



ST60 Antenna modules

We make your RF perform best

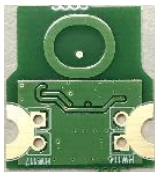
Document version 1.4

Antenna modules described in this page use a connector for I/O

- Antenna modules herein are designed and made by Sensorview with supports from ST
- These modules can be provided as sample qty. and mass-production qty.

F2F : Face to face communication / Vertical radiation from PCB surface

S2S : Side to side communication / Horizontal radiation from PCB edge

Type		F2F Type 1	F2F Type 2	S2S Type 1	S2S Type 2	F2F Dual
Figure						
Frequency range [GHz]		55 ~ 65	55 ~ 65	55 ~ 65	55 ~ 65	55 ~ 65
Peak gain [dBi]		7.4	7.5	4.1	4.9	5.5
Substrate (FR4) (Layer/Thickness mm)		6L 1.2T	6L 1.2T	6L 1.2T	6L 1.2T	6L 1.2T
Feature		Coaxial feed	Aperture coupling	Vivaldi	Quasi yagi	Dual feeding patch
Module size		16x17.5x1.2	16x17.5x1.2	16x22x1.2	16x20x1.2	18.5x14x1.2
Part No.		S60PVS1A	S60PVS2A	S60PHS1A	S60PHS2A	S60PVD1A
Max data rate*		5Gbps**	5Gbps**	5Gbps**	5Gbps**	6.25Gbps
Max. Distance*	Half duplex	25mm	25mm	12mm	10mm	8mm
	Full duplex	X	X	X	X	Not support

*@Total jitter max. 0.37UI

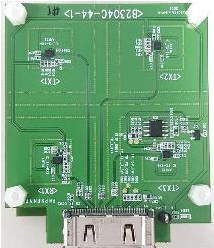
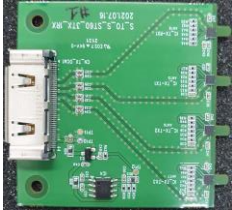
**Measured up to 5Gbps only

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F2F : Face to face communication / Vertical radiation from PCB surface

S2S : Side to side communication / Horizontal radiation from PCB edge

Type	F2F Vertical horn	F2F Slant horn	F2F Multi-link	S2S Multi-link
Figure				
Frequency range [GHz]	55 ~ 65	56 ~ 66	55 ~ 65	55 ~ 65
Peak gain [dBi]	7.8	7.5	7.4	6.5
Substrate (FR4) (Layer/Thickness mm)	4L 1T	4L 1T*	6L 1.2T	6L 1.2T
Feature	Horn	Horn	Coaxial feed	Dipole w/ dielectric guide
Module size	17x18.5x1	19x18.5x1.2	60.5x60.5x1.2	53x50x1.2
Part No.	S60HVD1A	S60HVD2A	S60PVM1C	S60PHM1A
Max data rate*	6.25Gbps	6.25Gbps	3Gbps**	2.83Gbps***
Max. Distance*	Half duplex	20mm	20mm	35mm
	Full duplex	Not support	9mm	15mm
				32mm
				On-going

*@Total jitter max. 0.37UI

**Due to FRC(Flexible RF cable) supporting max 3Gbps

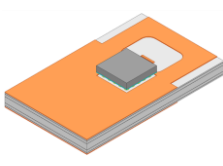
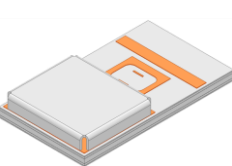
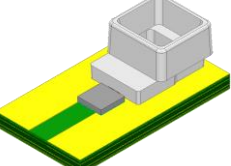
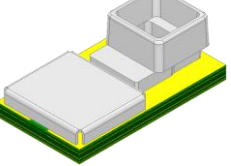
***Measured up to 2.83Gbps only

Antenna modules described in this page are designed to be mounted on your board

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F2F : Face to face communication / Vertical radiation from PCB surface

S2S : Side to side communication / Horizontal radiation from PCB edge

Type	F2F SAM1	F2F SAM2	F2F SAM3	F2F SAM4	F2F SAM5
Figure					
Frequency range [GHz]	55 ~ 65	55 ~ 65	55 ~ 65	56 ~ 66	56 ~ 66
Peak gain [dBi]	6dBi	6dBi	5dBi	8dBi	8dBi
Substrate (FR4) (Layer/Thickness mm)	6L 1.2T	6L 1.2T	6L 1.2T	4L 1.2T (v1) 6L 1.2T (v2)	6L 1.2T
Feature	Single No R/C No shield can	Loopback + R/C	SAM2 + R/C + Shield can	Horn + R/C	Horn + R/C + Shield can
Module size	6.4 x 7.4 (mm)	6.4 x 10 (mm)	8 x 14 (mm)	8 x 14 (mm)	8 x 14 (mm)
Part No.	S60PVS3A	S60PVS4A	S60PVS4B	S60HVS1A	S60HVS1B
Max data rate*	2.83 Gbps 5.66 Gbps	2.83 Gbps 5.66 Gbps	2.83 Gbps 5.66 Gbps	2.83 Gbps 5.66 Gbps	2.83 Gbps 5.66 Gbps
Max. Distance*	20mm 12mm	20mm 12mm	16mm 8mm	22mm 14mm	22mm 14mm
	Verified	~ DEC	~ DEC	TBU	TBU

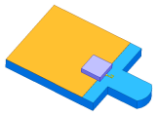
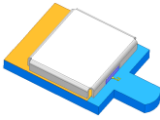
*@Total jitter max. 0.37UI

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F2F : Face to face communication / Vertical radiation from PCB surface

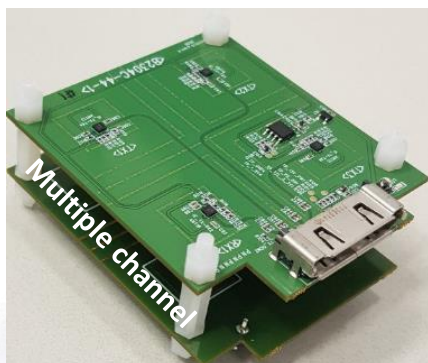
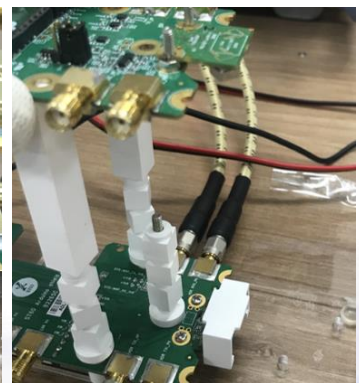
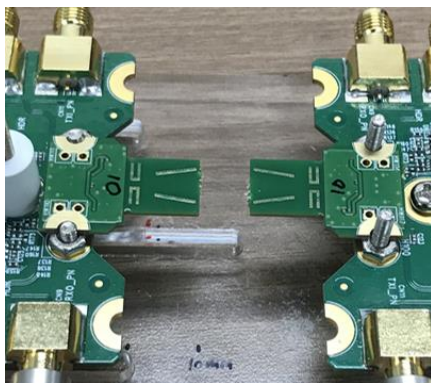
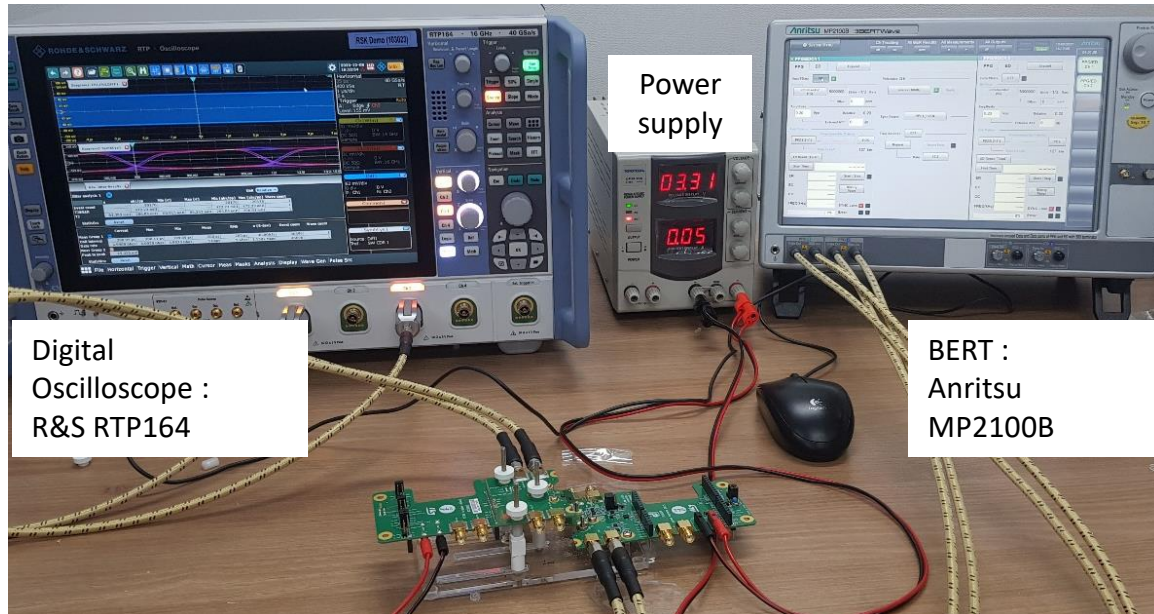
S2S : Side to side communication / Horizontal radiation from PCB edge

Type	S2S SAM1	S2S SAM2			
Figure					
Frequency range [GHz]	55 ~ 65	55 ~ 65			
Peak gain [dBi]	6dBi	6dBi			
Substrate (FR4) (Layer/Thickness mm)	6L 1.2T	6L 1.2T			
Feature	Single + R/C	Single + R/C + Shield can			
Module size	8 x 12 (mm)	8 x 12 (mm)			
Part No.	S60PHS3A	S60PHS3B			
Max data rate*	2.83 Gbps 5.66 Gbps	2.83 Gbps 5.66 Gbps			
Max. Distance*	20mm 12mm	20mm 12mm			
	~ DEC	~ DEC			

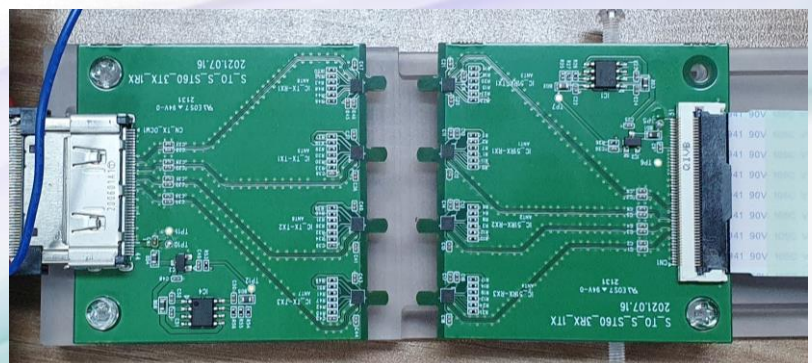
*@Total jitter max. 0.37UI

Bench test condition for ST60 antenna modules

- Pattern generator, 10G bandwidth oscilloscope and power supply
- ST60 antenna modules are verified with evaluation board
- Whole test implemented based on ST60A2 test guide
- Total jitter (UI) measurement



Face-to-Face

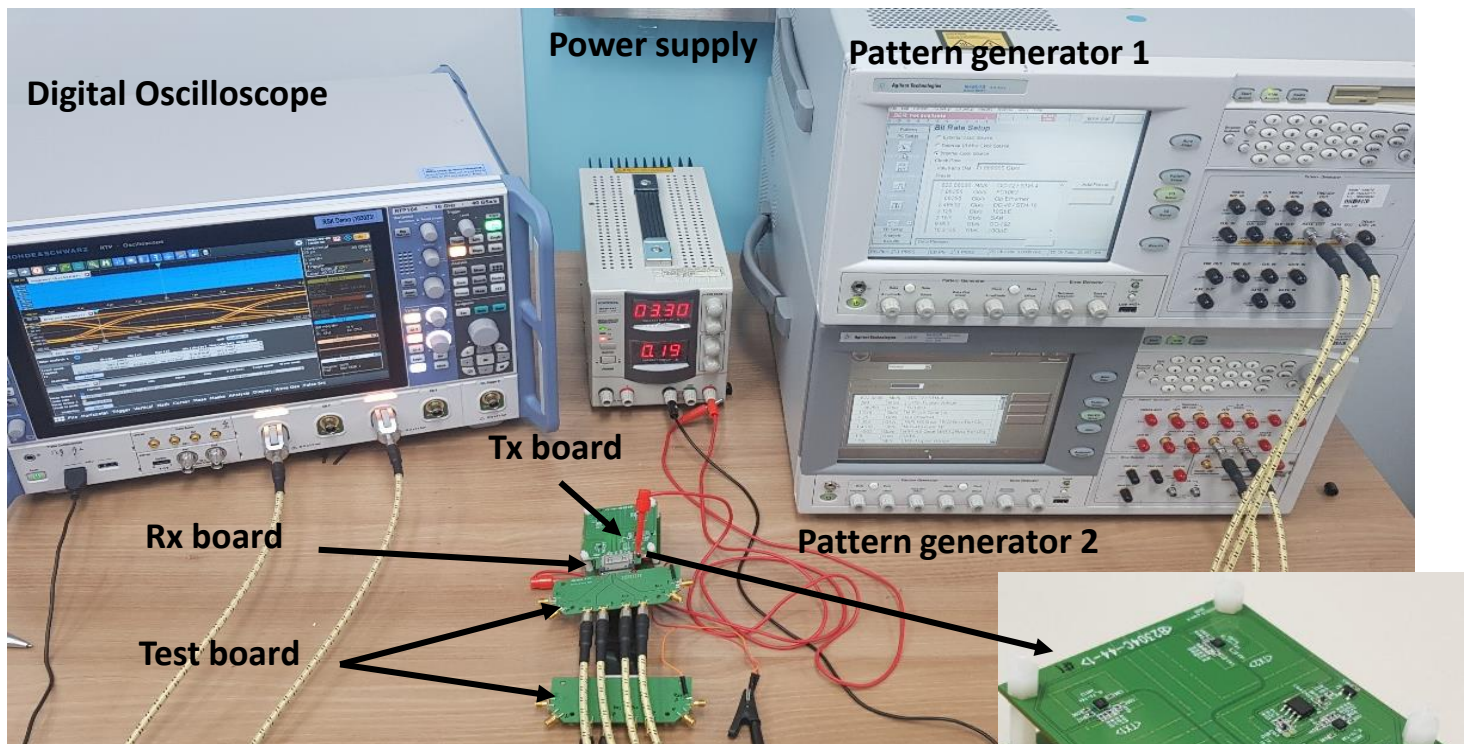


Side-to-Side

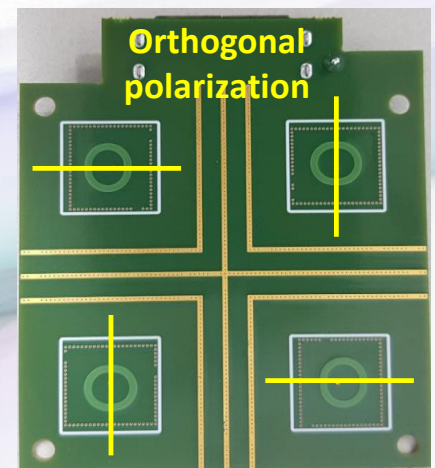
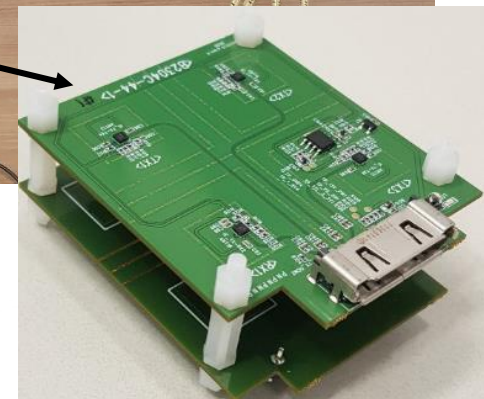
Multi-link antenna module for Face-to-Face

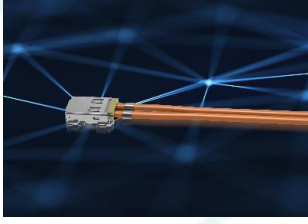
- 4-channel antennas are applied
- Realization of higher isolation by orthogonal polarization and via wall
- Sample available / On progress for Mass-production

Test results



Multiple datarate 3Gbps (Distance 15mm)											
#1						#2					
Single	Path	#1	#2	#3	#4	Single	Path	#1	#2	#3	#4
0.28	#1	x	0.31	0.31	0.31	0.16	#1	x	0.31	0.32	0.32
0.22	#2	x	x	0.27	0.31	0.28	#2	x	x	0.32	0.35
0.17	#3	x	x	x	0.24	0.28	#3	x	x	x	0.21
#3						#4					
Single	Path	#1	#2	#3	#4	Single	Path	#1	#2	#3	#4
0.26	#1	x	0.34	0.32	0.29	0.24	#1	x	0.24	0.24	0.23
0.32	#2	x	x	0.29	0.31	0.19	#2	x	x	0.3	0.34
0.19	#3	x	x	x	0.23	0.26	#3	x	x	x	0.27
#5						#6					
Single	Path	#1	#2	#3	#4	Single	Path	#1	#2	#3	#4
0.27	#1	x	0.36	0.37	0.37	0.24	#1	x	0.27	0.27	0.27
0.28	#2	x	x	0.29	0.42	0.32	#2	x	x	0.3	0.35
0.15	#3	x	x	x	0.22	0.2	#3	x	x	x	0.23





Micro-coaxial Interconnection



Low-loss microwave cable



mmWave Horn Antenna



High shielding chamber



Thank You

Your trusted partner for 5G and beyond-5G

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