FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2

CERTIFICATION TEST REPORT

For

Digital Device

MODEL NUMBER: 9290035003

ADDITIONAL MODEL NUMBER: 9290035004

PROJECT NUMBER: 4790348366

REPORT NUMBER: 4790348366-1

FCC ID: 2AGBW9290035003X

IC: 20812-35003X

HVIN: 35003

ISSUE DATE: Apr. 20, 2022

Prepared for

Signify (China) Investment Co., Ltd

Prepared by

UL-CCIC COMPANY LIMITED
No. 2, Chengwan Road, Suzhou Industrial Park, People's Republic of China
Tel: +86 512-6808 6400
Fax: +86 512-6808 4099
Website: www.ul.com

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	04/20/2022	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Signify (China) Investment Co., Ltd
Address:	Building 9, Lane 888, Tianlin Road, Minhang district, 200233 Shanghai, China.

Manufacturer Information

Company Name:	Signify (China) Investment Co., Ltd
Address:	Building 9, Lane 888, Tianlin Road, Minhang district, 200233 Shanghai, China.

EUT Description

Product Name:	Digital Device
Model Name:	9290035003
Additional No.:	9290035004
Sample Number:	4807838
Data of Receipt Sample:	Mar. 29, 2022
Test Date:	Mar. 30, 2022 ~ Apr. 18, 2022

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	PASS
ISED RSS-247 Issue 2	PASS
ISED RSS-GEN Issue 5	PASS

Summary of Test Results			
Clause	Test Items	FCC and ISED Rules	Test Results
1	6dB Bandwidth and 99% Occupied Bandwidth	FCC 15.247 (a) (2) RSS-247 Clause 5.2 (a) RSS-Gen Clause 6.7	PASS
2	Conducted Power	FCC 15.247 (b) (3) RSS-247 Clause 5.4 (d) RSS-Gen Clause 6.12	PASS
3	Power Spectral Density	FCC 15.247 (e) RSS-247 Clause 5.2 (b)	PASS
4	Conducted Band edge And Spurious emission	FCC 15.247 (d) RSS-247 Clause 5.5 RSS-GEN Clause 6.13	PASS
5	Radiated Band edges and Spurious emission	FCC 15.247 (d) FCC 15.209 FCC 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9 RSS-GEN Clause 6.13	PASS
6	Conducted Emission Test for AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	N/A (See Note 1)
7	Antenna Requirement	FCC 15.203 RSS-GEN Clause 6.8	PASS
Note: 1) The EUT is powered by battery. 2) The measurement result for the sample received is <Pass> according to < ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15C> when <Accuracy Method> decision rule is applied.			

Prepared By:

Tom Tang

Tom Tang
Project Engineer

Reviewed By:

Leon Wu

Leon Wu
Senior Project Engineer

Authorized By:

Chris Zhong

Chris Zhong
Laboratory Leader

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, KDB 662911 D01 Multiple Transmitter Output v02r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 2 and ISED RSS-GEN Issue 5.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4829.01)** **UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA.** **FCC (FCC Designation No.: CN1247)** **UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.** **IC (IC Designation No.: 25056; CAB No.: CN0073)** **UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.**

Note 1: All tests measurement facilities use to collect the measurement data are located at No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, People's Republic of China

Note 2: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. These measurements below 30MHz had been correlated to measurements performed on an OFS.

Note 3: The test anechoic chamber in UL-CCIC COMPANY LIMITED had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.1dB
Radiation Emission test (include Fundamental emission) (9kHz-30MHz)	3.4dB
Radiation Emission test (include Fundamental emission) (30MHz-1GHz)	3.4dB
Radiation Emission test (1GHz to 26GHz) (include Fundamental emission)	3.9dB (1GHz-18GHz)
	4.2dB (18GHz-26.5GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Product Name:	Digital Device	
Model No.:	9290035003	
Operating Frequency:	Operation Frequency	2405 MHz ~ 2480 MHz
	Modulation Type	O-QPSK
Channels Step:	Channels with 5MHz step	
Sample Type:	Fixed production	
Test Power grade:	/	
Test Software of EUT:	sscom (manufacturer declare)	
Antenna Type:	PCB Antenna	
Antenna Gain:	2.0 dBi	
	Note: This data is provided by customer and our lab isn't responsible for this data.	
Power Supply:	DC 3V	

Remark:
Model No.:

No.:	Name:	No.:	Name:
1	9290035003	2	9290035004

Only the main model 9290035003 was tested and only the data of this model is shown in this test report. Since Their material, types of enclosure, antenna location, electrical circuit design, layout, components used and internal wiring are identical, only the colors of the products are different, and the user can't change the RF parameters or others access the software setting.

5.2. MAXIMUM OUTPUT POWER

Antenna	Mode	Frequency (MHz)	Channel Number	Max Conducted Power (dBm)
1	Zigbee	2405-2480	1-16	3.40

5.3. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	2	2410	3	2415	4	2420
5	2425	6	2430	7	2435	8	2440
9	2445	10	2450	11	2455	12	2460
13	2465	14	2470	15	2475	16	2480

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
Zigbee	CH 1, CH 9 CH 16	2405MHz, 2445MHz, 2480MHz

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band				
Test Software		sscom		
Modulation Type	Transmit Antenna Number	Test Channel		
		LCH	MCH	HCH
O-QPSK	1	default	default	default

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2405-2480	PCB Antenna	2.0

Note: This data is provided by customer and the lab isn't responsible for this data.

Test Mode	Transmit and Receive Mode	Description
Zigbee	☒1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna independently.

5.7. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65%	
Atmospheric Pressure:	101kPa	
Temperature	TN	23 ~ 28°C
Voltage:	VL	N/A
	VN	DC 3V
	VH	N/A

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature

5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Description
1	Laptop	ThinkPad	E590	/
2	New Battery	DURACELL	CR2032	DC 3V

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB	USB to TTL	USB	100cm Length	/

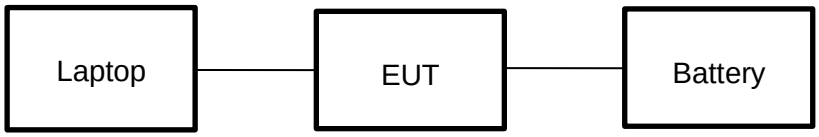
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	/	/	/	/

TEST SETUP

The EUT can work in an engineer mode with a software through a table PC.

SETUP DIAGRAM FOR TESTS



5.9. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions (Instrument**)**							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	EMI Test Receiver	R&S	ESR3	126700	2020-12-05	2021-12-04	2022-12-03
☑	Two-Line V-Network	R&S	ENV216	126701	2020-12-05	2021-12-04	2022-12-03
☑	Artificial Mains Networks	R&S	ENY81	126711	2020-10-13	2021-10-12	2022-10-11
Software							
Used	Description		Manufacturer		Name	Version	
☑	Test Software for Conducted disturbance		R&S		EMC32	Ver. 9.25	
Radiated Emissions (Instrument**)**							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9010B	155727	2020-05-10	2021-05-09	2022-05-08
☑	EMI test receiver	R&S	ESR26	126703	2020-12-05	2021-12-04	2022-12-03
☑	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB 1513	155456	2018-06-15	2021-06-03	2024-06-02
☑	Receiver Antenna (30MHz-1GHz)	SunAR RF Motion	JB1	177821	2019-01-19	2022-01-18	2025-01-17
☑	Receiver Antenna (1GHz-18GHz)	R&S	HF907	126705	2019-01-27	2022-02-28	2025-02-27
☑	Receiver Antenna (18GHz-26.5GHz)	ETS	3160-10	155565	2019-01-05	2021-07-15	2024-07-14
☑	Pre-amplification (To 18GHz)	Compliance Direction System Inc.	PAP-1G18-50	178825	2021-03-26	2022-03-01	2023-02-28
☑	Pre-amplification (To 26.5GHz)	R&S	SCU-26D	135391	2020-12-05	2021-12-04	2022-12-03
☑	Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	1	2020-05-10	2021-05-09	2022-05-08
☑	Highpass Filter	Wainwright	WHKX10-2700-3000-18000-40SS	2	2020-05-10	2021-05-09	2022-05-08
Software							
Used	Description		Manufacturer		Name	Version	
☑	Test Software for Radiated disturbance		Tonscend		TS+	Ver. 2.5	
Other instruments							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9010B	155368	2020-05-10	2021-05-09	2022-05-08
☑	Power Meter	Keysight	U2021XA	155370	2020-05-10	2021-05-09	2022-05-08

6. MEASUREMENT METHODS

No.	Test Item	KDB Name	Section
1	6dB Bandwidth	KDB 558074 D01 15.247 Meas Guidance v05r02	8.2
2	Output Power	KDB 558074 D01 15.247 Meas Guidance v05r02	8.3.1.3/8.3.2.3
3	Power Spectral Density	KDB 558074 D01 15.247 Meas Guidance v05r02	8.4
4	Out-of-band emissions in non-restricted bands	KDB 558074 D01 15.247 Meas Guidance v05r02	8.5
5	Out-of-band emissions in restricted bands	KDB 558074 D01 15.247 Meas Guidance v05r02	8.6
6	Band-edge	KDB 558074 D01 15.247 Meas Guidance v05r02	8.7
7	Conducted Emission Test for AC Power Port	ANSI C63.10-2013	6.2

7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

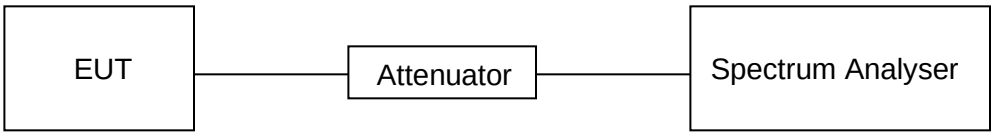
LIMITS

None; for reporting purposes only

PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



TEST ENVIRONMENT

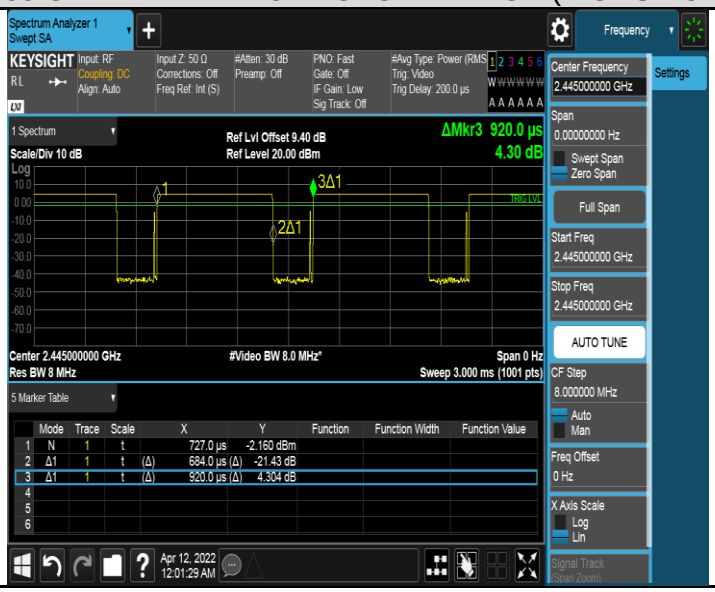
Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3V

TEST RESULTS TABLE

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (kHz)	Final VBW (kHz)
Zigbee	0.684	0.920	0.7435	74.35%	1.29	1.5	2

Note: 1) Duty Cycle Correction Factor=10log(1/x).
2) Where: x is Duty Cycle (Linear)
3) Where: T is On Time (transmit duration)

TEST GRAPHS

Zigbee ON TIME AND DUTY CYCLE MID CH (WORSE CASE)


7.1. 6 dB BANDWIDTH AND 99% OCCUPIED BANDWIDTH

LIMITS

FCC Part15 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2) ISED RSS-247 5.2 (a)	6dB Bandwidth	>= 500KHz	2400-2483.5
ISED RSS-Gen Clause 6.7	99 % Occupied Bandwidth	For reporting purposes only	2400-2483.5

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.8 for DTS bandwidth and clause 6.9 for Occupied Bandwidth.

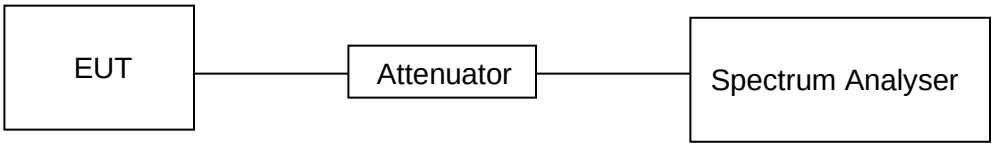
Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Frequency Span	For 6 dB Bandwidth: enough to capture all products of the modulation carrier emission For 99 % Occupied Bandwidth: Between 1.5 times and 5 times the OBW
Detector	Peak
RBW	For 6 dB Bandwidth: 100 kHz For 99 % Occupied Bandwidth: 1 % to 5 % of the occupied bandwidth
VBW	For 6 dB Bandwidth: ≥3 × RBW For 99 % Occupied Bandwidth: ≥3 × RBW
Trace	Max hold
Sweep	Auto couple

a) Use the 99 % power bandwidth function of the instrument, allow the trace to stabilize and report the measured bandwidth.

b) Allow the trace to stabilize and 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.

TEST SETUP



TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3V

TEST RESULTS TABLE

Test Mode	Test Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Result
Zigbee	LCH	1.330	2.4614	Pass
	MCH	1.330	2.4141	Pass
	HCH	1.330	2.4062	Pass

TEST GRAPHS

6dB Bandwdith

Test Mode	Test Channel	Verdict
Zigbee	LCH	PASS

Test Mode	Test Channel	Verdict
Zigbee	MCH	PASS

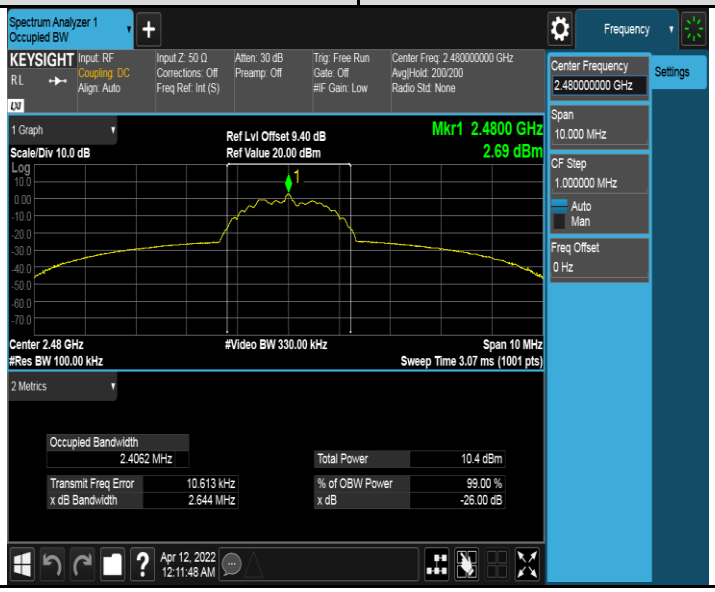
Test Mode	Test Channel	Verdict
Zigbee	HCH	PASS

99% Bandwidth

Test Mode	Test Channel
Zigbee	LCH

Test Mode	Test Channel
Zigbee	MCH

Test Mode	Test Channel
Zigbee	HCH



7.2. CONDUCTED OUTPUT POWER

LIMITS

FCC Part15 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247(b)(3)	Output Power	1 watt or 30dBm	2400-2483.5

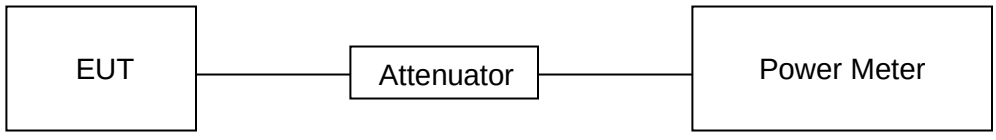
TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.
Measure the power of each channel.
AVG Detector used for AVG result.

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3V

TEST SETUP



TEST RESULTS TABLE

Test Mode	Test Channel	Measurement Output Power (AV)	10log(1/x) Factor	Maximum Conducted Output Power (AV)	LIMIT
		dBm	dBm	dBm	dBm
Zigbee	LCH	2.11	1.29	3.40	30
	MCH	1.97	1.29	3.26	30
	HCH	1.75	1.29	3.04	30

7.3. POWER SPECTRAL DENSITY

LIMITS

FCC Part15 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC §15.247 (e)	Power Spectral Density	8 dBm/3 kHz	2400-2483.5

TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

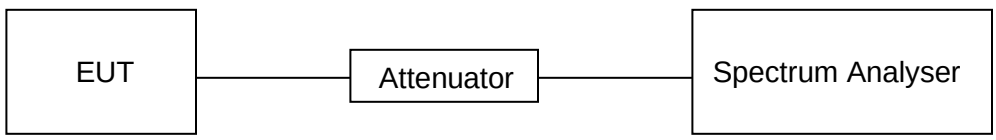
Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	3 kHz ≤ RBW ≤100 kHz
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3V

TEST SETUP

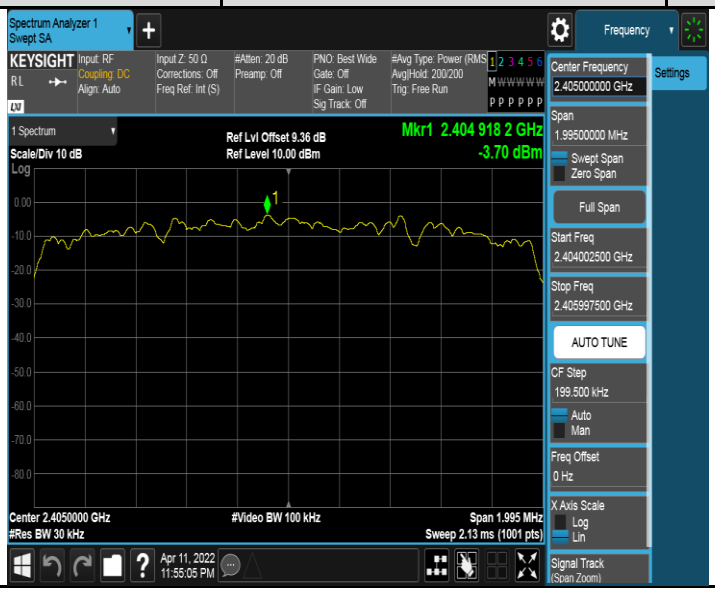


TEST RESULTS TABLE

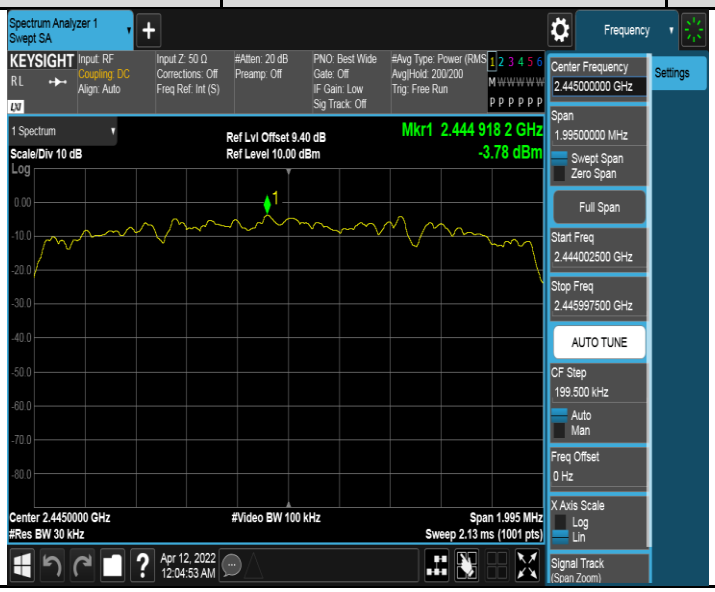
Test Mode	Test Channel	Maximum Peak power spectral density (dBm/30kHz)	Result
Zigbee	LCH	-3.70	Pass
	MCH	-3.78	Pass
	HCH	-4.10	Pass

TEST GRAPHS

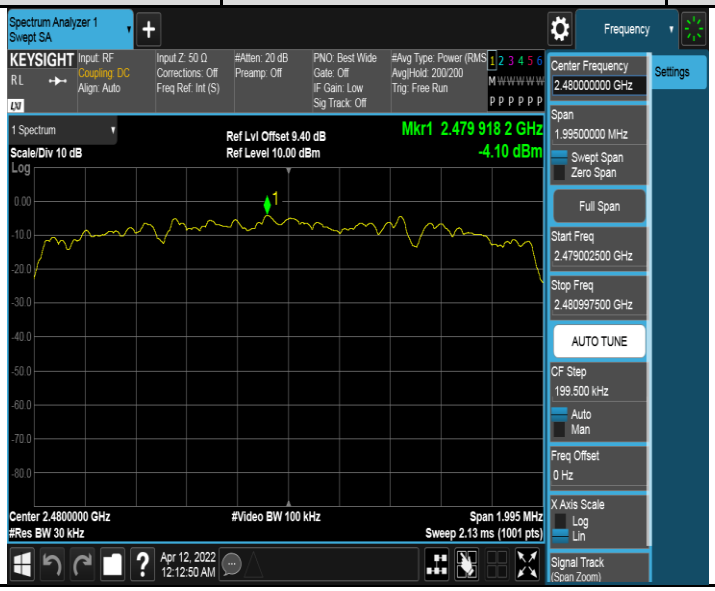
Test Mode	Test Channel	Verdict
Zigbee	LCH	PASS



Test Mode	Test Channel	Verdict
Zigbee	MCH	PASS



Test Mode	Test Channel	Verdict
Zigbee	HCH	PASS



7.4. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC Part15 (15.247), Subpart C		
Section	Test Item	Limit
FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

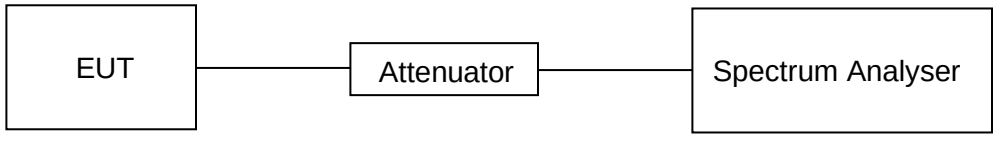
Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100K
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100K
VBW	≥3 × RBW
measurement points	≥span/RBW
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level**.**

TEST SETUP



TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3V

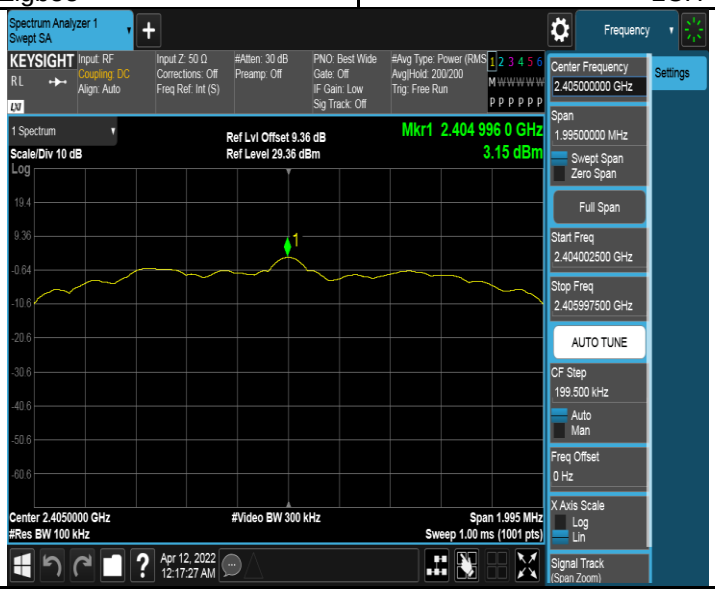
PART 1: REFERENCE LEVEL MEASUREMENT

TEST RESULTS TABLE

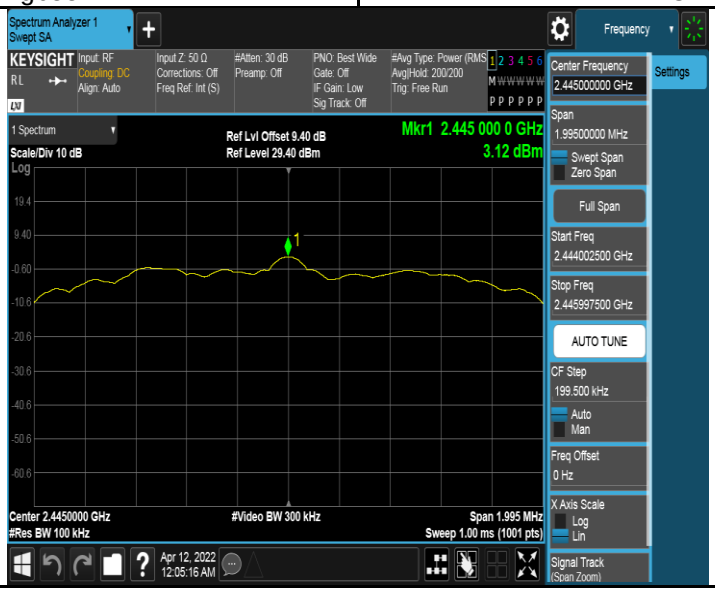
Test Mode	Test Channel	Result[dBm]
Zigbee	LCH	3.15
	MCH	3.12
	HCH	2.76

TEST GRAPHS

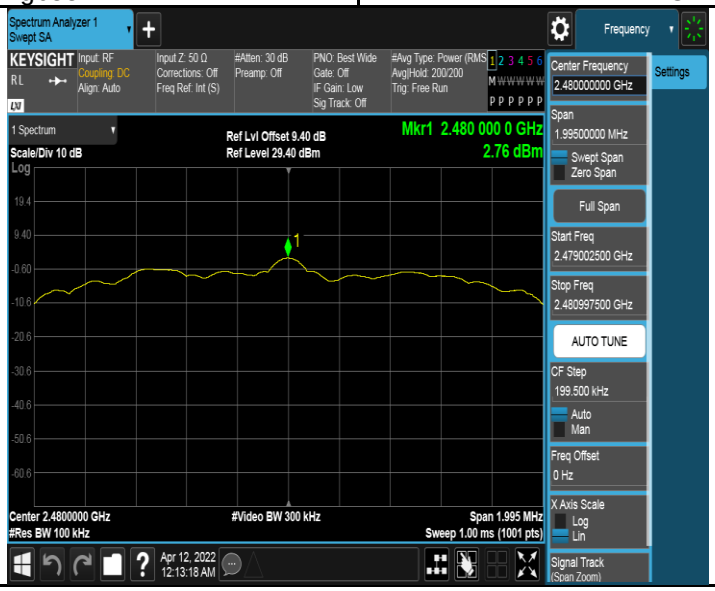
Test Mode	Channel
Zigbee	LCH



Test Mode	Channel
Zigbee	MCH



Test Mode	Channel
Zigbee	HCH



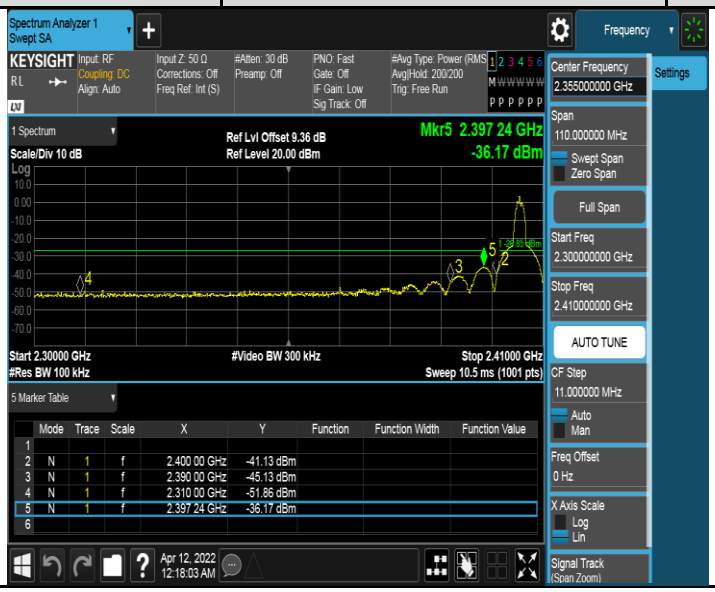
PART 2: CONDUCTED BANDEDGE

TEST RESULTS TABLE

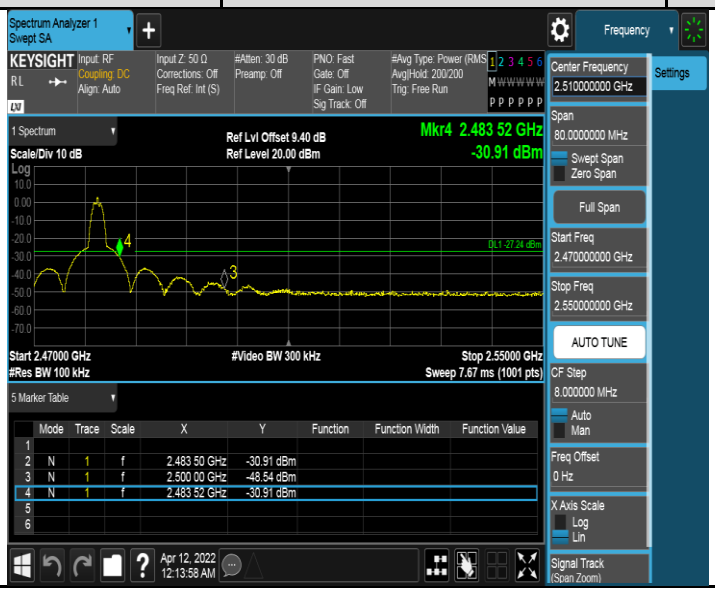
Test Mode	Test Channel	Result	Verdict
Zigbee	LCH	Refer to the Test Graph	PASS
	HCH	Refer to the Test Graph	PASS

TEST GRAPHS

Test Mode	Test Channel	Verdict
Zigbee	LCH	PASS



Test Mode	Test Channel	Verdict
Zigbee	HCH	PASS



PART 3: CONDUCTED SPURIOUS EMISSION

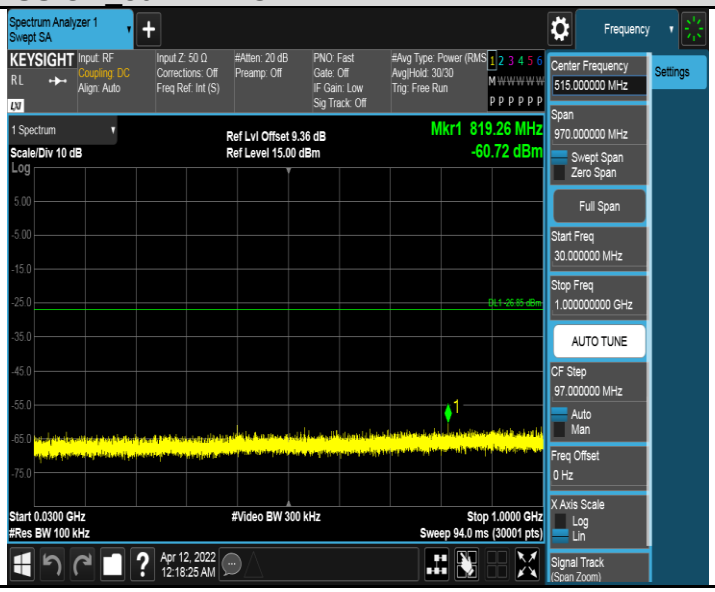
TEST RESULTS TABLE

Test Mode	Test Channel	Result	Verdict
Zigbee	LCH	Refer to the Test Graph	PASS
	MCH	Refer to the Test Graph	PASS
	HCH	Refer to the Test Graph	PASS

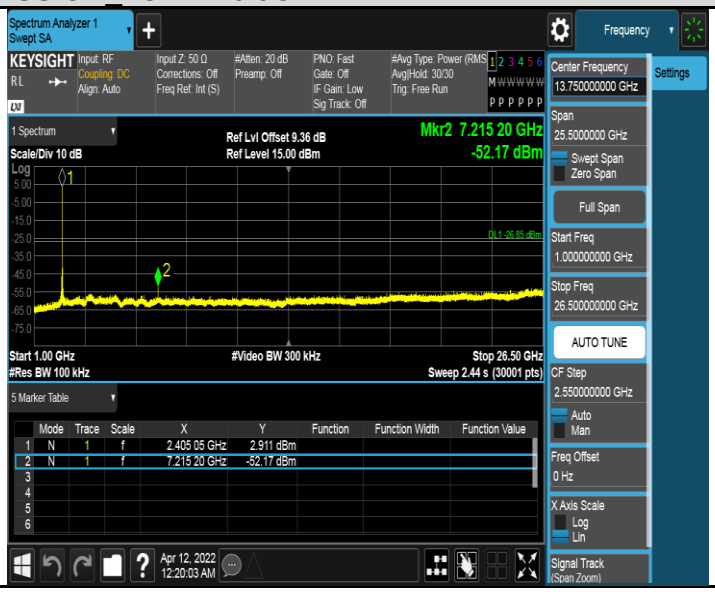
TEST GRAPHS

Test Mode	Channel	Verdict
Zigbee	LCH	PASS

LCH SPURIOUS EMISSION_30MHz~1GHz

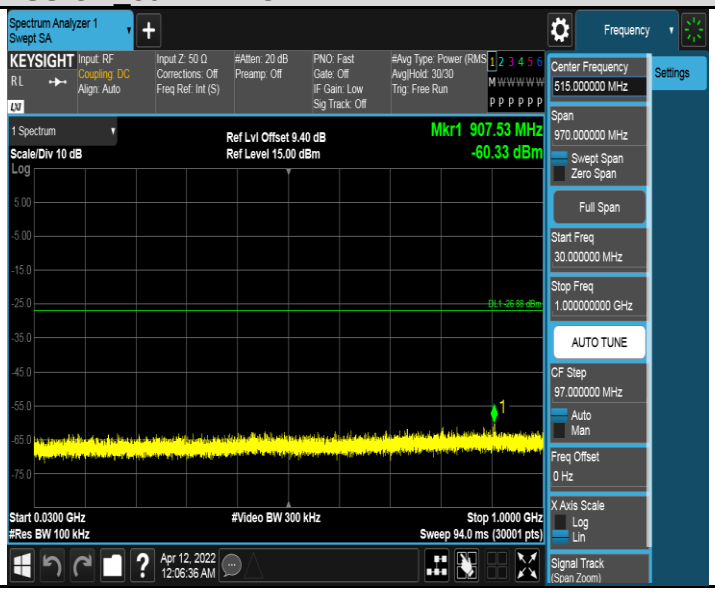


LCH SPURIOUS EMISSION_1GHz~26.5GHz

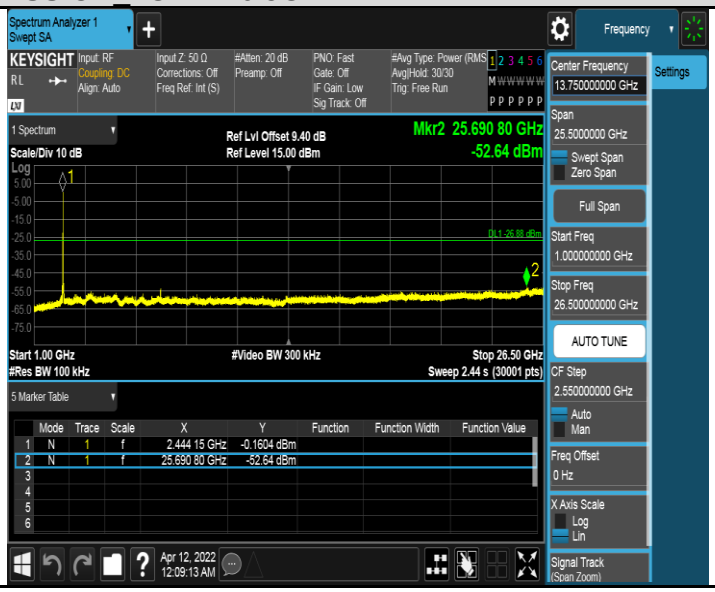


Test Mode	Channel	Verdict
Zigbee	MCH	PASS

MCH SPURIOUS EMISSION_30MHz~1GHz

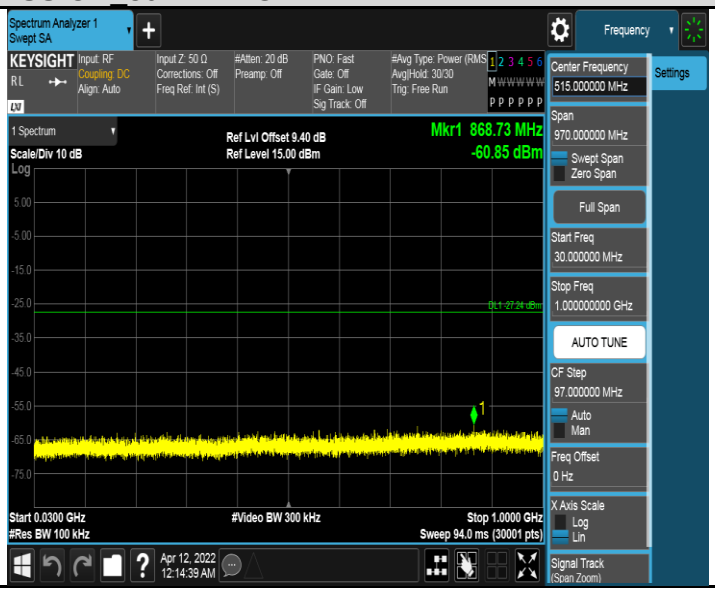


MCH SPURIOUS EMISSION_1GHz~26.5GHz

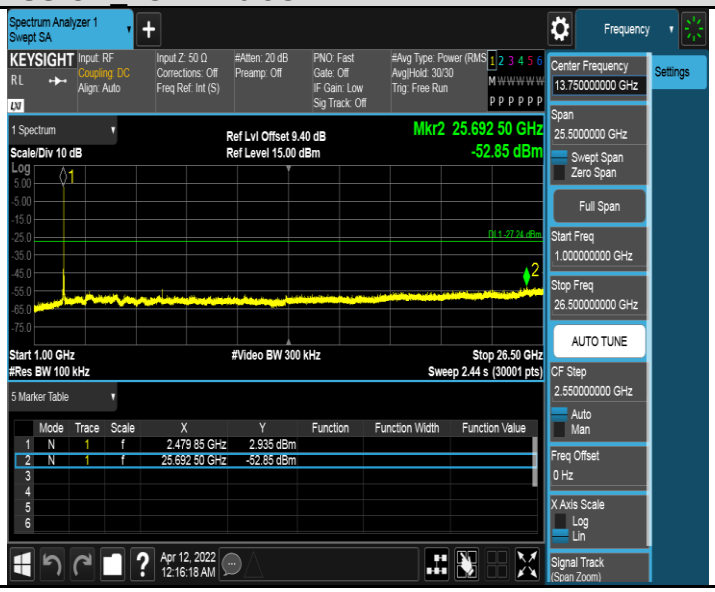


Test Mode	Channel	Verdict
Zigbee	HCH	PASS

HCH SPURIOUS EMISSION_30MHz~1GHz



HCH SPURIOUS EMISSION_1GHz~26.5GHz



7.5. RADIATED TEST RESULTS

7.5.1. LIMITS AND PROCEDURE

LIMITS

Please refer to FCC §15.205 and §15.209, ISED RSS-247 Clause 5.5, ISED RSS-GEN Clause 8.9&6.13 (Transmitter)
Radiation Disturbance Test Limit for ISED (9kHz-1GHz)

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5 – General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field strength (µV/m at 3 m)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 6 – General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H-Field) (µA/m)	Measurement distance (m)
9 - 490 kHz[Note 1]	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

Please refer to FCC KDB 558074

Radiation Disturbance Test Limit for FCC (Class B) (9KHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Note: 1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.

Radiation Disturbance Test Limit for FCC (Above 1G)

Frequency (MHz)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

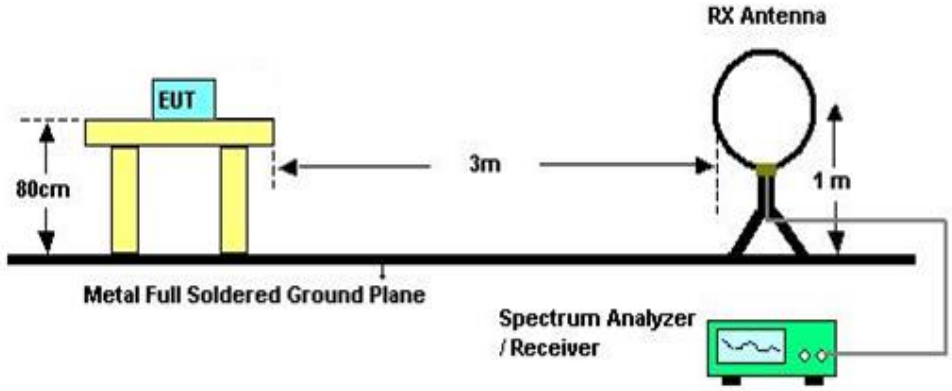
Restricted bands of operation

MHz	MHz	MHz	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			

Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6c

TEST SETUP AND PROCEDURE

Below 30MHz



The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
Sweep	Auto
Detector	Peak/QP/ Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 0.8 meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1m height antenna tower.

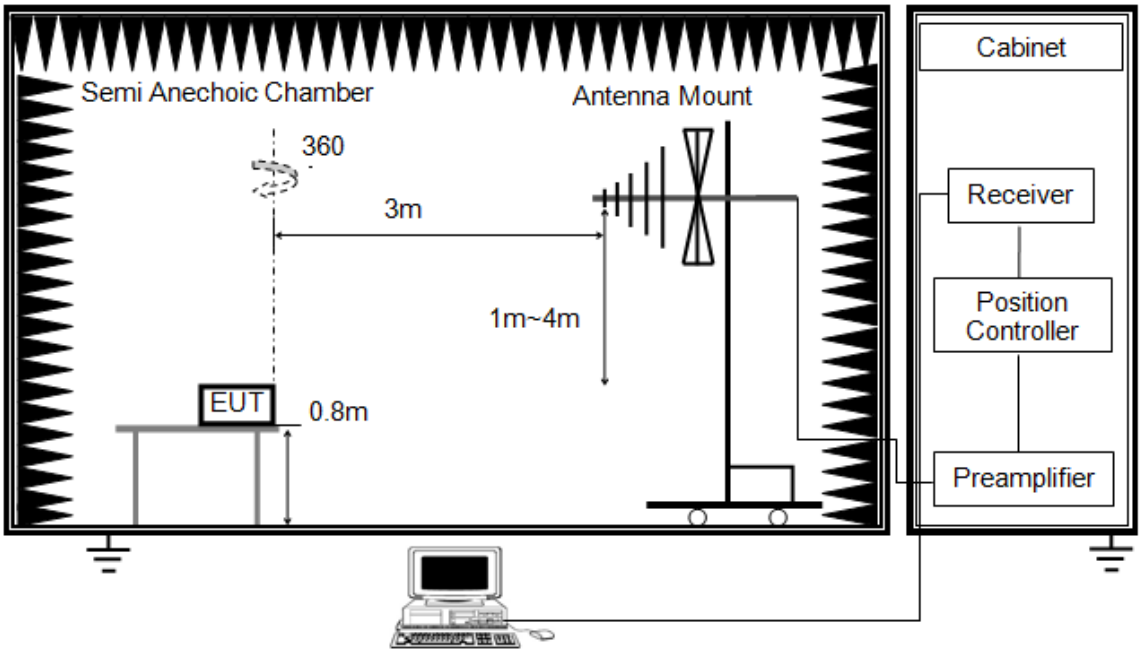
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector

6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ω. For example, the measurement frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y-51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

Below 1G



The setting of the spectrum analyser

RBW	120K
VBW	300K
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

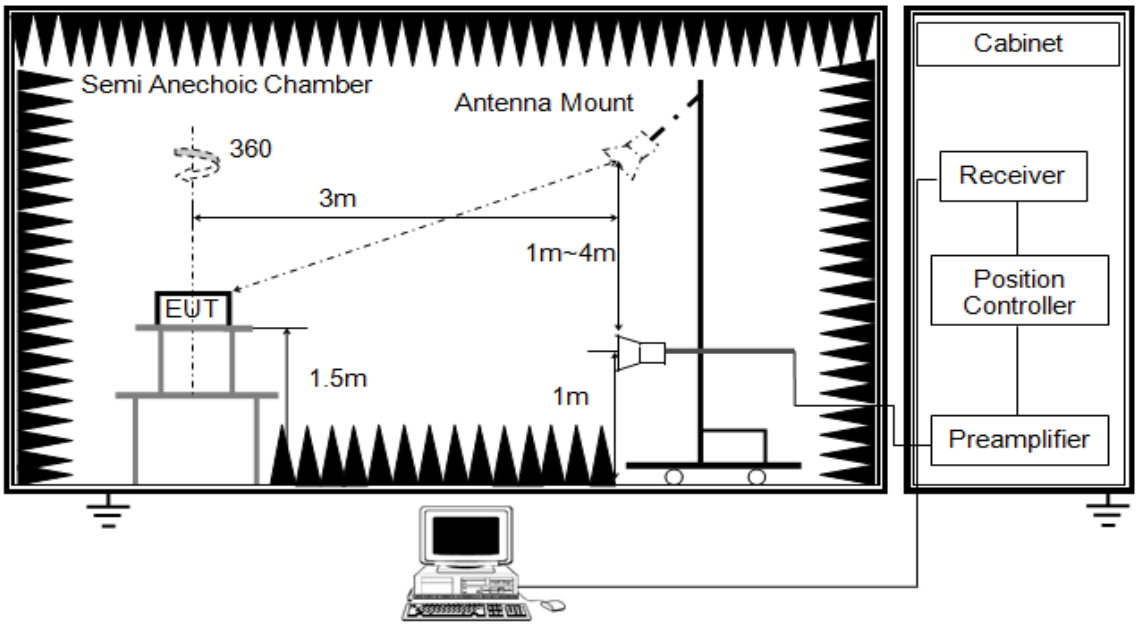
3. The EUT was placed on a turntable with 0.8 meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

6. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

Above 1G



The setting of the spectrum analyser

RBW	1M
VBW	PEAK:3M AVG: See note6
Sweep	Auto
Detector	Peak/Average(10Hz)
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 1.5m above ground.

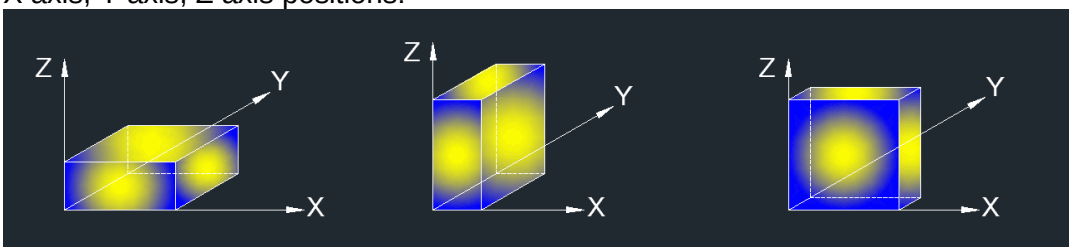
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with set VBW ≤RBW/100, but not less than list in section 7.1 with average detector, max hold to run for at least 50 traces for average measurements.

7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

X axis, Y axis, Z axis positions:



Note: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worse case (Y axis) data recorded in the report.

7.5.2. TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3V

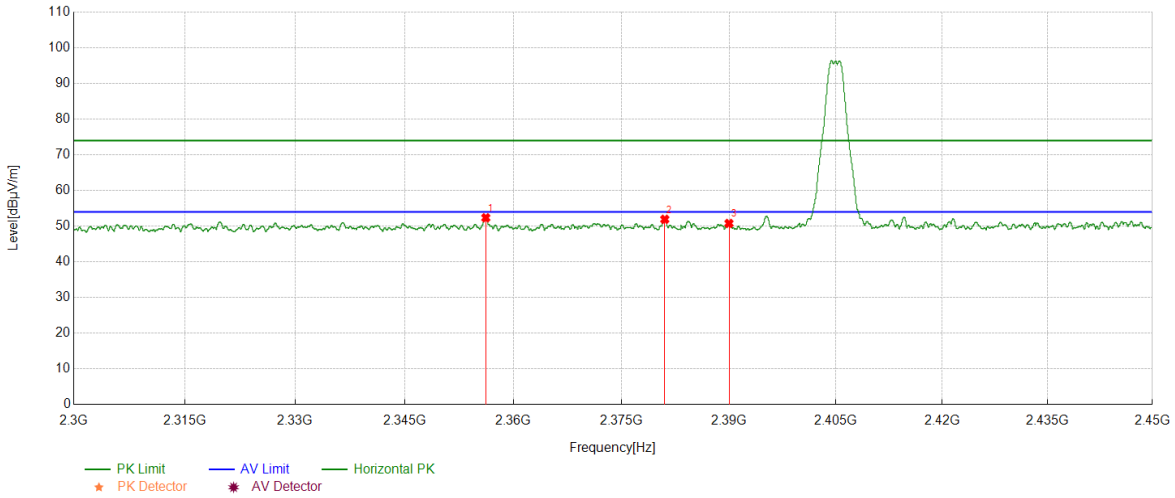
7.5.3. RESTRICTED BANDEDGE

TEST RESULT TABLE

Test Mode	Channel	Puw(dBm)	Verdict
Zigbee	LCH	<Limit	PASS
	MCH	<Limit	PASS
	HCH	<Limit	PASS

TEST GRAPHS

Test Mode	Channel	Polarization	Verdict
Zigbee	LCH	Horizontal	PASS

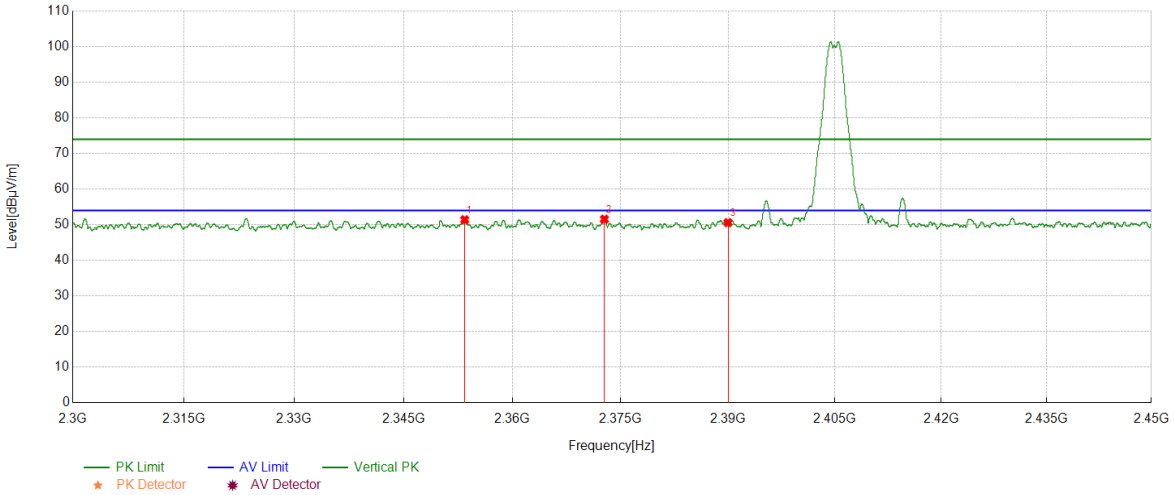


PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2356.2008	41.14	11.21	52.35	74.00	-21.65	Horizontal
2	2381.0289	40.58	11.34	51.92	74.00	-22.08	Horizontal
3	2390	39.49	11.28	50.77	74.00	-23.23	Horizontal

Note: 1. Peak detector: RBW: 1 MHz, VBW: 3 MHz.
2. Average detector: RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
3. Measurement = Reading Level + Correct Factor.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	LCH	Vertical	PASS

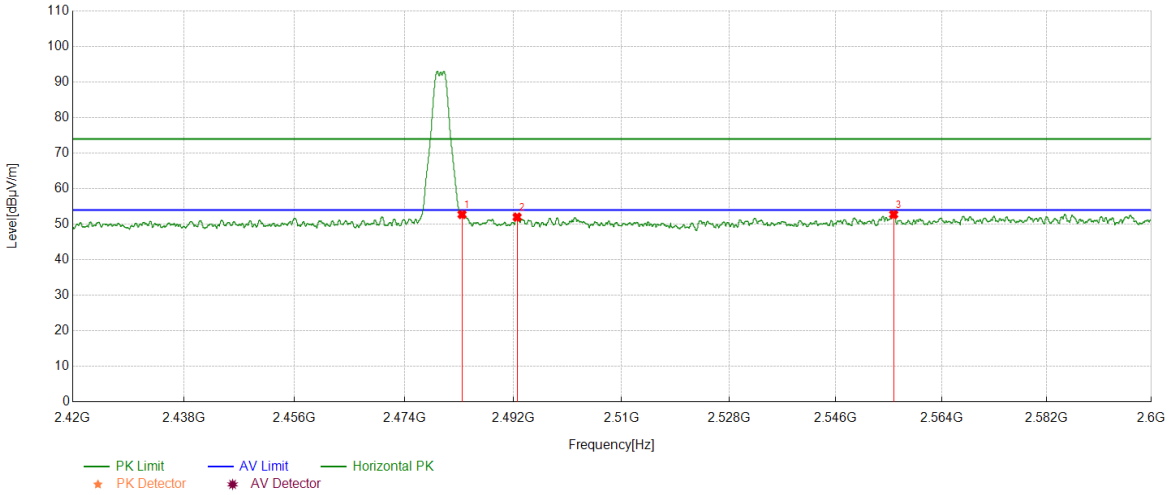


PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2353.4254	40.18	11.20	51.38	74.00	-22.62	Vertical
2	2372.7591	40.23	11.31	51.54	74.00	-22.46	Vertical
3	2390	39.30	11.28	50.58	74.00	-23.42	Vertical

Note: 1. Peak detector: RBW: 1 MHz, VBW: 3 MHz.
2. Average detector: RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
3. Measurement = Reading Level + Correct Factor.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	HCH	Horizontal	PASS

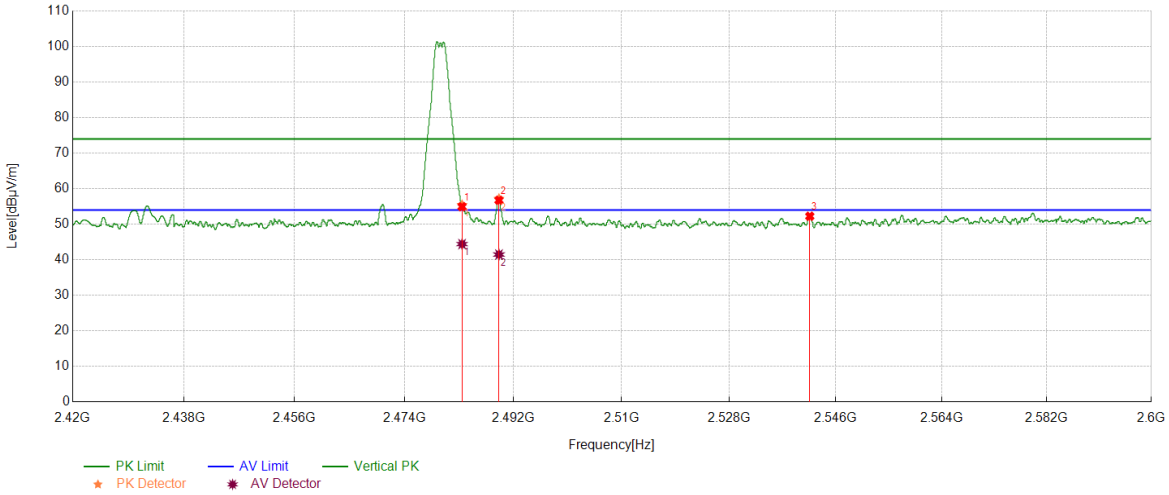


PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2483.5	41.38	11.36	52.74	74.00	-21.26	Horizontal
2	2492.6166	40.58	11.43	52.01	74.00	-21.99	Horizontal
3	2555.827	40.85	11.90	52.75	74.00	-21.25	Horizontal

Note: 1. Peak detector: RBW: 1 MHz, VBW: 3 MHz.
2. Average detector: RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
3. Measurement = Reading Level + Correct Factor.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	HCH	Vertical	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2483.5	44.04	11.36	55.40	74.00	-18.60	Vertical
2	2489.6012	45.73	11.39	57.12	74.00	-16.88	Vertical
3	2541.6052	40.38	11.87	52.25	74.00	-21.75	Vertical

AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2483.5	33.06	11.36	44.42	54.00	-9.58	Vertical
2	2489.6012	30.09	11.39	41.48	54.00	-12.52	Vertical

Note: 1. Peak detector: RBW: 1 MHz, VBW: 3 MHz.
2. Average detector: RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
3. Measurement = Reading Level + Correct Factor.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

7.5.4. SPURIOUS EMISSIONS

TEST RESULTS TABLE

1) For 1GHz~18GHz

Test Mode	Channel	Puw(dBm)	Verdict
Zigbee	LCH	<Limit	PASS
	MCH	<Limit	PASS
	HCH	<Limit	PASS

2) For 9KHz~30MHz

Test Mode	Channel	Puw(dBm)	Verdict
Zigbee	HCH	<Limit	PASS

Remark:
1) Through pre-testing all the test modes and test channels, but only the data of the worst case is included in this test report.

3) For 30MHz~1GHz

Test Mode	Channel	Puw(dBm)	Verdict
Zigbee	HCH	<Limit	PASS

Remark:
1) Through pre-testing all the test modes and test channels, but only the data of the worst case is included in this test report.

4) For 18GHz~26.5GHz

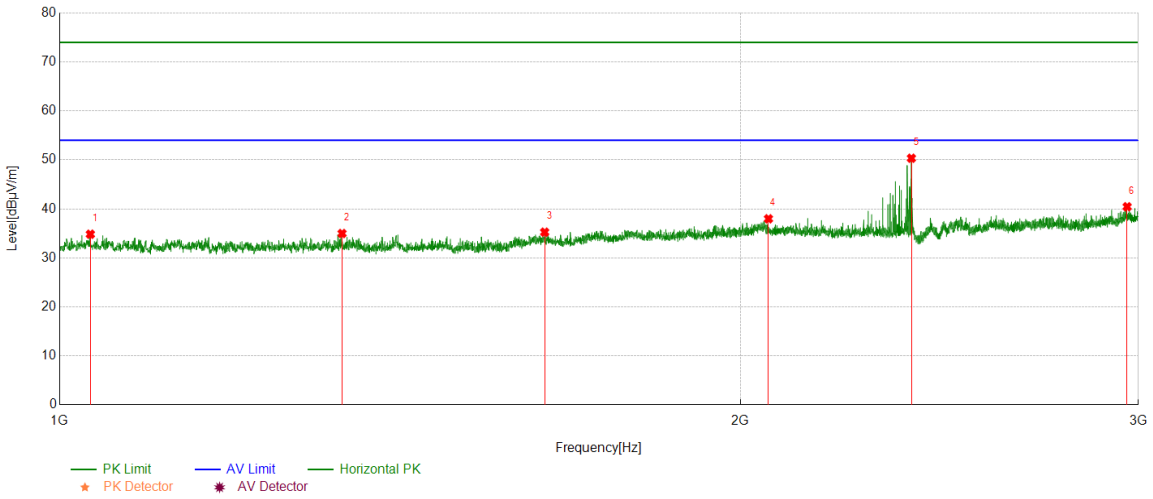
Test Mode	Channel	Puw(dBm)	Verdict
Zigbee	HCH	<Limit	PASS

Remark:
1) Through pre-testing all the test modes and test channels, but only the data of the worst case is included in this test report.

Part 1: 1GHz~3GHz

HARMONICS AND SPURIOUS EMISSIONS

Test Mode	Channel	Polarization	Verdict
Zigbee	LCH	Horizontal	PASS

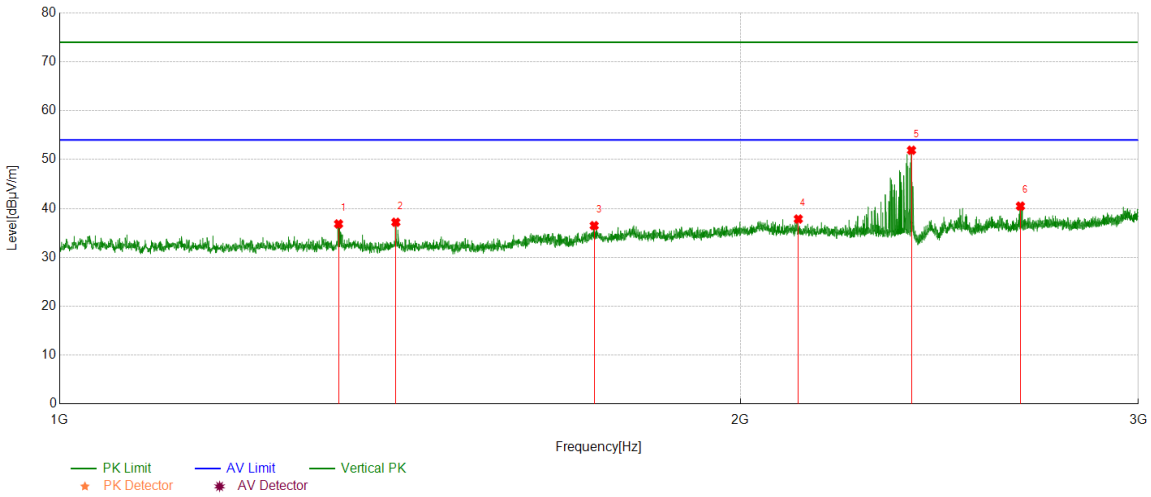


PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1031.754	40.07	-5.24	34.83	74.00	-39.17	Horizontal
2	1333.2917	41.42	-6.44	34.98	74.00	-39.02	Horizontal
3	1638.8299	40.53	-5.28	35.25	74.00	-38.75	Horizontal
4	2058.3823	40.79	-2.81	37.98	74.00	-36.02	Horizontal
5	2380.9226	53.13	-2.79	50.34	74.00	-23.66	Horizontal
6	2965.9957	40.15	0.29	40.44	74.00	-33.56	Horizontal

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. Peak: Peak detector.
5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	LCH	Vertical	PASS

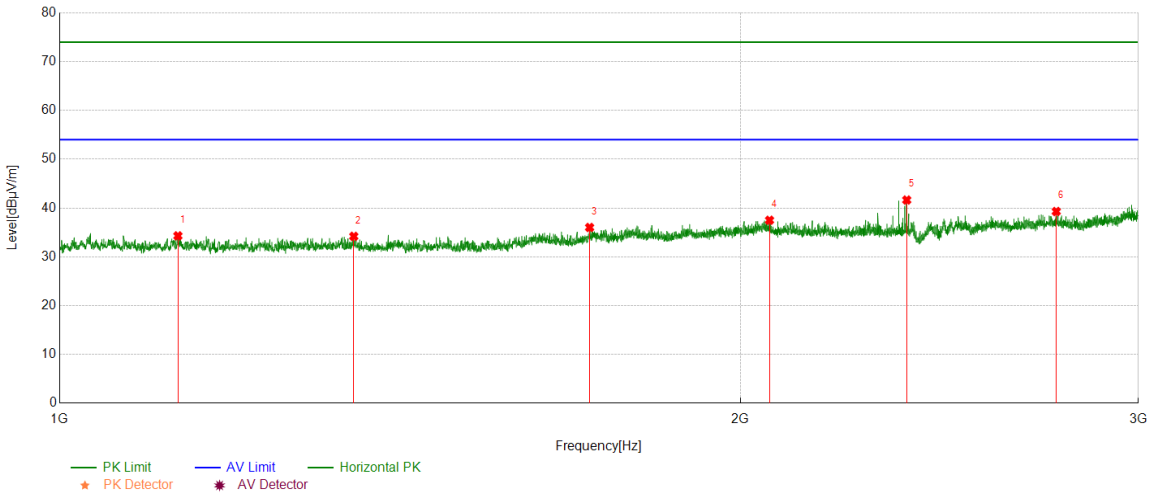


PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1328.5411	43.26	-6.43	36.83	74.00	-37.17	Vertical
2	1408.301	43.52	-6.34	37.18	74.00	-36.82	Vertical
3	1723.5904	41.24	-4.75	36.49	74.00	-37.51	Vertical
4	2121.8902	40.79	-2.95	37.84	74.00	-36.16	Vertical
5	2381.1726	54.69	-2.79	51.90	74.00	-22.10	Vertical
6	2660.4576	42.37	-1.89	40.48	74.00	-33.52	Vertical

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. Peak: Peak detector.
5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	MCH	Horizontal	PASS

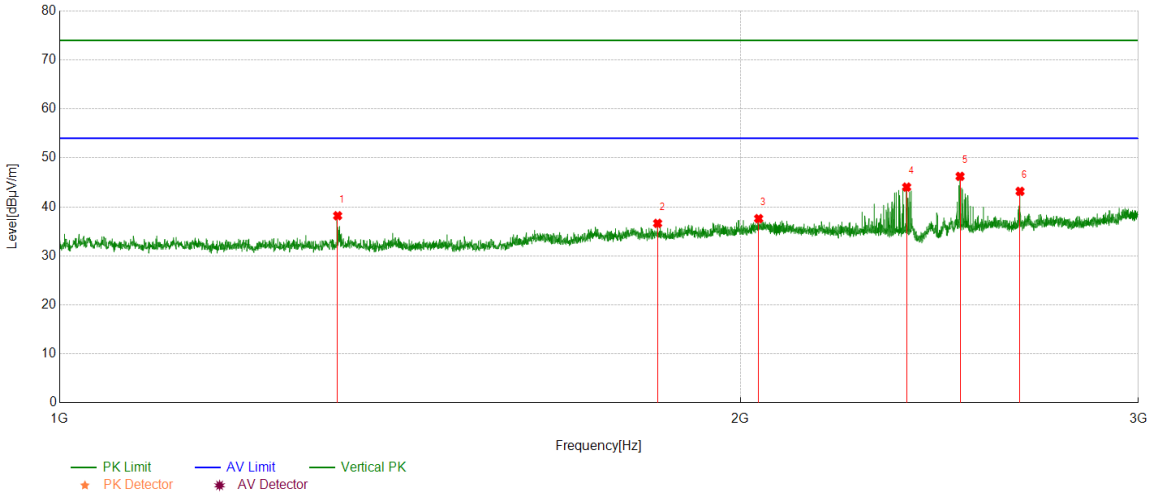


PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1128.016	40.35	-6.05	34.30	74.00	-39.70	Horizontal
2	1349.2937	40.36	-6.16	34.20	74.00	-39.80	Horizontal
3	1715.5894	40.78	-4.76	36.02	74.00	-37.98	Horizontal
4	2060.6326	40.37	-2.87	37.50	74.00	-36.50	Horizontal
5	2369.6712	44.41	-2.77	41.64	74.00	-32.36	Horizontal
6	2759.4699	40.74	-1.45	39.29	74.00	-34.71	Horizontal

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. Peak: Peak detector.
5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	MCH	Vertical	PASS

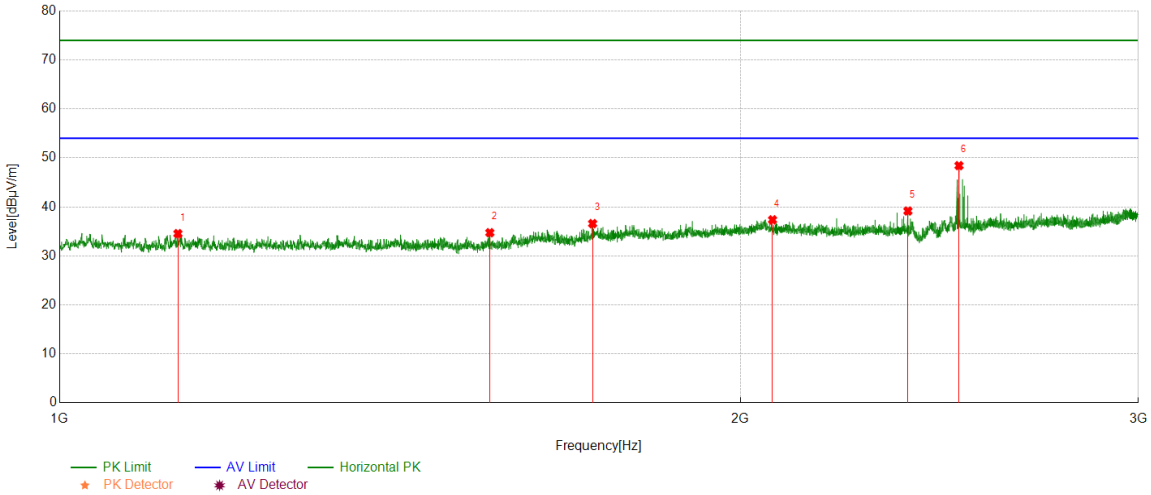


PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1327.2909	44.60	-6.41	38.19	74.00	-35.81	Vertical
2	1838.6048	40.79	-4.15	36.64	74.00	-37.36	Vertical
3	2037.8797	40.22	-2.61	37.61	74.00	-36.39	Vertical
4	2369.4212	46.81	-2.77	44.04	74.00	-29.96	Vertical
5	2501.9377	48.26	-2.03	46.23	74.00	-27.77	Vertical
6	2659.4574	45.07	-1.90	43.17	74.00	-30.83	Vertical

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. Peak: Peak detector.
5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	HCH	Horizontal	PASS

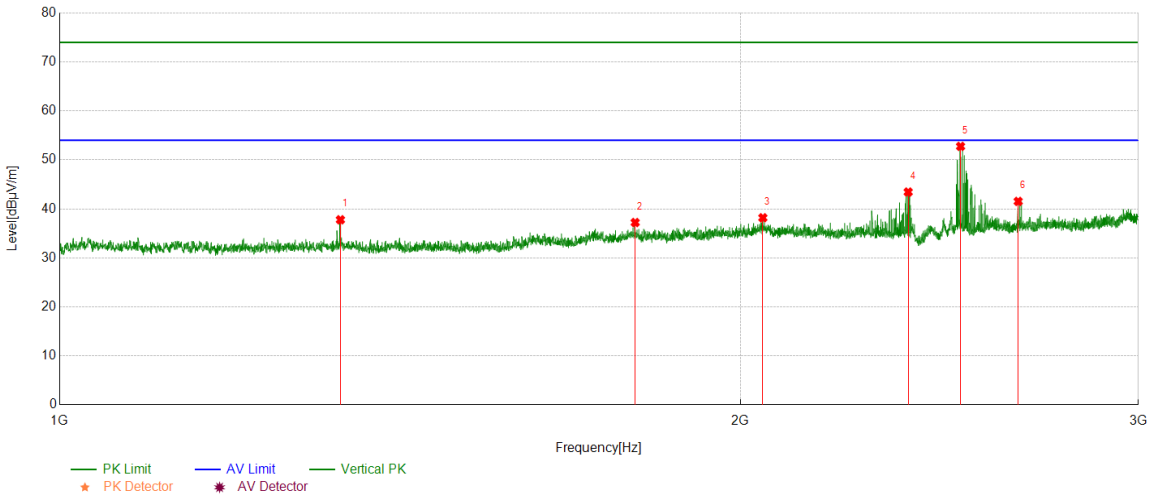


PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1128.016	40.59	-6.05	34.54	74.00	-39.46	Horizontal
2	1549.8187	41.22	-6.49	34.73	74.00	-39.27	Horizontal
3	1720.8401	41.29	-4.70	36.59	74.00	-37.41	Horizontal
4	2066.8834	40.38	-3.02	37.36	74.00	-36.64	Horizontal
5	2372.4216	41.93	-2.77	39.16	74.00	-34.84	Horizontal
6	2499.1874	50.47	-2.05	48.42	74.00	-25.58	Horizontal

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. Peak: Peak detector.
5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	HCH	Vertical	PASS



PK Result:

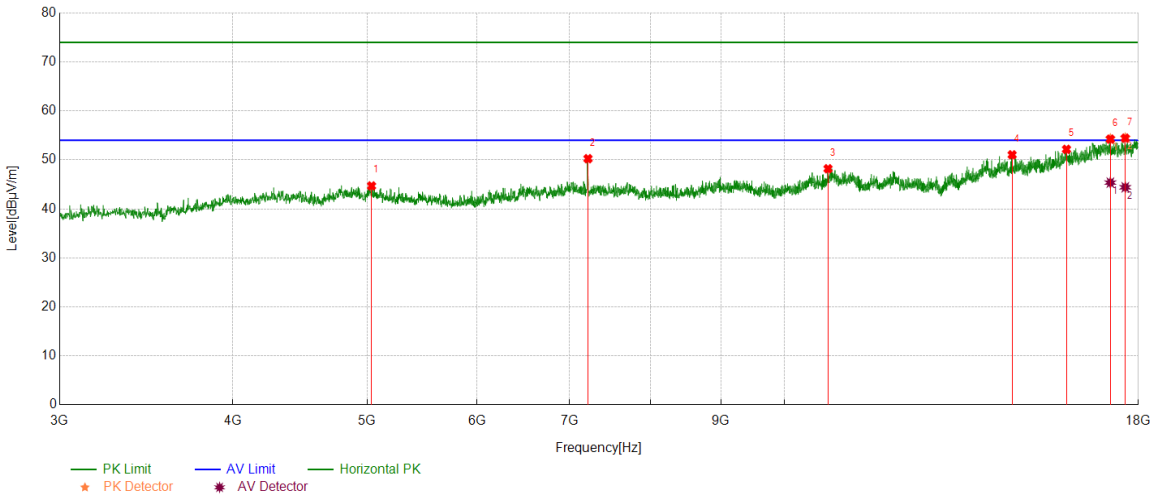
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1331.0414	44.22	-6.44	37.78	74.00	-36.22	Vertical
2	1797.0996	41.42	-4.20	37.22	74.00	-36.78	Vertical
3	2046.6308	40.74	-2.55	38.19	74.00	-35.81	Vertical
4	2373.1716	46.22	-2.78	43.44	74.00	-30.56	Vertical
5	2503.1879	54.78	-2.02	52.76	74.00	-21.24	Vertical
6	2654.4568	43.51	-1.98	41.53	74.00	-32.47	Vertical

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. Peak: Peak detector.
5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Part 2: 3GHz~18GHz

HARMONICS AND SPURIOUS EMISSIONS

Test Mode	Channel	Polarization	Verdict
Zigbee	LCH	Horizontal	PASS



PK Result:

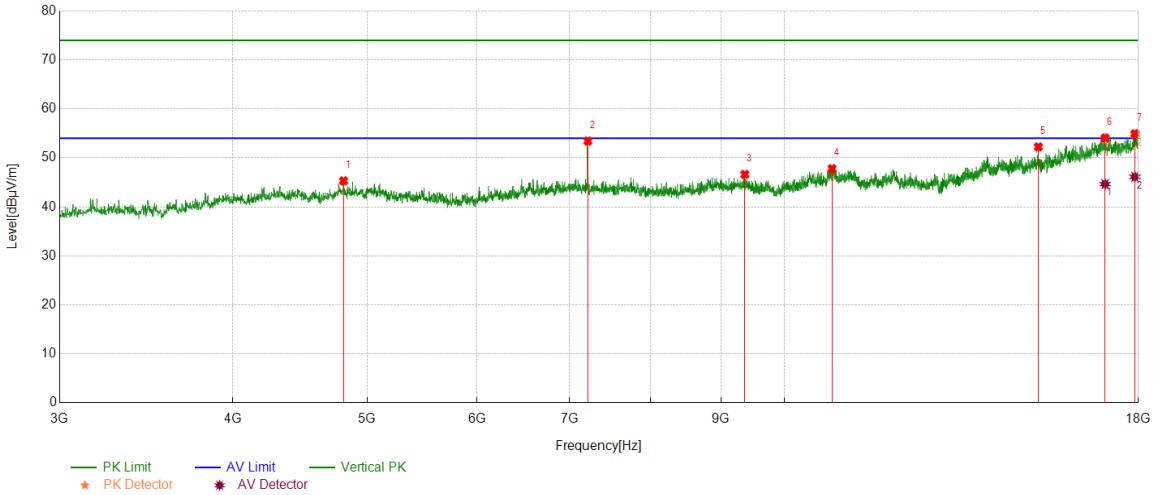
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	5036.5046	38.86	5.83	44.69	74.00	-29.31	Horizontal
2	7215.5269	42.01	8.24	50.25	74.00	-23.75	Horizontal
3	10750.3438	36.68	11.52	48.20	74.00	-25.80	Horizontal
4	14596.4496	36.86	14.18	51.04	74.00	-22.96	Horizontal
5	15974.7468	35.87	16.29	52.16	74.00	-21.84	Horizontal
6	17182.3978	36.69	17.63	54.32	74.00	-19.68	Horizontal
7	17613.7017	36.45	18.04	54.49	74.00	-19.51	Horizontal

AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	17182.3978	27.73	17.63	45.36	54.00	-8.64	Horizontal
2	17613.7017	26.37	18.04	44.41	54.00	-9.59	Horizontal

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak detector: RBW: 1 MHz, VBW: 3 MHz.
4. Average detector: RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	LCH	Vertical	PASS



PK Result:

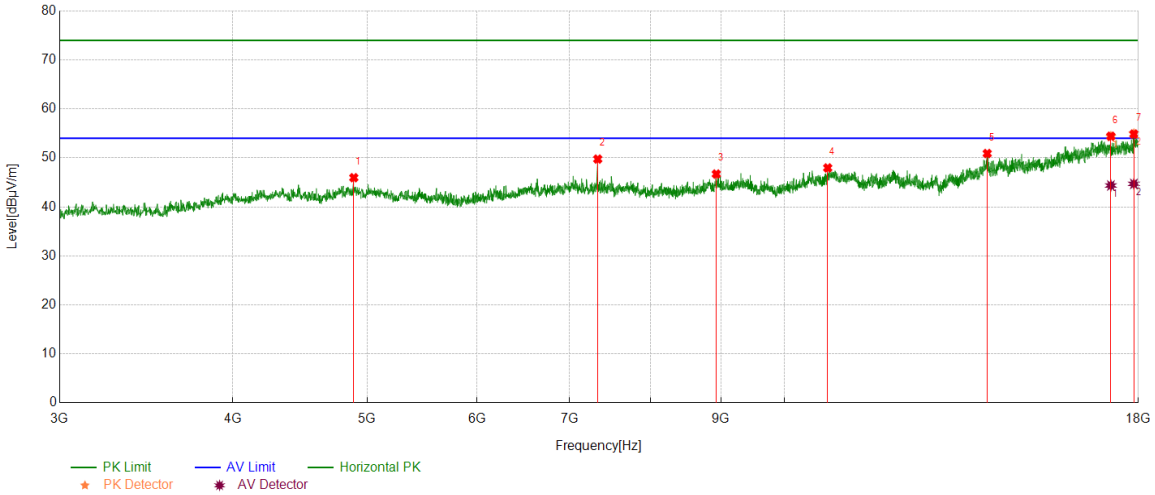
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	4807.726	40.03	5.28	45.31	74.00	-28.69	Vertical
2	7213.6517	45.19	8.24	53.43	74.00	-20.57	Vertical
3	9362.6703	37.55	9.08	46.63	74.00	-27.37	Vertical
4	10821.6027	36.28	11.52	47.80	74.00	-26.20	Vertical
5	15245.2807	36.94	15.31	52.25	74.00	-21.75	Vertical
6	17032.379	35.61	18.48	54.09	74.00	-19.91	Vertical
7	17898.7373	35.61	19.16	54.77	74.00	-19.23	Vertical

AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	17032.379	26.16	18.48	44.64	54.00	-9.36	Vertical
2	17898.7373	26.97	19.16	46.13	54.00	-7.87	Vertical

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak detector: RBW: 1 MHz, VBW: 3 MHz.
4. Average detector: RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	MCH	Horizontal	PASS



PK Result:

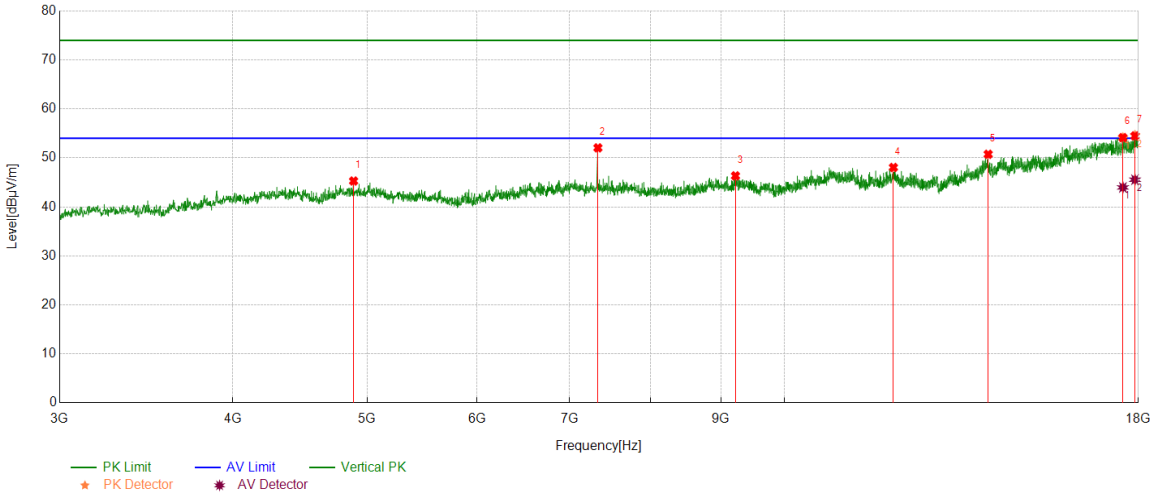
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	4890.2363	40.45	5.51	45.96	74.00	-28.04	Horizontal
2	7333.6667	41.65	8.11	49.76	74.00	-24.24	Horizontal
3	8929.4912	37.74	8.97	46.71	74.00	-27.29	Horizontal
4	10744.7181	36.64	11.32	47.96	74.00	-26.04	Horizontal
5	14003.8755	36.65	14.25	50.90	74.00	-23.10	Horizontal
6	17197.3997	36.46	17.89	54.35	74.00	-19.65	Horizontal
7	17866.8584	35.87	19.05	54.92	74.00	-19.08	Horizontal

AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	17197.3997	26.48	17.89	44.37	54.00	-9.63	Horizontal
2	17866.8584	25.65	19.05	44.70	54.00	-9.30	Horizontal

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak detector: RBW: 1 MHz, VBW: 3 MHz.
4. Average detector: RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	MCH	Vertical	PASS



PK Result:

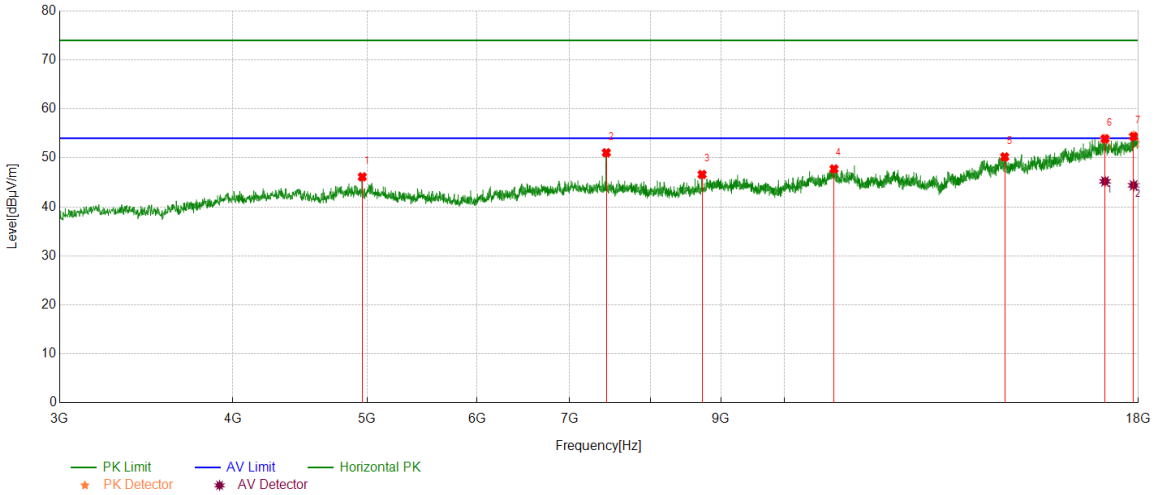
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	4888.361	39.78	5.50	45.28	74.00	-28.72	Vertical
2	7335.5419	43.95	8.10	52.05	74.00	-21.95	Vertical
3	9218.2773	37.65	8.69	46.34	74.00	-27.66	Vertical
4	11984.248	36.11	11.94	48.05	74.00	-25.95	Vertical
5	14026.3783	36.28	14.46	50.74	74.00	-23.26	Vertical
6	17544.318	36.29	17.80	54.09	74.00	-19.91	Vertical
7	17900.6126	35.42	19.14	54.56	74.00	-19.44	Vertical

AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	17544.318	26.17	17.80	43.97	54.00	-10.03	Vertical
2	17900.6126	26.41	19.14	45.55	54.00	-8.45	Vertical

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak detector: RBW: 1 MHz, VBW: 3 MHz.
4. Average detector: RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	HCH	Horizontal	PASS



PK Result:

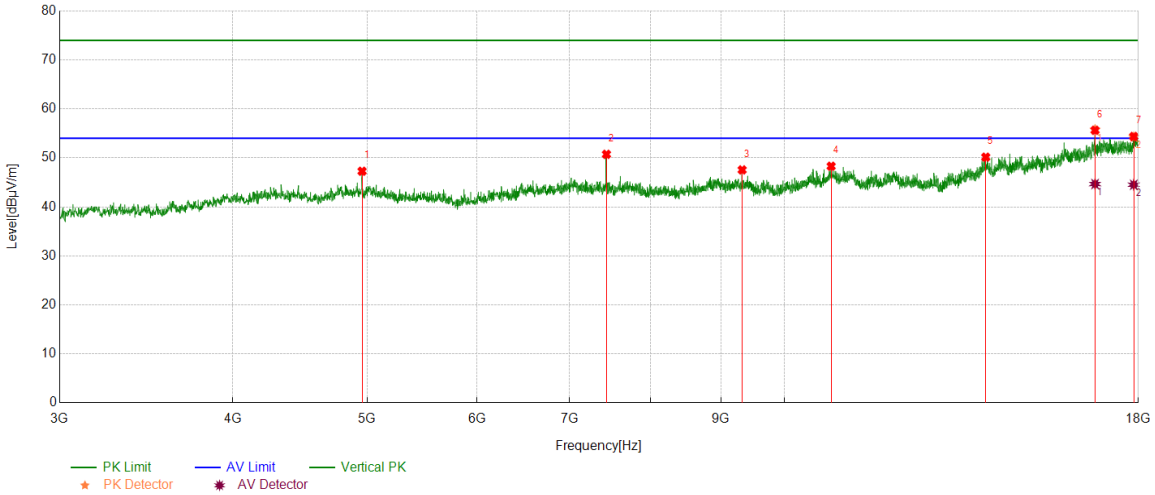
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	4959.62	40.35	5.78	46.13	74.00	-27.87	Horizontal
2	7438.6798	43.14	7.92	51.06	74.00	-22.94	Horizontal
3	8721.3402	38.40	8.22	46.62	74.00	-27.38	Horizontal
4	10857.2322	36.16	11.59	47.75	74.00	-26.25	Horizontal
5	14416.4271	36.16	14.05	50.21	74.00	-23.79	Horizontal
6	17030.5038	35.33	18.51	53.84	74.00	-20.16	Horizontal
7	17859.3574	35.43	19.08	54.51	74.00	-19.49	Horizontal

AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	17030.5038	26.70	18.51	45.21	54.00	-8.79	Horizontal
2	17859.3574	25.32	19.08	44.40	54.00	-9.60	Horizontal

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak detector: RBW: 1 MHz, VBW: 3 MHz.
4. Average detector: RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	HCH	Vertical	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	4957.7447	41.53	5.75	47.28	74.00	-26.72	Vertical
2	7440.5551	42.80	7.93	50.73	74.00	-23.27	Vertical
3	9321.4152	38.61	8.94	47.55	74.00	-26.45	Vertical
4	10806.6008	36.83	11.47	48.30	74.00	-25.70	Vertical
5	13970.1213	36.51	13.64	50.15	74.00	-23.85	Vertical
6	16751.0939	38.2	17.53	55.73	74.00	-18.27	Vertical
7	17863.1079	35.14	19.10	54.24	74.00	-19.76	Vertical

AV Result:

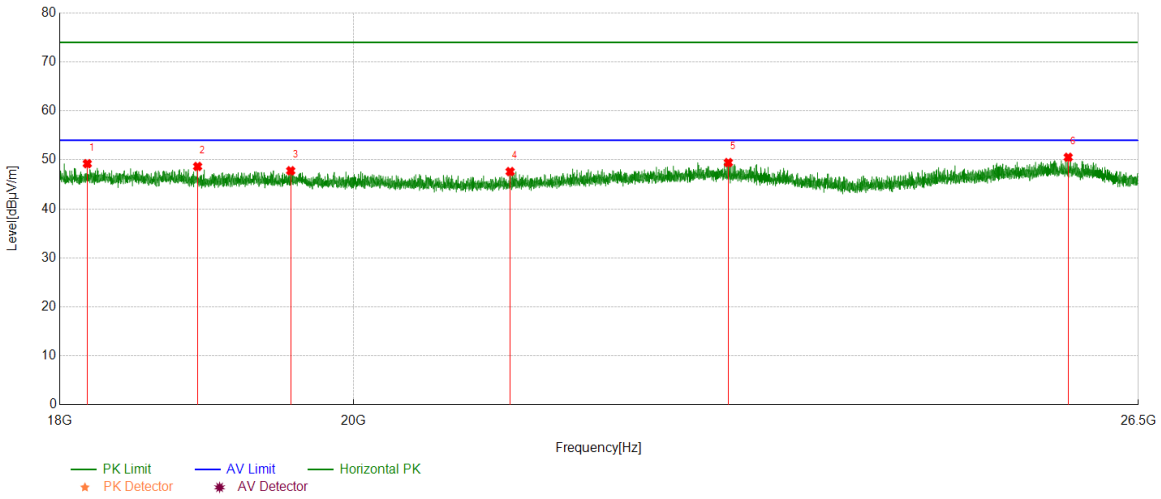
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	16751.0939	27.14	17.53	44.67	54.00	-9.33	Vertical
2	17863.1079	25.42	19.10	44.52	54.00	-9.48	Vertical

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak detector: RBW: 1 MHz, VBW: 3 MHz.
4. Average detector: RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Part 3: 18GHz~26.5GHz

SPURIOUS EMISSIONS 18GHz TO 26.5GHz (WORST-CASE CONFIGURATION)

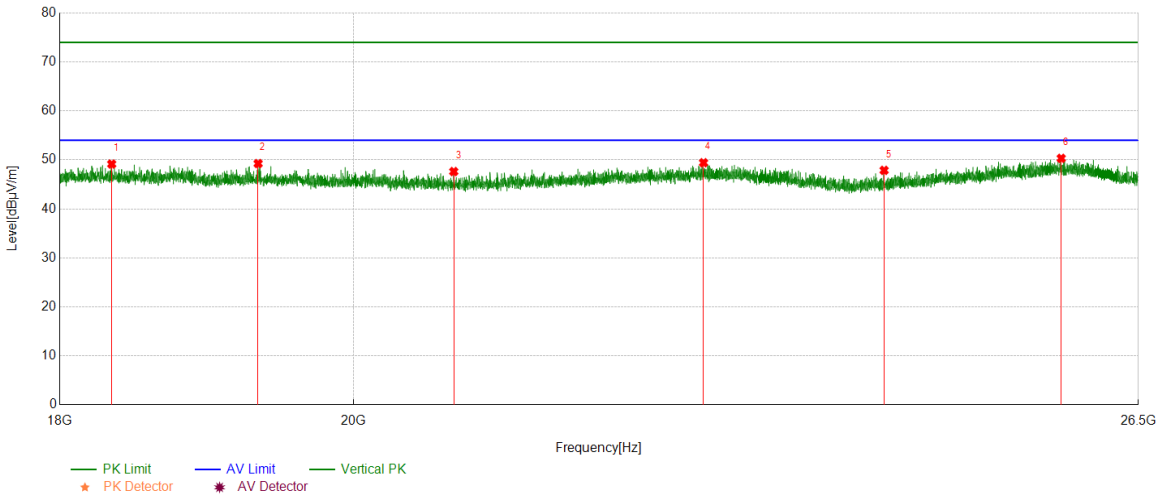
Test Mode	Channel	Polarization	Verdict
Zigbee	MCH	Horizontal	PASS



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	18179.3679	50.30	-1.07	49.23	74.00	-24.77	Peak
2	18912.9913	49.77	-1.11	48.66	74.00	-25.34	Peak
3	19554.8055	48.49	-0.71	47.78	74.00	-26.22	Peak
4	21155.5156	48.47	-0.86	47.61	74.00	-26.39	Peak
5	22876.9377	48.32	1.13	49.45	74.00	-24.55	Peak
6	25842.0342	49.12	1.41	50.53	74.00	-23.47	Peak

Note: 1. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
2. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
3. Measurement = Reading Level + Correct Factor.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
Zigbee	MCH	Vertical	PASS



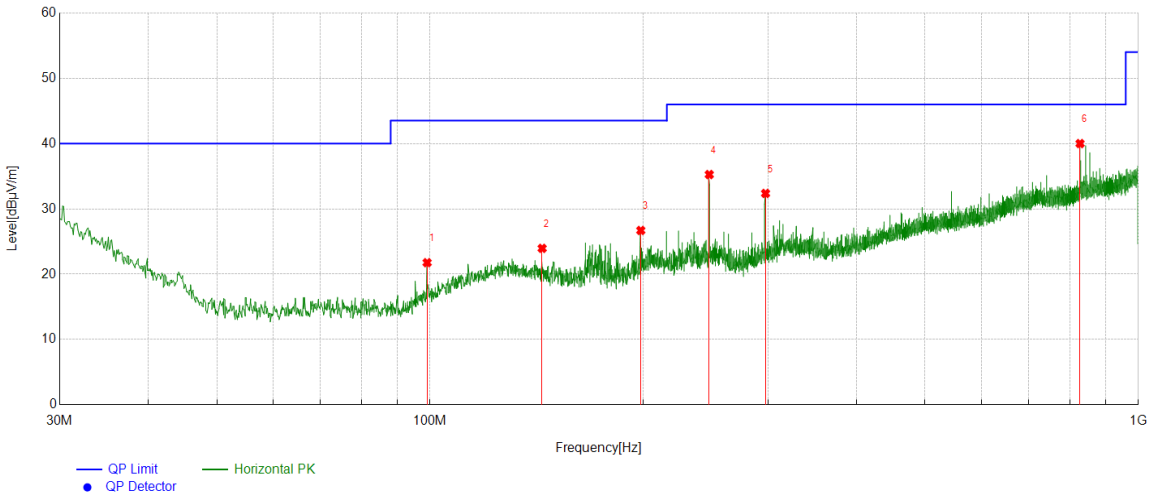
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	18339.1839	50.15	-1.00	49.15	74.00	-24.85	Peak
2	19327.8328	50.11	-0.86	49.25	74.00	-24.75	Peak
3	20732.1732	48.49	-0.87	47.62	74.00	-26.38	Peak
4	22674.6175	48.45	0.97	49.42	74.00	-24.58	Peak
5	24191.1691	48.84	-0.97	47.87	74.00	-26.13	Peak
6	25777.4277	49.01	1.31	50.32	74.00	-23.68	Peak

Note: 1. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
2. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
3. Measurement = Reading Level + Correct Factor.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Part 4: 30MHz~1GHz

SPURIOUS EMISSIONS 30M TO 1GHz (WORST-CASE CONFIGURATION)

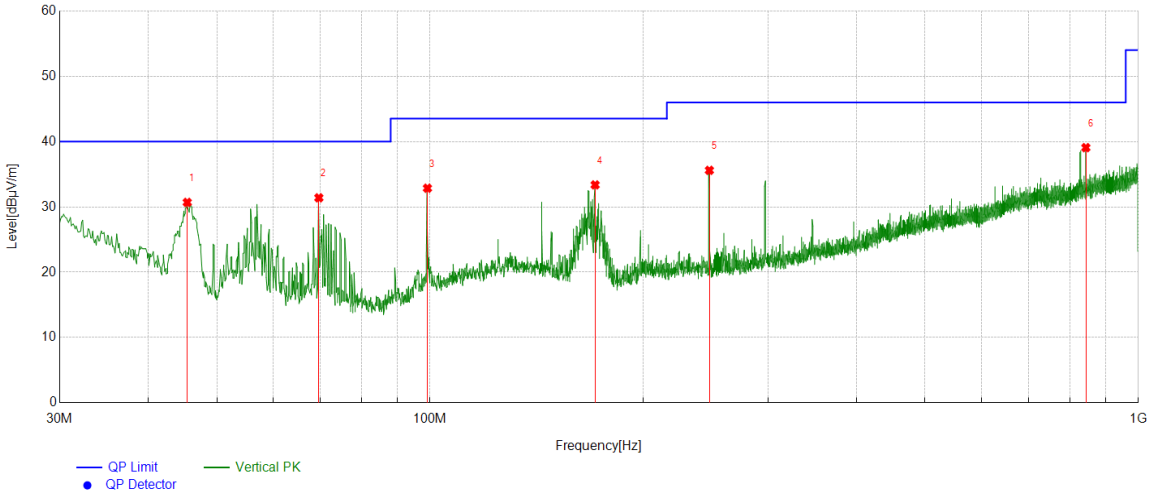
Test Mode	Channel	Polarization	Verdict
Zigbee	MCH	Horizontal	PASS



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	99.0709	4.92	16.85	21.77	43.50	-21.73	Peak
2	143.9864	3.82	20.14	23.96	43.50	-19.54	Peak
3	198.4088	6.94	19.76	26.70	43.50	-16.80	Peak
4	247.8838	15.85	19.41	35.26	46.00	-10.74	Peak
5	297.6498	11.18	21.19	32.37	46.00	-13.63	Peak
6	827.4197	8.99	31.01	40.00	46.00	-6.00	Peak

Note: 1. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.
3. Measurement = Reading Level + Correct Factor.

Test Mode	Channel	Polarization	Verdict
Zigbee	MCH	Vertical	PASS



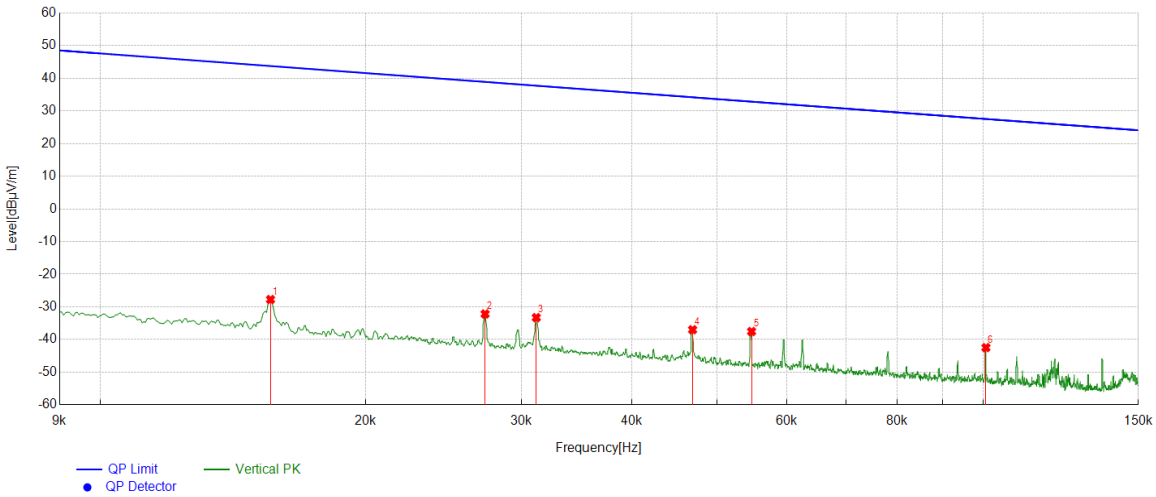
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	45.4245	13.24	17.45	30.69	40.00	-9.31	Peak
2	69.677	16.32	15.07	31.39	40.00	-8.61	Peak
3	99.1679	15.99	16.87	32.86	43.50	-10.64	Peak
4	171.0521	14.60	18.77	33.37	43.50	-10.13	Peak
5	247.9808	16.19	19.41	35.60	46.00	-10.40	Peak
6	843.2323	7.90	31.17	39.07	46.00	-6.93	Peak

Note: 1. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.
3. Measurement = Reading Level + Correct Factor.

Part 5: 9KHz~30MHz

SPURIOUS EMISSIONS Below 30MHz (WORST CASE CONFIGURATION-FACE ON)

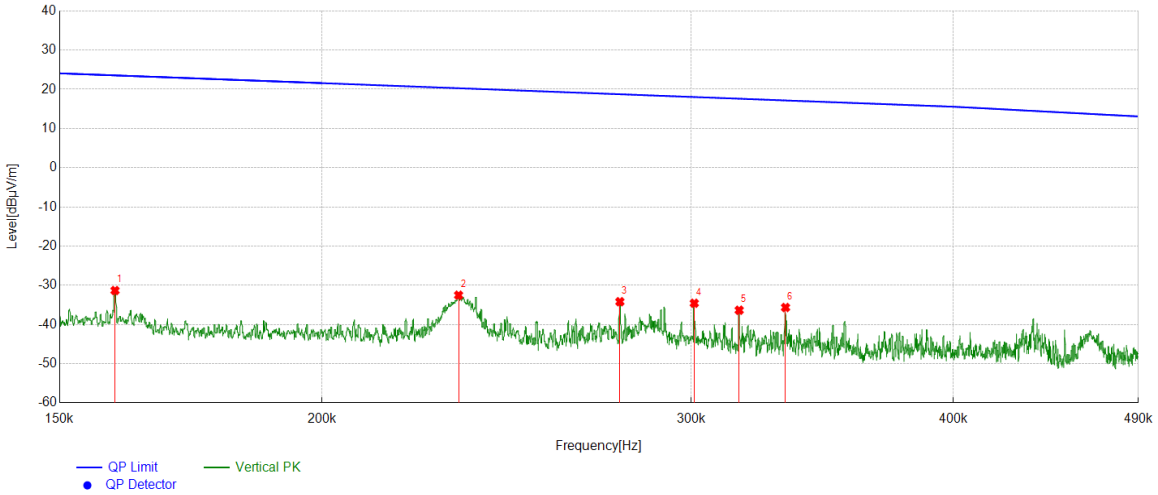
Test Mode	Channel	Frequency Range	Verdict
Zigbee	MCH	9kHz~150kHz	PASS



No.	Frequency	Reading Level	Correct Factor	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dBuA/m]	[dBuA/m]	[dB]	
1	0.0156	34.15	-61.89	-27.74	43.75	-79.24	-7.75	-71.49	Peak
2	0.0273	29.61	-61.77	-32.16	38.87	-83.66	-12.63	-71.03	Peak
3	0.0312	28.46	-61.74	-33.28	37.71	-84.78	-13.79	-70.99	Peak
4	0.0469	24.75	-61.74	-36.99	34.18	-88.49	-17.32	-71.17	Peak
5	0.0547	24.21	-61.75	-37.54	32.85	-89.04	-18.65	-70.39	Peak
6	0.1008	19.35	-61.82	-42.47	27.53	-93.97	-23.97	-70.00	Peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

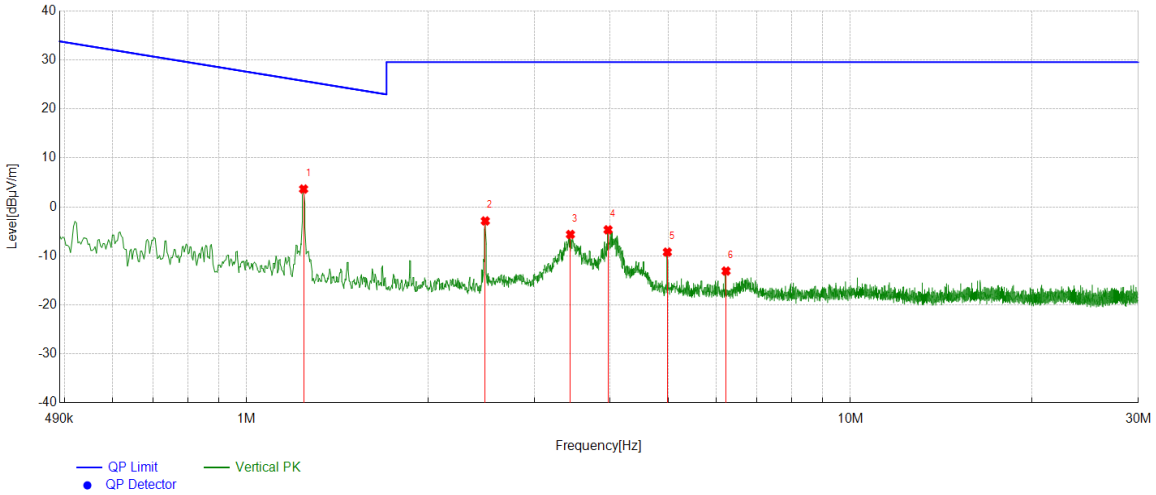
Test Mode	Channel	Frequency Range	Verdict
Zigbee	MCH	150kHz~490kHz	PASS



No.	Frequency	Reading Level	Correct Factor	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dBuA/m]	[dBuA/m]	[dB]	
1	0.1594	30.51	-61.84	-31.33	23.55	-82.83	-27.95	-54.88	Peak
2	0.2324	29.34	-61.87	-32.53	20.28	-84.03	-31.22	-52.81	Peak
3	0.2774	27.70	-61.89	-34.19	18.74	-85.69	-32.76	-52.93	Peak
4	0.301	27.32	-61.90	-34.58	18.03	-86.08	-33.47	-52.61	Peak
5	0.3162	25.54	-61.90	-36.36	17.6	-87.86	-33.9	-53.96	Peak
6	0.3327	26.24	-61.90	-35.66	17.16	-87.16	-34.34	-52.82	Peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

Test Mode	Channel	Frequency Range	Verdict
Zigbee	MCH	490kHz~30MHz	PASS



No.	Frequency	Reading Level	Correct Factor	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dBuA/m]	[dBuA/m]	[dB]	
1	1.2426	25.49	-21.85	3.64	25.72	-47.86	-25.78	-22.08	Peak
2	2.4851	18.92	-21.79	-2.87	29.54	-54.37	-21.96	-32.41	Peak
3	3.4383	16.13	-21.76	-5.63	29.54	-57.13	-21.96	-35.17	Peak
4	3.9696	17.06	-21.74	-4.68	29.54	-56.18	-21.96	-34.22	Peak
5	4.976	12.49	-21.72	-9.23	29.54	-60.73	-21.96	-38.77	Peak
6	6.2244	8.61	-21.70	-13.09	29.54	-64.59	-21.96	-42.63	Peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

8. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to FCC §15.203
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC §15.247(b)(4)
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ANTENNA GAIN

The antenna gain of EUT is less than 6 dBi

END OF REPORT