

FCC Measurement/Technical Report on

Multimedia Equipment with WLAN and Bluetooth BCI3L4PTN1(Star 3.5 / Star 3.0)

FCC ID: 2AUXS- BCI3L4PTN1
IC: 25847-BCI3L4PTN1

Test Report Reference: MDE_BOSCH_2411_FCC_07_rev02

Test Laboratory:

7layers GmbH
Borsigstrasse 11
40880 Ratingen
Germany



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:
Jörg-Timm Kilisch
Bernhard Retka

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	5
2 Revision History / Signatures	12
3 Administrative Data	13
3.1 Testing Laboratory	13
3.2 Project Data	13
3.3 Applicant Data	13
3.4 Manufacturer Data	14
4 Test object Data	15
4.1 General EUT Description	15
4.2 EUT Main components	16
4.3 Ancillary Equipment	16
4.4 Auxiliary Equipment	17
4.5 EUT Setups	17
4.6 Operating Modes / Test Channels	17
4.7 Duty cycle	19
4.8 Product labelling	20
5 Test Results	21
5.1 Occupied Bandwidth (6 dB)	21
5.2 Occupied Bandwidth (99%)	27
5.3 Peak Power Output	33
5.4 Spurious RF Conducted Emissions	38
5.5 Transmitter Spurious Radiated Emissions	46
5.6 Band Edge Compliance Conducted	80
5.7 Band Edge Compliance Radiated	90
5.8 Power Density	112
6 Test Equipment	119
6.1 Test Equipment Hardware	119
6.2 Test Equipment Software	123
7 Antenna Factors, Cable Loss and Sample Calculations	124
7.1 Antenna R&S HFH2-Z2 (9 kHz – 30 MHz)	124
7.2 Antenna R&S HL562 (30 MHz – 1 GHz)	125
7.3 Antenna R&S HF907 (1 GHz – 18 GHz)	126
7.4 Antenna EMCO 3160-09 (18 GHz – 26.5 GHz)	127
8 Measurement Uncertainties	128
9 Photo Report	129



1 APPLIED STANDARDS AND TEST SUMMARY

1.1 APPLIED STANDARDS

Type of Authorization

Certification for an Intentional Radiator.

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 2 and 15 (10-1-23 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 (only in case of direct or indirect connection to AC main)

§ 15.209 Radiated emission limits; general requirements

§ 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz

Note:

The tests were selected and performed with reference to the FCC Public Notice "Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of the FCC Rules, 558074 D01 15.247 Meas Guidance v05r02, 2019-04-02".
ANSI C63.10-2013 is applied.

1.2 FCC-IC CORRELATION TABLE

Correlation of measurement requirements for DTS (e.g. WLAN 2.4 GHz, BT LE) equipment from FCC and IC

DTS equipment

Measurement	FCC reference	IC reference
Conducted emissions on AC Mains	§ 15.207	RSS-Gen Issue 5 & AMD 1 & AMD 2: 8.8
Occupied bandwidth	§ 15.247 (a) (2)	RSS-247 Issue 3: 5.2 (a)
Peak conducted output power	§ 15.247 (b) (3), (4)	RSS-247 Issue 3: 5.4 (d)
Transmitter spurious RF conducted emissions	§ 15.247 (d)	RSS-Gen Issue 5 & AMD 1 & AMD 2: 6.13 / 8.9/8.10; RSS-247 Issue 3: 5.5
Transmitter spurious radiated emissions	§ 15.247 (d); § 15.209 (a)	RSS-Gen Issue 5 & AMD 1 & AMD 2: 6.13 / 8.9/8.10; RSS-247 Issue 3: 5.5
Band edge compliance	§ 15.247 (d)	RSS-247 Issue 3: 5.5
Power density	§ 15.247 (e)	RSS-247 Issue 3: 5.2 (b)
Antenna requirement	§ 15.203 / 15.204	RSS-Gen Issue 5 & AMD 1 & AMD 2: 8.3
Receiver spurious emissions	-	-

1.3 MEASUREMENT SUMMARY

47 CFR CHAPTER I FCC PART 15 Subpart C §15.247

§ 15.247 (a) (2)

Occupied Bandwidth (6 dB)

The measurement was performed according to ANSI C63.10, chapter 11.8.1

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Measurement method				
Chip01, Bluetooth LE 1 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed

47 CFR CHAPTER I FCC PART 15 Subpart C §15.247

IC RSS-Gen; Ch. 6.7 & Ch. 8

Occupied Bandwidth (99%)

The measurement was performed according to ANSI C63.10, chapter 6.9.3

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Measurement method				
Chip01, Bluetooth LE 1 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip01, Bluetooth LE 1 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip01, Bluetooth LE 1 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip01, Bluetooth LE 2 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip01, Bluetooth LE 2 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip01, Bluetooth LE 2 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed

47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

IC RSS-Gen; Ch. 6.7 & Ch. 8

Occupied Bandwidth (99%)

The measurement was performed according to ANSI C63.10, chapter 6.9.3

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Measurement method				
Chip02, Bluetooth LE 1 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip02, Bluetooth LE 1 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip02, Bluetooth LE 1 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip02, Bluetooth LE 2 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip02, Bluetooth LE 2 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip02, Bluetooth LE 2 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	N/A	Performed
Chip01, WLAN ax 20 MHz (SU), high, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN ax 20 MHz (SU), low, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN ax 20 MHz (MU), high, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN ax 20 MHz (MU), low, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN ax 20 MHz (MU), mid, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN b, high, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN b, low, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN b, mid, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN g, high, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN g, low, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN g, mid, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN n 20 MHz, high, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN n 20 MHz, low, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed
Chip01, WLAN n 20 MHz, mid, conducted	S01_AA01#S3.5	2024-12-19	N/A	Performed

47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

§ 15.247 (b) (3)

Peak Power Output

The measurement was performed according to ANSI C63.10, chapter 11.9.1.1/11.9.2.3.2

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Measurement method				
Chip01, Bluetooth LE 1 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

§ 15.247 (b) (3)

Peak Power Output

The measurement was performed according to ANSI C63.10, chapter 11.9.1.1/11.9.2.3.2

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Measurement method				
Chip01, WLAN ax 20 MHz (MU), low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

§ 15.247 (d)

Spurious RF Conducted Emissions

The measurement was performed according to ANSI C63.10, chapter 11.11

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency				
Chip01, Bluetooth LE 1 Mbps, high	S01_AA01#S3.5	2024-12-13	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, low	S01_AA01#S3.5	2024-12-13	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, mid	S01_AA01#S3.5	2024-12-13	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, high	S01_AA01#S3.5	2024-12-13	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, low	S01_AA01#S3.5	2024-12-13	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, mid	S01_AA01#S3.5	2024-12-13	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, high	S01_AA01#S3.5	2024-12-10	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, low	S01_AA01#S3.5	2024-12-10	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, mid	S01_AA01#S3.5	2024-12-10	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, high	S01_AA01#S3.5	2024-12-10	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, low	S01_AA01#S3.5	2024-12-10	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, mid	S01_AA01#S3.5	2024-12-10	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), high	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), low	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), high	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), low	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), mid	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, high	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, low	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, mid	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, high	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, low	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, mid	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, high	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, low	S01_AA01#S3.5	2024-12-19	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

§ 15.247 (d)

Spurious RF Conducted Emissions

The measurement was performed according to ANSI C63.10, chapter 11.11

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency				
Chip01, WLAN n 20 MHz, mid	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, Simultaneous Transmission A, -	S01_AA01#S3.5	2025-04-23	Passed	Passed
Chip01, Simultaneous Transmission B, -	S01_AA01#S3.5	2025-04-23	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

§ 15.247 (d)

Transmitter Spurious Radiated Emissions

The measurement was performed according to ANSI C63.10, chapter 6.4, 6.5, 6.6.5

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Measurement range				
Chip01, Bluetooth LE 2 Mbps, high, 30 MHz - 1 GHz	S01_AB01#S3.5	2025-08-01	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, high, 1 G - 26 GHz	S01_AB01#S3.5	2025-07-31	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, low, 30 MHz - 1 GHz	S01_AB01#S3.5	2025-08-01	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, low, 1 G - 26 GHz	S01_AB01#S3.5	2025-07-31	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, mid, 30 MHz - 1 GHz	S01_AB01#S3.5	2025-08-01	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, mid, 1 G - 26 GHz	S01_AB01#S3.5	2025-07-31	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, high, 30 MHz - 1 GHz	S01_AB01#S3.5	2025-08-01	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, high, 1 G - 26 GHz	S01_AB01#S3.5	2025-08-01	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, low, 30 MHz - 1 GHz	S01_AB01#S3.5	2025-08-01	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, low, 1 G - 26 GHz	S01_AB01#S3.5	2025-08-03	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, mid, 30 MHz - 1 GHz	S01_AB01#S3.5	2025-08-01	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, mid, 1 G - 26 GHz	S01_AB01#S3.5	2025-08-03	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), low, 1 G - 26 GHz (Harmonic only)	S01_AB01#S3.5	2025-06-14	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), low, 1 G - 26 GHz (Harmonic only)	S01_AB01#S3.5	2025-06-14	Passed	Passed
Chip01, WLAN b, high, 1 GHz - 26 GHz	S01_AB01#S3.5	2024-12-24	Passed	Passed
Chip01, WLAN b, high, 30 MHz - 1 GHz	S01_AB01#S3.5	2024-12-14	Passed	Passed
Chip01, WLAN b, low, 1 GHz - 26 GHz	S01_AB01#S3.5	2024-12-26	Passed	Passed
Chip01, WLAN b, low, 30 MHz - 1 GHz	S01_AB01#S3.5	2024-12-12	Passed	Passed
Chip01, WLAN b, mid, 1 GHz - 26 GHz	S01_AB01#S3.5	2024-12-24	Passed	Passed
Chip01, WLAN b, mid, 30 MHz - 1 GHz	S01_AB01#S3.5	2024-12-12	Passed	Passed
Chip01, WLAN b, mid, 9 kHz - 30 MHz	S01_AB01#S3.5	2024-12-15	Passed	Passed
Chip01, WLAN g, high, 1 GHz - 8 GHz	S01_AB01#S3.5	2024-12-24	Passed	Passed
Chip01, WLAN g, low, 1 GHz - 8 GHz	S01_AB01#S3.5	2024-12-24	Passed	Passed
Chip01, WLAN g, mid, 1 GHz - 8 GHz	S01_AB01#S3.5	2024-12-24	Passed	Passed
Chip01, WLAN b, high, 1 GHz - 26 GHz	S01_AA01#S3.0	2025-01-22	Passed	Passed
Chip01, WLAN b, mid, 30 MHz - 1 GHz	S01_AA01#S3.0	2025-01-15	Passed	Passed
Chip01, WLAN b, mid, 9 kHz - 30 MHz	S01_AA01#S3.0	2025-01-30	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

§ 15.247 (d)

Band Edge Compliance Conducted

The measurement was performed according to ANSI C63.10, chapter 11.11

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Band Edge				
Chip01, Bluetooth LE 1 Mbps, high, high	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, high, high	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, low, low	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, high, high	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, low, low	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, high, high	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, low, low	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, high, high	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, low, low	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), high, high	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), low, low	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), high, high	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), low, low	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, high, high	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, low, low	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, high, high	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, low, low	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, high, high	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, low, low	S01_AA01#S3.5	2024-12-19	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

§ 15.247 (d)

Band Edge Compliance Radiated

The measurement was performed according to ANSI C63.10, chapter 6.6.5

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Band Edge				
Chip01, Bluetooth LE 2 Mbps, low, low	S01_AB01#S3.5	2025-07-08	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, low, low	S01_AB01#S3.5	2025-07-08	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), low, low	S01_AB01#S3.5	2025-06-14	Passed	Passed
Chip01, WLAN b, low, low	S01_AB01#S3.5	2025-07-14	Passed	Passed
Chip01, WLAN g, low, low	S01_AB01#S3.5	2025-07-14	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, high, high	S01_AB01#S3.5	2025-06-13	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, high, high	S01_AB01#S3.5	2025-06-13	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, high, high	S01_AB01#S3.5	2025-06-13	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, high, high	S01_AB01#S3.5	2025-06-13	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), high, high	S01_AB01#S3.5	2025-01-27	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), high, high	S01_AB01#S3.5	2025-01-27	Passed	Passed
Chip01, WLAN b, high, high	S01_AB01#S3.5	2024-12-24	Passed	Passed
Chip01, WLAN g, high, high	S01_AB01#S3.5	2024-12-24	Passed	Passed
Chip01, WLAN n 20 MHz, high, high	S01_AB01#S3.5	2024-12-22	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), high, high	S01_AA01#S3.0	2025-01-21	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), high, high	S01_AA01#S3.0	2025-01-21	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

§ 15.247 (d)

Band Edge Compliance Radiated

The measurement was performed according to ANSI C63.10, chapter 6.6.5

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Band Edge				
Chip01, Bluetooth LE 2 Mbps, low, low	S01_AB01#S3.5	2025-07-08	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, low, low	S01_AB01#S3.5	2025-07-08	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), low, low	S01_AB01#S3.5	2025-06-14	Passed	Passed
Chip01, WLAN b, low, low	S01_AB01#S3.5	2025-07-14	Passed	Passed
Chip01, WLAN g, low, low	S01_AB01#S3.5	2025-07-14	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, high, high	S01_AB01#S3.5	2025-06-13	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, high, high	S01_AB01#S3.5	2025-06-13	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, high, high	S01_AB01#S3.5	2025-06-13	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, high, high	S01_AB01#S3.5	2025-06-13	Passed	Passed
Chip01, WLAN b, high, high	S01_AA01#S3.0	2025-01-22	Passed	Passed

47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

§ 15.247 (e)

Power Density

The measurement was performed according to ANSI C63.10, chapter 11.10.2/11.10.7

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Measurement method				
Chip01, Bluetooth LE 1 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 1 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, Bluetooth LE 2 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 1 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, high, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, low, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip02, Bluetooth LE 2 Mbps, mid, conducted	S01_AA01#S3.5	2024-12-05	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (SU), low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN ax 20 MHz (MU), mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN b, mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN g, mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, high, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed
Chip01, WLAN n 20 MHz, low, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed



47 CFR CHAPTER I FCC PART 15
Subpart C §15.247

§ 15.247 (e)

Power Density

The measurement was performed according to ANSI C63.10, chapter 11.10.2/11.10.7

Final Result

OP-Mode	Setup	Date	FCC	IC
Chip, Radio Technology, Operating Frequency, Measurement method Chip01, WLAN n 20 MHz, mid, conducted	S01_AA01#S3.5	2024-12-19	Passed	Passed

N/A: Not applicable

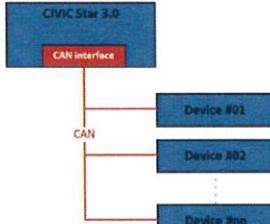
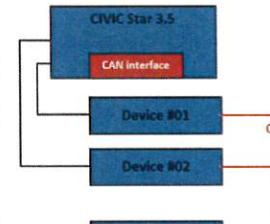
N/P: Not performed

2 REVISION HISTORY / SIGNATURES

Report version control			
Version	Release date	Change Description	Version validity
initial	2025-04-25	--	invalid
rev01	2025-08-05	<ul style="list-style-type: none"> - changed the values in test case output power and PSD. - for BTLE "Spurious Radiated Emissions" measurements have been added. - Low Band-Edge radiated measurements have been added. 	valid
rev02	2025-08-11	- updated administrative Data and Measurements summary.	valid

COMMENT:

The EUT (Multimedia Equipment with WLAN and Bluetooth) supports two different software variants. The differences between these variants are explained in the following table:

Parameter	LS4T	LS4+T
SW-SKU	ABBC	AABC
GPU frequency	635 MHz	731 MHz
Software variant	Star 3.0	Star 3.5
Blockdiagram Star Architectures	<p>The following block diagram shows the fundamental Star 3.0 architecture that uses the CAN interface.</p> 	<p>The following block diagram shows the fundamental Star 3.5 architecture that does not use the CAN interface, but it is assembled on the CIVIC device.</p> 

The CAN interface is always built on both Star architectures, but only Star 3.0 uses the CAN interface.

Based on the previous table and the applicant's suggested test plan, the measurements were conducted as follows:

- Variant "Star 3.5": Full testing
- Variant "Star 3.0": Spot checks only



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


 (responsible for accreditation scope)
 Dipl.-Ing. Daniel Gall


 (responsible for testing and report)
 BSc. Mhd Mouaz Saad

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. Daniel Gall

Report Template Version: 2025-02-28

3.2 PROJECT DATA

Responsible for testing and report: BSc. Mhd Mouaz Saad

Employees who performed the tests: documented internally at 7Layers

Date of Report: 2025-08-11

Testing Period: 2024-12-05 to 2025-08-03

3.3 APPLICANT DATA

Company Name: Robert Bosch GmbH

Address: Robert-Bosch-Platz 1, 70839 Gerlingen
Germany

Contact Person: Karin Silberhorn



3.4 MANUFACTURER DATA

Manufacturer 1

Company Name: Bosch Car Multimedia Portugal
Address: S.A. Rua Max Grundig
35-Lomar,
4705-820 Braga

Manufacturer 2

Company Name: Bosch Automotive Products (Suzhou) Co., Ltd.
Address: Changzhou Branch
No. 17, Long Men Road,
Wujin Hi-tech Industrial Zone
Changzhou, Jiangsu, P.R. China

4 TEST OBJECT DATA

4.1 GENERAL EUT DESCRIPTION

Kind of Device product description	Central In-Vehicle Infotainment Computer				
Product name	Multimedia Device with WLAN and Bluetooth				
Model name	BCI3L4PTN1(Star 3.5 / Star 3.0)				
Declared EUT data by the supplier					
Voltage Type	DC				
Voltage Level	12 VDC				
Antenna / Gain	External				
	Antenna 2 (Chip02 BT)	Antenna 3 (Chip01 BT)	Antenna 4 (WLAN 2.4)		
	0.1 dB	0.1 dB	0.1 dB		
Tested Modulation Type	BTLE : GFSK WLAN : WLAN b: DSSS, WLAN g/n: OFDM WLAN ax: OFDM and OFDMA				
General product description	Central In-Vehicle Infotainment Computer Gen20x.i3 infotainment system is the main unit in the vehicle, which combines the instrument cluster and infotainment functionality. It supports Bluetooth classic (BT), Bluetooth Low Energy (BTLE) and Wi-Fi (2.4GHz (SISO) and 5GHz (MIMO only)). Supported WLAN modes are b, g, n and ax with 20 MHz BW.				
Specific product description for the EUT	The EUT has the following modules for Bluetooth and WLAN:				
	ATC6QPL002(Chip02) : Only BT and BTLE	ATC6QPL004(Chip01) : BT, BTLE, Wi-Fi (2.4GHz and 5GHz).			
EUT ports (connected cables during testing):	Main Connector A(incl. DC Power) (unshielded, 1m)	GNSS antenna (shielded, 1.5m)			
	Main Connector B (unshielded, 1m)	BT/WLAN Antenna (shielded, 1.5m)			
	Ethernet (shielded, 1.5m)	HD-BaseT (shielded, 1.5m)			
	FM/AM/SDARS/Ref.-Antennas	USB 2.0 – TGS (shielded, 1.5m)			
	Video-Out Displays (shielded, 1.5m)	USB 2.0 - MM-Box (shielded, 1.5m)			
	CamsControl(shielded, 1.5m)	Video-in Cameras (shielded, 1.5m)			
	USB 3.0 High Speed Flashing/CAM Logging (shielded, 1.5m)				
Tested datarates	BTLE: 1Mbps, 2Mbps WLAN b: 1 Mbps, WLAN g: 6 Mbps, WLAN n and ax: MCS0				
Special software used for testing	ADB shell.exe / civic_wlan_rta_tool_v2_11.exe				
Connection to AC main is supported	No (no direct or indirect connection)				

4.2 EUT MAIN COMPONENTS

Sample Name	Sample Code	Description
EUT A	DE1050025aa01	Conducted Sample
Sample Parameter	Value	
Serial No.	0015674	
HW Version	D5	
SW Version	E064.4	
Comment	BCI3L4PTN1 - Star 3.5	

Sample Name	Sample Code	Description
EUT B	DE1050025ab01	Radiated Sample
Sample Parameter	Value	
Serial No.	0015673	
HW Version	D5	
SW Version	E064.4	
Comment	BCI3L4PTN1 - Star 3.5	

Sample Name	Sample Code	Description
EUT C	DE1050026aa01	Radiated Sample
Sample Parameter	Value	
Serial No.	0018792	
HW Version	D5	
SW Version	E064.4	
Comment	BCI3L4PTN1 - Star 3.0	

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
ANC 1	Continental, RKE223E1GNS, DE1050025/026AUX01	GNSS Antenna + Antenna Cable (1.5m)
ANC 2	Mercedes-Benz, A1779052902, DE1050025/026AUX45	4x WIFI/BT Antenna + 4x Antenna Cable (1.5m)

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
AUX A	Bosch, -, -, -, -	2x Cable Harness

4.5 EUT SETUPS

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

Setup	Combination of EUTs	Description and Rationale
S01_AA01#S3.5	EUT A, AUX A	Conducted Setup
S01_AB01#S3.5	EUT B, ANC 1, ANC 2, AUX A	Radiated Setup
S01_AA01#S3.0	EUT C, ANC 1, ANC 2, AUX A	Radiated Setup

4.6 OPERATING MODES / TEST CHANNELS

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

4.6.1 TEST CHANNELS

2.4 GHz ISM		
2400 - 2483.5 MHz		
low	mid	high
1	6	11
2412	2437	2462

2.4 GHz ISM		
2400 - 2483.5 MHz		
low	mid	high
0	19	39
2402	2440	2480

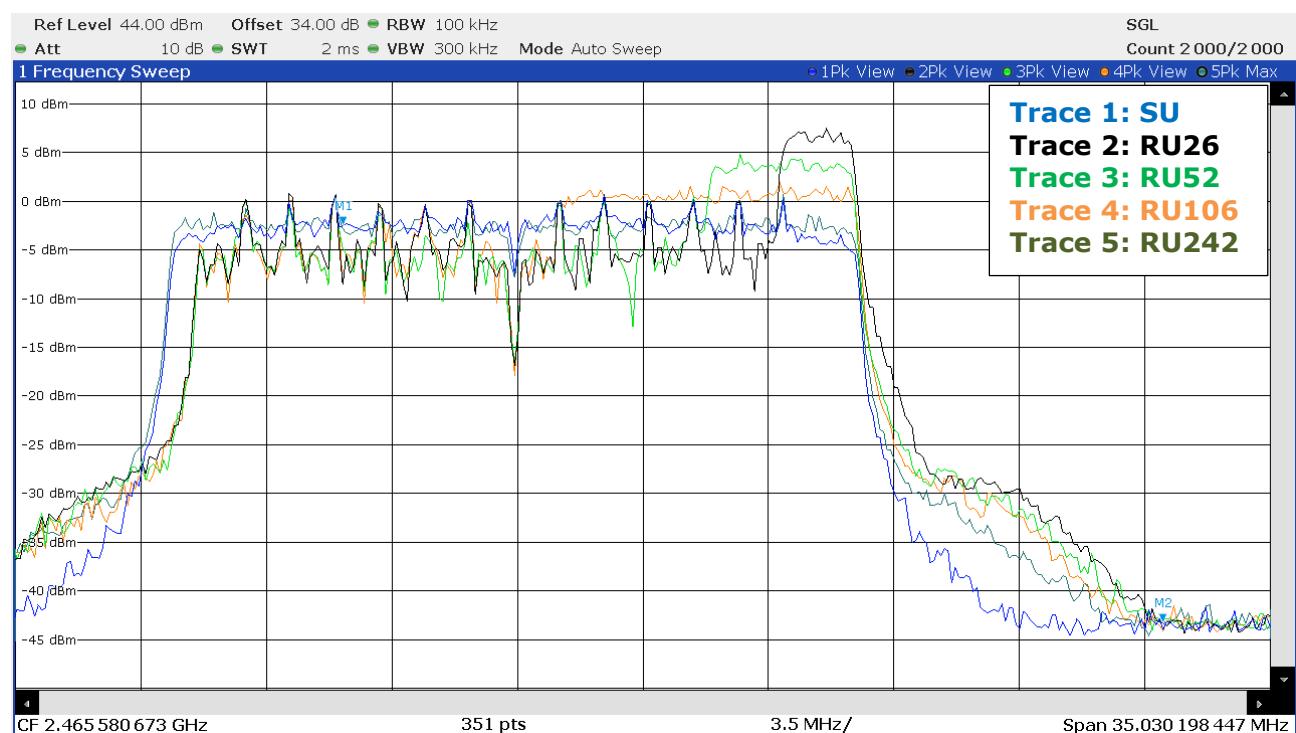
4.6.2 OPERATING MODES

The testing was conducted at the maximum output power setting specified by the manufacturer.

- BTLE mode: GFSK, Data Rate = 1 or 2 Mbps
- WLAN b-mode: 1 Mbit/s
- WLAN g-mode: 6 Mbit/s
- WLAN n-mode (20 MHz BW): MCS0
- WLAN ax-mode (20 MHz BW), support also the following modes:
 - o ax-mode **Single User (SU)** (not supported by all Test Channels)
 - o ax- mode **Multi User (MU)** (supported by all Test Channels)
- **Simultaneous Transmission A:**
 - o WLAN ax-mode (SU) Ch01 + WLAN 5GHz n40-mode Ch46 MSC0
- **Simultaneous Transmission B:**
 - o BTLE 2 Mbps Ch0 + WLAN 5GHz n40-mode Ch46 MSC0

The test case RU26 represents the worst-case scenario for ax-mode MU, which is why MU mode was performed exclusively by RU26.

ax20-mode_CH11



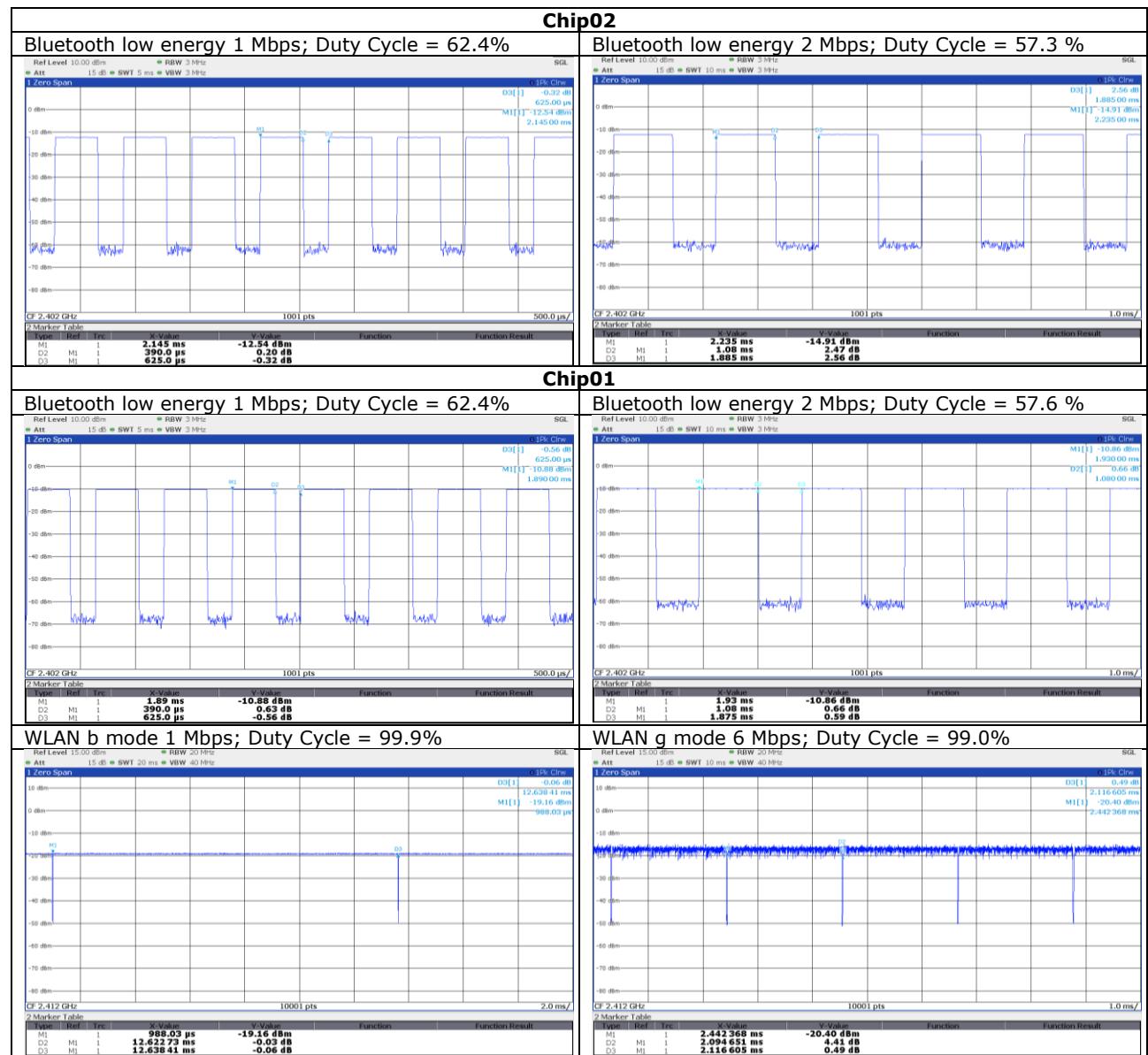
The supported test cases of the ax-mode MU by WLAN 2.4 GHz are in the following table:

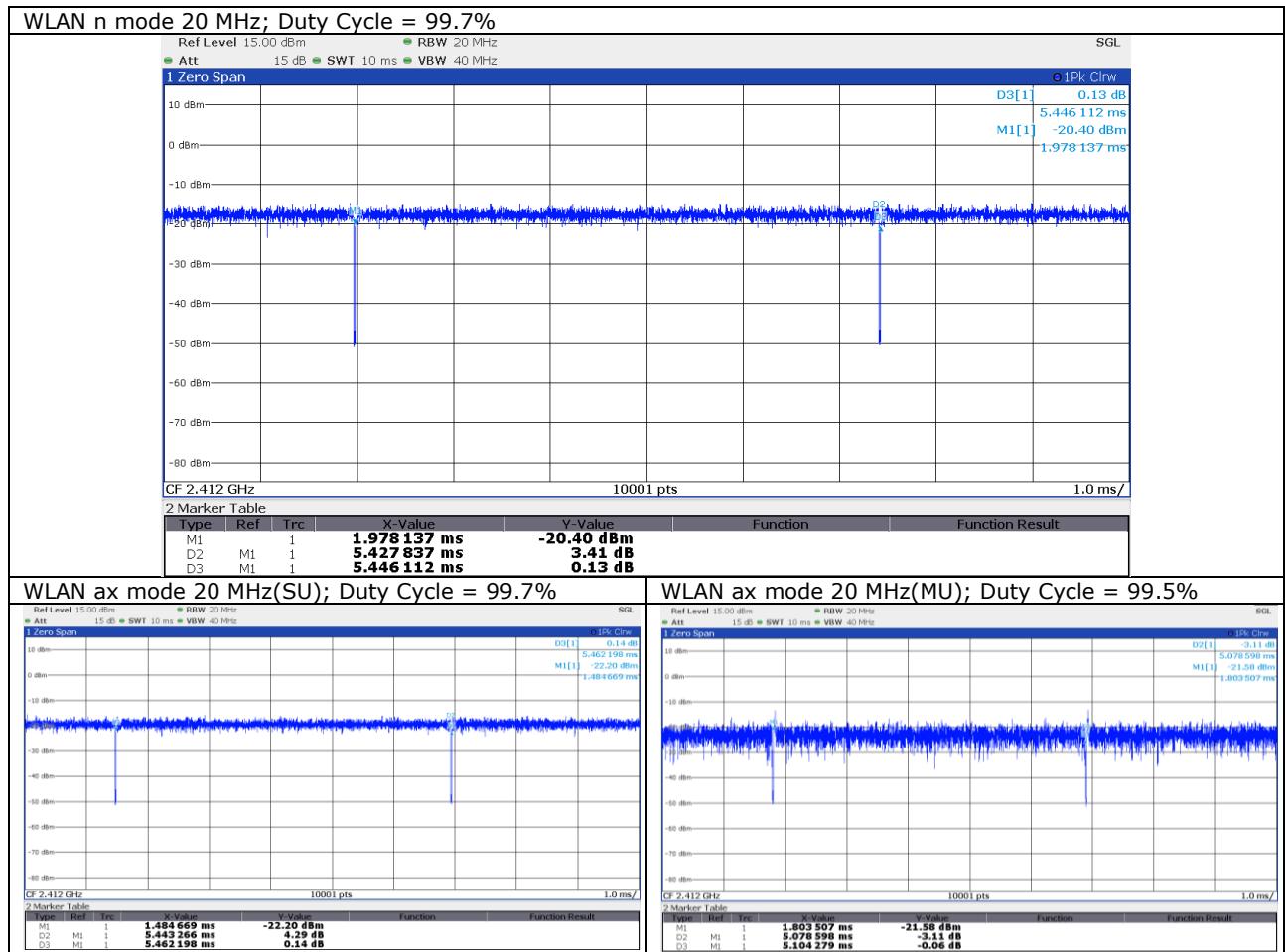
BW 20					
2412 [MHz]		2437 [MHz]		2462 [MHz]	
SU/RU	RU offset	SU/RU	RU offset	SU/RU	RU offset
SU	-	-	-	SU	-
RU26	0	RU26	4	RU26	8
RU52	37	-	-	RU52	40
RU106	53	-	-	RU106	54
RU242	61	-	-	RU242	61

4.7 DUTY CYCLE

The test was performed according to:

ANSI C63.10, chapter 10.6





4.8 PRODUCT LABELLING

4.8.1 FCC ID LABEL

Please refer to the documentation of the applicant.

4.8.2 LOCATION OF THE LABEL ON THE EUT

Please refer to the documentation of the applicant.

5 TEST RESULTS

5.1 OCCUPIED BANDWIDTH (6 DB)

Standard **FCC Part 15 Subpart C**

The test was performed according to:
ANSI C63.10, chapter 11.8.1

5.1.1 TEST DESCRIPTION

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

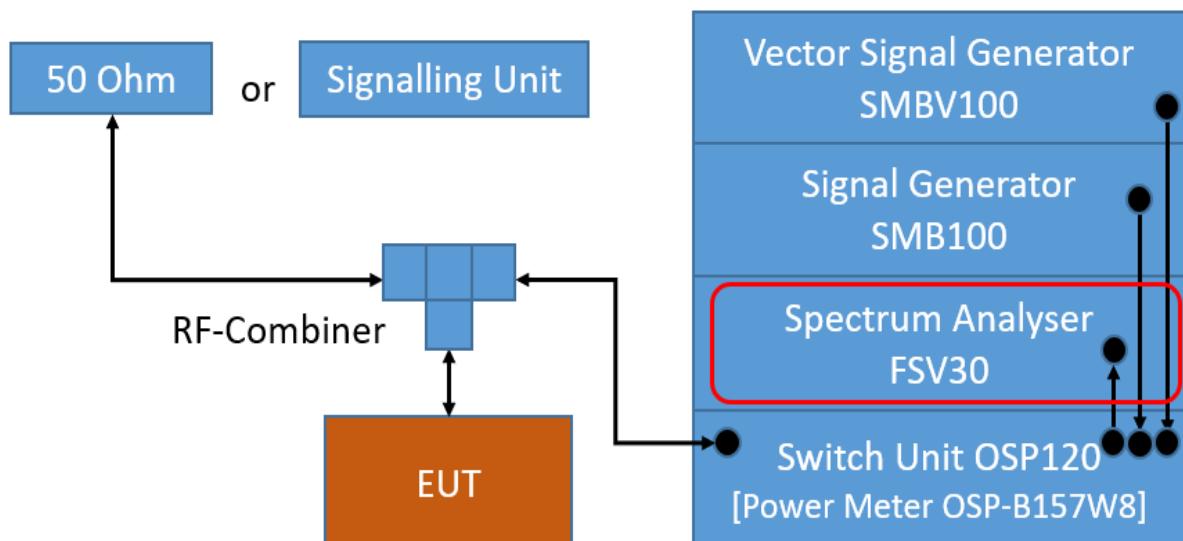
The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

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

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

Analyser settings:

- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Span: Two times nominal bandwidth
- Trace: Maxhold
- Sweeps: Till stable (min. 500, max. 15000)
- Sweptime: Auto
- Detector: Peak



TS8997; Channel Bandwidth

5.1.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart C, §15.247 (a) (2)

Systems using digital modulation techniques may operate in the 902-928 MHz and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.1.3 TEST PROTOCOL

Ambient temperature:

23 °C

Air Pressure:

1001 hPa

Humidity:

36%

Chip02

BT LE 1 Mbit/s

Band / Mode	Channel No.	Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]	Margin to Limit [MHz]
2.4 GHz ISM	0	2402	0.784	0.5	0.284
	19	2440	0.784	0.5	0.284
	39	2480	0.784	0.5	0.284

BT LE 2 Mbit/s

Band / Mode	Channel No.	Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]	Margin to Limit [MHz]
2.4 GHz ISM	0	2402	1.430	0.5	0.930
	19	2440	1.456	0.5	0.956
	39	2480	1.430	0.5	0.930

Ambient temperature:

23 °C

Air Pressure:

1001 hPa

Humidity:

36%

Chip01

BT LE 1 Mbit/s

Band / Mode	Channel No.	Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]	Margin to Limit [MHz]
2.4 GHz ISM	0	2402	0.784	0.5	0.284
	19	2440	0.800	0.5	0.300
	39	2480	0.800	0.5	0.300

BT LE 2 Mbit/s

Band / Mode	Channel No.	Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]	Margin to Limit [MHz]
2.4 GHz ISM	0	2402	1.456	0.5	0.956
	19	2440	1.456	0.5	0.956
	39	2480	1.456	0.5	0.956

Ambient temperature:

22 °C

Air Pressure:

999 hPa

Humidity:

37 %

Chip01

WLAN b-Mode; 20 MHz; 1 Mbit/s

Band	Channel No.	Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]	Margin to Limit [MHz]
2.4 GHz ISM	1	2412	7.9	0.5	7.4
	6	2437	8.2	0.5	7.7
	11	2462	8.2	0.5	7.7

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

Band	Channel No.	Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]	Margin to Limit [MHz]
2.4 GHz ISM	1	2412	16.4	0.5	15.9
	6	2437	16.4	0.5	15.9
	11	2462	16.4	0.5	15.9

WLAN n-Mode; 20 MHz; MCS0

Band	Channel No.	Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]	Margin to Limit [MHz]
2.4 GHz ISM	1	2412	17.4	0.5	16.9
	6	2437	17.5	0.5	17.0
	11	2462	17.4	0.5	16.9

WLAN ax-Mode; 20 MHz (**SU**); MCS0

Band	Channel No.	Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]	Margin to Limit [MHz]
2.4 GHz ISM	1	2412	19.0	0.5	18.5
	11	2462	19.0	0.5	18.5

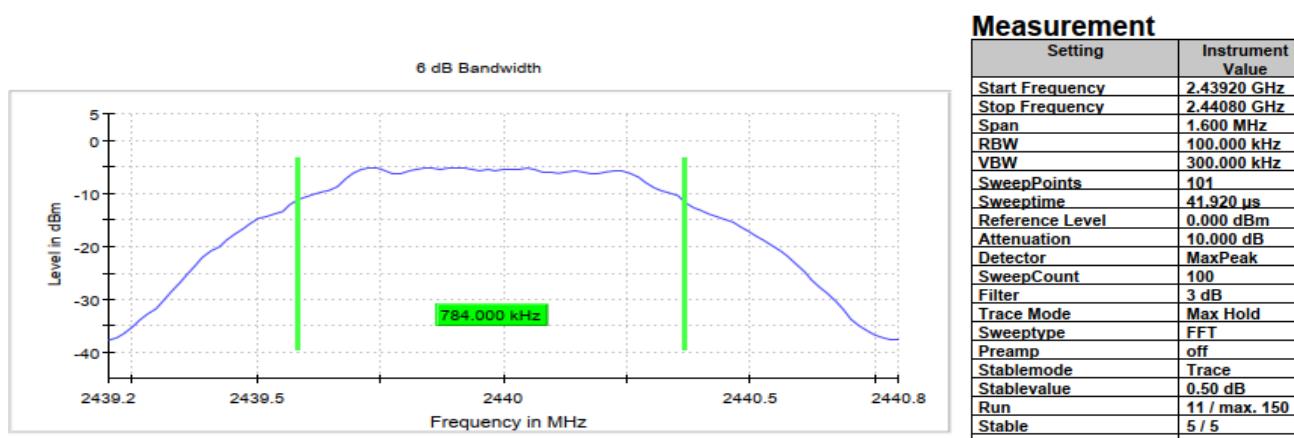
WLAN ax-Mode; 20 MHz (**MU**); MCS0

Band	Channel No.	Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]	Margin to Limit [MHz]
2.4 GHz ISM	1	2412	2.2	0.5	1.7
	6	2437	7.7	0.5	7.2
	11	2462	2.2	0.5	1.7

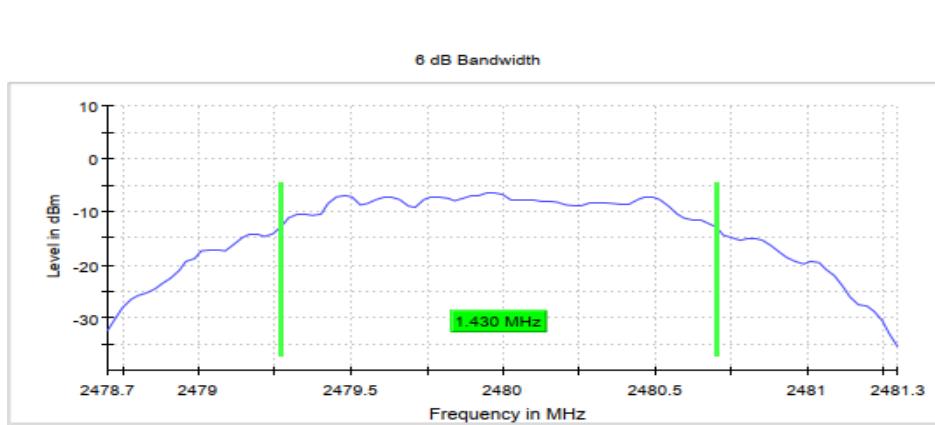
Remark: Please see next sub-clause for the measurement plot.

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

Chip02, Modulation= Bluetooth LE 1 Mbps, Operating Channel = mid
(S01_AA01#S3.5)



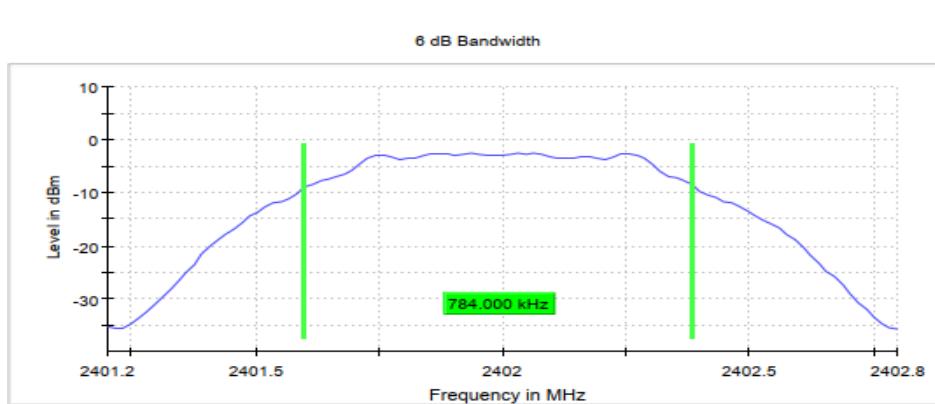
Chip02, Modulation= Bluetooth LE 2 Mbps, Operating Channel = high
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.47870 GHz
Stop Frequency	2.48130 GHz
Span	2.600 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	101
Sweeptime	41.890 µs
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	22 / max. 150
Stable	5 / 5
Max Stable Difference	0.00 dB

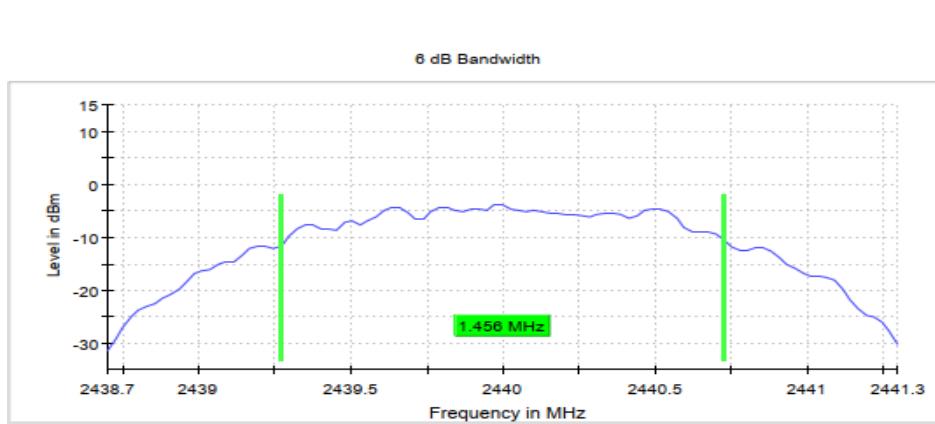
Chip01, Modulation= Bluetooth LE 1 Mbps, Operating Channel = low
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.40120 GHz
Stop Frequency	2.40280 GHz
Span	1.600 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	101
Sweeptime	41.920 µs
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	15 / max. 150
Stable	5 / 5
Max Stable Difference	0.00 dB

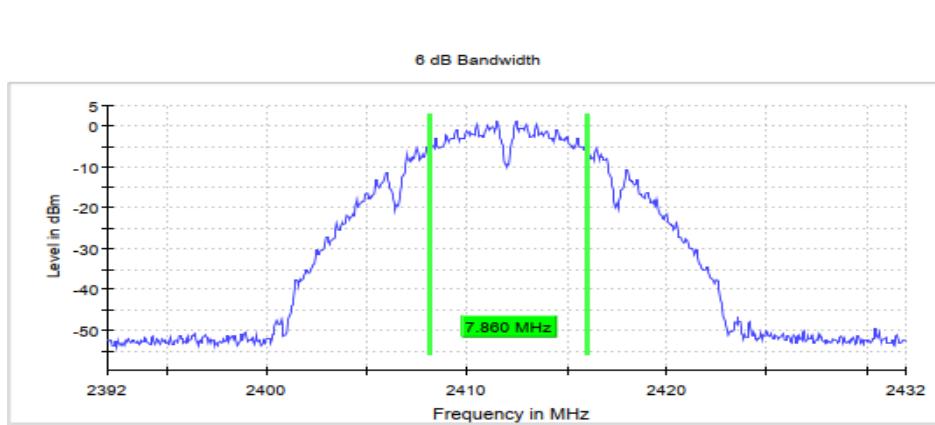
Chip01, Modulation= Bluetooth LE 2 Mbps, Operating Channel = mid
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.43870 GHz
Stop Frequency	2.44130 GHz
Span	2.600 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	101
Sweeptime	41.890 µs
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	17 / max. 150
Stable	5 / 5
Max Stable Difference	0.13 dB

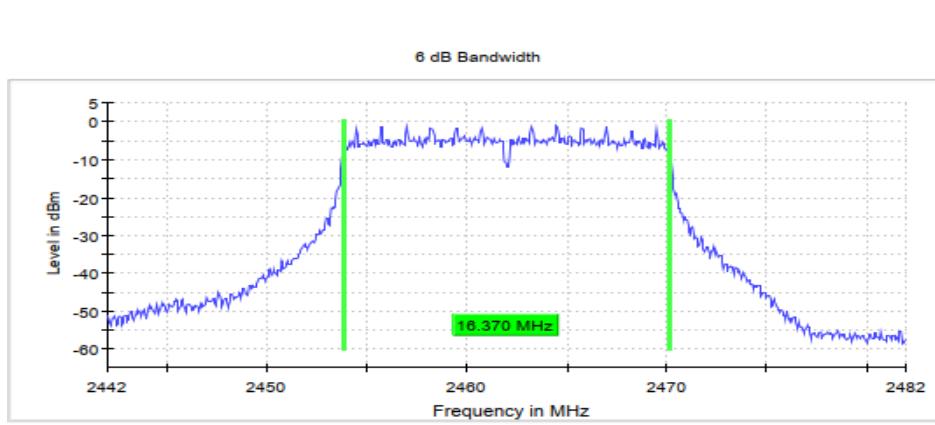
Chip01, Modulation= WLAN b, Operating Channel = low
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.39200 GHz
Stop Frequency	2.43200 GHz
Span	40.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	800
Sweeptime	1.040 ms
Reference Level	10.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	16 / max. 150
Stable	5 / 5
Max Stable Difference	0.47 dB

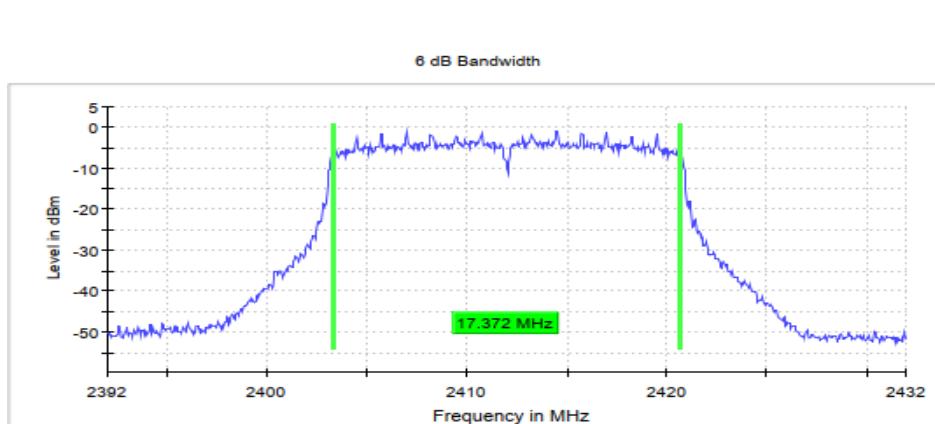
Chip01, Modulation= WLAN g, Operating Channel = high
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.44200 GHz
Stop Frequency	2.48200 GHz
Span	40.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	800
Sweeptime	1.040 ms
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	26 / max. 150
Stable	5 / 5
Max Stable Difference	0.46 dB

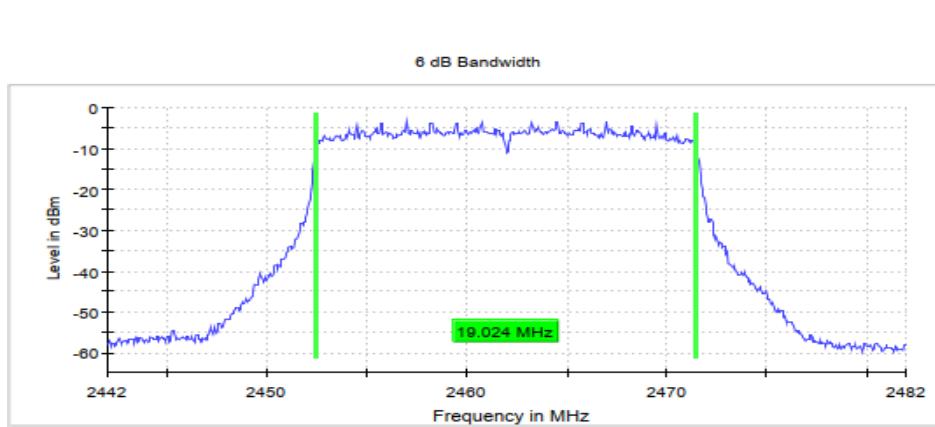
Chip01, Modulation= WLAN n 20 MHz, Operating Channel = low
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.39200 GHz
Stop Frequency	2.43200 GHz
Span	40.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	800
Sweeptime	1.040 ms
Reference Level	10.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	54 / max. 150
Stable	5 / 5
Max Stable Difference	0.31 dB

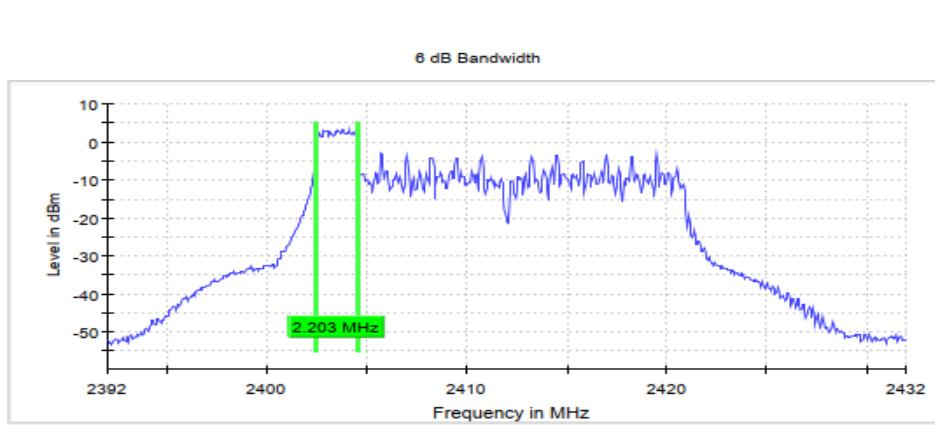
Chip01, Modulation= WLAN ax 20 MHz(SU), Operating Channel = high
 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.44200 GHz
Stop Frequency	2.48200 GHz
Span	40.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	800
Sweeptime	1.040 ms
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	104 / max. 150
Stable	5 / 5
Max Stable Difference	0.24 dB

Chip01, Modulation= WLAN ax 20 MHz(MU), Operating Channel = low
 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.39200 GHz
Stop Frequency	2.43200 GHz
Span	40.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	800
Sweeptime	1.040 ms
Reference Level	10.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	43 / max. 150
Stable	5 / 5
Max Stable Difference	0.05 dB

5.1.5 TEST EQUIPMENT USED

- R&S TS8997

5.2 OCCUPIED BANDWIDTH (99%)

Standard **FCC Part 15 Subpart C**

The test was performed according to:

ANSI C63.10, chapter 6.9.3

5.2.1 TEST DESCRIPTION

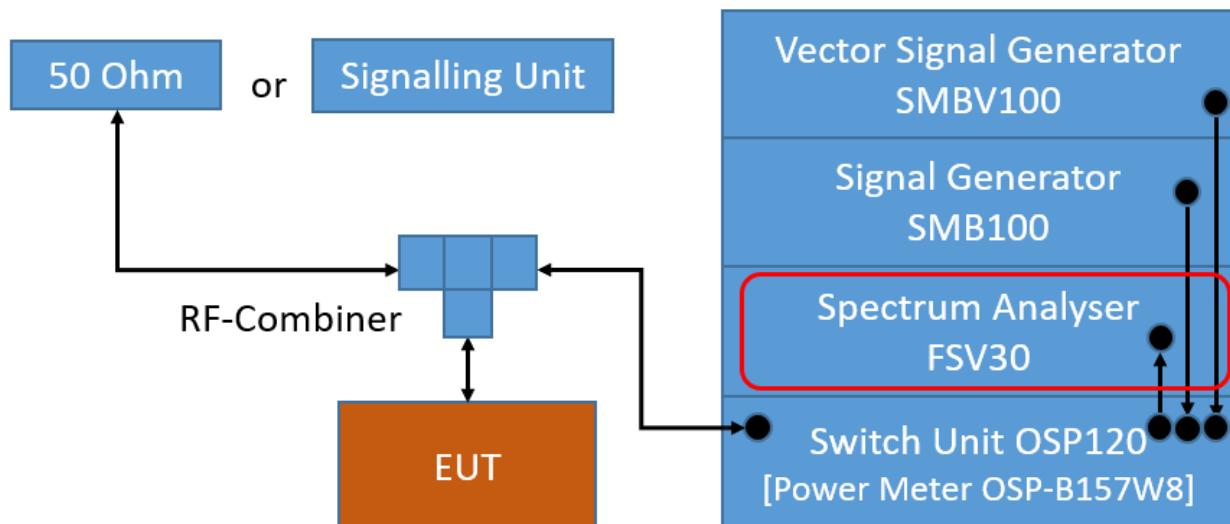
The Equipment Under Test (EUT) was set up to perform the occupied bandwidth measurements.

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

Analyser settings:

- Resolution Bandwidth (RBW): 1 to 5 % of the OBW
- Video Bandwidth (VBW): ≥ 3 times the RBW
- Span: 1.5 to 5 times the OBW
- Trace: Maxhold
- Sweeps: Till stable (min. 500, max. 75000)
- Sweptime: Auto
- Detector: Peak



TS8997; Channel Bandwidth

5.2.2 TEST REQUIREMENTS / LIMITS

No applicable limit:

5.2.3 TEST PROTOCOL

Ambient temperature: 23 °C
 Air Pressure: 1001 hPa
 Humidity: 36%

Chip02

BT LE 1 Mbit/s

Band	Channel No.	Frequency [MHz]	99 % Bandwidth [MHz]
2.4 GHz ISM	0	2402	1.025
	19	2440	1.025
	39	2480	1.025

BT LE 2 Mbit/s

Band	Channel No.	Frequency [MHz]	99 % Bandwidth [MHz]
2.4 GHz ISM	0	2402	2.002
	19	2440	1.987
	39	2480	1.987

Ambient temperature: 23 °C
 Air Pressure: 1001 hPa
 Humidity: 36%

Chip01

BT LE 1 Mbit/s

Band	Channel No.	Frequency [MHz]	99 % Bandwidth [MHz]
2.4 GHz ISM	0	2402	1.025
	19	2440	1.025
	39	2480	1.025

BT LE 2 Mbit/s

Band	Channel No.	Frequency [MHz]	99 % Bandwidth [MHz]
2.4 GHz ISM	0	2402	1.987
	19	2440	1.987
	39	2480	1.987

Ambient temperature: 22 °C
 Air Pressure: 999 hPa
 Humidity: 37 %

Chip01

WLAN b-Mode; 20 MHz; 1 Mbit/s

Band	Channel No.	Frequency [MHz]	99 % Bandwidth [MHz]
2.4 GHz ISM	1	2412	13.1
	6	2437	13.1
	11	2462	13.1

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

Band	Channel No.	Frequency [MHz]	99 % Bandwidth [MHz]
2.4 GHz ISM	1	2412	16.3
	6	2437	16.3
	11	2462	16.4

WLAN n-Mode; 20 MHz; MCS0

Band	Channel No.	Frequency [MHz]	99 % Bandwidth [MHz]
2.4 GHz ISM	1	2412	17.5
	6	2437	17.5
	11	2462	17.5

WLAN ax-Mode; 20 MHz; MCS0

Band	Channel No.	Frequency [MHz]	99 % Bandwidth [MHz]
2.4 GHz ISM	1	2412	18.9
	11	2462	18.9

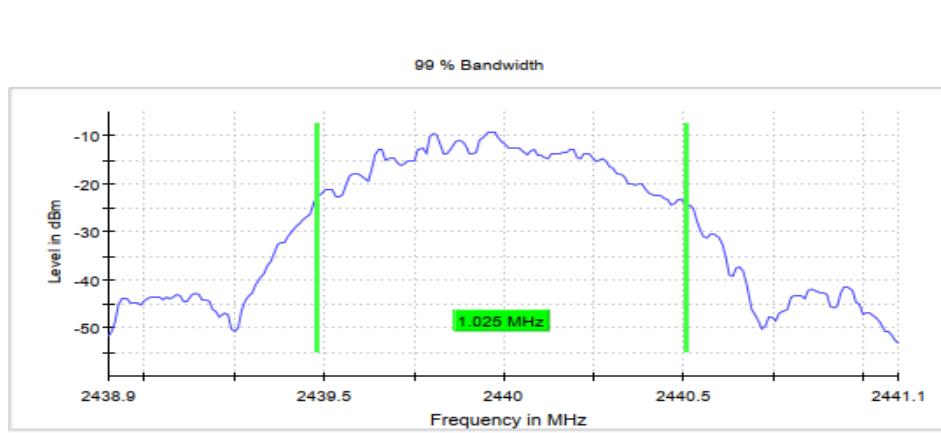
WLAN ax-Mode; 20 MHz; MCS0; RU26

Band	Channel No.	Frequency [MHz]	99 % Bandwidth [MHz]
2.4 GHz ISM	1	2412	18.4
	6	2437	17.4
	11	2462	18.4

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

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

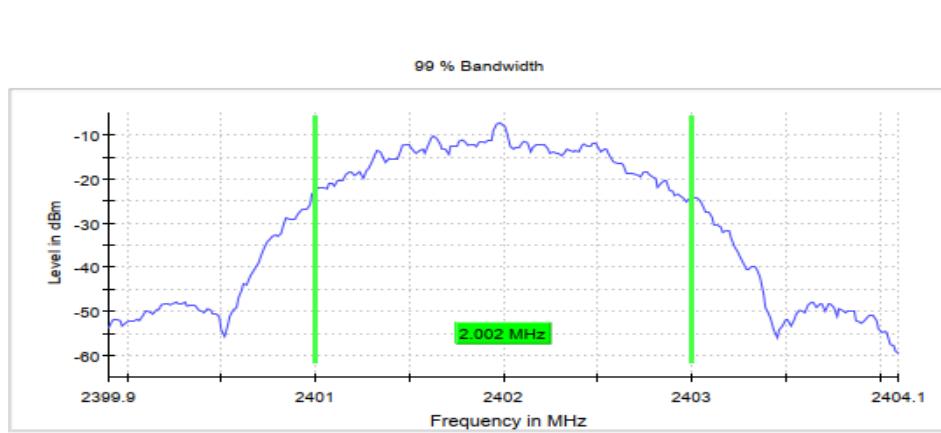
Chip02, Modulation= Bluetooth LE 1 Mbps, Operating Channel = mid
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.43890 GHz
Stop Frequency	2.44110 GHz
Span	2.200 MHz
RBW	20.000 kHz
VBW	100.000 kHz
SweepPoints	220
Sweeptime	210.000 µs
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	7 / max. 150
Stable	3 / 3
Max Stable Difference	0.07 dB

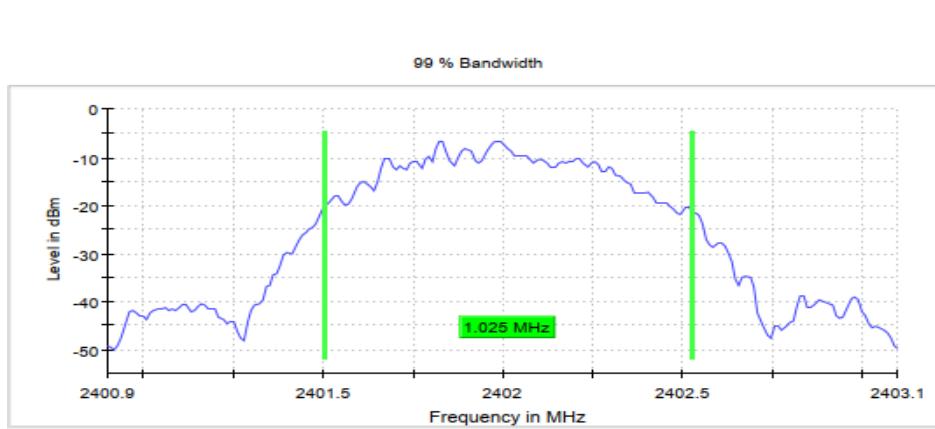
Chip02, Modulation= Bluetooth LE 2 Mbps, Operating Channel = low
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.39990 GHz
Stop Frequency	2.40410 GHz
Span	4.200 MHz
RBW	30.000 kHz
VBW	100.000 kHz
SweepPoints	280
Sweeptime	140.000 µs
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	13 / max. 150
Stable	3 / 3
Max Stable Difference	0.02 dB

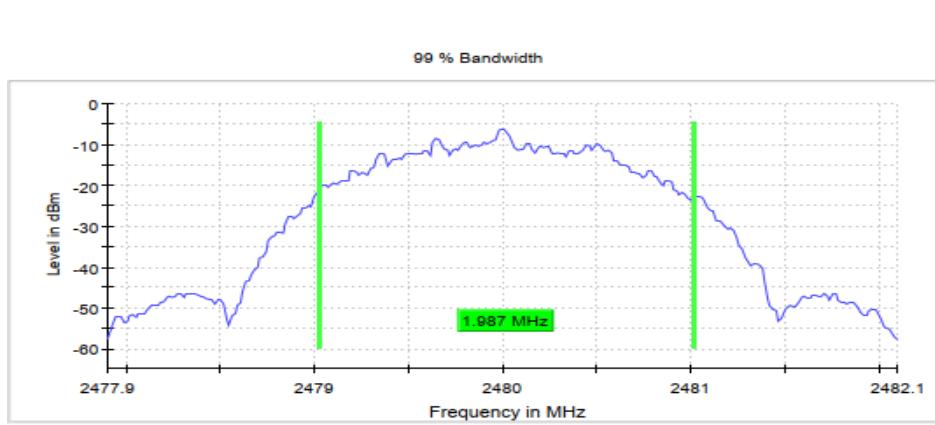
Chip01, Modulation= Bluetooth LE 1 Mbps, Operating Channel = low
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.40090 GHz
Stop Frequency	2.40310 GHz
Span	2.200 MHz
RBW	20.000 kHz
VBW	100.000 kHz
SweepPoints	220
Sweeptime	210.000 µs
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	11 / max. 150
Stable	3 / 3
Max Stable Difference	0.06 dB

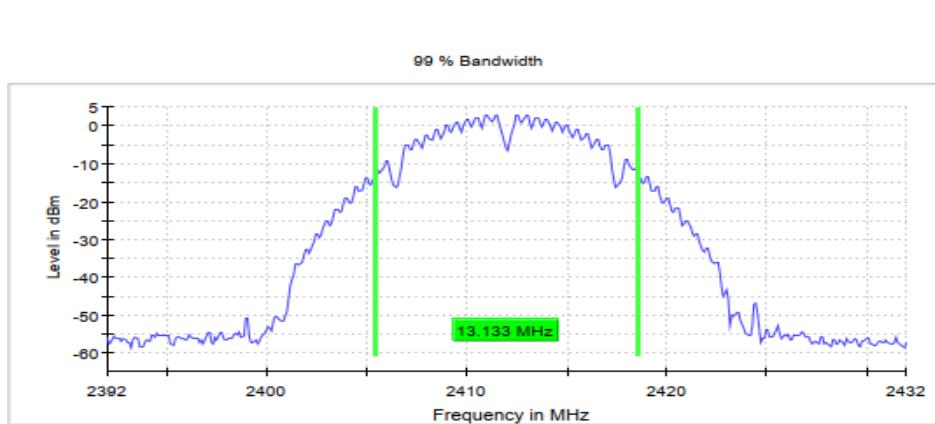
Chip01, Modulation= Bluetooth LE 2 Mbps, Operating Channel = high
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.47790 GHz
Stop Frequency	2.48210 GHz
Span	4.200 MHz
RBW	30.000 kHz
VBW	100.000 kHz
SweepPoints	280
Sweeptime	140.000 µs
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	7 / max. 150
Stable	3 / 3
Max Stable Difference	0.16 dB

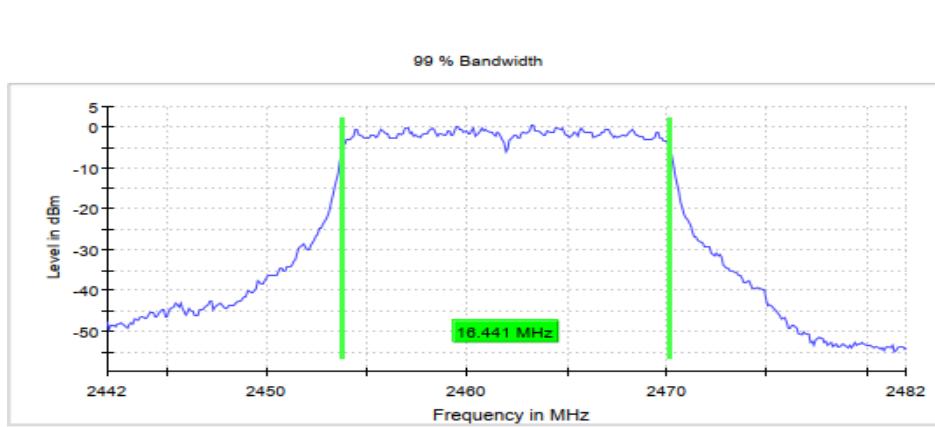
Chip01, Modulation= WLAN b, Operating Channel = low
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.39200 GHz
Stop Frequency	2.43200 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
Sweeptime	1.000 ms
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	6 / max. 150
Stable	3 / 3
Max Stable Difference	0.17 dB

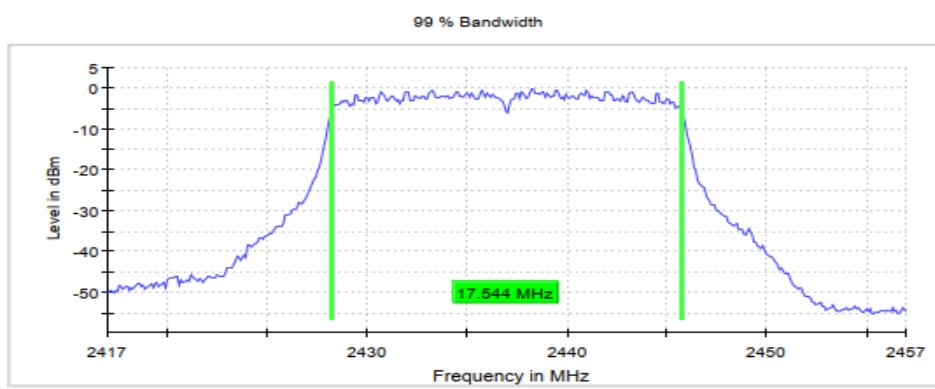
Chip01, Modulation= WLAN g, Operating Channel = high
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.44200 GHz
Stop Frequency	2.48200 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
Sweeptime	1.000 ms
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	41 / max. 150
Stable	3 / 3
Max Stable Difference	0.02 dB

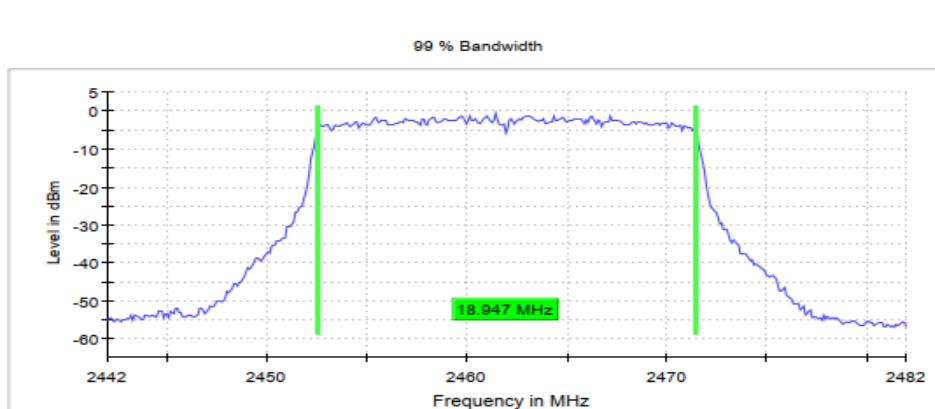
Chip01, Modulation= WLAN n 20 MHz, Operating Channel = mid
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.41700 GHz
Stop Frequency	2.45700 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
Sweeptime	1.000 ms
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	38 / max. 150
Stable	3 / 3
Max Stable Difference	0.13 dB

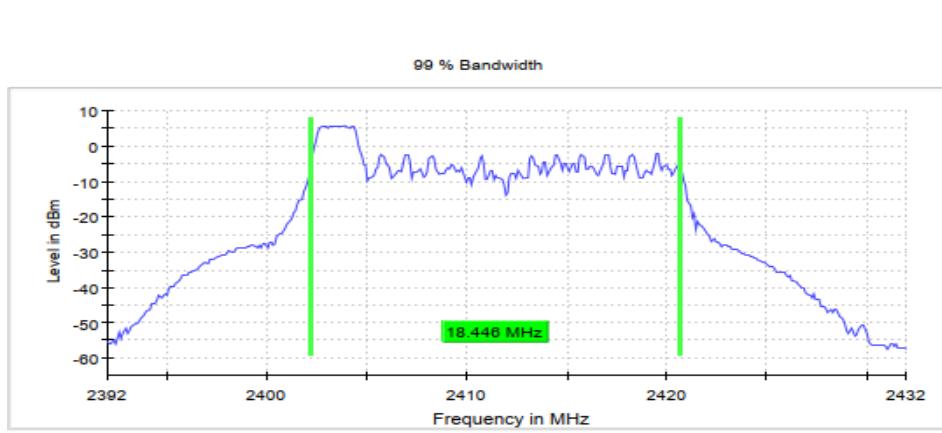
Chip01, Modulation= WLAN ax 20 MHz(SU), Operating Channel = high
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.44200 GHz
Stop Frequency	2.48200 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
Sweeptime	1.000 ms
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	44 / max. 150
Stable	3 / 3
Max Stable Difference	0.11 dB

Chip01, Modulation= WLAN ax 20 MHz(MU), Operating Channel = low
(S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	2.39200 GHz
Stop Frequency	2.43200 GHz
Span	40.000 MHz
RBW	200.000 kHz
VBW	1.000 MHz
SweepPoints	400
Sweeptime	1.000 ms
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	19 / max. 150
Stable	3 / 3
Max Stable Difference	0.19 dB

5.2.5 TEST EQUIPMENT USED

- R&S TS8997

5.3 PEAK POWER OUTPUT

Standard **FCC Part 15 Subpart C**

The test was performed according to:

ANSI C63.10, chapter 11.9.1.1/11.9.2.3.2

5.3.1 TEST DESCRIPTION

DTS EQUIPMENT:

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.

Maximum peak conducted output power (e.g. Bluetooth Low Energy):

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

The reference level of the spectrum analyser was set higher than the output power of the EUT.

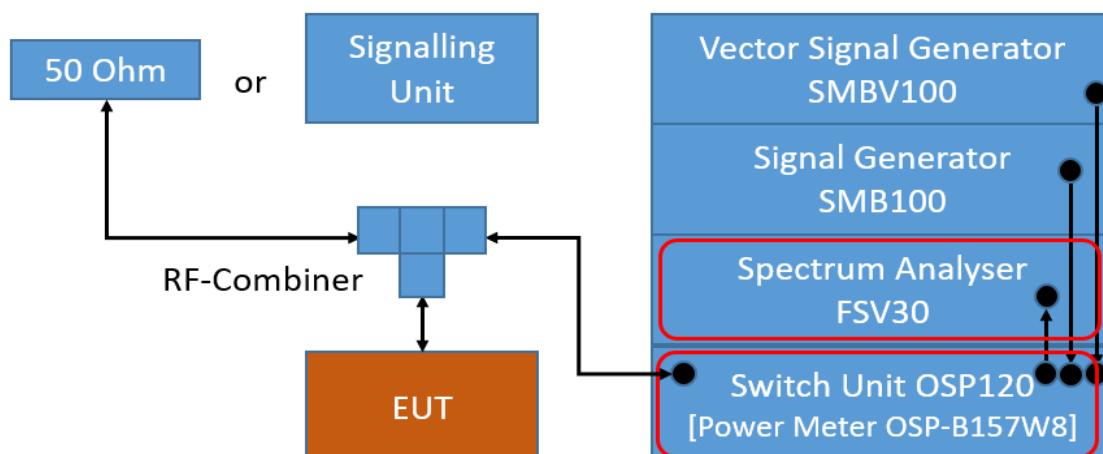
Analyser settings:

- Resolution Bandwidth (RBW): \geq DTS bandwidth
- Video Bandwidth (VBW): \geq 3 times RBW or maximum of analyzer
- Span: \geq 3 times RBW
- Trace: Maxhold
- Sweeps: Till stable (min. 300, max. 15000)
- Sweeptime: Auto
- Detector: Peak

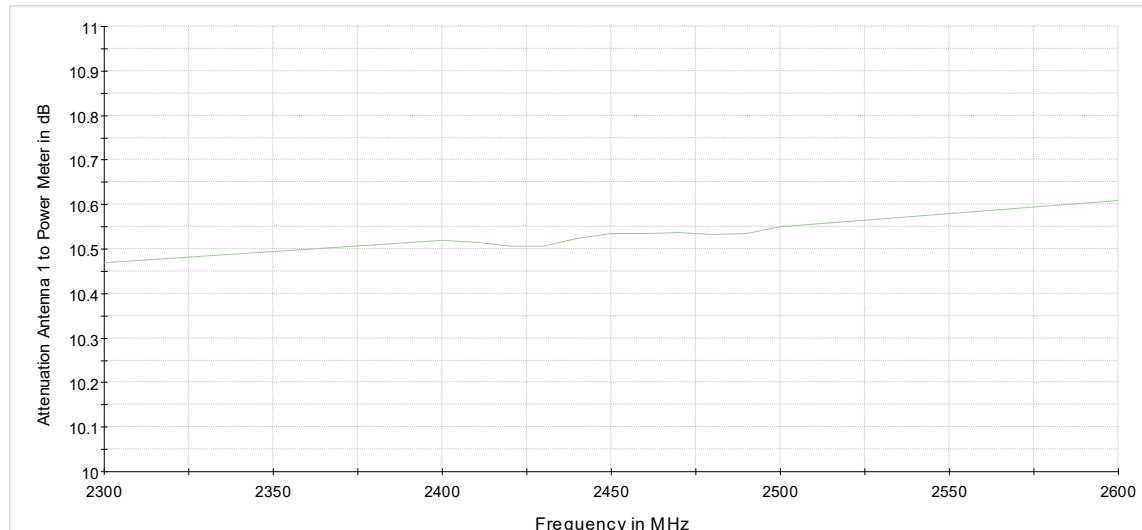
Maximum conducted average output power (e.g. WLAN):

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

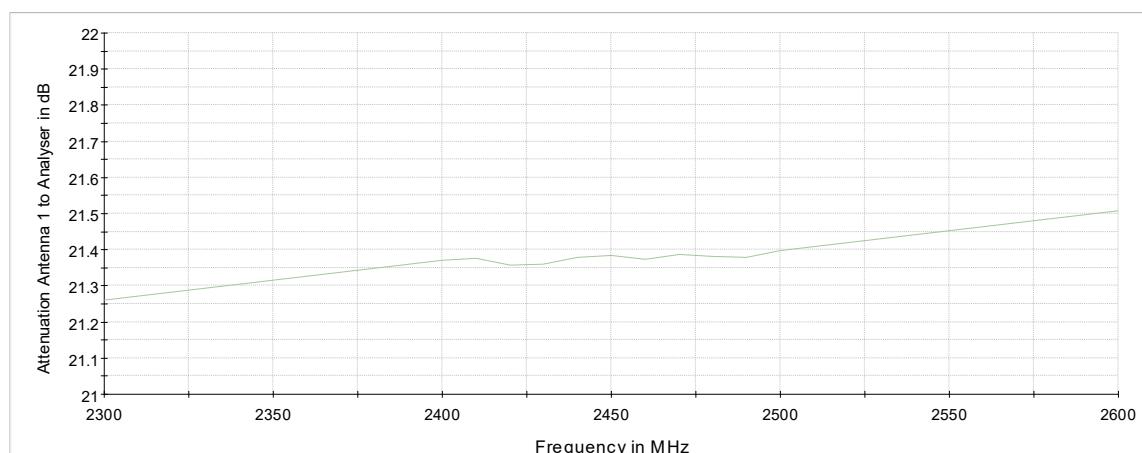
Measurement is performed using the gated RF average power meter integrated in the OSP 120 module OSP-B157W8 with signal bandwidth >300 MHz.



TS8997; Output Power



Attenuation of the measurement path to Power Meter



Attenuation of the measurement path to Analyser

5.3.2 TEST REQUIREMENTS / LIMITS

DTS devices:

FCC Part 15, Subpart C, §15.247 (b) (3)

For systems using digital modulation techniques in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands: 1 watt.

==> Maximum conducted peak output power: 30 dBm (excluding antenna gain, if antennas with directional gains that do not exceed 6 dBi are used).

Used conversion factor: Limit (dBm) = $10 \log (\text{Limit (W)}/1\text{mW})$

5.3.3 TEST PROTOCOL

Ambient temperature: 23 °C
 Air Pressure: 1001 hPa
 Humidity: 36%

Chip02

BT LE 1 Mbit/s

Band	Channel No.	Frequency [MHz]	Peak Power@EUT[dBm]	Cable + Insertion Loss[dB]	Peak Power [dBm]	Limit [dBm]	Margin to Limit [dB]	E.I.R.P [dBm]
2.4 GHz ISM	0	2402	-2.2	-1.2	-3.4	30.0	33.4	-3.3
	19	2440	-2.8	-1.2	-4.0	30.0	34.0	-3.9
	39	2480	-2.7	-1.2	-3.9	30.0	33.9	-3.8

BT LE 2 Mbit/s

Band	Channel No.	Frequency [MHz]	Peak Power@EUT[dBm]	Cable + Insertion Loss[dB]	Peak Power [dBm]	Limit [dBm]	Margin to Limit [dB]	E.I.R.P [dBm]
2.4 GHz ISM	0	2402	-2.1	-1.2	-3.3	30.0	33.3	-3.2
	19	2440	-2.6	-1.2	-3.8	30.0	33.8	-3.7
	39	2480	-2.6	-1.2	-3.8	30.0	33.8	-3.7

Ambient temperature: 23 °C
 Air Pressure: 1001 hPa
 Humidity: 36%

Chip01

BT LE 1 Mbit/s

Band	Channel No.	Frequency [MHz]	Peak Power@EUT[dBm]	Cable + Insertion Loss[dB]	Peak Power [dBm]	Limit [dBm]	Margin to Limit [dB]	E.I.R.P [dBm]
2.4 GHz ISM	0	2402	-0.1	-1.1	-1.2	30.0	31.2	-1.1
	19	2440	-0.2	-1.1	-1.3	30.0	31.3	-1.2
	39	2480	-0.4	-1.1	-1.5	30.0	31.5	-1.4

BT LE 2 Mbit/s

Band	Channel No.	Frequency [MHz]	Peak Power@EUT[dBm]	Cable + Insertion Loss[dB]	Peak Power [dBm]	Limit [dBm]	Margin to Limit [dB]	E.I.R.P [dBm]
2.4 GHz ISM	0	2402	0.1	-1.1	-1.0	30.0	31.0	-0.9
	19	2440	0	-1.1	-1.1	30.0	31.1	-1.0
	39	2480	-0.2	-1.1	-1.3	30.0	31.3	-1.2

Ambient temperature: 22 °C
 Air Pressure: 999 hPa
 Humidity: 37 %

WLAN b-Mode; 20 MHz; 1 Mbit/s

Band	Channel No.	Frequency [MHz]	Maximum Average Power@EUT [dBm]	Cable + Insertion Loss[dB]	Maximum Average Power [dBm]	Limit [dBm]	Margin to Limit [dB]	E.I.R.P [dBm]
2.4 GHz ISM	1	2412	11.1	-0.9	10.2	30.0	19.8	10.3
	6	2437	10.5	-0.9	9.6	30.0	20.4	9.7
	11	2462	11.0	-0.9	10.1	30.0	19.9	10.2

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

Band	Channel No.	Frequency [MHz]	Maximum Average Power@EUT [dBm]	Cable + Insertion Loss[dB]	Maximum Average Power [dBm]	Limit [dBm]	Margin to Limit [dB]	E.I.R.P [dBm]
2.4 GHz ISM	1	2412	10.8	-0.9	9.9	30.0	20.1	10.0
	6	2437	10.2	-0.9	9.3	30.0	20.7	9.4
	11	2462	10.7	-0.9	9.8	30.0	20.2	9.9

WLAN n-Mode; 20 MHz; MCS0

Band	Channel No.	Frequency [MHz]	Maximum Average Power@EUT [dBm]	Cable + Insertion Loss[dB]	Maximum Average Power [dBm]	Limit [dBm]	Margin to Limit [dB]	E.I.R.P [dBm]
2.4 GHz ISM	1	2412	10.6	-0.9	9.7	30.0	20.3	9.8
	6	2437	10.0	-0.9	9.1	30.0	20.9	9.2
	11	2462	10.4	-0.9	9.5	30.0	20.5	9.6

WLAN ax-Mode; 20 MHz (SU); MCS0

Band	Channel No.	Frequency [MHz]	Maximum Average Power@EUT [dBm]	Cable + Insertion Loss[dB]	Maximum Average Power [dBm]	Limit [dBm]	Margin to Limit [dB]	E.I.R.P [dBm]
2.4 GHz ISM	1	2412	8.6	-0.9	7.7	30.0	22.3	7.8
	11	2462	8.5	-0.9	7.6	30.0	22.4	7.7

WLAN ax-Mode; 20 MHz (MU); MCS0

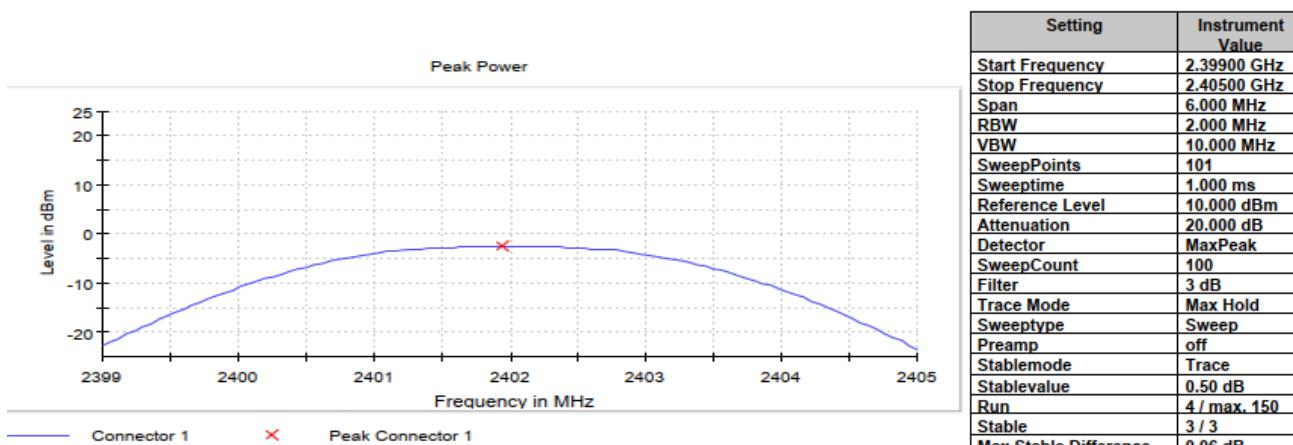
Band	Channel No.	Frequency [MHz]	Maximum Average Power@EUT [dBm]	Cable + Insertion Loss[dB]	Maximum Average Power [dBm]	Limit [dBm]	Margin to Limit [dB]	E.I.R.P [dBm]
2.4 GHz ISM	1	2412	8.4	-0.9	7.5	30.0	22.5	7.6
	6	2437	8.3	-0.9	7.4	30.0	22.6	7.5
	11	2462	8.2	-0.9	7.3	30.0	22.7	7.4

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

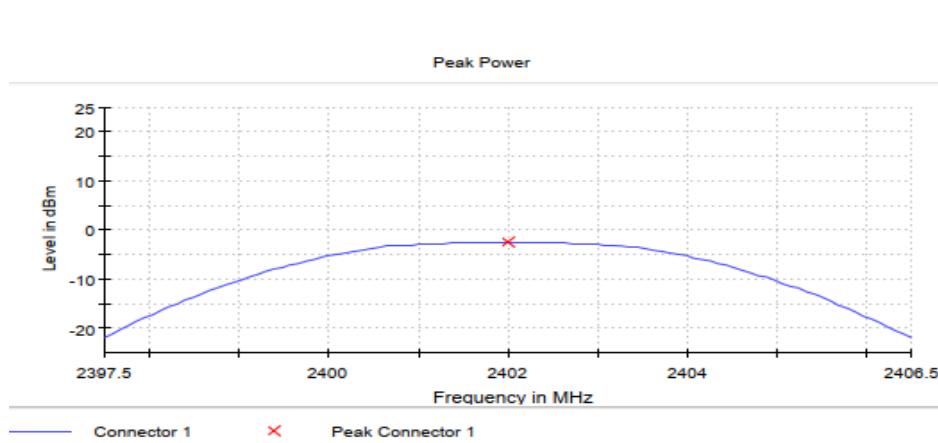
- The Results in the following plots are before implementing the cable attenuation correction, the corrected Results are defined in the previous tables.
- No plots are provided for WLAN (power meter measurements)

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

Chip02, Modulation= Bluetooth LE 1 Mbps, Operating Channel = low (S01_AA01#S3.5)

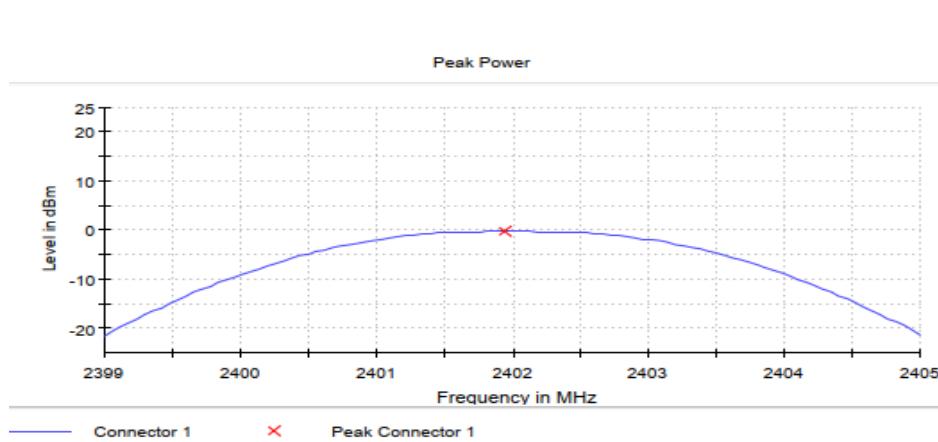


Chip02, Modulation= Bluetooth LE 2 Mbps, Operating Channel = low
 (S01_AA01#S3.5)



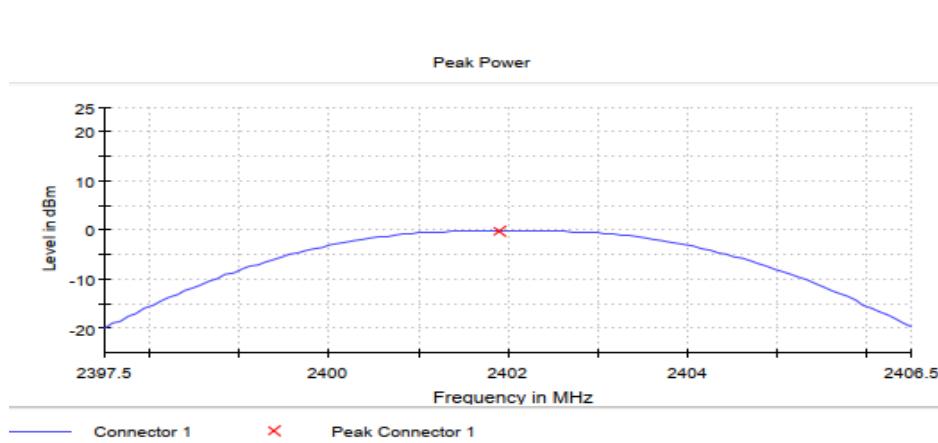
Setting	Instrument Value
Start Frequency	2.39750 GHz
Stop Frequency	2.40650 GHz
Span	9.000 MHz
RBW	3.000 MHz
VBW	10.000 MHz
SweepPoints	101
Sweptime	1.000 ms
Reference Level	10.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	4 / max. 150
Stable	3 / 3
Max Stable Difference	0.08 dB

Chip01, Modulation= Bluetooth LE 1 Mbps, Operating Channel = low
 (S01_AA01#S3.5)



Setting	Instrument Value
Start Frequency	2.39900 GHz
Stop Frequency	2.40500 GHz
Span	6.000 MHz
RBW	2.000 MHz
VBW	10.000 MHz
SweepPoints	101
Sweptime	1.000 ms
Reference Level	10.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	4 / max. 150
Stable	3 / 3
Max Stable Difference	0.06 dB

Chip01, Modulation= Bluetooth LE 2 Mbps, Operating Channel = low
 (S01_AA01#S3.5)



Setting	Instrument Value
Start Frequency	2.39750 GHz
Stop Frequency	2.40650 GHz
Span	9.000 MHz
RBW	3.000 MHz
VBW	10.000 MHz
SweepPoints	101
Sweptime	1.000 ms
Reference Level	10.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	4 / max. 150
Stable	3 / 3
Max Stable Difference	0.05 dB

5.3.5 TEST EQUIPMENT USED

- R&S TS8997

5.4 SPURIOUS RF CONDUCTED EMISSIONS

Standard **FCC Part 15 Subpart C**

The test was performed according to:

ANSI C63.10, chapter 11.11

5.4.1 TEST DESCRIPTION

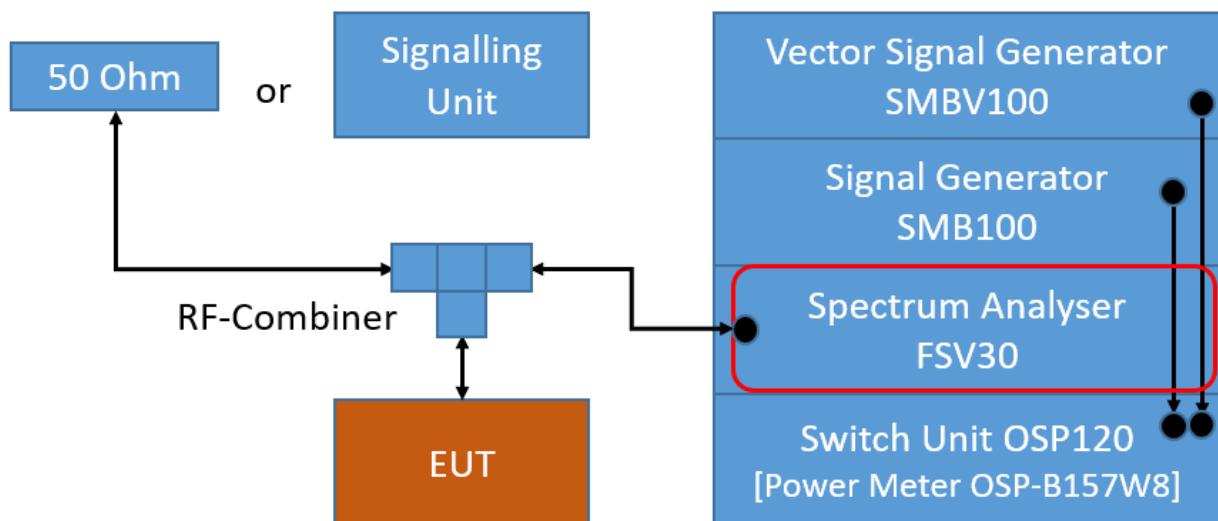
The Equipment Under Test (EUT) was set up to perform the spurious emissions measurements.

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

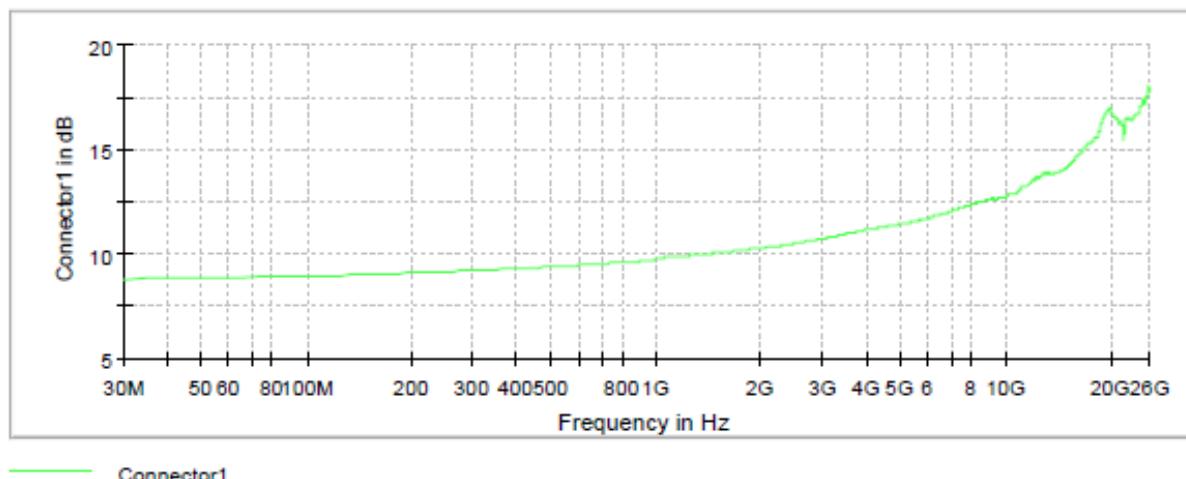
Analyser settings:

- Frequency range: 30 – 26000 MHz
- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Trace: Maxhold
- Sweeps: Till Stable (max. 120)
- Sweep Time: Auto
- Detector: Peak

The reference value for the measurement of the spurious RF conducted emissions is determined during the test "band edge compliance conducted". This value is used to calculate the 20 dBc or 30 dBc limit.



TS8997; Spurious RF Conducted Emissions



Connector1

Attenuation of the measurement part

5.4.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart C, §15.247 (c)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.4.3 TEST PROTOCOL

Ambient temperature: 21 °C
 Air Pressure: 1001 hPa
 Humidity: 36%

Chip02

BT LE 1 Mbit/s

Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
0	2402	2543.5	-61.6	PEAK	100	-3.9	-23.9	37.7
19	2440	2583.5	-61.4	PEAK	100	-4.4	-24.4	37.0
39	2480	2623.5	-61.6	PEAK	100	-4.8	-24.8	36.8

BT LE 2 Mbit/s

Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
0	2402	2543.5	-60.9	PEAK	100	-6.2	-26.2	34.7
19	2440	2583.5	-62.3	PEAK	100	-7.3	-27.3	35.0
39	2480	2623.5	-61.4	PEAK	100	-6.7	-26.7	34.7

Ambient temperature: 21 °C
 Air Pressure: 1001 hPa
 Humidity: 36%

Chip01

BT LE 1 Mbit/s

Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
0	2402	2493.5	-56.4	PEAK	100	-1.5	-21.5	34.9
19	2440	2533.5	-57.1	PEAK	100	-3.2	-23.2	33.9
39	2480	6942.8	-54.5	PEAK	100	-1.8	-21.8	32.7

BT LE 2 Mbit/s

Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
0	2402	2493.5	-57.6	PEAK	100	-0.9	-20.9	36.7
19	2440	2493.5	-56.6	PEAK	100	-4.4	-24.4	32.2
39	2480	2573.5	-58.3	PEAK	100	-4.4	-24.4	33.9

Ambient temperature: 22 °C
 Air Pressure: 999 hPa
 Humidity: 37 %

WLAN b-Mode; 20 MHz; 1 Mbit/s

Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
1	2412	2603.5	-53.3	PEAK	100	0.3	-29.7	23.6
6	2437	2623.5	-54.6	PEAK	100	0.0	-30.0	24.6
11	2462	2653.5	-55.6	PEAK	100	0.2	-29.8	25.8

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

Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
1	2412	2593.5	-56.5	PEAK	100	-4.6	-34.6	21.9
6	2437	2623.5	-57.3	PEAK	100	-4.8	-34.8	22.5
11	2462	2280.0	-57.2	PEAK	100	-2.4	-32.4	24.8

WLAN n-Mode; 20 MHz; MCS0

Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
1	2412	2603.5	-58.4	PEAK	100	-4.1	-34.1	24.3
6	2437	2623.5	-59.1	PEAK	100	-4.7	-34.7	24.4
11	2462	2643.5	-56.5	PEAK	100	-4.5	-34.5	22.0

WLAN ax-Mode; 20 MHz (SU); MCS0

Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
1	2412	2593.5	-54.7	PEAK	100	-4.2	-34.2	20.5
11	2462	2643.5	-57.7	PEAK	100	-5.1	-35.1	22.6

WLAN ax-Mode; 20 MHz (MU); MCS0

Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
1	2412	2593.5	-50.3	PEAK	100	1.8	-28.2	22.1
6	2437	2623.5	-51.2	PEAK	100	2.5	-27.5	23.7
11	2462	2653.5	-52.5	PEAK	100	2.0	-28.0	24.5

Ambient temperature: 24 °C
 Air Pressure: 1015 hPa
 Humidity: 39%

Chip01

Simultaneous Transmission A (Ref. WLAN 2.4 GHz ax-mode (SU)):

Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
1	2412	6973.0	-54.0	PEAK	100	-5.4	-35.4	18.6

Simultaneous Transmission B (Ref. BTLE 2Mbps):

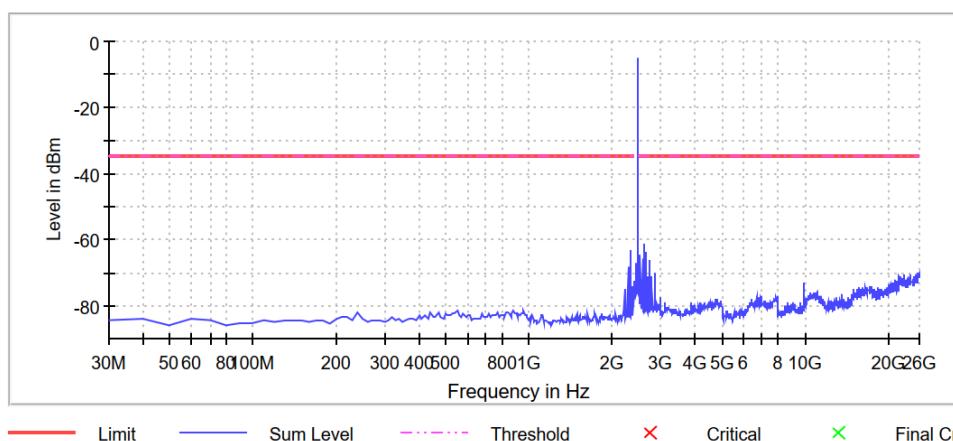
Channel No	Channel Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBm]	Detector	RBW [kHz]	Ref. Level [dBm]	Limit [dBm]	Margin to Limit [dB]
0	2402	6973.0	-52.5	PEAK	100	-3.7	-23.7	28.8

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

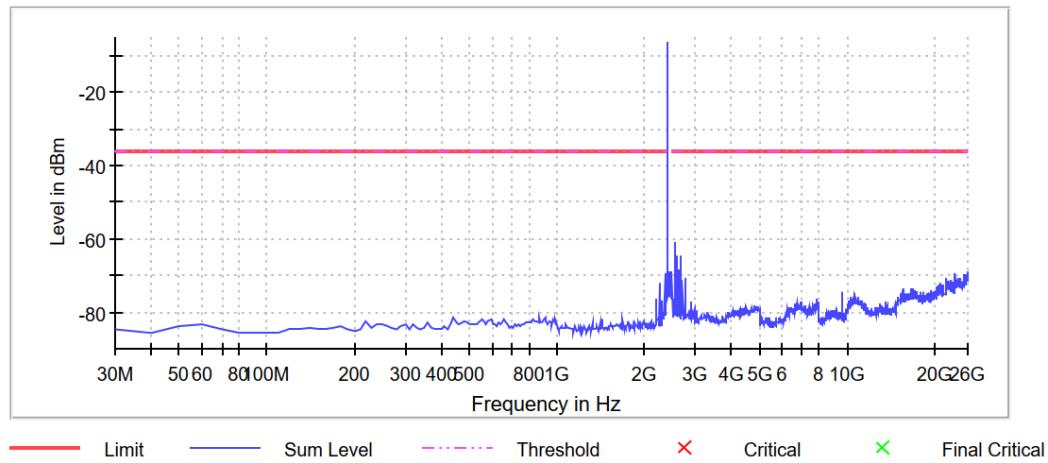
The used limits in the following plots are not correct, the correct limits are defined in the previous tables.

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

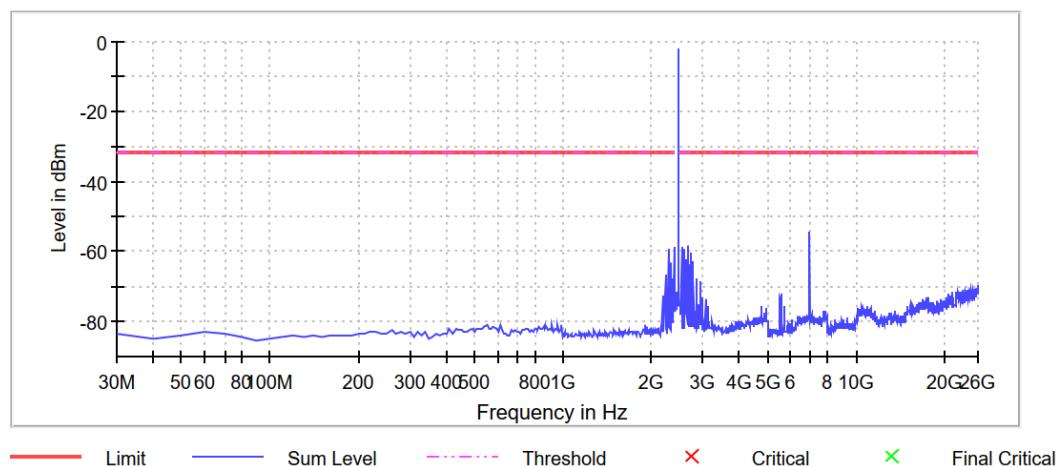
Chip02, Modulation= Bluetooth LE 1 Mbps, Operating Channel = high
 (S01_AA01#S3.5)
 Spurious



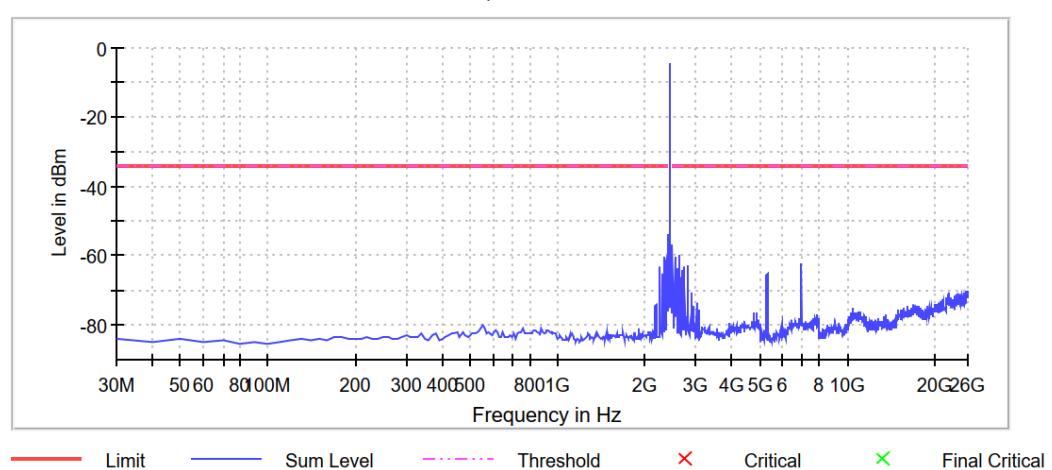
Chip02, Modulation= Bluetooth LE 2 Mbps, Operating Channel = low
 (S01_AA01#S3.5)
 Spurious



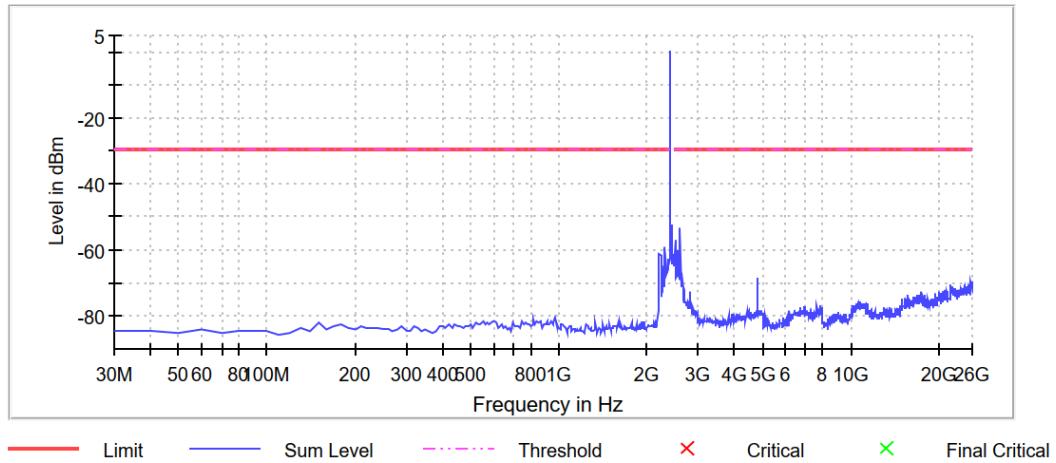
Chip01, Modulation= Bluetooth LE 1 Mbps, Operating Channel = high
 (S01_AA01#S3.5)
 Spurious



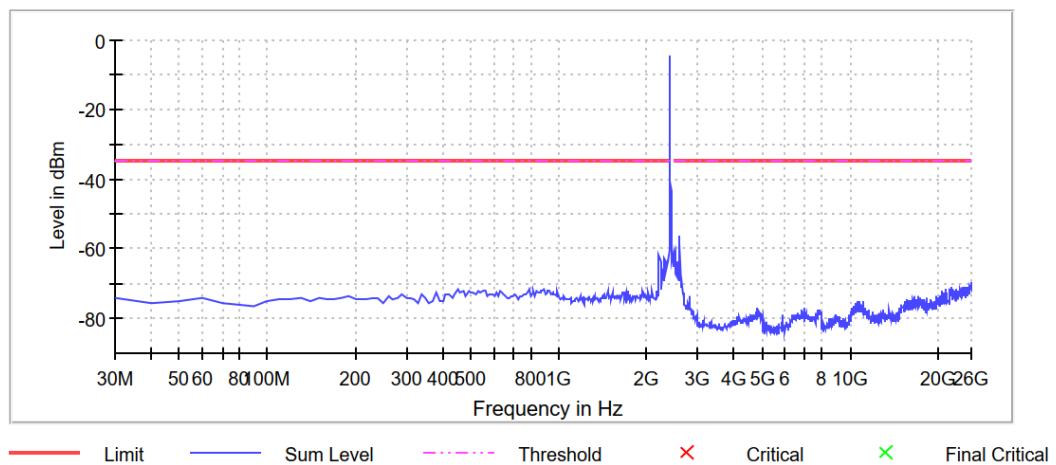
Chip01, Modulation= Bluetooth LE 2 Mbps, Operating Channel = mid
 (S01_AA01#S3.5)
 Spurious



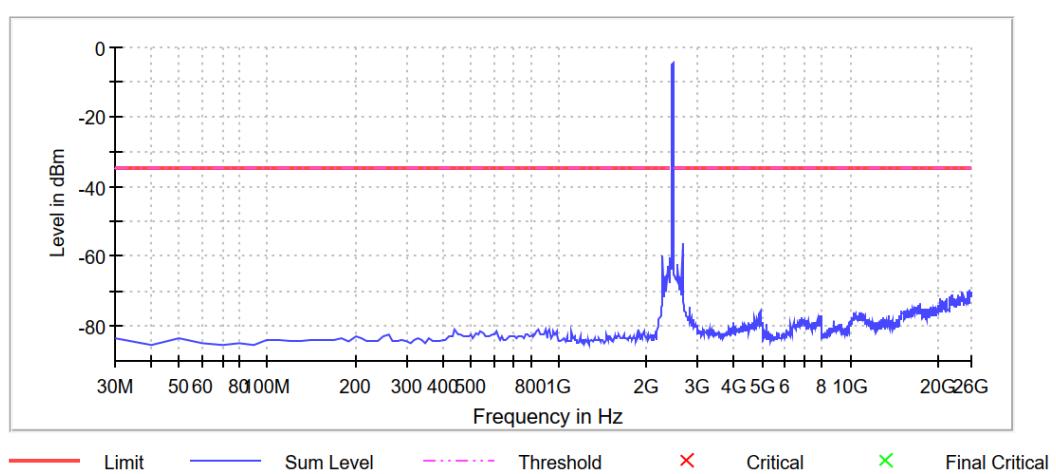
Chip01, Modulation= WLAN b, Operating Channel = low
(S01_AA01#S3.5)
Spurious



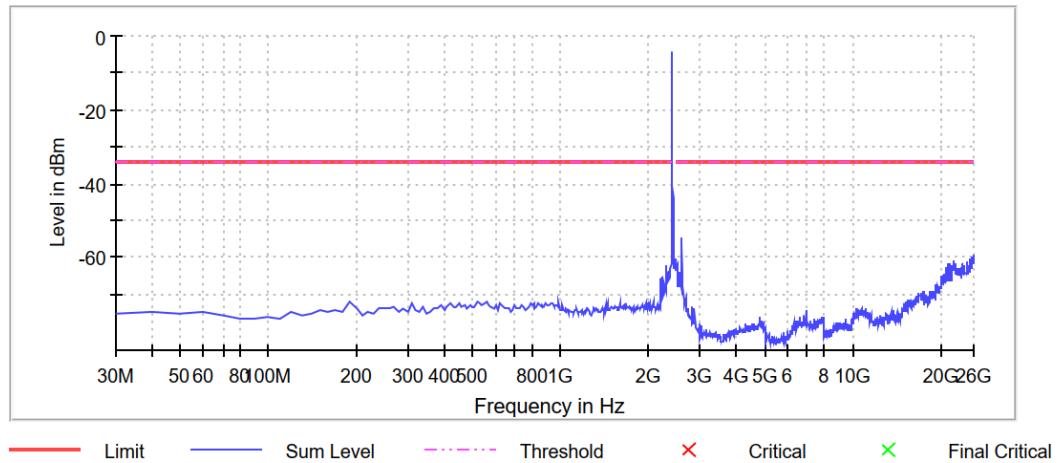
Chip01, Modulation= WLAN g, Operating Channel = low
(S01_AA01#S3.5)
Spurious



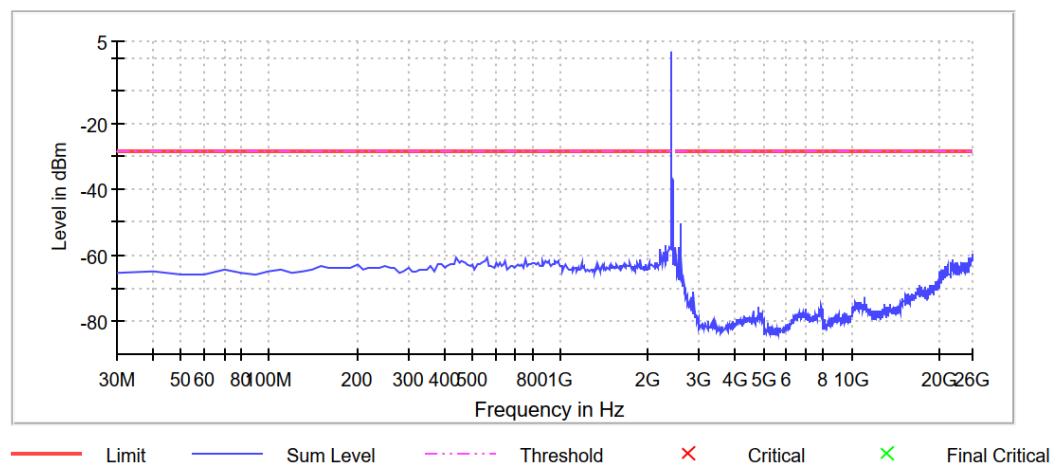
Chip01, Modulation= WLAN n 20 MHz, Operating Channel = high
(S01_AA01#S3.5)
Spurious



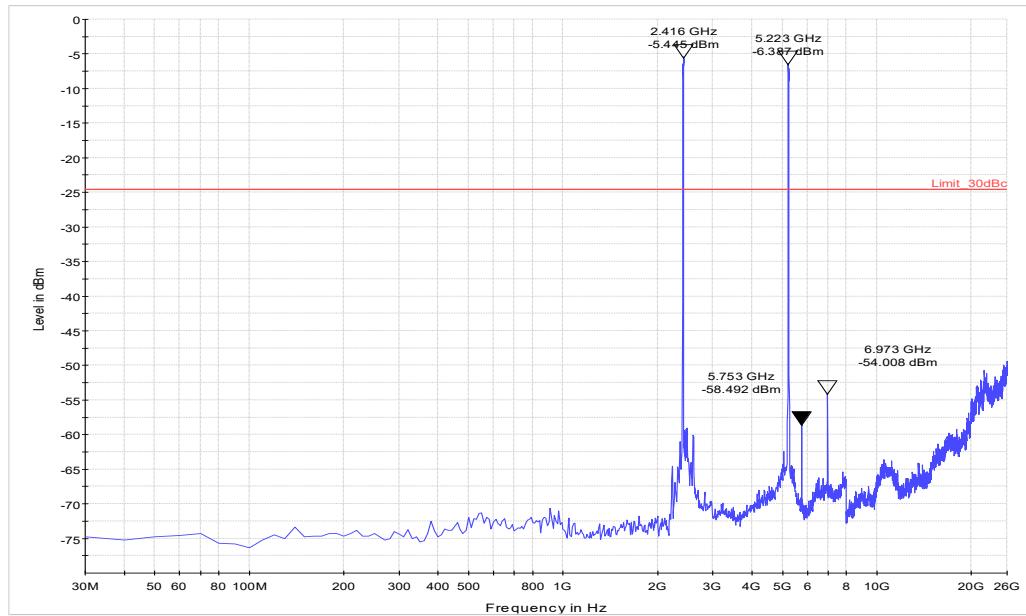
Chip01, Modulation= WLAN ax 20 MHz(SU), Operating Channel = low
 (S01_AA01#S3.5)
 Spurious



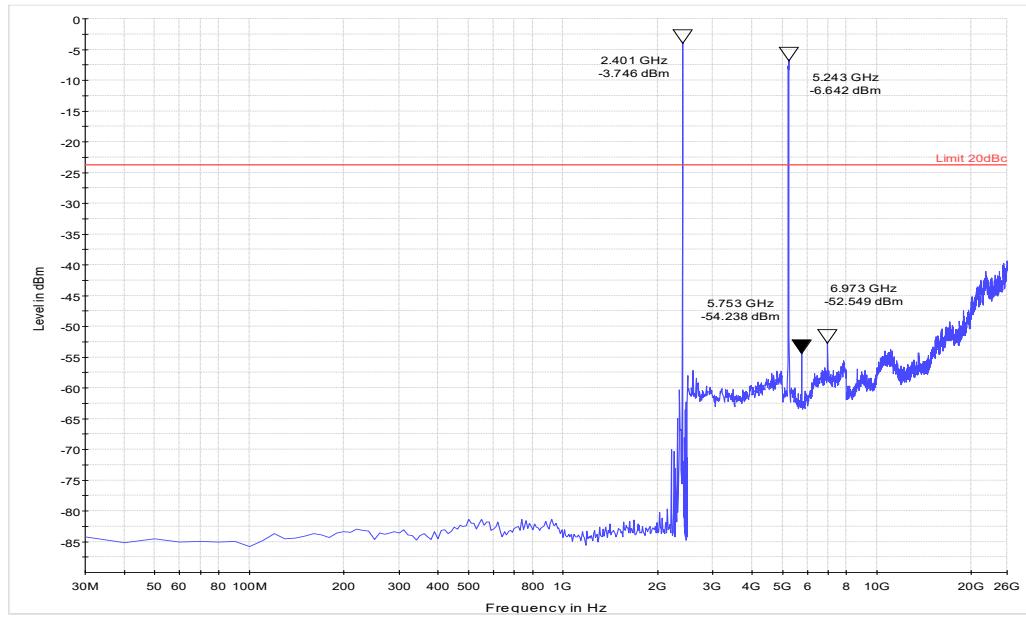
Chip01, Modulation= WLAN ax 20 MHz(MU), Operating Channel = low
 (S01_AA01#S3.5)
 Spurious



Radio Technology = Simultaneous Transmission A
(S01_AA01#S3.5)



Radio Technology = Simultaneous Transmission B
(S01_AA01#S3.5)



(Note: The increase in noise floor after 2 GHz is due to the spectrum analyzer automatically increasing its internal attenuation to protect its input stage from high signal levels, this has no influence on the measurements values)

5.4.5 TEST EQUIPMENT USED

- R&S TS8997

5.5 TRANSMITTER SPURIOUS RADIATED EMISSIONS

Standard **FCC Part 15 Subpart C**

The test was performed according to:

ANSI C63.10, chapter 6.4, 6.5, 6.6.5

5.5.1 TEST DESCRIPTION

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

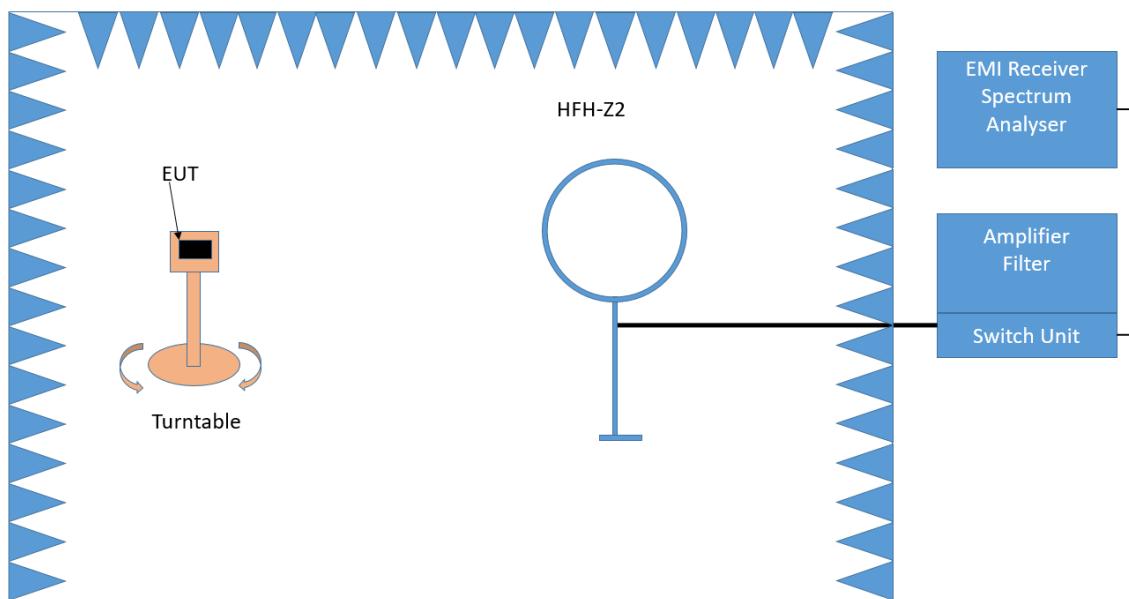
- < 30 MHz: Chapter 6.4
- 30 MHz – 1 GHz: Chapter 6.5
- > 1 GHz: Chapter 6.6 (procedure according 6.6.5 used)

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

Below 1 GHz:

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

1. Measurement up to 30 MHz



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

The Loop antenna HFH2-Z2 is used.

Step 1: pre measurement

- Anechoic chamber
- Antenna distance: 3 m
- Antenna height: 1 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)

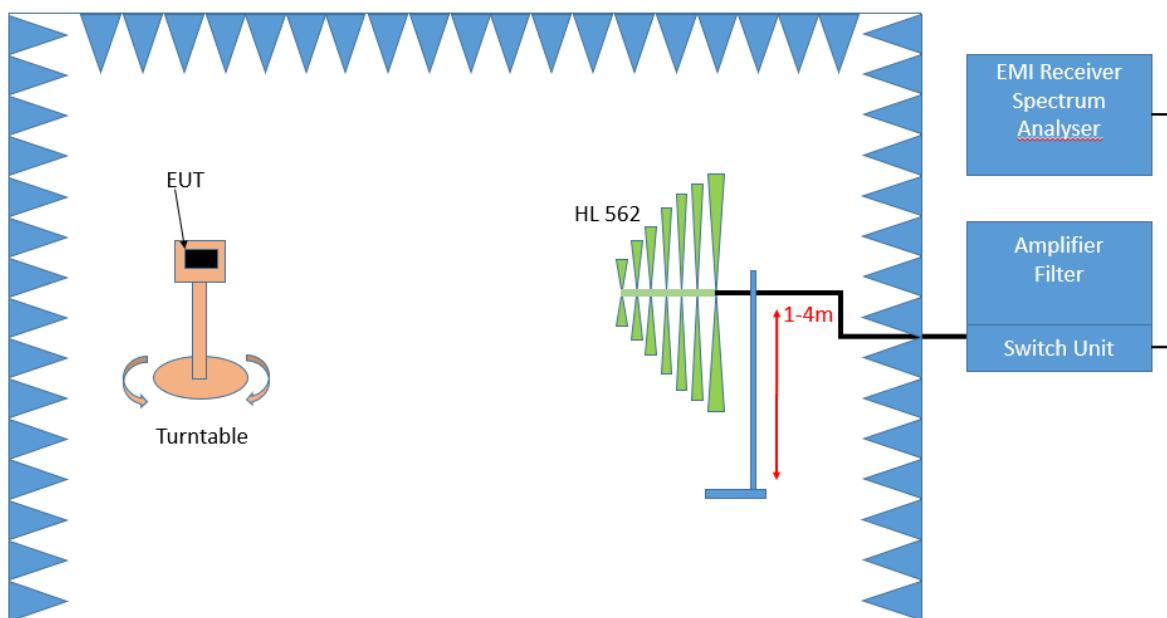
Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

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.

- Detector: Quasi-Peak (9 kHz - 150 kHz, Peak / Average 150 kHz- 30 MHz)
- Frequency range: 0.009 - 30 MHz
- Frequency steps: measurement at frequencies detected in step 1
- IF-Bandwidth: 0.2 - 10 kHz
- Measuring time / Frequency step: 1 s

2. Measurement above 30 MHz and up to 1 GHz



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

Step 1: Preliminary scan

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

Settings for step 1:

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

- Turntable step size: 90°
- Height variation range: 1 – 4 m
- Height variation step size: 1.5 m
- Polarisation: Horizontal + Vertical

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

Step 2: Adjustment measurement

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

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

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

Step 3: Final measurement with QP detector

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

EMI receiver settings for step 3:

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

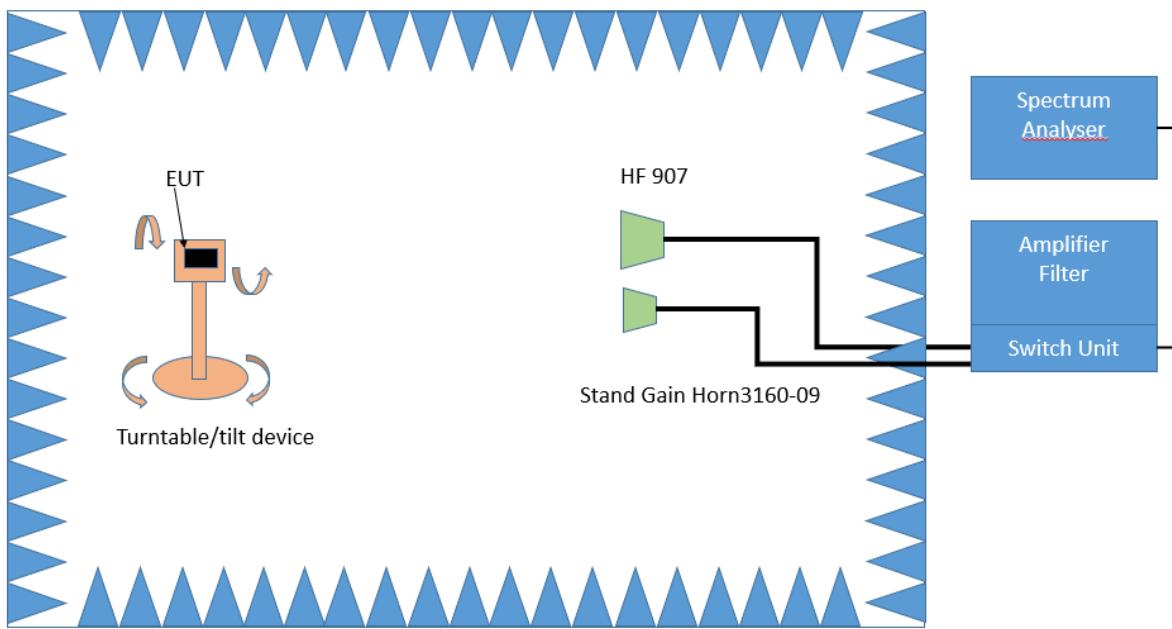
After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.

Above 1 GHz:

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

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

3. Measurement above 1 GHz



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

Step 1:

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

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

Spectrum analyser settings:

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

Step 2:

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

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

Spectrum analyser settings:

- Detector: Peak

Step 3:

Spectrum analyser settings for step 3:

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

5.5.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart C, §15.247 (d)

... In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

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

Frequency in MHz	Limit (μ V/m)	Measurement distance (m)	Limits ($\text{dB}\mu$ V/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 (μ V/m)	Measurement distance (m)	Limits ($\text{dB}\mu$ V/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 ($\text{dB}\mu$ V/m) = 20 log (Limit (μ V/m)/1 μ V/m)

5.5.3 TEST PROTOCOL

Ambient temperature: 20–22 °C
 Air Pressure: 999–1010 hPa
 Humidity: 38–45 %

Chip01(S01_AB01#S3.5)

BT LE 2 Mbit/s

Applied duty cycle correction (AV): 4.8 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [$\text{dB}\mu$ V/m]	Detector	RBW [kHz]	Limit [$\text{dB}\mu$ V/m]	Margin to Limit [dB]	Limit Type
0	2402*	---	---	---	---	---	---	RB
19	2440*	---	---	---	---	---	---	RB
39	2480	401.3	26.7	QP	120	46.0	19.3	RB

WLAN b-Mode; 20 MHz; 1 Mbit/s
 Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dB μ V/m]	Detector	RBW [kHz]	Limit [dB μ V/m]	Margin to Limit [dB]	Limit Type
1	2412	75.0	33.2	QP	120	40.0	6.8	RB
1	2412	150.0	33.4	QP	120	43.5	10.1	RB
1	2412	252.1	32.4	QP	120	46.0	13.6	RB
1	2412	330.9	37.4	QP	120	46.0	8.6	RB
1	2412	2351.4	41.5	AV	1000	54.0	12.5	RB
1	2412	2351.4	52.0	PEAK	1000	74.0	22.0	RB
6	2437	75.0	39.7	QP	120	40.0	0.3	RB
6	2437	137.8	37.9	QP	120	43.5	5.6	RB
6	2437	150.0	39.9	QP	120	43.5	3.6	RB
6	2437	252.1	38.0	QP	120	46.0	8.0	RB
6	2437	276.2	38.9	QP	120	46.0	7.1	RB
6	2437	324.2	34.1	QP	120	46.0	12.0	RB
11	2462	150.1	27.2	QP	120	43.5	16.4	RB
11	2462	162.5	31.4	QP	120	43.5	12.2	RB
11	2462	168.1	36.0	QP	120	43.5	7.5	RB
11	2462	407.1	40.0	QP	120	46.0	6.0	RB
11	2462	608.2	37.4	QP	120	46.0	8.6	RB

WLAN g-Mode; 20 MHz; 6 Mbit/s
 Applied duty cycle correction (AV): 0.1 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dB μ V/m]	Detector	RBW [kHz]	Limit [dB μ V/m]	Margin to Limit [dB]	Limit Type
1	2412*	- - -	- - -	- - -	- - -	- - -	- - -	RB
6	2437	2822.3	51.6	PEAK	1000	74.0	22.4	RB
6	2437	2822.3	38.8	AV	1000	54.0	15.2	RB
6	2437	5127.3	48.7	PEAK	1000	74.0	25.3	RB
6	2437	5127.3	35.9	AV	1000	54.0	18.1	RB
6	2437	5399.9	51.2	PEAK	1000	74.0	22.8	RB
6	2437	5399.9	41.4	AV	1000	54.0	12.6	RB
11	2462	2732.0	51.8	PEAK	1000	74.0	22.2	RB
11	2462	2732.0	38.9	AV	1000	54.0	15.1	RB
11	2462	5050.4	48.7	PEAK	1000	74.0	25.3	RB
11	2462	5050.4	36.2	AV	1000	54.0	17.8	RB
11	2462	5399.9	51.4	PEAK	1000	74.0	22.6	RB
11	2462	5399.9	39.8	AV	1000	54.0	14.2	RB

WLAN ax-Mode; 20 MHz (**SU**); MCS0
 Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dB μ V/m]	Detector	RBW [kHz]	Limit [dB μ V/m]	Margin to Limit [dB]	Limit Type
1	2412*	- - -	- - -	- - -	- - -	- - -	- - -	RB

WLAN ax-Mode; 20 MHz (**MU**); MCS0
 Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dB μ V/m]	Detector	RBW [kHz]	Limit [dB μ V/m]	Margin to Limit [dB]	Limit Type
1	2412*	---	---	---	---	---	---	RB

Chip02(S01_AB01#S3.5)

BT LE 2 Mbit/s

Applied duty cycle correction (AV): 4.8 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dB μ V/m]	Detector	RBW [kHz]	Limit [dB μ V/m]	Margin to Limit [dB]	Limit Type
0	2402	171.6	30.8	QP	120	43.5	12.7	RB
19	2440	172.7	33.9	QP	120	43.5	9.6	RB
39	2480	170.4	27.7	QP	120	43.5	15.8	RB

=====

Chip01(S01_AA01#S3.0)

WLAN b-Mode; 20 MHz; 1 Mbit/s

Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dB μ V/m]	Detector	RBW [kHz]	Limit [dB μ V/m]	Margin to Limit [dB]	Limit Type
6	2437	109.3	25.4	QP	120	43.5	18.1	RB
6	2437	162.3	17.4	QP	120	43.5	26.1	RB
6	2437	250.0	28.6	QP	120	46.0	17.4	RB
6	2437	324.5	26.6	QP	120	46.0	19.4	RB
6	2437	400.1	11.8	QP	120	46.0	34.2	RB
6	2437	608.3	25.8	QP	120	46.0	20.2	RB
11	2462	4858.2	48.9	PEAK	1000	74.0	25.1	RB
11	2462	4858.2	35.8	AV	1000	54.0	18.2	RB

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

- The measurements have been performed only on worst-case modes "b-mode, g-mode and BT LE 2 Mbit/s", which they have highest output power

***) no peaks have been found for these operating channels /operating modes**

Comment:

- At least spurious emissions that exceed the limit values, that come within 20 dB below these values are listed in the table above.

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

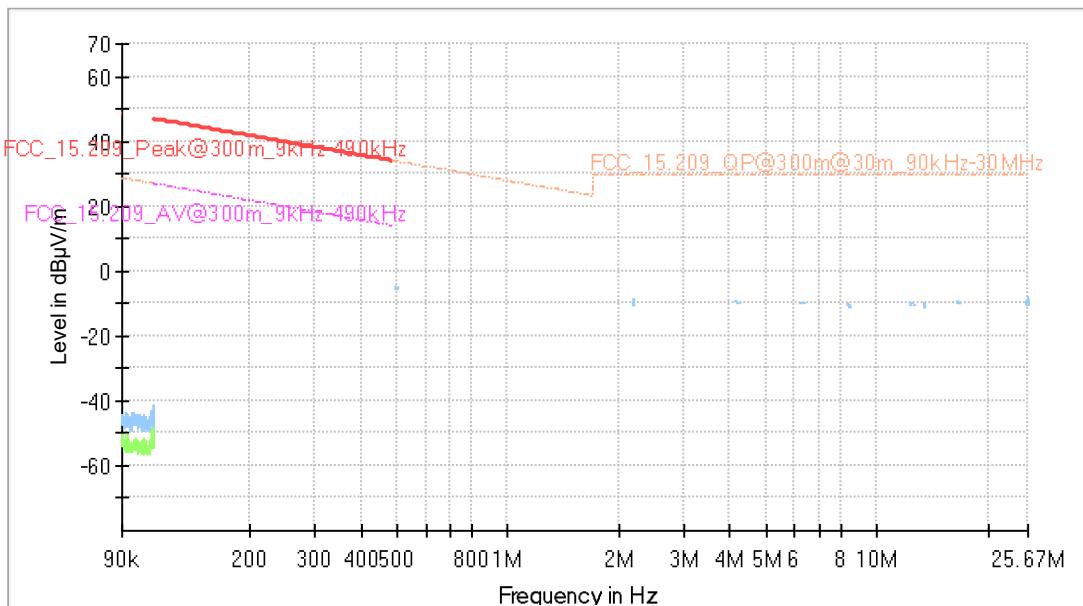
Trace:

blue = Peak (9 kHz - 40 GHz)
 green = AV (9 kHz - 30 MHz and 1 - 26 GHz), QP (30 MHz - 1 GHz)

Marker:

Star = critical frequency, Rhombus = final Results

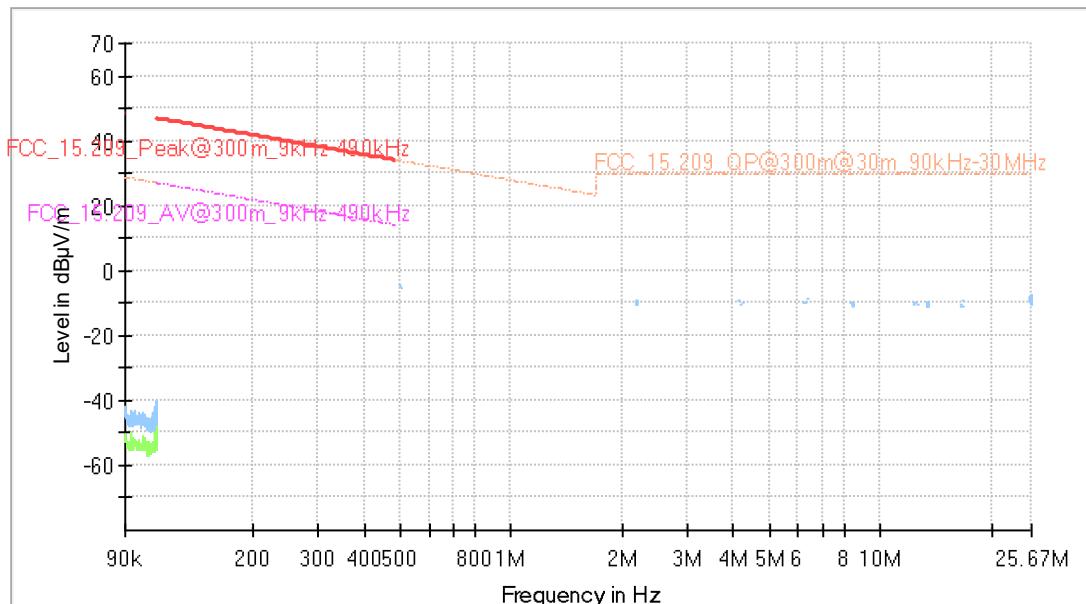
Chip01, Modulation= WLAN b, Operating Channel = mid,
 Measurement range = 9 kHz – 30 MHz
 (S01_AB01#S3.5)



Final Result

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

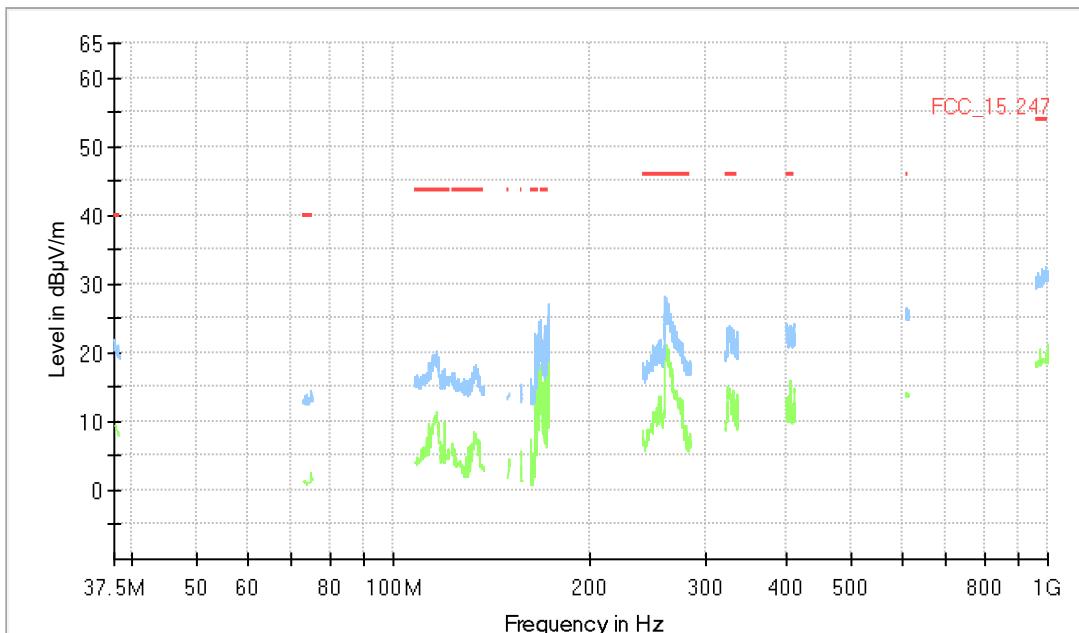
Chip01, Modulation= WLAN b, Operating Channel = mid,
 Measurement range = 9 kHz – 30 MHz
 (S01_AA01#S3.0)



Final Result

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

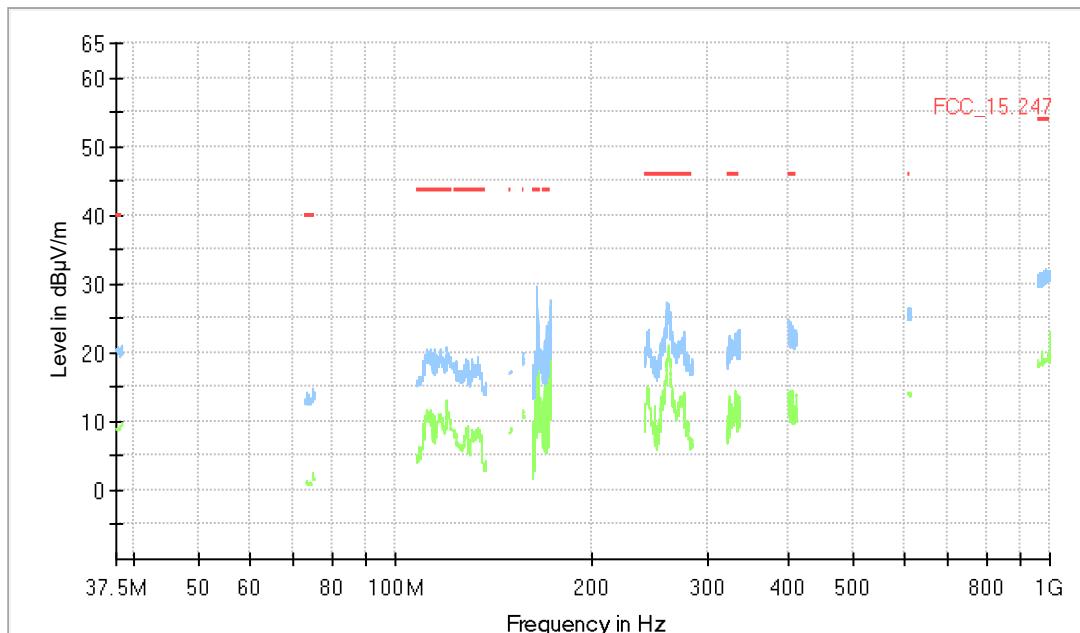
Chip01, Modulation= BT LE 2 Mbit/s, Operating Channel = low,
 Measurement range = 30 MHz – 1 GHz
 (S01_AB01#S3.5)



Final Result

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---	---	---

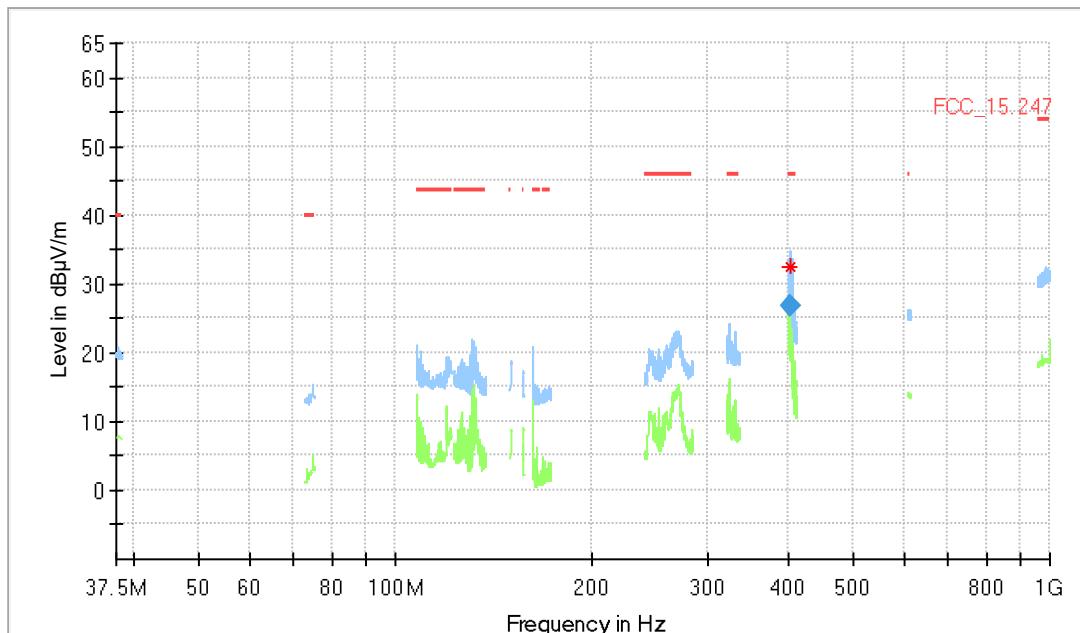
Chip01, Modulation= BT LE 2 Mbit/s, Operating Channel = mid,
 Measurement range = 30 MHz – 1 GHz
 (S01_AB01#S3.5)



Final Result

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---	---	---

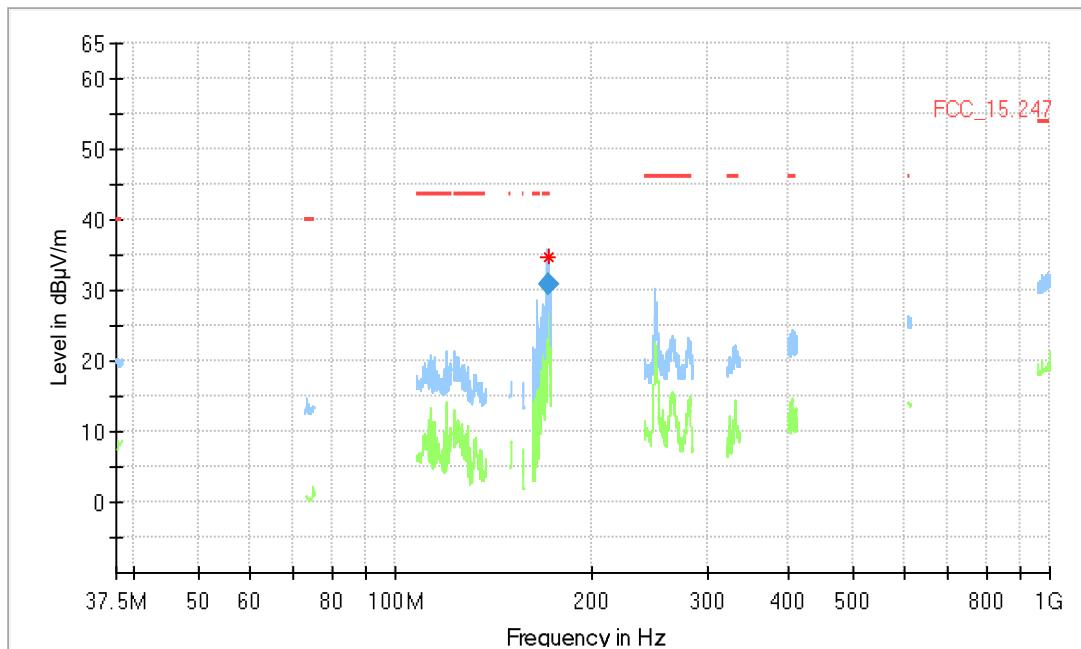
Chip01, Modulation= BT LE 2 Mbit/s, Operating Channel = high,
 Measurement range = 30 MHz – 1 GHz
 (S01_AB01#S3.5)



Final Result

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
401.250000	26.7	46.00	19.3	1000.0	120.000	117.0	H	268	17.0

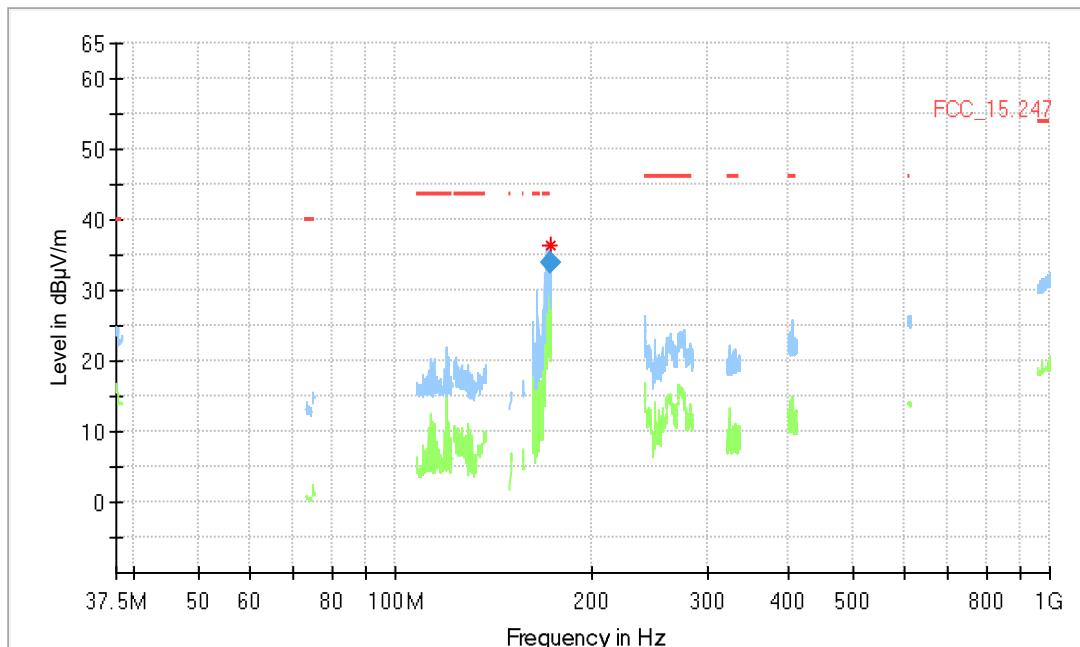
Chip02, Modulation= BT LE 2 Mbit/s, Operating Channel = low,
 Measurement range = 30 MHz – 1 GHz
 (S01_AB01#S3.5)



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
171.560000	30.8	43.50	12.7	1000.0	120.000	135.0	V	129	9.9

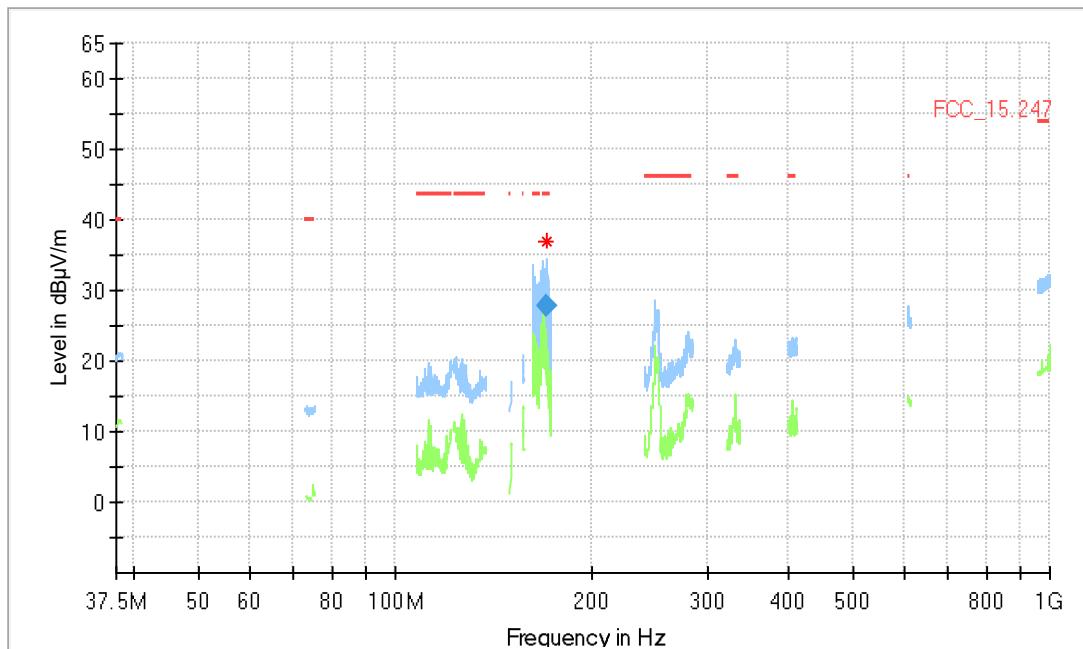
Chip02, Modulation= BT LE 2 Mbit/s, Operating Channel = mid,
 Measurement range = 30 MHz – 1 GHz
 (S01_AB01#S3.5)



Final Result

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
172.700000	33.9	43.50	9.6	1000.0	120.000	122.0	V	71	10.0

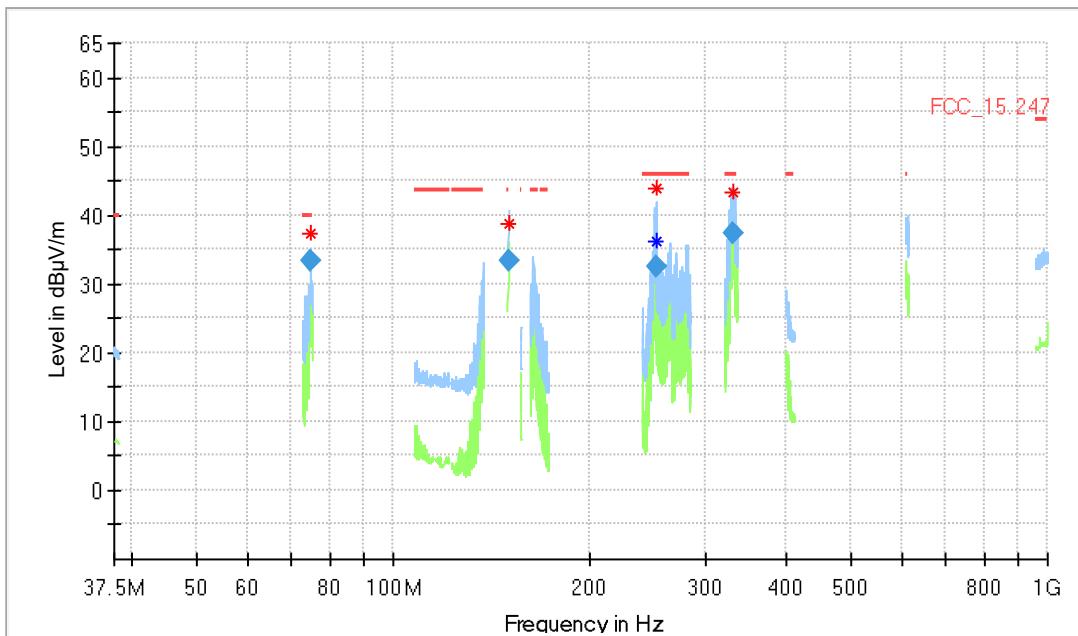
Chip02, Modulation= BT LE 2 Mbit/s, Operating Channel = high,
 Measurement range = 30 MHz – 1 GHz
 (S01_AB01#S3.5)



Final Result

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
170.390000	27.7	43.50	15.8	1000.0	120.000	100.0	V	52	9.8

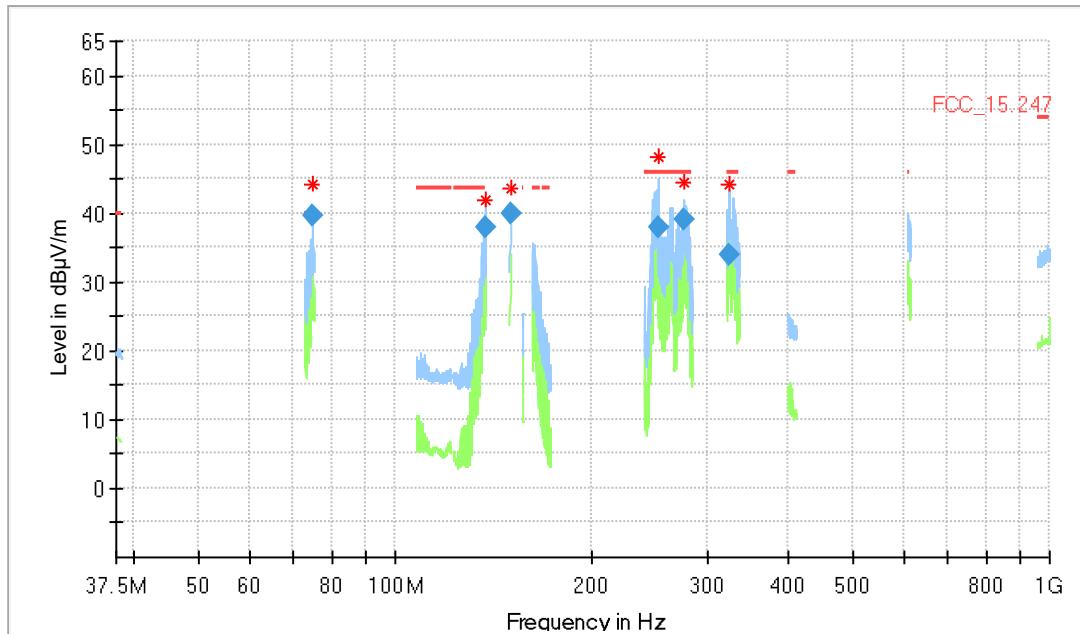
Chip01, Modulation= WLAN b, Operating Channel = low,
 Measurement range = 30 MHz – 1 GHz
 (S01_AB01#S3.5)



Final Result

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
74.980000	33.21	40.00	6.79	1000.0	120.000	105.0	V	72.0	9.9
150.020000	33.39	43.50	10.11	1000.0	120.000	104.0	V	94.0	9.9
252.060000	32.41	46.00	13.59	1000.0	120.000	104.0	V	355.0	12.8
330.880000	37.37	46.00	8.63	1000.0	120.000	104.0	H	83.0	15.7

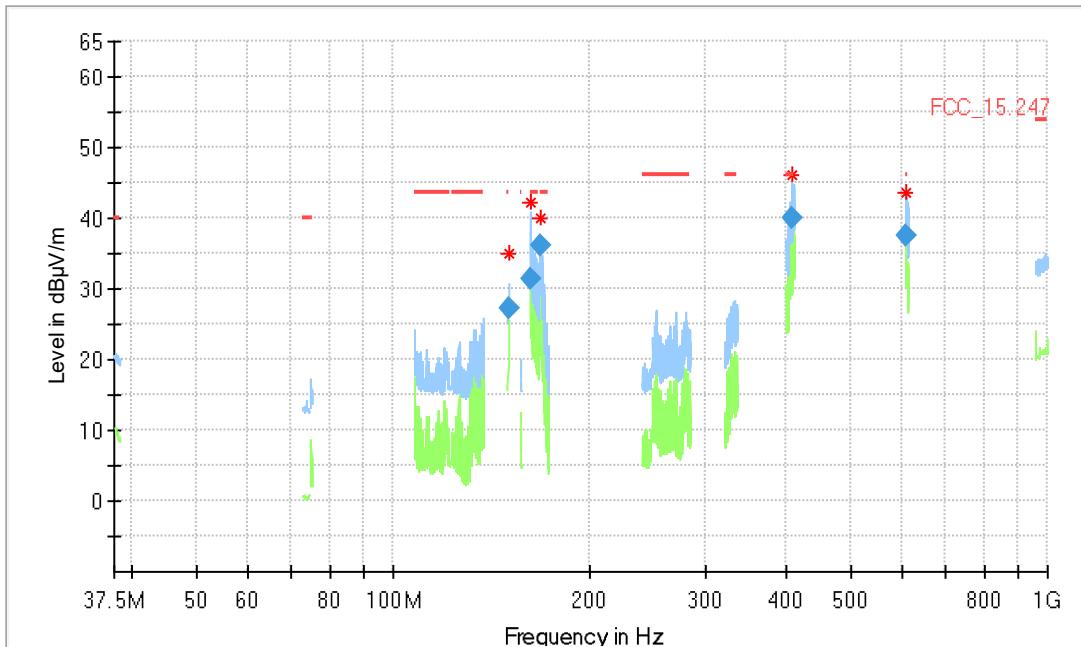
Chip01, Modulation= WLAN b, Operating Channel = mid,
 Measurement range = 30 MHz – 1 GHz
 (S01_AB01#S3.5)



Final Result

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
75.010000	39.66	40.00	0.34	1000.0	120.000	112.0	V	79.0	9.9
137.820000	37.92	43.50	5.58	1000.0	120.000	220.0	H	261.0	10.9
150.020000	39.86	43.50	3.64	1000.0	120.000	104.0	V	296.0	9.9
252.120000	38.04	46.00	7.96	1000.0	120.000	106.0	V	320.0	12.8
276.240000	38.91	46.00	7.09	1000.0	120.000	105.0	V	20.0	13.7
324.190000	34.05	46.00	11.95	1000.0	120.000	133.0	H	0.0	15.5

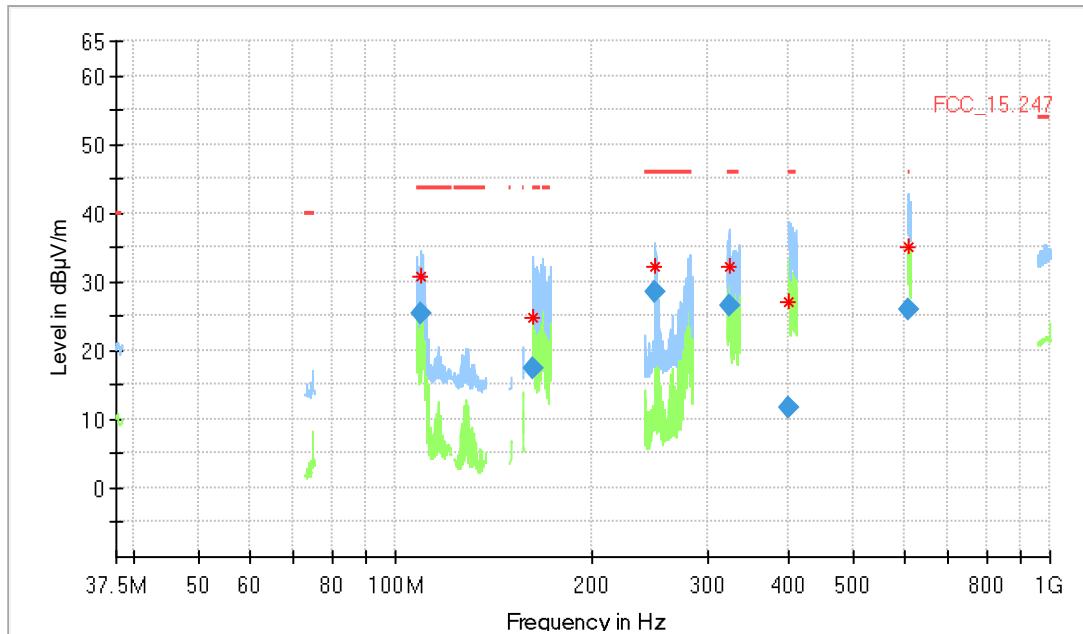
Chip01, Modulation= WLAN b, Operating Channel = high,
 Measurement range = 30 MHz – 1 GHz
 (S01_AB01#S3.5)



Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
150.050000	27.15	43.50	16.35	1000.0	120.000	192.0	H	150.0	9.9
162.522500	31.35	43.50	12.15	1000.0	120.000	100.0	V	25.0	9.9
168.050000	35.99	43.50	7.51	1000.0	120.000	105.0	V	44.0	10.2
407.070000	40.01	46.00	5.99	1000.0	120.000	107.0	H	247.0	18.3
608.240000	37.40	46.00	8.60	1000.0	120.000	106.0	H	265.0	23.0

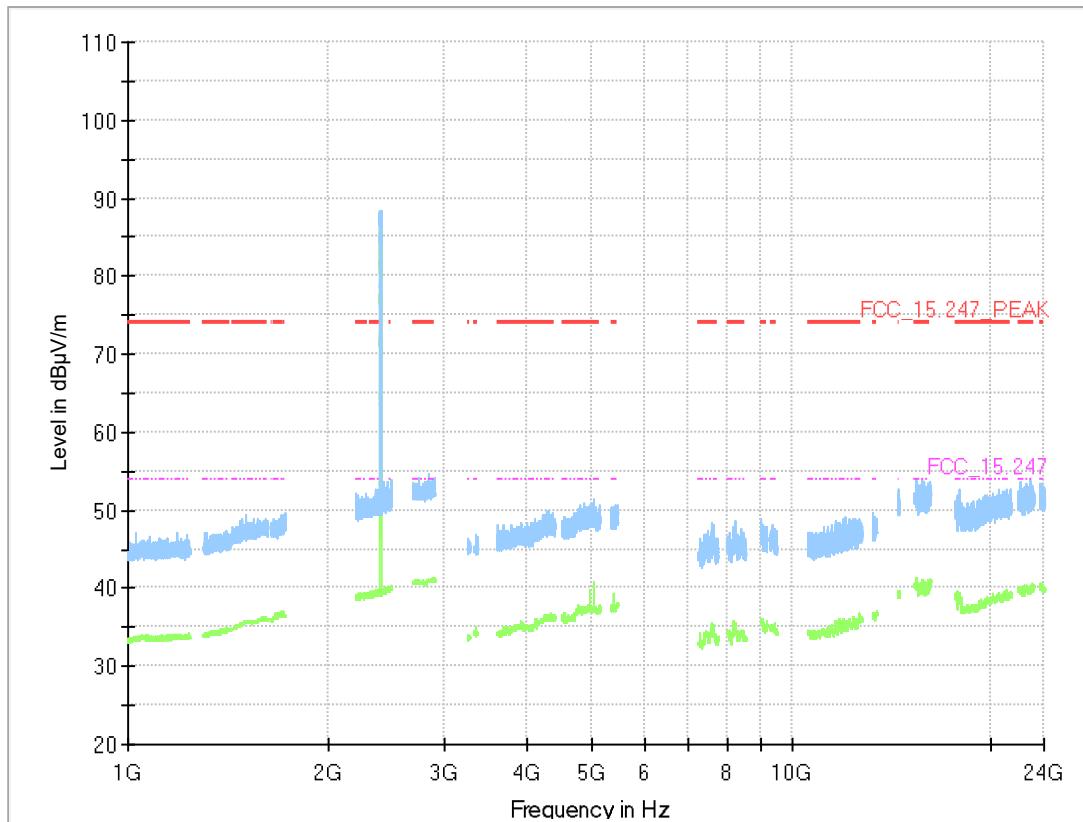
Chip01, Modulation= WLAN b, Operating Channel = mid,
 Measurement range = 30 MHz – 1 GHz
 (S01_AA01#S3.0)



Final Result

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
109.320000	25.37	43.50	18.13	1000.0	120.000	104.0	V	178.0	12.1
162.252500	17.38	43.50	26.12	1000.0	120.000	110.0	V	195.0	9.9
249.990000	28.57	46.00	17.43	1000.0	120.000	109.0	H	50.0	12.7
324.490000	26.61	46.00	19.39	1000.0	120.000	120.0	V	32.0	15.5
400.080000	11.80	46.00	34.20	1000.0	120.000	184.0	V	190.0	18.1
608.300000	25.82	46.00	20.18	1000.0	120.000	109.0	H	277.0	23.0

Chip01, Modulation= BT LE 2 Mbit/s, Operating Channel = low,
 Measurement range = 1 GHz - 24 GHz
 (S01_AB01#S3.5)

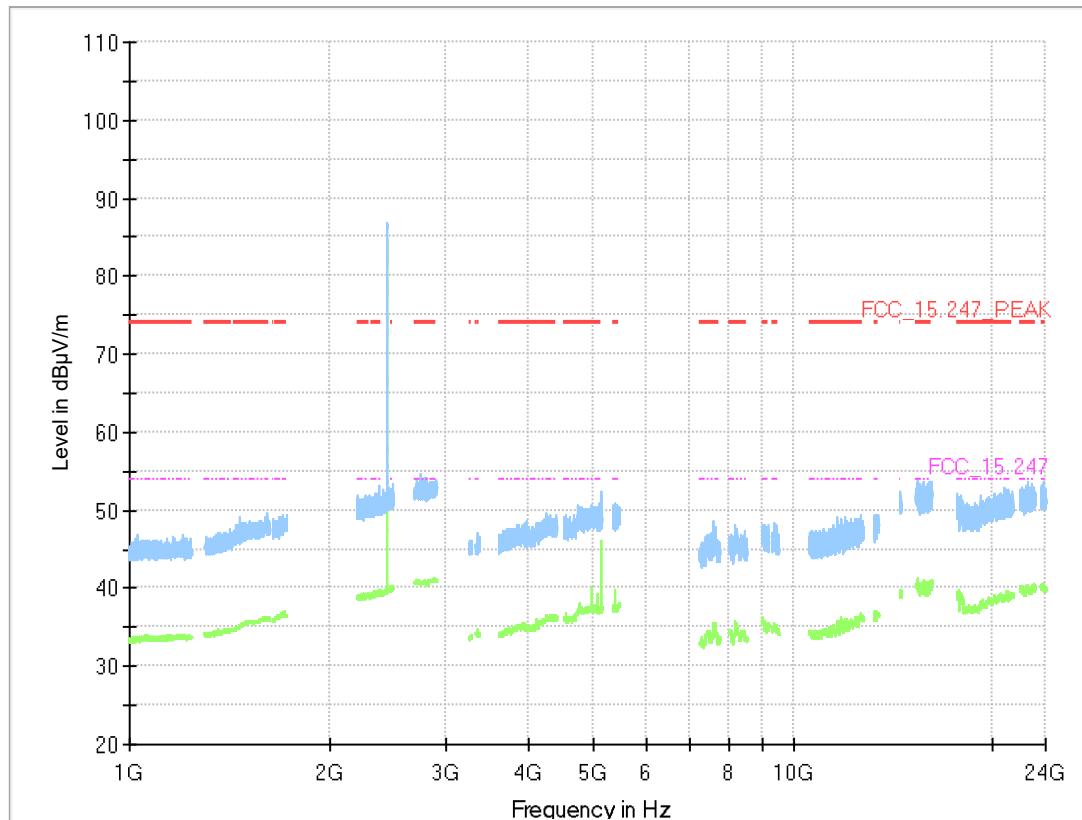


Final Result

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

(Note: the peak at 2402 MHz is the wanted signal)

Chip01, Modulation= BT LE 2 Mbit/s, Operating Channel = mid,
 Measurement range = 1 GHz - 24 GHz
 (S01_AB01#S3.5)

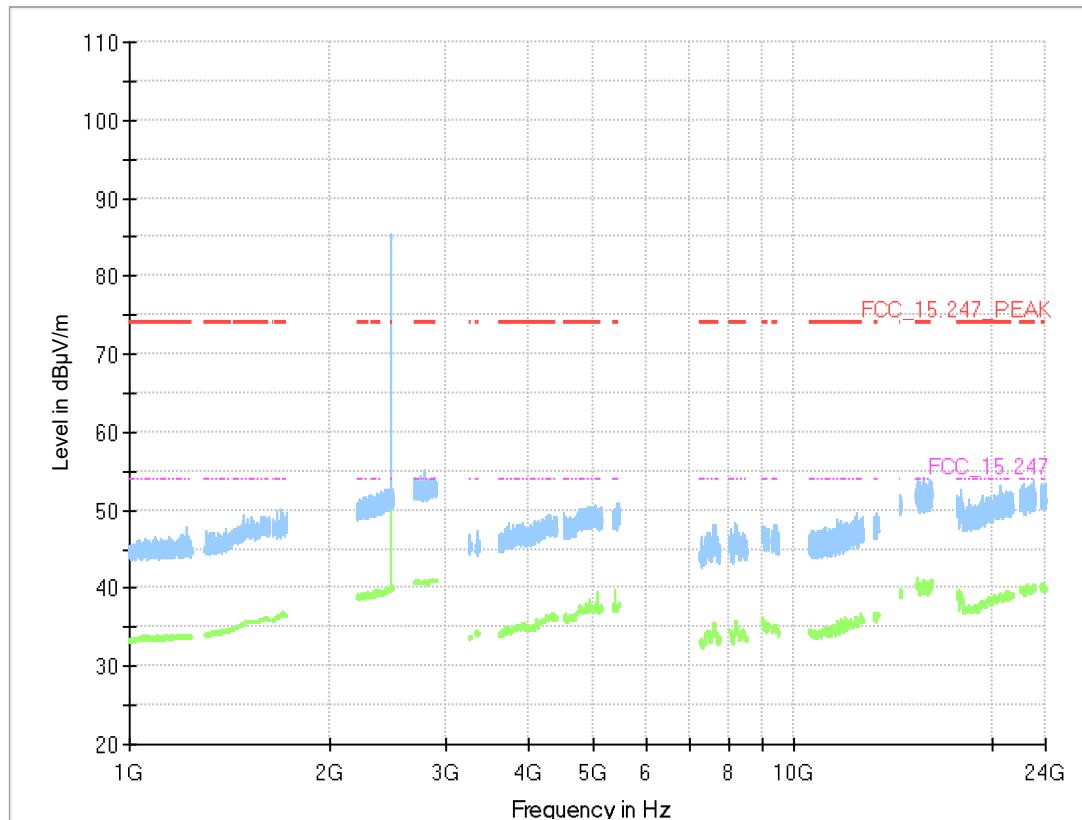


Final_Result

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

(Note: the peak at 2440 MHz is the wanted signal)

Chip01, Modulation= BT LE 2 Mbit/s, Operating Channel = high,
 Measurement range = 1 GHz - 24 GHz
 (S01_AB01#S3.5)

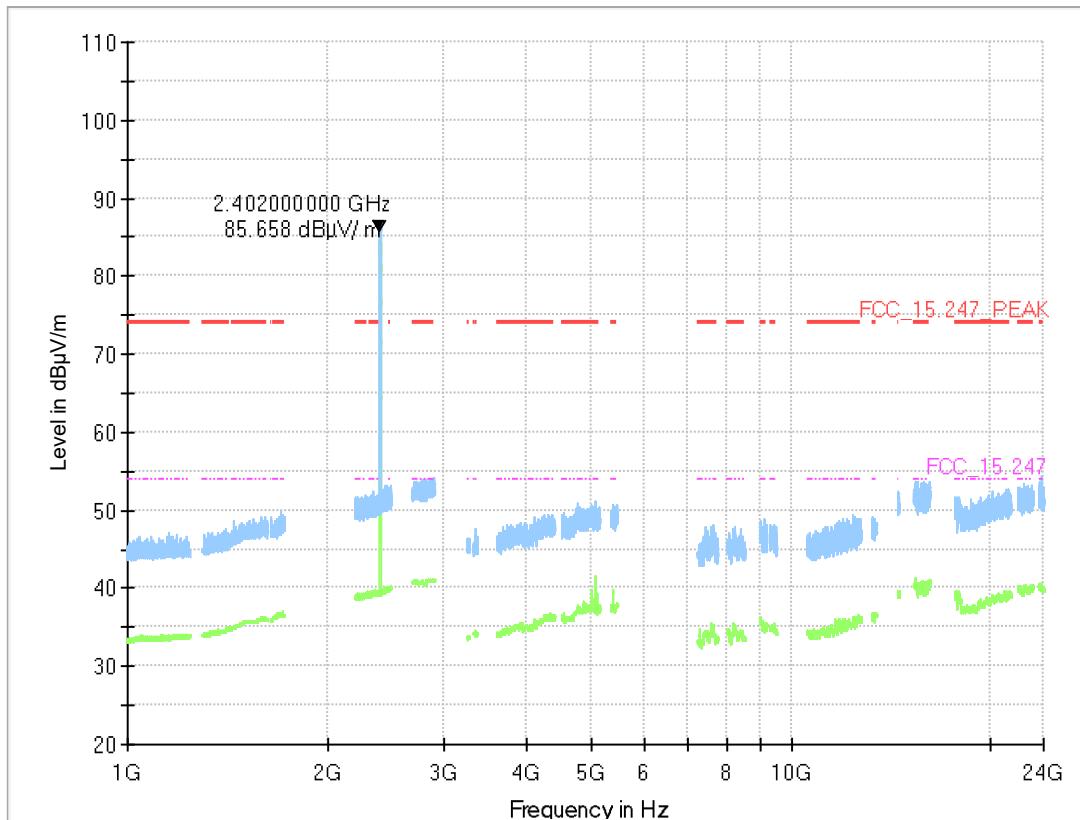


Final Result

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

(Note: the peak at 2480 MHz is the wanted signal)

Chip02, Modulation= BT LE 2 Mbit/s, Operating Channel = low,
 Measurement range = 1 GHz - 24 GHz
 (S01_AB01#S3.5)

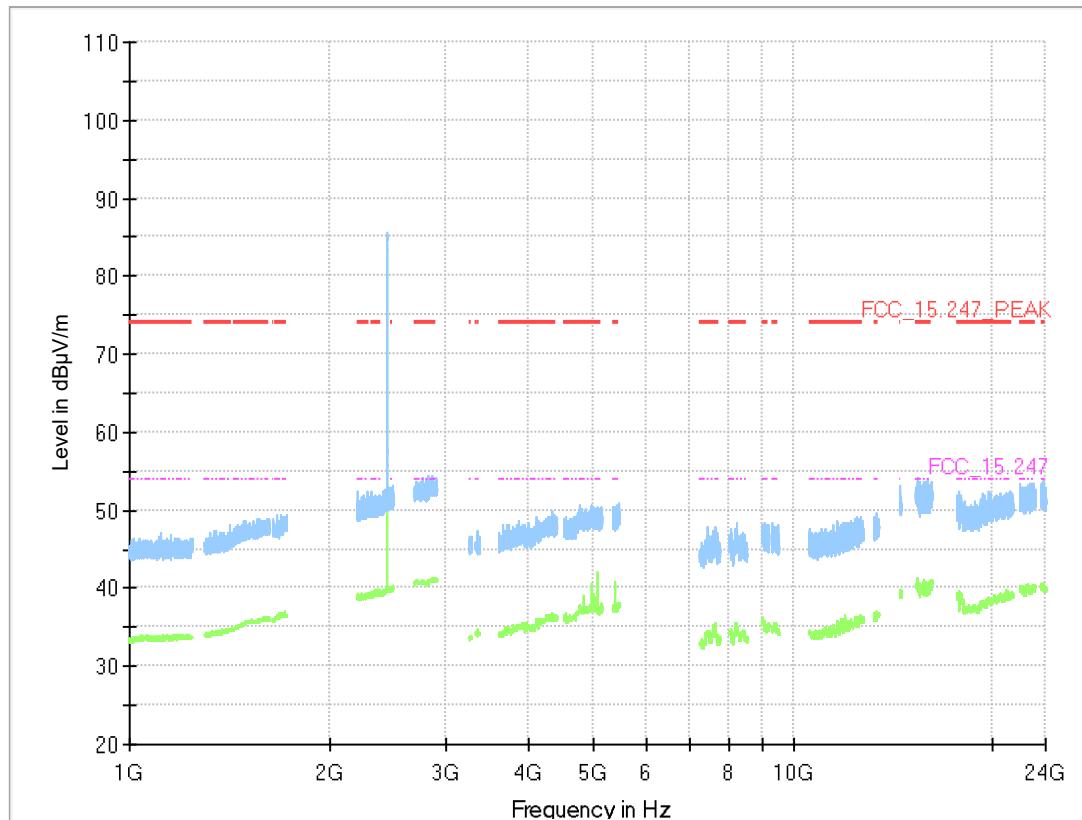


Final Result

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

(Note: the peak at 2402 MHz is the wanted signal)

Chip02, Modulation= BT LE 2 Mbit/s, Operating Channel = mid,
 Measurement range = 1 GHz - 24 GHz
 (S01_AB01#S3.5)

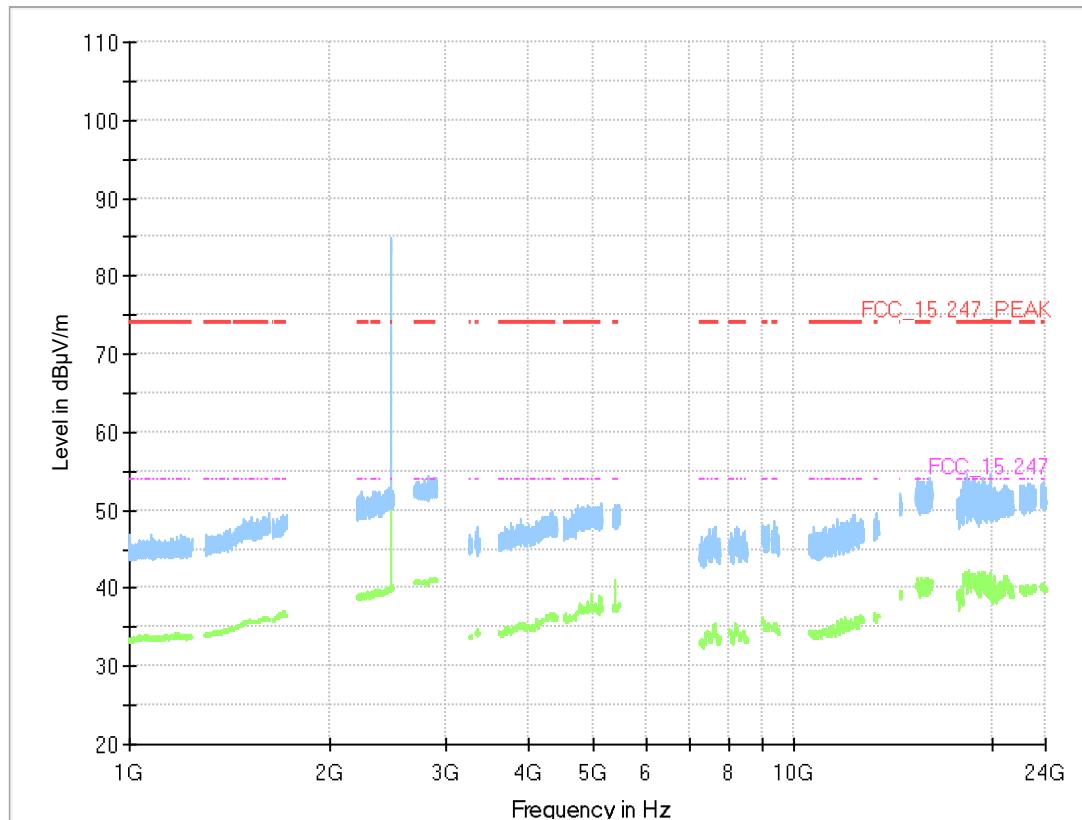


Final Result

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

(Note: the peak at 2440 MHz is the wanted signal)

Chip02, Modulation= BT LE 2 Mbit/s, Operating Channel = high,
 Measurement range = 1 GHz - 24 GHz
 (S01_AB01#S3.5)



Final Result

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

(Note: the peak at 2480 MHz is the wanted signal)