


MEASUREMENT REPORT

FCC PART 15.247 / ZigBee 802.15.4

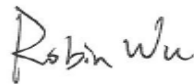
FCC ID: DD4ADX5D
Applicant: Shure Incorporated
Application Type: Certification
Product: Portable Wireless Receiver
Model No.: ADX5D A, ADX5D B, ADX5D C
Brand Name: 
FCC Classification: Digital Transmission System (DTS)
FCC Rule Part(s): Part15 Subpart C (Section 15.247)
Test Procedure(s): ANSI C63.10-2013
Test Date: January 26 ~ March 12, 2021

Reviewed By:



Jame Yuan

Approved By:



Robin Wu



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2101RSU056-U1	Rev. 01	Initial Report	03-12-2021	Valid

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1. General Information

1.1. Applicant

Shure Incorporated

5800 West Touhy Avenue, Niles, IL 60714-4608, USA

1.2. Manufacturer

Shure Incorporated

5800 West Touhy Avenue, Niles, IL 60714-4608, USA

1.3. Testing Facility

<input checked="" type="checkbox"/>	Test Site – MRT Suzhou Laboratory
	Laboratory Location (Suzhou – Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
	Laboratory Location (Suzhou – SIP) 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China
	Laboratory Accreditations
	A2LA: 3628.01 CNAS: L10551 FCC: CN1166 ISED: CN0001 VCCI: R-20025, G-20034, C-20020, T-20020
<input type="checkbox"/>	Test Site – MRT Shenzhen Laboratory
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China
	Laboratory Accreditations
	A2LA: 3628.02 CNAS: L10551 FCC: CN1284 ISED: CN0105
<input type="checkbox"/>	Test Site – MRT Taiwan Laboratory
	Laboratory Location (Taiwan) No. 38, Fuxing 2 nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
	Laboratory Accreditations
	TAF: L3261-190725 FCC: 291082, TW3261 ISED: TW3261

2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Portable Wireless Receiver
Model No.	ADX5D A, ADX5D B, ADX5D C
Zigbee Specification	802.15.4
Microphone Specification	Receiver only
Serial No.	2TJ29640061
Operating Temperature	-18 ~ 50 °C
Power Type	AC/DC Adapter
Operating Environment	Indoor Use

Note: We selected model ADX5D C to perform final testing.

2.2. Radio Specification

Frequency Range	2405 ~ 2480 MHz
Channel Number	16
Type of modulation	O-QPSK
Data Rate	250kbps
Channel Spacing	5MHz

2.3. Antenna Details

Antenna Type	Frequency Band (GHz)	Model No.	Max Peak Gain (dBi)
Omni Antenna (External)	2.4	ANT-24G-S18-SMAM	0.0
Chip Antenna (Internal)	2.4	2450AT42E010B	-2.0

Note: Antenna type and antenna gain are provided by the manufacturer.

2.4. Working Frequencies

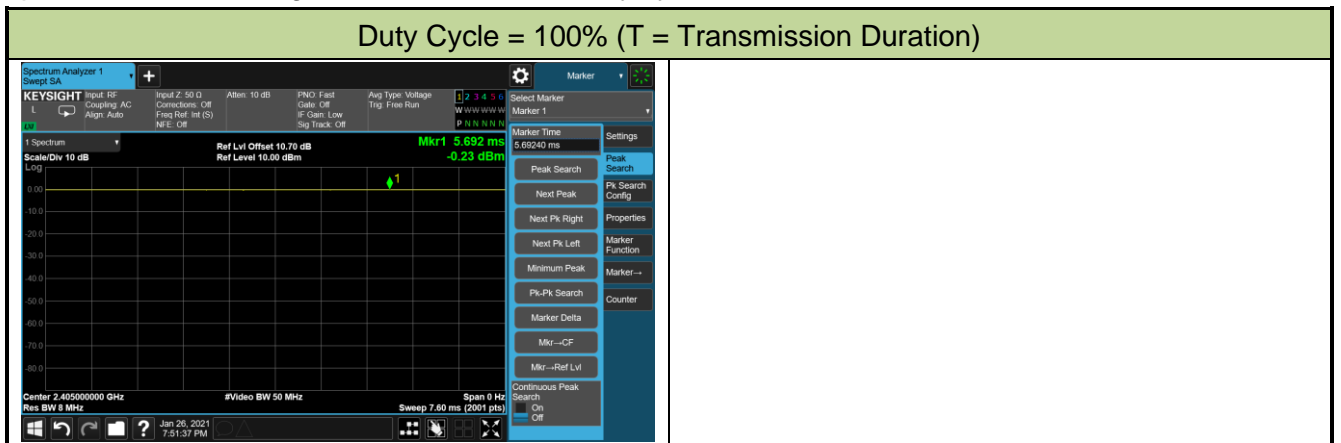
Channel	Frequency	Channel	Frequency	Channel	Frequency
11	2405 MHz	12	2410 MHz	13	2415 MHz
14	2420 MHz	15	2425 MHz	16	2430 MHz
17	2435 MHz	18	2440 MHz	19	2445 MHz
20	2450 MHz	21	2455 MHz	22	2460 MHz
23	2465 MHz	24	2470 MHz	25	2475 MHz
26	2480 MHz	--	--	--	--

2.5. Test Mode

Test Mode	Mode 1: Transmit by 802.15.4
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2.6. Duty Cycle

The maximum achievable duty cycles were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

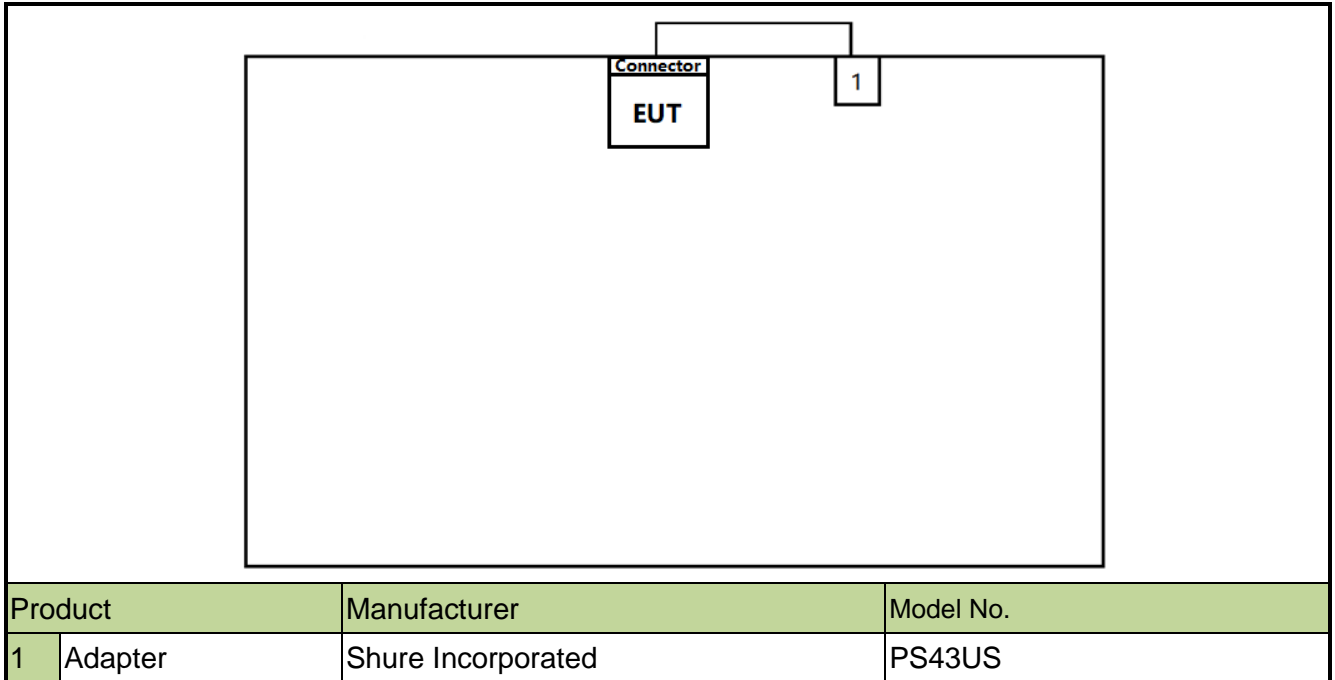


2.7. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.8. Test Configuration and Software

The device was tested per the guidance ANSI C63.10-2013 that was used to reference the appropriate EUT setup for radiated spurious emissions and AC line conducted emission testing.



Note 1: The test utility software used during testing was “Tera Term”, and the version was 4.101.

2.9. Test Environment Condition

Ambient Temperature	15 ~ 35 °C
Relative Humidity	20 ~75 %RH

3. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

Conclusion:

The product is defined as the professional installation of equipment by the manufacturer, there is no necessary to comply with the requirement of §15.203.

4. TEST EQUIPMENT CALIBRATION DATE

Conducted Emission (WZ-SR2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2022/01/12
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2021/09/09
Thermal Hygrometer	testo	608-H1	MRTSUE06404	1 year	2021/07/26
Shielding Room	MIX-BEP	Chamber-SR2	MRTSUE06215	N/A	N/A

Conducted Emission (SIP-SR2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2021/07/02
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2021/09/09
Thermal Hygrometer	testo	608-H1	MRTSUE06621	1 year	2021/12/03

Radiated Emission (WZ-AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2022/01/04
PXA Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2021/08/30
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2021/08/08
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2021/09/27
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2021/12/14
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2021/11/14
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Thermal Hygrometer	testo	608-H1	MRTSUE06403	1 year	2021/07/26
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2021/04/30

Radiated Emission (WZ-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
MXE EMI Receiver	Keysight	N9038A	MRTSUE06125	1 year	2021/07/02
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2021/05/26
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2021/10/25
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2021/12/14
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2021/11/14
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Thermal Hygrometer	Minggao	ETH529	MRTSUE06170	1 year	2021/12/08
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2021/04/30

Radiated Emission (SIP-AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2021/07/02
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2021/07/23
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06645	1 year	2021/08/30
Double Ridged Horn Antenna	R&S	HF907	MRTSUE06610	1 year	2021/08/30
Preamplifier	EMCI	EMC051845SE	MRTSUE06600	1 year	2021/11/12
Thermal Hygrometer	testo	608-H1	MRTSUE06620	1 year	2021/12/03
Anechoic Chamber	RIKEN	SIP-AC1	MRTSUE06554	1 year	2021/12/24

Radiated Emission (SIP-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2021/07/02
MXA Signal Analyzer	Keysight	N9020B	MRTSUE06604	1 year	2021/09/26
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06646	1 year	2021/08/30
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06648	1 year	2021/11/26
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06599	1 year	2021/11/26
Preamplifier	EMCI	EMC051845SE	MRTSUE06644	1 year	2021/11/12
Preamplifier	EMCI	EMC184045SE	MRTSUE06602	1 year	2021/10/13
Thermal Hygrometer	testo	608-H1	MRTSUE06624	1 year	2021/12/03
Anechoic Chamber	RIKEN	SIP-AC2	MRTSUE06781	1 year	2021/12/24

Radiated Emission (SIP-AC3)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2021/07/02
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2021/07/23
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06647	1 year	2021/08/08
Double Ridged Horn Antenna	R&S	HF907	MRTSUE06611	1 year	2021/09/13
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06598	1 year	2021/11/26
Preamplifier	EMCI	EMC012645SE	MRTSUE06642	1 year	2022/01/14
Preamplifier	EMCI	EMC184045SE	MRTSUE06641	1 year	2022/01/14
Thermal Hygrometer	testo	608-H1	MRTSUE06622	1 year	2021/12/03
Anechoic Chamber	RIKEN	SIP-AC3	MRTSUE06782	1 year	2021/12/24

Conducted Test Equipment (WZ-TR3)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2021/04/14
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2022/01/07
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2021/10/22
USB wideband power sensor	Keysight	U2021XA	MRTSUE06446	1 year	2021/08/30
USB wideband power sensor	Keysight	U2021XA	MRTSUE06447	1 year	2021/08/08
Bluetooth Test Set	Anritsu	MT8852B-042	MRTSUE06389	1 year	2021/06/11
Audio Analyzer	Agilent	U8903B	MRTSUE06143	1 year	2021/06/11
Modulation Analyzer	HP	HP8901A	MRTSUE06098	1 year	2021/09/26
Attenuator	MVE	20dB	MRTSUE06547	1 year	2021/05/20
Attenuator	MVE	6dB	MRTSUE06532	1 year	2021/05/20
Attenuator	MVE	10dB	MRTSUE06540	1 year	2021/05/20
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2021/10/20
DC Power Supply	GWINSTEK	DPS-3303C	MRTSUE06064	N/A	N/A
Temperature & Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2021/10/22
Thermal Hygrometer	testo	608-H1	MRTSUE06401	1 year	2021/07/26

Conducted Test Equipment (SIP-SR5)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
PXA Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2021/08/30
USB wideband power sensor	Agilent	U2021XA	MRTSUE06595	1 year	2021/09/26
USB wideband power sensor	Agilent	U2021XA	MRTSUE06596	1 year	2021/09/26
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2021/10/20
Attenuator	MVE	20dB	MRTSUE06547	1 year	2021/05/20
Attenuator	MVE	6dB	MRTSUE06532	1 year	2021/05/20
Attenuator	MVE	10dB	MRTSUE06540	1 year	2021/05/20
Bluetooth Test Set	Anritsu	MT8852B-042	MRTSUE06389	1 year	2021/06/11
Temperature Chamber	BAOYT	BYG-408CS	MRTSUE06847	1 year	2022/02/23
Thermal Hygrometer	testo	622	MRTSUE06629	1 year	2021/11/25

Software	Version	Function
EMI Software	e3	EMI Test Software

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): Horizontal: 9kHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 9kHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 1.13dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 1.15dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 0.28%

6. TEST RESULT

6.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	6dB Bandwidth	$\geq 500\text{kHz}$	Conducted	Pass	Section 6.2
15.247(b)(3)	Output Power	$\leq 1\text{Watt}$		Pass	Section 6.3
15.247(e)	Power Spectral Density	$\leq 8\text{dBm} / 3\text{kHz}$		Pass	Section 6.4
15.247(d)	Band Edge / Out-of-Band Emissions	$\geq 20\text{dBc (Peak)}$		Pass	Section 6.5
15.205 15.209	General Field Strength (Restricted Bands and Radiated Emission)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 6.6 Section 6.7
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits >	Line Conducted	Pass	Section 6.8

Notes:

- 1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 2) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.
- 3) We selected external antenna port to perform all RF conducted testing due to its power is higher than internal antenna port.

6.2. 6dB Bandwidth Measurement

6.2.1. Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

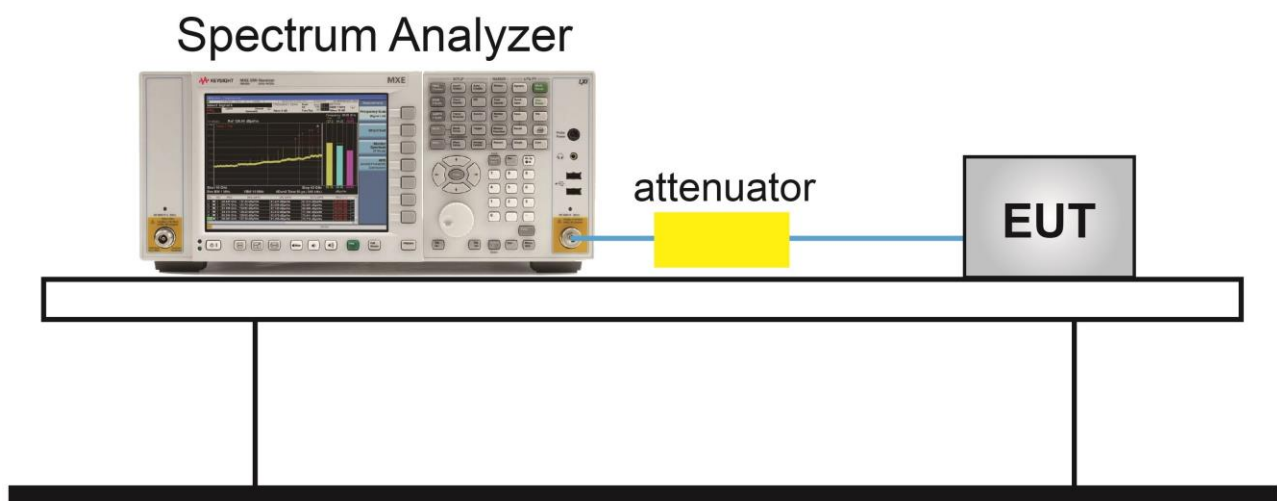
6.2.2. Test Procedure used

ANSI C63.10-2013 - Section 11.8

6.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 6$. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep = Auto couple
7. Allow the trace to stabilize

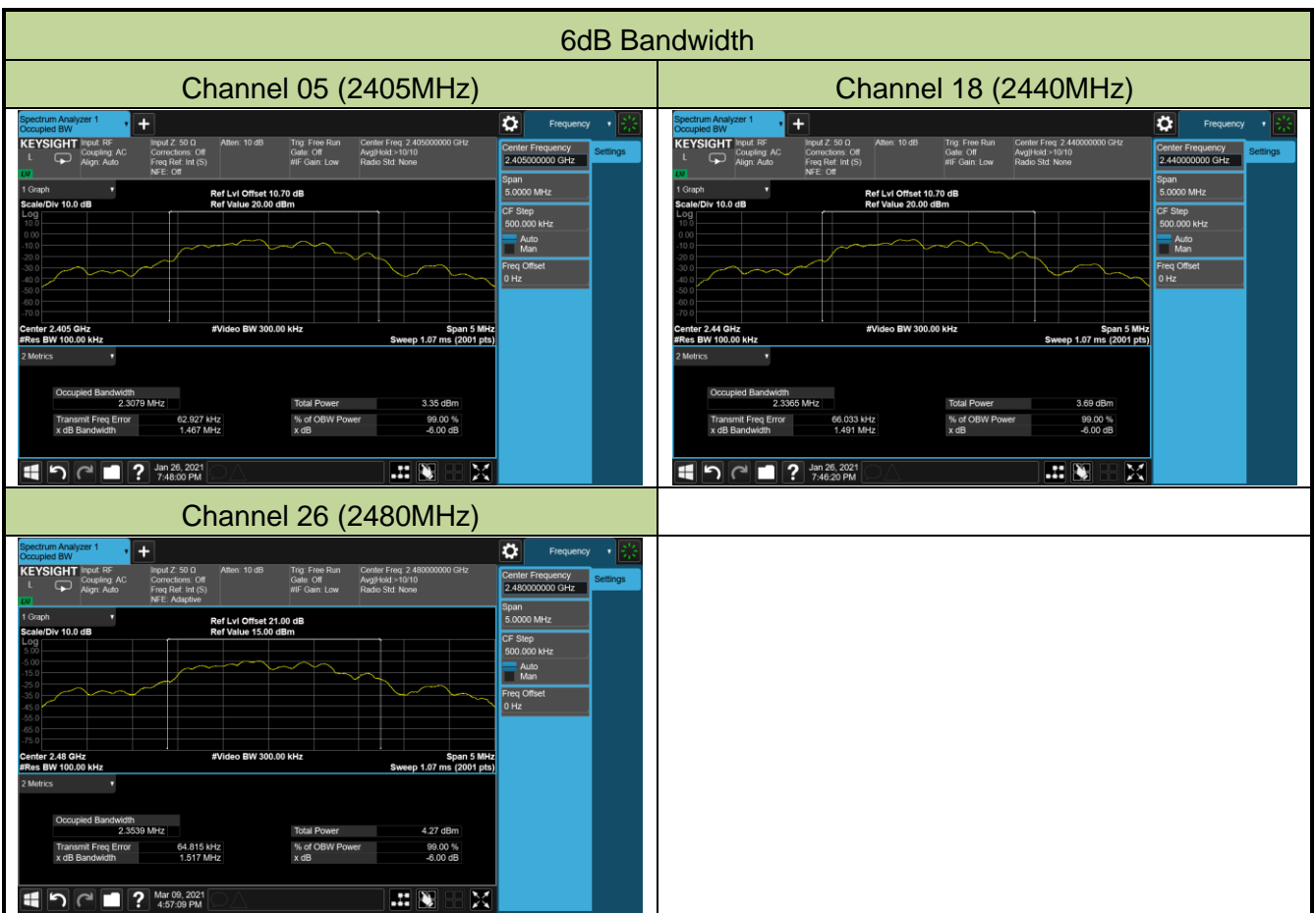
6.2.4. Test Setup



6.2.5. Test Result

Test Site	WZ-TR3	Test Engineer	Yuri Li
Test Date	2021/01/26 ~ 2021/03/09		
Remark	External Antenna Port		

Test Mode	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Zigbee	05	2405	1.467	≥ 0.5	Pass
Zigbee	18	2440	1.491	≥ 0.5	Pass
Zigbee	26	2480	1.517	≥ 0.5	Pass



6.3. Output Power Measurement

6.3.1. Test Limit

The maximum output power shall be less 1 Watt (30dBm).

6.3.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.9.1.3

ANSI C63.10-2013 - Section 11.9.2.3.2

6.3.3. Test Setting

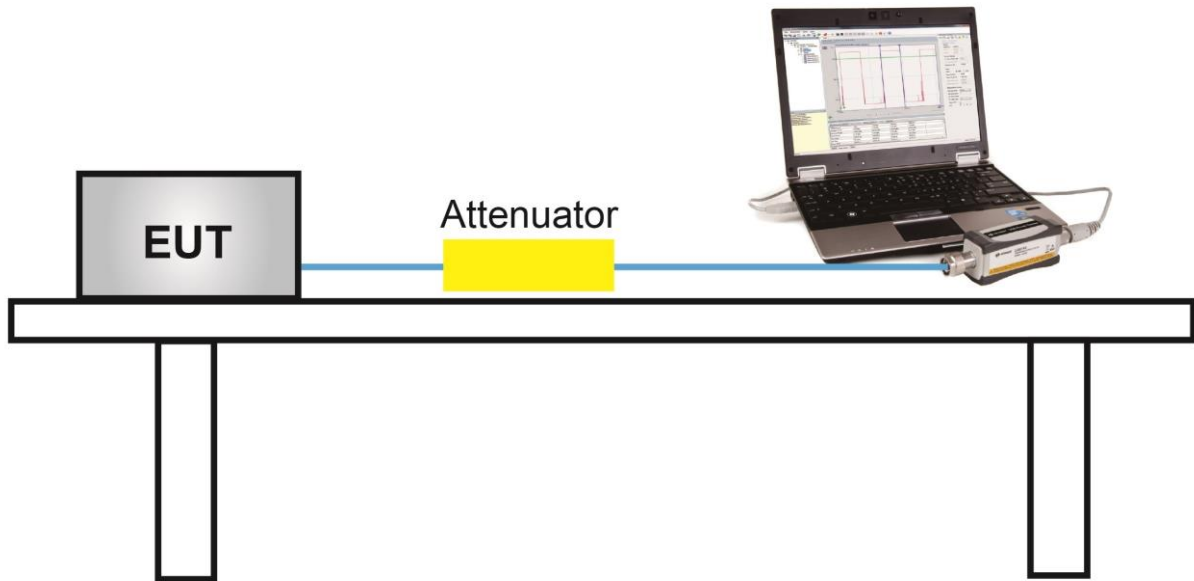
Method PKPM1 (Peak Power Measurement)

Peak power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The pulse sensor employs a VBW = 50MHz so this method was only used for signals whose DTS bandwidth was less than or equal to 50MHz.

Method AVGPM-G (Measurement using a gated RF average-reading power meter)

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

6.3.4. Test Setup



6.3.5. Test Result of Output Power

Test Site	WZ-TR3	Test Engineer	Yuri Li
Test Date	2021/01/26 ~ 2021/03/09		
Remark	External Antenna Port		

Test Result of Peak Output Power

Test Mode	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
802.15.4	05	2405	-0.09	≤ 30.00	Pass
802.15.4	18	2440	0.32	≤ 30.00	Pass
802.15.4	26	2480	1.11	≤ 30.00	Pass

Test Result of Average Output Power (Reporting Only)

Test Mode	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
802.15.4	05	2405	-0.23	≤ 30.00	Pass
802.15.4	18	2440	0.18	≤ 30.00	Pass
802.15.4	26	2480	1.05	≤ 30.00	Pass

Test Site	WZ-TR3	Test Engineer	Yuri Li
Test Date	2021/01/26 ~ 2021/03/09		
Remark	Internal Antenna Port		

Test Result of Peak Output Power

Test Mode	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
802.15.4	05	2405	-5.42	≤ 30.00	Pass
802.15.4	18	2440	-5.82	≤ 30.00	Pass
802.15.4	26	2480	-4.92	≤ 30.00	Pass

Test Result of Average Output Power (Reporting Only)

Test Mode	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
802.15.4	05	2405	-5.53	≤ 30.00	Pass
802.15.4	18	2440	-5.95	≤ 30.00	Pass
802.15.4	26	2480	-5.07	≤ 30.00	Pass

6.4. Power Spectral Density Measurement

6.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

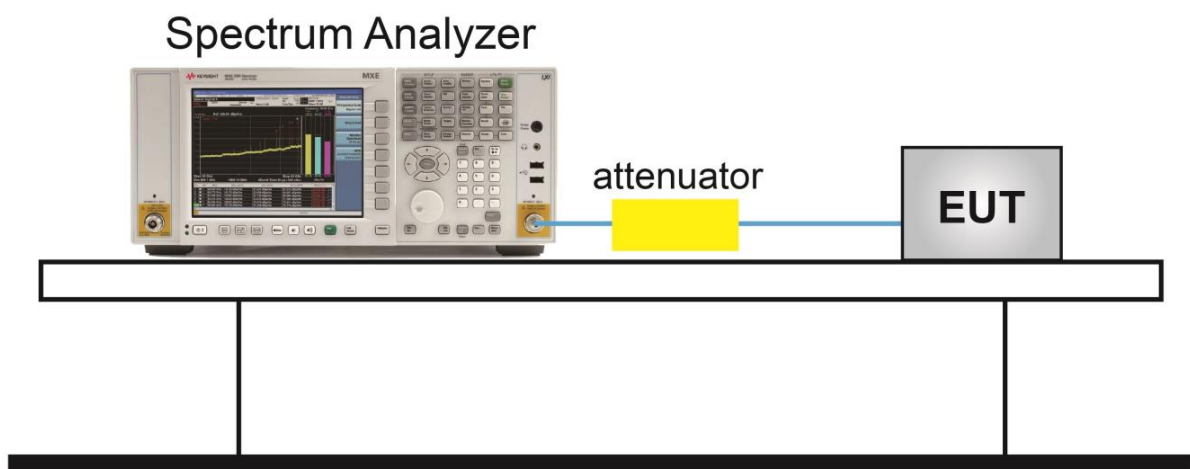
6.4.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.10.2

6.4.3. Test Setting

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the OBW
3. RBW = 3kHz
4. VBW = 10kHz
5. Detector = Peak
6. Sweep time = Auto couple
7. Trace mode = Max hold
8. Trace was allowed to stabilize

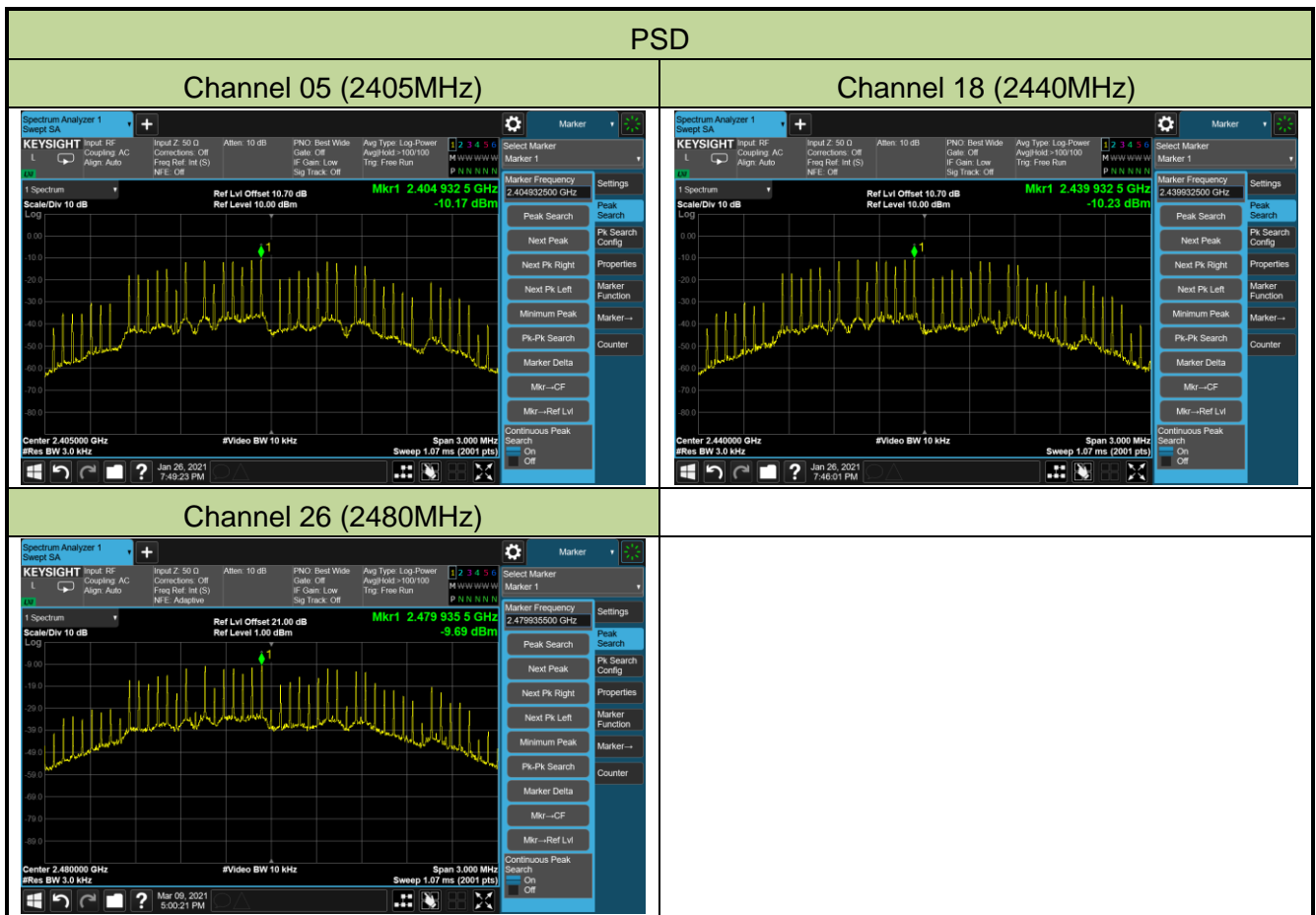
6.4.4. Test Setup



6.4.5. Test Result

Test Site	WZ-TR3	Test Engineer	Yuri Li
Test Date	2021/01/26 ~ 2021/03/09		
Remark	External Antenna Port		

Test Mode	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
802.15.4	05	2405	-10.17	≤ 8.00	Pass
802.15.4	18	2440	-10.23	≤ 8.00	Pass
802.15.4	26	2480	-9.69	≤ 8.00	Pass



6.5. Conducted Band Edge and Out-of-Band Emissions

6.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the PSD procedure.

6.5.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.11

6.5.3. Test Setting

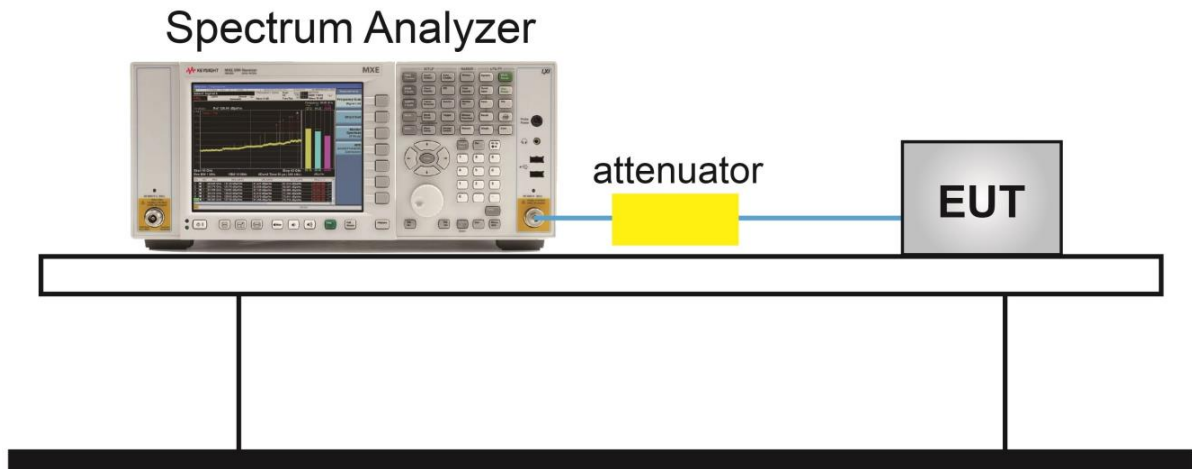
Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW $\geq 3 \times$ RBW
5. Detector = Peak
6. Sweep time = Auto couple
7. Trace mode = Max hold
8. Allow trace to fully stabilize

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep time = Auto couple
7. The trace was allowed to stabilize

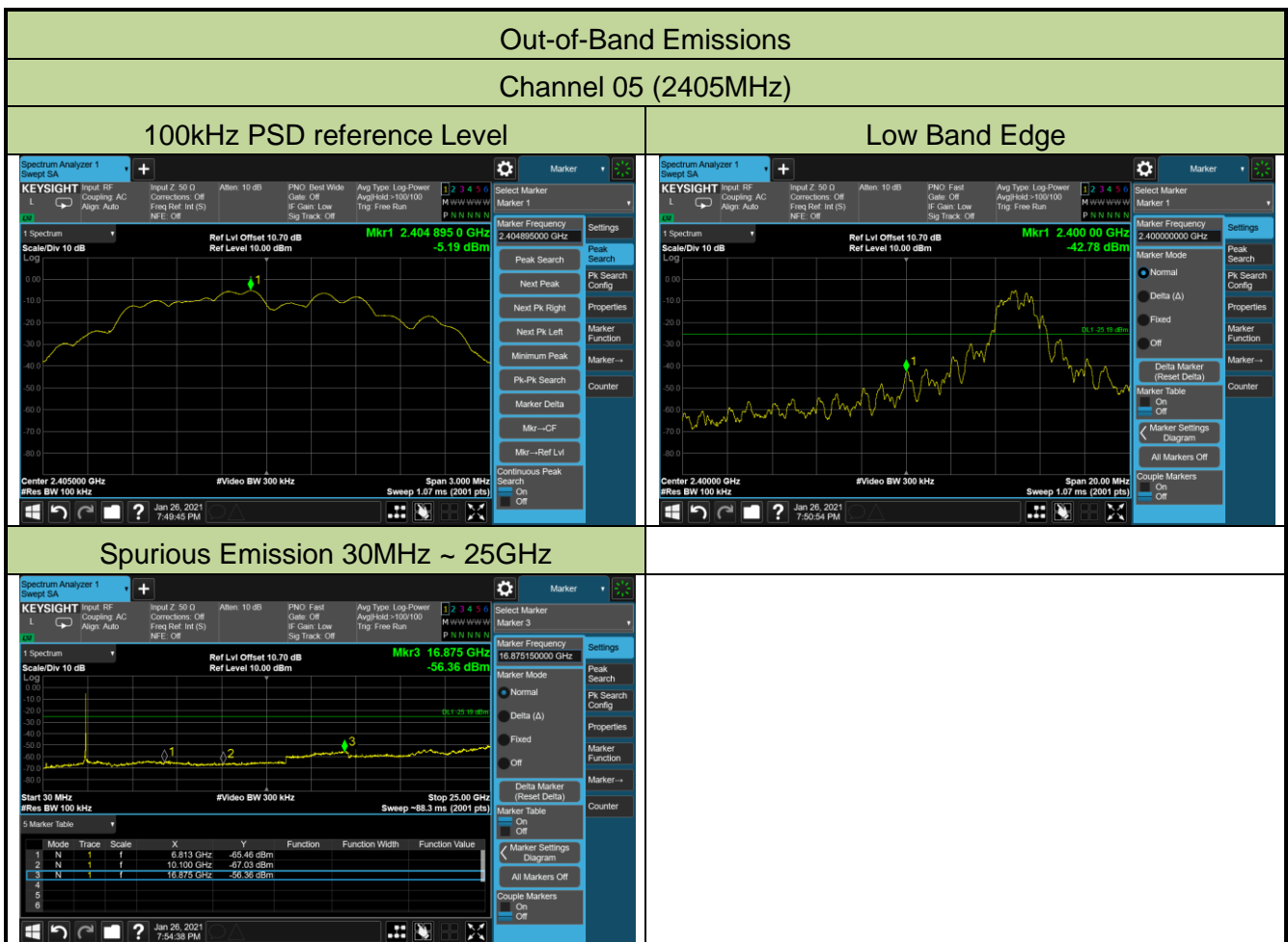
6.5.4. Test Setup



6.5.5. Test Result

Test Site	WZ-TR3	Test Engineer	Yuri Li
Test Date	2021/01/26 ~ 2021/03/09		
Remark	External Antenna Port		

Test Mode	Channel No.	Frequency (MHz)	Limit	Result
802.15.4	05	2405	20dBc	Pass
802.15.4	18	2440	20dBc	Pass
802.15.4	26	2480	20dBc	Pass



Channel 18 (2440MHz)

100kHz PSD reference Level



Spurious Emission 30MHz ~ 25GHz



Channel 26 (2480MHz)

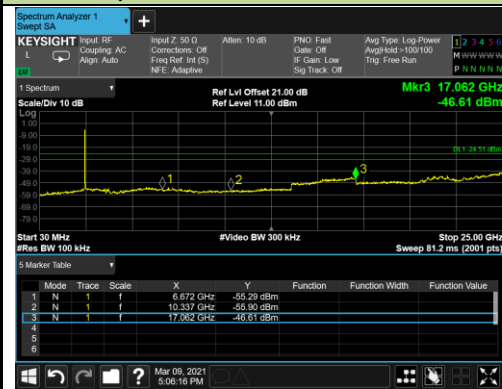
100kHz PSD reference Level



High Band Edge



Spurious Emission 30MHz ~ 25GHz



6.6. Radiated Spurious Emission Measurement

6.6.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$)	Measured Distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.6.2. Test Procedure Used

ANSI C63.10-2013 - Section 6.3 & 6.4 & 6.5 & 6.6

6.6.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Peak Measurements above 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

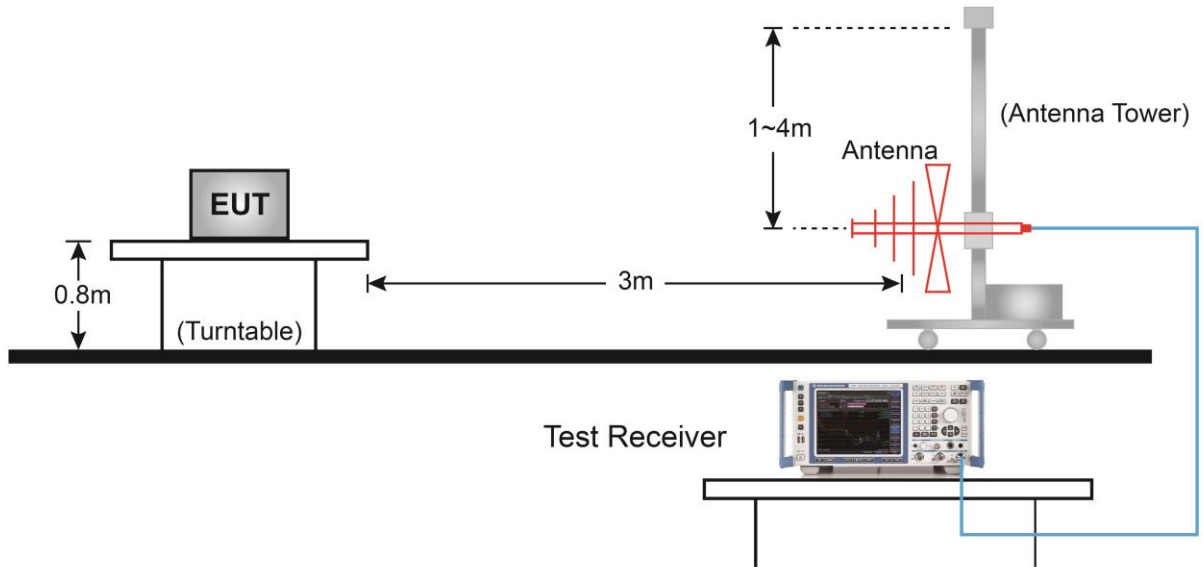
Average Measurement Level = Peak Measurement Level - 20 * Log(Duty Cycle) = -44.58

Duty Cycle = 0.59%

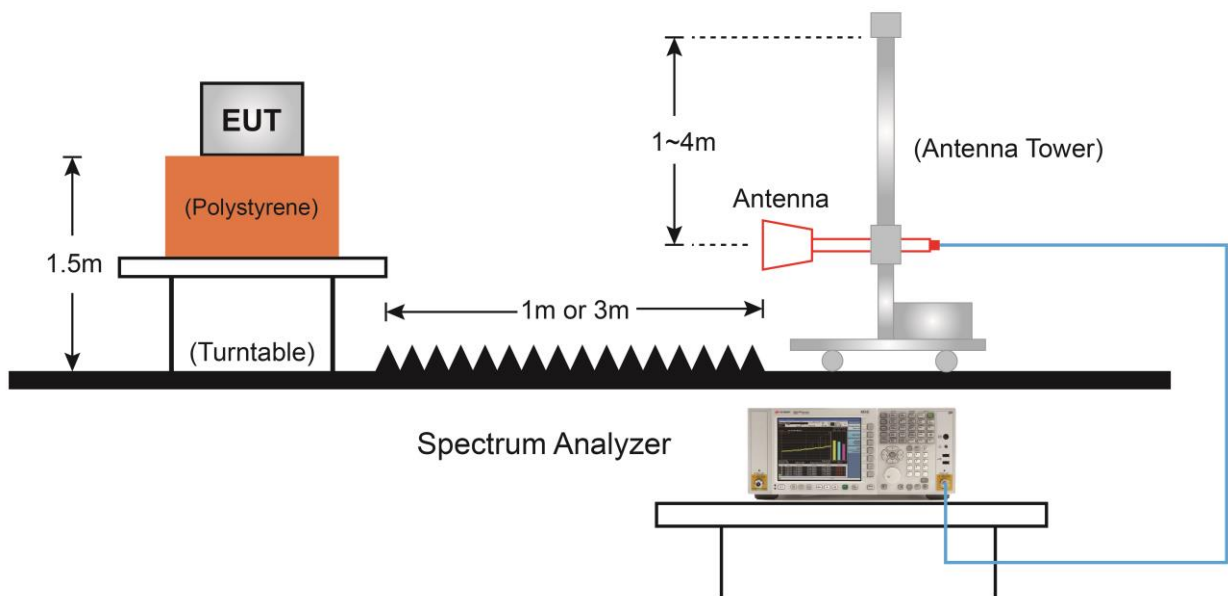
Detail duty cycle measurement refer to operation description.

6.6.4. Test Setup

Below 1GHz Test Setup:

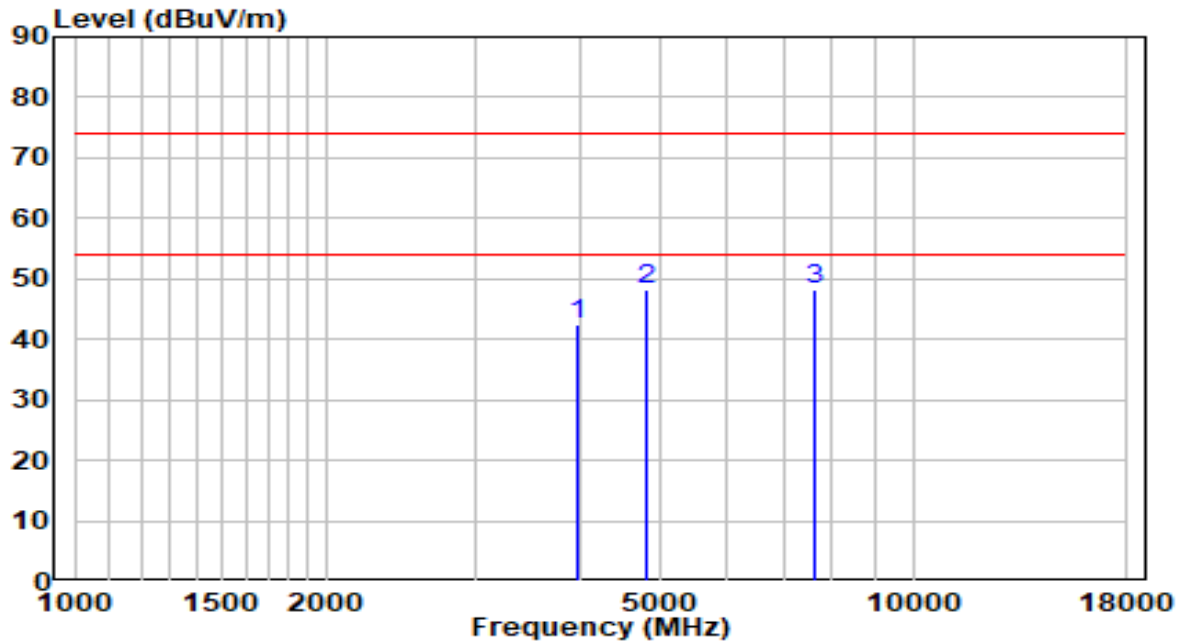


Above 1GHz Test Setup:



6.6.5. Test Result

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.1°C /36.8%
Polarity	Horizontal	Site / Test Engineer	WZ-AC1 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2405MHz (External Antenna)	Test Voltage	120V/60Hz

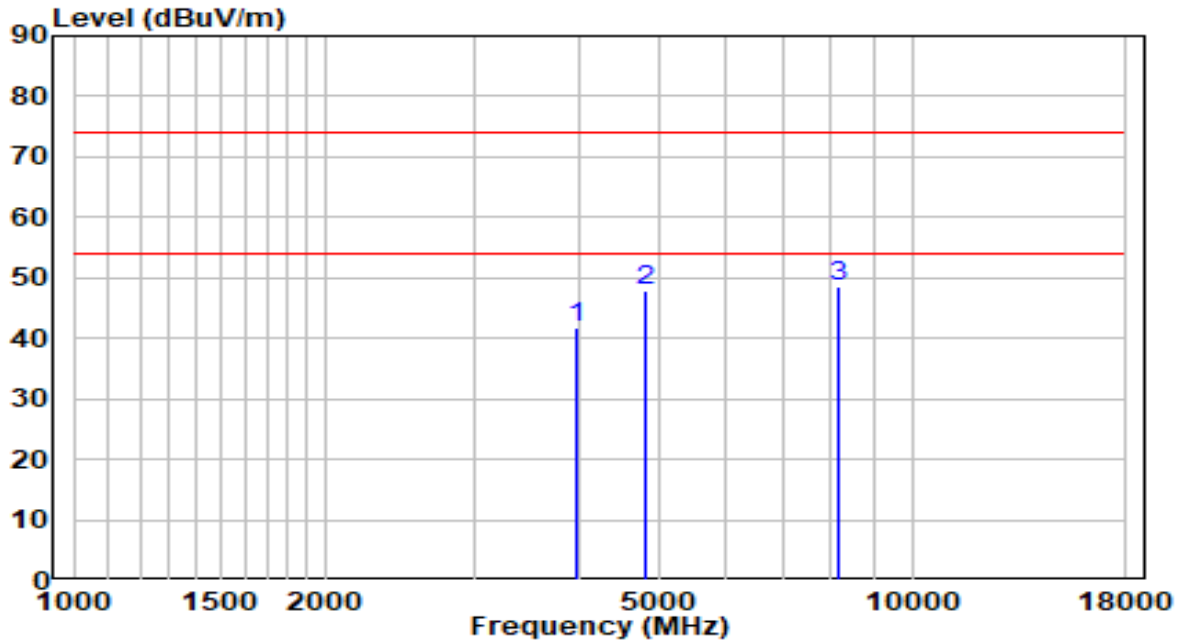


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	3966.500	39.46	3.00	42.46	-31.54	74.00	Peak
2	* 4808.000	42.55	5.73	48.28	-25.72	74.00	Peak
3	7604.500	38.00	10.07	48.07	-25.93	74.00	Peak

Note:

- "*", means this data is the worst emission level.
- C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) - Pre_Amplifier Gain (dB).
- Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.1°C /36.8%
Polarity	Vertical	Site / Test Engineer	WZ-AC1 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2405MHz (External Antenna)	Test Voltage	120V/60Hz

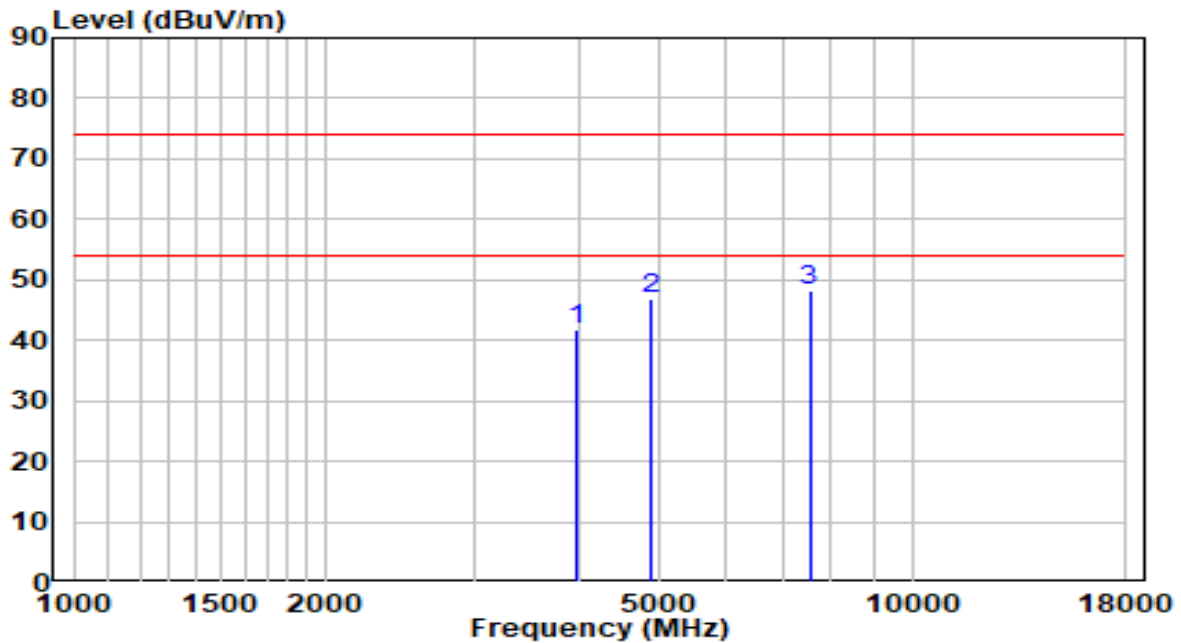


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	3966.500	38.91	3.00	41.91	-32.09	74.00	Peak
2	4808.000	42.05	5.73	47.78	-26.22	74.00	Peak
3	* 8174.000	37.67	10.95	48.62	-25.38	74.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) - Pre_Amplifier Gain (dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.1°C /36.8%
Polarity	Horizontal	Site / Test Engineer	WZ-AC1 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2440MHz (External Antenna)	Test Voltage	120V/60Hz

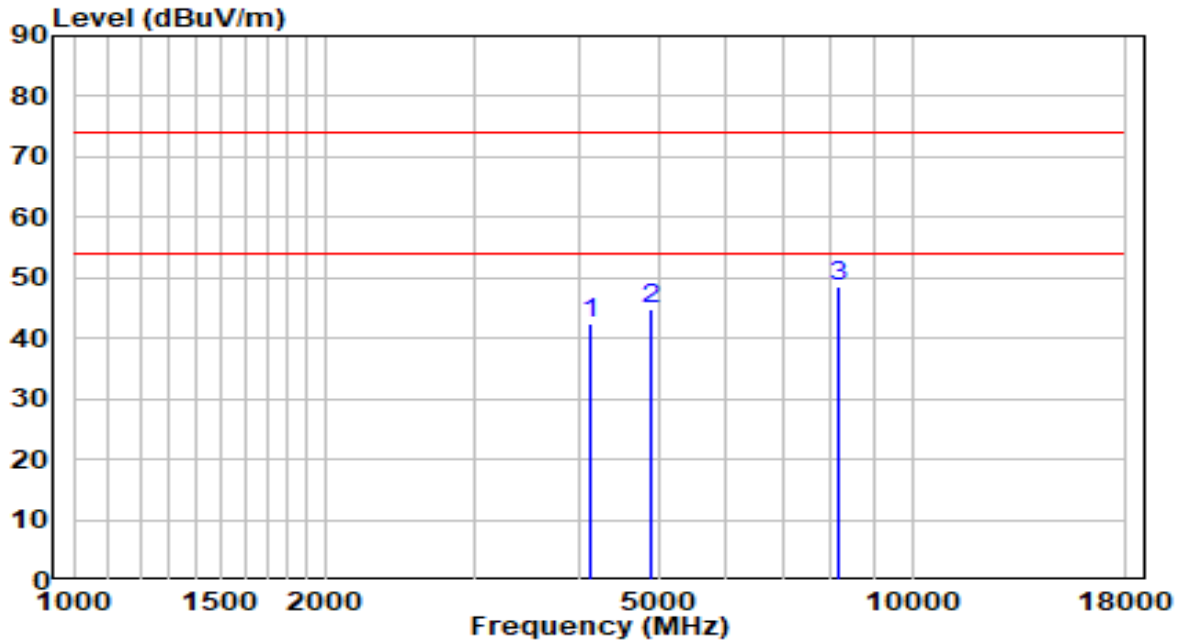


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	3975.000	38.97	2.97	41.94	-32.06	74.00	Peak
2	4884.500	41.55	5.25	46.80	-27.20	74.00	Peak
3	* 7545.000	37.99	10.33	48.32	-25.68	74.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) - Pre_Amplifier Gain (dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.1°C /36.8%
Polarity	Vertical	Site / Test Engineer	WZ-AC1 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2440MHz (External Antenna)	Test Voltage	120V/60Hz

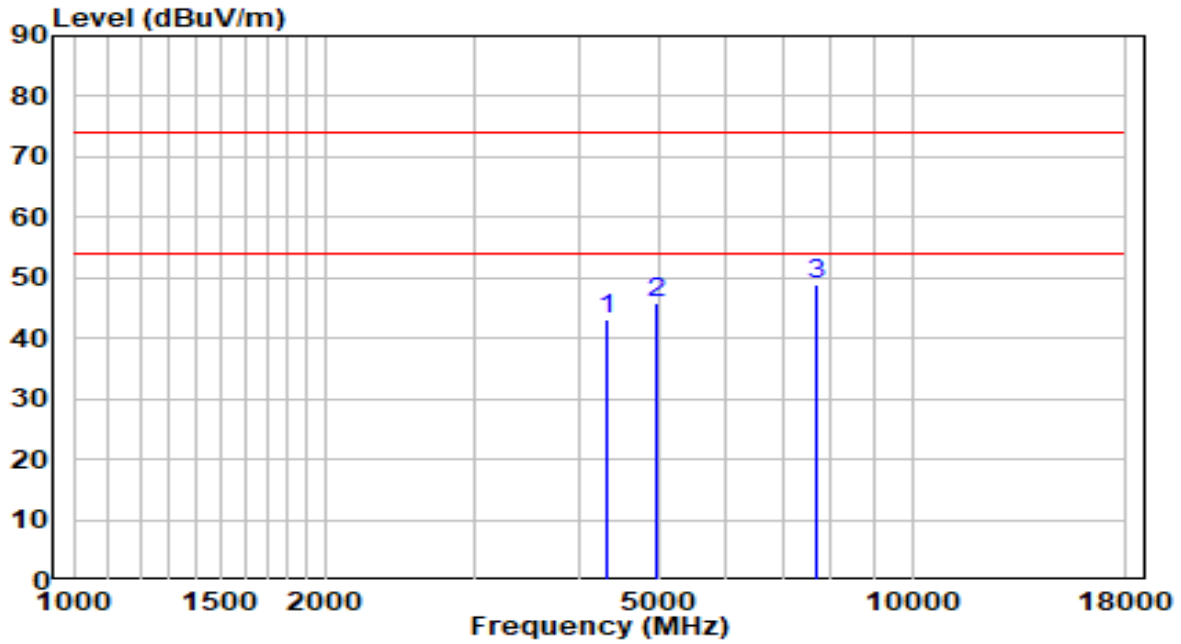


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	4119.500	39.01	3.35	42.36	-31.64	74.00	Peak
2	4876.000	39.79	5.21	45.00	-29.00	74.00	Peak
3	* 8174.000	37.73	10.95	48.68	-25.32	74.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) - Pre_Amplifier Gain (dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.1°C /36.8%
Polarity	Horizontal	Site / Test Engineer	WZ-AC1 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2480MHz (External Antenna)	Test Voltage	120V/60Hz

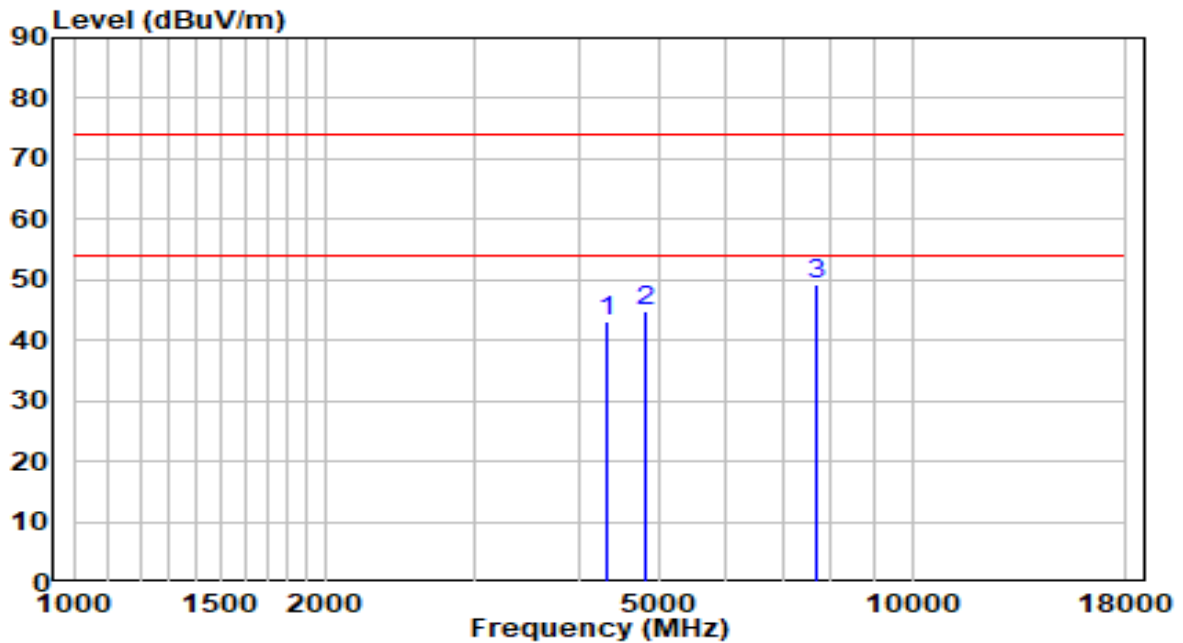


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	4332.000	39.20	3.89	43.09	-30.91	74.00	Peak
2	4961.000	40.49	5.49	45.97	-28.03	74.00	Peak
3	* 7681.000	38.60	10.20	48.80	-25.20	74.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) - Pre_Amplifier Gain (dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.1°C /36.8%
Polarity	Vertical	Site / Test Engineer	WZ-AC1 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2480MHz (External Antenna)	Test Voltage	120V/60Hz

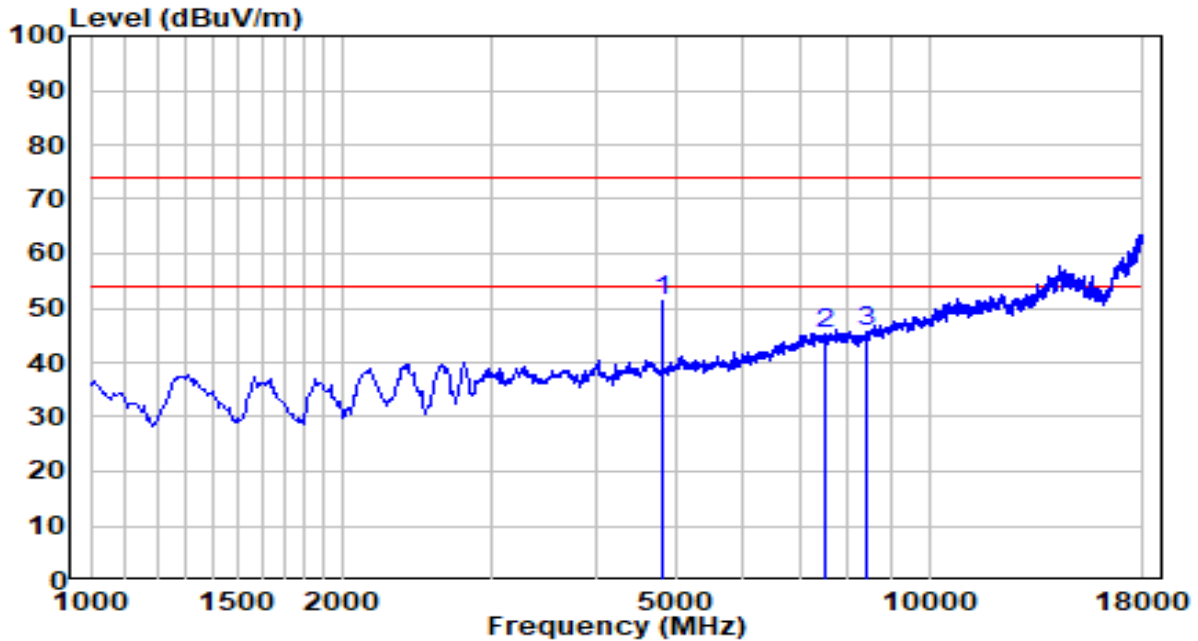


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	4315.000	39.23	3.99	43.22	-30.78	74.00	Peak
2	4825.000	39.70	5.25	44.95	-29.05	74.00	Peak
3	* 7672.500	39.12	10.10	49.21	-24.79	74.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) - Pre_Amplifier Gain (dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	22.1°C/37%
Polarity	Horizontal	Site / Test Engineer	WZ-AC2 / Carl Chen
Test Mode	Transmit by Zigbee Mode at Channel 2405MHz (Internal Antenna)	Test Voltage	120V/60Hz

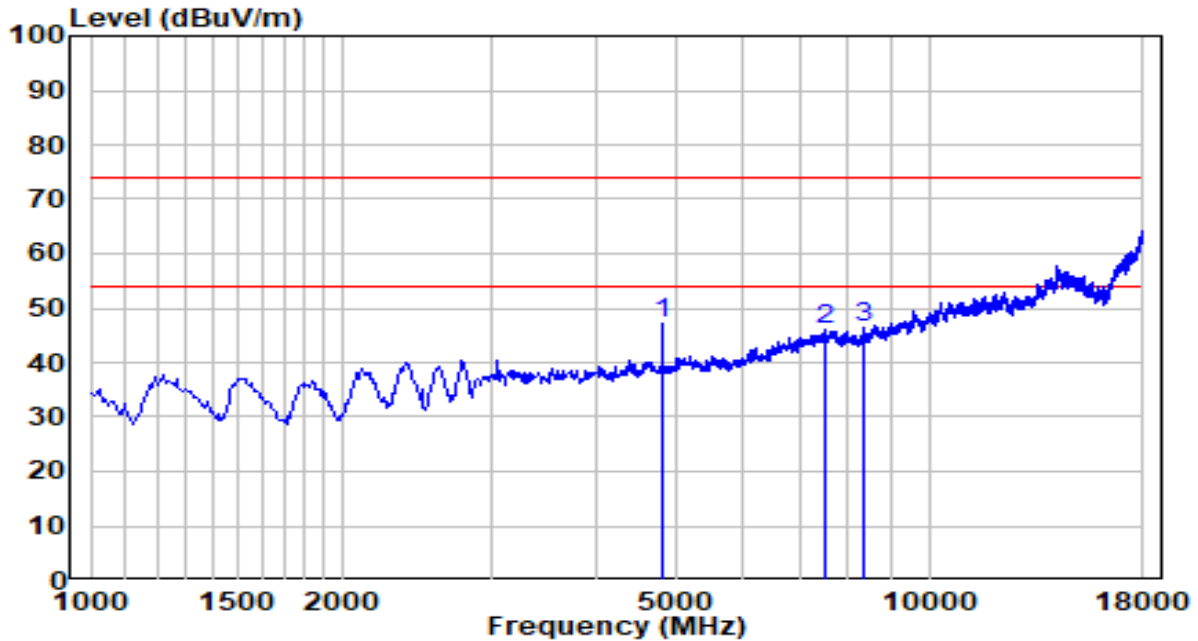


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	* 4808.000	47.69	3.77	51.45	-22.55	74.00	Peak
2	7536.500	33.68	11.73	45.42	-28.58	74.00	Peak
3	8446.000	33.17	12.36	45.53	-28.47	74.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB)– Preamplifier(dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	22.1°C/37%
Polarity	Vertical	Site / Test Engineer	WZ-AC2 / Carl Chen
Test Mode	Transmit by Zigbee Mode at Channel 2405MHz (Internal Antenna)	Test Voltage	120V/60Hz

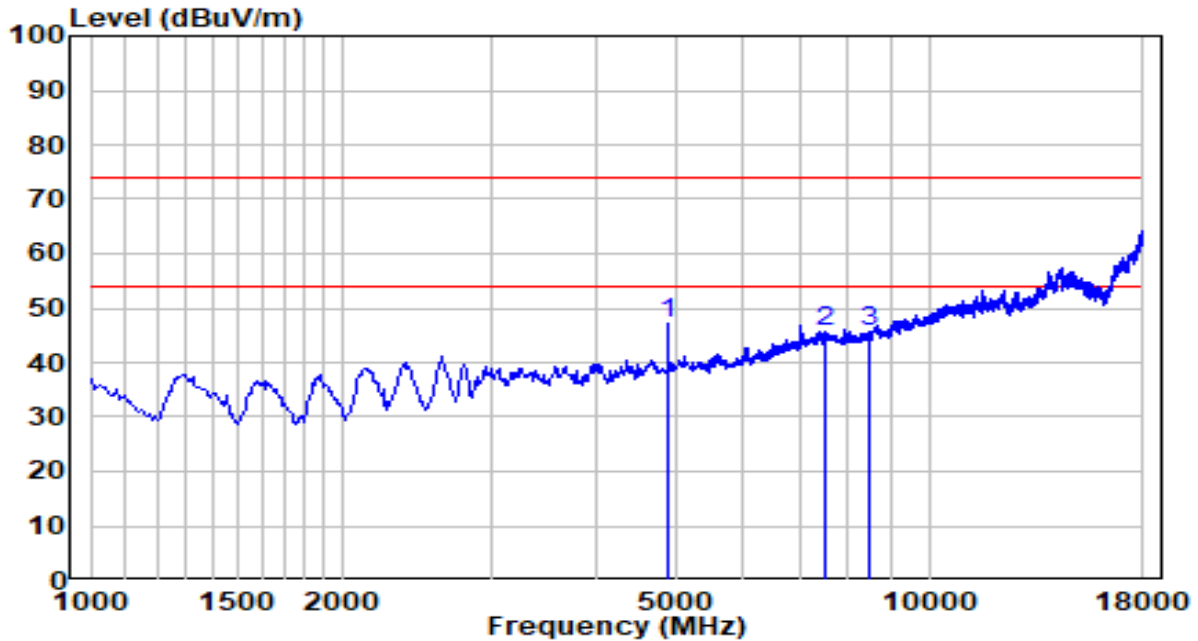


No	Frequency (MHz)	Reading (dBUV)	C.F (dB)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Remark (QP/PK/AV)
1	* 4808.000	43.21	3.77	46.98	-27.02	74.00	Peak
2	7494.000	34.22	11.74	45.96	-28.04	74.00	Peak
3	8369.500	34.27	12.01	46.28	-27.72	74.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB)– Preamplifier(dB).
3. Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	22.1°C/37%
Polarity	Horizontal	Site / Test Engineer	WZ-AC2 / Carl Chen
Test Mode	Transmit by Zigbee Mode at Channel 2440MHz (Internal Antenna)	Test Voltage	120V/60Hz

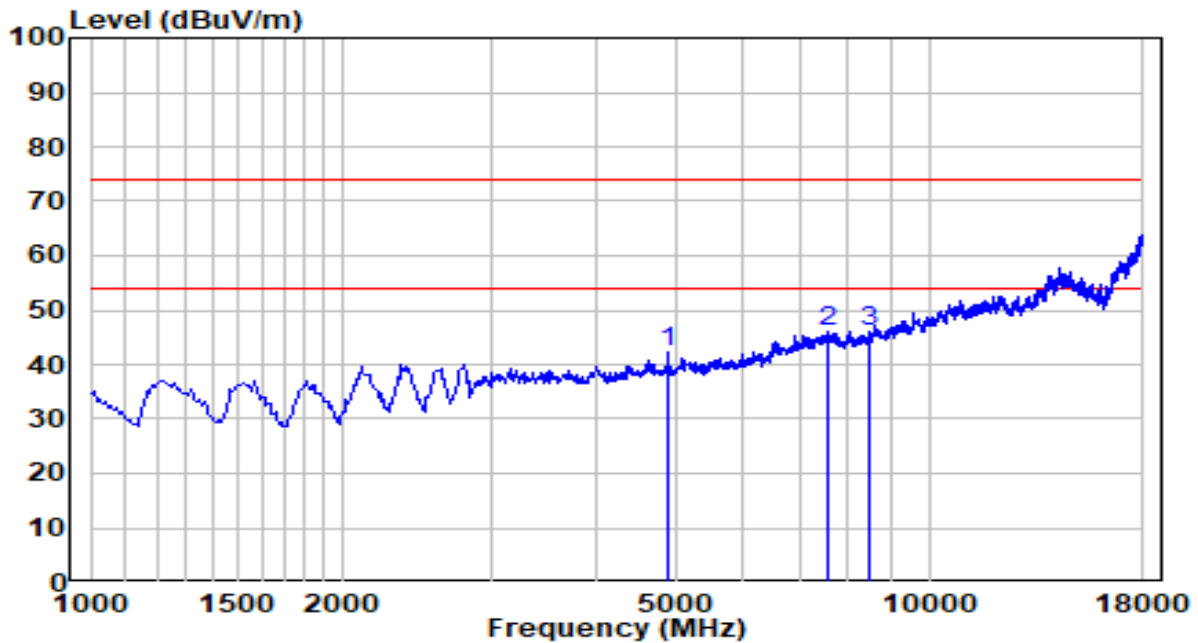


No	Frequency (MHz)	Reading (dBUV)	C.F (dB)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Remark (QP/PK/AV)
1	* 4884.500	43.51	3.64	47.15	-26.85	74.00	Peak
2	7494.000	34.01	11.74	45.76	-28.24	74.00	Peak
3	8454.500	33.21	12.37	45.59	-28.41	74.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB)– Preamplifier(dB).
3. Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	22.1°C/37%
Polarity	Vertical	Site / Test Engineer	WZ-AC2 / Carl Chen
Test Mode	Transmit by Zigbee Mode at Channel 2440MHz (Internal Antenna)	Test Voltage	120V/60Hz

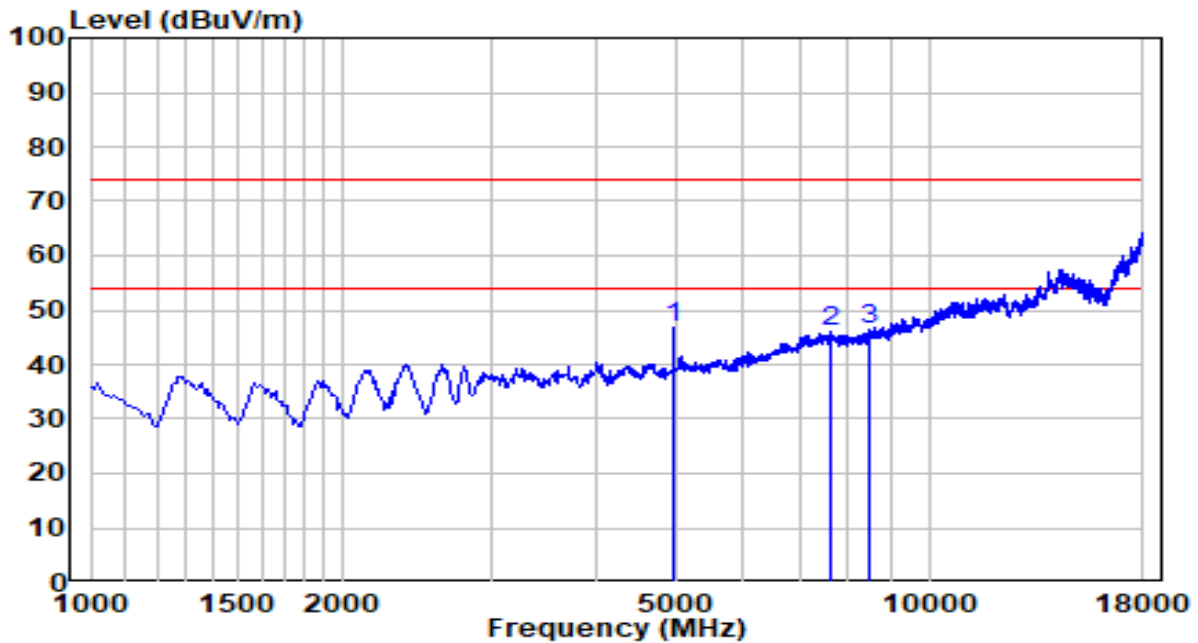


No	Frequency (MHz)	Reading (dBUV)	C.F (dB)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Remark (QP/PK/AV)
1	4876.000	38.54	3.63	42.16	-31.84	74.00	Peak
2	* 7553.500	34.45	11.78	46.22	-27.78	74.00	Peak
3	8488.500	34.03	12.12	46.15	-27.85	74.00	Peak

Note:

- "*", means this data is the worst emission level.
- C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB)– Preamplifier(dB).
- Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor).
- The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	22.1°C/37%
Polarity	Horizontal	Site / Test Engineer	WZ-AC2 / Carl Chen
Test Mode	Transmit by Zigbee Mode at Channel 2480MHz (Internal Antenna)	Test Voltage	120V/60Hz

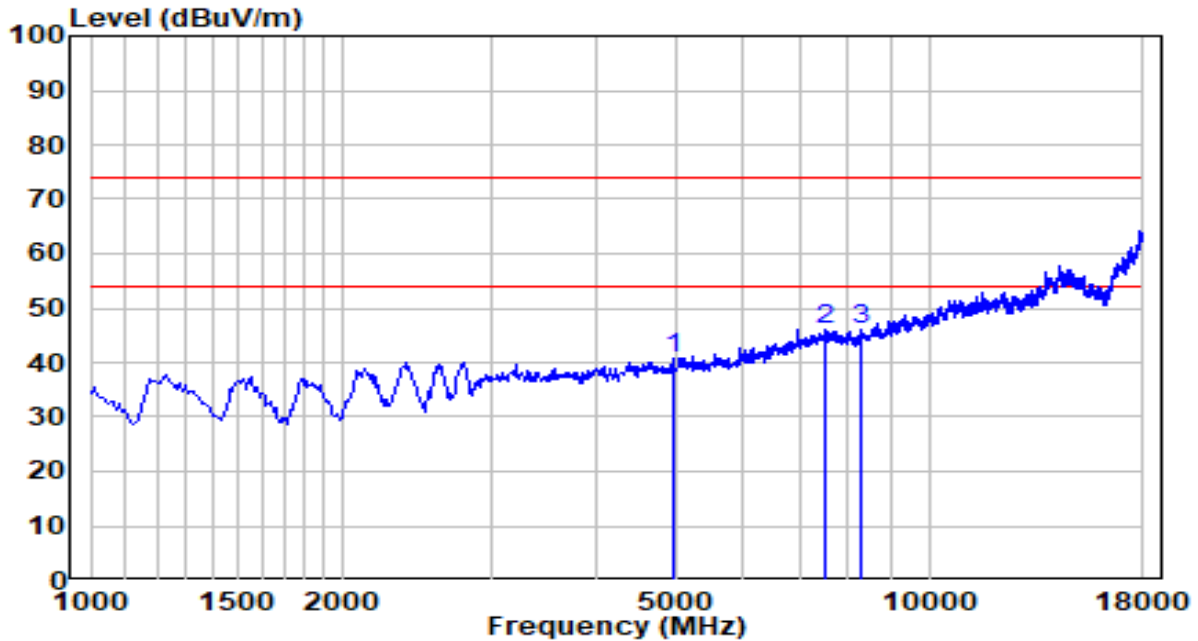


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	* 4961.000	43.14	3.74	46.89	-27.11	74.00	Peak
2	7613.000	34.08	11.86	45.93	-28.07	74.00	Peak
3	8454.500	33.95	12.37	46.33	-27.67	74.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB)– Preamplifier(dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	22.1°C/37%
Polarity	Vertical	Site / Test Engineer	WZ-AC2 / Carl Chen
Test Mode	Transmit by Zigbee Mode at Channel 2480MHz (Internal Antenna)	Test Voltage	120V/60Hz



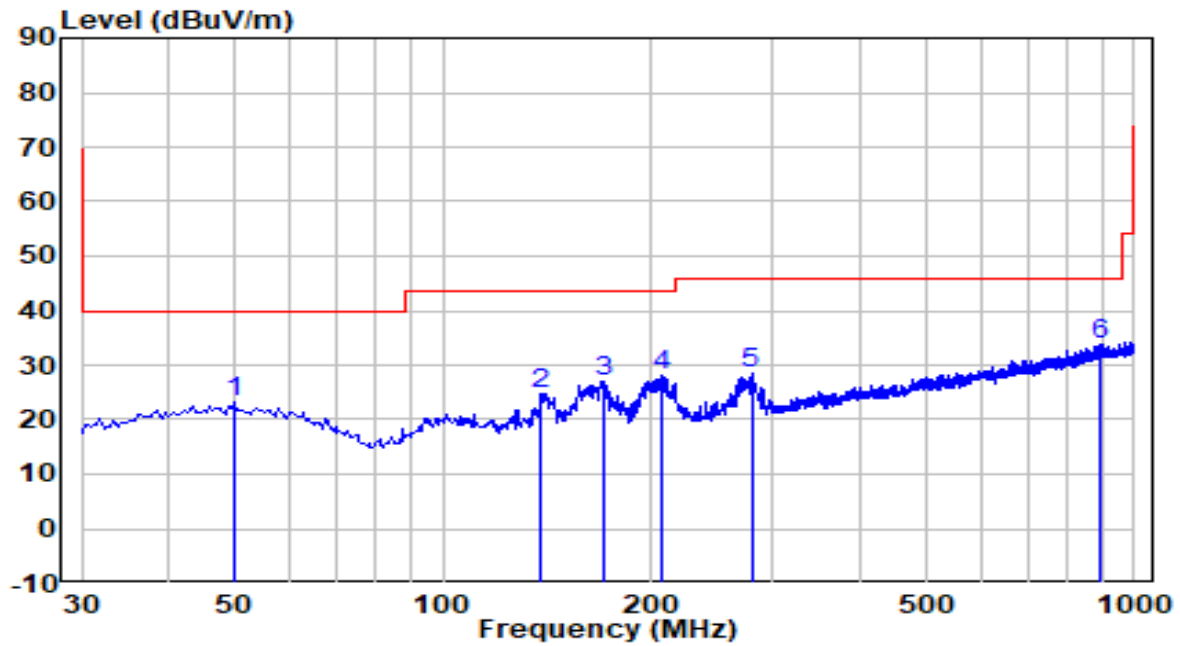
No	Frequency (MHz)	Reading (dBUV)	C.F (dB)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Remark (QP/PK/AV)
1	4961.000	37.09	3.74	40.83	-33.17	74.00	Peak
2	7494.000	34.34	11.74	46.08	-27.92	74.00	Peak
3	* 8301.500	34.45	11.74	46.19	-27.81	74.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB)– Preamplifier(dB).
3. Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

The Result of Radiated Emission below 1GHz:

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	AC2_VULB9162_0.03-7GHz	Temp. / Humidity	20.5°C /28.6%
Polarity	Horizontal	Site / Test Engineer	WZ-AC2 / Hyde Yu
Test Mode	Transmit by Zigbee at Channel 2480MHz	Test Voltage	120V/60Hz

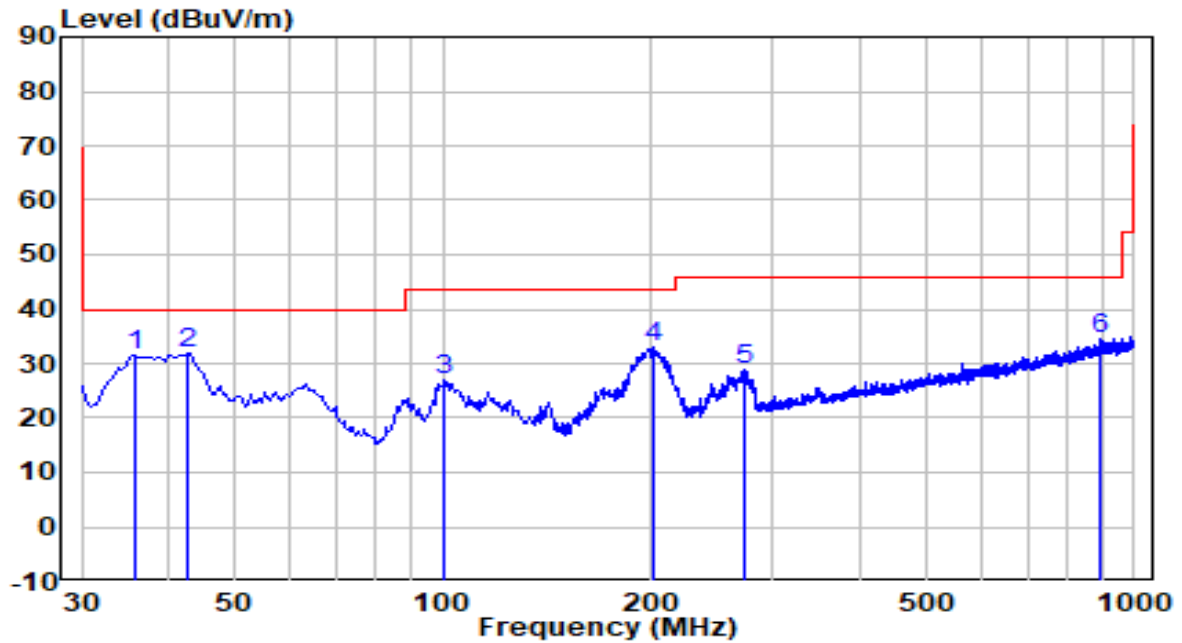


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	49.885	2.71	20.43	23.14	-16.86	40.00	Peak
2	138.640	9.84	14.78	24.63	-18.87	43.50	Peak
3	170.650	11.15	15.75	26.90	-16.60	43.50	Peak
4	206.540	10.28	17.84	28.12	-15.38	43.50	Peak
5	279.290	8.49	19.83	28.32	-17.68	46.00	Peak
6	* 892.815	3.97	29.70	33.67	-12.33	46.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	AC2_VULB9162_0.03-7GHz	Temp. / Humidity	20.5°C /28.6%
Polarity	Vertical	Site / Test Engineer	WZ-AC2 / Hyde Yu
Test Mode	Transmit by Zigbee at Channel 2480MHz	Test Voltage	120V/60Hz



No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	35.820	13.44	18.05	31.49	-8.51	40.00	Peak
2	* 42.610	12.06	19.85	31.91	-8.09	40.00	Peak
3	100.325	8.67	18.28	26.95	-16.55	43.50	Peak
4	201.205	15.02	18.18	33.19	-10.31	43.50	Peak
5	273.470	9.04	19.65	28.69	-17.31	46.00	Peak
6	896.210	4.86	29.74	34.59	-11.41	46.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

6.7. Radiated Restricted Band Edge Measurement

6.7.1. Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.7.2. Test Procedure Used

ANSI C63.10-2013 - Section 6.3 & 6.6 & 11.13

6.7.3. Test Setting

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

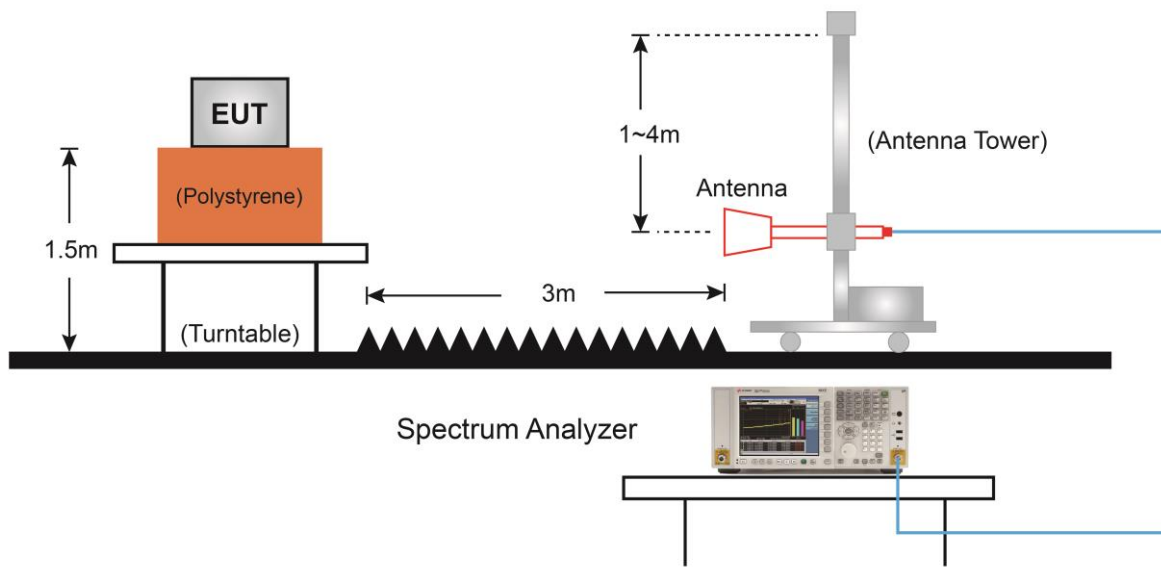
Average Field Strength Measurements

Average Measurement Level = Peak Measurement Level - 20 * Log(Duty Cycle) = -44.58

Duty Cycle = 0.59%

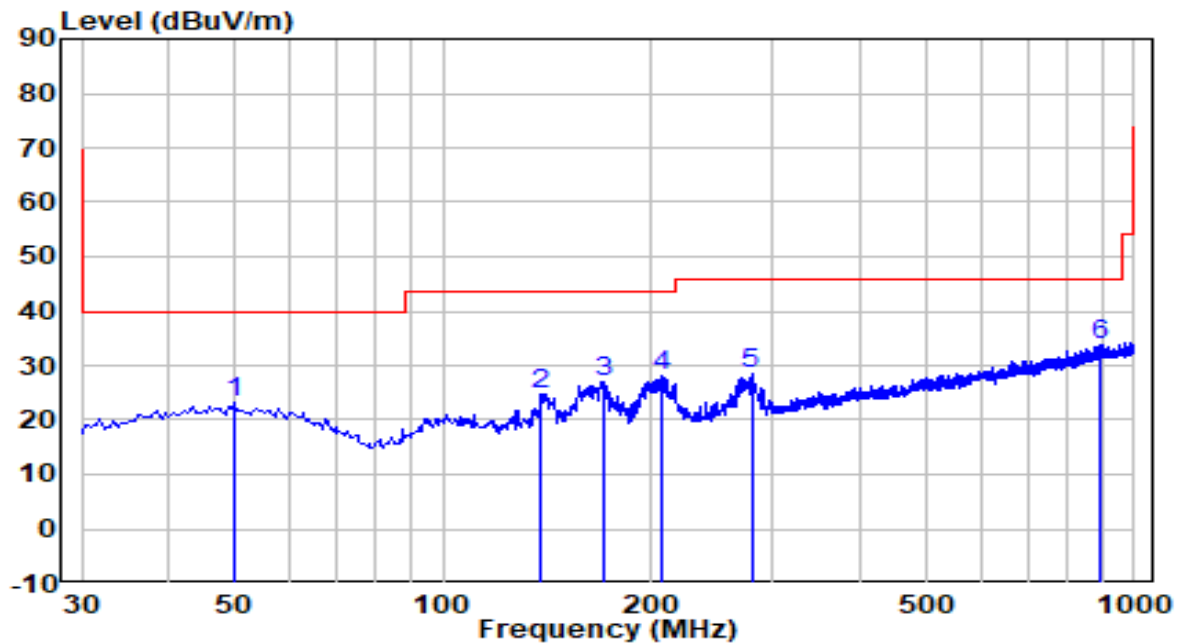
Detail duty cycle measurement refer to operation description.

6.7.4. Test Setup



6.7.5. Test Result

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	AC2_VULB9162_0.03-7GHz	Temp. / Humidity	20.5°C /28.6%
Polarity	Horizontal	Site / Test Engineer	WZ-AC2 / Hyde Yu
Test Mode	Transmit by Zigbee at Channel 2480MHz (External Antenna)	Test Voltage	120V/60Hz

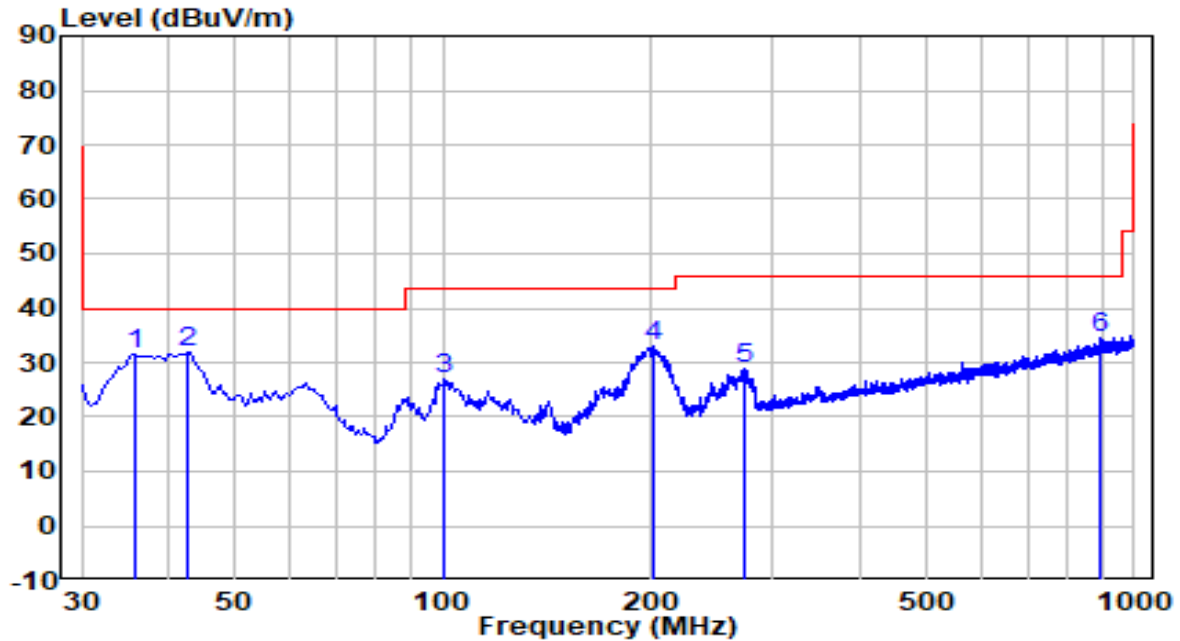


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	49.885	2.71	20.43	23.14	-16.86	40.00	Peak
2	138.640	9.84	14.78	24.63	-18.87	43.50	Peak
3	170.650	11.15	15.75	26.90	-16.60	43.50	Peak
4	206.540	10.28	17.84	28.12	-15.38	43.50	Peak
5	279.290	8.49	19.83	28.32	-17.68	46.00	Peak
6	* 892.815	3.97	29.70	33.67	-12.33	46.00	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	AC2_VULB9162_0.03-7GHz	Temp. / Humidity	20.5°C /28.6%
Polarity	Vertical	Site / Test Engineer	WZ-AC2 / Hyde Yu
Test Mode	Transmit by Zigbee at Channel 2480MHz (External Antenna)	Test Voltage	120V/60Hz



No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	35.820	13.44	18.05	31.49	-8.51	40.00	Peak
2	* 42.610	12.06	19.85	31.91	-8.09	40.00	Peak
3	100.325	8.67	18.28	26.95	-16.55	43.50	Peak
4	201.205	15.02	18.18	33.19	-10.31	43.50	Peak
5	273.470	9.04	19.65	28.69	-17.31	46.00	Peak
6	896.210	4.86	29.74	34.59	-11.41	46.00	Peak

Note:

- "*" means this data is the worst emission level.
- C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
- Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- The emission levels of other frequencies are very lower than the limit and not show in test report.

6.8. Radiated Restricted Band Edge Measurement

6.8.1. Test Limit

For RSS-Gen Section 8.10 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 8.10 of RSS-Gen, must also comply with the radiated emission limits specified in Section 8.9.

Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.009 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.525225	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	* Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for license exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138		

All out of band emissions appearing in a restricted band as specified in Section 8.10 of the RSS-Gen must not exceed the limits shown in Table per Section 8.9.

RSS-Gen Section 8.9		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.8.2. Test Procedure Used

ANSI C63.10-2013 Section 6.3 & 6.6 & 11.13

6.8.3. Test Setting

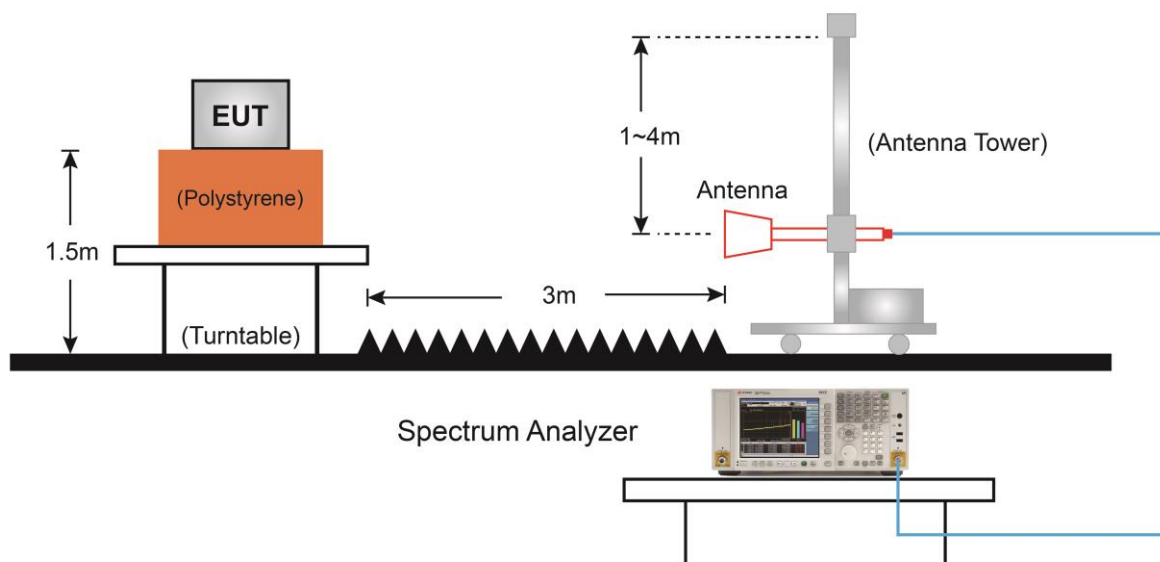
Peak Field Strength Measurements

8. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
9. RBW = 1MHz
10. VBW = 3MHz
11. Detector = peak
12. Sweep time = auto couple
13. Trace mode = max hold
14. Trace was allowed to stabilize

Average Field Strength Measurements

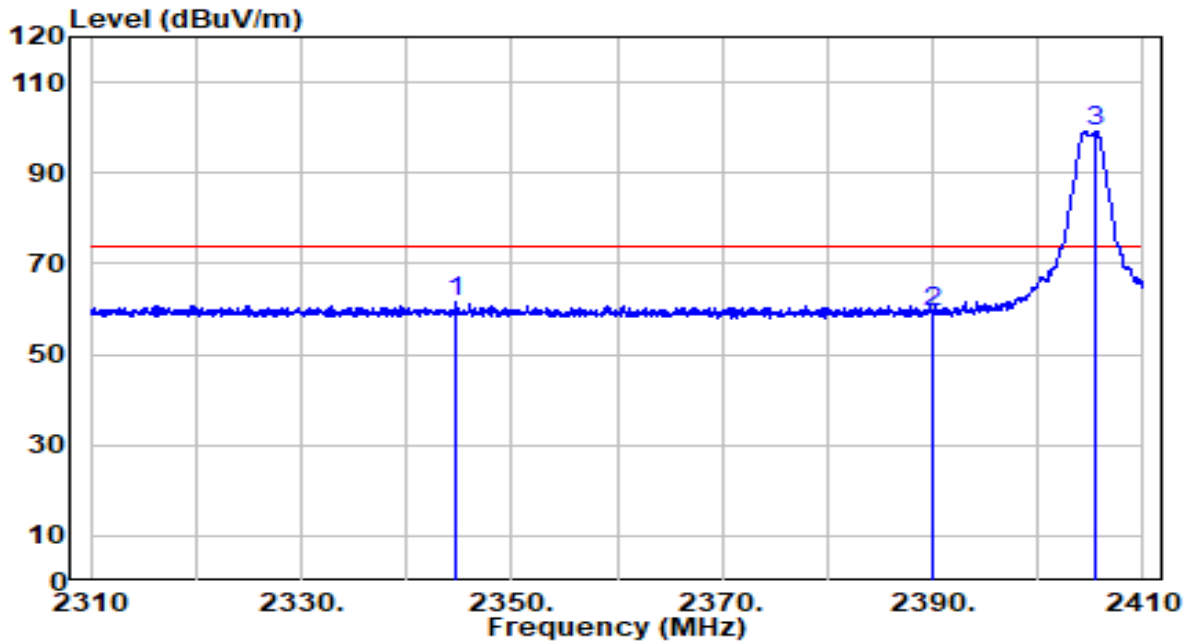
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq 1/T$
4. De As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

6.8.4. Test Setup



6.8.5. Test Result

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.3°C/36.9%
Polarity	Horizontal	Site / Test Engineer	WZ-AC1 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2405MHz (External Antenna)	Test Voltage	120V/60Hz



No	Frequency (MHz)	Reading (dBUV)	C.F (dB)	Duty Cycle Factor (dB)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Remark (QP/PK/AV)
1	2344.800	28.74	32.69	N/A	61.43	-12.57	74	Peak
	2344.800	28.74	32.69	-44.58	16.85	-37.15	54	Average
2	2390.000	26.96	32.54	N/A	59.51	-14.49	74	Peak
	2390.000	26.96	32.54	-44.58	14.93	-39.07	54	Average
3	2405.550	66.48	32.52	N/A	99.01	N/A	N/A	Peak
	2405.550	66.48	32.52	-44.58	54.43	N/A	N/A	Average

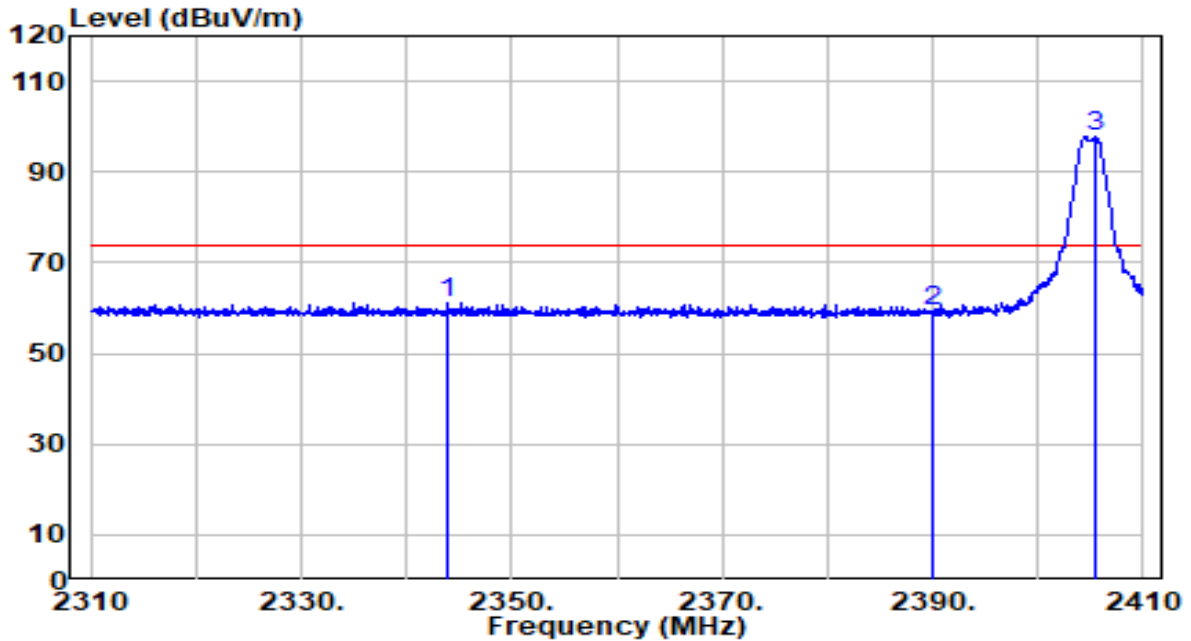
Note:

1. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).

2. For Peak Value: Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor).

For Average Value: Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor) + Duty Cycle Factor.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.3°C/36.9%
Polarity	Vertical	Site / Test Engineer	WZ-AC1 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2405MHz (External Antenna)	Test Voltage	120V/60Hz



No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Duty Cycle Factor (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	2343.850	28.66	32.69	N/A	61.35	-12.65	74	Peak
	2343.850	28.66	32.69	-44.58	16.77	-37.23	54	Average
2	2390.000	26.91	32.54	N/A	59.45	-14.55	74	Peak
	2390.000	26.91	32.54	-44.58	14.87	-39.13	54	Average
3	2405.500	65.07	32.52	N/A	97.59	N/A	N/A	Peak
	2405.500	65.07	32.52	-44.58	53.01	N/A	N/A	Average

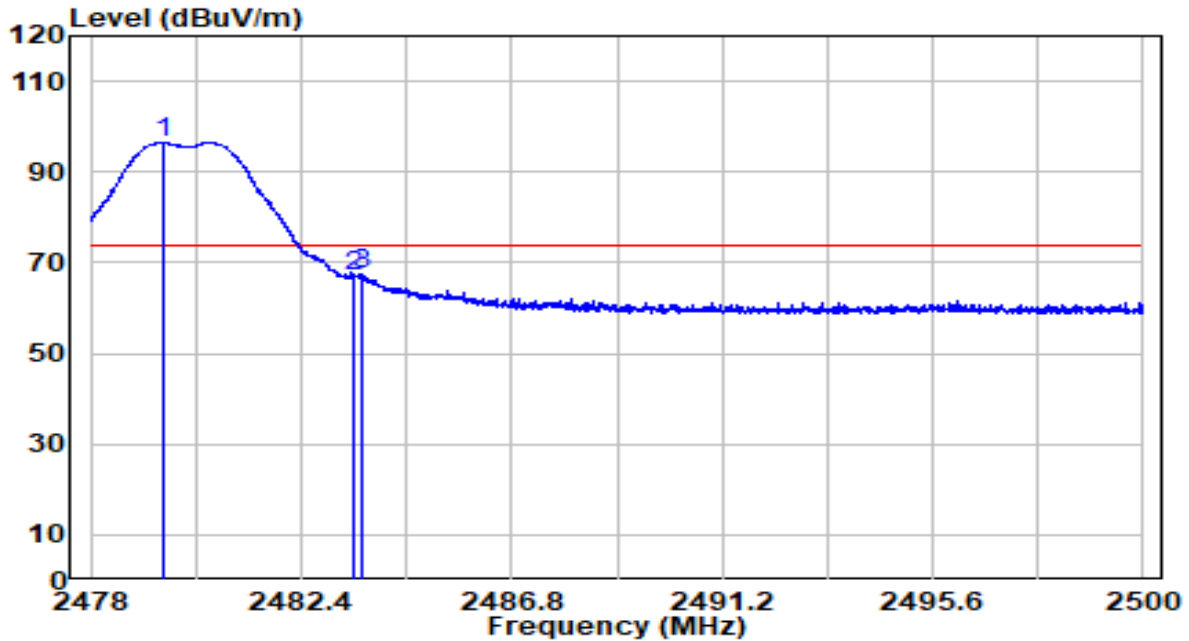
Note:

1. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).

2. For Peak Value: Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).

For Average Value: Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor) + Duty Cycle Factor.

EUT	Portable Wireless Receiver	Date of Test	2021-03-21
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.3°C/36.9%
Polarity	Horizontal	Site / Test Engineer	WZ-AC1 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2480MHz (External Antenna)	Test Voltage	120V/60Hz

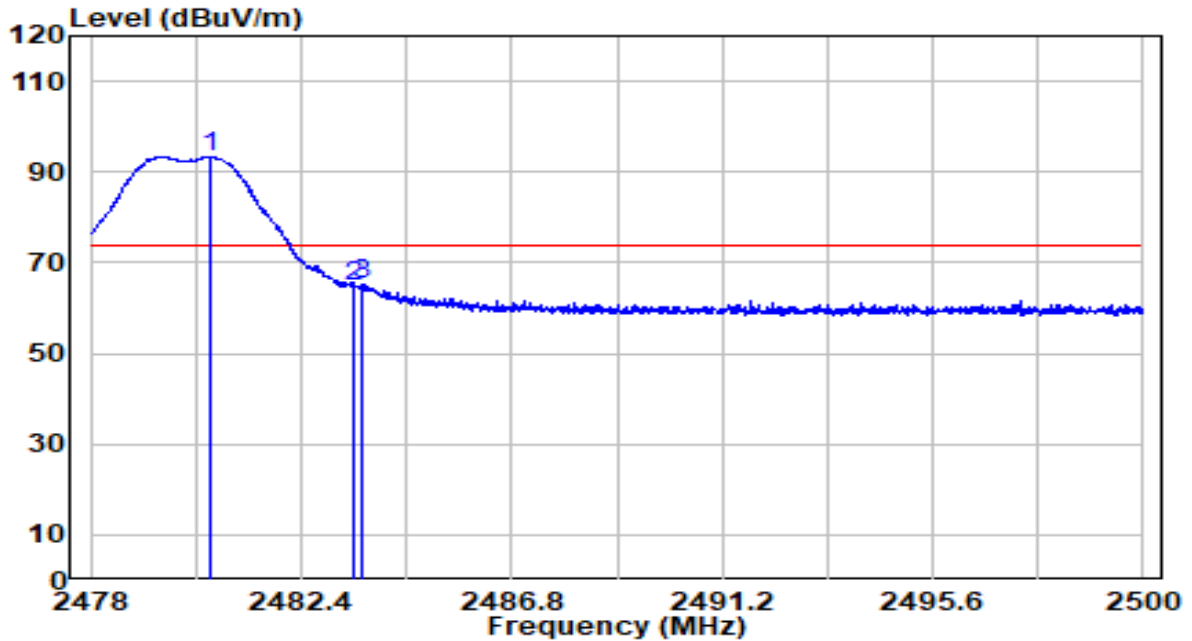


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Duty Cycle Factor (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	2479.496	63.98	32.45	N/A	96.43	N/A	N/A	Peak
	2479.496	63.98	32.45	-44.58	51.85	N/A	N/A	Average
2	2483.500	34.67	32.43	N/A	67.1	-6.90	74	Peak
	2483.500	34.67	32.43	-44.58	22.52	-31.48	54	Average
3	2483.643	35.02	32.43	N/A	67.44	-6.56	74	Peak
	2483.643	35.02	32.43	-44.58	22.86	-31.14	54	Average

Note:

1. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
2. For Peak Value: Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
For Average Value: Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor) + Duty Cycle Factor.

EUT	Portable Wireless Receiver	Date of Test	2021-03-21
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.3°C/36.9%
Polarity	Vertical	Site / Test Engineer	WZ-AC1 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2480MHz (External Antenna)	Test Voltage	120V/60Hz



No	Frequency (MHz)	Reading (dBUV)	C.F (dB)	Duty Cycle Factor (dB)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Remark (QP/PK/AV)
1	2480.519	60.80	32.44	N/A	93.25	N/A	N/A	Peak
	2480.519	60.80	32.44	-44.58	48.67	N/A	N/A	Average
2	2483.500	32.48	32.43	N/A	64.91	-9.09	74	Peak
	2483.500	32.48	32.43	-44.58	20.33	-33.67	54	Average
3	2483.676	32.66	32.43	N/A	65.09	-8.91	74	Peak
	2483.676	32.66	32.43	-44.58	20.51	-33.49	54	Average

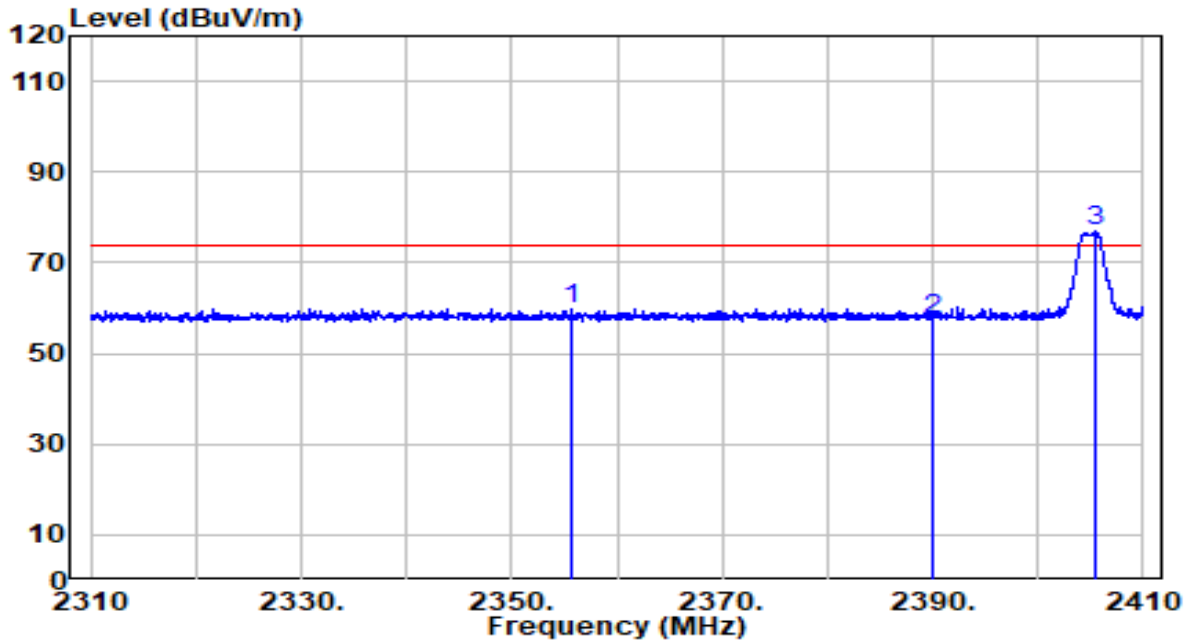
Note:

1. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).

2. For Peak Value: Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor).

For Average Value: Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor) + Duty Cycle Factor.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.3°C/36.9%
Polarity	Horizontal	Site / Test Engineer	WZ-AC1 / Tommy Tang
Test Mode	Transmit by Zigbee Mode at Channel 2405MHz (Internal Antenna)	Test Voltage	120V/60Hz



No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Duty Cycle Factor (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	2355.800	27.35	32.63	N/A	59.98	-14.02	74	Peak
	2355.800	27.35	32.63	-44.58	15.40	-38.60	54	Average
2	2390.000	24.90	32.54	N/A	57.44	-16.56	74	Peak
	2390.000	24.90	32.54	-44.58	12.86	-41.14	54	Average
3	2405.550	44.46	32.52	N/A	76.98	N/A	N/A	Peak
	2405.550	44.46	32.52	-44.58	32.4	N/A	N/A	Average

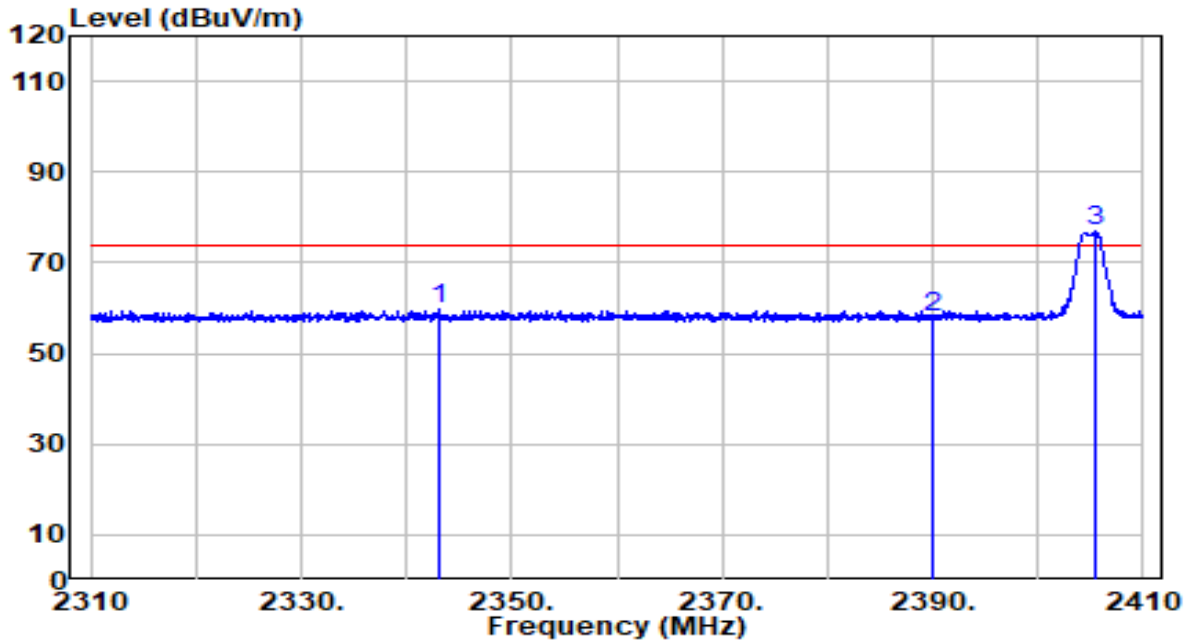
Note:

1. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).

2. For Peak Value: Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).

For Average Value: Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor) + Duty Cycle Factor.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	21.3°C/36.9%
Polarity	Vertical	Site / Test Engineer	WZ-AC1 / Tommy Tang
Test Mode	Transmit by Zigbee Mode at Channel 2405MHz (Internal Antenna)	Test Voltage	120V/60Hz



No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Duty Cycle Factor (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	2343.000	27.02	32.69	N/A	59.71	-14.29	74	Peak
	2343.000	27.02	32.69	-44.58	15.13	-38.87	54	Average
2	2390.000	25.63	32.54	N/A	58.17	-15.83	74	Peak
	2390.000	25.63	32.54	-44.58	13.59	-40.41	54	Average
3	2405.450	44.43	32.52	N/A	76.96	N/A	N/A	Peak
	2405.450	44.43	32.52	-44.58	32.38	N/A	N/A	Average

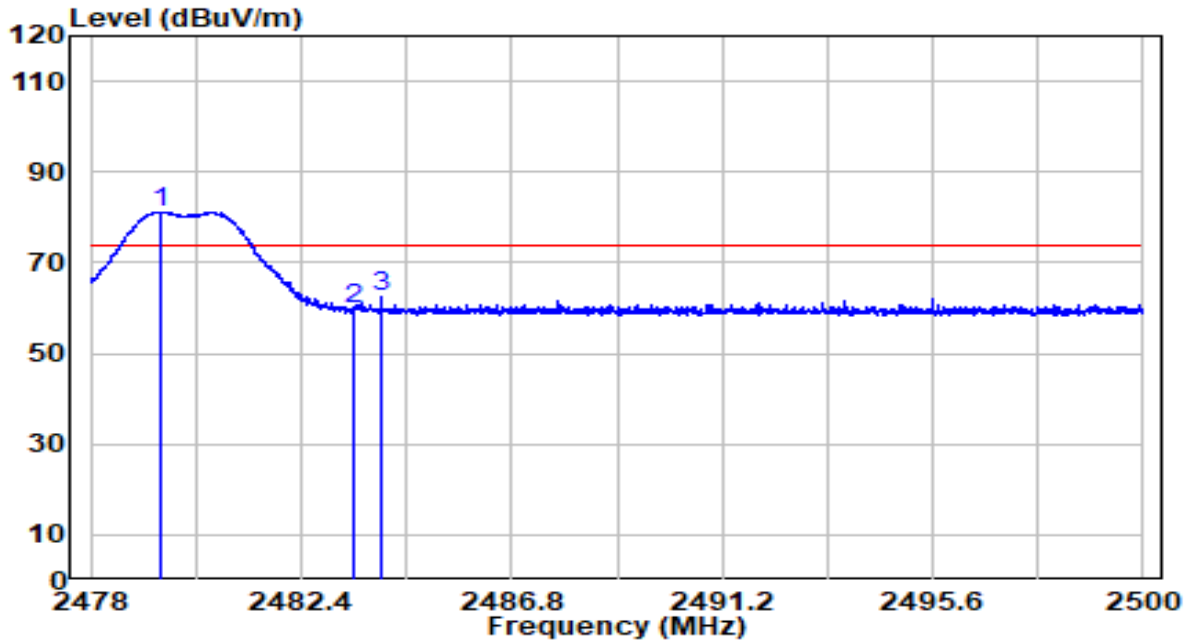
Note:

1. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).

2. For Peak Value: Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).

For Average Value: Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor) + Duty Cycle Factor.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	22.2°C/37%
Polarity	Horizontal	Site / Test Engineer	WZ-AC2 / Carl Chen
Test Mode	Transmit by Zigbee Mode at Channel 2480MHz (Internal Antenna)	Test Voltage	120V/60Hz



No	Frequency (MHz)	Reading (dBUV)	C.F (dB)	Duty Cycle Factor (dB)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Remark (QP/PK/AV)
1	2479.463	48.99	32.25	N/A	81.25	N/A	N/A	Peak
	2479.463	48.99	32.25	-44.58	36.67	N/A	N/A	Average
2	2483.500	27.31	32.32	N/A	59.62	-14.38	74	Peak
	2483.500	27.31	32.32	-44.58	15.04	-38.96	54	Average
3	2484.072	29.95	32.33	N/A	62.27	-11.73	74	Peak
	2484.072	29.95	32.33	-44.58	17.69	-36.31	54	Average

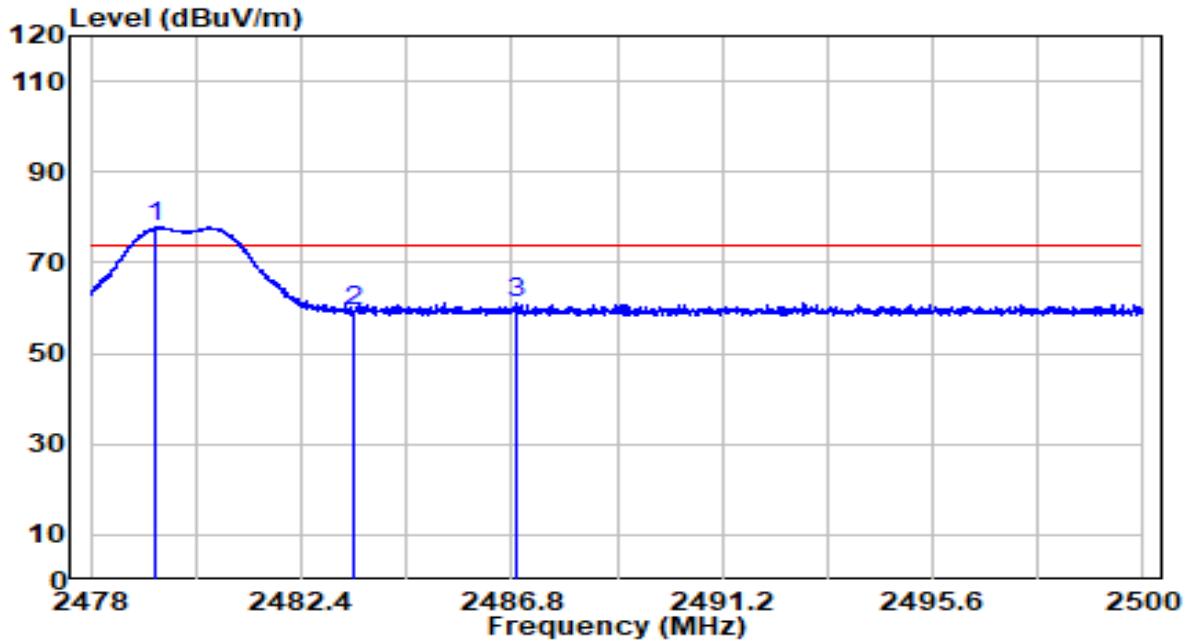
Note:

1. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).

2. For Peak Value: Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor).

For Average Value: Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor) + Duty Cycle Factor.

EUT	Portable Wireless Receiver	Date of Test	2021-03-12
Factor	AC1_BBHA9120D_1-18GHz	Temp. / Humidity	22.2°C/37%
Polarity	Vertical	Site / Test Engineer	WZ-AC2 / Carl Chen
Test Mode	Transmit by Zigbee Mode at Channel 2480MHz (Internal Antenna)	Test Voltage	120V/60Hz



No	Frequency (MHz)	Reading (dBUV)	C.F (dB)	Duty Cycle Factor (dB)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Remark (QP/PK/AV)
1	2479.364	45.49	32.25	N/A	77.74	N/A	N/A	Peak
	2479.364	45.49	32.25	-44.58	33.16	N/A	N/A	Average
2	2483.500	27.17	32.32	N/A	59.49	-14.51	74	Peak
	2483.500	27.17	32.32	-44.58	14.91	-39.09	54	Average
3	2486.888	28.67	32.37	N/A	61.04	-12.96	74	Peak
	2486.888	28.67	32.37	-44.58	16.46	-37.54	54	Average

Note:

1. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).

2. For Peak Value: Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor).

For Average Value: Measurement(dBUV/m) = Reading(dBUV) + C.F (Correction Factor) + Duty Cycle Factor.

6.9. AC Conducted Emissions Measurement

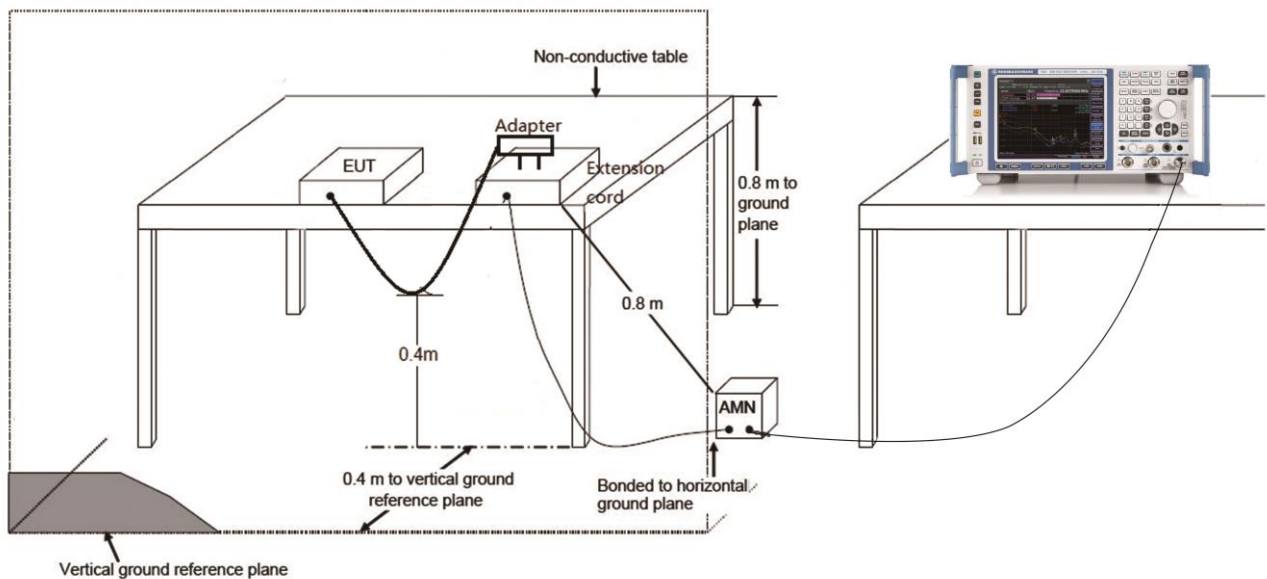
6.9.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dB μ V)	Average (dB μ V)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

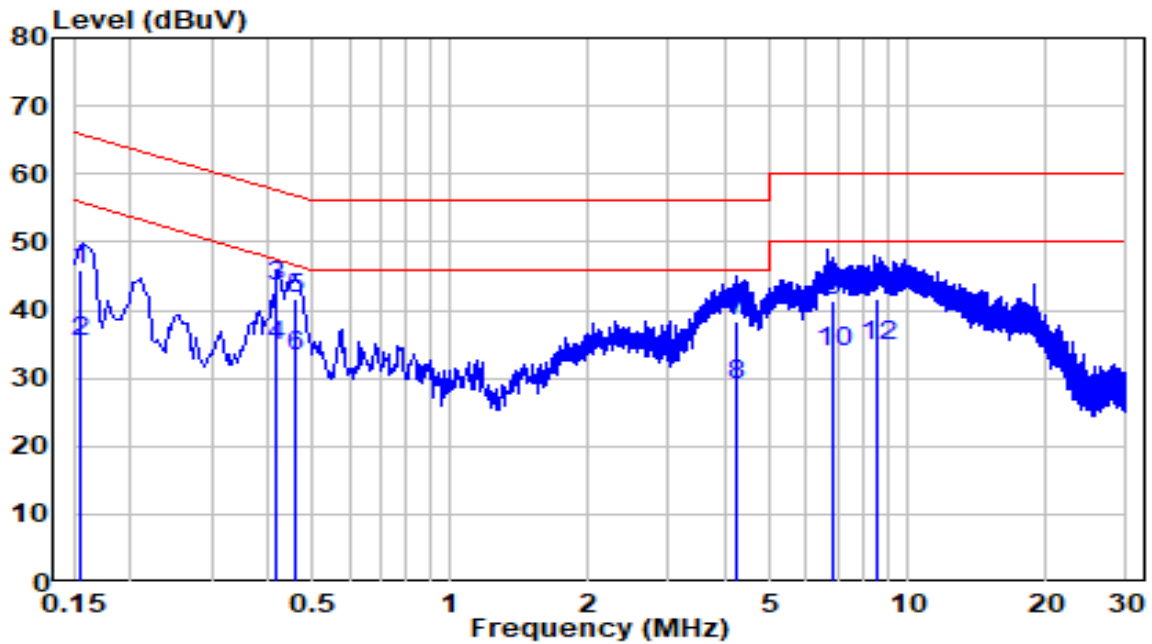
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.9.2. Test Setup



6.9.3. Test Result

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	ENV216_101683_L1_Filter Off_With Adapter	Temp. / Humidity	18.7°C /44.3%
Polarity	Line1	Site / Test Engineer	WZ-SR2 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2480MHz	Test Voltage	120V/60Hz

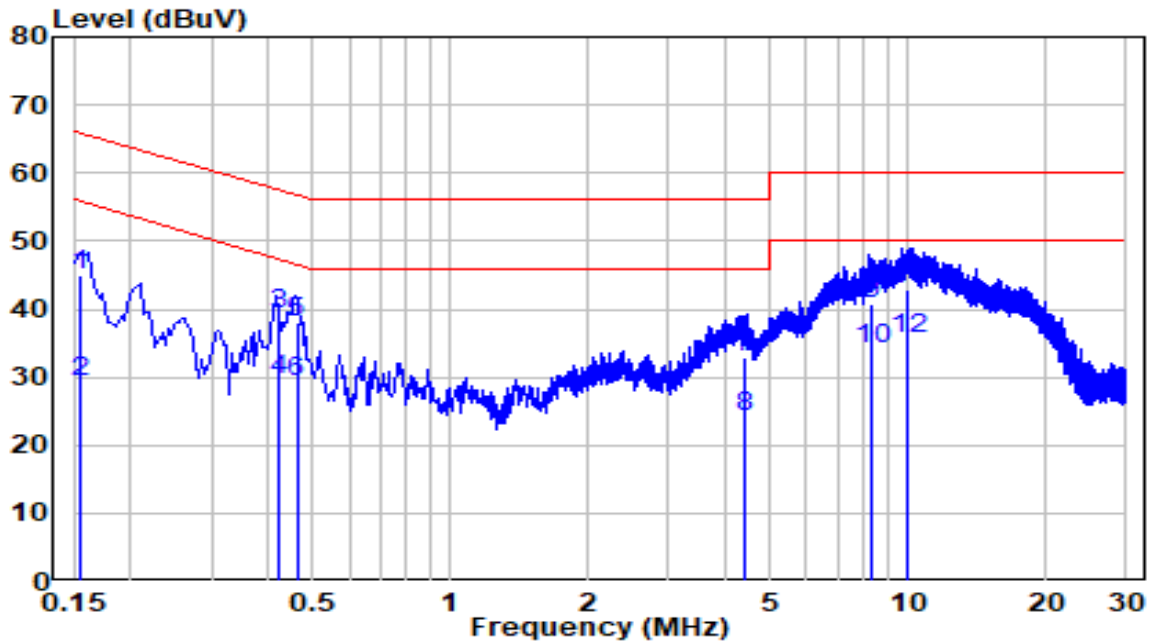


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	0.155	36.40	9.44	45.84	-19.89	65.73	QP
2	0.155	26.00	9.44	35.44	-20.29	55.73	AV
3	0.417	34.00	9.49	43.49	-14.02	57.51	QP
4	* 0.417	25.30	9.49	34.79	-12.72	47.51	AV
5	0.459	32.20	9.49	41.69	-15.02	56.71	QP
6	0.459	23.70	9.49	33.19	-13.52	46.71	AV
7	4.208	28.80	9.66	38.46	-17.54	56.00	QP
8	4.208	19.40	9.66	29.06	-16.94	46.00	AV
9	6.820	31.50	9.77	41.27	-18.73	60.00	QP
10	6.820	24.00	9.77	33.77	-16.23	50.00	AV
11	8.547	31.90	9.86	41.76	-18.24	60.00	QP
12	8.547	24.90	9.86	34.76	-15.24	50.00	AV

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = LISN Factor (dB)+ Cable Loss (dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Portable Wireless Receiver	Date of Test	2021-03-10
Factor	ENV216_101683_N_Filter Off_With Adapter	Temp. / Humidity	18.7°C /44.3%
Polarity	Neutral	Site / Test Engineer	WZ-SR2 / Buter Shi
Test Mode	Transmit by Zigbee Mode at Channel 2480MHz	Test Voltage	120V/60Hz



No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	0.155	35.60	9.44	45.04	-20.69	65.73	QP
2	0.155	19.90	9.44	29.34	-26.39	55.73	AV
3	0.420	29.60	9.49	39.09	-18.35	57.45	QP
4	0.420	20.00	9.49	29.49	-17.95	47.45	AV
5	0.461	28.63	9.50	38.13	-18.55	56.68	QP
6	0.461	19.70	9.50	29.20	-17.48	46.68	AV
7	4.407	23.10	9.67	32.77	-23.23	56.00	QP
8	4.407	14.60	9.67	24.27	-21.73	46.00	AV
9	8.327	31.00	9.86	40.86	-19.14	60.00	QP
10	8.327	24.10	9.86	33.96	-16.04	50.00	AV
11	9.931	32.90	9.94	42.84	-17.16	60.00	QP
12	* 9.931	25.70	9.94	35.64	-14.36	50.00	AV

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = LISN Factor (dB)+ Cable Loss (dB).
3. Measurement(dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- 4.The emission levels of other frequencies are very lower than the limit and not show in test report.

7. CONCLUSION

The data collected relate only the item(s) tested and show that the device is compliance with Part 15C of the FCC rules.

————— The End —————

Appendix A - Test Setup Photograph

Refer to "2101RSU056-UT" file.

Appendix B - EUT Photograph

Refer to "2101RSU056-UE" file.