

FCC Measurement/Technical Report on WLAN and Bluetooth module JODY-W2

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IC: 8595A-JODYW263

Test Report Reference: MDE_UBLOX_2008_FCC_03

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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 Intentional Radiator (Digital Device / Spread Spectrum).

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 2 (10-1-19 Edition) and 15 (10-1-19 Edition). The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

Part 15, Subpart C – Intentional Radiators

§ 15.201 Equipment authorization requirement

§ 15.207 Conducted limits

§ 15.209 Radiated emission limits; general requirements

Part 15, Subpart E – Unlicensed National Information Infrastructure Devices

§ 15.403 Definitions

§ 15.407 General technical requirements

Note:

The tests were selected and performed with reference to the FCC Public Notice "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, 789033 D02 General U-NII Test Procedures New Rules v02r01, 2017-12-14".

ANSI C63.10-2013 is applied.

1.2 FCC-IC CORRELATION TABLE

Correlation of measurement requirements for UNII / LE-LAN (e.g. WLAN 5 GHz) equipment from FCC and IC

UNII equipment

Measurement	FCC reference	IC reference
Conducted emissions on AC Mains	§ 15.207	RSS-Gen Issue 5: 8.8
Occupied bandwidth	§ 15.403 (i) (26 dB) / § 15.407 (e) (6 dB)	RSS-247 Issue 2: 6.2.1.1, 6.2.2.1, 6.2.3.1 (99%) RSS-247 Issue 2: 6.2.4.1 (6 dB)
Maximum conducted output power	§ 15.407 (a) (1),(2),(3),(4)	RSS-247 Issue 2: 6.2.1.1, 6.2.2.1, 6.2.3.1, 6.2.4.1
Maximum power spectral density	§ 15.407 (a) (1),(2),(3),(5)	RSS-247 Issue 2: 6.2.1.1, 6.2.2.1, 6.2.3.1, 6.2.4.1
Transmitter undesirable emissions; General Field Strength Limits, Restricted Bands	§ 15.407 (b) § 15.209 (a)	RSS-Gen Issue 5: 6.13/8.9/8.10; RSS-247 Issue 2: 3.3/6.2 6.2.1.2, 6.2.2.2, 6.2.3.2, 6.2.4.2
Frequency stability	§ 15.407 (g)	RSS-Gen Issue 5: 6.11/8.11
Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS)	§ 15.407 (h)	RSS-247 Issue 2: 6.2.2.1, 6.2.3.1, 6.3
Antenna requirement	§ 15.203 / 15.204	RSS-Gen Issue 5: 8.3
Receiver spurious emissions	-	-

1.3 MEASUREMENT SUMMARY

47 CFR CHAPTER I FCC PART 15 Subpart E §15.407 FCC §15.207

AC Conducted Emissions

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode	Setup	Date	FCC	IC
Operating mode worst case	S02_AK01_AC	2020-12-07	Passed	Passed

47 CFR CHAPTER I FCC PART 15 Subpart E §15.407 FCC §15.31, §15.403 (i)

26 dB Bandwidth

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode	Setup	Date	FCC	IC
Radio Technology, Operating Frequency, Subband				
WLAN a, high, U-NII-1	S02_AG01	2020-11-13	Performed	N/A
WLAN a, high, U-NII-2A	S02_AG01	2020-11-13	Performed	N/A
WLAN a, high, U-NII-2C	S02_AG01	2020-11-13	Performed	N/A
WLAN a, high, U-NII-3	S02_AG01	2020-11-13	Performed	N/A
WLAN a, low, U-NII-1	S02_AG01	2020-11-13	Performed	N/A
WLAN a, low, U-NII-2A	S02_AG01	2020-11-13	Performed	N/A
WLAN a, low, U-NII-2C	S02_AG01	2020-11-13	Performed	N/A
WLAN a, low, U-NII-3	S02_AG01	2020-11-13	Performed	N/A
WLAN a, mid, U-NII-1	S02_AG01	2020-11-13	Performed	N/A
WLAN a, mid, U-NII-2A	S02_AG01	2020-11-13	Performed	N/A
WLAN a, mid, U-NII-2C	S02_AG01	2020-11-13	Performed	N/A
WLAN a, mid, U-NII-3	S02_AG01	2020-11-13	Performed	N/A
WLAN ac 20 MHz, high, U-NII-1	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, high, U-NII-2A	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, high, U-NII-2C	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, high, U-NII-3	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, low, U-NII-1	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, low, U-NII-2A	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, low, U-NII-2C	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, low, U-NII-3	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, mid, U-NII-1	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, mid, U-NII-2A	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 20 MHz, mid, U-NII-3	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 40 MHz, high, U-NII-1	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 40 MHz, high, U-NII-2A	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 40 MHz, high, U-NII-2C	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 40 MHz, high, U-NII-3	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 40 MHz, low, U-NII-1	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 40 MHz, low, U-NII-2A	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 40 MHz, low, U-NII-2C	S02_AH01	2020-11-27	Performed	N/A
WLAN ac 40 MHz, low, U-NII-3	S02_AG01	2020-11-17	Performed	N/A

47 CFR CHAPTER I FCC PART 15 Subpart E §15.407 FCC §15.31, §15.403 (i)

26 dB Bandwidth

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Subband	Setup	Date	FCC	IC
WLAN ac 40 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	Performed	N/A
WLAN ac 80 MHz, high, U-NII-2C	S02_AH01	2020-11-27	Performed	N/A
WLAN ac 80 MHz, mid, U-NII-2C	S02_AH01	2020-11-27	Performed	N/A
WLAN ac 80 MHz, low, U-NII-2C	S02_AH01	2020-11-27	Performed	N/A
WLAN ac 80 MHz, mid, U-NII-1	S02_AH01	2020-11-27	Performed	N/A
WLAN ac 80 MHz, mid, U-NII-2A	S02_AH01	2020-11-27	Performed	N/A
WLAN ac 80 MHz, mid, U-NII-3	S02_AH01	2020-11-27	Performed	N/A
WLAN n 20 MHz, high, U-NII-1	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, high, U-NII-2A	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, high, U-NII-2C	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, high, U-NII-3	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, low, U-NII-1	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, low, U-NII-2A	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, low, U-NII-2C	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, low, U-NII-3	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, mid, U-NII-1	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, mid, U-NII-2A	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, mid, U-NII-2C	S02_AG01	2020-11-13	Performed	N/A
WLAN n 20 MHz, mid, U-NII-3	S02_AG01	2020-11-13	Performed	N/A
WLAN n 40 MHz, high, U-NII-1	S02_AG01	2020-11-17	Performed	N/A
WLAN n 40 MHz, high, U-NII-2A	S02_AG01	2020-11-17	Performed	N/A
WLAN n 40 MHz, high, U-NII-2C	S02_AG01	2020-11-17	Performed	N/A
WLAN n 40 MHz, high, U-NII-3	S02_AG01	2020-11-17	Performed	N/A
WLAN n 40 MHz, low, U-NII-1	S02_AG01	2020-11-17	Performed	N/A
WLAN n 40 MHz, low, U-NII-2A	S02_AG01	2020-11-17	Performed	N/A
WLAN n 40 MHz, low, U-NII-2C	S02_AG01	2020-11-17	Performed	N/A
WLAN n 40 MHz, low, U-NII-3	S02_AG01	2020-11-17	Performed	N/A
WLAN n 40 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	Performed	N/A

47 CFR CHAPTER I FCC PART 15 Subpart E §15.407
FCC §15.31, §15.407 (e)

6 dB Bandwidth

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Subband	Setup	Date	FCC	IC
WLAN a, high, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN a, low, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN a, mid, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN ac 20 MHz, high, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, low, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, high, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, low, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-3	S02_AH01	2020-11-27	Passed	Passed
WLAN n 20 MHz, high, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, low, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, mid, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN n 40 MHz, high, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, low, U-NII-3	S02_AG01	2020-11-17	Passed	Passed

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**FCC §15.31, IC RSS 247
Ch. 6.2.x**

99 % Bandwidth

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Subband	Setup	Date	FCC	IC
WLAN a, high, U-NII-1	S02_AG01	2020-11-13	N/A	Performed
WLAN a, high, U-NII-2A	S02_AG01	2020-11-13	N/A	Performed
WLAN a, high, U-NII-2C	S02_AG01	2020-11-13	N/A	Performed
WLAN a, high, U-NII-3	S02_AG01	2020-11-13	N/A	Performed
WLAN a, low, U-NII-1	S02_AG01	2020-11-13	N/A	Performed
WLAN a, low, U-NII-2A	S02_AG01	2020-11-13	N/A	Performed
WLAN a, low, U-NII-2C	S02_AG01	2020-11-13	N/A	Performed
WLAN a, low, U-NII-3	S02_AG01	2020-11-13	N/A	Performed
WLAN a, mid, U-NII-1	S02_AG01	2020-11-13	N/A	Performed
WLAN a, mid, U-NII-2A	S02_AG01	2020-11-13	N/A	Performed
WLAN a, mid, U-NII-2C	S02_AG01	2020-11-13	N/A	Performed
WLAN a, mid, U-NII-3	S02_AG01	2020-11-13	N/A	Performed
WLAN ac 20 MHz, high, U-NII-1	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 20 MHz, high, U-NII-2A	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 20 MHz, high, U-NII-2C	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 20 MHz, high, U-NII-3	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 20 MHz, low, U-NII-1	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 20 MHz, low, U-NII-2A	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 20 MHz, low, U-NII-2C	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 20 MHz, low, U-NII-3	S02_AG01	2020-11-17	N/A	Performed

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**FCC §15.31, IC RSS 247
Ch. 6.2.x**

99 % Bandwidth

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Subband	Setup	Date	FCC	IC
WLAN ac 20 MHz, mid, U-NII-1	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 20 MHz, mid, U-NII-2A	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 20 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 20 MHz, mid, U-NII-3	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 40 MHz, high, U-NII-1	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 40 MHz, high, U-NII-2A	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 40 MHz, high, U-NII-2C	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 40 MHz, high, U-NII-3	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 40 MHz, low, U-NII-1	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 40 MHz, low, U-NII-2A	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 40 MHz, low, U-NII-2C	S02_AH01	2020-11-27	N/A	Performed
WLAN ac 40 MHz, low, U-NII-3	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 40 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	N/A	Performed
WLAN ac 80 MHz, high, U-NII-2C	S02_AH01	2020-11-27	N/A	Performed
WLAN ac 80 MHz, low, U-NII-2C	S02_AH01	2020-11-27	N/A	Performed
WLAN ac 80 MHz, mid, U-NII-2C	S02_AH01	2020-11-27	N/A	Performed
WLAN ac 80 MHz, mid, U-NII-1	S02_AH01	2020-11-27	N/A	Performed
WLAN ac 80 MHz, mid, U-NII-2A	S02_AH01	2020-11-27	N/A	Performed
WLAN ac 80 MHz, mid, U-NII-3	S02_AH01	2020-11-27	N/A	Performed
WLAN n 20 MHz, high, U-NII-1	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, high, U-NII-2A	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, high, U-NII-2C	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, high, U-NII-3	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, low, U-NII-1	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, low, U-NII-2A	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, low, U-NII-2C	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, low, U-NII-3	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, mid, U-NII-1	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, mid, U-NII-2A	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, mid, U-NII-2C	S02_AG01	2020-11-13	N/A	Performed
WLAN n 20 MHz, mid, U-NII-3	S02_AG01	2020-11-13	N/A	Performed
WLAN n 40 MHz, high, U-NII-1	S02_AG01	2020-11-17	N/A	Performed
WLAN n 40 MHz, high, U-NII-2A	S02_AG01	2020-11-17	N/A	Performed
WLAN n 40 MHz, high, U-NII-2C	S02_AG01	2020-11-17	N/A	Performed
WLAN n 40 MHz, high, U-NII-3	S02_AG01	2020-11-17	N/A	Performed
WLAN n 40 MHz, low, U-NII-1	S02_AG01	2020-11-17	N/A	Performed
WLAN n 40 MHz, low, U-NII-2A	S02_AG01	2020-11-17	N/A	Performed
WLAN n 40 MHz, low, U-NII-2C	S02_AG01	2020-11-17	N/A	Performed
WLAN n 40 MHz, low, U-NII-3	S02_AG01	2020-11-17	N/A	Performed
WLAN n 40 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	N/A	Performed

47 CFR CHAPTER I FCC PART 15
Subpart E §15.407

FCC §15.31, §15.407 (a)(1)

Maximum Conducted Output Power

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Subband	Setup	Date	FCC	IC
WLAN a, high, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN a, high, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN a, high, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN a, high, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN a, low, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN a, low, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN a, low, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN a, low, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN a, mid, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN a, mid, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN a, mid, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN a, mid, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN ac 20 MHz, high, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, high, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, high, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, high, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, low, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, low, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, low, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, low, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, high, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, high, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, high, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, high, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, low, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, low, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, low, U-NII-2C	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 40 MHz, low, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 80 MHz, high, U-NII-2C	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, low, U-NII-2C	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-2C	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-1	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-2A	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-3	S02_AH01	2020-11-27	Passed	Passed
WLAN n 20 MHz, high, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, high, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart E §15.407

FCC §15.31, §15.407 (a)(1)

Maximum Conducted Output Power

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Subband	Setup	Date	FCC	IC
WLAN n 20 MHz, high, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, high, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, low, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, low, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, low, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, low, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, mid, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, mid, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, mid, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, mid, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN n 40 MHz, high, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, high, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, high, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, high, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, low, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, low, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, low, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, low, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart E §15.407

FCC §15.31, §15.407 (a) (1),(5)

Peak Power Spectral Density

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Subband	Setup	Date	FCC	IC
WLAN a, high, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN a, high, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN a, high, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN a, high, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN a, low, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN a, low, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN a, low, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN a, low, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN a, mid, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN a, mid, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN a, mid, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN a, mid, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN ac 20 MHz, high, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, high, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart E §15.407

FCC §15.31, §15.407 (a) (1),(5)

Peak Power Spectral Density

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Subband	Setup	Date	FCC	IC
WLAN ac 20 MHz, high, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, high, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, low, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, low, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, low, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, low, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, high, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, high, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, high, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, high, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, low, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, low, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, low, U-NII-2C	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 40 MHz, low, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 40 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN ac 80 MHz, high, U-NII-2C	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, low, U-NII-2C	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-2C	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-1	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-2A	S02_AH01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-3	S02_AH01	2020-11-27	Passed	Passed
WLAN n 20 MHz, high, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, high, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, high, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, high, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, low, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, low, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, low, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, low, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, mid, U-NII-1	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, mid, U-NII-2A	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, mid, U-NII-2C	S02_AG01	2020-11-13	Passed	Passed
WLAN n 20 MHz, mid, U-NII-3	S02_AG01	2020-11-13	Passed	Passed
WLAN n 40 MHz, high, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, high, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, high, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, high, U-NII-3	S02_AG01	2020-11-17	Passed	Passed

**47 CFR CHAPTER I FCC PART 15
Subpart E §15.407**

FCC §15.31, §15.407 (a) (1),(5)

Peak Power Spectral Density

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Subband	Setup	Date	FCC	IC
WLAN n 40 MHz, low, U-NII-1	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, low, U-NII-2A	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, low, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, low, U-NII-3	S02_AG01	2020-11-17	Passed	Passed
WLAN n 40 MHz, mid, U-NII-2C	S02_AG01	2020-11-17	Passed	Passed

**47 CFR CHAPTER I FCC PART 15
Subpart E §15.407**

**FCC §15.407 (b), (1),(2),(3),(4); FCC
§15.205, §15.209, §15.407 (b) (5),(6)**

Undesirable Emissions; General Field Strength Limits

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Measurement range, Subband	Setup	Date	FCC	IC
WLAN a, high, 1GHz - 26GHz, U-NII-1	S01_AC01	2020-09-27	Passed	Passed
WLAN a, high, 1GHz - 26GHz, U-NII-2A	S01_AK01	2020-11-21	Passed	Passed
WLAN a, high, 1GHz - 26GHz, U-NII-2C	S01_AK01	2020-11-22	Passed	Passed
WLAN a, high, 1GHz - 26GHz, U-NII-3	S01_AK01	2020-11-22	Passed	Passed
WLAN a, low, 1GHz - 26GHz, U-NII-1	S01_AC01	2020-09-27	Passed	Passed
WLAN a, low, 1GHz - 26GHz, U-NII-2A	S01_AK01	2020-11-21	Passed	Passed
WLAN a, low, 1GHz - 26GHz, U-NII-2C	S01_AK01	2020-11-22	Passed	Passed
WLAN a, low, 1GHz - 26GHz, U-NII-3	S01_AK01	2020-11-22	Passed	Passed
WLAN a, low, 9kHz - 30MHz, U-NII-1	S01_AK01	2020-11-25	Passed	Passed
WLAN a, low, 9kHz - 30MHz, U-NII-3	S01_AK01	2020-11-25	Passed	Passed
WLAN a, mid, 1GHz - 26GHz, U-NII-1	S01_AC01	2020-09-27	Passed	Passed
WLAN a, mid, 1GHz - 26GHz, U-NII-2A	S01_AK01	2020-11-21	Passed	Passed
WLAN a, mid, 1GHz - 26GHz, U-NII-2C	S01_AK01	2020-11-22	Passed	Passed
WLAN a, mid, 1GHz - 26GHz, U-NII-3	S01_AK01	2020-11-23	Passed	Passed
WLAN a, mid, 26GHz - 40GHz, U-NII-1	S01_AK01	2020-11-26	Passed	Passed
WLAN a, mid, 26GHz - 40GHz, U-NII-2A	S01_AK01	2020-11-26	Passed	Passed
WLAN a, mid, 26GHz - 40GHz, U-NII-2C	S01_AK01	2020-11-26	Passed	Passed
WLAN a, mid, 26GHz - 40GHz, U-NII-3	S01_AK01	2020-11-26	Passed	Passed
WLAN a, mid, 30MHz - 1GHz, U-NII-1	S01_AK01	2020-11-25	Passed	Passed
WLAN a, mid, 30MHz - 1GHz, U-NII-2A	S01_AK01	2020-11-25	Passed	Passed
WLAN a, mid, 30MHz - 1GHz, U-NII-2C	S01_AK01	2020-11-25	Passed	Passed
WLAN a, mid, 30MHz - 1GHz, U-NII-3	S01_AK01	2020-11-25	Passed	Passed
WLAN ac 20 MHz, high, 1GHz - 26GHz, U-NII-1 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed
WLAN ac 20 MHz, high, 1GHz - 26GHz, U-NII-2A Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-24	Passed	Passed

**47 CFR CHAPTER I FCC PART 15
Subpart E §15.407**

**FCC §15.407 (b), (1),(2),(3),(4); FCC
§15.205, §15.209, §15.407 (b) (5),(6)**

Undesirable Emissions; General Field Strength Limits

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode	Setup	Date	FCC	IC
Radio Technology, Operating Frequency, Measurement range, Subband				
WLAN ac 20 MHz, high, 1GHz - 26GHz, U-NII-2C Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 20 MHz, high, 1GHz - 26GHz, U-NII-3 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 20 MHz, low, 1GHz - 26GHz, U-NII-1 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed
WLAN ac 20 MHz, low, 1GHz - 26GHz, U-NII-2C Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 20 MHz, low, 1GHz - 26GHz, U-NII-3 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 40 MHz, high, 1GHz - 26GHz, U-NII-1 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 40 MHz, high, 1GHz - 26GHz, U-NII-2A Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-26	Passed	Passed
WLAN ac 40 MHz, high, 1GHz - 26GHz, U-NII-2C Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-26	Passed	Passed
WLAN ac 40 MHz, high, 1GHz - 26GHz, U-NII-3 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-27	Passed	Passed
WLAN ac 40 MHz, low, 1GHz - 26GHz, U-NII-1 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed
WLAN ac 40 MHz, low, 1GHz - 26GHz, U-NII-2C Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-27	Passed	Passed
WLAN ac 40 MHz, low, 1GHz - 26GHz, U-NII-3 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-26	Passed	Passed
WLAN ac 80 MHz, low, 1GHz - 26GHz, U-NII-2C Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-25	Passed	Passed
WLAN ac 80 MHz, mid, 1GHz - 26GHz, U-NII-1 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 80 MHz, mid, 1GHz - 26GHz, U-NII-2A Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-25	Passed	Passed
WLAN ac 80 MHz, mid, 1GHz - 26GHz, U-NII-3 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-25	Passed	Passed
WLAN n 20 MHz, high, 1GHz - 26GHz, U-NII-1 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed

**47 CFR CHAPTER I FCC PART 15
Subpart E §15.407**

**FCC §15.407 (b), (1),(2),(3),(4); FCC
§15.205, §15.209, §15.407 (b) (5),(6)**

Undesirable Emissions; General Field Strength Limits

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode	Setup	Date	FCC	IC
Radio Technology, Operating Frequency, Measurement range, Subband				
WLAN n 20 MHz, high, 1GHz - 26GHz, U-NII-2A Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, high, 1GHz - 26GHz, U-NII-2C Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, high, 1GHz - 26GHz, U-NII-3 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, low, 1GHz - 26GHz, U-NII-1	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, low, 1GHz - 26GHz, U-NII-2C Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, low, 1GHz - 26GHz, U-NII-3 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed
WLAN n 40 MHz, high, 1GHz - 26GHz, U-NII-1 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed
WLAN n 40 MHz, high, 1GHz - 26GHz, U-NII-2A Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-25	Passed	Passed
WLAN n 40 MHz, high, 1GHz - 26GHz, U-NII-2C Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-25	Passed	Passed
WLAN n 40 MHz, high, 1GHz - 26GHz, U-NII-3 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-25	Passed	Passed
WLAN n 40 MHz, low, 1GHz - 26GHz, U-NII-1 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-23	Passed	Passed
WLAN n 40 MHz, low, 1GHz - 26GHz, U-NII-2C Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-25	Passed	Passed
WLAN n 40 MHz, low, 1GHz - 26GHz, U-NII-3 Remark: Only Band Edges and harmonics in range 1- 26 GHz tested	S01_AK01	2020-11-25	Passed	Passed

47 CFR CHAPTER I FCC PART 15 Subpart E §15.407

FCC §15.407 (b), (1),(2),(3),(4)

Band Edge

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode Radio Technology, Operating Frequency, Subband	Setup	Date	FCC	IC
WLAN a, high, U-NII-1	S01_AC01	2020-09-27	Passed	Passed
WLAN a, high, U-NII-2A	S01_AK01	2020-11-21	Passed	Passed
WLAN a, high, U-NII-2C	S01_AK01	2020-11-22	Passed	Passed
WLAN a, high, U-NII-3	S01_AK01	2020-11-22	Passed	Passed
WLAN a, low, U-NII-1	S01_AC01	2020-09-27	Passed	Passed
WLAN a, low, U-NII-2C	S01_AK01	2020-11-22	Passed	Passed
WLAN a, low, U-NII-3	S01_AK01	2020-11-22	Passed	Passed
WLAN ac 20 MHz, high, U-NII-1	S01_AK01	2020-11-21	Passed	Passed
WLAN ac 20 MHz, high, U-NII-2A	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 20 MHz, high, U-NII-2C	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 20 MHz, high, U-NII-3	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 20 MHz, low, U-NII-1	S01_AK01	2020-11-23	Passed	Passed
WLAN ac 20 MHz, low, U-NII-2C	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 20 MHz, low, U-NII-3	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 40 MHz, high, U-NII-1	S01_AK01	2020-11-21	Passed	Passed
WLAN ac 40 MHz, high, U-NII-2A	S01_AK01	2020-11-25	Passed	Passed
WLAN ac 40 MHz, high, U-NII-2C	S01_AK01	2020-11-25	Passed	Passed
WLAN ac 40 MHz, high, U-NII-3	S01_AK01	2020-11-27	Passed	Passed
WLAN ac 40 MHz, low, U-NII-1	S01_AK01	2020-11-23	Passed	Passed
WLAN ac 40 MHz, low, U-NII-2C	S01_AK01	2020-11-25	Passed	Passed
WLAN ac 40 MHz, low, U-NII-3	S01_AK01	2020-11-25	Passed	Passed
WLAN ac 80 MHz, high, U-NII-2C	S01_AK01	2020-11-27	Passed	Passed
WLAN ac 80 MHz, low, U-NII-2C	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-1	S01_AK01	2020-11-24	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-2A	S01_AK01	2020-11-25	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-3	S01_AK01	2020-11-25	Passed	Passed
WLAN n 20 MHz, high, U-NII-1	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, high, U-NII-2A	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, high, U-NII-2C	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, high, U-NII-3	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, low, U-NII-1	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, low, U-NII-2C	S01_AK01	2020-11-23	Passed	Passed
WLAN n 20 MHz, low, U-NII-3	S01_AK01	2020-11-23	Passed	Passed
WLAN n 40 MHz, high, U-NII-1	S01_AK01	2020-11-21	Passed	Passed
WLAN n 40 MHz, high, U-NII-2A	S01_AK01	2020-11-25	Passed	Passed
WLAN n 40 MHz, high, U-NII-2C	S01_AK01	2020-11-25	Passed	Passed
WLAN n 40 MHz, high, U-NII-3	S01_AK01	2020-11-25	Passed	Passed
WLAN n 40 MHz, low, U-NII-1	S01_AK01	2020-11-23	Passed	Passed
WLAN n 40 MHz, low, U-NII-2C	S01_AK01	2020-11-25	Passed	Passed
WLAN n 40 MHz, low, U-NII-3	S01_AK01	2020-11-25	Passed	Passed

**47 CFR CHAPTER I FCC PART 15 Subpart E
§15.407**

FCC §15.31, §15.407 (h)

Dynamic Frequency Selection

The measurement was performed according to ANSI C63.10

Final Result

OP-Mode	Setup	Date	FCC	IC
WLAN ac 80 MHz normal connection	S02_AH01	2020-12-01	Passed	Passed

N/A: Not applicable

N/P: Not performed

2 REVISION HISTORY / SIGNATURES

Report version control			
Version	Release date	Change Description	Version validity
initial	2020-12-21	--	valid
--	--	--	--

COMMENT: -



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



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

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: DAKS D-PL-12140-01-01| -02 | -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: 2020-06-15

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: 2020-12-14
Testing Period: 2020-09-27 to 2020-12-07

3.3 APPLICANT DATA

Company Name: u-blox AG
Address: Zürcherstrasse 68
8800 Thalwil
Switzerland
Contact Person: Filip Kruzela

3.4 MANUFACTURER DATA

Company Name:	u-blox AG
Address:	Zürcherstrasse 68 8800 Thalwil Switzerland
Contact Person:	Filip Kruzela

4 TEST OBJECT DATA

4.1 GENERAL EUT DESCRIPTION

Kind of Device product description	Host-based module with Wi-Fi and Bluetooth 5.0
Product name	JODY-W263-01A
Type	JODY-W263-01A
Declared EUT data by the supplier	
Voltage Type	DC
Voltage Level	1.8 and 3.3 V at Module (voltage is generated on the auxiliary carrier board, which is supplied by SDIO from the computer board for conducted tests or external power supply at 5 or 12 V for radiated tests. For AC conducted emissions the module was supplied directly by a laboratory power supply)
Tested Modulation Type	OFDM
Specific product description	The EUT is a Bluetooth and WLAN module. In the 5 GHz band it supports SISO Mode only. Supported WLAN modes are a, n and ac, with a 20 MHz BW, n 20 and 40 MHz BW as well as ac in 20, 40 and 80 MHz BW. The U-NII bands 1, 2A, 2C and 3 are supported. For this report the EUT is a slave without radar detection in the relevant DFS bands. Channels falling into the frequency range 5600 to 5650 MHz are supported for the USA but not supported for Canada.
Ports of the device	Enclosure Data DC Power Antenna
Antenna 1	External dual band antenna with 4.6 dBi max. gain in the relevant 5 GHz bands
Antenna 2	N/A
Tested Datarates	WLAN a: 6 Mbit WLAN n: MCS 0 WLAN ac: MCS 0
Special software used for testing	The test modes were set by the software "labtool" provided by the applicant on an auxiliary computer board.
Output Power to set	Output power to set in the labtool software: WLAN a + WLAN n + WLAN ac 20 MHz BW: 15 dBm WLAN ac 40 MHz BW: channel 102 (5510 MHz): 14 dBm, all other channels: 15 dBm WLAN ac 80 MHz BW: 14 dBm
TPC supported	No

4.2 EUT MAIN COMPONENTS

Sample Name	Sample Code	Description
EUT ac01	DE1015121ac01	
Sample Parameter	Value	
Serial No.	E98CCF957E012240300	
HW Version	00	
SW Version	16.80.205.p164	
Comment		

Sample Name	Sample Code	Description
EUT ag01	DE1015121ag01	
Sample Parameter	Value	
Serial No.	E98CCF957E012280300	
HW Version	00	
SW Version	16.80.205.p164	
Comment		

Sample Name	Sample Code	Description
EUT ah01	DE1015121ah01	
Sample Parameter	Value	
Serial No.	E98CCF957E012740300	
HW Version	00	
SW Version	16.80.205.p164	
Comment		

Sample Name	Sample Code	Description
EUT ak01	DE1015121ak01	
Sample Parameter	Value	
Serial No.	E98CCF957E011080300	
HW Version	00	
SW Version	16.80.205.p164	
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, HW, SW, S/N)	Description
Antenna 1	Linx, ANT-DB1-RAF-RPS, -, -, -	Dual band antenna used for WLAN
Antenna 2	Linx, ANT-2.4-CW-RCT-RP, -, -, -	Single band antenna for BT Classic in the 2.4 GHz ISM band

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
AUX2	Toradex, Ixora, V 1.2a, Angstrom v2017.12 Apalis-TK1_console-Image 2.8b5 20200801, 10629806	Board Computer
AUX4	UBLOX, JODY-Carrier Board, Rev. C, -, 10000001914323016001	Carrier Board for module providing ports
AUX6	UBLOX, JODY-Carrier Board, Rev. C, -, 10000001898798003001	Carrier Board for module providing ports
AUX7	UBLOX, JODY-Carrier Board, Rev. C, -, 10000001914323007002	Carrier Board for module providing ports
AUX7I1	Agilent, E3631A, -, -, MY40018563	120 V 60 Hz AC laboratory power supply

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
S02_AK01_AC	EUT ak01, AUX7, Antenna 1, Antenna 2	AC conducted emissions Setup
S02_AK01	EUT ak01, AUX2, AUX7,	Conducted Setup
S02_AH01	EUT ah01, AUX2, AUX6,	Conducted Setup
S02_AG01	EUT ag01, AUX2, AUX6,	Conducted Setup
S01_AK01	EUT ak01, AUX7, Antenna 1, Antenna 2	Radiated Setup
S01_AC01	EUT ac01, AUX4, Antenna 1, Antenna 2	Radiated Setup

4.6 OPERATING MODES / TEST CHANNELS

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

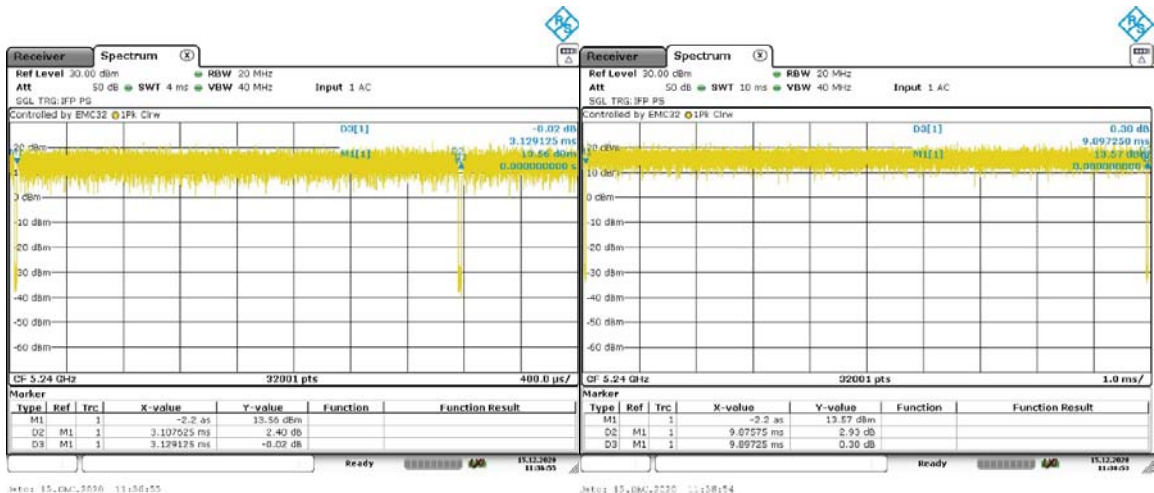
U-NII-Subband 1 5150 - 5250 MHz			U-NII-Subband 2A 5250 - 5350 MHz			U-NII-Subband 2C 5470 - 5725 MHz			U-NII-Subband 3 5725 - 5850 MHz			Nom. BW
low	mid	high	low	mid	high	low	mid	high	low	mid	high	20 MHz
36	40 / 44 ²⁾	48	52	56 / 60 ²⁾	64	100	116	140 / 144 ¹⁾	149	157	165	Ch.-No.
5180	5200 / 5220	5240	5260	5280 / 5300	5320	5500	5580	5700 / 5720	5745	5785	5825	MHz

low	mid	high	low	mid	high	low	mid	high	low	mid	high	40 MHz
38	-	46	54	-	62	102	110	138 / 142 ¹⁾	151	-	159	Ch.-No.
5190	-	5230	5270	-	5310	5510	5550	5690 / 5710	5755	-	5795	MHz

low	mid	high	low	mid	high	low	mid	high	low	mid	high	80 MHz
-	42	-	-	58	-	106	122	134 ¹⁾	-	155	-	Ch.-No.
-	5210	-	-	5290	-	5530	5610	5670	-	5775	-	MHz

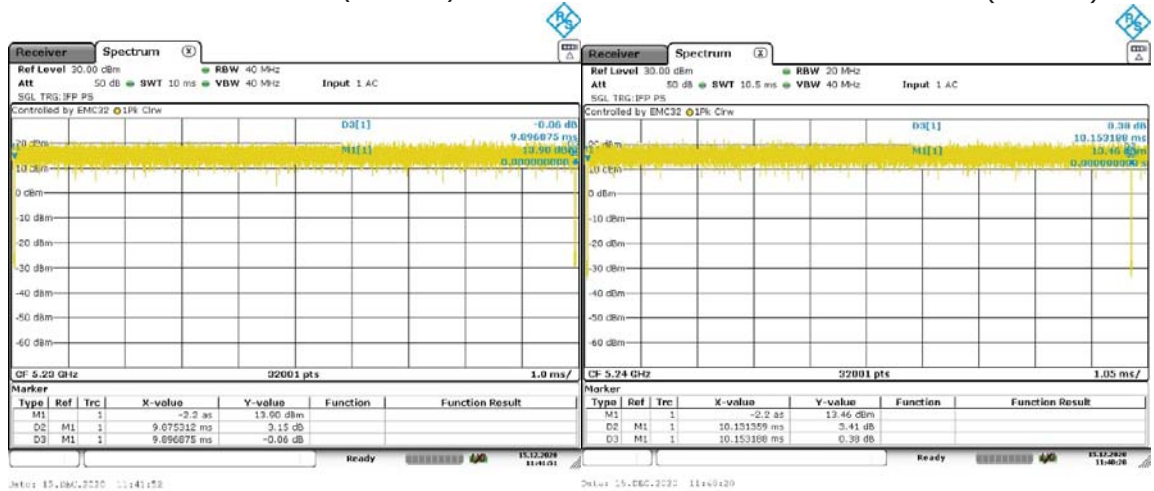
- 1) Channels 144, 142 and 134 are straddle channels. Relevant high channels for upper Band Edge of band 2C are CH.140, CH. 138 and Ch 122.
- 2) Channels 40 and 60 were used during conducted testing, channels 44 and 56 were used during radiated testing.

4.7 DUTY CYCLE



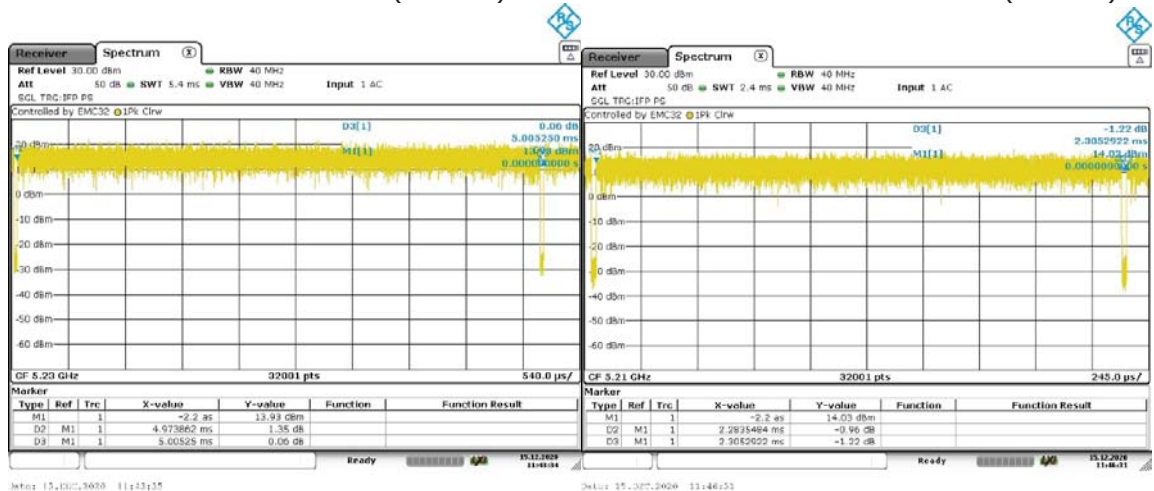
WLAN a 6 Mbit (99.3 %)

WLAN n 20 MHz BW MCS 0 (99.8 %)



WLAN n 40 MHz BW MCS 0 (99.8 %)

WLAN ac 20 MHz BW MCS 0 (99.8 %)



WLAN ac 40 MHz BW MCS 0 (99.4 %)

WLAN ac 80 MHz BW MCS 0 (99.1 %)

4.8 PRODUCT LABELLING

4.8.1 FCC ID LABEL

Please refer to the documentation of the applicant.

4.8.2 LOCATION OF THE LABEL ON THE EUT

Please refer to the documentation of the applicant.

5 TEST RESULTS

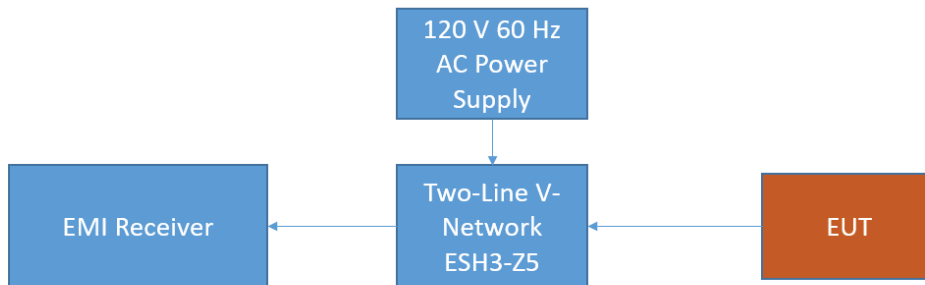
5.1 AC CONDUCTED EMISSIONS

Standard **FCC Part 15 Subpart E**

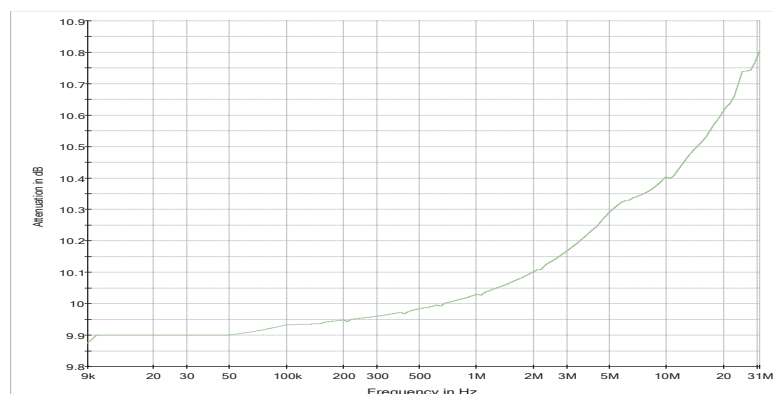
The test was performed according to:
ANSI C63.10

5.1.1 TEST DESCRIPTION

The test set-up was made in accordance to the general provisions of ANSI C 63.10. The Equipment Under Test (EUT) was setup in a shielded room to perform the conducted emissions measurements in a typical installation configuration. The EUT was powered from 50 μ H || 50 Ohm Line Impedance Stabilization Network (LISN). The LISN's unused connections were terminated with 50 Ohm loads.



FCC Conducted Emissions on AC



Attenuation of measurement path Two-line V-Network to EMI receiver

The measurement procedure consists of two steps. It is implemented into the EMI test software EMC-32 from R&S.

Step 1: Preliminary scan

Intention of this step is, to determine the conducted EMI-profile of the EUT.

EMI receiver settings:

- Detector: Peak – Maxhold & Average

- Frequency range: 150 kHz – 30 MHz
- Frequency steps: 2.5 kHz
- IF-Bandwidth: 9 kHz
- Measuring time / Frequency step: 100 ms (FFT-based)
- Measurement on phase + neutral lines of the power cords

On basis of this preliminary scan the highest amplitudes and the corresponding frequencies relative to the limit are identified. Emissions above the limit and emissions which are in the 10 dB range below the limit are considered.

Step 2: Final measurement

Intention of this step is, to determine the highest emissions with the settings defined in the test specification for the frequencies identified in step 1.

EMI receiver settings:

- Detector: Quasi-Peak & (CISPR) Average
- IF Bandwidth: 9 kHz
- Measuring time: 1 s / frequency

At each frequency determined in step 1, four measurements are performed in the following combinations:

- 1) Neutral lead - reference ground (PE grounded)
- 2) Phase lead - reference ground (PE grounded)
- 3) Neutral lead - reference ground (PE floating)
- 4) Phase lead - reference ground (PE floating)

The highest value is reported.

5.1.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart C, §15.207

Frequency (MHz)	QP Limits (dB μ V)	AV Limits (dB μ V)
0.15 – 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

5.1.3 TEST PROTOCOL

Temperature: 22 °C
Air Pressure: 994 hPa
Humidity: 33 %

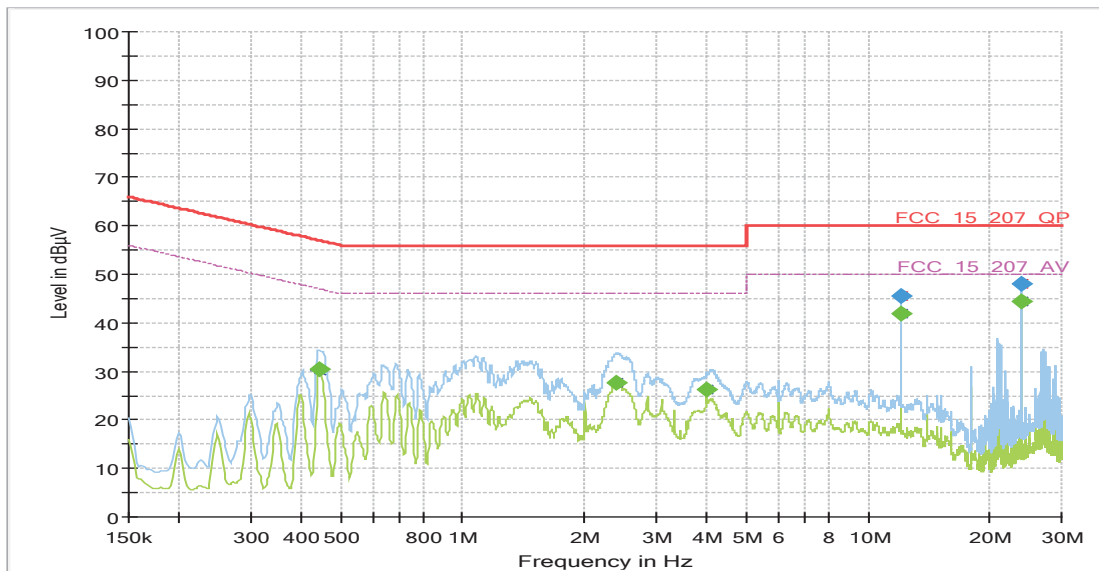
Power line	PE	Frequency [MHz]	Measured value QP [dBμV]	Measured value AV [dBμV]	Limit [dBμV]	Margin [dB]
L1	GND	12.01	-	42.0	50.0	8.0
L1	FLO	24.01	-	44.4	50.0	5.6

Remark: None.

5.1.4 MEASUREMENT PLOT

Operating mode = worst case (Setup S02_AK01_AC)

Test Standard: FCC §15.207, ANSI C63.10
Operating Conditions: 120 V 60 Hz, WLAN a 6 Mbit Ch. 48
Legend: Trace: blue = QP, green = CISPR AV; Star: red or blue = critical frequency; Rhombus: blue = final QP, green = final CISPR AV
Tested Port / used LISN: AC mains => 1st LISN ESH3-Z5
Termination of other ports: AC of AUX => 2nd LISN ESH3-Z5 +50 Ohm



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.444750	---	30.37	46.97	16.60	1000.0	9.000	L1	FLO	10.1
2.402250	---	27.72	46.00	18.28	1000.0	9.000	N	FLO	10.2
4.002000	---	26.30	46.00	19.70	1000.0	9.000	L1	GND	10.3
12.005250	45.44	---	60.00	14.56	1000.0	9.000	L1	GND	10.7
12.005250	---	41.96	50.00	8.04	1000.0	9.000	L1	GND	10.7
24.009000	48.07	---	60.00	11.93	1000.0	9.000	L1	FLO	11.2
24.009000	---	44.41	50.00	5.59	1000.0	9.000	L1	FLO	11.2

5.1.5 TEST EQUIPMENT USED

- Conducted Emissions FCC

5.2 26 DB BANDWIDTH

Standard **FCC Part 15 Subpart E**

The test was performed according to:
ANSI C63.10

5.2.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up to perform the occupied bandwidth measurements.

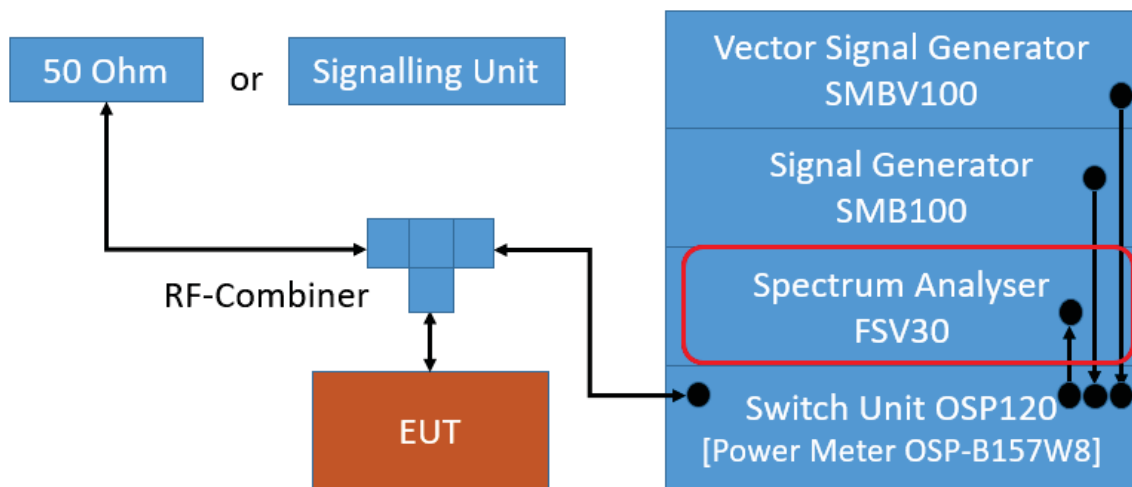
The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

The results recorded were measured with the modulation which produce the worst-case (widest) emission bandwidth.

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

Analyzer settings:

- Resolution Bandwidth (RBW): initially approx. 1 % of nominal emission bandwidth
- Video Bandwidth (VBW): > RBW
- Span: 40 / 80 / 160 / 320 MHz (for 20 / 40 / 80 / 160 MHz nominal bandwidth)
- Trace: Maxhold
- Sweeps: Until the trace is stable
- Sweep time: Auto
- Detector: Peak



TS8997; Occupied Channel Bandwidth 6 dB / 26 dB / 99 %

5.2.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart E, §15.403 (i)

There exist no applicable limits for the U-NII subbands 1, 2A and 2C. The test was performed to determine the limits for the "Maximum Conducted Output Power" test case. Therefore no result was applied.

5.2.3 TEST PROTOCOL

Ambient temperature: 25 °C
Air Pressure: 1011 hPa
Humidity: 40 %

Radio Technology	Operating Frequency	Subband	26 dB Bandwidth [MHz]
WLAN a	low	U-NII-1	19.9
WLAN a	mid	U-NII-1	19.9
WLAN a	high	U-NII-1	19.9
WLAN a	low	U-NII-2A	19.9
WLAN a	mid	U-NII-2A	19.9
WLAN a	high	U-NII-2A	20.0
WLAN a	low	U-NII-2C	19.8
WLAN a	mid	U-NII-2C	19.8
WLAN a	high	U-NII-2C	19.9
WLAN a	low	U-NII-3	19.9
WLAN a	mid	U-NII-3	19.9
WLAN a	high	U-NII-3	20.0
WLAN n 20 MHz	low	U-NII-1	20.4
WLAN n 20 MHz	mid	U-NII-1	20.4
WLAN n 20 MHz	high	U-NII-1	20.3
WLAN n 20 MHz	low	U-NII-2A	20.2
WLAN n 20 MHz	mid	U-NII-2A	20.3
WLAN n 20 MHz	high	U-NII-2A	20.3
WLAN n 20 MHz	low	U-NII-2C	20.2
WLAN n 20 MHz	mid	U-NII-2C	20.4
WLAN n 20 MHz	high	U-NII-2C	20.4
WLAN n 20 MHz	low	U-NII-3	20.3
WLAN n 20 MHz	mid	U-NII-3	20.2
WLAN n 20 MHz	high	U-NII-3	20.4
WLAN n 40 MHz	low	U-NII-1	40.4
WLAN n 40 MHz	high	U-NII-1	40.4
WLAN n 40 MHz	low	U-NII-2A	40.4
WLAN n 40 MHz	high	U-NII-2A	40.5
WLAN n 40 MHz	low	U-NII-2C	40.4
WLAN n 40 MHz	mid	U-NII-2C	40.5
WLAN n 40 MHz	high	U-NII-2C	41.0
WLAN n 40 MHz	low	U-NII-3	40.5
WLAN n 40 MHz	high	U-NII-3	40.5
WLAN ac 20 MHz	low	U-NII-1	20.3
WLAN ac 20 MHz	mid	U-NII-1	20.3
WLAN ac 20 MHz	high	U-NII-1	20.3
WLAN ac 20 MHz	low	U-NII-2A	20.2
WLAN ac 20 MHz	mid	U-NII-2A	20.2
WLAN ac 20 MHz	high	U-NII-2A	20.4
WLAN ac 20 MHz	low	U-NII-2C	20.4
WLAN ac 20 MHz	mid	U-NII-2C	20.3
WLAN ac 20 MHz	high	U-NII-2C	20.6
WLAN ac 20 MHz	high	U-NII-2C straddle	20.3
WLAN ac 20 MHz	low	U-NII-3	20.3
WLAN ac 20 MHz	mid	U-NII-3	20.4
WLAN ac 20 MHz	high	U-NII-3	20.4

Radio Technology	Operating Frequency	Subband	26 dB Bandwidth [MHz]
WLAN ac 40 MHz	low	U-NII-1	40.5
WLAN ac 40 MHz	high	U-NII-1	40.8
WLAN ac 40 MHz	low	U-NII-2A	40.4
WLAN ac 40 MHz	high	U-NII-2A	41.0
WLAN ac 40 MHz	low	U-NII-2C	40.4
WLAN ac 40 MHz	mid	U-NII-2C	40.5
WLAN ac 40 MHz	high	U-NII-2C	40.5
WLAN ac 40 MHz	high	U-NII-2C straddle	41.4
WLAN ac 40 MHz	low	U-NII-3	40.7
WLAN ac 40 MHz	high	U-NII-3	41.3
WLAN ac 80 MHz	mid	U-NII-1	82.5
WLAN ac 80 MHz	mid	U-NII-2A	84.0
WLAN ac 80 MHz	low	U-NII-2C	82.5
WLAN ac 80 MHz	mid	U-NII-2C	83.5
WLAN ac 80 MHz	high	U-NII-2C straddle	83.5
WLAN ac 80 MHz	mid	U-NII-3	82.5

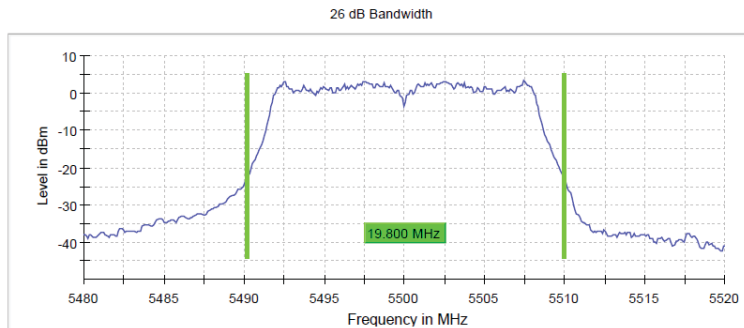
Remark: Please see next sub-clause for the measurement plot.

5.2.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2A
(S02_AG01)

26 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5500.000000	19.800000	---	---	5490.150000	5509.950000	3.3	PASS

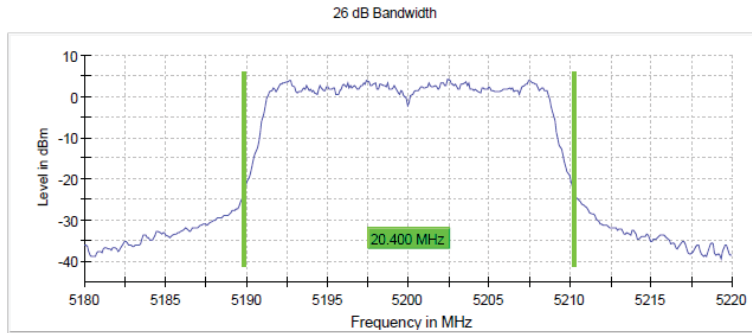


Setting	Instrument Value
Start Frequency	5.48000 GHz
Stop Frequency	5.52000 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
SweepTime	28.477 μ s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	52 / max. 150
Stable	5 / 5
Max Stable Difference	0.09 dB

Radio Technology = WLAN n 20 MHz, Operating Frequency = mid, Subband = U-NII-1
(S02_AG01)

26 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5200.000000	20.400000	---	---	5189.850000	5210.250000	4.1	PASS

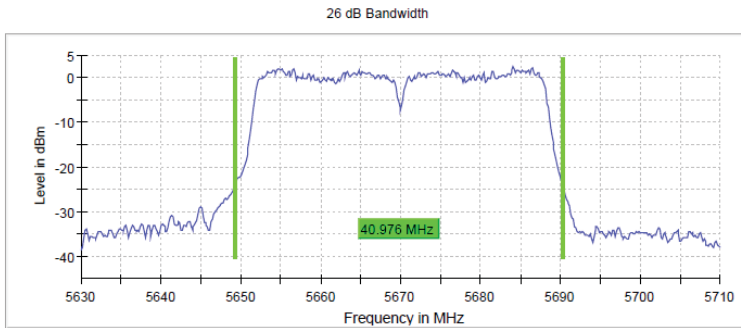


Setting	Instrument Value
Start Frequency	5.18000 GHz
Stop Frequency	5.22000 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
SweepTime	28.477 μs
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	41 / max. 150
Stable	5 / 5
Max Stable Difference	0.30 dB

Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-2C
(S02_AG01)

26 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5670.000000	40.975610	---	---	5649.287054	5690.262664	2.4	PASS

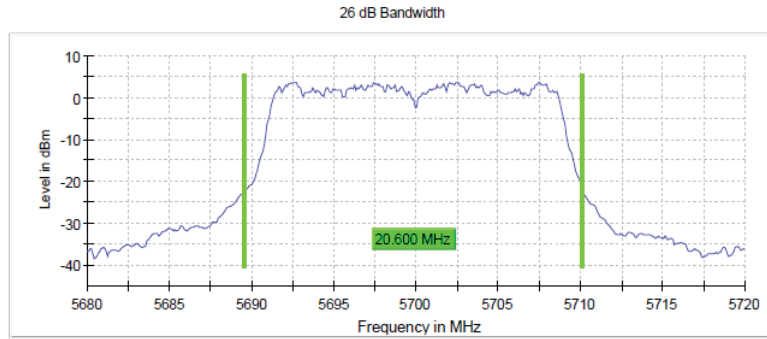


Setting	Instrument Value
Start Frequency	5.63000 GHz
Stop Frequency	5.71000 GHz
Span	80.000 MHz
RBW	300.000 kHz
VBW	1.000 MHz
SweepPoints	533
SweepTime	31.621 μs
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	47 / max. 150
Stable	5 / 5
Max Stable Difference	0.19 dB

Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Subband = U-NII-2C (S02_AG01)

26 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5700.000000	20.600000	—	—	5689.550000	5710.150000	3.7	PASS

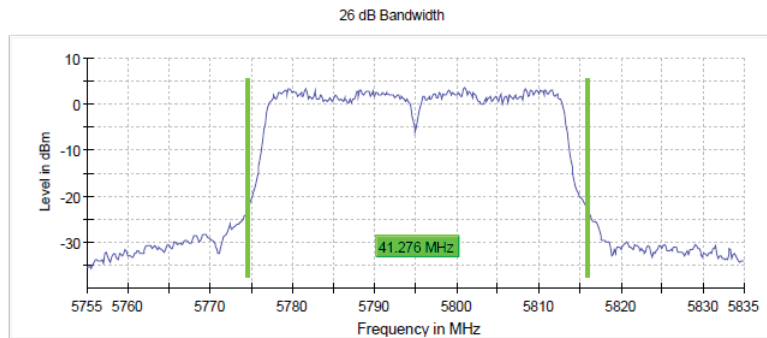


Setting	Instrument Value
Start Frequency	5.68000 GHz
Stop Frequency	5.72000 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
SweepTime	28.477 μs
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	88 / max. 150
Stable	5 / 5
Max Stable Difference	0.00 dB

Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S02_AG01)

26 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5795.000000	41.275797	—	—	5774.587242	5815.863039	3.7	PASS

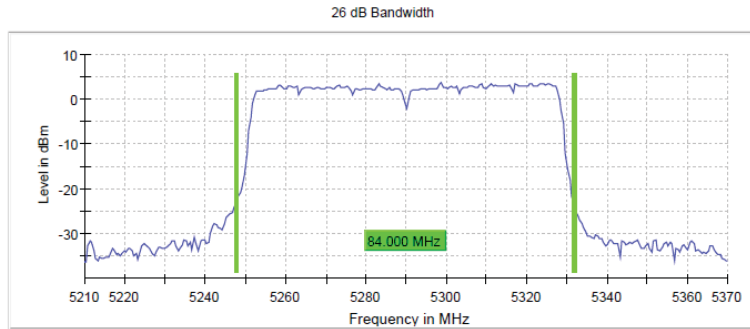


Setting	Instrument Value
Start Frequency	5.75500 GHz
Stop Frequency	5.83500 GHz
Span	80.000 MHz
RBW	300.000 kHz
VBW	1.000 MHz
SweepPoints	533
SweepTime	31.621 μs
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	103 / max. 150
Stable	5 / 5
Max Stable Difference	0.00 dB

Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Subband = U-NII-2A (S02_AH01)

26 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5290.000000	84.000000	---	---	5247.750000	5331.750000	3.5	PASS



Setting	Instrument Value
Start Frequency	5.21000 GHz
Stop Frequency	5.37000 GHz
Span	160.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	320
SweepTime	22.875 μ s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	37 / max. 150
Stable	5 / 5
Max Stable Difference	0.30 dB

5.2.5 TEST EQUIPMENT USED

- R&S TS8997

5.3 6 DB BANDWIDTH

Standard **FCC Part 15 Subpart E**

The test was performed according to:
ANSI C63.10

5.3.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was setup in a shielded room to perform the occupied bandwidth measurements.

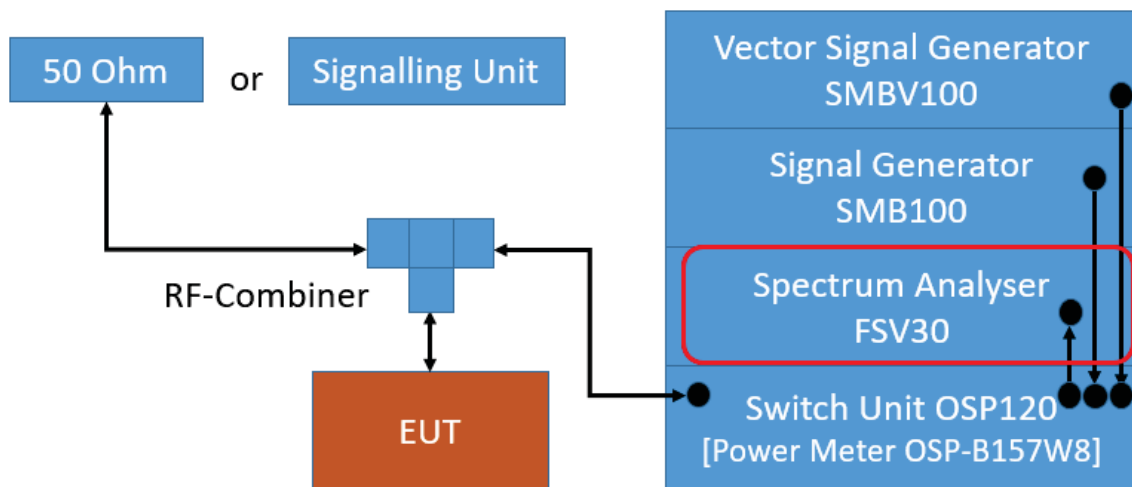
The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

The results recorded were measured with the modulation which produce the worst-case (smallest) emission bandwidth.

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

Analyzer settings:

- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Span: 40 / 80 / 160 / 320 MHz (for 20 / 40 / 80 / 160 MHz nominal bandwidth))
- Trace: Maxhold
- Sweeps: Until the trace is stable
- Sweptime: Auto
- Detector: Peak



TS8997; Occupied Channel Bandwidth 6 dB / 26 dB / 99 %

5.3.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart E, §15.407 (e)

Within the 5.725-5.850 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

5.3.3 TEST PROTOCOL

Ambient temperature: 25 °C
Air Pressure: 1011 hPa
Humidity: 40 %

Radio Technology	Operating Frequency	6 dB Bandwidth [MHz]	Limit [MHz]	Margin [MHz]
WLAN a	low	16.45	0.5	15.95
WLAN a	mid	16.45	0.5	15.95
WLAN a	high	16.45	0.5	15.95
WLAN n 20 MHz	low	17.65	0.5	17.15
WLAN n 20 MHz	mid	17.65	0.5	17.15
WLAN n 20 MHz	high	17.65	0.5	17.15
WLAN n 40 MHz	low	35.80	0.5	35.30
WLAN n 40 MHz	high	35.90	0.5	35.40
WLAN ac 20 MHz	low	17.65	0.5	17.15
WLAN ac 20 MHz	mid	17.65	0.5	17.15
WLAN ac 20 MHz	high	17.65	0.5	17.15
WLAN ac 40 MHz	low	35.90	0.5	35.40
WLAN ac 40 MHz	high	35.90	0.5	35.40
WLAN ac 80 MHz	mid	76.40	0.5	75.90

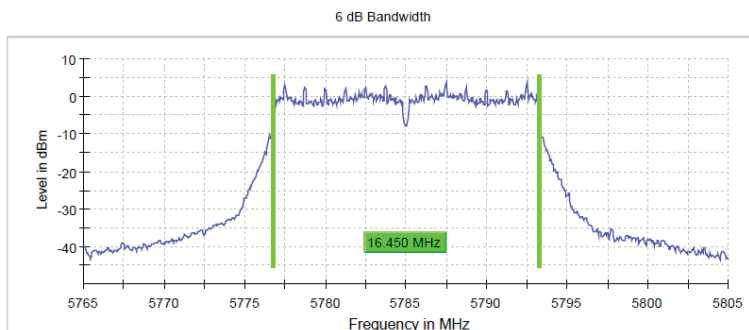
Remark: Please see next sub-clause for the measurement plot.

5.3.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-3 (S02_AG01)

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5785.000000	16.450000	0.500000	---	5776.775000	5793.225000	3.7	PASS

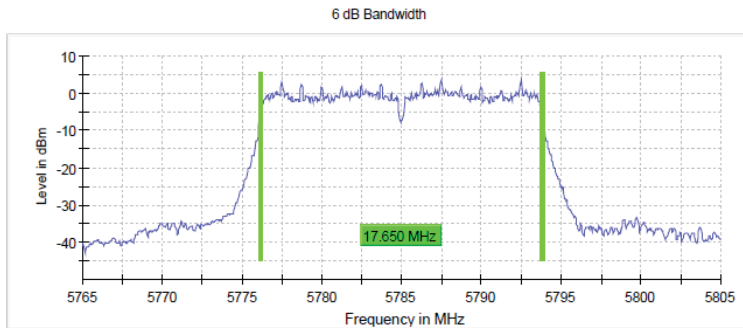


Setting	Instrument Value
Start Frequency	5.76500 GHz
Stop Frequency	5.80500 GHz
Span	40.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	800
SweepTime	56.836 µs
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	39 / max. 150
Stable	5 / 5
Max Stable Difference	0.29 dB

Radio Technology = WLAN n 20 MHz, Operating Frequency = mid, Subband = U-NII-3
(S02_AG01)

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5785.000000	17.650000	0.500000	---	5776.175000	5793.825000	3.7	PASS

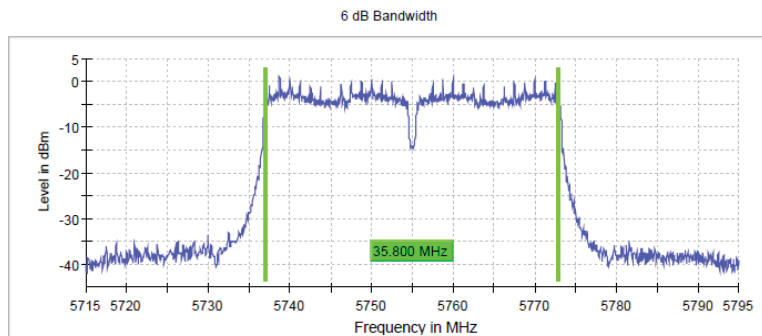


Setting	Instrument Value
Start Frequency	5.76500 GHz
Stop Frequency	5.80500 GHz
Span	40.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	800
SweepTime	56.836 µs
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	49 / max. 150
Stable	5 / 5
Max Stable Difference	0.28 dB

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-3
(S02_AG01)

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5755.000000	35.800000	0.500000	---	5737.025000	5772.825000	1.1	PASS

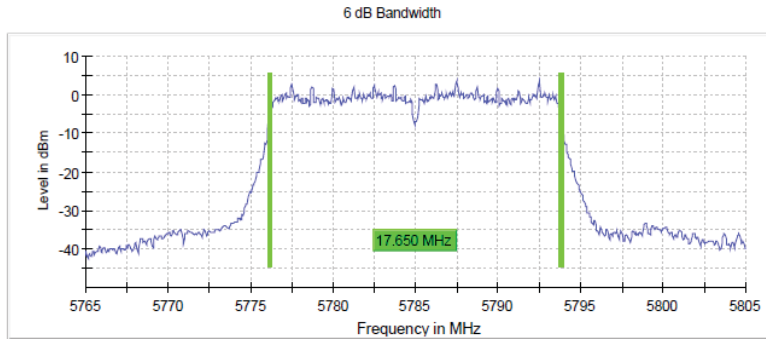


Setting	Instrument Value
Start Frequency	5.71500 GHz
Stop Frequency	5.79500 GHz
Span	80.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	1600
SweepTime	94.727 µs
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	75 / max. 150
Stable	5 / 5
Max Stable Difference	0.22 dB

Radio Technology = WLAN ac 20 MHz, Operating Frequency = mid, Subband = U-NII-3 (S02_AG01)

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5785.000000	17.650000	0.500000	---	5776.175000	5793.825000	3.6	PASS

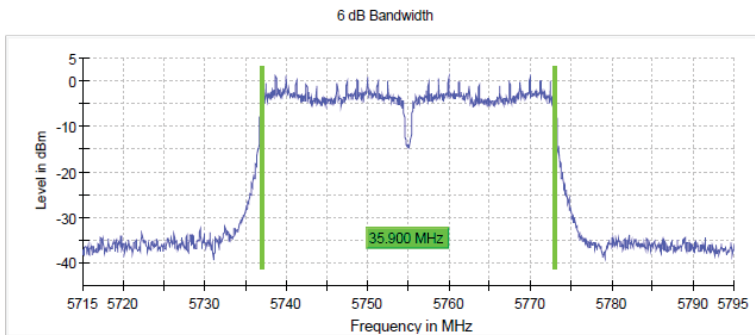


Setting	Instrument Value
Start Frequency	5.76500 GHz
Stop Frequency	5.80500 GHz
Span	40.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	800
SweepTime	56.836 μ s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	50 / max. 150
Stable	5 / 5
Max Stable Difference	0.09 dB

Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S02_AG01)

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5755.000000	35.900000	0.500000	---	5737.025000	5772.925000	1.3	PASS

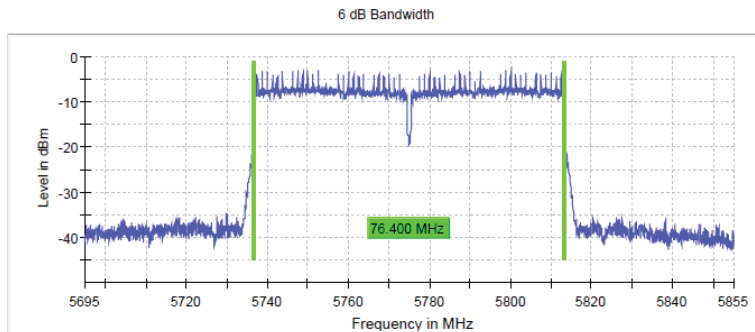


Setting	Instrument Value
Start Frequency	5.71500 GHz
Stop Frequency	5.79500 GHz
Span	80.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	1600
SweepTime	94.727 μ s
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	68 / max. 150
Stable	5 / 5
Max Stable Difference	0.12 dB

Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Subband = U-NII-3 (S02_AH01)

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
5775.000000	76.400000	0.500000	---	5736.775000	5813.175000	-3.0	PASS



Setting	Instrument Value
Start Frequency	5.69500 GHz
Stop Frequency	5.85500 GHz
Span	160.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	3200
SweepTime	189.453 μ s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	102 / max. 150
Stable	5 / 5
Max Stable Difference	0.21 dB

5.3.5 TEST EQUIPMENT USED

- R&S TS8997

5.4 99 % BANDWIDTH

Standard **FCC Part 15 Subpart E**

The test was performed according to:
ANSI C63.10

5.4.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up to perform the occupied bandwidth measurements.

The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

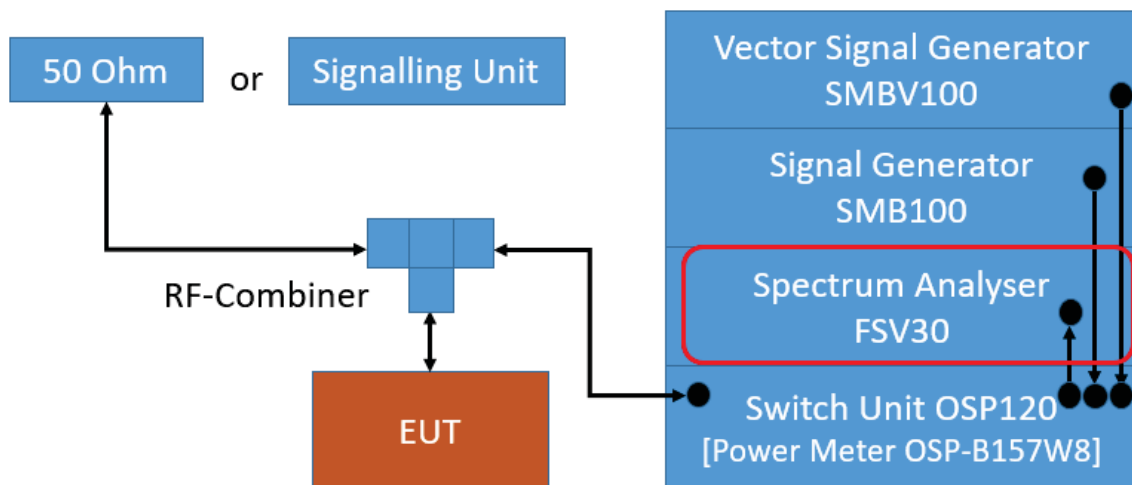
The results recorded were measured with the modulation which produce the worst-case (widest) emission bandwidth.

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

Analyzer settings:

- Resolution Bandwidth (RBW): approx. ≥ 1 % of the span, but not below
- Video Bandwidth (VBW): ≥ 3 times the RBW
- Span: 40 / 80 / 160 / 320 MHz (for 20 / 40 / 80 / 160 MHz nominal bandwidth)
- Trace: Maxhold
- Sweeps: Until the trace is stable
- Sweptime: Auto
- Detector: Peak

The 99 % measurement function of the spectrum analyser function was used to determine the 99 % bandwidth.



TS8997; Occupied Channel Bandwidth 6 dB / 26 dB / 99 %

5.4.2 TEST REQUIREMENTS / LIMITS

No applicable limit.

5.4.3 TEST PROTOCOL

Ambient temperature: 25 °C
Air Pressure: 1011 hPa
Humidity: 40 %

Radio Technology	Operating Frequency	Subband	99% Bandwidth [MHz]
WLAN a	low	U-NII-1	16.7
WLAN a	mid	U-NII-1	16.7
WLAN a	high	U-NII-1	16.7
WLAN a	low	U-NII-2A	16.7
WLAN a	mid	U-NII-2A	16.7
WLAN a	high	U-NII-2A	16.7
WLAN a	low	U-NII-2C	16.7
WLAN a	mid	U-NII-2C	16.7
WLAN a	high	U-NII-2C	16.7
WLAN a	low	U-NII-3	16.7
WLAN a	mid	U-NII-3	16.7
WLAN a	high	U-NII-3	16.7
WLAN n 20 MHz	low	U-NII-1	17.7
WLAN n 20 MHz	mid	U-NII-1	17.7
WLAN n 20 MHz	high	U-NII-1	17.7
WLAN n 20 MHz	low	U-NII-2A	17.7
WLAN n 20 MHz	mid	U-NII-2A	17.7
WLAN n 20 MHz	high	U-NII-2A	17.7
WLAN n 20 MHz	low	U-NII-2C	17.7
WLAN n 20 MHz	mid	U-NII-2C	17.7
WLAN n 20 MHz	high	U-NII-2C	17.7
WLAN n 20 MHz	low	U-NII-3	17.7
WLAN n 20 MHz	mid	U-NII-3	17.7
WLAN n 20 MHz	high	U-NII-3	17.7
WLAN n 40 MHz	low	U-NII-1	36.3
WLAN n 40 MHz	high	U-NII-1	36.3
WLAN n 40 MHz	low	U-NII-2A	36.3
WLAN n 40 MHz	high	U-NII-2A	36.3
WLAN n 40 MHz	low	U-NII-2C	36.3
WLAN n 40 MHz	mid	U-NII-2C	36.5
WLAN n 40 MHz	high	U-NII-2C	36.5
WLAN n 40 MHz	low	U-NII-3	36.5
WLAN n 40 MHz	high	U-NII-3	36.5
WLAN ac 20 MHz	low	U-NII-1	17.7
WLAN ac 20 MHz	mid	U-NII-1	17.7
WLAN ac 20 MHz	high	U-NII-1	17.7
WLAN ac 20 MHz	low	U-NII-2A	17.7
WLAN ac 20 MHz	mid	U-NII-2A	17.7
WLAN ac 20 MHz	high	U-NII-2A	17.7
WLAN ac 20 MHz	low	U-NII-2C	17.7
WLAN ac 20 MHz	mid	U-NII-2C	17.7
WLAN ac 20 MHz	high	U-NII-2C	17.7
WLAN ac 20 MHz	high	U-NII-2C straddle	17.7
WLAN ac 20 MHz	low	U-NII-3	17.7
WLAN ac 20 MHz	mid	U-NII-3	17.7
WLAN ac 20 MHz	high	U-NII-3	17.7
WLAN ac 40 MHz	low	U-NII-1	36.3
WLAN ac 40 MHz	high	U-NII-1	36.3
WLAN ac 40 MHz	low	U-NII-2A	36.3
WLAN ac 40 MHz	high	U-NII-2A	36.3

Radio Technology	Operating Frequency	Subband	99% Bandwidth [MHz]
WLAN ac 40 MHz	low	U-NII-2C	36.5
WLAN ac 40 MHz	mid	U-NII-2C	36.3
WLAN ac 40 MHz	high	U-NII-2C	36.5
WLAN ac 40 MHz	high	U-NII-2C straddle	36.5
WLAN ac 40 MHz	low	U-NII-3	36.5
WLAN ac 40 MHz	high	U-NII-3	36.5
WLAN ac 80 MHz	mid	U-NII-1	76.5
WLAN ac 80 MHz	mid	U-NII-2A	76.5
WLAN ac 80 MHz	low	U-NII-2C	76.5
WLAN ac 80 MHz	mid	U-NII-2C	76.5
WLAN ac 80 MHz	high	U-NII-2C straddle	76.5
WLAN ac 80 MHz	mid	U-NII-3	76.5

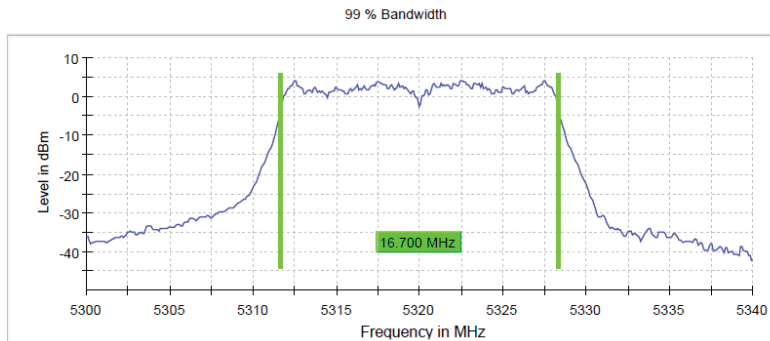
Remark: Please see next sub-clause for the measurement plot.

5.4.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2A
(S02_AG01)

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
5320.000000	16.700000	---	---	5311.650000	5328.350000	PASS

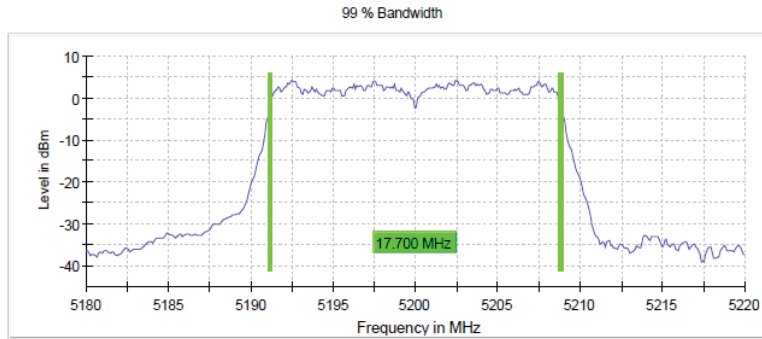


Setting	Instrument Value
Start Frequency	5.30000 GHz
Stop Frequency	5.34000 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
SweepTime	28.477 μ s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	34 / max. 150
Stable	5 / 5
Max Stable Difference	0.06 dB

Radio Technology = WLAN n 20 MHz, Operating Frequency = mid, Subband = U-NII-1
(S02_AG01)

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
5200.000000	17.700000	—	—	5191.150000	5208.850000	PASS

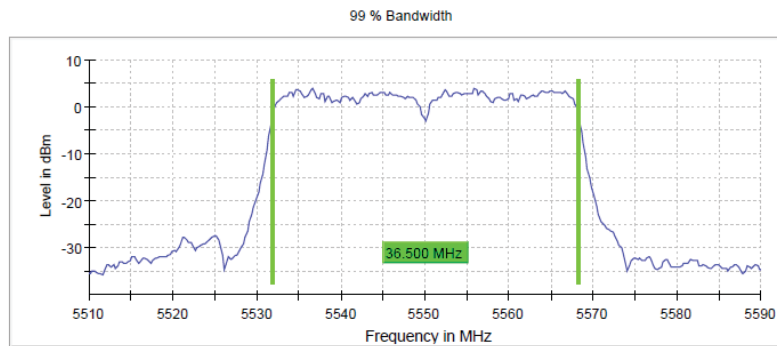


Setting	Instrument Value
Start Frequency	5.18000 GHz
Stop Frequency	5.22000 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
SweepTime	28.477 μ s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	55 / max. 150
Stable	5 / 5
Max Stable Difference	0.25 dB

Radio Technology = WLAN n 40 MHz, Operating Frequency = mid, Subband = U-NII-2C
(S02_AG01)

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
5550.000000	36.500000	—	—	5531.875000	5568.375000	PASS

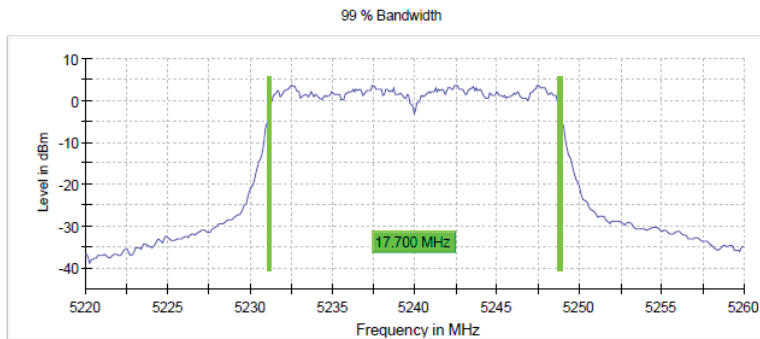


Setting	Instrument Value
Start Frequency	5.51000 GHz
Stop Frequency	5.59000 GHz
Span	80.000 MHz
RBW	500.000 kHz
VBW	2.000 MHz
SweepPoints	320
SweepTime	18.906 μ s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	61 / max. 150
Stable	5 / 5
Max Stable Difference	0.00 dB

Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Subband = U-NII-1
(S02_AG01)

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
5240.000000	17.700000	---	---	5231.150000	5248.850000	PASS

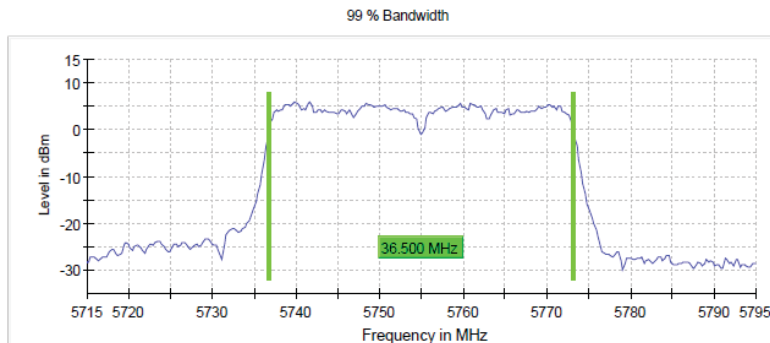


Setting	Instrument Value
Start Frequency	5.22000 GHz
Stop Frequency	5.26000 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
SweepTime	28.477 μ s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	65 / max. 150
Stable	5 / 5
Max Stable Difference	0.28 dB

Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Subband = U-NII-3
(S02_AG01)

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
5755.000000	36.500000	---	---	5736.625000	5773.125000	PASS



Setting	Instrument Value
Start Frequency	5.71500 GHz
Stop Frequency	5.79500 GHz
Span	80.000 MHz
RBW	500.000 kHz
VBW	2.000 MHz
SweepPoints	320
SweepTime	18.906 μ s
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	90 / max. 150
Stable	5 / 5
Max Stable Difference	0.00 dB

5.4.5 TEST EQUIPMENT USED

- R&S TS8997

5.5 MAXIMUM CONDUCTED OUTPUT POWER

Standard **FCC Part 15 Subpart E**

The test was performed according to:
ANSI C63.10

5.5.1 TEST DESCRIPTION

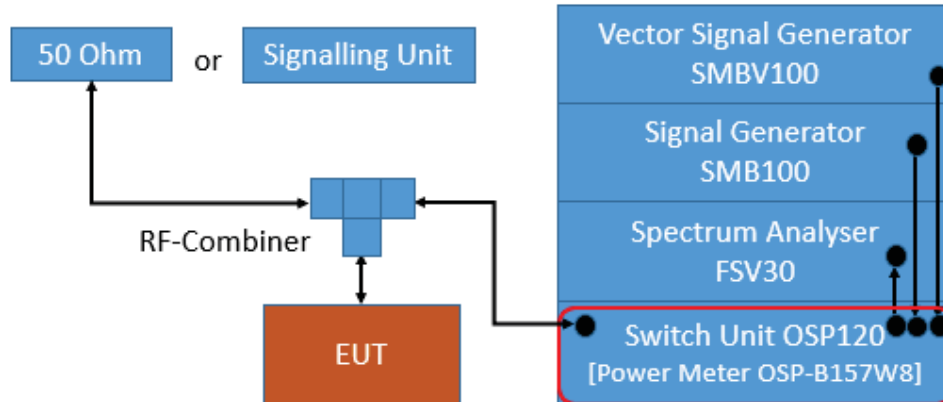
The Equipment Under Test (EUT) was set up to perform the output power measurements. The results recorded were measured with the modulation which produces the worst-case (highest) output power

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

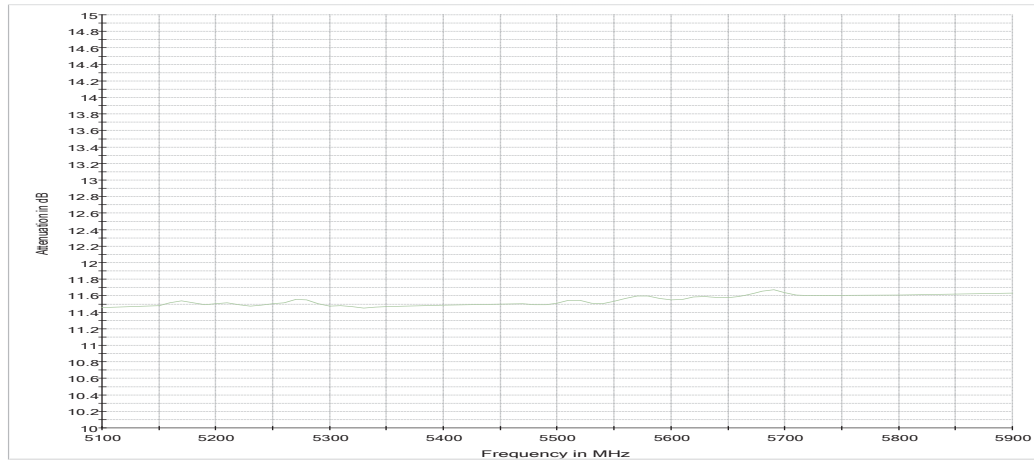
The OSP-B157W is a gated RF average power meter with a signal bandwidth > 300 MHz.

Note:

The measurement was performed according FCC Public Note "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, 789033 D02", method **PM-G**.



TS8997; Maximum Conducted Output Power



Attenuation of measurement path

5.5.2 TEST REQUIREMENTS / LIMITS

A) FCC

FCC Part 15, Subpart E, §15.407 (a) (1) (i): Outdoor access point:

For systems using digital modulation techniques in the 5.15 – 5.25 GHz bands:

Limit: 1 W (30 dBm) provided the maximum antenna gain does not exceed 6 dBi.

The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

§15.407 (a) (1) (ii): Indoor access point:

Limit: 1 W (30 dBm) provided the maximum antenna gain does not exceed 6 dBi.

§15.407 (a) (1) (iii): Fixed point-to-point access points:

Limit: 1 W (30 dBm) provided the maximum antenna gain does not exceed 23 dBi.

§15.407 (a) (1) (iv): Client devices:

Limit: 250 mW (24 dBm) provided the maximum antenna gain does not exceed 6 dBi.

FCC Part 15, Subpart E, §15.407 (a) (2)

For systems using digital modulation techniques in the 5.25 – 5.35 GHz and 5.47 – 5.725 GHz bands:

Limit: 250 mW (24 dBm) or $11 \text{ dBm} + 10 \log (26 \text{ dB bandwidth/MHz})$ whatever is the lesser.

FCC Part 15, Subpart E, §15.407 (a) (3):

For systems using digital modulation techniques in the 5.725 – 5.850 GHz bands:

Limit: 1 W (30 dBm) provided the maximum antenna gain does not exceed 6 dBi. The antenna gain limitation is not applicable for fixed point-to-point devices.

§15.407 (a) (4):

The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

B) IC

Different frequency bands and limits apply, as compared to the FCC requirements.

All frequency bands: B is the 99% emission bandwidth in MHz.

RSS-247, 6.2.1.1, Band 5150-5250 MHz, indoor operation only, except for OEM devices installed by vehicle manufacturers:

Limits:

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW. (e.i.r.p.)

Other devices: 200 mW (23 dBm) or $10 + 10 \log_{10} B$ [dBm], whichever power is less.

RSS-247, 6.2.2.1, Band 5250-5350 MHz:

Limits:

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other devices than installed in vehicles:

Maximum conducted Power: 250 mW (24 dBm) or $11 + 10 \log_{10} B$ [dBm], whichever power is less.

e.i.r.p.: 1.0 W (30 dBm) or $17 + 10 \log_{10} B$ [dBm], whichever power is less.

Outdoor fixed devices with a maximum e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below:

- i. -13 dBW/MHz for $0^\circ \leq \theta < 8^\circ$
- ii. $-13 - 0.716 (\theta - 8)$ dBW/MHz for $8^\circ \leq \theta < 40^\circ$
- iii. $-35.9 - 1.22 (\theta - 40)$ dBW/MHz for $40^\circ \leq \theta \leq 45^\circ$
- iv. -42 dBW/MHz for $\theta > 45^\circ$

RSS-247, 6.2.3.1, Bands 5470-5600 MHz and 5650-5725 MHz:

Limits:

Maximum conducted Power: 250 mW (24 dBm) or $11 + 10 \log_{10} B$ [dBm], whichever power is less.

e.i.r.p.: 1.0 W (30 dBm) or $17 + 10 \log_{10} B$ [dBm], whichever power is less.

Note: Devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

RSS-247, 6.2.4.1, Band 5725-5850 MHz:

Limits:

Maximum conducted Power: 1 W (30 dBm)

e.i.r.p.: 4 W (36 dBm)

5.5.3 TEST PROTOCOL

Ambient temperature: 25 °C
 Air Pressure: 1011 hPa
 Humidity: 40 %
 WLAN a-Mode; 20 MHz; 6 Mbit/s

U-NII-Subband	Ch. No.	Freq. [MHz]	Cond. Power [dBm]	EIRP [dBm]	FCC Cond. Limit [dBm]	Margin [dB]	IC Cond. Limit [dBm]	Margin [dB]	IC EIRP Limit [dBm]	Margin [dB]	
1	36	5180	14.0	18.6	24.0	10.0	N/A	-	22.2	3.7	1)
	40	5200	14.0	18.6	24.0	10.0	N/A	-	22.2	3.6	1)
	48	5240	13.9	18.5	24.0	10.1	N/A	-	22.2	3.7	1)
2A	52	5260	14.1	18.7	24.0	9.9	23.2	9.1	29.2	10.5	1)
	60	5300	13.8	18.4	24.0	10.2	23.2	9.4	29.2	10.8	1)
	64	5320	13.9	18.5	24.0	10.1	23.2	9.3	29.2	10.7	1)
2C	100	5500	13.3	17.9	24.0	10.6	23.2	9.9	29.2	11.3	
	116	5580	13.2	17.8	24.0	10.7	23.2	10.0	29.2	11.4	
	140	5700	13.6	18.2	24.0	10.3	23.2	9.6	29.2	11.0	
3	149	5745	14.9	19.5	30.0	15.1	30.0	15.1	36.0	16.5	
	157	5785	14.7	19.3	30.0	15.3	30.0	15.3	36.0	16.7	
	165	5825	14.5	19.1	30.0	15.5	30.0	15.5	36.0	16.9	

WLAN n-Mode; 20 MHz; MCS 0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	Cond. Power [dBm]	EIRP [dBm]	FCC Cond. Limit [dBm]	Margin [dB]	IC Cond. Limit [dBm]	Margin [dB]	IC EIRP Limit [dBm]	Margin [dB]	
1	36	5180	14.2	18.8	24.0	9.8	N/A	-	22.5	3.7	1)
	40	5200	14.1	18.7	24.0	9.9	N/A	-	22.5	3.7	1)
	48	5240	14.1	18.7	24.0	9.9	N/A	-	22.5	3.7	1)
2A	52	5260	14.3	18.9	24.0	9.7	23.5	9.2	29.5	10.6	1)
	60	5300	14.1	18.7	24.0	9.9	23.5	9.4	29.5	10.8	1)
	64	5320	14.2	18.8	24.0	9.8	23.5	9.3	29.5	10.7	1)
2C	100	5500	13.5	18.1	24.0	10.5	23.5	9.9	29.5	11.3	
	116	5580	13.4	18.0	24.0	10.6	23.5	10.0	29.5	11.4	
	140	5700	13.9	18.5	24.0	10.1	23.5	9.6	29.5	11.0	
3	149	5745	15.1	19.7	30.0	14.9	30.0	14.9	36.0	16.3	
	157	5785	14.9	19.5	30.0	15.1	30.0	15.1	36.0	16.5	
	165	5825	14.8	19.4	30.0	15.2	30.0	15.2	36.0	16.6	

WLAN n-Mode; 40 MHz; MCS 0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	Cond. Power [dBm]	EIRP [dBm]	FCC Cond. Limit [dBm]	Margin [dB]	IC Cond. Limit [dBm]	Margin [dB]	IC EIRP Limit [dBm]	Margin [dB]	
1	38	5190	13.8	18.4	24.0	10.2	N/A	-	23.0	4.6	1)
	46	5230	13.7	18.3	24.0	10.3	N/A	-	23.0	4.7	1)
2A	54	5270	14.1	18.7	24.0	9.9	24.0	9.9	30.0	11.3	1)
	62	5310	13.8	18.4	24.0	10.2	24.0	10.2	30.0	11.6	1)
2C	102	5510	13.2	17.8	24.0	10.8	24.0	10.8	30.0	12.2	
	110	5550	13.0	17.6	24.0	11.0	24.0	11.0	30.0	12.4	
	134	5670	13.6	18.2	24.0	10.4	24.0	10.4	30.0	11.8	
3	151	5755	14.8	19.4	30.0	15.2	30.0	15.2	36.0	16.6	
	159	5795	14.7	19.3	30.0	15.3	30.0	15.3	36.0	16.7	

WLAN ac-Mode; 20 MHz; MCS 0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	Cond. Power [dBm]	EIRP [dBm]	FCC Cond. Limit [dBm]	Margin [dB]	IC Cond. Limit [dBm]	Margin [dB]	IC EIRP Limit [dBm]	Margin [dB]	
1	36	5180	13.8	18.4	24.0	10.2	N/A	-	22.5	4.0	1)
	40	5200	13.9	18.5	24.0	10.1	N/A	-	22.5	4.0	1)
	48	5240	13.8	18.4	24.0	10.2	N/A	-	22.5	4.0	1)
2A	52	5260	14.0	18.6	24.0	10.0	23.5	9.4	29.5	10.8	1)
	60	5300	13.8	18.4	24.0	10.2	23.5	9.7	29.5	11.1	1)
	64	5320	14.0	18.6	24.0	10.0	23.5	9.5	29.5	10.9	1)
2C	100	5500	13.5	18.1	24.0	10.5	23.5	10.0	29.5	11.4	
	116	5580	13.5	18.1	24.0	10.5	23.5	10.0	29.5	11.4	
	140	5700	13.9	18.5	24.0	10.1	23.5	9.6	29.5	11.0	
2C+3	144	5720	13.7	18.3	24.0	10.3	23.5	9.8	29.5	11.2	
3	149	5745	15.1	19.7	30.0	14.9	30.0	14.9	36.0	16.3	
	157	5785	14.9	19.5	30.0	15.1	30.0	15.1	36.0	16.5	
	165	5825	14.7	19.3	30.0	15.3	30.0	15.3	36.0	16.7	

WLAN ac-Mode; 40 MHz; MCS 0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	Cond. Power [dBm]	EIRP [dBm]	FCC Cond. Limit [dBm]	Margin [dB]	IC Cond. Limit [dBm]	Margin [dB]	IC EIRP Limit [dBm]	Margin [dB]	
1	38	5190	13.8	18.4	24.0	10.2	N/A	-	23.0	4.6	1)
	46	5230	13.6	18.2	24.0	10.4	N/A	-	23.0	4.8	1)
2A	54	5270	14.1	18.7	24.0	9.9	24.0	9.9	30.0	11.3	1)
	62	5310	13.8	18.4	24.0	10.2	24.0	10.2	30.0	11.6	1)
2C	102	5510	12.1	16.7	24.0	11.9	24.0	11.9	30.0	13.3	
	110	5550	13.2	17.8	24.0	10.8	24.0	10.8	30.0	12.2	
	134	5670	13.8	18.4	24.0	10.2	24.0	10.2	30.0	11.6	
2C+3	142	5710	13.7	18.3	24.0	10.3	24.0	10.3	30.0	11.7	
3	151	5755	14.9	19.5	30.0	15.1	30.0	15.1	36.0	16.5	
	159	5795	14.7	19.3	30.0	15.3	30.0	15.3	36.0	16.7	

WLAN ac-Mode; 80 MHz; MCS 0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	Cond. Power [dBm]	EIRP [dBm]	FCC Cond. Limit [dBm]	Margin [dB]	IC Cond. Limit [dBm]	Margin [dB]	IC EIRP Limit [dBm]	Margin [dB]	
1	42	5210	13.4	18.0	24.0	10.6	N/A	-	23.0	5.0	1)
2A	58	5290	12.9	17.5	24.0	11.1	24.0	11.1	30.0	12.5	1)
2C	106	5530	12.2	16.8	24.0	11.8	24.0	11.8	30.0	13.2	
	122	5610	12.1	16.7	24.0	11.9	N/A	N/A	N/A	N/A	
2C+3	138	5690	12.9	17.5	24.0	11.1	24.0	11.1	30.0	12.5	
3	155	5775	13.9	18.5	30.0	16.1	30.0	16.1	36.0	17.5	

1) no additional limit applies related to the elevation.

Remark: None.

5.5.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Power Meter measurement, no plots provided.

5.5.5 TEST EQUIPMENT USED

- R&S TS8997

5.6 PEAK POWER SPECTRAL DENSITY

Standard **FCC Part 15 Subpart E**

The test was performed according to:
ANSI C63.10

5.6.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up in a shielded room to perform the Maximum Power Spectral Density measurements.

The results recorded were measured with the modulation which produces the worst-case (highest) output power.

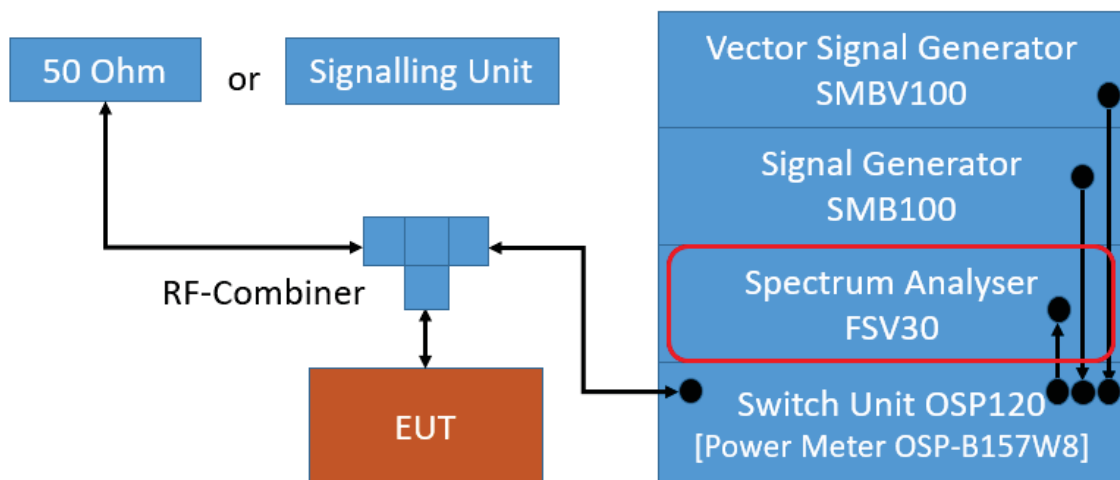
The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

Analyzer settings:

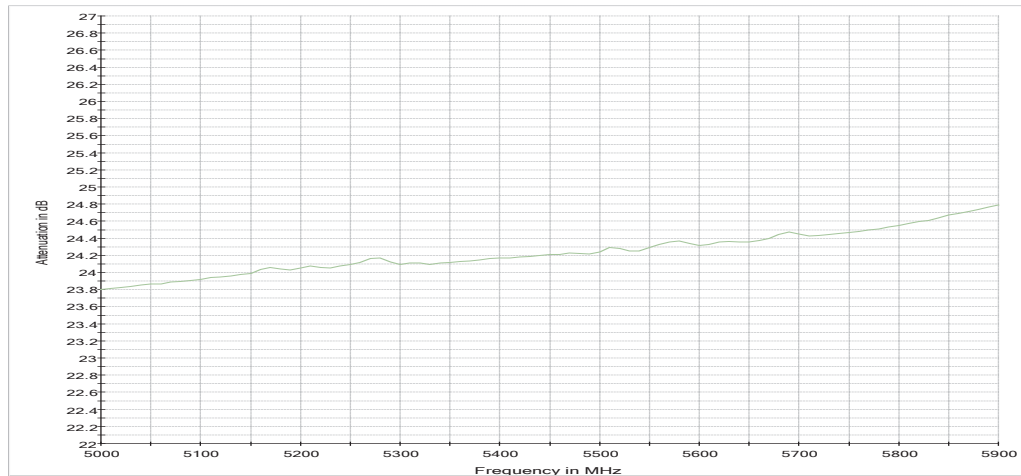
- Resolution Bandwidth (RBW): 1 MHz (for subband 3: 500 kHz)
- Video Bandwidth (VBW): 3 MHz (for subband 3: 2 MHz)
- Trace: Max Hold
- Sweeps: till stable (at least 180, max. 900)
- Sweptime: $\leq$ Number of sweep points x Min. Transmitter on time
- Detector: RMS
- Trigger: free run

Note:

The analyser settings are according FCC Public Note "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, 789033 D02", method **SA-3**.



TS8997; Maximum Power Spectral Density



Attenuation of the measurement path

5.6.2 TEST REQUIREMENTS / LIMITS

A) FCC

FCC Part 15, Subpart E, §15.407 (a) (1)

For systems using digital modulation techniques in the 5.15 – 5.25 GHz bands:

(i) and (ii), outdoor and indoor access points: Limit: 17 dBm/MHz.

(iv), mobile and portable client devices: Limit: 11 dBm/MHz.

FCC Part 15, Subpart E, §15.407 (a) (2)

For systems using digital modulation techniques in the 5.25 – 5.35 GHz and 5.47 – 5.725 GHz bands:

Limit: 11 dBm/MHz.

FCC Part 15, Subpart E, §15.407 (a) (3)

For systems using digital modulation techniques in the 5.725 – 5.850 GHz bands:

Limit: 30 dBm/500 kHz.

B) IC

Different frequency bands and limits apply, as compared to the FCC requirements.

RSS-247, 6.2.1 (1), Band 5150-5250 MHz, indoor operation only:

Limit (e.i.r.p.): 10 dBm/MHz.

RSS-247, 6.2.2 (1), Band 5250-5350 MHz:

Limit: 11 dBm/MHz.

RSS-247, 6.2.3 (1), Bands 5470-5600 MHz and 5650-5725 MHz:

Limit: 11 dBm/MHz.

RSS-247, 6.2.4 (1), Band 5725-5850 MHz:

Limit: 30 dBm/500 kHz.

5.6.3 TEST PROTOCOL

Ambient temperature: 25 °C
 Air Pressure: 1011 hPa
 Humidity: 40 %
 WLAN a-Mode; 20 MHz; 6 Mbit/s

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm/MHz]	FCC Limit [dBm/MHz]	Margin [dB]	IC Limit [dBm/MHz]	Margin [dB]	IC EIRP MPD
1	36	5180	2.8	11.0	8.2	10.0	2.6	7.4
	40	5200	2.8	11.0	8.2	10.0	2.6	7.4
	48	5240	2.7	11.0	8.3	10.0	2.7	7.3
2A	52	5260	2.9	11.0	8.1	11.0	8.1	unit:
	60	5300	2.6	11.0	8.4	11.0	8.4	dBm/
	64	5320	2.8	11.0	8.2	11.0	8.2	MHz
2C	100	5500	2.0	11.0	9.0	11.0	9.0	
	116	5580	2.1	11.0	8.9	11.0	8.9	
	140	5700	2.5	11.0	8.5	11.0	8.5	
2C/3	144	5720	2.5	11.0	8.5	11.0	8.5	
3	149	5745	0.7	30.0	29.3	30.0	29.3	
	157	5785	0.4	30.0	29.6	30.0	29.6	
	165	5825	0.3	30.0	29.7	30.0	29.7	

WLAN n-Mode; 20 MHz; MCS 0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm/MHz]	FCC Limit [dBm/MHz]	Margin [dB]	IC Limit [dBm/MHz]	Margin [dB]	IC EIRP MPD
1	36	5180	2.9	11.0	8.1	10.0	2.5	7.5
	40	5200	2.7	11.0	8.3	10.0	2.7	7.3
	48	5240	2.7	11.0	8.3	10.0	2.7	7.3
2A	52	5260	2.9	11.0	8.1	11.0	8.1	unit:
	60	5300	2.6	11.0	8.4	11.0	8.4	dBm/
	64	5320	2.8	11.0	8.2	11.0	8.2	MHz
2C	100	5500	1.9	11.0	9.1	11.0	9.1	
	116	5580	2.0	11.0	9.0	11.0	9.0	
	140	5700	2.5	11.0	8.5	11.0	8.5	
3	149	5745	0.6	30.0	29.4	30.0	29.4	
	157	5785	0.4	30.0	29.6	30.0	29.6	
	165	5825	0.3	30.0	29.8	30.0	29.8	

WLAN n-Mode; 40 MHz; MCS 0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm/MHz]	FCC Limit [dBm/MHz]	Margin [dB]	IC Limit [dBm/MHz]	Margin [dB]	IC EIRP MPD
1	38	5190	-0.3	11.0	11.3	10.0	5.7	4.3
	46	5230	-0.5	11.0	11.5	10.0	5.9	4.1
2A	54	5270	-0.2	11.0	11.2	11.0	11.2	unit:
	62	5310	-0.3	11.0	11.3	11.0	11.3	dBm/
2C	102	5510	-1.3	11.0	12.3	11.0	12.3	MHz
	110	5550	-1.2	11.0	12.2	11.0	12.2	
	134	5670	-5.7	11.0	16.7	11.0	16.7	
3	151	5755	-2.5	30.0	32.5	30.0	32.5	
	159	5795	-2.7	30.0	32.7	30.0	32.7	

WLAN ac-Mode; 20 MHz; MCS 0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm/MHz]	FCC Limit [dBm/MHz]	Margin [dB]	IC Limit [dBm/MHz]	Margin [dB]	IC EIRP MPD
1	36	5180	2.5	11.0	8.5	10.0	2.9	7.1
	40	5200	2.3	11.0	8.7	10.0	3.1	6.9
	48	5240	2.3	11.0	8.7	10.0	3.1	6.9
2A	52	5260	2.6	11.0	8.4	11.0	8.4	unit:
	60	5300	2.3	11.0	8.7	11.0	8.7	dBm/
	64	5320	2.5	11.0	8.5	11.0	8.5	MHz
2C	100	5500	1.8	11.0	9.2	11.0	9.2	
	116	5580	2.0	11.0	9.0	11.0	9.0	
	140	5700	2.4	11.0	8.6	11.0	8.6	
2C+3	144	5720	2.1	11.0	8.9	11.0	8.9	
3	149	5745	0.5	30.0	29.5	30.0	29.5	
	157	5785	0.3	30.0	29.7	30.0	29.7	
	165	5825	0.1	30.0	29.9	30.0	29.9	

WLAN ac-Mode; 40 MHz; MCS 0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm/MHz]	FCC Limit [dBm/MHz]	Margin [dB]	IC Limit [dBm/MHz]	Margin [dB]	IC EIRP MPD
1	38	5190	-0.2	11.0	11.2	10.0	5.6	4.4
	46	5230	-0.5	11.0	11.5	10.0	5.9	4.1
2A	54	5270	-0.1	11.0	11.1	11.0	11.1	unit:
	62	5310	-0.3	11.0	11.3	11.0	11.3	dBm/
2C	102	5510	-2.4	11.0	13.4	11.0	13.4	MHz
	110	5550	-1.0	11.0	12.0	11.0	12.0	
	134	5670	-0.3	11.0	11.3	11.0	11.3	
2C+3	142	5710	-0.5	11.0	11.5	11.0	11.5	
3	151	5755	-2.4	30.0	32.4	30.0	32.4	
	159	5795	-2.6	30.0	32.6	30.0	32.6	

WLAN ac-Mode; 80 MHz; MCS 0; SISO

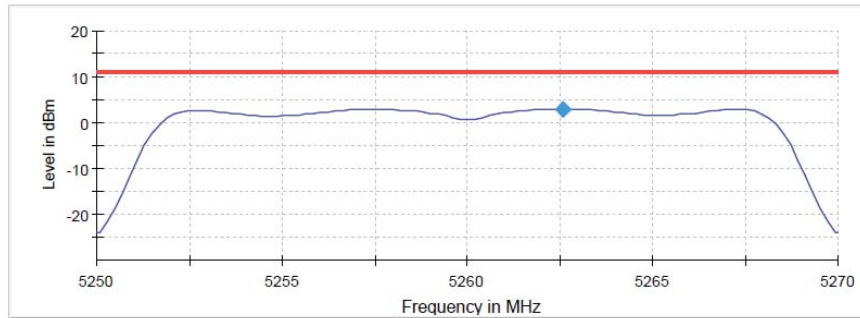
U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm/MHz]	FCC Limit [dBm/MHz]	Margin [dB]	IC Limit [dBm/MHz]	Margin [dB]	IC EIRP MPD
1	42	5210	-4.4	11.0	15.4	10.0	9.8	0.2
2A	58	5290	-4.9	11.0	15.9	11.0	15.9	unit:
2C	106	5530	-5.8	11.0	16.8	11.0	16.8	dBm/
	122	5610	-5.7	11.0	16.9	N/A	N/A	
2C+3	138	5690	-5.3	11.0	16.3	11.0	16.3	
3	155	5775	-7.2	30.0	37.2	30.0	37.2	

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

5.6.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-2A (S02_AG01)

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)
5260.000000	5262.574257	2.918



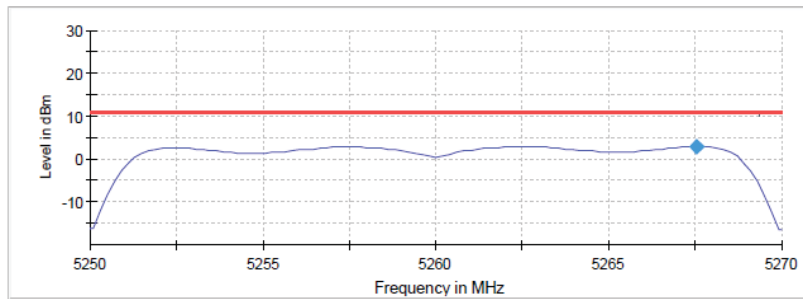
— Limit — Sum Level ◆ PSD

Setting	Instrument Value
Start Frequency	5.25000 GHz
Stop Frequency	5.27000 GHz
Span	20.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
SweepTime	1.010 s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	RMS
SweepCount	60
Filter	3 dB
Trace Mode	Max Hold
SweepType	Sweep
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.01 dB

Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-2A (S02_AG01)

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)
5260.000000	5267.524752	2.904

Power Spectral Density

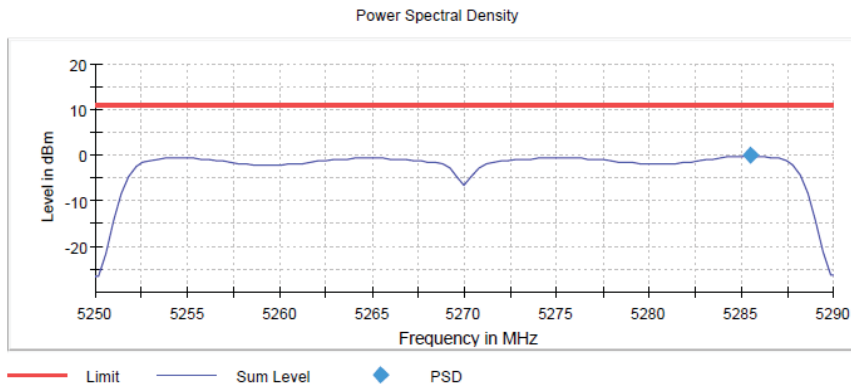


— Limit — Sum Level ◆ PSD

Setting	Instrument Value
Start Frequency	5.25000 GHz
Stop Frequency	5.27000 GHz
Span	20.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
SweepTime	1.010 s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	RMS
SweepCount	60
Filter	3 dB
Trace Mode	Max Hold
SweepType	Sweep
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.01 dB

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-2A (S02_AG01)

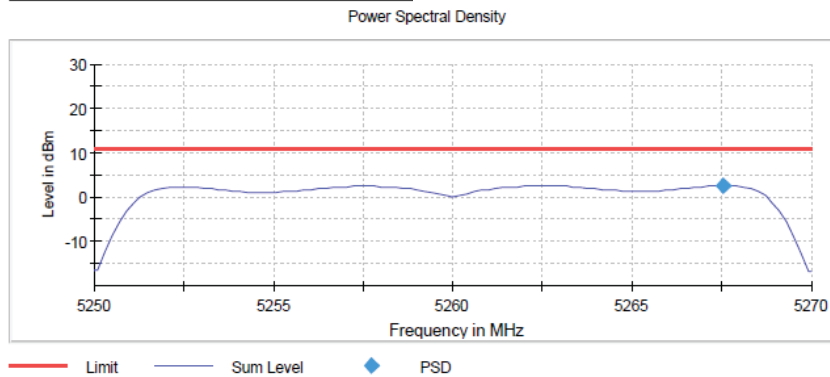
DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)
5270.000000	5285.445545	-0.152



Setting	Instrument Value
Start Frequency	5.25000 GHz
Stop Frequency	5.29000 GHz
Span	40.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
SweepTime	202.000 ms
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	RMS
SweepCount	298
Filter	3 dB
Trace Mode	Max Hold
SweepType	Sweep
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.03 dB

Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Subband = U-NII-2A (S02_AG01)

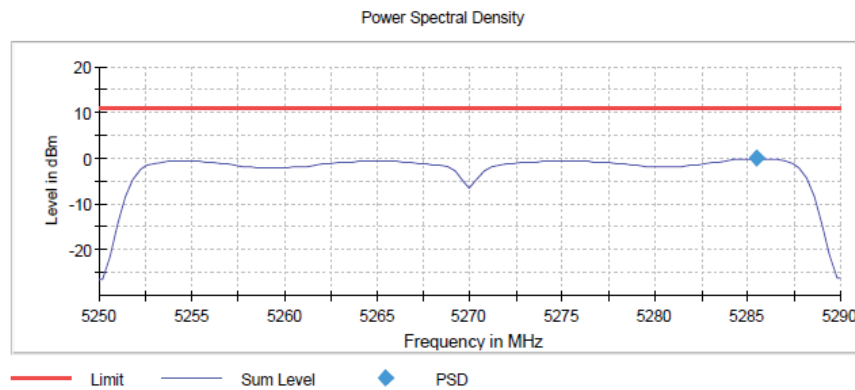
DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)
5260.000000	5267.524752	2.591



Setting	Instrument Value
Start Frequency	5.25000 GHz
Stop Frequency	5.27000 GHz
Span	20.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
SweepTime	1.010 s
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	RMS
SweepCount	60
Filter	3 dB
Trace Mode	Max Hold
SweepType	Sweep
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.01 dB

Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Subband = U-NII-2A (S02_AG01)

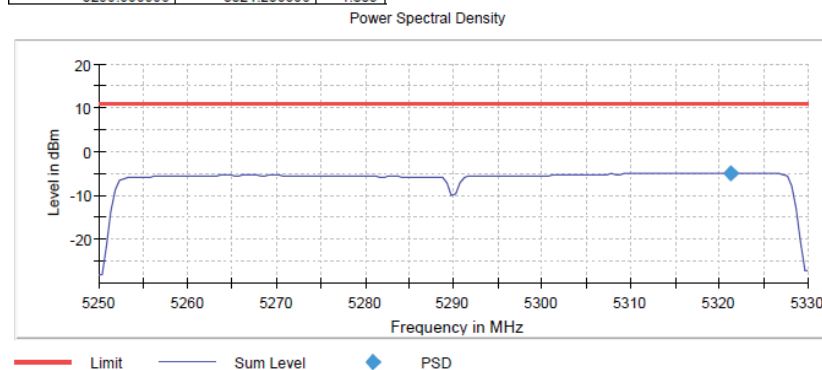
DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)
5270.000000	5285.445545	-0.143



Setting	Instrument Value
Start Frequency	5.25000 GHz
Stop Frequency	5.29000 GHz
Span	40.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
SweepTime	202.000 ms
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	RMS
SweepCount	298
Filter	3 dB
Trace Mode	Max Hold
SweepType	Sweep
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.01 dB

Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Subband = U-NII-2A (S02_AH01)

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)
5290.000000	5321.250000	-4.859



Setting	Instrument Value
Start Frequency	5.25000 GHz
Stop Frequency	5.33000 GHz
Span	80.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	160
SweepTime	320.000 ms
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	RMS
SweepCount	188
Filter	3 dB
Trace Mode	Max Hold
SweepType	Sweep
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.01 dB

5.6.5 TEST EQUIPMENT USED

- R&S TS8997

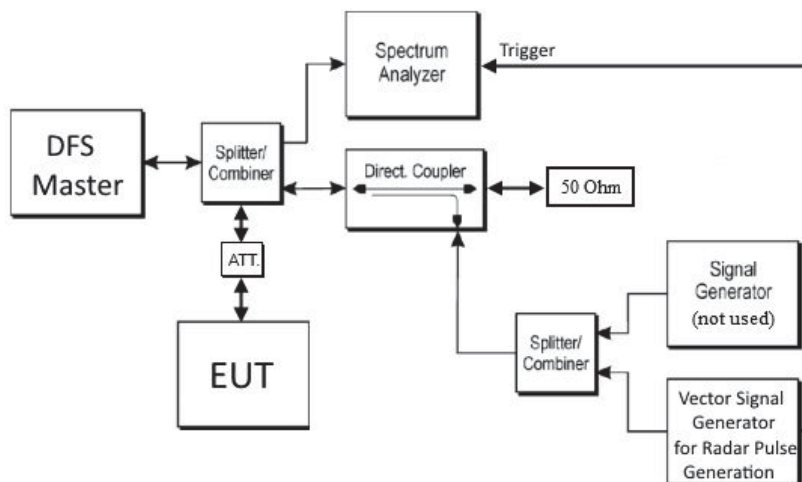
5.7 DYNAMIC FREQUENCY SELECTION

Standard **FCC Part 15 Subpart E**

The test was performed according to:
ANSI C63.10

5.7.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up in a shielded room for the DFS measurements. Since the EUT is a slave device without radar detection, it was connected to another device acting as master with radar detection.



After setting up a connection to the Master using the maximum supported bandwidth of the EUT, a radar pulse of type 0 was send from the vector signal generator.

At the same time the spectrum analyser is triggered by the vector signal generator and a trace is recorded:

Analyzer settings:

- Resolution Bandwidth (RBW): 3 MHz
- Video Bandwidth (VBW): 3 MHz
- Trace: Clear/Write
- Sweeps: Single Sweep
- Sweep time: 20 s
- Detector: Peak
- Trigger: External

In addition to the plot also the trace data is recorded to calculate the Channel Closing Time.

Afterwards the test is repeated with a sweep time of 32 minutes to monitor the Non-occupancy period.

5.7.2 TEST REQUIREMENTS / LIMITS

Limits according KDB 905462 D02 UNII DFS Compliance Procedures New Rules

Parameter	Value
<i>Non-occupancy period</i>	Minimum 30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds See Note 1.
<i>Channel Closing Transmission Time</i>	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
Note 1: <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.	

5.7.3 TEST PROTOCOL

Ambient temperature: 24 °C
Air Pressure: 1002 hPa
Humidity: 30 %

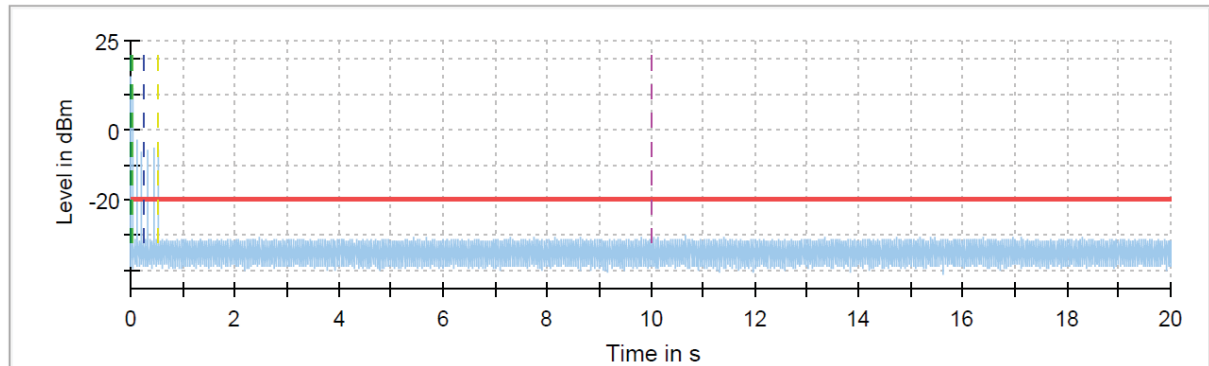
WLAN ac-Mode; 80 MHz						
Ch. No.	Ch. Center Freq. [MHz]	Aggregate Transmission Time from 200 ms to 10 s after end of radar pulse [ms]	Limit [ms]	Margin [ms]	Channel move time within 10 s	Transmissions within Non-occupancy period
106	5530	1.032	60.0	59.0	yes	none

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

5.7.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

(S01_3_AA01)

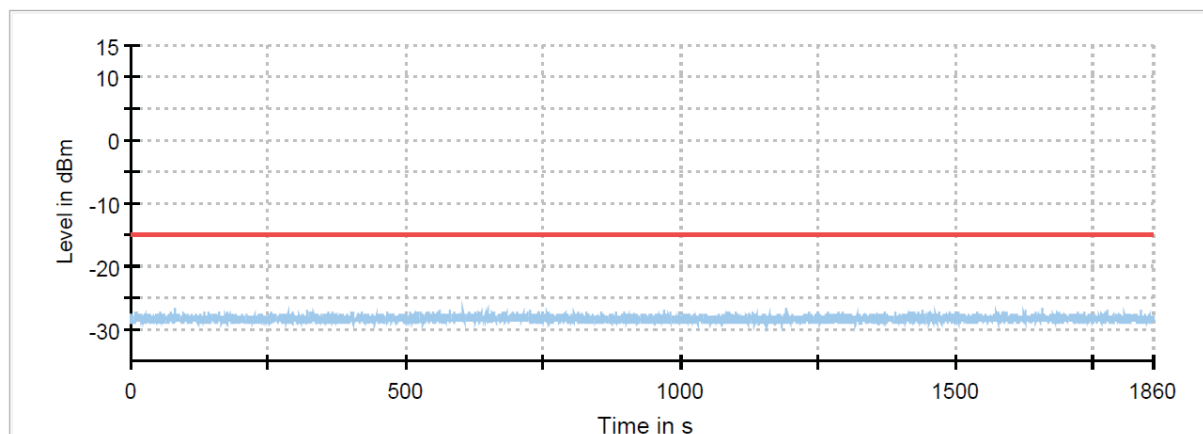
Channel Move Time



Channel Move Time
 Start of Radar
 First 200ms of Channel Closing Tx Time
 Last measured edge of Channel Closing Tx Time
 Threshold
 Trigger at end of Radar
 10sec Channel Move Time Limit

Channel Closing Time

Non-occupancy period



Non-occupancy period
 Threshold
 Non Occupancy Period

5.7.5 TEST EQUIPMENT USED

- R&S TS8997

5.8 UNDESIRABLE EMISSIONS; GENERAL FIELD STRENGTH LIMITS

Standard **FCC Part 15 Subpart E**

The test was performed according to:
ANSI C63.10

5.8.1 TEST DESCRIPTION

The test set-up was made in accordance to the general provisions of ANSI C63.10 in a typical installation configuration. The measurements were performed according the following sub-chapters of ANSI C63.10:

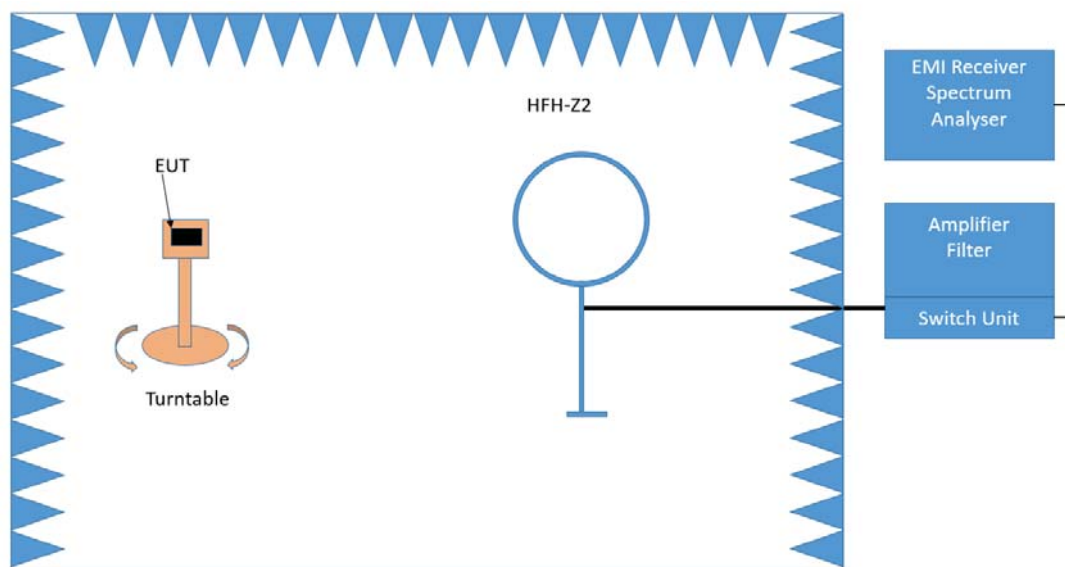
- < 30 MHz: Chapter 6.4
- 30 MHz – 1 GHz: Chapter 6.5
- > 1 GHz: Chapter 6.6 (procedure according 6.6.5 used)

The measurement procedure is implemented into the EMI test software EMC32 from R&S. Exploratory tests are performed at 3 orthogonal axes to determine the worst-case orientation of a body-worn or handheld EUT. The final test on all kind of EUTs is also performed at 3 axes. A pre-check is performed while the EUT is powered.

Below 1 GHz:

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The influence of the EUT support table that is used between 30–1000 MHz was evaluated.

1. Measurement up to 30 MHz



Test Setup; Spurious Emission Radiated (SAC), 9 kHz – 30 MHz

The Loop antenna HFH2-Z2 is used.

Step 1: pre measurement

- Anechoic chamber

- Antenna distance: 3 m
- Detector: Peak-Maxhold
- Frequency range: 0.009 - 0.15 MHz and 0.15 - 30 MHz
- Frequency steps: 0.05 kHz and 2.25 kHz
- IF-Bandwidth: 0.2 kHz and 9 kHz
- Measuring time / Frequency step: 100 ms (FFT-based)

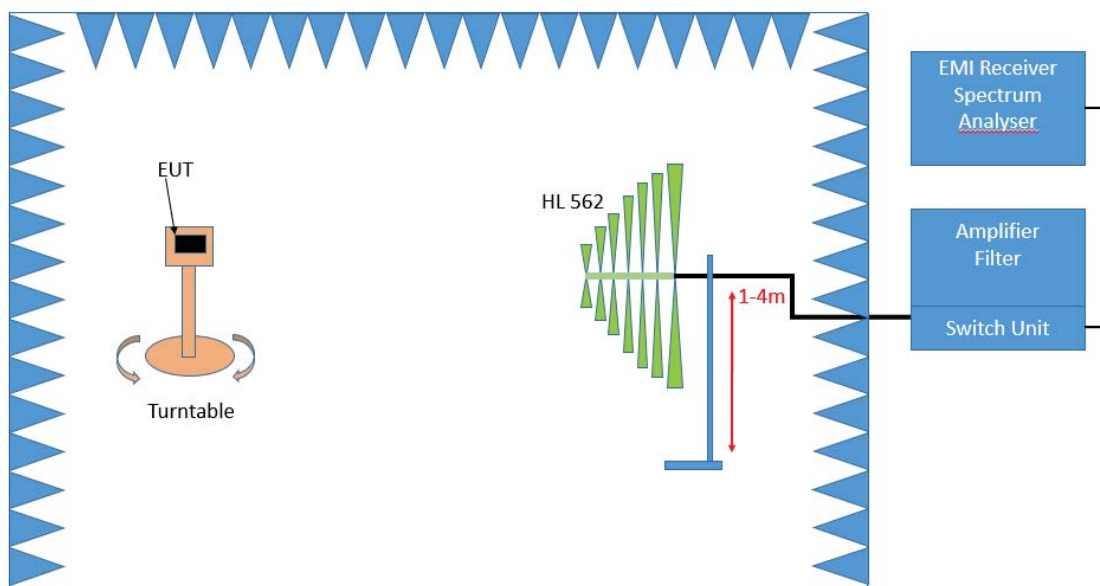
Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

Step 2: final measurement

For the relevant emissions determined in step 1, an additional measurement with the following settings will be performed. Intention of this step is to find the maximum emission level.

- Open area test site
- Antenna distance: according to the Standard
- Detector: Quasi-Peak
- Frequency range: 0.009 - 30 MHz
- Frequency steps: measurement at frequencies detected in step 1
- IF-Bandwidth: 0.2 - 10 kHz
- Measuring time / Frequency step: 1 s

2. Measurement above 30 MHz and up to 1 GHz



Test Setup; Spurious Emission Radiated (SAC), 30 MHz- 1GHz

Step 1: Preliminary scan

This is a preliminary test to identify the highest amplitudes relative to the limit.

Settings for step 1:

- Antenna distance: 3 m
- Detector: Peak-Maxhold / Quasipeak (FFT-based)
- Frequency range: 30 - 1000 MHz
- Frequency steps: 30 kHz
- IF-Bandwidth: 120 kHz
- Measuring time / Frequency step: 100 ms
- Turntable angle range: -180° to 90°
- Turntable step size: 90°
- Height variation range: 1 - 4 m

- Height variation step size: 1.5 m
- Polarisation: Horizontal + Vertical

Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

Step 2: Adjustment measurement

In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.

For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will slowly vary by 360° around this value. During this action, the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position, the antenna height will also slowly vary between 1 and 4 m. During this action, the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: 360 °
- Height variation range: 1 – 4 m
- Antenna Polarisation: max. value determined in step 1

Step 3: Final measurement with QP detector

With the settings determined in step 2, the final measurement will be performed:

EMI receiver settings for step 3:

- Detector: Quasi-Peak (< 1 GHz)
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

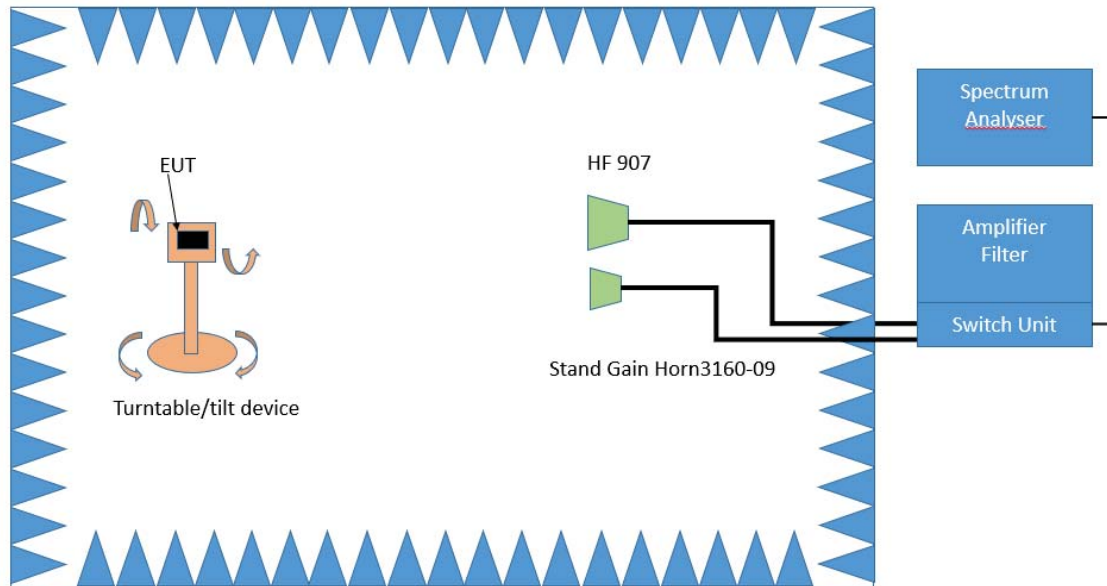
After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.

Above 1 GHz:

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in the fully-anechoic chamber.

All steps were performed with one height (1.5 m) of the receiving antenna only.

3. Measurement 1 GHz up to 26.5 GHz



Test Setup; Spurious Emission Radiated (FAC), 1 GHz-26.5 GHz

Step 1:

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in the fully-anechoic chamber.

All steps were performed with one height (1.5 m) of the receiving antenna only.

The EUT is turned during the preliminary measurement across the elevation axis, with a step size of 90 °.

The turn table step size (azimuth angle) for the preliminary measurement is 45 °.

Step 2:

Due to the fact, that in this frequency range the test is performed in a fully anechoic room, the height scan of the receiving antenna instep 2 is omitted. Instead of this, a maximum search with a step size $\pm 45^\circ$ for the elevation axis is performed.

The turn table azimuth will slowly vary by $\pm 22.5^\circ$.

The elevation angle will slowly vary by $\pm 45^\circ$

EMI receiver settings (for all steps):

- Detector: Peak, Average
- IF Bandwidth = 1 MHz

Step 3:

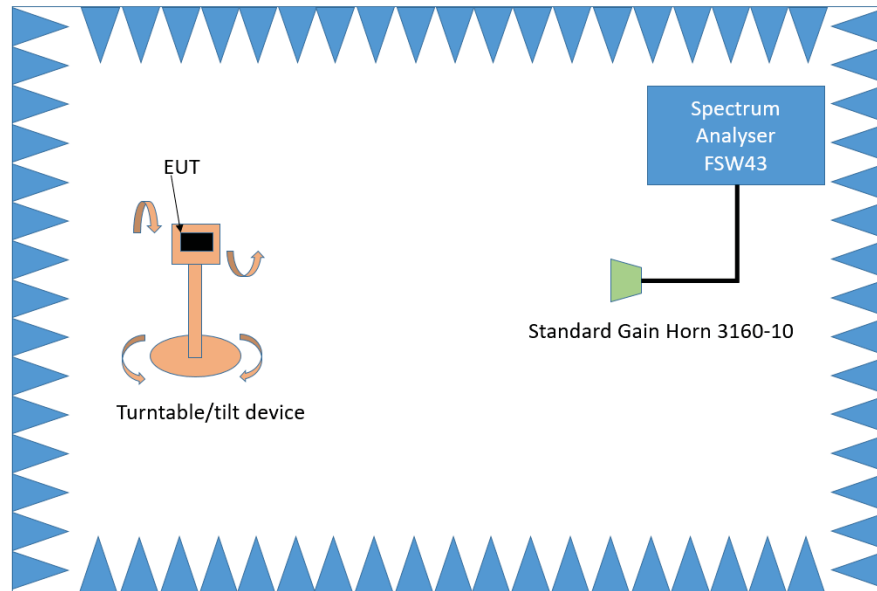
Spectrum analyser settings for step 3:

- Detector: Peak / Average
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 1 MHz
- Measuring time: 1 s

4. Measurement above 26.5 GHz up to 40 GHz

The following modifications, compared to the frequency range 1 GHz – 26.5 GHz, apply to the measurement procedure for the frequency range above 26.5 GHz:

- Measurement distance: 1m



Test Setup; Spurious Emission Radiated (FAC), 26.5 – 40 GHz

5.8.2 TEST REQUIREMENTS / LIMITS

A) FCC

FCC Part 15 Subpart E, §15.407 (b)(1)

For transmitters operating in the 5150–5250 MHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5150–5350 MHz.

FCC Part 15 Subpart E, §15.407 (b)(2)

For transmitters operating in the 5250–5350 MHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5150–5350 MHz.

FCC Part 15 Subpart E, §15.407 (b)(3)

For transmitters operating in the 5470–5725 MHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5470–5725 MHz.

FCC Part 15 Subpart E, §15.407 (b)(4)

For transmitters operating in the 5725–5850 MHz band:

Limit: –27 dBm/MHz at 75 MHz or more above or below the band edge
 increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge
 increasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edge
 increasing linearly to 27 dBm/MHz at the band edge.

B) IC

Different frequency bands and limits apply, as compared to the FCC requirements.

RSS-247, 6.2.1.2, Emissions outside the band 5150-5250 MHz, indoor operation only:

Limit: -27 dBm/MHz EIRP outside of the band 5150-5250 MHz.

RSS-247, 6.2.2.2, Emissions outside the band 5250-5350 MHz:

Limit: -27 dBm/MHz EIRP outside of the band 5250-5350 MHz.

RSS-247, 6.2.3.2, Emissions outside the bands 5470-5600 MHz and 5650-5725 MHz:

Limit: -27 dBm/MHz EIRP outside of the band 5470-5725 MHz.

However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p. at 5850 MHz instead of 5725 MHz.

Note: No operation is permitted for the frequency range 5600-5650 MHz.

RSS-247, 6.2.4.2, Emissions outside the band 5725-5850 MHz:

- 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;
- 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
- 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
- 27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

C) FCC & IC

FCC Part 15 Subpart E, §15.405

The provisions of §§ 15.203 and 15.205 are included.

§15.407 (b)(6)

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.

§15.407 (b)(7)

The provisions of §15.205 apply to intentional radiators operating under this section

FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limits (dBµV/m)
0.009 – 0.49	2400/F(kHz)@300m	3	(48.5 – 13.8)@300m
0.49 – 1.705	24000/F(kHz)@30m	3	(33.8 – 23.0)@30m
1.705 – 30	30@30m	3	29.5@30m

The measured values are corrected with an inverse linear distance extrapolation factor (40 dB/decade) according FCC 15.31 (2).

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limits (dBµV/m)
30 – 88	100@3m	3	40.0@3m
88 – 216	150@3m	3	43.5@3m
216 – 960	200@3m	3	46.0@3m
960 – 26000	500@3m	3	54.0@3m
26000 – 40000	500@3m	1	54.0@3m

The measured values above 26 GHz are corrected with an inverse linear distance extrapolation factor (20 dB/decade).

§15.35(b) ..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

Used conversion factor:

- Limit (dBµV/m) = 20 log (Limit (µV/m)/1µV/m)
- Limit (dBµV/m) = EIRP [dBm] - 20 log (d [m]) + 104.8

Limit types (in result tables on next page):

RB – Emissions falls into a "Restricted Band" according FCC §§15.205 and 15.209 *)

UE – "Undesirable Emission Limit" according FCC §15.407

BE-RB – Band Edge Limit basing on "Restricted Band Limits"

BE-UE – Band Edge Limit basing on "Undesirable Emission Limit"

*) Below 1 GHz the limits of §15.209 are applied for all frequencies.

5.8.3 TEST PROTOCOL

Ambient temperature: 22–26 °C
Air Pressure: 1002–1024 hPa
Humidity: 32–44 %
WLAN a-Mode; 20 MHz; 6 Mbit/s
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
36	5180	-	-	-	1000	-	>6	-
44	5220	652.5	37.0	QP	120	46.0	9.0	RB
48	5240	-	-	-	1000	-	>6	-
52	5260	10519.6	52.8	PEAK	1000	68.2	15.4	UE
56	5280	660.0	38.4	QP	120	46.0	7.6	RB
56	5280	10563.8	51.1	PEAK	1000	68.2	17.1	UE
64	5320	-	-	-	1000	-	>6	-
100	5500	-	-	-	1000	-	>6	-
116	5580	697.5	37.5	QP	120	46.0	8.5	RB
140	5700	-	-	-	1000	-	>6	-
149	5745	-	-	-	1000	-	>6	-
157	5785	723.1	37.5	QP	120	46.0	8.5	RB
165	5825	-	-	-	1000	-	>6	-

WLAN n-Mode; 20 MHz; MCS 0; SISO
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
36	5180	-	-	-	1000	-	>6	-
44	5220	-	-	-	1000	-	>6	-
48	5240	-	-	-	1000	-	>6	-
52	5260	-	-	-	1000	-	>6	-
56	5280	-	-	-	1000	-	>6	-
64	5320	-	-	-	1000	-	>6	-
100	5500	-	-	-	1000	-	>6	-
116	5580	-	-	-	1000	-	>6	-
140	5700	-	-	-	1000	-	>6	-
149	5745	-	-	-	1000	-	>6	-
157	5785	-	-	-	1000	-	>6	-
165	5825	-	-	-	1000	-	>6	-

WLAN n-Mode; 40 MHz; MCS 0; SISO
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type
38	5190	-	-	-	1000	-	>6	-
46	5230	-	-	-	1000	-	>6	-
62	5310	-	-	-	1000	-	>6	-
102	5510	-	-	-	1000	-	>6	-
134	5670	-	-	-	1000	-	>6	-
151	5755	-	-	-	1000	-	>6	-
159	5795	-	-	-	1000	-	>6	-

WLAN ac-Mode; 20 MHz; MCS 0; SISO
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type
36	5180	-	-	-	1000	-	>6	-
44	5220	-	-	-	1000	-	>6	-
48	5240	-	-	-	1000	-	>6	-
52	5260	-	-	-	1000	-	>6	-
56	5280	-	-	-	1000	-	>6	-
64	5320	-	-	-	1000	-	>6	-
100	5500	-	-	-	1000	-	>6	-
116	5580	-	-	-	1000	-	>6	-
140	5700	-	-	-	1000	-	>6	-
149	5745	-	-	-	1000	-	>6	-
157	5785	-	-	-	1000	-	>6	-
165	5825	-	-	-	1000	-	>6	-

WLAN ac-Mode; 40 MHz; MCS 0; SISO
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type
38	5190	-	-	-	1000	-	>6	-
46	5230	-	-	-	1000	-	>6	-
62	5310	-	-	-	1000	-	>6	-
102	5510	-	-	-	1000	-	>6	-
134	5670	-	-	-	1000	-	>6	-
151	5755	-	-	-	1000	-	>6	-
159	5795	-	-	-	1000	-	>6	-

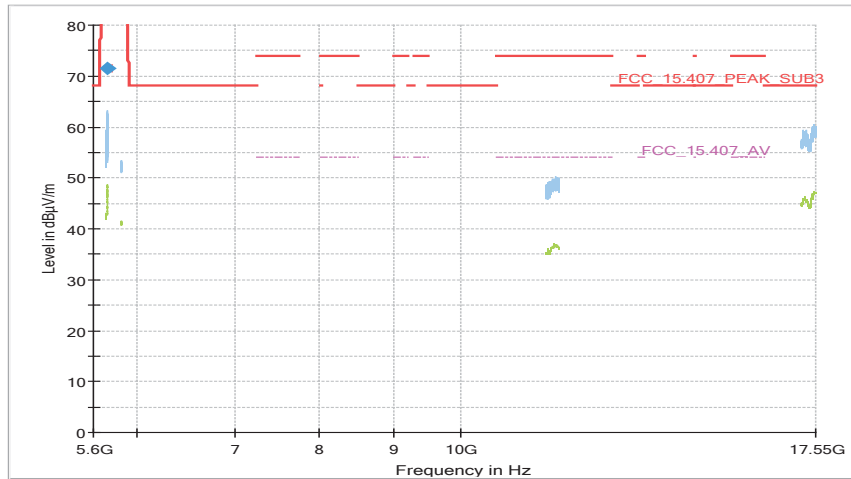
WLAN ac-Mode; 80 MHz; MCS 0; SISO
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type
42	5210	-	-	-	1000	-	>6	-
58	5290	-	-	-	1000	-	>6	-
106	5530	-	-	-	1000	-	>6	-
155	5775	-	-	-	1000	-	>6	-

Remark: Only the WLAN a mode was tested from 9 kHz to 40 GHz. For the other modes only Band Edge and Harmonics in the range 5 to 26 GHz were tested. For Band Edge results see respective test case.

5.8.4 MEASUREMENT PLOTS (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

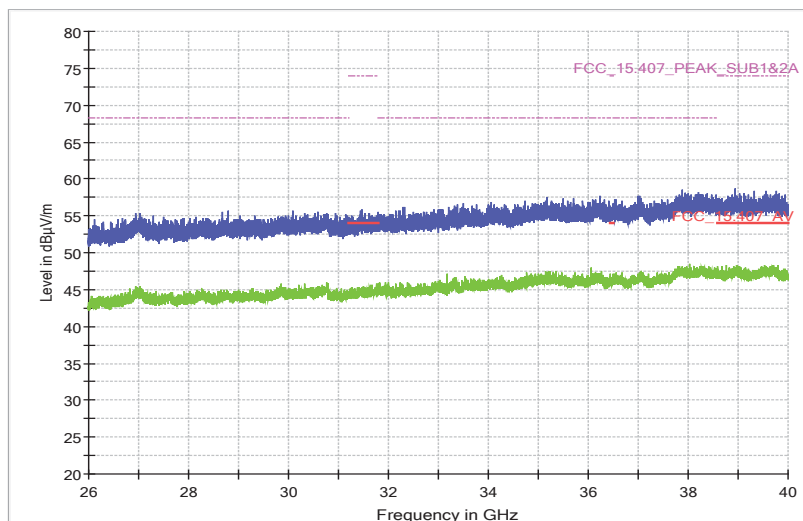
Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Measurement range = 1GHz
 - 26GHz, Subband = U-NII-3
 (S01_AK01)



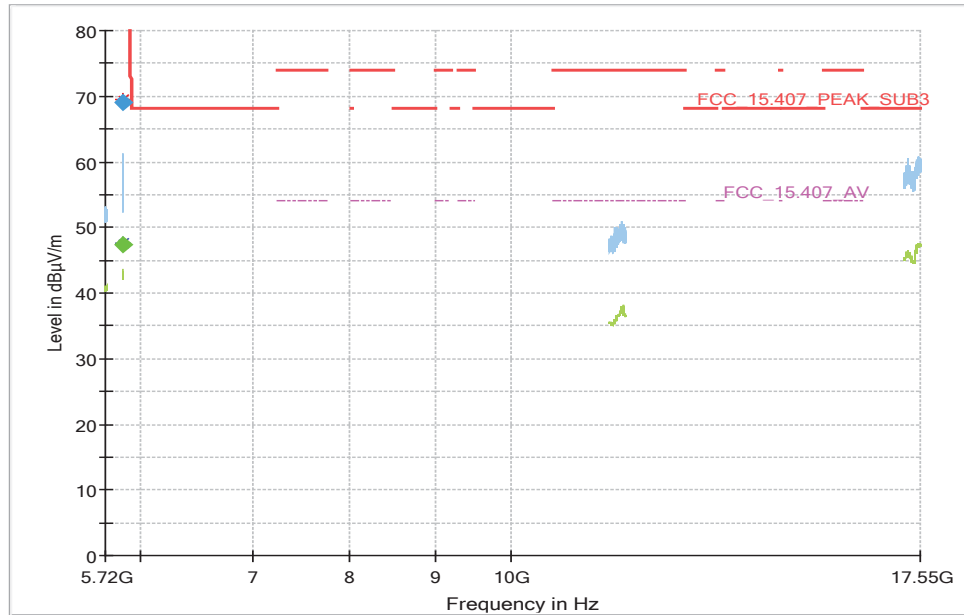
Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5722.900	71.5	---	117.4	45.91	1000.0	1000.000	150.0	H	-53.0	92.0	14.1

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-1
 (S01_AK01)



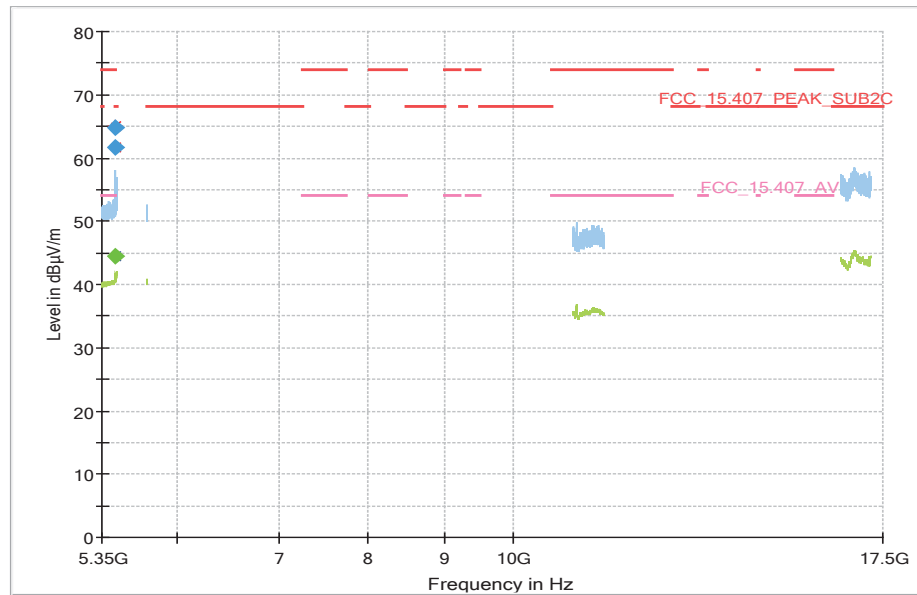
Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5850.300	---	47.5	---	---	1000.0	1000.000	150.0	H	-56.0	85.0	14.7
5850.400	69.1	---	121.2	52.22	1000.0	1000.000	150.0	H	-56.0	79.0	14.7

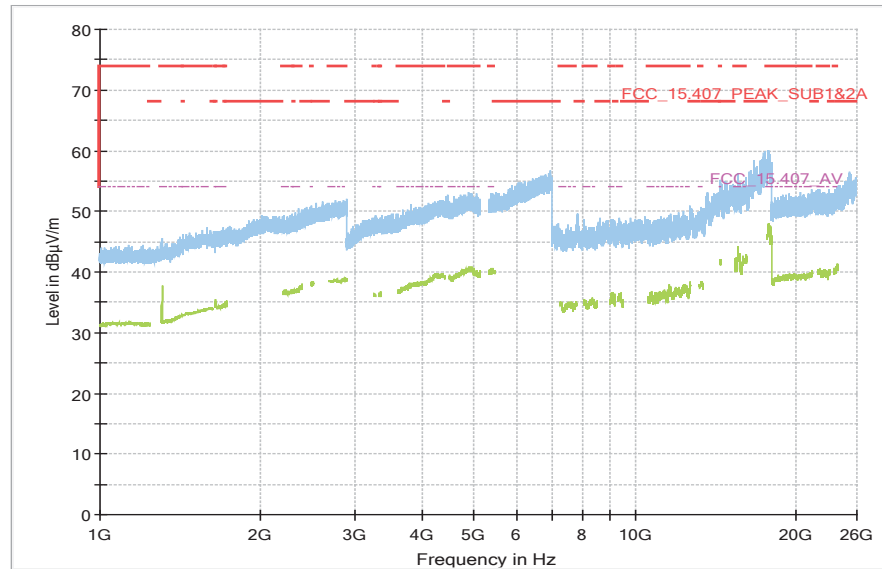
Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Measurement range = 1GHz
 - 26GHz, Subband = U-NII-2C
 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5458.600	61.6	---	74.00	12.41	1000.0	1000.000	150.0	H	87.0	78.0	14.0
5458.840	---	44.4	54.00	9.64	1000.0	1000.000	150.0	H	-53.0	79.0	14.0
5466.280	64.7	---	68.20	3.47	1000.0	1000.000	150.0	H	-54.0	75.0	14.0

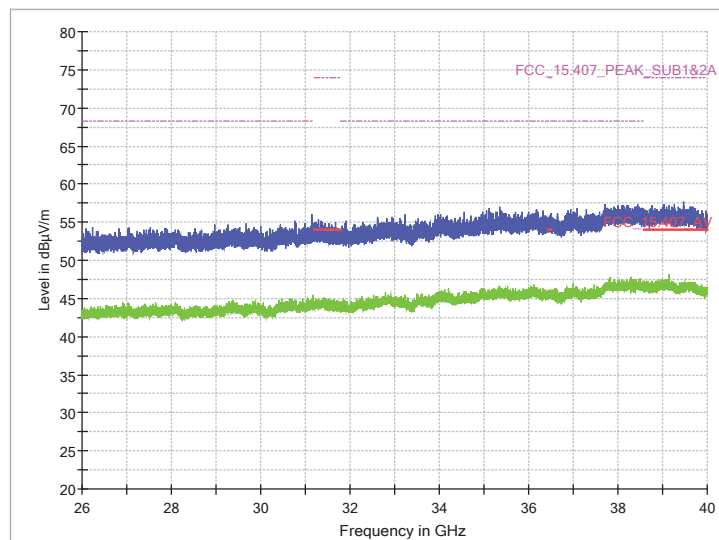
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01_AC01)



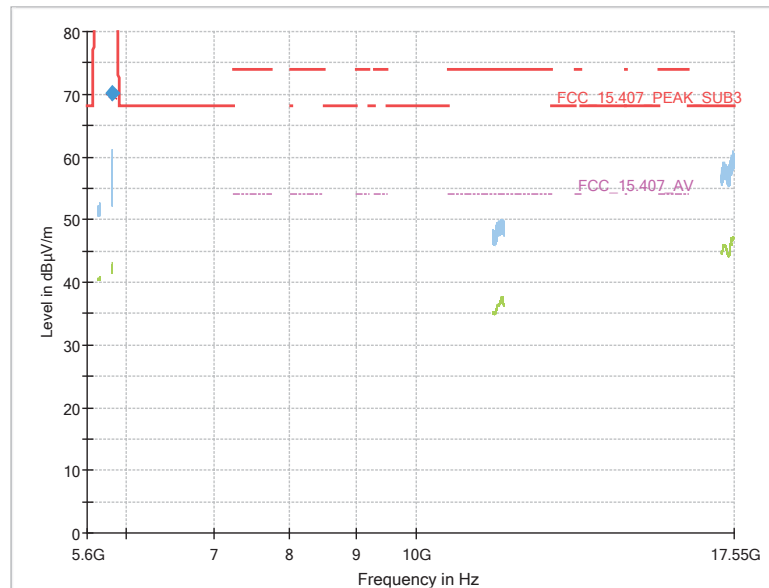
Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---	---	---	---	---

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-2C (S01_AK01)



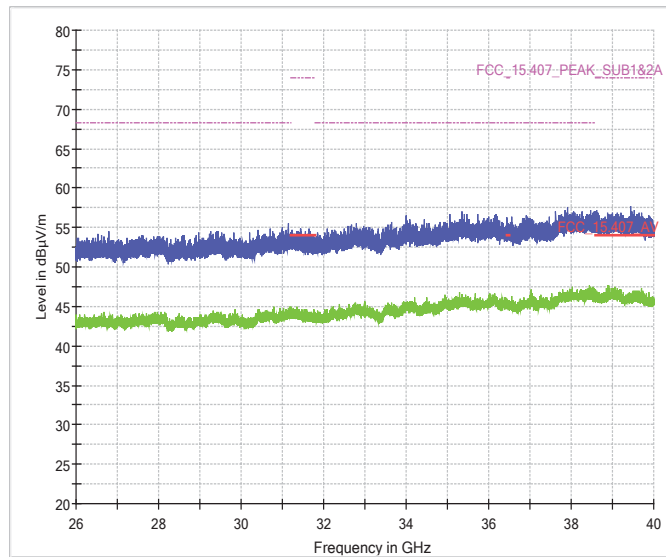
Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01_AK01)



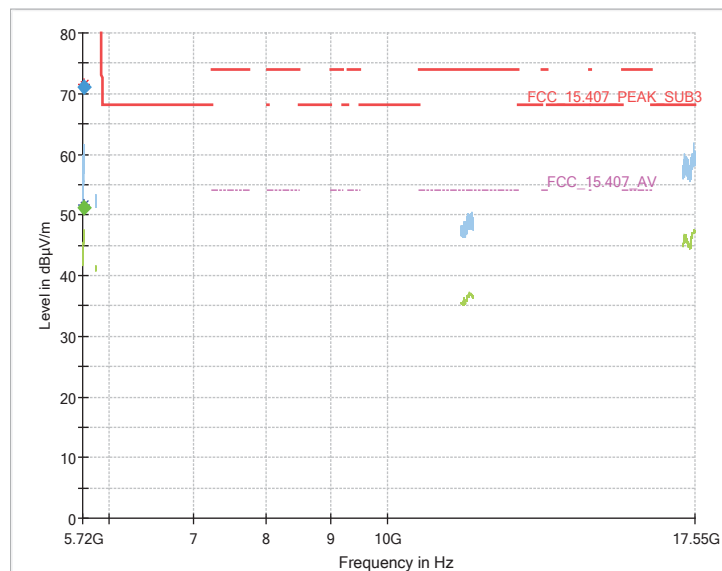
Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5851.700	70.2	---	118.3	48.16	1000.0	1000.000	150.0	H	-55.0	75.0	14.7

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-3 (S01_AK01)



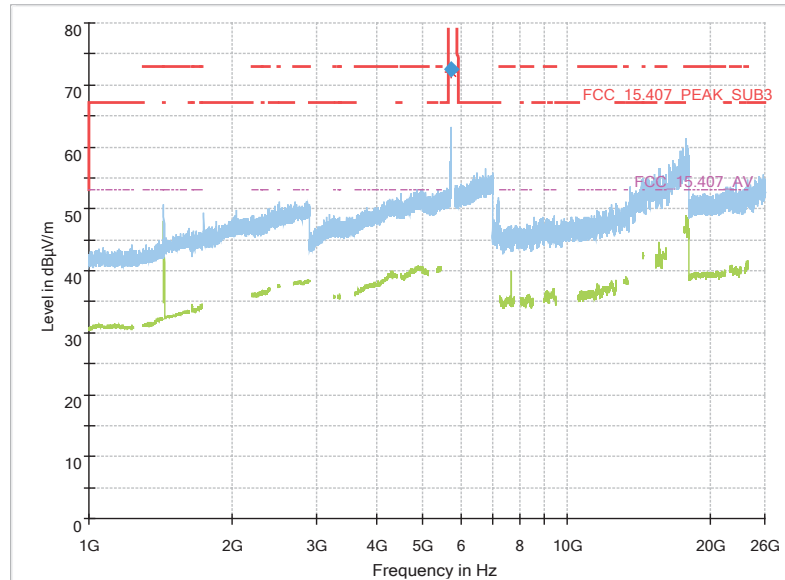
Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5723.900	---	51.1	---	---	1000.0	1000.000	150.0	H	-53.0	78.0	14.1
5723.900	71.2	---	119.6	48.53	1000.0	1000.000	150.0	H	-53.0	82.0	14.1

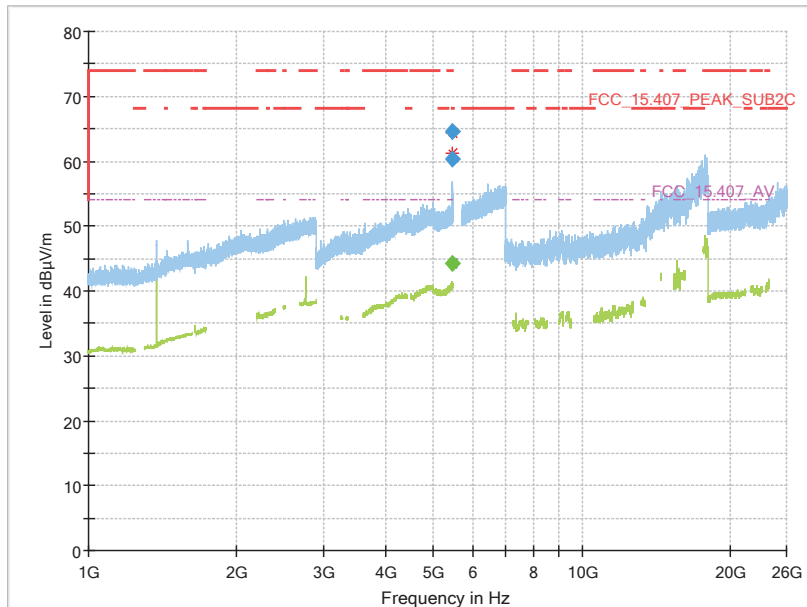
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5724.600	73.4	---	121.2	47.87	1000.0	1000.000	150.0	H	-53.0	98.0	14.1

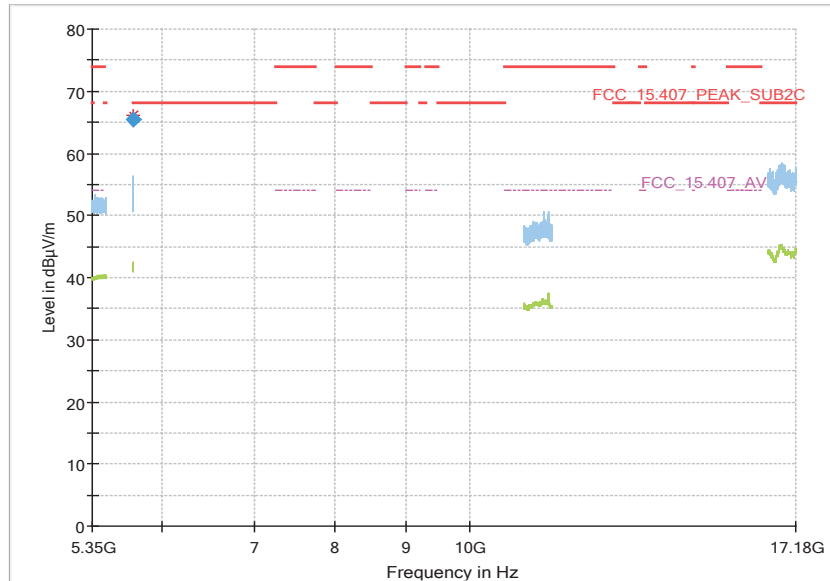
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5460.000	---	44.2	54.00	9.77	1000.0	1000.000	150.0	V	79.0	-2.0	14.1
5460.000	60.3	---	74.00	13.72	1000.0	1000.000	150.0	H	90.0	105.0	14.1
5469.000	64.7	---	68.20	3.53	1000.0	1000.000	150.0	V	79.0	15.0	14.0

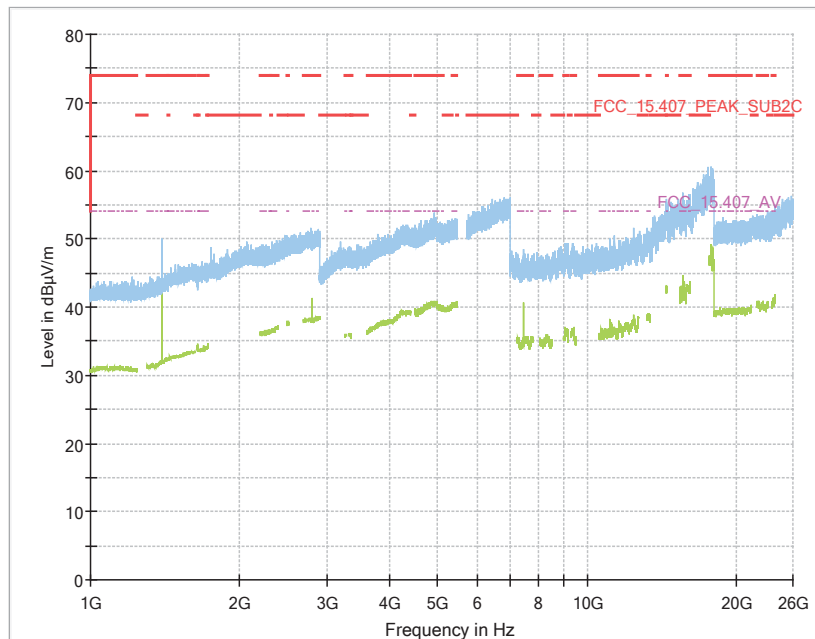
Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5725.300	65.5	---	68.20	2.72	1000.0	1000.000	150.0	H	-56.0	79.0	14.1

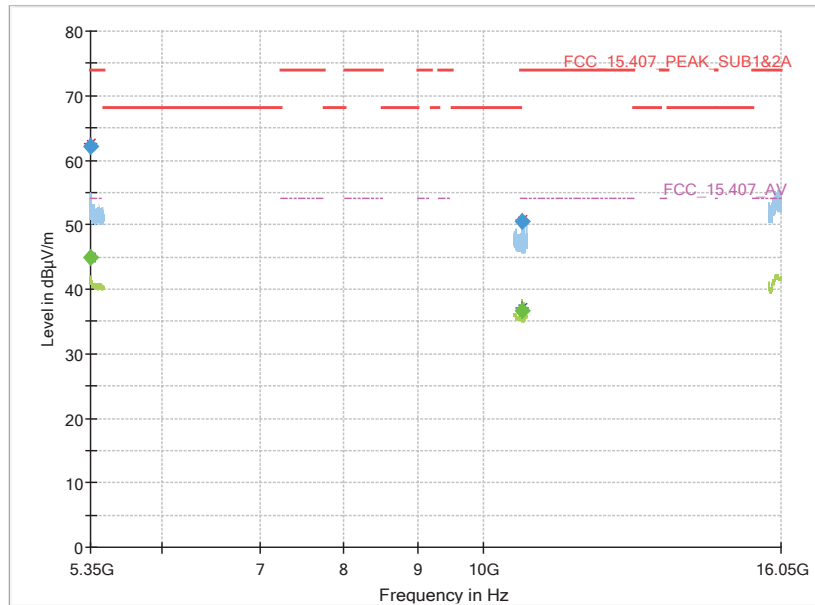
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---	---	---	---	---

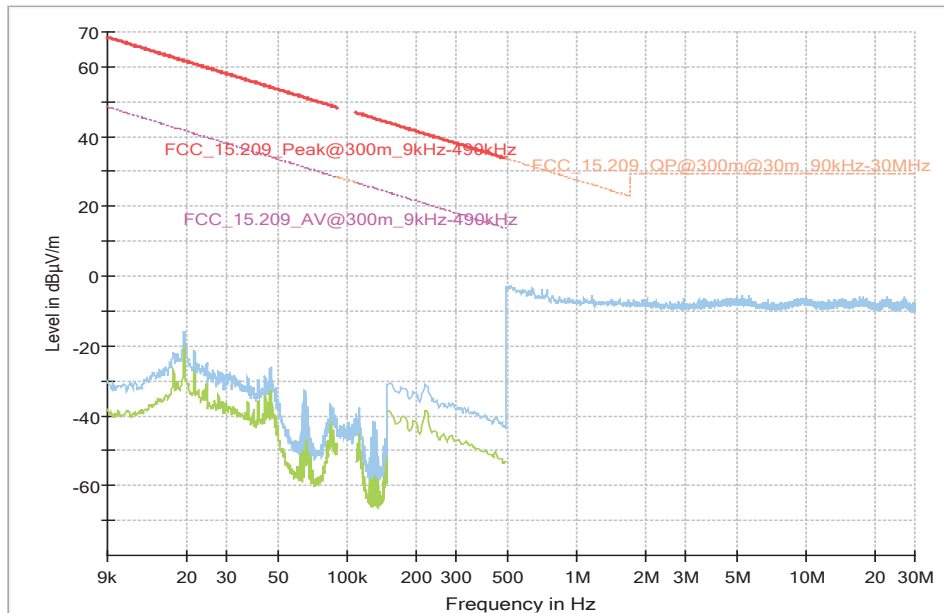
Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5351.980	62.1	---	74.00	11.87	1000.0	1000.000	150.0	H	-91.0	96.0	13.9
5351.980	---	45.0	54.00	8.99	1000.0	1000.000	150.0	H	-53.0	75.0	13.9
10639.200	50.5	---	74.00	23.47	1000.0	1000.000	150.0	H	-46.0	94.0	-12.4
10640.500	---	36.7	54.00	17.26	1000.0	1000.000	150.0	H	-46.0	94.0	-12.4

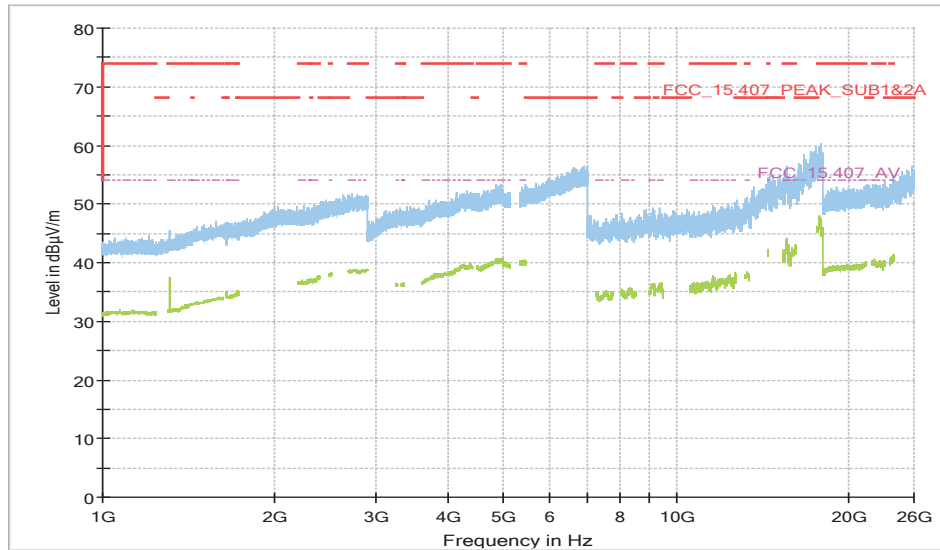
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 9kHz - 30MHz, Subband = U-NII-1
(S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---	---

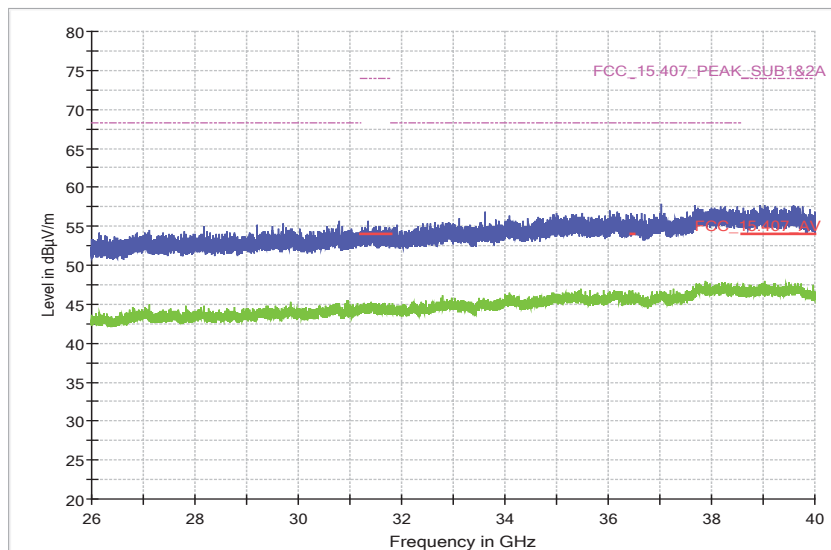
Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01_AC01)



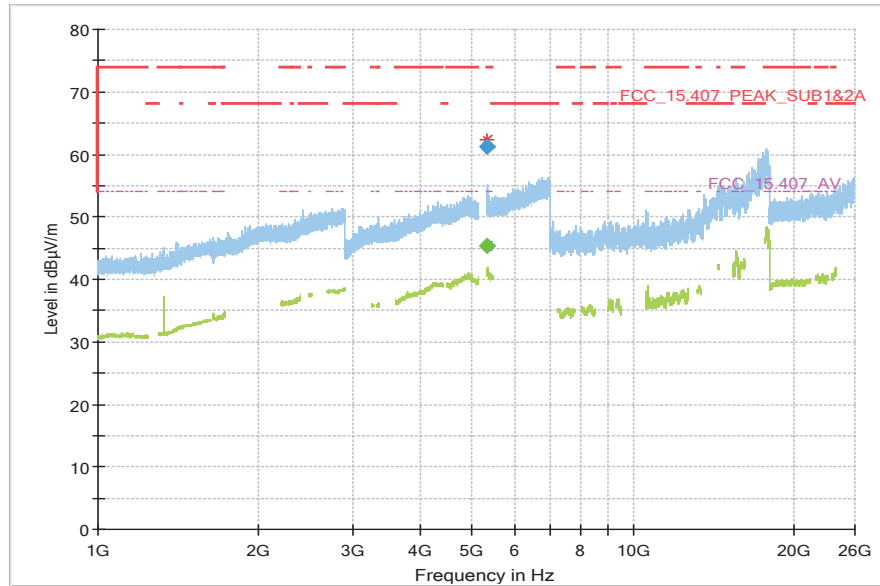
Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---	---	---	---	---

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-2A (S01_AK01)



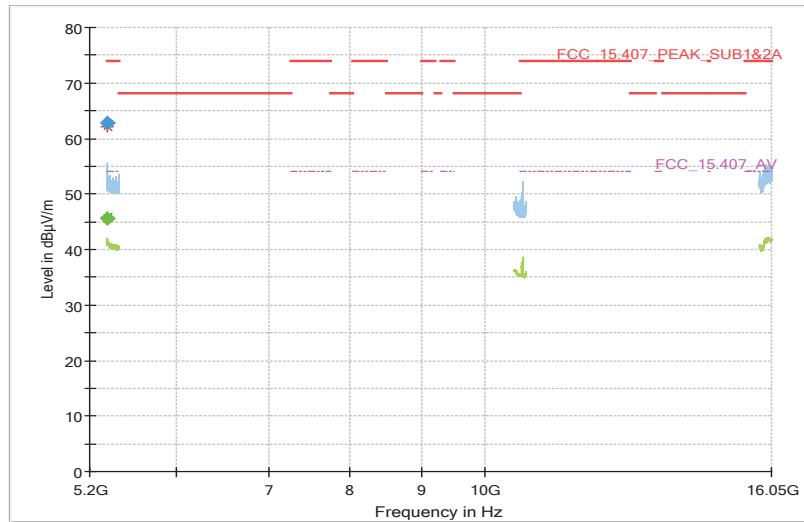
Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5350.550	---	45.4	54.00	8.58	1000.0	1000.000	150.0	H	-53.0	105.0	13.9
5350.550	61.3	---	74.00	12.67	1000.0	1000.000	150.0	H	84.0	94.0	13.9

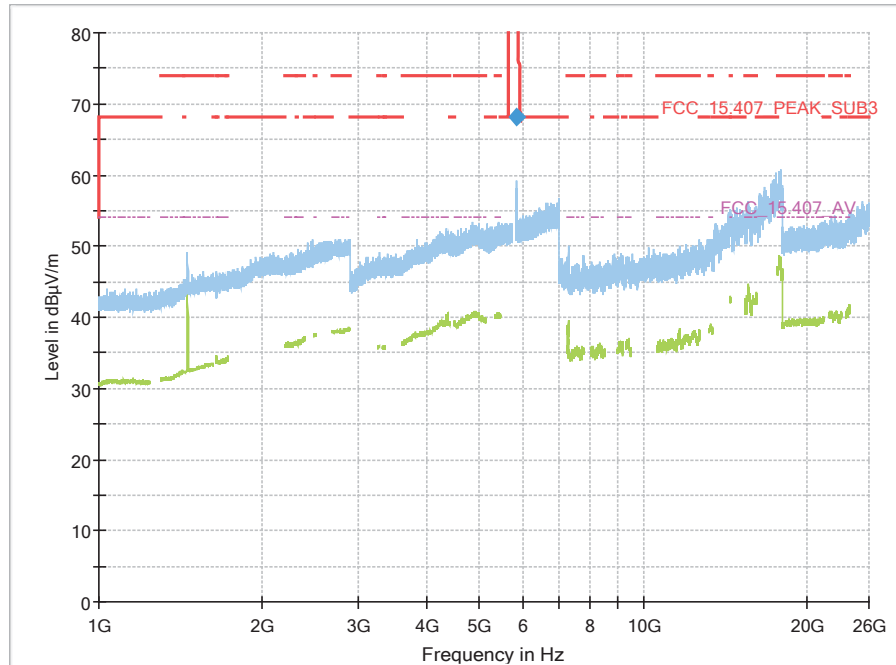
Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5350.110	62.7	---	74.00	11.32	1000.0	1000.000	150.0	H	-79.0	75.0	13.9
5350.770	---	45.7	54.00	8.31	1000.0	1000.000	150.0	H	-52.0	85.0	13.9

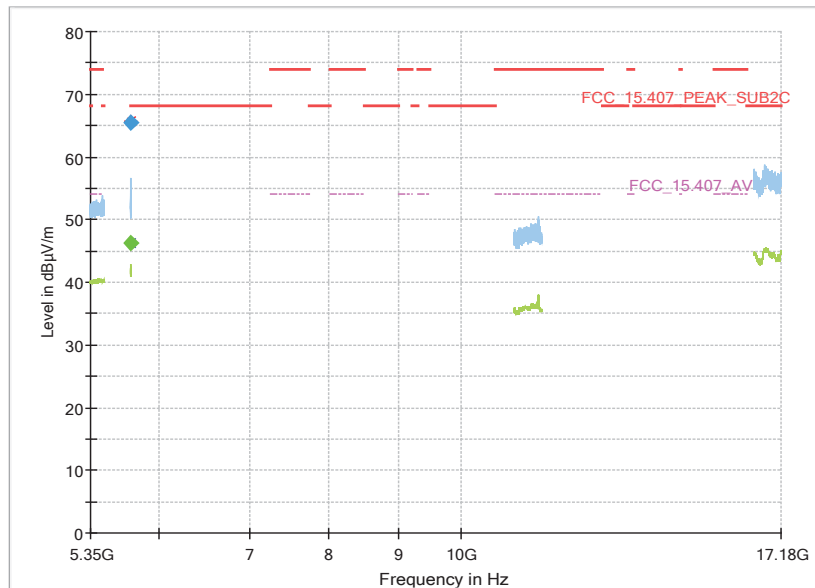
Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-3
(S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5850.700	68.1	---	120.6	52.49	1000.0	1000.000	150.0	H	-51.0	105.0	14.7

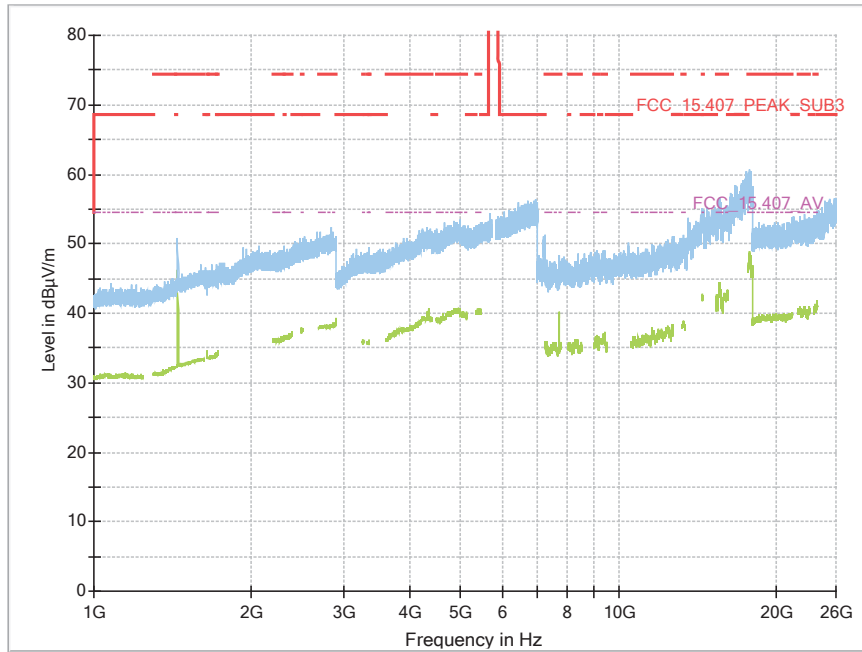
Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5725.450	---	46.3	---	---	1000.0	1000.000	150.0	H	-56.0	78.0	14.1
5725.450	65.4	---	68.20	2.81	1000.0	1000.000	150.0	H	-56.0	79.0	14.1

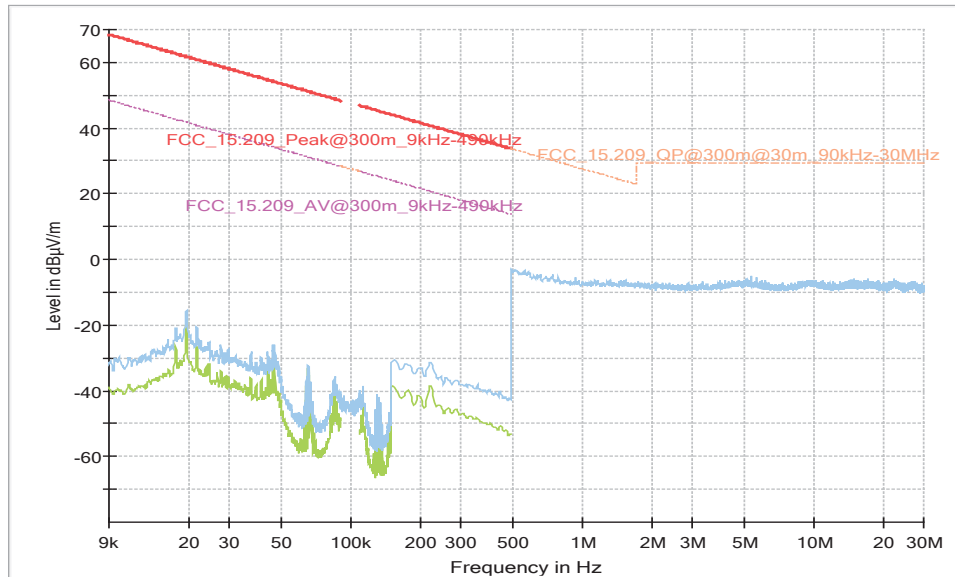
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
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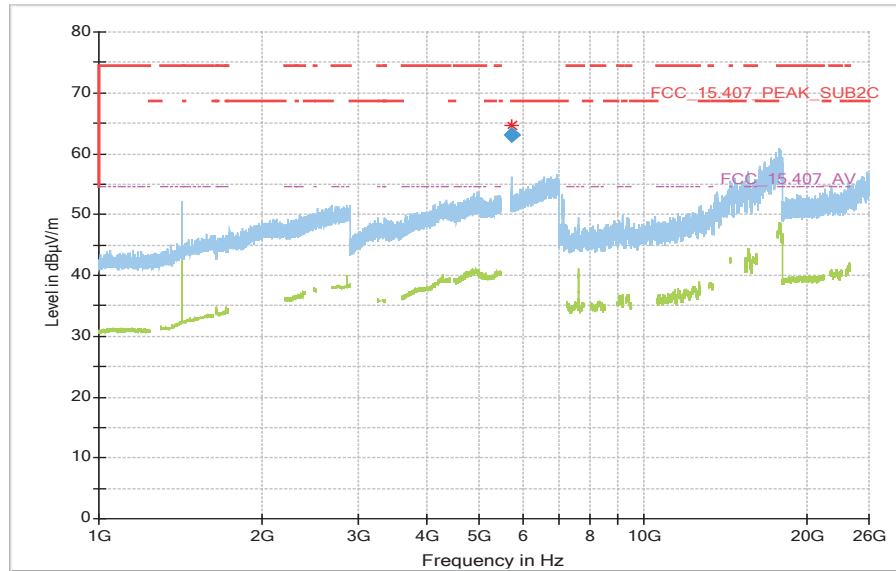
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 9kHz - 30MHz, Subband = U-NII-3
(S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---	---

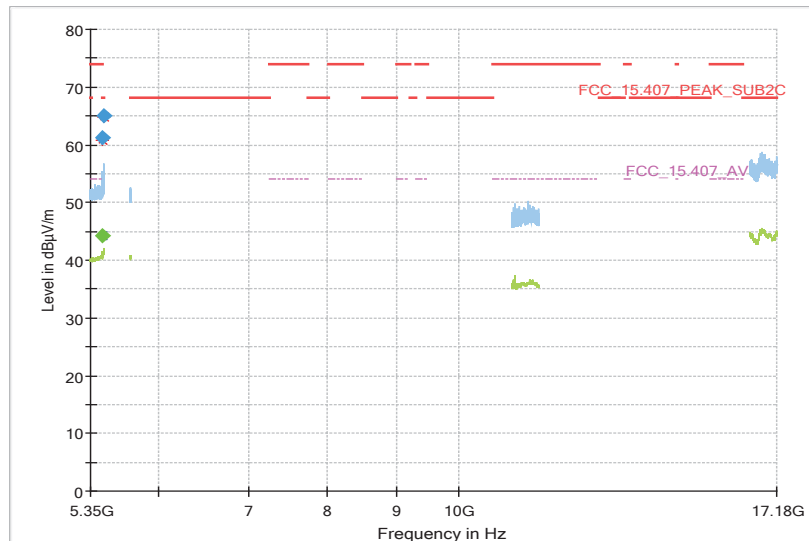
Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5725.765	62.5	---	68.20	5.73	1000.0	1000.000	150.0	V	-2.0	14.0	14.1

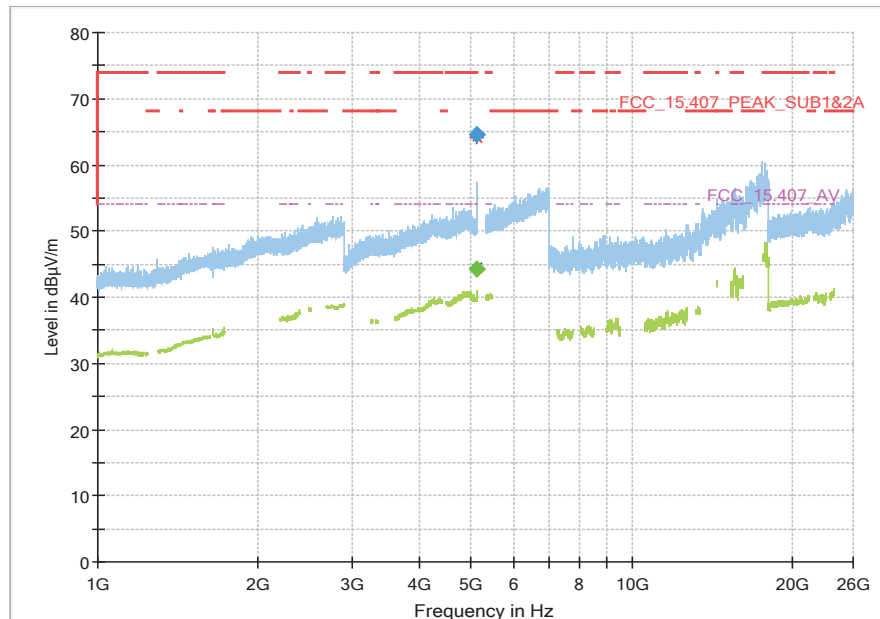
Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5459.440	---	44.3	54.00	9.66	1000.0	1000.000	150.0	H	-53.0	86.0	14.0
5459.440	61.3	---	74.00	12.68	1000.0	1000.000	150.0	H	-91.0	100.0	14.0
5468.800	65.0	---	68.20	3.18	1000.0	1000.000	150.0	H	-52.0	94.0	14.0

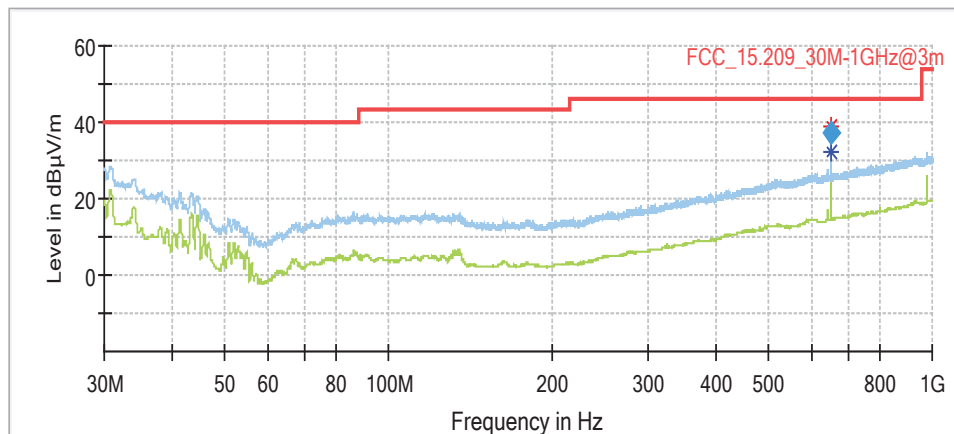
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01_AC01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5149.188	64.6	---	74.00	9.36	1000.0	1000.000	150.0	H	83.0	78.0	13.2
5149.513	---	44.3	54.00	9.68	1000.0	1000.000	150.0	V	-89.0	-2.0	13.2

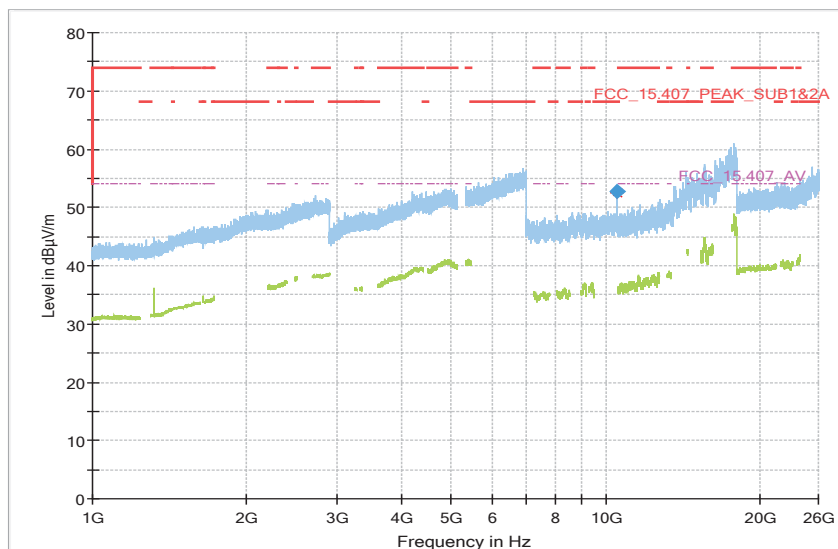
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-1 (S01_AK01)



Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
652.500000	36.96	46.00	9.04	1000.0	120.000	128.0	H	-198.0	21.0	

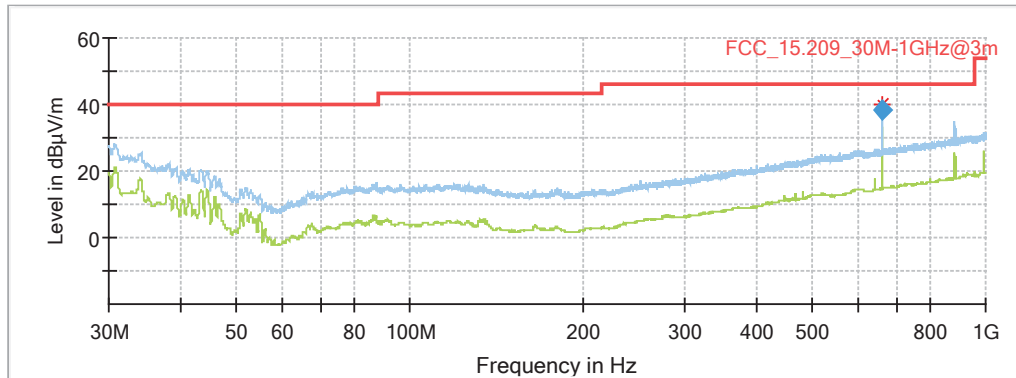
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
10519.563	52.8	---	68.20	15.44	1000.0	1000.000	150.0	H	50.0	90.0	-11.4

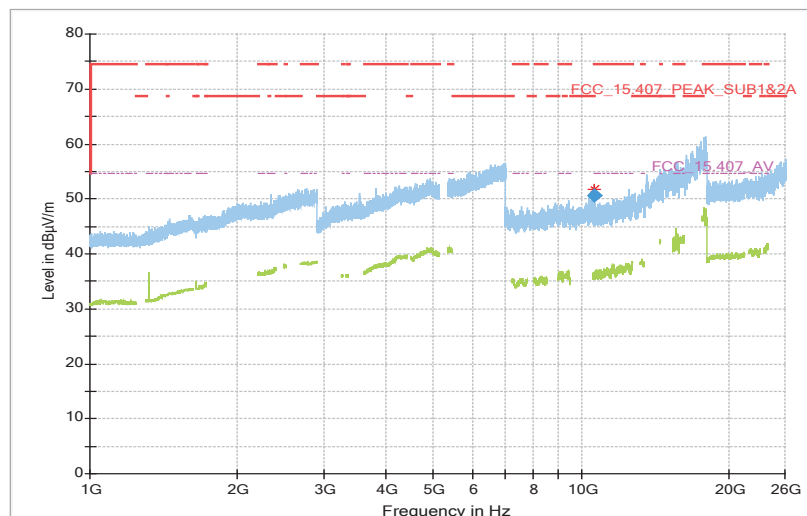
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-2A (S01_AK01)



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
660.000000	38.44	46.00	7.56	1000.0	120.000	136.0	H	117.0	21.2	

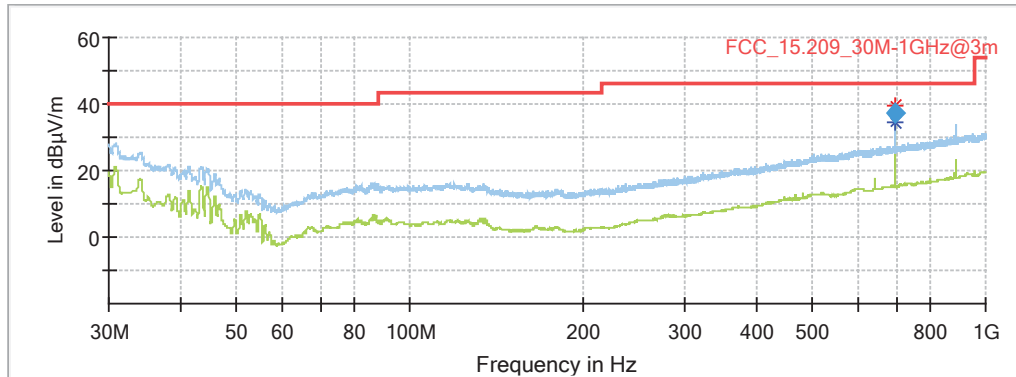
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
10563.838	50.2	---	68.20	18.04	1000.0	1000.000	150.0	H	8.0	86.0	-11.6

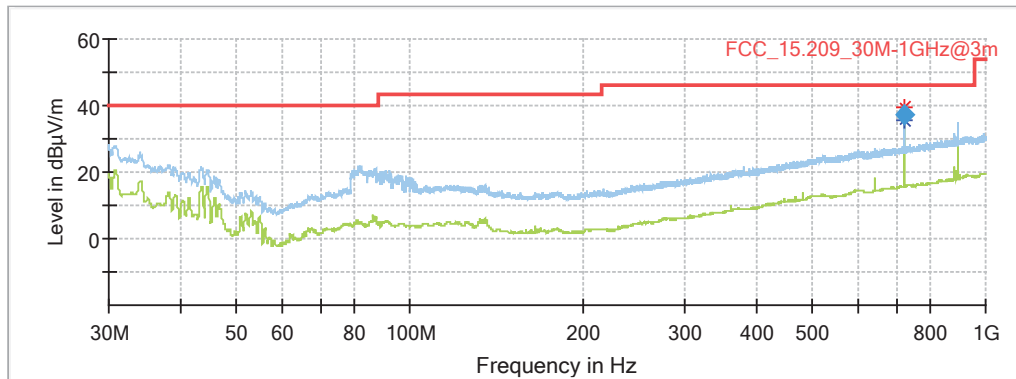
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-2C (S01_AK01)



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin	Meas. Time (ms)	Bandwidth (Hz)	Height	Pol	Azimuth	Corr. (dB/m)	Comment
697.500000	37.48	46.00	8.52	1000.0	120.000	117.0	H	63.0	21.5	

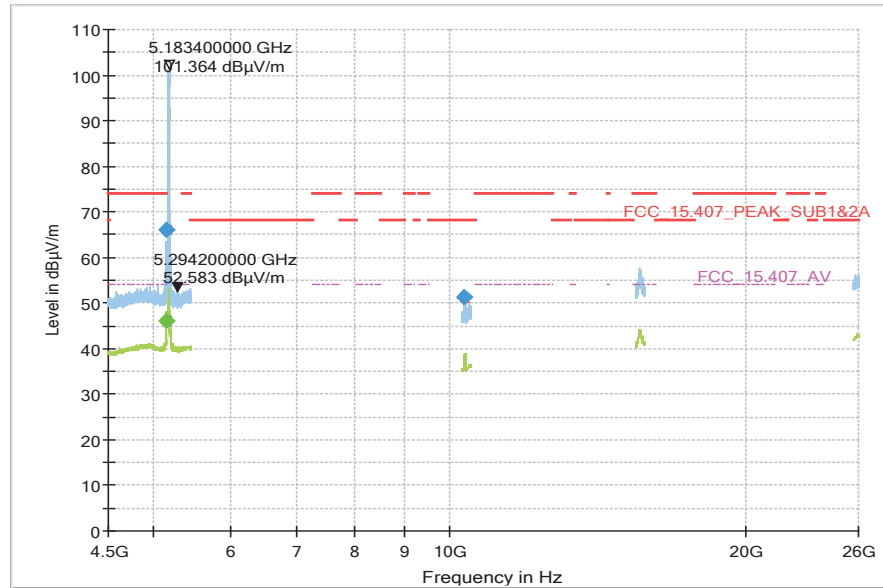
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-3 (S01_AK01)



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin	Meas. Time (ms)	Bandwidth (Hz)	Height	Pol	Azimuth	Corr. (dB/m)	Comment
723.120000	37.49	46.00	8.51	1000.0	120.000	115.0	H	250.0	22.2	

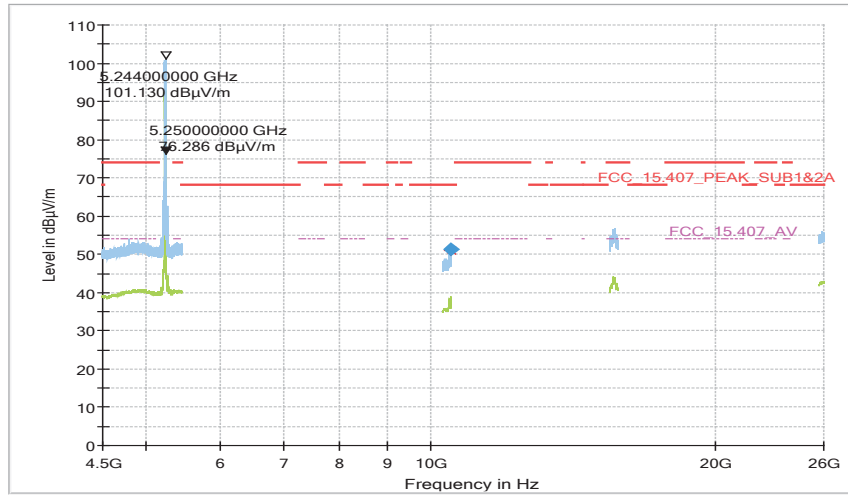
Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Measurement range = 1GHz
 - 26GHz, Subband = U-NII-1
 (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5148.375	66.0	---	74.00	7.96	1000.0	1000.000	150.0	H	-43.0	79.0	13.2
5150.000	---	46.0	---	---	1000.0	1000.000	150.0	H	-51.0	86.0	13.2
10354.800	51.2	---	68.20	16.97	1000.0	1000.000	150.0	H	45.0	84.0	-12.2

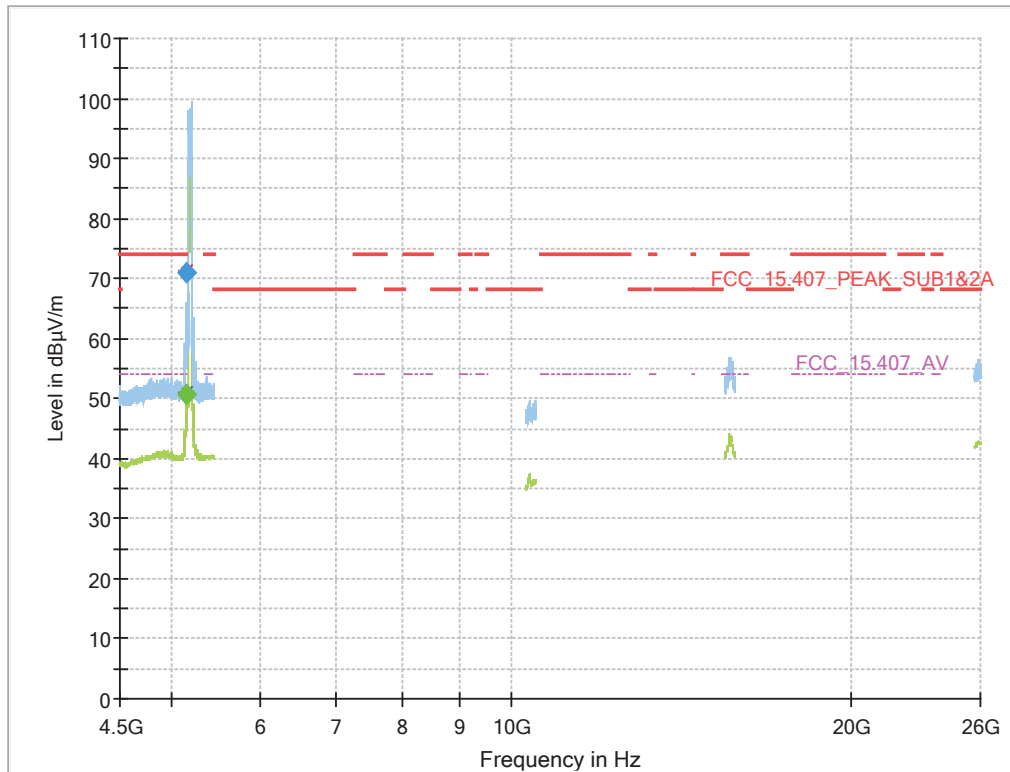
Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
10478.800	51.3	---	68.20	16.88	1000.0	1000.000	150.0	H	-88.0	75.0	-11.2

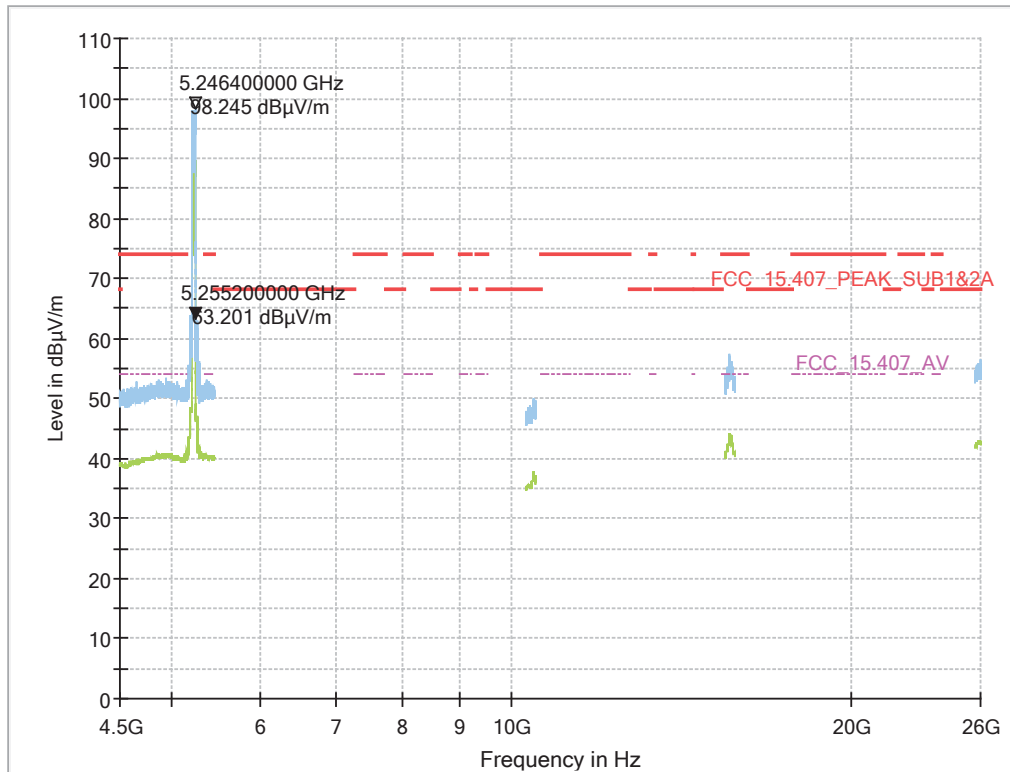
Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Measurement range = 1GHz
 - 26GHz, Subband = U-NII-1
 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5149.838	---	50.7	54.00	3.27	1000.0	1000.000	150.0	H	-51.0	78.0	13.2
5149.838	71.1	---	74.00	2.88	1000.0	1000.000	150.0	H	-49.0	82.0	13.2

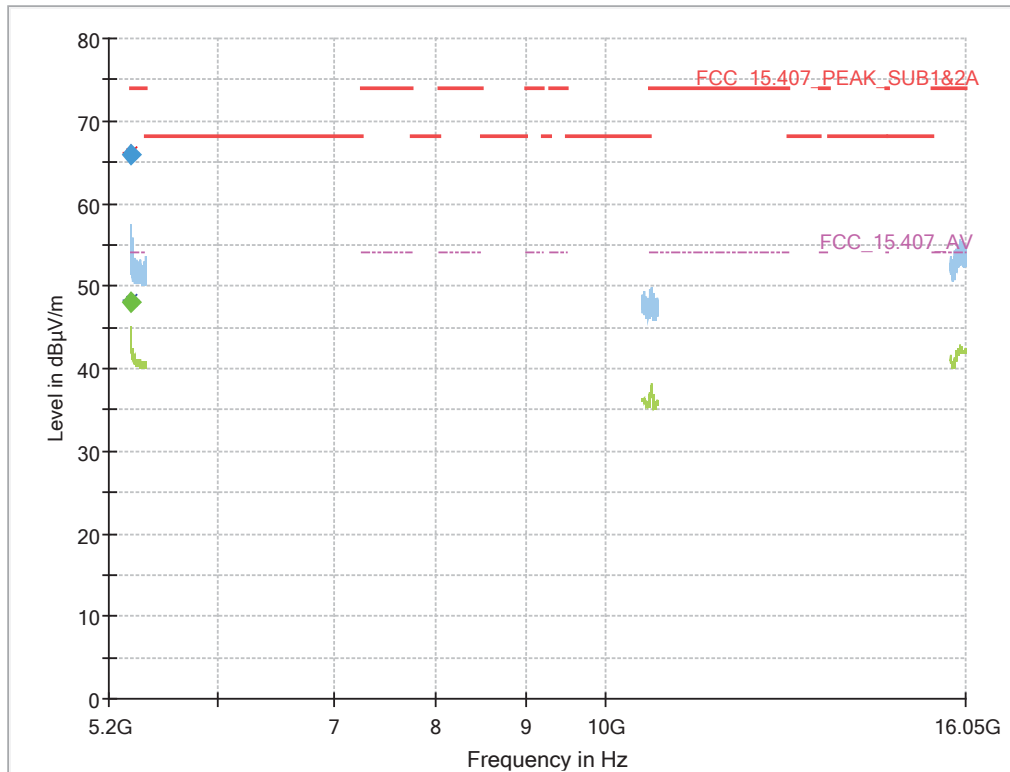
Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---	---	---	---	---

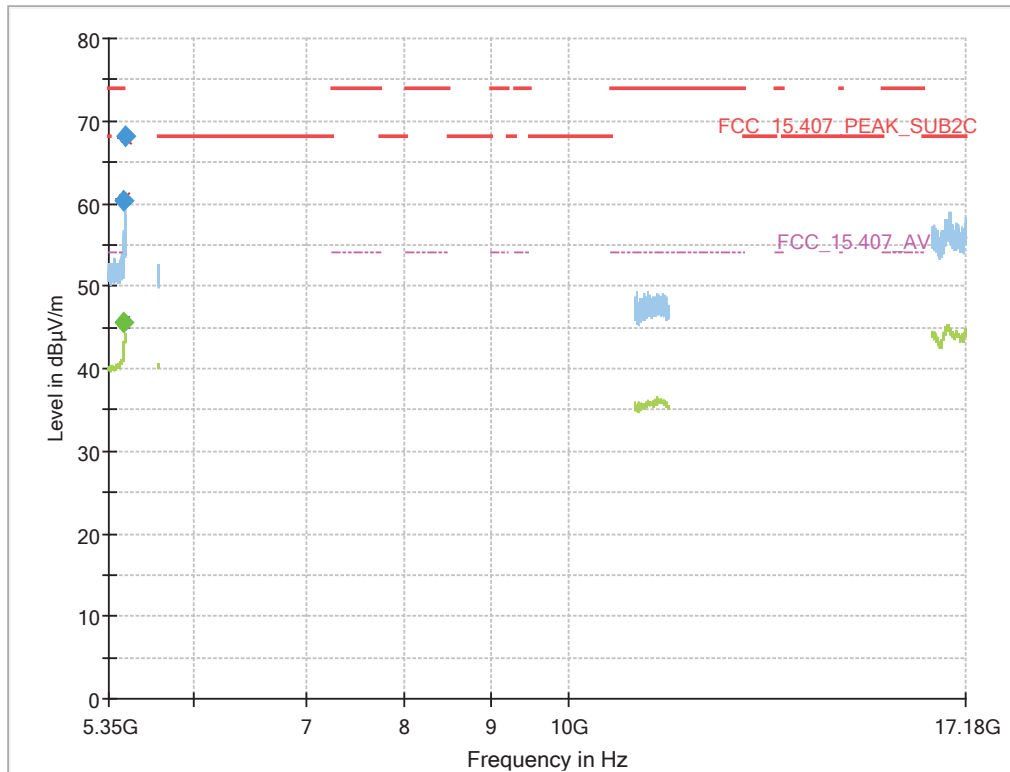
Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5350.110	---	48.2	54.00	5.85	1000.0	1000.000	150.0	H	88.0	78.0	13.9
5351.760	65.8	---	74.00	8.18	1000.0	1000.000	150.0	H	92.0	86.0	13.9

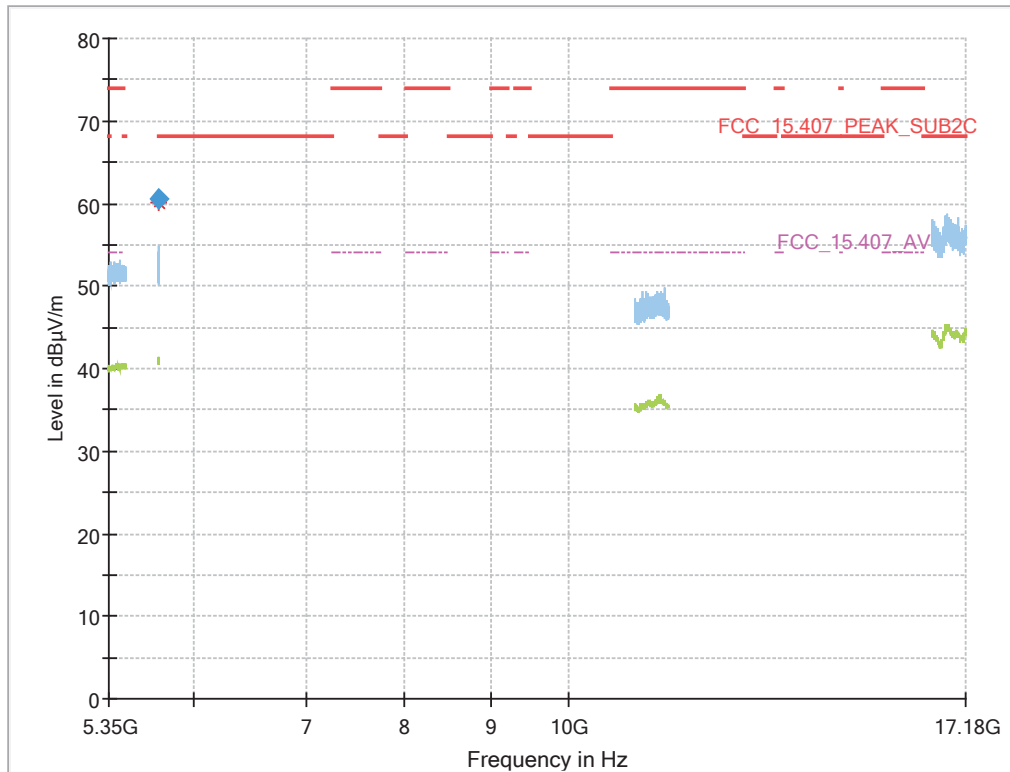
Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Measurement range = 1GHz
 - 26GHz, Subband = U-NII-2C
 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5458.960	60.4	---	74.00	13.65	1000.0	1000.000	150.0	V	54.0	-1.0	14.0
5459.800	---	45.5	54.00	8.52	1000.0	1000.000	150.0	V	88.0	-4.0	14.0
5469.280	68.1	---	68.20	0.11	1000.0	1000.000	150.0	V	87.0	-6.0	14.0

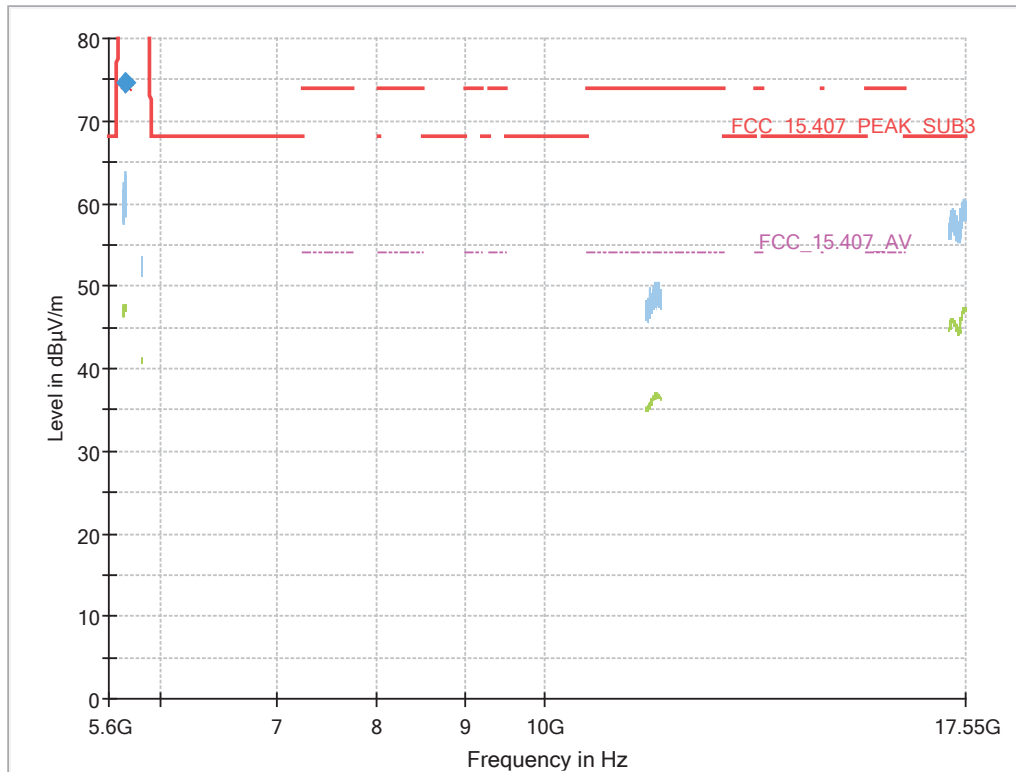
Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5725.700	60.7	---	68.20	7.54	1000.0	1000.000	150.0	V	46.0	-6.0	14.1

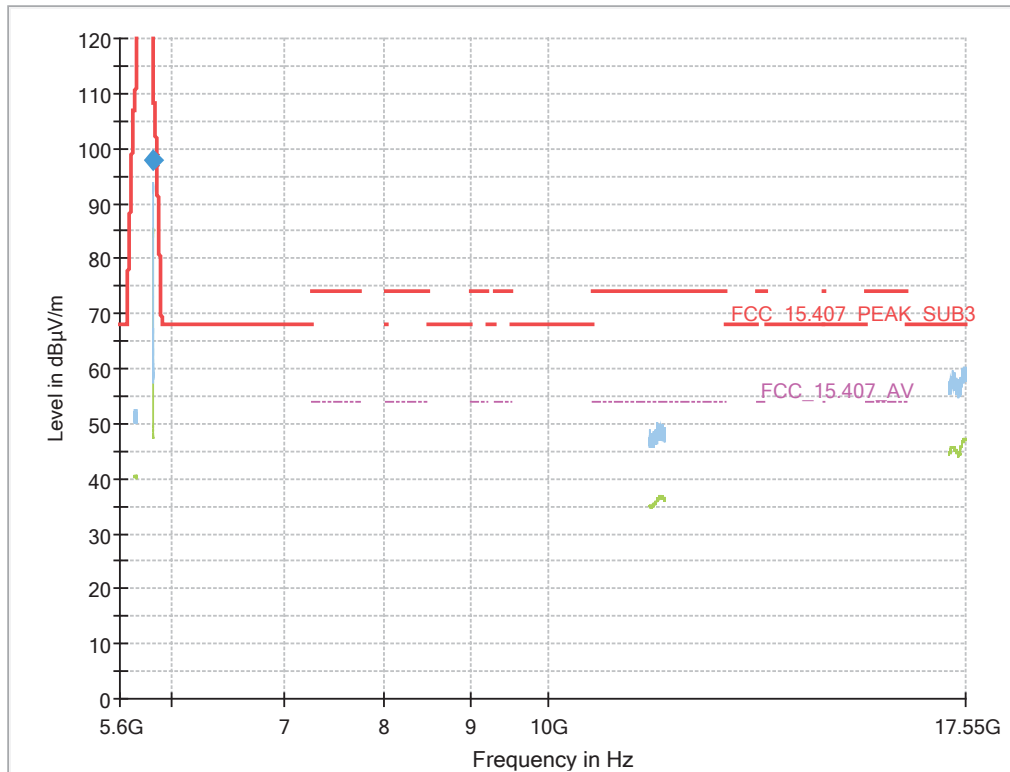
Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Measurement range = 1GHz
 - 26GHz, Subband = U-NII-3
 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5723.900	74.6	---	119.6	45.05	1000.0	1000.000	150.0	H	-53.0	93.0	14.1

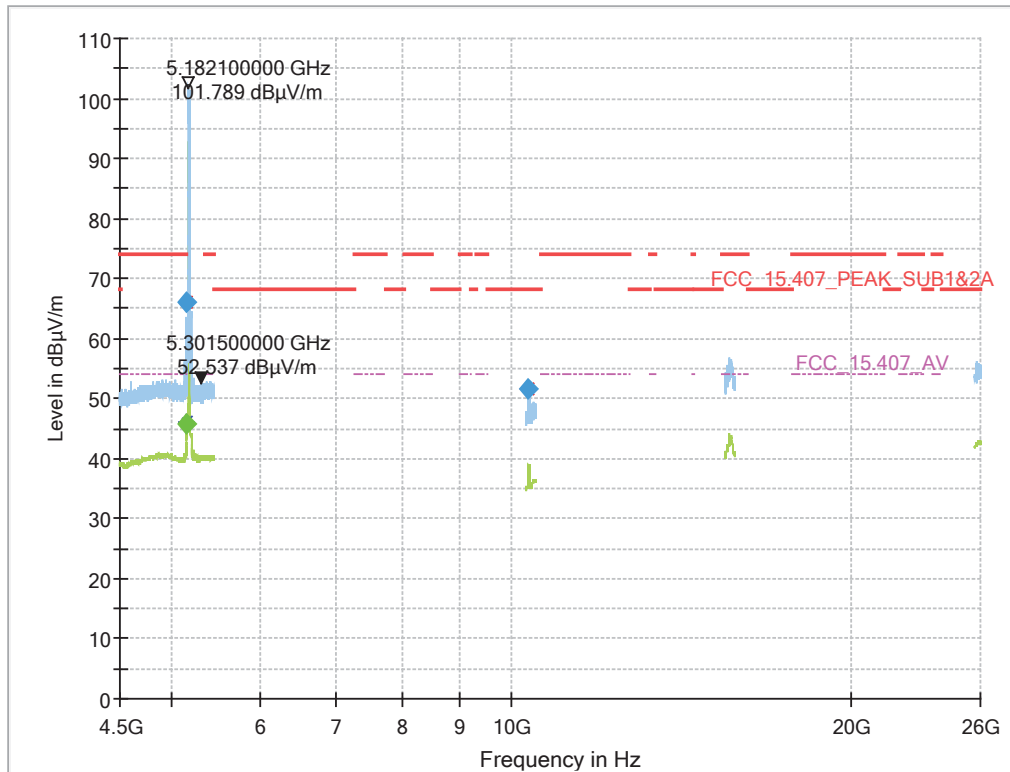
Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5850.200	97.8	---	121.7	20.96	1000.0	1000.000	150.0	V	-11.0	15.0	14.7

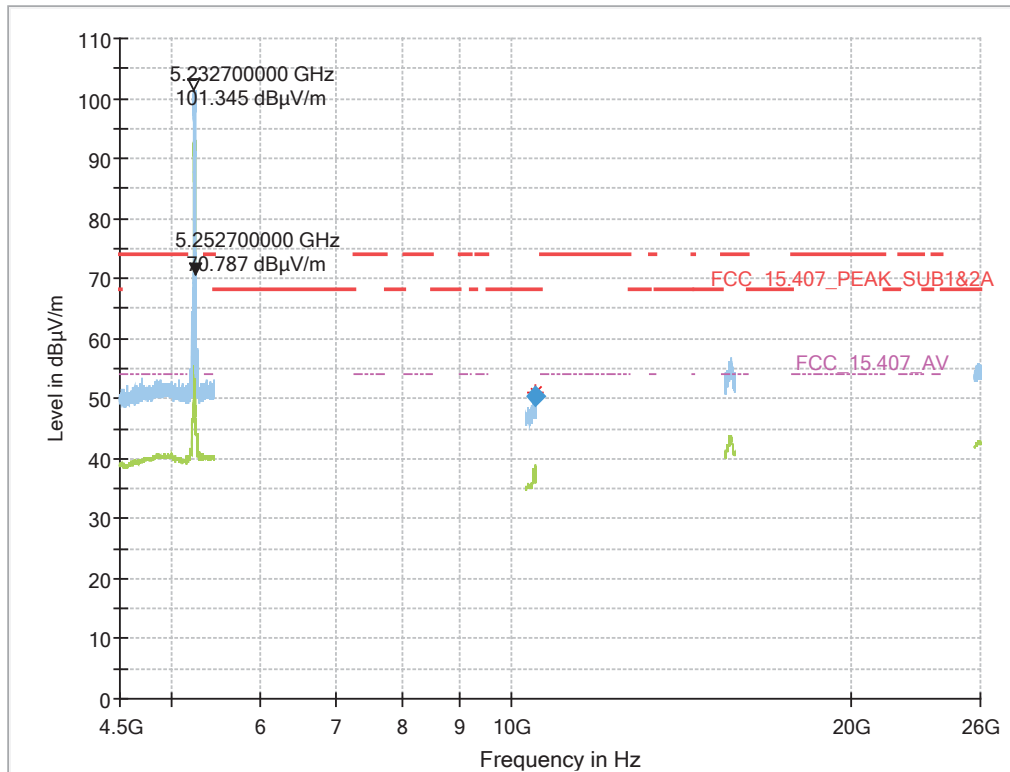
Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5148.700	66.0	---	74.00	7.97	1000.0	1000.000	150.0	H	-49.0	78.0	13.2
5150.000	---	45.7	54.00	8.27	1000.0	1000.000	150.0	H	-49.0	78.0	13.2
10357.100	51.7	---	68.20	16.49	1000.0	1000.000	150.0	H	48.0	87.0	-12.2

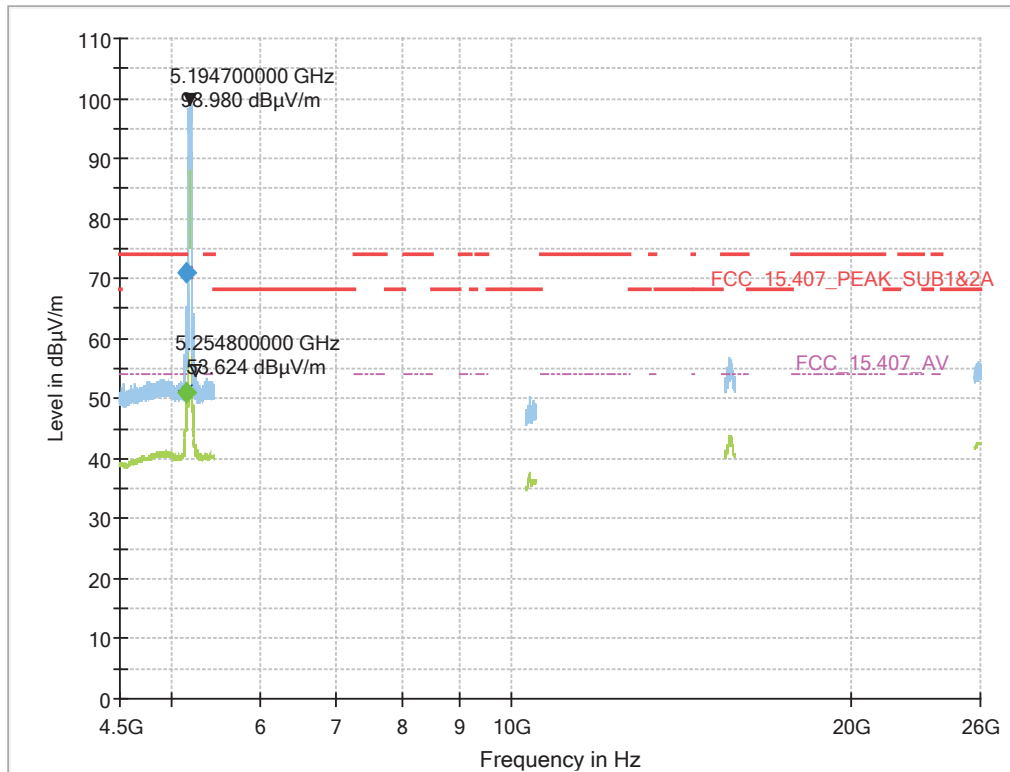
Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
10478.500	50.5	---	68.20	17.67	1000.0	1000.000	150.0	H	-89.0	79.0	-11.2

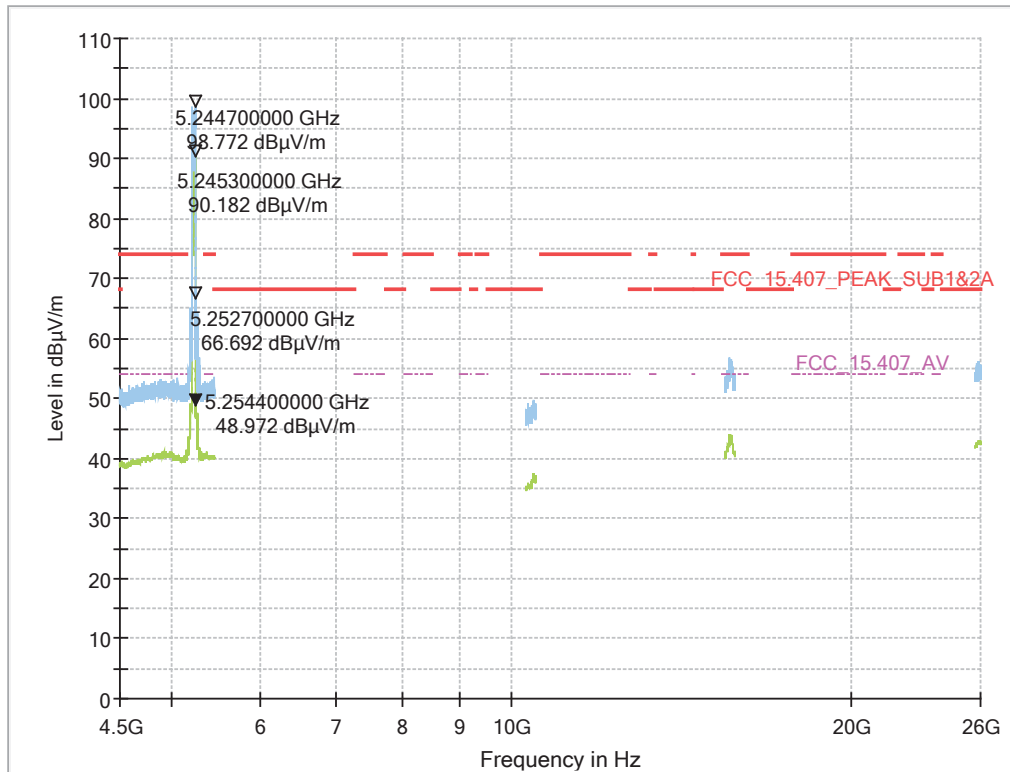
Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5149.350	71.0	---	74.00	3.02	1000.0	1000.000	150.0	H	-49.0	82.0	13.2
5149.513	---	51.1	54.00	2.90	1000.0	1000.000	150.0	H	-51.0	78.0	13.2

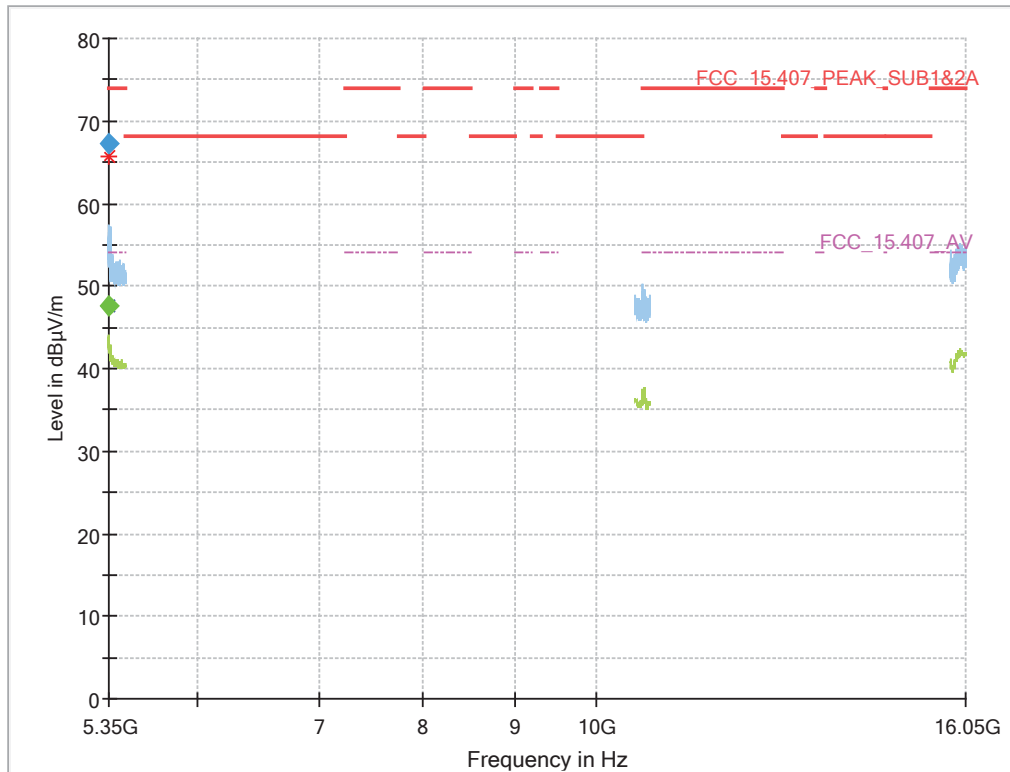
Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Measurement range =
1GHz - 26GHz, Subband = U-NII-1
(S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---	---	---	---	---

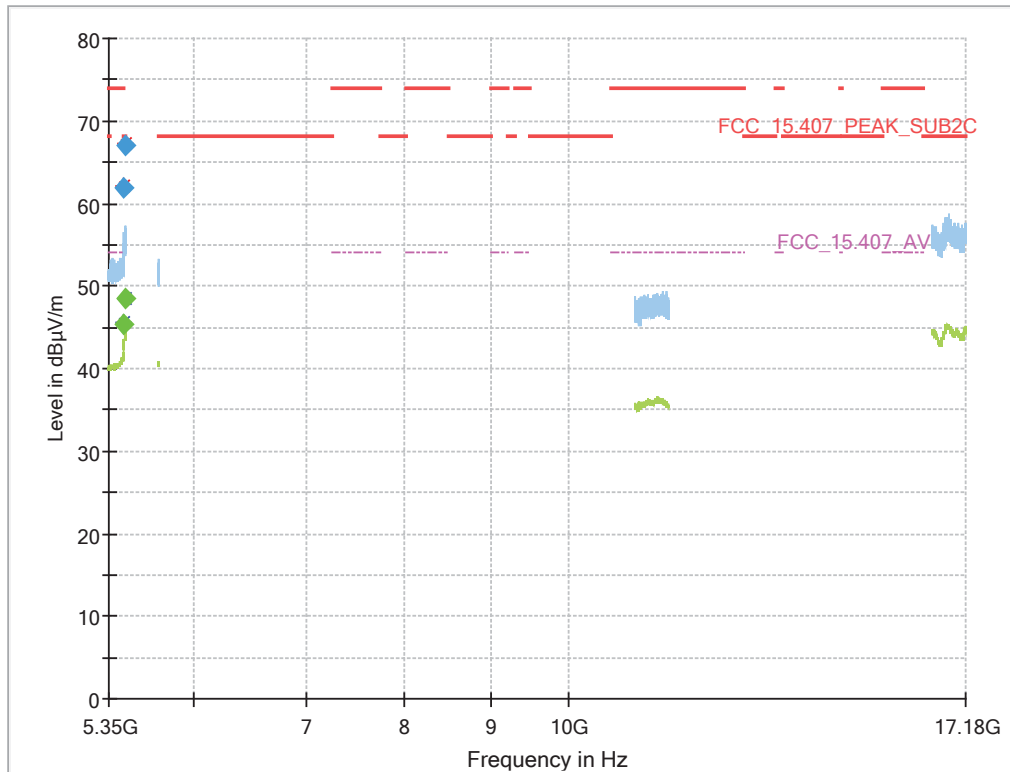
Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5351.650	67.2	---	74.00	6.81	1000.0	1000.000	150.0	V	45.0	15.0	13.9
5351.760	---	47.5	54.00	6.47	1000.0	1000.000	150.0	V	129.0	-4.0	13.9

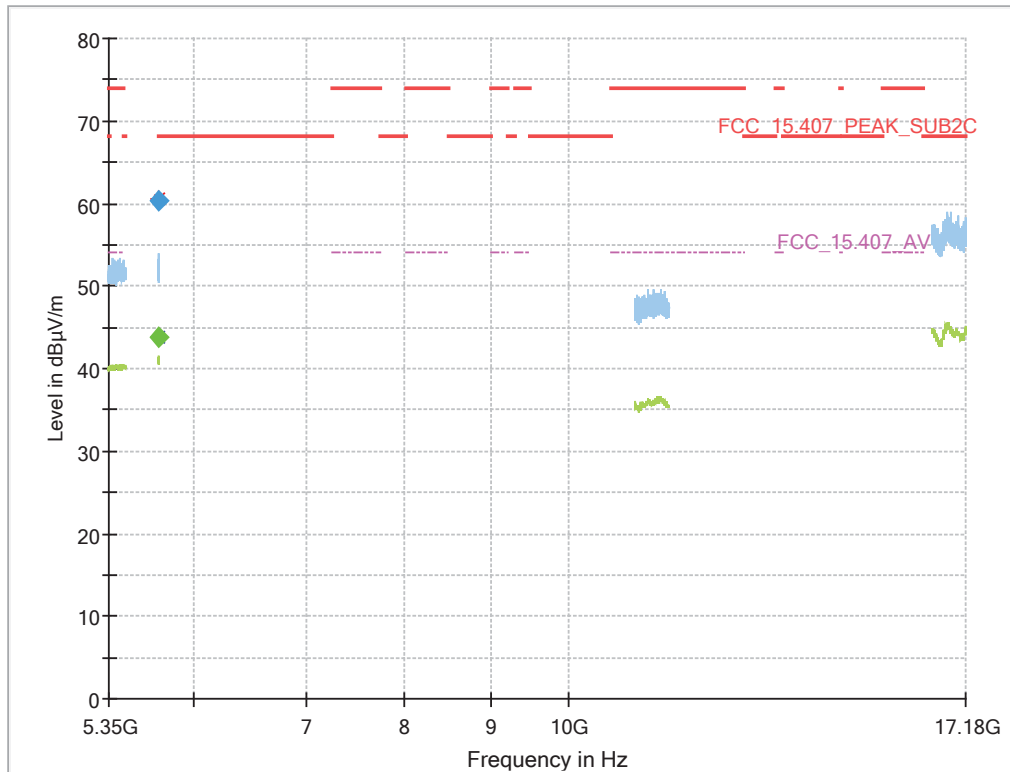
Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5459.680	---	45.5	54.00	8.53	1000.0	1000.000	150.0	V	84.0	3.0	14.0
5459.920	61.9	---	74.00	12.10	1000.0	1000.000	150.0	V	81.0	15.0	14.1
5469.880	---	48.4	---	---	1000.0	1000.000	150.0	H	-53.0	78.0	14.0
5469.880	67.0	---	68.20	1.16	1000.0	1000.000	150.0	H	-52.0	89.0	14.0

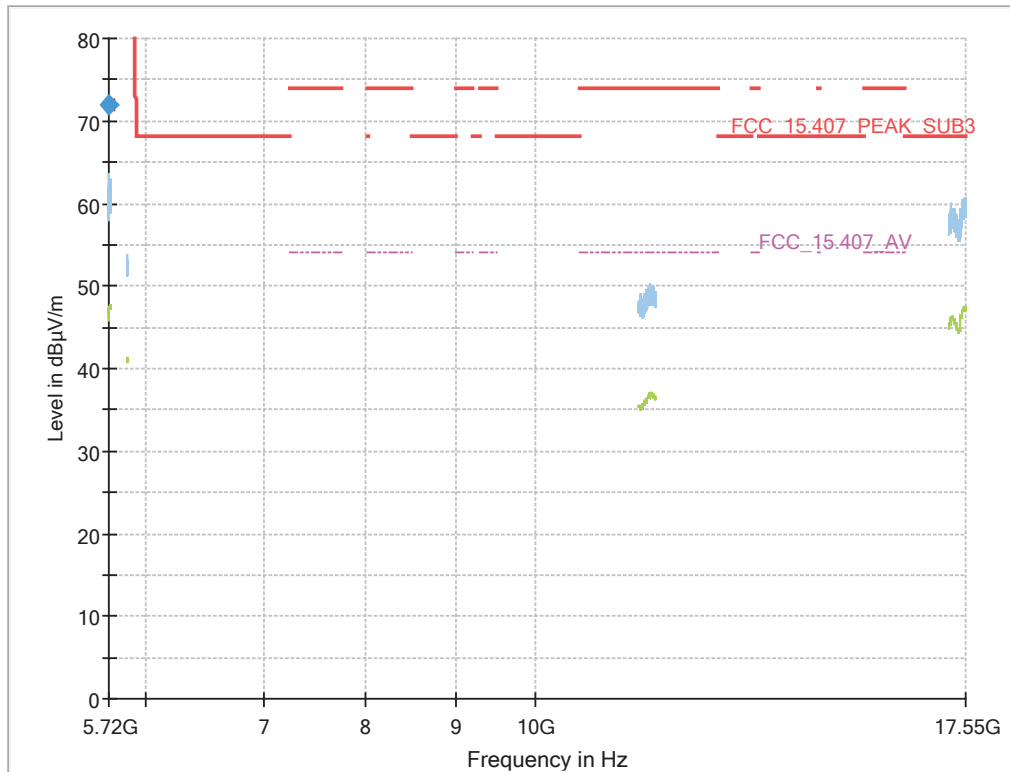
Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5726.050	---	43.8	---	---	1000.0	1000.000	150.0	H	-131.0	93.0	14.1
5726.050	60.3	---	68.20	7.94	1000.0	1000.000	150.0	V	-88.0	-4.0	14.1

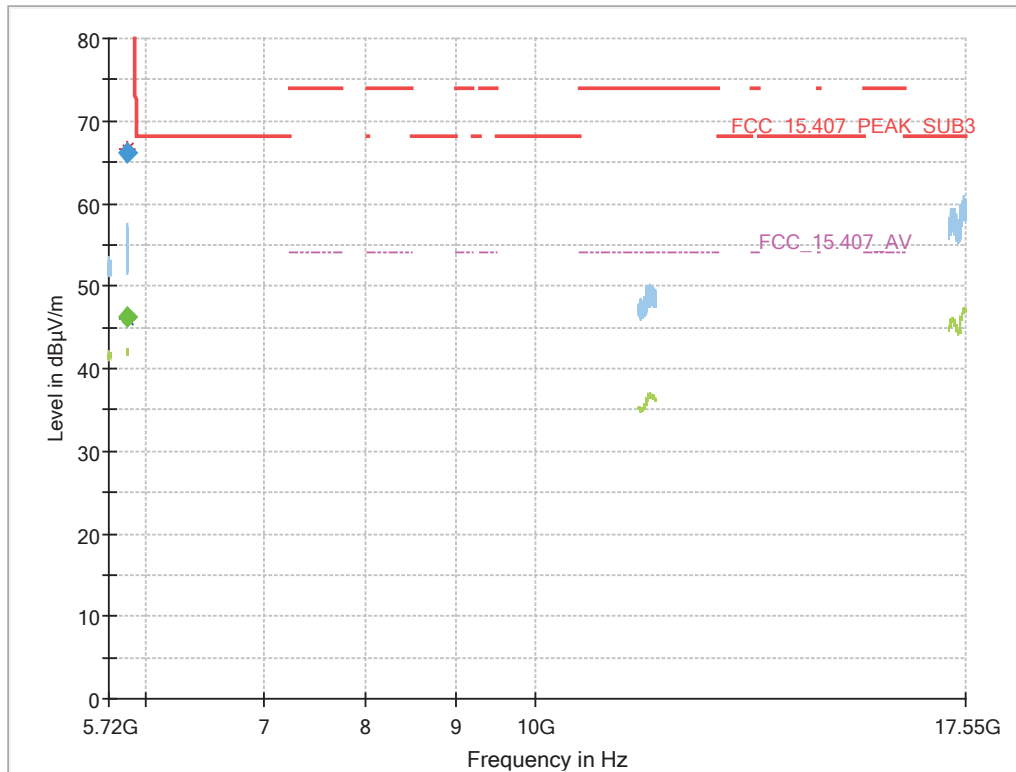
Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5720.000	71.9	---	110.8	38.91	1000.0	1000.000	150.0	H	-135.0	105.0	14.1

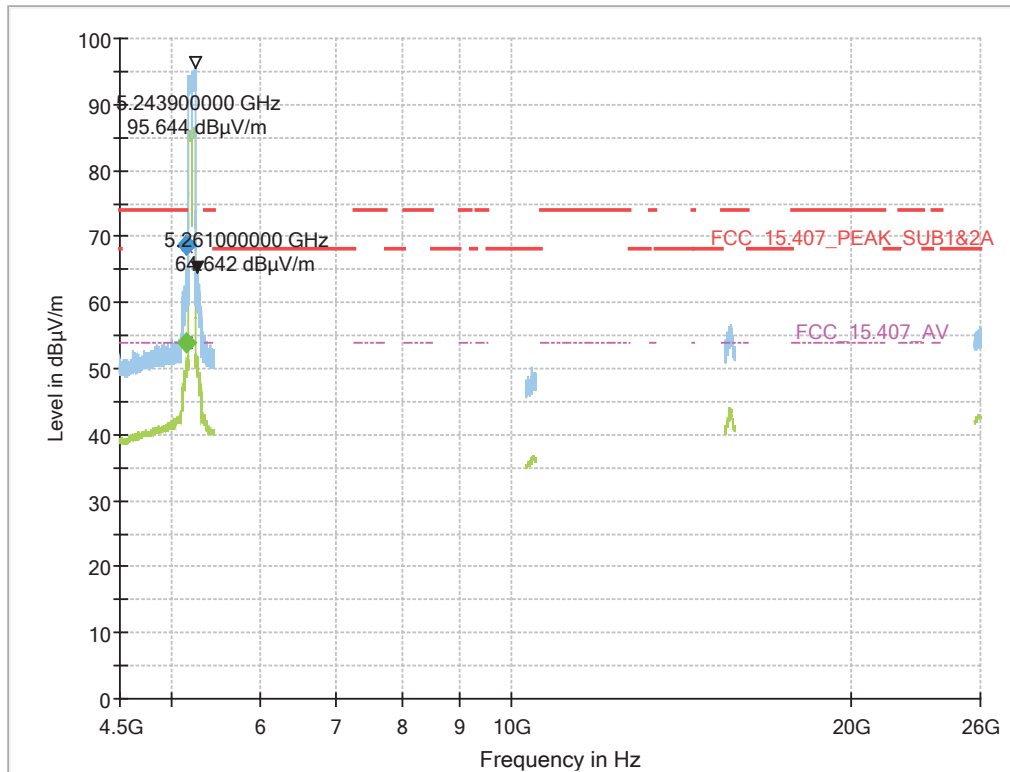
Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5850.000	---	46.1	---	---	1000.0	1000.000	150.0	H	-53.0	86.0	14.7
5850.000	66.2	---	122.2	55.95	1000.0	1000.000	150.0	H	-53.0	86.0	14.7

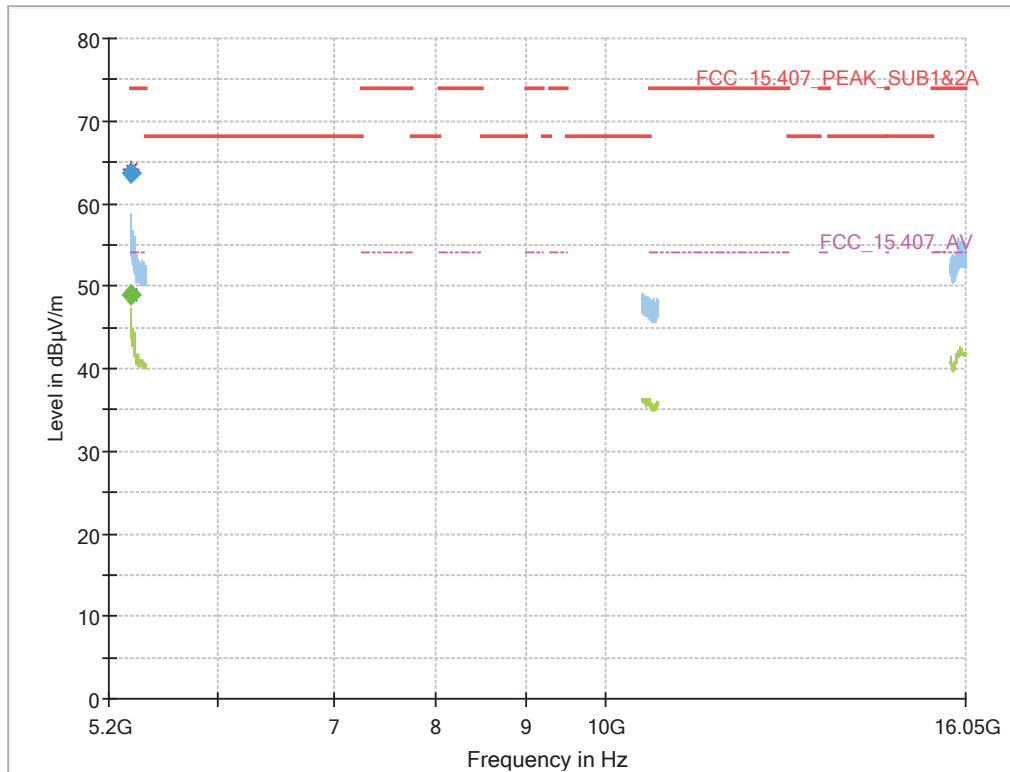
Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5149.025	68.6	---	74.00	5.39	1000.0	1000.000	150.0	H	-49.0	83.0	13.2
5149.838	---	53.8	54.00	0.22	1000.0	1000.000	150.0	H	-51.0	78.0	13.2

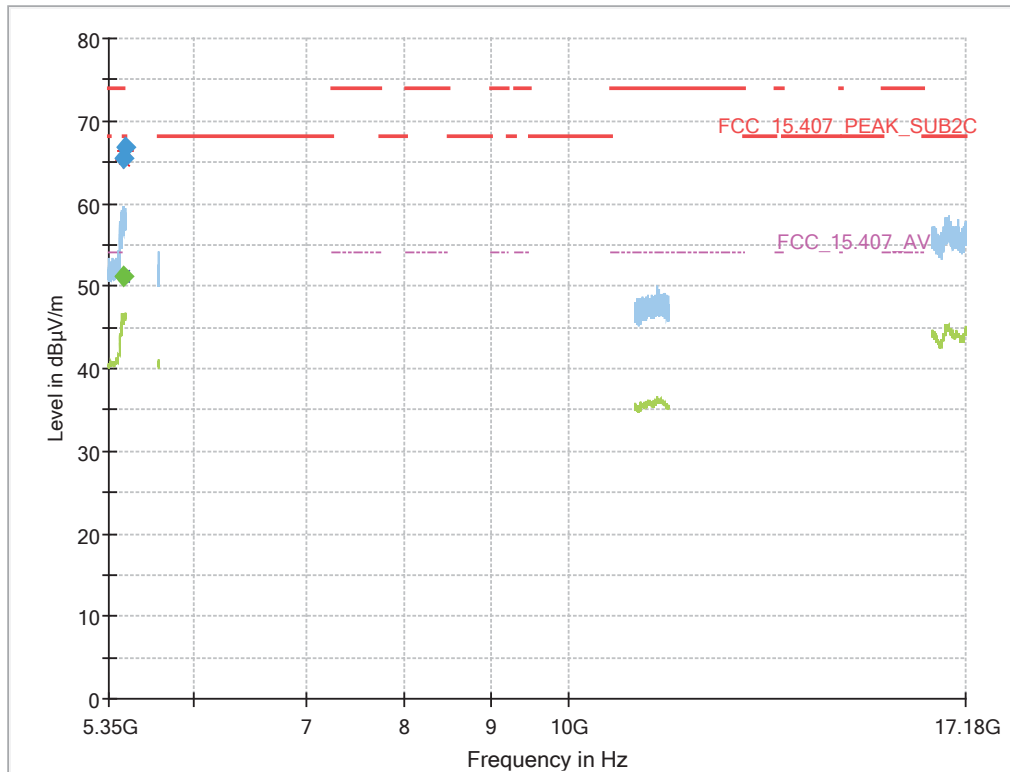
Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5350.550	---	49.0	54.00	4.97	1000.0	1000.000	150.0	V	129.0	3.0	13.9
5350.550	63.7	---	74.00	10.26	1000.0	1000.000	150.0	V	131.0	-2.0	13.9

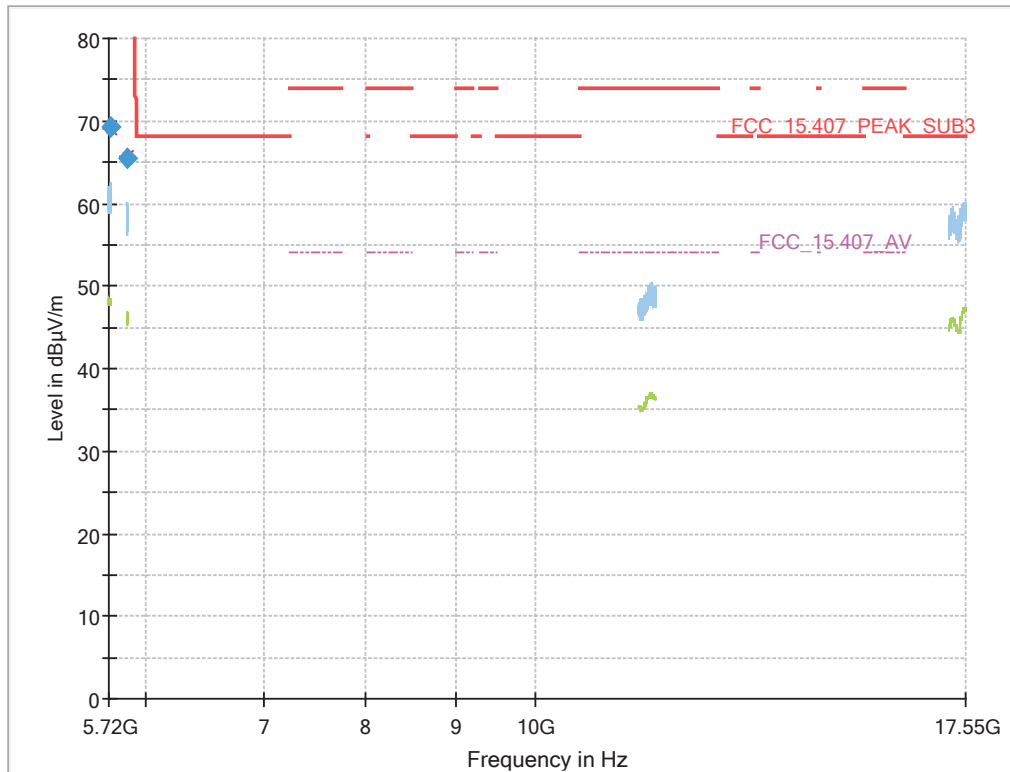
Radio Technology = WLAN ac 80 MHz, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5459.680	65.4	---	74.00	8.57	1000.0	1000.000	150.0	H	-52.0	86.0	14.0
5459.800	---	51.1	54.00	2.89	1000.0	1000.000	150.0	V	132.0	15.0	14.0
5469.760	66.9	---	68.20	1.28	1000.0	1000.000	150.0	V	132.0	15.0	14.0

Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5723.800	69.3	---	119.4	50.20	1000.0	1000.000	150.0	H	-129.0	96.0	14.1
5850.700	65.6	---	120.6	55.03	1000.0	1000.000	150.0	V	101.0	-6.0	14.7

5.8.5 TEST EQUIPMENT USED

- Radiated Emissions

5.9 BAND EDGE

Standard **FCC Part 15 Subpart E**

The test was performed according to:
ANSI C63.10

5.9.1 TEST DESCRIPTION

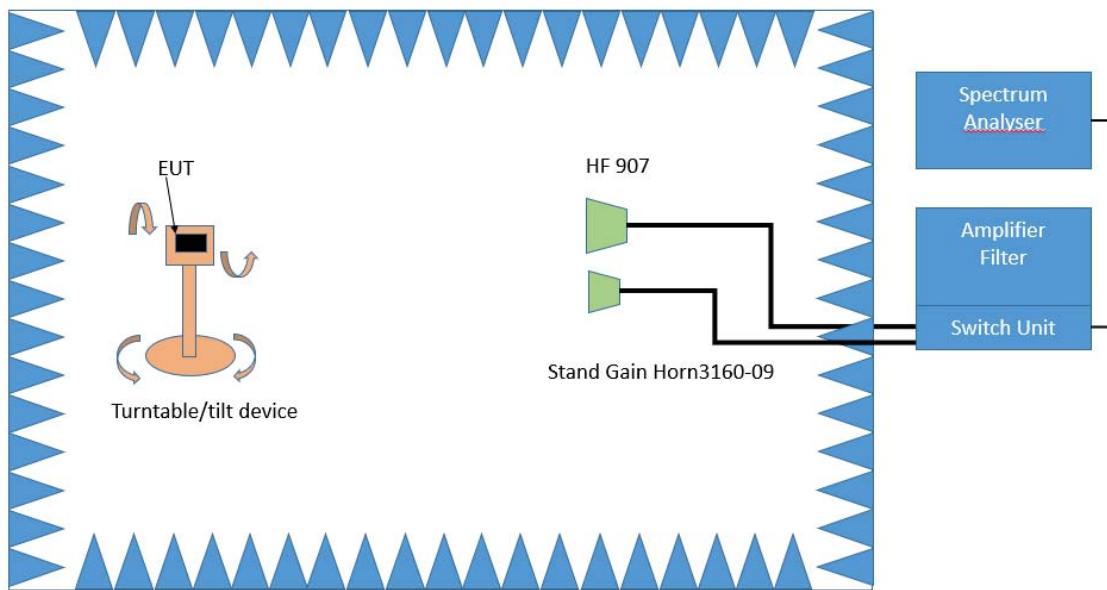
The test set-up was made in accordance to the general provisions of ANSI C63.10 in a typical installation configuration. The measurements were performed according the following sub-chapter of ANSI C63.10:

- Chapter 6.10.5

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in the fully-anechoic chamber.

All steps were performed with one height (1.5 m) of the receiving antenna only (procedure according ANSI C63.10, chapter 6.6.5).

3. Measurement above 1 GHz



Test Setup; Spurious Emission Radiated (FAC), 1 GHz-26.5 GHz

Step 1:

The EUT is turned during the preliminary measurement across the elevation axis, with a step size of 90 °.

The turn table step size (azimuth angle) for the preliminary measurement is 45 °.

Spectrum analyser settings:

- Detector: Peak, Average
- RBW = 1 MHz
- VBW = 3 MHz

Step 2:

The turn table azimuth will slowly vary by $\pm 22.5^\circ$.

The elevation angle will slowly vary by $\pm 45^\circ$

Spectrum analyser settings:
- Detector: Peak

Step 3:

Spectrum analyser settings for step 3:
- Detector: Peak / CISPR Average
- Measured frequencies: in step 1 determined frequencies
- RBW = 1 MHz
- VBW = 3 MHz
- Measuring time: 1 s

5.9.2 TEST REQUIREMENTS / LIMITS

For band edges connected to a restricted band, the limits are specified in Section 15.209(a)

FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limits (dBµV/m)
0.009 – 0.49	2400/F(kHz)@300m	3	(48.5 – 13.8)@300m
0.49 – 1.705	24000/F(kHz)@30m	3	(33.8 – 23.0)@30m
1.705 – 30	30@30m	3	29.5@30m

The measured values are corrected with an inverse linear distance extrapolation factor (40 dB/decade) according FCC 15.31 (2).

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limits (dBµV/m)
30 – 88	100@3m	3	40.0@3m
88 – 216	150@3m	3	43.5@3m
216 – 960	200@3m	3	46.0@3m
960 – 26000	500@3m	3	54.0@3m
26000 – 40000	500@3m	1	54.0@3m

The measured values above 26 GHz are corrected with an inverse linear distance extrapolation factor (20 dB/decade).

§15.35(b) ..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

Used conversion factor: $\text{Limit (dBµV/m)} = 20 \log (\text{Limit (µV/m)}/1\mu\text{V/m})$

In addition, for ISED:

For band 5150 – 5250 MHz:

Any unwanted emissions that fall into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB.

5.9.3 TEST PROTOCOL

Ambient temperature: 23–26 °C
 Air Pressure: 1002–1024 hPa
 Humidity: 32–44 %
 WLAN a-Mode; 20 MHz; x Mbit/s
 Applied duty cycle correction (AV): 0 dB

U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Band Edge Freq. [MHz]	Spurious Level [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type	FCC /IC?
1	36	5180	5150.0	64.6	PEAK	1000	74.0	9.4	BE-RB	FCC&IC
	36	5180	5150.0	44.3	AV	1000	54.0	9.7	BE-RB	FCC&IC
2A	64	5320	5350.0	61.3	PEAK	1000	74.0	12.7	BE-RB	FCC&IC
	64	5320	5350.0	45.4	AV	1000	54.0	8.6	BE-RB	FCC&IC
2C	100	5500	5460.0	60.3	PEAK	1000	74.0	13.7	BE-RB	FCC&IC
	100	5500	5460.0	44.2	AV	1000	54.0	9.8	BE-RB	FCC&IC
	100	5500	5470.0	64.7	PEAK	1000	68.2	3.5	BE-UE	FCC&IC
	140	5700	5725.0	62.5	PEAK	1000	68.2	5.7	BE-UE	FCC&IC
3	149	5745	5725.0	73.4	PEAK	1000	121.3	47.9	BE-UE	FCC&IC
	165	5825	5850.0	68.1	PEAK	1000	121.3	53.2	BE-UE	FCC&IC

WLAN n-Mode; 20 MHz; x Mbit/s MCSx; SISO
 Applied duty cycle correction (AV): 0 dB

U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Band Edge Freq. [MHz]	Spurious Level [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type	FCC /IC?
1	36	5180	5150.0	66.0	PEAK	1000	74.0	8.0	BE-RB	FCC&IC
	36	5180	5150.0	46.0	AV	1000	54.0	8.0	BE-RB	FCC&IC
2A	64	5320	5350.0	62.7	PEAK	1000	74.0	11.3	BE-RB	FCC&IC
	64	5320	5350.0	45.7	AV	1000	54.0	8.3	BE-RB	FCC&IC
2C	100	5500	5460.0	61.6	PEAK	1000	74.0	12.4	BE-RB	FCC&IC
	100	5500	5460.0	44.4	AV	1000	54.0	9.6	BE-RB	FCC&IC
	100	5500	5470.0	64.7	PEAK	1000	68.2	3.5	BE-UE	FCC&IC
	140	5700	5725.0	65.5	PEAK	1000	68.2	2.7	BE-UE	FCC&IC
3	149	5745	5725.0	71.5	PEAK	1000	121.3	49.8	BE-UE	FCC&IC
	165	5825	5850.0	70.2	PEAK	1000	121.3	51.1	BE-UE	FCC&IC

WLAN n-Mode; 40 MHz; x Mbit/s MCSx; SISO
 Applied duty cycle correction (AV): 0 dB

U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Band Edge Freq. [MHz]	Spurious Level [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type	FCC /IC?
1	38	5190	5150.0	71.1	PEAK	1000	74.0	2.9	BE-RB	FCC&IC
	38	5190	5150.0	50.7	AV	1000	54.0	3.3	BE-RB	FCC&IC
2A	62	5310	5350.0	65.8	PEAK	1000	74.0	8.2	BE-RB	FCC&IC
	62	5310	5350.0	48.2	AV	1000	54.0	5.8	BE-RB	FCC&IC
2C	102	5510	5460.0	60.4	PEAK	1000	74.0	13.6	BE-RB	FCC&IC
	102	5510	5460.0	45.5	AV	1000	54.0	8.5	BE-RB	FCC&IC
	102	5510	5470.0	68.1	PEAK	1000	68.2	0.1	BE-UE	FCC&IC
	134	5670	5725.0	60.7	PEAK	1000	68.2	7.5	BE-UE	FCC&IC
3	151	5755	5725.0	74.6	PEAK	1000	121.3	46.7	BE-UE	FCC&IC
	159	5795	5850.0	97.8	PEAK	1000	121.3	23.5	BE-UE	FCC&IC

WLAN ac-Mode; 20 MHz; x Mbit/s MCSx; SISO
Applied duty cycle correction (AV): 0 dB

U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Band Edge Freq. [MHz]	Spurious Level [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type	FCC /IC?
1	36	5180	5150.0	66.0	PEAK	1000	74.0	8.0	BE-RB	FCC&IC
	36	5180	5150.0	45.7	AV	1000	54.0	8.3	BE-RB	FCC&IC
2A	64	5320	5350.0	62.1	PEAK	1000	74.0	11.9	BE-RB	FCC&IC
	64	5320	5350.0	45.0	AV	1000	54.0	9.0	BE-RB	FCC&IC
2C	100	5500	5460.0	61.3	PEAK	1000	74.0	12.7	BE-RB	FCC&IC
	100	5500	5460.0	44.3	AV	1000	54.0	9.7	BE-RB	FCC&IC
	100	5500	5470.0	65.0	PEAK	1000	68.2	3.2	BE-UE	FCC&IC
	140	5700	5725.0	65.4	PEAK	1000	68.2	2.8	BE-UE	FCC&IC
3	149	5745	5725.0	71.2	PEAK	1000	121.3	50.1	BE-UE	FCC&IC
	165	5825	5850.0	69.1	PEAK	1000	121.3	52.2	BE-UE	FCC&IC

WLAN ac-Mode; 40 MHz; x Mbit/s MCSx; SISO
Applied duty cycle correction (AV): 0 dB

U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Band Edge Freq. [MHz]	Spurious Level [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type	FCC /IC?
1	38	5190	5150.0	71.0	PEAK	1000	74.0	3.0	BE-RB	FCC&IC
	38	5190	5150.0	51.1	AV	1000	54.0	2.9	BE-RB	FCC&IC
2A	62	5310	5350.0	67.2	PEAK	1000	74.0	6.8	BE-RB	FCC&IC
	62	5310	5350.0	47.5	AV	1000	54.0	6.5	BE-RB	FCC&IC
2C	102	5510	5460.0	61.9	PEAK	1000	74.0	12.1	BE-RB	FCC&IC
	102	5510	5460.0	45.5	AV	1000	54.0	8.5	BE-RB	FCC&IC
	102	5510	5470.0	67.0	PEAK	1000	68.2	1.2	BE-UE	FCC&IC
	134	5670	5725.0	60.3	PEAK	1000	68.2	7.9	BE-UE	FCC&IC
3	151	5755	5725.0	71.9	PEAK	1000	121.3	49.4	BE-UE	FCC&IC
	159	5795	5850.0	66.2	PEAK	1000	122.2	56.0	BE-UE	FCC&IC

WLAN ac-Mode; 80 MHz; x Mbit/s MCSx; SISO
Applied duty cycle correction (AV): 0 dB

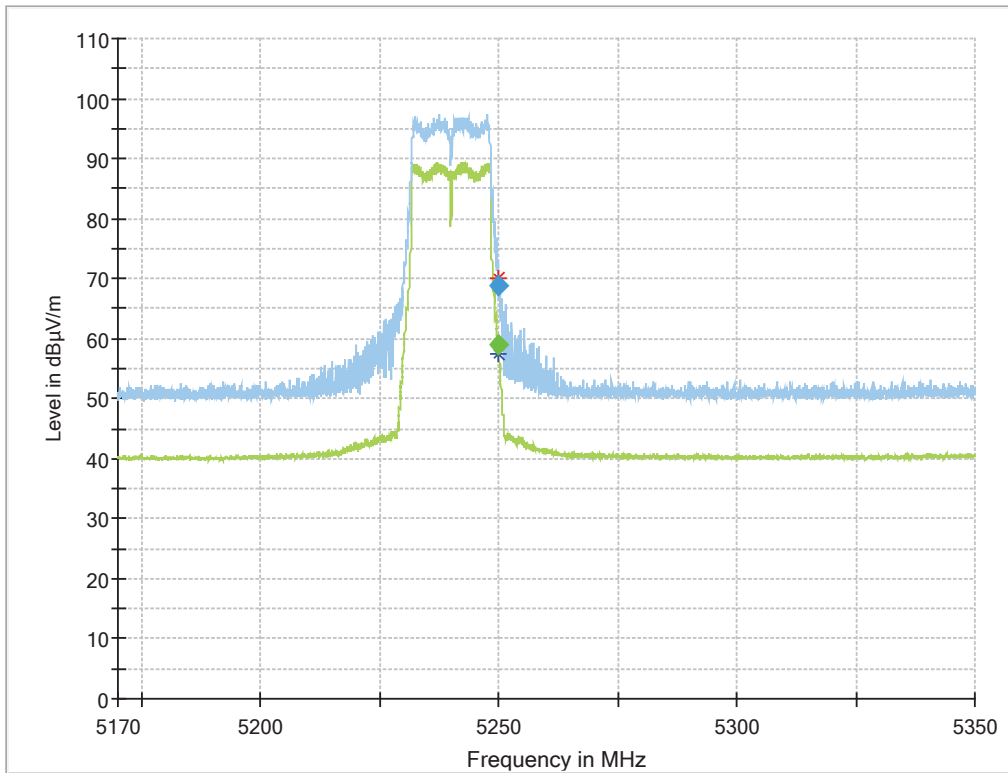
U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Band Edge Freq. [MHz]	Spurious Level [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type	FCC /IC?
1	42	5210	5150.0	68.6	PEAK	1000	74.0	5.4	BE-RB	FCC&IC
	42	5210	5150.0	53.8	AV	1000	54.0	0.2	BE-RB	FCC&IC
2A	58	5290	5350.0	63.7	PEAK	1000	74.0	10.3	BE-RB	FCC&IC
	58	5290	5350.0	49.0	AV	1000	54.0	5.0	BE-RB	FCC&IC
2C	106	5530	5460.0	65.4	PEAK	1000	74.0	8.6	BE-RB	FCC&IC
	106	5530	5460.0	51.1	AV	1000	54.0	2.9	BE-RB	FCC&IC
	106	5530	5470.0	66.9	PEAK	1000	68.2	1.3	BE-UE	FCC&IC
	122	5610	5725.0	58.3	PEAK	1000	68.2	9.9	BE-UE	FCC&IC
3	155	5775	5725.0	69.3	PEAK	1000	121.3	52.0	BE-UE	FCC&IC
	155	5775	5850.0	65.6	PEAK	1000	121.3	55.7	BE-UE	FCC&IC

Mode	U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Unwanted Emissions in Band 2A attenuated more than 26 dB below channel power?
WLAN a	1	48	5240	Yes
WLAN n 20 MHz	1	48	5240	Yes
WLAN n 40 MHz	1	46	5230	Yes
WLAN ac 20 MHz	1	48	5240	Yes
WLAN ac 40 MHz	1	46	5230	Yes
WLAN ac 80 MHz	1	42	5210	Yes

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

5.9.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-1 (S01_AC01)

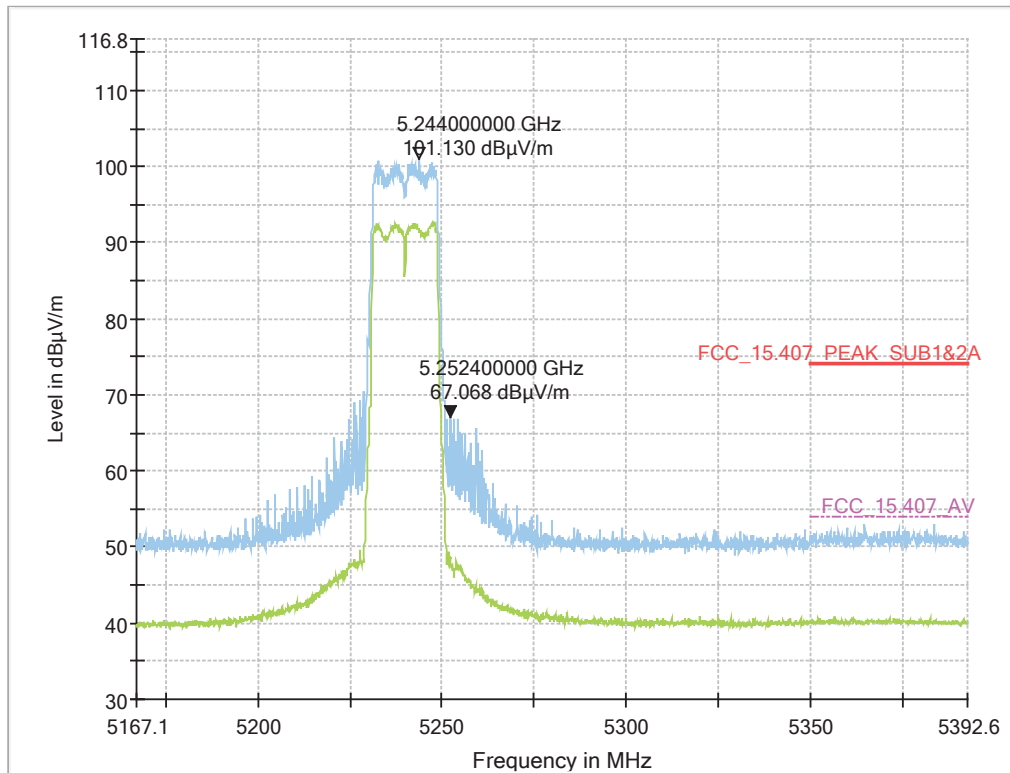


Final_Result

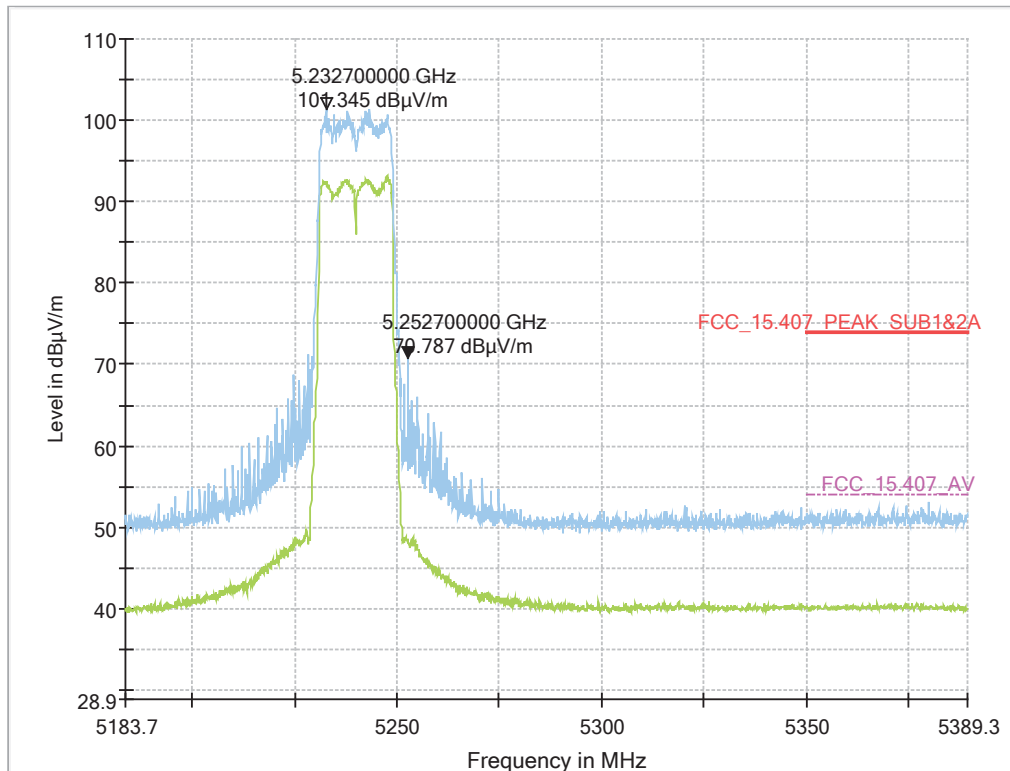
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5250.040	---	58.9	---	---	1000.0	200.000	150.0	H	79.0	78.0	13.3
5250.040	68.7	---	---	---	1000.0	200.000	150.0	H	94.0	102.0	13.3

Remark: Markers are set to 26 dB below channel power.

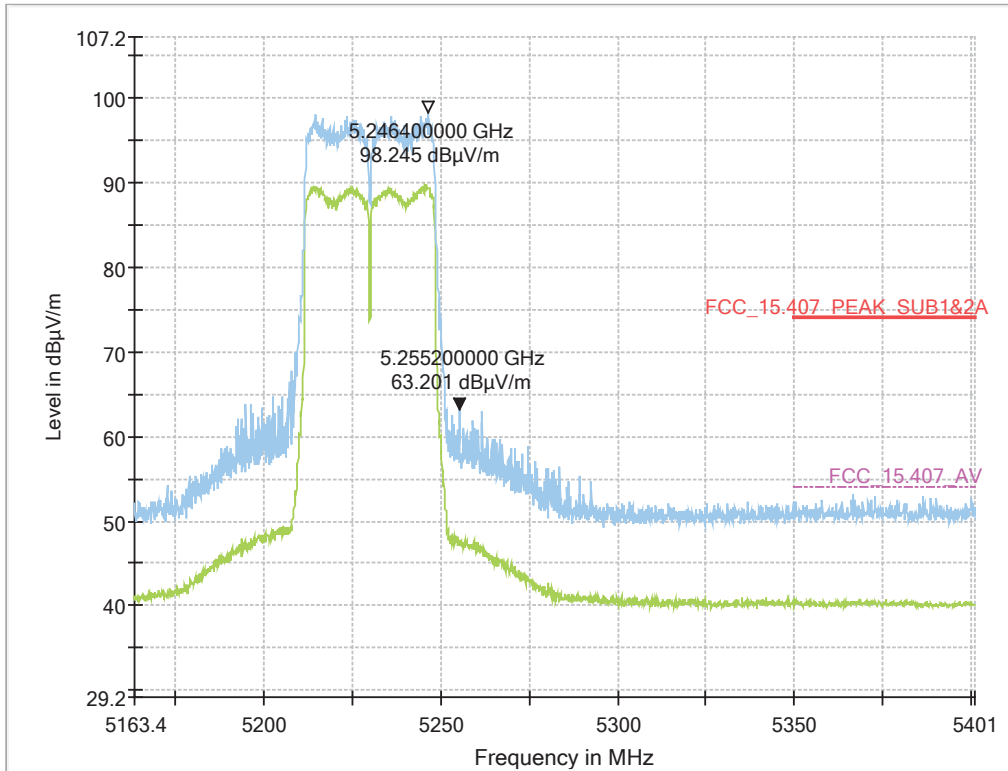
Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-1
(S01_AK01)



Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Subband = U-NII-1
(S01_AK01)



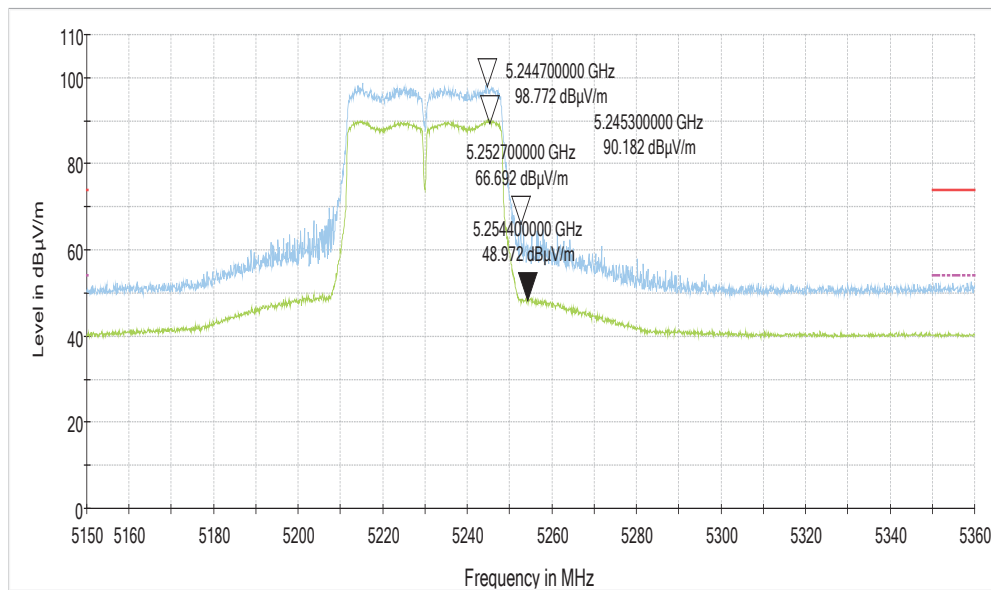
Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-1 (S01_AK01)



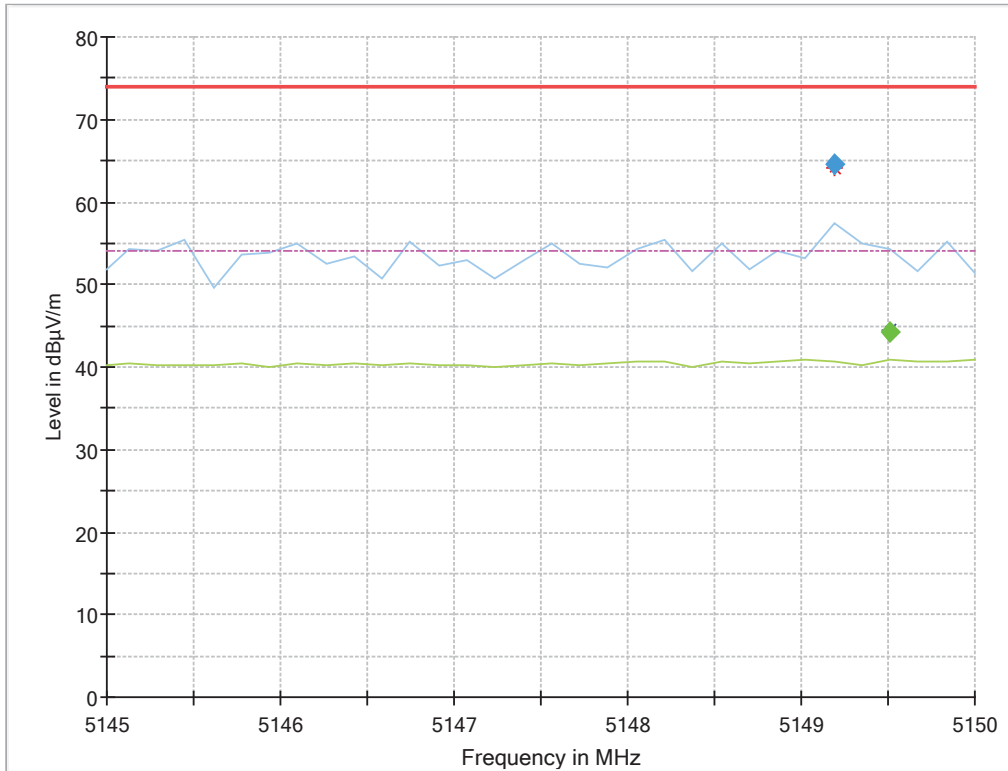
Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---	---	---	---	---

Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Subband = U-NII-1
(S01_AK01)



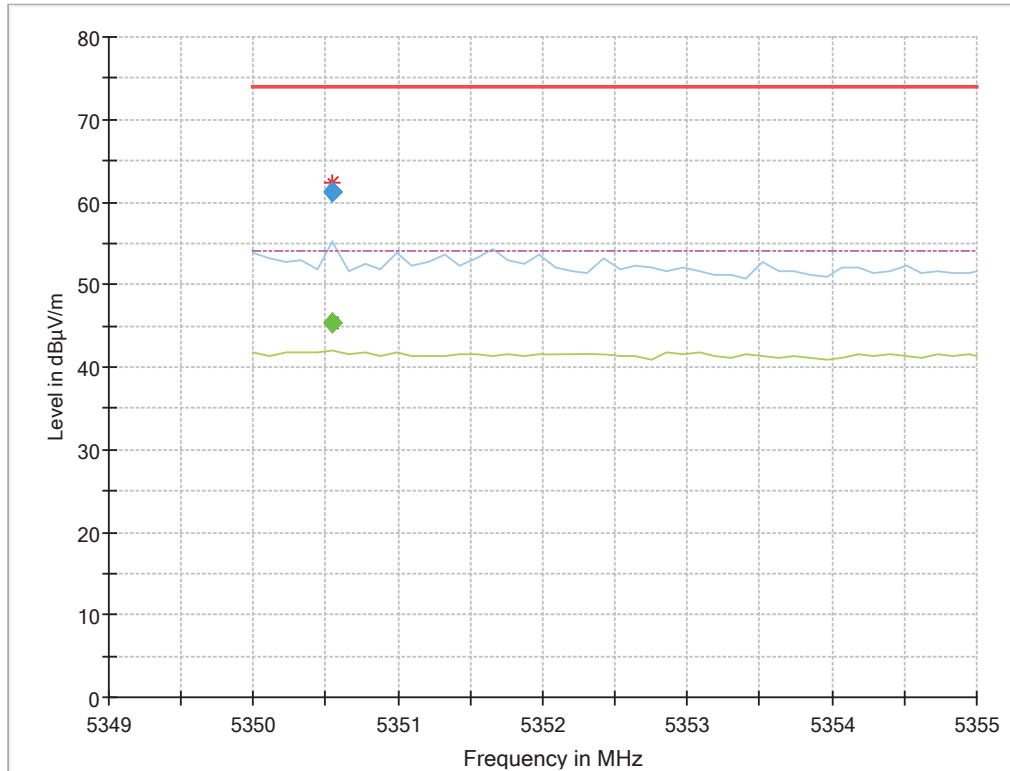
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-1
(S01_AC01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5149.188	64.6	---	74.00	9.36	1000.0	1000.000	150.0	H	83.0	78.0	13.2
5149.513	---	44.3	54.00	9.68	1000.0	1000.000	150.0	V	-89.0	-2.0	13.2

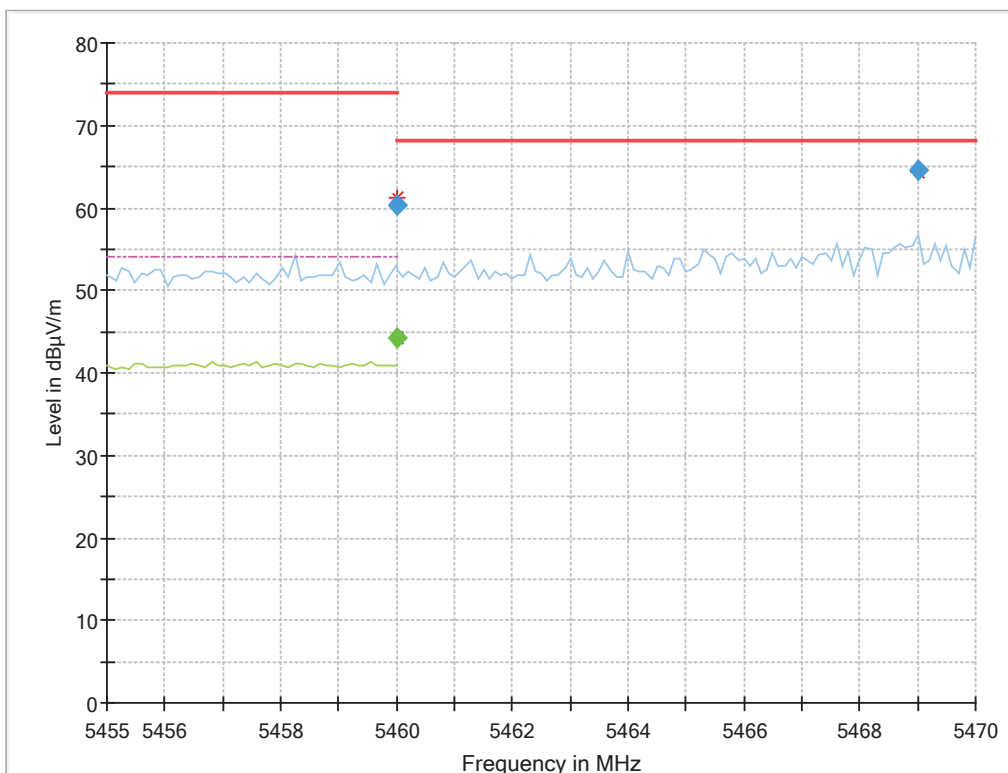
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2A (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5350.550	---	45.4	54.00	8.58	1000.0	1000.000	150.0	H	-53.0	105.0	13.9
5350.550	61.3	---	74.00	12.67	1000.0	1000.000	150.0	H	84.0	94.0	13.9

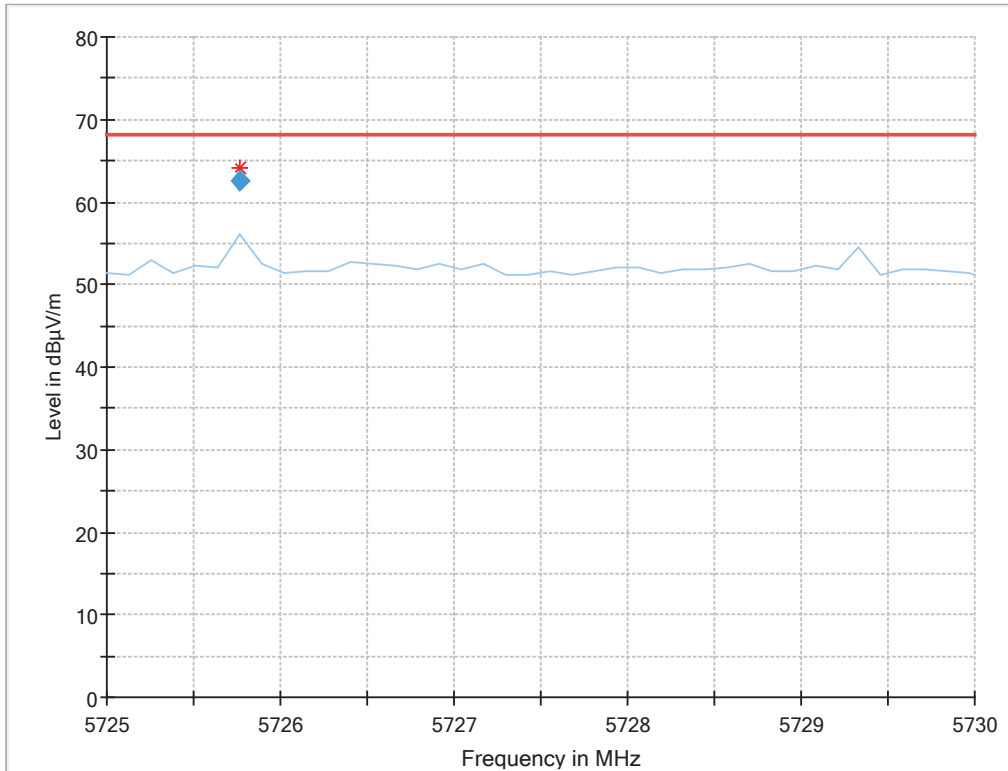
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5460.000	---	44.2	54.00	9.77	1000.0	1000.000	150.0	V	79.0	-2.0	14.1
5460.000	60.3	---	74.00	13.72	1000.0	1000.000	150.0	H	90.0	105.0	14.1
5469.000	64.7	---	68.20	3.53	1000.0	1000.000	150.0	V	79.0	15.0	14.0

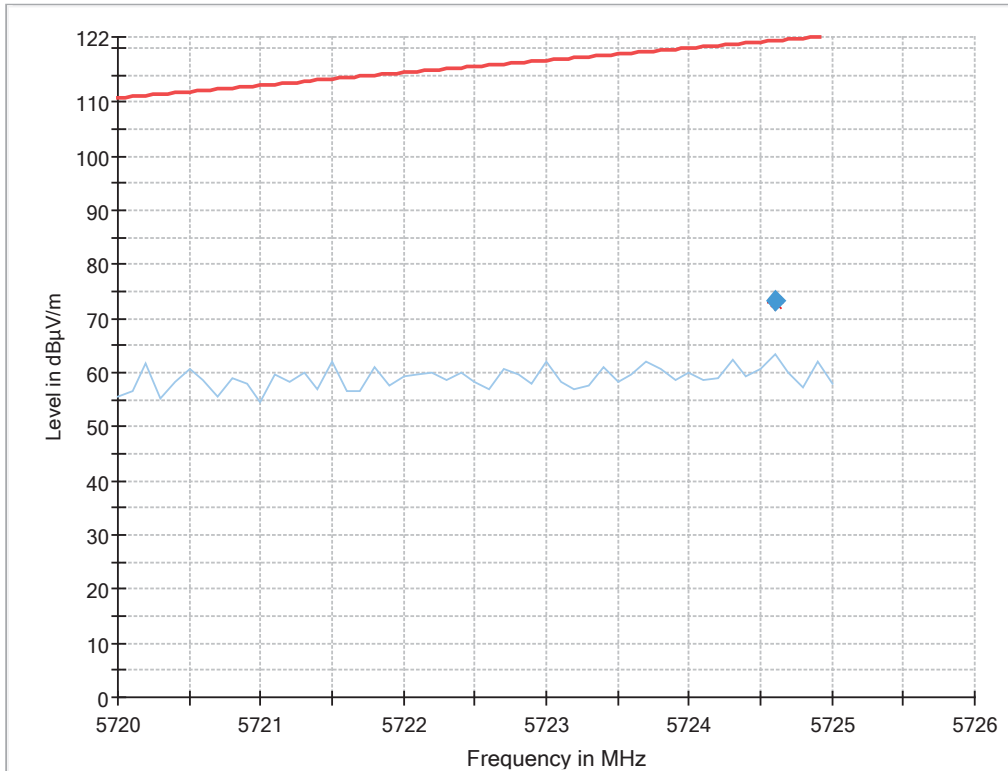
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5725.765	62.5	---	68.20	5.73	1000.0	1000.000	150.0	V	-2.0	14.0	14.1

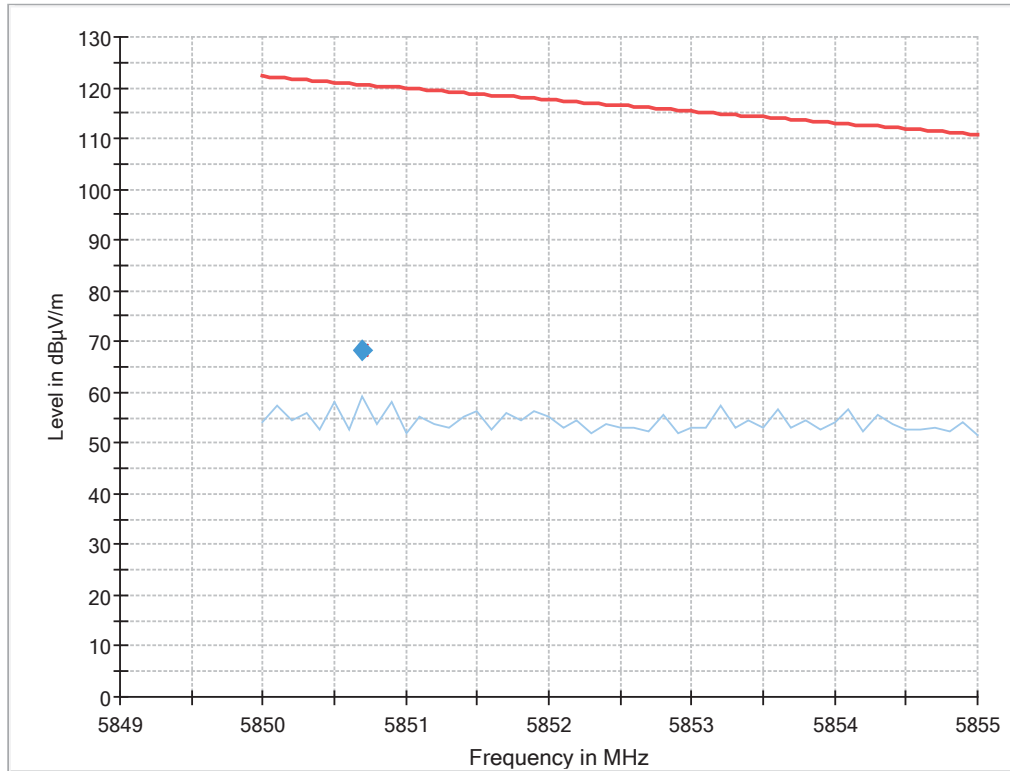
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5724.600	73.4	---	121.2	47.87	1000.0	1000.000	150.0	H	-53.0	98.0	14.1

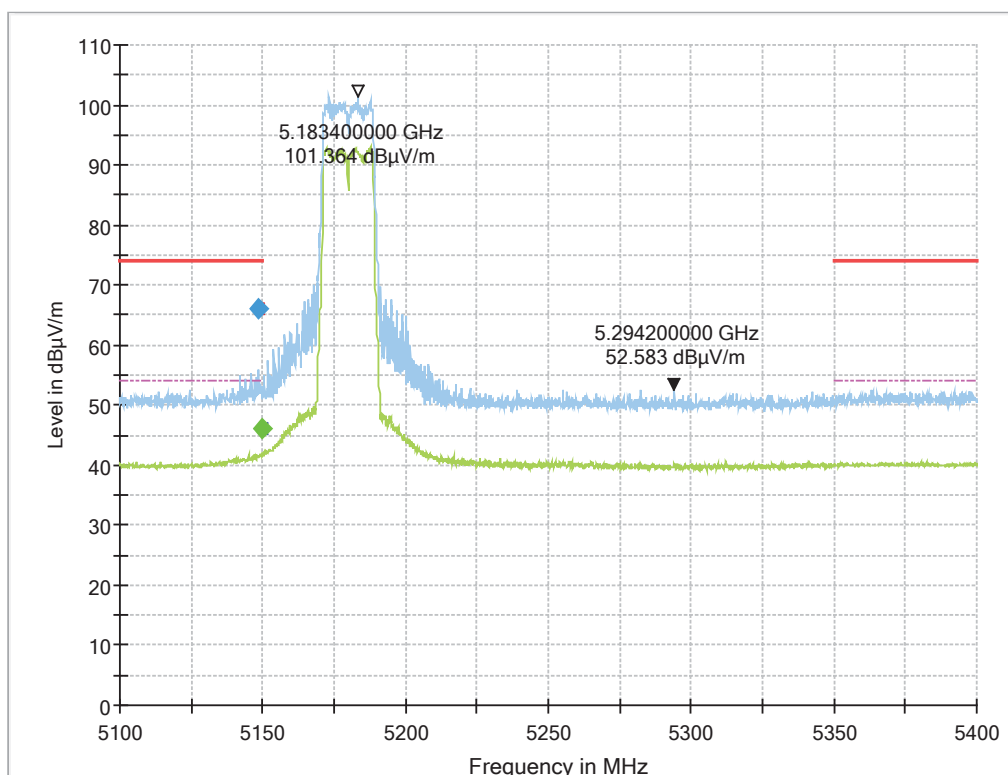
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3
(S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5850.700	68.1	---	120.6	52.49	1000.0	1000.000	150.0	H	-51.0	105.0	14.7

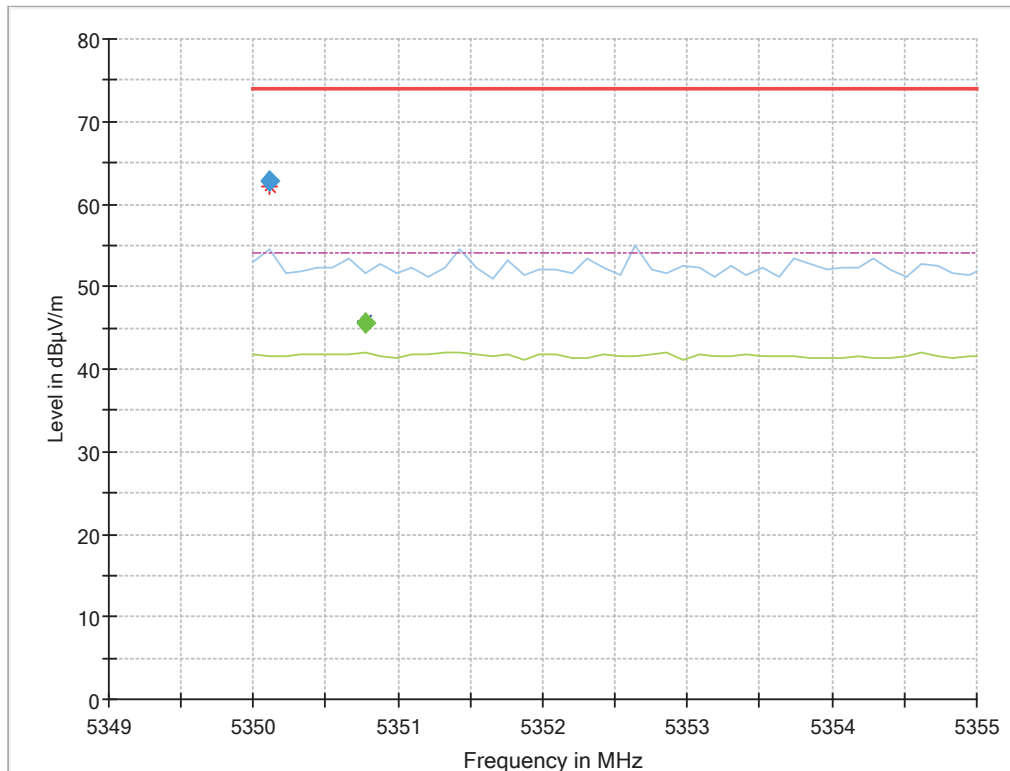
Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-1
(S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5148.375	66.0	---	74.00	7.96	1000.0	1000.000	150.0	H	-43.0	79.0	13.2
5150.000	---	46.0	---	---	1000.0	1000.000	150.0	H	-51.0	86.0	13.2

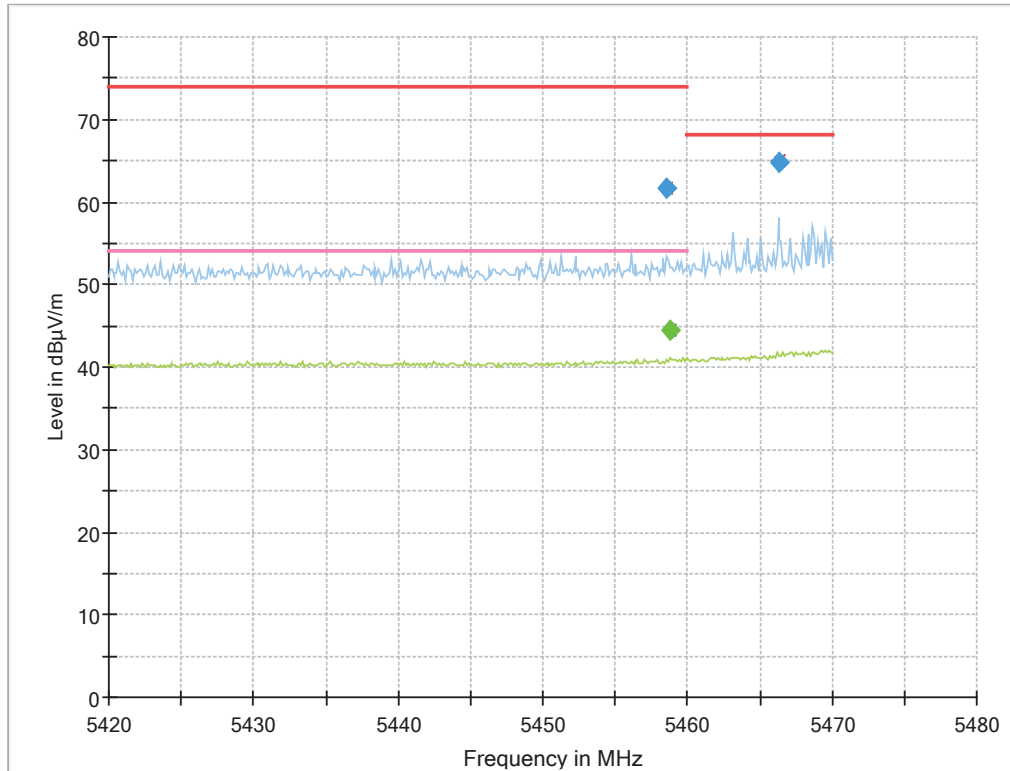
Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-2A (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5350.110	62.7	---	74.00	11.32	1000.0	1000.000	150.0	H	-79.0	75.0	13.9
5350.770	---	45.7	54.00	8.31	1000.0	1000.000	150.0	H	-52.0	85.0	13.9

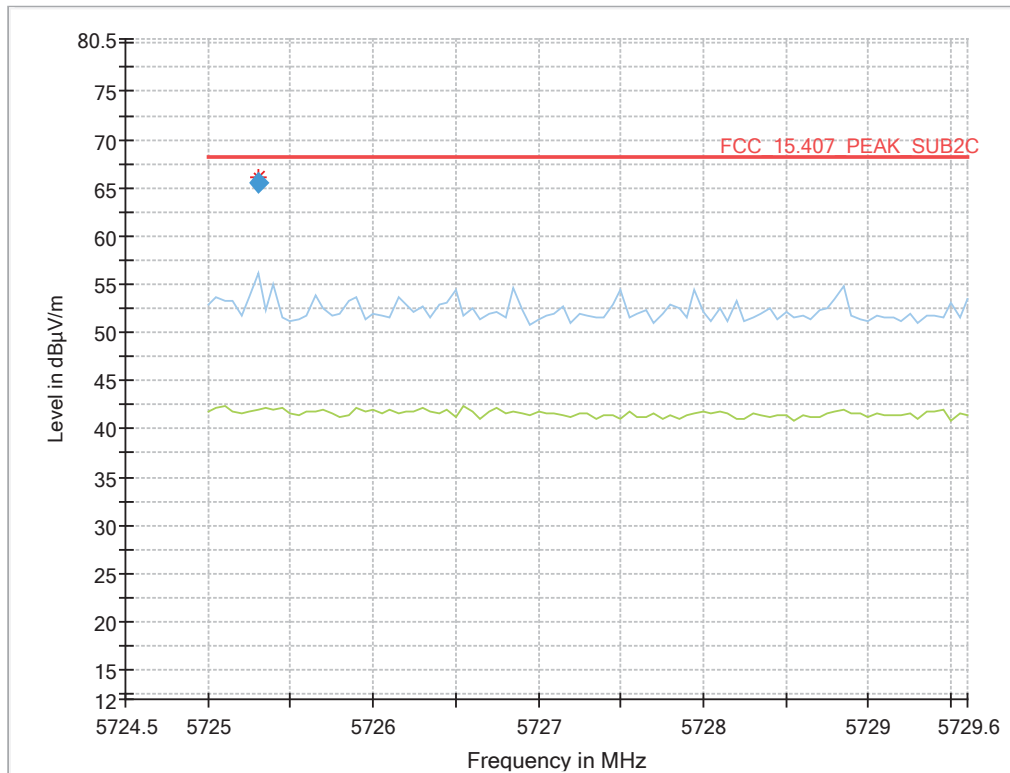
Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5458.600	61.6	---	74.00	12.41	1000.0	1000.000	150.0	H	87.0	78.0	14.0
5458.840	---	44.4	54.00	9.64	1000.0	1000.000	150.0	H	-53.0	79.0	14.0
5466.280	64.7	---	68.20	3.47	1000.0	1000.000	150.0	H	-54.0	75.0	14.0

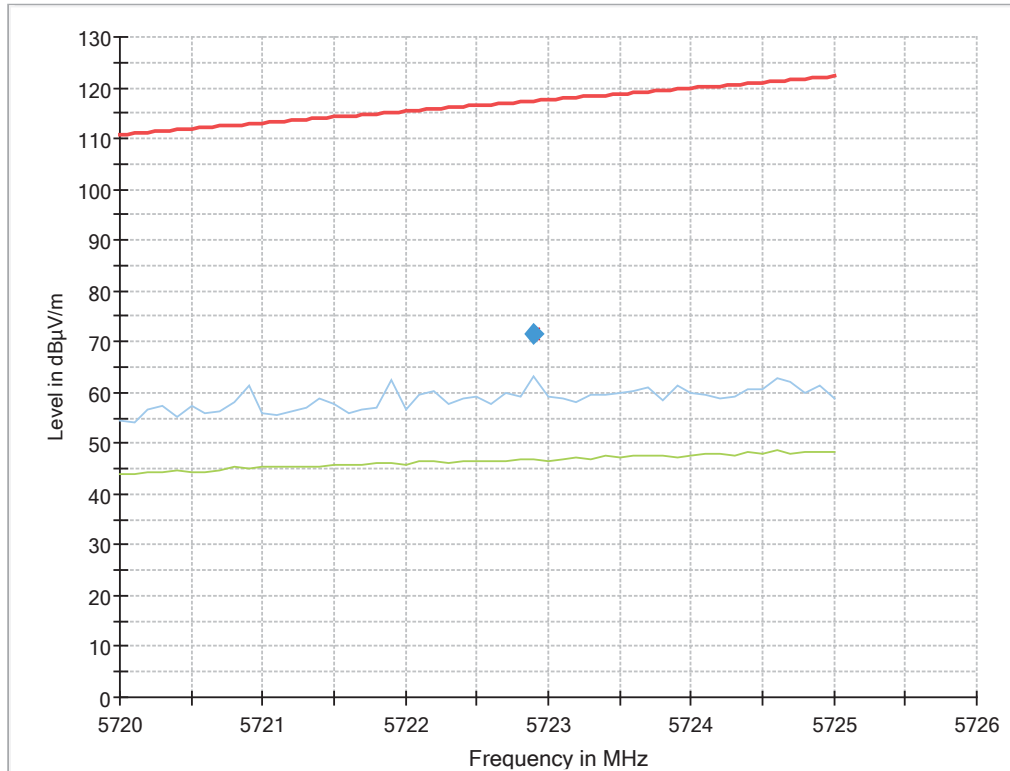
Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5725.300	65.5	---	68.20	2.72	1000.0	1000.000	150.0	H	-56.0	79.0	14.1

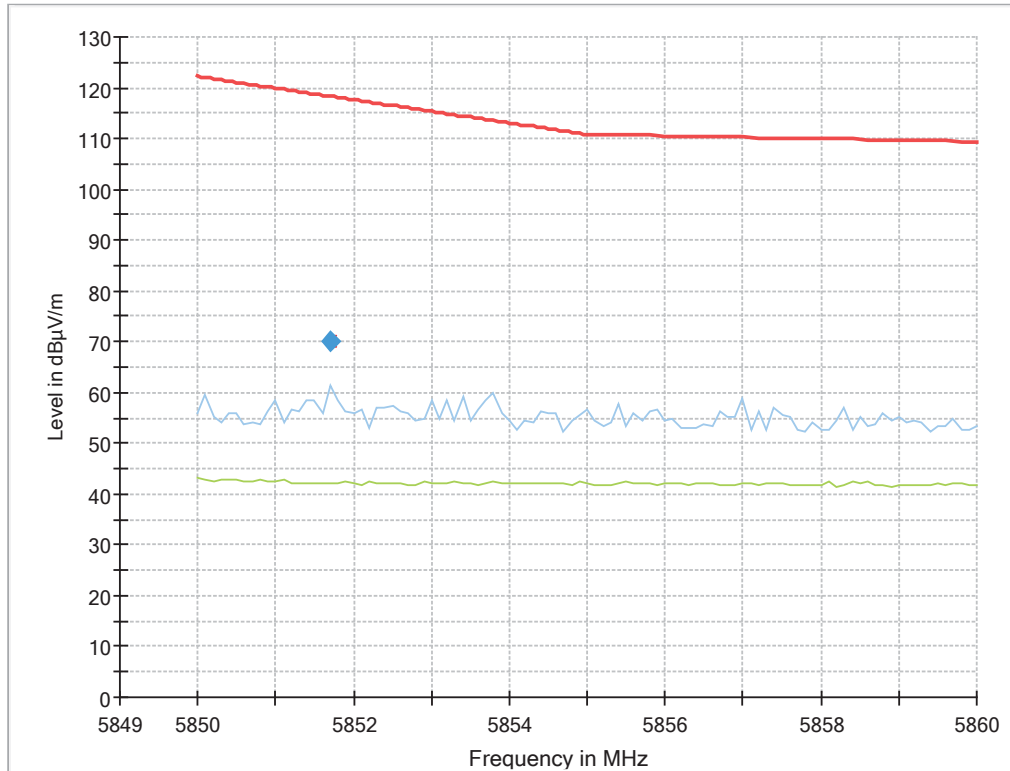
Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5722.900	71.5	---	117.4	45.91	1000.0	1000.000	150.0	H	-53.0	92.0	14.1

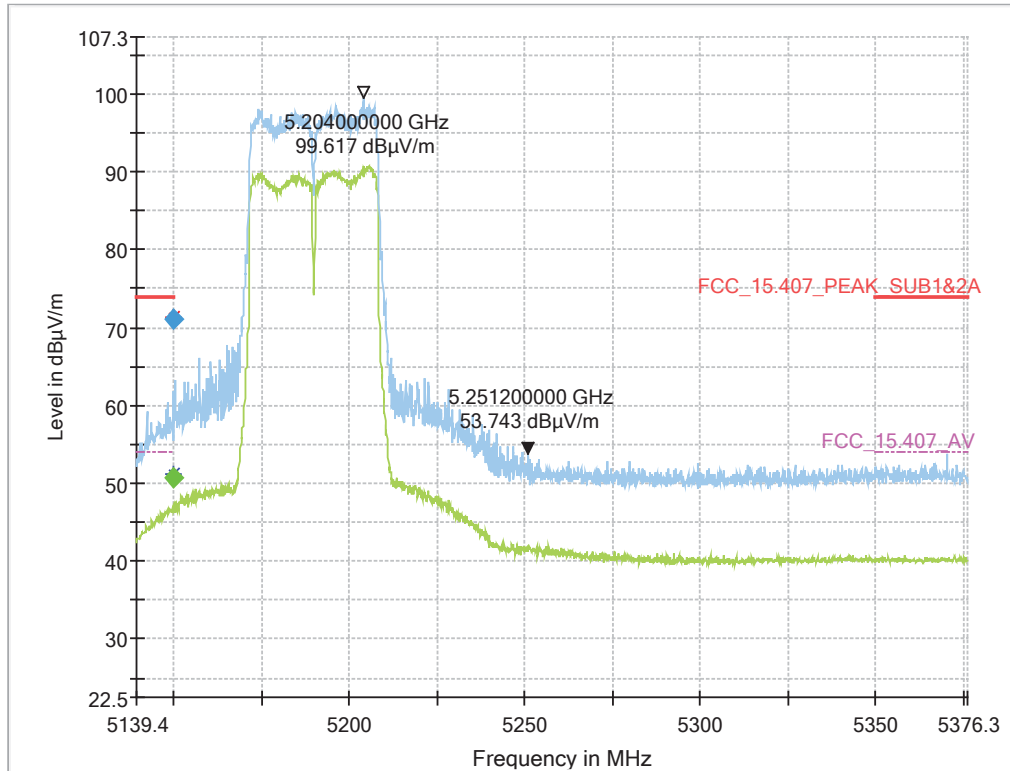
Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5851.700	70.2	---	118.3	48.16	1000.0	1000.000	150.0	H	-55.0	75.0	14.7

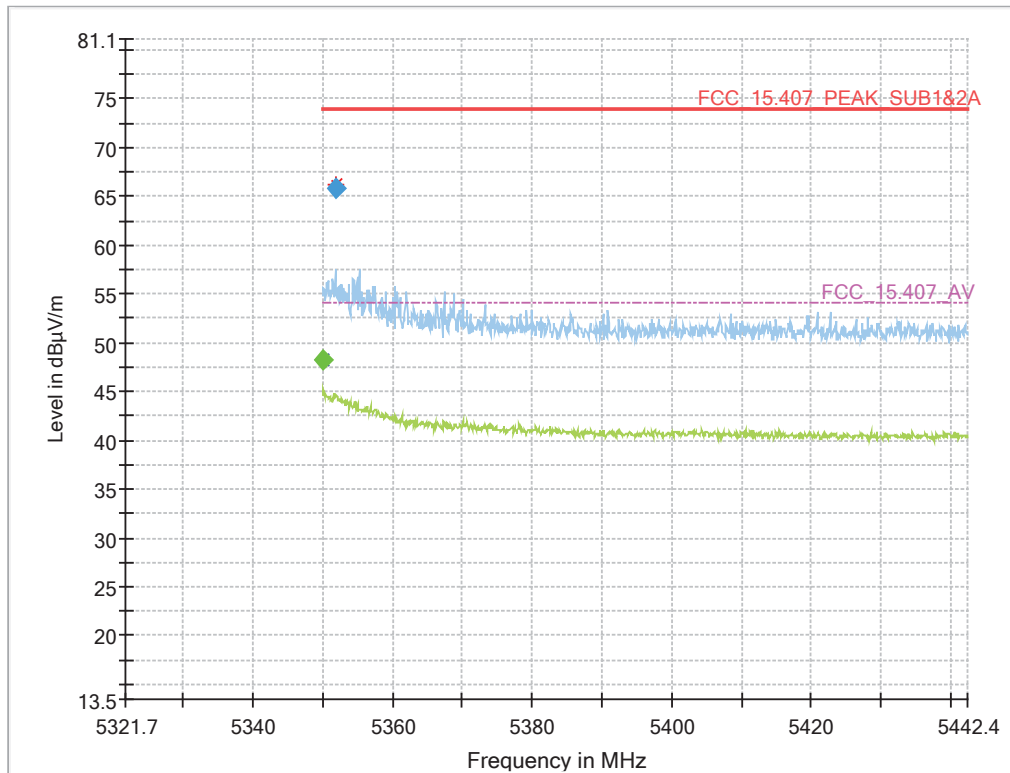
Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5149.838	---	50.7	54.00	3.27	1000.0	1000.000	150.0	H	-51.0	78.0	13.2
5149.838	71.1	---	74.00	2.88	1000.0	1000.000	150.0	H	-49.0	82.0	13.2

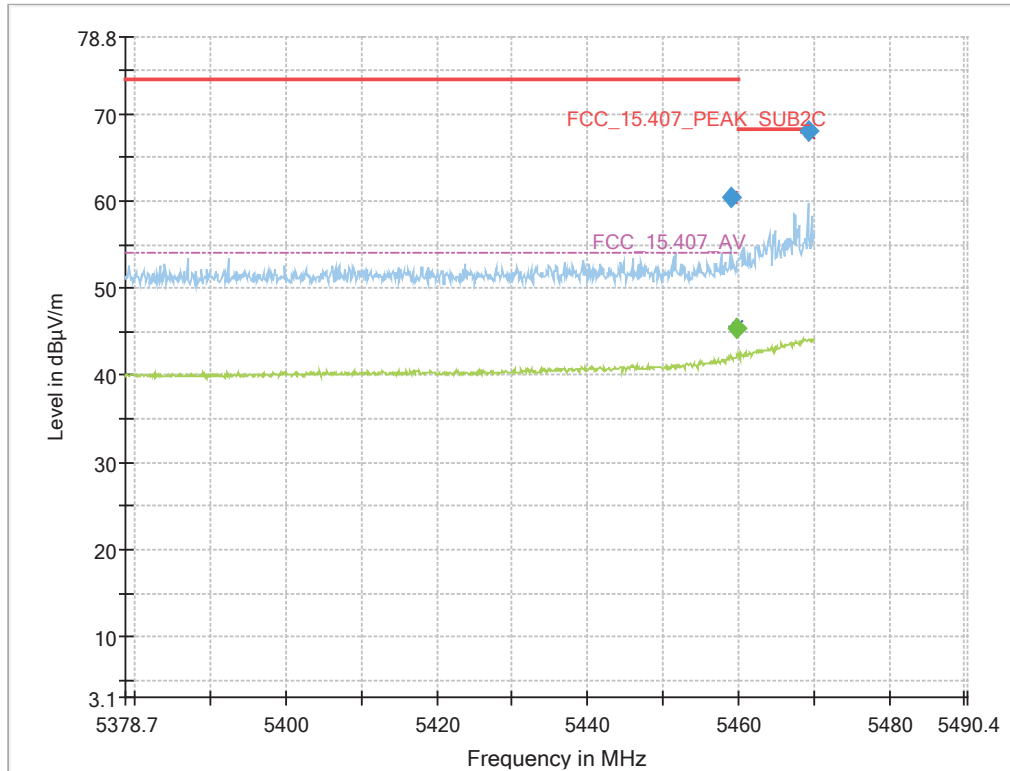
Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-2A (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5350.110	---	48.2	54.00	5.85	1000.0	1000.000	150.0	H	88.0	78.0	13.9
5351.760	65.8	---	74.00	8.18	1000.0	1000.000	150.0	H	92.0	86.0	13.9

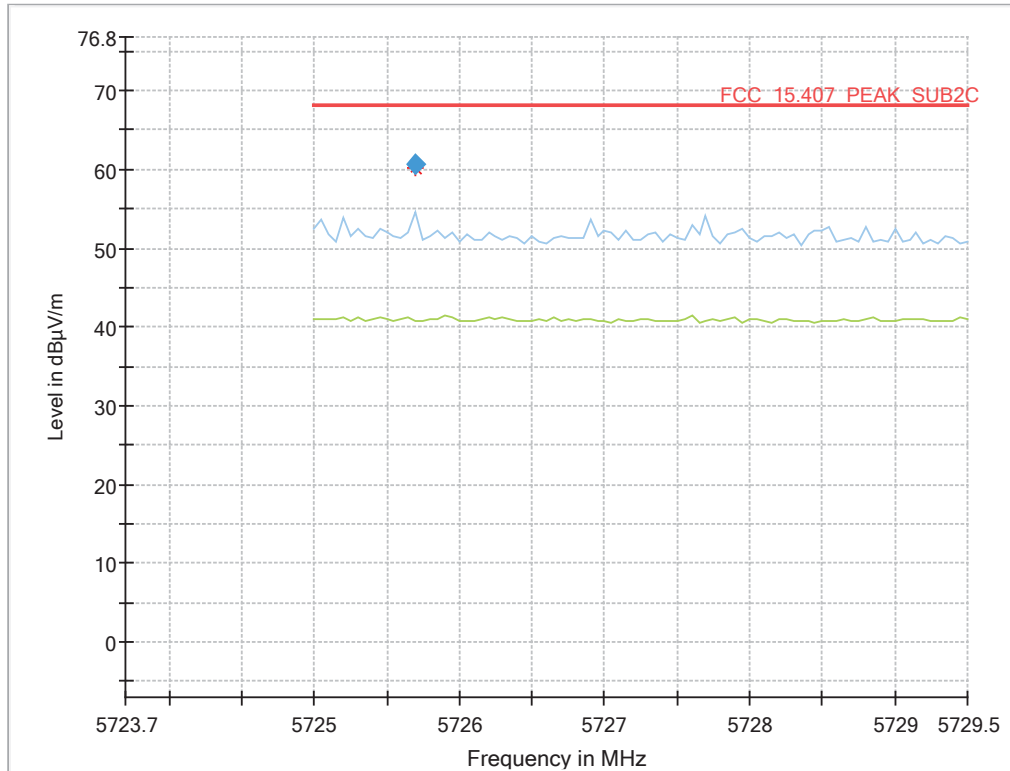
Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5458.960	60.4	---	74.00	13.65	1000.0	1000.000	150.0	V	54.0	-1.0	14.0
5459.800	---	45.5	54.00	8.52	1000.0	1000.000	150.0	V	88.0	-4.0	14.0
5469.280	68.1	---	68.20	0.11	1000.0	1000.000	150.0	V	87.0	-6.0	14.0

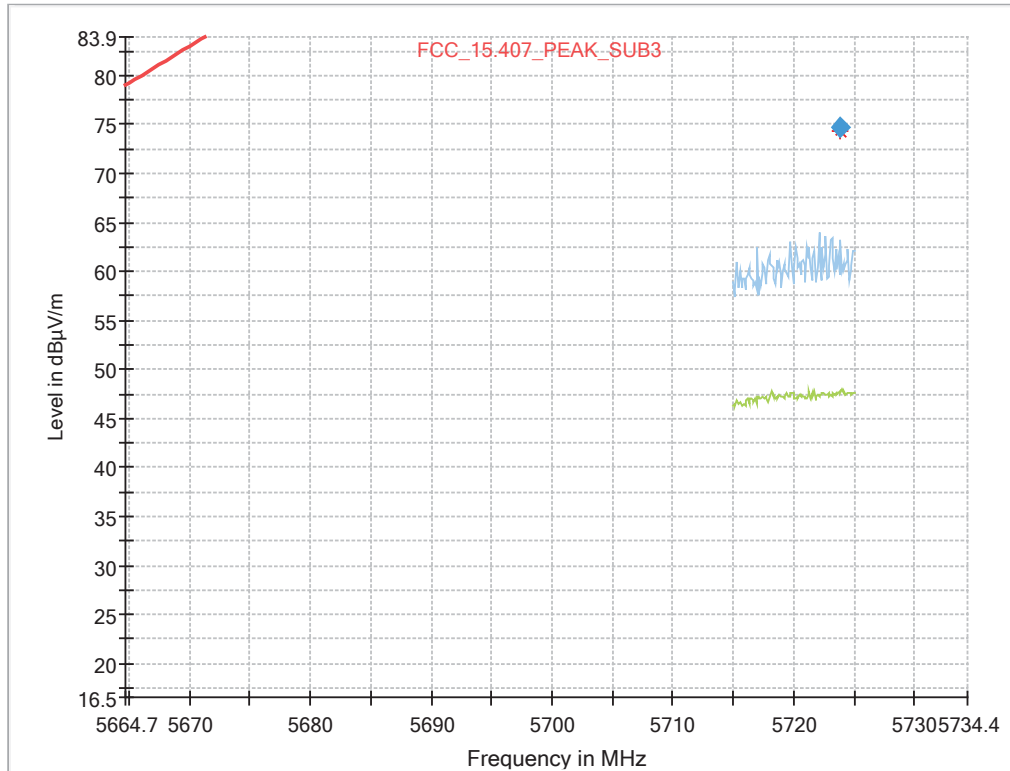
Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5725.700	60.7	---	68.20	7.54	1000.0	1000.000	150.0	V	46.0	-6.0	14.1

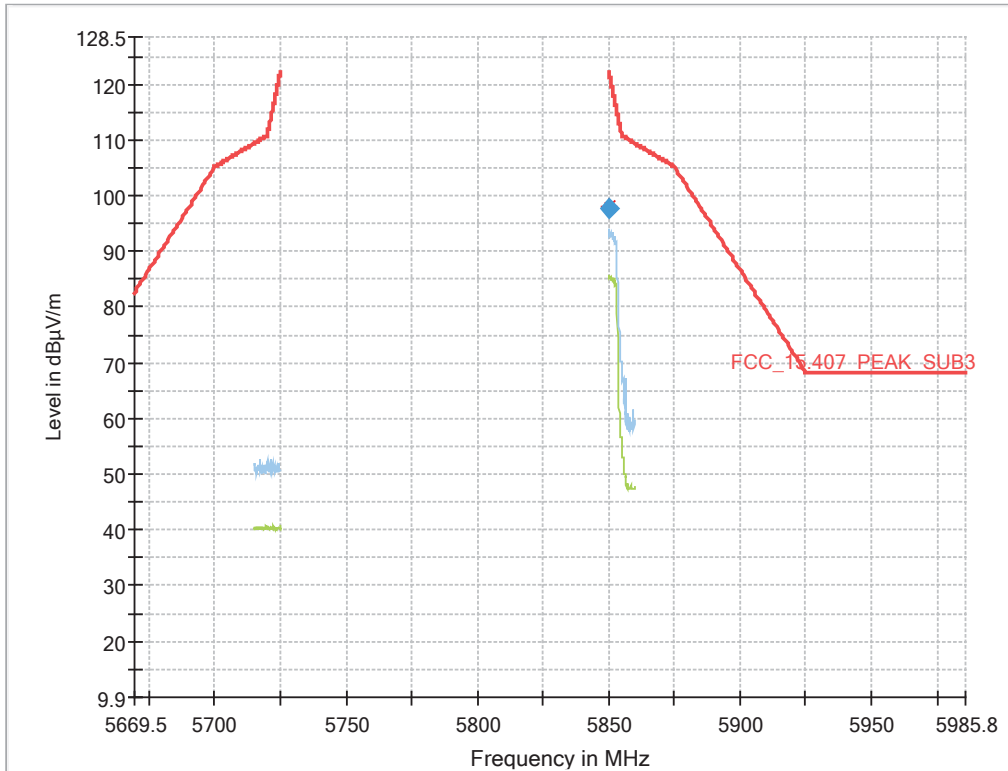
Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5723.900	74.6	---	119.6	45.05	1000.0	1000.000	150.0	H	-53.0	93.0	14.1

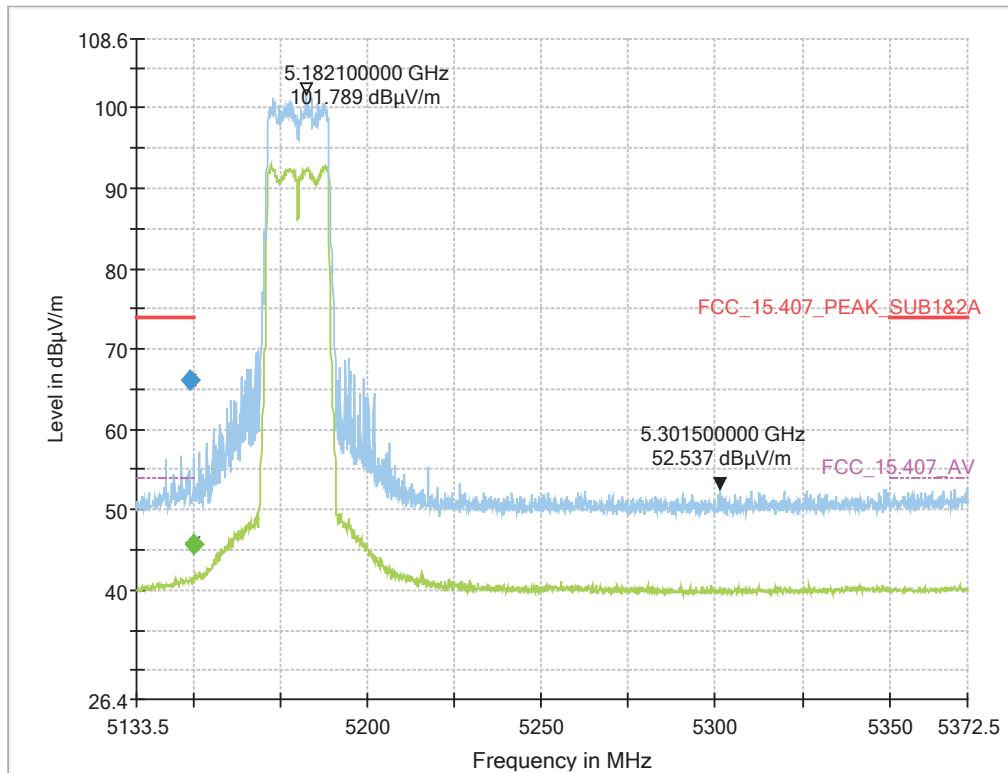
Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5850.200	97.8	---	121.7	20.96	1000.0	1000.000	150.0	V	-11.0	15.0	14.7

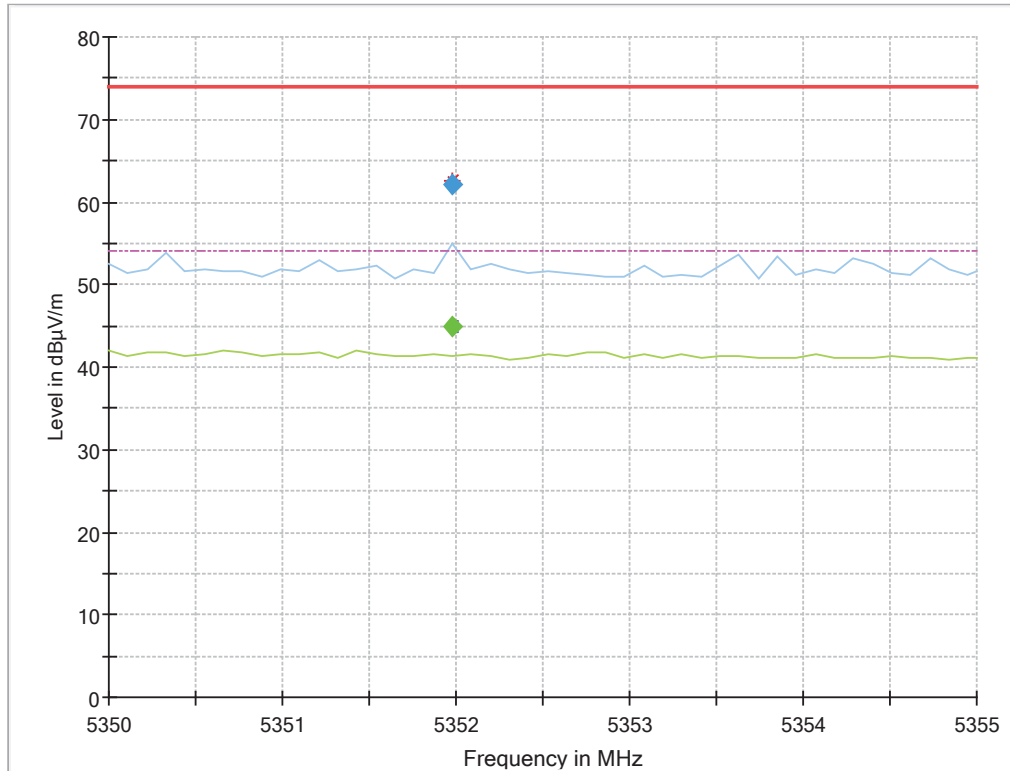
Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Subband = U-NII-1 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5148.700	66.0	---	74.00	7.97	1000.0	1000.000	150.0	H	-49.0	78.0	13.2
5150.000	---	45.7	54.00	8.27	1000.0	1000.000	150.0	H	-49.0	78.0	13.2

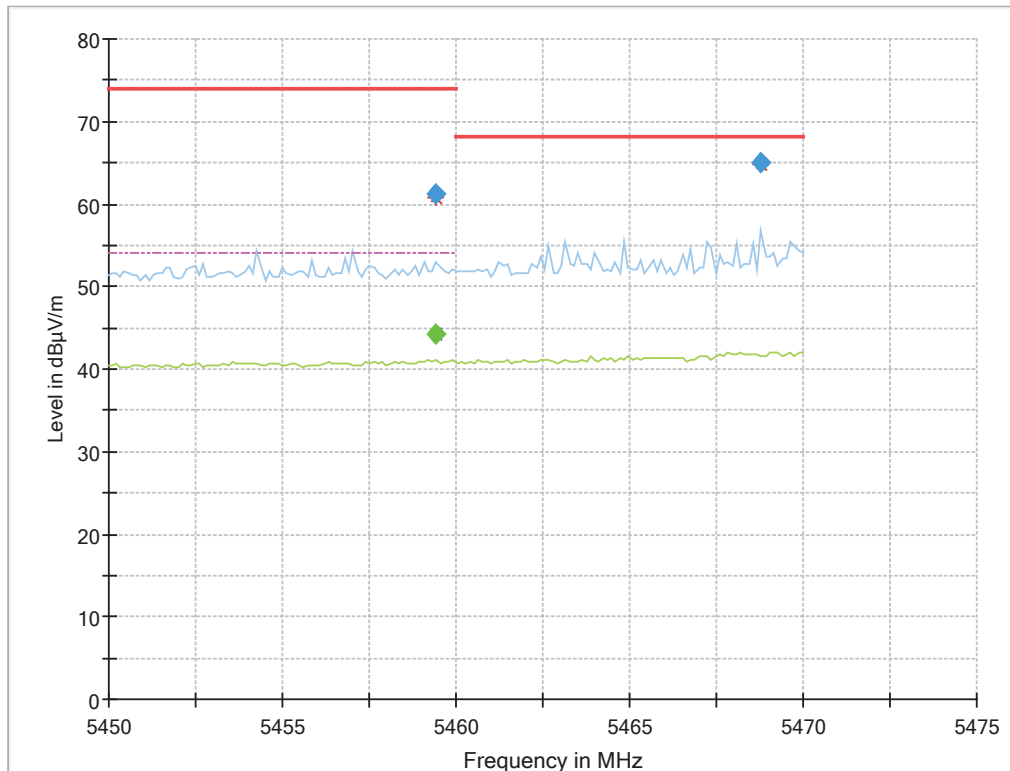
Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Subband = U-NII-2A (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5351.980	62.1	---	74.00	11.87	1000.0	1000.000	150.0	H	-91.0	96.0	13.9
5351.980	---	45.0	54.00	8.99	1000.0	1000.000	150.0	H	-53.0	75.0	13.9

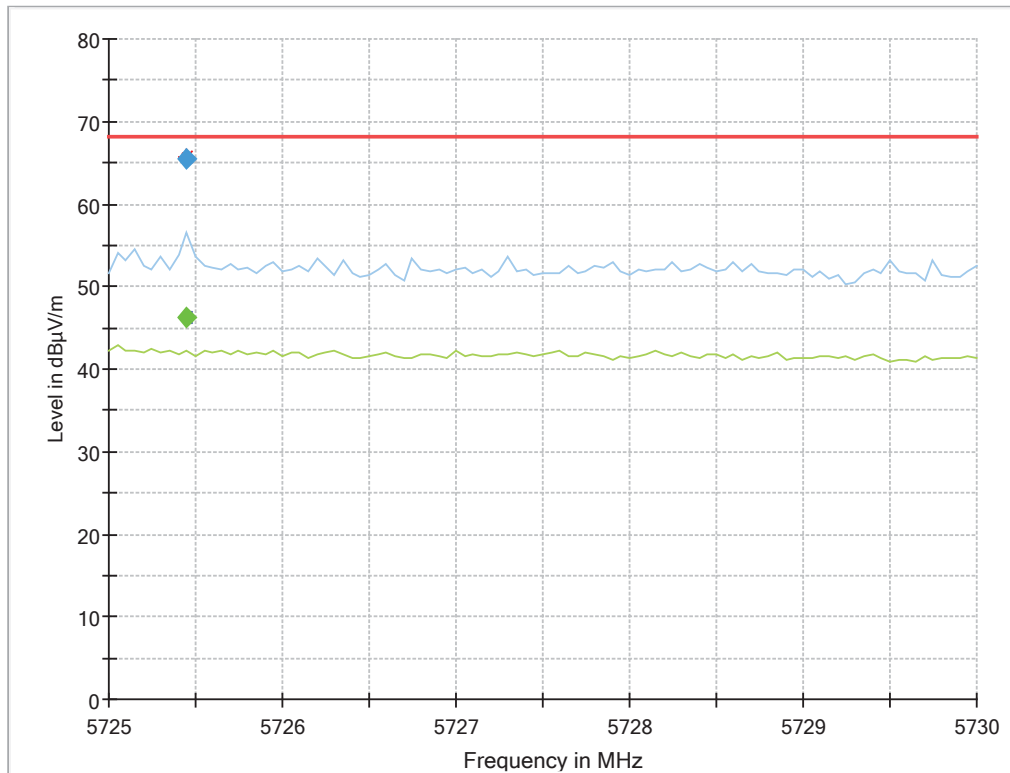
Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5459.440	---	44.3	54.00	9.66	1000.0	1000.000	150.0	H	-53.0	86.0	14.0
5459.440	61.3	---	74.00	12.68	1000.0	1000.000	150.0	H	-91.0	100.0	14.0
5468.800	65.0	---	68.20	3.18	1000.0	1000.000	150.0	H	-52.0	94.0	14.0

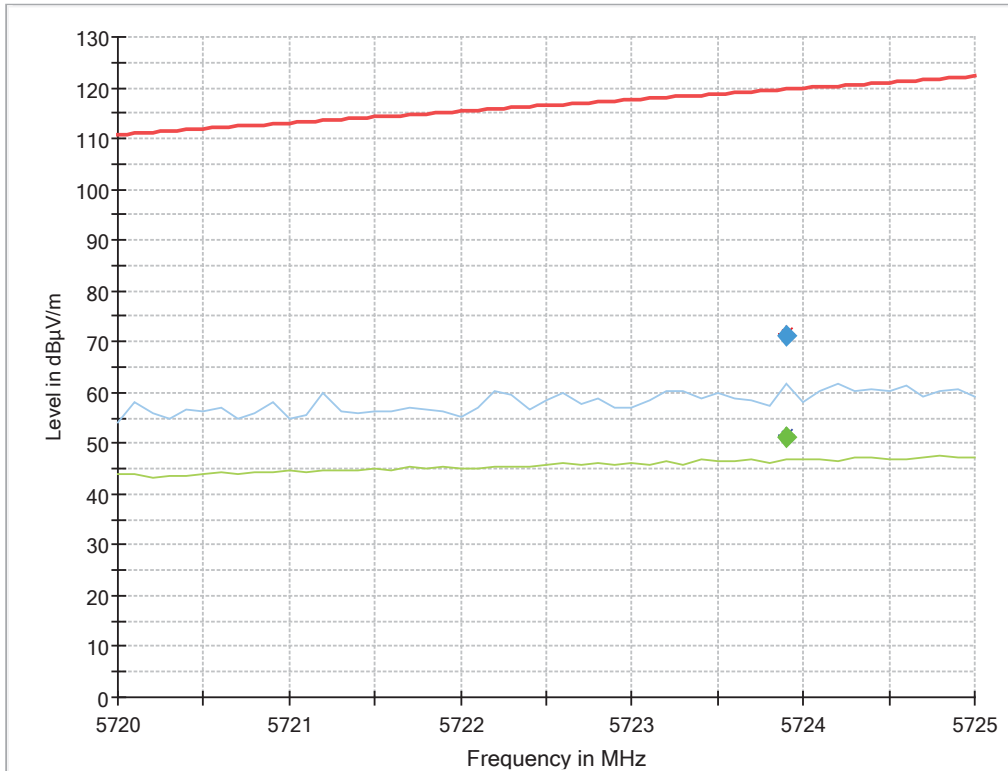
Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5725.450	---	46.3	---	---	1000.0	1000.000	150.0	H	-56.0	78.0	14.1
5725.450	65.4	---	68.20	2.81	1000.0	1000.000	150.0	H	-56.0	79.0	14.1

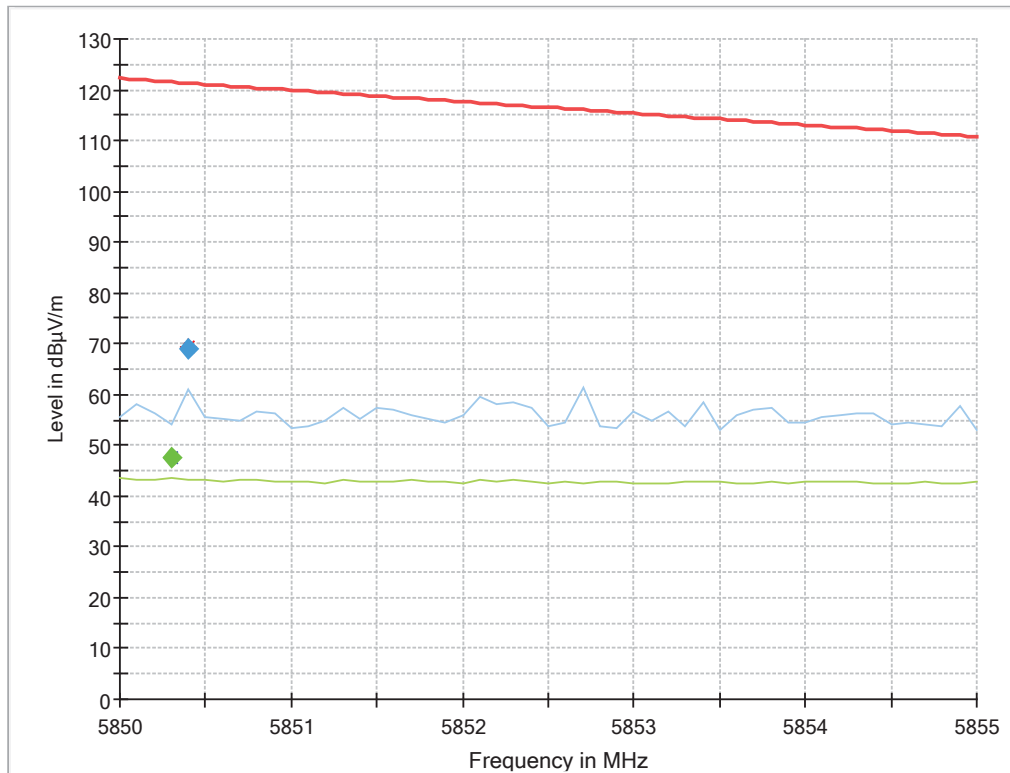
Radio Technology = WLAN ac 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5723.900	---	51.1	---	---	1000.0	1000.000	150.0	H	-53.0	78.0	14.1
5723.900	71.2	---	119.6	48.53	1000.0	1000.000	150.0	H	-53.0	82.0	14.1

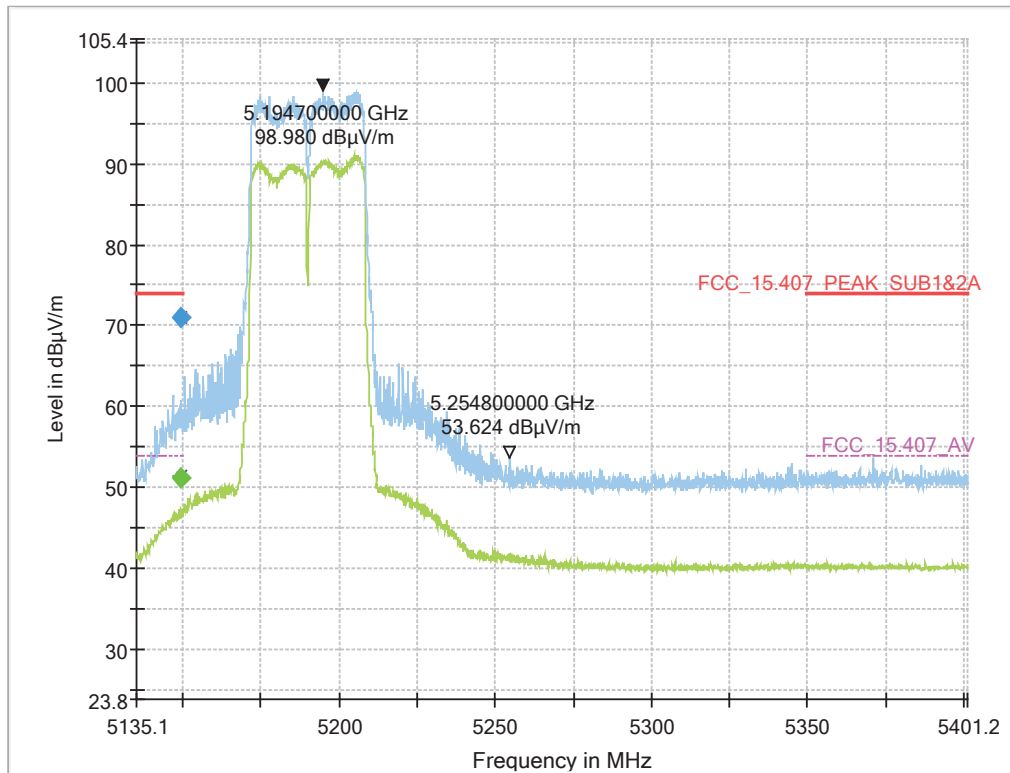
Radio Technology = WLAN ac 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5850.300	---	47.5	---	---	1000.0	1000.000	150.0	H	-56.0	85.0	14.7
5850.400	69.1	---	121.2	52.22	1000.0	1000.000	150.0	H	-56.0	79.0	14.7

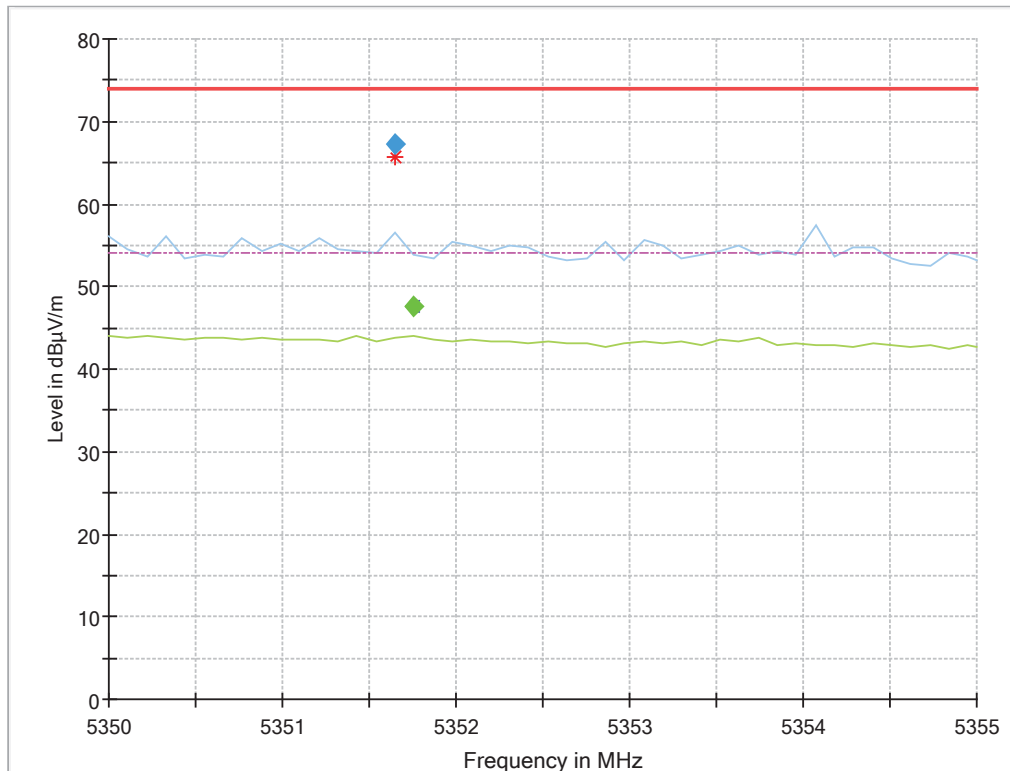
Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5149.350	71.0	---	74.00	3.02	1000.0	1000.000	150.0	H	-49.0	82.0	13.2
5149.513	---	51.1	54.00	2.90	1000.0	1000.000	150.0	H	-51.0	78.0	13.2

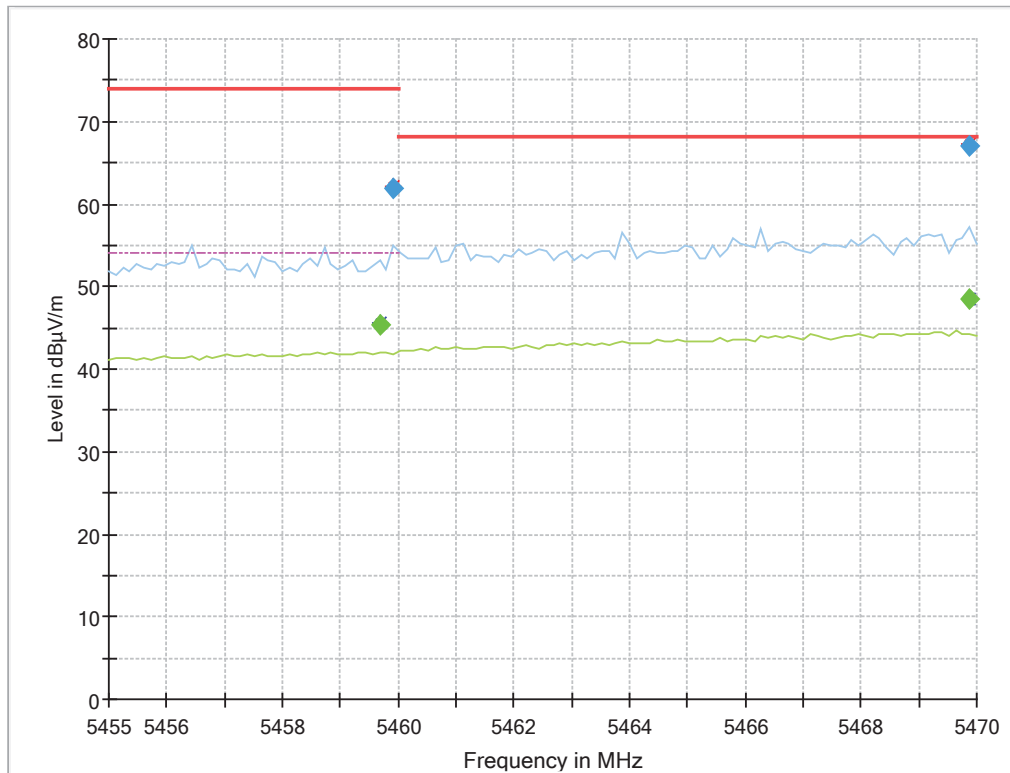
Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Subband = U-NII-2A (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5351.650	67.2	---	74.00	6.81	1000.0	1000.000	150.0	V	45.0	15.0	13.9
5351.760	---	47.5	54.00	6.47	1000.0	1000.000	150.0	V	129.0	-4.0	13.9

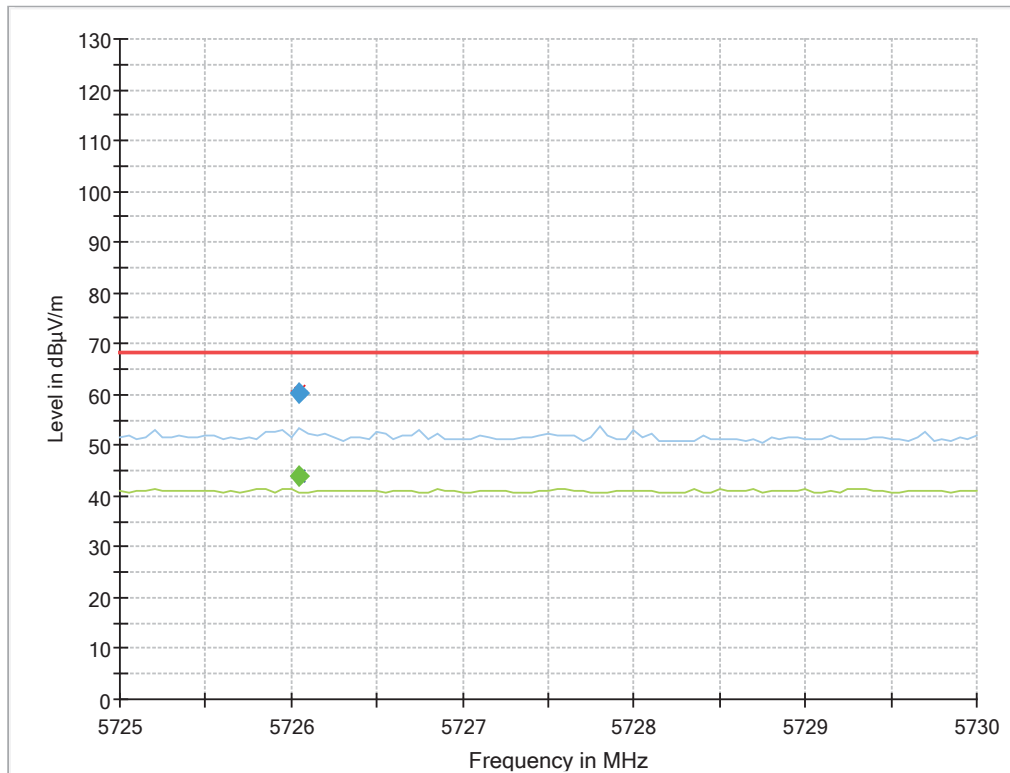
Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5459.680	---	45.5	54.00	8.53	1000.0	1000.000	150.0	V	84.0	3.0	14.0
5459.920	61.9	---	74.00	12.10	1000.0	1000.000	150.0	V	81.0	15.0	14.1
5469.880	---	48.4	---	---	1000.0	1000.000	150.0	H	-53.0	78.0	14.0
5469.880	67.0	---	68.20	1.16	1000.0	1000.000	150.0	H	-52.0	89.0	14.0

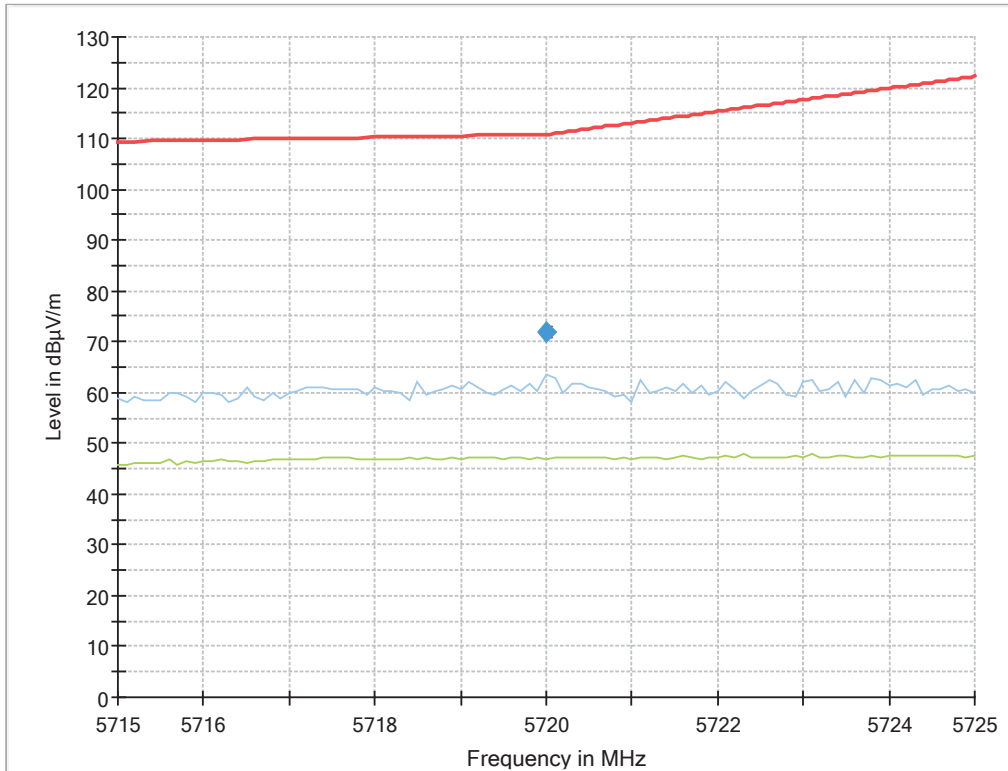
Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5726.050	60.3	---	68.20	7.94	1000.0	1000.000	150.0	V	-88.0	-4.0	14.1
5726.050	---	43.8	---	---	1000.0	1000.000	150.0	H	-131.0	93.0	14.1

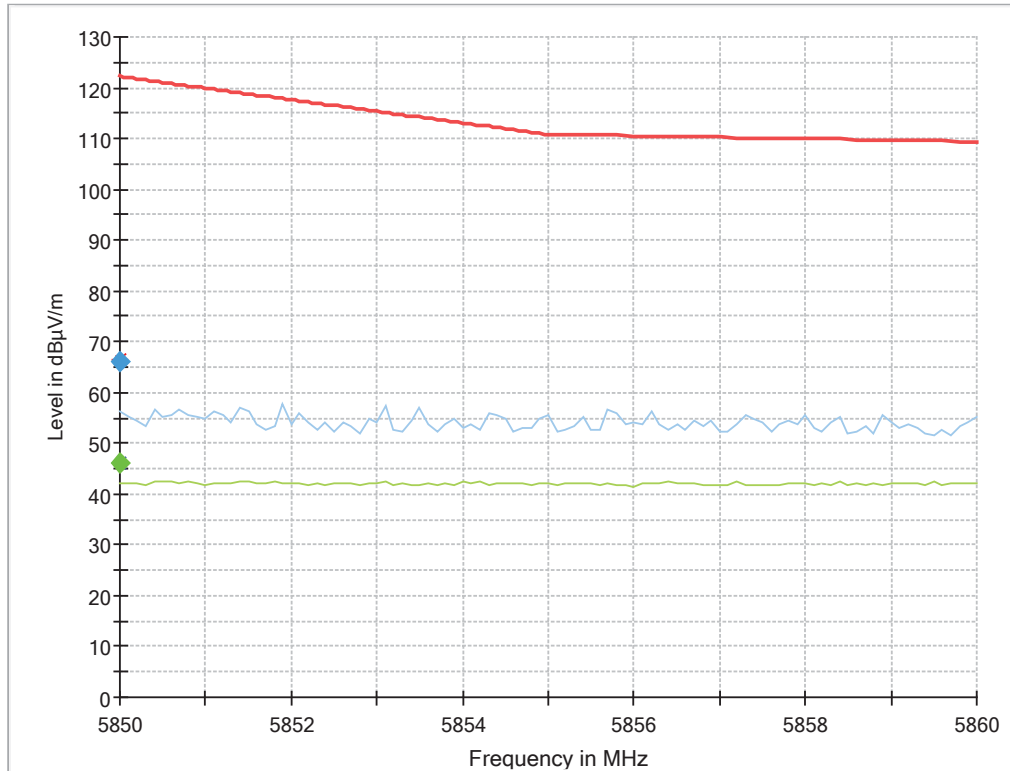
Radio Technology = WLAN ac 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5720.000	71.9	---	110.8	38.91	1000.0	1000.000	150.0	H	-135.0	105.0	14.1

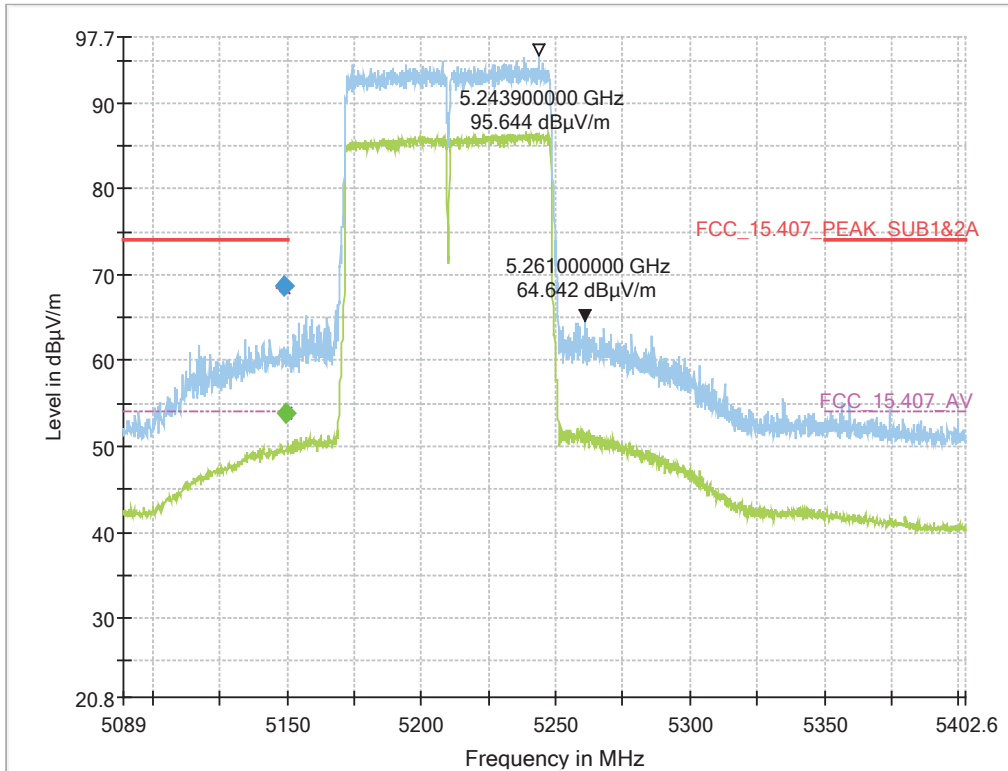
Radio Technology = WLAN ac 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S01_AK01)



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5850.000	---	46.1	---	---	1000.0	1000.000	150.0	H	-53.0	86.0	14.7
5850.000	66.2	---	122.2	55.95	1000.0	1000.000	150.0	H	-53.0	86.0	14.7

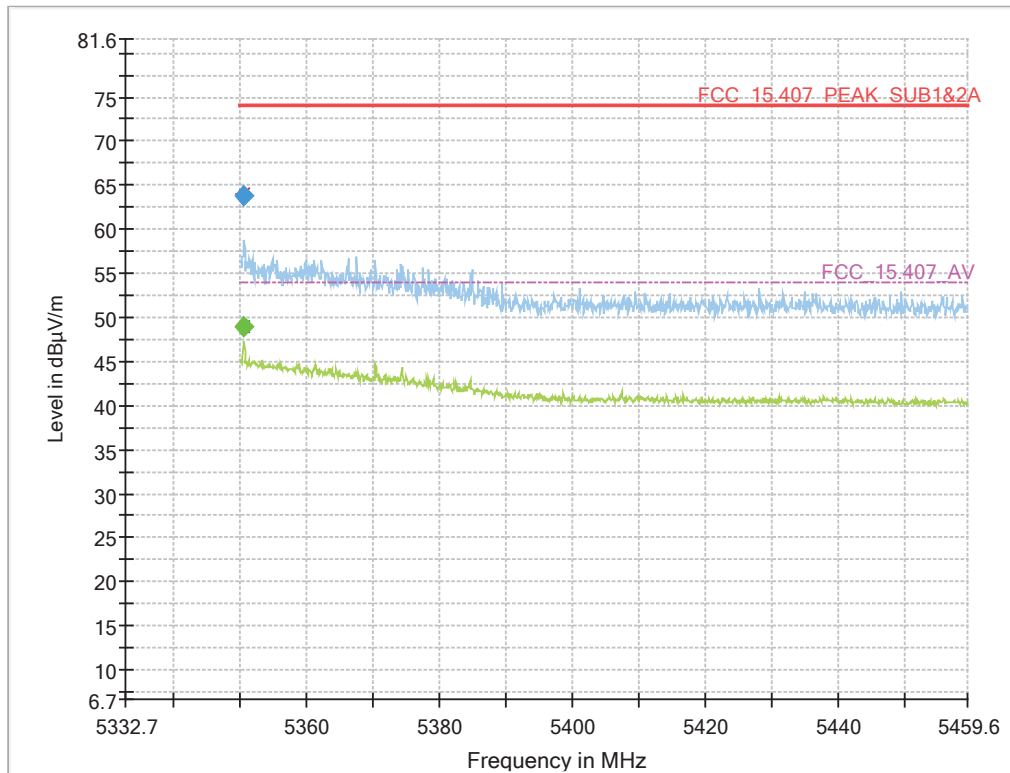
Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Subband = U-NII-1 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5149.025	68.6	---	74.00	5.39	1000.0	1000.000	150.0	H	-49.0	83.0	13.2
5149.838	---	53.8	54.00	0.22	1000.0	1000.000	150.0	H	-51.0	78.0	13.2

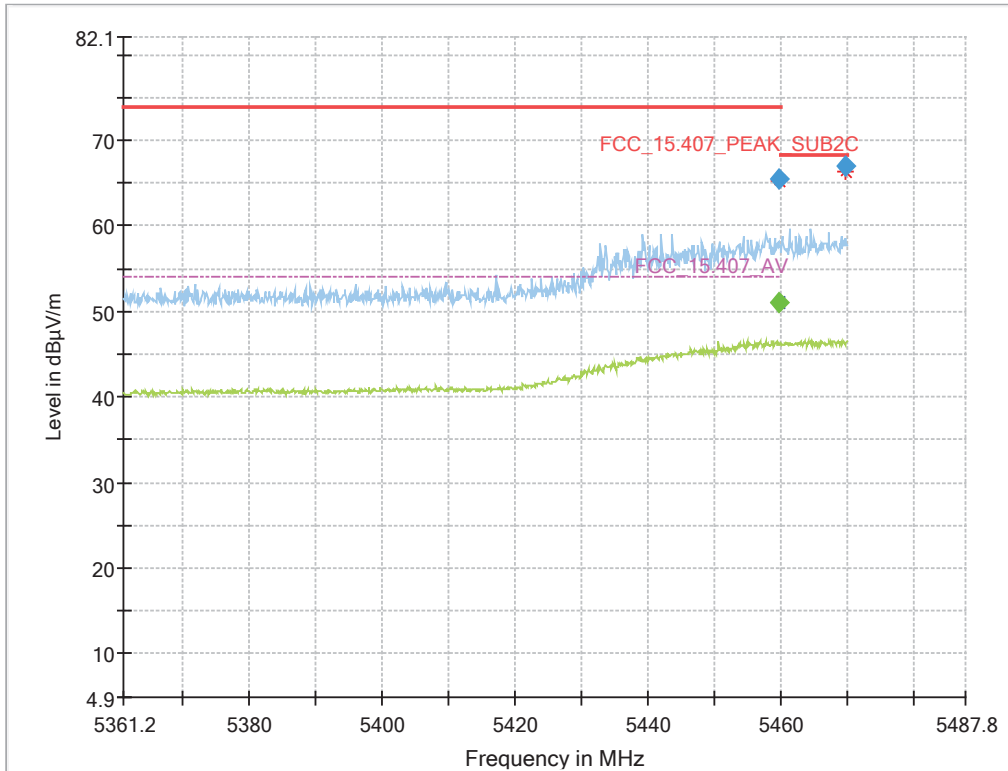
Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Subband = U-NII-2A (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5350.550	---	49.0	54.00	4.97	1000.0	1000.000	150.0	V	129.0	3.0	13.9
5350.550	63.7	---	74.00	10.26	1000.0	1000.000	150.0	V	131.0	-2.0	13.9

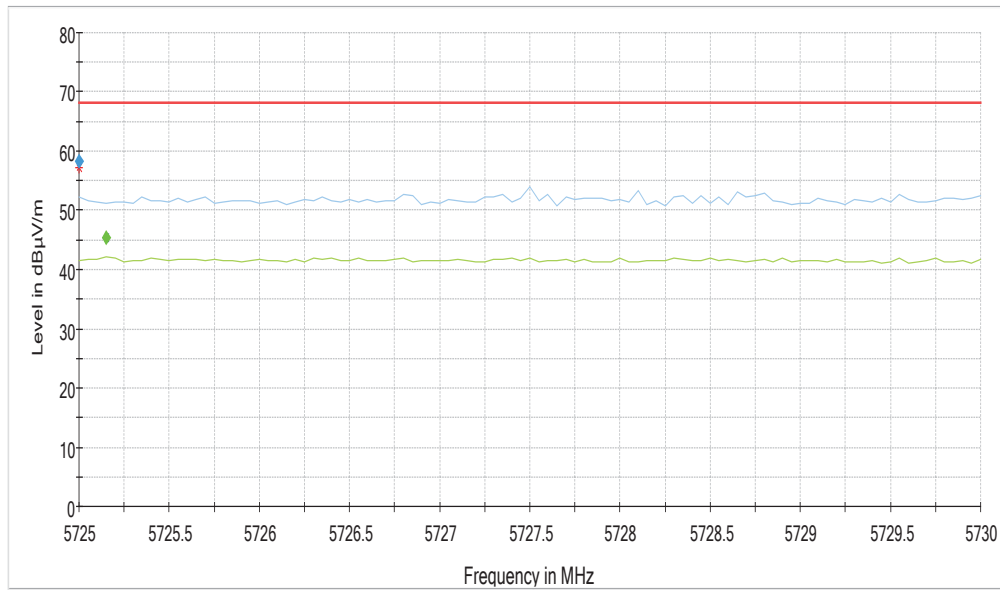
Radio Technology = WLAN ac 80 MHz, Operating Frequency = low, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5459.680	65.4	---	74.00	8.57	1000.0	1000.000	150.0	H	-52.0	86.0	14.0
5459.800	---	51.1	54.00	2.89	1000.0	1000.000	150.0	V	132.0	15.0	14.0
5469.760	66.9	---	68.20	1.28	1000.0	1000.000	150.0	V	132.0	15.0	14.0

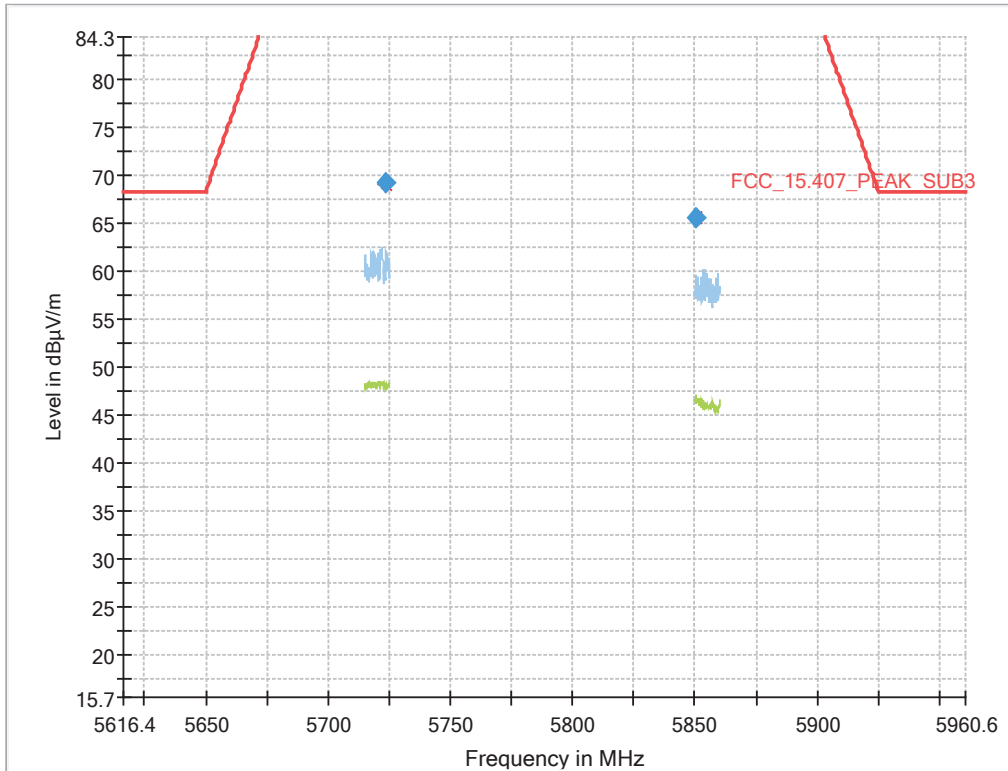
Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Subband = U-NII-2C (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5725.000	58.3	---	68.20	9.92	1000.0	1000.000	150.0	H	-135.0	100.0	14.1
5725.150	---	45.3	---	---	1000.0	1000.000	150.0	H	-56.0	78.0	14.1

Radio Technology = WLAN ac 80 MHz, Operating Frequency = mid, Subband = U-NII-3 (S01_AK01)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
5723.800	69.3	---	119.4	50.20	1000.0	1000.000	150.0	H	-129.0	96.0	14.1
5850.700	65.6	---	120.6	55.03	1000.0	1000.000	150.0	V	101.0	-6.0	14.7

5.9.5 TEST EQUIPMENT USED

- Radiated Emissions

6 TEST EQUIPMENT

- 1 Conducted Emissions FCC
Conducted Emissions AC Mains for FCC standards

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
1.1	MFS	Rubidium Frequency Normal MFS	Datum GmbH	002	2020-11	2021-11
1.2	Opus10 TPR (8253.00)	T/P Logger 13	Lufft Mess- und Regeltechnik GmbH	13936	2019-05	2021-05
1.3	ESH3-Z5	Two-Line V-Network (AUX)	Rohde & Schwarz GmbH & Co. KG	828304/029	2019-06	2021-06
1.4	Chroma 6404	AC Source	Chroma ATE INC.	64040001304		
1.5	Shielded Room 02	Shielded Room 4m x 3m	Frankonia Germany EMC Solution GmbH	-		
1.6	ESH3-Z5	Two-Line V-Network (EUT)	Rohde & Schwarz GmbH & Co. KG	829996/002	2019-06	2021-06
1.7	ESR 7	EMI Receiver / Spectrum Analyzer	Rohde & Schwarz	101424	2019-01	2021-01
1.8	Opus10 THI (8152.00)	T/H Logger 02	Lufft Mess- und Regeltechnik GmbH	7489	2019-05	2021-05

- 2 R&S TS8997
2.4 and 5 GHz Bands Conducted Test Lab

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
2.1	SMB100A	Signal Generator 9 kHz - 6 GHz	Rohde & Schwarz	107695	2020-08	2023-08
2.2	EX520	Digital Multimeter 12	Extech Instruments Corp	05157876	2020-04	2022-04
2.3	FSV30	Signal Analyzer 10 Hz - 30 GHz	Rohde & Schwarz	103005	2020-05	2022-05
2.4	Opus10 THI (8152.00)	T/H Logger 15	Lufft Mess- und Regeltechnik GmbH	13985	2019-06	2021-06
2.5	Opus10 THI (8152.00)	T/H Logger 14	Lufft Mess- und Regeltechnik GmbH	13993	2019-06	2021-06
2.6	Opus10 THI (8152.00)	T/H Logger 03	Lufft Mess- und Regeltechnik GmbH	7482	2019-06	2021-06
2.7	SMBV100A	Vector Signal Generator 9 kHz - 6 GHz	Rohde & Schwarz	259291	2019-11	2022-11
2.8	OSP120	Contains Power Meter and Switching Unit OSP-B157W8	Rohde & Schwarz	101158	2018-05	2021-05

3 Radiated Emissions
Lab to perform radiated emission tests

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
3.1	MFS	Rubidium Frequency Normal MFS	Datum GmbH	002	2020-11	2021-11
3.2	N5000/NP	Filter for EUT, 2 Lines, 250 V, 16 A	ETS-LINDGREN	241515		
3.3	Opus10 TPR (8253.00)	T/P Logger 13	Lufft Mess- und Regeltechnik GmbH	13936	2019-05	2021-05
3.4	ESW44	EMI Receiver / Spectrum Analyzer	Rohde & Schwarz GmbH & Co. KG	101603	2019-12	2021-12
3.5	Anechoic Chamber 01	SAC/FAR, 10.58 m x 6.38 m x 6.00 m	Frankonia	none	2018-06	2021-06
3.6	HL 562 ULTRALOG	Biconical-log-per antenna (30 MHz - 3 GHz) with HL 562E biconicals	Rohde & Schwarz GmbH & Co. KG	830547/003	2018-07	2021-07
3.7	AMF-7D00101800-30-10P-R	Broadband Amplifier 100 MHz - 18 GHz	Miteq			
3.8	ASP 1.2/1.8-10 kg	Antenna Mast	Maturo GmbH	-		
3.9	Anechoic Chamber 03	FAR, 8.80m x 4.60m x 4.05m (l x w x h)	Albatross Projects	P26971-647-001-PRB		
3.10	Fluke 177	Digital Multimeter 03 (Multimeter)	Fluke Europe B.V.	86670383	2020-04	2022-04
3.11	Opus10 THI (8152.00)	T/H Logger 10	Lufft Mess- und Regeltechnik GmbH	12488	2019-06	2021-06
3.12	JS4-18002600-32-5P	Broadband Amplifier 18 GHz - 26 GHz	Miteq	849785		
3.13	FSW 43	Spectrum Analyzer	Rohde & Schwarz	103779	2019-02	2021-02
3.14	3160-09	Standard Gain / Pyramidal Horn Antenna 26.5 GHz	EMCO Elektronik GmbH	00083069		
3.15	WHKX 7.0/18G-8SS	High Pass Filter	Wainwright Instruments GmbH	09		
3.16	DS 420S	Turn Table 2 m diameter	HD GmbH	420/573/99		
3.17	JS4-00102600-42-5A	Broadband Amplifier 30 MHz - 26 GHz	Miteq	619368		
3.18	TT 1.5 WI	Turn Table	Maturo GmbH	-		

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
3.19	HL 562 ULTRALOG	Biconical-log-per Antenna (30 MHz - 3 GHz)	Rohde & Schwarz GmbH & Co. KG	100609	2019-05	2022-05
3.20	3160-10	Standard Gain / Pyramidal Horn Antenna 40 GHz	EMCO Elektronik GmbH	00086675		
3.21	MA4985-XP-ET	Bore Sight Antenna Mast	innco systems GmbH	none		
3.22	VLFX-650+	Low Pass Filter DC650 MHz	Mini-Circuits	15542		
3.23	5HC3500/18000-1.2-KK	High Pass Filter	Trilithic	200035008		
3.24	HFH2-Z2	Loop Antenna	Rohde & Schwarz	829324/006	2018-01	2021-01
3.25	JS4-00101800-35-5P	Broadband Amplifier 30 MHz - 18 GHz	Miteq	896037		
3.26	AS 620 P	Antenna Mast (pneumatic polarisation)	HD GmbH	620/37		
3.27	TD1.5-10kg	EUT Tilt Device (Rohacell)	Maturo GmbH	TD1.5-10kg/024/3790709		
3.28	Innco Systems CO3000	Controller for bore sight mast SAC	innco systems GmbH	CO3000/967/39371016/L		
3.29	HF 907-2	Double-ridged horn	Rohde & Schwarz	102817	2019-04	2022-04
3.30	PAS 2.5 - 10 kg	Antenna Mast	Maturo GmbH	-		
3.31	AFS42-00101800-25-S-42	Broadband Amplifier 25 MHz - 18 GHz	Miteq	2035324		
3.32	AM 4.0	Antenna Mast 4 m	Maturo GmbH	AM4.0/180/11920513		
3.33	HF 907	Double-ridged horn	Rohde & Schwarz	102444	2018-07	2021-07

The calibration interval is the time interval between "Last Calibration" and "Calibration Due"

7 ANTENNA FACTORS, CABLE LOSS AND SAMPLE CALCULATIONS

This chapter contains the antenna factors with their corresponding path loss of the used measurement path for all antennas as well as the insertion loss of the LISN.

7.1 LISN R&S ESH3-Z5 (150 KHZ – 30 MHZ)

Frequency		Corr.	LISN insertion loss ESH3-Z5	cable loss (incl. 10 dB attenuator)
MHz		dB	dB	dB
0.15		10.1	0.1	10.0
5		10.3	0.1	10.2
7		10.5	0.2	10.3
10		10.5	0.2	10.3
12		10.7	0.3	10.4
14		10.7	0.3	10.4
16		10.8	0.4	10.4
18		10.9	0.4	10.5
20		10.9	0.4	10.5
22		11.1	0.5	10.6
24		11.1	0.5	10.6
26		11.2	0.5	10.7
28		11.2	0.5	10.7
30		11.3	0.5	10.8

Sample calculation

$U_{LISN} \text{ (dB } \mu\text{V)} = U \text{ (dB } \mu\text{V)} + \text{Corr. (dB)}$
 U = Receiver reading
 LISN Insertion loss = Voltage Division Factor of LISN
 Corr. = sum of single correction factors of used LISN, cables, switch units (if used)
 Linear interpolation will be used for frequencies in between the values in the table.

7.2 ANTENNA R&S HFH2-Z2 (9 KHZ – 30 MHZ)

Frequency MHz	AF HFH-Z2) dB (1/m)	Corr. dB	cable loss 1 (inside chamber) dB	cable loss 2 (outside chamber) dB	cable loss 3 (switch unit) dB	cable loss 4 (to receiver) dB	distance corr. (-40 dB/ decade) dB	d _{Limit} (meas. distance (limit) m	d _{used} (meas. distance (used) m
0.009	20.50	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.01	20.45	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.015	20.37	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.02	20.36	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.025	20.38	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.03	20.32	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.05	20.35	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.08	20.30	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.1	20.20	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.2	20.17	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.3	20.14	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.49	20.12	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.490001	20.12	-39.6	0.1	0.1	0.1	0.1	-40	30	3
0.5	20.11	-39.6	0.1	0.1	0.1	0.1	-40	30	3
0.8	20.10	-39.6	0.1	0.1	0.1	0.1	-40	30	3
1	20.09	-39.6	0.1	0.1	0.1	0.1	-40	30	3
2	20.08	-39.6	0.1	0.1	0.1	0.1	-40	30	3
3	20.06	-39.6	0.1	0.1	0.1	0.1	-40	30	3
4	20.05	-39.5	0.2	0.1	0.1	0.1	-40	30	3
5	20.05	-39.5	0.2	0.1	0.1	0.1	-40	30	3
6	20.02	-39.5	0.2	0.1	0.1	0.1	-40	30	3
8	19.95	-39.5	0.2	0.1	0.1	0.1	-40	30	3
10	19.83	-39.4	0.2	0.1	0.2	0.1	-40	30	3
12	19.71	-39.4	0.2	0.1	0.2	0.1	-40	30	3
14	19.54	-39.4	0.2	0.1	0.2	0.1	-40	30	3
16	19.53	-39.3	0.3	0.1	0.2	0.1	-40	30	3
18	19.50	-39.3	0.3	0.1	0.2	0.1	-40	30	3
20	19.57	-39.3	0.3	0.1	0.2	0.1	-40	30	3
22	19.61	-39.3	0.3	0.1	0.2	0.1	-40	30	3
24	19.61	-39.3	0.3	0.1	0.2	0.1	-40	30	3
26	19.54	-39.3	0.3	0.1	0.2	0.1	-40	30	3
28	19.46	-39.2	0.3	0.1	0.3	0.1	-40	30	3
30	19.73	-39.1	0.4	0.1	0.3	0.1	-40	30	3

Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$
 U = Receiver reading
 AF = Antenna factor
 Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
 distance correction = $-40 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$
 Linear interpolation will be used for frequencies in between the values in the table.
 Table shows an extract of values

7.3 ANTENNA R&S HL562 (30 MHz – 1 GHz)

($d_{\text{Limit}} = 3 \text{ m}$)

Frequency	AF R&S HL562	Corr.	cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	cable loss 4 (to receiver)	distance corr. (-20 dB/ decade)	d_{Limit} (meas. distance (limit))	d_{used} (meas. distance (used))
MHz	dB (1/m)	dB	dB	dB	dB	dB	dB	m	m
30	18.6	0.6	0.29	0.04	0.23	0.02	0.0	3	3
50	6.0	0.9	0.39	0.09	0.32	0.08	0.0	3	3
100	9.7	1.2	0.56	0.14	0.47	0.08	0.0	3	3
150	7.9	1.6	0.73	0.20	0.59	0.12	0.0	3	3
200	7.6	1.9	0.84	0.21	0.70	0.11	0.0	3	3
250	9.5	2.1	0.98	0.24	0.80	0.13	0.0	3	3
300	11.0	2.3	1.04	0.26	0.89	0.15	0.0	3	3
350	12.4	2.6	1.18	0.31	0.96	0.13	0.0	3	3
400	13.6	2.9	1.28	0.35	1.03	0.19	0.0	3	3
450	14.7	3.1	1.39	0.38	1.11	0.22	0.0	3	3
500	15.6	3.2	1.44	0.39	1.20	0.19	0.0	3	3
550	16.3	3.5	1.55	0.46	1.24	0.23	0.0	3	3
600	17.2	3.5	1.59	0.43	1.29	0.23	0.0	3	3
650	18.1	3.6	1.67	0.34	1.35	0.22	0.0	3	3
700	18.5	3.6	1.67	0.42	1.41	0.15	0.0	3	3
750	19.1	4.1	1.87	0.54	1.46	0.25	0.0	3	3
800	19.6	4.1	1.90	0.46	1.51	0.25	0.0	3	3
850	20.1	4.4	1.99	0.60	1.56	0.27	0.0	3	3
900	20.8	4.7	2.14	0.60	1.63	0.29	0.0	3	3
950	21.1	4.8	2.22	0.60	1.66	0.33	0.0	3	3
1000	21.6	4.9	2.23	0.61	1.71	0.30	0.0	3	3

($d_{\text{Limit}} = 10 \text{ m}$)

30	18.6	-9.9	0.29	0.04	0.23	0.02	-10.5	10	3
50	6.0	-9.6	0.39	0.09	0.32	0.08	-10.5	10	3
100	9.7	-9.2	0.56	0.14	0.47	0.08	-10.5	10	3
150	7.9	-8.8	0.73	0.20	0.59	0.12	-10.5	10	3
200	7.6	-8.6	0.84	0.21	0.70	0.11	-10.5	10	3
250	9.5	-8.3	0.98	0.24	0.80	0.13	-10.5	10	3
300	11.0	-8.1	1.04	0.26	0.89	0.15	-10.5	10	3
350	12.4	-7.9	1.18	0.31	0.96	0.13	-10.5	10	3
400	13.6	-7.6	1.28	0.35	1.03	0.19	-10.5	10	3
450	14.7	-7.4	1.39	0.38	1.11	0.22	-10.5	10	3
500	15.6	-7.2	1.44	0.39	1.20	0.19	-10.5	10	3
550	16.3	-7.0	1.55	0.46	1.24	0.23	-10.5	10	3
600	17.2	-6.9	1.59	0.43	1.29	0.23	-10.5	10	3
650	18.1	-6.9	1.67	0.34	1.35	0.22	-10.5	10	3
700	18.5	-6.8	1.67	0.42	1.41	0.15	-10.5	10	3
750	19.1	-6.3	1.87	0.54	1.46	0.25	-10.5	10	3
800	19.6	-6.3	1.90	0.46	1.51	0.25	-10.5	10	3
850	20.1	-6.0	1.99	0.60	1.56	0.27	-10.5	10	3
900	20.8	-5.8	2.14	0.60	1.63	0.29	-10.5	10	3
950	21.1	-5.6	2.22	0.60	1.66	0.33	-10.5	10	3
1000	21.6	-5.6	2.23	0.61	1.71	0.30	-10.5	10	3

Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + \text{AF (dB 1/m)} + \text{Corr. (dB)}$
 U = Receiver reading
 AF = Antenna factor
 Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
 $\text{distance correction} = -20 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$
 Linear interpolation will be used for frequencies in between the values in the table.
 Tables show an extract of values.

7.4 ANTENNA R&S HF907 (1 GHZ – 18 GHZ)

Frequency	AF R&S HF907	Corr.
MHz	dB (1/m)	dB
1000	24.4	-19.4
2000	28.5	-17.4
3000	31.0	-16.1
4000	33.1	-14.7
5000	34.4	-13.7
6000	34.7	-12.7
7000	35.6	-11.0

cable loss 1 (relay + cable inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit, atten- uator & pre-amp)	cable loss 4 (to receiver)		
dB	dB	dB	dB		
0.99	0.31	-21.51	0.79		
1.44	0.44	-20.63	1.38		
1.87	0.53	-19.85	1.33		
2.41	0.67	-19.13	1.31		
2.78	0.86	-18.71	1.40		
2.74	0.90	-17.83	1.47		
2.82	0.86	-16.19	1.46		

Frequency	AF R&S HF907	Corr.
MHz	dB (1/m)	dB
3000	31.0	-23.4
4000	33.1	-23.3
5000	34.4	-21.7
6000	34.7	-21.2
7000	35.6	-19.8

cable loss 1 (relay inside chamber)	cable loss 2 (inside chamber)	cable loss 3 (outside chamber)	cable loss 4 (switch unit, atten- uator & pre-amp)	cable loss 5 (to receiver)	used for FCC 15.247
dB	dB	dB	dB	dB	
0.47	1.87	0.53	-27.58	1.33	
0.56	2.41	0.67	-28.23	1.31	
0.61	2.78	0.86	-27.35	1.40	
0.58	2.74	0.90	-26.89	1.47	
0.66	2.82	0.86	-25.58	1.46	

Frequency	AF R&S HF907	Corr.
MHz	dB (1/m)	dB
7000	35.6	-57.3
8000	36.3	-56.3
9000	37.1	-55.3
10000	37.5	-56.2
11000	37.5	-55.3
12000	37.6	-53.7
13000	38.2	-53.5
14000	39.9	-56.3
15000	40.9	-54.1
16000	41.3	-54.1
17000	42.8	-54.4
18000	44.2	-54.7

cable loss 1 (relay inside chamber)	cable loss 2 (High Pass)	cable loss 3 (pre- amp)	cable loss 4 (inside chamber)	cable loss 5 (outside chamber)	cable loss 6 (to receiver)
dB	dB	dB	dB	dB	dB
0.56	1.28	-62.72	2.66	0.94	1.46
0.69	0.71	-61.49	2.84	1.00	1.53
0.68	0.65	-60.80	3.06	1.09	1.60
0.70	0.54	-61.91	3.28	1.20	1.67
0.80	0.61	-61.40	3.43	1.27	1.70
0.84	0.42	-59.70	3.53	1.26	1.73
0.83	0.44	-59.81	3.75	1.32	1.83
0.91	0.53	-63.03	3.91	1.40	1.77
0.98	0.54	-61.05	4.02	1.44	1.83
1.23	0.49	-61.51	4.17	1.51	1.85
1.36	0.76	-62.36	4.34	1.53	2.00
1.70	0.53	-62.88	4.41	1.55	1.91

Sample calculation

$$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.

Tables show an extract of values.

7.5 ANTENNA EMCO 3160-09 (18 GHZ – 26.5 GHZ)

Frequency	AF EMCO 3160-09	Corr.	cable loss 1 (inside chamber)	cable loss 2 (pre- amp)	cable loss 3 (inside chamber)	cable loss 4 (switch unit)	cable loss 5 (to receiver)
MHz	dB (1/m)	dB	dB	dB	dB	dB	dB
18000	40.2	-23.5	0.72	-35.85	6.20	2.81	2.65
18500	40.2	-23.2	0.69	-35.71	6.46	2.76	2.59
19000	40.2	-22.0	0.76	-35.44	6.69	3.15	2.79
19500	40.3	-21.3	0.74	-35.07	7.04	3.11	2.91
20000	40.3	-20.3	0.72	-34.49	7.30	3.07	3.05
20500	40.3	-19.9	0.78	-34.46	7.48	3.12	3.15
21000	40.3	-19.1	0.87	-34.07	7.61	3.20	3.33
21500	40.3	-19.1	0.90	-33.96	7.47	3.28	3.19
22000	40.3	-18.7	0.89	-33.57	7.34	3.35	3.28
22500	40.4	-19.0	0.87	-33.66	7.06	3.75	2.94
23000	40.4	-19.5	0.88	-33.75	6.92	3.77	2.70
23500	40.4	-19.3	0.90	-33.35	6.99	3.52	2.66
24000	40.4	-19.8	0.88	-33.99	6.88	3.88	2.58
24500	40.4	-19.5	0.91	-33.89	7.01	3.93	2.51
25000	40.4	-19.3	0.88	-33.00	6.72	3.96	2.14
25500	40.5	-20.4	0.89	-34.07	6.90	3.66	2.22
26000	40.5	-21.3	0.86	-35.11	7.02	3.69	2.28
26500	40.5	-21.1	0.90	-35.20	7.15	3.91	2.36

Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values.

7.6 ANTENNA EMCO 3160-10 (26.5 GHZ – 40 GHZ)

Frequency	AF EMCO 3160-10	Corr.	cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	cable loss 4 (to receiver)	distance corr. (-20 dB/ decade)	d _{Limit} (meas. distance (limit))	d _{used} (meas. distance (used))
GHz	dB (1/m)	dB	dB	dB	dB	dB	dB	m	m
26.5	43.4	-11.2	4.4				-9.5	3	1.0
27.0	43.4	-11.2	4.4				-9.5	3	1.0
28.0	43.4	-11.1	4.5				-9.5	3	1.0
29.0	43.5	-11.0	4.6				-9.5	3	1.0
30.0	43.5	-10.9	4.7				-9.5	3	1.0
31.0	43.5	-10.8	4.7				-9.5	3	1.0
32.0	43.5	-10.7	4.8				-9.5	3	1.0
33.0	43.6	-10.7	4.9				-9.5	3	1.0
34.0	43.6	-10.6	5.0				-9.5	3	1.0
35.0	43.6	-10.5	5.1				-9.5	3	1.0
36.0	43.6	-10.4	5.1				-9.5	3	1.0
37.0	43.7	-10.3	5.2				-9.5	3	1.0
38.0	43.7	-10.2	5.3				-9.5	3	1.0
39.0	43.7	-10.2	5.4				-9.5	3	1.0
40.0	43.8	-10.1	5.5				-9.5	3	1.0

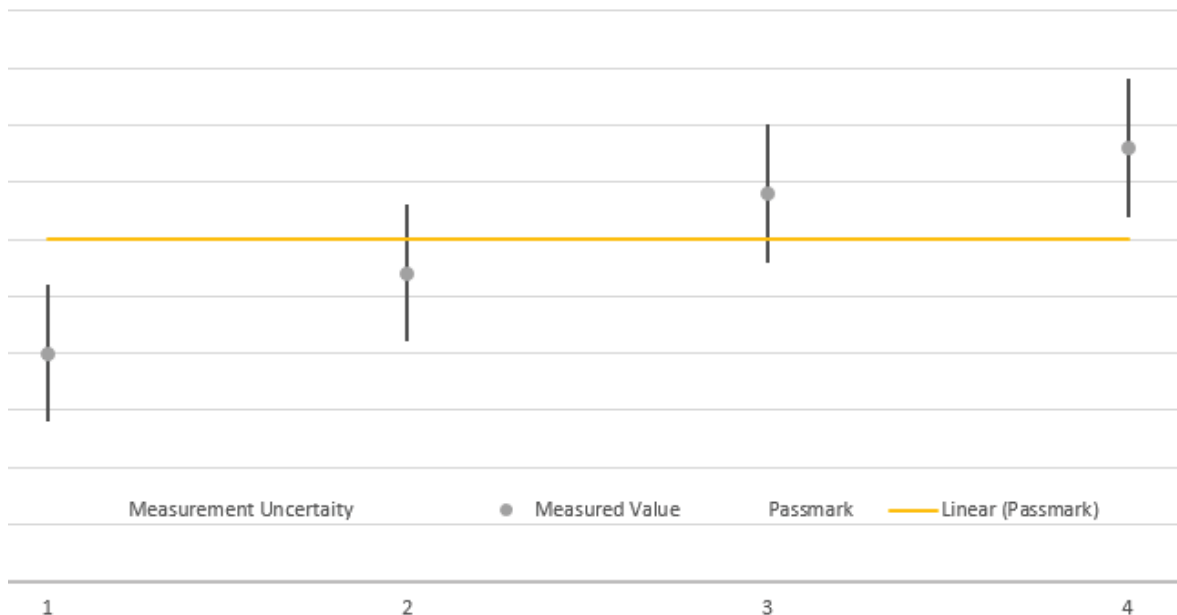
Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + \text{Corr. (dB)}$
 U = Receiver reading
 AF = Antenna factor
 Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
 Linear interpolation will be used for frequencies in between the values in the table.
 distance correction = $-20 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$
 Linear interpolation will be used for frequencies in between the values in the table.
 Table shows an extract of values.

8 MEASUREMENT UNCERTAINTIES

Test Case	Parameter	Uncertainty
AC Power Line	Power	± 3.4 dB
Field Strength of spurious radiation	Power	± 5.5 dB
6 dB / 26 dB / 99% Bandwidth	Power Frequency	± 2.9 dB ± 11.2 kHz
Conducted Output Power	Power	± 2.2 dB
Band Edge Compliance	Power Frequency	± 2.2 dB ± 11.2 kHz
Frequency Stability	Frequency	± 25 Hz
Power Spectral Density	Power	± 2.2 dB

The measurement uncertainties for all parameters are calculated with an expansion factor (coverage factor) $k = 1.96$. This means, that the true value is in the corresponding interval with a probability of 95 %.



The verdicts in this test report are given according the above diagram:

Case	Measured Value	Uncertainty Range	Verdict
1	below pass mark	below pass mark	Passed
2	below pass mark	within pass mark	Passed
3	above pass mark	within pass mark	Failed
4	above pass mark	above pass mark	Failed

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so called shared risk principle.

9 PHOTO REPORT

Please see separate photo report.