

FCC Test Report

Equipment : Keyboard
Brand Name : SONY
Model No. : VGP-WKB16
FCC ID : AK8VGPWKB16
Standard : 47 CFR FCC Part 15.249
Operating Band : 2400 MHz – 2483.5 MHz
Applicant : Sony Corporation
Manufacturer : 1-7-1 Konan, Minato-ku, Tokyo 108-0075, Japan

The product sample received on Jul. 09, 2013 and completely tested on Aug. 07, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

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

Reviewed by:

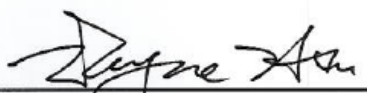

Wayne Hsu / Assistant Manager

Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Testing Applied Standards	6
1.3	Testing Location Information	6
1.4	Measurement Uncertainty	6
2	TEST CONFIGURATION OF EUT	7
2.1	The Worst Case Modulation Configuration	7
2.2	Test Channel Frequencies Configuration.....	7
2.3	The Worst Case Measurement Configuration.....	7
2.4	Test Setup Diagram	8
3	TRANSMITTER TEST RESULT	11
3.1	AC Power-line Conducted Emissions	11
3.2	Emission Bandwidth	14
3.3	Fundamental Emissions	16
3.4	Transmitter Radiated Unwanted Emissions	18
4	TEST EQUIPMENT AND CALIBRATION DATA	30
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]:0.187385MHz 33.18 (Margin 20.97dB) - AV 52 (Margin 12.15dB) - QP	FCC 15.207	Complied
3.2	15.215(c)	Emission Bandwidth	2.06 MHz; fall in band	Information only	Complied
3.3	15.249(a)	Fundamental Emissions	[dBuV/m at 3m]: 54.07 (Margin 39.93dB) average	[dBuV/m at 3m]: average: 94	Complied
3.4	15.249(a)/(d)	Transmitter Radiated Unwanted Emissions	[dBuV/m at 3m]: 43.58MHz 30.31 (Margin 9.69dB) - PK	Harmonics: 54 dBuV/m@3m Other band: 50 dB or FCC 15.209, whichever is the lesser attenuation.	Complied



SPORTON INTERNATIONAL INC.
TEL : 886-3-327-3456
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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)	Co-location
2400-2483.5	GFSK	2402~2478	77	54.07	N/A
Note 1: Field strength performed average level at 3m. Note 2: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)					

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)
☒ 1.80%	-34.89
If worst duty < 100%, average emission = peak emission + 20 log x	

1.1.5 EUT Operational Condition

Supply Voltage	☒ AC mains	☒ DC	☐ System
Type of DC Source	☐ Internal DC supply	☒ External DC adapter	☒ Battery

1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2009

1.3 Testing Location Information

Testing Location				
☒	HWA YA	ADD : No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.		
		TEL : 886-3-327-3456 FAX : 886-3-327-0973		
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Zeus	24°C / 50%	Aug. 06, 2013
RF Conducted	TH06-HY	Wei	25.2°C / 56%	Aug. 01, 2013
Radiated Emission	03CH02-HY	Eddie	25.9°C / 56%	Jul. 20, 2013 Aug. 07, 2013

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty			
Test Item		Uncertainty	Limit
AC power-line conducted emissions		±2.26 dB	N/A
Emission bandwidth,		±1.42 %	N/A
Unwanted emissions, conducted	30 – 1000 MHz	±0.51 dB	N/A
	1 – 18 GHz	±0.67 dB	N/A
	18 – 40 GHz	±0.83 dB	N/A
	40 – 200 GHz	N/A	N/A
All emissions, radiated	30 – 1000 MHz	±2.56 dB	N/A
	1 – 18 GHz	±3.59 dB	N/A
	18 – 40 GHz	±3.82 dB	N/A
	40 – 200 GHz	N/A	N/A
Temperature		±0.8 °C	N/A
Humidity		±3 %	N/A
DC and low frequency voltages		±3 %	N/A
Time		±1.42 %	N/A
Duty Cycle		±1.42 %	N/A

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Modulation Used for Conformance Testing	
Test Mode	Field Strength (dBuV/m at 3 m)
GFSK-Transmit	54.07

2.2 Test Channel Frequencies Configuration

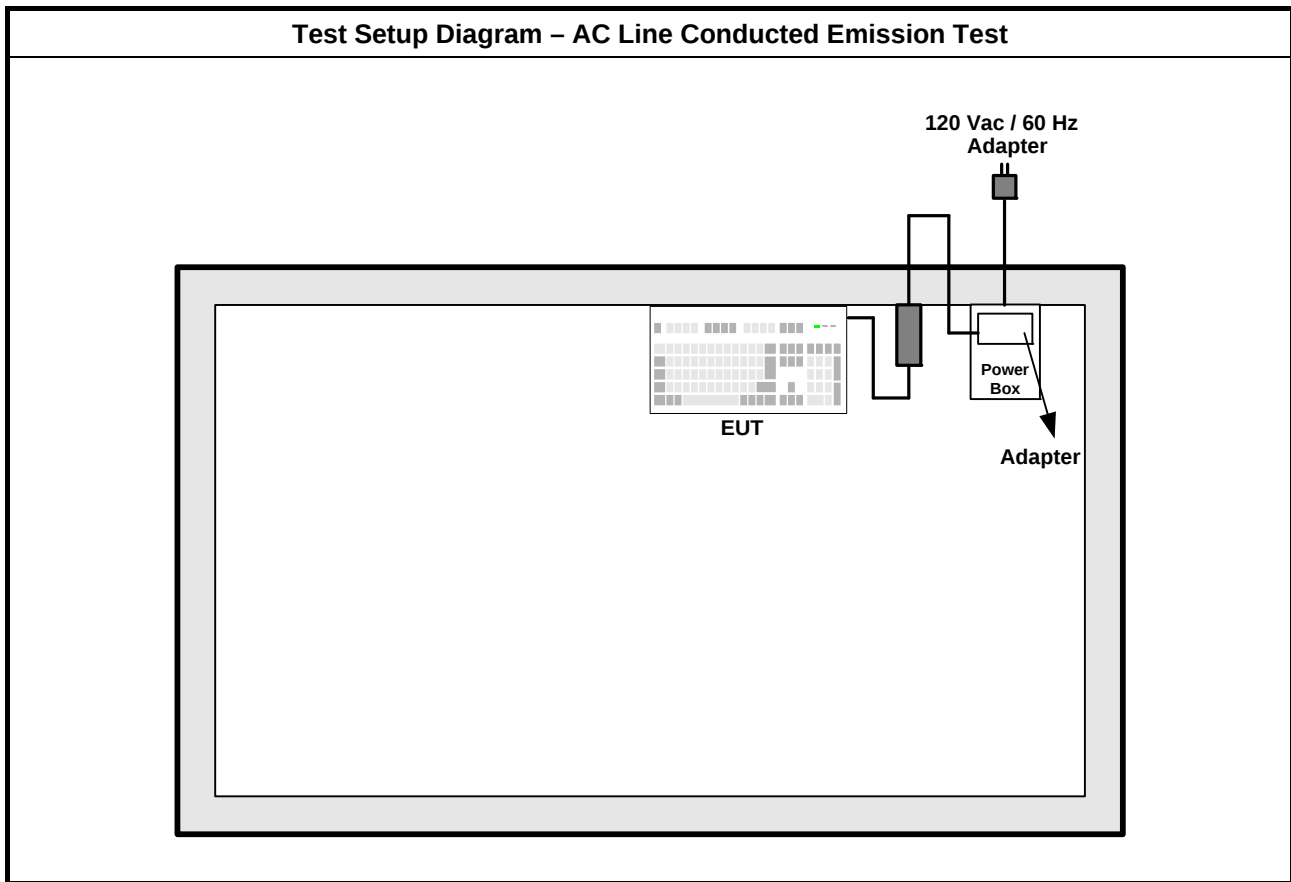
Test Channel Frequencies Configuration	
Test Mode	Test Channel Frequencies (MHz)
GFSK-Transmit	2402-(F1), 2441-(F2), 2478-(F3)

2.3 The Worst Case Measurement Configuration

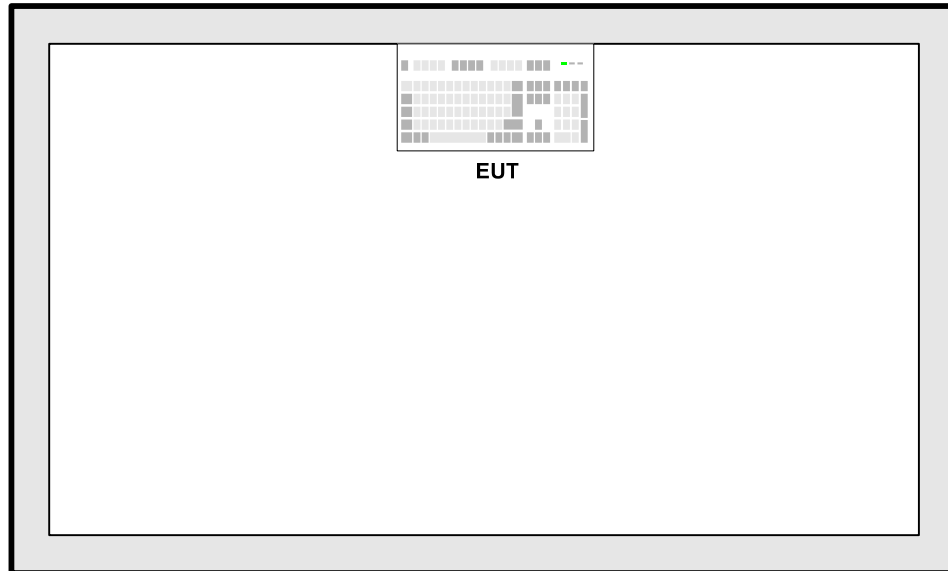
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral (120Vac / 60Hz)
Operating Mode	Operating Mode Description
1	AC Power & Radio link

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.		
	☒ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two orthogonal planes. The worst planes is Y.		
	☐ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes.		
Operating Mode	☒ 1. Transmitter Mode		
	☒ 2. Charge Mode		
Test Mode	GFSK-Transmit		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			

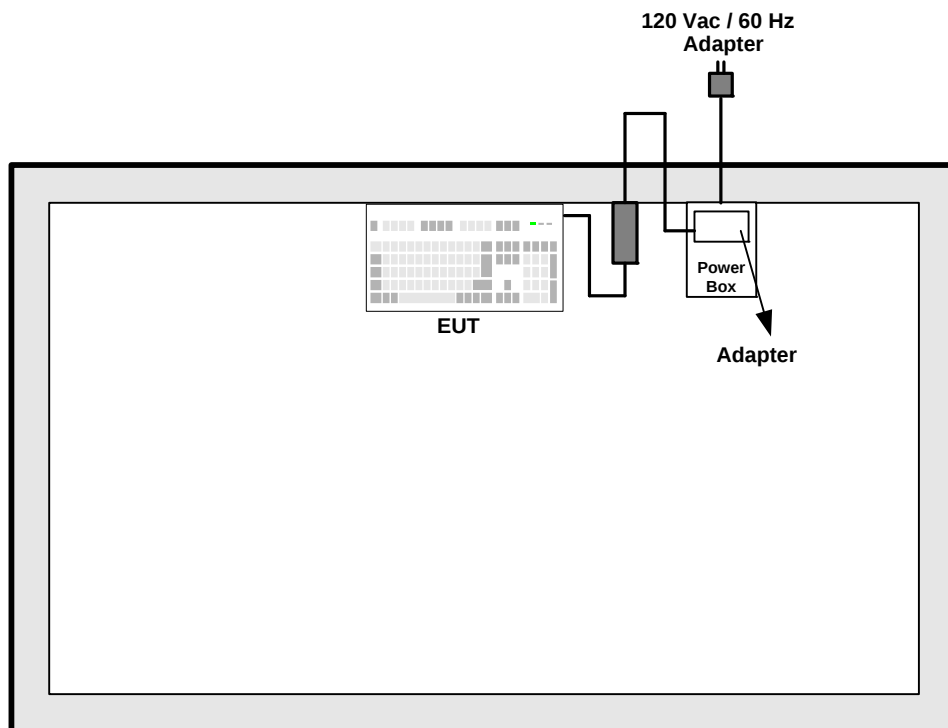
2.4 Test Setup Diagram



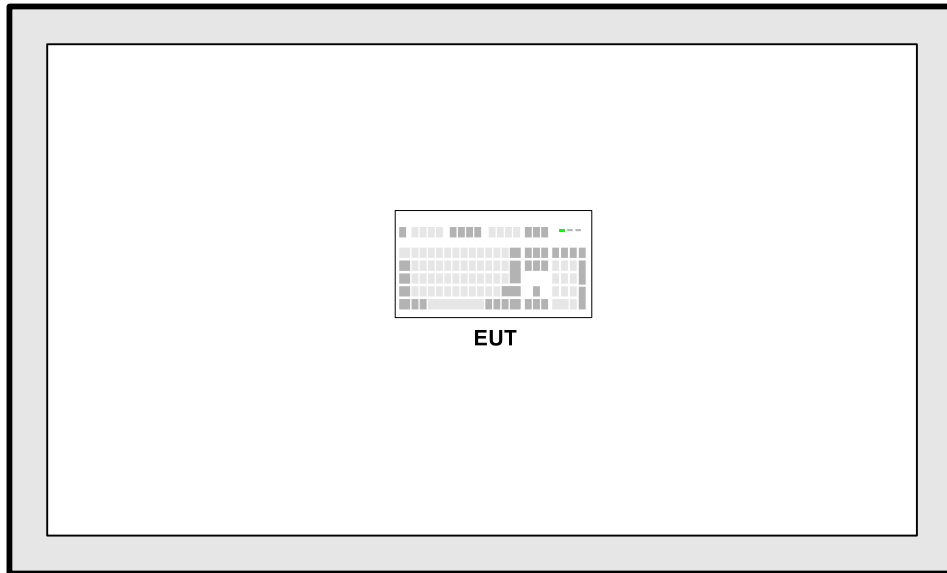
**Test Setup Diagram - Radiated Test (Below 1GHz)
Transmitter Mode**



**Test Setup Diagram - Radiated Test (Below 1GHz)
Charge Mode**



Test Setup Diagram - Radiated Test (Above 1GHz)



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.

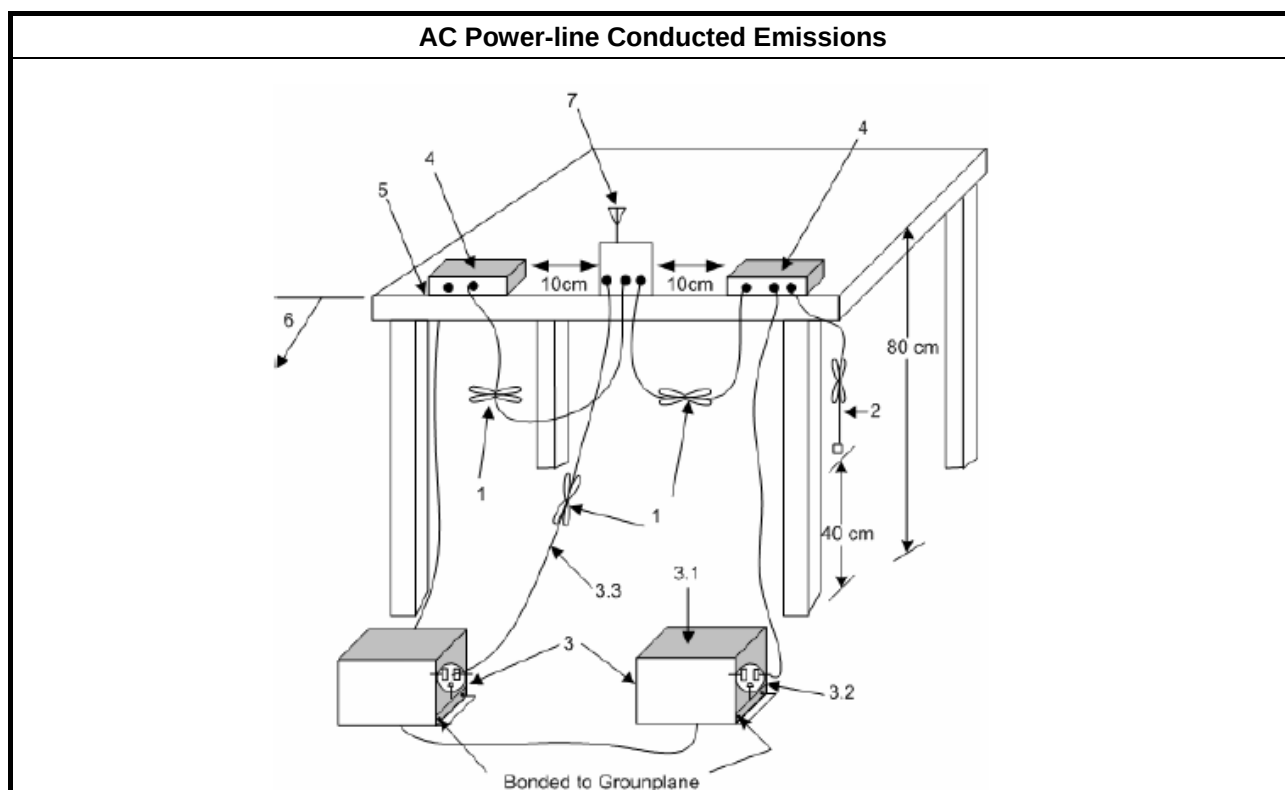
3.1.2 Measuring Instruments

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

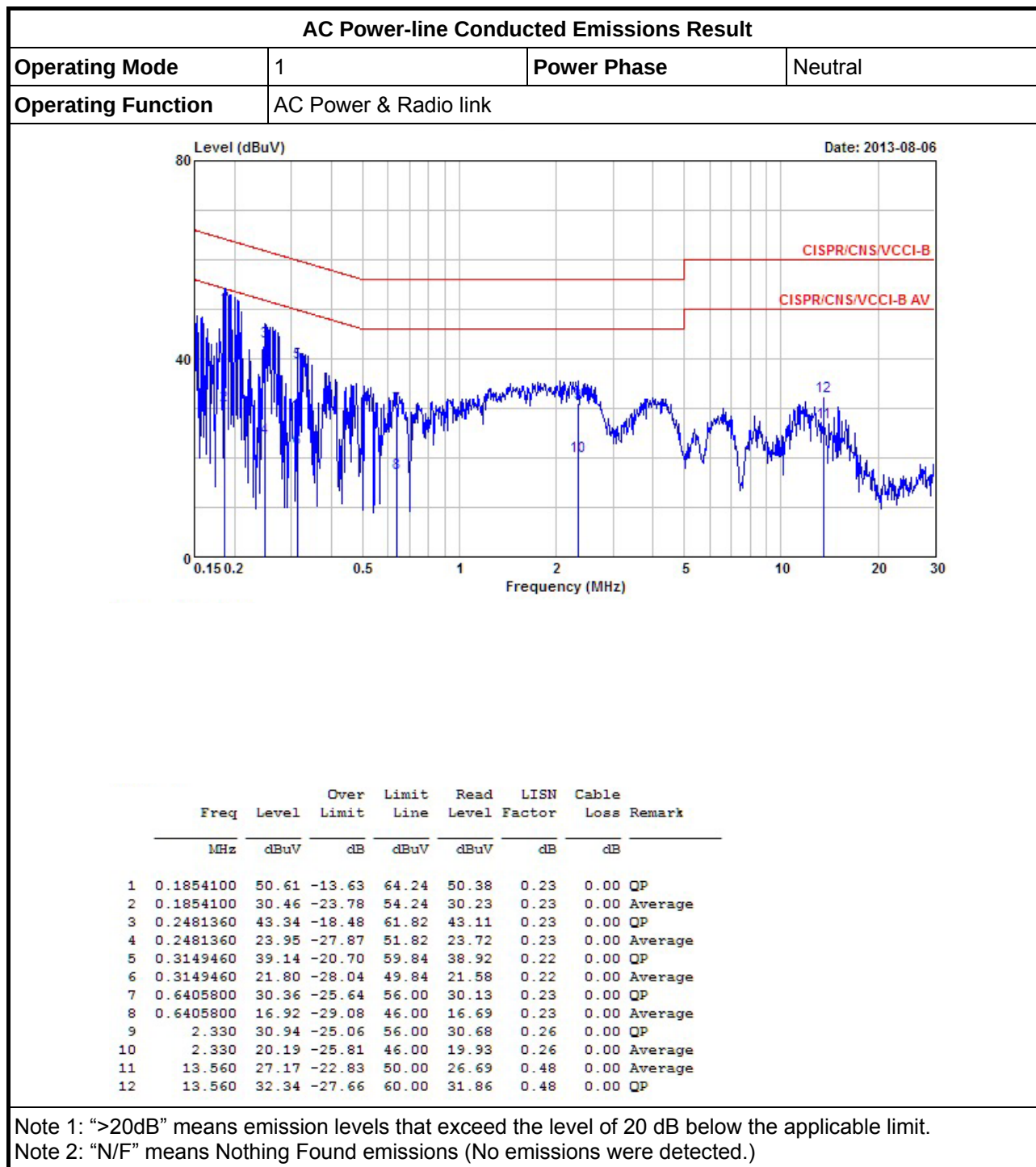
3.1.3 Test Procedures

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

3.1.4 Test Setup

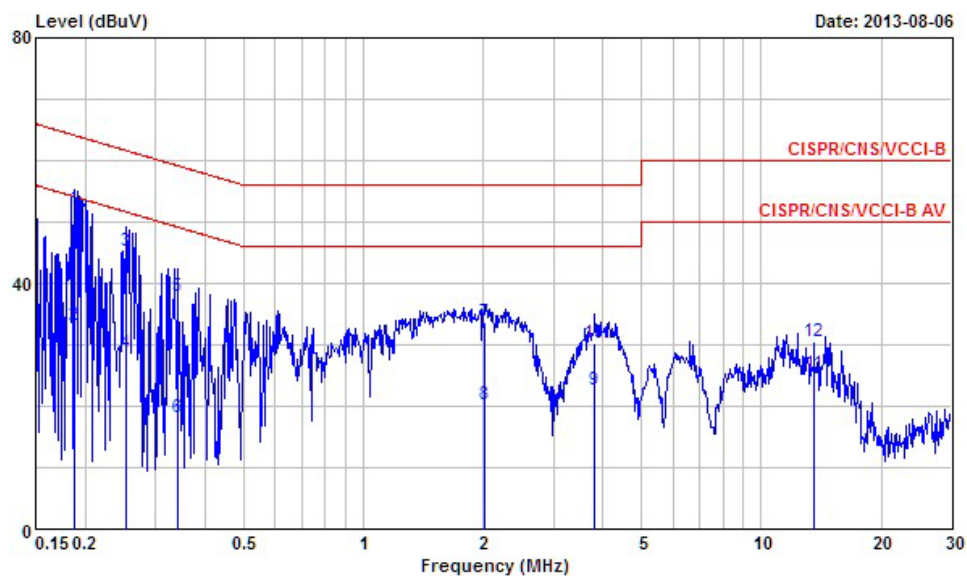


3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	AC Power & Radio link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1873850	52.00	-12.15	64.15	51.89	0.11	0.00	QP
2	0.1873850	33.18	-20.97	54.15	33.07	0.11	0.00	Average
3	0.2534510	45.37	-16.27	61.64	45.26	0.11	0.00	QP
4	0.2534510	28.64	-23.00	51.64	28.53	0.11	0.00	Average
5	0.3428090	37.84	-21.29	59.13	37.74	0.10	0.00	QP
6	0.3428090	18.24	-30.89	49.13	18.14	0.10	0.00	Average
7	2.020	33.62	-22.38	56.00	33.49	0.13	0.00	QP
8	2.020	20.19	-25.81	46.00	20.06	0.13	0.00	Average
9	3.820	22.69	-23.31	46.00	22.54	0.15	0.00	Average
10	3.820	30.36	-25.64	56.00	30.21	0.15	0.00	QP
11	13.560	25.20	-24.80	50.00	24.93	0.27	0.00	Average
12	13.560	30.53	-29.47	60.00	30.26	0.27	0.00	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	
☒	Emission bandwidth falls completely within authorized band.

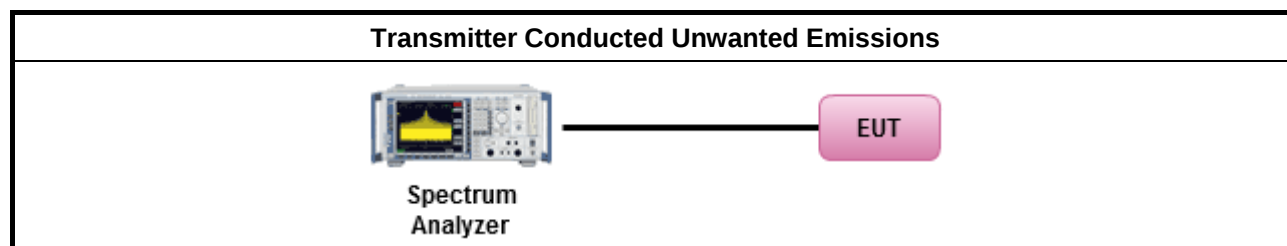
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

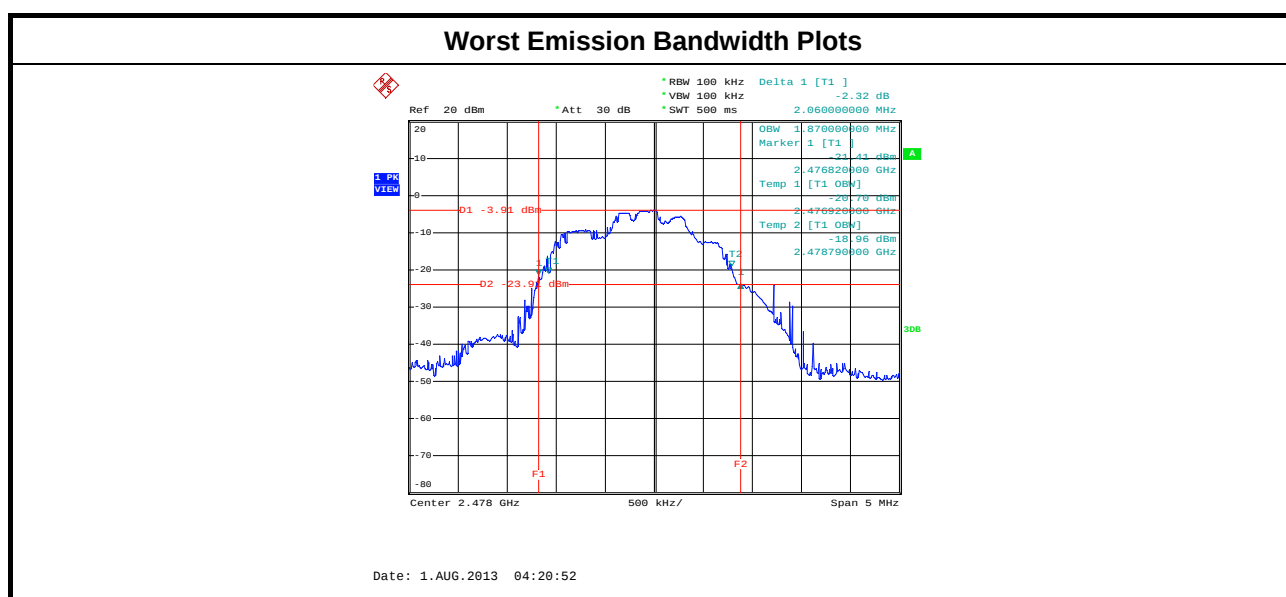
Test Method	
☒	Refer as ANSI C63.10, clause 6.9.1 for 20 dB emission bandwidth and 99% occupied bandwidth measurement.

3.2.4 Test Setup



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	1.92	1.68	2400.8500	-
GFSK-Transmit	2441	2.04	1.77	-	-
GFSK-Transmit	2478	2.06	1.87	-	2478.8800
Limit		N/A	N/A		2400
Result		Complied			



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)

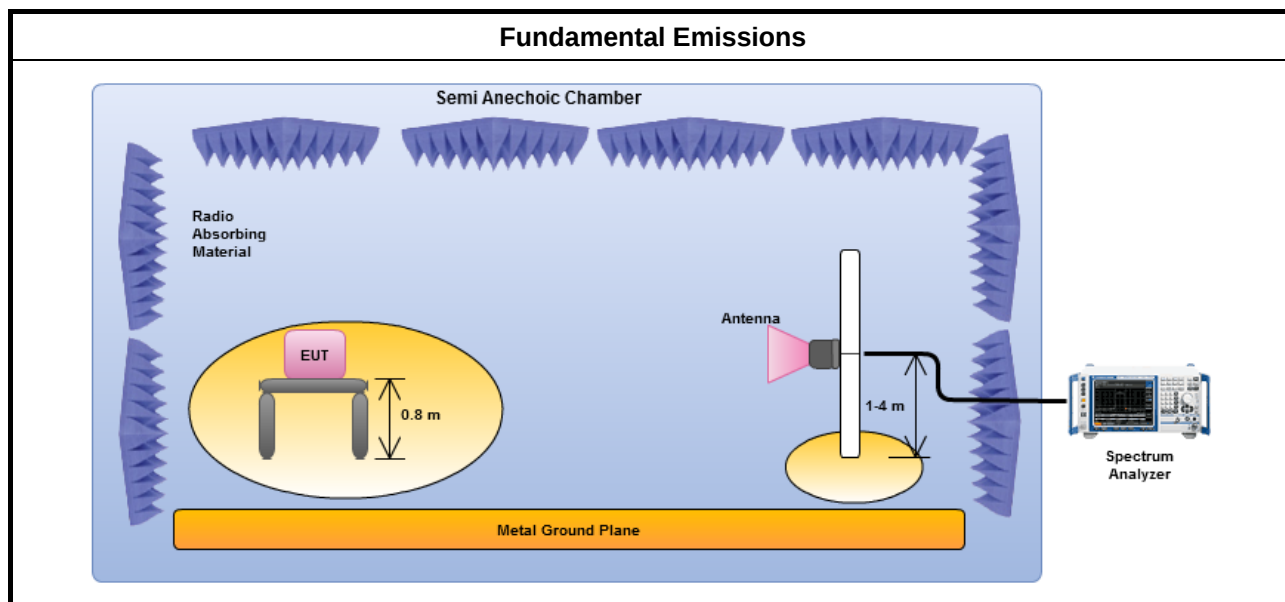
3.3.2 Measuring Instruments

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 $\geq 100\%$.
☒	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 $20\log(\text{dwell time}/100 \text{ ms})$. 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



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	86.08	27.92	114	peak
GFSK-Transmit	2402	51.19	42.81	94	average
GFSK-Transmit	2441	88.17	25.83	114	peak
GFSK-Transmit	2441	53.28	40.72	94	average
GFSK-Transmit	2478	88.96	25.04	114	peak
GFSK-Transmit	2478	54.07	39.93	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.

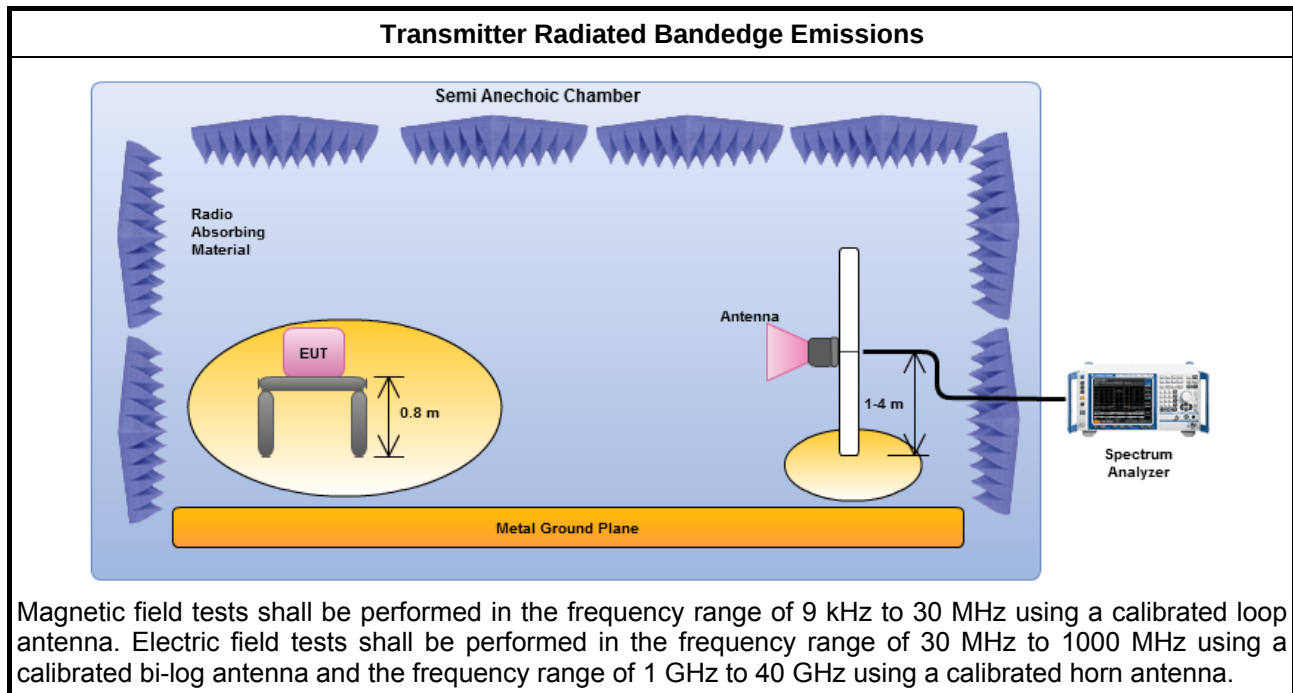
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

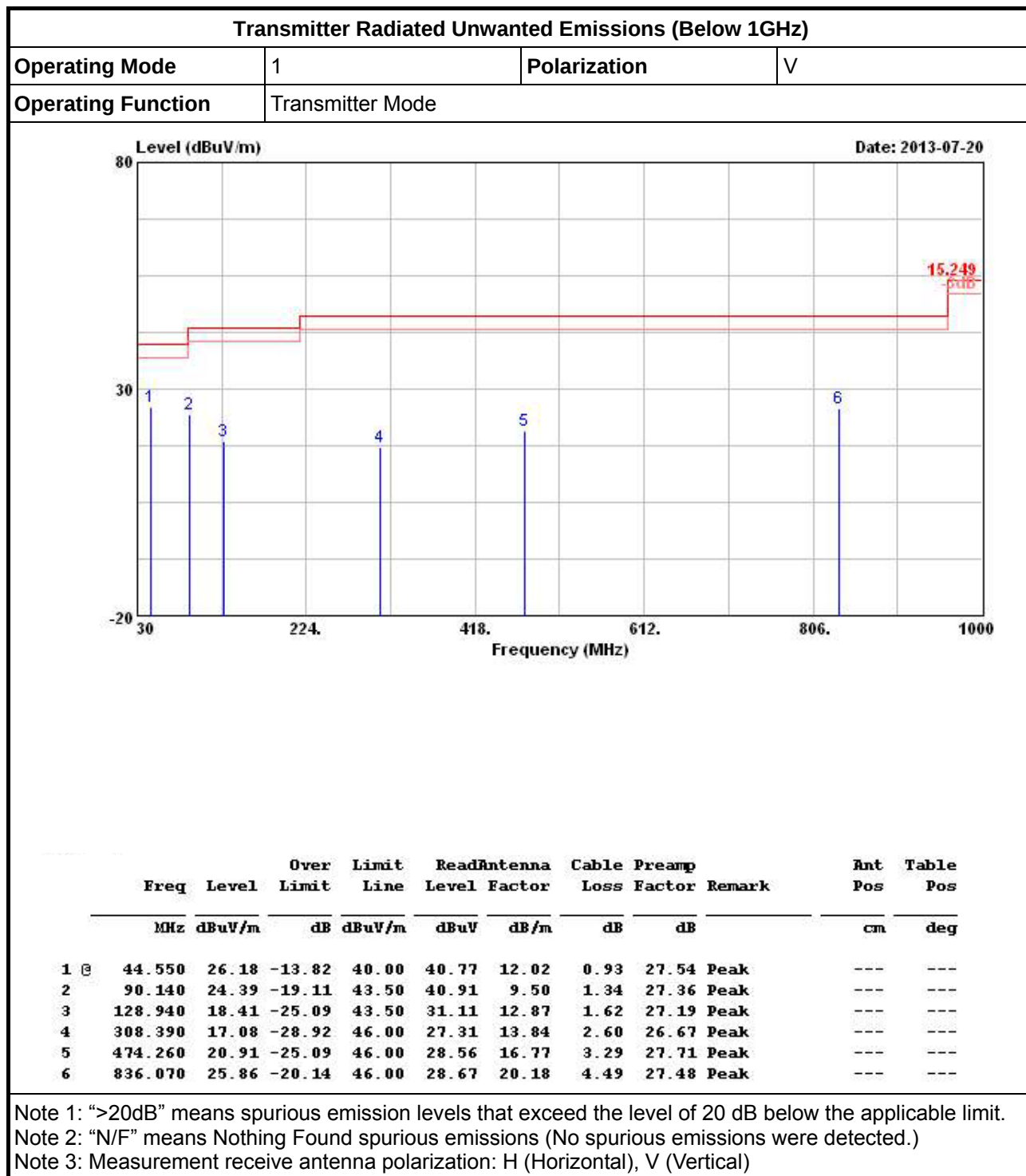
Test Method – General Information	
☒	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, 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).
☐	Measurements in the frequency range 5 GHz - 10GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
☒	Measurements in the frequency range 10 GHz - 18GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
☒	Measurements in the frequency range above 18 GHz - 25GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit.
☒	The average emission levels shall be measured in [duty cycle $\geq$ 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 $\geq$ 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 $20\log(\text{dwell time}/100 \text{ ms})$. 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



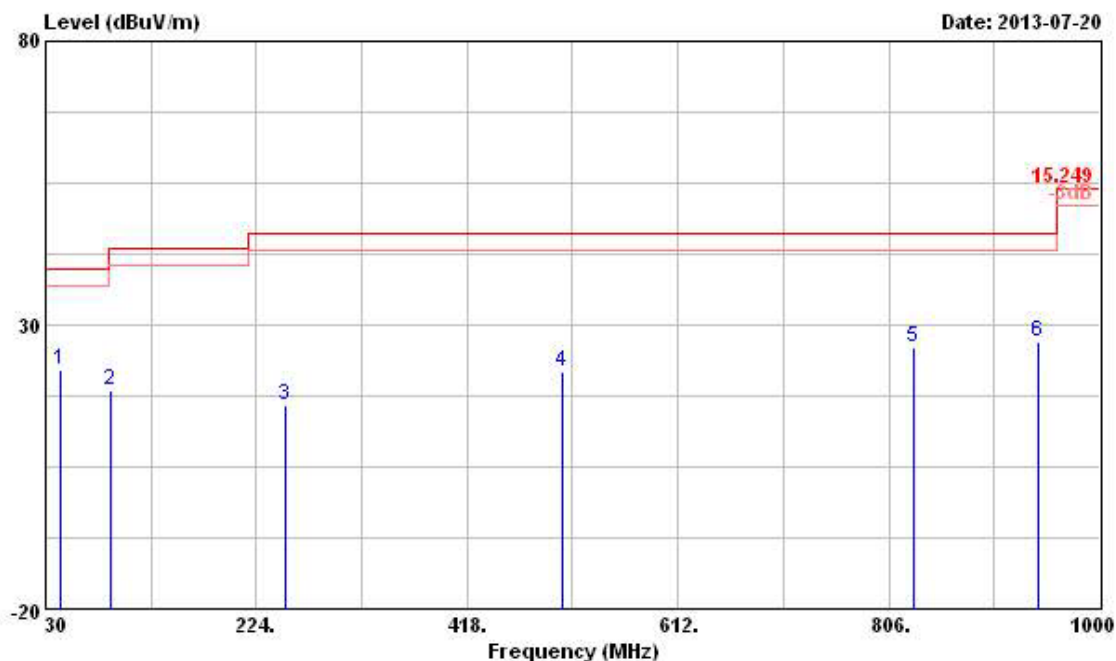
3.4.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

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	H
Operating Function	Transmitter Mode		



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	43.580	22.02	-17.98	40.00	36.39	12.27	0.91	27.55	Peak	---	---
2	90.140	18.51	-24.99	43.50	35.03	9.50	1.34	27.36	Peak	---	---
3	250.190	15.96	-30.04	46.00	27.31	13.00	2.39	26.74	Peak	---	---
4	505.300	21.83	-24.17	46.00	28.77	17.45	3.43	27.82	Peak	---	---
5	828.310	25.94	-20.06	46.00	28.77	20.20	4.48	27.51	Peak	---	---
6	943.740	26.92	-19.08	46.00	28.13	21.11	4.79	27.11	Peak	---	---

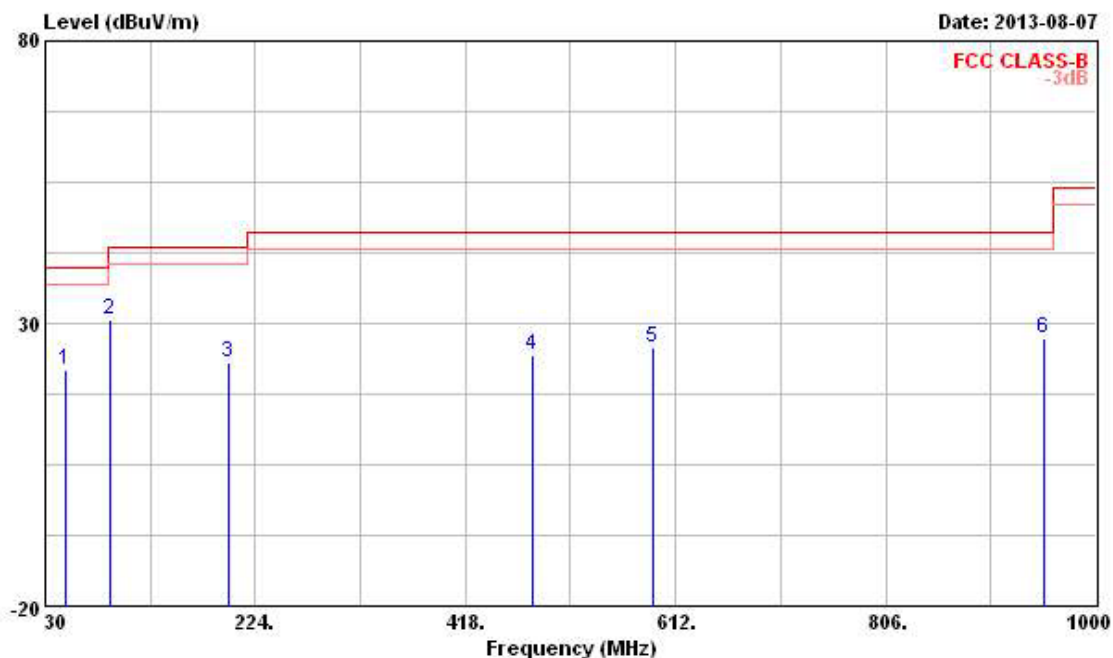
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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	2	Polarization	V
Operating Function	Charge Mode		



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	48.430	21.78	-18.22	40.00	37.98	10.34	0.99	27.53	QP	---	---
2	90.140	30.78	-12.72	43.50	47.30	9.50	1.34	27.36	Peak	---	---
3	198.780	22.96	-20.54	43.50	36.50	11.28	2.06	26.88	Peak	---	---
4	479.110	24.30	-21.70	46.00	31.85	16.87	3.31	27.73	Peak	---	---
5	591.630	25.56	-20.44	46.00	29.87	19.93	3.66	27.90	Peak	---	---
6	951.500	27.38	-18.62	46.00	28.34	21.30	4.82	27.08	Peak	---	---

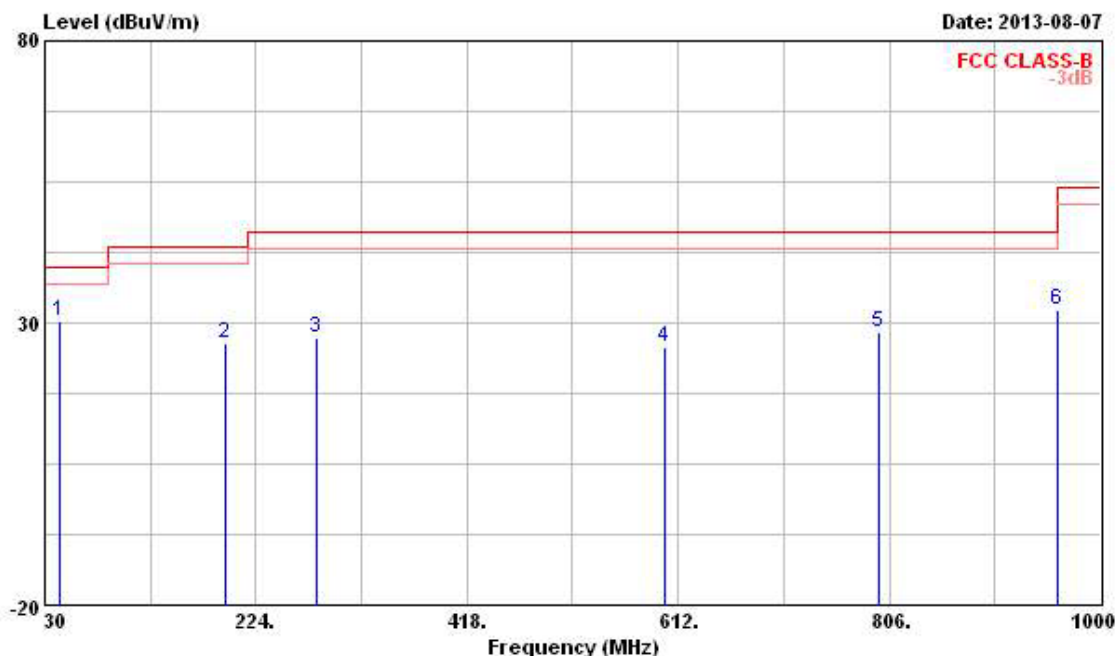
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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	2	Polarization	H
Operating Function	Charge Mode		

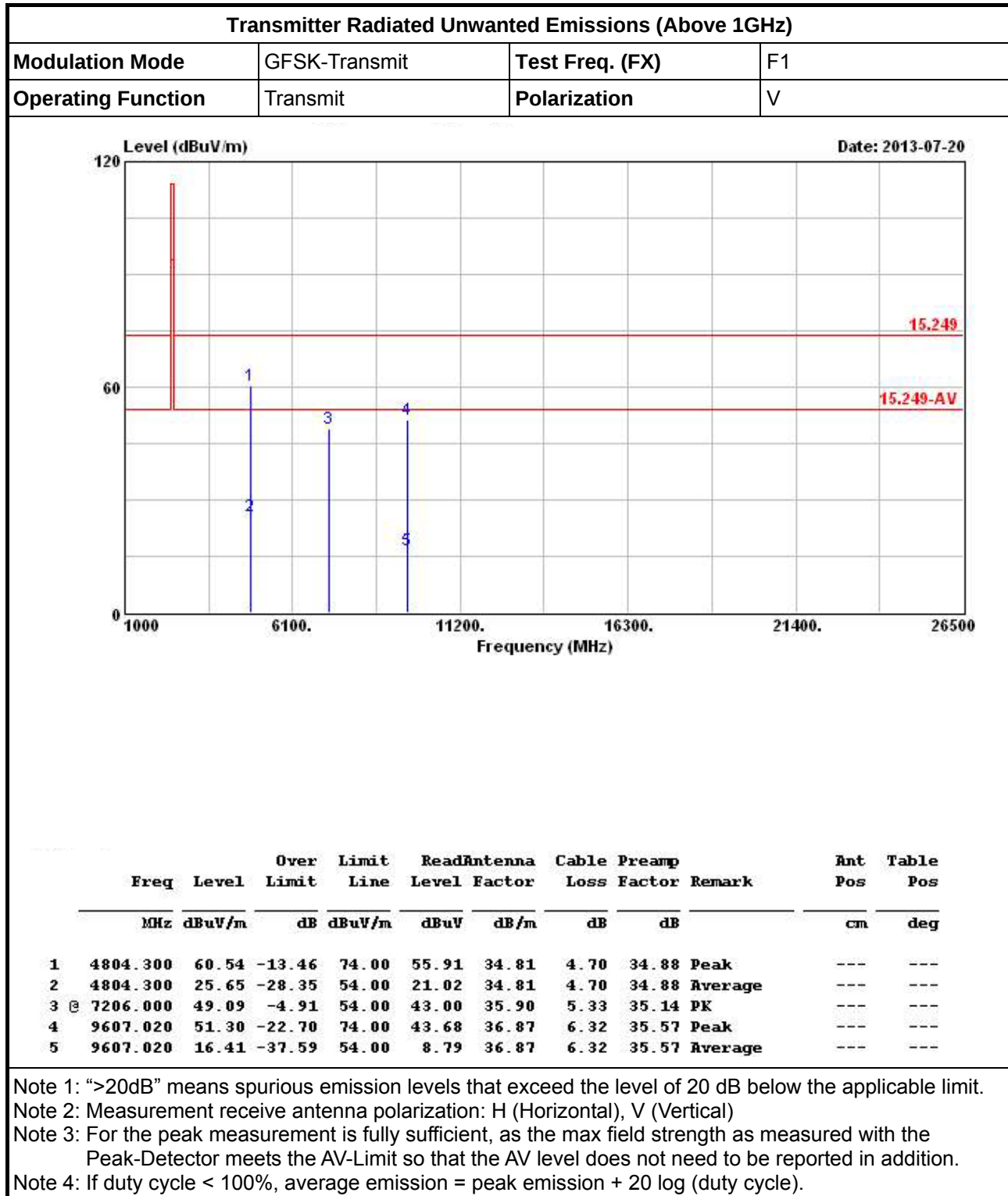


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	43.580	30.31	-9.69	40.00	44.68	12.27	0.91	27.55	Peak	---	---
2	195.870	26.24	-17.26	43.50	40.02	11.06	2.05	26.89	Peak	---	---
3	280.260	27.47	-18.53	46.00	38.21	13.43	2.49	26.66	Peak	---	---
4	599.390	25.56	-20.44	46.00	29.64	20.15	3.68	27.91	Peak	---	---
5	796.300	28.51	-17.49	46.00	31.51	20.21	4.40	27.61	Peak	---	---
6	960.230	32.39	-21.61	54.00	33.06	21.52	4.85	27.04	Peak	---	---

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

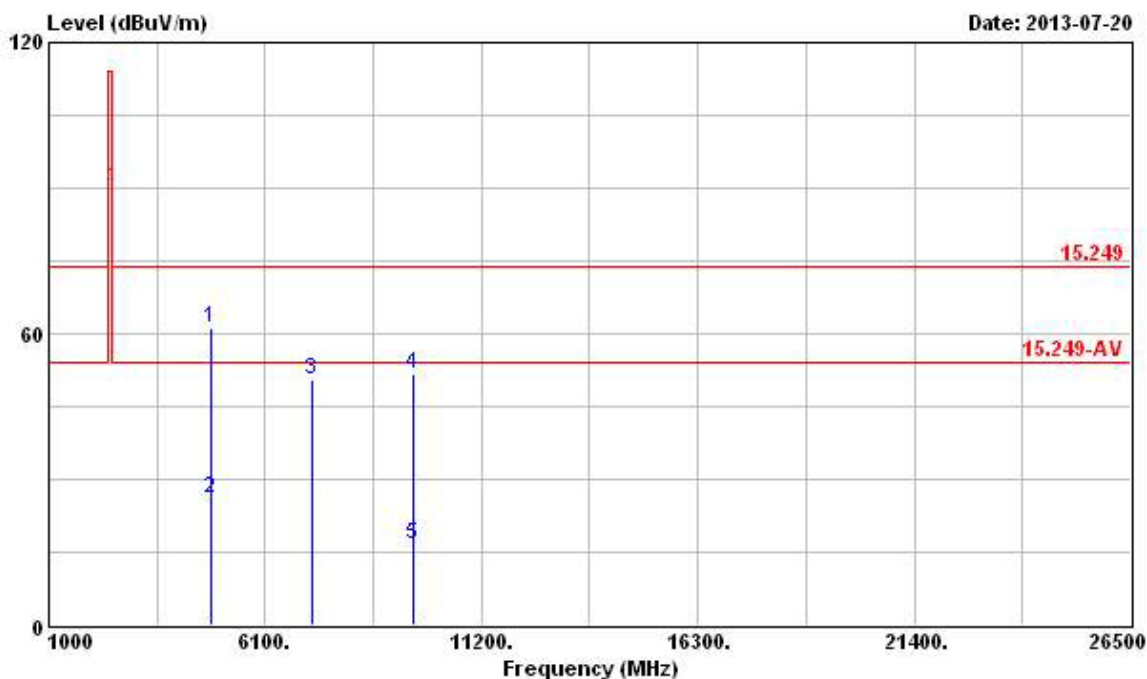
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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. (FX)	F1
Operating Function	Transmit	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4803.070	61.00	-13.00	74.00	56.37	34.81	4.70	34.88	Peak	---	---
2	4803.070	26.11	-27.89	54.00	21.48	34.81	4.70	34.88	Average	---	---
3	7206.320	50.50	-3.50	54.00	44.41	35.90	5.33	35.14	PK	---	---
4	9608.000	51.65	-22.35	74.00	44.03	36.87	6.32	35.57	Peak	---	---
5	9608.000	16.76	-37.24	54.00	9.14	36.87	6.32	35.57	Average	---	---

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

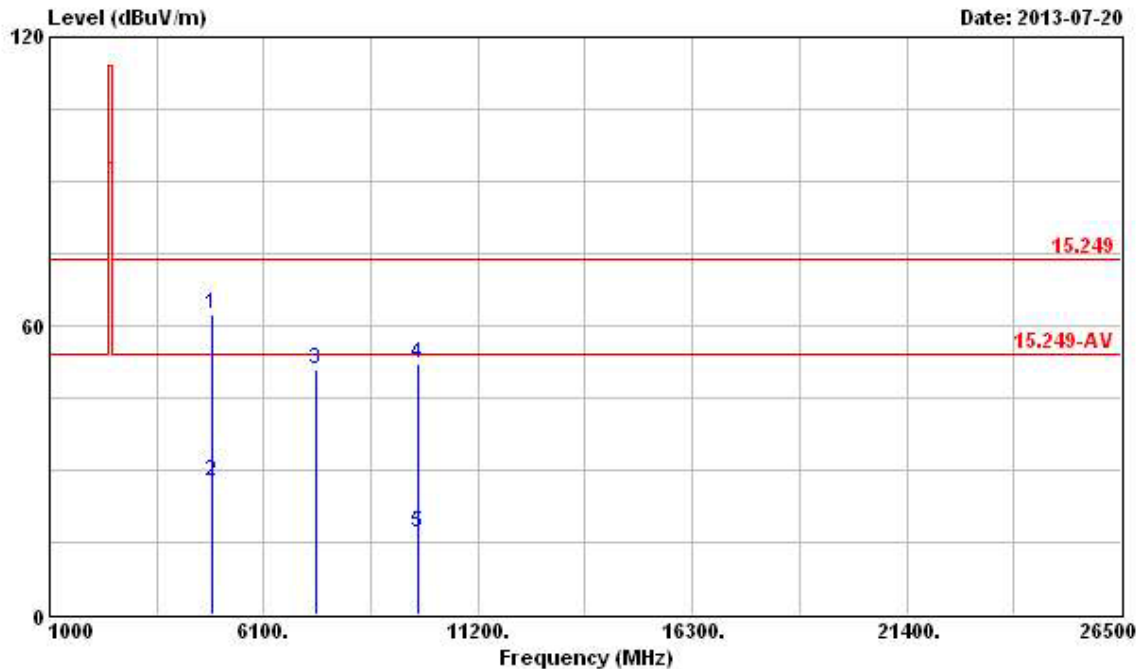
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

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. (FX)	F2
Operating Function	Transmit	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4882.140	62.51	-11.49	74.00	57.84	34.77	4.76	34.86	Peak	---	---
2	4882.140	27.62	-26.38	54.00	22.95	34.77	4.76	34.86	Average	---	---
3 @	7323.000	50.89	-3.11	54.00	44.69	35.90	5.47	35.17	PK	---	---
4	9764.000	51.96	-22.04	74.00	43.96	37.14	6.44	35.58	Peak	---	---
5	9764.000	17.07	-36.93	54.00	9.07	37.14	6.44	35.58	Average	---	---

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

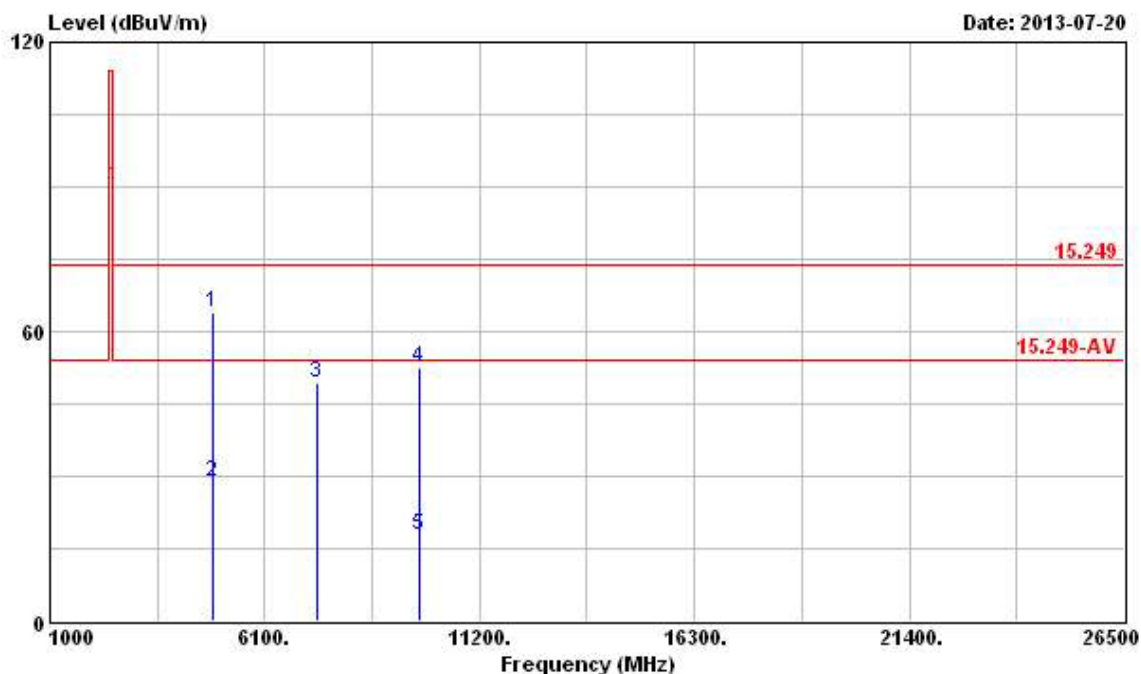
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

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. (FX)	F2
Operating Function	Transmit	Polarization	H



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4881.340	63.90	-10.10	74.00	59.23	34.77	4.76	34.86	Peak	---
2	4881.340	29.01	-24.99	54.00	24.34	34.77	4.76	34.86	Average	---
3	7323.000	49.41	-4.59	54.00	43.21	35.90	5.47	35.17	PK	---
4	9752.000	52.61	-21.39	74.00	44.67	37.11	6.41	35.58	Peak	---
5	9752.000	17.72	-36.28	54.00	9.78	37.11	6.41	35.58	Average	---

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

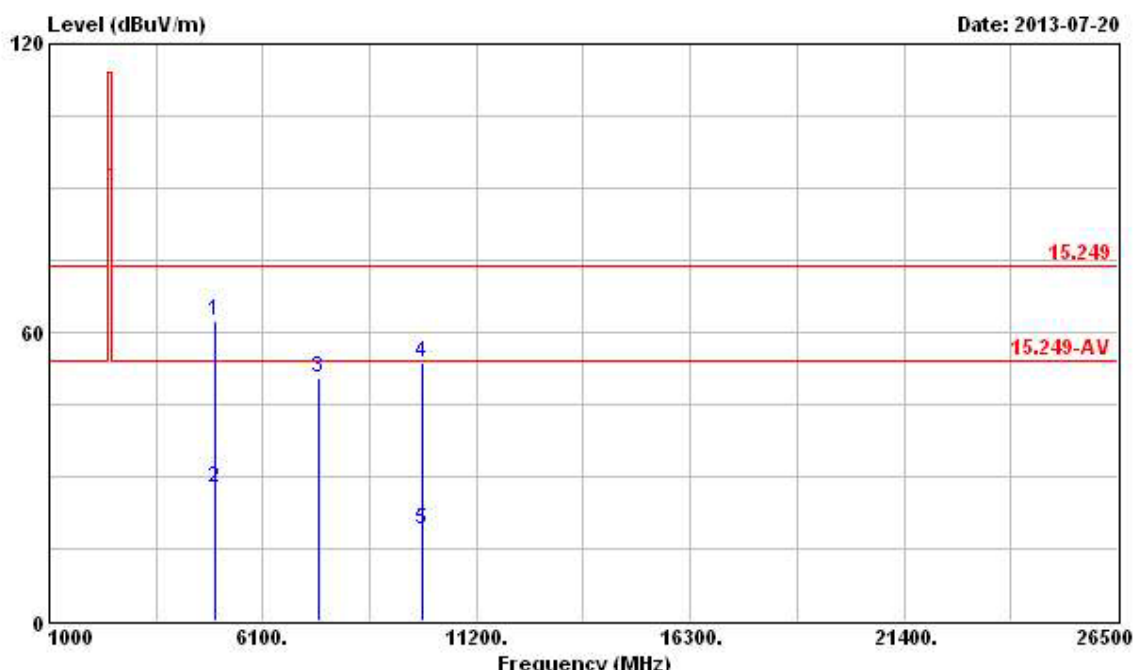
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

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. (FX)	F3
Operating Function	Transmit	Polarization	V



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4955.220	62.50	-11.50	74.00	57.83	34.72	4.79	34.84	Peak	---
2	4955.220	27.61	-26.39	54.00	22.94	34.72	4.79	34.84	Average	---
3	7434.110	50.43	-3.57	54.00	44.12	35.90	5.61	35.20	PK	---
4	9912.120	53.65	-20.35	74.00	45.31	37.36	6.56	35.58	Peak	---
5	9912.120	18.76	-35.24	54.00	10.42	37.36	6.56	35.58	Average	---

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

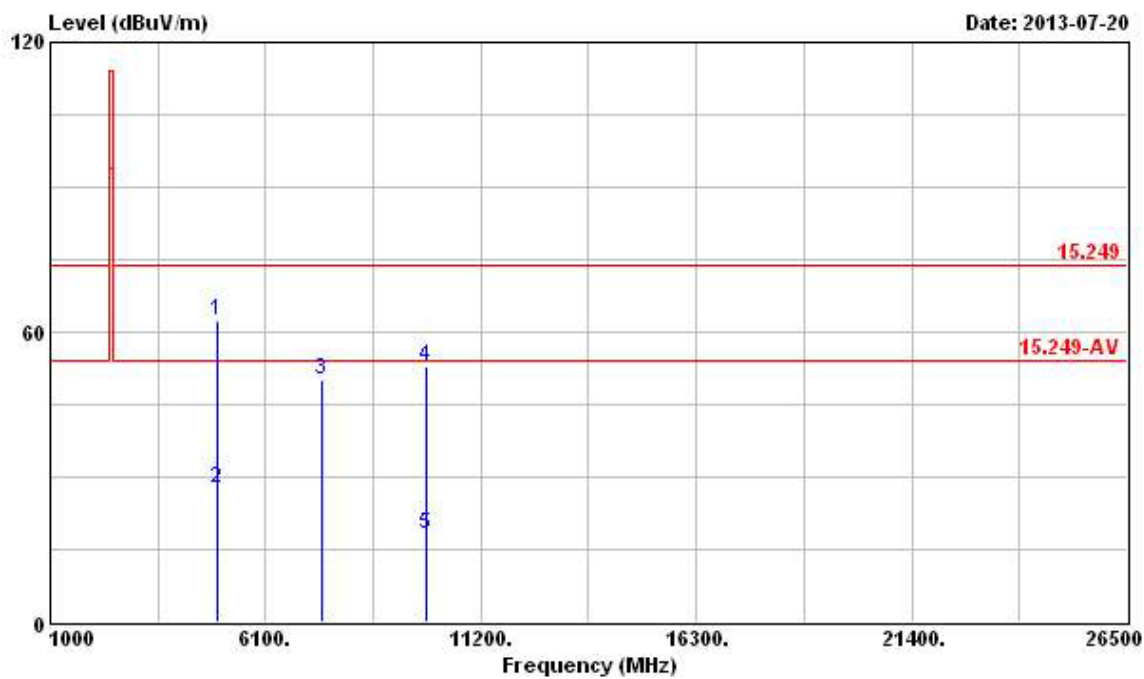
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

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. (FX)	F3
Operating Function	Transmit	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4955.370	62.33	-11.67	74.00	57.66	34.72	4.79	34.84	Peak	---
2	4955.370	27.44	-26.56	54.00	22.77	34.72	4.79	34.84	Average	---
3	7434.000	50.08	-3.92	54.00	43.77	35.90	5.61	35.20	PK	---
4	9912.000	52.98	-21.02	74.00	44.64	37.36	6.56	35.58	Peak	---
5	9912.000	18.09	-35.91	54.00	9.75	37.36	6.56	35.58	Average	---

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	Mar. 26, 2013	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 21, 2013	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 18, 2013	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+012	9kHz ~ 30MHz	Nov. 09, 2012	Conduction (CO04-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101013	9KHz~40GHz	Jan. 29, 2013	Conducted (TH06-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 21, 2013	Conducted (TH06-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	-20 ~ 100℃	Nov. 21, 2012	Conducted (TH06-HY)
RF Cable-2m	HUBER+SUHNER	SUCOFLEX_104	SN 345673/4	1GHz ~ 26.5GHz	NA	Conducted (TH06-HY)
RF Cable-3m	HUBER+SUHNER	SUCOFLEX_104	SN 345668/4	1GHz ~ 26.5GHz	NA	Conducted (TH06-HY)

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



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Sep. 14, 2012	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 11, 2013	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100kHz ~ 1.3GHz	Jul 17, 2013	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	Aug. 10, 2012	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 16, 2012	Radiation (03CH02-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 08, 2013	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 10, 2012	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 05, 2013	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 22, 2012	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0~ 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 ~ 4 m	N/A	Radiation (03CH02-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz - 30 MHz	Dec. 02, 2012	Radiation (03CH02-HY)

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