

FCC Test Report

Equipment : Wireless Controller
Brand Name : Wacom
Model No. : EKR-100
FCC ID : HV4EKR100-1
Standard : 47 CFR FCC Part 15.249
Operating Band : 2400 MHz – 2483.5 MHz
FCC Classification : DXX
Applicant : Wacom Co., Ltd.
Manufacturer : 2-510-1 Toyonodai, Kazo-shi,
Saitama 349-1148, Japan

The product sample received on Oct. 16, 2014 and completely tested on Feb. 06, 2015. 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:



Vic Hsiao / Supervisor





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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]: 17.290MHz 42.46 (Margin 17.54dB) - QP 36.99 (Margin 13.01dB) - AV	FCC 15.207	Complied
3.2	15.215(c)	Emission Bandwidth	2.1708 MHz; fall in band	Information only	Complied
3.3	15.249(a)	Fundamental Emissions	[dBuV/m at 3m]: 77.62 (Margin 16.38dB) average	[dBuV/m at 3m]: average: 94	Complied
3.4	15.249(a)/(d)	Transmitter Radiated Unwanted Emissions	[dBuV/m at 3m]:134.760 MHz 39.77 (Margin 3.73 dB) - PK	Harmonics: 54 dBuV/m@3m Other band: 50 dB or FCC 15.209, whichever is the lesser attenuation.	Complied



Revision History

Report No.	Version	Description	Issued Date
FR4O0730	Rev. 01	Initial issue of report	Dec. 16, 2014
FR4O0730-01	Rev. 01	Product modification Refer to 1.1.4	Feb. 26, 2015



1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information				
Frequency Range (MHz)	Modulation	Ch. Frequency (MHz)	Channel Number	Fundamental Field Strength (dBuV/m)
2400-2483.5	GFSK	2402~2478	77	77.62

Note 1: Field strength performed average level at 3m.

1.1.2 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input type="checkbox"/>	External antenna (dedicated antennas) ; Unique antenna connector

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 Miscellaneous changes

Product Modifications	
No.	Description
1	Change an antenna
2	Add a SMD (0.33Ω) and a 1/2w resistor
3	Change of C31 & C32 location
4	Change of U3 location from SOT-23-5 LN2054 to SOP-8 XT2055
5	Change of Q3(NPN Transistor), SMD 0603 R61 · SMD 0603 R32 location
6	Removed D1 & D2 (LED)

1.1.5 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)	Duty Cycle Correction Factor [dB] = (20 log x)
<input checked="" type="checkbox"/> 45.94%	6.76
If worst duty < 100%, average emission = peak emission + 20 log x	

1.1.6 EUT Operational Condition

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

1.2 Accessories and Support Equipment

Accessories Information				
Li-ion Battery	Brand Name	Shenzhen Highest Electronic	Model Name	274462P
	Power Rating	3.7V --- 780mAh		
USB Cable	Brand Name	Wacom	Model Name	STJ-A347
	Signal Line	0.3 meter, non-shielded cable		

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

Support Equipment - AC Conduction and Radiated Emission			
Equipment	Brand Name	Model Name	FCC ID
Notebook	DELL	E5530	DoC

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

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: FCC 636805					
Test Condition	Test Site No.	Test Engineer	Test Environment		
AC Conduction	CO04-HY	Zeus	22°C / 43%		
RF Conducted	TH01-HY	Ian	23.4°C / 62%		
Radiated Emission	03CH03-HY	Daniel	22°C / 54%		

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	Limit
AC power-line conducted emissions		±2.2 dB	N/A
Emission bandwidth,		±1.4 %	N/A
Unwanted emissions, conducted	30 – 1000 MHz	±0.5 dB	N/A
	1 – 18 GHz	±0.6 dB	N/A
	18 – 40 GHz	±0.8 dB	N/A
	40 – 200 GHz	N/A	N/A
All emissions, radiated	30 – 1000 MHz	±2.5 dB	N/A
	1 – 18 GHz	±3.5 dB	N/A
	18 – 40 GHz	±3.8 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		±1.4 %	N/A
Duty Cycle		±1.4 %	N/A

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration




Modulation Used for Conformance Testing	
Test Mode	Field Strength (dBuV/m at 3 m)
GFSK-Transmit	77.62

2.2 Test Channel Frequencies Configuration

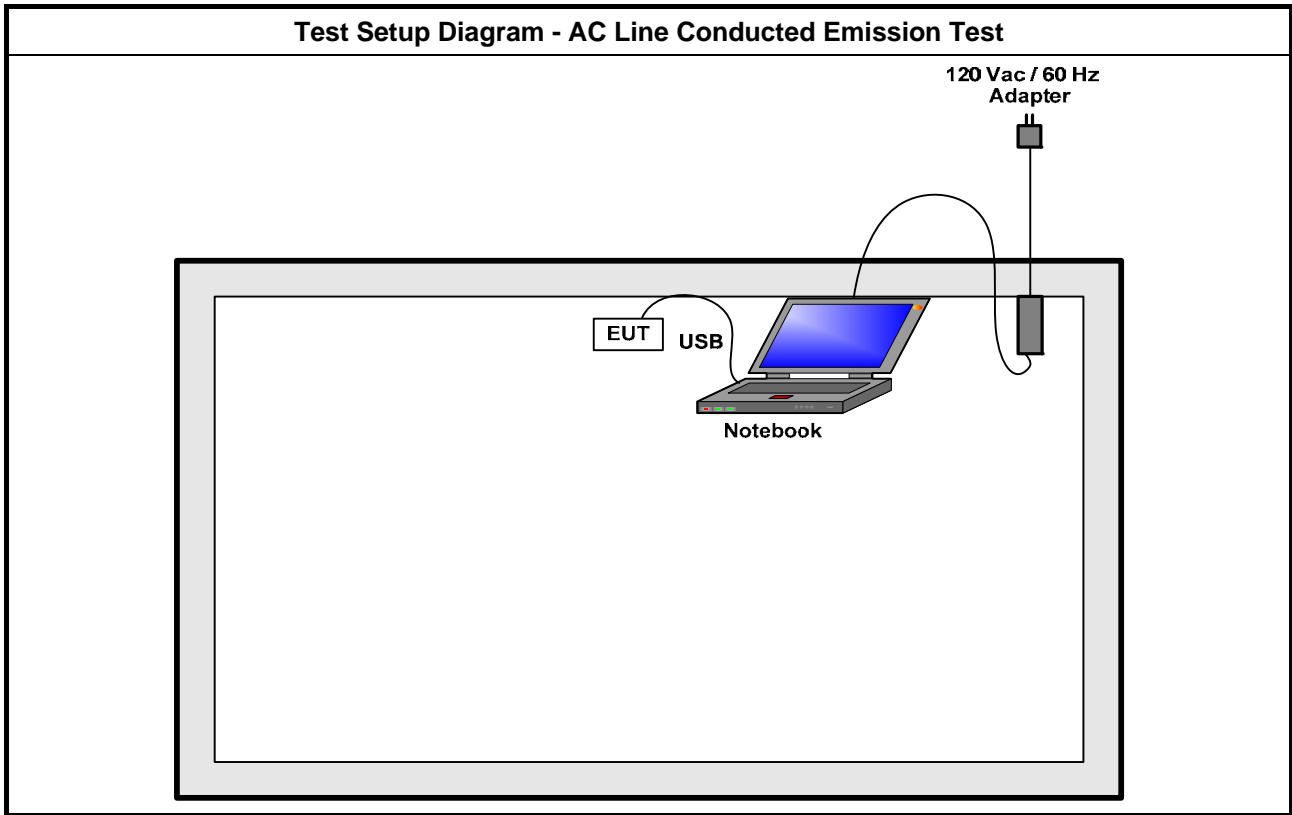
Test Channel Frequencies Configuration	
Test Mode	Test Channel Frequencies (MHz)
GFSK-Transmit	2402, 2445, 2478

2.3 The Worst Case Measurement Configuration

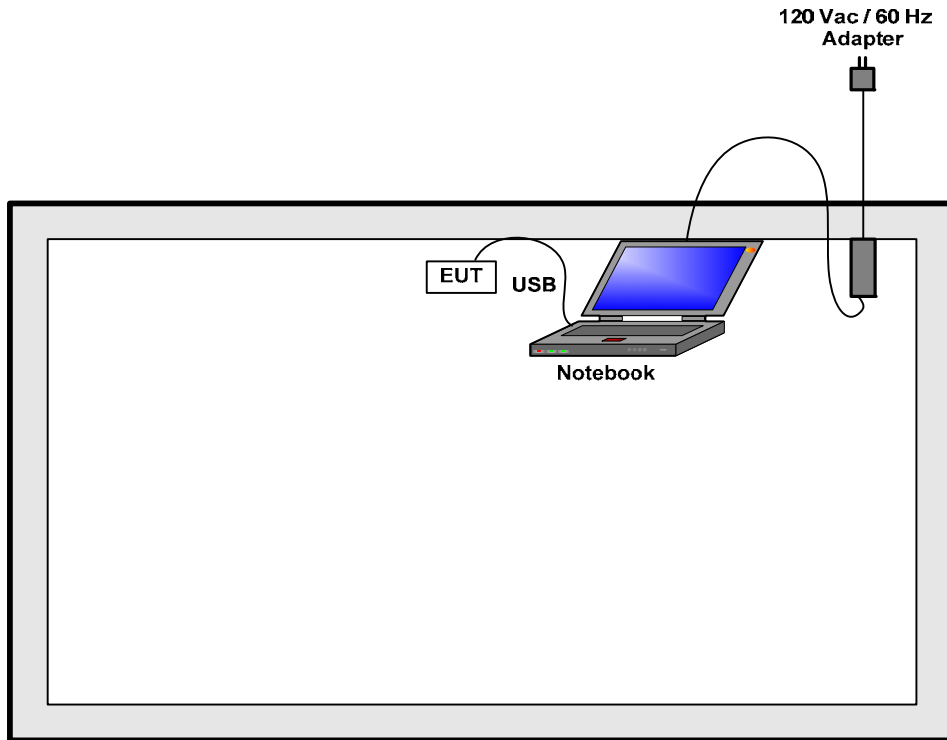
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	Power from Host & Radio link

The Worst Case Mode for Following Conformance Tests			
Tests Item		Emission Bandwidth, Fundamental Emissions, Radiated Unwanted Emissions	
Test Condition		Radiated measurement	
User Position		<input type="checkbox"/> EUT will be placed in fixed position.	
X Plane	Y Plane	Z Plane	<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. EUT shall be performed three orthogonal planes. The worst planes is Y.
Operating Mode		Operating Mode Description	
		Transmitter Mode	
Modulation Mode		GFSK-Transmit	

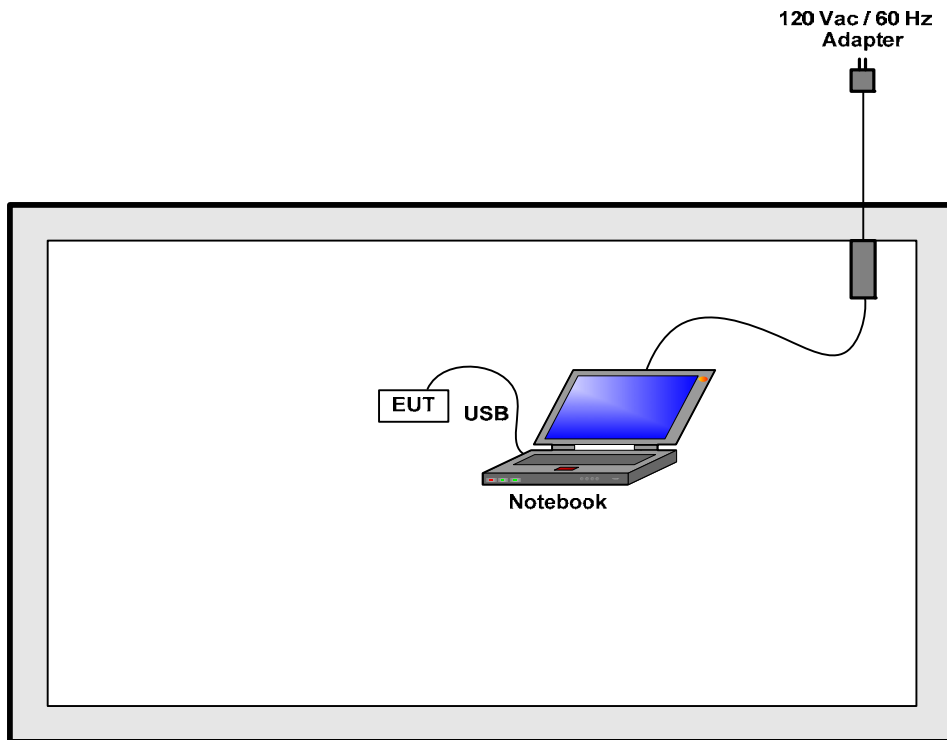
2.4 Test Setup Diagram



Test Setup Diagram - Radiated Below 1GHz Test



Test Setup Diagram - Radiated Above 1GHz 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.

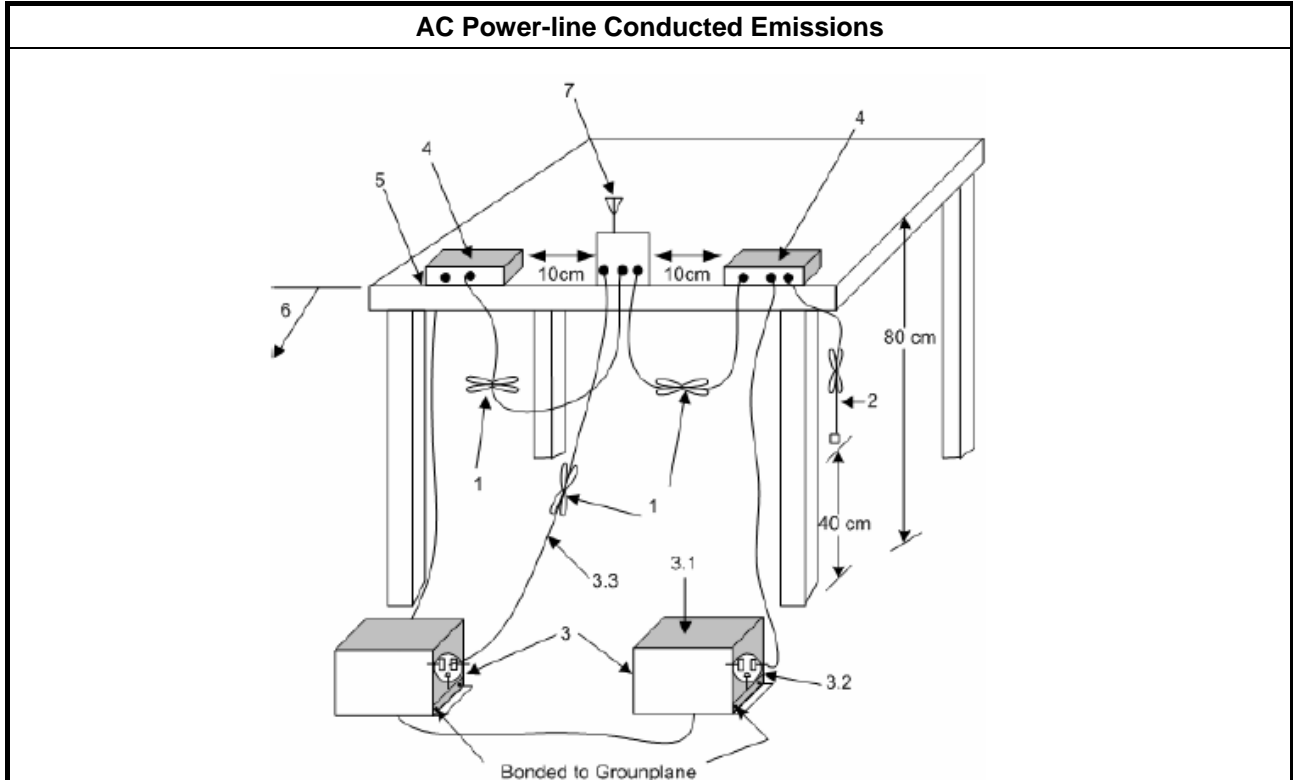
3.1.2 Measuring Instruments

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

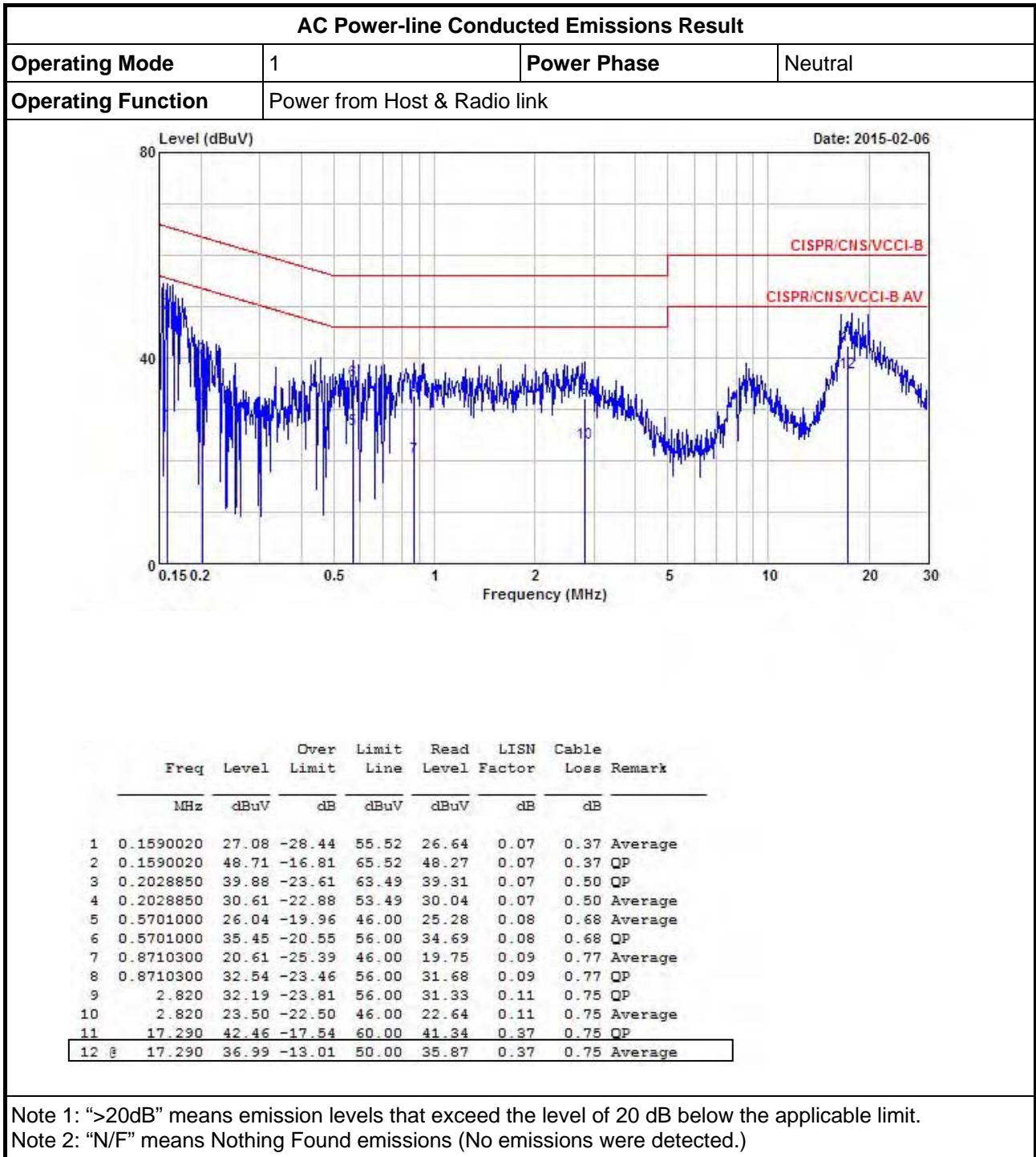
3.1.3 Test Procedures

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

3.1.4 Test Setup



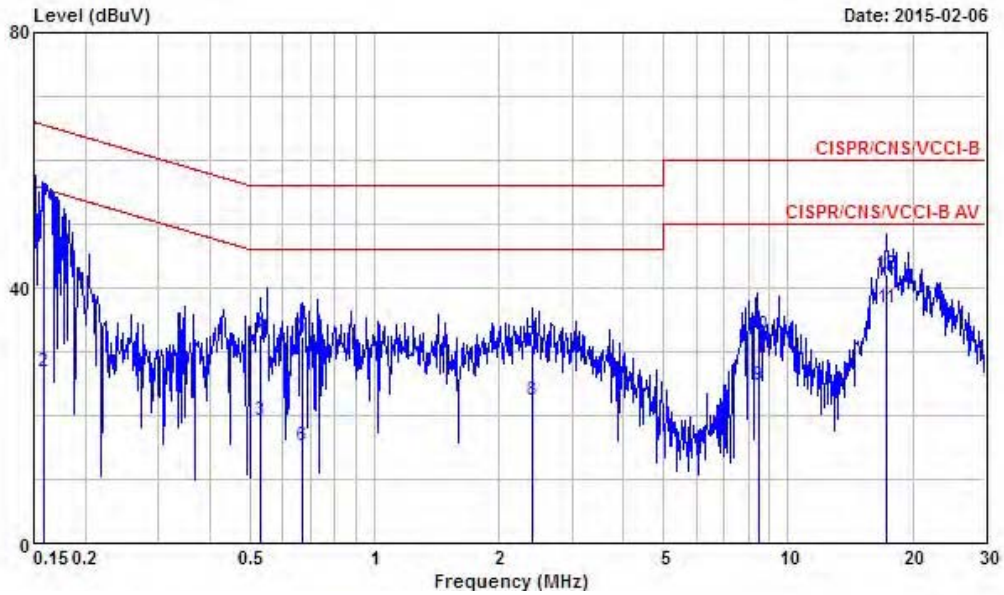
3.1.5 Test Result of AC Power-line Conducted Emissions





AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Power from Host & Radio link		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.1590020	50.24	-15.28	65.52	49.82	0.05	0.37	QP
2	0.1590020	26.79	-28.73	55.52	26.37	0.05	0.37	Average
3	0.5293420	19.27	-26.73	46.00	18.54	0.07	0.66	Average
4	0.5293420	32.52	-23.48	56.00	31.79	0.07	0.66	QP
5	0.6718660	32.40	-23.60	56.00	31.61	0.08	0.71	QP
6	0.6718660	15.30	-30.70	46.00	14.51	0.08	0.71	Average
7	2.410	31.04	-24.96	56.00	30.16	0.11	0.77	QP
8	2.410	22.41	-23.59	46.00	21.53	0.11	0.77	Average
9	8.460	24.76	-25.24	50.00	23.77	0.21	0.78	Average
10	8.460	32.70	-27.30	60.00	31.71	0.21	0.78	QP
11	17.290	36.81	-13.19	50.00	35.73	0.33	0.75	Average
12	17.290	42.12	-17.88	60.00	41.04	0.33	0.75	QP

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 Emission Bandwidth

3.2.1 Emission Bandwidth Limit

Emission Bandwidth Limit
<input checked="" type="checkbox"/> Emission bandwidth falls completely within authorized band.

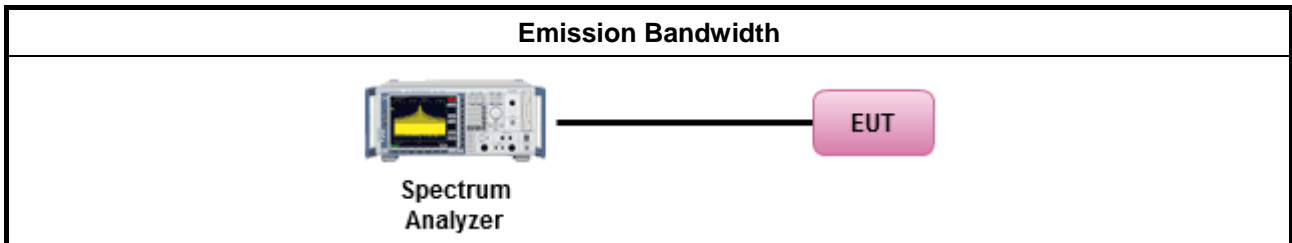
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

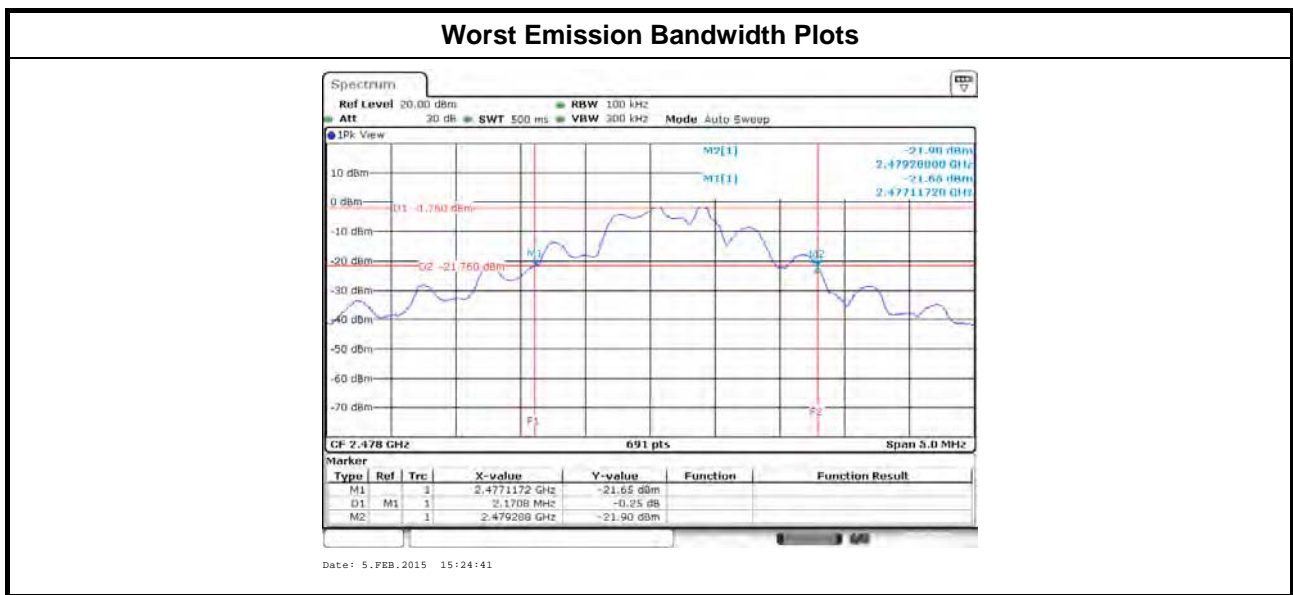
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.9.2 for 20 dB emission bandwidth and 99% occupied bandwidth measurement.

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Emission Bandwidth Result					
Modulation Mode	Frequency (MHz)	20dB BW (MHz)	99% Bandwidth (MHz)	F _L at 20dB BW (MHz)	F _H at 20dB BW (MHz)
GFSK-Transmit	2402	1.8958	1.7366	2401.0955	-
GFSK-Transmit	2445	2.1563	2.0767	-	-
GFSK-Transmit	2478	2.1708	2.1635	-	2479.2880
Limit		N/A	N/A	2400	2483.5
Result		Complied			



3.3 Fundamental Emissions

3.3.1 Fundamental Emissions Limit

Fundamental Emissions E-Field Strength Limit (3m)	
<input type="checkbox"/>	902-928 MHz Band: 94 dBuV/m (quasi peak)
<input checked="" type="checkbox"/>	2400-2483.5 MHz Band: 94 dBuV/m (average)
<input type="checkbox"/>	5725-5785 MHz Band: 94 dBuV/m (average)

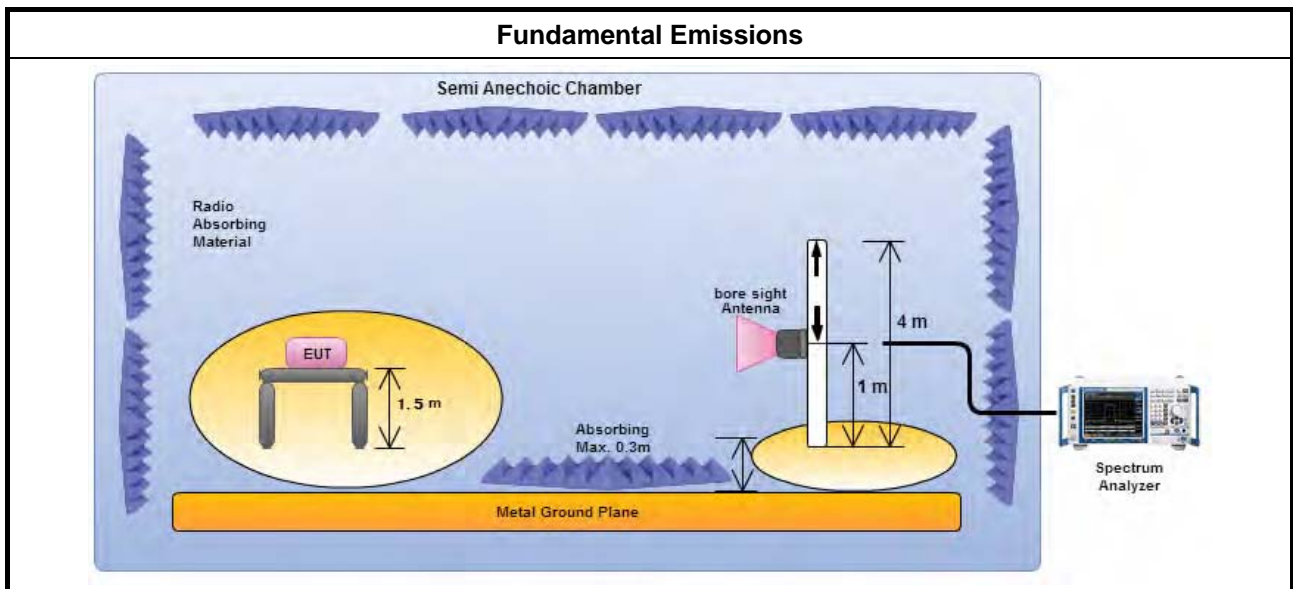
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \leq 100 or by duty cycle correction factor].
<input checked="" type="checkbox"/>	For the transmitter emissions shall be measured using following options below:
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.1.2.3 (Reduced VBW) – Duty cycle \geq 100%.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions. Adjusted by a “duty cycle correction factor”, derived from $20\log(\text{dwell time}/100 \text{ ms})$. Average emission = peak emission + 20 log (duty cycle).
<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, refer as ANSI C63.10, clause 6.6 for radiated emissions

3.3.4 Test Setup





3.3.5 Test Result of Fundamental Emissions

Field Strength of Fundamental Emissions Result					
Modulation Mode	Frequency (MHz)	Fundamental (dBuV/m)@3m	Margin (dB)	Limit (dBuV/m)@3m	Type
GFSK-Transmit	2402	84.38	29.62	114	peak
GFSK-Transmit	2402	77.62	16.38	94	average
GFSK-Transmit	2445	83.44	83.44	114	peak
GFSK-Transmit	2445	76.68	17.32	94	average
GFSK-Transmit	2478	82.01	31.99	114	peak
GFSK-Transmit	2478	75.25	18.75	94	average
Result		Complied			
Note 1: Measurement worst emissions of receive antenna polarization: Vertical.					
Note 2: If duty cycle < 100%, average emission = peak emission + 20 log (duty cycle).					



3.4 Transmitter Radiated Unwanted Emissions

3.4.1 Transmitter Radiated Unwanted Emissions Limit

Transmitter Radiated Unwanted Emissions Limit	
Harmonics:	
<input checked="" type="checkbox"/>	54 dBuV/m (average)
Other Unwanted Emissions:	
<input checked="" type="checkbox"/>	50 dB below the level of the fundamental or FCC 15.209, whichever is the lesser attenuation.

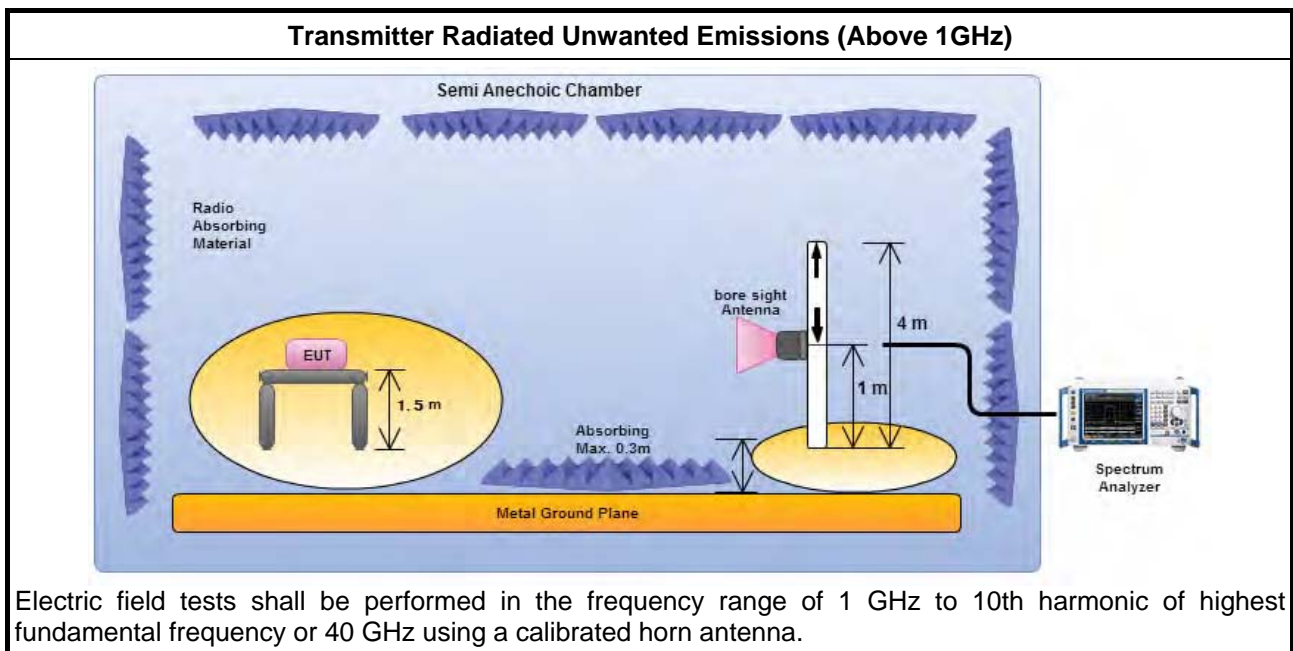
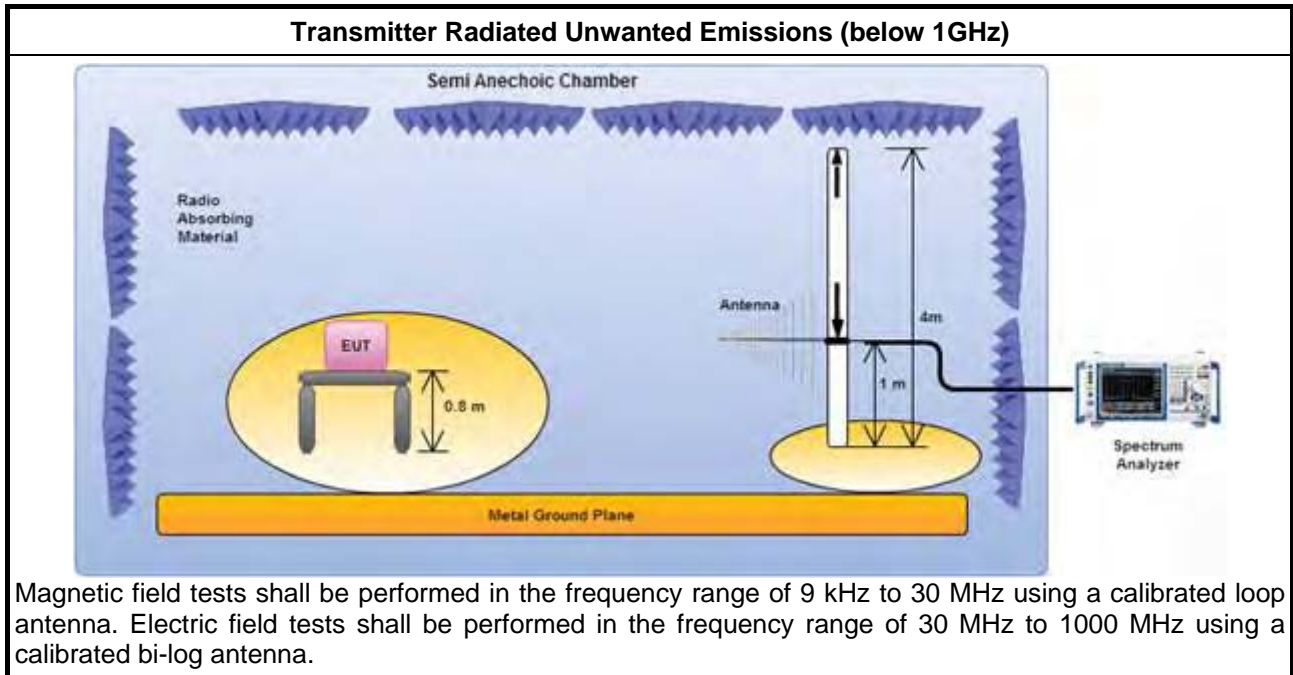
3.4.2 Measuring Instruments

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

3.4.3 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"/>	Refer as ANSI C63.10, clause 6.10.3 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 type="checkbox"/>	Refer as ANSI C63.10, clause 4.1.2.3 (Reduced VBW) – Duty cycle \geq 100%.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions. Adjusted by a “duty cycle correction factor”, derived from $20\log(\text{dwell time}/100 \text{ ms})$. Average emission = peak emission + 20 log (duty cycle).
<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 for marker-delta method for band-edge measurements.
<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 6.6 for radiated emissions from above 1 GHz.

3.4.4 Test Setup



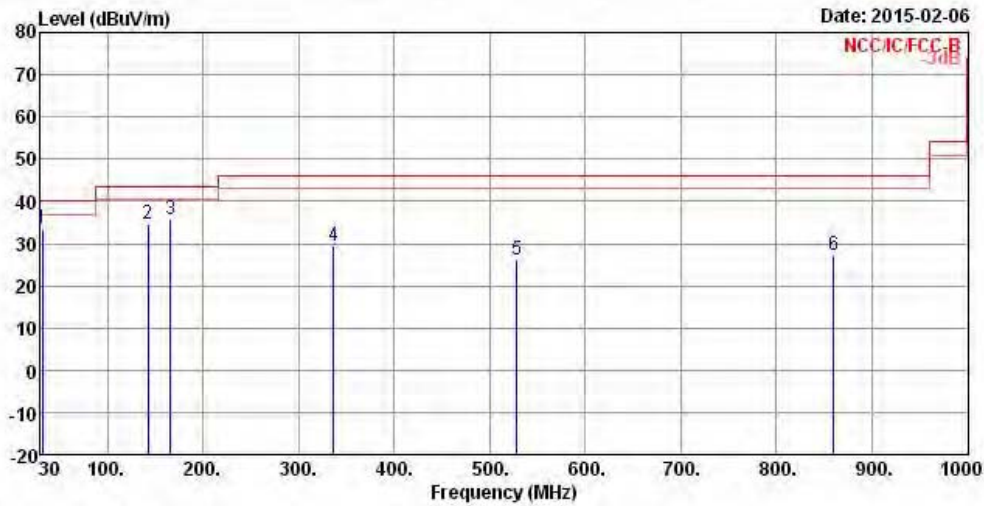
3.4.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

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



3.4.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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



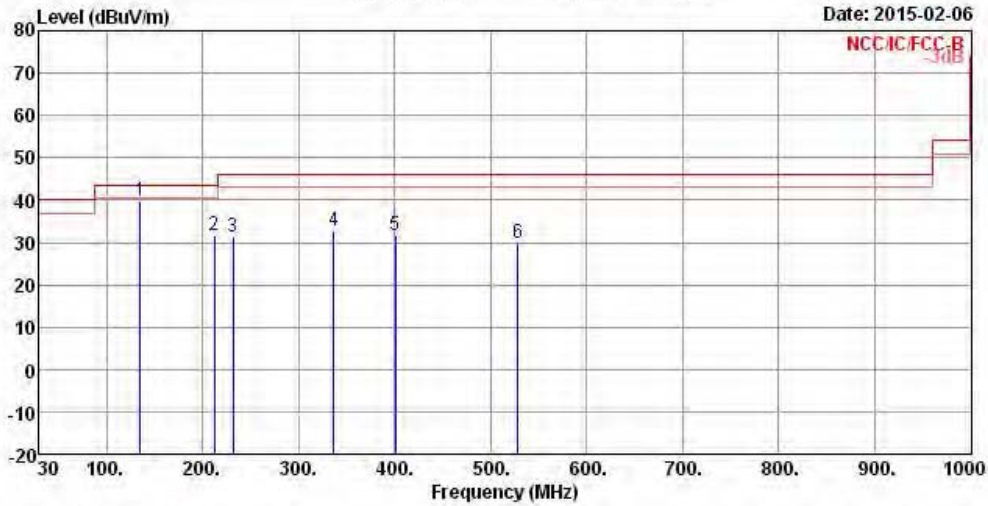
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	31.940	33.65	-6.35	40.00	43.23	16.90	0.87	27.35	Peak	---	---
2	142.520	34.79	-8.71	43.50	49.15	10.82	1.98	27.16	Peak	---	---
3	165.800	35.61	-7.89	43.50	51.13	9.51	2.12	27.15	Peak	---	---
4	336.520	29.39	-16.61	46.00	39.75	13.49	3.06	26.91	Peak	---	---
5	528.580	26.18	-19.82	46.00	32.75	17.48	3.86	27.91	Peak	---	---
6	860.320	27.40	-18.60	46.00	29.82	20.02	4.98	27.42	Peak	---	---

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



Transmitter Radiated Unwanted Emissions (Below 1GHz)

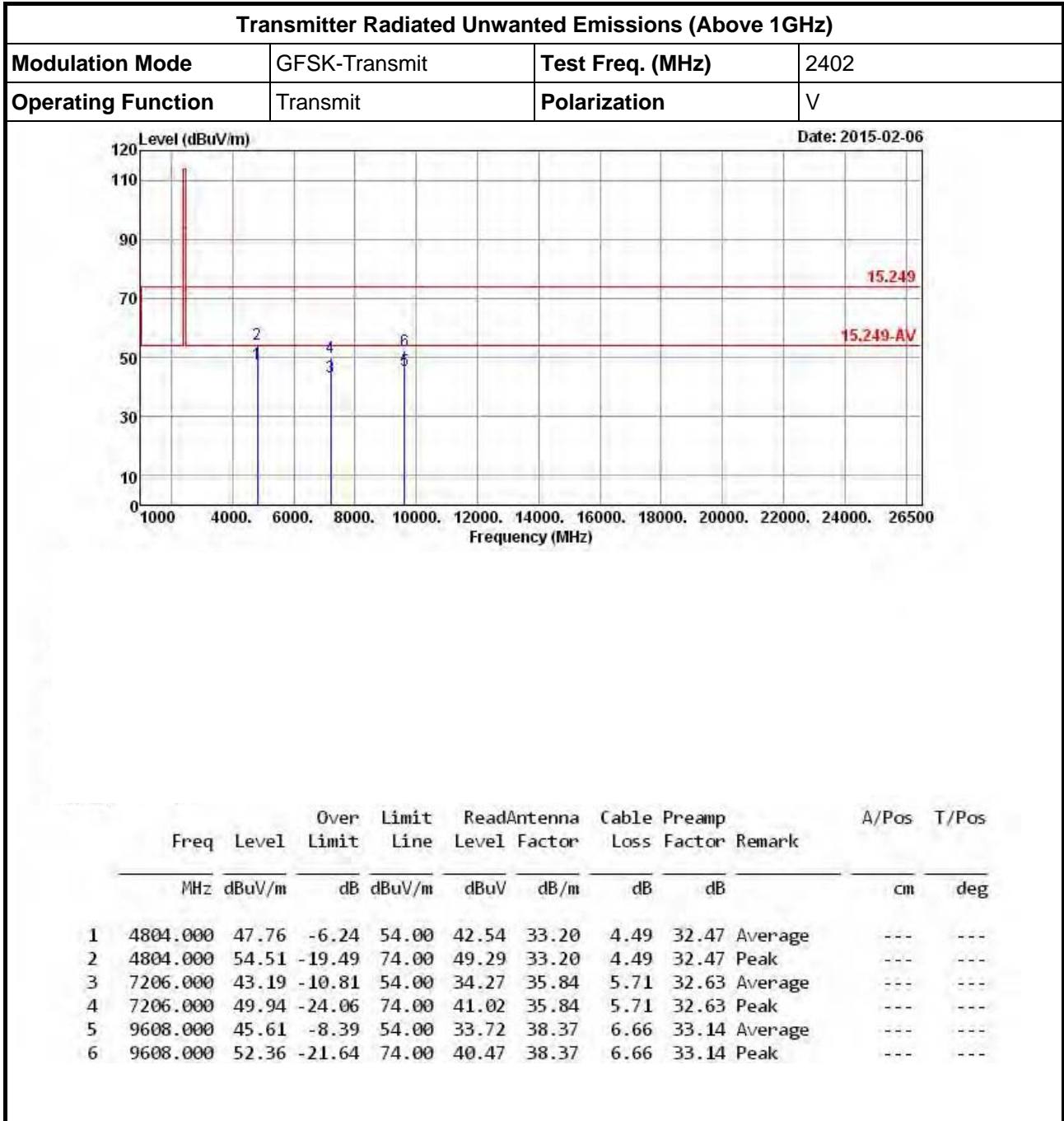
Operating Mode	1	Polarization	H
Operating Function	Transmitter Mode		



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	134.760	39.77	-3.73	43.50	53.43	11.59	1.92	27.17	Peak	---	---
2	212.360	31.54	-11.96	43.50	47.40	8.82	2.40	27.08	Peak	---	---
3	231.760	31.24	-14.76	46.00	45.67	10.05	2.51	26.99	Peak	---	---
4	336.520	32.60	-13.40	46.00	42.96	13.49	3.06	26.91	Peak	---	---
5	400.540	31.58	-14.42	46.00	40.24	15.32	3.34	27.32	Peak	---	---
6	528.580	29.78	-16.22	46.00	36.35	17.48	3.86	27.91	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)

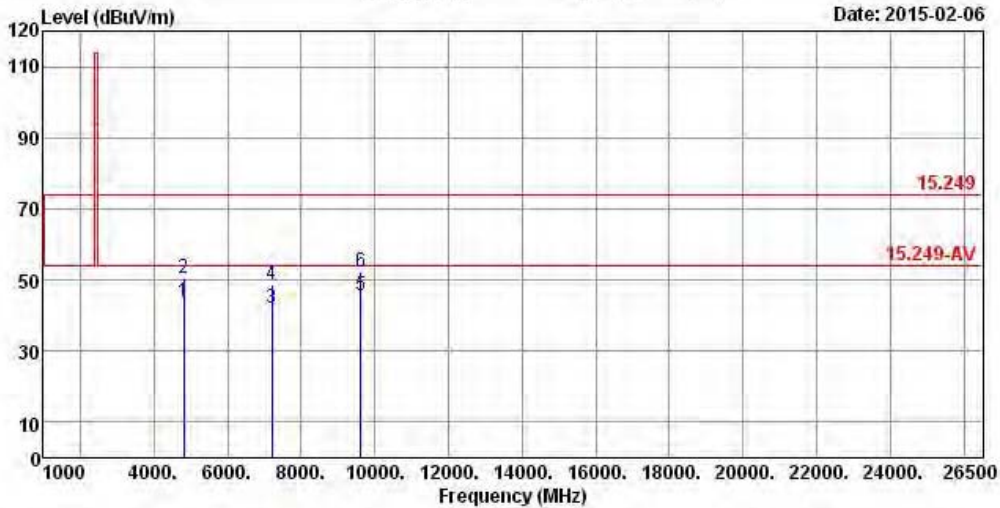
3.4.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)



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 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: If duty cycle < 100%, average emission = peak emission + 20 log (duty cycle).

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	GFSK-Transmit	Test Freq. (MHz)	2402
Operating Function	Transmit	Polarization	H



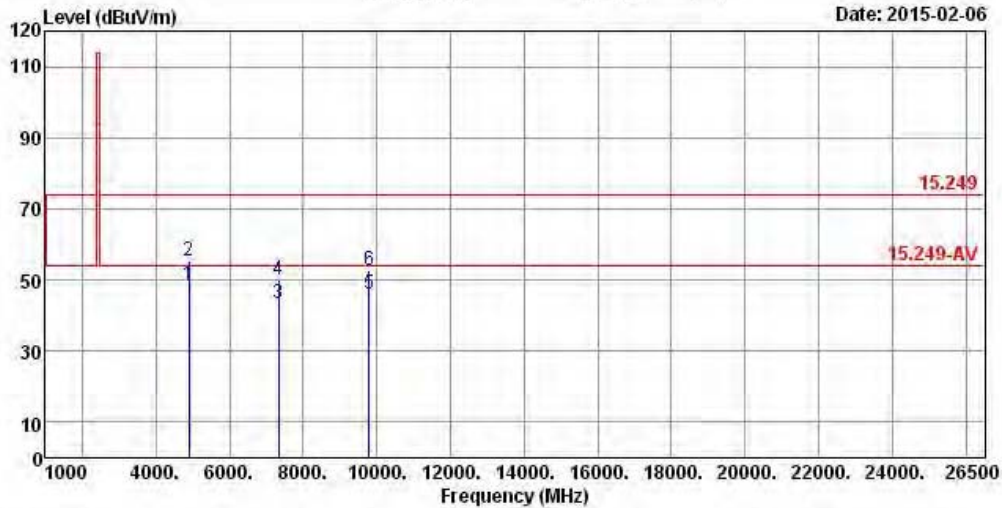
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4804.000	43.77	-10.23	54.00	38.55	33.20	4.49	32.47	Average	---	---
2	4804.000	50.52	-23.48	74.00	45.30	33.20	4.49	32.47	Peak	---	---
3	7206.000	42.07	-11.93	54.00	33.15	35.84	5.71	32.63	Average	---	---
4	7206.000	48.82	-25.18	74.00	39.90	35.84	5.71	32.63	Peak	---	---
5	9608.000	45.62	-8.38	54.00	33.73	38.37	6.66	33.14	Average	---	---
6	9608.000	52.37	-21.63	74.00	40.48	38.37	6.66	33.14	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 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: If duty cycle < 100%, average emission = peak emission + 20 log (duty cycle).



Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	GFSK-Transmit	Test Freq. (MHz)	2445
Operating Function	Transmit	Polarization	V



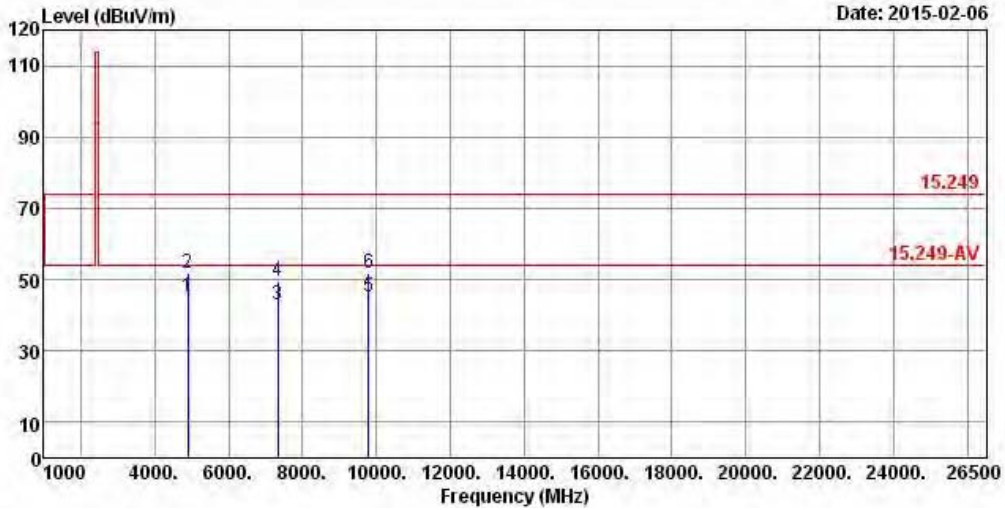
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4890.000	48.74	-5.26	54.00	43.33	33.33	4.53	32.45	Average	---	---
2	4890.000	55.49	-18.51	74.00	50.08	33.33	4.53	32.45	Peak	---	---
3	7335.000	43.29	-10.71	54.00	34.02	36.20	5.75	32.68	Average	---	---
4	7335.000	50.04	-23.96	74.00	40.77	36.20	5.75	32.68	Peak	---	---
5	9780.000	46.08	-7.92	54.00	33.84	38.64	6.73	33.13	Average	---	---
6	9780.000	52.83	-21.17	74.00	40.59	38.64	6.73	33.13	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 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: If duty cycle < 100%, average emission = peak emission + 20 log (duty cycle).



Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	GFSK-Transmit	Test Freq. (MHz)	2445
Operating Function	Transmit	Polarization	H



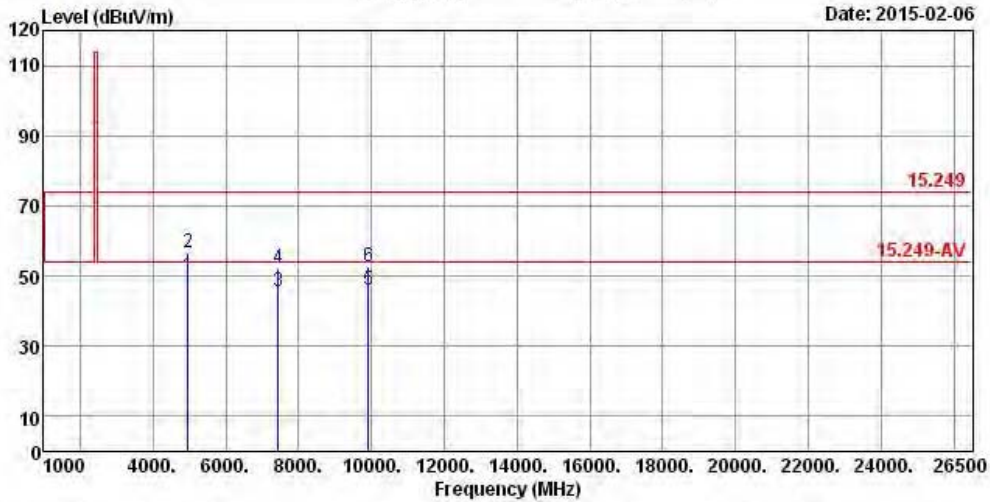
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4890.000	45.23	-8.77	54.00	39.82	33.33	4.53	32.45	Average	---	---
2	4890.000	51.98	-22.02	74.00	46.57	33.33	4.53	32.45	Peak	---	---
3	7335.000	42.78	-11.22	54.00	33.51	36.20	5.75	32.68	Average	---	---
4	7335.000	49.53	-24.47	74.00	40.26	36.20	5.75	32.68	Peak	---	---
5	9780.000	45.27	-8.73	54.00	33.03	38.64	6.73	33.13	Average	---	---
6	9780.000	52.02	-21.98	74.00	39.78	38.64	6.73	33.13	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 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: If duty cycle < 100%, average emission = peak emission + 20 log (duty cycle).



Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	GFSK-Transmit	Test Freq. (MHz)	2478
Operating Function	Transmit	Polarization	V



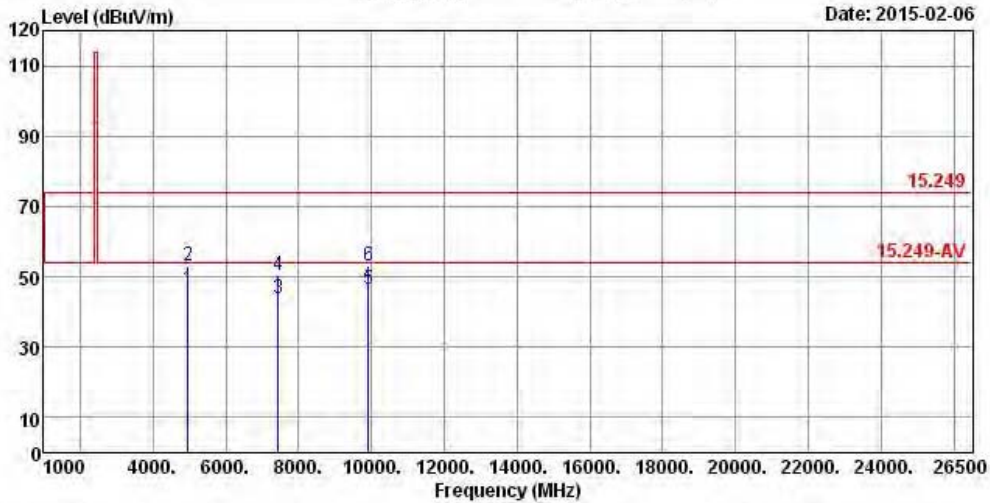
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB		cm	deg
1	4956.000	49.92	-4.08	54.00	44.37	33.44	4.55	32.44 Average	---	---
2	4956.000	56.67	-17.33	74.00	51.12	33.44	4.55	32.44 Peak	---	---
3	7434.000	45.63	-8.37	54.00	36.14	36.42	5.79	32.72 Average	---	---
4	7434.000	52.38	-21.62	74.00	42.89	36.42	5.79	32.72 Peak	---	---
5	9912.000	46.05	-7.95	54.00	33.52	38.86	6.80	33.13 Average	---	---
6	9912.000	52.80	-21.20	74.00	40.27	38.86	6.80	33.13 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 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: If duty cycle < 100%, average emission = peak emission + 20 log (duty cycle).



Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	GFSK-Transmit	Test Freq. (MHz)	2478
Operating Function	Transmit	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4956.000	46.36	-7.64	54.00	40.81	33.44	4.55	32.44	Average	---	---
2	4956.000	53.11	-20.89	74.00	47.56	33.44	4.55	32.44	Peak	---	---
3	7434.000	43.69	-10.31	54.00	34.20	36.42	5.79	32.72	Average	---	---
4	7434.000	50.44	-23.56	74.00	40.95	36.42	5.79	32.72	Peak	---	---
5	9912.000	46.54	-7.46	54.00	34.01	38.86	6.80	33.13	Average	---	---
6	9912.000	53.29	-20.71	74.00	40.76	38.86	6.80	33.13	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 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: If duty cycle < 100%, average emission = peak emission + 20 log (duty cycle).



4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Apr. 14, 2014	AC Conduction
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 22, 2015	AC Conduction
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	Oct. 31, 2014	AC Conduction
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	AC Conduction

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101514	9kHz ~ 40GHz	Jun. 13, 2014	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 31, 2014	RF Conducted

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Nov. 29, 2014	Radiation
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May 05, 2014	Radiation
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	Sep. 01, 2014	Radiation
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Mar. 27, 2014	Radiation
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 20, 2014	Radiation
Horn Antenna	ETS · LINDGREN	3115	6741	1GHz ~ 18GHz	Jul. 11, 2014	Radiation
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz ~ 40GHz	Jan. 27, 2015	Radiation
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 15, 2014	Radiation
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Dec. 12, 2014	Radiation
Turn Table	EM Electronics	EM Electronics	060615	0 ~ 360 degree	N/A	Radiation
Antenna Mast	MF	MF-7802	MF780208179	1 ~ 4 m	N/A	Radiation

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9kHz ~ 30MHz	Jul. 28, 2014	Radiation

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