FCC Test Report

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

The product sample received on Oct. 16, 2014 and completely tested on Dec. 10, 2014. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

Vic Hsiao / Supervisor

Testing Laboratory
1190

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Summary of Test Result

Conformance Test Specifications					
Report Clause	**Ref. Std. Clause**	**Description**	**Measured**	**Limit**	**Result**
1.1.2	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	[dBuV]: 0.1556680MHz 49.50 (Margin 16.19dB) - QP 25.60 (Margin 30.09dB) - AV	FCC 15.207	Complied
3.2	15.215(c)	Emission Bandwidth	1.7004MHz; 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]:9780.800MHz 53.23 (Margin 0.77dB) - AV 59.99 (Margin 14.01dB) - 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

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	
☒	Integral antenna (antenna permanently attached)
☐	External antenna (dedicated antennas) ; Unique antenna connector

1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	☐ Production ; ☒ Pre-Production ; ☐ Prototype
Type of EUT	
☒	Stand-alone
☐	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.:
☐	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.:
☐	Other:

1.1.4 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
☐ Operated normally mode for worst duty cycle	
☒ Operated test mode for worst duty cycle	
Test Signal Duty Cycle (x)	**Duty Cycle Correction Factor [dB] = (20 log x)**
☒ 45.94%	6.76
If worst duty < 100%, average emission = peak emission + 20 log x	

1.1.5 EUT Operational Condition

Supply Voltage	☐ AC mains	☒ DC	- -
Type of DC Source	☐ Internal DC supply	☐ External DC adapter	☒ 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				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	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 C63.10-2009

1.4 Testing Location Information

Testing Location							
☒	HWA YA	ADD	:	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.			
		TEL	:	886-3-327-3456	FAX	:	886-3-327-0973

Test Site Registration Number: FCC 636805			
Test Condition	**Test Site No.**	**Test Engineer**	**Test Environment**
AC Conduction	CO04-HY	Zeus	25°C / 43%
RF Conducted	TH01-HY	Ian	23.4°C / 60%
Radiated Emission (Below 1GHz)	03CH03-HY	Hunter	26°C / 48%
Radiated Emission (Above 1GHz)	03CH03-HY	Hunter	24.8°C / 52%

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

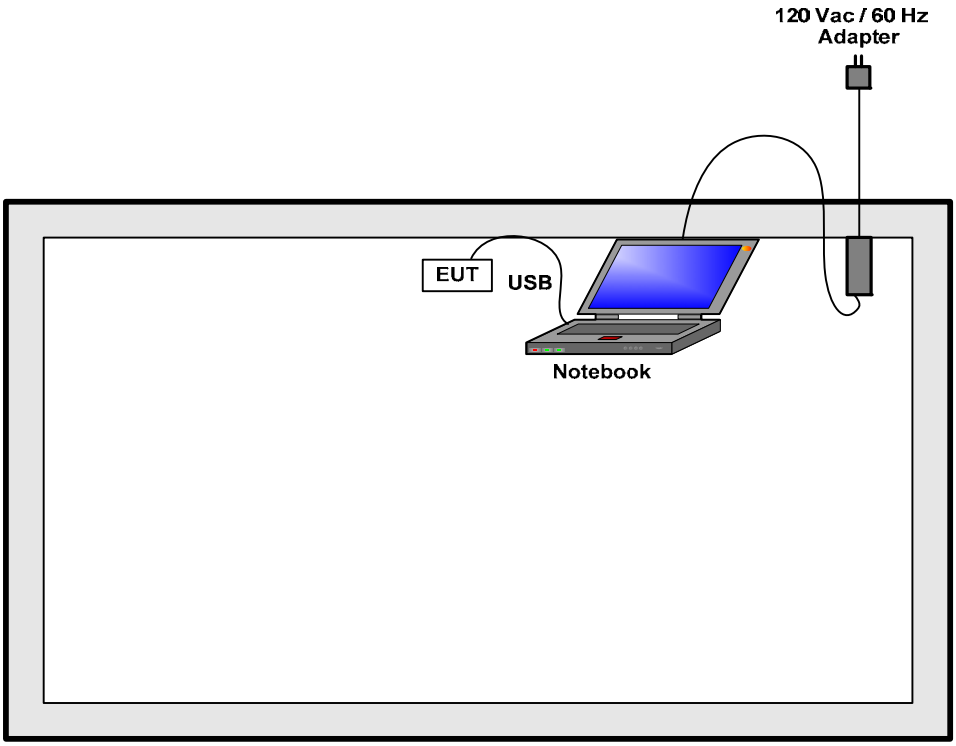
2.3 The Worst Case Measurement Configuration

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

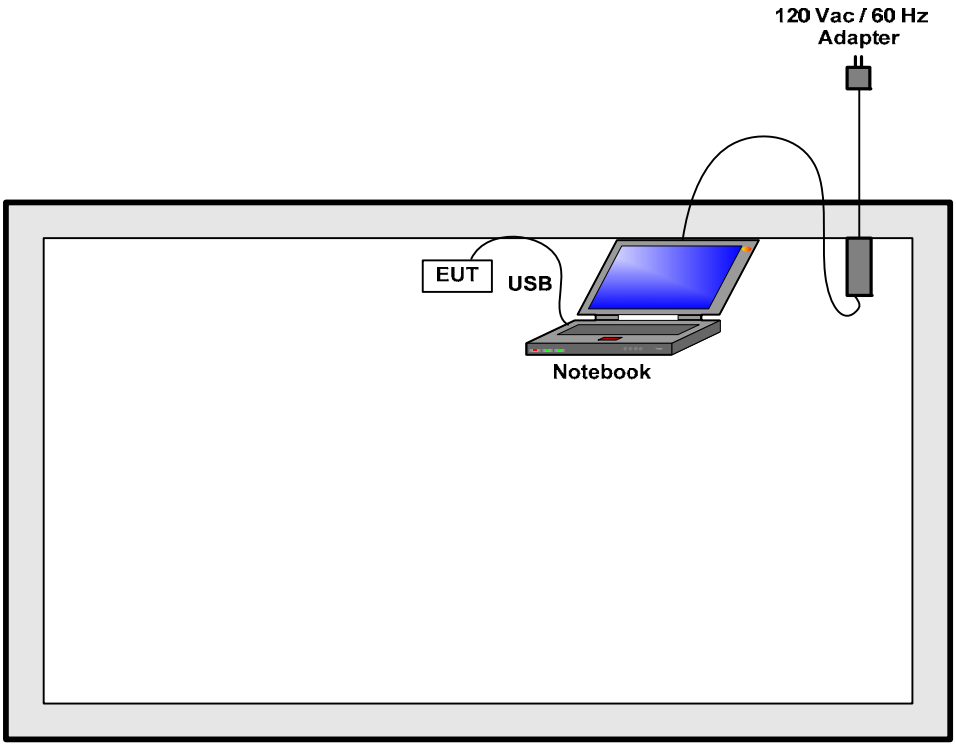
The Worst Case Mode for Following Conformance Tests			
Tests Item			Emission Bandwidth, Fundamental Emissions, Radiated Unwanted Emissions
Test Condition			Radiated measurement
User Position			☐ EUT will be placed in fixed position.
X Plane	**Y Plane**	**Z Plane**	☐ EUT will be placed in mobile position and operating multiple positions.
			☒ 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

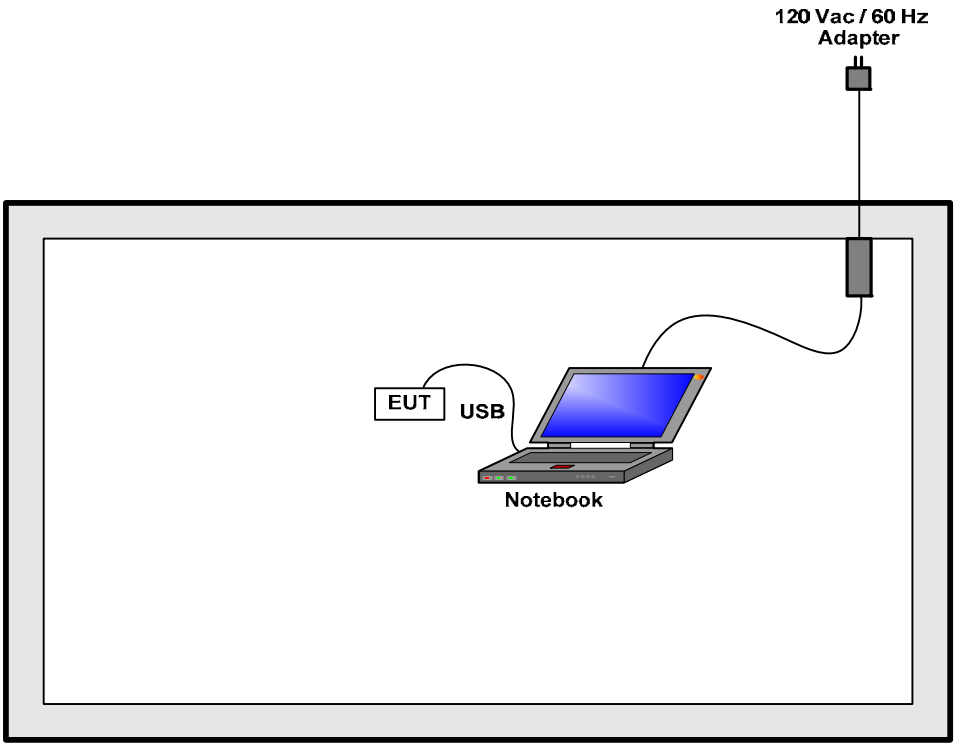
Test Setup Diagram - AC Line Conducted Emission Test



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

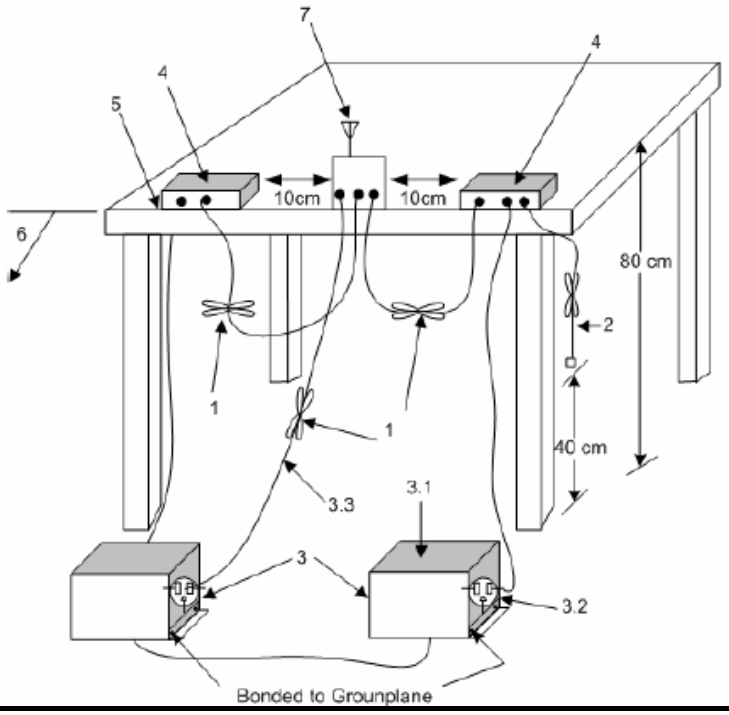
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
☒ Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

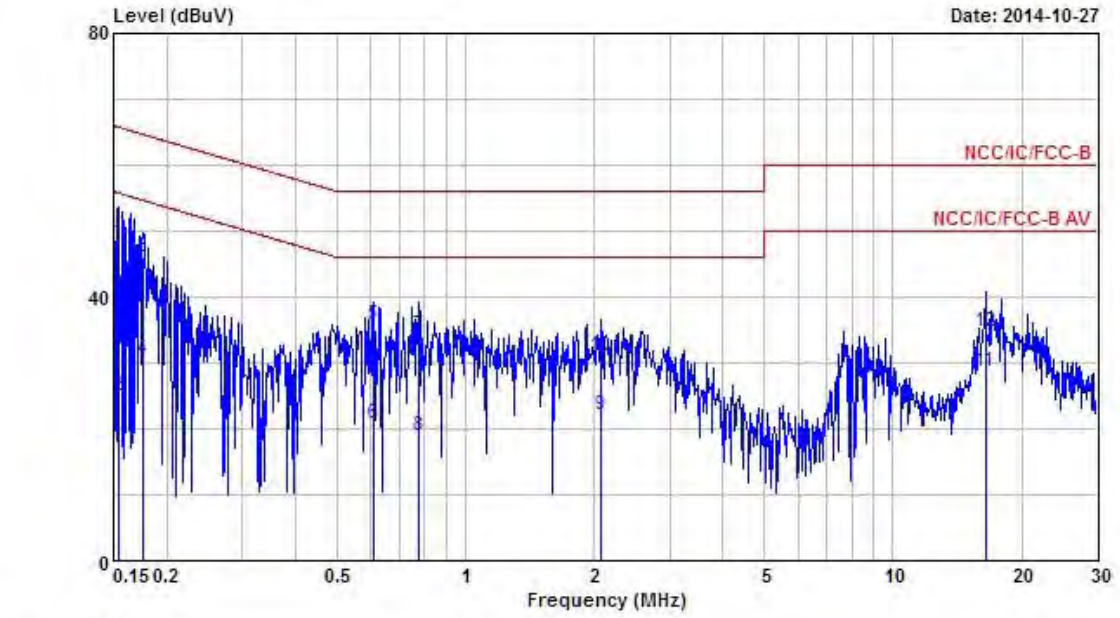
3.1.4 Test Setup

AC Power-line Conducted Emissions



3.1.5 Test Result of AC Power-line Conducted Emissions

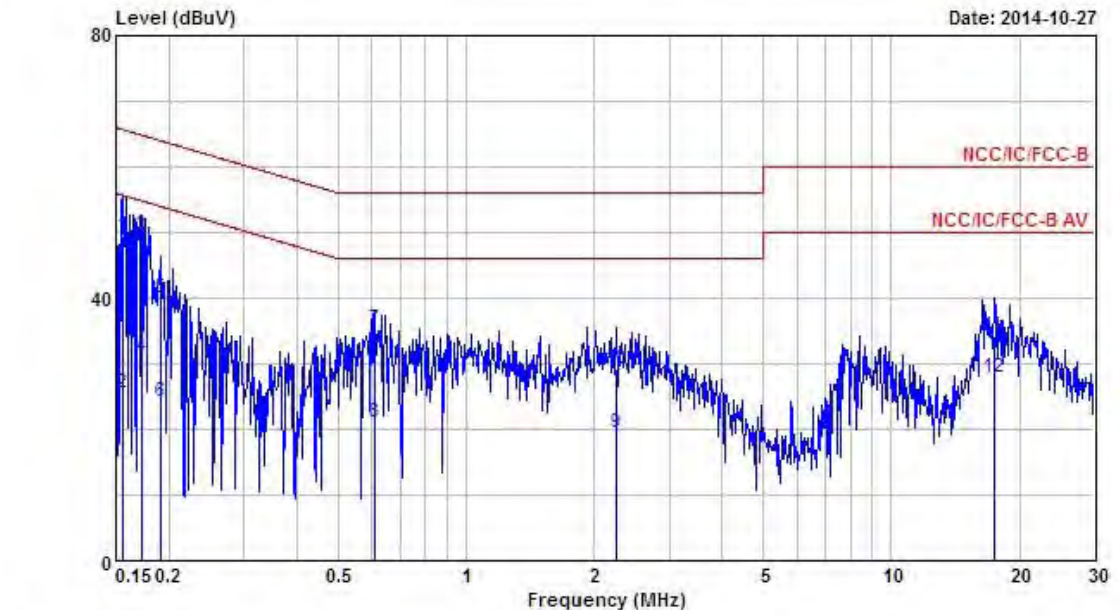
AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Neutral
Operating Function	Power from host & Radio link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1548450	48.33	-17.41	65.74	48.07	0.02	0.24	QP
2	0.1548450	24.89	-30.85	55.74	24.63	0.02	0.24	Average
3	0.1758420	46.04	-18.64	64.68	45.80	0.02	0.22	QP
4	0.1758420	30.42	-24.26	54.68	30.18	0.02	0.22	Average
5	0.6075240	35.91	-20.09	56.00	35.72	0.04	0.15	QP
6	0.6075240	20.80	-25.20	46.00	20.61	0.04	0.15	Average
7	0.7751940	34.11	-21.89	56.00	33.94	0.04	0.13	QP
8	0.7751940	18.96	-27.04	46.00	18.79	0.04	0.13	Average
9	2.070	22.18	-23.82	46.00	21.83	0.06	0.29	Average
10	2.070	30.93	-25.07	56.00	30.58	0.06	0.29	QP
11	16.490	28.75	-21.25	50.00	28.20	0.28	0.27	Average
12	16.490	34.62	-25.38	60.00	34.07	0.28	0.27	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.)

AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Line
Operating Function	Power from host & Radio link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1556680	49.50	-16.19	65.69	49.23	0.03	0.24	QP
2	0.1556680	25.60	-30.09	55.69	25.33	0.03	0.24	Average
3	0.1721540	49.48	-15.38	64.86	49.23	0.03	0.22	QP
4	0.1721540	31.18	-23.68	54.86	30.93	0.03	0.22	Average
5	0.1903870	40.11	-23.91	64.02	39.87	0.03	0.21	QP
6	0.1903870	24.33	-29.69	54.02	24.09	0.03	0.21	Average
7	0.6107510	35.18	-20.82	56.00	34.99	0.04	0.15	QP
8	0.6107510	21.07	-24.93	46.00	20.88	0.04	0.15	Average
9	2.250	19.36	-26.64	46.00	19.01	0.08	0.27	Average
10	2.250	29.10	-26.90	56.00	28.75	0.08	0.27	QP
11	17.380	34.29	-25.71	60.00	33.75	0.29	0.25	QP
12	17.380	27.96	-22.04	50.00	27.42	0.29	0.25	Average

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

3.2 Emission Bandwidth

3.2.1 Emission Bandwidth Limit

Emission Bandwidth Limit
☒ Emission bandwidth falls completely within authorized band.

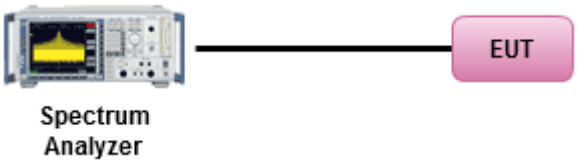
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method
☒ Refer as ANSI C63.10, clause 6.9.1 for 20 dB emission bandwidth and 99% occupied bandwidth measurement.

3.2.4 Test Setup

Emission Bandwidth


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	1.7004	1.7293	2401.0449	-
GFSK-Transmit	2445	1.6932	1.7438	-	-
GFSK-Transmit	2478	1.6932	1.7366	-	2478.7525
Limit		**N/A**	**N/A**	**2400**	**2483.5**
Result		**Complied**			

Worst Emission Bandwidth Plots

3.3 Fundamental Emissions

3.3.1 Fundamental Emissions Limit

Fundamental Emissions E-Field Strength Limit (3m)	
☐	902-928 MHz Band: 94 dBuV/m (quasi peak)
☒	2400-2483.5 MHz Band: 94 dBuV/m (average)
☐	5725-5785 MHz Band: 94 dBuV/m (average)

3.3.2 Measuring Instruments

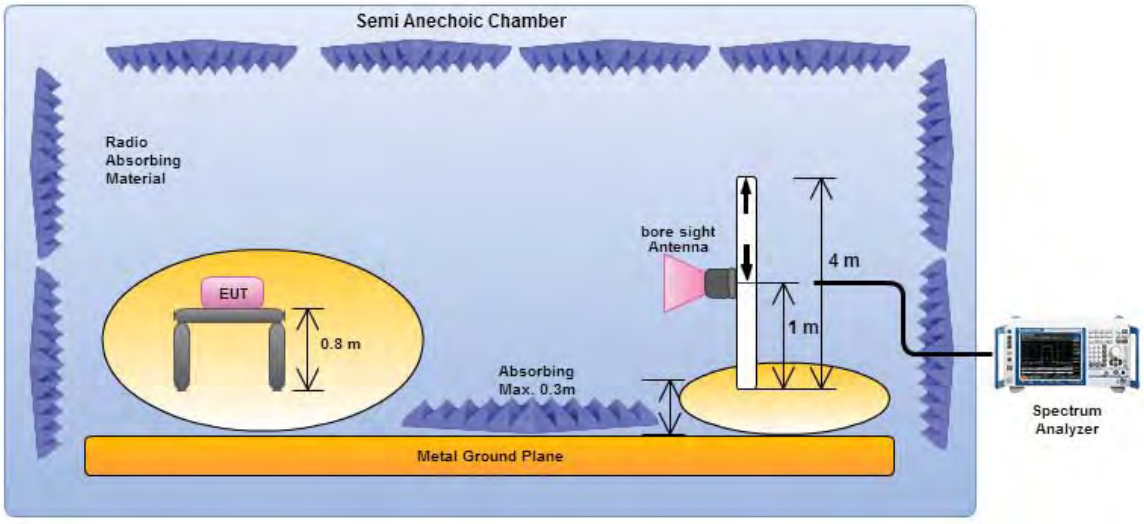
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

☒	The average emission levels shall be measured in [duty cycle ≤ 100 or by duty cycle correction factor].	
☒	For the transmitter emissions shall be measured using following options below:	
	☐	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty cycle ≥ 100%.
	☒	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions. Adjusted by a “duty cycle correction factor”, derived from 20log (dwell time/100 ms). Average emission = peak emission + 20 log (duty cycle).
	☒	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
☒	For radiated measurement, refer as ANSI C63.10, clause 6.6 for radiated emissions	

3.3.4 Test Setup

Fundamental Emissions



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:
☒ 54 dBuV/m (average)
Other Unwanted Emissions:
☒ 50 dB below the level of the fundamental or FCC 15.209, whichever is the lesser attenuation.

3.4.2 Measuring Instruments

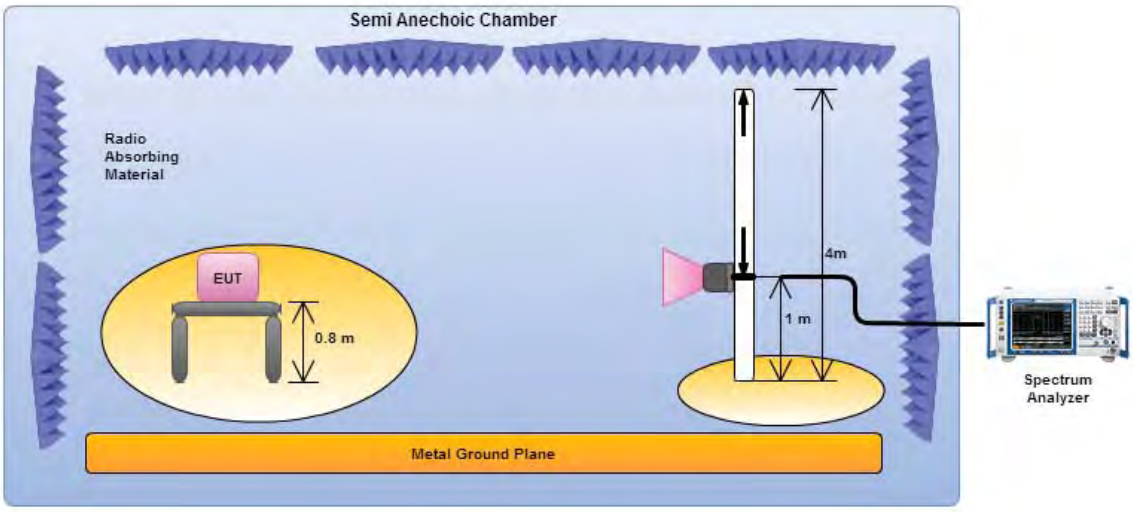
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method – General Information	
☒	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).
☒	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
☒	Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
☒	For the transmitter unwanted emissions shall be measured using following options below:
☐	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty cycle ≥ 100%.
☒	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions. Adjusted by a “duty cycle correction factor”, derived from 20log (dwell time/100 ms). Average emission = peak emission + 20 log (duty cycle).
☒	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
☒	For the transmitter bandedge emissions shall be measured using following options below:
☒	Refer as ANSI C63.10, clause 6.9.2 for band-edge testing.
☐	Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.
☒	For radiated measurement.
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
☒	Refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz.

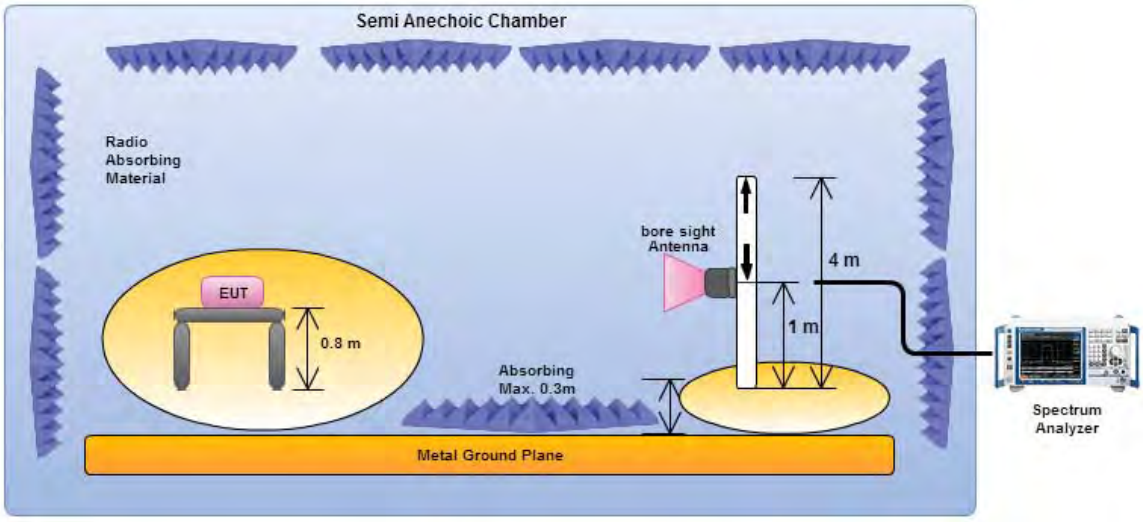
3.4.4 Test Setup

Transmitter Radiated Unwanted Emissions (below 1GHz)



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



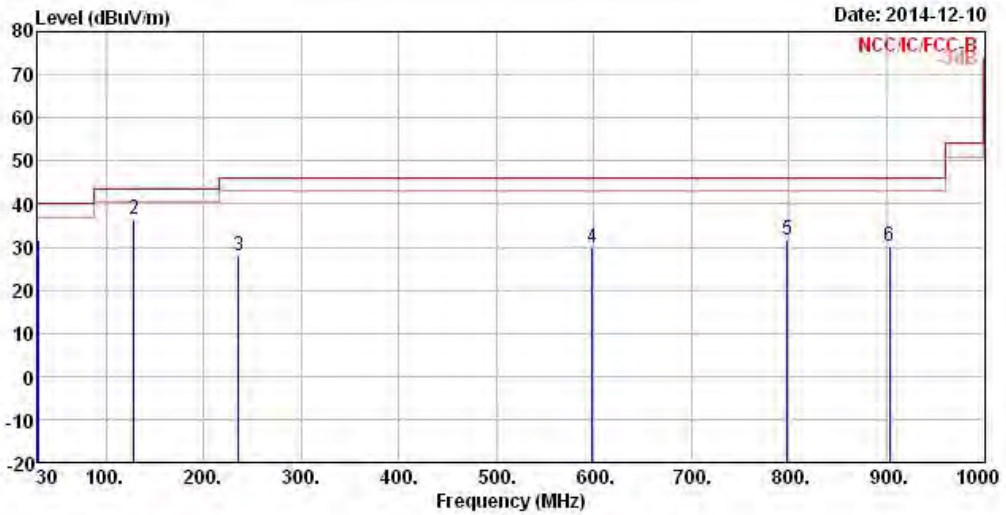
Electric field tests shall be performed in the frequency range of 1 GHz to 10th harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna.

3.4.5 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)

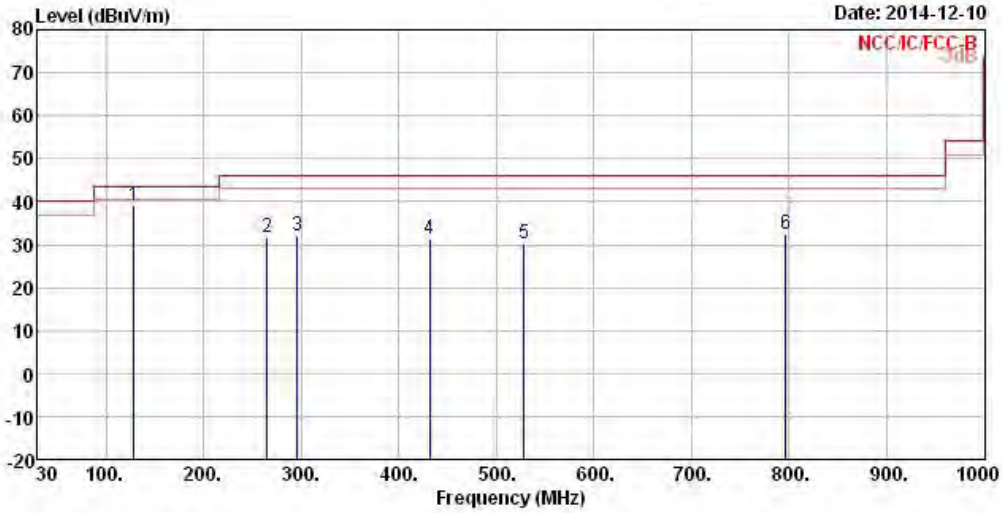
Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Operating Mode	1	**Polarization**	V
Operating Function	Transmitter Mode		



	Freq	Level	Over Limit	Limit Line	Read 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	30.000	31.75	-8.25	40.00	39.47	18.85	0.82	27.39	Peak	---	---
2	128.940	36.51	-6.99	43.50	49.88	11.93	1.87	27.17	Peak	---	---
3	235.640	28.13	-17.87	46.00	41.34	11.23	2.53	26.97	Peak	---	---
4	598.420	29.79	-16.21	46.00	35.00	18.41	4.14	27.76	Peak	---	---
5	798.240	31.82	-14.18	46.00	34.89	19.65	4.91	27.63	Peak	---	---
6	903.000	30.16	-15.84	46.00	31.72	20.54	5.20	27.30	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		

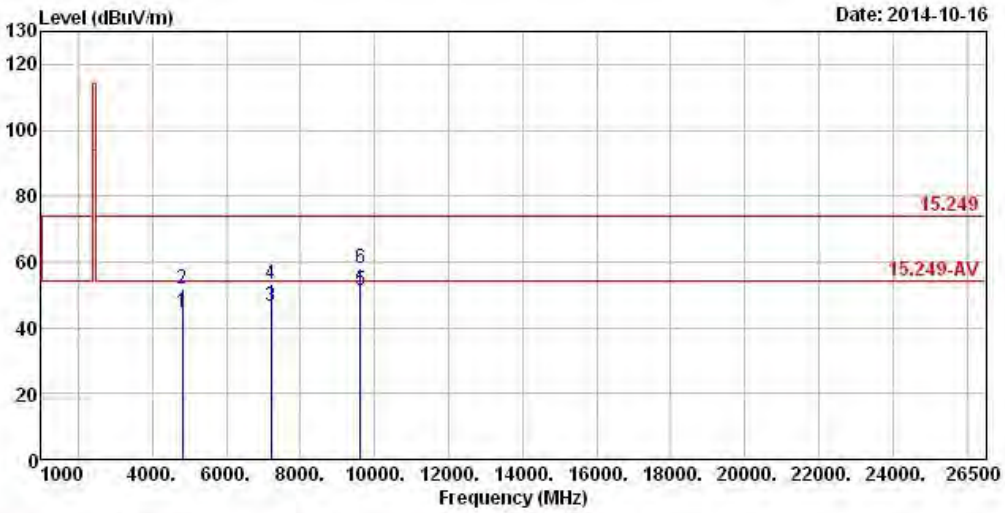


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	128.940	39.04	-4.46	43.50	52.41	11.93	1.87	27.17	Peak	---	---
2	264.740	31.56	-14.44	46.00	42.29	13.41	2.70	26.84	Peak	---	---
3	295.780	31.97	-14.03	46.00	42.63	13.16	2.88	26.70	Peak	---	---
4	431.580	31.14	-14.86	46.00	38.90	16.32	3.44	27.52	Peak	---	---
5	528.580	30.17	-15.83	46.00	36.57	17.65	3.86	27.91	Peak	---	---
6	796.300	32.49	-13.51	46.00	35.56	19.66	4.90	27.63	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)

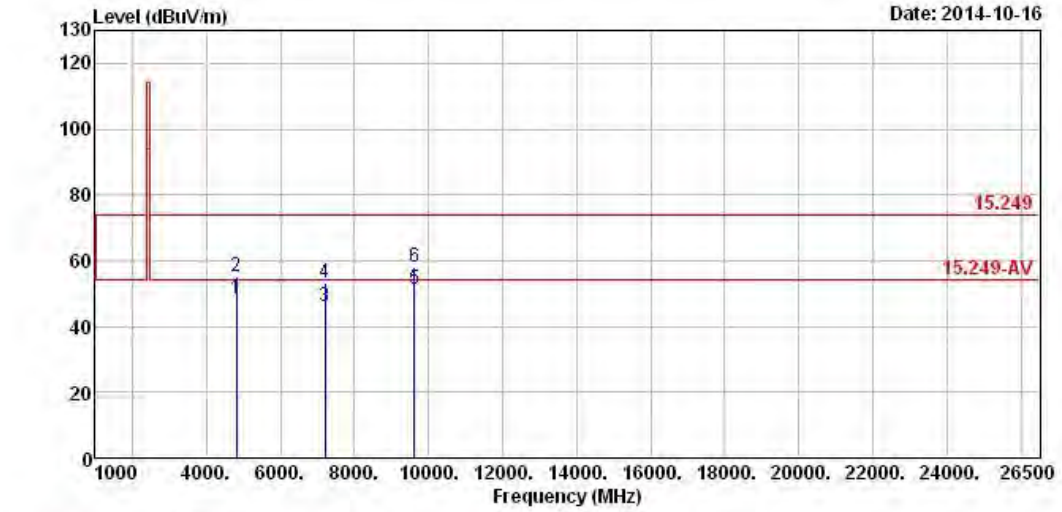
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	GFSK-Transmit	**Test Freq. (MHz)**	2402
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read 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	4804.400	44.85	-9.15	54.00	38.41	33.20	5.71	32.47	Average	0	0
2	4804.400	51.61	-22.39	74.00	45.17	33.20	5.71	32.47	Peak	0	0
3	7206.600	46.55	-7.45	54.00	36.14	35.84	7.20	32.63	Average	0	0
4	7206.600	53.31	-20.69	74.00	42.90	35.84	7.20	32.63	Peak	0	0
5	9608.800	51.45	-2.55	54.00	37.41	38.37	8.81	33.14	Average	0	0
6	9608.800	58.21	-15.79	74.00	44.17	38.37	8.81	33.14	Peak	0	0

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 3: For 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).

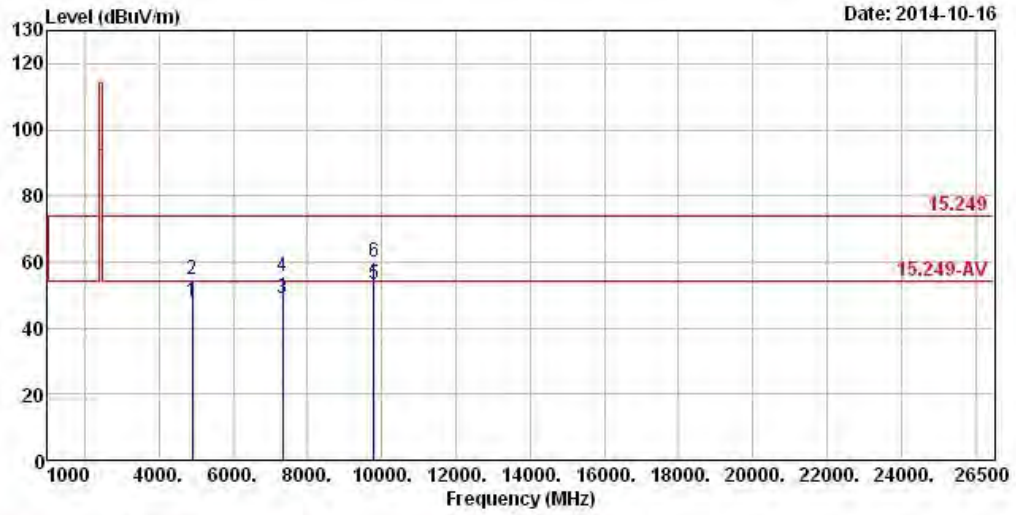
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	GFSK-Transmit	**Test Freq. (MHz)**	2402
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read 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	4804.400	48.54	-5.46	54.00	42.10	33.20	5.71	32.47	Average	0	0
2	4804.400	55.30	-18.70	74.00	48.86	33.20	5.71	32.47	Peak	0	0
3	7207.200	46.26	-7.74	54.00	35.85	35.84	7.20	32.63	Average	0	0
4	7207.200	53.02	-20.98	74.00	42.61	35.84	7.20	32.63	Peak	0	0
5	9608.800	51.49	-2.51	54.00	37.45	38.37	8.81	33.14	Average	0	0
6	9608.800	58.25	-15.75	74.00	44.21	38.37	8.81	33.14	Peak	0	0

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 3: For 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).

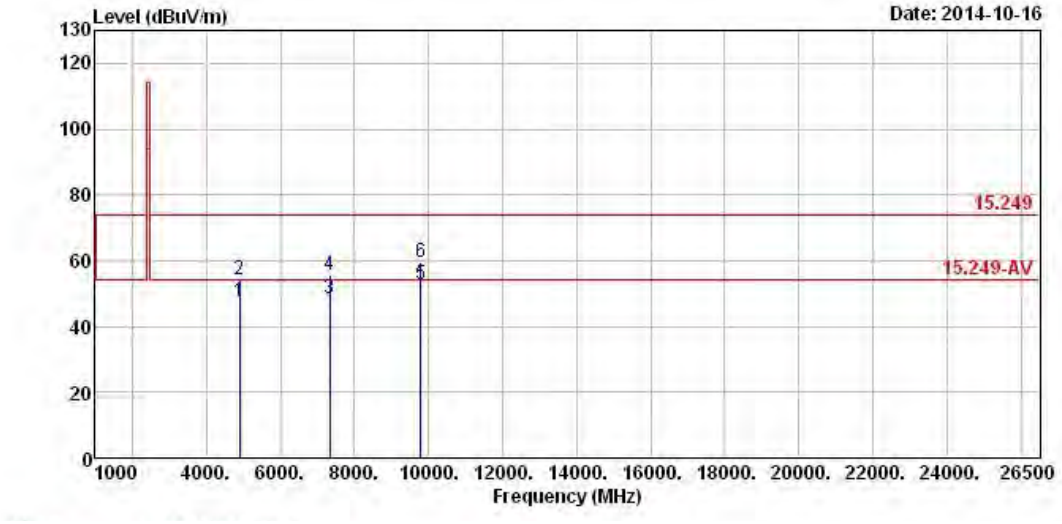
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	GFSK-Transmit	**Test Freq. (MHz)**	2445
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read 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	4890.400	47.87	-6.13	54.00	41.26	33.33	5.73	32.45	Average	0	0
2	4890.400	54.63	-19.37	74.00	48.02	33.33	5.73	32.45	Peak	0	0
3	7335.600	48.91	-5.09	54.00	38.11	36.20	7.28	32.68	Average	0	0
4	7335.600	55.67	-18.33	74.00	44.87	36.20	7.28	32.68	Peak	0	0
5	9780.800	53.23	-0.77	54.00	38.93	38.67	8.76	33.13	Average	0	0
6	9780.800	59.99	-14.01	74.00	45.69	38.67	8.76	33.13	Peak	0	0

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 3: For 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).

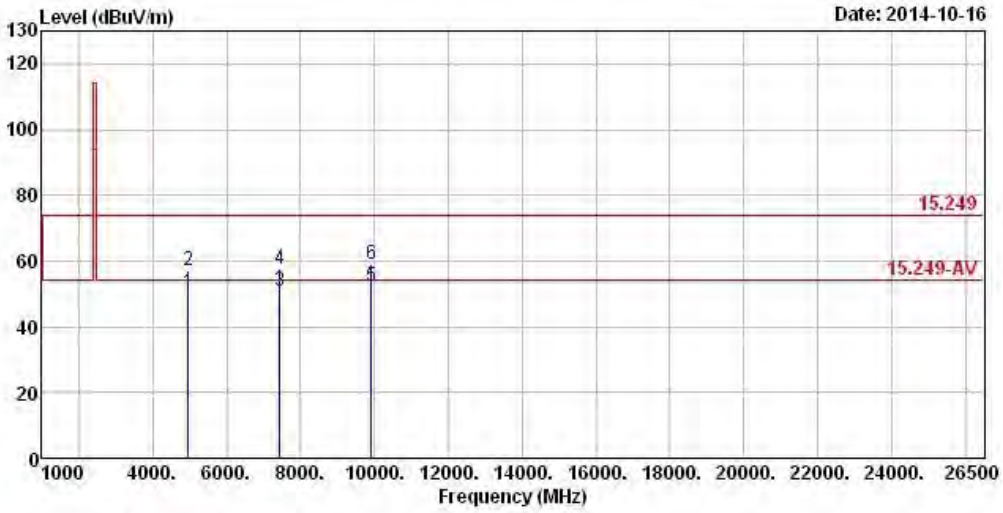
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	GFSK-Transmit	**Test Freq. (MHz)**	2445
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read 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	4890.400	47.62	-6.38	54.00	41.01	33.33	5.73	32.45	Average	0	0
2	4890.400	54.38	-19.62	74.00	47.77	33.33	5.73	32.45	Peak	0	0
3	7335.600	48.65	-5.35	54.00	37.85	36.20	7.28	32.68	Average	0	0
4	7335.600	55.41	-18.59	74.00	44.61	36.20	7.28	32.68	Peak	0	0
5	9780.800	52.62	-1.38	54.00	38.32	38.67	8.76	33.13	Average	0	0
6	9780.800	59.38	-14.62	74.00	45.08	38.67	8.76	33.13	Peak	0	0

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 3: For 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).

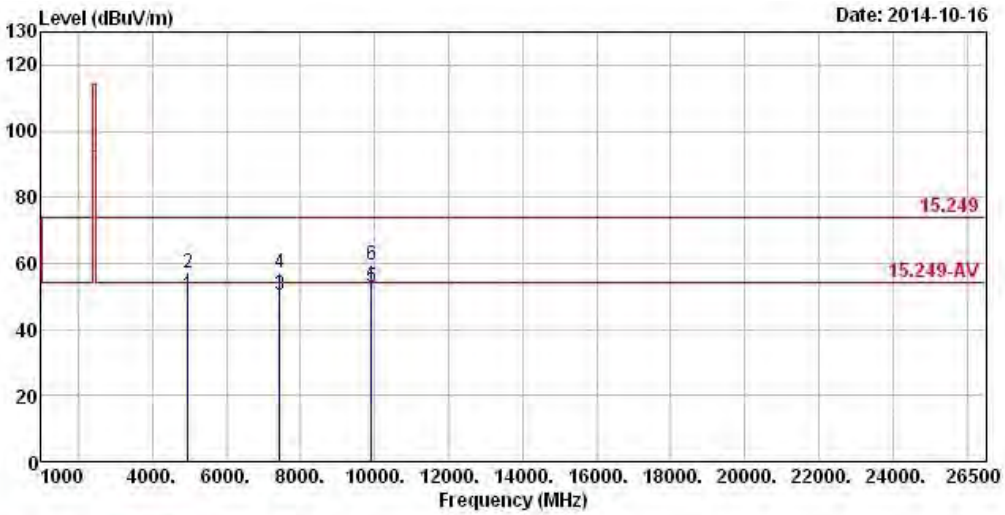
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	GFSK-Transmit	**Test Freq. (MHz)**	2478
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read 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	4956.400	50.39	-3.61	54.00	43.65	33.44	5.74	32.44	Average	0	0
2	4956.400	57.15	-16.85	74.00	50.41	33.44	5.74	32.44	Peak	0	0
3	7434.600	50.82	-3.18	54.00	39.70	36.47	7.37	32.72	Average	0	0
4	7434.600	57.58	-16.42	74.00	46.46	36.47	7.37	32.72	Peak	0	0
5	9912.800	52.13	-1.87	54.00	37.69	38.86	8.71	33.13	Average	0	0
6	9912.800	58.89	-15.11	74.00	44.45	38.86	8.71	33.13	Peak	0	0

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 3: For 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	Read 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	4956.400	50.36	-3.64	54.00	43.62	33.44	5.74	32.44	Average	0	0
2	4956.400	57.12	-16.88	74.00	50.38	33.44	5.74	32.44	Peak	0	0
3	7434.600	50.32	-3.68	54.00	39.20	36.47	7.37	32.72	Average	0	0
4	7434.600	57.08	-16.92	74.00	45.96	36.47	7.37	32.72	Peak	0	0
5	9912.800	52.88	-1.12	54.00	38.44	38.86	8.71	33.13	Average	0	0
6	9912.800	59.64	-14.36	74.00	45.20	38.86	8.71	33.13	Peak	0	0

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 3: For 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

<AC Power-line Conducted Emissions>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Mar. 26, 2014	AC Conduction
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 21, 2014	AC Conduction
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+012	9kHz ~ 30MHz	Oct. 30, 2013	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	101013	9kHz ~ 40GHz	Jan. 25, 2014	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 31, 2014	RF Conducted
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jul. 26, 2014	RF Conducted

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

<Radiated Unwanted Emissions Below 1GHz>

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
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Mar. 27, 2014	Radiation
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 20, 2014	Radiation
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 15, 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 year.

<Radiated Unwanted Emissions Above 1GHz>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Nov. 30, 2013	Radiation
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	Sep. 01, 2014	Radiation
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Mar. 27, 2014	Radiation
Horn Antenna	ETS・LINDGREN	3115	6741	1GHz ~ 18GHz	Jun. 11, 2014	Radiation
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 10, 2014	Radiation
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Dec. 11, 2013	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.