

FCC Test Report

Equipment : Bluetooth Keyboard
Brand Name : ACROX
Model No. : K1W, K1Z
FCC ID : PRDKB09
Standard : 47 CFR FCC Part 15.247
Applicant : ACROX Technologies Co., Ltd.
Manufacturer : 4F., No.89, Minshan St., Neihu Dist.,
Taipei City 114

This report only contains BR and EDR mode test result.
The product sample received on Feb. 26, 2013 and completely tested on Mar. 04, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Wayne Hsu / Assistant Manager





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Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
1.1.2	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	0.178MHz: 49.54dBuV (5.01dB) - AV 54.41dBuV (10.14dB) - QP	FCC 15.207	Complied
3.2	15.247(a)	20dB Bandwidth	1.155 MHz	N/A	Complied
3.2	15.247(a)	Carrier Frequency Separation (ChS)	1.000MHz	ChS \geq 20 dB BW x 2/3.	Complied
3.3	15.247(a)	Number of Hopping Frequencies (N)	Max: 79 Min: 75	N \geq 15	Complied
3.4	15.247(a)	Time of Occupancy (Dwell Time)	0.3200 sec	0.4 s within 0.4 x N	Complied
3.5	15.247(b)	RF Output Power (that Maximum Peak Conducted Output Power)	Power [dBm] Basic: 3.12	Power [dBm] Basic: 21 EDR: 21 LE: 30	Complied
3.6	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2537.90MHz: 60.19dB Restricted Bands [dBuV/m at 3m]: 2483.5MHz 44.40 (Margin 29.6dB) - PK 32.55 (Margin 21.45dB) - AV	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied
3.7	15.247(c)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 143.49MHz 33.69 (Margin 9.81dB) - PK	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information				
Frequency Range (MHz)	Bluetooth Version	Ch. Frequency (MHz)	Channel Number	RF Output Power (dBm)
2400-2483.5	v3.0 Basic	2402-2480	0-78 [79]	3.12
Note 1: Bluetooth uses GFSK (1Mbps) modulation for FHSS modulation. Note 2: RF output power specifies that Maximum Peak Conducted Output Power.				

1.1.2 Table for Multiple Listing

The EUT has two models which are listed as table below:

Model	Differences
K1W	For marketing purpose only.
K1Z	

1.1.3 Antenna Information

Antenna Category	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input type="checkbox"/>	Temporary RF connector provided
<input checked="" type="checkbox"/>	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.

Antenna General Information			
Ant. No.	Ant. Cat.	Ant. Type	G _{ANT} (dBi)
1	Integral	PCB	2.78

1.1.4 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	<input type="checkbox"/> Production ; <input checked="" type="checkbox"/> Pre-Production ; <input checked="" type="checkbox"/> Prototype
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device)



	Combined Equipment - Brand Name / Model No.: ...
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
<input type="checkbox"/>	Other:

1.1.5 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
<input checked="" type="checkbox"/> Operated normally hopping mode for worst duty cycle	
<input checked="" type="checkbox"/> Operated test mode for worst duty cycle	
Test Signal Duty Cycle (x)	Power Duty Factor [dB] – (10 log 1/x)
<input checked="" type="checkbox"/> 79.23% - test mode single channel - DH5	1.01
Bluetooth ACL packets can be 1, 3, or 5 time slots. The DH1 packet can cover a single time slot. The DH3 packet can cover up to 3 time slots. The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle.	

1.2 Accessories

Accessories				
No.	Equipment	Brand Name	Model Name	Serial No.
1	-	-	-	-

1.3 Support Equipment

Support Equipment - Conducted Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	E5420	-

Reminder: In the Radiated Emissions tested the EUT was tested alone.

1.4 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2009
- ♦ FCC Public Notice DA 00-705
- ♦ FCC KDB 412172 - Guidelines for Determining the ERP and EIRP

1.5 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C		
		TEL : 886-3-327-3456	FAX : 886-3-327-0973	
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
Conducted Emission	CO04-HY	Bill Hsiao	20°C / 53%	27-Feb-13
RF Conducted	TH01-HY	Ian Du	24°C / 63%	27-Feb-13 ~28- Feb-13
Radiated Emission	03CH05-HY	Daniel Hsu	24°C / 63%	25-Feb-13 ~04-Mar-13
Test site registered number [643075] with FCC. Test site registered number [4086B-1] with IC.				

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty			
Test Item		Uncertainty	Limit
AC power-line conducted emissions		±2.26 dB	N/A
Emission bandwidth,		±1.42 %	N/A
RF output power, conducted		±0.63 dB	N/A
Unwanted emissions, conducted	30 – 1000 MHz	±0.51 dB	N/A
	1 – 18 GHz	±0.67 dB	N/A
	18 – 40 GHz	±0.83 dB	N/A
	40 – 200 GHz	N/A	N/A
All emissions, radiated	30 – 1000 MHz	±2.56 dB	N/A
	1 – 18 GHz	±3.59 dB	N/A
	18 – 40 GHz	±3.82 dB	N/A
	40 – 200 GHz	N/A	N/A
Temperature		±0.8 °C	N/A
Humidity		±3 %	N/A
DC and low frequency voltages		±3 %	N/A
Time		±1.42 %	N/A
Duty Cycle		±1.42 %	N/A

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Worst Modulation Used for Conformance Testing					
Bluetooth Version	Number of Transmit Chains (N _{TX})	Data Rate	Modulation Mode	RF Output Power (dBm)	Worst Modulation Mode
v3.0 Basic	1	1 Mbps	BT-1M	3.12	BT-1M
Note 1: Bluetooth uses GFSK (1Mbps) modulation for FHSS modulation. Note 2: Modulation modes consist of FHSS BT-1M: GFSK (1Mbps), Note 3: RF output power specifies that that Maximum Peak Conducted Output Power.					

2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration		
Bluetooth Version	Worst Modulation Mode	Test Channel Frequencies (MHz) – FX (Frequencies Abbreviations)
v3.0 Basic	BT-1M	2402-(F1), 2441-(F2), 2480-(F3)

2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter					
Test Software Version		BLUETOOL_MI_1.4.5.4			
Worst Modulation Mode	Number of Transmit Chains (N _{TX})	Frequency (MHz)	Power Setting	Data Rate	RF Output Power (dBm)
BT-1M	1	2402	Default	1 Mbps	3.05
BT-1M	1	2441	Default	1 Mbps	3.12
BT-1M	1	2480	Default	1 Mbps	3.04
Note 1: RF output power specifies that that Maximum Peak Conducted Output Power.					




2.4 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	Normal Link

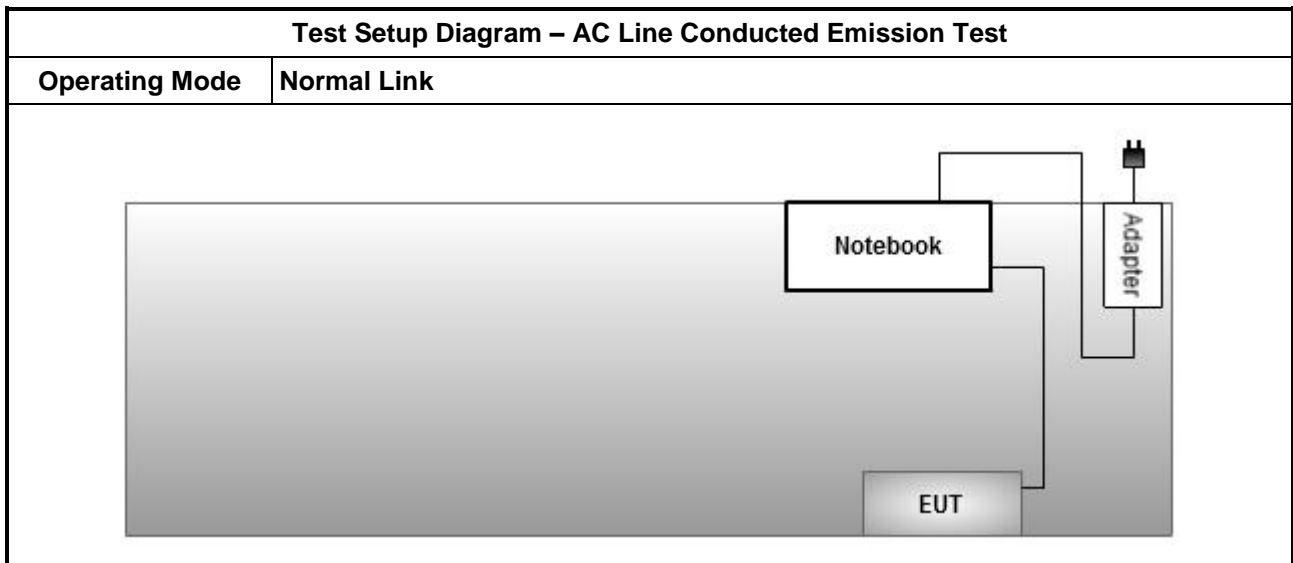
The Worst Case Mode for Following Conformance Tests			
Tests Item	RF Output Power 20dB Bandwidth Carrier Frequency Separation (ChS)		
Test Condition	Conducted measurement at transmit chains		
Modulation Mode	Number of Transmit Chains (N_{TX})	Data Rate / MCS	Test Frequency
BT-1M	1	1 Mbps	F1, F2, F3

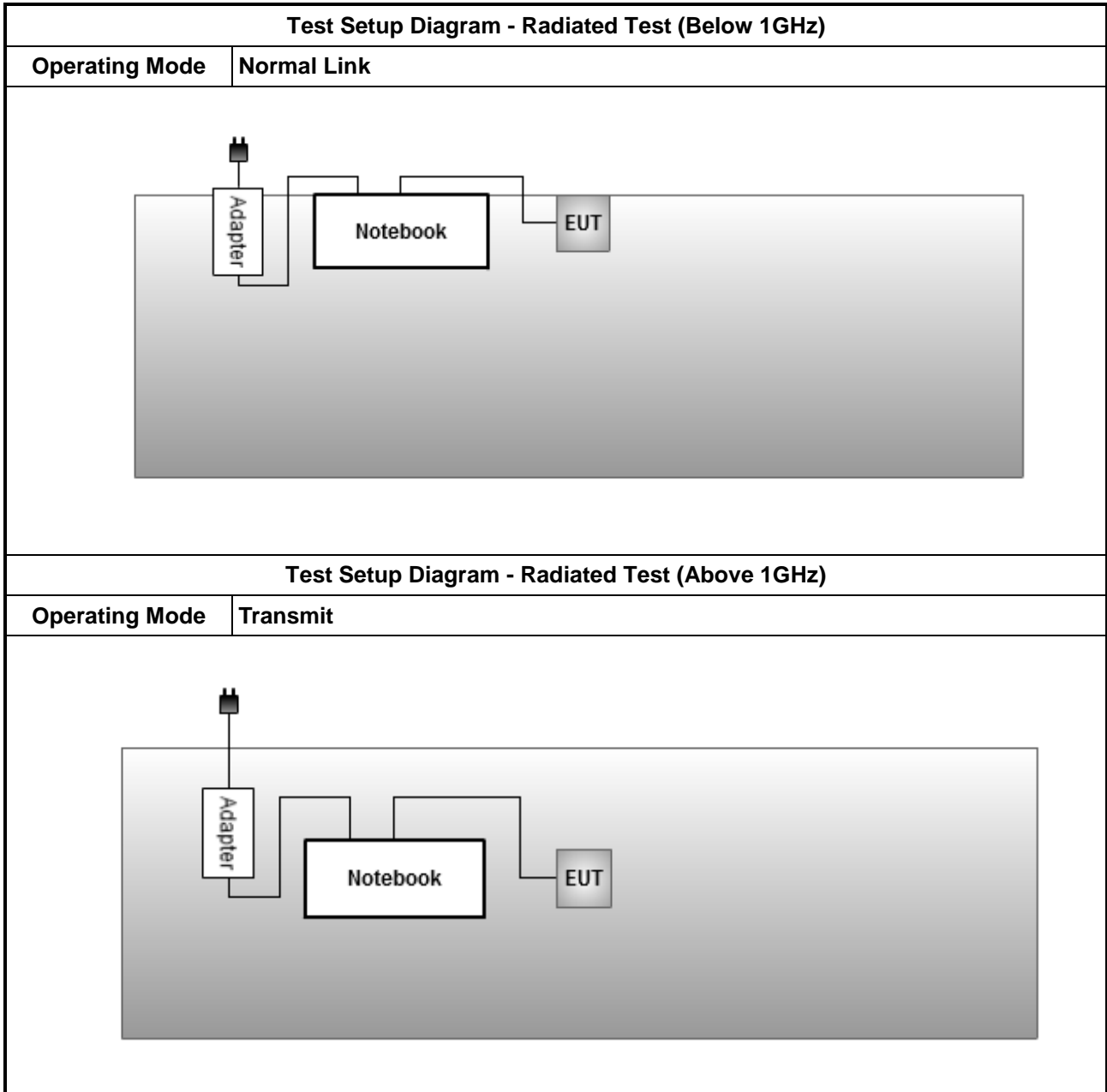
The Worst Case Mode for Following Conformance Tests			
Tests Item	Number of Hopping Frequencies (N) Time of Occupancy (Dwell Time)		
Test Condition	Conducted measurement at transmit chains		
Modulation Mode	Number of Transmit Chains (N_{TX})	Data Rate / MCS	Test Frequency
BT-1M	1	1 Mbps	Hopping

The Worst Case Mode for Following Conformance Tests			
Tests Item	Transmitter Radiated Bandedge Emissions		
Test Condition	Radiated measurement		
Modulation Mode	Number of Transmit Chains (N_{TX})	Data Rate / MCS	Test Frequency
BT-1M	1	1 Mbps	F1, F3

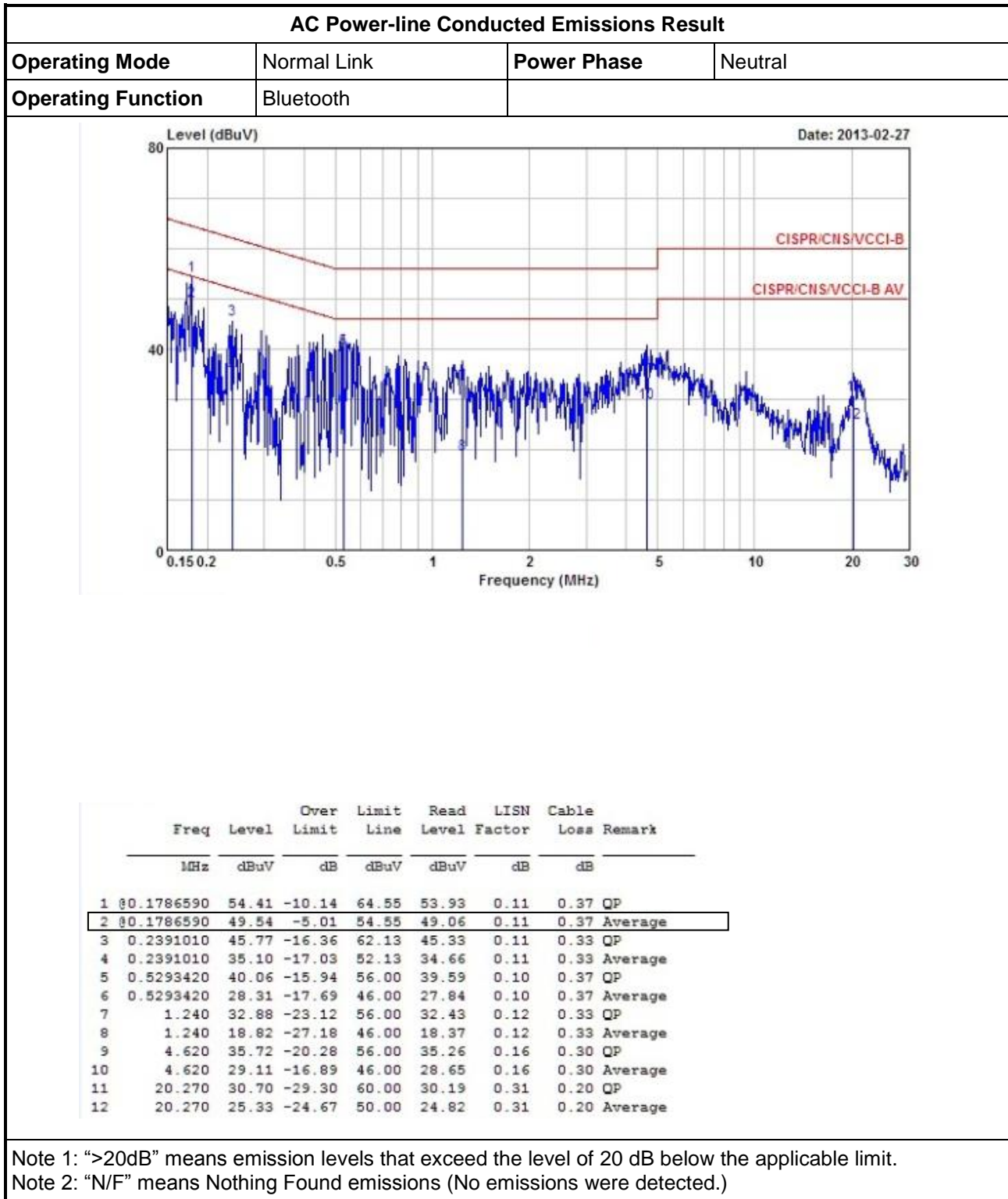
The Worst Case Mode for Following Conformance Tests			
Tests Item	Transmitter Radiated Unwanted Emissions		
Test Condition	Radiated measurement		
User Position	<input checked="" type="checkbox"/> EUT will be placed in fixed position.		
	<input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two or three orthogonal planes.		
	<input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed three orthogonal planes. Worst orthogonal planes of EUT is Z plane.		
Operating Mode < 1GHz	<input checked="" type="checkbox"/> 1. Normal Link		
Modulation Mode	Data Rate / MCS	Test Frequency	
BT-1M	1 Mbps	F1, F2, F3	
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			

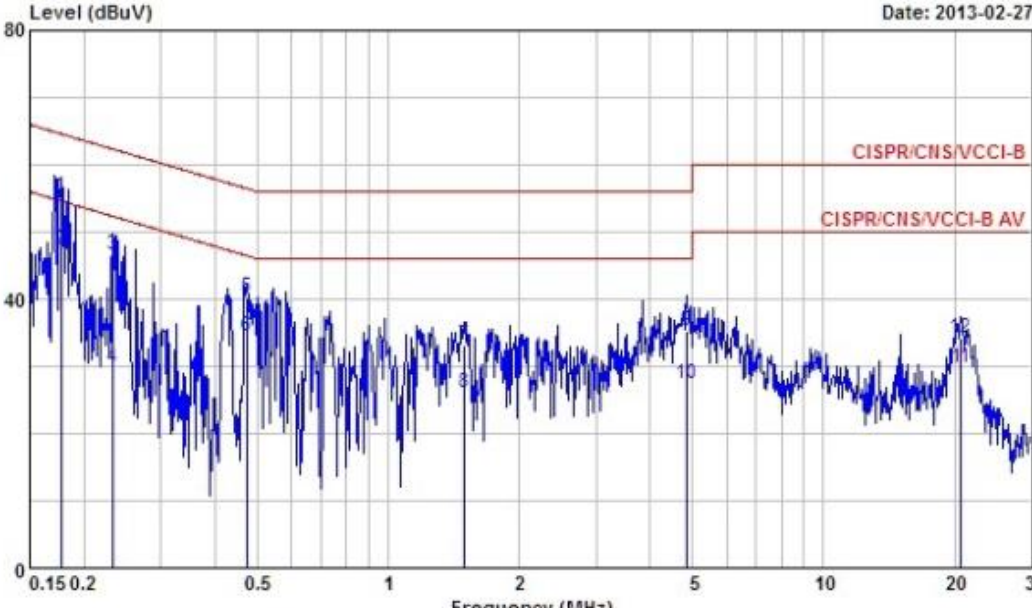
2.5 Test Setup Diagram





3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result																																																																																																																																										
Operating Mode	Normal Link	Power Phase	Line																																																																																																																																							
Operating Function	Bluetooth																																																																																																																																									
Date: 2013-02-27																																																																																																																																										
																																																																																																																																										
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Freq</th> <th>Level</th> <th>Over</th> <th>Limit</th> <th>Read</th> <th>LISN</th> <th>Cable</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV</th> <th>Limit</th> <th>Line</th> <th>Level</th> <th>Factor</th> <th>Loss</th> <th></th> </tr> <tr> <th></th> <th></th> <th></th> <th>dB</th> <th>dBuV</th> <th>dBuV</th> <th>dB</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr><td>1</td><td>0.1781250</td><td>55.23</td><td>-9.34</td><td>64.57</td><td>54.63</td><td>0.23</td><td>0.37</td><td>QP</td></tr> <tr><td>2</td><td>0.1781250</td><td>47.37</td><td>-7.20</td><td>54.57</td><td>46.77</td><td>0.23</td><td>0.37</td><td>Average</td></tr> <tr><td>3</td><td>0.2328500</td><td>46.70</td><td>-15.65</td><td>62.35</td><td>46.15</td><td>0.23</td><td>0.32</td><td>QP</td></tr> <tr><td>4</td><td>0.2328500</td><td>29.71</td><td>-22.64</td><td>52.35</td><td>29.16</td><td>0.23</td><td>0.32</td><td>Average</td></tr> <tr><td>5</td><td>0.4736030</td><td>40.14</td><td>-16.31</td><td>56.45</td><td>39.54</td><td>0.22</td><td>0.38</td><td>QP</td></tr> <tr><td>6</td><td>0.4736030</td><td>34.50</td><td>-11.95</td><td>46.45</td><td>33.90</td><td>0.22</td><td>0.38</td><td>Average</td></tr> <tr><td>7</td><td>1.490</td><td>33.28</td><td>-22.72</td><td>56.00</td><td>32.68</td><td>0.24</td><td>0.36</td><td>QP</td></tr> <tr><td>8</td><td>1.490</td><td>26.13</td><td>-19.87</td><td>46.00</td><td>25.53</td><td>0.24</td><td>0.36</td><td>Average</td></tr> <tr><td>9</td><td>4.850</td><td>35.18</td><td>-20.82</td><td>56.00</td><td>34.56</td><td>0.32</td><td>0.30</td><td>QP</td></tr> <tr><td>10</td><td>4.850</td><td>27.48</td><td>-18.52</td><td>46.00</td><td>26.86</td><td>0.32</td><td>0.30</td><td>Average</td></tr> <tr><td>11</td><td>20.700</td><td>29.74</td><td>-20.26</td><td>50.00</td><td>28.97</td><td>0.57</td><td>0.20</td><td>Average</td></tr> <tr><td>12</td><td>20.700</td><td>34.22</td><td>-25.78</td><td>60.00</td><td>33.45</td><td>0.57</td><td>0.20</td><td>QP</td></tr> </tbody> </table>					Freq	Level	Over	Limit	Read	LISN	Cable	Remark		MHz	dBuV	Limit	Line	Level	Factor	Loss					dB	dBuV	dBuV	dB	dB		1	0.1781250	55.23	-9.34	64.57	54.63	0.23	0.37	QP	2	0.1781250	47.37	-7.20	54.57	46.77	0.23	0.37	Average	3	0.2328500	46.70	-15.65	62.35	46.15	0.23	0.32	QP	4	0.2328500	29.71	-22.64	52.35	29.16	0.23	0.32	Average	5	0.4736030	40.14	-16.31	56.45	39.54	0.22	0.38	QP	6	0.4736030	34.50	-11.95	46.45	33.90	0.22	0.38	Average	7	1.490	33.28	-22.72	56.00	32.68	0.24	0.36	QP	8	1.490	26.13	-19.87	46.00	25.53	0.24	0.36	Average	9	4.850	35.18	-20.82	56.00	34.56	0.32	0.30	QP	10	4.850	27.48	-18.52	46.00	26.86	0.32	0.30	Average	11	20.700	29.74	-20.26	50.00	28.97	0.57	0.20	Average	12	20.700	34.22	-25.78	60.00	33.45	0.57	0.20	QP
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<p>Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)</p>																																																																																																																																										

3.2 20dB Bandwidth and Carrier Frequency Separation

3.2.1 20dB Bandwidth and Carrier Frequency Separation Limit

20dB Bandwidth and Carrier Frequency Separation Limit for Frequency Hopping Systems	
<input type="checkbox"/>	902-928 MHz Band:
<input type="checkbox"/>	N ≥ 50 and 20 dB bandwidth < 250 kHz
<input type="checkbox"/>	50 > N ≥ 25 and 250kHz ≤ 20 dB bandwidth ≤ 500 kHz
<input checked="" type="checkbox"/>	2400-2483.5 MHz Band:
<input type="checkbox"/>	N ≥ 79 and ChS ≥ MAX (20 dB bandwidth, 25 kHz).
<input checked="" type="checkbox"/>	N ≥ 15 and ChS ≥ MAX (20 dB bandwidth x 2/3, 25 kHz).
<input type="checkbox"/>	5725-5850 MHz Band: N ≥ 79 and 20 dB bandwidth ≤ 1 MHz
N: Number of Hopping Frequencies ChS: Hopping Channel Separation	

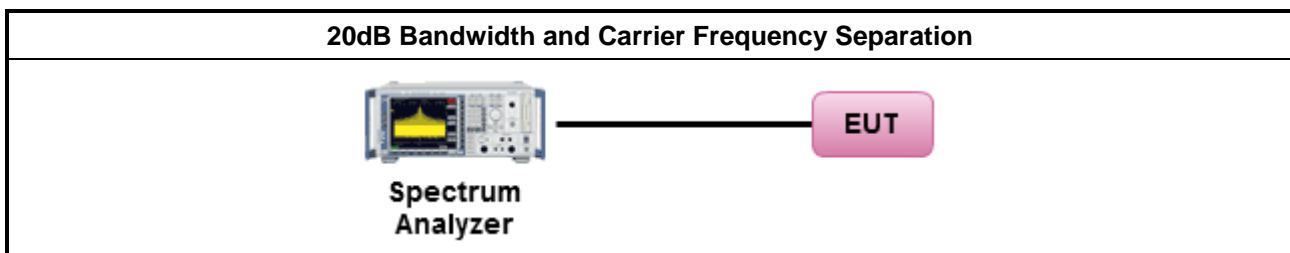
3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

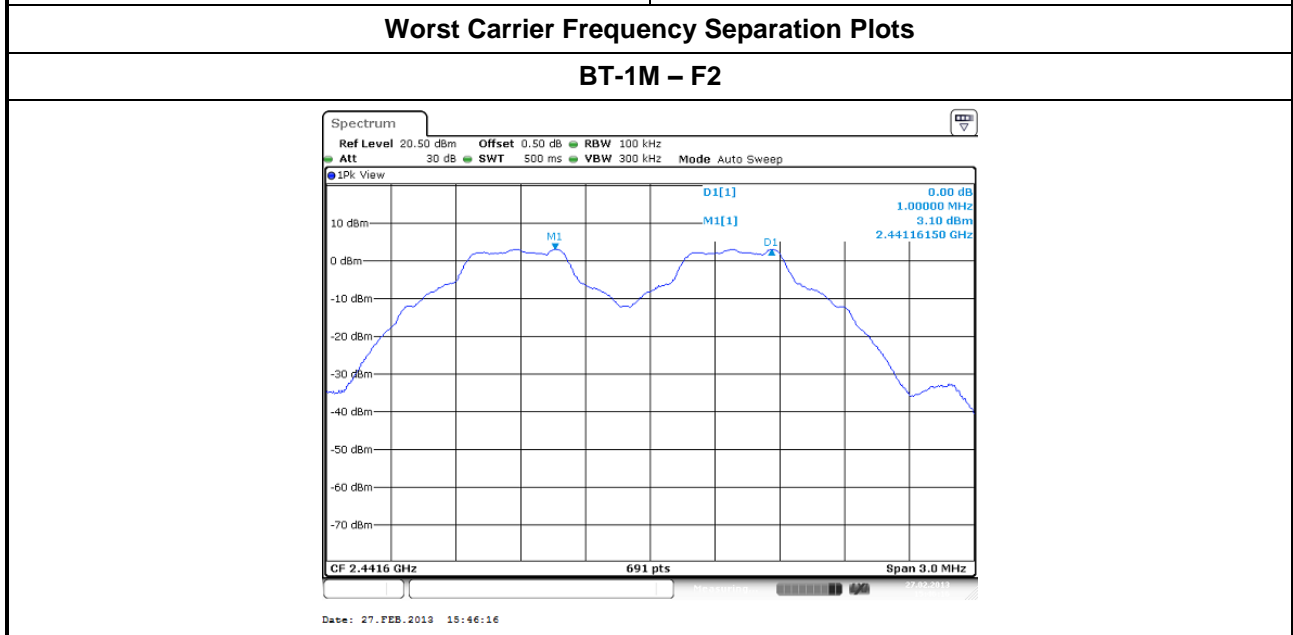
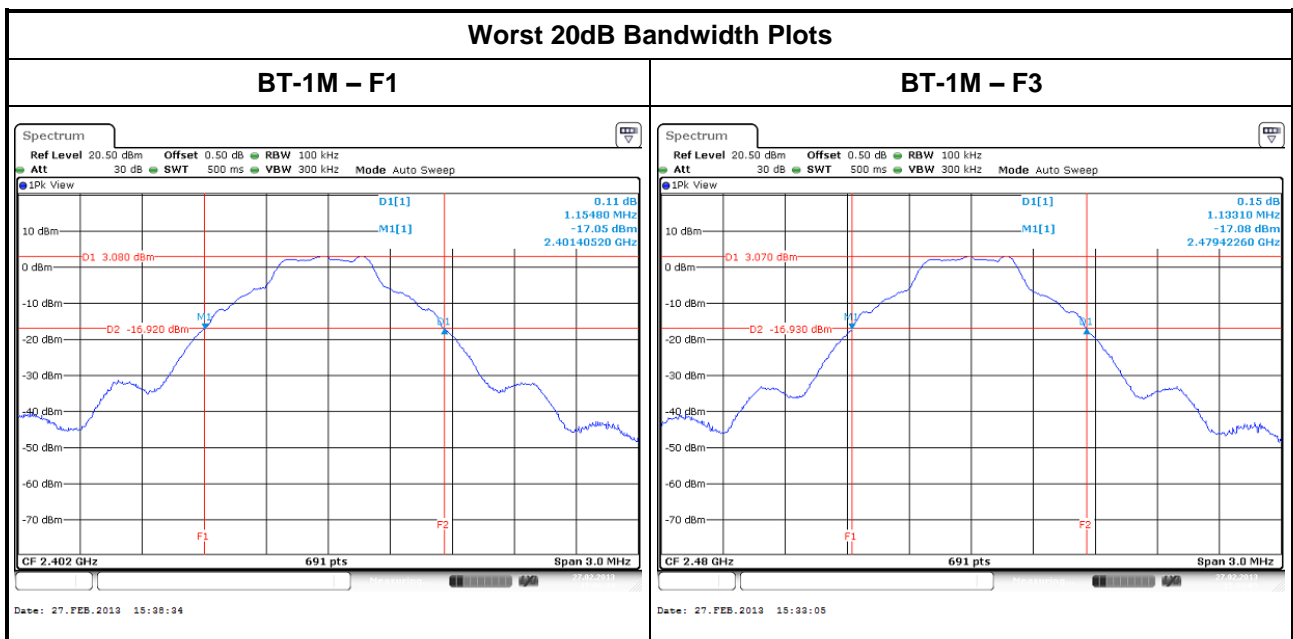
Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.1 for 20 dB bandwidth measurement.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 7.7.2 for carrier frequency separation measurement.
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	For conducted measurements on devices with single transmit chains.
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains using options given below:
<input type="checkbox"/>	Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1.
<input type="checkbox"/>	Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains.
<input type="checkbox"/>	Option 3: A power splitter/combiner shall be used to combine all the transmit chains (antenna outputs) into a single test point and record a single test point EBW.
<input type="checkbox"/>	For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

3.2.4 Test Setup



3.2.5 Test Result of 20dB Bandwidth and Carrier Frequency Separation

20dB Bandwidth and Carrier Frequency Separation Result					
Modulation Mode	Freq. (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)	Channel Separation (MHz)	Channel Separation Limits (MHz)
BT-1M	2402	1.155	1.016	1.000	0.770
BT-1M	2441	1.133	0.999	1.000	0.755
BT-1M	2480	1.133	0.986	1.000	0.755
Result		Complied			



3.3 Number of Hopping Frequencies

3.3.1 Number of Hopping Frequencies Limit

Number of Hopping Frequencies Limit for Frequency Hopping Systems	
<input type="checkbox"/>	902-928 MHz Band:
<input type="checkbox"/>	N ≥ 50 and 20 dB bandwidth < 250 kHz
<input type="checkbox"/>	50 > N ≥ 25 and 250kHz ≤ 20 dB bandwidth ≤ 500 kHz
<input checked="" type="checkbox"/>	2400-2483.5 MHz Band:
<input type="checkbox"/>	N ≥ 79 and ChS ≥ MAX (20 dB bandwidth, 25 kHz).
<input checked="" type="checkbox"/>	N ≥ 15 and ChS ≥ MAX (20 dB bandwidth x 2/3, 25 kHz).
<input type="checkbox"/>	5725-5850 MHz Band: N ≥ 79
N: Number of Hopping Frequencies ChS: Hopping Channel Separation	

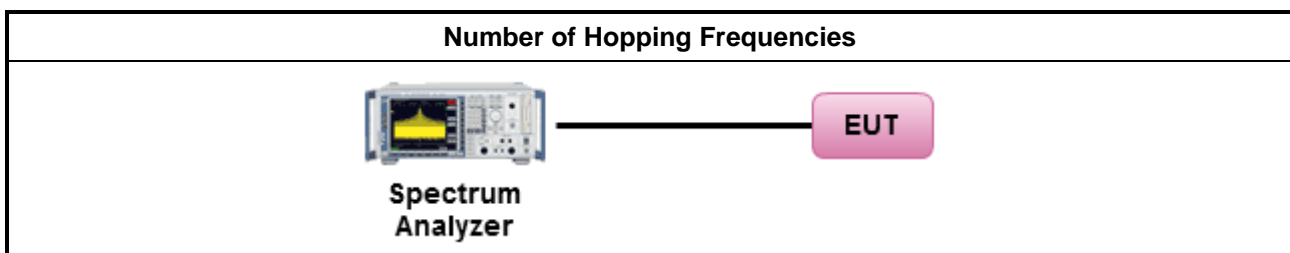
3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

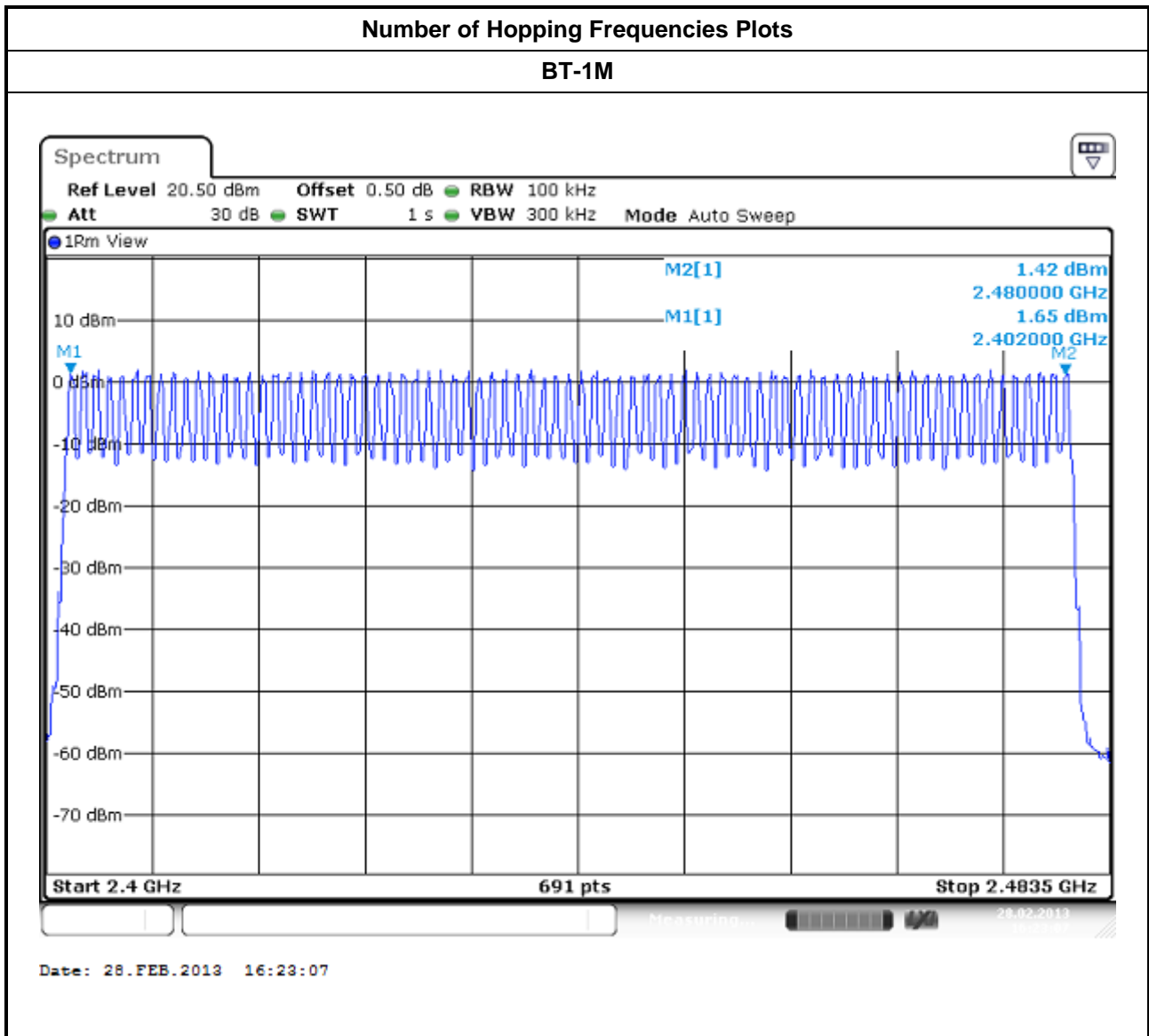
Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 7.7.3 for number of hopping frequencies measurement.
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	For conducted measurements on devices with single transmit chains.
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains using options given below:
<input type="checkbox"/>	Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1.
<input type="checkbox"/>	Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains.
<input type="checkbox"/>	Option 3: A power splitter/combiner shall be used to combine all the transmit chains (antenna outputs) into a single test point and record a single test point EBW.
<input type="checkbox"/>	For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

3.3.4 Test Setup



3.3.5 Test Result of Number of Hopping Frequencies

Number of Hopping Frequencies Result			
Modulation Mode	Freq. (MHz)	Hopping Channel Number (N)	Hopping Channel Number Limits
BT-1M	2402-2480	79	75
Result	Complied		



3.4 Time of Occupancy (Dwell Time)

3.4.1 Time of Occupancy (Dwell Time) Limit

Time of Occupancy (Dwell Time) Limit for Frequency Hopping Systems	
<input type="checkbox"/>	902-928 MHz Band:
<input type="checkbox"/>	N ≥ 50 and 20 dB bandwidth < 250 kHz: Dwell time ≤ 0.4 sec within 20 sec
<input type="checkbox"/>	50 > N ≥ 25 and 250kHz ≤ 20 dB bandwidth ≤ 500 kHz: Dwell time ≤ 0.4 sec within 10 sec
<input checked="" type="checkbox"/>	2400-2483.5 MHz Band: Dwell time ≤ 0.4 second within 0.4 x N
<input type="checkbox"/>	5725-5850 MHz Band: Dwell time ≤ 0.4 second within 30 sec
N: Number of Hopping Frequencies	

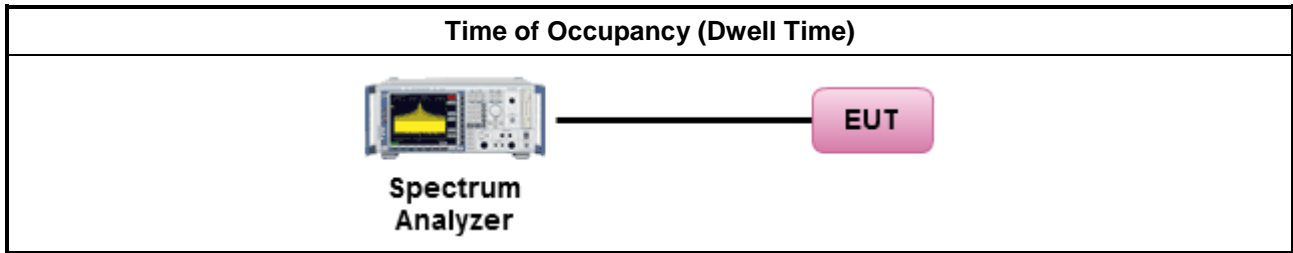
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 7.7.4 for dwell time measurement.
<input checked="" type="checkbox"/>	Bluetooth ACL packets can be 1, 3, or 5 time slots. Following as dwell time. Operate DH5 at maximum dwell time and maximum duty cycle.
<input checked="" type="checkbox"/>	The DH1 packet can cover a single time slot. A maximum length packet has duration of 1 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 1/1600 seconds, or 0.625ms. DH1 Packet permit maximum $1600 / 79 / 2 = 10.12$ hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $10.12 \times 31.6 = 320$ within 31.6 seconds.
<input checked="" type="checkbox"/>	The DH3 packet can cover up to 3 time slots. A maximum length packet has duration of 3 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 3/1600 seconds, or 1.875ms. DH3 Packet permit maximum $1600 / 79 / 4 = 5.06$ hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds.
<input checked="" type="checkbox"/>	The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle. A maximum length packet has duration of 5 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 5/1600 seconds, or 3.125ms. DH5 Packet permit maximum $1600 / 79 / 6 = 3.37$ hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $3.37 \times 31.6 = 106.6$ within 31.6 seconds
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	For conducted measurements on devices with single transmit chains.
<input type="checkbox"/>	For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

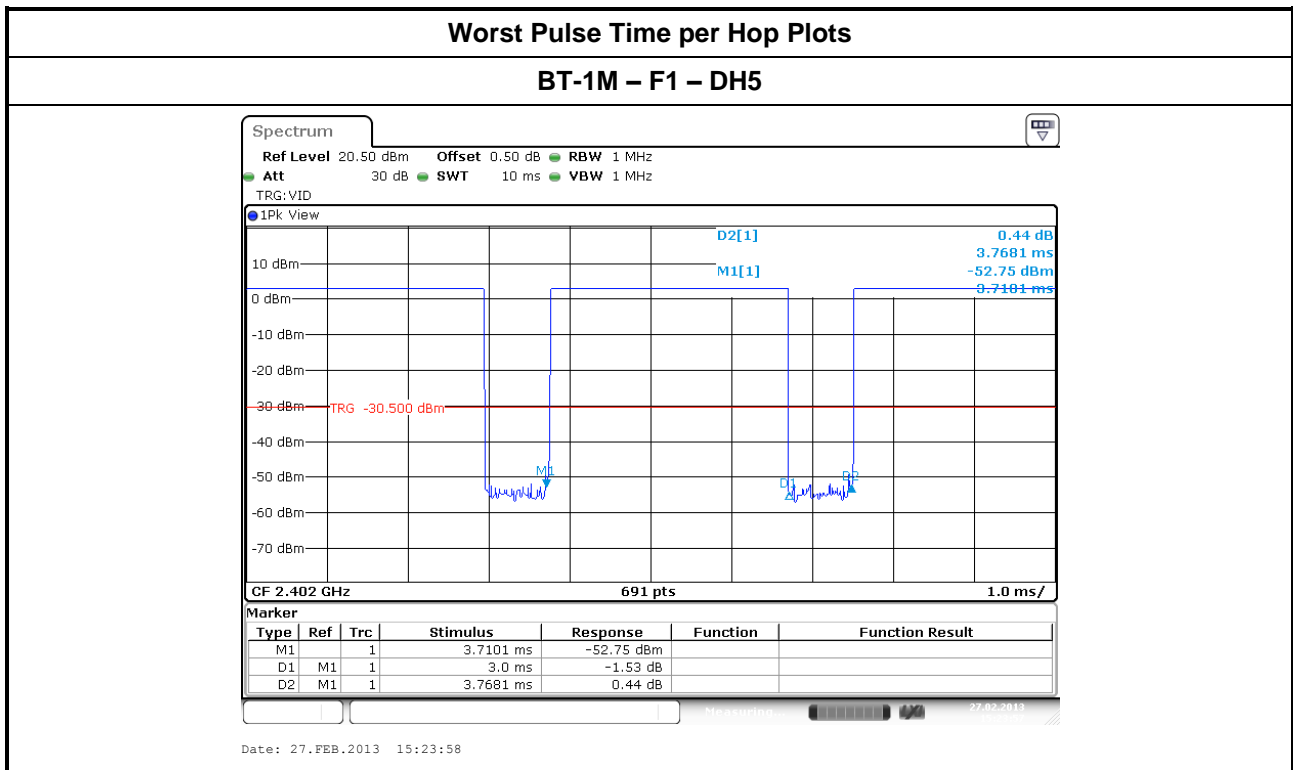
3.4.4 Test Setup



3.4.5 Test Result of Time of Occupancy (Dwell Time)

Time of Occupancy (Dwell Time) Result					
Modulation Mode	Freq. (MHz)	Pulse Time per Hop (ms)	Number of Pulse in [0.4 x N sec]	Dwell Time in [0.4 x N sec] (s)	Dwell Time Limits (s)
BT-1M	2402	79	3.0000	0.3200	0.4000
Result		Complied			

Bluetooth ACL packets can be 1, 3, or 5 time slots. The DH1 packet can cover a single time slot. The DH3 packet can cover up to 3 time slots. The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle. A maximum length packet has duration of 5 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 5/1600 seconds, or 3.125ms.



3.5 RF Output Power

3.5.1 RF Output Power Limit

RF Output Power Limit for Frequency Hopping Systems	
Maximum Peak Conducted Output Power Limit	
<input type="checkbox"/> 902-928 MHz Band:	
<input type="checkbox"/>	For Hopping Channel: $N \geq 50$
<input type="checkbox"/>	<input type="checkbox"/> If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
<input type="checkbox"/>	<input type="checkbox"/> If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
<input type="checkbox"/>	For Hopping Channel: $50 > N \geq 25$
<input type="checkbox"/>	<input type="checkbox"/> If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 24$ dBm (0.25 W)
<input type="checkbox"/>	<input type="checkbox"/> If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$ dBm
<input checked="" type="checkbox"/> 2400-2483.5 MHz Band:	
<input type="checkbox"/>	For Hopping Channel: $N \geq 79$
<input type="checkbox"/>	<input type="checkbox"/> If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
<input type="checkbox"/>	<input type="checkbox"/> If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
<input checked="" type="checkbox"/>	For Hopping Channel: $N \geq 15$
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 21$ dBm (0.125 W)
<input type="checkbox"/>	<input type="checkbox"/> If $G_{TX} > 6$ dBi, then $P_{Out} = 21 - (G_{TX} - 6)$ dBm
<input type="checkbox"/> 5725-5850 MHz Band:	
<input type="checkbox"/>	For Hopping Channel: $N \geq 79$
<input type="checkbox"/>	<input type="checkbox"/> If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
<input type="checkbox"/>	<input type="checkbox"/> If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
e.i.r.p. Power Limit:	
<input type="checkbox"/> 902-928 MHz Band:	
<input type="checkbox"/>	For Hopping Channel: $N \geq 50 - P_{eirp} \leq 36$ dBm (4 W)
<input type="checkbox"/>	For Hopping Channel: $50 > N \geq 25 - P_{eirp} \leq 30$ dBm (1 W)
<input checked="" type="checkbox"/> 2400-2483.5 MHz Band:	
<input type="checkbox"/>	For Hopping Channel: $N \geq 79 - P_{eirp} \leq 36$ dBm (4 W)
<input checked="" type="checkbox"/>	For Hopping Channel: $79 > N \geq 15 - P_{eirp} \leq 27$ dBm (0.5 W)
<input type="checkbox"/> 5725-5850 MHz Band:	
<input type="checkbox"/>	For Hopping Channel: $N \geq 79 - P_{eirp} \leq 36$ dBm (4 W)
<p>G_{TX} = the maximum transmitting antenna directional gain in dBi. P_{eirp} = e.i.r.p. Power in dBm. N: Number of Hopping Frequencies ChS: Hopping Channel Separation</p>	

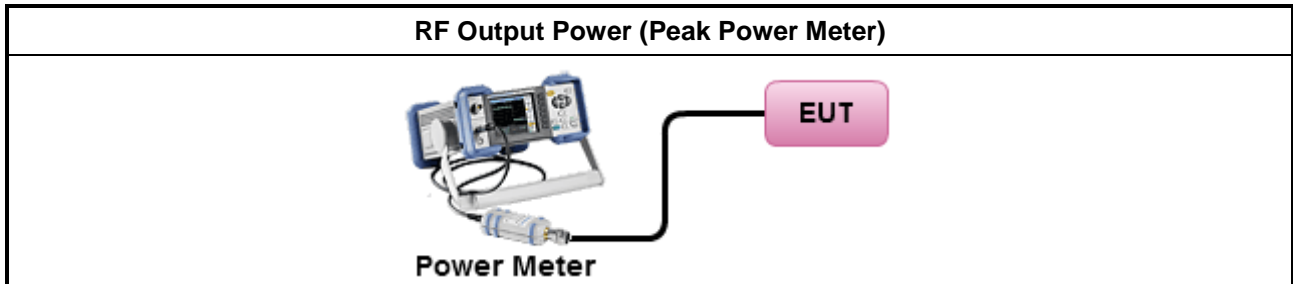
3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Maximum Peak Conducted Output Power
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.2.1.1 Option 1 (RBW \geq EBW method).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.2.1.2 Option 2 (integrated band power method).
<input type="checkbox"/>	Refer as FCC DA 00-0705, spectrum analyzer for peak power.
<input checked="" type="checkbox"/>	Refer as FCC DA 00-0705, peak power meter for peak power.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.2.1 a) for peak power meter.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.2.1 a) for spectrum analyzer - (RBW \geq EBW).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.2.1 b) for spectrum analyzer - BW correction factor.

3.5.4 Test Setup

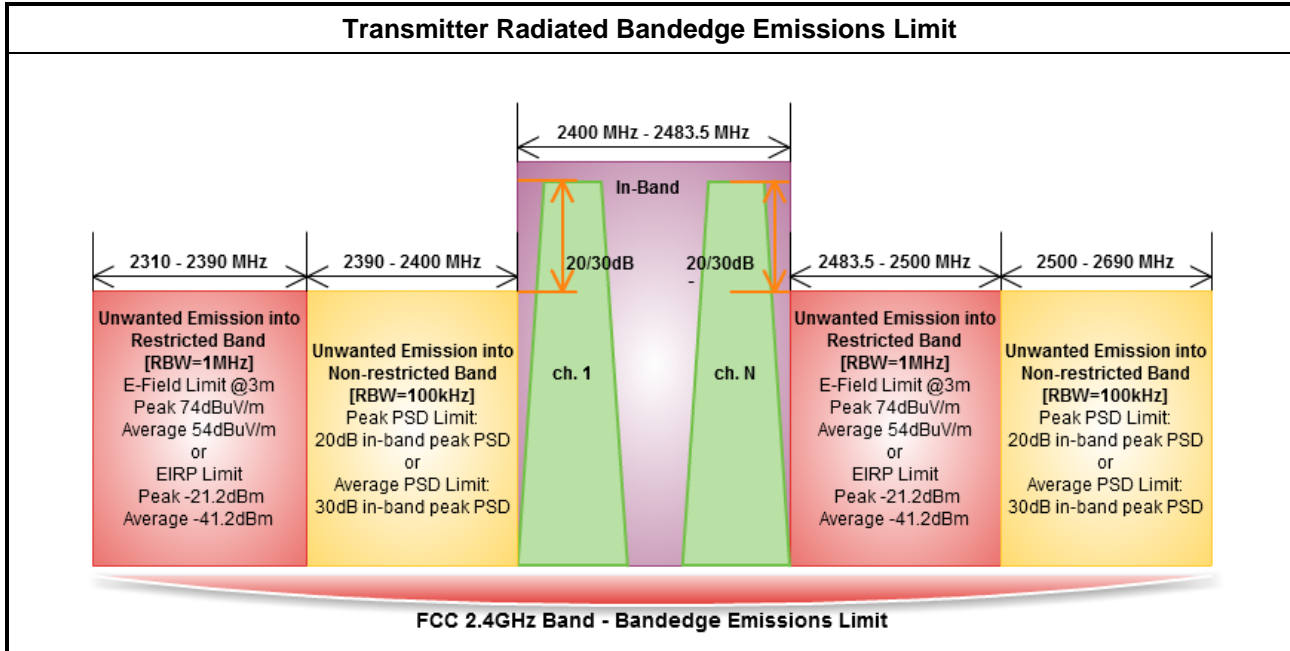


3.5.5 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result					
Directional Gain (dBi)	2.78	RF Output Power (dBm)			
Modulation Mode	Freq. (MHz)	RF Output Power	Power Limit	EIRP Power	EIRP Limit
BT-1M	2402	3.05	30	5.83	36
BT-1M	2441	3.12	30	5.90	36
BT-1M	2480	3.04	30	5.82	36
Result		Complied			
RF Output Power Limit for Frequency Hopping Systems					

3.6 Transmitter Radiated Bandedge Emissions

3.6.1 Transmitter Radiated Bandedge Emissions Limit



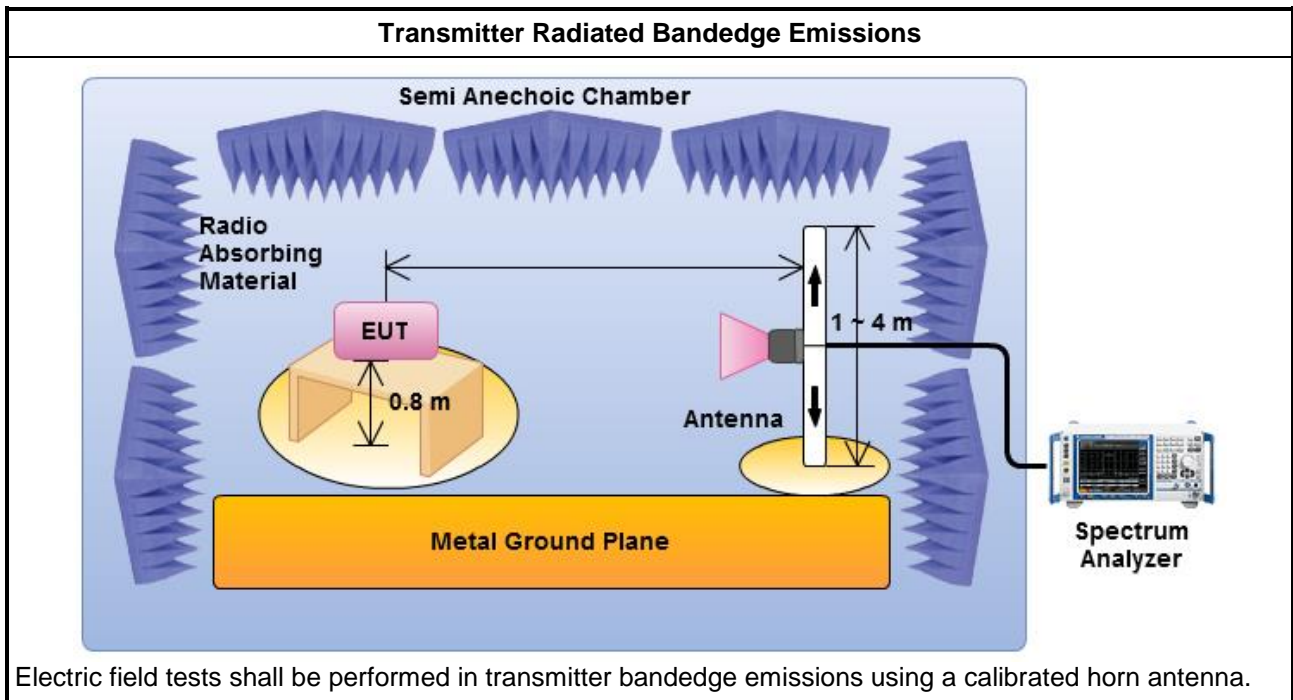
3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

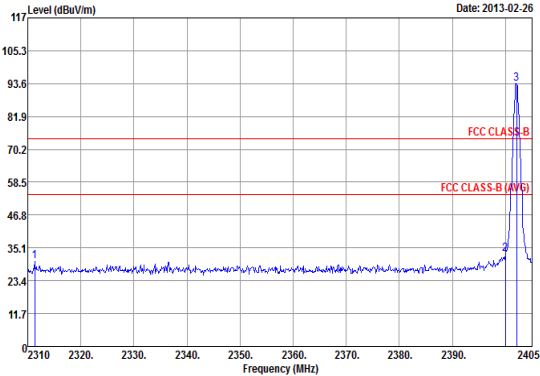
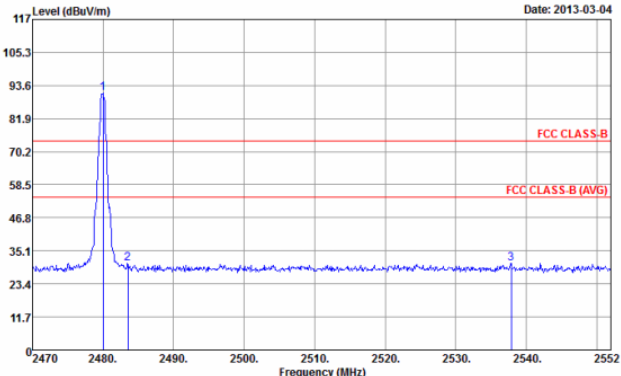
3.6.3 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	For unwanted emissions into non-restricted bands, 20 dB relative to the in-band peak output power in 100 kHz.
<input checked="" type="checkbox"/>	For unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). – Duty cycle ≥ 98%.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
<input checked="" type="checkbox"/>	For the transmitter bandedge emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2 for band-edge testing.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 7.7.9 for band-edge testing into non-restricted bands.

3.6.4 Test Setup



3.6.5 Test Result of Transmitter Radiated Bandedge Emissions

Transmitter Radiated Bandedge Emissions Result								
Modulation	BT-1M		Non-restricted Band Emissions					
Non-restricted Band (MHz)	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	2402	93.56	2399.96	33.04	60.52	20	PK	H
2500-2690	2480	90.78	2537.90	30.59	60.19	20	PK	H
Low Bandedge				Up Bandedge				
								
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)								

Transmitter Radiated Bandedge Emissions Result								
Modulation	BT-1M		Restricted Band Emissions					
Restricted Band (MHz)	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dBuV/m)	Level Type	Pol. note 1
2310-2390	2402	93.87	2390	3	44.19	74	PK	H
2310-2390	2402	93.56	2390	3	30.45	54	AV	H
2483.5-2500	2480	91.08	2483.5	3	44.40	74	PK	H
2483.5-2500	2480	90.71	2483.5	3	32.55	54	AV	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).								
Note 2: the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log (dwell time/100 ms) [-30dB]								

3.7 Transmitter Radiated Unwanted Emissions

3.7.1 Transmitter Radiated Unwanted Emissions Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

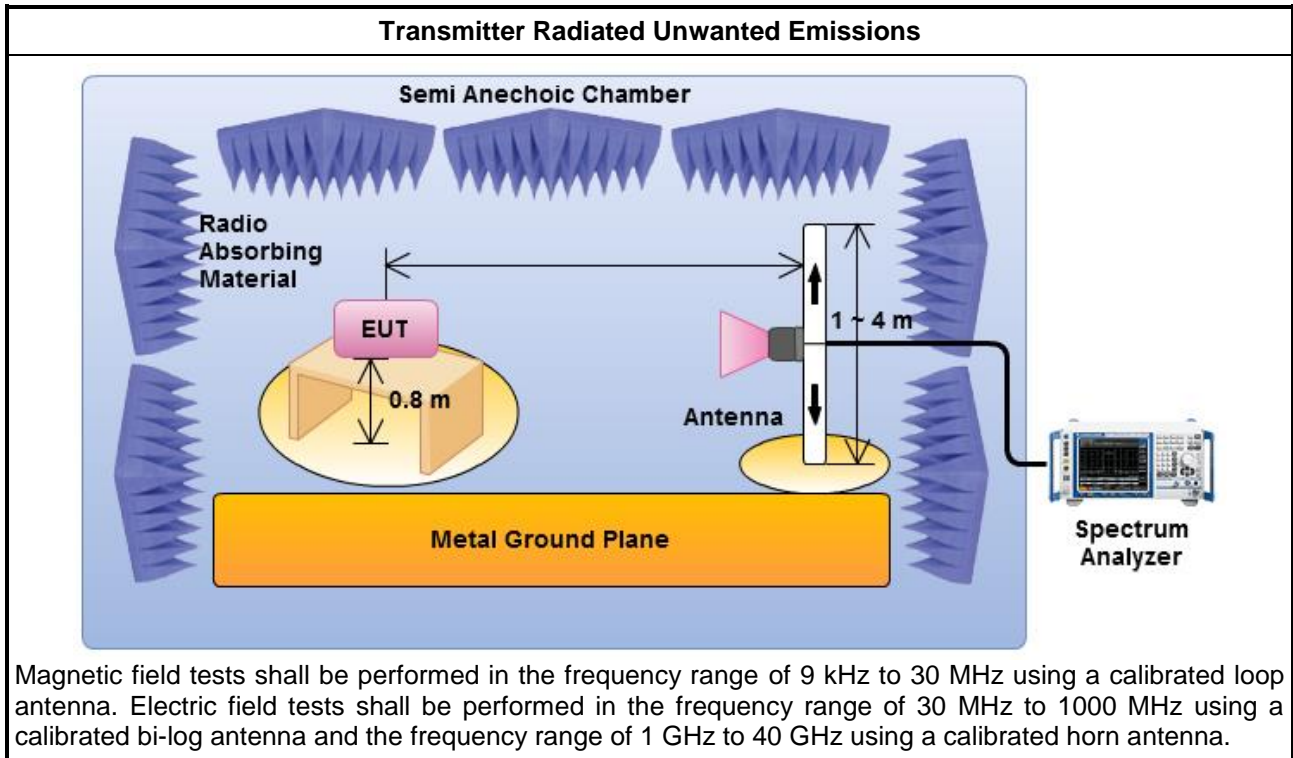
3.7.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
<input checked="" type="checkbox"/>	Measurements in the frequency range 10 GHz - 18GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input checked="" type="checkbox"/>	Measurements in the frequency range above 18 GHz - 25GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as FCC DA 00-0705, for spurious radiated emissions. The dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from $20\log(\text{dwell time}/100 \text{ ms})$
<input checked="" type="checkbox"/>	For unwanted emissions into non-restricted bands, 20 dB relative to the in-band peak output power in 100 kHz.
<input checked="" type="checkbox"/>	For unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty cycle \geq 98%.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
<input type="checkbox"/>	Refer as FCC DA 00-0705, for conducted measurement.
<input checked="" type="checkbox"/>	For radiated measurement.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.

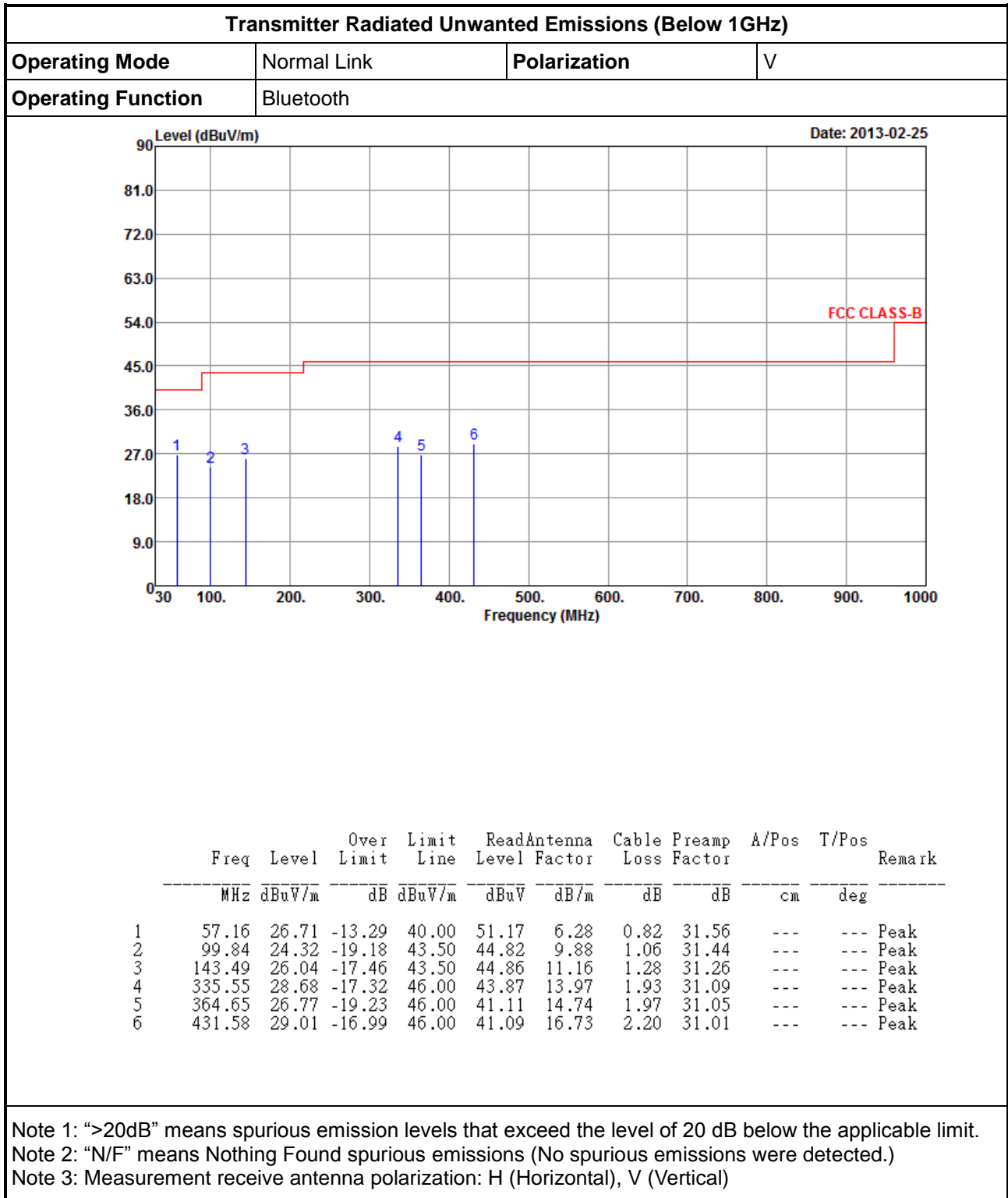
3.7.4 Test Setup

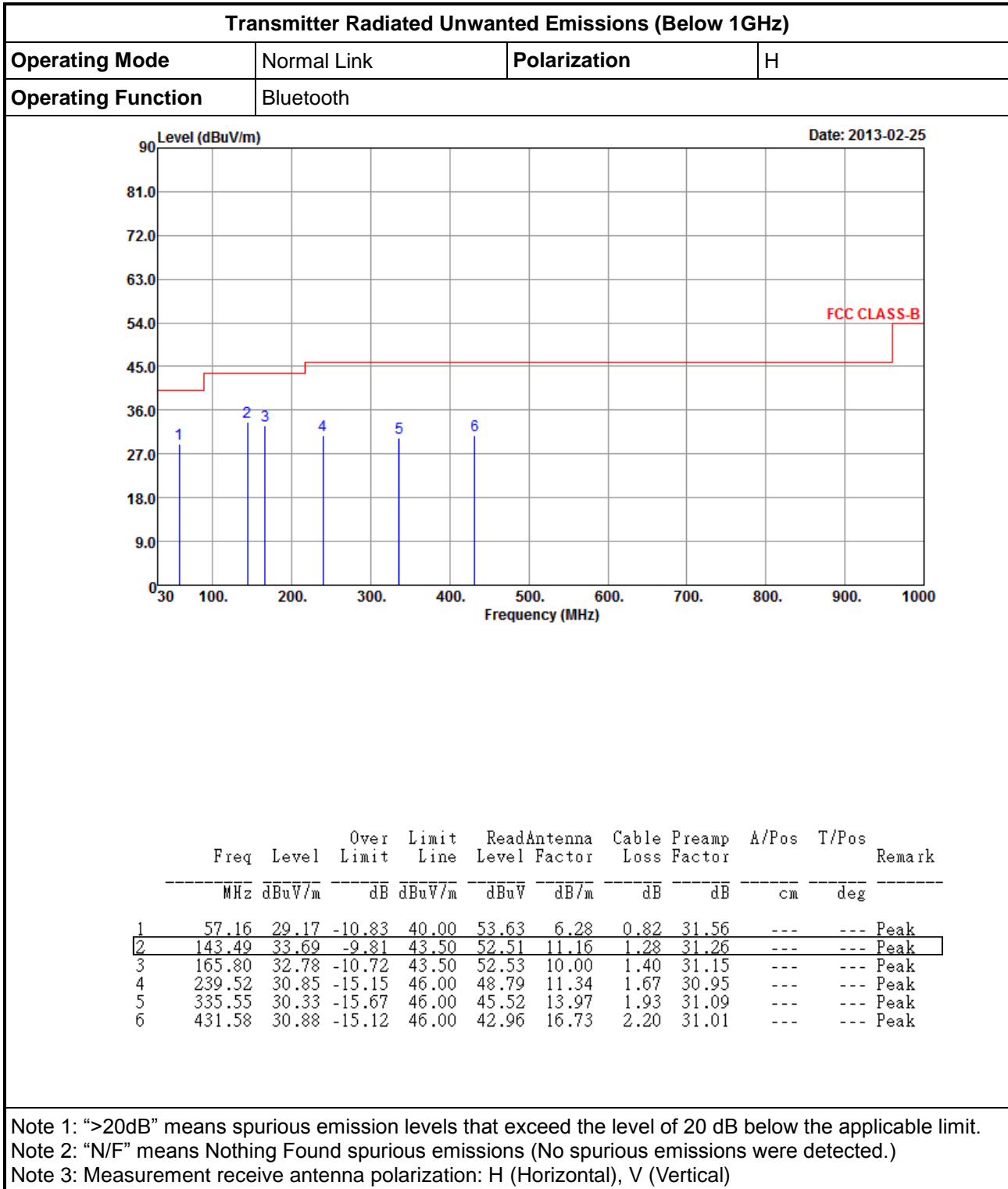


3.7.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

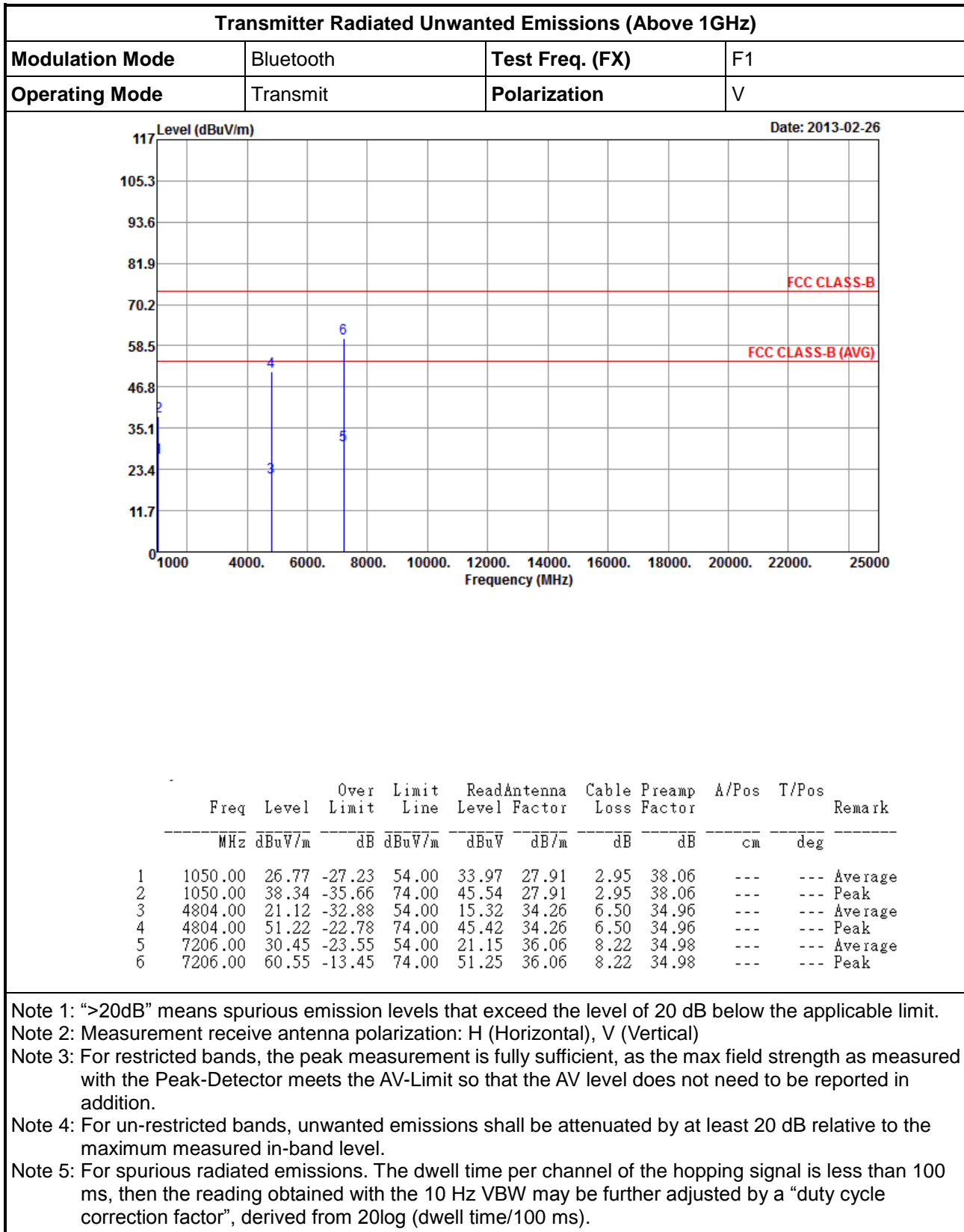
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.7.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)





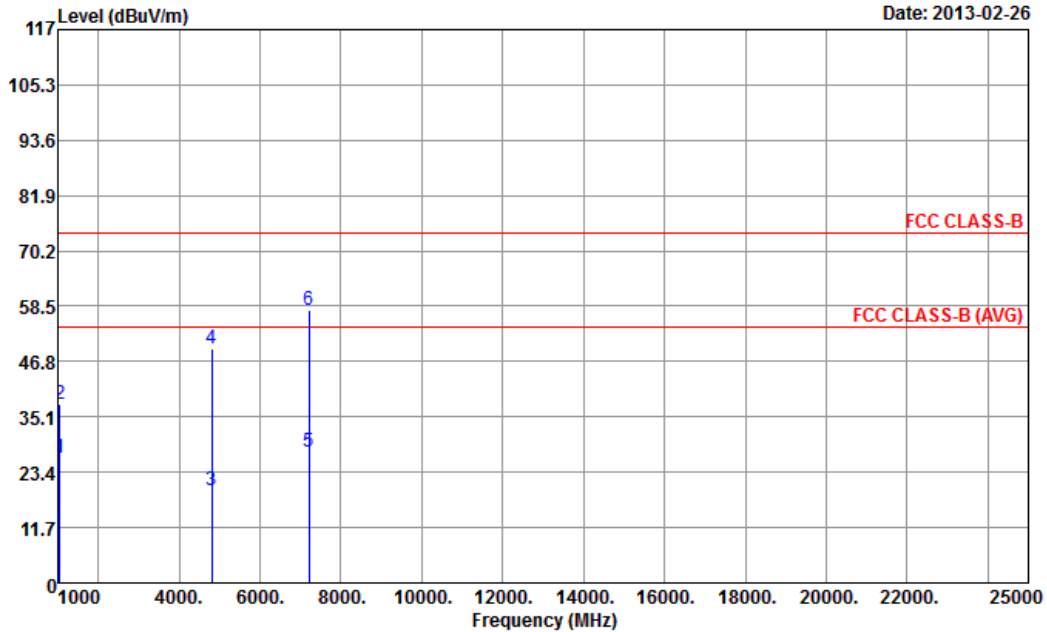
3.7.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for BT-1M





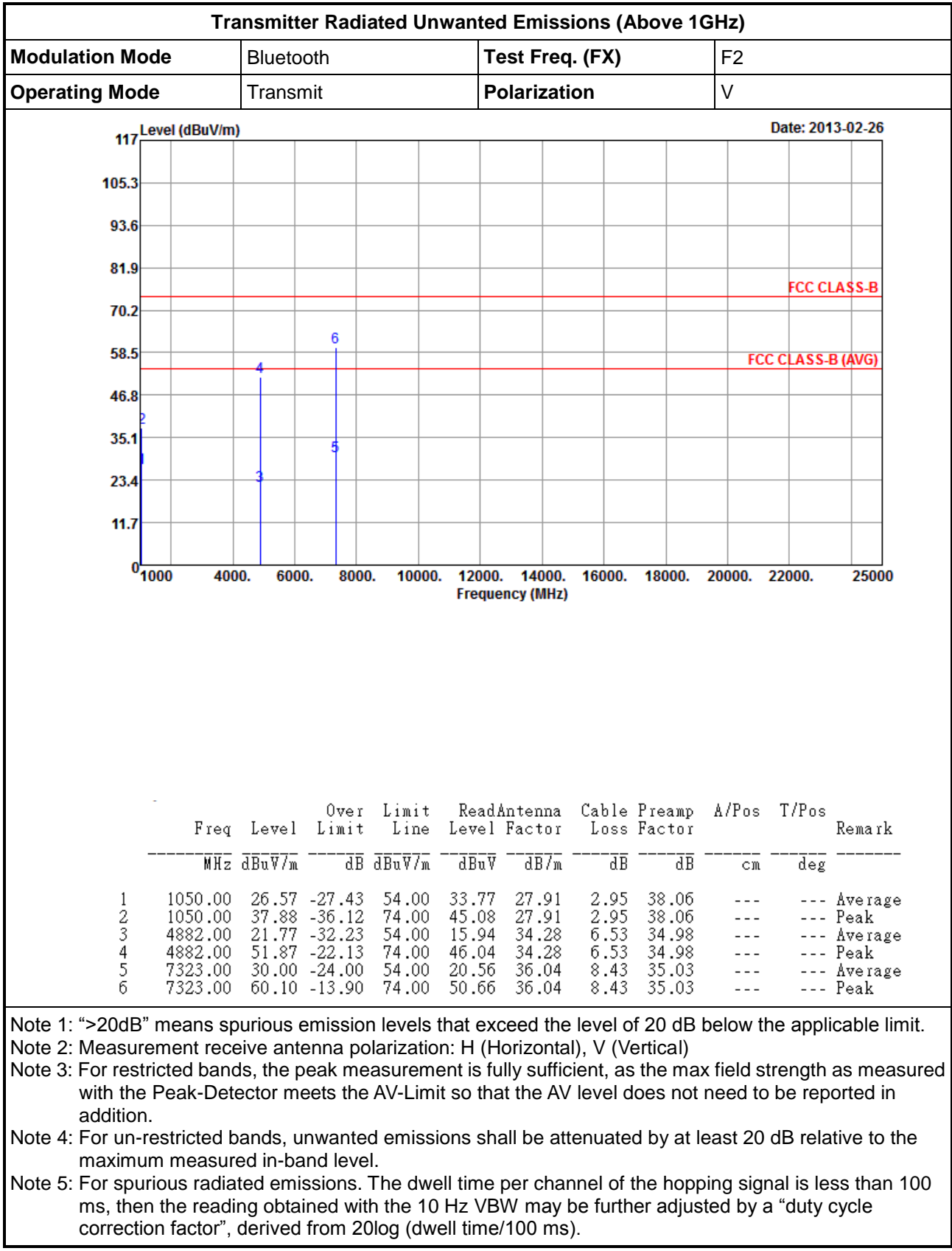
Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	Bluetooth	Test Freq. (FX)	F1
Operating Mode	Transmit	Polarization	H



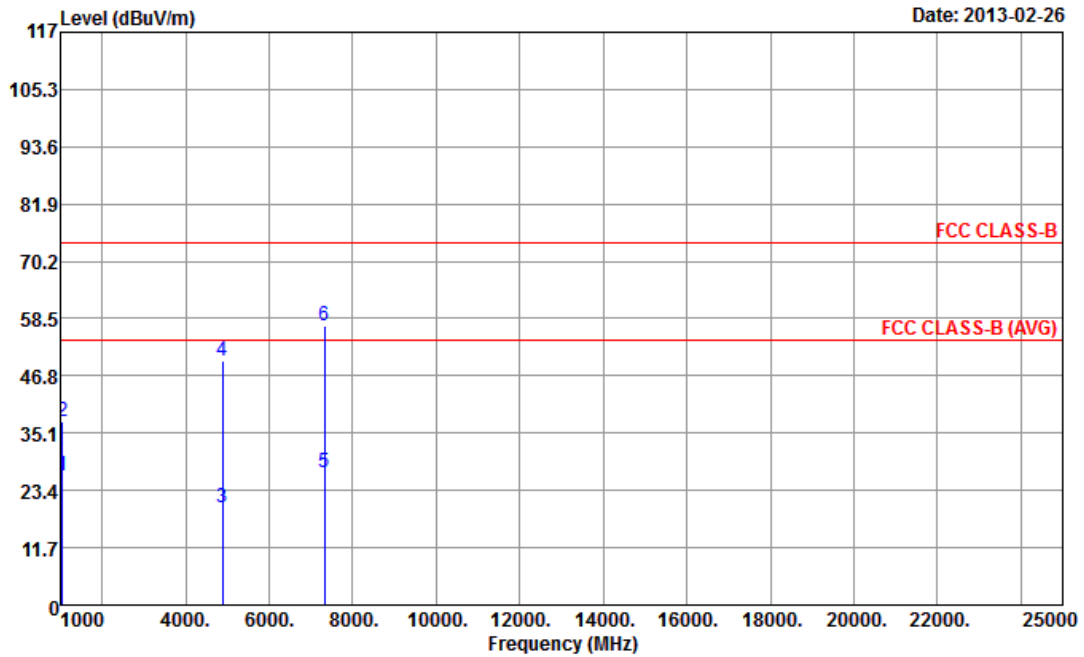
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1050.00	26.55	-27.45	54.00	33.75	27.91	2.95	38.06	---	---	Average
2	1050.00	37.95	-36.05	74.00	45.15	27.91	2.95	38.06	---	---	Peak
3	4804.00	19.41	-34.59	54.00	13.61	34.26	6.50	34.96	---	---	Average
4	4804.00	49.51	-24.49	74.00	43.71	34.26	6.50	34.96	---	---	Peak
5	7206.00	27.58	-26.42	54.00	18.28	36.06	8.22	34.98	---	---	Average
6	7206.00	57.68	-16.32	74.00	48.38	36.06	8.22	34.98	---	---	Peak

- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
- Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
- Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
- Note 4: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.
- Note 5: For spurious radiated emissions. The dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log (dwell time/100 ms).



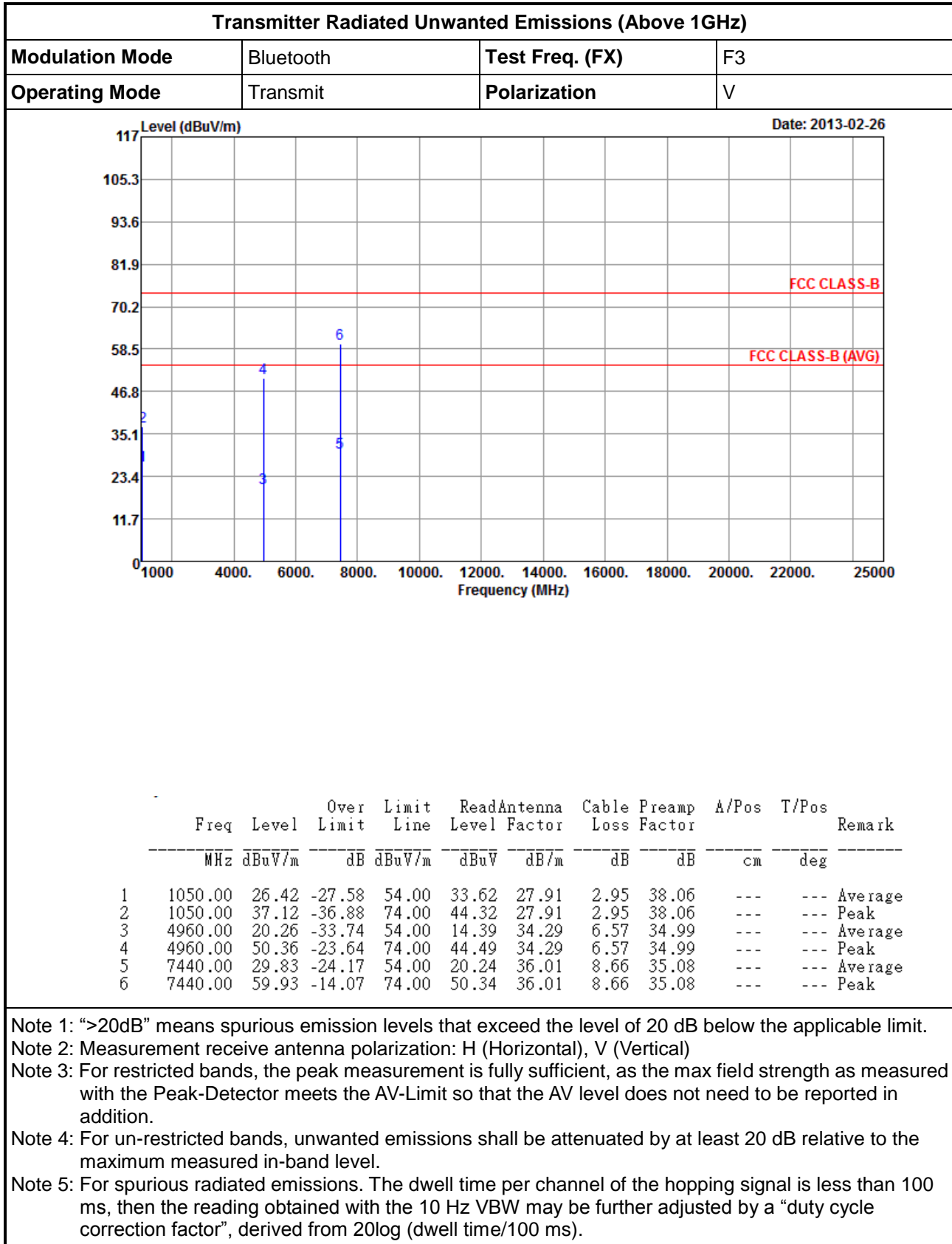
Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	Bluetooth	Test Freq. (FX)	F2
Operating Mode	Transmit	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1050.00	26.31	-27.69	54.00	33.51	27.91	2.95	38.06	---	---	Average
2	1050.00	37.55	-36.45	74.00	44.75	27.91	2.95	38.06	---	---	Peak
3	4882.00	19.83	-34.17	54.00	14.00	34.28	6.53	34.98	---	---	Average
4	4882.00	49.93	-24.07	74.00	44.10	34.28	6.53	34.98	---	---	Peak
5	7323.00	27.00	-27.00	54.00	17.56	36.04	8.43	35.03	---	---	Average
6	7323.00	57.10	-16.90	74.00	47.66	36.04	8.43	35.03	---	---	Peak

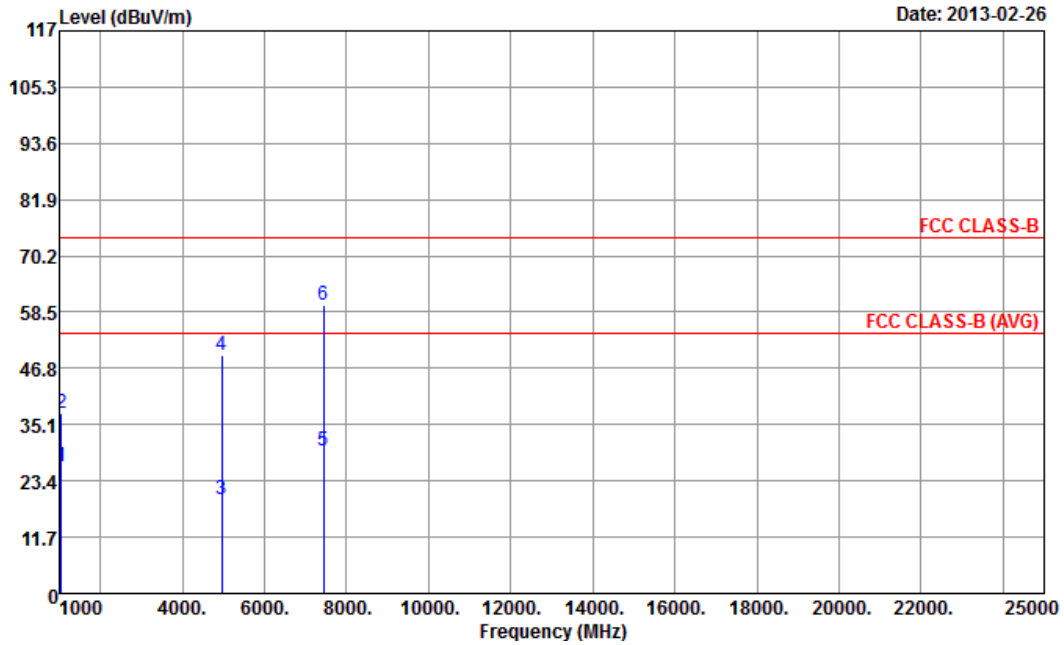
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 4: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.
 Note 5: For spurious radiated emissions. The dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log (dwell time/100 ms).





Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	Bluetooth	Test Freq. (FX)	F3
Operating Mode	Transmit	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1050.00	26.41	-27.59	54.00	33.61	27.91	2.95	38.06	---	---	Average
2	1050.00	37.52	-36.48	74.00	44.72	27.91	2.95	38.06	---	---	Peak
3	4960.00	19.54	-34.46	54.00	13.67	34.29	6.57	34.99	---	---	Average
4	4960.00	49.64	-24.36	74.00	43.77	34.29	6.57	34.99	---	---	Peak
5	7440.00	29.71	-24.29	54.00	20.12	36.01	8.66	35.08	---	---	Average
6	7440.00	59.81	-14.19	74.00	50.22	36.01	8.66	35.08	---	---	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 4: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.
 Note 5: For spurious radiated emissions. The dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log (dwell time/100 ms).



4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Nov. 22, 2012	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRON IK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 21, 2013	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 20, 2012	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+01 2	9kHz ~ 30MHz	Nov. 09, 2012	Conduction (CO04-HY)
ISN	TESEQ	ISN T800	30330	9kHz ~ 30MHz	Feb. 07, 2013	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
CDN	TESEQ	M016	25100	150kHz ~ 26MHz	Mar. 02, 2012	Conduction (CO04-HY)
CDN	TESEQ	M016	25103	150kHz ~ 26MHz	Mar. 02, 2012	Conduction (CO04-HY)
50 ohm terminal	N/A	N/A	TM012	N/A	Feb. 26, 2013	Conduction (CO04-HY)
50 ohm terminal	N/A	N/A	CON-04-02	N/A	Feb. 26, 2013	Conduction (CO04-HY)
50 ohm terminal	N/A	N/A	CON-04-01	N/A	Feb. 26, 2013	Conduction (CO04-HY)
50 ohm terminal	N/A	N/A	CON-04-03	N/A	Feb. 26, 2013	Conduction (CO04-HY)
50 ohm terminal	N/A	N/A	CON-01-04	N/A	Feb. 26, 2013	Conduction (CO04-HY)

Note: Calibration Interval of instruments listed above is one year.



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101486	9KHz~40GHz	Nov. 14, 2012	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 19, 2012	Conducted (TH01-HY)
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 02, 2012	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100°C	Nov. 21, 2012	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jun. 26, 2012	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	Sep. 08, 2012	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	Sep. 08, 2012	Conducted (TH01-HY)
RF Cable-2m	HUBER+SUHNER	SUCOFLEX_104	SN 345675/4	1GHz ~ 26.5GHz	NA	Conducted (TH01-HY)
RF Cable-3m	HUBER+SUHNER	SUCOFLEX_104	SN 345669/4	1GHz ~ 26.5GHz	NA	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP	100055	9Kz – 40GHz	Jun. 06, 2012	Radiation (03CH05-HY)
Receiver	R&S	ESIB26	100337	20Hz – 26.5GHz	Jun. 21, 2012	Radiation (03CH05-HY)
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH05-HY	30 MHz - 1 GHz 3m	N/A	Radiation (03CH05-HY)
Amplifier	COM-POWER	PA-103	161050	1 MHz ~ 1 GHz	Mar. 20, 2012	Radiation (03CH05-HY)
Amplifier	Agilent	8449B	3008A02665	1GHz – 26.5 GHz	Aug. 28, 2012	Radiation (03CH05-HY)
Horn Antenna	ETS-LINDGREN	3117	66584	1GHz~18GHz	Aug. 09, 2012	Radiation (03CH05-HY)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170517	18G~40G	Jan. 14, 2013	Radiation (03CH05-HY)
RF Cable-R03m	Jye Bao	RG142	03CH05-HY	30 MHz - 1 GHz	Oct. 14, 2012	Radiation (03CH05-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX104	03CH05-HY	1GHz~40GHz	Oct. 14, 2012	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30 MHz - 1 GHz	Oct. 06, 2012	Radiation (03CH05-HY)
Turn Table	HD	HD100	420/611	0 - 360 degree	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	HD100	240/666	1 m - 4 m	N/A	Radiation (03CH05-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/0001	9 kHz ~ 30 MHz	Jul. 03, 2012	Radiation (03CH05-HY)

Note: Calibration Interval of instruments listed above is two year.