RADIO TEST REPORT
FCC ID: 2AAU7-ZB2ZWUS

Product：	Zipabox 2 + Z-wave module + 4G module
Trade Mark：	Zipabox 2
Model Name：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Family Model：	zb2.zwus, zb2.zwis, zb2.zwau, zbm.zwus, zbm.zwis, zbm.zwau, ah2.zwus.4g, ah2.zwus.3g
Report No.：	S18113000604E002

Prepared for

Tri plus grupa d.o.o.

Banjavciceva 11, 10000 Zagreb, Croatia

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

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TEST RESULT CERTIFICATION

Applicant's name	:	Tri plus grupa d.o.o.
Address	:	Banjavciceva 11, 10000 Zagreb, Croatia
Manufacturer's Name	:	Tri plus grupa d.o.o.
Address	:	Banjavciceva 11, 10000 Zagreb, Croatia
Product description		
Product name	:	Zipabox 2 + Z-wave module + 4G module
Model and/or type reference	:	zb2.main + zb2.zw + zbm.zw + zbm.4G
Family Model：		zb2.zwus, zb2.zwis, zb2.zwau, zbm.zwus, zbm.zwis, zbm.zwau, ah2.zwus.4g, ah2.zwus.3g
Rating(s)	:	DC 3.6V/900 mAh from battery or DC 12V from Adapter
Standards	:	FCC Part15.249
Test procedure		ANSI C63.10-2013

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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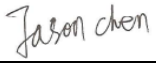
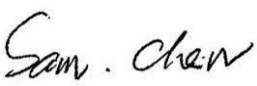
Date of Test	:	
Date (s) of performance of tests	:	14 Dec. 2018 ~29 Apr. 2019
Date of Issue	:	29 Apr. 2019
Test Result	:	**Pass**

Testing Engineer : 

(Allen Liu)

Technical Manager : 

(Jason Chen)

Authorized Signatory : 

(Sam Chen)

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.249)			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	Pass	
15.203	Antenna Requirement	Pass	
15.249 15.209	Radiated Spurious Emission	Pass	
15.249(2)	Frequency Tolerance	Pass	
15.249(a)	Fundamental Measurement	Pass	
15.205	Band Edge Emission	Pass	
15.215	Occupied Bandwidth	Pass	

1.1 TEST FACILITY

Shenzhen NTEK Testing Technology Co., Ltd
Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R. China.
FCC FRN Registration No.:463705; IC Registration No.:9270A-1
CNAS Registration No.:L5516

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Zipabox 2 + Z-wave module + 4G module
Trade Mark	Zipabox 2
Model Name	zb2.main + zb2.zw + zbm.zw + zbm.4G
Family Model	zb2.zwus, zb2.zwis, zb2.zwau, zbm.zwus, zbm.zwis, zbm.zwau, ah2.zwus.4g, ah2.zwus.3g
Model Difference	All the model are the same circuit and RF module, State of the art automation controller. Modular design allows it to support variety of standards such as Z-wave, ZigBee, KNX, 433, EnOcean, 4G.
Product Description	The EUT is a Zipabox 2 + Z-wave module + 4G module Operation Frequency: 908.4 MHz / 916 MHz Modulation Type: GFSK Antenna Designation: External Antenna Antenna 1 Gain(Peak) 0 dBi Antenna 2 Gain(Peak) 0 dBi Based on the application, features, or specification exhibited in User's Manual. More details of EUT technical specification, please refer to the User's Manual.
Channel List	Please refer to the Note 2.
Adapter	Model:KA1801A-1201500DE Input: 100-240V~50/60Hz 0.55A Max Output: 12V⎓1500mA
Battery	DC 3.6V, 900mAh
Hardware version	Zipabox2 v2.1.4
Software version	1.4

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

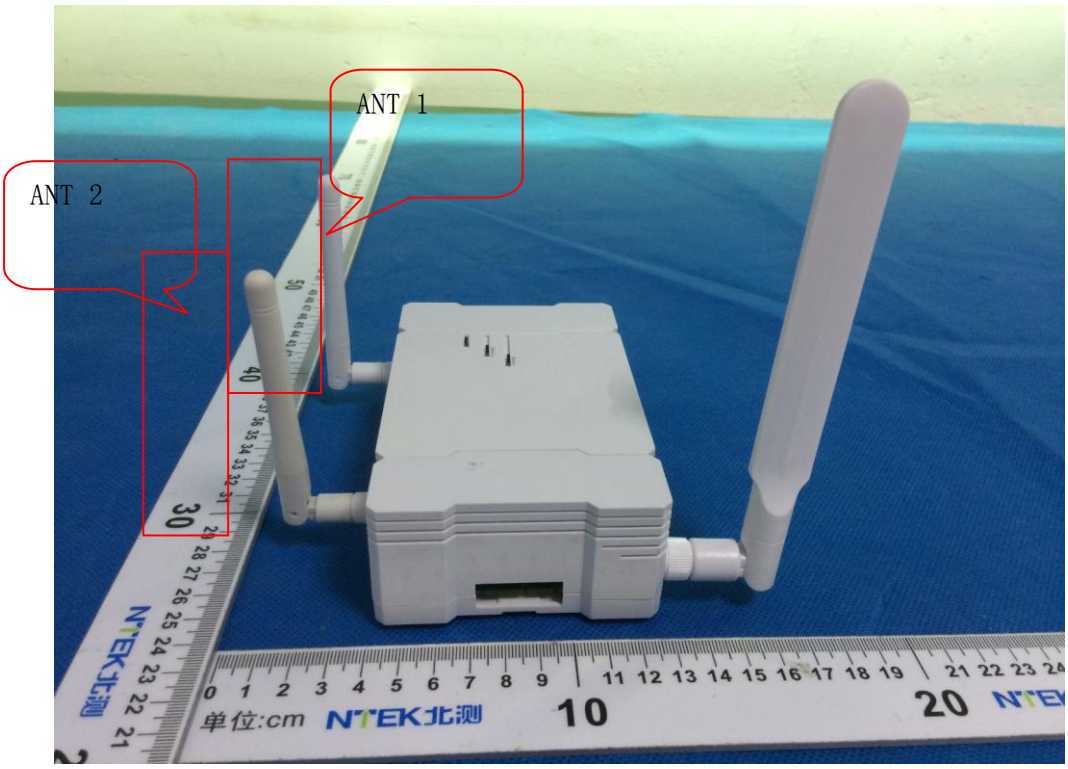
2.

Channel	Frequency(MHz)
01	908.4
02	916

3.

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	External Antenna	N/A	0	Antenna
2	N/A	N/A	External Antenna	N/A	0	Antenna



Note:The device does not support simultaneous transmission

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH01
Mode 2	CH02
Mode 3	Normal link

For Radiated Spurious Emission	
Pretest Mode	Description
Mode 1	CH01
Mode 2	CH02

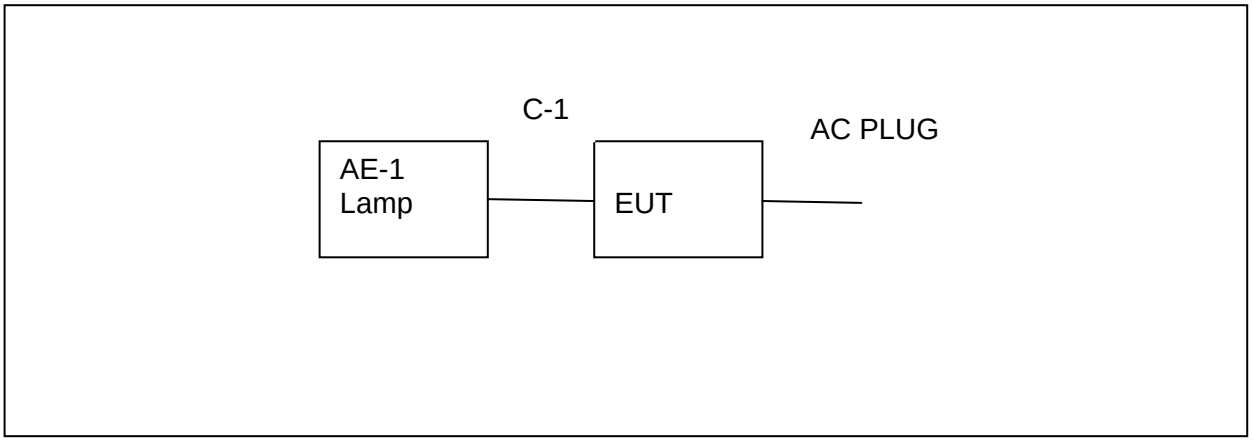
For Conducted Emission	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH02
Mode 3	Normal link

Note:

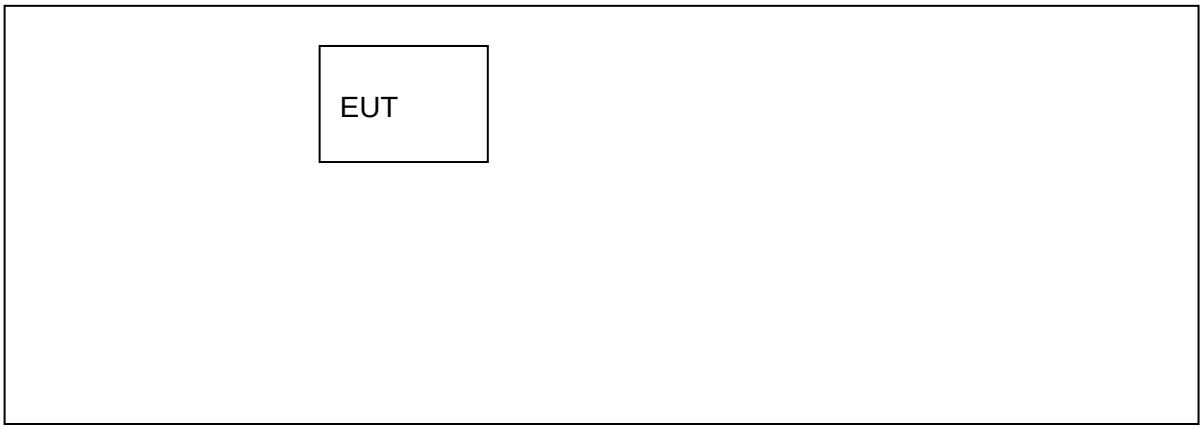
(1) The measurements are performed at the highest, middle, lowest available channels.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Mode



Radiated Spurious Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
AE-1	Lamp	N/A	N/A	N/A	Peripherals

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	DC Cable	NO	NO	0.5m	

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Aglient	E4407B	MY45108040	2018.05.19	2019.05.18	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2018.10.08	2019.10.07	1 year
3	EMI Test Receiver	Agilent	N9038A	MY53227146	2018.10.08	2019.10.07	1 year
4	Test Receiver	R&S	ESPI	101318	2018.05.19	2019.05.18	1 year
5	Bilog Antenna	TESEQ	CBL6111D	31216	2018.04.08	2019.04.07	1 year
6	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2018.05.19	2020.05.18	1 year
7	Horn Antenna	EM	EM-AH-10180	2011071402	2018.04.08	2019.04.07	1 year
8	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2018.12.11	2019.12.10	1 year
9	Amplifier	EMC	EMC051835SE	980246	2018.08.05	2019.08.04	1 year
10	Amplifier	MITEQ	TTA1840-35-HG	177156	2018.12.11	2019.12.10	1 year
11	Loop Antenna	ARA	PLA-1030/B	1029	2018.08.05	2019.08.04	1 year
12	Power Meter	DARE	RPR3006W	15I00041SNO84	2017.04.21	2020.04.20	1 year
13	Test Cable (9KHz-30MHz)	N/A	R-01	N/A	2017.04.21	2020.04.20	3 year
14	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2017.04.21	2020.04.20	3 year
15	High Test Cable(1G-40GHz)	N/A	R-03	N/A	2017.04.21	2020.04.20	3 year
16	High Test Cable(1G-40GHz)	N/A	R-04	N/A	2017.04.19	2020.04.18	3 year
17	temporary antenna connector (Note)	NTS	R001	N/A	N/A	N/A	N/A

Note:
We will use the temporary antenna connector (soldered on the PCB board) When conducted test
And this temporary antenna connector is listed within the instrument list

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2018.05.19	2019.05.18	1 year
2	LISN	R&S	ENV216	101313	2018.04.18	2019.04.19	1 year
3	LISN	SCHWARZBECK	NNLK 8129	8129245	2018.05.19	2019.05.18	1 year
4	50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200983704	2018.05.19	2020.05.18	1 year
5	Test Cable (9KHz-30MHz)	N/A	C01	N/A	2017.04.21	2020.04.20	3 year
6	Test Cable (9KHz-30MHz)	N/A	C02	N/A	2017.04.21	2020.04.20	3 year
7	Test Cable (9KHz-30MHz)	N/A	C03	N/A	2017.04.21	2020.04.20	3 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable which is scheduled for calibration every 3 years.

3. ANTENNA REQUIREMENT

3.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

3.2 EUT ANTENNA

The EUT antenna is permanent attached External antenna(Gain:0dBi). It comply with the standard requirement.

3.3 CONDUCTED EMISSION MEASUREMENT

3.3.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5			66 - 56 *	56 - 46 *	CISPR
0.50 -5.0			56.00	46.00	CISPR
5.0 -30.0			60.00	50.00	CISPR

0.15 -0.5			66 - 56 *	56 - 46 *	LP002.
0.50 -5.0			56.00	46.00	LP002.
5.0 -30.0			60.00	50.00	LP002.

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

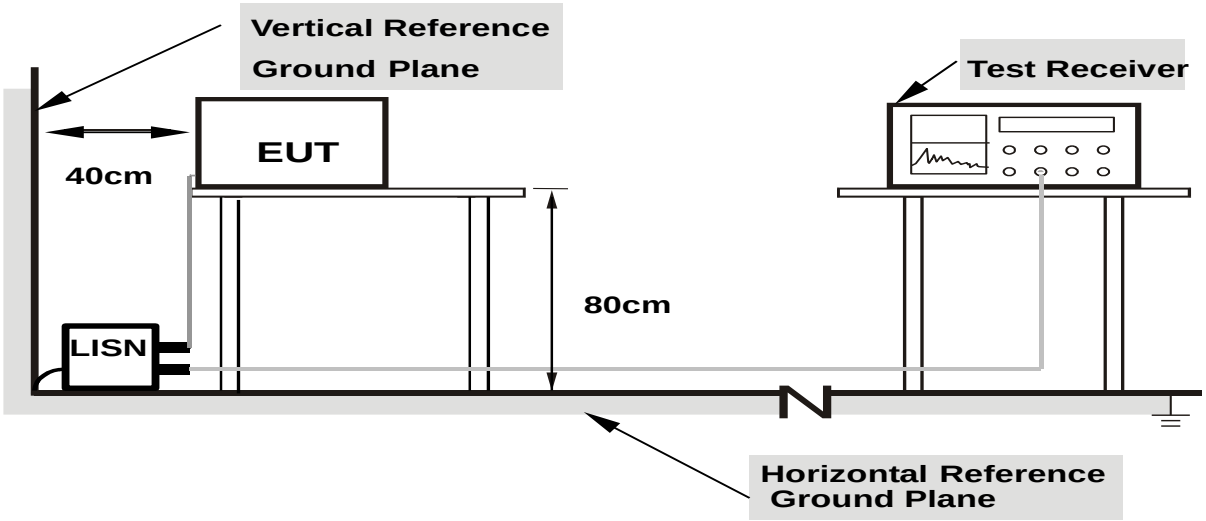
3.3.2 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

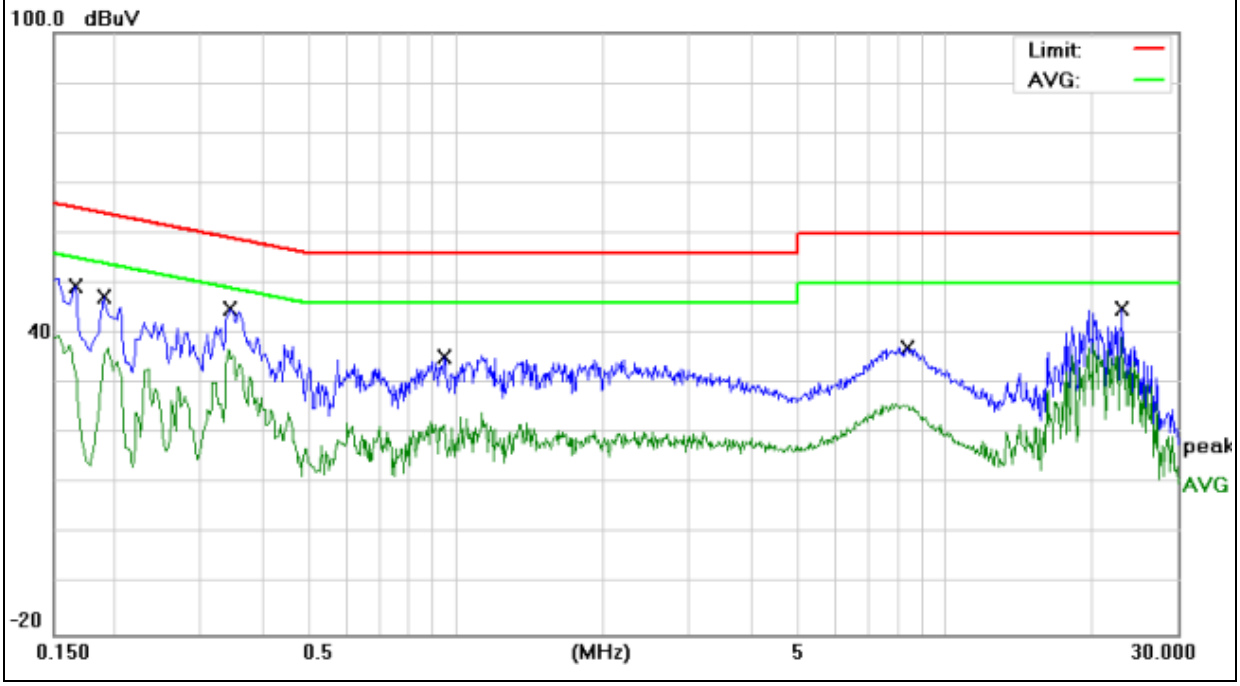
3.2.5 TEST RESULT

EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name. ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	55%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 12V from adapter AC 120V/60Hz	Test Mode：	Mode 3

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1660	39.80	9.76	49.56	65.15	-15.59	QP
0.1660	26.57	9.76	36.33	55.15	-18.82	AVG
0.1900	37.54	9.76	47.30	64.03	-16.73	QP
0.1900	25.70	9.76	35.46	54.03	-18.57	AVG
0.3460	35.08	9.73	44.81	59.06	-14.25	QP
0.3460	27.15	9.73	36.88	49.06	-12.18	AVG
0.9459	25.58	9.74	35.32	56.00	-20.68	QP
0.9459	18.41	9.74	28.15	46.00	-17.85	AVG
8.3939	27.23	9.95	37.18	60.00	-22.82	QP
8.3939	16.74	9.95	26.69	50.00	-23.31	AVG
23.1259	34.38	10.53	44.91	60.00	-15.09	QP
23.1259	28.83	10.53	39.36	50.00	-10.64	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

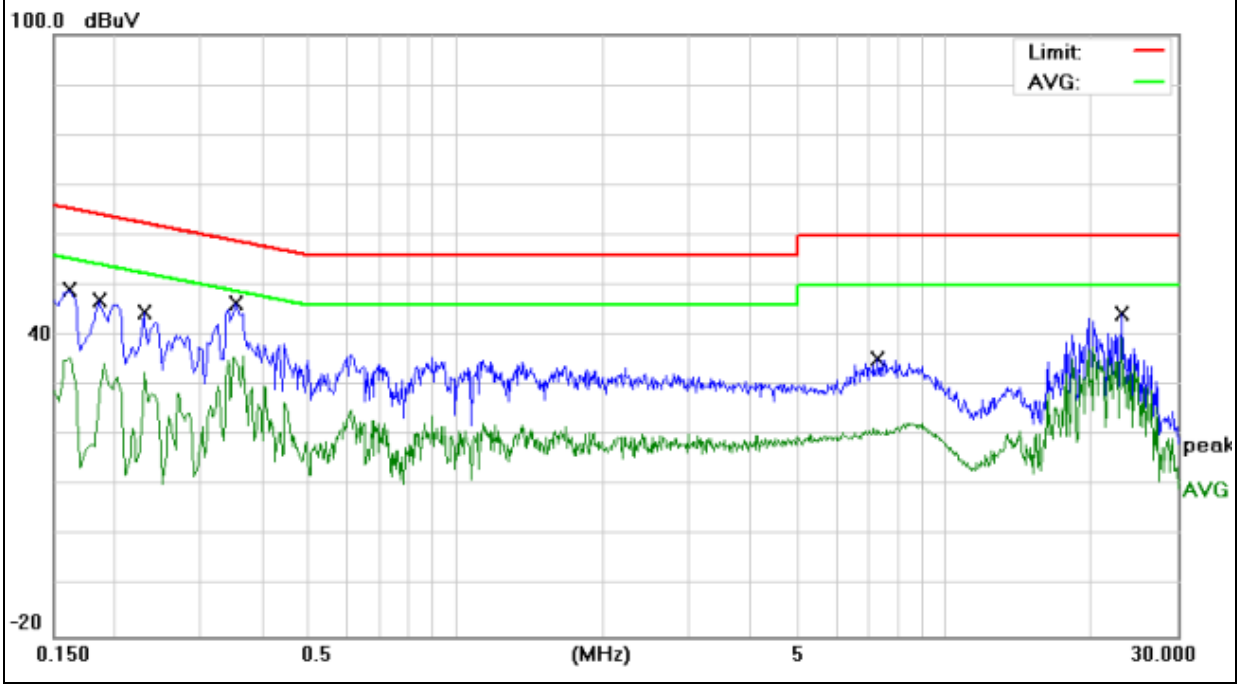


EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name. ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	55%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 12V from adapter AC 120V/60Hz	Test Mode：	Mode 3

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1620	39.30	9.73	49.03	65.36	-16.33	QP
0.1620	25.29	9.73	35.02	55.36	-20.34	AVG
0.1859	37.19	9.73	46.92	64.21	-17.29	QP
0.1859	23.72	9.73	33.45	54.21	-20.76	AVG
0.2300	34.80	9.74	44.54	62.45	-17.91	QP
0.2300	26.58	9.74	36.32	52.45	-16.13	AVG
0.3540	36.65	9.75	46.40	58.87	-12.47	QP
0.3540	26.15	9.75	35.90	48.87	-12.97	AVG
7.3059	25.31	9.98	35.29	60.00	-24.71	QP
7.3059	18.13	9.98	28.11	50.00	-21.89	AVG
23.1259	33.93	10.49	44.42	60.00	-15.58	QP
23.1259	19.96	10.49	30.45	50.00	-19.55	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

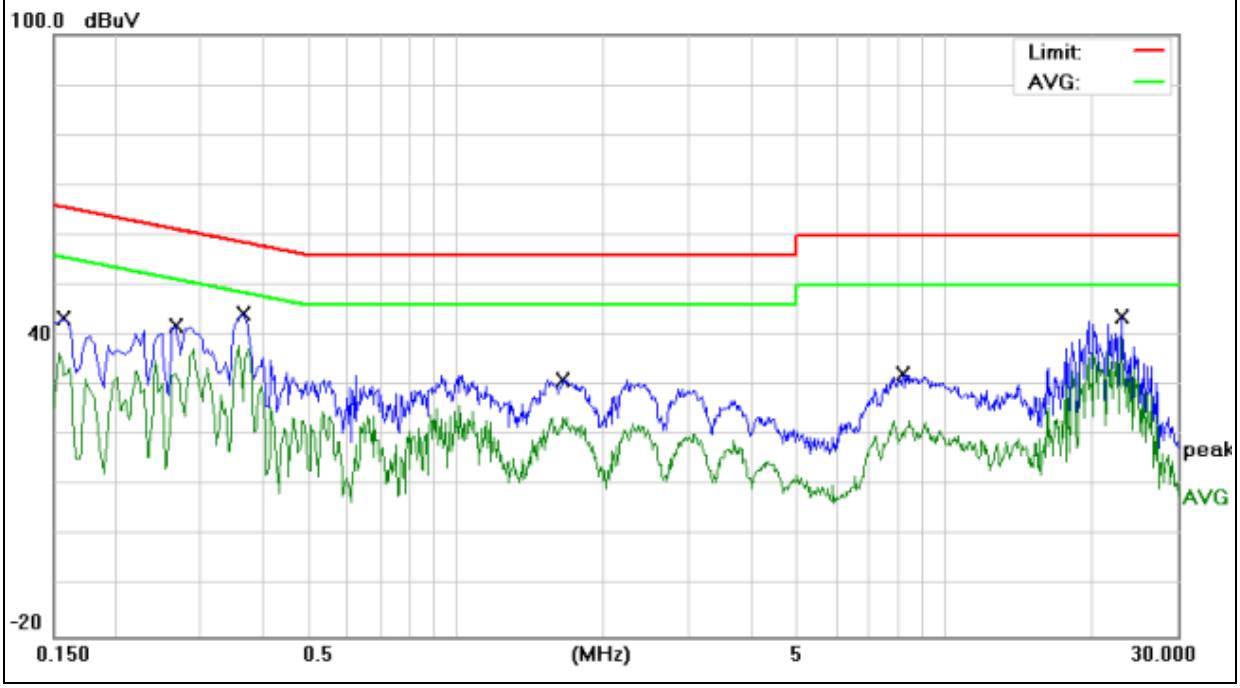


EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name. ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	55%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 12V from adapter AC 240V/60Hz	Test Mode：	Mode 3

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1580	33.57	9.75	43.32	65.56	-22.24	QP
0.1580	22.57	9.75	32.32	55.56	-23.24	AVG
0.2660	32.07	9.75	41.82	61.24	-19.42	QP
0.2660	20.70	9.75	30.45	51.24	-20.79	AVG
0.3660	34.59	9.74	44.33	58.59	-14.26	QP
0.3660	28.18	9.74	37.92	48.59	-10.67	AVG
1.6619	21.50	9.77	31.27	56.00	-24.73	QP
1.6619	15.25	9.77	25.02	46.00	-20.98	AVG
8.2339	22.34	9.94	32.28	60.00	-27.72	QP
8.2339	13.42	9.94	23.36	50.00	-26.64	AVG
23.1259	33.14	10.53	43.67	60.00	-16.33	QP
23.1259	19.61	10.53	30.14	50.00	-19.86	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

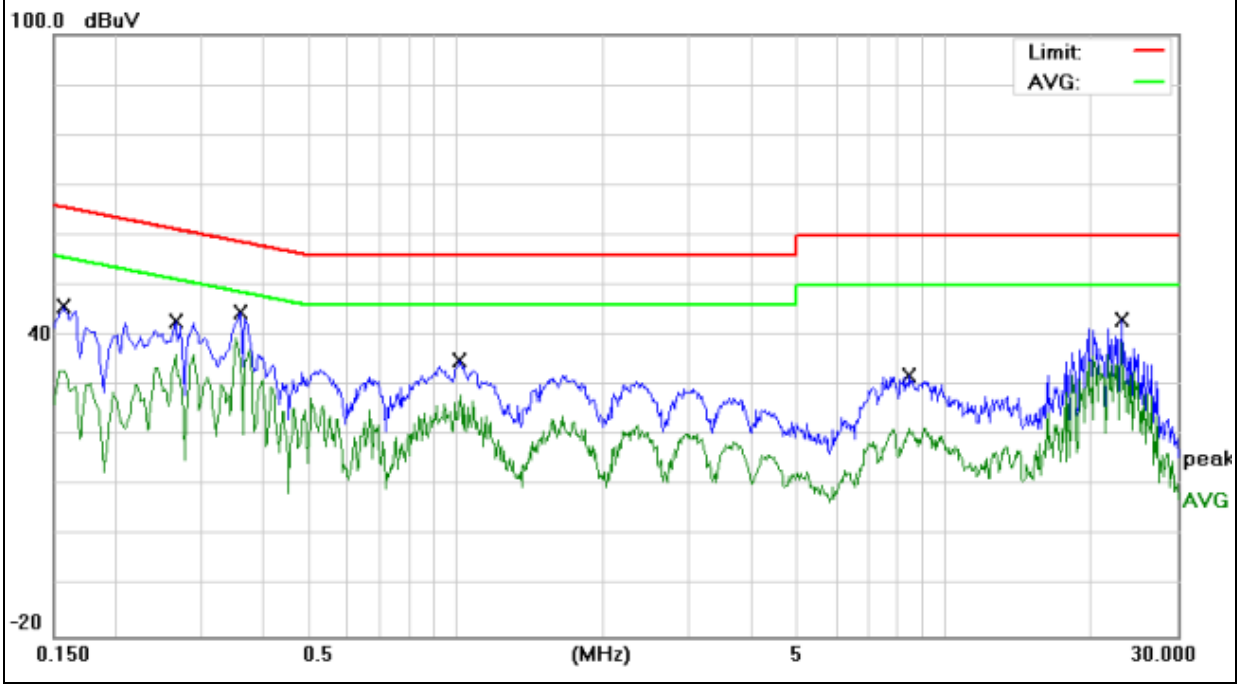


EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name. ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	55%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 12V from adapter AC 240V/60Hz	Test Mode：	Mode 3

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1580	36.05	9.74	45.79	65.56	-19.77	QP
0.1580	23.62	9.74	33.36	55.56	-22.20	AVG
0.2660	33.17	9.74	42.91	61.24	-18.33	QP
0.2660	22.71	9.74	32.45	51.24	-18.79	AVG
0.3620	34.92	9.75	44.67	58.68	-14.01	QP
0.3620	29.67	9.75	39.42	48.68	-9.26	AVG
1.0180	25.20	9.75	34.95	56.00	-21.05	QP
1.0180	18.25	9.75	28.00	46.00	-18.00	AVG
8.4938	22.00	10.00	32.00	60.00	-28.00	QP
8.4938	15.36	10.00	25.36	50.00	-24.64	AVG
23.1259	32.54	10.49	43.03	60.00	-16.97	QP
23.1259	17.96	10.49	28.45	50.00	-21.55	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.4 RADIATED EMISSION MEASUREMENT

3.4.1 Radiated Emission Limits (FCC 15.209)

Frequencies (MHz)	Field Strength (micorvolts/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
Frequency (MHz)	Limit (dBuV)	
30~88	40	3
88~216	43.5	3
216~960	46	3
960 -10000	54.00	3
*902 - 928	94.00	3

Note:

(1) The tighter limit applies at the band edges.

(2) Emission level (dBuV/m)=20log Emission level (uV/m).

(3) *Note: This is the limit for the fundamental frequency.

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.249)

Frequency of Emission (MHz)	Field Strength of fundamental ((millivolts /meter)	Field Strength of Harmonics (microvolts/meter)
902-928	50	500

Notes:

(1) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.4.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. 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.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

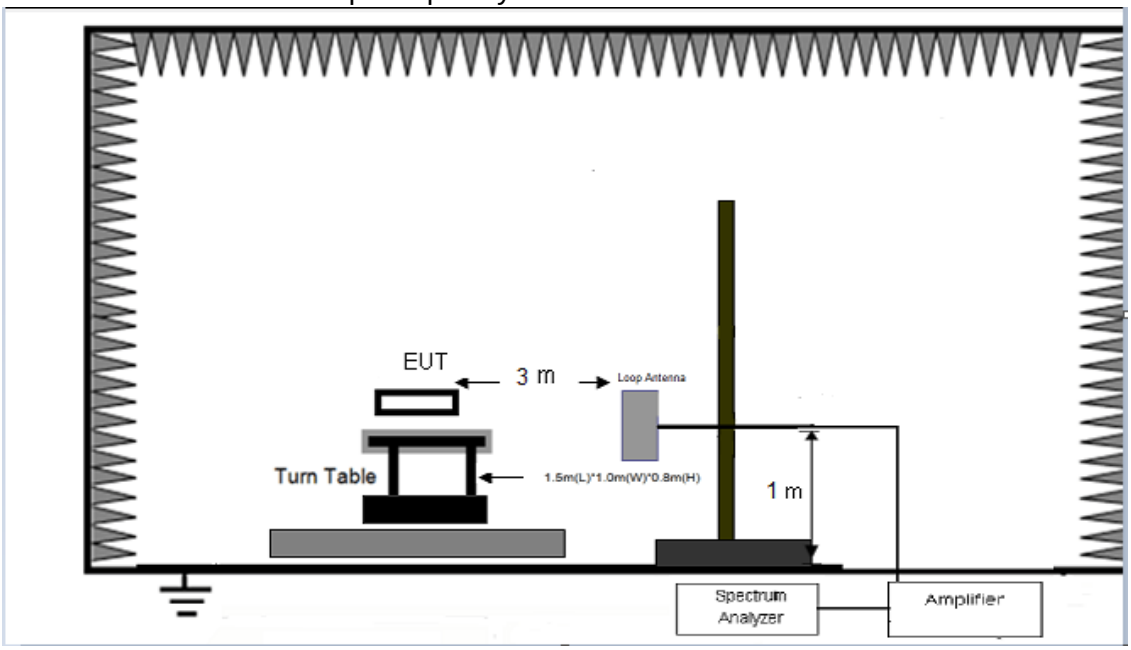
Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

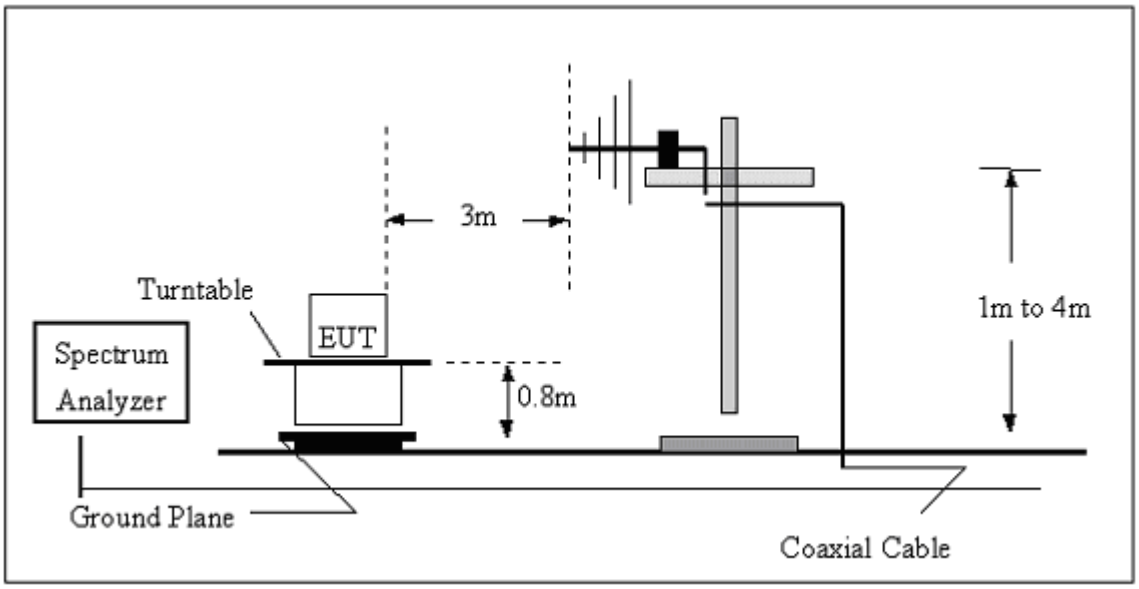
3.4.3 DEVIATION FROM TEST STANDARD

No deviation

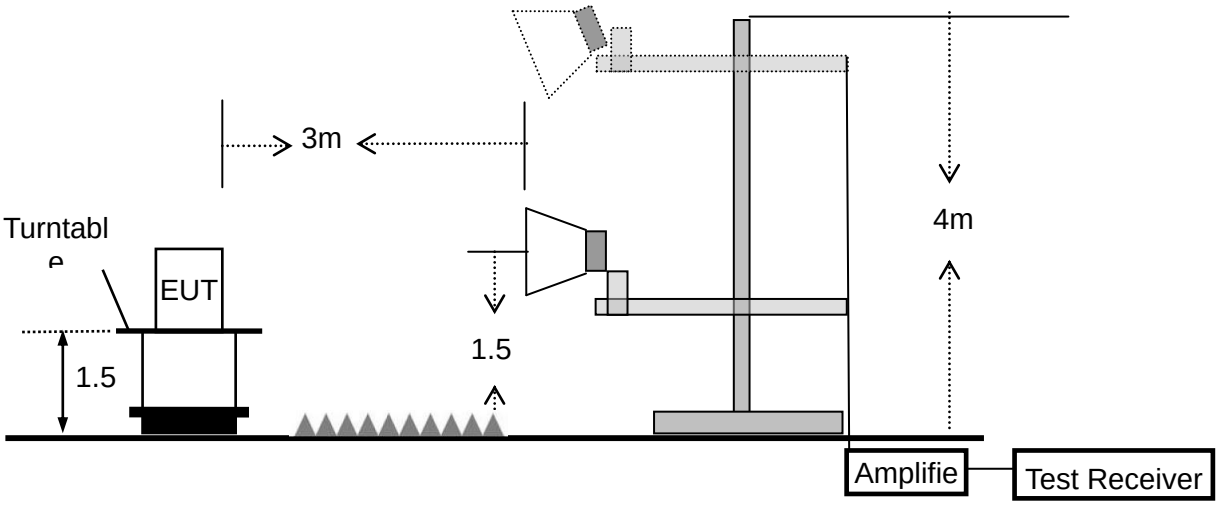
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



3.4.4 TEST RESULTS (BELOW 30MHz)

EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name. ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

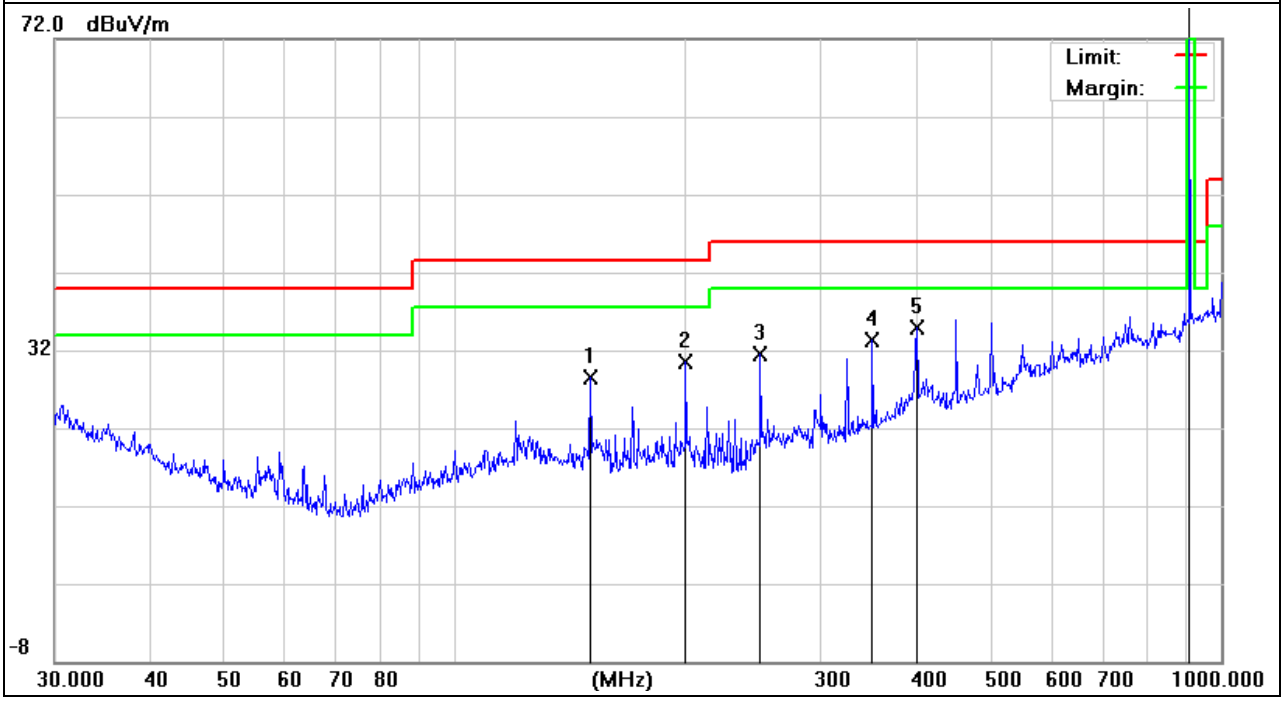
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =20 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.4.5 TEST RESULTS (BELOW 1000 MHz)

EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 1	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
150.0107	15.78	12.77	28.55	43.50	-14.95	QP
199.9856	20.73	9.76	30.49	43.50	-13.01	QP
250.3010	16.61	14.95	31.56	46.00	-14.44	QP
350.4768	15.76	17.62	33.38	46.00	-12.62	QP
400.4318	15.26	19.64	34.90	46.00	-11.10	QP
908.4000	63.82	29.45	93.27	114.0	-20.73	QP

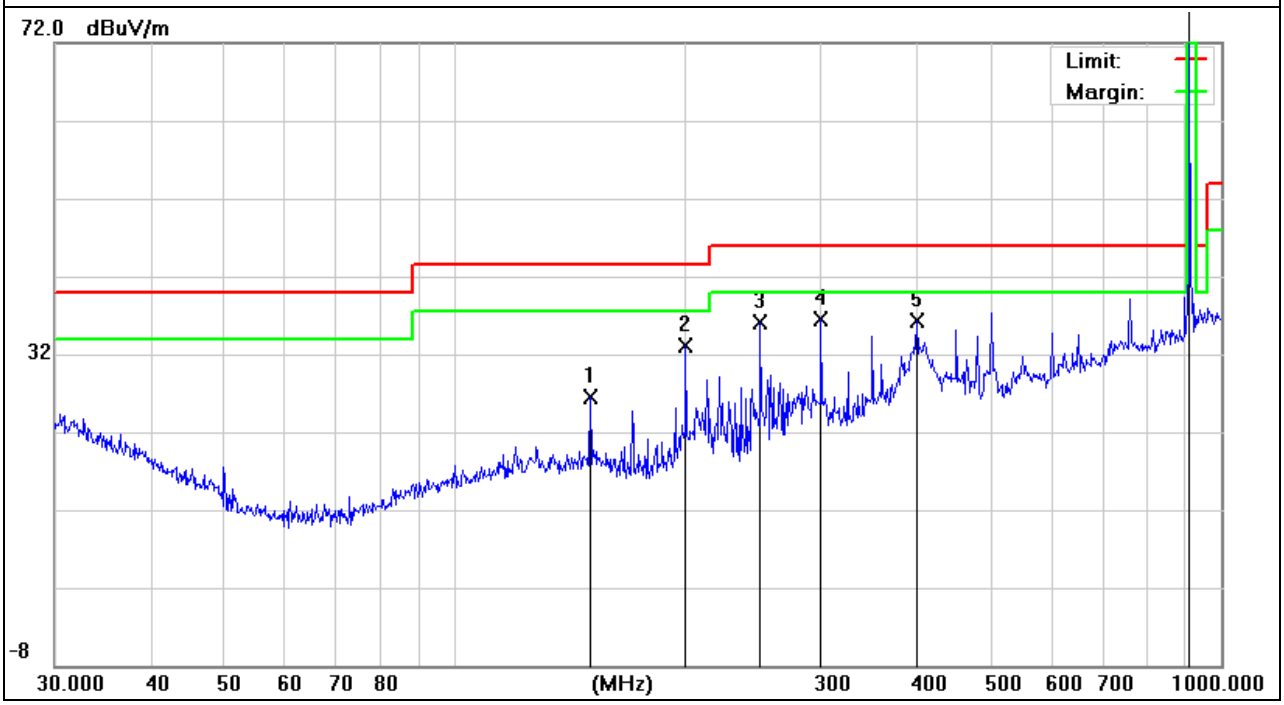
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 1	Polarization：	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
150.0107	13.77	12.77	26.54	43.50	-16.96	QP
199.9856	23.44	9.76	33.20	43.50	-10.30	QP
250.3010	21.15	14.95	36.10	46.00	-9.90	QP
300.3672	20.48	16.09	36.57	46.00	-9.43	QP
400.4318	16.69	19.64	36.33	46.00	-9.67	QP
908.4000	63.70	29.45	93.15	114.0	-20.85	QP

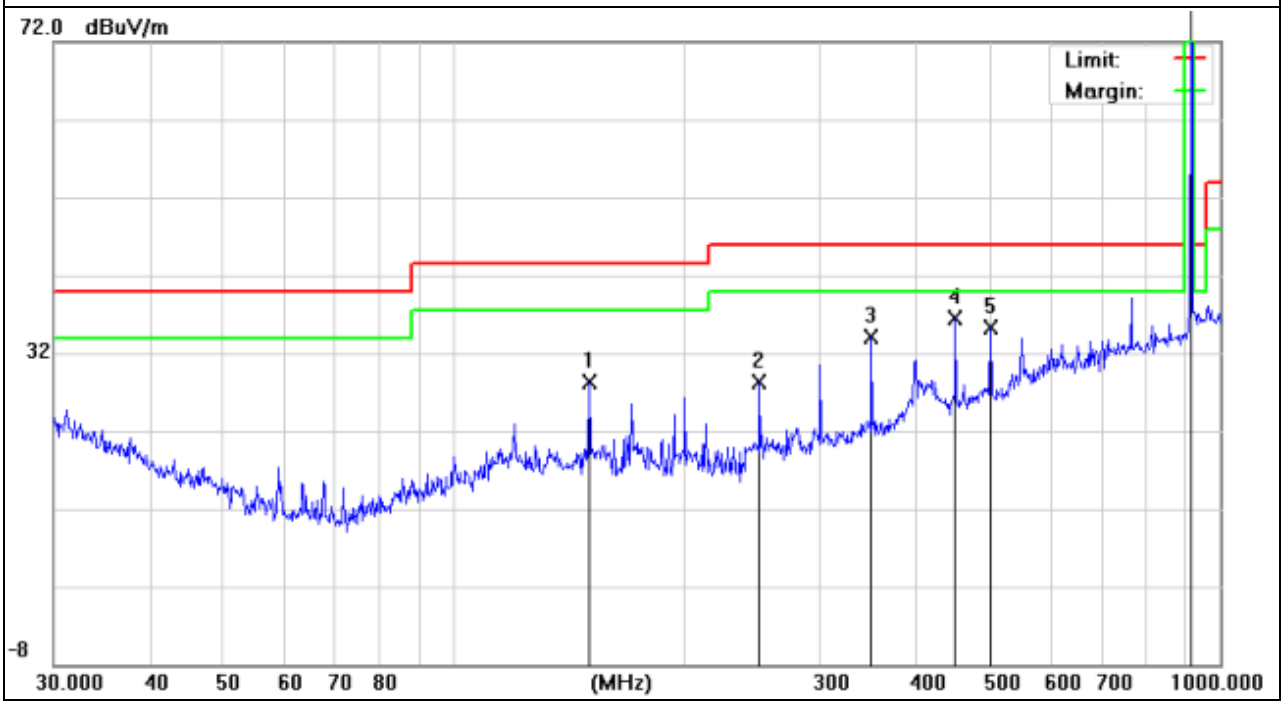
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 2	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
150.0107	15.53	12.77	28.30	43.50	-15.20	QP
250.3011	13.31	14.95	28.26	46.00	-17.74	QP
350.4768	16.40	17.62	34.02	46.00	-11.98	QP
451.1349	16.15	20.43	36.58	46.00	-9.42	QP
501.1789	13.17	22.16	35.33	46.00	-10.67	QP
916.0000	62.41	29.82	92.23	114.0	-21.77	QP

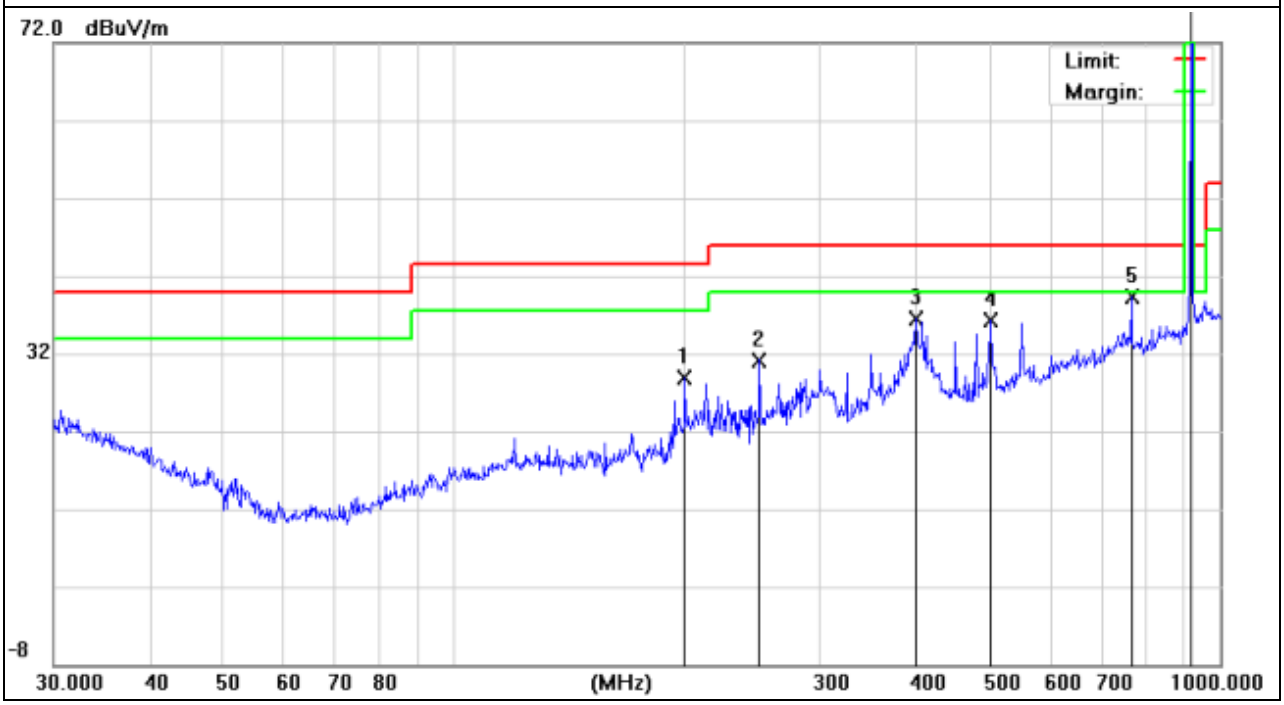
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 2	Polarization：	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
199.9856	19.21	9.76	28.97	43.50	-14.53	QP
250.3010	16.25	14.95	31.20	46.00	-14.80	QP
400.4318	16.86	19.64	36.50	46.00	-9.50	QP
501.1788	14.24	22.16	36.40	46.00	-9.60	QP
766.0570	11.89	27.50	39.39	46.00	-6.61	QP
916.0000	62.91	29.82	92.73	114.0	-21.27	QP

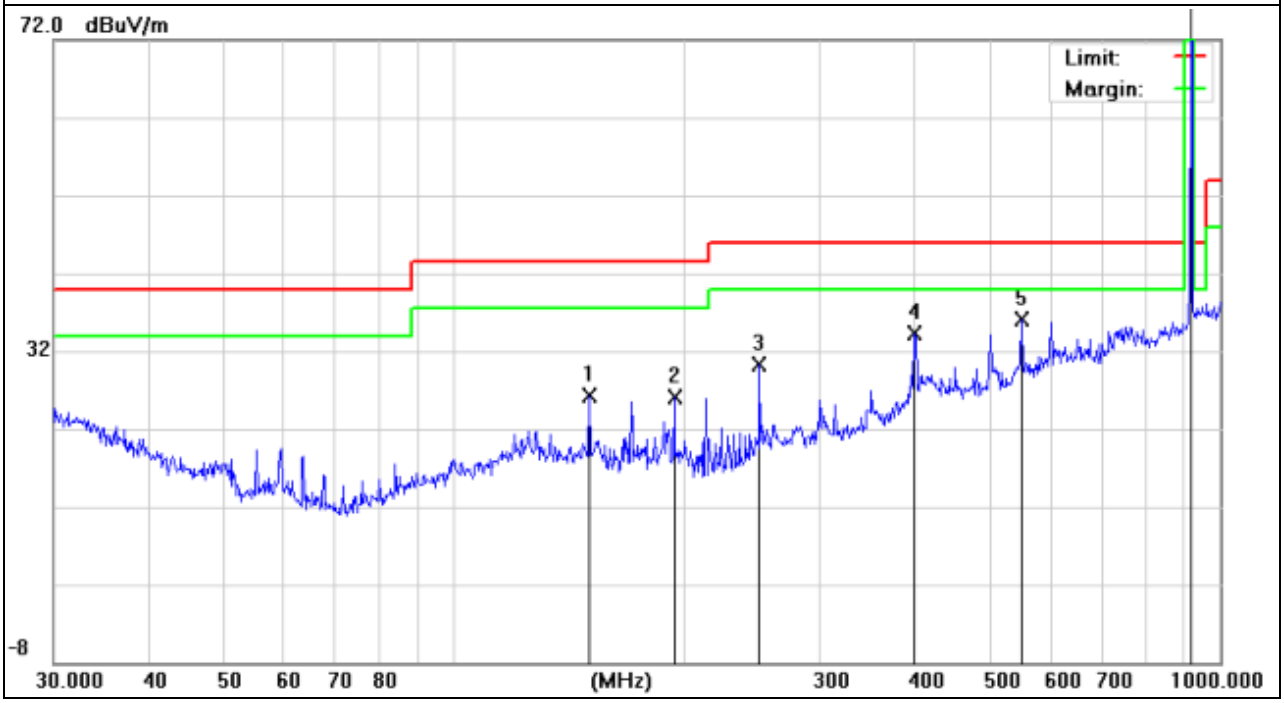
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 1 (module 2)	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
150.0107	13.44	12.77	26.21	43.50	-17.29	QP
193.7727	16.24	9.92	26.16	43.50	-17.34	QP
250.3011	15.32	14.95	30.27	46.00	-15.73	QP
399.0300	14.67	19.57	34.24	46.00	-11.76	QP
550.9479	11.56	24.56	36.12	46.00	-9.88	QP
916.0000	61.65	29.82	91.47	114.0	-22.53	QP

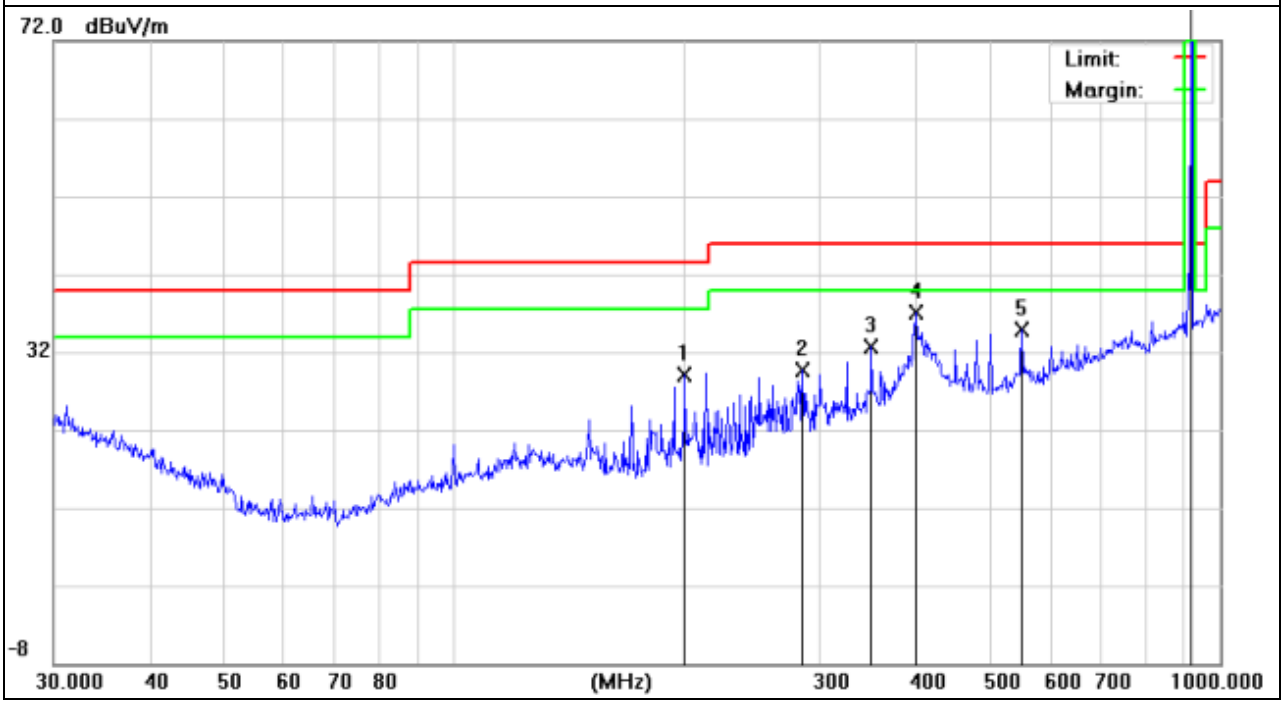
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 1 (module 2)	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
199.9856	19.26	9.76	29.02	43.50	-14.48	QP
284.9766	14.22	15.51	29.73	46.00	-16.27	QP
350.4768	15.18	17.62	32.80	46.00	-13.20	QP
400.4318	17.39	19.64	37.03	46.00	-8.97	QP
550.9479	10.31	24.56	34.87	46.00	-11.13	QP
916.0000	62.58	29.82	92.40	114.0	-21.60	QP

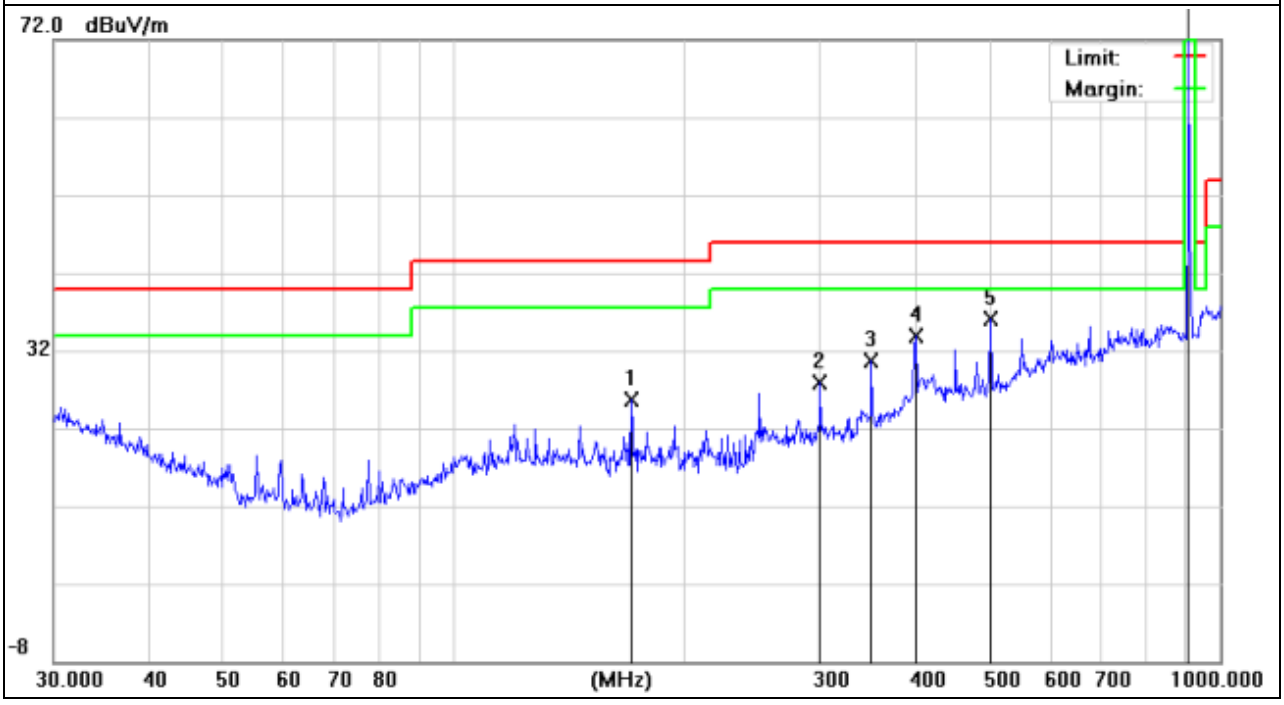
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 2 (module 2)	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
170.1947	14.29	11.34	25.63	43.50	-17.87	QP
300.3672	11.77	16.09	27.86	46.00	-18.14	QP
350.4768	13.11	17.62	30.73	46.00	-15.27	QP
400.4318	14.20	19.64	33.84	46.00	-12.16	QP
501.1789	13.90	22.16	36.06	46.00	-9.94	QP
908.4000	63.85	29.45	93.30	114.0	-20.70	QP

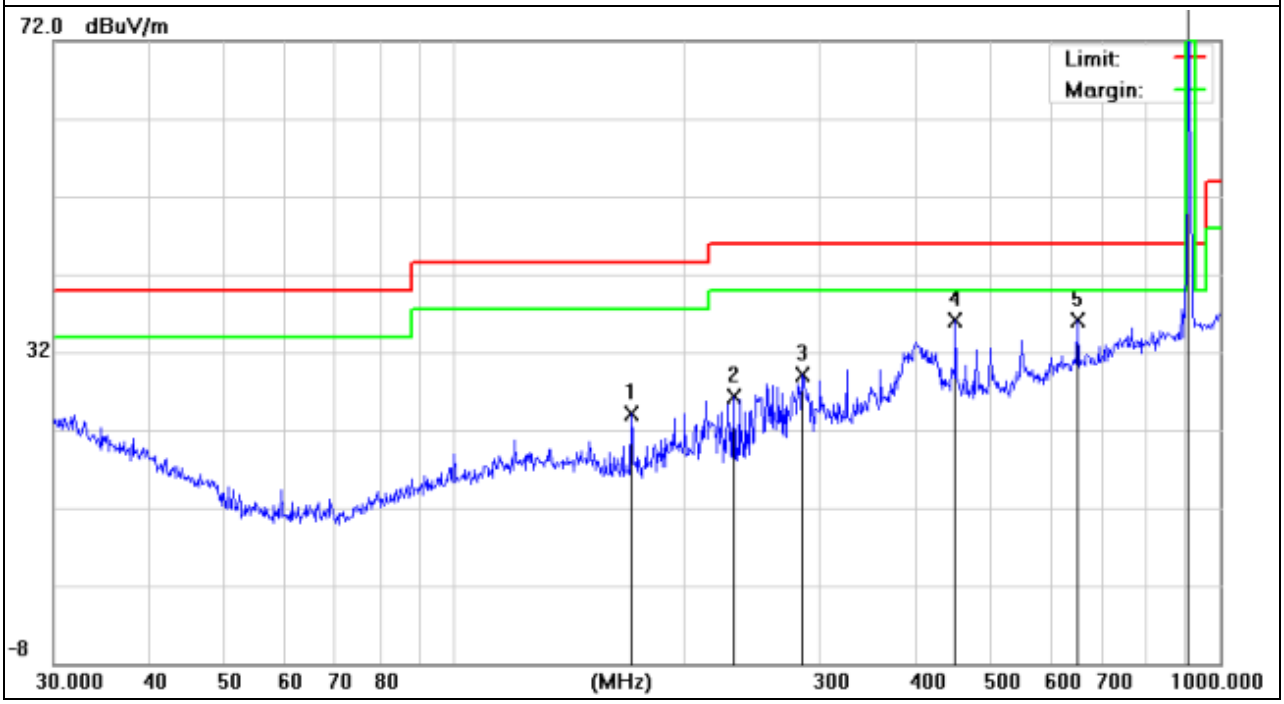
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 2 (module 2)	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
170.1947	12.70	11.34	24.04	43.50	-19.46	QP
231.7178	14.18	12.20	26.38	46.00	-19.62	QP
284.9766	13.52	15.51	29.03	46.00	-16.97	QP
451.1349	15.64	20.43	36.07	46.00	-9.93	QP
651.9415	11.44	24.73	36.17	46.00	-9.83	QP
908.4000	64.11	29.45	93.56	114.0	-20.44	QP

Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

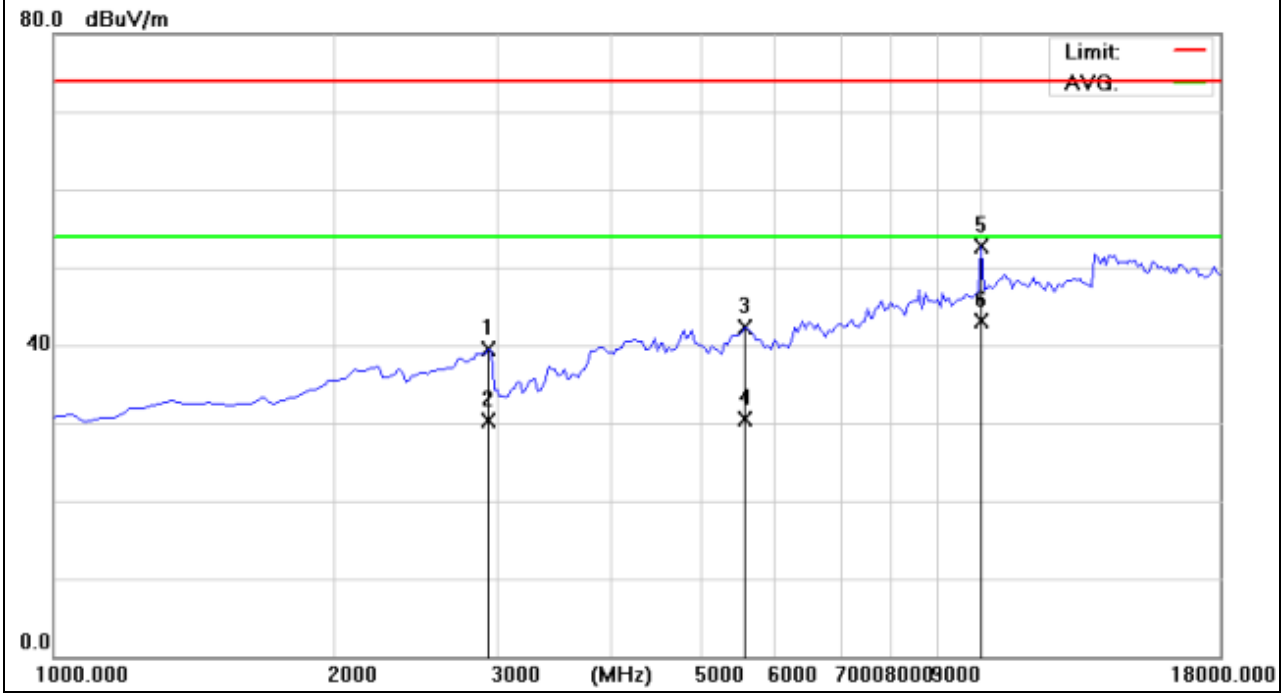


3.4.6 TEST RESULTS (ABOVE 1000 MHZ)

EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 1	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2955.000	41.94	-2.45	39.49	74.00	-34.51	peak
2955.000	32.77	-2.45	30.32	54.00	-23.68	AVG
5547.500	35.01	7.30	42.31	74.00	-31.69	peak
5547.500	23.15	7.30	30.45	54.00	-23.55	AVG
10010.00	-2.00	54.69	52.69	74.00	-21.31	peak
10010.00	-11.67	54.69	43.02	54.00	-10.98	AVG

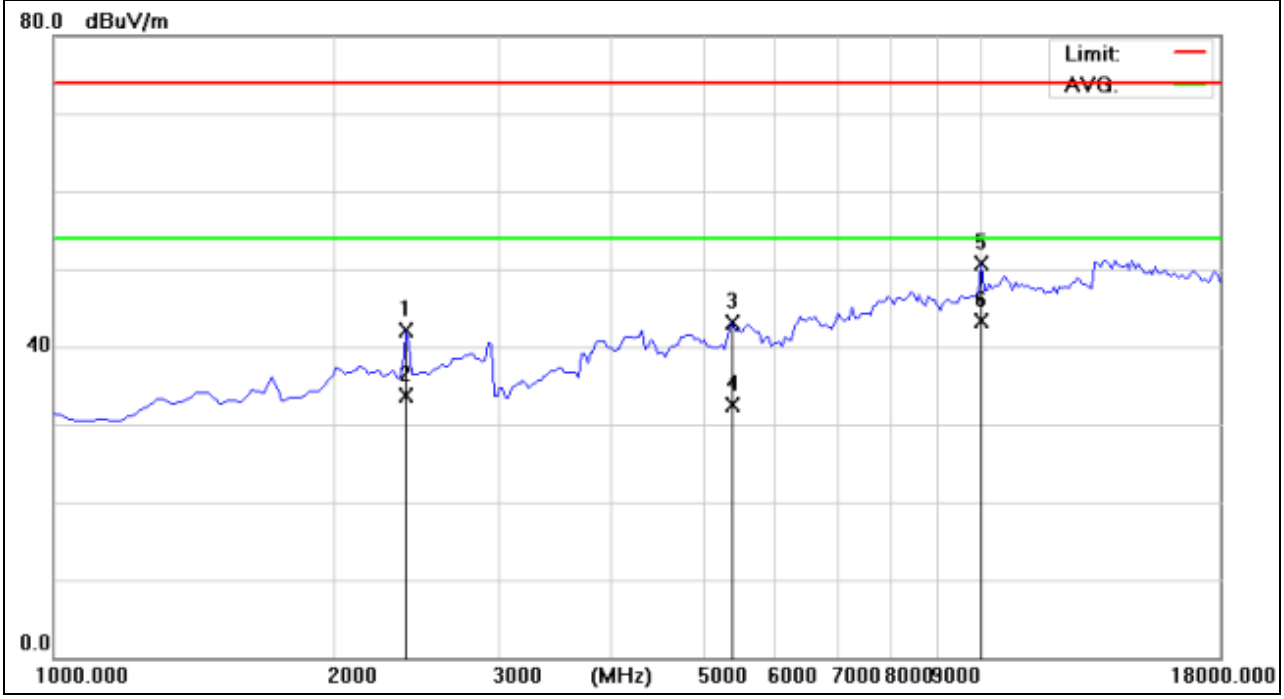
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
No emission above 18GHz.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 1	Polarization：	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402.500	46.68	-4.59	42.09	74.00	-31.91	peak
2402.500	38.25	-4.59	33.66	54.00	-20.34	AVG
5420.000	35.67	7.37	43.04	74.00	-30.96	peak
5420.000	25.21	7.37	32.58	54.00	-21.42	AVG
10010.00	-4.08	54.69	50.61	74.00	-23.39	peak
10010.00	-11.44	54.69	43.25	54.00	-10.75	AVG

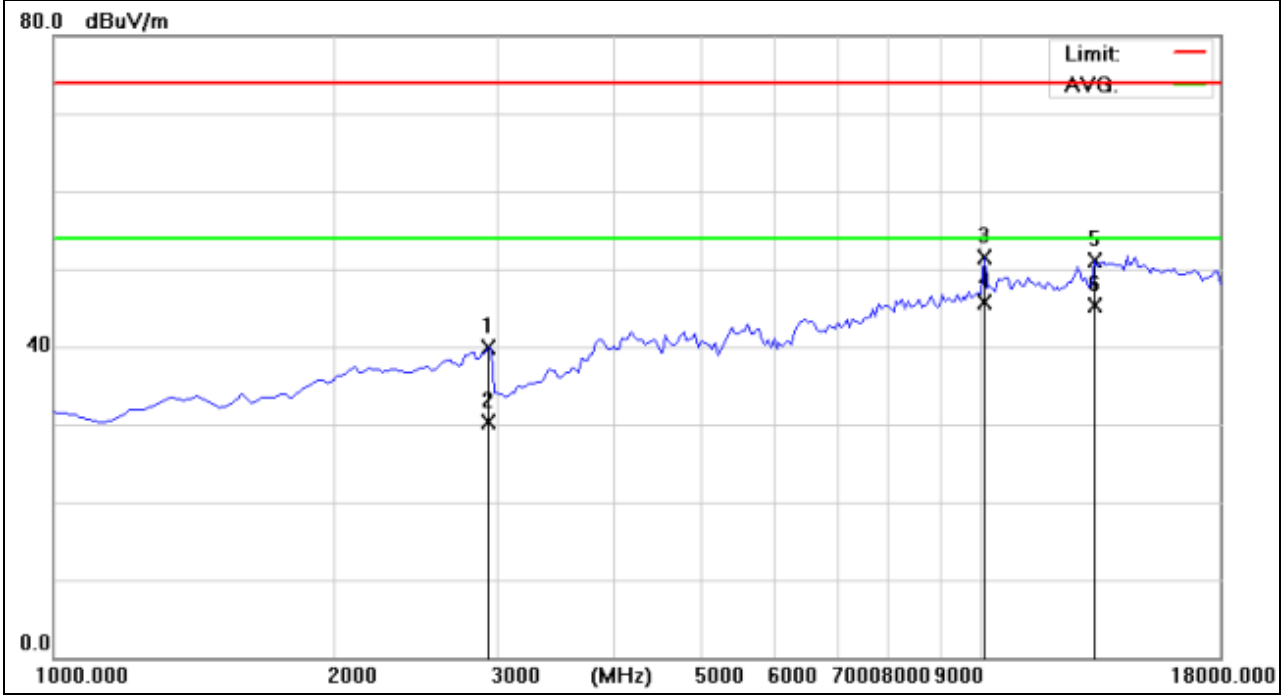
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
No emission above 18GHz.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 2	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2955.000	42.39	-2.45	39.94	74.00	-34.06	peak
2955.000	32.70	-2.45	30.25	54.00	-23.75	AVG
10095.00	-3.27	54.83	51.56	74.00	-22.44	peak
10095.00	-9.17	54.83	45.66	54.00	-8.34	AVG
13282.50	-9.84	60.85	51.01	74.00	-22.99	peak
13282.50	-15.49	60.85	45.36	54.00	-8.64	AVG

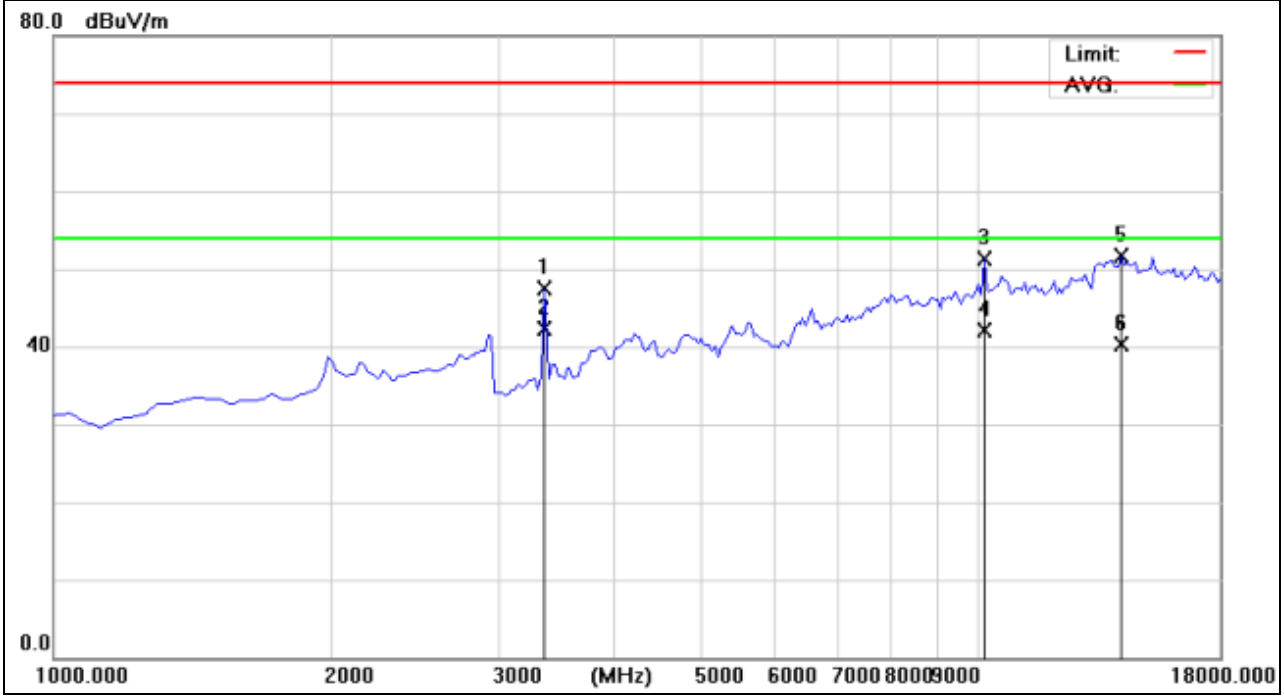
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
No emission above 18GHz.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 2	Polarization：	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3380.000	47.97	-0.41	47.56	74.00	-26.44	peak
3380.000	42.77	-0.41	42.36	54.00	-11.64	AVG
10095.00	-3.55	54.83	51.28	74.00	-22.72	peak
10095.00	-12.72	54.83	42.11	54.00	-11.89	AVG
14132.50	-9.20	60.98	51.78	74.00	-22.22	peak
14132.50	-20.63	60.98	40.35	54.00	-13.65	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
No emission above 18GHz.

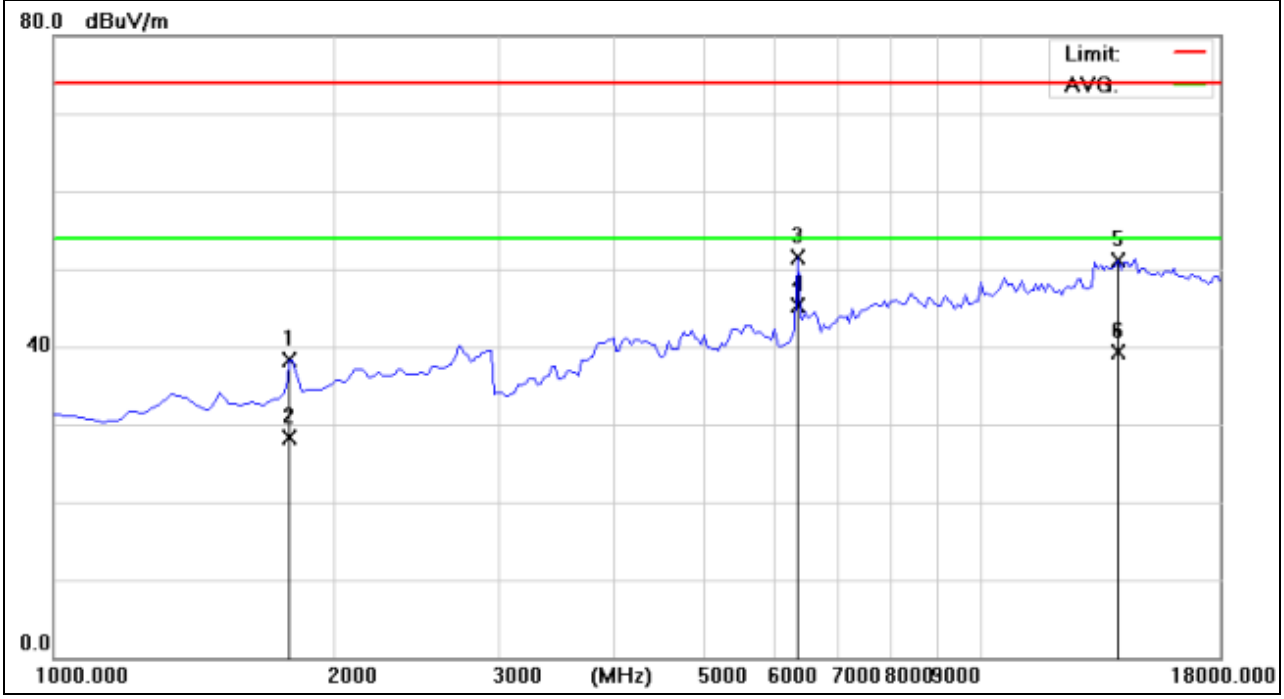


Note: EUT Pre-scan X/Y/Z orientation, only worst case is presented in the report(X orientation).

EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 1 (module 2)	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1807.500	45.66	-7.30	38.36	74.00	-35.64	peak
1807.500	35.55	-7.30	28.25	54.00	-25.75	AVG
6355.000	2.88	48.63	51.51	74.00	-22.49	peak
6355.000	-3.30	48.63	45.33	54.00	-8.67	AVG
14005.00	-9.91	61.01	51.10	74.00	-22.90	peak
14005.00	-21.76	61.01	39.25	54.00	-14.75	AVG

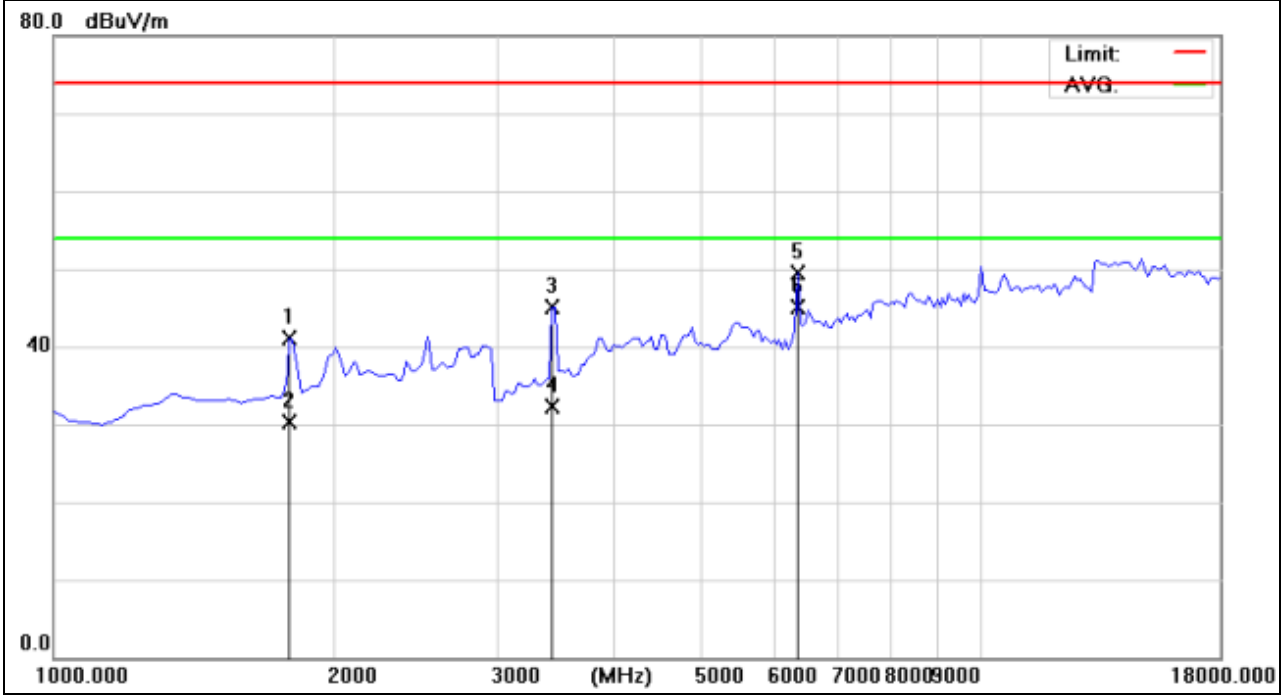
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
No emission above 18GHz.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 1 (module 2)	Polarization：	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1807.500	48.40	-7.30	41.10	74.00	-32.90	peak
1807.500	37.55	-7.30	30.25	54.00	-23.75	AVG
3465.000	45.05	0.12	45.17	74.00	-28.83	peak
3465.000	32.24	0.12	32.36	54.00	-21.64	AVG
6355.000	0.78	48.63	49.41	74.00	-24.59	peak
6355.000	-3.61	48.63	45.02	54.00	-8.98	AVG

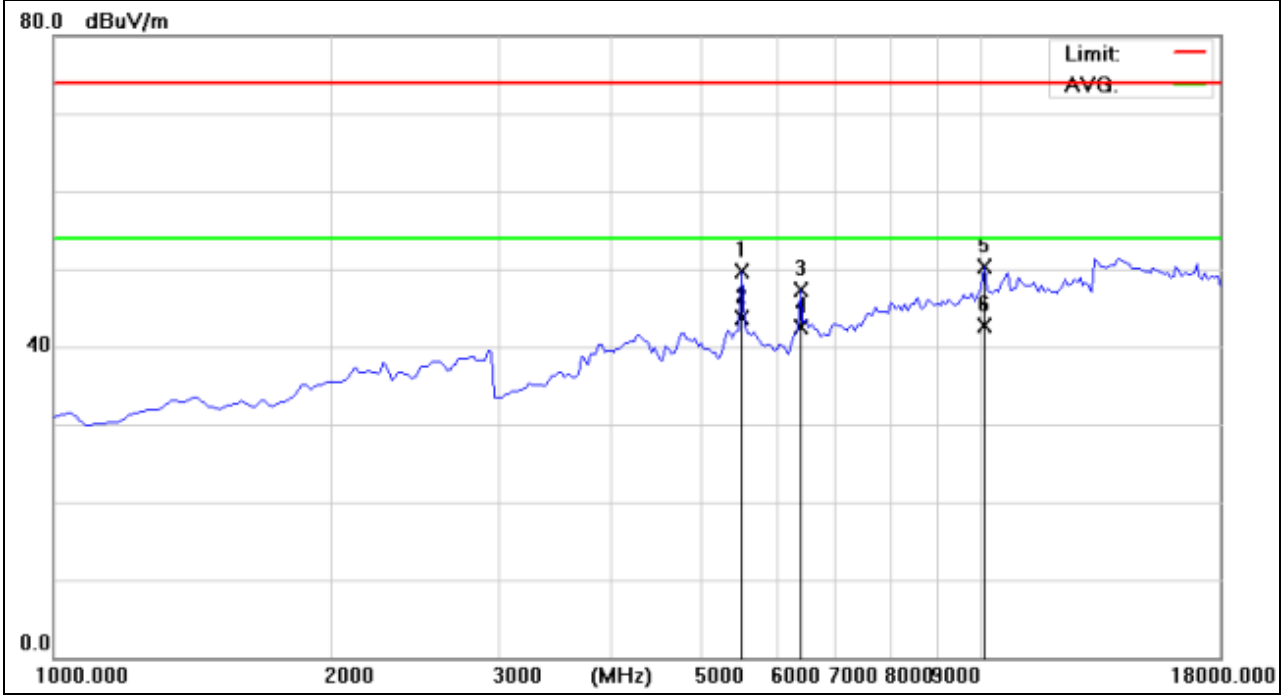
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
No emission above 18GHz.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 2 (module 2)	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5505.000	42.42	7.24	49.66	74.00	-24.34	peak
5505.000	36.42	7.24	43.66	54.00	-10.34	AVG
6397.500	-1.61	48.95	47.34	74.00	-26.66	peak
6397.500	-6.37	48.95	42.58	54.00	-11.42	AVG
10095.00	-4.50	54.83	50.33	74.00	-23.67	peak
10095.00	-12.14	54.83	42.69	54.00	-11.31	AVG

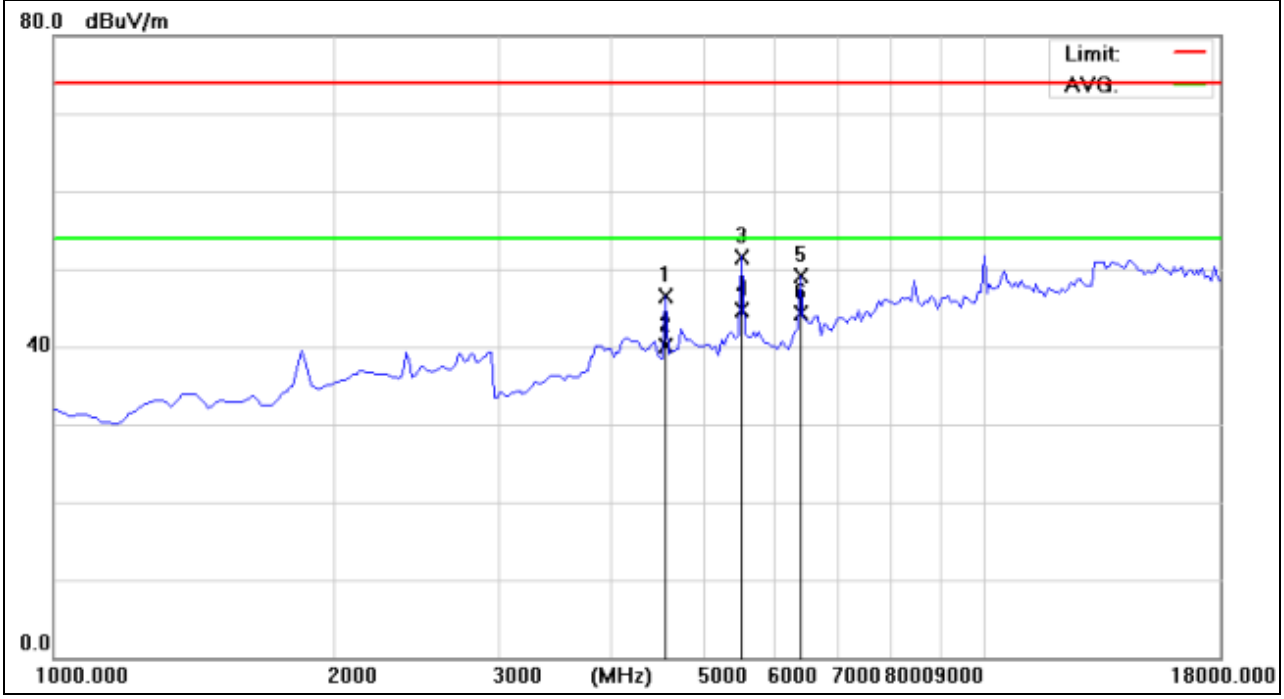
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
No emission above 18GHz.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	Mode 2 (module 2)	Polarization：	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4570.000	42.72	3.80	46.52	74.00	-27.48	peak
4570.000	36.22	3.80	40.02	54.00	-13.98	AVG
5505.000	44.36	7.24	51.60	74.00	-22.40	peak
5505.000	37.45	7.24	44.69	54.00	-9.31	AVG
6397.500	0.15	48.95	49.10	74.00	-24.90	peak
6397.500	-4.70	48.95	44.25	54.00	-9.75	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
No emission above 18GHz.



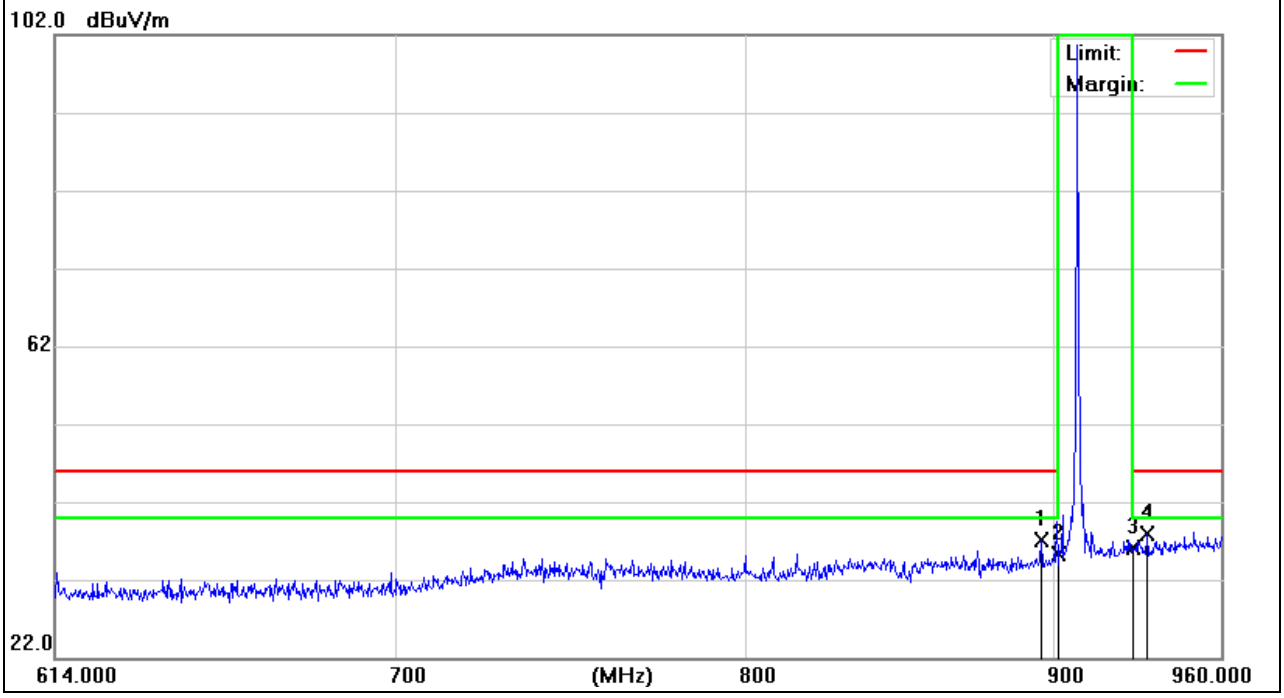
Note: EUT Pre-scan X/Y/Z orientation, only worst case is presented in the report(X orientation).

3.4.7 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	TX-908.4MHz	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
896.1471	8.27	28.75	37.02	46.00	-8.98	QP
902.0000	6.17	29.04	35.21	46.00	-10.79	QP
928.0000	5.65	30.51	36.16	46.00	-9.84	QP
933.3460	7.09	30.72	37.81	46.00	-8.19	QP

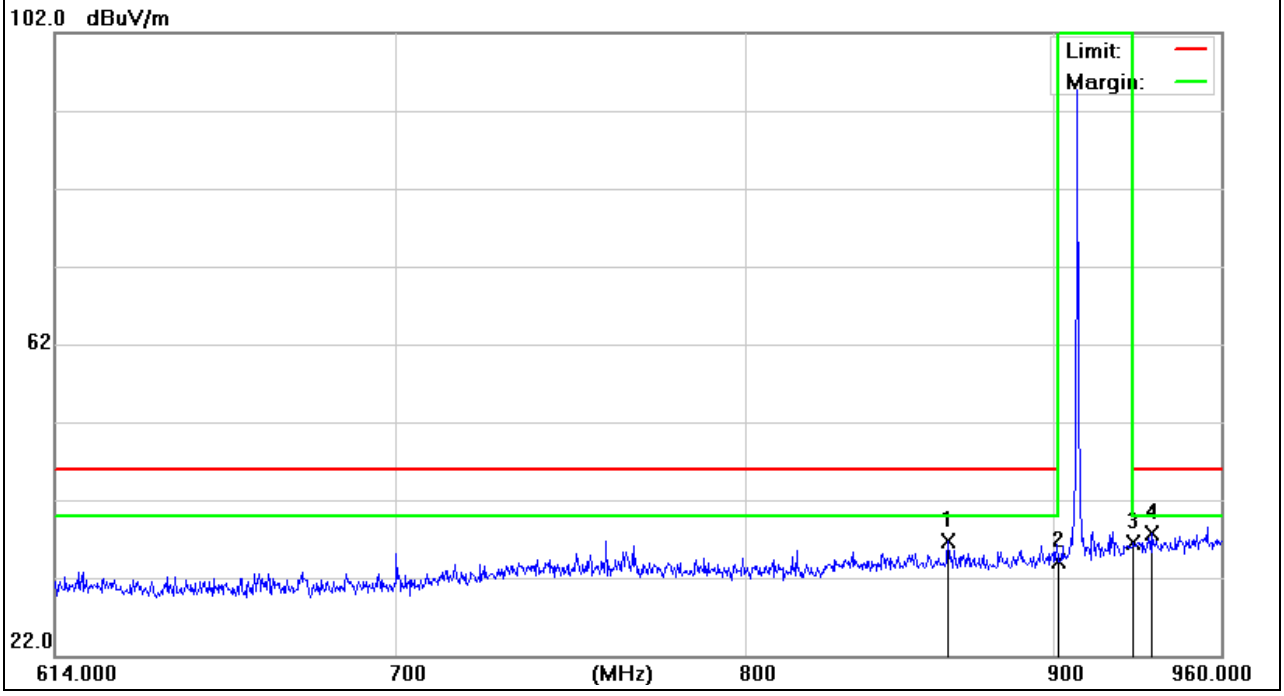
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	TX-908.4MHz	Polarization：	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
864.6715	8.14	28.65	36.79	46.00	-9.21	QP
902.0000	5.09	29.04	34.13	46.00	-11.87	QP
928.0000	6.04	30.51	36.55	46.00	-9.45	QP
934.5983	6.93	30.75	37.68	46.00	-8.32	QP

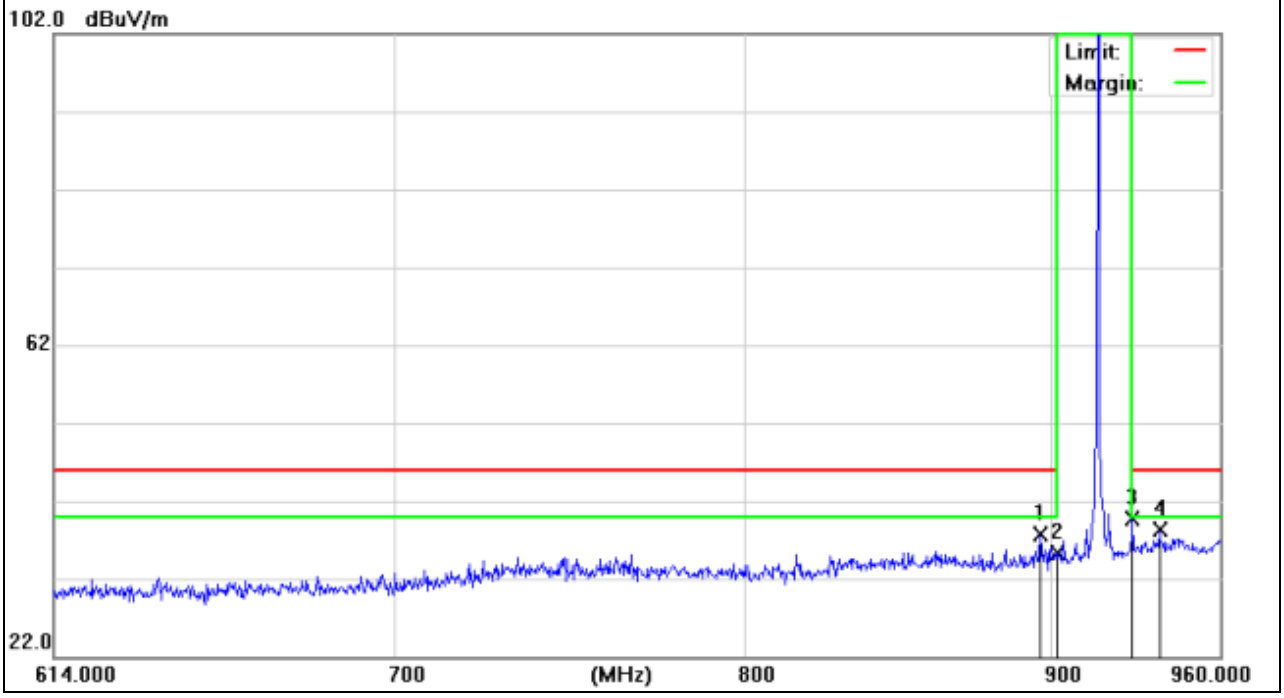
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	TX-916MHz	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
896.1471	8.87	28.75	37.62	46.00	-8.38	QP
902.0000	6.25	29.04	35.29	46.00	-10.71	QP
928.0000	9.18	30.51	39.69	46.00	-6.31	QP
937.9461	7.37	30.83	38.20	46.00	-7.80	QP

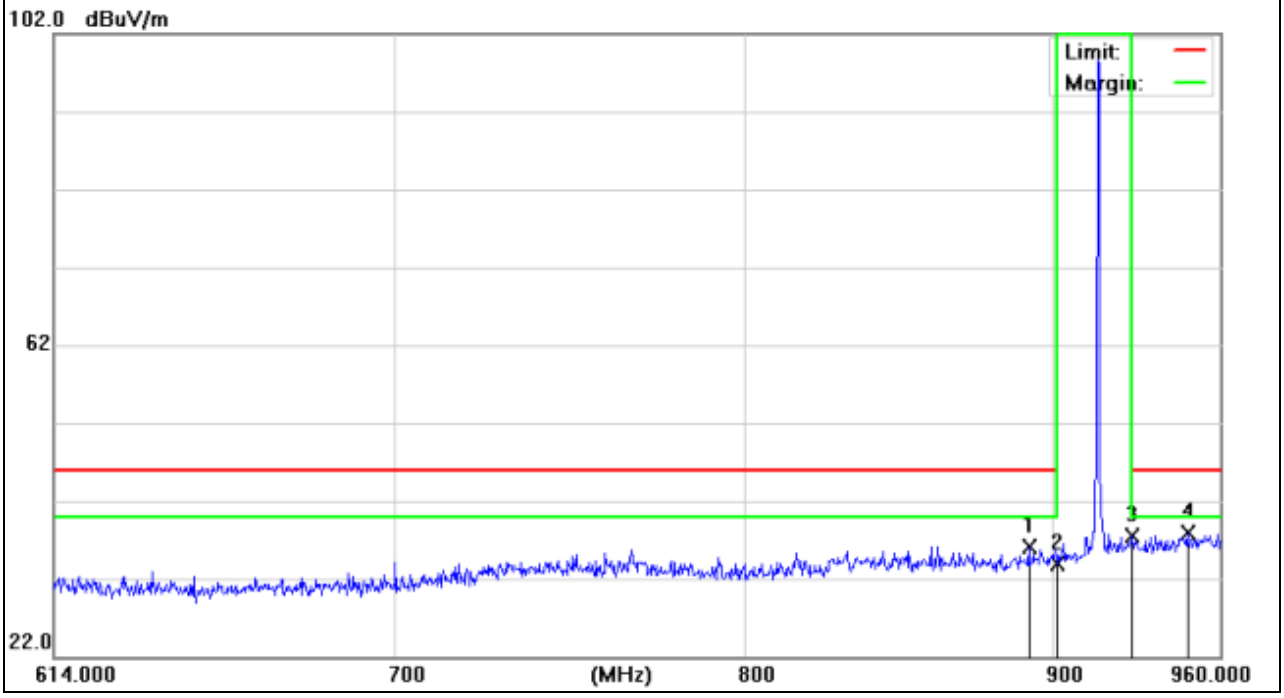
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	TX-916MHz	Polarization：	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
892.1509	7.46	28.58	36.04	46.00	-9.96	QP
902.0000	4.82	29.04	33.86	46.00	-12.14	QP
928.0000	7.04	30.51	37.55	46.00	-8.45	QP
948.0611	6.89	31.07	37.96	46.00	-8.04	QP

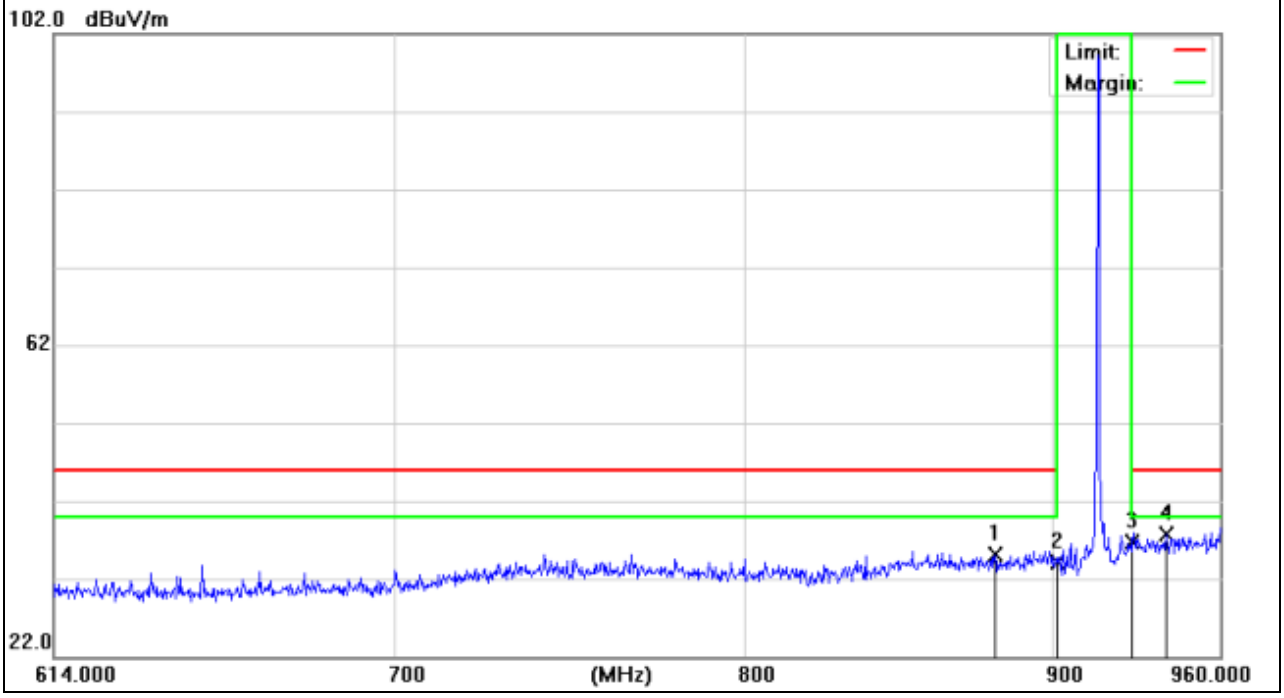
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	TX-908.4MHz (module 2)	Polarization：	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
880.6622	6.77	28.36	35.13	46.00	-10.87	QP
902.0000	5.12	29.04	34.16	46.00	-11.84	QP
928.0000	6.20	30.51	36.71	46.00	-9.29	QP
940.4646	6.77	30.89	37.66	46.00	-8.34	QP

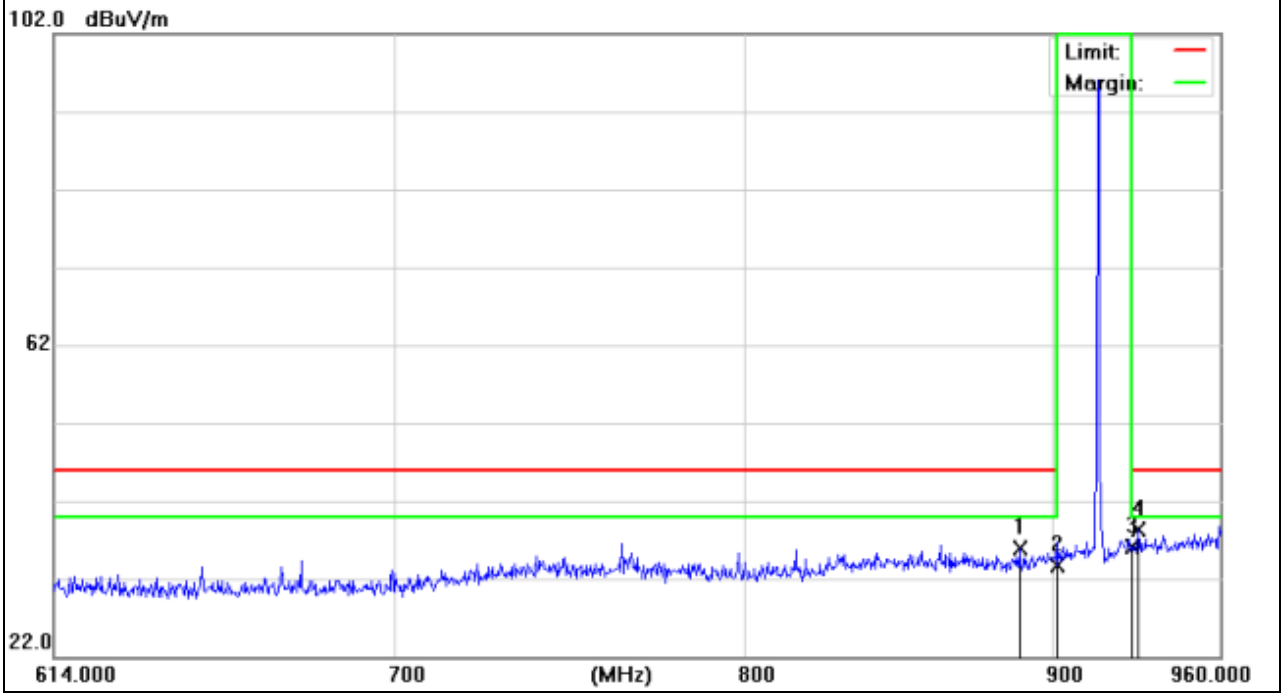
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	TX-908.4MHz (module 2)	Polarization：	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
888.9668	7.48	28.47	35.95	46.00	-10.05	QP
902.0000	4.59	29.04	33.63	46.00	-12.37	QP
928.0000	5.63	30.51	36.14	46.00	-9.86	QP
930.4307	7.68	30.65	38.33	46.00	-7.67	QP

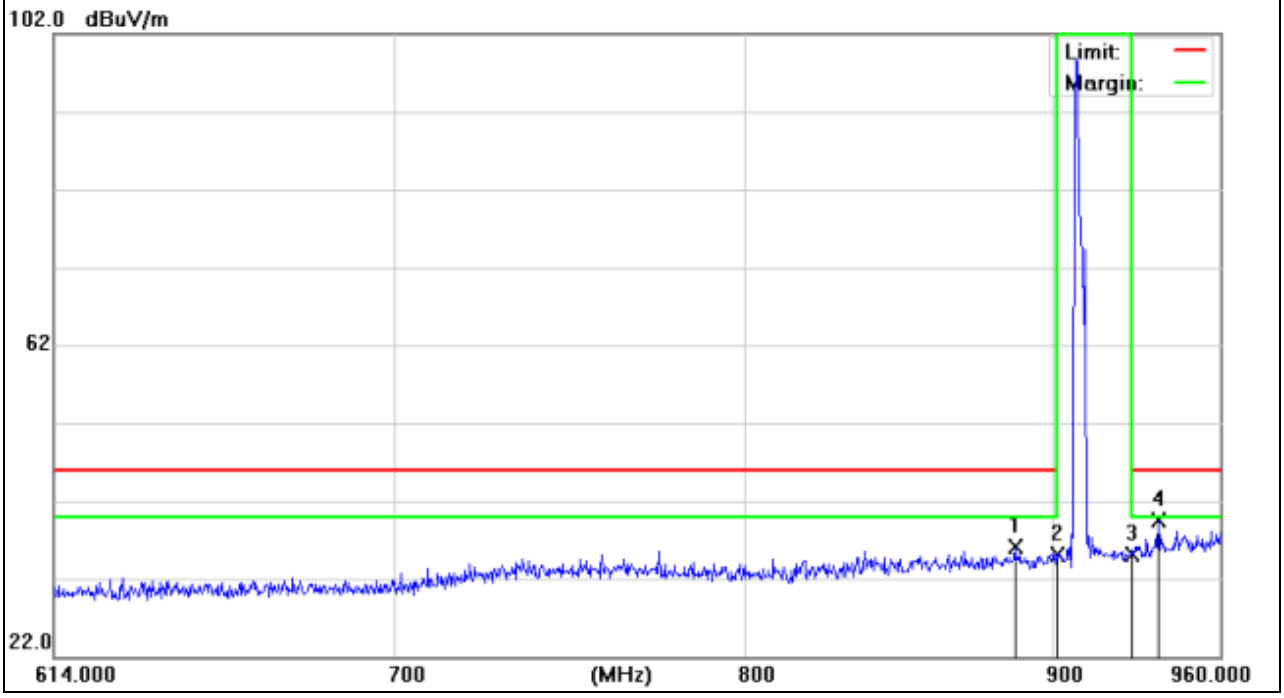
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	TX-916MHz (module 2)	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
887.3790	7.66	28.44	36.10	46.00	-9.90	QP
902.0000	6.00	29.04	35.04	46.00	-10.96	QP
928.0000	4.66	30.51	35.17	46.00	-10.83	QP
937.5270	8.62	30.82	39.44	46.00	-6.56	QP

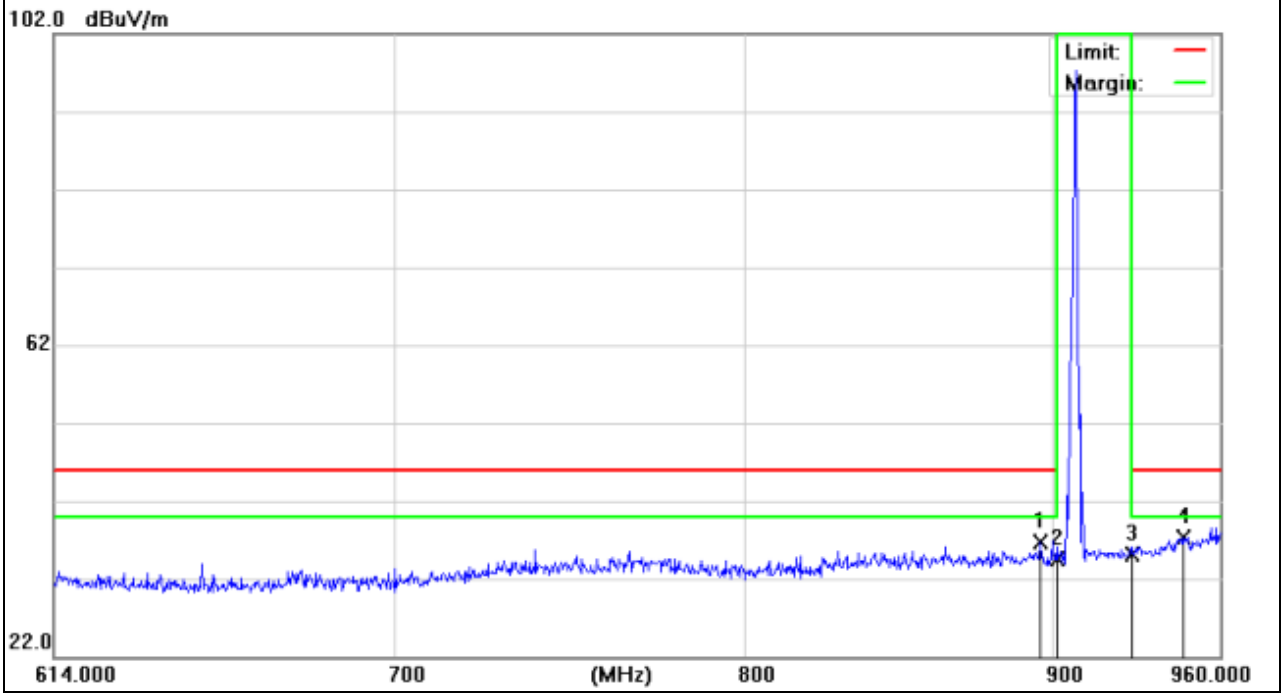
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	25 ℃	Relative Humidity：	51%
Pressure：	1010 hPa	Test Voltage ：	DC 3.6V from battery
Test Mode ：	TX-916MHz (module 2)	Polarization：	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
896.1471	7.99	28.75	36.74	46.00	-9.26	QP
902.0000	5.40	29.04	34.44	46.00	-11.56	QP
928.0000	4.68	30.51	35.19	46.00	-10.81	QP
946.3677	6.35	31.03	37.38	46.00	-8.62	QP

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



3.4.8. frequency tolerance

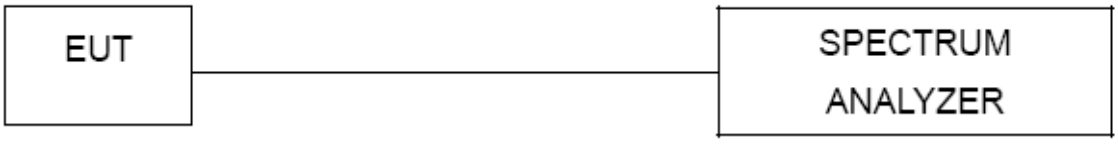
4.1 FREQUENCY TOLERANCE LIMITS

The frequency tolerance of the carrier signal shall be maintained within ±0.001% of the operating frequency over a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

4.2TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 10KHz, VBW≧RBW, Sweep time = Auto.

4.3 TEST SETUP



4.4 TEST RESULTS

EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	26 ℃	Relative Humidity：	53%
Pressure：	1020 hPa	Test Power ：	DC 3.6V from battery
Test Mode ：	Mode 1/2		

908.4MHz

Voltage (V)	Frequency(MHz)	Reading(MHz)	Frequency Tolerance	LIMIT
3.2	908.4	908.395	-0.000550%	±0.001%
3.6	908.4	908.395	-0.000550%	±0.001%
4.2	908.4	908.394	-0.000661%	±0.001%

Temperature (℃)	Frequency(MHz)	Reading(MHz)	Frequency Tolerance	LIMIT
-20	908.4	908.395	-0.000550%	±0.001%
-10	908.4	908.393	-0.000771%	±0.001%
0	908.4	908.394	-0.000661%	±0.001%
10	908.4	908.395	-0.000550%	±0.001%
20	908.4	908.395	-0.000550%	±0.001%
30	908.4	908.394	-0.000661%	±0.001%
40	908.4	908.393	-0.000771%	±0.001%
50	908.4	908.395	-0.000550%	±0.001%

916MHz

Voltage (V)	Frequency(MHz)	Reading(MHz)	Frequency Tolerance	LIMIT
3.2	916	915.998	-0.000218%	±0.001%
3.6	916	915.995	-0.000546%	±0.001%
4.2	916	915.994	-0.000655%	±0.001%

Temperature (℃)	Frequency(MHz)	Reading(MHz)	Frequency Tolerance	LIMIT
-20	916	915.998	-0.000218%	±0.001%
-10	916	915.996	-0.000437%	±0.001%
0	916	915.996	-0.000437%	±0.001%
10	916	915.994	-0.000655%	±0.001%
20	916	915.997	-0.000328%	±0.001%
30	916	915.996	-0.000437%	±0.001%
40	916	915.997	-0.000328%	±0.001%
50	916	915.996	-0.000437%	±0.001%

EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	26 ℃	Relative Humidity：	53%
Pressure：	1020 hPa	Test Power ：	DC 3.6V from battery
Test Mode ：	Mode 1/2 (module 2)		

908.4MHz

Voltage (V)	Frequency(MHz)	Reading(MHz)	Frequency Tolerance	LIMIT
3.2	908.4	908.377	-0.002532%	±0.001%
3.6	908.4	908.377	-0.002532%	±0.001%
4.2	908.4	908.378	-0.002422%	±0.001%

Temperature (℃)	Frequency(MHz)	Reading(MHz)	Frequency Tolerance	LIMIT
-20	908.4	908.377	-0.002532%	±0.001%
-10	908.4	908.377	-0.002532%	±0.001%
0	908.4	908.378	-0.002422%	±0.001%
10	908.4	908.379	-0.002312%	±0.001%
20	908.4	908.377	-0.002532%	±0.001%
30	908.4	908.378	-0.002422%	±0.001%
40	908.4	908.377	-0.002532%	±0.001%
50	908.4	908.379	-0.002312%	±0.001%

916MHz

Voltage (V)	Frequency(MHz)	Reading(MHz)	Frequency Tolerance	LIMIT
3.2	916	915.978	-0.002402%	±0.001%
3.6	916	915.978	-0.002402%	±0.001%
4.2	916	915.978	-0.002402%	±0.001%

Temperature (℃)	Frequency(MHz)	Reading(MHz)	Frequency Tolerance	LIMIT
-20	916	915.977	-0.002511%	±0.001%
-10	916	915.978	-0.002402%	±0.001%
0	916	915.978	-0.002402%	±0.001%
10	916	915.977	-0.002511%	±0.001%
20	916	915.976	-0.002620%	±0.001%
30	916	915.977	-0.002511%	±0.001%
40	916	915.978	-0.002402%	±0.001%
50	916	915.977	-0.002511%	±0.001%

5. BANDWIDTH TEST

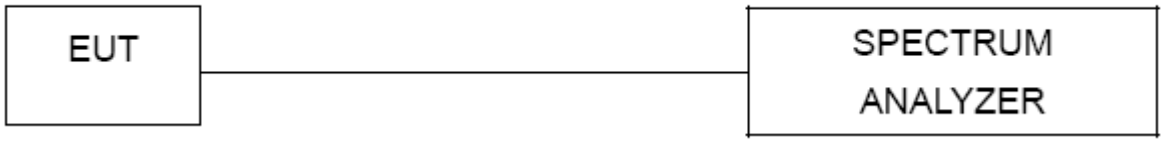
5.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 100KHz, VBW≧RBW, Sweep time = Auto.

5.1 DEVIATION FROM STANDARD

No deviation.

5.1 TEST SETUP



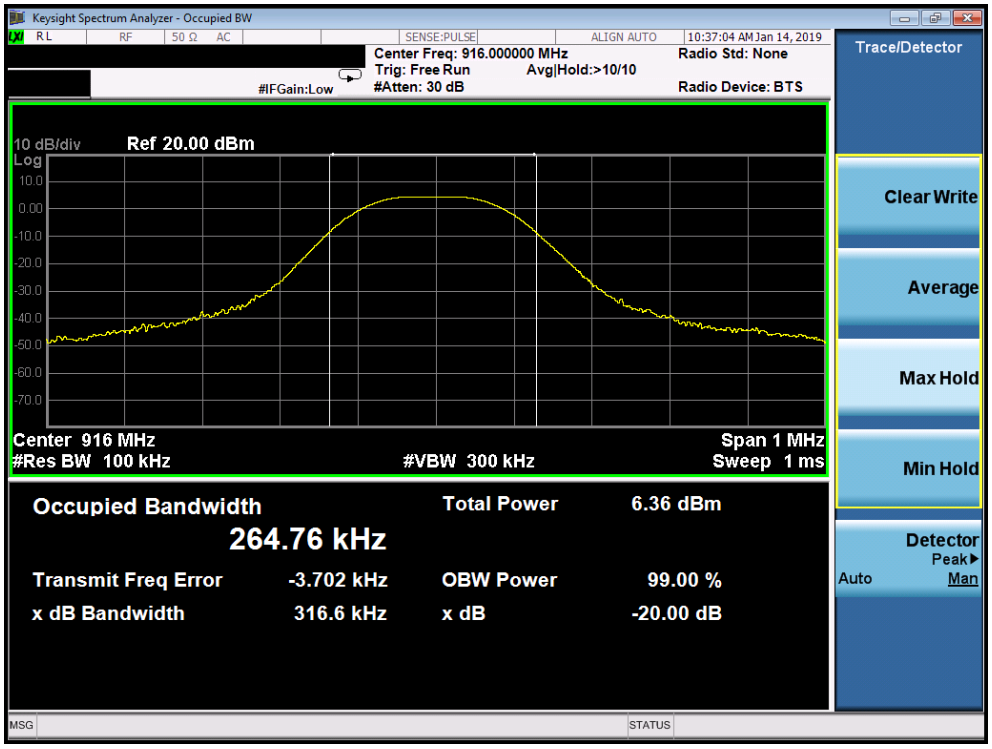
6. TEST RESULTS

EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	26 ℃	Relative Humidity：	53%
Pressure：	1020 hPa	Test Power ：	DC 3.6V from battery
Test Mode ：	Mode 1/2		

Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)
CH01	908.4	0.3108
CH02	916	0.3166

908.4 MHz

916 MHz

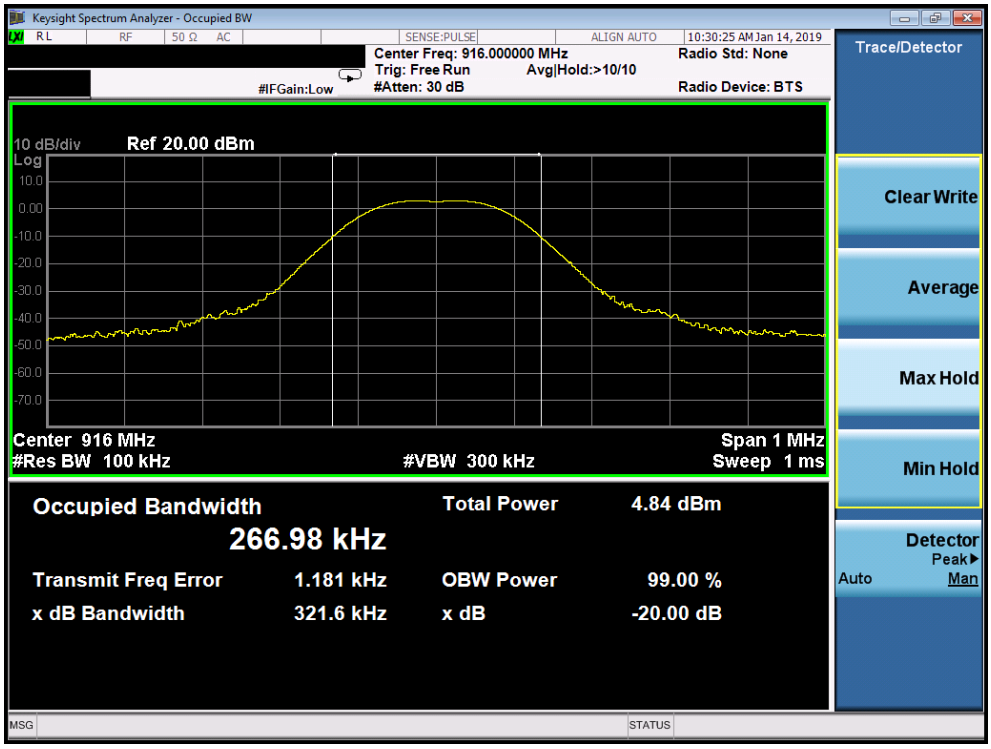

Keysight Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
10:37:04 AM Jan 14, 2019
Center Freq: 916.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Trace/Detector
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 916 MHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1 MHz
Sweep 1 ms
Occupied Bandwidth
264.76 kHz
Total Power 6.36 dBm
Transmit Freq Error -3.702 kHz
OBW Power 99.00 %
x dB Bandwidth 316.6 kHz
x dB -20.00 dB
Clear Write
Average
Max Hold
Min Hold
Detector
Peak
Auto
Man
MSG
STATUS

EUT：	Zipabox 2 + Z-wave module + 4G module	Model Name ：	zb2.main + zb2.zw + zbm.zw + zbm.4G
Temperature：	26 ℃	Relative Humidity：	53%
Pressure：	1020 hPa	Test Power ：	DC 3.6V from battery
Test Mode ：	Mode 1/2 (module 2)		

Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)
CH01	908.4	0.3165
CH02	916	0.3216

908.4 MHz

916 MHz



END OF REPORT