



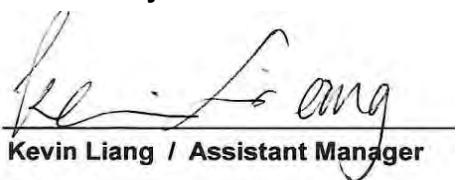
FCC Test Report

Equipment : Wireless door camera
Brand Name : EDIMAX
Model No. : IC-6220DC (Door Camera)
FCC ID : NDD9562201605
Standard : 47 CFR FCC Part 15.247
Operating Band : 2400 MHz – 2483.5 MHz
FCC Classification : DSS
Applicant : EDIMAX TECHNOLOGY CO., LTD.
Manufacturer : No.3, Wu-Chuan 3rd Road, Wu-Gu, New Taipei City 248, Taiwan

The product sample received on Jun. 06, 2016 and completely tested on Jun. 24, 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 A. TEST PHOTOS

APPENDIX B. 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]: 0.3914930MHz 37.47 (Margin 20.56dB) - QP 36.12 (Margin 11.91dB) - AV	FCC 15.207	Complied
3.2	15.247(a)	20dB Bandwidth	4.3420 MHz	N/A	Complied
3.2	15.247(a)	Carrier Frequency Separation (ChS)	2.895 MHz	ChS \geq BW _{20dB} x2/3.	Complied
3.3	15.247(a)	Number of Hopping Frequencies (N)	Max: 21 Min: 15	N \geq 15	Complied
3.4	15.247(a)	Time of Occupancy (Dwell Time)	0.318sec	0.4 s within 0.4 x N	Complied
3.5	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm]:17.05	Power [dBm]:21	Complied
3.6	15.247(d)	Transmitter Bandedge Emissions	Restricted Bands [dBuV/m at 3m]: 2389.56MHz 63.05 (Margin 10.95dB) - PK 51.11 (Margin 2.89dB) - AV	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied
3.7	15.247(d)	Transmitter Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 833.160MHz 42.65 (Margin 3.35dB) - QP	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

RF General Information				
Frequency Range (MHz)	Modulation	Ch. Frequency (MHz)	Channel Number	RF Output Power (dBm)
2400-2483.5	GFSK	2405-2465	1-21 [21]	17.05

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.

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.
<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).

Antenna General Information				
No.	Ant. Cat.	Ant. Type	Ant. Connector	Gain (dBi)
1	Integral	PIFA	I-Pex	3.98



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 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
<input type="checkbox"/> Operated normally 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"/> 89.05%	0.50

1.1.5 EUT Operational Condition

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



1.2 Accessories and Support Equipment

Specification of Accessory				
AC Adapter 1	Brand Name	DVE	Model Name	DSA-6PFG-12 FUS 120050
	Power Rating	I/P: 100-240Vac, 2000mA ; O/P: 12Vdc, 0.5A		
	Power Cord	1.5 meter, non-shielded cable, w/o ferrite core		
AC Adapter 2	Brand Name	DVE	Model Name	DSA-12PFT-12 FUS 120100
	Power Rating	I/P: 100-240Vac, 0.5A ; O/P: 12Vdc, 1A		
	Power Cord	1.5 meter, non-shielded cable, w/o ferrite core		
Gateway	Brand Name	EDIMAX	Model Name	IC-6220DC (Gateway)

Support Equipment - Conduction				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	Dell	E5530	R33002
2	AC adaptor	Dell	LA65NS2-01	-

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

Support Equipment - Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	-	-	-	-

1.3 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
- ♦ FCC Public Notice DA 00-705



1.4 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 : 886-3-327-3456 FAX : 886-3-327-0973			
Test Site Registration Number: 553509			
Test Condition	Test Site No.	Test Engineer	Test Environment
AC Conduction	CO04-HY	Daniel	25.8°C / 54%
RF Conducted	TH01-HY	Howard	23°C / 63%
Radiated Emission	03CH03-HY	Jeff	21.1°C / 55%



1.5 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			
Modulation Mode	Transmit Chains (N_{TX})	Data Rate	RF Output Power (dBm)
GFSK	1	1 Mbps	17.05

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.

2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration	
Modulation Mode	Test Channel Frequencies (MHz)
GFSK	2405, 2435, 2465

2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter			
Test Software	N/A		
Modulation Mode	2405 MHz	2435 MHz	2465 MHz
GFSK	Default	Default	Default



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	Battery Mode
2	USB Mode

Operating mode 2 was the worst case and it was recorded in this test report.

The Worst Case Mode for Following Conformance Tests	
Tests Item	RF Output Power, 20dB Bandwidth, Carrier Frequency Separation (ChS) Number of Hopping Frequencies (N), Time of Occupancy (Dwell Time)
Test Condition	Conducted measurement at transmit chains
Modulation Mode	GFSK

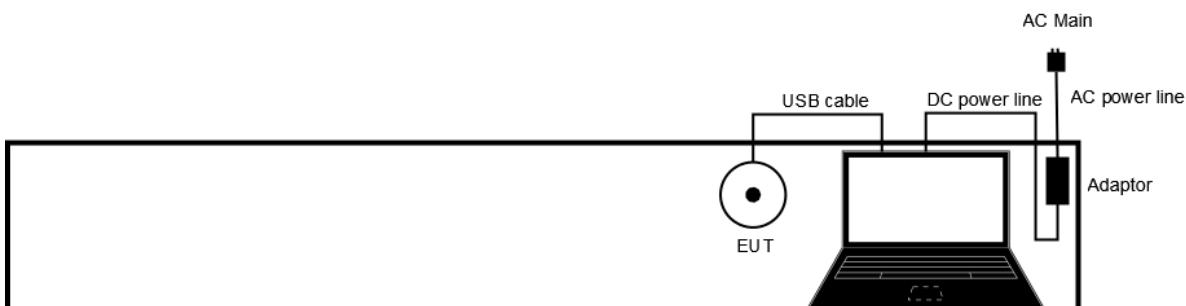
The Worst Case Mode for Following Conformance Tests	
Tests Item	Transmitter Radiated Bandedge Emissions Transmitter Radiated Unwanted Emissions
Test Condition	Radiated measurement
User Position	<input type="checkbox"/> EUT will be placed in fixed position. <input checked="" type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes. <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.
Operating Mode	Operating Mode Description
1	Battery Mode
2	USB Mode

Operating mode 1 was the worst case and it was recorded in this test report.

Modulation Mode	GFSK		
	X Plane	Y Plane	Z Plane
Orthogonal Planes of EUT			
Worst Planes of EUT			V

2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test (Mode 1)



Test Setup Diagram - Radiated Test (Mode1)



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.

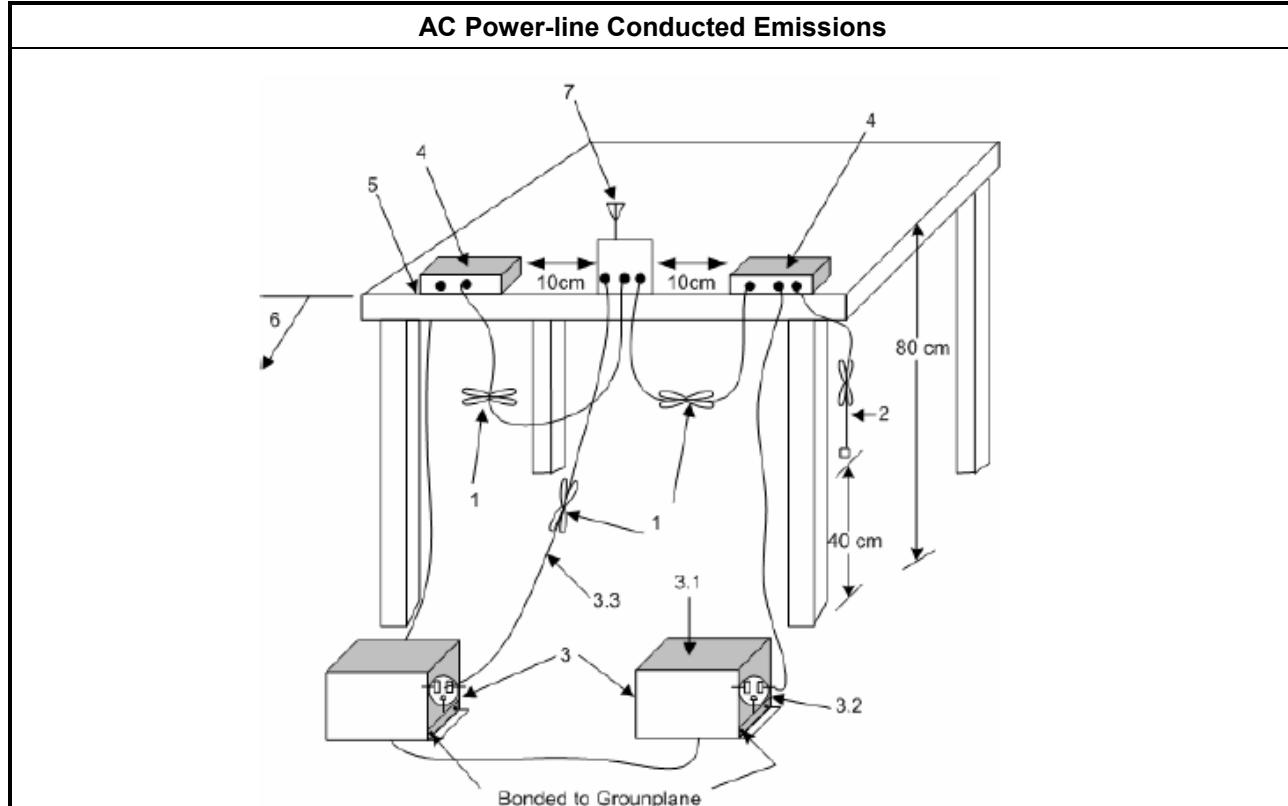
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

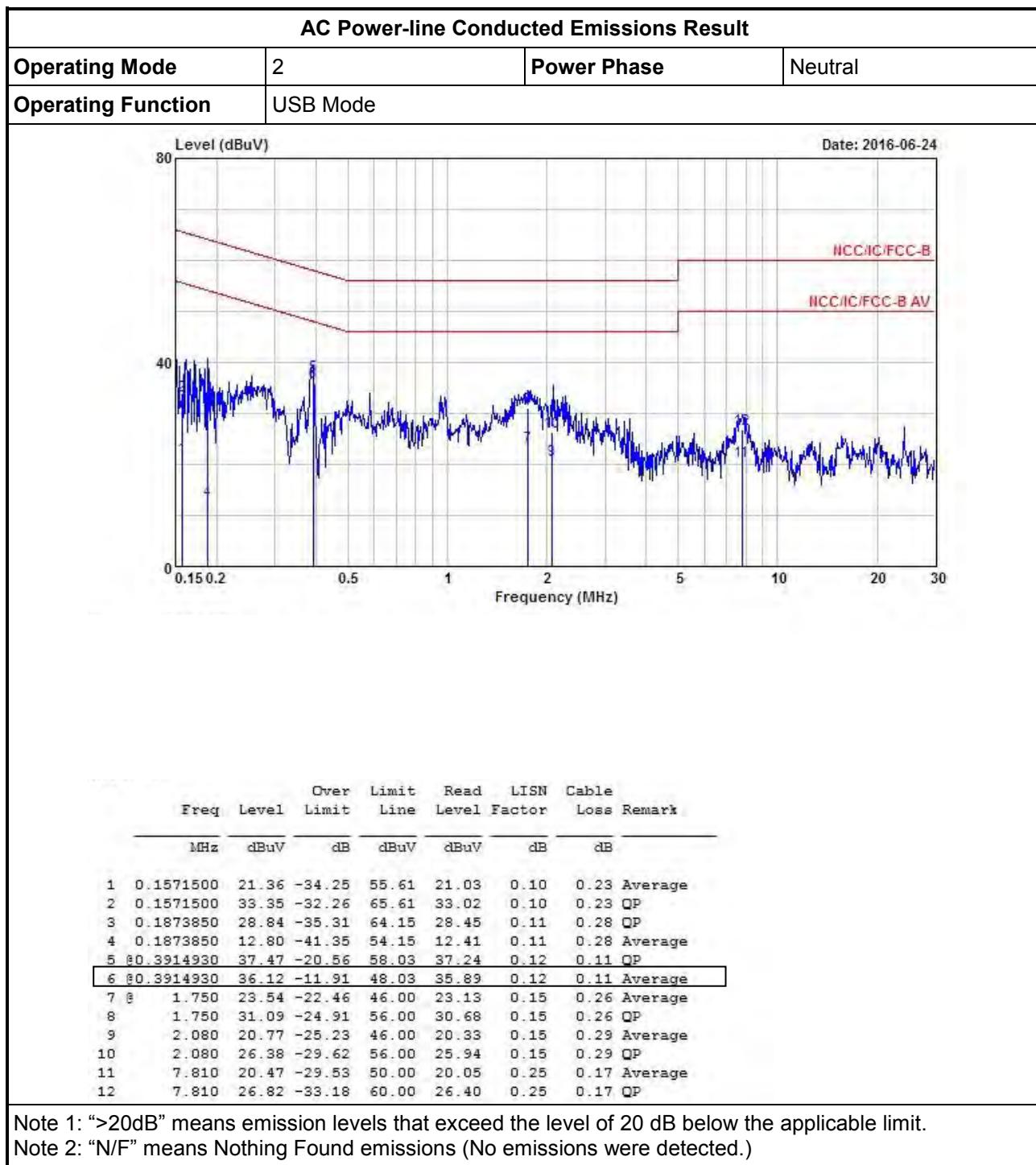
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

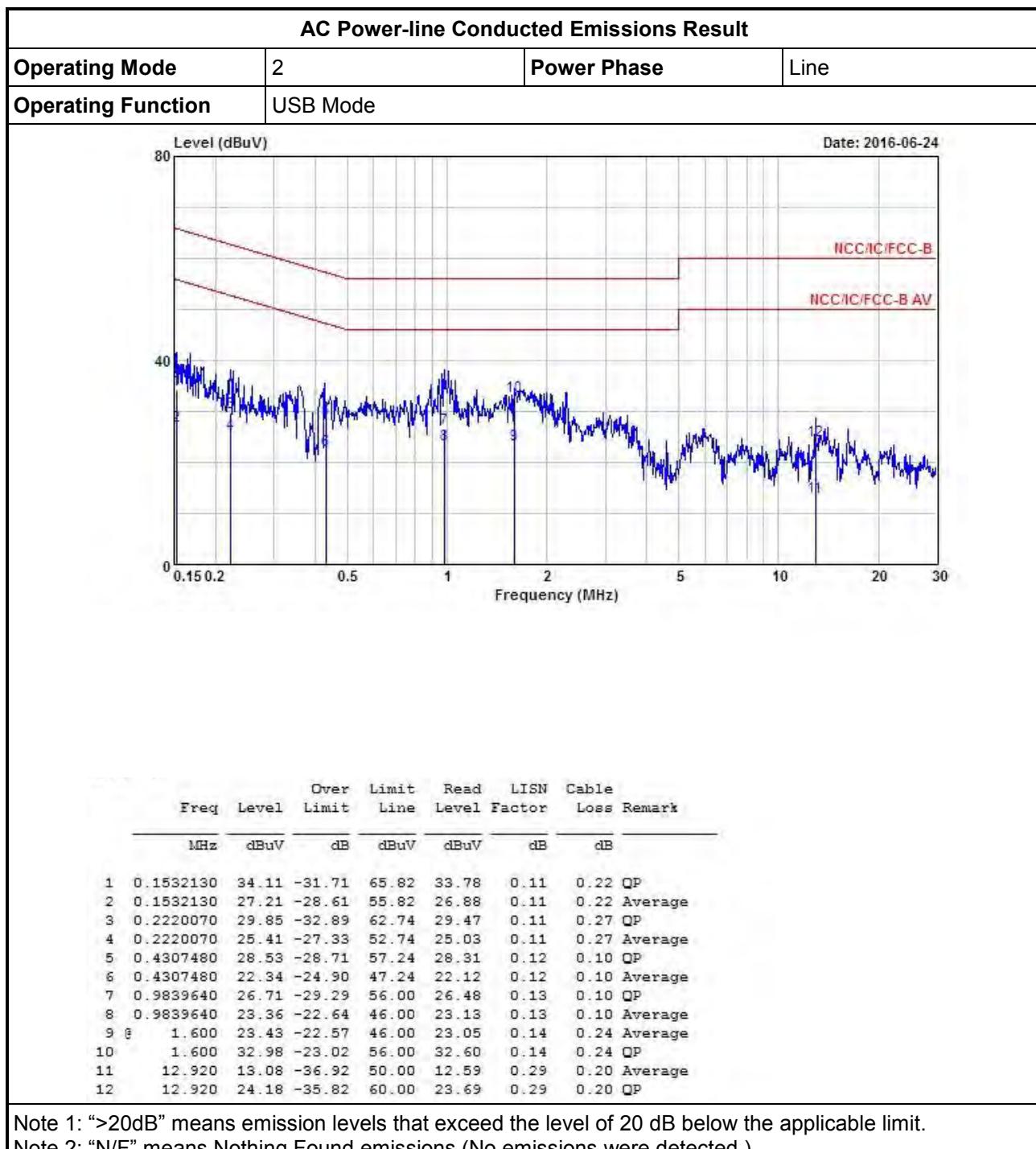
3.1.4 Test Setup





3.1.5 Test Result of AC Power-line Conducted Emissions





3.2 20dB Bandwidth and Carrier Frequency Separation

3.2.1 20dB Bandwidth and Carrier Frequency Separation Limit

20dB Bandwidth and Carrier Frequency Separation Limit for Frequency Hopping Systems	
<input checked="" type="checkbox"/>	2400-2483.5 MHz Band:
<input type="checkbox"/>	$N \geq 75$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz).
<input checked="" type="checkbox"/>	$N \geq 15$ and $ChS \geq MAX$ (20 dB bandwidth $\times 2/3$, 25 kHz).

N: Number of Hopping Frequencies; ChS: Hopping Channel Separation

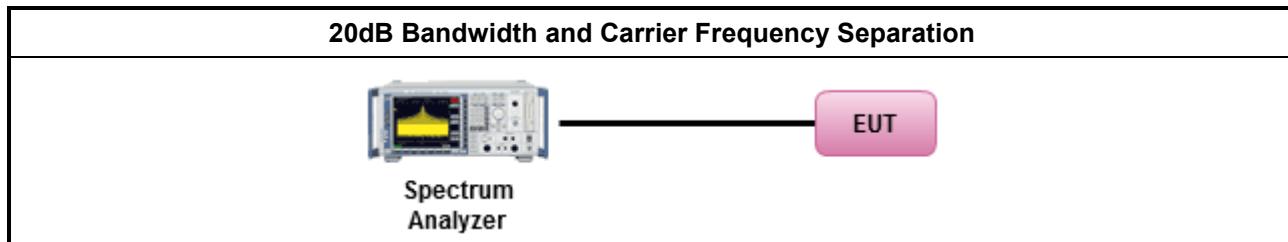
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> Refer as FCC Public Notice DA 00-705, 20 dB bandwidth measurement.
<input checked="" type="checkbox"/> Refer as FCC Public Notice DA 00-705, carrier frequency separation measurement.
<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 type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

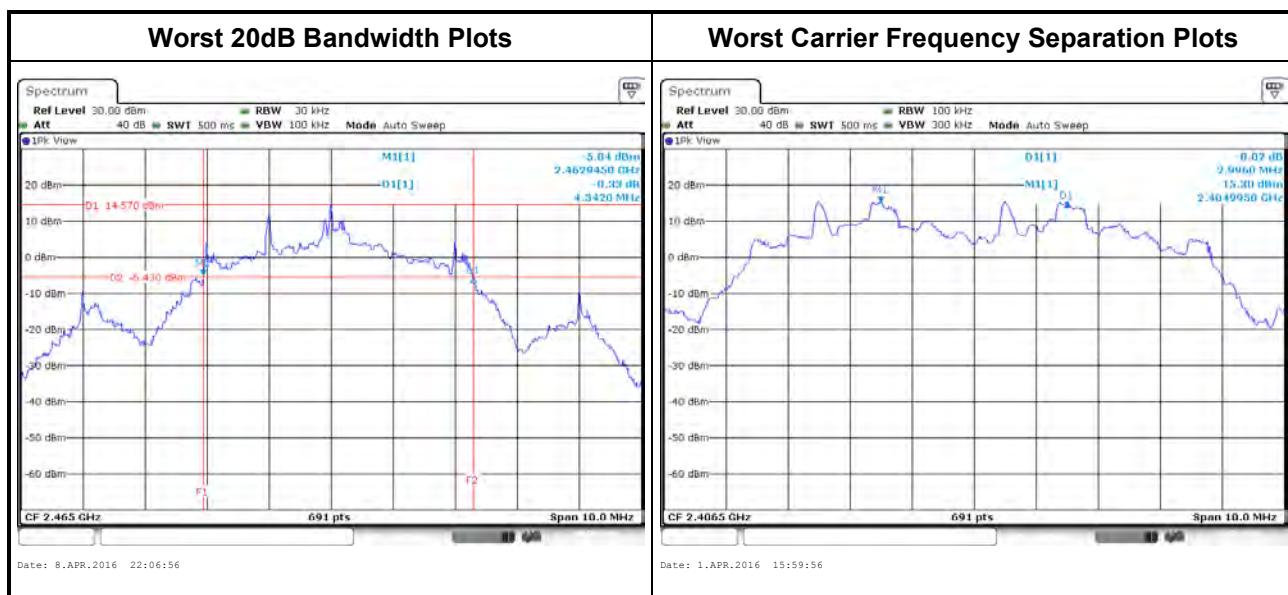
3.2.4 Test Setup





3.2.5 Test Result of 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)
GFSK	2405	4.2980	4.5875	3.0100	2.865
GFSK	2435	4.3130	4.5875	2.9960	2.865
GFSK	2465	4.3420	4.6454	2.9960	2.856
Result			Complied		



3.3 Number of Hopping Frequencies

3.3.1 Number of Hopping Frequencies Limit

Number of Hopping Frequencies Limit for Frequency Hopping Systems	
<input checked="" type="checkbox"/> 2400-2483.5 MHz Band:	
<input type="checkbox"/> N ≥ 75 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).	

N: Number of Hopping Frequencies; ChS: Hopping Channel Separation

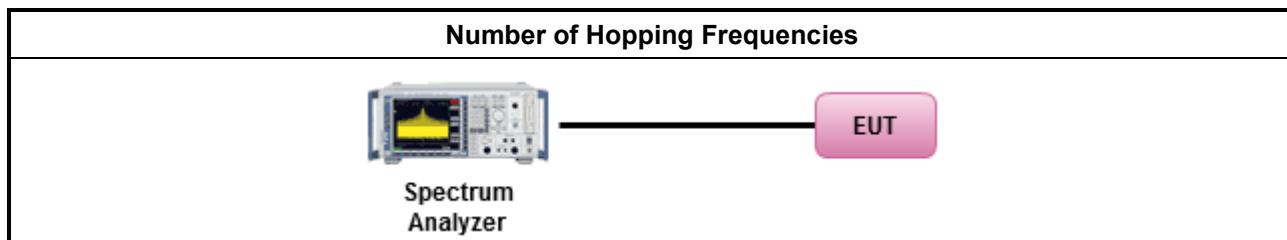
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

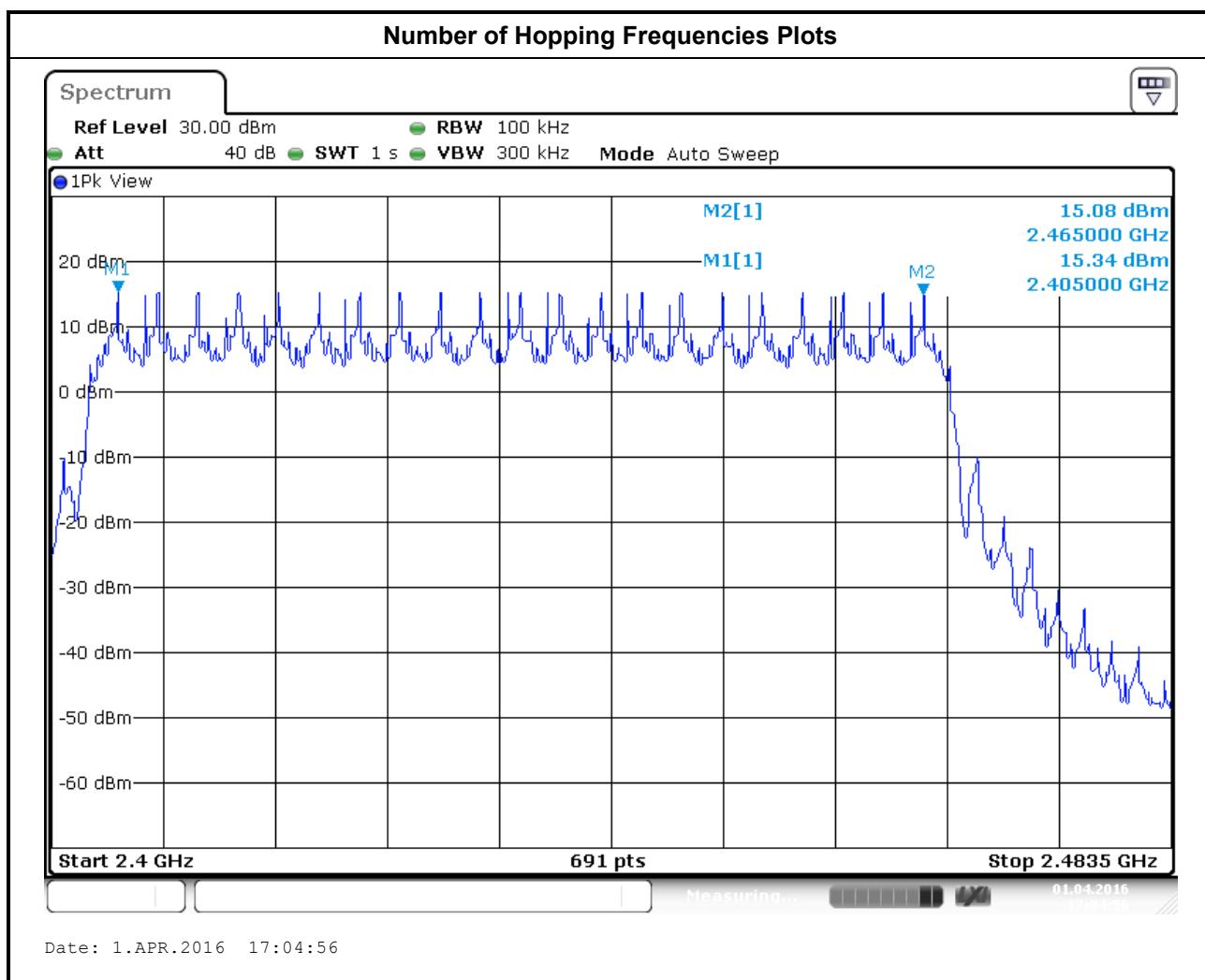
Test Method
<input checked="" type="checkbox"/> Refer as FCC Public Notice DA 00-705, number of hopping frequencies measurement.
<input checked="" type="checkbox"/> For conducted measurement.
<input checked="" type="checkbox"/> The EUT supports single transmit chain and measurements performed on this transmit chain.
<input 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 Number of Hopping Frequencies

Number of Hopping Frequencies Result			
Modulation Mode	Freq. (MHz)	Hopping Channel Number (N)	Hopping Channel Number Limits
GFSK	2402-2480	21	15
Result	Complied		



3.4 Time of Occupancy (Dwell Time)

3.4.1 Time of Occupancy (Dwell Time) Limit

Time of Occupancy (Dwell Time) Limit for Frequency Hopping Systems	
<input checked="" type="checkbox"/> 2400-2483.5 MHz Band: Dwell time \leq 0.4 second within $0.4 \times N$	
N: Number of Hopping Frequencies	

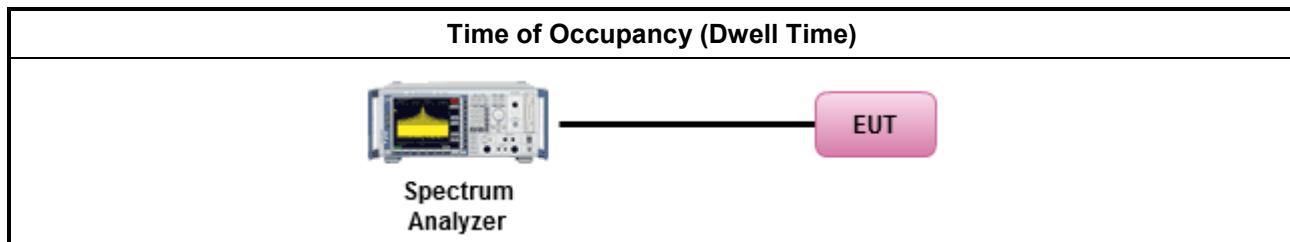
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/> Refer as FCC Public Notice DA 00-705, dwell time measurement.	
<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 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 Time of Occupancy (Dwell Time)

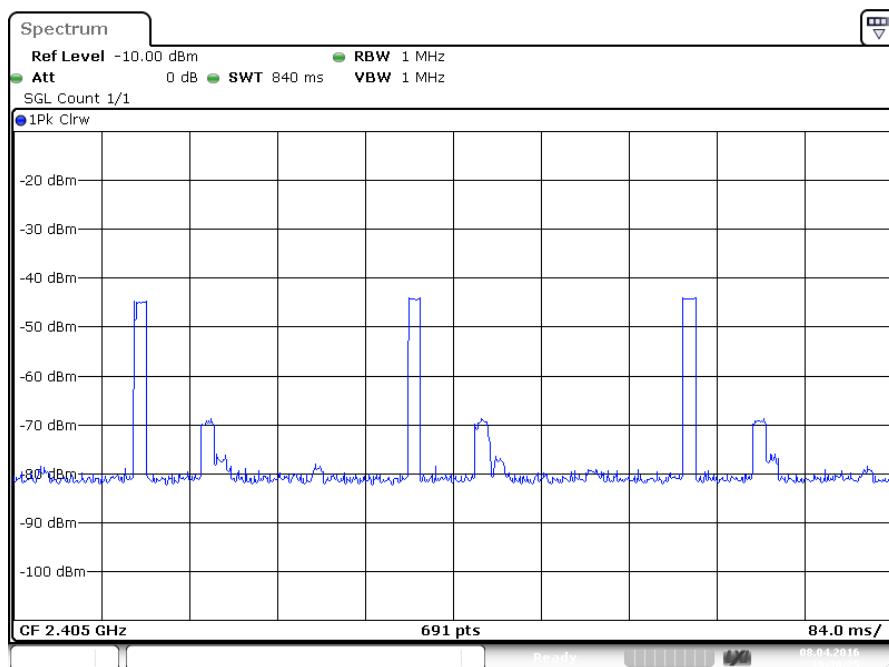
Time of Occupancy (Dwell Time) Result						
Modulation Mode	Freq. (MHz)	Pulse Time per Hop (ms)	Number of Pulse	Measure Time (s)	Dwell Time in [0.4 x N sec] (s)	Dwell Time Limits (s)
GFSK	2405	10.61	3	0.84	0.318	0.4
Result	Complied					

The total sweep time is 0.4×21 Channels = 8.4 seconds.

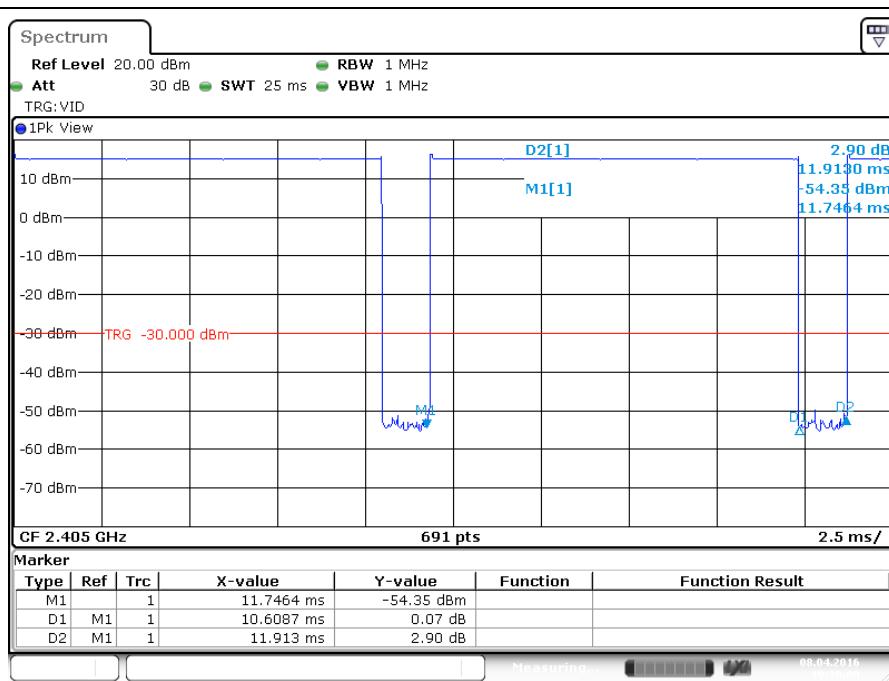
The number of hops is in the 8.4sec. sweep time, we determined to reduce the sweep time to 0.84 sec., count the number of hops and multiply by 10. The total number of hops will be multiplied by the measured time of one pulse.



Worst Number of Pulse



Worst Pulse Time per Hop Plots





3.5 RF Output Power

3.5.1 RF Output Power Limit

RF Output Power Limit for Frequency Hopping Systems		
Maximum Peak Conducted Output Power Limit		
<input checked="" type="checkbox"/> 2400-2483.5 MHz Band:		
<input type="checkbox"/> For Hopping Channel: $N \geq 75$		
<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"/> For Hopping Channel: $N \geq 15$		
<input checked="" type="checkbox"/> If $G_{TX} \leq 6$ dBi, then $P_{out} \leq 21$ dBm (0.125 W)		
<input type="checkbox"/> If $G_{TX} > 6$ dBi, then $P_{out} = 21 - (G_{TX} - 6)$ dBm		
e.i.r.p. Power Limit:		
<input checked="" type="checkbox"/> 2400-2483.5 MHz Band:		
<input type="checkbox"/> For Hopping Channel: $N \geq 75 - P_{eirp} \leq 36$ dBm (4 W)		
<input checked="" type="checkbox"/> For Hopping Channel: $N \geq 15 - P_{eirp} \leq 27$ dBm (0.5 W)		
G_{TX} = the maximum transmitting antenna directional gain in dBi.		
P_{eirp} = e.i.r.p. Power in dBm.		
N: Number of Hopping Frequencies		
ChS: Hopping Channel Separation		

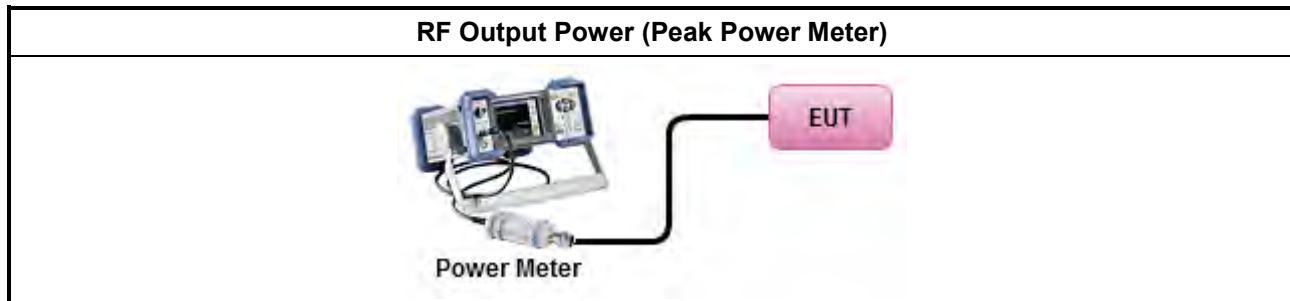
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/> Maximum Peak Conducted Output Power	
<input type="checkbox"/> Refer as FCC 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 type="checkbox"/> Refer as ANSI C63.10, clause 11.9.1.3) for peak power meter.	
<input type="checkbox"/> Refer as ANSI C63.10, clause 11.9.1.1) for spectrum analyzer - (RBW \geq EBW).	
<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 type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.	

3.5.4 Test Setup



3.5.5 Test Result of Maximum Peak Conducted Output Power

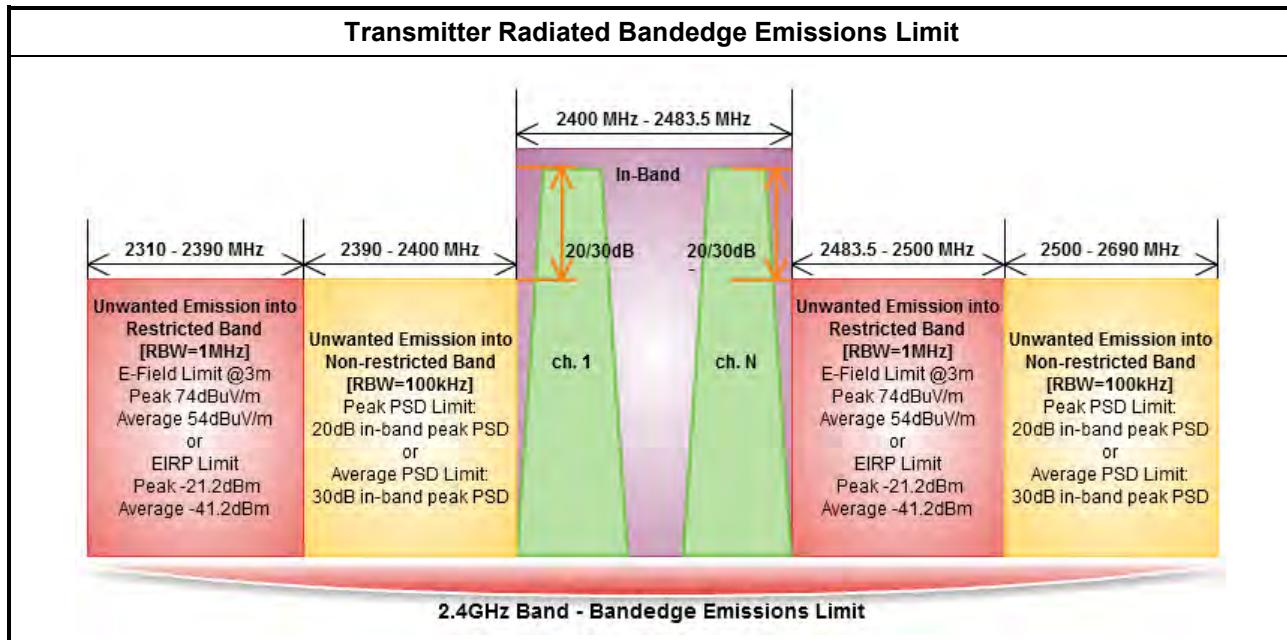
Maximum Peak Conducted Output Power Result						
Condition		RF Output Power (dBm)				
Modulation Mode	Freq. (MHz)	RF Output Power	Power Limit	Antenna Gain (dBi)	EIRP Power	EIRP Limit
GFSK	2405	17.05	21	3.98	21.03	27
GFSK	2435	16.54	21	3.98	20.52	27
GFSK	2465	16.25	21	3.98	20.23	27
Result		Complied				

3.5.6 Test Result of Maximum Average Conducted Output Power

Maximum Average Conducted Output Power Result						
Condition		RF Output Power (dBm)				
Modulation Mode	Freq. (MHz)	Average Power	Duty Factor (dB)	RF Output Power	Antenna Gain (dBi)	EIRP Power
GFSK	2405	16.46	0.50	16.96	3.98	20.94
GFSK	2435	15.71	0.50	16.21	3.98	20.19
GFSK	2465	15.45	0.50	15.95	3.98	19.93
Result		Complied				

3.6 Transmitter Radiated Bandedge Emissions

3.6.1 Transmitter Radiated Bandedge Emissions Limit



3.6.2 Measuring Instruments

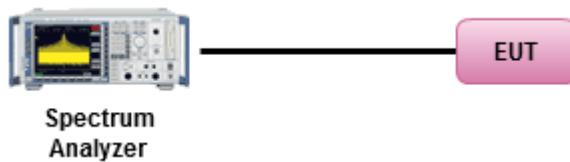
Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

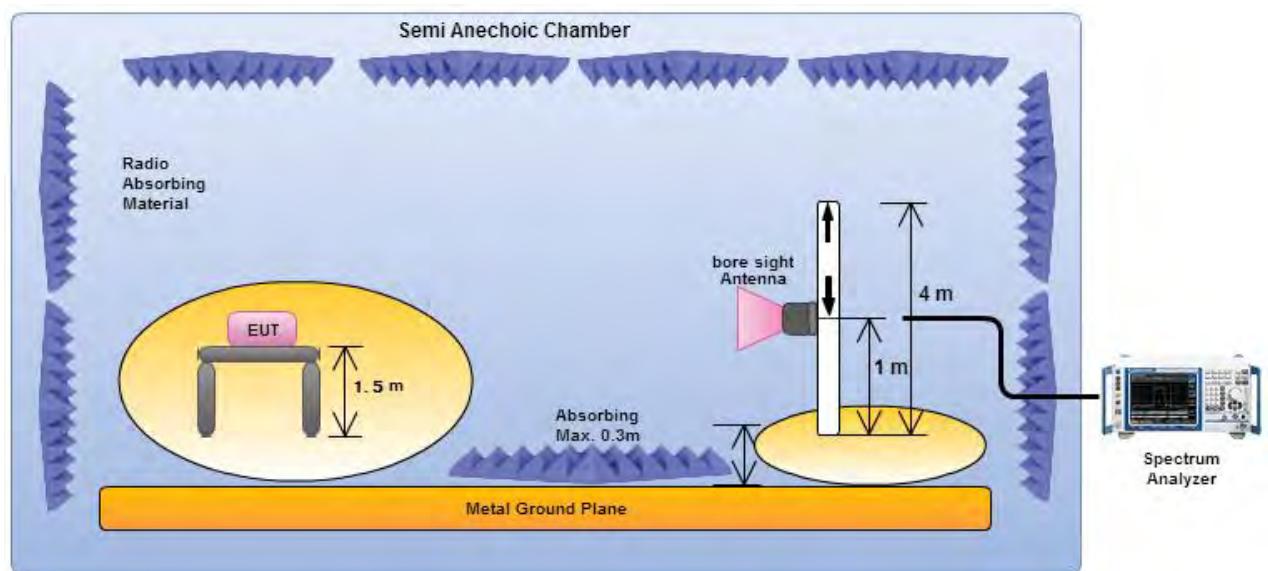
Test Method – General Information	
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.10 bandedge testing shall be performed at the lowest frequency channel and highest 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"/> 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 checked="" 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 ANSI C63.10, clause 4.1.4.2.2 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 6.10 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"/> Refer as ANSI C63.10, clause 7.8.6 for band-edge testing into non-restricted bands.	
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.6 for radiated emissions and test distance is 3m.	

3.6.4 Test Setup

Transmitter Hopping Bandedge Emissions



Transmitter Radiated Bandedge Emissions



Electric field tests shall be performed in transmitter bandedge emissions using a calibrated horn antenna.



3.6.5 Test Result of Transmitter Hopping Bandedge Emissions

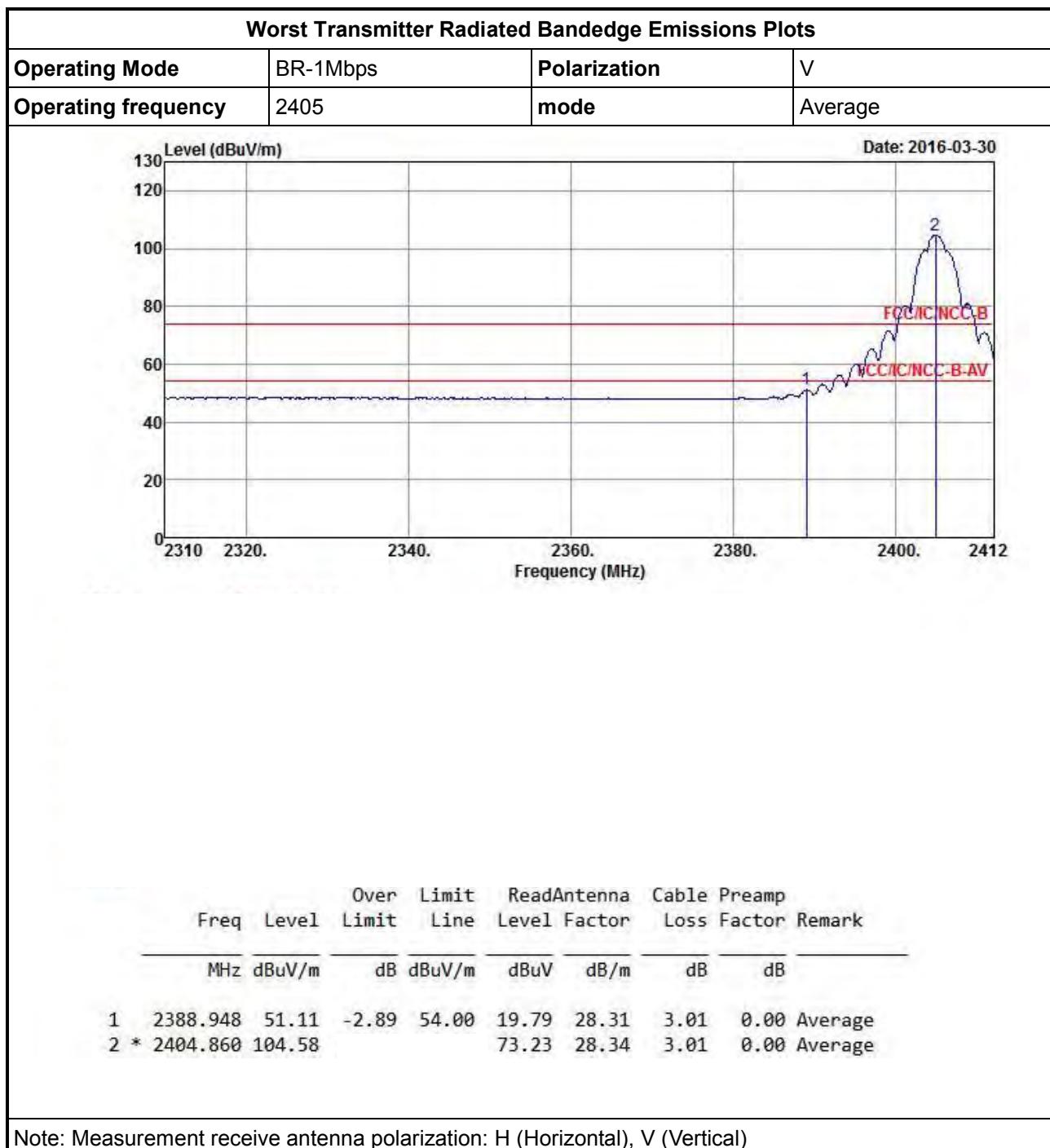
2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Non-restricted Band)							
Modulation	Test Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Pol.
GFSK	2405	110.03	2399.15	76.55	33.48	20	H
GFSK	2465	107.93	2548.12	52.00	55.93	20	H

Note 1: Measurement worst emissions of receive antenna polarization

2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Restricted Band)									
Modulation Mode	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.
GFSK	2405	3	2389.560	63.05	74	2388.948	51.11	54	H
GFSK	2465	3	2495.740	61.94	74	2484.488	48.88	54	H

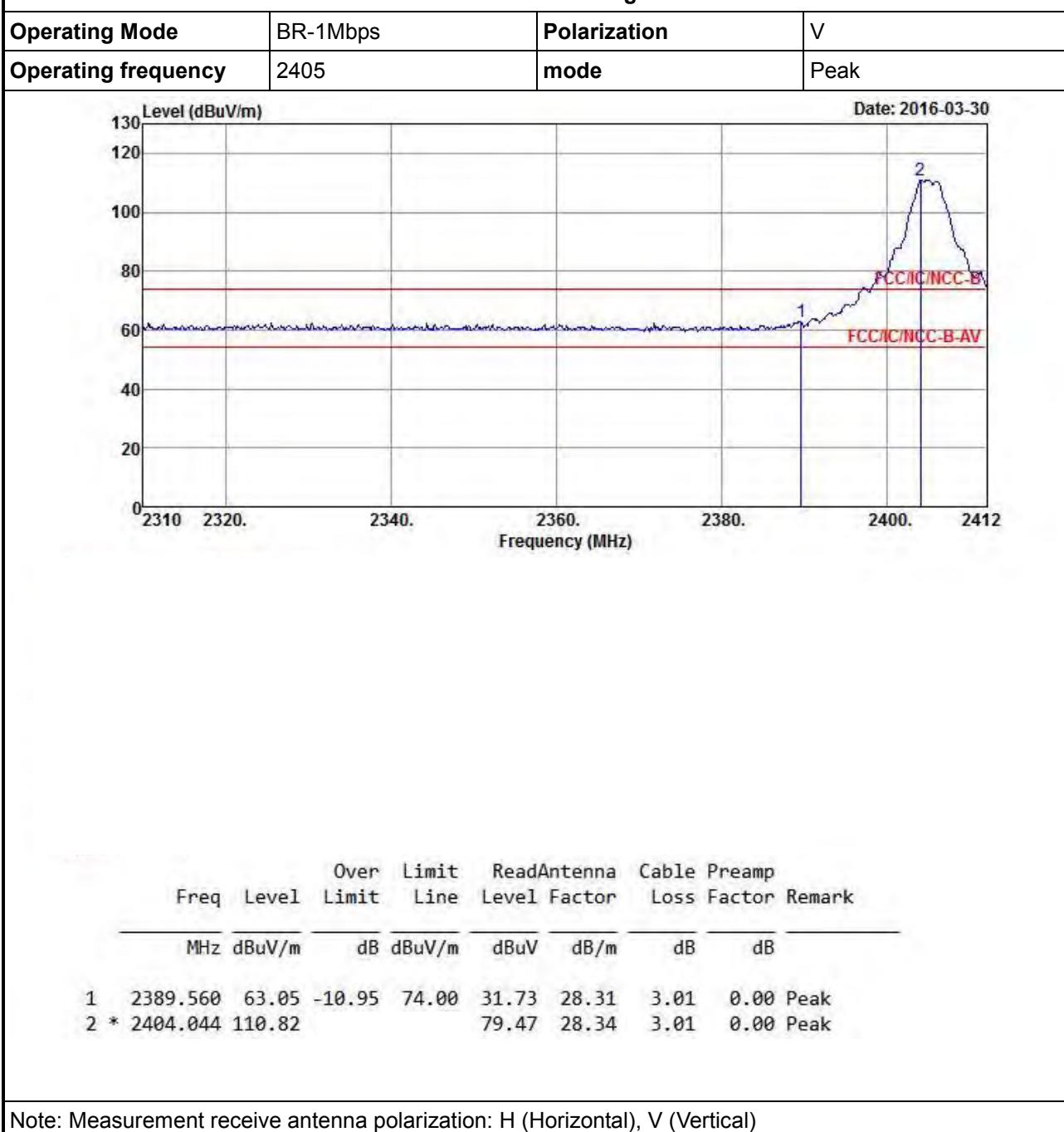
Note 1: Measurement worst emissions of receive antenna polarization.

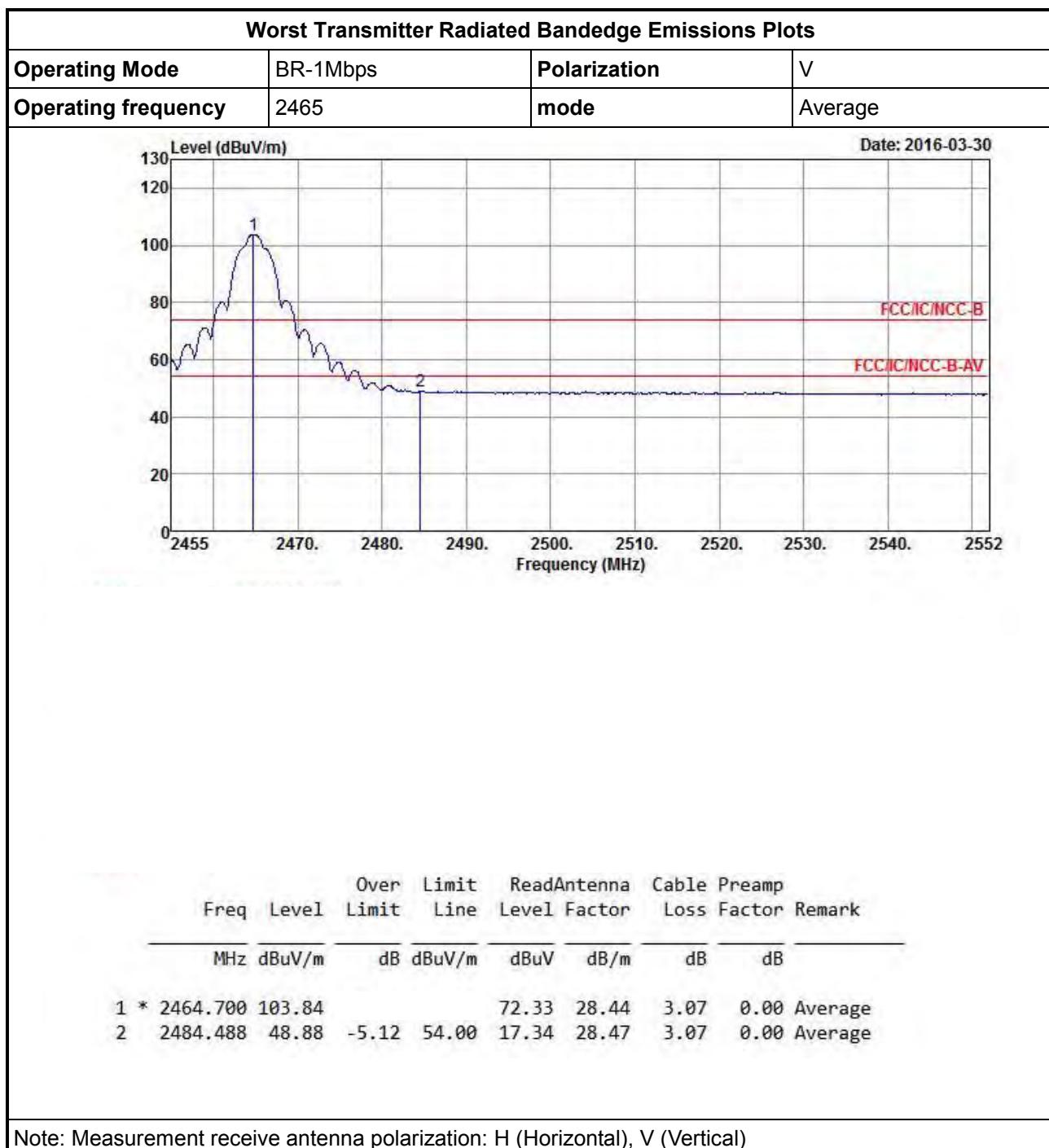
Note 2: Average emission setting: RBW=1MHz; VBW $\geq 1/T$, where T is "Pulse On Time", e.g., LE VBW $\geq 1/625$ us, VBW=3kHz.

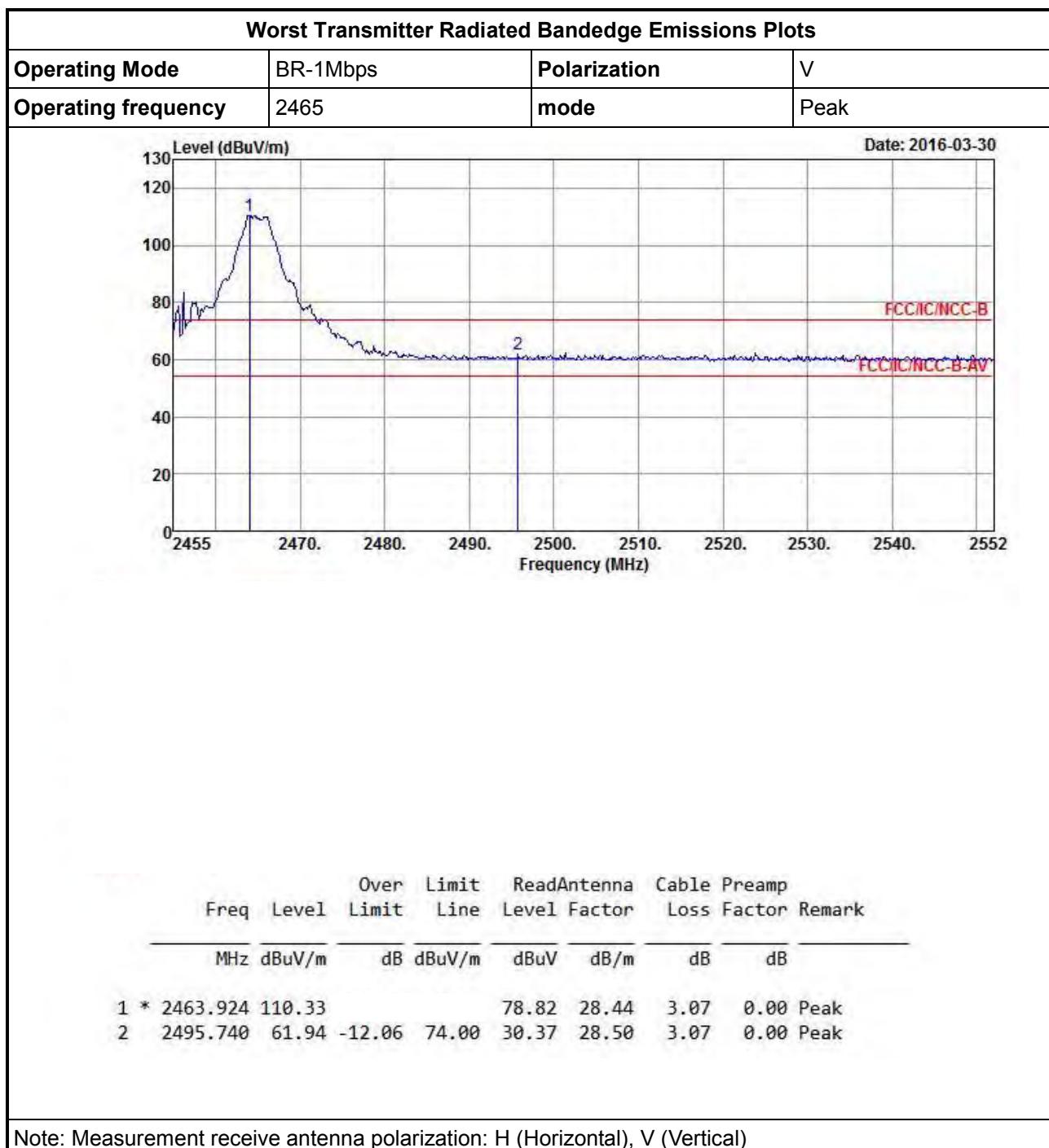




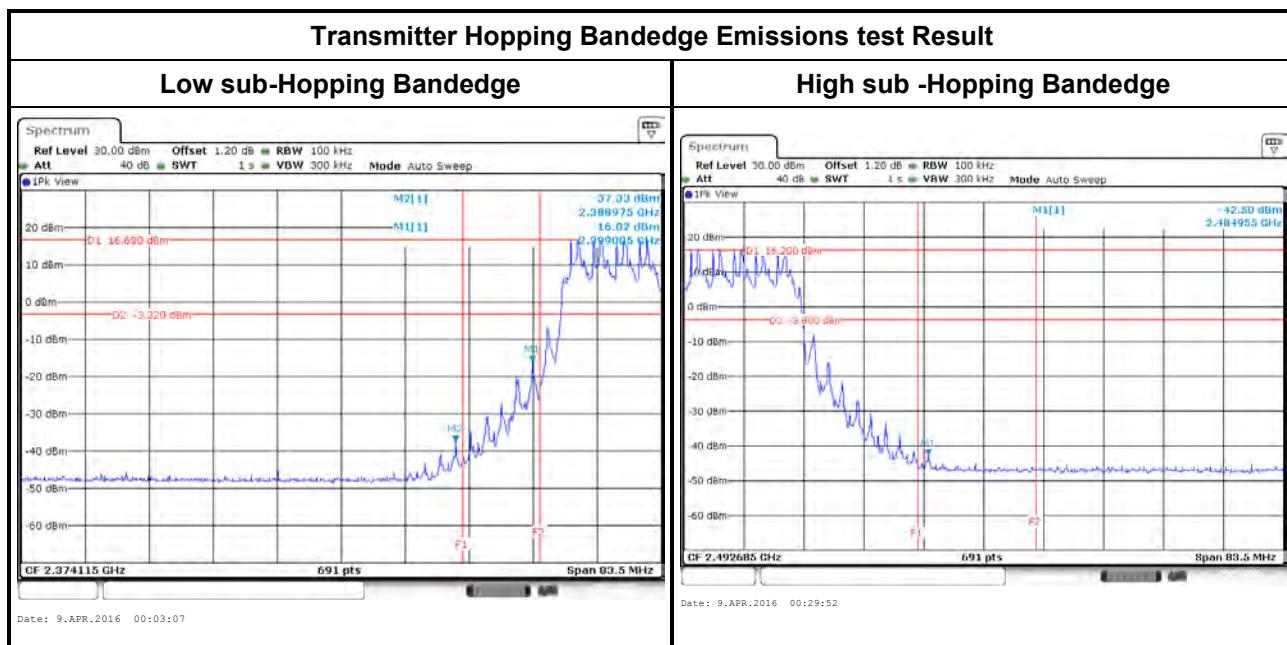
Worst Transmitter Radiated Bandedge Emissions Plots







3.6.6 Test Result of Transmitter Radiated Bandedge Emissions





3.7 Transmitter Radiated Unwanted Emissions

3.7.1 Transmitter Radiated Unwanted Emissions Limit

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

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

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

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

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

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

3.7.2 Measuring Instruments

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

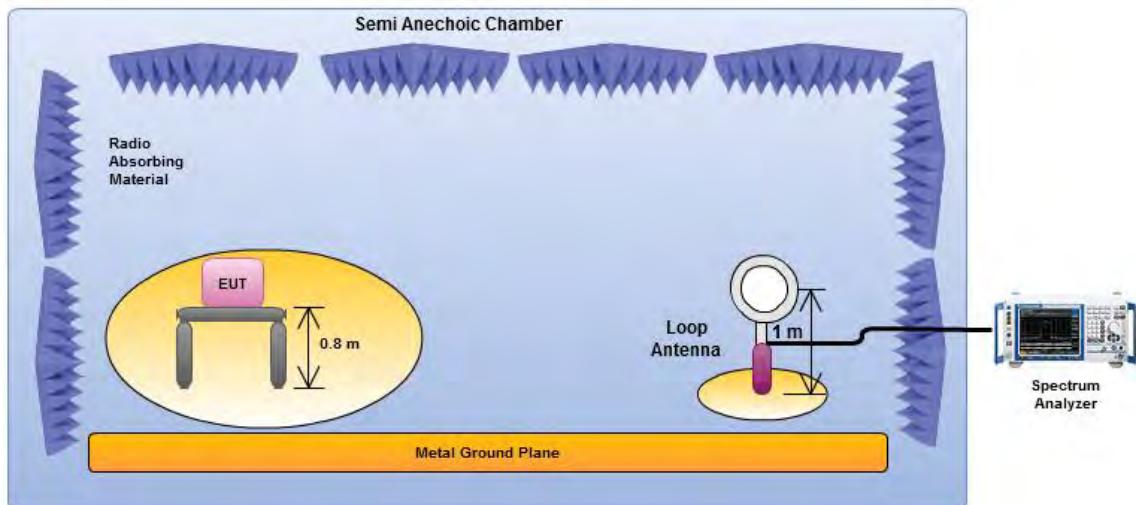


3.7.3 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
<input checked="" type="checkbox"/>	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 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 checked="" type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.3 (Reduced VBW). $\text{VBW} \geq 1/T$, 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 ANSI C63.10, clause 4.1.4.2.2 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 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 20 dB below the permissible value has no need to be reported.

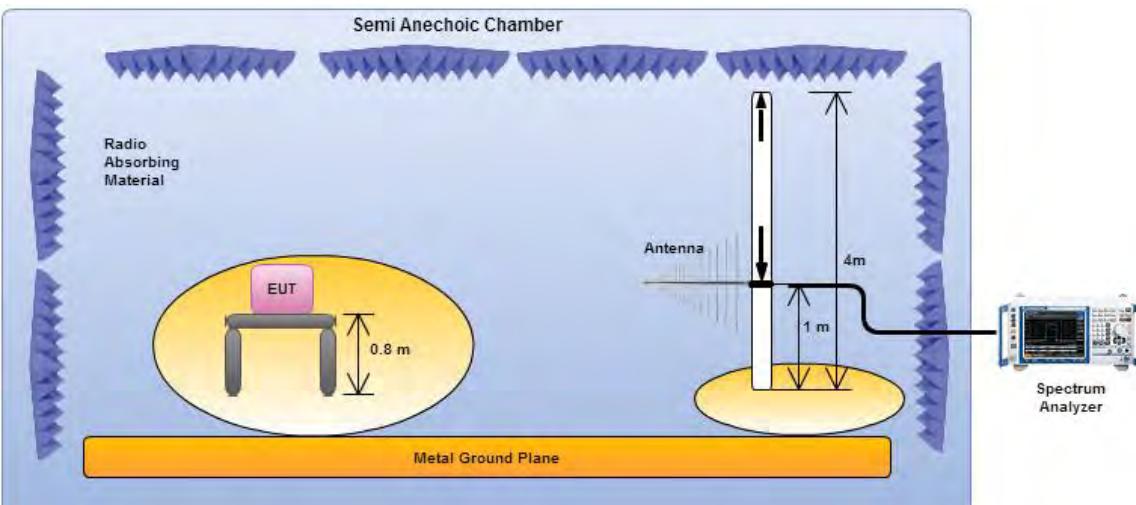
3.7.4 Test Setup

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



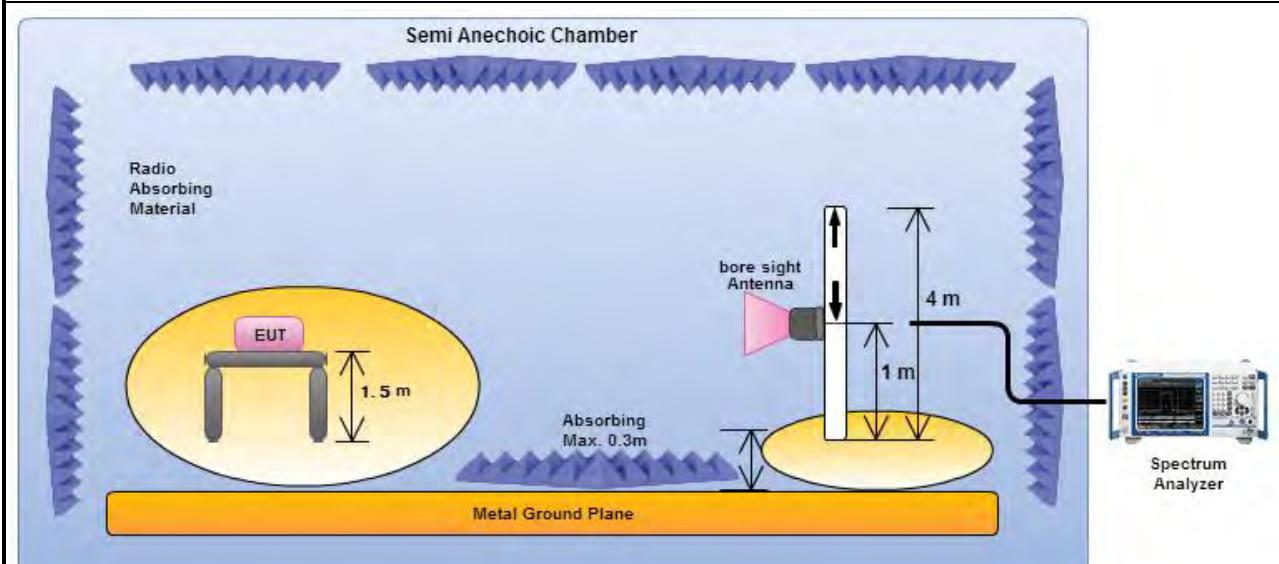
Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna.

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)

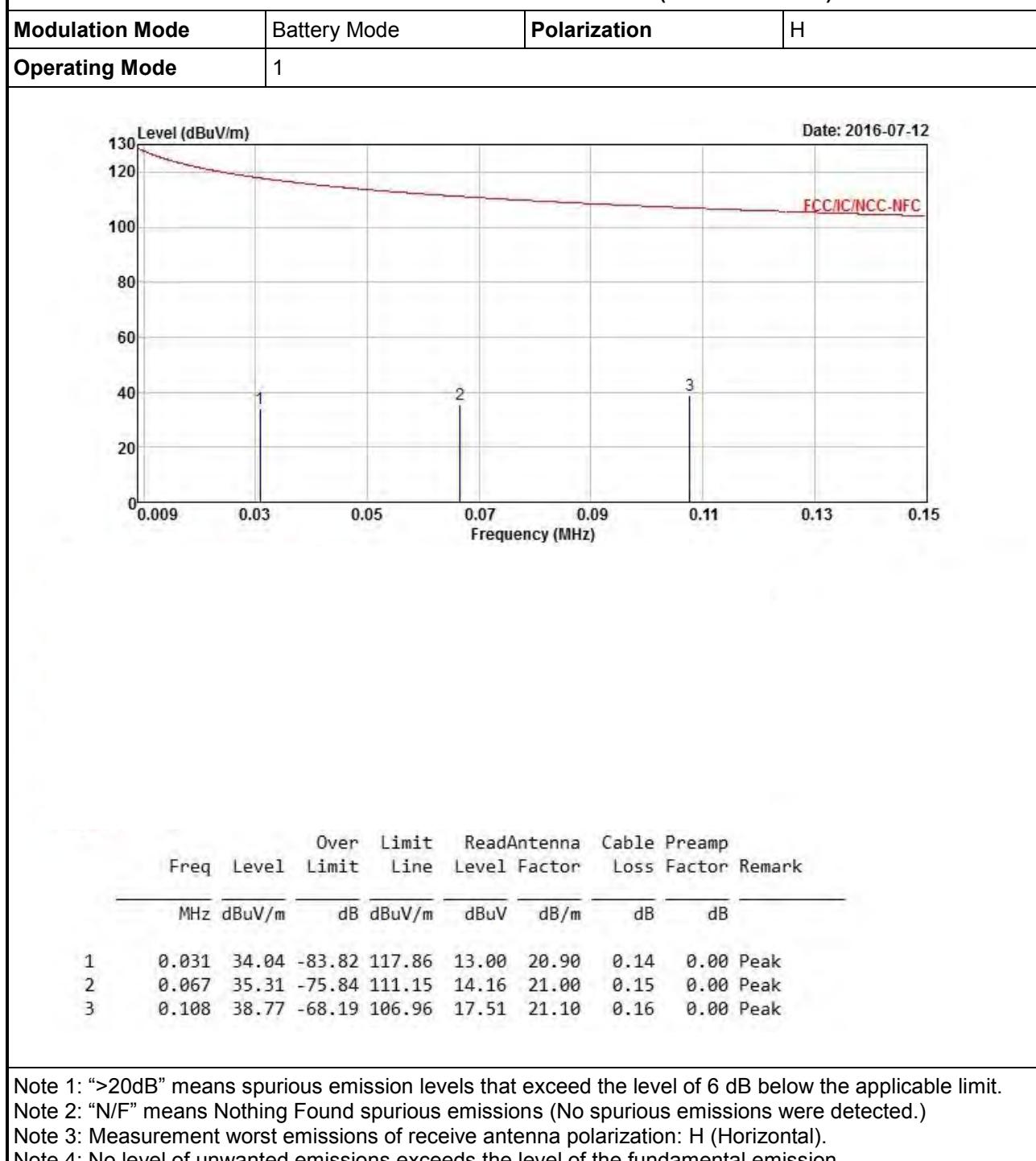


Electric field tests shall be performed in the frequency range of 1 GHz to 10th harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna.



3.7.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

Transmitter Radiated Unwanted Emissions (9 kHz – 150 kHz)





Transmitter Radiated Unwanted Emissions (150 kHz – 2 MHz)

Modulation Mode	Battery Mode	Polarization	H				
Operating Mode	1						
Over Limit ReadAntenna Cable Preamp							
Freq	Level	Limit	Line	Antenna	Cable	Preamp	
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	
1	0.601	47.84	-24.19	72.03	26.90	20.72	0.22
2	1.193	51.54	-14.53	66.07	30.52	20.74	0.28
3	1.508	44.36	-19.68	64.04	23.45	20.62	0.29
							0.00 Peak
							0.00 Peak
							0.00 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



Transmitter Radiated Unwanted Emissions (2 MHz – 8 MHz)

Modulation Mode	Battery Mode		Polarization		H					
Operating Mode	1									
Level (dBuV/m)								Date: 2016-07-12		
Freq	Level	Over Limit	Limit	Read	Antenna	Cable	Preamp			
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	Remark		
1	2.108	40.83	-28.71	69.54	20.11	20.41	0.31	0.00 Peak		
2	2.972	40.99	-28.55	69.54	20.54	20.11	0.34	0.00 Peak		
3	5.432	35.90	-33.64	69.54	14.58	20.94	0.38	0.00 Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

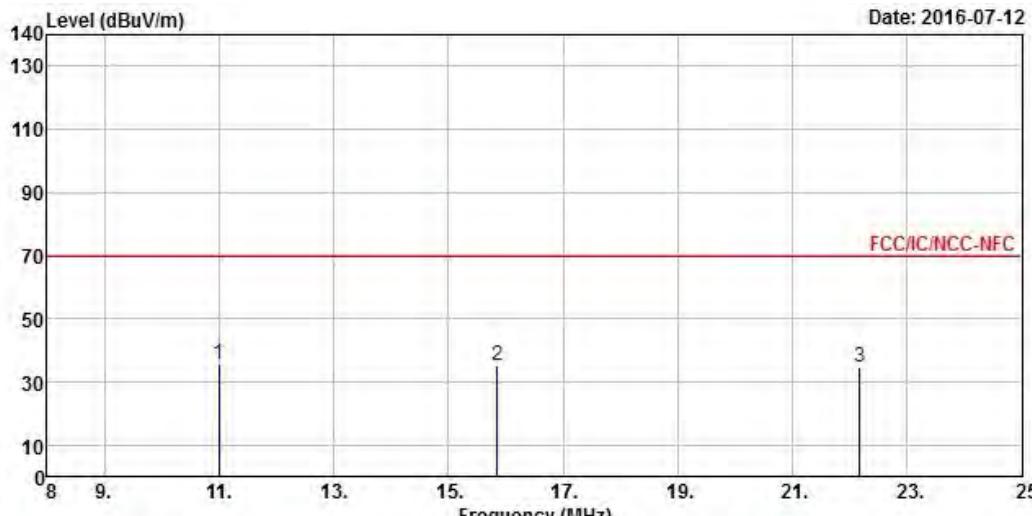
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



Transmitter Radiated Unwanted Emissions (8 MHz – 25 MHz)

Modulation Mode	Battery Mode		Polarization		H					
Operating Mode	1									
Level (dBuV/m)						Date: 2016-07-12				
						FCC/IC/NCC-NFC				
Freq	Level	Over Limit	Limit	Read	Antenna	Cable	Preamp			
	MHz	dBuV/m	dB	Line	Level	Factor	Loss	Factor	Remark	
1	10.992	35.86	-33.68	69.54	14.09	21.32	0.45	0.00	Peak	
2	15.854	35.10	-34.44	69.54	13.14	21.42	0.54	0.00	Peak	
3	22.178	34.66	-34.88	69.54	12.42	21.54	0.70	0.00	Peak	

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



Transmitter Radiated Unwanted Emissions (25 MHz – 30 MHz)

Modulation Mode	Battery Mode		Polarization		H				
Operating Mode	1								
Level (dBuV/m)						Date: 2016-07-12			
						FCC/IC/NCC-NFC			
1	25.470	34.11	-35.43	69.54	11.75	21.61	0.75	0.00	Peak
2	27.020	33.99	-35.55	69.54	11.59	21.64	0.76	0.00	Peak
3	28.800	33.73	-35.81	69.54	11.28	21.68	0.77	0.00	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

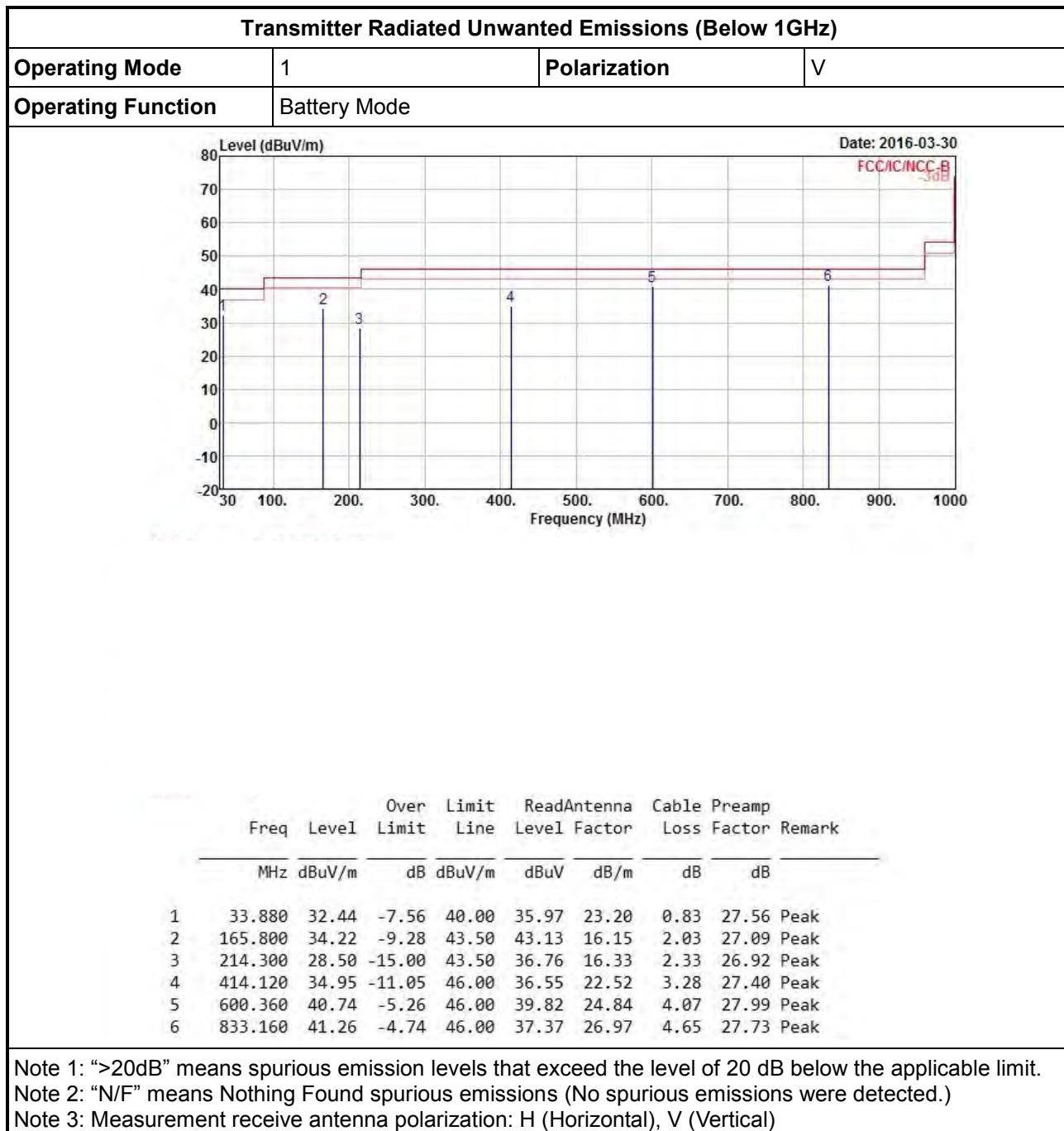
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

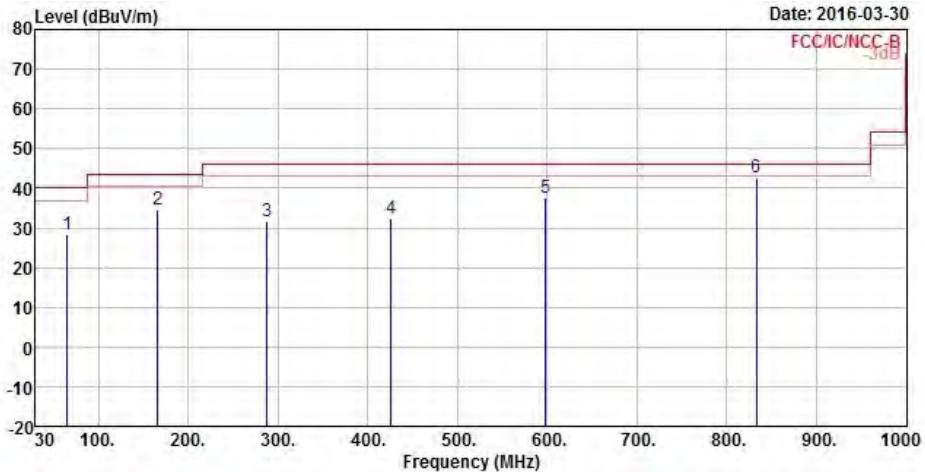


3.7.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)





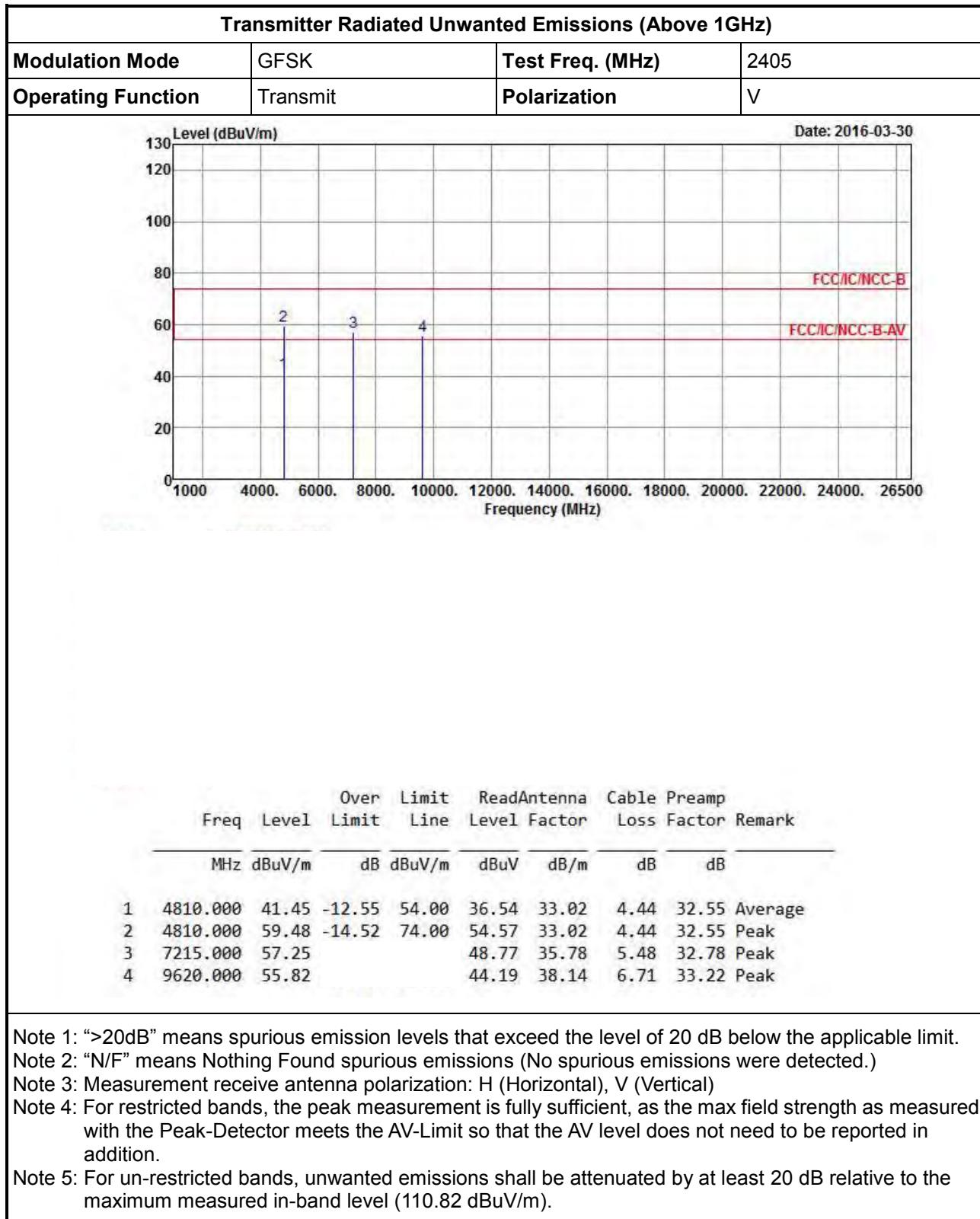
Transmitter Radiated Unwanted Emissions (Below 1GHz)

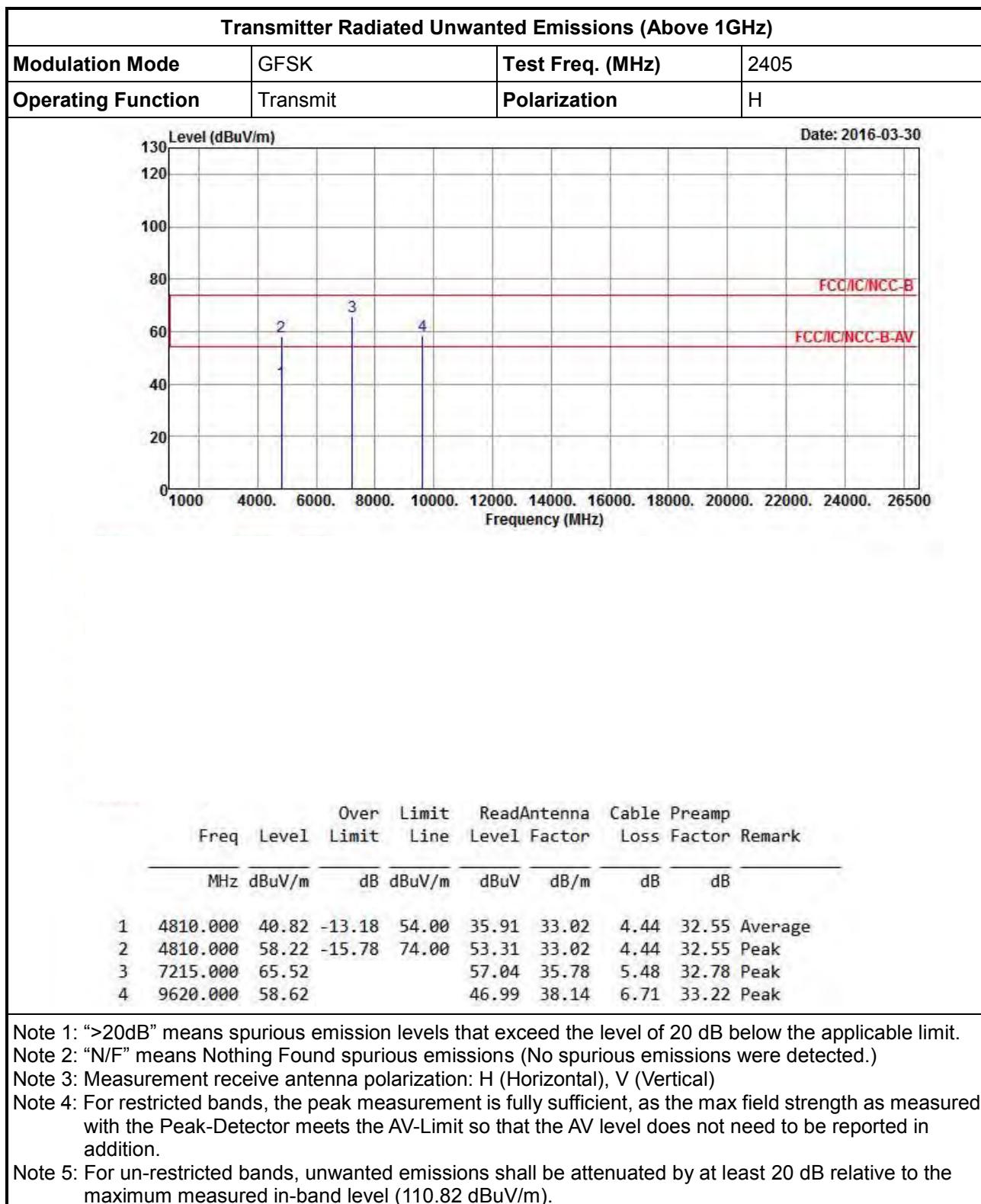
Operating Mode	1	Polarization	H																																																																																
Operating Function	Battery Mode																																																																																		
																																																																																			
<table><thead><tr><th></th><th>Freq</th><th>Level</th><th>Over Limit</th><th>Line</th><th>Read</th><th>Antenna</th><th>Cable</th><th>Preamp</th><th></th></tr><tr><th></th><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>Level</th><th>Factor</th><th>Loss</th><th>Factor</th><th>Remark</th></tr></thead><tbody><tr><td>1</td><td>64.920</td><td>28.52</td><td>-11.48</td><td>40.00</td><td>42.22</td><td>12.57</td><td>1.19</td><td>27.46</td><td>Peak</td></tr><tr><td>2</td><td>165.800</td><td>34.45</td><td>-9.05</td><td>43.50</td><td>43.36</td><td>16.15</td><td>2.03</td><td>27.09</td><td>Peak</td></tr><tr><td>3</td><td>288.020</td><td>31.65</td><td>-14.35</td><td>46.00</td><td>36.25</td><td>19.53</td><td>2.57</td><td>26.70</td><td>Peak</td></tr><tr><td>4</td><td>425.760</td><td>32.35</td><td>-13.65</td><td>46.00</td><td>33.84</td><td>22.65</td><td>3.32</td><td>27.46</td><td>Peak</td></tr><tr><td>5</td><td>598.420</td><td>37.60</td><td>-8.40</td><td>46.00</td><td>36.70</td><td>24.83</td><td>4.06</td><td>27.99</td><td>Peak</td></tr><tr><td>6</td><td>833.160</td><td>42.65</td><td>-3.35</td><td>46.00</td><td>38.76</td><td>26.97</td><td>4.65</td><td>27.73</td><td>Peak</td></tr></tbody></table>					Freq	Level	Over Limit	Line	Read	Antenna	Cable	Preamp			MHz	dBuV/m	dB	dBuV/m	Level	Factor	Loss	Factor	Remark	1	64.920	28.52	-11.48	40.00	42.22	12.57	1.19	27.46	Peak	2	165.800	34.45	-9.05	43.50	43.36	16.15	2.03	27.09	Peak	3	288.020	31.65	-14.35	46.00	36.25	19.53	2.57	26.70	Peak	4	425.760	32.35	-13.65	46.00	33.84	22.65	3.32	27.46	Peak	5	598.420	37.60	-8.40	46.00	36.70	24.83	4.06	27.99	Peak	6	833.160	42.65	-3.35	46.00	38.76	26.97	4.65	27.73	Peak
	Freq	Level	Over Limit	Line	Read	Antenna	Cable	Preamp																																																																											
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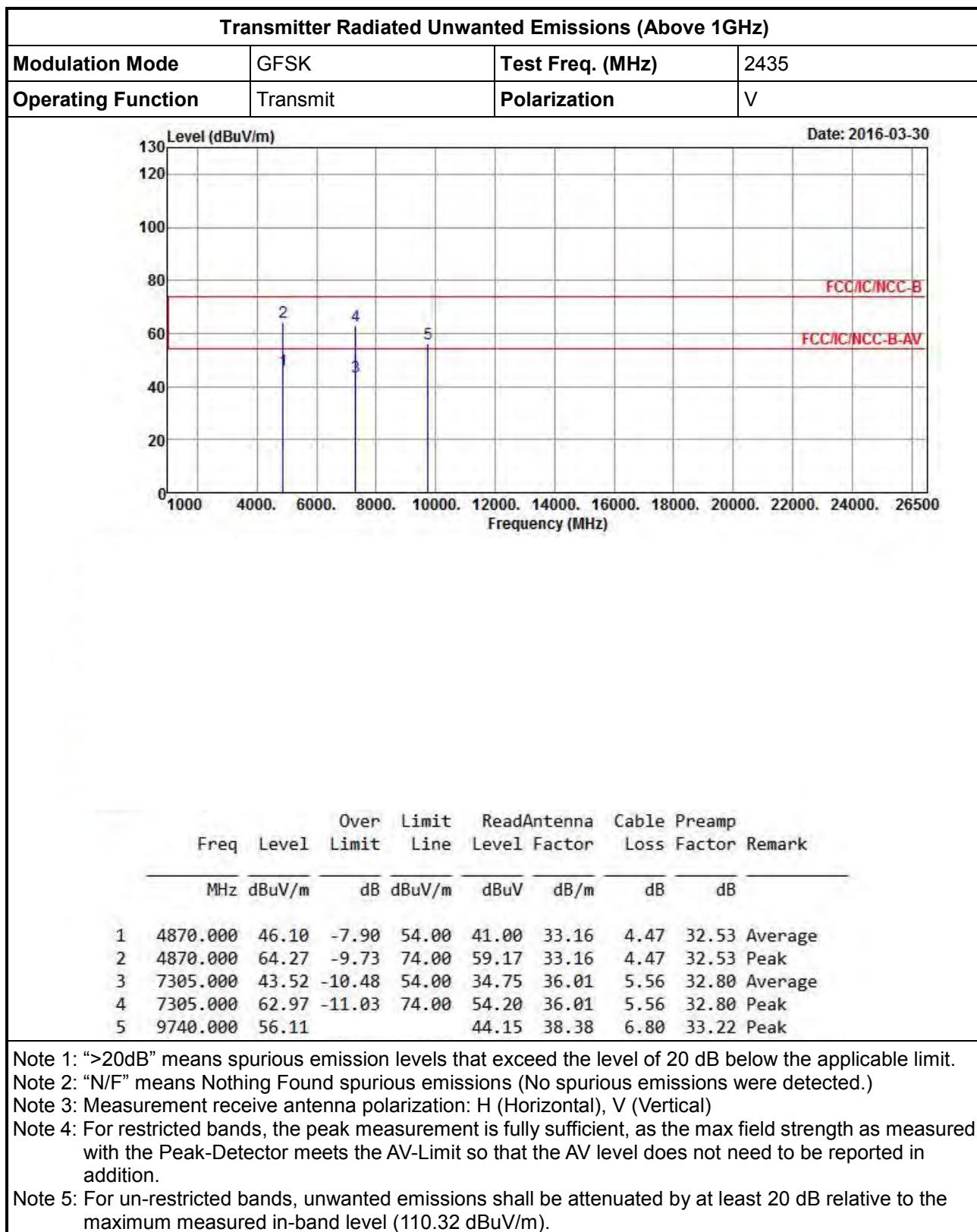
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

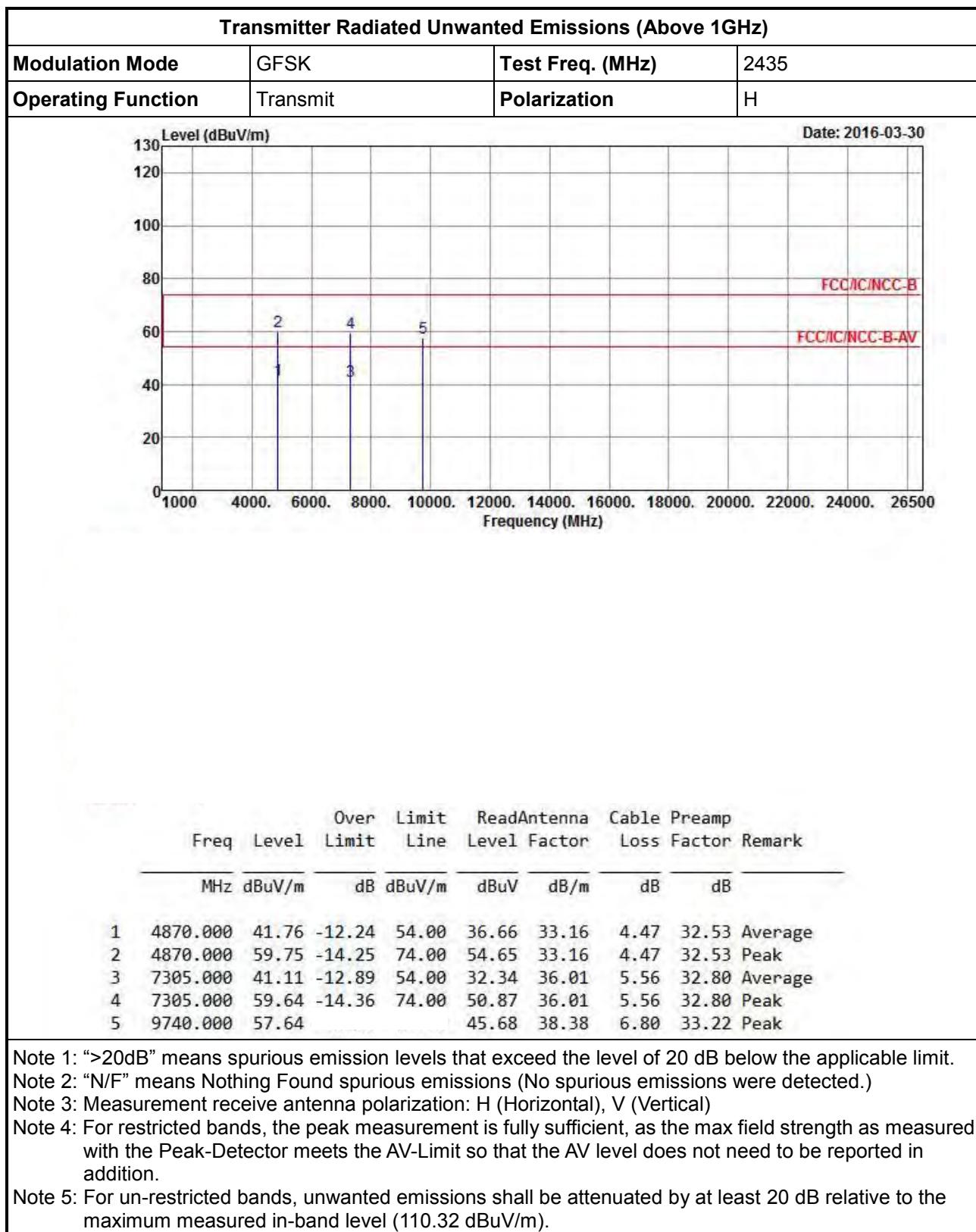


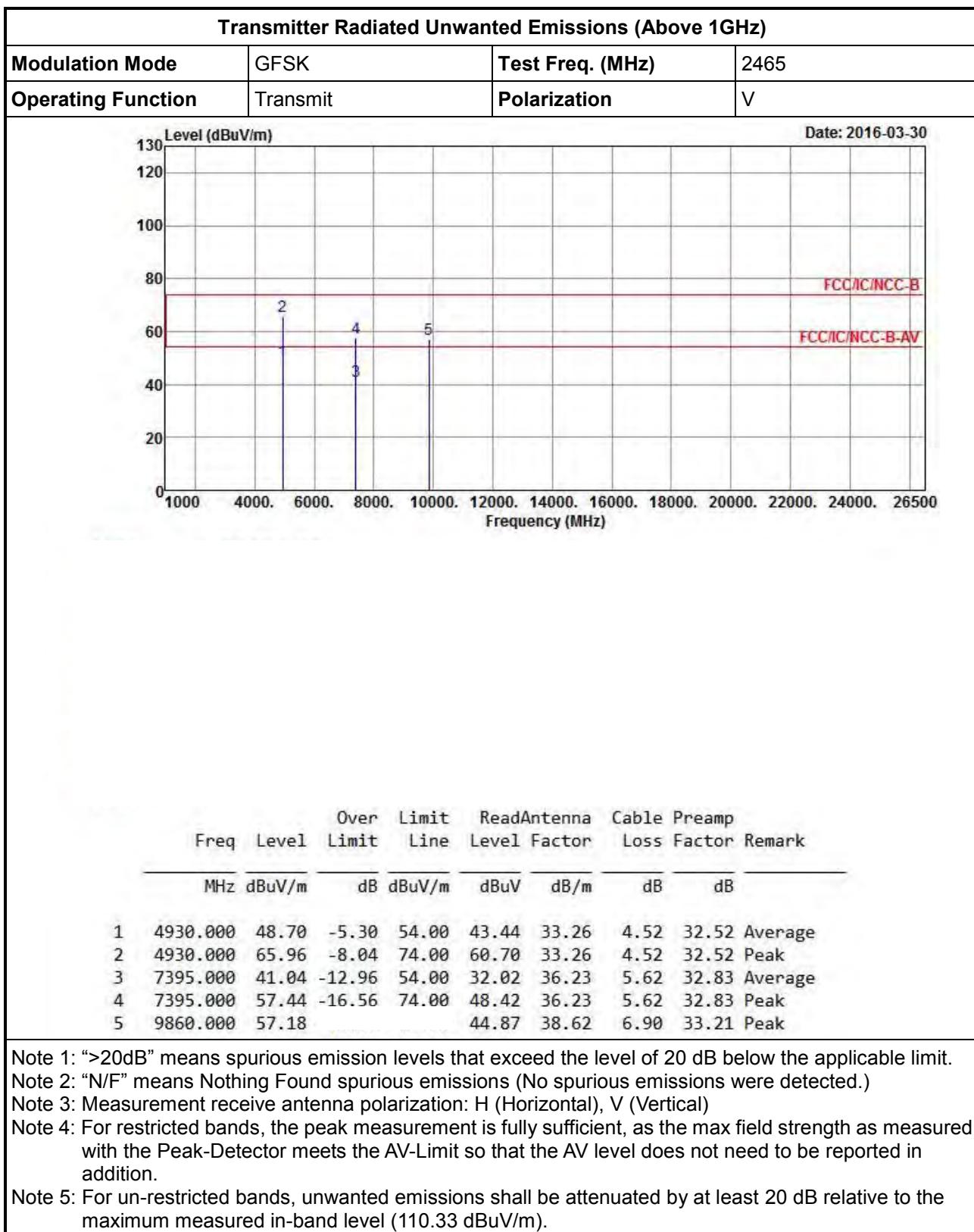
3.7.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)

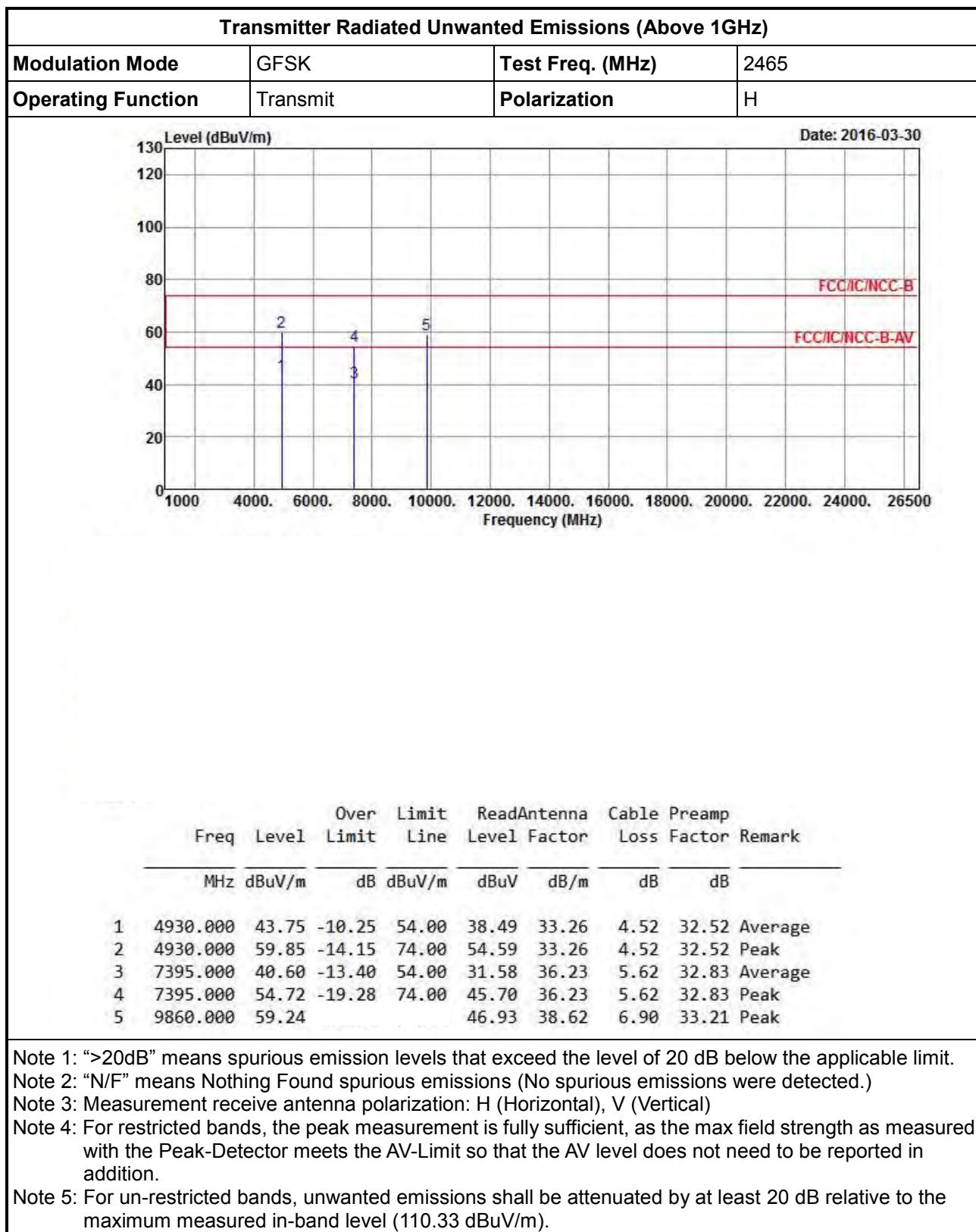














4 Test Equipment and Calibration Data

< AC Conduction >

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

< RF Conducted >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	9KHz~40GHz	Feb 16, 2016	Feb 15, 2017
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 28, 2015	Jul. 27, 2016
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	Feb. 04 ,2016	Feb. 03 ,2017
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	Feb. 04, 2016	Feb. 03, 2017

< Radiated Emission >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Nov. 28, 2015	Nov. 27, 2016
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz ~ 18GHz 3m	Dec. 16, 2015	Dec. 15, 2016
Amplifier	HP	8447D	2944A11149	10kHz ~ 1.3GHz	Jul 24, 2015	Jul 23, 2016
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	Sep. 02, 2015	Sep. 01, 2016
Spectrum	R&S	FSV40	101513	9kHz ~ 40GHz	Feb. 16, 2016	Feb. 15, 2017
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 18, 2015	Sep. 17, 2016
Horn Antenna	ETS • LINDGREN	3115	6741	1GHz ~ 18GHz	Jul. 15, 2015	Jul. 14, 2016
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz ~ 40GHz	Jan. 29, 2016	Jan. 28, 2017

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	Feb.02.2015	Feb.01.2017