

# FCC Test Report

**Equipment** : Tablet Computer  
**Brand Name** : Dell  
**Model No.** : J42A  
**FCC ID** : E2KJ42A  
**Standard** : 47 CFR FCC Part 15.247  
**Frequency Range** : 2400 MHz – 2483.5 MHz  
**Equipment Class** : DSS  
**Applicant** : Dell  
**Manufacturer** : One Dell Way, Round Rock, Texas 78682, U.S.A.

The product sample received on Sep. 12, 2012 and completely tested on Oct. 31, 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.

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	[dBuV]: 0.179522MHz 40.21(Margin 14.30dB) - AV 51.32 (Margin 13.19dB) - QP	FCC 15.207	Complied
3.2	15.247(a)	6dB Bandwidth	LE:0.696 MHz	≥500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm] LE:3.79	Power [dBm] LE:30	Complied
3.4	15.247(d)	Power Spectral Density	PSD [dBm/3kHz] LE: -13.46	PSD [dBm/3kHz]: 8	Complied
3.5	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2518.79MHz: 38.24dB Restricted Bands [dBuV/m at 3m]: 2483.53MHz 60.70 (Margin 13.3dB) - PK 48.01 (Margin 5.99dB) - AV	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied
3.6	15.247(c)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]:7320MHz 49.22 (Margin 4.78dB) - 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)	Co-location
2400-2483.5	v4.0 LE	2402-2480	0-39 [40]	3.79	N/A
<p>Note 1: Bluetooth LE (Low Energy) using GFSK modulation for DTS digital modulation.</p> <p>Note 2: RF output power specifies that Maximum Peak Conducted Output Power.</p> <p>Note 3: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)</p>					

### 1.1.2 Antenna Information

Antenna Category	
<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			
Ant. No.	Ant. Cat.	Ant. Type	G <sub>ANT</sub> (dBi)
1	Integral	PIFA	1.6

**1.1.3 Type of EUT**

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	<input type="checkbox"/> Production ; <input checked="" 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)
<input checked="" type="checkbox"/> 74.19% - test mode single channel - LE	1.30

**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	LITEON	Model Name	PA-1300-04
	Power Rating	I/P: 100-240 V~1.0A (1,0A) 50-60 Hz ; O/P: 19V 1.58A (1,58A)		
Battery	Brand Name	DELL	Model Name	JD33K
	Power Rating	7.4Vdc, 27Wh	Type	Li-polymer

Note: Regarding to more detail and other information, please refer to user manual.

## 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
- ◆ FCC KDB 412172

## 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
RF Conducted	TH01-HY	Shiming	23.8°C / 64%	30-Oct-12
AC Conduction	CO04-HY	Bill	24.6°C / 51.5%	11-Oct-12
Radiated Emission	03CH02-HY	Daniel	23.5°C / 62%	31-Oct-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))

<b>Measurement Uncertainty</b>			
<b>Test Item</b>		<b>Uncertainty</b>	<b>Limit</b>
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	Transmit Chains (N <sub>TX</sub> )	Data Rate	Modulation Mode	RF Output Power (dBm)
v4.0 LE	1	1 Mbps	LE-1M	3.79
Note 1: Bluetooth LE (Low Energy) using GFSK modulation for DTS digital modulation. Note 2: Modulation modes consist below configuration: DSSS LE-1M: GFSK (1Mbps) Note 3: RF output power specifies that Maximum Peak Conducted Output Power.				

### 2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration		
Bluetooth Version	Modulation Mode	Test Channel Frequencies (MHz) – FX (Frequencies Abbreviations)
v4.0 LE	LE-1M	2402-(F1), 2440-(F2), 2480-(F3)

### 2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter					
Test Software Version		QRCT			
Modulation Mode	Transmit Chains (N <sub>TX</sub> )	Frequency (MHz)	Power Setting	Data Rate	RF Output Power (dBm)
LE-1M	1	2402	Default	1 Mbps	3.52
LE-1M	1	2440	Default	1 Mbps	3.79
LE-1M	1	2480	Default	1 Mbps	2.84
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	
<b>Tests Item</b>	AC power-line conducted emissions
<b>Condition</b>	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
<b>Operating Mode</b>	Operating Mode Description
1	Normal Link

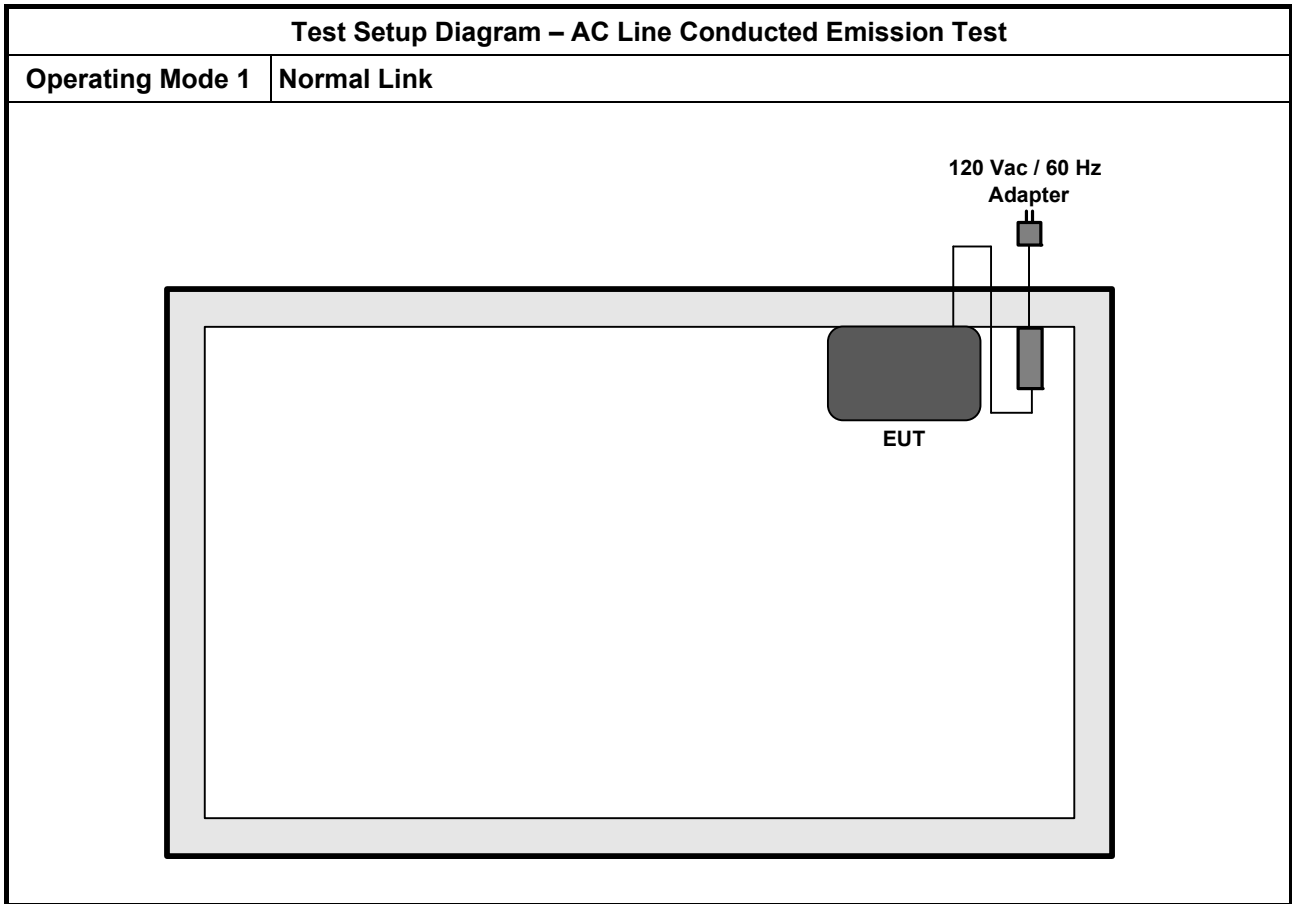
The Worst Case Mode for Following Conformance Tests			
<b>Tests Item</b>	RF Output Power, Power Spectral Density, 6 dB Bandwidth		
<b>Test Condition</b>	Conducted measurement at transmit chains		
<b>Modulation Mode</b>	<b>Transmit Chains (N<sub>TX</sub>)</b>	<b>Data Rate</b>	<b>Test Frequency</b>
LE-1M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

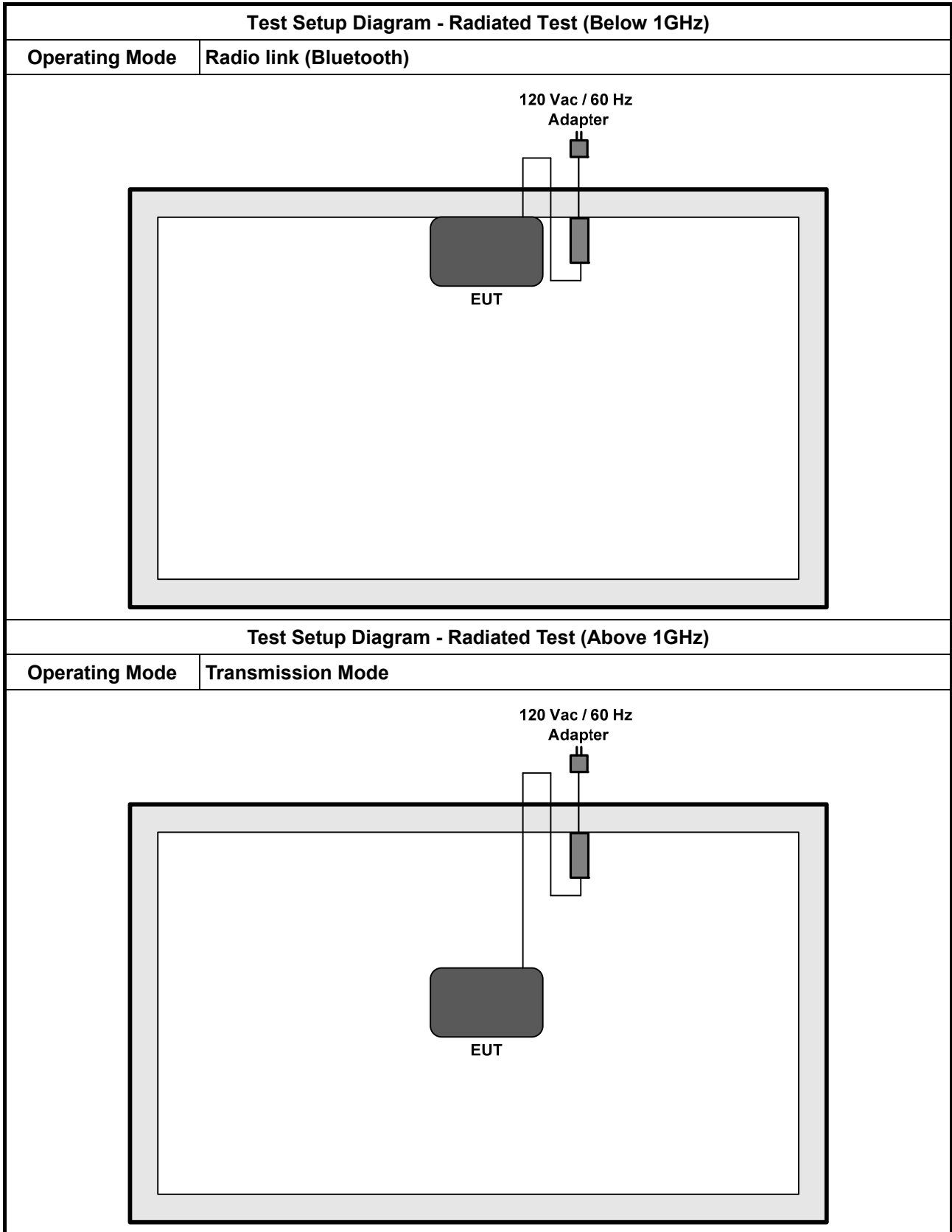
The Worst Case Mode for Following Conformance Tests			
<b>Tests Item</b>	Power Spectral Density 6 dB Bandwidth		
<b>Test Condition</b>	Conducted measurement at transmit chains		
<b>Modulation Mode</b>	<b>Number of Transmit Chains (N<sub>TX</sub>)</b>	<b>Data Rate / MCS</b>	<b>Test Frequency</b>
LE-1M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

The Worst Case Mode for Following Conformance Tests			
<b>Tests Item</b>	Transmitter Radiated Bandedge Emissions		
<b>Test Condition</b>	Radiated measurement		
<b>Modulation Mode</b>	<b>Number of Transmit Chains (N<sub>TX</sub>)</b>	<b>Data Rate / MCS</b>	<b>Test Frequency</b>
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. Worst orthogonal planes of EUT is X plane.		
<b>Operating Mode &lt; 1GHz</b>	<input checked="" type="checkbox"/> 1. Radio link (Bluetooth)		
<b>Modulation Mode</b>	<b>Data Rate</b>	<b>Test Frequency</b>	<b>Worst Planes of EUT</b>
LE-1M	1 Mbps	F1, F2, F3	X
<b>Orthogonal Planes of EUT</b>	<b>X Plane</b>	<b>Y Plane</b>	<b>Z Plane</b>
			

## 2.5 Test Setup Diagram





### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

##### 3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: \* Decreases with the logarithm of the frequency.

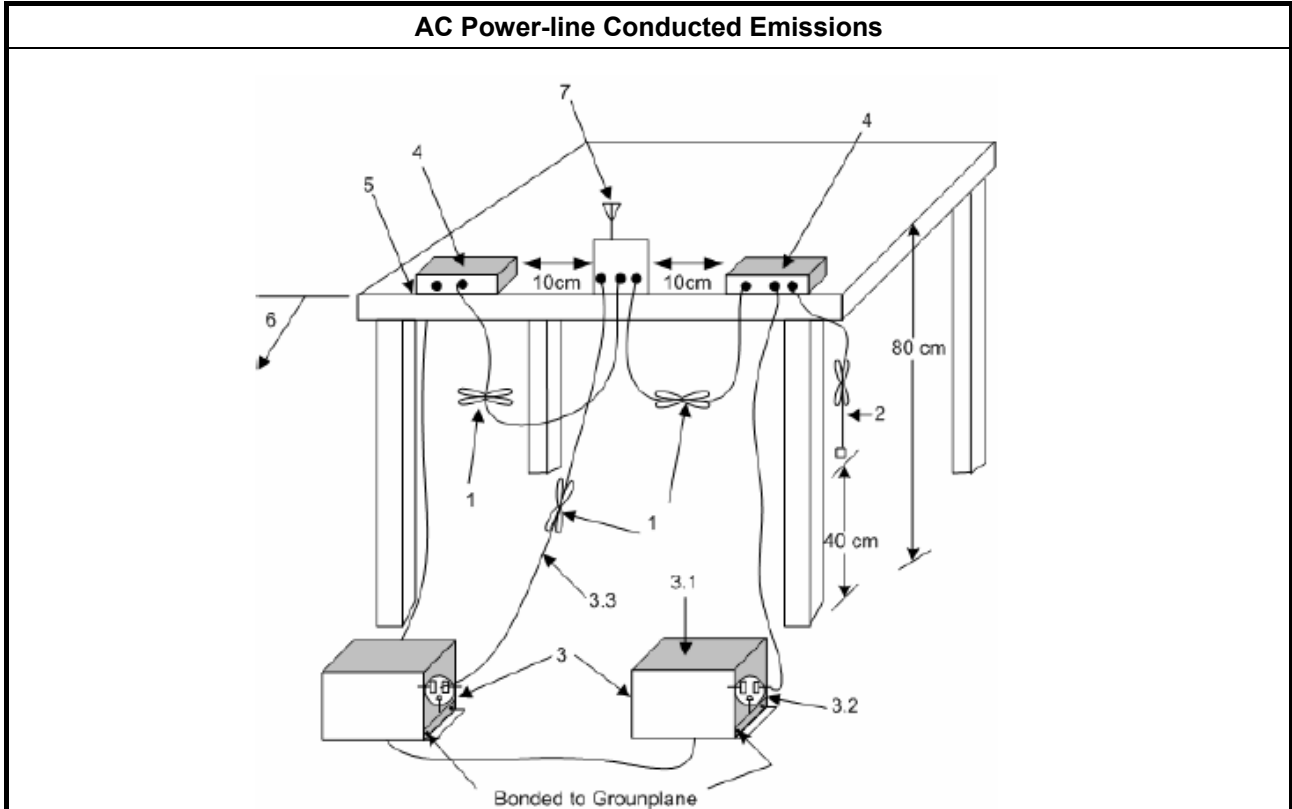
##### 3.1.2 Measuring Instruments

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

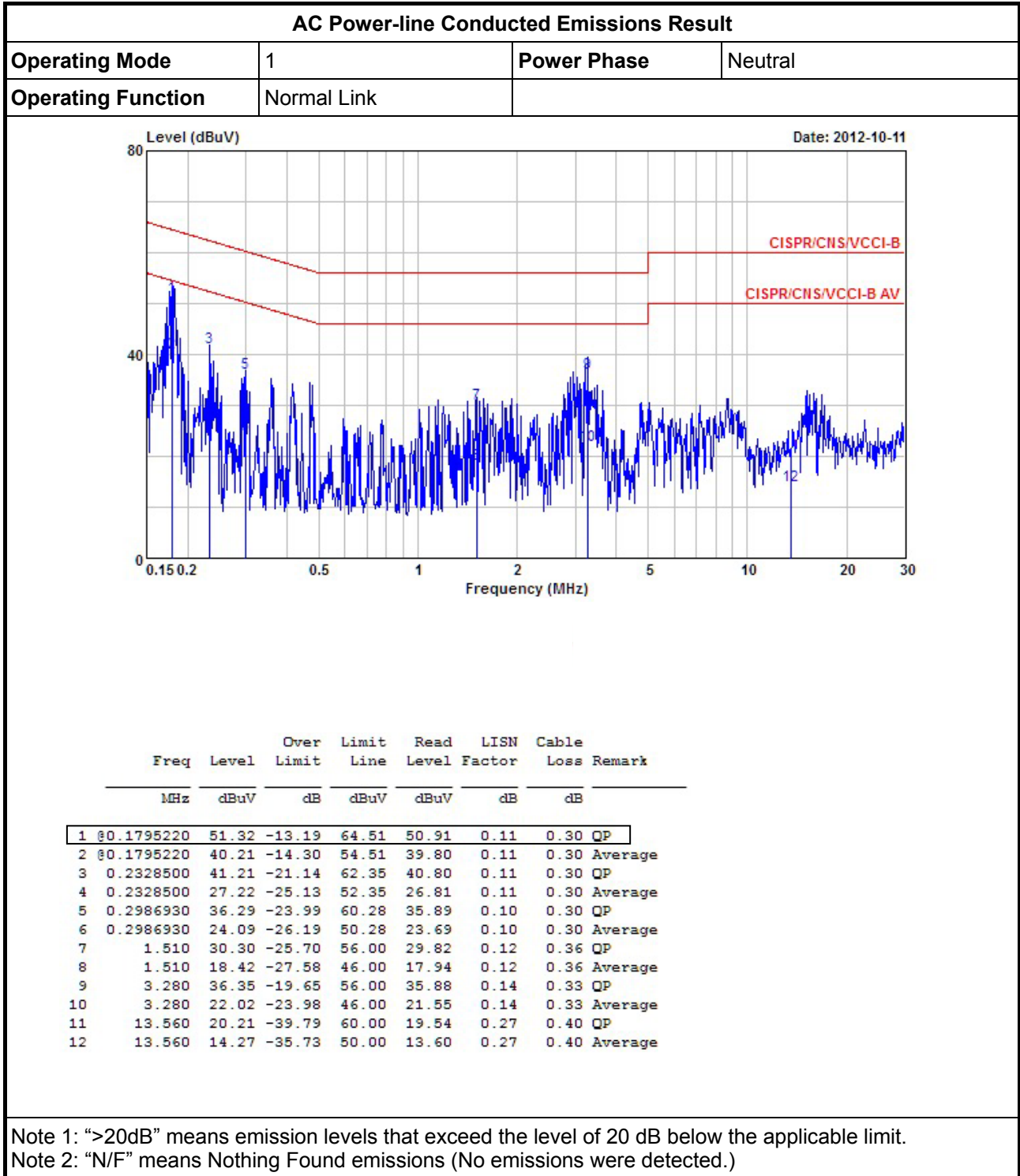
##### 3.1.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

##### 3.1.4 Test Setup

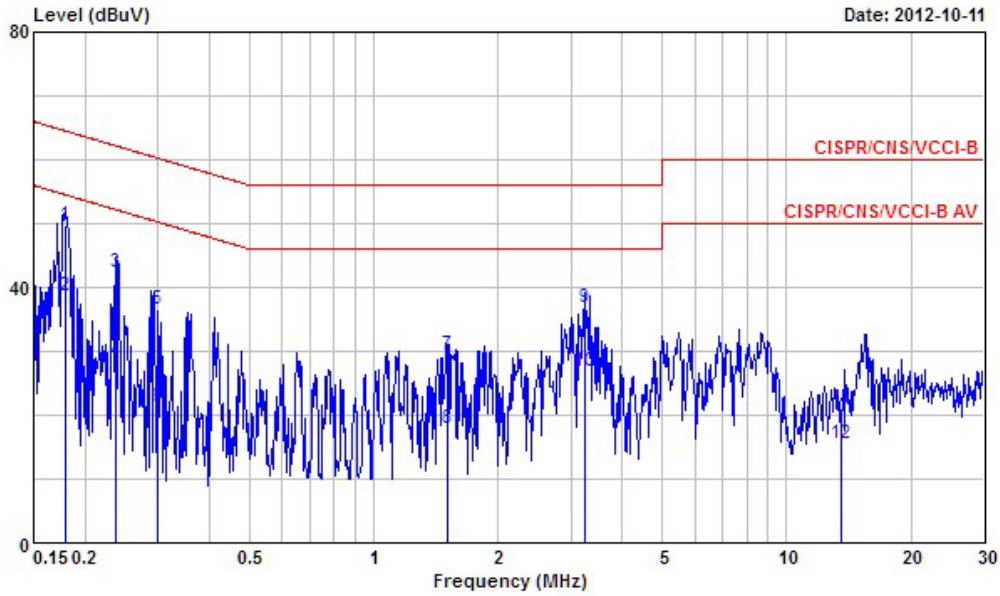


3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Normal Link		



	MHz	dBuV	dB	dBuV	dBuV	dB	dB	le as Remark
1	0.1786590	49.73	-14.82	64.55	49.20	0.23	0.30	QP
2	0.1786590	38.77	-15.78	54.55	38.24	0.23	0.30	Average
3	0.2365810	42.46	-19.76	62.22	41.93	0.23	0.30	QP
4	0.2365810	28.55	-23.67	52.22	28.02	0.23	0.30	Average
5	0.3008180	36.67	-23.55	60.22	36.15	0.22	0.30	QP
6	0.3008180	21.35	-28.87	50.22	20.83	0.22	0.30	Average
7	1.510	29.49	-26.51	56.00	28.89	0.24	0.36	QP
8	1.510	17.83	-28.17	46.00	17.23	0.24	0.36	Average
9	3.258	36.78	-19.22	56.00	36.17	0.28	0.33	QP
10	3.258	26.80	-19.20	46.00	26.19	0.28	0.33	Average
11	13.560	20.94	-39.06	60.00	20.06	0.48	0.40	QP
12	13.560	15.52	-34.48	50.00	14.64	0.48	0.40	Average

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.)



### 3.2 6dB Bandwidth

#### 3.2.1 6dB Bandwidth Limit

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

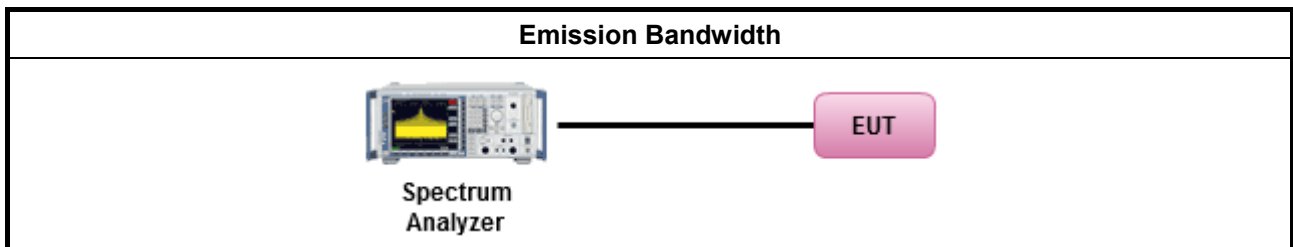
#### 3.2.2 Measuring Instruments

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

#### 3.2.3 Test Procedures

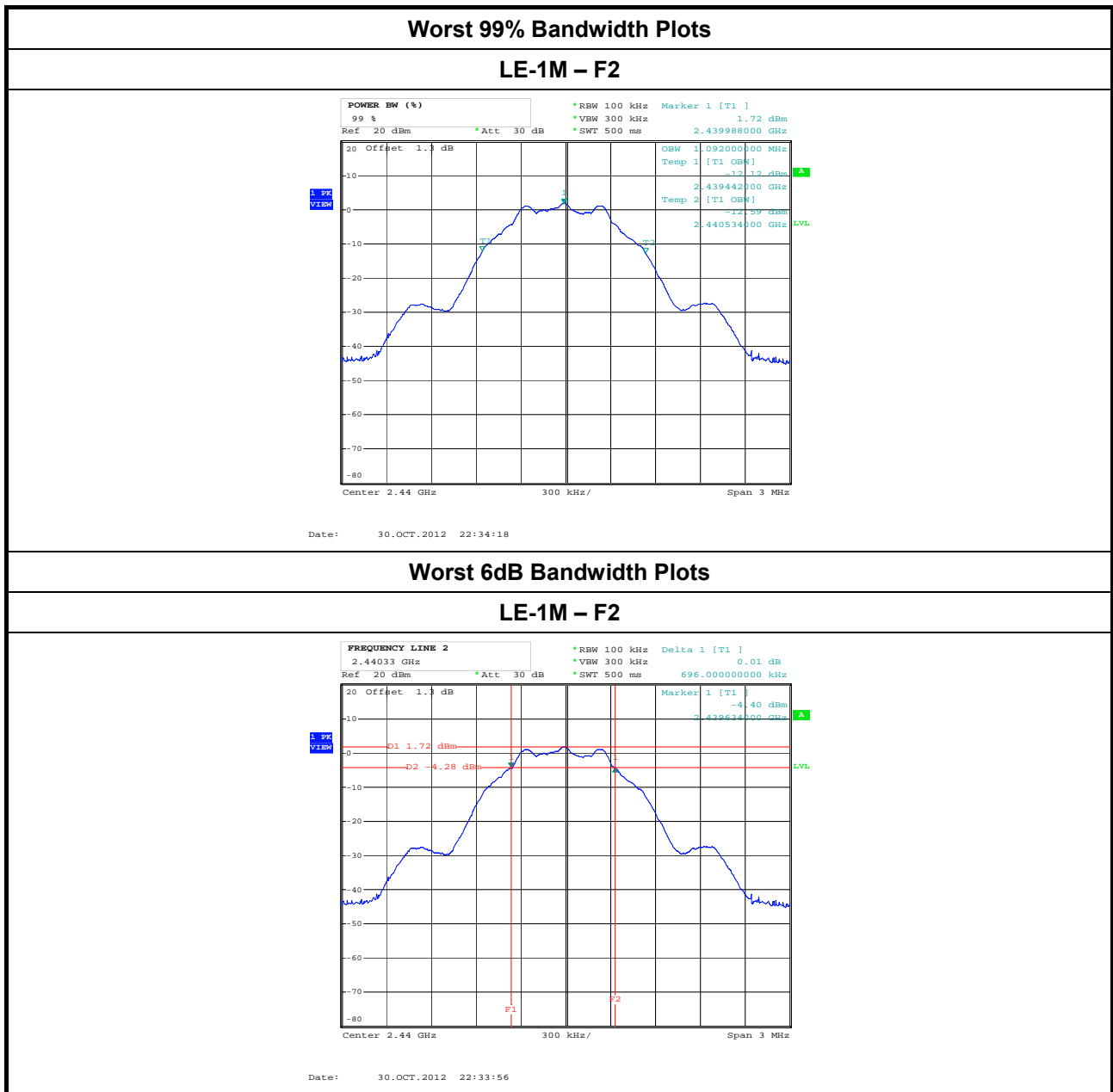
Test Method	
<input checked="" type="checkbox"/>	For the emission bandwidth shall be measured using one of the options below:
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 5.1.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.1.2 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"/>	The EUT supports single transmit chain and measurements performed on this transmit chain.
<input checked="" type="checkbox"/>	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

#### 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	1.092	0.684
LE-1M	2440	1.092	0.696
LE-1M	2480	1.086	0.684
Limit		N/A	≥500 kHz
Result		Complied	



### 3.3 RF Output Power

#### 3.3.1 RF Output Power Limit

RF Output Power Limit for Digital Modulation Systems	
<b>Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit</b>	
<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
<b>e.i.r.p. Power Limit:</b>	
<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)
$P_{Out}$ = 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.	

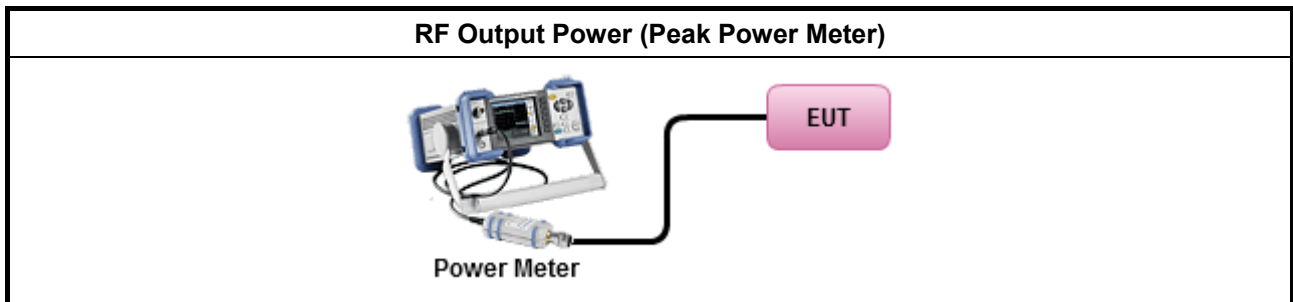
#### 3.3.2 Measuring Instruments

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

#### 3.3.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Maximum Peak Conducted Output Power
<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 checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 2 for conducted measurement.
<input checked="" type="checkbox"/>	The EUT supports single transmit chain and measurements performed on this transmit chain.
<input checked="" type="checkbox"/>	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

#### 3.3.4 Test Setup





3.3.5 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result						
Condition		RF Output Power (dBm)				
Modulation Mode	Freq. (MHz)	RF Output Power	Power Limit	Antenna Gain (dBi)	EIRP Power	EIRP Limit
LE-1M	2402	3.52	30	1.6	5.12	36
LE-1M	2440	3.79	30	1.6	5.39	36
LE-1M	2480	2.84	30	1.6	4.44	36
<b>Result</b>		<b>Complied</b>				

### 3.4 Power Spectral Density

#### 3.4.1 Power Spectral Density Limit

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

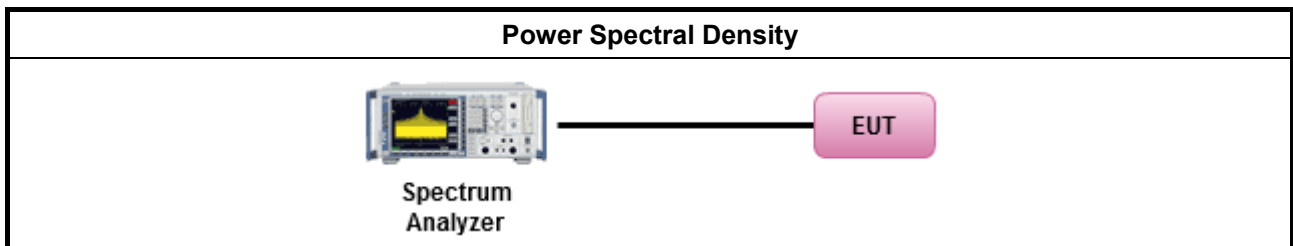
#### 3.4.2 Measuring Instruments

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

#### 3.4.3 Test Procedures

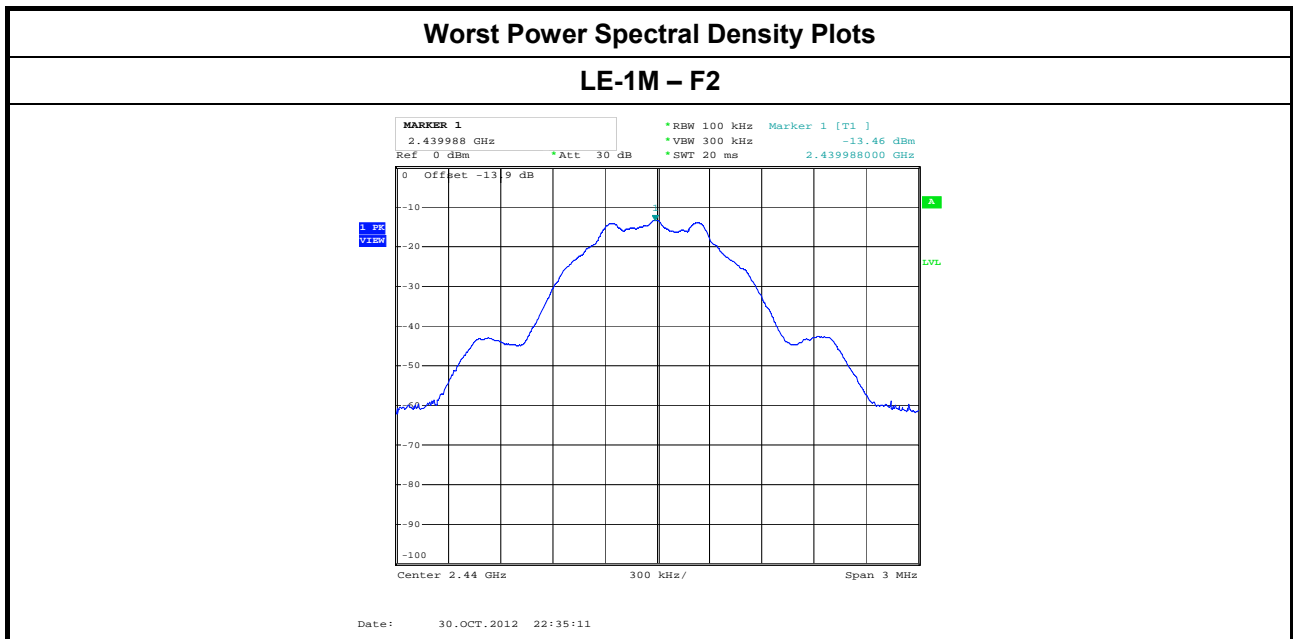
Test Method
<input checked="" type="checkbox"/> Power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the power spectral density. In addition, the use of a peak PSD procedure will always result in a "worst-case" measured level 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"/> The EUT supports single transmit chain and measurements performed on this transmit chain.
<input checked="" type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

#### 3.4.4 Test Setup



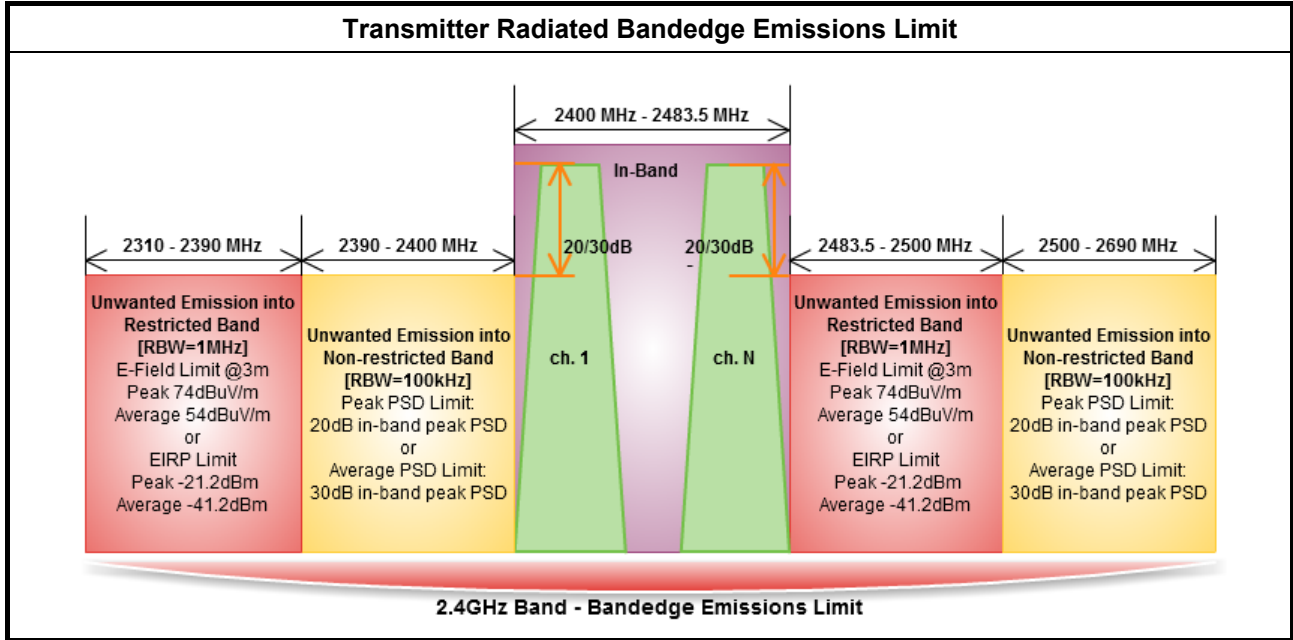
### 3.4.5 Test Result of Power Spectral Density

Power Spectral Density Result (dBm/3kHz)			
Modulation Mode	Freq. (MHz)	PSD	PSD Limit
LE-1M	2402	-13.74	8
LE-1M	2440	-13.46	8
LE-1M	2480	-14.36	8
<b>Result</b>		<b>Complied</b>	
Note 1: PSD [dBm/3kHz] = PSD [dBm/100kHz] + BWFC [-15.2 dB]			



### 3.5 Transmitter Radiated Bandedge Emissions

#### 3.5.1 Transmitter Radiated Bandedge Emissions Limit



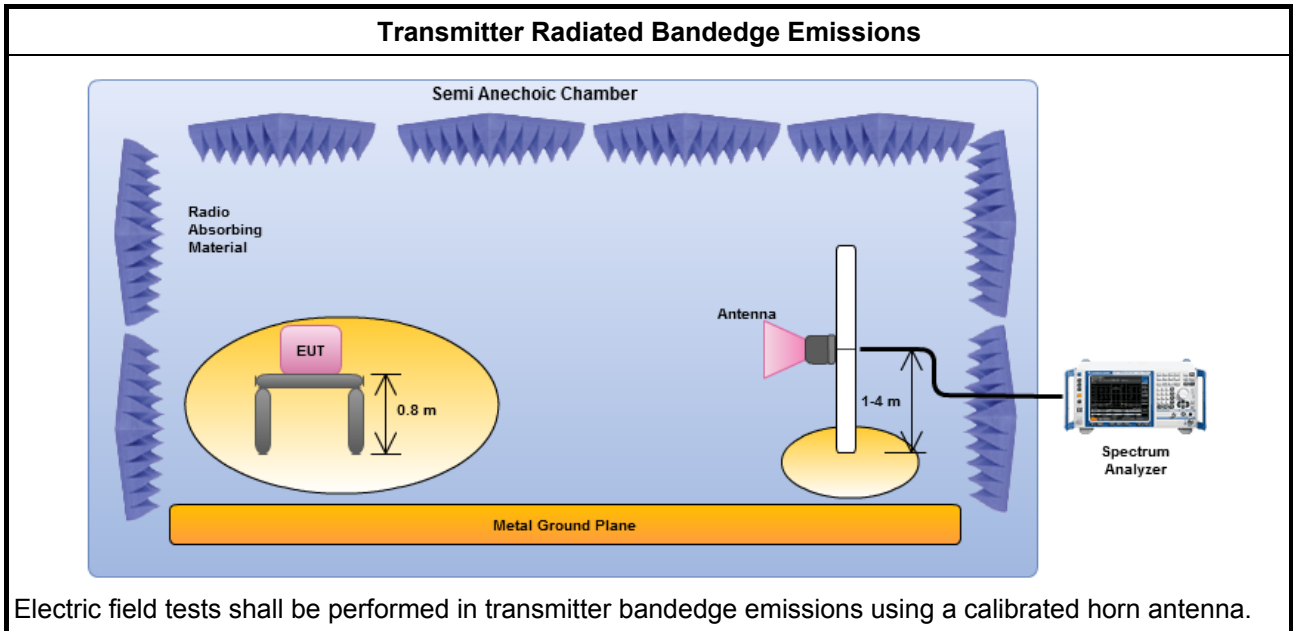
#### 3.5.2 Measuring Instruments

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

**3.5.3 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"/>	For unwanted emissions into non-restricted bands. 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.
<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 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.
<input checked="" type="checkbox"/>	For radiated measurement, refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.

**3.5.4 Test Setup**

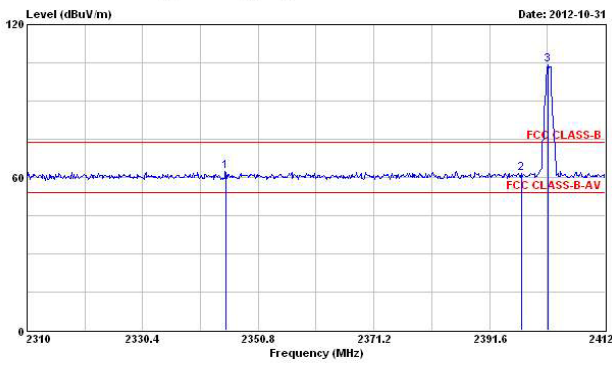
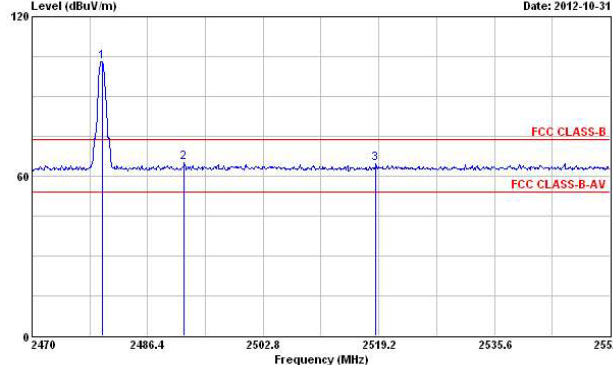




### 3.5.5 Test Result of Transmitter Radiated Bandedge Emissions

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	104.39	2397.21	61.73	42.66	20	PK	V
2500-2690	2480	103.02	2518.79	64.78	38.24	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	104.76	2318.87	3	59.05	74	PK	V
2310-2390	2402	89.03	2387.42	3	46.36	54	AV	V
2483.5-2500	2480	103.26	2497.06	3	60.70	74	PK	V
2483.5-2500	2480	88.00	2483.53	3	48.01	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]

### 3.6 Transmitter Radiated Unwanted Emissions

#### 3.6.1 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.

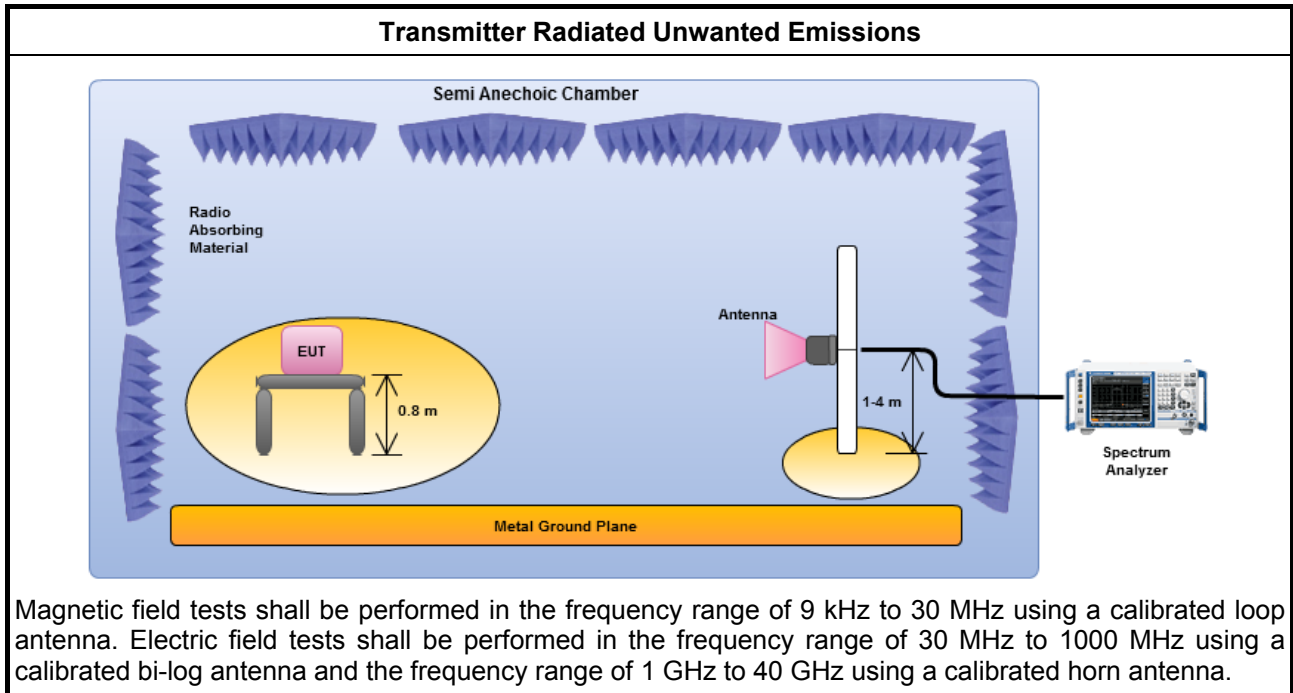
#### 3.6.2 Measuring Instruments

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

**3.6.3 Test Procedures**

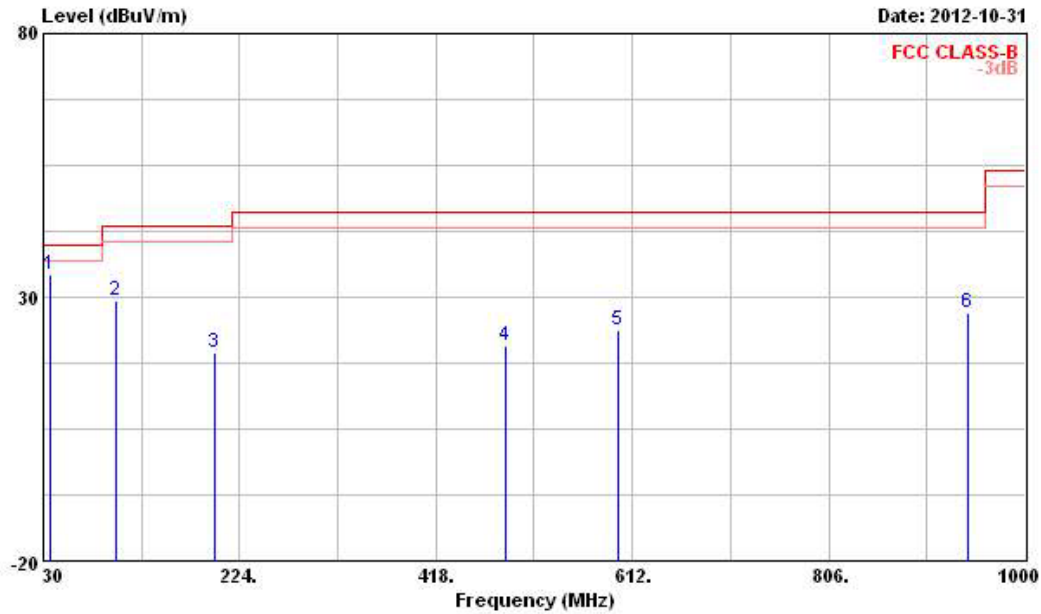
<b>Test Method – General Information</b>	
<input checked="" type="checkbox"/>	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements 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 ≥ 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. 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.
<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 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.

### 3.6.4 Test Setup



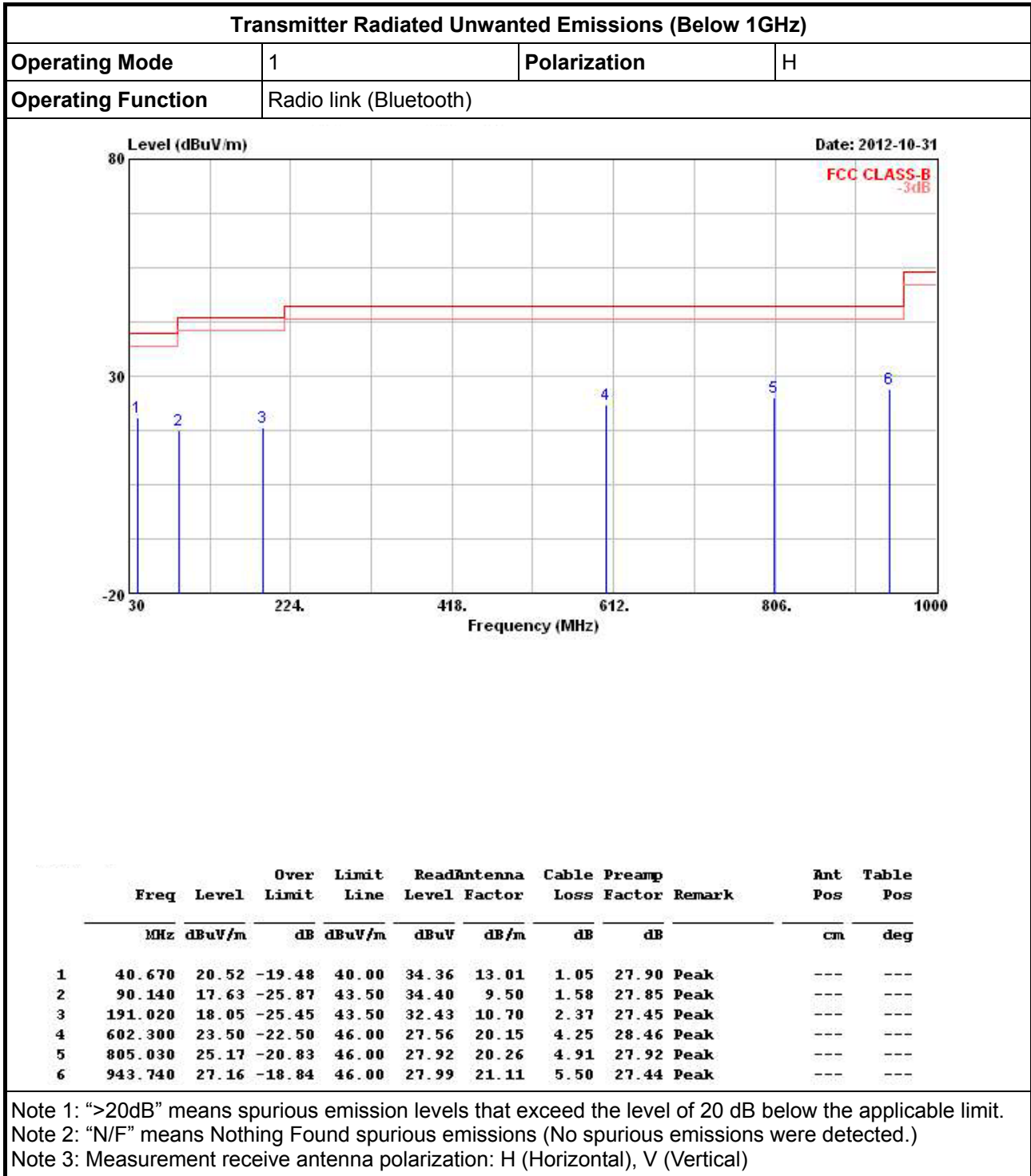
### 3.6.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Operating Mode	1	Polarization	V
Operating Function	Radio link (Bluetooth)		



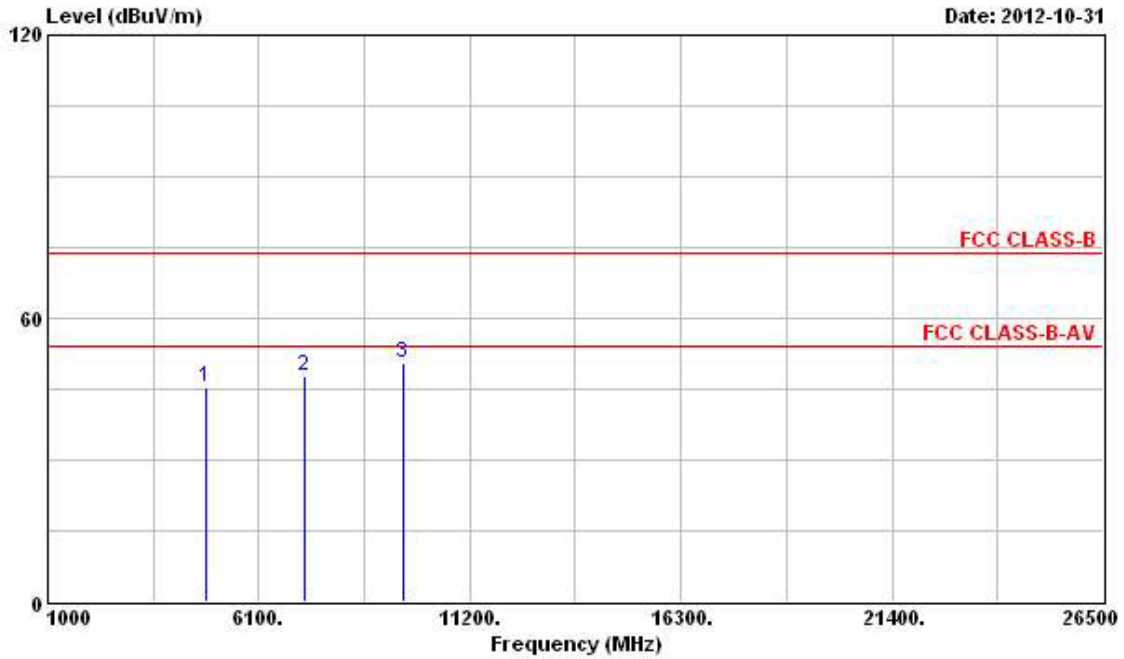
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg
1	36.790	34.36	-5.64	40.00	47.36	13.92	1.00	27.92	Peak	---	---
2	101.780	29.31	-14.19	43.50	44.06	11.41	1.68	27.84	Peak	---	---
3	198.780	19.44	-24.06	43.50	33.16	11.28	2.42	27.42	Peak	---	---
4	486.870	20.76	-25.24	46.00	28.29	17.02	3.76	28.31	Peak	---	---
5	598.420	23.91	-22.09	46.00	28.02	20.12	4.23	28.46	Peak	---	---
6	943.740	27.03	-18.97	46.00	27.86	21.11	5.50	27.44	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)



3.6.6 Transmitter Radiated Unwanted Emissions (Above 1GHz)

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



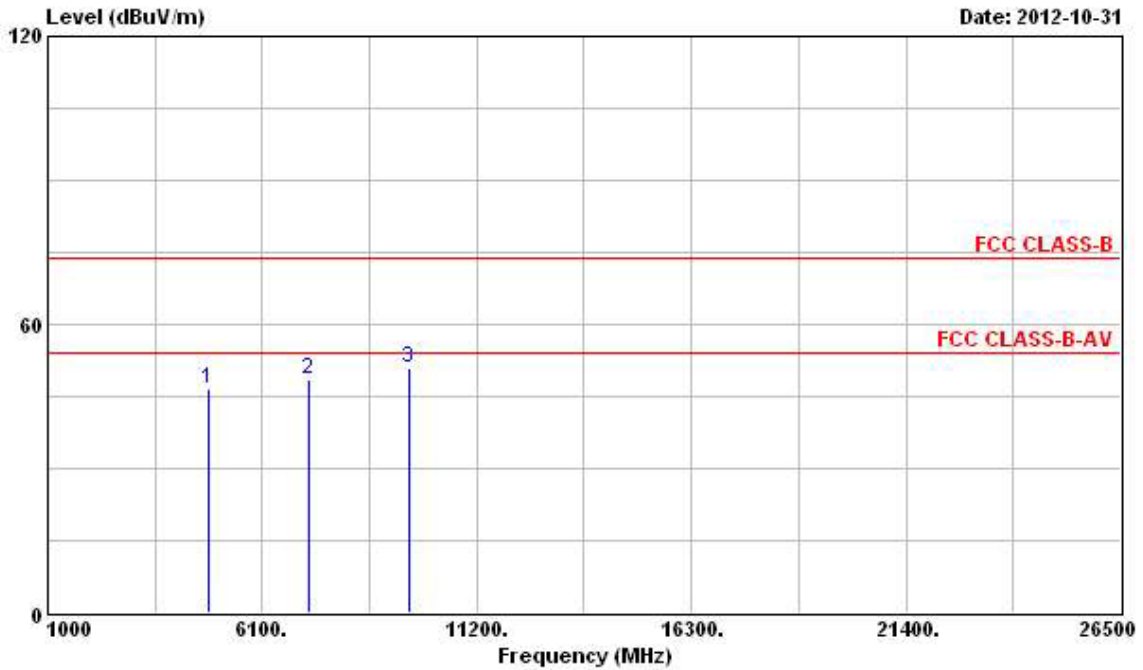
Line	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4804.000	45.20	-8.80	54.00	40.31	35.11	4.58	34.80 PK	0	0
2	7206.000	47.78			40.35	36.88	5.62	35.07 Peak	0	0
3	9608.000	50.55			41.16	38.52	6.34	35.47 Peak	0	0

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 (item 2 and 3) 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)

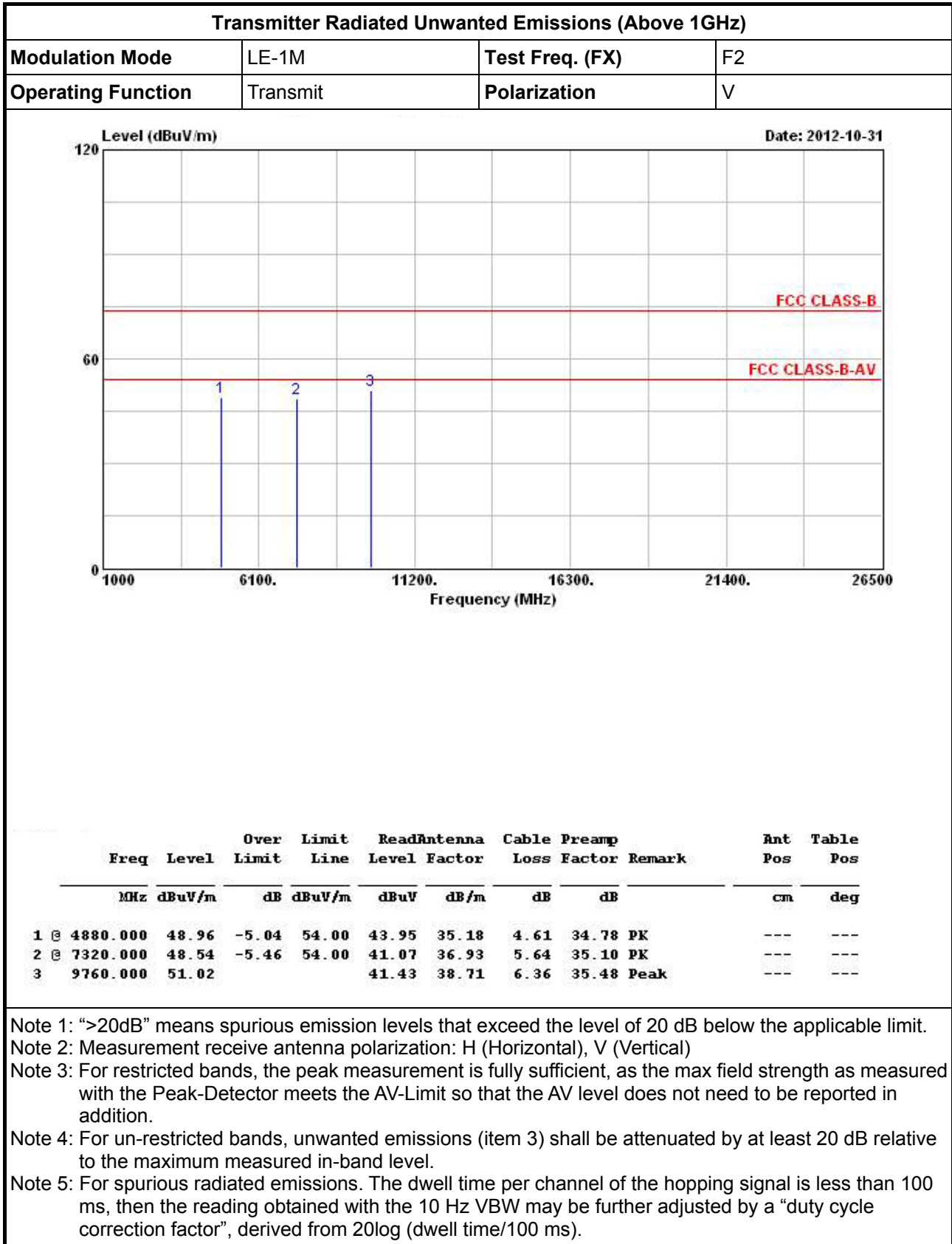
Modulation Mode	LE-1M	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	H



	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	46.55	-7.45	54.00	41.04	35.73	4.58	34.80 PK	---	---
2	7206.000	48.47			40.08	37.84	5.62	35.07 Peak	---	---
3	9608.000	51.07			40.88	39.32	6.34	35.47 Peak	---	---

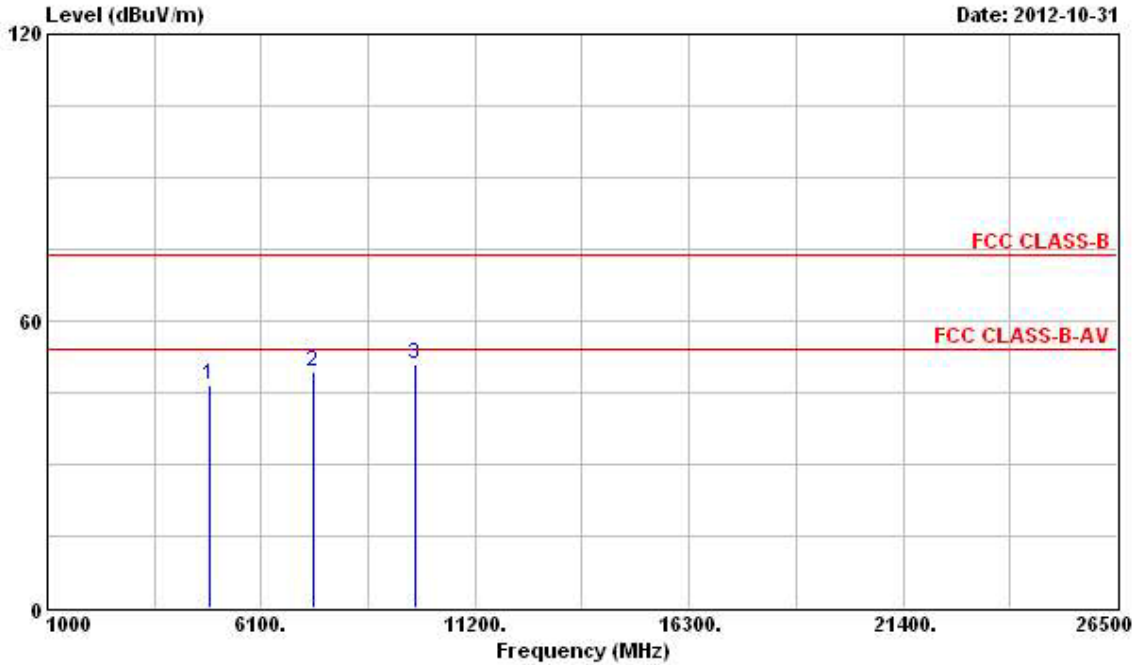
- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
- Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
- Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured 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 (item 2 and 3) 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).





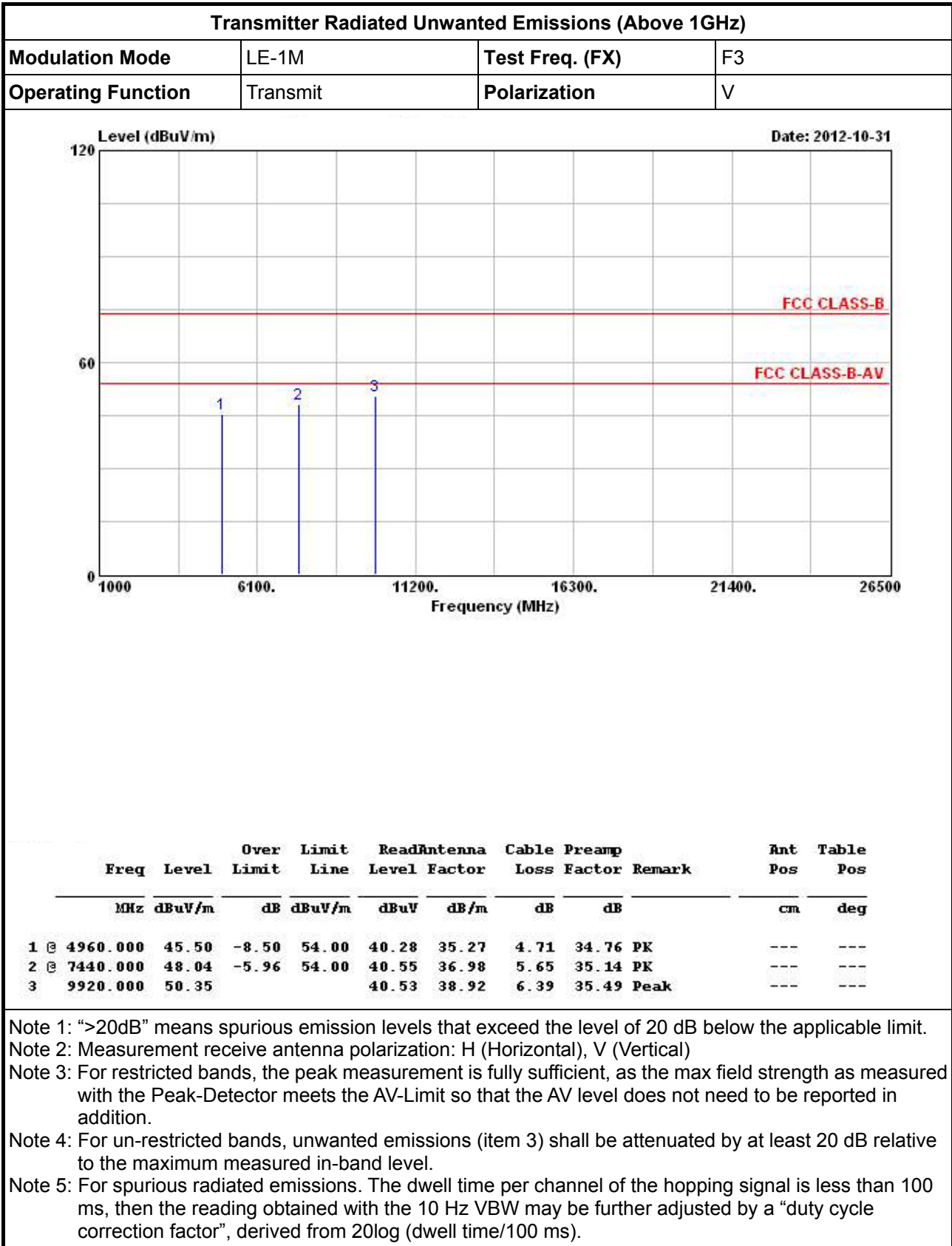


Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	LE-1M	Test Freq. (FX)	F2
Operating Function	Transmit	Polarization	H



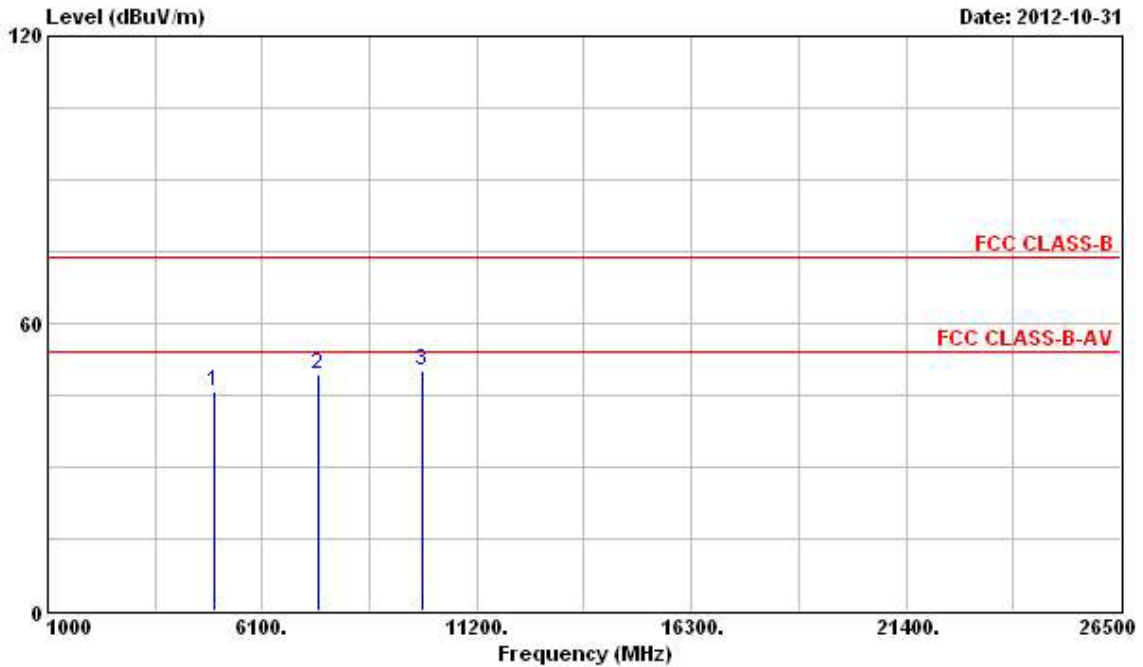
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg
1	4880.000	46.66	-7.34	54.00	41.00	35.83	4.61	34.78	PK	---	---
2	7320.000	49.22	-4.78	54.00	40.81	37.87	5.64	35.10	PK	---	---
3	9760.000	50.93			40.54	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 (item 3) 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	LE-1M	Test Freq. (FX)	F3
Operating Function	Transmit	Polarization	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 @ 4960.000	45.88	-8.12	54.00	39.98	35.95	4.71	34.76 PK	---	---
2 @ 7440.000	49.19	-4.81	54.00	40.79	37.89	5.65	35.14 PK	---	---
3 9920.000	50.22			39.60	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 (item 3) 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	100132	9kHz ~ 2.75GHz	Feb. 08, 2012	Conduction (CO01-HY)
LISN	TESEQ	NNB-52	27380	9kHz ~ 30MHz	Apr. 09, 2012	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz ~ 30MHz	Feb. 20, 2012	Conduction (CO01-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832010001	9kHz ~ 30MHz	Mar. 02, 2012	Conduction (CO01-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
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Sep. 14, 2012	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	R&S	HFH2-Z2	860004/0001	9 kHz - 30 MHz	Jul. 03, 2012*	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  
President, Taiwan Accreditation Foundation  
Date: April 05, 2012

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