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QUALCOMM®

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Revision History

Revision	Date	Description
A	Feb 2016	Initial release

Note: There is no Rev. I, O, Q, S, X, or Z per Mil. standards.

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- RF SW

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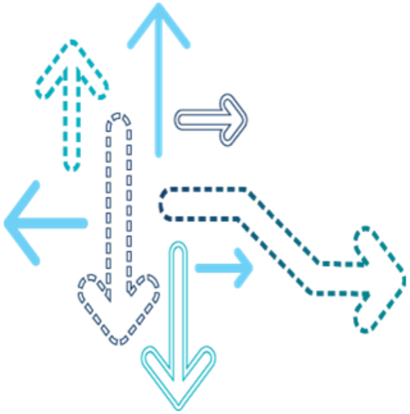
RF HW



WTR29x5 TDS Spur Issue Consideration

- **Platform**: MSM8952/56/76
- **适用平台**：MSM8952/56/76

- **Symptom**: TDS spurious emissions allows 5 exceptions in 3GPP. However, no exception is allowed according to China State Radio Regulatory Commission (SRRC) Type Approval certification test requirement.
- During SRRC test, spurs could be observed falling in the 805–1850MHz, which resulted in UE fail to meet -71dBm test limit. Those spurs are XO(19.2MHz) harmonics.
- **问题描述**： TDS spurious emissions 这个测试项，在3GPP规范里面，是允许5个failed点的，但是中国无委认证测试会更加严格，不允许有任何failed的地方。
- 在无委的测试中，已有客户遇到1805-1850MHz频段内杂散超标（上限-71dBm)的问题，这些杂散频点是XO(19.2MHz)频率倍频产物或者交调产物。

WTR29x5 TDS Spur Issue Consideration

- **Root Cause**:
- 1. LPF used at the PA output. The attenuation at 1805-1850MHz is not enough for LPF.
- 2. WTR29x5 XO GND pin40 grounding is not good enough.
- **问题原因**:
- 1. 设计中使用了LPF。LPF在1805-1850MHz频段内没有抑制。
- 2. WTR29x5 XO GND pin40接地不好，回流路径太长。

- **Solution**:
- 1. To guarantee spurious emissions performance, we recommend use B34+B39 2-in-1 post-PA Tx SAW filter (reference part: Epcos B9919) or DCS-Narrow Notch for B34/39 (SACEA1G81TA0FT0) instead of LPF at PA output.
- 2. Ensure all GND pins were connected to main GND plane directly, especially pin40, reducing the loop inductance of WTR29x5 XO GND pin.
- **解决办法**：
- 1. PA输出端使用TX SAW或者DCS Notch filter代替LPF，可以保证这个测试项没有问题。参考器件型号有EPCOS B9919 和 Murata SACEA1G81TA0FT0.
- 2. 布板过程中，优先WTR29x5 地脚的处理，确保地脚，尤其是Pin40，直接最短距离连接到主地，以减少接地阻抗。

WTR29x5_DA_matching_for_TDSCDMA

- **Platform**: MSM8952/56/76
- **适用平台**：MSM8952/56/76

- **Symptom**: There is non-monotonous power delta or big power delta of special adjacent RGIs in TDSCDMA B34 linearizer calibration. See below two case.
- **问题描述**：TDSCDMA B34 的线性化校准中，发现一些相邻的RGI的功率差值不单调或者差值过大。如下表所示。

Case A: non-monotonous power delta

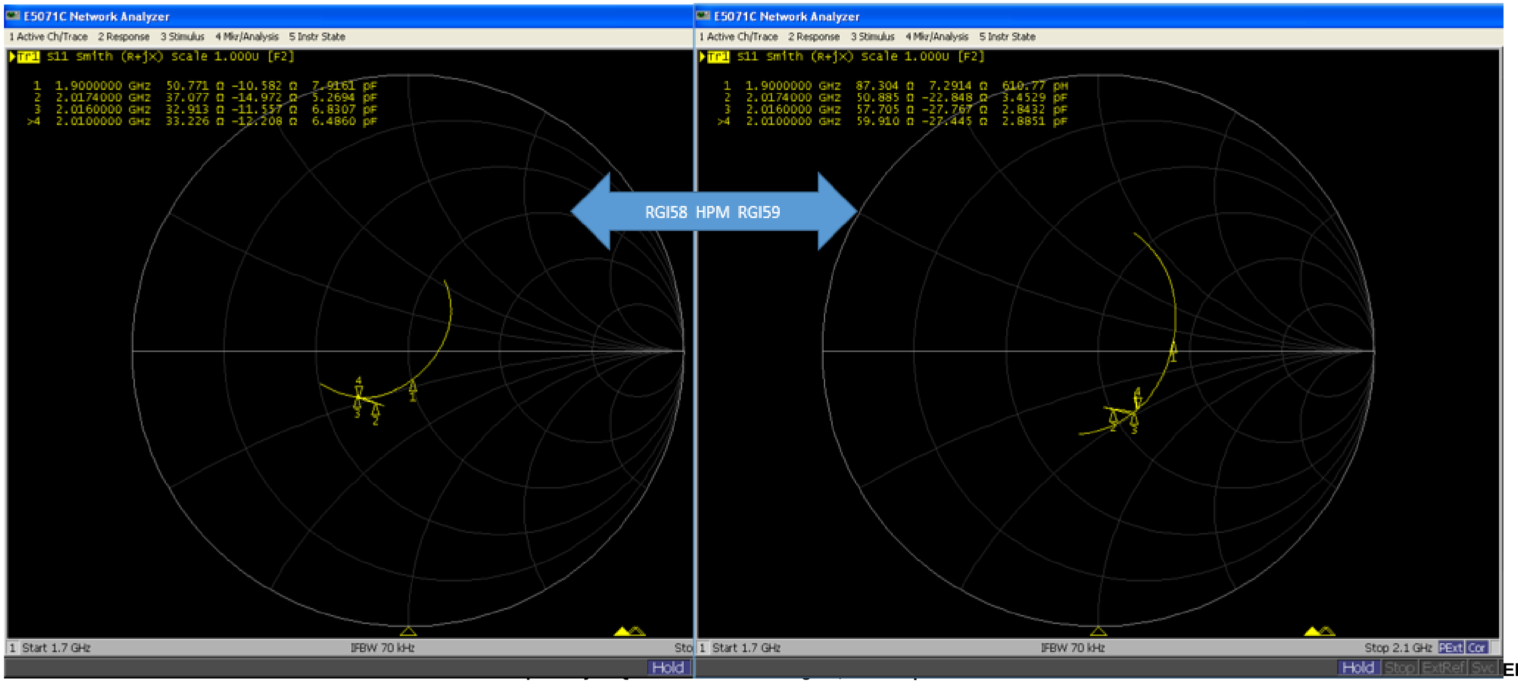
Channel	PA State	TxAGC	Vcc	Icq	Power	HDET	LPM HDET	DeltaPwr
10081	1	76	3400	200	28.9	3848	-	0
10081	1	75	3400	200	28.8	3829	-	0.1
10081	1	74	3400	200	28.8	3800	-	0
10081	1	73	3400	200	28.6	3607	-	0.2
10081	1	72	3400	200	28.1	3179	-	0.5
10081	1	71	3400	200	27.6	2871	-	0.5
10081	1	70	3400	200	26.7	2444	-	0.9
10081	1	69	3400	200	25.8	1999	-	0.9
10081	1	68	3400	200	24.7	1519	-	1.1
10081	1	67	3400	200	23.6	1120	-	1.1
10081	1	66	3400	200	22.5	869	-	1.1
10081	1	65	3400	200	21.4	673	-	1.1
10081	1	64	3400	200	20.3	525	-	1.1
10081	1	63	3400	200	19	392	-	1.3
10081	1	62	3400	200	18.2	326	-	0.8
10081	1	61	3400	200	16.9	242	-	1.3
10081	1	60	3400	200	15.6	178	-	1.3
10081	1	59	3400	200	14	124	-	1.6
10081	1	58	3400	200	14.6	139	-	-0.6
10081	1	57	3400	200	13.6	118	-	1
10081	1	56	3400	200	12.7	96	-	0.9

Case B: power delta is big

10081	0	65	3400	112	9.53	-	-	0
10081	0	64	3400	112	8.3	-	-	1.23
10081	0	63	3400	112	7.46	-	-	0.84
10081	0	62	3400	112	6.05	-	-	1.41
10081	0	61	3400	112	2.66	-	-	3.39
10081	0	60	3400	112	1.72	-	-	0.94
10081	0	59	3400	112	0.68	-	-	1.04
10081	0	58	3400	112	-0.38	-	-	1.06
10081	0	57	3400	112	-1.32	-	-	0.94

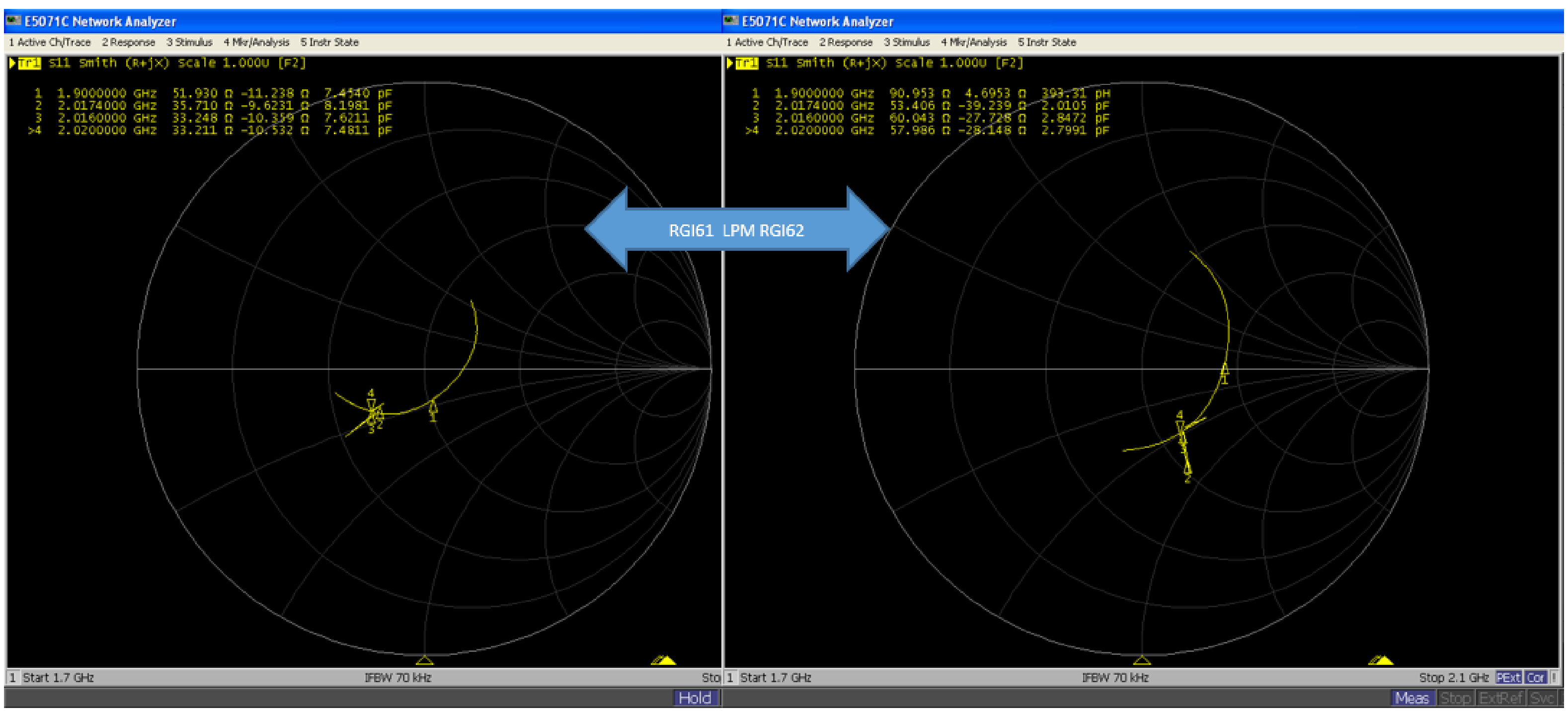
WTR29x5_DA_matching_for_TDSCDMA

- **Analysis**: According the WTR29x5 design, the expected power delta is 1dB per each RGI, but measured power is a little different, shown as below. Customer can get similar data if testing power at DA output pin with pigtail. So the reason should be DA output matching.
  - TDSCDMA B34 Low Power Mode, RGI62-RGI61= 1.49dB
  - TDSCDMA B34 High Power Mode, RGI59-RGI58= 0.52dB
- **Root Cause**: Checked impedance of WTR29x5 DA4 port, the impedance shift obviously between RGI62/61 at LPM and between RGI59/58 at HPM. So the DA output matching is able to change RGI power delta.



WTR29x5_DA_matching_for_TDSCDMA

- **问题分析**：根据WTR29x5的设计，这几个相邻RGI的期望功率差值为1dB，但实际测量值略有差异。测试值如下。客户从WTR 的DA输出口测量到的功率也符合如下差值。所以问题的原因应该是WTR输出匹配。
  - TDSCDMA B34 Low Power Mode, RGI62-RGI61= 1.49dB
  - TDSCDMA B34 High Power Mode, RGI59-RGI58= 0.52dB
- **原因**: 测量WTR29x5的DA4端口阻抗，发现DA阻抗在RGI62/61(LPM)和RGI59/58(HPM)之间有偏移。所以输出阻抗可以很大程度的影响功率的差值。



WTR29x5_DA_matching_for_TDSCDMA

- **Solution**: Tune the DA output matching to 50ohm to balance the special RGI impedance.
- **解决办法**：调试WTR DA的输出匹配到50ohm，来平衡特殊RGI的阻抗变化。

RF_CLK/IQ/DAC connection in Thor platform

- **Platform**: MSM8996/MDM9x40/MDM9x45
- **适用平台**：MSM8996/MDM9x40/MDM9x45

- **Symptom**: For Qualcomm reference 80-NR113-42/43/44/45, they are used to 2DL/3DL/TDD UL CA/FDD UL CA rf card, so we have different RFCLK/Rx BBIQ/ Tx BBIQ /ET DAC assignment per each RF card, please pay more attention to those configuration.
- **问题描述**：在高通Thor平台参考原理图80-NR113-42/43/44/45中，他们可以支持2DL/3DL/TDD UL CA/FDD UL CA等不同的射频卡配置，其中RFCLK/RX BBIQ/Tx BBIQ/ET DAC接口的连接在不同射频卡中是不一样的，客户做设计时需要注意。

RF_CLK/IQ/DAC connection in Thor platform

- RF_CLK configuration
- RF_CLK的连接

Modem IC	PMIC	Transceiver	Clock Source
MDM9x45/ MDM9x40	PMD9645	WTR3925 (WTR0)	RF_CLK2
		WTR4905 (WTR1)	RF_CLK1
MSM8996	PM8996	WTR3925 (WTR0)	RF_CLK2
		WTR4905 (WTR1)	RF_CLK1

Modem IC	PMIC	Transceiver	Clock Source
MDM9x45/ MDM9x40	PMD9645	WTR3925	RF_CLK1
MSM8996	PM8996	WTR3925	RF_CLK1

- For two WTR design, WTR3925(WTR0) is using RF_CLK2 and WTR4905(WTR1) is using RF_CLK1. For one WTR design, WTR3925(WTR0) is using RF_CLK1.
- 对于2个WTR的设计来说，WTR3925（WTR0）使用的是RF_CLK2 而WTR4905（WTR1）使用的是RF_CLK1. 对于单WTR的设计来说，WTR3925使用的是RF_CLK1.

RF_CLK/IQ/DAC connection in Thor platform

- BBRX_FB_I/Q configuration
- BBRX_FB_I/Q的连接

WTR	WTR IQ Channel	MDM9x45/MDM9x40/MSM8996 BBRX Channel
WTR3925 (WTR0)	TX_FBRX_BB_I/Q	BBRX_FB_I/Q
WTR4905 (WTR1)	GNSS_BB_I/Q	

WTR	WTR IQ Channel	MDM9x45/MDM9x40/MSM8996 BBRX Channel
WTR3925 (WTR0)	TX_FBRX_BB_I/Q	BBRX_FB_I/Q

- For two WTR design, WTR3925(WTR0) and WTR4905(WTR1) are sharing BBRX_FB_I/Q and WTR4905 is using GNSS_BB_I/Q pins as TX_FBRX_IQ pins to implement closed loop power control.
- 对于2个WTR的设计来说，WTR3925（WTR0）和WTR4905（WTR1）共享BBRX_FB_I/Q，并且WTR4905是使用它的GNSS_BB_I/Q管脚来连接FBRX IQ管脚实现闭环功率控制.

RF_CLK/IQ/DAC connection in Thor platform

- RX I/Q configuration
- RX I/Q的连接

WTR	WTR IQ Channel	MDM9x40/45 BBRX Channel	MSM8996 BBRX Channel
WTR3925 (WTR0)	PRX_CA1_I/Q	BBRX_I/Q_CH5	BBRX_I/Q_CH4
	DRX_CA1_I/Q	BBRX_I/Q_CH6	BBRX_I/Q_CH5
	PRX_CA2_I/Q	BBRX_I/Q_CH0	BBRX_I/Q_CH0
	DRX_CA2_I/Q	BBRX_I/Q_CH1	BBRX_I/Q_CH1
WTR4905 (WTR1)	PRX_I/Q	BBRX_I/Q_CH3	BBRX_I/Q_CH3
	DRX_I/Q	BBRX_I/Q_CH2	BBRX_I/Q_CH2

WTR	WTR IQ Channel	MDM9x40/45/MSM8996 BBRX Channel
WTR3925 (WTR0)	PRX_CA1_I/Q	BBRX_I/Q_CH3
	DRX_CA1_I/Q	BBRX_I/Q_CH2
	PRX_CA2_I/Q	BBRX_I/Q_CH0
	DRX_CA2_I/Q	BBRX_I/Q_CH1

- We use different Rx IQ channels for different design. Please follow our default connection in above table when design your project.
- 我们在不同设计中使用不同的Rx IQ连接方式，请在设计过程中follow我们上面表格中列举的连接方法。

RF_CLK/IQ/DAC connection in Thor platform

- TX IQ and ET DAC configuration
- TX IQ和ET DAC的连接

- 2UL CA with 3DL CA design
- 2UL CA和3DL CA的原理图

WTR	WTR IQ Channel	MDM9x45/MDM9x40/MSM8996
WTR3925 (WTR0)	TX_BB_I/Q	TX_DAC1_I/Q
WTR4905 (WTR1)	TX_BB_I/Q	TX_DAC0_I/Q

PA	QFE	MDM9x45/MDM9x40/MSM8996
(Used for PAs connected to WTR3925)	QFE3100 - U13	ET_DAC1
(Used for PAs connected to WTR4905)	QFE3100 - U4	ET_DAC0

2DL CA and 3DL CA only design

2DL CA和3DL CA only的原理图

WTR	WTR IQ Channel	MDM9x45/MDM9x40/MSM8996
WTR3925 (WTR0)	TX_BB_I/Q	TX_DAC0_I/Q
WTR4905 (WTR1)	TX_BB_I/Q	

PA	QFE	MDM9x45/MDM9x40/MSM8996
(Used for PAs connected to WTR3925)	QFE3100	ET_DAC0

- Tx IQ connection and ET DAC connection is also based on RF configuration. Please follow above table in your design.
- Tx IQ连接和ET DAC的连接也是基于不同RF配置而不同，请在做原理图设计时遵守上面的表格。

Use QRCT IQ capture to debug GSM desense issue

- **Platform**：All
- **适用平台**：所有
- **Symptom**: Customer often meet Rx desense issues at some channels caused by unknown noise. We can use QRCT IQ capture to monitor the noise frequency, level, spectrum shape, and IQ waveform in time domain. After known more details of the noise, we can find out the aggressor more easily, and select the correct solution to fix the desense issue.
- **问题描述**：经常发生各种Rx desense问题，在某些信道受到各种来源的noise干扰导致接收灵敏度的恶化。我们可以利用QRCT的IQ capture功能，就能很直观地看到干扰信号的频点，高度，频谱形状，以及时域的IQ波形。知道这些信息后，就可以更有目的性的利用各种方法来解决desense问题，或者更容易推算出干扰源。
- **Solution**: In 2015-1-31 Journal we have provided the steps of WCDMA IQ capture, but some steps of GSM IQ capture are different. We also add a method to observe IQ waveform in time domain which will be very helpful in some cases. Add a -110dBm CW signal at antenna port with 50kHz offset, then we can see the frequency and relative level of the noise easily in the IQ spectrum. Here are the steps:
- **解决方案**：在2015-1-31的技术期刊中，我们探讨过WCDMA的IQ capture操作方式，而GSM操作步骤有些不同。本文还增加了观察IQ信号时域波形的方法。在手机天线口加入一个50kHz偏移的-110dBm的CW信号作为参考，从IQ信号频谱中可以很方便地看出noise信号的相对强度和频点。操作步骤如下：

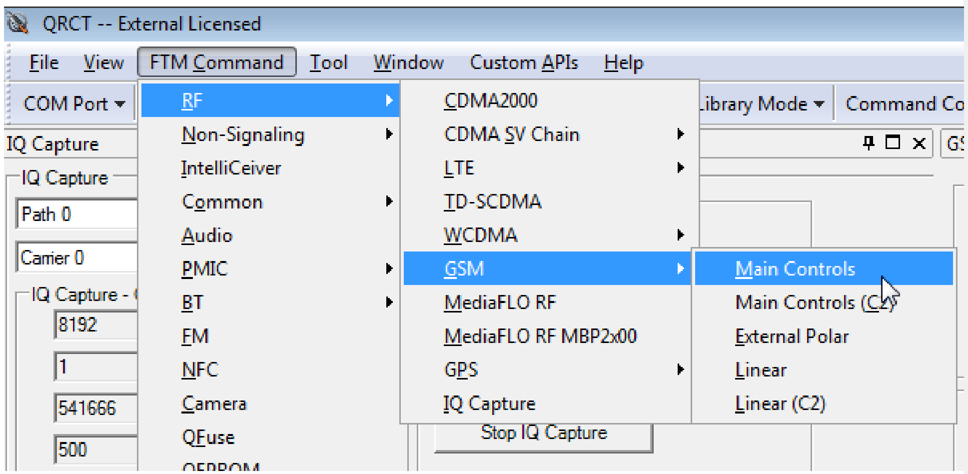
Use QRCT IQ capture to debug GSM desense issue

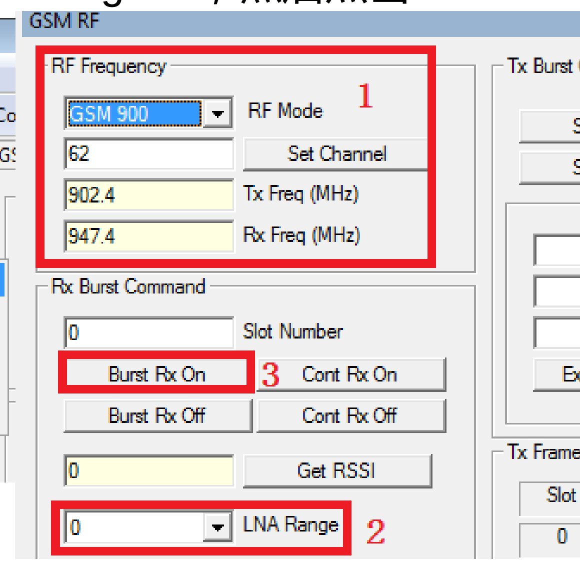
1. In a shielding room, open QRCT, control the phone into FTM mode.

在屏蔽室，打开QRCT，控制手机进入FTM模式

2. Open GSM->Main Controls, configure the band, channel, LNA range=0, then click “Burst Rx On” button.

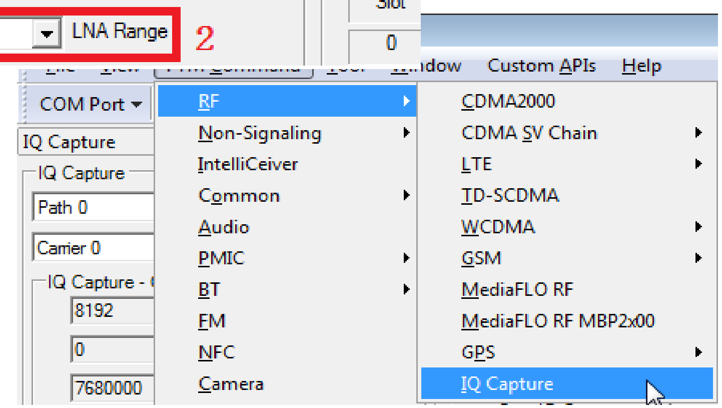
打开GSM的Main Controls，配置频段，频点，LNA range=0，然后点击Burst Rx On按钮。





3. Open IQ capture, follow below 1-6 steps to get the GSM IQ spectrum.

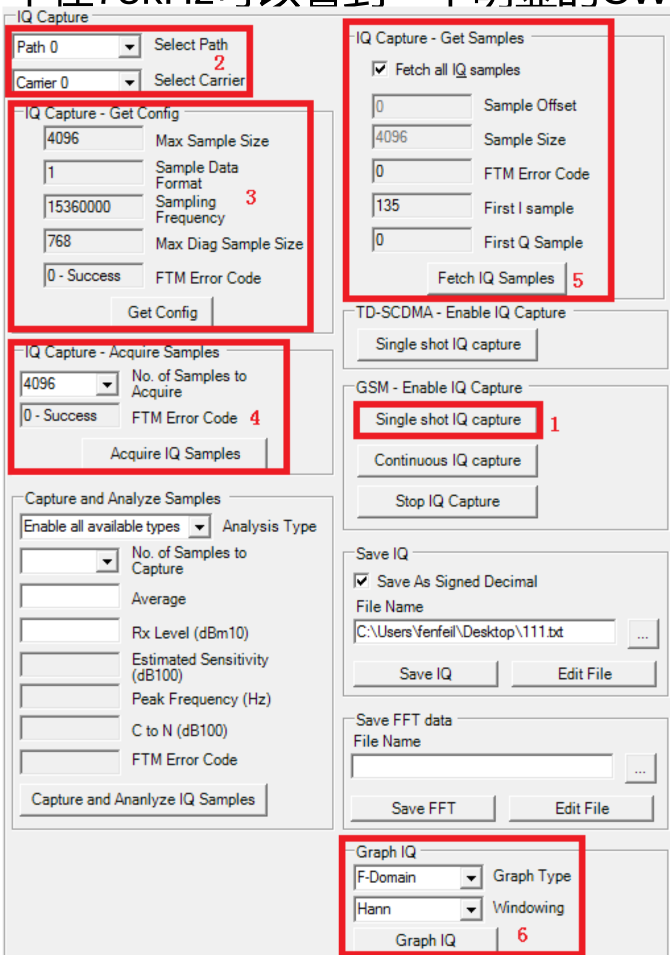
打开IQ Capture，按顺序1-6配置下来，就可以抓到GSM IQ频谱。

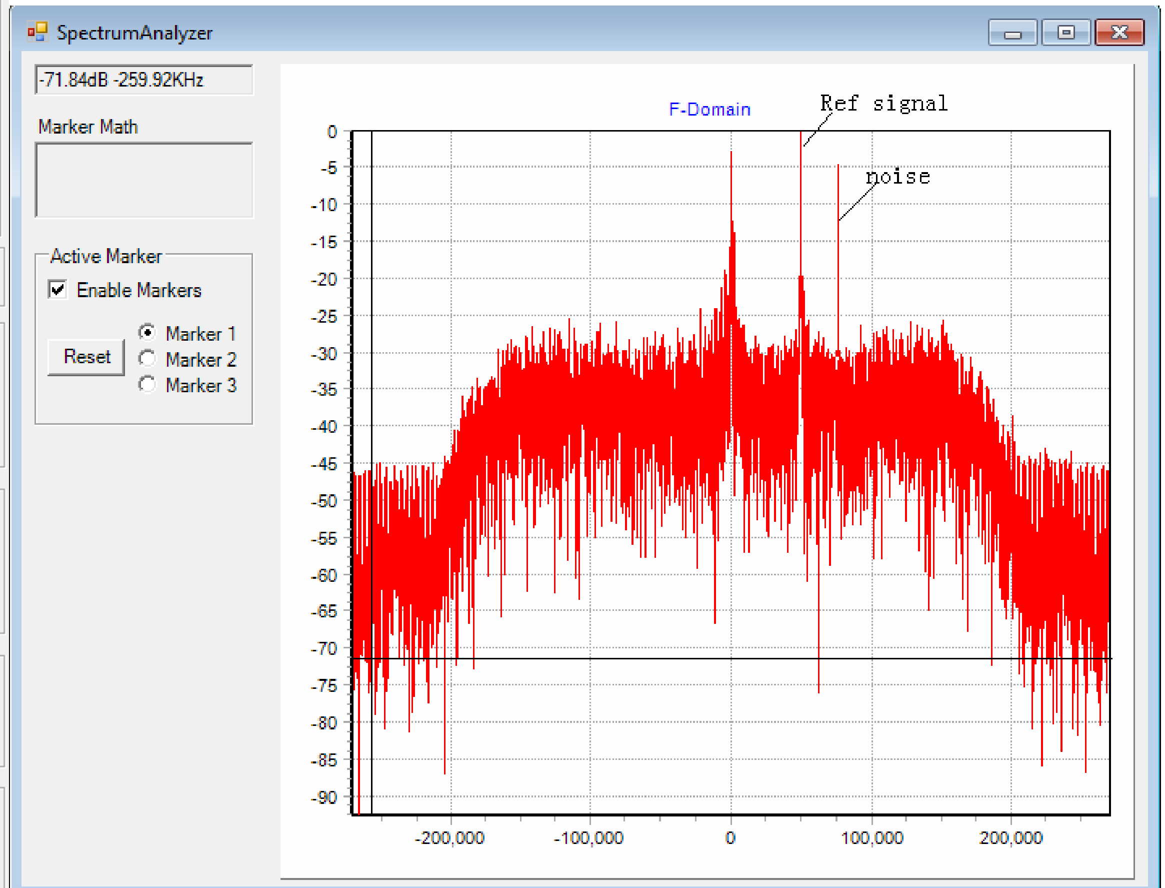


Use QRCT IQ capture to debug GSM desense issue

4. We can see the 50kHz offset CW signal if we add -110dBm CW at antenna port. In the example figure, we can also see a 75kHz offset noise with 5dB lower level than the reference CW signal.

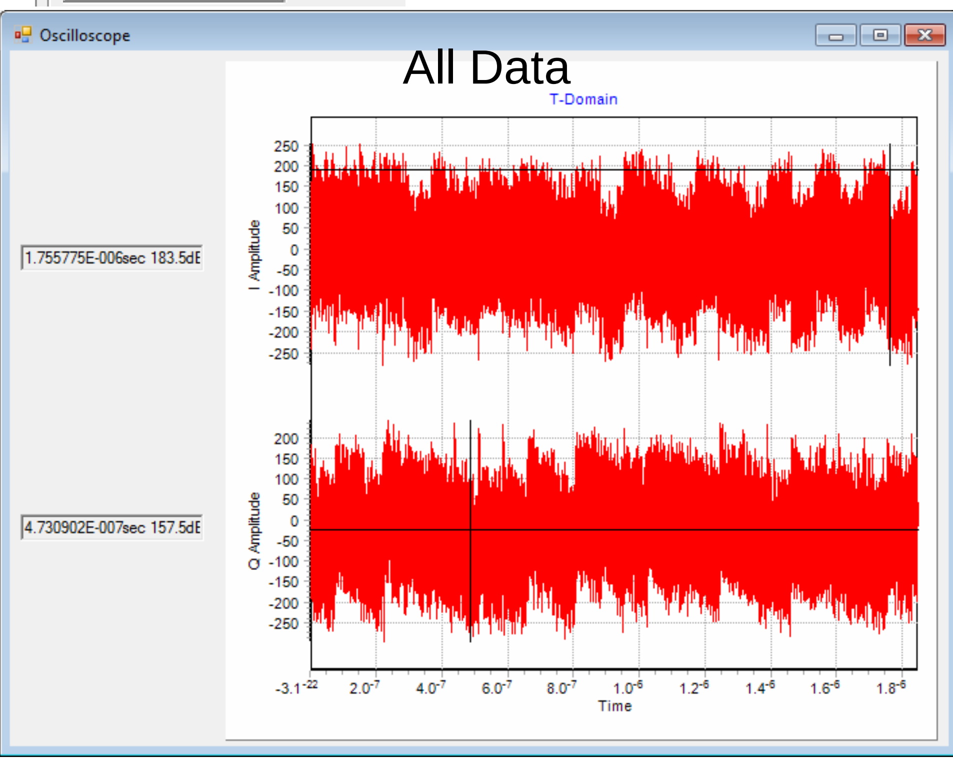
如果天线口加了偏移50kHz的-110dBm的CW信号作为参考，可以看到该CW信号的频谱。另外图中在75kHz可以看到一个明显的CW干扰, 比参考信号低5dB。

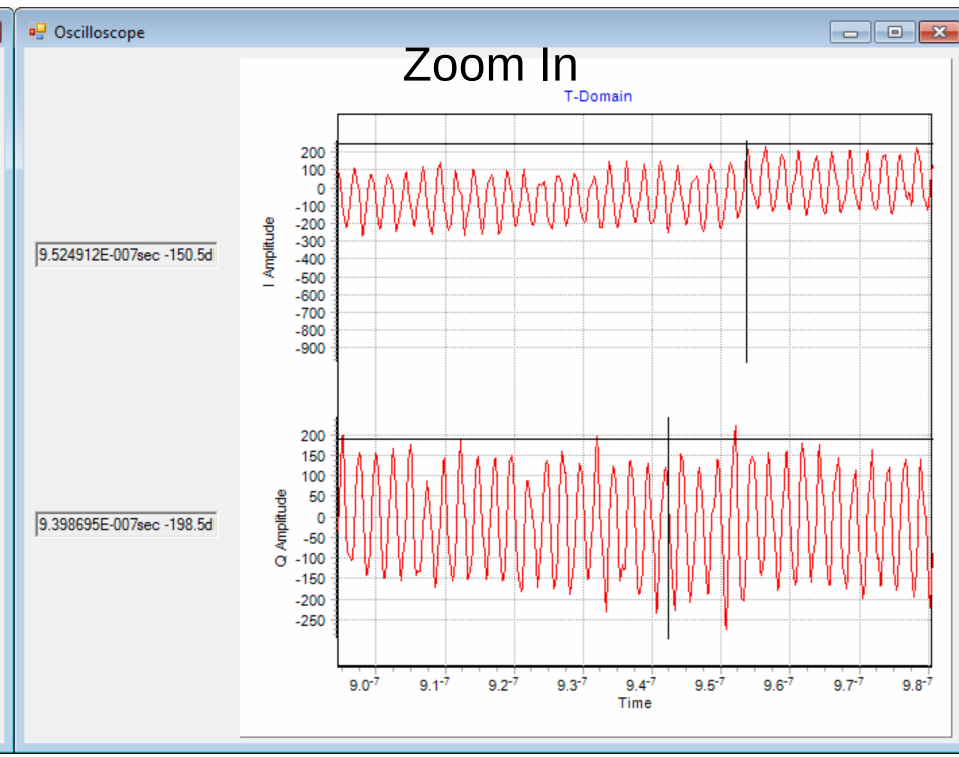




Use QRCT IQ capture to debug GSM desense issue

If you want to observe IQ waveform in time domain, pls select T-Domain under Graph IQ, then click “Graph IQ” button. Below is an example of -100dBm CW signal with 50kHz offset.
如果要看IQ的时域波形，可以在Graph IQ栏中选择T-Domain，然后点击Graph IQ按钮就可以看到IQ的时域波形。下面是一个天线口加了-100dBm偏移50kHz CW信号的例子。





Wrong NV definition in QXDM about RFNV_GSM_Cx_GSM<band>_ENH_TEMP_COMP_I

- **Platform**: All
- **适用平台**：All

- **Symptom**: Customer can’t find NV RFNV_GSM_Cx_GSM<band>_ENH_TEMP_COMP_I in QRCT after active it in QXDM.
- **问题描述**： RFNV_GSM_Cx_GSM<band>_ENH_TEMP_COMP_I 默认是不激活的，客户需要激活之后使用这项NV。 有些客户使用QXDM激活如下：

70877 RFNV GSM C0 GSM850 ENH TEMP COMP /nv/item_files/rfnv/00025108 RF GSM/E...

Fields

Input	Value	Name (Partial)	Size	Type
0	0	tempcomp_table.tempcomp_table[0]	16	INT16
0	0	tempcomp_table.tempcomp_table[1]	16	INT16
0	0	tempcomp_table.tempcomp_table[2]	16	INT16
0	0	tempcomp_table.tempcomp_table[3]	16	INT16
0	0	tempcomp_table.tempcomp_table[4]	16	INT16
0	0	tempcomp_table.tempcomp_table[5]	16	INT16
0	0	tempcomp_table.tempcomp_table[6]	16	INT16
0	0	tempcomp_table.tempcomp_table[7]	16	INT16
0	0	tempcomp_table.tempcomp_table[8]	16	INT16
0	0	tempcomp_table.tempcomp_table[9]	16	INT16
0	0	tempcomp_table.tempcomp_table[10]	16	INT16
0	0	tempcomp_table.tempcomp_table[11]	16	INT16

70877 RFNV GSM C0 GSM850 ENH TEMP COMP /nv/item_files/rfnv/00025108 RF GSM/E...

Fields

Input	Value	Name (Partial)	Size	Type
0	0	tempcomp_table.tempcomp_table[244]	16	INT16
0	0	tempcomp_table.tempcomp_table[245]	16	INT16
0	0	tempcomp_table.tempcomp_table[246]	16	INT16
0	0	tempcomp_table.tempcomp_table[247]	16	INT16
0	0	tempcomp_table.tempcomp_table[248]	16	INT16
0	0	tempcomp_table.tempcomp_table[249]	16	INT16
0	0	tempcomp_table.tempcomp_table[250]	16	INT16
0	0	tempcomp_table.tempcomp_table[251]	16	INT16
0	0	tempcomp_table.tempcomp_table[252]	16	INT16
0	0	tempcomp_table.tempcomp_table[253]	16	INT16
0	0	tempcomp_table.tempcomp_table[254]	16	INT16
0	0	tempcomp_table.tempcomp_table[255]	16	INT16

但是这样激活之后在QRCT中看不到此NV。

Wrong NV definition in QXDM about RFNV_GSM_Cx_GSM<band>_ENH_TEMP_COMP_I

- **Root Cause**:
- In QXDM this NV only contains 256 elements. But NV Docs and QRCT Nv definition show that this NV contains two arrays, each has 16*16 elements. The format in QXDM is wrong, so it is invisible in QRCT after active it in QXDM.
- **问题原因**:
- QXDM中显示此NV只有256个参数。但是NV文档中介绍如下：

9.3.1.15 RFNV_GSM_Cx_GSM<band>_ENH_TEMP_COMP_I

Data type: Structure of two arrays. Each is a 16 × 16, two-dimensional array of int16 elements, for a total of 256, int16 values per array. The first array is for GMSK, the second for EDGE. (Overall, this item contains 512, int16 values.)

QRCT的的Nv defination 文档定义如下：

<NvItem id="25108" name="RFNV_GSM_C0_GSM850_ENH_TEMP_COMP_I" permission="readwrite">

<Member type="GSM_EnhTempComp_temp_type" name="gmsk" sizeOf="1"/>

<Member type="GSM_EnhTempComp_temp_type" name="edge" sizeOf="1"/>

QRCT NV definition 和NV的定义是正确的，在QXDM中激活之后在QRCT看不到的原因是QXDM中此NV的格式并不正确。

Wrong NV definition in QXDM about RFNV_GSM_Cx_GSM<band>_ENH_TEMP_COMP_I

- **Solution**:
- 1. Add the correct format of this NV to XML.
- 2.Use QRCT to read the NV definition file, then edit it and write to phone.
- **解决办法**：
- 1.在XML中添加

<NvItem id="25108" subscriptionid="0" name="RFNV_GSM_C0_GSM850_ENH_TEMP_COMP_I" mapping="direct" encoding="dec" index="0">1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,11,1,1,1,1,1,1,1,1,111,1,1,1,1,1,1,1,1,1,1,11,1,11,1,1,1,1,1,1,1,1,1,11,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,11,1,11,1,1,1,1,11,11,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,11,1,11,11,1,1,1,1,1,1,1,11,1,111,1,1,1,1,11,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,11,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,11,11,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,11,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,11,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1111,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,11,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,11,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,11,1,1,1,1,1,1,1,1</NvItem>激活。

- 2. 用QRCT读取NV definition 然后编辑写入手机。

GSM BER failure under strong signal level

- **Platform**: MSM8976/MSM8952/MSM8953
- **适用平台**：MSM8976/MSM8952/MSM8953

- **Symptom**:
- BER "0%" with USB connection to PC (cell power: -60dBm)
- BER degradation "0% ~ 3%" without USB connection (cell power: -60dBm)
- **问题描述**：GSM 下行测试时，即使在Cell power=-60dBm的情况下，BER都会增大甚至超标，故障在插入usb线下消失。

- **Solution**: Apply CR933554.
- **解决办法**：申请CR933554。

QPA calibration issue - caused by WTR IQ rosin joint

- **Description** : most LTE/WCDMA bands' compression point is too low , but Tx power is normal . Increase the RGI , got no improvement. This issue found in production line。
- **描述：**大部分LTE/WCDMA频段压缩点太低，但是发射功率正常， 增大RGI后没改善。

MEASUREMENTS: Tx XPT Swp2 - Max M Line Power

Channel	XPT Mode	Vcc (mV)	XPT Swp2 Max MLine Power	Time (s)
27308	1	3400	24.149	

MEASUREMENTS: Tx XPT Swp2 - M Line RGI Compression

Channel	XPT Mode	TxAGC	Vcc (mV)	Compression (dB)	Compression Min	Time (s)
27308	1	60	1800	0.537443	2.5	
27308	1	61	2300	0.630341	2.5	
27308	1	62	2800	0.819172	2.5	
27308	1	63	3300	0.819172	2.5	

- **Root cause** : IQ trance is open or WTR rosin joint (WTR)
- **原因**：IQ线有开路或者WTR虚焊

- **Solution**: fixed by check IQ trance or re-solder WTR .
- **解决方案**：检查IQ线上的0R是否焊接良好或者重新加焊WTR

QPA calibration issue - caused by WTR IQ rosin joint

- **Description**: GSM max power cannot met target power . The cal log shows EDGE power is higher than GSM (normal board GSM power is higher than EDGE)。
- **描述**： GSM最大功率偏低达不到目标功率。从校准log来看EDGE的功率反而高于GSM功率，正常板子的GSM功率高于EDGE。

MEASUREMENTS: GSM/EDGE Tx DA Cal Sweep

Channel	Chain	PA Range	RGI	GSM PMEAS	EDGE PMEAS	Time (s)
512	0	0	0	-12.7	-1	
512	0	0	1	-11.7	0	
512	0	0	2	-10.2	1.6	
512	0	0	3	-8.8	2.9	
512	0	0	4	-7.4	4.5	
512	0	0	5	-5.9	5.9	
512	0	0	6	-4.5	7.3	
512	0	0	7	-3.3	8.6	
512	0	0	8	-2	9.9	
512	0	0	9	-0.5	11.4	
512	0	0	10	1.2	13.1	
512	0	0	11	2.7	14.6	
512	0	0	12	4.2	16.2	
512	0	0	13	5.6	17.6	
512	0	0	14	7.2	19.3	
512	0	0	15	8.7	[illegible]	
512	0	0	16	9.9	22	
512	0	0	17	11	23	
512	0	0	18	12	23.7	
512	0	0	19	13	24.6	
512	0	0	20	14.1	25.4	
512	0	0	21	15.3	26.2	
512	0	0	22	16.3	26.9	

GSM power lower than EDGE

- **Root cause**： IQ trance is open or WTR rosin joint (WTR)
- **原因**：IQ线有开路或者WTR虚焊

- **Solution**: fixed by check IQ trance or re-solder WTR .
- **解决方案**：检查IQ线上的0R是否焊接良好或者重新加焊WTR

1. Disabling HORxD completely
2. Trade-off between GSM PvT falling edge and ORFS switching
3. CDMA Tx Max power out of control due to incorrect customized RxD RFC

RF SW

Disabling HORxD completely

- **Platform:** all platform which has HORXD support
- **适用平台**： 所有支持HORxD的平台

- **Symptom**: HORXD is enabled default in QC release. It is needed to disable on devices which don’t support HORxD. Otherwise, some performance issue, including sensitivity, throughput, could be introduced.
- **问题描述**：在高通释放给客户的软件版本里，HORxD默认是使能的，但在那些不支持HORxD的终端上面，必须把它关闭，否则可能引入类似灵敏度和吞率下降的性能问题。

Disabling HORxD completely

- The method to disable HORxD
- RFC point of view, remove all bands from ho_rxd_bands_supported section in file rfc_<rf_card you used>_cmn_ag.c.

Before

```
/* ho_rxd_bands_supported */
{
  {
    /* Bit mask element 0 */
    (0),
    /* Bit mask element 1 */
    (0),
    /* Bit mask element 2 */
    ( ( (uint64)1 << (SYS_BAND_LTE_EUTRAN_BAND41 - 128) ) ),
  },
},
```

After

```
/* ho_rxd_bands_supported */
{
  {
    /* Bit mask element 0 */
    (0),
    /* Bit mask element 1 */
    (0),
    /* Bit mask element 2 */
    (0),
  },
},
```

- Disable HORxD from ML1 Level by EFS/NV
  - Set NV#73703 (Equivalent with EFS: /nv/item_files/modem/lte/ML1/ho_rxd_config) as following value to disable HORxD permanently from ML1 level
  - EFS View (binary Value)

```
ho_rxd_config
           0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00000000h: 00 00 00 00 1E 00 14 00 00 00 00 00 00 00 00 00 ; ................
```

  - NV View by QXDM

```
73703   LTE ML1 HO RXD Config              /nv/item_files/modem/lte/ML1/ho_rxd_config
73704   PLMN Blocking Needed In LTE Only ...  /nv/item_files/modem/mmode/is_plmn_block_req_in_lte_only_mode
```

Fields

Input	Value	Name (Partial)	Size	Type
0	0	ho_rxd_enable	16	UINT16
0	0	unused	16	UINT16
0	0	schd_rate_off_2_on	16	UINT16
0	0	schd_rate_on_2_off	16	UINT16
0	0	cinr_thres_off_2_on	16	INT16
0	0	cinr_thres_on_2_off	16	INT16
0	0	reserved_2	16	UINT16
0	0	reserved_3	16	UINT16

Disabling HORxD completely

- 如何完全关闭HORxD
- 从RFC代码层次关闭，需要把所有的BAND都从对应RF卡的cmn文件（rfc_<rf_card you used>_cmn_ag.c）ho_rxd_bands_supported段移除.

在频段B41上使能了HORxD

```
/* ho_rxd_bands_supported */
{
  {
    /* Bit mask element 0 */
    (0),
    /* Bit mask element 1 */
    (0),
    /* Bit mask element 2 */
    ( ( (uint64)1 << (SYS_BAND_LTE_EUTRAN_BAND41 - 128) ) ),
  },
},
```

没有在任何频段使能HORXD

```
/* ho_rxd_bands_supported */
{
  {
    /* Bit mask element 0 */
    (0),
    /* Bit mask element 1 */
    (0),
    /* Bit mask element 2 */
    (0),
  },
},
```

- 通过NV与其相应的EFS文件从协议层一关闭HORxD
  - 设置NV#73703 (等价EFS文件路径: /nv/item_files/modem/lte/ML1/ho_rxd_config)的第一个元素为0可以从协议栈层次永久关闭HORXD
  - EFS文件视角(二进制格式)

```
ho_rxd_config
            0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00000000h: 00 00 00 00 1E 00 14 00 00 00 00 00 00 00 00 00 ; ................
```

  - 在QXDM中NV视角

73703	LTE ML1 HO RXD Config	/nv/item_files/modem/lte/ML1/ho_rxd_config
73704	PLMN Blocking Needed In LTE Only ...	/nv/item_files/modem/mmode/is_plmn_block_req_in_lte_only_mode

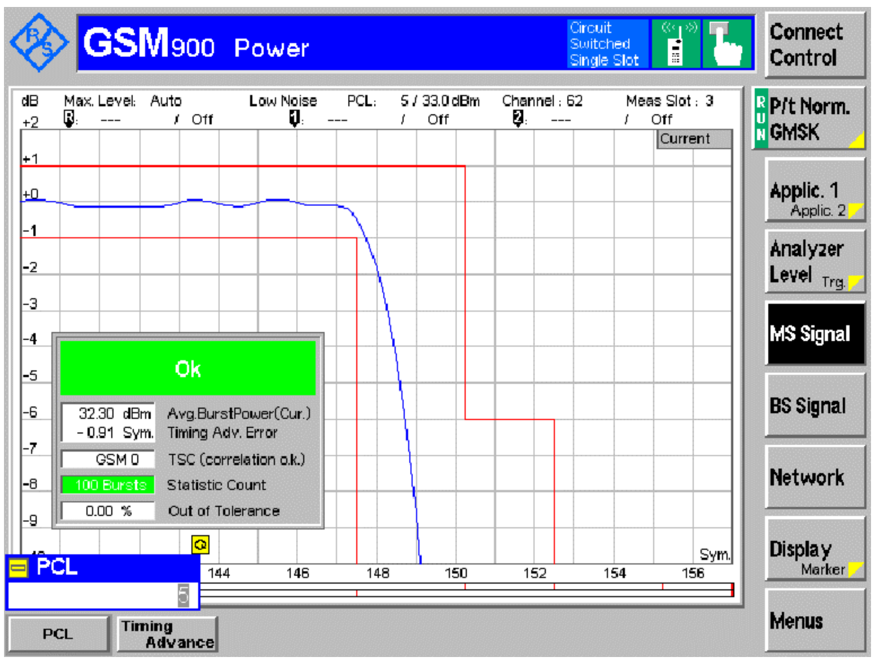
Fields

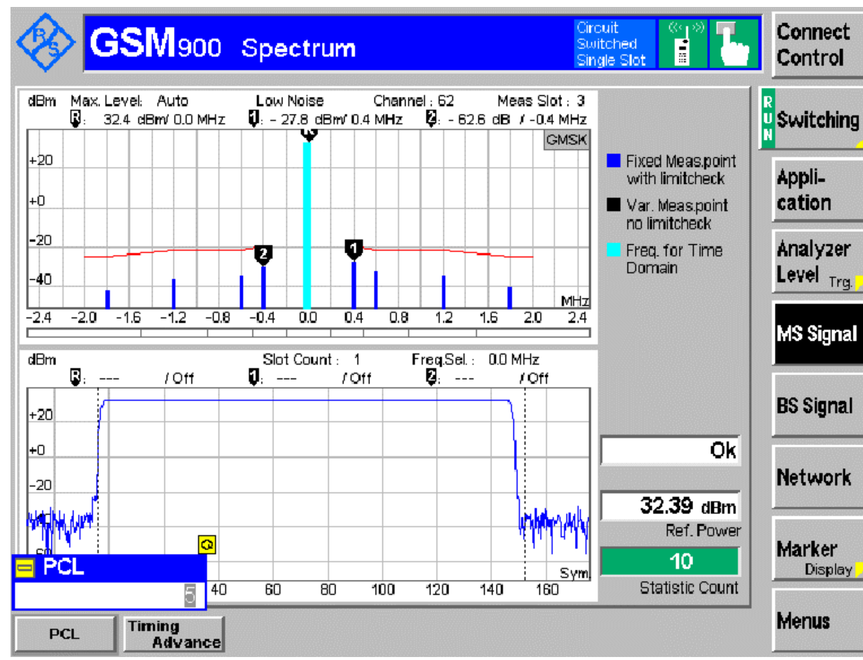
Input	Value	Name (Partial)	Size	Type
0	0	ho_rxd_enable	16	UINT16
0	0	unused	16	UINT16
0	0	schd_rate_off_2_on	16	UINT16
0	0	schd_rate_on_2_off	16	UINT16
0	0	cinr_thres_off_2_on	16	INT16
0	0	cinr_thres_on_2_off	16	INT16
0	0	reserved_2	16	UINT16
0	0	reserved_3	16	UINT16

Trade-off between GSM PvT falling edge and ORFS switching

- **Platform**: MSM8909+WTR4905,MSM8952/76+WTR2955/65
- **适用平台**：MSM8909+WTR4905,MSM8952/76+WTR2955/65

- **Symptom**: GSM PvT right upper corner of falling edge is very close to left limit, it can be improved by tune timing, but GSM ORFS switching @PCL5 will be worse out of limits.
- **问题描述**：GSM PvT下降沿的右上拐角靠左侧)比较临界，调整Timing NV能改善，但GSM 开关谱会恶化(有可能超标)。如下图GSM900 @PCL5测量结果例子。





Trade-off between GSM PvT falling edge and ORFS switching

- **Root Cause**:

  1. GSM RF has a trade-off between GSM PvT (right corner part of falling edge) and GSM ORFS switching @400kHz when testing higher power (like G900 PCL5).

  2. OEM FE design limiting, GSM DA RFCAL higher power part saturated(e.g. below figure), which contributed to worse ORFS switching.

- **原因**:

  1. GSM RF的功率对时间模板(下降沿右上拐角部分)与GSM开关频谱之间存在相互制约关系

  2. 因客户前端设计的限制, GSM DA校准高功率部分已饱和(如下图例子所示)，也可能对开关频谱恶化提供贡献。

37	0	0	25	31.537	27.21
37	0	0	26	32.1598	28.3818
37	0	0	27	32.6765	29.6721
37	0	0	28	32.9646	30.7458
37	0	0	29	33.025	31.2972
37	0	0	30	33.047	31.9009
37	0	0	31	33.0615	32.3686

124	0	0	25	31.4243	27.3299
124	0	0	26	31.9803	28.4824
124	0	0	27	32.4483	29.7139
124	0	0	28	32.6781	30.7127
124	0	0	29	32.7149	31.2138
124	0	0	30	32.7238	31.7578
124	0	0	31	32.7168	32.1707

975	0	0	25	31.5669	27.0656
975	0	0	26	32.2621	28.245
975	0	0	27	32.8512	29.5751
975	0	0	28	33.2086	30.7136
975	0	0	29	33.2944	31.3224
975	0	0	30	33.3633	31.9849
975	0	0	31	33.3638	32.53

Trade-off between GSM PvT falling edge and ORFS switching

- **Solution**:

  1. Base on current MPSS release default static NVs value, to fine tune "**pa_stop_offset_adj**" value of **RFNV_GSM_Cx_GSM<band>_TX_TIMING_I.** If it requires more marginal on ORFS switching, please try fine tune ramp down part of (e.g. add one more 9800 into 1st & 2nd Ramp_down values)**RFNV_GSM_Cx_GSM<band>_POLAR_RAMP_PROFILE_I**, according to actual design test result.

  2. Tune HW matching to eliminate PA Tx saturation contributing non-linear to worse ORFS. Otherwise to accept more trade-off.

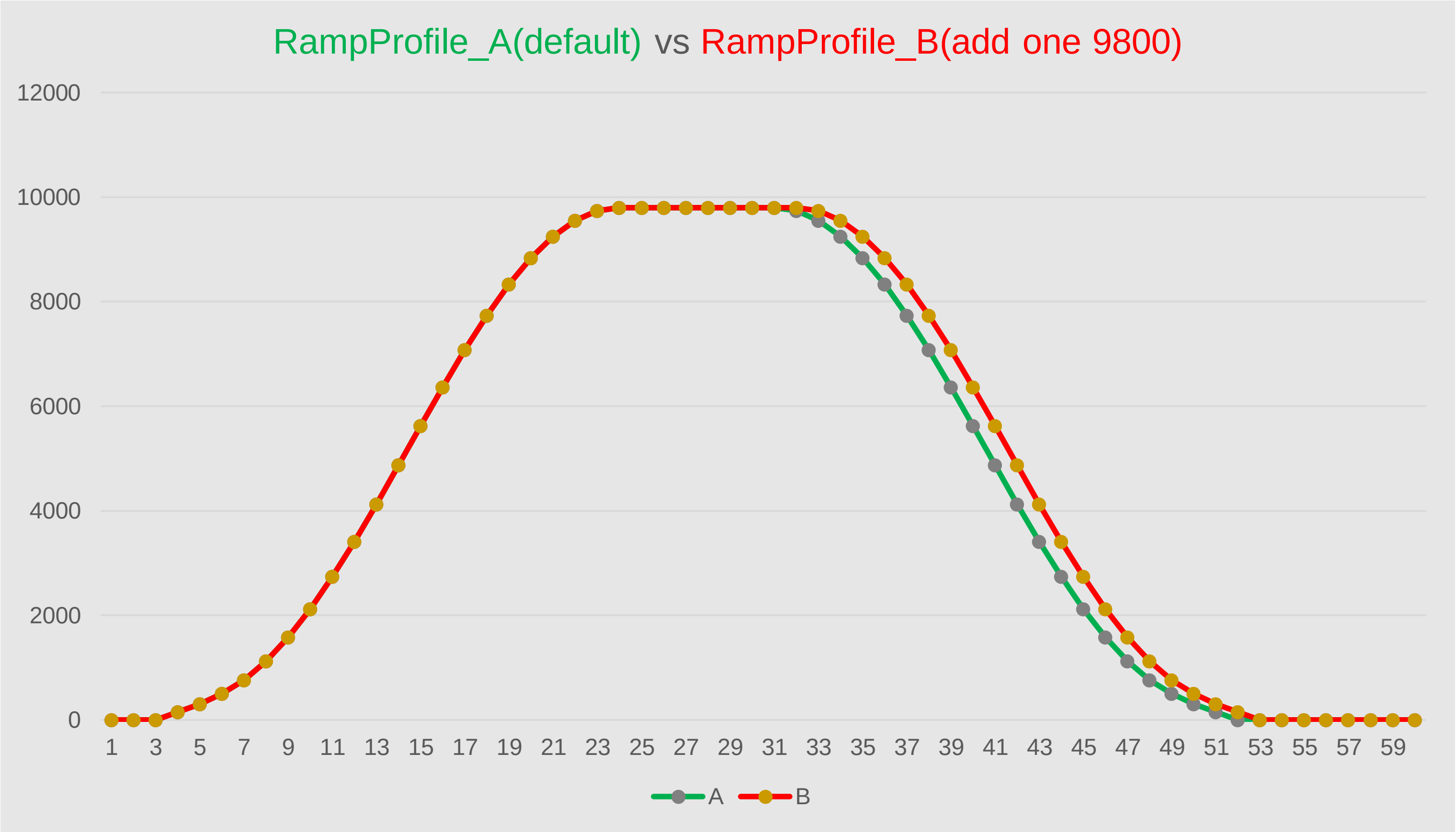
- **解决办法**：

  1. 基于当前MPSS软件默认静态NV设置条件下的实际测试结果, 可微调**RFNV_GSM_Cx_GSM<band>_TX_TIMING_I**的"**pa_stop_offset_adj**"。如果微调timing后的需要更多的开关频谱，可尝试微调**RFNV_GSM_Cx_GSM<band>_POLAR_RAMP_PROFILE_I**中的下降沿部分，例如尝试在第1和第2个下降沿值中添加1个9800值是否有所帮助(如下图所示)。

  2. 调硬件匹配以排除PA发射饱和对频谱恶化的贡献。

Trade-off between GSM PvT falling edge and ORFS switching

A	9800	9740	9556	9252	8842	8331	7737	7077	6367	5626	4872	4128	3411	2737	2123
B	9800	9800	9740	9556	9252	8842	8331	7737	7077	6367	5626	4872	4128	3411	2737



Trade-off between GSM PvT falling edge and ORFS switching

- **Result:**

  This trade-off has no side effect, PvT is stable among different power supply voltages.

- **结果:**

  没有边际问题，当前相互制约下的PvT模板在不同供电电压下测试结果是稳定的。

CDMA Tx Max power out of control due to incorrect customized RxD RFC

- **Platform**: non-WTR3925 design Platforms
- **适用平台**：非WTR3925设计的平台

- **Symptom**:

In 8976 platform, issue is reported that 1x C2k Tx max power would higher than 28dBm (as below Figure. A) once 1x C2k RxD is enabled/disabled dynamically by L1.

- **问题描述**：

在8976 平台测试CDMA最大发射功率时, 发现只要1x L1 动态打开和关闭接收分集，就会得到28dBm以上测量结果 (如下图A所示)。

```
Srch TNG Demod Status   05:03:00.021        TC F:1 [ RX0  0/384 ] [ -99/      ] [ 30/   29/ 13] PN 12[ -8.1/F(E
Srch TNG Demod Status   05:03:00.041        TC F:1 [ RX0  0/384 ] [ -99/      ] [ 30/   29/ 13] PN 12[ -8.2/F(E
Srch TNG Demod Status   05:03:00.061        TC F:1 [ RX0  0/384 ] [ -99/      ] [ 30/   29/ 13] PN 12[ -8.0/F(E
Srch TNG Demod Status   05:03:00.081        TC F:1 [ RX0  0/384 ] [ -99/      ] [ 30/   29/ 13] PN 12[ -8.1/F(E
Srch TNG Demod Status   05:03:00.101        TC F:1 [ RX0  0/384 ] [ -99/      ] [ 30/   29/ 13] PN 12[ -7.8/F(E
Srch TNG Demod Status   05:03:00.121        TC F:1 [ RX0  0/384 ] [ -99/      ] [ 30/   29/ 13] PN 12[ -8.1/F(E
```

Figure A. Tx power 30dBm or so

CDMA Tx Max power out of control due to incorrect customized RxD RFC

- **Root Cause**:

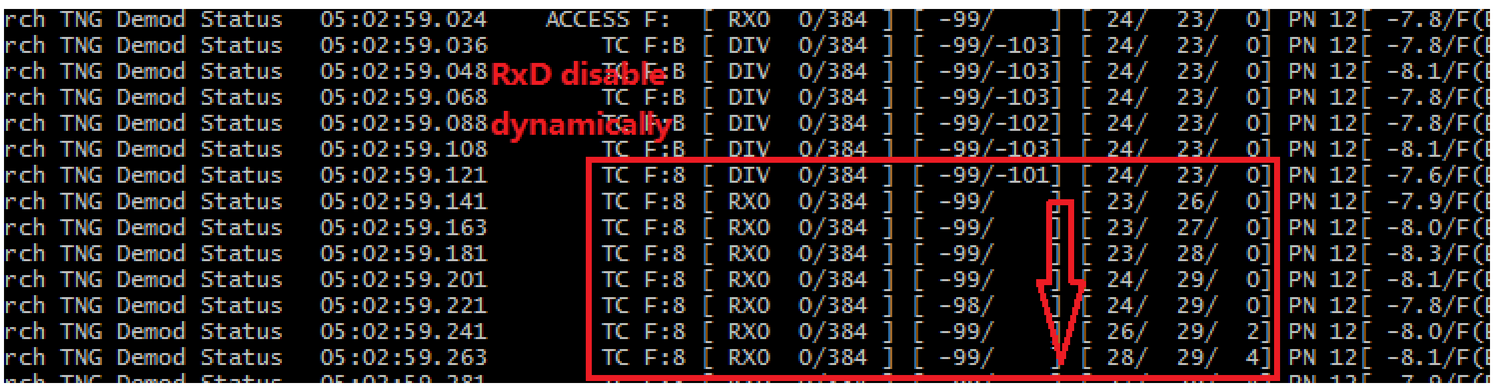
  1. Customer accidently duplicate a ANT_SEL (logic HIGH) signal from Tx0 signal configure table into in C2k RFC Rx1/Rx0 signal configure table, and the ANT_SEL is designed for a GRFC switcher control within FBRX_HDET circuit part.

  2. Once 1x L1 dynamically switches RxD disable from enable and RFSW will set the ANT_SEL signal to be initial state LOW logic, afterwards affecting HDET reading, getting big Tx error and abnormal Tx max power (as below Figure. B).

CDMA Tx Max power out of control due to incorrect customized RxD RFC

- **原因:**

  1. 意外地在RFC中将控制FBRX_HDET通路中的GRFC开关信号，从Tx0信号配置中同时复制在CDMA Rx1和Rx0信号配置当中。
  2. 在实际测试过程中，CDMA 接收分集会被L1动态打开和关闭，当分集关闭时RFSW将FBRX_HDET通路中的GRFC开关信号初始化为低，此时影响HDET读值从而最终反映到最大发射功率异常(如下图B所示)。



```
rch TNG Demod Status   05:02:59.024   ACCESS F:  [ RX0  0/384 ] [ -99/     ] [ 24/  23/  0] PN 12[ -7.8/F(E
rch TNG Demod Status   05:02:59.036       TC F:B [ DIV  0/384 ] [ -99/-103] [ 24/  23/  0] PN 12[ -7.8/F(E
rch TNG Demod Status   05:02:59.048       TC F:B [ DIV  0/384 ] [ -99/-103] [ 24/  23/  0] PN 12[ -8.1/F(E
rch TNG Demod Status   05:02:59.068       TC F:B [ DIV  0/384 ] [ -99/-103] [ 24/  23/  0] PN 12[ -7.8/F(E
rch TNG Demod Status   05:02:59.088       TC F:B [ DIV  0/384 ] [ -99/-102] [ 24/  23/  0] PN 12[ -7.8/F(E
rch TNG Demod Status   05:02:59.108       TC F:B [ DIV  0/384 ] [ -99/-103] [ 24/  23/  0] PN 12[ -8.1/F(E
rch TNG Demod Status   05:02:59.121       TC F:8 [ DIV  0/384 ] [ -99/-101] [ 24/  23/  0] PN 12[ -7.6/F(E
rch TNG Demod Status   05:02:59.141       TC F:8 [ RX0  0/384 ] [ -99/     ] [ 23/  26/  0] PN 12[ -7.9/F(E
rch TNG Demod Status   05:02:59.163       TC F:8 [ RX0  0/384 ] [ -99/     ] [ 23/  27/  0] PN 12[ -8.0/F(E
rch TNG Demod Status   05:02:59.181       TC F:8 [ RX0  0/384 ] [ -99/     ] [ 23/  28/  0] PN 12[ -8.3/F(E
rch TNG Demod Status   05:02:59.201       TC F:8 [ RX0  0/384 ] [ -99/     ] [ 24/  29/  0] PN 12[ -8.1/F(E
rch TNG Demod Status   05:02:59.221       TC F:8 [ RX0  0/384 ] [ -98/     ] [ 24/  29/  0] PN 12[ -7.8/F(E
rch TNG Demod Status   05:02:59.241       TC F:8 [ RX0  0/384 ] [ -99/     ] [ 26/  29/  2] PN 12[ -8.0/F(E
rch TNG Demod Status   05:02:59.263       TC F:8 [ RX0  0/384 ] [ -99/     ] [ 28/  29/  4] PN 12[ -8.1/F(E
```

CDMA Tx Max power out of control due to incorrect customized RxD RFC

- **Solution:**

  remove the duplicated the ANT_SEL signal from C2k RFC Rx1 & Rx0 signal configure.

- **解决办法**：

  不要将CDMA RFC发射的相关GRFC信号复制到分集或主集信号配置。

Questions?

https://support.cdmatech.com