報告編號: **RTBGHE-WTW-P21090197-6**

行動通信電信終端設備技術規範測試報告

產品名稱	攜帶式平版電腦
申請廠商	美商蘋果亞洲股份有限公司台灣分公司
製造廠商	Apple Inc. Hongfujin Precision Electronics (Chengdu) Co., Ltd.
商標或廠牌	APPLE
型號	A2568
該產品樣品試驗依據之試驗標準	國家通訊傳播委員會 行動通信電信終端設備技術規範【PLMN ALL】 (NR 終端設備(PLMN12)) 訂定日期：109 年 09 月 25 日
試驗結果	合格

填發本檢驗報告之檢驗機構

香港商立德國際商品試驗有限公司桃園分公司林口實驗室
實驗室認可編號：TAF 2021 (9kHz~40GHz)
實驗室地址：新北市林口區嘉寶里 14 鄰 47-2 號
受理日期：110 年 09 月 09 日
完成日期：110 年 09 月 23 日
發行日期：110 年 10 月 07 日

報告簽署人簽章:





目　　錄

名　　稱	頁碼
報告發行紀錄	3
1. 行動通信電信終端設備技術規範量測記錄表	5
2. 一般敘述	6
2.1 待測設備	6
2.2 輔助測試之週邊設備描述	12
3. 發射功率	13
3.1 適用標準	13
3.2 量測儀器	14
3.3 測試配置	14
3.4 量測結果	15
4. 頻率穩定度	25
4.1 適用標準	25
4.2 量測方法	25
4.3 量測儀器	25
4.4 測試配置	26
4.5 量測結果	27
5. 相鄰頻道洩漏功率比(ACLR)	31
5.1 適用標準	31
5.2 量測方法	31
5.3 量測儀器	33
5.4 測試配置	33
5.5 量測結果 (ACLR / $UTRA_{ACLR}$)	34
6. 發射頻譜波罩	254
6.1 適用標準	254
6.2 量測方法	255
6.3 量測儀器	257
6.4 測試配置	257
6.5 量測結果	258
7. 混附發射區域之不必要發射	402
7.1 適用標準	402
7.2 量測方法	402
7.3 量測儀器	403
7.4 測試配置	403
7.5 量測結果	404
8. 檢測實驗室基本資料	692

報告發行紀錄

Issue No.	Description	Date Issued
RTBGHE-WTW-P21090197-6	Original release	110 年 10 月 07 日

證 明 書

發行日期：110 年 10 月 07 日

產 品 名 稱： 攜帶式平版電腦
廠 牌： APPLE
型 號： A2568
申 請 者： 美商蘋果亞洲股份有限公司台灣分公司
量 測 規 範 行動通信電信終端設備技術規範【PLMN ALL】
(NR 終端設備(PLMN12))
訂定日期：109 年 09 月 25 日

香港商立德國際商品試驗有限公司桃園分公司在此證明上述待測設備樣品一組(型號：A2568)，收件日期 110 年 09 月 09 日，於 110 年 09 月 09 日至 110 年 09 月 23 日已在本公司的標準測試場地完成量測。報告中所描述之測試結果和待測設備的架構組合，均根據樣品實際的量測情況作詳實的記錄。

立德桃園分公司依“行動通信電信終端設備技術規範”製作測試結果報告。

特 此 證 明 ！

報告製作者：周歆穎 ，日 期：110 年 10 月 07 日
周 歆 穎 / 高級專員

審 核 者：陳志偉 ，日 期：110 年 10 月 07 日
陳志偉 / 高級工程師

香港商立德國際商品試驗有限公司桃園分公司
實驗室地址：新北市林口區嘉寶里 14 鄰 47-2 號

此份報告不得摘錄複製，除全份複製外，需經實驗室書面同意。

1. 行動通信電信終端設備技術規範量測記錄表

申　請　廠　商：美商蘋果亞洲股份有限公司台灣分公司
製　造　廠　商：Apple Inc.
Hongfujin Precision Electronics (Chengdu) Co., Ltd.
申請廠商地址：110 臺北市信義區松仁路 100 號 32 樓
廠　　牌：APPLE
產　品　名　稱：攜帶式平版電腦
型　　號：A2568
量測單位名稱：香港商立德國際商品試驗有限公司桃園分公司
林口實驗室華亞檢測部
量測單位地址：桃園市龜山區文化里華亞二路 19 號
量測單位認可編號：TAF 2021 (9kHz~40GHz)
認可有效期限：112 年 08 月 06 日
量測單位聯絡電話：03-3183232
量　測　規　範：行動通信電信終端設備技術規範【PLMN ALL】
(NR 終端設備(PLMN12))
訂定日期：109 年 09 月 25 日

項次	量測項目	規　　範	量測結果判定
1	發射功率	行動通信電信終端設備技術規範 6.1.1 章節	合格
2	頻率穩定度	行動通信電信終端設備技術規範 6.1.2 章節	合格
3	相鄰頻道洩漏功率比(ACLR)	行動通信電信終端設備技術規範 6.1.3 章節	合格
4	發射頻譜波罩	行動通信電信終端設備技術規範 6.1.4 章節	合格
5	混附發射區域之不必要發射	行動通信電信終端設備技術規範 6.1.5 章節	合格
6	電磁波能量比吸收率(SAR)	行動通信電信終端設備技術規範 6.6.1.1 章節	NA (註 1)
7	電波功率密度	行動通信電信終端設備技術規範 6.6.2.1 章節	合格 (註 2)
8	攜帶式終端設備連接介面、電源轉接器連接介面、充電線及電源轉接器	行動通信電信終端設備技術規範 6.9 章節	合格 (請參考 CNS 14336-1 報告)
9	災防告警細胞廣播訊息接收功能	行動通信電信終端設備技術規範 6.10 章節	註 3

註：
1. 依據第 77 次審驗一致性會議第 10910462 號提案決議，待測設備發射源距離人體頭部 20 公分以上，依 PLMN ALL 之 6.6.2.1 規定，檢測電波功率密度。
2. 電波功率密度計算值請參閱 BV CPS 報告編號：RTBGHE-WTW-P21090197-5。
3. 依據 2020 年 06 月 12 日國家通訊傳播委員會電信終端設備與低功率射頻電機審驗一致性會議結論，目前暫緩評估 5G NR 災防告警細胞廣播訊息接收功能。
4. 量測結果之判定不考慮量測不確定度的貢獻。

2. 一般敘述

2.1 待測設備

產 品 名 稱：	攜帶式平版電腦
型 號：	A2568
額 定 電 源：	5.0 or 5.2Vdc 來自電源供應器 9.0 or 15Vdc 來自電源供應器 (當電量小於 60%時) 5.0Vdc 來自電腦 3.81Vdc 來自電池
調 變 方 式：	Pi/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM
頻 帶：	5G NR FR1 Band n1 (SCS: 15kHz): Uplink (UL): 1920MHz ~ 1980MHz Downlink (DL): 2110MHz ~ 2170MHz 5G NR FR1 Band n3 (SCS: 15kHz): Uplink (UL): 1710MHz ~ 1785MHz Downlink (DL): 1805MHz ~ 1880MHz 5G NR FR1 Band n7 (SCS: 15kHz): Uplink (UL): 2500MHz ~ 2570MHz Downlink (DL): 2620MHz ~ 2690MHz 5G NR FR1 Band n8 (SCS: 15kHz): Uplink (UL): 885MHz ~ 915MHz Downlink (DL): 930MHz ~ 960MHz 5G NR FR1 Band n28 (SCS: 15kHz): Uplink (UL): 703MHz ~ 748MHz Downlink (DL): 758MHz ~ 803MHz 5G NR FR1 Band n38 (SCS: 30kHz): 2570MHz ~ 2620MHz 5G NR FR1 Band n41 (SCS: 30kHz): 2500MHz ~ 2690MHz 5G NR FR1 Band n78 (SCS: 30kHz): 3300MHz ~ 3570MHz
工 作 頻 寬：	5G NR FR1 Band n1 (SCS: 15kHz): 5MHz / 10MHz / 15MHz / 20MHz / 30MHz / 40MHz 5G NR FR1 Band n3 (SCS: 15kHz): 5MHz / 10MHz / 15MHz / 20MHz / / 25MHz / 30MHz 5G NR FR1 Band n7 (SCS: 15kHz): 5MHz / 10MHz / 15MHz / 20MHz / / 25MHz / 30MHz / 40MHz 5G NR FR1 Band n8 (SCS: 15kHz): 5MHz / 10MHz / 15MHz / 20MHz 5G NR FR1 Band n28 (SCS: 15kHz): 5MHz / 10MHz / 15MHz / 20MHz / 30MHz 5G NR FR1 Band n38 (SCS: 30kHz): 20MHz / 30MHz / 40MHz 5G NR FR1 Band n41 (SCS: 30kHz): 20MHz / 30MHz / 40MHz / 50MHz / 60MHz / 70MHz / 80MHz / 90MHz / 100MHz 5G NR FR1 Band n78 (SCS: 30kHz): 20MHz / 30MHz / 40MHz / 50MHz / 60MHz / 70MHz / 80MHz / 90MHz / 100MHz

量 測 功 率：	5G NR FR1 Band n1 (SCS: 15kHz): 24.82dBm 5G NR FR1 Band n3 (SCS: 15kHz): 25.50dBm 5G NR FR1 Band n7 (SCS: 15kHz): 24.40dBm 5G NR FR1 Band n8 (SCS: 15kHz): 25.69dBm 5G NR FR1 Band n28 (SCS: 15kHz): 25.12dBm 5G NR FR1 Band n38 (SCS: 30kHz): 24.76dBm 5G NR FR1 Band n41 (Low Power) (SCS: 30kHz): 22.69dBm 5G NR FR1 Band n78 (Low Power) (SCS: 30kHz): 23.40dBm 5G NR FR1 Band n41 (High Power) (SCS: 30kHz): 26.69dBm 5G NR FR1 Band n78 (High Power) (SCS: 30kHz): 25.77dBm
發 射 模 式：	1 Tx / 1 Rx
天 線 種 類：	見註 1
電 源 線 類 別：	NA
信 號 線 類 別：	見註 2
配 件：	見註 2

註 1: 此待測設備搭配測試的天線，其資料如下：

天線型式	廠牌/製造商	型號	接頭型式	增益 (dBi)							
				5G NR n1	5G NR n3	5G NR n7	5G NR n8	5G NR n28	5G NR n38	5G NR n41	5G NR N78
PIFA (UHB/2.4GHz (Ant. 1a))	APPLE	Ant. 1a	Mini UFL	-	-	-	-	-	-	-	1.5
PIFA (MB/HB/5GHz (Ant. 1b))	APPLE	Ant. 1b	Mini UFL	0.5	-0.7	-2.8	-	-	-4.7	-3.8	-
PIFA (LB/LMB/MB/HB/UHB (Ant. 2))	APPLE	Ant. 2	Mini UFL	-0.7	-1.7	0.8	-1.0	-3.5	0.2	0.3	-0.2
PIFA (UHB/2.4GHz (Ant. 3a))	APPLE	Ant. 3a	Mini UFL	-	-	-	-	-	-	-	2.5
PIFA (LMB/MB/HB/5GHz/L1/L5 (Ant. 3b))	APPLE	Ant. 3b	Mini UFL	1.1	0.7	-4.3	-	-	-5.9	-4.4	-
PIFA (LB/LMB/MB/HB/UHB (Ant. 4))	APPLE	Ant. 4	Mini UFL	-0.9	-2.0	0.7	-0.7	-2.7	0.0	0.4	0.6

*此待測物可切換天線路徑，報告中為最高發射功率之路徑 (Ant. 4: n1, n3, n7, n8, n28; Ant. 2: n38, n41; Ant. 3a: n78)。

*上述天線的規格資訊由申請者聲明，實驗室不承擔任何責任。

註 2: 此產品搭配使用之配件如下：

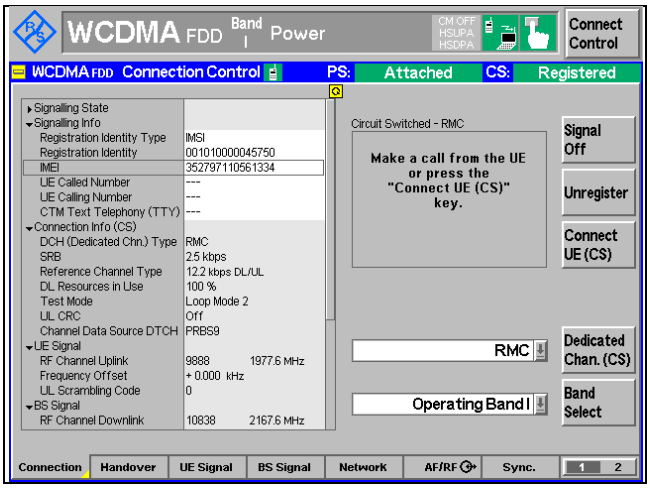
*本案經申請者提供選購品、隨貨配件及非隨貨配件與實驗室提供測試配件併同檢驗。產品、選購及隨貨配件之照片請參照 BV CPS 報告編號：BGHE-WTW-P21090197，非隨貨配件及測試配件之照片請參照 BV CPS 報告編號：BGHE-WTW-P21090197_SU，測試設置照片請參照 BV CPS 報告編號：BGHE-WTW-P21090197_TSup。

選購品及隨貨配件			
配件	廠牌/製造商	型號	規格
Power Adapter 1 – 隨貨配件, USB-Type C	APPLE (製造商: Salcomp)	A2305	I/P: 100-240Vac, 50-60Hz, 0.5A O/P: 5Vdc, 3A or 9Vdc, 2.22A
Power Adapter 2 – 隨貨配件, USB-Type C	APPLE (製造商: Flextronics)	A2305	I/P: 100-240Vac, 50-60Hz, 0.5A O/P: 5Vdc, 3A or 9Vdc, 2.22A
Rechargeable Li-ion Battery	APPLE (製造商: Huizhou Desay Battery Co Ltd)	A2522	3.81Vdc, 19.19Wh, 5034mAh
USB-C to USB-C Cable – 隨貨配件	APPLE	NA	1.0m shielded cable without core
Apple Pencil – 選購品	Apple	A2051	CCAI18LP2130T4
SSD Card	-	-	64GB, 256GB

非隨貨配件及測試配件				
配件	廠牌/製造商	型號	規格	備註
Power Adapter 3, USB-Type C	APPLE (製造商: LiteOn)	A1947	I/P: 100-240Vac, 50/60Hz, 1.5A O/P: 20.3Vdc, 3A or 15Vdc, 3A or 9Vdc, 3A or 5.2Vdc, 2.4A	申請者提供
Power Adapter 4, USB-Type C	APPLE (製造商: Delta)	A1719	I/P: 100-240Vac, 50/60Hz, 1.5A O/P: 20.2Vdc, 4.3A or 9Vdc, 3A or 5.2Vdc, 2.4A	申請者提供
USB-C VGA Multiport Adapter	Apple	A1620	0.07m, w/o core	申請者提供
USB-C Digital AV Multiport Adapter	Apple	A1621	0.06m, w/o core	申請者提供
HDMI cable	Amber	HDMI-AA120	01m, w/o core	實驗室提供

*經預測試後，以 Adapter 4 + Battery + 256GB SSD Card + USB-C to USB-C Cable 具有較大干擾雜訊，故以此組合進行最終量測。

註 3: IMEI: 352797110561334為測試時專用的IMEI號碼，上市時之IMEI請參考電信終端設備審驗切結書。(此產品僅支援DSSS，雙卡單待，僅單一IMEI號碼)



此裝置測試中心頻率如下：

5G NR FR1 Band n1 (SCS: 15kHz):

Bandwidth	頻道	對應頻率 (MHz)	Bandwidth	頻道	對應頻率 (MHz)
5MHz	384500	1922.50	20MHz	386000	1930.00
	390000	1950.00		390000	1950.00
	395500	1977.50		394000	1970.00

Bandwidth	頻道	對應頻率 (MHz)
40MHz	388000	1940.00
	390000	1950.00
	392000	1960.00

5G NR FR1 Band n3 (SCS: 15kHz):

Bandwidth	頻道	對應頻率 (MHz)	Bandwidth	頻道	對應頻率 (MHz)
5MHz	342500	1712.50	20MHz	344000	1720.00
	349500	1747.50		349500	1747.50
	356500	1782.50		355000	1775.00

Bandwidth	頻道	對應頻率 (MHz)
30MHz	345000	1725.00
	349500	1747.50
	354000	1765.00

5G NR FR1 Band n7 (SCS: 15kHz):

Bandwidth	頻道	對應頻率 (MHz)	Bandwidth	頻道	對應頻率 (MHz)
5MHz	500500	2502.5	20MHz	502000	2510.0
	507000	2535.0		507000	2535.0
	513500	2567.5		512000	2560.0

Bandwidth	頻道	對應頻率 (MHz)
40MHz	504000	2520.0
	507000	2535.0
	510000	2550.0

5G NR FR1 Band n8 (SCS: 15kHz):

Bandwidth	頻道	對應頻率 (MHz)	Bandwidth	頻道	對應頻率 (MHz)
5MHz	177500	887.5	15MHz	178500	892.5
	180000	900.0		180000	900.0
	182500	912.5		181500	907.5

Bandwidth	頻道	對應頻率 (MHz)
20MHz	179000	895.0
	180000	900.0
	181000	905.0

5G NR FR1 Band n28 (SCS: 15kHz):

Bandwidth	頻道	對應頻率 (MHz)	Bandwidth	頻道	對應頻率 (MHz)
5MHz	141100	705.50	15MHz	142100	710.50
	145100	725.50		145100	725.50
	149100	745.50		148100	740.50

Bandwidth	頻道	對應頻率 (MHz)
30MHz	143600	718.00
	145100	725.50
	146600	733.00

5G NR FR1 Band n38 (SCS: 30kHz):

Bandwidth	頻道	對應頻率 (MHz)	Bandwidth	頻道	對應頻率 (MHz)
20MHz	516000	2580.00	30MHz	517000	2585.00
	519000	2595.00		519000	2595.00
	522000	2610.00		521000	2605.00

Bandwidth	頻道	對應頻率 (MHz)
40MHz	518000	2590.00
	519000	2595.00
	520000	2600.00

5G NR FR1 Band n41 (SCS: 30kHz):

Bandwidth	頻道	對應頻率 (MHz)	Bandwidth	頻道	對應頻率 (MHz)
20MHz	502002	2510.01	50MHz	505002	2525.01
	519000	2595.00		519000	2595.00
	535998	2679.99		532998	2664.99

Bandwidth	頻道	對應頻率 (MHz)
100MHz	510000	2550.00
	519000	2595.00
	528000	2640.00

5G NR FR1 Band n78 (SCS: 30kHz):

Bandwidth	頻道	對應頻率 (MHz)	Bandwidth	頻道	對應頻率 (MHz)
20MHz	620668	3310.02	50MHz	621668	3325.02
	629000	3435.00		629000	3435.00
	637332	3559.98		636332	3544.98

Bandwidth	頻道	對應頻率 (MHz)
100MHz	623334	3350.01
	629000	3435.00
	634666	3519.99

*詳細之規格請參考使用說明書，產品的照片請參照 BV CPS 報告編號：BGHE-WTW-P21090197。

2.2 輔助測試之週邊設備描述

此待測設備於受測時無須搭配一般用途之相關設備，故採獨立測試。

3. 發射功率

3.1 適用標準

FR1：
傳導輸出功率限制值(Conducted)
終端設備功率等級 Class 2: 26 dBm
終端設備功率等級 Class 3: 23 dBm
功率等級適用頻段與容許誤差應符合附表 1 之規定，其中測試誤差(Test Tolerance, TT)如附表 2。

(1) 在正常條件下執行測試。
(2) 量測時應使用解析頻寬設定為 1 MHz 以上的頻譜分析量測儀器執行量測，並選擇 Channel Power 模式執行。
(3) FR1 檢測頻道為低、中、高三個頻道，並分別對最低、中間及最高之工作頻寬，依下表進行檢測。
(4) 由 RF 輸出埠直接量測輸出功率。

附表 1、FR1 傳導輸出功率限制值 (參考 3GPP TS 38.521-1 Table 6.2.1.5-1 及 Table 6.2.1.5-2)

NR 上行頻段 (MHz)	等級 2 (dBm)	誤差(dB)	等級 3 (dBm)	誤差(dB)
1920～1980			23	+2+TT/-2-TT
1710～1785			23	+2+TT/-2-TT (註)
2500～2570			23	+2+TT/-2-TT (註)
885～915			23	+2+TT/-2-TT (註)
703～748			23	+2/-2.5
2500～2690	26	+2+TT/-3-TT (註)	23	+2+TT/-2-TT (註)
3300～3570	26	+2+TT/-3-TT	23	+2+TT/-3-TT
註：發射頻段落在 F_{UL_low} 和 F_{UL_low} + 4MHz 之間或是落在 F_{UL_high} - 4MHz 和 F_{UL_high} 之間者，其最大輸出功率之下限放寬 1.5dB。				

附表 2、FR1 傳導輸出功率測試誤差 (Test Tolerance, TT) (參考 3GPP 38.521-1 Table 6.2.1.5-3)

	f ≤ 3.0GHz	3.0GHz < f ≤ 4.2GHz	4.2GHz < f ≤ 6.0GHz
BW ≤ 40MHz	0.7 dB	1.0 dB	1.0 dB
40MHz < BW ≤ 100MHz	1.0 dB	1.0 dB	1.0 dB

附表 3、FR1 測試方法及規範 (參考 3GPP 38.521-1 Table 6.2.1.4.1-1)

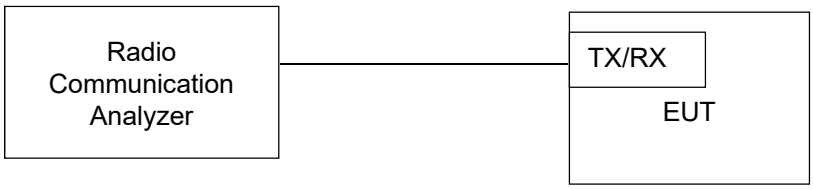
預設條件			
測試環境	常態		
測試頻道	低、中、高		
測試頻道頻寬	最低、中間、最高		
子載波間隔	最低、最高		
測試參數			
測試 ID	下行結構	上行結構	
	不適用	調變方式(註2)	資源區塊分配(註1)
1		DFT-s-OFDM PI/2 BPSK	Inner Full
2		DFT-s-OFDM PI/2 BPSK	Inner 1RB Left
3		DFT-s-OFDM PI/2 BPSK	Inner 1RB Right
4		DFT-s-OFDM QPSK	Inner Full
5		DFT-s-OFDM QPSK	Inner 1RB Left
6		DFT-s-OFDM QPSK	Inner 1RB Right
註1：每一資源區塊(Resource Block 簡稱 RB)分配規格結構應符合3GPP TS 38.521-1Table 6.1-1之規定。 註2：DFT-s-OFDM PI/2 BPSK 測試僅適用於支援 half Pi BPSK 之 FR1終端設備。			

3.2 量測儀器

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
Radio Communication Analyzer Keysight	E7515B	MY58300759	Apr. 23, 2021	Apr. 22, 2022

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

3.3 測試配置



3.4 量測結果

操作模式	發射	測試者	鄭詠璋
量測場地溫度	23℃	量測場地濕度	71% RH

Measured Power

5G NR FR1 Band n1						
Test ID	BW	MCS Index	Channel	384500	390000	395500
			Frequency (MHz)	1922.5	1950.0	1977.5
1	5MHz	PI/2 BPSK	Inner Full	24.37	24.3	24.69
2			Inner 1RB Left	24.45	24.56	24.77
3			Inner 1RB Right	24.42	24.4	24.63
4		QPSK	Inner Full	24.08	24.47	24.32
5			Inner 1RB Left	24.38	24.29	24.52
6			Inner 1RB Right	24.29	24.41	24.49

5G NR FR1 Band n1						
Test ID	BW	MCS Index	Channel	386000	390000	394000
			Frequency (MHz)	1930.0	1950.0	1970.0
1	20MHz	PI/2 BPSK	Inner Full	24.41	24.4	24.67
2			Inner 1RB Left	24.46	24.52	24.61
3			Inner 1RB Right	24.49	24.52	24.62
4		QPSK	Inner Full	24.51	24.82	24.63
5			Inner 1RB Left	24.38	24.38	24.43
6			Inner 1RB Right	24.38	24.45	24.58

5G NR FR1 Band n1						
Test ID	BW	MCS Index	Channel	388000	390000	392000
			Frequency (MHz)	1940	1950	1960
1	40MHz	PI/2 BPSK	Inner Full	22.48	22.5	22.68
2			Inner 1RB Left	22.89	22.77	22.84
3			Inner 1RB Right	22.77	22.88	22.85
4		QPSK	Inner Full	22.54	22.52	22.69
5			Inner 1RB Left	22.77	22.75	22.83
6			Inner 1RB Right	22.78	22.78	22.89

5G NR FR1 Band n3						
Test ID	BW	MCS Index	Channel	342500	349500	356500
			Frequency (MHz)	1712.5	1747.5	1782.5
1	5MHz	PI/2 BPSK	Inner Full	24.68	24.6	24.53
2			Inner 1RB Left	24.57	24.34	24.43
3			Inner 1RB Right	24.59	24.44	24.27
4		QPSK	Inner Full	24.64	24.49	24.47
5			Inner 1RB Left	24.55	24.27	24.33
6			Inner 1RB Right	24.58	24.45	24.14

5G NR FR1 Band n3						
Test ID	BW	MCS Index	Channel	344000	349500	355000
			Frequency (MHz)	1720.0	1747.5	1775.0
1	20MHz	PI/2 BPSK	Inner Full	24.62	24.43	24.69
2			Inner 1RB Left	24.64	24.46	24.46
3			Inner 1RB Right	24.59	24.42	24.32
4		QPSK	Inner Full	25.5	24.44	24.42
5			Inner 1RB Left	24.57	24.39	24.34
6			Inner 1RB Right	24.48	24.41	24.27

5G NR FR1 Band n3						
Test ID	BW	MCS Index	Channel	345000	349500	354000
			Frequency (MHz)	1725	1747.5	1765
1	30MHz	PI/2 BPSK	Inner Full	24.63	24.41	24.41
2			Inner 1RB Left	24.58	24.38	24.39
3			Inner 1RB Right	24.62	24.44	24.27
4		QPSK	Inner Full	25.16	24.5	24.42
5			Inner 1RB Left	24.45	24.36	24.3
6			Inner 1RB Right	24.43	24.32	24.19

5G NR FR1 Band n7						
Test ID	BW	MCS Index	Channel	500500	507000	513500
			Frequency (MHz)	2502.5	2535.0	2567.5
1	5MHz	PI/2 BPSK	Inner Full	24	24.25	24.36
2			Inner 1RB Left	24.05	24.06	24.39
3			Inner 1RB Right	23.97	24.07	24.4
4		QPSK	Inner Full	24.06	24	24.32
5			Inner 1RB Left	23.96	23.97	24.27
6			Inner 1RB Right	23.98	24.06	24.34

5G NR FR1 Band n7						
Test ID	BW	MCS Index	Channel	502000	507000	512000
			Frequency (MHz)	2510.0	2535.0	2560.0
1	20MHz	PI/2 BPSK	Inner Full	24.08	24.14	24.29
2			Inner 1RB Left	24.14	24.13	24.16
3			Inner 1RB Right	24.08	24.15	24.29
4		QPSK	Inner Full	23.99	24.22	24.26
5			Inner 1RB Left	23.97	24.04	24.12
6			Inner 1RB Right	23.9	24.15	24.28

5G NR FR1 Band n7						
Test ID	BW	MCS Index	Channel	504000	507000	510000
			Frequency (MHz)	2520	2535	2550
1	40MHz	PI/2 BPSK	Inner Full	24.17	24.25	24.36
2			Inner 1RB Left	24.13	24.14	24.29
3			Inner 1RB Right	24.15	24.23	24.37
4		QPSK	Inner Full	24.07	24.13	24.3
5			Inner 1RB Left	23.96	24.05	24.16
6			Inner 1RB Right	23.92	24.16	24.28

5G NR FR1 Band n8						
Test ID	BW	MCS Index	Channel	177500	180000	182500
			Frequency (MHz)	887.5	900.0	912.5
1	5MHz	PI/2 BPSK	Inner Full	25.03	24.99	24.77
2			Inner 1RB Left	25.19	24.96	24.86
3			Inner 1RB Right	25	24.93	24.71
4		QPSK	Inner Full	25.14	24.95	24.87
5			Inner 1RB Left	24.98	24.84	24.73
6			Inner 1RB Right	24.81	24.89	24.72

5G NR FR1 Band n8						
Test ID	BW	MCS Index	Channel	178500	180000	181500
			Frequency (MHz)	892.5	900.0	907.5
1	15MHz	PI/2 BPSK	Inner Full	25.29	24.78	24.73
2			Inner 1RB Left	25.03	24.93	24.78
3			Inner 1RB Right	24.81	24.75	24.77
4		QPSK	Inner Full	25.06	24.8	24.72
5			Inner 1RB Left	25.01	24.86	24.84
6			Inner 1RB Right	24.75	24.37	24.6

5G NR FR1 Band n8						
Test ID	BW	MCS Index	Channel	179000	180000	181000
			Frequency (MHz)	895.0	900.0	905.0
1	20MHz	PI/2 BPSK	Inner Full	25.69	25.6	25.1
2			Inner 1RB Left	25.26	24.99	24.87
3			Inner 1RB Right	24.89	24.79	24.67
4		QPSK	Inner Full	25.06	24.83	24.84
5			Inner 1RB Left	24.99	24.92	24.78
6			Inner 1RB Right	24.77	24.73	24.55

5G NR FR1 Band n28						
Test ID	BW	MCS Index	Channel	141100	145100	149100
			Frequency (MHz)	705.5	725.5	745.5
1	5MHz	PI/2 BPSK	Inner Full	24.96	25	24.64
2			Inner 1RB Left	25.12	25.11	24.77
3			Inner 1RB Right	24.86	24.82	24.57
4		QPSK	Inner Full	25.1	24.96	24.87
5			Inner 1RB Left	25	24.91	24.73
6			Inner 1RB Right	24.77	24.76	24.45

5G NR FR1 Band n28						
Test ID	BW	MCS Index	Channel	142100	145100	148100
			Frequency (MHz)	710.5	725.5	740.5
1	15MHz	PI/2 BPSK	Inner Full	24.86	24.93	24.81
2			Inner 1RB Left	24.96	25.03	24.83
3			Inner 1RB Right	24.58	24.73	24.57
4		QPSK	Inner Full	24.97	24.96	24.83
5			Inner 1RB Left	24.86	24.98	24.63
6			Inner 1RB Right	24.56	24.64	24.44

5G NR FR1 Band n28						
Test ID	BW	MCS Index	Channel	143600	145100	146600
			Frequency (MHz)	718	725.5	733
1	30MHz	PI/2 BPSK	Inner Full	22.89	22.74	22.5
2			Inner 1RB Left	22.97	22.93	23.1
3			Inner 1RB Right	22.53	22.35	22.55
4		QPSK	Inner Full	22.83	22.74	22.51
5			Inner 1RB Left	22.98	22.84	23.11
6			Inner 1RB Right	22.39	22.39	22.59

5G NR FR1 Band n38						
Test ID	BW	MCS Index	Channel	516000	519000	522000
			Frequency (MHz)	2580	2595	2610
1	20MHz	PI/2 BPSK	Inner Full	24.61	24.67	24.7
2			Inner 1RB Left	24.54	24.45	24.54
3			Inner 1RB Right	24.51	24.58	24.46
4		QPSK	Inner Full	24.65	24.63	24.72
5			Inner 1RB Left	24.56	24.37	24.71
6			Inner 1RB Right	24.63	24.68	24.62

5G NR FR1 Band n38						
Test ID	BW	MCS Index	Channel	517000	519000	521000
			Frequency (MHz)	2585	2595	2605
1	30MHz	PI/2 BPSK	Inner Full	24.50	24.66	24.59
2			Inner 1RB Left	24.59	24.44	24.62
3			Inner 1RB Right	24.61	24.52	24.69
4		QPSK	Inner Full	24.66	24.61	24.51
5			Inner 1RB Left	24.53	24.39	24.55
6			Inner 1RB Right	24.49	24.7	24.58

5G NR FR1 Band n38						
Test ID	BW	MCS Index	Channel	518000	519000	520000
			Frequency (MHz)	2590	2595	2600
1	40MHz	PI/2 BPSK	Inner Full	24.49	24.74	24.47
2			Inner 1RB Left	24.62	24.35	24.42
3			Inner 1RB Right	24.57	24.58	24.59
4		QPSK	Inner Full	24.53	24.63	24.6
5			Inner 1RB Left	24.48	24.76	24.55
6			Inner 1RB Right	24.42	24.66	24.53

5G NR FR1 Band n41 (Low Power)						
Test ID	BW	MCS Index	Channel	502002	519000	535998
			Frequency (MHz)	2510.01	2595.00	2679.99
1	20MHz	PI/2 BPSK	Inner Full	22.44	22.6	22.42
2			Inner 1RB Left	22.44	22.45	22.31
3			Inner 1RB Right	22.46	22.58	22.6
4		QPSK	Inner Full	22.53	22.62	22.54
5			Inner 1RB Left	22.43	22.54	22.4
6			Inner 1RB Right	22.42	22.56	22.58

5G NR FR1 Band n41 (Low Power)						
Test ID	BW	MCS Index	Channel	505002	519000	532998
			Frequency (MHz)	2525.01	2595.00	2664.99
1	50MHz	PI/2 BPSK	Inner Full	22.49	22.48	22.42
2			Inner 1RB Left	22.25	22.56	22.39
3			Inner 1RB Right	22.39	22.51	22.56
4		QPSK	Inner Full	22.63	22.58	22.52
5			Inner 1RB Left	22.58	22.65	22.16
6			Inner 1RB Right	22.49	22.55	22.63

5G NR FR1 Band n41 (Low Power)						
Test ID	BW	MCS Index	Channel	510000	519000	528000
			Frequency (MHz)	2550.00	2595.00	2640.00
1	100MHz	PI/2 BPSK	Inner Full	22.41	22.63	22.52
2			Inner 1RB Left	22.36	22.51	22.43
3			Inner 1RB Right	22.41	22.63	22.39
4		QPSK	Inner Full	22.59	22.68	22.22
5			Inner 1RB Left	22.66	22.58	22.69
6			Inner 1RB Right	22.53	22.62	22.33

5G NR FR1 Band n78 (Low Power)						
Test ID	BW	MCS Index	Channel	620668	629000	637332
			Frequency (MHz)	3310.02	3435.00	3559.98
1	20MHz	PI/2 BPSK	Inner Full	22.95	22.84	22.55
2			Inner 1RB Left	22.89	22.77	22.69
3			Inner 1RB Right	22.91	22.82	22.55
4		QPSK	Inner Full	22.97	22.77	22.79
5			Inner 1RB Left	22.95	22.81	22.68
6			Inner 1RB Right	22.88	22.96	22.73

5G NR FR1 Band n78 (Low Power)						
Test ID	BW	MCS Index	Channel	621668	629000	636332
			Frequency (MHz)	3325.02	3435.00	3544.98
1	50MHz	PI/2 BPSK	Inner Full	23.39	23.13	22.27
2			Inner 1RB Left	23.21	22.64	23.06
3			Inner 1RB Right	22.63	23.25	22.72
4		QPSK	Inner Full	22.97	22.69	22.36
5			Inner 1RB Left	22.86	22.94	22.48
6			Inner 1RB Right	22.54	23.01	23.17

5G NR FR1 Band n78 (Low Power)						
Test ID	BW	MCS Index	Channel	623334	629000	634666
			Frequency (MHz)	3350.01	3435.00	3519.99
1	100MHz	PI/2 BPSK	Inner Full	23.4	22.79	22.6
2			Inner 1RB Left	23.16	22.85	22.53
3			Inner 1RB Right	22.77	23.28	22.64
4		QPSK	Inner Full	23.04	22.36	22.88
5			Inner 1RB Left	22.94	22.46	22.77
6			Inner 1RB Right	23	22.71	22.57

5G NR FR1 Band n41 (High Power)						
Test ID	BW	MCS Index	Channel	502002	519000	535998
			Frequency (MHz)	2510.01	2595.00	2679.99
1	20MHz	PI/2 BPSK	Inner Full	26.57	26.57	26.48
2			Inner 1RB Left	26.47	26.5	26.36
3			Inner 1RB Right	26.52	26.55	26.57
4		QPSK	Inner Full	26.53	26.52	26.51
5			Inner 1RB Left	26.6	26.5	26.4
6			Inner 1RB Right	26.63	26.61	26.57

5G NR FR1 Band n41 (High Power)						
Test ID	BW	MCS Index	Channel	505002	519000	532998
			Frequency (MHz)	2525.01	2595.00	2664.99
1	50MHz	PI/2 BPSK	Inner Full	26.52	26.5	26.35
2			Inner 1RB Left	26.43	26.52	26.40
3			Inner 1RB Right	26.49	26.31	26.55
4		QPSK	Inner Full	26.56	26.25	26.41
5			Inner 1RB Left	26.55	26.38	26.33
6			Inner 1RB Right	26.51	26.4	26.69

5G NR FR1 Band n41 (High Power)						
Test ID	BW	MCS Index	Channel	510000	519000	528000
			Frequency (MHz)	2550.00	2595.00	2640.00
1	100MHz	PI/2 BPSK	Inner Full	26.13	26.53	26.6
2			Inner 1RB Left	26.28	26.41	26.5
3			Inner 1RB Right	26.46	26.36	26.16
4		QPSK	Inner Full	26.36	26.33	26.26
5			Inner 1RB Left	26.65	26.28	26.61
6			Inner 1RB Right	26.32	26.48	26.54

5G NR FR1 Band n78 (High Power)						
Test ID	BW	MCS Index	Channel	620668	629000	637332
			Frequency (MHz)	3310.02	3435.00	3559.98
1	20MHz	PI/2 BPSK	Inner Full	24.94	25.17	25.23
2			Inner 1RB Left	24.95	25.03	25.15
3			Inner 1RB Right	24.85	25.2	25.23
4		QPSK	Inner Full	25	25.26	25.18
5			Inner 1RB Left	24.93	25.26	25.36
6			Inner 1RB Right	24.85	25.39	25.11

5G NR FR1 Band n78 (High Power)						
Test ID	BW	MCS Index	Channel	621668	629000	636332
			Frequency (MHz)	3325.02	3435.00	2544.98
1	50MHz	PI/2 BPSK	Inner Full	24.89	25.53	24.78
2			Inner 1RB Left	24.77	24.9	25.6
3			Inner 1RB Right	25.3	25.26	25.32
4		QPSK	Inner Full	24.76	25.27	25.42
5			Inner 1RB Left	24.69	25.71	25.77
6			Inner 1RB Right	24.66	25.48	25.52

5G NR FR1 Band n78 (High Power)						
Test ID	BW	MCS Index	Channel	623334	629000	634666
			Frequency (MHz)	3350.01	3435.00	3519.99
1	100MHz	PI/2 BPSK	Inner Full	25.13	24.69	25.54
2			Inner 1RB Left	25.42	24.6	25.62
3			Inner 1RB Right	25.06	25.67	25.28
4		QPSK	Inner Full	24.92	24.88	24.8
5			Inner 1RB Left	24.65	25.4	25.26
6			Inner 1RB Right	24.93	25.19	25.61

4. 頻率穩定度

4.1 適用標準

(1) 載波頻率應在頻道之主波頻率±0.1百萬分之一(PPM)以內。

4.2 量測方法

(1) 將未供電之受測物置於環境溫櫃中，供應受測物標稱之交流電源或使用全新或充電完全之電池。若可行，則將天線連接至受測物之天線輸出接頭。
(2) 關閉受測物且置之於環境溫櫃中，設定至適用規範指定之最高溫度。對正常持續操作之裝置，當置於溫櫃中時可使受測物運作。
(3) 依附表之規定檢測中頻道，並對最高之工作頻寬，進行檢測。

附表 5、FR1 頻率穩定度測試方法及規範(參考 3GPP TS 38.521-1 Table 6.4.1.4.1-1)

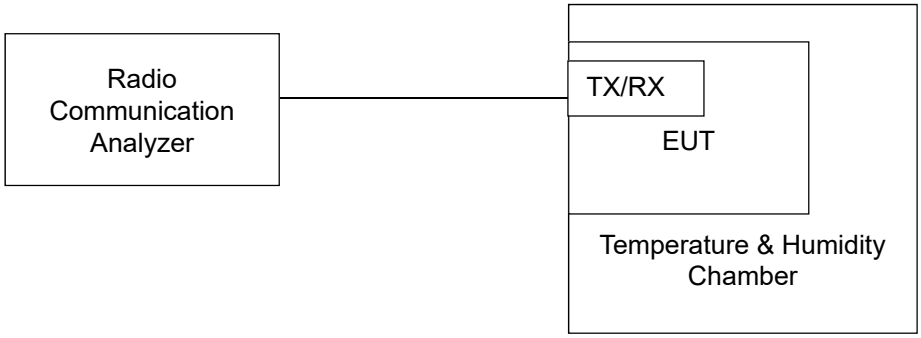
預設條件				
測試環境	常態環境常態電壓、低極端溫度低極端電壓、低極端溫度高極端電壓、高極端溫度低極端電壓、高極端溫度高極端電壓			
測試頻道	中			
測試頻道頻寬	最高			
子載波間隔	最低			
測試參數				
	下行結構		上行結構	
Test ID	調變方式	資源區塊分配	調變方式	資源區塊分配
1	CP-OFDM QPSK	Full RB (註 1)	DFT-s-OFDM QPSK	REFSENS (註 2)
註 1: Full 資源區塊(Full RB)分配應符合 3GPP 38.521-1 Table 7.3.2.4.1-2 規定之每一子載波間隔及頻道頻寬。 註 2: 參考靈敏度(Reference Sensitivity, REFSENS)應符合 3GPP 38.521-1 Table 7.3.2.4.1-3 規定之每一子載波間隔、頻道頻寬、NR 頻段上行資源區塊分配和起始 RB 位置。				

4.3 量測儀器

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
Radio Communication Analyzer Keysight	E7515B	MY58300759	Apr. 23, 2021	Apr. 22, 2022
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Dec. 24, 2020	Dec. 23, 2021
Digital Multimeter Fluke	87-III	70360742	Jun. 24, 2021	Jun. 23, 2022
DC Power Supply Topward	6306A	727263	NA	NA

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4 測試配置


Radio
Communication
Analyzer
TX/RX
EUT
Temperature & Humidity
Chamber

4.5 量測結果

操作模式	發射	測試者	鄭詠璋
量測場地溫度	23℃	量測場地濕度	71% RH

5G NR FR1 Band n1

Operating frequency: 1950MHz, SCS: 15kHz, BW: 40MHz					
Temp. (℃)	Power Supply (Vdc)	0 minute	2 minute	5 minute	10 minute
		Drift (ppm)	Drift (ppm)	Drift (ppm)	Drift (ppm)
25	4.19	-0.007	-0.012	-0.023	-0.022
-10	4.19	-0.016	-0.003	-0.012	-0.015
	3.62	-0.044	-0.057	-0.048	-0.047
55	4.19	-0.043	-0.043	-0.036	-0.050
	3.62	0.016	0.031	0.038	0.047

註：

1. 製造商聲明待測物內部 DC 輸入端標稱電壓為 3.81Vdc，低極限操作電壓為 3.62Vdc，高極限操作電壓為 4.19Vdc，此待測物使用內部鋰電池，故頻率穩定度檢測值如上表所示，確認待測物於極限電壓範圍內仍可使用通訊頻率。
2. 待測物電壓於 3.55Vdc ~ 3.62Vdc 正常連線，當電壓低於 3.55Vdc 後即自動關機。

5G NR FR1 Band n3

Operating frequency: 1747.5MHz, SCS: 15kHz, BW: 30MHz					
Temp. (℃)	Power Supply (Vdc)	0 minute	2 minute	5 minute	10 minute
		Drift (ppm)	Drift (ppm)	Drift (ppm)	Drift (ppm)
25	4.19	0.046	0.053	0.058	0.060
-10	4.19	0.041	0.052	0.046	0.052
	3.62	-0.031	-0.037	-0.045	-0.046
55	4.19	0.001	0.010	0.001	-0.007
	3.62	-0.008	-0.005	-0.005	-0.018

註：

1. 製造商聲明待測物內部 DC 輸入端標稱電壓為 3.81Vdc，低極限操作電壓為 3.62Vdc，高極限操作電壓為 4.19Vdc，此待測物使用內部鋰電池，故頻率穩定度檢測值如上表所示，確認待測物於極限電壓範圍內仍可使用通訊頻率。
2. 待測物電壓於 3.55Vdc ~ 3.62Vdc 正常連線，當電壓低於 3.55Vdc 後即自動關機。

5G NR FR1 Band n7

Operating frequency: 2535MHz, SCS: 15kHz, BW: 40MHz					
Temp. (℃)	Power Supply (Vdc)	0 minute	2 minute	5 minute	10 minute
		Drift (ppm)	Drift (ppm)	Drift (ppm)	Drift (ppm)
25	4.19	0.003	0.015	0.008	0.012
-10	4.19	0.004	-0.001	0.012	0.001
	3.62	-0.037	-0.049	-0.058	-0.046
55	4.19	0.027	0.039	0.039	0.046
	3.62	0.023	0.009	-0.003	-0.013

註：

1. 製造商聲明待測物內部 DC 輸入端標稱電壓為 3.81Vdc，低極限操作電壓為 3.62Vdc，高極限操作電壓為 4.19Vdc，此待測物使用內部鋰電池，故頻率穩定度檢測值如上表所示，確認待測物於極限電壓範圍內仍可使用通訊頻率。
2. 待測物電壓於 3.55Vdc ~ 3.62Vdc 正常連線，當電壓低於 3.55Vdc 後即自動關機。

5G NR FR1 Band n8

Operating frequency: 900MHz, SCS: 15kHz, BW: 20MHz					
Temp. (℃)	Power Supply (Vdc)	0 minute	2 minute	5 minute	10 minute
		Drift (ppm)	Drift (ppm)	Drift (ppm)	Drift (ppm)
25	4.19	0.016	0.005	0.003	-0.003
-10	4.19	0.048	0.052	0.057	0.044
	3.62	0.012	0.018	0.032	0.022
55	4.19	0.008	0.018	0.021	0.016
	3.62	0.035	0.028	0.021	0.030

註：

1. 製造商聲明待測物內部 DC 輸入端標稱電壓為 3.81Vdc，低極限操作電壓為 3.62Vdc，高極限操作電壓為 4.19Vdc，此待測物使用內部鋰電池，故頻率穩定度檢測值如上表所示，確認待測物於極限電壓範圍內仍可使用通訊頻率。
2. 待測物電壓於 3.55Vdc ~ 3.62Vdc 正常連線，當電壓低於 3.55Vdc 後即自動關機。

5G NR FR1 Band n28

Operating frequency: 725.5MHz, SCS: 15kHz, BW: 30MHz					
Temp. (℃)	Power Supply (Vdc)	0 minute	2 minute	5 minute	10 minute
		Drift (ppm)	Drift (ppm)	Drift (ppm)	Drift (ppm)
25	4.19	-0.010	-0.003	-0.004	-0.003
-10	4.19	-0.046	-0.045	-0.037	-0.033
	3.62	0.050	0.063	0.059	0.068
55	4.19	-0.023	-0.035	-0.049	-0.056
	3.62	0.009	0.020	0.014	0.001

註：

1. 製造商聲明待測物內部 DC 輸入端標稱電壓為 3.81Vdc，低極限操作電壓為 3.62Vdc，高極限操作電壓為 4.19Vdc，此待測物使用內部鋰電池，故頻率穩定度檢測值如上表所示，確認待測物於極限電壓範圍內仍可使用通訊頻率。
2. 待測物電壓於 3.55Vdc ~ 3.62Vdc 正常連線，當電壓低於 3.55Vdc 後即自動關機。

5G NR FR1 Band n38

Operating frequency: 2595MHz, SCS: 30kHz, BW: 40MHz					
Temp. (℃)	Power Supply (Vdc)	0 minute	2 minute	5 minute	10 minute
		Drift (ppm)	Drift (ppm)	Drift (ppm)	Drift (ppm)
25	4.19	-0.011	-0.009	0.006	0.019
-10	4.19	-0.015	-0.012	-0.005	-0.006
	3.62	0.012	0.009	-0.005	-0.014
55	4.19	-0.029	-0.039	-0.046	-0.039
	3.62	0.035	0.050	0.052	0.062

註：

1. 製造商聲明待測物內部 DC 輸入端標稱電壓為 3.81Vdc，低極限操作電壓為 3.62Vdc，高極限操作電壓為 4.19Vdc，此待測物使用內部鋰電池，故頻率穩定度檢測值如上表所示，確認待測物於極限電壓範圍內仍可使用通訊頻率。
2. 待測物電壓於 3.55Vdc ~ 3.62Vdc 正常連線，當電壓低於 3.55Vdc 後即自動關機。

5G NR FR1 Band n41

Operating frequency: 2595MHz, SCS: 30kHz, BW: 100MHz					
Temp. (℃)	Power Supply (Vdc)	0 minute	2 minute	5 minute	10 minute
		Drift (ppm)	Drift (ppm)	Drift (ppm)	Drift (ppm)
25	4.19	-0.004	0.004	0.014	0.026
-10	4.19	0.024	0.016	0.016	0.012
	3.62	-0.044	-0.038	-0.030	-0.040
55	4.19	0.020	0.029	0.016	0.031
	3.62	0.016	0.029	0.026	0.023

註：

1. 製造商聲明待測物內部 DC 輸入端標稱電壓為 3.81Vdc，低極限操作電壓為 3.62Vdc，高極限操作電壓為 4.19Vdc，此待測物使用內部鋰電池，故頻率穩定度檢測值如上表所示，確認待測物於極限電壓範圍內仍可使用通訊頻率。
2. 待測物電壓於 3.55Vdc ~ 3.62Vdc 正常連線，當電壓低於 3.55Vdc 後即自動關機。

5G NR FR1 Band n78

Operating frequency: 3435MHz, SCS: 30kHz, BW: 100MHz					
Temp. (℃)	Power Supply (Vdc)	0 minute	2 minute	5 minute	10 minute
		Drift (ppm)	Drift (ppm)	Drift (ppm)	Drift (ppm)
25	4.19	-0.041	-0.048	-0.048	-0.062
-10	4.19	-0.008	-0.023	-0.024	-0.014
	3.62	-0.018	-0.008	-0.022	-0.009
55	4.19	-0.022	-0.008	-0.011	-0.024
	3.62	-0.021	-0.024	-0.029	-0.028

註：

1. 製造商聲明待測物內部 DC 輸入端標稱電壓為 3.81Vdc，低極限操作電壓為 3.62Vdc，高極限操作電壓為 4.19Vdc，此待測物使用內部鋰電池，故頻率穩定度檢測值如上表所示，確認待測物於極限電壓範圍內仍可使用通訊頻率。
2. 待測物電壓於 3.55Vdc ~ 3.62Vdc 正常連線，當電壓低於 3.55Vdc 後即自動關機。

5. 相鄰頻道洩漏功率比(ACLR)

5.1 適用標準

相鄰頻道洩漏功率比限制值(FR1)
終端設備功率等級 Class 2: **31dB 以上**
終端設備功率等級 Class 3: **30dB 以上**
，須符合下表之規範值。

附表 7、FR1 相鄰頻道洩漏功率比限制值(參考 3GPP TS 38.521-1 Table 6.5.2.4.1.5-2)

	終端設備功率等級 2	終端設備功率等級3
NR ACLR	31 - TT dB	30 - TT dB

附表 8、FR1 NR 相鄰頻道洩漏功率比測試誤差(Test Tolerance, TT)(參考 3GPP TS 38.521-1 Table 6.5.2.4.1.5-3)

	f ≤ 3.0GHz	3.0GHz < f ≤ 4.2GHz	4.2GHz < f ≤ 6.0GHz
BW ≤ 100MHz	0.8 dB	0.8 dB	0.8 dB

但設備屬UTRA者限制值為
$UTRA_{ACLR1}$採功率等級class 3者: **33dB以上**
$UTRA_{ACLR2}$採功率等級class 3者: **36dB以上**
，測量時，頻道之量測頻寬依下表規定。

附表 9、FR1 NR_{ACLR} 量測頻寬(參考 3GPP 38.521-1 Table 6.5.2.4.1.5-1)

NR頻道頻寬 / NR ACLR量測頻寬												
	5 MHz	10 MHz	15 MHz	20 MHz	25 MHz	30 MHz	40 MHz	50 MHz	60 MHz	80 MHz	90 MHz	100 MHz
NR ACLR 量測頻寬 (MHz)	4.515	9.375	14.235	19.095	23.955	28.815	38.895	48.615	58.35	78.15	88.23	98.31

附表 11、FR1 相鄰頻道洩漏功率比($UTRA_{ACLR}$）限制值(參考 3GPP 38.521-1 Table 6.5.2.4.2.5-2)

	終端設備功率等級3
$UTRA_{ACLR1}$	33 dB - TT
$UTRA_{ACLR2}$	36 dB - TT
註：TT = 0.8 dB	

5.2 量測方法

(1) 在正常條件下執行測試，量測方式符合 TS 138 521-1, table 6.5.2.4.1.4.1-1(FR1&$UTRA_{ACLR}$)。
(2) 測量檢測頻道與其相鄰通道的平均功率，計算相鄰頻道洩漏功率比。測量時，頻道的量測頻寬依下表之規定。
(3) (FR1)檢測頻道為低、高二個頻道，對最低及最高的工作頻寬之最大調變級數發射模式，均應分別檢測並依下表之規定。
(4) 若測量之鄰頻功率超過-50dBm，則應符合下表之 UTRA 相鄰頻道洩漏功率比限制值。

附表 10、FR1 ACLR 測試方法及規範(參考 3GPP TS 38.521-1 Table6.5.2.4.1.4.1-1)

預設條件						
測試環境		常態環境常態電壓				
測試頻道		低、高				
測試頻道頻寬		最低、最高				
子載波間隔		最低、最高				
頻道頻寬測試參數						
測試 ID	頻率	頻道頻寬	子載波間隔	下行結構	上行結構	
					調變方式(註2)	資源區塊分配(註1)
1(註3)	預設				DFT-s-OFDM PI/2 BPSK	Inner_Full
2(註3)	低頻道				DFT-s-OFDM PI/2 BPSK	Edge_1RB_Left
3(註3)	高頻道				DFT-s-OFDM PI/2 BPSK	Edge_1RB_Right
4(註3)	預設				DFT-s-OFDM PI/2 BPSK	Outer_Full
5(註4)	預設				DFT-s-OFDM PI/2 BPSK	Inner_Full
6(註4)	低頻道				DFT-s-OFDM PI/2 BPSK	Edge_1RB_Left
7(註4)	高頻道				DFT-s-OFDM PI/2 BPSK	Edge_1RB_Right
8(註4)	預設				DFT-s-OFDM PI/2 BPSK	Outer_Full
9	預設				DFT-s-OFDM QPSK	Inner_Full
10	低頻道				DFT-s-OFDM QPSK	Edge_1RB_Left
11	高頻道	預設	預設	不適用	DFT-s-OFDM QPSK	Edge_1RB_Right
12	預設				DFT-s-OFDM QPSK	Outer_Full
13	預設				DFT-s-OFDM 16 QAM	Inner_Full
14	低頻道				DFT-s-OFDM 16 QAM	Edge_1RB_Left
15	高頻道				DFT-s-OFDM 16 QAM	Edge_1RB_Right
16	預設				DFT-s-OFDM 16 QAM	Outer_Full
17	低頻道				DFT-s-OFDM 64 QAM	Edge_1RB_Left
18	高頻道				DFT-s-OFDM 64 QAM	Edge_1RB_Right
19	預設				DFT-s-OFDM 64 QAM	Outer_Full
20	低頻道				DFT-s-OFDM 256 QAM	Edge_1RB_Left
21	高頻道				DFT-s-OFDM 256 QAM	Edge_1RB_Right
22	預設				DFT-s-OFDM 256 QAM	Outer_Full

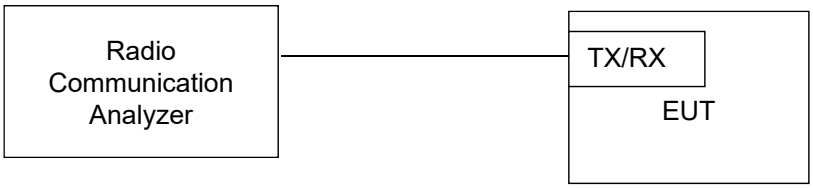
頻道頻寬測試參數						
測試 ID	頻率	頻道頻寬	子載波間隔	下行結構	上行結構	
23	預設	預設	預設	不適用	CP-OFDM QPSK	Inner_Full
24	低頻道				CP-OFDM QPSK	Edge_1RB_Left
25	高頻道				CP-OFDM QPSK	Edge_1RB_Right
26	預設				CP-OFDM QPSK	Outer_Full
27	預設				CP-OFDM 16 QAM	Inner_Full
28	低頻道				CP-OFDM 16 QAM	Edge_1RB_Left
29	高頻道				CP-OFDM 16 QAM	Edge_1RB_Right
30	預設				CP-OFDM 16 QAM	Outer_Full
31	低頻道				CP-OFDM 64 QAM	Edge_1RB_Left
32	高頻道				CP-OFDM 64 QAM	Edge_1RB_Right
33	預設				CP-OFDM 64 QAM	Outer_Full
34	低頻道				CP-OFDM 256 QAM	Edge_1RB_Left
35	高頻道				CP-OFDM 256 QAM	Edge_1RB_Right
36	預設				CP-OFDM 256 QAM	Outer_Full
註1：每一資源區塊分配規格結構應符合3GPP TS 38.521-1 Table 6.1-1規定。 註2：DFT-s-OFDM PI/2 BPSK 測試僅適用支援 half Pi BPSK 之 FR1終端設備。 註3：針對功率等級3，操作在 TDD 具 PI/2 BPSK 調變之終端設備及具支援 powerBoosting-pi2BPSK 能力與 IE powerBoostPi2BPSK 設定為1且頻段為2500-2690MHz(n41)/3300-3570MHz(n78)之終端設備。 註4：針對功率等級3，操作在 FDD 或 TDD 但非操作在2500-2690MHz(n41)/3300-3570MHz(n78)之終端設備，或 TDD 頻段操作在3300-3570MHz(n78)且 IE powerBoostPi2BPSK 設定為0之終端設備。						

5.3 量測儀器

儀器名稱 (廠牌/製造商)	型號	序號	校正日期	下次校正日期
Radio Communication Analyzer Keysight	E7515B	MY58300759	Apr. 23, 2021	Apr. 22, 2022

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.4 測試配置



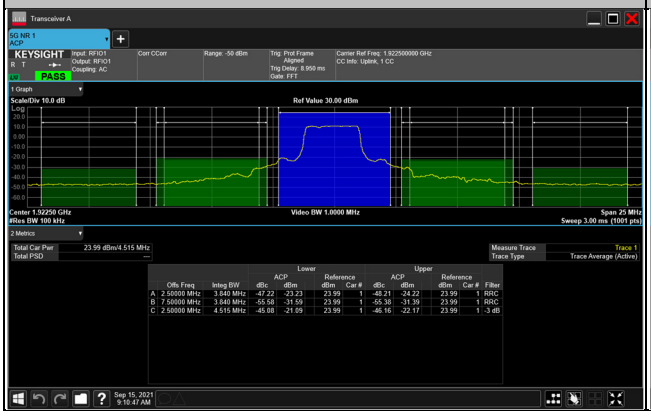
5.5 量測結果 (ACLR / UTRAACLR)

操作模式	發射	測試者	鄭詠璋
量測場地溫度	23℃	量測場地濕度	71% RH

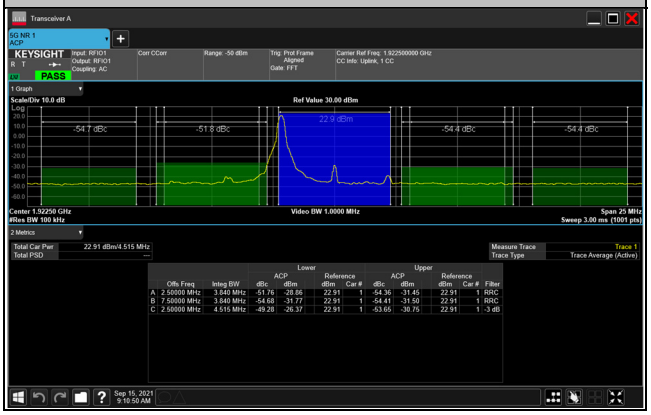
5G NR FR1 Band n1

Bandwidth: 5MHz

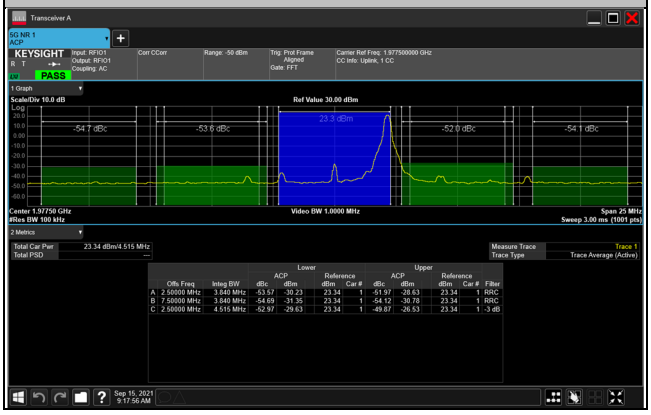
ID5_DFT-s-OFDM PI/2 BPSK _ Inner_Full

Ch384500	Ch395500
	

ID6_DFT-s-OFDM PI/2 BPSK _ Edge_1RB_Left

Ch384500


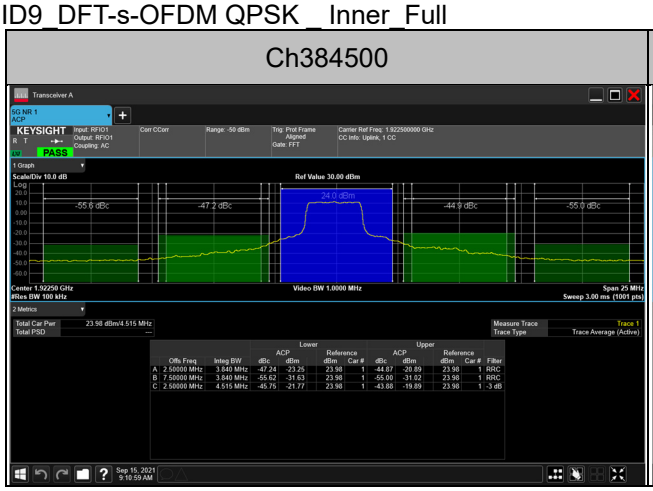
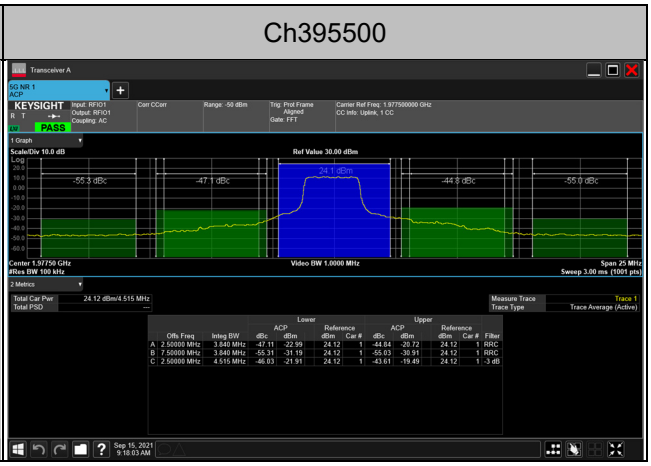
ID7_DFT-s-OFDM PI/2 BPSK _ Edge_1RB_Right

Ch395500


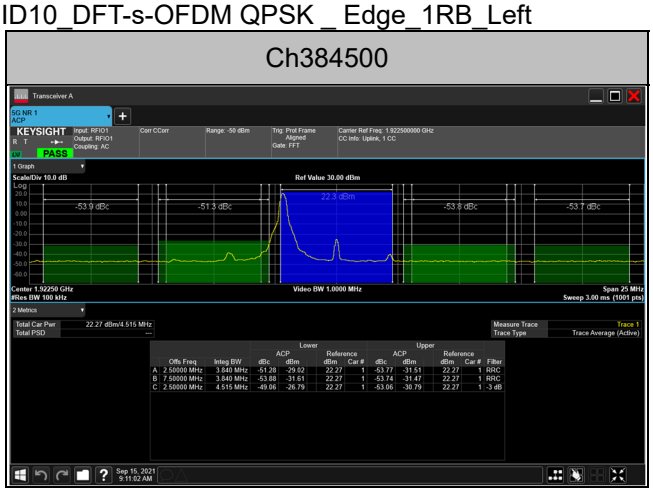
ID8_DFT-s-OFDM PI/2 BPSK _ Outer_Full

Ch384500	Ch395500
	

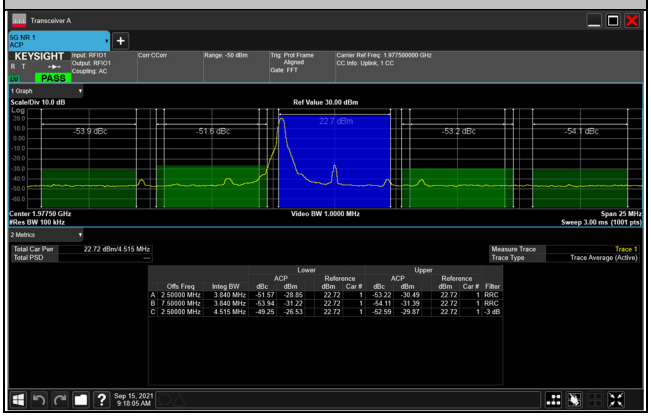
ID9_DFT-s-OFDM QPSK _ Inner_Full

Ch384500	Ch395500
	

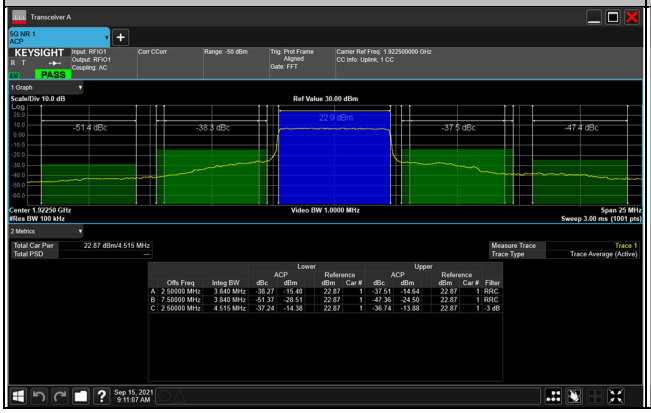
ID10_DFT-s-OFDM QPSK _ Edge_1RB_Left

Ch384500


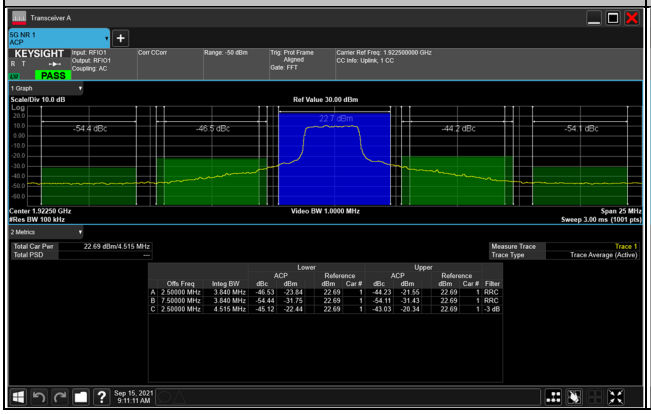
ID11_DFT-s-OFDM QPSK _ Edge_1RB_Right

Ch395500


ID12_DFT-s-OFDM QPSK _ Outer_Full

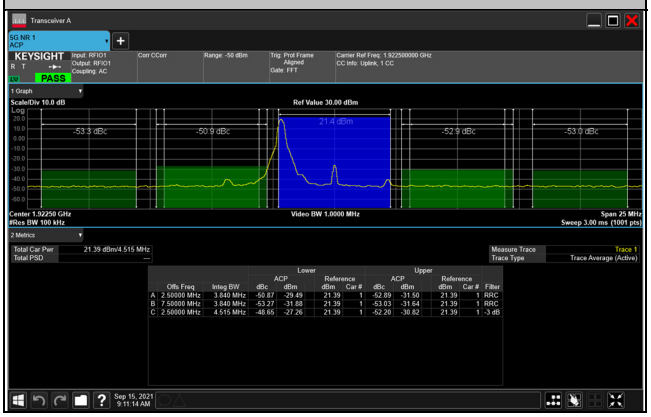
Ch384500	Ch395500
	

ID13_DFT-s-OFDM 16QAM _ Inner_Full

Ch384500	Ch395500
	

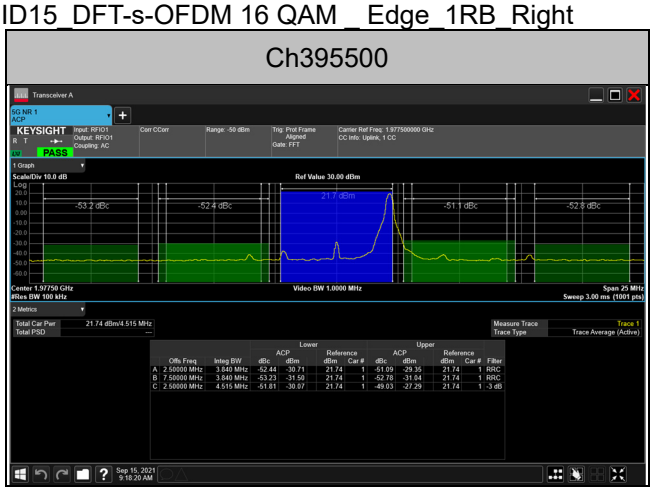
ID14_DFT-s-OFDM 16 QAM _ Edge_1RB_Left

Ch384500



ID15_DFT-s-OFDM 16 QAM _ Edge_1RB_Right

Ch395500



ID16_DFT-s-OFDM 16 QAM_ Outer_Full

Ch384500

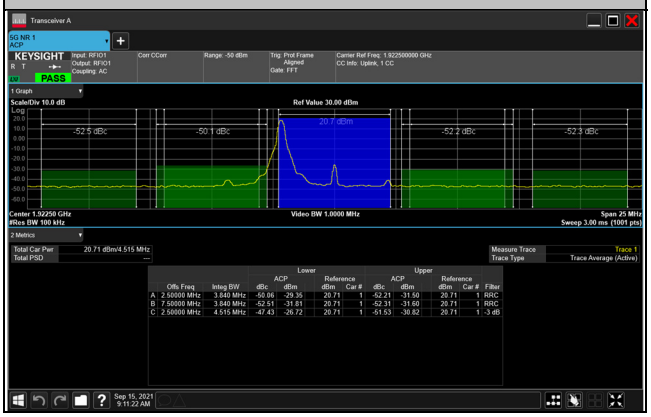


Ch395500



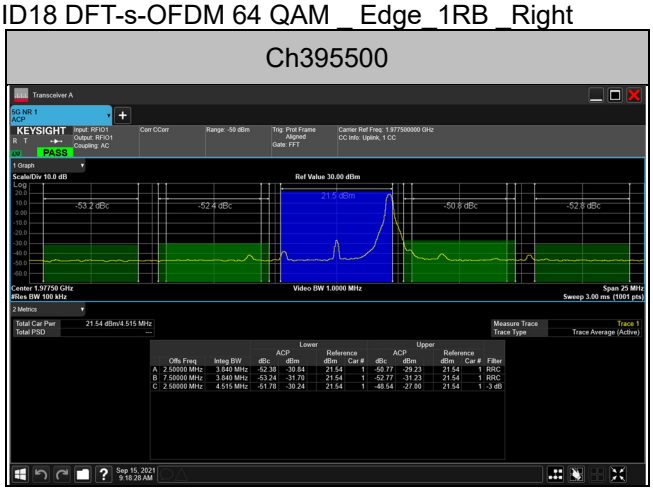
ID17 DFT-s-OFDM 64 QAM _ Edge_1RB_Left

Ch384500



ID18 DFT-s-OFDM 64 QAM _ Edge_1RB _Right

Ch395500



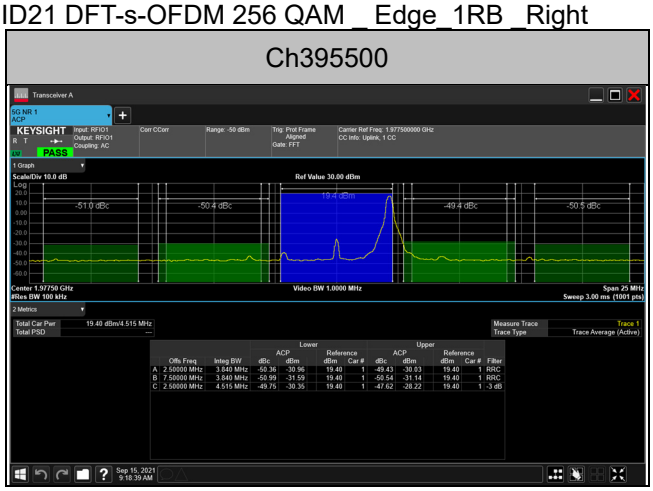
ID19_DFT-s-OFDM 64 QAM_ Outer_Full

Ch384500	Ch395500
	

ID20 DFT-s-OFDM 256 QAM _ Edge_1RB_Left

Ch384500


ID21 DFT-s-OFDM 256 QAM _ Edge_1RB _Right

Ch395500


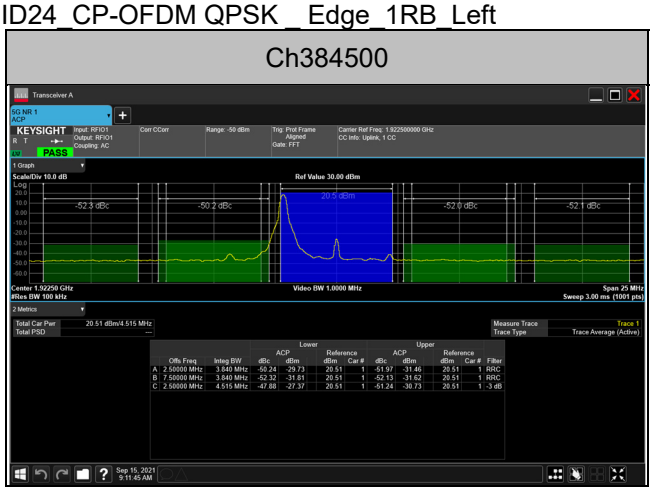
ID22_DFT-s-OFDM 256 QAM_ Outer_Full

Ch384500	Ch395500
	

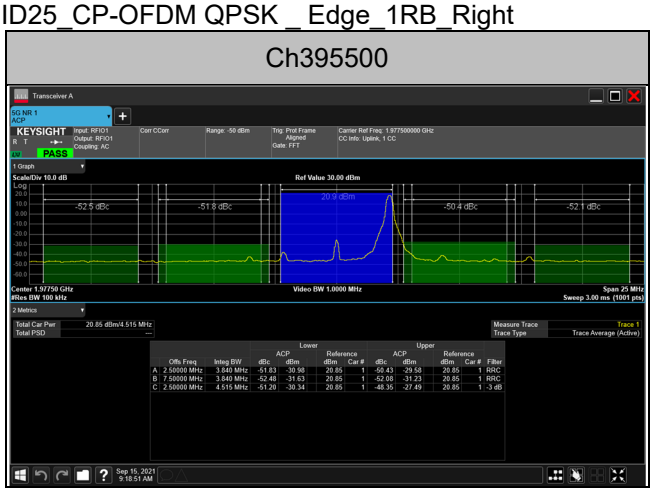
ID23_CP-OFDM QPSK _ Inner_Full

Ch384500	Ch395500
	

ID24_CP-OFDM QPSK _ Edge_1RB_Left

Ch384500


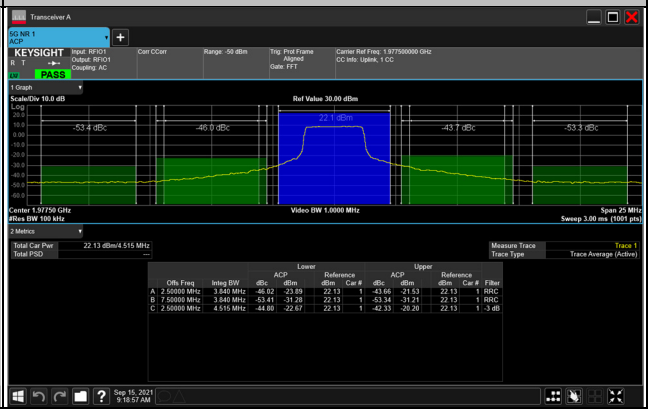
ID25_CP-OFDM QPSK _ Edge_1RB_Right

Ch395500


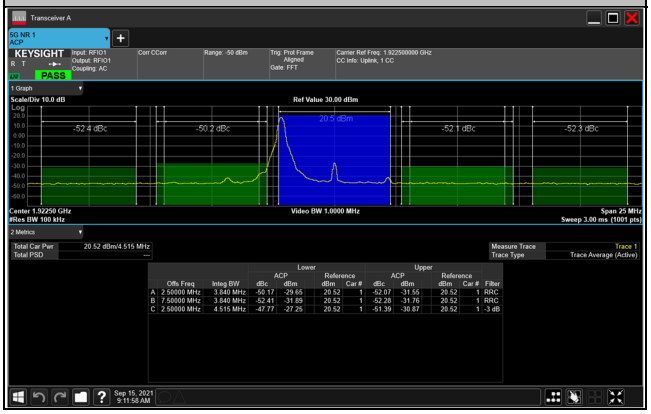
ID26_CP-OFDM QPSK _ Outer_Full

Ch384500	Ch395500
	

ID27_CP-OFDM 16 QAM _ Inner_Full

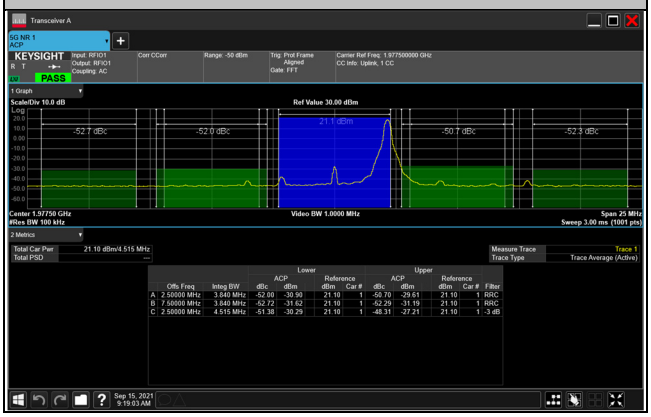
Ch384500	Ch395500
	

ID28_CP-OFDM 16 QAM _ Edge_1RB_Left

Ch384500


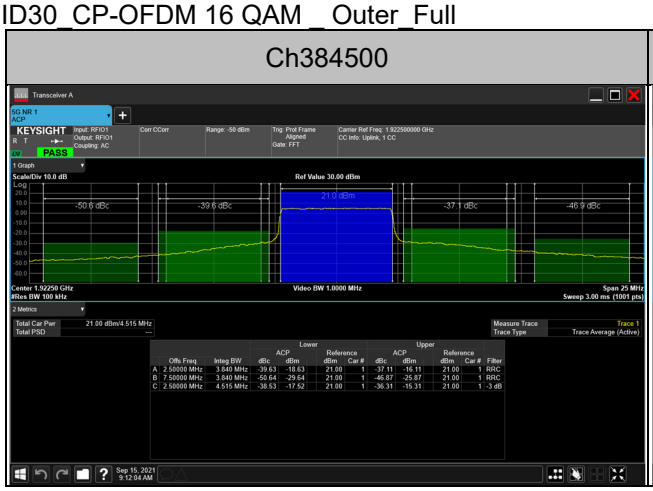
ID29_CP-OFDM 16 QAM _ Edge_1RB_Right

Ch395500

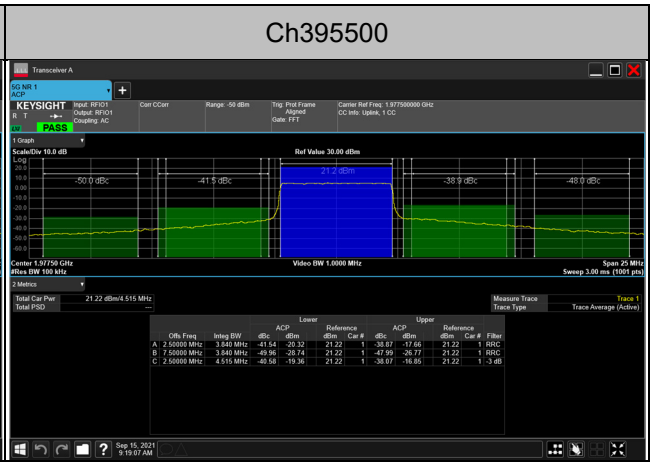


ID30_CP-OFDM 16 QAM _ Outer_Full

Ch384500

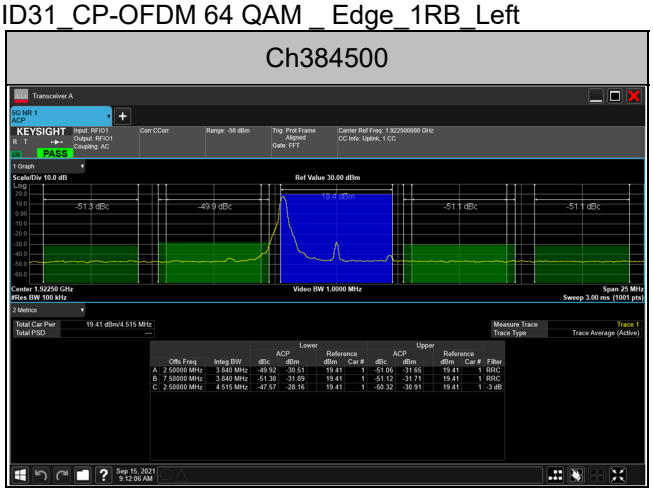


Ch395500



ID31_CP-OFDM 64 QAM _ Edge_1RB_Left

Ch384500



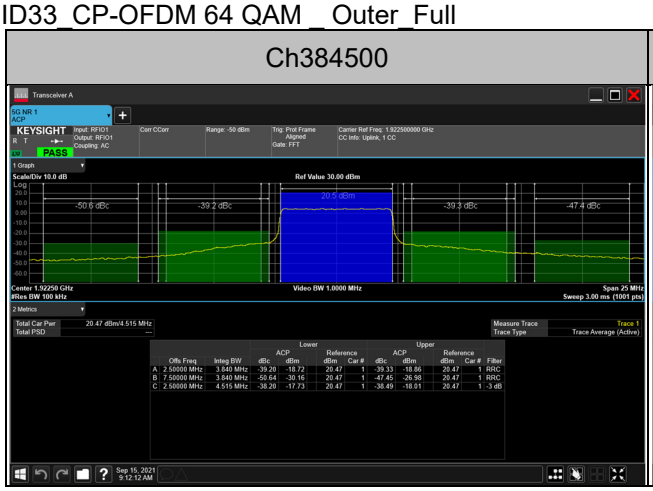
ID32_CP-OFDM 64 QAM _ Edge_1RB_Right

Ch395500

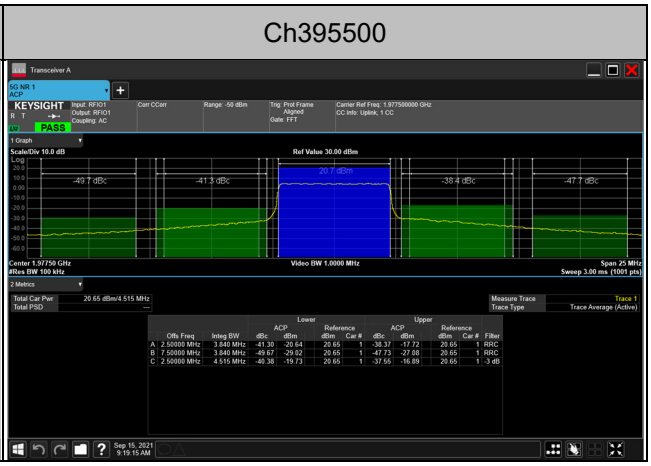


ID33_CP-OFDM 64 QAM _ Outer_Full

Ch384500

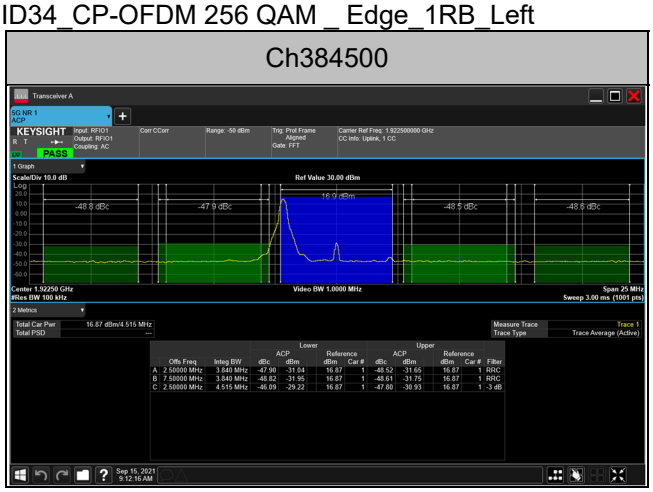


Ch395500



ID34_CP-OFDM 256 QAM _ Edge_1RB_Left

Ch384500



ID35_CP-OFDM 256 QAM _ Edge_1RB_Right

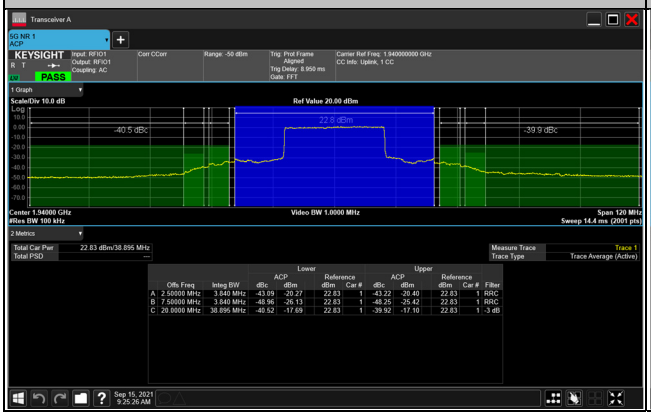
Ch395500


ID36_CP-OFDM 256 QAM _ Outer_Full

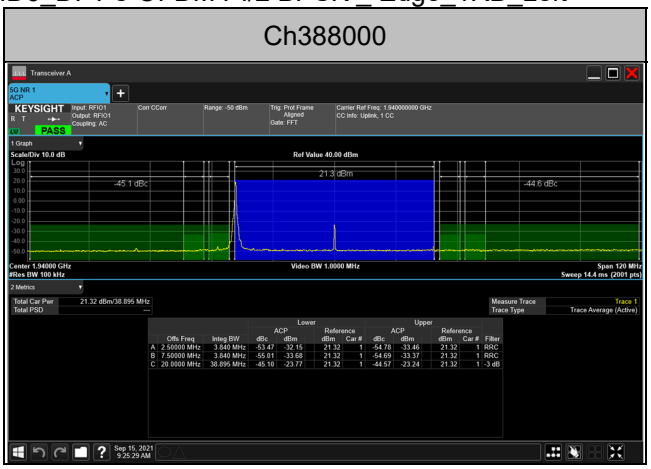
Ch384500	Ch395500
	

Bandwidth: 40MHz

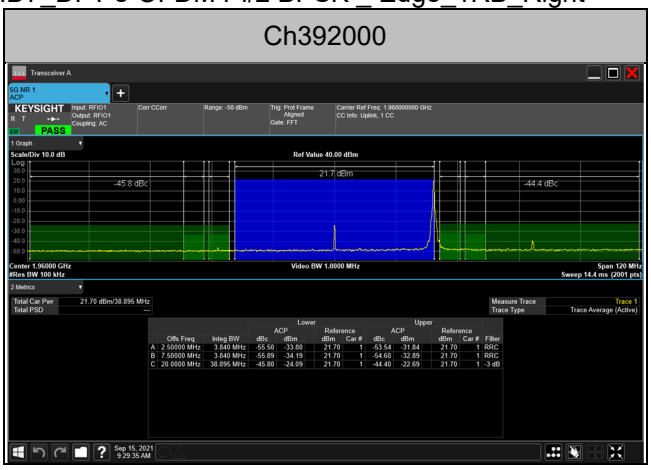
ID5_DFT-s-OFDM PI/2 BPSK _ Inner_Full

Ch388000	Ch392000
	

ID6_DFT-s-OFDM PI/2 BPSK _ Edge_1RB_Left

Ch388000


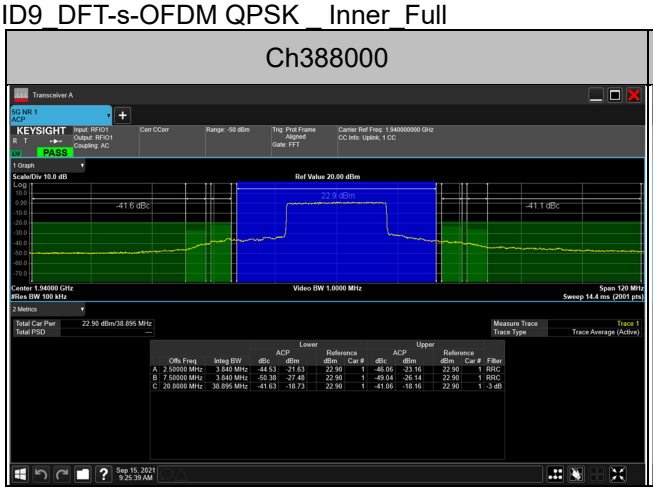
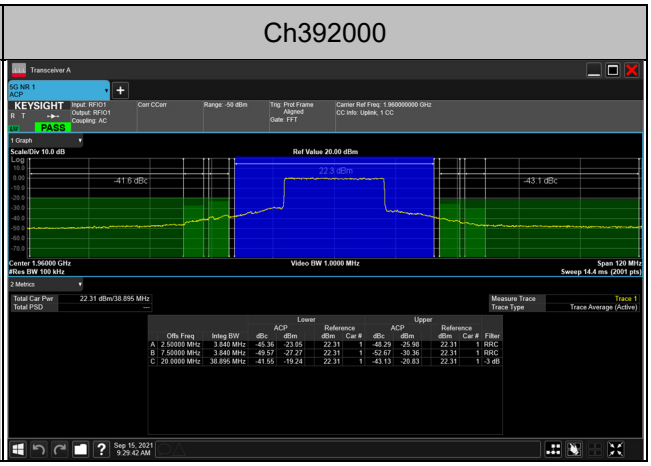
ID7_DFT-s-OFDM PI/2 BPSK _ Edge_1RB_Right

Ch392000


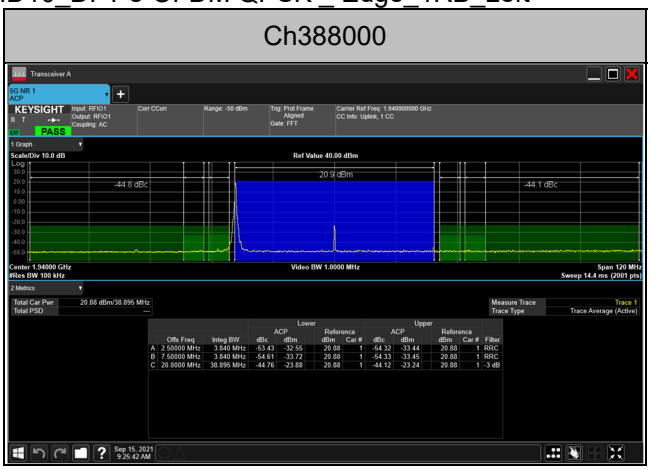
ID8_DFT-s-OFDM PI/2 BPSK _ Outer_Full

Ch388000	Ch392000
	

ID9_DFT-s-OFDM QPSK _ Inner_Full

Ch388000	Ch392000
	

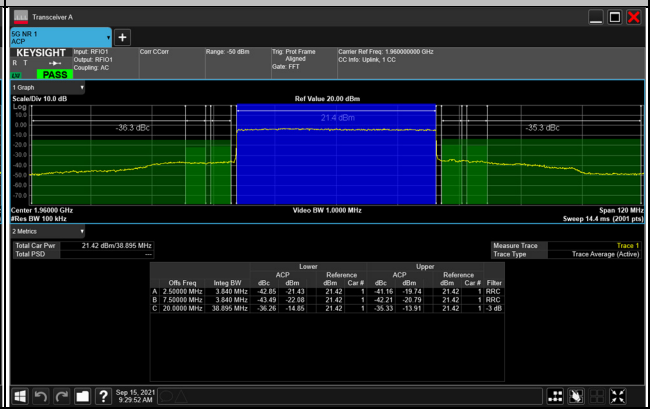
ID10_DFT-s-OFDM QPSK _ Edge_1RB_Left

Ch388000


ID11_DFT-s-OFDM QPSK _ Edge_1RB_Right

Ch392000


ID12_DFT-s-OFDM QPSK _ Outer_Full

Ch388000	Ch392000
	

ID13_DFT-s-OFDM 16QAM _ Inner_Full

Ch388000	Ch392000
	

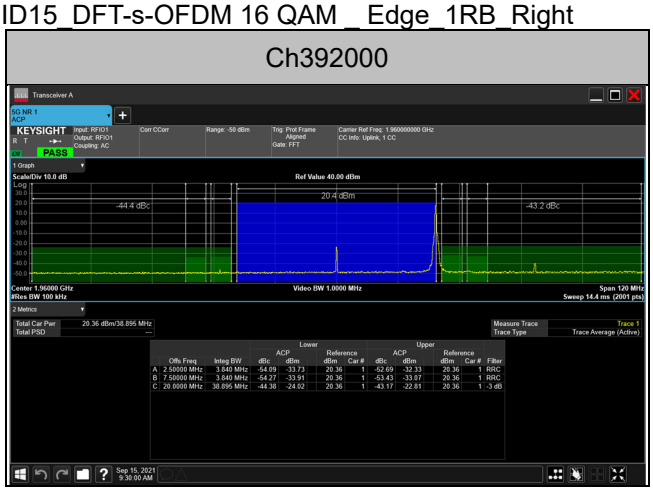
ID14_DFT-s-OFDM 16 QAM _ Edge_1RB_Left

Ch388000



ID15_DFT-s-OFDM 16 QAM _ Edge_1RB_Right

Ch392000

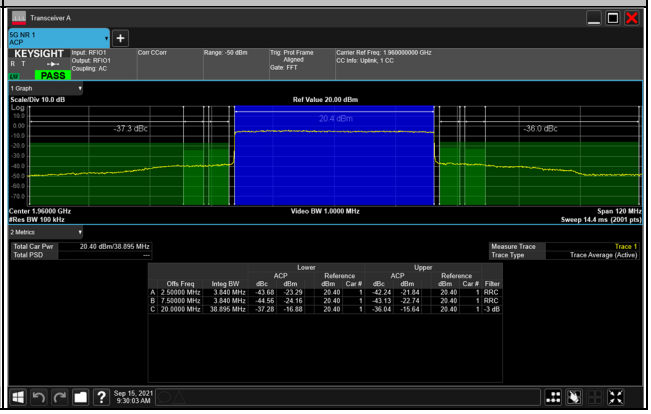


ID16_DFT-s-OFDM 16 QAM_ Outer_Full

Ch388000



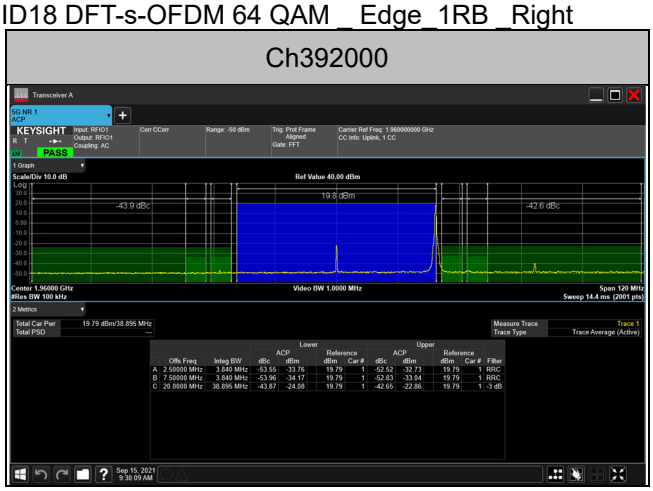
Ch392000



ID17 DFT-s-OFDM 64 QAM _ Edge_1RB_Left

Ch388000


ID18 DFT-s-OFDM 64 QAM _ Edge_1RB _Right

Ch392000


ID19_DFT-s-OFDM 64 QAM_ Outer_Full

Ch388000	Ch392000
	

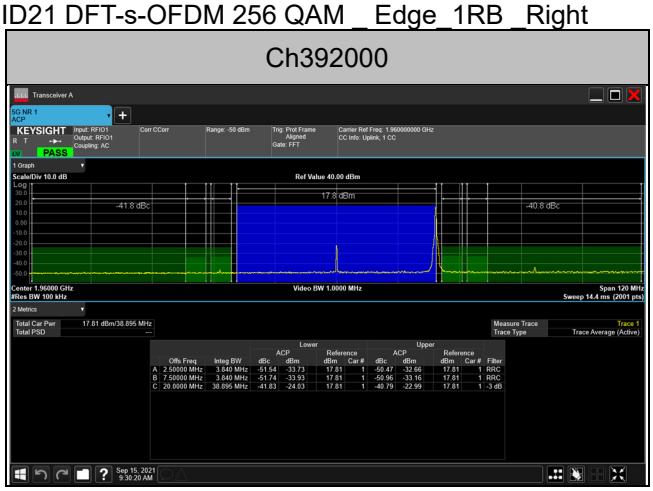
ID20 DFT-s-OFDM 256 QAM _ Edge_1RB_Left

Ch388000

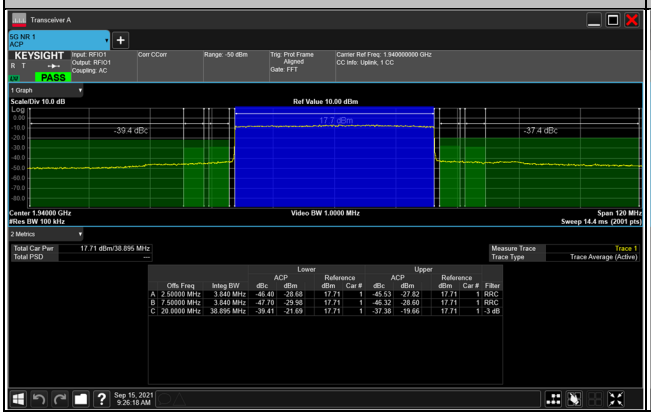
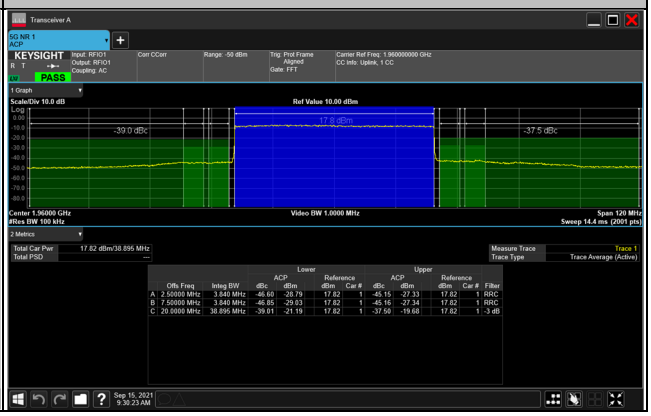


ID21 DFT-s-OFDM 256 QAM _ Edge_1RB _Right

Ch392000



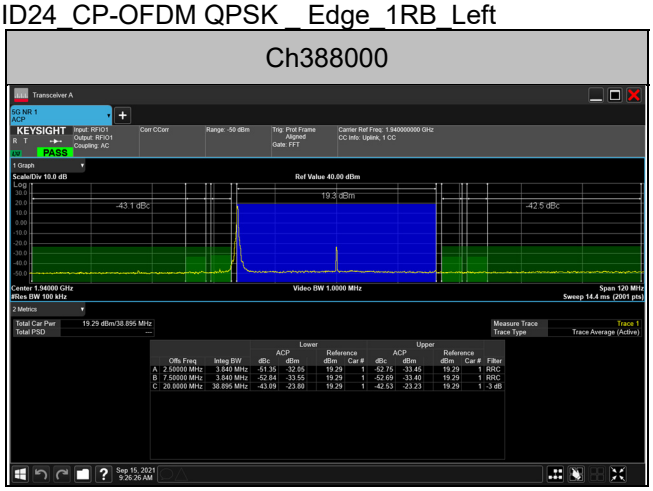
ID22_DFT-s-OFDM 256 QAM_ Outer_Full

Ch388000	Ch392000
	

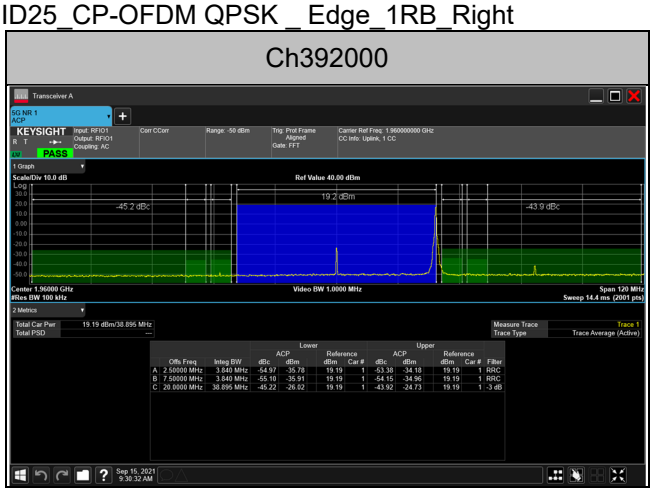
ID23_CP-OFDM QPSK _ Inner_Full

Ch388000	Ch392000
	

ID24_CP-OFDM QPSK _ Edge_1RB_Left

Ch388000


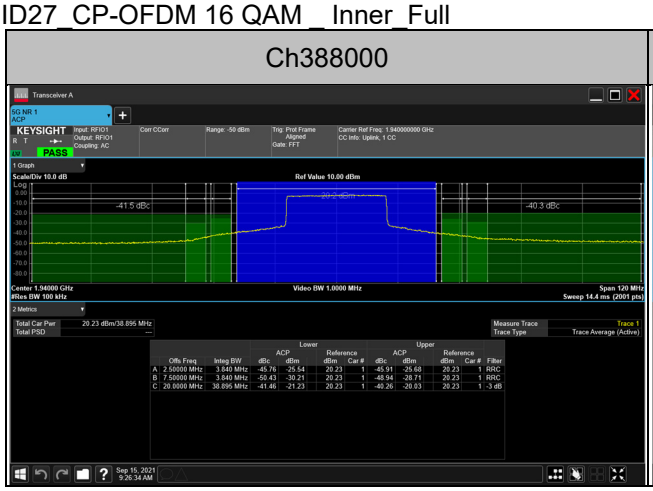
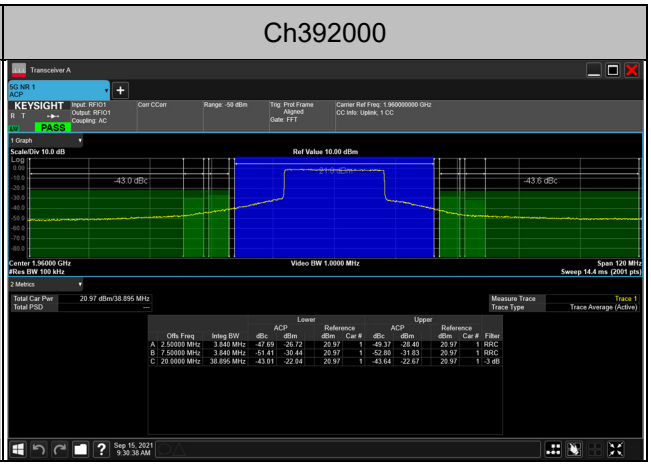
ID25_CP-OFDM QPSK _ Edge_1RB_Right

Ch392000


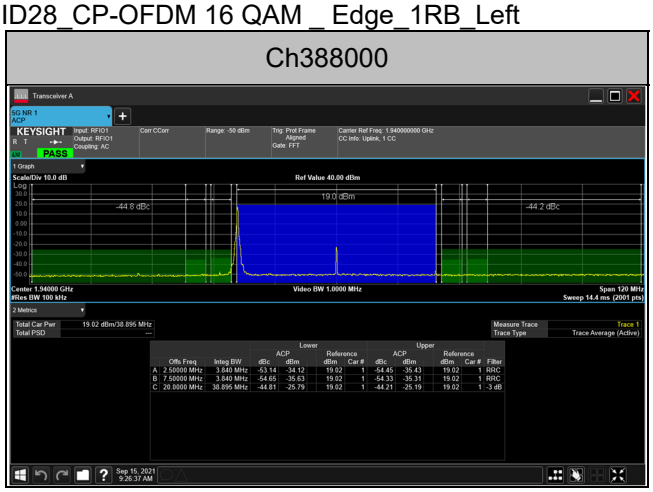
ID26_CP-OFDM QPSK _ Outer_Full

Ch388000	Ch392000
	

ID27_CP-OFDM 16 QAM _ Inner_Full

Ch388000	Ch392000
	

ID28_CP-OFDM 16 QAM _ Edge_1RB_Left

Ch388000


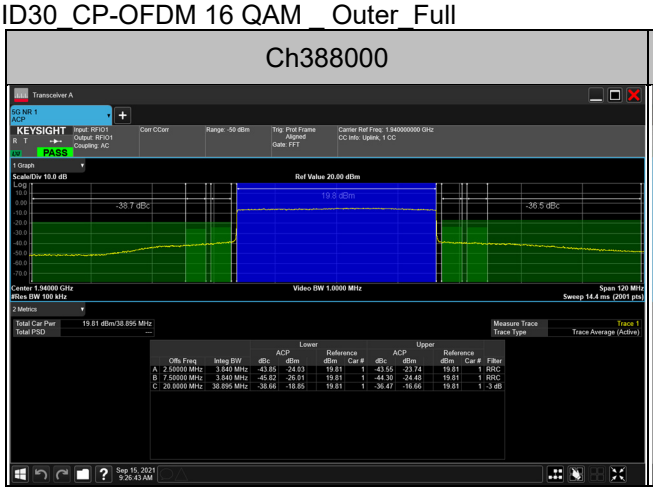
ID29_CP-OFDM 16 QAM _ Edge_1RB_Right

Ch392000

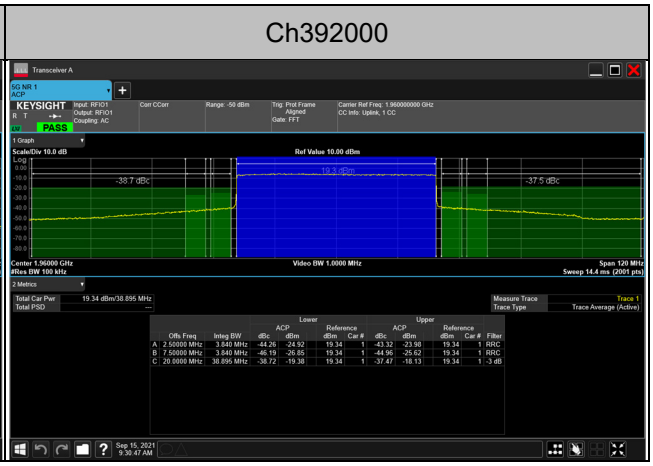


ID30_CP-OFDM 16 QAM _ Outer_Full

Ch388000

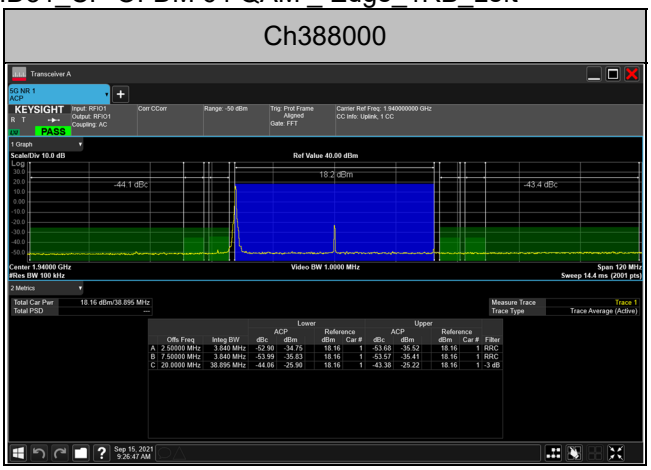


Ch392000

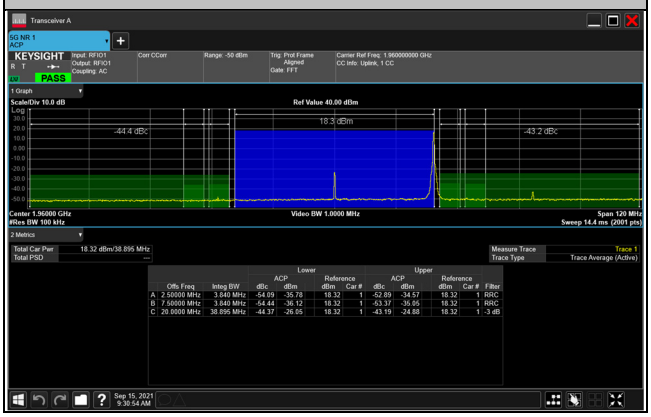


ID31_CP-OFDM 64 QAM _ Edge_1RB_Left

Ch388000



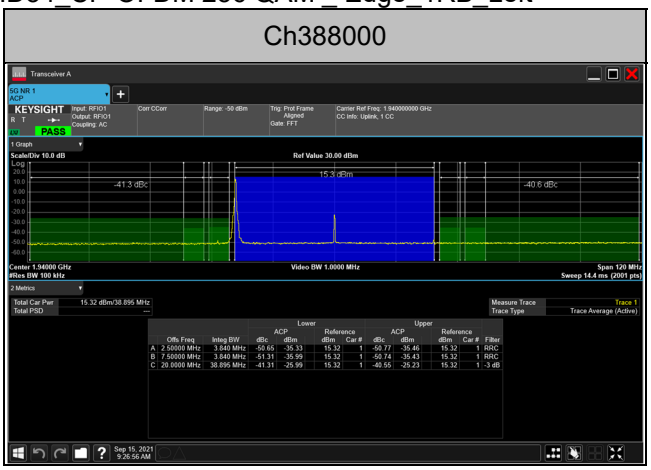
ID32_CP-OFDM 64 QAM _ Edge_1RB_Right

Ch392000


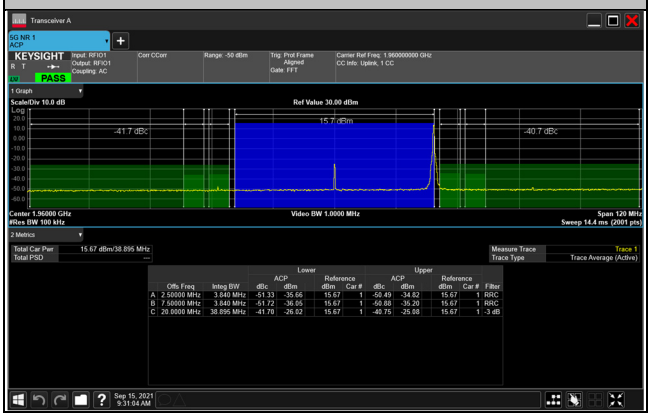
ID33_CP-OFDM 64 QAM _ Outer_Full

Ch388000	Ch392000
	

ID34_CP-OFDM 256 QAM _ Edge_1RB_Left

Ch388000


ID35_CP-OFDM 256 QAM _ Edge_1RB_Right

Ch392000


ID36_CP-OFDM 256 QAM _ Outer_Full

Ch388000	Ch392000
	

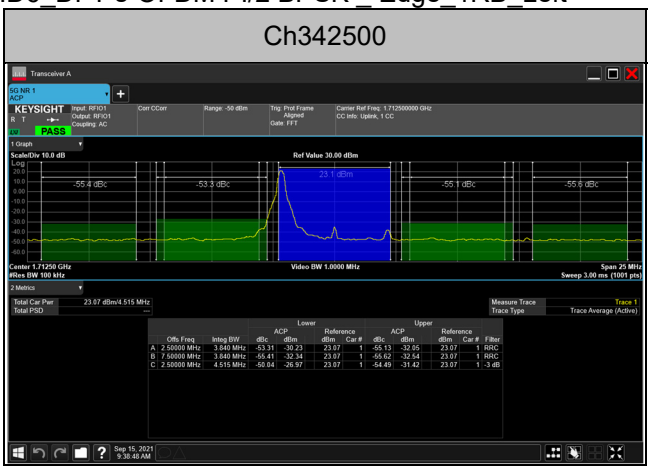
5G NR FR1 Band n3

Bandwidth: 5MHz

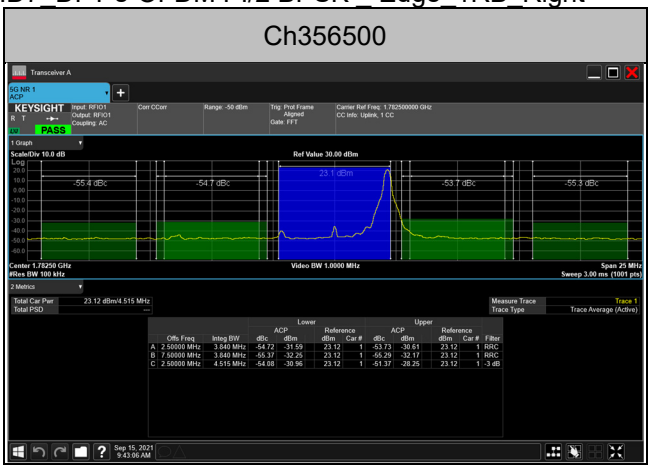
ID5_DFT-s-OFDM PI/2 BPSK _ Inner_Full

Ch342500	Ch356500
	

ID6_DFT-s-OFDM PI/2 BPSK _ Edge_1RB_Left

Ch342500


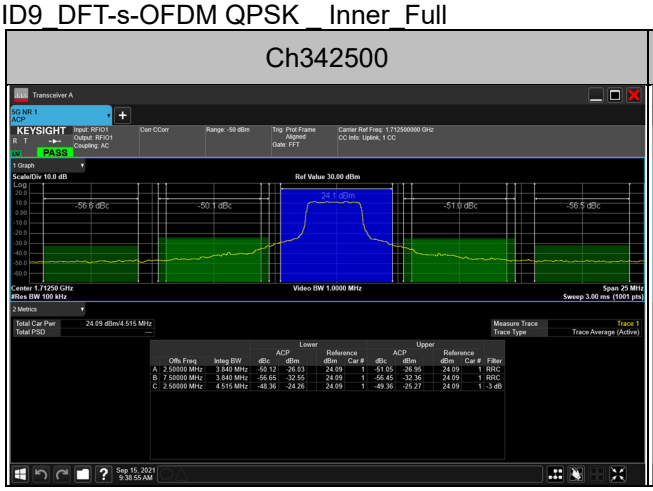
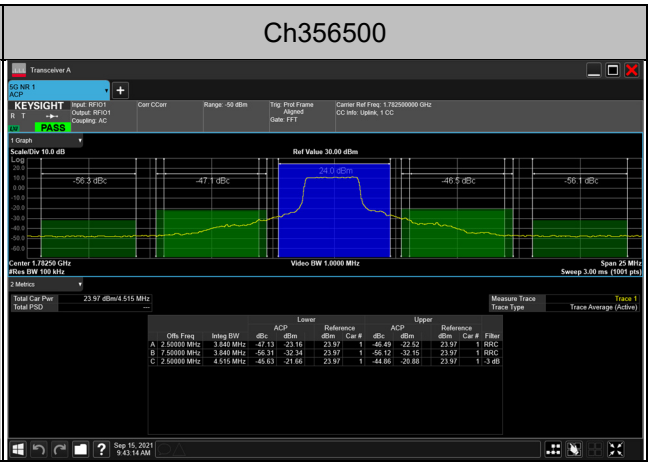
ID7_DFT-s-OFDM PI/2 BPSK _ Edge_1RB_Right

Ch356500


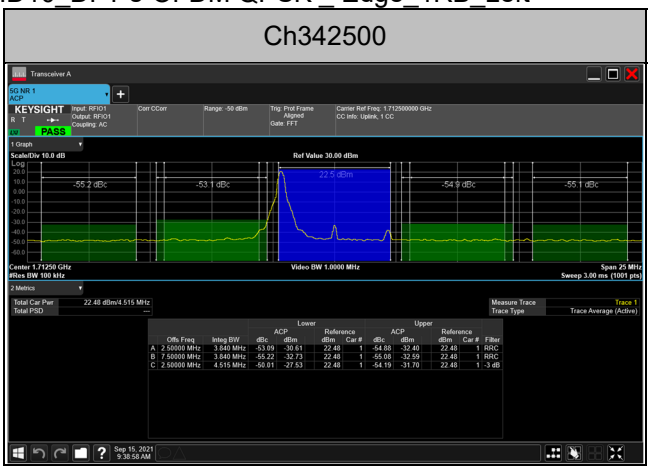
ID8_DFT-s-OFDM PI/2 BPSK _ Outer_Full

Ch342500	Ch356500
	

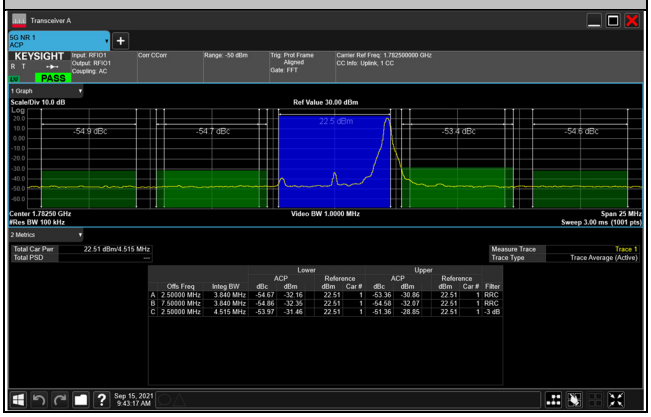
ID9_DFT-s-OFDM QPSK _ Inner_Full

Ch342500	Ch356500
	

ID10_DFT-s-OFDM QPSK _ Edge_1RB_Left

Ch342500


ID11_DFT-s-OFDM QPSK _ Edge_1RB_Right

Ch356500


ID12_DFT-s-OFDM QPSK _ Outer_Full

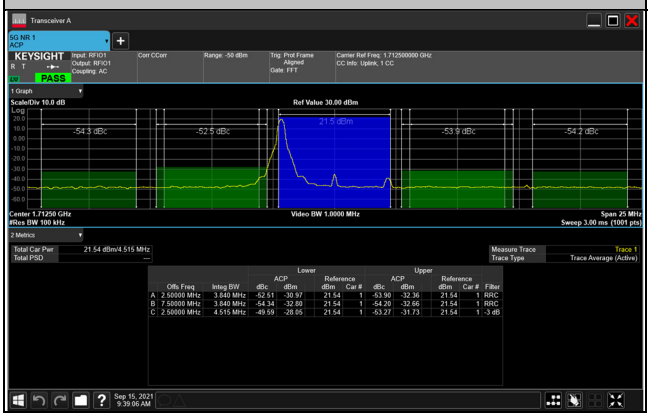
Ch342500	Ch356500
	

ID13_DFT-s-OFDM 16QAM _ Inner_Full

Ch342500	Ch356500
	

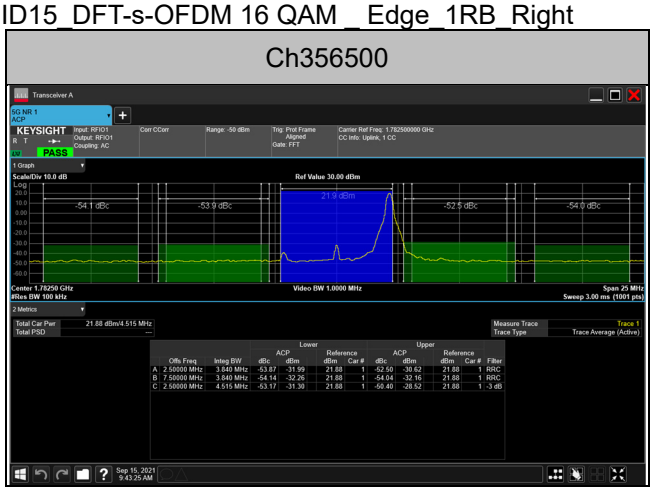
ID14_DFT-s-OFDM 16 QAM _ Edge_1RB_Left

Ch342500



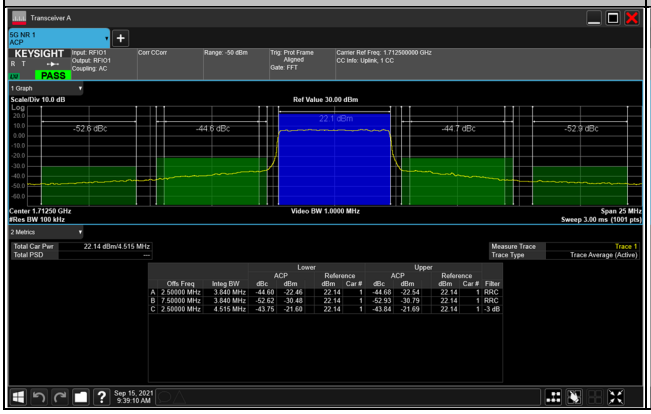
ID15_DFT-s-OFDM 16 QAM _ Edge_1RB_Right

Ch356500



ID16_DFT-s-OFDM 16 QAM_ Outer_Full

Ch342500

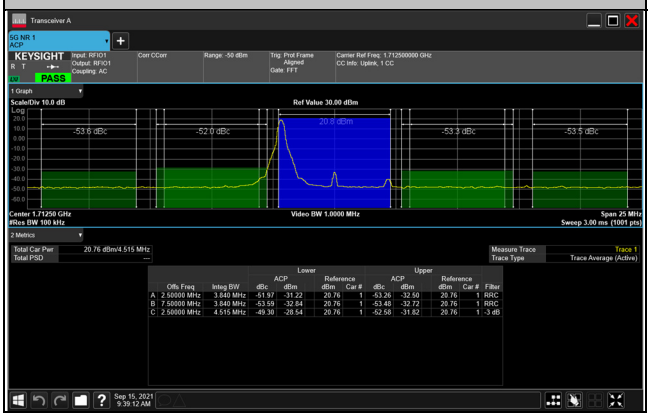


Ch356500



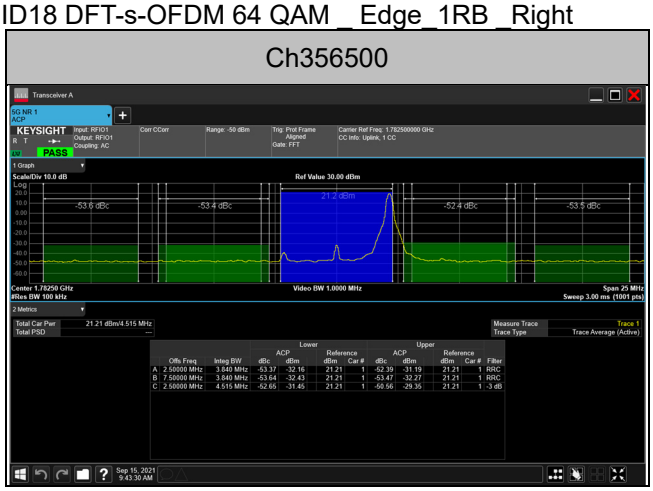
ID17 DFT-s-OFDM 64 QAM _ Edge_1RB_Left

Ch342500



ID18 DFT-s-OFDM 64 QAM _ Edge_1RB _Right

Ch356500



ID19_DFT-s-OFDM 64 QAM_ Outer_Full

Ch342500



Ch356500



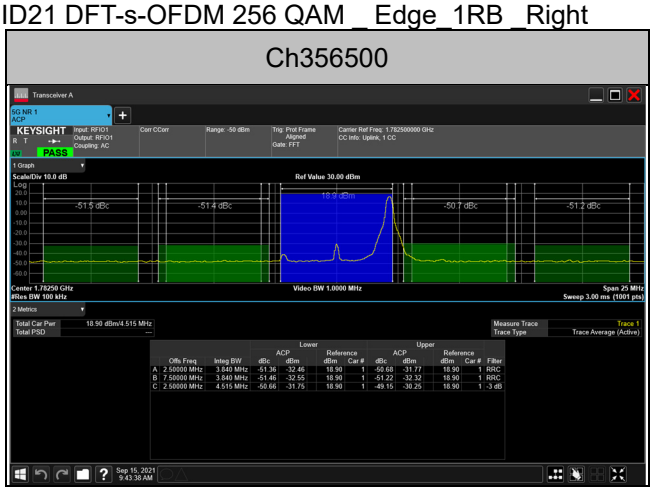
ID20 DFT-s-OFDM 256 QAM _ Edge_1RB_Left

Ch342500



ID21 DFT-s-OFDM 256 QAM _ Edge_1RB _Right

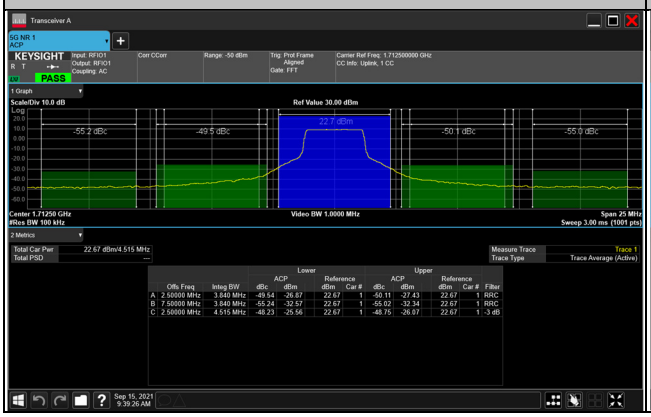
Ch356500



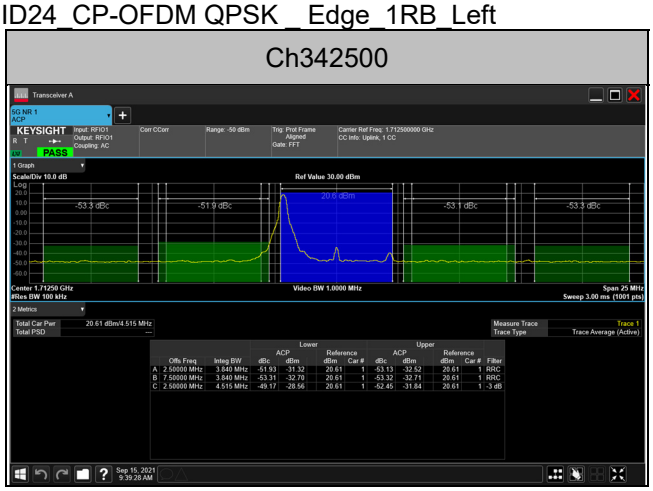
ID22_DFT-s-OFDM 256 QAM_ Outer_Full

Ch342500	Ch356500
	

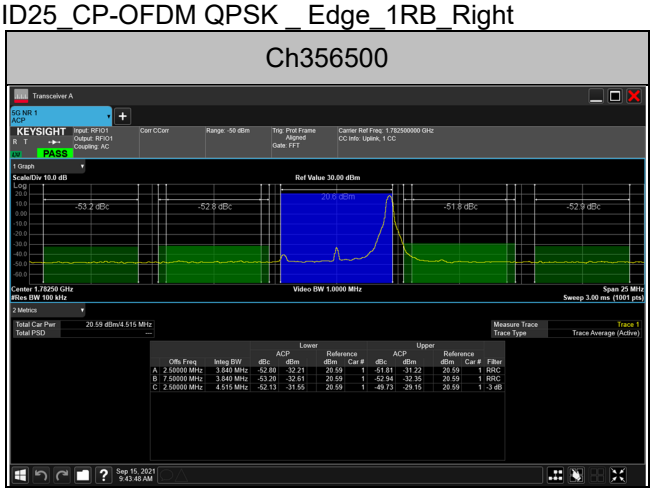
ID23_CP-OFDM QPSK _ Inner_Full

Ch342500	Ch356500
	

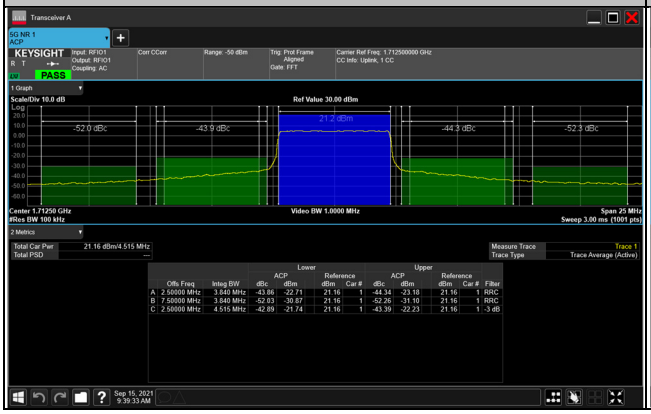
ID24_CP-OFDM QPSK _ Edge_1RB_Left

Ch342500


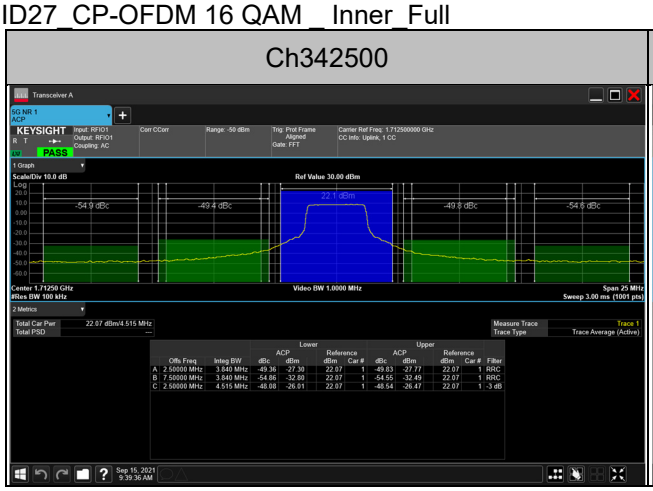
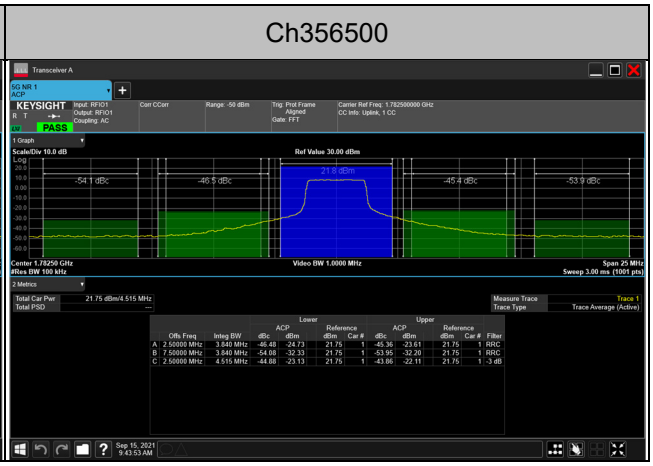
ID25_CP-OFDM QPSK _ Edge_1RB_Right

Ch356500


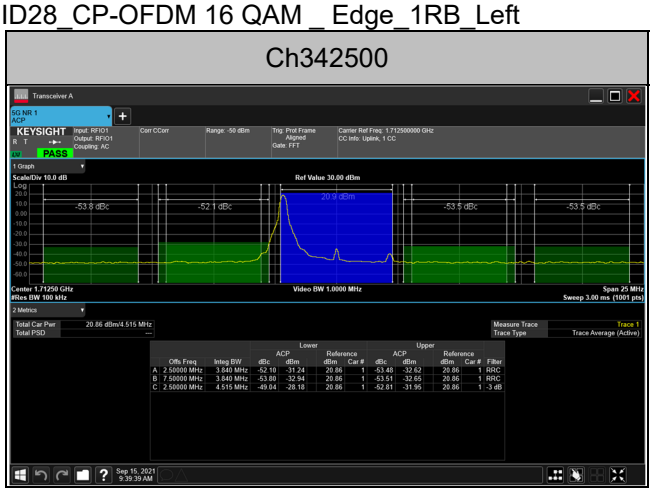
ID26_CP-OFDM QPSK _ Outer_Full

Ch342500	Ch356500
	

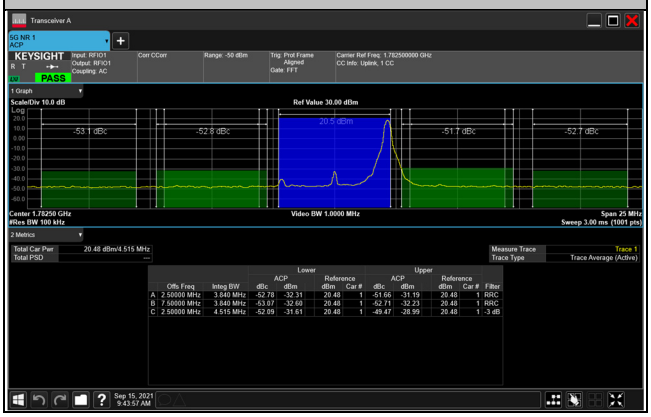
ID27_CP-OFDM 16 QAM _ Inner_Full

Ch342500	Ch356500
	

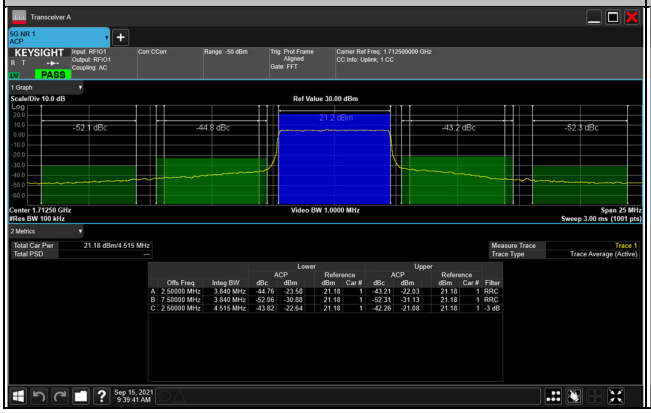
ID28_CP-OFDM 16 QAM _ Edge_1RB_Left

Ch342500


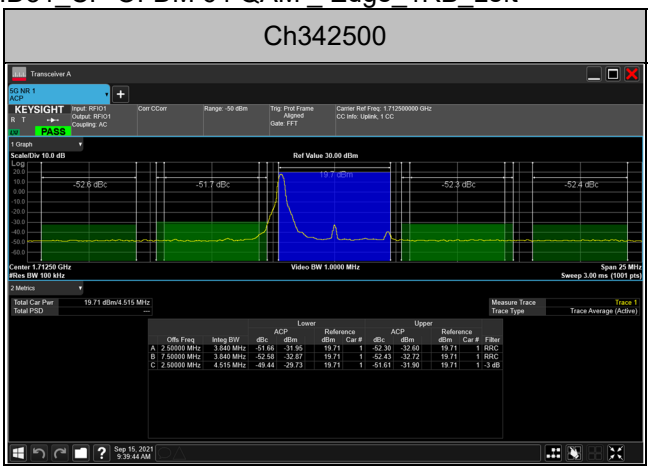
ID29_CP-OFDM 16 QAM _ Edge_1RB_Right

Ch356500


ID30_CP-OFDM 16 QAM _ Outer_Full

Ch342500	Ch356500
	

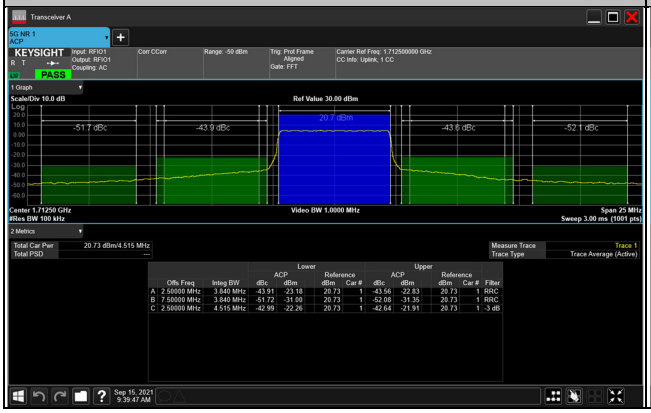
ID31_CP-OFDM 64 QAM _ Edge_1RB_Left

Ch342500


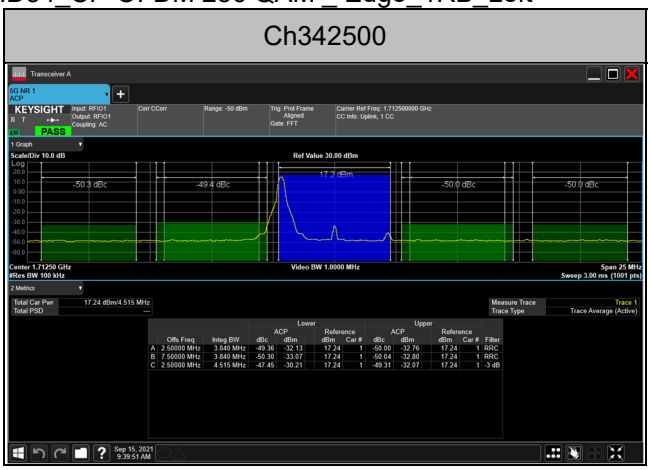
ID32_CP-OFDM 64 QAM _ Edge_1RB_Right

Ch356500


ID33_CP-OFDM 64 QAM _ Outer_Full

Ch342500	Ch356500
	

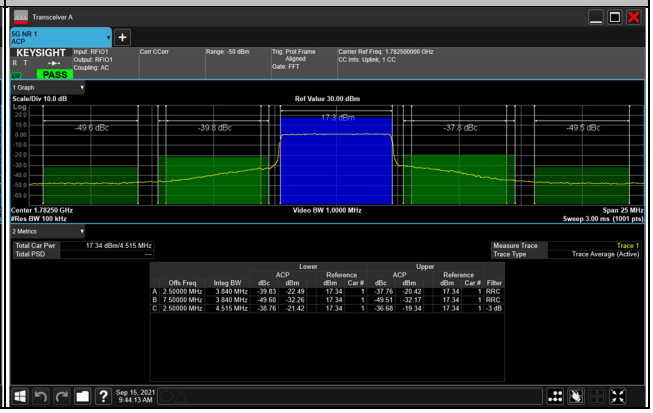
ID34_CP-OFDM 256 QAM _ Edge_1RB_Left

Ch342500


ID35_CP-OFDM 256 QAM _ Edge_1RB_Right

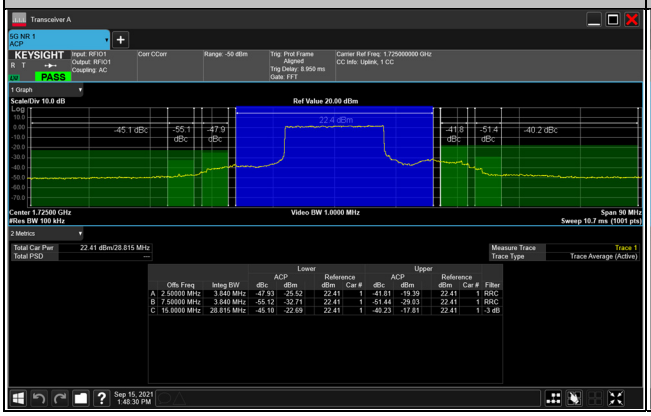
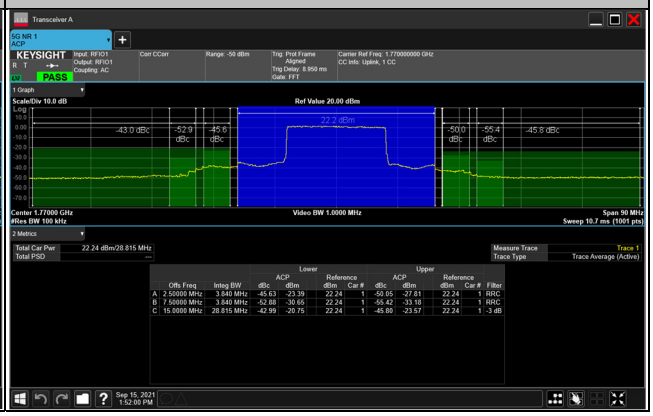
Ch356500


ID36_CP-OFDM 256 QAM _ Outer_Full

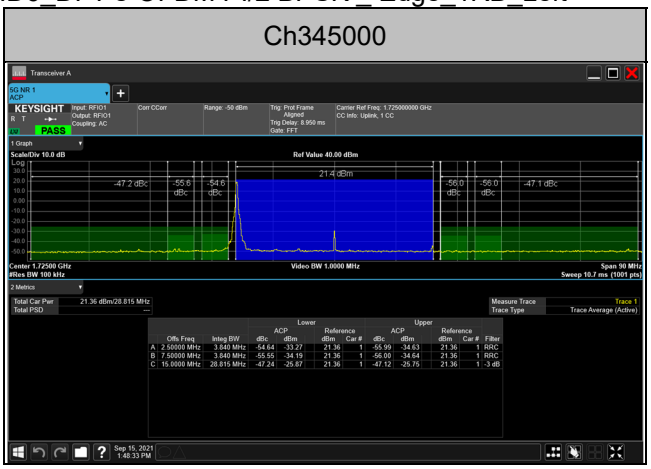
Ch342500	Ch356500
	

Bandwidth: 30MHz

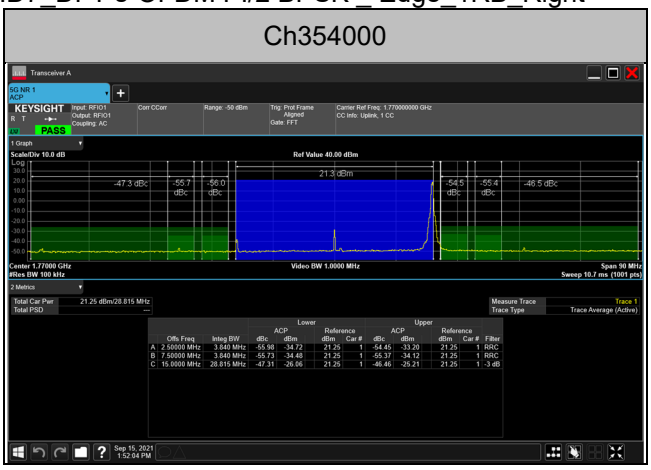
ID5_DFT-s-OFDM PI/2 BPSK _ Inner_Full

Ch345000	Ch354000
	

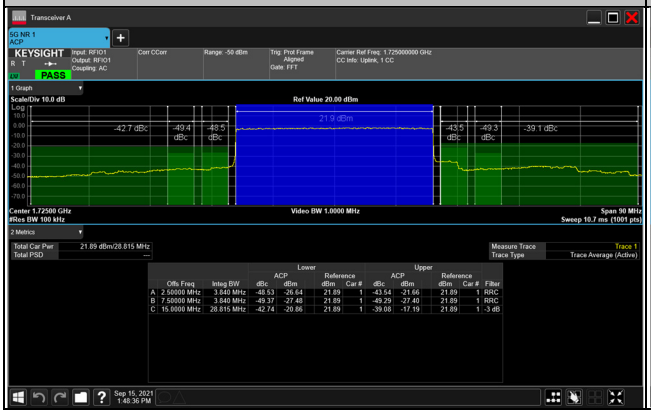
ID6_DFT-s-OFDM PI/2 BPSK _ Edge_1RB_Left

Ch345000


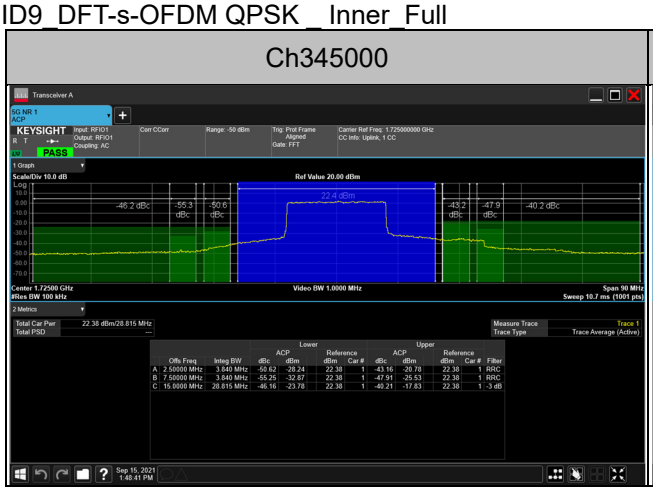
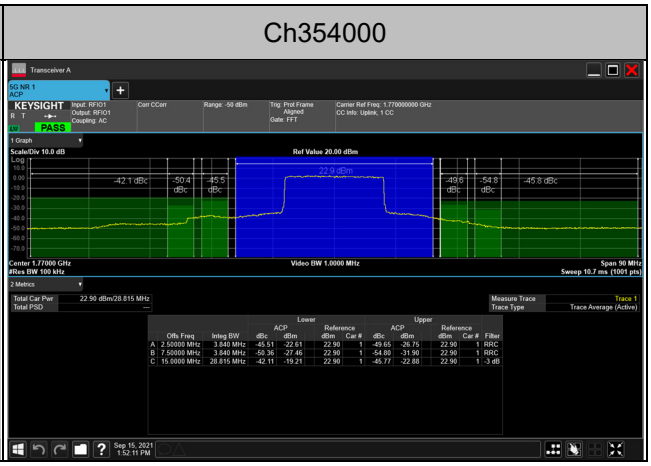
ID7_DFT-s-OFDM PI/2 BPSK _ Edge_1RB_Right

Ch354000


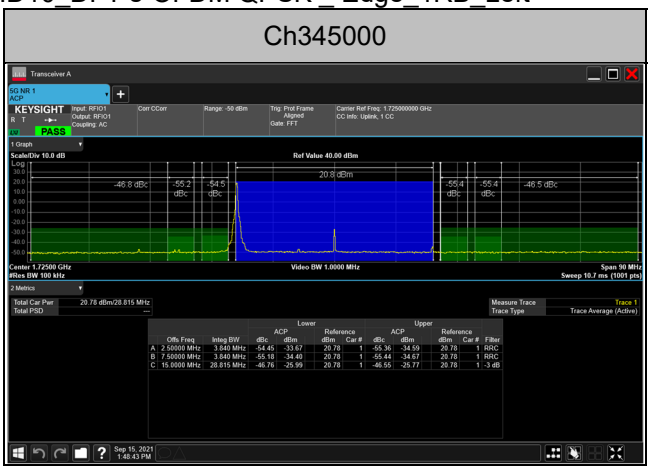
ID8_DFT-s-OFDM PI/2 BPSK _ Outer_Full

Ch345000	Ch354000
	

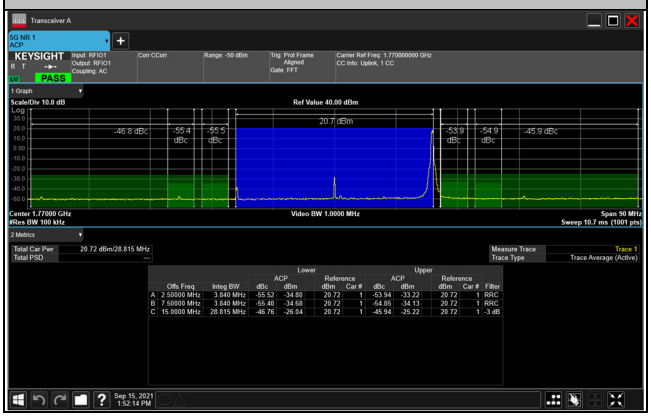
ID9_DFT-s-OFDM QPSK _ Inner_Full

Ch345000	Ch354000
	

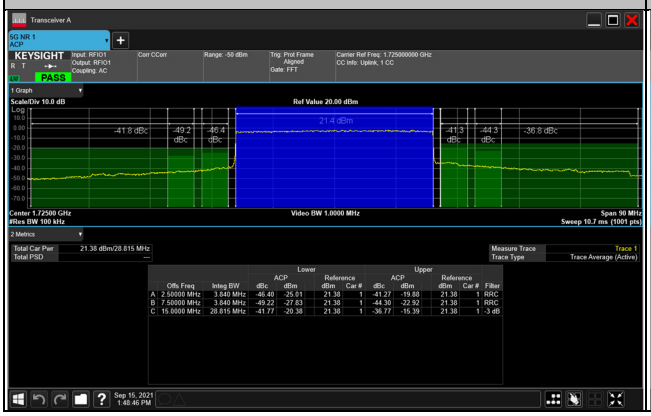
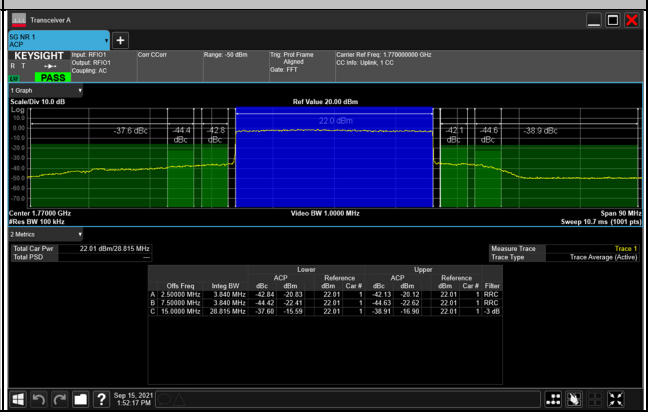
ID10_DFT-s-OFDM QPSK _ Edge_1RB_Left

Ch345000


ID11_DFT-s-OFDM QPSK _ Edge_1RB_Right

Ch354000


ID12_DFT-s-OFDM QPSK _ Outer_Full

Ch345000	Ch354000
	

ID13_DFT-s-OFDM 16QAM _ Inner_Full

Ch345000	Ch354000
	

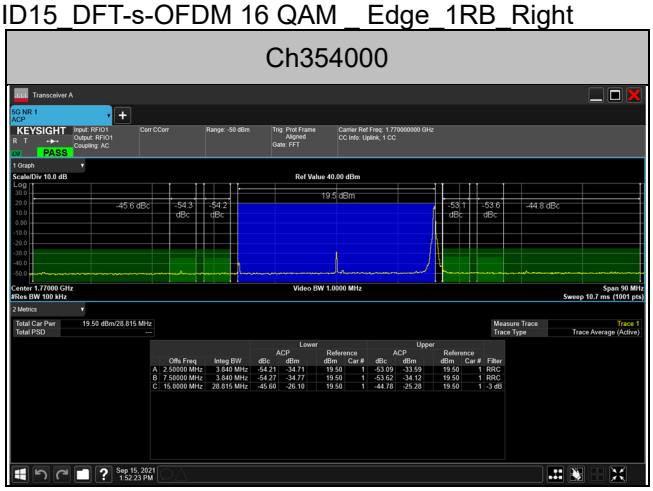
ID14_DFT-s-OFDM 16 QAM _ Edge_1RB_Left

Ch345000

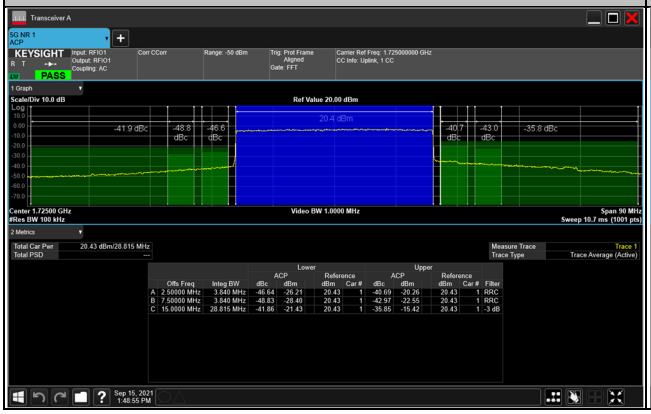
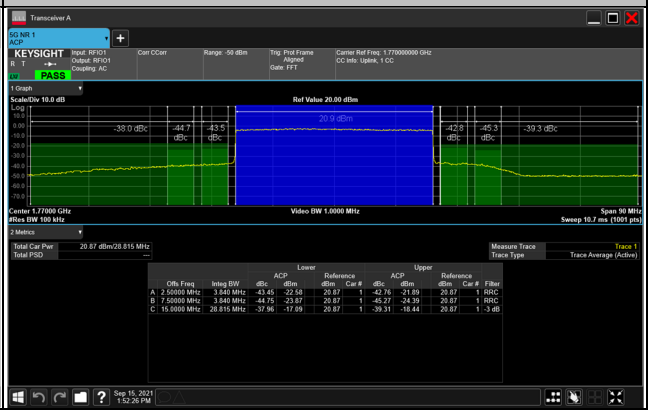


ID15_DFT-s-OFDM 16 QAM _ Edge_1RB_Right

Ch354000



ID16_DFT-s-OFDM 16 QAM_ Outer_Full

Ch345000	Ch354000
	

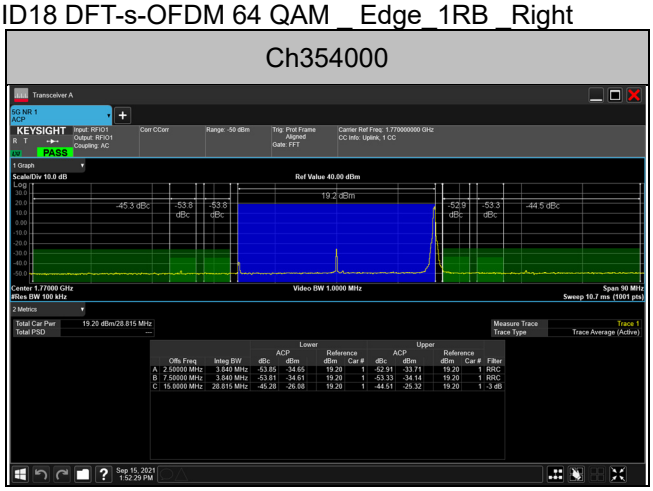
ID17 DFT-s-OFDM 64 QAM _ Edge_1RB_Left

Ch345000

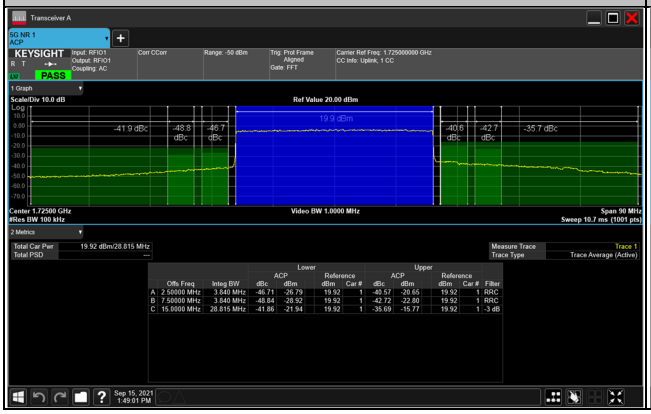
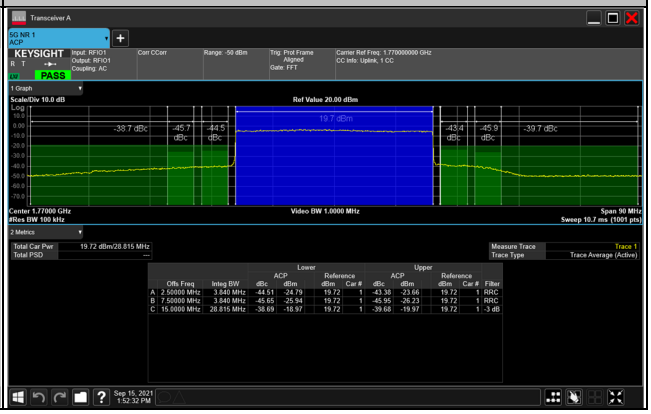


ID18 DFT-s-OFDM 64 QAM _ Edge_1RB _Right

Ch354000

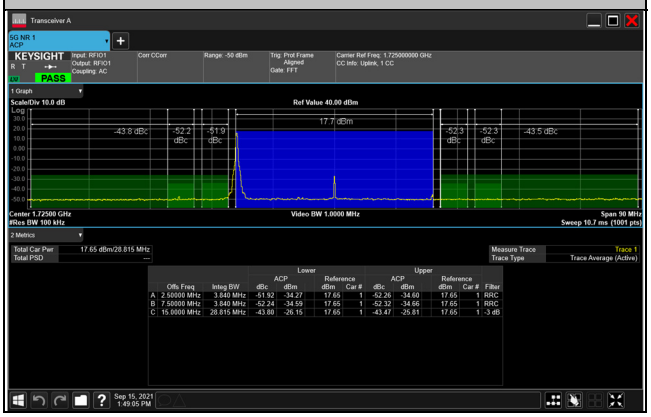


ID19_DFT-s-OFDM 64 QAM_ Outer_Full

Ch345000	Ch354000
	

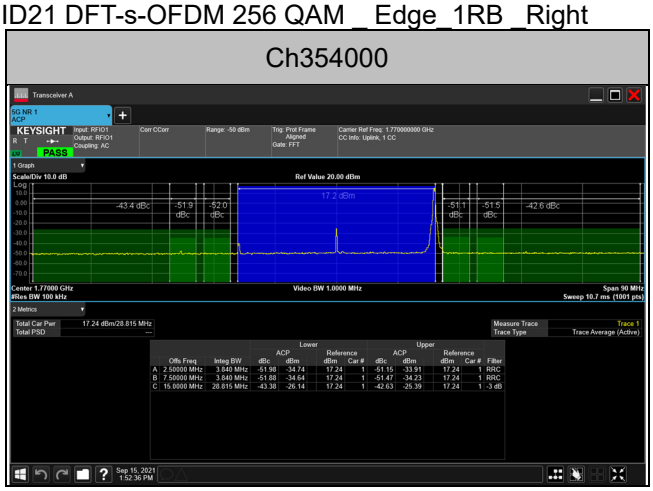
ID20 DFT-s-OFDM 256 QAM _ Edge_1RB_Left

Ch345000

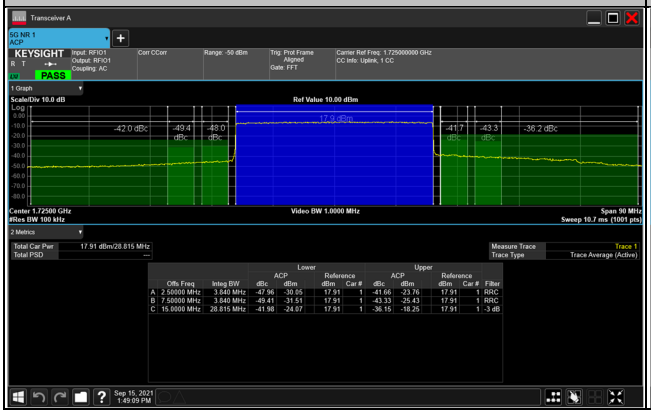
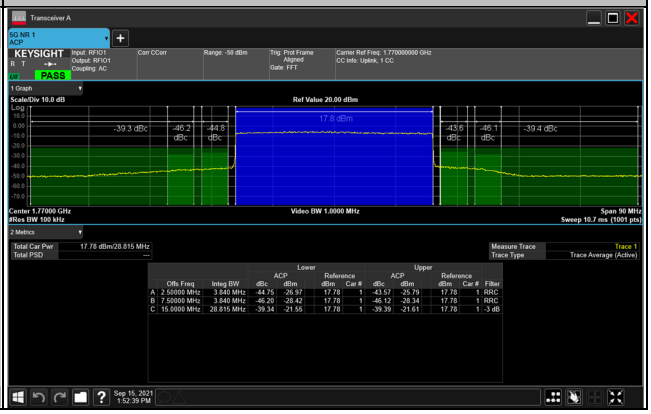


ID21 DFT-s-OFDM 256 QAM _ Edge_1RB _Right

Ch354000



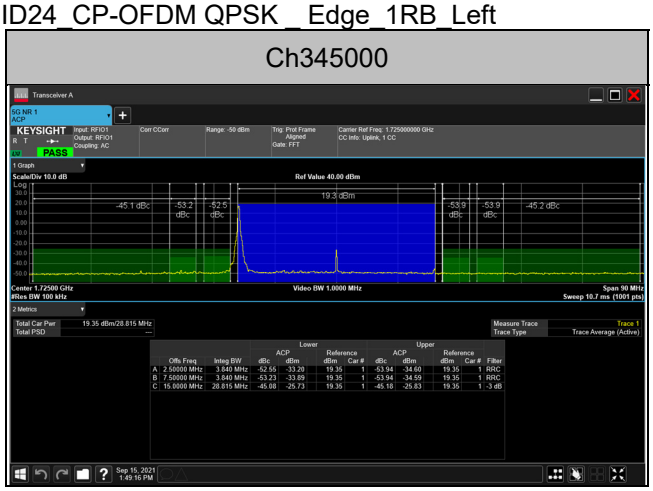
ID22_DFT-s-OFDM 256 QAM_ Outer_Full

Ch345000	Ch354000
	

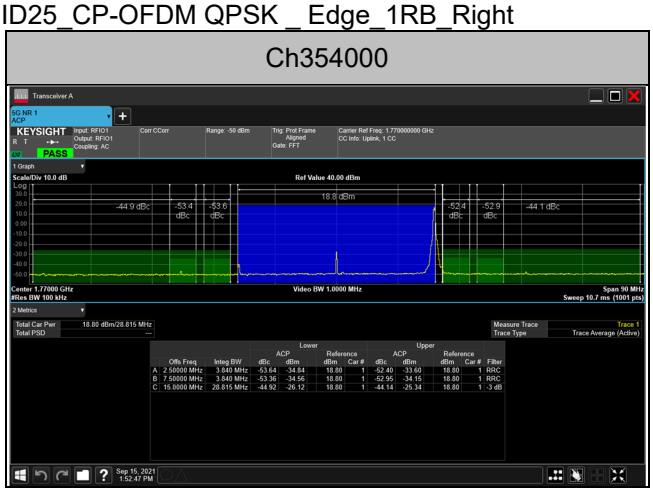
ID23_CP-OFDM QPSK _ Inner_Full

Ch345000	Ch354000
	

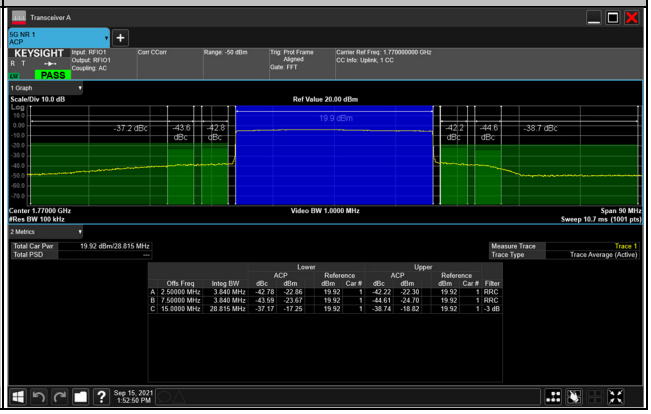
ID24_CP-OFDM QPSK _ Edge_1RB_Left

Ch345000


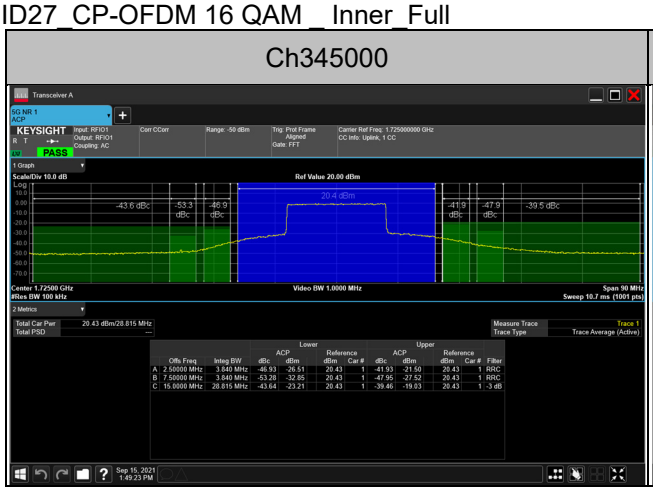
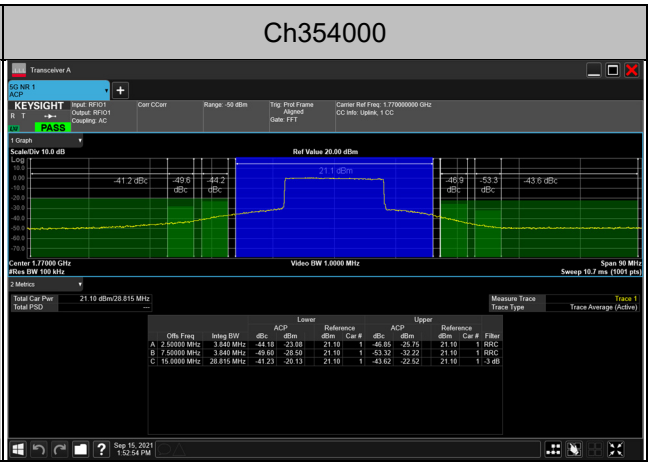
ID25_CP-OFDM QPSK _ Edge_1RB_Right

Ch354000


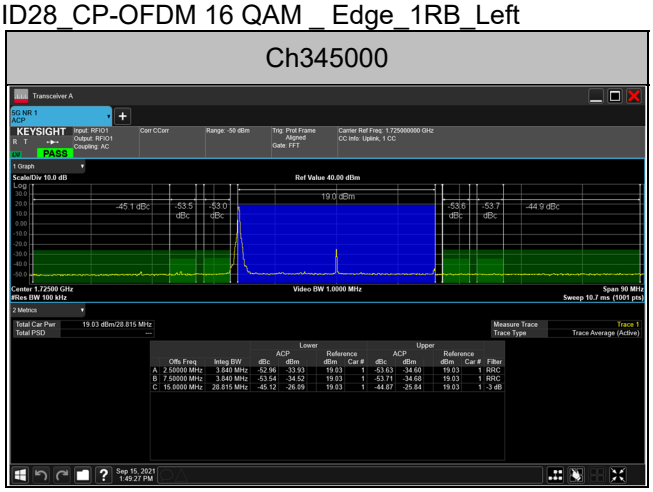
ID26_CP-OFDM QPSK _ Outer_Full

Ch345000	Ch354000
	

ID27_CP-OFDM 16 QAM _ Inner_Full

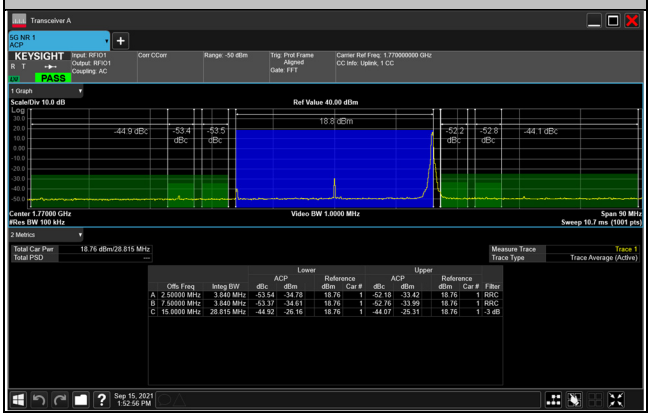
Ch345000	Ch354000
	

ID28_CP-OFDM 16 QAM _ Edge_1RB_Left

Ch345000


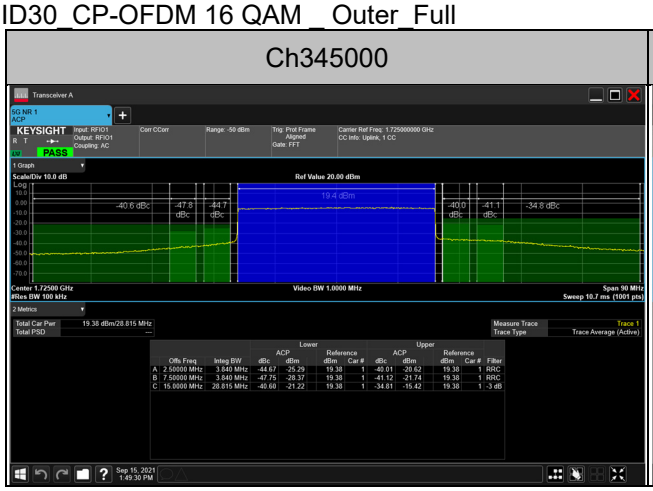
ID29_CP-OFDM 16 QAM _ Edge_1RB_Right

Ch354000

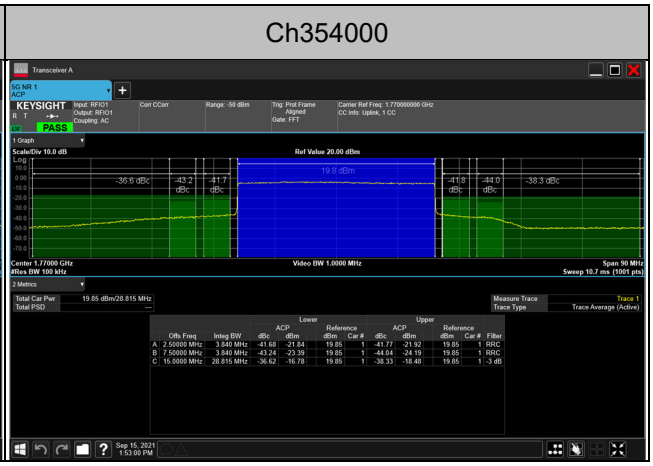


ID30_CP-OFDM 16 QAM _ Outer_Full

Ch345000

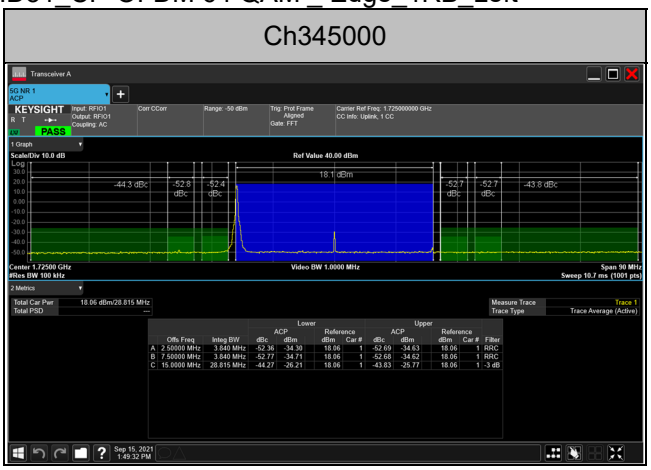


Ch354000



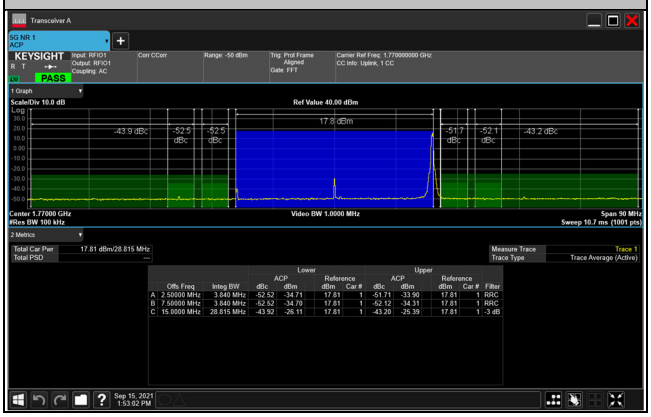
ID31_CP-OFDM 64 QAM _ Edge_1RB_Left

Ch345000



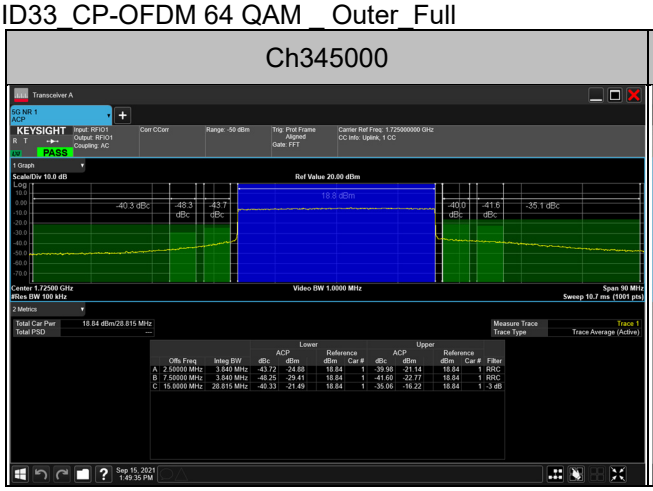
ID32_CP-OFDM 64 QAM _ Edge_1RB_Right

Ch354000

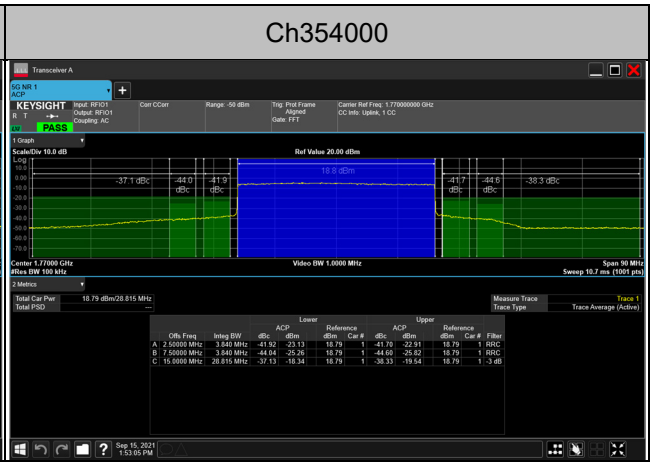


ID33_CP-OFDM 64 QAM _ Outer_Full

Ch345000

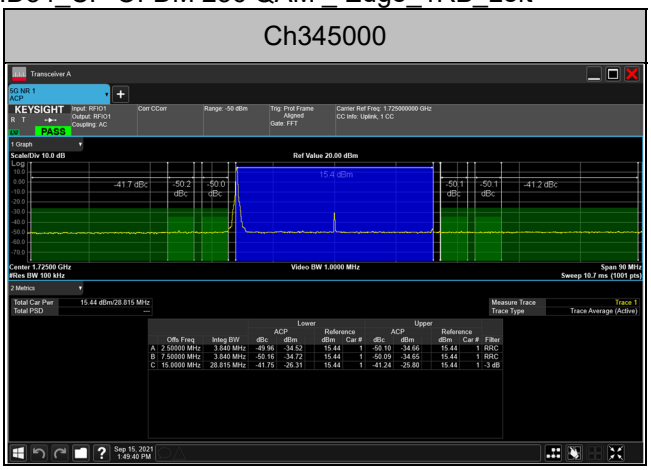


Ch354000

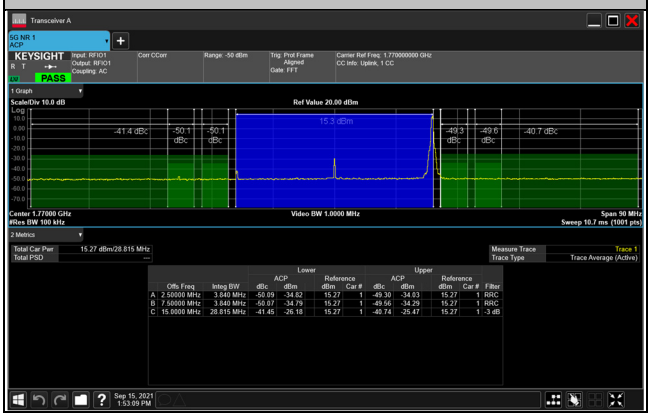


ID34_CP-OFDM 256 QAM _ Edge_1RB_Left

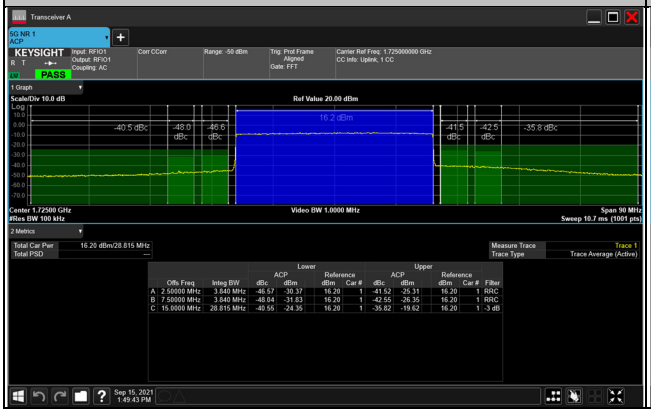
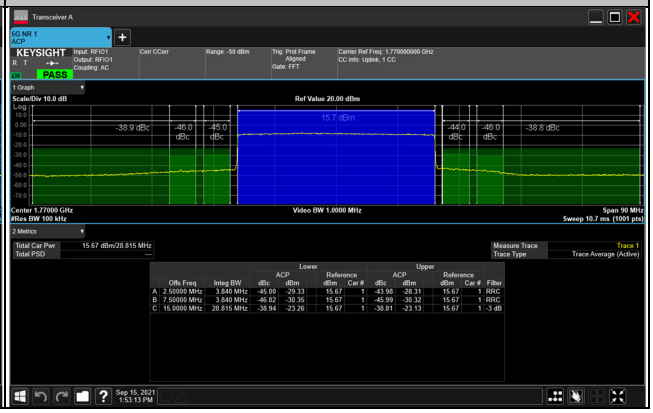
Ch345000



ID35_CP-OFDM 256 QAM _ Edge_1RB_Right

Ch354000


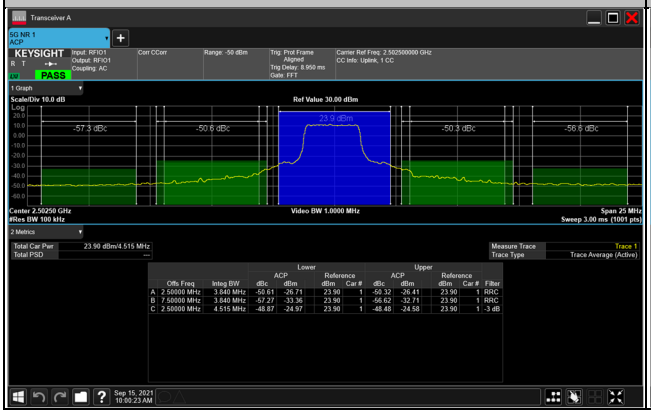
ID36_CP-OFDM 256 QAM _ Outer_Full

Ch345000	Ch354000
	

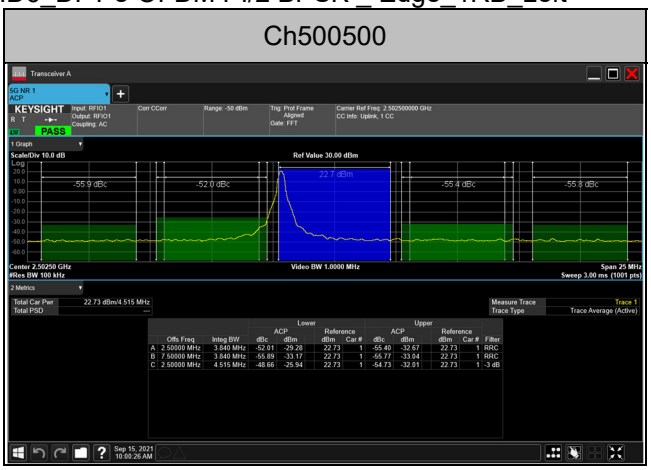
5G NR FR1 Band n7

Bandwidth: 5MHz

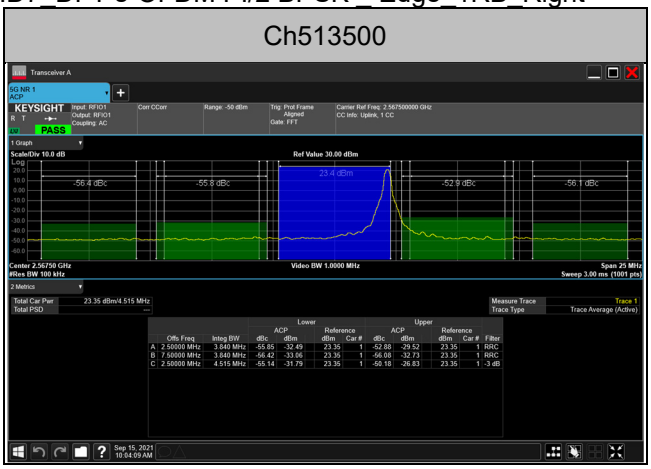
ID5_DFT-s-OFDM PI/2 BPSK _ Inner_Full

Ch500500	Ch513500
	

ID6_DFT-s-OFDM PI/2 BPSK _ Edge_1RB_Left

Ch500500


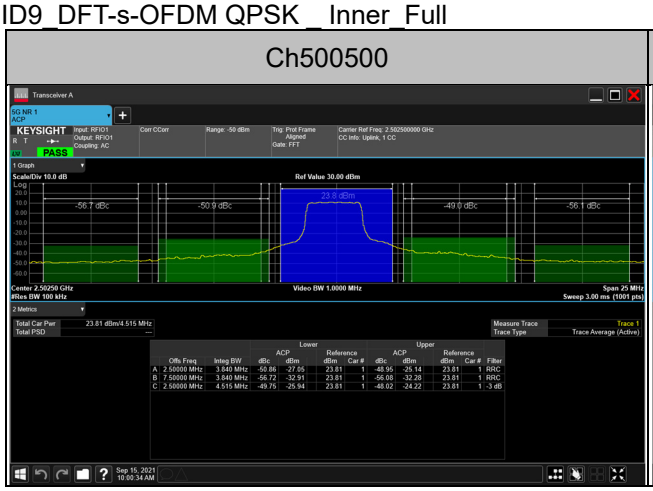
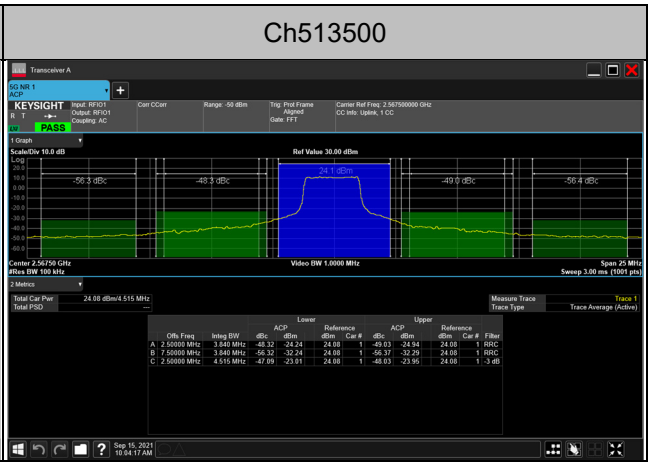
ID7_DFT-s-OFDM PI/2 BPSK _ Edge_1RB_Right

Ch513500


ID8_DFT-s-OFDM PI/2 BPSK _ Outer_Full

Ch500500	Ch513500
	

ID9_DFT-s-OFDM QPSK _ Inner_Full

Ch500500	Ch513500
	

ID10_DFT-s-OFDM QPSK _ Edge_1RB_Left

Ch500500
