Bluetooth performance

Seminary in Tampere

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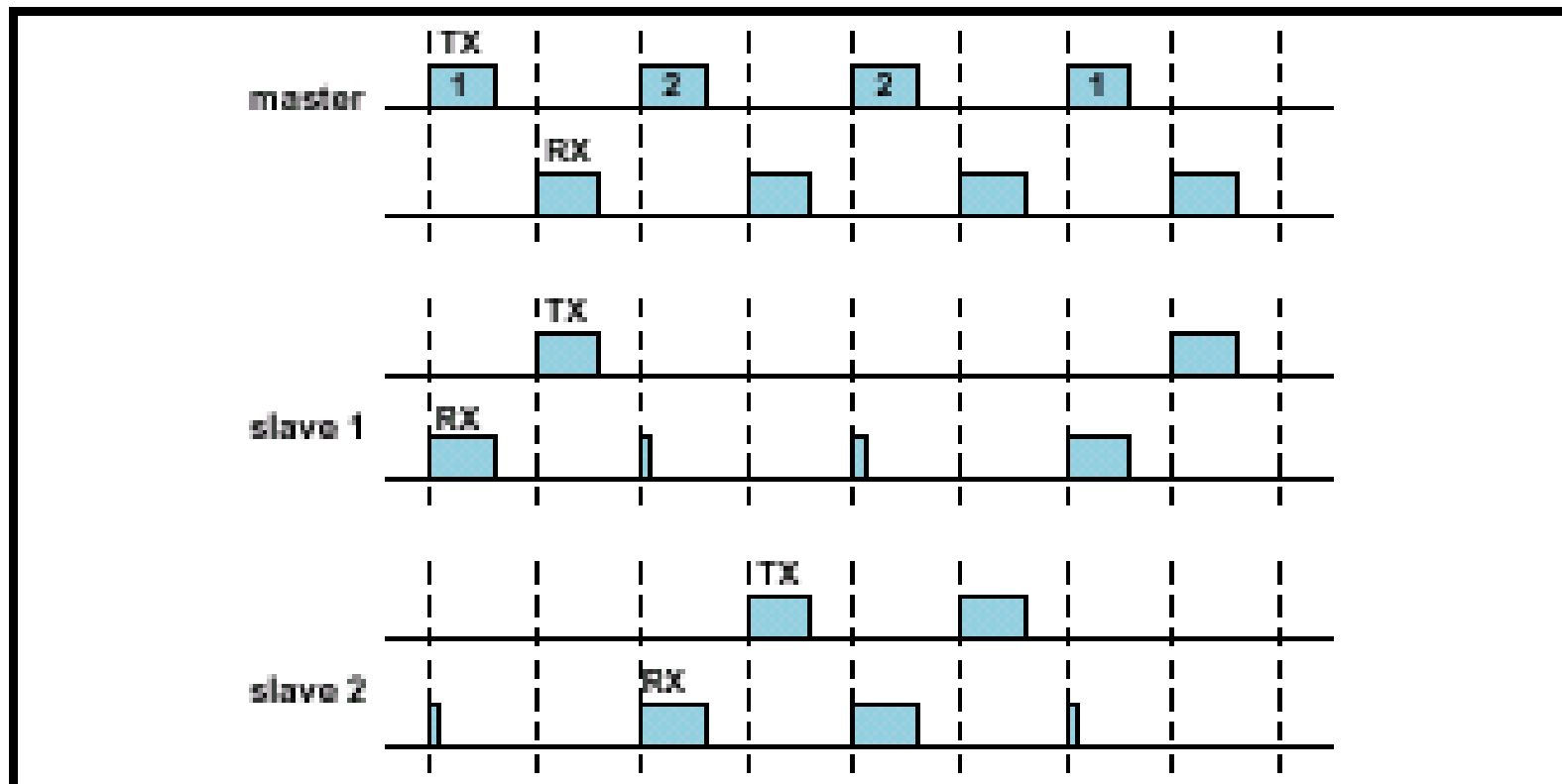
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Bluetooth throughput

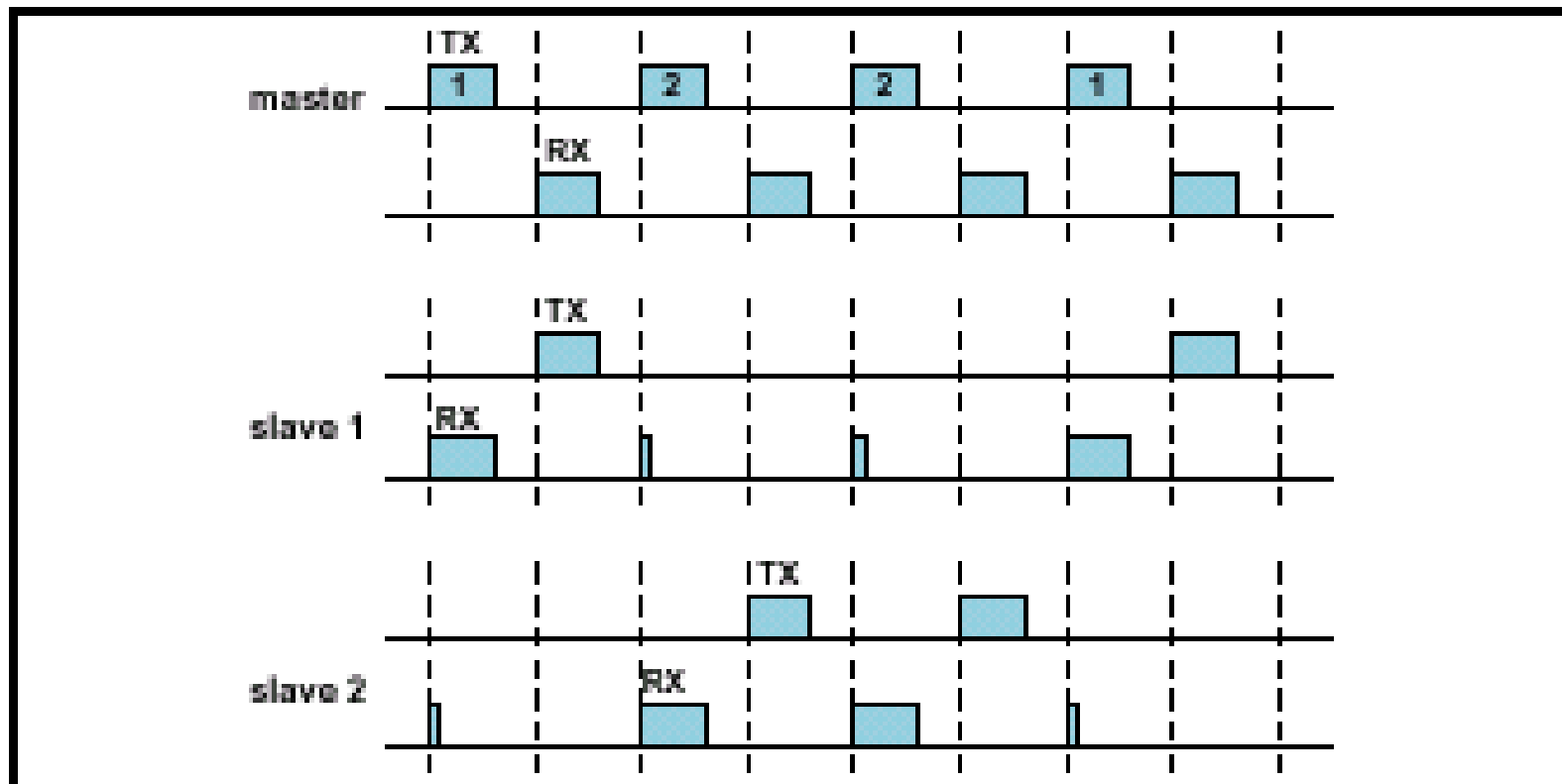| Type	Bytes max. in package	FEC error correction type	Sym-metric kb/s	asym-metric High kb/s	asymmetric Low: High/Low: kb/s
DM1	17	1/3	108	108	DM1/DM1: 108
DH1	27	None	172	172	DH1/DH1: 172
DM3	121	1/3	258	387	DM3/DM1: 54
DH3	183	None	390	585	DH3/DH1: 86
DM5	224	1/3	286	477	DM5/DM1: 36
DH5	339	None	433	723	DH5/DH1: 57

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A two slave system

RFCOMM throughput

Type	Symmetric RFCOMM/On air kb/s	Asymmetric High RFCOMM/On air kb/s	Asymmetric Low. RFCOMM/ On air High/Low: kb/s
DM1	64 / 108	64 / 108	DM1/DM1: 64 / 108
DH1	128 / 172	128 / 172	DH1/DH1: 64 / 172
DM3	42.3/ 258	64 / 387	DM3/DM1: 32 / 54
DH3	42.3 / 390	64 / 585	DH3/DH1: 32 / 36
DM5	25.7 / 286	42 / 477	DM5/DM1: 21 / 36
DH5	25.7 / 433	42 / 723	DH5/DH1: 21 / 57

Bluetooth and 802.11 DSSS

	Bluettooh	802.11 DSSS
Frame length	625 us	1-8 ms
Peak power	1,100 mW	40 mW
Channel width	1 MHz	22 MHz
Channel jump freq.	0.625 ms	fixed channel
data rate	1 Mbit/s	11 Mbit/s

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A two slave system

Reduction in bandwidth

The data is estimated and will depend on:
Antenna type, location of antenna, packet length in
Bluetooth as well in 802.11 etc.

Type of problem	Bluetooth	802.11 11 MHz	802.11 1 MHz
50 Hz noise spikes	4% loss	1-50% loss	10-50% loss
Collision of Bluetooth and 802.11 DSSS	25% loss	100% loss	5% loss
1 mW Bluetooth close to 802.11 DSSS	12.5% loss	50% loss	5% loss

CAN over Bluetooth

- Will need optical isolation if external antenna is used.
- Low throughput when small packets.
- Long delays in standard Bluetooth Stack

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Delay us	added up delay, us		Description of the process causing the delay
0	0		CAN-message received from the CAN-bus.
10	10		Interrupt latency from CAN receive interrupt
40	50		Transfer from CAN to Bluetooth stack.
500	550		CAN-profile (e.g. automotive).
500	1050		RFCOMM
500	1550		L2CAP
400	1950		HCI transfer through USB, RS-232 etc.
3750	5700		Baseband transmit processing.
400	6100		Wait for a slot on the air.
0	6100		0
625	6725		Broadcast on Bluetooth.

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0	6725		0
1250	7975		Baseband receive processing.
400	8375		HCI transfere through USB, RS-232 etc.
500	8875		L2CAP
500	9375		RFCOMM
200	9575		CAN-profile
100	9675		Store in CAN controller for arbitration
125	9800		Arbitration
256	10056		CAN-transfer.
0	10056		CAN package received at the remote module.

RFCOMM throughput

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