FCC Test Report

Equipment	**: Set-Top Box**
Brand Name	**: CISCO**
Model No.	**: IPV50xy, IPV60xy (X=5, Y can be 0, 3, 5, 6)**
FCC ID	**: VUI-IPV5K6KUSWIFI**
Standard	**: 47 CFR FCC Part 15.247**
Operating Band	**: 2400 MHz – 2483.5 MHz**
Equipment Class	**: DSS**
Applicant	**: PEGATRON CORPORATION** 5F No. 76, Ligong St.,Beitou District, Taipei City 112 Taiwan
Manufacturer	**: Maintek Computer (Suzhou) Co., Ltd** 233 Jin Feng Rd New District Suzhou JiangsuI 215011 China

The product sample received on Mar. 05, 2014 and completely tested on May 28, 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

Table of Contents

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]: 0.1524030MHz 39.11 (Margin 16.76dB) - AV 53.75 (Margin 12.12dB) - QP	FCC 15.207	Complied
3.2	15.247(a)	20dB Bandwidth	EDR: 1.2808MHz	N/A	Complied
3.2	15.247(a)	Carrier Frequency Separation (ChS)	EDR: 1.0000MHz	ChS ≥ BW_{20dB} x2/3.	Complied
3.3	15.247(a)	Number of Hopping Frequencies (N)	Max: 79 Min: 15	N ≥ 15	Complied
3.4	15.247(a)	Time of Occupancy (Dwell Time)	EDR:0.315sec	0.4 s within 0.4 x N	Complied
3.5	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm] BR: 7.35 EDR: 6.58	Power [dBm] BR:21 EDR:21	Complied
3.6	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2393.84MHz: 39.94dB Restricted Bands [dBuV/m at 3m]: 2483.50MHz 49.10 (Margin 4.90dB) - AV 60.64 (Margin 13.36dB) - PK	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied
3.7	15.247(c)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 44.55MHz 36.86 (Margin 3.14dB) - PK	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied

Revision History

Report No.	Version	Description	Issued Date
FR430452-02AD	Rev. 01	Initial issue of report	Dec. 4, 2014

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information					
Frequency Range (MHz)	**Bluetooth Version**	**Ch. Frequency (MHz)**	**Channel Number**	**RF Output Power (dBm)**	**Co-location**
2400-2483.5	BR / EDR	2402-2480	0-78 [79]	7.35	Yes
Note 1: Bluetooth BR uses a GFSK (1Mbps). Note 2: Bluetooth EDR uses a combination of π/4-DQPSK (2Mbps) and 8DPSK (3Mbps). Note 3: RF output power specifies that Maximum Peak Conducted Output Power.					

1.1.2 Antenna Information

Antenna Category	
☒	Integral antenna (antenna permanently attached)
	☐ Temporary RF connector provided
	☒ 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.

Antenna General Information		
Ant. Cat.	**Ant. Type**	**Gain (dBi)**
Integral	PCB	2.26

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 test mode for worst duty cycle	
Test Signal Duty Cycle (x)	**Power Duty Factor [dB] – (10 log 1/x)**
☒ 78.76% - test mode single channel-DH5	1.04
Bluetooth ACL packets can be 1, 3, or 5 time slots. The DH1 packet can cover a single time slot. The DH3 packet can cover up to 3 time slots. The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle.	

1.1.5 EUT Operational Condition

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

1.2 Accessories and Support Equipment

Accessories Information				
AC Adapter 1	Brand Name	I.T.E	Model Name	ML18-A120150-A1
	Power Rating	I/P: 100-120V~ 50/60Hz 0.6A ; O/P: 12V⎓1.5A		
AC Adapter 2	Brand Name	Chicony	Model Name	W13-018N1A
	Power Rating	I/P: 100-120V~ 60Hz 0.5A ; O/P: 12V⎓1.5A		

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

Support Equipment - AC Conduction				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5530	DoC
2	USB Cable (Only test use)	--	--	--

Support Equipment - RF Conducted				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5520	DoC

Support Equipment - Radiated Emission				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5520	DoC
2	USB Cable (Only test use)	--	--	--

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
- FCC Public Notice DA 00-705

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 Condition	Test Site No.	Test Engineer	Test Environment
AC Conduction	CO04-HY	Zeus	22°C / 53%
RF Conducted	TH06-HY	Cain	24.3°C / 63.1%
Radiated Emission (below 1GHz)	03CH03-HY	Leo	24°C / 60%
Radiated Emission (above 1GHz)	03CH03-HY	Leo	24°C / 56%

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		±1.4 %
RF output power, conducted		±0.6 dB
Power density, conducted		±0.8 dB
Unwanted emissions, conducted	30 – 1000 MHz	±0.5 dB
	1 – 18 GHz	±0.7 dB
	18 – 40 GHz	±0.8 dB
	40 – 200 GHz	N/A
All emissions, radiated	30 – 1000 MHz	±2.6 dB
	1 – 18 GHz	±3.9 dB
	18 – 40 GHz	±3.8 dB
	40 – 200 GHz	N/A
Temperature		±0.8 °C
Humidity		±3 %
DC and low frequency voltages		±3 %
Time		±1.4 %
Duty Cycle		±1.4 %

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Worst Modulation Used for Conformance Testing					
Bluetooth Mode	**Transmit Chains (N_{TX})**	**Data Rate**	**Modulation Mode**	**RF Output Power (dBm)**	**Worst Mode**
BR	1	1 Mbps	BR-1Mbps	7.35	BR-1Mbps
EDR	1	2 Mbps	EDR-2Mbps	6.28	
EDR	1	3 Mbps	EDR-3Mbps	6.58	
Note 1: Bluetooth BR uses a combination of GFSK (1Mbps). Note 2: Bluetooth EDR uses a combination of π/4-DQPSK (2Mbps) and 8DPSK (3Mbps). Note 3: Modulation modes consist below configuration: FHSS BR-1Mbps: GFSK (1Mbps), EDR-2Mbps: π/4-DQPSK (2Mbps), EDR-3Mbps: 8DPSK(3Mbps) Note 4: RF output power specifies that Maximum Peak Conducted Output Power.					

2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter			
Test Software Version	BlueTest3		
Modulation Mode	**2402 MHz**	**2440 MHz**	**2480 MHz**
BR,1Mbps	63	63	63
EDR,2Mbps	120	120	120
EDR,3Mbps	120	120	120

2.3 The Worst Case Measurement Configuration

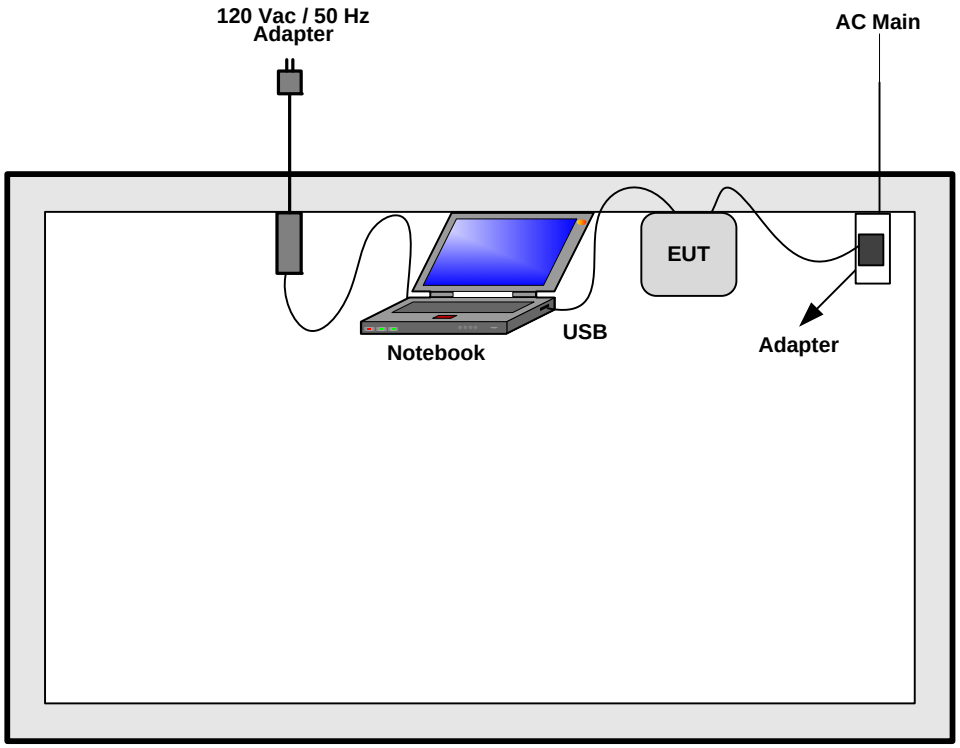
The Worst Case Mode for Following Conformance Tests			
Tests Item	AC power-line conducted emissions		
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz		
Operating Mode	Operating Mode Description		
1	AC Mode & Radio link (Adapter 1)		
2	AC Mode & Radio link (Adapter 2)		
The operating mode 2 is the worst case and it was record in this test report.			
User Position	☐ EUT will be placed in fixed position.		
	☒ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes. The worst planes is Z Plane.		
	☐ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
			

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	BR-1Mbps, EDR-3Mbps

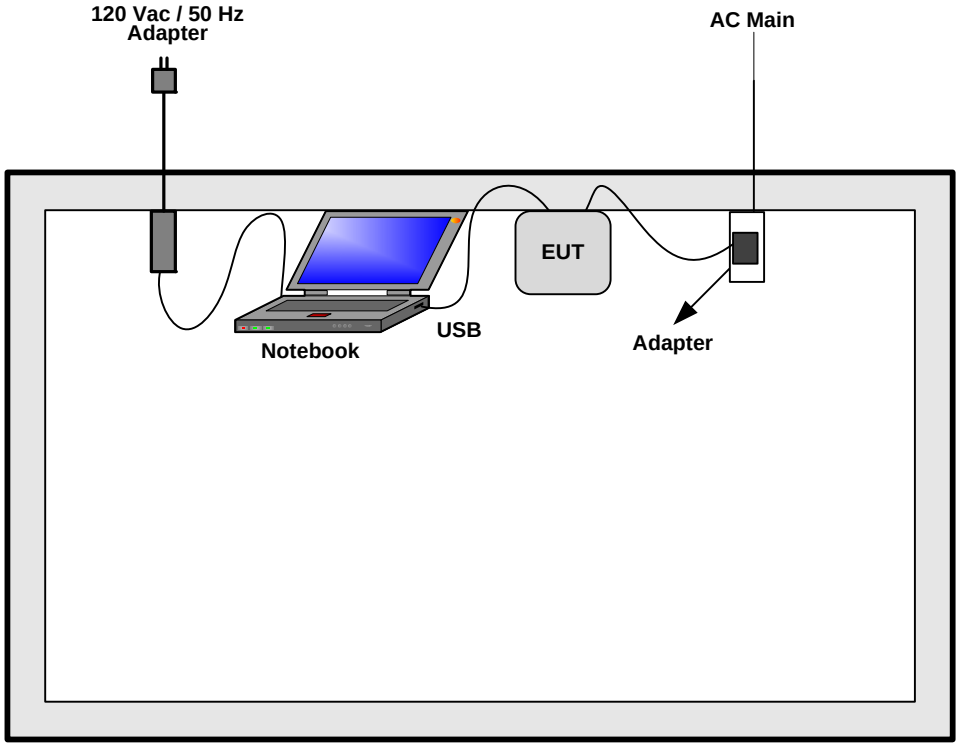
The Worst Case Mode for Following Conformance Tests			
Tests Item	Transmitter Radiated Unwanted Emissions Transmitter Radiated Bandedge Emissions		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
User Position	☐ EUT will be placed in fixed position.		
	☒ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes. The worst planes is X Plane.		
	☐ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.		
Operating Mode < 1GHz	Operating Mode Description		
1	AC Mode & Radio link (Adapter 1)		
2	AC Mode & Radio link (Adapter 2)		
The operating mode 2 is the worst case and it was record in this test report.			
Operating Mode > 1GHz	Operating Mode Description		
2	AC Mode & Radio link (Adapter 2)		
Modulation Mode	BR-1Mbps、EDR-2Mbps、EDR-3Mbps		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
			

2.4 Test Setup Diagram

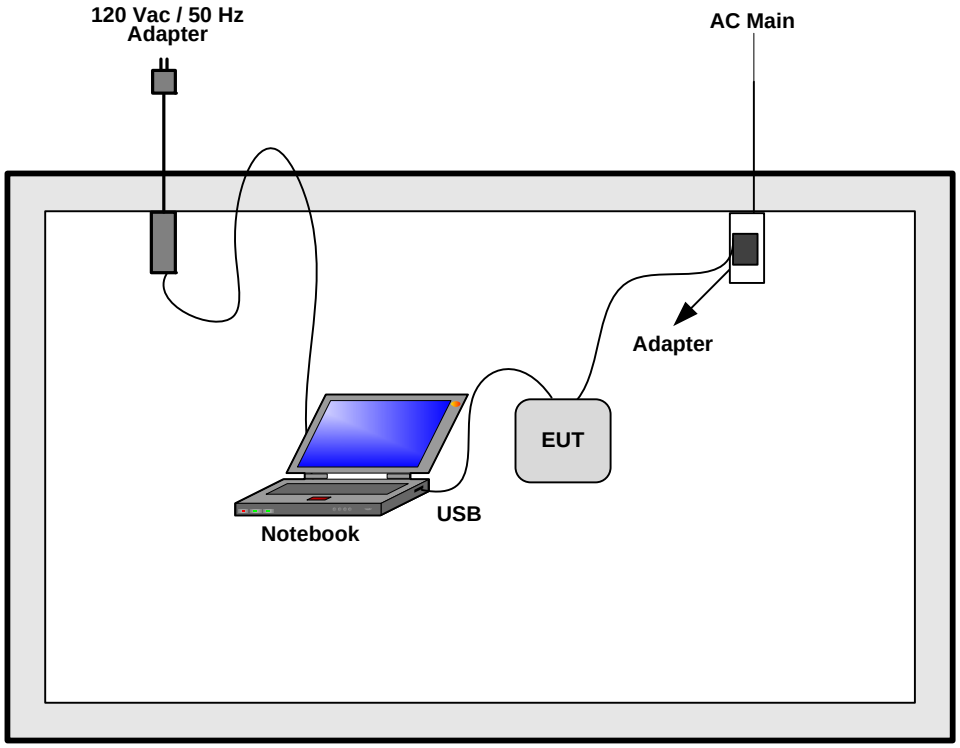
Test Setup Diagram – AC Line Conducted Emission Test



Test Setup Diagram - Radiated Test (Below 1GHz)



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

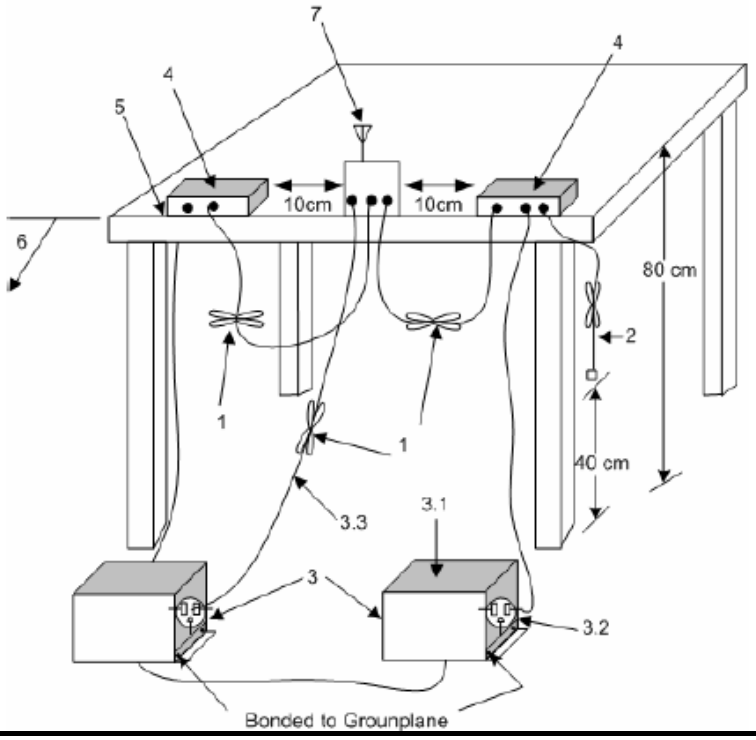
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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

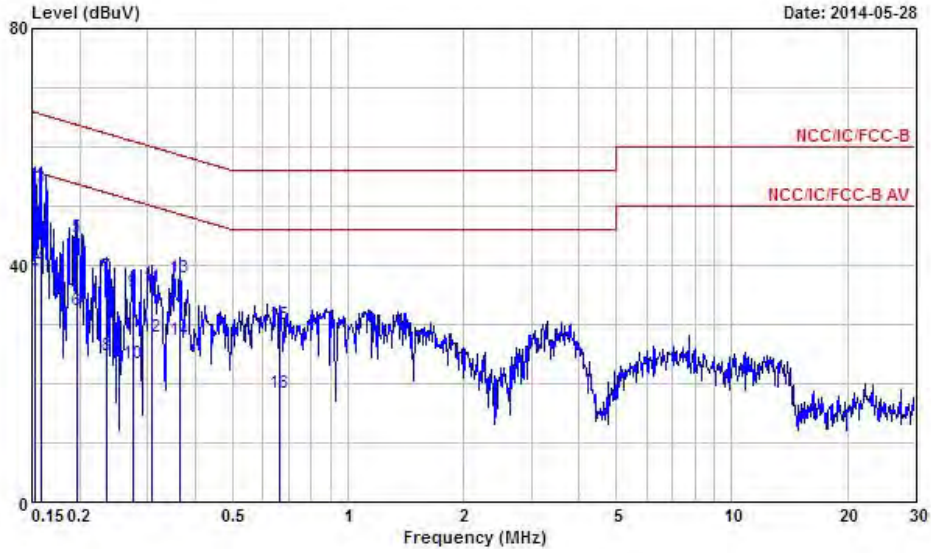
3.1.4 Test Setup

AC Power-line Conducted Emissions



3.1.5 Test Result of AC Power-line Conducted Emissions

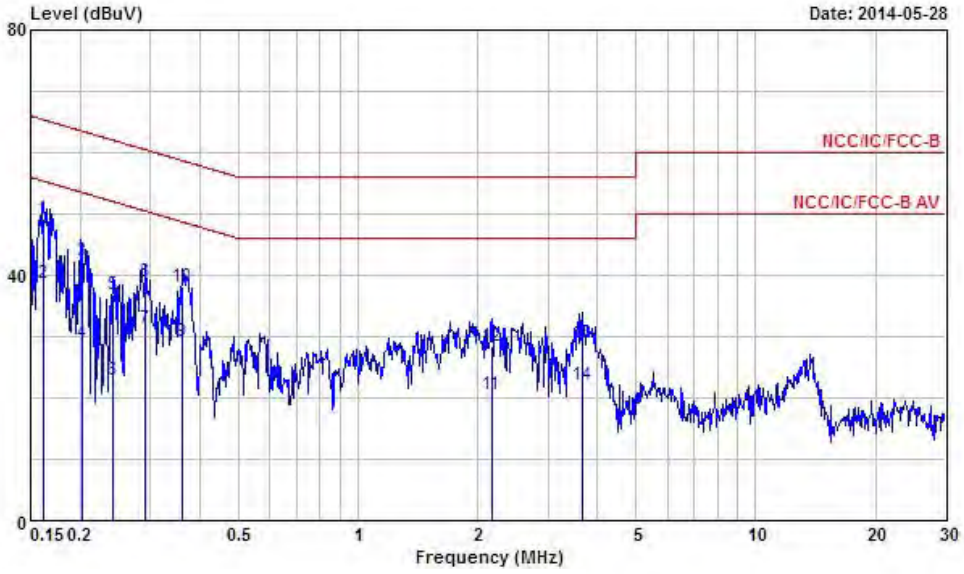
AC Power-line Conducted Emissions Result			
Operating Mode	2	**Power Phase**	Neutral
Operating Function	AC Mode & Radio link (Adapter 2)		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1524030	53.75	-12.12	65.87	53.39	0.02	0.34	QP
2	0.1524030	39.11	-16.76	55.87	38.75	0.02	0.34	Average
3	@0.1590020	53.25	-12.27	65.52	52.86	0.02	0.37	QP
4	0.1590020	39.69	-15.83	55.52	39.30	0.02	0.37	Average
5	0.1975810	44.65	-19.06	63.71	44.13	0.02	0.50	QP
6	0.1975810	32.45	-21.26	53.71	31.93	0.02	0.50	Average
7	0.2353310	38.14	-24.12	62.26	37.60	0.02	0.52	QP
8	0.2353310	24.80	-27.46	52.26	24.26	0.02	0.52	Average
9	0.2758730	35.50	-25.44	60.94	34.93	0.02	0.55	QP
10	0.2758730	23.51	-27.43	50.94	22.94	0.02	0.55	Average
11	0.3083410	36.37	-23.65	60.02	35.78	0.03	0.56	QP
12	0.3083410	27.77	-22.25	50.02	27.18	0.03	0.56	Average
13	0.3633820	37.85	-20.80	58.65	37.23	0.03	0.59	QP
14	0.3633820	27.33	-21.32	48.65	26.71	0.03	0.59	Average
15	0.6612710	30.00	-26.00	56.00	29.25	0.04	0.71	QP
16	0.6612710	18.35	-27.65	46.00	17.60	0.04	0.71	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.)

AC Power-line Conducted Emissions Result			
Operating Mode	2	**Power Phase**	Line
Operating Function	AC Mode & Radio link (Adapter 2)		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1615500	49.27	-16.11	65.38	48.86	0.03	0.38	QP
2	0.1615500	38.61	-16.77	55.38	38.20	0.03	0.38	Average
3	0.2028850	42.42	-21.07	63.49	41.89	0.03	0.50	QP
4	0.2028850	29.05	-24.44	53.49	28.52	0.03	0.50	Average
5	0.2416480	36.75	-25.29	62.04	36.19	0.03	0.53	QP
6	0.2416480	22.99	-29.05	52.04	22.43	0.03	0.53	Average
7	0.2924290	31.22	-19.24	50.46	30.64	0.03	0.55	Average
8	0.2924290	38.82	-21.64	60.46	38.24	0.03	0.55	QP
9	0.3614620	29.14	-19.55	48.69	28.53	0.03	0.58	Average
10	0.3614620	38.16	-20.53	58.69	37.55	0.03	0.58	QP
11	2.170	20.41	-25.59	46.00	19.55	0.07	0.79	Average
12	2.170	28.42	-27.58	56.00	27.56	0.07	0.79	QP
13	3.680	29.07	-26.93	56.00	28.26	0.10	0.71	QP
14	3.680	22.21	-23.79	46.00	21.40	0.10	0.71	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 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	
☒	2400-2483.5 MHz Band:
	☐ N ≥ 75 and ChS ≥ MAX (20 dB bandwidth, 25 kHz).
	☒ N ≥ 15 and ChS ≥ MAX (20 dB bandwidth x 2/3, 25 kHz).
N: Number of Hopping Frequencies; **ChS**: Hopping Channel Separation	

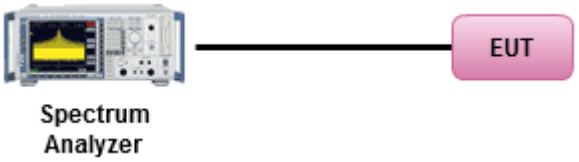
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

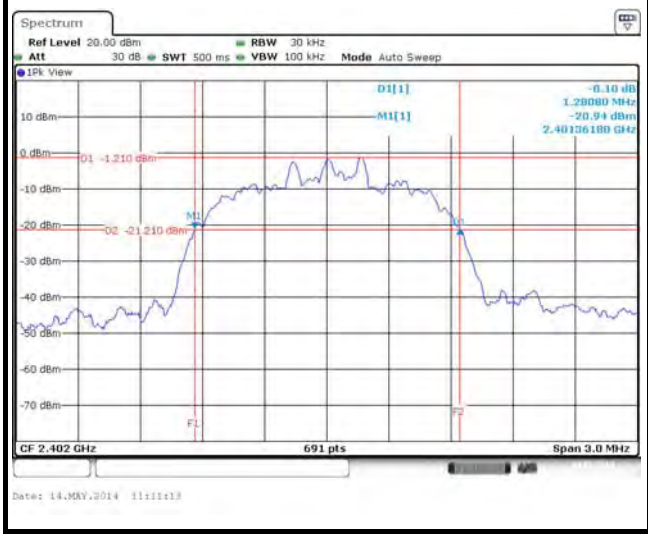
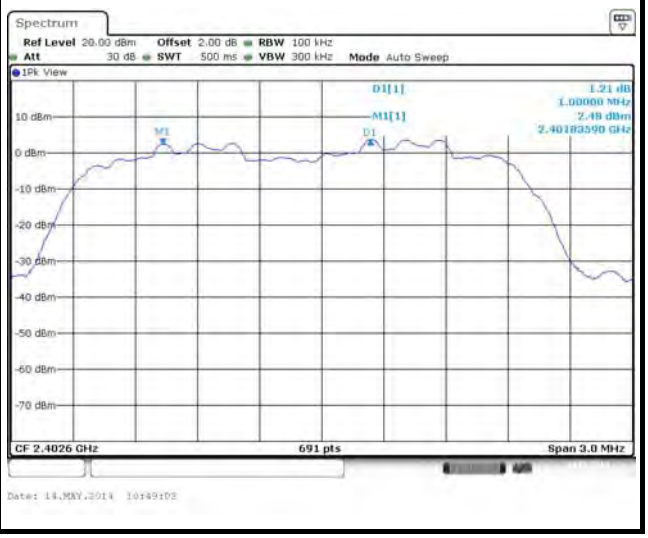
Test Method	
☒	Refer as ANSI C63.10, clause 6.9.1 for 20 dB bandwidth measurement.
☒	Refer as ANSI C63.10, clause 7.7.2 for carrier frequency separation measurement.
☒	For conducted measurement.
	☒ The EUT supports single transmit chain and measurements performed on this transmit chain.
	☐ The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

3.2.4 Test Setup

20dB Bandwidth and Carrier Frequency Separation
 Spectrum Analyzer

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)**
BR-1Mbps	2402	0.9590	0.8726	1.0000	0.63933
BR-1Mbps	2440	0.9508	0.8639	1.0000	0.63387
BR-1Mbps	2480	0.9508	0.8683	1.0000	0.63387
EDR-3Mbps	2402	1.2808	1.1635	1.0000	0.85387
EDR-3Mbps	2440	1.2764	1.1635	1.0000	0.85093
EDR-3Mbps	2480	1.2764	1.1678	1.0000	0.85093
Result		**Complied**			

Worst 20dB Bandwidth Plots	Worst Carrier Frequency Separation Plots
EDR-3Mbps	**EDR-3Mbps**
	

3.3 Number of Hopping Frequencies

3.3.1 Number of Hopping Frequencies Limit

Number of Hopping Frequencies Limit for Frequency Hopping Systems	
☒	2400-2483.5 MHz Band:
☐	N ≥ 75 and ChS ≥ MAX (20 dB bandwidth, 25 kHz).
☒	N ≥ 15 and ChS ≥ MAX (20 dB bandwidth x 2/3, 25 kHz).
N: Number of Hopping Frequencies; **ChS**: Hopping Channel Separation	

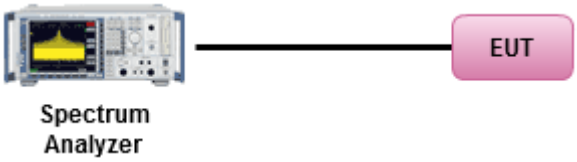
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
☒	Refer as ANSI C63.10, clause 7.7.3 for number of hopping frequencies measurement.
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain.
☐	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

3.3.4 Test Setup

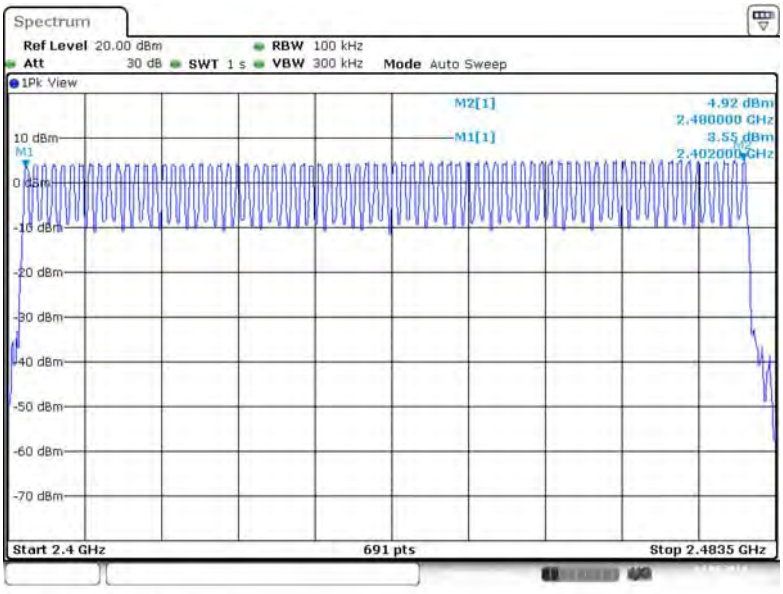
Number of Hopping Frequencies


3.3.5 Test Result of Number of Hopping Frequencies

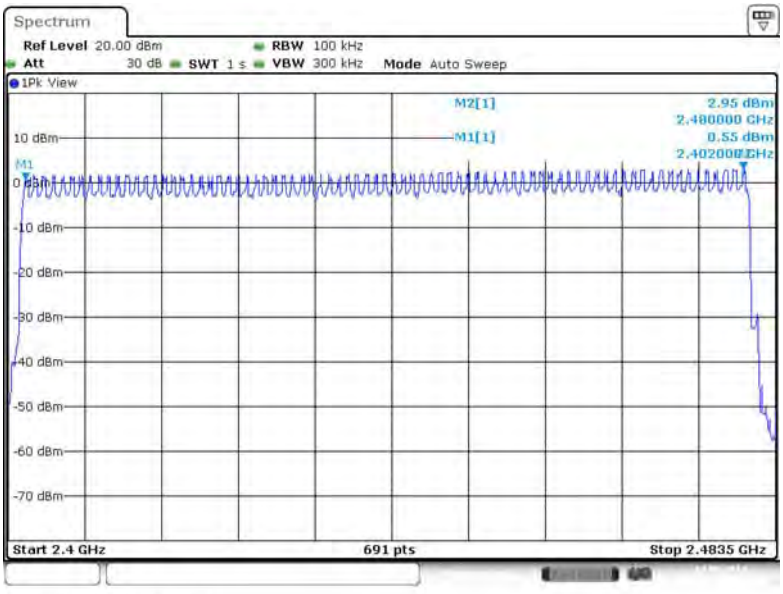
Number of Hopping Frequencies Result			
Modulation Mode	**Freq. (MHz)**	**Hopping Channel Number (N)**	**Hopping Channel Number Limits**
BR-1Mbps	2402-2480	79	15
EDR-3Mbps	2402-2480	79	15
Result	**Complied**		

Number of Hopping Frequencies Plots

BR-1Mbps



EDR-3Mbps



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
☒ 2400-2483.5 MHz Band: Dwell time ≤ 0.4 second within 0.4 x N
N: Number of Hopping Frequencies

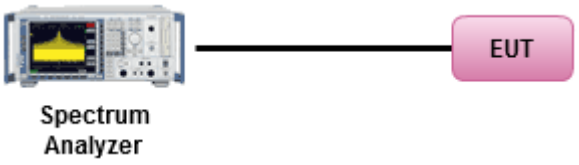
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

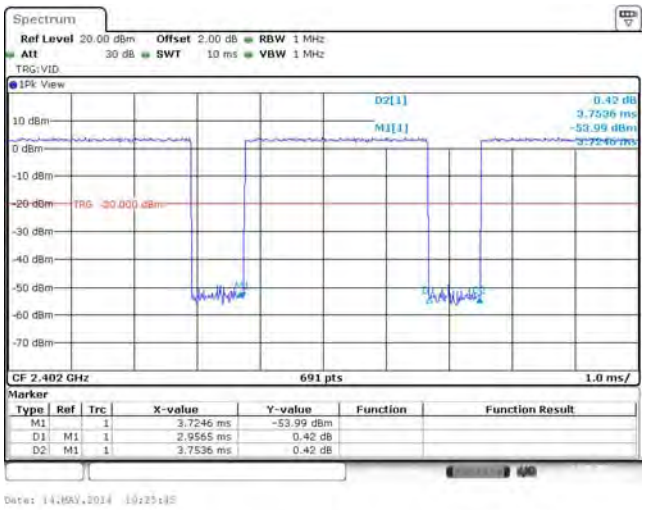
Test Method	
☒	Refer as ANSI C63.10, clause 7.7.4 for dwell time measurement.
☒	Bluetooth ACL packets can be 1, 3, or 5 time slots. Following as dwell time. Operate DH5 at maximum dwell time and maximum duty cycle.
☒	The DH1 packet can cover a single time slot. A maximum length packet has duration of 1 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 1/1600 seconds, or 0.625ms. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 10.12 x 31.6 = 320 within 31.6 seconds.
☒	The DH3 packet can cover up to 3 time slots. A maximum length packet has duration of 3 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 3/1600 seconds, or 1.875ms. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 5.06 x 31.6 = 160 within 31.6 seconds.
☒	The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle. A maximum length packet has duration of 5 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 5/1600 seconds, or 3.125ms. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain.
☐	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

3.4.4 Test Setup

Time of Occupancy (Dwell Time)


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 in [0.4 x N sec]**	**Dwell Time in [0.4 x N sec] (s)**	**Dwell Time Limits (s)**
BR-1Mbps	2402	2.9565	106.7	0.315	0.4
EDR-3Mbps	2402	2.9565	106.7	0.315	0.4
Result		**Complied**			
Bluetooth ACL packets can be 1, 3, or 5 time slots. The DH1 packet can cover a single time slot. The DH3 packet can cover up to 3 time slots. The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle. A maximum length packet has duration of 5 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 5/1600 seconds, or 3.125ms.					

Worst Pulse Time per Hop Plots
EDR-3Mbps


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		
☒	2400-2483.5 MHz Band:	
	☐	For Hopping Channel: N ≥ 75
		☐ If G_{TX} ≤ 6 dBi, then P_{Out} ≤ 30 dBm (1 W)
		☐ If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6) dBm
	☒	For Hopping Channel: N ≥ 15
		☒ If G_{TX} ≤ 6 dBi, then P_{Out} ≤ 21 dBm (0.125 W)
		☐ If G_{TX} > 6 dBi, then P_{Out} = 21 – (G_{TX} – 6) dBm
e.i.r.p. Power Limit:		
☒	2400-2483.5 MHz Band:	
	☐	For Hopping Channel: N ≥ 75 - P_{eirp} ≤ 36 dBm (4 W)
	☒	For Hopping Channel: N ≥ 15 - P_{eirp} ≤ 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	
☒	Maximum Peak Conducted Output Power
☐	Refer as FCC DA 00-0705, spectrum analyzer for peak power.
☒	Refer as FCC DA 00-0705, peak power meter for peak power.
☐	Refer as ANSI C63.10, clause 6.10.2.1 a) for peak power meter.
☐	Refer as ANSI C63.10, clause 6.10.2.1 a) for spectrum analyzer - (RBW ≥ EBW).
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain.
☐	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

3.5.4 Test Setup

RF Output Power (Peak Power Meter)


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
BR-1Mbps	2402	5.80	21	2.26	8.06	27
BR-1Mbps	2440	7.18	21	2.26	9.44	27
BR-1Mbps	2480	7.35	21	2.26	9.61	27
EDR-3Mbps	2402	4.38	21	2.26	6.64	27
EDR-3Mbps	2440	6.09	21	2.26	8.35	27
EDR-3Mbps	2480	6.58	21	2.26	8.84	27
Result		Complied				

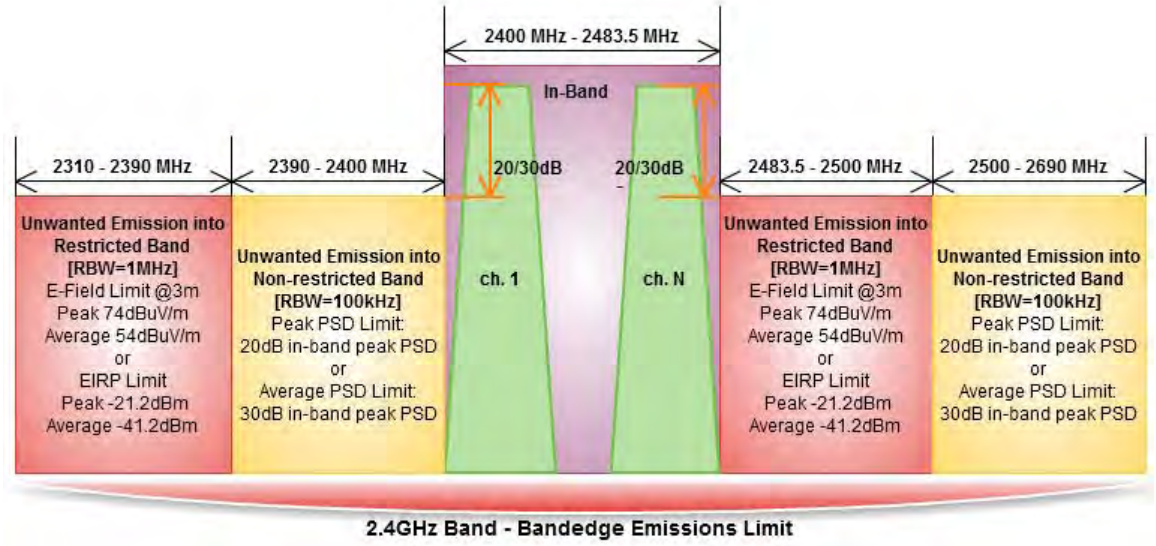
3.5.6 Test Result of Maximum Average Conducted Output Power

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
BR-1Mbps	2402	4.40	1.04	5.44	2.26	7.70
BR-1Mbps	2440	5.85	1.04	6.89	2.26	9.15
BR-1Mbps	2480	6.10	1.04	7.14	2.26	9.40
EDR-3Mbps	2402	0.38	1.04	1.42	2.26	3.68
EDR-3Mbps	2440	2.26	1.04	3.30	2.26	5.56
EDR-3Mbps	2480	3.04	1.04	4.08	2.26	6.34
Result		Complied				

3.6 Transmitter Radiated Bandedge Emissions

3.6.1 Transmitter Radiated Bandedge Emissions Limit

Transmitter Radiated Bandedge Emissions Limit



3.6.2 Measuring Instruments

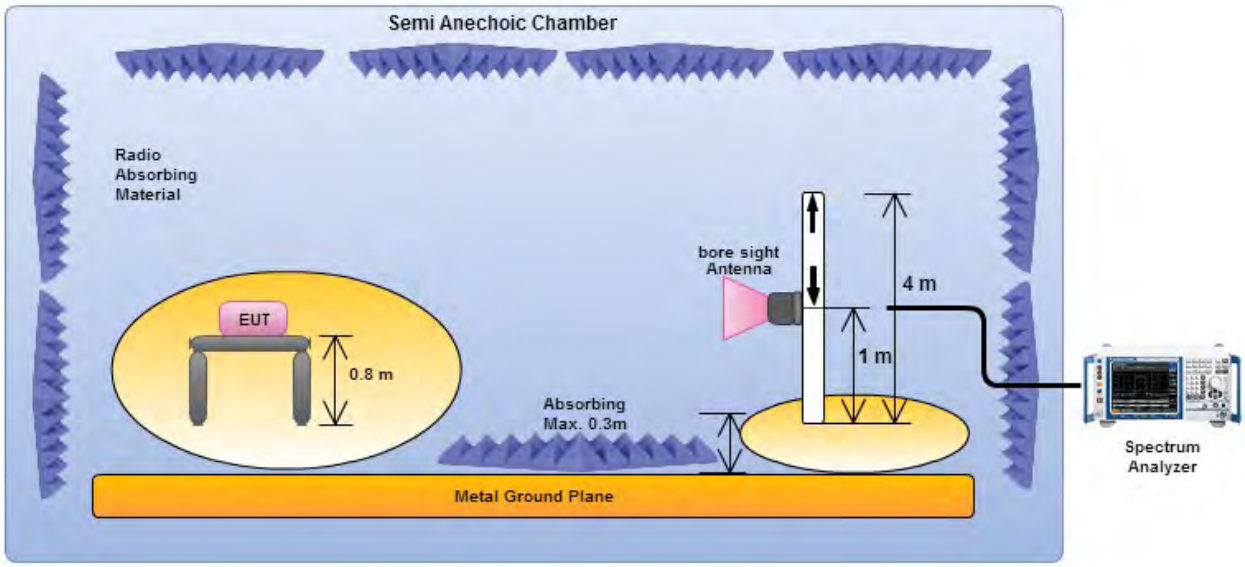
Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Test Method – General Information		
☒	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:	
	☒	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.
	☒	For unwanted emissions into restricted bands.
		☒ Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		☐ Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		☒ 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.
	☒	Refer as ANSI C63.10, clause 7.7.9 for band-edge testing into non-restricted bands.
☒	For radiated measurement, refer as ANSI C63.10, clause 6.6 for radiated emissions above 1 GHz.	

3.6.4 Test Setup

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 Radiated Bandedge Emissions

Transmitter Radiated Bandedge Emissions (Non-restricted Band)								
Modulation	**N_{TX}**	**Test Freq. (MHz)**	**In-band PSD [i] (dBuV/100kHz)**	**Freq. (MHz)**	**Out-band PSD [o] (dBuV/100kHz)**	**[i] – [o] (dB)**	**Limit (dB)**	**Pol.**
BR-1Mbps	1	2402	102.88	2399.66	60.08	42.80	20	H
BR -1Mbps	1	2480	106.24	2516.32	61.66	44.58	20	H
EDR-2Mbps	1	2402	99.69	2390.99	59.74	39.95	20	H
EDR-2Mbps	1	2480	104.34	2396.48	60.36	43.98	20	H
EDR-3Mbps	1	2402	99.99	2393.84	60.05	39.94	20	H
EDR-3Mbps	1	2480	104.19	2515.68	60.94	43.25	20	H
Note 1: Measurement worst emissions of receive antenna polarization								

Transmitter Radiated Bandedge Emissions (Restricted Band)										
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Measure Distance (m)**	**Freq. (MHz) PK**	**Level (dBuV/m) PK**	**Limit (dBuV/m) PK**	**Freq. (MHz) AV**	**Level (dBuV/m) AV**	**Limit (dBuV/m) AV**	**Pol.**
BR-1Mbps	1	2402	3	2319.69	56.63	74	2323.77	43.88	54	H
BR -1Mbps	1	2480	3	2483.52	60.64	74	2483.50	49.10	54	H
EDR-2Mbps	1	2402	3	2319.69	56.84	74	2316.32	43.79	54	H
EDR-2Mbps	1	2480	3	2483.50	57.69	74	2483.50	47.01	54	H
EDR-3Mbps	1	2402	3	2352.64	56.25	74	2310.71	43.78	54	H
EDR-3Mbps	1	2480	3	2483.50	58.59	74	2483.50	46.82	54	H
Note 1: Measurement worst emissions of receive antenna polarization. Note 2: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is “Pulse On Time”, e.g., DH5 VBW≥1/3.125ms, VBW=1kHz										

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

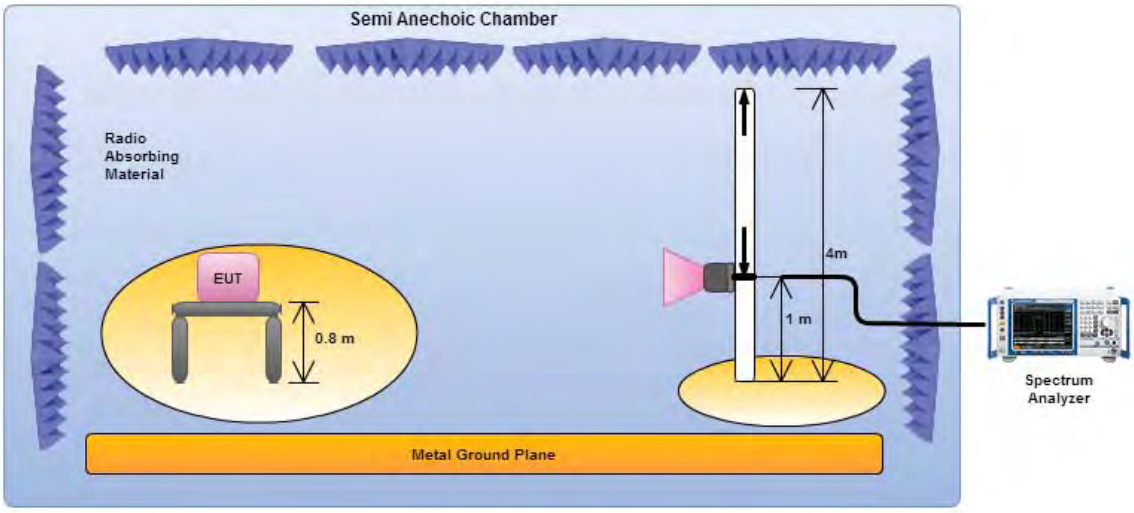
Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

Test Method – General Information			
☒	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 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 ≥ 98 or duty factor].		
☒	For the transmitter unwanted emissions shall be measured using following options below:		
	☒	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 20log (dwell time/100 ms)	
	☒	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.	
	☒	For unwanted emissions into restricted bands.	
		☒	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		☐	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		☒	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
☒	For radiated measurement.		
	☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.	
	☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.	
	☒	Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1 GHz and test distance is 3m.	

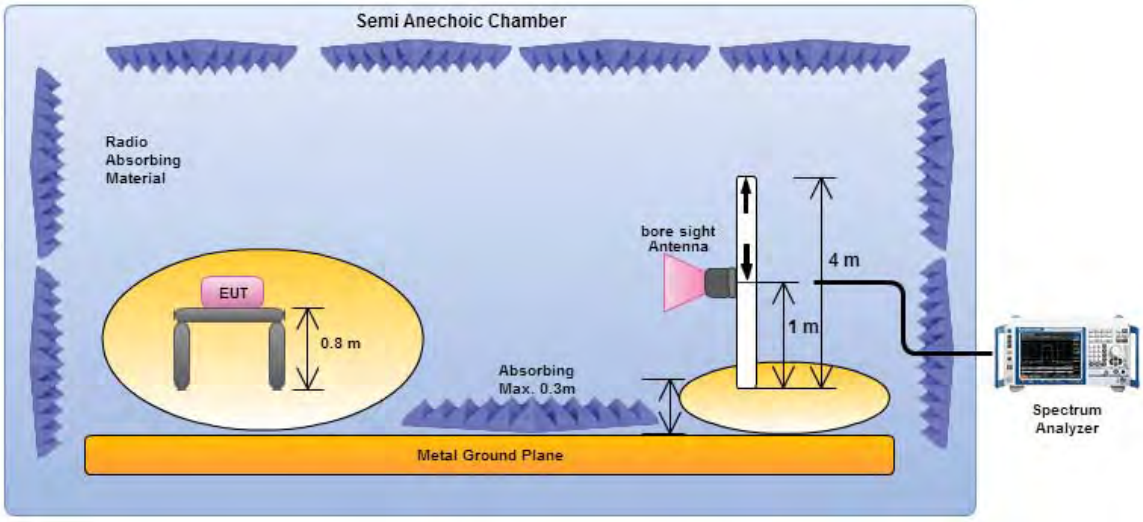
3.7.4 Test Setup

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)



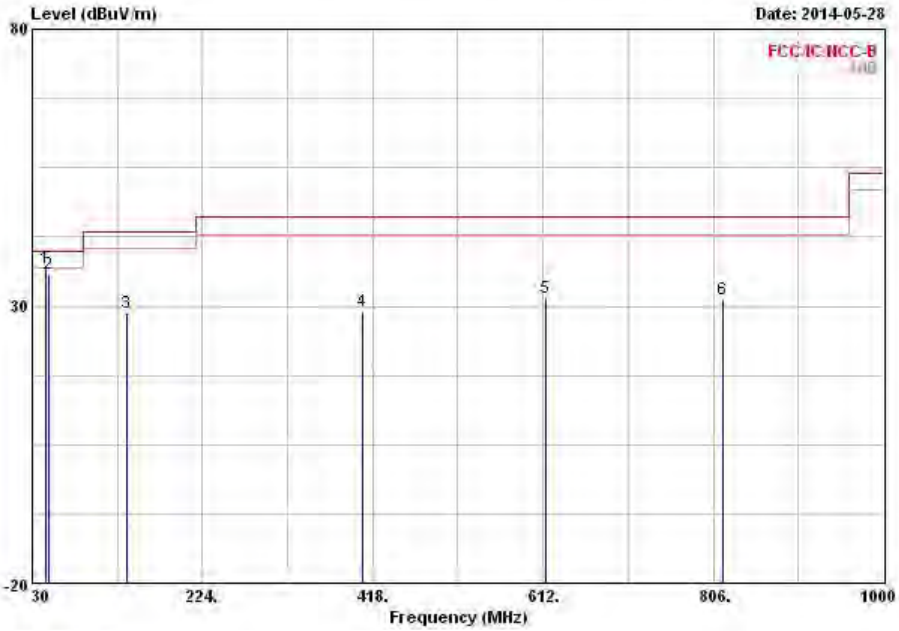
Electric field tests shall be performed in the frequency range of 1 GHz to 10th harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna.

3.7.5 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.

3.7.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

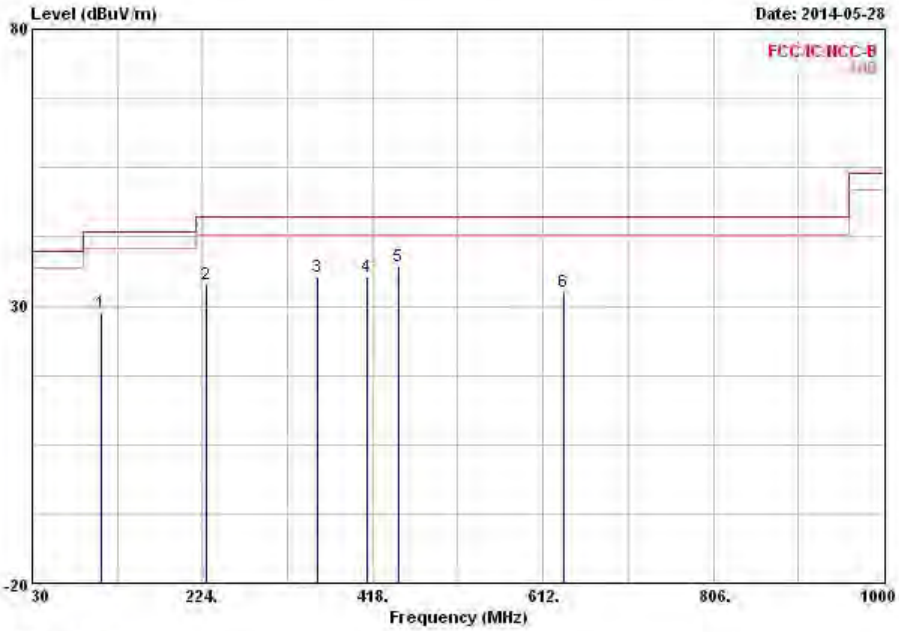
Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Operating Mode	2	**Polarization**	V
Operating Function	AC Mode & Radio link (Adapter 2)		



	Freq	Level	Over Limit	Limit Line	Read 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 @	44.550	36.86	-3.14	40.00	52.87	10.26	1.08	27.35	Peak	---	---
2	48.300	35.78	-4.22	40.00	53.02	9.05	1.12	27.41	QP	---	---
3	138.120	28.68	-14.82	43.50	42.38	11.53	1.94	27.17	Peak	---	---
4	405.940	28.92	-17.08	46.00	36.88	16.03	3.36	27.35	Peak	---	---
5	614.490	31.48	-14.52	46.00	36.37	18.66	4.21	27.76	Peak	---	---
6	816.720	31.21	-14.79	46.00	33.90	19.96	4.92	27.57	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	AC Mode & Radio link (Adapter 2)		

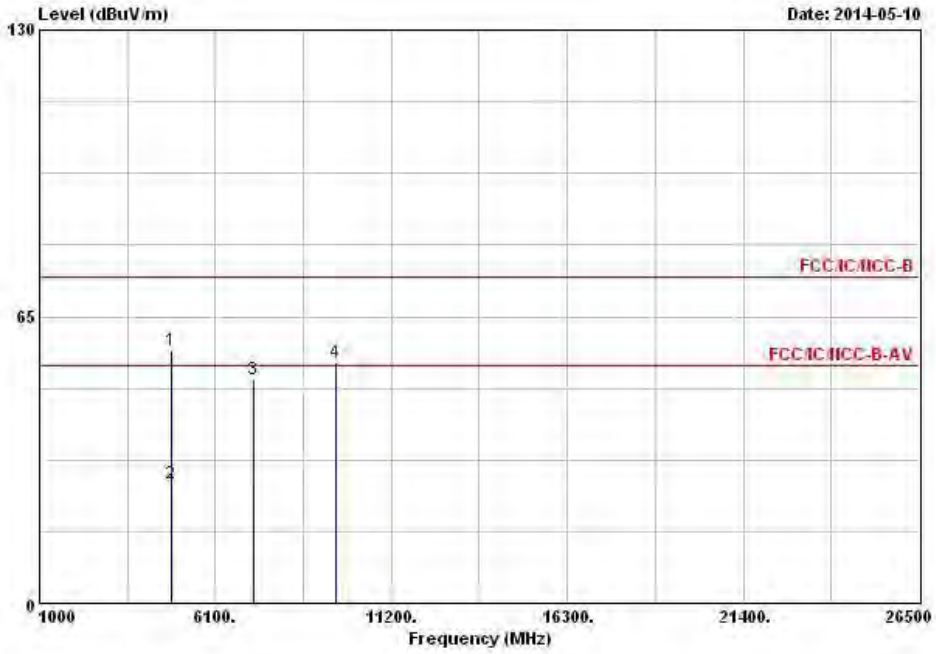


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	108.780	28.81	-14.69	43.50	42.15	12.16	1.68	27.18	Peak	---	---
2	228.480	33.84	-12.16	46.00	47.96	10.39	2.49	27.00	Peak	---	---
3	355.480	35.34	-10.66	46.00	44.64	14.59	3.14	27.03	Peak	---	---
4	411.810	35.28	-10.72	46.00	43.00	16.30	3.38	27.40	Peak	---	---
5	448.070	37.25	-8.75	46.00	44.96	16.43	3.49	27.63	Peak	---	---
6	634.850	32.49	-13.51	46.00	37.29	18.68	4.29	27.77	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)

3.7.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)

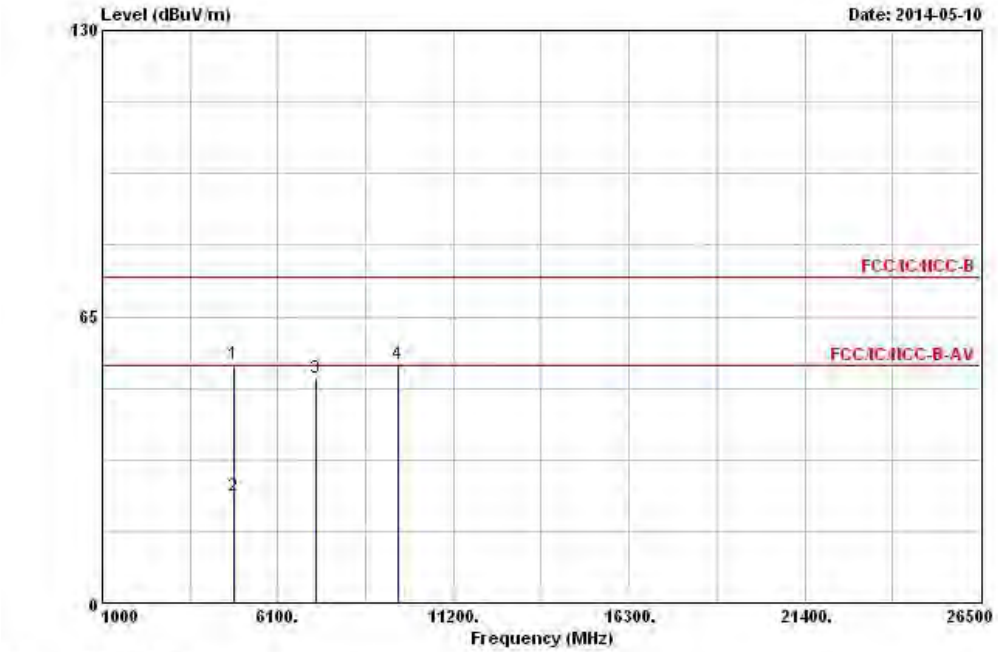
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR-1Mbps	**Test Freq. (MHz)**	2402
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read 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	4804.000	57.27	-16.73	74.00	50.94	33.06	5.71	32.44	Peak	---	---
2	4804.000	27.17	-26.83	54.00	20.84	33.06	5.71	32.44	Average	---	---
3	7206.000	50.64			40.28	35.80	7.20	32.64	Peak	---	---
4	9608.000	54.66			40.72	38.23	8.81	33.10	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 restricted bands, 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: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.
Note 5: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is "Pulse On Time", e.g., DH5 VBW≥1/3.125ms, VBW=1kHz.

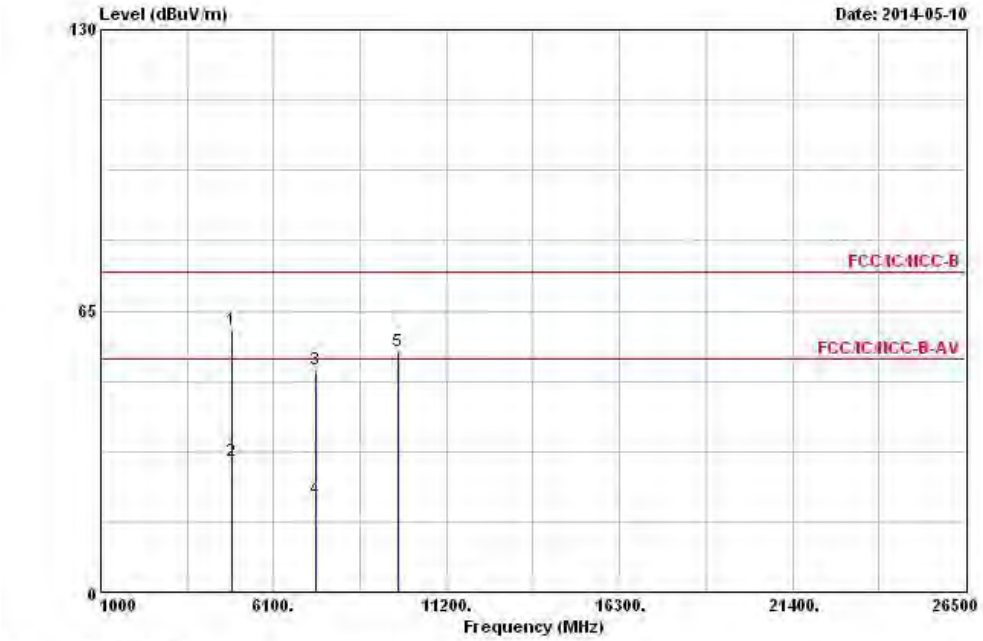
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR-1Mbps	**Test Freq. (MHz)**	2402
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read 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	4804.000	54.30	-19.70	74.00	47.97	33.06	5.71	32.44	Peak	---	---
2	4804.000	24.20	-29.80	54.00	17.87	33.06	5.71	32.44	Average	---	---
3	7206.000	51.17			40.81	35.80	7.20	32.64	Peak	---	---
4	9608.000	54.32			40.38	38.23	8.81	33.10	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 restricted bands, 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: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.
Note 5: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is "Pulse On Time", e.g., DH5 VBW≥1/3.125ms, VBW=1kHz.

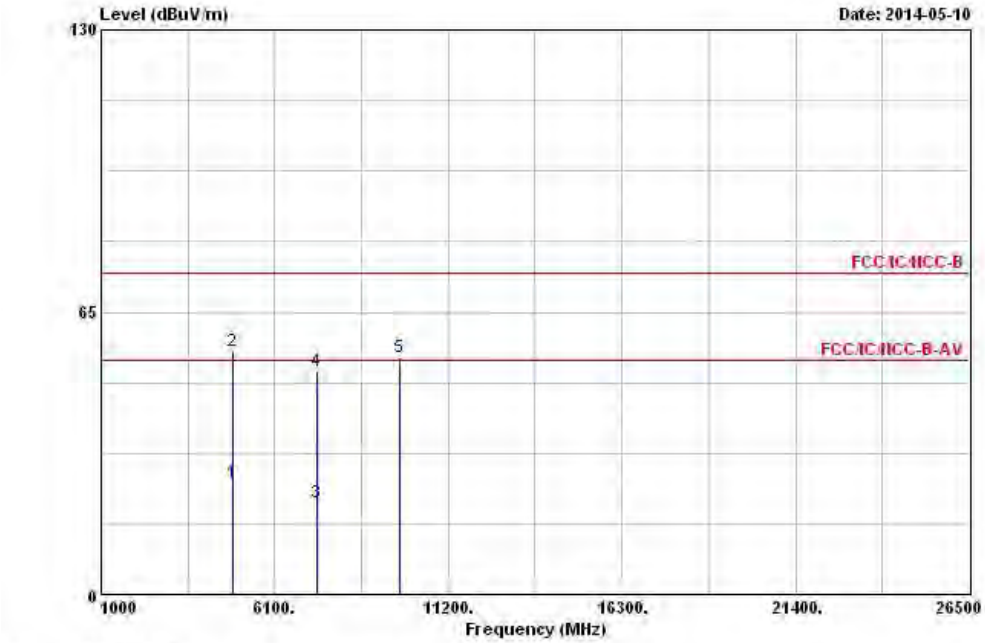
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR-1Mbps	**Test Freq. (MHz)**	2441
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read 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	4882.000	60.54	-13.46	74.00	54.05	33.18	5.73	32.42	Peak	---	---
2	4882.000	30.44	-23.56	54.00	23.95	33.18	5.73	32.42	Average	---	---
3	7323.000	51.56	-22.44	74.00	40.86	36.09	7.28	32.67	Peak	---	---
4	7323.000	21.46	-32.54	54.00	10.76	36.09	7.28	32.67	Average	---	---
5	9764.000	55.65			41.36	38.61	8.76	33.08	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 restricted bands, 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: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.
Note 5: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is "Pulse On Time", e.g., DH5 VBW≥1/3.125ms, VBW=1kHz.

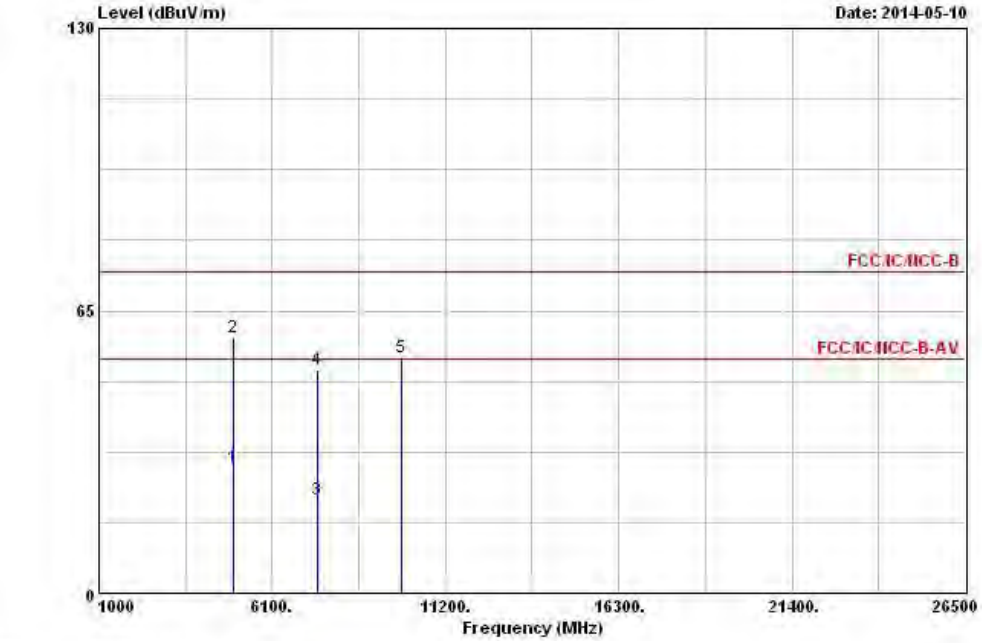
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR-1Mbps	**Test Freq. (MHz)**	2441
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read 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	4884.000	25.81	-28.19	54.00	19.32	33.18	5.73	32.42	Average	---	---
2	4884.000	55.91	-18.09	74.00	49.42	33.18	5.73	32.42	Peak	---	---
3	7323.000	21.24	-32.76	54.00	10.54	36.09	7.28	32.67	Average	---	---
4	7323.000	51.34	-22.66	74.00	40.64	36.09	7.28	32.67	Peak	---	---
5	9764.000	54.72			40.43	38.61	8.76	33.08	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 restricted bands, 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: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.
Note 5: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is “Pulse On Time”, e.g., DH5 VBW≥1/3.125ms, VBW=1kHz.

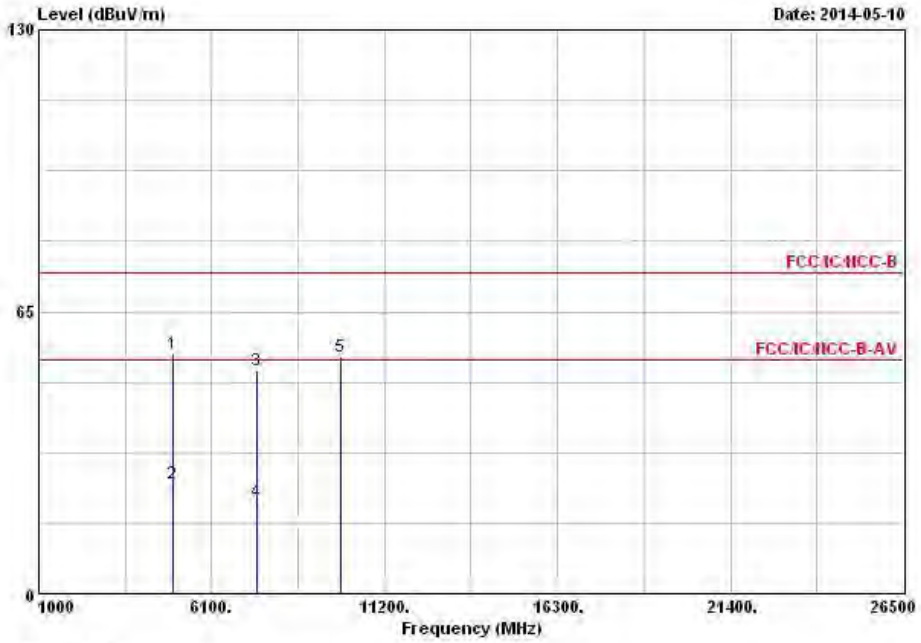
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR-1Mbps	**Test Freq. (MHz)**	2480
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read 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	4960.000	28.75	-25.25	54.00	22.07	33.34	5.75	32.41	Average	---	---
2	4960.000	58.85	-15.15	74.00	52.17	33.34	5.75	32.41	Peak	---	---
3	7440.000	21.38	-32.62	54.00	10.34	36.38	7.37	32.71	Average	---	---
4	7440.000	51.48	-22.52	74.00	40.44	36.38	7.37	32.71	Peak	---	---
5	9920.000	54.35			39.76	38.95	8.71	33.07	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 restricted bands, 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: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.
Note 5: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is “Pulse On Time”, e.g., DH5 VBW≥1/3.125ms, VBW=1kHz.

Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR-1Mbps	**Test Freq. (MHz)**	2480
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read 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	4960.000	55.34	-18.66	74.00	48.66	33.34	5.75	32.41	Peak	---	---
2	4960.000	25.24	-28.76	54.00	18.56	33.34	5.75	32.41	Average	---	---
3	7440.000	51.31	-22.69	74.00	40.27	36.38	7.37	32.71	Peak	---	---
4	7440.000	21.21	-32.79	54.00	10.17	36.38	7.37	32.71	Average	---	---
5	9920.000	54.66			40.07	38.95	8.71	33.07	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 restricted bands, 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: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.
Note 5: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is “Pulse On Time”, e.g., DH5 VBW≥1/3.125ms, VBW=1kHz.

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, 2014	AC Conduction
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 21, 2014	AC Conduction
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 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	Jun. 27, 2013	RF Conducted
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	Sep. 11, 2013	RF Conducted
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	Sep. 11, 2013	RF Conducted
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_103	10715/4 10716/4	30MHz ~ 26.5GHz	Dec. 02, 2013	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. 30, 2013	Radiation
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May 05, 2014	Radiation
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	Aug. 20, 2013	Radiation)
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Mar. 27, 2014	Radiation
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 21, 2013	Radiation
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	May 31, 2013	Radiation
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 10, 2014	Radiation
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 16, 2013	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.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	TESEQ	HLA 6120	31244	9kHz ~ 30MHz	Dec. 02, 2012	Radiation

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