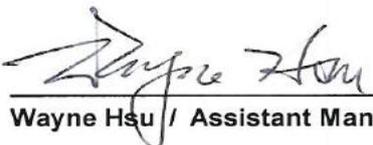


# FCC Test Report

**Equipment** : Tablet device  
**Brand Name** : VAIO  
**Model No.** : SVJ202A11L (19.5V, 3.3A)  
**FCC ID** : AK8SVJ202A11L  
**Standard** : 47 CFR FCC Part 15.247  
**Frequency Range** : 2400 MHz – 2483.5 MHz  
**Applicant** : Sony Corporation  
1-7-1 Konan Minato-ku, Tokyo, 108-0075 JAPAN  
**Manufacturer** : Foxconn  
No. 3, Wu-Chuan 3rd Road, Wu-Ku Industrial Park,  
New Taipei City, Taiwan  
**RF Module** : Intel 135BNHMW

The product sample received on Jul. 30, 2012 and completely tested on Aug. 16, 2012. 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.

  
Wayne Hsu / Assistant Manager



## Table of Contents

<b>1</b>	<b>GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1	Information.....	5
1.2	Accessories .....	8
1.3	Support Equipment .....	8
1.4	Testing Applied Standards .....	8
1.5	Testing Location Information .....	8
1.6	Measurement Uncertainty .....	9
<b>2</b>	<b>TEST CONFIGURATION OF EUT .....</b>	<b>10</b>
2.1	The Worst Case Modulation Configuration .....	10
2.2	Test Channel Frequencies Configuration.....	10
2.3	The Worst Case Power Setting Parameter .....	11
2.4	The Worst Case Measurement Configuration .....	11
2.5	Test Setup Diagram .....	14
<b>3</b>	<b>TRANSMITTER TEST RESULT .....</b>	<b>16</b>
3.1	AC Power-line Conducted Emissions .....	16
3.2	6dB Bandwidth.....	19
3.3	20dB Bandwidth and Carrier Frequency Separation .....	21
3.4	Number of Hopping Frequencies.....	23
3.5	Time of Occupancy (Dwell Time).....	25
3.6	RF Output Power .....	27
3.7	Power Spectral Density .....	31
3.8	Transmitter Radiated Bandedge Emissions .....	33
3.9	Transmitter Radiated Unwanted Emissions .....	40
<b>4</b>	<b>TEST EQUIPMENT AND CALIBRATION DATA.....</b>	<b>58</b>
<b>5</b>	<b>CERTIFICATION OF TAF ACCREDITATION .....</b>	<b>60</b>
	<b>APPENDIX A. TEST PHOTOS .....</b>	<b>A5</b>
	<b>APPENDIX B. PHOTOGRAPHS OF EUT .....</b>	<b>B16</b>

## 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	[dBuV]: 0.18838MHz 39.59 (Margin 14.52dB) - AV 53.46 (Margin -10.65dB) - QP	FCC 15.207	Complied
3.2	15.247(a)	6dB Bandwidth	LE: 0.95 MHz	≥500kHz	Complied
3.3	15.247(a)	20dB Bandwidth	EDR: 1.386 MHz	N/A	Complied
3.3	15.247(a)	Carrier Frequency Separation (ChS)	EDR: 1.002 MHz	ChS ≥ 20 dB BW x 2/3.	Complied
3.4	15.247(a)	Number of Hopping Frequencies (N)	Max: 79 Min: 15	N ≥ 15	Complied
3.5	15.247(a)	Time of Occupancy (Dwell Time)	EDR: 0.3179 sec	0.4 s within 0.4 x N	Complied
3.6	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm] Basic: 6.74 EDR: 5.99 LE: 8.41	Power [dBm] Basic: 21 EDR: 21 LE: 30	Complied
3.7	15.247(d)	Power Spectral Density	PSD [dBm/3kHz] LE: -9.53	PSD [dBm/3kHz]: 8	Complied
3.8	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2501.41MHz: 37.74dB Restricted Bands [dBuV/m at 3m]: 2483.50MHz 60.52 (Margin 13.48dB) - PK 49.96 (Margin 4.04dB) - AV	Non-Restricted Bands: > 20 dBc  Restricted Bands: FCC 15.209	Complied
3.9	15.247(c)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 7440.00MHz 49.65 (Margin 4.35dB) - 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	v2.1 Basic	2402-2480	0-78 [79]	6.74
2400-2483.5	v2.1 + EDR	2402-2480	0-78 [79]	5.99
2400-2483.5	v4.0 LE	2402-2480	0-39 [40]	8.41

Note 1: Bluetooth EDR uses a combination of GFSK (1Mbps),  $\pi/4$ -DQPSK (2Mbps) and 8DPSK (3Mbps).  
 Note 2: Bluetooth EDR uses as a system using FHSS modulation.  
 Note 3: Bluetooth LE (Low Energy) using GFSK modulation for DTS digital modulation.  
 Note 4: RF output power specifies that Maximum Peak Conducted Output Power.

1.1.2 Antenna Information

Antenna Category	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input checked="" type="checkbox"/>	Temporary RF connector provided
<input 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							
Antenna Port (Total 1 Port)				1(TX/RX)			
Maximum RF Output Power Level (PL)				1			
Transmit Chains Power Distribution				<input checked="" type="checkbox"/> symmetrical distribution <input type="checkbox"/> asymmetrical distribution			
Ant. No.	PL	Ant. Port [Ant No. X connect to Ant. Port Y]	Ant. Cat.	Ant. Type	G <sub>ANT</sub> (dBi)	DG (dBi) [correlated] N <sub>TX</sub> = 1	DG (dBi) [uncorrelated] N <sub>TX</sub> = 1
1	1	1	Integral	PIFA	2.06 (Main Ant.)	N/A	N/A
<p>Note 1: For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows:                      Any transmit signals are correlated, Directional Gain (DG) = G<sub>ANT</sub> + 10 log(N) dBi                      All transmit signals are completely uncorrelated, Directional Gain (DG)= G<sub>ANT</sub></p> <p>Note 2: For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:                      Any transmit signals are correlated, Directional Gain (DG) = 10 log[(10<sup>G<sub>1/20</sub></sup> + 10<sup>G<sub>2/20</sub></sup> + ... + 10<sup>G<sub>N/20</sub></sup>)<sup>2</sup> /N] dBi                      All transmit signals are completely uncorrelated, Directional Gain (DG) = 10 log[(10<sup>G<sub>1/10</sub></sup> + 10<sup>G<sub>2/10</sub></sup> + ... + 10<sup>G<sub>N/10</sub></sup>)/N] dBi</p> <p>Note 3: The EUT supports diversity transmitting and the results on transmit chain port main is the worst case.</p>							

1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	
Presentation of Equipment	<input checked="" type="checkbox"/> Production ; <input type="checkbox"/> Pre-Production ; <input 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:

**1.1.4 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)	Voltage Duty Factor [dB] – (20 log 1/x)
<input checked="" type="checkbox"/> 94.90% - test mode single channel - DH5	0.23	0.45
<input checked="" type="checkbox"/> 71.87% - test mode single channel - LE	1.43	2.87
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.		

**1.1.5 EUT Operational Condition**

<b>Supply Voltage</b>	<input checked="" type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
<b>Type of DC Source</b>	<input type="checkbox"/> Internal DC supply	<input checked="" type="checkbox"/> External DC adapter	<input checked="" type="checkbox"/> Battery

### 1.2 Accessories

Accessories Information				
AC Adapter	Brand Name	SONY	Model Name	VGP-AC19V48
	Power Rating	I/P: 100-240 V~1.5A 50/60 Hz ; O/P: 19.5V 3.3A		
Battery	Brand Name	SONY	Model Name	VGP-BPS21B
	Power Rating	10.8V /3 500mAh / 38Wh	Type	Li-ion

### 1.3 Support Equipment

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 KDB 558074 - Guidance for Performing Compliance Measurements on DTS
- ◆ 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	25°C / 49.5%	16-Aug-12
RF Conducted	TH01-HY	Ian	23.9°C / 32%	15-Aug-12
Radiated Emission	03CH02-HY	Hsiao	24.2°C / 56%	16-Aug-12

## 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, 6dB bandwidth		±1.42 %	N/A
RF output power, conducted		±0.63 dB	N/A
Power density, conducted		±0.81 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 <sub>TX</sub> )	Data Rate	Modulation Mode	RF Output Power (dBm)	Power Spectral Density (dBm/3kHz)	Worst Modulation Mode
v2.1 Basic	1	1 Mbps	BT-1M	6.74	-	BT-1M
v2.1 + EDR	1	2 Mbps	BT-2M	5.80	-	
v2.1 + EDR	1	3 Mbps	BT-3M	5.99	-	
v4.0 LE	1	1 Mbps	LE-1M	8.41	-9.53	LE-1M

Note 1: Bluetooth EDR uses a combination of GFSK (1Mbps),  $\pi/4$ -DQPSK (2Mbps) and 8DPSK (3Mbps).  
 Note 2: Bluetooth EDR uses as a system using FHSS modulation.  
 Note 3: Bluetooth LE (Low Energy) using GFSK modulation for DTS digital modulation.  
 Note 4: Modulation modes consist of BT-1M, BT-2M, 1 BT-3M, LE-1M  
 FHSS BT-1M: GFSK (1Mbps), BT-2M:  $\pi/4$ -DQPSK (2Mbps), BT-3M: 8DPSK (3Mbps),  
 LE-1M: GFSK (1Mbps)  
 Note 5: RF output power specifies 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)
v2.1 Basic / EDR	BT-1M	2402-(F1), 2441-(F2), 2480-(F3)
v4.0 LE	LE-1M	2402-(F1), 2442-(F2'), 2480-(F3)

### 2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter					
Test Software Version		DRTU			
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Frequency (MHz)	Power Setting	Data Rate	RF Output Power (dBm)
BT-1M	1	2402	8	1 Mbps	6.02
BT-1M	1	2441	8	1 Mbps	6.56
BT-1M	1	2480	8	1 Mbps	6.74
BT-2M	1	2402	8	2 Mbps	4.95
BT-2M	1	2441	8	2 Mbps	5.69
BT-2M	1	2480	8	2 Mbps	5.80
BT-3M	1	2402	8	3 Mbps	5.09
BT-3M	1	2441	8	3 Mbps	5.83
BT-3M	1	2480	8	3 Mbps	5.99
LE-1M	1	2402	Default	1 Mbps	7.89
LE-1M	1	2442	Default	1 Mbps	8.41
LE-1M	1	2480	Default	1 Mbps	7.66

Note 1: RF output power specifies 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	Transmitter Mode

The Worst Case Mode for Following Conformance Tests			
Tests Item	RF Output Power		
Test Condition	Conducted measurement at transmit chains		
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Worst Data Rate / MCS	Test Frequency
BT-1M	1	1 Mbps	F1, F2, F3
LE-1M	1	1 Mbps	F1, F2', F3

The Worst Case Mode for Following Conformance Tests			
Tests Item	20dB Bandwidth Carrier Frequency Separation (ChS)		
Test Condition	Conducted measurement at transmit chains		
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Worst Data Rate / MCS	Test Frequency
BT-3M	1	3 Mbps	F1, F2, F3

The Worst Case Mode for Following Conformance Tests			
Tests Item	Number of Hopping Frequencies (N)		
Test Condition	Conducted measurement at transmit chains		
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Worst Data Rate / MCS	Test Frequency
BT-3M	1	3 Mbps	Hopping

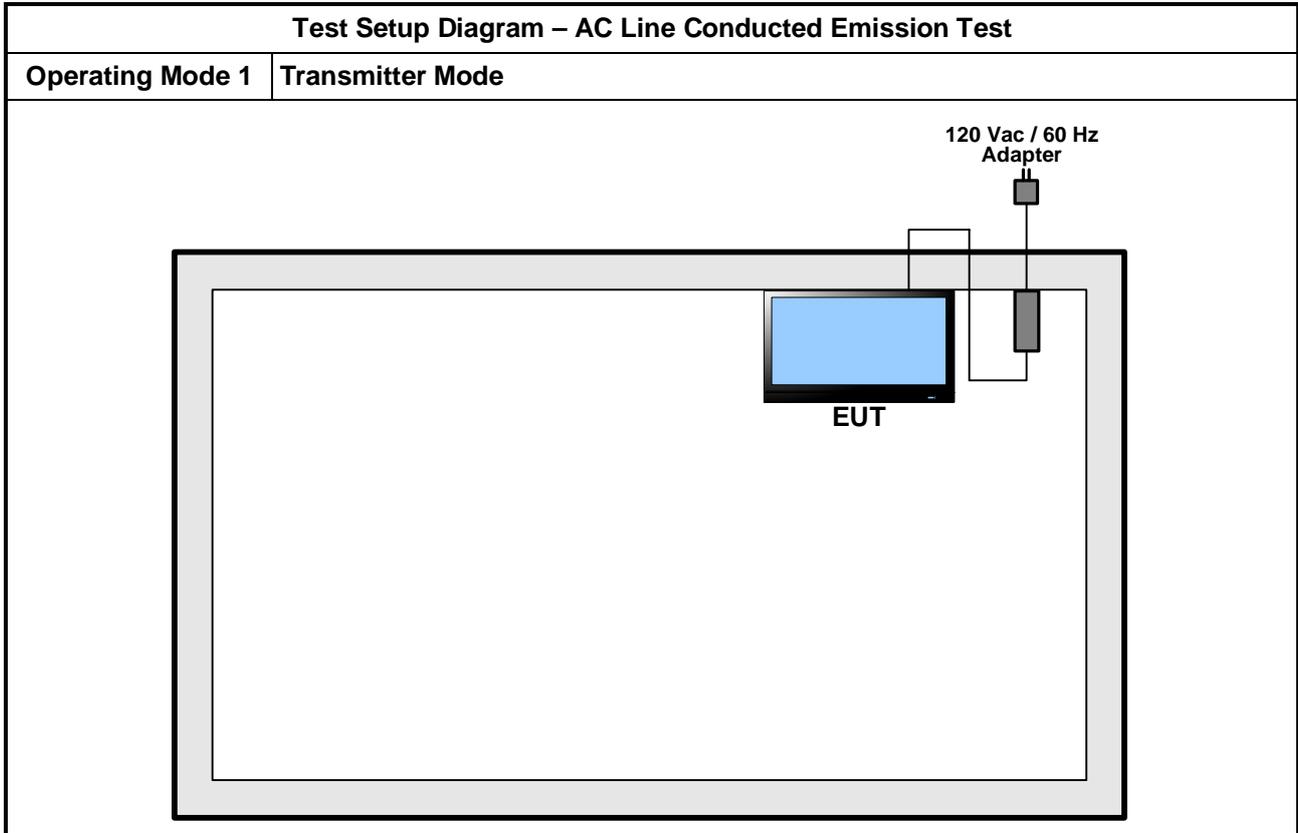
The Worst Case Mode for Following Conformance Tests			
Tests Item	Time of Occupancy (Dwell Time)		
Test Condition	Conducted measurement at transmit chains		
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Worst Data Rate / MCS	Test Frequency
BT-3M	1	3 Mbps	Hopping

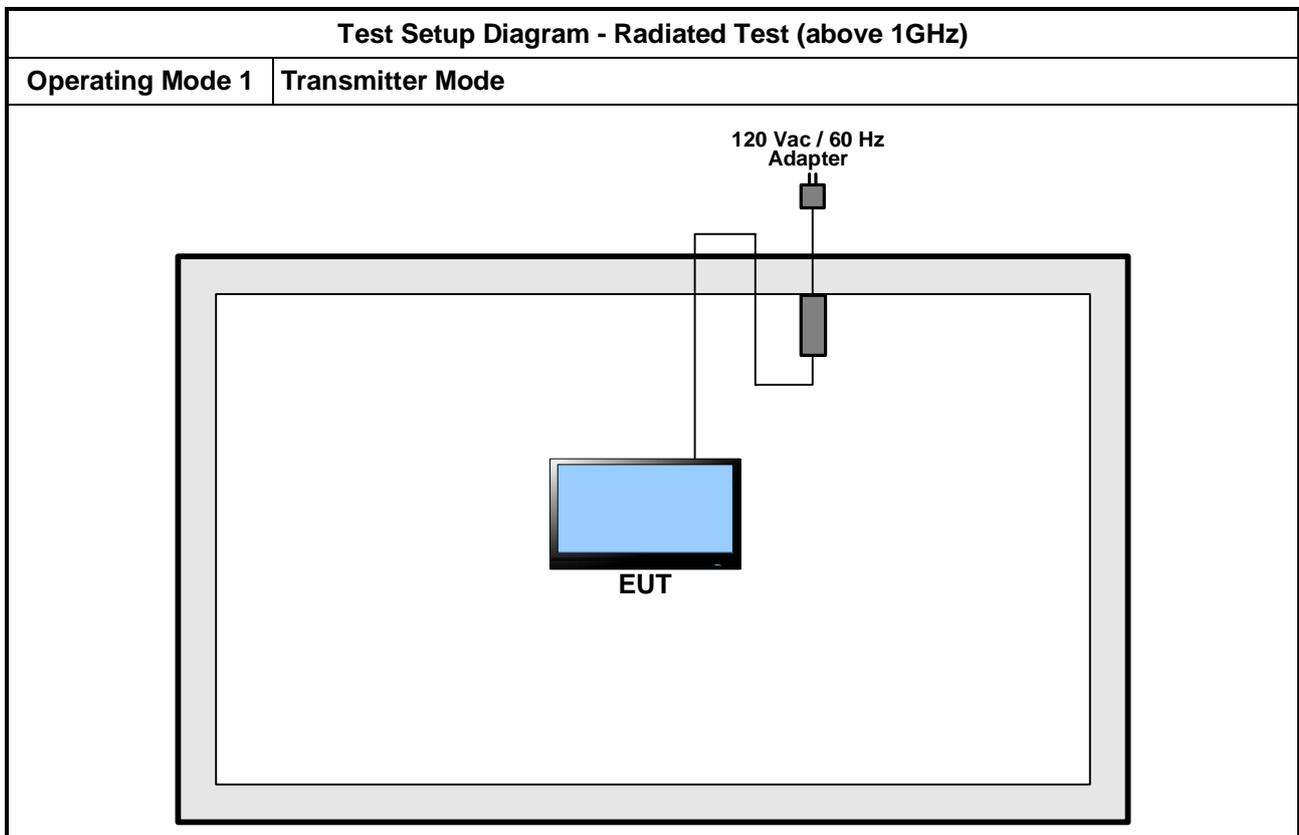
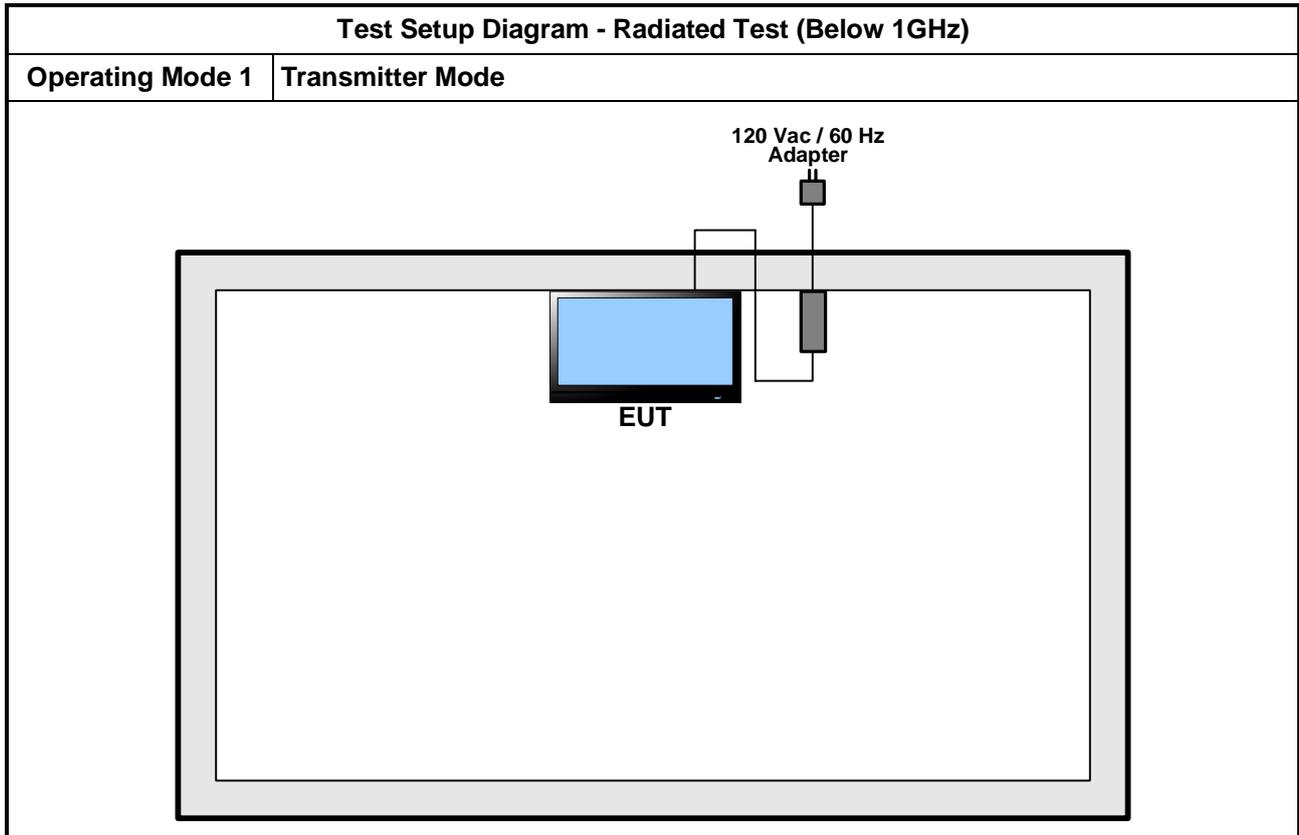
The Worst Case Mode for Following Conformance Tests			
Tests Item	Power Spectral Density 6 dB Bandwidth		
Test Condition	Conducted measurement at transmit chains		
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Worst Data Rate / MCS	Test Frequency
LE-1M	1	1 Mbps	F1, F2', F3

The Worst Case Mode for Following Conformance Tests			
Tests Item	Transmitter Radiated Bandedge Emissions		
Test Condition	Radiated measurement		
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Worst Data Rate / MCS	Test Frequency
BT-1M	1	1 Mbps	F1, F3
BT-3M	1	3 Mbps	F1, F3
LE-1M	1	1 Mbps	F1, F3

The Worst Case Mode for Following Conformance Tests			
<b>Tests Item</b>	Transmitter Radiated Unwanted Emissions		
<b>Test Condition</b>	Radiated measurement		
<b>User Position</b>	<input 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 checked="" 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.		
<b>Operating Mode &lt; 1GHz</b>	<input checked="" type="checkbox"/> 1. Transmitter Mode		
<b>Worst Modulation Mode</b>	<b>Worst Data Rate / MCS</b>	<b>Test Frequency</b>	<b>Worst Orthogonal Planes of EUT</b>
BT-1M	1 Mbps	F1, F2, F3	Z Plane
LE-1M	1 Mbps	F1, F2', F3	Z Plane
<b>Orthogonal Planes of EUT</b>	<b>X Plane</b>	<b>Y Plane</b>	<b>Z Plane</b>
			

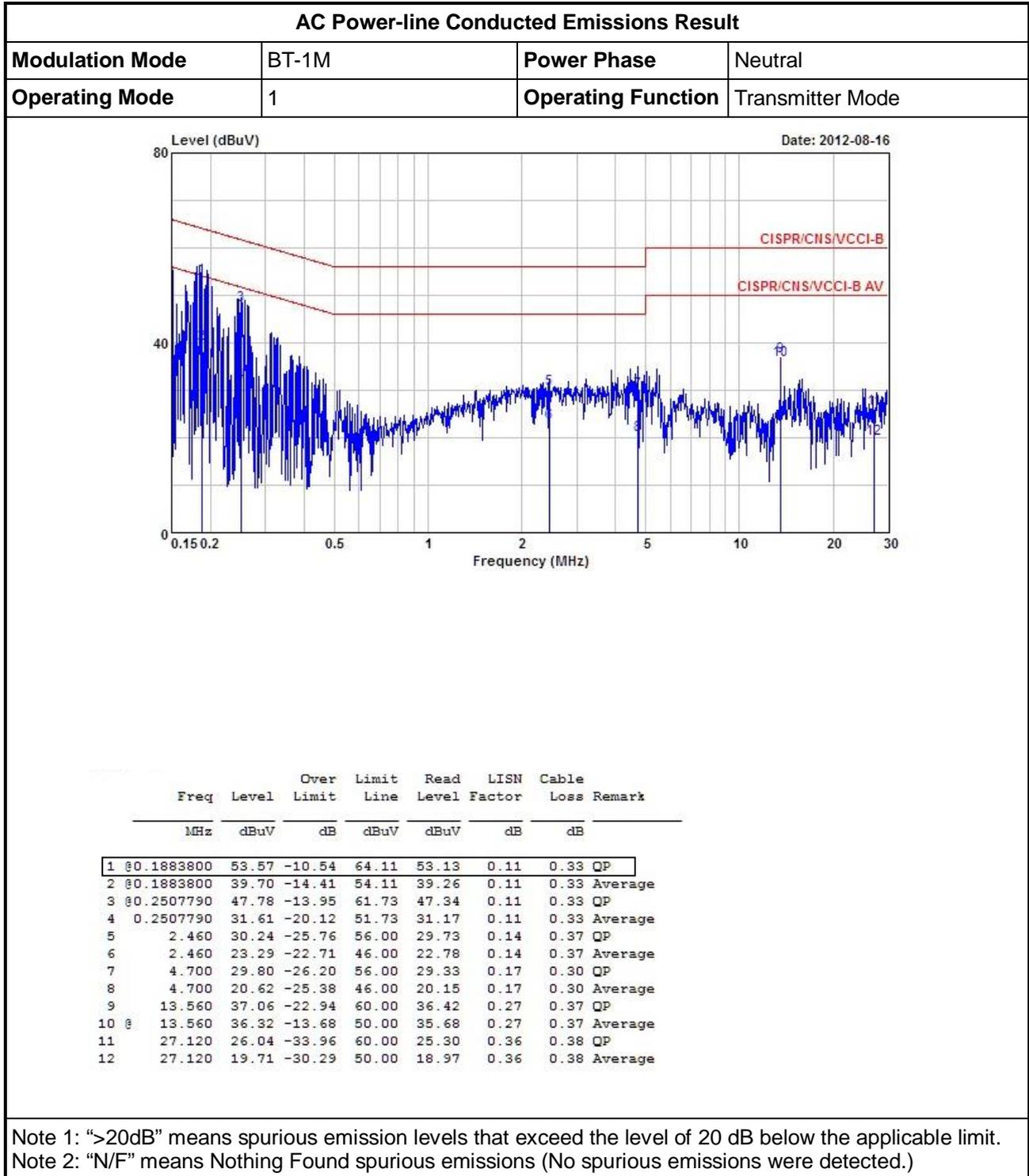
## 2.5 Test Setup Diagram





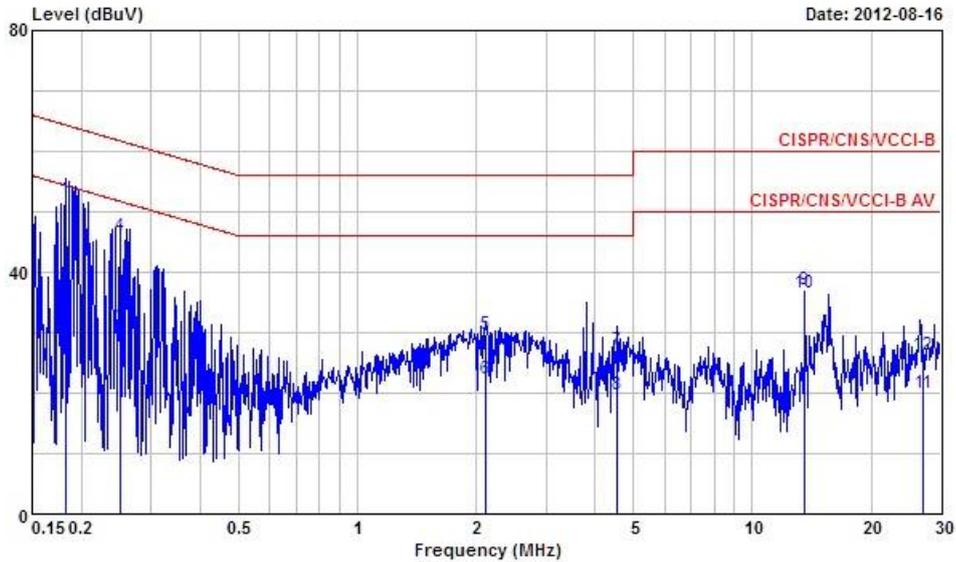


3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Modulation Mode	BT-1M	Power Phase	Line
Operating Mode	1	Operating Function	Transmitter Mode



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1824860	52.21	-12.16	64.37	51.63	0.23	0.35	QP
2	0.1824860	34.96	-19.41	54.37	34.38	0.23	0.35	Average
3	0.2507790	30.74	-20.99	51.73	30.18	0.23	0.33	Average
4	0.2507790	46.13	-15.60	61.73	45.57	0.23	0.33	QP
5	2.120	29.86	-26.14	56.00	29.22	0.25	0.39	QP
6	2.120	22.36	-23.64	46.00	21.72	0.25	0.39	Average
7	4.550	27.10	-28.90	56.00	26.49	0.31	0.30	QP
8	4.550	19.70	-26.30	46.00	19.09	0.31	0.30	Average
9	13.560	36.98	-23.02	60.00	36.13	0.48	0.37	QP
10	13.560	36.53	-13.47	50.00	35.68	0.48	0.37	Average
11	27.120	19.97	-30.03	50.00	18.91	0.68	0.38	Average
12	27.120	26.32	-33.68	60.00	25.26	0.68	0.38	QP

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

### 3.2 6dB Bandwidth

#### 3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit	
Systems using digital modulation techniques:	
<input checked="" type="checkbox"/>	6 dB bandwidth $\geq$ 500 kHz.

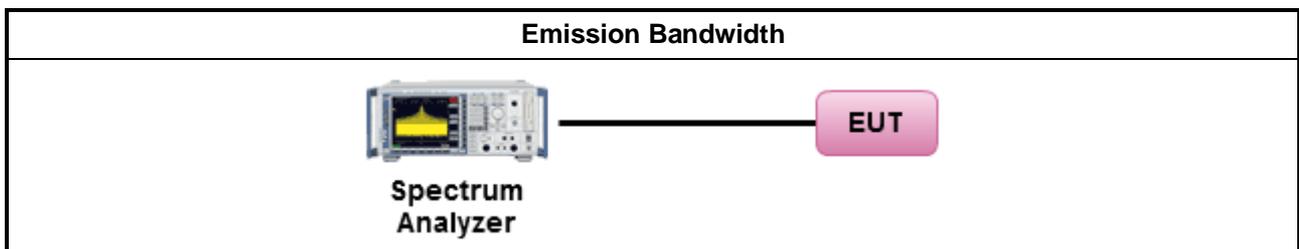
#### 3.2.2 Measuring Instruments

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

#### 3.2.3 Test Procedures

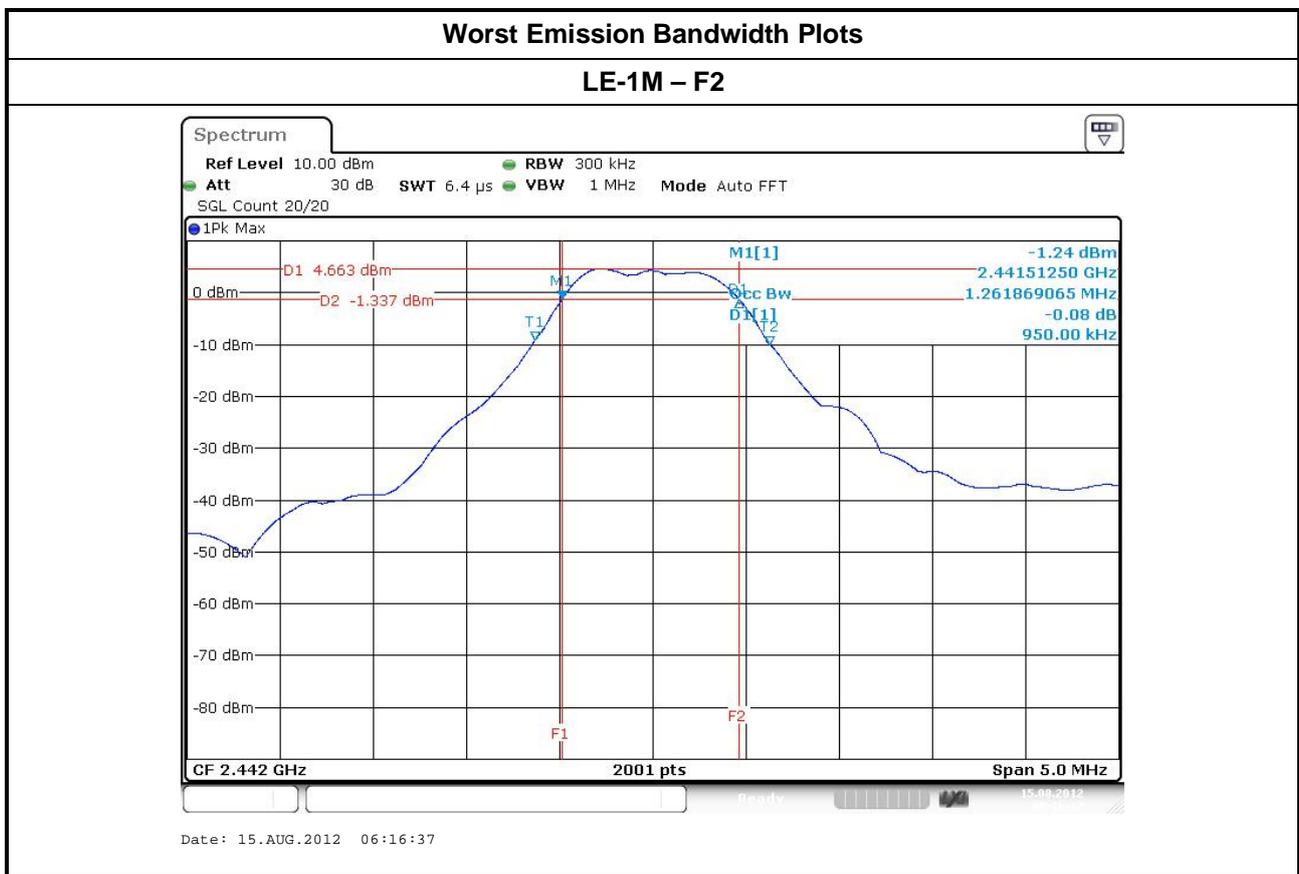
Test Method	
<input checked="" type="checkbox"/>	For the emission bandwidth shall be measured using one of the options below:
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 5.1.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.1.2 Option 2 for 6 dB bandwidth measurement.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" 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 checked="" 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 Emission Bandwidth

Emission Bandwidth Result			
Modulation Mode	Freq. (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)
LE-1M	2402	1.26	0.93
LE-1M	2442	1.26	0.95
LE-1M	2480	1.27	0.93
<b>Limit</b>		<b>N/A</b>	<b>≥500 kHz</b>
<b>Result</b>		<b>Complied</b>	



### 3.3 20dB Bandwidth and Carrier Frequency Separation

#### 3.3.1 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
<b>N:</b> Number of Hopping Frequencies <b>ChS:</b> Hopping Channel Separation	

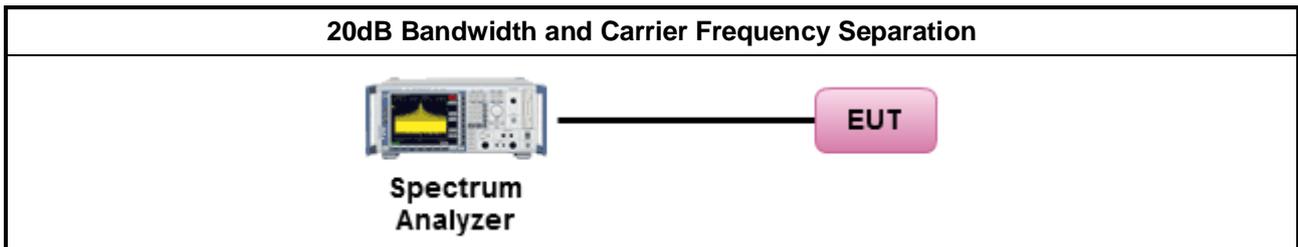
#### 3.3.2 Measuring Instruments

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

#### 3.3.3 Test Procedures

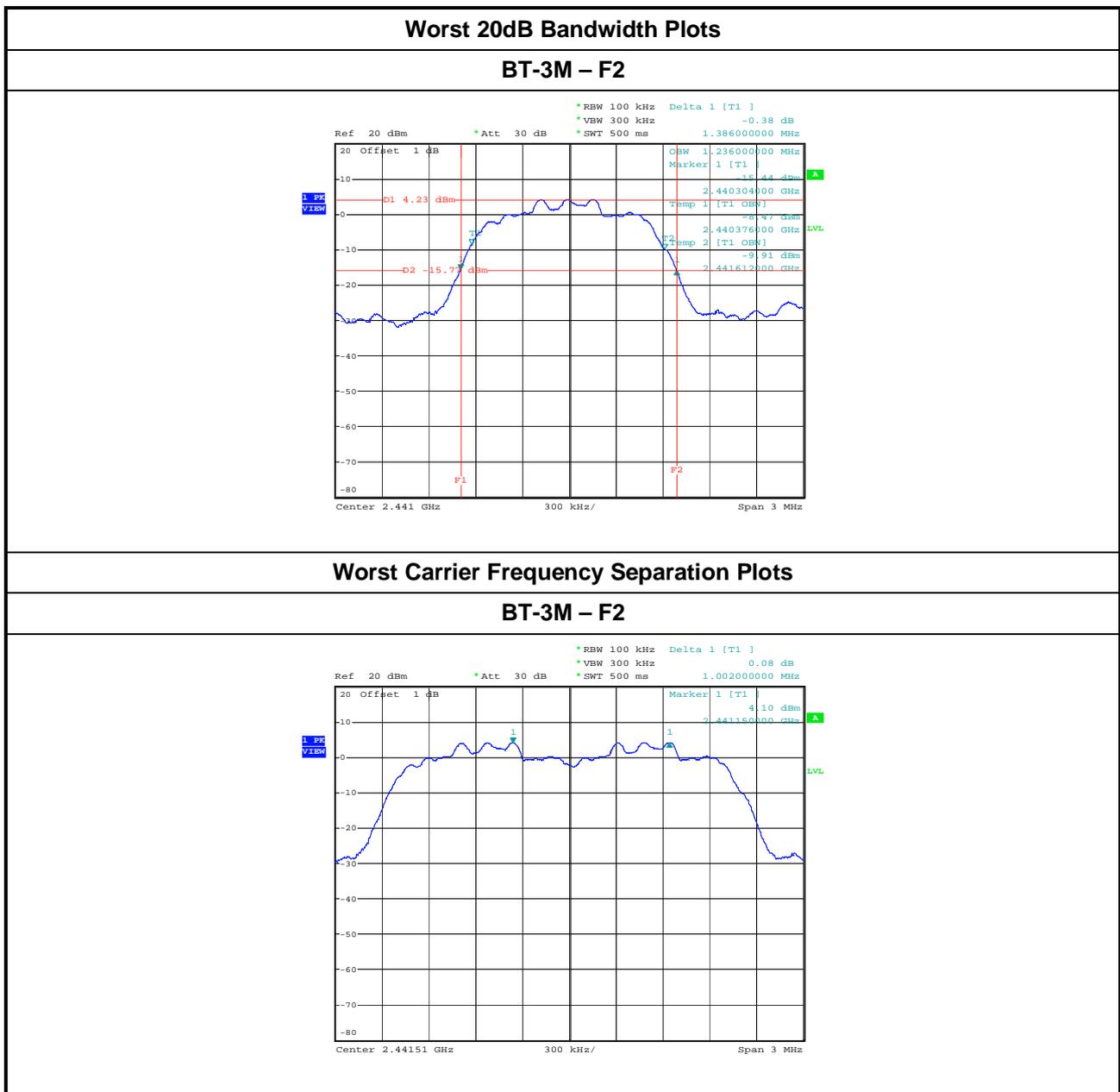
Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.1 for 20 dB bandwidth measurement.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 7.7.2 for carrier frequency separation measurement.
<input checked="" type="checkbox"/>	For conducted measurement.
<input 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.

#### 3.3.4 Test Setup



3.3.5 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-3M	2402	1.374	1.236	1.002	0.916
BT-3M	2441	1.386	1.236	1.002	0.924
BT-3M	2480	1.386	1.236	1.002	0.924
<b>Result</b>		<b>Complied</b>			



### 3.4 Number of Hopping Frequencies

#### 3.4.1 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
<b>N:</b> Number of Hopping Frequencies <b>ChS:</b> Hopping Channel Separation	

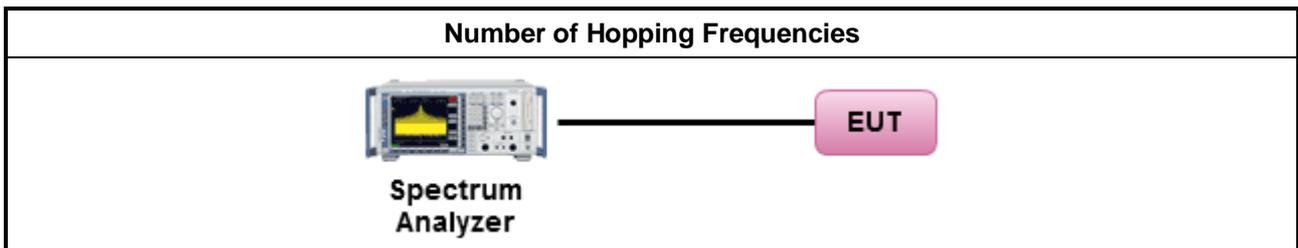
#### 3.4.2 Measuring Instruments

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

#### 3.4.3 Test Procedures

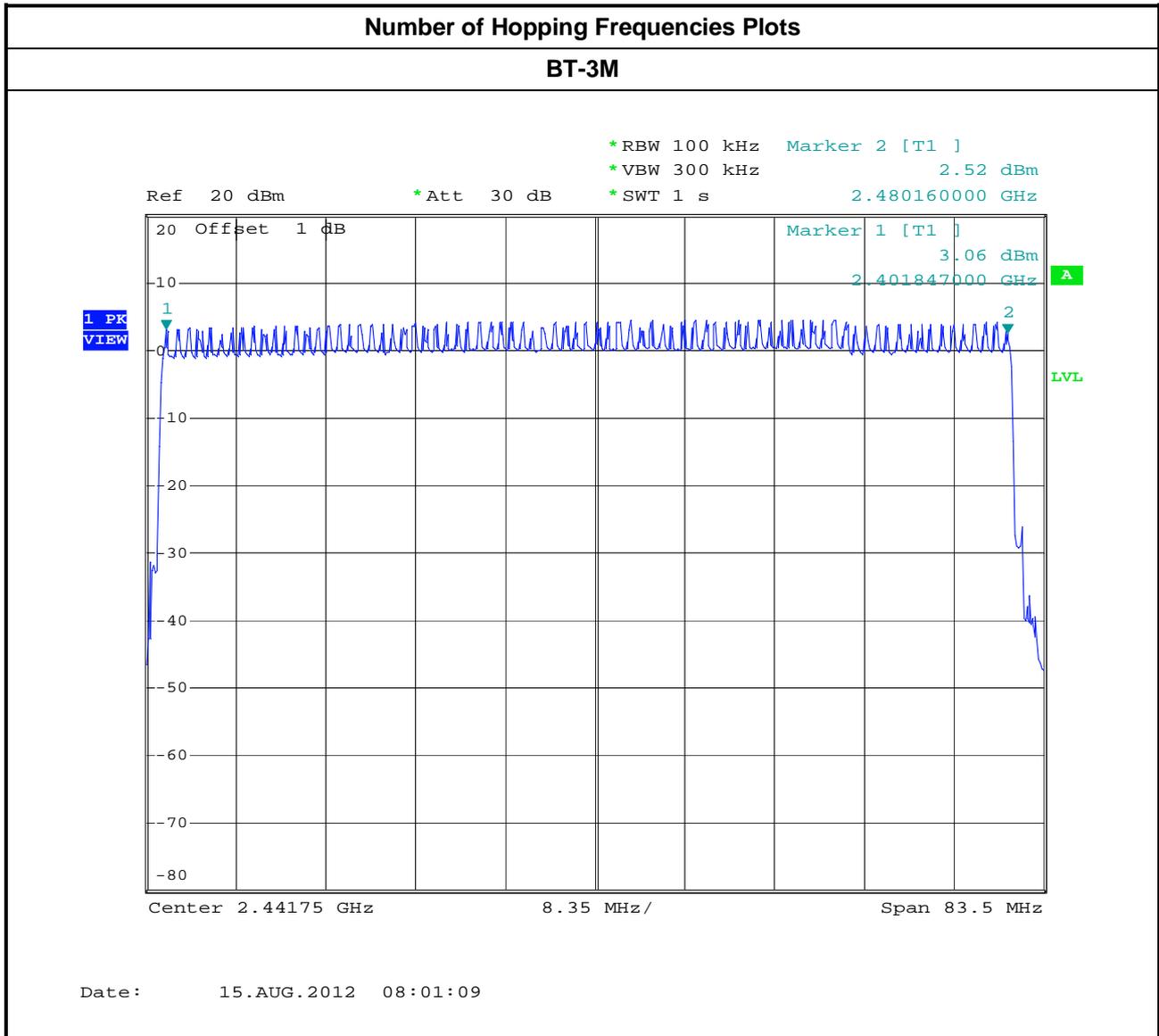
Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 7.7.3 for number of hopping frequencies measurement.
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	For conducted measurements on devices with single transmit chains.
<input 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.

#### 3.4.4 Test Setup



3.4.5 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-3M	2402-2480	79	15
<b>Result</b>	<b>Complied</b>		



### 3.5 Time of Occupancy (Dwell Time)

#### 3.5.1 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
<b>N:</b> Number of Hopping Frequencies	

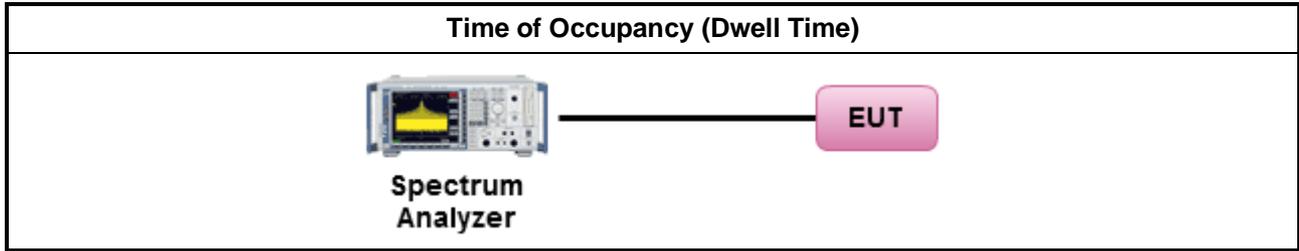
#### 3.5.2 Measuring Instruments

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

#### 3.5.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	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.

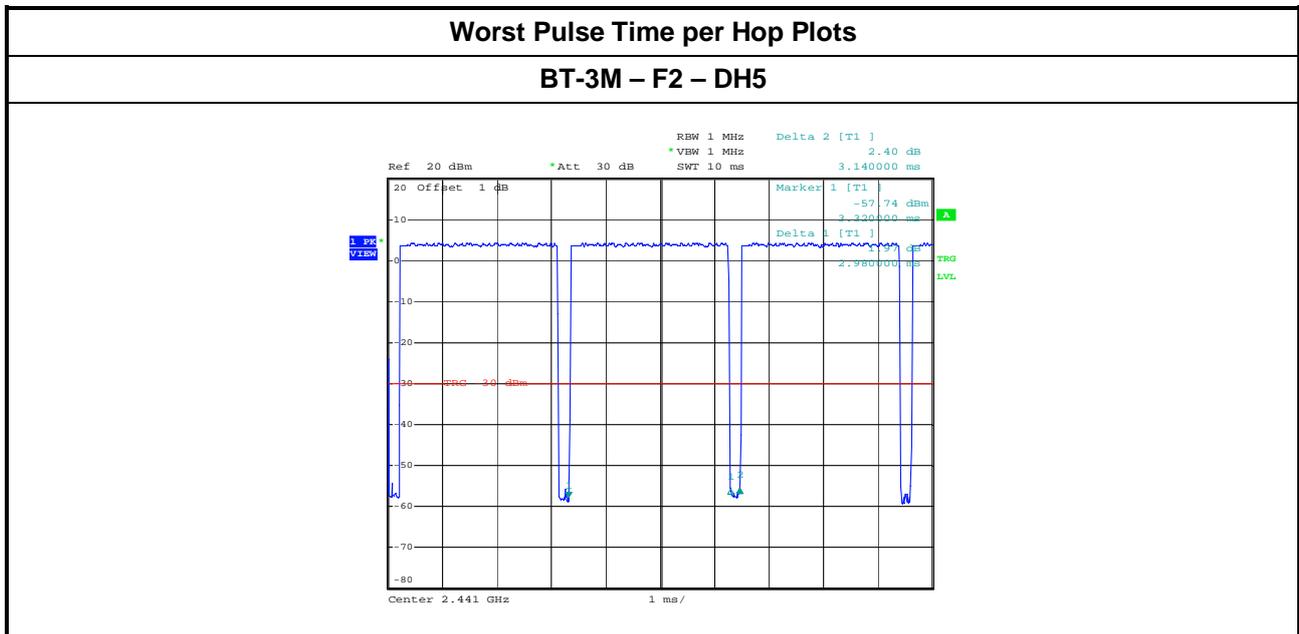
3.5.4 Test Setup



3.5.5 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-3M	2441	2.98	106.6	0.3179	0.4
<b>Result</b>		<b>Complied</b>			

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.



### 3.6 RF Output Power

#### 3.6.1 RF Output Power Limit

RF Output Power Limit for Frequency Hopping Systems	
<b>Maximum Peak Conducted Output Power Limit</b>	
<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
<b>e.i.r.p. Power Limit:</b>	
<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><b><math>G_{TX}</math></b> = the maximum transmitting antenna directional gain in dBi.  <b><math>P_{eirp}</math></b> = e.i.r.p. Power in dBm.  <b>N</b>: Number of Hopping Frequencies  <b>ChS</b>: Hopping Channel Separation</p>	

RF Output Power Limit for Digital Modulation Systems	
<b>Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit</b>	
<input type="checkbox"/>	902-928 MHz Band:
<input type="checkbox"/>	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
<input type="checkbox"/>	If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
<input checked="" type="checkbox"/>	2400-2483.5 MHz Band:
<input checked="" type="checkbox"/>	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
<input type="checkbox"/>	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
<input type="checkbox"/>	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
<input type="checkbox"/>	Smart antenna system (SAS):
<input type="checkbox"/>	Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
<input type="checkbox"/>	Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
<input type="checkbox"/>	Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dBm
<input type="checkbox"/>	5725-5850 MHz Band:
<input type="checkbox"/>	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
<input type="checkbox"/>	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
<input type="checkbox"/>	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30$ dBm
<b>e.i.r.p. Power Limit:</b>	
<input type="checkbox"/>	902-928 MHz Band: $P_{eirp} \leq 36$ dBm (4 W)
<input checked="" type="checkbox"/>	2400-2483.5 MHz Band
<input checked="" type="checkbox"/>	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
<input type="checkbox"/>	Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
<input type="checkbox"/>	Smart antenna system (SAS)
<input type="checkbox"/>	Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
<input type="checkbox"/>	Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
<input type="checkbox"/>	Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm
<input type="checkbox"/>	5725-5850 MHz Band
<input type="checkbox"/>	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
<input type="checkbox"/>	Point-to-point systems (P2P): N/A
$P_{Out}$ = maximum peak conducted output power or maximum conducted output power in dBm, $G_{TX}$ = the maximum transmitting antenna directional gain in dBi. $P_{eirp}$ = e.i.r.p. Power in dBm.	

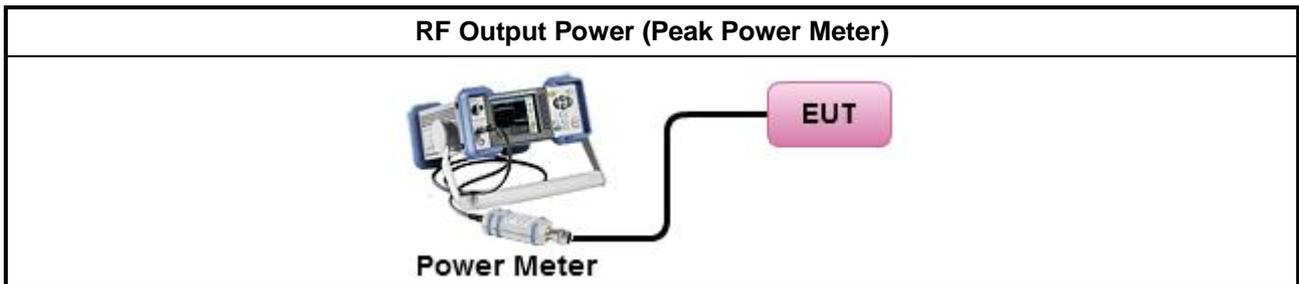
### 3.6.2 Measuring Instruments

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

3.6.3 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 ≥ EBW method).
<input checked="" 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 ≥ EBW).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.2.1 b) for spectrum analyzer - BW correction factor.
<input type="checkbox"/>	Maximum Conducted (Average) Output Power
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.2.2.1 Option 1 (RMS detection with slow sweep speed).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.2.2.2 Option 2 (spectral trace averaging).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.3.1 for spectrum analyzer - Method 1 (trace averaging).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.3.2 for spectrum analyzer - Method 2 (zero-span averaging).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.3.2 for spectrum analyzer - Method 3 (band power max-hold).
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 2 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: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
<input type="checkbox"/>	If multiple transmit chains, EIRP calculation could be following as methods:
<input type="checkbox"/>	Method 1: $EIRP_1 = P_1 + G_{ANT1}$ ; $EIRP_2 = P_2 + G_{ANT2}$ ; ... $EIRP_n = P_n + G_{ANTn}$ $EIRP_{total} = EIRP_1 + EIRP_2 + \dots + EIRP_n$ (calculated in linear unit [mW] and transfer to log unit [dBm])
<input type="checkbox"/>	Method 2: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 2 for radiated measurement.

3.6.4 Test Setup



**3.6.5 Test Result of Maximum Peak Conducted Output Power**

Maximum Peak Conducted Output Power Result					
Directional Gain (dBi)	2.06	RF Output Power (dBm)			
Modulation Mode	Freq. (MHz)	RF Output Power	Power Limit	EIRP Power	EIRP Limit
BT-1M	2402	6.02	21	8.08	27
BT-1M	2441	6.56	21	8.62	27
BT-1M	2480	6.74	21	8.80	27
<b>Result</b>		<b>Complied</b>			
RF Output Power Limit for Frequency Hopping Systems					

Maximum Peak Conducted Output Power Result					
Directional Gain (dBi)	2.06	RF Output Power (dBm)			
Modulation Mode	Freq. (MHz)	RF Output Power	Power Limit	EIRP Power	EIRP Limit
BT-3M	2402	5.09	21	7.15	27
BT-3M	2441	5.83	21	7.89	27
BT-3M	2480	5.99	21	8.05	27
<b>Result</b>		<b>Complied</b>			
RF Output Power Limit for Frequency Hopping Systems					

Maximum Peak Conducted Output Power Result					
Directional Gain (dBi)	2.06	RF Output Power (dBm)			
Modulation Mode	Freq. (MHz)	RF Output Power	Power Limit	EIRP Power	EIRP Limit
LE-1M	2402	7.89	30	9.95	36
LE-1M	2442	8.41	30	10.47	36
LE-1M	2480	7.66	30	9.72	36
<b>Result</b>		<b>Complied</b>			
RF Output Power Limit for Digital Modulation Systems					

### 3.7 Power Spectral Density

#### 3.7.1 Power Spectral Density Limit

Power Spectral Density Limit
<input checked="" type="checkbox"/> Power Spectral Density (PSD) $\leq$ 8 dBm/3kHz

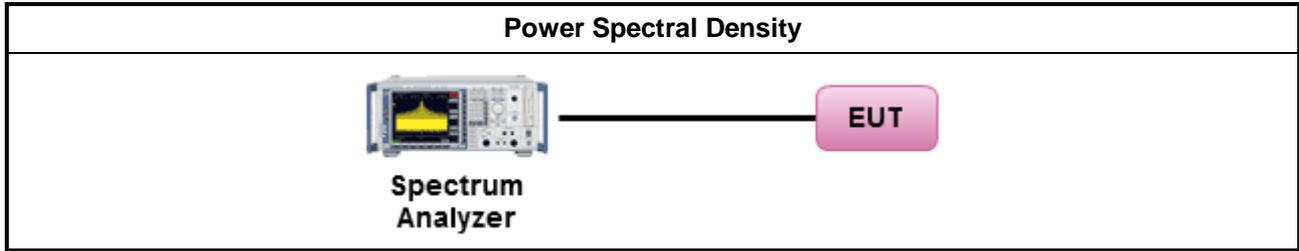
#### 3.7.2 Measuring Instruments

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

#### 3.7.3 Test Procedures

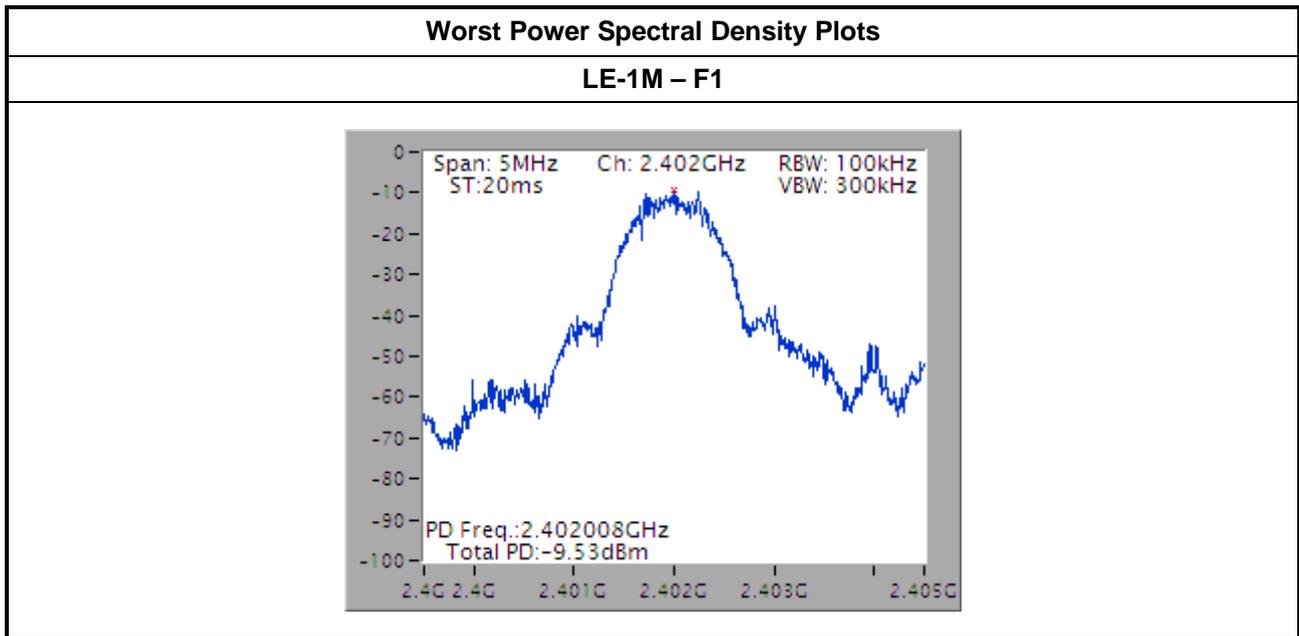
Test Method
<input checked="" type="checkbox"/> Power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the power spectral density. In addition, the use of a peak PSD procedure will always result in a "worst-case" measured level for comparison to the limit. Therefore, whenever the DTS bandwidth exceeds 500 kHz, it is acceptable to utilize the peak PSD procedure to demonstrate compliance to the PSD limit, regardless of how the fundamental output power was measured. For the power spectral density shall be measured using below options:
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 5.3.1 Option 1 (peak PSD; BWCF=-15.2dB).
<input type="checkbox"/> Refer as FCC KDB 558074, clause 5.3.2 Option 2 (average PSD; BWCF=-15.2dB).
<input type="checkbox"/> Refer as ANSI C63.10, clause 6.11.2.3 for PSD for DTS - (RBW=3kHz; sweep=100s).
<input type="checkbox"/> Refer as ANSI C63.10, clause 6.11.2.4 for Alternative PSD for DTS - (RBW=3kHz; average=100)
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 2 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: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the N <sub>TX</sub> output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace. The new data trace samples added 100 kHz segment and found the highest value of each 100 kHz segments. Add the bandwidth correction factor (BWCF) [-15.2 dB] adjusting in power spectral density per 3kHz.
<input type="checkbox"/> Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.
<input type="checkbox"/> Refer as FCC KDB 558074, clause 2 for radiated measurement.

3.7.4 Test Setup



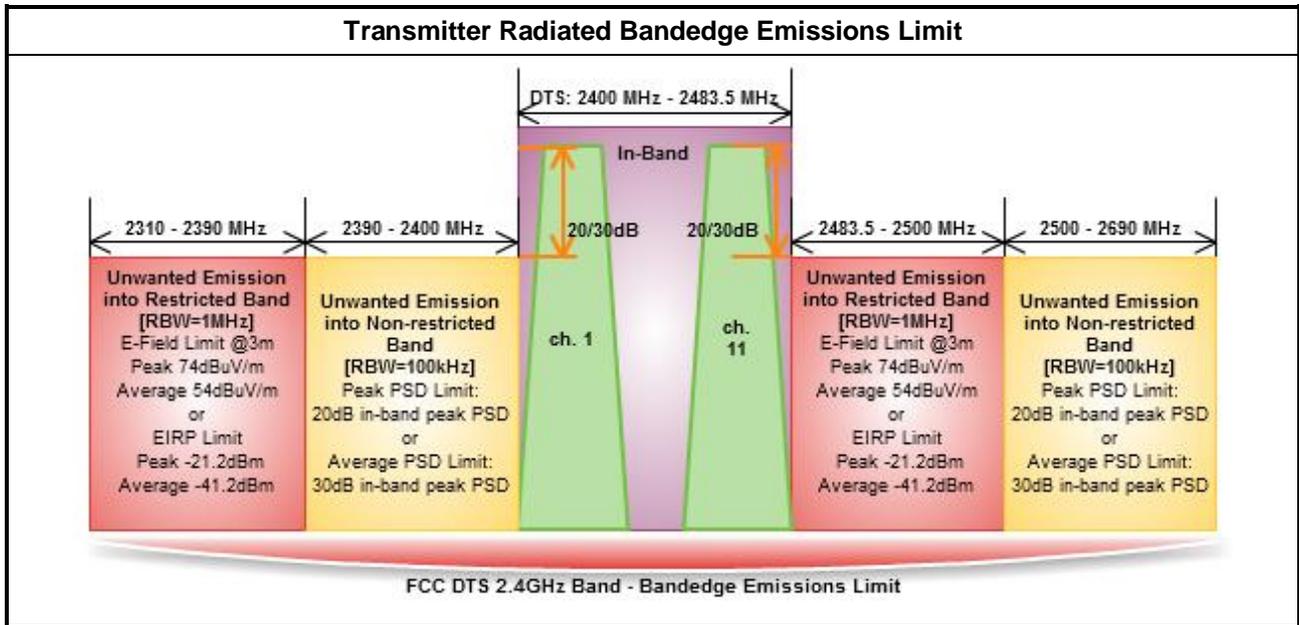
3.7.5 Test Result of Power Spectral Density

Power Spectral Density Result (dBm/3kHz)			
Modulation Mode	Freq. (MHz)	PSD	PSD Limit
LE-1M	2402	-9.53	8
LE-1M	2442	-9.75	8
LE-1M	2480	-9.73	8
<b>Result</b>		<b>Complied</b>	
Note 1: PSD [dBm/3kHz] = PSD [dBm/100kHz] + BWFC [-15.2 dB]			



### 3.8 Transmitter Radiated Bandedge Emissions

#### 3.8.1 Transmitter Radiated Bandedge Emissions Limit



**3.8.2 Measuring Instruments**

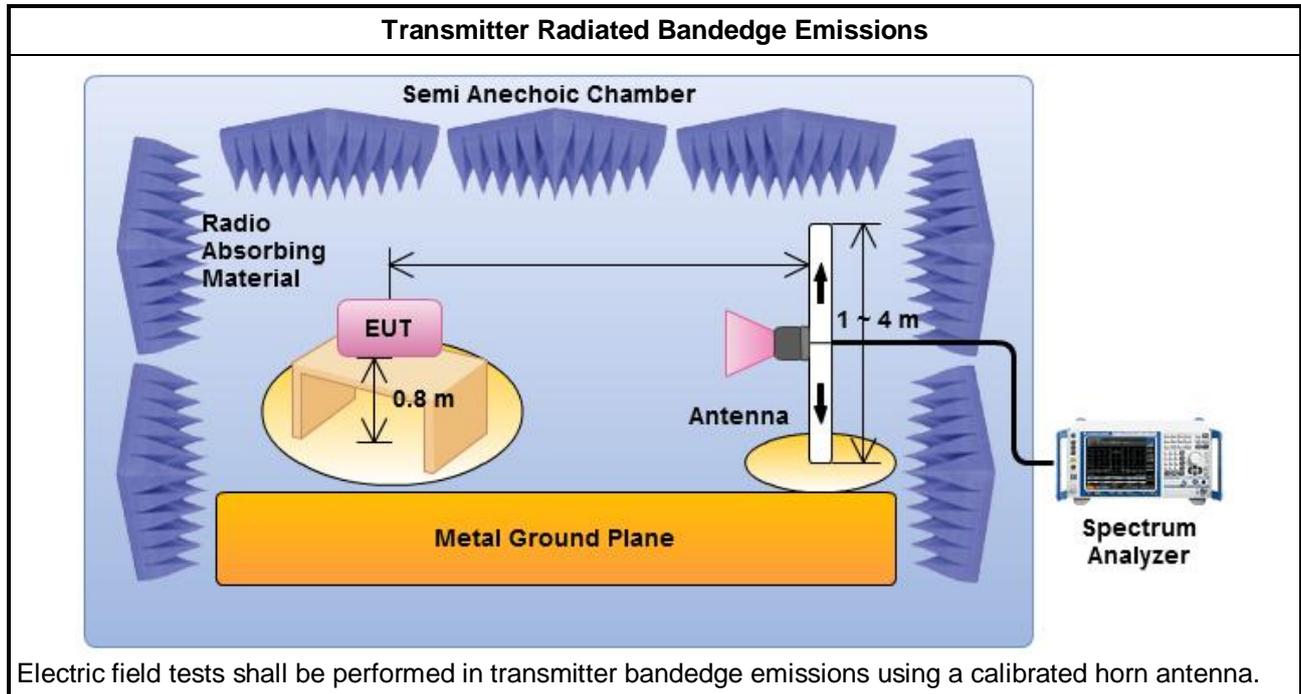
Refer a test equipment and calibration data table in this test report.

**3.8.3 Test Procedures**

<b>Test Method – General Information</b>	
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle $\geq$ 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"/>	Refer as FCC KDB 558074, clause 5.4.1 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2 for unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.2.1 Option 1 (Power Averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.2.2 Option 2 (Trace Averaging).
<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 FCC KDB 558074, clause 5.4.2.2.1.1 measurement procedure peak limit.
<input 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 type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.4 for narrower resolution bandwidth using the band power and summing the spectral levels (i.e., 100 kHz or 1 MHz).
<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.

Test Method	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 2 for conducted measurement.
<input type="checkbox"/>	For unwanted emissions into non-restricted bands (relative emission limits).
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N) if the measurements are made relative to the in-band emissions on the individual outputs.
<input type="checkbox"/>	For unwanted emissions into restricted bands. Test conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.1 unwanted emissions in restricted bands on frequencies ≤ 1000 MHz
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.2 unwanted emissions in restricted bands on frequencies > 1000 MHz
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains using options given below:
<input type="checkbox"/>	Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, out-of-band and spurious emission measurement. The trace data for each transmit chain has to be individually recorded and each transmit chain trace data shall be added and compared with the limit.
<input type="checkbox"/>	Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 2 for radiated measurement.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
<input 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.

3.8.4 Test Setup



3.8.5 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	106.15	2394.35	61.96	44.19	20	PK	V
2500-2690	2480	103.99	2525.92	62.93	41.06	20	PK	V

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	106.39	2387.42	3	59.42	74	PK	V
2310-2390	2402	105.41	2362.02	3	47.05	54	AV	V
2483.5-2500	2480	104.10	2483.50	3	60.52	74	PK	V
2483.5-2500	2480	103.20	2483.50	3	49.96	54	AV	V

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]

Transmitter Radiated Bandedge Emissions Result								
Modulation	BT-3M		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	102.69	2391.91	62.93	39.76	20	PK	V
2500-2690	2480	101.32	2501.41	63.58	37.74	20	PK	V
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-3M		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	103.12	2347.33	3	58.96	74	PK	V
2310-2390	2402	98.85	2387.83	3	47.02	54	AV	V
2483.5-2500	2480	101.46	2498.70	3	60.48	74	PK	V
2483.5-2500	2480	97.22	2483.50	3	49.15	54	AV	V
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]								

Transmitter Radiated Bandedge Emissions Result								
Modulation	LE-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	105.36	2391.91	62.39	42.97	20	PK	V
2500-2690	2480	102.62	2529.94	63.02	39.60	20	PK	V

Low Bandedge				Up Bandedge			

Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)

Transmitter Radiated Bandedge Emissions Result								
Modulation	LE-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	105.70	2389.76	3	64.88	74	PK	V
2310-2390	2402	89.66	2384.97	3	47.09	54	AV	V
2483.5-2500	2480	102.95	2483.50	3	61.06	74	PK	V
2483.5-2500	2480	87.64	2483.50	3	49.55	54	AV	V

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]

### 3.9 Transmitter Radiated Unwanted Emissions

#### 3.9.1 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.

#### 3.9.2 Measuring Instruments

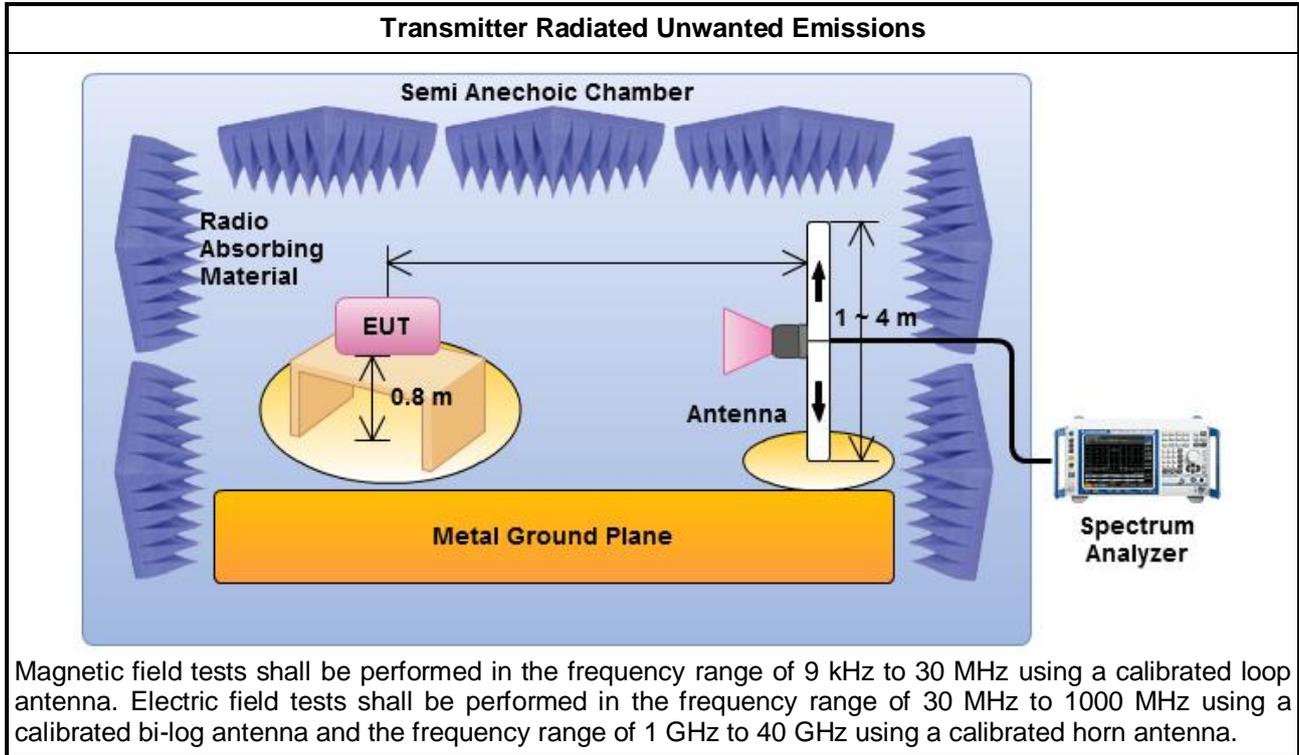
Refer a test equipment and calibration data table in this test report.

3.9.3 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"/>	Refer as FCC KDB 558074, clause 5.4.1 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2 for unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.1 Option 1 (Power Averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.2 Option 2 (Trace Averaging).
<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 FCC KDB 558074, clause 5.4.2.1.1 measurement procedure peak limit.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.

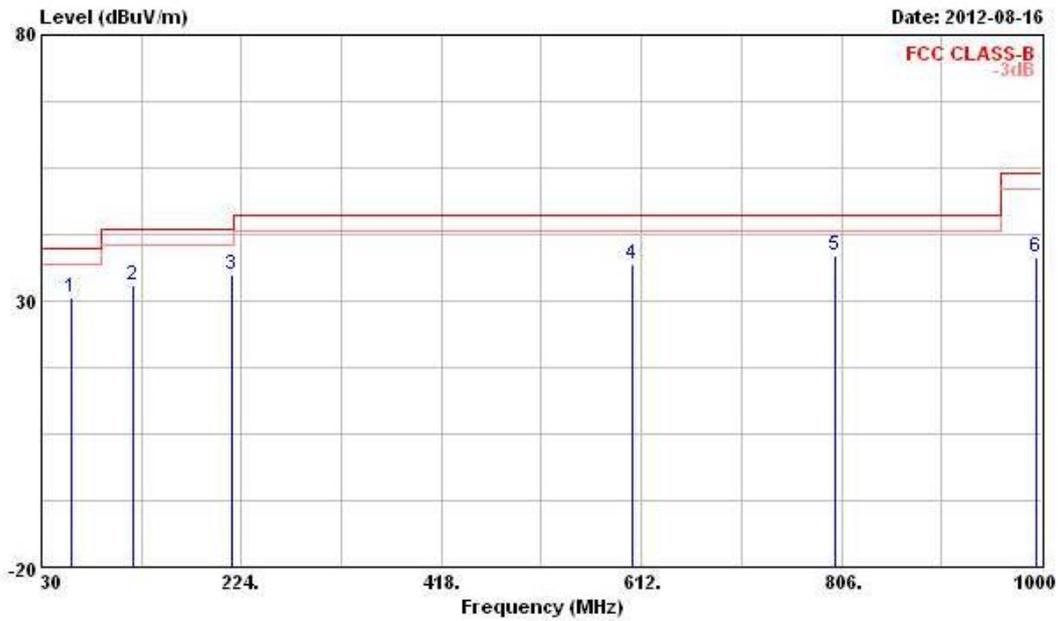
Test Method	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 2 for conducted measurement.
<input type="checkbox"/>	For unwanted emissions into non-restricted bands (relative emission limits).
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N) if the measurements are made relative to the in-band emissions on the individual outputs.
<input type="checkbox"/>	For unwanted emissions into restricted bands. Test conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.1 unwanted emissions in restricted bands on frequencies ≤ 1000 MHz
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.2 unwanted emissions in restricted bands on frequencies > 1000 MHz
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains using options given below:
<input type="checkbox"/>	Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, out-of-band and spurious emission measurement. The trace data for each transmit chain has to be individually recorded and each transmit chain trace data shall be added and compared with the limit.
<input type="checkbox"/>	Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.
<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.

3.9.4 Test Setup



3.9.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Modulation Mode	BT-1M	Polarization	V
Operating Mode	1	Operating Function	Transmitter Mode

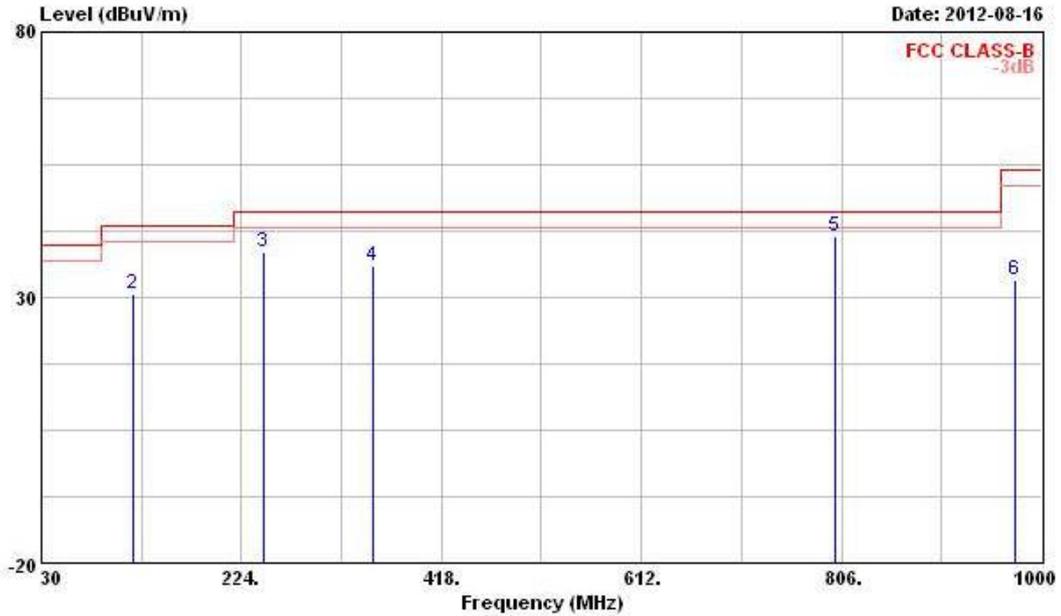


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	59.100	30.56	-9.44	40.00	49.74	7.38	1.29	27.85	Peak	---	---
2	118.270	32.80	-10.70	43.50	45.38	13.38	1.81	27.77	Peak	---	---
3	214.300	35.06	-8.44	43.50	48.07	11.83	2.53	27.37	Peak	---	---
4	602.300	36.94	-9.06	46.00	41.00	20.15	4.25	28.46	Peak	---	---
5	800.180	38.54	-7.46	46.00	41.32	20.27	4.89	27.94	Peak	---	---
6	995.150	38.18	-15.82	54.00	37.38	22.38	5.66	27.24	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation Mode	BT-1M	Polarization	H
Operating Mode	1	Operating Function	Transmitter Mode

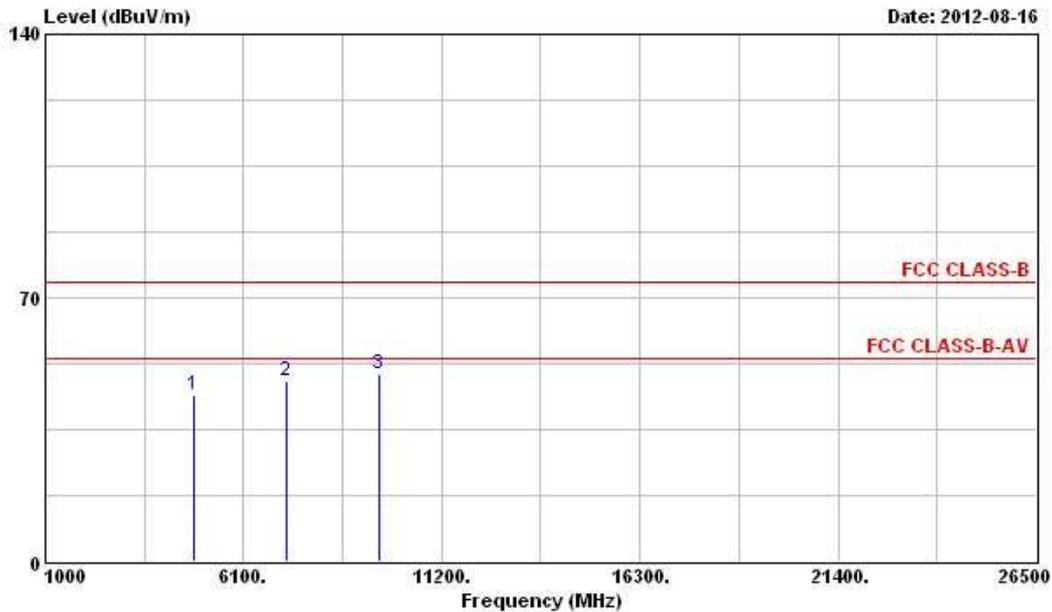


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	30.000	24.62	-15.38	40.00	35.46	16.22	0.89	27.95	Peak	---	---
2	118.270	30.82	-12.68	43.50	43.40	13.38	1.81	27.77	Peak	---	---
3	245.340	38.46	-7.54	46.00	50.18	12.84	2.74	27.30	Peak	---	---
4	351.070	35.83	-10.17	46.00	45.68	14.49	3.18	27.52	Peak	---	---
5	800.180	41.43	-4.57	46.00	44.21	20.27	4.89	27.94	Peak	---	---
6	974.780	33.21	-20.79	54.00	33.05	21.88	5.60	27.32	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

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

Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BT-1M	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	V

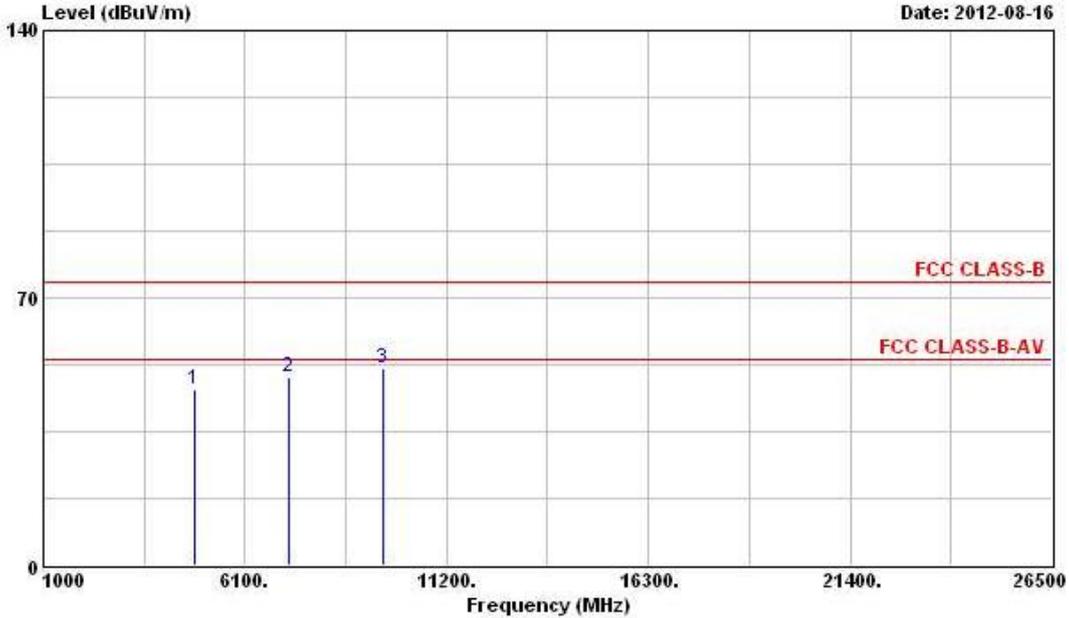


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4804.000	44.31	-9.69	54.00	39.42	35.11	4.58	34.80	PK	---	---
2	7206.000	47.96			40.53	36.88	5.62	35.07	Peak	---	---
3	9608.000	49.94			40.55	38.52	6.34	35.47	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).

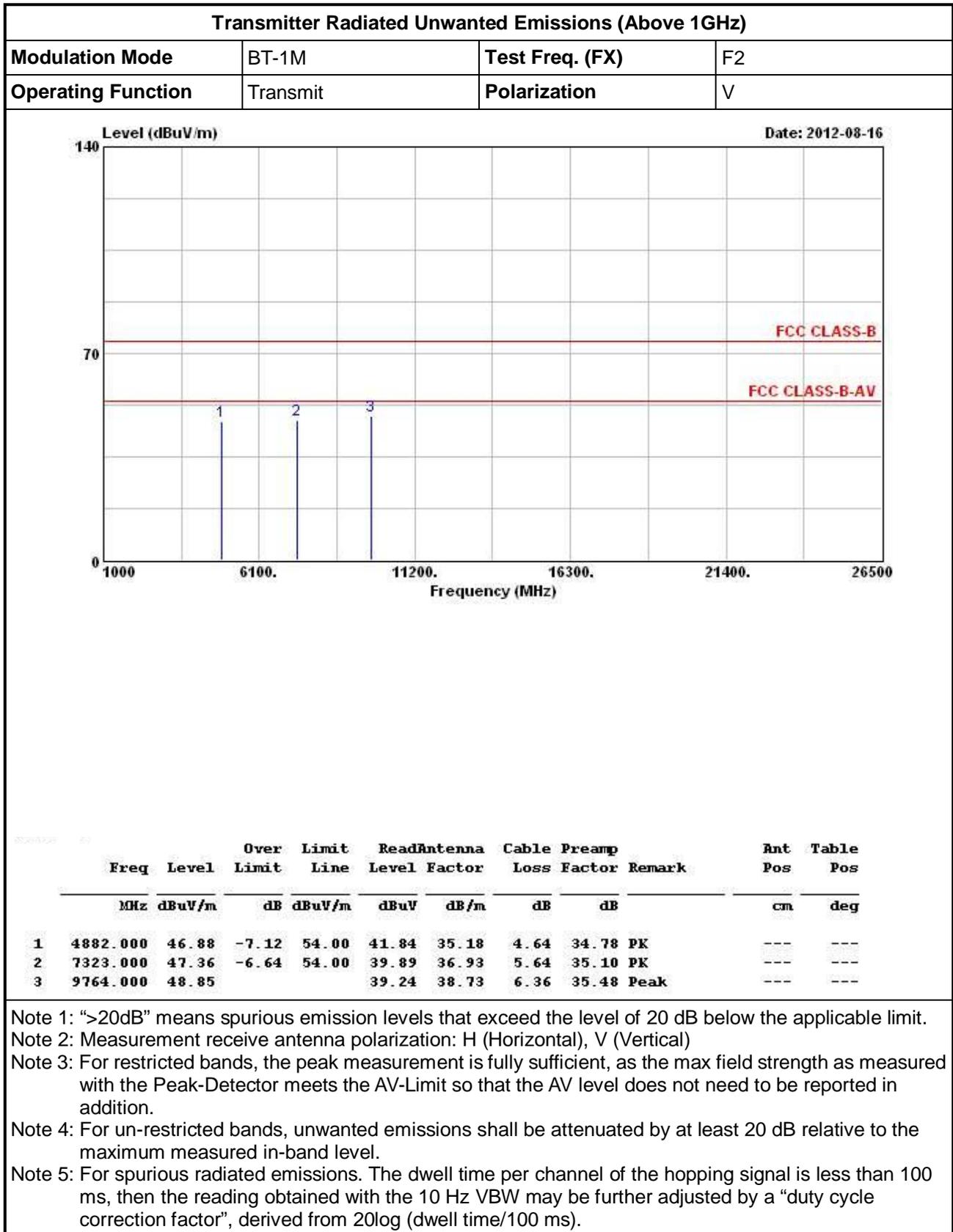
**Transmitter Radiated Unwanted Emissions (Above 1GHz)**

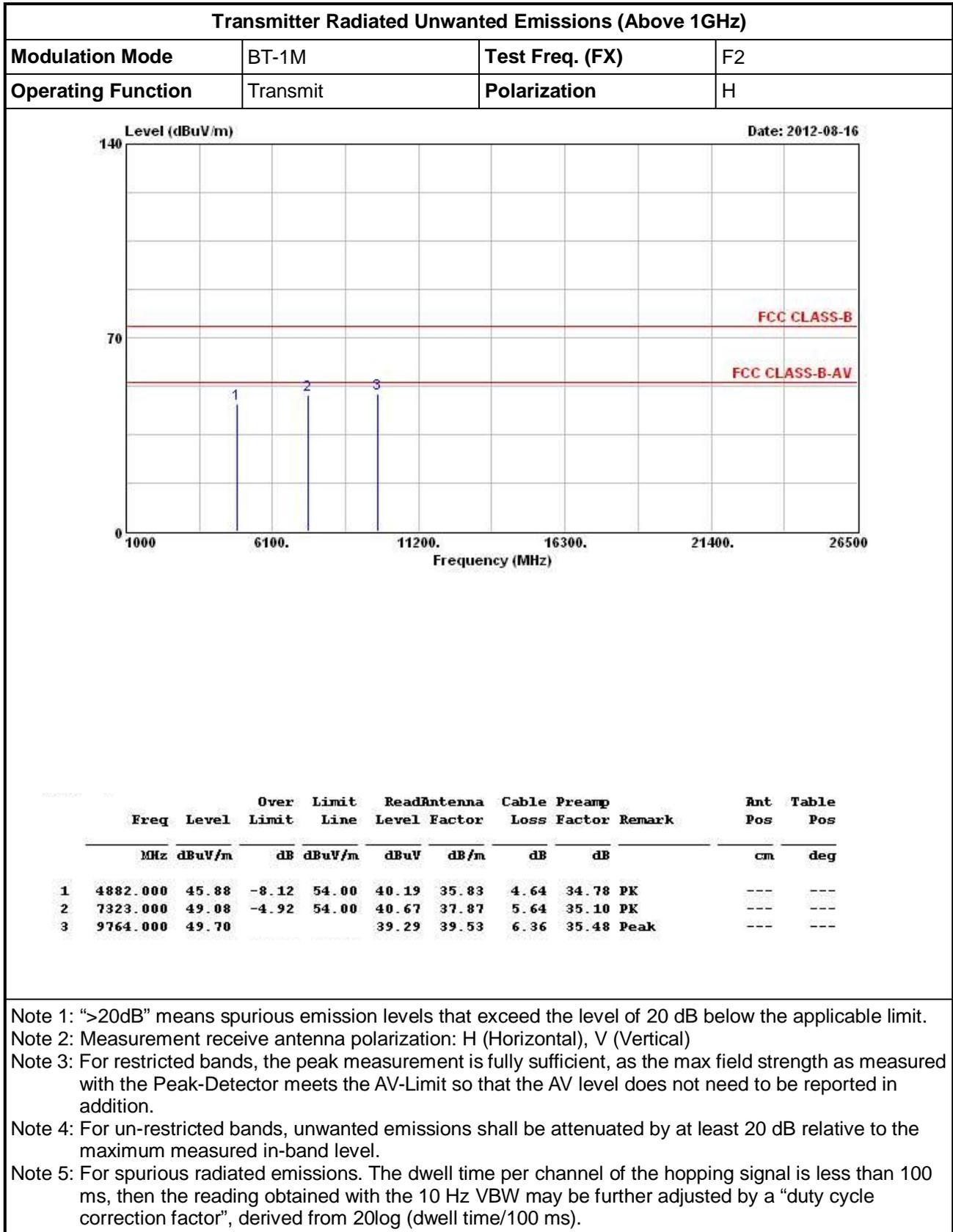
<b>Modulation Mode</b>	BT-1M	<b>Test Freq. (FX)</b>	F1
<b>Operating Function</b>	Transmit	<b>Polarization</b>	H

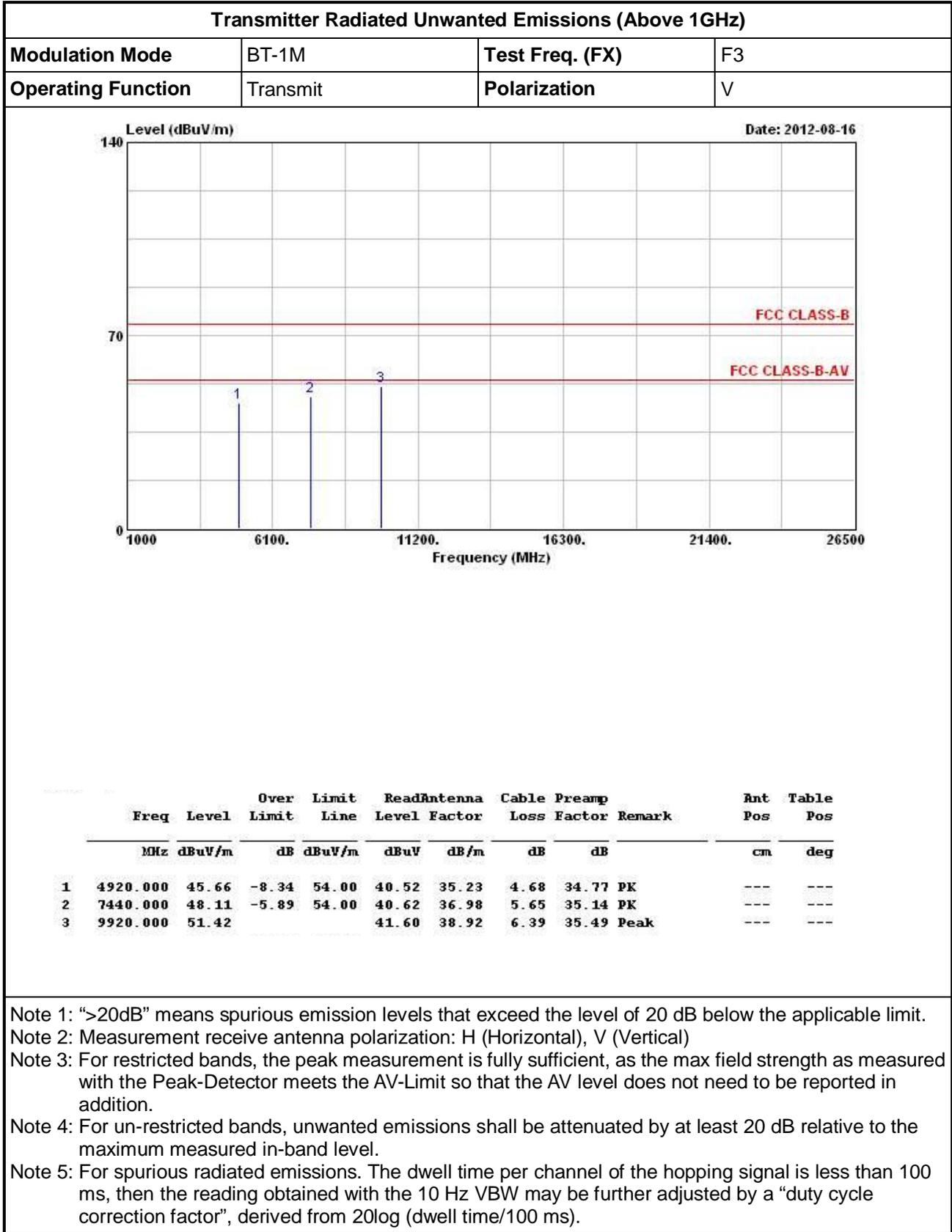


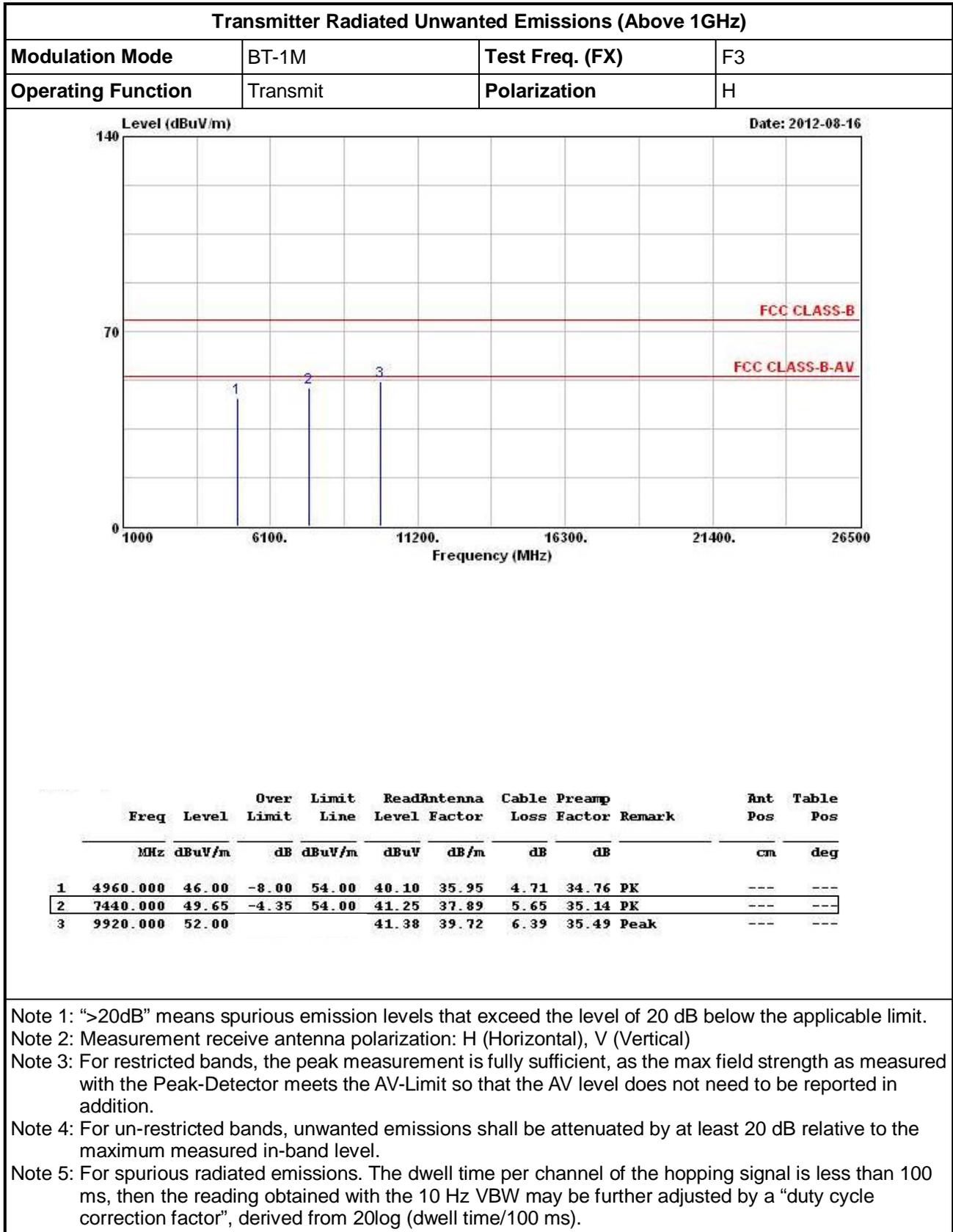
	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4804.000	45.83	-8.17	54.00	40.32	35.73	4.58	34.80	Average	---
2	7206.000	49.36			40.97	37.84	5.62	35.07	Peak	---
3	9608.000	51.54			41.35	39.32	6.34	35.47	Peak	---

- 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).



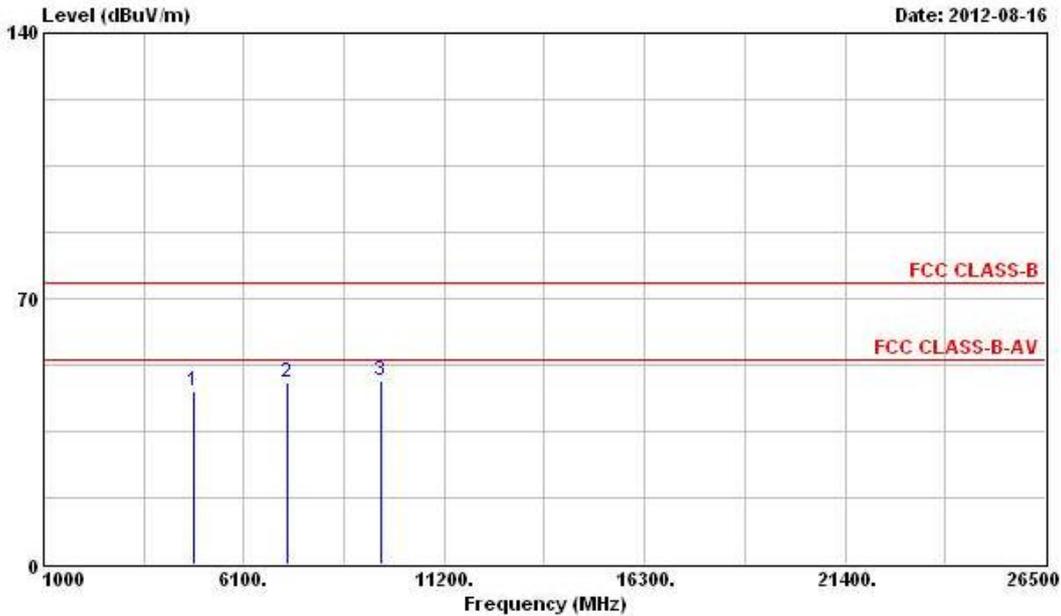






3.9.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for LE-1M

Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	LE-1M	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	V

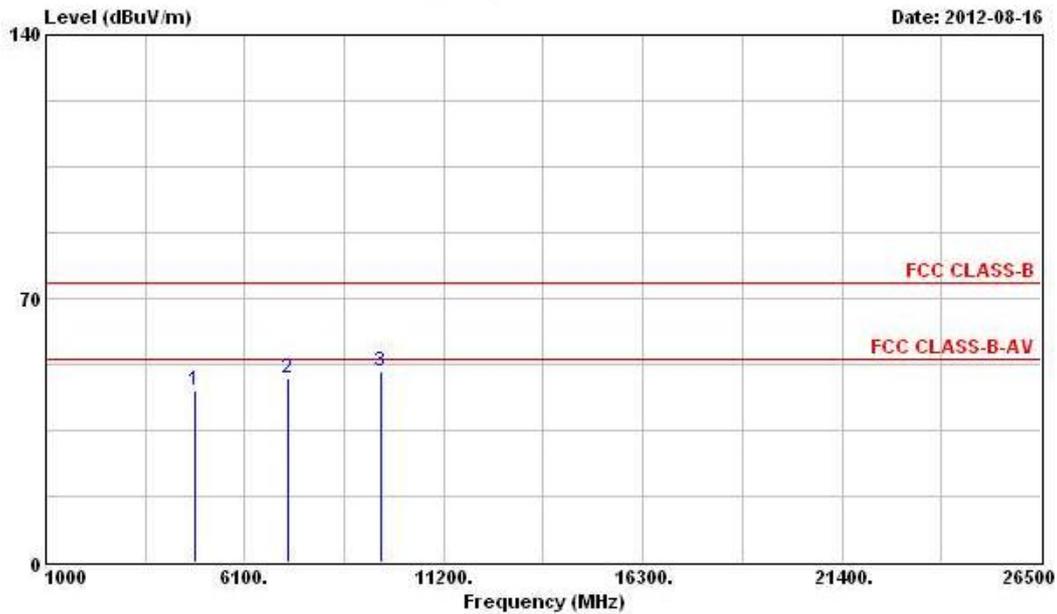


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4804.000	45.47	-8.53	54.00	40.58	35.11	4.58	34.80	PK	---	---
2	7206.000	47.92			40.49	36.88	5.62	35.07	Peak	---	---
3	9608.000	48.38			38.99	38.52	6.34	35.47	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).

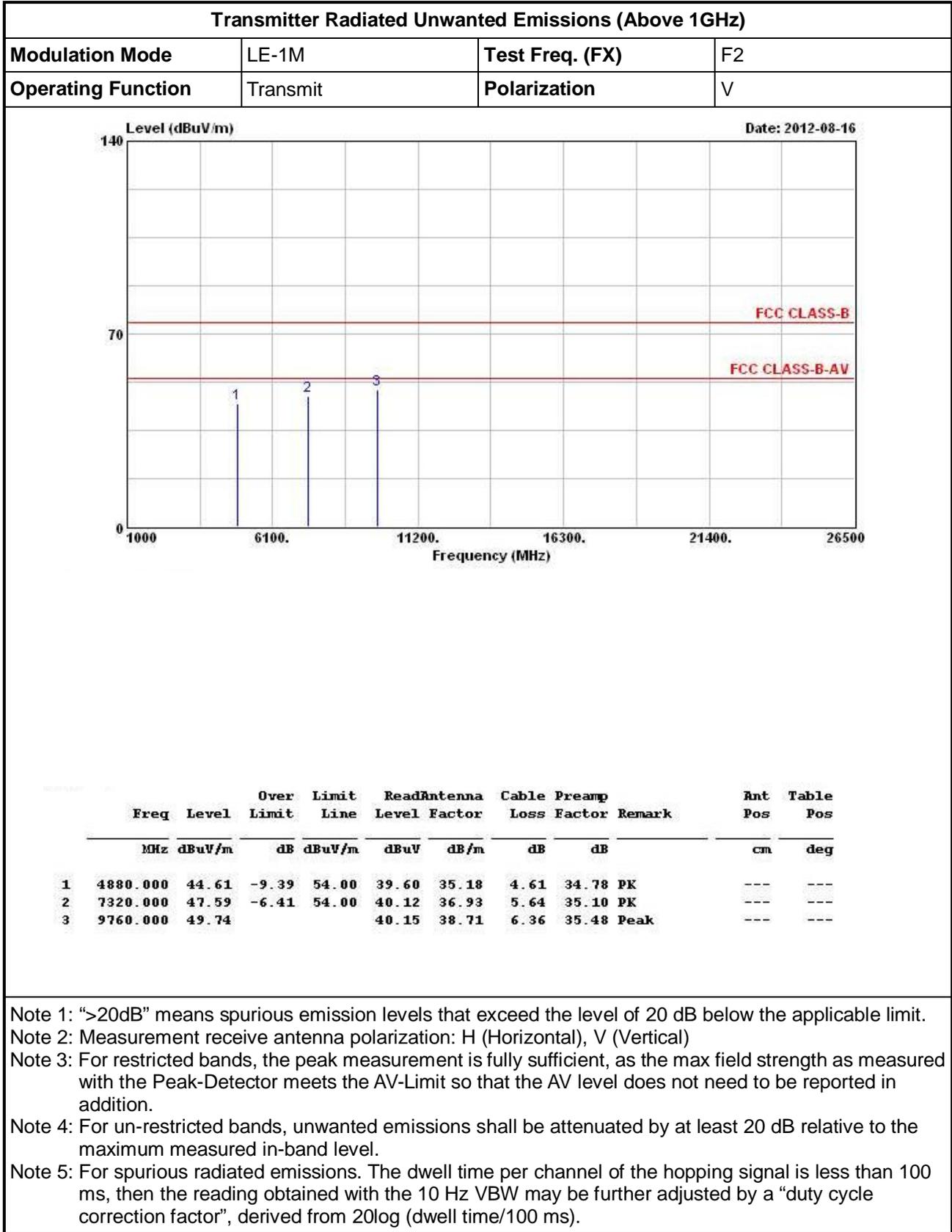
**Transmitter Radiated Unwanted Emissions (Above 1GHz)**

<b>Modulation Mode</b>	LE-1M	<b>Test Freq. (FX)</b>	F1
<b>Operating Function</b>	Transmit	<b>Polarization</b>	H



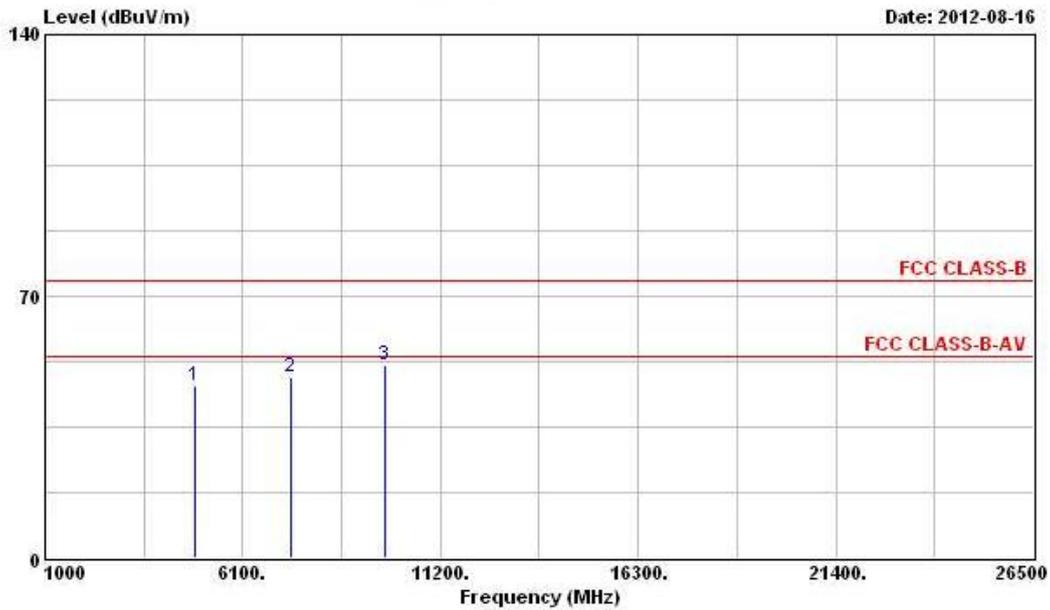
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4804.000	45.47	-8.53	54.00	39.96	35.73	4.58	34.80 PK	---	---
2	7206.000	48.73			40.34	37.84	5.62	35.07 Peak	---	---
3	9608.000	50.69			40.50	39.32	6.34	35.47 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)**

<b>Modulation Mode</b>	LE-1M	<b>Test Freq. (FX)</b>	F2
<b>Operating Function</b>	Transmit	<b>Polarization</b>	H

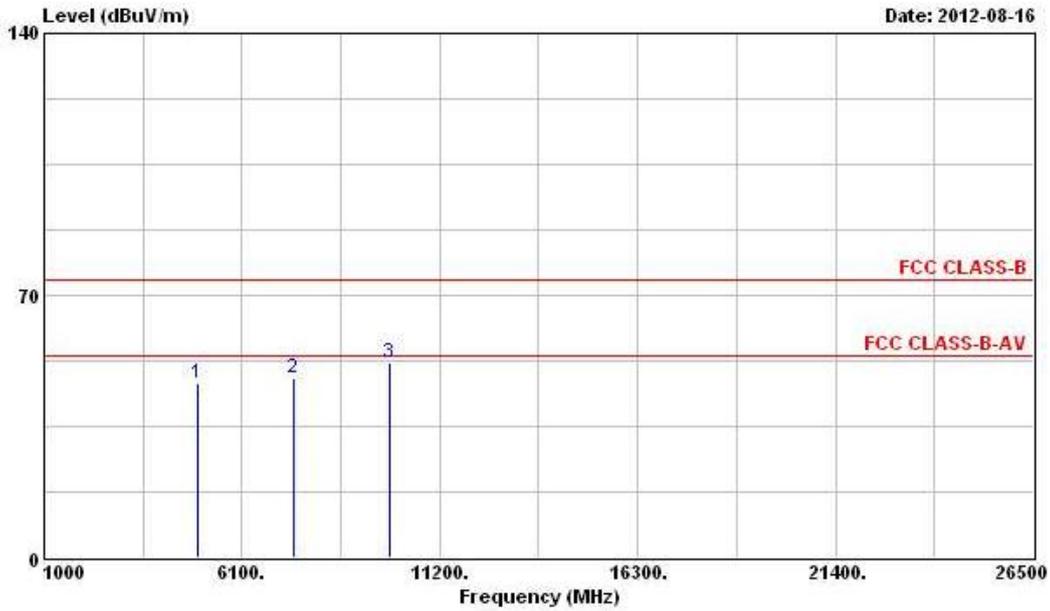


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4880.000	45.88	-8.12	54.00	40.22	35.83	4.61	34.78	PK	---	---
2	7320.000	48.23	-5.77	54.00	39.82	37.87	5.64	35.10	PK	---	---
3	9760.000	51.43			41.04	39.51	6.36	35.48	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)**

<b>Modulation Mode</b>	LE-1M	<b>Test Freq. (FX)</b>	F3
<b>Operating Function</b>	Transmit	<b>Polarization</b>	V

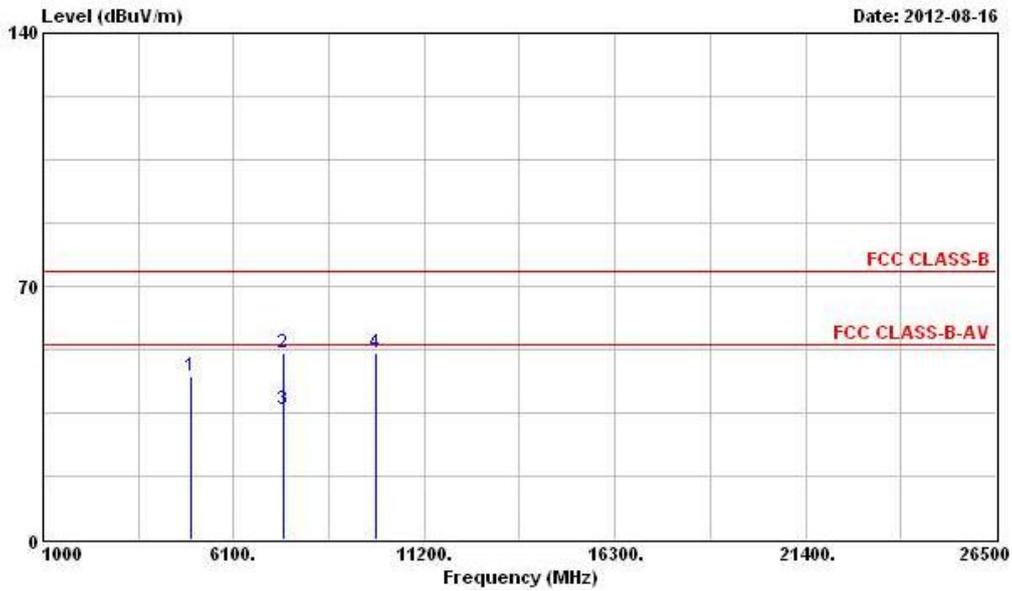


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4960.000	46.61	-7.39	54.00	41.39	35.27	4.71	34.76	PK	---	---
2	7440.000	48.08	-5.92	54.00	40.59	36.98	5.65	35.14	PK	---	---
3	9920.000	52.05			42.23	38.92	6.39	35.49	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)**

<b>Modulation Mode</b>	LE-1M	<b>Test Freq. (FX)</b>	F3
<b>Operating Function</b>	Transmit	<b>Polarization</b>	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4960.000	45.30	-8.70	54.00	39.40	35.95	4.71	34.76	PK	---	---
2	7440.000	51.38	-22.62	74.00	42.98	37.89	5.65	35.14	Peak	---	---
3	7440.000	36.13	-17.87	54.00	27.73	37.89	5.65	35.14	Average	---	---
4	9920.000	51.47			40.85	39.72	6.39	35.49	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	9 kHz ~ 2.75 GHz	Mar. 23, 2012	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Feb. 08, 2012	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9 kHz ~ 30 MHz	Apr. 20, 2012	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	CB049	9 kHz ~ 30 MHz	Apr. 25, 2012	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	FSP 40	100305	9KHz~40GHz	Feb. 21, 2012	Conducted (TH01-HY)
Spectrum Analyzer	R&S	FSV 40	15195-01-00	9KHz~40GHz	Jan. 06, 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	Dec. 07, 2011	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100302	10MHz ~ 40GHz	Nov. 22, 2011	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	Jan. 12, 2012	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	Jan. 12, 2012	Conducted (TH01-HY)
RF Cable-2m	HUBER+SUHNER	SUCOFLEX_104	SN 345672/4	1GHz ~ 26.5GHz	Dec. 03, 2011	Conducted (TH01-HY)
RF Cable-3m	HUBER+SUHNER	SUCOFLEX_104	SN 345668/4	1GHz ~ 26.5GHz	Dec. 03, 2011	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jun. 09, 2011*	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Sep. 01, 2011	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 10, 2012	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100kHz ~ 1.3GHz	Jul. 23, 2012	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	Aug. 10, 2012	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 15, 2011	Radiation (03CH02-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan.13, 2012	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Nov. 11, 2011	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 06, 2012	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 22, 2011	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0~ 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 ~ 4 m	N/A	Radiation (03CH02-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Sep. 09, 2010*	Radiation (03CH02-HY)

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

## 5 Certification of TAF Accreditation



Certificate No. : L1190-120405

財團法人全國認證基金會  
Taiwan Accreditation Foundation

### Certificate of Accreditation

This is to certify that

**Sporton International Inc.**  
**EMC & Wireless Communications Laboratory**  
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,  
Taiwan, R.O.C.

**is accredited in respect of laboratory**

**Accreditation Criteria** : ISO/IEC 17025:2005  
**Accreditation Number** : 1190  
**Originally Accredited** : December 15, 2003  
**Effective Period** : January 10, 2010 to January 09, 2013  
**Accredited Scope** : Testing Field, see described in the Appendix  
**Specific Accreditation Program** : Accreditation Program for Designated Testing Laboratory for Commodities Inspection  
Accreditation Program for Telecommunication Equipment Testing Laboratory  
Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities

*Jay-San Chen*  
Jay-San Chen  
President, Taiwan Accreditation Foundation  
Date: April 05, 2012

P1, total 24 pages