

Test Report

FCC Part15 Subpart C

Product Name : BLE 256KB Module with Bluetooth 4.2
Radio

Model No. : CY8CKIT-143A , CY5676A

FCC ID : WAP-CY5676A

IC : 7922A-CY5676A

Applicant : Cypress Semiconductor

Address : 198 Champion Ct, San Jose, California 95134
United States

Date of Receipt : May. 18, 2016

Test Date : May. 19, 2016~ May 30, 2016

Issued Date : May. 31, 2016

Report No. : 1652071R-RF-US-P06V01

Report Version : V1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by CNAS,TAF or any agency of the government.

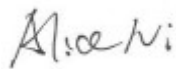
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Test Report Certification

Issued Date : May. 31, 2016

Report No. : 1652071R-RF-US-P06V01

Product Name : BLE 256KB Module with Bluetooth 4.2 Radio
Applicant : Cypress Semiconductor
Address : 198 Champion Ct, San Jose, California 95134 United States
Manufacturer : Wujiang Sigmatron Electronics Co., Ltd
Address : 386 Huahong Rd, Wujiang, Suzhou, Jiangsu, China
Model No. : CY8CKIT-143A , CY5676A
FCC ID : WAP-CY5676A
IC : 7922A-CY5676A
EUT Voltage : DC 1.9V to 5.5V
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C: 2015
ANSI C63.4:2014; ANSI C63.10:2013;
KDB 558074 D01v03r05
Industry Canada RSS-Gen Issue 4 / RSS-247 Issue 1
Test Result : Complied
Performed Location : Quietek Corporation - Suzhou EMC Laboratory
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Laboratory Information

We, **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

Taiwan R.O.C.	:	BSMI, NCC, TAF
USA	:	FCC
Japan	:	VCCI
China	:	CNAS

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://www.quietek.com/english/about/certificates.aspx?bval=5>
The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/index_en.aspx

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1652071R-RF-US-P06V01	V1.0	Initial Issued Report	May. 31, 2016

1. General Information

1.1. EUT Description

Product Name	BLE 256KB Module with Bluetooth 4.2 Radio
Model No.	CY8CKIT-143A
Working Voltage	DC 1.9V to 5.5V
Bluetooth Specification	V4.2
Frequency Range	2402- 2480 MHz
Channel Number	V4.2: 40
Channel Separation	V4.2: 2MHz
Type of Modulation	V4.2: GFSK
Data Rate	V4.2: 1Mbps(GFSK)
Model No.	CY5676A
Working Voltage	DC 1.9V~5.5V
Bluetooth Specification	V4.2
Frequency Range	2402- 2480 MHz
Channel Number	V4.2: 40
Channel Separation	V4.2: 2MHz
Type of Modulation	V4.2: GFSK
Data Rate	V4.2: 1Mbps(GFSK)
Antenna Type	Reference to Antenna List
Peak Antenna Gain	Reference to Antenna List

Note: 1. Modules CY8CKIT-143A and CY5676A have the same PCB, periphery parts and the encapsulation of the main chip.

2. The difference of two modules is BLE chip part number.

3. Both of the models were tested, and only the worst data are showed in the report.

1.2. Working Frequency of Each Channel:

Bluetooth Working Frequency of Each Channel: (For BLE)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz	03	2408 MHz
04	2410 MHz	05	2412 MHz	06	2414 MHz	07	2416 MHz
08	2418 MHz	09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz	15	2432 MHz
16	2434 MHz	17	2436 MHz	18	2438 MHz	19	2440 MHz
20	2442 MHz	21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz	27	2456 MHz
28	2458 MHz	29	2460 MHz	30	2462 MHz	31	2464 MHz
32	2466 MHz	33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz	39	2480 MHz

1.3. Antenna information

Model No.	N/A					
Antenna manufacturer	N/A					
Antenna Delivery	☒	1*TX+1*RX	☐	2*TX+2*RX	☐	3*TX+3*RX
Antenna technology	☒	SISO				
	☐	MIMO	☐	Basic		
			☐	CDD		
			☐	Beam-forming		
Antenna Type	☐	External	☐	Dipole		
	☒	Internal	☐	PIFA		
			☒	PCB		
			☐	Ceramic Chip Antenna		
			☐	Metal plate type F antenna		
Antenna Gain	1.6dBi					

1.4. Mode of Operation

Test Mode
Mode 1: Transmit

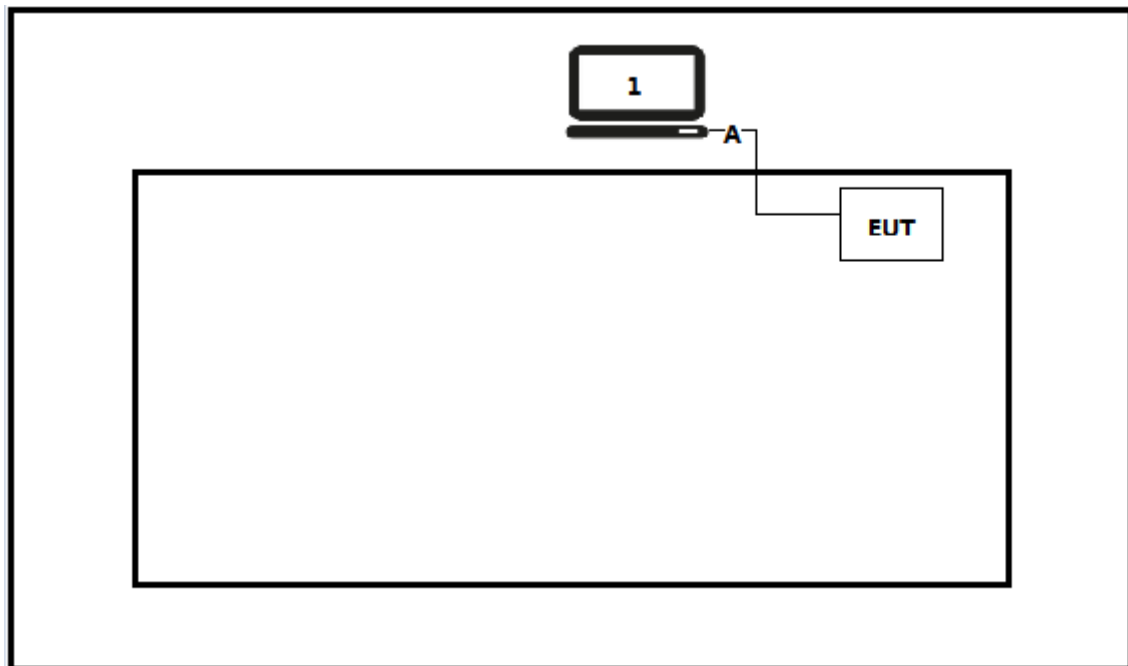
1.5. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

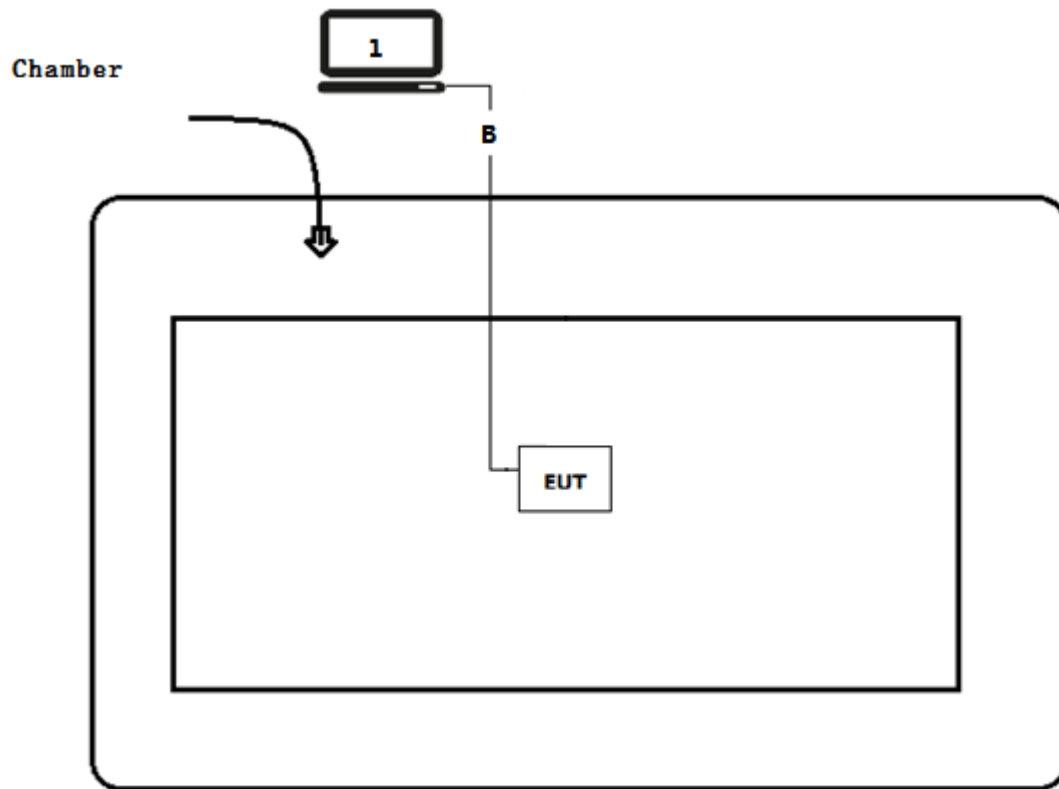
No.	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Think Pad	2526	LV-A3285	Power by adapter

1.6. Configuration of Tested System

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated Emission



1.7. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	Run the RF test software, and set the test mode and channel, then press OK to start continue receive.

2. Technical Test

2.1. Summary of Test Result

Performed Test Item	Normative References	Worst case mode	Limit	Result
AC Power Line Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.207	Mode 1	FCC 15.207	PASS
Emissions in restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.209	Mode 1	FCC 15.209	PASS
Emissions in non-restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(d)	Mode 1		

2.2. Test Frequency configuration:

Bluetooth Working Frequency of Each Channel: (For BLE)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz	03	2408 MHz
04	2410 MHz	05	2412 MHz	06	2414 MHz	07	2416 MHz
08	2418 MHz	09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz	15	2432 MHz
16	2434 MHz	17	2436 MHz	18	2438 MHz	19	2440 MHz
20	2442 MHz	21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz	27	2456 MHz
28	2458 MHz	29	2460 MHz	30	2462 MHz	31	2464 MHz
32	2466 MHz	33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz	39	2480 MHz

2.3. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

2.4. Measurement Uncertainty

Test Items	Uncertainty
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AC Power Line Conducted Emission

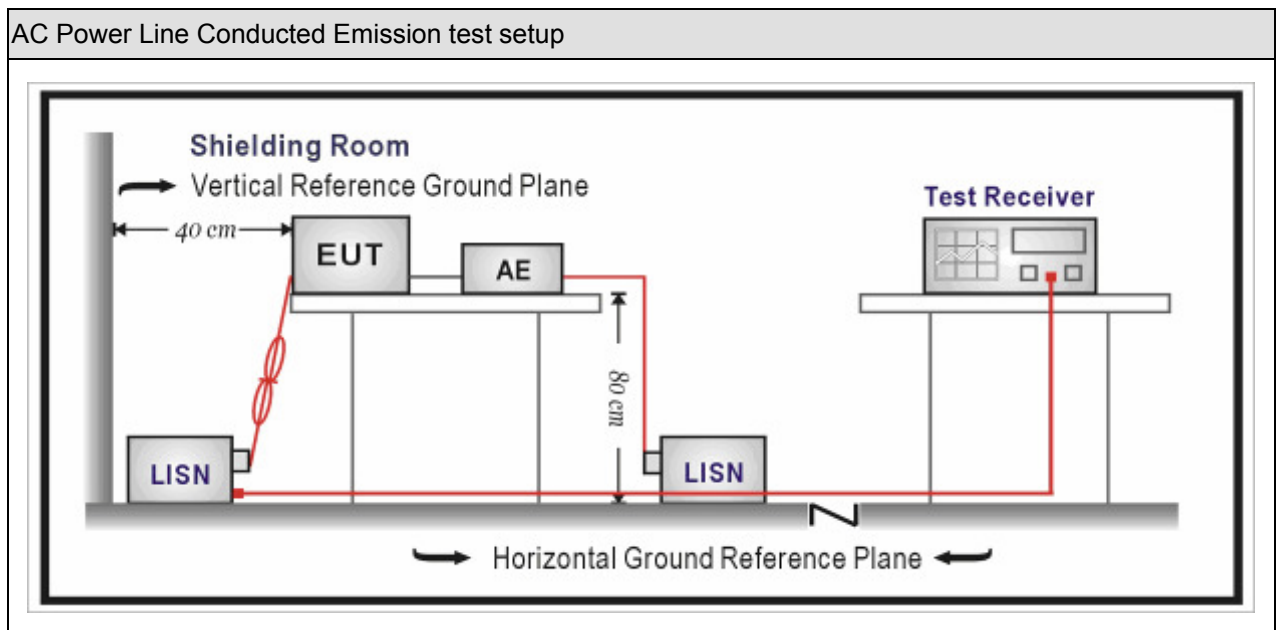
3. AC Power Line Conducted Emission

3.1. Test Equipment

AC Power Line Conducted Emission / TR-1					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100726	2016.03.05	2017.03.04
Two-Line V-Network	R&S	ENV216	100043	2016.03.29	2017.03.28
Two-Line V-Network	R&S	ENV216	100044	2015.09.17	2016.09.16
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2016.03.02	2017.03.01
50ohm Termination	SHX	TF2	07081401	2015.09.17	2016.09.16
Temperature/Humidity Meter	zhichen	ZC1-2	TR1-TH	2016.01.04	2017.01.03

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

3.2. Test Setup



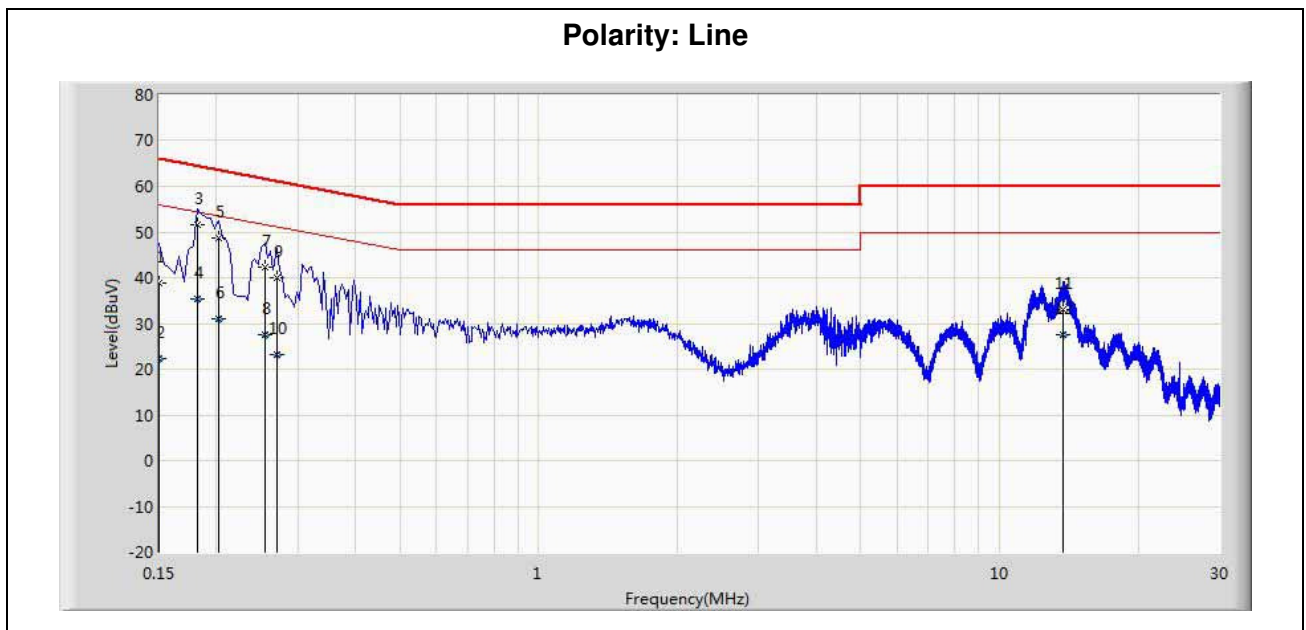
3.3. Limit

Frequency of Emission (MHz)	Conducted Limit
	Quasi-peak (dB)

3.5. Test Result

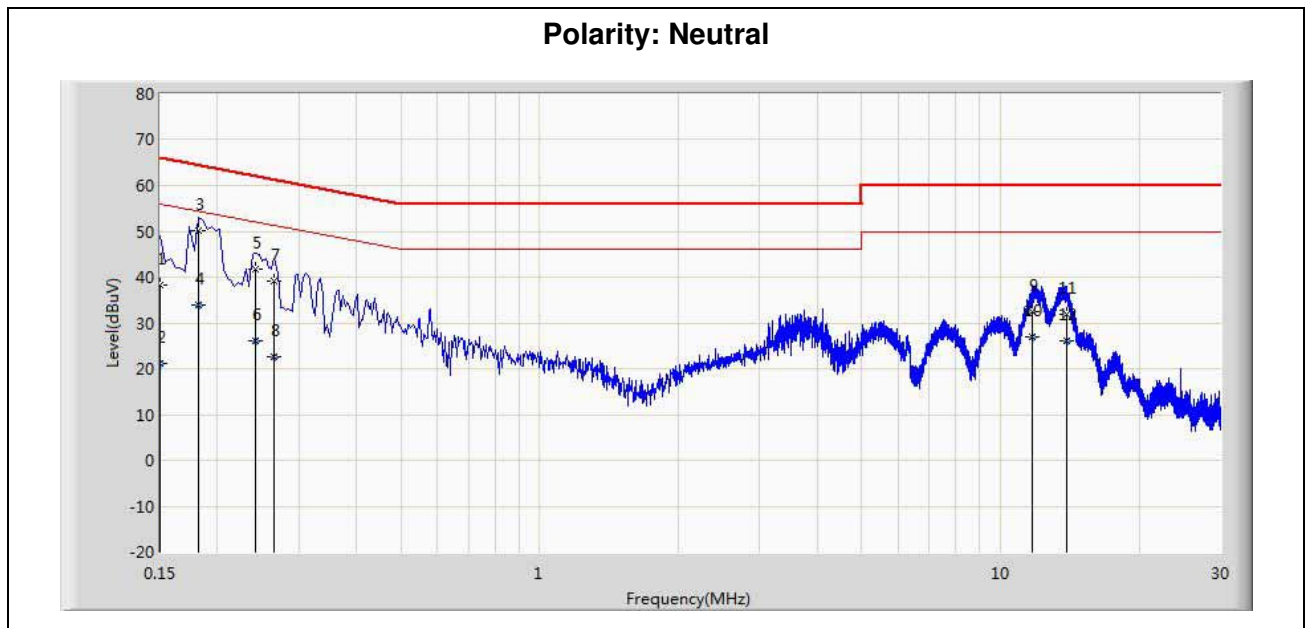
Product Name	: BLE 256KB Module with Bluetooth 4.2 Radio	Polarity	: Line
Test Item	: AC Power Line Conducted Emission	Power	: AC 120V/60Hz
Test Site	: TR1	Test Mode	: Mode 1

No	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Detector
1	0.150	38.957	29.336	-27.043	66.000	9.621	QP
2	0.150	22.413	12.793	-33.587	56.000	9.621	AV
3	0.182	51.552	41.933	-12.842	64.394	9.619	QP
4	0.182	35.276	25.657	-19.118	54.394	9.619	AV
5	0.202	48.785	39.162	-14.743	63.528	9.622	QP
6	0.202	30.969	21.347	-22.559	53.528	9.622	AV
7	0.254	42.179	32.558	-19.446	61.625	9.621	QP
8	0.254	27.436	17.815	-24.189	51.625	9.621	AV
9	0.270	39.901	30.278	-21.217	61.118	9.623	QP
10	0.270	23.304	13.681	-27.814	51.118	9.623	AV
11	13.734	32.972	23.083	-27.028	60.000	9.889	QP
12	13.734	27.560	17.671	-22.440	50.000	9.889	AV



Product Name	: BLE 256KB Module with Bluetooth 4.2 Radio	Polarity	: Neutral
Test Item	: AC Power Line Conducted Emission	Power	: AC 120V/60Hz
Test Site	: TR1	Test Mode	: Mode 1

No	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Detector
1	0.150	38.181	28.580	-27.819	66.000	9.601	QP
2	0.150	21.234	11.633	-34.766	56.000	9.601	AV
3	0.182	50.235	40.636	-14.159	64.394	9.599	QP
4	0.182	34.034	24.435	-20.360	54.394	9.599	AV
5	0.242	41.666	32.065	-20.361	62.027	9.601	QP
6	0.242	25.985	16.384	-26.042	52.027	9.601	AV
7	0.266	39.217	29.612	-22.025	61.242	9.606	QP
8	0.266	22.485	12.880	-28.756	51.242	9.606	AV
9	11.730	32.366	22.499	-27.634	60.000	9.867	QP
10	11.730	26.875	17.008	-23.125	50.000	9.867	AV
11	13.890	31.787	21.894	-28.213	60.000	9.893	QP
12	13.890	26.169	16.276	-23.831	50.000	9.893	AV



4. Emissions in restricted frequency bands

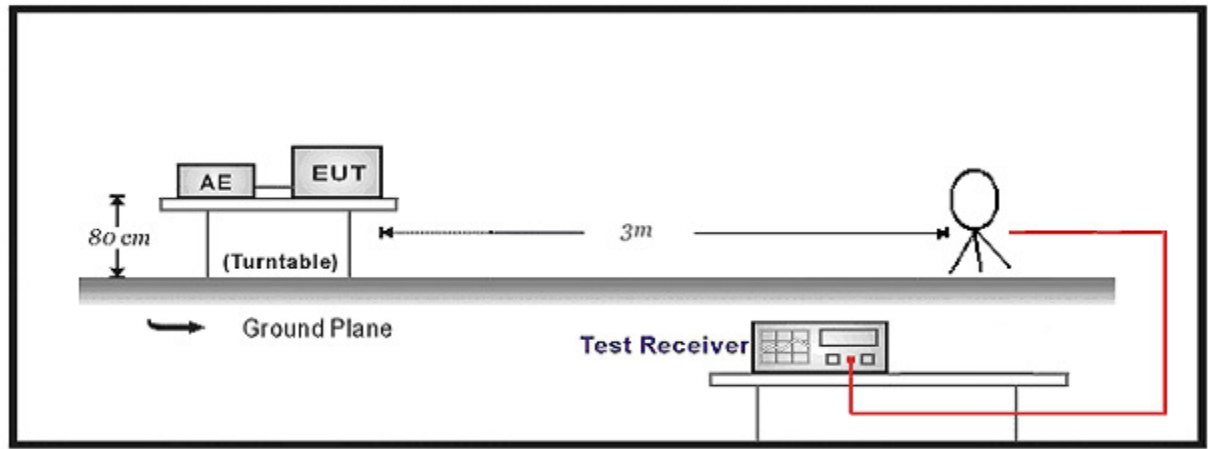
4.1. Test Equipment

Radiated Emission(Below 1GHz) / AC-2					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100573	2016.03.05	2017.03.04
Loop Antenna	R&S	HFH2-Z2	833799/003	2015.11.16	2016.11.17
Bilog Chainenna	Teseq GmbH	CBL6112D	27611	2015.10.16	2016.10.15
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2016.03.02	2017.03.01
Temperature/Humidity Meter	Zhichen	ZC1-2	AC2-TH	2016.01.04	2017.01.03
Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

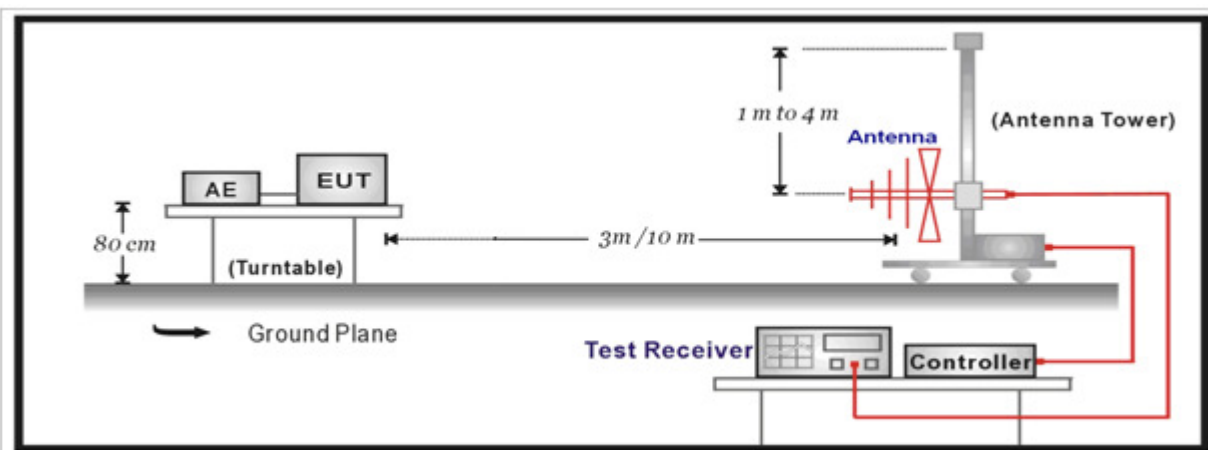
Radiated Emission(Above 1GHz) / AC-5					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2016.01.04	2017.01.03
Preamplifier	Miteq	NSP1800-25	1364185	2016.05.06	2017.05.05
Preamplifier	QuieTek	AP-040G	CHM-0906001	2016.05.06	2017.05.05
DRG Horn	ETS-Lindgren	3117	00123988	2016.01.22	2017.01.21
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2015.11.25	2016.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2016.03.02	2017.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2016.03.02	2017.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2016.03.02	2017.03.01
EMI Receiver	Agilent	N9038A	MY51210196	2015.06.10	2016.06.09
Temperature/Humidity Meter	Zhichen	ZC1-2	AC5-TH	2016.01.04	2017.01.03
Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

4.2. Test Setup

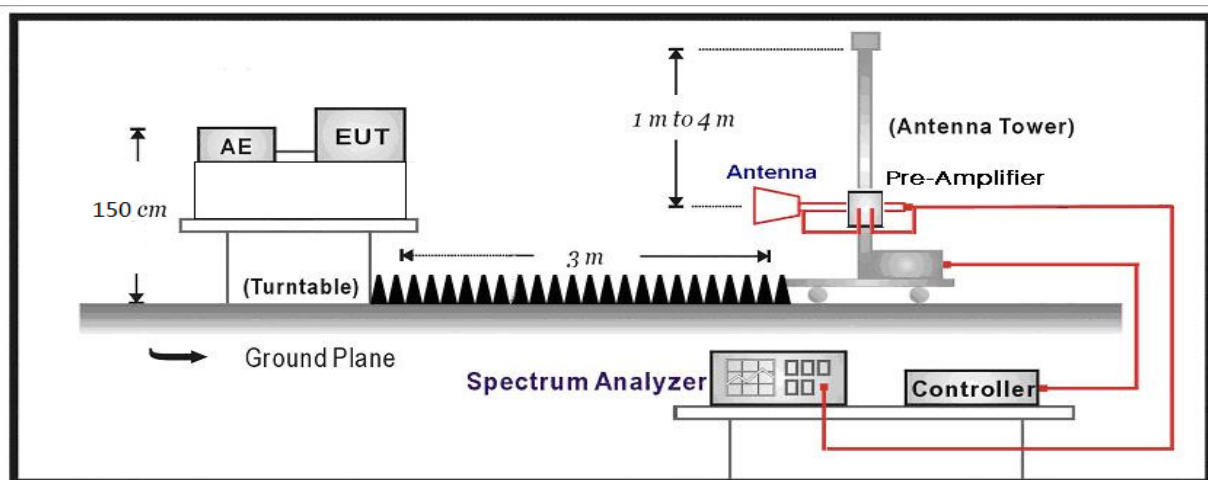
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limit

Restricted Bands of operation			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
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
8.81425 – 8.81475	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	
13.36 – 13.41			

Restricted Band Emissions Limit

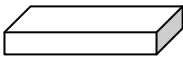
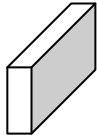
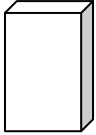
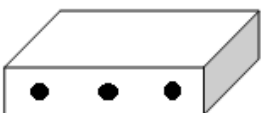
Frequency
(MHz)

Field strength
(

4.4. Test Procedure

Test Method						
	References Rule			Chapter	Description	
☐	ANSI C63.10			11.11	Emissions in non-restricted frequency bands	
	☐	ANSI C63.10		11.11.2	Reference level measurement	
	☐	ANSI C63.10		11.11.3	Emission level measurement	
☒	ANSI C63.10			11.12	Emissions in restricted frequency bands	
	☒	ANSI C63.10		11.12.1	Radiated emission measurements	
	☒	ANSI C63.10		11.12.2.7	Radiated spurious emission test	
		☒	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz	
		☒	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz	
		☒	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz	
	☒	ANSI C63.10		11.12.2	Antenna-port conducted measurements	
		☒	ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure	
		☒	ANSI C63.10	11.12.2.4	Peak power measurement procedure	
		☒	ANSI C63.10	11.12.2.5	Average power measurement procedures	
			☐	ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
			☐	ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
			☒	ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

4.5. EUT test Axis definition

Item	Emissions in non-restricted frequency bands			
Device Category	☐	Fixed position use		
	☒	Mobile position use		
Test mode	Mode 1			
Test method	☒	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☒	Worst Axis ☐	Worst Axis ☐
	☐	Conducted		
	☐	Chain 0		
				
	☐	Chain 0	Chain 1	
				
		Worst Chain ☐	Worst Chain ☐	
	☐	Chain 0	Chain 1	Chain 2
				
	Worst Chain ☐	Worst Chain ☐	Worst Chain ☐	

4.6. Test Result

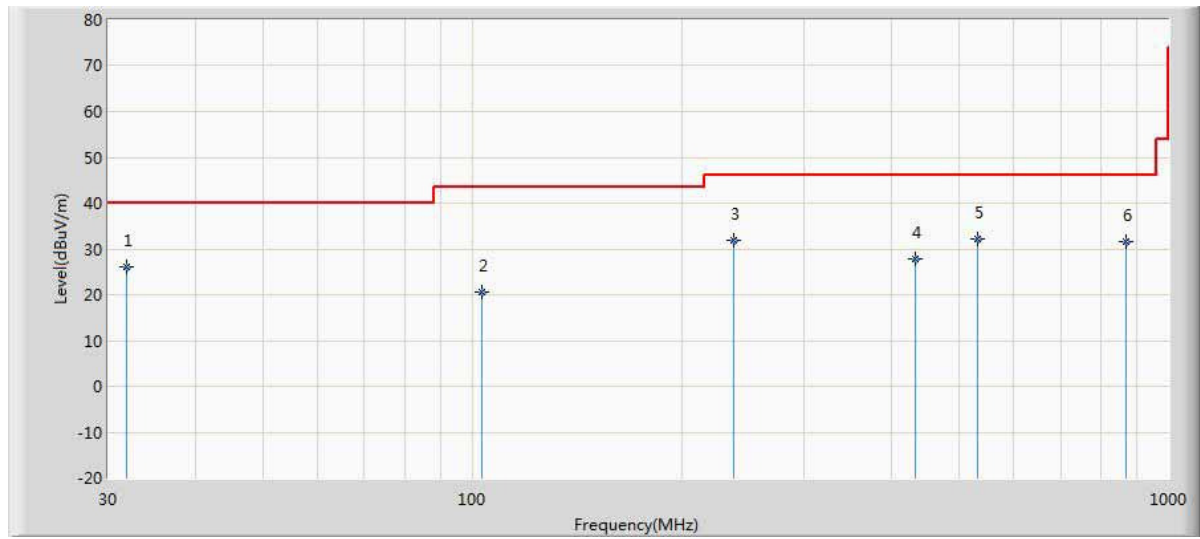
Product Name	:	BLE 256KB Module with Bluetooth 4.2 Radio	Power	:	AC 120V/60Hz
Test Mode	:	Mode 1	Test Site	:	AC-5

Chain	CH	Antenna	Frequency (MHz)	Measure Level (dB)
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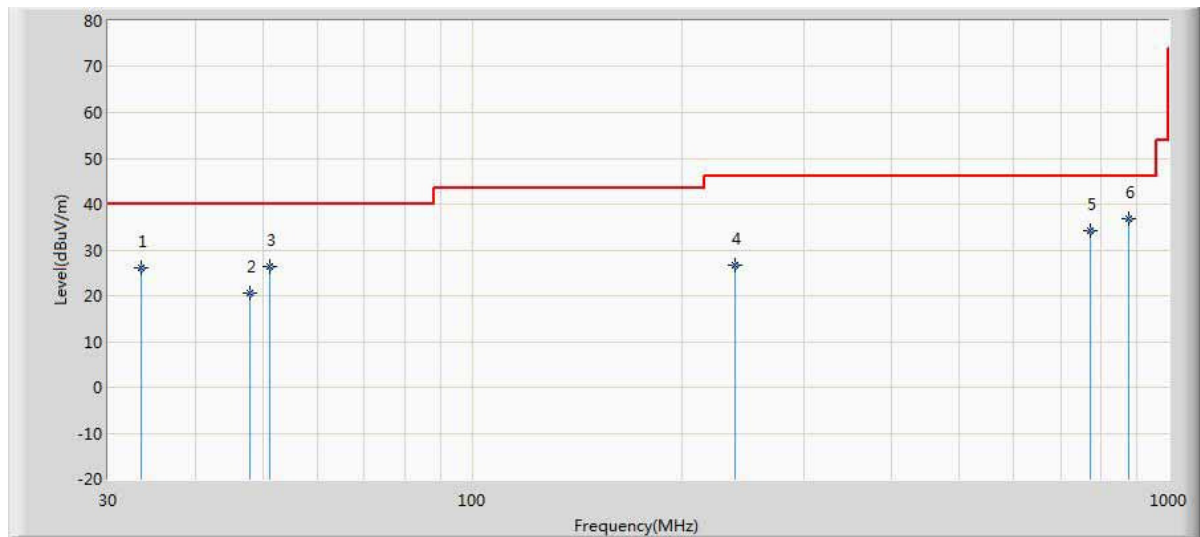
The worst case of Radiated Emission below 1GHz:

Chain	CH	Antenna	Frequency (MHz)	Reading Level (dB

Polarity: Horizontal



Polarity: Vertical



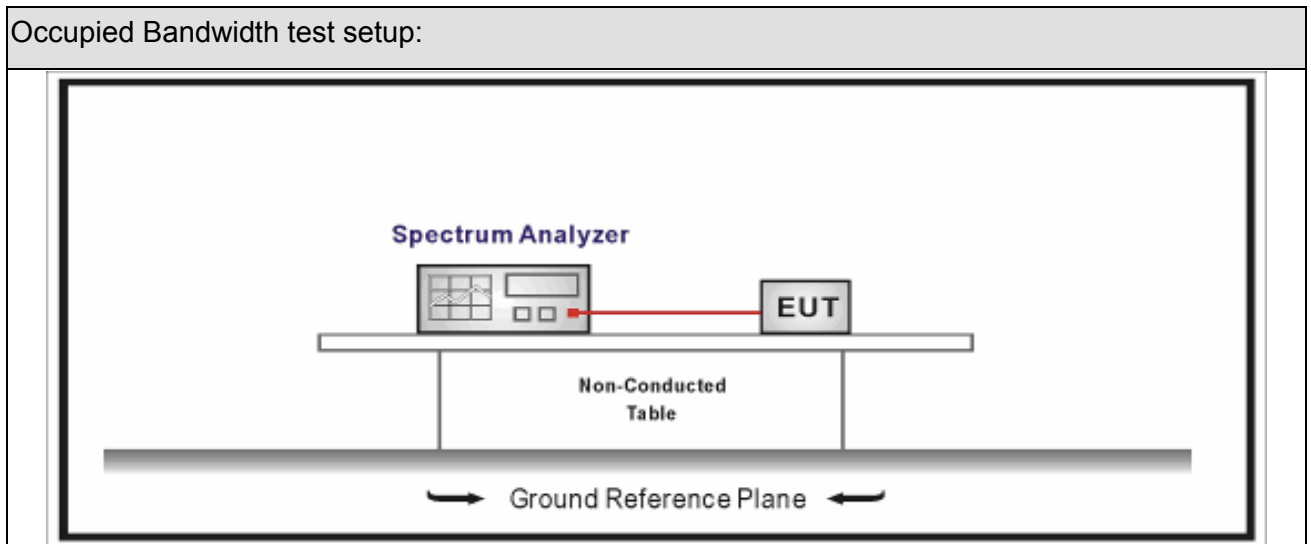
5. Emissions in non-restricted frequency bands

5.1. Test Equipment

Occupied Bandwidth / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2016.03.11	2017.03.10
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2016.04.10	2017.04.10

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

5.2. Test Setup



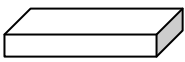
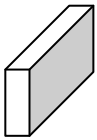
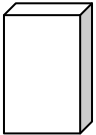
5.3. Limit

Un-Restricted Band Emissions Limit	
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30c(Note1)
RF Output power(PK detector)	20c(Note2)
Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc). Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).	

5.4. Test Procedure

Test Method					
	References Rule			Chapter	Description
☒	ANSI C63.10			11.11	Emissions in non-restricted frequency bands
	☒	ANSI C63.10		11.11.2	Reference level measurement
	☒	ANSI C63.10		11.11.3	Emission level measurement
☐	ANSI C63.10			11.12	Emissions in restricted frequency bands
	☐	ANSI C63.10		11.12.1	Radiated emission measurements
	☐	ANSI C63.10		11.12.2.7	Radiated spurious emission test
☒	ANSI C63.10			6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
☒	ANSI C63.10			6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
☒	ANSI C63.10			6.6	Radiated emissions from unlicensed wireless devices above 1 GHz
	☒	ANSI C63.10		11.12.2	Antenna-port conducted measurements
		☐	ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure
		☒	ANSI C63.10	11.12.2.4	Peak power measurement procedure
		☐	ANSI C63.10	11.12.2.5	Average power measurement procedures
		☐	ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
		☐	ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
		☐	ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

5.5. EUT test Axis definition

Item	Emissions in non-restricted frequency bands			
Device Category	☐	Fixed position use		
	☒	Mobile position use		
Test mode	Mode 1			
Test method	☐	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☐	Worst Axis ☐	Worst Axis ☐
	☒	Conducted		
	☒	Chain 0		
				
	☐	Chain 0	Chain 1	
				
		Worst Chain ☐	Worst Chain ☐	
	☐	Chain 0	Chain 1	Chain 2
				
	Worst Chain ☐	Worst Chain ☐	Worst Chain ☐	

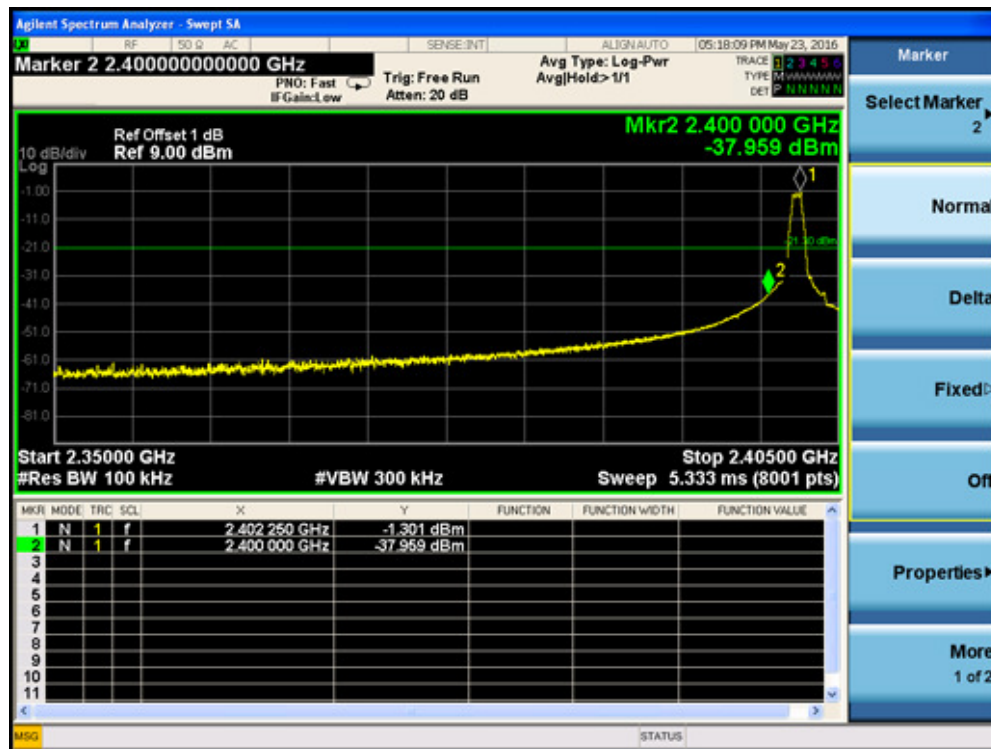
5.6. Test Result

Product Name	: BLE 256KB Module with Bluetooth 4.2 Radio	Test Power	: AC 120V/60Hz
Test Site	: TR8		

Mode	Channel	Test Frequency (MHz)	In-Band PSD[a] (dBm/100kHz)	Frequency (MHz)	Out-Band PSD[b] (dBm/100kHz)	[a]-[b] (dB)	Limit (dB)	Result
1	00	2402	-1.301	2400.00	-37.959	36.658	>20	Pass
1	39	2480	1.494	2500	-56.940	55.446	>20	Pass

Note: The worst case of Emissions in non-restricted frequency bands as below:

Mode 1 CH39 (2480MHz)



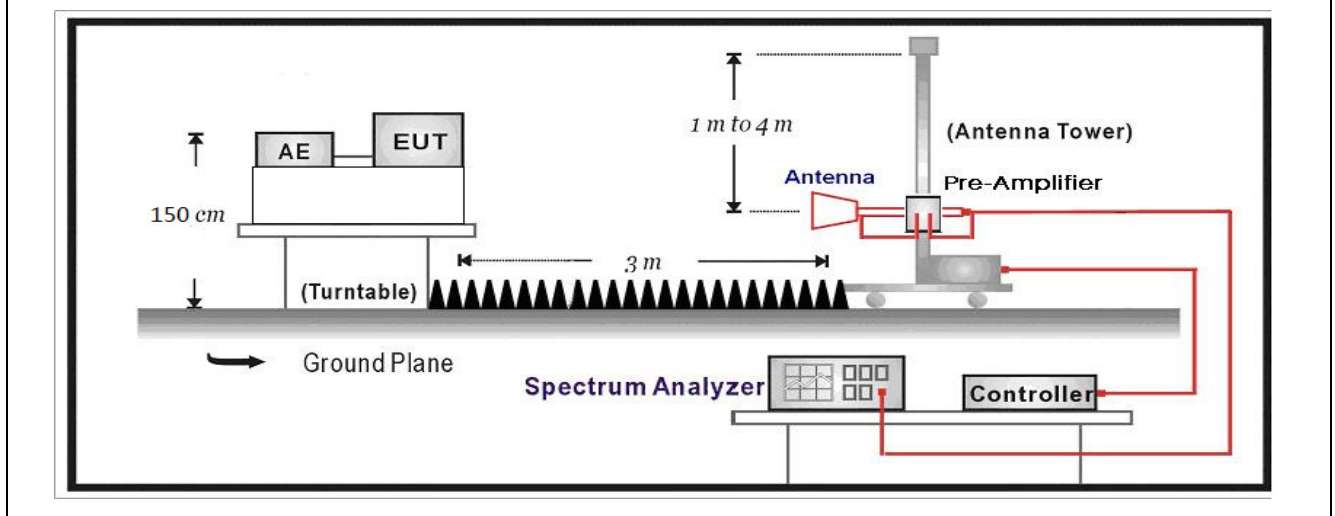
6. Radiated Emission Band Edge

6.1. Test Equipment

Radiated Emission(Above 1GHz) / AC-5					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2016.01.04	2017.01.03
Preamplifier	Miteq	NSP1800-25	1364185	2016.05.06	2017.05.05
Preamplifier	Quietek	AP-040G	CHM-0906001	2016.05.06	2017.05.05
DRG Horn	ETS-Lindgren	3117	00123988	2016.01.22	2017.01.21
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2015.11.25	2016.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2016.03.02	2017.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2016.03.02	2017.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2016.03.02	2017.03.01
EMI Receiver	Agilent	N9038A	MY51210196	2015.06.10	2016.06.09
Temperature/Humidity Meter	Zhichen	ZC1-2	AC5-TH	2016.01.04	2017.01.03
Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

6.2. Test Setup

Above 1GHz Test Setup:



6.3. Limit

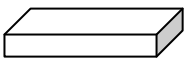
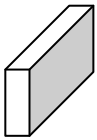
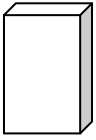
Band edge Limit

Frequency bands (MHz)	Detector	Limit (dB)
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6.4. Test Procedure

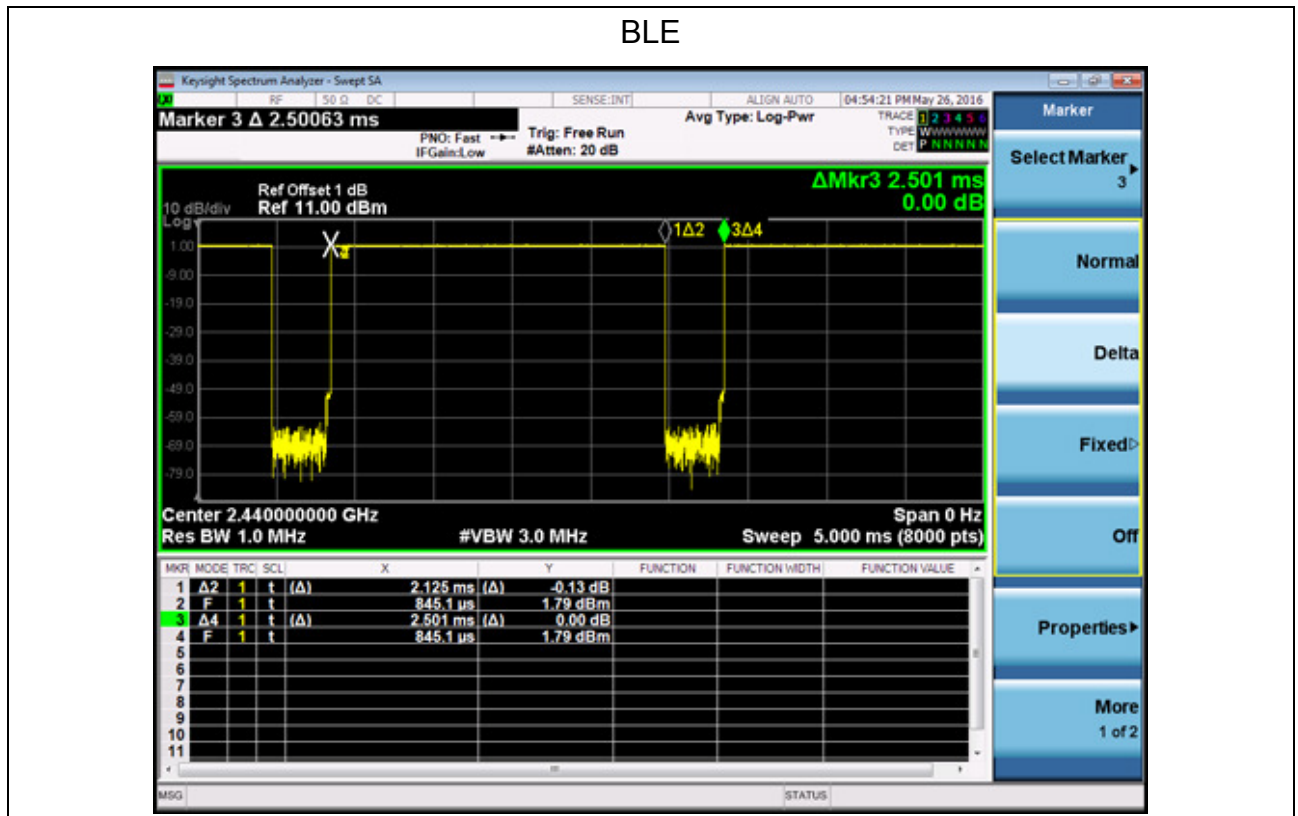
Test Method				
	References Rule		Chapter	Description
☒	ANSI C63.10		6.10	Band-edge testing
	☒	ANSI C63.10	6.10.5	Restricted-band band-edge measurements
	☐	ANSI C63.10	6.10.6	Marker-delta method
☒	ANSI C63.10		11.12	Emissions in restricted frequency bands
	☒	ANSI C63.10	11.12.1	Radiated emission measurements
	☒	ANSI C63.10	11.12.2.7	Radiated spurious emission test
☐	ANSI C63.10		6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
☐	ANSI C63.10		6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
☒	ANSI C63.10		6.6	Radiated emissions from unlicensed wireless devices above 1 GHz
	☐	ANSI C63.10	11.12.2	Antenna-port conducted measurements
	☐	ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure
		ANSI C63.10	11.12.2.4	Peak power measurement procedure
		ANSI C63.10	11.12.2.5	Average power measurement procedures
	☐	ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
		ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
		ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

6.5. EUT test definition

Item	Emissions in non-restricted frequency bands			
Device Category	☐	Fixed position use		
	☒	Mobile position use		
Test mode	Mode 1			
Test method	☒	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☒	Worst Axis ☐	Worst Axis ☐
	☐	Conducted		
	☐	Chain 0		
				
	☐	Chain 0	Chain 1	
				
	☐	Chain 0	Chain 1	Chain 2
				

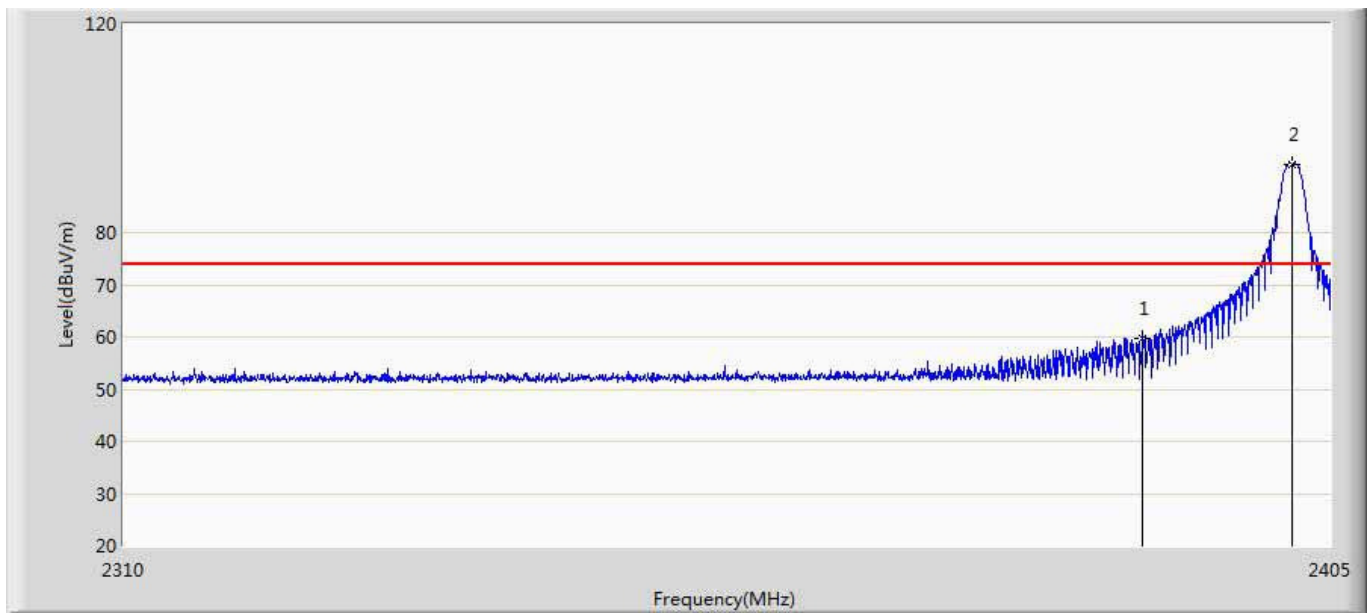
6.6. Duty Cycle

Test Mode	Tx On (ms)	Tx Off (ms)	Reduced VBW (kHz)	Tx On + Tx Off (ms)	Duty Cycle
BLE	2.125	0.376	0.47	2.501	85.0%



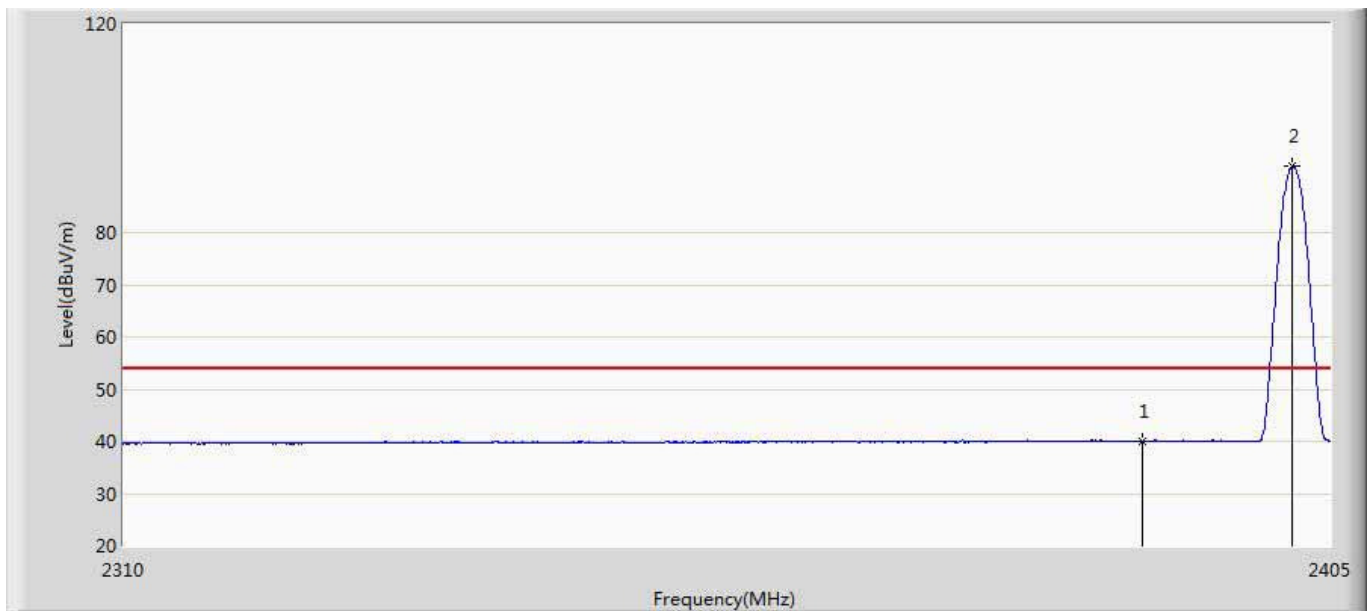
6.7 Test Result

Engineer: Scott	
Site: AC5	Time: 2016/05/24 - 10:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT:BLE 256KB Module with Bluetooth 4.2 Radio	Power: AC 120V/60Hz
Note: Mode 1:Transmit at CH2402Mhz by BLE	



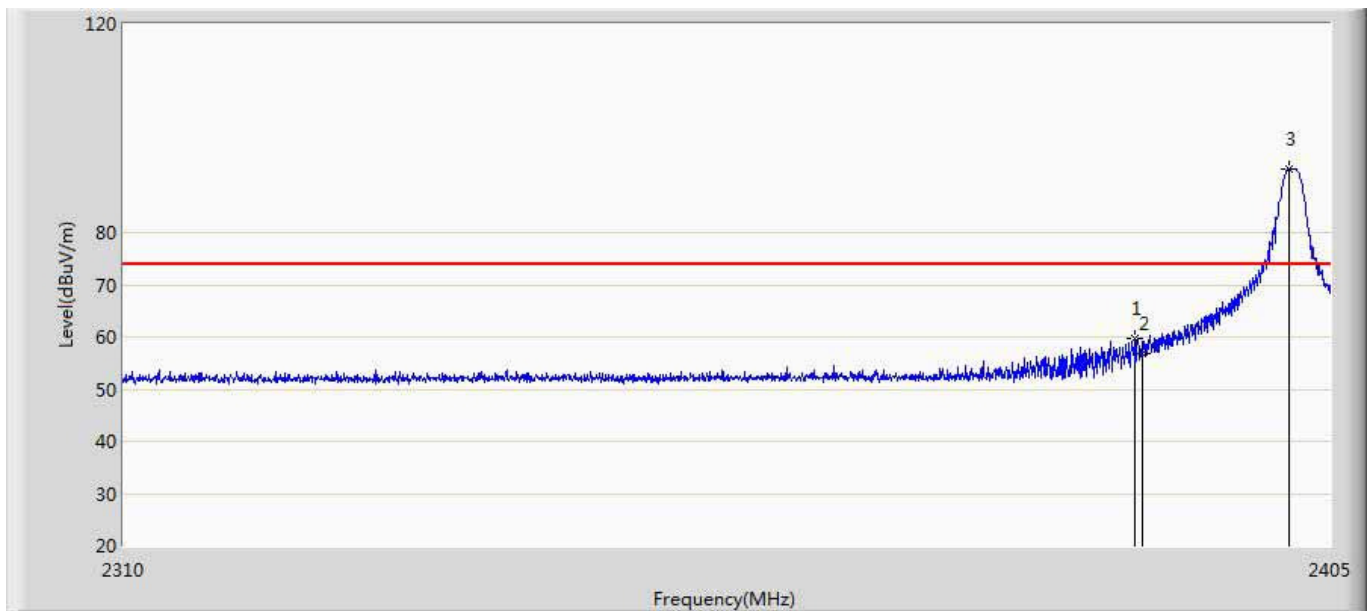
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	59.780	22.425	-14.220	74.000	37.355	PK
2	*	2401.913	93.142	55.800	N/A	N/A	37.342	PK

Engineer: Scott	
Site: AC5	Time: 2016/05/24 - 10:27
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT:BLE 256KB Module with Bluetooth 4.2 Radio	Power: AC 120V/60Hz
Note: Mode 1:Transmit at CH2402Mhz by BLE	



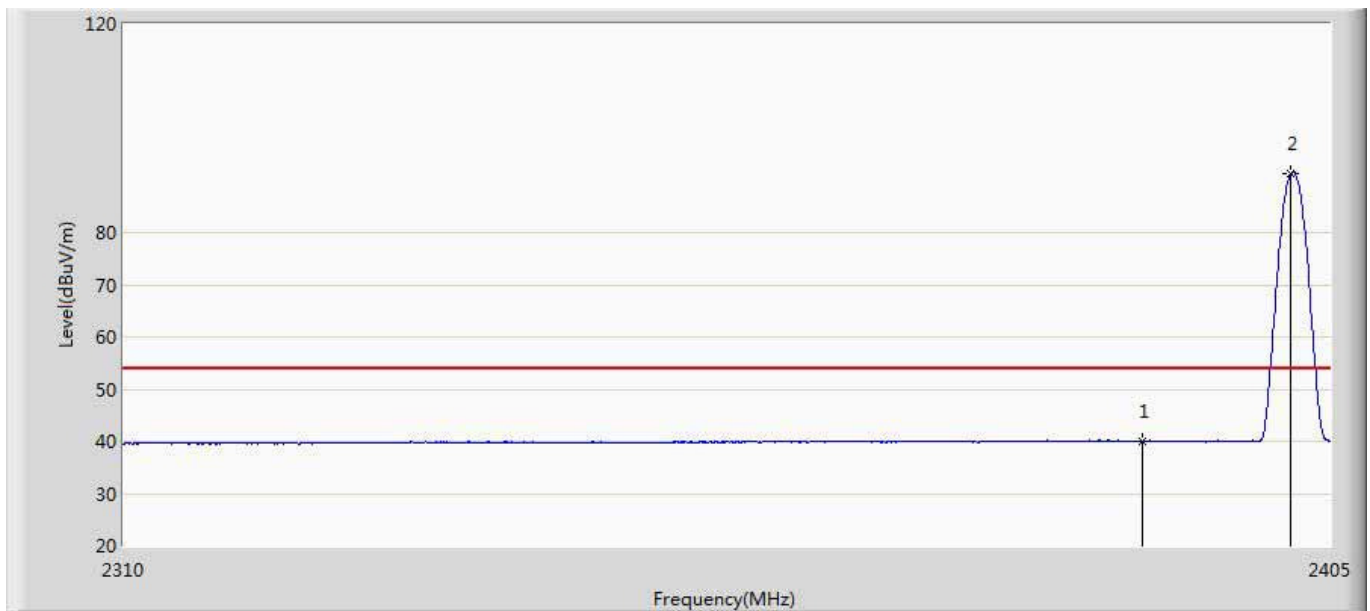
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	40.074	2.719	-13.926	54.000	37.355	AV
2	*	2402.008	92.842	55.500	N/A	N/A	37.341	AV

Engineer: Scott	
Site: AC5	Time: 2016/05/24 - 10:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT:BLE 256KB Module with Bluetooth 4.2 Radio	Power: AC 120V/60Hz
Note: Mode 1:Transmit at CH2402Mhz by BLE	



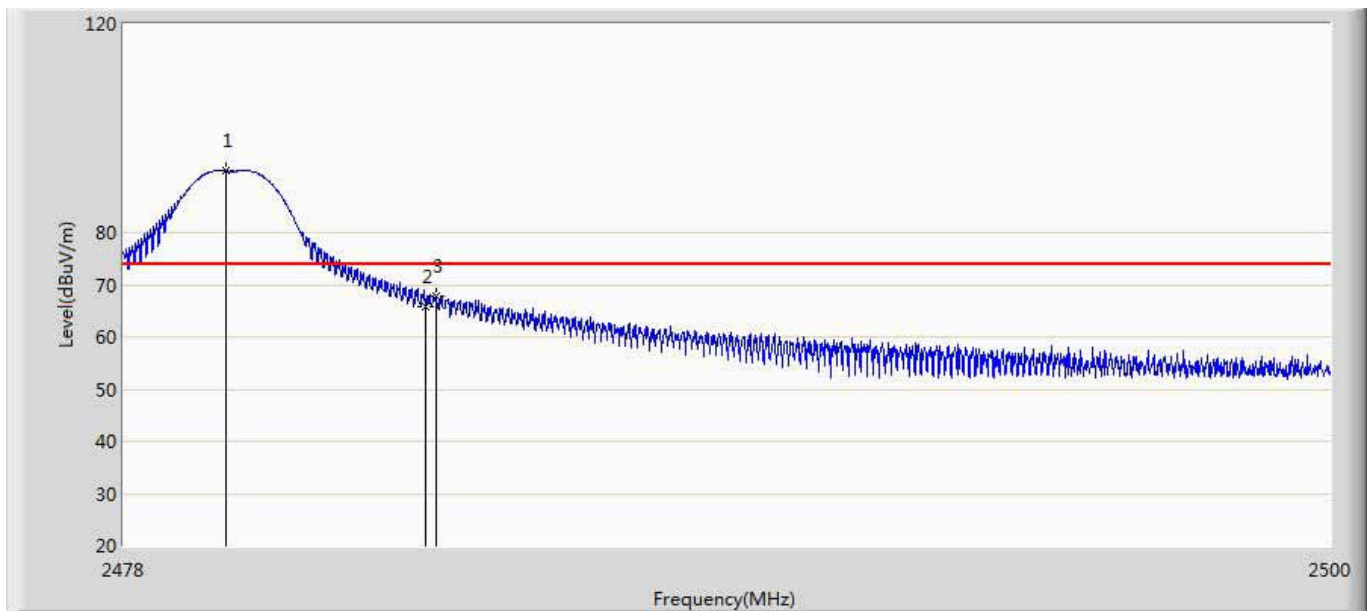
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2389.325	59.759	22.403	-14.241	74.000	37.355	PK
2		2390.000	56.890	19.535	-17.110	74.000	37.355	PK
3	*	2401.722	92.213	54.871	N/A	N/A	37.342	PK

Engineer: Scott	
Site: AC5	Time: 2016/05/24 - 10:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT:BLE 256KB Module with Bluetooth 4.2 Radio	Power: AC 120V/60Hz
Note: Mode 1:Transmit at CH2402Mhz by BLE	



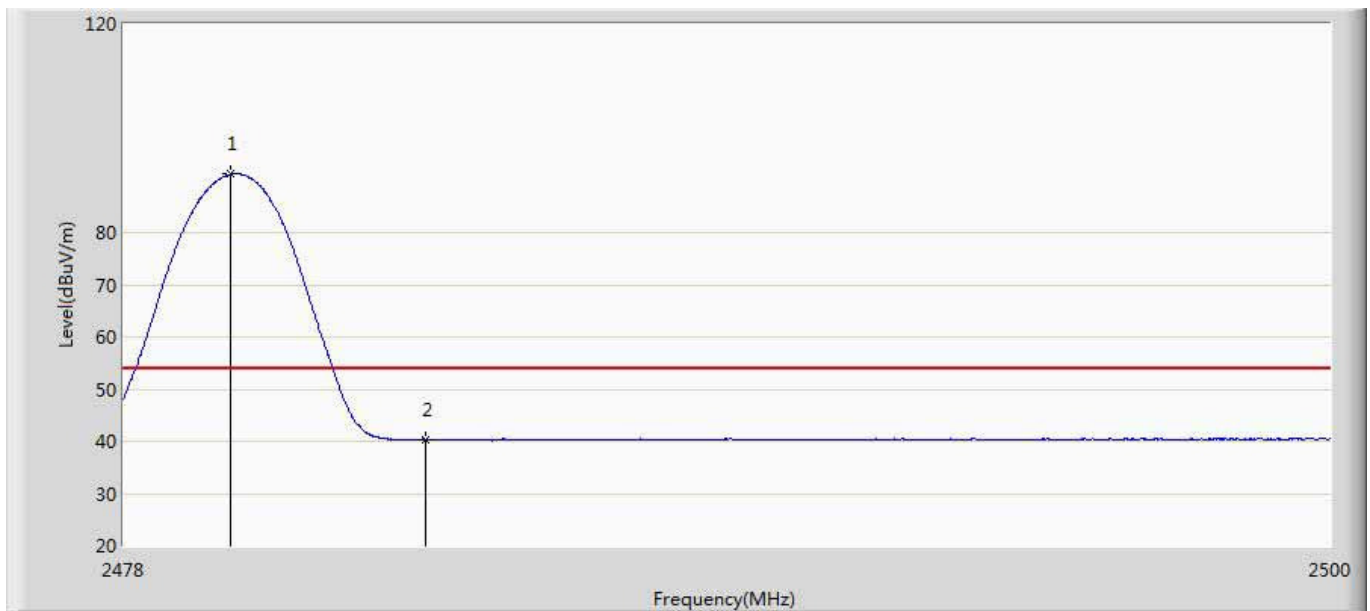
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	40.032	2.677	-13.968	54.000	37.355	AV
2	*	2401.865	91.342	54.000	N/A	N/A	37.342	AV

Engineer: Scott	
Site: AC5	Time: 2016/05/24 - 10:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT:BLE 256KB Module with Bluetooth 4.2 Radio	Power: AC 120V/60Hz
Note: Mode 1:Transmit at CH2480Mhz by BLE	



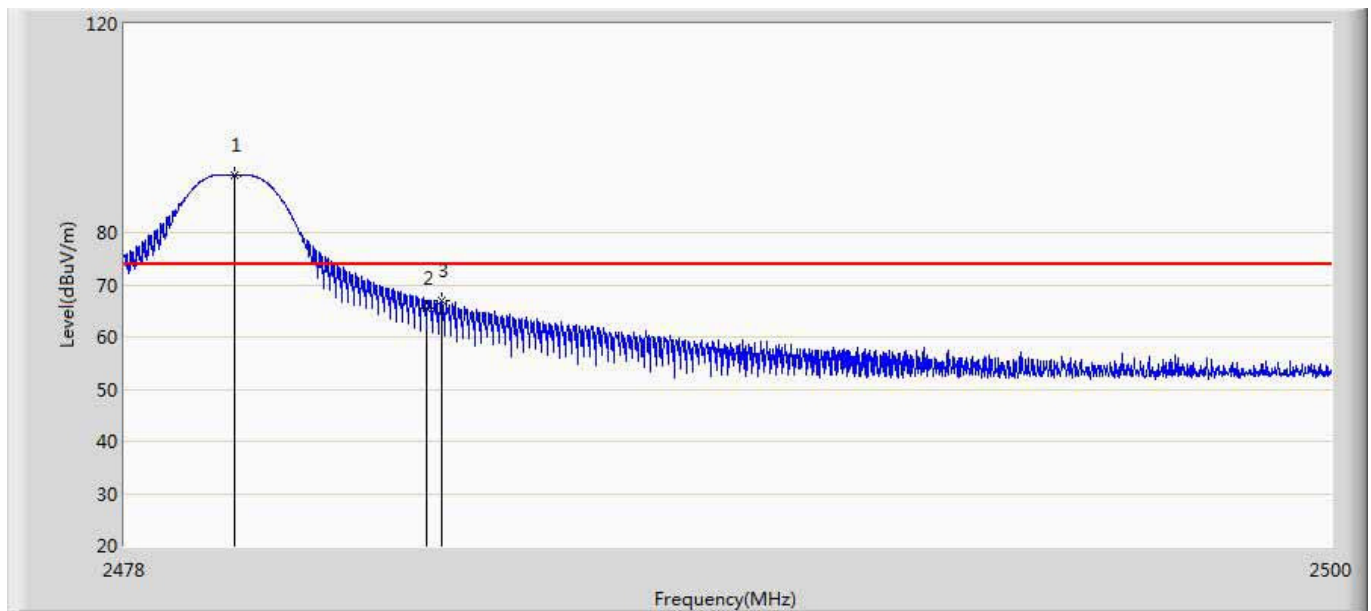
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.870	91.771	54.286	N/A	N/A	37.485	PK
2		2483.500	65.915	28.404	-8.085	74.000	37.511	PK
3		2483.687	67.901	30.388	-6.099	74.000	37.513	PK

Engineer: Scott	
Site: AC5	Time: 2016/05/24 - 10:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT:BLE 256KB Module with Bluetooth 4.2 Radio	Power: AC 120V/60Hz
Note: Mode 1:Transmit at CH2480Mhz by BLE	



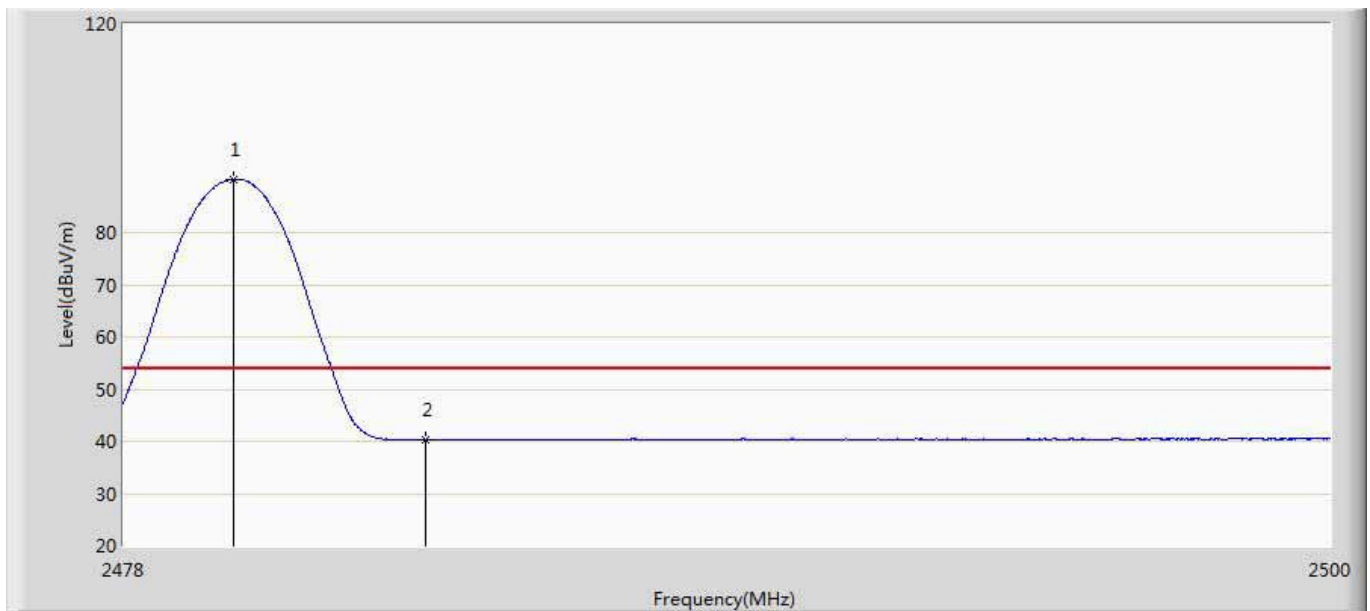
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.947	91.166	53.680	N/A	N/A	37.486	AV
2		2483.500	40.305	2.794	-13.695	54.000	37.511	AV

Engineer: Scott	
Site: AC5	Time: 2016/05/24 - 10:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT:BLE 256KB Module with Bluetooth 4.2 Radio	Power: AC 120V/60Hz
Note: Mode 1:Transmit at CH2480Mhz by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.002	90.994	53.508	N/A	N/A	37.486	PK
2		2483.500	65.416	27.905	-8.584	74.000	37.511	PK
3		2483.764	66.951	29.438	-7.049	74.000	37.514	PK

Engineer: Scott	
Site: AC5	Time: 2016/05/24 - 10:41
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT:BLE 256KB Module with Bluetooth 4.2 Radio	Power: AC 120V/60Hz
Note: Mode 1:Transmit at CH2480Mhz by BLE	



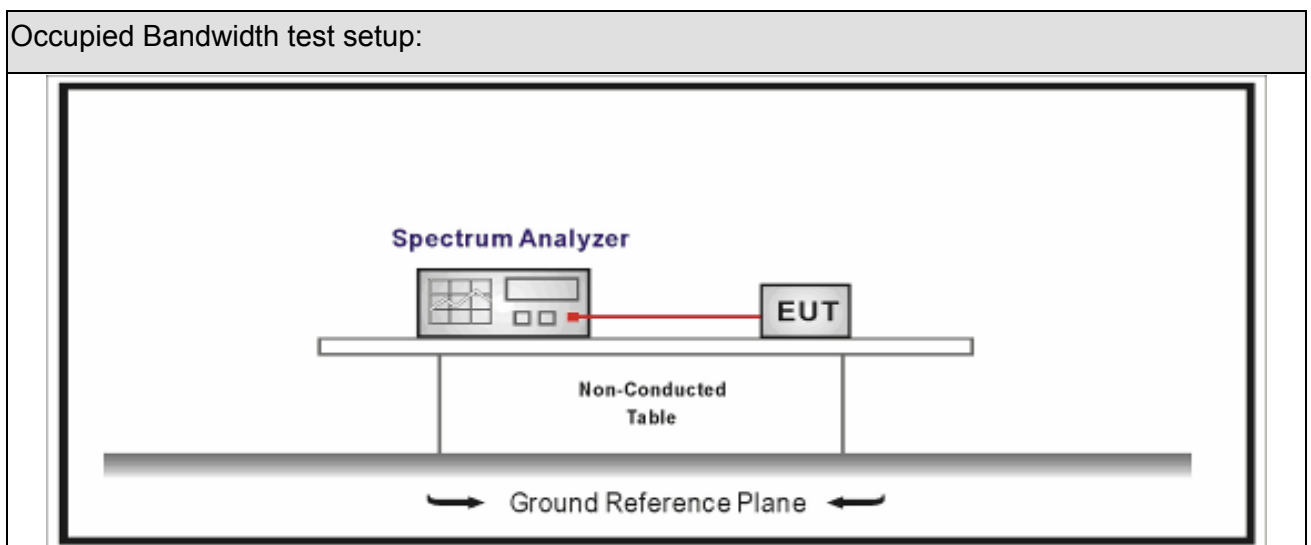
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.013	90.265	52.779	N/A	N/A	37.486	AV
2		2483.500	40.176	2.665	-13.824	54.000	37.511	AV

7. Occupied Bandwidth

7.1. Test Equipment

Occupied Bandwidth / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2016.03.11	2017.03.10
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2016.04.10	2017.04.10
Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

7.2. Test Setup



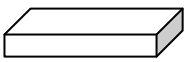
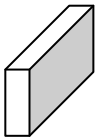
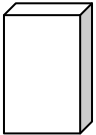
7.3. Limit

Occupied Bandwidth
Systems using digital modulation techniques operate in the 2400-2483.5 MHz. The minimum 6 dB bandwidth shall be at least 500 kHz

7.4. Test Procedure

Test Method				
	Reference Rule		Chapter	Description
☒	ANSI C63.10		11.8	DTS bandwidth
	☐	ANSI C63.10	11.8.1	Option 1
	☒	ANSI C63.10	11.8.2	Option 2

7.5. EUT test definition

Item	Occupied Bandwidth			
Device Category	☐	Fixed position use		
	☒	Mobile position use		
Test mode	Mode 1			
Test method	☐	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☐	Worst Axis ☐	Worst Axis ☐
	☒	Conducted		
	☒	Chain 0		
				
	☐	Chain 0	Chain 1	
				
	☐	Chain 0	Chain 1	Chain 2
				

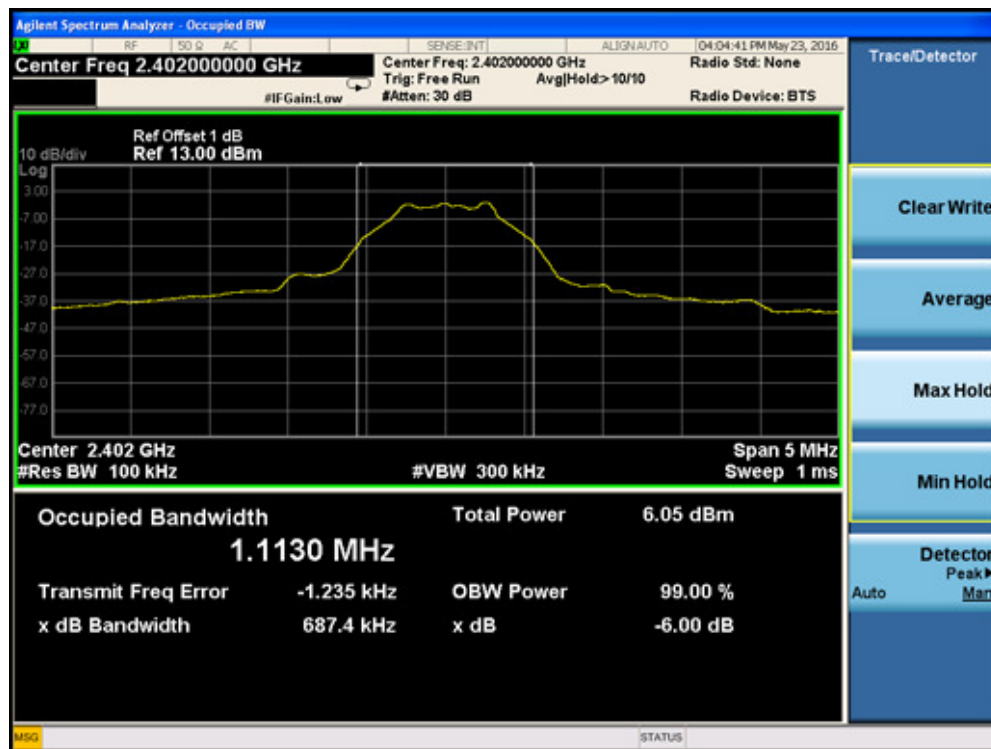
7.6. Test Result

Product Name	:	BLE 256KB Module with Bluetooth 4.2 Radio	Test Power	:	AC 120V/60Hz
Test Site	:	TR-8			

Mode	CH.	Test Freq. (MHz)	99% Occupied Bandwidth (kHz)	6dB Occupied Bandwidth (kHz)	Limit (kHz)	Result
1	00	2402	1113.0	687.4	>500	Pass
1	19	2440	1110.1	695.0	>500	Pass
1	39	2480	1107.2	692.2	>500	Pass

Note : The worst case of Occupied Bandwidth as below:

Mode 1 CH00 (2402MHz)



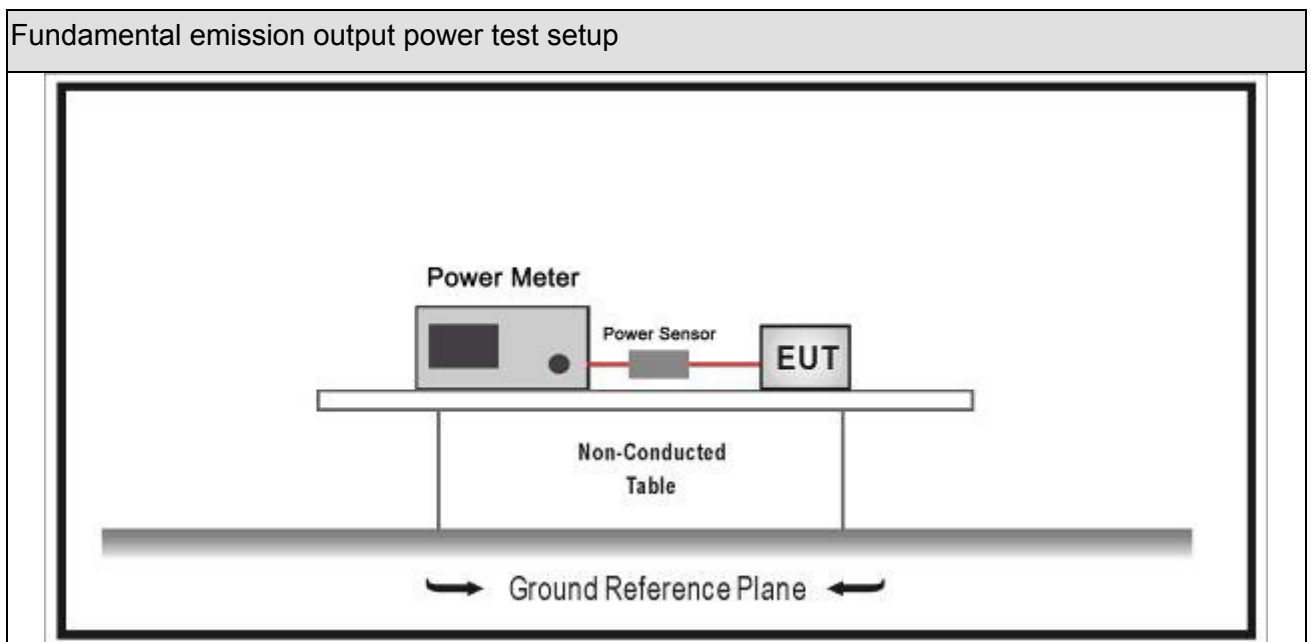
8. Fundamental emission output power

8.1. Test Equipment

Fundamental emission output power/ TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2016.01.04	2017.01.03
Spectrum Analyzer	Agilent	N9010A	MY48030494	2016.03.11	2017.03.10
Wideband Peak Power Meter	Anritsu	ML2495A	0905006	2015.11.11	2016.11.10
Power Sensor	Anritsu	MA2411B	0846014	2015.11.11	2016.11.10
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2016.04.10	2017.04.09

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

8.2. Test Setup



8.3. Limit

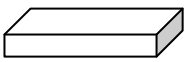
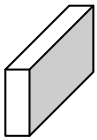
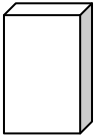
Fundamental emission output power Limit

☒ GTX

8.4. Test Procedure

Fundamental emission output power Test Method				
	References Rule		Chapter	Description
☒	ANSI C63.10		11.9	Fundamental emission output power
	☒	ANSI C63.10	11.9.1	Maximum peak conducted output power
		☐ ANSI C63.10	11.9.1.1	RBW $\geq$ DTS bandwidth
		☐ ANSI C63.10	11.9.1.2	Integrated band power method
		☒ ANSI C63.10	11.9.1.3	PKPM1 Peak power meter method
	☐	ANSI C63.10	11.9.2	Maximum conducted (average) output power
		☐ ANSI C63.10	11.9.2.2	Measurement using a spectrum analyzer (SA)
	☐	ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle

8.5. EUT test definition

Item	Fundamental emission output power			
Device Category	☐	Fixed position use		
	☒	Mobile position use		
Test mode	Mode 1			
Test method	☐	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☐	Worst Axis ☐	Worst Axis ☐
	☒	Conducted		
	☒	Chain 0		
				
	☐	Chain 0	Chain 1	
				
	☐	Chain 0	Chain 1	Chain 2
				

8.6. Test Result

Product Name	:	BLE 256KB Module with Bluetooth 4.2 Radio	Test Power	:	AC 120V/60Hz
Test Site	:	TR8			

Mode	Channel	Test Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
1	00	2402	-0.42	30	Pass
1	19	2440	2.44	30	Pass
1	39	2480	2.22	30	Pass

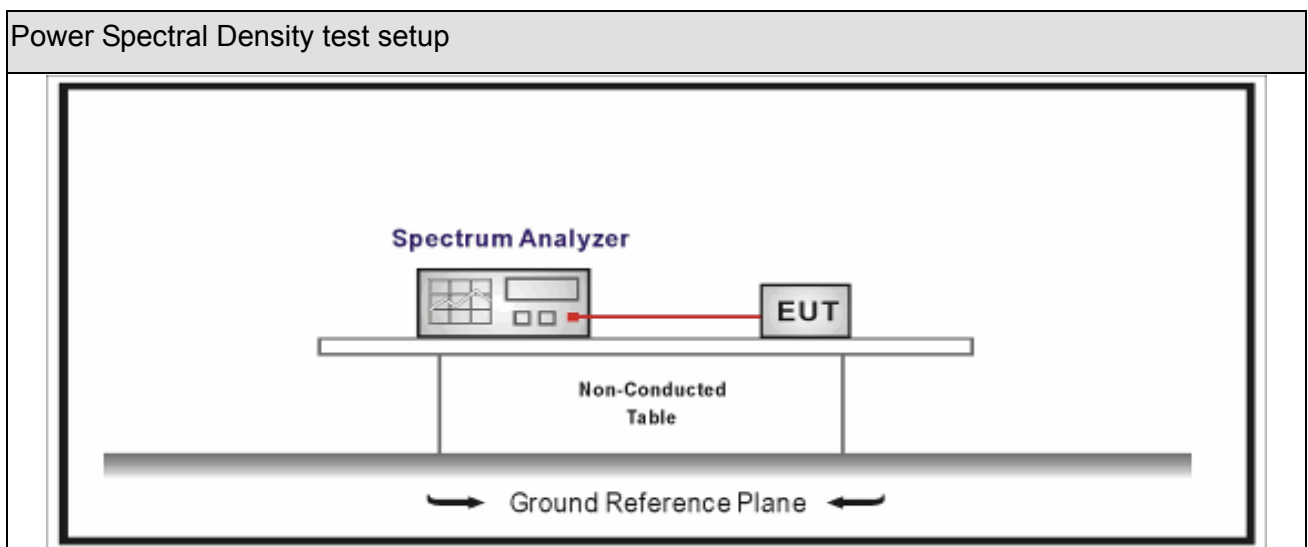
9. Power Spectral Density

9.1. Test Equipment

Power Spectral Density / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2016.03.11	2017.03.10
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2016.04.10	2017.04.10

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

9.2. Test Setup



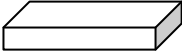
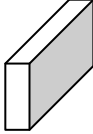
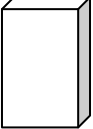
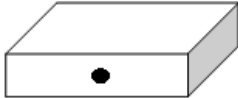
9.3. Limit

Power Spectral Density Limit

Power Spectral Density

Power Spectral Density Test Method				
	References Rule		Chapter	Description
☒	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	☒	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	☐	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle

9.5. EUT test definition

Item	Power Spectral Density Test Method			
Device Category	☐	Fixed position use		
	☒	Mobile position use		
Test mode	Mode 1			
Test method	☐	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☐	Worst Axis ☐	Worst Axis ☐
	☒	Conducted		
	☒	Chain 0		
				
	☐	Chain 0	Chain 1	
				
	☐	Chain 0	Chain 1	Chain 2
				

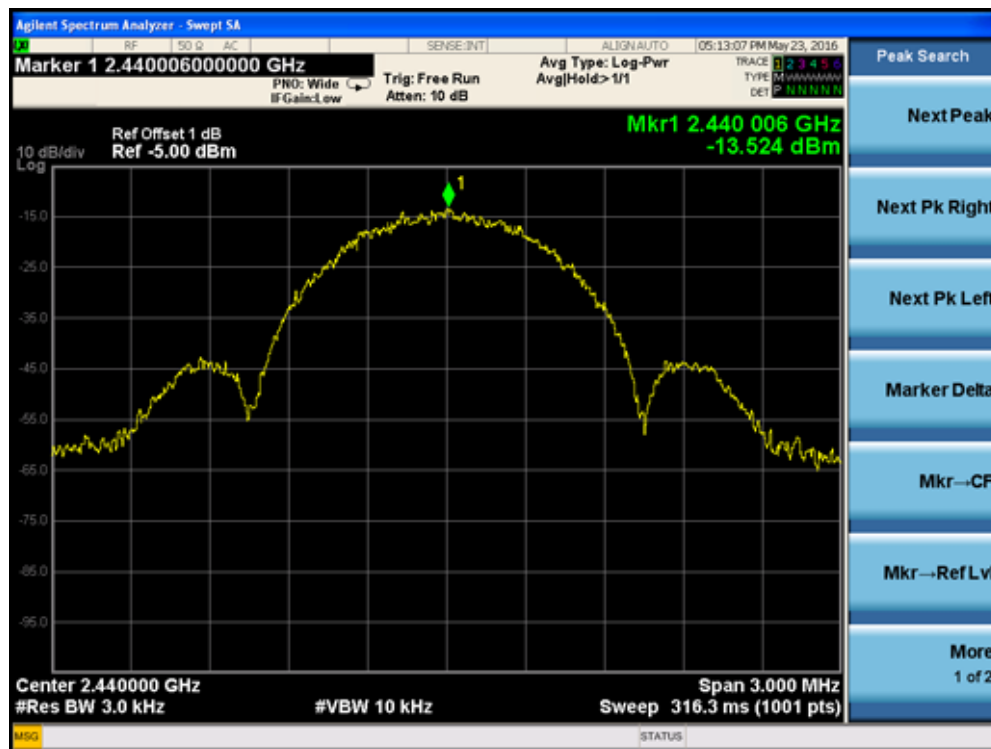
9.6. Test Result

Product Name	:	BLE 256KB Module with Bluetooth 4.2 Radio	Test Power	:	AC 120V/60Hz
Test Site	:	TR8			

Mode	Channel	Test Frequency (MHz)	Measurement PSD (dBm/3kHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
			Ant 0			
1	00	2402	-16.647	-16.647	8	Pass
1	19	2440	-13.524	-13.524	8	Pass
1	39	2480	-14.260	-14.260	8	Pass

Note : The worst case of Power Spectral Density as below:

Mode 1 CH19(2440MHz)



The End