


Prüfbericht-Nr.: <i>Test report no.:</i>	60439682-004	Auftrags-Nr.: <i>Order no.:</i>	23870517 030	Seite 1 von 55 <i>Page 1 of 55</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	-	Auftragsdatum: <i>Order date:</i>	2021.03.10	
Auftraggeber: <i>Client:</i>	Schneider Electric			
Prüfgegenstand: <i>Test item:</i>	SpaceLogic Insight-Sensor			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	FCC ID: DVE-IS1			
Auftrags-Inhalt: <i>Order content:</i>	Accredited testing			
Prüfgrundlage: <i>Test specification:</i>	FCC 47 CFR Part 15.247 with parts 15.207 & 15.209 ANSI C63.10: 2013			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2021.03.10			
Prüfmuster-Nr.: <i>Test sample no.:</i>	See chapter 2.3			
Prüfzeitraum: <i>Testing period:</i>	2021.03.15 – 2022.04.06			
Ort der Prüfung: <i>Place of testing:</i>	Lund, Sweden			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland Sweden			
Prüfergebnis*: <i>Test result*:</i>	Pass			
überprüft von: <i>reviewed by:</i>		genehmigt von: <i>authorized by:</i>		
Datum: 2022.04.21 <i>Date:</i>		Datum: 2022.04.21 <i>Date:</i>		
Stellung / Position:	Technical Expert	Stellung / Position:	Lab Manager	
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts.</i></p>				

Revision History

REVISION	DATE	REMARKS	AUTHOR
001	2021.09.20	First release	Sam Ebadeh
002	2022.01.19	Corrected FCC ID	Sam Ebadeh
003	2022.02.08	Removed Zigbee as technology and added results to chapter 4.11 and 4.10 + new antenna gain value	Sam Ebadeh
004	2022.04.21	Updated with power spectral density, Antenna conducted emissions and band edge. Added 99% BW as worst case plot	Sam Ebadeh

Note: Latest revision report will replace all previous reports

This report based on FCC Part 15.247 Template version 1.2

Summary of Test Results

FCC 47 CFR Rule Part	Test Description	Applicability	Report Section	RESULT	REMARKS
15.207	AC Power Line Conducted Emissions (Intentional Radiators)	YES	4.1	PASS	
15.209	Radiated Emissions (Intentional Radiators)	YES	4.2	PASS	
15.247 (d)	Antenna Conducted Emissions	YES	4.3	N.P.	Radiated Emissions performed instead
15.247 (d)	Band Edge Compliance (Authorized Band)	YES	4.4	PASS	
15.247 (d)	Band Edge Compliance (Restricted Band)	YES	4.5	PASS	
15.247 (a)(1)	20dB Bandwidth	NO	4.6	N/A	BLE is non-hopping
15.247 (a)(1)	Carrier (Hopping Channel) Separation	NO	4.7	N.P.	No FHSS
15.247 (a)(1)	Number of Hopping Channels	NO	4.8	N.P.	No FHSS
15.247 (a)(1)	Time of Occupancy (Dwell Time)	NO	4.9	N.P.	No FHSS
15.247 (a)(2)	6dB Bandwidth	YES	4.10	PASS	
15.247 (b)	Peak Conducted Output Power	YES	4.11	PASS	
15.247 (e)	Power Spectral Density	YES	4.12	PASS	

Possible test case verdicts:

- | | |
|--|-----------------------|
| - Test case does not apply to the test object: | N/A |
| - Test object complies with the requirement: | PASS or COMPLIANT |
| - Test object does not meet the requirement: | FAIL or NOT COMPLIANT |
| - Test case not performed on the test object: | N.P. |

Table of Contents

1.	GENERAL INFORMATION	5
1.1	Test Site	5
1.2	Client Information	5
2.	PRODUCT INFORMATION.....	6
2.1	General Description.....	6
2.2	Device Characteristics.....	6
2.3	Test Samples	6
2.4	Wireless Technologies and Bands Supported by the EUT.....	6
2.5	Antenna Information.....	7
2.6	Wireless Technology Details	7
2.7	Ancillary Equipment.....	7
2.8	EUT Diagrams.....	7
3.	TEST METHODS	8
3.1	Test Standards.....	8
3.2	Additional references.....	8
3.3	Limits	9
3.4	Description of Test Methods and Equipment Setup	10
3.5	EUT Configuration During Test.....	15
3.6	EUT Operation Modes.....	15
3.7	Deviations from the Test Standard	15
3.8	Environmental Conditions.....	16
4.	TEST RESULTS	17
4.1	Test Results – AC Power Line Conducted Emissions (Intentional Transmitter).....	17
4.2	Test Results – Radiated Emissions (Intentional Transmitter).....	20
4.3	Test Results – Antenna Conducted Emissions	39
4.4	Test Results – Band Edge Compliance (Authorized Band)	39
4.5	Test Results – Band Edge Compliance (Restricted Band)	41
4.6	Test Results – 20dB Bandwidth.....	44
4.7	Test Results – Carrier (Hopping Channel) Separation	44
4.8	Test Results – Number of Hopping Channels	44
4.9	Test Results – Time of Occupancy (Dwell Time)	44
4.10	Test Results – 6dB Bandwidth.....	45
4.11	Test Results – Peak Conducted Output Power.....	48
4.12	Test Results – Power Spectral Density.....	50
5.	TEST EQUIPMENT STATUS.....	52
5.1	List of Hardware with Calibration Dates	52
5.2	Software / Firmware Versions.....	53
6.	MEASUREMENT UNCERTAINTY	54
6.1	Measurement Uncertainty for CTE	54
6.2	Measurement Uncertainty for Conducted Emissions	54
6.3	Measurement Uncertainty for SAC 5 (Radiated Emissions & Band Edge)	54
7.	PHOTOGRAPHS.....	55
7.1	Photographs of the EUT.....	55

1. GENERAL INFORMATION

1.1 Test Site

Test Facility:	TÜV Rheinland Sweden AB
Address:	Mobilvägen 10
	223 62 Lund
	Sweden
Swedac Registration Number:	10325
FCC Test Firm Registration Number:	517458
ISED Test Site Registration Number:	24753

1.2 Client Information

Company Name:	Schneider Electric
Address:	Mobilvägen 10
	223 62 Lund
	Sweden
Contact Person:	Fredrik Göth
Contact e-Mail / Telephone	Fredrik.Goth@se.com / +46 104 78 25 91

2. PRODUCT INFORMATION

2.1 General Description

Model name:	SpaceLogic Insight sensor
Manufacturer:	Schneider Electric
Model number / Marketing name:	RP-C-EXT-IS-BLE
FCC ID:	FCC ID: DVE-IS1
Description:	Ceiling sensor for controlling HVAC, light and blind applications
Ancillary Equipment:	See section 2.7

2.2 Device Characteristics

Type of Power Supply	External
Nominal Supply Voltage	24 VDC
Supply Voltage Range	-
Operating Temperature Range	0°C to +50°C
Operating Air Humidity Range	20 to 90% RH non-condensing
Highest Internal Frequency Source	2480 MHz

2.3 Test Samples

EUT #	EUT ID	Description	Used For:
1	A003013241-001	Standard test sample	Radiated Emissions
2	A003015806-002	Standard test sample	Conducted Emissions
3	22-0015-001	Conducted Sample	RF Conducted power and 6dB Bandwidth

2.4 Wireless Technologies and Bands Supported by the EUT

Technology	Band	Frequency Range (Tx)	Evaluation Performed*
Bluetooth LE	2.4 GHz	2402 MHz – 2480 MHz	YES

2.5 Antenna Information

Technology	Band	Number of Antennas	Antenna Type(s)	Gain (dBi)
Bluetooth Low Energy	2.4 GHz	2	Integrated	+2.64

2.6 Wireless Technology Details

Technology	Band	Modulation Type(s)	No. of Channels	Channel Spacing	Adaptivity
Bluetooth LE	2.4 GHz	GFSK	40	2 MHz	N/A

2.7 Ancillary Equipment

ID	Description	Manufacturer / Model	Hardware & Software Versions
A003017662-001	Interface card	Schneider Electric	-
A003017662-003	Transformer	-	-
A003017662-004	24 VAC RPC	Schneider Electric	-

2.8 EUT Diagrams

-

3. TEST METHODS

3.1 Test Standards

Testing was performed according to the following standards / references

Standard	Version	Description
FCC 47 CFR 15.247	-	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
FCC 47 CFR 15.207	-	Conducted limits
FCC 47 CFR 15.209	-	Radiated emission limits; general requirements

3.2 Additional references

The following standards / references were also considered for the testing

Standard	Version	Description
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.3 Limits

FCC 47 CFR Rule Part	Test Description	Limit Reference (FCC 47 CFR Reference)
15.207	AC Power Line Conducted Emissions (Intentional Radiators)	15.207 (a)
15.209	Radiated Emissions (Intentional Radiators)	15.209 (a) *See Note 1
15.247 (d)	Antenna Conducted Emissions	15.247 (d)
15.247 (d)	Band Edge Compliance (Authorized Band)	15.247 (d)
15.247 (d)	Band Edge Compliance (Restricted Band)	15.247 (d)
15.247 (a)(1)	20dB Bandwidth	15.247 (a)(1)
15.247 (a)(1)	Carrier (Hopping Channel) Separation	15.247 (a)(1)
15.247 (a)(1)	Number of Hopping Channels	15.247 (a)(1)
15.247 (a)(1)	Time of Occupancy (Dwell Time)	15.247 (a)(1)
15.247 (a)(2)	6dB Bandwidth	15.247 (a)(2)
15.247 (b)	Peak Conducted Output Power	§15.247 (b)(1) [Hopping] §15.247 (b)(3) [Non-Hopping]
15.247 (e)	Power Spectral Density	15.247 (e)

Interpretation of the measurement results has been performed in accordance with ANSI C63.10 section 1.3

Compliance with the requirements has been based on the results of the measurements compared to the specified limits, not taking into account measurement instrumentation uncertainty.

Measurement Uncertainty figures are stated in section 6

Note 1

Radiated Emissions limits in the tables from 47 CFR sections 15.109 & 15.209 are presented in $\mu\text{V}/\text{m}$. Measurements on the test system are made in $\text{dB}\mu\text{V}/\text{m}$. To convert between these, the following adjustment is used:

$$\text{New Limit} = 20 \log \left(\frac{\text{Original Limit}}{10^6} \right) + 120$$

Example: from 15.209(a) the limit for 30MHz – 88MHz is $100\mu\text{V}/\text{m}$ at 3m. This gives:

$$\text{New Limit} = 20 \log \left(\frac{100}{10^6} \right) + 120 = 40\text{dB}\mu\text{V}/\text{m} \text{ at } 3\text{m}$$

Additionally, in some cases testing has been performed at distances other than those specified in the tables. When this has occurred, the limits have been adjusted in accordance with the requirements in 47 CFR 15.31, using an extrapolation factor of 40dB/decade at frequencies below 30MHz and 20dB/decade at or above 30MHz

Example: from 15.209(a) the limit for 1.705MHz – 30MHz is $30\mu\text{V}/\text{m}$ (=29.54 $\text{dB}\mu\text{V}/\text{m}$) at 30m

$$\text{Limit@3m} = \text{Limit@30m} + 40 \log \left(\frac{30}{3} \right) = 29.54 + 40.00 = 69.54 \text{ dB}\mu\text{V}/\text{m} \text{ at } 3\text{m}$$

Example: from 15.209(a) the limit for 1GHz – 18GHz is $500\mu\text{V}/\text{m}$ (=53.98 $\text{dB}\mu\text{V}/\text{m}$) at 3m

$$\text{Limit@1m} = \text{Limit@3m} + 20 \log \left(\frac{3}{1} \right) = 53.98 + 9.54 = 63.52 \text{ dB}\mu\text{V}/\text{m} \text{ at } 1\text{m}$$

3.4 Description of Test Methods and Equipment Setup

3.4.1 General Description

Testing was performed in accordance with the various requirements of ANSI C63.4 and ANSI C63.10. Any deviations from the test methods are described in section 3.7

Where different arrangements of equipment were used for different types of measurements, these are tabulated in section 3.4.2 and details of each arrangement are included in subsequent sections

3.4.2 Test Equipment Setup Used by Test Type

FCC 47 CFR Rule Part	Test Description	Test Equipment Used
15.207	AC Power Line Conducted Emissions (Intentional Radiators)	Conducted Emissions
15.209	Radiated Emissions (Intentional Radiators)	SAC5
15.247 (d)	Antenna Conducted Emissions	CTE
15.247 (d)	Band Edge Compliance (Authorized band)	CTE
15.247 (d)	Band Edge Compliance (Restricted band)	SAC 5
15.247 (a)(1)	20dB Bandwidth	CTE
15.247 (a)(1)	Carrier (Hopping Channel) Separation	CTE
15.247 (a)(1)	Number of Hopping Channels	CTE
15.247 (a)(1)	Time of Occupancy (Dwell Time)	CTE
15.247 (a)(2)	6dB Bandwidth	CTE
15.247 (b)	Peak Conducted Output Power	CTE
15.247 (e)	Power Spectral Density	CTE

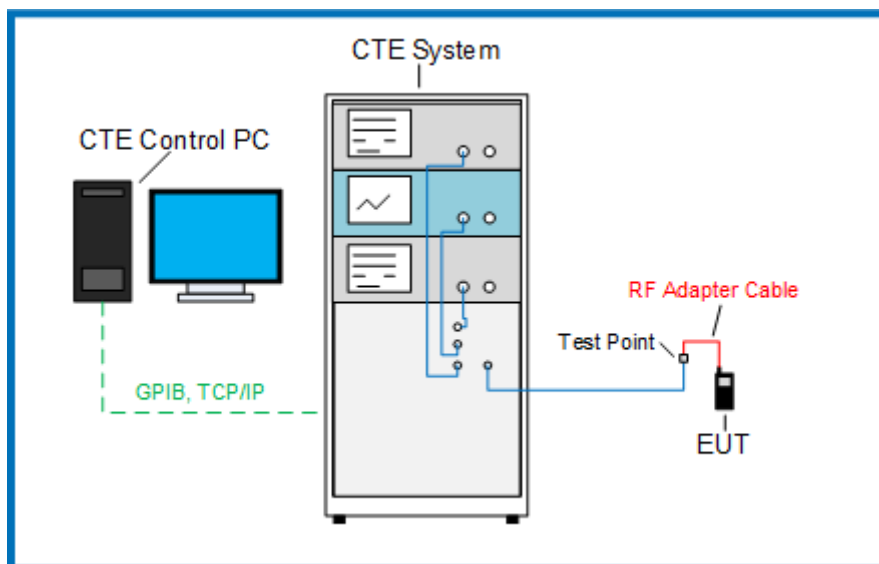
3.4.3 Test Equipment Setup – CTE System

The Comprehensive Test Environment (CTE) system consists of a number of instruments (see section) mounted in a rack together with automated relays and interconnecting hardware. The instruments and other equipment are controlled from a standard PC running software provided by the manufacturer. The RF output of the EUT is connected to the test system via a coaxial cable.

Tests are in the form of pre-defined scripts that can be loaded on the PC. The scripts, as well as the hardware setup, have been verified for conformance with the relevant test specifications.

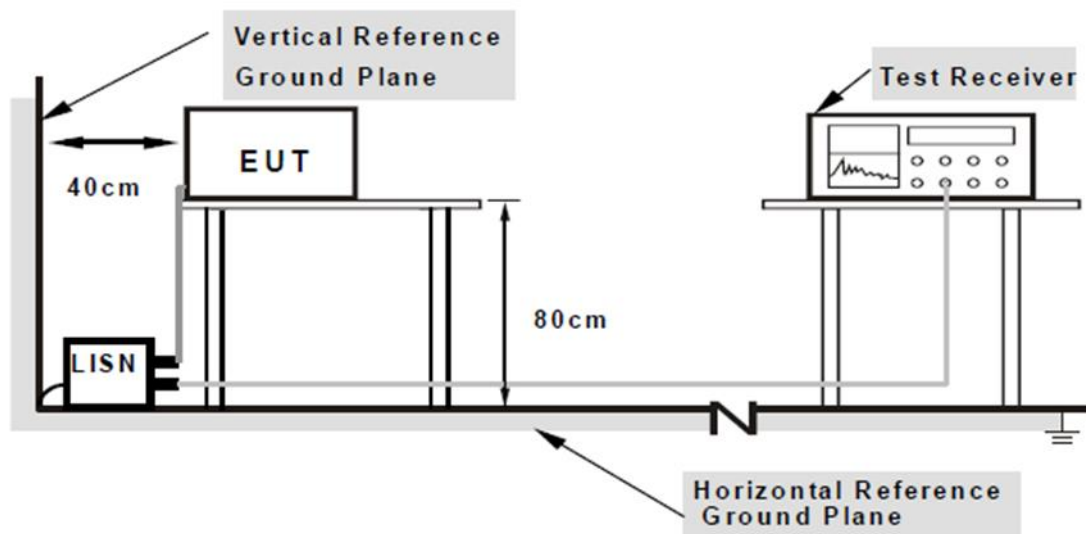
Losses in the cables and interconnects have been measured using the system's own automated routines and are compensated for automatically. Any additional loss in RF adapter cables supplied together with the EUT can be compensated for using the known characteristics of that adapter.

CTE Block Diagram



3.4.4 Test Equipment Setup – Conducted Emissions

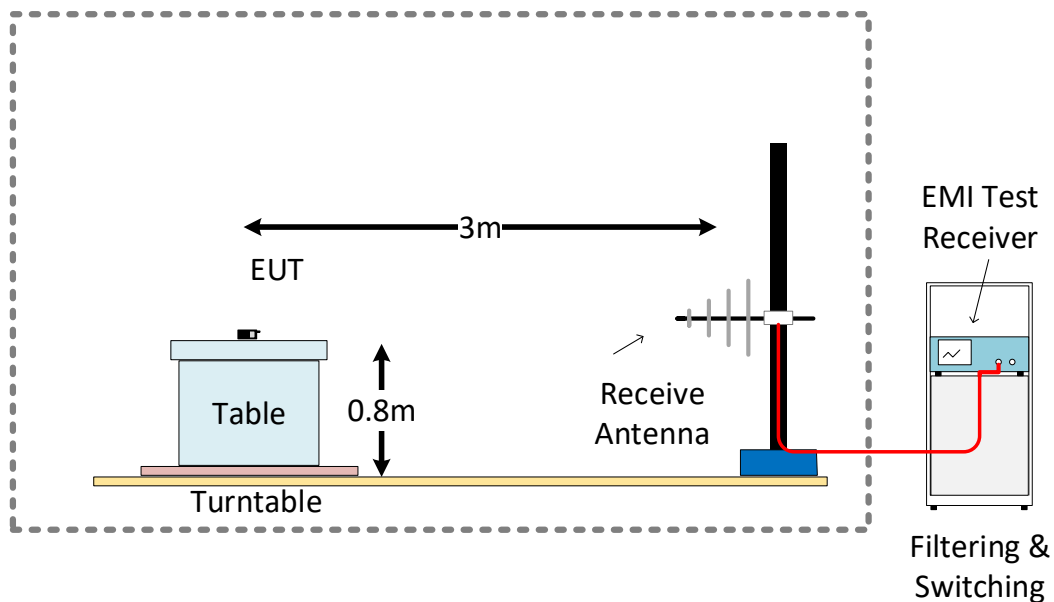
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The LISNs provide $50\Omega/50\mu\text{H}$ of coupling impedance for the measuring instrument.
- The lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10 dB under the prescribed limits could not be reported.



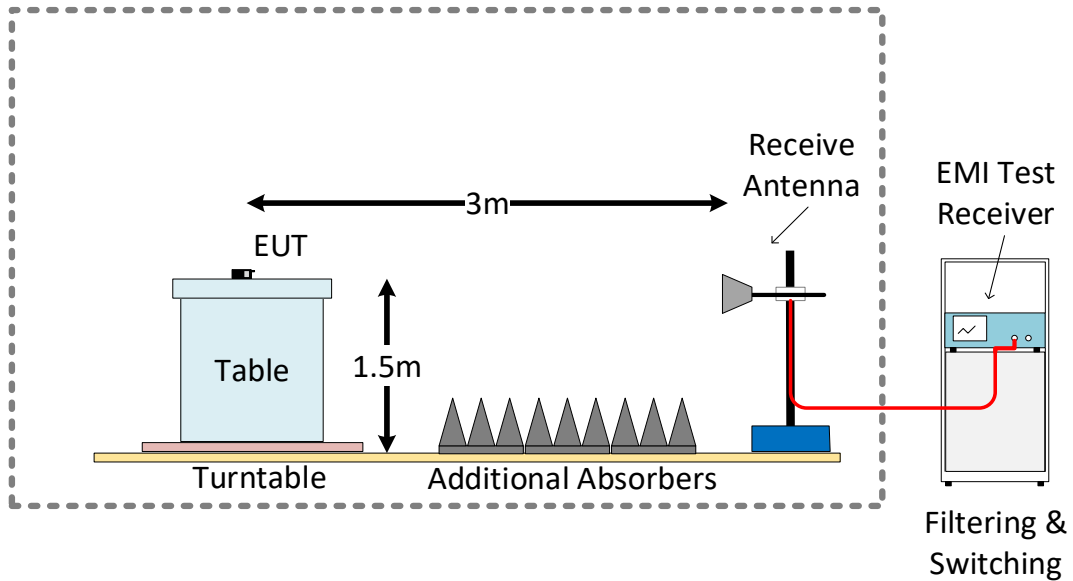
3.4.5 Test Equipment Setup – SAC 5 (Radiated Emissions and Restricted Band Edge)

- For frequency range 30MHz-1GHz Log-Periodic Antenna was used. Antenna elevated from 100 cm from floor to 400 cm from floor, and was placed at 3 m from center of turntable in tilted position. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.
- For frequency range 1GHz-18GHz horn Antenna was used. Antenna elevated from 100 cm from floor to 200 cm from floor, and was placed at 3 m from center of turntable. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.
- For frequency range 18GHz-40GHz double horn Antenna was used. Antenna's height was adjusted to 150 cm from floor, and 1 m distance to center of turntable. The equipment under test (EUT) was placed at the middle of the turntable on at 150 cm height from floor.
- For all frequency ranges the turntable was rotated 360° for obtaining the maximum emission.

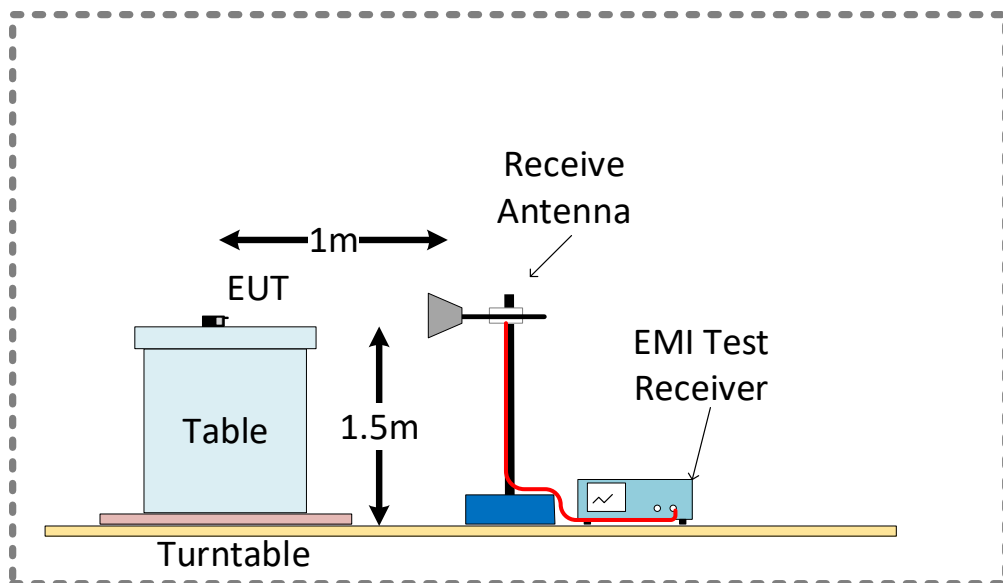
SAC 5 Test Setup Configuration 30MHz – 1GHz



SAC 5 Test Setup Configuration 1GHz – 18GHz



SAC 5 Test Setup Configuration 18GHz – 40GHz



3.5 EUT Configuration During Test

N/A

3.6 EUT Operation Modes

Operation mode	Description
Continuous TX	Unit was powered up and set to transmit continuously on a specified channel with a 100% duty cycle.

3.7 Deviations from the Test Standard

None.

3.8 Environmental Conditions

3.8.1 Environmental Conditions – SAC5 (Radiated Emissions)

Environmental Conditions Log – SAC5

Date	Time	Temperature (°C)	Relative Humidity (%)
2021.03.15	07:37	18.6	33
2021.03.16	06:55	18.5	34
2021.03.17	08:20	18.4	33
2021.03.19	10:54	18.2	29

3.8.2 Environmental Conditions – CTE

Environmental Conditions Log – CTE

Date	Time	Temperature (°C)	Relative Humidity (%)
2022.02.08	14:00	19.8	34
2022.04.06	14:42	18.1	42

4. TEST RESULTS

4.1 Test Results – AC Power Line Conducted Emissions (Intentional Transmitter)

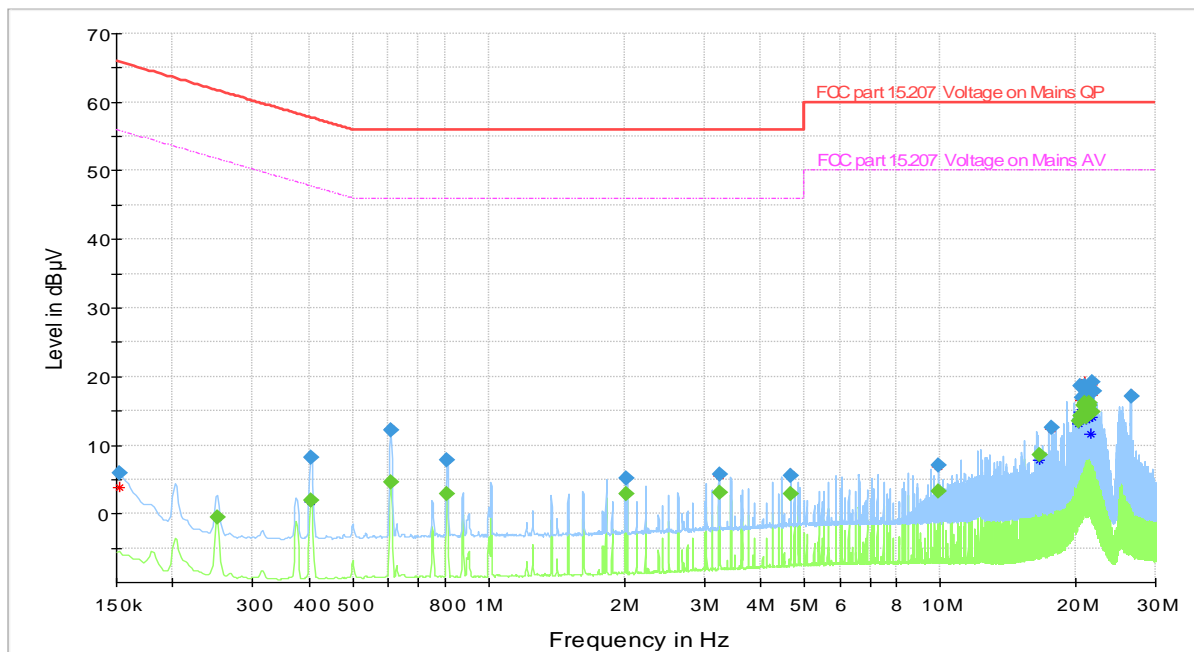
4.1.1 AC Power Line Conducted Emissions (Intentional) – Test Summary

Test Specification	FCC 47 CFR 15.207 (Part 15 Subpart C)		
Test Engineer & Date	Sam Ebadeh	2021.03.17	
EUT and Ancillary Equipment IDs	A003015806-002	A003017662-001 A003017662-003 A003017662-004	
EUT Operation Mode(s)	-		
EUT Wireless Configuration(s)	Continuous TX		
EUT Hardware Configuration(s)	N/A		
Overall Result	PASS		
Test Parameter	Wireless Configuration	Frequency Range	Result*
AC Conducted Power Line Emissions – “N” Line & “L1” Line	Bluetooth Low Energy Mid channel (2440 MHz)	150 kHz – 30 MHz	PASS

* For detailed measurements, see tables and graphs in sections below

4.1.2 AC Power Line Conducted Emissions (Intentional) – Test Details

Test	Conducted Emission	
Test mode condition	Bluetooth Low Energy Mid Channel (2440 MHz)	
Standard	47 CFR Part 15.207 Class B	
EUT	A003015806-002	
Ancillary Equipment	A003017662-001: Interface card A003017662-003: Transformer adaptor A003017662-004: RPC	
Test Engineer	Sam Ebadeh	Date: 2021.03.17



- Preview Result 2-CAV
- Preview Result 1-QPK
- * Critical_Freqs CAV
- * Critical_Freqs QPK
- FCC part 15.207 Voltage on Mains QP
- FCC part 15.207 Voltage on Mains AV
- ◆ Final_Result QPK
- ◆ Final_Result CAV

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.152250	5.99	---	65.88	59.89	1000.0	9.000	L1	ON	9.7
0.251250	---	-0.48	51.72	52.19	1000.0	9.000	N	ON	9.6
0.404250	---	1.91	47.77	45.86	1000.0	9.000	N	ON	9.6
0.404250	8.19	---	57.77	49.58	1000.0	9.000	L1	ON	9.6
0.606750	---	4.58	46.00	41.42	1000.0	9.000	L1	ON	9.6
0.606750	12.19	---	56.00	43.81	1000.0	9.000	L1	ON	9.6
0.809250	7.85	---	56.00	48.15	1000.0	9.000	L1	ON	9.6
0.809250	---	2.93	46.00	43.07	1000.0	9.000	L1	ON	9.6
2.024250	---	2.93	46.00	43.07	1000.0	9.000	N	ON	9.7
2.024250	5.24	---	56.00	50.76	1000.0	9.000	L1	ON	9.7
3.239250	5.68	---	56.00	50.32	1000.0	9.000	N	ON	9.8
3.239250	---	3.04	46.00	42.96	1000.0	9.000	N	ON	9.8
4.656750	---	2.91	46.00	43.09	1000.0	9.000	N	ON	9.8
4.656750	5.52	---	56.00	50.48	1000.0	9.000	N	ON	9.8
9.921750	---	3.35	50.00	46.65	1000.0	9.000	L1	ON	9.9
9.921750	7.03	---	60.00	52.97	1000.0	9.000	L1	ON	9.9
16.539000	---	8.53	50.00	41.47	1000.0	9.000	N	ON	10.0
17.614500	12.51	---	60.00	47.49	1000.0	9.000	N	ON	10.1
20.285250	---	13.47	50.00	36.53	1000.0	9.000	L1	ON	10.0
20.449500	---	14.19	50.00	35.81	1000.0	9.000	L1	ON	10.0
20.451750	18.67	---	60.00	41.33	1000.0	9.000	L1	ON	10.0
20.652000	---	14.12	50.00	35.88	1000.0	9.000	L1	ON	10.0
20.658750	16.84	---	60.00	43.16	1000.0	9.000	L1	ON	10.0
20.784750	18.50	---	60.00	41.50	1000.0	9.000	L1	ON	10.0
20.787000	---	15.70	50.00	34.30	1000.0	9.000	L1	ON	10.0
20.910750	18.56	---	60.00	41.44	1000.0	9.000	L1	ON	10.0
20.910750	---	16.25	50.00	33.75	1000.0	9.000	L1	ON	10.0
21.039000	---	14.00	50.00	36.00	1000.0	9.000	L1	ON	10.0
21.063750	16.79	---	60.00	43.21	1000.0	9.000	L1	ON	10.0
21.291000	17.98	---	60.00	42.02	1000.0	9.000	L1	ON	10.0
21.412500	---	16.15	50.00	33.85	1000.0	9.000	L1	ON	10.0
21.414750	---	15.72	50.00	34.28	1000.0	9.000	L1	ON	10.0
21.414750	17.87	---	60.00	42.13	1000.0	9.000	L1	ON	10.0
21.538500	---	14.88	50.00	35.12	1000.0	9.000	L1	ON	10.0
21.662250	---	14.88	50.00	35.12	1000.0	9.000	L1	ON	10.0
21.664500	19.18	---	60.00	40.82	1000.0	9.000	L1	ON	10.0
21.864750	17.90	---	60.00	42.10	1000.0	9.000	L1	ON	10.0
26.425500	17.06	---	60.00	42.94	1000.0	9.000	N	ON	10.1

4.2 Test Results – Radiated Emissions (Intentional Transmitter)

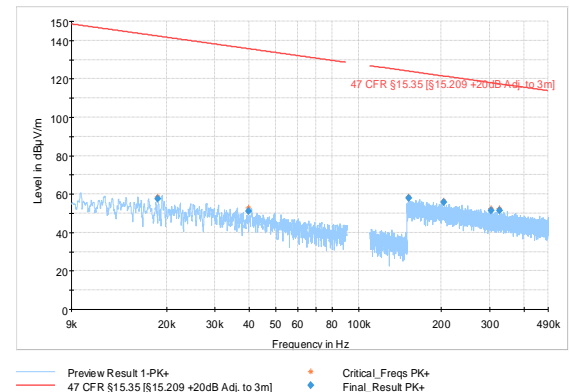
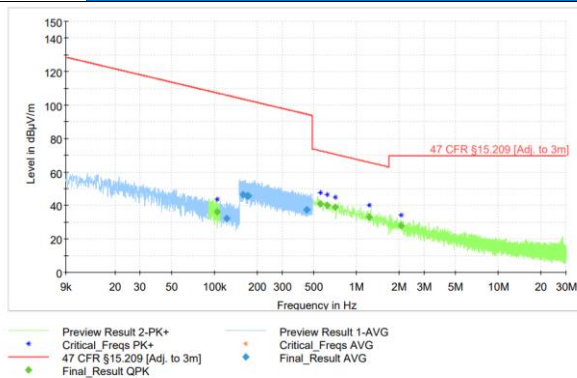
4.2.1 Radiated Emissions (Intentional) – Test Summary

Test Specification	FCC 47 CFR 15.247 (Part 15 Subpart C)		
Test Engineer & Date	Sam Ebadeh Niall Forrester Fariborz Abasi Simon Palmhager Joel Efraimsson	2021.03.15 – 2021.03.19	
EUT and Ancillary Equipment IDs	A003013241-001	A003017662-001 A003017662-003 A003017662-004	
EUT Operation Mode(s)	-		
EUT Wireless Configuration(s)	Continuous TX		
EUT Hardware Configuration(s)	N/A		
Overall Result	PASS		
Test Parameter	Wireless Configuration	Frequency Range	Result
Radiated Emission	Bluetooth Low Energy Low channel (2402 MHz)	9 kHz – 30 MHz	PASS
Radiated Emissions	Bluetooth Low Energy Low channel (2402 MHz)	30 MHz – 1 GHz	PASS
Radiated Emissions	Bluetooth Low Energy Low channel (2402 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	Bluetooth Low Energy Low channel (2402 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions	Bluetooth Low Energy Mid channel (2440 MHz)	9 kHz – 30 MHz	PASS
Radiated Emissions	Bluetooth Low Energy Mid channel (2440 MHz)	30 MHz – 1 GHz	PASS
Radiated Emissions	Bluetooth Low Energy Mid channel (2440 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	Bluetooth Low Energy Mid channel (2440 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions	Bluetooth Low Energy High channel (2440 MHz)	9 kHz – 30 MHz	PASS
Radiated Emissions	Bluetooth Low Energy High channel (2440 MHz)	30 MHz – 1 GHz	PASS
Radiated Emissions	Bluetooth Low Energy High channel (2440 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	Bluetooth Low Energy High channel (2440 MHz)	18 GHz – 40 GHz	PASS

4.2.2 Radiated Emissions (Intentional) – Test Details

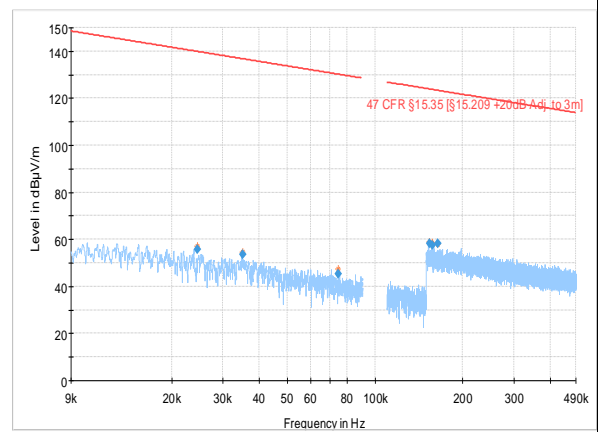
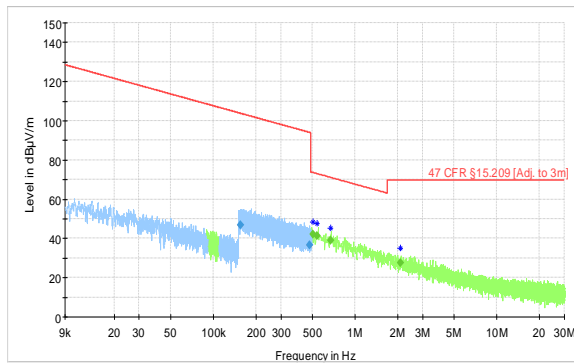
Low Channel

Test mode condition	Bluetooth Low Energy, Low channel (2402 MHz) QuasiPeak / Average & Peak	
Antenna orientation	Parallel to axis	
Sweep frequency	9 kHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Simon Palmhager	Date: 2021.03.16
Chamber details	Chamber: SAC 5	



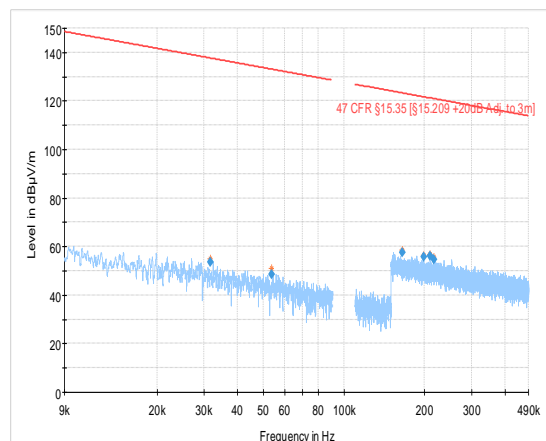
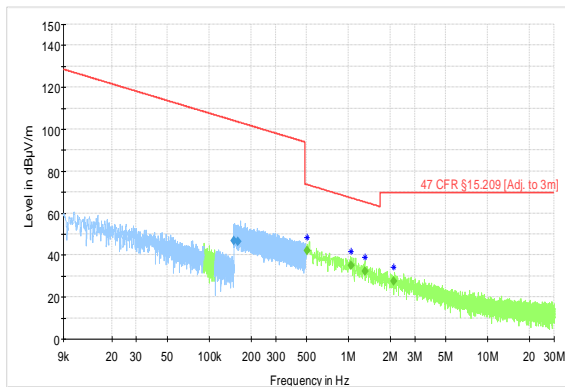
Frequency (MHz)	Average (dBuV/m)	QuasiPeak (dBuV/m)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.104508	---	36.27	---	107.22	70.96	1000.0	0.200	100.0	H	244.0
0.122118	32.14	---	---	105.87	73.73	1000.0	0.200	100.0	H	45.0
0.158754	46.42	---	---	103.59	57.17	1000.0	9.000	100.0	H	295.0
0.170837	45.79	---	---	102.95	57.17	1000.0	9.000	100.0	H	135.0
0.173528	45.67	---	---	102.82	57.14	1000.0	9.000	100.0	H	-13.0
0.446079	37.33	---	---	94.62	57.29	1000.0	9.000	100.0	H	11.0
0.450206	37.23	---	---	94.54	57.30	1000.0	9.000	100.0	H	-41.0
0.559535	---	41.12	---	72.65	31.53	1000.0	9.000	100.0	H	179.0
0.623324	---	40.03	---	71.71	31.68	1000.0	9.000	100.0	H	76.0
0.712410	---	38.79	---	70.55	31.76	1000.0	9.000	100.0	H	295.0
1.231714	---	33.27	---	65.79	32.53	1000.0	9.000	100.0	H	-13.0
2.061198	---	27.89	---	69.54	41.65	1000.0	9.000	100.0	H	45.0
0.018534	---	---	57.53	142.25	84.71	1000.0	0.200	100.0	H	268.0
0.039757	---	---	51.22	135.62	84.40	1000.0	0.200	100.0	H	214.0
0.151824	---	---	57.96	123.98	66.01	1000.0	9.000	100.0	H	49.0
0.204699	---	---	55.85	121.38	65.53	1000.0	9.000	100.0	H	153.0
0.304409	---	---	51.41	117.94	66.53	1000.0	9.000	100.0	H	178.0
0.325667	---	---	51.62	117.35	65.73	1000.0	9.000	100.0	H	-15.0

Test mode condition	Bluetooth Low Energy, Low channel (2402 MHz) QuasiPeak / Average & Peak	
Antenna orientation	Parallel to floor	
Sweep frequency	9 kHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	Niall Forrester	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Niall Forrester	Date: 2021.03.17
Chamber details	Chamber: SAC 5	



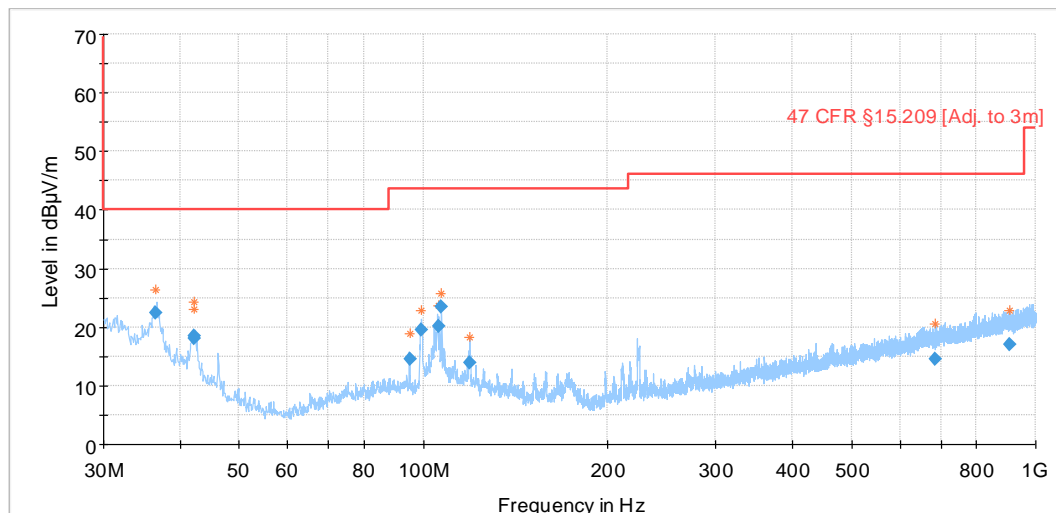
Frequency (MHz)	Average (dBuV/m)	QuasiPeak (dBuV/m)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	PoI	Azimuth (deg)
0.260849	41.87	---	---	99.28	57.41	1000.0	9.000	100.0	H	11.0
0.463554	36.80	---	---	94.28	57.48	1000.0	9.000	100.0	H	256.0
0.874052	---	36.57	---	68.77	32.21	1000.0	9.000	100.0	H	49.0
1.216995	---	33.37	---	65.90	32.53	1000.0	9.000	100.0	H	154.0
1.494253	---	30.97	---	64.12	33.15	1000.0	9.000	100.0	H	77.0
2.443738	---	26.07	---	69.54	43.47	1000.0	9.000	100.0	H	218.0
0.024514	---	---	55.76	139.82	84.05	1000.0	0.200	100.0	H	135.0
0.035082	---	---	53.57	136.70	83.14	1000.0	0.200	100.0	H	75.0
0.074611	---	---	45.28	130.15	84.86	1000.0	0.200	100.0	H	225.0
0.153533	---	---	58.38	123.88	65.50	1000.0	9.000	100.0	H	291.0
0.156967	---	---	57.47	123.69	66.22	1000.0	9.000	100.0	H	45.0
0.163835	---	---	58.11	123.32	65.21	1000.0	9.000	100.0	H	292.0

Test mode condition	Bluetooth Low Energy, Low channel (2402 MHz) QuasiPeak / Average & Peak	
Antenna orientation	Perpendicular to axis	
Sweep frequency	9 kHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Sam Ebadeh Niall Forrester	Date: 2021.03.17
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBuV/m)	QuasiPeak (dBuV/m)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.150965	46.75	---	---	104.03	57.27	1000.0	9.000	100.0	H	281.0
0.160408	46.34	---	---	103.50	57.16	1000.0	9.000	100.0	H	315.0
0.505552	---	42.08	---	73.53	31.45	1000.0	9.000	100.0	H	269.0
1.048715	---	35.10	---	67.19	32.09	1000.0	9.000	100.0	H	219.0
1.310756	---	32.37	---	65.25	32.88	1000.0	9.000	100.0	H	45.0
2.115594	---	27.47	---	69.54	42.07	1000.0	9.000	100.0	H	205.0
0.031688	---	---	53.67	137.59	83.91	1000.0	0.200	100.0	H	269.0
0.053708	---	---	48.51	133.00	84.49	1000.0	0.200	100.0	H	315.0
0.165123	---	---	57.40	123.25	65.85	1000.0	9.000	100.0	H	135.0
0.198661	---	---	55.83	121.64	65.81	1000.0	9.000	100.0	H	135.0
0.209296	---	---	56.27	121.19	64.92	1000.0	9.000	100.0	H	63.0
0.217225	---	---	54.61	120.87	66.25	1000.0	9.000	100.0	H	153.0

Test mode condition	Bluetooth Low Energy, Low channel (2402 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	30 MHz – 1 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Sam Ebadeh	Date: 2021.03.16
Chamber details	Chamber: SAC 5	

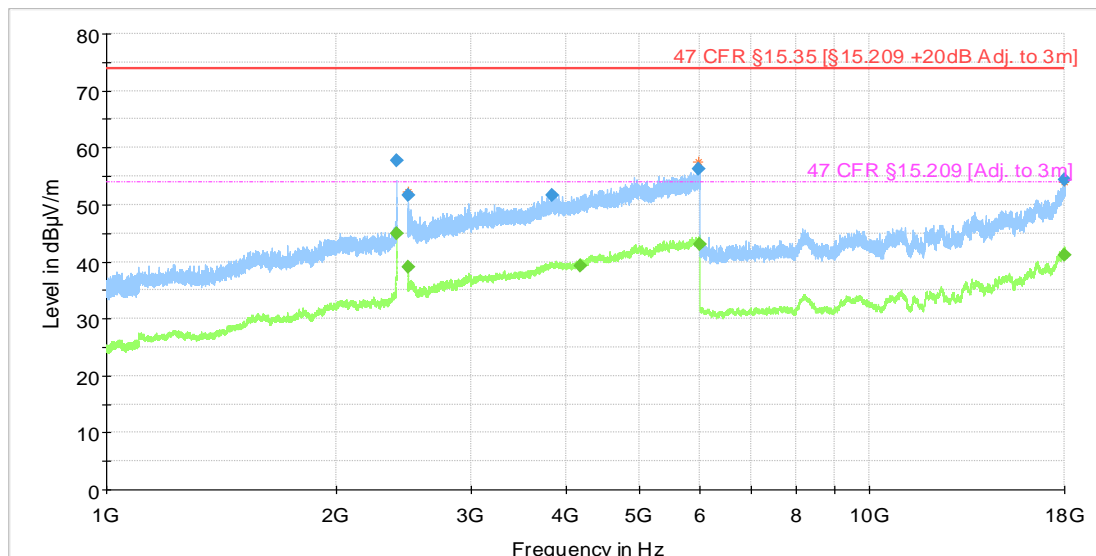


- Preview Result 2-AVG
- * Critical_Freqs AVG
- 47 CFR §15.209 [Adj. to 3m]
- ◆ Final_Result AVG
- Preview Result 1-PK+
- * Critical_Freqs PK+
- ◆ Final_Result QPK

Comment

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
36.559920	22.36	40.00	17.64	1000.0	120.000	100.0	V	202.0
42.117160	18.07	40.00	21.93	1000.0	120.000	125.0	V	292.0
42.119920	18.49	40.00	21.51	1000.0	120.000	100.0	V	322.0
94.905800	14.63	43.52	28.89	1000.0	120.000	125.0	V	112.0
99.061240	19.50	43.52	24.02	1000.0	120.000	108.0	V	176.0
105.647200	20.20	43.52	23.32	1000.0	120.000	108.0	V	278.0
107.025280	23.38	43.52	20.14	1000.0	120.000	125.0	V	158.0
118.887760	13.94	43.52	29.58	1000.0	120.000	125.0	V	112.0
686.016160	14.61	46.02	31.41	1000.0	120.000	233.0	V	130.0
905.070320	17.04	46.02	28.98	1000.0	120.000	204.0	H	248.0

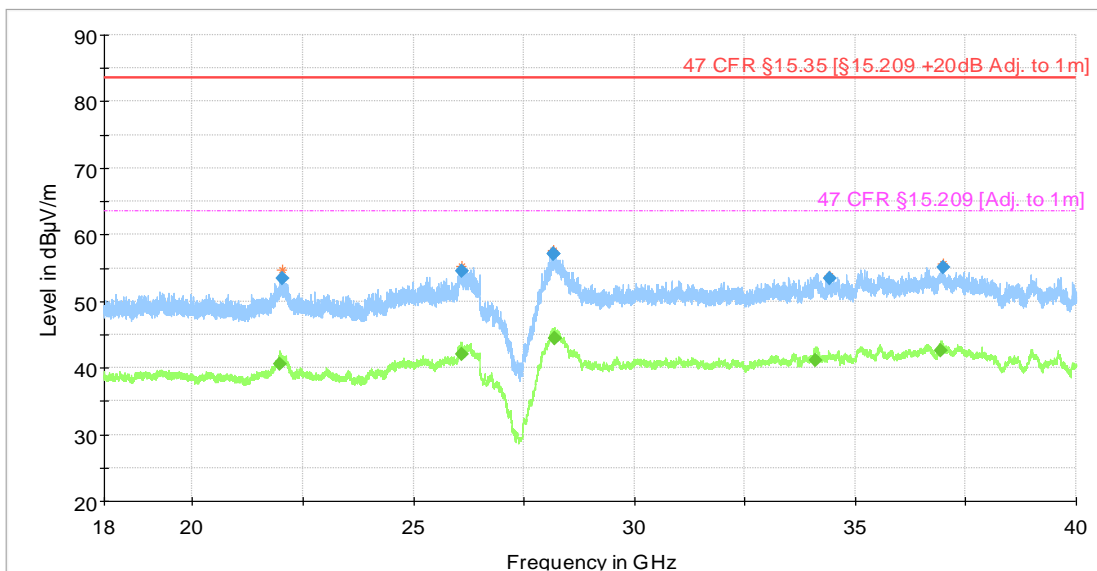
Test mode condition	Bluetooth Low Energy, Low channel (2402 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Sam Ebadeh	Date: 2021.03.15
Chamber details	Chamber: SAC 5	



— Preview Result 2-AVG
— Preview Result 1-PK+
* Critical_Freqs AVG
* Critical_Freqs PK+
— 47 CFR §15.35 [§15.209 +20dB Adj. to 3m]
— 47 CFR §15.209 [Adj. to 3m]
◆ Final_Result PK+
◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2399.977000	57.77	---	73.98	16.21	1000.0	1000.000	169.0	H	221.0
2399.988000	---	44.98	53.98	9.00	1000.0	1000.000	175.0	H	221.0
2483.521000	---	39.03	53.98	14.95	1000.0	1000.000	187.0	H	131.0
2483.715553	51.69	---	73.98	22.29	1000.0	1000.000	175.0	V	-22.0
3840.310000	51.65	---	73.98	22.32	1000.0	1000.000	175.0	V	158.0
4180.400000	---	39.20	53.98	14.78	1000.0	1000.000	125.0	V	179.0
5973.675000	56.37	---	73.98	17.61	1000.0	1000.000	175.0	V	-18.0
5995.501840	---	43.10	53.98	10.88	1000.0	1000.000	100.0	V	338.0
17987.084000	54.45	---	73.98	19.53	1000.0	1000.000	175.0	H	265.0
17988.059000	---	41.07	53.98	12.90	1000.0	1000.000	125.0	H	232.0

Test mode condition	Bluetooth Low Energy, Low channel (2402 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Fariborz Abasi	Date: 2021.03.19
Chamber details	Chamber: SAC 5	

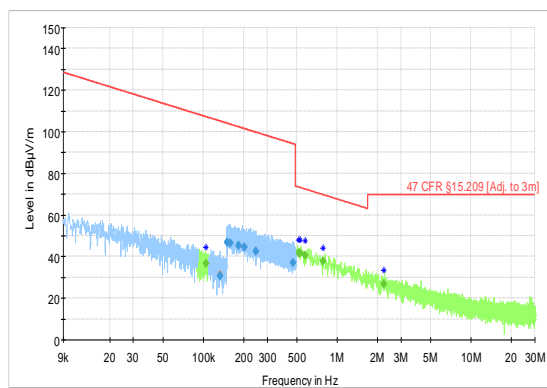


- Preview Result 2-AVG
- * Critical_Freqs AVG
- 47 CFR §15.35 [§15.209 +20dB Adj. to 1m]
- ◆ Final_Result PK+
- Preview Result 1-PK+
- * Critical_Freqs PK+
- 47 CFR §15.209 [Adj. to 1m]
- ◆ Final_Result AVG

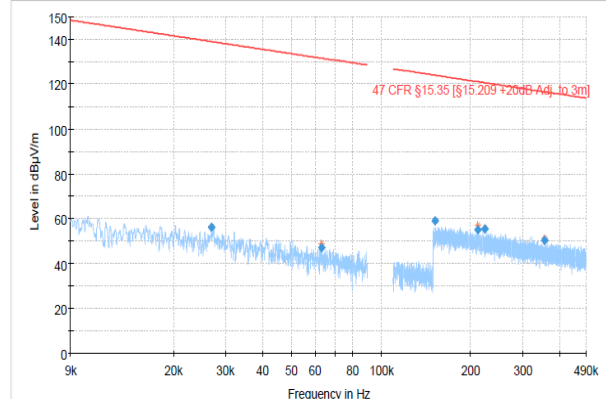
Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
21984.048000	---	40.52	63.52	23.00	1000.0	1000.000	155.0	V	158.0
22043.206000	53.48	---	83.52	30.05	1000.0	1000.000	155.0	V	322.0
26078.743000	54.55	---	83.52	28.97	1000.0	1000.000	155.0	V	116.0
26097.560000	---	42.06	63.52	21.47	1000.0	1000.000	155.0	V	8.0
28154.955000	57.02	---	83.52	26.50	1000.0	1000.000	155.0	V	202.0
28155.244000	57.12	---	83.52	26.40	1000.0	1000.000	155.0	V	202.0
28183.978000	---	44.40	63.52	19.12	1000.0	1000.000	155.0	H	336.0
28190.801000	---	44.40	63.52	19.12	1000.0	1000.000	155.0	H	322.0
34089.103000	---	41.21	63.52	22.31	1000.0	1000.000	155.0	H	68.0
34432.725000	53.48	---	83.52	30.04	1000.0	1000.000	155.0	V	322.0
36941.128000	---	42.65	63.52	20.87	1000.0	1000.000	155.0	H	188.0
36993.668000	55.17	---	83.52	28.35	1000.0	1000.000	155.0	H	158.0

Mid Channel

Test mode condition	Bluetooth Low Energy, Mid channel (2440 MHz) QuasiPeak / Average & Peak	
Antenna orientation	Parallel to axis	
Sweep frequency	9 kHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Simon Palmhager	Date: 2021.03.16
Chamber details	Chamber: SAC 5	



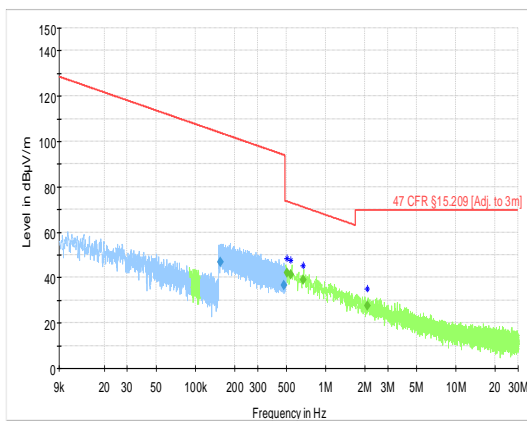
— Preview Result 2-PK+
+ Critical_Freqs PK+
— 47 CFR §15.209 (Adj. to 3m)
◆ Final_Result QPK
— Preview Result 1-AVG
+ Critical_Freqs AVG
◆ Final_Result AVG



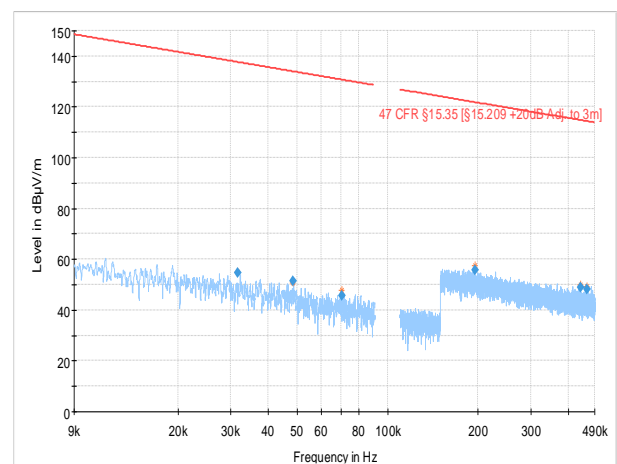
— Preview Result 1-PK+
— 47 CFR §15.35 (Adj. to 3m)
+ Critical_Freqs PK+
◆ Final_Result PK+

Frequency (MHz)	Average (dBuV/m)	QuasiPeak (dBuV/m)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.104782	---	36.61	---	107.20	70.59	1000.0	0.200	100.0	H	-26.0
0.133957	30.85	---	---	105.07	74.21	1000.0	0.200	100.0	H	229.0
0.150699	46.74	---	---	104.04	57.30	1000.0	9.000	100.0	H	154.0
0.159666	46.41	---	---	103.54	57.13	1000.0	9.000	100.0	H	45.0
0.183106	45.23	---	---	102.35	57.12	1000.0	9.000	100.0	H	294.0
0.202919	44.42	---	---	101.46	57.04	1000.0	9.000	100.0	H	-45.0
0.246406	42.50	---	---	99.77	57.27	1000.0	9.000	100.0	H	25.0
0.466469	36.91	---	---	94.23	57.32	1000.0	9.000	100.0	H	77.0
0.519252	---	41.81	---	73.30	31.49	1000.0	9.000	100.0	H	192.0
0.530991	---	41.60	---	73.10	31.50	1000.0	9.000	100.0	H	257.0
0.576799	---	40.67	---	72.38	31.72	1000.0	9.000	100.0	H	205.0
0.782139	---	37.80	---	69.74	31.94	1000.0	9.000	100.0	H	135.0
2.245048	---	26.97	---	69.54	42.58	1000.0	9.000	100.0	H	269.0
0.026798	---	---	56.16	139.04	82.88	1000.0	0.200	100.0	H	179.0
0.063223	---	---	47.19	131.59	84.39	1000.0	0.200	100.0	H	-41.0
0.152255	---	---	59.06	123.95	64.89	1000.0	9.000	100.0	H	293.0
0.211756	---	---	55.06	121.09	66.03	1000.0	9.000	100.0	H	63.0
0.224225	---	---	55.36	120.59	65.24	1000.0	9.000	100.0	H	135.0
0.355415	---	---	50.51	116.59	66.08	1000.0	9.000	100.0	H	268.0

Test mode condition	Bluetooth Low Energy, Mid channel (2440 MHz) QuasiPeak / Average & Peak	
Antenna orientation	Parallel to floor	
Sweep frequency	9 kHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	Niall Forrester	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Niall Forrester	Date: 2021.03.17
Chamber details	Chamber: SAC 5	



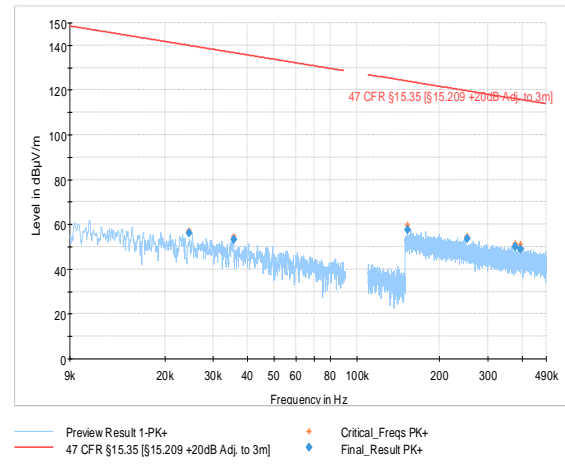
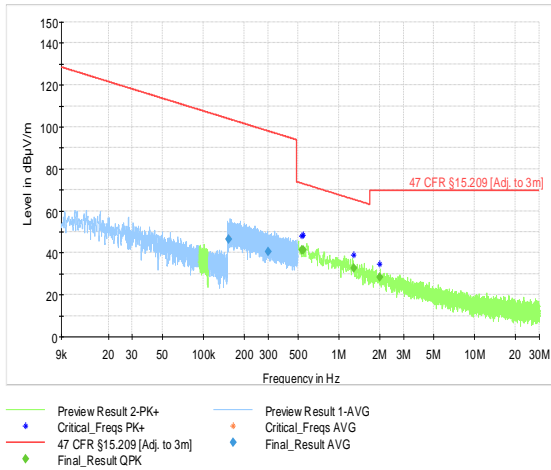
— Preview Result 2-PK+
— Preview Result 1-AVG
— 47 CFR §15.209 (Adj. to 3m)
◆ Final_Result QPK
◆ Critical_Freqs PK+
◆ Critical_Freqs AVG
◆ Final_Result AVG



— Preview Result 1-PK+
— 47 CFR §15.35 (Adj. to 3m)
◆ Critical_Freqs PK+
◆ Final_Result PK+

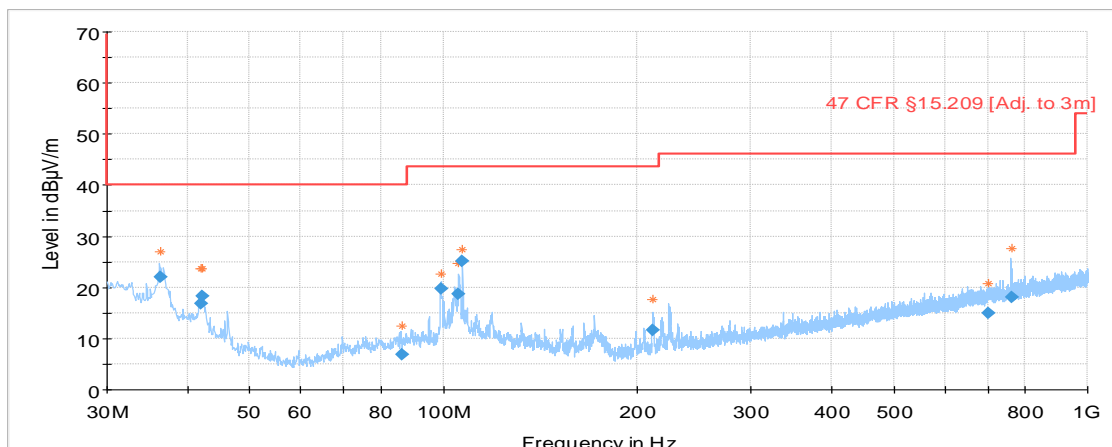
Frequency (MHz)	Average (dBuV/m)	QuasiPeak (dBuV/m)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.155081	46.66	---	---	103.79	57.14	1000.0	9.000	100.0	H	139.0
0.476382	36.58	---	---	94.05	57.47	1000.0	9.000	100.0	H	216.0
0.506765	---	42.06	---	73.51	31.45	1000.0	9.000	100.0	H	315.0
0.537293	---	41.41	---	73.00	31.59	1000.0	9.000	100.0	H	-26.0
0.676047	---	39.08	---	71.01	31.92	1000.0	9.000	100.0	H	66.0
2.093963	---	27.53	---	69.54	42.01	1000.0	9.000	100.0	H	101.0
0.031552	---	---	54.79	137.62	82.84	1000.0	0.200	100.0	H	139.0
0.048236	---	---	51.39	133.94	82.55	1000.0	0.200	100.0	H	225.0
0.070450	---	---	45.84	130.65	84.81	1000.0	0.200	100.0	H	-15.0
0.195756	---	---	55.80	121.77	65.97	1000.0	9.000	100.0	H	10.0
0.439614	---	---	49.05	114.74	65.69	1000.0	9.000	100.0	H	225.0
0.460769	---	---	48.21	114.34	66.13	1000.0	9.000	100.0	H	135.0

Test mode condition	Bluetooth Low Energy, Mid channel (2440 MHz) QuasiPeak / Average & Peak	
Antenna orientation	Perpendicular to axis	
Sweep frequency	9 kHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Sam Ebadeh	Date: 2021.03.17
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBuV/m)	QuasiPeak (dBuV/m)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.153702	46.64	---	---	103.87	57.23	1000.0	9.000	100.0	H	12.0
0.302738	40.43	---	---	97.98	57.55	1000.0	9.000	100.0	H	139.0
0.536886	---	41.48	---	73.01	31.52	1000.0	9.000	100.0	H	166.0
0.544497	---	41.44	---	72.88	31.45	1000.0	9.000	100.0	H	11.0
1.292340	---	32.49	---	65.38	32.89	1000.0	9.000	100.0	H	244.0
1.995055	---	28.16	---	69.54	41.39	1000.0	9.000	100.0	H	257.0
0.024533	---	---	56.12	139.81	83.69	1000.0	0.200	100.0	H	269.0
0.035571	---	---	53.31	136.58	83.27	1000.0	0.200	100.0	H	280.0
0.153108	---	---	57.54	123.90	66.37	1000.0	9.000	100.0	H	135.0
0.252063	---	---	53.74	119.57	65.83	1000.0	9.000	100.0	H	139.0
0.377026	---	---	50.14	116.08	65.93	1000.0	9.000	100.0	H	255.0
0.393693	---	---	49.05	115.70	66.65	1000.0	9.000	100.0	H	295.0

Test mode condition	Bluetooth Low Energy, Mid channel (2440 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	30 MHz – 1 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Sam Ebadeh	Date: 2021.03.16
Chamber details	Chamber: SAC 5	

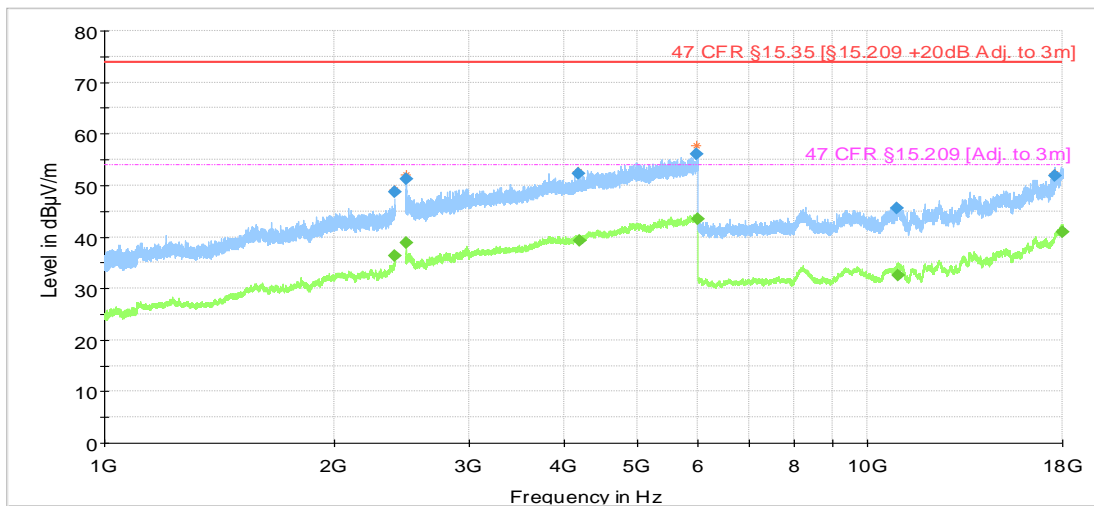


- Preview Result 2-AVG
- * Critical_Freqs AVG
- 47 CFR §15.209 [Adj. to 3m]
- ◆ Final_Result AVG
- Preview Result 1-PK+
- * Critical_Freqs PK+
- ◆ Final_Result QPK

Comment

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
36.391840	22.02	40.00	17.98	1000.0	120.000	100.0	V	279.0
42.060640	16.91	40.00	23.09	1000.0	120.000	100.0	V	296.0
42.237800	18.32	40.00	21.68	1000.0	120.000	100.0	V	292.0
86.005200	6.79	40.00	33.21	1000.0	120.000	304.0	V	22.0
99.078520	19.66	43.52	23.87	1000.0	120.000	100.0	V	248.0
105.373640	18.65	43.52	24.87	1000.0	120.000	100.0	V	40.0
107.010800	25.20	43.52	18.32	1000.0	120.000	100.0	V	158.0
211.458200	11.57	43.52	31.95	1000.0	120.000	100.0	V	162.0
702.760640	15.04	46.02	30.98	1000.0	120.000	233.0	H	199.0
761.389280	18.05	46.02	27.97	1000.0	120.000	183.0	V	338.0

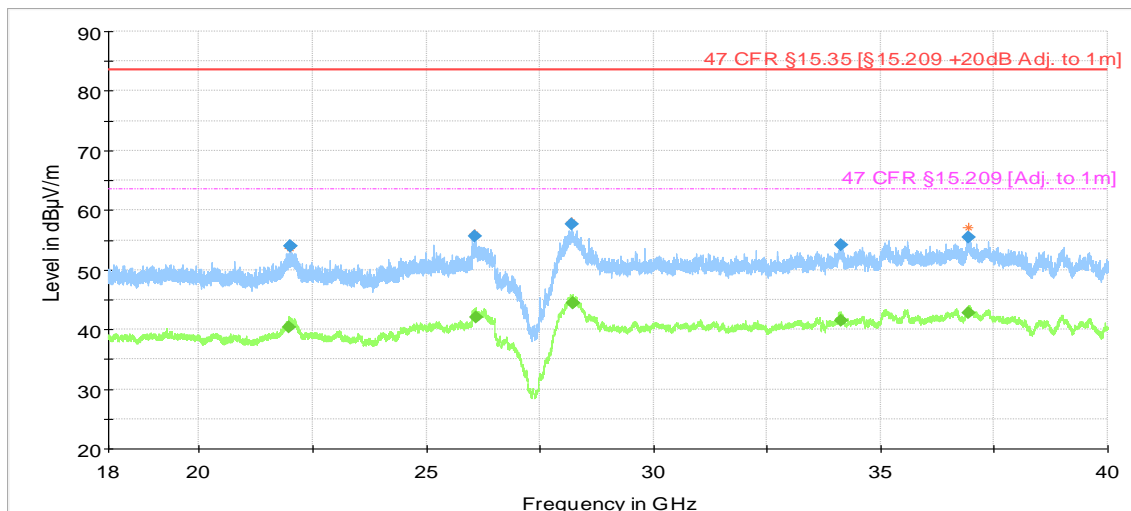
Test mode condition	Bluetooth Low Energy, Mid channel (2440 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Simon Palmhager	Date: 2021.03.15
Chamber details	Chamber: SAC 5	



- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs AVG
- * Critical_Freqs PK+
- 47 CFR §15.35 [§15.209 +20dB Adj. to 3m]
- 47 CFR §15.209 [Adj. to 3m]
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2399.774000	48.63	---	73.98	25.35	1000.0	1000.000	100.0	V	100.0
2399.969000	---	36.32	53.98	17.66	1000.0	1000.000	100.0	H	68.0
2483.558000	---	38.94	53.98	15.04	1000.0	1000.000	125.0	V	110.0
2483.835097	51.33	---	73.98	22.65	1000.0	1000.000	177.0	V	190.0
4181.957000	52.22	---	73.98	21.76	1000.0	1000.000	125.0	V	116.0
4187.835000	---	39.30	53.98	14.68	1000.0	1000.000	175.0	V	54.0
5974.655000	56.15	---	73.98	17.82	1000.0	1000.000	125.0	V	112.0
5982.855000	---	43.53	53.98	10.45	1000.0	1000.000	100.0	H	68.0
10920.898000	45.65	---	73.98	28.33	1000.0	1000.000	147.0	V	248.0
10966.684000	---	32.47	53.98	21.51	1000.0	1000.000	210.0	H	290.0
17591.672000	51.87	---	73.98	22.11	1000.0	1000.000	125.0	H	252.0
17992.964000	---	41.02	53.98	12.96	1000.0	1000.000	100.0	V	68.0

Test mode condition	Bluetooth Low Energy, Mid channel (2440 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Joel Efraimsson	Date: 2021.03.19
Chamber details	Chamber: SAC 5	

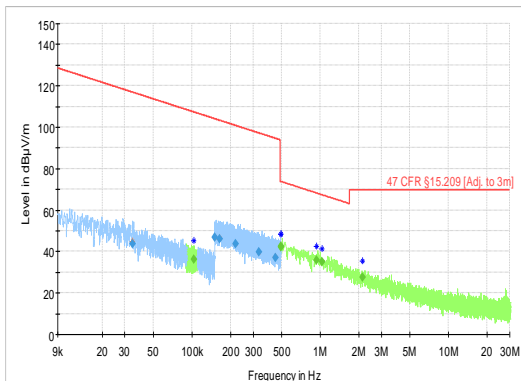


— Preview Result 2-AVG
— Preview Result 1-PK+
* Critical_Freqs AVG
* Critical_Freqs PK+
— 47 CFR §15.35 [§15.209 +20dB Adj. to 1m]
— 47 CFR §15.209 [Adj. to 1m]
◆ Final_Result PK+
◆ Final_Result AVG

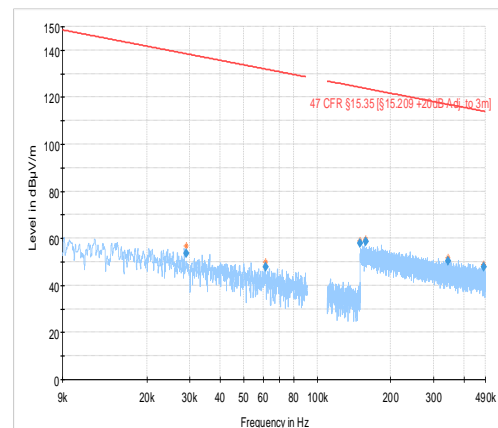
Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
21985.418000	---	40.48	63.52	23.04	1000.0	1000.000	155.0	V	68.0
21989.399000	53.93	---	83.52	29.59	1000.0	1000.000	155.0	V	132.0
21993.495000	54.01	---	83.52	29.51	1000.0	1000.000	155.0	V	132.0
26061.846000	55.56	---	83.52	27.96	1000.0	1000.000	155.0	H	202.0
26091.747000	---	42.01	63.52	21.51	1000.0	1000.000	155.0	V	128.0
28198.283000	57.72	---	83.52	25.80	1000.0	1000.000	155.0	V	248.0
28215.015000	---	44.36	63.52	19.16	1000.0	1000.000	155.0	V	22.0
28217.943000	---	44.35	63.52	19.17	1000.0	1000.000	155.0	V	22.0
34139.946000	54.09	---	83.52	29.43	1000.0	1000.000	155.0	H	186.0
34140.177000	---	41.43	63.52	22.09	1000.0	1000.000	155.0	V	68.0
36931.861000	55.49	---	83.52	28.03	1000.0	1000.000	155.0	H	206.0
36944.027000	---	42.70	63.52	20.82	1000.0	1000.000	155.0	H	42.0

High Channel

Test mode condition	Bluetooth Low Energy, High channel (2480 MHz) QuasiPeak / Average & Peak	
Antenna orientation	Parallel to axis	
Sweep frequency	9 kHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Simon Palmhager	Date: 2021.03.16
Chamber details	Chamber: SAC 5	



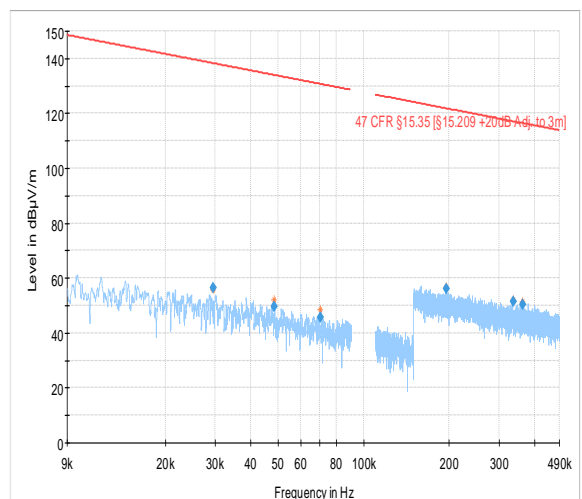
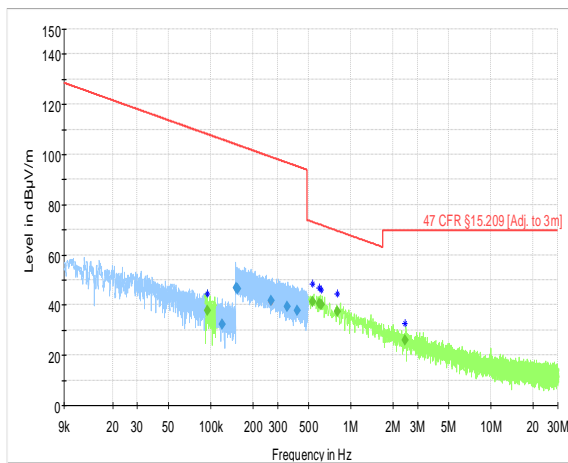
◆ Preview Result 2-PK+ — Preview Result 1-AVG
◆ Critical_Freqs PK+ + Critical_Freqs AVG
— 47 CFR §15.209 (Adj. to 3m) ◆ Final_Result AVG
◆ Final_Result QPK



— Preview Result 1-PK+ + Critical_Freqs PK+
— 47 CFR §15.35 (§15.209 +20dB Adj. to 3m) ◆ Final_Result PK+

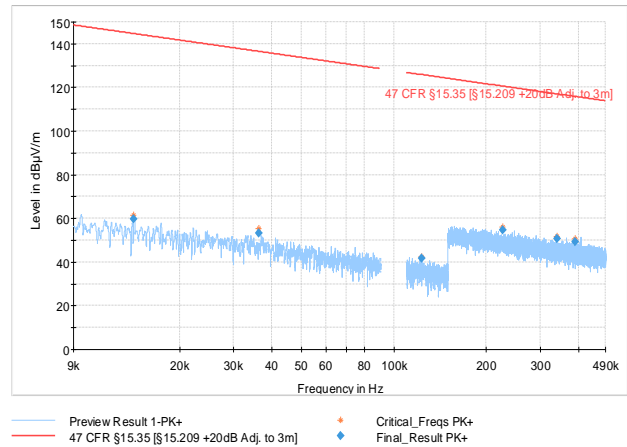
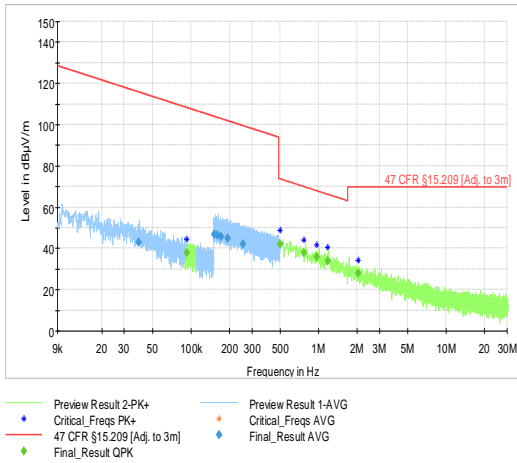
Frequency (MHz)	Average (dBuV/m)	QuasiPeak (dBuV/m)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.034321	43.83	---	---	116.89	73.06	1000.0	0.200	100.0	H	89.0
0.103677	---	36.31	---	107.29	70.99	1000.0	0.200	100.0	H	315.0
0.150613	46.81	---	---	104.05	57.24	1000.0	9.000	100.0	H	135.0
0.163726	46.25	---	---	103.32	57.07	1000.0	9.000	100.0	H	135.0
0.219109	43.58	---	---	100.79	57.21	1000.0	9.000	100.0	H	49.0
0.333945	39.69	---	---	97.13	57.44	1000.0	9.000	100.0	H	26.0
0.445972	37.16	---	---	94.62	57.46	1000.0	9.000	100.0	H	45.0
0.492117	---	42.25	---	73.76	31.51	1000.0	9.000	100.0	H	308.0
0.493693	---	42.33	---	73.74	31.40	1000.0	9.000	100.0	H	206.0
0.935025	---	35.93	---	68.19	32.25	1000.0	9.000	100.0	H	64.0
1.036442	---	35.11	---	67.29	32.19	1000.0	9.000	100.0	H	26.0
2.135331	---	27.42	---	69.54	42.12	1000.0	9.000	100.0	H	135.0
0.029026	---	---	53.66	138.35	84.68	1000.0	0.200	100.0	H	229.0
0.061308	---	---	47.74	131.85	84.11	1000.0	0.200	100.0	H	292.0
0.150092	---	---	57.87	124.08	66.21	1000.0	9.000	100.0	H	177.0
0.158253	---	---	58.48	123.62	65.14	1000.0	9.000	100.0	H	35.0
0.343353	---	---	50.42	116.89	66.47	1000.0	9.000	100.0	H	215.0
0.482931	---	---	47.72	113.93	66.20	1000.0	9.000	100.0	H	23.0

Test mode condition	Bluetooth Low Energy, High channel (2480 MHz) QuasiPeak / Average & Peak	
Antenna orientation	Parallel to floor	
Sweep frequency	9 kHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Simon Palmhager	Date: 2021.03.17
Chamber details	Chamber: SAC 5	



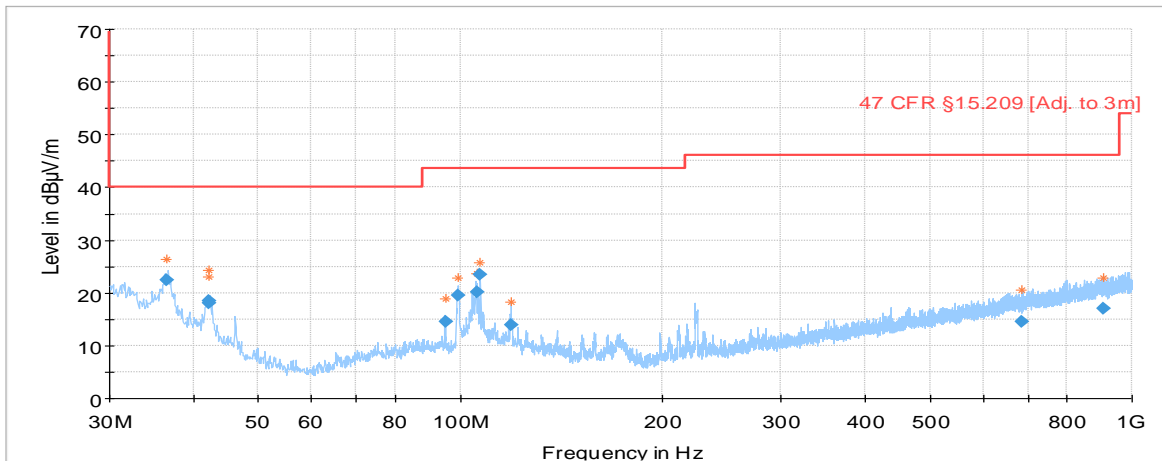
Frequency (MHz)	Average (dBuV/m)	QuasiPeak (dBuV/m)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.094416	---	37.68	---	108.10	70.43	1000.0	0.200	100.0	H	45.0
0.121159	32.43	---	---	105.94	73.51	1000.0	0.200	100.0	H	205.0
0.152517	46.76	---	---	103.94	57.18	1000.0	9.000	100.0	H	-1.0
0.156484	46.59	---	---	103.72	57.13	1000.0	9.000	100.0	H	179.0
0.270903	41.55	---	---	98.95	57.40	1000.0	9.000	100.0	H	244.0
0.353243	39.18	---	---	96.64	57.47	1000.0	9.000	100.0	H	25.0
0.412899	37.85	---	---	95.29	57.44	1000.0	9.000	100.0	H	229.0
0.532642	---	41.36	---	73.08	31.72	1000.0	9.000	100.0	H	49.0
0.594030	---	40.45	---	72.13	31.68	1000.0	9.000	100.0	H	-14.0
0.613534	---	40.03	---	71.85	31.82	1000.0	9.000	100.0	H	37.0
0.799957	---	37.28	---	69.54	32.27	1000.0	9.000	100.0	H	-1.0
2.452334	---	25.99	---	69.54	43.55	1000.0	9.000	100.0	H	-26.0
0.029440	---	---	56.34	138.23	81.88	1000.0	0.200	100.0	H	-45.0
0.048291	---	---	49.79	133.93	84.14	1000.0	0.200	100.0	H	135.0
0.070442	---	---	45.66	130.65	84.99	1000.0	0.200	100.0	H	34.0
0.195238	---	---	56.00	121.79	65.79	1000.0	9.000	100.0	H	9.0
0.336689	---	---	51.37	117.06	65.69	1000.0	9.000	100.0	H	75.0
0.363937	---	---	50.34	116.38	66.04	1000.0	9.000	100.0	H	165.0

Test mode condition	Bluetooth Low Energy, High channel (2480 MHz) QuasiPeak / Average & Peak	
Antenna orientation	Perpendicular to axis	
Sweep frequency	9 kHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Simon Palmhager	Date: 2021.03.16
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBuV/m)	QuasiPeak (dBuV/m)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.039020	42.99	---	---	115.78	72.79	1000.0	0.200	100.0	H	225.0
0.093059	---	37.70	---	108.23	70.53	1000.0	0.200	100.0	H	135.0
0.152933	46.77	---	---	103.91	57.15	1000.0	9.000	100.0	H	135.0
0.161722	46.31	---	---	103.43	57.11	1000.0	9.000	100.0	H	257.0
0.170991	45.80	---	---	102.95	57.15	1000.0	9.000	100.0	H	229.0
0.195068	44.74	---	---	101.80	57.06	1000.0	9.000	100.0	H	315.0
0.255624	42.16	---	---	99.45	57.29	1000.0	9.000	100.0	H	-45.0
0.500526	---	42.16	---	73.62	31.46	1000.0	9.000	100.0	H	45.0
0.764200	---	37.85	---	69.94	32.09	1000.0	9.000	100.0	H	167.0
0.971280	---	35.72	---	67.86	32.13	1000.0	9.000	100.0	H	38.0
1.175402	---	33.69	---	66.20	32.51	1000.0	9.000	100.0	H	166.0
2.040659	---	27.89	---	69.54	41.66	1000.0	9.000	100.0	H	281.0
0.014140	---	---	59.88	144.60	84.71	1000.0	0.200	100.0	H	203.0
0.036291	---	---	53.28	136.41	83.12	1000.0	0.200	100.0	H	178.0
0.122994	---	---	41.57	125.81	84.24	1000.0	0.200	100.0	H	135.0
0.225920	---	---	54.59	120.53	65.93	1000.0	9.000	100.0	H	203.0
0.339449	---	---	50.79	116.99	66.20	1000.0	9.000	100.0	H	63.0
0.389716	---	---	49.35	115.79	66.44	1000.0	9.000	100.0	H	135.0

Test mode condition	Bluetooth Low Energy, High channel (2480 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	30 MHz – 1 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Sam Ebadeh	Date: 2021.03.16
Chamber details	Chamber: SAC 5	

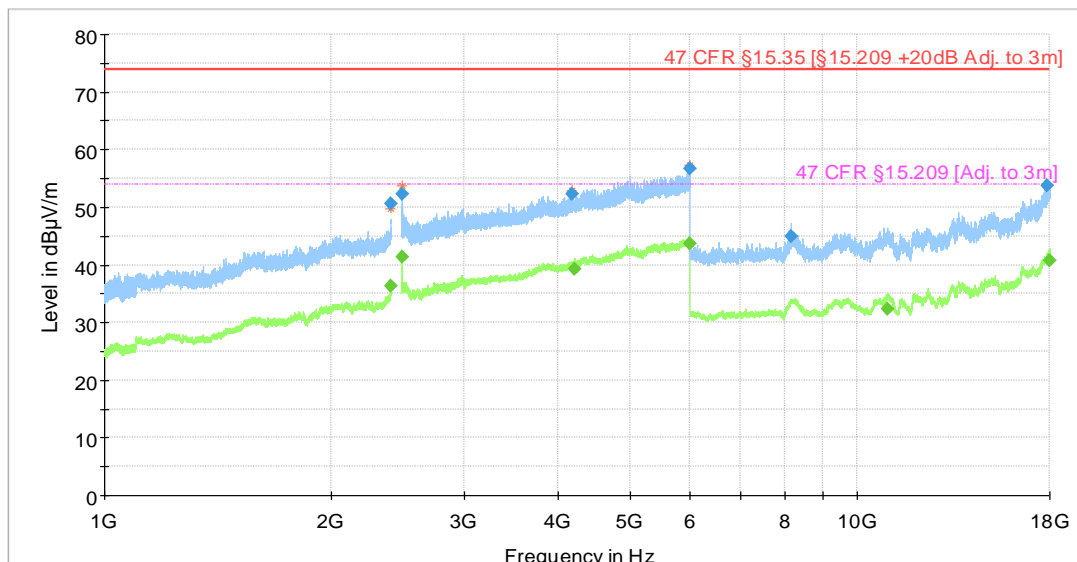


- Preview Result 2-AVG
- * Critical_Freqs AVG
- 47 CFR §15.209 [Adj. to 3m]
- ◆ Final_Result AVG
- Preview Result 1-PK+
- * Critical_Freqs PK+
- ◆ Final_Result QPK

Comment

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
36.559920	22.36	40.00	17.64	1000.0	120.000	100.0	V	202.0
42.117160	18.07	40.00	21.93	1000.0	120.000	125.0	V	292.0
42.119920	18.49	40.00	21.51	1000.0	120.000	100.0	V	322.0
94.905800	14.63	43.52	28.89	1000.0	120.000	125.0	V	112.0
99.061240	19.50	43.52	24.02	1000.0	120.000	108.0	V	176.0
105.647200	20.20	43.52	23.32	1000.0	120.000	108.0	V	278.0
107.025280	23.38	43.52	20.14	1000.0	120.000	125.0	V	158.0
118.887760	13.94	43.52	29.58	1000.0	120.000	125.0	V	112.0
686.016160	14.61	46.02	31.41	1000.0	120.000	233.0	V	130.0
905.070320	17.04	46.02	28.98	1000.0	120.000	204.0	H	248.0

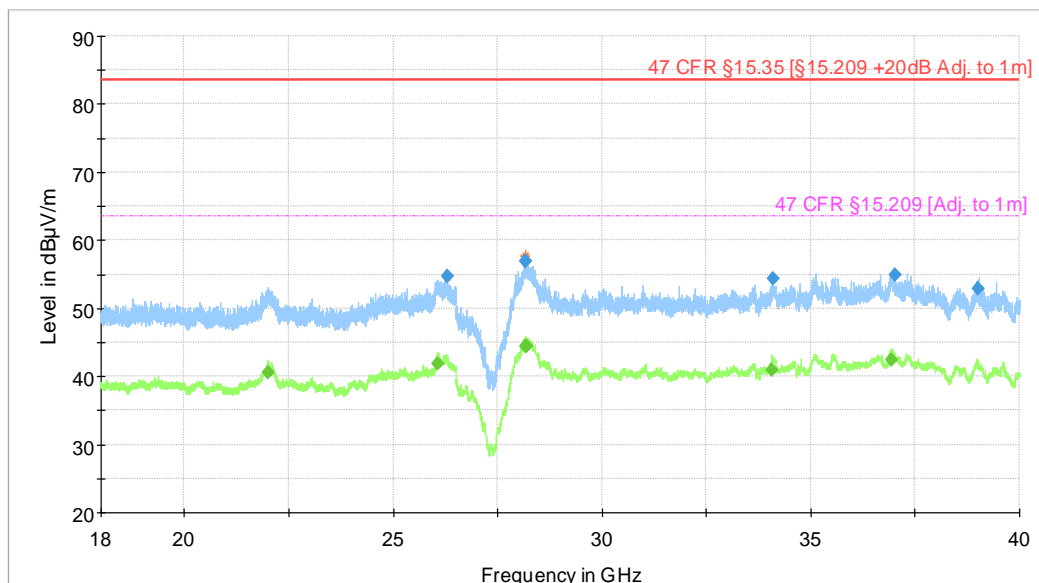
Test mode condition	Bluetooth Low Energy, High channel (2480 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Sam Ebadeh	Date: 2021.03.15
Chamber details	Chamber: SAC 5	



- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs AVG
- * Critical_Freqs PK+
- 47 CFR §15.35 [§15.209 +20dB Adj. to 3m]
- 47 CFR §15.209 [Adj. to 3m]
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2399.933500	---	36.33	53.98	17.65	1000.0	1000.000	187.0	V	202.0
2399.956341	50.67	---	73.98	23.31	1000.0	1000.000	199.0	V	245.0
2483.526033	---	41.29	53.98	12.69	1000.0	1000.000	177.0	H	292.0
2483.758618	52.21	---	73.98	21.77	1000.0	1000.000	125.0	H	296.0
4184.130000	52.23	---	73.98	21.75	1000.0	1000.000	158.0	H	10.0
4211.796000	---	39.35	53.98	14.63	1000.0	1000.000	112.0	H	245.0
5979.590000	---	43.70	53.98	10.28	1000.0	1000.000	102.0	V	20.0
5984.894000	56.74	---	73.98	17.24	1000.0	1000.000	175.0	H	338.0
8174.855000	44.99	---	73.98	28.99	1000.0	1000.000	175.0	H	154.0
10949.175000	---	32.41	53.98	21.57	1000.0	1000.000	125.0	H	-4.0
17859.748000	53.84	---	73.98	20.14	1000.0	1000.000	101.0	H	98.0
17984.542000	---	40.84	53.98	13.14	1000.0	1000.000	206.0	H	112.0
2399.933500	---	36.33	53.98	17.65	1000.0	1000.000	187.0	V	202.0

Test mode condition	Bluetooth Low Energy, High channel (2480 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Fariborz Abasi	Date: 2021.03.19
Chamber details	Chamber: SAC 5	



— Preview Result 2-AVG
* Critical_Freqs AVG
— 47 CFR §15.35 [§15.209 +20dB Adj. to 1m]
◆ Final_Result PK+

— Preview Result 1-PK+
* Critical_Freqs PK+
— 47 CFR §15.209 [Adj. to 1m]
◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
22000.203000	---	40.61	63.52	22.91	1000.0	1000.000	155.0	V	236.0
26054.147000	---	41.80	63.52	21.72	1000.0	1000.000	155.0	V	202.0
26304.937000	54.66	---	83.52	28.86	1000.0	1000.000	155.0	H	306.0
28165.464000	57.01	---	83.52	26.51	1000.0	1000.000	155.0	V	98.0
28168.202000	56.91	---	83.52	26.61	1000.0	1000.000	155.0	V	98.0
28178.036000	---	44.40	63.52	19.12	1000.0	1000.000	155.0	V	252.0
28183.833000	---	44.41	63.52	19.12	1000.0	1000.000	155.0	V	262.0
34078.029000	---	40.97	63.52	22.55	1000.0	1000.000	155.0	H	142.0
34087.332000	54.40	---	83.52	29.12	1000.0	1000.000	155.0	V	38.0
36927.170000	---	42.48	63.52	21.04	1000.0	1000.000	155.0	H	216.0
37020.779000	54.93	---	83.52	28.60	1000.0	1000.000	155.0	V	102.0
39017.888000	52.86	---	83.52	30.66	1000.0	1000.000	155.0	H	246.0

4.3 Test Results – Antenna Conducted Emissions

4.3.1 Antenna Conducted Emissions – Test Summary

Requirement not tested.

4.4 Test Results – Band Edge Compliance (Authorized Band)

4.4.1 Band Edge Compliance (Authorized Band) – Test Summary

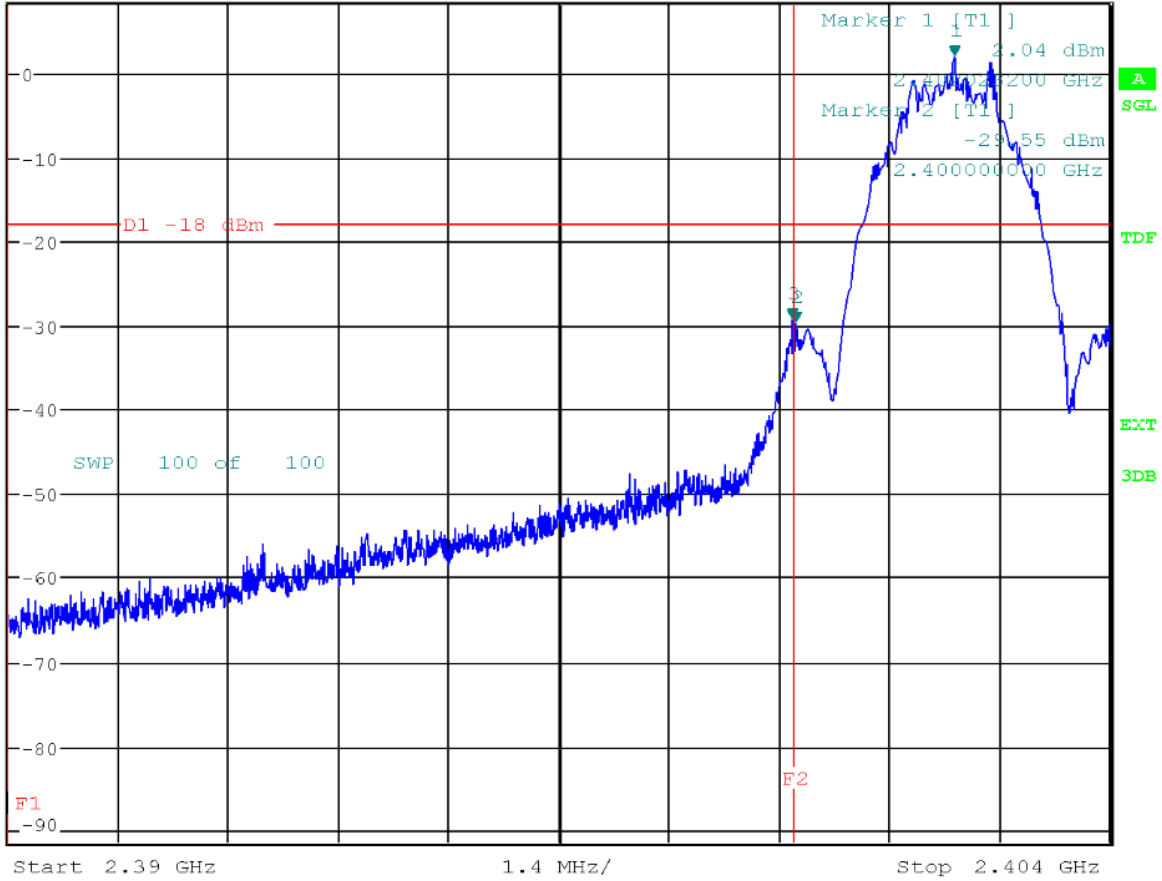
Test Specification	47 CFR 15.247 (d)			
Test Engineer & Date	Niall Forrester	2022.04.06		
EUT and Ancillary Equipment IDs	22-0015-001	22-0015-003		
EUT Operation Mode(s)	Signalling mode			
EUT Wireless Configuration(s)	Bluetooth LE			
EUT Hardware Configuration(s)	-			
Overall Result	PASS			
Test Parameter	Wireless Configuration	Measured Level (dBm)	High Limit (dBm)	Result
Emissions at Band Edge (Auth. Band – Low Edge)	2402 MHz BLE 1M - Peak	-51.04	-17.40	PASS
Emissions at Band Edge (Auth. Band – Low Edge)	2402 MHz BLE 1M – Average	-61.50	-24.36	PASS
Emissions at Band Edge (Auth. Band – Low Edge)	2402 MHz BLE 2M - Peak	-29.19	-17.96	PASS
Emissions at Band Edge (Auth. Band – Low Edge)	2402 MHz BLE 2M – Average	-40.72	-28.22	PASS
Emissions at Band Edge (Auth. Band – Low Edge)	2480 MHz BLE 1M - Peak	-55.78	-17.93	PASS
Emissions at Band Edge (Auth. Band – Low Edge)	2480 MHz BLE 1M – Average	-65.13	-25.01	PASS
Emissions at Band Edge (Auth. Band – High Edge)	2480 MHz BLE 2M - Peak	-47.32	-18.51	PASS
Emissions at Band Edge (Auth. Band – High Edge)	2480 MHz BLE 2M – Average	-58.95	-28.95	PASS

4.4.2 Band Edge Compliance (Authorized Band) – Test Details (Worst Case Plot – BLE 2M Low channel)



06.Apr 22 15:30
 Ref 8.5 dBm *Att 10 dB *RBW 100 kHz Marker 3 [T1] -29.19 dBm
 *VBW 300 kHz 2.399968000 GHz
 SWT 15 ms

1 PK
 MAXH



Date: 6.APR.2022 15:30:43

4.5 Test Results – Band Edge Compliance (Restricted Band)

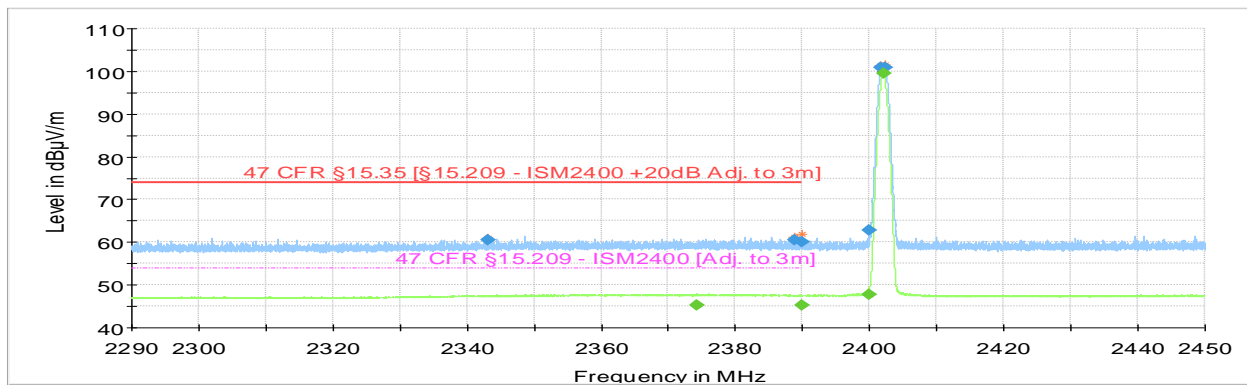
4.5.1 Band Edge Compliance (Restricted Band) – Test Summary

Test Specification	47 CFR 15.209 & 15.247 (d)	
Test Engineer & Date	Simon Palmhager	2021.03.16
EUT and Ancillary Equipment IDs	A003013241-001	A003017662-001 A003017662-003 A003017662-004
EUT Operation Mode(s)	Default	
EUT Wireless Configuration(s)	Continuous TX	
EUT Hardware Configuration(s)	N/A	
Overall Result	PASS	
Test Parameter	Wireless Configuration	Result*
Emissions at Band Edge (Rest. Band – Low Edge)	BLE – GFSK Low channel - 2402 MHz	PASS
Emissions at Band Edge (Rest. Band – High Edge)	BLE – GFSK High channel - 2480 MHz	PASS

* For detailed measurements, see tables and graphs in sections below

4.5.2 Band Edge Compliance (Restricted Band) – Test Details
Restricted Band – Low Edge

Test mode condition	BLE, Low channel (2402 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz Lower Band Edge	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Simon Palmhager	Date: 2021.03.16
Chamber details	Chamber: SAC 5	

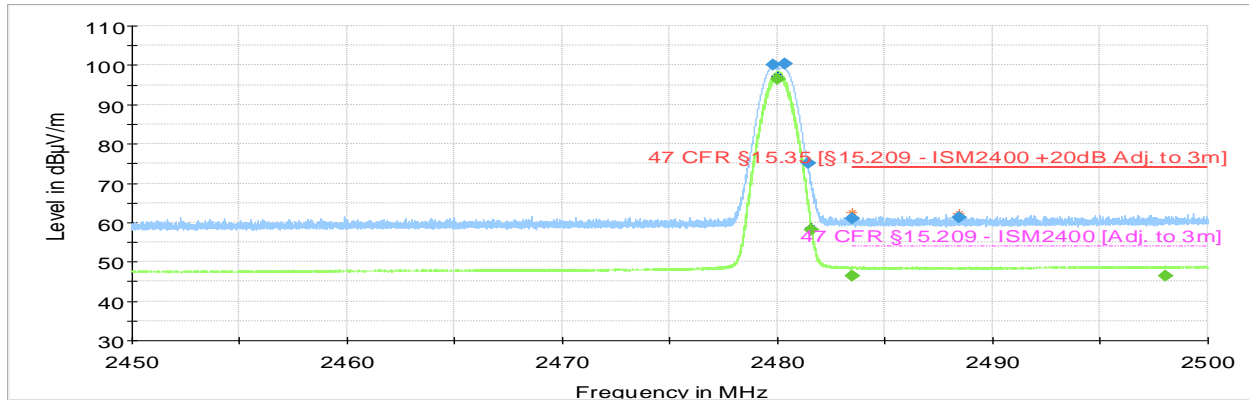


- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs AVG
- * Critical_Freqs PK+
- 47 CFR §15.35 [§15.209 - ISM2400 +20dB Adj. to 3m]
- 47 CFR §15.209 - ISM2400 [Adj. to 3m]
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2343.008000	60.55	---	73.98	13.43	1000.0	1000.000	203.0	H	165.0
2374.160000	---	45.22	53.98	8.76	1000.0	1000.000	203.0	H	327.0
2388.832000	60.61	---	73.98	13.37	1000.0	1000.000	210.0	H	227.0
2390.000000	---	45.13	53.98	8.85	1000.0	1000.000	145.0	H	351.0
2390.000000	59.98	---	73.98	14.00	1000.0	1000.000	101.0	H	301.0
2400.000000	62.77	---	---	---	1000.0	1000.000	101.0	H	340.0
2400.000000	---	47.65	---	---	1000.0	1000.000	134.0	H	340.0
2401.760000	100.89	---	---	---	1000.0	1000.000	134.0	H	342.0
2402.016000	---	99.60	---	---	1000.0	1000.000	133.0	H	338.0
2402.272000	100.79	---	---	---	1000.0	1000.000	133.0	H	344.0

Restricted Band – High Edge

Test mode condition	BLE, High channel (2480 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz Lower Band Edge	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003013241-001	
Ancillary Equipment	A003017662-001 A003017662-003 A003017662-004	
Test Engineer	Simon Palmhager	Date: 2021.03.16
Chamber details	Chamber: SAC 5	



- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs AVG
- * Critical_Freqs PK+
- 47 CFR §15.35 [§15.209 - ISM2400 +20dB Adj. to 3m]
- 47 CFR §15.209 - ISM2400 [Adj. to 3m]
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2479.765000	100.12	---	---	---	1000.0	1000.000	156.0	H	346.0
2480.020000	---	96.38	---	---	1000.0	1000.000	146.0	H	349.0
2480.315000	100.37	---	---	---	1000.0	1000.000	156.0	H	351.0
2481.415000	75.05	---	---	---	1000.0	1000.000	133.0	H	0.0
2481.535000	---	58.14	---	---	1000.0	1000.000	145.0	H	350.0
2483.500000	60.95	---	73.98	13.03	1000.0	1000.000	192.0	H	68.0
2483.500000	---	46.31	53.98	7.66	1000.0	1000.000	171.0	H	340.0
2488.450000	61.15	---	73.98	12.83	1000.0	1000.000	100.0	V	157.0
2498.005000	---	46.38	53.98	7.60	1000.0	1000.000	100.0	H	0.0

4.6 Test Results – 20dB Bandwidth

4.6.1 20dB Bandwidth – Test Summary

Requirement not performed.

4.7 Test Results – Carrier (Hopping Channel) Separation

4.7.1 Carrier (Hopping Channel) Separation – Test Summary

Requirement not performed as the device does not support FHSS.

4.8 Test Results – Number of Hopping Channels

4.8.1 Number of Hopping Channels – Test Summary

Requirement not performed as the device does not support FHSS.

4.9 Test Results – Time of Occupancy (Dwell Time)

4.9.1 Time of Occupancy (Dwell Time) – Test Summary

Requirement not performed as the device does not support FHSS.

4.10 Test Results – 6dB Bandwidth

4.10.1 6dB Bandwidth – Test Summary

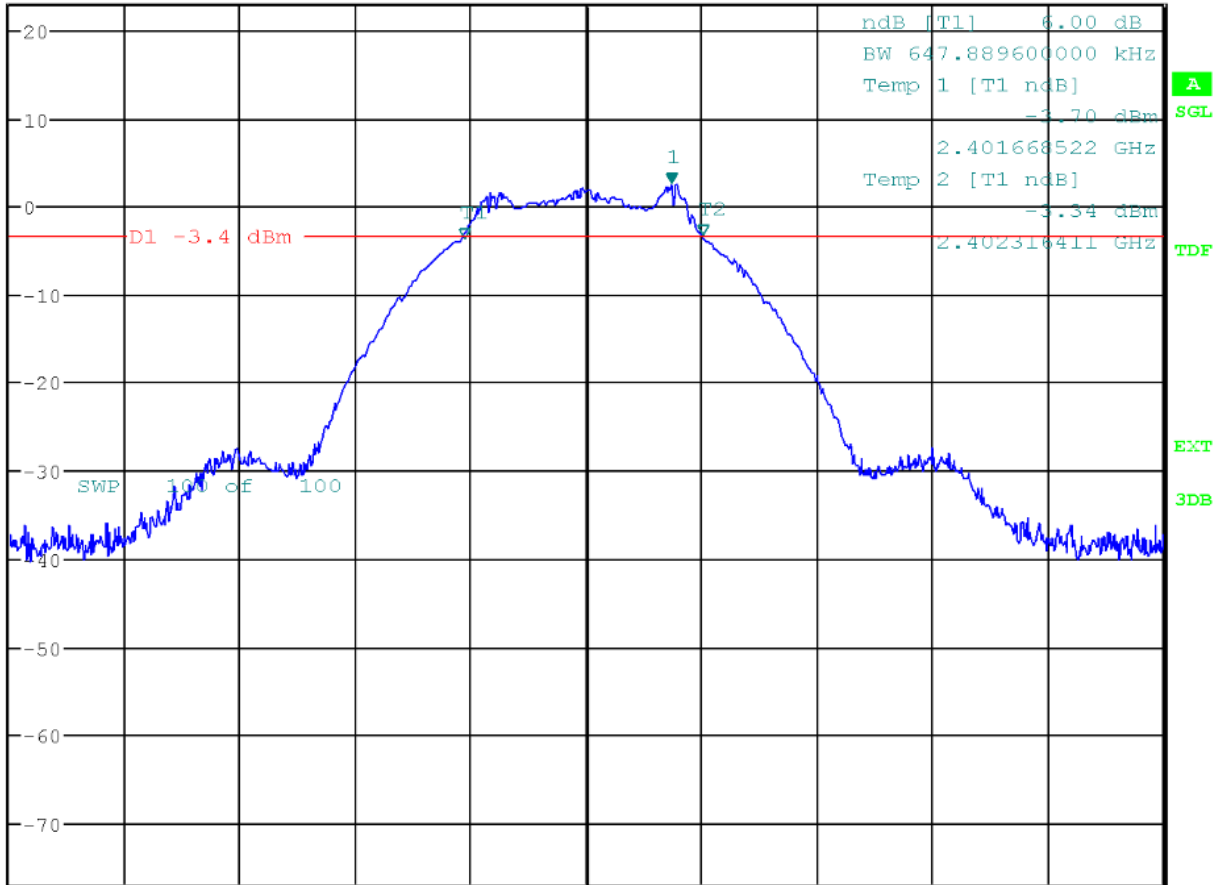
Test Specification	47 CFR 15.247 (a)(2)			
Test Engineer & Date	Sam Ebadeh	2022.02.08		
EUT and Ancillary Equipment IDs	22-0015-001	None		
EUT Operation Mode(s)	DTM			
EUT Wireless Configuration(s)	Bluetooth Low Energy (see below for details)			
EUT Hardware Configuration(s)	-			
Overall Result	PASS			
Test Parameter	Wireless Configuration	Measured Level (kHz)	Limit Min (kHz)	Result
6dB Bandwidth	Bluetooth Low Energy 1M Low Channel (GFSK 2402 MHz)	647.889	500	PASS
6dB Bandwidth	Bluetooth Low Energy 2M Low Channel (GFSK 2402 MHz)	979.326	500	PASS
6dB Bandwidth	Bluetooth Low Energy 1M Mid Channel (GFSK 2440 MHz)	651.456	500	PASS
6dB Bandwidth	Bluetooth Low Energy 2M Mid Channel (GFSK 2440 MHz)	829.122	500	PASS
6dB Bandwidth	Bluetooth Low Energy 1M High Channel (GFSK 2480 MHz)	652.912	500	PASS
6dB Bandwidth	Bluetooth Low Energy 2M High Channel (GFSK 2480 MHz)	839.051	500	PASS

4.10.2 6 dB Bandwidth – Test Details



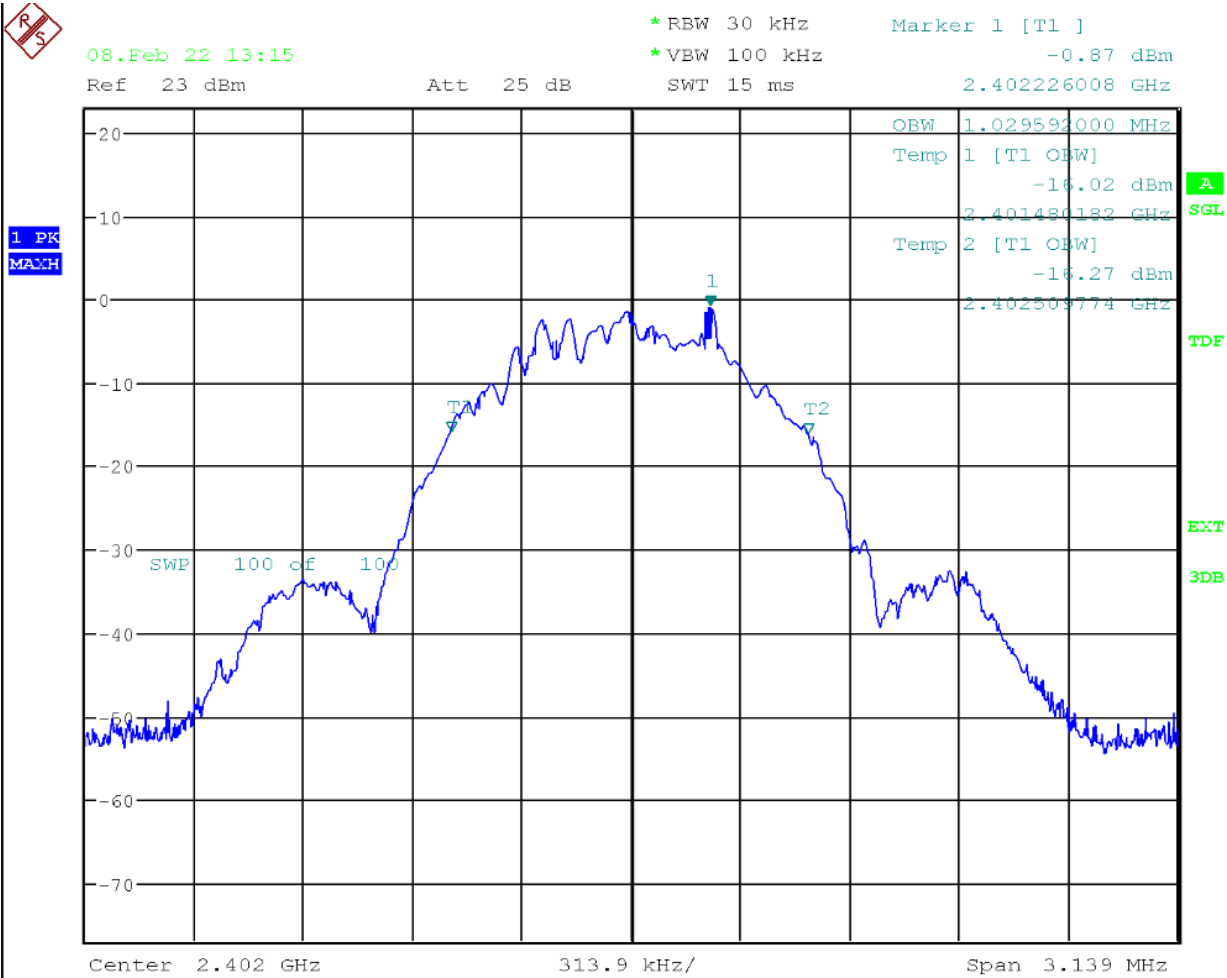
08.Feb 22 13:15
 Ref 23 dBm Att 45 dB SWT 10 ms
 * RBW 100 kHz Marker 1 [T1] 2.57 dBm
 * VBW 300 kHz 2.402231030 GHz

1 PK
 MAXH



Center 2.402 GHz 313.9 kHz/ Span 3.139 MHz

4.10.3 99% BW – Test Details (Worst Case Plot)



Date: 8.FEB.2022 13:15:44

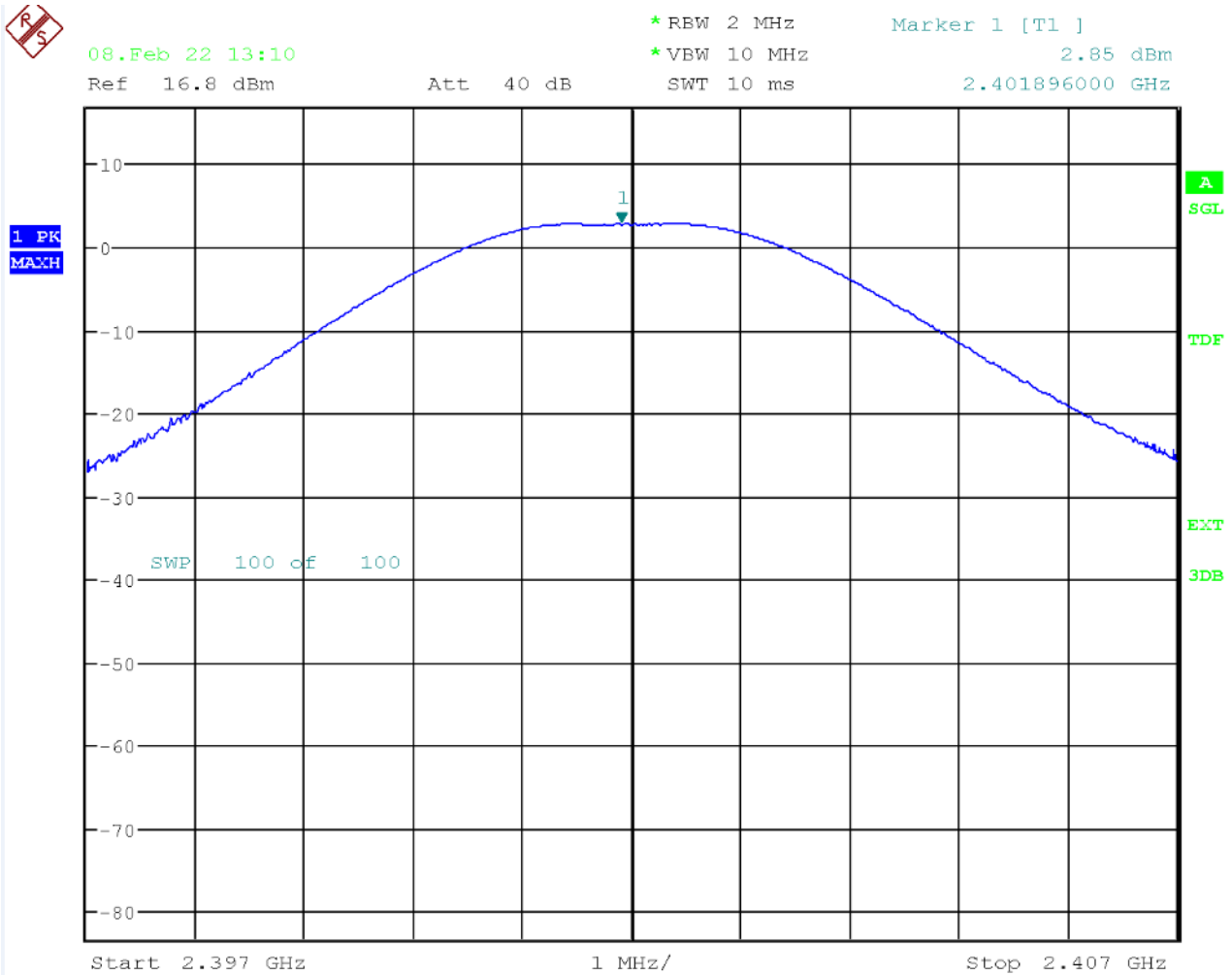
4.11 Test Results – Peak Conducted Output Power

4.11.1 Peak Conducted Output Power – Test Summary

Test Specification	47 CFR 15.247(b)	
Test Engineer & Date	Sam Ebadeh	2022.02.08
EUT and Ancillary Equipment IDs	22-0015-001	None
EUT Operation Mode(s)	DTM	
EUT Wireless Configuration(s)	Bluetooth Low Energy (see below for details)	
EUT Hardware Configuration(s)	-	
Overall Result	PASS	

Test Parameter	Wireless Configuration	Measured Level in Normal Test Conditions (dBm)	Limit (dBm)	Result
Peak Conducted Output Power	Bluetooth Low Energy 1M Low Channel (GFSK 2402 MHz)	2.846	30	PASS
Peak Conducted Output Power	Bluetooth Low Energy 2M Low Channel (GFSK 2402 MHz)	2.851	30	PASS
Peak Conducted Output Power	Bluetooth Low Energy 1M Mid Channel (GFSK 2440 MHz)	2.456	30	PASS
Peak Conducted Output Power	Bluetooth Low Energy 2M Mid Channel (GFSK 2440 MHz)	2.485	30	PASS
Peak Conducted Output Power	Bluetooth Low Energy 1M High Channel (GFSK 2480 MHz)	2.546	30	PASS
Peak Conducted Output Power	Bluetooth Low Energy 2M High Channel (GFSK 2480 MHz)	2.560	30	PASS

4.11.2 Peak Conducted Output Power – Test Details (Worst Case Plot)

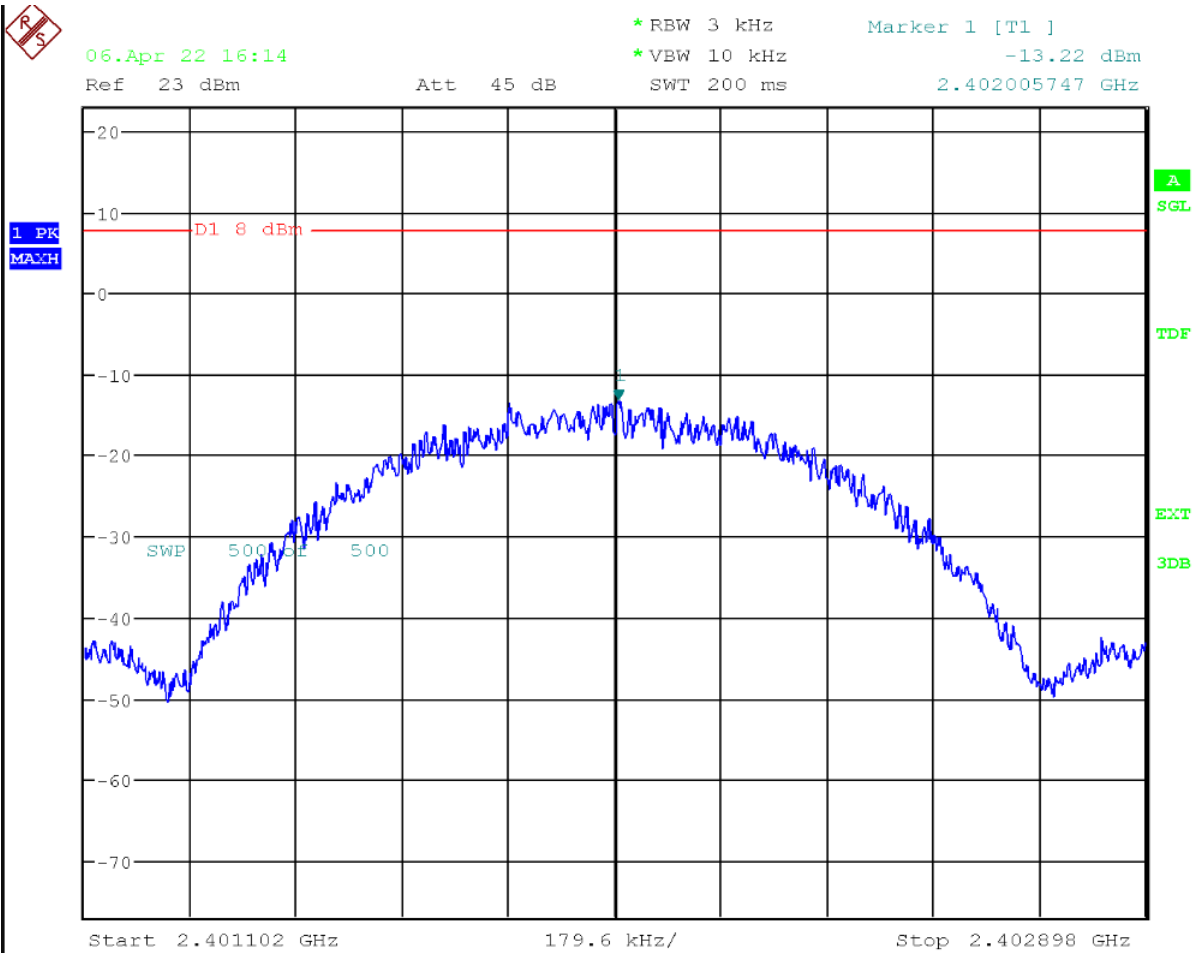


4.12 Test Results – Power Spectral Density

4.12.1 Power Spectral Density – Test Summary

Test Specification	15.247 (e)				
Test Engineer & Date	Niall Forrester		2022.04.06		
EUT and Ancillary Equipment IDs	22-0015-001		22-0015-003		
EUT Operation Mode(s)	Signalling mode				
EUT Wireless Configuration(s)	Bluetooth LE				
EUT Hardware Configuration(s)	-				
Overall Result	PASS				
Test Parameter	Wireless Configuration	Measured (dBm/3kHz)	Low Limit (dBm/3kHz)	High Limit (dBm/3kHz)	Result
Power Density	2402 MHz Bluetooth LE 1M	-13.22	-30.00	8.00	PASS
Power Density	2402 MHz Bluetooth LE 2M	-16.39	-30.00	8.00	PASS
Power Density	2440 MHz Bluetooth LE 1M	-13.73	-30.00	8.00	PASS
Power Density	2440 MHz Bluetooth LE 2M	-16.89	-30.00	8.00	PASS
Power Density	2480 MHz Bluetooth LE 1M	-13.64	-30.00	8.00	PASS
Power Density	2480 MHz Bluetooth LE 2M	-16.78	-30.00	8.00	PASS

4.12.2 Power Spectral Density – Test Summary (Worst case plot)



Date: 6.APR.2022 16:14:11

5. TEST EQUIPMENT STATUS

5.1 List of Hardware with Calibration Dates

5.1.1 Hardware List – Conducted Emissions System

Type	Manufacturer	Model	Serial Number / ID	Calibration Date	Calibration Due
Two-Line V-network	Rohde & Schwarz	ENV216	101090 2704076	2020.07.16	2021.07.16
Test Receiver 9KHz to 3.5 GHz	Rohde & Schwarz	ESR3	101674 2704016	2020.07.17	2021.07.17

5.1.2 Hardware List – SAC5 System

Type	Manufacturer	Model	Serial Number / ID	Calibration Date	Calibration Due
EMI Test Receiver	Rohde & Schwarz	ESW44	101760 2881044	2020.07.17	2021.07.17
Ultra Broadband Antenna	Rohde & Schwarz	HL562E	100988 2823181	2019.07.23	2021.07.23
Double Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF907	102678 2823164	2019.07.15	2021.07.15
Control Device	Maturo	NCD	NCD/393/2372.01	N/A	N/A
Open Switch & Control Unit	Rohde & Schwarz	OSP150	100081 2884198	2020.08.04	2021.08.04
Open Switch & Control Unit	Rohde & Schwarz	OSP120	100084 2761253	2020.08.04	2021.08.04
Shielded Filter Unit	Rohde & Schwarz	OSP-F Extension 1	101333 2761265	2020.08.04	2021.08.04
Shielded Filter Unit	Rohde & Schwarz	OSP-F Extension 2	101335 2761266	2020.08.04	2021.08.04
Shielded Filter Unit	Rohde & Schwarz	OSP-F Base Unit	101330 2761262	2020.08.04	2021.08.04
Humidity Temperature Probe	Lufft	OPUS 20	126.0118.0802.033 2771042	2020.07.31	2022.07.31

5.1.3 Hardware List – CTE System

Type	Manufacturer	Model	Serial Number / ID	Calibration Date	Calibration Due
Comprehensive Testing Environment	TÜV Rheinland LGA Products	HWE 6000	00139	N/A	N/A
Bluetooth Signaling Unit	Rohde & Schwarz	CMW500	163750 2711468	2021.07.13	2022.07.13
Spectrum Analyzer	Rohde & Schwarz	FSU26	100308 2704108	2021.07.20	2022.07.20
Vector Signal Generator	Rohde & Schwarz	SMU200A	101584 2704111	2021.07.14	2022.07.14
Power Supply	Keithley	2303	1198722 2717714	2021.07.14	2022.07.14
Multimeter	Keithley	2700	1035251 2704115	2021.07.08	2022.07.08
Average Power Sensor	Rohde & Schwarz	NRP-Z31	102145 2704104	2021.07.15	2022.07.15
Temperature Chamber	Vötsch	VT4002	58566081940010 2717693	N/A	N/A
Temp. & Humidity Logger	Lufft	Opus 20	113.0118.0802.033 2771025	2020.07.31	2022.07.31

5.2 Software / Firmware Versions

Equipment	Software / Firmware Name	Version
Conducted Emissions System	EMC 32	V10.60.10
SAC 5	EMC 32	V10.60.10
Comprehensive Testing Environment (CTE)	CTE – TMF CTE – BT	V48.0 V43.1

6. MEASUREMENT UNCERTAINTY

6.1 Measurement Uncertainty for CTE

Parameter	Uncertainty (Coverage Factor k=2)
Maximum Output Power (15.247b)	±0.51 dB
6dB / 20dB Channel Bandwidth & 99% Occupied bandwidth (15.247a)	<5%
Carrier Frequency Separation (15.247a)	N/A
Number of Hopping Channels (15.247a)	N/A
Time of Occupancy – Dwell Time (15.247a)	N/A
Band Edge Compliance of Conducted Emissions (15.247a)	±1.04 dB
Conducted Spurious Emissions (15.247d)	±2.98 dB
Power Spectral Density (15.247e)	±0.51 dB

6.2 Measurement Uncertainty for Conducted Emissions

Parameter	Uncertainty (Coverage Factor k=2)
Conducted emissions with LISN 150KHz to 30 MHz	2.98 dB

6.3 Measurement Uncertainty for SAC 5 (Radiated Emissions & Band Edge)

Parameter	Uncertainty (Coverage Factor k=2)
Field Strength 10 Hz -9 kHz	3.38 dB
Field Strength 9 kHz -30 MHz	3.38 dB
Field Strength 30 MHz -1000 MHz	3.38 dB
Field Strength 1 GHz -18 GHz	4.88 dB
Field Strength 18 GHz - 40 GHz	5.14 dB

7. PHOTOGRAPHS

7.1 Photographs of the EUT

For photographs see appendix.