

FCC Measurement/Technical Report on

WLAN and Bluetooth module

JODY-W167-03A

FCC ID: XPYJODYW167
IC: 8595A-JODYW167

Test Report Reference: MDE_UBLOX_1828_FCCg

Test Laboratory:

7layers GmbH
Borsigstrasse 11
40880 Ratingen
Germany



Deutsche
Akkreditierungsstelle
D-PL-12140-01-00

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.

7layers GmbH

Borsigstraße 11
40880 Ratingen, Germany
T +49 (0) 2102 749 0
F +49 (0) 2102 749 350

Geschäftsführer/

Managing Directors:

Frank Spiller
Bernhard Retka
Alexandre Norré-Oudard

Registergericht/registered:

Düsseldorf HRB 75554
USt-Id.-Nr./VAT-No. DE203159652
Steuer-Nr./TAX-No. 147/5869/0385

*a Bureau Veritas
Group Company*

www.7layers.com

Table of Contents

1	Applied Standards and Test Summary	3
1.1	Applied Standards	3
1.2	FCC-IC Correlation Table	4
1.3	Measurement Summary / Signatures	5
2	Revision History	15
3	Administrative Data	16
3.1	Testing Laboratory	16
3.2	Project Data	16
3.3	Applicant Data	16
3.4	Manufacturer Data	17
4	Test object Data	18
4.1	General EUT Description	18
4.2	EUT Main components	19
4.3	Ancillary Equipment	19
4.4	Auxiliary Equipment	20
4.5	EUT Setups	20
4.6	Operating Modes	21
4.7	Product labelling	21
5	Test Results	22
5.1	AC Conducted Emissions	22
5.2	26 dB Bandwidth	25
5.3	6 dB Bandwidth	30
5.4	99 % Bandwidth	33
5.5	Maximum Conducted Output Power	38
5.6	Peak Power Spectral Density	47
5.7	Undesirable Emissions; General Field Strength Limits	56
5.8	Band Edge	72
5.9	Dynamic Frequency Selection	81
6	Test Equipment	84
7	Antenna Factors, Cable Loss and Sample Calculations	88
7.1	LISN R&S ESH3-Z5 (150 kHz – 30 MHz)	88
7.2	Antenna R&S HFH2-Z2 (9 kHz – 30 MHz)	89
7.3	Antenna R&S HL562 (30 MHz – 1 GHz)	90
7.4	Antenna R&S HF907 (1 GHz – 18 GHz)	91
7.5	Antenna EMCO 3160-09 (18 GHz – 26.5 GHz)	92
7.6	Antenna EMCO 3160-10 (26.5 GHz – 40 GHz)	93
8	Setup Drawings	94
9	Measurement Uncertainties	95
10	Photo Report	95

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 (10-1-18 Edition) and 15 (10-1-18 Edition). The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

Part 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.

Summary Test Results:

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

1.2 FCC-IC CORRELATION TABLE

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 / SIGNATURES

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

Operating mode

worst case

Setup

S04_7_AC02

FCC

Passed

IC

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

Radio Technology, Operating Frequency, Subband

Setup

S02_7_AC02

FCC

Performed

IC

N/A

WLAN a, high, U-NII-1

S02_7_AC02

Performed

N/A

WLAN a, high, U-NII-2A

S02_7_AC02

Performed

N/A

WLAN a, high, U-NII-2C

S02_7_AC02

Performed

N/A

WLAN a, high, U-NII-3

S02_7_AC02

Performed

N/A

WLAN a, low, U-NII-1

S02_7_AC02

Performed

N/A

WLAN a, low, U-NII-2A

S02_7_AC02

Performed

N/A

WLAN a, low, U-NII-2C

S02_7_AC02

Performed

N/A

WLAN a, low, U-NII-3

S02_7_AC02

Performed

N/A

WLAN a, mid, U-NII-1

S02_7_AC02

Performed

N/A

WLAN a, mid, U-NII-2A

S02_7_AC02

Performed

N/A

WLAN a, mid, U-NII-2C

S02_7_AC02

Performed

N/A

WLAN a, mid, U-NII-3

S02_7_AC02

Performed

N/A

WLAN ac 20 MHz, straddle, U-NII-2C/3

S02_7_AC02

Performed

N/A

WLAN ac 40 MHz, straddle, U-NII-2C/3

S02_7_AC02

Performed

N/A

WLAN ac 80 MHz, high, U-NII-2C

S02_7_AC02

Performed

N/A

WLAN ac 80 MHz, low, U-NII-2C

S02_7_AC02

Performed

N/A

WLAN ac 80 MHz, mid, U-NII-1

S02_7_AC02

Performed

N/A

WLAN ac 80 MHz, mid, U-NII-2A

S02_7_AC02

Performed

N/A

WLAN ac 80 MHz, mid, U-NII-3

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, high, U-NII-1

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, high, U-NII-2A

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, high, U-NII-2C

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, high, U-NII-3

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, low, U-NII-1

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, low, U-NII-2A

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, low, U-NII-2C

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, low, U-NII-3

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, mid, U-NII-1

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, mid, U-NII-2A

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, mid, U-NII-2C

S02_7_AC02

Performed

N/A

WLAN n 20 MHz, mid, U-NII-3

S02_7_AC02

Performed

N/A

WLAN n 40 MHz, high, U-NII-1

S02_7_AC02

Performed

N/A

WLAN n 40 MHz, high, U-NII-2A

S02_7_AC02

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

WLAN n 40 MHz, high, U-NII-2C

Setup

S02_7_AC02

FCC

Performed

IC

N/A

WLAN n 40 MHz, high, U-NII-3

S02_7_AC02

Performed

N/A

WLAN n 40 MHz, low, U-NII-1

S02_7_AC02

Performed

N/A

WLAN n 40 MHz, low, U-NII-2A

S02_7_AC02

Performed

N/A

WLAN n 40 MHz, low, U-NII-2C

S02_7_AC02

Performed

N/A

WLAN n 40 MHz, low, U-NII-3

S02_7_AC02

Performed

N/A

WLAN n 40 MHz, mid, U-NII-2C

S02_7_AC02

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

WLAN a, high, U-NII-3

Setup

S02_7_AC02

FCC

Passed

IC

Passed

WLAN a, low, U-NII-3

S02_7_AC02

Passed

Passed

WLAN a, mid, U-NII-3

S02_7_AC02

Passed

Passed

WLAN ac 20 MHz, high, U-NII-3

S02_7_AC02

Passed

Passed

WLAN ac 20 MHz, low, U-NII-3

S02_7_AC02

Passed

Passed

WLAN ac 20 MHz, mid, U-NII-3

S02_7_AC02

Passed

Passed

WLAN ac 40 MHz, high, U-NII-3

S02_7_AC02

Passed

Passed

WLAN ac 40 MHz, low, U-NII-3

S02_7_AC02

Passed

Passed

WLAN ac 80 MHz, mid, U-NII-3

S02_7_AC02

Passed

Passed

WLAN n 20 MHz, high, U-NII-3

S02_7_AC02

Passed

Passed

WLAN n 20 MHz, low, U-NII-3

S02_7_AC02

Passed

Passed

WLAN n 20 MHz, mid, U-NII-3

S02_7_AC02

Passed

Passed

WLAN n 40 MHz, high, U-NII-3

S02_7_AC02

Passed

Passed

WLAN n 40 MHz, low, U-NII-3

S02_7_AC02

Passed

Passed

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

WLAN a, high, U-NII-1

Setup

S02_7_AC02

FCC

N/A

IC

Performed

WLAN a, high, U-NII-2A

S02_7_AC02

N/A

Performed

WLAN a, high, U-NII-2C

S02_7_AC02

N/A

Performed

WLAN a, high, U-NII-3

S02_7_AC02

N/A

Performed

WLAN a, low, U-NII-1

S02_7_AC02

N/A

Performed

WLAN a, low, U-NII-2A

S02_7_AC02

N/A

Performed

WLAN a, low, U-NII-2C

S02_7_AC02

N/A

Performed

WLAN a, low, U-NII-3

S02_7_AC02

N/A

Performed

47 CFR CHAPTER I FCC PART 15 Subpart E §15.407

**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	FCC	IC
WLAN a, mid, U-NII-1	S02_7_AC02	N/A	Performed
WLAN a, mid, U-NII-2A	S02_7_AC02	N/A	Performed
WLAN a, mid, U-NII-2C	S02_7_AC02	N/A	Performed
WLAN a, mid, U-NII-3	S02_7_AC02	N/A	Performed
WLAN ac 20 MHz, straddle, U-NII-2C/3	S02_7_AC02	N/A	Performed
WLAN ac 40 MHz, straddle, U-NII-2C/3	S02_7_AC02	N/A	Performed
WLAN ac 80 MHz, high, U-NII-2C	S02_7_AC02	N/A	Performed
WLAN ac 80 MHz, low, U-NII-2C	S02_7_AC02	N/A	Performed
WLAN ac 80 MHz, mid, U-NII-1	S02_7_AC02	N/A	Performed
WLAN ac 80 MHz, mid, U-NII-2A	S02_7_AC02	N/A	Performed
WLAN ac 80 MHz, mid, U-NII-3	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, high, U-NII-1	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, high, U-NII-2A	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, high, U-NII-2C	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, high, U-NII-3	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, low, U-NII-1	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, low, U-NII-2A	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, low, U-NII-2C	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, low, U-NII-3	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, mid, U-NII-1	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, mid, U-NII-2A	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, mid, U-NII-2C	S02_7_AC02	N/A	Performed
WLAN n 20 MHz, mid, U-NII-3	S02_7_AC02	N/A	Performed
WLAN n 40 MHz, high, U-NII-1	S02_7_AC02	N/A	Performed
WLAN n 40 MHz, high, U-NII-2A	S02_7_AC02	N/A	Performed
WLAN n 40 MHz, high, U-NII-2C	S02_7_AC02	N/A	Performed
WLAN n 40 MHz, high, U-NII-3	S02_7_AC02	N/A	Performed
WLAN n 40 MHz, low, U-NII-1	S02_7_AC02	N/A	Performed
WLAN n 40 MHz, low, U-NII-2A	S02_7_AC02	N/A	Performed
WLAN n 40 MHz, low, U-NII-2C	S02_7_AC02	N/A	Performed
WLAN n 40 MHz, low, U-NII-3	S02_7_AC02	N/A	Performed
WLAN n 40 MHz, mid, U-NII-2C	S02_7_AC02	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	FCC	IC
WLAN a, high, U-NII-1	S02_7_AC02	Passed	Passed
WLAN a, high, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN a, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN a, high, U-NII-3	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-1	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-3	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-1	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, high, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, high, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, straddle, U-NII-2/3	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, high, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, low, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, low, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, low, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, high, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, high, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, straddle, U-NII-2C/3	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, high, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, low, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, low, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, low, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, mid, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-1	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-2C	S02_7_AC02	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	FCC	IC
WLAN n 20 MHz, high, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-1	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-1	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-1	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, U-NII-1	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, mid, U-NII-2C	S02_7_AC02	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	FCC	IC
WLAN a, high, U-NII-1	S02_7_AC02	Passed	Passed
WLAN a, high, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN a, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN a, high, U-NII-3	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-1	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-3	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-1	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, high, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, high, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, straddle, U-NII-2C/3	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, high, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, low, U-NII-1	S02_7_AC02	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	FCC	IC
WLAN ac 20 MHz, low, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, low, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 20 MHz, mid, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, high, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, high, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, straddle, U-NII-2C/3	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, high, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, low, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, low, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, low, U-NII-3	S02_7_AC02	Passed	Passed
WLAN ac 40 MHz, mid, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-1	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-1	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-1	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-1	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-1	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-3	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, U-NII-1	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, U-NII-2A	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, U-NII-2C	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, U-NII-3	S02_7_AC02	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

WLAN n 40 MHz, mid, U-NII-2C

Setup

S02_7_AC02

FCC

Passed

IC

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, Measurement method

WLAN a, high, 30MHz - 40GHz, U-NII-1, conducted

WLAN a, high, 30MHz - 40GHz, U-NII-2A, conducted

WLAN a, high, 30MHz - 40GHz, U-NII-2C, conducted

WLAN a, high, 30MHz - 40GHz, U-NII-3, conducted

WLAN a, low, 30MHz - 40GHz, U-NII-1, conducted

WLAN a, low, 9kHz - 1GHz, U-NII-1, radiated (enclosure only)

WLAN a, low, 1GHz - 26GHz, U-NII-1, radiated (enclosure only)

WLAN a, low, 26GHz - 40GHz, U-NII-1, radiated (enclosure only)

WLAN a, low, 30MHz - 40GHz, U-NII-2A, conducted

WLAN a, low, 30MHz - 40GHz, U-NII-2C, conducted

WLAN a, low, 30MHz - 40GHz, U-NII-3, conducted

WLAN a, mid, 30MHz - 40GHz, U-NII-1, conducted

WLAN a, mid, 9kHz - 30MHz, U-NII-1, conducted

WLAN a, mid, 30MHz - 40GHz, U-NII-2A, conducted

WLAN a, mid, 30MHz - 40GHz, U-NII-2C, conducted

WLAN a, mid, 9kHz - 30MHz, U-NII-3, conducted

WLAN a, mid, 30MHz - 40GHz, U-NII-3, conducted

WLAN ac 80 MHz, high, 30MHz - 40GHz, U-NII-2C, conducted

WLAN ac 80 MHz, low, 30MHz - 40GHz, U-NII-2C, conducted

WLAN ac 80 MHz, mid, 30MHz - 40GHz, U-NII-1, conducted

WLAN ac 80 MHz, mid, 30MHz - 40GHz, U-NII-2A, conducted

WLAN ac 80 MHz, mid, 30MHz - 40GHz, U-NII-3, conducted

WLAN n 20 MHz, high, 30MHz - 40GHz, U-NII-1, conducted

WLAN n 20 MHz, high, 30MHz - 40GHz, U-NII-2A, conducted

WLAN n 20 MHz, high, 30MHz - 40GHz, U-NII-2C, conducted

WLAN n 20 MHz, high, 30MHz - 40GHz, U-NII-3, conducted

WLAN n 20 MHz, low, 30MHz - 40GHz, U-NII-1, conducted

WLAN n 20 MHz, low, 30MHz - 40GHz, U-NII-2A, conducted

WLAN n 20 MHz, low, 30MHz - 40GHz, U-NII-2C, conducted

WLAN n 20 MHz, low, 30MHz - 40GHz, U-NII-3, conducted

WLAN n 20 MHz, mid, 30MHz - 40GHz, U-NII-1, conducted

WLAN n 20 MHz, mid, 30MHz - 40GHz, U-NII-2A, conducted

Setup

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AA01

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

S02_7_AC02

FCC

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

IC

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

Passed

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, Measurement method

WLAN n 20 MHz, mid, 30MHz - 40GHz, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, 30MHz - 40GHz, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, 30MHz - 40GHz, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, 30MHz - 40GHz, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, 30MHz - 40GHz, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, 30MHz - 40GHz, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, 30MHz - 40GHz, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, 30MHz - 40GHz, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, 30MHz - 40GHz, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, 30MHz - 40GHz, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, mid, 30MHz - 40GHz, U-NII-2C, conducted	S02_7_AC02	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, Measurement method

WLAN a, high, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN a, high, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN a, high, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN a, high, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-1, radiated (enclosure only)	S02_7_AA02	Passed	Passed
WLAN a, low, U-NII-2A, conducted	S02_7_AC01	Passed	Passed
WLAN a, low, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN a, low, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN a, mid, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz MIMO, high, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz MIMO, low, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz MIMO, mid, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz MIMO, mid, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz MIMO, mid, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, high, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, low, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-1, conducted	S02_7_AC02	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, Measurement method

	Setup	FCC	IC
WLAN ac 80 MHz, mid, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN ac 80 MHz, mid, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, high, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, high, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, high, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, high, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, low, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, low, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, low, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, low, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, mid, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, mid, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, mid, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz MIMO, mid, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, high, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, low, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 20 MHz, mid, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz MIMO, high, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz MIMO, high, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz MIMO, high, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz MIMO, high, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz MIMO, low, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz MIMO, low, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz MIMO, low, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz MIMO, low, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz MIMO, mid, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-2A, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-2C, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, high, U-NII-3, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, U-NII-1, conducted	S02_7_AC02	Passed	Passed
WLAN n 40 MHz, low, U-NII-2A, conducted	S02_7_AC02	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, Measurement method

Setup

FCC

IC

WLAN n 40 MHz, low, U-NII-2C, conducted

S02_7_AC02

Passed

Passed

WLAN n 40 MHz, low, U-NII-3, conducted

S02_7_AC02

Passed

Passed

WLAN n 40 MHz, mid, U-NII-2C, conducted

S02_7_AC02

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

FCC

IC

WLAN ac 80 MHz normal connection

S03_7_AC02

Passed

Passed

N/A: Not applicable

N/P: Not performed

2 REVISION HISTORY

Report version control			
Version	Release date	Change Description	Version validity
initial	2019-07-01	--	valid
--	--	--	--

COMMENT: -



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



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



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

3 ADMINISTRATIVE DATA

3.1 TESTING LABORATORY

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

The test facility is accredited by the following accreditation organisation:

Laboratory accreditation no: DAkKS D-PL-12140-01-00
FCC Designation Number: DE0015
FCC Test Firm Registration: 929146
ISED CAB Identifier DE0007; ISED#: 3699A

Responsible for accreditation scope: Dipl.-Ing. Marco Kullik
Report Template Version: 2019-06-18

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: 2019-07-01
Testing Period: 2019-06-06 to 2019-06-25

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	The EUT is a module supporting WLAN in the 2.4 GHz and 5 GHz bands as well as Bluetooth (BT) 4.2 including Bluetooth Low Energy (BT LE)
Product name	WLAN and Bluetooth module
Type	JODY-W167-03A
DECLARED EUT DATA BY THE SUPPLIER	
Voltage Type	DC
Voltage Level	3.3 V
Tested Modulation Type	OFDM: WLAN a: 6 Mbps WLAN n/ac: MCS0 (20/40/80 MHz)
Specific product description	The JODY-W1 is a compact automotive grade module that provides Wi-Fi, Bluetooth, and Bluetooth low energy communication. The JODY-W167-03A module can be operated in the following modes: Wi-Fi 2x2 MIMO 802.11n in the 2.4 GHz and 5 GHz bands. Wi-Fi 2x2 MIMO 802.11ac in the 5GHz band. Wi-Fi 802.11n/ac real simultaneous dual band on two antennas. Dual-mode Bluetoothv4.2, can be operated fully simultaneous with both the Wi-Fi modes. It is equipped with three antenna pins connected two three SMA connectors on the evaluation board. Maximum supported band width in 2.4 GHz Wi-Fi mode: 20 MHz, 5GHz Wi-Fi mode: 80 MHz
Ports of the device	DC Power Supply Antenna ports Signal ports
Antenna 1	None provided, 2 dBi antenna gain assumed for conducted measurements
Antenna 2	None provided, 2 dBi antenna gain assumed for conducted measurements
Special software used for testing	The test modes were set using scripts that were run on a board computer with Linux operating system provided by the applicant.

The main components of the EUT are listed and described in chapter 3.2 EUT Main components.

4.2 EUT MAIN COMPONENTS

Sample Name	Sample Code	Description
EUT aa01	DE1015104aa01	
Sample Parameter	Value	
Serial No.	946D4CA6ED141C40500	
HW Version	00	
SW Version	P8.1	
Comment		

Sample Name	Sample Code	Description
EUT ac02	DE1015104ac02	
Sample Parameter	Value	
Serial No.	946D4CA6ED288040700	
HW Version	00	
SW Version	P8.1	
Comment		

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

4.3 ANCILLARY EQUIPMENT

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

Device	Details (Manufacturer, Type Model, OUT Code)	Description
Evaluation Board	UBLOX JODY-W1 EVB Certification board	Board providing ports to the EUT
Sample Name	Description	
Evaluation Board	Evaluation Board	

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
AC/DC power supply	PeakTech, 6005D, -, -, 081062045	AC/DC power supply (115 V 60 Hz)
Board Computer	Toradex, Ixora, -, - , -	Computer used for setting the test modes
DFS Master	UBLOX Emmy-W163, 03, 15.68.7.p62- 15.29.7.p62, 632000013740100	DFS Master for DFS tests: FCC ID: XPYEMMYW163, IC:8595A-EMMYW163

4.5 EUT SETUPS

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

Setup	Combination of EUTs	Description and Rationale
S01_7_AA01	EUT aa01, Evaluation Board	Radiated Setup
S01_7_AC02	EUT ac02, Evaluation Board	Radiated Setup
S02_7_AC02	EUT ac02, Evaluation Board, Board Computer	Conducted Setup
S03_7_AC02	EUT ac02, Evaluation Board, Board Computer, DFS Master	Conducted DFS Setup
S04_7_AC02	EUT ac02, Evaluation Board, AC/DC power supply	AC Conducted Setup

4.6 OPERATING MODES

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

4.6.1 TEST CHANNELS

Test Channels:

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	48	52	60	64	100/104 ²⁾	116	136 ^{2)/140 /144¹⁾}	149	157	165	Ch.-No.
5180	5200	5240	5260	5300	5320	5500/5520	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	126 ^{2)/134 /142¹⁾}	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	138 ¹⁾	-	155	-	Ch.-No.
-	5210	-	-	5290	-	5530	5610	5690	-	5775	-	MHz

1)Applicable for ac mode only ("straddle" channels acc. KDB 789033) tested for straddle channel relevant test cases only.

2)Since the power of the second lowest/highest channel is higher than the power of the lowest/highest channel, the second lowest and highest was also tested for some test cases.

Power Setting in EUT Script according to applicant (power levels of final product):

20 MHz Channel

Channel No.	36	40	44	48	52	56	60	64	100	104	108	112	116	120	124	128	132	136	140	144	149	153	157	161	165
Channel freq. [MHz]	5180	5200	5220	5240	5260	5280	5300	5320	5500	5520	5540	5560	5580	5600	5620	5640	5660	5680	5700	5720	5745	5765	5785	5805	5825
WLAN mode a	12	14	14	14	14	14	14	12	11	14	14	14	14	14	14	14	14	14	11	14	17	17	17	17	17
WLAN mode n	12	14	14	14	14	14	14	12	11	14	14	14	14	14	14	14	14	14	11	14	17	17	17	17	17
WLAN mode ac	12	14	14	14	14	14	14	12	11	14	14	14	14	14	14	14	14	14	11	14	17	17	17	17	17

40 MHz Channel

Channel No.	38	46	54	62	102	110	118	126	134	142	151	159
Channel freq. [MHz]	5190	5230	5270	5310	5510	5550	5590	5630	5670	5710	5755	5795
WLAN mode n	10	13	13	12	10	14	14	14	11	14	17	17
WLAN mode ac	10	13	13	12	10	14	14	14	11	14	17	17

80 MHz Channel

Channel No.	42	58	106	122	138	155
Channel freq. [MHz]	5210	5290	5530	5610	5690	5775
WLAN mode ac	10	10	9	9	12	15

4.7 PRODUCT LABELLING

4.7.1 FCC ID LABEL

Please refer to the documentation of the applicant.

4.7.2 LOCATION OF THE LABEL ON THE EUT

Please refer to the documentation of the applicant.

5 TEST RESULTS

5.1 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.

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
- 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 (dBμV)	AV Limits (dBμV)
0.15 – 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

5.1.3 TEST PROTOCOL

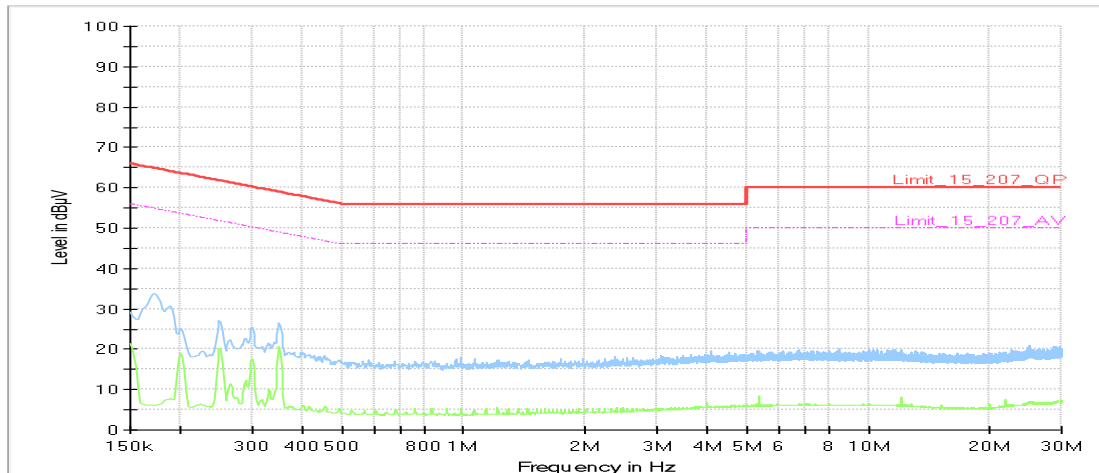
Temperature: 28 °C
 Air Pressure: 1012 hPa
 Humidity: 39 %

Power line	Frequency [MHz]	Measured value QP [dBμV]	Measured value AV [dBμV]	QP Limit [dBμV]	AV Limit [dBμV]	Margin QP [dB]	Margin AV [dB]
N	-	-	-	-	-	> 20	> 20
L	-	-	-	-	-	> 20	> 20

Remark: Measured at 120 V 60 Hz input of lab power supply, WLAN 5 GHz, CH 48

5.1.4 MEASUREMENT PLOTS

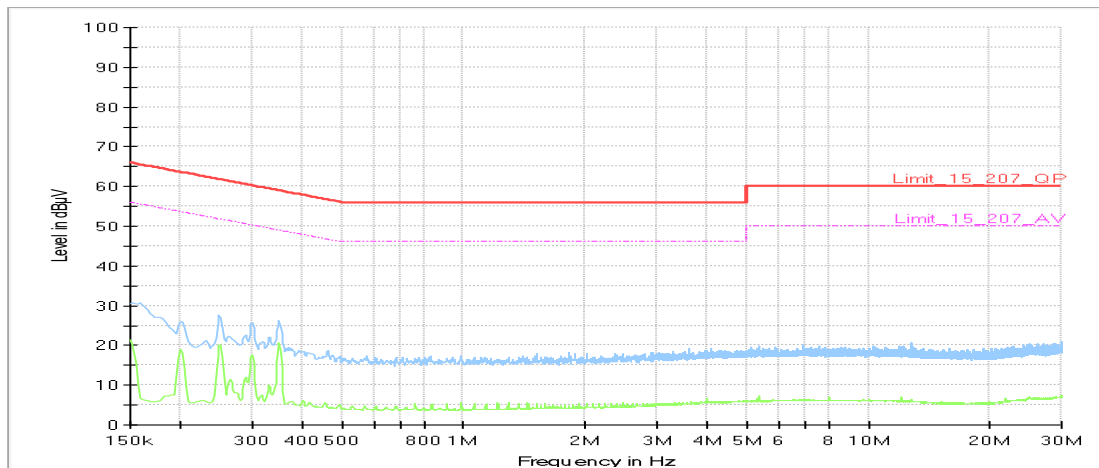
Core 0



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
---	---	---	---	---	---	---	---	---	---

Core 1



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
---	---	---	---	---	---	---	---	---	---

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 spectrum analyzer via a short coax cable with a known loss.

Analyzer settings:

- Resolution Bandwidth (RBW): initially approx. 1 % of nominal emission bandwidth
- Video Bandwidth (VBW): > RBW
- Span: 40 / 80 / 160 MHz (for 20 / 40 / 80 MHz nominal bandwidth, higher if necessary)
- Trace: Maxhold
- Number of Sweeps: Till stable
- Sweeptime: Auto
- Detector: Peak

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: 24 °C
Air Pressure: 1017 hPa
Humidity: 48 %

26 dB BW Values of Core 0:

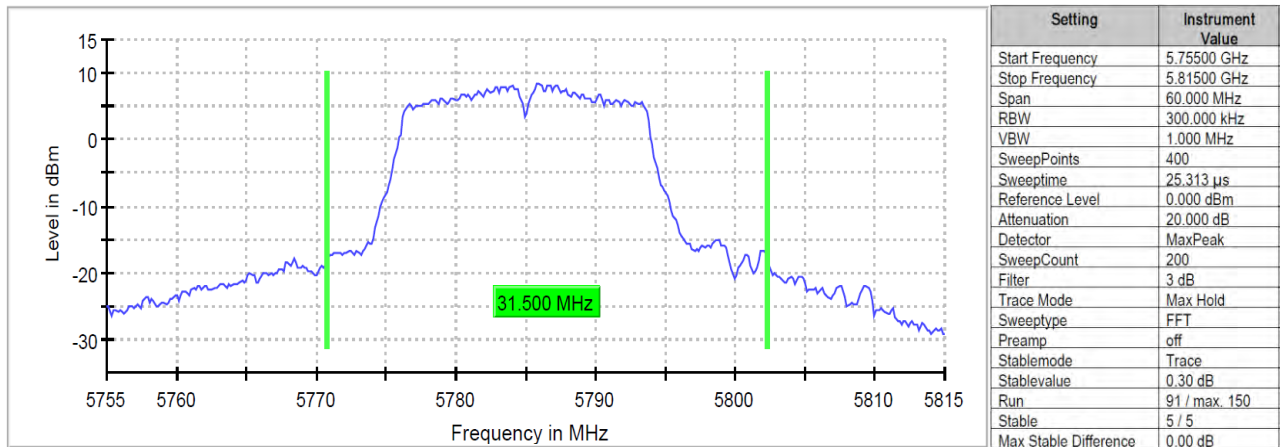
Radio Technology	Operating Frequency	Subband	26 dB Bandwidth [MHz]
WLAN a	low	U-NII-1	21.4
WLAN a	mid	U-NII-1	21.7
WLAN a	high	U-NII-1	21.7
WLAN a	low	U-NII-2A	21.7
WLAN a	mid	U-NII-2A	21.7
WLAN a	high	U-NII-2A	21.3
WLAN a	Low (5500 MHz)	U-NII-2C	21.5
WLAN a	Low (5520 MHz)	U-NII-2C	21.8
WLAN a	mid	U-NII-2C	21.7
WLAN a	High (5680 MHz)	U-NII-2C	21.7
WLAN a	High (5700 MHz)	U-NII-2C	21.5
WLAN a	low	U-NII-3	23.6
WLAN a	mid	U-NII-3	27.0
WLAN a	high	U-NII-3	24.0
WLAN n 20 MHz	low	U-NII-1	21.8
WLAN n 20 MHz	mid	U-NII-1	22.0
WLAN n 20 MHz	high	U-NII-1	22.6
WLAN n 20 MHz	low	U-NII-2A	22.4
WLAN n 20 MHz	mid	U-NII-2A	24.1
WLAN n 20 MHz	high	U-NII-2A	22.0
WLAN n 20 MHz	Low (5500 MHz)	U-NII-2C	21.8
WLAN n 20 MHz	Low (5520 MHz)	U-NII-2C	22.1
WLAN n 20 MHz	mid	U-NII-2C	21.9
WLAN n 20 MHz	High (5680 MHz)	U-NII-2C	22.5
WLAN n 20 MHz	High (5700 MHz)	U-NII-2C	21.8
WLAN n 20 MHz	low	U-NII-3	27.3
WLAN n 20 MHz	mid	U-NII-3	31.5
WLAN n 20 MHz	high	U-NII-3	31.2
WLAN n 40 MHz	low	U-NII-1	39.8
WLAN n 40 MHz	high	U-NII-1	39.9
WLAN n 40 MHz	low	U-NII-2A	39.9
WLAN n 40 MHz	high	U-NII-2A	39.8
WLAN n 40 MHz	low	U-NII-2C	40.1
WLAN n 40 MHz	mid	U-NII-2C	40.1
WLAN n 40 MHz	high	U-NII-2C	40.1
WLAN n 40 MHz	low	U-NII-3	67.0
WLAN n 40 MHz	high	U-NII-3	71.8
WLAN ac 20 MHz	Straddle	U-NII-2C/3	22.0
WLAN ac 40 MHz	Straddle	U-NII-2C/3	40.2
WLAN ac 80 MHz	mid	U-NII-1	83.0
WLAN ac 80 MHz	mid	U-NII-2A	82.5
WLAN ac 80 MHz	low	U-NII-2C	83.0
WLAN ac 80 MHz	mid	U-NII-2C	82.5
WLAN ac 80 MHz	high	U-NII-2C	82.5
WLAN ac 80 MHz	mid	U-NII-3	94.0

26 dB BW Values of Core 1:

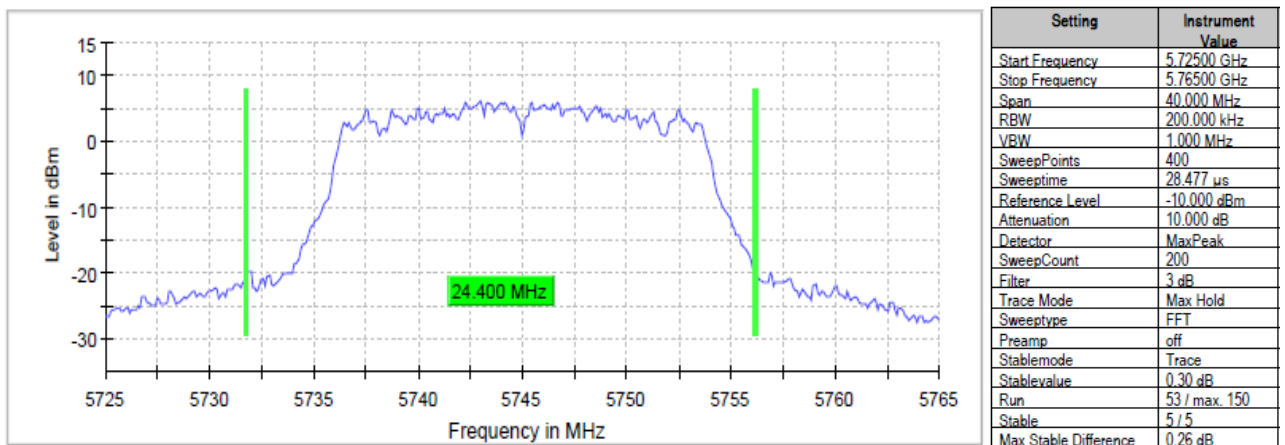
Radio Technology	Operating Frequency	Subband	26 dB Bandwidth [MHz]
WLAN a	low	U-NII-1	21.1
WLAN a	mid	U-NII-1	21.3
WLAN a	high	U-NII-1	21.5
WLAN a	low	U-NII-2A	21.4
WLAN a	mid	U-NII-2A	21.4
WLAN a	high	U-NII-2A	21.3
WLAN a	Low (5500 MHz)	U-NII-2C	21.4
WLAN a	Low (5520 MHz)	U-NII-2C	21.3
WLAN a	mid	U-NII-2C	21.4
WLAN a	High (5680 MHz)	U-NII-2C	21.5
WLAN a	High (5700 MHz)	U-NII-2C	21.4
WLAN a	low	U-NII-3	21.7
WLAN a	mid	U-NII-3	21.7
WLAN a	high	U-NII-3	21.7
WLAN n 20 MHz	low	U-NII-1	21.7
WLAN n 20 MHz	mid	U-NII-1	21.7
WLAN n 20 MHz	high	U-NII-1	21.7
WLAN n 20 MHz	low	U-NII-2A	21.8
WLAN n 20 MHz	mid	U-NII-2A	21.9
WLAN n 20 MHz	high	U-NII-2A	21.8
WLAN n 20 MHz	Low (5500 MHz)	U-NII-2C	21.7
WLAN n 20 MHz	Low (5520 MHz)	U-NII-2C	21.9
WLAN n 20 MHz	mid	U-NII-2C	21.9
WLAN n 20 MHz	High (5680 MHz)	U-NII-2C	21.7
WLAN n 20 MHz	High (5700 MHz)	U-NII-2C	21.7
WLAN n 20 MHz	low	U-NII-3	24.4
WLAN n 20 MHz	mid	U-NII-3	22.9
WLAN n 20 MHz	high	U-NII-3	23.2
WLAN n 40 MHz	low	U-NII-1	39.8
WLAN n 40 MHz	high	U-NII-1	40.1
WLAN n 40 MHz	low	U-NII-2A	39.8
WLAN n 40 MHz	high	U-NII-2A	40.1
WLAN n 40 MHz	low	U-NII-2C	39.9
WLAN n 40 MHz	mid	U-NII-2C	39.8
WLAN n 40 MHz	high	U-NII-2C	39.8
WLAN n 40 MHz	low	U-NII-3	51.2
WLAN n 40 MHz	high	U-NII-3	64.5
WLAN ac 20 MHz	Straddle	U-NII-2C/3	21.8
WLAN ac 40 MHz	Straddle	U-NII-2C/3	39.9
WLAN ac 80 MHz	mid	U-NII-1	82.5
WLAN ac 80 MHz	mid	U-NII-2A	82.5
WLAN ac 80 MHz	low	U-NII-2C	82.5
WLAN ac 80 MHz	mid	U-NII-2C	82.5
WLAN ac 80 MHz	high	U-NII-2C	82.5
WLAN ac 80 MHz	mid	U-NII-3	84.0

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

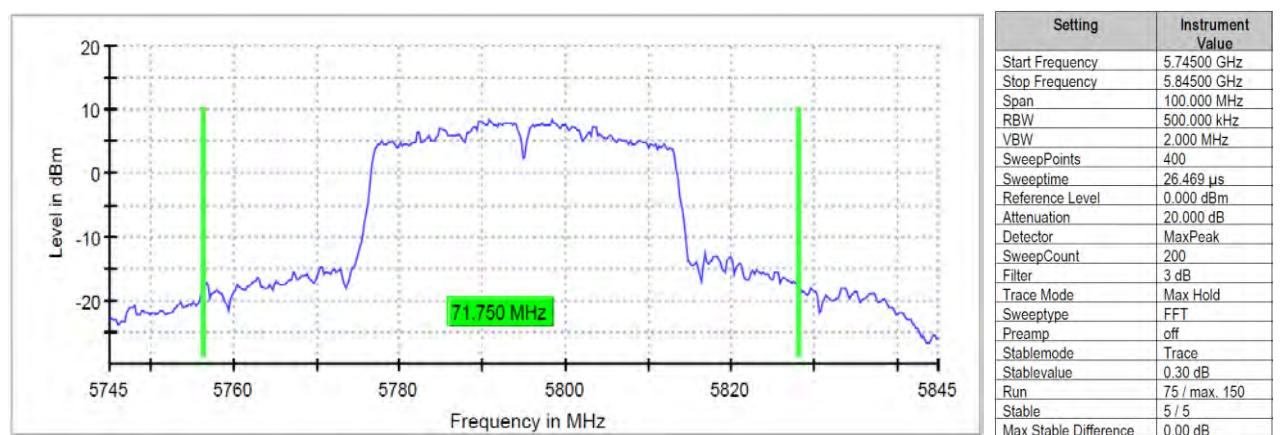
5.2.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")



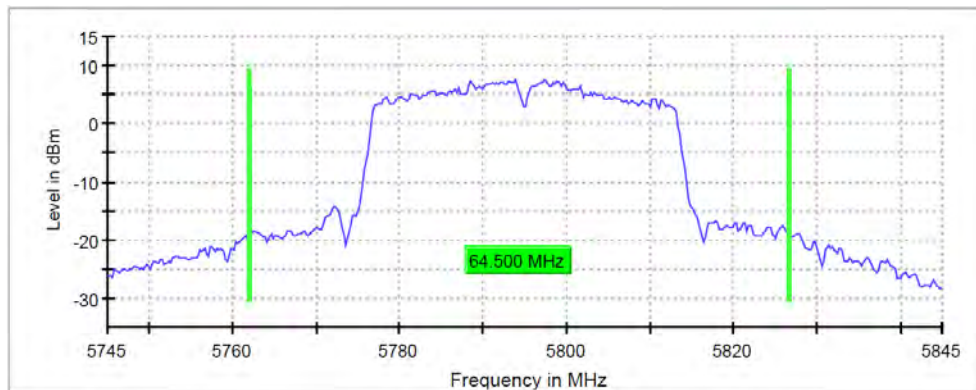
WLAN mode n, 20 MHz, mid channel band U-NII-3, core 0



WLAN mode n, 20 MHz, low channel band U-NII-3, core 1

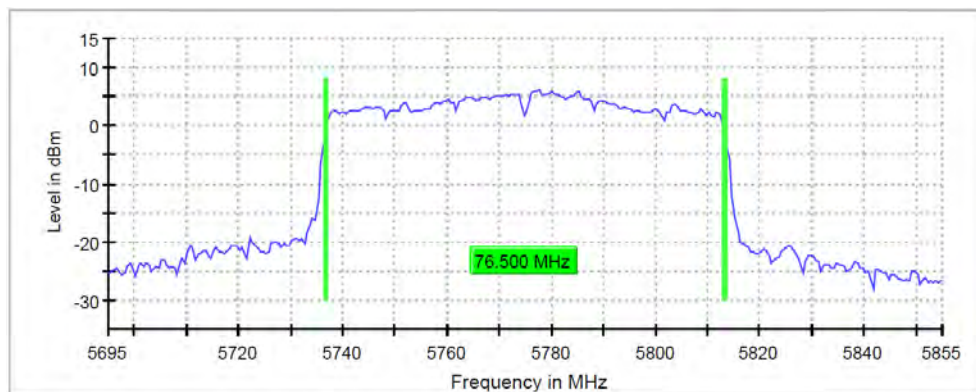


WLAN mode n, 40 MHz, high channel band U-NII-3, core 0



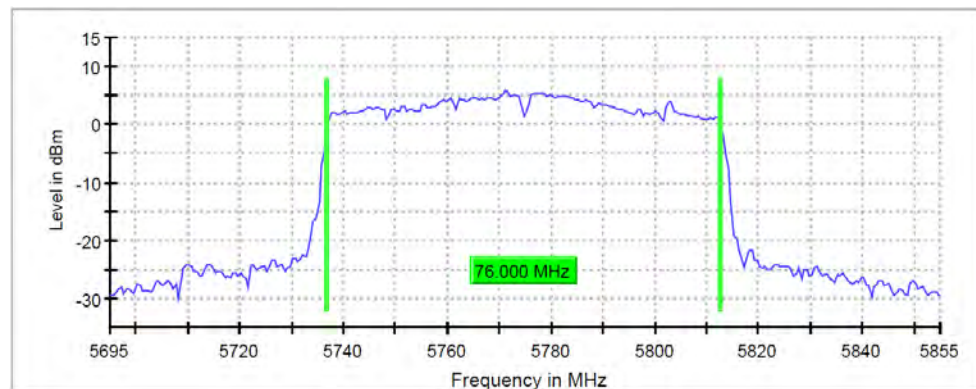
Setting	Instrument Value
Start Frequency	5.74500 GHz
Stop Frequency	5.84500 GHz
Span	100.000 MHz
RBW	500.000 kHz
VBW	2.000 MHz
SweepPoints	400
SweepTime	26.469 μ s
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	77 / max. 150
Stable	5 / 5
Max Stable Difference	0.19 dB

WLAN mode n, 40 MHz, high channel band U-NII-3, core 1



Setting	Instrument Value
Start Frequency	5.69500 GHz
Stop Frequency	5.85500 GHz
Span	160.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	320
SweepTime	22.875 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	22 / max. 150
Stable	5 / 5
Max Stable Difference	0.26 dB

WLAN mode n, 80 MHz, mid channel band U-NII-3, core 0



Setting	Instrument Value
Start Frequency	5.69500 GHz
Stop Frequency	5.85500 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	35 / max. 150
Stable	5 / 5
Max Stable Difference	0.07 dB

WLAN mode n, 80 MHz, mid channel band U-NII-3, core 1

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 spectrum analyzer via a short coax cable with a known loss.

Analyzer settings:

- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Span: 40 / 80 / 160 MHz (for 20 / 40 / 80 MHz nominal bandwidth)
- Trace: Maxhold
- Detector: Peak
- Sweep Time: Auto
- Number of Sweeps: Till stable

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: 24 °C
 Air Pressure: 1017 hPa
 Humidity: 48 %

6 dB BW Values of Core 0:

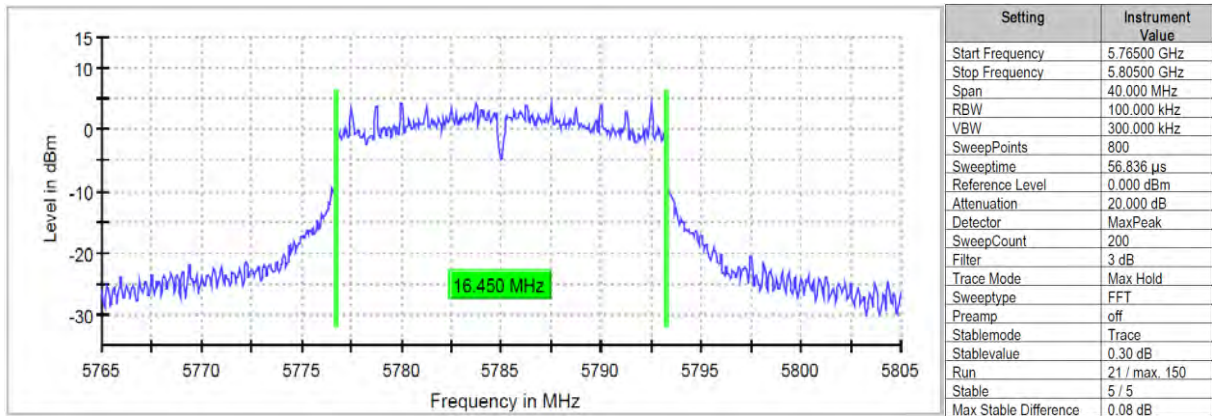
Radio Technology	Operating Frequency	6 dB Bandwidth [MHz]	Limit [MHz]	Margin [MHz]	Min. 6 dB Frequency [MHz]	Max. 6 dB Frequency [MHz]
WLAN a	low	16.45	0.5	15.95	5736.78	5753.23
WLAN a	mid	16.45	0.5	15.95	5776.78	5793.23
WLAN a	high	16.45	0.5	15.95	5816.78	5833.23
WLAN n 20 MHz	low	17.65	0.5	17.15	5736.18	5753.83
WLAN n 20 MHz	mid	17.65	0.5	17.15	5776.18	5793.83
WLAN n 20 MHz	high	17.65	0.5	17.15	5816.18	5833.83
WLAN n 40 MHz	low	35.85	0.5	35.35	5737.08	5772.93
WLAN n 40 MHz	high	35.85	0.5	35.35	5777.08	5812.93
WLAN ac 20 MHz	low	17.65	0.5	17.15	5736.18	5753.83
WLAN ac 20 MHz	mid	17.65	0.5	17.15	5776.18	5793.83
WLAN ac 20 MHz	high	17.65	0.5	17.15	5816.18	5833.83
WLAN ac 40 MHz	low	35.80	0.5	35.30	5737.03	5772.83
WLAN ac 40 MHz	high	35.85	0.5	35.35	5777.08	5812.93
WLAN ac 80 MHz	mid	75.75	0.5	75.25	5737.08	5812.83

6 dB BW of Core 1:

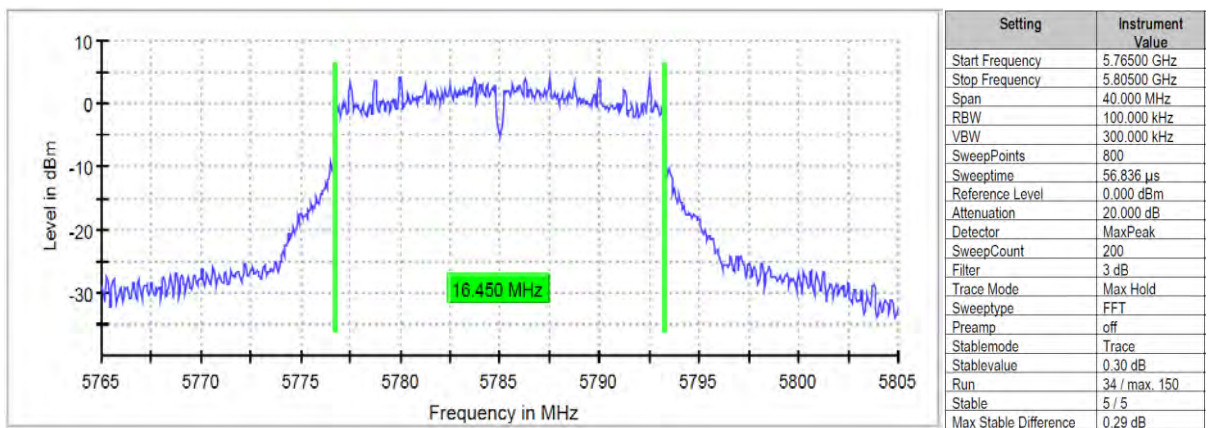
Radio Technology	Operating Frequency	6 dB Bandwidth [MHz]	Limit [MHz]	Margin [MHz]	Min. 6 dB Frequency [MHz]	Max. 6 dB Frequency [MHz]
WLAN a	low	16.45	0.5	15.95	5736.78	5753.23
WLAN a	mid	16.45	0.5	15.95	5776.78	5793.23
WLAN a	high	16.45	0.5	15.95	5816.78	5833.23
WLAN n 20 MHz	low	17.65	0.5	17.15	5736.18	5753.83
WLAN n 20 MHz	mid	17.65	0.5	17.15	5776.18	5793.83
WLAN n 20 MHz	high	17.65	0.5	17.15	5816.18	5833.83
WLAN n 40 MHz	low	35.85	0.5	35.35	5737.08	5772.93
WLAN n 40 MHz	high	35.80	0.5	35.30	5776.83	5812.63
WLAN ac 20 MHz	low	17.65	0.5	17.15	5736.18	5753.83
WLAN ac 20 MHz	mid	17.65	0.5	17.15	5776.18	5793.83
WLAN ac 20 MHz	high	17.65	0.5	17.15	5816.18	5833.83
WLAN ac 40 MHz	low	35.90	0.5	35.40	5737.08	5772.98
WLAN ac 40 MHz	high	35.55	0.5	35.05	5777.08	5812.63
WLAN ac 80 MHz	mid	75.55	0.5	75.05	5737.08	5812.63

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

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



WLAN mode a, mid channel, Core 0



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 spectrum analyzer via a short coax cable with a known loss.

Analyzer settings:

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

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

5.4.2 TEST REQUIREMENTS / LIMITS

No applicable limit:

5.4.3 TEST PROTOCOL

Ambient temperature: 24 °C
 Air Pressure: 1017 hPa
 Humidity: 48 %

99 % BW of Core 0:

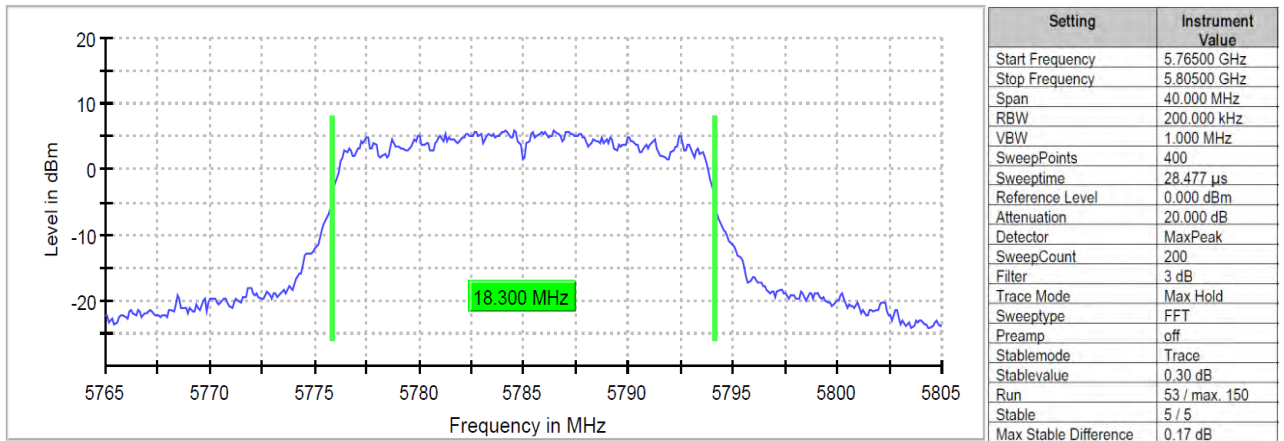
Radio Technology	Operating Frequency	Subband	99 % Bandwidth [MHz]
WLAN a	low	U-NII-1	16.7
WLAN a	mid	U-NII-1	16.7
WLAN a	high	U-NII-1	16.8
WLAN a	low	U-NII-2A	16.8
WLAN a	mid	U-NII-2A	16.8
WLAN a	high	U-NII-2A	16.7
WLAN a	Low (5500 MHz)	U-NII-2C	16.8
WLAN a	Low (5520 MHz)	U-NII-2C	16.8
WLAN a	mid	U-NII-2C	16.8
WLAN a	High (5680 MHz)	U-NII-2C	16.7
WLAN a	High (5700 MHz)	U-NII-2C	16.7
WLAN a	low	U-NII-3	17.0
WLAN a	mid	U-NII-3	17.0
WLAN a	high	U-NII-3	17.0
WLAN n 20 MHz	low	U-NII-1	17.9
WLAN n 20 MHz	mid	U-NII-1	18.0
WLAN n 20 MHz	high	U-NII-1	17.9
WLAN n 20 MHz	low	U-NII-2A	18.0
WLAN n 20 MHz	mid	U-NII-2A	18.0
WLAN n 20 MHz	high	U-NII-2A	17.9
WLAN n 20 MHz	Low (5500 MHz)	U-NII-2C	17.9
WLAN n 20 MHz	Low (5520 MHz)	U-NII-2C	17.9
WLAN n 20 MHz	mid	U-NII-2C	18.1
WLAN n 20 MHz	High (5680 MHz)	U-NII-2C	18.0
WLAN n 20 MHz	High (5700 MHz)	U-NII-2C	17.9
WLAN n 20 MHz	low	U-NII-3	18.3
WLAN n 20 MHz	mid	U-NII-3	18.3
WLAN n 20 MHz	high	U-NII-3	18.1
WLAN n 40 MHz	low	U-NII-1	36.3
WLAN n 40 MHz	high	U-NII-1	36.5
WLAN n 40 MHz	low	U-NII-2A	36.5
WLAN n 40 MHz	high	U-NII-2A	36.3
WLAN n 40 MHz	low	U-NII-2C	36.5
WLAN n 40 MHz	mid	U-NII-2C	36.5
WLAN n 40 MHz	high	U-NII-2C	36.3
WLAN n 40 MHz	low	U-NII-3	37.3
WLAN n 40 MHz	high	U-NII-3	37.3
WLAN ac 20 MHz	straddle	U-NII-2C/3	18.0
WLAN ac 40 MHz	straddle	U-NII-2C/3	36.5
WLAN ac 80 MHz	mid	U-NII-1	75.5
WLAN ac 80 MHz	mid	U-NII-2A	76.0
WLAN ac 80 MHz	low	U-NII-2C	75.5
WLAN ac 80 MHz	mid	U-NII-2C	76.0
WLAN ac 80 MHz	high	U-NII-2C	75.5
WLAN ac 80 MHz	mid	U-NII-3	76.5

99 % BW of Core 1:

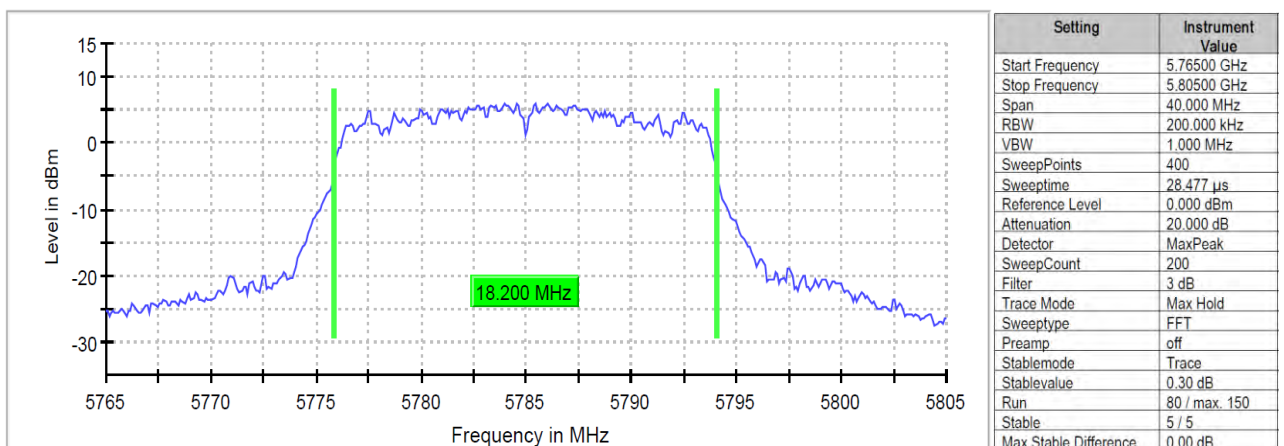
Radio Technology	Operating Frequency	Subband	99 % Bandwidth [MHz]
WLAN a	low	U-NII-1	16.7
WLAN a	mid	U-NII-1	16.7
WLAN a	high	U-NII-1	16.7
WLAN a	low	U-NII-2A	16.7
WLAN a	mid	U-NII-2A	16.7
WLAN a	high	U-NII-2A	16.7
WLAN a	Low (5500 MHz)	U-NII-2C	16.6
WLAN a	Low (5520 MHz)	U-NII-2C	16.7
WLAN a	mid	U-NII-2C	16.7
WLAN a	High (5680 MHz)	U-NII-2C	16.7
WLAN a	High (5700 MHz)	U-NII-2C	16.7
WLAN a	low	U-NII-3	16.8
WLAN a	mid	U-NII-3	16.8
WLAN a	high	U-NII-3	16.5
WLAN n 20 MHz	low	U-NII-1	17.9
WLAN n 20 MHz	mid	U-NII-1	17.9
WLAN n 20 MHz	high	U-NII-1	17.9
WLAN n 20 MHz	low	U-NII-2A	17.9
WLAN n 20 MHz	mid	U-NII-2A	17.9
WLAN n 20 MHz	high	U-NII-2A	17.9
WLAN n 20 MHz	Low (5500 MHz)	U-NII-2C	18.0
WLAN n 20 MHz	Low (5520 MHz)	U-NII-2C	17.9
WLAN n 20 MHz	mid	U-NII-2C	18.0
WLAN n 20 MHz	High (5680 MHz)	U-NII-2C	18.0
WLAN n 20 MHz	High (5700 MHz)	U-NII-2C	17.9
WLAN n 20 MHz	low	U-NII-3	18.1
WLAN n 20 MHz	mid	U-NII-3	18.2
WLAN n 20 MHz	high	U-NII-3	18.1
WLAN n 40 MHz	low	U-NII-1	36.3
WLAN n 40 MHz	high	U-NII-1	36.5
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	36.5
WLAN n 40 MHz	mid	U-NII-2C	36.3
WLAN n 40 MHz	high	U-NII-2C	36.3
WLAN n 40 MHz	low	U-NII-3	36.8
WLAN n 40 MHz	high	U-NII-3	36.8
WLAN ac 20 MHz	straddle	U-NII-2C/3	17.9
WLAN ac 40 MHz	straddle	U-NII-2C/3	36.3
WLAN ac 80 MHz	mid	U-NII-1	76.0
WLAN ac 80 MHz	mid	U-NII-2A	75.5
WLAN ac 80 MHz	low	U-NII-2C	75.5
WLAN ac 80 MHz	mid	U-NII-2C	76.0
WLAN ac 80 MHz	high	U-NII-2C	75.5
WLAN ac 80 MHz	mid	U-NII-3	76.0

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

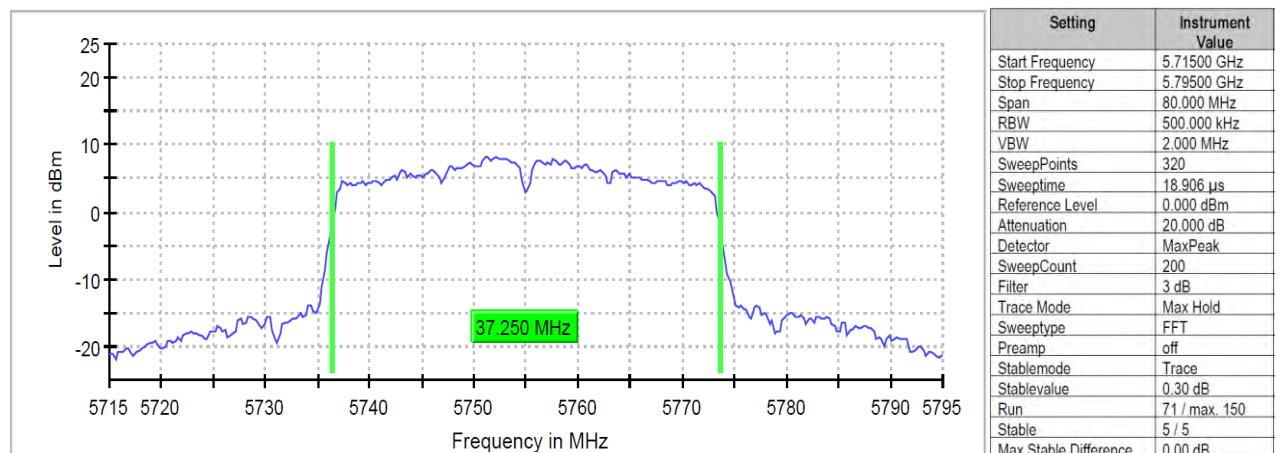
5.4.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")



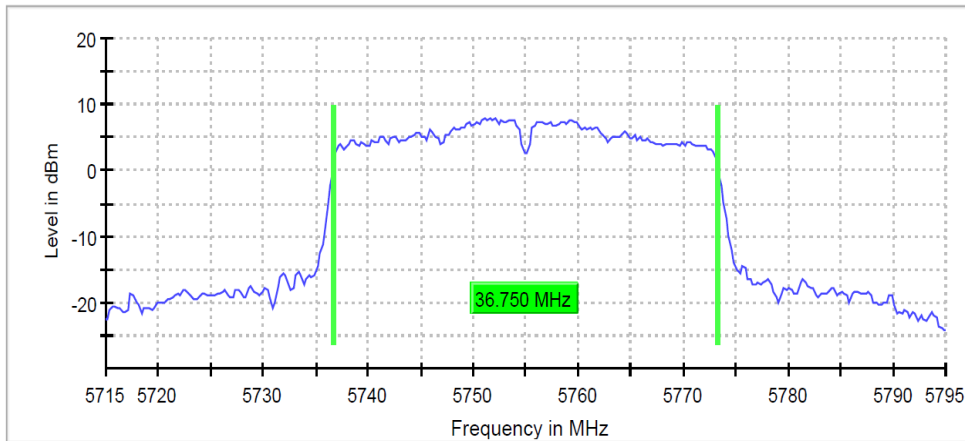
WLAN mode n, 20 MHz, mid channel band U-NII-3, core 0



WLAN mode n, 20 MHz, mid channel band U-NII-3, core 1

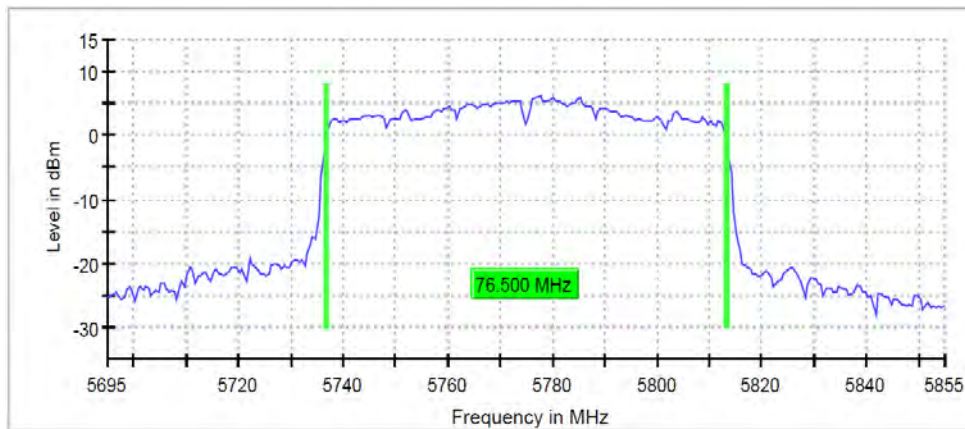


WLAN mode n, 40 MHz, low channel band U-NII-3, core 0



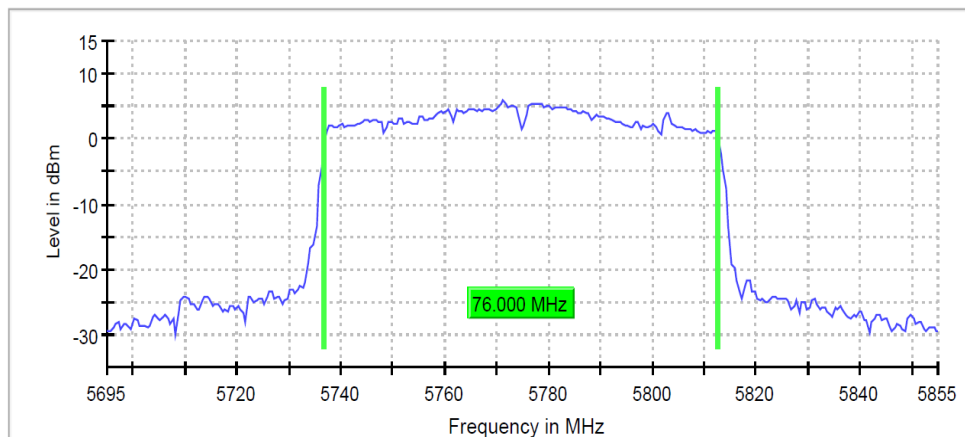
Setting	Instrument Value
Start Frequency	5.71500 GHz
Stop Frequency	5.79500 GHz
Span	80.000 MHz
RBW	500.000 kHz
VBW	2.000 MHz
SweepPoints	320
SweepTime	18.906 μ s
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	200
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamplifier	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	42 / max. 150
Stable	5 / 5
Max Stable Difference	0.00 dB

WLAN mode n, 40 MHz, low channel band U-NII-3, core 1



Setting	Instrument Value
Start Frequency	5.69500 GHz
Stop Frequency	5.85500 GHz
Span	160.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	320
SweepTime	22.875 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	22 / max. 150
Stable	5 / 5
Max Stable Difference	0.26 dB

WLAN mode n, 80 MHz, mid channel band U-NII-3, core 0



Setting	Instrument Value
Start Frequency	5.69500 GHz
Stop Frequency	5.85500 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	35 / max. 150
Stable	5 / 5
Max Stable Difference	0.07 dB

WLAN mode n, 80 MHz, mid channel band U-NII-3, core 1

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 a gated average reading power meter via a coax cable with a known loss.

5.5.2 TEST REQUIREMENTS / LIMITS

A) FCC

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

§15.407 (a) (1)

Limit: 50 mW (17 dBm) or $4 \text{ dBm} + 10 \log (26 \text{ dB bandwidth/MHz})$ whatever is the lesser.

FCC ET Docket No. 13-49, FIRST REPORT AND ORDER, April 1, 2014 ("new rules"):

§15.407 (a) (1) (i): Outdoor access point:

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) (iv): Mobile and portable client devices:

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

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

§15.407 (a) (2)

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

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

§15.407 (a) (3)

Limit: 1 W (30 dBm) or $17 \text{ dBm} + 10 \log (26 \text{ dB bandwidth/MHz})$ whatever is the lesser.

FCC ET Docket No. 13-49, FIRST REPORT AND ORDER, April 1, 2014 ("new rules"):

§15.407 (a) (3):

Limit: 1 W (30 dBm).

§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.

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

Limit (e.i.r.p.): 200 mW (23 dBm) or $10 + 10 \log_{10} B$ [dBm], whichever power is less.

B is the 99% emission bandwidth in MHz.

RSS-247, 6.2.2 (1), Band 5250-5350 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: For EUTs operating at a higher e.i.r.p. than 200 mW (23 dBm), compliance with the e.i.r.p. elevation mask is required.

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.

RSS-247, 6.2.4 (1), Band 5725-5825 MHz:

Limits:

Maximum conducted Power: 1W (30 dBm) or $17 + 10 \log_{10} B$ [dBm], whichever power is less.

e.i.r.p.: 4.0 W (36 dBm) or $23 + 10 \log_{10} B$ [dBm], whichever power is less.

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

5.5.3 TEST PROTOCOL

Ambient temperature: 24 °C
 Air Pressure: 1017 hPa
 Humidity: 48 %

Power Values of Core 0:

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	11.3	13.3	30.0	18.7	N/A		22.2	8.9	1)
	40	5200	13.5	15.5	30.0	16.5	N/A		22.2	6.7	1)
	48	5240	13.5	15.5	30.0	16.5	N/A		22.3	6.8	1)
2A	52	5260	13.8	15.8	24.0	10.2	23.3	9.5	29.3	13.5	1)
	60	5300	13.9	15.9	24.0	10.1	23.3	9.4	29.3	13.4	1)
	64	5320	11.8	13.8	24.0	12.2	23.2	11.4	29.2	15.4	1)
2C	100	5500	10.6	12.6	24.0	13.4	23.3	12.7	29.3	16.7	
	104	5520	12.8	14.8	24.0	11.2	23.3	10.5	29.3	14.5	
	116	5580	13.2	15.2	24.0	10.8	23.3	10.1	29.3	14.1	
	136	5680	12.5	14.5	24.0	11.5	23.2	10.7	29.2	14.7	
	140	5700	10.0	12.0	24.0	14.0	23.2	13.2	29.2	17.2	
	149	5745	16.7	18.7	30.0	13.3	30.0	13.3	36.0	17.3	
3	157	5785	16.5	18.5	30.0	13.5	30.0	13.5	36.0	17.5	
	165	5825	16.5	18.5	30.0	13.5	30.0	13.5	36.0	17.5	

WLAN n-Mode; 20 MHz; MCS0; 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	11.3	13.3	30.0	18.7	N/A		22.5	9.2	1)
	40	5200	13.5	15.5	30.0	16.5	N/A		22.6	7.1	1)
	48	5240	13.3	15.3	30.0	16.7	N/A		22.5	7.2	1)
2A	52	5260	13.8	15.8	24.0	10.2	23.6	9.8	29.6	13.8	1)
	60	5300	13.7	15.7	24.0	10.3	23.6	9.9	29.6	13.9	1)
	64	5320	11.6	13.6	24.0	12.4	23.5	11.9	29.5	15.9	1)
2C	100	5500	10.4	12.4	24.0	13.6	23.5	13.1	29.5	17.1	
	104	5520	12.8	14.8	24.0	11.2	23.5	10.7	29.5	14.7	
	116	5580	13.1	15.1	24.0	10.9	23.6	10.5	29.6	14.5	
	136	5680	12.6	14.6	24.0	11.4	23.6	11.0	29.6	15.0	
	140	5700	10.0	12.0	24.0	14.0	23.5	13.5	29.5	17.5	
	149	5745	16.5	18.5	30.0	13.5	30.0	13.5	36.0	17.5	
3	157	5785	16.4	18.4	30.0	13.6	30.0	13.6	36.0	17.6	
	165	5825	16.5	18.5	30.0	13.5	30.0	13.5	36.0	17.5	

WLAN n-Mode; 40 MHz; MCS0; 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	9.8	11.8	30.0	20.2	N/A		23.0	11.2	1)
	46	5230	12.6	14.6	30.0	17.4	N/A		23.0	8.4	1)
2A	54	5270	12.9	14.9	24.0	11.1	24.0	11.1	30.0	15.1	1)
	62	5310	11.7	13.7	24.0	12.3	24.0	12.3	30.0	16.3	1)
2C	102	5510	8.5	10.5	24.0	15.5	24.0	15.5	30.0	19.5	
	110	5550	12.8	14.8	24.0	11.2	24.0	11.2	30.0	15.2	
	134	5670	9.5	11.5	24.0	14.5	24.0	14.5	30.0	18.5	
3	151	5755	16.9	18.9	30.0	13.1	30.0	13.1	36.0	17.1	
	159	5795	17.0	19.0	30.0	13.0	30.0	13.0	36.0	17.0	

WLAN ac-Mode; 20 MHz; MCS0; 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	11.1	13.1	30.0	18.9	N/A		22.5	9.4	1)
	40	5200	13.4	15.4	30.0	16.6	N/A		22.5	7.1	1)
	48	5240	13.3	15.3	30.0	16.7	N/A		22.6	7.3	1)
2A	52	5260	13.7	15.7	24.0	10.3	23.6	9.9	29.6	13.9	1)
	60	5300	14.0	16.0	24.0	10.0	23.5	9.5	29.5	13.5	1)
	64	5320	11.9	13.9	24.0	12.1	23.5	11.6	29.5	15.6	1)
2C	100	5500	10.4	12.4	24.0	13.6	23.5	13.1	29.5	17.1	
	104	5520	12.7	14.7	24.0	11.3	23.6	10.9	29.6	14.9	
	116	5580	13.0	15.0	24.0	11.0	23.6	10.6	29.6	14.6	
	136	5680	12.6	14.6	24.0	11.4	23.6	11.0	29.6	15.0	
	140	5700	10.1	12.1	24.0	13.9	23.5	13.4	29.5	17.4	
2C/3 (straddle channel)	144	5720	12.5	14.5	24.0	11.5	23.6	11.1	29.6	15.1	
3	149	5745	16.7	18.7	30.0	13.3	30.0	13.3	36.0	17.3	
	157	5785	16.7	18.7	30.0	13.3	30.0	13.3	36.0	17.3	
	165	5825	16.7	18.7	30.0	13.3	30.0	13.3	36.0	17.3	

WLAN ac-Mode; 40 MHz; MCS0; 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	9.9	11.9	30.0	20.1	N/A		23.0	11.1	1)
	46	5230	12.8	14.8	30.0	17.2	N/A		23.0	8.2	1)
2A	54	5270	12.9	14.9	24.0	11.1	24.0	11.1	30.0	15.1	1)
	62	5310	11.7	13.7	24.0	12.3	24.0	12.3	30.0	16.3	1)
2C	102	5510	8.5	10.5	24.0	15.5	24.0	15.5	30.0	19.5	
	110	5550	12.8	14.8	24.0	11.2	24.0	11.2	30.0	15.2	
	134	5670	9.4	11.4	24.0	14.6	24.0	14.6	30.0	18.6	
2C/3 (straddle channel)	142	5710	12.0	14.0	24.0	12.0	24.0	12.0	30.0	16.0	
3	151	5755	17.0	19.0	30.0	13.0	30.0	13.0	36.0	17.0	
	159	5795	17.2	19.2	30.0	12.8	30.0	12.8	36.0	16.8	

WLAN ac-Mode; 80 MHz; MCS0; 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	9.7	11.7	30.0	20.3	N/A		23.0	11.3	1)
2A	58	5290	9.7	11.7	24.0	14.3	24.0	14.3	30.0	18.3	1)
2C	106	5530	7.4	9.4	24.0	16.6	24.0	16.6	30.0	20.6	
	122	5610	7.2	9.2	24.0	16.8	24.0	16.8	30.0	20.8	
	138	5690	10.1	12.1	24.0	13.9	24.0	13.9	30.0	17.9	
3	155	5775	14.4	16.4	30.0	15.6	30.0	15.6	36.0	19.6	

Power Values of Core 1:

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	11.3	13.3	30.0	18.7	N/A		22.2	8.9	1)
	40	5200	13.4	15.4	30.0	16.6	N/A		22.2	6.8	1)
	48	5240	13.3	15.3	30.0	16.7	N/A		22.2	6.9	1)
2A	52	5260	13.1	15.1	24.0	10.9	23.2	10.1	29.2	14.1	1)
	60	5300	13.1	15.1	24.0	10.9	23.2	10.1	29.2	14.1	1)
	64	5320	11.3	13.3	24.0	12.7	23.2	11.9	29.2	15.9	1)
2C	100	5500	10.3	12.3	24.0	13.7	23.2	12.9	29.2	16.9	
	104	5520	13.2	15.2	24.0	10.8	23.2	10.0	29.2	14.0	
	116	5580	13.3	15.3	24.0	10.7	23.2	9.9	29.2	13.9	
	136	5680	13.3	15.3	24.0	10.7	23.2	9.9	29.2	13.9	
	140	5700	10.3	12.3	24.0	13.7	23.2	12.9	29.2	16.9	
3	149	5745	16.1	18.1	30.0	13.9	30.0	13.9	36.0	17.9	
	157	5785	16.0	18.0	30.0	14.0	30.0	14.0	36.0	18.0	
	165	5825	16.0	18.0	30.0	14.0	30.0	14.0	36.0	18.0	

WLAN n-Mode; 20 MHz; MCS0; 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	11.2	13.2	30.0	18.8	N/A		22.5	9.3	1)
	40	5200	13.3	15.3	30.0	16.7	N/A		22.5	7.2	1)
	48	5240	13.4	15.4	30.0	16.6	N/A		22.5	7.1	1)
2A	52	5260	12.9	14.9	24.0	11.1	23.5	10.6	29.5	14.6	1)
	60	5300	12.8	14.8	24.0	11.2	23.5	10.7	29.5	14.7	1)
	64	5320	11.1	13.1	24.0	12.9	23.5	12.4	29.5	16.4	1)
2C	100	5500	10.5	12.5	24.0	13.5	23.6	13.1	29.6	17.1	
	104	5520	13.3	15.3	24.0	10.7	23.5	10.2	29.5	14.2	
	116	5580	13.4	15.4	24.0	10.6	23.6	10.2	29.6	14.2	
	136	5680	13.2	15.2	24.0	10.8	23.6	10.4	29.6	14.4	
	140	5700	10.0	12.0	24.0	14.0	23.5	13.5	29.5	17.5	
3	149	5745	15.8	17.8	30.0	14.2	30.0	14.2	36.0	18.2	
	157	5785	15.8	17.8	30.0	14.2	30.0	14.2	36.0	18.2	
	165	5825	15.7	17.7	30.0	14.3	30.0	14.3	36.0	18.3	

WLAN n-Mode; 40 MHz; MCS0; 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	9.7	11.7	30.0	20.3	N/A		23.0	11.3	1)
	46	5230	12.8	14.8	30.0	17.2	N/A		23.0	8.2	1)
2A	54	5270	12.5	14.5	24.0	11.5	24.0	11.5	30.0	15.5	1)
	62	5310	11.5	13.5	24.0	12.5	24.0	12.5	30.0	16.5	1)
2C	102	5510	8.5	10.5	24.0	15.5	24.0	15.5	30.0	19.5	
	110	5550	12.8	14.8	24.0	11.2	24.0	11.2	30.0	15.2	
	134	5670	9.6	11.6	24.0	14.4	24.0	14.4	30.0	18.4	
3	151	5755	16.7	18.7	30.0	13.3	30.0	13.3	36.0	17.3	
	159	5795	16.4	18.4	30.0	13.6	30.0	13.6	36.0	17.6	

WLAN ac-Mode; 20 MHz; MCS0; 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	11.6	13.6	30.0	18.4	N/A		22.5	8.9	1)
	40	5200	13.6	15.6	30.0	16.4	N/A		22.5	6.9	1)
	48	5240	13.7	15.7	30.0	16.3	N/A		22.5	6.8	1)
2A	52	5260	13.2	15.2	24.0	10.8	23.5	10.3	29.5	14.3	1)
	60	5300	13.3	15.3	24.0	10.7	23.6	10.3	29.6	14.3	1)
	64	5320	11.5	13.5	24.0	12.5	23.5	12.0	29.5	16.0	1)
2C	100	5500	10.5	12.5	24.0	13.5	23.5	13.0	29.5	17.0	
	104	5520	13.4	15.4	24.0	10.6	23.5	10.1	29.5	14.1	
	116	5580	13.3	15.3	24.0	10.7	23.5	10.2	29.5	14.2	
	136	5680	13.3	15.3	24.0	10.7	23.5	10.2	29.5	14.2	
	140	5700	10.4	12.4	24.0	13.6	23.5	13.1	29.5	17.1	
2C/3 (straddle channel)	144	5720	12.9	14.9	24.0	11.1	23.5	10.6	29.5	14.6	
3	149	5745	16.0	18.0	30.0	14.0	30.0	14.0	36.0	18.0	
	157	5785	16.1	18.1	30.0	13.9	30.0	13.9	36.0	17.9	
	165	5825	15.9	17.9	30.0	14.1	30.0	14.1	36.0	18.1	

WLAN ac-Mode; 40 MHz; MCS0; 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	9.8	11.8	30.0	20.2	N/A		23.0	11.2	1)
	46	5230	12.8	14.8	30.0	17.2	N/A		23.0	8.2	1)
2A	54	5270	12.5	14.5	24.0	11.5	24.0	11.5	30.0	15.5	1)
	62	5310	11.3	13.3	24.0	12.7	24.0	12.7	30.0	16.7	1)
2C	102	5510	8.5	10.5	24.0	15.5	24.0	15.5	30.0	19.5	
	110	5550	12.7	14.7	24.0	11.3	24.0	11.3	30.0	15.3	
	134	5670	9.3	11.3	24.0	14.7	24.0	14.7	30.0	18.7	
2C/3 (straddle channel)	142	5710	12.3	14.3	24.0	11.7	24.0	11.7	30.0	15.7	
3	151	5755	16.4	18.4	30.0	13.6	30.0	13.6	36.0	17.6	
	159	5795	16.2	18.2	30.0	13.8	30.0	13.8	36.0	17.8	

WLAN ac-Mode; 80 MHz; MCS0; 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	9.6	11.6	30.0	20.4	N/A		23.0	11.4	1)
2A	58	5290	9.2	11.2	24.0	14.8	24.0	14.8	30.0	18.8	1)
2C	106	5530	7.0	9.0	24.0	17.0	24.0	17.0	30.0	21.0	
	122	5610	6.6	8.6	24.0	17.4	24.0	17.4	30.0	21.4	
	138	5690	10.2	12.2	24.0	13.8	24.0	13.8	30.0	17.8	
3	155	5775	13.7	15.7	30.0	16.3	30.0	16.3	36.0	20.3	

Power Values of Core 0 + Core 1 (calculated MIMO value):

WLAN n-Mode; 20 MHz; MCS0

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	14.3	16.3	30.0	15.7	N/A		22.5	6.3	1)
	40	5200	16.4	18.4	30.0	13.6	N/A		22.6	4.1	1)
	48	5240	16.4	18.4	30.0	13.6	N/A		22.5	4.2	1)
2A	52	5260	16.4	18.4	24.0	7.6	23.6	7.2	29.6	11.2	1)
	60	5300	16.3	18.3	24.0	7.7	23.6	7.3	29.6	11.3	1)
	64	5320	14.4	16.4	24.0	9.6	23.5	9.2	29.5	13.2	1)
2C	100	5500	13.5	15.5	24.0	10.5	23.5	10.1	29.5	14.1	
	104	5520	16.1	18.1	24.0	7.9	23.5	7.5	29.5	11.5	
	116	5580	16.3	18.3	24.0	7.7	23.6	7.3	29.6	11.3	
	136	5680	15.9	17.9	24.0	8.1	23.6	7.6	29.6	11.6	
3	140	5700	13.0	15.0	24.0	11.0	23.5	10.5	29.5	14.5	
	149	5745	15.7	17.7	24.0	8.3	23.6	7.8	29.6	11.8	
	157	5785	19.2	21.2	30.0	10.8	30.0	10.8	36.0	14.8	
	165	5825	19.1	21.1	30.0	10.9	30.0	10.9	36.0	14.9	

WLAN n-Mode; 40 MHz; MCS0

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	12.8	14.8	30.0	17.2	N/A		23.0	8.2	1)
	46	5230	15.7	17.7	30.0	14.3	N/A		23.0	5.3	1)
2A	54	5270	15.7	17.7	24.0	8.3	24.0	8.3	30.0	12.3	1)
	62	5310	14.6	16.6	24.0	9.4	24.0	9.4	30.0	13.4	1)
2C	102	5510	11.5	13.5	24.0	12.5	24.0	12.5	30.0	16.5	
	110	5550	15.8	17.8	24.0	8.2	24.0	8.2	30.0	12.2	
	134	5670	12.6	14.6	24.0	11.4	24.0	11.4	30.0	15.4	
3	151	5755	14.2	16.2	24.0	9.8	24.0	9.8	30.0	13.8	
	159	5795	19.8	21.8	30.0	10.2	30.0	10.2	36.0	14.2	

WLAN ac-Mode; 20 MHz; MCS0

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	14.4	16.4	30.0	15.6	N/A		22.5	6.2	1)
	40	5200	16.5	18.5	30.0	13.5	N/A		22.5	4.0	1)
	48	5240	16.5	18.5	30.0	13.5	N/A		22.6	4.0	1)
2A	52	5260	16.5	18.5	24.0	7.5	23.6	7.1	29.6	11.1	1)
	60	5300	16.7	18.7	24.0	7.3	23.5	6.9	29.5	10.9	1)
	64	5320	14.7	16.7	24.0	9.3	23.5	8.8	29.5	12.8	1)
2C	100	5500	13.5	15.5	24.0	10.5	23.5	10.1	29.5	14.1	
	104	5520	16.1	18.1	24.0	7.9	23.6	7.5	29.6	11.5	
	116	5580	16.2	18.2	24.0	7.8	23.6	7.4	29.6	11.4	
	136	5680	16.0	18.0	24.0	8.0	23.6	7.6	29.6	11.6	
2C/3 (straddle channel)	140	5700	13.3	15.3	24.0	10.7	23.5	10.3	29.5	14.3	
	144	5720	15.7	17.7	24.0	8.3	23.6	7.8	29.6	11.8	
	149	5745	19.4	21.4	30.0	10.6	30.0	10.6	36.0	14.6	
3	157	5785	19.4	21.4	30.0	10.6	30.0	10.6	36.0	14.6	
	165	5825	19.3	21.3	30.0	10.7	30.0	10.7	36.0	14.7	

WLAN ac-Mode; 40 MHz; MCS0

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	12.9	14.9	30.0	17.1	N/A		23.0	8.1	1)
	46	5230	15.8	17.8	30.0	14.2	N/A		23.0	5.2	1)
2A	54	5270	15.7	17.7	24.0	8.3	24.0	8.3	30.0	12.3	1)
	62	5310	14.5	16.5	24.0	9.5	24.0	9.5	30.0	13.5	1)
2C	102	5510	11.5	13.5	24.0	12.5	24.0	12.5	30.0	16.5	
	110	5550	15.8	17.8	24.0	8.2	24.0	8.2	30.0	12.2	
	134	5670	12.4	14.4	24.0	11.6	24.0	11.6	30.0	15.6	
2C/3 (straddle channel)	142	5710	15.2	17.2	24.0	8.8	24.0	8.8	30.0	12.8	
3	151	5755	19.7	21.7	30.0	10.3	30.0	10.3	36.0	14.3	
	159	5795	19.7	21.7	30.0	10.3	30.0	10.3	36.0	14.3	

WLAN ac-Mode; 80 MHz; MCS0; 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	12.7	14.7	30.0	17.3	N/A		23.0	8.3	1)
2A	58	5290	12.5	14.5	24.0	11.5	24.0	11.5	30.0	15.5	1)
2C	106	5530	10.2	12.2	24.0	13.8	24.0	13.8	30.0	17.8	
	122	5610	9.9	11.9	24.0	14.1	24.0	14.1	30.0	18.1	
	138	5690	13.2	15.2	24.0	10.8	24.0	10.8	30.0	14.8	
3	155	5775	17.1	19.1	30.0	12.9	30.0	12.9	36.0	16.9	

Remark: 1) no additional limit applies related to the elevation.
Please see next sub-clause for the measurement plot.

5.5.4 MEASUREMENT PLOT

Power Meter Measurement, no plots.

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 spectrum analyzer via a short coax cable with a known loss.

Analyzer settings:

- Resolution Bandwidth (RBW): 1 MHz / 500 kHz (U-NII bands 1,2A,2C / U-NII band 3)
- Video Bandwidth (VBW): 3 MHz / 2 MHz (U-NII bands 1,2A,2C / U-NII band 3)
- Detector: RMS
- Number of Sweeps: till stable

See plots for further details

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-1**.

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.

Note: The limit will be also fulfilled when measuring at any bandwidth greater than 500 kHz.

This applies to signals where the maximum conducted output power was measured at a bandwidth exceeding 500 kHz and which fulfil that limit of 30 dBm.

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: 24 °C
Air Pressure: 1017 hPa
Humidity: 48 %

Power Density Values of Core 0:

WLAN a-Mode; 20 MHz; 6 Mbit/s

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	36	5180	1.1	17.0	15.9	3.1	10.0	6.9
	40	5200	3.1	17.0	13.9	5.1	10.0	4.9
	48	5240	2.6	17.0	14.4	4.6	10.0	5.4
2A	52	5260	2.8	11.0	8.2		11.0	8.2
	60	5300	2.9	11.0	8.1		11.0	8.1
	64	5320	0.9	11.0	10.1		11.0	10.1
2C	100	5500	-0.3	11.0	11.3		11.0	11.3
	104	5520	2.0	11.0	9.0		11.0	9.0
	116	5580	2.5	11.0	8.5		11.0	8.5
	136	5680	2.1	11.0	8.9		11.0	8.9
3	140	5700	-0.8	11.0	11.8		11.0	11.8
	149	5745	2.9	30.0	27.1		30.0	27.1
	157	5785	2.9	30.0	27.1		30.0	27.1
	165	5825	2.8	30.0	27.2		30.0	27.2

WLAN n-Mode; 20 MHz; MCS0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	36	5180	0.6	17.0	16.4	2.6	10.0	7.4
	40	5200	2.5	17.0	14.5	4.5	10.0	5.5
	48	5240	2.2	17.0	14.8	4.2	10.0	5.8
2A	52	5260	2.7	11.0	8.3		11.0	8.3
	60	5300	2.6	11.0	8.4		11.0	8.4
	64	5320	1.1	11.0	9.9		11.0	9.9
2C	100	5500	-0.2	11.0	11.2		11.0	11.2
	104	5520	1.8	11.0	9.2		11.0	9.2
	116	5580	2.7	11.0	8.4		11.0	8.4
	136	5680	1.6	11.0	9.4		11.0	9.4
3	140	5700	-0.6	11.0	11.6		11.0	11.6
	149	5745	2.6	30.0	27.4		30.0	27.4
	157	5785	2.6	30.0	27.4		30.0	27.4
	165	5825	2.5	30.0	27.5		30.0	27.5

WLAN n-Mode; 40 MHz; MCS0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	38	5190	-2.9	17.0	19.9	-0.9	10.0	10.9
	46	5230	-0.1	17.0	17.1	1.9	10.0	8.1
2A	54	5270	0.2	11.0	10.8		11.0	10.8
	62	5310	-0.9	11.0	11.9		11.0	11.9
2C	102	5510	-4.6	11.0	15.6		11.0	15.6
	110	5550	-0.2	11.0	11.2		11.0	11.2
	134	5670	-3.4	11.0	14.4		11.0	14.4
3	151	5755	1.3	30.0	28.7		30.0	28.7
	159	5795	1.6	30.0	28.4		30.0	28.4

WLAN ac-Mode; 20 MHz; MCS0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	36	5180	0.3	17.0	16.7	2.3	10.0	7.7
	40	5200	2.5	17.0	14.5	4.5	10.0	5.5
	48	5240	2.5	17.0	14.5	4.5	10.0	5.5
2A	52	5260	3.0	11.0	8.1		11.0	8.1
	60	5300	2.9	11.0	8.1		11.0	8.1
	64	5320	1.3	11.0	9.7		11.0	9.7
2C	100	5500	-0.1	11.0	11.1		11.0	11.1
	104	5520	1.9	11.0	9.2		11.0	9.2
	116	5580	2.2	11.0	8.8		11.0	8.8
	136	5680	1.8	11.0	9.2		11.0	9.2
2C/3 (straddle channel)	140	5700	-0.2	11.0	11.2		11.0	11.2
	144	5720	1.8	11.0	9.2		11.0	9.2
3	149	5745	2.9	30.0	27.1		30.0	27.1
	157	5785	2.9	30.0	27.1		30.0	27.1
	165	5825	3.1	30.0	26.9		30.0	26.9

WLAN ac-Mode; 40 MHz; MCS0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	38	5190	-2.7	17.0	19.7	-0.7	10.0	10.7
	46	5230	0.0	17.0	17.0	2.0	10.0	8.0
2A	54	5270	0.0	11.0	11.0		11.0	11.0
	62	5310	-1.2	11.0	12.2		11.0	12.2
2C	102	5510	-4.2	11.0	15.2		11.0	15.2
	110	5550	-0.1	11.0	11.1		11.0	11.1
	134	5670	-3.3	11.0	14.3		11.0	14.3
2C/3 (straddle channel)	142	5710	-0.5	11.0	11.5		11.0	11.5
3	151	5755	1.4	30.0	28.6		30.0	28.6
	159	5795	1.6	30.0	28.4		30.0	28.4

WLAN ac-Mode; 80 MHz; MCS0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	42	5210	-5.6	17.0	22.6	-3.6	10.0	13.6
2A	58	5290	-5.6	11.0	16.6		11.0	16.6
2C	106	5530	-8.5	11.0	19.5		11.0	19.5
	122	5610	-8.7	11.0	19.7		11.0	19.7
	138	5690	-6.0	11.0	17.0		11.0	17.0
3	155	5775	-5.5	30.0	35.5		30.0	35.5

Power Density Values of Core 1:

WLAN a-Mode; 20 MHz; 6 Mbit/s

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	36	5180	1.0	17.0	16.0	3.0	10.0	7.0
	40	5200	2.8	17.0	14.2	4.8	10.0	5.2
	48	5240	3.1	17.0	13.9	5.1	10.0	4.9
2A	52	5260	2.7	11.0	8.3		11.0	8.3
	60	5300	2.9	11.0	8.1		11.0	8.1
	64	5320	1.1	11.0	9.9		11.0	9.9
2C	100	5500	-0.1	11.0	11.1		11.0	11.1
	104	5520	2.9	11.0	8.1		11.0	8.1
	116	5580	3.3	11.0	7.7		11.0	7.7
	136	5680	3.3	11.0	7.7		11.0	7.7
	140	5700	0.1	11.0	10.9		11.0	10.9
3	149	5745	2.9	30.0	27.1		30.0	27.1
	157	5785	3.0	30.0	27.0		30.0	27.0
	165	5825	2.7	30.0	27.3		30.0	27.3

WLAN n-Mode; 20 MHz; MCS0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	36	5180	-0.6	17.0	17.6	1.4	10.0	8.6
	40	5200	1.3	17.0	15.7	3.3	10.0	6.7
	48	5240	1.5	17.0	15.5	3.5	10.0	6.5
2A	52	5260	0.8	11.0	10.2		11.0	10.2
	60	5300	0.9	11.0	10.1		11.0	10.1
	64	5320	-0.9	11.0	11.9		11.0	11.9
2C	100	5500	-0.3	11.0	11.3		11.0	11.3
	104	5520	2.7	11.0	8.3		11.0	8.3
	116	5580	3.0	11.0	8.0		11.0	8.0
	136	5680	2.7	11.0	8.3		11.0	8.3
	140	5700	-0.4	11.0	11.4		11.0	11.4
3	149	5745	2.5	30.0	27.5		30.0	27.5
	157	5785	2.4	30.0	27.6		30.0	27.6
	165	5825	2.2	30.0	27.8		30.0	27.8

WLAN n-Mode; 40 MHz; MCS0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	38	5190	-2.5	17.0	19.5	-0.5	10.0	10.5
	46	5230	0.2	17.0	16.8	2.2	10.0	7.8
2A	54	5270	-0.2	11.0	11.2		11.0	11.2
	62	5310	-1.4	11.0	12.4		11.0	12.4
2C	102	5510	-4.5	11.0	15.5		11.0	15.5
	110	5550	0.2	11.0	10.8		11.0	10.8
	134	5670	-3.4	11.0	14.4		11.0	14.4
3	151	5755	1.1	30.0	28.9		30.0	28.9
	159	5795	0.9	30.0	29.1		30.0	29.1

WLAN ac-Mode; 20 MHz; MCS0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	36	5180	1.2	17.0	15.8	3.2	10.0	6.8
	40	5200	3.1	17.0	13.9	5.1	10.0	4.9
	48	5240	3.0	17.0	14.0	5.0	10.0	5.0
2A	52	5260	2.9	11.0	8.1		11.0	8.1
	60	5300	2.9	11.0	8.1		11.0	8.1
	64	5320	0.9	11.0	10.1		11.0	10.1
2C	100	5500	-0.1	11.0	11.1		11.0	11.1
	104	5520	2.5	11.0	8.5		11.0	8.5
	116	5580	2.9	11.0	8.1		11.0	8.1
	136	5680	2.6	11.0	8.4		11.0	8.4
	140	5700	-0.3	11.0	11.3		11.0	11.3
2C/3 (straddle channel)	144	5720	2.4	11.0	8.6		11.0	8.6
3	149	5745	2.6	30.0	27.4		30.0	27.4
	157	5785	2.5	30.0	27.5		30.0	27.5
	165	5825	2.4	30.0	27.6		30.0	27.6

WLAN ac-Mode; 40 MHz; MCS0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	38	5190	-2.5	17.0	19.5	-0.5	10.0	10.5
	46	5230	0.5	17.0	16.5	2.5	10.0	7.5
2A	54	5270	0.3	11.0	10.7		11.0	10.7
	62	5310	-0.9	11.0	11.9		11.0	11.9
2C	102	5510	-4.2	11.0	15.2		11.0	15.2
	110	5550	-0.4	11.0	11.4		11.0	11.4
	134	5670	-3.7	11.0	14.7		11.0	14.7
2C/3 (straddle channel)	142	5710	-0.6	11.0	11.6		11.0	11.6
3	151	5755	0.6	30.0	29.4		30.0	29.4
	159	5795	0.6	30.0	29.4		30.0	29.4

WLAN ac-Mode; 80 MHz; MCS0; SISO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	42	5210	-6.8	17.0	23.8	10.0	14.8	-6.8
2A	58	5290	-7.1	11.0	18.1	11.0	18.1	-7.1
2C	106	5530	-9.2	11.0	20.2	11.0	20.2	-9.2
	122	5610	-9.6	11.0	20.6	11.0	20.6	-9.6
	138	5690	-6.4	11.0	17.4	11.0	17.4	-6.4
3	155	5775	-5.7	30.0	35.7	30.0	35.7	-5.7

Power Density Values of Core 0 + Core 1 (calculated MIMO value):

WLAN n-Mode; 20 MHz; MCS0

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	36	5180	3.0	17.0	14.0	5.0	10.0	5.0
	40	5200	5.0	17.0	12.0	7.0	10.0	3.0
	48	5240	4.9	17.0	12.1	6.9	10.0	3.1
2A	52	5260	4.9	11.0	6.1		11.0	6.1
	60	5300	4.8	11.0	6.2		11.0	6.2
	64	5320	3.2	11.0	7.8		11.0	7.8
2C	100	5500	2.8	11.0	8.2		11.0	8.2
	104	5520	5.3	11.0	5.7		11.0	5.7
	116	5580	5.8	11.0	5.2		11.0	5.2
	136	5680	5.2	11.0	5.8		11.0	5.8
	140	5700	2.5	11.0	8.5		11.0	8.5
3	149	5745	5.6	30.0	24.4		30.0	24.4
	157	5785	5.5	30.0	24.5		30.0	24.5
	165	5825	5.4	30.0	24.6		30.0	24.6

WLAN n-Mode; 40 MHz; MCS0; MIMO

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	38	5190	0.3	17.0	16.7	2.3	10.0	7.7
	46	5230	3.1	17.0	13.9	5.1	10.0	4.9
2A	54	5270	3.0	11.0	8.0		11.0	8.0
	62	5310	1.9	11.0	9.1		11.0	9.1
2C	102	5510	-1.5	11.0	12.5		11.0	12.5
	110	5550	3.0	11.0	8.0		11.0	8.0
	134	5670	-0.4	11.0	11.4		11.0	11.4
3	151	5755	4.2	30.0	25.8		30.0	25.8
	159	5795	4.3	30.0	25.7		30.0	25.7

WLAN ac-Mode; 20 MHz; MCS0

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	36	5180	3.8	17.0	13.2	5.8	10.0	4.2
	40	5200	5.8	17.0	11.2	7.8	10.0	2.2
	48	5240	5.8	17.0	11.2	7.8	10.0	2.2
2A	52	5260	5.9	11.0	5.1		11.0	5.1
	60	5300	5.9	11.0	5.1		11.0	5.1
	64	5320	4.1	11.0	6.9		11.0	6.9
2C	100	5500	2.9	11.0	8.1		11.0	8.1
	104	5520	5.2	11.0	5.8		11.0	5.8
	116	5580	5.6	11.0	5.4		11.0	5.4
	136	5680	5.2	11.0	5.8		11.0	5.8
2C/3 (straddle channel)	140	5700	2.7	11.0	8.3		11.0	8.3
	144	5720	5.1	11.0	5.9		11.0	5.9
3	149	5745	5.8	30.0	24.2		30.0	24.2
	157	5785	5.7	30.0	24.3		30.0	24.3
	165	5825	5.8	30.0	24.2		30.0	24.2

WLAN ac-Mode; 40 MHz; MCS0

U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	38	5190	0.4	17.0	16.6	2.4	10.0	7.6
	46	5230	3.3	17.0	13.7	5.3	10.0	4.7
2A	54	5270	3.2	11.0	7.8		11.0	7.8
	62	5310	2.0	11.0	9.0		11.0	9.0
2C	102	5510	-1.2	11.0	12.2		11.0	12.2
	110	5550	2.8	11.0	8.2		11.0	8.2
	134	5670	-0.5	11.0	11.5		11.0	11.5
2C/3 (straddle channel)	142	5710	2.5	11.0	8.5		11.0	8.5
3	151	5755	4.0	30.0	26.0		30.0	26.0
	159	5795	4.1	30.0	25.9		30.0	25.9

WLAN ac-Mode; 80 MHz; MCS0

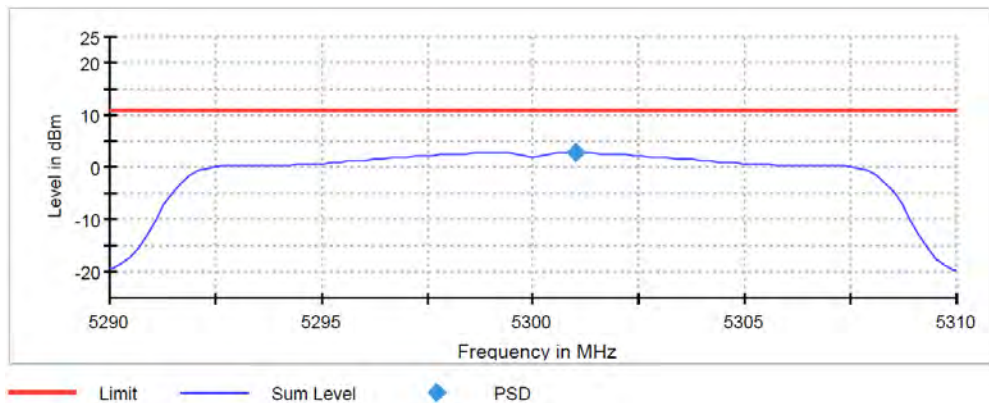
U-NII-Subband	Ch. No.	Freq. [MHz]	MPSD [dBm / MHz] or [dBm / 500 kHz]	FCC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]	MPSD EIRP [dBm / MHz] or [dBm / 500 kHz]	IC Limit [dBm / MHz] or [dBm / 500 kHz]	Margin [dB]
1	42	5210	-3.1	17.0	20.1	-1.1	10.0	11.1
2A	58	5290	-3.3	11.0	14.3		11.0	14.3
2C	106	5530	-5.8	11.0	16.8		11.0	16.8
	122	5610	-6.1	11.0	17.1		11.0	17.1
	138	5690	-3.2	11.0	14.2		11.0	14.2
3	155	5775	-2.6	30.0	32.6		30.0	32.6

Remark: The values and limits of U-NII bands 1, 2A and 2C are given as dBm/MHz and the values of band U-NII-3 are given as dBm/500 kHz.

Please see next sub-clause for the measurement plot.

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

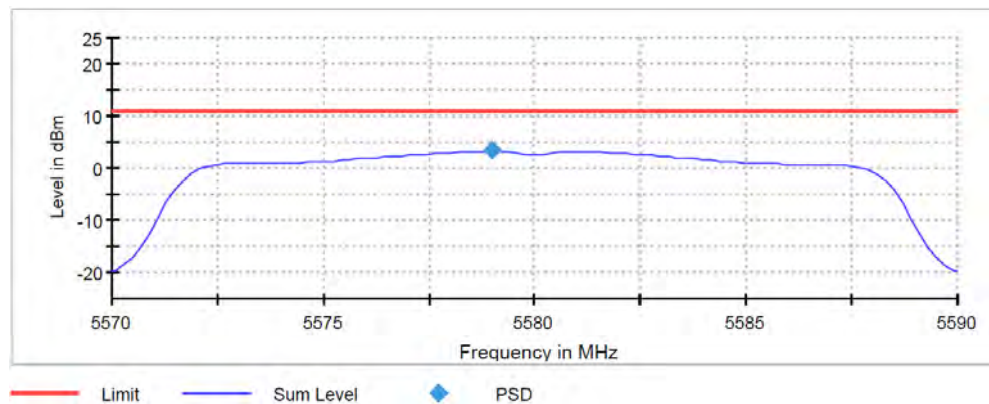
DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)
5300.000000	5300.990099	2.906



Setting	Instrument Value
Start Frequency	5.29000 GHz
Stop Frequency	5.31000 GHz
Span	20.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
Sweptime	101.000 ms
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	RMS
SweepCount	595
Filter	3 dB
Trace Mode	Max Hold
SweepType	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.00 dB

WLAN mode a, mid channel band U-NII-2A, core 0

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)
5580.000000	5579.009901	3.312



Setting	Instrument Value
Start Frequency	5.57000 GHz
Stop Frequency	5.59000 GHz
Span	20.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
Sweptime	101.000 ms
Reference Level	-10.000 dBm
Attenuation	10.000 dB
Detector	RMS
SweepCount	595
Filter	3 dB
Trace Mode	Max Hold
SweepType	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.03 dB

WLAN mode a, mid channel band U-NII-2C, core 1

5.6.5 TEST EQUIPMENT USED

- R&S TS8997

5.7 UNDESIRABLE EMISSIONS; GENERAL FIELD STRENGTH LIMITS

Standard **FCC Part 15 Subpart E**

5.7.1 RADIATED MEASUREMENT (ANTENNA PORTS TERMINATED WITH 50 OHM)

The test was performed according to:
ANSI C63.10

5.7.1.1 TEST DESCRIPTION

The test set-up was made in accordance to the general provisions of ANSI C63.10 in a typical installation configuration. The Equipment Under Test (EUT) was set up on a non-conductive table 1.0 x 2.0 m² in the semi-anechoic chamber. The influence of the EUT support table that is used between 30–1000 MHz was evaluated.

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 from a DC power source.

1. Measurement up to 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

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 – 3 m
- Height variation step size: 2 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 $\pm 45^{\circ}$ 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 by ± 100 cm around the antenna height determined. 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: $\pm 45^{\circ}$ around the determined value
- Height variation range: ± 100 cm around the determined value
- Antenna Polarisation: max. value determined in step 1

Step 3: Final measurement with QP detector

With the settings determined in step 3, the final measurement will be performed:

EMI receiver settings for step 4:

- 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.

3. Measurement above 1 GHz

The following modifications apply to the measurement procedure for the frequency range above 1 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° .

Above 26 GHz the measurement distance is reduced to 1 m.

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

5.7.1.2 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 EIRP outside of the band 5715–5860 MHz and additionally

Limit: –17 dBm/MHz EIRP within the frequency ranges 5715–5725 and 5850–5860 MHz.

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.

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

RSS-247, 6.2.4 (2), Emissions outside the band 5725-5825 MHz:

Limit: –27 dBm/MHz EIRP outside of the band 5715–5835 MHz and additionally

Limit: –17 dBm/MHz EIRP within the frequency ranges 5715–5725 and 5825–5835 MHz.

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.

5.7.1.3 TEST PROTOCOL

Ambient temperature: 26 - 27 °C
 Air Pressure: 1007 - 1021 hPa
 Humidity: 34 - 40 %

Measured Core: Core 1

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	-	-	-	-	-	>10	-

Measured Core: Core 2

WLAN a-Mode; 20 MHz; 6 Mbit/s

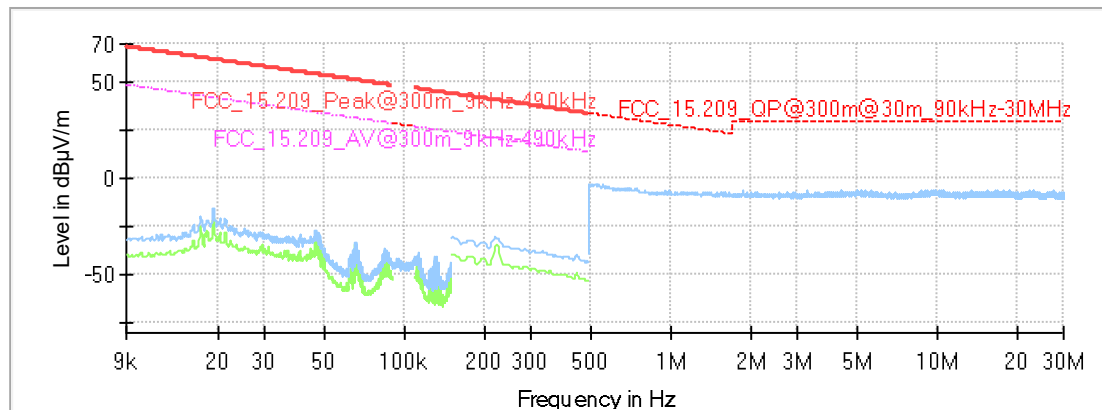
Applied duty cycle correction (AV): 0 dB

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	-	-	-	-	-	>10	-

Remark: Since the antenna ports were terminated with 50 Ohm for the measurement and no relevant peaks were found, only one channel was tested radiated. Measured Range: 9 kHz to 40 GHz.
 Please see next sub-clause for the measurement plot.

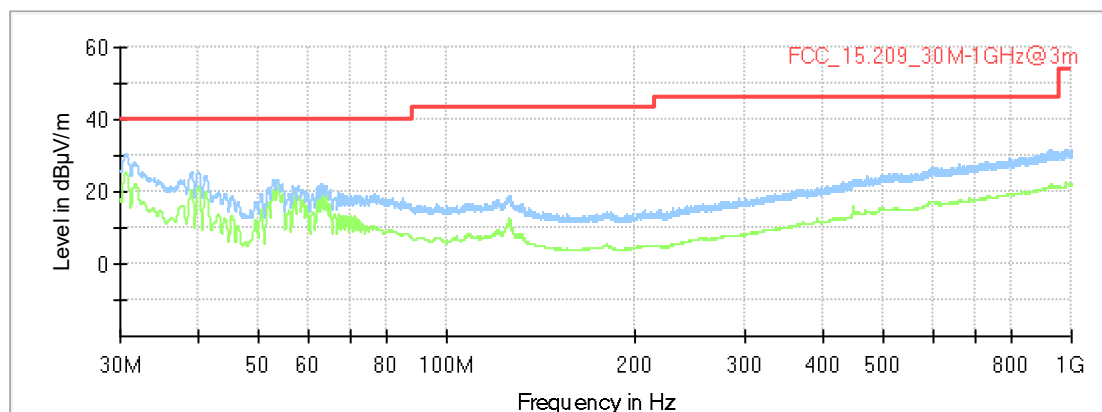
5.7.1.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

Core 0



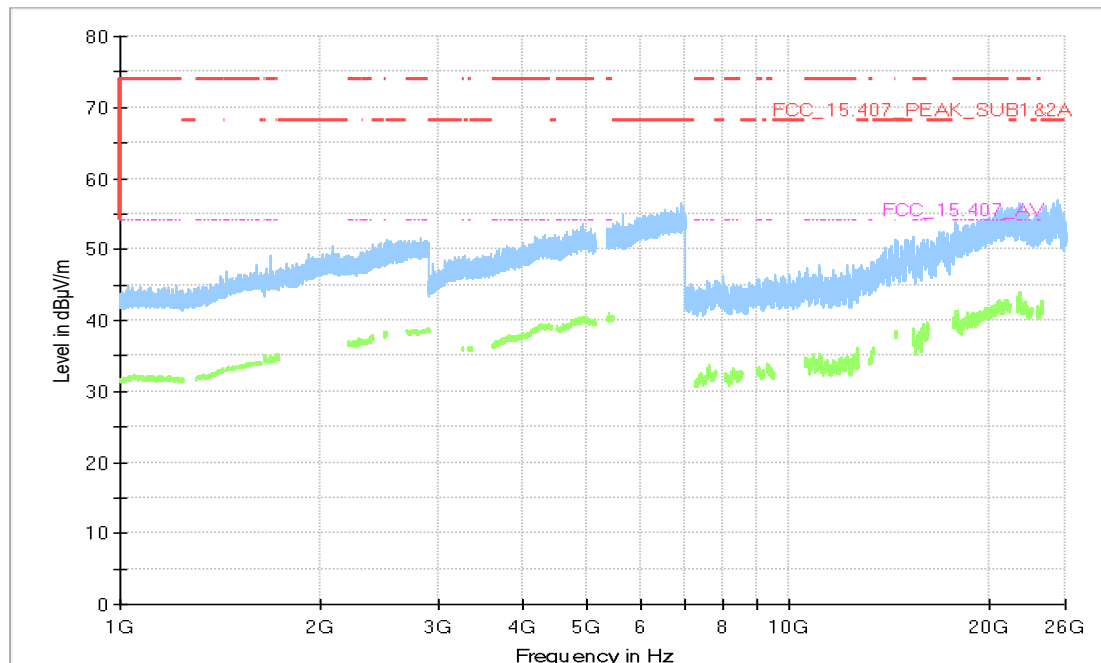
Final_Result

Frequency (MHz)	MaxPeak	Average	Limit (dBµV)	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.
---	---	---	---	---	---	---	---	---	---	---



Final_Result

Frequency (MHz)	QuasiPeak	Limit (dBµV)	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.	Comment
---	---	---	---	---	---	---	---	---	---	---

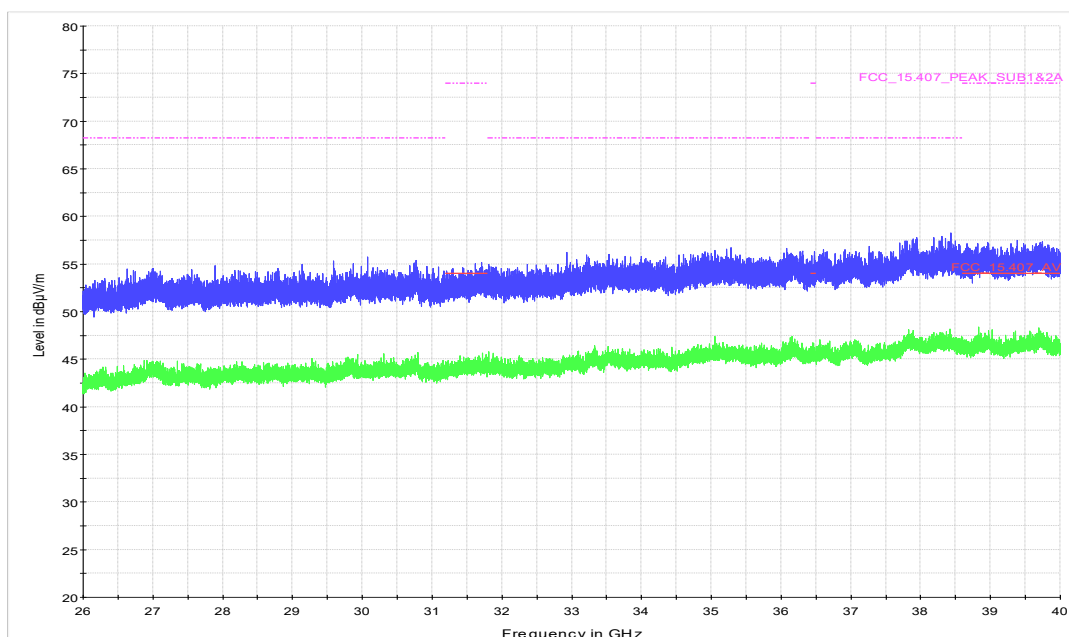


Critical_Freqs

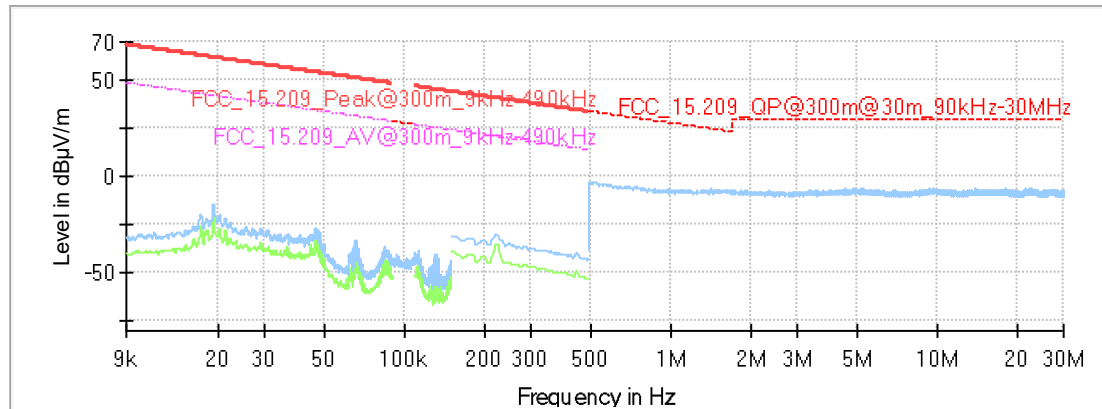
Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV / m)	Margin (dB)	Meas. Tim	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
---	---	---	---	---	---	---	---		---	---

Final_Result

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

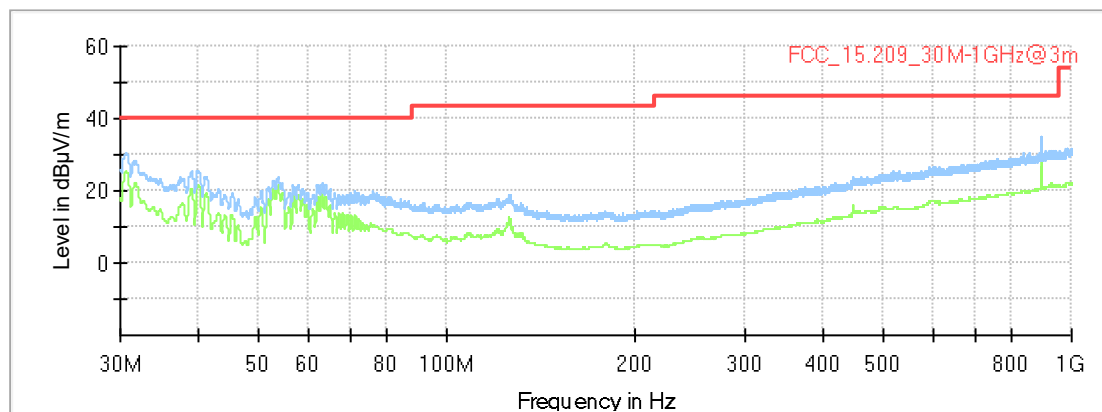


Core1



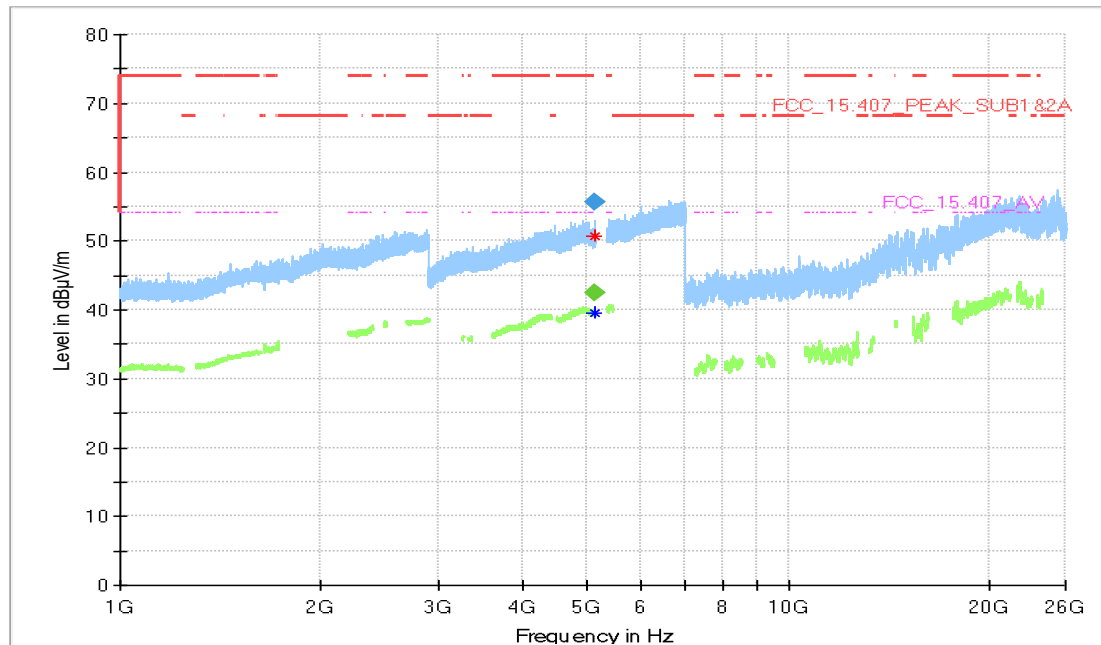
Final_Result

Frequency (MHz)	MaxPeak	Average	Limit (dBμV)	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.
---	---	---	---	---	---	---	---	---	---	---



Final_Result

Frequency (MHz)	QuasiPeak	Limit (dBμV)	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.	Comment
---	---	---	---	---	---	---	---	---	---	---

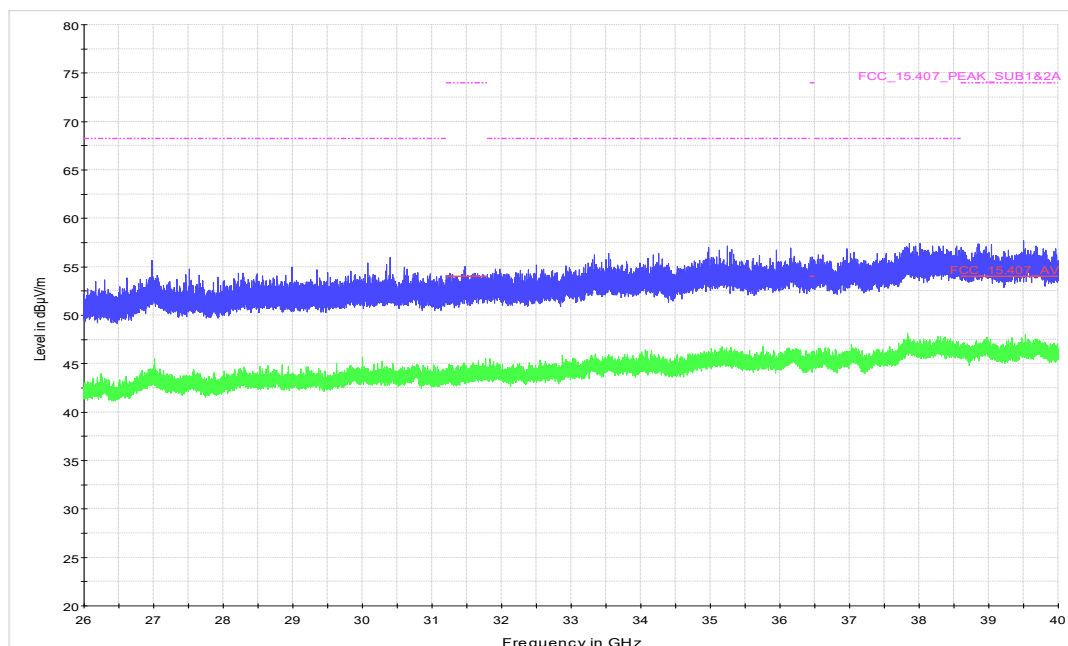


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV / m)	Margin (dB)	Meas. Tim	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
5149.188	50.8	---	74.00	23.2	---	---	150.	H	-	-12.0
5149.675	---	39.5	54.00	14.5	---	---	150.	V	37.0	-12.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV)	CAverage (dBµV)	Limit (dBµV / m)	Margin (dB)	Meas. Tim	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
5149.188	55.5	---	74.00	18.4	1000	1000.0	150.	H	-	-12.0
5149.675	---	42.3	54.00	11.6	1000	1000.0	150.	V	37.0	-12.0



5.7.2 CONDUCTED MEASUREMENTS AT ANTENNA PORT

The test was performed according to:

ANSI C63.10

5.7.2.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up to perform the conducted spurious emissions measurements. The antenna port of the EUT was connected to spectrum analyzer via a short coax cable with a known cable loss C_L . The measured voltage U_{meas} at the 50 Ohm input of the analyser was used to calculate the EUT output power at the antenna port:

$$P = U_{meas}^2 + C_L - 107$$

where

P is the output power in dBm

U_{meas} is the measured voltage at the 50 Ohm input of the analyzer in dBμV

C_L is the cable loss of the used cable.

The maximum transmit isotropically antenna gain G_i (in dBi) was added to the measured output power P to determine the equivalent isotropically radiated power EIRP.

$$EIRP = P + G_i$$

where

P is the output power in dBm

G_i is maximum transmit antenna gain in dBi.

The resultant EIRP level was converted to an equivalent electric field strength using the following relationship:

$$E = EIRP - 20 \log d + 104.8$$

where

E is the electric field strength in dBμV/m

EIRP is the equivalent isotropically radiated power in dBm

d is the specified measurement distance in m.

The appropriate maximum ground reflection factor was added to the EIRP:

6 dB for frequencies ≤ 30 MHz;

4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive; and

0 dB for frequencies > 1000 MHz).

Frequency range [MHz]	measurement distance d [m]	-20 log d [dB]	ground reflection factor [dB]
0,009 – 0,49	300	-49,54	6
0,49 – 30	30	-29,54	6
30 – 1000	3	-9,54	4,7
>1000	3	-9,54	0

For the MIMO values of Core 0 + Core 1, the measured dBm values were converted to mW, then added together, reconverted to dBm and afterwards converted to dBμV/m as described above.

Measurement up to 30 MHz

Step 1: pre measurement

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

- Detector: Peak, Average
- Frequency range: 0.009 - 30 MHz
- IF-Bandwidth: 10 kHz

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

Step 2: final measurement

EMI receiver settings:

- Detector: Peak / Average / Quasi-Peak (depending on frequency)
- Frequency range: 0.009 – 30 MHz
- Frequency steps: measurement at frequencies detected in step 1
- IF-Bandwidth: 0.2 - 10 kHz (depending on frequency)
- Measuring time / Frequency step: 1 s

2. Measurement above 30 MHz and up to 1 GHz

Step 1: pre measurement

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

Settings:

- Detector: Peak, Average
- Frequency range: 30 – 1000 MHz
- IF-Bandwidth: 1 MHz

Step 2: final measurement

EMI receiver settings:

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

3. Measurement above 1 GHz

Step 1: pre measurement

Settings:

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

Step 2: final measurement

Spectrum analyzer settings:

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

5.7.2.2 TEST REQUIREMENTS / LIMITS

Please see test description for radiated measurement

5.7.2.3 TEST PROTOCOL

Ambient temperature: 26 °C
Air Pressure: 1010 hPa
Humidity: 35 %

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 Core 0 [dBμV/m]	Spurious Level Core 1 [dBμV/m]	Spurious Level Core 0 + 1 [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type
36	5180	-	-	-	-	PEAK	-	-	>6	-
40	5200	10399.0	45.4	44.1	47.8	PEAK	1000	68.2	20.4	UE
40	5200	15601.9	51.4	51.7	54.6	PEAK	1000	74.0	19.4	RB
40	5200	15601.8	38.9	38.5	41.7	AV	1000	54.0	12.3	RB
48	5240	10484.0	45.8	44.2	48.1	PEAK	1000	68.2	20.1	UE
48	5240	15727.3	51.0	50.6	53.8	PEAK	1000	74.0	20.2	RB
52	5260	10519.0	45.6	44.5	48.1	PEAK	1000	68.2	20.1	UE
52	5260	15779.2	51.3	50.1	53.8	PEAK	1000	74.0	20.2	RB
60	5300	10597.6	47.4	44.6	49.2	PEAK	1000	68.2	19.0	UE
60	5300	15897.3	49.0	50.5	52.8	PEAK	1000	74.0	21.2	RB
64	5320	-	-	-	-	PEAK	-	-	>6	-
100	5500	10997.9	47.9	45.3	49.8	PEAK	1000	74.0	24.2	RB
104	5520	11042.6	53.9	47.8	54.9	PEAK	1000	74.0	19.1	RB
104	5520	11043.0	40.4	36.0	41.7	AV	1000	54.0	12.3	RB
116	5580	11159.1	55.4	48.8	56.3	PEAK	1000	74.0	17.7	RB
116	5580	11162.1	42.4	36.6	43.4	AV	1000	54.0	10.6	RB
136	5680	11362.3	55.5	49.5	56.5	PEAK	1000	74.0	17.5	RB
136	5680	11375.5	44.4	37.9	45.3	AV	1000	54.0	8.7	RB
136	5680	17042.2	54.9	54.3	57.6	PEAK	1000	68.2	10.6	UE
140	5700	11399.2	53.4	46.0	54.1	PEAK	1000	74.0	19.9	RB
140	5700	11400.7	40.4	35.4	41.6	AV	1000	54.0	12.4	RB
149	5745	11488.9	58.7	52.5	59.6	PEAK	1000	74.0	14.4	RB
149	5745	11492.2	47.8	41.5	48.7	AV	1000	54.0	5.3	RB
149	5745	17236.1	57.6	56.5	60.1	PEAK	1000	68.2	8.1	UE
157	5785	11569.0	59.8	53.3	60.7	PEAK	1000	74.0	13.3	RB
157	5785	11571.8	48.7	42.0	49.5	AV	1000	54.0	4.5	RB
157	5785	17353.5	55.6	54.4	58.1	PEAK	1000	68.2	10.1	UE
165	5825	11648.4	60.2	53.8	61.1	PEAK	1000	74.0	12.9	RB
165	5825	11652.2	49.2	43.2	50.2	AV	1000	54.0	3.8	RB
165	5825	17478.5	55.7	51.5	57.1	PEAK	1000	68.2	11.1	UE

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

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level Core 0 [dBμV/m]	Spurious Level Core 1 [dBμV/m]	Spurious Level Core 0 + 1 [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type
36	5180	-	-	-	-	PEAK	-	-	>6	-
40	5200	10401.5	44.9	45.6	48.3	PEAK	1000	68.2	19.9	UE
40	5200	15605.1	50.9	51.8	54.4	PEAK	1000	74.0	19.6	RB
40	5200	15596.4	38.3	38.4	41.4	AV	1000	54.0	12.6	RB
48	5240	10460.8	45.0	45.4	48.2	PEAK	1000	68.2	20.0	UE
48	5240	15720.6	50.7	50.5	53.6	PEAK	1000	74.0	20.4	RB
48	5240	15723.2	38.0	37.5	40.8	AV	1000	54.0	13.2	RB
52	5260	15782.9	51.8	49.7	53.9	PEAK	1000	74.0	20.1	RB
52	5260	15782.4	38.6	37.5	41.1	AV	1000	54.0	12.9	RB
60	5300	10603.9	47.7	45.0	49.6	PEAK	1000	74.0	24.4	RB 1)
60	5300	10603.9	48.1	49.9	52.1	PEAK	1000	74.0	21.9	RB 1)
64	5320	15896.8	-	-	-	Peak	-	-	>6	-
100	5500	10998.8	49.0	44.7	50.4	PEAK	1000	74.0	23.6	RB
100	5500	11004.6	35.6	33.7	37.8	AV	1000	54.0	16.2	RB
104	5520	11038.3	52.0	47.5	53.3	PEAK	1000	74.0	20.7	RB
104	5520	11038.3	40.2	36.0	41.6	AV	1000	54.0	12.4	RB
116	5580	11163.6	53.8	49.7	55.2	PEAK	1000	74.0	18.8	RB
116	5580	11161.6	42.4	36.8	43.5	AV	1000	54.0	10.5	RB
136	5680	11352.6	55.1	48.9	56.0	PEAK	1000	74.0	18.0	RB
136	5680	11360.5	43.7	38.8	44.9	AV	1000	54.0	9.1	RB
136	5680	17044.5	51.0	54.1	55.8	PEAK	1000	68.2	12.4	UE
140	5700	11352.6	53.0	48.9	54.4	PEAK	1000	74.0	19.6	RB
140	5700	11360.5	40.3	38.0	42.3	AV	1000	54.0	11.7	RB
140	5700	17034.2	50.1	54.1	55.6	PEAK	1000	68.2	12.6	UE
149	5745	11490.0	58.5	51.3	59.3	PEAK	1000	74.0	14.7	RB
149	5745	11487.8	47.2	41.1	48.2	AV	1000	54.0	5.8	RB
149	5745	17231.0	55.9	54.6	58.3	PEAK	1000	68.2	9.9	UE
157	5785	11571.8	59.0	52.7	59.9	PEAK	1000	74.0	14.1	RB
157	5785	11570.3	48.3	41.9	49.2	AV	1000	54.0	4.8	RB
157	5785	17348.3	54.8	53.1	57.0	PEAK	1000	68.2	11.2	UE
165	5825	11645.6	59.6	54.1	60.7	PEAK	1000	74.0	13.3	RB
165	5825	11650.7	48.5	43.0	49.6	AV	1000	54.0	4.4	RB
165	5825	17486.4	53.4	51.5	55.6	PEAK	1000	68.2	12.6	UE

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

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level Core 0 [dBμV/m]	Spurious Level Core 1 [dBμV/m]	Spurious Level Core 0 + 1 [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type
38	5190	-	-	-	-	PEAK	-	-	>6	-
46	5230	15679.4	50.2	48.7	52.5	PEAK	1000	74.0	21.5	UE
54	5270	-	-	-	-	PEAK	-	-	>6	-
62	5310	-	-	-	-	PEAK	-	-	>6	-
102	5510	-	-	-	-	PEAK	-	-	>6	-
110	5550	11101.0	50.3	45.6	51.6	PEAK	1000	74.0	22.4	RB
134	5670	11332.4	47.8	45.5	49.8	PEAK	1000	74.0	24.2	RB
151	5755	11510.1	56.8	51.2	57.9	PEAK	1000	74.0	16.1	RB
151	5755	11511.7	45.2	39.6	46.3	AV	1000	54.0	7.7	RB
151	5755	17270.7	54.3	52.9	56.7	PEAK	1000	68.2	11.5	UE
159	5795	11591.9	57.1	52.1	58.3	PEAK	1000	74.0	15.7	RB
159	5795	11590.7	46.5	40.3	47.4	AV	1000	54.0	6.6	RB
159	5795	17382.3	53.2	51.5	55.4	PEAK	1000	68.2	12.8	UE

1)

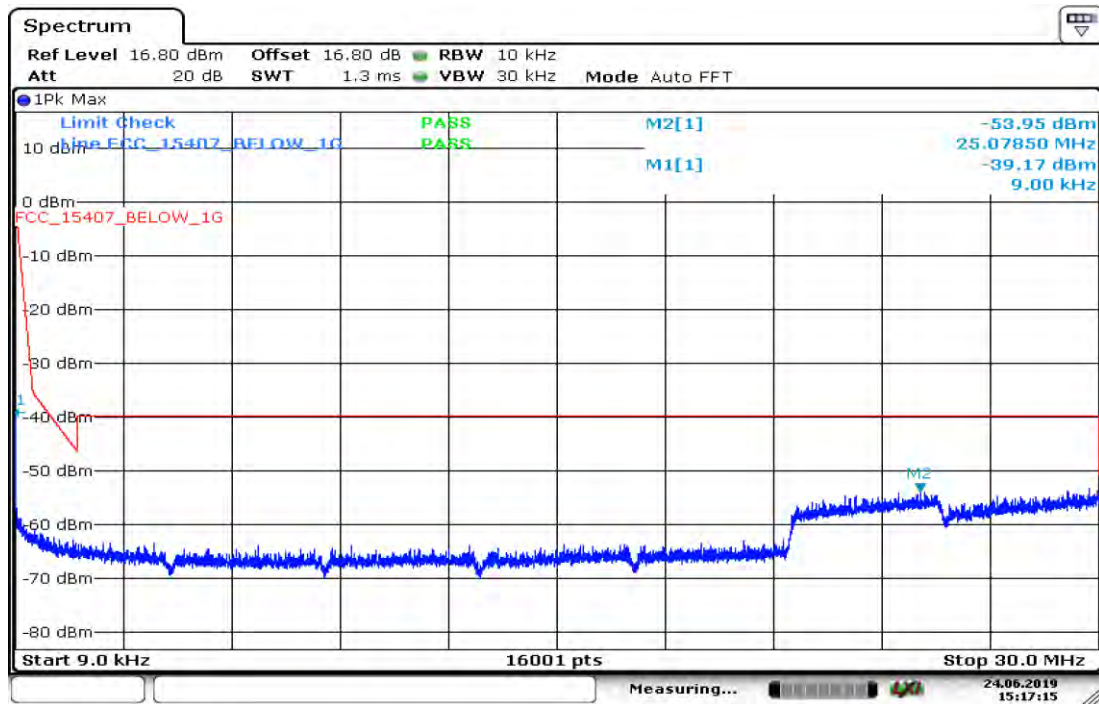
1)

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

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level Core 0 [dBμV/m]	Spurious Level Core 1 [dBμV/m]	Spurious Level Core 0 + 1 [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]	Limit Type
42	5210	-	-	-	-	PEAK	-	-	>6	-
58	5290	-	-	-	-	PEAK	-	-	>6	-
106	5530	-	-	-	-	PEAK	-	-	>6	-
122	5610	-	-	-	-	PEAK	-	-	>6	-
138	5690	-	-	-	-	PEAK	-	-	>6	-
155	5775	11553.6	53.3	47.3	54.3	PEAK	1000	74.0	19.7	RB
155	5775	11549.6	41.4	36.3	42.6	AV	1000	54.0	11.4	RB

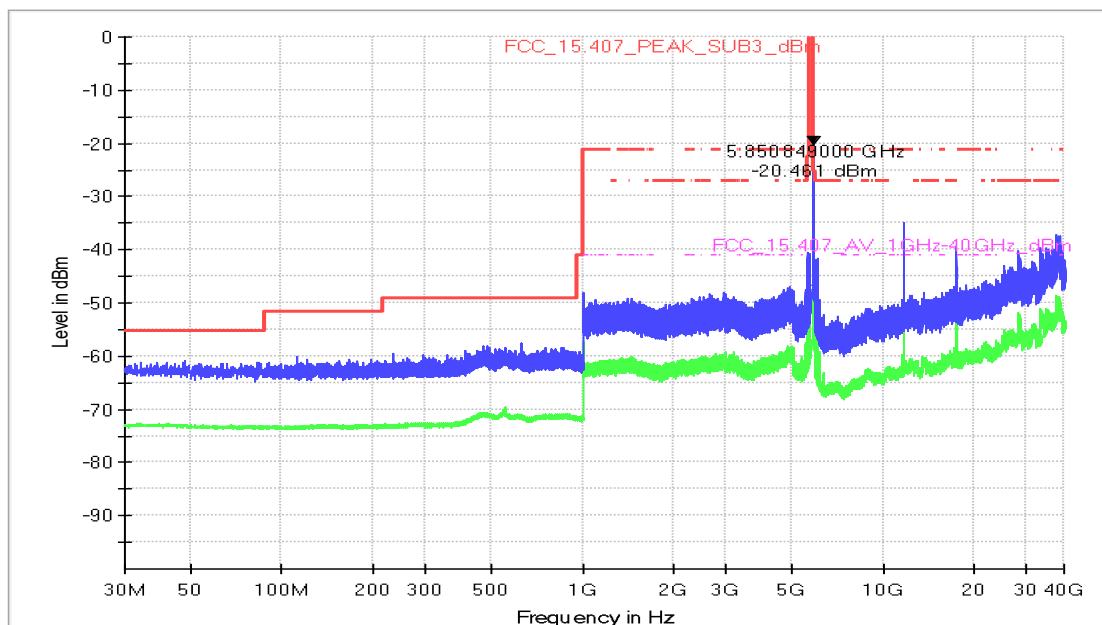
1) Only peak value given since Peak value is below Average limit.

5.7.2.4 MEASUREMENT PLOTS (SHOWING THE HIGHEST VALUE, "WORST CASE")

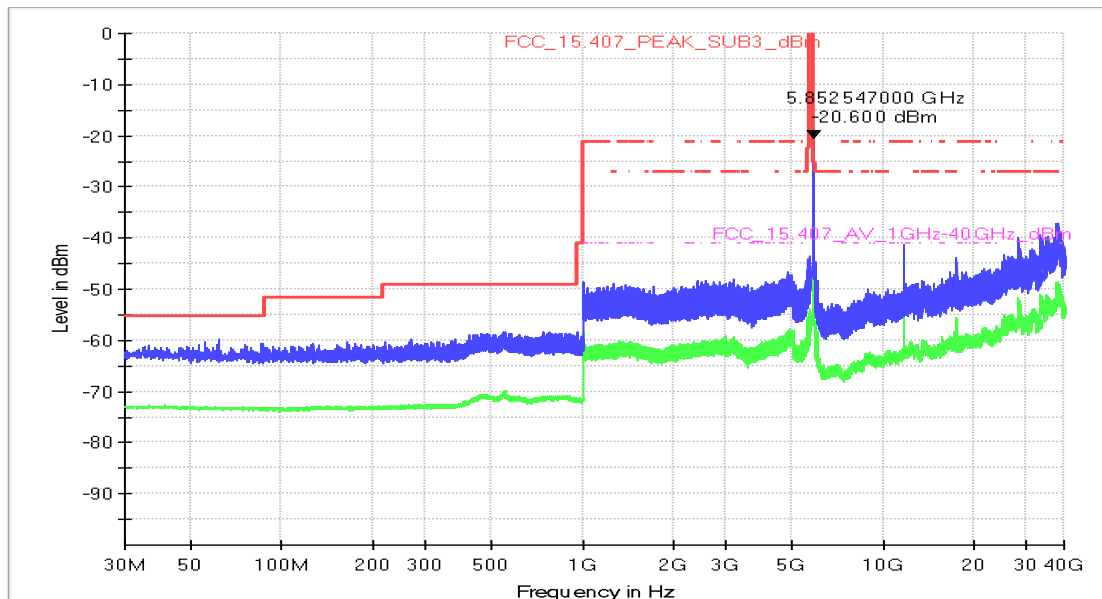


Date: 24.JUN.2019 15:17:15

WLAN mode a, U-NII band 1, mid channel, Core 1 (result includes 2 dB for antenna gain and 6 dB reflection factor)



WLAN mode a, U-NII band 3, high channel, Core 0 (result includes 2 dB for antenna gain and below 30 MHz 4.7 dB reflection factor)



WLAN mode a, U-NII band 3, high channel, Core 1 (result includes 2 dB for antenna gain and below 30 MHz 4.7 dB reflection factor)

5.7.2.5 TEST EQUIPMENT USED

- Radiated Emissions

5.8 BAND EDGE

Standard **FCC Part 15 Subpart E**

5.8.1 RADIATED MEASUREMENTS (ANTENNA PORTS TERMINATED WITH 50 OHM)

The test was performed according to:
ANSI C63.10

5.8.1.1 TEST DESCRIPTION

Please see test description for the test case "UNDESIRABLE EMISSIONS"

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

5.8.1.3 TEST PROTOCOL

Ambient temperature: 26 °C
Air Pressure: 1021 hPa
Humidity: 34 %

Measured Core: Core 1

WLAN a-Mode; 20 MHz; 6 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	55.1	PEAK	1000	74.0	18.9	BE-RB	FCC&IC
	36	5180	5150.0	42.4	AV	1000	54.0	11.6	BE-RB	FCC&IC

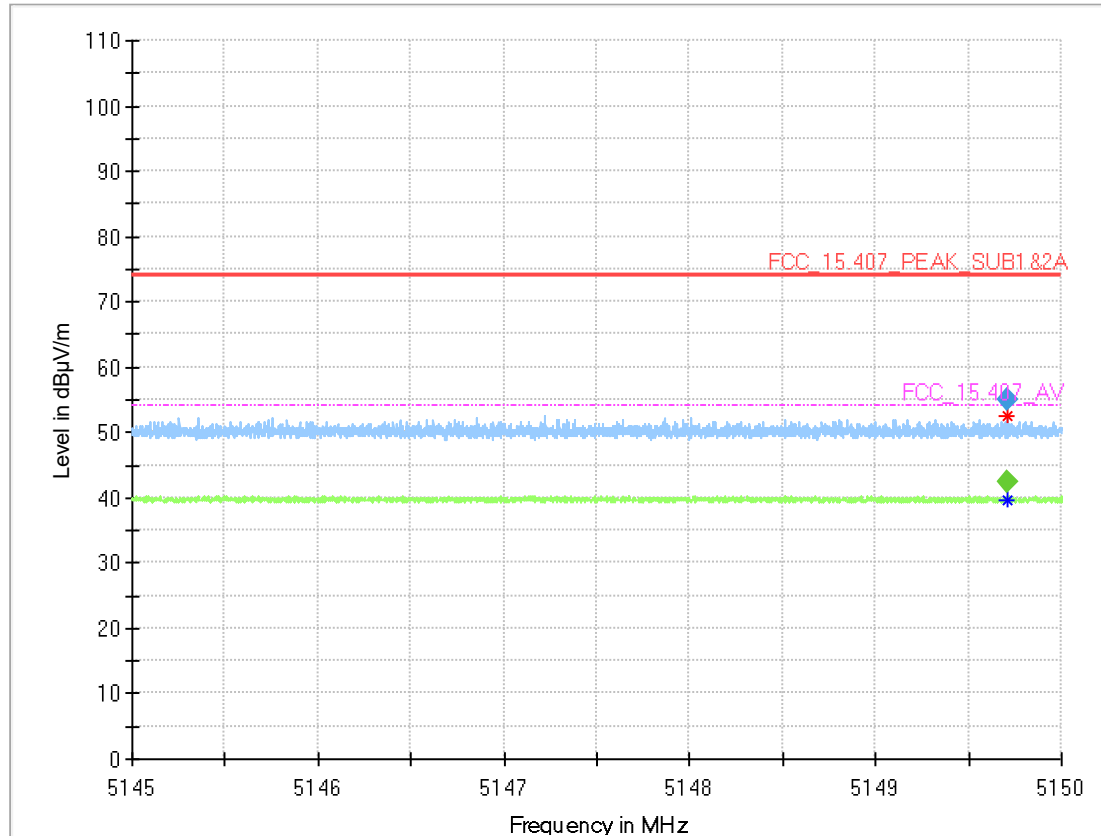
Measured Core: Core 2

WLAN a-Mode; 20 MHz; 6 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	55.5	PEAK	1000	74.0	18.5	BE-RB	FCC&IC
	36	5180	5150.0	42.3	AV	1000	54.0	11.7	BE-RB	FCC&IC

Remark: Since the antenna ports were terminated with 50 Ohm for the measurement and no relevant peaks were found, only one channel was tested radiated.
Please see next sub-clause for the measurement plot.

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



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV / m)	Margin (dB)	Meas. Tim	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
5149.713	52.7	---	74.00	21.3	---	---	150.	H	-95.0	15.0
5149.713	---	39.5	54.00	14.4	---	---	150.	H	-	15.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV)	CAverage (dBµV)	Limit (dBµV / m)	Margin (dB)	Meas. Tim	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
5149.713	---	42.4	54.00	11.6	1000	1000.0	150.	H	-	15.0
5149.713	55.1	---	74.00	18.9	1000	1000.0	150.	H	-95.0	15.0

5.8.2 CONDUCTED MEASUREMENTS AT ANTENNA PORT

The test was performed according to:
ANSI C63.10

5.8.2.1 TEST DESCRIPTION

Please see test description for the test case "UNDESIRABLE EMISSIONS".

Band edge results of Band 3 were taken from the undesirable emissions pre measurement.

Additional Band Edge measurements for band 1 / 2A / 2C:

Settings:

- Detector: Peak, RMS
 - Trace: Max Hold, Average (Power Average)
 - IF Bandwidth = 1 MHz

Measurements may have also been performed separately, as only Peak, Max Hold or only RMS, Power averaging. See also measurement plots.

5.8.2.2 TEST REQUIREMENTS / LIMITS

Please see test description for the test case "UNDESIRABLE EMISSIONS"

5.8.2.3 TEST PROTOCOL

Ambient temperature: 24 °C
Air Pressure: 1017 hPa
Humidity: 48 %

WLAN a-Mode; 20 MHz; 6Mbps										
U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Band Edge Freq. [MHz]	Spurious Level Core 0 [dBμV/m]	Spurious Level Core 1 [dBμV/m]	Spurious Level Core 0 + 1 [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Min. Margin [dB]
1	36	5180	5150.0	56.4	56.0	59.2	PEAK	1000	74.0	17.6
	36	5180	5150.0	46.8	47.5	50.2	AV	1000	54.0	6.6
	40	5200	5150.0	59.5	57.5	61.6	PEAK	1000	74.0	14.5
	40	5200	5150.0	47.3	48.0	50.7	AV	1000	54.0	6.0
2A	60	5300	5350.0	60.1	59.4	62.8	PEAK	1000	74.0	13.9
	60	5300	5350.0	49.3	48.3	51.9	AV	1000	54.0	4.7
	64	5320	5350.0	59.9	57.6	61.9	PEAK	1000	74.0	14.2
	64	5320	5350.0	48.2	47.6	50.9	AV	1000	54.0	5.8
2C	100	5500	5460.0	58.9	55.5	60.5	PEAK	1000	74.0	15.1
	100	5500	5460.0	48.2	46.8	50.6	AV	1000	54.0	5.8
	100	5500	5470.0	61.4	58.0	63.0	PEAK	1000	68.2	6.9
	104	5520	5460.0	58.8	57.5	61.2	PEAK	1000	74.0	15.2
	104	5520	5460.0	48.4	47.8	51.1	AV	1000	54.0	5.6
	104	5520	5470.0	59.9	58.8	62.4	PEAK	1000	68.2	8.3
	136	5680	5725.0	50.3	63.1	63.3	PEAK	1000	68.2	5.1
	140	5700	5725.0	59.5	54.4	60.6	PEAK	1000	68.2	8.8
3	149	5745	5725.0	84.4	80.2	85.8	PEAK	1000	115.1	30.7
	165	5825	5850.0	74.7	74.6	77.7	PEAK	1000	116.5	41.8

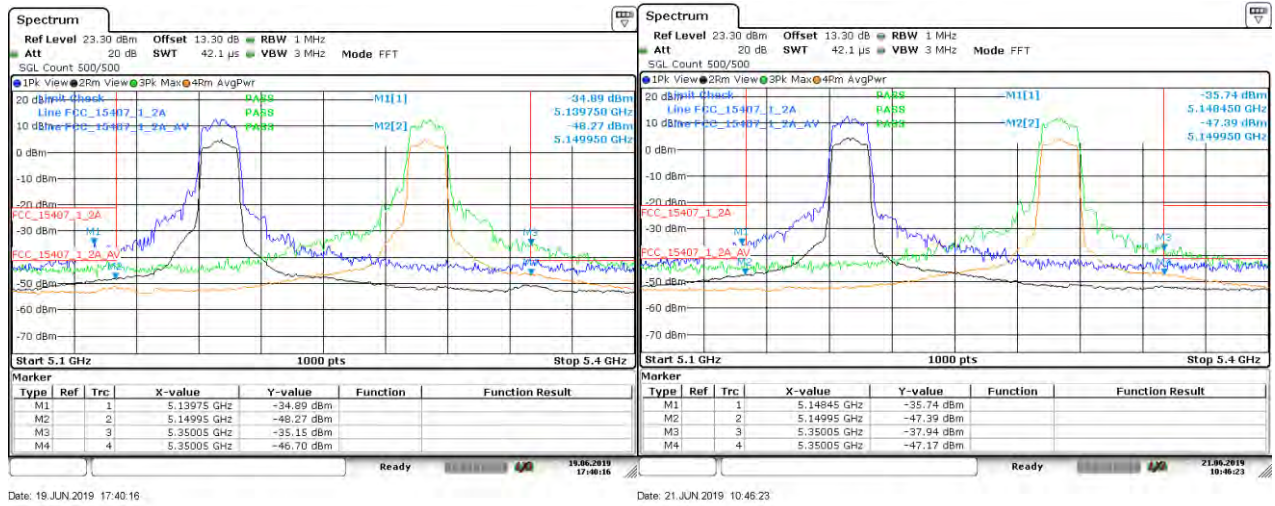
WLAN n-Mode; 20 MHz; MCS0										
U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Band Edge Freq. [MHz]	Spurious Level Core 0 [dBμV/m]	Spurious Level Core 1 [dBμV/m]	Spurious Level Core 0 + 1 [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]
1	36	5180	5150.0	56.8	57.1	60.0	PEAK	1000	74.0	14.0
	36	5180	5150.0	46.8	47.5	50.2	AV	1000	54.0	3.8
	40	5200	5150.0	60.3	59.5	62.9	PEAK	1000	74.0	11.1
	40	5200	5150.0	46.9	47.8	50.4	AV	1000	54.0	3.6
2A	60	5300	5350.0	60.1	57.3	61.9	PEAK	1000	74.0	12.1
	60	5300	5350.0	48.5	48.0	51.3	AV	1000	54.0	2.7
	64	5320	5350.0	58.5	56.6	60.7	PEAK	1000	74.0	13.3
	64	5320	5350.0	48.0	47.5	50.8	AV	1000	54.0	3.2
2C	100	5500	5460.0	60.3	56.4	61.7	PEAK	1000	74.0	12.3
	100	5500	5460.0	47.3	46.0	49.7	AV	1000	54.0	4.3
	100	5500	5470.0	63.4	56.0	64.1	PEAK	1000	68.2	4.1
	104	5520	5460.0	56.9	58.3	60.7	PEAK	1000	74.0	13.3
	104	5520	5460.0	48.1	48.1	51.1	AV	1000	54.0	2.9
	104	5520	5470.0	60.8	61.2	64.0	PEAK	1000	68.2	4.2
	136	5680	5725.0	60.9	59.8	63.4	PEAK	1000	68.2	4.8
	140	5700	5725.0	61.3	57.5	62.8	PEAK	1000	68.2	5.4
3	149	5745	5725.0	79.9	81.4	83.7	PEAK	1000	112.9	29.2
	165	5825	5850.0	75.5	75.8	78.7	PEAK	1000	110.5	31.8

WLAN n-Mode; 40 MHz; MCS0										
U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Band Edge Freq. [MHz]	Spurious Level Core 0 [dBμV/m]	Spurious Level Core 1 [dBμV/m]	Spurious Level Core 0 + 1 [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]
1	38	5190	5150.0	61.7	56.3	62.8	PEAK	1000	74.0	11.2
	38	5190	5150.0	48.2	46.3	50.4	AV	1000	54.0	3.6
	46	5230	5150.0	54.3	55.9	58.2	PEAK	1000	74.0	15.8
	46	5230	5150.0	44.9	45.8	48.3	AV	1000	54.0	5.7
2A	54	5270	5350.0	58.4	57.6	61.0	PEAK	1000	74.0	13.0
	54	5270	5350.0	46.6	47.0	49.8	AV	1000	54.0	4.2
	62	5310	5350.0	59.3	57.5	61.5	PEAK	1000	74.0	12.5
	62	5310	5350.0	49.4	46.8	51.3	AV	1000	54.0	2.7
2C	102	5510	5460.0	56.1	61.5	62.6	PEAK	1000	74.0	11.4
	102	5510	5460.0	45.3	46.1	48.7	AV	1000	54.0	5.3
	102	5510	5470.0	56.9	62.3	63.4	PEAK	1000	68.2	4.8
	110	5550	5460.0	56.0	57.5	59.8	PEAK	1000	74.0	14.2
	110	5550	5460.0	46.2	46.3	49.2	AV	1000	54.0	4.8
	110	5550	5470.0	57.2	61.4	62.8	PEAK	1000	68.2	5.4
	126	5630	5725.0	54.7	52.8	56.8	PEAK	1000	68.2	11.4
	134	5670	5725.0	56.5	54.5	58.6	PEAK	1000	68.2	9.6
3	151	5755	5725.0	84.4	83.6	87.0	PEAK	1000	116.5	29.5
	159	5795	5850.0	74.3	68.0	75.2	PEAK	1000	110.3	35.1

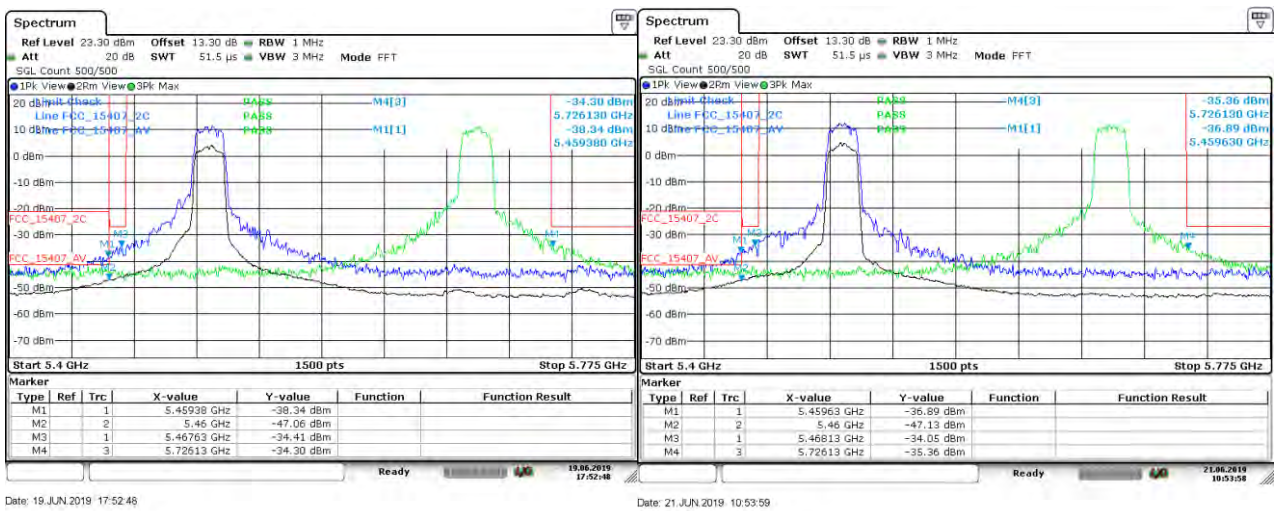
WLAN ac-Mode; 80 MHz; MCS0										
U-NII-Subband	Ch. No.	Ch. Center Freq. [MHz]	Band Edge Freq. [MHz]	Spurious Level Core 0 [dBμV/m]	Spurious Level Core 1 [dBμV/m]	Spurious Level Core 0 + 1 [dBμV/m]	Detector	RBW [kHz]	Limit [dBμV/m]	Margin [dB]
1	38	5190	5150.0	60.2	57.7	62.1	PEAK	1000	74.0	11.9
	38	5190	5150.0	48.3	46.3	50.4	AV	1000	54.0	3.6
2A	54	5270	5350.0	62.3	55.7	63.1	PEAK	1000	74.0	10.9
	54	5270	5350.0	46.0	46.1	49.1	AV	1000	54.0	4.9
2C	106	5530	5460.0	54.9	52.5	56.9	PEAK	1000	74.0	17.1
	106	5530	5460.0	45.1	44.4	47.8	AV	1000	54.0	6.2
	106	5530	5470.0	55.3	54.1	57.7	PEAK	1000	68.2	10.5
	122	5610	5725.0	51.9	52.4	55.1	PEAK	1000	68.2	13.1
3	155	5775	5650.0	77.6	73.4	79.0	PEAK	1000	118.8	39.8
	155	5775	5925.0	70.3	68.5	72.5	PEAK	1000	119.2	46.7

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

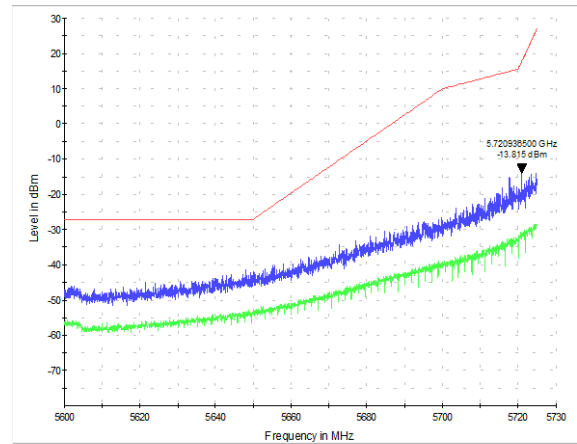
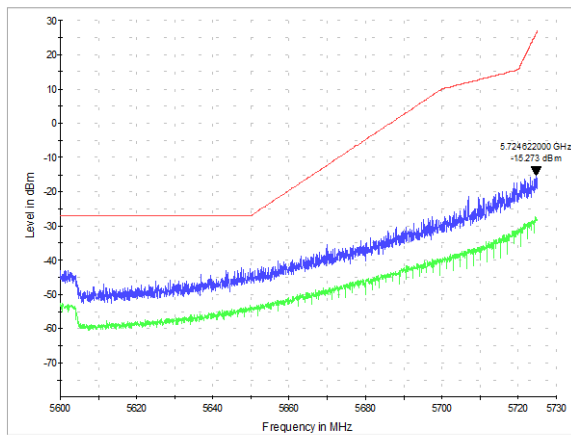
5.8.2.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")



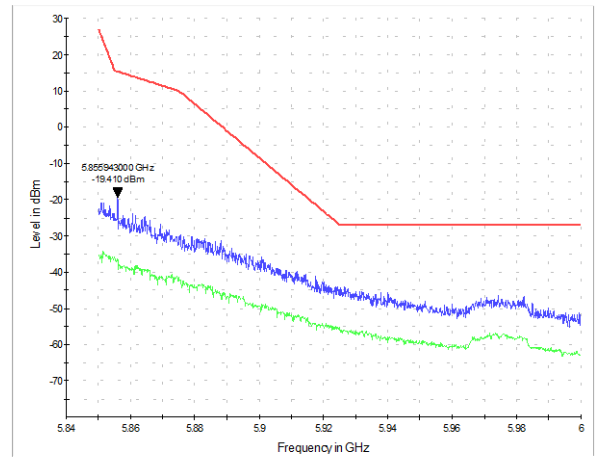
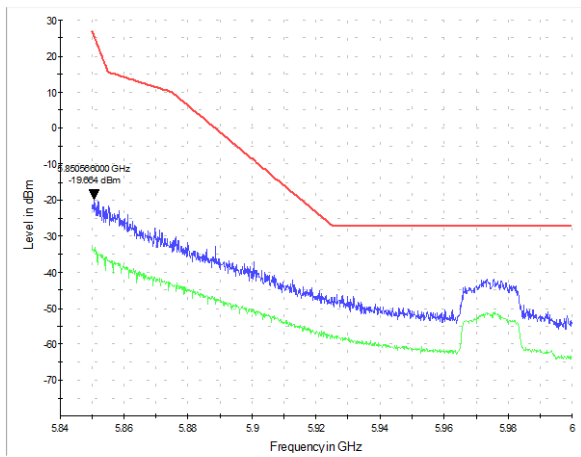
WLAN mode n 20 MHz, Ch. 40 and 60, Core 0 and Core 1



WLAN mode n 20 MHz, Ch. 104 and 136, Core 0 and Core 1



WLAN mode n 20 MHz, Ch. 149., Core0 and Core 1



WLAN mode n 20 MHz, Ch. 165., Core0 and Core 1

5.8.2.5 TEST EQUIPMENT USED

- R&S TS8997

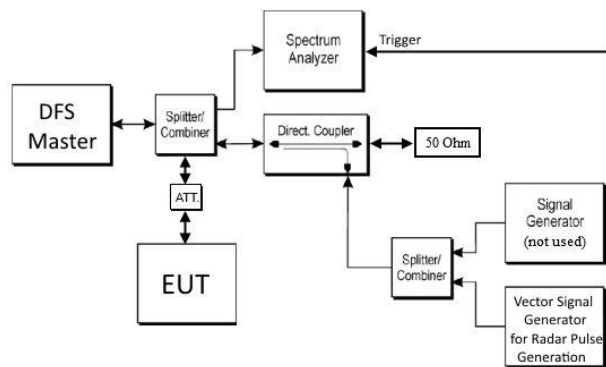
5.9 DYNAMIC FREQUENCY SELECTION

Standard **FCC Part 15 Subpart E**

The test was performed according to:
ANSI C63.10

5.9.1 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 sent from the vector signal generator.

At the same time the spectrum analyser is triggered and a trace is recorded:

Afterwards another trace with higher sweep time is taken to monitor the Non-occupancy period.

5.9.2 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.	

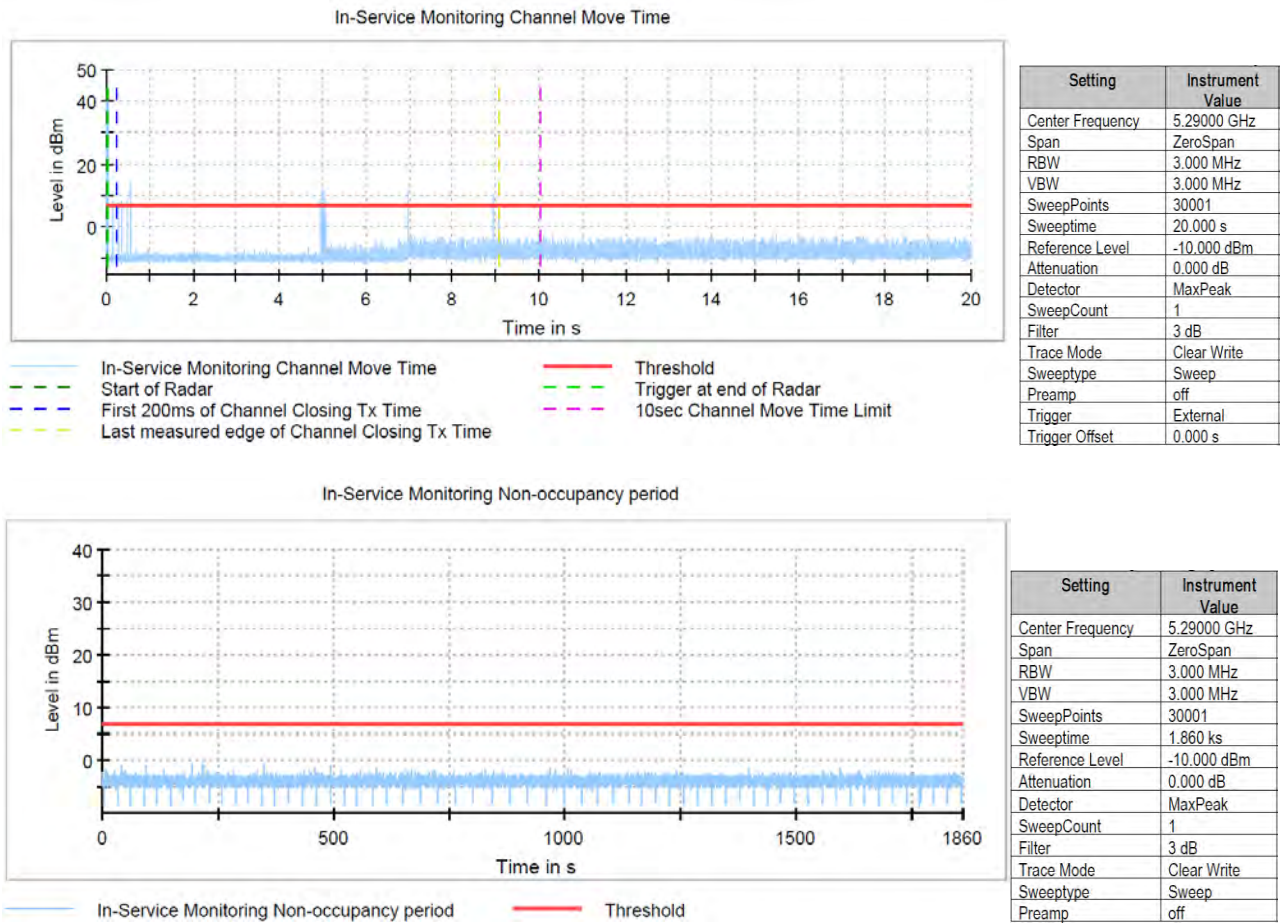
5.9.3 TEST PROTOCOL

Ambient temperature: 24 °C
Air Pressure: 1018 hPa
Humidity: 45 %

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
58	5290	0.9	60.0	59.1	yes	none

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

5.9.4 MEASUREMENT PLOT



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	Opus10 THI (8152.00)	ThermoHygro Datalogger 06 (Environ)	Lufth Mess- und Regeltechnik GmbH	7474		
1.2	Opus10 TPR (8253.00)	ThermoAirpressure Datalogger 13 (Environ)	Lufth Mess- und Regeltechnik GmbH	13936		
1.3	Fluke 177	Digital Multimeter 03 (Multimeter)	Fluke Europe B.V.	86670383	2018-04	2020-04
1.4	ESH3-Z5	Two-Line V-Network (AUX)	Rohde & Schwarz GmbH & Co. KG	828304/029		
1.5	EP 1200/B, NA/B1	Amplifier with integrated variable Oscillator	Spitzenberger & Spies GmbH & Co. KG	B6278		
1.6	Chroma 6404	AC Power Source	Chroma ATE INC.	64040001304		
1.7	Shielded Room 02	Shielded Room for conducted testing, 12 m ²	Frankonia	-		
1.8	ESH3-Z5	Two-Line V-Network (EUT)	Rohde & Schwarz GmbH & Co. KG	829996/002	2019-06	2021-06
1.9	ESR 7	EMI Receiver / Spectrum Analyzer	Rohde & Schwarz	101424	2019-01	2020-01
1.10	Opus10 THI (8152.00)	ThermoHygro Datalogger 02 (Environ)	Lufth Mess- und Regeltechnik GmbH	7489		

- 2 R&S TS8997
EN300328/301893 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	2017-07	2020-07
2.2	MFS	Rubidium Frequency Standard	Datum-Beverly	5489/001	2018-07	2019-07
2.3	1515 / 93459	Broadband Power Divider SMA (Aux)	Weinschel Associates	LN673		
2.4	FSV30	Signal Analyzer 10 Hz - 30 GHz	Rohde & Schwarz	103005	2018-04	2020-04
2.5	Fluke 177	Digital Multimeter 03 (Multimeter)	Fluke Europe B.V.	86670383	2018-04	2020-04
2.6	VHF-3100+	High Pass Filter		-		
2.7	VT 4002	Temperature Chamber	Vötsch	58566002150010	2018-04	2020-04

2.8	A8455-4	4 Way Power Divider (SMA)		-		
2.9	Opus10 THI (8152.00)	ThermoHygro Datalogger 03 (Environ)	Lufth Mess- und Regeltechnik GmbH	7482	2019-06	2021-06
2.10	SMBV100A	Vector Signal Generator 9 kHz - 6 GHz	Rohde & Schwarz	259291	2016-10	2019-10
2.11	OSP120	Switching Unit with integrated power meter	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	NRV-Z1	Sensor Head A	Rohde & Schwarz GmbH & Co. KG	827753/005	2018-07	2019-07
3.2	MFS	Rubidium Frequency Normal MFS	Datum GmbH	002	2018-10	2020-10
3.3	Opus10 TPR (8253.00)	ThermoAirpressure Datalogger 13 (Environ)	Lufth Mess- und Regeltechnik GmbH	13936		
3.4	ESW44	EMI Receiver / Spectrum Analyzer	Rohde & Schwarz GmbH & Co. KG	101603	2018-05	2019-11
3.5	Anechoic Chamber	10.58 x 6.38 x 6.00 m ³	Frankonia	none	2018-06	2020-06
3.6	FS-Z60	Harmonic Mixer 40 - 60 GHz	Rohde & Schwarz Messgerätebau GmbH	100178	2016-12	2019-12
3.7	FS-Z220	Harmonic Mixer 140 - 220 GHz	Rohde & Schwarz Messgerätebau GmbH	101005	2017-03	2020-03
3.8	SGH-05	Standard Gain / Pyramidal Horn Antenna (140 - 220 GHz)	RPG-Radiometer Physics GmbH	075		
3.9	HL 562	Ultralog new biconicals	Rohde & Schwarz	830547/003	2018-07	2021-07
3.10	5HC2700/12750-1.5-KK	High Pass Filter	Trilithic	9942012		
3.11	ASP 1.2/1.8-10 kg	Antenna Mast	Maturo GmbH	-		
3.12	Fully Anechoic Room	8.80m x 4.60m x 4.05m (l x w x h)	Albatross Projects	P26971-647-001-PRB	2018-06	2020-06
3.13	Fluke 177	Digital Multimeter 03 (Multimeter)	Fluke Europe B.V.	86670383	2018-04	2020-04
3.14	PONTIS Con4101	PONTIS Camera Controller		6061510370		

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
3.15	NRVD	Power Meter	Rohde & Schwarz GmbH & Co. KG	828110/016	2018-07	2019-07
3.16	HF 906	Double-ridged horn	Rohde & Schwarz	357357/002	2018-09	2021-09
3.17	JS4-18002600-32-5P	Broadband Amplifier 18 GHz - 26 GHz	Miteq	849785		
3.18	FSW 43	Spectrum Analyzer	Rohde & Schwarz	103779	2019-02	2021-02
3.19	3160-09	Standard Gain / Pyramidal Horn Antenna 26.5 GHz	EMCO Elektronik GmbH	00083069		
3.20	SGH-19	Standard Gain / Pyramidal Horn Antenna (40 - 60 GHz)	RPG-Radiometer Physics GmbH	093		
3.21	WHKX 7.0/18G-8SS	High Pass Filter	Wainwright	09		
3.22	4HC1600/12750-1.5-KK	High Pass Filter	Trilithic	9942011		
3.23	Chroma 6404	AC Power Source	Chroma ATE INC.	64040001304		
3.24	JS4-00102600-42-5A	Broadband Amplifier 30 MHz - 26 GHz	Miteq	619368		
3.25	TT 1.5 WI	Turn Table	Maturo GmbH	-		
3.26	HL 562 Ultralog	Log.-per. Antenna	Rohde & Schwarz	100609	2019-05	2022-05
3.27	HF 906	Double-ridged horn	Rohde & Schwarz	357357/001	2018-03	2021-03
3.28	FS-Z325	Harmonic Mixer 220 - 325 GHz	Rohde & Schwarz Messgerätebau GmbH	101006	2017-03	2020-03
3.29	3160-10	Standard Gain / Pyramidal Horn Antenna 40 GHz	EMCO Elektronik GmbH	00086675		
3.30	SGH-08	Standard Gain / Pyramidal Horn Antenna (90 - 140 GHz)	RPG-Radiometer Physics GmbH	064		
3.31	SGH-12	Standard Gain / Pyramidal HornAntenna (60 - 90 GHz)	RPG-Radiometer Physics GmbH	326		
3.32	Air compressor	Anechoic Chamber; 8.8m x 4.6 m x 4.05 m	JUN-AIR Deutschland GmbH	612582		
3.33	5HC3500/18000-1.2-KK	High Pass Filter	Trilithic	200035008		
3.34	FS-Z140	Harmonic Mixer 90 -140 GHz	Rohde & Schwarz Messgerätebau GmbH	101007	2017-02	2020-02
3.35	HFH2-Z2	Loop Antenna	Rohde & Schwarz	829324/006	2018-01	2021-01

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
3.36	Opus10 THI (8152.00)	ThermoHygro Datalogger 12 (Environ)	Lufft Mess- und Regeltechnik GmbH	12482		
3.37	ESR 7	EMI Receiver / Spectrum Analyzer	Rohde & Schwarz	101424	2019-01	2020-01
3.38	JS4-00101800-35-5P	Broadband Amplifier 30 MHz - 18 GHz	Miteq	896037		
3.39	AS 620 P	Antenna mast	HD GmbH	620/37		
3.40	Tilt device Maturo (Rohacell)	Antrieb TD1.5-10kg	Maturo GmbH	TD1.5-10kg/024/3790709		
3.41	SGH-03	Standard Gain / Pyramidal Horn Antenna (220 - 325 GHz)	RPG-Radiometer Physics GmbH	060		
3.42	FS-Z90	Harmonic Mixer 60 - 90 GHz	Rohde & Schwarz Messgerätebau GmbH	101686	2017-03	2020-03
3.43	ESIB 26	Spectrum Analyzer	Rohde & Schwarz	830482/004	2018-01	2020-01
3.44	PAS 2.5 - 10 kg	Antenna Mast	Maturo GmbH	-		
3.45	AFS42-00101800-25-S-42	Broadband Amplifier 25 MHz - 18 GHz	Miteq	2035324		
3.46	AM 4.0	Antenna mast	Maturo GmbH	AM4.0/180/11920513		
3.47	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 atten- uator)
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

$$U_{\text{LISN}} (\text{dB } \mu\text{V}) = U (\text{dB } \mu\text{V}) + \text{Corr. (dB)}$$

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	AF	Corr.	cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	cable loss 4 (to receiver)	distance corr. (-40 dB/decade)	d _{Limit} (meas. distance (limit))	d _{used} (meas. distance (used))
MHz	dB (1/m)	dB	dB	dB	dB	dB	dB	m	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.
MHz	dB (1/m)	dB
30	18.6	0.6
50	6.0	0.9
100	9.7	1.2
150	7.9	1.6
200	7.6	1.9
250	9.5	2.1
300	11.0	2.3
350	12.4	2.6
400	13.6	2.9
450	14.7	3.1
500	15.6	3.2
550	16.3	3.5
600	17.2	3.5
650	18.1	3.6
700	18.5	3.6
750	19.1	4.1
800	19.6	4.1
850	20.1	4.4
900	20.8	4.7
950	21.1	4.8
1000	21.6	4.9

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))
dB	dB	dB	dB	dB	m	m
0.29	0.04	0.23	0.02	0.0	3	3
0.39	0.09	0.32	0.08	0.0	3	3
0.56	0.14	0.47	0.08	0.0	3	3
0.73	0.20	0.59	0.12	0.0	3	3
0.84	0.21	0.70	0.11	0.0	3	3
0.98	0.24	0.80	0.13	0.0	3	3
1.04	0.26	0.89	0.15	0.0	3	3
1.18	0.31	0.96	0.13	0.0	3	3
1.28	0.35	1.03	0.19	0.0	3	3
1.39	0.38	1.11	0.22	0.0	3	3
1.44	0.39	1.20	0.19	0.0	3	3
1.55	0.46	1.24	0.23	0.0	3	3
1.59	0.43	1.29	0.23	0.0	3	3
1.67	0.34	1.35	0.22	0.0	3	3
1.67	0.42	1.41	0.15	0.0	3	3
1.87	0.54	1.46	0.25	0.0	3	3
1.90	0.46	1.51	0.25	0.0	3	3
1.99	0.60	1.56	0.27	0.0	3	3
2.14	0.60	1.63	0.29	0.0	3	3
2.22	0.60	1.66	0.33	0.0	3	3
2.23	0.61	1.71	0.30	0.0	3	3

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

30	18.6	-9.9
50	6.0	-9.6
100	9.7	-9.2
150	7.9	-8.8
200	7.6	-8.6
250	9.5	-8.3
300	11.0	-8.1
350	12.4	-7.9
400	13.6	-7.6
450	14.7	-7.4
500	15.6	-7.2
550	16.3	-7.0
600	17.2	-6.9
650	18.1	-6.9
700	18.5	-6.8
750	19.1	-6.3
800	19.6	-6.3
850	20.1	-6.0
900	20.8	-5.8
950	21.1	-5.6
1000	21.6	-5.6

0.29	0.04	0.23	0.02	-10.5	10	3
0.39	0.09	0.32	0.08	-10.5	10	3
0.56	0.14	0.47	0.08	-10.5	10	3
0.73	0.20	0.59	0.12	-10.5	10	3
0.84	0.21	0.70	0.11	-10.5	10	3
0.98	0.24	0.80	0.13	-10.5	10	3
1.04	0.26	0.89	0.15	-10.5	10	3
1.18	0.31	0.96	0.13	-10.5	10	3
1.28	0.35	1.03	0.19	-10.5	10	3
1.39	0.38	1.11	0.22	-10.5	10	3
1.44	0.39	1.20	0.19	-10.5	10	3
1.55	0.46	1.24	0.23	-10.5	10	3
1.59	0.43	1.29	0.23	-10.5	10	3
1.67	0.34	1.35	0.22	-10.5	10	3
1.67	0.42	1.41	0.15	-10.5	10	3
1.87	0.54	1.46	0.25	-10.5	10	3
1.90	0.46	1.51	0.25	-10.5	10	3
1.99	0.60	1.56	0.27	-10.5	10	3
2.14	0.60	1.63	0.29	-10.5	10	3
2.22	0.60	1.66	0.33	-10.5	10	3
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)

distance correction = $-20 \cdot \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$

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

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

U = Receiver reading

AF = Antenna factor

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

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

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

U = Receiver reading

AF = Antenna factor

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

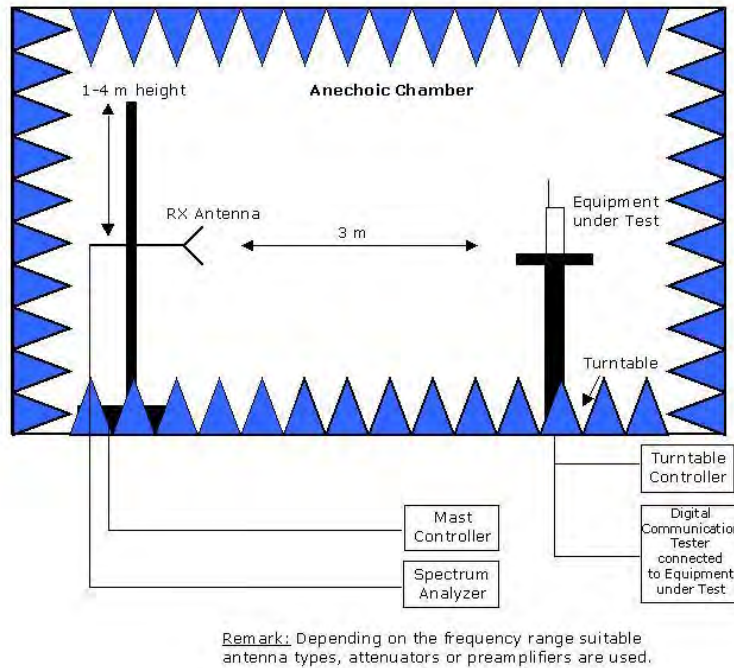
Linear interpolation will be used for frequencies in between the values in the table.

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 SETUP DRAWINGS



Drawing 1: Setup in the Anechoic chamber. For measurements below 1 GHz the ground was replaced by a conducting groundplane.

9 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

10 PHOTO REPORT

Please see separate photo report.