



DATASHEET
FEUILLE DE SPECIFICATIONS

Page : 1 / 13

P/N: MCS-TRX-11.6G-13.7G-45dB-46dBm-0
Designation: 40W, 45dB, 11.6-13.7GHz Transceiver Module



11.6-13.7GHz 40W Transceiver Module

Ed.	Written by	Date	Observation	Approved by
0	A. Billy	20/05/2022	Creation	R.Penicault



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Page : 2 / 13

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Electrical features <i>Caractéristiques électriques</i>		All parameters specified @ baseplate temperature of +25°C and Vsupply=+28Vdc, unless otherwise specified	
Electrical parameters <i>Paramètres électriques</i>	Measuring conditions <i>Conditions de mesure</i>	MCS specifications <i>Spécifications MCS</i>	Units <i>Unités</i>
Bandwidth <i>Bande de fréquence</i>		11.6 – 13.7	GHz
TX Output power <i>Puissance de sortie TX</i>	In CW Mode, @Psat High power mode In [11.6-13.0GHz] In [13.0-13.7GHz]	44.5 min. 45.0 typ. 43.5 min. 44.5 typ.	dBm
	Low power mode @ Pin=+3dBm	34 typ.	dBm
Input power <i>Puissance d'entrée</i>	High power mode: For saturated power	-2 min. to +5 max.	dBm
	Low power or RF OFF: Absolute maximum level	+20 max.	dBm
Gain <i>Gain</i>	High power mode @ small signal	50 min. 60 max. <i>(includes gain compensation vs temperature)</i>	dB
	Low power mode @ small signal	32 min. 38 max.	dB
In band Gain ripple <i>Ondulation de gain</i>	Small signal @ Psat	+/- 3 max. +/- 1.5 max.	dB
Insertion loss in RX mode <i>Perte d'insertion en mode RX</i>	RF_IN/OUT to RX_OUT	2.5 typ. 2.8 max.	dB
TX-RX Isolation <i>Isolation TX-RX</i>		15 min. 20 typ.	dBc
Impedance <i>Impedance</i>		50	Ohms
Input / Output VSWR <i>TOS d'entrée / sortie</i>	TX_IN RF_IN/OUT RX_OUT	1.5:1 typ. 2:1 max. 1.5:1 typ. 2:1 max. 1.5:1 typ. 2:1 max.	

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Load mismatch <i>Résistance au TOS de charge</i>		Infinite (protected by the 2 circulators)	
Noise figure <i>Facteur de bruit</i>	High power mode	12 typ. 15 max.	dB
Time for TX on/off (blinking) <i>Vitesse d'extinction RF</i>	10-90% RF rise / fall time "RF_On/Off"	1 typ. 2 max.	µs
Power density in blanking mode <i>Densité spectrale de puissance</i>	In 2MHz BW	-120 max. (RF switch + gate bias and drain cutoff of power MMICs)	dBm
Harmonics <i>Harmoniques</i>	High power mode @ Psat H2	-30 typ. -25 max.	dBc
Spurious <i>Parasites</i>	High power mode @ Psat	-65 max.	dBc
	Low power mode @ 0dBm Input	-55 max.	dBc
AM/PM conversion <i>Conversion AM/PM</i>	@ Pout=45dBm	3 max.	°/dB
Intermodulation OIP3 <i>Intermodulation OIP3</i>	2 carriers, Δ=1MHz, @ Pout=40dBm each	50 typ.	dBm
Operating class <i>Classe de fonctionnement</i>		AB on GaN power devices	
Supply voltage <i>Tension d'alimentation</i>	"Vdc"	+24 min. +28 typ. +32 max.	Vdc
Current consumption <i>Consommation de courant</i>	High power mode : @Psat	11 typ. 13 max	A
	@ small signal	5 typ.	
	Low power mode	3 typ.	
	Blanking mode	0.3 max.	

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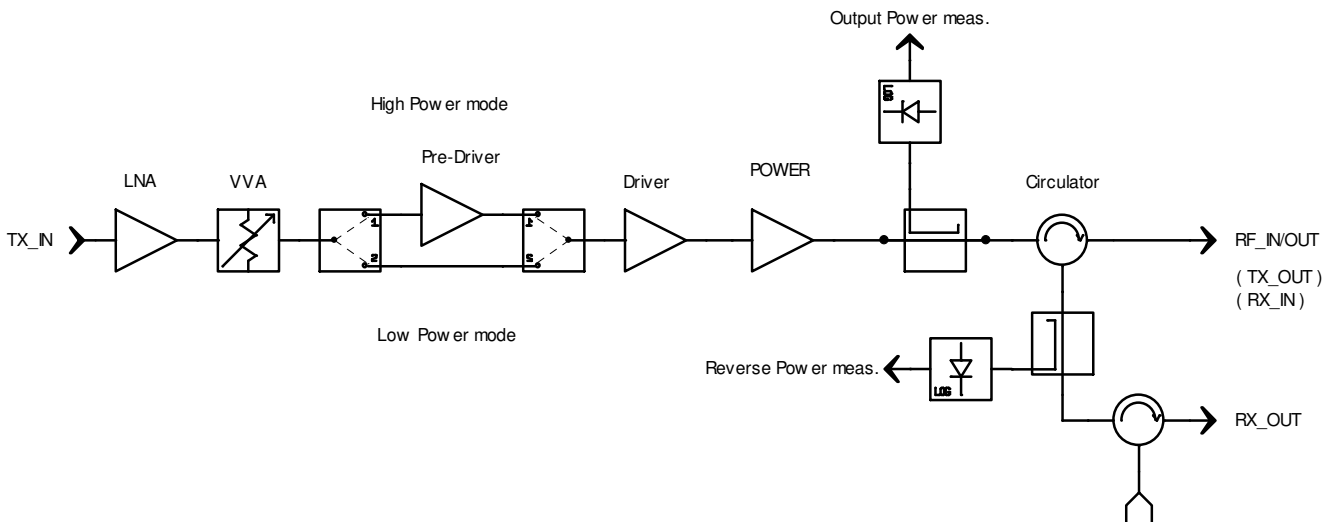


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Temperature voltage monitoring <i>Tension de contrôle de température</i>	"Temperature" Analog signal: positive slope & value	15 typ. 1.5V typ. @ +25°C	mV/°C
Output Power voltage monitoring <i>Tension de contrôle de puissance</i>	"Output power level" Analog signal: positive slope & value	80 typ. 2.5V typ. @ 45dBm (with RF_In/Out Loaded)	mV/dB
Reverse power voltage monitoring <i>Tension de contrôle de puissance réfléchie</i>	"Reverse power level" Analog signal: positive slope & value	80 typ. 1.5V typ. @ 45dBm (with RF_In/Out OPEN & RX_Out loaded)	mV/dB

Bloc diagram



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Page : 5 / 13

Control, Alarms and Monitoring (Sub-D connector)

Contrôles, Alarmes et Informations

Parameters <i>Paramètres</i>	Description <i>Description</i>	Spécifications <i>Specifications</i>
Shutdown ON/OFF command <i>Commande Marche/Arrêt</i>	RS422 Input "DC ON/OFF" (Shutdown of internal DC supplies)	(-P) Low = OFF (Shutdown) (-P) High or Not connected = ON
Noise quieting ; RF On/Off control <i>Commande d'extinction RF</i>	RS422 Input "RF ON/OFF"	(-P) Low = RF Output OFF (-P) High or Not Connected = RF Output ON
Power mode control <i>Sélection mode de puissance</i>	RS422 Input "High/Low Power"	(-P) Low = Low Power Mode (-P) High or Not Connected = High Power Mode
Temperature analog signal <i>Lecture temperature</i>	Analog output Signal "Temperature"	Range: 0 to +3Vdc Refer to Electrical features
Over temperature alarm <i>Alarme température</i>	RS422 Output "Over temperature alarm"	(-P) Low = No default (-P) High = Over temperature alarm
Output Power analog signal <i>Lecture puissance de sortie</i>	Analog output Signal "Output power level"	Range: 0 to +3Vdc Refer to Electrical features
Reverse Power analog signal <i>Lecture puissance réfléchie</i>	Analog output Signal "Reverse power level"	Range: 0 to +3Vdc Refer to Electrical features

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DATASHEET FEUILLE DE SPECIFICATIONS

Page : 6 / 13

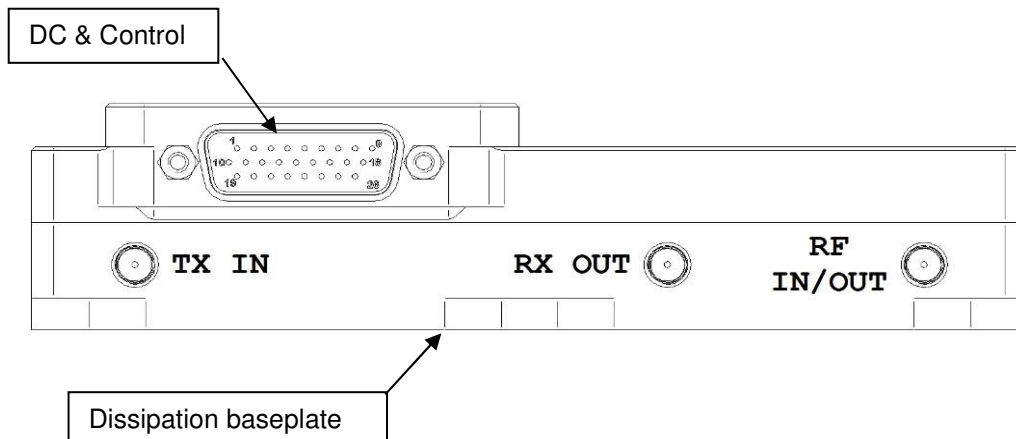
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Mechanical features

Caractéristiques mécaniques

Parameters <i>Paramètres</i>	Measuring conditions <i>Conditions de mesure</i>	MCS specifications <i>Spécifications MCS</i>	Units <i>Unités</i>
Length x width x height <i>Longueur x largeur x Hauteur</i>	L x W x H ISO 2768-mH	135 x 96 x 32 max. (without connectors) (see drawings below)	mm
Cooling <i>Dissipation</i>	Apply thermal interface	Conduction cooled: user must maintain base plate temperature below +85°C (Self-protection turns ON at +90°C)	-
RF Connectors <i>Connectique RF</i>	Input / Output	SMA female	-
Supply & Control connector <i>Connecteur de contrôle et alim.</i>	"DC & Control"	Sub-D High density male 26pts (Conec 15-007653E)	-
Weight <i>Masse</i>		500 typ.	g
Housing <i>Châssis</i>		Aluminium coated with Surtec 650	
Sealing <i>Etanchéité</i>		Hermetic sealing with conductive silicone gasket	

Mechanical interfaces:



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DATASHEET
FEUILLE DE SPECIFICATIONS

Page : 7 / 13

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"DC & Control" pinning:

Pin No.	Signal Name	Comment
1	RF_On/Off -P	RS422 Input
2	RF_On/Off -N	
3	High/Low Power -P	RS422 Input
4	High/Low Power -N	
5	DC_On/Off -P	RS422 Input
6	DC_On/Off -N	
7 to 9	GND	Common ground (Supply, Analog)
10	Over temperature alarm -P	RS422 Output
11	Over temperature alarm -N	
12	GND	Common ground (Supply, Analog)
13	Output power level	Analog output
14	Temperature	Analog output
15 to 18	"Vdc"	Supply voltage
19	Reverse power level	Analog output
20	N.C	
21 to 23	GND	Common ground (Supply, Analog)
24 to 26	"Vdc"	Supply voltage

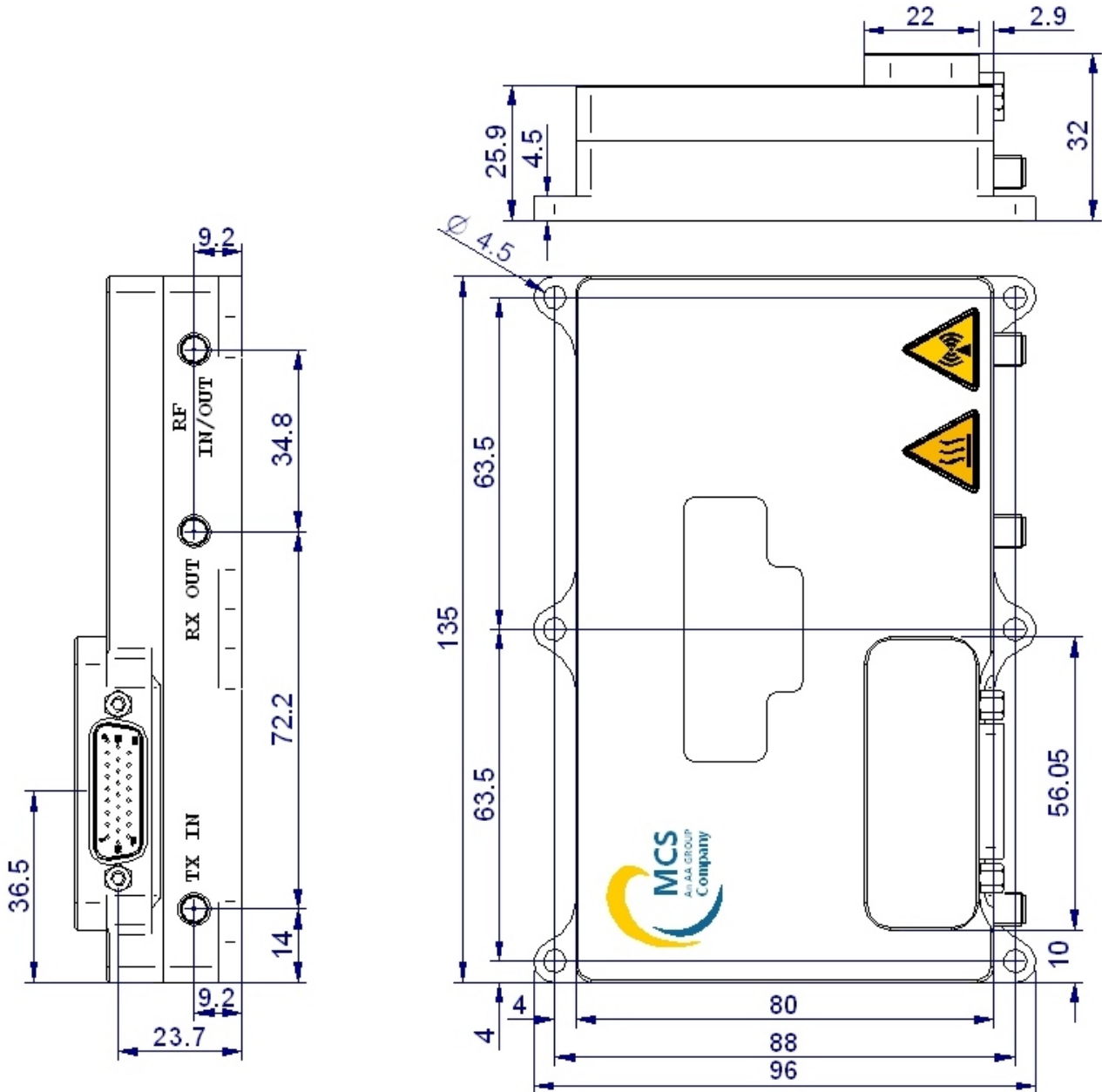
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Mechanical drawing:



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Page : 9 / 13

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Standard environmental conditions

Conditions environnementales standard

Parameters <i>Paramètres</i>	Conditions <i>Conditions</i>	MCS specifications <i>Spécifications MCS</i>	Units <i>Unités</i>
Cold temperature operation <i>Température de service à froid</i>	Baseplate temperature	-40 min.	°C
Cold temperature storage <i>Température de stockage à froid</i>	Baseplate temperature	-55 min.	°C
Dry heat temperature operation <i>Température de service à chaud</i>	Baseplate temperature	+85 max. <i>(includes automatic shutdown for thermal protection when baseplate temp exceeds +90°C)</i>	°C
Dry heat temperature storage <i>Température de stockage à chaud</i>	Baseplate temperature	+85 max.	°C

Specific environmental conditions

Conditions environnementales spécifiques

(guaranteed by design, not qualified by test)

Parameters <i>Paramètres</i>	Conditions <i>Conditions</i>	MCS specifications <i>Spécifications MCS</i>	Units <i>Unités</i>
Altitude <i>Altitude</i>	Operating Storage	35 000 max. 40 000 max.	ft
Sand and dust <i>Sable et poussières</i>		As per MIL-STD-810G, method 510.5 procedure I & II	
Humidity <i>Humidité</i>	97% @ +26°C	As per MIL-STD-810G, method 507.5 procedure II	
Salt fog <i>Brouillard salin</i>		As per MIL-STD-810G, method 509.6 for solution 6.5-7.2pH at 35°C	-
Fungus <i>Moisissures</i>		Coating compliant	-
Explosive atmosphere <i>Atmosphère explosive</i>		Sealing compliant No ignition caused by the amplifier.	

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Page : 10 / 13

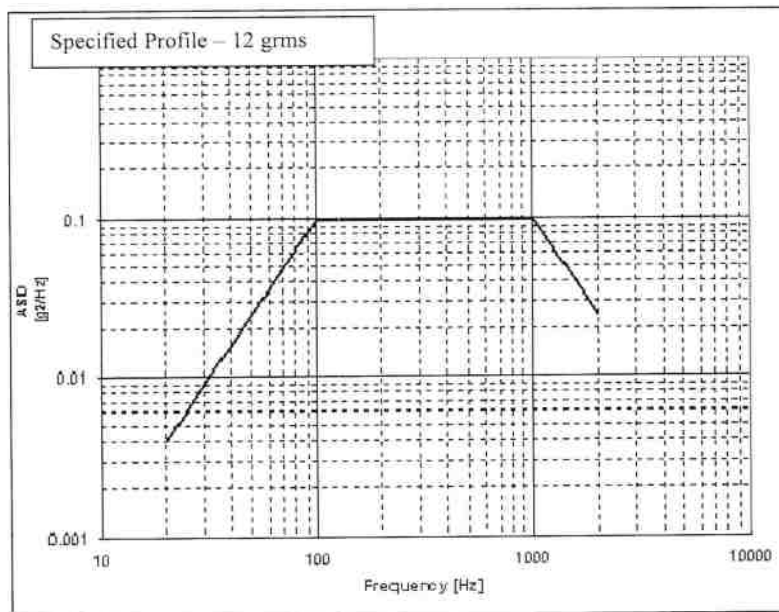
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Parameters <i>Paramètres</i>	Conditions <i>Conditions</i>	MCS specifications <i>Spécifications MCS</i>	Units <i>Unités</i>
Functional random vibrations <i>Vibrations aléatoires operation</i>	shape: see graph below	As per MIL-STD-810G method 514.6 procedure IV	
Functional shocks <i>Chocs fonctionnels</i>	30g half sine shock pulse during 11ms	As per MIL-STD-810G method 516.6 procedure I	
Functional acceleration <i>Accélération fonctionnelle</i>		Forward 12g Back 4g Up 4g Down 2g Lateral 3g	



Vibration envelope

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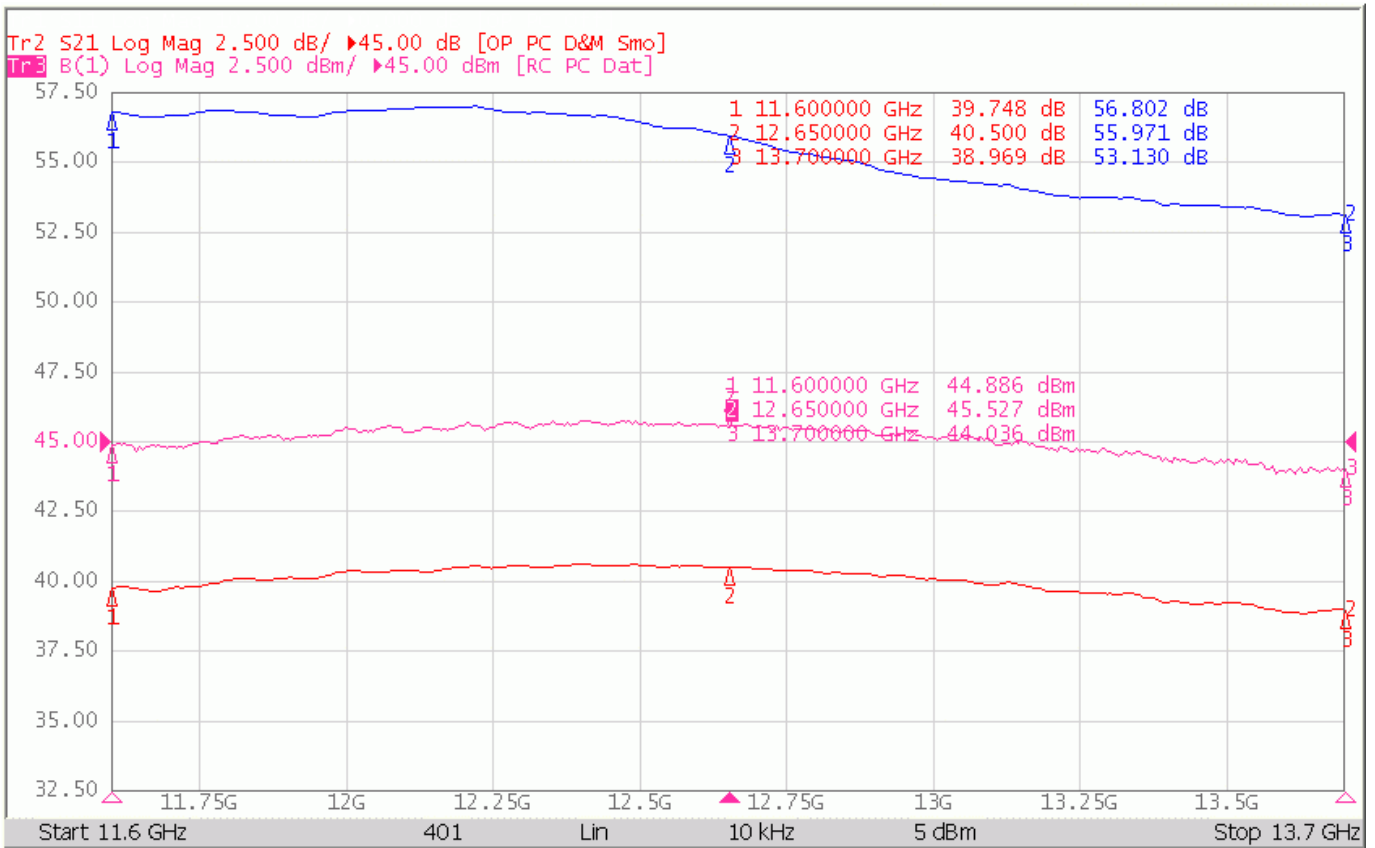


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High Power mode

Gain at small signal in dB (blue)
Saturated output power at +5dBm input power in dBm (purple)
Gain at +5dBm input power in dB (red)



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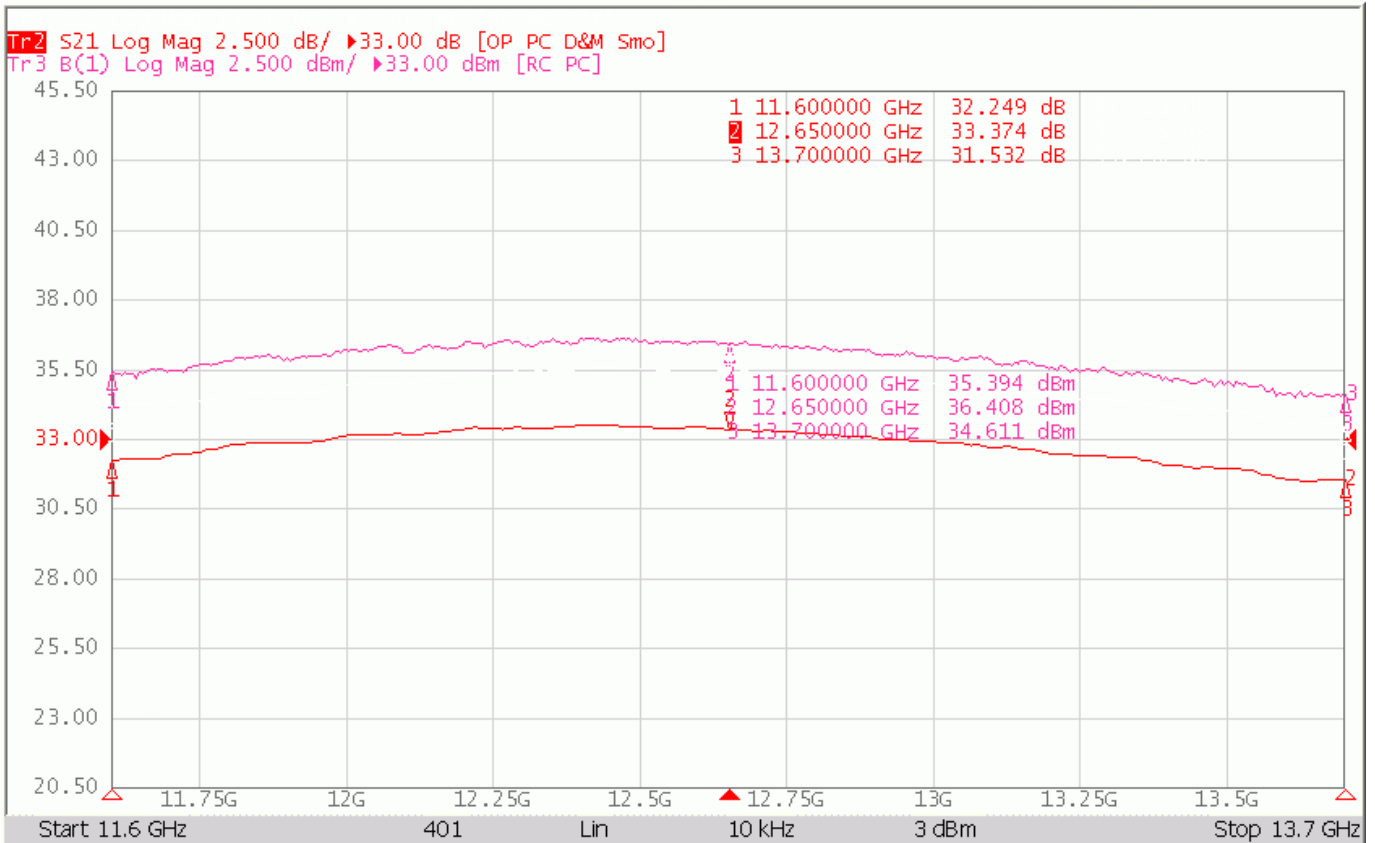


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Low Power mode

Output power at +3dBm input power in dBm (Purple)
Gain at +3dBm input power in dBm (Red)



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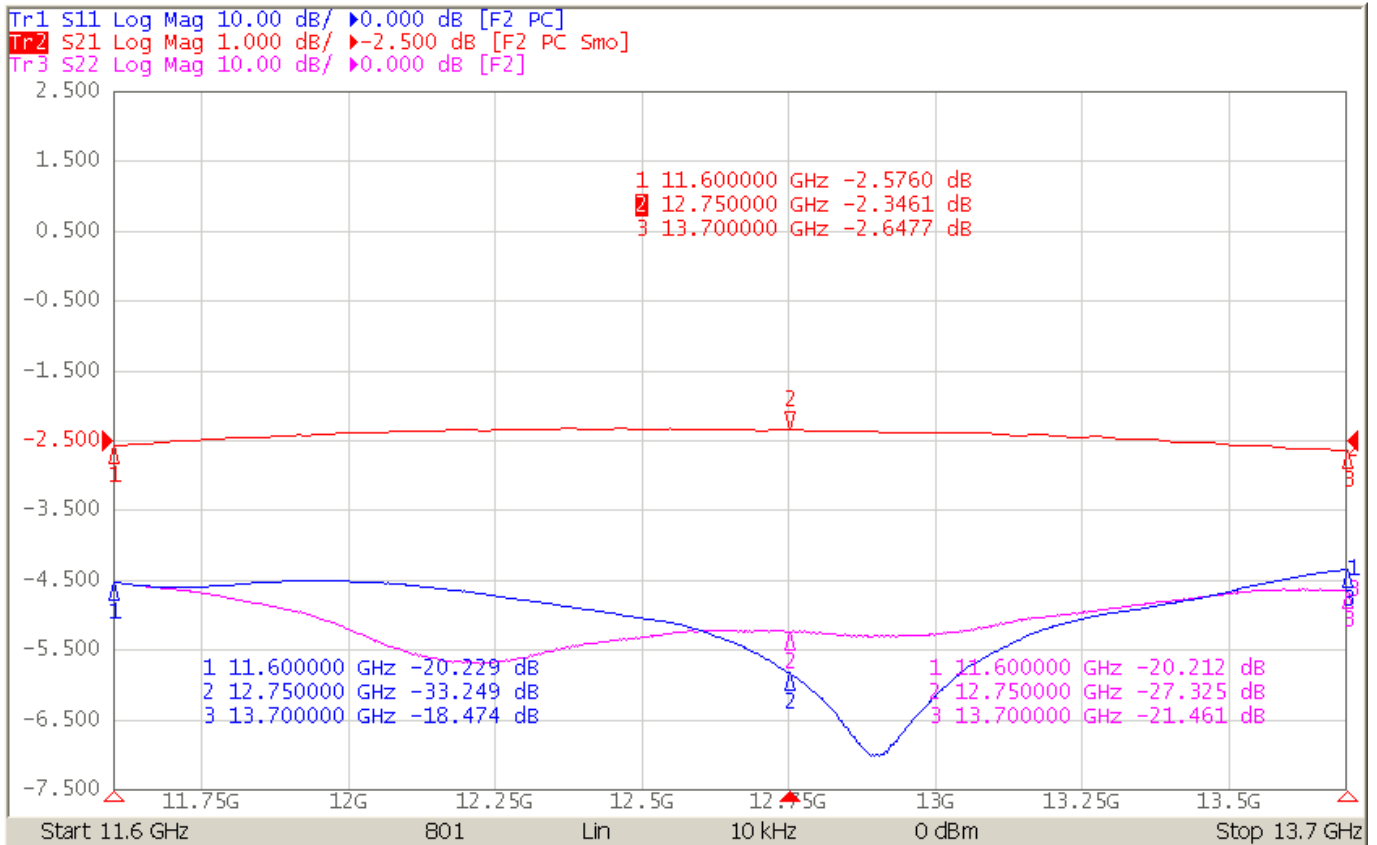


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RX mode

RX loss in dB (Red)
RF_In/Out VSWR in dB (Blue)
RX_Out VSWR in dB (Purple)



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