FCC PART 15C
TESTREPORT
No. I16Z42400-SRD02

for

TCL Communication Ltd.

Home Bridge

Model Name: HB01

with

FCC ID: 2ACCJBC01

Hardware Version: V03

Software Version: HB01_00_01.00_24

Issued Date: 2017-01-05

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

No.52, HuayuanNorth Road, Haidian District, Beijing, P. R. China 100191.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I16Z42400-SRD02	Rev.0	1st edition	2017-01-05

CONTENTS

1. Test Laboratory

1.1. Testing Location

Conducted testing Location: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China100191

Radiated testing Location: CTTL(BDA)

Address: No. 18 Jia Kangding Street, BDA District, Beijing, P. R. China 100191

1.2. Testing Environment

Normal Temperature: 15-35℃

Extreme Temperature: -10/+55℃

Relative Humidity: 20-75%

1.3. Project data

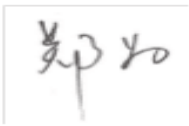
Testing Start Date: 2016-12-15

Testing End Date: 2017-01-05

1.4. Signature

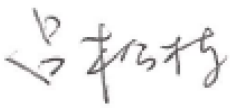
Jiang Xue

(Prepared this test report)



Zheng Wei

(Reviewed this test report)



Lv Songdong

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address /Post:	5F, C-Tower, No.232, Liangjing Road, Zhangjiang High-tech Park, Pudong, Shanghai, China
Contact Person:	Liu Feng
Contact Email	liu.feng@tcl.com
Telephone:	0755-33035419
Fax:	0755-33035419

2.2. Manufacturer Information

Company Name:	TCL Mobile Communication Co. Ltd. Huizhou
Address /Post:	70 Huifeng 4rd., ZhongKai High-Technology Development District, Huizhou, Guangdong, PRC. 516006
Contact Person:	Liu Feng
Contact Email	liu.feng@tcl.com
Telephone:	0755-33035419
Fax:	0755-33035460

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Home Bridge
Model name	HB01
FCC ID	2ACCJBC01
IC ID	/
With WLAN Function	Yes
Frequency Range	ISM 2400MHz~2483.5MHz
Type of Modulation	DQPSK
Number of Channels	11
Antenna	Integral Antenna
MAX Conducted Power	10.82dBm(OFDM)
Power Supply	3.8V DC by Battery

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	/	V03	HB01_00_01.00_24
EUT2	/	V03	HB01_00_01.00_24

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	USB cable	/
AE2	Travel charger	/

AE1

Model	CDA3122005C1
Manufacturer	PUAN
Length of cable	100cm

AE2

Model	UC11EU
Manufacturer	TENPAO
Length of cable	/

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment under Test (EUT) is a model of Home Bridge with integrated antenna .
It consists of normal options: travel charger, USB cable.
Manual and specifications of the EUT were provided to fulfil the test.
Samples undergoing test were selected by the client.

3.5. Interpretation of the Test Environment

For the test methods, the test environment uncertainty figures correspond to an expansion factor k=2.

Measurement Uncertainty

Parameter	Uncertainty
temperature	0.48°C
humidity	2 %
DC voltages	0.003V

4. Reference Documents

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz.	2015
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013

5. Test Results

5.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247 (b)	/	P
Peak Power Spectral Density	15.247 (e)	/	P
Occupied 6dB Bandwidth	15.247 (a)	/	P
Band Edges Compliance	15.247 (d)	/	P
Transmitter Spurious Emission - Conducted	15.247 (d)	/	P
Transmitter Spurious Emission - Radiated	15.247, 15.205, 15.209	/	P
AC Powerline Conducted Emission	15.107, 15.207	/	P

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NP	Not Perform, The test was not performed by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard
F	Fail, The EUT does not comply with the essential requirements in the standard

5.2. Statements

The test cases as listed in section 5.1 of this report for the EUT specified in section 3 was performed by CTTL and according to the standards or reference documents listed in section 4.2

The EUT met all requirements of the standards or reference documents, and only the WLAN function was tested in this report.

5.3. Test Conditions

T nom	Normal Temperature
T min	Low Temperature
T max	High Temperature
V nom	Normal Voltage

For this report, if the test cases listed above are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	T nom	26℃
Voltage	V nom	3.8V (By battery)
Humidity	H nom	44%

6. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	2016-06-07	2017-06-06
2	Test Receiver	ESCI	100344	Rohde & Schwarz	2016-03-02	2017-03-01
3	LISN	ESH3Z2	357881052	Rohde & Schwarz	2016-10-06	2017-10-05
4	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Test Receiver	ESCI 7	100948	Rohde & Schwarz	2016-07-06	2017-07-05
2	Loop antenna	HFH2-Z2	829324/007	Rohde & Schwarz	2014-12-17	2017-12-16
3	Antenna	VULB9163	301	Schwarzbeck	2014-12-17	2017-12-16
4	Dual-Ridge Waveguide Horn Antenna	3115	6914	EMCO	2014-12-16	2017-12-15
5	Dual-Ridge Waveguide Horn Antenna	3116	2661	ETS-Lindgren	2014-06-18	2017-06-17
6	Vector Signal Analyzer	FSV	101047	Rohde & Schwarz	2016-06-29	2017-06-28
7	Semi-anechoic chamber	/	CT000332-1074	Frankonia German	/	/

7. Measurement Uncertainty

7.1. Maximum Output Power

Measurement Uncertainty: 0.339dB,k=1.96

7.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dBm/MHz,k=1.96

7.3. DTS 6-dB Signal Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

7.4. Band Edges Compliance

Measurement Uncertainty : 0.62dBm,k=1.96

7.5. Transmitter Spurious Emission

Conducted (k=1.96)

Frequency Range	Uncertainty(dBm)
30MHz ≤ f ≤ 2GHz	1.22
2GHz ≤ f ≤3.6GHz	1.22
3.6GHz ≤ f ≤8GHz	1.22
8GHz ≤ f ≤12.75GHz	1.51
12.75GHz ≤ f ≤26GHz	1.51
26GHz ≤ f ≤40GHz	1.59

Radiated (k=2)

Frequency Range	Uncertainty(dBm)
30MHz ≤ f ≤ 1GHz	4.86
1GHz ≤ f ≤18GHz	5.26
18GHz ≤ f ≤40GHz	5.28

7.6. AC Power-line Conducted Emission

Measurement Uncertainty : 3.38dBm,k=2

ANNEX A: Detailed Test Results

A.1. Measurement Method

A.1.1. Conducted Measurements

Connect the EUT to the test system as Fig.A.1.1.1 shows.
Set the EUT to the required work mode.
Set the EUT to the required channel.
Set the Vector Signal Analyzer and start measurement.
Record the values. Vector Signal Analyzer

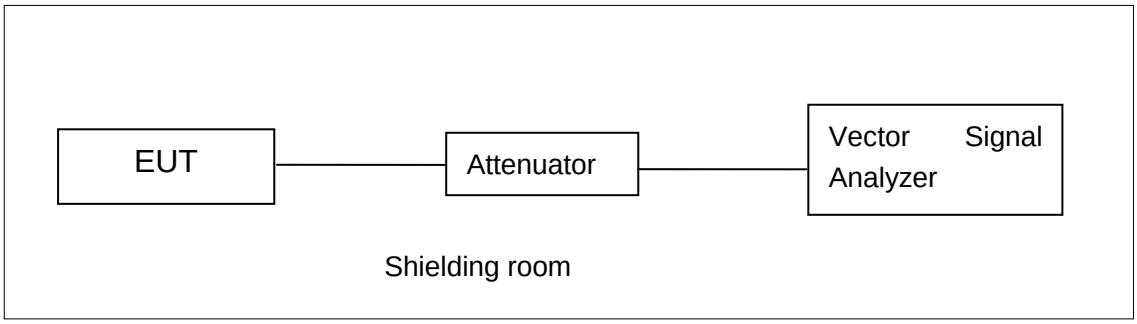


Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,
Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;
Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 10Hz;

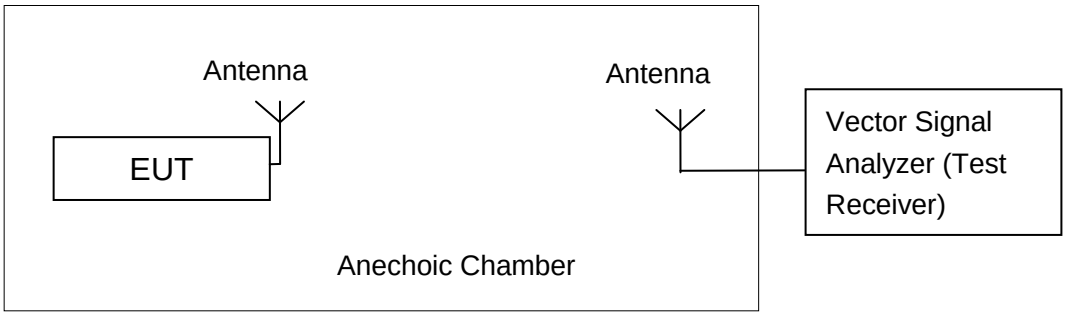


Fig.A.1.2.1: Test Setup Diagram for Radiated Measurements

A.2. Maximum Output Power

Method of Measurement: See ANSI C63.10-2013-clause 11.9.1.2

a) Set the RBW = 1MHz.
b) Set the VBW = 3MHz.
c) Set the span ≥ [1.5 × DTS bandwidth].
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select the peak detector).

Measurement Limit:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

EUT ID: EUT2

A.2.1. Peak Output Power-conducted

Measurement Results:

Mode	Test Result (dBm)		
	2405MHz (Ch11)	2440MHz (Ch18)	2480 MHz (Ch26)
ZigBee	9.62	10.82	10.60

Conclusion: Pass

A.2.2. Average Output Power-conducted

Method of Measurement: See ANSI C63.10-2013-clause 11.9.2.2.2

The procedure for this method is as follows:
a) Set span = 3MHz.
b) Set RBW = 100 kHz.
c) Set VBW = 300 kHz.
d) Number of points in sweep = 625
e) Sweep time = auto.
f) Detector = RMS.
g) The trigger shall be set to "free run."
h) Trace average 100 traces in power averaging (rms) mode.
i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges.

Mode	Test Result (dBm)		
	2405MHz (Ch11)	2440MHz (Ch18)	2480 MHz (Ch26)
ZigBee	7.07	7.83	7.78

Conclusion: Pass

A.3. Peak Power Spectral Density

Method of Measurement: See ANSI C63.10-2013-clause 11.10.2

a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to RBW = 3 kHz.
d) Set the VBW = 10 kHz.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.

Measurement Limit:

Standard	Limit
FCC CRF Part 15.247(e)	< 8 dBm/3 kHz

Measurement Results:

Mode	Frequency (MHz)	Power Spectral Density (dBm / MHz)		Conclusion
Zigbee	2405(CH11)	Fig.B.3.1	-4.79	**P**
	2440(CH18)	Fig.B.3.2	-4.05	**P**
	2480(CH26)	Fig.B.3.3	-4.75	**P**

Conclusion: Pass

Test graphs as below:

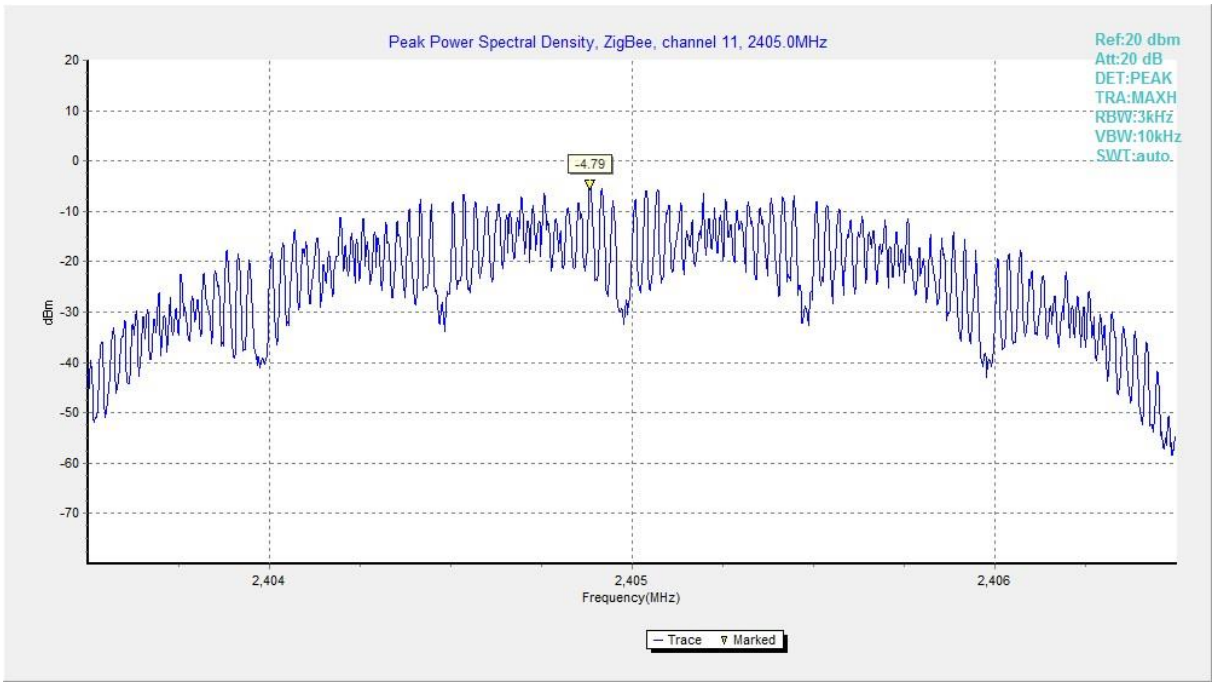


Fig.A.3.1 Power Spectral Density(802.11b,Ch 11)

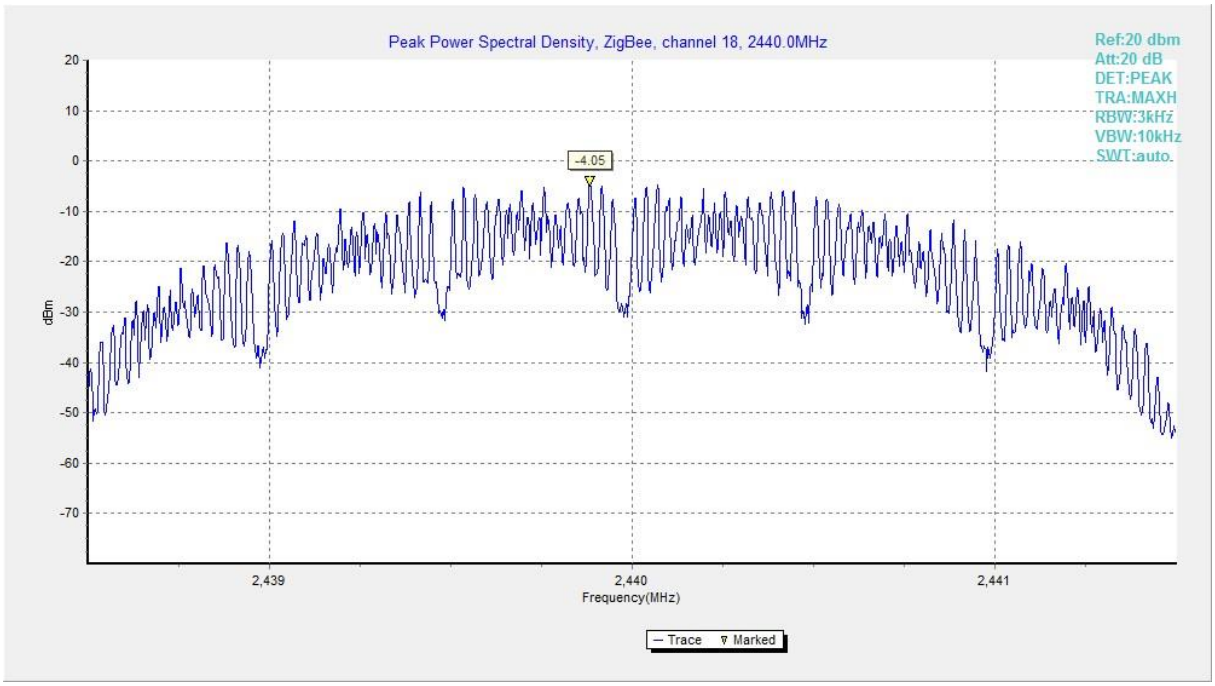


Fig.A.3.2 Power Spectral Density (802.11b, Ch 18)

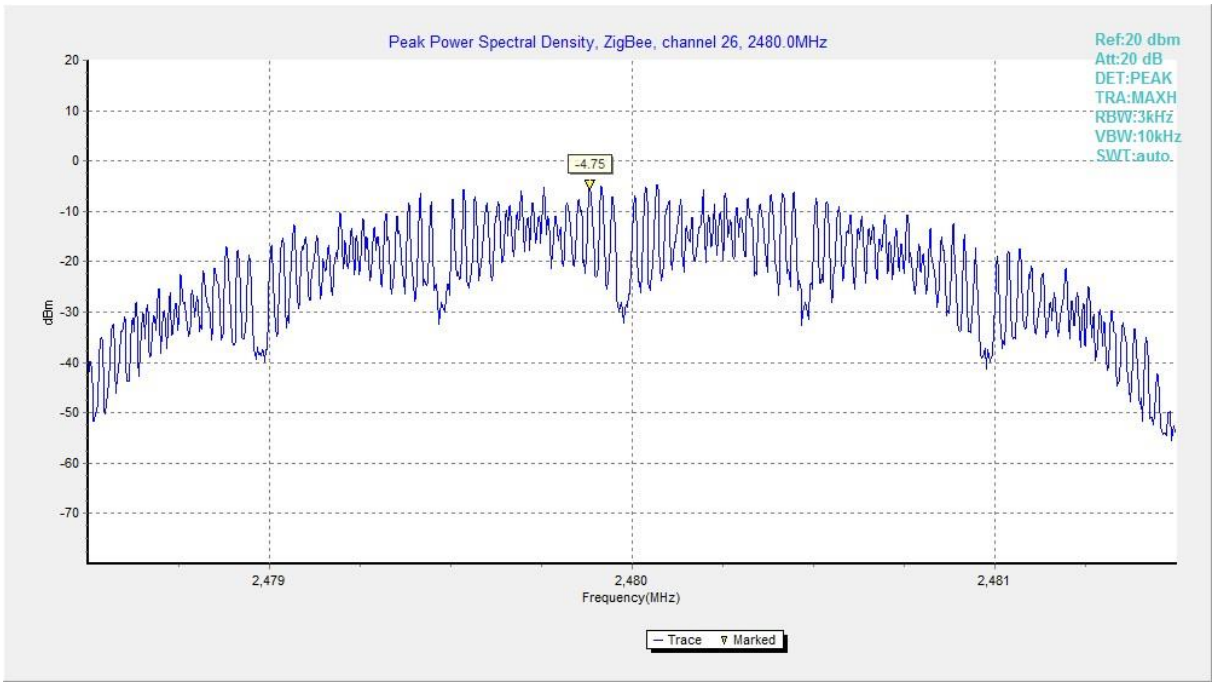


Fig.A.3.3 Power Spectral Density (802.11b, Ch 26)

A.4. DTS 6-dB Signal Bandwidth

Method of Measurement: See ANSI C63.10-2013 section 11.8.1.

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) = 300 kHz.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	≥ 500

EUT ID: EUT2

Measurement Result:

Mode	Frequency (MHz)	Occupied Channel Bandwidth (MHz)		Conclusion
Zigbee	2405	Fig.B.4.1.	1.54	**P**
	2440	Fig.B.4.2.	1.57	**P**
	2480	Fig.B.4.3.	1.55	**P**

Conclusion: Pass

Test graphs as below:

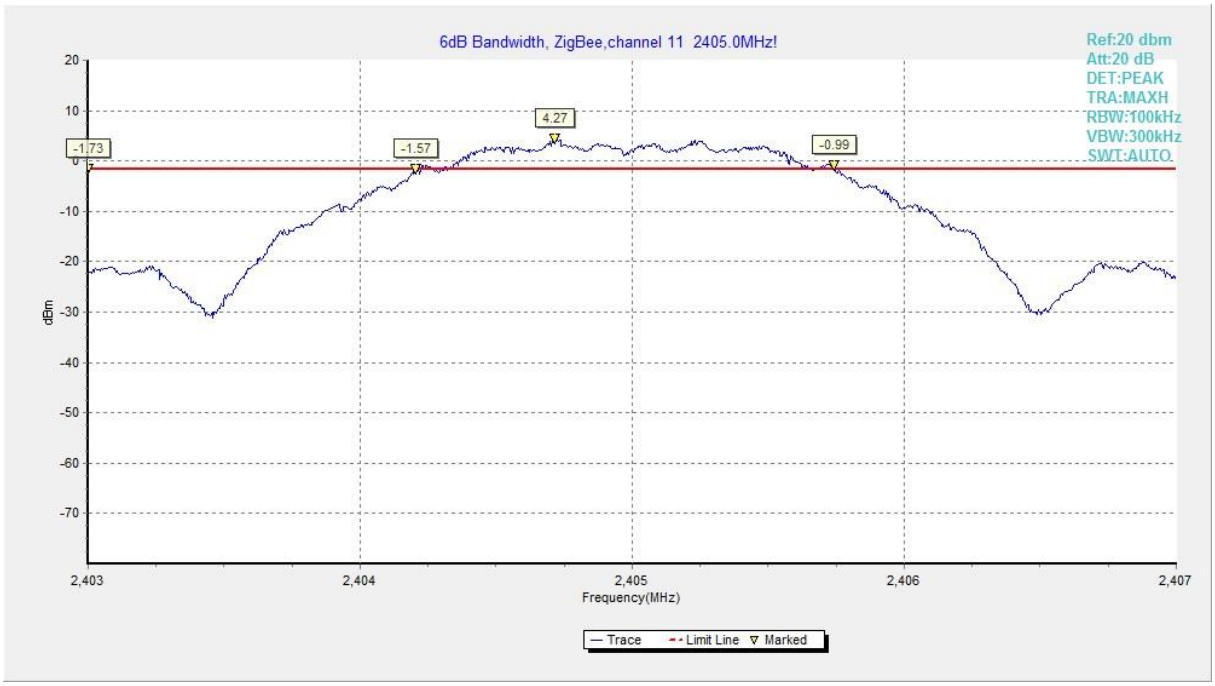


Fig.A.4.1 Occupied 6dB Bandwidth(Zigbee Channel 11)

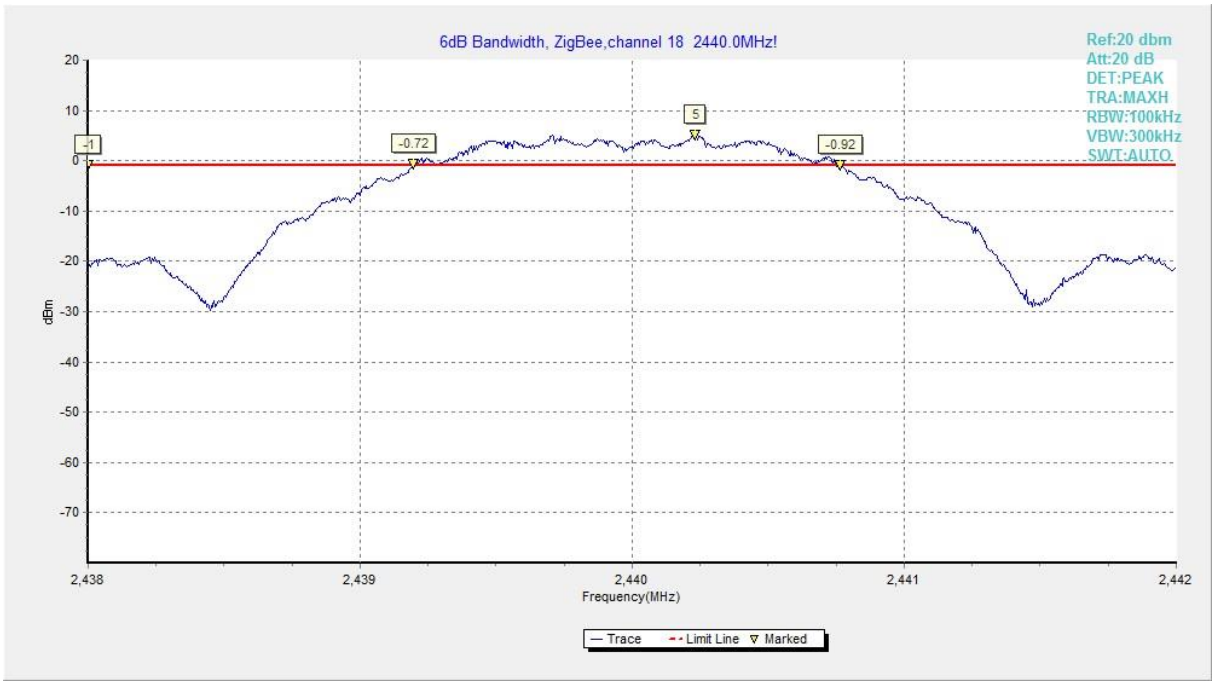


Fig.A.4.2 Occupied 6dB Bandwidth (Zigbee Channel 18)

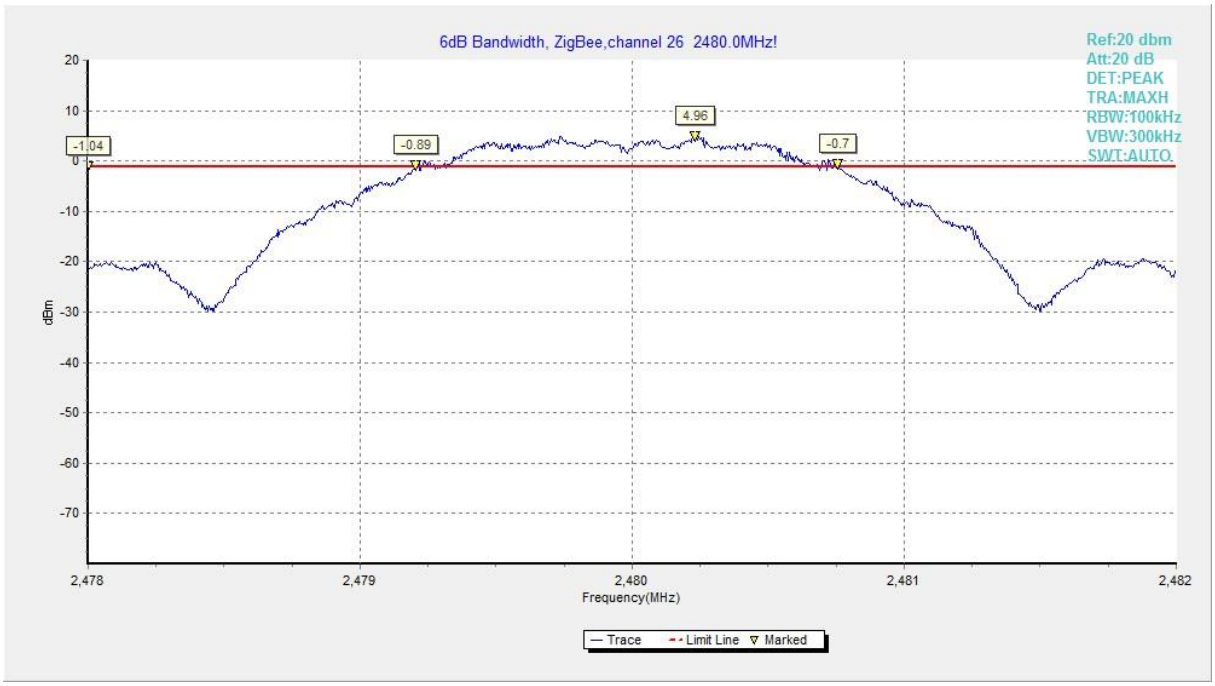


Fig.A.4.3 Occupied 6dB Bandwidth (Zigbee Channel 26)

A.5. Band Edges Compliance

Method of Measurement: See ANSI C63.10-2013-clause 6.10.4

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below.

a) Set Span = 100MHz
b) Sweep Time: coupled
c) Set the RBW= 100 kHz
c) Set the VBW= 300 kHz
d) Detector: Peak
e) Trace: Max hold

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 20

EUT ID: EUT2

Measurement Result:

Mode	Channel	Test Results	Conclusion
Zigbee	11	Fig.A.5.1	**P**
	26	Fig.A.5.2	**P**

Conclusion: Pass

Test graphs as below:

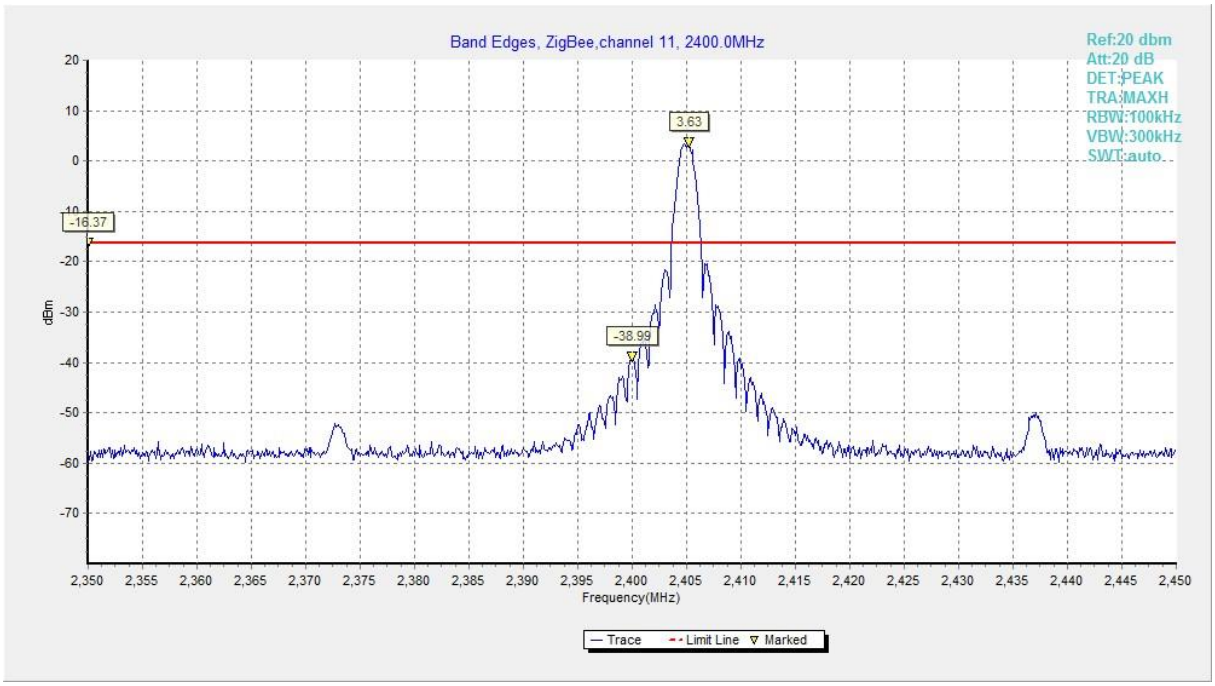


Fig.A.5.1 Band Edges (Zigbee Channel 11)

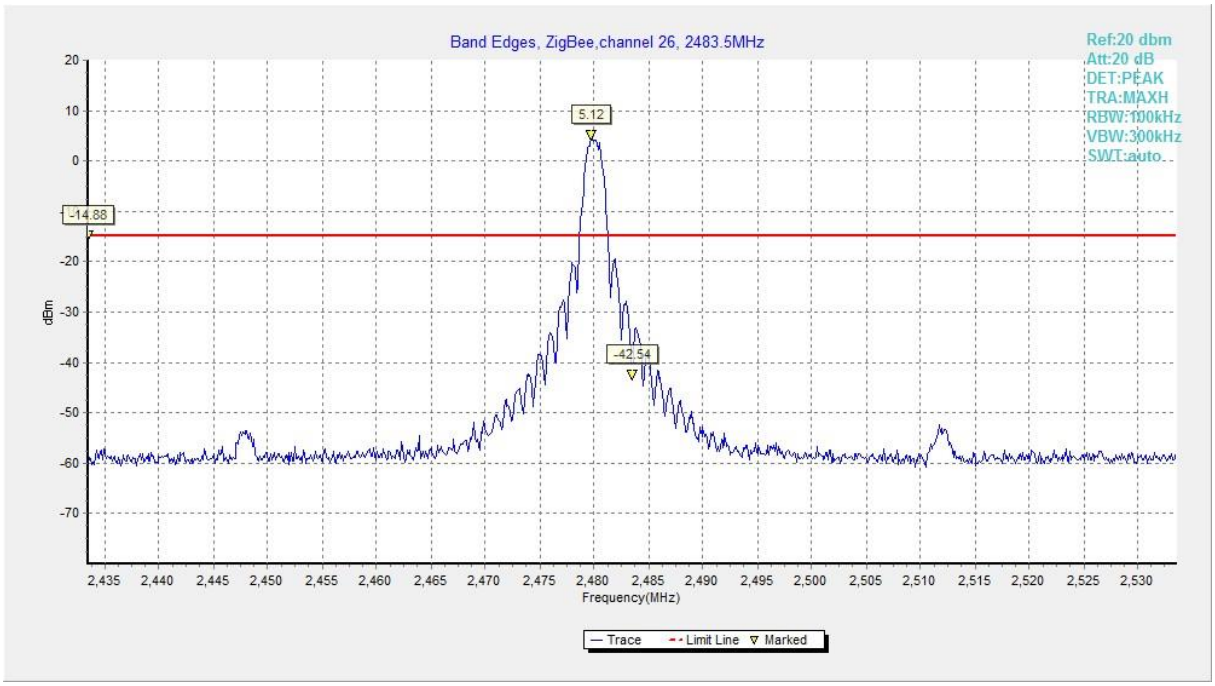


Fig.A.5.2 Band Edges (Zigbee Channel 26)

A.6. Transmitter Spurious Emission

A.6.1 Transmitter Spurious Emission – Conducted

Method of Measurement: See ANSI C63.10-2013-clause 11.11.2

Establish a reference level by using the following procedure:

a) Set instrument center frequency to DTS channel center frequency

b) Set the span to ≥ 1.5 times the DTS bandwidth

c) Set the RBW= 100 kHz

d) Set the VBW= 300 kHz

e) Detector = Peak

f) Sweep time = auto couple

g) Trace mode = max hold

h) Allow trace to fully stabilize

i) Use the peak marker function to determine the maximum PSD level

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Establish an emission level by using the following procedure:

a) Set the center frequency and span to encompass frequency range to be measured.

b) Set the RBW = 100 kHz.

c) Set the VBW = 300 kHz.

d) Detector = peak.

e) Sweep time = auto couple.

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz bandwidth

EUT ID: EUT2

Measurement Results:

802.11b mode

MODE	Channel	Frequency Range	Test Results	Conclusion
Zigbee	11	2.412 GHz	Fig.A.6.1.1	**P**
		30 MHz ~ 1 GHz	Fig.A.6.1.2	**P**
		1 GHz ~ 2.5 GHz	Fig.A.6.1.3	**P**
		2.5 GHz ~ 7.5 GHz	Fig.A.6.1.4	**P**
		7.5 GHz ~ 10 GHz	Fig.A.6.1.5	**P**
		10 GHz ~ 15 GHz	Fig.A.6.1.6	**P**
		15 GHz ~ 20 GHz	Fig.A.6.1.7	**P**
		20 GHz ~ 26 GHz	Fig.A.6.1.8	**P**
	18	2.437 GHz	Fig.A.6.1.9	**P**
		30 MHz ~ 1 GHz	Fig.A.6.1.10	**P**
		1 GHz ~ 2.5 GHz	Fig.A.6.1.11	**P**
		2.5 GHz ~ 7.5 GHz	Fig.A.6.1.12	**P**
		7.5 GHz ~ 10 GHz	Fig.A.6.1.13	**P**
		10 GHz ~ 15 GHz	Fig.A.6.1.14	**P**
		15 GHz ~ 20 GHz	Fig.A.6.1.15	**P**
		20 GHz ~ 26 GHz	Fig.A.6.1.16	**P**
	26	2.462 GHz	Fig.A.6.1.17	**P**
		30 MHz ~ 1 GHz	Fig.A.6.1.18	**P**
		1 GHz ~ 2.5 GHz	Fig.A.6.1.19	**P**
		2.5 GHz ~ 7.5 GHz	Fig.A.6.1.20	**P**
		7.5 GHz ~ 10 GHz	Fig.A.6.1.21	**P**
		10 GHz ~ 15 GHz	Fig.A.6.1.22	**P**
		15 GHz ~ 20 GHz	Fig.A.6.1.23	**P**
		20 GHz ~ 26 GHz	Fig.A.6.1.24	**P**

Conclusion: Pass

Test graphs as below:

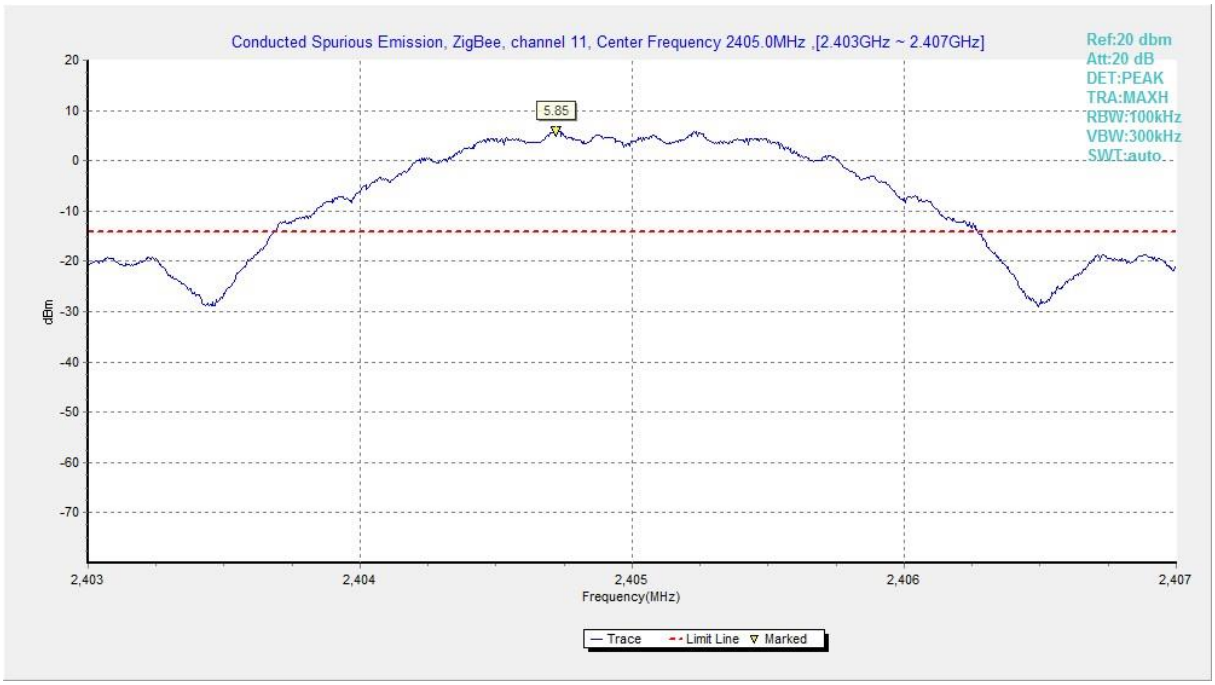


Fig.A.6.1.1 Transmitter Spurious Emission - Conducted (Zigbee Channel 11, Center Frequency)

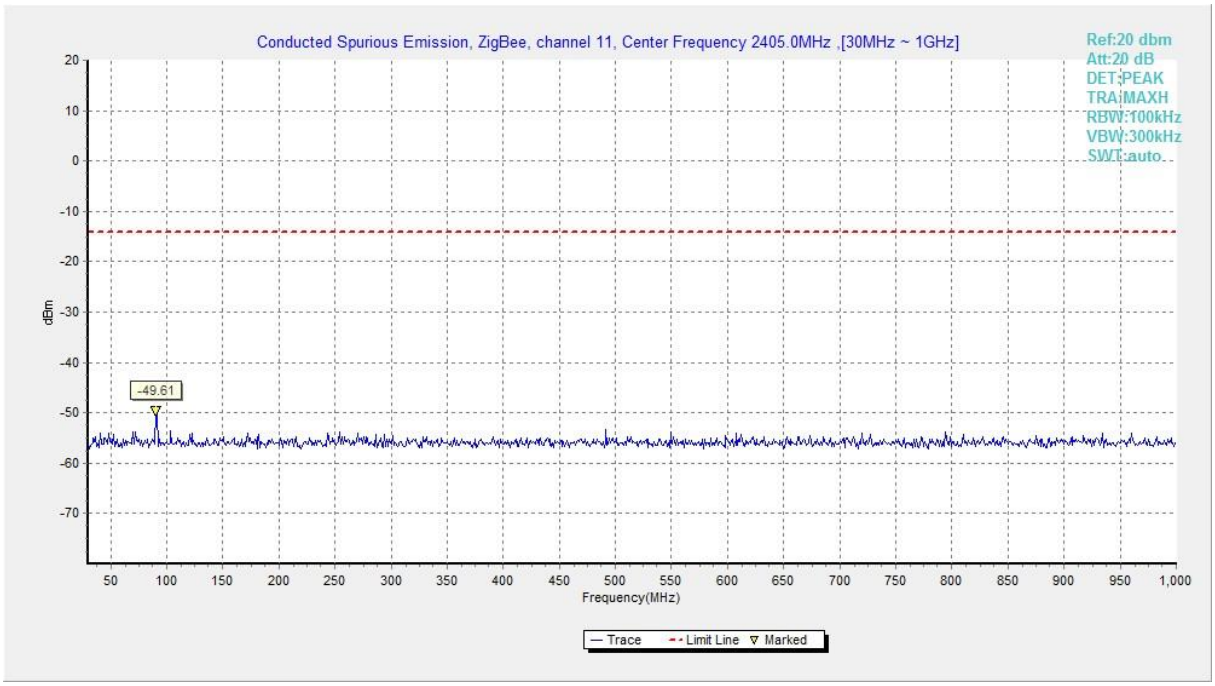


Fig.A.6.1.2 Transmitter Spurious Emission - Conducted (Zigbee Channel 11, 30 MHz-1 GHz)

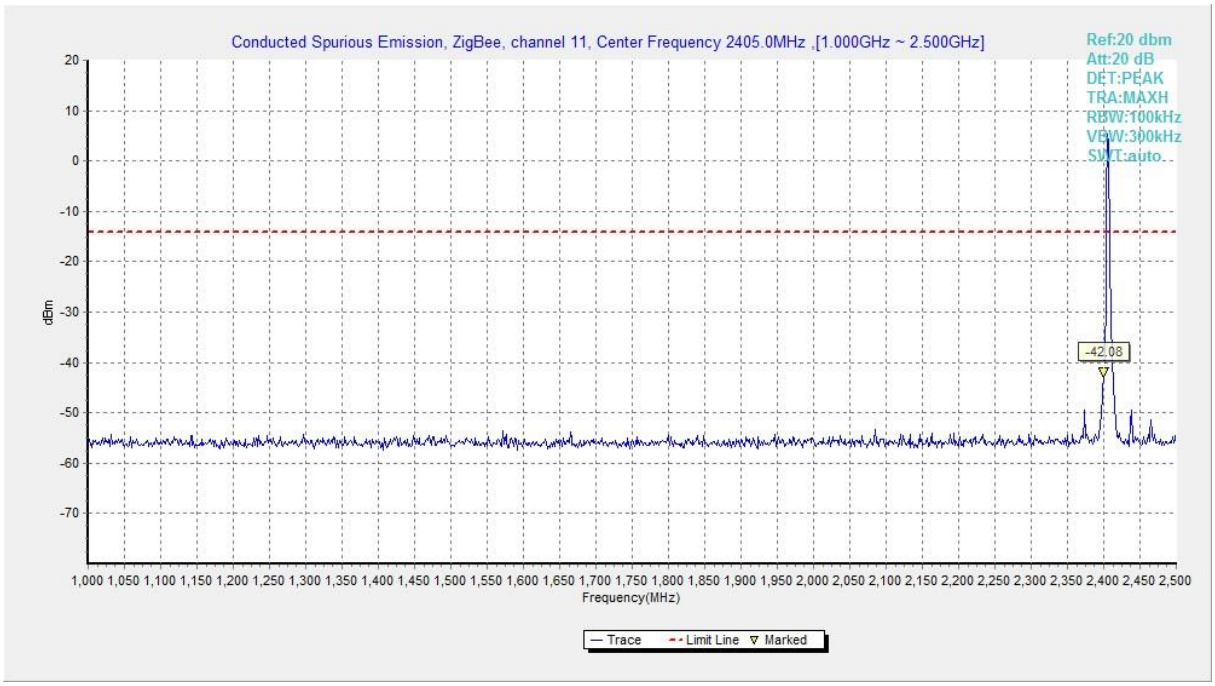


Fig.A.6.1.3 Transmitter Spurious Emission - Conducted (Zigbee Channel 11, 1 GHz-2.5 GHz)

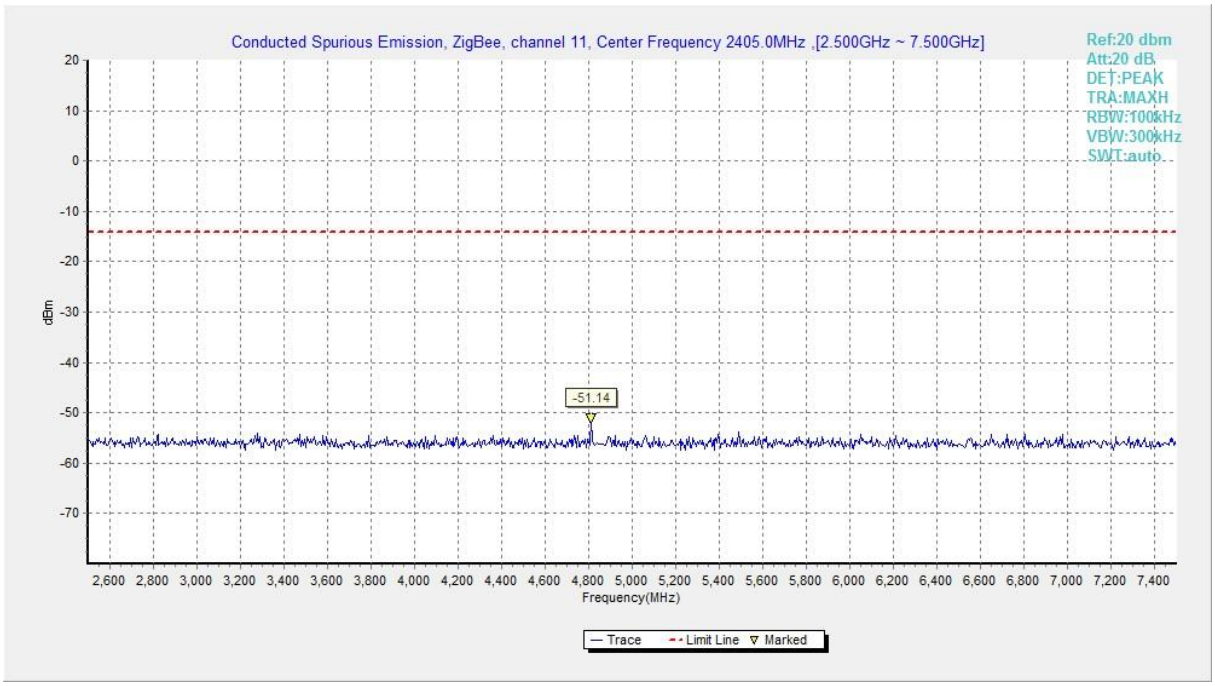


Fig.A.6.1.4 Transmitter Spurious Emission - Conducted (Zigbee Channel 11, 2.5 GHz-7.5 GHz)

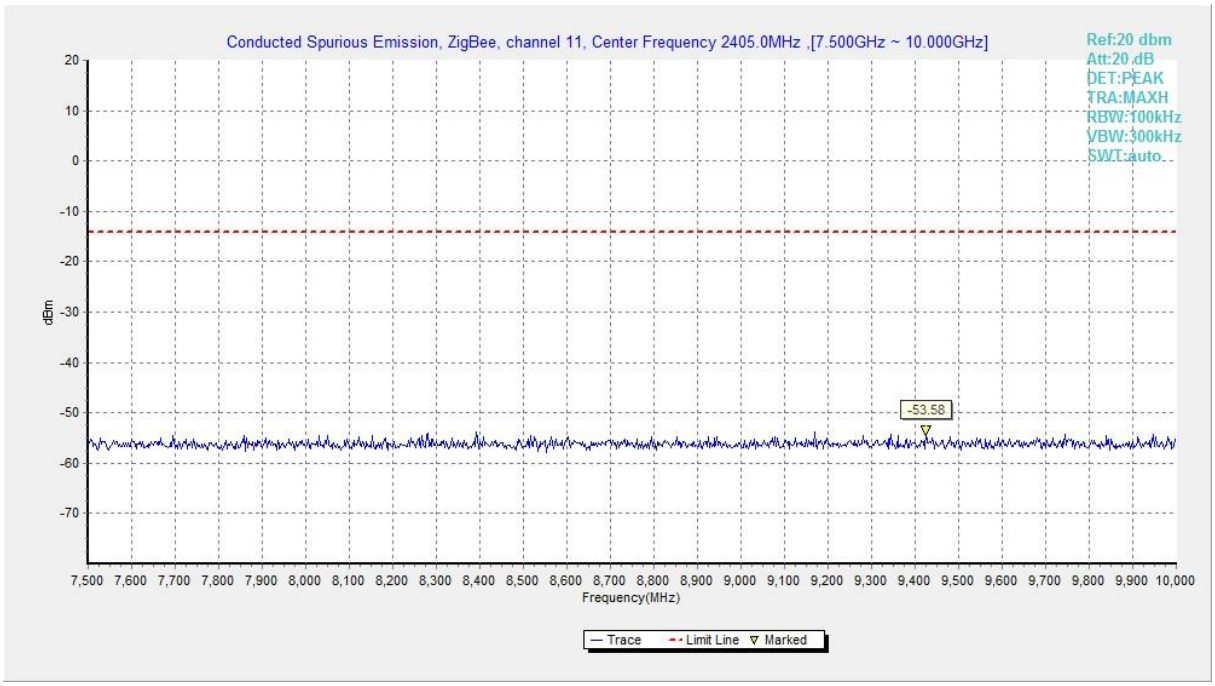


Fig.A.6.1.5 Transmitter Spurious Emission - Conducted (Zigbee Channel 11, 7.5 GHz-10 GHz)

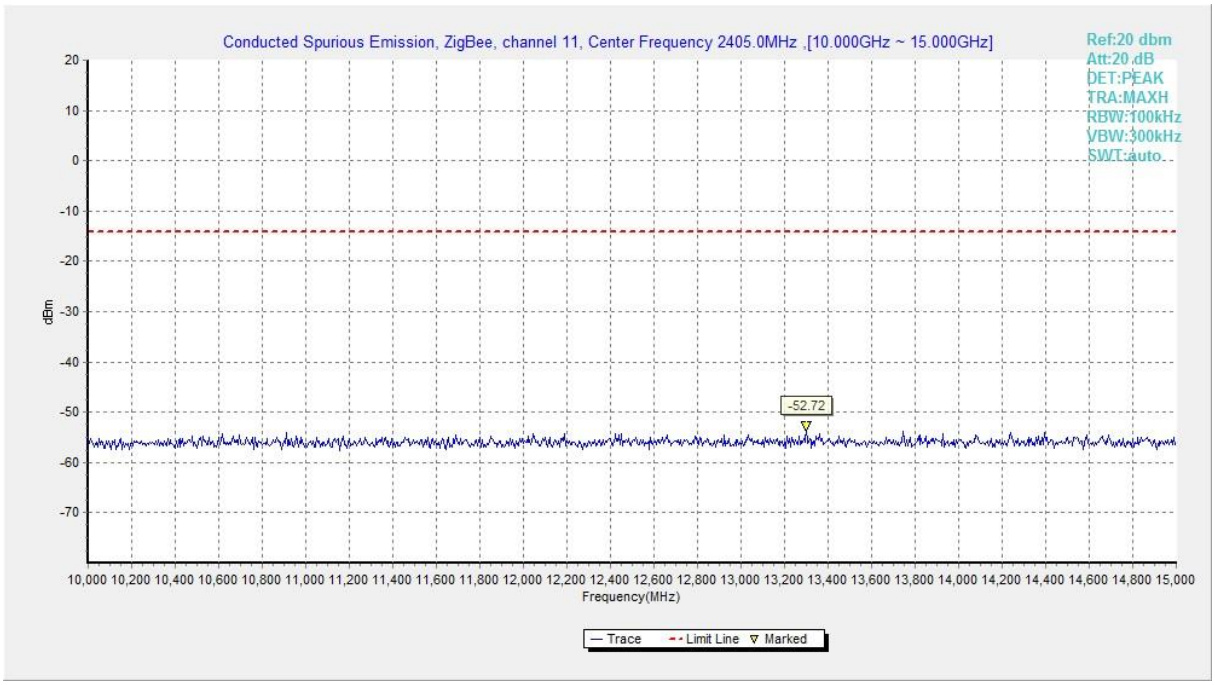


Fig.A.6.1.6 Transmitter Spurious Emission - Conducted (Zigbee Channel 11, 10 GHz-15 GHz)

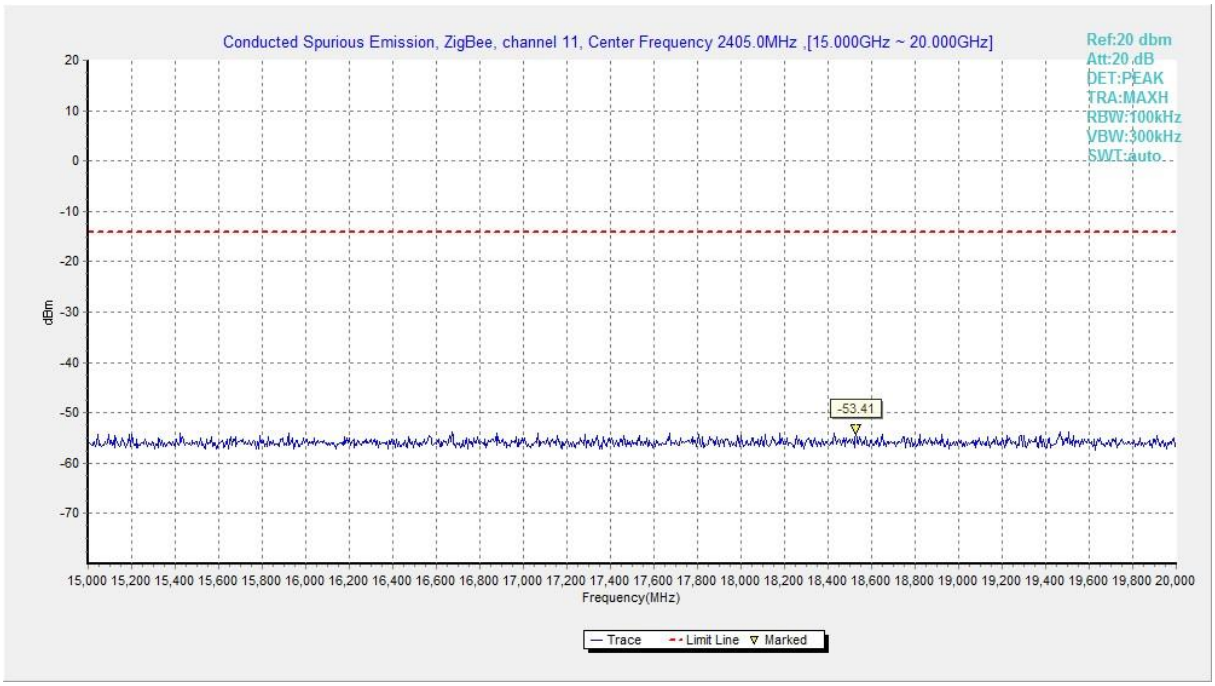


Fig.A.6.1.7 Transmitter Spurious Emission - Conducted (Zigbee Channel 11, 15 GHz-20 GHz)

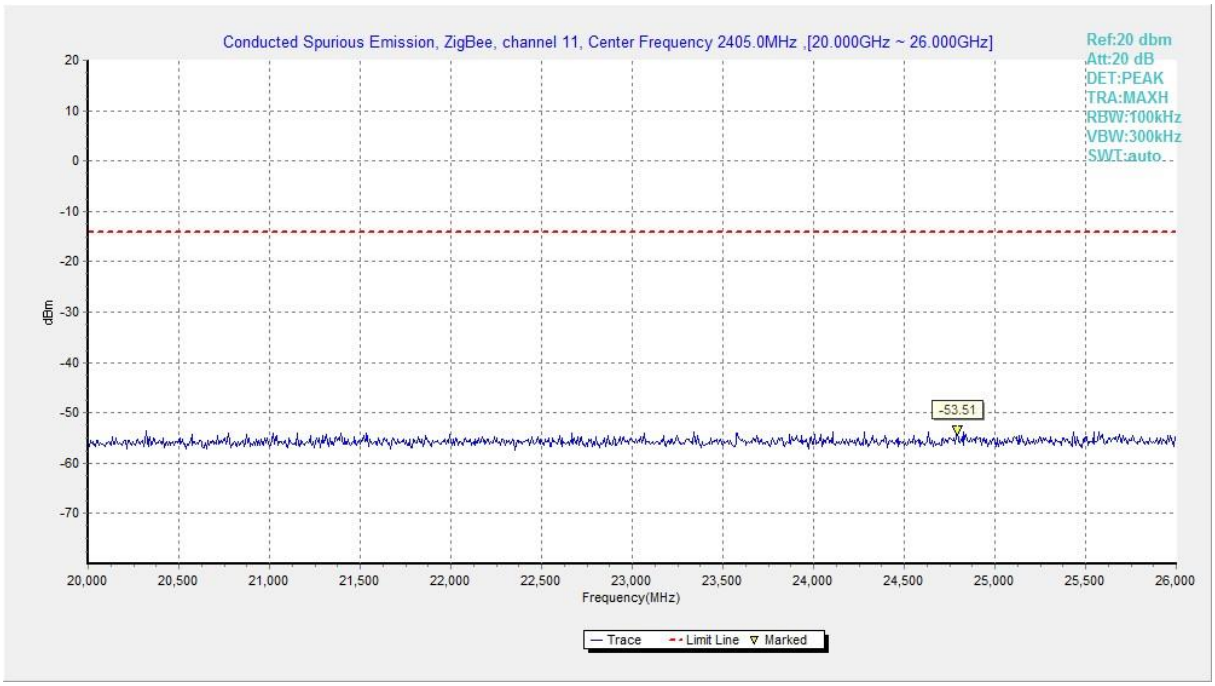


Fig.A.6.1.8 Transmitter Spurious Emission - Conducted (Zigbee Channel 11, 20 GHz-26 GHz)

Fig.A.6.1.9 Transmitter Spurious Emission - Conducted (Zigbee Channel 18, Center Frequency)

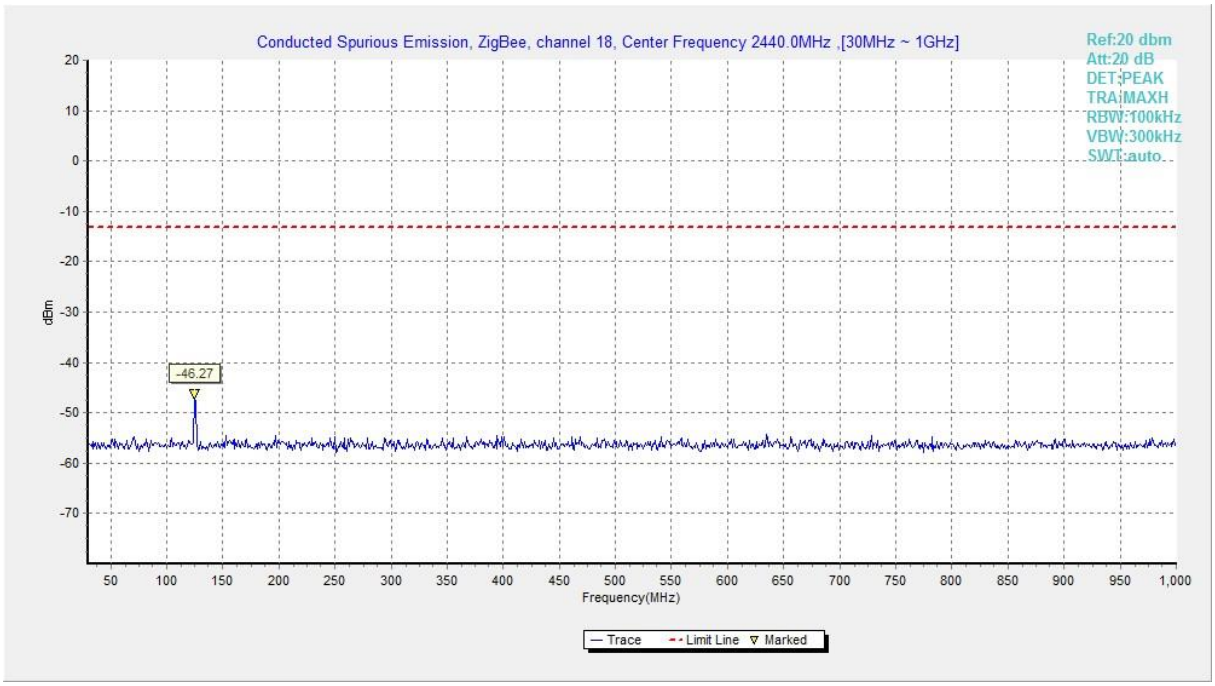


Fig.A.6.1.10 Transmitter Spurious Emission - Conducted (Zigbee Channel 18, 30 MHz-1 GHz)

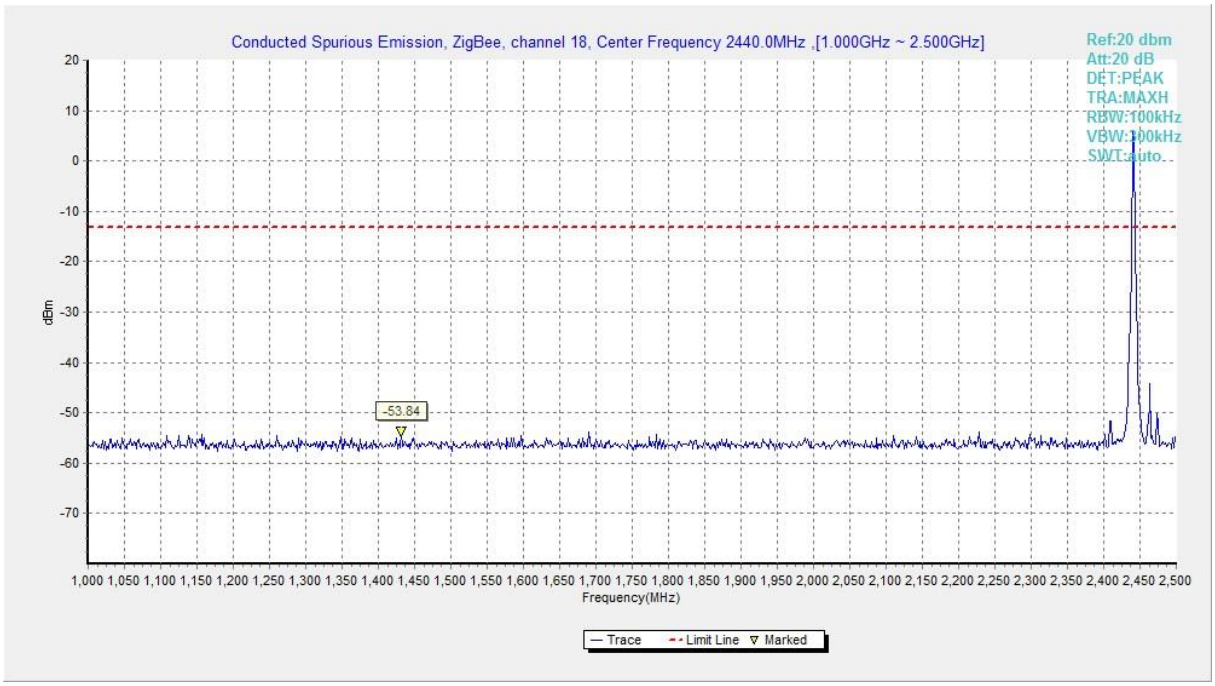


Fig.A.6.1.11 Transmitter Spurious Emission - Conducted (Zigbee Channel 18, 1 GHz-2.5 GHz)

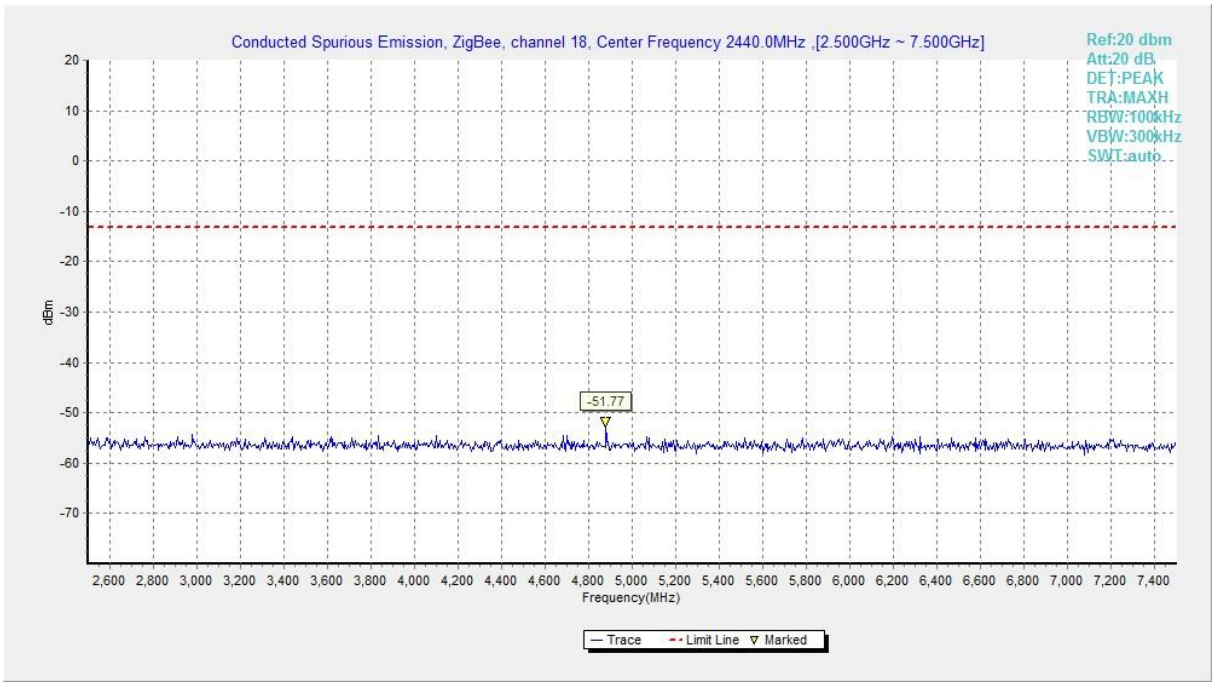


Fig.A.6.1.12 Transmitter Spurious Emission - Conducted (Zigbee Channel 18, 2.5 GHz-7.5 GHz)

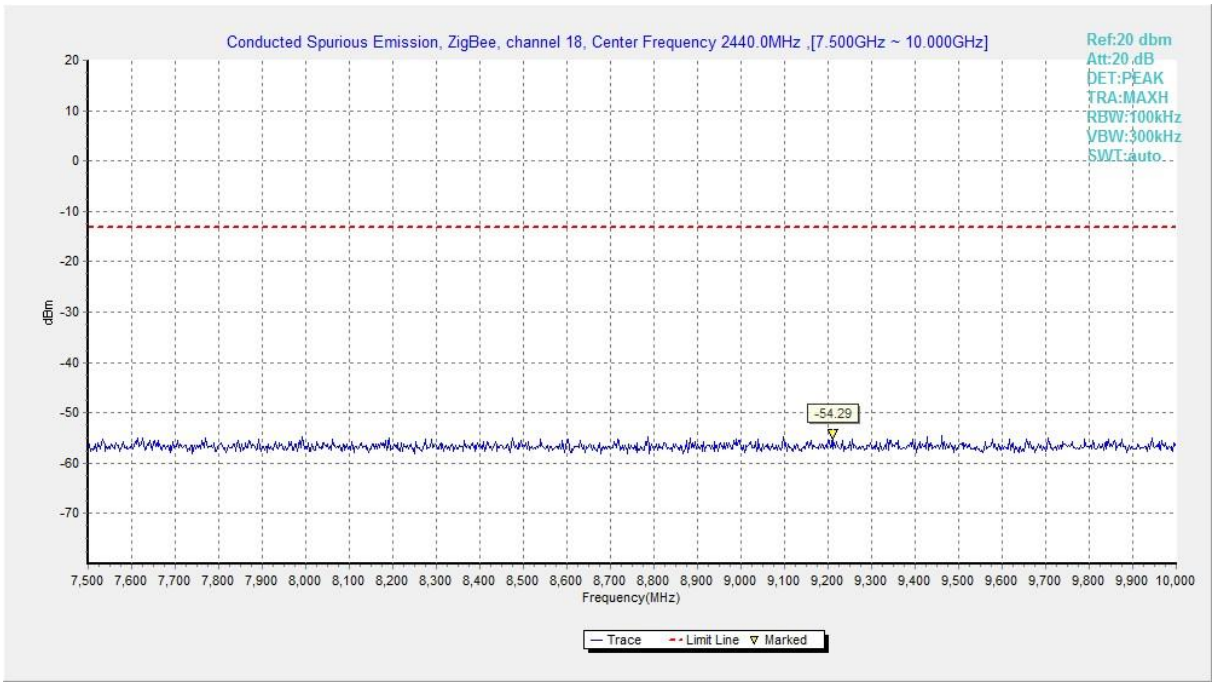


Fig.A.6.1.13 Transmitter Spurious Emission - Conducted (Zigbee Channel 18, 7.5 GHz-10 GHz)

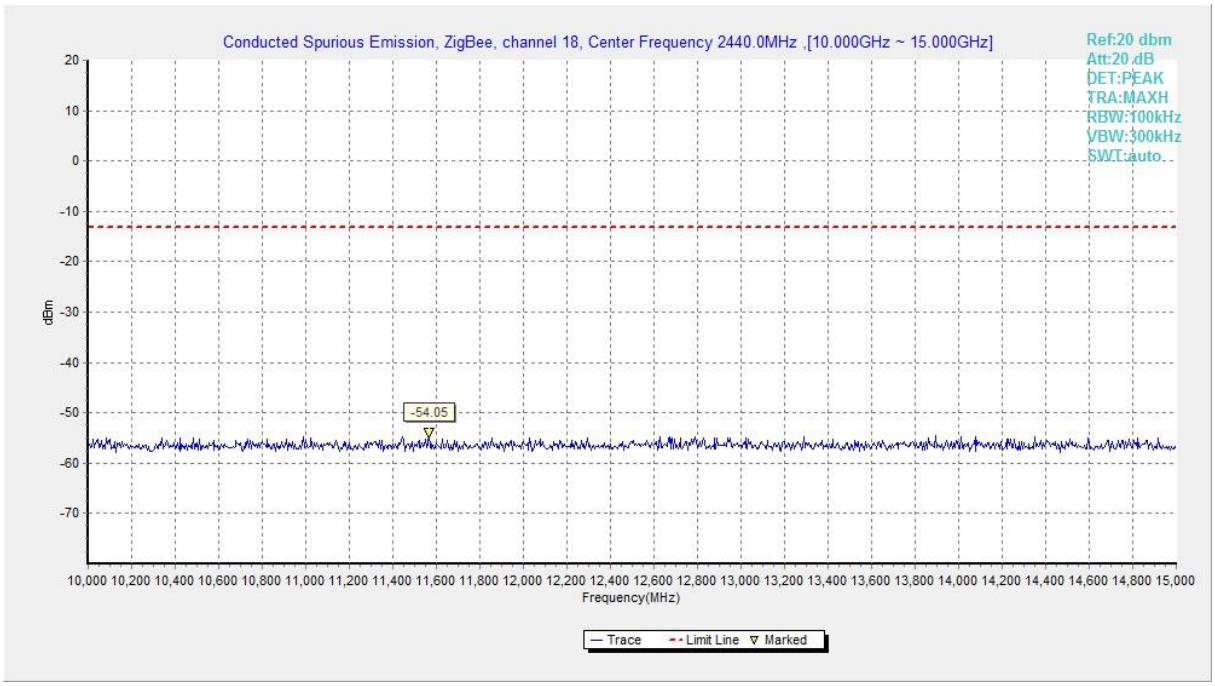


Fig.A.6.1.14 Transmitter Spurious Emission - Conducted (Zigbee Channel 18, 10 GHz-15 GHz)

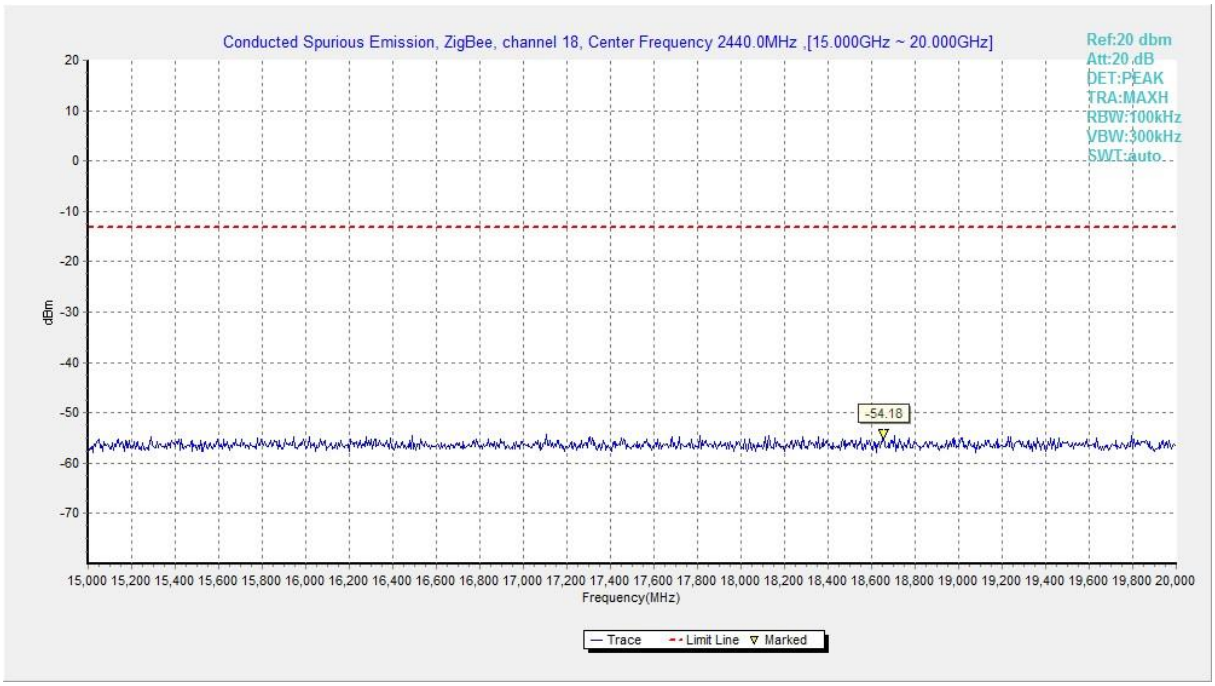


Fig.A.6.1.15 Transmitter Spurious Emission - Conducted (Zigbee Channel 18, 15 GHz-20 GHz)

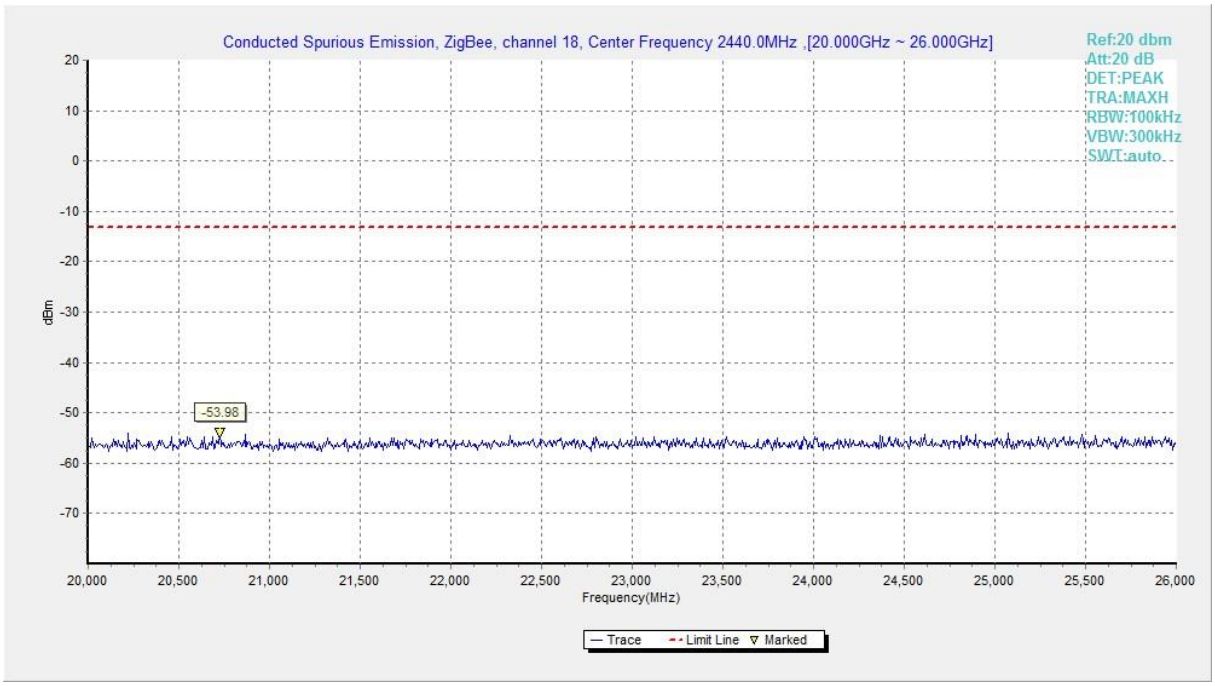


Fig.A.6.1.16 Transmitter Spurious Emission - Conducted (Zigbee Channel 18, 20 GHz-26 GHz)

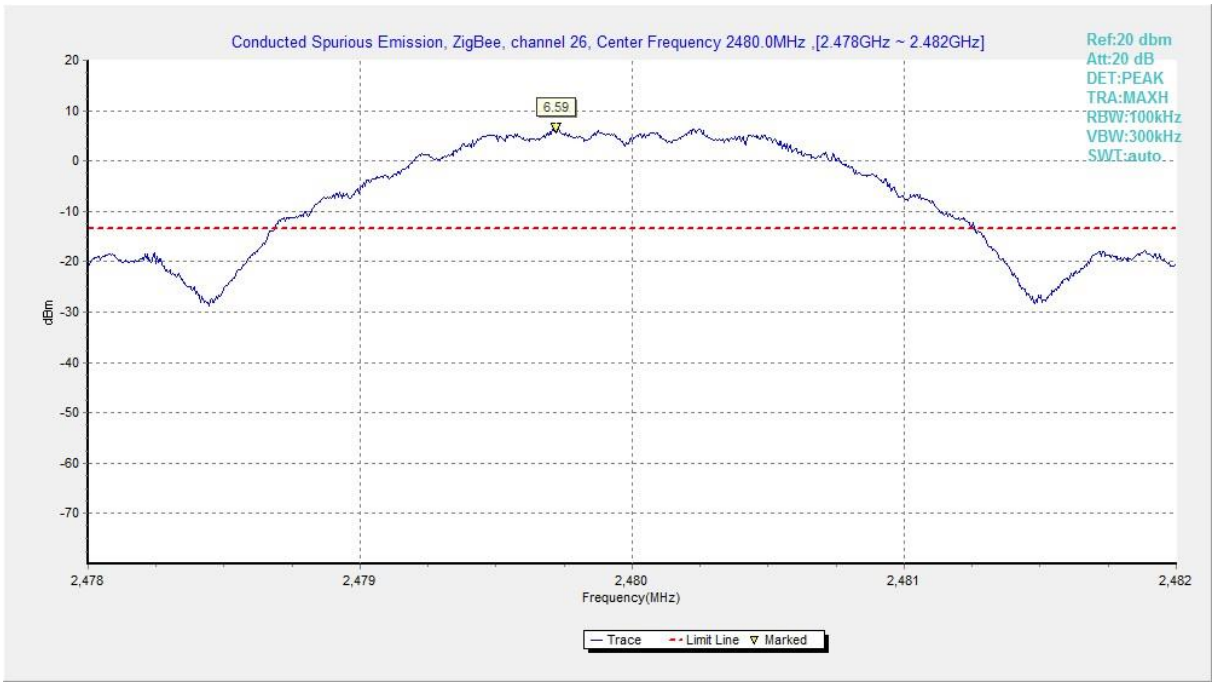


Fig.A.6.1.17 Transmitter Spurious Emission - Conducted (Zigbee Channel 26, Center Frequency)

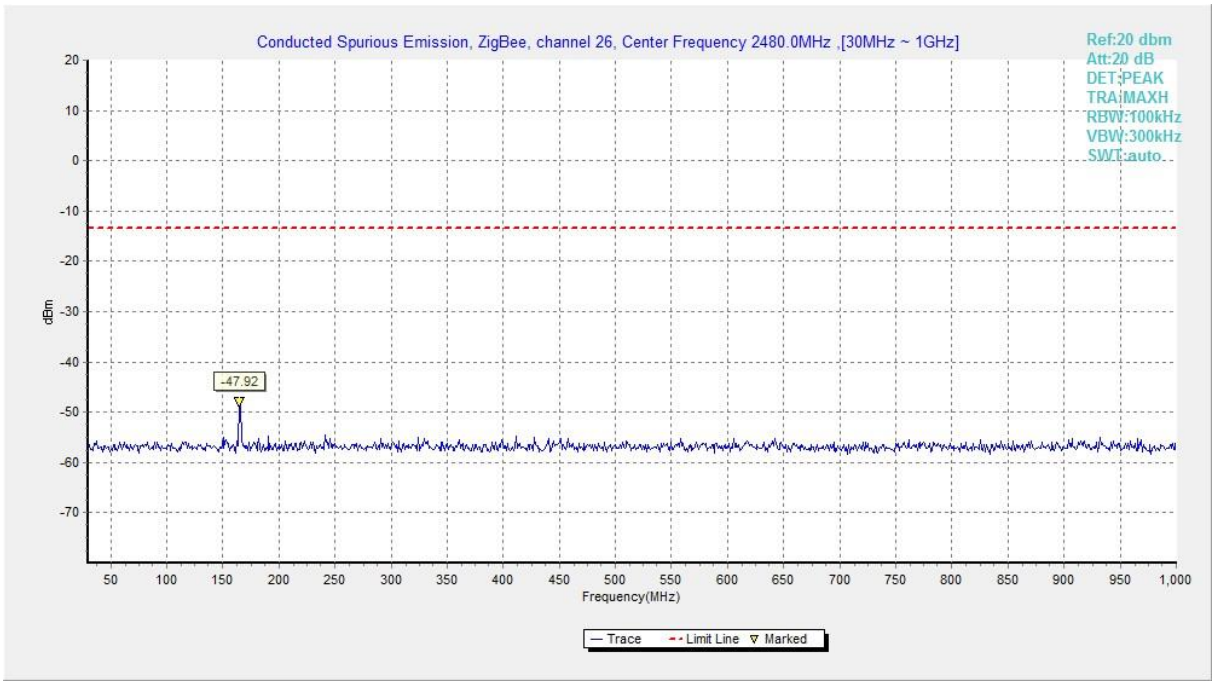


Fig.A.6.1.18 Transmitter Spurious Emission - Conducted (Zigbee Channel 26, 30 MHz-1 GHz)

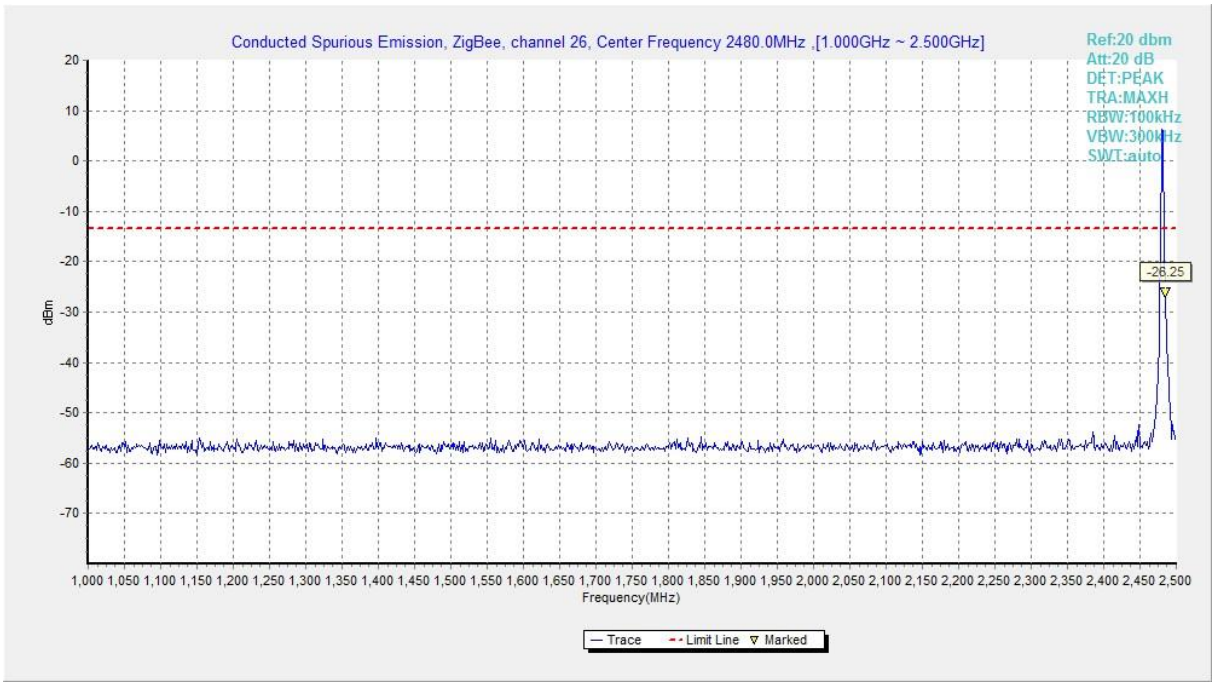


Fig.A.6.1.19 Transmitter Spurious Emission - Conducted (Zigbee Channel 26, 1 GHz-2.5 GHz)

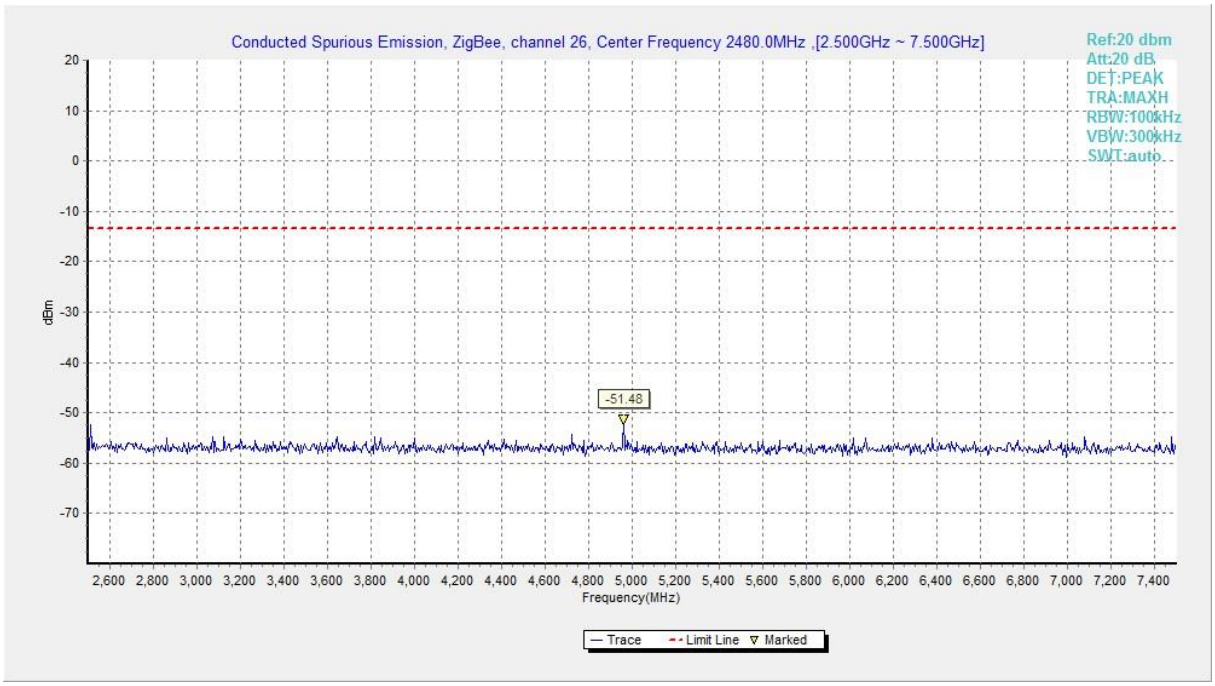


Fig.A.6.1.20 Transmitter Spurious Emission - Conducted (Zigbee Channel 26, 2.5 GHz-7.5 GHz)

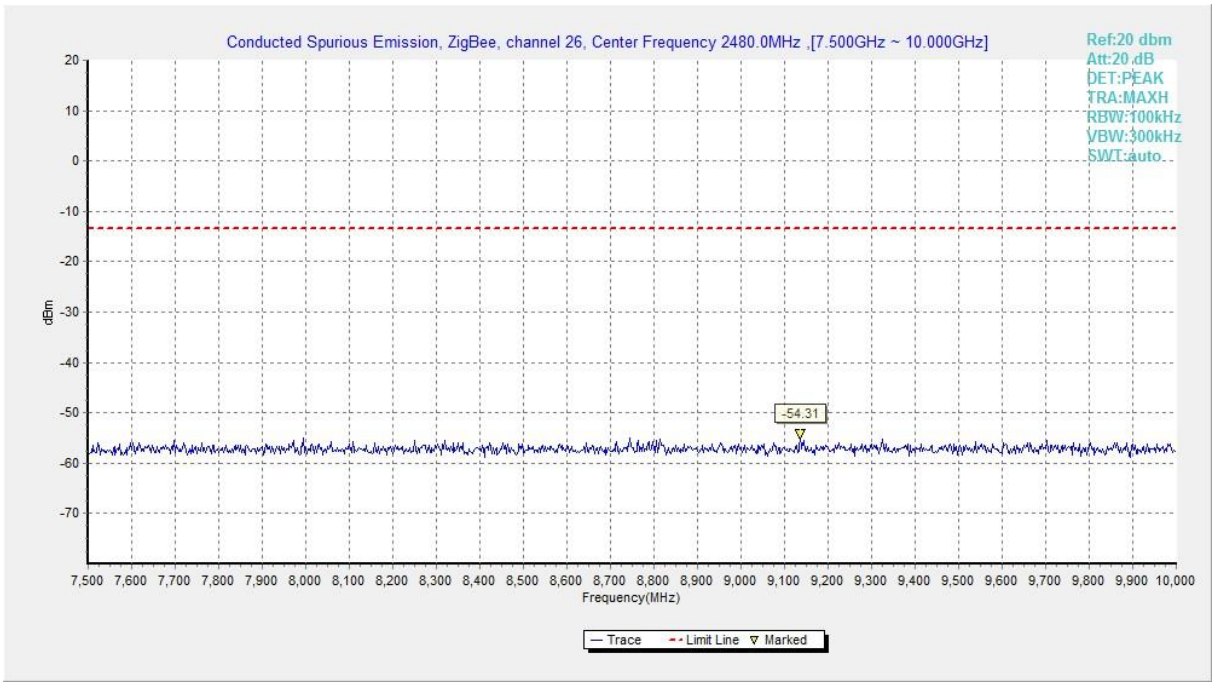


Fig.A.6.1.21 Transmitter Spurious Emission - Conducted (Zigbee Channel 26, 7.5 GHz-10 GHz)

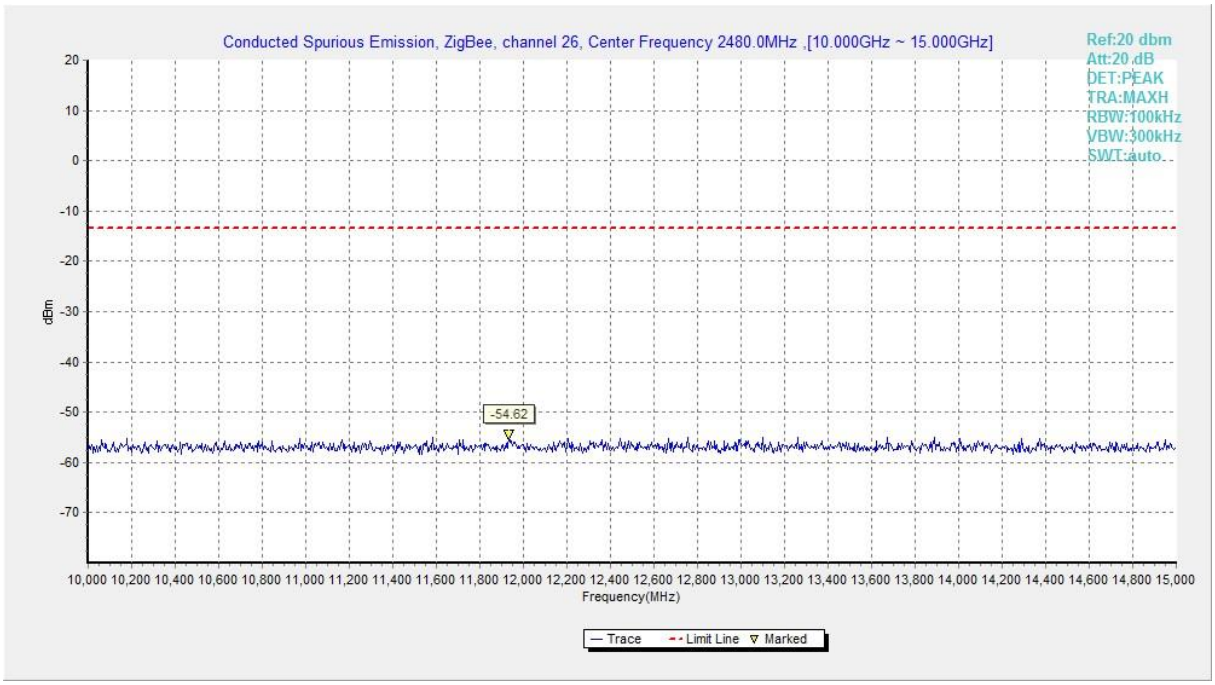


Fig.A.6.1.22 Transmitter Spurious Emission - Conducted (Zigbee Channel 26, 10 GHz-15 GHz)

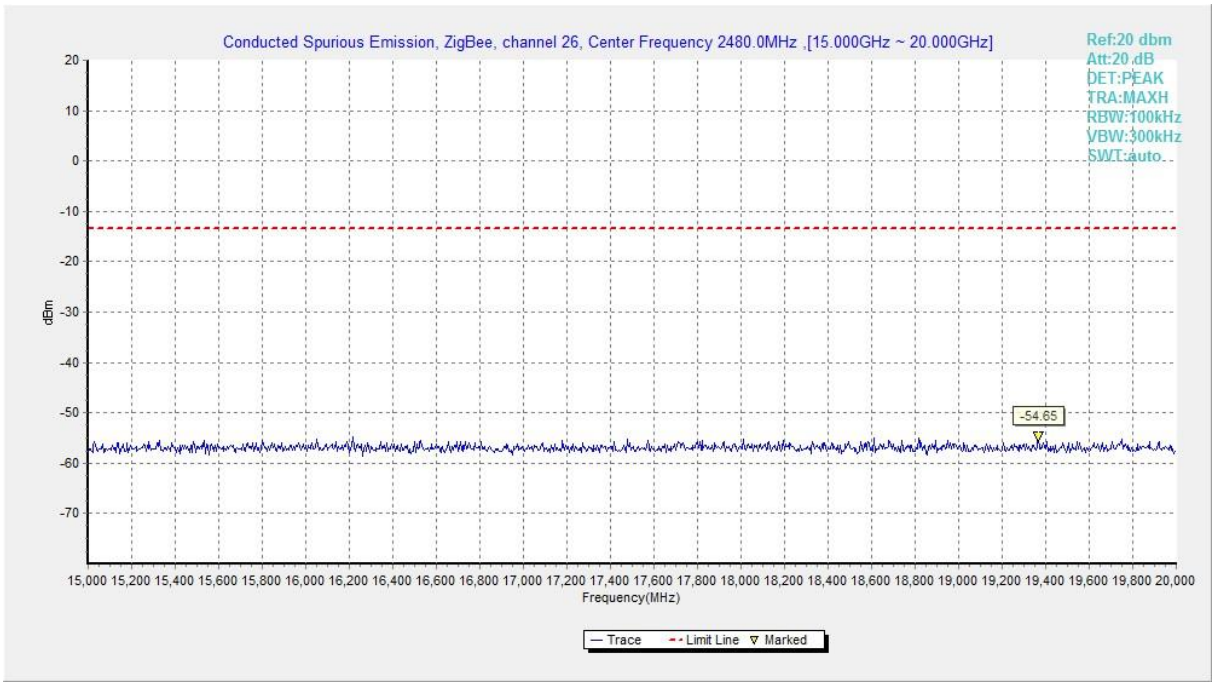


Fig.A.6.1.23 Transmitter Spurious Emission - Conducted (Zigbee Channel 26, 15 GHz-20 GHz)

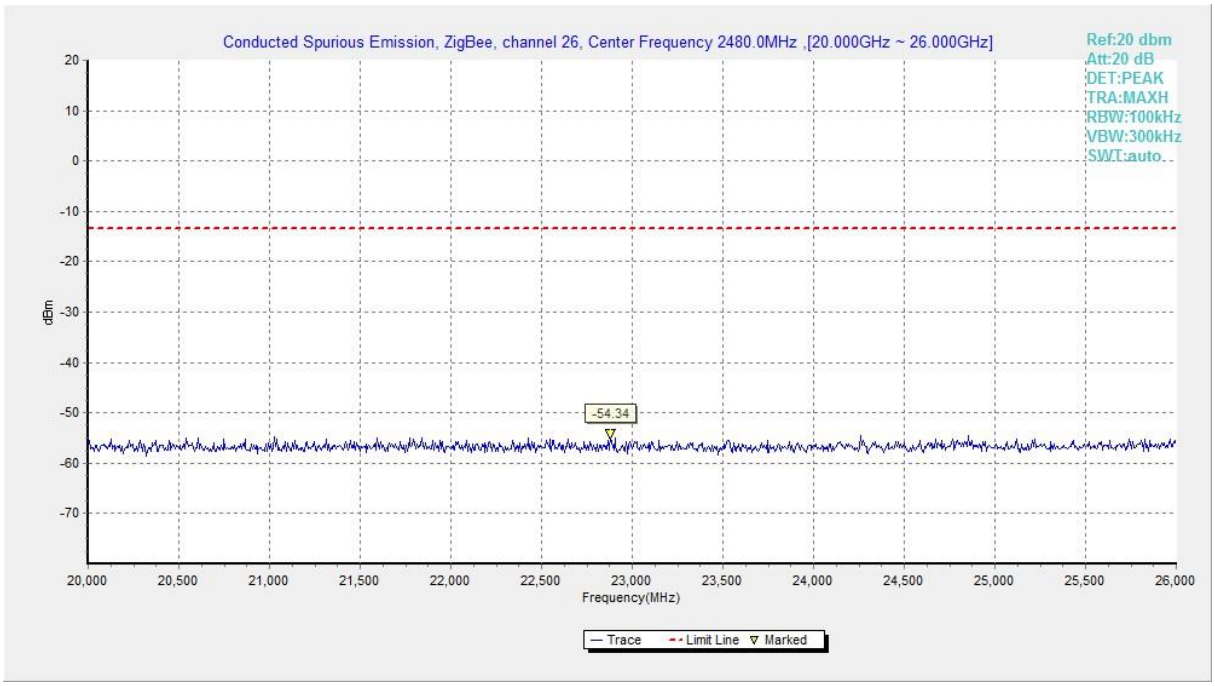


Fig.A.6.1.24 Transmitter Spurious Emission - Conducted (Zigbee Channel 26, 20 GHz-26 GHz)

A.6.2 Transmitter Spurious Emission - Radiated

Method of Measurement: See ANSI C63.10-2013-clause 6.4 &6.5 & 6.6

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

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

Limit in restricted band:

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Frequency (MHz)	Field strength(μV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Test Condition

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100KHz/300KHz	5
1000-4000	1MHz/1MHz	15
4000-18000	1MHz/1MHz	40
18000-26500	1MHz/1MHz	20

EUT ID: EUT1

Measurement Results:

Zigbee

Mode	Channel	Frequency Range	Test Results	Conclusion
Zigbee	Power	2.38GHz ~2.45GHz	Fig.A.6.2.1	**P**
	11	1 GHz ~ 3 GHz	Fig.A.6.2.2	**P**
		3 GHz ~ 18 GHz	Fig.A.6.2.3	**P**
	18	9 kHz ~30 MHz	Fig.A.6.2.4	**P**
		30 MHz ~1 GHz	Fig.A.6.2.5	**P**
		1 GHz ~ 3 GHz	Fig.A.6.2.6	**P**
		3 GHz ~ 18 GHz	Fig.A.6.2.7	**P**
		18 GHz~ 26.5 GHz	Fig.A.6.2.8	**P**
	Power	2.45GHz ~2.5GHz	Fig.A.6.2.9	**P**
	26	1 GHz ~ 3 GHz	Fig.A.6.2.10	**P**
		3 GHz ~ 18 GHz	Fig.A.6.2.11	**P**

Conclusion: Pass

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

Result=P_{Mea}+$A_{Rpl=}$ P_{Mea}+Cable Loss+Antenna Factor

Average Result:

Zigbee

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2389.215	41.1	-38.8	27.7	52.200	V
17999.000	47.7	-17.7	45.6	19.800	H
17999.500	47.6	-17.7	45.6	19.700	V
17998.000	47.5	-17.7	45.6	19.600	H
17986.500	47.4	-17.7	45.6	19.500	H
17992.000	47.4	-17.7	45.6	19.500	V

Ch18

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17993.000	47.6	-17.7	45.6	19.700	H
18000.000	47.5	-45.6	44.5	48.566	H
17998.500	47.4	-17.7	45.6	19.500	V
17987.000	47.4	-17.7	45.6	19.500	V
17994.000	47.3	-17.7	45.6	19.400	H
17972.500	47.3	-17.7	45.6	19.400	H

Ch26

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2486.820	42.2	-38.9	27.7	53.400	V
17997.000	47.5	-17.7	45.6	19.600	V
17992.000	47.5	-17.7	45.6	19.600	H
17999.500	47.4	-17.7	45.6	19.500	V
17990.000	47.4	-17.7	45.6	19.500	H
17985.000	47.4	-17.7	45.6	19.500	H

Peak Result:

Zigbee

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2389.570	68.1	-38.8	27.7	79.200	V
17990.500	58.6	-17.7	45.6	30.700	H
17983.500	58.4	-17.7	45.6	30.500	V
17977.500	58.3	-17.7	45.6	30.400	H
17980.000	58.2	-17.7	45.6	30.300	H
17963.500	58.2	-17.7	45.6	30.300	H

Ch18

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17978.000	58.2	-17.7	45.6	30.300	H
17992.000	58.2	-17.7	45.6	30.300	V
17974.500	58.2	-17.7	45.6	30.300	V
17973.000	58.2	-17.7	45.6	30.300	V
17942.000	58.0	-17.7	45.6	30.100	H
17985.000	58.0	-17.7	45.6	30.100	H

Ch26

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2486.710	54.9	-38.9	27.7	66.100	V
17962.500	58.5	-17.7	45.6	30.600	H
17957.500	58.3	-17.7	45.6	30.400	H
17991.500	58.3	-17.7	45.6	30.400	H
17992.500	58.2	-17.7	45.6	30.300	V
17994.000	58.2	-17.7	45.6	30.300	V

Test graphs as below:

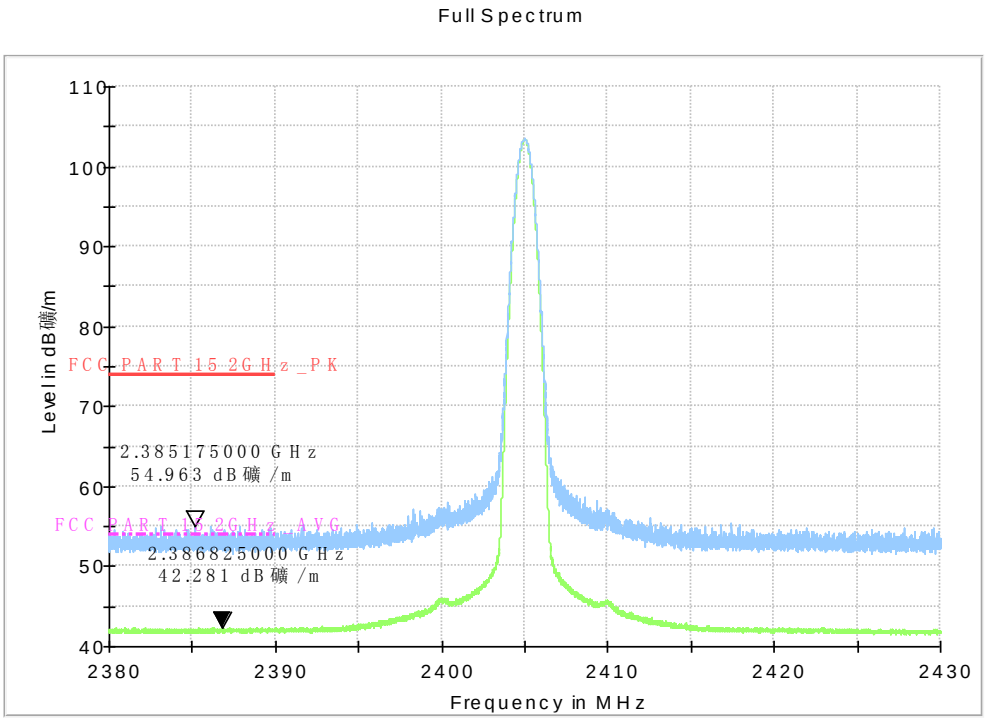


Fig.A.6.2.1 Transmitter Spurious Emission - Radiated (Power): Zigbee, ch11, 2.38 GHz – 2.43GHz

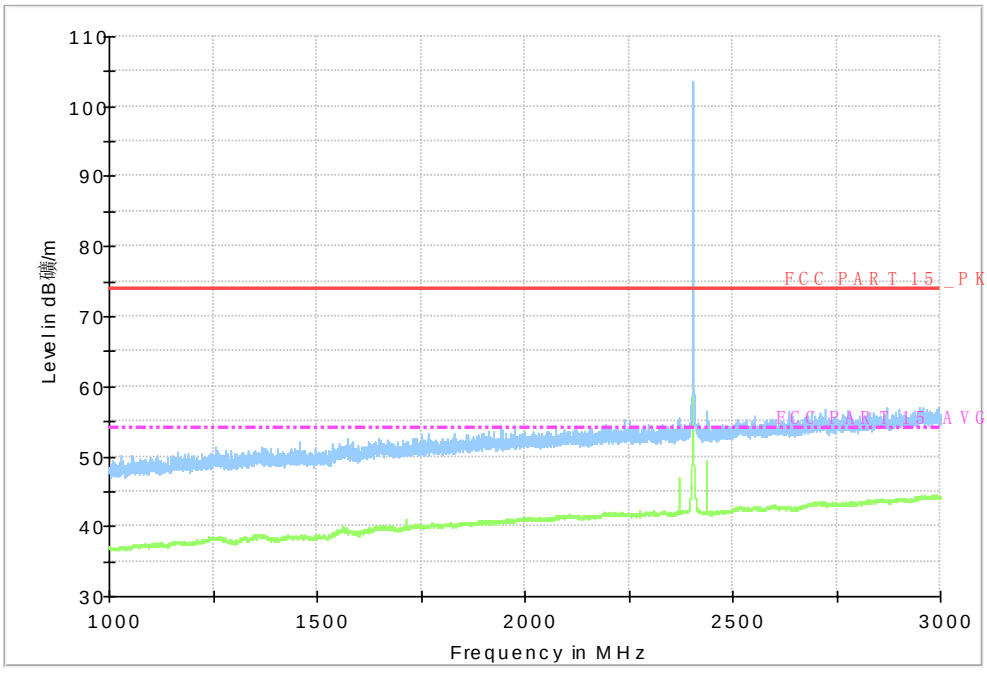


Fig.A.6.2.2 Transmitter Spurious Emission - Radiated (Zigbee, ch11, 1 GHz-3 GHz)

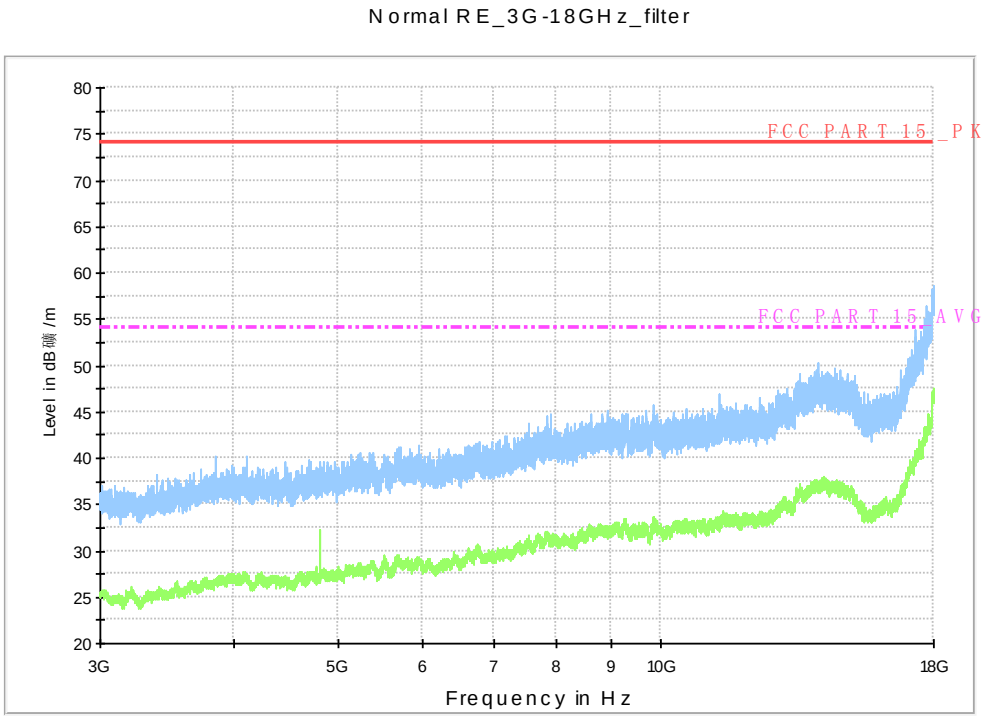


Fig.A.6.2.3 Transmitter Spurious Emission - Radiated (Zigbee, ch11, 3 GHz-18 GHz)

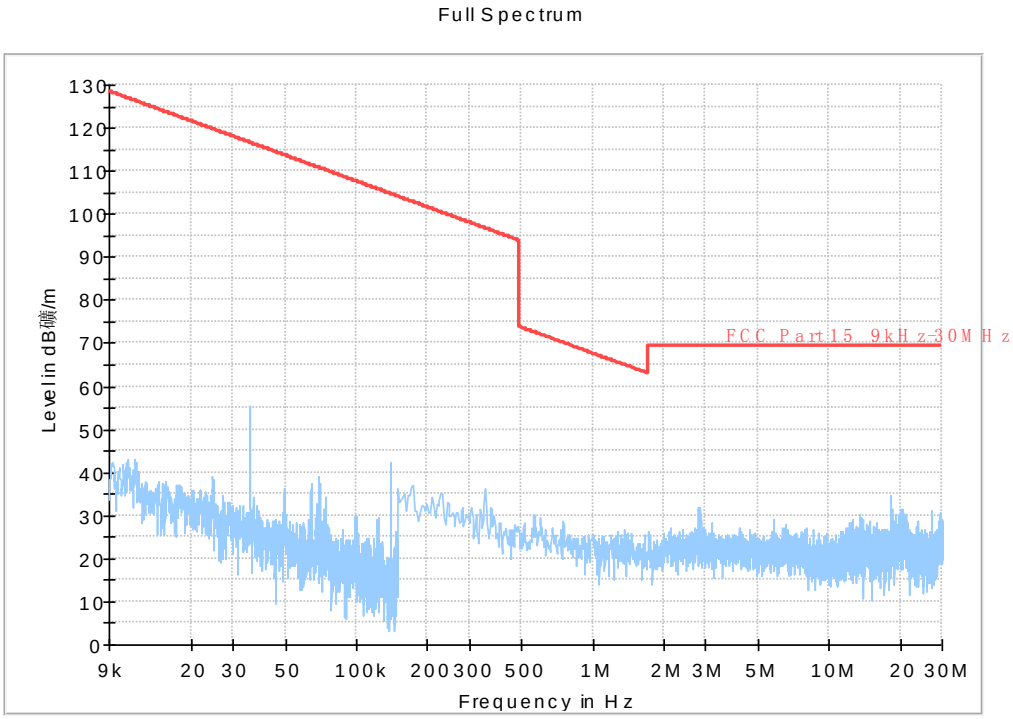


Fig.A.6.2.4 Transmitter Spurious Emission - Radiated (Zigbee, ch18, 9kHz-30 MHz)

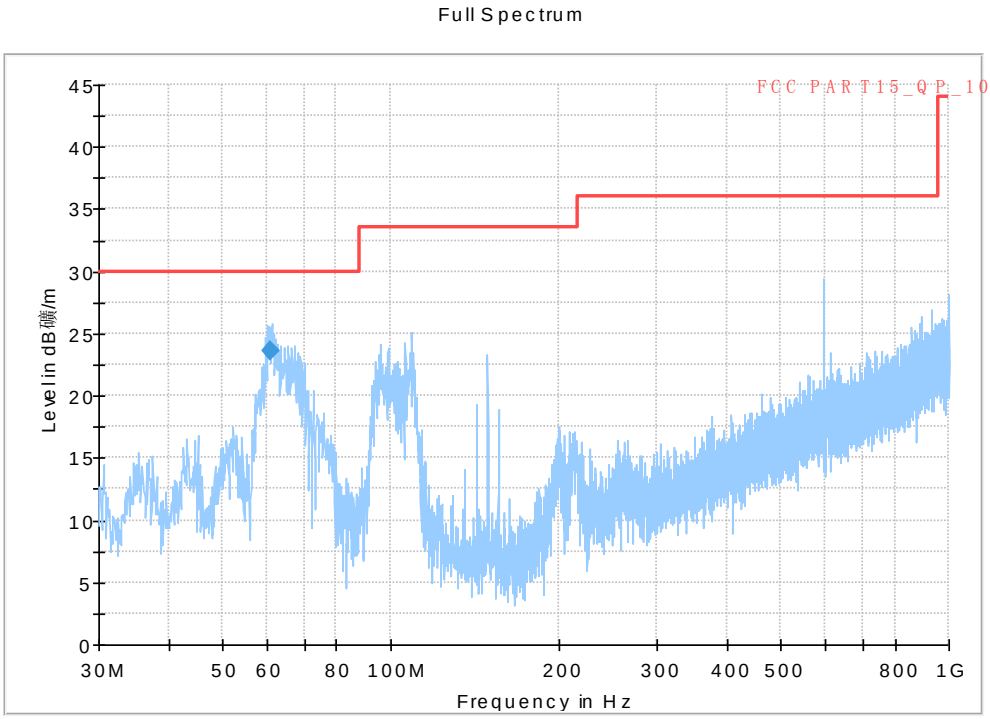


Fig.A.6.2.5 Transmitter Spurious Emission - Radiated (Zigbee, ch18, 30 MHz-1 GHz)

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
60.814000	23.57	104.0	V	154.0	-10.9	6.43	30.0

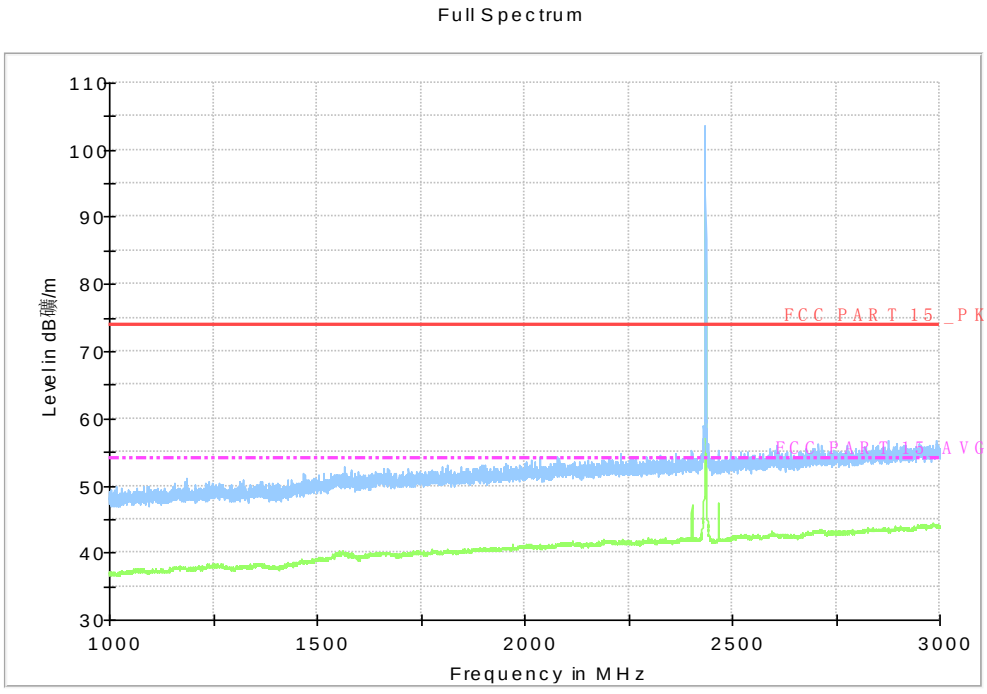


Fig.A.6.2.6 Transmitter Spurious Emission - Radiated (Zigbee, ch18, 1 GHz-3 GHz)

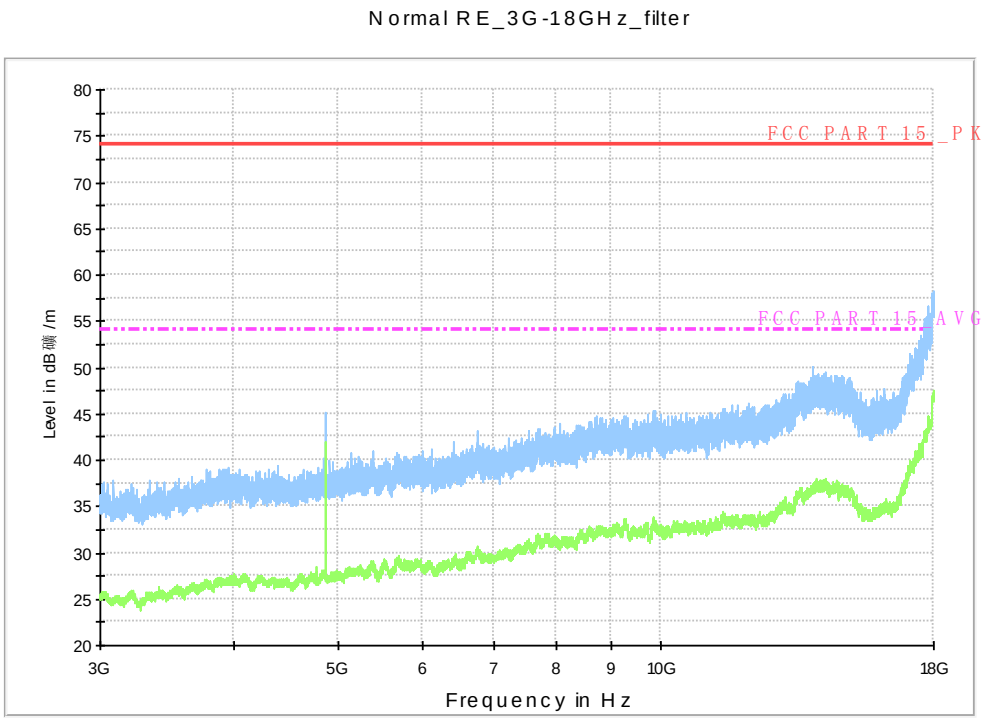


Fig.A.6.2.7 Transmitter Spurious Emission - Radiated (Zigbee, ch18, 3 GHz-18 GHz)

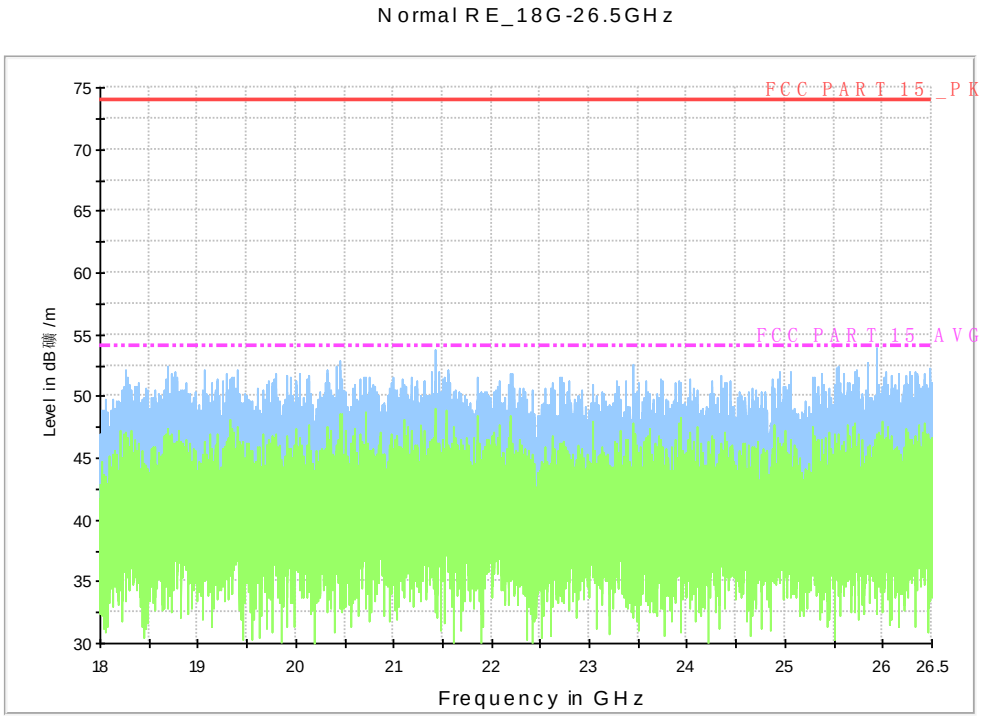


Fig.A.6.2.8 Transmitter Spurious Emission - Radiated (Zigbee, ch18, 18GHz – 26.5GHz)

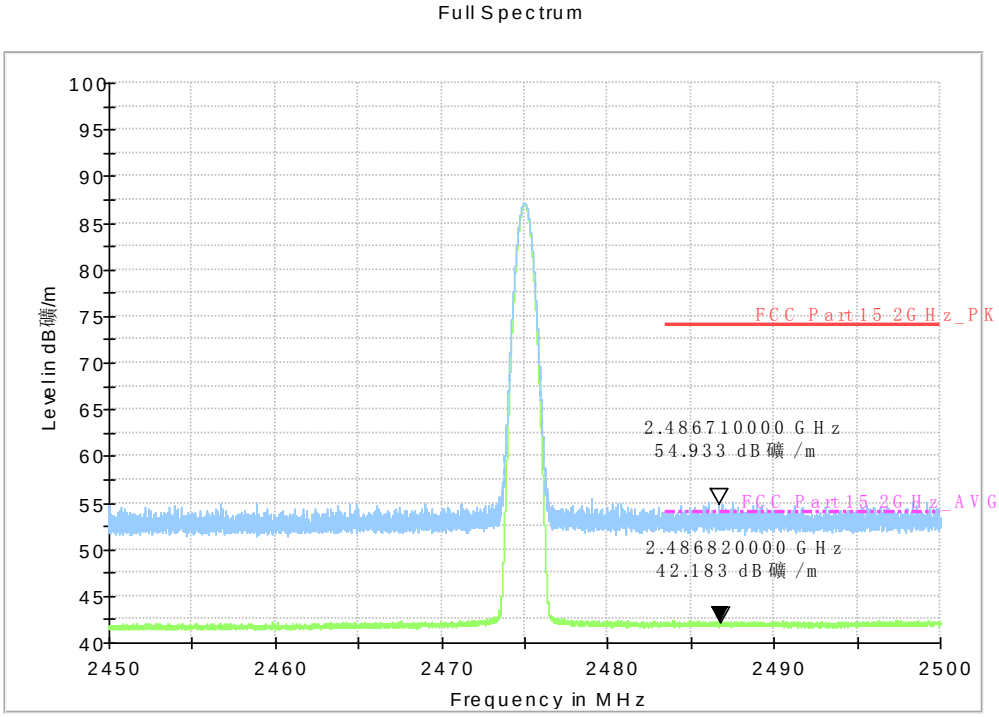


Fig.A.6.2.9 Transmitter Spurious Emission - Radiated (Power): Zigbee, ch26, 2.45 GHz - 2.50GHz

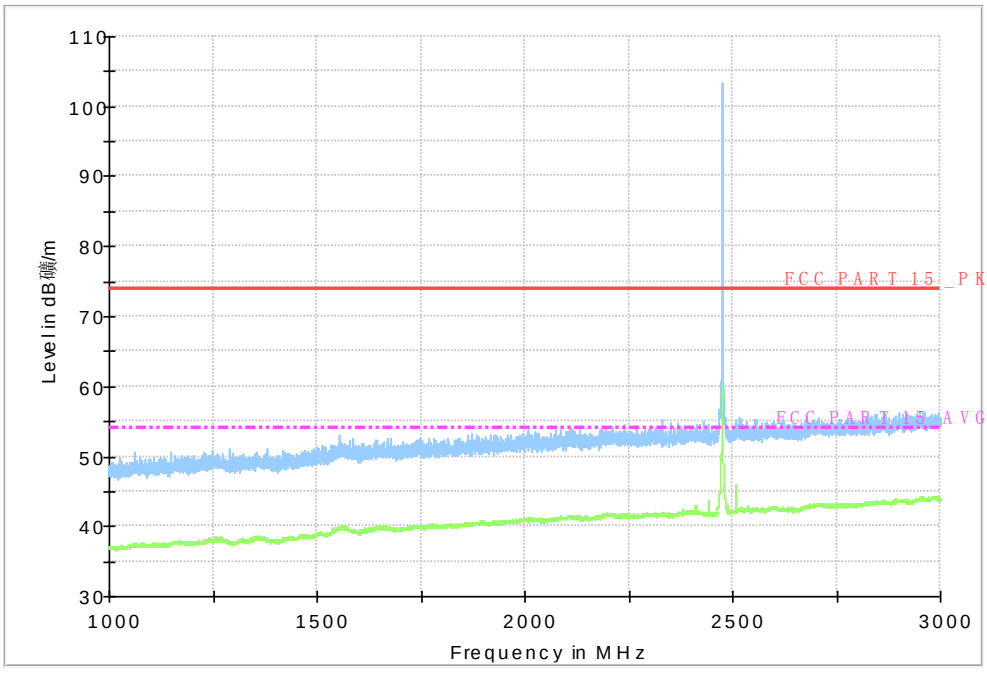


Fig.A.6.2.10 Transmitter Spurious Emission - Radiated (Zigbee, ch26, 1 GHz-3 GHz)

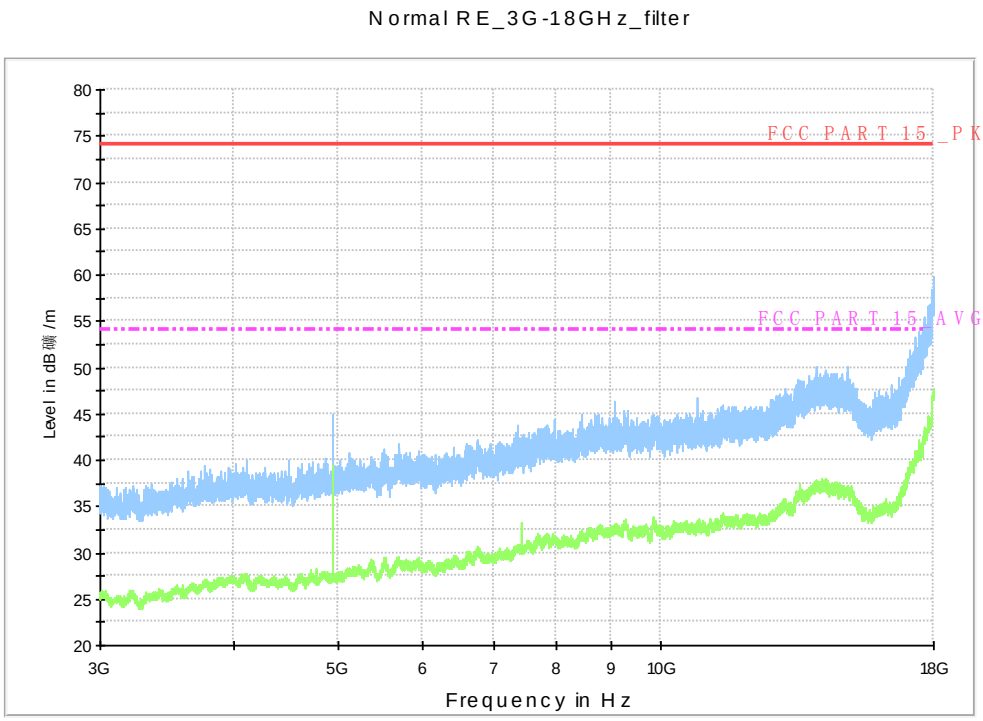


Fig.A.6.2.11 Transmitter Spurious Emission - Radiated (Zigbee, ch26, 3 GHz-18 GHz)

A.7. AC Power-line Conducted Emission

Method of Measurement: See ANSI C63.10-2013-clause 6.2

1 The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.

2 If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.

3 The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.

4 If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

5 If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.36 Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement Result and limit:

Zigbee (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11b	Idle	
0.15 to 0.5	66 to 56	Fig.A.7.1	Fig.A.7.2	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Zigbee (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11b	Idle	
0.15 to 0.5	56 to 46	Fig.A.7.1	Fig.A.7.2	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Conclusion: Pass

Test graphs as below:

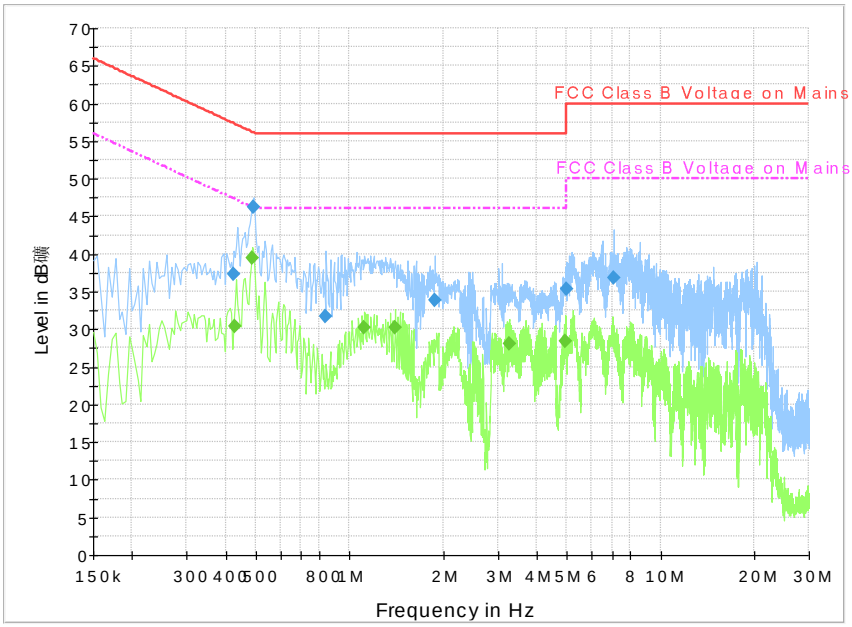


Fig.A.7.1 AC Powerline Conducted Emission-Zigbee

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.424500	37.4	GND	L1	19.9	20.0	57.4
0.492000	46.2	GND	N	19.9	9.9	56.1
0.838500	31.7	GND	N	19.8	24.3	56.0
1.882500	33.8	GND	L1	19.7	22.2	56.0
4.978500	35.4	GND	N	19.6	20.6	56.0
7.071000	36.8	GND	L1	19.6	23.2	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.429000	30.3	GND	N	19.9	16.9	47.3
0.487500	39.4	GND	N	19.9	6.8	46.2
1.117500	30.2	GND	N	19.7	15.8	46.0
1.401000	30.2	GND	N	19.7	15.8	46.0
3.255000	28.1	GND	L1	19.3	17.9	46.0
4.929000	28.5	GND	L1	19.6	17.5	46.0

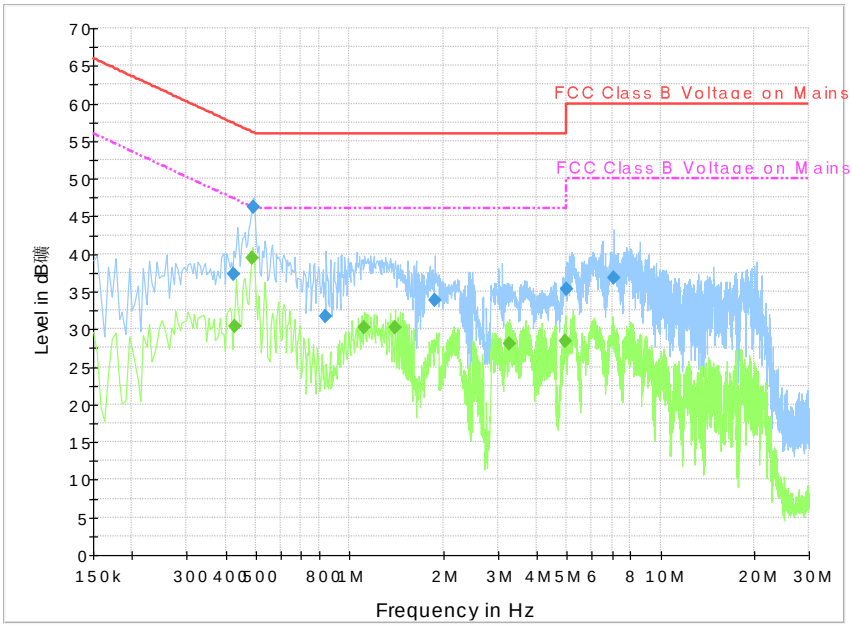


Fig.A.7.2 AC Powerline Conducted Emission-Zigbee

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.415500	36.2	GND	L1	19.9	20.0	57.4
0.492000	46.3	GND	N	19.9	9.9	56.1
1.176000	36.3	GND	N	19.8	24.3	56.0
1.891500	33.4	GND	L1	19.7	22.2	56.0
2.476500	31.8	GND	N	19.6	20.6	56.0
4.884000	33.9	GND	L1	19.6	23.2	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.429000	30.3	GND	N	19.9	16.9	47.3
0.487500	39.4	GND	N	19.9	6.8	46.2
1.117500	30.2	GND	N	19.7	15.8	46.0
1.401000	30.2	GND	N	19.7	15.8	46.0
3.255000	28.1	GND	L1	19.3	17.9	46.0
4.929000	28.5	GND	L1	19.6	17.5	46.0

*****END OF REPORT*****