



FCC Test Report

Equipment : Rugged Tablet Computer
Brand Name : AAEON
Model No. : xRTC-700Bx
(x - Where x may be any combination of alphanumeric characters or "-" or blank.)
FCC ID : OHBRTC700BWBGH
Standard : 47 CFR FCC Part 15.247
Frequency : 2400 MHz – 2483.5 MHz
FCC Classification : DTS
Function : Point-to-multipoint; Point-to-point
Applicant / Manufacturer : AAEON Technology Inc.
5F, No. 135, Lane 235,
Pao Chiao Rd., Taipei, Taiwan

The product sample received on Jul. 29, 2016 and completely tested on Aug. 18, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 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:


Kevin Liang / Assistant Manager





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Appendix I. Test Result of AC Power-line Conducted Emissions**Appendix A. Test Result of Emission Bandwidth****Appendix B. Test Result of Maximum Conducted Output Power****Appendix C. Test Result of Power Spectral Density****Appendix D. Test Result of Transmitter Radiated Bandedge Emissions****Appendix E. Transmitter Radiated Unwanted Emissions****Appendix F. Test Photos****Appendix G. Photographs of EUT**



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]: 0.1515980MHz 49.45 (Margin 16.46dB) - QP 31.93 (Margin 23.98dB) - AV	FCC 15.207	Complied
3.2	15.247(a)	DTS Bandwidth	Refer as Appendix A	$\geq 500\text{kHz}$	Complied
3.3	15.247(b)	Fundamental Emission Output Power	Refer as Appendix B	Power [dBm]:30	Complied
3.4	15.247(e)	Power Spectral Density	Refer as Appendix C	PSD [dBm/3kHz]:8	Complied
3.5	15.247(d)	Test Result of Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2501.120 MHz: 43.13 dB Restricted Bands [dBuV/m at 3m]: 2498.080 MHz 60.84 (Margin 13.16 dB) - PK 2492.800 MHz 48.25 (Margin 5.75 dB) - AV	Non-Restricted Bands:> 20 dBc Bands: FCC 15.209	Complied
3.6	15.247(d)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 934.040 MHz 40.55 (Margin 5.45dB)	Non-Restricted Bands:> 20 dBc Restricted Bands: FCC 15.209	Complied



Revision History



1 General Description

1.1 Information

1.1.1 RF General Information

Band	Mode	BWch (MHz)	Channel Number	Nss-Min	Nant
2.4G	BT-LE	1	0-39 [40]	1	1

Note:

- 2.4G is the 2.4GHz Band (2.4-2.4835GHz).
- Bluetooth LE (Low Energy) using GFSK modulation for DTS digital modulation.
- BWch is the nominal channel bandwidth.
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs.

1.1.2 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input type="checkbox"/>	Temporary RF connector provided
<input checked="" type="checkbox"/>	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
<input type="checkbox"/>	External antenna (dedicated antennas)
<input type="checkbox"/>	Single power level with corresponding antenna(s).
<input type="checkbox"/>	Multiple power level and corresponding antenna(s).
<input type="checkbox"/>	RF connector provided

Antenna General Information

No.	Ant. Cat.	Ant. Type	Gain (dBi)
1	Integral	Dipole	3



1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
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 Mode Test Duty Cycle

Operated 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"/> 62.6% - test mode single channel – LE	2.03

1.1.5 EUT Operational Condition

Supply Voltage	<input checked="" type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
Type of DC Source	<input checked="" type="checkbox"/> External AC adapter	<input type="checkbox"/> From Host System	<input checked="" type="checkbox"/> Battery

1.1.6 EUT Operate Information

Items	Description		
Communication Mode	<input checked="" type="checkbox"/>	IP Based (Load Based)	<input type="checkbox"/> Frame Based
Beamforming Function	<input type="checkbox"/>	With beamforming	<input checked="" type="checkbox"/> Without beamforming
Operate Condition	<input type="checkbox"/>	Indoor	<input type="checkbox"/> Outdoor
	<input type="checkbox"/>	Fixed P2P	<input checked="" type="checkbox"/> Portable Client
Operate Mode	<input checked="" type="checkbox"/>	Client	



1.2 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 C63.10-2013
- ♦ KDB 558074 D01 v03r05

1.3 Testing Location Information

Testing Location					
<input checked="" type="checkbox"/>	HWA YA	ADD	: No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.		
		TEL		FAX : 886-3-327-6973	
Test Condition		Test Site No.	Test Engineer	Test Environment	
AC Conduction		CO04-HY	Ryan	25°C / 52%	
RF Conducted		TH01-HY	Howard	25°C / 65%	
Radiated		03CH03-HY	Jeff	21.5°C / 58%	
Test Date					
AC Conduction		CO04-HY	Ryan	25°C / 52%	
RF Conducted		TH01-HY	Howard	25°C / 65%	
Radiated		03CH03-HY	Jeff	21.5°C / 58%	

Test site registered number [553509] with FCC.



1.4 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	
AC power-line conducted emissions	±2.3 dB	
Emission bandwidth, 6dB bandwidth	±0.6 %	
RF output power, conducted	±0.1 dB	
Power density, conducted	±0.6 dB	
Unwanted emissions, conducted	9 – 150 kHz	±0.4 dB
	0.15 – 30 MHz	±0.4 dB
	30 – 1000 MHz	±0.6 dB
	1 – 18 GHz	±0.5 dB
	18 – 40 GHz	±0.5 dB
	40 – 200 GHz	N/A
All emissions, radiated	9 – 150 kHz	±2.5 dB
	0.15 – 30 MHz	±2.3 dB
	30 – 1000 MHz	±2.6 dB
	1 – 18 GHz	±3.6 dB
	18 – 40 GHz	±3.8 dB
	40 – 200 GHz	N/A
Temperature	±0.8 °C	
Humidity	±5 %	
DC and low frequency voltages	±0.9%	
Time	±1.4 %	
Duty Cycle	±0.6 %	



2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Worst Modulation Used for Conformance Testing			
Bluetooth Version	Transmit Chains (N _{TX})	Data Rate	Modulation Mode
LE	1	1 Mbps	LE-1Mbps
Note 1: Bluetooth LE (Low Energy) using GFSK modulation for DTS digital modulation.			
Note 2: Modulation modes consist below configuration: DSSS LE-1Mbps: GFSK (1Mbps)			

2.2 Test Channel Mode

Test Software Version	Win8DUTApp/1.0.016						
Band	Mode	BWch (MHz)	Nss-Min	Nant	Ch. (MHz)	Range	Power Setting
2.4G	LE	1	1	1	2402	L	Default
2.4G	LE	1	1	1	2440	M	Default
2.4G	LE	1	1	1	2480	H	Default

Abbreviation Explanation

Band	Mode	BWch (MHz)	Nss-Min	Nant	Ch. (MHz)	Range	Test Cond.	Abbreviation
2.4G	BT-LE	1	1	1	2402	L	TN,VN	2.4G;BT-LE;1;1;1;2480;TN,VN

Note:

- Test range channel consist of L (Low Ch.), M (Middle Ch.), H (High Ch.), S (Single Ch).
- Test range temperature consist of L (Low Temp.), N (Normal Temp.), H(High Temp.)
- Test range Voltage consist of L (Low Voltage.), N (Normal Voltage), H(High .Voltage).



2.3 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	Adapter Mode		
	X Plane	Y Plane	Z Plane
Orthogonal Planes of EUT			
Worst Planes of EUT			V

The Worst Case Mode for Following Conformance Tests	
Tests Item	DTS Bandwidth, Fundamental Emission Output Power, Power Spectral Density, Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests			
Tests Item	Emissions in Restricted Frequency Bands		
Test Condition	Radiated measurement		
User Position	<input type="checkbox"/> EUT will be placed in fixed position. <input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. <input checked="" type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.		
Operating Mode < 1GHz	<input checked="" type="checkbox"/> 1. Adapter Mode		
	X Plane	Y Plane	Z Plane
Orthogonal Planes of EUT			
Worst Planes of EUT	V		



2.4 Accessories and Support Equipment

Accessories				
AC Adapter	Brand Name	FSP	Model Name	FSP036-RBBN2
	Power Rating	I/P: 100 - 240 Vac, 1.2 A, O/P: 12 Vdc, 3 A		
	Power Cord	1.2 meter, non-shielded cable, with one ferrite core		
Battery 1	Brand Name	Getac	Model Name	RTC600S
	Power Rating	7.4 Vdc, 1530 mAh	Type	Li-ion, 2S1P
Battery 2	Brand Name	Getac	Model Name	RTC600H
	Power Rating	7.4Vdc, 1530 mAh	Type	Li-ion, 2S1P
LCD Panel	Brand Name	INNOLUX	Model Name	N070ICG-LD1

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

Support Equipment –AC Conduction and Radiated Emission

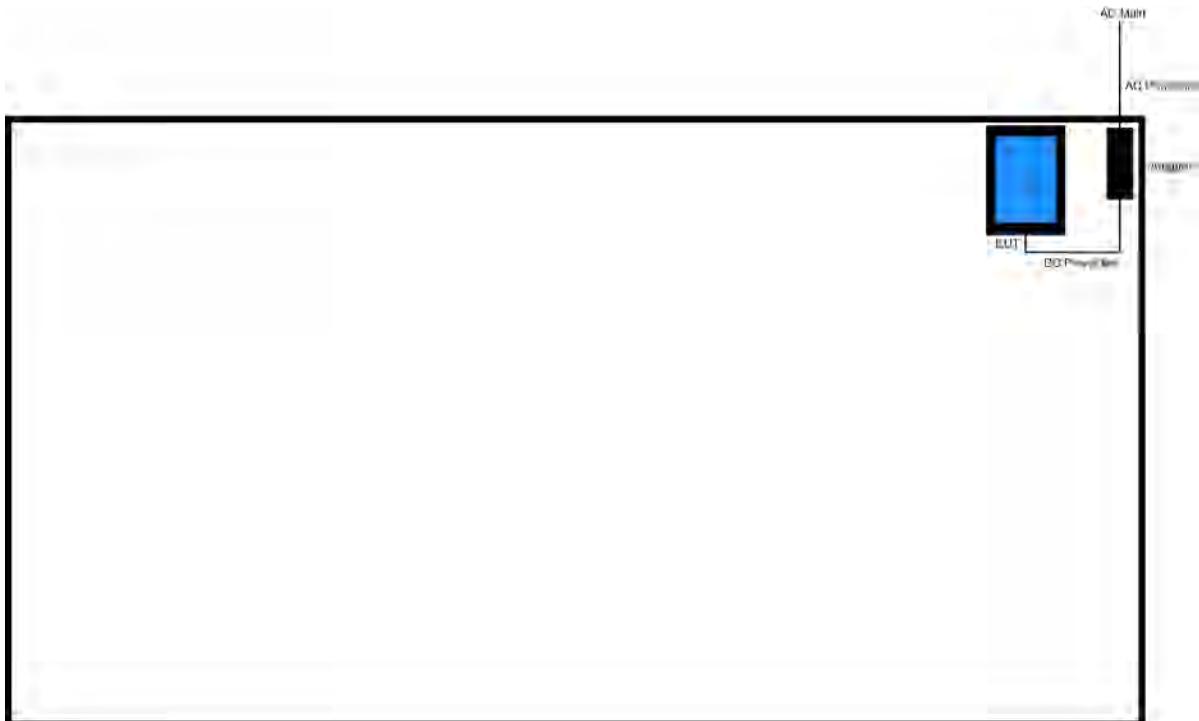
No.	Equipment	Brand Name	Model Name	FCC ID
1	-	-	-	-

Support Equipment - RF Conducted

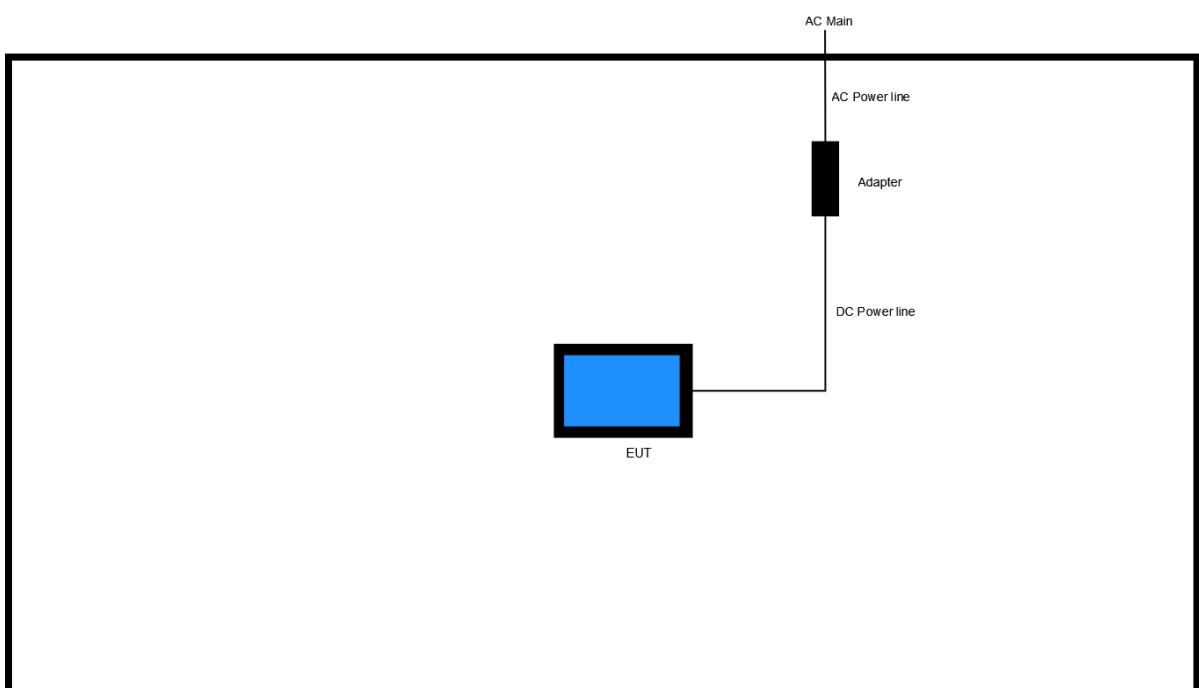
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E6400	DoC
2	AC Adapter for Notebook	DELL	HA65NM130	DoC

2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Test Setup Diagram - Radiated Test



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.

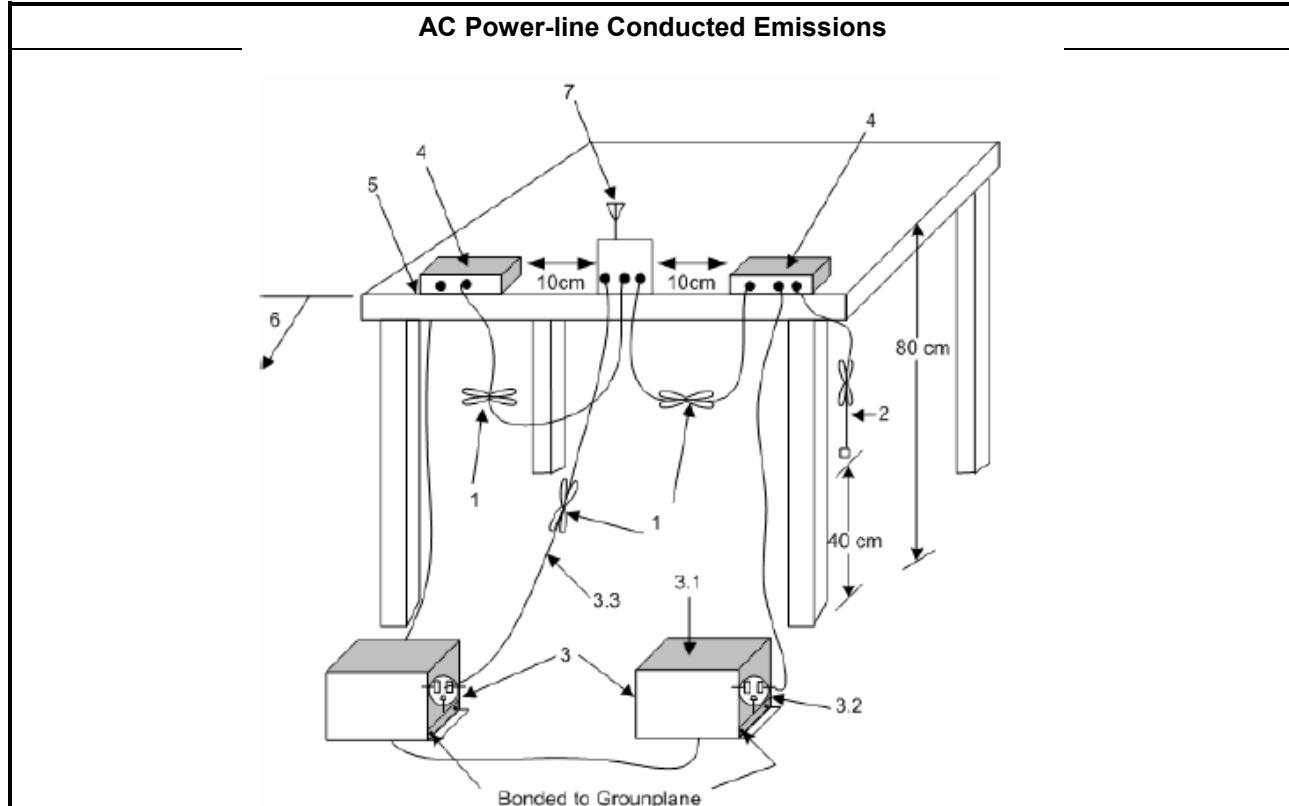
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, 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

Refer as Appendix I

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
Systems using digital modulation techniques:
▪ 6 dB bandwidth \geq 500 kHz.

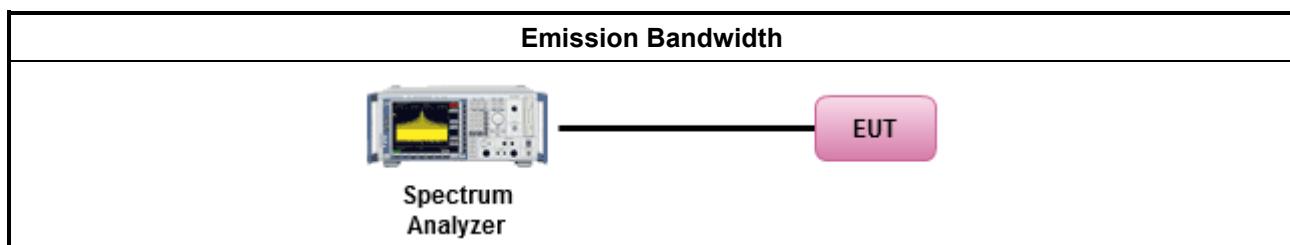
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method
▪ For the emission bandwidth shall be measured using one of the options below:
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 8.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/> Refer as KDB 558074, clause 8.2 Option 2 for 6 dB bandwidth measurement.
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix A



3.3 Fundamental Emission Output Power

3.3.1 Fundamental Emission Output Power Limit

Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit	
▪ 2400-2483.5 MHz Band:	
	▪ If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
	▪ Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
	▪ Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	▪ Smart antenna system (SAS):
	- Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	- Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	- Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dB dBm
e.i.r.p. Power Limit:	
▪ 2400-2483.5 MHz Band	
	▪ Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
	▪ Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
	▪ Smart antenna system (SAS)
	- Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	- Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	- Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm

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.



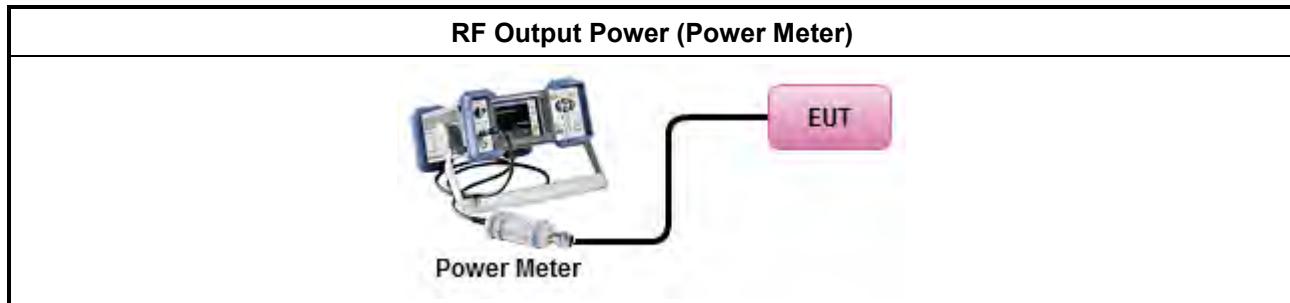
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
▪ Maximum Peak Conducted Output Power	
<input type="checkbox"/> Refer as KDB 558074, clause 9.1.1 Option 1 (RBW \geq EBW method).	<input checked="" type="checkbox"/> Refer as KDB 558074, clause 9.1.2 Option 2 (peak power meter for VBW \geq DTS BW)
▪ Maximum Conducted Output Power	
[duty cycle \geq 98% or external video / power trigger]	
<input type="checkbox"/> Refer as KDB 558074, clause 9.2.2.2 Method AVGSA-2 (spectral trace averaging).	<input type="checkbox"/> Refer as KDB 558074, clause 9.2.2.3 Method AVGSA-2 Alt. (slow sweep speed)
duty cycle $<$ 98% and average over on/off periods with duty factor	
<input type="checkbox"/> Refer as KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).	<input type="checkbox"/> Refer as KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
RF power meter and average over on/off periods with duty factor or gated trigger	
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 9.2.3 Method AVGPM (using an RF average power meter).	
▪ For conducted measurement.	
	<ul style="list-style-type: none">▪ If the EUT supports multiple transmit chains using options given below: 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.▪ If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup



3.3.5 Test Result of Maximum Peak Conducted Output Power

Refer as Appendix B

3.3.6 Test Result of Maximum Average Conducted Output Power

Refer as Appendix B



3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
▪ Power Spectral Density (PSD) $\leq 8 \text{ dBm/3kHz}$

3.4.2 Measuring Instruments

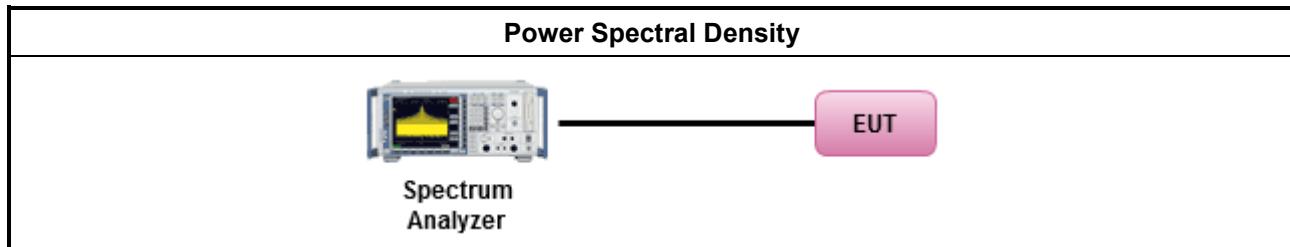
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method
▪ Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 10.2 Method PKPSD (RBW=3-100kHz; Detector=peak). [duty cycle $\geq 98\%$ or external video / power trigger]
<input type="checkbox"/> Refer as KDB 558074, clause 10.3 Method AVGPSD-2 (spectral trace averaging).
<input type="checkbox"/> Refer as KDB 558074, clause 10.4 Method AVGPSD-2 (slow sweep speed)
duty cycle $< 98\%$ and average over on/off periods with duty factor
<input type="checkbox"/> Refer as KDB 558074, clause 10.5 Method AVGPSD-2 Alt (spectral trace averaging).
<input type="checkbox"/> Refer as KDB 558074, clause 10.6 Method AVGPSD-2 Alt. (slow sweep speed)
▪ For conducted measurement.
▪ If The EUT supports 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_{TX} 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.
<input type="checkbox"/> Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,
<input type="checkbox"/> Option 3: 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.



3.4.4 Test Setup

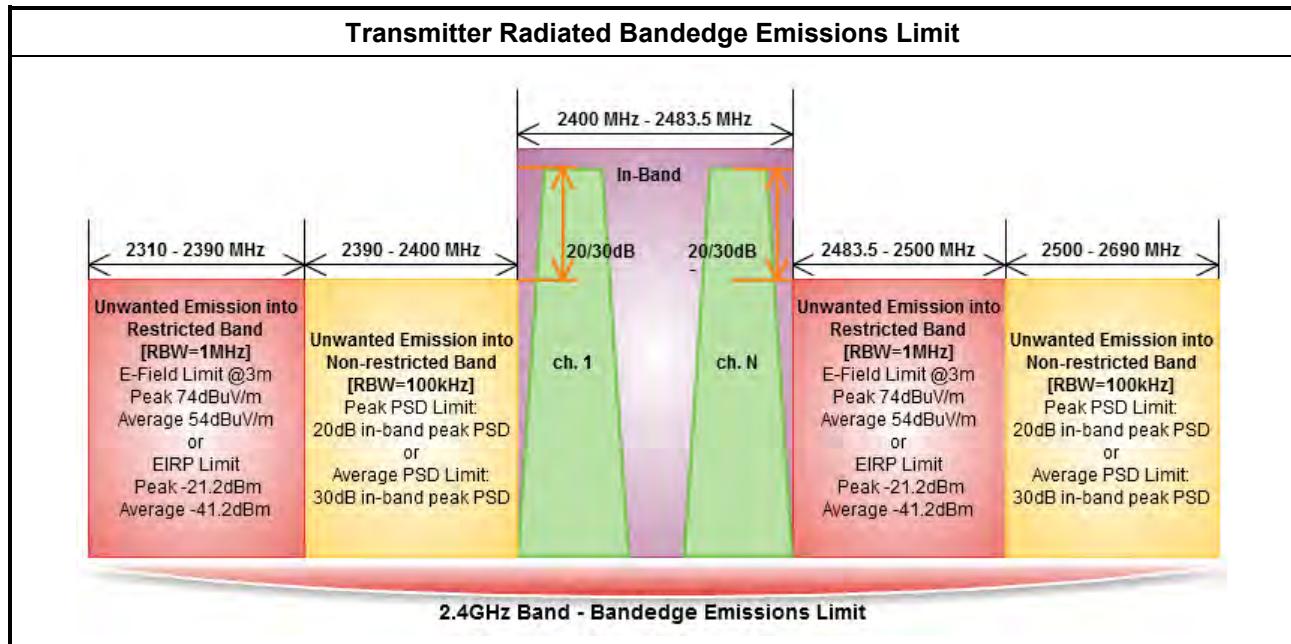


3.4.5 Test Result of Power Spectral Density

Refer as Appendix C

3.5 Transmitter Radiated Bandedge Emissions

3.5.1 Transmitter Radiated Bandedge Emissions Limit



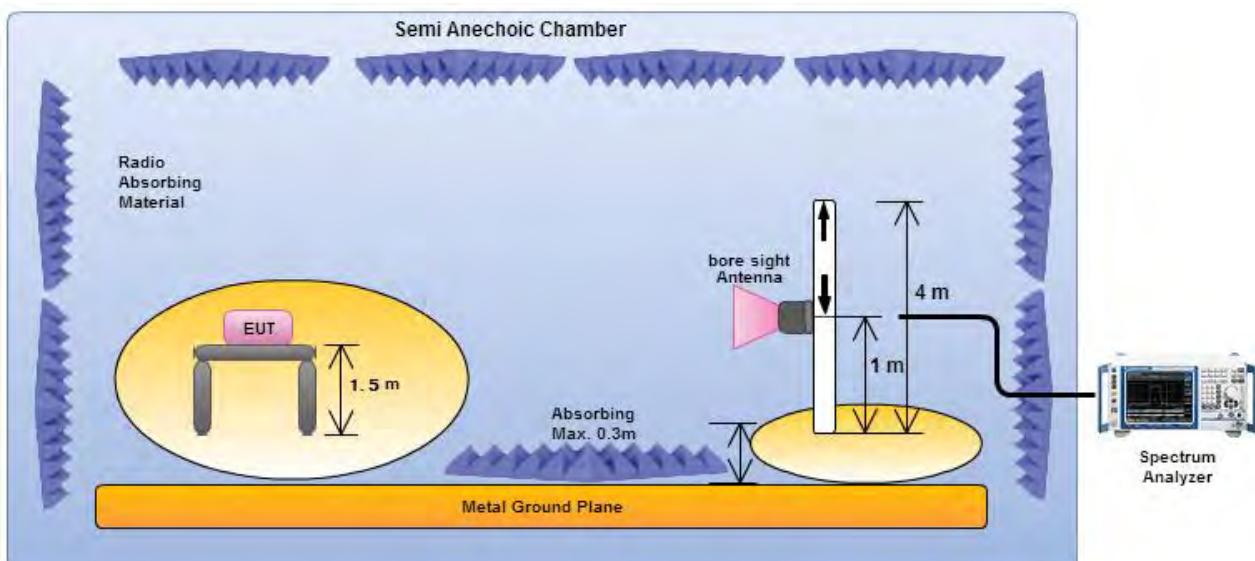
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method
<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 6.10 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 KDB 558074, clause 11 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 12 for unwanted emissions into restricted bands.
<input type="checkbox"/> Refer as KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle \geq 98%)
<input type="checkbox"/> Refer as KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW $\geq 1/T$).
<input type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.3 (Reduced VBW). VBW $\geq 1/T$, where T is pulse time.
<input type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 11.3 and 12.2.4 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 KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.10 for band-edge testing.
<input type="checkbox"/> Refer as ANSI C63.10, clause 6.10.6.2 for marker-delta method for band-edge measurements.
<input checked="" type="checkbox"/> For radiated measurement, refer as KDB 558074, clause 12.2.7 and ANSI C63.10, clause 6.6. Test distance is 3m.

3.5.4 Test Setup

Transmitter Radiated Bandedge Emissions
 <p>Electric field tests shall be performed in transmitter bandedge emissions using a calibrated horn antenna.</p>



3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix D



3.6 Transmitter Radiated Unwanted Emissions

3.6.1 Transmitter in 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.

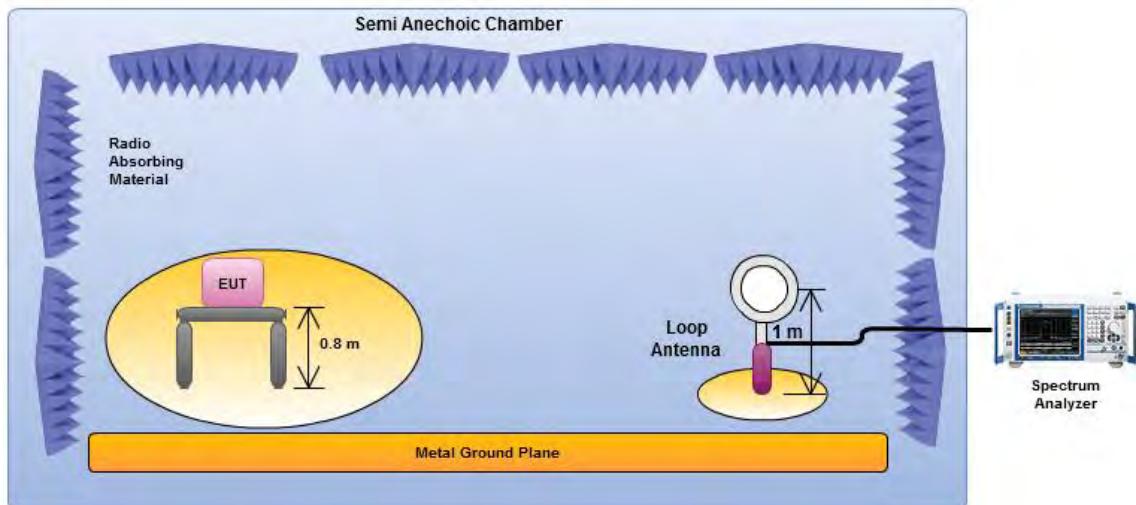


3.6.3 Test Procedures

Test Method
<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"/> 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 KDB 558074, clause 11 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 12 for unwanted emissions into restricted bands.
<input type="checkbox"/> Refer as KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq 98\%$)
<input type="checkbox"/> Refer as KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW $\geq 1/T$).
<input type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.3 (Reduced VBW). VBW $\geq 1/T$, where T is pulse time.
<input type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 11.3 and 12.2.4 measurement procedure peak limit.
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 12.2.3 measurement procedure Quasi-Peak limit.
<input checked="" type="checkbox"/> For radiated measurement, refer as KDB 558074, clause 12.2.7.
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1 GHz and test distance is 3m.
<input checked="" type="checkbox"/> The any unwanted emissions level shall not exceed the fundamental emission level.
<input checked="" type="checkbox"/> All amplitude of spurious emissions that are attenuated by more than 30 dB below the permissible value has no need to be reported.

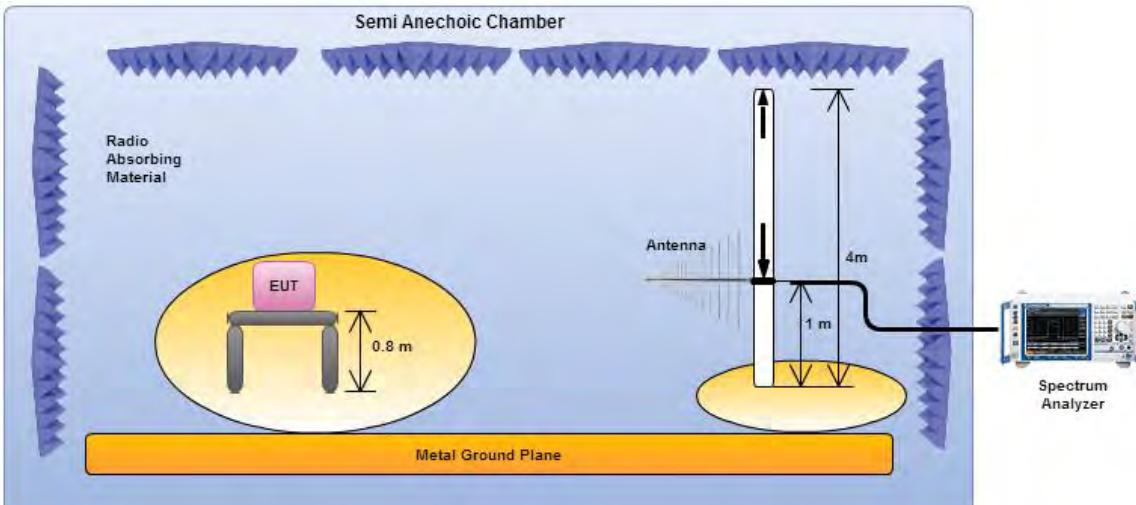
3.6.4 Test Setup

Transmitter Spurious and Out of Band Emissions (9 kHz - 30 MHz)

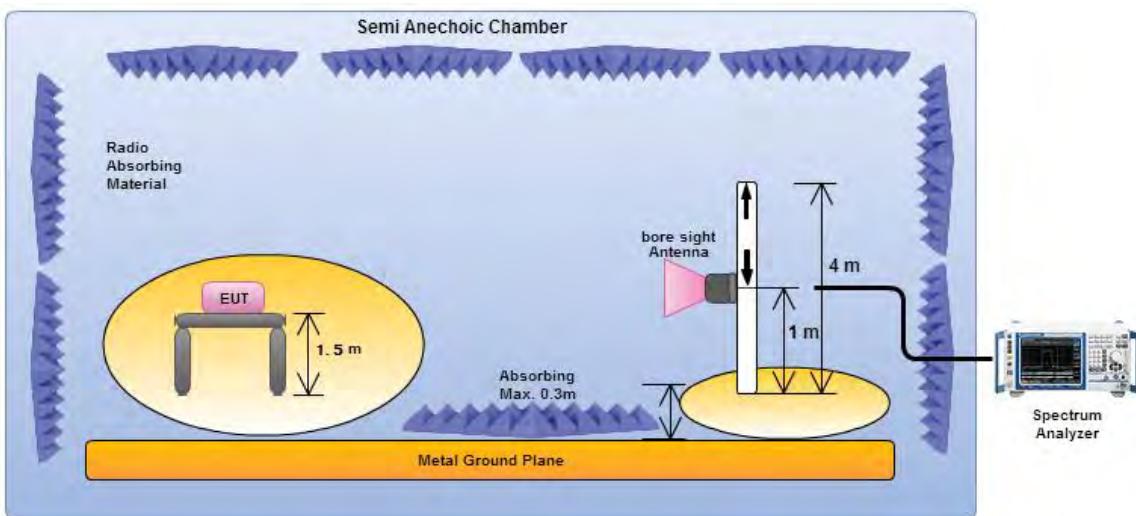


Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna.

Transmitter Radiated Unwanted Emissions (below 1GHz)



Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna.

Transmitter Radiated Unwanted Emissions (above 1GHz)

Electric field tests shall be performed in the frequency range of 1 GHz to 10th harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna.

3.6.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

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

Any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

3.6.6 Transmitter Radiated Unwanted Emissions

Refer as Appendix E



4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
EMC Receiver	KEYSIGHT	N9038A	MY54130031	20Hz ~ 8.4GHz	14/04/2016	13/04/2017
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	26/01/2016	25/01/2017
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	30/10/2015	29/10/2016
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	NCR	NCR

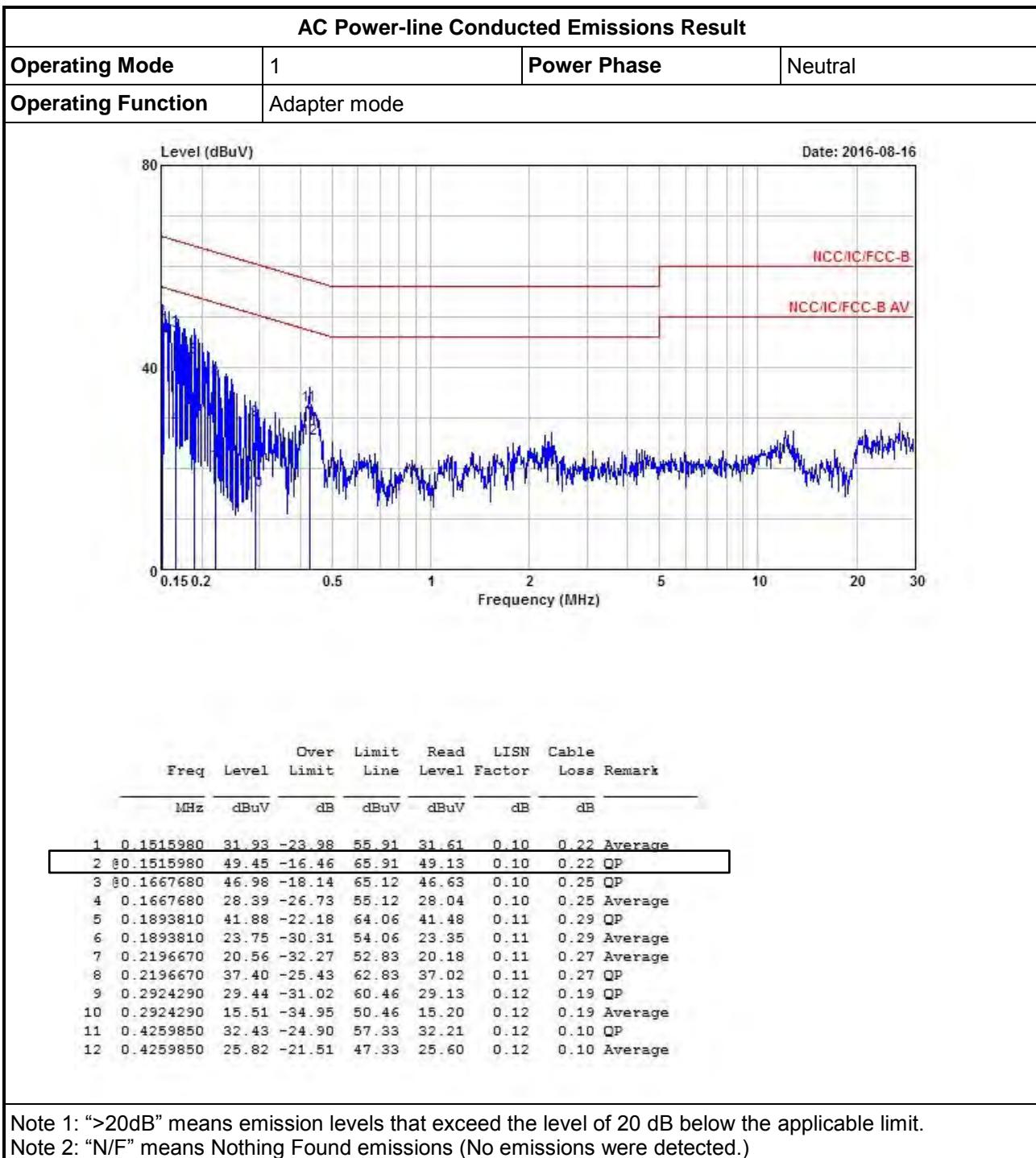
NCR: Non-Calibration required.

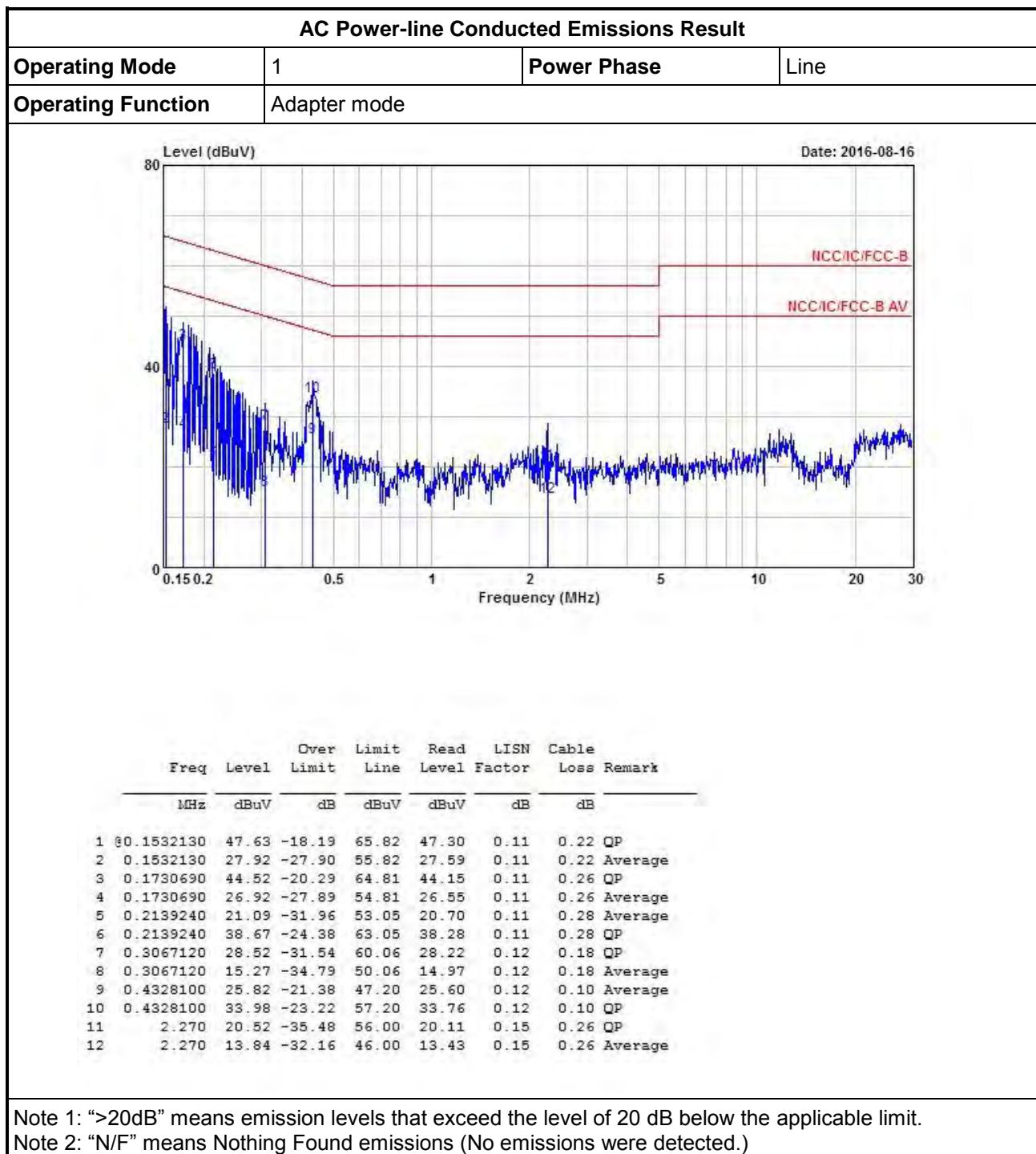
Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	9KHz~40GHz	16/02/2016	15/02/ 2017
Power Sensor	Anritsu	MA2411B	917017	300MHz ~ 40GHz	04/02/2016	03/02/2017
Power Meter	Anritsu	ML2495A	949003	300MHz ~ 40GHz	04/02/2016	03/02/2017
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	21/07/2016	20/07/2017

Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	28/11/2015	27/11/2016
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz ~ 18GHz 3m	16/12/2015	15/12/ 2016
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	10/05//2016	09/05/2017
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	02/09/2015	01/09/ 2016
Spectrum	R&S	FSV40	101513	9kHz ~ 40GHz	16/02/ 2016	15/02/ 2017
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	18/09/ 2015	17/09/2016
Horn Antenna	SCHWARZBECK	BBHA9120D	1531	1GHz ~ 18GHz	22/04/ 2016	21/04/ 2017
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz ~ 40GHz	29/01/ 2016	28/01/ 2017
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	02/02/2015	01/02/2017



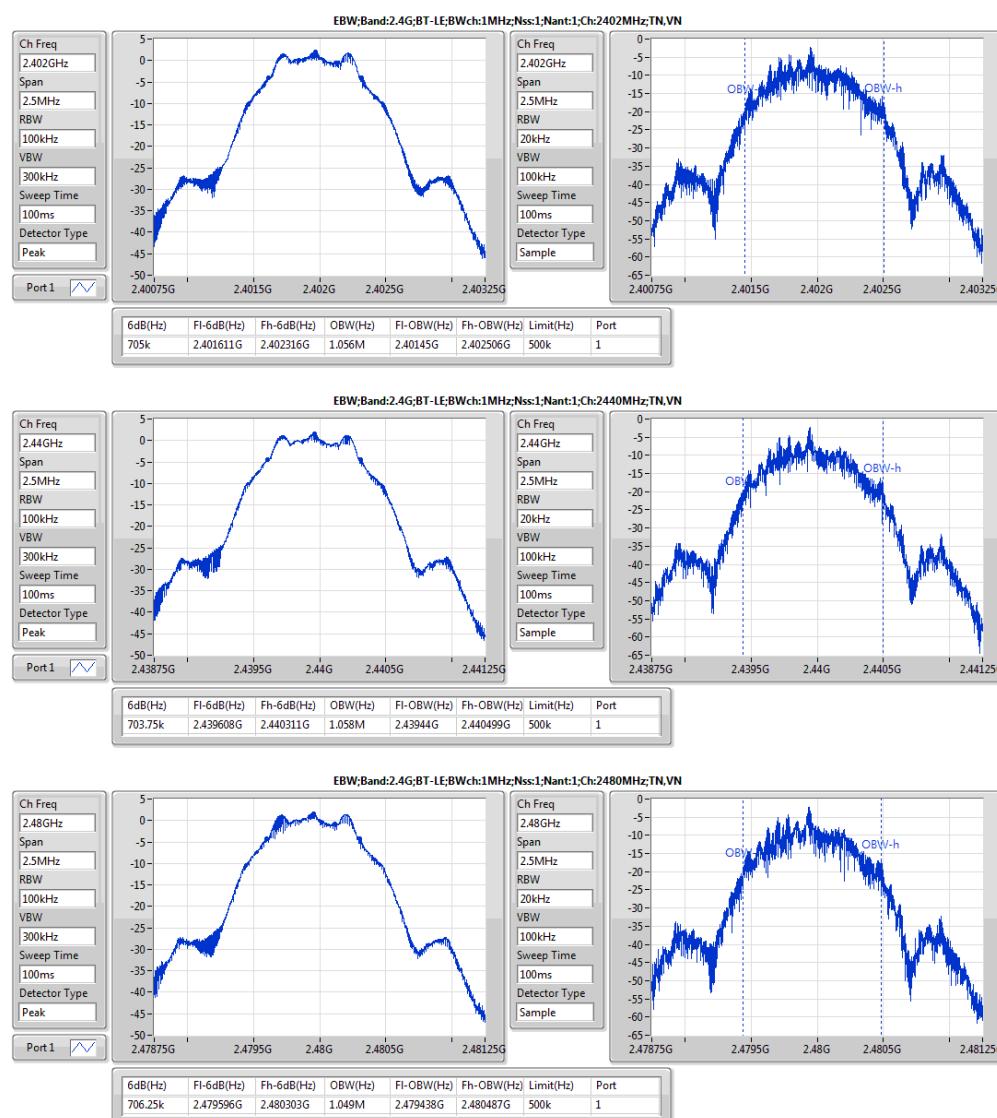


**Summary**

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4G:BT-LE;1;1;1	706.25k	1.058M	1M06F1D	703.75k	1.049M

**Result**

Mode	Result	Limit	P1-N dB (Hz)	P1-OBW (Hz)
2.4G:BT-LE;1;1;1;2402;L;TN,VN	Pass	500k	705k	1.056M
2.4G:BT-LE;1;1;1;2440;M;TN,VN	Pass	500k	703.75k	1.058M
2.4G:BT-LE;1;1;1;2480;H;TN,VN	Pass	500k	706.25k	1.049M



**Summary**

Mode	Sum (dBm)	Sum (W)	EIRP (dBm)	EIRP (W)
2.4G-BT-LE;1;1;1	2.48	0.00177	5.48	0.00353

Result

Mode	Result	DG (dBi)	EIRP (dBm)	EIRP Lim. (dBm)	Sum (dBm)	Sum Lim. (dBm)	P1 (dBm)
2.4G:BT-LE;1;1;1;2402;L;TN,VN	Pass	3.00	5.48	36.00	2.48	30.00	2.48
2.4G:BT-LE;1;1;1;2440;M;TN,VN	Pass	3.00	5.07	36.00	2.07	30.00	2.07
2.4G:BT-LE;1;1;1;2480;H;TN,VN	Pass	3.00	5.39	36.00	2.39	30.00	2.39

**Summary**

Mode	Sum (dBm)	Sum (W)	EIRP (dBm)	EIRP (W)
2.4G:BT-LE;1;1;1	1.71	0.00148	4.71	0.00296

Result

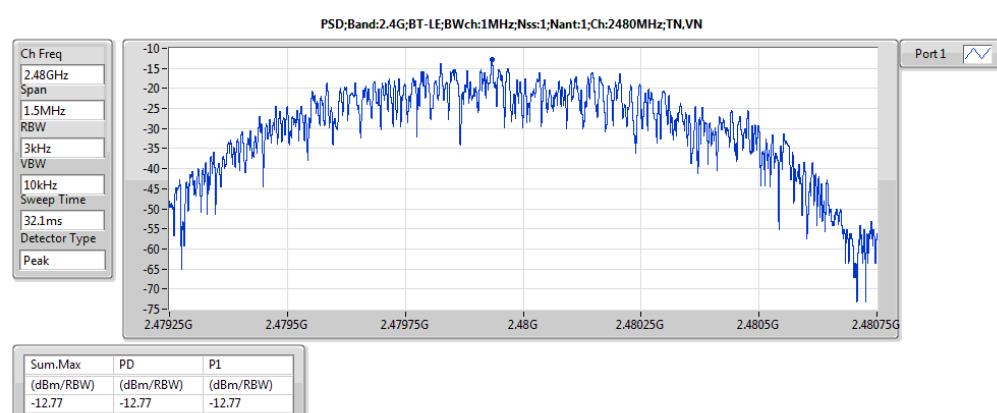
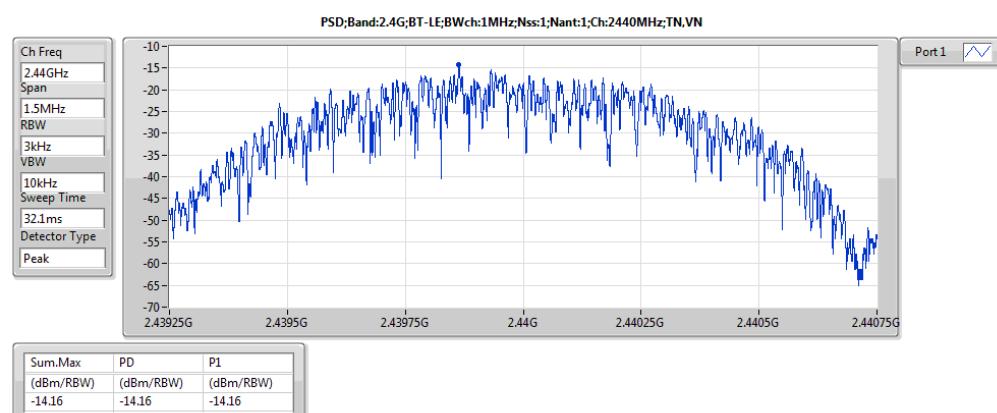
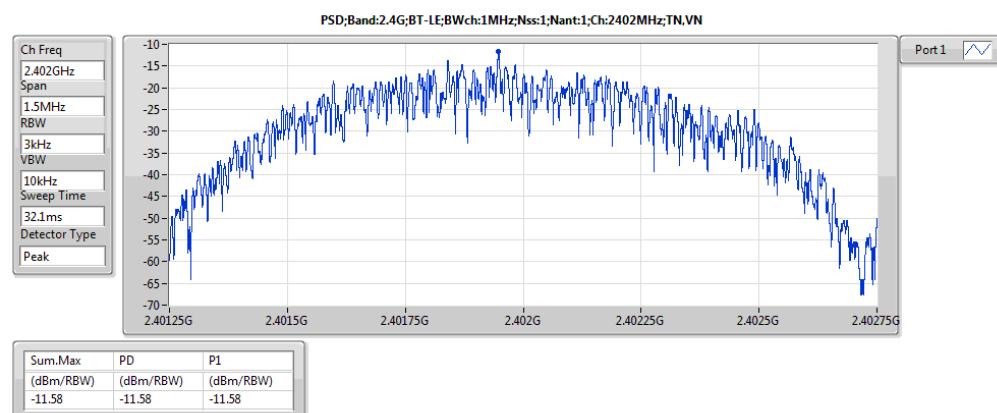
Mode	Result	DG (dBi)	EIRP (dBm)	EIRP Lim. (dBm)	Sum (dBm)	Sum Lim. (dBm)	P1 (dBm)
2.4G:BT-LE;1;1;1;2402;L;TN,VN	Pass	3.00	4.71	36.00	1.71	30.00	1.71
2.4G:BT-LE;1;1;1;2440;M;TN,VN	Pass	3.00	4.34	36.00	1.34	30.00	1.34
2.4G:BT-LE;1;1;1;2480;H;TN,VN	Pass	3.00	4.68	36.00	1.68	30.00	1.68

**Summary**

Mode	PD (dBm/RBW)	EIRP.PD (dBm/RBW)
2.4G:BT-LE;1;1;1	-11.58	-8.58

Result

Mode	Result	Meas.RBW (Hz)	Lim.RBW (Hz)	BWCF (dB)	DG (dBi)	Sum.Max (dBm/RBW)	PD (dBm/RBW)	PD.Limit (dBm/RBW)	EIRP.PD (dBm/RBW)	EIRP.PD.Li m (dBm/RBW)	P1 (dBm/RBW)
2.4G;BT-LE;1;1;1;2402;L;TN,VN	Pass	3k	3k	0.00	3.00	-11.58	-11.58	8.00	-8.58	Inf	-11.58
2.4G;BT-LE;1;1;1;2440;M;TN,VN	Pass	3k	3k	0.00	3.00	-14.16	-14.16	8.00	-11.16	Inf	-14.16
2.4G;BT-LE;1;1;1;2480;H;TN,VN	Pass	3k	3k	0.00	3.00	-12.77	-12.77	8.00	-9.77	Inf	-12.77





Transmitter Radiated Bandedge Emissions

Appendix D

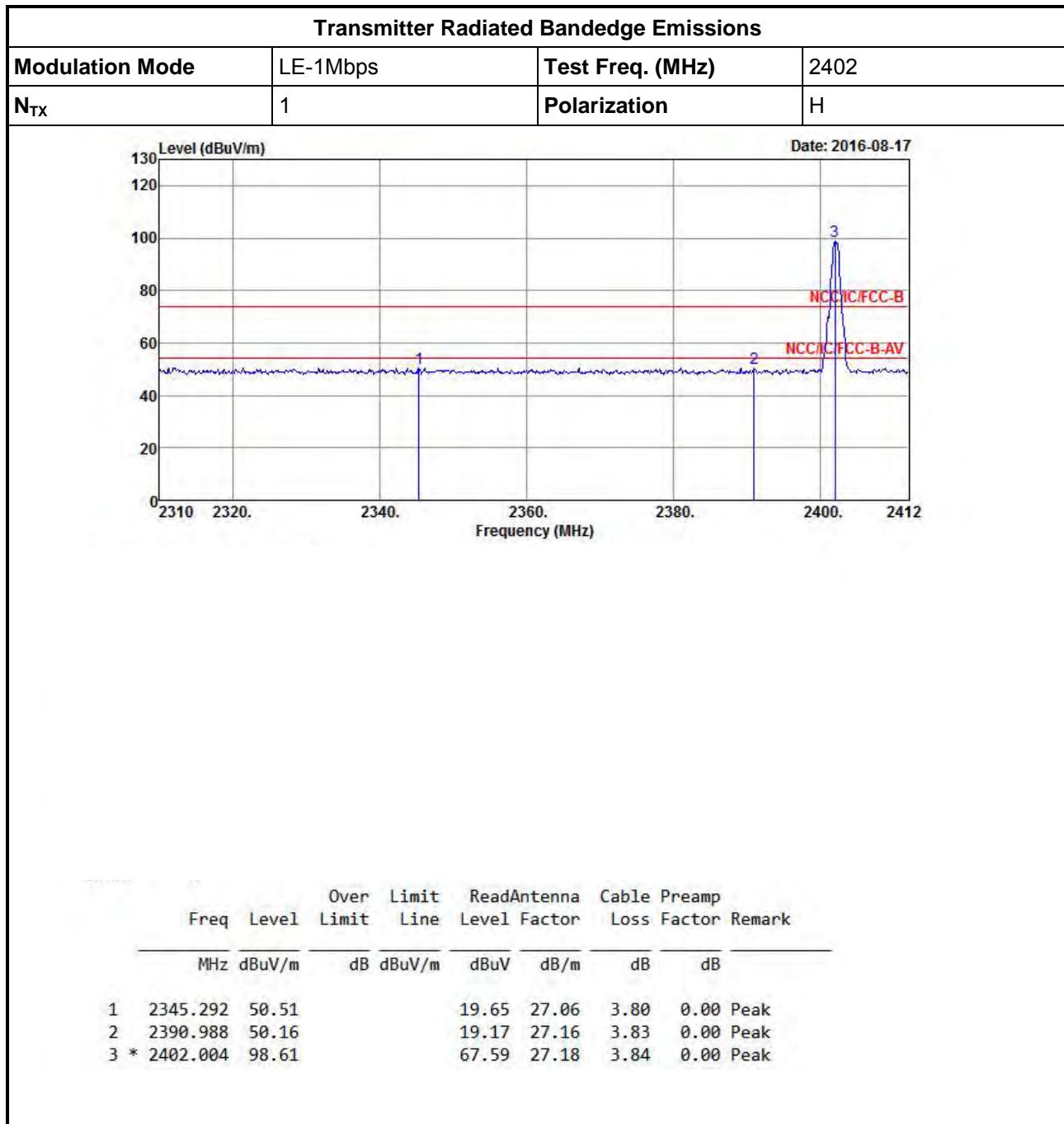
2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Non-restricted Band)								
Modulation	N _{TX}	Test Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Pol.
LE-1Mbps	1	2402	98.61	2390.988	50.16	48.45	20	H
LE-1Mbps	1	2480	94.95	2501.120	51.82	43.13	20	H

Note 1: Measurement worst emissions of receive antenna polarization

2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Restricted Band)										
Modulation Mode	N _{TX}	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
LE-1Mbps	1	2402	3	2322.852	60.20	74	2342.028	47.69	54	H
LE-1Mbps	1	2480	3	2498.080	60.84	74	2492.800	48.25	54	H

Note 1: Measurement worst emissions of receive antenna polarization.

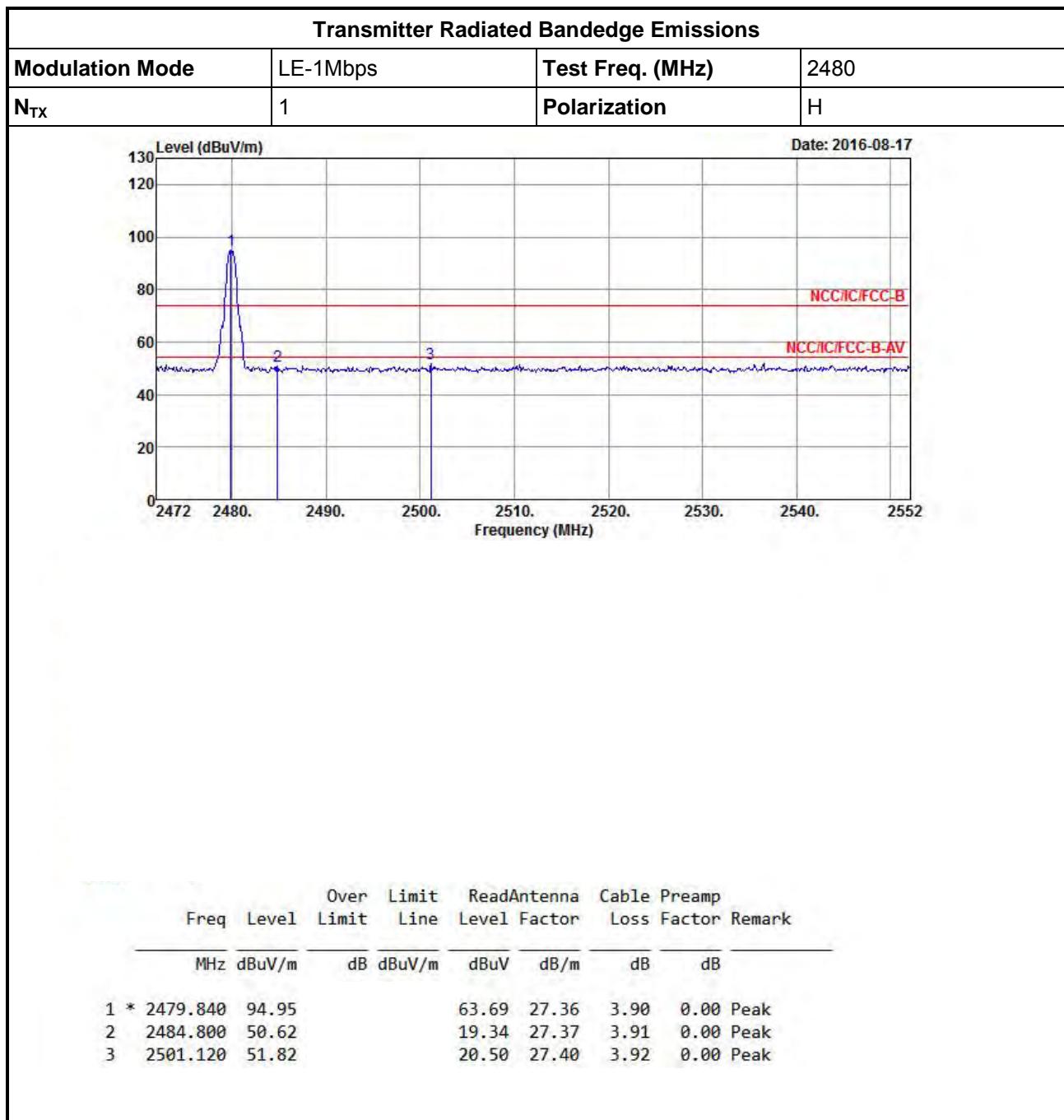
Note 2: Average emission setting: RBW=1MHz; VBW $\geq 1/T$, where T is "Pulse On Time", e.g., LE VBW $\geq 1/625\mu s$, VBW=3kHz.

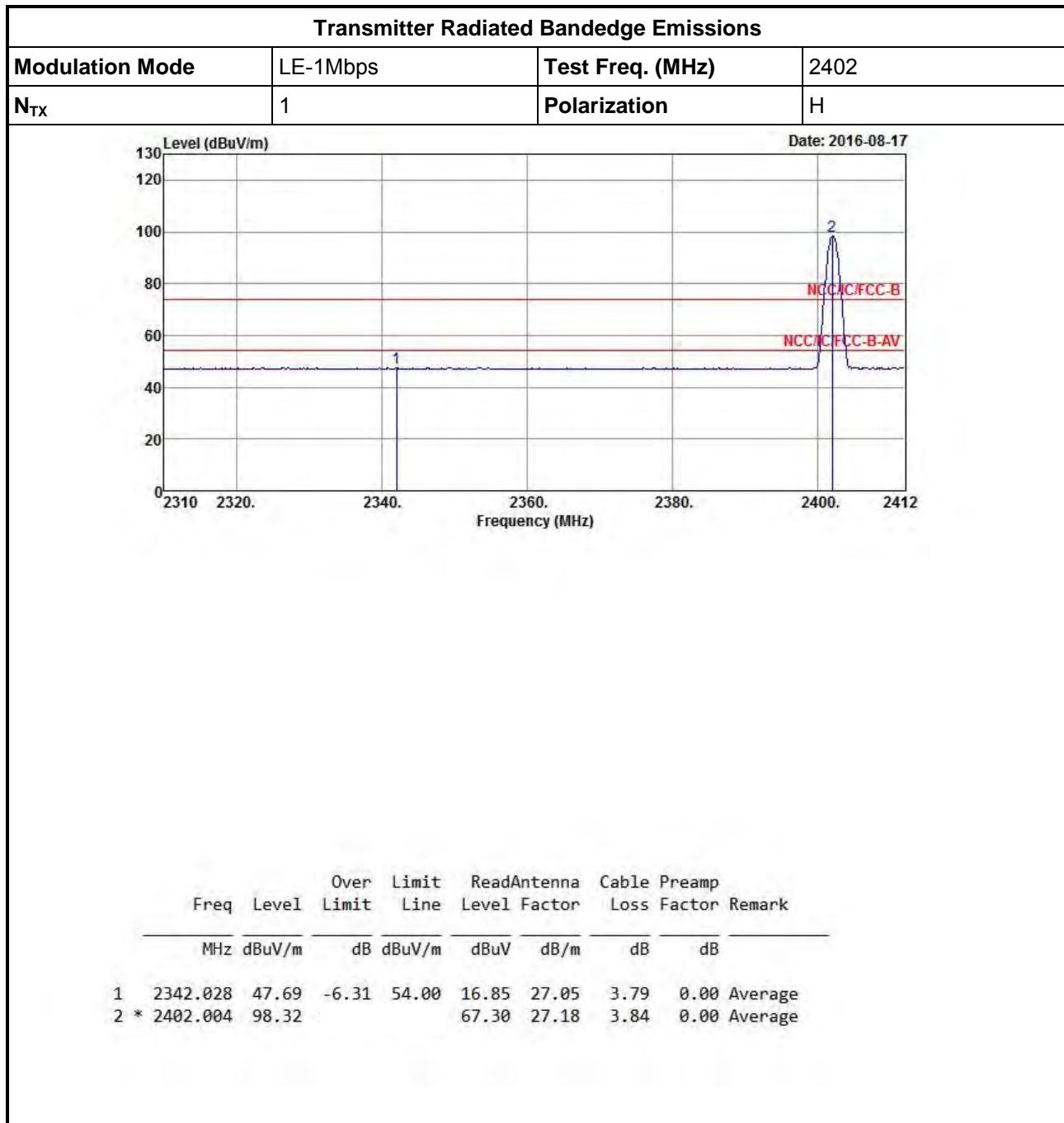
**Transmitter Radiated Bandedge Emissions (Non-restricted Band)**

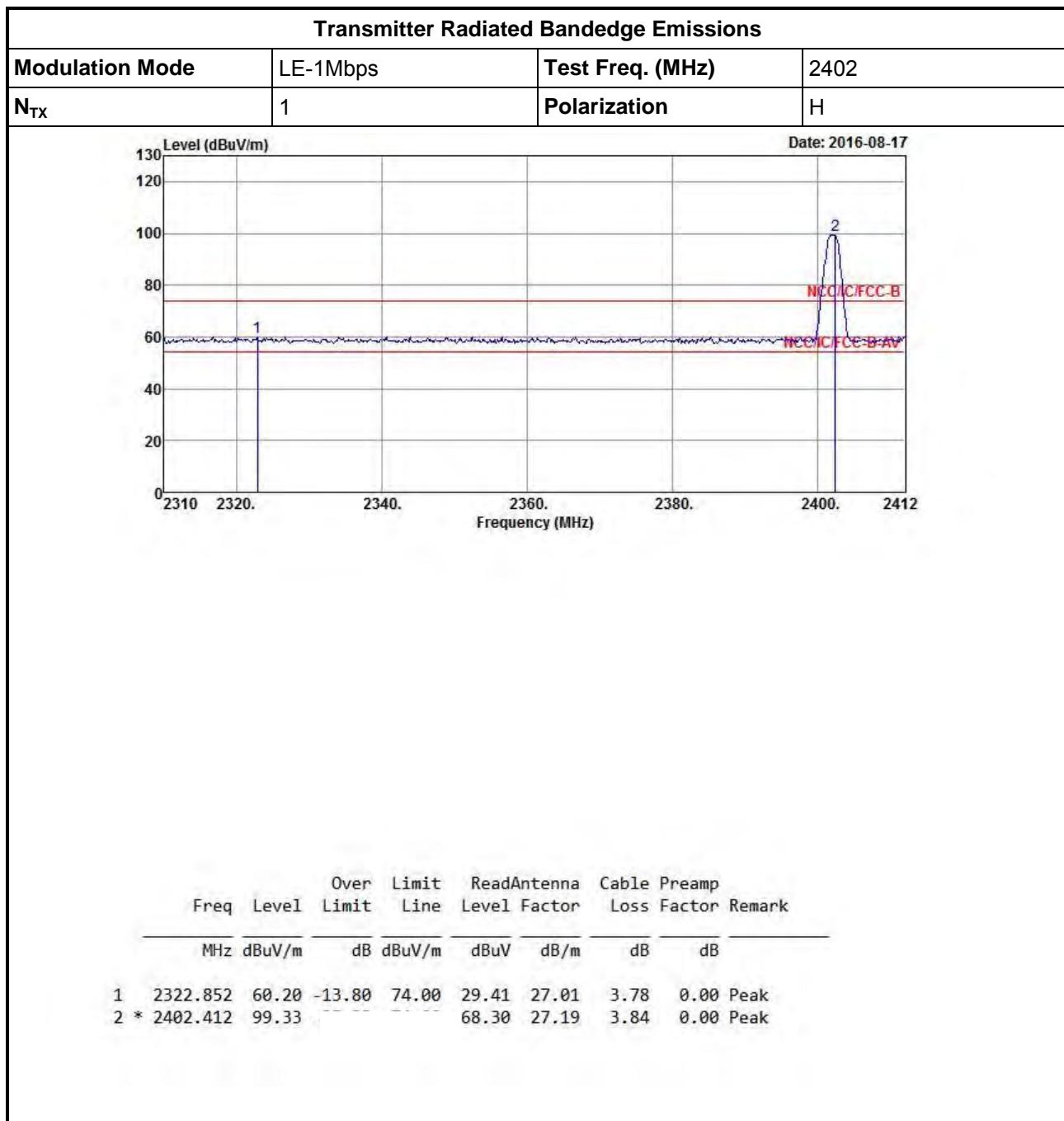


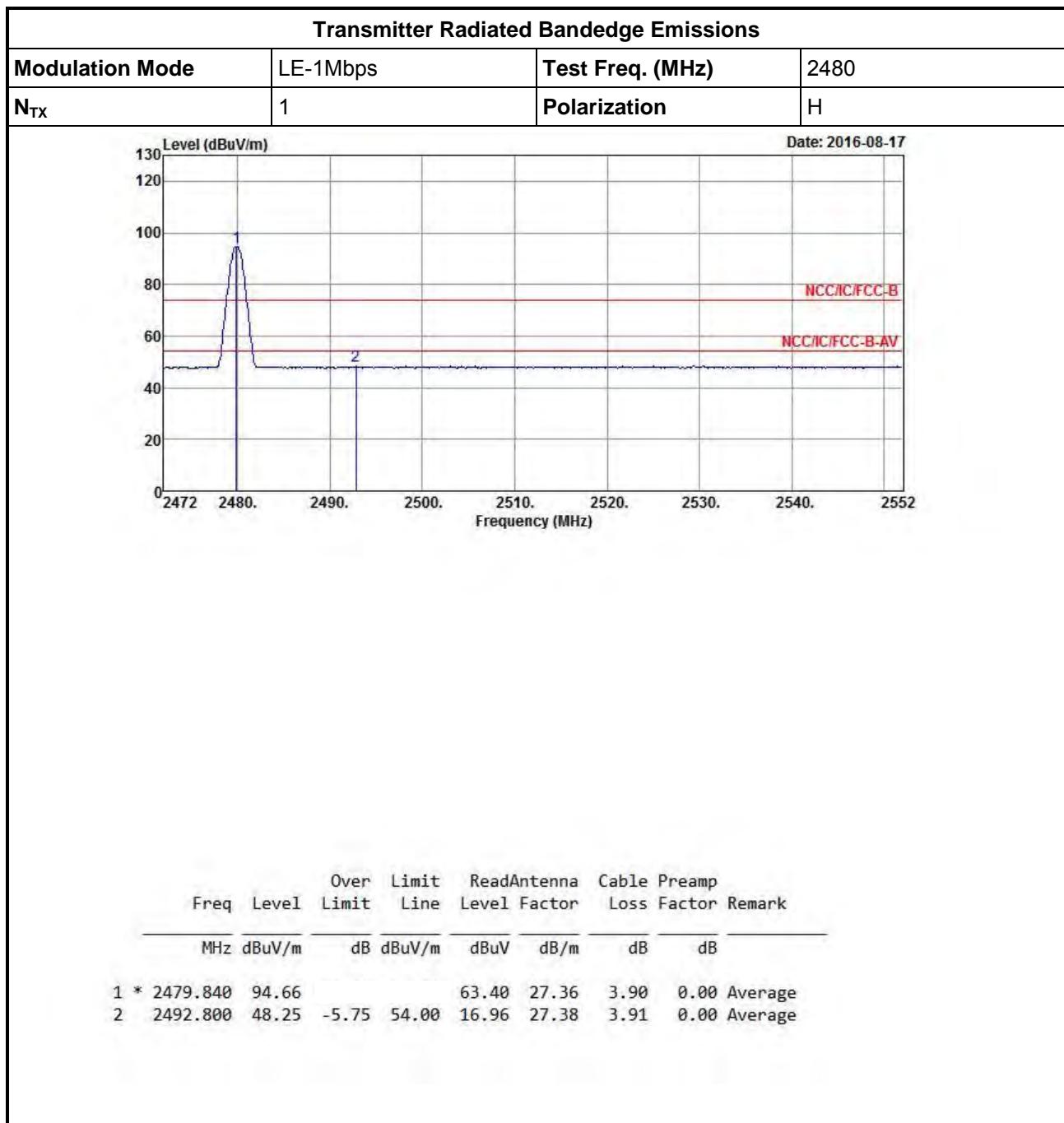
Transmitter Radiated Bandedge Emissions

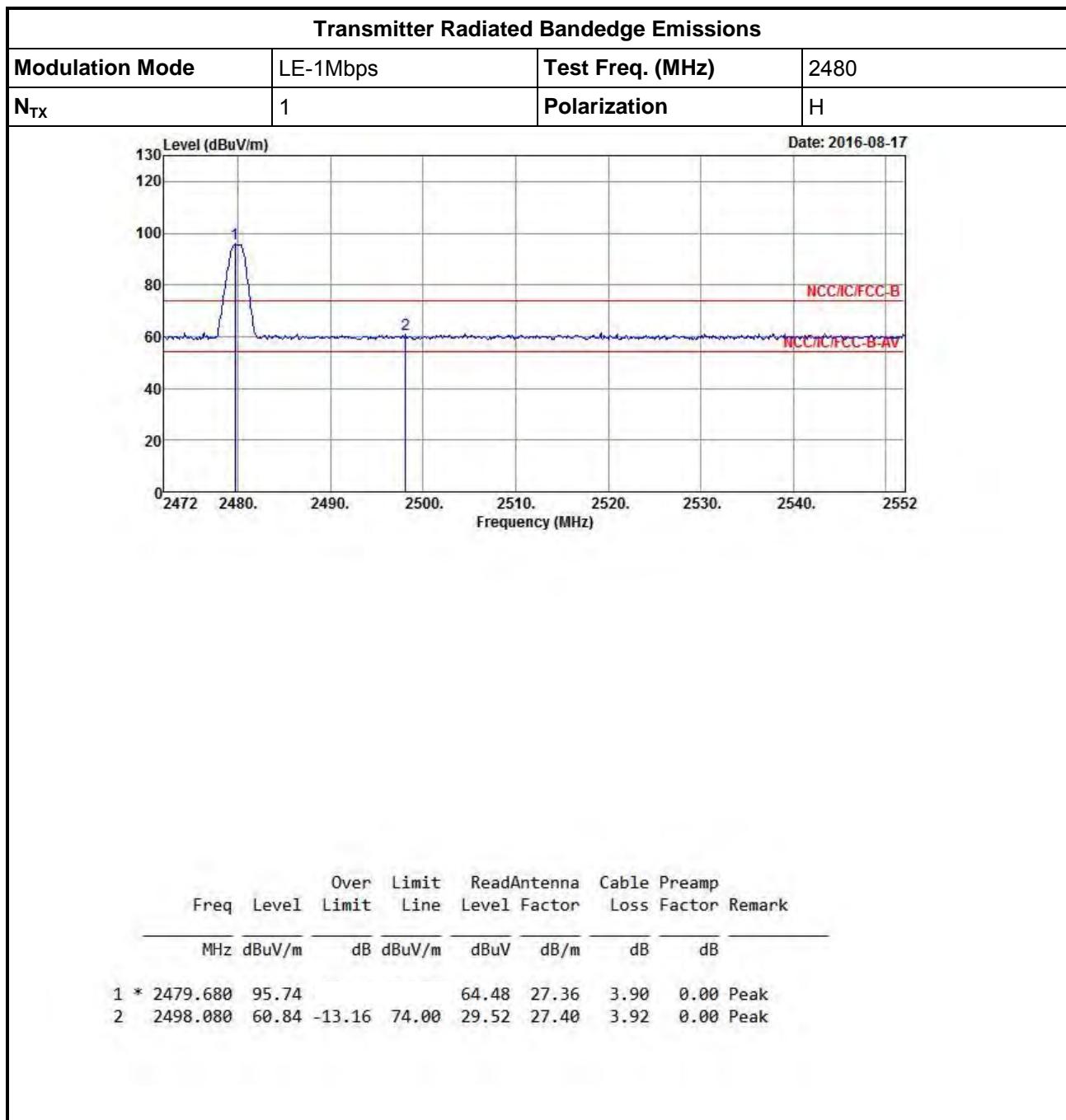
Appendix D



**Transmitter Radiated Bandedge Emissions (Restricted Band)**





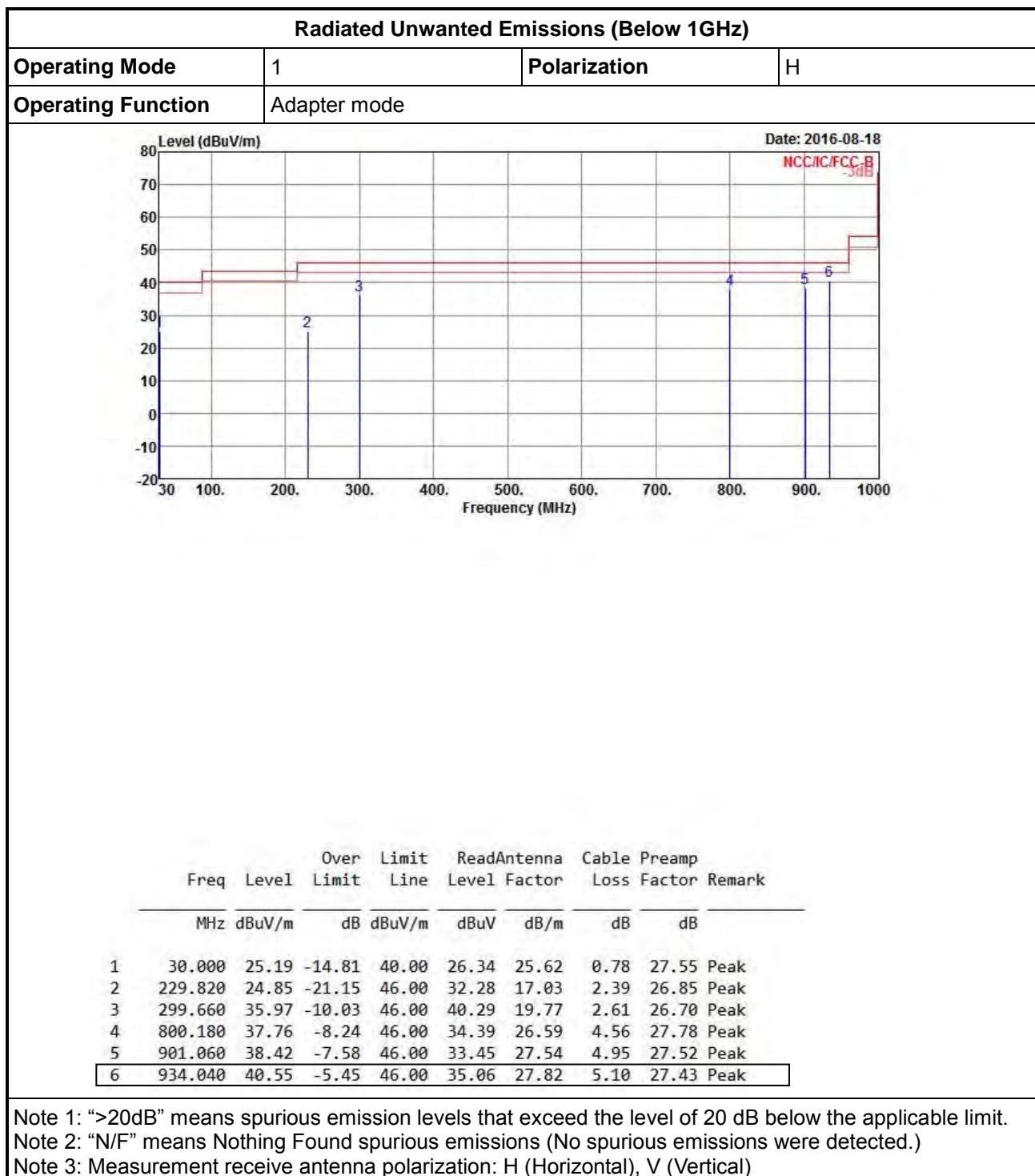




Transmitter Radiated Unwanted Emissions (Below 1GHz)

Radiated Unwanted Emissions (Below 1GHz)																																			
Operating Mode		1		Polarization		V																													
Operating Function		Adapter mode																																	
<table border="1"> <thead> <tr> <th rowspan="2">Freq</th> <th rowspan="2">Level</th> <th>Over</th> <th>Limit</th> <th>Read</th> <th>Antenna</th> <th>Cable</th> <th>Preamp</th> <th colspan="2" rowspan="2">Remark</th> </tr> <tr> <th>Limit</th> <th>Line</th> <th>Level</th> <th>Factor</th> <th>Loss</th> <th>Factor</th> </tr> </thead> <tbody> <tr> <td>MHz</td> <td>dBuV/m</td> <td>dB</td> <td>dBuV/m</td> <td>dBuV</td> <td>dB/m</td> <td>dB</td> <td>dB</td> <td colspan="2"></td> </tr> </tbody> </table>										Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark		Limit	Line	Level	Factor	Loss	Factor	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		
Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark																											
		Limit	Line	Level	Factor	Loss	Factor																												
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB																												
1	31.940	34.32	-5.68	40.00	36.66	24.41	0.80	27.55	Peak																										
2	134.760	22.53	-20.97	43.50	29.72	18.24	1.80	27.23	Peak																										
3	264.740	22.83	-23.17	46.00	27.54	19.57	2.50	26.78	Peak																										
4	324.880	30.92	-15.08	46.00	34.26	20.52	2.84	26.70	Peak																										
5	666.320	33.79	-12.21	46.00	32.06	25.39	4.30	27.96	Peak																										
6	800.180	32.85	-13.15	46.00	29.48	26.59	4.56	27.78	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 (Above 1GHz)

