

FCC

RF Test Report

Product Type : BBT TALKIN

Applicant : OMNISPECIAL TECHNOLOGY CO., LIMITED

Address : A1 , 11/F., Front Block, Hang Lok Building, 130 Wing Lok St.,
Sheung Wan, HONG KONG

Trade Name : Bb TALKIN'

Model Number : BBT-A001

Test Specification : FCC 47 CFR PART 15 SUBPART C: Oct., 2014
ANSI C63.10:2013

Receive Date : Jul. 29, 2015

Test Period : Jul. 30 ~ Aug. 04, 2015

Issue Date : Oct. 02, 2015

Issue by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade City,
Taoyuan County 334, Taiwan R.O.C.
Tel : +886-3-2710188 / Fax : +886-3-2710190



Taiwan Accreditation Foundation accreditation number: 1330

Note: This report shall not be reproduced except in full, without the written approval of A Test Lab Techno Corp. This document may be altered or revised by A Test Lab Techno Corp. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF, or any government agencies. The test results in the report only apply to the tested sample.

Revision History

Rev.	Issue Date	Revisions	Revised By
00	Sep. 10, 2015	Initial Issue	
01	Oct. 02, 2015	Revise Report Information	Janice Huang

Verification of Compliance

Issued Date: 10/02/2015

Product Type : BBT TALKIN
Applicant : OMNISPECIAL TECHNOLOGY CO., LIMITED
Address : A1 , 11/F., Front Block, Hang Lok Building, 130 Wing Lok St.,
Sheung Wan, HONG KONG
Trade Name : Bb TALKIN'
Model Number : BBT-A001
FCC ID : 2AFMY-BBTPRO
EUT Rated Voltage : DC 5V, 0.8 A
Test Voltage : 120 Vac / 60 Hz
Applicable Standard : FCC 47 CFR PART 15 SUBPART C: Oct., 2014
ANSI C63.10:2013

Test Result : Complied

Performing Lab. : A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade City,
Taoyuan County 334, Taiwan R.O.C.
Tel : +886-3-2710188 / Fax : +886-3-2710190
Taiwan Accreditation Foundation accreditation number: 1330
<http://www.atl-lab.com.tw/e-index.htm>



A Test Lab Techno Corp. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By

: Fly Lu

(Manager)

(Fly Lu)

Reviewed By

: Eric Ou Yang

(Testing Engineer)

(Eric Ou Yang)

TABLE OF CONTENTS

1	General Information	6
1.1.	Summary of Test Result	6
1.2.	Measurement Uncertainty	6
2	EUT Description	7
3	Test Methodology	8
3.1.	Mode of Operation	8
3.2.	EUT Exercise Software	8
3.3.	Configuration of Test System Details	9
3.4.	Test Site Environment	9
4	Maximum Conducted Output Power Measurement	10
4.1.	Limit.....	10
4.2.	Test Setup	10
4.3.	Test Instruments	10
4.4.	Test Procedure	10
4.5.	Test Result	11
5	Conducted Emission Measurement.....	12
5.1.	Limit.....	12
5.2.	Test Instruments	12
5.3.	Test Setup	12
5.4.	Test Procedure	13
5.5.	Test Result	14
6	Radiated Interference Measurement.....	16
6.1.	Limit.....	16
6.2.	Test Instruments	16
6.3.	Setup	17
6.4.	Test Procedure	19
6.5.	Test Result	20
7	20dB RF Bandwidth Measurement.....	24
7.1.	Limit.....	24
7.2.	Test Setup	24
7.3.	Test Instruments	24
7.4.	Test Procedure	25
7.5.	Test Result	26
7.6.	Test Graphs	27

8	Carrier Frequency Separation Measurement	29
8.1.	Limit.....	29
8.2.	Test Setup	29
8.3.	Test Instruments	29
8.4.	Test Procedure	30
8.5.	Test Result	31
8.6.	Test Graphs	32
9	Number of Hopping Measurement	34
9.1.	Limit.....	34
9.2.	Test Setup	34
9.3.	Test Instruments	34
9.4.	Test Procedure	34
9.5.	Test Result	35
9.6.	Test Graphs	36
10	Time of Occupancy (Dwell Time) Measurement	38
10.1.	Limit.....	38
10.2.	Test Setup	38
10.3.	Test Instruments	38
10.4.	Test Procedure	38
10.5.	Test Result	39
10.6.	Test Graphs	41
11	Out of Band Conducted Emissions Measurement	43
11.1.	Limit.....	43
11.2.	Test Setup	43
11.3.	Test Instruments	43
11.4.	Test Procedure	43
11.5.	Test Graphs	44
12	Band Edges Measurement	48
12.1.	Limit.....	48
12.2.	Test Setup	48
12.3.	Test Instruments	48
12.4.	Test Procedure	49
12.5.	Test Result	50
13	Antenna Measurement	54
13.1.	Limit.....	54
13.2.	Antenna Connector Construction	54

1 General Information

1.1. Summary of Test Result

FCC Standard	Item	Result	Remark
15.207	AC Power Conducted Emission	PASS	-----
15.203	Antenna Requirement	PASS	-----
15.247(b)(1)	Max. Output Power	PASS	-----
15.247(d)	Transmitter Radiated Emissions	PASS	-----
15.247(a)(1)	20dB RF Bandwidth	PASS	-----
15.247(a)(1)	Carrier Frequency Separation	PASS	-----
15.247(a)(1)(iii)	Number of Hopping	PASS	-----
15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	PASS	-----
15.247(d)	Out of Band Conducted Spurious Emission	PASS	-----
15.247(d)	Band Edge Measurement	PASS	-----

The test results of this report relate only to the tested sample(s) identified in this report. Manufacturer or whom it may concern should recognize the pass or fail of the test result.

1.2. Measurement Uncertainty

Test Item	Frequency Range		Uncertainty (dB)
Conducted Emission	9kHz ~ 30MHz		± 2.02
Radiated Emission	30MHz ~ 1000MHz	Horizontal	± 3.98
		Vertical	± 3.62
	1000MHz ~ 18000MHz	Horizontal	± 3.11
		Vertical	± 3.07
	18000MHz ~ 40000MHz	Horizontal	± 3.66
		Vertical	± 3.54

2 EUT Description

Product	BBT TALKIN				
Trade Name	Bb TALKIN'				
Model Number	BBT-A001				
Applicant	OMNISPECIAL TECHNOLOGY CO., LIMITED A1 , 11/F., Front Block, Hang Lok Building, 130 Wing Lok St., Sheung Wan, HONG KONG				
Manufacturer	OMNISPECIAL TECHNOLOGY CO., LIMITED A1 , 11/F., Front Block, Hang Lok Building, 130 Wing Lok St., Sheung Wan, HONG KONG				
FCC ID	2AFMY-BBTPRO				
Frequency Range	2402 ~ 2480 MHz				
Modulation Type	GFSK for 1Mbps				
	$\pi/4$ -DQPSK for 2Mbps				
	8DPSK for 3Mbps				
Antenna Type	Dipole antenna				
Antenna Gain	3.64 dBi				
RF Output Power (Conducted)	GFSK for 1Mbps	11.14	dBm /	0.013	W
	$\pi/4$ -DQPSK for 2Mbps	12.70	dBm /	0.019	W
	8DPSK for 3Mbps	12.76	dBm /	0.019	W

3 Test Methodology

3.1. Mode of Operation

Decision of Test ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode
Mode 1: Normal Operation Mode
Mode 2: GFSK Link Mode
Mode 3: $\pi/4$ -DQPSK Link Mode
Mode 4: 8DPSK Link Mode

Final-Test Mode
Mode 1: Normal Operation Mode
Mode 2: GFSK Link Mode
Mode 4: 8DPSK Link Mode

Description of Test Modes

Preliminary tests were performed in different modulation to find the worst case. The modulation has shown the worst-case in section 4.5. Investigation has been done on all the possible configurations for searching the worst cases.

Note: The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

Tested System Details

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

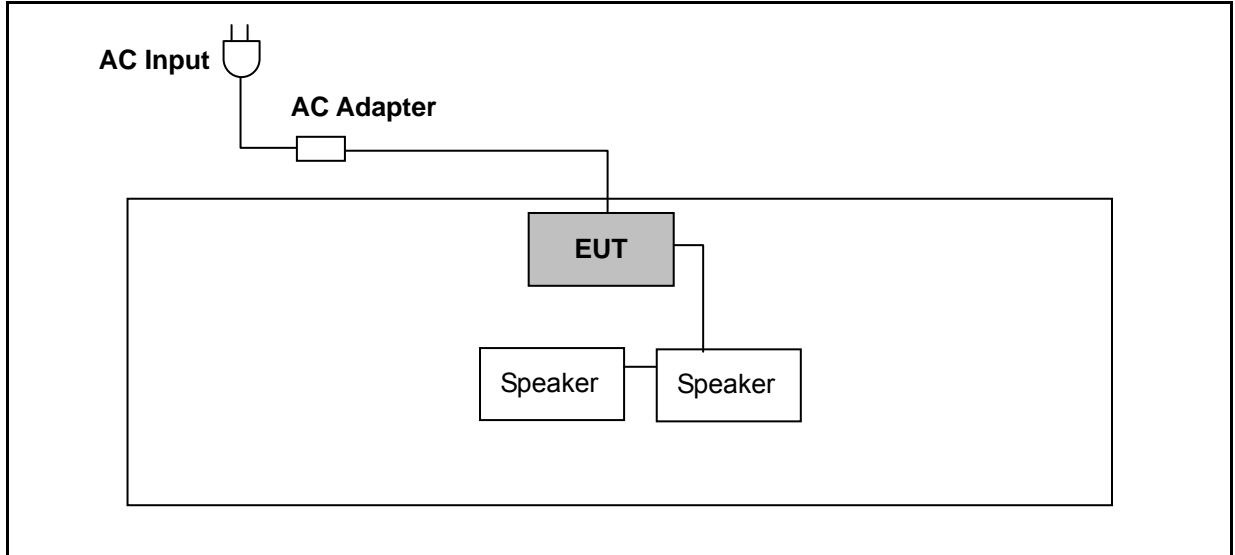
	Product	Manufacturer	Model Number	Serial Number	Power Cord
1.	Bluetooth Tester	R & S	CBT	100350	NA

3.2. EUT Exercise Software

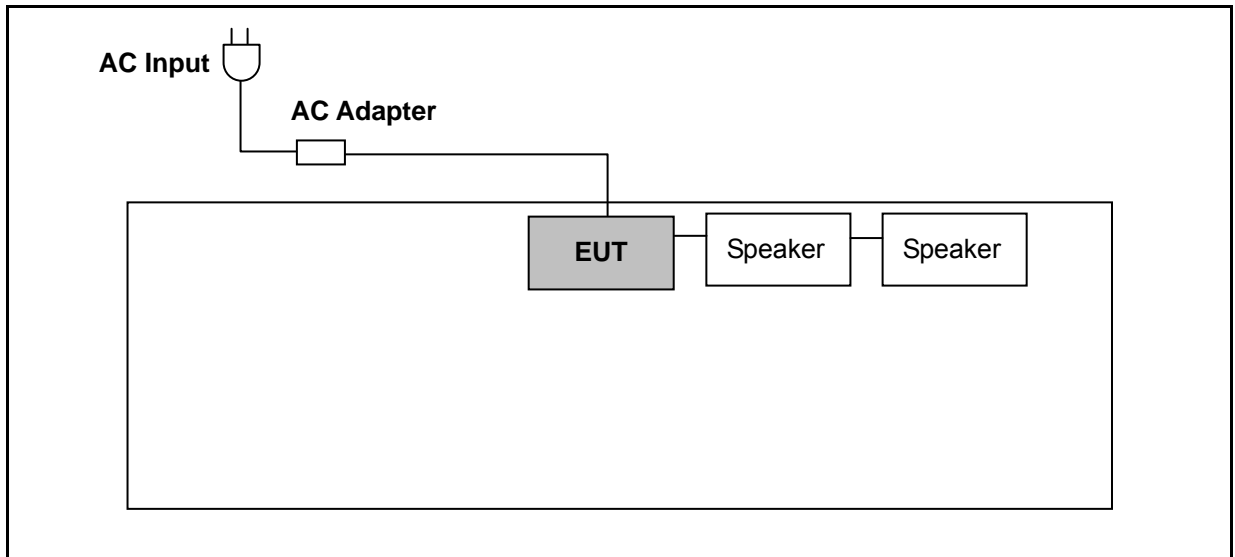
1	Setup the EUT and Bluetooth Tester (CBT) as shown on 3.3.
2	Turn on the power of all equipment.
3	Open Bluetooth function link to CBT.
4	EUT run test program.

3.3. Configuration of Test System Details

Conducted Emission



Radiated Emission



3.4. Test Site Environment

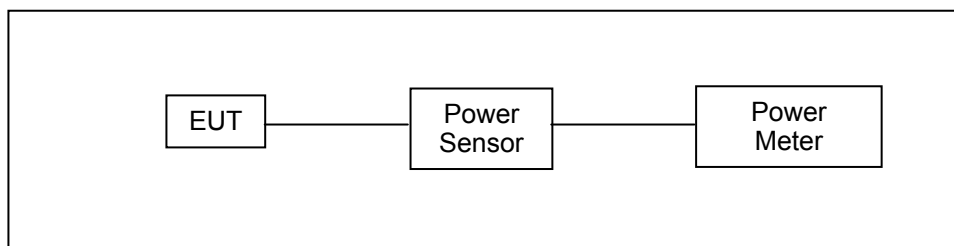
Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950

4 Maximum Conducted Output Power Measurement

4.1. Limit

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels < 0.125 watt.

4.2. Test Setup



4.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Single Channel PK Power Sensor	Agilent	N1911A	MY45101619	12/15/2014	(1)
Wideband Power Meter	Agilent	N1921A	MY45241957	12/15/2014	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/24/2015	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year.

NOTE: N.C.R. = No Calibration Request.

4.4. Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The tests below are run with the EUT's transmitter set at high power in TX mode. The EUT is needed to force selection of output power level and channel number. While testing, EUT was set to transmit continuously. Remove the Subjective device's antenna and connect the RF output port to power sensor. The maximum peak output power shall not exceed 1 watt.

Use a direct connection between the antenna port of transmitter and the power sensor, for prevent the power sensor input attenuation 40-50 dB. Set the RBW Bandwidth of the emission or use a channel power meter mode. For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm). For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6)/3 dBm. The antenna port of the EUT was connected to the input of a power sensor. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

4.5. Test Result

Model Number	BBT-A001						
Test Item	Maximum Conducted Output Power						
Test Mode	Mode 2 / Mode 3 / Mode 4						
Date of Test	07/30/2015			Test Site	TE02		
Test Mode	Frequency (MHz)	Packet Type	Average Power		Peak Power		Limit (W)
			(dBm)	(W)	(dBm)	(W)	
Mode 2	2402	DH1	9.18	0.00828	9.57	0.00906	< 0.125
		DH3	9.29	0.00849	9.75	0.00944	< 0.125
		DH5	9.34	0.00859	9.92	0.00982	< 0.125
	2441	DH1	9.23	0.00838	10.28	0.01067	< 0.125
		DH3	9.29	0.00849	10.43	0.01104	< 0.125
		DH5	9.41	0.00873	10.61	0.01151	< 0.125
	2480	DH1	9.18	0.00828	10.65	0.01161	< 0.125
		DH3	9.26	0.00843	10.87	0.01222	< 0.125
		DH5	9.47	0.00885	11.14	0.01300	< 0.125
Mode 3	2402	2DH1	8.22	0.00664	12.37	0.01726	< 0.125
		2DH3	8.34	0.00682	12.46	0.01762	< 0.125
		2DH5	8.42	0.00695	12.51	0.01782	< 0.125
	2441	2DH1	8.25	0.00668	12.46	0.01762	< 0.125
		2DH3	8.33	0.00681	12.55	0.01799	< 0.125
		2DH5	8.47	0.00703	12.63	0.01832	< 0.125
	2480	2DH1	8.46	0.00701	12.48	0.01770	< 0.125
		2DH3	8.56	0.00718	12.61	0.01824	< 0.125
		2DH5	8.62	0.00728	12.70	0.01862	< 0.125
Mode 4	2402	3DH1	8.39	0.00690	12.42	0.01746	< 0.125
		3DH3	8.47	0.00703	12.52	0.01786	< 0.125
		3DH5	8.56	0.00718	12.60	0.01820	< 0.125
	2441	3DH1	8.49	0.00706	12.56	0.01803	< 0.125
		3DH3	8.57	0.00719	12.65	0.01841	< 0.125
		3DH5	8.62	0.00728	12.71	0.01866	< 0.125
	2480	3DH1	8.59	0.00723	12.62	0.01828	< 0.125
		3DH3	8.64	0.00731	12.69	0.01858	< 0.125
		3DH5	8.70	0.00741	12.76	0.01888	< 0.125

Note: The relevant measured result has the offset with cable loss already.

5 Conducted Emission Measurement

5.1. Limit

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

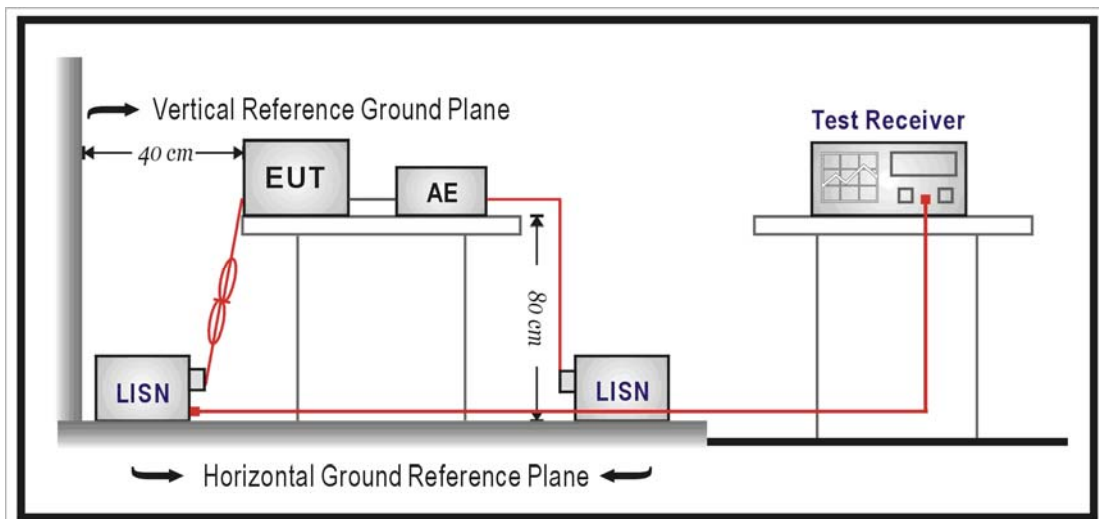
5.2. Test Instruments

Describe	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	06/25/2015	(1)
LISN	R&S	ENV216	101040	03/10/2015	(1)
LISN	R&S	ENV216	101041	03/06/2015	(1)
RF Cable	Woken	00100D1380194M	TE-02-02	06/26/2015	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: (1) Calibration period 1 year.

NOTE: N.C.R. = No Calibration Request.

5.3. Test Setup



5.4. Test Procedure

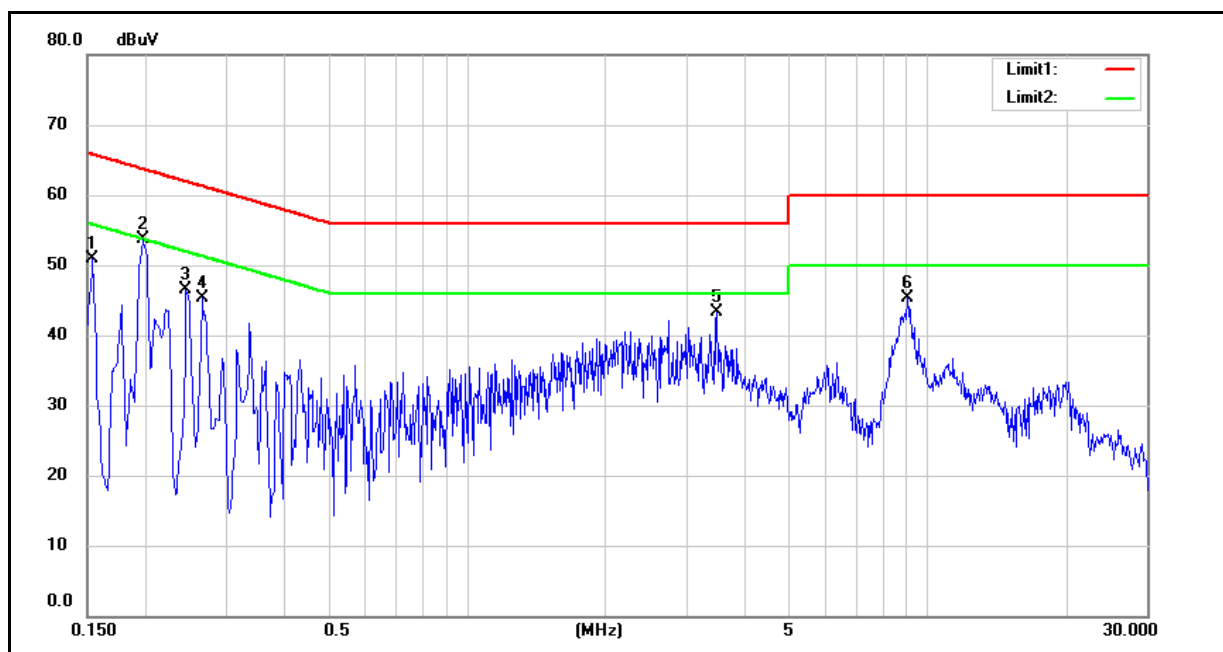
The power line conducted emission measurements were performed in a shielded enclosure. The EUT was assembled on a wooden table which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and EMCO Model 3162/2 SH Line Impedance Stabilization Networks (LISN). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPR quasi-peak detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 4.1.

5.5. Test Result

Standard:	FCC Part 15C	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	BBT-A001	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	08/04/2015
		Test By:	Eric Ou Yang
Description:			

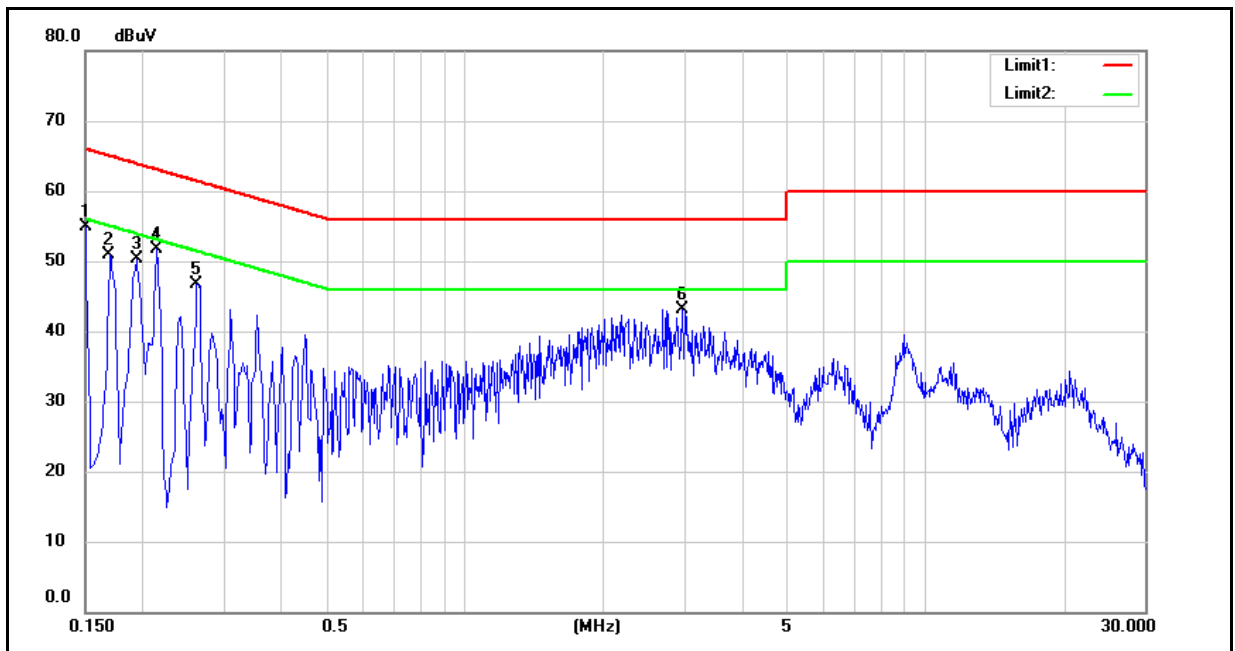


No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1540	35.25	14.94	9.58	44.83	24.52	65.78	55.78	-20.95	-31.26	Pass
2	0.1980	39.50	25.00	9.58	49.08	34.58	63.69	53.69	-14.61	-19.11	Pass
3	0.2460	27.91	9.94	9.58	37.49	19.52	61.89	51.89	-24.40	-32.37	Pass
4	0.2660	31.73	15.65	9.59	41.32	25.24	61.24	51.24	-19.92	-26.00	Pass
5	3.4940	25.69	15.07	9.71	35.40	24.78	56.00	46.00	-20.60	-21.22	Pass
6	9.0980	28.27	23.10	9.88	38.15	32.98	60.00	50.00	-21.85	-17.02	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Standard:	FCC Part 15C	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	BBT-A001	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	08/04/2015
		Test By:	Eric Ou Yang
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1500	39.97	17.01	9.58	49.55	26.59	66.00	56.00	-16.45	-29.41	Pass
2	0.1700	32.62	10.04	9.58	42.20	19.62	64.96	54.96	-22.76	-35.34	Pass
3	0.1940	39.65	24.99	9.58	49.23	34.57	63.86	53.86	-14.63	-19.29	Pass
4	0.2140	36.67	16.29	9.58	46.25	25.87	63.05	53.05	-16.80	-27.18	Pass
5	0.2620	32.16	17.13	9.59	41.75	26.72	61.37	51.37	-19.62	-24.65	Pass
6	2.9740	23.56	12.87	9.71	33.27	22.58	56.00	46.00	-22.73	-23.42	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

6 Radiated Interference Measurement

6.1. Limit

According to §15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at meter)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 - 88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

6.2. Test Instruments

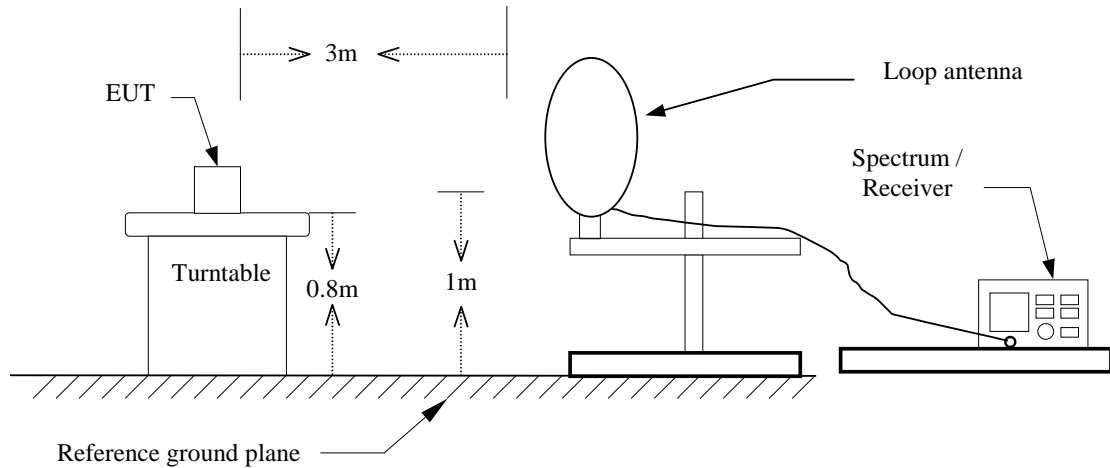
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/06/2015	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/06/2015	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/24/2015	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/24/2015	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	07/20/2015	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/12/2015	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	07/06/2015	(1)
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	02/02/2015	(1)
Microwave Cable	EMCI	EMC-104-SM-S M-14000	140202	02/24/2015	(1)
Microwave Cable	EMCI	EMC104-SM-S M-600	140301	02/24/2015	(1)
Test Site	ATL	TE01	888001	08/28/2014	(1)

Remark: (1) Calibration period 1 year.

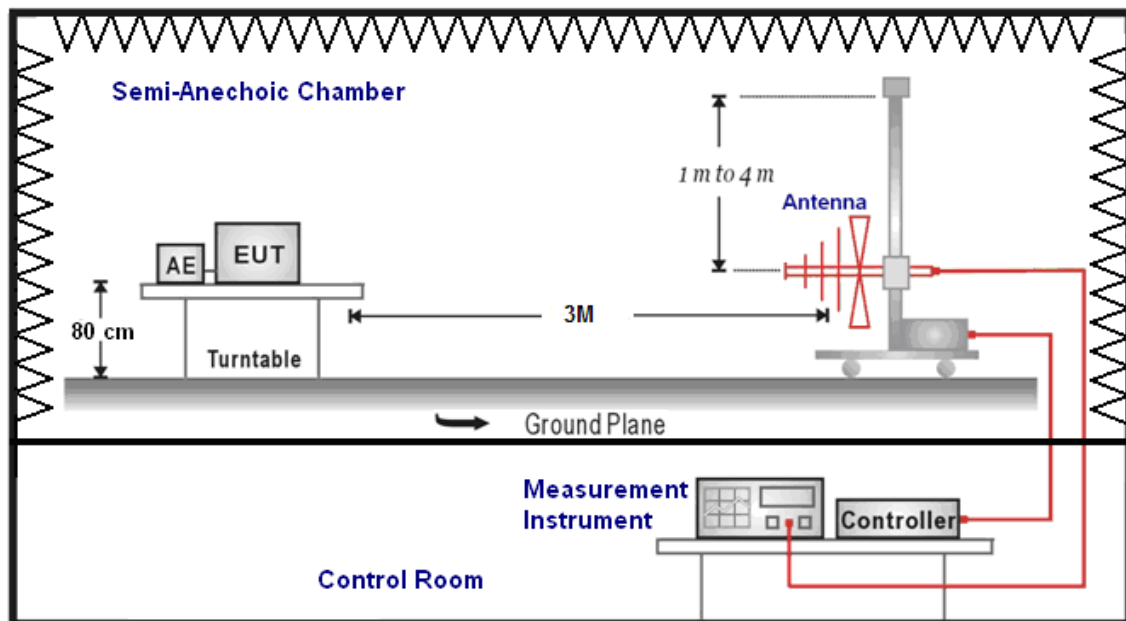
NOTE: N.C.R. = No Calibration Request.

6.3. Setup

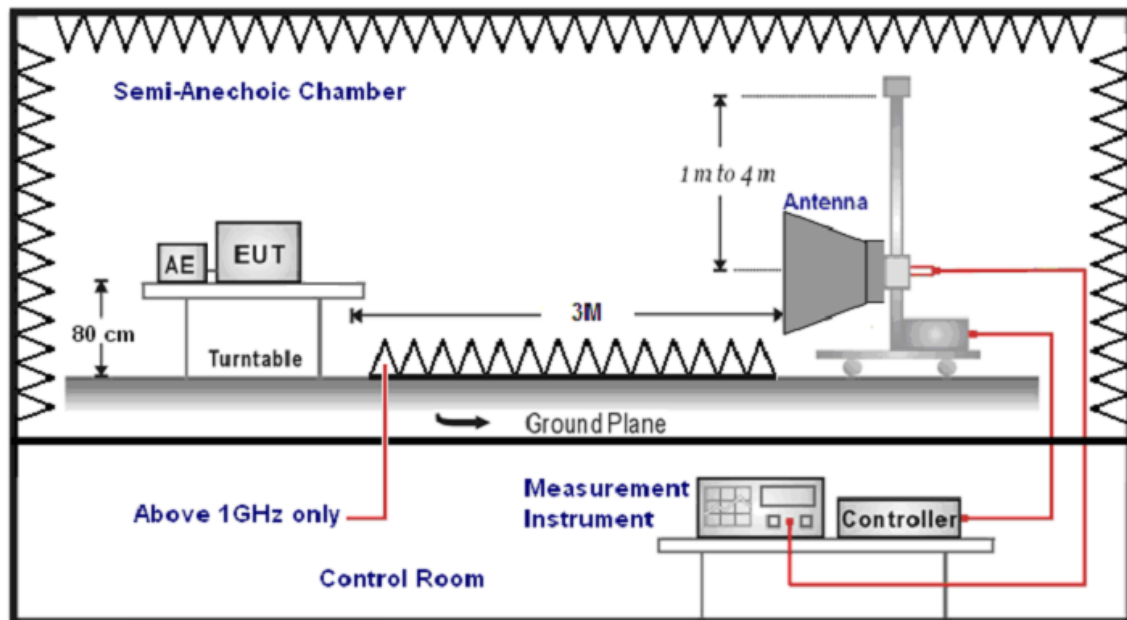
9kHz ~ 30MHz



Below 1GHz



Above 1GHz



6.4. Test Procedure

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 meters height, top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements when Duty cycle >98% / 1/T for average measurements when Duty cycle <98%. A nonconductive material surrounded the EUT to supporting the EUT for standing on three orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

SCHWARZBECK MESS-ELEKTRONIK Biconilog Antenna (mode VULB9163) at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna (model BBHA9120D&9170) was used in frequencies 1 – 26.5 GHz at a distance of 1 meter. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20dB/decade).

For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts per meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro volts per meter (dBuV/m).

The actual field intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

$$(1) \text{ Amplitude (dBuV/m) = FI (dBuV) + AF (dBuV) + CL (dBuV) - Gain (dB)}$$

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

$$(2) \text{ Actual Amplitude (dBuV/m) = Amplitude (dBuV) - Dis(dB)}$$

The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:

(a) For fundamental frequency : Transmitter Output < +30dBm

(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

6.5. Test Result

Below 1GHz

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		BBT-A001		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		1		Date:		08/01/2015	
				Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
170.5000	33.62	-11.62	22.00	43.50	-21.50	QP	H
277.0000	40.16	-10.19	29.97	46.00	-16.03	QP	H
340.0000	40.77	-8.67	32.10	46.00	-13.90	QP	H
457.0000	35.02	-6.18	28.84	46.00	-17.16	QP	H
665.0000	33.96	-2.22	31.74	46.00	-14.26	QP	H
778.5000	29.31	0.14	29.45	46.00	-16.55	QP	H
200.0000	40.90	-13.75	27.15	43.50	-16.35	QP	V
314.5000	43.27	-9.15	34.12	46.00	-11.88	QP	V
458.0000	41.48	-6.16	35.32	46.00	-10.68	QP	V
518.0000	40.92	-5.08	35.84	46.00	-10.16	QP	V
612.5000	31.78	-3.00	28.78	46.00	-17.22	QP	V
832.0000	28.06	0.99	29.05	46.00	-16.95	QP	V

Note: No emission found between lowest internal used/generated frequencies to 30MHz (9 kHz~30MHz).

Above 1GHz

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		BBT-A001		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		2		Date:		07/31/2015	
Frequency:		2402 MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3023.000	37.64	1.08	38.72	74.00	-35.28	peak	H
4804.000	53.28	6.24	59.52	74.00	-14.48	peak	H
4804.000	46.43	6.24	52.67	54.00	-1.33	AVG	H
6754.000	34.50	11.15	45.65	74.00	-28.35	peak	H
3030.000	37.78	1.10	38.88	74.00	-35.12	peak	V
4563.000	33.12	5.19	38.31	74.00	-35.69	peak	V
6733.000	33.70	11.11	44.81	74.00	-29.19	peak	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		BBT-A001		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		2		Date:		07/31/2015	
Frequency:		2441 MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3009.000	37.77	1.03	38.80	74.00	-35.20	peak	H
4882.000	52.50	6.58	59.08	74.00	-14.92	peak	H
4882.000	46.39	6.58	52.97	54.00	-1.03	AVG	H
6691.000	33.36	11.04	44.40	74.00	-29.60	peak	H
3030.000	37.74	1.10	38.84	74.00	-35.16	peak	V
4570.000	33.54	5.22	38.76	74.00	-35.24	peak	V
6670.000	33.94	11.01	44.95	74.00	-29.05	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	BBT-A001			Temp.(℃)/Hum.(%RH):	26(℃)/60%RH		
Mode:	2			Date:	07/31/2015		
Frequency:	2480 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3023.000	37.66	1.08	38.74	74.00	-35.26	peak	H
4960.000	52.64	6.92	59.56	74.00	-14.44	peak	H
4960.000	46.22	6.92	53.14	54.00	-0.86	AVG	H
6677.000	34.43	11.02	45.45	74.00	-28.55	peak	H
3037.000	37.31	1.11	38.42	74.00	-35.58	peak	V
4626.000	33.87	5.47	39.34	74.00	-34.66	peak	V
6691.000	34.06	11.04	45.10	74.00	-28.90	peak	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		BBT-A001		Temp.(℃)/Hum.(%RH):		26(℃)/60%RH	
Mode:		4		Date:		07/31/2015	
Frequency:		2402 MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3030.000	37.56	1.10	38.66	74.00	-35.34	peak	H
4619.000	33.30	5.43	38.73	74.00	-35.27	peak	H
6698.000	33.88	11.06	44.94	74.00	-29.06	peak	H
3030.000	35.61	1.10	36.71	74.00	-37.29	peak	V
4577.000	32.42	5.25	37.67	74.00	-36.33	peak	V
6649.000	32.50	10.98	43.48	74.00	-30.52	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	BBT-A001			Temp.(℃)/Hum.(%RH):	26(℃)/60%RH		
Mode:	4			Date:	07/31/2015		
Frequency:	2441 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3009.000	36.65	1.03	37.68	74.00	-36.32	peak	H
4577.000	32.59	5.25	37.84	74.00	-36.16	peak	H
6698.000	33.84	11.06	44.90	74.00	-29.10	peak	H
3030.000	36.67	1.10	37.77	74.00	-36.23	peak	V
4619.000	32.85	5.43	38.28	74.00	-35.72	peak	V
6663.000	32.79	10.99	43.78	74.00	-30.22	peak	V

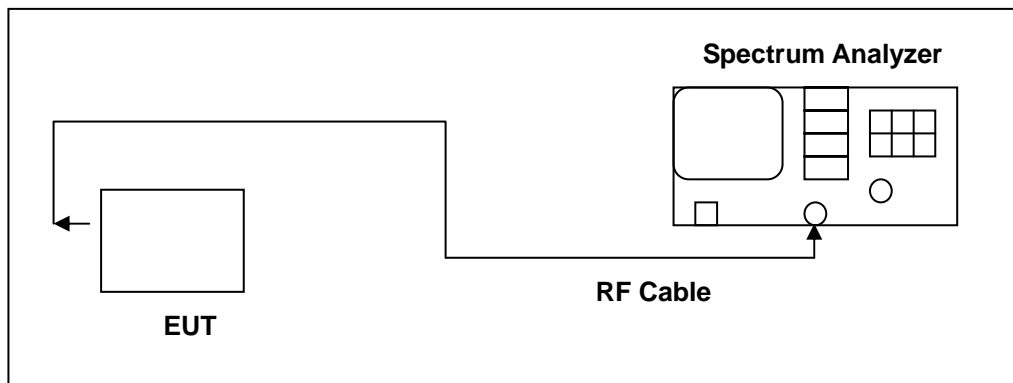
Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	BBT-A001			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	4			Date:	07/31/2015		
Frequency:	2480 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3023.000	35.16	1.08	36.24	74.00	-37.76	peak	H
4605.000	32.51	5.37	37.88	74.00	-36.12	peak	H
6691.000	32.40	11.04	43.44	74.00	-30.56	peak	H
3030.000	35.48	1.10	36.58	74.00	-37.42	peak	V
4563.000	31.63	5.19	36.82	74.00	-37.18	peak	V
6677.000	33.24	11.02	44.26	74.00	-29.74	peak	V

7 20dB RF Bandwidth Measurement

7.1. Limit

N/A

7.2. Test Setup



7.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/16/2014	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1 500	140303	02/24/2015	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year.

NOTE: N.C.R. = No Calibration Request.

7.4. Test Procedure

20dB RF Bandwidth

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

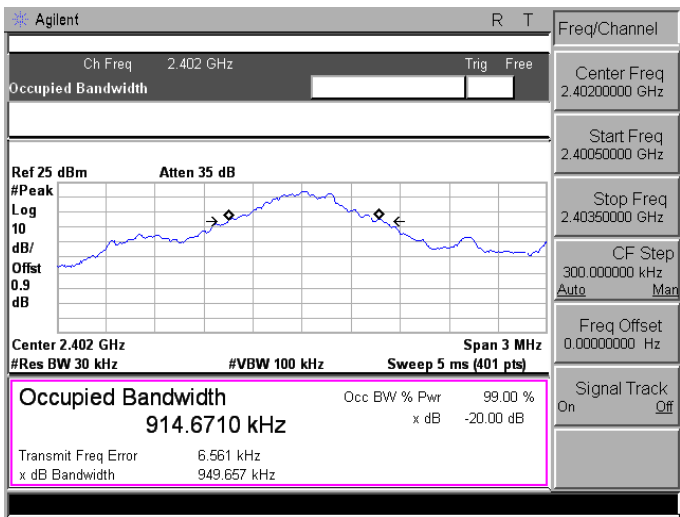
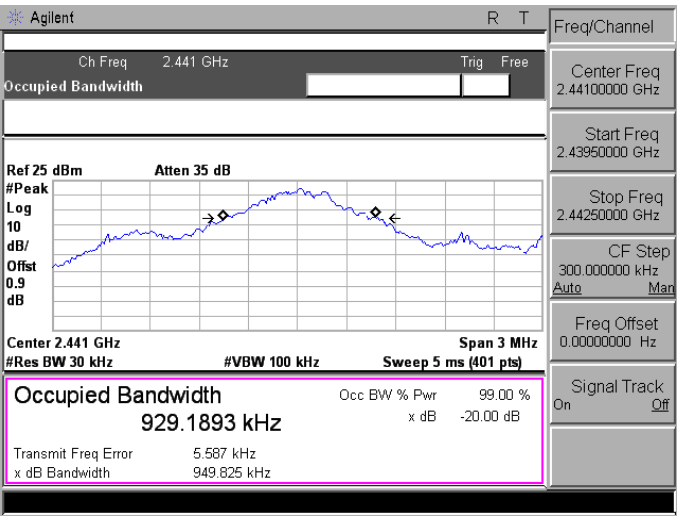
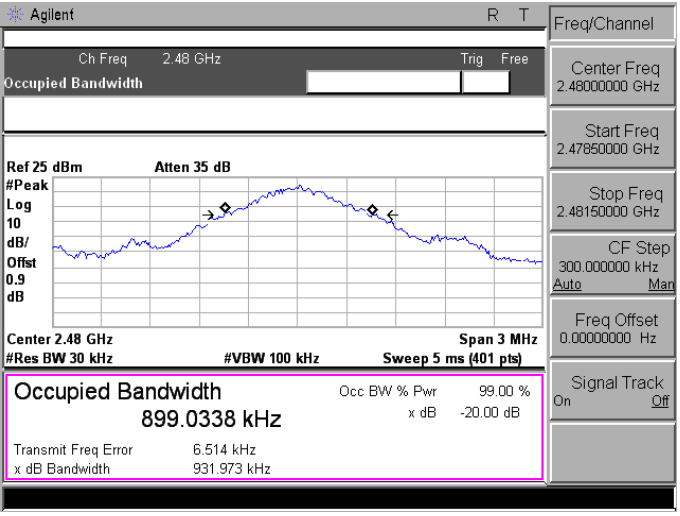
1. Span = approx. 2 to 3 times the 20dB bandwidth, centered on a hopping frequency
2. RBW \geq 1% of the 20dB span
3. VBW \geq RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

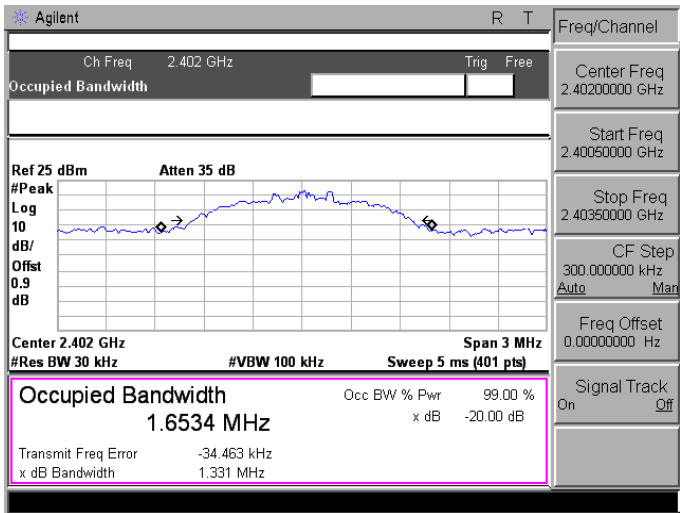
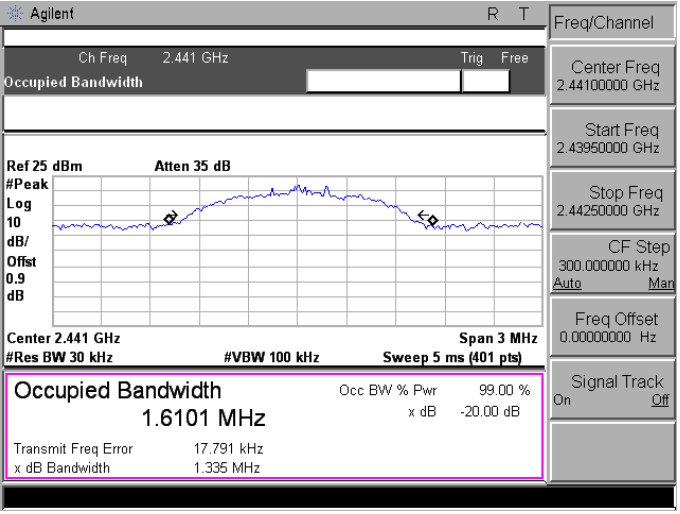
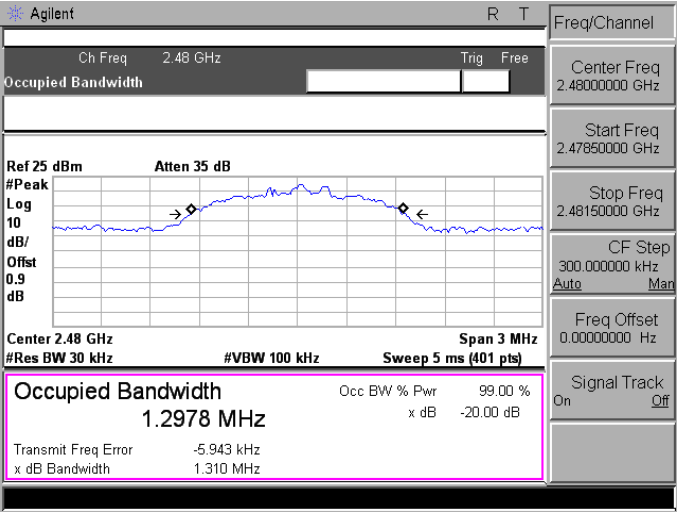
The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate. The marker-to-peak function was used to set the marker to the peak of the emission. The marker-delta function was used to measure 20dB down one side of the emission. The marker-delta function and marker was moved to the other side of the emission until it was even with the reference marker. The marker-delta reading at this point was the 20dB bandwidth of the emission.

7.5. Test Result

Model Number	BBT-A001		
Test Item	20dB RF Bandwidth and 99 % Occupied Bandwidth		
Test Mode	Mode 2 / Mode 4		
Date of Test	07/30/2015	Test Site	TE02
Test Mode	Frequency (MHz)	20dB RF Bandwidth (MHz)	Limit (MHz)
Mode 2	2402	0.950	-----
	2441	0.950	-----
	2480	0.932	-----
Mode 4	2402	1.331	-----
	2441	1.335	-----
	2480	1.310	-----

7.6. Test Graphs

Mode 2: GFSK Link Mode	
2402	
2441	
2480	

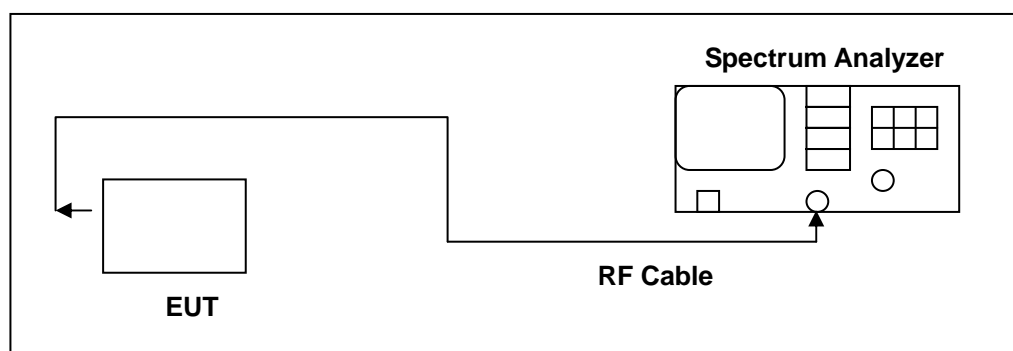
Mode 4: 8DPSK Link Mode	
2402	 <p>Agilent R T</p> <p>Ch Freq 2.402 GHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 25 dBm Atten 35 dB</p> <p>#Peak Log 10 dB/ Offst 0.9 dB</p> <p>Center 2.402 GHz Span 3 MHz</p> <p>#Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)</p> <p>Occupied Bandwidth 1.6534 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -34.463 kHz x dB Bandwidth 1.331 MHz</p> <p>Freq/Channel</p> <p>Center Freq 2.4020000 GHz</p> <p>Start Freq 2.4005000 GHz</p> <p>Stop Freq 2.4035000 GHz</p> <p>CF Step 300.000000 kHz Auto Man</p> <p>Freq Offset 0.0000000 Hz</p> <p>Signal Track On Off</p>
2441	 <p>Agilent R T</p> <p>Ch Freq 2.441 GHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 25 dBm Atten 35 dB</p> <p>#Peak Log 10 dB/ Offst 0.9 dB</p> <p>Center 2.441 GHz Span 3 MHz</p> <p>#Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)</p> <p>Occupied Bandwidth 1.6101 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error 17.791 kHz x dB Bandwidth 1.335 MHz</p> <p>Freq/Channel</p> <p>Center Freq 2.4410000 GHz</p> <p>Start Freq 2.4395000 GHz</p> <p>Stop Freq 2.4425000 GHz</p> <p>CF Step 300.000000 kHz Auto Man</p> <p>Freq Offset 0.0000000 Hz</p> <p>Signal Track On Off</p>
2480	 <p>Agilent R T</p> <p>Ch Freq 2.48 GHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 25 dBm Atten 35 dB</p> <p>#Peak Log 10 dB/ Offst 0.9 dB</p> <p>Center 2.48 GHz Span 3 MHz</p> <p>#Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts)</p> <p>Occupied Bandwidth 1.2978 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -5.943 kHz x dB Bandwidth 1.310 MHz</p> <p>Freq/Channel</p> <p>Center Freq 2.4800000 GHz</p> <p>Start Freq 2.4785000 GHz</p> <p>Stop Freq 2.4815000 GHz</p> <p>CF Step 300.000000 kHz Auto Man</p> <p>Freq Offset 0.0000000 Hz</p> <p>Signal Track On Off</p>

8 Carrier Frequency Separation Measurement

8.1. Limit

Title 47 of the CFR, Part 15 Subpart (c) 15.247(a)(1) requires the measurement of the bandwidth of the transmission between the -20 dB points on the transmitted spectrum. The results of this test determine the limits for channel spacing. The channel spacing shall be a minimum of 25 kHz or the 20 dB bandwidth, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel.

8.2. Test Setup



8.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/16/2014	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1 500	140303	02/24/2015	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year.

NOTE: N.C.R. = No Calibration Request.

8.4. Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth transmitter of the V6 had its hopping function enabled. The following spectrum analyzer settings were used:

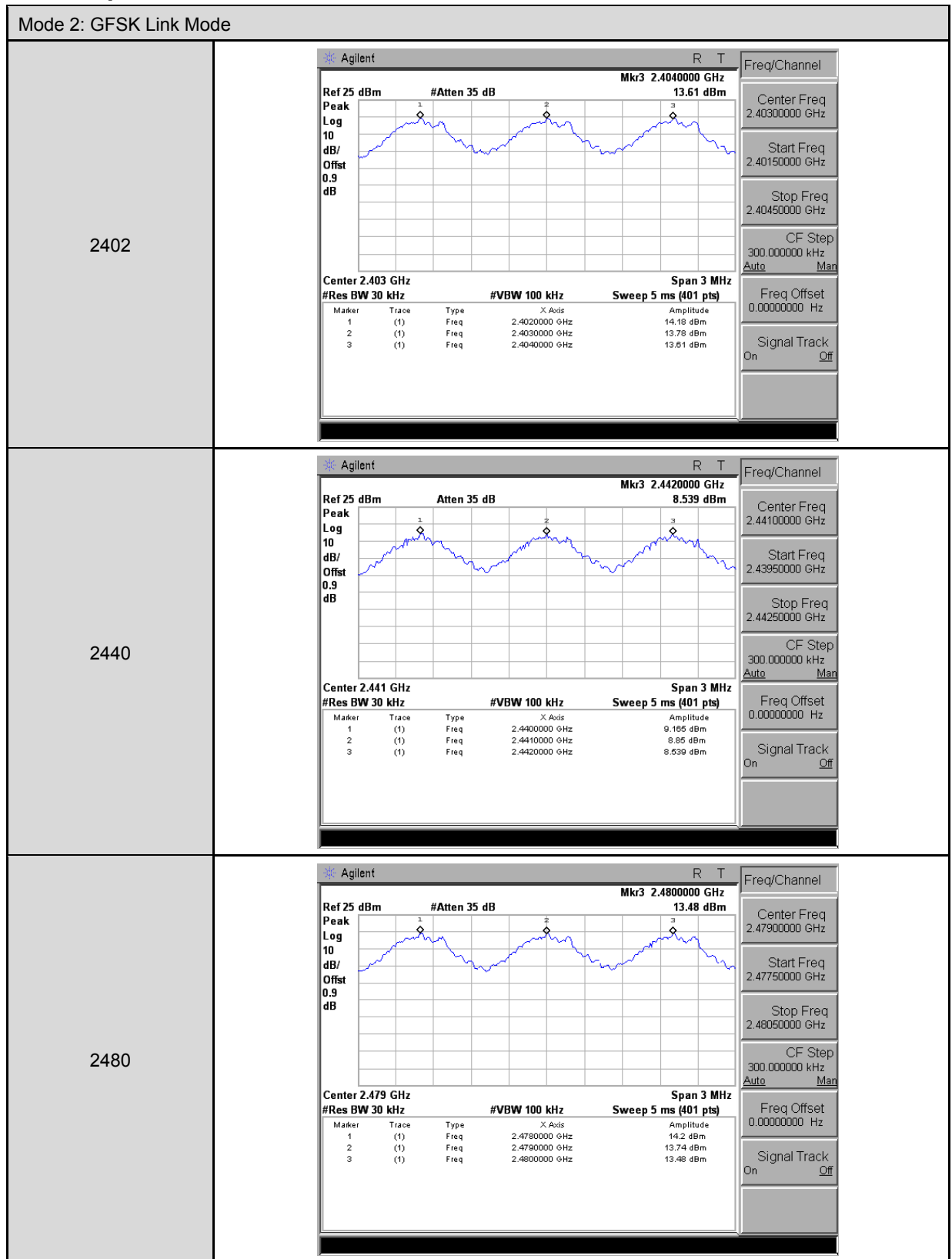
1. Span = wide enough to capture the peaks of two adjacent channels
2. Resolution (or IF) Bandwidth (RBW) \geq 1% of the span
3. Video (or Average) Bandwidth (VBW) \geq RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

8.5. Test Result

Model Number	BBT-A001		
Test Item	Carrier Frequency Separation		
Test Mode	Mode 2 / Mode 4		
Date of Test	07/30/2015	Test Site	TE02
Test Mode	Frequency (MHz)	Measurement (MHz)	Limit (MHz)
Mode 2	2402	1.000	> 0.633
	2441	1.000	> 0.633
	2480	1.000	> 0.621
Mode 4	2402	1.000	> 0.887
	2441	1.000	> 0.890
	2480	1.000	> 0.873

8.6. Test Graphs



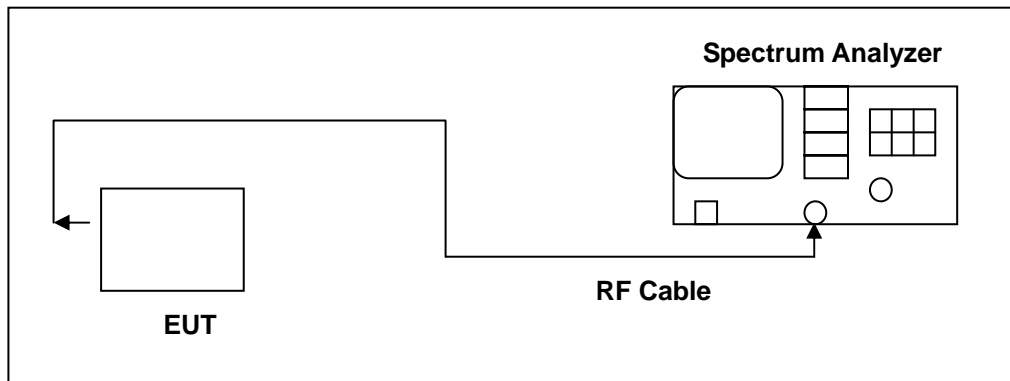
Mode 4: 8DPSK Link Mode																					
2402	<div><div><div>Agilent</div><div>R T</div><div>Ref 25 dBm #Atten 35 dB Mkr3 2.4040000 GHz 17.97 dBm</div><div><div>Peak</div><div>Log</div><div>10 dB/</div><div>Offset</div><div>0.9 dB</div></div><div><div>Center 2.403 GHz</div><div>#Res BW 30 kHz</div><div>#VBW 100 kHz</div><div>Span 3 MHz</div><div>Sweep 5 ms (401 pts)</div></div><div><table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>2.4020000 GHz</td><td>18.14 dBm</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>2.4030000 GHz</td><td>17.9 dBm</td></tr><tr><td>3</td><td>(1)</td><td>Freq</td><td>2.4040000 GHz</td><td>17.97 dBm</td></tr></table></div></div><div><div>Freq/Channel</div><div>Center Freq 2.40300000 GHz</div><div>Start Freq 2.40150000 GHz</div><div>Stop Freq 2.40450000 GHz</div><div>CF Step 300.000000 kHz Auto Man</div><div>Freq Offset 0.00000000 Hz</div><div>Signal Track On Off</div></div></div>	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	2.4020000 GHz	18.14 dBm	2	(1)	Freq	2.4030000 GHz	17.9 dBm	3	(1)	Freq	2.4040000 GHz	17.97 dBm
Marker	Trace	Type	X Axis	Amplitude																	
1	(1)	Freq	2.4020000 GHz	18.14 dBm																	
2	(1)	Freq	2.4030000 GHz	17.9 dBm																	
3	(1)	Freq	2.4040000 GHz	17.97 dBm																	
2441	<div><div><div>Agilent</div><div>R T</div><div>Ref 25 dBm #Atten 35 dB Mkr3 2.4420000 GHz 18.37 dBm</div><div><div>Peak</div><div>Log</div><div>10 dB/</div><div>Offset</div><div>0.9 dB</div></div><div><div>Center 2.441 GHz</div><div>#Res BW 30 kHz</div><div>#VBW 100 kHz</div><div>Span 3 MHz</div><div>Sweep 5 ms (401 pts)</div></div><div><table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>2.4400000 GHz</td><td>18.91 dBm</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>2.4410000 GHz</td><td>18.44 dBm</td></tr><tr><td>3</td><td>(1)</td><td>Freq</td><td>2.4420000 GHz</td><td>18.37 dBm</td></tr></table></div></div><div><div>Freq/Channel</div><div>Center Freq 2.44100000 GHz</div><div>Start Freq 2.43950000 GHz</div><div>Stop Freq 2.44250000 GHz</div><div>CF Step 300.000000 kHz Auto Man</div><div>Freq Offset 0.00000000 Hz</div><div>Signal Track On Off</div></div></div>	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	2.4400000 GHz	18.91 dBm	2	(1)	Freq	2.4410000 GHz	18.44 dBm	3	(1)	Freq	2.4420000 GHz	18.37 dBm
Marker	Trace	Type	X Axis	Amplitude																	
1	(1)	Freq	2.4400000 GHz	18.91 dBm																	
2	(1)	Freq	2.4410000 GHz	18.44 dBm																	
3	(1)	Freq	2.4420000 GHz	18.37 dBm																	
2480	<div><div><div>Agilent</div><div>R T</div><div>Ref 25 dBm #Atten 35 dB Mkr3 2.4800000 GHz 12.51 dBm</div><div><div>Peak</div><div>Log</div><div>10 dB/</div><div>Offset</div><div>0.9 dB</div></div><div><div>Center 2.403 GHz</div><div>#Res BW 30 kHz</div><div>#VBW 100 kHz</div><div>Span 3 MHz</div><div>Sweep 5 ms (401 pts)</div></div><div><table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>2.4780000 GHz</td><td>13.44 dBm</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>2.4790000 GHz</td><td>13 dBm</td></tr><tr><td>3</td><td>(1)</td><td>Freq</td><td>2.4800000 GHz</td><td>12.51 dBm</td></tr></table></div></div><div><div>Freq/Channel</div><div>Center Freq 2.47900000 GHz</div><div>Start Freq 2.47750000 GHz</div><div>Stop Freq 2.48050000 GHz</div><div>CF Step 300.000000 kHz Auto Man</div><div>Freq Offset 0.00000000 Hz</div><div>Signal Track On Off</div></div></div>	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	2.4780000 GHz	13.44 dBm	2	(1)	Freq	2.4790000 GHz	13 dBm	3	(1)	Freq	2.4800000 GHz	12.51 dBm
Marker	Trace	Type	X Axis	Amplitude																	
1	(1)	Freq	2.4780000 GHz	13.44 dBm																	
2	(1)	Freq	2.4790000 GHz	13 dBm																	
3	(1)	Freq	2.4800000 GHz	12.51 dBm																	

9 Number of Hopping Measurement

9.1. Limit

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

9.2. Test Setup



9.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/16/2014	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/24/2015	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year.

NOTE: N.C.R. = No Calibration Request.

9.4. Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

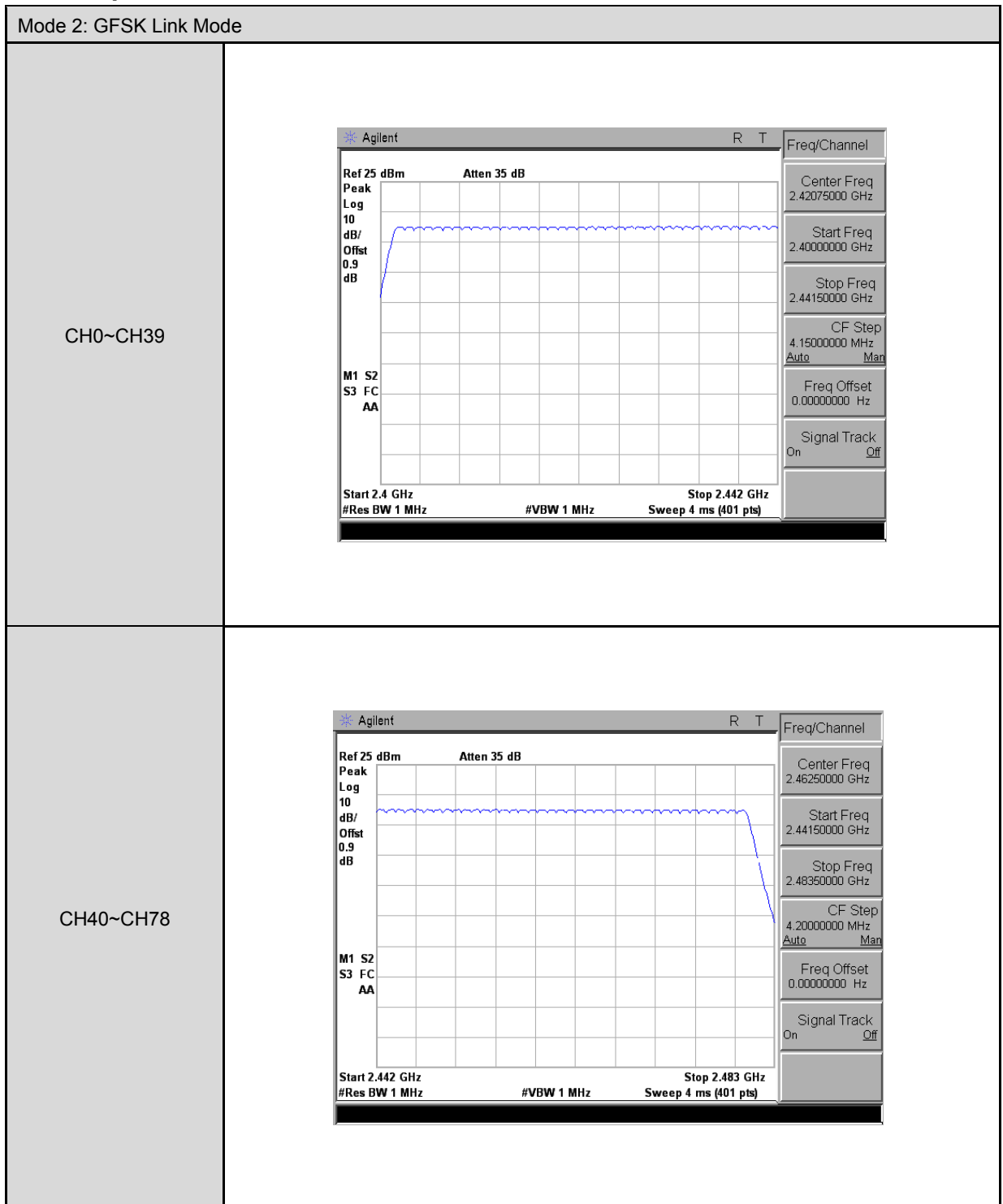
1. Span = the frequency band of operation
2. RBW \geq 1% of the span
3. VBW \geq RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

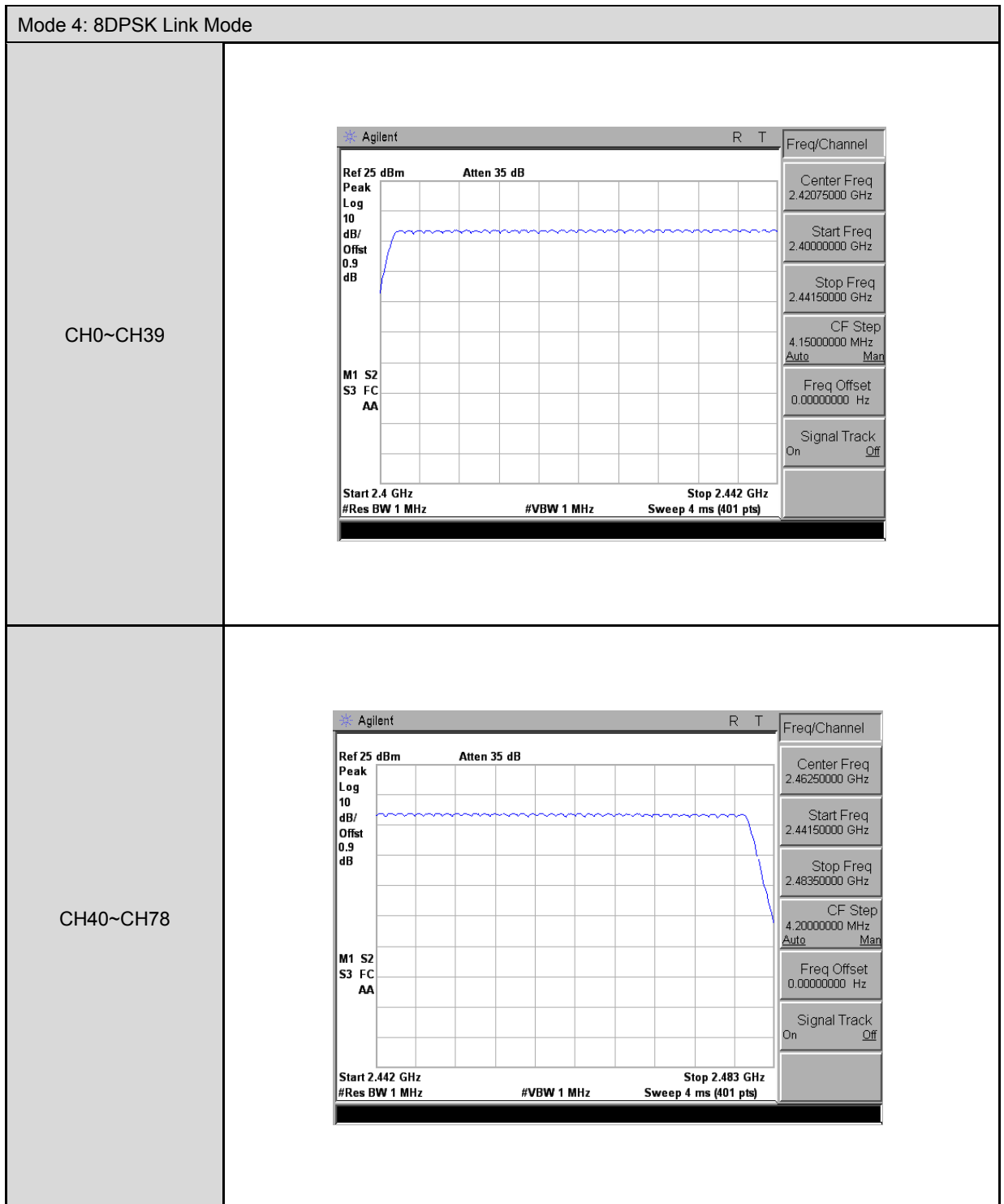
The trace was allowed to stabilize.

9.5. Test Result

Model Number	BBT-A001		
Test Item	Number of Hopping		
Test Mode	Mode 2 / Mode 4		
Date of Test	07/30/2015	Test Site	TE02
Test Mode	Frequency Range (MHz)	Measurement (ch)	Limit (ch)
Mode 2	2402 - 2480	79	> 15
Mode 4	2402 - 2480	79	> 15

9.6. Test Graphs



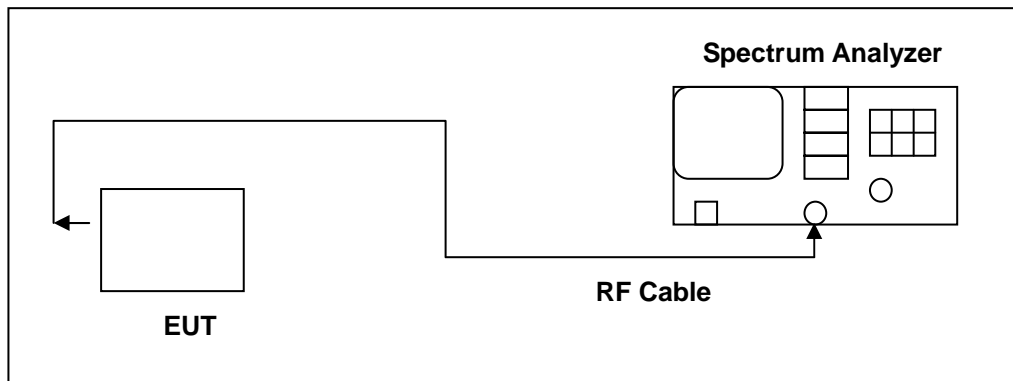


10 Time of Occupancy (Dwell Time) Measurement

10.1. Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

10.2. Test Setup



10.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/16/2014	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/24/2015	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year.

NOTE: N.C.R. = No Calibration Request.

10.4. Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

1. Span = zero span, centered on a hopping channel
2. RBW = 1 MHz
3. VBW \geq RBW
4. Sweep = as necessary to capture the entire dwell time per hopping channel
5. Detector function = peak
6. Trace = max hold

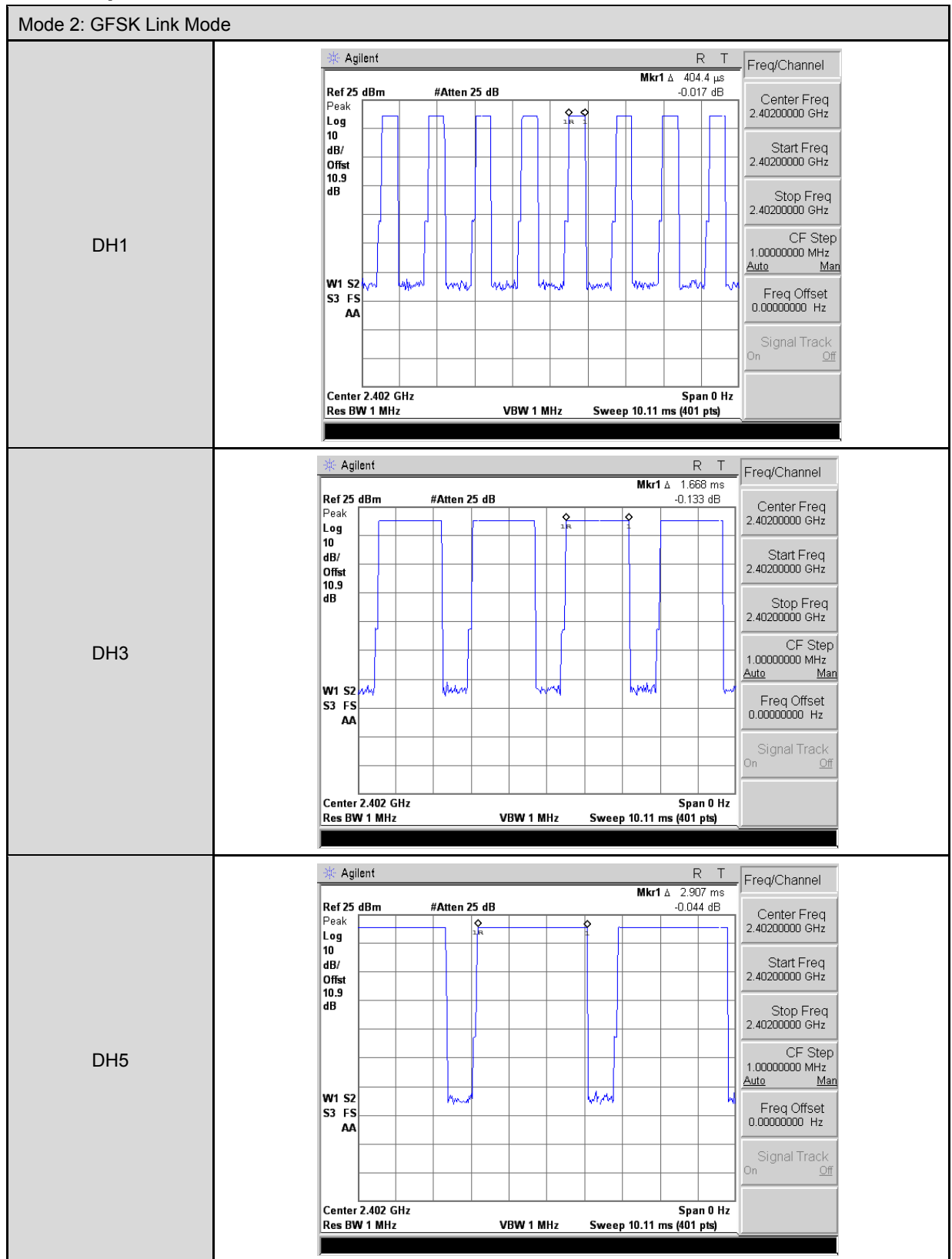
The marker-delta function was used to determine the dwell time.

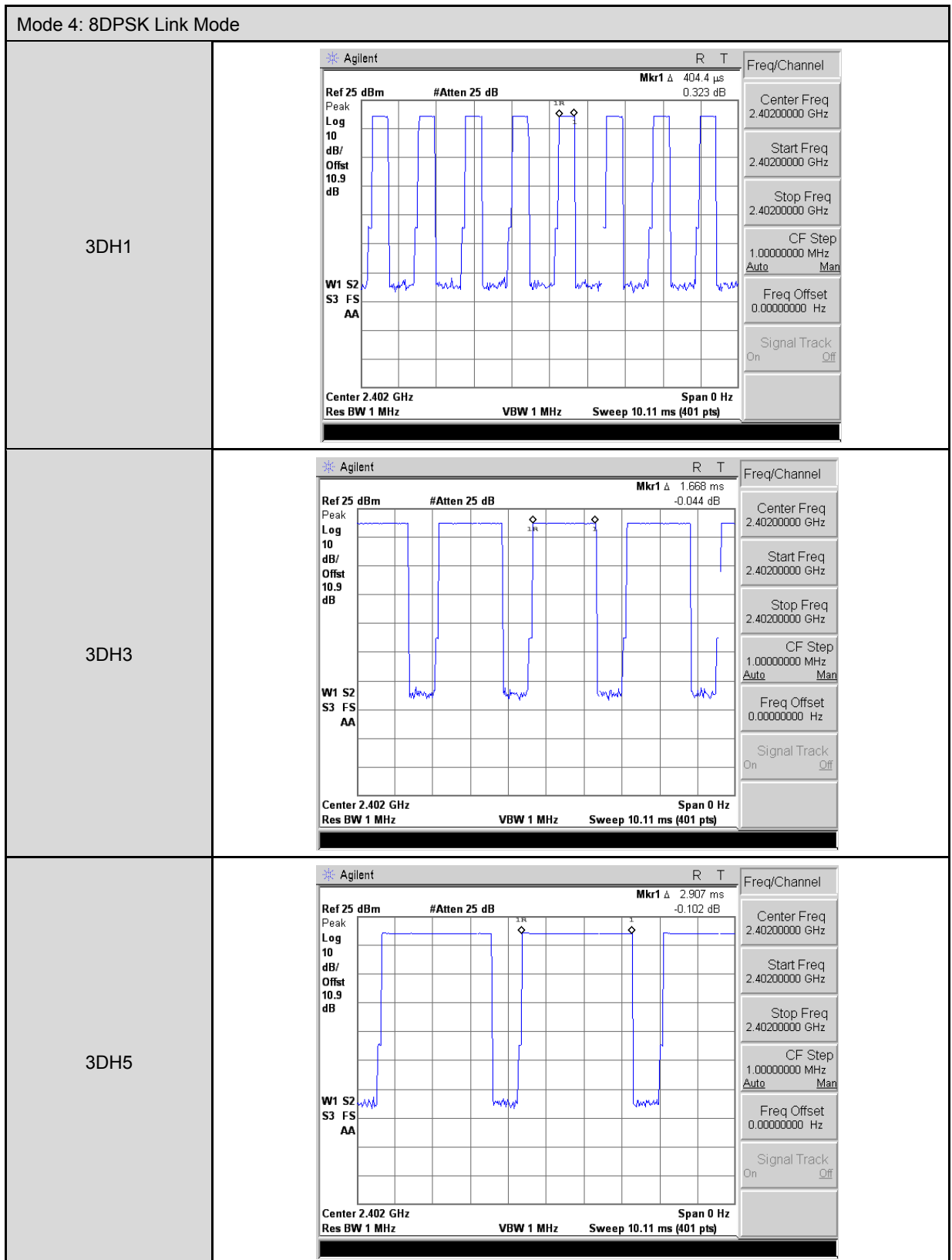
10.5. Test Result

Model Number	BBT-A001		
Test Item	Time of Occupancy (Dwell Time)		
Test Mode	Mode 2: GFSK Link Mode		
Date of Test	07/30/2015	Test Site	TE02
DH1			
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
The EUT Hopping Number per Sec	1600 times/sec		
Each Channel Dwell Times per Sec	800/79CH = 10.13(times/sec)		
Each Channel Dwell Times on Cycle(1)	31.6 * 10.13 = 320.108(times)		
Each Channel Dwell Times (2)	0.404 ms (sec)		
Dwell Times on Cycle (1) * (2)	129.4517 ms (sec)		
LIMIT(msec)	< = 400		
DH3			
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
The EUT Hopping Number per Sec	1600 times/sec		
Each Channel Dwell Times per Sec	400/79CH = 5.1(times/sec)		
Each Channel Dwell Times on Cycle(1)	31.6 * 5.1 = 161.16(times)		
Each Channel Dwell Times (2)	1.668 ms (sec)		
Dwell Times on Cycle (1) * (2)	266.7065 ms (sec)		
LIMIT(msec)	< = 400		
DH5			
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
The EUT Hopping Number per Sec	1600 times/sec		
Each Channel Dwell Times per Sec	266.7/79CH = 3.37(times/sec)		
Each Channel Dwell Times on Cycle(1)	31.6 * 3.37 = 106.492(times)		
Each Channel Dwell Times (2)	2.907 ms (sec)		
Dwell Times on Cycle (1) * (2)	310.4909 ms (sec)		
LIMIT(msec)	< = 400		

Model Number	BBT-A001		
Test Item	Time of Occupancy (Dwell Time)		
Test Mode	Mode 4: 8DPSK Link Mode		
Date of Test	07/30/2015	Test Site	TE02
3DH1			
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
The EUT Hopping Number per Sec	1600 times/sec		
Each Channel Dwell Times per Sec	800/79CH = 10.13(times/sec)		
Each Channel Dwell Times on Cycle(1)	31.6 * 10.13 = 320.108(times)		
Each Channel Dwell Times (2)	0.404 ms (sec)		
Dwell Times on Cycle (1) * (2)	129.4517 ms (sec)		
LIMIT(msec)	< = 400		
3DH3			
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
The EUT Hopping Number per Sec	1600 times/sec		
Each Channel Dwell Times per Sec	400/79CH = 5.1(times/sec)		
Each Channel Dwell Times on Cycle(1)	31.6 * 5.1 = 161.16(times)		
Each Channel Dwell Times (2)	1.668 ms (sec)		
Dwell Times on Cycle (1) * (2)	266.7065 ms (sec)		
LIMIT(msec)	< = 400		
3DH5			
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
The EUT Hopping Number per Sec	1600 times/sec		
Each Channel Dwell Times per Sec	266.7/79CH = 3.37(times/sec)		
Each Channel Dwell Times on Cycle(1)	31.6 * 3.37 = 106.492(times)		
Each Channel Dwell Times (2)	2.907 ms (sec)		
Dwell Times on Cycle (1) * (2)	310.4909 ms (sec)		
LIMIT(msec)	< = 400		

10.6. Test Graphs



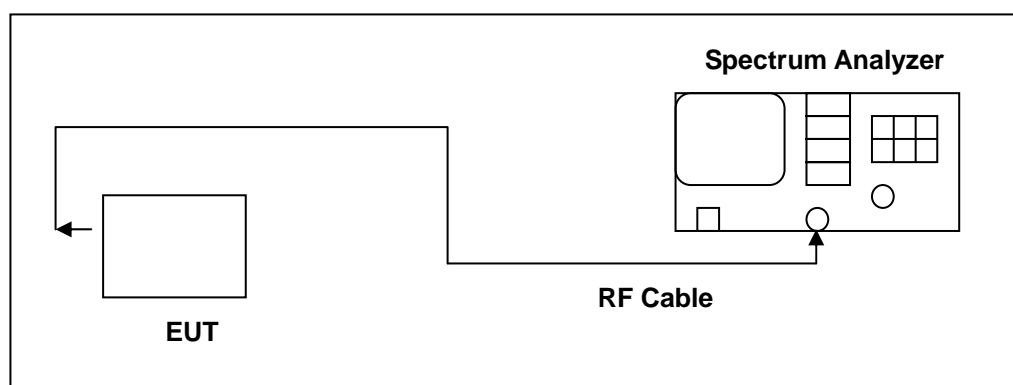


11 Out of Band Conducted Emissions Measurement

11.1. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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

11.2. Test Setup



11.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/16/2014	(1)
Spectrum Analyzer	Agilent	E4408B	MY45107753	07/27/2015	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1 500	140303	02/24/2015	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

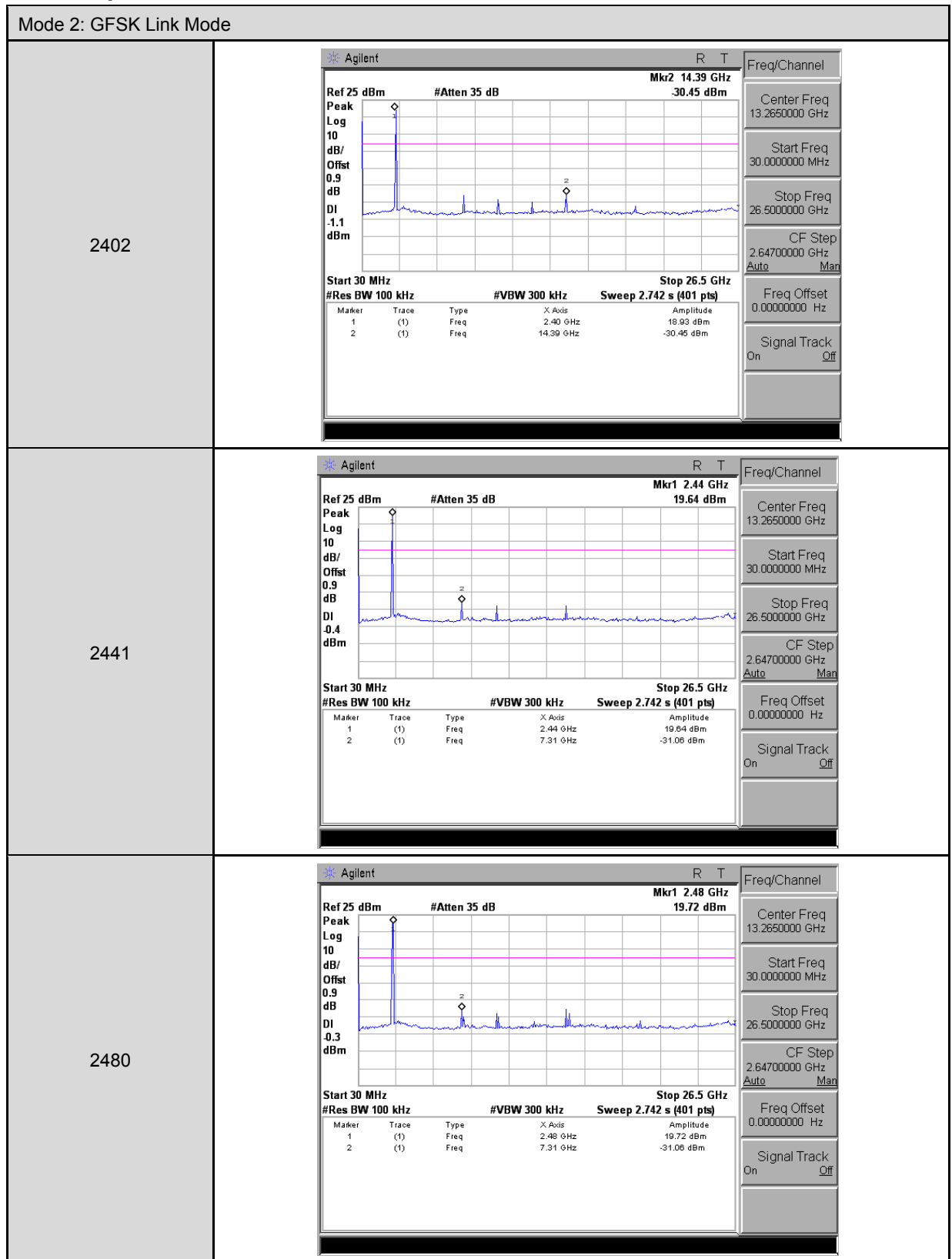
Remark: (1) Calibration period 1 year.

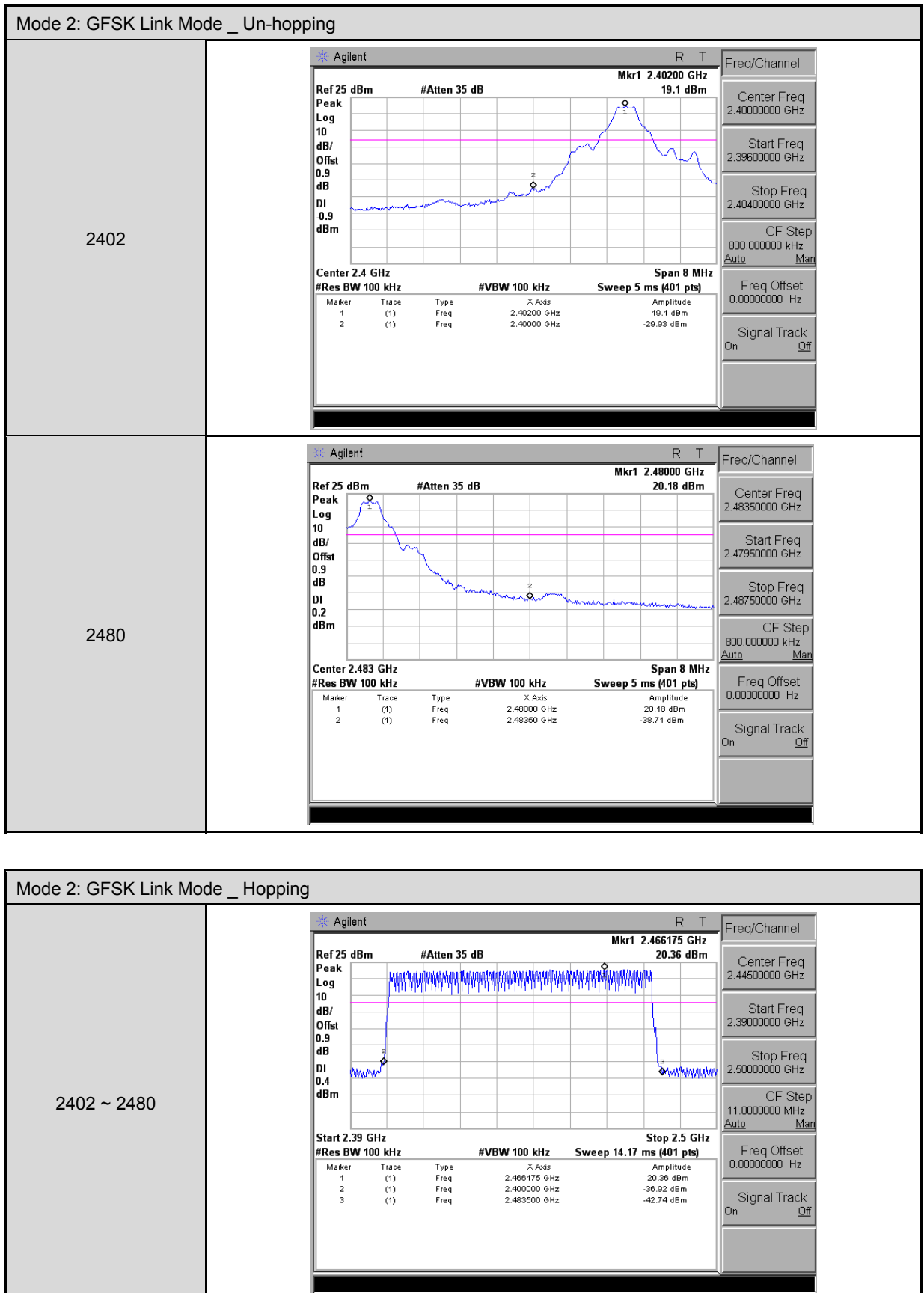
NOTE: N.C.R. = No Calibration Request.

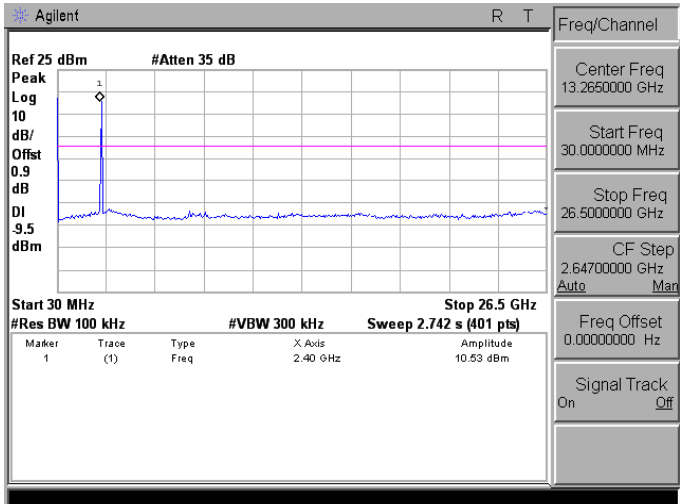
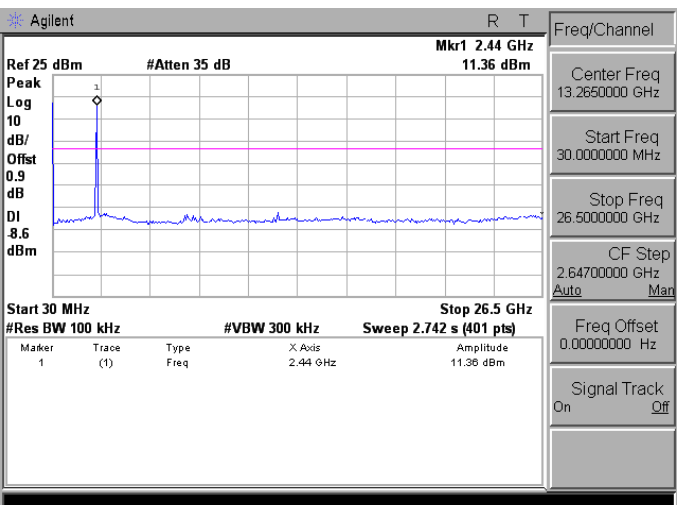
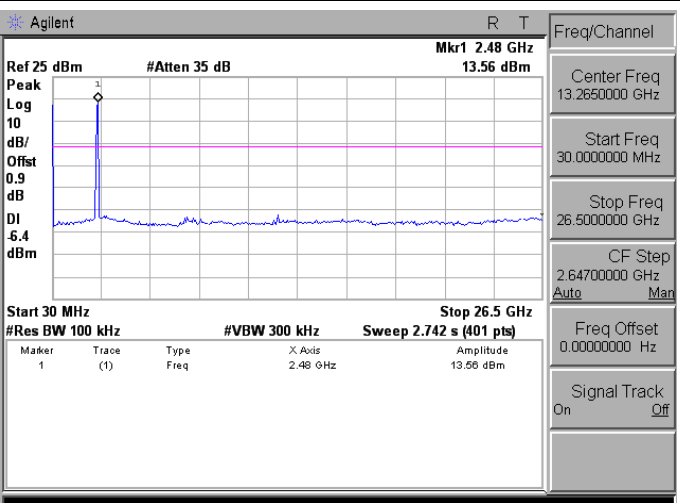
11.4. Test Procedure

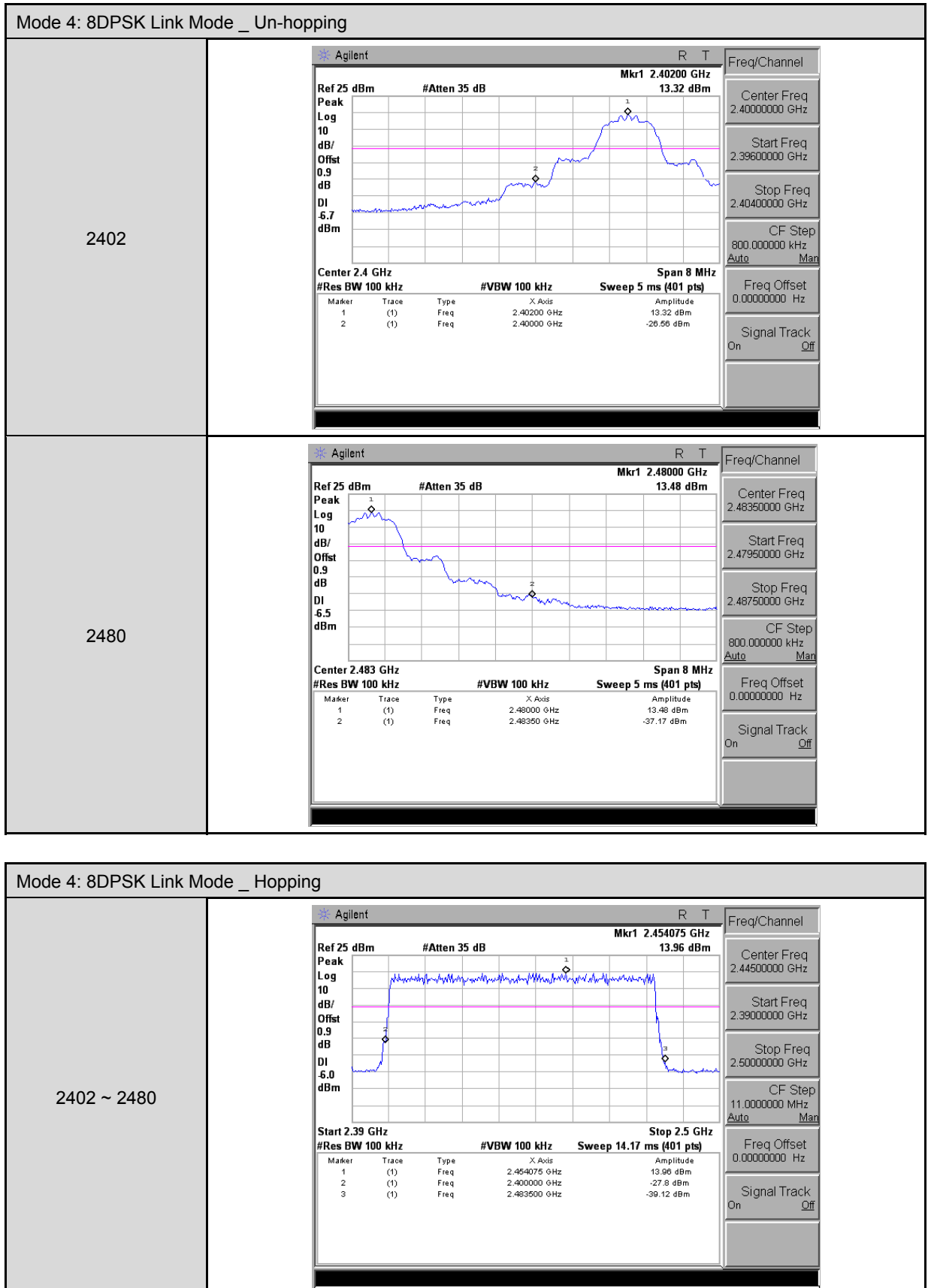
Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function. All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band. The test was performed at 3 channels (Channel 0, 39, 78)

11.5. Test Graphs





Mode 4: 8DPSK Link Mode	
2402	
2441	
2480	

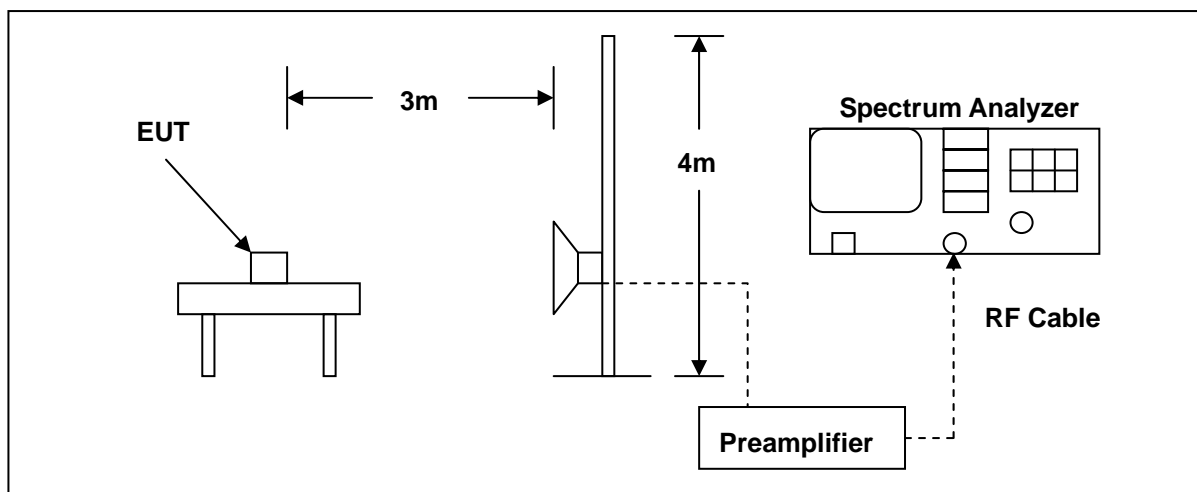


12 Band Edges Measurement

12.1. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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

12.2. Test Setup



12.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4408B	MY45107753	07/27/2015	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/24/2015	(1)
Horn Antenna	SCHWARZBECK MESS-ELEKTRONIK	9120D	9120D-550	06/12/2015	(1)
Microwave Cable	EMCI	EMC-104-SM-SM-1 4000	140202	02/24/2015	(1)
Microwave Cable	EMCI	EMC104-SM-SM-6 00	140301	02/24/2015	(1)
Test Site	ATL	TE01	888001	08/28/2014	(1)

Remark: (1) Calibration period 1 year.

NOTE: N.C.R. = No Calibration Request.

12.4. Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The emissions on the harmonics frequencies, the limits, and the margin of compliance are presented. These tests were made when the transmitter was in full radiated power. The additional test was performed to show compliance with the requirement at the band-edge frequency 2483.5 MHz and up to 2500 MHz and at 2390.0 MHz.

The transmitter was configured with the worst case antenna and setup to transmit at the highest channel. Then the field strength was measured at 2483.5 MHz.

The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel. Then the field strength was measured at 2390.0 MHz. These tests were performed at 4 different bit rates.

For measurements the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

12.5. Test Result

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		BBT-A001		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		2		Date:		07/31/2015	
Frequency:		2402 MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2376.110	52.87	-1.11	51.76	74.00	-22.24	peak	H
2390.000	51.35	-1.05	50.30	74.00	-23.70	peak	H
2376.220	61.07	-1.11	59.96	74.00	-14.04	peak	V
2376.220	51.87	-1.11	50.76	54.00	-3.24	AVG	V
2390.000	54.94	-1.05	53.89	74.00	-20.11	peak	V
2390.000	42.85	-1.05	41.80	54.00	-12.20	AVG	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		BBT-A001		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		2		Date:		07/31/2015	
Frequency:		2480 MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2483.500	57.99	-0.62	57.37	74.00	-16.63	peak	H
2483.500	44.78	-0.62	44.16	54.00	-9.84	AVG	H
2483.640	59.40	-0.62	58.78	74.00	-15.22	peak	H
2483.640	44.55	-0.62	43.93	54.00	-10.07	AVG	H
2483.500	65.53	-0.62	64.91	74.00	-9.09	peak	V
2483.500	51.66	-0.62	51.04	54.00	-2.96	AVG	V
2484.100	67.93	-0.62	67.31	74.00	-6.69	peak	V
2484.100	51.31	-0.62	50.69	54.00	-3.31	AVG	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		BBT-A001		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		2		Date:		07/31/2015	
		Hopping		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2376.880	49.62	-1.11	48.51	74.00	-25.49	peak	H
2390.000	45.93	-1.05	44.88	74.00	-29.12	peak	H
2483.500	55.59	-0.62	54.97	74.00	-19.03	peak	H
2483.500	36.22	-0.62	35.60	54.00	-18.40	AVG	H
2484.230	55.65	-0.62	55.03	74.00	-18.97	peak	H
2484.230	36.01	-0.62	35.39	54.00	-18.61	AVG	H
2387.900	55.65	-1.05	54.60	74.00	-19.40	peak	V
2387.900	38.38	-1.05	37.33	54.00	-16.67	AVG	V
2390.000	51.75	-1.05	50.70	74.00	-23.30	peak	V
2483.500	57.21	-0.62	56.59	74.00	-17.41	peak	V
2483.500	39.38	-0.62	38.76	54.00	-15.24	AVG	V
2484.230	59.87	-0.62	59.25	74.00	-14.75	peak	V
2484.230	36.33	-0.62	35.71	54.00	-18.29	AVG	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	BBT-A001			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	4			Date:	07/31/2015		
Frequency:	2402 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2376.330	53.08	-1.11	51.97	74.00	-22.03	peak	H
2390.000	56.63	-1.05	55.58	74.00	-18.42	peak	H
2390.000	42.76	-1.05	41.71	54.00	-12.29	AVG	H
2376.110	60.25	-1.11	59.14	74.00	-14.86	peak	V
2376.110	49.10	-1.11	47.99	54.00	-6.01	AVG	V
2390.000	63.00	-1.05	61.95	74.00	-12.05	peak	V
2390.000	43.64	-1.05	42.59	54.00	-11.41	AVG	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	BBT-A001			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	4			Date:	07/31/2015		
Frequency:	2480 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2483.500	62.75	-0.62	62.13	74.00	-11.87	peak	H
2483.500	46.59	-0.62	45.97	54.00	-8.03	AVG	H
2483.640	62.58	-0.62	61.96	74.00	-12.04	peak	H
2483.640	44.03	-0.62	43.41	54.00	-10.59	AVG	H
2483.500	72.63	-0.62	72.01	74.00	-1.99	peak	V
2483.500	54.02	-0.62	53.40	54.00	-0.60	AVG	V
2483.720	72.82	-0.62	72.20	74.00	-1.80	peak	V
2483.720	52.47	-0.62	51.85	54.00	-2.15	AVG	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		BBT-A001		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		4		Date:		07/31/2015	
		Hopping		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2385.810	47.42	-1.33	46.09	74.00	-27.91	peak	H
2390.000	46.20	-1.32	44.88	74.00	-29.12	peak	H
2483.500	49.60	-0.92	48.68	74.00	-25.32	peak	H
2493.160	49.80	-0.88	48.92	74.00	-25.08	peak	H
2387.330	49.34	-1.33	48.01	74.00	-25.99	peak	V
2390.000	46.56	-1.32	45.24	74.00	-28.76	peak	V
2483.500	44.01	-0.92	43.09	74.00	-30.91	peak	V
2485.560	49.68	-0.91	48.77	74.00	-25.23	peak	V

13 Antenna Measurement

13.1. Limit

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.

And According to 15.247 (b)(4), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

13.2. Antenna Connector Construction

The antenna used in this product is Dipole antenna. And the maximum Gain of this antenna is only 3.64 dBi.