

FCC/IC- TEST REPORT

Report Number : **708881779706-00** Date of Issue: September 19, 2017

Model : SZU06A1, SZU06A2

Product Type : ZigBee wireless communication module

FCC ID : 2ALOUSZU06A

Applicant : Chengdu Diyue Technology Co., Ltd.

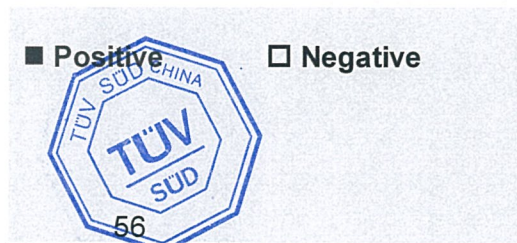
Address : Room 408, 4/F, Block A, Gaofa Building, No.6, Jiuxing Avenue,
High-tech Zone, Chengdu, Sichuan province, China

Production Facility : Chengdu Diyue Technology Co., Ltd.

Address : Room 408, 4/F, Block A, Gaofa Building, No.6, Jiuxing Avenue,
High-tech Zone, Chengdu, Sichuan province, China

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including
Appendices : 56



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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
No.16 Lane, 1951 Du Hui Road,
Shanghai 201108,
P.R. China

Test Firm
Registration
Number: 820234
Telephone: +86 21 6141 0123
Fax: +86 21 6140 8600

Test Site 2

Company name: MRT Technology (Suzhou) Co., Ltd.
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Economic Development Zone, Suzhou, China

Test Firm
Registration
Number: 893164
Telephone: +86-512-66308358
Fax: +86-512-66308368

3 Description of the Equipment under Test

Description of the Equipment Under Test

Product:	ZigBee wireless communication module
Model no.:	SZU06A1, SZU06A2
FCC ID:	2ALOUSZU06A
IC:	NA
Options and accessories:	NA
Rating voltage:	2.1V~3.9V DC
RF Transmission Frequency:	2405MHz-2480MHz
No. of Operated Channel:	16
Channel Space:	5MHz
Channel list:	Channel 11: 2405MHz Channel 12: 2410MHz Channel 13: 2415MHz ... Channel 19: 2445MHz ... Channel 26: 2480MHz
Radio technology:	IEEE 802.15.4
Modulation:	O-QPSK
Hardware version:	SZU06A1V06 for SZU06A1; SZU06A2V06 for SZU06A2
Software version:	SZU06A_GSME01_00000006
Antenna Type:	Snake antenna for SZU06A1 Dipole antenna W1010 for SZU06A2
Antenna Gain:	Snake antenna for SZU06A1: 3.66dBi Dipole antenna W1010 for SZU06A2: 2.0dBi
Description of the EUT:	The Equipment Under Test (EUT) is ZigBee wireless transceiver module operated at 2.4GHz



4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB558074 D01 DTS Measurement Guidance v04 and ANSI C63.10 (2013).

5 Summary of Test Results

Technical Requirements						
FCC Part 15 Subpart C						
Test Condition		Pages	Test Site	Test Result		
				Pass	Fail	N/A
§15.207	Conducted emission AC power port	---	---	☐	☐	☒
§15.247 (b) (1)	Conducted peak output power	10	Site 2	☒	☐	☐
§15.247(a)(1)	20dB bandwidth	---	---	☐	☐	☒
§15.247(a)(1)	Carrier frequency separation	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Number of hopping frequencies	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Dwell Time	---	---	☐	☐	☒
§15.247(e)	Power spectral density	13	Site 2	☒	☐	☐
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	11	Site 2	☒	☐	☐
§15.247(d)	Spurious RF conducted emissions	15	Site 2	☒	☐	☐
§15.247(d)	Band edge	19	Site 2	☒	☐	☐
§15.247(d) & §15.209	Spurious radiated emissions for transmitter	22	Site 2	☒	☐	☐
§15.203	Antenna requirement	See note 1		☒	☐	☐

Remark 1: N/A – Not Applicable.

Note 1: For model: SZU06A1 uses a snake antenna, which gain is 3.3dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

For model: SZU06A2 have a U.FL RF connector and uses a dipole antenna thorough U.FL-RSMA pigtail, which dipole antenna gain is 2.0dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2ALOUSZU06A complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: August 12, 2017

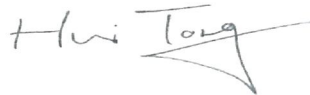
Testing Start Date: August 23, 2017

Testing End Date: September 11, 2017

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

Reviewed by:

Prepared by:



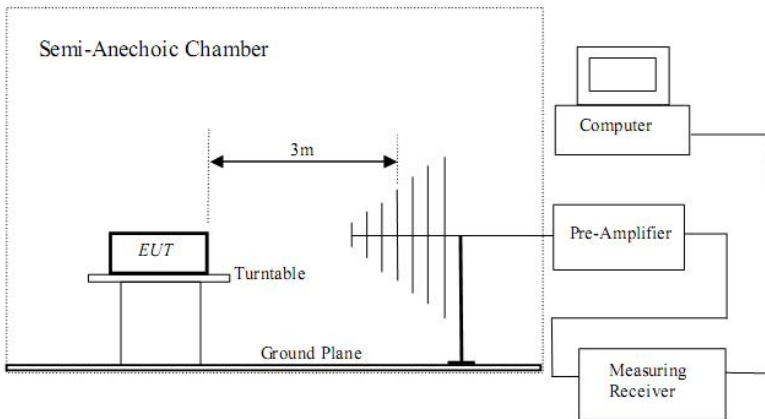
Hui TONG
Review Engineer



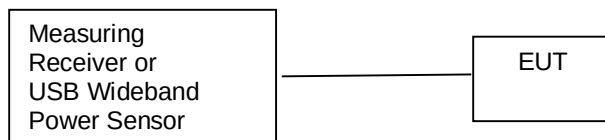
Wenwen CHENG
Project Engineer

7 Test Setups

7.1 Radiated test setups



7.2 Conducted RF test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)
Notebook	Lenove	X240

Test channel & mode:

The Zigbee transceiver was configured using a proprietary communication interface provided by the client. The interface allows power level and channel control required to support the evaluation. The power level settings in the table below were used for the evaluation.

Test software	CommBox-zbspTool
---------------	------------------

Test mode	Channel	Frequency (MHz)
Tx	11	2405
Tx	19	2445
Tx	26	2480

Additional Comments:

The customer declared two models with the same RF part.

Full Test was performed with DUT2: 2.4GHZ IEEE 802.15.4 Zigbee module with u.FL antenna connector; Model: SZU06A1

Partial test was performed with model name DUT1: 2.4GHz IEEE 802.15.4 Zigbee module with integrated PCB (Snake) antenna; Model: SZU06A2

9 Technical Requirement

9.1 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
RBW > the 6 dB bandwidth of the emission being measured, VBW $\geq$ 3RBW, Span $\geq$ 3RBW
Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

Limits

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤ 1	≤ 30

Test result as below table

Model	Max Gain (dBi)	Ch.	Freq. (MHz)	Peak Power (dBm)	Average Power (dBm)	Limit (dBm)
Zigbee	3.66	11	2405	6.10	5.96	30
	3.66	19	2445	6.29	5.11	30
	3.66	26	2480	6.40	6.26	30

9.2 6dB bandwidth Occupied Bandwidth

Test Method

- 1. Use the following spectrum analyzer settings:
RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
- 3. Allow the trace to stabilize, record the 6 dB Bandwidth value.

Limit

Limit [kHz]

≥500

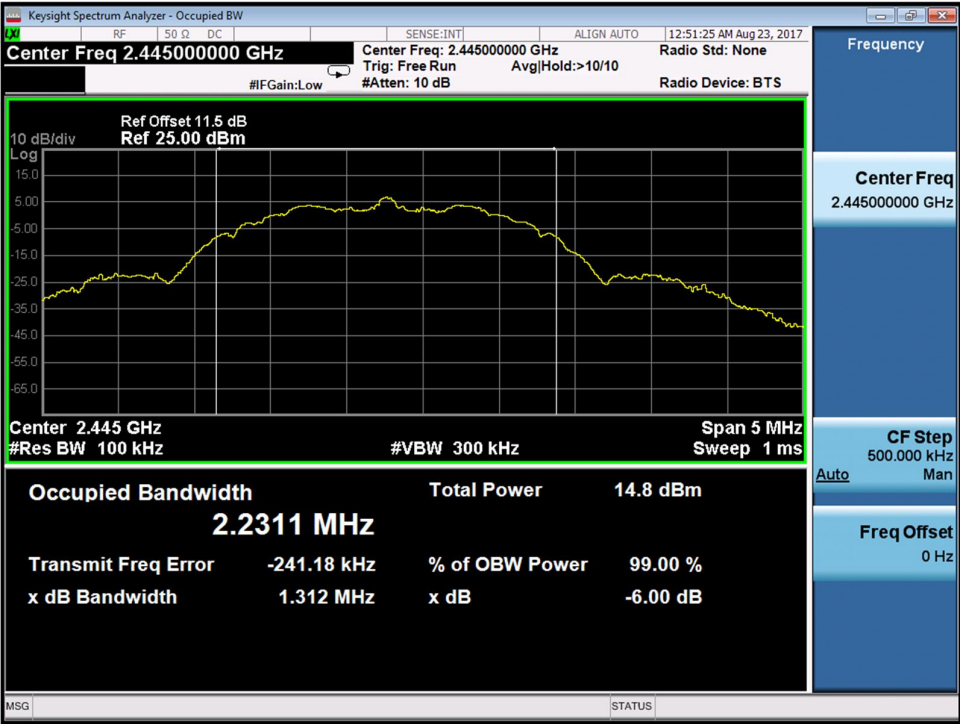
Test result

Frequency MHz	6dB bandwidth MHz	Result
Top channel 2405MHz	1.306	Pass
Middle channel 2445MHz	1.312	Pass
Bottom channel 2480MHz	1.447	Pass

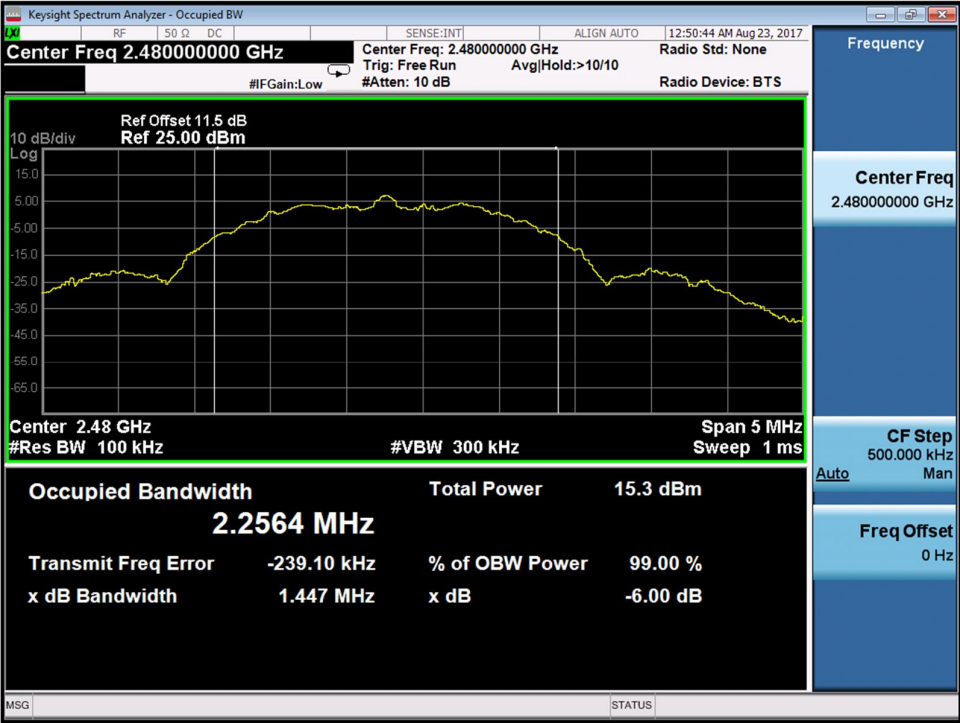
2405MHz



2445MHz



2480MHz



9.3 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

- 1. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
- 2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
- 3. Repeat above procedures until other frequencies measured were completed.

Limit

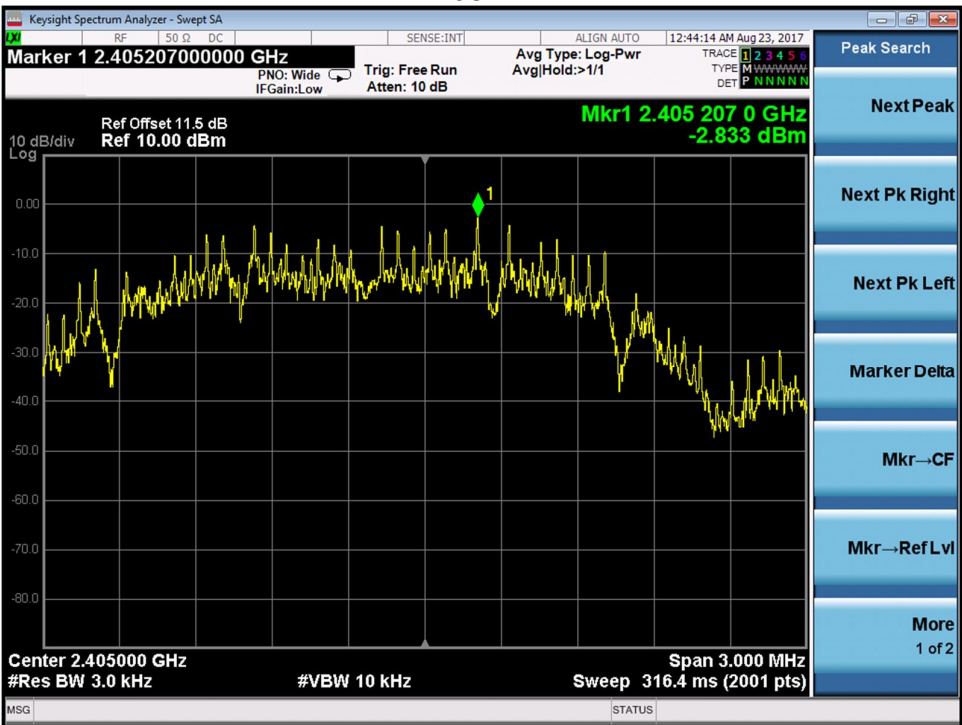
Limit [dBm]

≤8

Test result

Frequency MHz	Power spectral density dBm	Result
Top channel 2405MHz	-2.833	Pass
Middle channel 2445MHz	-2.589	Pass
Bottom channel 2480MHz	-2.811	Pass

2405MHz





China

2445MHz



2480MHz



9.4 Spurious RF conducted emissions

Test Method

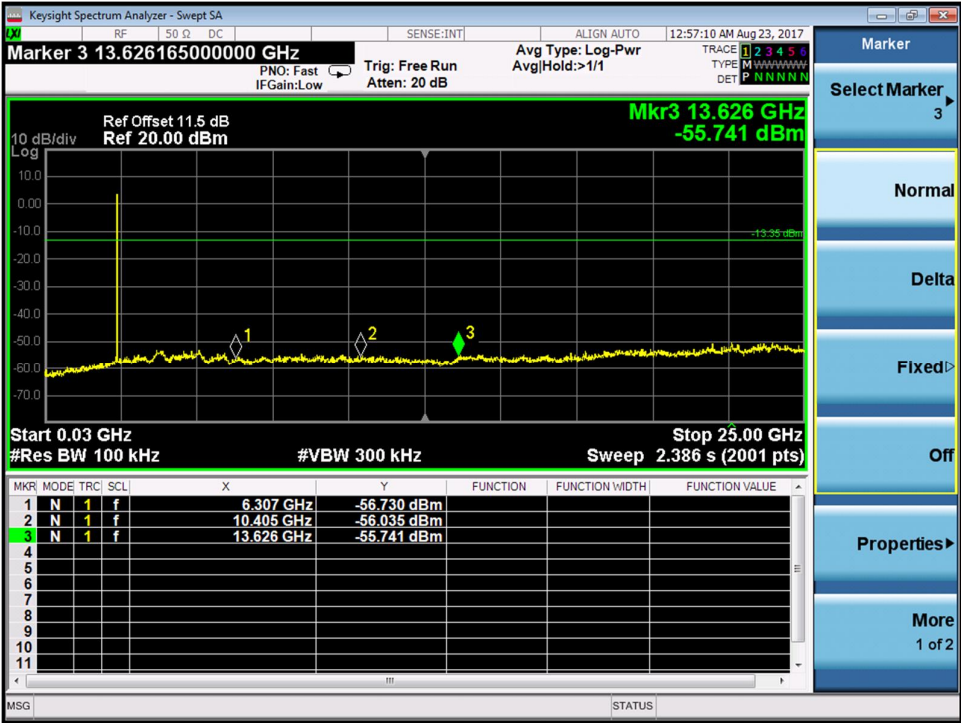
1. Establish a reference level by using the following procedure:
 - a. Set RBW=100 kHz. VBW $\geq$ 3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
 - b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
2. Use the maximum PSD level to establish the reference level.
 - a. Set the center frequency and span to encompass frequency range to be measured.
 - b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
3. Repeat above procedures until other frequencies measured were completed.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

Spurious RF conducted emissions

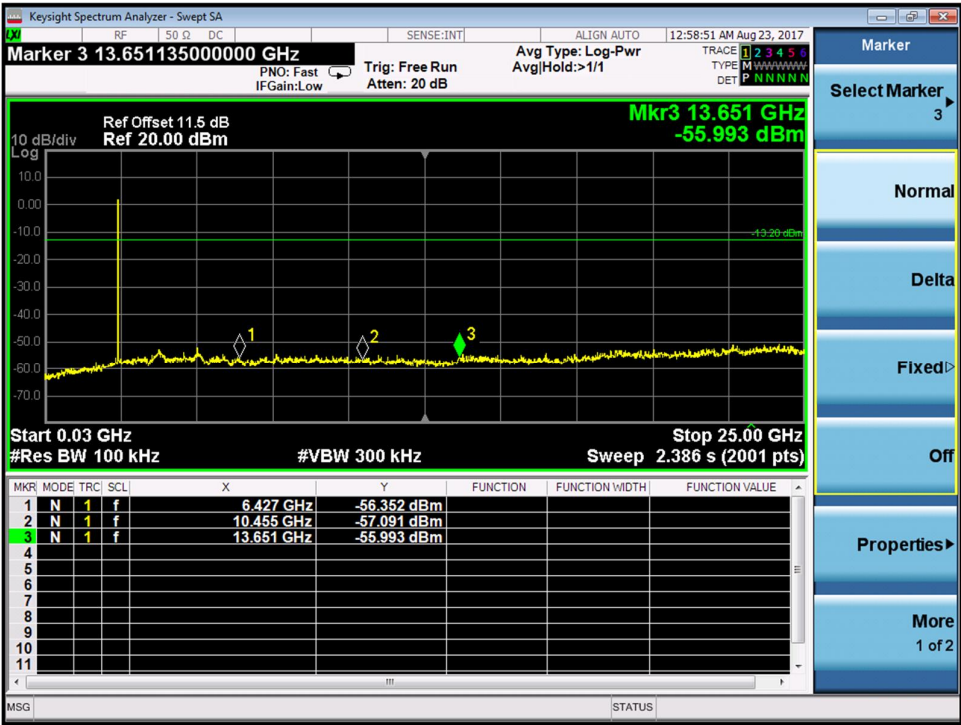
2405MHz





China

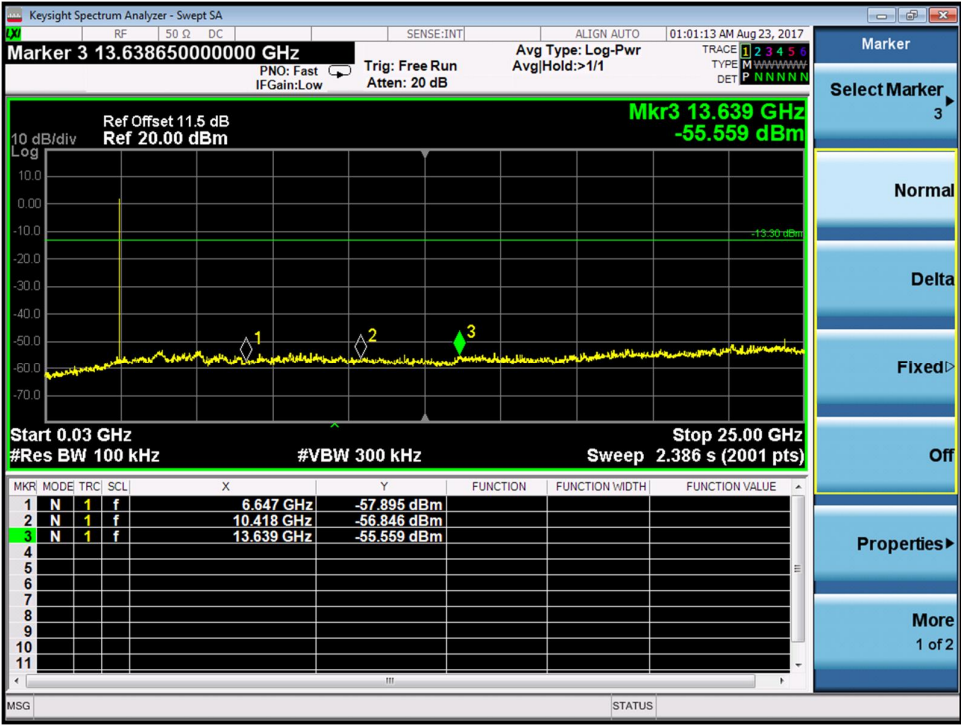
2445MHz





China

2480MHz





9.5 Band edge

Test Method

- 1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW $\geq$ RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section.

Limit

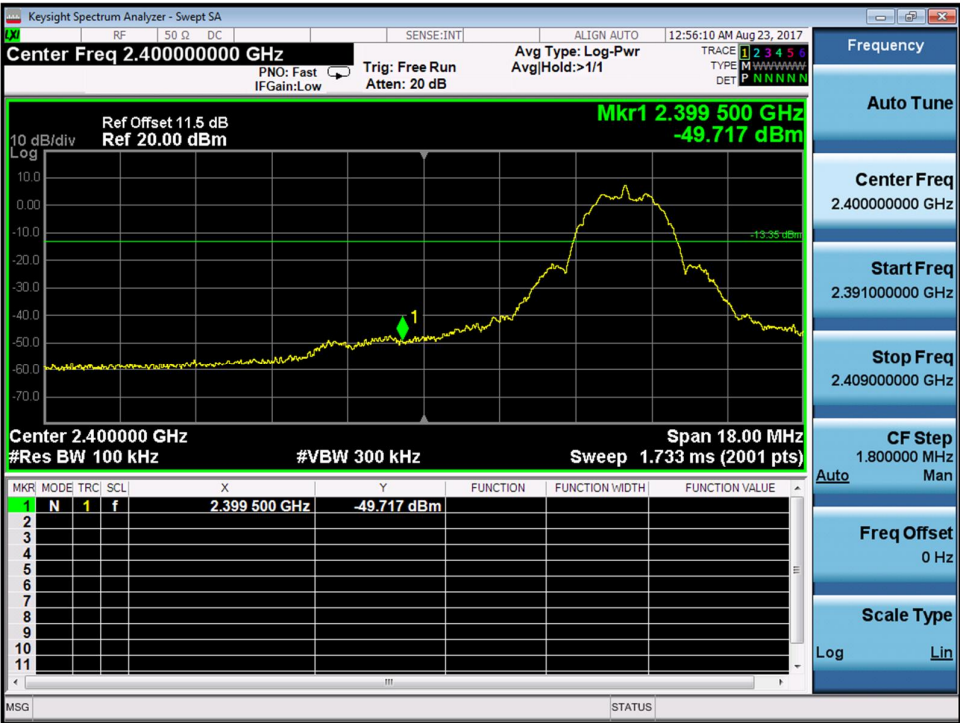
In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) and RSS-Gen8.10, must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)) and RSS-Gen.



China

Test result

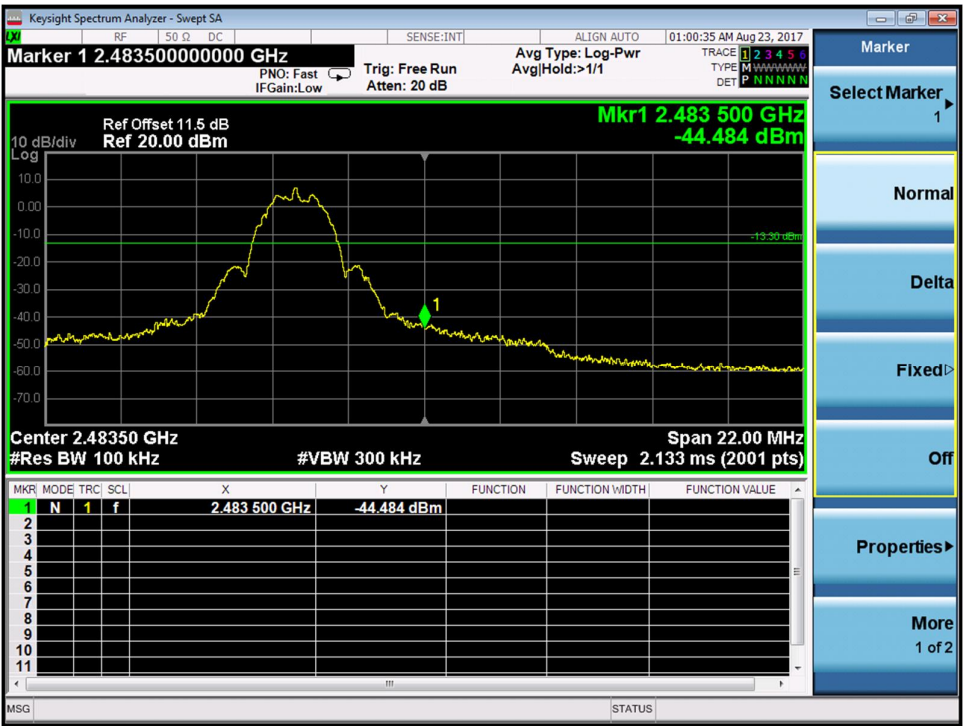
2405MHz





China

2480MHz



9.6 Spurious radiated emissions for transmitter

Test Method

1: The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

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

3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

5: Use the following spectrum analyzer settings According to C63.10:

For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious

RBW = 1MHz, VBW $\geq$ RBW for peak measurement and VBW = 10Hz for average measurement,

Sweep = auto, Detector function = peak, Trace = max hold.

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious

RBW = 100 KHz, VBW $\geq$ RBW for peak measurement, Sweep = auto, Detector function = peak,

Trace = max hold.

Note:

1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.

2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.

3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($20\log(1/\text{duty cycle})$).

4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

Limit

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

LIMITS OF RADIATED EMISSION MEASUREMENT (Frequency Range 9kHz-1000MHz)

Frequency MHz	Field Strength uV/m	Measured Distance Meters
0.009~0.490	2400/F (kHz)	300
0.490~1.705	24000/F (kHz)	30
1.705~30	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

Frequency MHz	Field Strength (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20logEmission level (uV/m).

Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Transmitting spurious emission test result as below:

Remark 1: There are the ambient noise within frequency range 9kHz ~ 30MHz and 18GHz ~ 25GHz, the permissible value is not show in the report.

Remark 2: Average measurement was not performed if peak level lower than average limit.

Remark 3: Other frequency was 20dB below limit line with 1-18GHz, there is not show in the report.

For model: SZU06A1

2405MHz

Frequency MHz	Reading Level dBuV/m	Factor dB	Measure Level dBuV/m	Limit dBuV/m	Margin dB	Detector Peak	Polarization
4935.50	35.52	2.79	38.31	74.00	-35.69	PK	Horizontal
10792.00	35.05	12.63	47.67	74.00	-26.33	PK	Horizontal
14200.50 ^{“*”}	35.18	15.39	50.56	74.00	-23.44	PK	Horizontal
17320.00 ^{“*”}	36.41	16.66	53.07	74.00	-20.93	PK	Horizontal
4808.00	36.35	2.69	39.05	74.00	-34.95	PK	Vertical
11013.00	35.37	12.99	48.36	74.00	-25.64	PK	Vertical
13988.00 ^{“*”}	35.63	14.87	50.50	74.00	-23.50	PK	Vertical
17005.50 ^{“*”}	37.29	15.46	52.75	74.00	-21.25	PK	Vertical

2445MHz

Frequency MHz	Reading Level dBuV/m	Factor dB	Measure Level dBuV/m	Limit dBuV/m	Margin dB	Detector Peak	Polarization
5012.00	35.04	3.05	38.09	74.00	-35.91	PK	Horizontal
11021.50	35.07	12.98	48.04	74.00	-25.96	PK	Horizontal
14141.00 ^{“*”}	35.43	15.29	50.72	74.00	-23.28	PK	Horizontal
16912.00 ^{“*”}	37.72	15.32	53.04	74.00	-20.96	PK	Horizontal
4842.00	34.71	2.70	37.41	74.00	-36.59	PK	Vertical
10970.50	34.86	13.05	47.91	74.00	-26.09	PK	Vertical
14175.00 ^{“*”}	35.75	15.33	51.08	74.00	-22.92	PK	Vertical
16750.50 ^{“*”}	38.00	14.60	52.60	74.00	-21.40	PK	Vertical

2480MHz

Frequency MHz	Reading Level dBuV/m	Factor dB	Measure Level dBuV/m	Limit dBuV/m	Margin dB	Detector Peak	Polarization
4935.50	35.60	2.79	38.39	74.00	-35.61	PK	Horizontal
11038.50	35.34	12.93	48.27	74.00	-25.73	PK	Horizontal
13979.50 ^{“*”}	35.69	14.81	50.51	74.00	-23.49	PK	Horizontal
16937.50 ^{“*”}	36.62	15.42	52.04	74.00	-21.96	PK	Horizontal
4825.00	35.03	2.70	37.73	74.00	-36.27	PK	Vertical
10979.00	34.89	13.04	47.93	74.00	-26.07	PK	Vertical
14183.50 ^{“*”}	35.96	15.35	51.31	74.00	-22.69	PK	Vertical
16784.50 ^{“*”}	37.68	14.76	52.44	74.00	-21.56	PK	Vertical

Remark:

- (1) Emission level= Original Receiver Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss -Amplifier gain
- (3) Margin = limit – Corrected Reading
- (4) ^{“*”} is not in restricted band, its limit is 20dBc of the fundamental emission level or 15.209 which is higher.

For model: SZU06A2

2405MHz

Frequency MHz	Reading Level dBuV/m	Factor dB	Measure Level dBuV/m	Limit dBuV/m	Margin dB	Detector Peak	Polarization
4765.50	36.21	2.61	38.82	74.00	-35.18	PK	Horizontal
11659.00	36.44	12.25	48.69	74.00	-25.31	PK	Horizontal
14209.00 ^{“*”}	35.98	15.40	51.38	74.00	-22.62	PK	Horizontal
16682.50 ^{“*”}	37.60	14.41	52.00	74.00	-22.00	PK	Horizontal
4774.00	35.58	2.64	38.23	74.00	-35.77	PK	Vertical
11081.00	35.28	12.85	48.13	74.00	-25.87	PK	Vertical
13784.00 ^{“*”}	36.55	14.34	50.89	74.00	-23.11	PK	Vertical
16869.50 ^{“*”}	37.39	15.21	52.59	74.00	-21.41	PK	Vertical

2445MHz

Frequency MHz	Reading Level dBuV/m	Factor dB	Measure Level dBuV/m	Limit dBuV/m	Margin dB	Detector Peak	Polarization
4961.00	35.02	2.91	37.93	74.00	-36.07	PK	Horizontal
11650.50	36.20	12.31	48.51	74.00	-25.49	PK	Horizontal
14141.00 ^{“*”}	35.45	15.29	50.74	74.00	-23.26	PK	Horizontal
16742.00 ^{“*”}	37.57	14.58	52.15	74.00	-21.85	PK	Horizontal
4748.50	36.70	2.54	39.25	74.00	-34.76	PK	Vertical
11064.00	36.88	12.84	49.72	74.00	-24.28	PK	Vertical
14294.00 ^{“*”}	35.61	15.52	51.13	74.00	-22.87	PK	Vertical
16810.00 ^{“*”}	38.04	14.87	52.90	74.00	-21.10	PK	Vertical



2480MHz

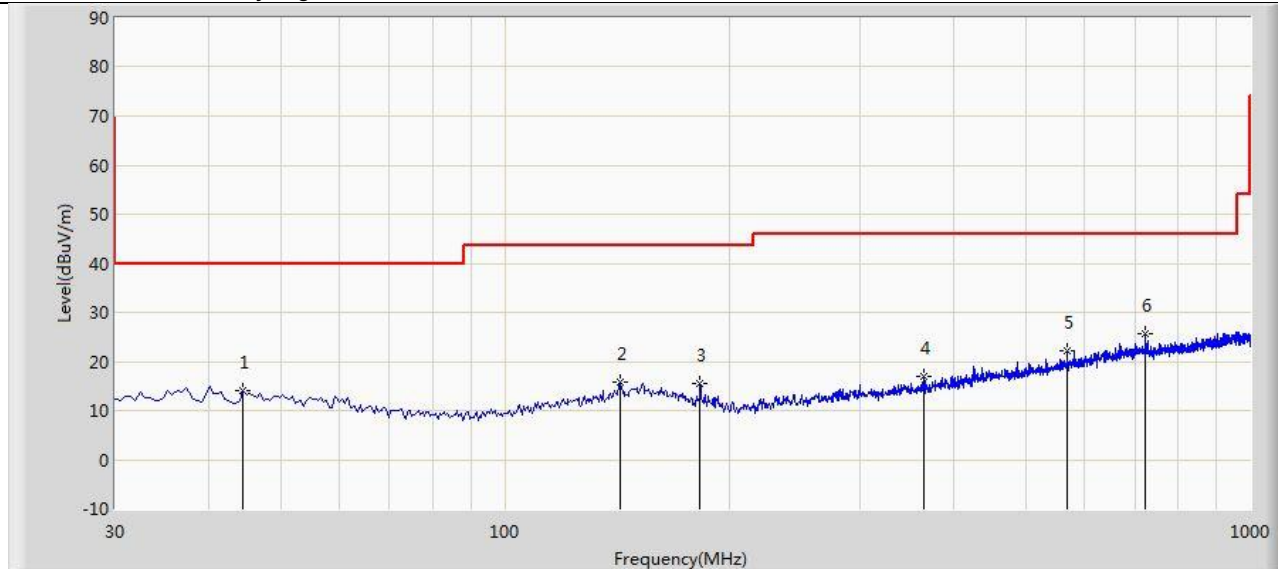
Frequency MHz	Reading Level dBuV/m	Factor dB	Measure Level dBuV/m	Limit dBuV/m	Margin dB	Detector Peak	Polarization
4757.00	36.17	2.58	38.75	74.00	-35.25	PK	Horizontal
11030.00	35.72	12.97	48.69	74.00	-25.31	PK	Horizontal
14226.00 ^{“*”}	35.80	15.45	51.24	74.00	-22.76	PK	Horizontal
16861.00 ^{“*”}	38.00	15.20	53.19	74.00	-20.81	PK	Horizontal
5029.00	36.02	3.08	39.09	74.00	-34.91	PK	Vertical
11421.00	35.46	12.59	48.05	74.00	-25.95	PK	Vertical
14260.00 ^{“*”}	35.76	15.48	51.24	74.00	-22.76	PK	Vertical
16929.00 ^{“*”}	37.49	15.41	52.90	74.00	-21.10	PK	Vertical

Remark:

- (1) Emission level= Original Receiver Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss -Amplifier gain
- (3) Margin = limit – Corrected Reading
- (4) ^{“*”} is not in restricted band, its limit is 20dBc of the fundamental emission level or 15.209 which is higher.

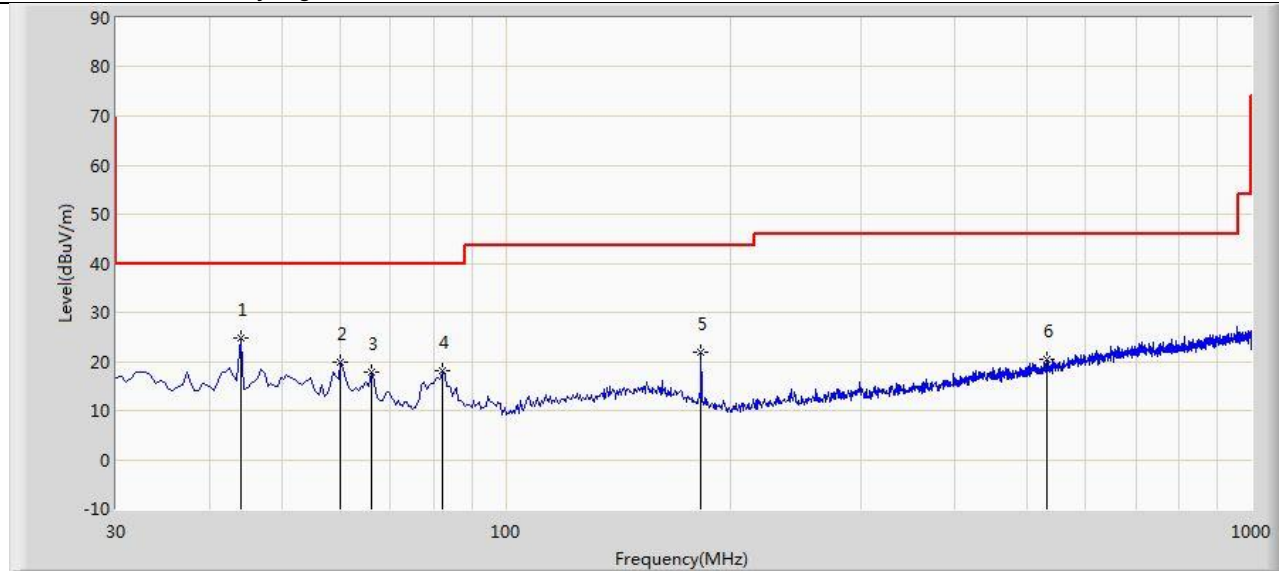
The worst case of Radiated Emission below 1GHz:

Site: AC1	Time: 2017/08/30 - 03:47
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: VULB 9168_20-2000MHz	Polarity: Horizontal
EUT: SZU06A1	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2445MHz	



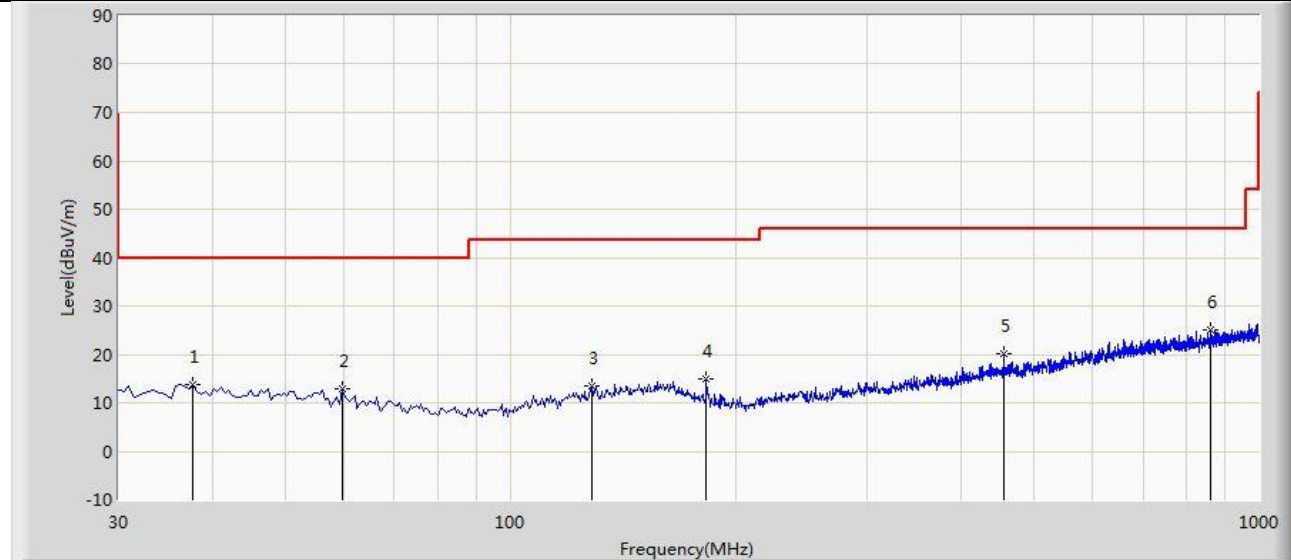
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			44.550	14.118	-0.100	-25.882	40.000	14.218	PK
2			143.005	15.811	1.117	-27.689	43.500	14.694	PK
3			182.775	15.612	3.136	-27.888	43.500	12.477	PK
4			365.620	16.942	1.148	-29.058	46.000	15.794	PK
5			568.350	22.218	2.413	-23.782	46.000	19.805	PK
6		*	723.550	25.610	3.257	-20.390	46.000	22.353	PK

Site: AC1	Time: 2017/08/30 - 03:49
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: VULB 9168_20-2000MHz	Polarity: Vertical
EUT: SZU06A1	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2445MHz	



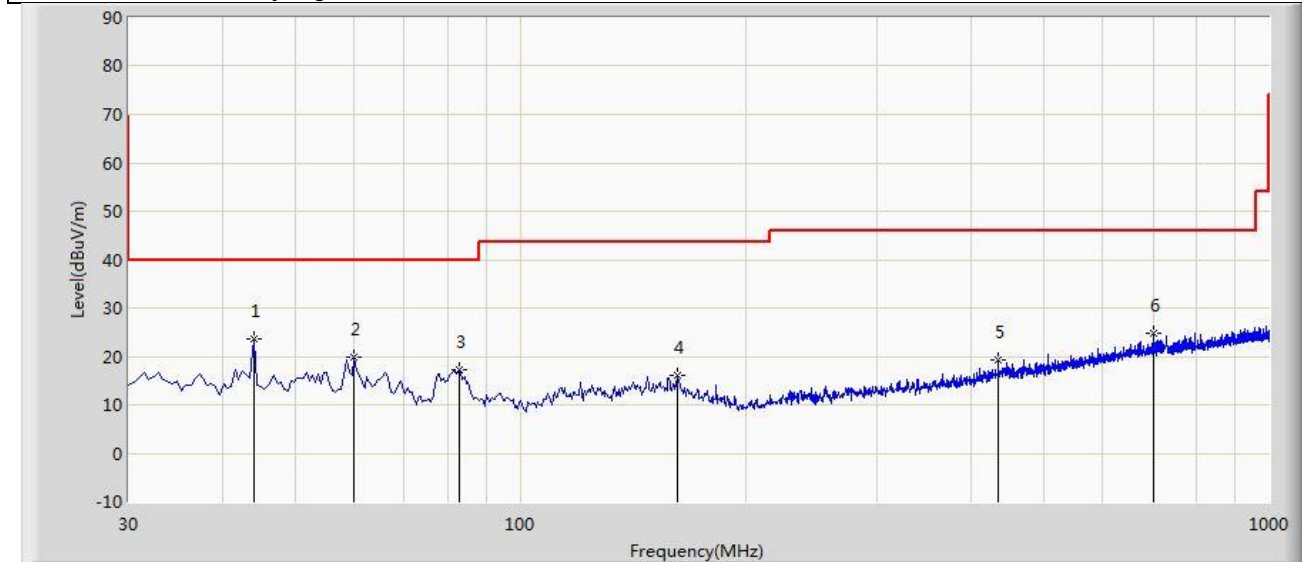
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	44.065	24.895	10.651	-15.105	40.000	14.244	PK
2			60.070	19.792	6.480	-20.208	40.000	13.312	PK
3			65.890	17.963	5.698	-22.037	40.000	12.265	PK
4			82.380	18.126	8.058	-21.874	40.000	10.068	PK
5			182.775	22.024	9.548	-21.476	43.500	12.477	PK
6			531.975	20.350	1.228	-25.650	46.000	19.122	PK

Site: AC1	Time: 2017/08/30 - 04:06
Limit: FCC_Part15.209_RE(3m)	Engineer: Flag Yang
Probe: VULB 9168_20-2000MHz	Polarity: Horizontal
EUT: SZU06A2	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2445MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			37.760	13.812	-0.419	-26.188	40.000	14.231	PK
2			59.585	12.769	-0.619	-27.231	40.000	13.388	PK
3			128.455	13.398	-0.236	-30.102	43.500	13.634	PK
4			182.775	14.951	2.475	-28.549	43.500	12.477	PK
5			455.830	20.156	2.274	-25.844	46.000	17.882	PK
6		*	861.290	24.992	1.195	-21.008	46.000	23.797	PK

Site: AC1	Time: 2017/08/30 - 04:06
Limit: FCC_Part15.209_RE(3m)	Engineer: Flag Yang
Probe: VULB 9168_20-2000MHz	Polarity: Vertical
EUT: SZU06A2	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2445MHz	

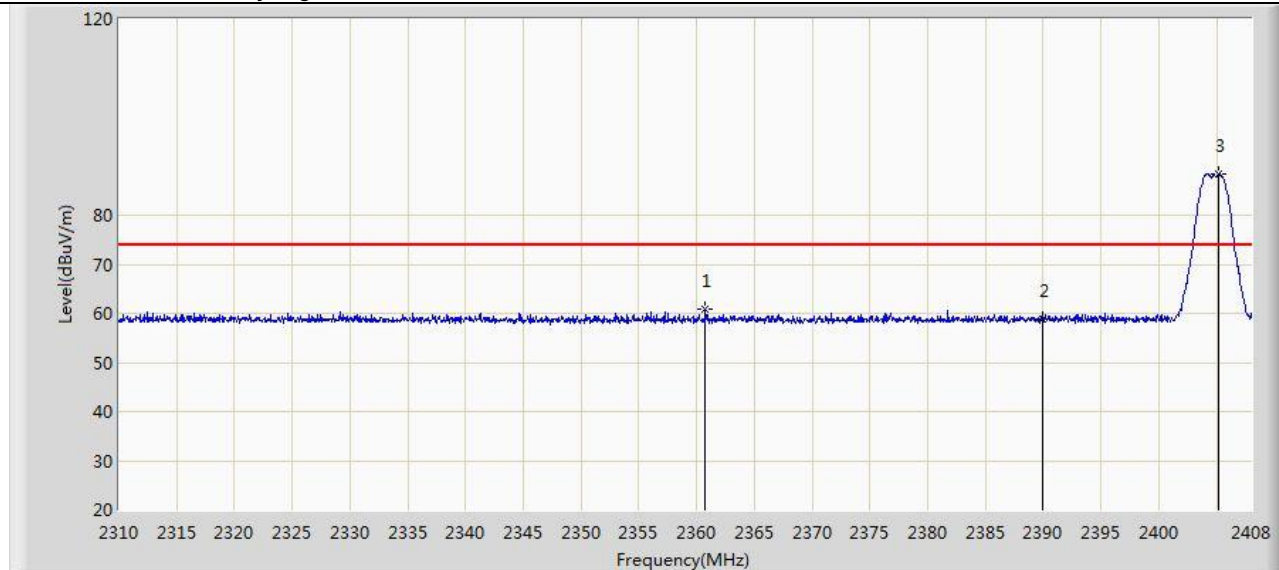


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	44.065	23.597	9.353	-16.403	40.000	14.244	PK
2			60.070	19.877	6.565	-20.123	40.000	13.312	PK
3			82.865	17.194	7.118	-22.806	40.000	10.077	PK
4			161.920	16.088	1.066	-27.412	43.500	15.022	PK
5			434.490	19.212	1.776	-26.788	46.000	17.436	PK
6			702.210	24.761	2.732	-21.239	46.000	22.029	PK

Radiated Restricted Band Edge Measurement

Test Result:

Site: AC1	Time: 2017/08/22 - 23:22
Limit: FCC Part15.209 RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SZU06A1	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2405MHz	

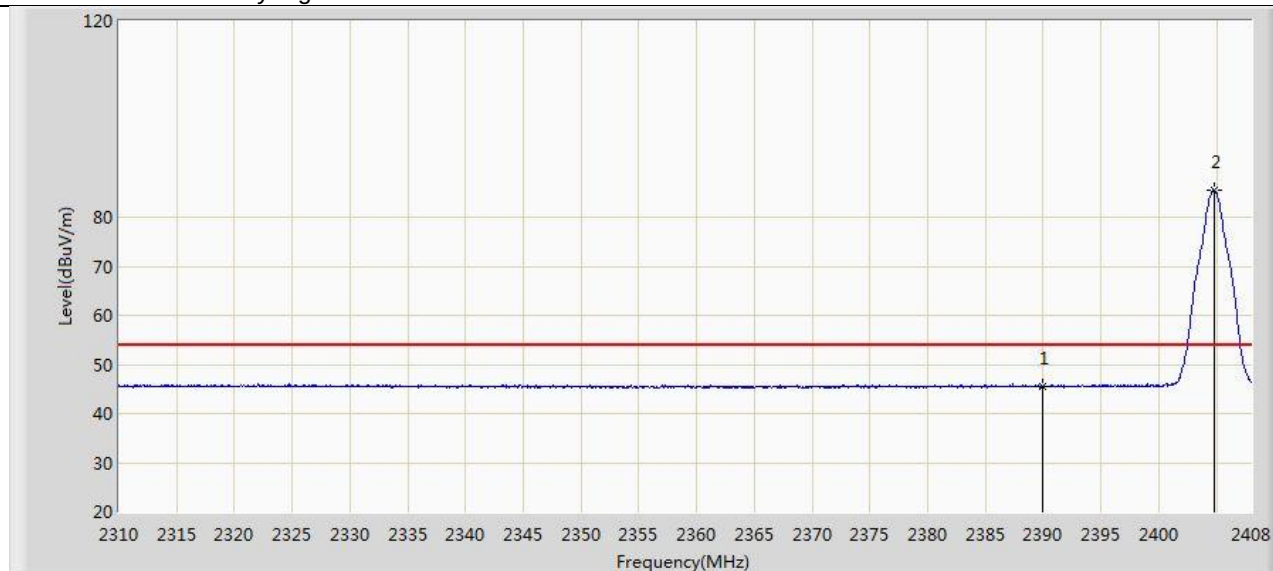


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2360.764	60.933	29.676	-13.067	74.000	31.258	PK
2			2390.000	58.914	27.711	-15.086	74.000	31.203	PK
3		*	2405.207	88.484	57.304	14.484	74.000	31.180	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/22 - 23:33
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SZU06A1	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2405MHz	

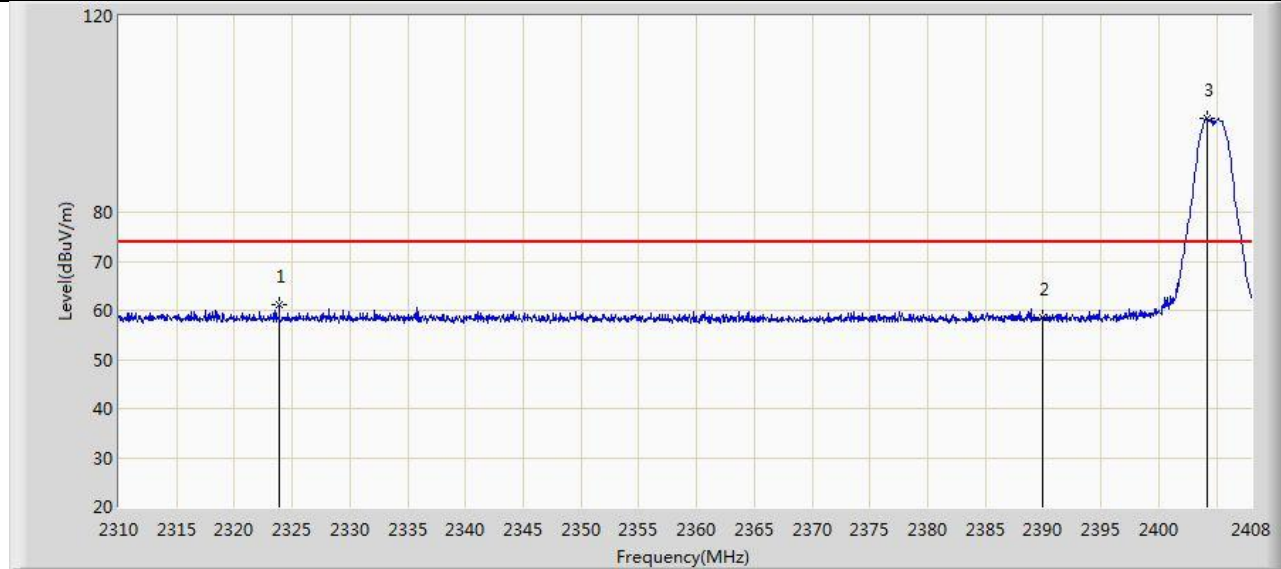


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	45.639	14.436	-8.361	54.000	31.203	AV
2		*	2404.766	85.467	54.287	31.467	54.000	31.180	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/22 - 23:33
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SZU06A1	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2405MHz	

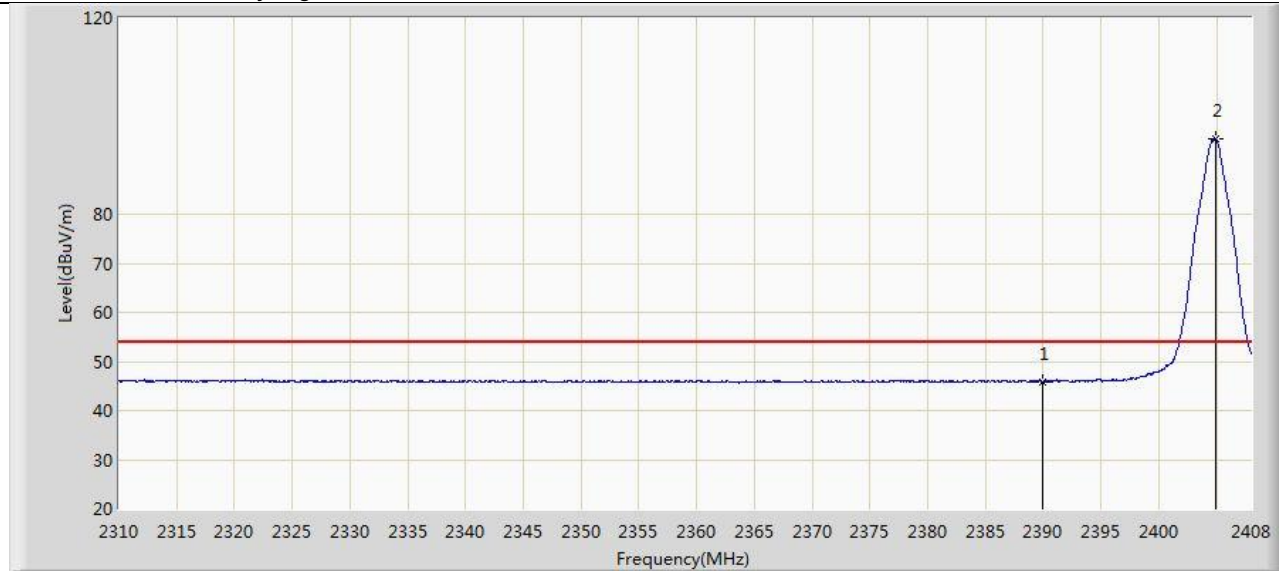


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2323.867	61.245	29.842	-12.755	74.000	31.403	PK
2			2390.000	58.511	27.308	-15.489	74.000	31.203	PK
3		*	2404.178	99.084	67.903	25.084	74.000	31.181	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/22 - 23:35
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SZU06A1	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2405MHz	

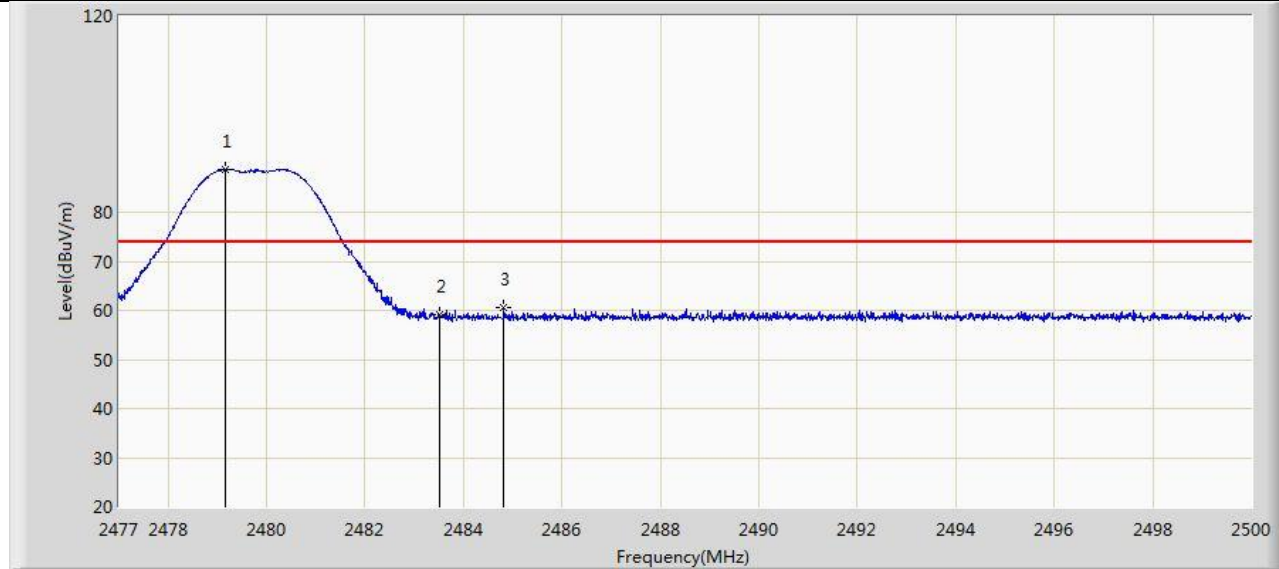


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	45.878	14.675	-8.122	54.000	31.203	AV
2		*	2404.913	95.465	64.285	41.465	54.000	31.180	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/22 - 23:36
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SZU06A1	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2480MHz	

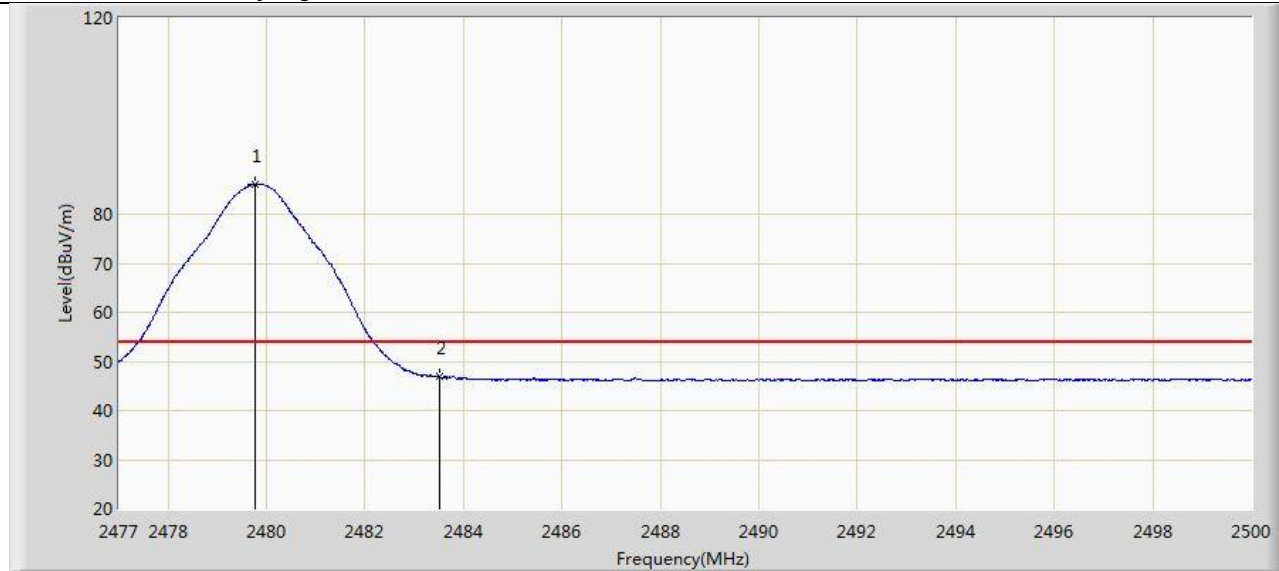


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.174	88.761	57.579	14.761	74.000	31.182	PK
2			2483.500	58.987	27.794	-15.013	74.000	31.194	PK
3			2484.809	60.696	29.499	-13.304	74.000	31.197	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/22 - 23:39
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SZU06A1	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2480MHz	

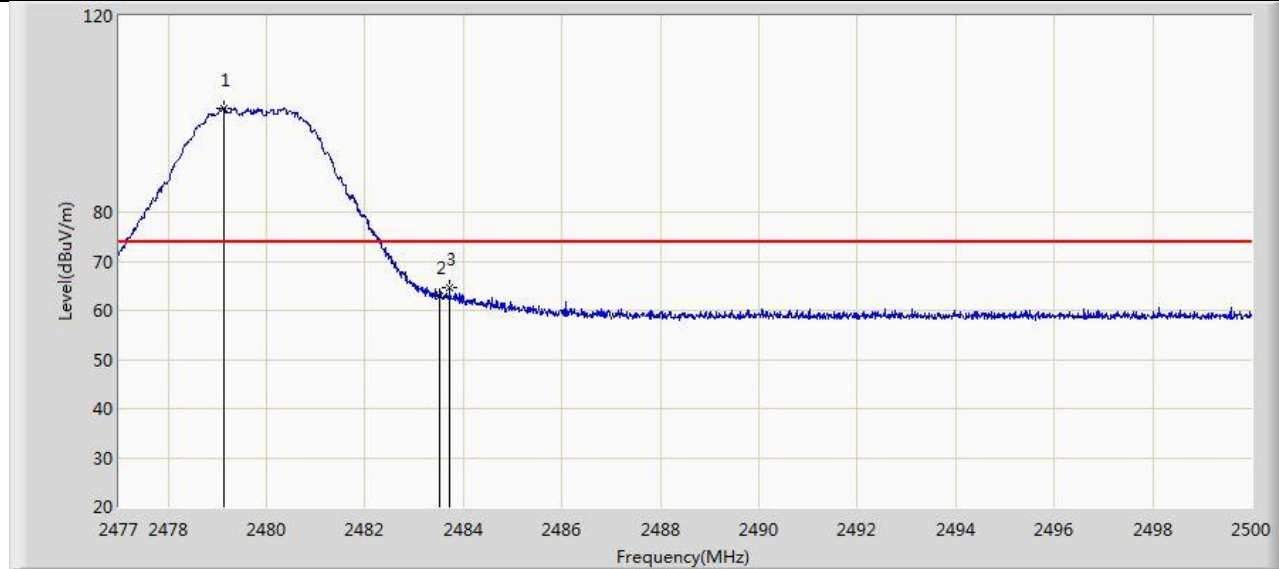


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.760	86.099	54.916	32.099	54.000	31.184	AV
2			2483.500	46.886	15.693	-7.114	54.000	31.194	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/22 - 23:40
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SZU06A1	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2480MHz	

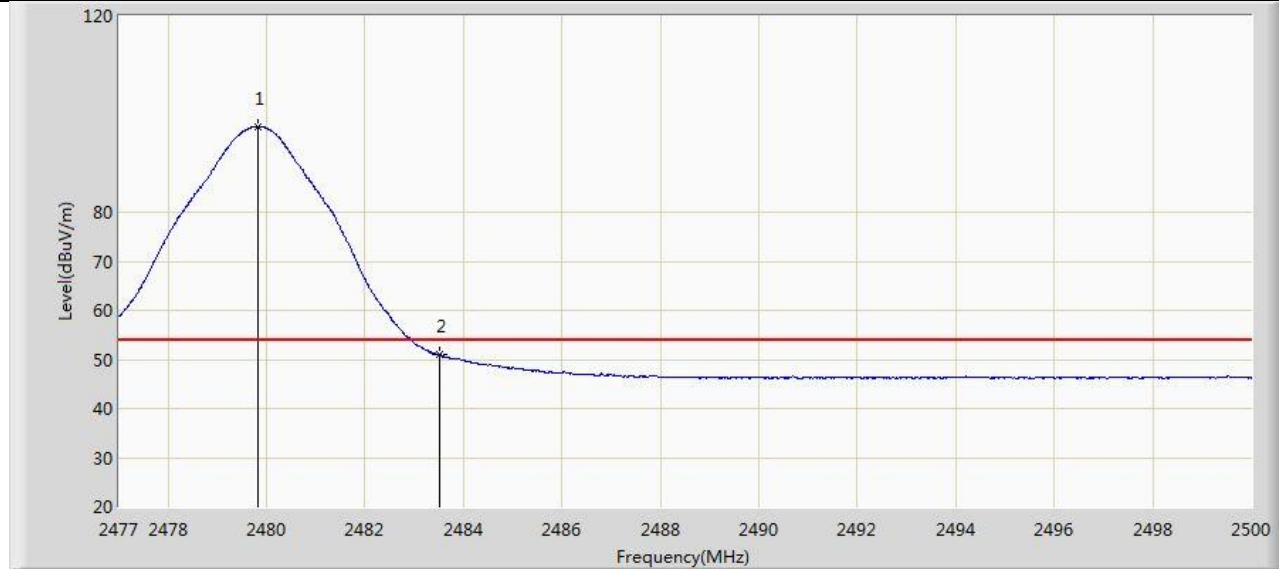


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.139	101.118	69.936	27.118	74.000	31.182	PK
2			2483.500	62.869	31.676	-11.131	74.000	31.194	PK
3			2483.716	64.507	33.313	-9.493	74.000	31.194	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/22 - 23:43
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SZU06A1	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2480MHz	

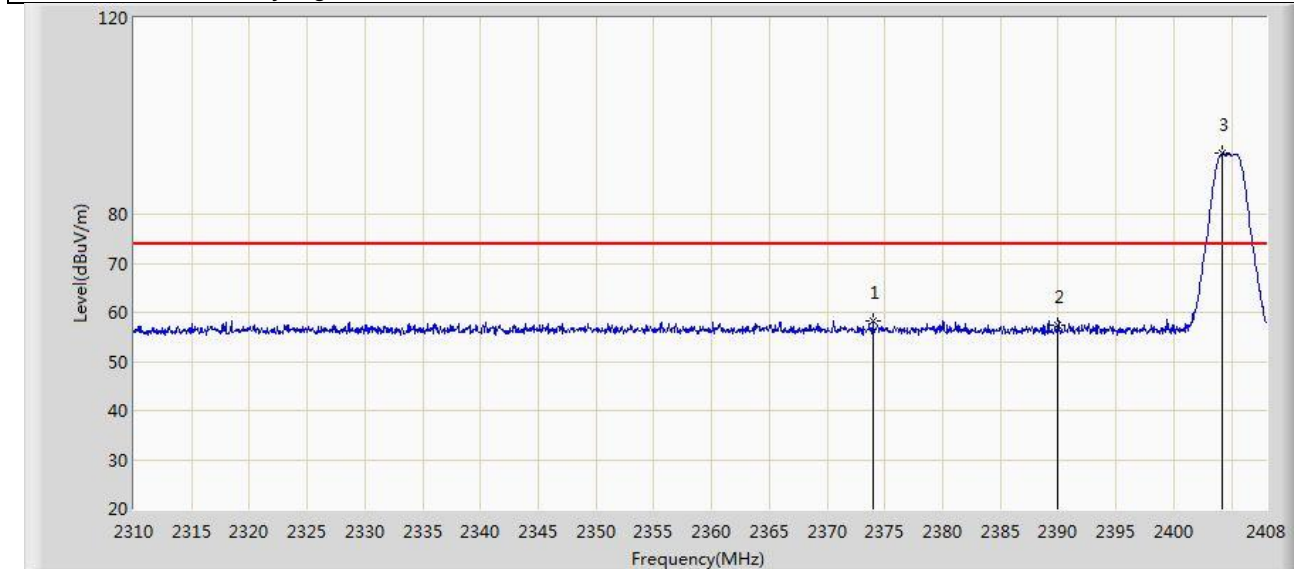


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.829	97.450	66.266	43.450	54.000	31.184	AV
2			2483.500	50.871	19.678	-3.129	54.000	31.194	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/24 - 23:37
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SZU06A2	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2405MHz	

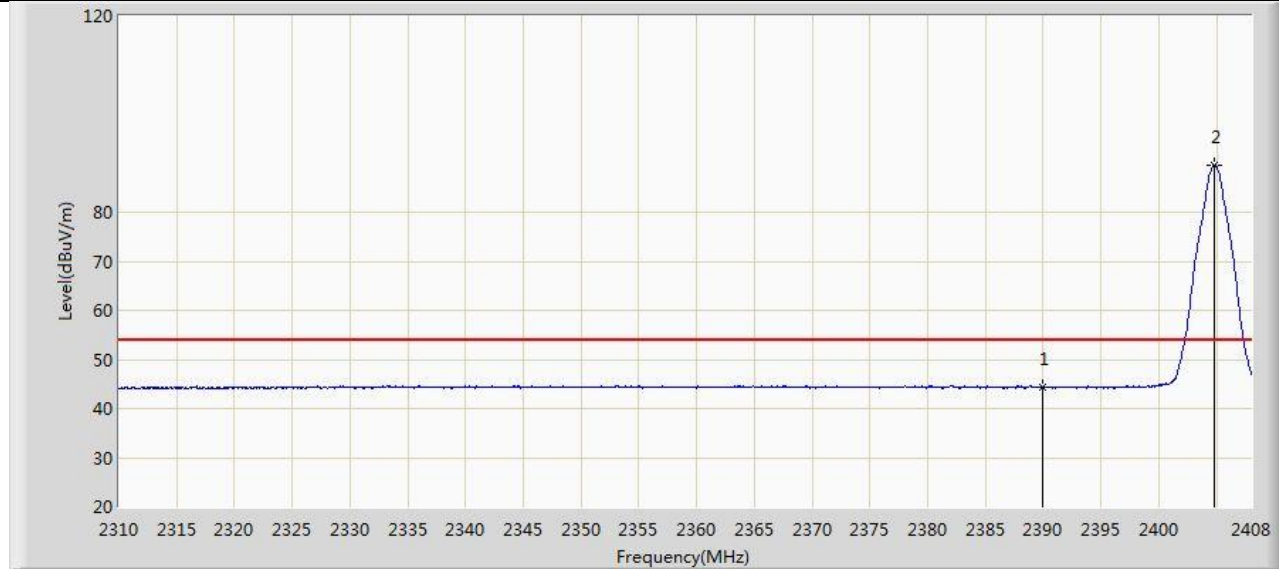


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2373.994	58.155	26.923	-15.845	74.000	31.232	PK
2			2390.000	57.350	26.147	-16.650	74.000	31.203	PK
3		*	2404.227	92.342	61.161	18.342	74.000	31.181	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/24 - 23:43
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SZU06A2	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2405MHz	

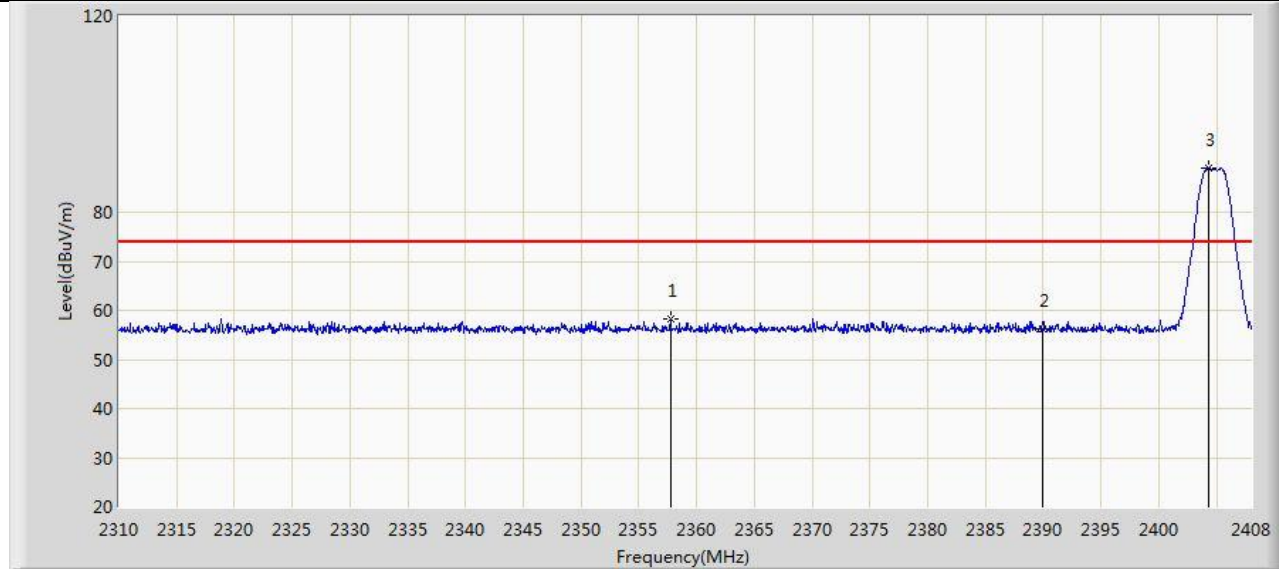


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	44.360	13.157	-9.640	54.000	31.203	AV
2		*	2404.815	89.545	58.365	35.545	54.000	31.180	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/24 - 23:43
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SZU06A2	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2405MHz	

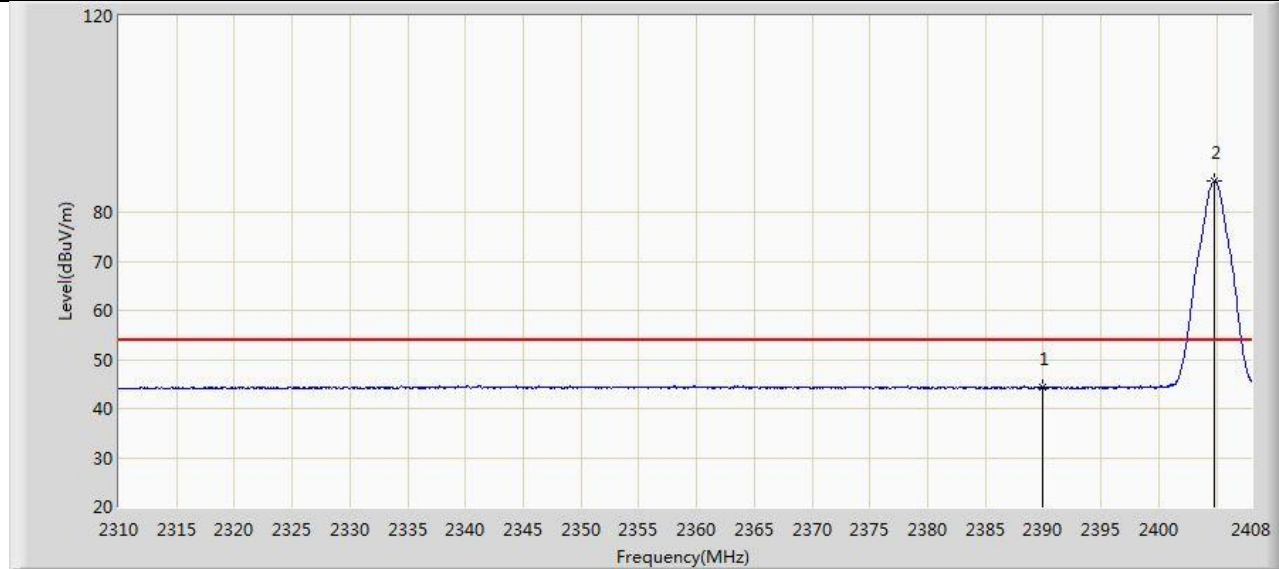


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2357.726	58.134	26.870	-15.866	74.000	31.264	PK
2			2390.000	56.209	25.006	-17.791	74.000	31.203	PK
3		*	2404.276	88.988	57.807	14.988	74.000	31.181	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/24 - 23:45
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SZU06A2	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2405MHz	

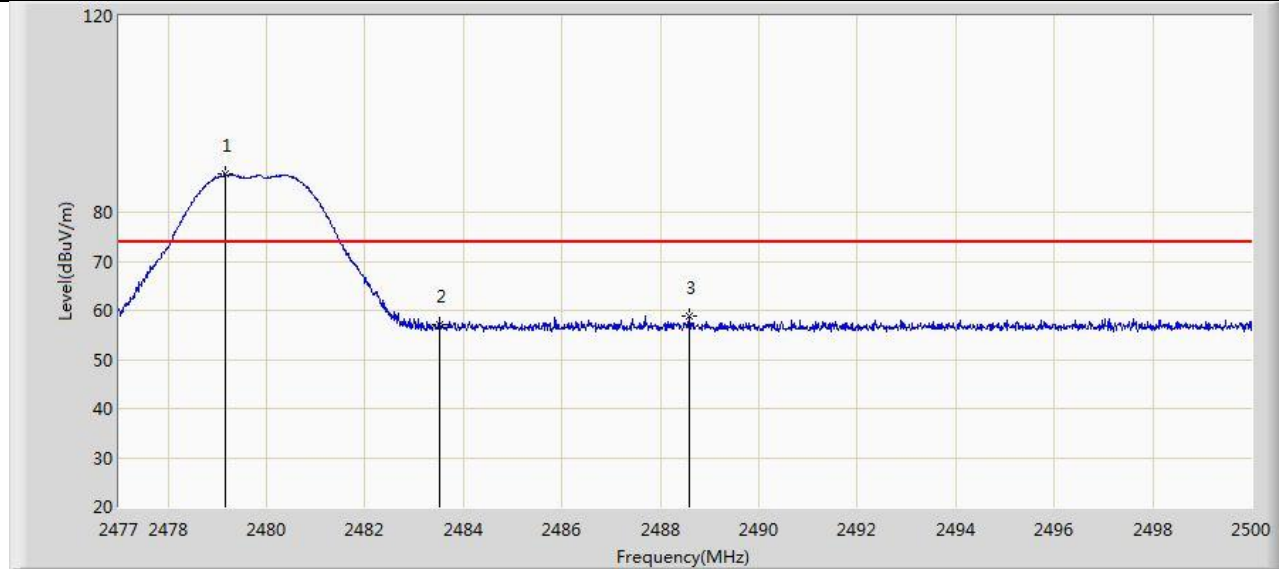


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	44.376	13.173	-9.624	54.000	31.203	AV
2		*	2404.766	86.334	55.154	32.334	54.000	31.180	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/24 - 23:57
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SZU06A2	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2480MHz	

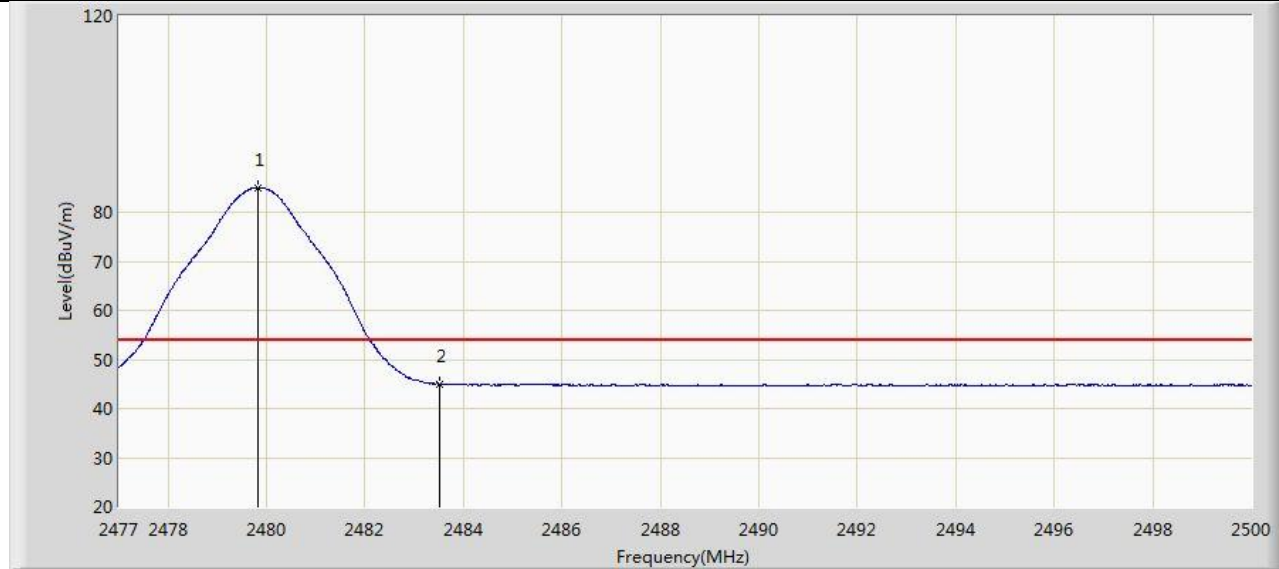


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.151	87.716	56.534	13.716	74.000	31.182	PK
2			2483.500	57.088	25.895	-16.912	74.000	31.194	PK
3			2488.592	58.844	27.637	-15.156	74.000	31.207	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/24 - 23:59
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SZU06A2	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2480MHz	

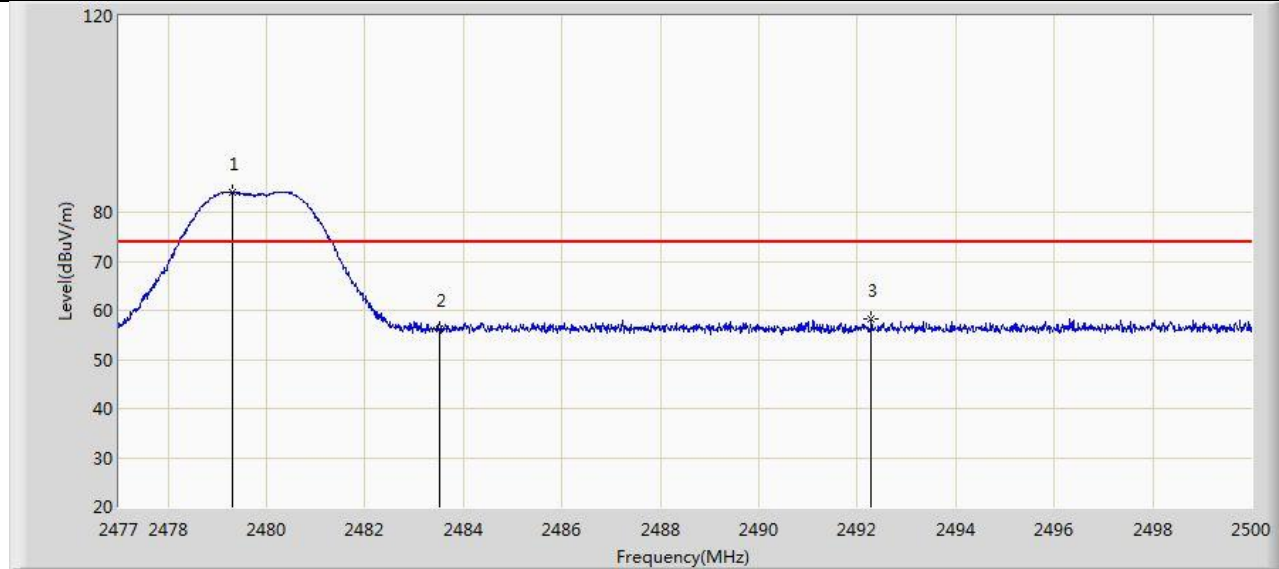


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.829	85.065	53.881	31.065	54.000	31.184	AV
2			2483.500	44.962	13.769	-9.038	54.000	31.194	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/25 - 00:00
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SZU06A2	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2480MHz	

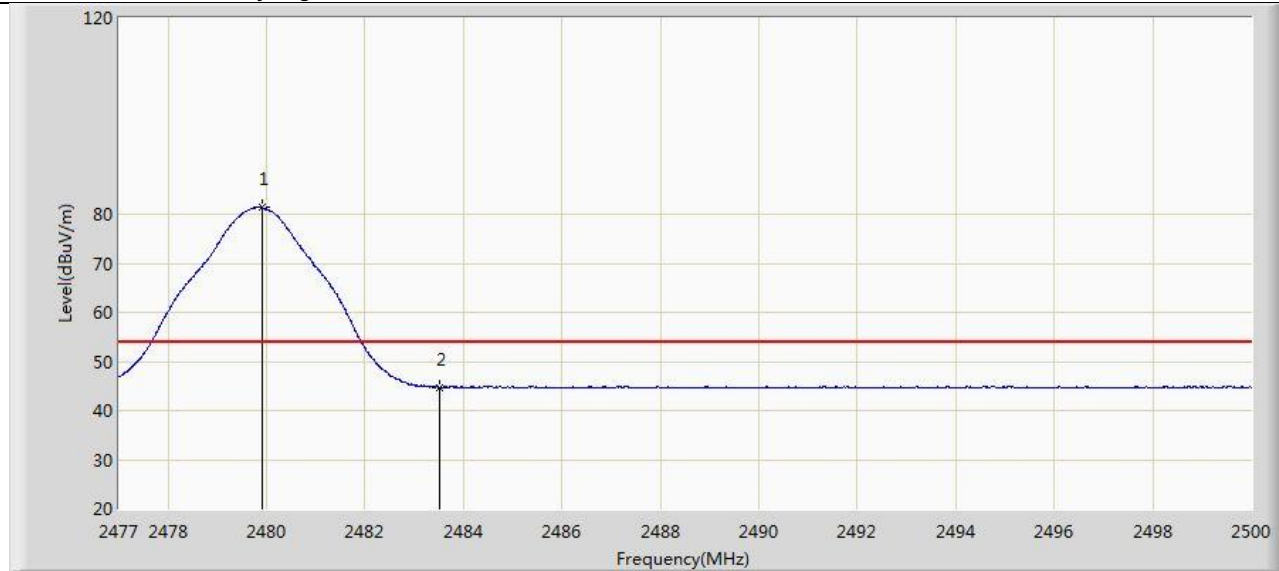


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.300	84.198	53.016	10.198	74.000	31.182	PK
2			2483.500	56.142	24.949	-17.858	74.000	31.194	PK
3			2492.283	58.342	27.126	-15.658	74.000	31.216	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/08/25 - 00:02
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SZU06A2	Power: By PC
Test Mode: Transmit by Zigbee at Channel 2480MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.898	81.377	50.193	27.377	54.000	31.184	AV
2			2483.500	44.782	13.589	-9.218	54.000	31.194	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

10 Test Equipment List

List of Test Instruments Test Site1

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
C	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2018-8-7
RE	EMI Test Receiver	Rohde & Schwarz	ESR3	101906	2018-8-7
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	848	2018-9-17
	Horn Antenna	Rohde & Schwarz	HF907	102393	2018-9-17
	Pre-amplifier	Rohde & Schwarz	SCU-18D	19006451	2018-8-7
	3m Semi-anechoic chamber	TDK	9X6X6	----	2018-5-20
CE	EMI Test Receiver	Rohde & Schwarz	ESR 3	101907	2018-8-7
	LISN	Rohde & Schwarz	ENV4200	100224	2018-8-7
	LISN	Rohde & Schwarz	ENV216	101924	2018-8-7

Test Site2

Radiated Disturbance – AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cal. Due Date
MXE EMI Receiver	Agilent	N9038A	MRTSUE06125	1 year	2017/08/03
Loop Antenna	Schwarzbeck	FMZB1519	MRTSUE06025	1 year	2017/12/21
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2018/03/28
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2017/11/19
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2017/10/22
Broadband Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06024	1 year	2018/01/04
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06183	1 year	2017/12/20
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2018/05/10

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cal. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
USB Wideband Power Sensor	Agilent	U2021XA	MRTSUE06030	1 year	2017/12/06
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06184	1 year	2017/12/22

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth and 99% Occupied Bandwidth
- Power spectral density*
- Spurious RF conducted emissions
- Conducted Band edge

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Test Site1

Items	Extended Uncertainty
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, LISN, $\pm 2.73\text{dB}$
Radiated Disturbance	30MHz to 1GHz, $\pm 5.03\text{dB}$ (Horizontal)
	$\pm 5.11\text{dB}$ (Vertical)
	1GHz to 18GHz, $\pm 5.15\text{dB}$ (Horizontal)
	$\pm 5.12\text{dB}$ (Vertical)
	18GHz to 25GHz, $\pm 4.76\text{dB}$

Test Site2

AC Conducted Emission Measurement - SR2

Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$):

150kHz~30MHz: 3.46dB

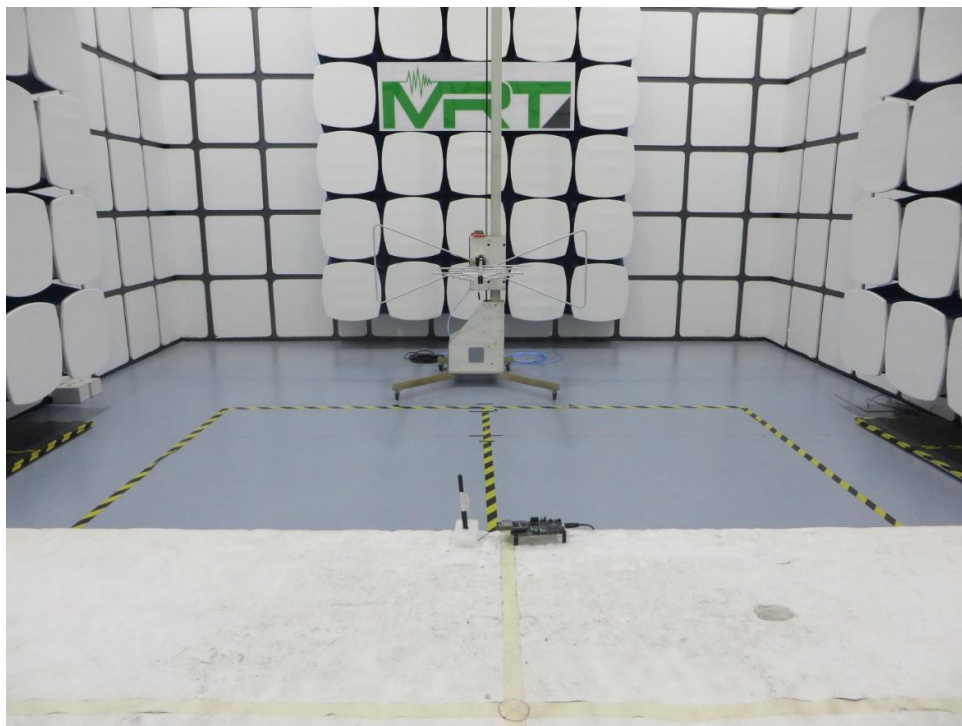
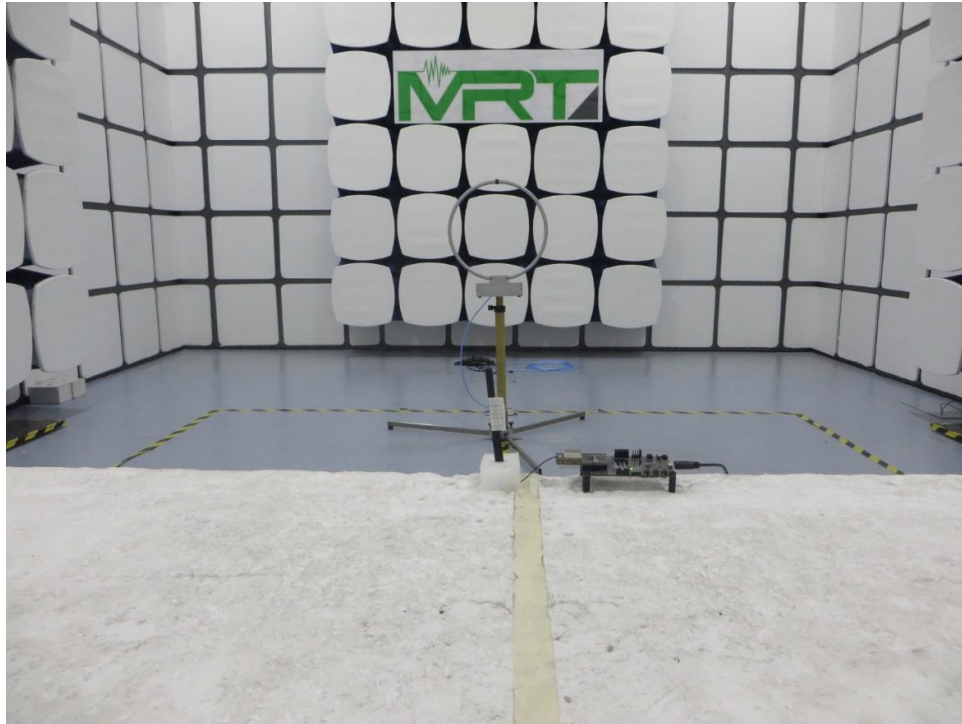
Radiated Emission Measurement – AC1

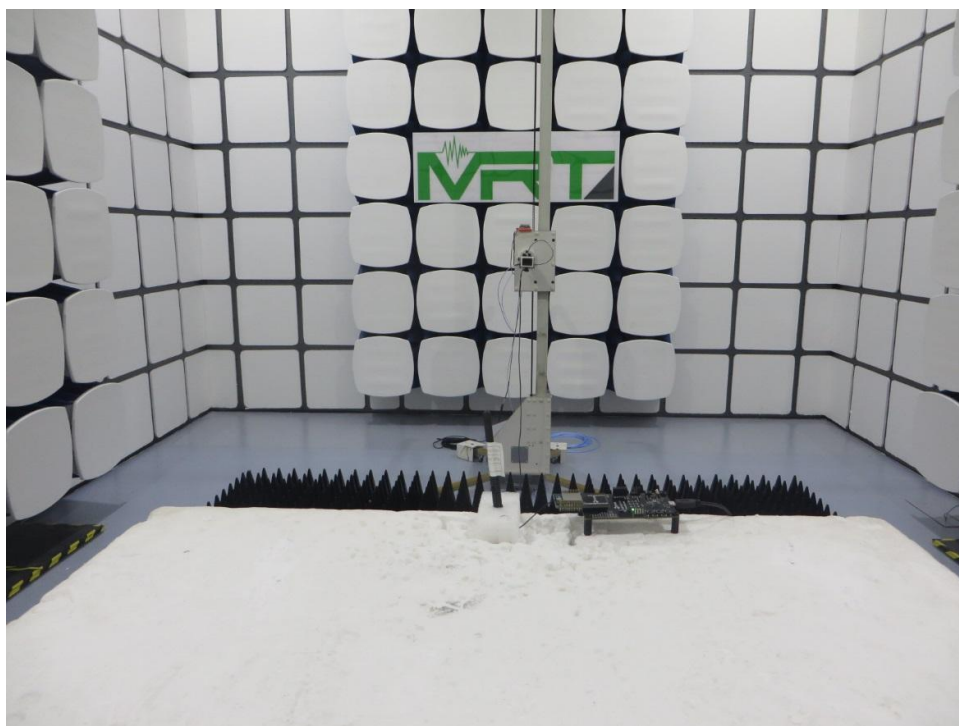
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$):

9kHz ~ 1GHz: 4.18dB

1GHz ~ 25GHz: 4.76dB

12 Photographs of Test Set-ups





13 Photographs of EUT

Photo 1. General view of SZU06A1



Photo 2. General view of SZU06A1 connect with Dipole Antenna

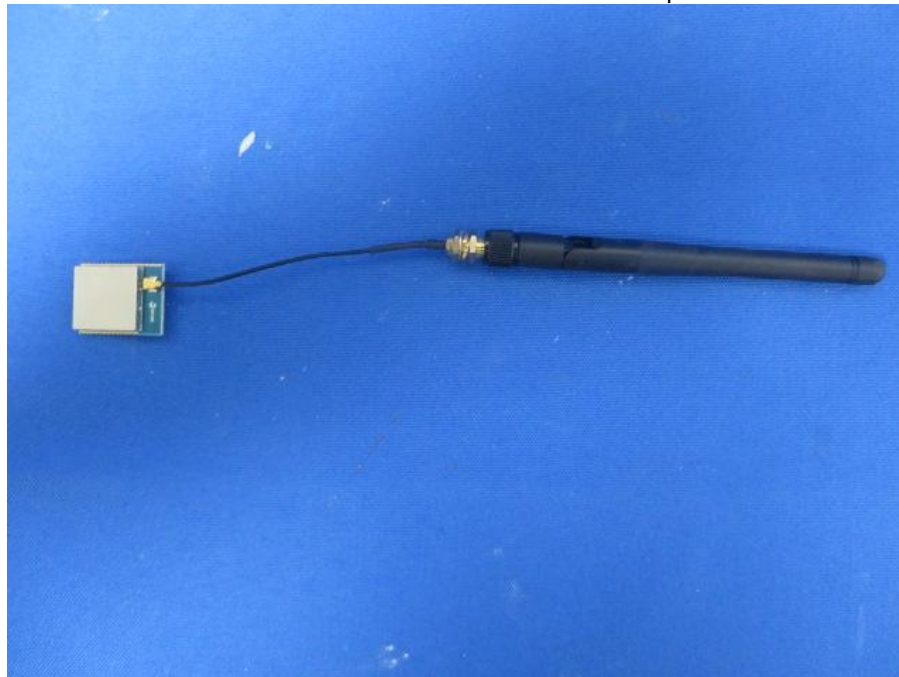


Photo 3. General view of SZU06A1

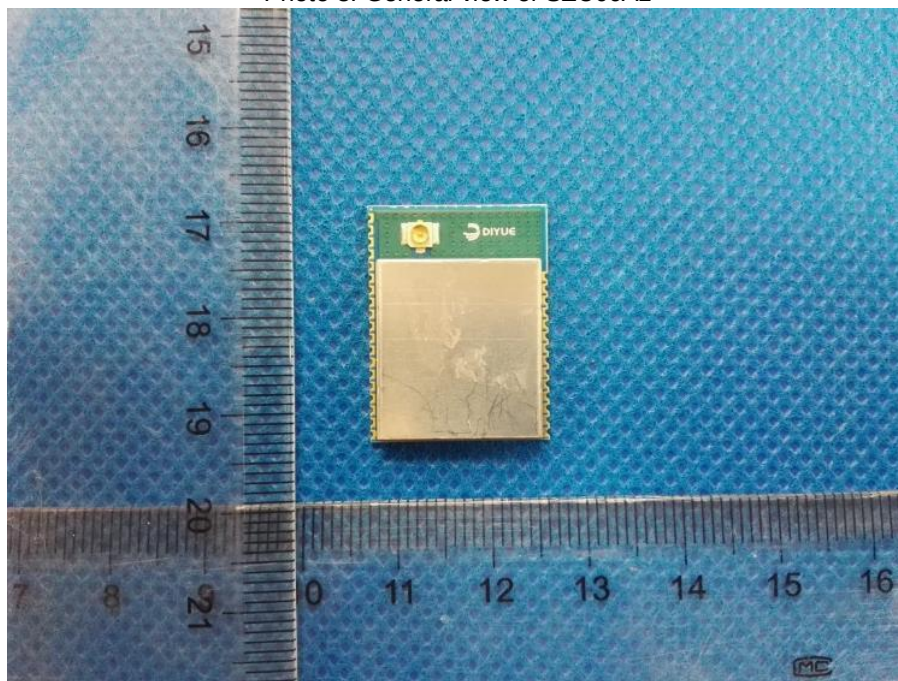


Photo 4. Internal view of SZU06A1

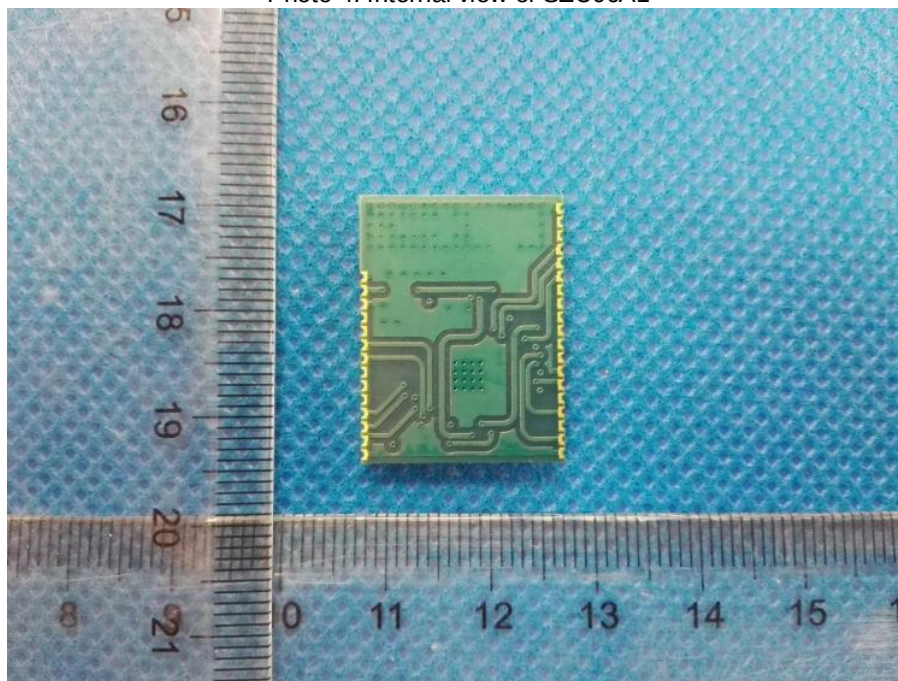


Photo 5 Internal view of SZU06A1



Photo 6. Internal view of SZU06A1

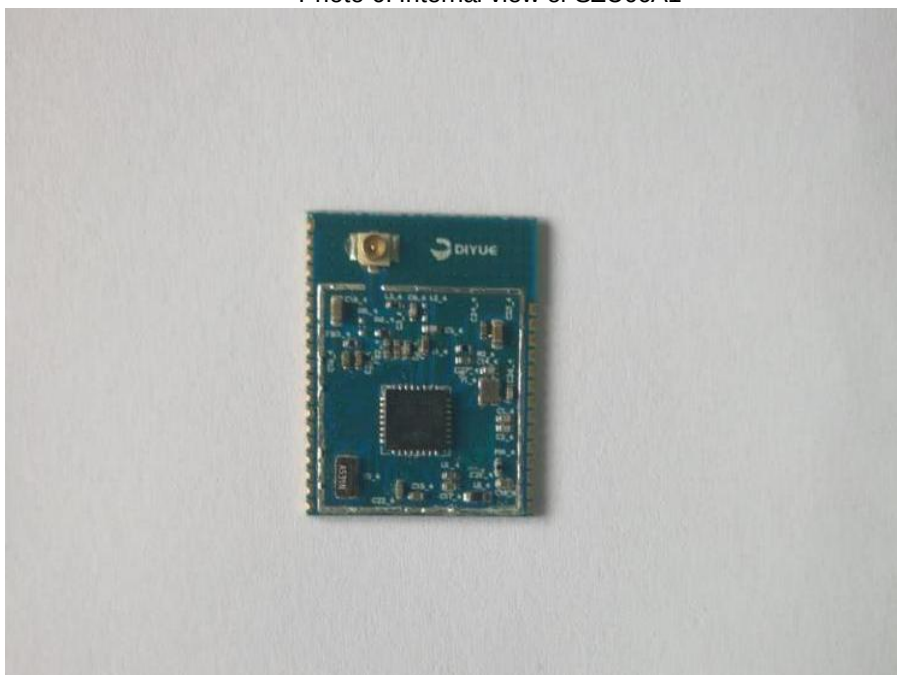


Photo 7. Internal view of SZU06A1 Dipole antenna W1010



Photo 8. General view of SZU06A2



Photo 8. General view of SZU06A2

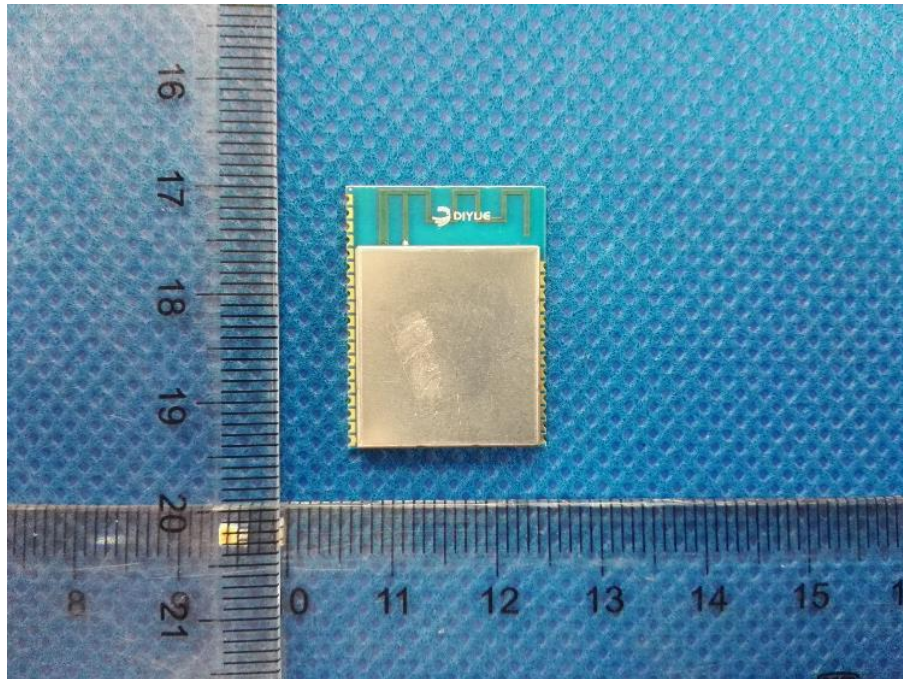


Photo 9. General view of SZU06A2

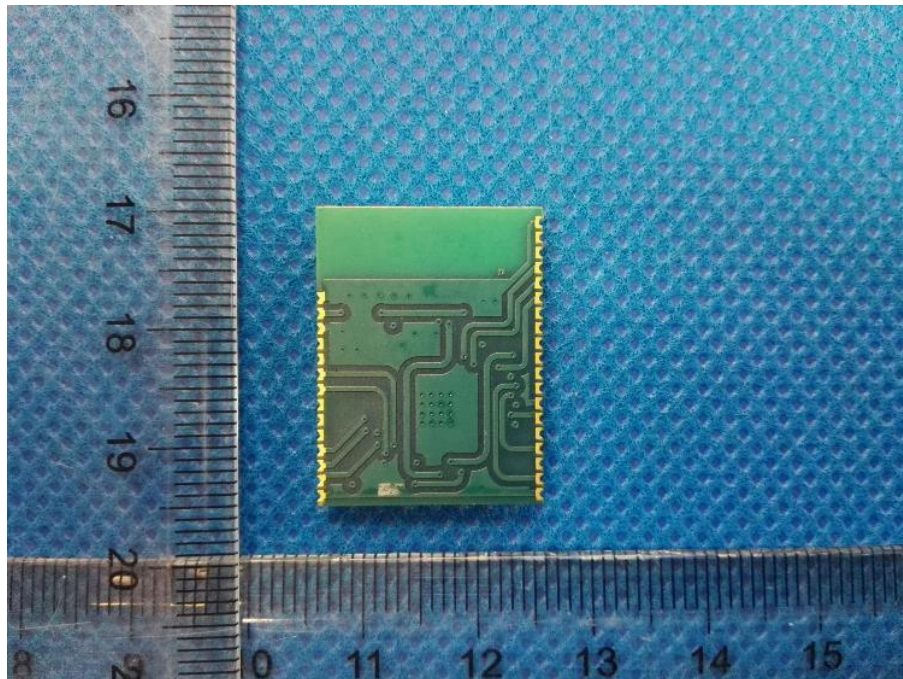


Photo 10 Internal view of SZU06A2



Photo 11 Internal view of SZU06A2

