FCC Measurement/Technical Report on

NAR Compenser
LTE-MBC-NAR2

FCC ID: RK7MBC-NAR2
IC: 4774A-MBCNAR2

Test Report Reference: MDE_MOLEX_1901_FCC_01_rev01

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D-PL-12140-01-01
D-PL-12140-01-02
D-PL-12140-01-03

Note:
The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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1 APPLIED STANDARDS AND TEST SUMMARY

1.1 APPLIED STANDARDS

Type of Authorization
Certification for an Wideband Consumer signal Booster.

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 2 and 20, 22, 24, 27 (10-1-18 Edition). The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

Part 20, Commercial Mobiles Serviced

§ 20.21 Signal Boosters

Part 22, Subpart H – Cellular Radiotelephone Service

§ 22.905 – Channels for cellular service
§ 22.913 – Effective radiated power limits
§ 22.917 – Emission limitations for cellular equipment

Part 24 E – Personal Communication Services

§ 24.229 - Frequencies
§ 24.232 – Power and antenna height limits
§ 24.238 – Emission limitations for Broadband PCS equipment

Part 27 – Miscellaneous Wireless Communication Services

§ 27.5 (b), (c) - Frequencies
§ 27.50 (b) (c) – Power limits and duty cycle
§ 27.53 (c), (f), (g), (h) – Emission limits

The tests were selected and performed with reference to the **FCC Public Notice 935210** applying **"Wideband Consumer Signal Booster Compliance Measurement Guidance" 935210 D03 v04r03, 2019-04-15.**

Summary Test Results:

The EUT complied with all performed tests as listed in chapter 1.3 Measurement Summary / Signatures.

1.2 FCC-IC CORRELATION TABLE

FCC-ISED Correlation of measurement requirements for Wideband Consumer Signal Booster from FCC and ISED Canada

Measurement	FCC reference	ISED reference
Anti-oscillation	§20.21(e)(8)(ii)(A) §20.21(e)(5)	RSS-131 Issue 3: 5.1.1.1
Gain control	§20.21(e)(8)(ii)(B)	RSS-131 Issue 3: 5.1.1.2
Power down	§20.21(e)(8)(i)(H)	RSS-131 Issue 3: 5.1.1.3
Interference avoidance for wireless subsystems	§20.21(e)(8)(ii)(C)	RSS-131 Issue 3: 5.1.1.4
Bidirectional capability	§20.21(e)(8)(i)(B)	RSS-131 Issue 3: 5.1.2
Noise limits	§20.21(e)(8)(i)(A)	RSS-131 Issue 3: 5.1.3.1
Gain limits	§20.21(e)(8)(i)(C)(1)	RSS-131 Issue 3: 5.1.3.2
Power limits	§20.21(e)(8)(i)(D)	RSS-131 Issue 3: 5.1.3.3
Out-of-band emission limits	§20.21(e)(8)(i)(E)	RSS-131 Issue 3: 5.1.3.4
Intermodulation limits	§20.21(e)(8)(i)(F)	RSS-131 Issue 3: 5.1.3.5
Transmit power off mode	§20.21(e)(8)(i)(H)	RSS-131 Issue 3: 5.1.3.6
Uplink inactivity	§20.21(e)(8)(i)(I)	RSS-131 Issue 3: 5.1.3.7

1.3 MEASUREMENT SUMMARY / SIGNATURES

47 CFR CHAPTER I FCC PART 20 §20.21	**§ 20.21 (e)(3) Frequency Bands**			
Authorized Frequency Band The measurement was performed according to KDB 935210 D03			**Final Result**	
OP-Mode Frequency Band, Direction	**Setup**	**Date**	**FCC**	**ISED**
Band 12, Downlink	S01_AA01	2020-01-20	Performed	Performed
Band 12, Uplink	S01_AA01	2020-01-20	Performed	Performed
Band 13, Downlink	S01_AA01	2020-01-20	Performed	Performed
Band 13, Uplink	S01_AA01	2020-01-20	Performed	Performed
Band 2, Downlink	S01_AA01	2020-01-20	Performed	Performed
Band 2, Uplink	S01_AA01	2020-01-20	Performed	Performed
Band 4, Downlink	S01_AA01	2020-01-20	Performed	Performed
Band 4, Uplink	S01_AA01	2020-01-20	Performed	Performed
Band 5, Downlink	S01_AA01	2020-01-20	Performed	Performed
Band 5, Uplink	S01_AA01	2020-01-20	Performed	Performed

47 CFR CHAPTER I FCC PART 20 §20.21	**§ 20.21 (e)(8)(i)(D) Power Limits; § 20.21 (e)(8)(i)(B) Bidirectional Capability**			
Maximum Power The measurement was performed according to KDB 935210 D03			**Final Result**	
OP-Mode Frequency Band, Direction, Signal Type	**Setup**	**Date**	**FCC**	**ISED**
Band 12, Downlink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 12, Downlink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 12, Uplink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 12, Uplink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 13, Downlink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 13, Downlink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 13, Uplink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 13, Uplink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 2, Downlink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 2, Downlink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 2, Uplink, AWGN	S01_AA01	2020-01-20	Passed	Passed
Band 2, Uplink, Pulsed CW	S01_AA01	2020-01-20	Passed	Passed
Band 4, Downlink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 4, Downlink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 4, Uplink, AWGN	S01_AA01	2020-01-20	Passed	Passed
Band 4, Uplink, Pulsed CW	S01_AA01	2020-01-20	Passed	Passed
Band 5, Downlink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 5, Downlink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 5, Uplink, AWGN	S01_AA01	2020-01-20	Passed	Passed
Band 5, Uplink, Pulsed CW	S01_AA01	2020-01-20	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(i)(C)(2) Booster Gain Limits; § 20.21 (e)(8)(i)(B) Bidirectional Capability

Maximum Booster Gain
The measurement was performed according to KDB 935210 D03

OP-Mode	Setup	Date	Final Result FCC	Final Result ISED
Frequency Band, Direction, Signal Type				
Band 12, Downlink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 12, Downlink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 12, Uplink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 12, Uplink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 13, Downlink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 13, Downlink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 13, Uplink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 13, Uplink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 2, Downlink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 2, Downlink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 2, Uplink, AWGN	S01_AA01	2020-01-20	Passed	Passed
Band 2, Uplink, Pulsed CW	S01_AA01	2020-01-20	Passed	Passed
Band 4, Downlink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 4, Downlink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 4, Uplink, AWGN	S01_AA01	2020-01-20	Passed	Passed
Band 4, Uplink, Pulsed CW	S01_AA01	2020-01-20	Passed	Passed
Band 5, Downlink, AWGN	S01_AA01	2020-01-21	Passed	Passed
Band 5, Downlink, Pulsed CW	S01_AA01	2020-01-21	Passed	Passed
Band 5, Uplink, AWGN	S01_AA01	2020-01-20	Passed	Passed
Band 5, Uplink, Pulsed CW	S01_AA01	2020-01-20	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(i)(F) Intermodulation Limits

Intermodulation
The measurement was performed according to KDB 935210 D03

OP-Mode	Setup	Date	Final Result FCC	Final Result ISED
Frequency Band, Direction, Input Power				
Band 12, Downlink, AGC	S01_AA01	2020-01-22	Passed	Passed
Band 12, Uplink, AGC	S01_AA01	2020-01-22	Passed	Passed
Band 12, Uplink, AGC+10dB	S01_AA01	2020-01-22	Passed	Passed
Band 13, Downlink, AGC	S01_AA01	2020-01-22	Passed	Passed
Band 13, Uplink, AGC	S01_AA01	2020-01-22	Passed	Passed
Band 13, Uplink, AGC+10dB	S01_AA01	2020-01-22	Passed	Passed
Band 2, Downlink, AGC	S01_AA01	2020-01-22	Passed	Passed
Band 2, Uplink, AGC	S01_AA01	2020-01-22	Passed	Passed
Band 2, Uplink, AGC+10dB	S01_AA01	2020-01-22	Passed	Passed
Band 4, Downlink, AGC	S01_AA01	2020-01-22	Passed	Passed
Band 4, Uplink, AGC	S01_AB01	2020-01-23	Passed	Passed
Band 4, Uplink, AGC+10dB	S01_AB01	2020-01-23	Passed	Passed
Band 5, Downlink, AGC	S01_AA01	2020-01-22	Passed	Passed
Band 5, Uplink, AGC	S01_AA01	2020-01-22	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21 **§ 20.21 (e)(8)(i)(F) Intermodulation Limits**

Intermodulation
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode Frequency Band, Direction, Input Power	Setup	Date	FCC	ISED
Band 5, Uplink, AGC+10dB	S01_AA01	2020-01-22	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21 **§ 20.21 (e)(8)(i)(E) Out-of-bands Limits**

Out-of-band Emission
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode Frequency Band, Direction, Signal Type, Band Edge	Setup	Date	FCC	ISED
Band 12, Downlink, CDMA, lower	S01_AA01	2020-01-27	Passed	Passed
Band 12, Downlink, CDMA, upper	S01_AA01	2020-01-27	Passed	Passed
Band 12, Downlink, GSM, lower	S01_AA01	2020-01-27	Passed	Passed
Band 12, Downlink, GSM, upper	S01_AA01	2020-01-27	Passed	Passed
Band 12, Downlink, LTE, lower	S01_AA01	2020-01-27	Passed	Passed
Band 12, Downlink, LTE, upper	S01_AA01	2020-01-27	Passed	Passed
Band 12, Uplink, CDMA, lower	S01_AA01	2020-01-27	Passed	Passed
Band 12, Uplink, CDMA, upper	S01_AA01	2020-01-27	Passed	Passed
Band 12, Uplink, GSM, lower	S01_AA01	2020-01-27	Passed	Passed
Band 12, Uplink, GSM, upper	S01_AA01	2020-01-27	Passed	Passed
Band 12, Uplink, LTE, lower	S01_AA01	2020-01-27	Passed	Passed
Band 12, Uplink, LTE, upper	S01_AA01	2020-01-27	Passed	Passed
Band 13, Downlink, CDMA, lower	S01_AA01	2020-01-27	Passed	Passed
Band 13, Downlink, CDMA, upper	S01_AA01	2020-01-27	Passed	Passed
Band 13, Downlink, GSM, lower	S01_AA01	2020-01-27	Passed	Passed
Band 13, Downlink, GSM, upper	S01_AA01	2020-01-27	Passed	Passed
Band 13, Downlink, LTE, lower	S01_AA01	2020-01-27	Passed	Passed
Band 13, Downlink, LTE, upper	S01_AA01	2020-01-27	Passed	Passed
Band 13, Uplink, CDMA, lower	S01_AA01	2020-01-27	Passed	Passed
Band 13, Uplink, CDMA, upper	S01_AA01	2020-01-27	Passed	Passed
Band 13, Uplink, GSM, lower	S01_AA01	2020-01-27	Passed	Passed
Band 13, Uplink, GSM, upper	S01_AA01	2020-01-27	Passed	Passed
Band 13, Uplink, LTE, lower	S01_AA01	2020-01-27	Passed	Passed
Band 13, Uplink, LTE, upper	S01_AA01	2020-01-27	Passed	Passed
Band 2, Downlink, CDMA, lower	S01_AA01	2020-01-27	Passed	Passed
Band 2, Downlink, CDMA, upper	S01_AA01	2020-01-27	Passed	Passed
Band 2, Downlink, GSM, lower	S01_AA01	2020-01-27	Passed	Passed
Band 2, Downlink, GSM, upper	S01_AA01	2020-01-27	Passed	Passed
Band 2, Downlink, LTE, lower	S01_AA01	2020-01-27	Passed	Passed
Band 2, Downlink, LTE, upper	S01_AA01	2020-01-27	Passed	Passed
Band 2, Uplink, CDMA, lower	S01_AA01	2020-01-24	Passed	Passed
Band 2, Uplink, CDMA, upper	S01_AA01	2020-01-24	Passed	Passed
Band 2, Uplink, GSM, lower	S01_AA01	2020-01-24	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(i)(E) Out-of-bands Limits

Out-of-band Emission
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode Frequency Band, Direction, Signal Type, Band Edge	Setup	Date	FCC	ISED
Band 2, Uplink, GSM, upper	S01_AA01	2020-01-24	Passed	Passed
Band 2, Uplink, LTE, lower	S01_AA01	2020-01-23	Passed	Passed
Band 2, Uplink, LTE, upper	S01_AA01	2020-01-24	Passed	Passed
Band 4, Downlink, CDMA, lower	S01_AA01	2020-01-27	Passed	Passed
Band 4, Downlink, CDMA, upper	S01_AA01	2020-01-27	Passed	Passed
Band 4, Downlink, GSM, lower	S01_AA01	2020-01-27	Passed	Passed
Band 4, Downlink, GSM, upper	S01_AA01	2020-01-27	Passed	Passed
Band 4, Downlink, LTE, lower	S01_AA01	2020-01-27	Passed	Passed
Band 4, Downlink, LTE, upper	S01_AA01	2020-01-27	Passed	Passed
Band 4, Uplink, CDMA, lower	S01_AA01	2020-01-24	Passed	Passed
Band 4, Uplink, CDMA, upper	S01_AA01	2020-01-24	Passed	Passed
Band 4, Uplink, GSM, lower	S01_AA01	2020-01-24	Passed	Passed
Band 4, Uplink, GSM, upper	S01_AA01	2020-01-24	Passed	Passed
Band 4, Uplink, LTE, lower	S01_AA01	2020-01-24	Passed	Passed
Band 4, Uplink, LTE, upper	S01_AA01	2020-01-24	Passed	Passed
Band 5, Downlink, CDMA, lower	S01_AA01	2020-01-27	Passed	Passed
Band 5, Downlink, CDMA, upper	S01_AA01	2020-01-27	Passed	Passed
Band 5, Downlink, GSM, lower	S01_AA01	2020-01-27	Passed	Passed
Band 5, Downlink, GSM, upper	S01_AA01	2020-01-27	Passed	Passed
Band 5, Downlink, LTE, lower	S01_AA01	2020-01-27	Passed	Passed
Band 5, Downlink, LTE, upper	S01_AA01	2020-01-27	Passed	Passed
Band 5, Uplink, CDMA, lower	S01_AA01	2020-01-24	Passed	Passed
Band 5, Uplink, CDMA, upper	S01_AA01	2020-01-24	Passed	Passed
Band 5, Uplink, GSM, lower	S01_AA01	2020-01-24	Passed	Passed
Band 5, Uplink, GSM, upper	S01_AA01	2020-01-24	Passed	Passed
Band 5, Uplink, LTE, lower	S01_AA01	2020-01-24	Passed	Passed
Band 5, Uplink, LTE, upper	S01_AA01	2020-01-24	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 2.1051 Spurious emissions at antenna terminals

Conducted Spurious Emissions
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode Frequency Band, Direction	Setup	Date	FCC	ISED
Band 12, Downlink	S01_AA01	2020-01-22	Passed	Passed
Band 12, Uplink	S01_AA01	2020-01-22	Passed	Passed
Band 13, Downlink	S01_AA01	2020-01-22	Passed	Passed
Band 13, Uplink	S01_AA01	2020-01-22	Passed	Passed
Band 2, Downlink	S01_AA01	2020-01-22	Passed	Passed
Band 2, Uplink	S01_AA01	2020-01-22	Passed	Passed
Band 4, Downlink	S01_AA01	2020-01-22	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 2.1051 Spurious emissions at antenna terminals

Conducted Spurious Emissions
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode Frequency Band, Direction	Setup	Date	FCC	ISED
Band 4, Uplink	S01_AA01	2020-01-22	Passed	Passed
Band 5, Downlink	S01_AA01	2020-01-22	Passed	Passed
Band 5, Uplink	S01_AA01	2020-01-22	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(i)(A) Noise Limits; § 20.21 (e)(8)(i)(H) Transmitter Power Off Mode

Maximum Transmitter Noise Power
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode Frequency Band, Direction, Signal Type	Setup	Date	FCC	ISED
Band 12, Downlink, None	S01_AA01	2020-01-28	Passed	Passed
Band 12, Uplink, AWGN DL	S01_AA01	2020-01-28	Passed	Passed
Band 12, Uplink, None	S01_AA01	2020-01-28	Passed	Passed
Band 13, Downlink, None	S01_AA01	2020-01-28	Passed	Passed
Band 13, Uplink, AWGN DL	S01_AA01	2020-01-28	Passed	Passed
Band 13, Uplink, None	S01_AA01	2020-01-28	Passed	Passed
Band 2, Downlink, None	S01_AA01	2020-01-28	Passed	Passed
Band 2, Uplink, AWGN DL	S01_AA01	2020-01-28	Passed	Passed
Band 2, Uplink, None	S01_AA01	2020-01-28	Passed	Passed
Band 4, Downlink, None	S01_AA01	2020-01-28	Passed	Passed
Band 4, Uplink, AWGN DL	S01_AA01	2020-01-28	Passed	Passed
Band 4, Uplink, None	S01_AA01	2020-01-28	Passed	Passed
Band 5, Downlink, None	S01_AA01	2020-01-28	Passed	Passed
Band 5, Uplink, AWGN DL	S01_AA01	2020-01-28	Passed	Passed
Band 5, Uplink, None	S01_AA01	2020-01-28	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(i)(A) Noise Limits; § 20.21 (e)(8)(i)(H) Transmitter Power Off Mode

Variable Uplink Noise Timing
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode Frequency Band, Direction	Setup	Date	FCC	ISED
Band 12, Uplink	S01_AA01	2020-01-28	Passed	Passed
Band 13, Uplink	S01_AA01	2020-01-28	Passed	Passed
Band 2, Uplink	S01_AA01	2020-01-28	Passed	Passed
Band 4, Uplink	S01_AA01	2020-01-28	Passed	Passed
Band 5, Uplink	S01_AA01	2020-01-28	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(i)(I) Uplink Inactivity			

Uplink Inactivity
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode	Setup	Date	FCC	ISED
Frequency Band, Direction				
Band 12, Uplink	S01_AA01	2020-01-28	Passed	Passed
Band 13, Uplink	S01_AA01	2020-01-28	Passed	Passed
Band 2, Uplink	S01_AA01	2020-01-28	Passed	Passed
Band 4, Uplink	S01_AA01	2020-01-28	Passed	Passed
Band 5, Uplink	S01_AA01	2020-01-28	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(i)(C)(1) Booster Gain Limits, § 20.21 (e)(8)(i)(H) Transmit Power Off Mode

Variable Booster Gain
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode	Setup	Date	FCC	ISED
Frequency Band, Direction				
Band 12, Uplink	S01_AA01	2020-01-29	Passed	Passed
Band 13, Uplink	S01_AA01	2020-01-29	Passed	Passed
Band 2, Uplink	S01_AA01	2020-01-29	Passed	Passed
Band 4, Uplink	S01_AA01	2020-01-29	Passed	Passed
Band 5, Uplink	S01_AA01	2020-01-29	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(i)(C)(1) Booster Gain Limits, § 20.21 (e)(8)(i)(H) Transmit Power Off Mode

Variable Uplink Gain Timing
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode	Setup	Date	FCC	ISED
Frequency Band, Direction				
Band 12, Uplink	S01_AA01	2020-01-29	Passed	Passed
Band 13, Uplink	S01_AA01	2020-01-29	Passed	Passed
Band 2, Uplink	S01_AA01	2020-01-29	Passed	Passed
Band 4, Uplink	S01_AA01	2020-01-29	Passed	Passed
Band 5, Uplink	S01_AA01	2020-01-29	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 2.1049 Occupied Bandwidth

Occupied Bandwidth
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode	Setup	Date	FCC	ISED
Frequency Band, Direction, Signal Type				
Band 12, Downlink, CDMA	S01_AA01	2020-01-30	Passed	Passed
Band 12, Downlink, GSM	S01_AA01	2020-01-30	Passed	Passed
Band 12, Downlink, LTE	S01_AA01	2020-01-30	Passed	Passed
Band 12, Uplink, CDMA	S01_AA01	2020-01-30	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 2.1049 Occupied Bandwidth

Occupied Bandwidth
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode	Setup	Date	FCC	ISED
Frequency Band, Direction, Signal Type				
Band 12, Uplink, GSM	S01_AA01	2020-01-30	Passed	Passed
Band 12, Uplink, LTE	S01_AA01	2020-01-30	Passed	Passed
Band 13, Downlink, CDMA	S01_AA01	2020-01-30	Passed	Passed
Band 13, Downlink, GSM	S01_AA01	2020-01-30	Passed	Passed
Band 13, Downlink, LTE	S01_AA01	2020-01-30	Passed	Passed
Band 13, Uplink, CDMA	S01_AA01	2020-01-30	Passed	Passed
Band 13, Uplink, GSM	S01_AA01	2020-01-30	Passed	Passed
Band 13, Uplink, LTE	S01_AA01	2020-01-30	Passed	Passed
Band 2, Downlink, CDMA	S01_AA01	2020-01-30	Passed	Passed
Band 2, Downlink, GSM	S01_AA01	2020-01-30	Passed	Passed
Band 2, Downlink, LTE	S01_AA01	2020-01-30	Passed	Passed
Band 2, Uplink, CDMA	S01_AA01	2020-01-30	Passed	Passed
Band 2, Uplink, GSM	S01_AA01	2020-01-30	Passed	Passed
Band 2, Uplink, LTE	S01_AA01	2020-01-30	Passed	Passed
Band 4, Downlink, CDMA	S01_AA01	2020-01-30	Passed	Passed
Band 4, Downlink, GSM	S01_AA01	2020-01-30	Passed	Passed
Band 4, Downlink, LTE	S01_AA01	2020-01-30	Passed	Passed
Band 4, Uplink, CDMA	S01_AA01	2020-01-30	Passed	Passed
Band 4, Uplink, GSM	S01_AA01	2020-01-30	Passed	Passed
Band 4, Uplink, LTE	S01_AA01	2020-01-30	Passed	Passed
Band 5, Downlink, CDMA	S01_AA01	2020-01-30	Passed	Passed
Band 5, Downlink, GSM	S01_AA01	2020-01-30	Passed	Passed
Band 5, Downlink, LTE	S01_AA01	2020-01-30	Passed	Passed
Band 5, Uplink, CDMA	S01_AA01	2020-01-30	Passed	Passed
Band 5, Uplink, GSM	S01_AA01	2020-01-30	Passed	Passed
Band 5, Uplink, LTE	S01_AA01	2020-01-30	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(ii)(A) Ant-Oscillation, § 20.21 (e)(5) Anti-Oscillation

Oscillation Restart
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode	Setup	Date	FCC	ISED
Frequency Band, Direction				
Band 12, Downlink	S01_AA01	2020-01-21	Passed	Passed
Band 12, Uplink	S01_AA01	2020-01-21	Passed	Passed
Band 13, Downlink	S01_AA01	2020-01-21	Passed	Passed
Band 13, Uplink	S01_AA01	2020-01-21	Passed	Passed
Band 2, Downlink	S01_AA01	2020-01-21	Passed	Passed
Band 2, Uplink	S01_AA01	2020-01-21	Passed	Passed
Band 4, Downlink	S01_AA01	2020-01-21	Passed	Passed
Band 4, Uplink	S01_AA01	2020-01-21	Passed	Passed
Band 5, Downlink	S01_AA01	2020-01-21	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(ii)(A) Ant-Oscillation, § 20.21 (e)(5) Anti-Oscillation

Oscillation Restart
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode Frequency Band, Direction	Setup	Date	FCC	ISED
Band 5, Uplink	S01_AA01	2020-01-21	Passed	Passed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 20.21 (e)(8)(ii)(A) Ant-Oscillation, § 20.21 (e)(5) Anti-Oscillation

Oscillation Shutdown or Mitigation
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode Frequency Band, Direction	Setup	Date	FCC	ISED
Band 12, Downlink	S01_AA01	2020-01-22	Passed	Passed
Band 12, Uplink Remark: EUT does not start up at 30 dB below AGC	S01_AA01	2020-01-21	Performed	Performed
Band 13, Downlink	S01_AA01	2020-01-22	Passed	Passed
Band 13, Uplink Remark: EUT does not start up at 30 dB below AGC	S01_AA01	2020-01-21	Performed	Performed
Band 2, Downlink	S01_AA01	2020-01-22	Passed	Passed
Band 2, Uplink Remark: EUT does not start up at 30 dB below AGC	S01_AA01	2020-01-21	Performed	Performed
Band 4, Downlink	S01_AA01	2020-01-22	Passed	Passed
Band 4, Uplink Remark: EUT does not start up at 30 dB below AGC	S01_AA01	2020-01-21	Performed	Performed
Band 5, Downlink	S01_AA01	2020-01-22	Passed	Passed
Band 5, Uplink Remark: EUT does not start up at 30 dB below AGC	S01_AA01	2020-01-21	Performed	Performed

47 CFR CHAPTER I FCC PART 20 §20.21	§ 2.1053 Field strength of Spurious Radiation

Radiated Spurious Emissions
The measurement was performed according to KDB 935210 D03 **Final Result**

OP-Mode Frequency Band, Direction	Setup	Date	FCC	ISED
Band 12, Downlink	S01_AB01	2020-01-22	Passed	Passed
Band 12, Uplink	S01_AB01	2020-01-22	Passed	Passed
Band 13, Downlink	S01_AB01	2020-01-22	Passed	Passed
Band 13, Uplink	S01_AB01	2020-01-22	Passed	Passed
Band 2, Downlink	S01_AB01	2020-01-22	Passed	Passed
Band 2, Uplink Remark: 1880 MHz is an wanted signal	S01_AB01	2020-01-22	Passed	Passed
Band 4, Downlink	S01_AB01	2020-01-22	Passed	Passed
Band 4, Uplink Remark: 1732.5 MHz is an wanted signal	S01_AB01	2020-01-22	Passed	Passed
Band 5, Downlink	S01_AB01	2020-01-22	Passed	Passed
Band 5, Uplink	S01_AB01	2020-01-22	Passed	Passed

N/A: Not applicable
N/P: Not performed

2 REVISION HISTORY

Report version control			
Version	**Release date**	**Change Description**	**Version validity**
initial	2020-02-13	--	valid
rev01	2020-03-20	Added marker values to result table and added additional markers to plots in chapter conducted spurious emissions	valid

COMMENT: -

(responsible for accreditation scope)
Dipl.-Ing. Marco Kullik

(responsible for testing and report)
Dipl.-Ing. Daniel Gall

7 layers GmbH, Borsigstr. 11
40880 Ratingen, Germany
Phone +49 (0)2102 749 0

3 ADMINISTRATIVE DATA

3.1 TESTING LABORATORY

Company Name:	7layers GmbH
Address:	Borsigstr. 11 40880 Ratingen Germany

The test facility is accredited by the following accreditation organisation:

Laboratory accreditation no:	DAkkS D-PL-12140-01-01| D-PL-12140-01-02 | D-PL-12140-01-03
FCC Designation Number:	DE0015
FCC Test Firm Registration:	929146
ISED CAB Identifier	DE0007; ISED#: 3699A
Responsible for accreditation scope:	Dipl.-Ing. Marco Kullik
Report Template Version:	2019-12-16

3.2 PROJECT DATA

Responsible for testing and report:	Dipl.-Ing. Daniel Gall
Employees who performed the tests:	documented internally at 7Layers
Date of Report:	2020-03-20
Testing Period:	2020-01-20 to 2020-01-30

3.3 APPLICANT DATA

Company Name:	Molex CVS Dabendorf GmbH
Address:	Märkische Straße 72 15806 Zossen Germany
Contact Person:	Ines Baufeld

3.4 MANUFACTURER DATA

Company Name:	Molex CVS Dabendorf GmbH
Address:	Märkische Straße 72 15806 Zossen Germany
Contact Person:	Sebastian Dern

4 TEST OBJECT DATA

4.1 GENERAL EUT DESCRIPTION

Kind of Device product description	Consumer mobile Signal Booster supporting bands 2, 4, 5, 12, 13
Product name / Model	LTE-MBC-NAR2
Type number	17400213
Declared EUT data by the supplier	
General Product Description	The EUT is a single housing wideband consumer signal booster with a single donor and single server port. It supports the eFDD bands 2, 4, 5, 12 and 13. Spectrum block filtering is not supported.
Booster Type	Mobile Wideband Consumer Signal Booster
Booster Connection	Direct Contact Coupling (e.g. cradle type)
MSCL Value	7 dB
Voltage Type	DC
Voltage Level	12 V
Maximum Output Donor Port [Uplink]:	22.0 dBm (conducted)
Maximum Output Server Port [Downlink]:	1.0 dBm (conducted)
Maximum Gain [Uplink]	22.1 dB
Maximum Gain [Downlink]	22.4 dB
The EUT provides the following ports:	Donor Port: Input BS-Signal, Output MS-Signal Server Port: Input MS-Signal, Output BS-Signal DC Port

The below Variant models are declared by the manufacturer as electrically identical but have not been tested:

Product name / Model	Product Type number
LTE-MBC-NAR2	17401213
LTE-MBC-NAR2	17400214
LTE-MBC-NAR2	17402213

4.2 EUT MAIN COMPONENTS

Sample Name	Sample Code	Description
EUT aa01	DE1386008aa01	
Sample Parameter	**Value**	
Serial No.	0D0FKW-00117.01.2098210013	
HW Version	004	
SW Version	0003	
Comment		

Sample Name	Sample Code	Description
EUT ab01	DE1386008ab01	
Sample Parameter	**Value**	
Serial No.	0D0FKW-00117.01.2098210011	
HW Version	004	
SW Version	0003	
Comment		

NOTE:The short description is used to simplify the identification of the EUT in this test report.

4.3 ANCILLARY EQUIPMENT

For the purposes of this test report, ancillary equipment is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT. It is necessary to configure the system in a typical fashion, as a customer would normally use it. But nevertheless Ancillary Equipment can influence the test results.

Device	Details (Manufacturer, Type Model, OUT Code)	Description
-	-	-

4.4 AUXILIARY EQUIPMENT

For the purposes of this test report, auxiliary equipment is defined as equipment which is used temporarily to enable operational and control features especially used for the tests of the EUT which is not used during normal operation or equipment that is used during the tests in combination with the EUT but is not subject of this test report. It is necessary to configure the system in a typical fashion, as a customer would normally use it.
But nevertheless Auxiliary Equipment can influence the test results.

Device	Details (Manufacturer, Type Model, HW, SW, S/N)	Description
-	-	-

4.5 EUT SETUPS

This chapter describes the combination of EUTs and equipment used for testing. The rationale for selecting the EUTs, ancillary and auxiliary equipment and interconnecting cables, is to test a representative configuration meeting the requirements of the referenced standards.

Setup	Combination of EUTs	Description and Rationale
S01_AA01	EUT aa01	Representative Setup
S01_AB01	EUT ab01	Representative Setup

4.6 OPERATING MODES

This chapter describes the operating modes of the EUTs used for testing.

4.6.1 TEST CHANNELS

Band	Direction	Lower Frequency Band Edge [MHz]	Upper Frequency Band Edge [MHz]	Center Frequency [MHz]	Port
2	downlink	1930.00	1990.00	1960.00	Donor
4	downlink	2110.00	2155.00	2132.50	Donor
5	downlink	869.00	894.00	881.50	Donor
12	downlink	728.00	746.00	737.00	Donor
13	downlink	746.00	756.00	751.00	Donor
2	uplink	1850.00	1910.00	1880.00	Server
4	uplink	1710.00	1755.00	1732.50	Server
5	uplink	824.00	849.00	836.50	Server
12	uplink	698.00	716.00	707.00	Server
13	uplink	777.00	787.00	782.00	Server

4.7 PRODUCT LABELLING

4.7.1 FCC ID LABEL

Please refer to the documentation of the applicant.

4.7.2 LOCATION OF THE LABEL ON THE EUT

Please refer to the documentation of the applicant.

5 TEST RESULTS

5.1 AUTHORIZED FREQUENCY BAND

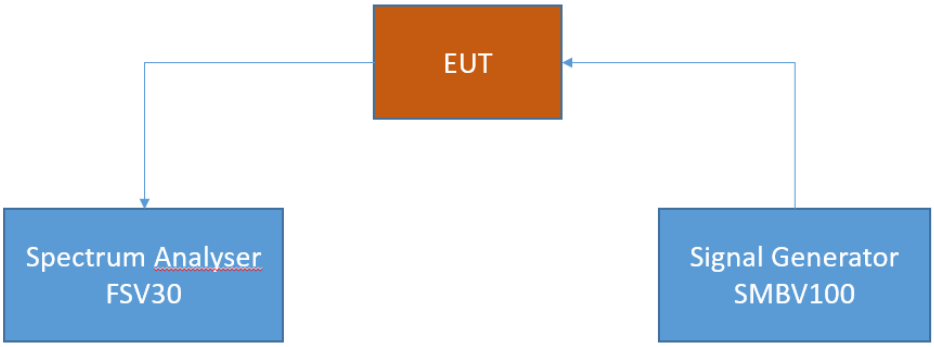
Standard

The test was performed according to:
KDB 935210 D03

5.1.1 TEST DESCRIPTION

This test case is intended to confirm that the signal booster only operates on the CMRS frequency bands authorized for use by the NPS. In addition, this test will identify the frequency at which the maximum gain is realized within each CMRS operational band, which then serves as a basis for subsequent tests.

The EUT was connected to the test setup according to the following diagram:



FCC Part 20.21; Consumer Signal Booster – Test Setup 7.1; Authorized Frequency Band Verification

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

5.1.2 TEST REQUIREMENTS / LIMITS

FCC Part 20, § 20.21 (e)(3) Frequency Bands

For this test case exists no applicable limit.

5.1.3 TEST PROTOCOL

Ambient temperature: 25 °C
Air Pressure: 1036 hPa
Humidity: 34 %

Band 2, downlink

Frequency	Frequency [MHz]	Output Power [dBm]
Lower Band Edge	1930.000	-7.0
Highest Power	1951.090	-5.5
Upper Band Edge	1990.000	-7.0

Band 4, downlink

Frequency	Frequency [MHz]	Output Power [dBm]
Lower Band Edge	2110.000	-6.0
Highest Power	2110.411	-6.0
Upper Band Edge	2155.000	-6.8

Band 5, downlink

Frequency	Frequency [MHz]	Output Power [dBm]
Lower Band Edge	869.000	-6.1
Highest Power	875.750	-5.8
Upper Band Edge	894.000	-6.7

Band 12, downlink

Frequency	Frequency [MHz]	Output Power [dBm]
Lower Band Edge	728.000	-4.6
Highest Power	745.930	-3.6
Upper Band Edge	746.000	-3.6

Band 13, downlink

Frequency	Frequency [MHz]	Output Power [dBm]
Lower Band Edge	746.000	-4.6
Highest Power	752.580	-4.4
Upper Band Edge	756.000	-5.0

Band 2, uplink

Frequency	Frequency [MHz]	Output Power [dBm]
Lower Band Edge	1850.000	16.3
Highest Power	1865.870	18.1
Upper Band Edge	1910.000	14.0

Band 4, uplink

Frequency	Frequency [MHz]	Output Power [dBm]
Lower Band Edge	1710.000	16.9
Highest Power	1719.751	18.2
Upper Band Edge	1755.000	17.9

Band 5, uplink

Frequency	Frequency [MHz]	Output Power [dBm]
Lower Band Edge	824.000	16.7
Highest Power	834.391	17.6
Upper Band Edge	849.000	15.9

Band 12, uplink

Frequency	Frequency [MHz]	Output Power [dBm]
Lower Band Edge	698.000	17.7
Highest Power	709.010	17.8
Upper Band Edge	716.000	17.1

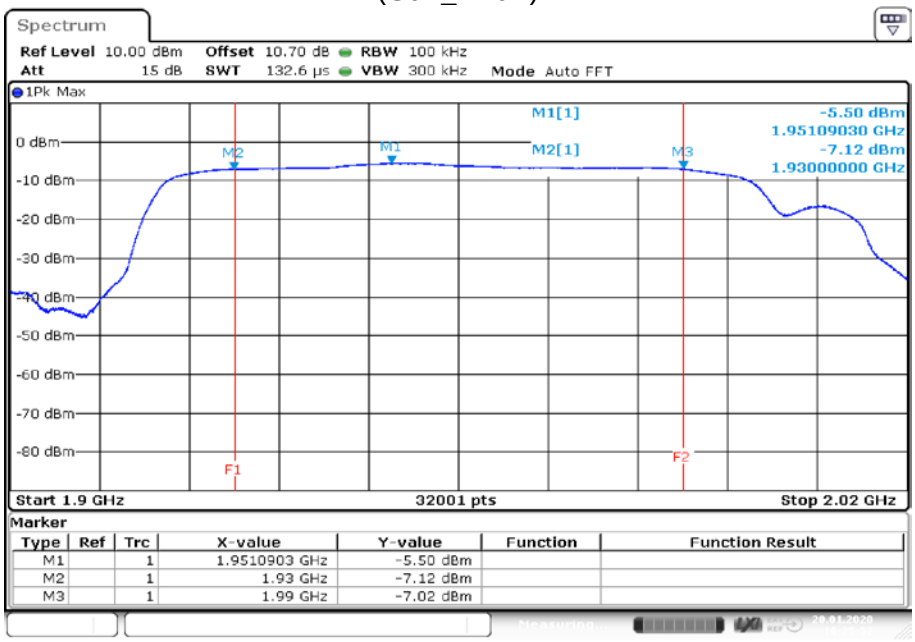
Band 13, uplink

Frequency	Frequency [MHz]	Output Power [dBm]
Lower Band Edge	777.000	16.4
Highest Power	780.390	17.5
Upper Band Edge	787.000	16.8

Remark: Please see next sub-clause for the measurement plot.

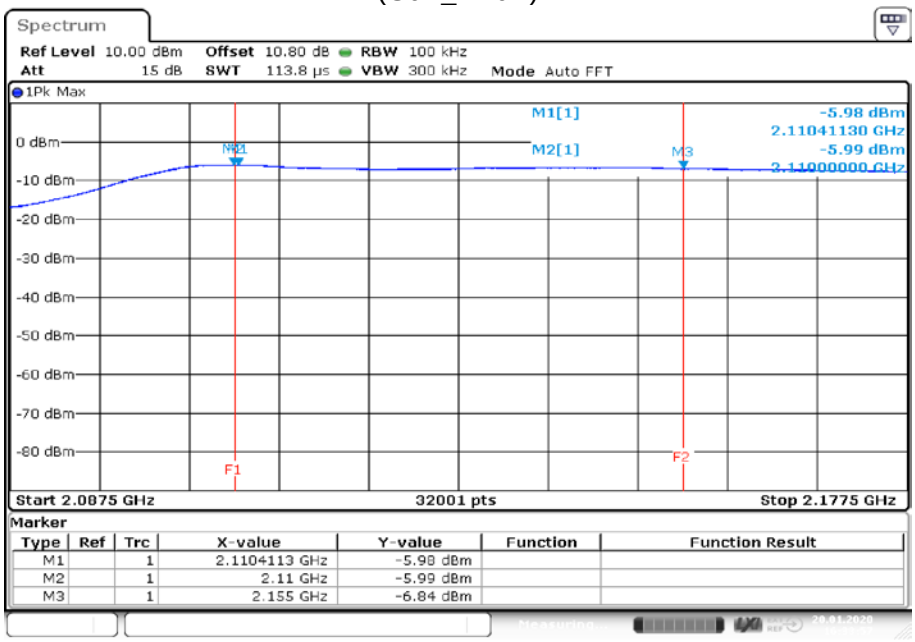
5.1.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, “WORST CASE”)

Frequency Band = Band 2, Direction = Downlink
(S01_AA01)



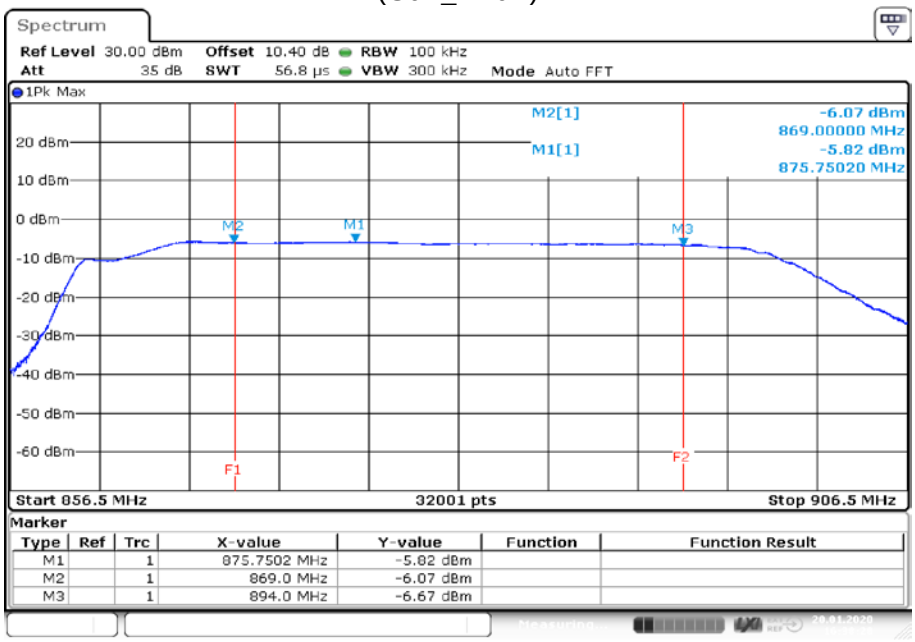
Date: 20.JAN.2020 16:25:52

Frequency Band = Band 4, Direction = Downlink
(S01_AA01)



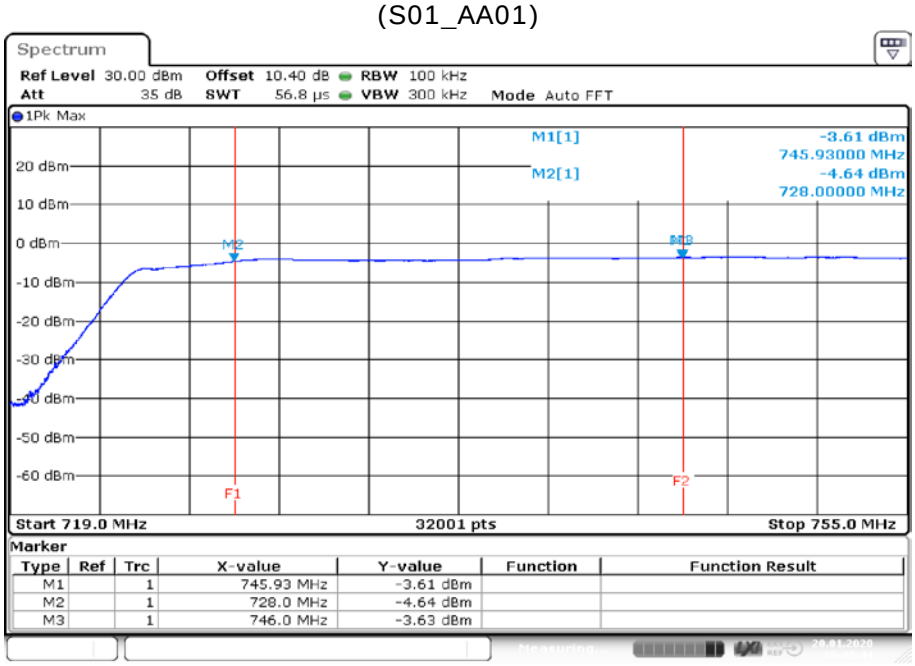
Date: 20.JAN.2020 16:33:57

Frequency Band = Band 5, Direction = Downlink
(S01_AA01)



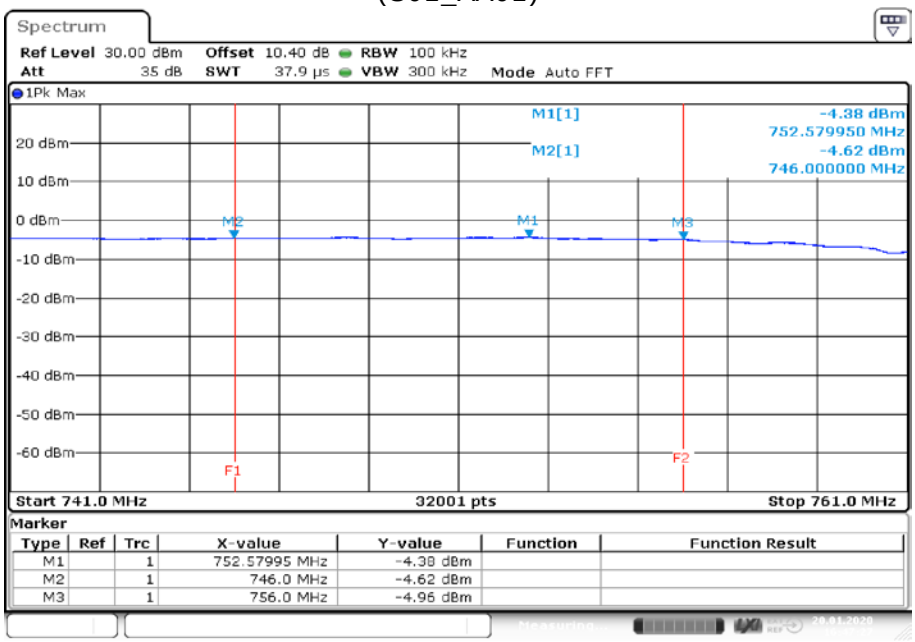
Date: 20.JAN.2020 16:38:28

Frequency Band = Band 12, Direction = Downlink
(S01_AA01)



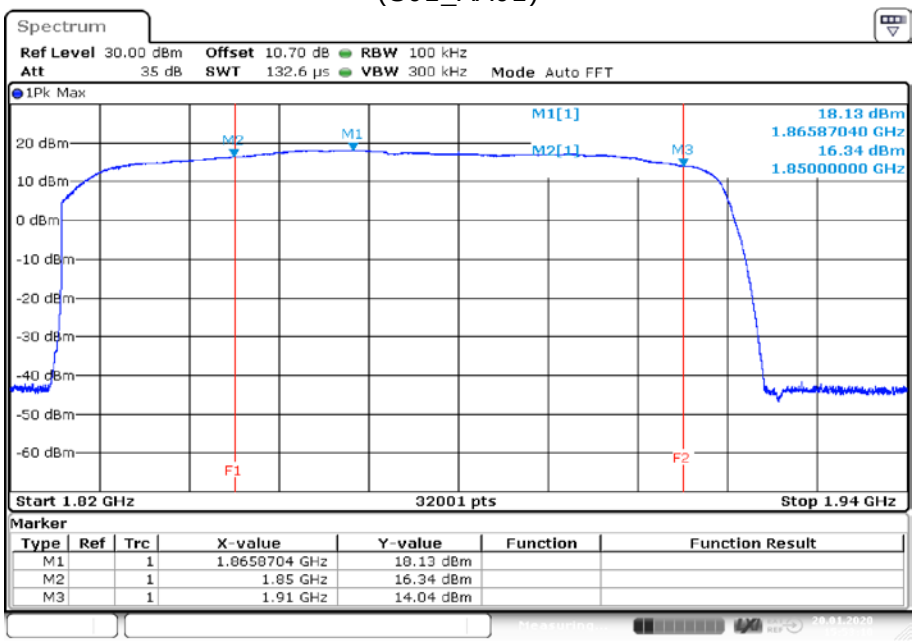
Date: 20.JAN.2020 16:42:44

Frequency Band = Band 13, Direction = Downlink
(S01_AA01)



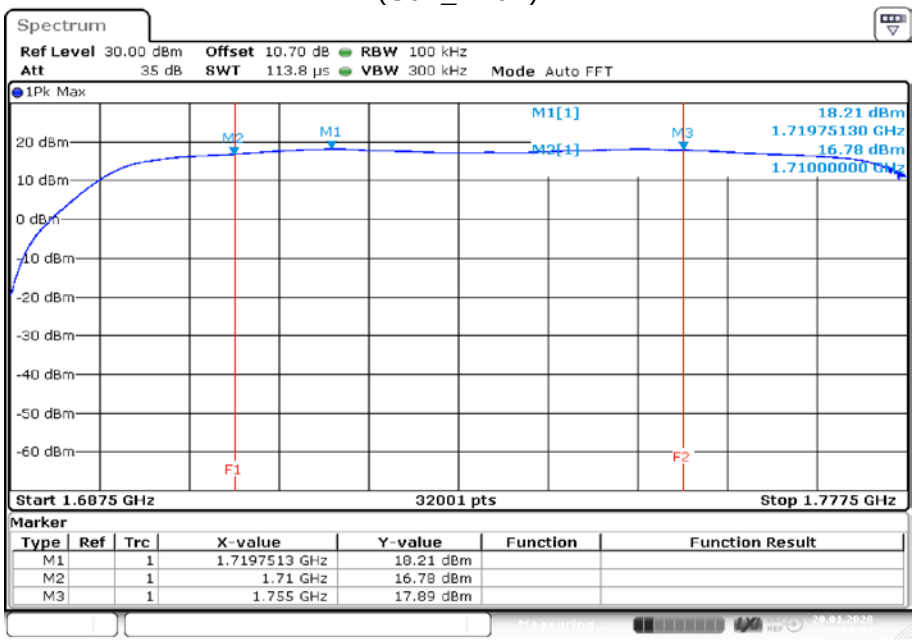
Date: 20.JAN.2020 16:47:27

Frequency Band = Band 2, Direction = Uplink
(S01_AA01)



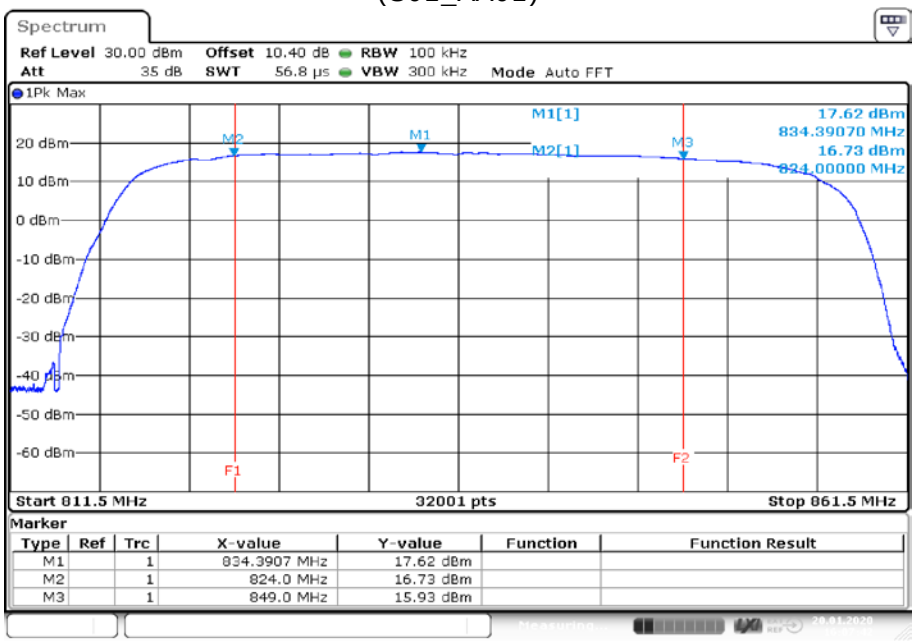
Date: 20.JAN.2020 15:53:10

Frequency Band = Band 4, Direction = Uplink
(S01_AA01)



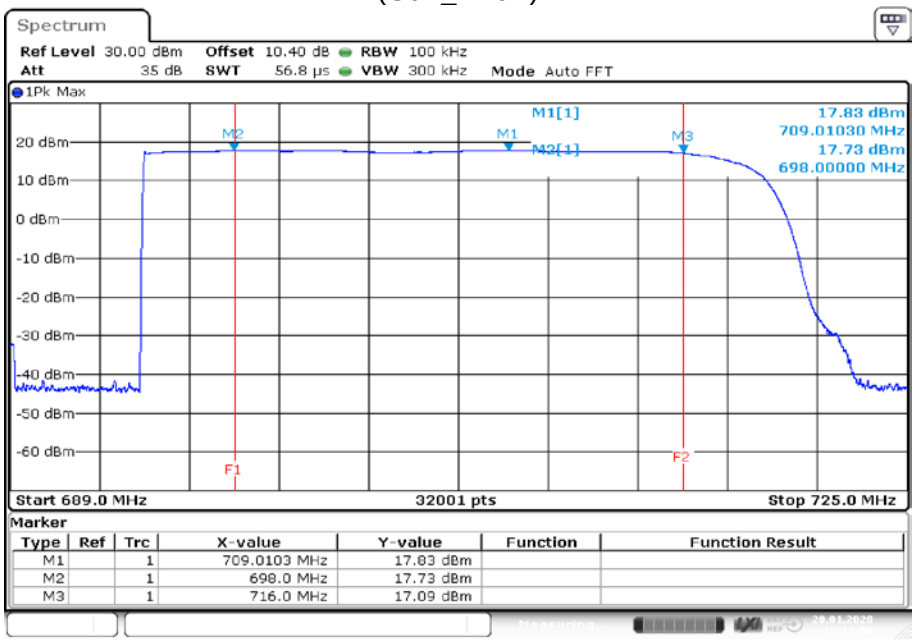
Date: 20.JAN.2020 16:00:55

Frequency Band = Band 5, Direction = Uplink
(S01_AA01)



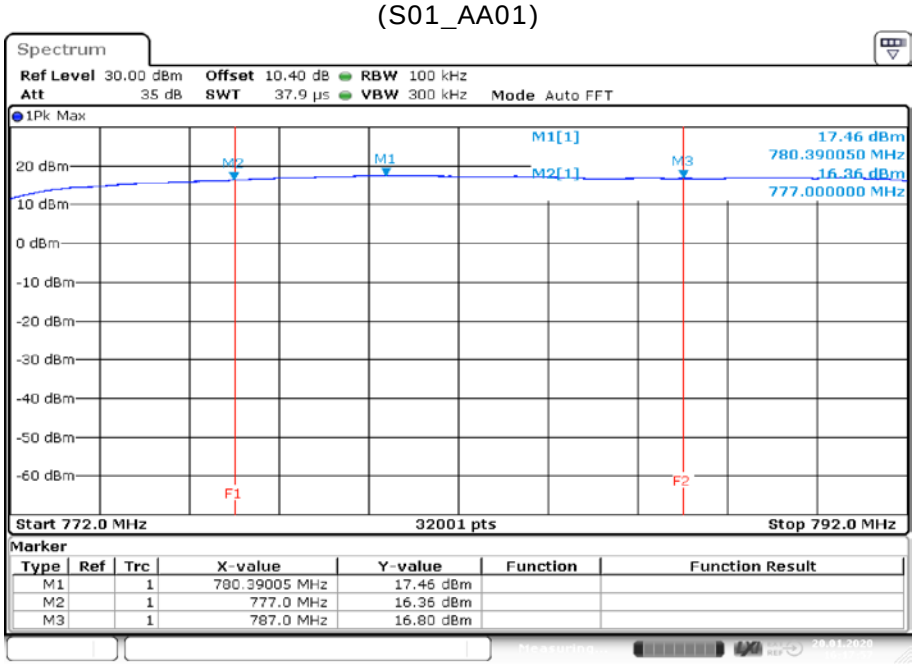
Date: 20.JAN.2020 16:07:42

Frequency Band = Band 12, Direction = Uplink
(S01_AA01)



Date: 20.JAN.2020 16:13:50

Frequency Band = Band 13, Direction = Uplink
(S01_AA01)



Date: 20.JAN.2020 16:17:58

5.1.5 TEST EQUIPMENT USED

- R&S TS8997

5.2 MAXIMUM POWER

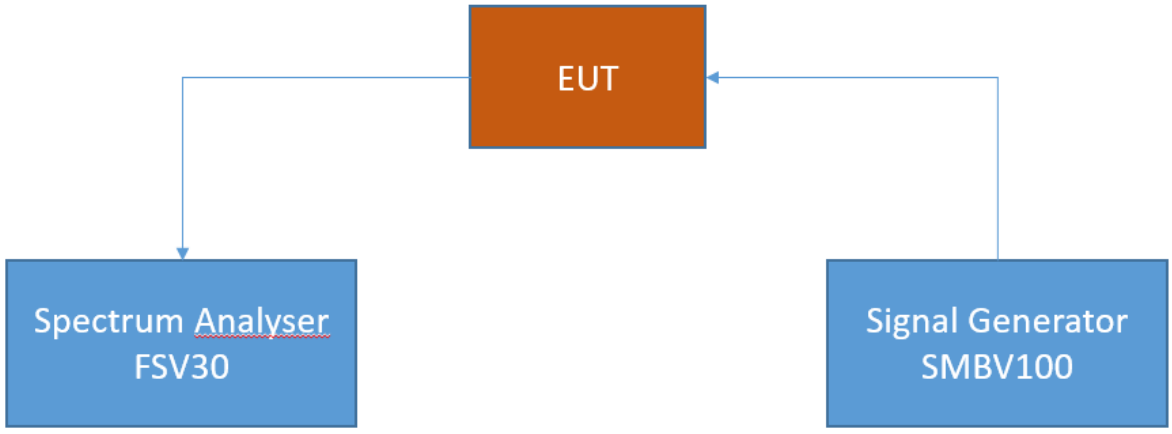
Standard

The test was performed according to:
KDB 935210 D03

5.2.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the signal booster power limits and requirements as specified in §§ 20.21(e)(8)(i)(D) and 20.21(e)(8)(i)(B) for wideband consumer signal boosters.

The EUT was connected to the test setup according to the following diagram:



FCC Part 20.21; Consumer Signal Booster – Test Setup 7.2; Maximum Power

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

5.2.2 TEST REQUIREMENTS / LIMITS

FCC Part 20, § 20.21(e)(8)(i)(D)

Power Limits. A booster's uplink power must not exceed 1 watt composite conducted power and equivalent isotropic radiated power (EIRP) for each band of operation. Composite downlink power shall not exceed 0.05 watt (17 dBm) conducted and EIRP for each band of operation. Compliance with power limits will use instrumentation calibrated in terms of RMS equivalent voltage.

FCC Part 20, § 20.21(e)(8)(i)(B)

Bidirectional Capability. Consumer Boosters must be able to provide equivalent uplink and downlink gain and conducted uplink power output that is at least 0.05 watts. One-way consumer boosters (*i.e.,* uplink only, downlink only, uplink impaired, downlink impaired) are prohibited. Spectrum block filtering may be used provided the uplink filter attenuation is not less than the downlink filter attenuation, and where RSSI is measured after spectrum block filtering is applied referenced to the booster's input port for each band of operation.

5.2.3 TEST PROTOCOL

Ambient temperature: 25 °C
Air Pressure: 1036 hPa
Humidity: 34 %

Band 2, downlink

Signal Type	Frequency [MHz]	AGC Start Input Power [dBm]	Minimum Output Power [dBm]	Maximum Output Power [dBm]	Lower Limit Output Power [dBm]	Upper Limit Output Power [dBm]	Margin to Lower Limit [dB]	Margin to Upper Limit [dB]
Pulsed CW	1951.090	-20.0	0.4	0.4	---	17.0	---	16.6
AWGN	1951.090	-23.0	-1.8	-1.0	---	17.0	---	18.0

Band 4, downlink

Signal Type	Frequency [MHz]	AGC Start Input Power [dBm]	Minimum Output Power [dBm]	Maximum Output Power [dBm]	Lower Limit Output Power [dBm]	Upper Limit Output Power [dBm]	Margin to Lower Limit [dB]	Margin to Upper Limit [dB]
Pulsed CW	2110.411	-20.0	0.0	0.0	---	17.0	---	17.0
AWGN	2110.411	-23.9	-2.8	-2.1	---	17.0	---	19.1

Band 5, downlink

Signal Type	Frequency [MHz]	AGC Start Input Power [dBm]	Minimum Output Power [dBm]	Maximum Output Power [dBm]	Lower Limit Output Power [dBm]	Upper Limit Output Power [dBm]	Margin to Lower Limit [dB]	Margin to Upper Limit [dB]
Pulsed CW	875.750	-20.0	0.5	0.5	---	17.0	---	16.5
AWGN	875.750	-23.4	-1.5	-1.3	---	17.0	---	18.3

Band 12, downlink

Signal Type	Frequency [MHz]	AGC Start Input Power [dBm]	Minimum Output Power [dBm]	Maximum Output Power [dBm]	Lower Limit Output Power [dBm]	Upper Limit Output Power [dBm]	Margin to Lower Limit [dB]	Margin to Upper Limit [dB]
Pulsed CW	745.930	-20.0	0.6	0.6	---	17.0	---	16.4
AWGN	745.930	-21.7	0.5	0.6	---	17.0	---	16.4

Band 13, downlink

Signal Type	Frequency [MHz]	AGC Start Input Power [dBm]	Minimum Output Power [dBm]	Maximum Output Power [dBm]	Lower Limit Output Power [dBm]	Upper Limit Output Power [dBm]	Margin to Lower Limit [dB]	Margin to Upper Limit [dB]
Pulsed CW	752.580	-20.0	1.0	1.0	---	17.0	---	16.0
AWGN	752.580	-22.2	0.2	0.3	---	17.0	---	16.7

Band 2, uplink

Signal Type	Frequency [MHz]	AGC Start Input Power [dBm]	Minimum Output Power [dBm]	Maximum Output Power [dBm]	Lower Limit Output Power [dBm]	Upper Limit Output Power [dBm]	Margin to Lower Limit [dB]	Margin to Upper Limit [dB]
Pulsed CW	1865.870	2.6	21.0	21.5	17.0	30.0	4.0	8.5
AWGN	1865.870	-1.9	19.7	19.8	17.0	30.0	2.7	10.2

Band 4, uplink

Signal Type	Frequency [MHz]	AGC Start Input Power [dBm]	Minimum Output Power [dBm]	Maximum Output Power [dBm]	Lower Limit Output Power [dBm]	Upper Limit Output Power [dBm]	Margin to Lower Limit [dB]	Margin to Upper Limit [dB]
Pulsed CW	1719.751	0.9	21.3	21.6	17.0	30.0	4.3	8.4
AWGN	1719.751	-2.1	19.9	20.0	17.0	30.0	2.9	10.0

Band 5, uplink

Signal Type	Frequency [MHz]	AGC Start Input Power [dBm]	Minimum Output Power [dBm]	Maximum Output Power [dBm]	Lower Limit Output Power [dBm]	Upper Limit Output Power [dBm]	Margin to Lower Limit [dB]	Margin to Upper Limit [dB]
Pulsed CW	834.391	3.6	20.6	22.0	17.0	30.0	3.6	8.0
AWGN	834.391	-1.3	19.8	19.9	17.0	30.0	2.8	10.1

Band 12, uplink

Signal Type	Frequency [MHz]	AGC Start Input Power [dBm]	Minimum Output Power [dBm]	Maximum Output Power [dBm]	Lower Limit Output Power [dBm]	Upper Limit Output Power [dBm]	Margin to Lower Limit [dB]	Margin to Upper Limit [dB]
Pulsed CW	709.010	4.1	21.8	21.9	17.0	30.0	4.8	8.1
AWGN	709.010	-1.8	19.8	20.0	17.0	30.0	2.8	10.0

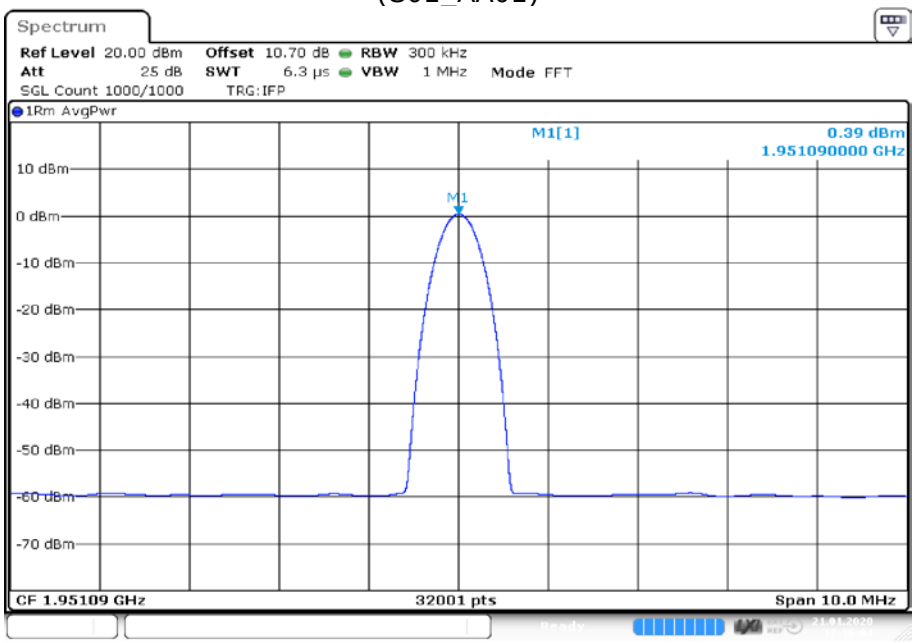
Band 13, uplink

Signal Type	Frequency [MHz]	AGC Start Input Power [dBm]	Minimum Output Power [dBm]	Maximum Output Power [dBm]	Lower Limit Output Power [dBm]	Upper Limit Output Power [dBm]	Margin to Lower Limit [dB]	Margin to Upper Limit [dB]
Pulsed CW	780.390	4.1	21.6	21.8	17.0	30.0	4.6	8.2
AWGN	780.390	-2.4	19.7	19.7	17.0	30.0	2.7	10.3

Remark: Please see next sub-clause for the measurement plot.

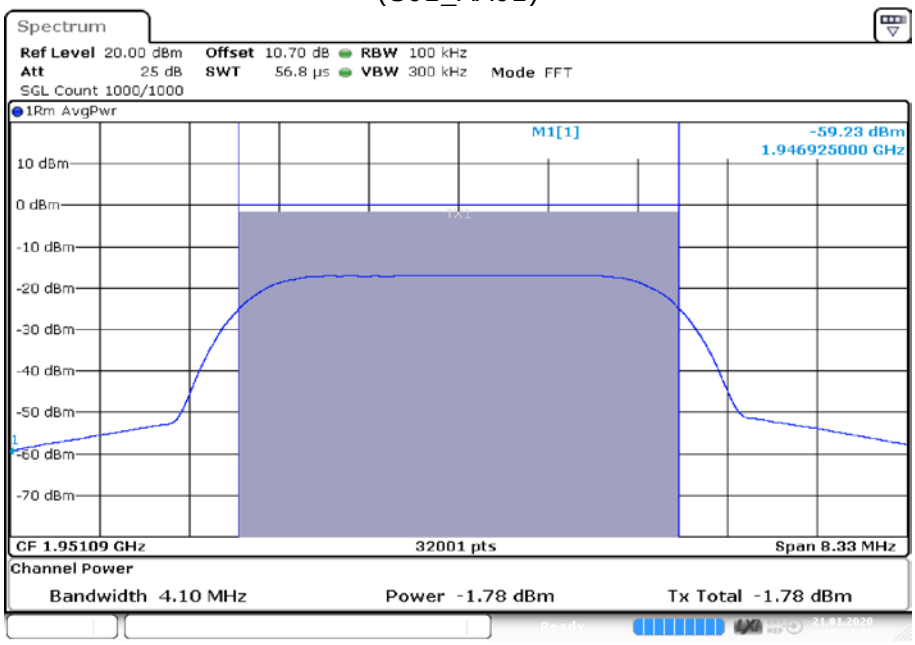
5.2.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, “WORST CASE”)

Frequency Band = Band 2, Direction = Downlink, Signal Type = Pulsed CW (S01_AA01)

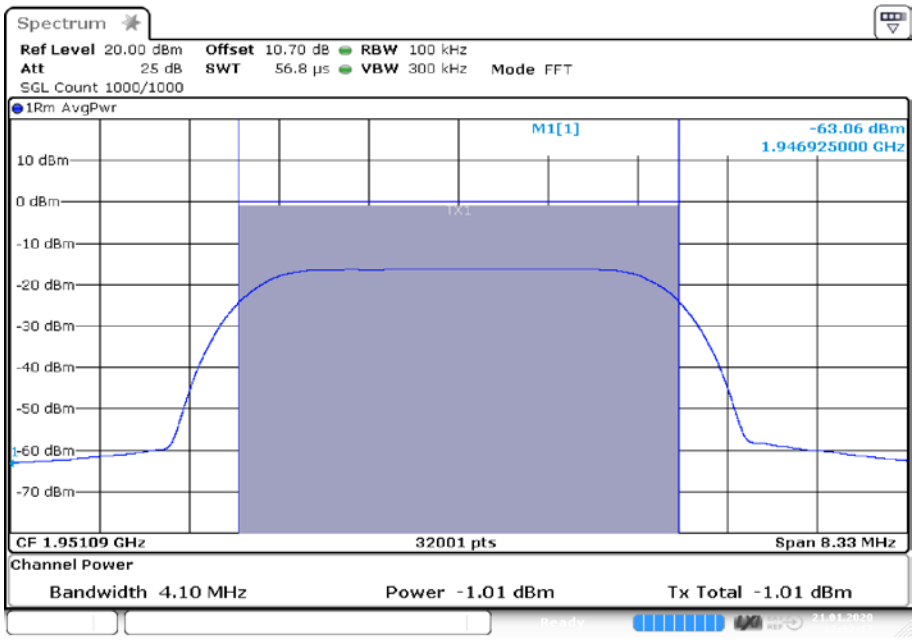


Date: 21.JAN.2020 12:36:05

Frequency Band = Band 2, Direction = Downlink, Signal Type = AWGN (S01_AA01)

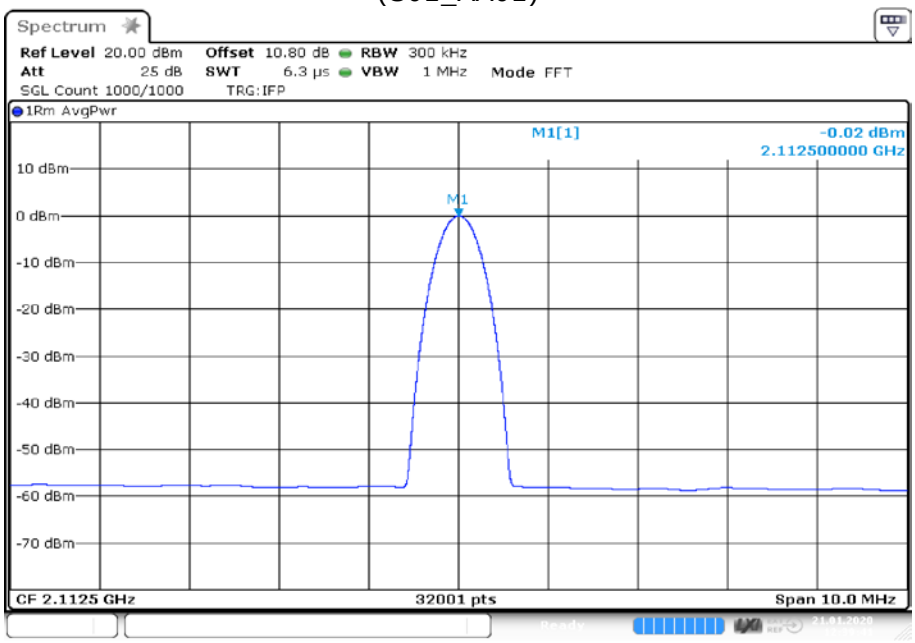


Date: 21.JAN.2020 12:34:19



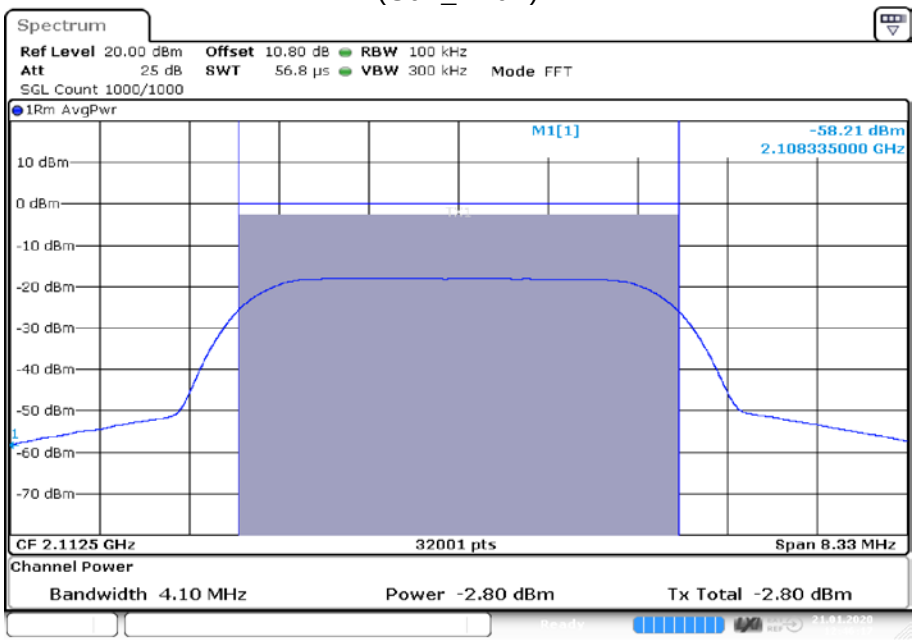
Date: 21.JAN.2020 12:32:17

Frequency Band = Band 4, Direction = Downlink, Signal Type = Pulsed CW (S01_AA01)

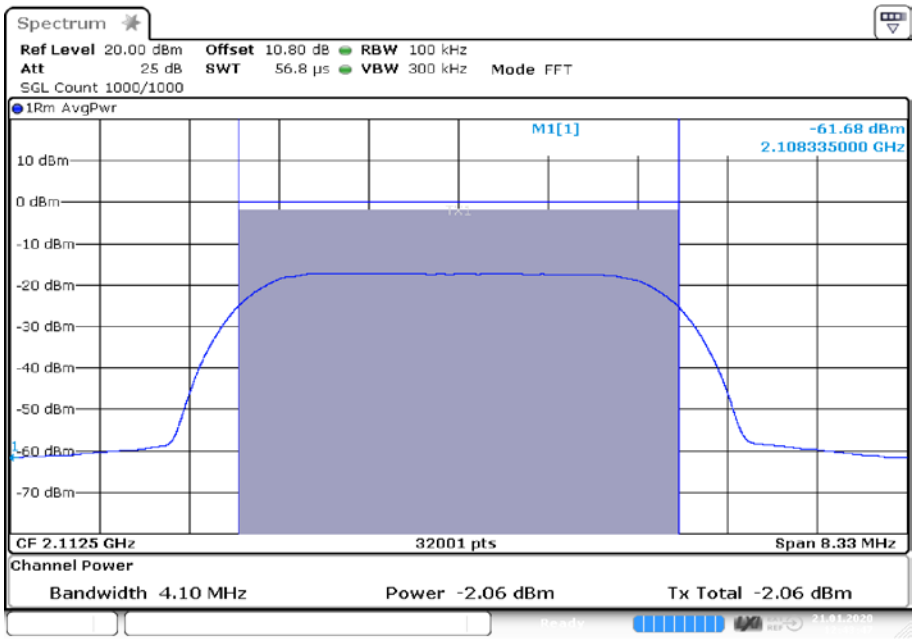


Date: 21.JAN.2020 12:39:42

Frequency Band = Band 4, Direction = Downlink, Signal Type = AWGN (S01_AA01)

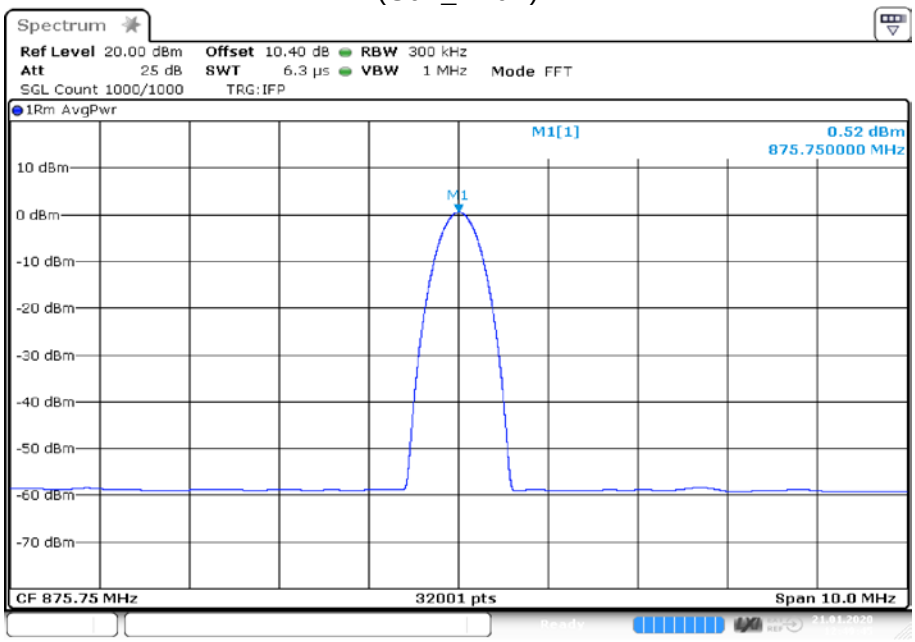


Date: 21.JAN.2020 12:46:18



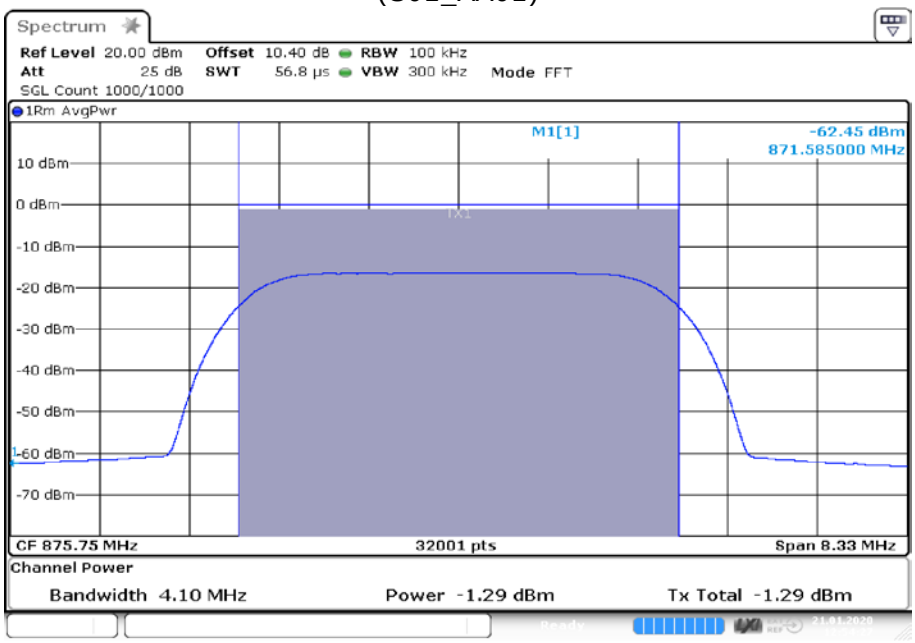
Date: 21.JAN.2020 12:43:48

Frequency Band = Band 5, Direction = Downlink, Signal Type = Pulsed CW (S01_AA01)

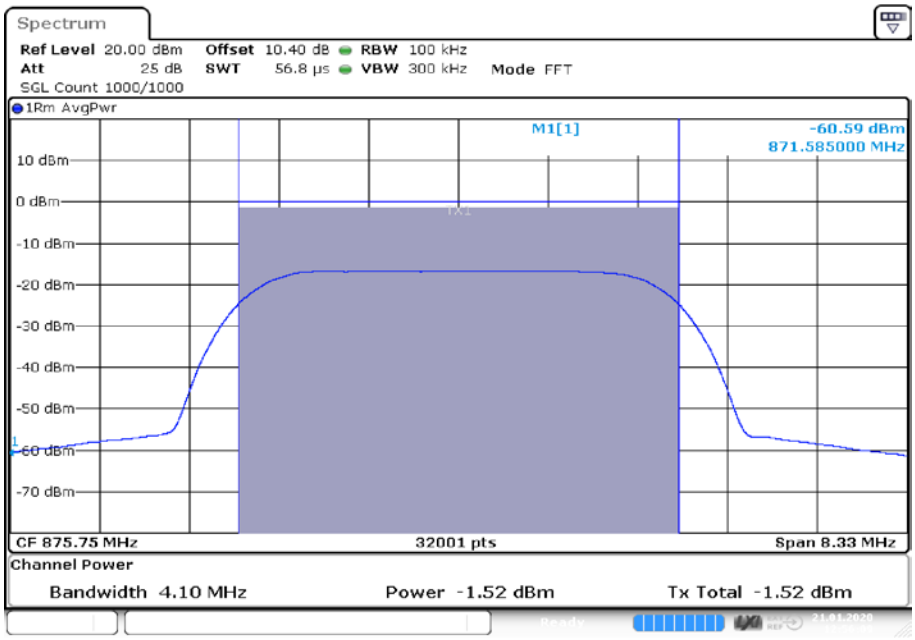


Date: 21.JAN.2020 12:49:46

Frequency Band = Band 5, Direction = Downlink, Signal Type = AWGN (S01_AA01)

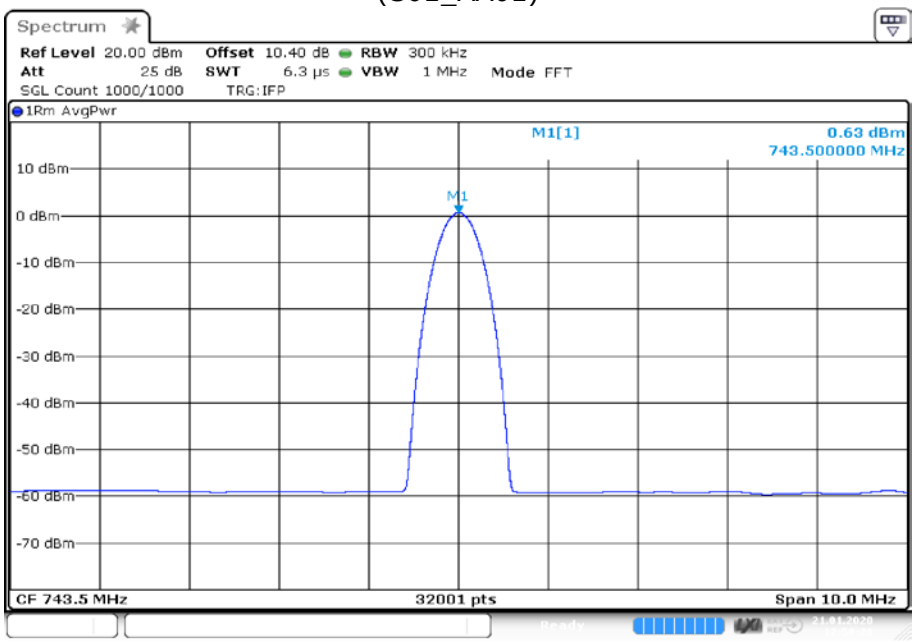


Date: 21.JAN.2020 12:54:28



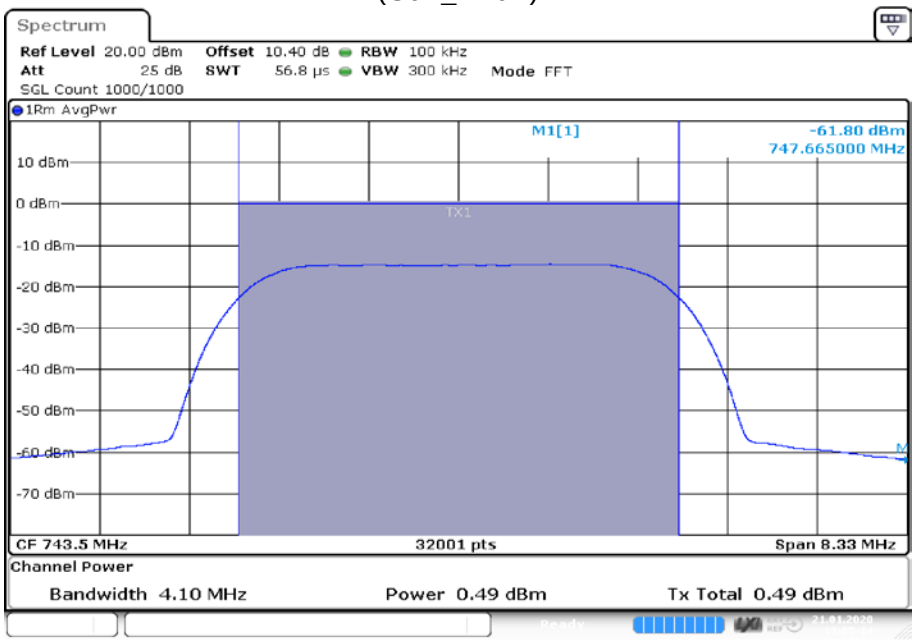
Date: 21.JAN.2020 12:56:09

Frequency Band = Band 12, Direction = Downlink, Signal Type = Pulsed CW (S01_AA01)

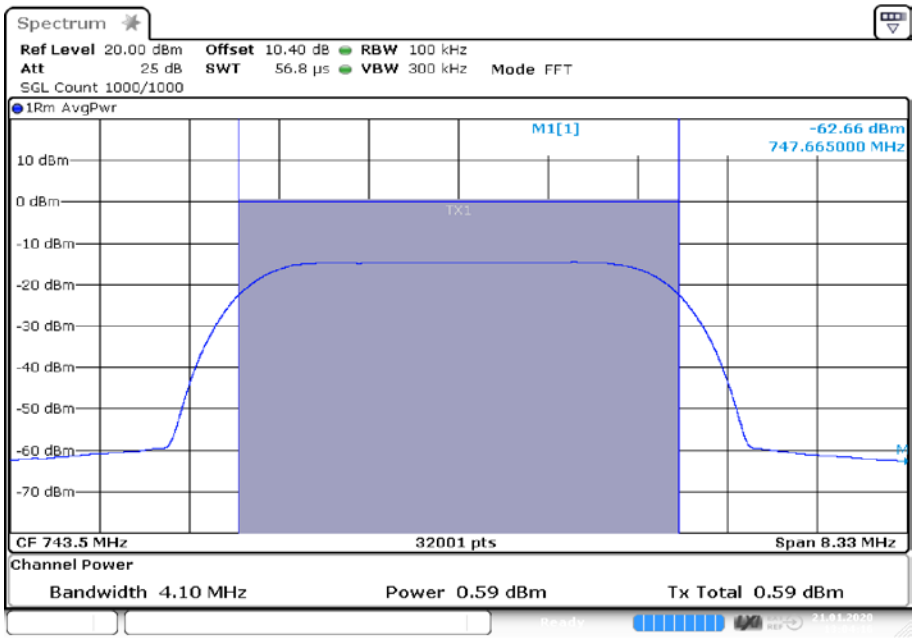


Date: 21.JAN.2020 12:58:20

Frequency Band = Band 12, Direction = Downlink, Signal Type = AWGN (S01_AA01)

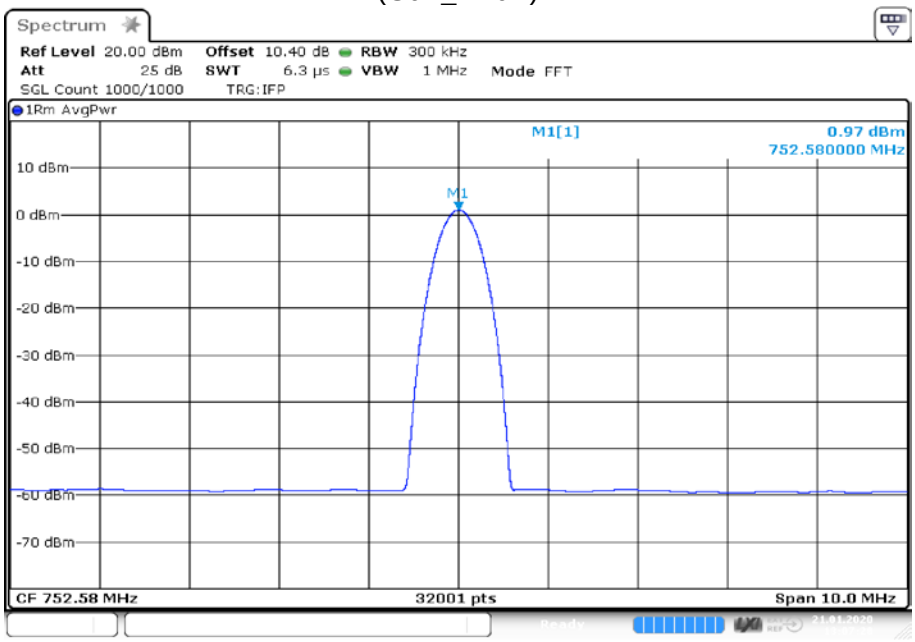


Date: 21.JAN.2020 13:05:14



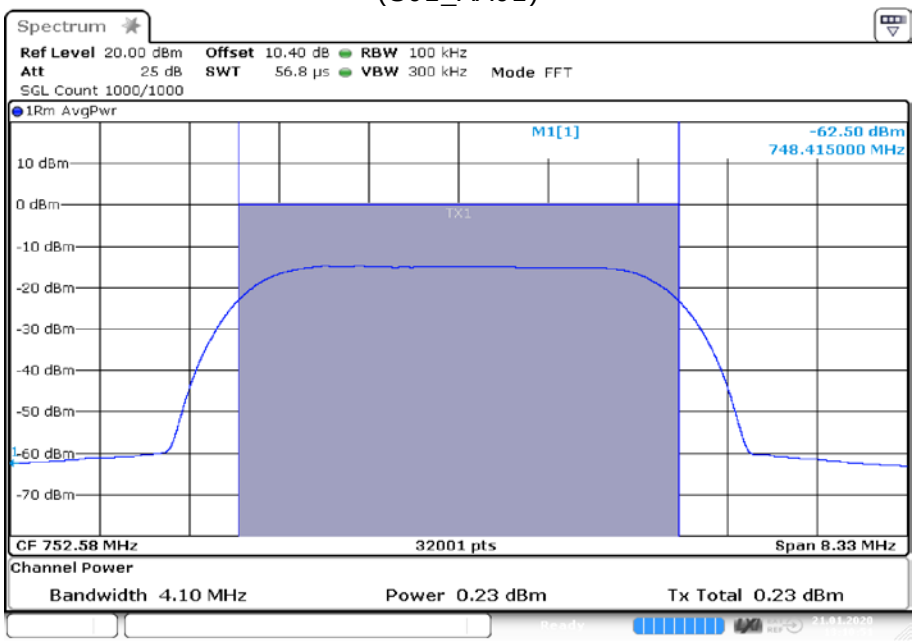
Date: 21.JAN.2020 13:04:17

Frequency Band = Band 13, Direction = Downlink, Signal Type = Pulsed CW (S01_AA01)

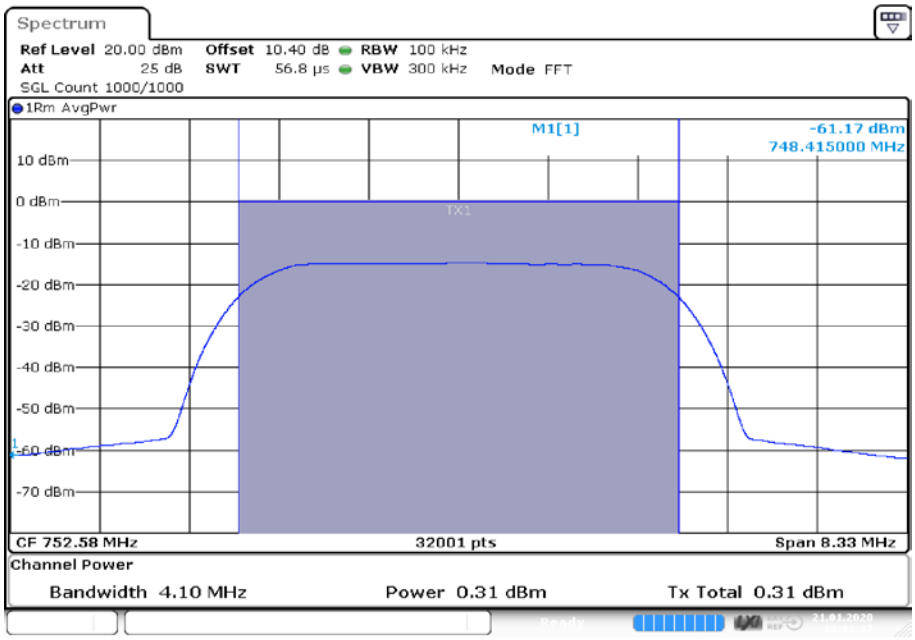


Date: 21.JAN.2020 13:07:29

Frequency Band = Band 13, Direction = Downlink, Signal Type = AWGN (S01_AA01)

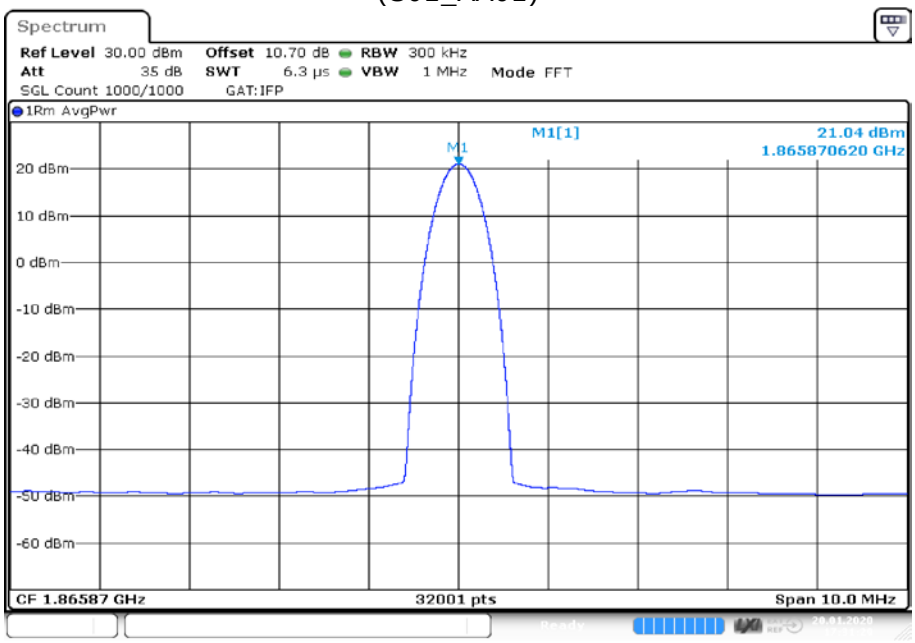


Date: 21.JAN.2020 13:10:52

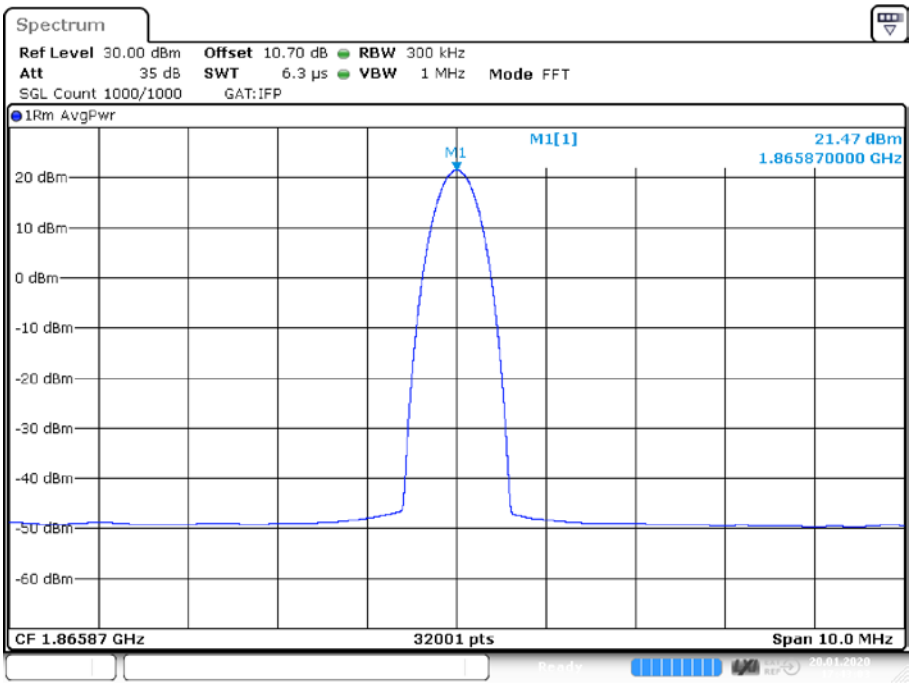


Date: 21.JAN.2020 13:11:38

Frequency Band = Band 2, Direction = Uplink, Signal Type = Pulsed CW (S01_AA01)

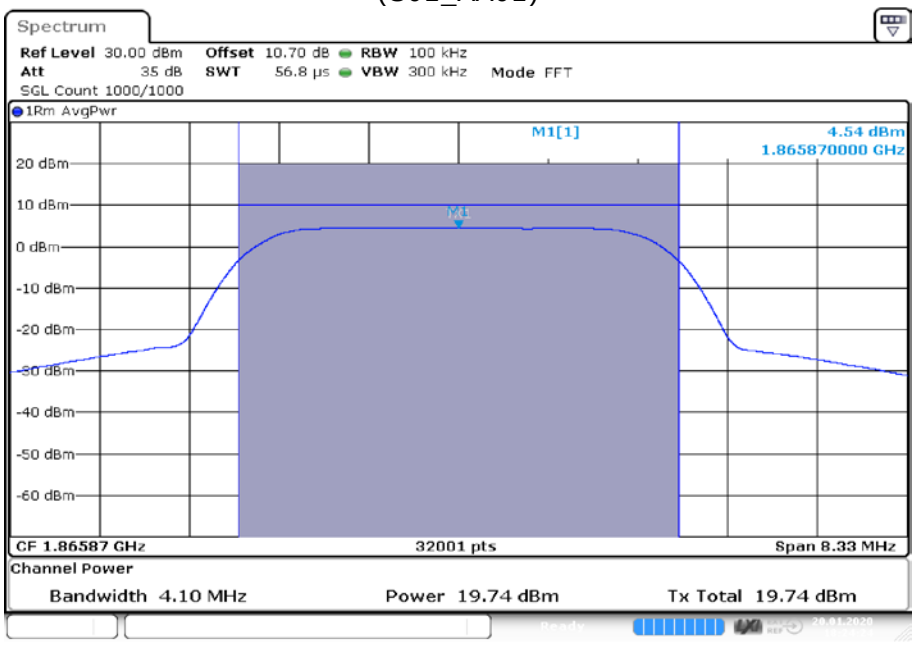


Date: 20.JAN.2020 17:31:29

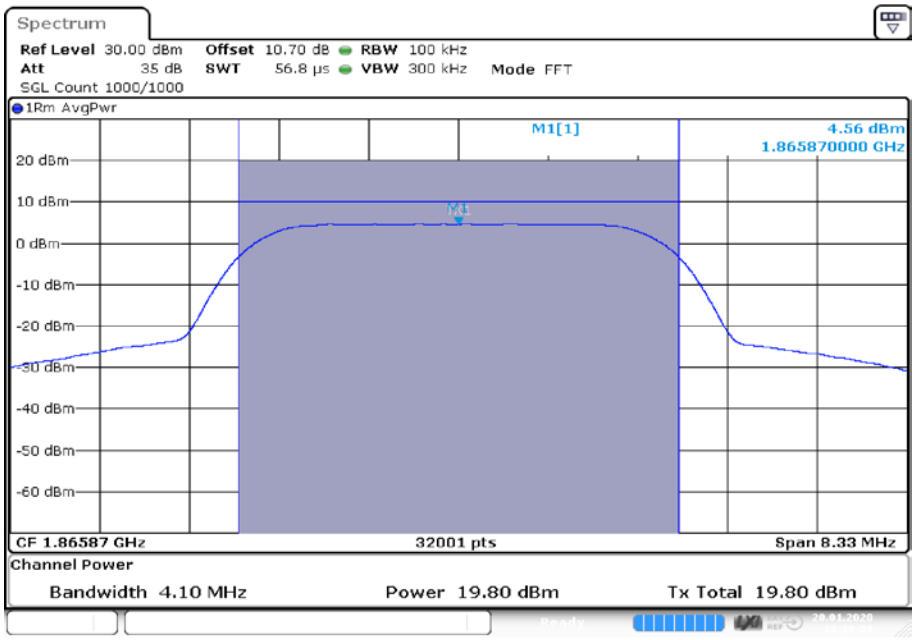


Date: 20.JAN.2020 17:43:03

Frequency Band = Band 2, Direction = Uplink, Signal Type = AWGN (S01_AA01)

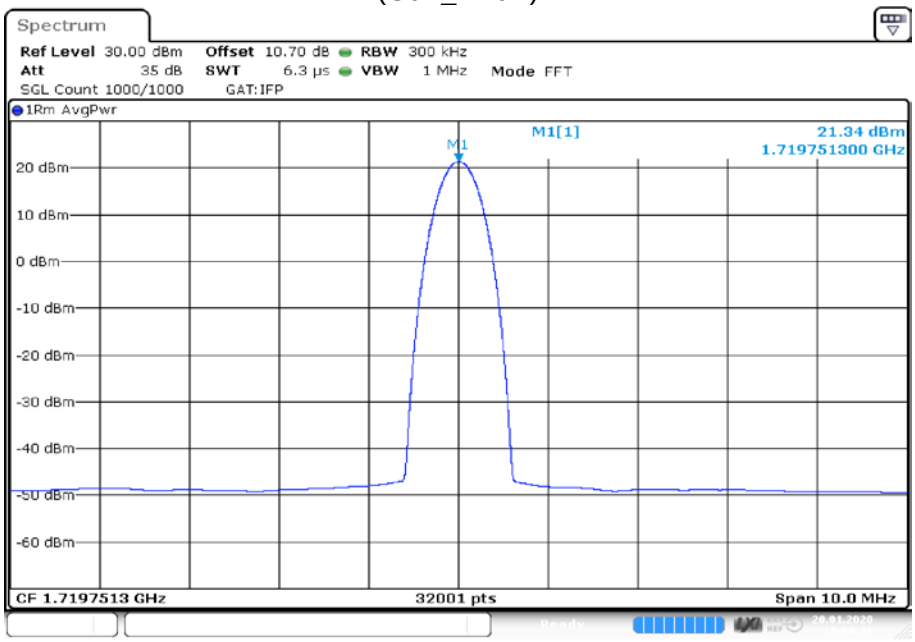


Date: 20.JAN.2020 18:24:25

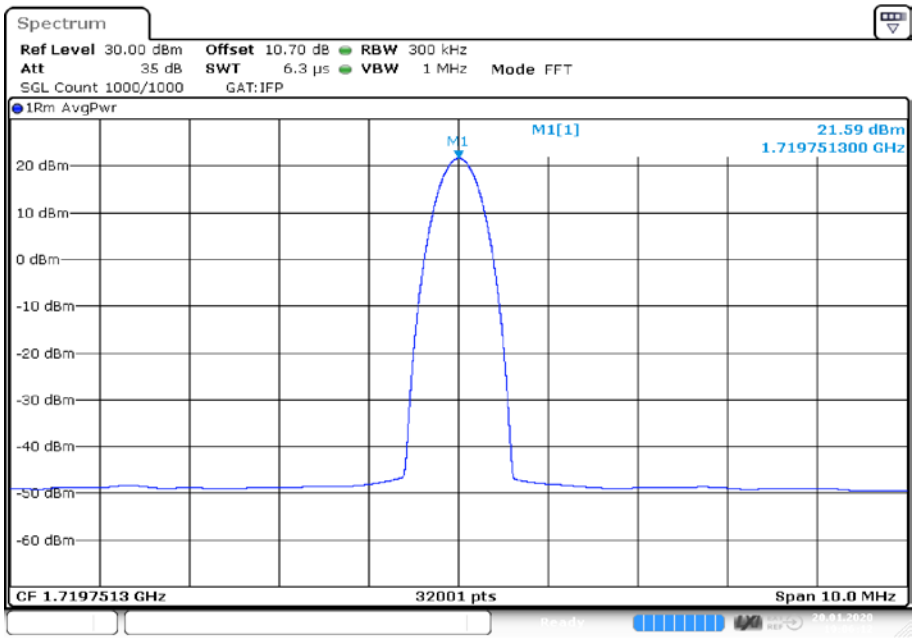


Date: 20.JAN.2020 18:20:08

Frequency Band = Band 4, Direction = Uplink, Signal Type = Pulsed CW (S01_AA01)

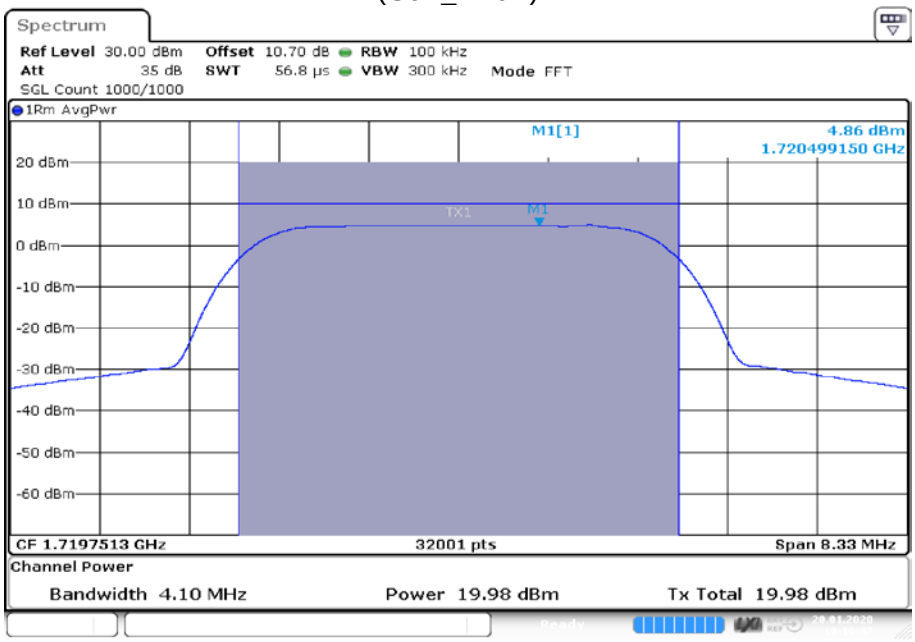


Date: 20.JAN.2020 19:04:28

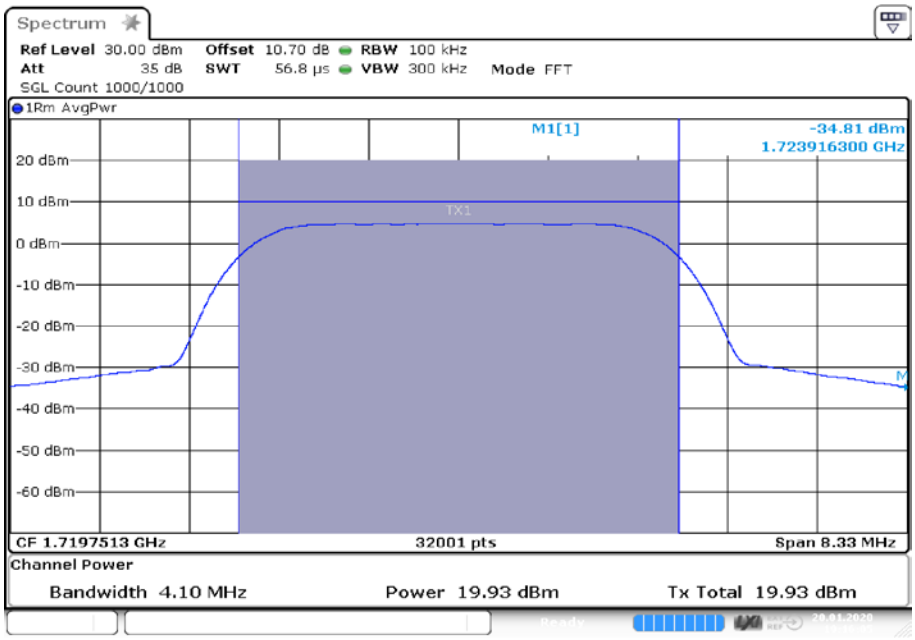


Date: 20.JAN.2020 19:06:12

Frequency Band = Band 4, Direction = Uplink, Signal Type = AWGN (S01_AA01)

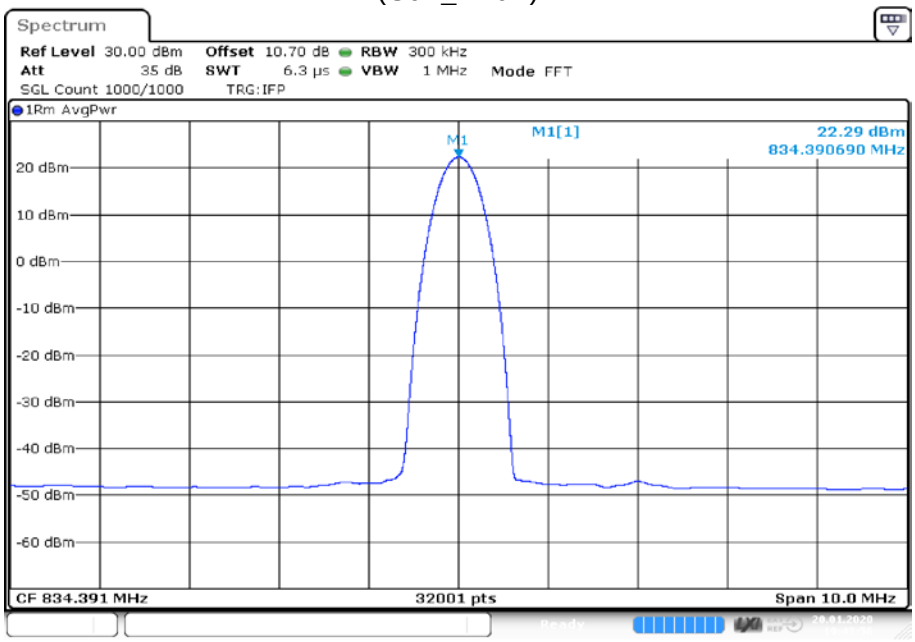


Date: 20.JAN.2020 19:16:47



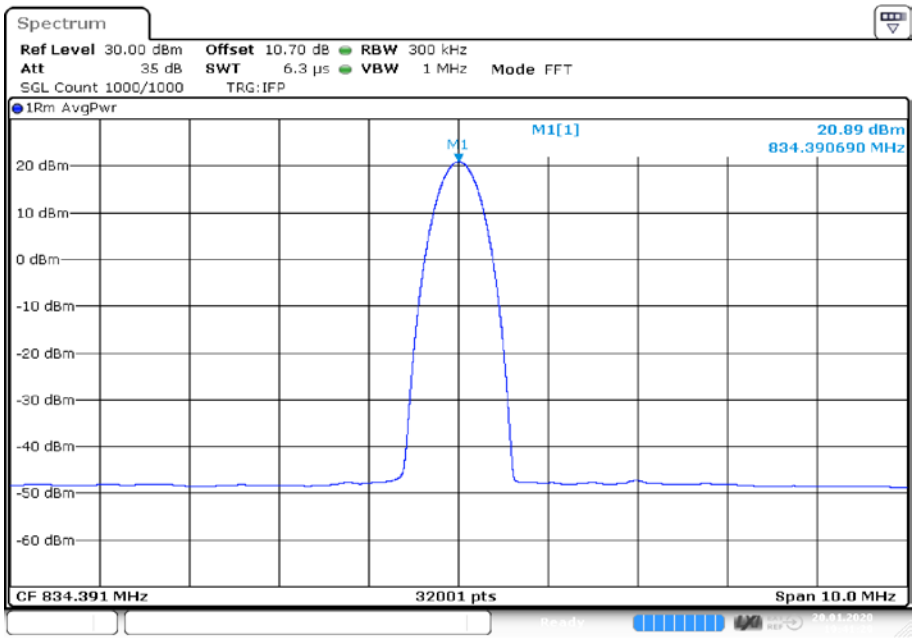
Date: 20.JAN.2020 19:16:05

Frequency Band = Band 5, Direction = Uplink, Signal Type = Pulsed CW (S01_AA01)



Date: 20.JAN.2020 19:43:57

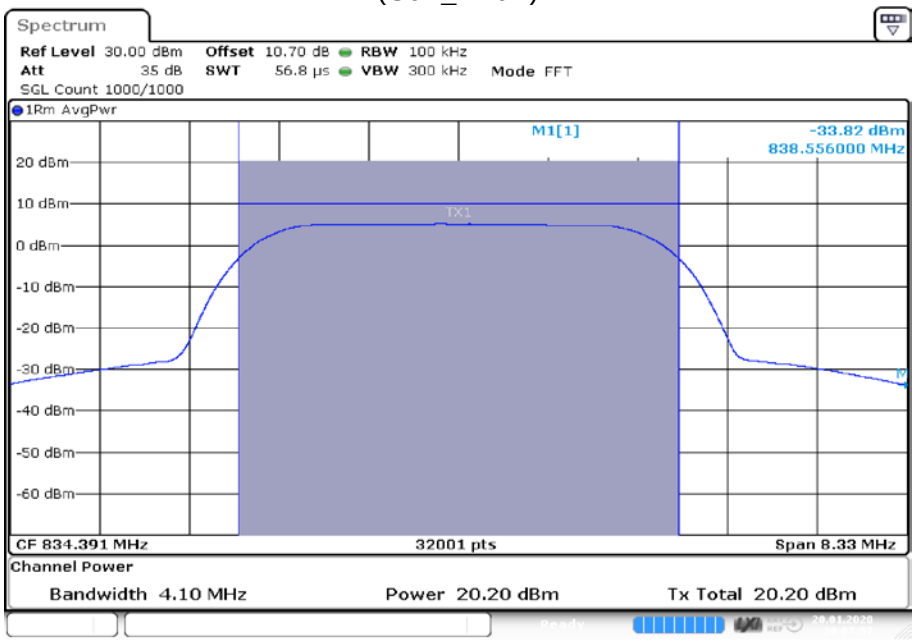
Note: Wrong offset, actual value is 0.3 dB lower



Date: 20.JAN.2020 19:41:29

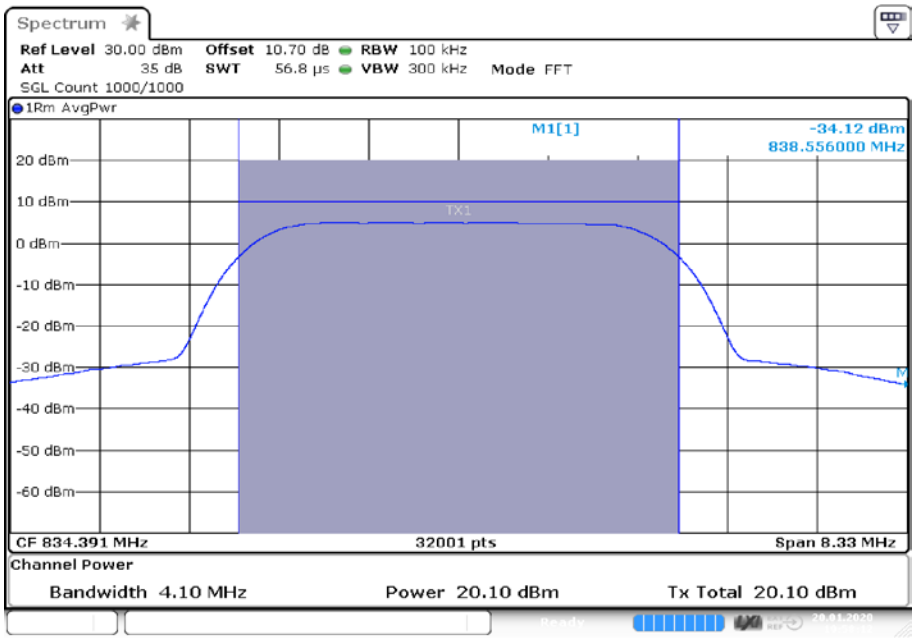
Note: Wrong offset, actual value is 0.3 dB lower

Frequency Band = Band 5, Direction = Uplink, Signal Type = AWGN (S01_AA01)



Date: 20.JAN.2020 20:07:58

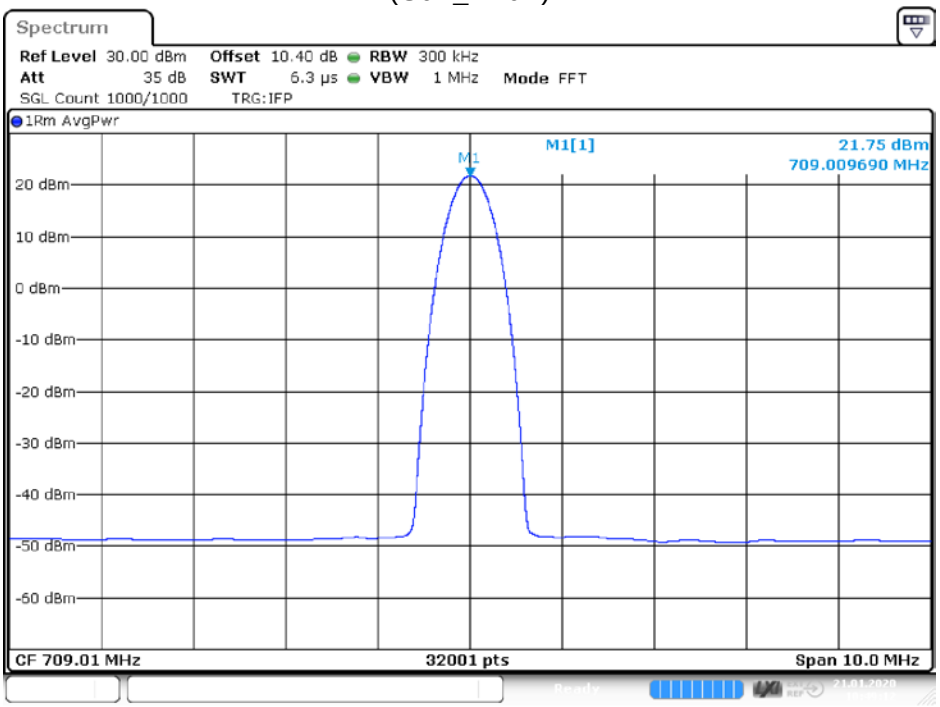
Note: Wrong offset, actual value is 0.3 dB lower



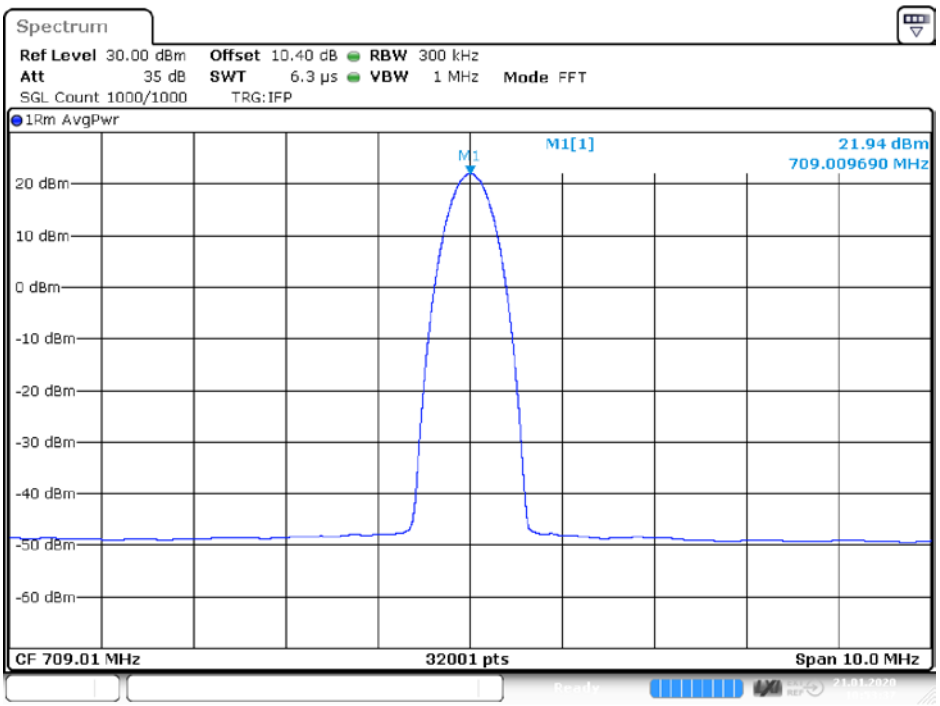
Date: 20.JAN.2020 19:58:12

Note: Wrong offset, actual value is 0.3 dB lower

Frequency Band = Band 12, Direction = Uplink, Signal Type = Pulsed CW (S01_AA01)

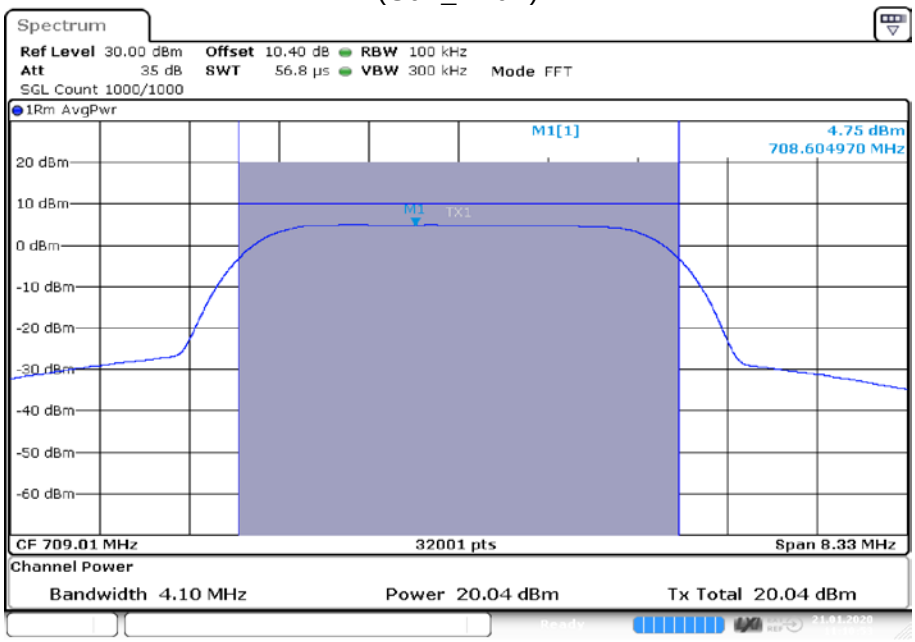


Date: 21.JAN.2020 10:49:13

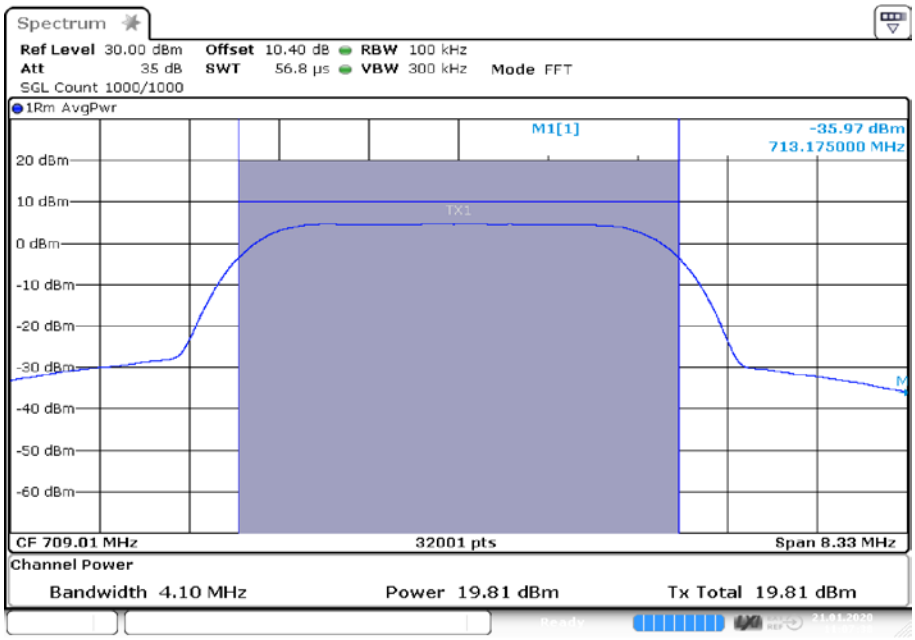


Date: 21.JAN.2020 10:53:37

Frequency Band = Band 12, Direction = Uplink, Signal Type = AWGN (S01_AA01)

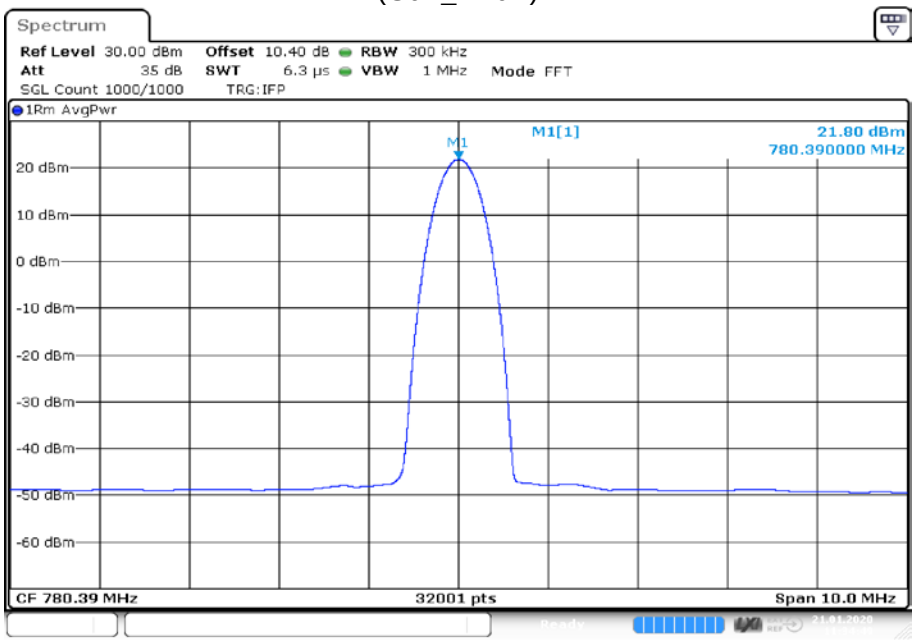


Date: 21.JAN.2020 11:10:53

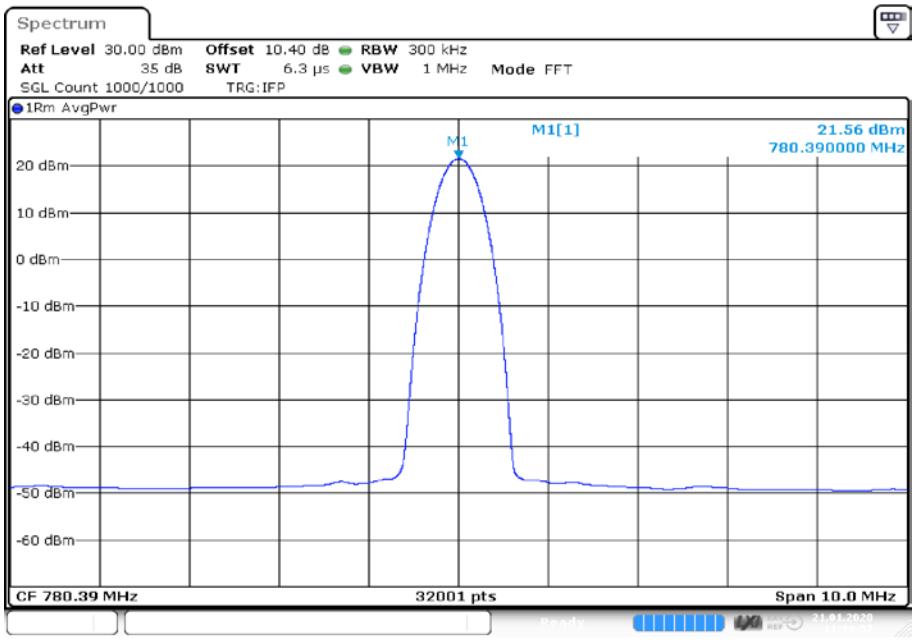


Date: 21.JAN.2020 11:07:38

Frequency Band = Band 13, Direction = Uplink, Signal Type = Pulsed CW (S01_AA01)

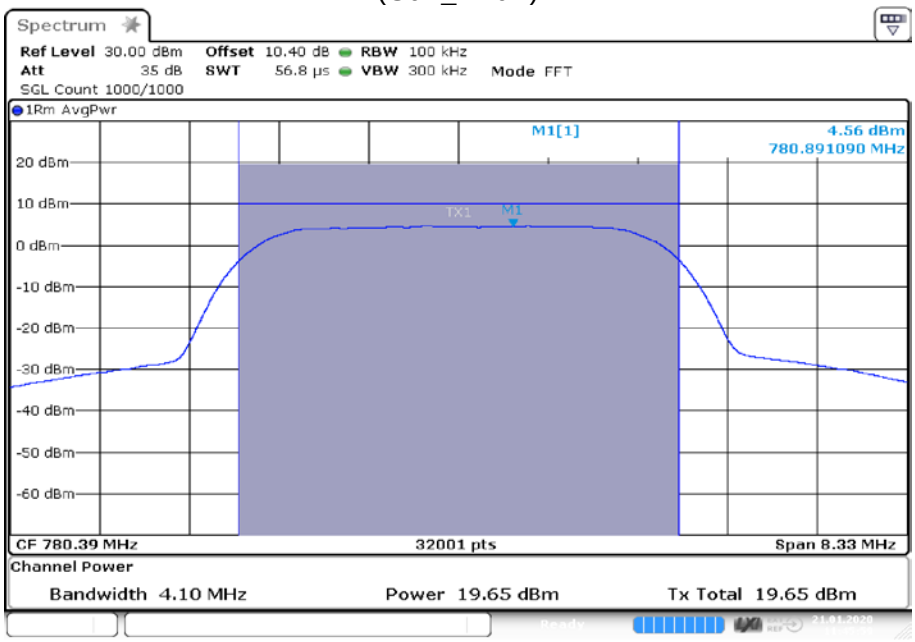


Date: 21.JAN.2020 11:34:50

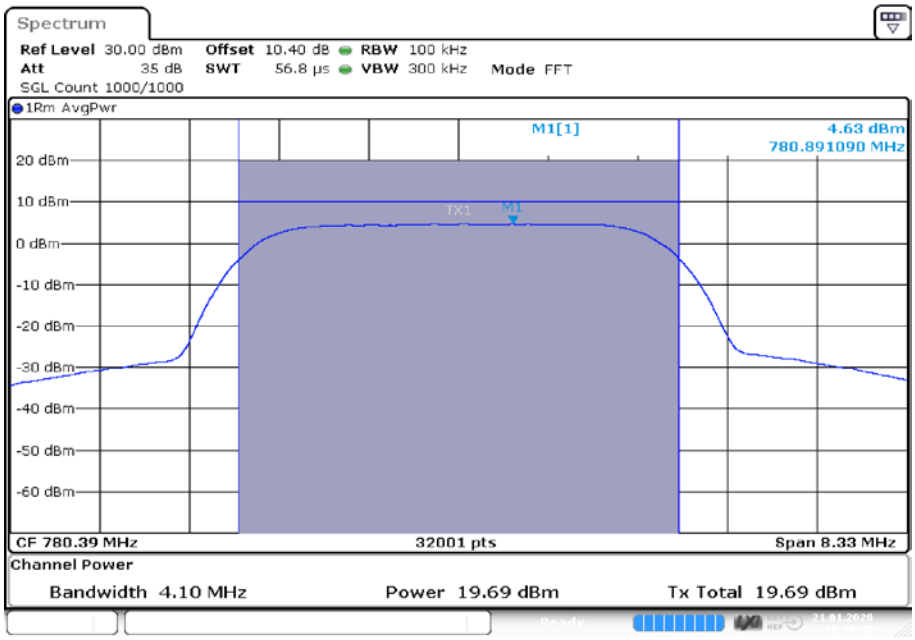


Date: 21.JAN.2020 11:39:57

Frequency Band = Band 13, Direction = Uplink, Signal Type = AWGN (S01_AA01)



Date: 21.JAN.2020 11:46:00



Date: 21.JAN.2020 11:46:48

5.2.5 TEST EQUIPMENT USED

- R&S TS8997

5.3 MAXIMUM BOOSTER GAIN

Standard

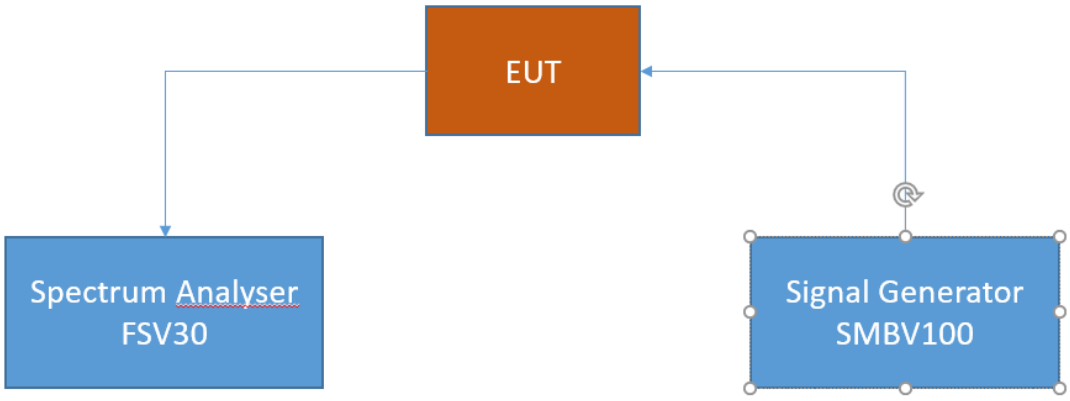
The test was performed according to:
KDB 935210 D03

5.3.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the signal booster gain limits and bidirectional capabilities as specified in § 20.21(e)(8)(i)(C)(2) and § 20.21(e)(8)(i)(B) for wideband consumer signal boosters.

The results of this test case are computed by the measurement values from test case 7.1 and 7.2.

The EUT was connected to the test setup according to the following diagram:



FCC Part 20.21; Consumer Signal Booster – Test Setup 7.3; Maximum Booster Gain

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

5.3.2 TEST REQUIREMENTS / LIMITS

FCC Part 20, § 20.21(e)(8)(i)(C)(2)

Booster Gain Limits. The uplink and downlink maximum gain of a Consumer Booster referenced to its input and output ports shall not exceed the following limits:
(*i*) Fixed Booster maximum gain shall not exceed 6.5 dB + 20 Log_{10} (Frequency)
(*ii*) Where, Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz.
(*iii*) Mobile Booster maximum gain shall not exceed 50 dB when using an inside antenna (e.g., inside a vehicle), 23 dB when using direct contact coupling (e.g., cradle-type boosters), or 15 dB when directly connected (e.g., boosters with a physical connection to the phone).

FCC Part 20, § 20.21(e)(8)(i)(B)

Bidirectional Capability. Consumer Boosters must be able to provide equivalent uplink and downlink gain and conducted uplink power output that is at least 0.05 watts. One-way consumer boosters (*i.e.,* uplink only, downlink only, uplink impaired, downlink impaired) are prohibited. Spectrum block filtering may be used provided the uplink filter attenuation is not less than the downlink filter attenuation, and where RSSI is measured after spectrum block filtering is applied referenced to the booster's input port for each band of operation.

Note:
The margin for equivalent uplink and downlink gain is considered as 9 dB. This margin is a provisional specification determined by the ANSI ASC C63® task group working in collaboration and consultation with FCC OET Laboratory Division staff.

5.3.3 TEST PROTOCOL

Ambient temperature: 25 °C
Air Pressure: 1036 hPa
Humidity: 34 %

Band 2

Signal Type	Maximum Gain Downlink [dB]	Maximum Gain Uplink [dB]	Difference Gain [dB]	Absolut Gain Limit [dB]	Difference Gain Limit [dB]	Margin Absolute Gain Downlink [dB]	Margin Absolute Gain Uplink [dB]	Margin Difference Gain [dB]
Pulsed CW	20.4	18.4	2.0	23.0	9.0	2.6	4.6	7.1
AWGN	22.0	21.7	0.3	23.0	9.0	1.0	1.3	8.7

Band 4

Signal Type	Maximum Gain Downlink [dB]	Maximum Gain Uplink [dB]	Difference Gain [dB]	Absolut Gain Limit [dB]	Difference Gain Limit [dB]	Margin Absolute Gain Downlink [dB]	Margin Absolute Gain Uplink [dB]	Margin Difference Gain [dB]
Pulsed CW	20.0	20.6	0.6	23.0	9.0	3.0	2.4	8.4
AWGN	21.8	22.0	0.2	23.0	9.0	1.2	1.0	8.8

Band 5

Signal Type	Maximum Gain Downlink [dB]	Maximum Gain Uplink [dB]	Difference Gain [dB]	Absolut Gain Limit [dB]	Difference Gain Limit [dB]	Margin Absolute Gain Downlink [dB]	Margin Absolute Gain Uplink [dB]	Margin Difference Gain [dB]
Pulsed CW	20.5	17.0	3.5	23.0	9.0	2.5	6.0	5.5
AWGN	22.1	21.1	1.0	23.0	9.0	0.9	1.9	8.0

Band 12

Signal Type	Maximum Gain Downlink [dB]	Maximum Gain Uplink [dB]	Difference Gain [dB]	Absolut Gain Limit [dB]	Difference Gain Limit [dB]	Margin Absolute Gain Downlink [dB]	Margin Absolute Gain Uplink [dB]	Margin Difference Gain [dB]
Pulsed CW	20.6	17.7	3.0	23.0	9.0	2.4	5.4	6.0
AWGN	22.3	20.0	2.3	23.0	9.0	0.7	3.0	6.8

Band 13

Signal Type	Maximum Gain Downlink [dB]	Maximum Gain Uplink [dB]	Difference Gain [dB]	Absolut Gain Limit [dB]	Difference Gain Limit [dB]	Margin Absolute Gain Downlink [dB]	Margin Absolute Gain Uplink [dB]	Margin Difference Gain [dB]
Pulsed CW	21.0	17.6	3.4	23.0	9.0	2.0	5.4	5.6
AWGN	22.4	22.1	0.4	23.0	9.0	0.6	1.0	8.6

Remark: Values are taken from measurements of test case Maximum Power.

5.3.4 TEST EQUIPMENT USED

- R&S TS8997

5.4 INTERMODULATION

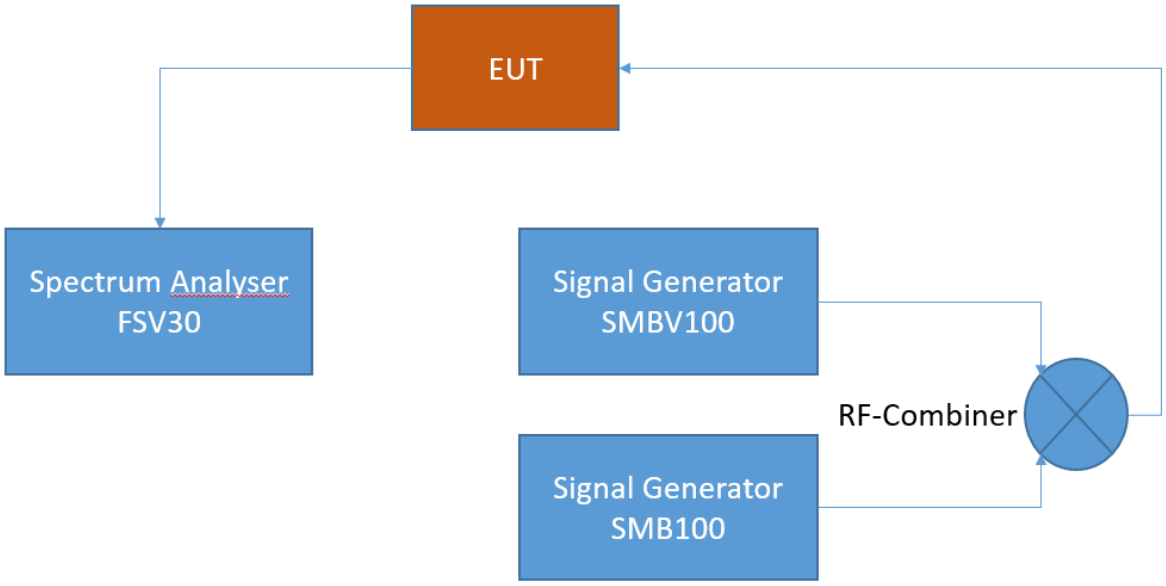
Standard

The test was performed according to:
KDB 935210 D03

5.4.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the intermodulation limit § 20.21(e)(8)(i)(F) for wideband consumer signal boosters.

The EUT was connected to the test setup according to the following diagram:



FCC Part 20.21; Consumer Signal Booster – Test Setup 7.4; Intermodulation

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

5.4.2 TEST REQUIREMENTS / LIMITS

FCC Part 20, § 20.21(e)(8)(i)(F)

Intermodulation Limits. The transmitted intermodulation products of a consumer booster at its uplink and downlink ports shall not exceed the power level of −19 dBm for the supported bands of operation. Compliance with intermodulation limits will use boosters operating at maximum gain and maximum rated output power, with two continuous wave (CW) input signals spaced 600 kHz apart and centered in the pass band of the booster, and with a 3 kHz measurement bandwidth.

5.4.3 TEST PROTOCOL

Ambient temperature: 23 °C
Air Pressure: 1030 hPa
Humidity: 34 %

Band 2, downlink

Input Power	f1 [MHz]	f2 [MHz]	Combined Input Power [dBm]	Maximum Inter modulation [dBm]	Inter modulation Limit [dBm]	Margin to Limit [dB]
AGC	1950.8	1951.4	-21.4	-49.6	-19.0	30.6
	1950.8	1951.4	-20.0	-46.5	-19.0	27.5

Band 4, downlink

Input Power	f1 [MHz]	f2 [MHz]	Combined Input Power [dBm]	Maximum Inter modulation [dBm]	Inter modulation Limit [dBm]	Margin to Limit [dB]
AGC	2110.1	2110.7	-22.1	-49.3	-19.0	30.3
	2110.1	2110.7	-20.0	-45.0	-19.0	26.0

Band 5, downlink

Input Power	f1 [MHz]	f2 [MHz]	Combined Input Power [dBm]	Maximum Inter modulation [dBm]	Inter modulation Limit [dBm]	Margin to Limit [dB]
AGC	875.5	876.1	-22.1	-55.1	-19.0	36.1
	875.5	876.1	-20.0	-52.9	-19.0	33.9

Band 12, downlink

Input Power	f1 [MHz]	f2 [MHz]	Combined Input Power [dBm]	Maximum Inter modulation [dBm]	Inter modulation Limit [dBm]	Margin to Limit [dB]
AGC	745.4	746.0	-20.3	-52.2	-19.0	33.2
	745.4	746.0	-20.0	-48.5	-19.0	29.5

Band 13, downlink

Input Power	f1 [MHz]	f2 [MHz]	Combined Input Power [dBm]	Maximum Inter modulation [dBm]	Inter modulation Limit [dBm]	Margin to Limit [dB]
AGC	752.3	752.9	-20.0	-51.7	-19.0	32.7

Band 2, uplink

Input Power	f1 [MHz]	f2 [MHz]	Combined Input Power [dBm]	Maximum Inter modulation [dBm]	Inter modulation Limit [dBm]	Margin to Limit [dB]
AGC	1865.6	1866.2	-0.2	-22.5	-19.0	3.5
	1865.6	1866.2	1.8	-22.5	-19.0	3.5
	1865.6	1866.2	3.8	-22.2	-19.0	3.2
	1865.6	1866.2	5.8	-24.5	-19.0	5.5
	1865.6	1866.2	7.8	-22.6	-19.0	3.6
AGC+10dB	1865.6	1866.2	9.8	-22.7	-19.0	3.7

Band 4, uplink

Input Power	f1 [MHz]	f2 [MHz]	Combined Input Power [dBm]	Maximum Inter modulation [dBm]	Inter modulation Limit [dBm]	Margin to Limit [dB]
AGC	1719.5	1720.1	-1.0	-22.1	-19.0	3.1
	1719.5	1720.1	1.0	-20.7	-19.0	1.7
	1719.5	1720.1	3.0	-21.1	-19.0	2.1
	1719.5	1720.1	5.0	-21.9	-19.0	2.9
	1719.5	1720.1	7.0	-23.5	-19.0	4.5
AGC+10dB	1719.5	1720.1	9.0	-22.5	-19.0	3.5

Band 5, uplink

Input Power	f1 [MHz]	f2 [MHz]	Input Power [dBm]	Maximum Inter modulation [dBm]	Inter modulation Limit [dBm]	Margin to Limit [dB]
AGC	834.1	834.7	-0.2	-28.7	-19.0	9.7
	834.1	834.7	1.8	-26.0	-19.0	7.0
	834.1	834.7	3.8	-26.0	-19.0	7.0
	834.1	834.7	5.8	-26.4	-19.0	7.4
	834.1	834.7	7.8	-27.4	-19.0	8.4
AGC+10dB	834.1	834.7	9.8	-28.4	-19.0	9.4

Band 12, uplink

Input Power	f1 [MHz]	f2 [MHz]	Input Power [dBm]	Maximum Inter modulation [dBm]	Inter modulation Limit [dBm]	Margin to Limit [dB]
AGC	708.7	709.3	0.0	-22.5	-19.0	3.5
	708.7	709.3	2.0	-22.4	-19.0	3.4
	708.7	709.3	4.0	-22.3	-19.0	3.3
	708.7	709.3	6.0	-22.5	-19.0	3.5
	708.7	709.3	8.0	-22.2	-19.0	3.2
AGC+10dB	708.7	709.3	10.0	-22.2	-19.0	3.2

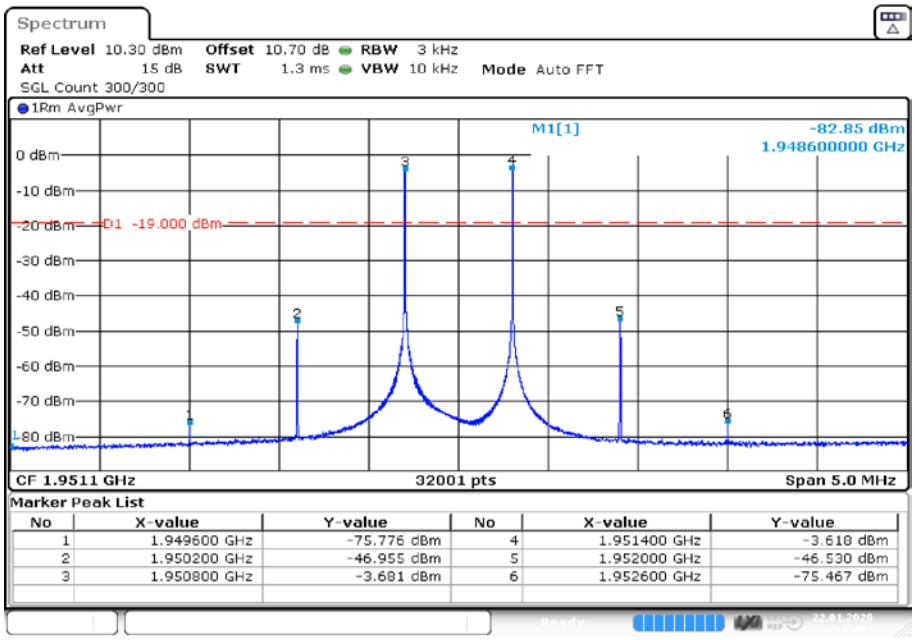
Band 13, uplink

Input Power	f1 [MHz]	f2 [MHz]	Input Power [dBm]	Maximum Inter modulation [dBm]	Inter modulation Limit [dBm]	Margin to Limit [dB]
AGC	780.1	780.7	-0.5	-27.7	-19.0	8.7
	780.1	780.7	1.5	-27.9	-19.0	8.9
	780.1	780.7	3.5	-27.7	-19.0	8.7
	780.1	780.7	5.5	-27.6	-19.0	8.6
	780.1	780.7	7.5	-27.3	-19.0	8.3
AGC+10dB	780.1	780.7	9.5	-27.3	-19.0	8.3

Remark: Please see next sub-clause for the measurement plot.

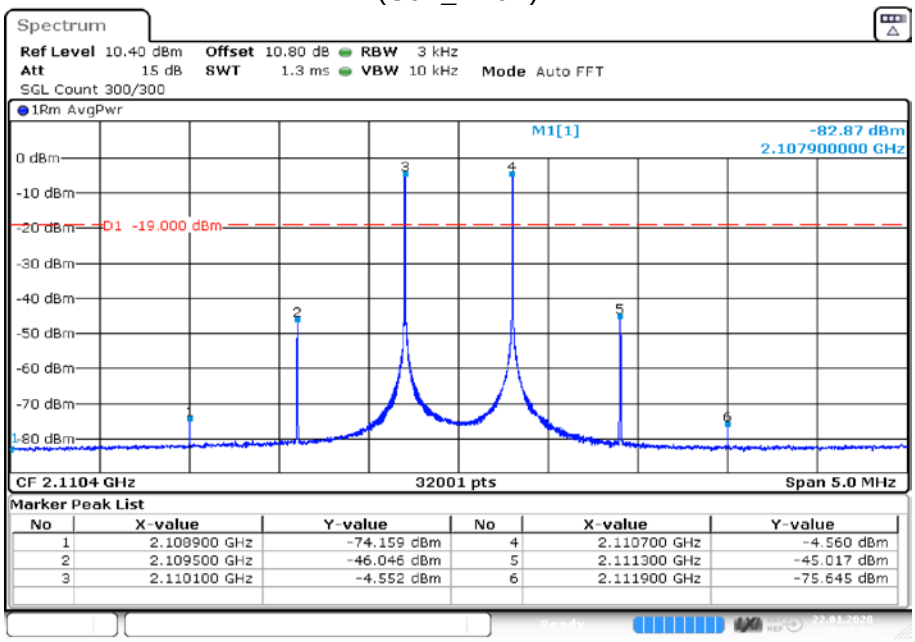
5.4.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, “WORST CASE”)

Frequency Band = Band 2, Direction = Downlink, Input Power = AGC (S01_AA01)



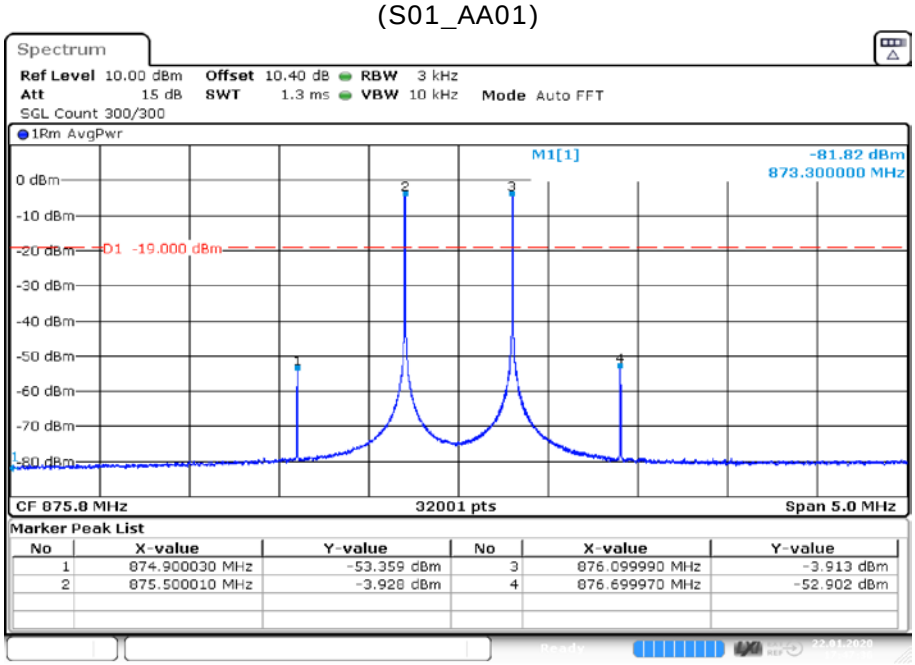
Date: 22.JAN.2020 17:55:43

Frequency Band = Band 4, Direction = Downlink, Input Power = AGC (S01_AA01)



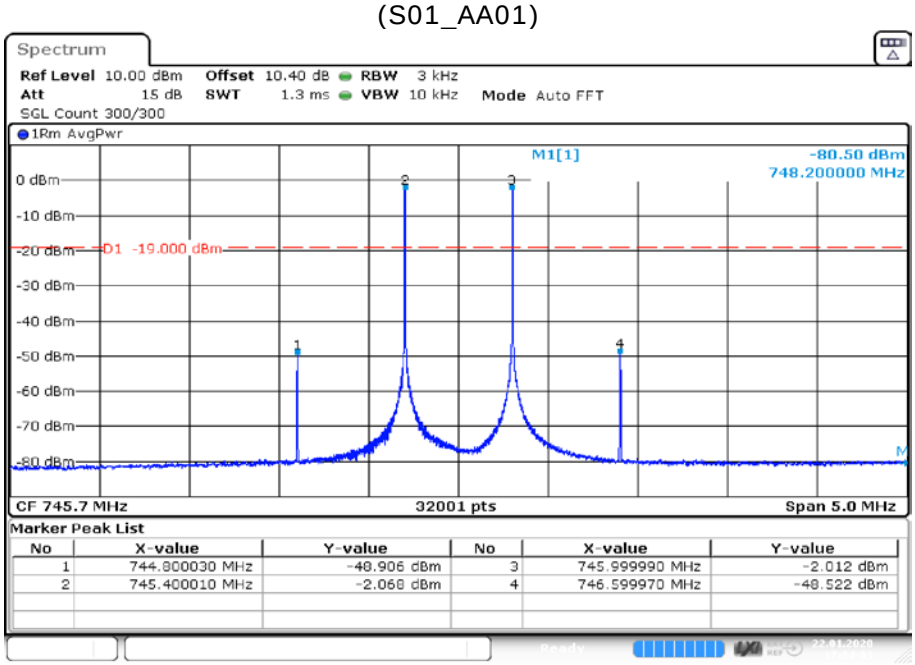
Date: 22.JAN.2020 18:11:29

Frequency Band = Band 5, Direction = Downlink, Input Power = AGC (S01_AA01)



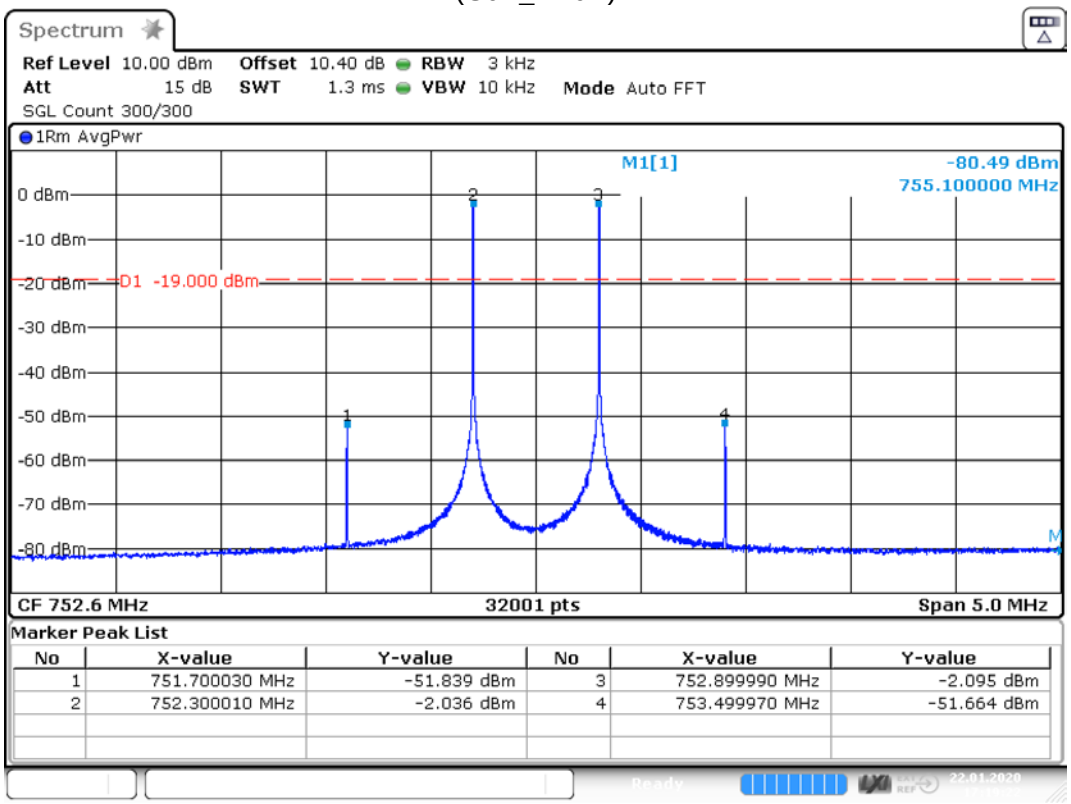
Date: 22.JAN.2020 17:47:36

Frequency Band = Band 12, Direction = Downlink, Input Power = AGC (S01_AA01)



Date: 22.JAN.2020 17:34:03

Frequency Band = Band 13, Direction = Downlink, Input Power = AGC (S01_AA01)

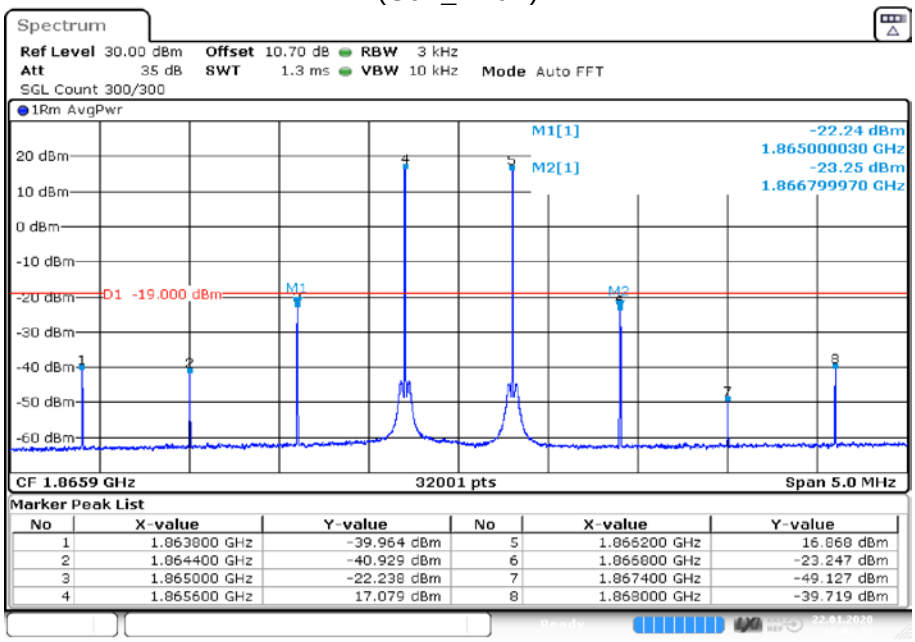


Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	751.700030 MHz	-51.839 dBm	3	752.899990 MHz	-2.095 dBm
2	752.300010 MHz	-2.036 dBm	4	753.499970 MHz	-51.664 dBm

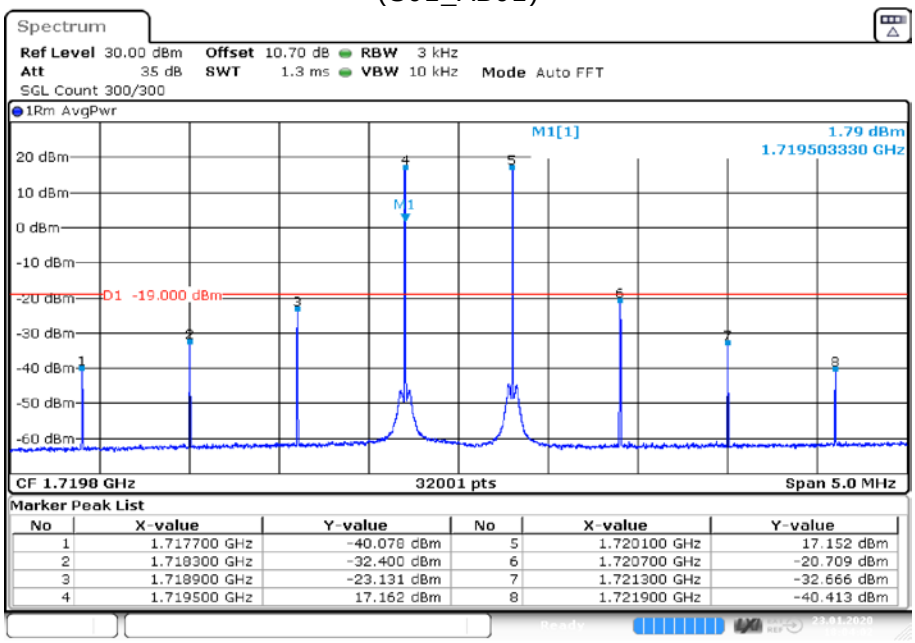
Date: 22.JAN.2020 17:19:22

Frequency Band = Band 2, Direction = Uplink, Input Power = AGC (S01_AA01)



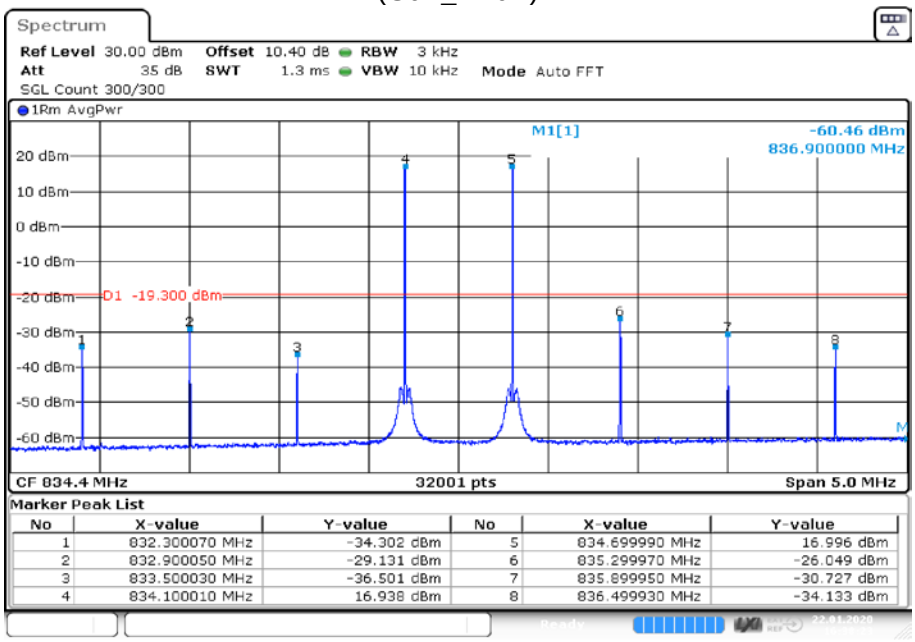
Date: 22.JAN.2020 16:02:33

Frequency Band = Band 4, Direction = Uplink, Input Power = AGC (S01_AB01)



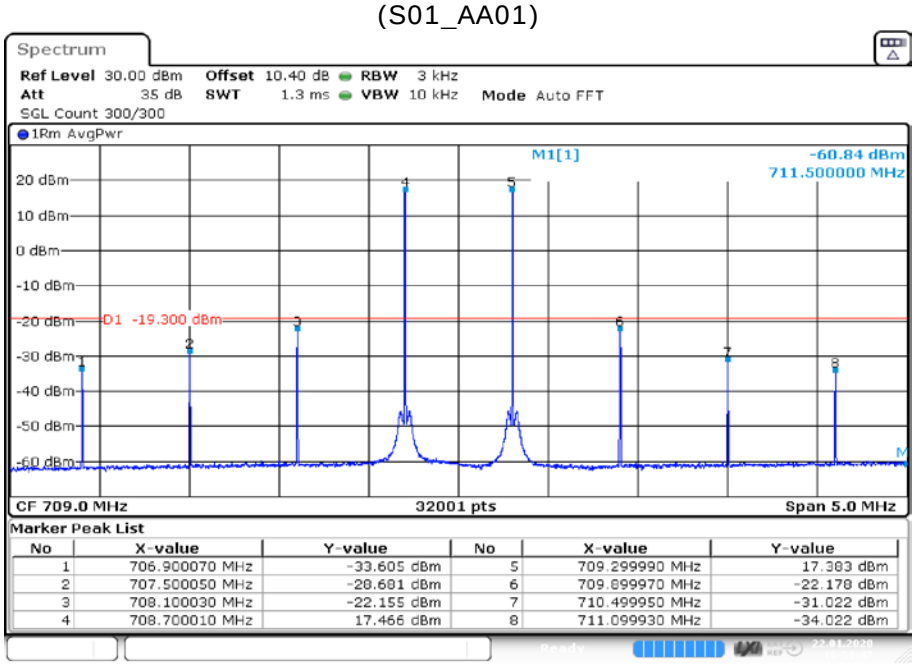
Date: 23.JAN.2020 18:04:01

Frequency Band = Band 5, Direction = Uplink, Input Power = AGC (S01_AA01)



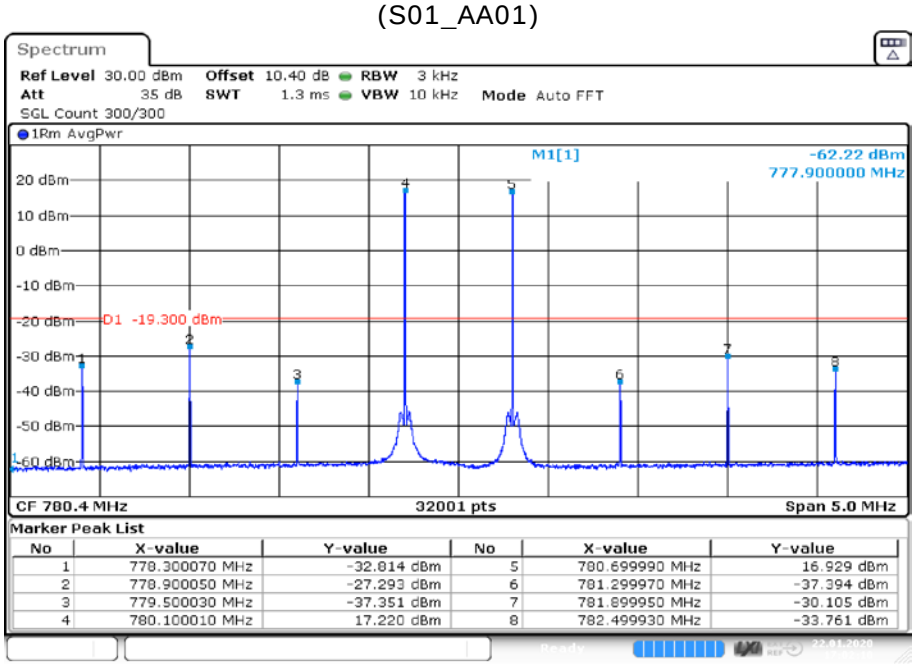
Date: 22.JAN.2020 16:38:23

Frequency Band = Band 12, Direction = Uplink, Input Power = AGC (S01_AA01)



Date: 22.JAN.2020 16:52:47

Frequency Band = Band 13, Direction = Uplink, Input Power = AGC (S01_AA01)



Date: 22.JAN.2020 17:02:10

5.4.5 TEST EQUIPMENT USED

- R&S TS8997

5.5 OUT-OF-BAND EMISSION

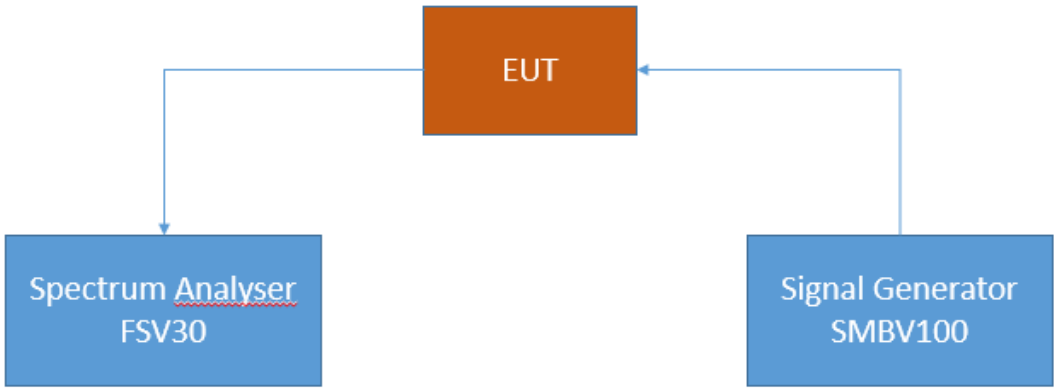
Standard

The test was performed according to:
KDB 935210 D03

5.5.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the out-of-band emission limit § 20.21(e)(8)(i)(E) for wideband consumer signal boosters. The limits itself come from the applicable rule for each operating as listed in Appendix A of KDB 935210 D03

The EUT was connected to the test setup according to the following diagram:



FCC Part 20.21; Consumer Signal Booster – Test Setup 7.5; Out-of-band emissions

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

5.5.2 TEST REQUIREMENTS / LIMITS

FCC Part 20, § 20.21(e)(8)(i)(E)

Out of Band Emission Limits. Booster out of band emissions (OOBE) shall be at least 6 dB below the FCC's mobile emission limits for the supported bands of operation. Compliance to OOBE limits will utilize high peak-to-average CMRS signal types.

Part 22, Subpart H – Cellular Radiotelephone Service; Band 5 (Cellular)

§ 22 917 – Emission limitations for cellular equipment

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

Part 24 E – Personal Communication Services

§ 24.238 – Emission limitations for Broadband PCS equipment; Band 2 (Broadband PCS)

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

Part 27 – Miscellaneous Wireless Communication Services;

Band 4 (AWS-1)
§ 27.53 (h) – Emission limits

(1) *General protection levels.* Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB.
(2) *Additional protection levels.* Notwithstanding the foregoing paragraph (h)(1) of this section:
(i) Operations in the 2180-2200 MHz band are subject to the out-of-band emission requirements set forth in §27.1134 for the protection of federal government operations operating in the 2200-2290 MHz band.
(ii) For operations in the 2000-2020 MHz band, the power of any emissions below 2000 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 $\log_{10}$(P) dB.
(iii) For operations in the 1915-1920 MHz band, the power of any emission between 1930-1995 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 $\log_{10}$(P) dB.
(iv) For operations in the 1995-2000 MHz band, the power of any emission between 2005-2020 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 $\log_{10}$(P) dB.

Band 12 (Lower 700 MHz)
§ 27.53 (g) – Emission limits

For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed

Band 13 (Upper 700 MHz)
§ 27.53 (c), (f) – Emission limits

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

5.5.3 TEST PROTOCOL

Ambient temperature: 23 – 26 °C
Air Pressure: 997 – 1017 hPa
Humidity: 33 %

Band 2, downlink

Signal Type	Band Edge	Signal Frequency [MHz]	AGC Start Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
GSM	upper	1989.80	-20.0	-33.4	-19.0	14.4
LTE	upper	1987.50	-23.0	-45.8	-19.0	26.8
CDMA	upper	1988.75	-23.0	-53.4	-19.0	34.4
GSM	lower	1930.20	-20.0	-34.3	-19.0	15.3
LTE	lower	1932.50	-23.0	-45.4	-19.0	26.4
CDMA	lower	1931.25	-23.0	-55.1	-19.0	36.1

Band 4, downlink

Signal Type	Band Edge	Signal Frequency [MHz]	AGC Start Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
GSM	upper	2154.80	-20.0	-33.1	-19.0	14.1
LTE	upper	2152.50	-23.9	-45.9	-19.0	26.9
CDMA	upper	2153.75	-23.9	-51.7	-19.0	32.7
GSM	lower	2110.20	-20.0	-32.8	-19.0	13.8
LTE	lower	2112.50	-23.9	-45.6	-19.0	26.6
CDMA	lower	2111.25	-23.9	-50.8	-19.0	31.8

Band 5, downlink

Signal Type	Band Edge	Signal Frequency [MHz]	AGC Start Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
GSM	upper	893.80	-20.0	-31.6	-19.0	12.6
LTE	upper	891.50	-23.4	-45.9	-19.0	26.9
CDMA	upper	892.75	-23.4	-56.3	-19.0	37.3
GSM	lower	869.20	-20.0	-32.1	-19.0	13.1
LTE	lower	871.50	-23.4	-45.3	-19.0	26.3
CDMA	lower	870.25	-23.4	-55.8	-19.0	36.8

Band 12, downlink

Signal Type	Band Edge	Signal Frequency [MHz]	AGC Start Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
GSM	upper	745.80	-20.0	-31.9	-19.0	12.9
LTE	upper	743.50	-21.7	-43.5	-19.0	24.5
CDMA	upper	744.75	-21.7	-56.1	-19.0	37.1
GSM	lower	728.20	-20.0	-32.0	-19.0	13.0
LTE	lower	730.50	-21.7	-43.7	-19.0	24.7
CDMA	lower	729.25	-21.7	-56.8	-19.0	37.8

Band 13, downlink

Signal Type	Band Edge	Signal Frequency [MHz]	AGC Start Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
GSM	upper	755.80	-20.0	-31.9	-19.0	12.9
LTE	upper	753.50	-22.2	-44.0	-19.0	25.0
CDMA	upper	754.75	-22.2	-56.1	-19.0	37.1
GSM	lower	746.20	-20.0	-32.3	-19.0	13.3
LTE	lower	748.50	-22.2	-43.7	-19.0	24.7
CDMA	lower	747.25	-22.2	-56.0	-19.0	37.0

Band 2, uplink

Signal Type	Band Edge	Signal Frequency [MHz]	AGC Start Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
GSM	upper	1909.80	2.6	-34.4	-19.0	15.4
LTE	upper	1907.50	-1.9	-23.4	-19.0	4.4
CDMA	upper	1908.75	-1.9	-23.9	-19.0	4.9
GSM	lower	1850.20	2.6	-34.9	-19.0	15.9
LTE	lower	1852.50	-1.9	-22.4	-19.0	3.4
CDMA	lower	1851.25	-1.9	-28.1	-19.0	9.1

Band 4, uplink

Signal Type	Band Edge	Signal Frequency [MHz]	AGC Start Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
GSM	upper	1754.80	0.9	-33.5	-19.0	14.5
LTE	upper	1752.50	-2.1	-24.0	-19.0	5.0
CDMA	upper	1753.75	-2.1	-30.1	-19.0	11.1
GSM	lower	1710.20	0.9	-34.6	-19.0	15.6
LTE	lower	1712.50	-2.1	-23.9	-19.0	4.9
CDMA	lower	1711.25	-2.1	-28.8	-19.0	9.8

Band 5, uplink

Signal Type	Band Edge	Signal Frequency [MHz]	AGC Start Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
GSM	upper	848.80	3.6	-32.7	-19.0	13.7
LTE	upper	846.50	-1.3	-20.8	-19.0	1.8
CDMA	upper	847.75	-1.3	-24.5	-19.0	5.5
GSM	lower	824.20	3.6	-33.3	-19.0	14.3
LTE	lower	826.50	-1.3	-21.9	-19.0	2.9
CDMA	lower	825.25	-1.3	-26.3	-19.0	7.3

Band 12, uplink

Signal Type	Band Edge	Signal Frequency [MHz]	AGC Start Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
GSM	upper	715.80	4.1	-29.7	-19.0	10.7
LTE	upper	713.50	-1.8	-26.0	-19.0	7.0
CDMA	upper	714.75	-1.8	-27.7	-19.0	8.7
GSM	lower	698.20	4.1	-29.6	-19.0	10.6
LTE	lower	700.50	-1.8	-23.9	-19.0	4.9
CDMA	lower	699.25	-1.8	-27.8	-19.0	8.8

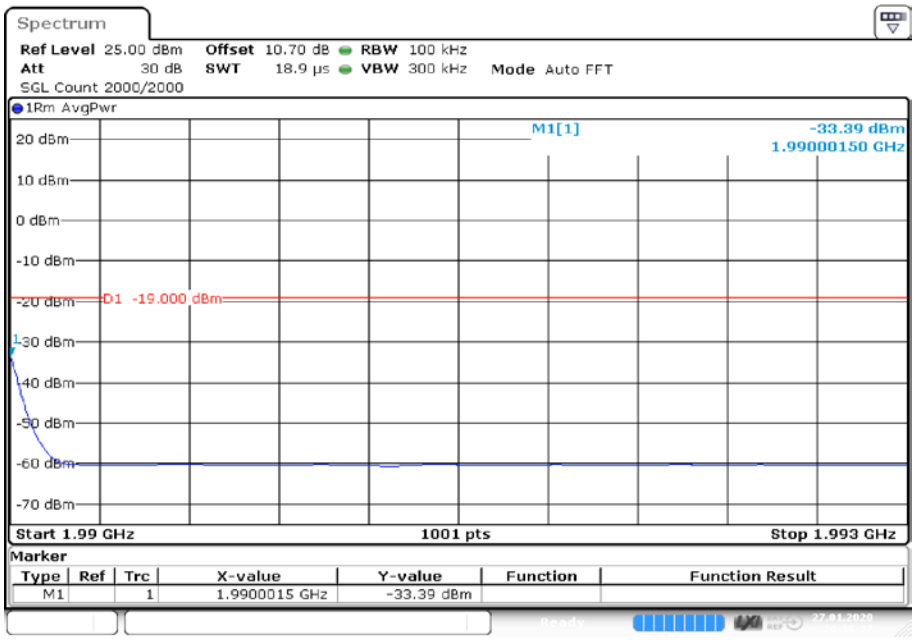
Band 13, uplink

Signal Type	Band Edge	Signal Frequency [MHz]	AGC Start Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
GSM	upper	786.80	4.1	-30.2	-19.0	11.2
LTE	upper	784.50	-2.4	-27.9	-19.0	8.9
CDMA	upper	785.75	-2.4	-32.5	-19.0	13.5
GSM	lower	777.20	4.1	-29.7	-19.0	10.7
LTE	lower	779.50	-2.4	-29.4	-19.0	10.4
CDMA	lower	778.25	-2.4	-32.6	-19.0	13.6

Remark: Please see next sub-clause for the measurement plot.

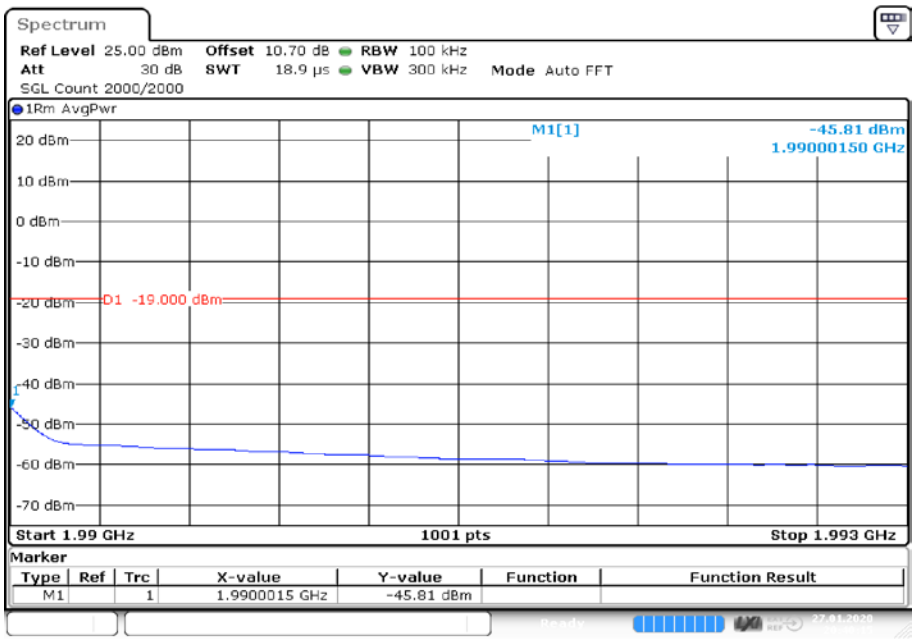
5.5.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, “WORST CASE”)

Frequency Band = Band 2, Direction = Downlink, Signal Type = GSM, Band Edge = upper (S01_AA01)



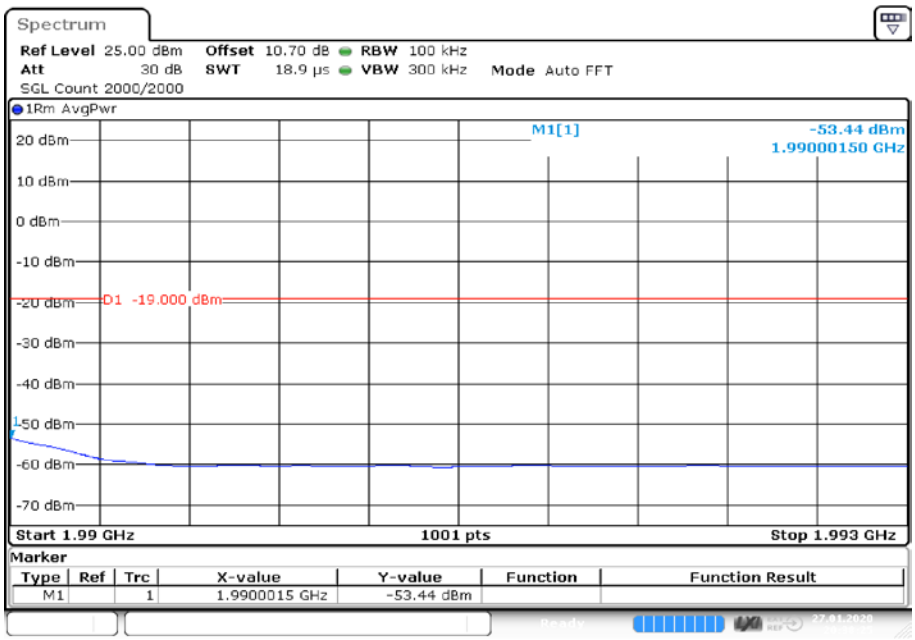
Date: 27.JAN.2020 20:36:27

Frequency Band = Band 2, Direction = Downlink, Signal Type = LTE, Band Edge = upper (S01_AA01)



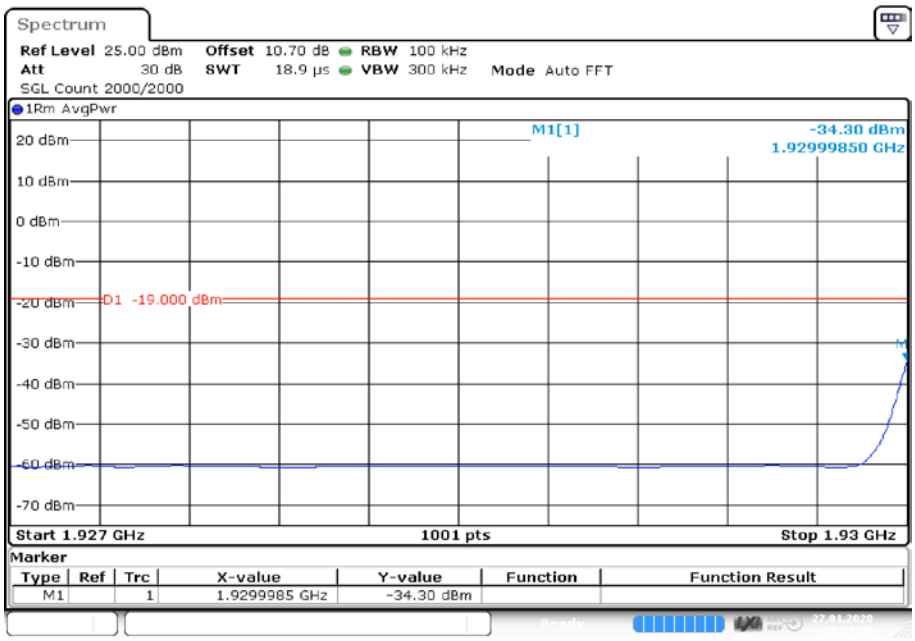
Date: 27.JAN.2020 20:40:15

Frequency Band = Band 2, Direction = Downlink, Signal Type = CDMA, Band Edge = upper (S01_AA01)



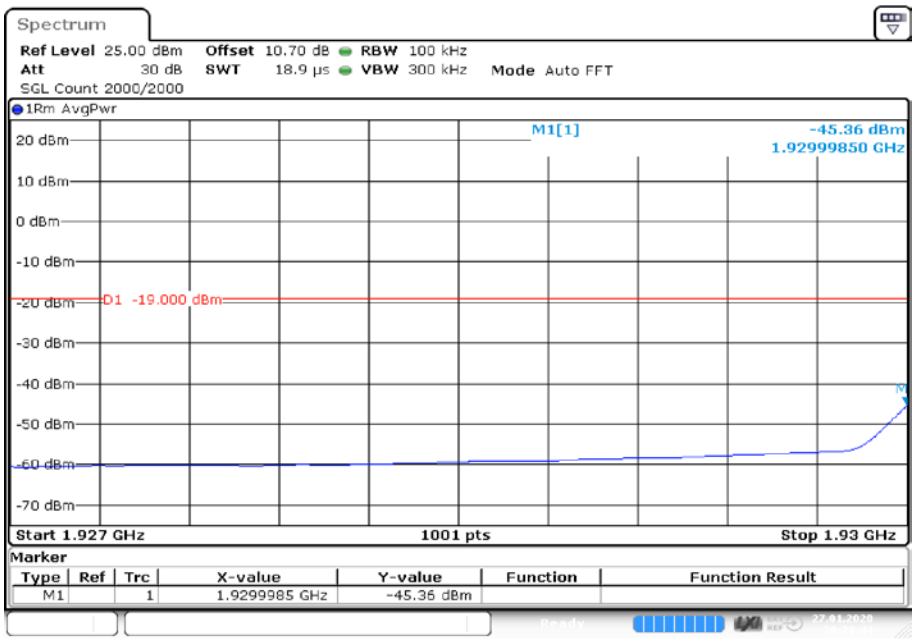
Date: 27.JAN.2020 20:38:26

Frequency Band = Band 2, Direction = Downlink, Signal Type = GSM, Band Edge = lower (S01_AA01)



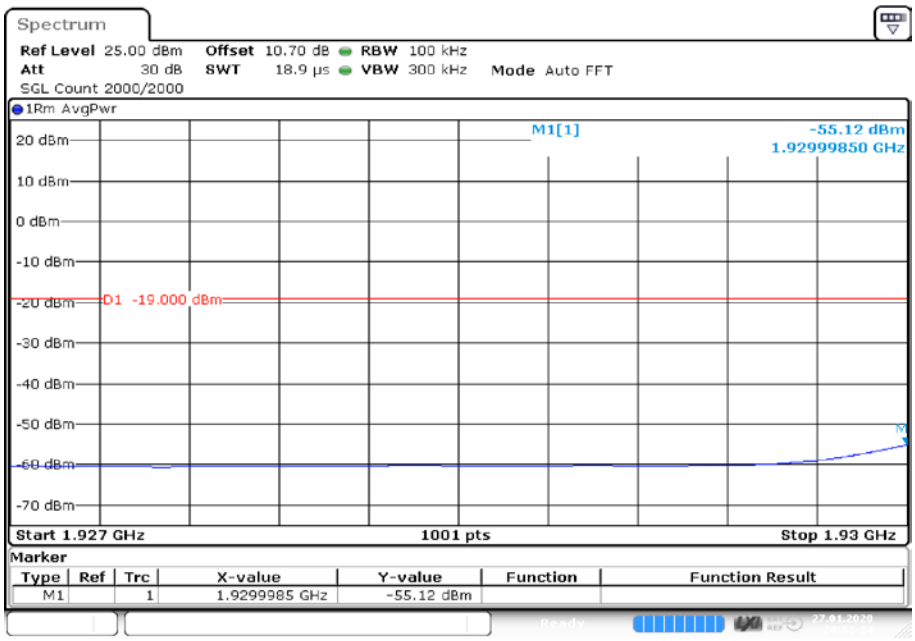
Date: 27.JAN.2020 20:34:21

Frequency Band = Band 2, Direction = Downlink, Signal Type = LTE, Band Edge = lower (S01_AA01)



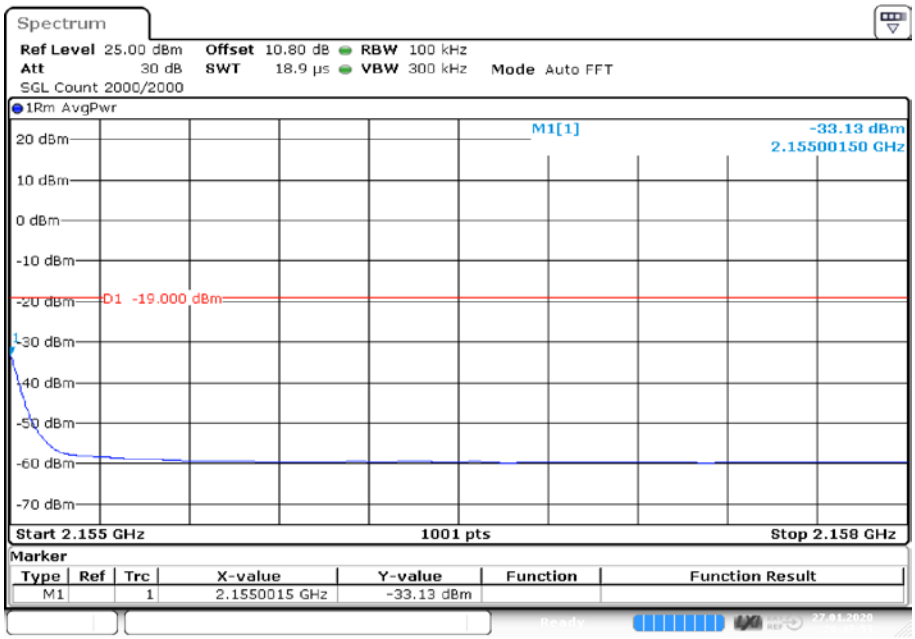
Date: 27.JAN.2020 20:29:44

Frequency Band = Band 2, Direction = Downlink, Signal Type = CDMA, Band Edge = lower (S01_AA01)



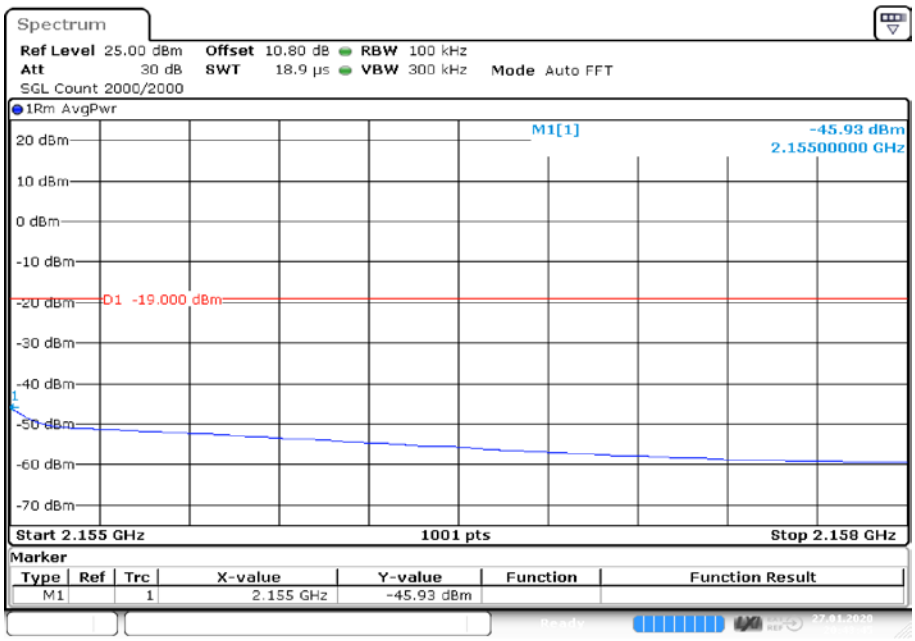
Date: 27.JAN.2020 20:32:24

Frequency Band = Band 4, Direction = Downlink, Signal Type = GSM, Band Edge = upper (S01_AA01)



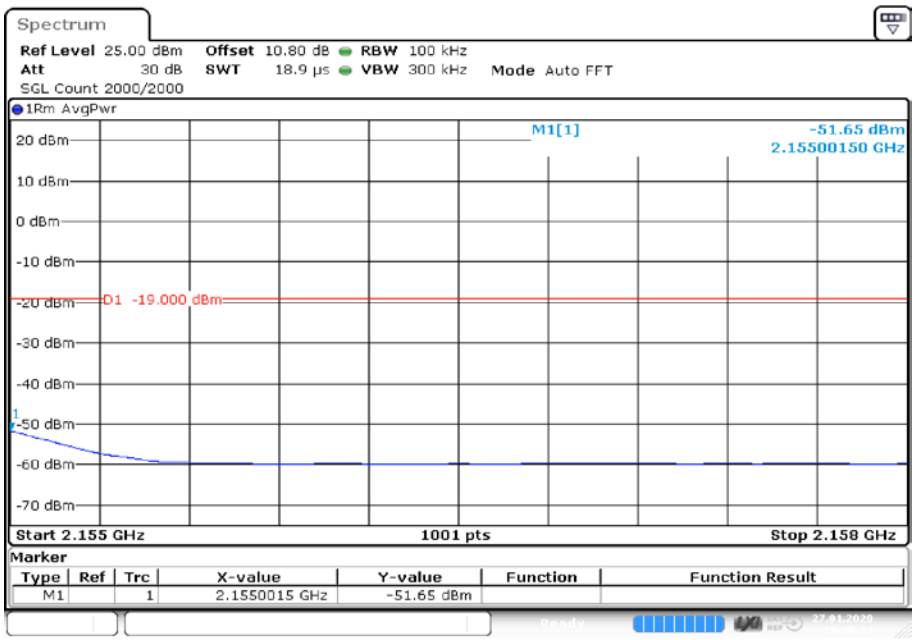
Date: 27.JAN.2020 20:47:54

Frequency Band = Band 4, Direction = Downlink, Signal Type = LTE, Band Edge = upper (S01_AA01)



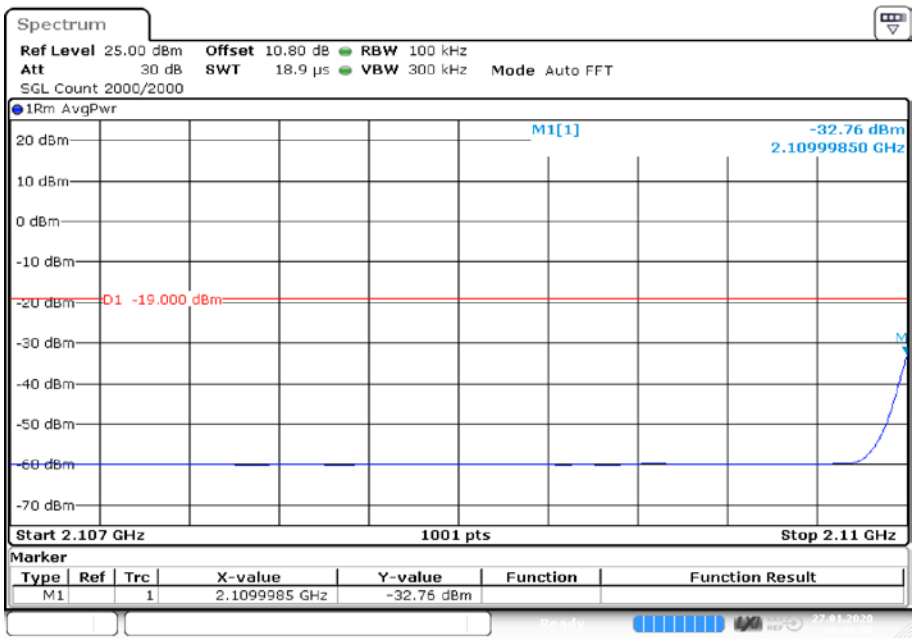
Date: 27.JAN.2020 20:43:45

Frequency Band = Band 4, Direction = Downlink, Signal Type = CDMA, Band Edge = upper (S01_AA01)



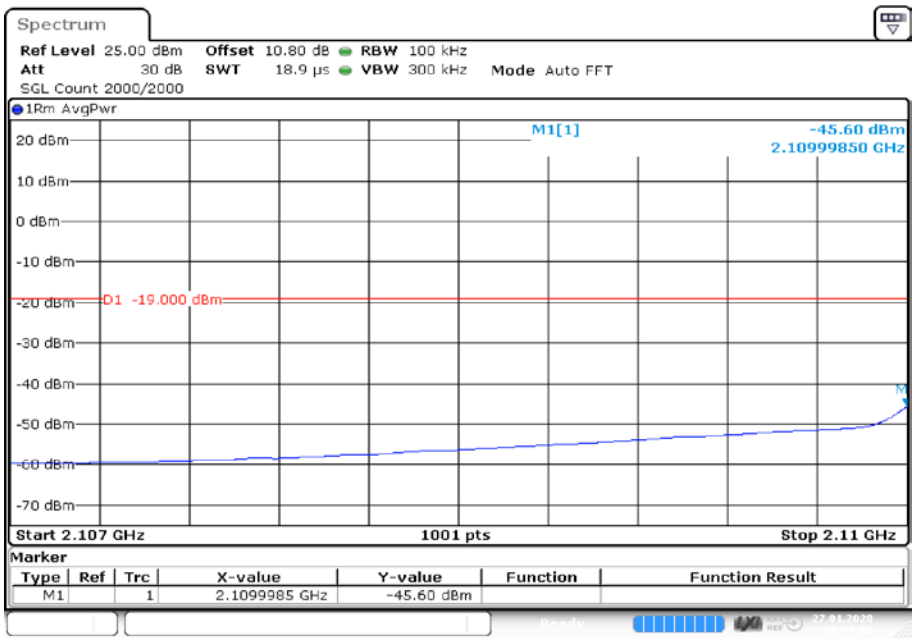
Date: 27.JAN.2020 20:46:14

Frequency Band = Band 4, Direction = Downlink, Signal Type = GSM, Band Edge = lower (S01_AA01)



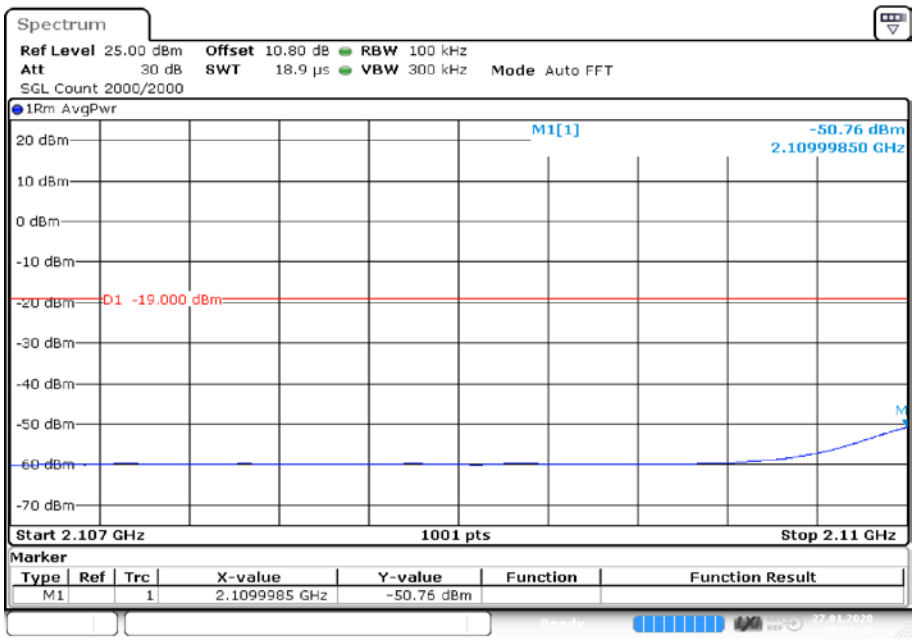
Date: 27.JAN.2020 20:49:58

Frequency Band = Band 4, Direction = Downlink, Signal Type = LTE, Band Edge = lower (S01_AA01)



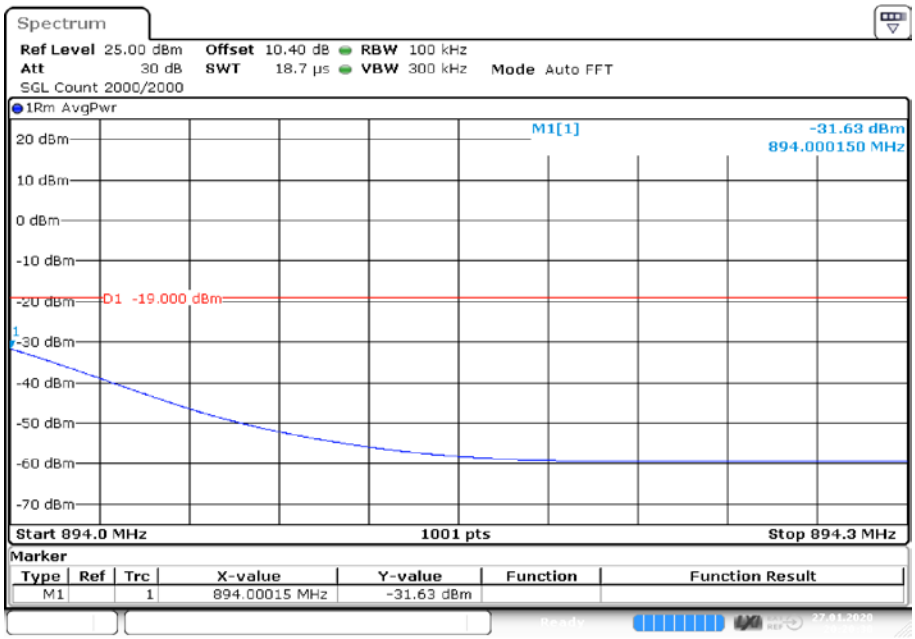
Date: 27.JAN.2020 20:53:21

Frequency Band = Band 4, Direction = Downlink, Signal Type = CDMA, Band Edge = lower (S01_AA01)



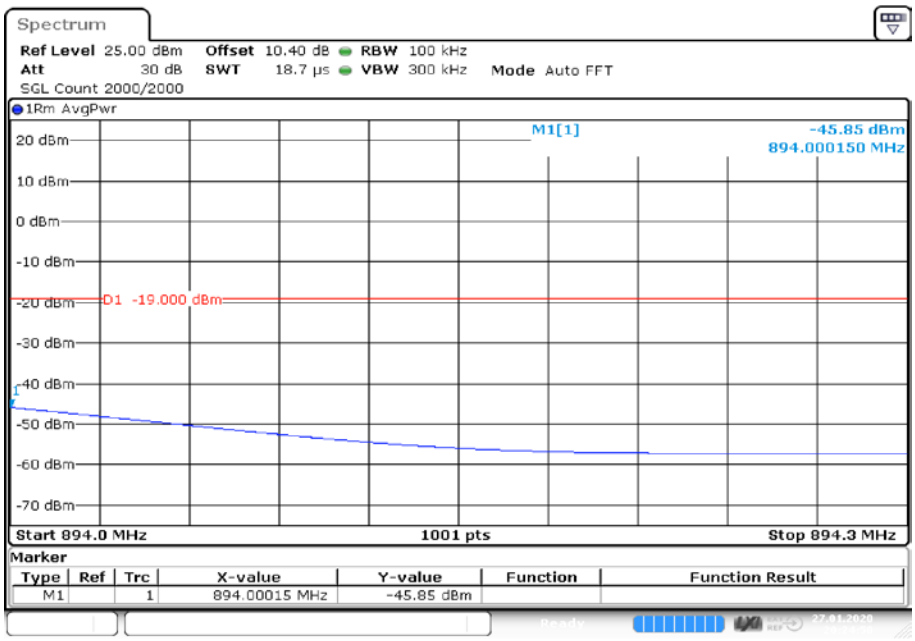
Date: 27.JAN.2020 20:51:40

Frequency Band = Band 5, Direction = Downlink, Signal Type = GSM, Band Edge = upper (S01_AA01)



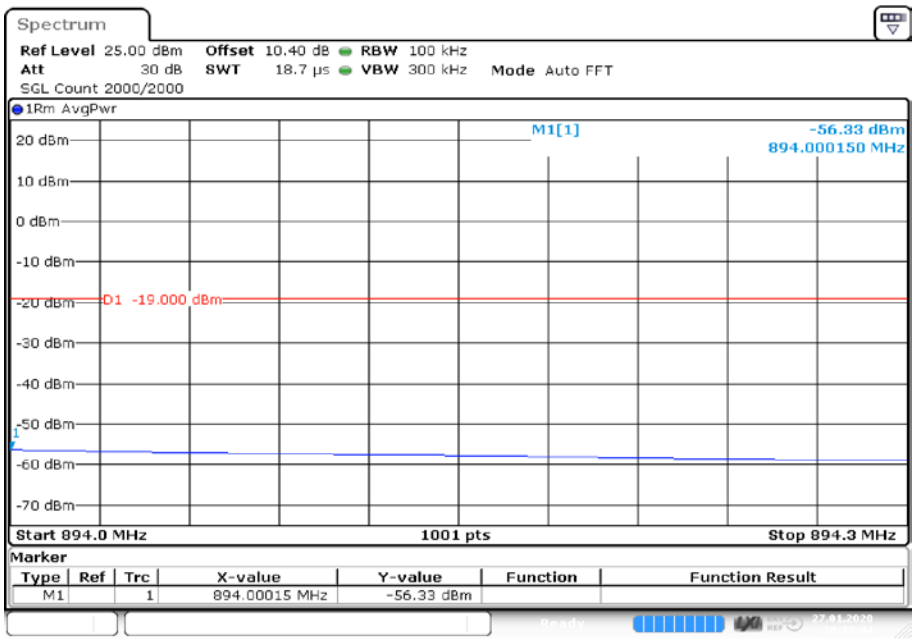
Date: 27.JAN.2020 20:20:30

Frequency Band = Band 5, Direction = Downlink, Signal Type = LTE, Band Edge = upper (S01_AA01)



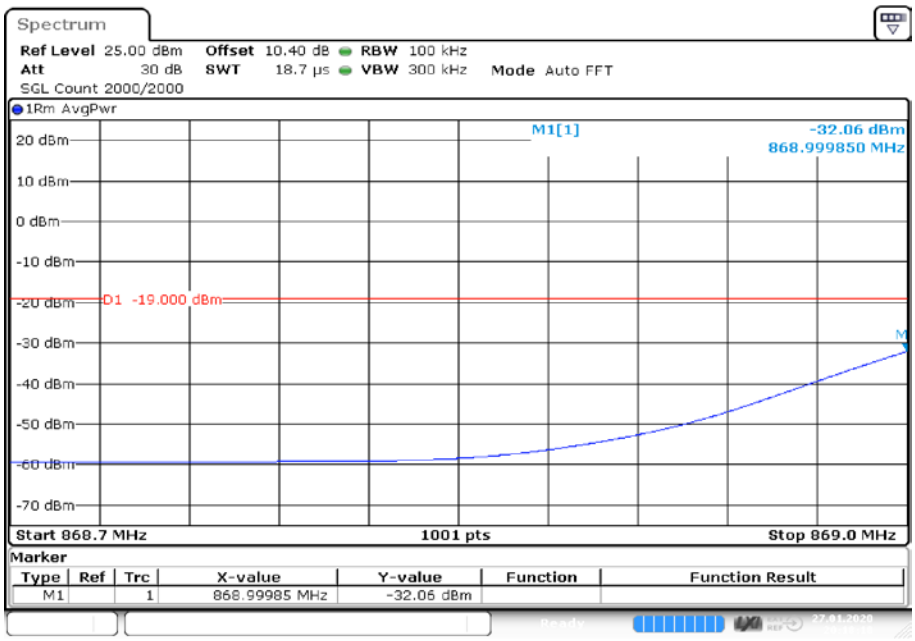
Date: 27.JAN.2020 20:24:51

Frequency Band = Band 5, Direction = Downlink, Signal Type = CDMA, Band Edge = upper (S01_AA01)



Date: 27.JAN.2020 20:22:45

Frequency Band = Band 5, Direction = Downlink, Signal Type = GSM, Band Edge = lower (S01_AA01)



Date: 27.JAN.2020 20:18:18