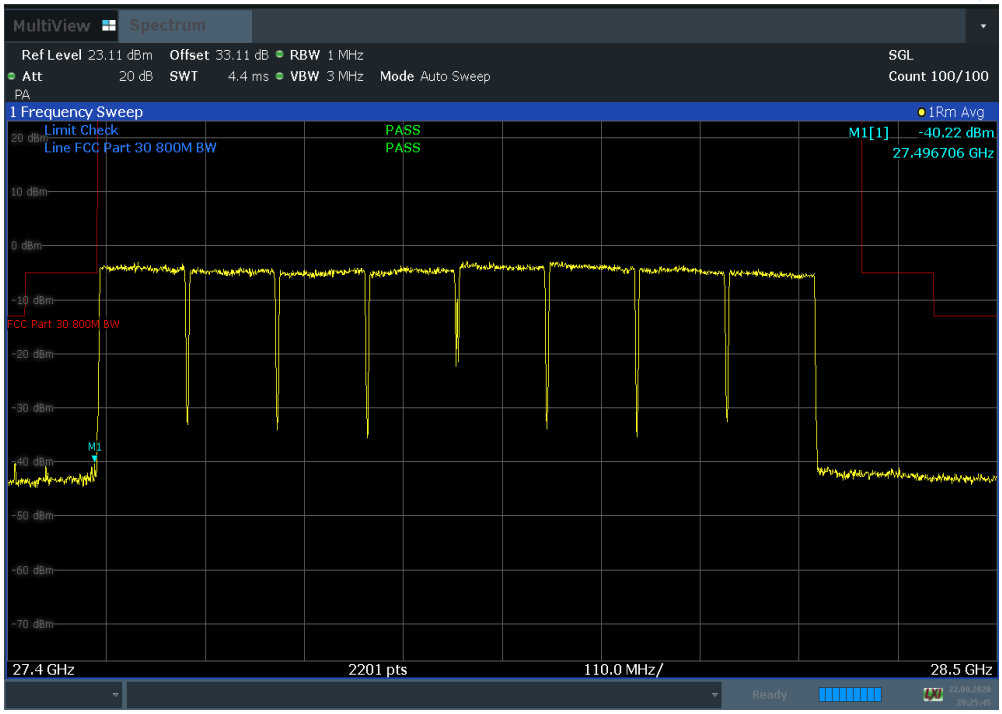
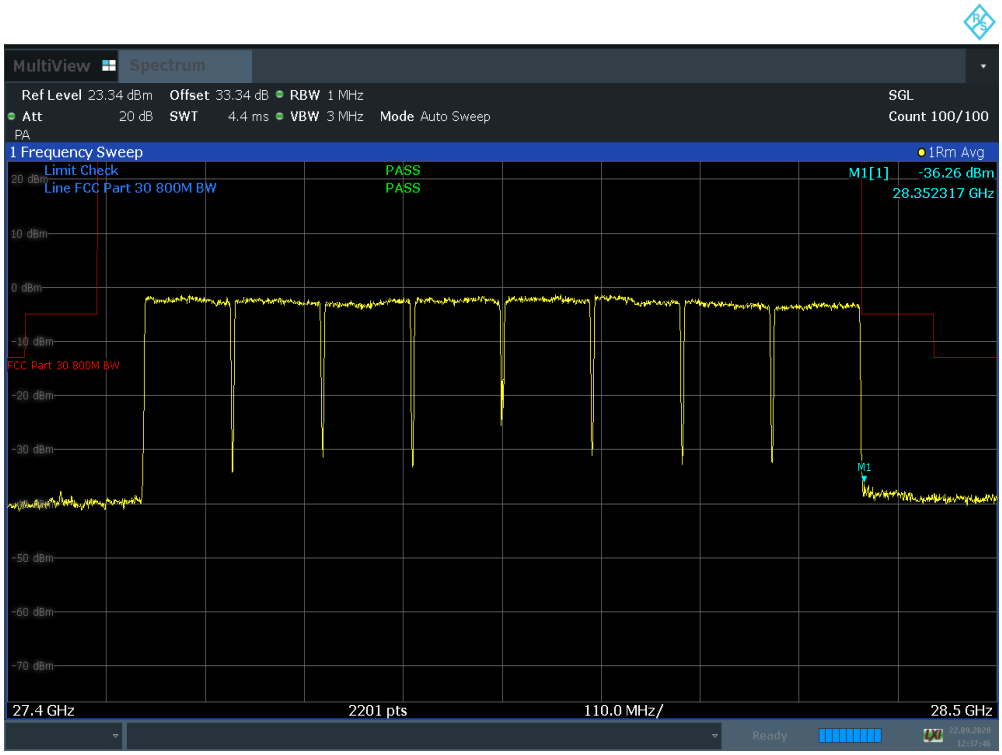
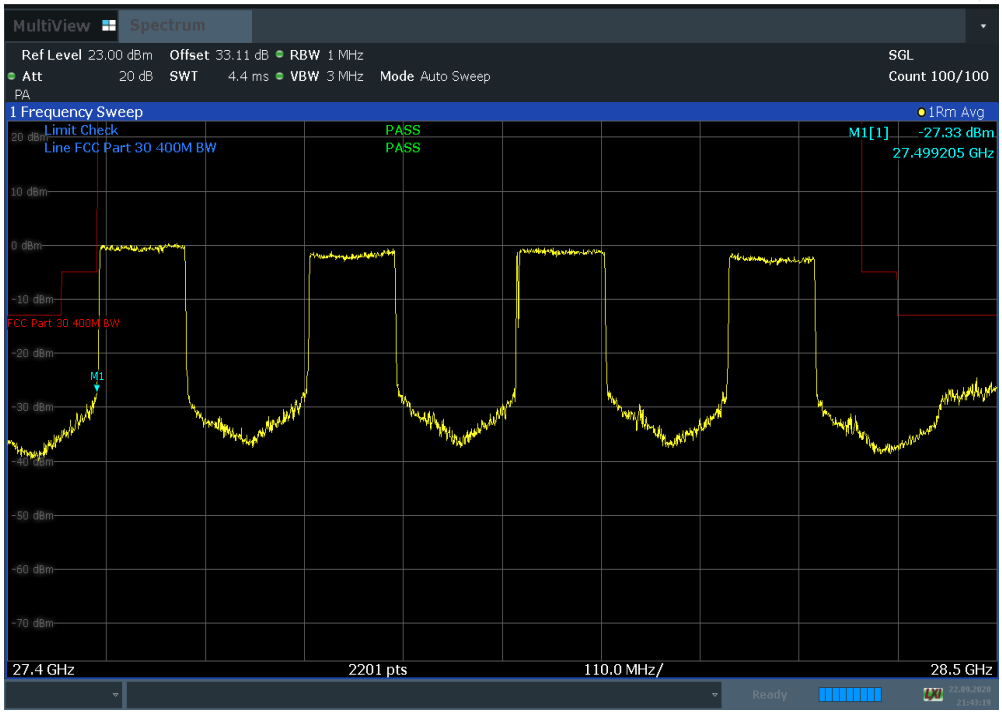


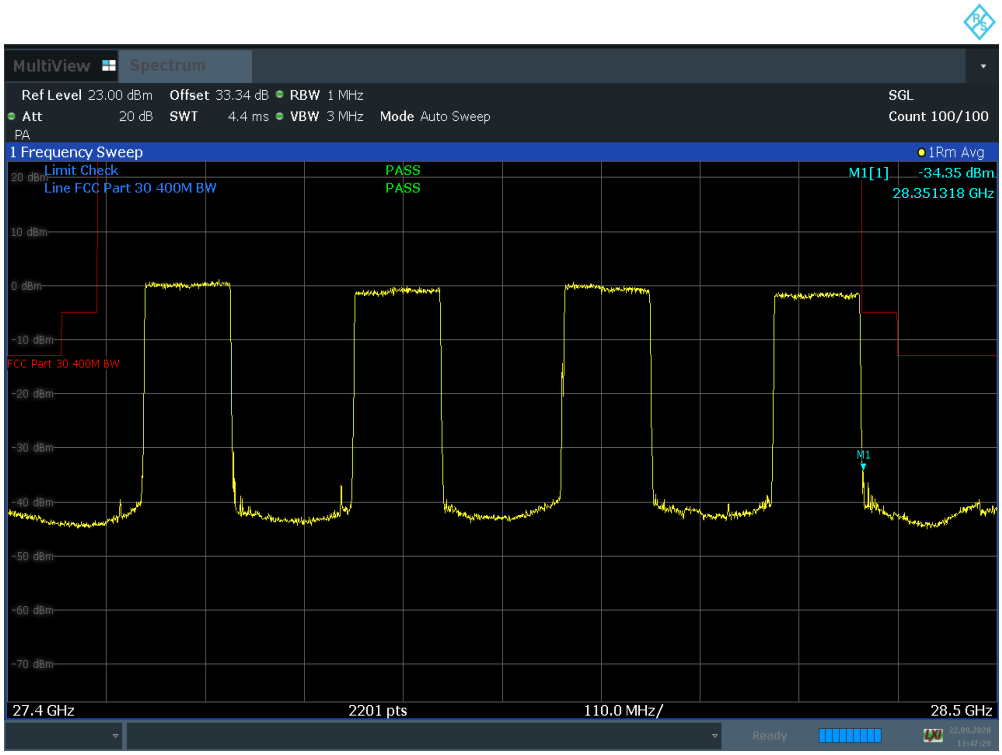
Plot 7-761. Band Edge (Ant D 100 MHz BW 8CC CC QPSK Low)



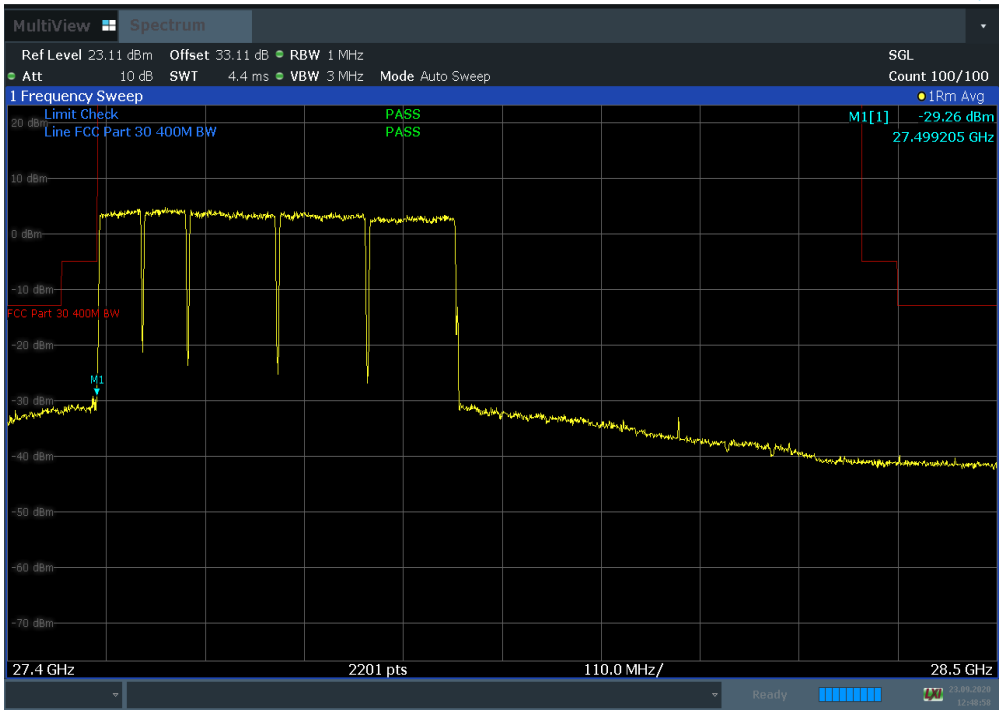
Plot 7-762. Band Edge (Ant D 100 MHz BW 8CC CC QPSK High)



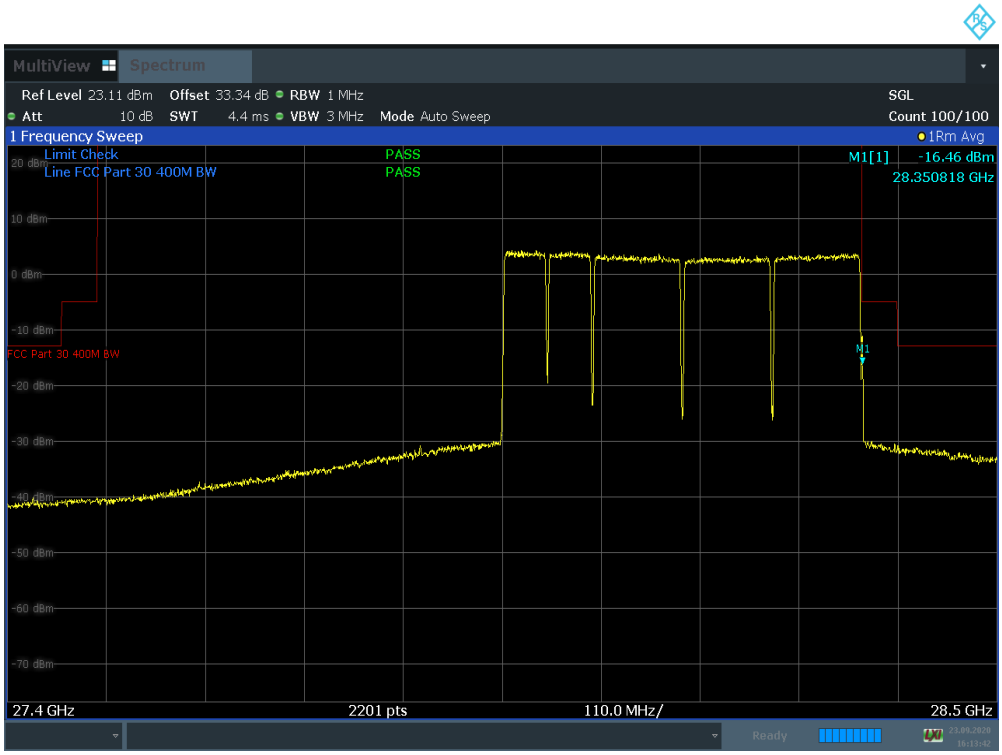
Plot 7-763 Band Edge (Ant D 100 MHz BW 4CC NC QPSK Low)



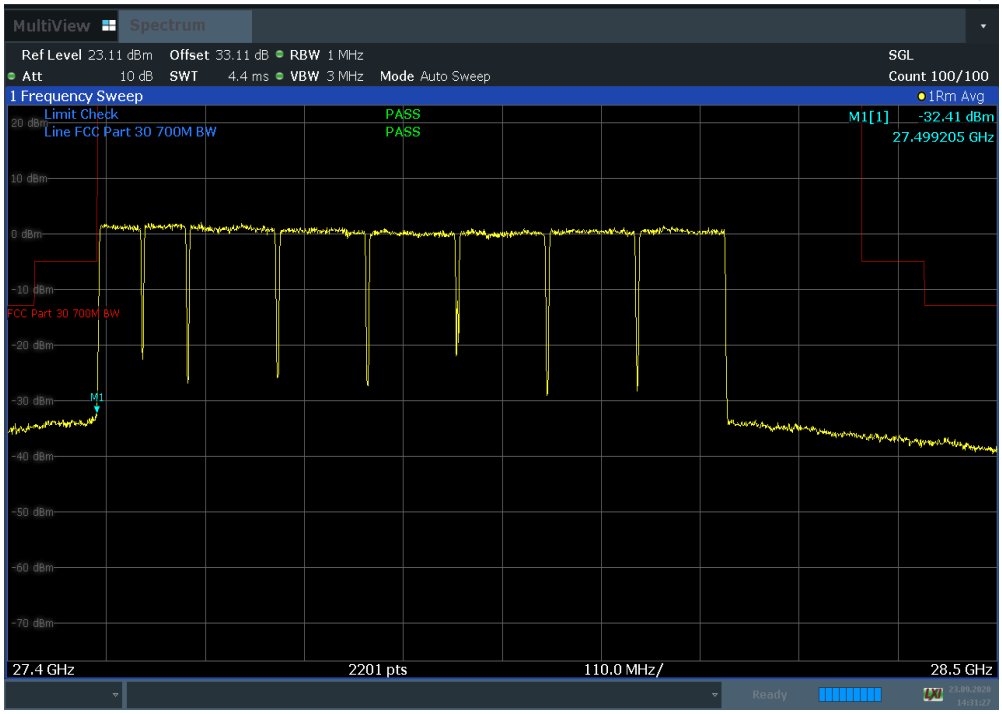
Plot 7-764. Band Edge (Ant D 100 MHz BW 4CC NC QPSK High)



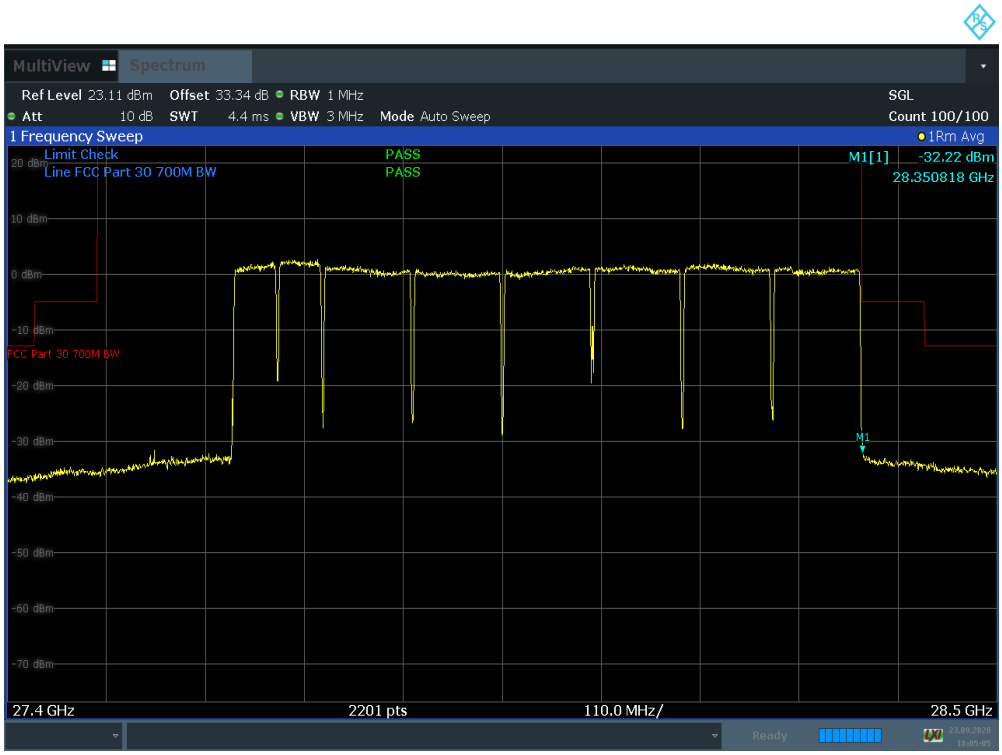
Plot 7-765 Band Edge (Ant D 50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Low)



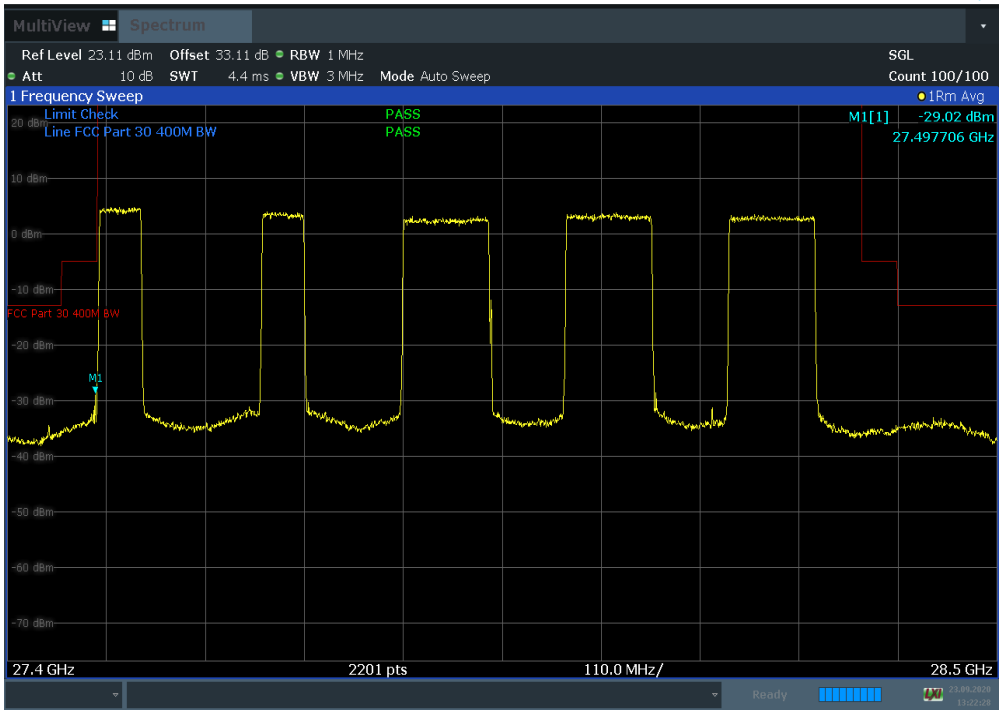
Plot 7-766. Band Edge (Ant D 50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High)



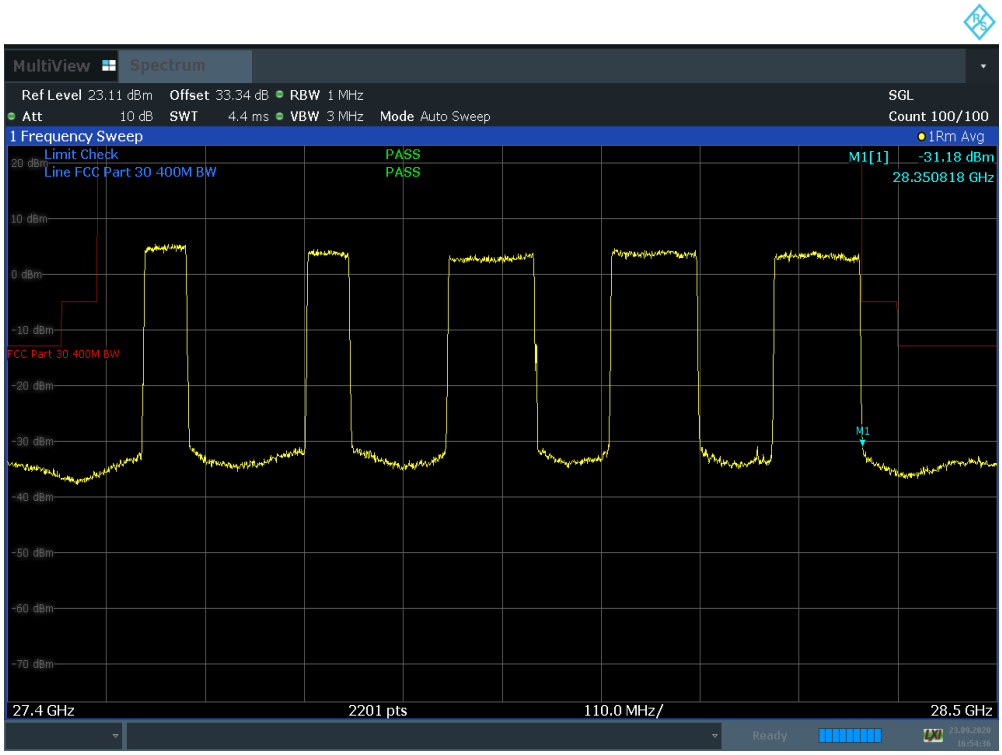
Plot 7-767. Band Edge (Ant D 50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Low)



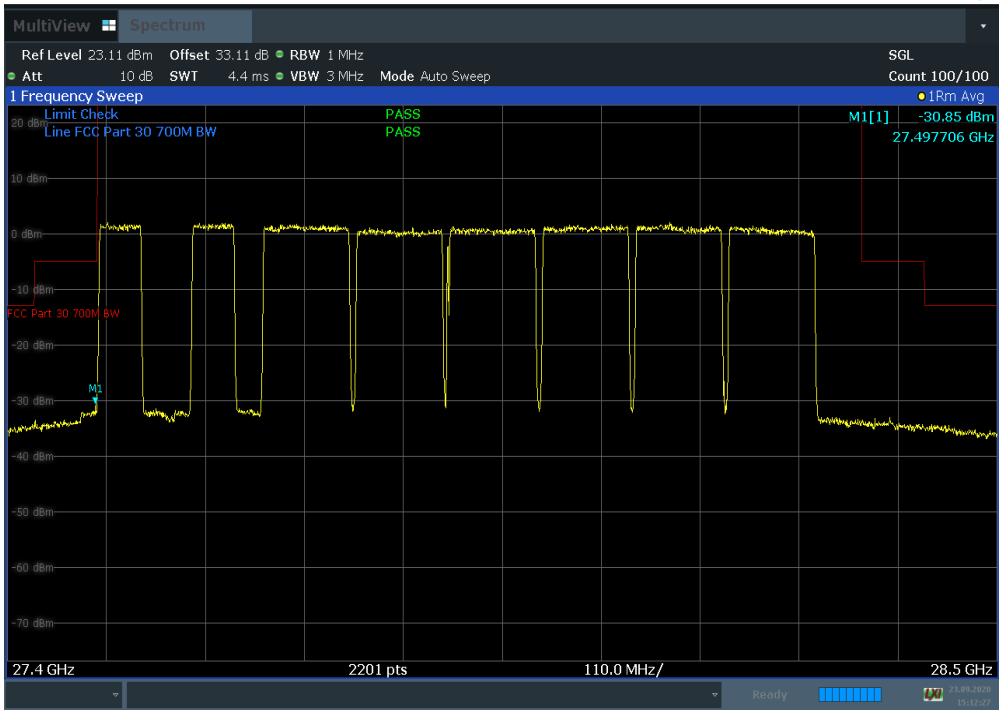
Plot 7-768. Band Edge (Ant D 50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High)



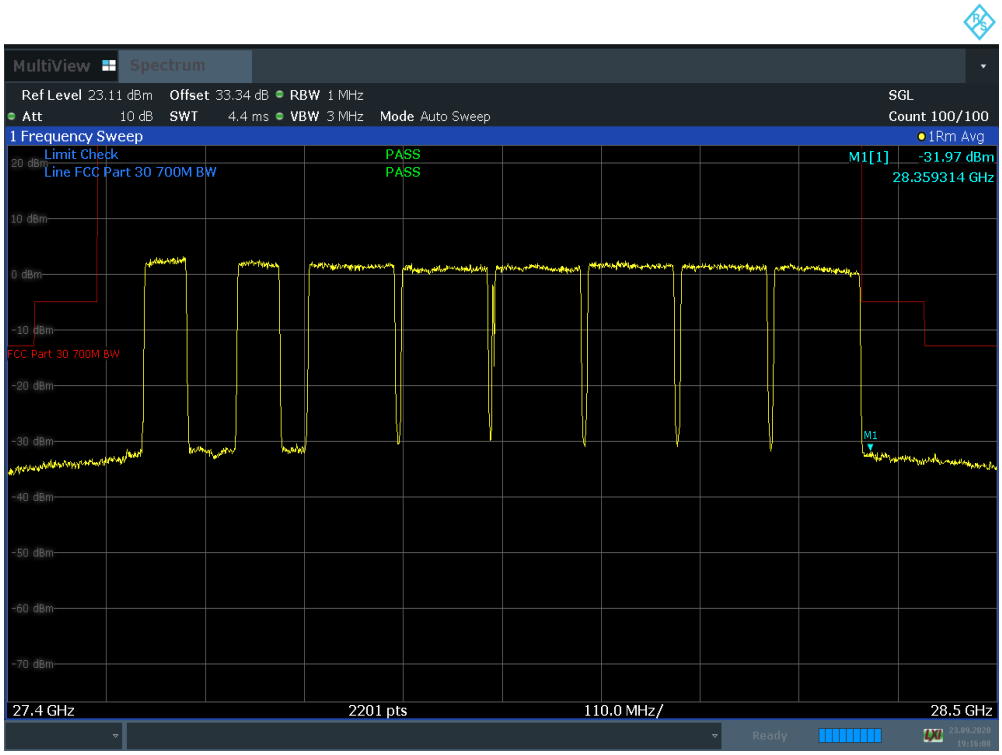
Plot 7-769 Band Edge (Ant D 50 MHz BW 2CC + 100 MHz BW 3CC NC QPSK Low)



Plot 7-770. Band Edge (Ant D 50 MHz BW 2CC + 100 MHz BW 3CC NC QPSK High)

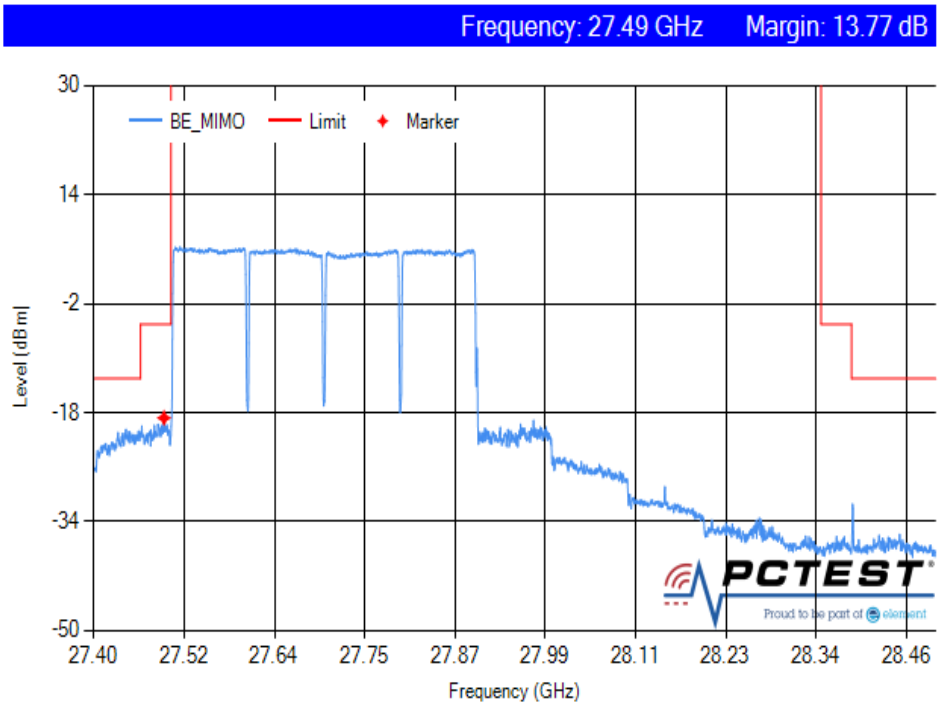


Plot 7-771. Band Edge (Ant D 50 MHz BW 2CC + 100 MHz BW 6CC NC QPSK Low)

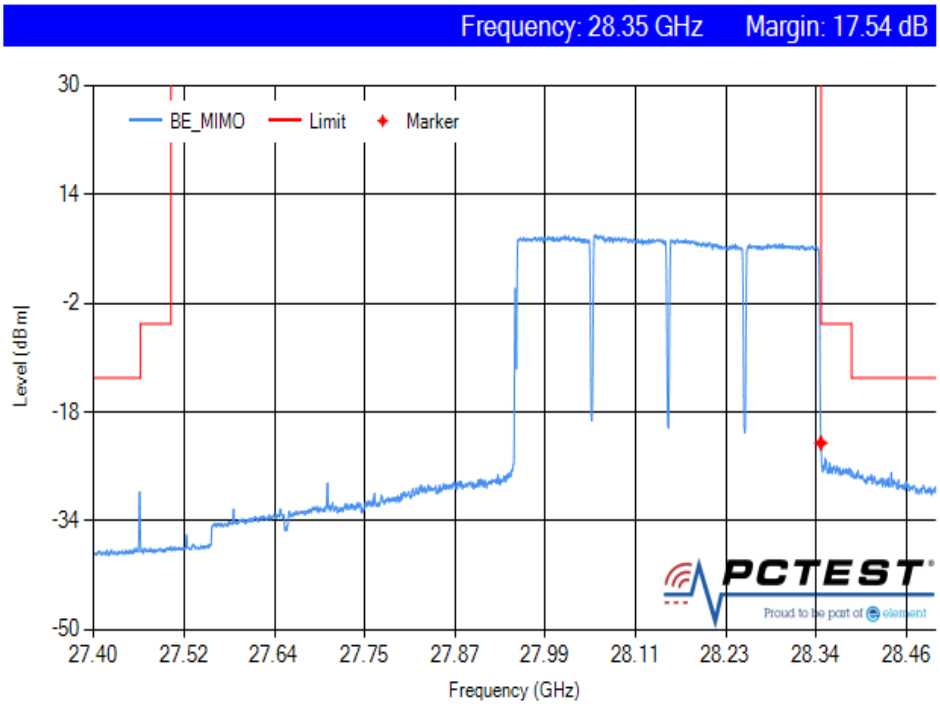


Plot 7-772. Band Edge (Ant D 50 MHz BW 2CC + 100 MHz BW 6CC NC QPSK High)

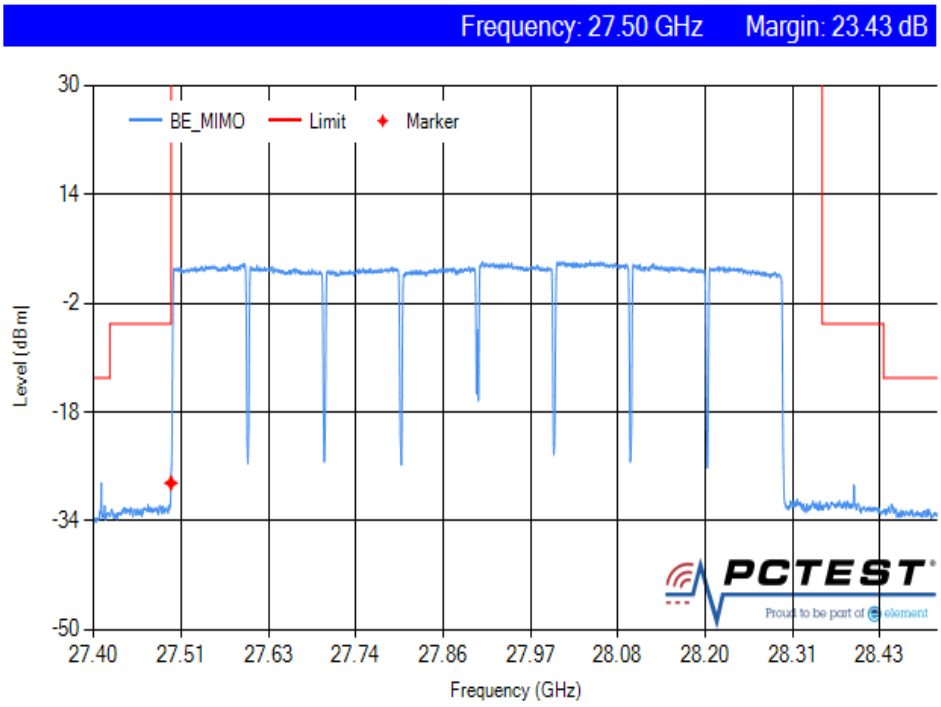
7.6.6 MIMO Band Edge Maximized on Antenna A/B/C/D



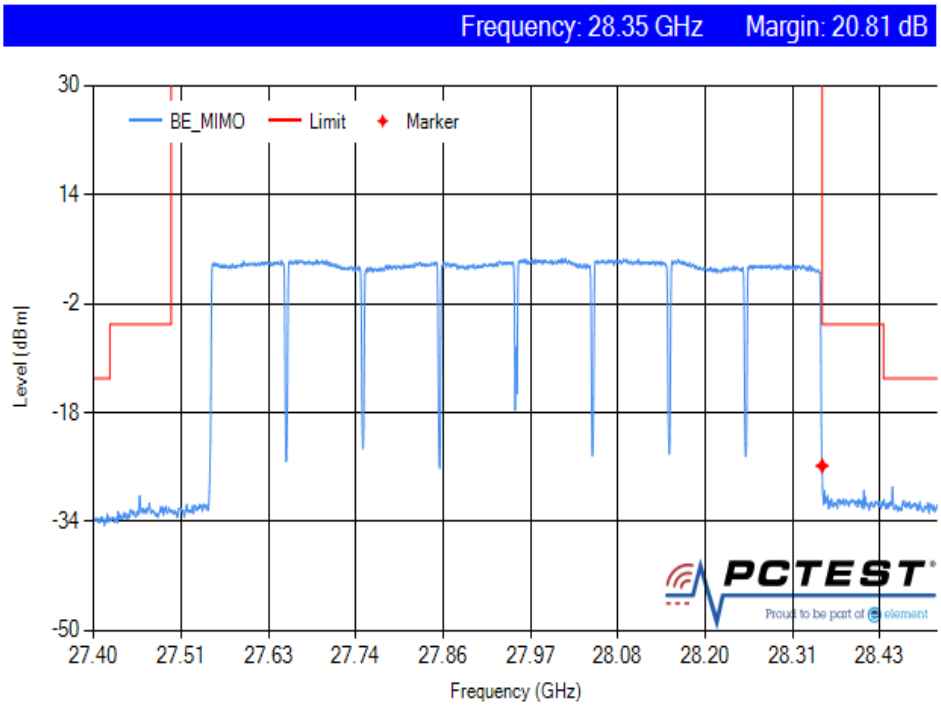
Plot 7-773 Band Edge (MIMO 100 MHz BW 4CC CC QPSK Low)



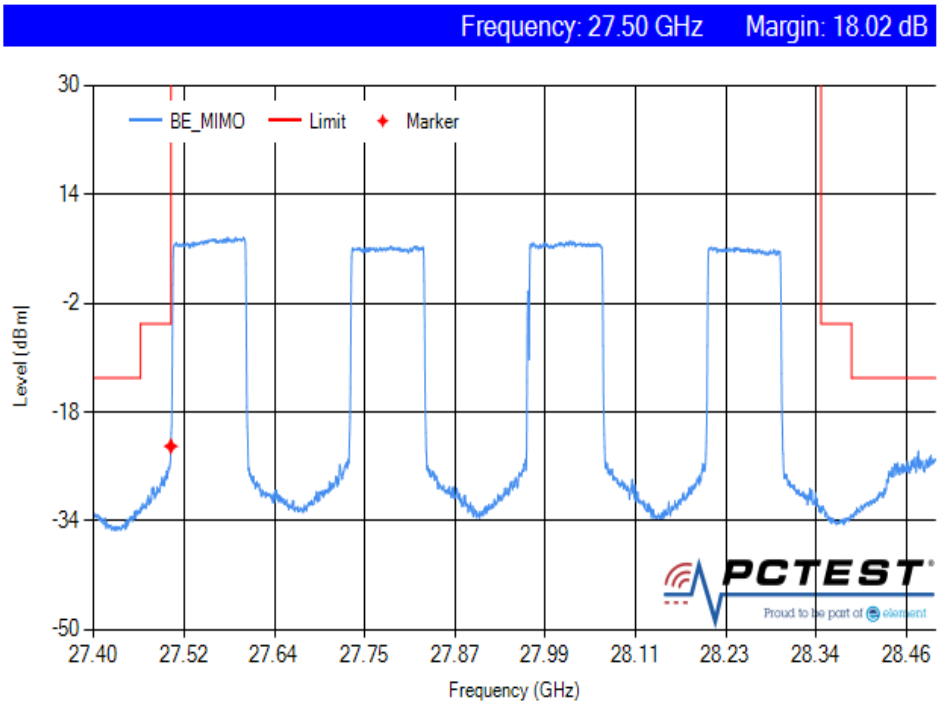
Plot 7-774. Band Edge (MIMO 100 MHz BW 4CC CC QPSK High)



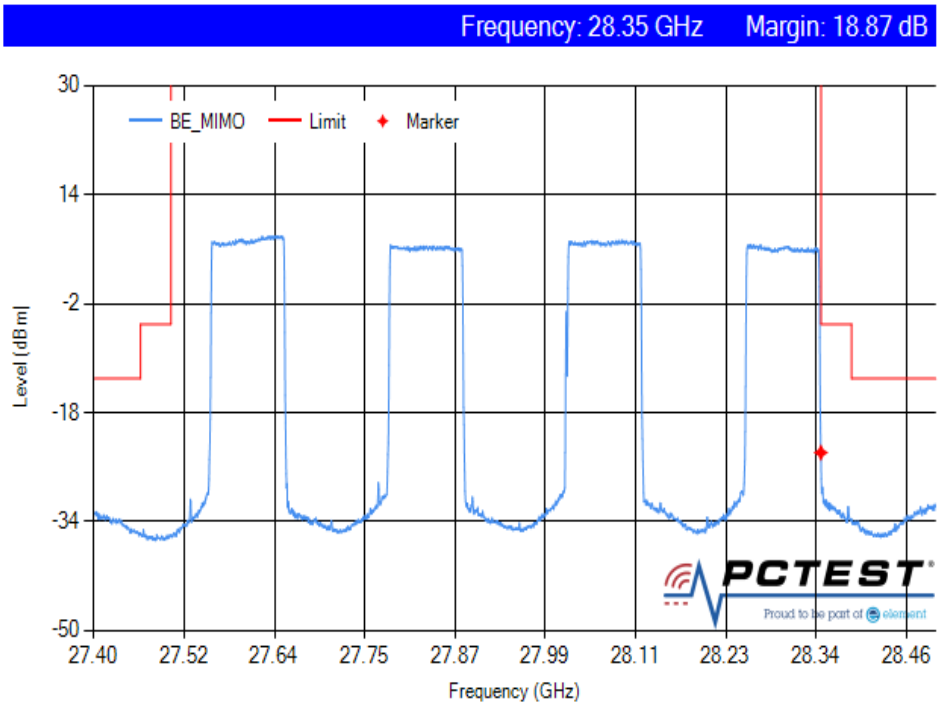
Plot 7-775. Band Edge (MIMO 100 MHz BW 8CC CC QPSK Low)



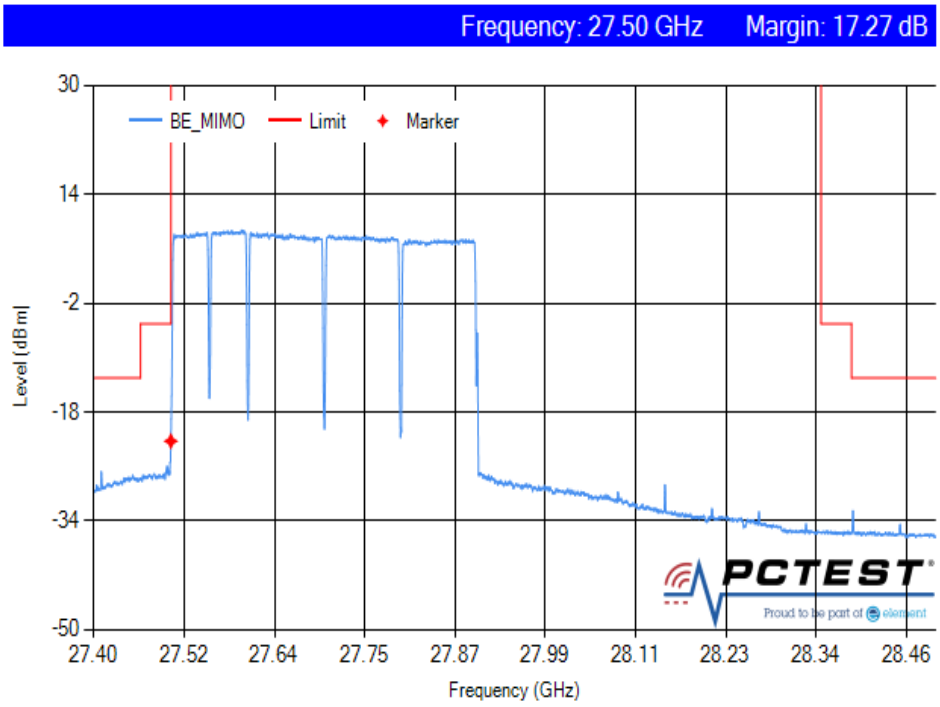
Plot 7-776. Band Edge (MIMO 100 MHz BW 8CC CC QPSK High)



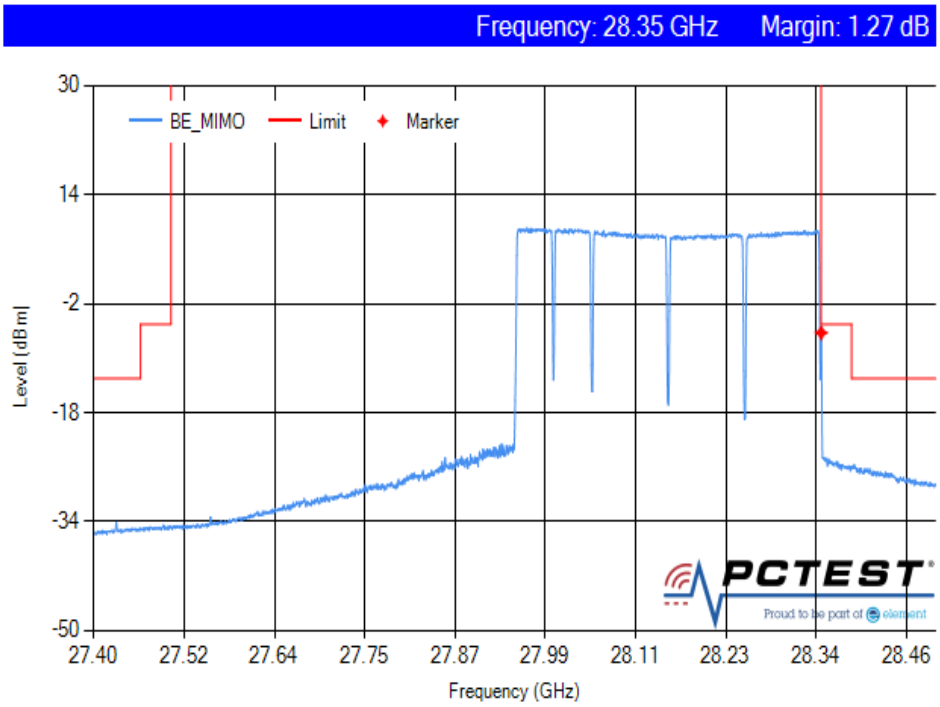
Plot 7-777 Band Edge (MIMO 100 MHz BW 4CC NC QPSK Low)



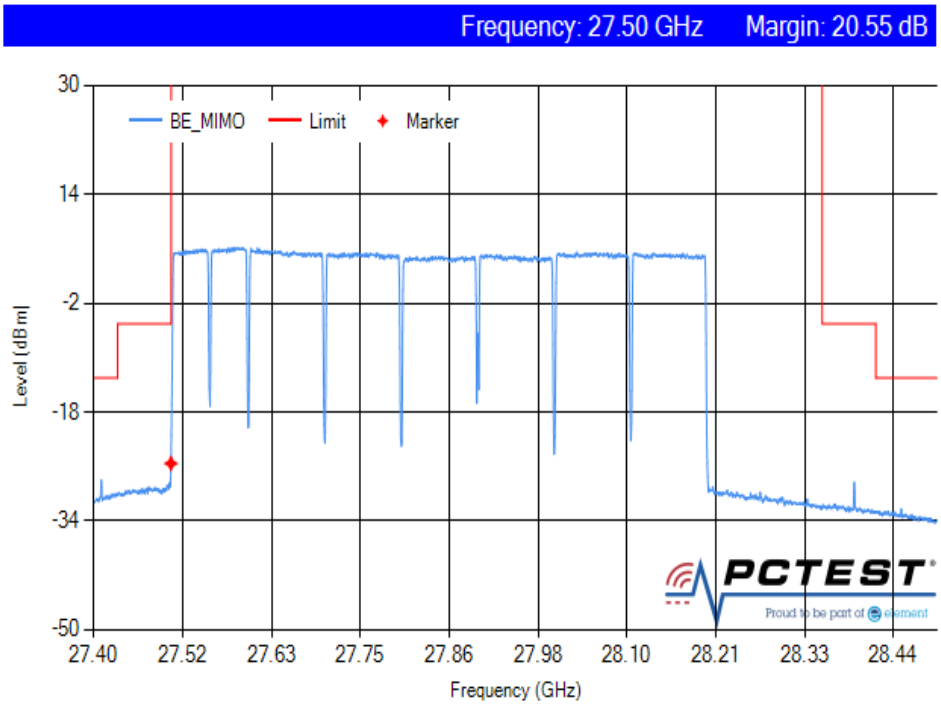
Plot 7-778. Band Edge (MIMO 100 MHz BW 4CC NC QPSK High)



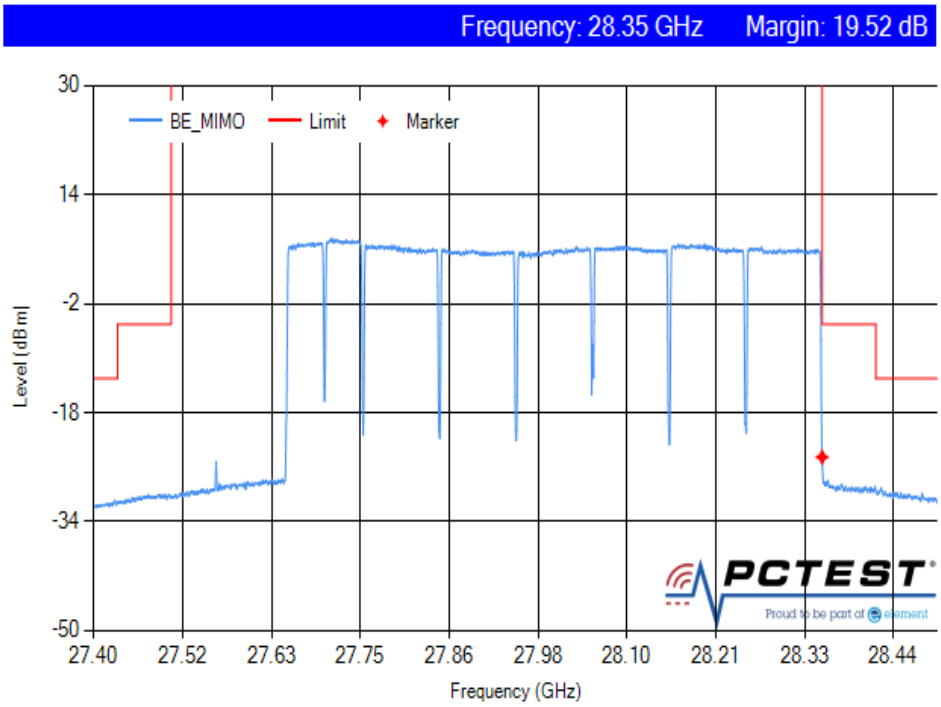
Plot 7-779 Band Edge (MIMO 50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Low)



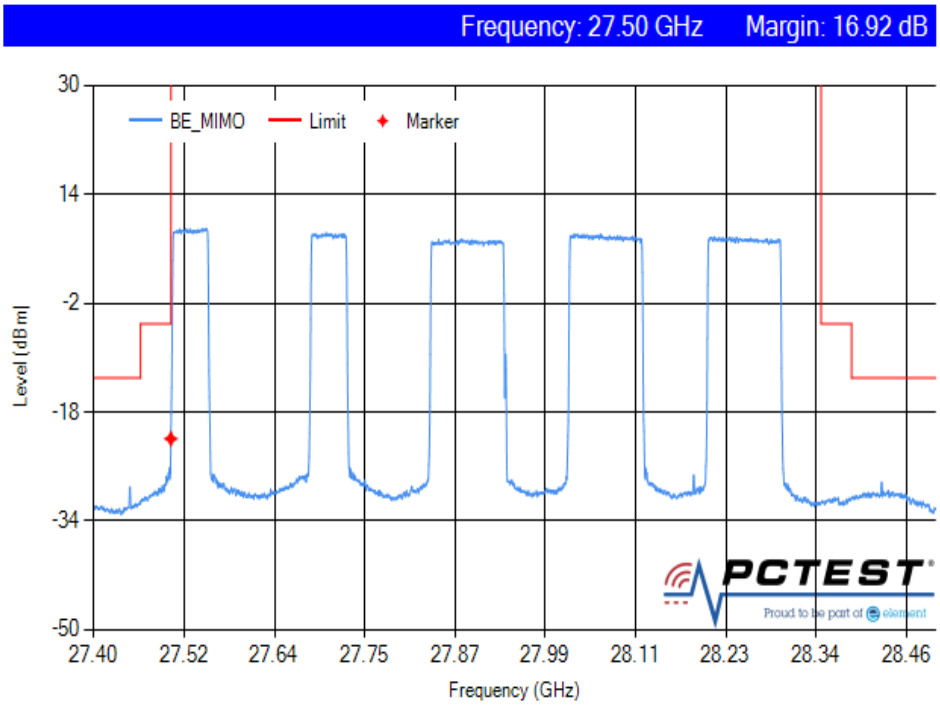
Plot 7-780. Band Edge (MIMO 50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High)



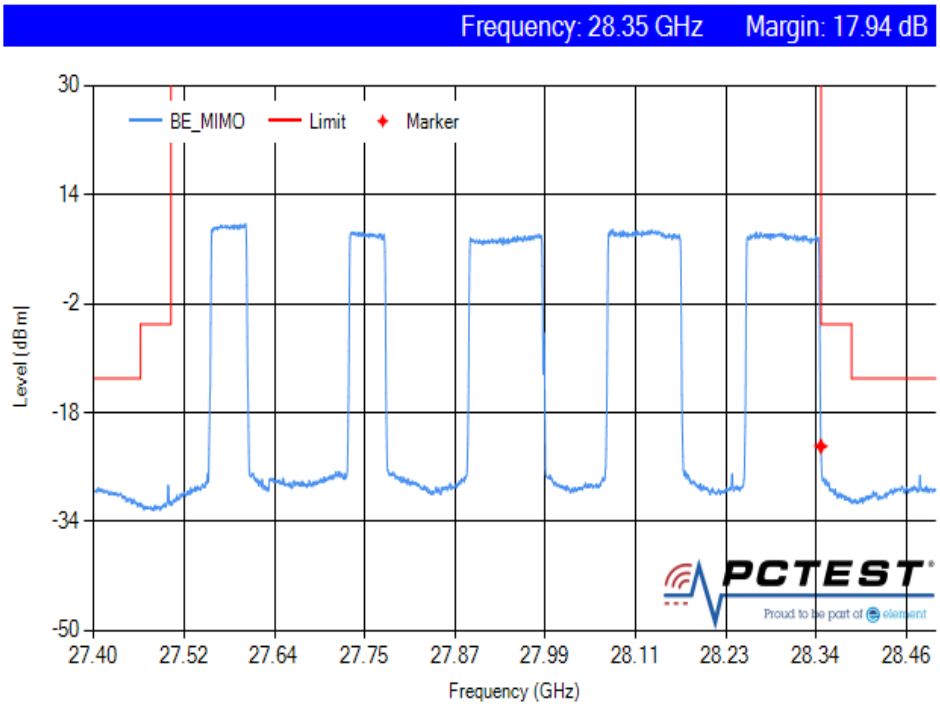
Plot 7-781. Band Edge (MIMO 50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Low)



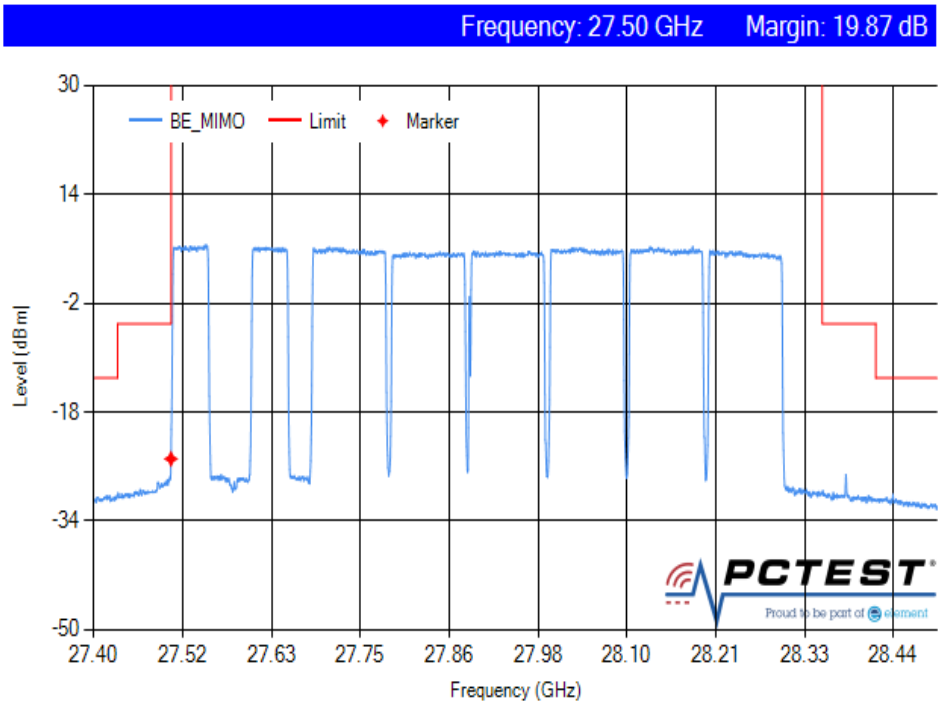
Plot 7-782. Band Edge (MIMO 50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High)



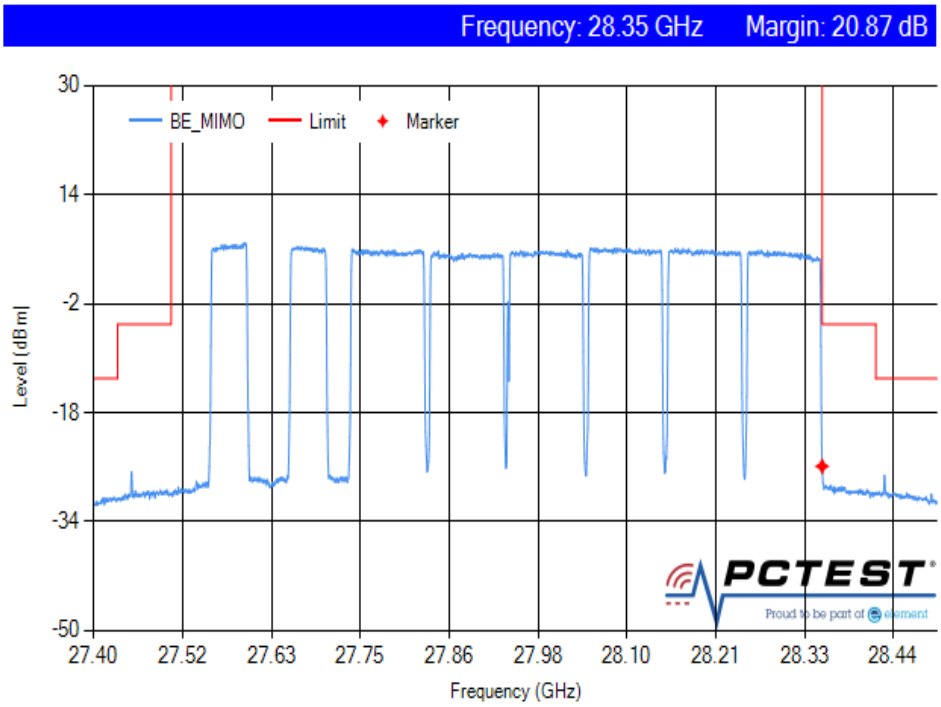
Plot 7-783 Band Edge (MIMO 50 MHz BW 2CC + 100 MHz BW 3CC NC QPSK Low)



Plot 7-784. Band Edge (MIMO 50 MHz BW 2CC + 100 MHz BW 3CC NC QPSK High)



Plot 7-785. Band Edge (MIMO 50 MHz BW 2CC + 100 MHz BW 6CC NC QPSK Low)



Plot 7-786. Band Edge (MIMO 50 MHz BW 2CC + 100 MHz BW 6CC NC QPSK High)

7.7 Frequency Stability / Temperature Variation

§2.1055

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Test Procedure Used

ANSI C63.26-2015 Section 5.6
KDB 842590 D01 v01r01 Section 4.5

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

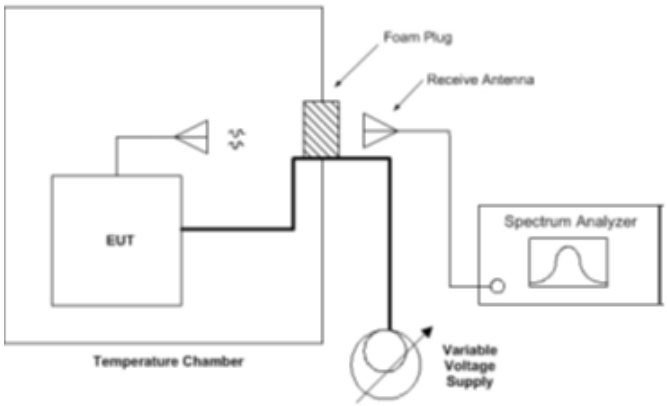


Figure 7-1. Test Instrument & Measurement Setup

The EUT was measured using horn antenna connected to a spectrum analyzer. The EUT was placed inside an environmental chamber.

Test Notes

The Frequency Deviation column in the table below is the amount of deviation measured from the center frequency of the Reference measurement (first row).

Frequency Stability Measurements
§2.1055

OPERATING FREQUENCY : 2,792,502,000 Hz

REFERENCE VOLTAGE : 120 VAC

VOLTAGE (%)	POWER (VAC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	120.00	+ 20 (Ref)	2,792,504,673	0	0.0000000
100 %		- 30	2,792,504,600	-53	-0.0000016
100 %		- 20	2,792,504,597	-19	-0.0000017
100 %		- 10	2,792,504,628	-25	-0.0000006
100 %		0	2,792,504,568	18	-0.0000028
100 %		+ 10	2,792,504,622	-50	-0.0000008
100 %		+ 20	2,792,504,654	-28	0.0000003
100 %		+ 30	2,792,504,657	115	0.0000004
100 %		+ 40	2,792,504,602	-36	-0.0000016
100 %		+ 50	2,792,504,578	-30	-0.0000024
85 %	102.00	+ 20	2,792,504,646	17	0.0000000
115 %	138.00	+ 20	2,792,504,658	26	0.0000005

Table 7-23. Frequency Stability Data

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

Frequency Stability Measurements

§2.1055

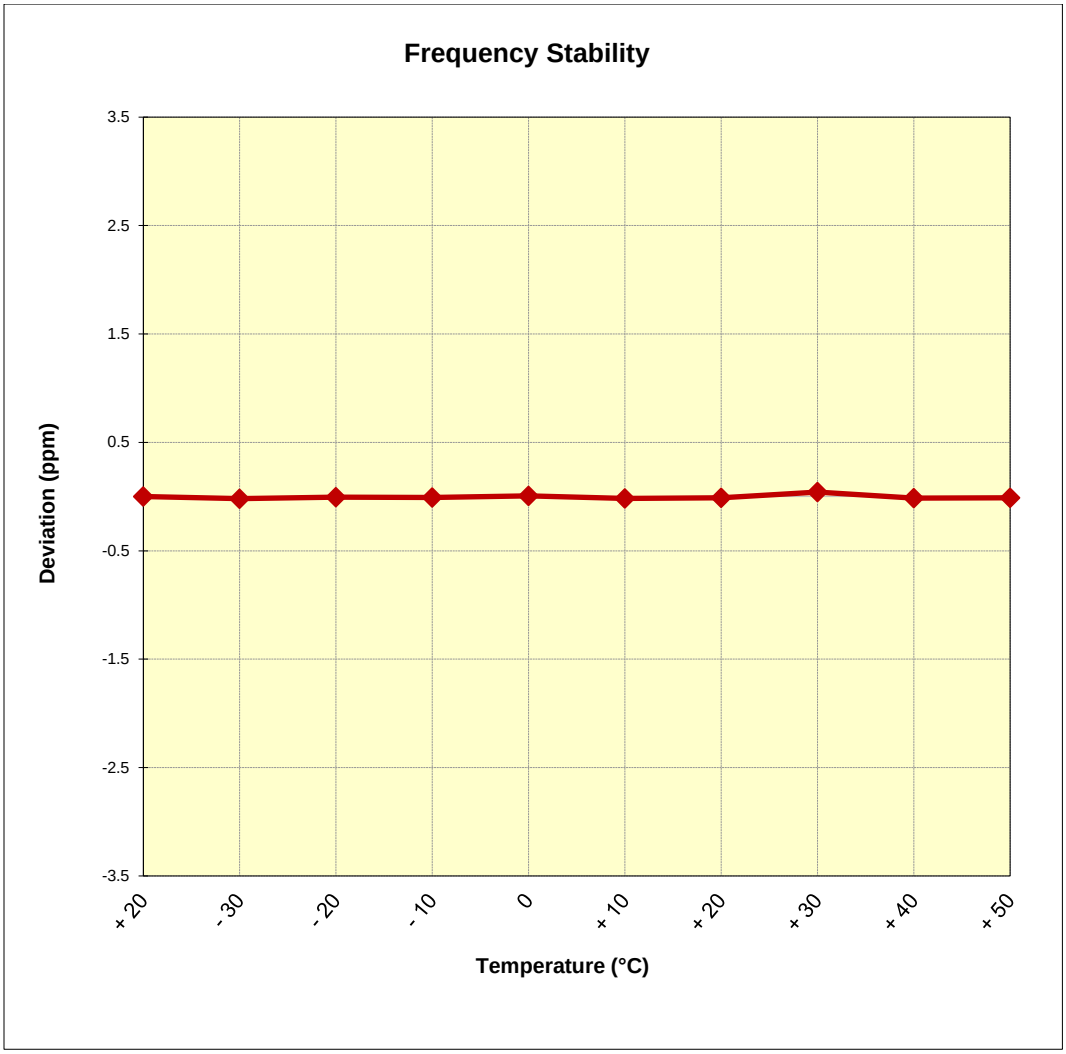


Figure 7-2. Frequency Stability Graph

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung 5G Access Unit Model: AT1K04-B00** complies with all the requirements of Part 30.

9.0 APPENDIX A

9.1 HARMONIC MIXER Verification Certificate

HCT

교 정 성 적 서

CALIBRATION CERTIFICATE

경기도 이천시 마장면 서이천로 578번길 74
TEL : 031-645-6900, FAX : 031-645-6969

KOLAS

성적서발급번호(Certificate No) : IC-2020-16953
교 정 번 호(Calibration No) : C-2020-020404

1. 의뢰자 (Client)
- 기관명 (Name) : 피씨테스트코리아 주식회사
- 주소 (Address) : 경기도 용인시 기흥구 흥덕1로 13, 피136, 피137호(영덕동, 흥덕 IT 밸리)

2. 측정기 (Calibration Subject) ◇ 등록번호 : 380383
- 기기명 (Description) : HARMONIC MIXER
- 제작회사 및 형식(Manufacturer and Model Name) : ROHDE & SCHWARZ / FS-Z60
- 기기번호 (Serial Number) : 100981

3. 교정일자 (Date of Calibration) : 2020.03.13

4. 교정환경 (Environment)
- 온도(Temperature) : (22.4 ± 0.4) ℃ - 습도(Humidity) : (46 ± 4) % R.H.
- 교정장소 (Location) : 고정표준실(Permanent Calibration Lab)
(주소: 경기도 이천시 마장면 서이천로 578번길 74)

5. 측정표준의 소급성 (Traceability) ◇Field code : 40641(RF SPECTRUM ANALYZER)

교정방법 및 소급성 서술 (Calibration method and/or brief description)

상기 기기는 고주파 스펙트럼 분석기의 교정절차(HCT-CS-125-40641)에 따라 국가측정표준기관으로부터 측정의 소급성이 확보된 아래의 표준장비를 이용하여 교정 되었음.

교정에 사용한 표준장비 명세 (List of used standards/specifications)

기기명 (Description)	제작회사 및 형식 (Manufacturer and Model Name)	기기번호 (Serial Number)	차기교정예정일자 (The due date of next Calibration)	교정기관 (Calibration laboratory)
EXG ANALOG SIGNAL GENERATOR	KEYSIGHT N5173B	MY53270544	2020/10/02	(주)에이치시티
EPM SERIES POWER METER	AGILENT E4419B	GB42420565	2020/11/02	(주)에이치시티
POWER SENSOR	AGILENT 8487A	MY41092450	2021/01/15	Keysight Technologies
POWER SENSOR	KEYSIGHT V8486A	MY56330017	2020/12/30	Keysight Technologies
WR-19 MULTIPLIER SOURCE MODULE	OML S19MS-A	160516-1	2020/09/09	(주)에이치시티

6. 교정결과 (Calibration result) : 교정결과 참조 (Refer to attachment)

7. 측정불확도 (Measurement uncertainty) : 교정결과 참조 (Refer to attachment)
신뢰수준 약 95 %, k = 2 (Confidence level about 95 %, k = 2)

확 인 (affirmation)	작성자 (Measurements performed by)	승인자 (Approved by)
	성명 (Name) 박 민 지	직위 (Title) 기술책임자(Technical Cal. Manager) (정) 성명 (Name) 이 승 찬

위 성적서는 국제시험기관인정협력체(International Laboratory Accreditation Cooperation) 상호인정협정(Mutual Recognition Arrangement)에 서명한 한국인정기구(KOLAS)로부터 공인 받은 분야의 교정결과입니다.

2020. 03. 16

한국인정기구 인정
Accredited by KOLAS, Republic of KOREA

㈜에이치시티 대표이사
President, HCT Co., Ltd.

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※ 성적서의 원본은 상단에 HCT로고그램이 들어간 위변조 방지 용지에 인쇄되어 발급되며, 원본 복사시에는 복사본이라는 표시가 처리됩니다.

F-02P-02-008 (Rev.02)

교 정 성 적 서

CALIBRATION CERTIFICATE

경기도 이천시 마장면 서이천로 578번길 74
TEL : 031-645-6900, FAX : 031-645-6969

성적서발급번호(Certificate No) : IC-2019-72539
교 정 번 호(Calibration No) : C-2019-084261

1. 의뢰자 (Client)
- 기관명 (Name) : 피씨테스트코리아 주식회사
- 주소 (Address) : 경기도 용인시 기흥구 흥덕1로 13, 피136, 피137호(영덕동, 흥덕 IT 밸리)

2. 측정기 (Calibration Subject) ◇ 등록번호 : 369548
- 기기명 (Description) : HARMONIC MIXER
- 제작회사 및 형식(Manufacturer and Model Name) : ROHDE & SCHWARZ / FS-Z90
- 기기번호 (Serial Number) : 101860

3. 교정일자 (Date of Calibration) : 2019.10.23

4. 교정환경 (Environment)
- 온도(Temperature) : (22.5 ± 0.3) ℃ - 습도(Humidity) : (45 ± 3) % R.H.
- 교정장소 (Location) : 고정표준실(Permanent Calibration Lab)

5. 측정표준의 소급성 (Traceability) ◇Field code : 40641(RF SPECTRUM ANALYZER)

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EXG ANALOG SIGNAL GENERATOR	KEYSIGHT N5173B	MY53270544	2020/10/02	(주)에이치시티
EPM SERIES POWER METER	AGILENT E4419B	GB42420565	2019/11/01	(주)에이치시티
POWER SENSOR	KEYSIGHT V8486A	MY56330017	2019/12/27	Keysight Technologies
POWER SENSOR	KEYSIGHT W8486A	MY56370005	2019/12/27	Keysight Technologies
WR-12 MULTIPLIER SOURCE MODULE	OML S12MS-A	160419-1	2020/09/09	(주)에이치시티

6. 교정결과 (Calibration result) : 교정결과 참조 (Refer to attachment)

7. 측정불확도 (Measurement uncertainty) : 교정결과 참조 (Refer to attachment)
신뢰수준 약 95 %, k = 2 (Confidence level about 95 %, k = 2)

확 인 (affirmation)	작성자 (Measurements performed by)	승인자 (Approved by)
	성명 (Name) 박 민 지	직위 (Title) 기술책임자(Technical Cal. Manager) (정) 성명 (Name) 이 승 찬

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2019. 10. 23

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㈜에이치시티 대표이사
President, HCT Co., Ltd.

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F-02P-02-008 (Rev.02)

HCT

교 정 성 적 서

CALIBRATION CERTIFICATE

경기도 이천시 마장면 서이천로 578번길 74
TEL : 031-645-6900, FAX : 031-645-6969

KOLAS
KOREA LABORATORY ACCREDITATION SCHEME
CALIBRATION NO KOL0101

성적서발급번호(Certificate No) : IC-2020-16950
교 정 번 호(Calibration No) : C-2020-020401

1. 의뢰자 (Client)
- 기관명 (Name) : 피씨테스트코리아 주식회사
- 주소 (Address) : 경기도 용인시 기흥구 흥덕1로 13, 피136, 피137호(영덕동, 흥덕 IT 밸리)

2. 측정기 (Calibration Subject) ◇ 등록번호 : 380381
- 기기명 (Description) : HARMONIC MIXER
- 제작회사 및 형식(Manufacturer and Model Name) : ROHDE & SCHWARZ / FS-Z140
- 기기번호 (Serial Number) : 101135

3. 교정일자 (Date of Calibration) : 2020.03.13

4. 교정환경 (Environment)
- 온도(Temperature) : (22.4 ± 0.4)℃ 습도(Humidity) : (46 ± 4) % R.H.
- 교정장소 (Location) : 고정표준실(Permanent Calibration Lab)
(주소: 경기도 이천시 마장면 서이천로 578번길 74)

5. 측정표준의 소급성 (Traceability) ◇Field code : 40641(RF SPECTRUM ANALYZER)

교정방법 및 소급성 서술 (Calibration method and/or brief description)

상기 기기는 고주파 스펙트럼 분석기의 교정절차(HCT-CS-125-40641)에 따라 국가측정표준기관으로부터 측정의 소급성이 확보된 아래의 표준장비를 이용하여 교정 되었음.

교정에 사용한 표준장비 명세 (List of used standards/specifications)

기기명 (Description)	제작회사 및 형식 (Manufacturer and Model Name)	기기번호 (Serial Number)	차기교정예정일자 (The due date of next Calibration)	교정기관 (Calibration laboratory)
EXG ANALOG SIGNAL GENERATOR	KEYSIGHT N5173B	MY53270544	2020/10/02	(주)에이치시티
EPM SERIES POWER METER	AGILENT E4419B	GB42420565	2020/11/02	(주)에이치시티
POWER SENSOR	KEYSIGHT W8486A	MY56370005	2020/12/30	Keysight Technologies
WR-08 MULTIPLIER SOURCE MODULE	OML S08MS-A	164019-1	2020/09/09	(주)에이치시티

6. 교정결과 (Calibration result) : 교정결과 참조 (Refer to attachment)

7. 측정불확도 (Measurement uncertainty) : 교정결과 참조 (Refer to attachment)
신뢰수준 약 95 %, k = 2 (Confidence level about 95 %, k = 2)

확 인 (affirmation)	작성자 (Measurements performed by)	승인자 (Approved by)
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2020. 03. 16

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