高通RF技术期刊2016-11-30

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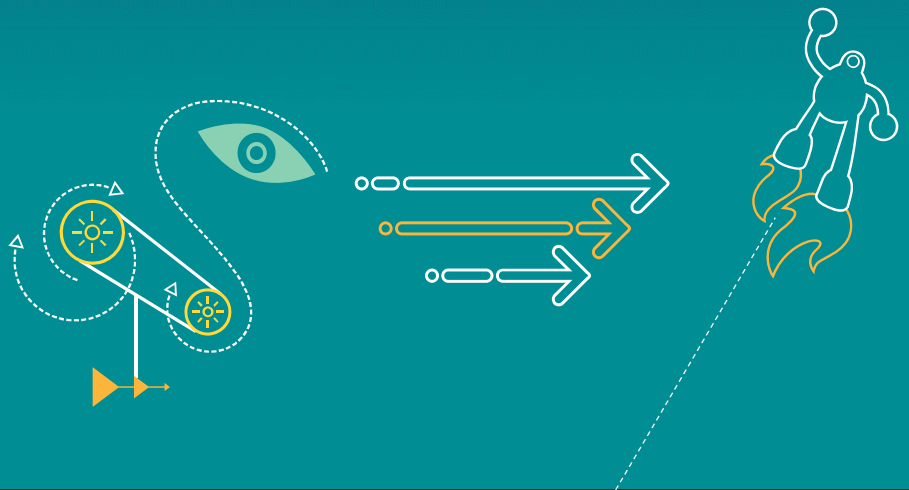

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Revision History

Revision	Date	Description
A	Nov 2016	Initial release

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

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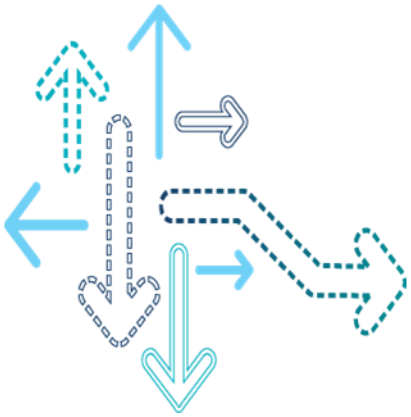
RF HW



WTR3925+MSM8920/40/53 design chip selection

- **KBA number**: KBA-161130071536
- **Platform**: MSM8920/40/53(12*14) + WTR3925
- **适用平台**： MSM8920/40/53(12*14) + WTR3925

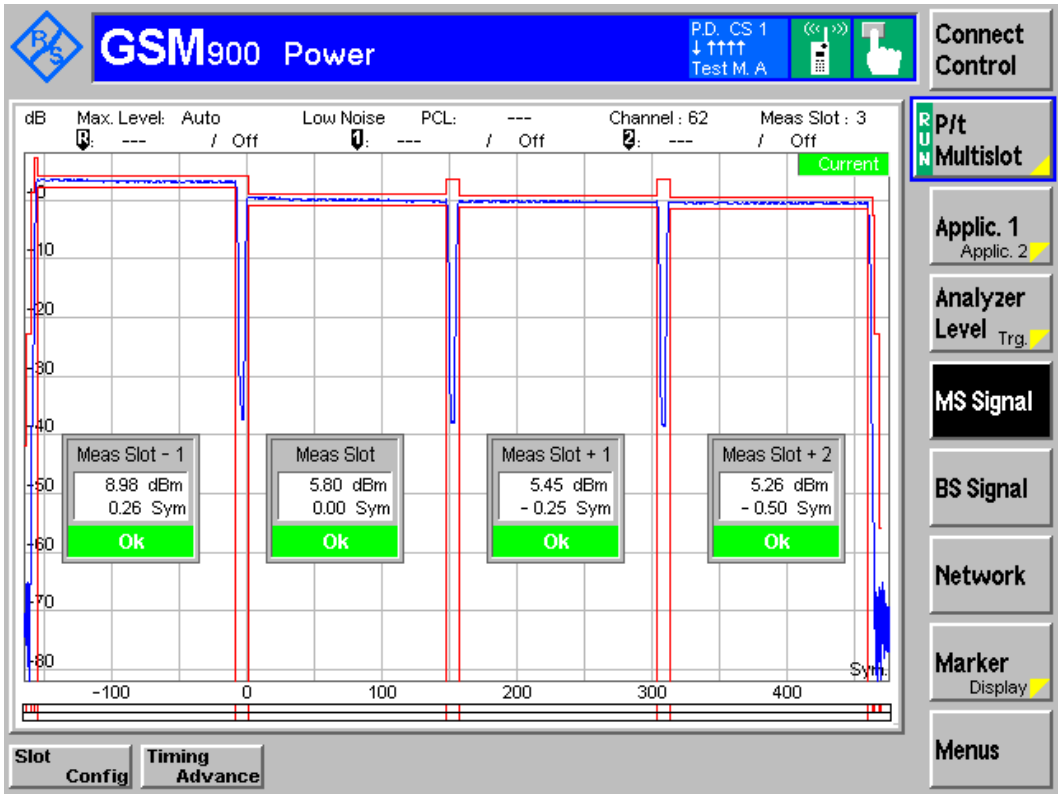
- **Symptom**: For MSM8920/40/53(12*14) chip non-CA version, BB_Rx_CH3 is disabled. But when attach with WTR3925, DRx_CA2 IQ line is shared with WTR3925 FBRx IQ and is connected to BB_Rx_CH3. If BB_Rx_CH3 is disabled, then WTR3925's FBRx function cannot work.
- **问题现象**： 对于MSM8920/40/52(12*14)的non-CA基带芯片，它的BB_Rx_CH3被关闭了。但是当射频芯片搭配WTR3925时，由于MSM侧没有专用的FBRx IQ接口，所以WTR3925借用了DRx_CA2的IQ，而DRx_CA2的IQ是连接在BB_Rx_CH3上的。所以如果使用non-CA的MSM8920/40/52的基带芯片，那由于BB_Rx_CH3已经关闭了，那么WTR3925的FBRx功能无法使用。

- **Solution**: For MSM8920/40/53(12*14) +WTR3925 design, please select MSM chip that could support CA to do the design.
- **解决方案**：对于MSM8920/40/53(12*14)+WTR3925的设计，请选用能支持CA的基带芯片，否则WTR3925无法正常工作。

GPRS/EDGE Multi slots power issue in low bands

- **KBA number**: KBA-161201005212
- **Platform**: All platform

- **Symptom**:
- GPRS/EDGE Multi slots power test result is abnormal, take one of them as below example:
- 在测试GRRS/EDGE多时隙功率时，各时隙功率不平台，差异较大。如下图所示的异常测试结果。



GPRS/EDGE Multi slots power issue in low bands

- **Analysis**:
- There is no such issue @ WTR_DA port. Issue follows the SWPT setting and only can be seen at low gain mode.
- 问题分析：
- 在收发芯片口看不到这种问题，问题定位在射频前端。另外故障只发生在低增益状态，随着切换点的变更，发生问题的功率范围会随之改变。

- **Solution**:
- This should be PA defect(QM77002), when using HPM+MPM, issue can be seen, change either of LPM or ULPM, issue disappear. Make sure change the Cal tree and SWPT simultaneously. Below two changes are both OK.
- Modify Cal tree, using PA range 0,3 (rather than 0,1 as usual), at the same time, change the <NvItem id="27501" subscriptionid="0" name="RFNV_GSM_C0_GSM900_EXTENDED_PA_SWPT_I" mapping="direct" encoding="dec" index="0">1000,1000,1000,65535,65535,65535,65535,65535,65535,65535,65535,65535,65535,65535,1750,65535</NvItem>

GPRS/EDGE Multi slots power issue in low bands

- 2.In Cal tree, use PA range 0,2 (rather than 0,1), at the same time, change the <NvItem id="27501" subscriptionid="0" name="RFNV_GSM_C0_GSM900_EXTENDED_PA_SWPT_I" mapping="direct" encoding="dec" index="0">1000,1000,65535,65535,65535,65535,65535,65535,65535,65535,65535,65535,65535,65535,1750,65535</NvItem>

- Both above changes can help to solve this issue.

- **解决方案**:
- QM77002的MPM增益状态导致了问题的发生，使用LPM或者ULPM均可以使问题得到解决。确保同时修改校准参数和NV中的切换点设置。

WTR3925 and WTR4905 DA output power very low

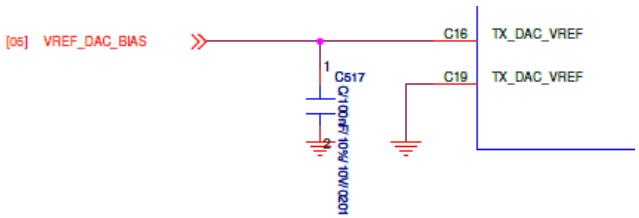
- **KBA number**: KBA-161202020301
- **Platform**: MDM9X40+WTR3925 and MDM9X40+WTR3925+WTR4905
- **适用平台**： MDM9X40+WTR3925 and MDM9X40+WTR3925+WTR4905

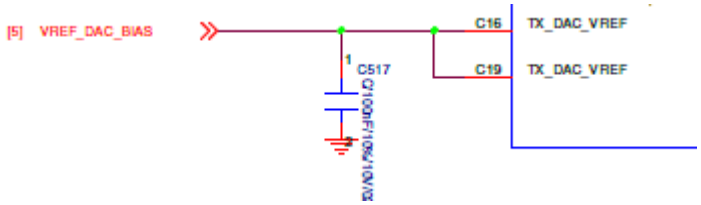
- **Symptom**: Customer met all band WTR4905 and WTR3925 output power very lower only -56dbm, PA output is -28dbm. WTR4905 and WTR3925 used the same TX DAC0 path.
- **问题现象**： 客户遇到WTR4905和WTR3925所有的频段输出功率非常低，只有-56dbm，PA的输出也只有-28dbm。WTR4905和WTR3925使用同一个TX DAC0通路。

- **Analyze and Root cause**:
  - Customer tested its MDM9240 PIN C16 TX_DAC_VREF voltage, it was 0V.
  - In customer schematic, MDM Pin C16 connected with VREF_DAC_BIAS, and MDM Pin C19 connected with GND as below left picture.
    - Actually the MDM C16 and C19 pin connect together in MDM9240 chipset internal.
    - Customer cut off the GND line of MDM C19 PIN, MDM PIN C16 can work normally.
    - The root cause is that TX_DAC_VREF C16 and C19 PIN should be connect with VREF_DAC_BIAS Whatever we use one or two TX_DAC path as right picture. It is different from previous platform.

WTR3925 and WTR4905 DA output power very low (cont.)

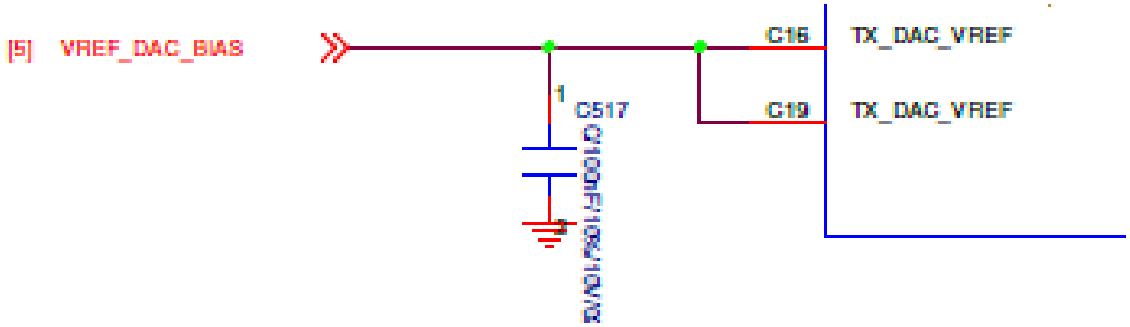
- **分析和原因**：
  - 客户测量MDM9240 管脚C16 TX_DAC_VREF 电压为0V。
  - 如左下图中的客户原理图，MDM管脚C16连接到VREF_DAC_BIAS, 同时MDM管脚C19接地。
  - 实际上，在MDM9240芯片内部，管脚C16和C19连接在一起。
  - 客户切断MDM 管脚C19 地线，测量MDM 管脚C16 供电正常。
  - 该问题的本质根源：无论使用一路或者两路TX_DAC 通路，TX_DAC_VREF C16和C19应该连接到VREF_DAC_BIAS. 如右下图所示。这不同于以前平台。





WTR3925 and WTR4905 DA output power very low (cont.)

- **Solution**: Modify the MDM PIN C19 connection as below picture
- **解决方法**：修正MDM 管脚C19 的连接如下图。

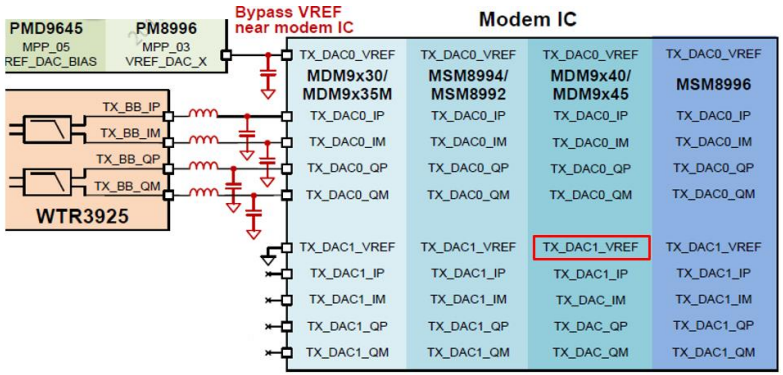


WTR3925 and WTR4905 DA output power very low (cont.)

- **Addition**: If only one WTR is present, for MDM9X40&MDM9X45 TX DAC and VREF &IREF connection, refer to document 80-NP505-5B_L MDM9X45 AND MDM9X40 CHIPSET INTRODUCTION DESIGN GUIDELINES P140。

Signal name	Termination
If only one WTR is present, unused signals:	
BBRX/GNSS (any unused)	GND
TX_DAC0/1_P/M (any unused)	Float
TX_DAC_REF	Power
ET_DAC0/1_P/M (any unused)	Float
VDD_A2	Power

If only one WTR is present, there is a typo for WTR3925+MDM9X40/MDM9X45 in WTR3925 training slides 80-NH379-5A_K WTR3925_WTR3915_WTR3905_WTR3605 RF TRANSCEIVER DESIGN GUIDELINES TRAINING SLIDES P111. The TX_DAC1_VREF should connect with PDM9645 REF_DAC_BIAS as red dash line.

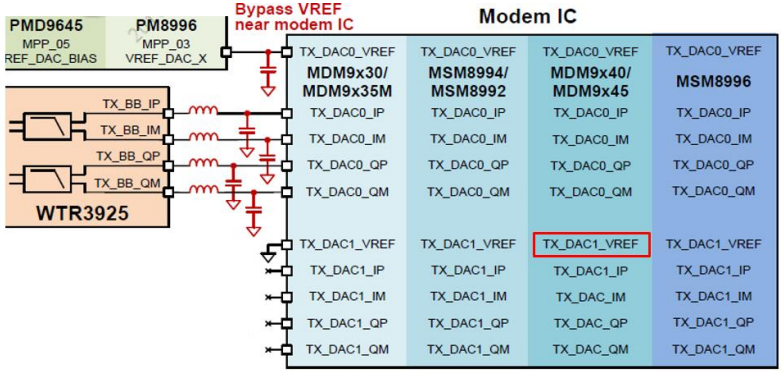


WTR3925 and WTR4905 DA output power very low (cont.)

- **附加**：如果只使用一个WTR，对MDM9X40和MDM9X45 TX DAC 和 VREF和IREF的连接，请参考文档 80-NP505-5B_L MDM9X45 AND MDM9X40 CHIPSET INTRODUCTION DESIGN GUIDELINES P140。

Signal name	Termination
If only one WTR is present, unused signals:	
BBRX/GNSS (any unused)	GND
TX_DAC0/1_P/M (any unused)	Float
TX_DAC_REF	Power
ET_DAC0/1_P/M (any unused)	Float
VDD_A2	Power

如果只有使用一个WTR，针对WTR3925+MDM9X40/MDM9X45配置时，在WTR3925的培训文档中80-NH379-5A_K WTR3925_WTR3915_WTR3905_WTR3605 RF TRANSCEIVER DESIGN GUIDELINES TRAINING SLIDES P111有个错误. TX_DAC1_VREF 应该连接到 PDM9645 REF_DAC_BIAS 如下图中的虚线所示.



WTR3925 and WTR4905 DA output power very low (cont.)

- **Addition**：Please refer to below documents for other MDM platform TX DAC and DAC_VREF connection.
  - 80-N5423-92_C MDM9X15 P7
  - 80-N5423-5_M MDM9X15 P177
  - 80-NA804-5B_D MDM8225 and MDM9x25(M) Chipset Design Guideline –Digital Baseband P158
  - 80-NH377-5B_H MDM9X35M AND MDM9X30 CHIPSET - ARCHITECTURE AND DIGITAL BASEBAND DESIGN GUIDE P185
  - 80-NP505-5B_L MDM9X45 AND MDM9X40 CHIPSET INTRODUCTION DESIGN GUIDELINES P140
  - 80-NH379-5A_K WTR3925_WTR3915_WTR3905_WTR3605 RF TRANSCEIVER DESIGN GUIDELINES_TRAINING SLIDES P111

WTR3925 and WTR4905 DA output power very low (cont.)

- **附加**：对其他的MDM平台的TX DAC和DAC_VREF的连接，请参考下面的文档
  - 80-N5423-92_C MDM9X15 P7
  - 80-N5423-5_M MDM9X15 P177
  - 80-NA804-5B_D MDM8225 and MDM9x25(M) Chipset Design Guideline –Digital Baseband P158
  - 80-NH377-5B_H MDM9X35M AND MDM9X30 CHIPSET - ARCHITECTURE AND DIGITAL BASEBAND DESIGN GUIDE P185
  - 80-NP505-5B_L MDM9X45 AND MDM9X40 CHIPSET INTRODUCTION DESIGN GUIDELINES P140
  - 80-NH379-5A_K WTR3925_WTR3915_WTR3905_WTR3605 RF TRANSCEIVER DESIGN GUIDELINES_TRAINING SLIDES P111

QET4100 FAQ

- **KBA number**: KBA-161108193004
- **Platform**: MSM8998+QET4100
- **适用平台**：MSM8998+QET4100

- **Q1**: On QFE4100, How many PNs do we recommend for Buck and BOB inductor? Is there any second source?
- **A**：For the buck inductor, there is 0.8mm Cyntec inductor as primary source with best performance, MPN, Cyntec: SDQM20160H-1R0MSR-39.
- The second source for L1 is TDK: TFM201608ALC1R0MTAA, which has Slight performance degradation than the primary source of Cyntec one, roughly ~ 1dB/Hz RxBN degration.
- For the boost inductor, it's not as critical as the buck. If customer need second source, we can check main parameters (DCR, Isat, inductor decay vs current etc.) against reference one in case by case situation.
-
- **Q2**: What's ET Vmax QET4100 can support compared to QET3100?
- **A**: Per device spec., the ET Vmax(output peak) for QFE3100 is up to 4.2V, and for QET4100 is up to 4.6V.

QET4100 FAQ

- **Q3**: Which pin on PMC should ECM_OUT(pin10) on QET4100 connects ?
  A: It's optional, no need to connect this. DNI is ok.
-
- **Q4**: Can QFE3100/QET4100 support HPUE?
- **A**: QFE3100 cannot support class 2 PA, since this part has been CSed for a while, no effort to re-qualify it. QET4100 can support HPUE, but requires two 0603 size 22uF bypass caps for VDD_AMP, as already updated in 80-P2014-111 and 80-P2014-5. 80-P2014-1 also has the updated load spec. for HPUE in table 3-6.
-
- **Q5**: Whether LDO circuit is enabled when ET mode?
- **A**: No, LDO is only enabled at APT mode.
-
- **Q6**: ET DAC signals are routed from MSM or WTR to QET4100?
- **A**: ET DACs are connected to WTR instead of MSM.

- **Q7**: Assist LDO is used for increasing voltage or decrease voltage?
- **A**: Assist LDO provide additional current in parallel to the buck when enabled, and the benefit of using Assist LDO instead of bypass is to keep consistence output voltage, to avoid the voltage jump around the Vset.

QET4100 FAQ

- **Q8**: TX I & Q are pre-distortion signals?
- **A**: Yes, at ET/EPT system. There is a DPD(Digital Pre-distortion) before TX DAC, which improves the non-linearity at ET/EPT system. No DPD at APT system.
-
- **Q9**: The input for APT Buck need to connect to two source (Boost/VPH_PWR) at external? And auto switch it internally?
- **A**: Yes, QET4100 will auto switch the power source in ET mode based on the battery level and desired ET Vmax. Note that this is only available in ET mode. In APT mode, the buck is connected to VPH_PWR, but there is LDO-assist.

- **Q10**: Why APT mode has high efficiency in your KPI in page 28 of 80-P2014-5?
- **A**: The table only list QET4100 chip level efficiency, not including PA data. PA operating in ET mode is much more efficient than in APT mode. This makes the overall system efficiency in ET mode higher than in APT mode.

- **Q11**: How to calculate the efficiency of QET4100 chip?
- **A**: Vout*Iout/Vin*Iin of QET.

QET4100 FAQ

- **Q12**: What's the function of shunt RC snubber circuit on QET4100 VPA?
- **A**: This shunt RC is the snubber circuit for the stability of ET mode reserved. If there is any possibility to cause the PA oscillation, this snubber installed could help to stabilize the circuit. The RC snubber at QET4100 output side is required. The snubber at PA side is optional, place holder required only for LTE 40MHz intra-band contiguous CA support.
-
- **Q13**: How many ET PA the QET4100 can connect to?
- **A:** Depend on the limitation of ET mode load capacitance, less than 1000pF for QET4100. This includes all ET PA's internal and external bypass capacitors at their ET supply pins.
-
- **Q14**: QFE3100 has Vbatt output while QET4100 has not. What is it used for? How to supply to PA VBAT pin with QFE4100?
- **A**: QFE3100 Vbatt output can be an option to be used as power supply of the PA bias circuits, another option is VPH_PWR. For design with QET4100, VPH_PWR can be used for power supply of PA bias circuits.

QET4100 FAQ

- **Q15**: Can QFE2101 be used on MSM8998 platform for APT only mode?
- **A**: Yes, QET4100 can support full APT mode. However, its main advantage is ET support in addition to APT. For APT only, QFE2101 is a cheaper solution, and also less BOMs and PCB area.
-
- **Q16**: In 80-P2014-111, page16, the recommended distance from QET4100 VAMP (pin4) to an RF PA VCC1/VCC2 pin is less than 15mm. Can we use trace longer than 15mm?
- **A**: The 15mm requirement is not hard limit, it's most likely OK if you keep it within 20 or even 25mm. We want to make sure the parasitic inductance derived from the trace routing from QET4100 output to the PA supply pin is small, so that it won't impact ET stability. The routing distance impacts the parasitic inductance the most, that's why we specify the 15mm requirement; the trace width also impacts the parasitic inductance, please use wide trace for the main VPA_ET routing, 1.5mm or wider. The goal is to keep the trace inductance from QET4100 output to PA less than 2nH.
-
- **Q17**: For class AB bypass cap, is that ok to use 0402 size instead of 0603 size?
- **A**: The 0603 size cap has better voltage de-rating curve than 0402 size cap, i.e. the actual cap value is higher with high VDD_AMP, even though the 6.3V voltage rating is same. For QET4100, it’s required to use 0603 size, as it supports higher Vmax.

QET4100 FAQ

- **Q18**: What's the threshold setting for QET4100 Assist-LDO?
- **A**: In APT mode, when the current draw exceeds the limit by APT buck or the head room in APT mode is not enough, the assisting LDO will turn on to provide the rest of the current draw .
- The buck current limit is ~1.5A, beyond that LDO helps to supply extra current.
- The buck voltage headroom required depends on load current and resistance from buck PFET + Inductor DCR + Trace (~ 280 mOhm total typically).
-
- **Q19**: To support ET, is that ok to supply VCC1 with VPH_PWR on Qorvo ET PA QM56022?
- **A**: 1.In theory, it should be OK to supply VCC1 with VPH_PWR, assuming the operating range of VPH_PWR is within VCC1 spec.
  It’s not recommended to supply VCC1 directly with VBAT, as current drawn directly from VBAT will be unaccounted by the fuel gauge in certain situation.
  2. No concern here from QET4100 side, Vcc1 is with fixed supply, and Vcc2 do ET.
  3. There is concern of PA efficiency penalty due to ET on Vcc2 only, although Vcc1 consumes relatively small amount of current.
  Again, this is a question for the PA vendor.
-

GSM desense issue in JO.2.0.c1

- **KBA number:** KBA-161121001159
- **Platform：**MSM8909
- **适用平台：**MSM8909

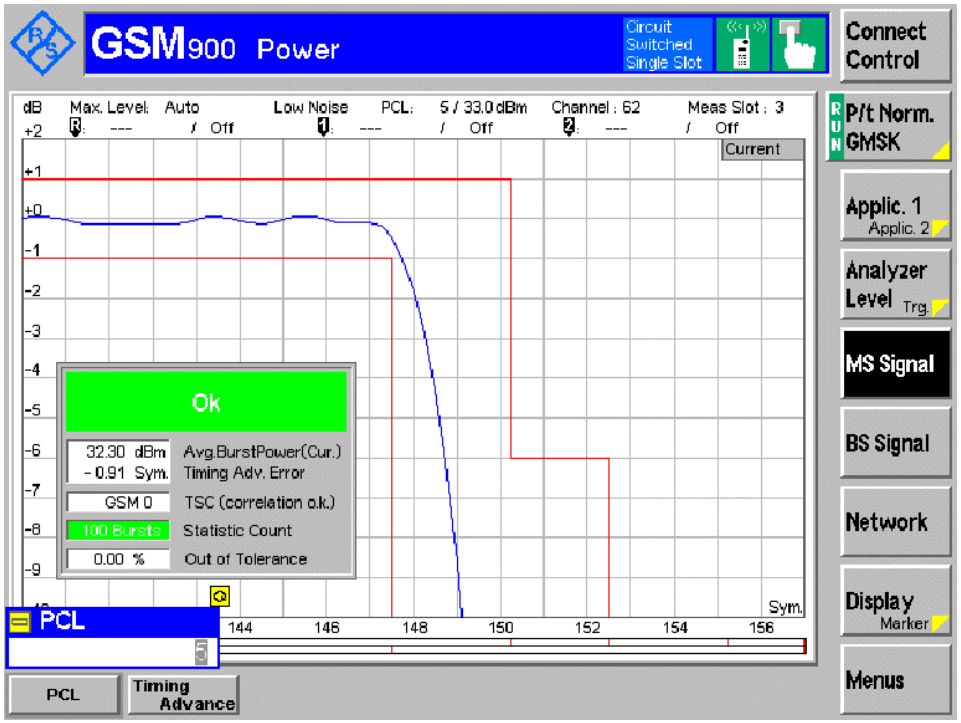
- **Symptom**：GSM sensitivity will degrade 3-5dBm when upgrade from MPSS.JO.1.1.c1 to MPSS.JO.2.0.c1, other technology is ok.
- **问题描述**：当版本从MPSS.JO.1.1.c1升级到MPSS.JO.2.0.c1时，GSM的灵敏度会恶化3-5dBm。其他制式没有这个问题。

- **Solution**：Check if the CR1067281 is in your build, this issue can be solved by apply the CR.
- **解决方案**：首先检查CR1067281是否包含在版本中，如果没有可以申请CR解决此问题。

GSM ramp profile NV normalization to get good PvT and ORFS switching

- **KBA number**: KBA-161202021125
- **Platform**: MSM8952/53/56//76+WTR2955/65
- **适用平台**：MSM8952/53/56/76+WTR2955/65

- **Symptom**: GSM PvT falling edge is very close to the limit, it can be improved by tune timing, but GSM ORFS switching will be worse and close to the limit.
- **问题描述**：GSM PvT下降沿比较临界，调整Timing NV能改善，但GSM 开关谱会恶化(有可能超标)。



GSM ramp profile NV normalization to get good PvT and ORFS switching

- **Solution**:
- The current QC platform default GSM NV get very limit PVT margin, customer could improve it by modifying the pa_stop_offset_adj, but it will lead the switching spectrum worse, to resolve this problem, just need to adjust Ramp_down(0-29) in **RFNV_GSM_Cx_GSM<band>_POLAR_RAMP_PROFILE_I** .
- For example, the MSM8953 defult value is 9800,9740,9556,9252,8842,8331,7737,7077,6367,5626,4872, 4128.3411,2737,2123,1581,1124,758, 496, 300,150,0,0,0,0,0,0,0,0,0 can replaced by
- Insert two '9800':
- 9800, 9800,9800,9740,9556,9252,8842,8331,7737,7077,6367,5626,4872, 4128.3411,2737,2123,1581,1124,758, 496, 300,150,0,0,0,0,0,0,0,0,0
- Normalization:
  9800,9800,9800,9728,9508,9146,8662,8042,7380,6631,5841,5035,4236,2762,2121,1563,1098,729,454,273,149,65,0,0,0
  …

- **解决办法**：

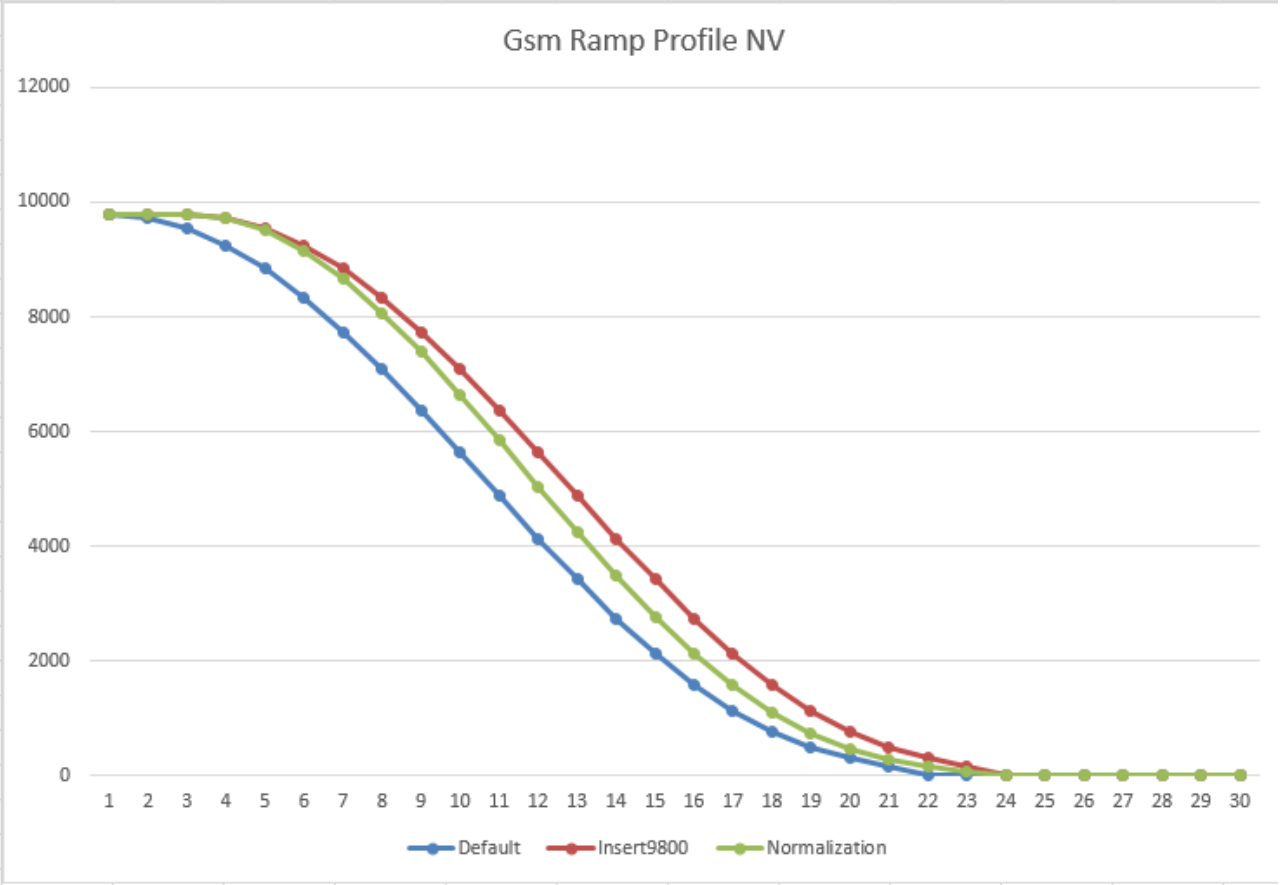
1. 缺省GSM NV设置测出的PVT比较临界, 可微调GSM timing NV的"**pa_stop_offset_adj**"。但是PVT调好之后开关谱又会恶化，这时可尝试微调**RFNV_GSM_Cx_GSM<band>_POLAR_RAMP_PROFILE_I**中的下降沿部分，例如尝试在第1和第2个下降沿值中添加2个9800值得到的结果较好。

2. 插入2个9800之后，再对下降沿ramp NV的值做个归一化，能够使得对开关谱的恶化降低到比较小的程度。

GSM ramp profile NV normalization to get good PvT and ORFS switching

C5 =ROUND((POWER(A3/9800,1.2))* 9800, 0)

	A	B	C
1	Default	Insert9800	Normalization
2	9800	9800	9800
3	9740	9800	9800
4	9556	9800	9800
5	9252	9740	9728
6	8842	9556	9508
7	8331	9252	9146
8	7737	8842	8662
9	7077	8331	8065
10	6367	7737	7380
11	5626	7077	6631
12	4872	6367	5841
13	4128	5626	5035
14	3411	4872	4236
15	2737	4128	3473
16	2123	3411	2762
17	1581	2737	2121
18	1124	2123	1563
19	758	1581	1098
20	496	1124	729
21	300	758	454
22	150	496	273
23	0	300	149
24	0	150	65
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	0	0	0



GSM ramp profile NV normalization to get good PvT and ORFS switching

- **Result:**

  The normalization calculation formula is done in excel as following:

  Assume the max value is V_{max} (“9800”in 8953example), the new profile data can be :

  V_{new} =Round((power(V_{old} /V_{max} ,1.2))* V_{max} ，0)

After normalization, the PVT and GSM ORFS both could get good result.

- **结果:**

GSM Ramp NV的下降沿插入2个9800并归一化之后，GSM PVT 和开关谱都能取得很好的结果。

PAMid-D5703(S011) cannot support B66

- **KBA number:** KBA-161202021604
- **Platform**: All platform attached by QC MB PAMid – D5703(S011)
- **适用平台**： 所有搭配D5703（S011）的平台

- **Update**: D5703 (S011) cannot support B66.
  - Reasons:
    - D5703 (S011) internal B2+B4 qualplexer cannot support B66 Rx.
    - D5703 (S011) has not been tested with B66 and there is no SW support for this, so AUX port + external B66 duplexer solution is also not recommended.

- **更新:** D5703 （S011）不支持B66。
  - 原因：
    - D5703（S011）内部B2+B4四功器不支持B66 Rx.
    - D5703（S011）没有测试过B66，也没有软件支持，所以即使是用辅助口+外部双工器的方案也不推荐。

QPA4373 coupler coupling factor/matching

- **KBA number:** KBA-161123235311
- **Platform**: All platform attached by QPA4373
- **适用平台**： 所有搭配QPA4373的平台

- **Description**: QPA4373 coupler coupling factor is not flat across L/M/H working band, 80-NP237-51 RF card required 5G LPF between QPA4373 coupler and WTR; QRD designed a passive LC PI type LPF matching circuit in DP10-VL729-100 to get the coupling path coupling factor a little flat, have the effect to suppress 5GHz signal and save the cost of 5G LPF.

- **描述:** QPA4373的耦合因子在低/中/高工作频段的频率响应不平坦， 80-NP237-51 RF卡的参考原理图中，还要求在QPA4373的耦合输出和WTR之间加入5G的LPF; QRD在DP10-VL729-100中设计了一个PI型无源LC LPF匹配网络，可以使耦合因子的频率响应平坦一点、对5GHz信号也有抑制作用从而去掉5G LPF而降低成本。

QPA4373 coupler coupling factor/matching—Cont.

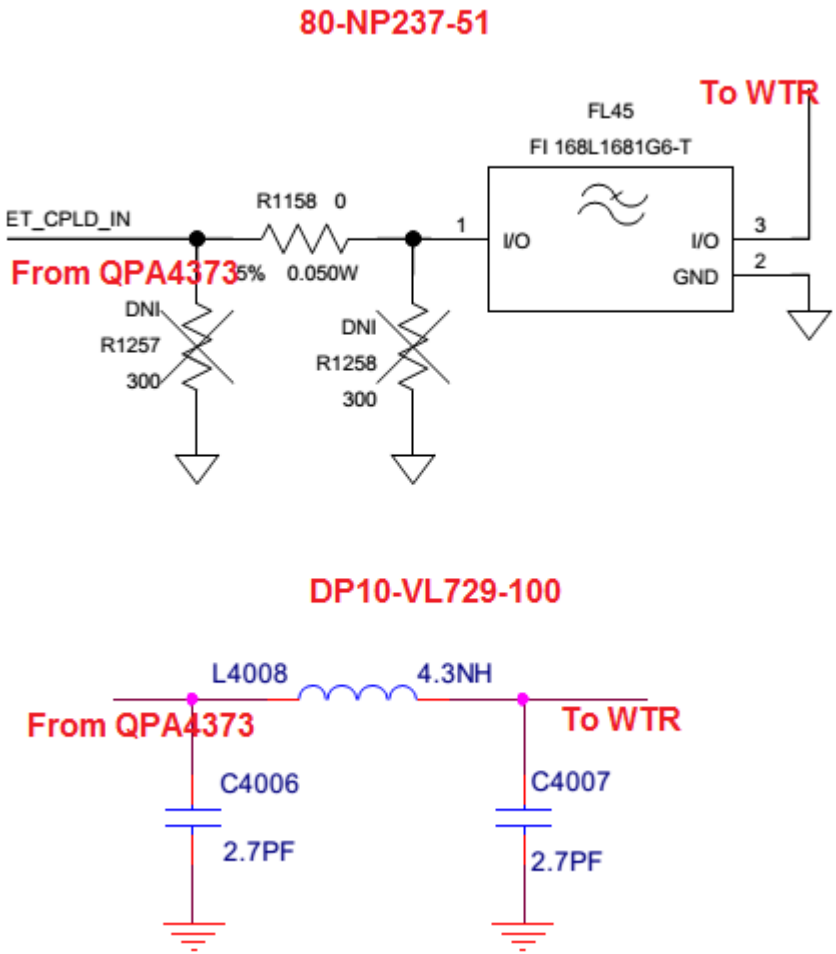
- QPA4373 coupler coupling factor in spec

Table 3-20 Coupler RF specifications

Parameter	Symbol	Min	Typ	Max	Unit
Coupling factor					
CF_LB	699–915 MHz	–	33	–	dB
CF_MB	1710–2025 MHz	–	25	–	dB
CF_HB	2300–2690 MHz	–	21	–	dB

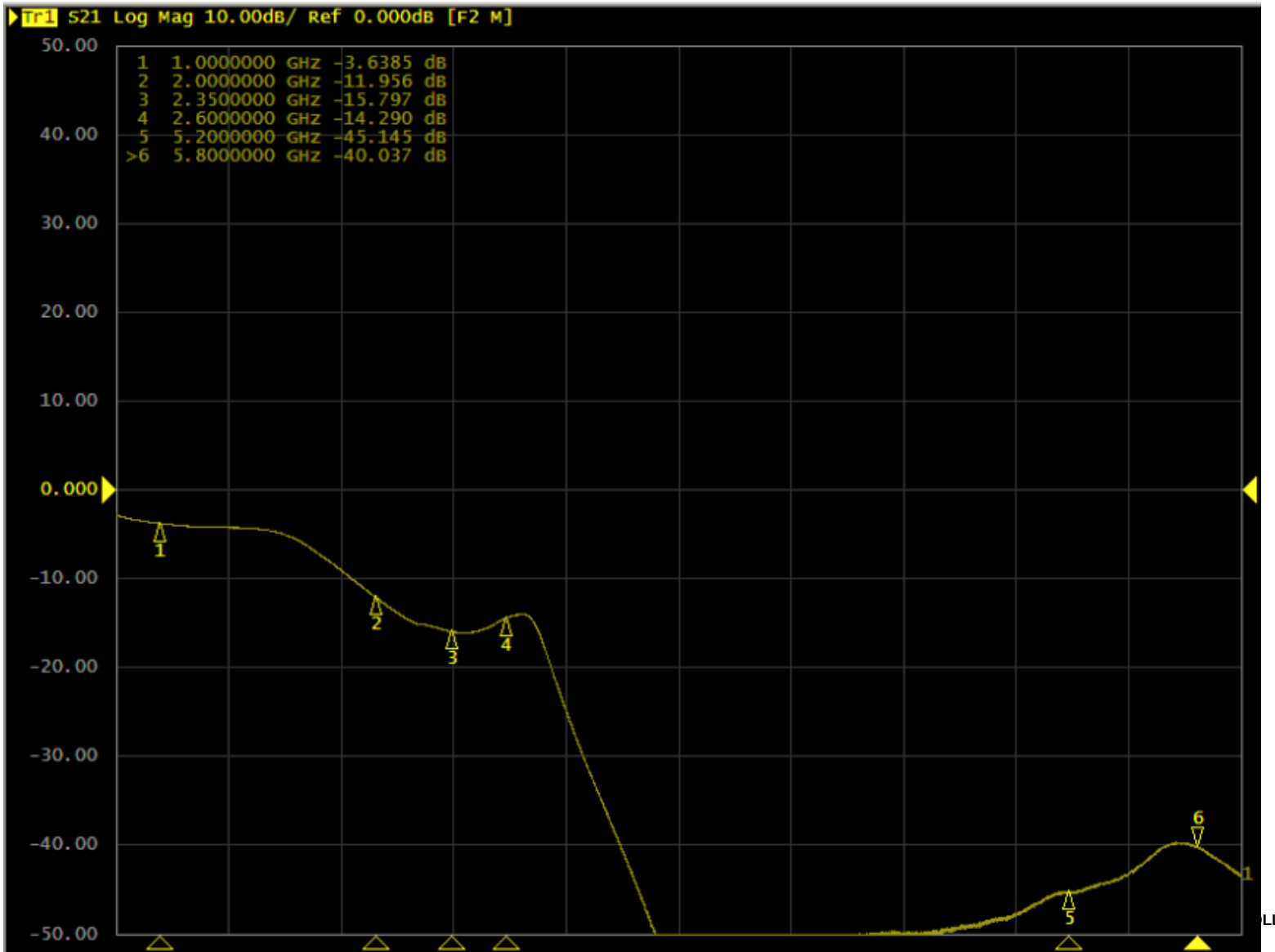
QPA4373 coupler coupling factor/matching—Cont.

- Coupler matching in 80-NP237-51 and DP10-VL729-100 reference schematic



QPA4373 coupler coupling factor/matching—Cont.

- DP10-VL729-100 passive LC PI type LPF matching circuit frequency response



QPA4373 coupler coupling factor/matching—Cont.

Cal log reference

80-NP237-51

LB LTE B5

Channel	PA State	TxAGC	Vcc	Icq	Power	HDET
20512	1	69	3400	247	28.8	11164
20512	1	68	3400	247	28.5	10264
20512	1	67	3400	247	28.1	9354
20512	1	66	3400	247	27.5	8071
20512	1	65	3400	247	26.6	6668
20512	1	64	3400	247	25.6	5307
20512	1	63	3400	247	24.9	4474
20512	1	62	3400	247	23.9	3622
20512	1	61	3400	247	23	2891
20512	1	60	3400	247	21.8	2228

MB LTE B1

Channel	PA State	TxAGC	Vcc	Icq	Power	HDET
18300	1	78	3400	234	28.8	62648
18300	1	77	3400	234	28.7	60270
18300	1	76	3400	234	28.6	59104
18300	1	75	3400	234	28.6	58462
18300	1	74	3400	234	28.4	56050
18300	1	73	3400	234	28.2	53372
18300	1	72	3400	234	28	50870
18300	1	71	3400	234	27.3	43666
18300	1	70	3400	234	26.6	37033
18300	1	69	3400	234	25.6	29391
18300	1	68	3400	234	24.9	25472
18300	1	67	3400	234	24	20645
18300	1	66	3400	234	22.9	16054
18300	1	65	3400	234	21.5	11402

HB LTE B7

Channel	PA State	TxAGC	Vcc	Icq	Power	HDET
21410	1	56	3300	127	26.5	59351
21410	1	55	3300	127	26	53205
21410	1	54	3300	127	25.2	43820
21410	1	53	3300	127	24.6	38838
21410	1	52	3300	127	23.6	30705
21410	1	51	3300	127	22.8	25289
21410	1	50	3300	127	21.4	18492

DP10-VL729-100

LB LTE B5

Channel	PA State	TxAGC	Vcc	Icq	Power	HDET
20512	1	69	3400	247	28.8	11524
20512	1	68	3400	247	28.4	10630
20512	1	67	3400	247	28.1	9736
20512	1	66	3400	247	27.4	8402
20512	1	65	3400	247	26.5	6874
20512	1	64	3400	247	25.7	5734
20512	1	63	3400	247	24.8	4642
20512	1	62	3400	247	23.9	3710
20512	1	61	3400	247	22.9	2989
20512	1	60	3400	247	21.8	2289

MB LTE B1

Channel	PA State	TxAGC	Vcc	Icq	Power	HDET
18300	1	78	3400	234	28.8	28222
18300	1	77	3400	234	28.6	27054
18300	1	76	3400	234	28.5	26521
18300	1	75	3400	234	28.5	26214
18300	1	74	3400	234	28.3	24972
18300	1	73	3400	234	28	23607
18300	1	72	3400	234	27.8	22489
18300	1	71	3400	234	27.1	19154
18300	1	70	3400	234	26.4	16236
18300	1	69	3400	234	25.4	12737
18300	1	68	3400	234	24.7	10895
18300	1	67	3400	234	23.8	8752
18300	1	66	3400	234	22.7	6847
18300	1	65	3400	234	21.2	4886

HB LTE B7

Channel	PA State	TxAGC	Vcc	Icq	Power	HDET
21410	1	56	3300	127	26.3	5515
21410	1	55	3300	127	25.8	4925
21410	1	54	3300	127	24.9	4030
21410	1	53	3300	127	24.4	3584
21410	1	52	3300	127	23.4	2813
21410	1	51	3300	127	22.5	2291
21410	1	50	3300	127	21.1	1670

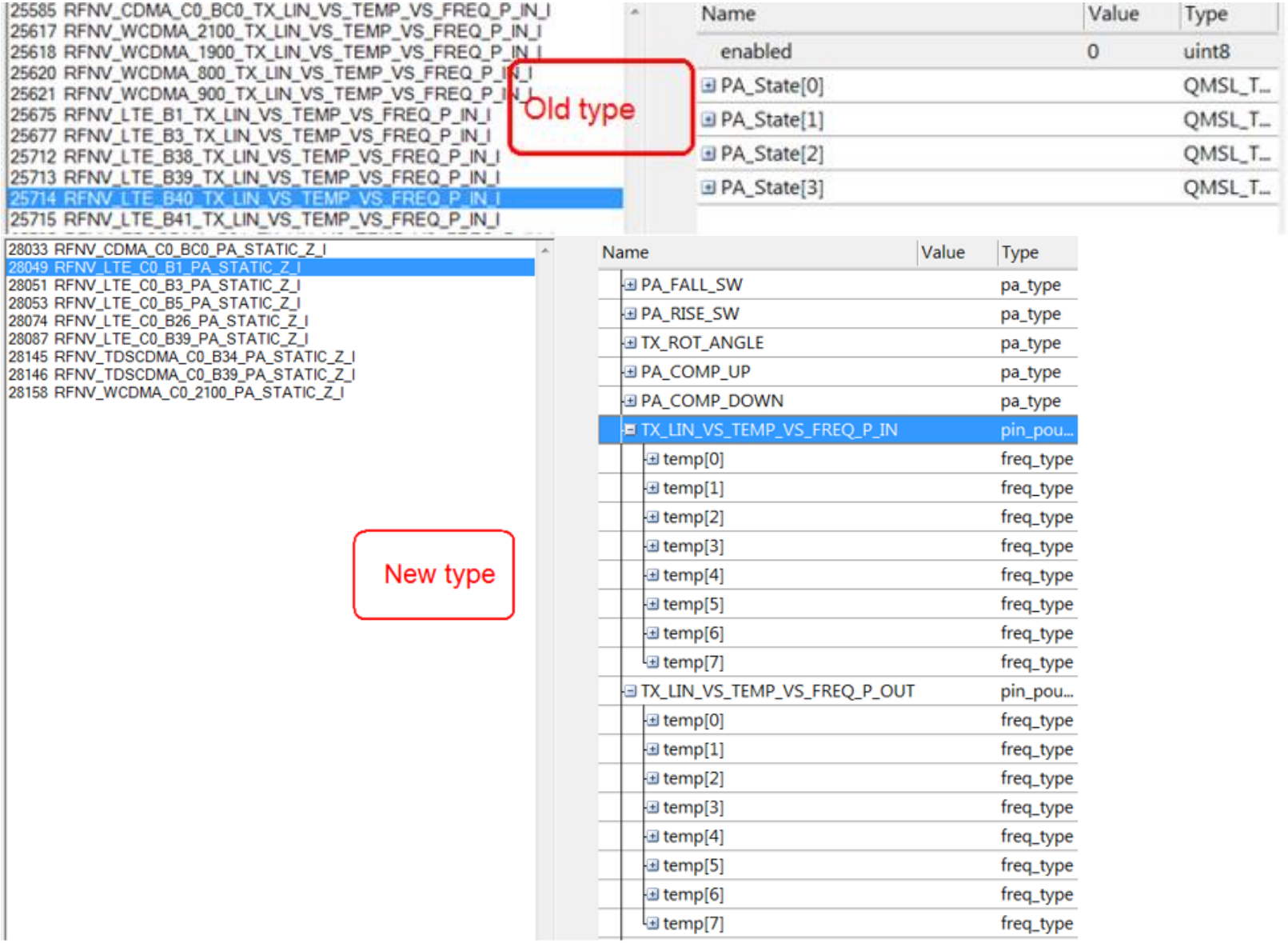
PinPout char just output 1kb data after char done

- **KBA number:** KBA-161128191515
- **Platform**: All platform attached by QPA.
- **适用平台**： 所有搭配QPA的平台.

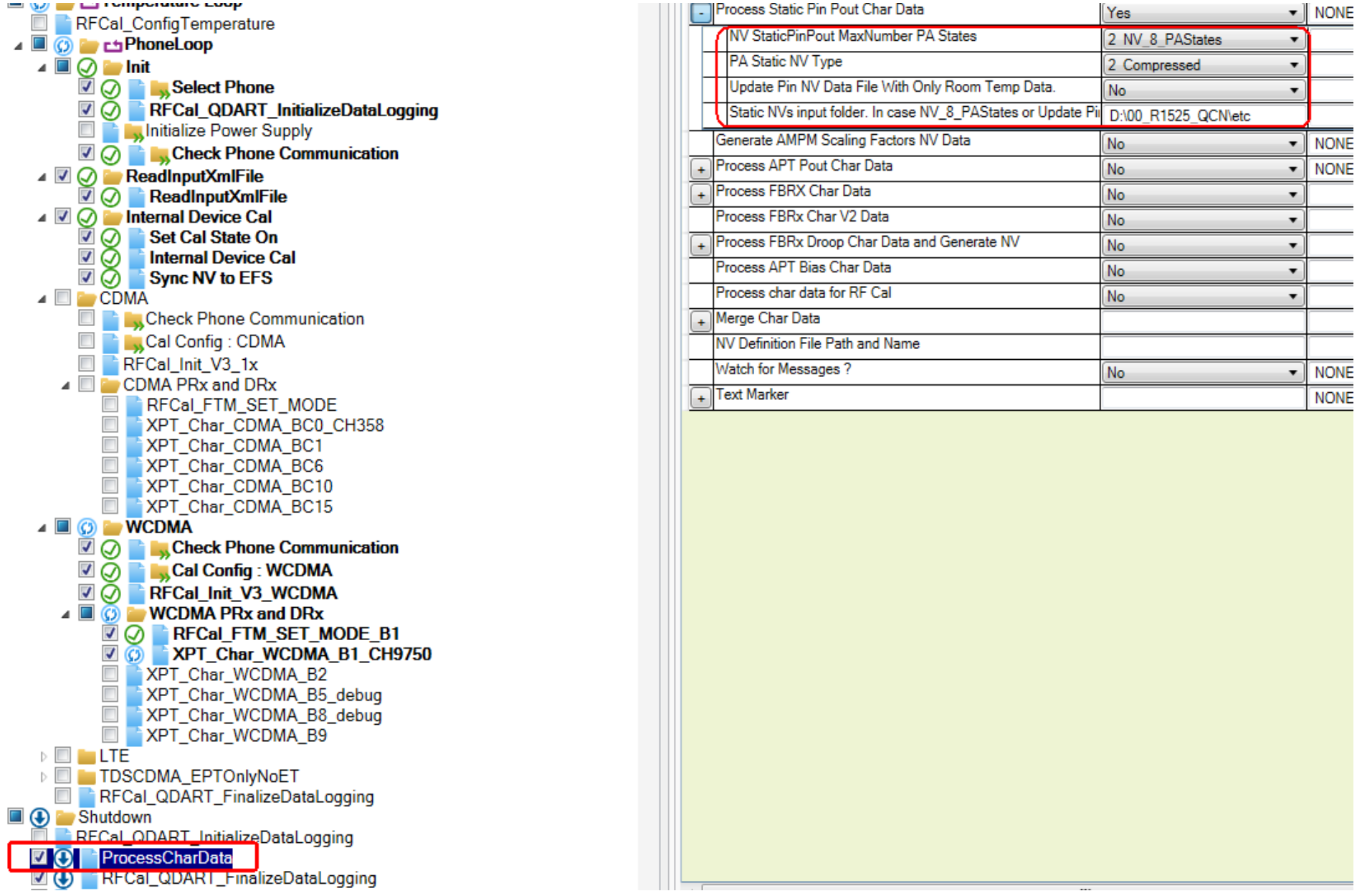
- **Symptom**：PinPout char just output 1kb invalid data after char done.
- **问题描述**：PinPout char测试完成之后，只能生成1kb的无效数据。

- **Solution**：
- 1. The NV type of PA parameter have changed to ‘Compress’, but the default XTT didn’t change, thus output 1kb invalid char data.
- 2. You need to modify the ‘PA States’ to ‘NV_8_PAStates’, ‘PA Static NV Type’ to ‘Compressed’ and add the input path of Static NV in the ProcessCharData item of XTT.
- **解决方案**：
- 1. 在QCN中的PA参数格式变更为压缩模式，但是相对应的默认PinPout char脚本未做更改导致生成数据异常。
- 2. 在XTT脚本的‘ProcessCharData’项中，修改PA States为‘NV_8_PAStates’，修改PA Static NV Type为‘Compressed’, 并增加Static NVs input路径。

PinPout char just output 1kb data after char done



PinPout char just output 1kb data after char done



QC Gen1 PAMiD ULCA supporting notice

- **KBA number**: KBA-161128184108
- **Platform**: All platform attached by QC Gen 1 PAMiD
- **适用平台**： 所有搭配高通第一代PAMiD的平台

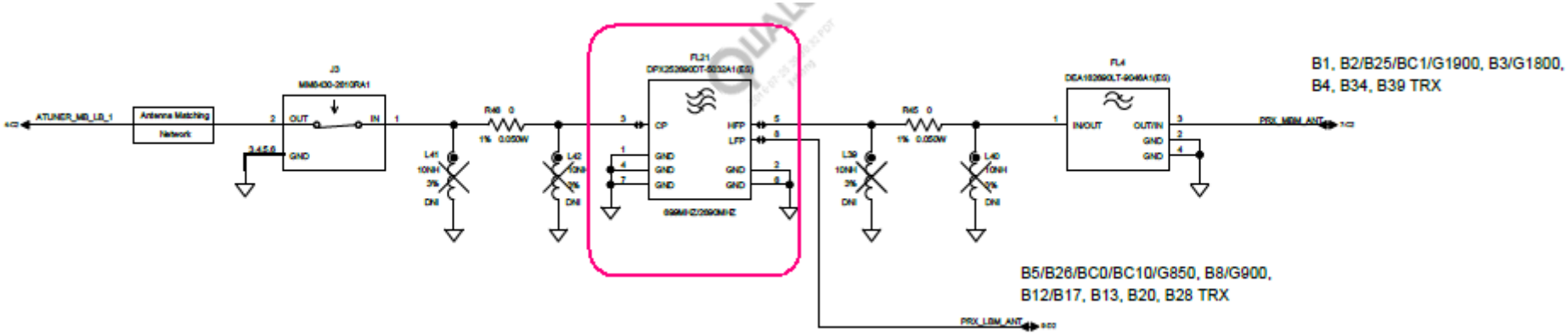
- **Description**:
  - As of now, no intraband 40MHz ULCA support for all Gen1 PAMiDs.
  - LB PAMiD: no B5B ULCA support because this wasn't POR.

- **描述:**
  - 到目前为止，所有高通第一代PAMiD不支持40MHz上行带内载波聚合。
  - 低频PAMiD: 不支持B5B ULCA， 因为这个功能没有POR。

Diplexer application note in Gen1 L/MB PAMID

- **KBA number:** KBA-161128192553
- **Platform**: All platform attached by QC Gen 1 PAMiD
- **适用平台**： 所有搭配高通第一代PAMiD的平台

- **Description**: For QC Gen 1 PAMiD, need to add one diplexer in L/MB PAMID FE. Please refer to reference design 80-NR113-49, 80-NT066-45, 80-NT066-44
- **描述**：对所有搭配高通第一代PAMiD的方案，必须在中低频的PAMID 前端加Diplexer



Diplexer application note in Gen1 L/MB PAMID-Cont.

- 3GPP requirement for Spurious emissions limits:
- 3GPP对杂散的要求:

Frequency Range	Maximum Level	Measurement Bandwidth	Notes
9 kHz ≤ f < 150 kHz	-36 dBm	1 kHz	
150 kHz ≤ f < 30 MHz	-36 dBm	10 kHz	
30 MHz ≤ f < 1000 MHz	-36 dBm	100 kHz	
1 GHz ≤ f < 12.75 GHz	-30 dBm	1 MHz	
12.75 GHz ≤ f < 5th harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	Note 1

- Select 1 band in LB and MB for example. For MB like PCS, refer to MH80-P3196-4 MB PAMID spec, 2nd harmonic power is just -26dBm, can't meet 3GPP target. For LB like B28B, refer to MH80-P3200-1 LB PAMID spec, 2nd harmonic power is just 6dBm, B28B DPX min isolation for 2nd harmonic is 35dB, can't meet 3GPP target. Add diplexer in L/MB common path, calculate link budget, both LB and MB can meet 3GPP target. Details refer to link budget calculation in subsequent table.
- 中低频各选择一个频段为例。对中频PCS，参考MH80-P3196-4,二次谐波只有-26dBm，不能满足3GPP要求。低频B28B，参考MH80-P3200-1，二次谐波只有6dBm，B28B双工器对此隔离度为35dB,不能满足3GPP要求。在中低频公共端加一个合路器，计算链路预算，中低频都可以满足3GPP要求。具体链路预算可以参考后面的表格.

Diplexer application note in Gen1 L/MB PAMID-Cont.

- PCS harmonic power:
- PCS谐波功率

Parameter	Conditions	Min	Typ	Max	Unit
Operating Frequency Range	DCS	1710		1785	MHz
TX Harmonics Power	2Fc			-26	dBm

- B28B harmonic power:
- B28B谐波功率：

TX_LB1: Band 28B

T_A = 25°C, VBATT = 3.8V, Zin/Zout = 50 Ω unless otherwise specified

Parameter	Conditions	Min	Typ	Max	Units
Operating Frequency Range		718		748	MHz
TX 2nd Harmonic Power	Pout ≤ Pmax - MPR			6.0	dBm
TX 3rdHarmonic Power	Pout ≤ Pmax - MPR			-7.0	dBm
TX 4th Harmonic Power	Pout ≤ Pmax - MPR			-7.0	dBm
TX 5th Harmonic Power	Pout ≤ Pmax - MPR			-10.0	dBm
TX ≥ 6th Harmonic Power	Pout ≤ Pmax - MPR			-16.0	dBm

Diplexer application note in Gen1 L/MB PAMID-Cont.

- Diplexer isolation：
- 合路器隔离度：

No.	PORT	PARAMETER	FREQ (MHz)	Qualcomm specifications	Specification	Typ.	UNIT
1	LOW	Insertion Loss [at Ta= +25 degC]	699 - 960	0.3Max.	0.34 Max.	0.29	dB
2		Insertion Loss [at Ta= -40~+90 degC]	699 - 960	0.35Max.	0.39 Max.	-	dB
3		Attenuation	1574 - 1605	20 Min.	15 Min.	19	dB
4			1648 - 1710	25Min.	20 Min.	25	dB
5			1710 - 2690	25Min.	25 Min.	30	dB
6			4905 - 5845	30Min.	30 Min.	37	dB
7		Isolation	1710 - 2690	25Min.	25 Min.	30	dB
8	HIGH	Insertion Loss [at Ta= +25 degC]	1710 - 2690	0.45Max.	0.65 Max.	0.55	dB
9		Insertion Loss [at Ta= -40~+90 degC]	1710 - 2690	0.50Max	0.70 Max.	-	dB
10		Attenuation	699 - 915	30Min.	28 Min.	31	dB
11			915 - 960	25Min.	25 Min.	27	dB
12			3420 - 3570	5Min.	5 Min.	10	dB
13			3600 - 3820	15Min.	12 Min.	17	dB
14			4905 - 5845	15Min.	15 Min.	18	dB
15		Isolation	699 - 915	30Min.	28 Min.	30	dB
16			915 - 960	25Min.	24 Min.	26	dB

Diplexer application note in Gen1 L/MB PAMID-Cont.

- Link budget for L/MB PAMID, please note disregard T-line loss here：
- L/MB PAMID的链路估算如下， 这里忽略线损：

Band	case	Pamid 2nd Harmonic Power	DPX Isolation	Diplexer Isolation	Total 2nd Harmonic Power @ RF conn
B28B	typical case	6	40	30	-64
	worse case	6	35	25	-54
PCS	typical case	-26	/	17	-43
	worse case	-26	/	12	-38

Max power issue when enabled Pin CAL for QPA

- **KBA number**: KBA-161128224727
- **Platform**: All with QPA + EPT/ET
- **适用平台**：所有使用QPA + EPT/ET的平台

- **Symptom**: Max power of WCDMA is about 16dBm in online mode, seems DUT can't switch to the EPT gain. Debug this issue on WCDMA B1, re-cal and do the Cal verification first, and find the pa state is 3(EPT gain) in high power level, but max output power is very low.
- **问题描述**：在信令模式下WCDMA最大功率只有16dBm左右，看起来DUT没有切换到EPT增益。在WCDMA B1上分析这个问题，重新校准并做校准验证，发现PA已经切换到 PA state3(EPT增益），但是最大输出功率很低。

Temp (C)	Channel	BST Power (dBm)	Target Tx Power	CallProcessorIndex	Meas Count	Tx Direction	Rx Direction	Test in Idle Mode	Measure Additional Carriers	Rx Error (dB)	Rx Error Min	Rx Error Max	Tx Error (dB)	Tx Error Min	Tx Error Max	Tx Power (dBm)	Min Tx Power (dBm)	Max Tx Power (dBm)	PA state
22	9750	-107	29	1	12	0	0	0	1	13.4154	-9	9	-24.8061	-9	9	-1.21609	-1.25058	-1.18585	3
22	9750	-106	28	1	12	-1	1	0	1	12.2154	-9	9	-24.6212	-9	9	-1.03119	-1.21155	-0.977478	3
22	9750	-105	27	1	12	-1	1	0	1	11.2333	-9	9	-24.6124	-9	9	-1.0224	-1.04923	-0.99649	3
22	9750	-104	26	1	12	-1	1	0	1	10.4167	-9	9	-24.623	-9	9	-1.03296	-1.06284	-1.01379	3
22	9750	-103	25	1	12	-1	1	0	1	9.6	-9	9	-24.6303	-9	9	-1.04028	-1.07077	-1.0101	3
22	9750	-102	24	1	12	-1	1	0	1	8.50769	-9	9	-24.6357	-9	9	-1.04565	-1.08118	-1.02707	3
22	9750	-101	23	1	12	-1	1	0	1	7.62308	-9	9	-25.0148	-9	9	-2.02475	-2.04758	-2.00427	3
22	9750	-100	22	1	12	-1	1	0	1	6.96154	-9	9	-25.3074	-9	9	-3.31741	-3.35379	-3.29865	3
22	9750	-99	21	1	12	-1	1	0	1	6.4	-9	9	-25.4264	-9	9	-4.43643	-4.46054	-4.41312	3
22	9750	-98	20	1	12	-1	1	0	1	5.51667	-9	9	-25.3755	-9	9	-5.3855	-5.41449	-5.36575	3
22	9750	-97	19	1	12	-1	1	0	1	4.56154	-9	9	-19.9672	-9	9	-0.977203	-0.993347	-0.95871	3
22	9750	-96	18	1	12	-1	1	0	1	4.11667	-9	9	-17.2085	-9	9	0.781525	0.752838	0.819275	3
22	9750	-95	17	1	12	-1	1	0	1	3.36923	-9	9	-17.7991	-9	9	-0.809113	-0.828583	-0.788147	3
22	9750	-94	16	1	12	-1	1	0	1	3	-9	9	-0.32972	-9	9	15.6603	15.641	15.6826	2
22	9750	-93	15	1	12	-1	1	0	1	2.67692	-9	9	0.07958	-9	9	15.0696	15.0543	15.0865	2
22	9750	-92	14	1	12	-1	1	0	1	2	-9	9	-0.2205	-9	9	13.7695	13.7541	13.7809	2
22	9750	-91	13	1	12	-1	1	0	1	1.68462	-9	9	-0.50657	-9	9	12.4834	12.467	12.4965	2

Max power issue when enabled Pin CAL for QPA

- Solution: Pin CAL channel list in CAL XML should align with TX CAL channel in QCN. This is not only for WCDMA, it can also apply in other modes
- **解决方案**：Pin cal 在校准XML文件里的信道列表应该跟QCN里的发射校准信道保持一致。这个方案不仅适用于WCDMA， 同样适用于其他模式。

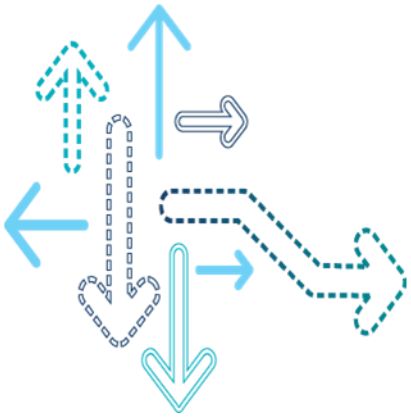
```
<XPT_PinCal_Swp_Channel_List>9621,9638,9656,9673,9691,9708,9726,9750,9761,9778,9796,9813,9831,9848,9866,9883<
```

```
1971 NV_WCDMA_TX_CAL_CHAN_I
1975 NV_WCDMA_800_TX_CAL_CHAN_I
4049 NV_WCDMA_BC4_TX_CAL_CHAN_I
1974 NV_WCDMA_1900_RX_CAL_CHAN_I
4050 NV_WCDMA_BC4_RX_CAL_CHAN_I
1973 NV_WCDMA_1900_TX_CAL_CHAN_I
3705 NV_WCDMA_900_RX_CAL_CHAN_I
1972 NV_WCDMA_RX_CAL_CHAN_I
3704 NV_WCDMA_900_TX_CAL_CHAN_I
1976 NV_WCDMA_800_RX_CAL_CHAN_I
```

Name	Value	Type
UNKNOWN[0]	9621	int16
UNKNOWN[1]	9638	int16
UNKNOWN[2]	9656	int16
UNKNOWN[3]	9673	int16
UNKNOWN[4]	9691	int16
UNKNOWN[5]	9708	int16
UNKNOWN[6]	9726	int16
UNKNOWN[7]	9750	int16
UNKNOWN[8]	9761	int16
UNKNOWN[9]	9778	int16
UNKNOWN[10]	9796	int16
UNKNOWN[11]	9813	int16
UNKNOWN[12]	9831	int16
UNKNOWN[13]	9848	int16
UNKNOWN[14]	9866	int16
UNKNOWN[15]	9883	int16

1. ULCA GCF Conformance Test Memo
2. Limitation of MIPI device numbers in each band
3. Improper Tx Cal channel list causing online crash
4. ULCA FTM Test Procedure On TA

RF SW



ULCA GCF Conformance Test Memo

- **Platform:** All Platforms with ULCA feature support
- **适用平台：**所有支持上行载波聚合的平台

- CMCC has mandatory intra-band ULCA requirement for mobile terminal price is larger than ￥2000 from Oct. 1st, 2016.
- Some ULCA test cases which are defined in 3GPP SPEC 36.521-1, could get failure test result on callbox Anritsu 8821C or CMW500. There are a couple of points for such failure cases:
  - Some ULCA test cases have not been validated by GCF because case test rules and requirements are not locked down on 3GPP SPEC, it doesn't be required for any certification institution or any operator before GCF organization grant validation for a test case.
  - Some callbox have not proper test capability for corresponding cases yet.
  - Chipset manufactory, callbox vendor and GCF organization are still working on 3GPP test case validation process.

- 中国移动规定从2016年10月1日起首轮送测零售价人民币2000元以上产品必需支持频带内上行载波聚合功能。
- 在客户做ULCA测试的过程中，会遇到一些定义在3GPP SPEC 36.521-1规范中的上行载波聚合测试项不能通过的情况，有以下几点原因：
  - 由于测试规范和测试需求仍需调整，当前测试项仍未被GCF组织定义为生效测试项。
  - 一些综测仪仍然不具备测试该项目的能力。
  - 芯片厂商，仪器厂商和GCF组织还未完成该测试项的验证生效流程。

ULCA GCF Conformance Test Memo

- How to get to know the test case validation status from GCF organization?
  - Visit GCF website http://www.globalcertificationforum.org to get the validation status of each test case.
  - Search the corresponding cases to get the validation status
    - **P**: Test case is not validated
    - **A**: Test case is validated and approved. Available for device certification
    - **B**: Test case is validated and approved, but has limitations. Available for limited device certification
    - **C**: Test case is validated and approved. But not ready for device certification because the corresponding work item has not met the CEC
    - **D**: The test case was validation and approved. But an issue has been discovered and it is downgraded. No longer available for device certification
    - **N**: Test case is in the work item but not application for this band
  - For GCF certification, all the category A and B cases are required to be verified with pass result.

- There is one typical test case which is not validated by GCF organization, customer don't need to test it for ULCA, and no certification institution or operator would require test for this case.
  - Section 6.3.5A.2.1 Power Control Relative power tolerance for CA (intra-band contiguous DL CA and UL CA) in 3GPP SPEC 36.521-1
  - This case is in P status on GCF website, it is not validated by GCF organization yet

ULCA GCF Conformance Test Memo

- 如何得知测试项是否是生效状态?
  - 访问GCF官方网站 http://www.globalcertificationforum.org可以查询每个测试项和生效状态
  - 搜索相应的测试项获得测试项生效与否状态
    - **P**: Test case is not validated
    - **A**: Test case is validated and approved. Available for device certification
    - **B**: Test case is validated and approved, but has limitations. Available for limited device certification
    - **C**: Test case is validated and approved. But not ready for device certification because the corresponding work item has not met the CEC
    - **D**: The test case was validation and approved. But an issue has been discovered and it is downgraded. No longer available for device certification
    - **N**: Test case is in the work item but not application for this band
  - 所有标记为A和B的测试项都要求测试通过。

- 对于上行载波聚合测试项，以下是一个非常典型的测试项，该测试项仍是未生效状态。客户不需要测试这一项，当前也没有任何一个认证机构和运营商要求测试该项。
  - Section 6.3.5A.2.1 Power Control Relative power tolerance for CA (intra-band contiguous DL CA and UL CA) in 3GPP SPEC 36.521-1
  - 这一测试项在GCF组织官网上仍被标记为P状态

Limitation of MIPI device numbers in each band

- **Platform:** All Platforms
- **适用平台：**所有平台

- **Symptom**：Recently, customers report crash issues with below signatures and are related with MIPI device numbers put in each band.
- **问题描述**：最近客户报了一些死机问题，是和每个band中放的MIPI device个数有关的，一般会带有类似下列的死机标签。

  - rf_hal_buffer.cpp:623 rf_script_buffer::append_rffe(slave_id6, addr 28, data0) FAILED!Script full. max_rffe: 12, num_trans 12
  - rfc_gsm.cpp:1008 fail to build asm enable script for rx start

  - rf_hal_buffer.cpp:623 rf_script_buffer::append_rffe(slave_id9, addr 28, data1) FAILED!Script full. max_rffe: 5, num_trans 5

  - MODEM - rflm_tds_ccs.c:1680 iSeqDataStatus != RFLM_CCS_SEQ_ERR_NONE, iSeqDataStatus:0x1.

  - rfcommon_mdsp_event_builder_internal.c:733 RFCCS Event: Out of pool resources. max_tasks_allocated=24 not enough. Curr_idx=24. Handle=8b4c6be0

Limitation of MIPI device numbers in each band

- **Analysis**：
- In design, if the RF task number increased by RFFE MIPI tasks and exceed the max allowed values, it will trigger crash.
- **问题分析**：
- 根据设计，如果RF task的总数随着RFFE MIPI task数目的增加而超过允许的最大值，就会触发死机。

- **Solution：**
- To solve such crashes, the correct way is to reduce the MIPI device number. Not to exceed the max number in Rx configuration and Tx configuration respectively, and also all devices put in PRx, DRx and Tx for a band has a limit.
- For the recommended device number, please refer to default release code, not to exceed the max values set throughout all RF cards.
- The task limit is defined based on air interface technologies nature and chipset abilities. It could not simply enlarge the limit to eliminate the crashes, since more tasks will not only introduce memory risks but also MIPS risks that tasks could not be executed in specified period, and lead to unexpected issues.

Limitation of MIPI device numbers in each band

- **解决方案：**
- 解决这类crash的正确方法是减少使用的MIPI device的个数。使得在每个band的Rx和Tx中配置的数目都不超过各自的限制。同时对一个band来说，不仅Rx和Tx各有限制，而且放在PRx，DRx和Tx中的总数也是有限制的。
- Task的限额和MIPI device的限额并不是等量的，所以请参考release的软件中缺省的每个band的PRx，DRx和Tx中的MIPI device个数作为限制个数的参考，可以参考各个RF card中出现的最大值。
- Task限额的定义是根据空口技术的特点和芯片能力来决定的。不能通过简单的增加限额来消除此类crash，因为task数目的增加不仅会带来memory分配和使用的风险，而且也会带来MIPS的风险，就是说在规定的时间内执行不完这些task，从而引起各种不可预期的问题。
- 客户可以通过增减MIPI device个数来确认是否是该原因引起的死机；如果确定不了，也可以提case到RFSW team进行检查。

Improper Tx Cal channel list causing online crash

- **Platform**: All platforms
- **适用平台**：所有平台

- **Symptom**: UE crash in some edge channel.
- **问题描述**：测试时候某些测试信道(主要是边缘信道)死机。

- **Analysis:** From dump log, we see the UE is in LTE band 4, 1.4M BW, channel 20393. SW can't find a correct PA state to set RGI.
- 问题分析：从dump log中可以看到，UE工作在LTE band 4， 1.4M 带宽， channel 是20393. 软件无法正确的PA state。

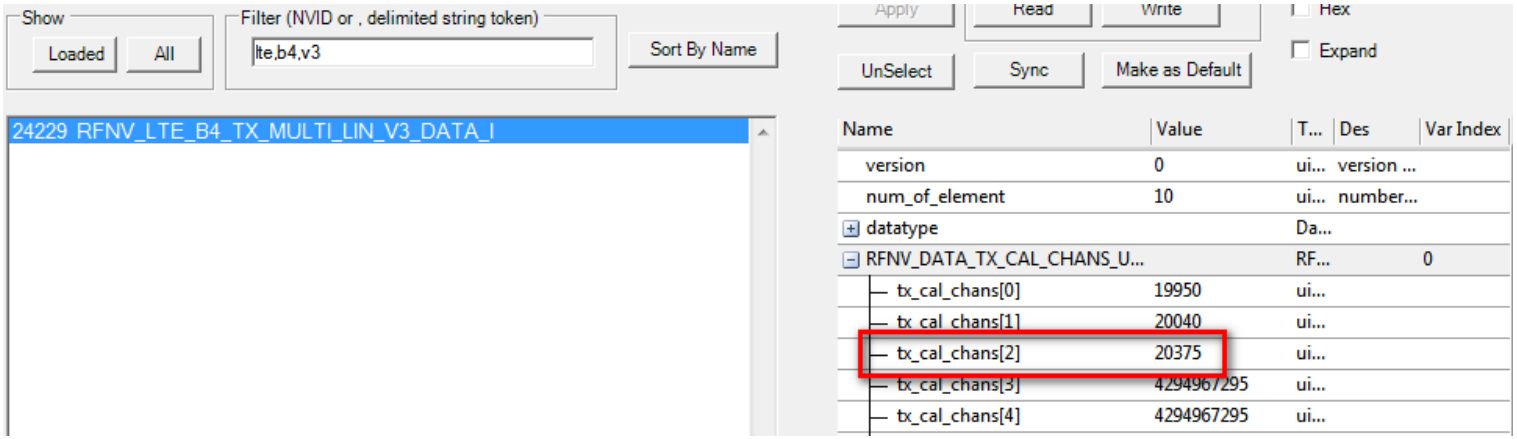
```
rfcommon_autopin.c:423      AutoPin Tx is enabled for tech 8 handle 7 autopin run period : 192000  autopin run state: 1
rflte_mc_tx_config.c:3321   RF LTE Main Control has tuned to TX carrier_idx 0, band 4 channel 20393 with BW 0
rflte_dispatch.c:8285       rflte_dispatch_tx_script_based_config_req: done with rflte_mc_tx_config() sucessfully
rflte_state.c:3449          RF_LTE_MC state update: umid 0x60702C3, carrier_idx 0 state 3
```

Improper Tx Cal channel list causing online crash

```
              rflte_dm_tx.c:9288      rflte_dm_update_tx_num_pa_statesNum of Active PA states: 4
wtr2965_trx_lte_tx_class.cpp:1950     RFDEVICE_LTE_GET_TX_PLL_VALUES not supported via Tx Cmd Dispatch for WTR2965
wtr2965_trx_lte_tx_class.cpp:3059     Tx on sequence on/off:1
              rflte_dm_tx.c:1887      retrieving TX EN: 2 band: 3  num_trans:2
wtr2965_trx_lte_tx_class.cpp:3059     Tx on sequence on/off:0
              rflte_dm_tx.c:2184      retrieving tx GNSS GRFC && Tx OFF Failed. rfm_device: 2 band: 3, number_of_tx_off_grfc = 0 and number_of_gnss_blanking_grfc:0
              rflte_dm_tx.c:2189      retrieving TX OFF: 2 band: 3 , total scripts built: 1
              rflte_dm_tx.c:9103      rflte_mc_tx_hw_ctl_set_rgi_0 : ERROR : Cannot find a valid PA state to set RGI Zero
              rflte_dm_tx.c:2330      retrieving TX EN: 2 band: 3 total script build:1
              rflte_dm_tx.c:2364      Failed to populate RGI_0 script to DM due to invalid device or valid pa state.
              rflte_dm_tx.c:6287      rflte_dm_update_qpoet_script.Null PAPM device ptr
              rflte_dm_tx.c:9103      rflte_mc_tx_hw_ctl_set_rgi_0 : ERROR : Cannot find a valid PA state to set RGI Zero
     rfdevice_pa_common.cpp:929       PA does not have exclusive ON register, using low PA gain and default ICQ to turn ON PA
              rf_hal_ccs.c:977        DEBUG_SB: rf_bus_ccs_execute_synchronous_ext: SW Port synchronous execution
     rfdevice_pa_common.cpp:929       PA does not have exclusive ON register, using low PA gain and default ICQ to turn ON PA
              rf_hal_ccs.c:977        DEBUG_SB: rf_bus_ccs_execute_synchronous_ext: SW Port synchronous execution
            rflte_mc_fed.c:1133       SPLIT_RETUNE_DEBUG: rflte_mc_fed_tx_config_finalize: tx band 4, doesn't match prx band 56 and drx band 56 in state mc. tx-rx port 0
              rxlm_intf.cpp:159       rxlm_allocate_buffer: Chain = 0, Tech = 11, Handle = 8, Status = 1.
              rflte_state.c:4166      rflte_state_set_fbrx_buffer_idx: carrier_idx:0 activated handle idx is:1 for fbrx handle : 8
       rflte_mc_tx_config.c:3150      rflte_mc_tx_config: carrier 0 fbrx handle 8 is allocated!
        rfcommon_fbrx_msm.c:270       rfcommon_fbrx_msm_convert_cfg_to_mode: fbrx_mode = 3
         rfcommon_fbrx_mc.c:1218      rfcommon_fbrx_mc_update_mode: tx handle = 7, fbrx_mode = 3, bandwidth = 10, ftm_cal_mode = 0
tr2965_rxtx_common_class.cpp:743      wtr2965_rxtx_common_class::fbrx_disable
        rfcommon_fbrx_ccs.c:402       rfcommon_fbrx_ccs_configure_event: Begin CCS Flow: Event ID 0x00000001, Event handle 0x8973ee34, Shared mem ptr 0x88d96aa0, Priority
        rfcommon_fbrx_ccs.c:402       rfcommon_fbrx_ccs_configure_event: Begin CCS Flow: Event ID 0x00000000, Event handle 0x8973ee30, Shared mem ptr 0x88d958d4, Priority
        rfcommon_fbrx_ccs.c:402       rfcommon_fbrx_ccs_configure_event: Begin CCS Flow: Event ID 0x00000004, Event handle 0x8973ee40, Shared mem ptr 0x88d96cb8, Priority
         rfcommon_fbrx_mc.c:845       ilpc method 2
         rfcommon_fbrx_mc.c:1702      ILPC enabled 0
       rflte_mc_tx_config.c:4372      RF_LTE_MC: rflte_mc_fbrx_tx_init()FBRx Trigger Power Level Activated at :-400 dBm , with FBRx System NV val:0
       rflte_mc_tx_hw_ctl.c:5435      RF_LTE_MC: rflte_mc_tx_pwr_ctl_script_setup: Validate Input Params RFM Device:2, tx band:3 pwr ctrl mode 1
```

- From calibration NV, we see the highest Cal channel is 20375, which can't cover the 1.4M bandwidth highest channel. This is the root cause for the crash. The edge channel must cover the edge channel of minimum bandwidth.
- 从校准NV来看，最高校准信道为20375，无法覆盖1.4M带宽下的最高信道。这是导致死机的根本原因。最高最低校准信道必须要覆盖最小带宽下的边缘信道。

Improper Tx Cal channel list causing online crash



- **Solution**: Modify the cal parameter to cover the edge channel of minimum bandwidth.
- **解决方案**：调整校准参数，以覆盖最小测试带宽的边缘信道。

ULCA FTM Test Procedure On TA

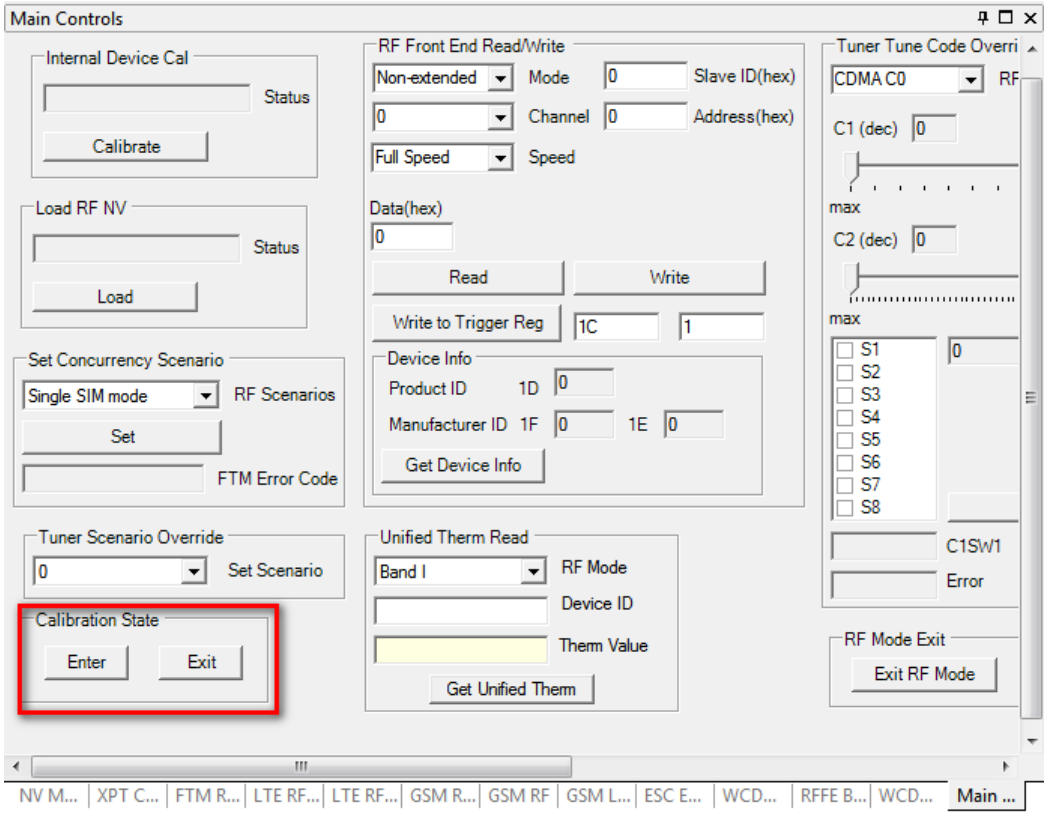
- **Platform**: All Tabasco 2.x modem based platforms
- **适用平台**：所有基于TA.2.x modem的平台

This topic provides the FTM procedure to manually make ULCA transmit power with QRCT. Please be noticed, it's only applicable for intra contiguous ULCA.

该专题提供了利用QRCT手动进行ULCA发功率的步骤。请注意的是，该步骤仅适用于带内连续的上行载波聚合场景。

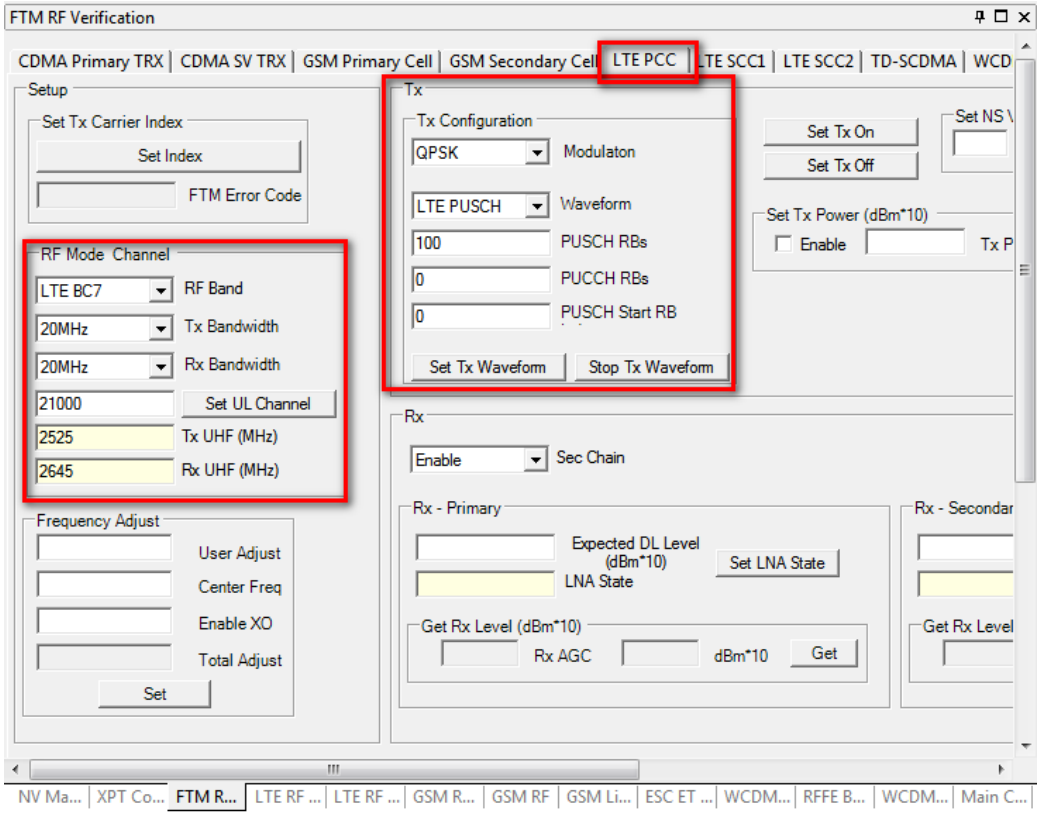
ULCA FTM Test Procedure On TA

- Enter FTM mode.
- Enter calibration state.



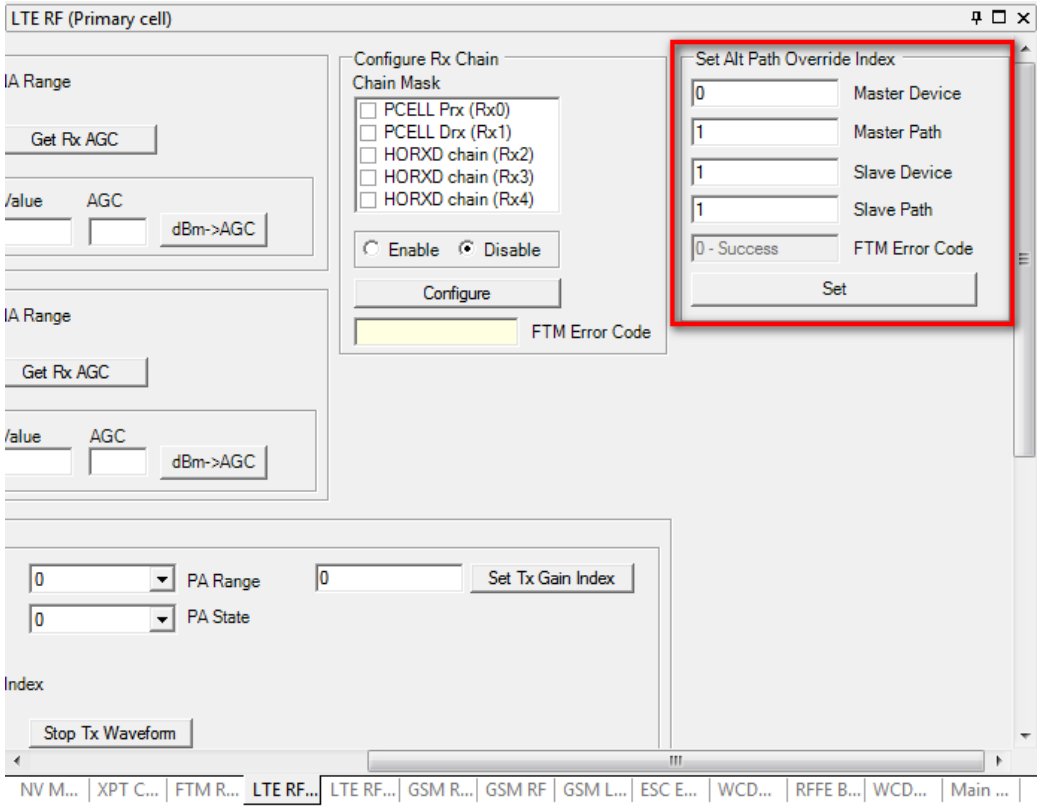
ULCA FTM Test Procedure On TA

- Set PCC band/channel in FTM Verification page



ULCA FTM Test Procedure On TA

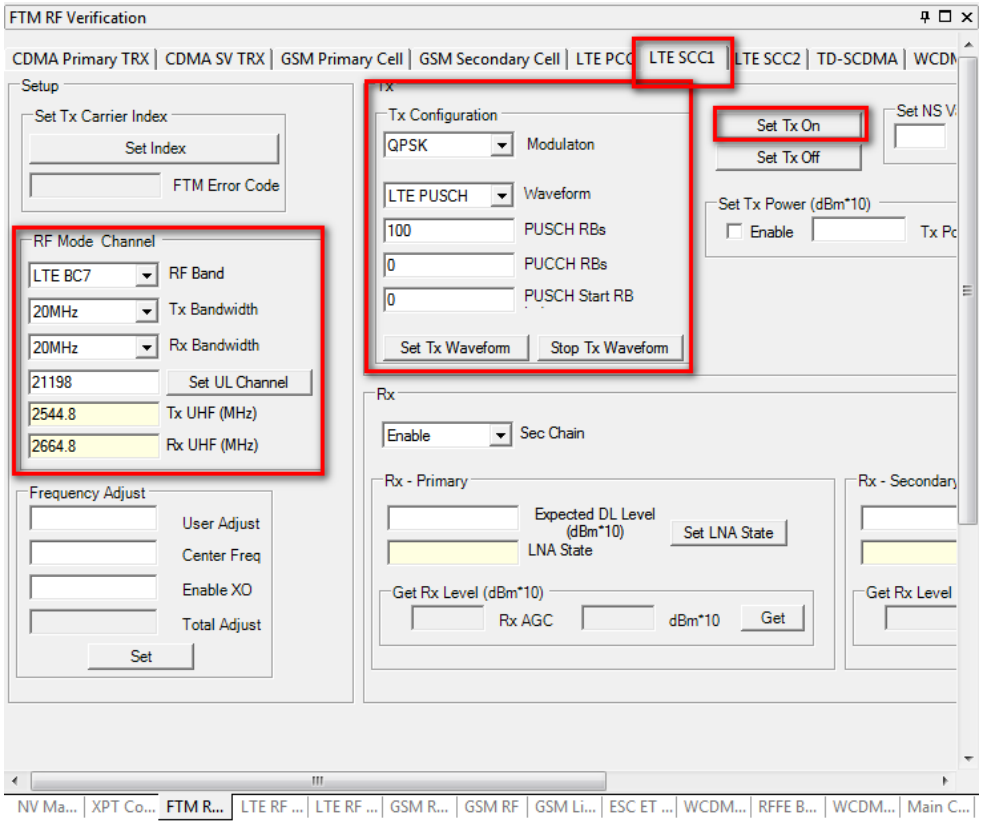
- Switch to Alt path in LTE RF(Primary cell) page



*Note: Alt path Info may be different from shown above, depends on your RFC design. If there is no Rx Alt path for current band, we must add a fake Rx Alt path in RFC, or it will cause crash.

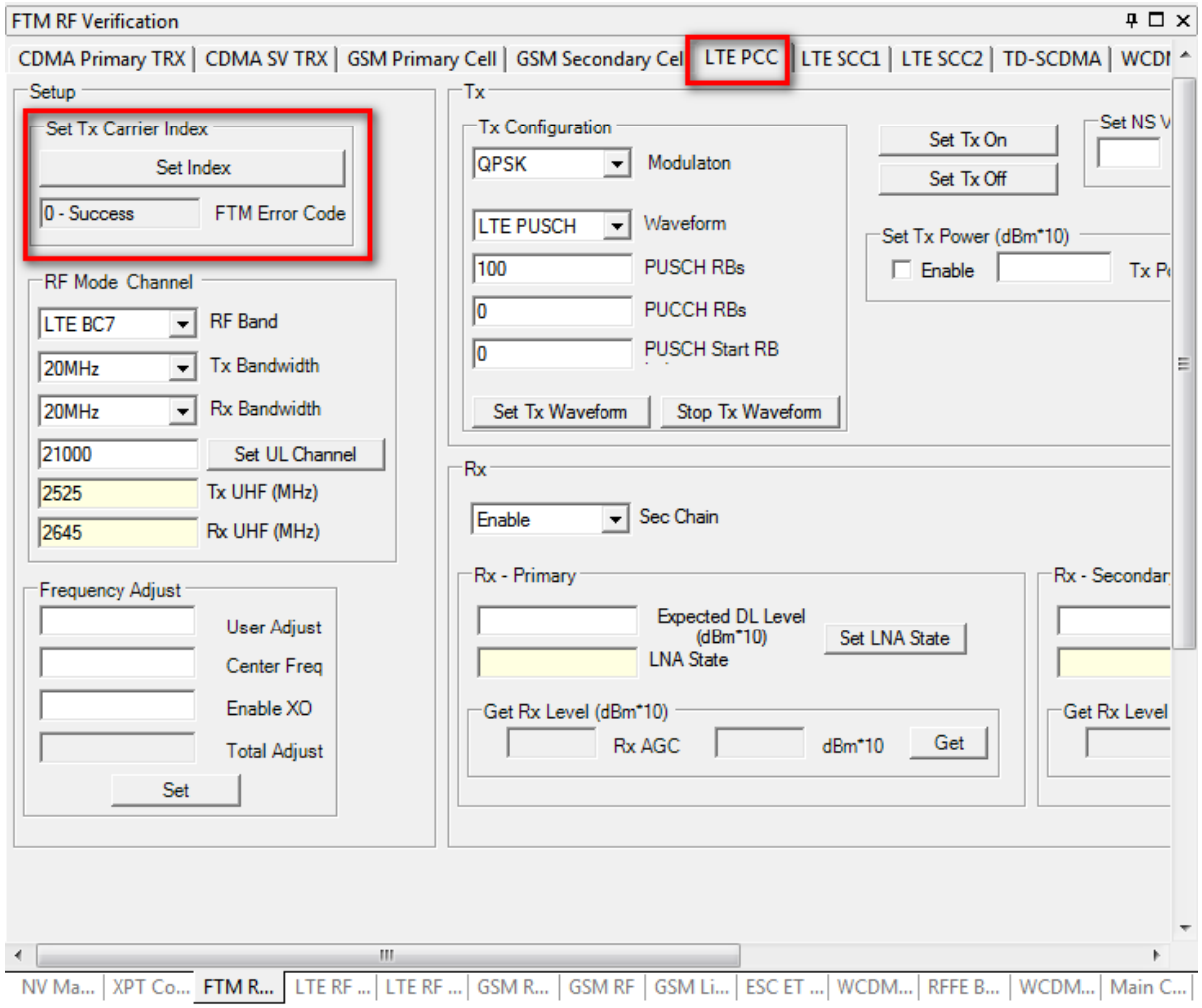
ULCA FTM Test Procedure On TA

- Return to FTM RF Verification page, switch to LTE SCC1 page, set band and channel, and set Tx On



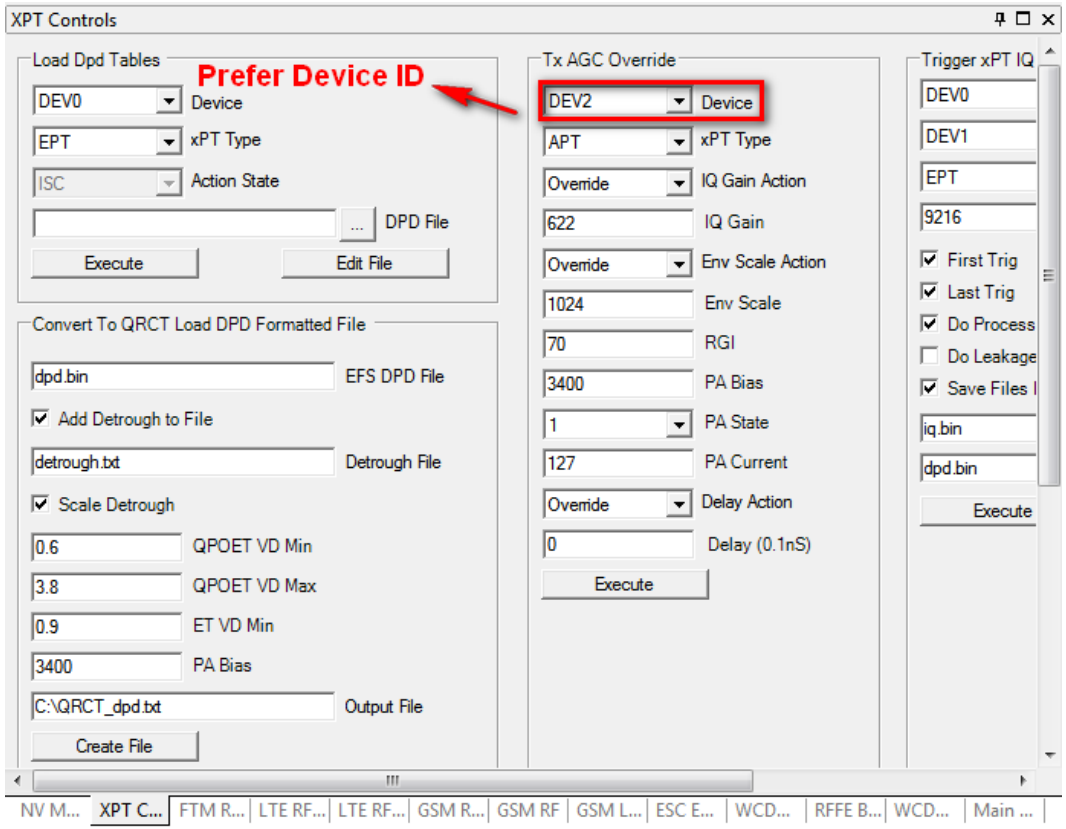
ULCA FTM Test Procedure On TA

- Set Tx carrier index in LTE PCC page



ULCA FTM Test Procedure On TA

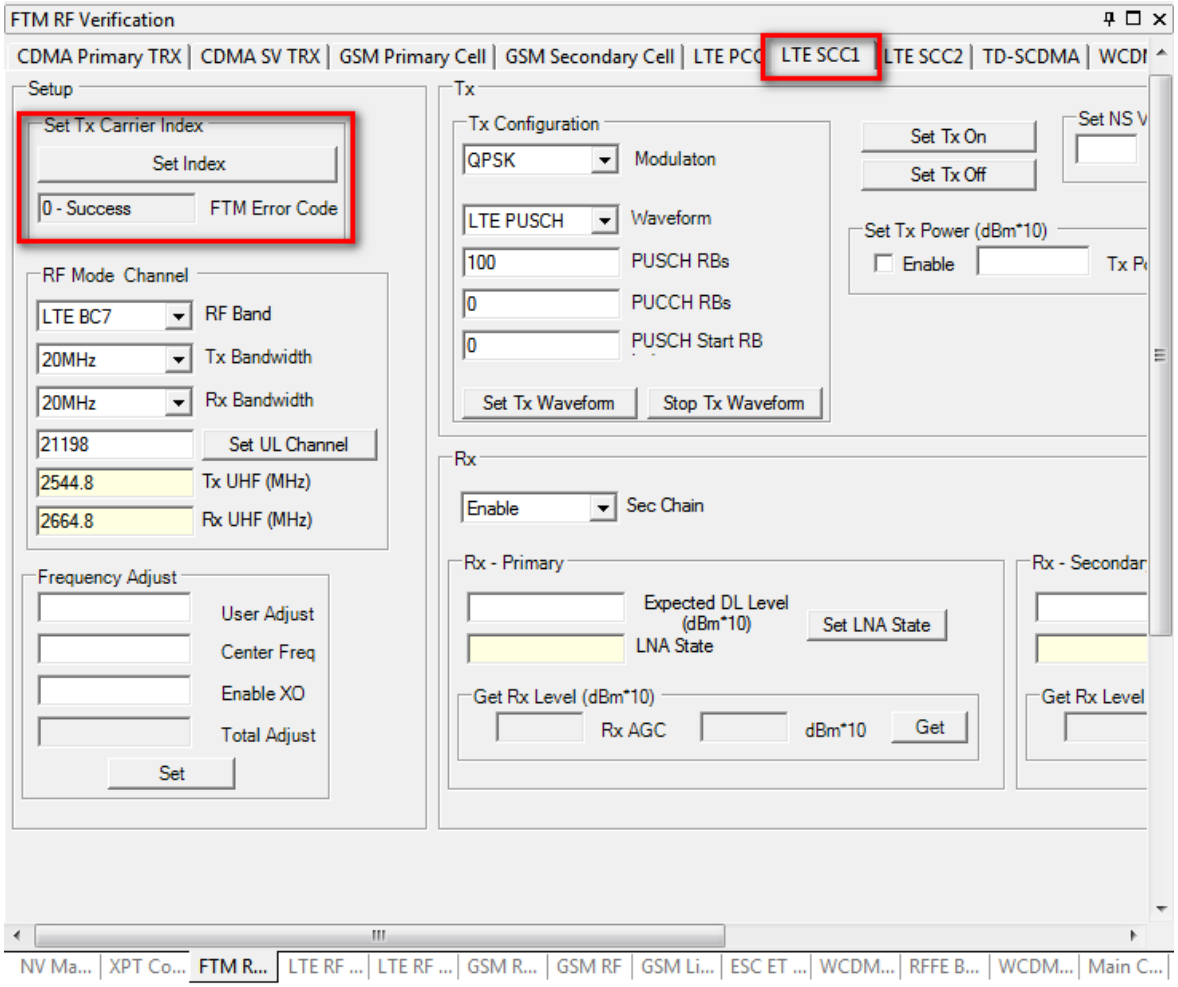
- Set PA bias/ICQ and other info in XPT controls page



* Prefer Device ID depends on your RFC design.

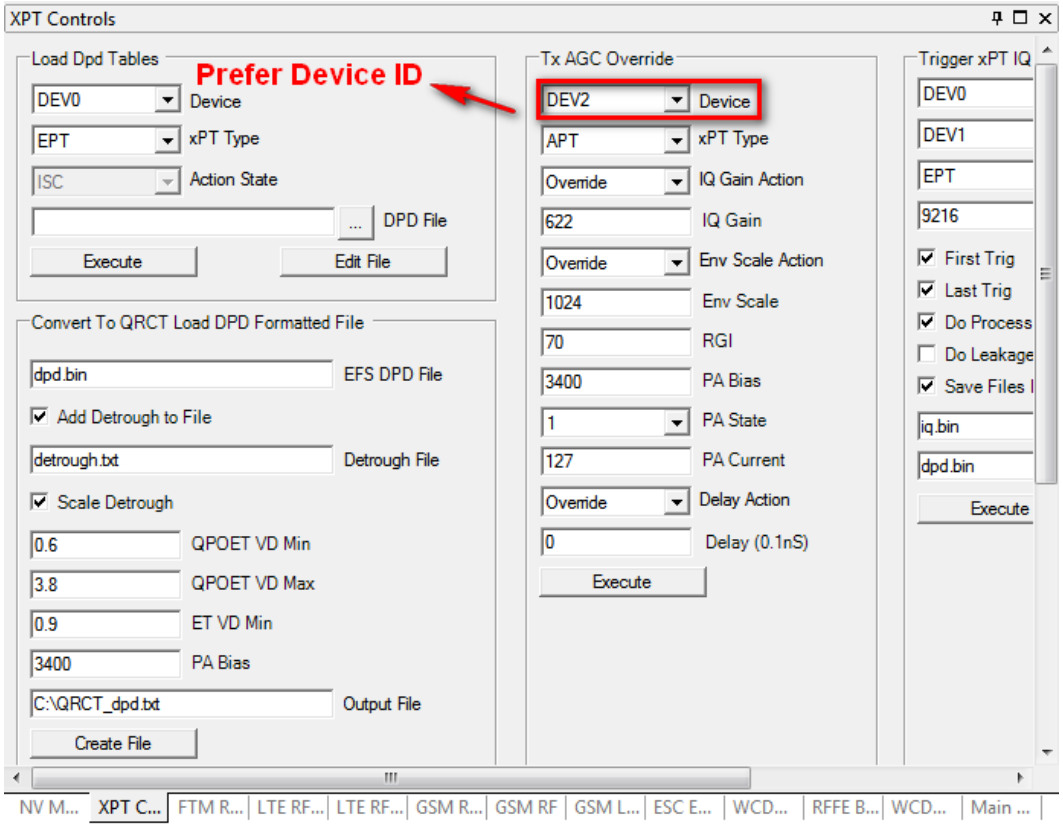
ULCA FTM Test Procedure On TA

- Return to LTE SCC1 page, set Tx carrier index.



ULCA FTM Test Procedure On TA

- Switch to XPT controls page, set SCC PA info(the same with PCC)



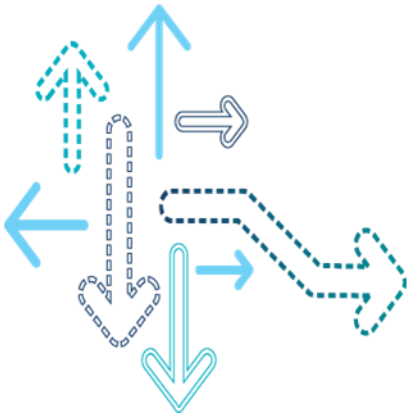
- Then watch waveform by spectrometer

ULCA FTM Test Procedure On TA

- For ULCA BW combo, pls check 3GPP spec. Just list a part of 20M+20M available channel combo here for your reference.
  - Band1, CH18100+18298
  - Band3, CH19300+19498
  - Band7, CH21000+21198
  - Band38, CH37850+38048
  - Band39, CH38350+38548
  - Band40, CH39051+39249
  - Band41, CH39750+39948

1. WTR5975
2. SDR660
3. WTR3925
4. WTR2965
5. QPA
6. Qtuner
7. QET

RF HW doc list



WTR5975

Topic	Doc number	Description	Rev.	Distribution Date
Spec	80-NT066-1	WTR5975 WAFER-LEVEL RF TRANSCEIVER DEVICE SPECIFICATION (ADVANCE INFORMATION)	J	5-Nov-16
	80-NT076-1	QLN10XX LOW NOISE AMPLIFIER DEVICE SPECIFICATION (ADVANCE INFORMATION)	F	16-Nov-16
	80-NT086-1	QLN2050 LOW NOISE AMPLIFIER DEVICE SPECIFICATION (ADVANCE INFORMATION)	B	11-Nov-16
Revision guide	80-NT066-4	WTR59X5 WAFER-LEVEL RF TRANSCEIVER DEVICE REVISION GUIDE	E	10-Nov-16
	80-NT066-4B	WTR5975 WAFER-LEVEL RF TRANSCEIVER DEVICE REVISION GUIDE FOR MSM8998	A	18-Nov-16
	80-NT076-4	QLN1020/QLN1030/QLN1035 LOW NOISE AMPLIFIER DEVICE REVISION GUIDE	C	13-Sep-16
Training slides	80-NT066-5A	WTR59X5 RF TRANSCEIVER DESIGN GUIDELINES/TRAINING SLIDES	C	23-Jul-16
RF APP	80-NT066-650	MDM9650/MSM8998 + WTR5975 RF Features and Schedule	D	1-Oct-16
	80-NT066-123	WTR5X75 PRELIMINARY TX AND RX LINK BUDGET CALCULATOR SPREADSHEET	B	17-Jun-16
	80-WL020-27	ANTENNA SHARING DESIGN GUIDELINES FOR WTR5975+WCN3990	A	25-Aug-16
SCH	80-NT066-42	WTR5975/QLN10X0 + QUALCOMM RF360 WITH QFE43X5 GLOBAL SKU REFERENCE SCHEMATIC (PRELIMINARY)	F	27-Sep-16
	80-NT066-43	WTR59X5 + QLN1020/QLN1035 + QUALCOMM RF360 WITH QFE43X5 AND QFE4340 4X4 MIMO REFERENCE SCHEMATIC (PRELIMINARY INFORMATION)	D	17-Oct-16
	80-NT066-44	WTR59X5 + QLN10X0 + QUALCOMM RF360 WITH LB/MB/HB PAMID + DIVERSITY FRONT END MODULE (NA/EU)	D	22-Sep-16
	80-NT066-45	WTR59X5 + QLN10X0 + QUALCOMM RF360 WITH LB/MB/HB PAMID + DIVERSITY FRONT-END MODULE (CHINA)	D	22-Sep-16
	80-NT066-46	WTR59X5 + QLN1020/QLN1035 + QUALCOMM RF360 WITH QFE43X5 4 X 4 MIMO REFERENCE SCHEMATIC (PRELIMINARY INFORMATION)	A	1-Jun-16
Layout	DP25-NT066-42	DESIGN PACKAGE, WTR59X5 QLN10X0 QUALCOMM RF360 WITH QFE43X5 AND HIGH-BAND PAMID GLOBAL SKU LAYOUT FILE	C	13-Jul-16
Design files	DP25-NT066-1	DESIGN PACKAGE, WTR5975 ORCAD LIBRARY SYMBOL	C	29-May-16
	DP25-NT076-1	DESIGN PACKAGE, QLN1020/1030/1035 ORCAD LIBRARY SYMBOL	A	20-Oct-15
	HS11-NT066-1HW	WTR5975 IBIS MODEL	1	6-May-16
	HS11-NT066-1BHW	WTR5975 QLINK IBIS AMI MODEL	1	6-May-16
	HS11-NT066-5HW	WTR5975 253WLNSPTHERMAL PACKAGE MODEL ICEPAK	1	21-Jul-16
	NT90-NT356-1	PACKAGE OUTLINE DRAWING, 253 WLPSP, 5.92X6.16X0.50MM, D270, B22	C	26-Mar-16
	NT90-P2264-1	PACKAGE OUTLINE DRAWING, 24 PSP, 2.50X2.50X0.79MM, S270, M300	B	28-Oct-15
	NT90-P2265-1	PACKAGE OUTLINE DRAWING, 50 PSP, 2.83X2.83X0.79MM, S270, M300	A	28-Oct-15

WTR5975

Checklist	80-NT066-111	WTR5975 + QLN10XX + QUALCOMM RF360 WITH MDM9X5X/MSM8998 SCHEMATIC REVIEW CHECKLIST	A	20-Sep-16
	80-NT066-114	WTR59X5 AND QLN10XX LAYOUT REVIEW CHECKLIST	D	16-Nov-16
S-parameter	80-NT076-13	QLN10XX S-PARAMETERS AND NF CIRCLE	C	26-Oct-16
	HS11-NT076-13HW	S-PARAMETERS FOR QLN10XX	3	28-Oct-16
Key Performance Indicator	80-NT066-K71E	MDM9X50 WTR5975+QUALCOMM RF360 KEY PERFORMANCE INDICATOR DATA PACKAGE	B	20-Sep-16
	80-NT066-K72E	MSM8998 WTR59X5 + QLN10X0 + QUALCOMM RF360 WITH LB/MB/HB PAMID + DIVERSITY FRONT-END MODULE KEY PERFORMANCE INDICATOR DATA PACKAGE	B	20-Sep-16
	80-NT066-K73E	MSM8998 WTR59x5 + QLN1020/QLN1035 + Qualcomm® RF360™ with QFE43x5 and QFE4340 4 ×4 MIMO RF Key Performance Indicator	B	20-Sep-16
QLN Diversity Module by TDK	MH80-P4631-1	M552 TDK LB GLOBAL DEVICE SPECIFICATION	B	30-Jul-16
	MH80-P4632-1	M553 MHUHB NA+EU DUAL-FEED DEVICE SPECIFICATION	B	30-Jul-16
	MH80-P4633-1	M556A TDK MB/HB JP/APAC SAW FRONT-END DIVERSITY MODULE DEVICE SPECIFICATION	C	14-Oct-16
	MH80-P4634-1	M554 MHUHB CHINA DUAL-FEED DEVICE SPECIFICATION	B	30-Jul-16
	MH80-P4635-1	M555A TDK MB/HB CHINA SINGLE FEED SAW FRONT-END DIVERSITY MODULE DEVICE SPECIFICATION	C	14-Oct-16
	MH80-P4636-1	M557 JAPAN/APAC DUAL-FEED (4X4 MIMO DEMONSTRATOR) DEVICE SPECIFICATION	A	20-Sep-16
QRD8998 design package	80-VL744-131	QRD8998_GEN2_3-4-3 BILL OF MATERIALS (BOM)	A	10-Nov-16
	DP10-VL744-100	DESIGN PACKAGE, QRD8998_GEN2_3-4-3, SMART PHONE, ELECTRICAL HARDWARE, PCB SCHEMATIC	A	9-Nov-16
	DP10-VL744-110	DESIGN PACKAGE, QRD8998_GEN2, SMART PHONE, ELECTRICAL HARDWARE, PCB LAYOUT	A	9-Nov-16
	DP10-VL744-120	DESIGN PACKAGE, QRD8998_GEN2, SMART PHONE, ELECTRICAL HARDWARE, FABRICATION FILES	A	9-Nov-16
	DP10-VL744-140	DESIGN PACKAGE, QRD8998_GEN2, SMART PHONE, ELECTRICAL HARDWARE, PCB ASSEMBLY	A	9-Nov-16
	DP25-P2169-4	DESIGN PACKAGE, PCB, QRD8998 MAIN BOARD, EVT	B	28-Oct-16
Knowledgebase Article	KBA-160723022706	MSM8998 + WTR5975 RFHW FAQ	2	22-Aug-16
	KBA-160619232022	What is the difference between QLINK and legacy IQ pair? What's the layout requirement of Qlink?	1	22-Aug-16
	KBA-160717225021	Can QLN10xx be replaced by 3rd party eLNA?	2	18-Jul-16

SDR660

Topic	Doc number	Description	Rev.	Distribution Date
Spec	80-P6369-1	SDR660 WAFER-LEVEL RF TRANSCEIVER DEVICE SPECIFICATION (ADVANCE INFORMATION)	A	14-Sep-16
Revision guide	80-P6369-4	SDR660 DEVICE REVISION GUIDE	A	TBD
Training slides	80-P6369-5A	SDR660 RF TRANSCEIVER AND SYSTEM DESIGN GUIDELINES/TRAINING SLIDES	A	21-Oct-16
RF APP				
SCH	80-P6369-42	SDR660 + QLN10XX + QLN2042 + QUALCOMM RF360 WITH QPA5460, QPA88XX, AND QPA4340 GLOBAL ET CONFIGURATION REFERENCE SCHEMATIC	A	17-Nov-16
	80-P6369-43	SDR660 + QUALCOMM RF360 WITH QPA4360 AND QPA4340 DL-CA AND UL-CA CHINA APT REFERENCE SCHEMATIC	A	27-Oct-16
Layout				
Design files	NT90-P1787-1	PACKAGE OUTLINE DRAWING, 180 WLPSP, 5.79X4.43X0.50MM, D270, B22	C	4-May-16
	NT90-P2264-1	PACKAGE OUTLINE DRAWING, 24 PSP, 2.50X2.50X0.79MM, S270, M300	B	28-Oct-15
	NT90-P2265-1	PACKAGE OUTLINE DRAWING, 50 PSP, 2.83X2.83X0.79MM, S270, M300	A	28-Oct-15
Checklist				
S-parameter				
	HS11-NT076-13HW	S-PARAMETERS FOR QLN10XX	1.0	5-Apr-16
Key Performance Indicator				

SDR660

Topic	Doc number	Description	Rev.	Distribution Date
Design Package	DP10-VL741-100	DESIGN PACKAGE, QRD660_2-6-2, SMART PHONE, ELECTRICAL HARDWARE, PCB SCHEMATIC	C	15-Nov-16
	DP10-VL741-110	DESIGN PACKAGE, QRD660_2-6-2, SMART PHONE, ELECTRICAL HARDWARE, PCB LAYOUT	B	15-Nov-16
	DP10-VL741-120	DESIGN PACKAGE, QRD660_2-6-2, SMART PHONE, ELECTRICAL HARDWARE, FABRICATION FILES	A	16-Nov-16
	DP10-VL741-140	DESIGN PACKAGE, QRD660_2-6-2, SMART PHONE, ELECTRICAL HARDWARE, PCB ASSEMBLY	A	16-Nov-16
	DP10-VL741-150	DESIGN PACKAGE, QRD660_2-6-2, SMART PHONE, ELECTRICAL HARDWARE, PCB COMPONENTS LIBRARY		TBD
	DP10-VL741-210	DESIGN PACKAGE, QRD660_2-6-2, SMART PHONE, MECHANICAL HARDWARE, PCB STACKUP		TBD
	DP10-VL741-230	DESIGN PACKAGE, QRD660_2-6-2, SMART PHONE,MECHANICAL HARDWARE, MECH PLASTIC & STAMPED METAL CAD		TBD
	80-VL741-111	QRD660_2-6-2 GERBER FILE ASSOCIATED IMPEDANCE CONTROL REQUIREMENT		TBD
Training slides				
BOM	80-VL741-131	QRD660_2-6-2 BILL OF MATERIALS (BOM)	A	10-Nov-16
Test Data				

WTR3925

Topic	Description	Doc number	Rev.	Distribution Date
Spec	80-NH379-1	WTR3925/WTR3905/WTR3900 WAFER-LEVEL RF TRANSCEIVER DEVICE SPECIFICATION	L	31-Mar-16
	80-P0061-1	WTR3950 WAFER-LEVEL RF RECEIVER DEVICE SPECIFICATION (ADVANCE INFORMATION)	E	18-May-16
	80-NL713-1	WTR4905_WTR4605 WAFER-LEVEL RF TRANSCEIVER DEVICE SPECIFICATION (ADVANCE INFORMATION)	J	15-Oct-15
Revision guide	80-NH379-4	WTR3925/WTR3905/WTR3900 WAFER-LEVEL RF TRANSCEIVER DEVICE REVISION GUIDE	J	15-Jun-15
	80-NL713-4	WTR4905WTR4605 WAFER-LEVEL RF TRANSCEIVER DEVICE REVISION GUIDE	F	3-Jul-15
	80-P0061-4	WTR3950 WAFER-LEVEL RF RECEIVER DEVICE REVISION GUIDE	C	18-May-16
Training slides	80-P0061-5A	WTR3950 WAFER-LEVEL RF RECEIVER DESIGN GUIDELINES/TRAINING SLIDES	F	19-May-16
	80-NR113-5A	UPLINK CARRIER AGGREGATION FOR THOR MODEMS (MDM9X45MSM8996)	F	29-Jul-16
	80-NH379-5A	WTR3925_WTR3915_WTR3905_WTR3605 RF TRANSCEIVER DESIGN GUIDELINES_TRAINING SLIDES	K	9-Nov-15
	80-NH379-5B	DUAL-TX (VOICE AND DATA) RF APPLICATIONS USING BOLT MODEMS	A	21-May-14
	80-NL713-5	WTR4905_WTR4605 RF TRANSCEIVER DESIGN GUIDELINES_TRAINING SLIDES	D	1-Jun-15
	80-NR220-6	WTR3925 FEEDBACK RECEIVER DESIGN GUIDE	F	18-Feb-16
	80-NT820-6	FBRx_Design_Guide_MDM9x40_MDM9x45_MSM8996_Zhanrong.pdf	E	3/28/2016
	80-NT820-2	LTE_Factory_RF_Calibration_SW_Overview_MDM9x40_MDM9x45_MSM8996	B	7/15/2015
RF Function	80-NH379-650	MDM9X30/MDM9X35M/FUSION 4.5/MSM8994/MSM8992 WTR3925 RF FEATURES AND SCHEDULE	D	6/8/2015
	80-NR113-650	MDM9X45_MSM8996 WTR3925 + WTR4905 RF FEATURES AND SCHEDULE	F	29-Jul-16
RF APP	80-NR113-56	ERF_APP_SPECMDM9X40_MDM9X45_MSM8996RF80-NR113-5A UPLINK CARRIER AGGREGATION FOR THOR MODEMS (MDM9X45MSM8996)	H	20-Jul-16
	80-NL713-56	MSM8X16/MSM8X39/MSM8929/MSM8X09 BASED WTR4605/WTR4905 RF ISSUES AND UPDATES APPLICATION NOTE	G	12-Jan-16
	80-NR113-6	QFE33XX TO QFE43XX Hardware Migration Guide for APT + DPDand ET Designs	C	6-Oct-15
	80-NR113-21	2 and 3 antenna sharing	A	7-Jul-15
	80-NR113-121	WTR3925 + WTR4905 + QUALCOMM RF360™ GLOBAL 3DL CA PRELIMINARY RX LINKBUDGET CALCULATOR	A	23-Jul-15
	80-NR113-124	WAN/WI-FI COEXISTENCE OVERVIEW FOR THE MSM8996/MDM9X4X + QCA61X4 PLATFORM	A	20-Apr-16
	80-NR113-125	LINK BUDGET ANALYSIS FOR RF FRONT-END DESIGN APPLICATION NOTE	C	20-Apr-16
	80-NH379-121	WTR3925 + QUALCOMM RF360 GLOBAL 2DL CA PRELIMINARY RX LINK BUDGET CALCULATOR	B	12-Jul-15
	80-NH379-123	WTR3925 LTE CARRIER AGGREGATION AND WI-FI COEXISTENCE REQUIREMENTS.pdf	B	22-Dec-15
RF Design Review Template	80-V5756-3	CUSTOMER DESIGN REVIEW SPREADSHEET	G	28-Oct-15

WTR3925

SCH	80-NH379-42	WTR3925 + WTR4905 + QUALCOMM RF360 GLOBAL 3DL CA - PRELIMINARY REFERENCE SCHEMATIC	K	16-Oct-15
	80-NH379-43	WTR3925 + QUALCOMM RF360 GLOBAL 2DL CA WITH QFE3100 DESIGN EXAMPLE	Obsolete	27-Apr-16
	80-NH379-46	WTR3925 + QUALCOMM RF360 WITH QFE4320,QPA4340, DL-CA AND UL-CA	C	4-Oct-16
	80-NR113-42	WTR3925 + WTR4905 + QUALCOMM RF360 GLOBAL 3DL CA - PRELIMINARY REFERENCE SCHEMATIC	G	16-Feb-16
	80-NR113-42A	WTR3925 + WTR4905 + QUALCOMM RF360™ GLOBAL 3DL CA AND 4 × 4 MIMO BOM	A	21-Jul-15
	80-NR113-43	WTR3925 + QUALCOMM RF360 GLOBAL 2DL CA WITH QFE3100 DESIGN EXAMPLE	EA	27-Apr-16
	80-NR113-43A	WTR3925 + QUALCOMM RF360 GLOBAL 2DL CA BILL OF MATERIALS	A	21-Jul-15
	80-NR113-44	WTR3925 + WTR4905 + Qualcomm RF360™TDD (CHINA) ULCA	CA	11-Nov-15
	80-NR113-45	WTR3925 + WTR4905 + QUALCOMM RF360 FDD (ROW) ULCA PRELIMINARY REFERENCE SCHEMATIC	D	1-Apr-16
	80-NR113-46	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE2340, QFE4345 AND QFE4335 GLOBAL 3DL CA AND 4X4 MIMO -DESIGN EXAMPLE	D	20-May-16
	80-NR113-47	WTR3925+WTR4905+QUALCOMM RF360 WITH QFE4345 AND QFE4335 TDD (CHINA) ULCA DESIGN EXAMPLE	AA	11-Nov-15
	80-NR113-48	WTR3925+WTR4905+QUALCOMM RF360 WITH QFE2340, QFE4345, AND QFE4335 GLOBAL 3DL CA, 4X4 MIMO AND ANTENNA SHARING DESIGN EXAMPLE	B	11-Nov-15
	80-NR113-49	WTR3925 + QUALCOMM RF360 WITH HB, MB, AND LB PAMIDS GLOBAL 2DL CA PRELIMINARY REFERENCE SCHEMATIC	BA	26-Jan-16
	80-NR113-50	WTR3925 + WTR4905 + QUALCOMM RF360 WITH HB, MB, AND LB PAMID GLOBAL 3DL CA DESIGN EXAMPLE	A	11-Nov-15
	80-P0061-41	WTR3925 + WTR4905 + WTR3950 + QUALCOMM RF360 3DL CA WITH LTE-U PRELIMINARY REFERENCE SCHEMATIC	F	7-Mar-16
	80-P0061-42	WTR3925 + WTR4905 + WTR3950 + QUALCOMM RF360 WITH QFE2340, QFE4345, AND QFE4335 3DL CA WITH LTE-U DESIGN EXAMPLE	D	4-Apr-16
Layout	DP25-NR113-42T	DESIGN PACKAGE, WTR3925 + WTR4905 + QUALCOMM RF360 GLOBAL 3DL TGZ LAYOUT FILE	A	03/11/2015
	DP25-NR113-42	DESIGN PACKAGE WTR3925 + WTR4905 + QUALCOMM RF360 GLOBAL 3DL CCZ LAYOUT FILE	A	20-May-15
	DP25-NR113-43	DESIGN PACKAGE , WTR3925 + WTR4905 + QUALCOMM RF360 GLOBAL 3DL CCZ LAYOUT FILE	A	20-May-15
	DP25-NR113-43T	DESIGN PACKAGE , WTR3925 + WTR4905 + QUALCOMM RF360 GLOBAL 3DL TGZ LAYOUT FILE	A	15-May-15
	DP10-VL727-110	DESIGN PACKAGE, DTP8996_3-4-3, SMART PHONE, HEDGE, ELECTRICAL HARDWARE, PCB LAYOUT	A	11-Aug-15
Checklist	80-NH379-93	WTR3925/WTR3950 + QUALCOMM RF360 WITH MDM9X30/MDM9X35M/MSM8994/MDM9X40/MDM9X45/MSM8996 SCHEMATIC REVIEW CHECKLIST	M	18-May-16
	80-NH379-94	WTR3925 + WTR3950 LAYOUT REVIEW CHECKLIST	E	19-Jan-16
S-parameter	80-NH379-13	WTR3925/WTR3915/WTR3905/WTR3605 S-PARAMETERS APPLICATION NOTE	B	30-Apr-14
	80-NL713-13	APPLICATION NOTE WTR4905WTR4605 S-PARAMETERS AND NF CIRCLE	D	14-Sep-15
	HS11-NH379-13	HS11-NH379-13HW_S_PARAMETERS_WTR3925_WTR3915_WTR3905.zip		4-Jun-15
NV	80-NT820-100	Comprehensive_RF_NV_Items_MDM9640_MDM9645_MSM8996	E	24-Feb-16
Ext components Mini spec	80-VP447-12	MSM/MDM KEY RF EXTERNAL COMPONENTS APPLICATION	YB	2-Feb-16

WTR3925

QRD NON-SCH/PCB	DP10-VL727-120	DESIGN PACKAGE, DTP8996_3-4-3, SMART PHONE, HEDGE, ELECTRICAL HARDWARE, FABRICATION FILES	D	23-Oct-15
	DP10-VL727-140	DESIGN PACKAGE, DTP8996_3-4-3, SMART PHONE, HEDGE, ELECTRICAL HARDWARE, PCB ASSEMBLY	D	23-Oct-15
	DP10-VL743-100	QRD8920_2-4-2_SCHEMATIC	B	12-Nov-16
	DP10-VL743-110	QRD8920_2-4-2_LAYOUT	A	12-Nov-16
Datapackage	80-NR113-K71E	MDM9X45-MSM8996 WTR3925+WTR4905 RF KEY PERFORMANCE INDICATOR DATA PACKAGE.pdf	E	12-Jan-16
	80-NR113-K72E	MDM9x40MDM9x45 WTR3925 + WTR4905 Qualcomm RF360™ ULCA with QFE43x5 RF Key Performance Indicator	B	8-Sep-15
	80-NR113-K73E	MSM8996 WTR3925+QUALCOMM RF360 GLOBAL 2DL CA WITH QFE43X5 AND QFE2340 RF KEY PERFORMANCE INDICATOR DATA PACKAGE	A	15-Aug-16
	80-NR113-K74E	MDM9X40/MDM9X45 WTR3925 + WTR4905 QUALCOMM RF360 ULCA WITH QFE43X5 DATA PACKAGE	B	27-Dec-15
	80-NR113-L71E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B12 GLOBAL 3DL CA	A	11/6/2015
	80-NR113-L72E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B2 GLOBAL 3DL CA CONFIGURATION RF DATA PACKAGE (MDM9X45)	A	7/20/2016
	80-NR113-L73E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B2 GLOBAL 3DL CA	A	2/9/2016
	80-NR113-L74E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B3 GLOBAL 3DL CA	A	3/24/2016
	80-NR113-L75E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B4 GLOBAL 3DL CA	A	2/10/2016
	80-NR113-L76E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B5 GLOBAL 3DL CA	A	2/10/2016
	80-NR113-L77E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B7 GLOBAL 3DL CA	A	2/10/2016
	80-NR113-L78E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B8 GLOBAL 3DL CA	A	2/10/2016
	80-NR113-L79E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B11 GLOBAL 3DL CA	A	2/10/2016
	80-NR113-L80E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B13 GLOBAL 3DL CA	A	2/16/2016
	80-NR113-L81E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B18 GLOBAL 3DL CA	A	2/21/2016
	80-NR113-L82E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B21 GLOBAL 3DL CA	A	2/17/2016
	80-NR113-L83E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, LTE B25 GLOBAL 3DL CA	A	2/17/2016
	80-NR113-L84E	WTR3925 + WTR4905 + QUALCOMM RF360WITH QFE3320, QFE3335, AND QFE2340, LTE B30 GLOBAL 3DL CA	A	1/21/2016
	80-NR113-W71E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, WCDMA B1 GLOBAL 3DL CA	A	1/21/2016
	80-NR113-W72E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, WCDMA B2 GLOBAL 3DL CA	A	1/19/2016
	80-NR113-W73E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, WCDMA B5 GLOBAL 3DL CA	A	1/19/2016
	80-NR113-W74E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, WCDMA B8 GLOBAL 3DL CA	A	1/21/2016
	80-NR113-W75E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, WCDMA B3 GLOBAL 3DL CA	A	1/21/2016
	80-NR113-W76E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, WCDMA B4 GLOBAL 3DL CA	A	1/22/2016
	80-NR113-W77E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, WCDMA B6 GLOBAL 3DL CA	A	1/22/2016
	80-NR113-W78E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, WCDMA B9 GLOBAL 3DL CA	A	1/22/2016
	80-NR113-C73E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, CDMA BC6 GLOBAL 3DL CA	A	4/20/2016
	80-NR113-C75E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, CDMA BC14 GLOBAL 3DL CA	A	4/20/2016
	80-NR113-C72E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, CDMA BC1 GLOBAL 3DL CA	A	4/20/2016
	80-NR113-C76E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, CDMA BC15 GLOBAL 3DL CA	A	4/20/2016
	80-NR113-C74E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, CDMA BC10 GLOBAL 3DL CA	A	5/2/2016
	80-NR113-C71E	WTR3925 + WTR4905 + QUALCOMM RF360 WITH QFE3320, QFE3335, AND QFE2340, CDMA BC0 GLOBAL 3DL CA	A	5/2/2016

WTR29x5

	Doc. No	Description	Rev.	Distribution Date
Spec	80-NP237-1	WTR2955/WTR2655 WAFER-LEVEL RF TRANSCEIVER DEVICE SPECIFICATION (ADVANCE INFORMATION)	J	3-Nov-16
	80-NP237-4	WTR2955/WTR2655 WAFER-LEVEL RF TRANSCEIVER DEVICE REVISION GUIDE	F	3-Nov-16
Schematic	80-NP237-42	CHILE NON-CA REFERENCE SCHEMATIC USING WTR2955 AND QUALCOMM RF360	F	18-Nov-16
	80-NP237-43	NA CA REFERENCE SCHEMATIC USING WTR2955 AND QUALCOMM RF360 REFERENCE SCHEMATIC	E	19-Oct-16
	80-NP237-44	JP/KR CA RF Reference Schematic using WTR2955 and RF360	B	31-Aug-15
	80-NP237-45	CHILE CA REFERENCE SCHEMATIC USING WTR2955 AND QUALCOMM RF360 REFERENCE SCHEMATIC	E	18-Nov-16
	80-NP237-46	WTR2955 AND QUALCOMM RF360 + GLOBAL CA REFERENCE SCHEMATIC	B	11-Aug-15
	80-NP237-47	CHILE NON-CA RF SAWLESS REFERENCE SCHEMATIC USING WTR2955 AND QUALCOMM RF360	D	8-Jun-16
	80-NP237-48	WTR2965 + QUALCOMM RF360 WITH QFE4320, QFE4303, AND QFE4305 ULCA REFERENCE SCHEMATIC	A	29-Oct-15
	80-NP237-49	WTR2965 AND QUALCOMM RF360 GLOBAL CA DESIGN EXAMPLE	A	3-Aug-15
	80-NP237-50	WTR2965 + QUALCOMM RF360 WITH QFE4320 AND QFE2340 CHINA 2DL CA DESIGN EXAMPLE	A	14-Sep-15
	80-NP237-51	WTR2965 + QUALCOMM RF360 WITH QPA4373, QFE430X NON-CA SAWLESS REFERENCE SCHEMATIC	A	10-Nov-15
	80-NP237-52	WTR2965 + QUALCOMM RF360 WITH QFE4320, QPA4340, CHILE DL-CA AND UL-CA - REFEREN	B	15-Jul-16
	80-NP237-53		A	3-Oct-16
Layout	DP25-NP237-46T	DESIGN PACKAGE, WTR2955 + QUALCOMM RF360 GLOBAL CA TGZ LAYOUT FILE	A	2-Jun-15
Training	80-NP237-5	WTR2955/WTR2655 WAFER-LEVEL RF TRANSCEIVER DESIGN GUIDELINES/TRAINING SLIDES	F	8-Nov-16
App note	80-NP237-111	WTR2955 SCHEMATIC REVIEW CHECKLIST	D	26-Oct-16
	80-NP237-112	WTR2955/WTR2655 LAYOUT REVIEW CHECKLIST	B	29-Jun-15
	80-NP237-13	APPLICATION NOTE: WTR2955/WTR2655 S-PARAMETERS	C	14-Sep-15
	80-NP237-56	APPLICATION NOTE: WTR2955/WTR2655 ISSUES AND UPDATES	G	10-May-16
	80-NP237-121	WTR2955/WTR2965 PORT MAPPING SPREADSHEET	D	15-Jul-16
	80-NP237-122	WTR2955 + QUALCOMM RF360 CHILE 2DL CA PRELIMINARY RX LINK BUDGET CALCULATOR	A	21-Jun-16
	80-NP237-650	WTR2X55/WTR2965 RF FEATURES AND ROADMAP	C	23-Sep-16

DATA package	80-NP237-A71	WTR2955 + QUALCOMM RF360 LTE CHILE INTER AND INTRA 2DL CARRIER AGGREGATION CONFIGURATION RF CS DATA PACKAGE (MSM8952)	A	14-Oct-15
	80-NP237-A72	WTR2955/WTR2965 + QUALCOMM RF360 LTE NA AND JP/KR INTER AND INTRA 2DL CARRIER AGGREGATION CONFIGURATION RF CS DATA PACKAGE (MSM8953)	A	10-Nov-16
	80-NP237-A73	WTR2965 + QUALCOMM RF360 LTE CHILE INTRA UL CARRIER AGGREGATION CONFIGURATION –BAND 7	A	18-Oct-16
	80-NP237-A74	WTR2965 + QUALCOMM RF360 LTE CHILE INTRABAND CONTIGUOUS UL CARRIER AGGREGATION CONFIGURATION – BAND 40 AND BAND 41 RF DATA PACKAGE (MSM8953)	A	10-Nov-16
	80-NP237-C71	WTR2955 + QUALCOMM RF360 WITH QFE4320: CDMA BC1, BC10, AND BC15 RF CS DATA PACKAGE	A	10-Mar-16
	80-NP237-C72	WTR2955 + QUALCOMM RF360 WITH QFE4320: CDMA-BC0 RF CS DATA PACKAGE (MSM8952)	A	8-Mar-16
	80-NP237-G73	WTR2955 + QUALCOMM RF360 WCDMA B2, B4 AND B8 REGIONAL CONFIGURATION RF DATA PACKAGE (MSM8952)	A	14-Oct-15
	80-NP237-G74	WTR2955 + QUALCOMM RF360 WITH QPA4373, GSM NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	21-Jul-16
	80-NP237-L71	WTR2955 + QUALCOMM RF360 WITH QFE4320: LTE B1, B2, B3, B5, B8, B20, B26, B39 RF CS DATA PACKAGE (MSM8952)	A	15-Oct-15
	80-NP237-L72	WTR2955 + QUALCOMM RF360 WITH QFE4320: LTE B7, B38, B40, B41 RF CS DATA PACKAGE (MSM8952)	A	14-Oct-15
	80-NP237-L73	WTR2955 + QUALCOMM RF360 WITH QFE4320: LTE B13 RF CS DATA PACKAGE (MSM8952)	A	11-Mar-16
	80-NP237-L74	WTR2955 + QUALCOMM RF360 WITH QFE4320: LTE B4 RF CS DATA PACKAGE (MSM8952)	A	18-Mar-16
	80-NP237-L75	WTR2955 + QUALCOMM RF360 WITH QFE4320: LTE B28 RF CS DATA PACKAGE (MSM8952)	A	29-Apr-16
	80-NP237-L76	WTR2965 + QUALCOMM RF360 WITH QPA4373, LTE B7 NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	21-Jul-16
	80-NP237-L77	WTR2965 + QUALCOMMRF360 WITH QPA4373, LTE B38 NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	21-Jul-16
	80-NP237-L78	WTR2965 + QUALCOMM RF360 WITH QPA4373, LTE B39 NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	21-Jul-16
	80-NP237-L79	WTR2965 + QUALCOMM RF360 WITH QPA4373, LTE B40 NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	21-Jul-16
	80-NP237-L80	WTR2965 + QUALCOMM RF360 WITH QPA4373, LTE B41 NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	21-Jul-16
	80-NP237-L81	WTR2965 + QUALCOMM RF360 WITH QPA4340: LTE B7, B30, B38, B40, AND B41 RF CS DATA PACKAGE (MSM8953)	A	26-Jul-16
	80-NP237-T72	WTR2955 + QUALCOMM RF360 WITH QFE4320: TDSCDMA B34, B39 RF CS DATA PACKAGE (MSM8952)	A	14-Oct-15
	80-NP237-T74	WTR2955 + QUALCOMM RF360 WITH QPA4373, TD-SCDMA B34, B39 GLOBAL 3DL CA CONFIGU	A	20-May-16
	80-NP237-W71	WTR2955 + QUALCOMM RF360™WITH QFE4320: WCDMA B1 RF CS DATA PACKAGE (MSM8952)	A	29-Jan-16
	80-NP237-W72	WTR2955 + QUALCOMM RF360™WITH QFE4320: WCDMA B1 RF CS DATA PACKAGE (MSM8952)	A	28-Jan-16

QPA436x & QPA5460

QPA436x				
			Revision	Date
Datasheet	80-P7394-1	QPA4360 DEVICE SPECIFICATION	B	10/19/2016
	80-P7395-1	QPA4361 DEVICE SPECIFICATION	A	10/5/2015
Schematic	80-NP237-53	WTR2965 + QUALCOMM RF360 WITH QPA4340, QPA4360, AND QPA88XX, DL-CA AND UL-CA REFERENCE SCHEMATIC	A	9/30/2016
	80-P6369-43	SDR660 + QUALCOMM RF360 WITH QPA4360 AND QPA4340 DL-CA AND UL-CA CHINA APT REFERENCE SCHEMATIC	A	10/18/2016
	DP10-VL741-100	DESIGN PACKAGE, QRD660_2-6-2, SMART PHONE, ELECTRICAL HARDWARE, PCB SCHEMATIC	C	11/15/2016
Training				
App	80-P7394-4	QPA4360 DEVICE REVISION GUIDE	C	10/13/2016
	80-P1762-1	PA MANUAL CONTROL GUI (PMCG) USER MANUAL	A	11/17/2015
	80-P1071-18	RFFE REGISTER MAP AND PORT SHEET FOR PAMID, QPA, QET	C	10/21/2016
Test result				
QPA5460				
			Revision	Date
Datasheet	80-P6406-1	QPA5460 DEVICE SPECIFICATION	A	11/9/2016
Schematic	80-P6369-42	SDR660 + QLN10XX + QLN2042 + QUALCOMM RF360 WITH QPA5460, QPA88XX, AND QPA4340 GLOBAL ET CONFIGURATION REFERENCE SCHEMATIC	A	11/17/2016

QPA4373 & QPA4340

QPA4373				
			Revision	Date
Datasheet	80-NV838-1	QPA4373 DEVICE SPECIFICATION	B	4/25/2016
Schematic	80-NP237-51	WTR2965 + QUALCOMM RF360 WITH QPA4373, QFE430X NON-CA SAWLESS REFERENCE SCHEMATIC	A	6/7/2016
Training	80-NV838-5	PHASE Q RFFE - QPA4373 + QPA4351 POWER AMPLIFIERS DESIGN GUIDELINES/TRAINING SLIDES	A	6/13/2016
App	80-NV838-4	QPA4373 DEVICE REVISION GUIDE	B	6/6/2016
	80-NV838-111	QPA4373 DESIGN CHECKLIST	A	4/25/2016
	80-NV838-122	QPA4373 HIGH-BAND EPT LOAD PULL REPORT	A	4/20/2016
Test result	80-NP237-T74	WTR2955 + QUALCOMM RF360 WITH QPA4373, TD-SCDMA B34, B39 GLOBAL 3DL CA CONFIGURATION RF DATA PACKAGE (MSM8952)	A	5/18/2016
	80-NP237-G74	WTR2955 + QUALCOMM RF360 WITH QPA4373, GSM NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	10/14/2015
	80-NP237-L76	WTR2965 + QUALCOMM RF360 WITH QPA4373, LTE B7 NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	7/21/2016
	80-NP237-L77	WTR2965 + QUALCOMMRF360 WITH QPA4373, LTE B38 NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	7/21/2016
	80-NP237-L78	WTR2965 + QUALCOMM RF360 WITH QPA4373, LTE B39 NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	7/21/2016
	80-NP237-L79	WTR2965 + QUALCOMM RF360 WITH QPA4373, LTE B40 NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	7/21/2016
	80-NP237-L80	WTR2965 + QUALCOMM RF360 WITH QPA4373, LTE B41 NON-CA SAWLESS CONFIGURATION RF DATA PACKAGE (MSM8952)	A	7/21/2016
QPA4340				
			Revision	Date
Datasheet	80-P3114-1	QPA4340 HIGH-BAND MULTIMODE POWER AMPLIFIER DEVICE SPECIFICATION	E	8/29/2016
Schematic	80-NP237-53	WTR2965 + QUALCOMM RF360 WITH QPA4340, QPA4360, AND QPA88XX, DL-CA AND UL-CA REFERENCE SCHEMATIC	A	9/30/2016
	80-NP237-52	WTR2965 + QUALCOMM RF360 WITH QFE4320, QPA4340, CHILE DL-CA AND UL-CA - REFERENCE SCHEMATIC	B	7/5/2016
	80-P6369-43	SDR660 + QUALCOMM RF360 WITH QPA4360 AND QPA4340 DL-CA AND UL-CA CHINA APT REFERENCE SCHEMATIC	A	10/18/2016
	DP10-VL741-100	DESIGN PACKAGE, QRD660_2-6-2, SMART PHONE, ELECTRICAL HARDWARE, PCB SCHEMATIC	C	11/15/2016
	80-P6369-42	SDR660 + QLN10XX + QLN2042 + QUALCOMM RF360 WITH QPA5460, QPA88XX, AND QPA4340 GLOBAL ET CONFIGURATION REFERENCE SCHEMATIC	A	11/17/2016
	80-NH379-46	WTR3925 + QUALCOMM RF360 WITH QFE4320, QPA4340, DL-CA AND UL-CA	C	10/3/2016
	80-NT066-43	WTR5975 + QLN1020/QLN1035/QLN2050 + QUALCOMM RF360 WITH QFE43X5 AND QFE4340 4 × 4 MIMO DESIGN EXAMPLE	D	10/14/2016
Training	80-P3114-5	QPA4340 HIGH-BAND MULTIMODE POWER AMPLIFIER WITH MODE SWITCHES DESIGN GUIDELINES/TRAINING SLIDES	B	5/19/2016
App	80-P3114-4	QPA4340 HIGH-BAND MULTIMODE POWER AMPLIFIER DEVICE REVISION GUIDE	D	9/8/2016
	80-P3114-111	QPA4340 DESIGN CHECKLIST	A	4/8/2016
	80-P3114-122	QPA4340 LOADPULL REPORT	B	8/17/2016
	80-P3114-123	QPA4340 40 MHZ SUPPORT LOADPULL REPORT	A	8/17/2016
	DP25-NH379-46	DESIGN PACKAGE, WTR3925 + QUALCOMM RF360 WITH QFE4320, QPA4340, DL-CA AND UL-CA LAYOUT FILE	A	11/11/2016
Test result	80-NP237-L81	WTR2965 + QUALCOMM RF360 WITH QPA4340: LTE B7, B30, B38, B40, AND B41 RF CS DATA PACKAGE (MSM8953)	A	7/26/2016

LB PAMID

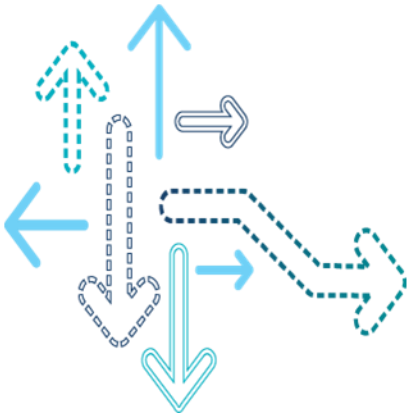
S001/S010				
			Revision	Date
Datasheet	MH80-P3200-1	S001 TDK LB PAMID DEVICE SPECIFICATION	B	3/8/2016
	MH80-P3201-1	S010 TDK LB PAMID DEVICE SPECIFICATION	B	3/9/2016
Schematic	80-NR113-49	WTR3925 + QUALCOMM RF360 WITH HB, MB, AND LB PAMIDS GLOBAL 2DL CA PRELIMINARY REFERENCE SCHEMATIC	BA	11/9/2016
	80-NR113-50	WTR3925 + WTR4905 + QUALCOMM RF360 WITH HB, MB, AND LB PAMIDS GLOBAL 3DL CA DESIGN EXAMPLE	A	4/8/2016
	80-NT066-44	WTR59X5 + QLN10X0 + QUALCOMM RF360 WITH LB-MB-HB PAMID + DIVERSITY FRONT END MODULE (NA-EU)	D	9/21/2016
	80-NT066-45	WTR59X5 + QLN10X0 + QUALCOMM RF360 WITH LB-MB-HB PAMID + DIVERSITY FRONT-END MODULE (CHINA)	D	9/20/2016
Training	80-P3194-5	TDK ET PAMID DESIGN GUIDELINES-TRAINING SLIDES	E	10/11/2016
App	MH80-P3200-4	S001 TDK LB PAMID DEVICE REVISION GUIDE	B	3/9/2016
	MH80-P3201-4	S010 TDK LB PAMID DEVICE REVISION GUIDE	B	3/9/2016
	MH80-P3200-111	S001 TDK LB PAMID DESIGN CHECKLIST	B	3/8/2016
	MH80-P3201-111	S010 TDK LB PAMID DESIGN CHECKLIST	B	3/8/2016
	DP25-NR113-49T	DESIGN PACKAGE, WTR3925 + QUALCOMM RF360 WITH HB, MB, AND LB PAMIDS GLOBAL 2DL CA TGZ LAYOUT FILE	A	11/24/2015
	DP25-NT066-44	DESIGN PACKAGE, WTR59X5 + QLN10X0 + QUALCOMM RF360 WITH LB/MB/HB PAMID + DIVERSITY FRONT-END MODULE (NA/EU) LAYOUT FILE	A	8/30/2016
	80-P1071-18	RFFE REGISTER MAP AND PORT SHEET FOR PAMID, QPA, QET	C	10/21/2016
Test result	80-NT066-K72E	MSM8998 WTR59X5 + QLN10X0 + QUALCOMM RF360 WITH LB_MB_HB PAMID + DIVERSITY FRONT-END MODULE KEY PERFORMANCE INDICATOR DATA PACKAGE	B	9/19/2016

Qtuner

QAT3550				
	80-P4264-1	QAT3550 Reconfigurable Antenna Tuner Device Specification	F	11/16/2016
	80-P4264-5	QAT3550 Design Guideline/Training Slides	A	May-16
	80-P4264-121	QAT3550 TUNER SPREADSHEET	C	Oct-16
Reference schematic				
	80-NT066-43	Reference design for QFE3550 Close Loop on MSM8998	D	
	80-P6369-43	Reference design for QFE3550 Close Loop on SDM660		
application				
	80-P1071-20	QSPR Tuner Active Sweep Overview for MPSS.AT	C	
	80-P2482-36	MPSS.AT Antenna Tuner Software Overview	C	
QAT2514				
	80-P3644-1	QAT2514 LOW RON SP4T APERTURE SWITCH DEVICE SPECIFICATION	A	
	80-P3644-5	QAT 2514 design guideline		
QAT2522				
	80-P3645-1	QAT2522 DPDT Aperture Switch Device Specification	A	
QAT3514				
	80-P3646-1	QAT3514 LOW RON SP4T APERTURE SWITCH DEVICE SPECIFICATION	G	
	80-P3646-4	QAT3514 LOW RON SP4T APERTURE SWITCH DEVICE REVISION GUIDE	A	
	80-P3646-5	QAT3514 ANTENNA APERTURE SWITCH DESIGN GUIDELINES	B	
	80-P3646-121	QAT3514 Tuner Spreadsheet	A	
QAT3522				
	80-P3647-1	QAT3522 DPDT APERTURE SWITCH DEVICE SPECIFICATION	A	
	80-P3647-4	QAT3522 DPDT APERTURE SWITCH DEVICE REVISION GUIDE		
QAT3533				
	80-P3648-1	QAT3533 3 × 3 MAIN ANTENNA MATRIX SWITCH DEVICE SPECIFICATION	A	
QAT3544				
	80-P3649-1	QAT3544 4 × 4 MAIN ANTENNA MATRIX SWITCH DEVICE SPECIFICATION	A	

QET

QFE3100				
Datasheet			Revision	date
	80-NP959-1	QFE3100 PA POWER TRACKING IC DEVICE SPECIFICATION (ADVANCE INFORMATION)	L	5/17/2016
	80-NP959-4	QFE3100 PA POWER TRACKING IC DEVICE REVISION GUIDE	E	1/7/2016
Training				
	80-NP959-5	QFE3100 PA POWER MANAGEMENT IC DESIGN GUIDELINES/TRAINING SLIDES	D	2/8/2016
APP				
	80-NP959-91	CRITICAL QFE3100 LAYOUT REQUIREMENTS CHECKLIST	B	7/1/2015
QET4100				
Datasheet			Revision	date
	80-P2014-1	QET4100 PA ENVELOPE TRACKING IC DEVICE SPECIFICATION	D	9/15/2016
	80-P2014-4	QET4100 PA ENVELOPE TRACKING IC DEVICE REVISION GUIDE	C	8/15/2016
Training				
	80-P2014-5	QET4100 PA POWER MANAGEMENT IC DESIGN GUIDELINES/TRAINING SLIDES	D	9/30/2016
APP				
	80-P2014-111	QET4100 CRITICAL LAYOUT CHECKLIST	F	9/30/2016



Questions?

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