



Figure 1. UD Box 5G Dual Channel

Features

- RF: 24-44 GHz; IF: 0.01- 14 GHz
- Built-in LO with 24-44 GHz control range
- Highly precise OCXO reference clock
- Conversion Loss: 13 dB (typical)
- Choices of single or dual channels
- Bi-directional circuit topology
- 10 MHz output and 100 MHz input/output synchronization
- TMYTEK-made accessories, i.e. amplifier, band-pass filter (optional)
- RoHS Compliant

Applications

- 5G NR mmWave (n257-n261)
- Satellite Ka/Q band

Function Block Diagram

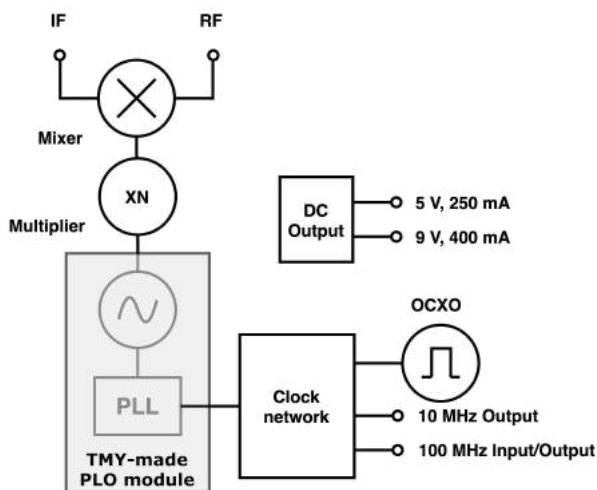


Figure 2. UD Box 5G Single Channel Block Diagram

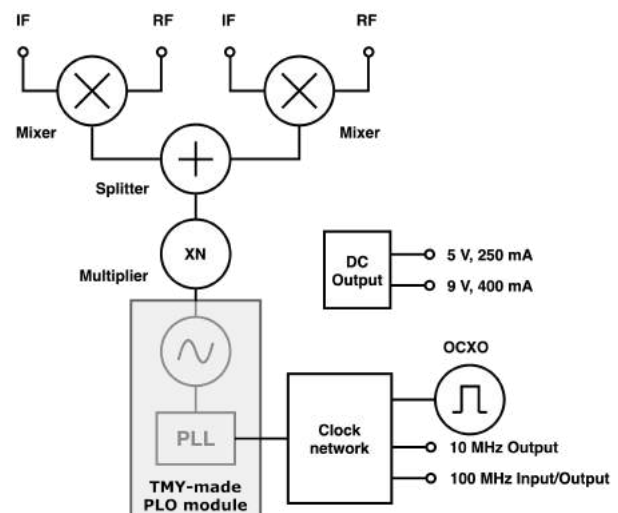


Figure 3. UD Box 5G Dual Channel Block Diagram

RF Specifications

Parameter	Conditions	Unit	Min.	Typ.	Max.
RF Frequency	---	GHz	24	---	44
IF Frequency	---	GHz	0.01	---	14
LO Frequency	---	GHz	24	---	44
LO Frequency Resolution	---	MHz	---	0.01	---
Reference Clock Stability	-30 ~ +70 degree	ppb	-50	---	50
Conversion Loss	Full band	dB	---	13	---
IF to RF Isolation	With filter / No filter	dB	70* ¹ / 12	---	---
RF to IF Isolation	With filter / No filter	dB	46* ¹ / 18	---	---
Lo to RF Leakage	Full band	dBm	-22	---	---
Lo to IF Leakage	Full band	dBm	-22	---	---
Tx Output P1dB	RF = 28/39 GHz Tested at RF1 and RF2 port	dBm	0	---	---
Rx Input P1dB	RF = 28/39 GHz Tested at RF1 and RF2 port	dBm	10	---	---
Rx Noise Figure	28/39 GHz	dB	---	13.8	---
RF Return Loss	Full band	dB	6	10	---
IF Return Loss	Full band	dB	8	10	---
Warm Up Time	---	minutes	---	30* ²	---

*¹ With optional n257 filter

*² Suggested warm up time

Clock Output Characteristics

Parameter	Conditions	Unit	Min.	Typ.	Max.
100 MHz Output Power	---	dBm	-3	---	---
100 MHz Phase Noise	@1 kHz carrier offset	dBc/Hz	---	-120	---
	@10 kHz carrier offset	dBc/Hz	---	-125	---
	@100 kHz carrier offset	dBc/Hz	---	-130	---
	@1 MHz carrier offset	dBc/Hz	---	-135	---
10 MHz Output Power	---	dBm	-5	---	---
10 MHz Phase Noise	@1 kHz carrier offset	dBc/Hz	---	-120	---
	@10 kHz carrier offset	dBc/Hz	---	-125	---
	@100 kHz carrier offset	dBc/Hz	---	-128	---
	@1 MHz carrier offset	dBc/Hz	---	-130	---

AC/DC Characteristics

Parameter	Conditions	Unit	Min.	Typ.	Max.
DC Power Consumption	---	W	---	20* ¹	24* ²
DC Input	---	V	---	15	---
Accessories DC Power Supply	Single / Dual Channel	V	---	5/9	---
		mA	---	250/400	---

*¹ Without using 5V and 9V

*² With 5V or 9V fully loading

Software Specifications

Parameter	Conditions	Unit	Min.	Typ.	Max.
Switch time	---	ms	---	100	---
PC OS	Windows 7/8/10				
API Support Language	C#, C/C++, Python, LabView				
Control Interface	Ethernet				

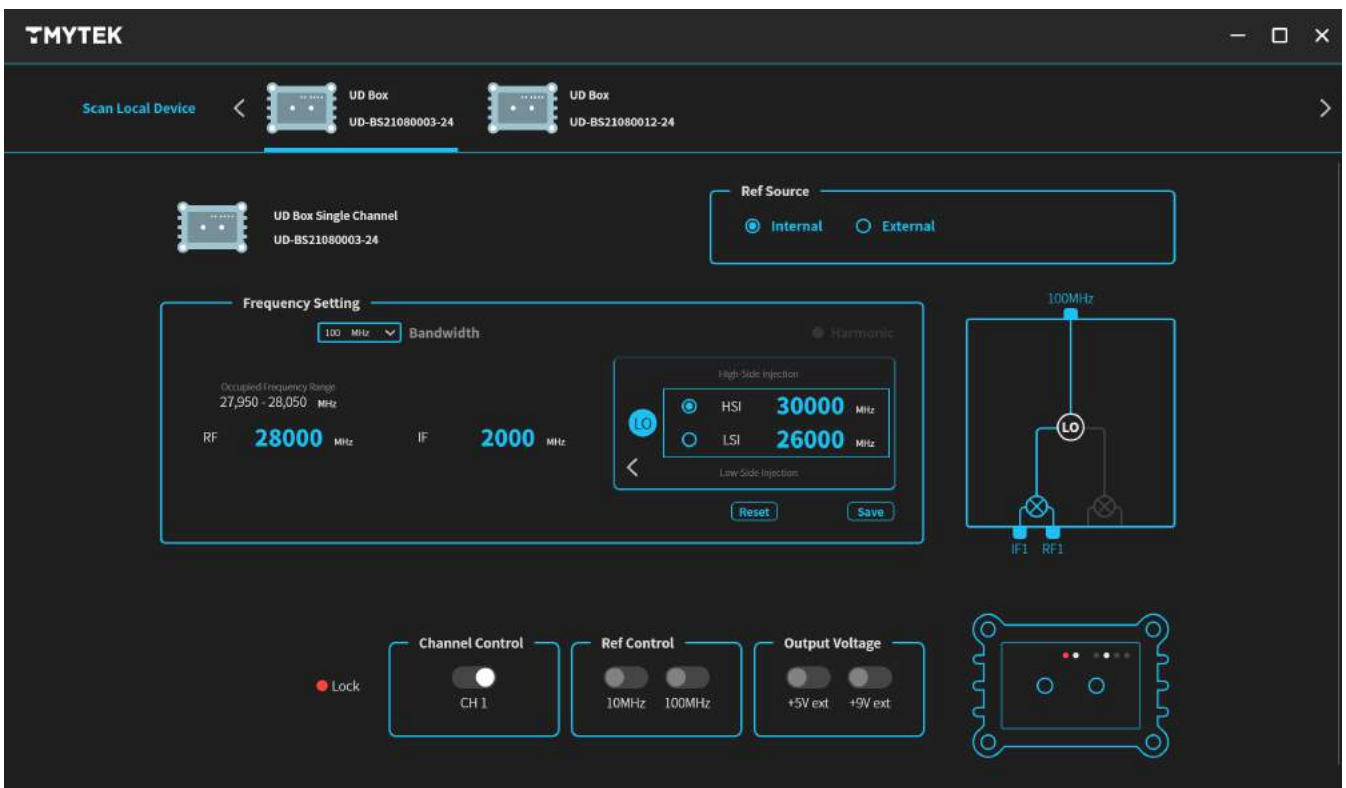


Figure 4. Controlling UD Box 5G using TMXLAB Kit

Connector Specifications

Parameter	Conditions	Location	Type and Function
RF	Single Channel	Front Panel	Single 2.4 mm connector
	Dual Channel	Front Panel	Two 2.4 mm connectors
IF	Single Channel	Front Panel	Single 2.92 mm connector
	Dual Channel	Front Panel	Two 2.92 mm connectors
Power DC IN		Rear Panel	Input DC power
LAN		Rear Panel	Ethernet Port LO frequency control
ON/OFF Button		Rear Panel	Power ON/OFF switch
Reference Clock Port	10MHz	Rear Panel	BNC connector
	100 MHz	Rear Panel	SMA connector
DC Power Output Port		Rear Panel	Output 5V and 9V DC power

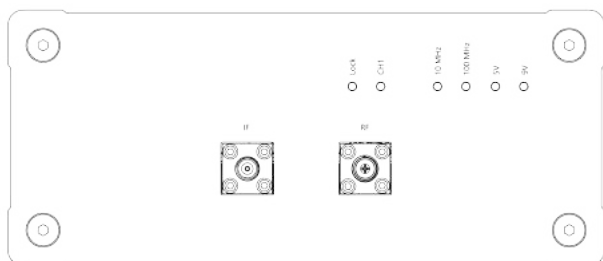


Figure 5. UD Box 5G Front Panel – Single Channel

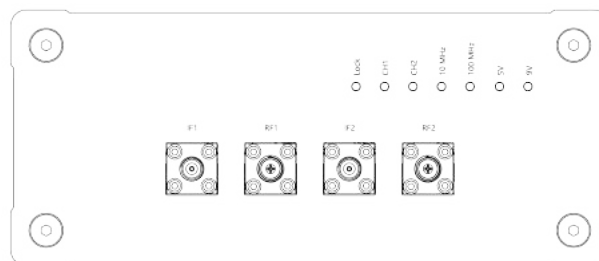


Figure 6. UD Box 5G Front Panel – Dual Channel

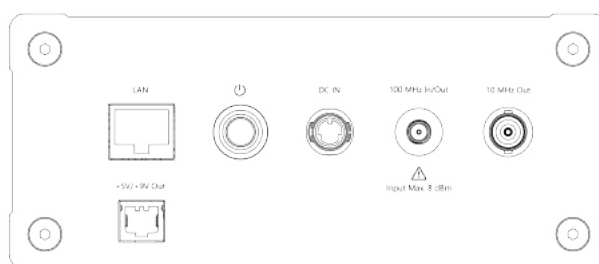


Figure 7. UD Box 5G Rear Panel

Package Details

TMYTEK’s connectorized packaging:

Parameter	Condition	Unit	Main body	Connector included
Dimension	Length	mm	120.6	142.8
	Width	mm	152	152
	Height	mm	65	65
Weight	unit	g	---	900
Material	Aluminum	---	---	---

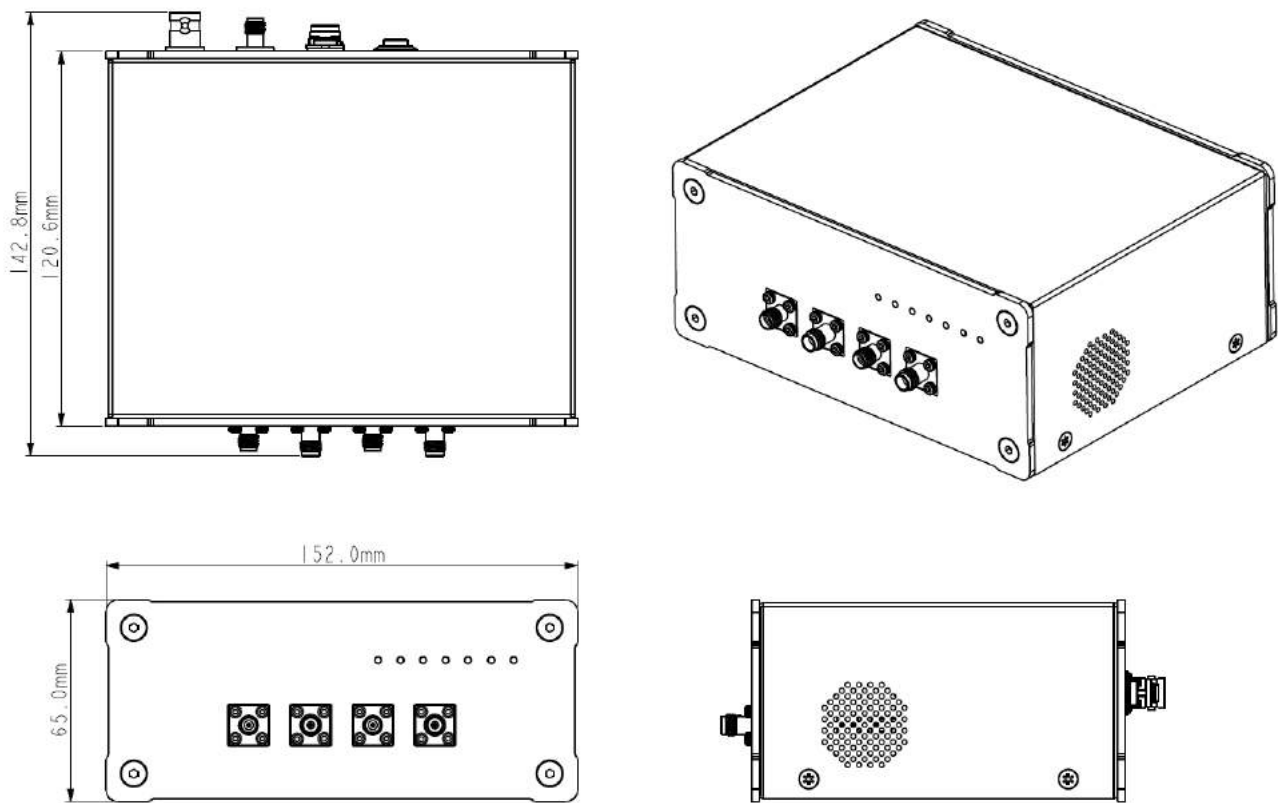


Figure 8. UD Box 5G Mechanical Drawing

Accessories Specifications

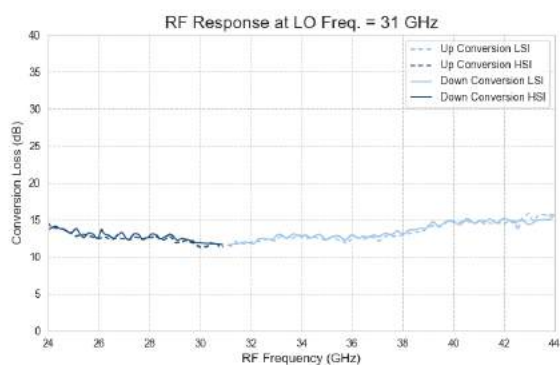
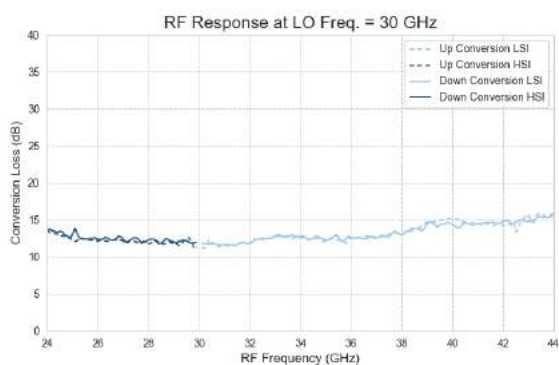
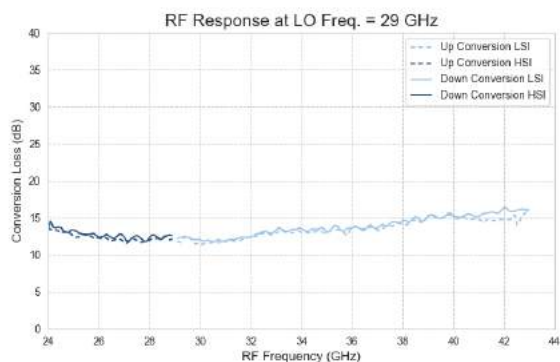
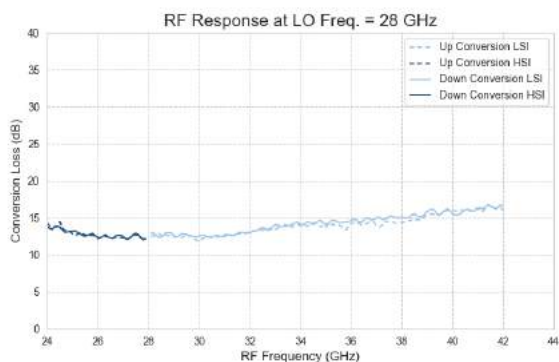
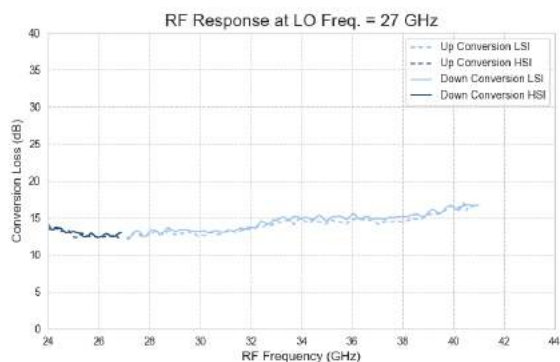
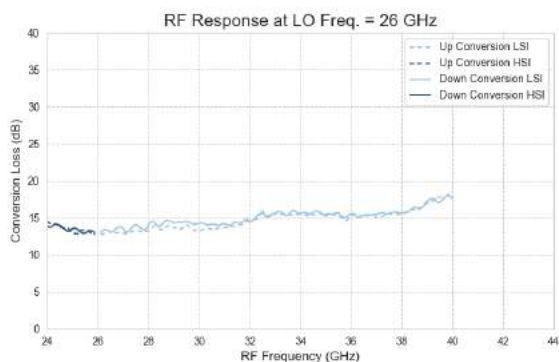
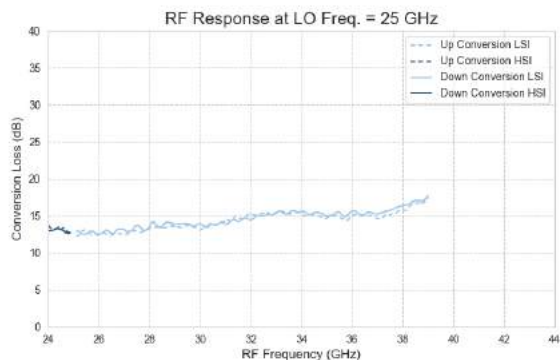
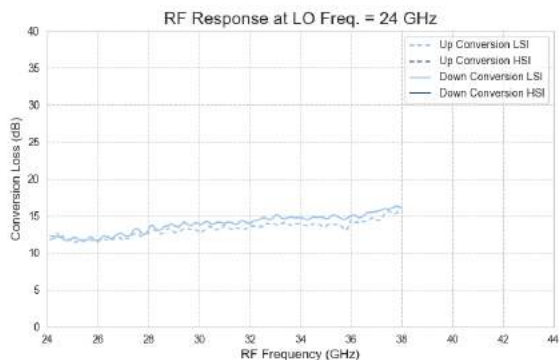
The following accessories are developed by TMYTEK for use with UD Box under different applications (with emphasis on the 5G application). Please consult us for detailed accessories' specifications.

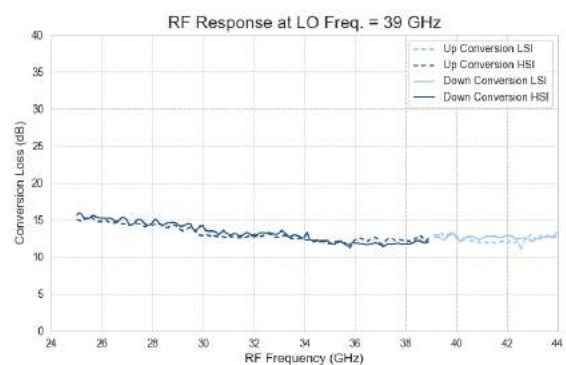
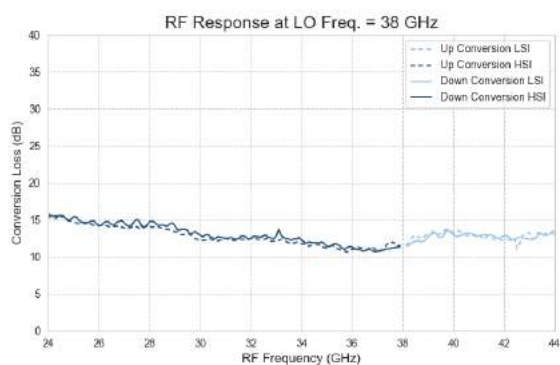
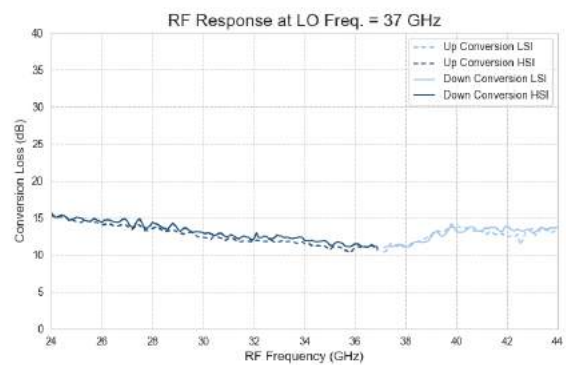
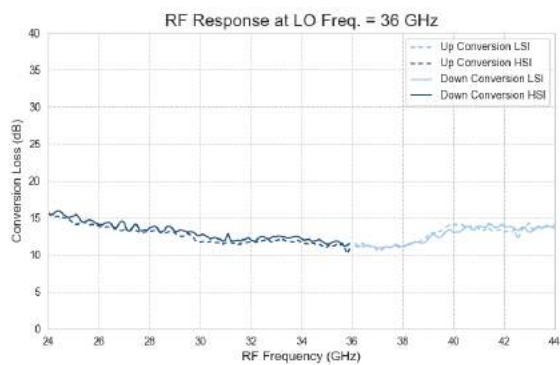
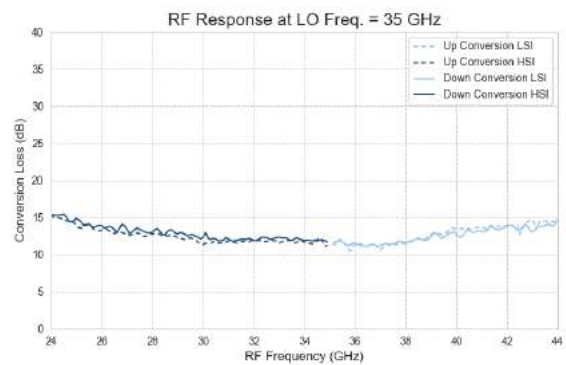
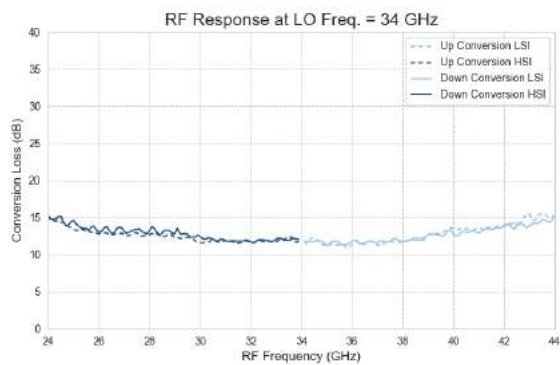
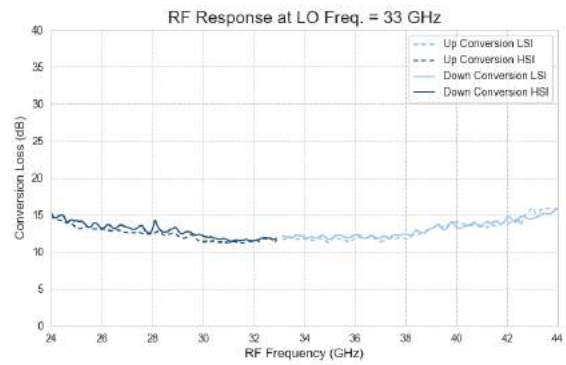
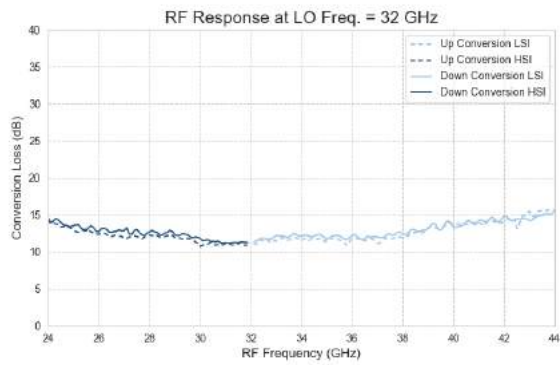
Item Type	5G NR Band	Units	Operating Frequency
RF Band-Pass Filter	n257	GHz	26.5 - 29.5
	n260	GHz	37 - 40
	n261	GHz	27.5 - 28.5
Broadband Amplifier	---	GHz	20 - 40

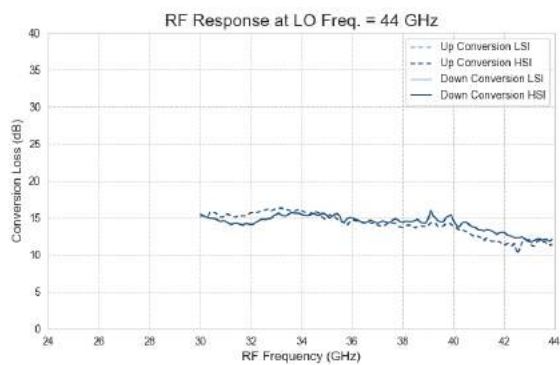
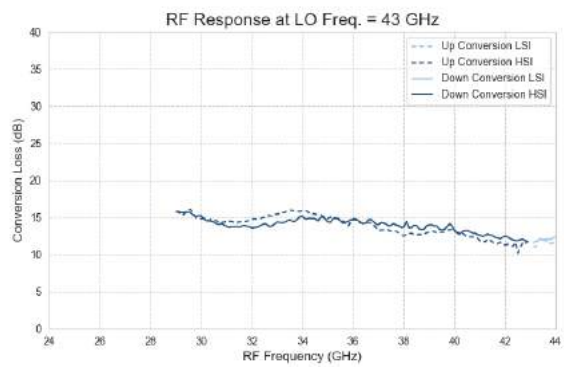
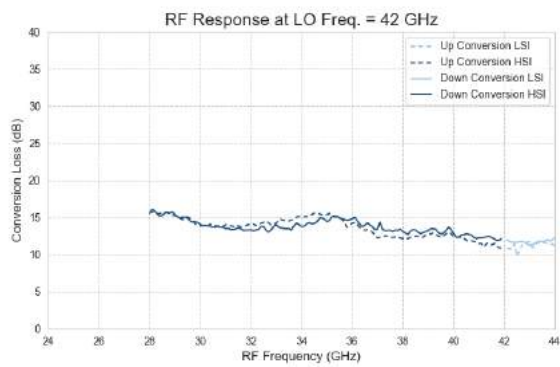
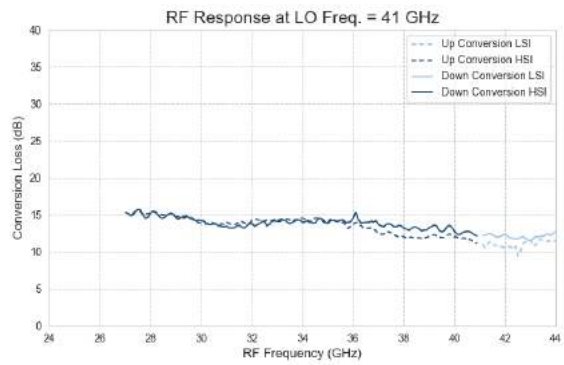
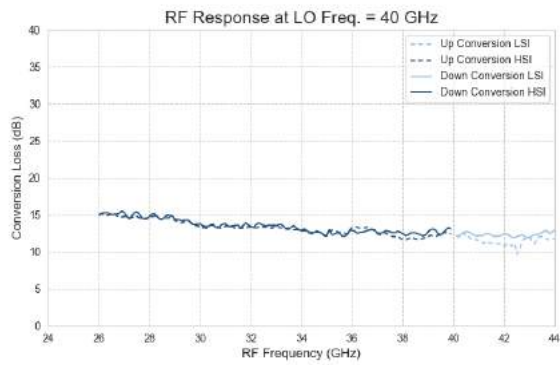
Typical Performance

Conversion Loss

Both high-side injection and low-side injection.





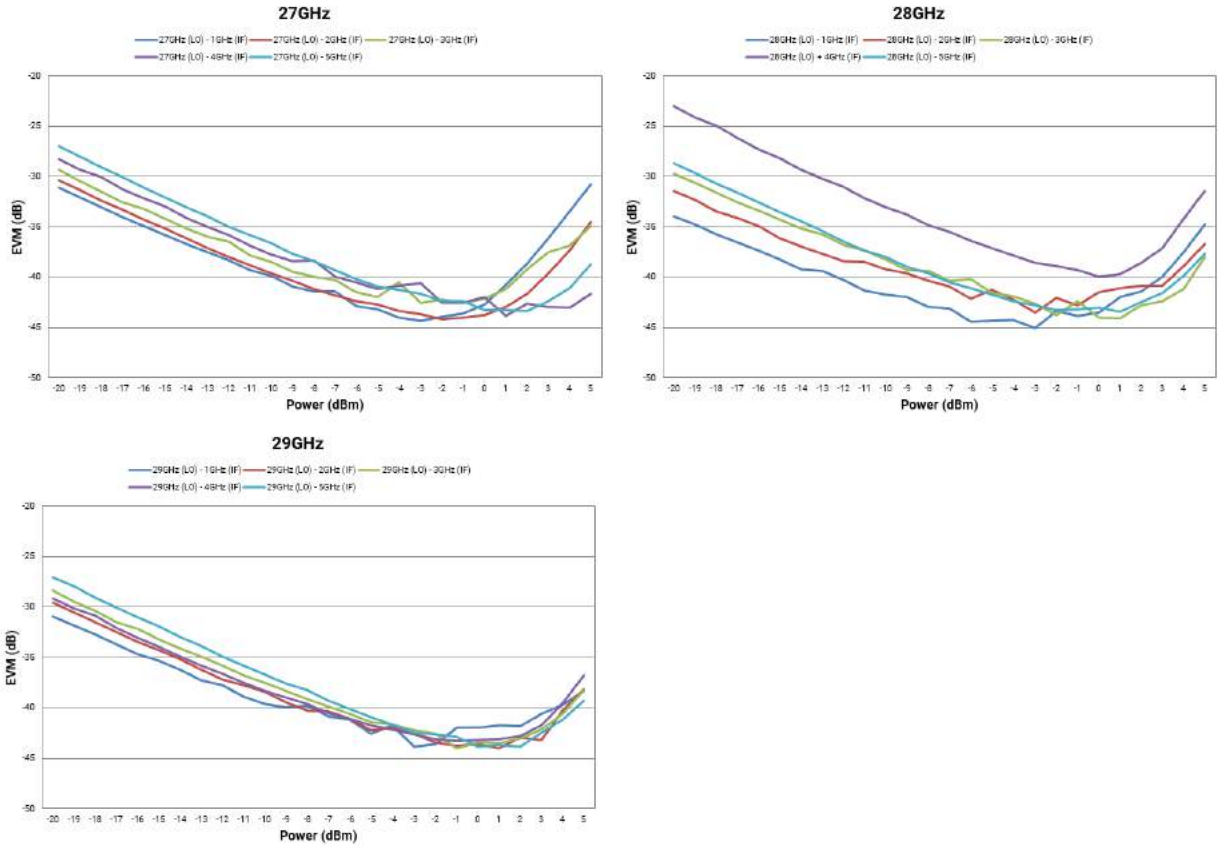


EVM

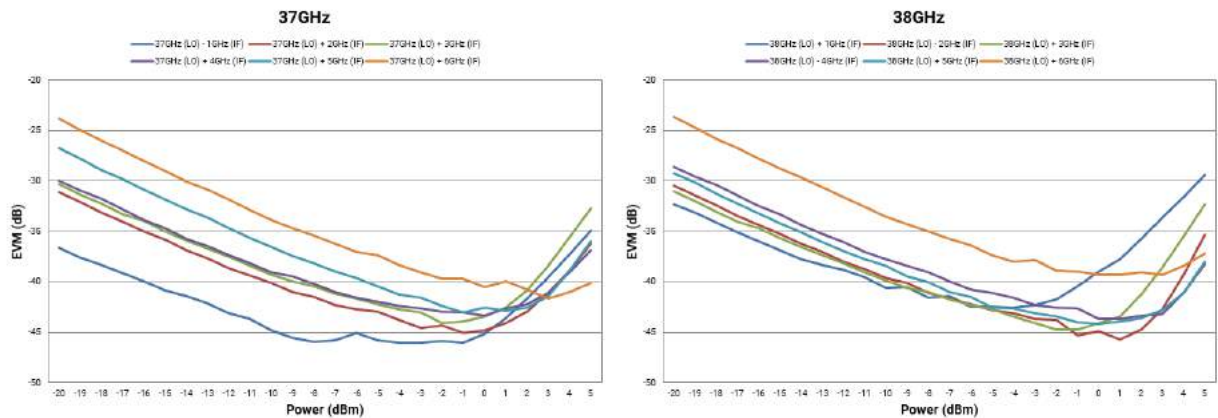
5G NR FR2 modulation signals up- and down loop-back conversion.

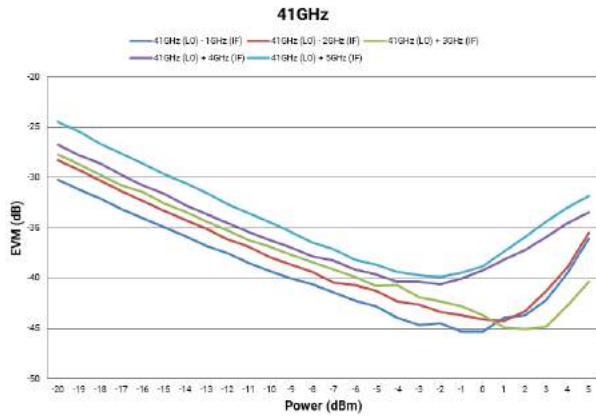
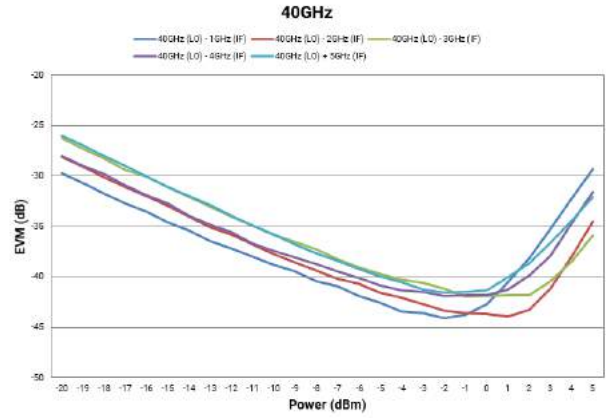
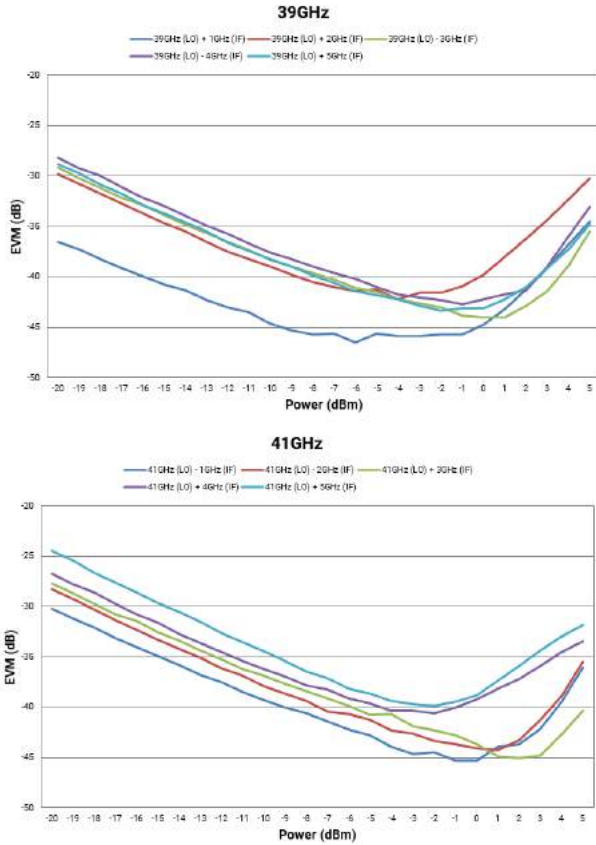
Measurement setup: uplink; channel bandwidth 200 MHz; subcarrier spacing 120 kHz; modulation type 64-QAM; contact us for more testing detail.

Band n257

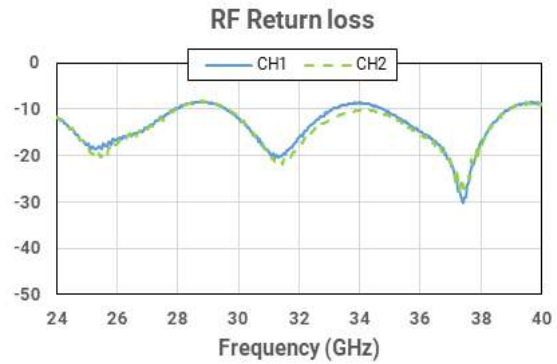
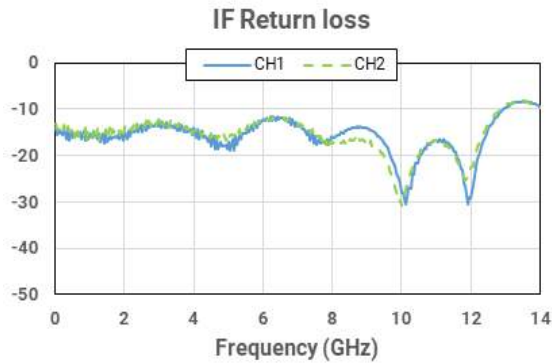


Band n260





Return Loss (dual channel)



Isolation (dual channel)

