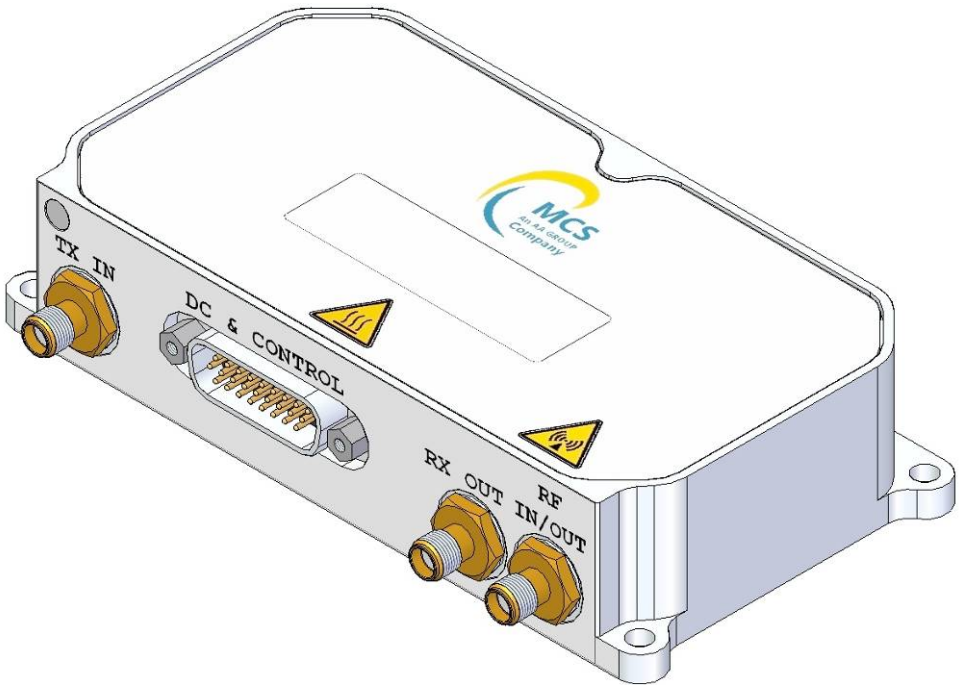
**DATASHEET**
*FEUILLE DE SPECIFICATIONS*



**P/N:** MCS-TRX-4400M-5900M-50dB-47dBm-0
**Designation:** 50W, 50dB, 4400-5900MHz Transceiver Module




# 4400-5900MHz 50W Transceiver Module

| *Ed.* | *Written by* | *Date* | *Observation* | *Approved by* |
|---|---|---|---|---|
| 0 | A. Billy | 18/05/2022 | Creation | R. VERGNAULT |
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| **Electrical features**<br>*Caractéristiques électriques* | | All parameters specified @ baseplate temperature of +25°C and Vsupply=+28Vdc, unless otherwise specified | |
|---|---|---|---|
| **Electrical parameters**<br>*Paramètres électriques* | **Measuring conditions**<br>*Conditions de mesure* | **MCS specifications**<br>*Spécifications MCS* | **Units**<br>*Unités* |
| **Bandwidth**<br>*Bande de fréquence* | | 4400 - 5900 | MHz |
| **TX Output power**<br>*Puissance de sortie TX* | In CW Mode:<br>**High power mode**<br>@ Psat, Pin=+3dBm<br>@ Pin=0dBm | 45.5 min. 46.5 typ. 47.5 max.<br>45 typ. | dBm |
| | **Low power mode**<br>@ Pin=+3dBm | 21 typ. | dBm |
| **Input power**<br>*Puissance d'entrée* | **High power mode:**<br>For saturated power<br>**Low power or RF OFF:**<br>Absolute maximum level | 0 min. to **+5 max.**<br>**+20 max.** | dBm |
| **Gain**<br>*Gain* | **High power mode**<br>@ small signal | 52 min. 58 typ. 62 max.<br>(includes gain compensation vs temperature) | dB |
| | **Low power mode** | 18 typ. | dB |
| **In band Gain ripple**<br>*Ondulation de gain* | @ small signal<br>@ Psat | +/- 3 max.<br>+/- 1.5 max. | dB |
| **Insertion loss in RX mode**<br>*Perte d'insertion en mode RX* | RF_IN/OUT to RX_OUT | 1.0 typ. 1.5 max. | dB |
| **RX output max. power**<br>*Puissance max. en sortie RX* | "RX_OUT" | 16 typ. 18 max.<br>(protected by limiter) | dBm |
| **Impedance**<br>*Impedance* | | 50 | Ohms |
| **Input / Output VSWR**<br>*TOS d'entrée / sortie* | TX_IN<br>RF_IN/OUT<br>RX_OUT | 1.5:1 typ. 2:1 max.<br>1.5:1 typ. 2:1 max.<br>1.5:1 typ. 2:1 max. | |

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| **Electrical features**<br>*Caractéristiques électriques* | | All parameters specified @ baseplate temperature of +25°C and Vsupply=+28Vdc, unless otherwise specified | |
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| **Electrical parameters**<br>*Paramètres électriques* | **Measuring conditions**<br>*Conditions de mesure* | **MCS specifications**<br>*Spécifications MCS* | **Units**<br>*Unités* |
| **Load mismatch**<br>*Résistance au TOS de charge* | | 5:1 max.<br>(protected by the circulator, and a limiter on RX path) | |
| **Noise figure**<br>*Facteur de bruit* | **High power mode** | 15 typ. | dB |
| **Time for TX on/off (blanking)**<br>*Vitesse d'exctinction RF* | 10-90% RF rise / fall time<br>"RF_On/Off" | 0.5 typ. 1 max. | µs |
| **Power density in blanking mode**<br>*Densité spectrale de puissance* | In 2MHz BW | -120 max.<br>(RF switch + gate bias and drain cutoff of power MMICs) | dBm |
| **Harmonics**<br>*Harmoniques* | **High power mode**<br>@ Psat<br>H2<br>H3 | <br><br>-30 typ. -25 max.<br>-40 typ. -35 max. | <br><br>dBc |
| **Spurious**<br>*Parasites* | **High power mode**<br>@ 0dBm Input<br>**Low power mode**<br>@ 0dBm Input | -60 max.<br><br>-50 max. | dBc<br><br>dBc |
| **AM/PM conversion**<br>*Conversion AM/PM* | @ Pout=46dBm | 3 max. | °/dB |
| **Intermodulation OIP3**<br>*Intermodulation OIP3* | 2 carriers, Δ=1MHz,<br>@ Pout=40dBm each | 53 typ. | dBm |
| **Operating class**<br>*Classe de fonctionnement* | | AB on GaN power devices | |
| **Supply voltage**<br>*Tension d'alimentation* | "Vdc"<br>(With output power derating if Vdc < typical value) | +24 min. +28 typ. +32 max. | Vdc |

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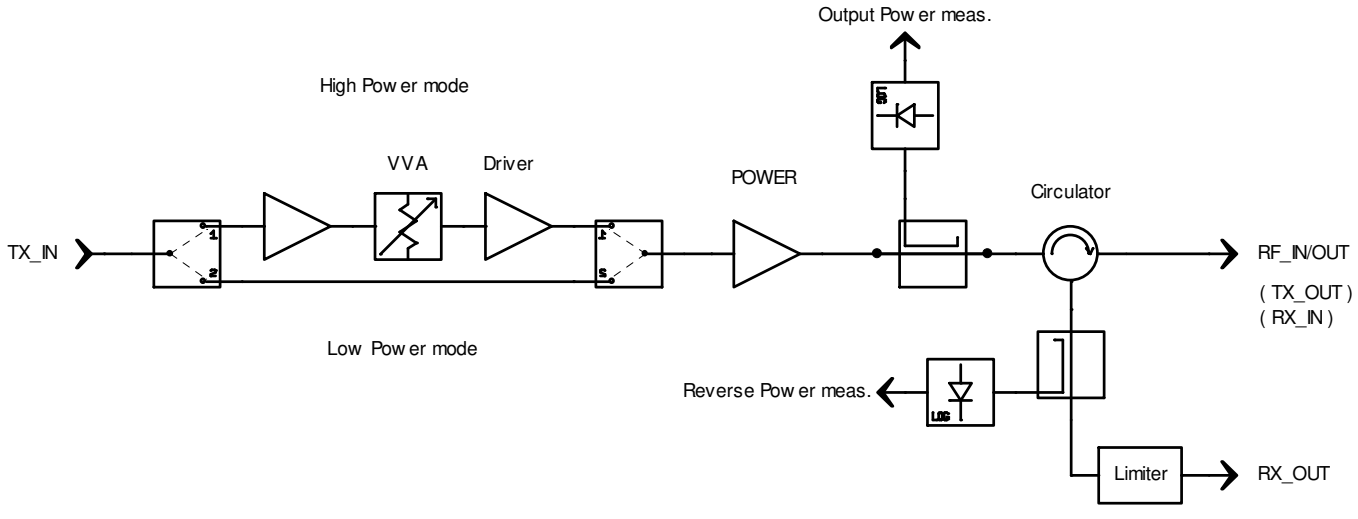
| **Electrical features**<br>*Caractéristiques électriques* | | All parameters specified @ baseplate temperature of +25°C and Vsupply=+28Vdc, unless otherwise specified | |
|---|---|---|---|
| **Electrical parameters**<br>*Paramètres électriques* | **Measuring conditions**<br>*Conditions de mesure* | **MCS specifications**<br>*Spécifications MCS* | **Units**<br>*Unités* |
| **Current consumption**<br>*Consommation de courant* | **High power mode :**<br>@Psat<br>@ small signal<br>**Low power mode**<br>**Blanking mode** | 7.5 typ. 9.0 max<br>1.5 typ.<br>1.5 max.<br>0.3 max. | A |
| **Temperature voltage monitoring**<br>*Tension de contrôle de température* | "Temperature"<br>Analog signal: positive slope & value | 15 typ.<br>**1.5V typ. @ +25°C** | mV/°C |
| **Output power voltage monitoring**<br>*Tension de contrôle de puissance de sortie* | "Output power level"<br>Analog signal: positive slope & value | 50 typ.<br>**2.5V typ. @ 47dBm** | mV/dB |
| **Reverse power voltage monitoring**<br>*Tension de contrôle de puissance réfléchie* | "Reverse power level"<br>Analog signal: positive slope & value | 50 typ.<br>**2.5V typ. @ 47dBm, with RF_OUT open** | mV/dB |

## Bloc diagram

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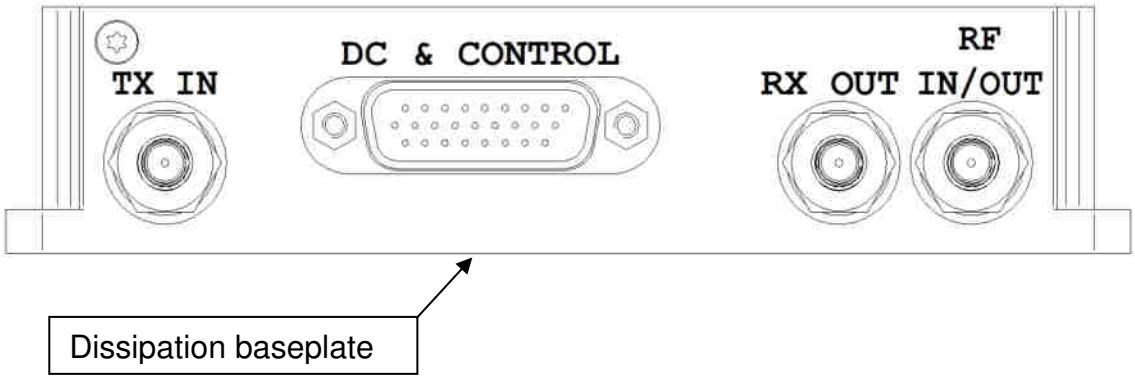
| **Control, Alarms and Monitoring (Sub-D connector)**<br>*Contrôles, Alarmes et Informations* | | |
|---|---|---|
| **Parameters**<br>*Paramètres* | **Description**<br>*Description* | **Spécifications**<br>*Specifications* |
| **Shutdown ON/OFF command**<br>*Commande Marche/Arrêt* | RS422 Input<br>"DC ON/OFF"<br>(Shutdown of internal DC supplies) | (-P) Low = **OFF (Shutdown)**<br>(-P) High or Not connected = **ON** |
| **Noise quieting ; RF On/Off control**<br>*Commande d'extinction RF* | RS422 Input<br>"RF ON/OFF" | (-P) Low = **RF Output OFF**<br>(-P) High or Not Connected = **RF Output ON** |
| **Power mode control**<br>*Sélection mode de puissance* | RS422 Input<br>"High/Low Power" | (-P) Low = **Low Power Mode**<br>(-P) High or Not Connected = **High Power Mode** |
| **Temperature analog signal**<br>*Lecture temperature* | Analog output<br>Signal "Temperature" | Range: 0 to +5Vdc<br>Refer to Electrical features |
| **Over temperature alarm**<br>*Alarme température* | RS422 Output<br>"Over temperature alarm" | (-P) Low = **No default**<br>(-P) High = **Over temperature alarm** |
| **Output Power analog signal**<br>*Lecture puissance de sortie* | Analog output<br>Signal "Output power level" | Range: 0 to +5Vdc<br>Refer to Electrical features |
| **Reverse Power analog signal**<br>*Lecture puissance réfléchie* | Analog output<br>Signal "Reverse power level" | Range: 0 to +5Vdc<br>Refer to Electrical features |

| **Mechanical features**<br>*Caractéristiques mécaniques* | | | |
|---|---|---|---|
| **Parameters**<br>*Paramètres* | **Measuring conditions**<br>*Conditions de mesure* | **MCS specifications**<br>*Spécifications MCS* | **Units**<br>*Unités* |
| **Length x width x height**<br>*Longueur x largeur x Hauteur* | L x W x H<br>ISO 2768-mH | 129 x 65 x 28 max.<br>(without connectors)<br>(see drawings below) | mm |
| **Cooling**<br>*Dissipation* | Apply thermal interface | Conduction cooled: user must maintain base plate temperature below +85°C<br>(Self-protection turns ON at +85°C) | - |
| **RF Connectors**<br>*Connectique RF* | Input / Output | SMA female | - |
| **Supply & Control connector**<br>*Connecteur de contrôle et alim.* | "DC & CONTROL" | Sub-D High density male 26pts | |
| **Weight**<br>*Masse* | | 400 typ. | g |
| **Housing**<br>*Châssis* | | Aluminium coated with Surtec 650 | |

## Mechanical interfaces:

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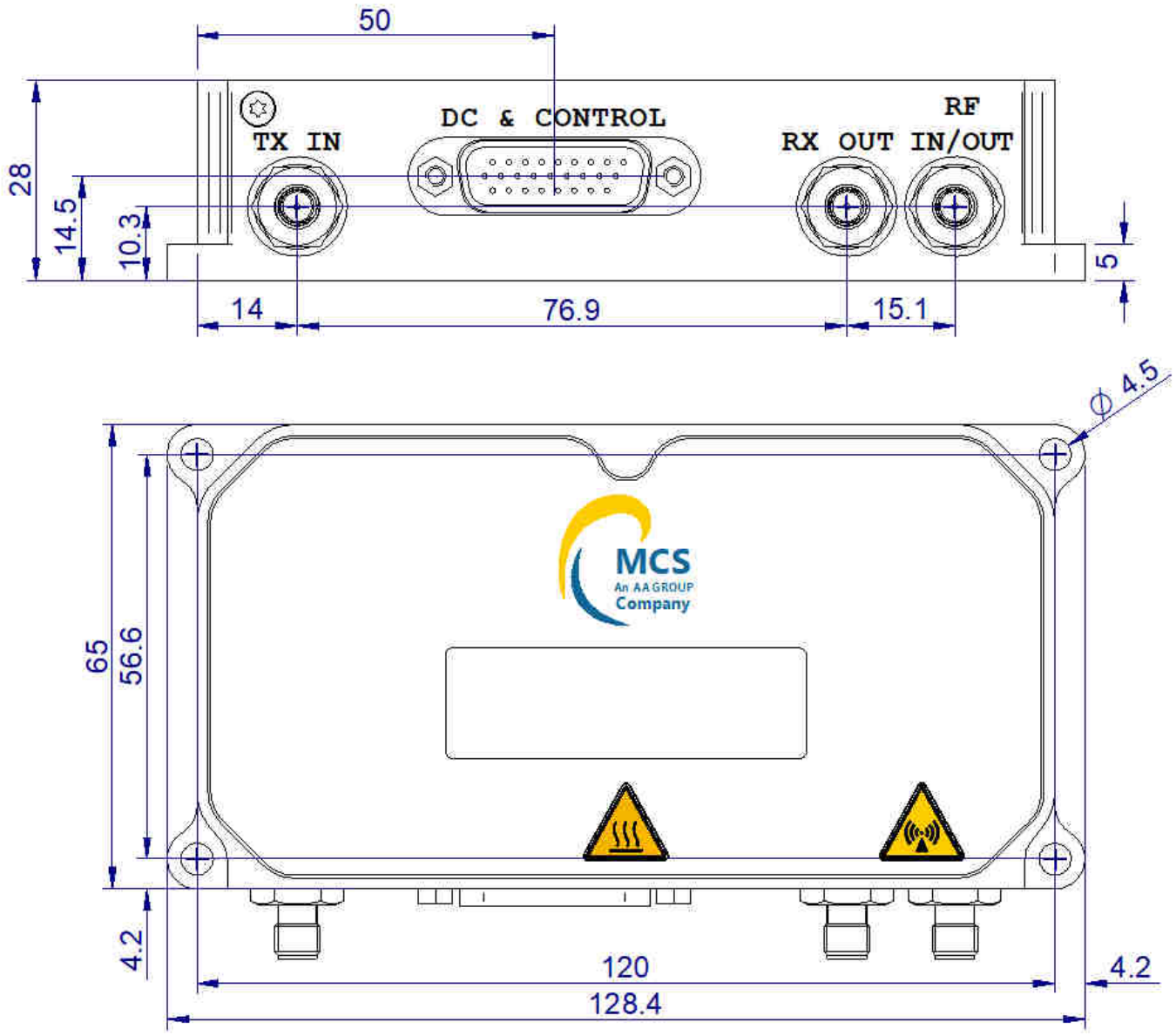
## "DC & Control" pinning:

| 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 | Output power level | Analog output |
| 13 | Temperature | Analog output |
| 14 to 16 | "Vdc" | Supply voltage |
| 17 | Reverse power level | Analog output |
| 18 to 21 | N.C | |
| 22 to 25 | "Vdc" | Supply voltage |
| 26 | N.C | |

## Mechanical drawing:

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| **Standard environnemental conditions**<br>*Conditions environnementales standard* | | | |
|---|---|---|---|
| **Parameters**<br>*Paramètres* | **Conditions**<br>*Conditions* | **MCS specifications**<br>*Spécifications MCS* | **Units**<br>*Unités* |
| **Cold temperature operation**<br>*Température de service à froid* | Baseplate temperature | -40 min. | °C |
| **Cold temperature storage**<br>*Température de stockage à froid* | Baseplate temperature | -55 min. | °C |
| **Dry heat temperature operation**<br>*Température de service à chaud* | Baseplate temperature | +80 max.<br>(includes automatic shutdown for thermal protection when baseplate temp exceeds +85°C) | °C |
| **Dry heat temperature storage**<br>*Température de stockage à chaud* | Baseplate temperature | +85 max. | °C |

| **Specific environnemental conditions**<br>*Conditions environnementales spécifiques*<br>(guaranteed by design, not qualified by test) | | | |
|---|---|---|---|
| **Parameters**<br>*Paramètres* | **Conditions**<br>*Conditions* | **MCS specifications**<br>*Spécifications MCS* | **Units**<br>*Unités* |
| **Altitude**<br>*Altitude* | | 30 000 max. | ft |
| **Sand and dust**<br>*Sable et poussières* | | As per MIL-STD-810G, method 510.5 procedure I & II | |
| **Humidity**<br>*Humidité* | 97% @ +26°C | As per MIL-STD-810G, method 507.5 procedure II | |
| **Salt fog**<br>*Brouillard salin* | | As per MIL-STD-810G, method 509.6 for solution 6.5-7.2pH at 35°C | - |
| **Fungus**<br>*Moisissures* | | Coating compliant | - |
| **Explosive atmosphere**<br>*Atmosphère explosive* | | Sealing compliant<br>No ignition caused by the amplifier. | |

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| **Specific environnemental conditions**<br>*Conditions environnementales spécifiques*<br>(guaranteed by design, not qualified by test) | | | |
|---|---|---|---|
| **Parameters**<br>*Paramètres* | **Conditions**<br>*Conditions* | **MCS specifications**<br>*Spécifications MCS* | **Units**<br>*Unités* |
| **Functional random vibrations**<br>*Vibrations aléatoires operation* | As per MIL-STD-202G<br>method 214A<br>Test condition I E | Compliant | |
| **Functional shocks**<br>*Chocs fonctionnels* | As per MIL-STD-810G<br>method 516.6<br>procedure I | 25g half sine shock pulse during 20ms | |
| **Functional acceleration**<br>*Accélération fonctionnelle* | | Forward 12g<br>Back 4g<br>Up 4g<br>Down 2g<br>Lateral 3g | |

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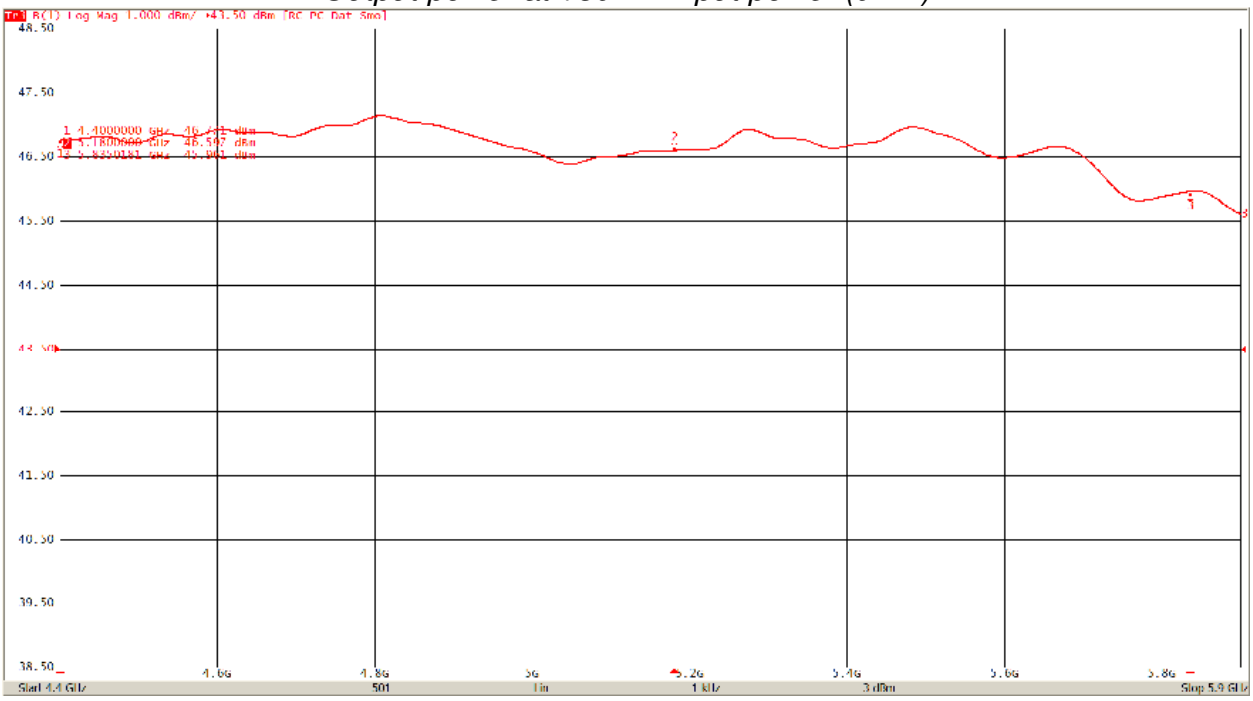
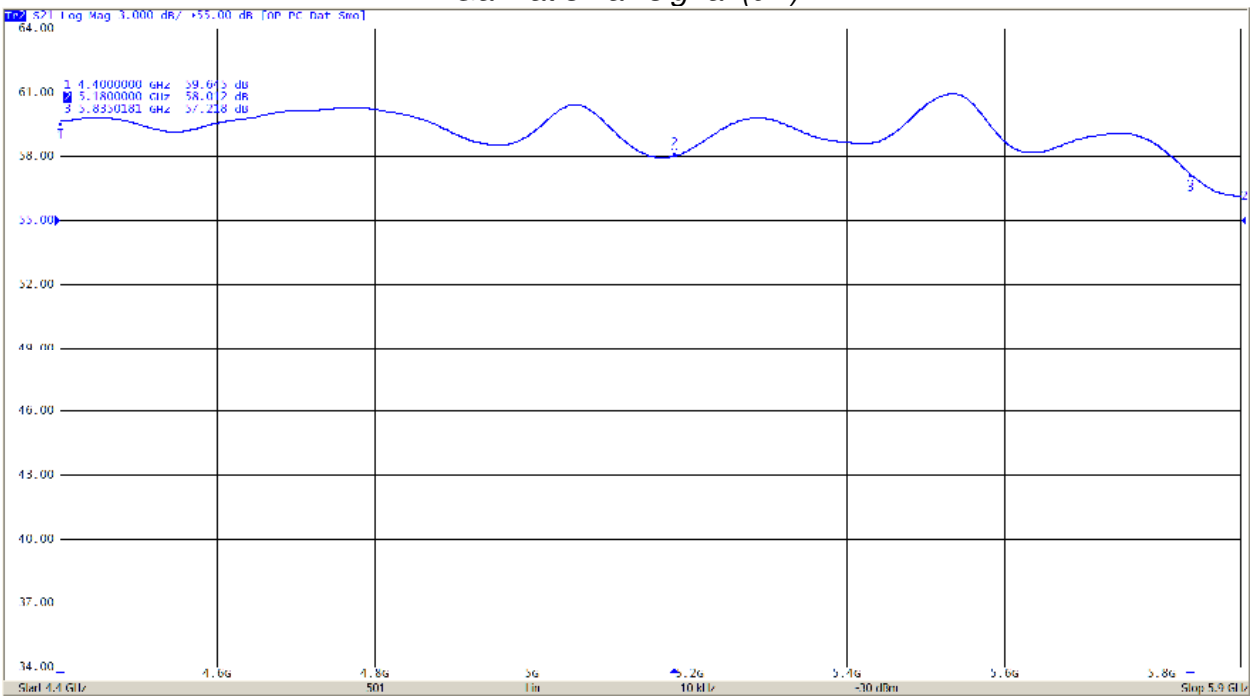
## High Power mode

*Output power at +3dBm input power (dBm)*




*Gain at small signal (dB)*

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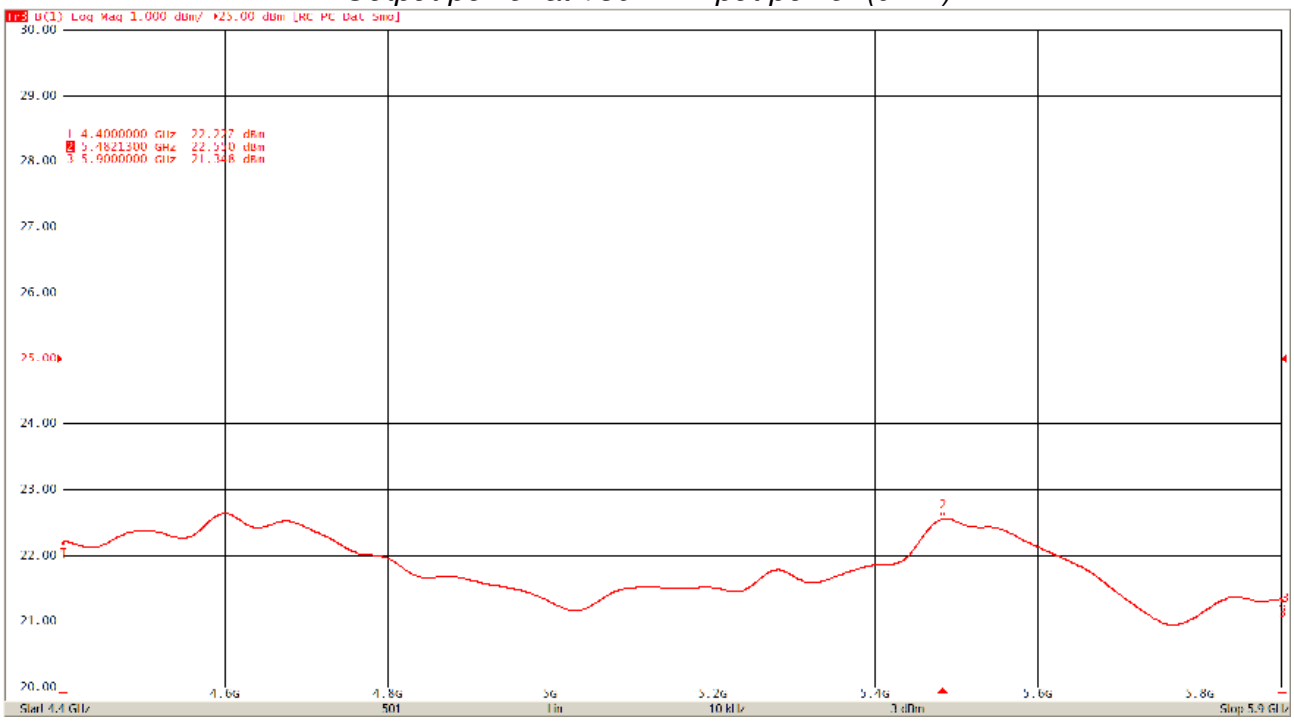
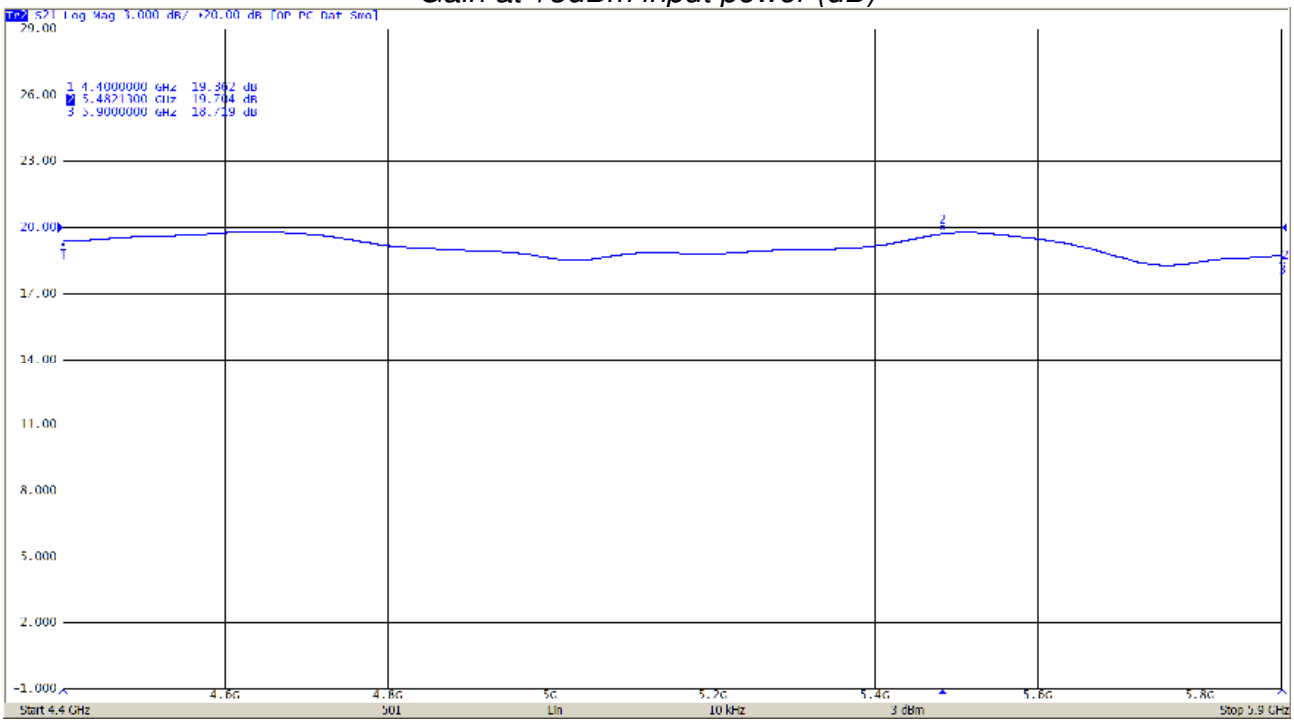
## Low Power mode

*Output power at +3dBm input power (dBm)*




*Gain at +3dBm input power (dB)*

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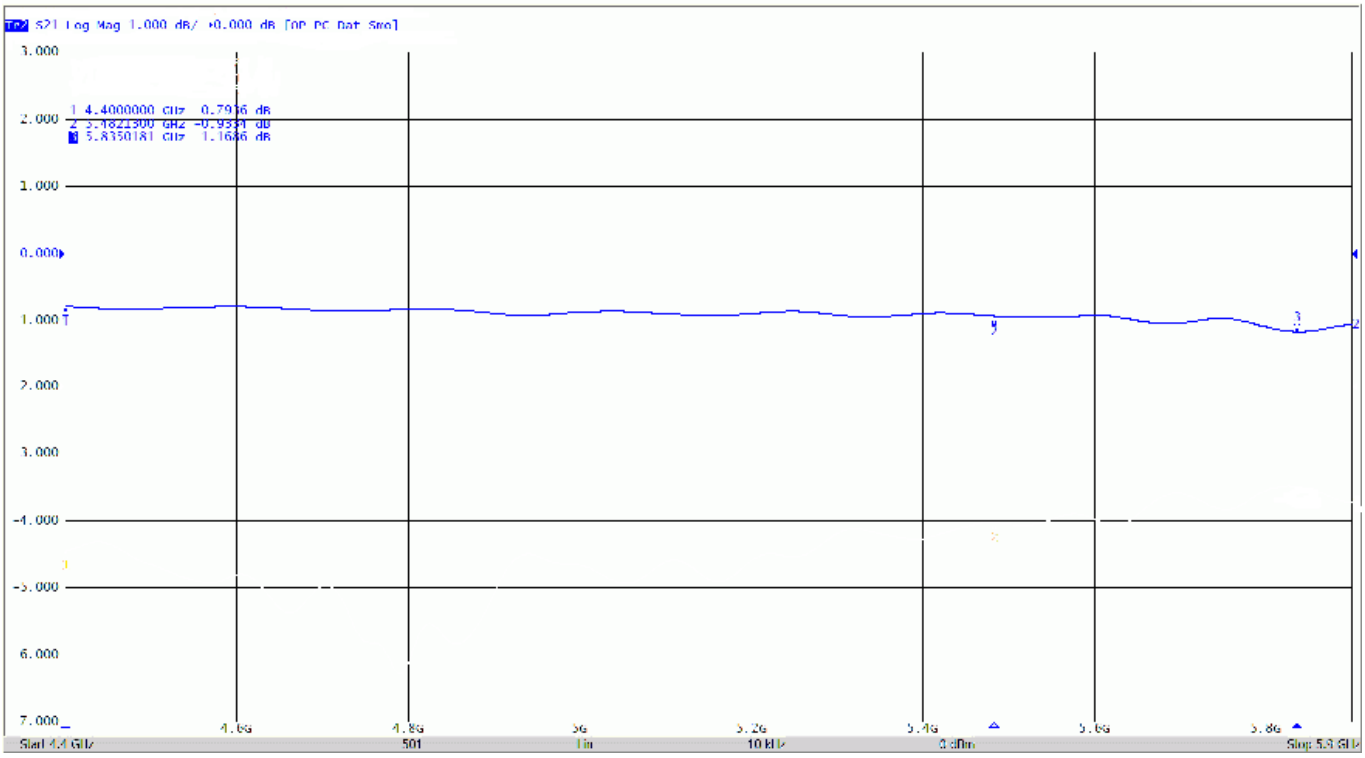
## RX mode

*RX loss (dB)*

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