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	A-MPR (dB)
NS_XX	Table1	26	10	n/a
			15	≤ 3 ※

※The value calculated from the slide 5 is [≤4]. but, we would like to stop by [≤3].
It is realizable by high precision duplexer with few frequency drifts.
The next slide shows the simulation in high precision duplexer of TDK-EPC.

B26 dpx simulation results

Tx filter transfer function
Simulation condition : adjust left side attenuation pole as -0.5, -1.0, -1.5MHz

Red : −0.5MHz @ left skirt
Green : −1.0MHz @ left skirt
Blue : −1.5MHz @ left skirt



Findings

•B18 lower transfer function does not affect so much for other characteristics.
only affect to APC700 DL attenuation.

• B19 insertion loss is not affected by B18 lower side, The loss is specified by right slope corresponding to high isolation at 859-894MHz.

• filter steepness @lower side

10 dB/MHz (-10 ~ -30dB)
7 dB/MHz (-5 ~ -30dB)

© TDK-EPC 2012

High precision duplexer Performance

High precision duplexer may expectable attenuation of about spec.15 dB(11~17dB)@803MHz spec.
If High precision duplexer is used, Sprious emission Requirements-35dBm/MHz is realizable by A-MPR3dB.
Sprious emission Requirements-35dBm/MHz is accepted by NS_09(Band21).

duplexer attenuation@803MHz		A-MPR (Modulator LO and image suppression 25dBc)					
		5dB(1RB)	4dB(1RB)	4dB(1RB)	4dB(1RB)	3dB(1RB)	3dB(1RB)
Spurious emission Requirements	50dBm/MHz	25dB	26dB	27dB	28dB	29dB	30dB
	40dBm/MHz	15dB	16dB	17dB	18dB	19dB	20dB
	35dBm/MHz	10dB	11dB	12dB	13dB	14dB	15dB
	30dBm/MHz	5dB	6dB	7dB	8dB	9dB	10dB
	25dBm/MHz	0dB	1dB	2dB	3dB	4dB	5dB

duplexer attenuation@803MHz		A-MPR (Modulator LO and image suppression 25dBc)					
		2dB(72≥RB)	1dB(72≥RB)	0dB(72≥RB)	0dB(72≥RB)	0dB(72≥RB)	0dB(72≥RB)
Spurious emission Requirements	50dBm/MHz	25dB	26dB	27dB	28dB	29dB	30dB
	40dBm/MHz	15dB	16dB	17dB	18dB	19dB	20dB
	35dBm/MHz	10dB	11dB	12dB	13dB	14dB	15dB
	30dBm/MHz	5dB	6dB	7dB	8dB	9dB	10dB
	25dBm/MHz	0dB	1dB	2dB	3dB	4dB	5dB