FCC Test Report

Equipment	:	**GRAPHICS TABLET COMPUTER**
Brand Name	:	**Wacom**
Model No.	:	**DTH-W1620**
FCC ID	:	**HV4DTHW1620**
Standard	:	**47 CFR FCC Part 15.247**
RF Specification	:	**Bluetooth BR/EDR**
Operating Band	:	**2400 MHz – 2483.5 MHz**
FCC Classification	:	**DSS**
Applicant / Manufacturer	:	**Wacom Co., Ltd.** 2-510-1 Toyonodai, Kazo-shi, Saitama 349-1148 Japan

The product sample received on Jul. 13, 2016 and completely tested on Sep. 22, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

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

Reviewed by:

Kevin Liang / Assistant Manager

Testing Laboratory
1190

Table of Contents

1 GENERAL DESCRIPTION 5

1.1 Information 5
1.2 Accessories and Support Equipment 7
1.3 Testing Applied Standards 7
1.4 Testing Location Information 7
1.5 Measurement Uncertainty 8

2 TEST CONFIGURATION OF EUT 9

2.1 The Worst Case Modulation Configuration 9
2.2 The Worst Case Power Setting Parameter 9
2.3 The Worst Case Measurement Configuration 10
2.4 Test Setup Diagram 11

3 TRANSMITTER TEST RESULT 12

3.1 AC Power-line Conducted Emissions 12
3.2 20dB Bandwidth and Carrier Frequency Separation 14
3.3 Number of Hopping Frequencies 15
3.4 Time of Occupancy (Dwell Time) 16
3.5 RF Output Power 17
3.6 Transmitter Radiated Bandedge Emissions 19
3.7 Transmitter Radiated Unwanted Emissions 21

4 TEST EQUIPMENT AND CALIBRATION DATA 25

Appendix I. Test Result of AC Power-line Conducted Emissions

Appendix A.1~A.2. Test Result of Emission Bandwidth & Channel Separation

Appendix B. Test Result of Maximum Conducted Output Power

Appendix C.1~C.2. Test Result of Hopping Number & Dwell Time

Appendix D. Test Result of Transmitter Radiated Bandedge Emissions

Appendix E. Transmitter Radiated Unwanted Emissions

Appendix F. Test Photos

Appendix G. 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]: 0.1712450MHz 56.84 (Margin 8.06dB) - QP 46.29 (Margin 8.61dB) - AV	FCC 15.207	Complied
3.2	15.247(a)	20dB Bandwidth	Refer as Appendix A	N/A	Complied
3.2	15.247(a)	Carrier Frequency Separation (ChS)	Refer as Appendix A	ChS ≥ BW_{20dB} x2/3.	Complied
3.3	15.247(a)	Number of Hopping Frequencies (N)	Refer as Appendix C	N ≥ 15	Complied
3.4	15.247(a)	Time of Occupancy (Dwell Time)	Refer as Appendix C	0.4 s within 0.4 x N	Complied
3.5	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Refer as Appendix B	Power [dBm] BR:21 EDR:21	Complied
3.6	15.247(d)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2399.964MHz: 47.40 dB Restricted Bands [dBuV/m at 3m]: 2490.080 MHz 60.29 (Margin 13.71 dB) - PK 30.19 (Margin 23.81 dB) - AV	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied
3.7	15.247(d)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 518.880 MHz 41.31 (Margin 4.69 dB) - PK	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied

Revision History

Report No.	Version	Description	Issued Date
FR662241AD	Rev. 01	Initial issue of report	Oct. 03, 2016
FR662241AD	Rev. 02	Revise the description of operating mode Update Photographs of EUT	Oct. 15, 2016

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information				
Frequency Range (MHz)	**Bluetooth Mode**	**Ch. Frequency (MHz)**	**Channel Number**	**RF Output Power (dBm)**
2400-2483.5	BR / EDR	2402-2480	0-78 [79]	5.71
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.
☐	External antenna (dedicated antennas)
	☐ Single power level with corresponding antenna(s).
	☐ Multiple power level and corresponding antenna(s).

Antenna General Information			
No.	**Ant. Cat.**	**Ant. Type**	**Gain (dBi)**
1	Integral	PIFA	0.9
2	Integral	PIFA	-1.76

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)**
☒ 77.10% - test mode single channel-BR-1Mbps	1.13
☒ 74.20% - test mode single channel-EDR-2Mbps	1.30
☒ 76.50% - test mode single channel-EDR-3Mbps	1.16
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	☒ External AC adapter	☐ From Host System	☒ Battery

1.1.6 EUT Operate Information

Items	Description			
Beamforming Function	☐	With beamforming	☒	Without beamforming
Operate Condition	☒	Point-to-multipoint (P2M)	☐	Point-to-point (P2P)

1.2 Accessories and Support Equipment

Accessories				
AC Adapter	Brand Name	DELTA	Model Name	ADP-100PB B
	Power Rating	I/P: 100 - 240Vac, 1.8A, O/P: 5V/3A or 20V/5A		
Touch Pen	Brand Name	Wacom	Model Name	KP-504E
WLAN/BT Module	Brand Name	Intel	Model Name	8260NGW
GPS chip	Brand Name	BROADCOM	Model Name	BCM4752IFBG

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

Support Equipment - RF Conducted			
No.	**Equipment**	**Brand Name**	**Model Name**
1	-	-	-

Support Equipment - AC Conduction and Radiated Emission			
No.	**Equipment**	**Brand Name**	**Model Name**
1	-	-	-

1.3 Testing Applied Standards

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

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC Public Notice DA 00-705

1.4 Testing Location Information

Testing Location					
☒	**HWA YA**	**ADD :** No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.			
		TEL : 886-3-327-3456	**FAX :** 886-3-327-0973		
Test Condition		**Test Site No.**	**Test Engineer**	**Test Environment**	**Test Date**
AC Conduction		CO04-HY	Ryan	22°C / 54%	09/08/2016
RF Conducted		TH01-HY	Ryan	24.5°C / 66.5%	22/09/2016
Radiated		03CH09-HY	Thor Wei	24.4°C / 61.3%	18/08/2016

Test site registered number [553509] with FCC.

1.5 Measurement Uncertainty

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

Measurement Uncertainty		
Test Item		**Uncertainty**
AC power-line conducted emissions		±2.3 dB
Emission bandwidth, 6dB bandwidth		±0.5%
RF output power, conducted		±0.1 dB
Power density, conducted		±0.5 dB
Unwanted emissions, conducted	±0.4 dB	±0.4 dB
	±0.4 dB	±0.4 dB
	±0.6 dB	±0.6 dB
	±0.5 dB	±0.5 dB
	±0.5 dB	±0.5 dB
	N/A	N/A
All emissions, radiated	±2.5 dB	±2.5 dB
	±2.3 dB	±2.3 dB
	±2.6 dB	±2.6 dB
	±3.6 dB	±3.6 dB
	±3.8 dB	±3.8 dB
	N/A	N/A
Temperature		±0.8 °C
Humidity		±5 %
DC and low frequency voltages		±0.9%
Time		±1.4 %
Duty Cycle		±0.5 %

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	4.90	EDR-3Mbps
EDR	1	2 Mbps	EDR-2Mbps	5.53	
EDR	1	3 Mbps	EDR-3Mbps	5.71	
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	DRTU V1.8.9-03151		
Modulation Mode	**2402 MHz**	**2441 MHz**	**2480 MHz**
BR,1Mbps	7	7	7
EDR,2Mbps	7	7	7
EDR,3Mbps	7	7	7

2.3 The Worst Case Measurement Configuration

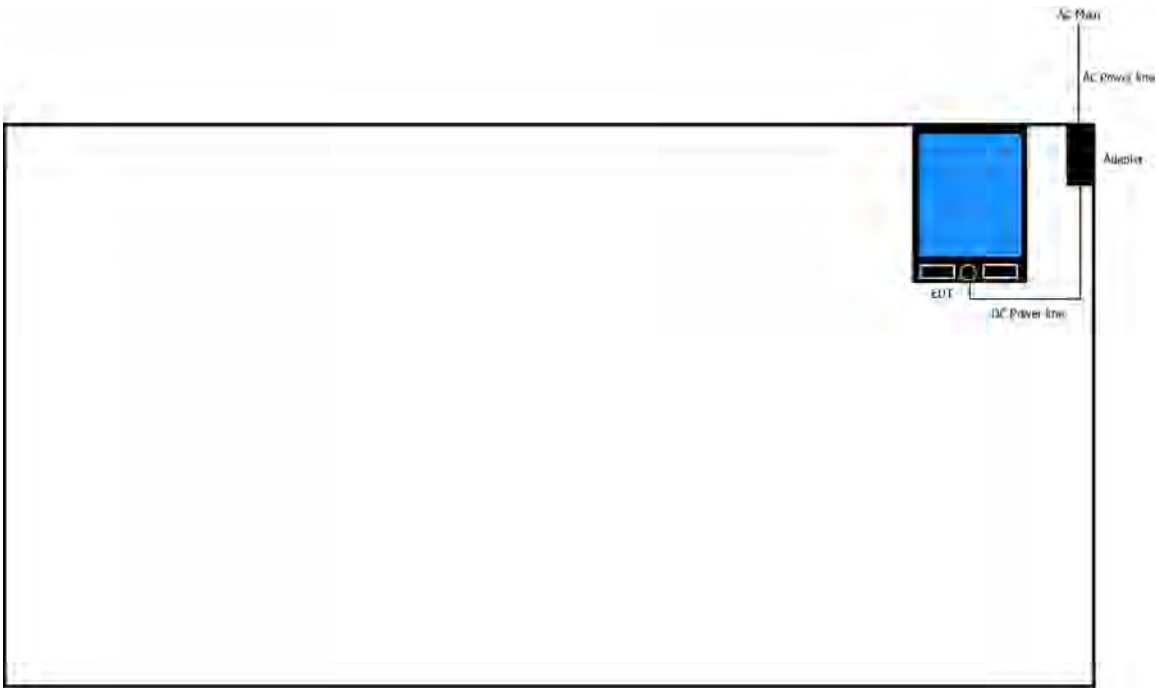
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	2M 2441MHz, Adapter with charging mode

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-2Mbps, EDR-3Mbps

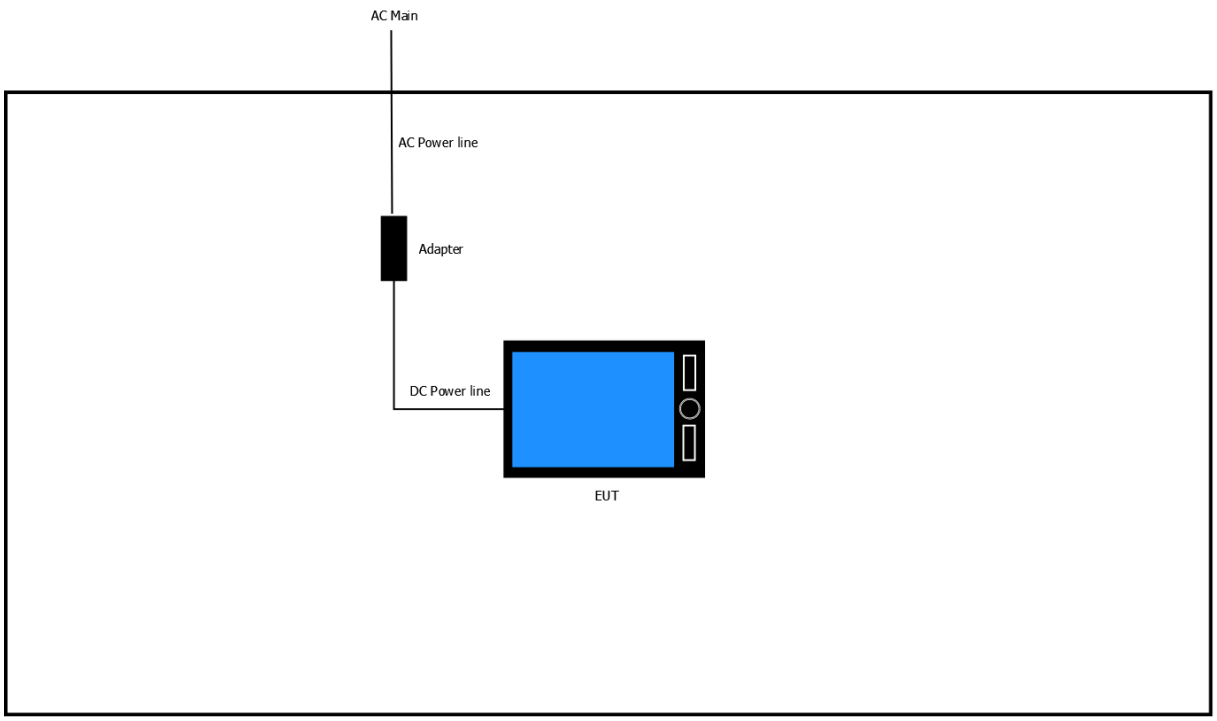
The Worst Case Mode for Following Conformance Tests			
Tests Item	Emission Bandwidth, Fundamental Emissions, Radiated Unwanted Emissions		
Test Condition	Radiated measurement		
User Position	☐ EUT will be placed in fixed position.		
	☐ EUT will be placed in mobile position and operating multiple positions.		
	☒ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.		
Operating Mode	Operating Mode Description		
1	2M 2441MHz, Adapter with charging mode		
Modulation Mode	BR-1Mbps, EDR-2Mbps, EDR-3Mbps		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
			
Worst Planes of EUT			V

2.4 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Test Setup Diagram - Radiated 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

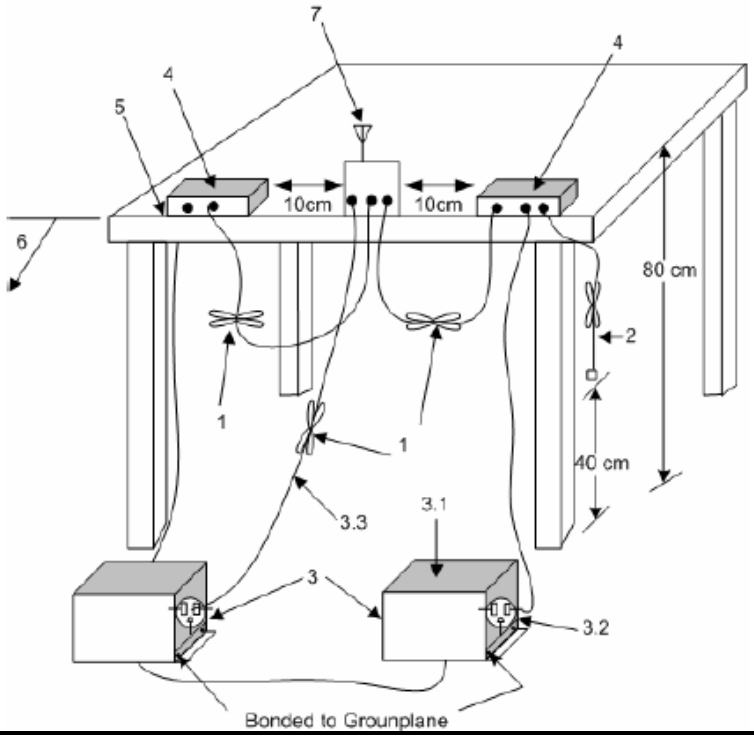
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
☒ Refer as ANSI C63.10-2013, 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

Refer as Appendix I

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	

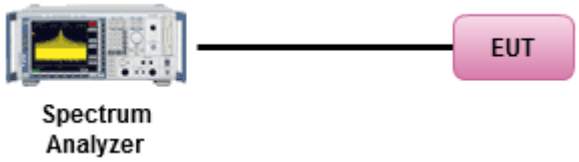
3.2.2 Measuring Instruments

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 6.9.2 for 20 dB bandwidth measurement.
☒	Refer as ANSI C63.10, clause 7.8.2 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

Refer as Appendix A.1~A.2

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	

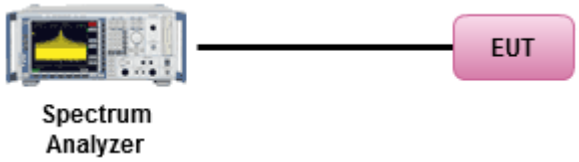
3.3.2 Measuring Instruments

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 7.8.3 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
 Spectrum Analyzer

3.3.5 Test Result of Number of Hopping Frequencies

Refer as Appendix C.1

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

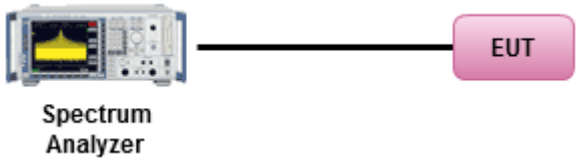
3.4.2 Measuring Instruments

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 7.8.4 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 TX, 1 time slot RX). 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 TX, 1 time slot RX). 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)
 Spectrum Analyzer

3.4.5 Test Result of Time of Occupancy (Dwell Time)

Refer as Appendix C.2

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 11.9.1.3) for peak power meter.
☐	Refer as ANSI C63.10, clause 11.9.1.1) 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

Refer as Appendix B

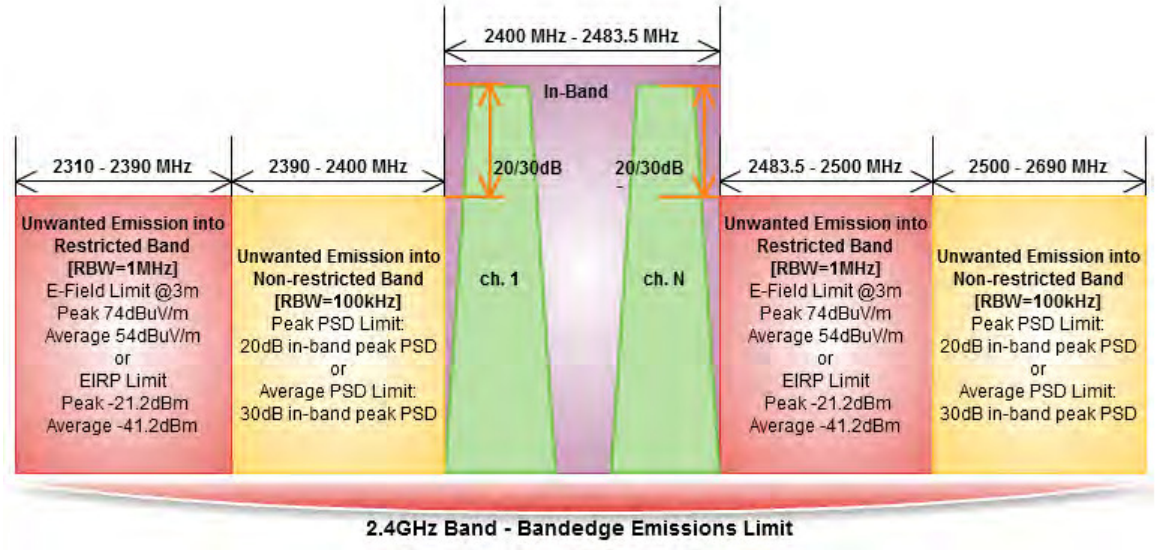
3.5.6 Test Result of Maximum Average Conducted Output Power

Refer as Appendix B

3.6 Transmitter Radiated Bandedge Emissions

3.6.1 Transmitter Radiated Bandedge Emissions Limit

Transmitter Radiated Bandedge Emissions Limit



3.6.2 Measuring Instruments

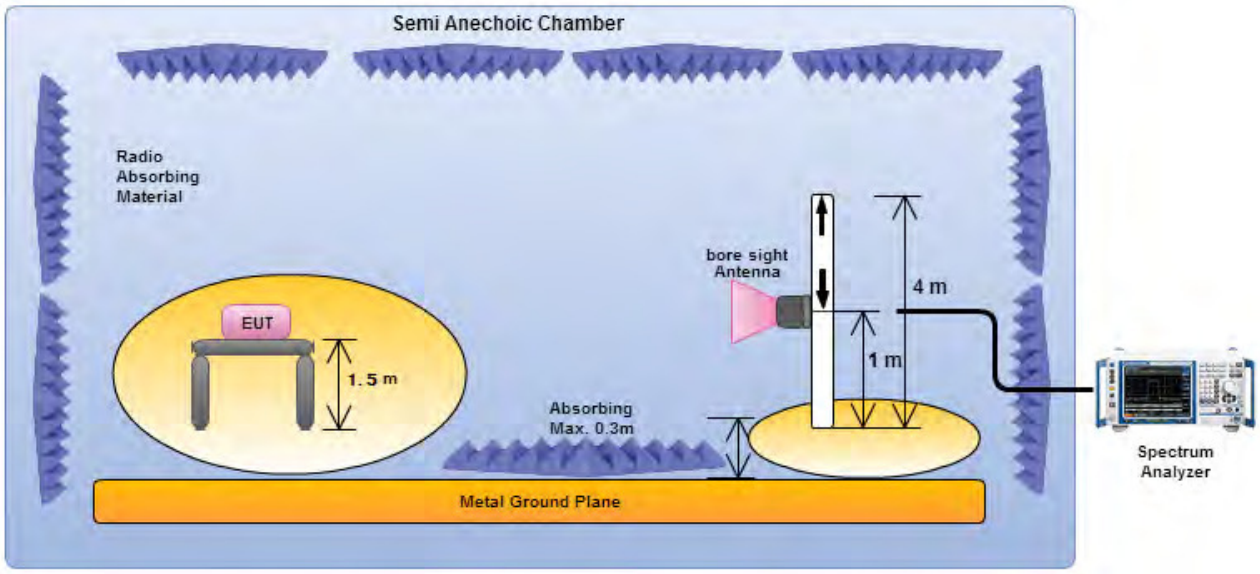
Refer a test equipment and calibration data table in this test report.

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 6.10 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 4.1.4.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		☐	Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.
		☒	Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.
☒	For the transmitter bandedge emissions shall be measured using following options below:		
	☒	Refer as ANSI C63.10, clause 6.10 for band-edge testing.	
	☐	Refer as ANSI C63.10, clause 6.10.6.2 for marker-delta method for band-edge measurements.	
	☒	Refer as ANSI C63.10, clause 7.8.6 for band-edge testing into non-restricted bands.	
☒	Refer as ANSI C63.10, clause 6.6 for radiated emissions and test distance is 3m.		

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

Refer as Appendix D

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

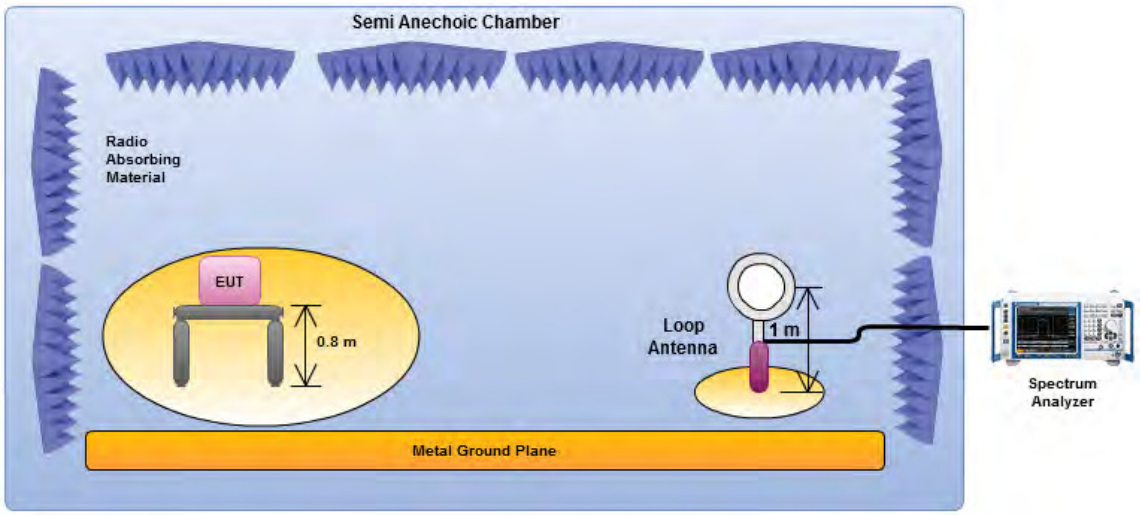
Refer a test equipment and calibration data table in this test report.

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).		
☒	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 4.1.4.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		☐	Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.
		☒	Refer as ANSI C63.10, clause 4.1.4.2.2 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.	
☒	The any unwanted emissions level shall not exceed the fundamental emission level.		
☒	All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.		

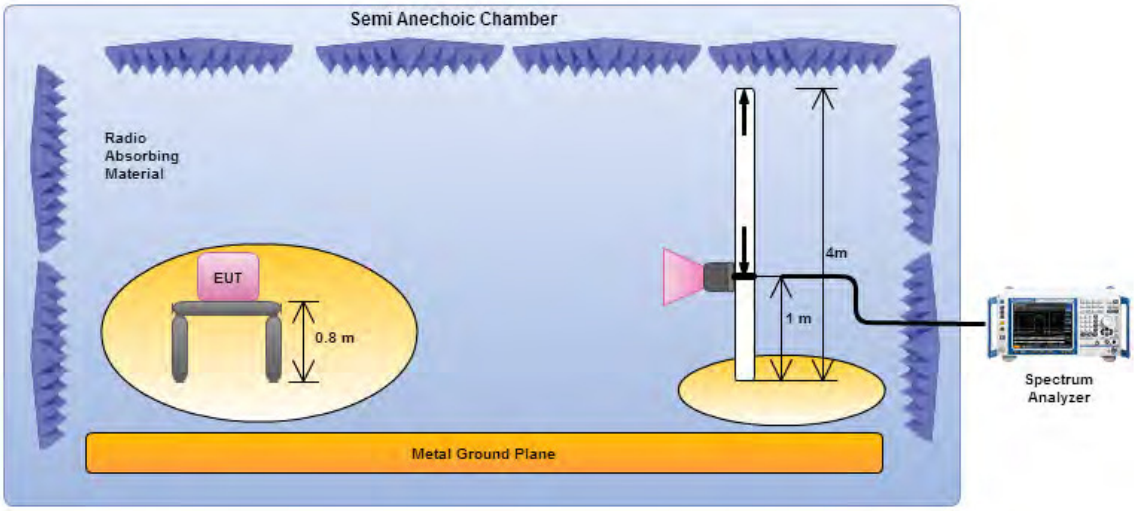
3.7.4 Test Setup

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



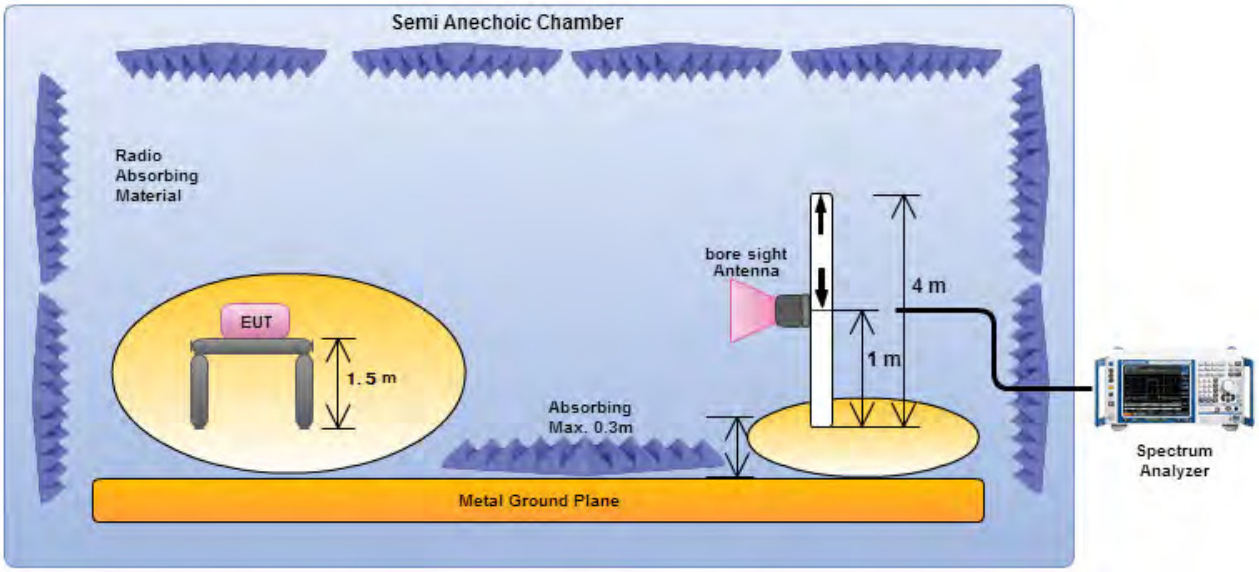
Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna.

Transmitter Radiated Unwanted Emissions (below 1GHz)



Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna.

Transmitter Radiated Unwanted Emissions (Above 1GHz)



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

3.7.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported. Any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

3.7.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Refer as Appendix E

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
EMC Receiver	KEYSIGHT	N9038A	MY54130031	20 Hz ~ 8.4 GHz	14/04/2016	13/04/2017
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9 kHz ~ 30 MHz	26/01/2016	25/01/2017
LISN (Support Unit)	R&S	ENV216	101295	9 kHz ~ 30 MHz	04/11/2015	03/11/2016
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9 kHz ~ 30 MHz	30/10/2015	29/10/2016
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	NCR	NCR

NCR: No Calibration Require.

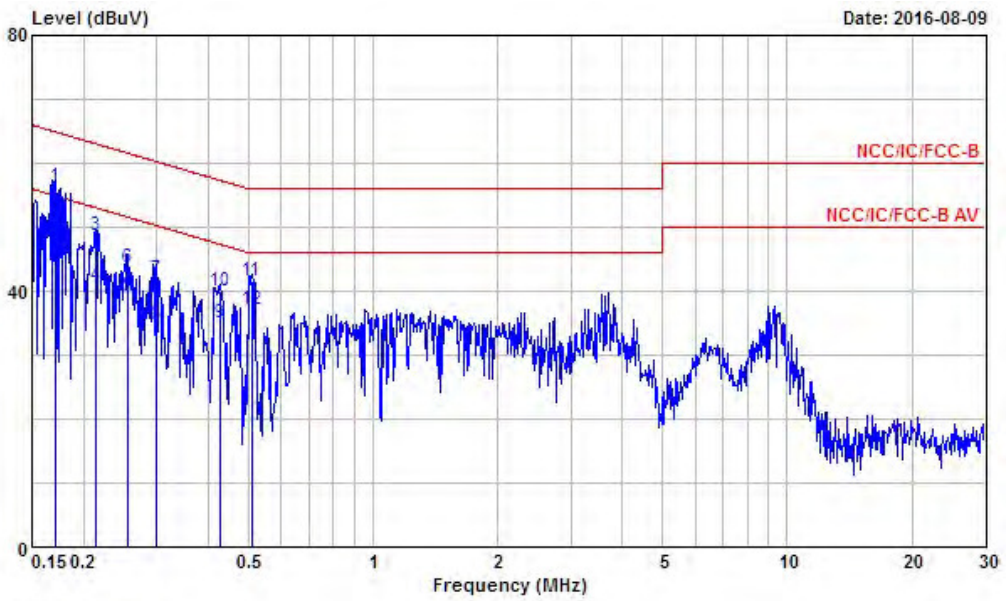
Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101500	9KHz~40GHz	12/05/2016	11/05/ 2017
Power Sensor	Anritsu	MA2411B	917017	300MHz ~ 40GHz	04/02/2016	03/02/2017
Power Meter	Anritsu	ML2495A	949003	300MHz ~ 40GHz	04/02/2016	03/02/2017
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	21/07/2016	20/07/2017

Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Last Cal.	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz ~ 1GHz 3m	25/04/2016	24/04/2017
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	1GHz ~ 18GHz 3m	30/06/2016	29/06/2017
Amplifier	EMC	EMC9135	980232	9kHz ~ 1.0GHz	29/01/2016	28/01/2017
Amplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	11/04/2016	10/04/2017
Spectrum	KEYSIGHT	N9010A	MY54200885	10Hz ~ 44GHz	04/07/2016	03/07/2017
Bilog Antenna & 5dB Attenuator	TESEQ & MTJ	CBL 6111D & MTJ6102	35418	30MHz ~ 1GHz	31/03/2016	30/03/2017
Horn Antenna	SCHWARZBECK	BBHA 9120D	BBHA 9120D 1534	1GHz ~ 18GHz	22/04/2016	21/04/2017
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170614	18GHz ~ 40GHz	04/01/2016	03/01/2017
Amplifier	MITEQ	JS44-18004000 -33-8P	1840917	18GHz ~ 40GHz	02/06/2015	01/06/2017
Loop Antenna	ROHDE&SCHWARZ	HFH2-Z2	100330	9 kHz~30 MHz	10/11/2014	09/11/2016

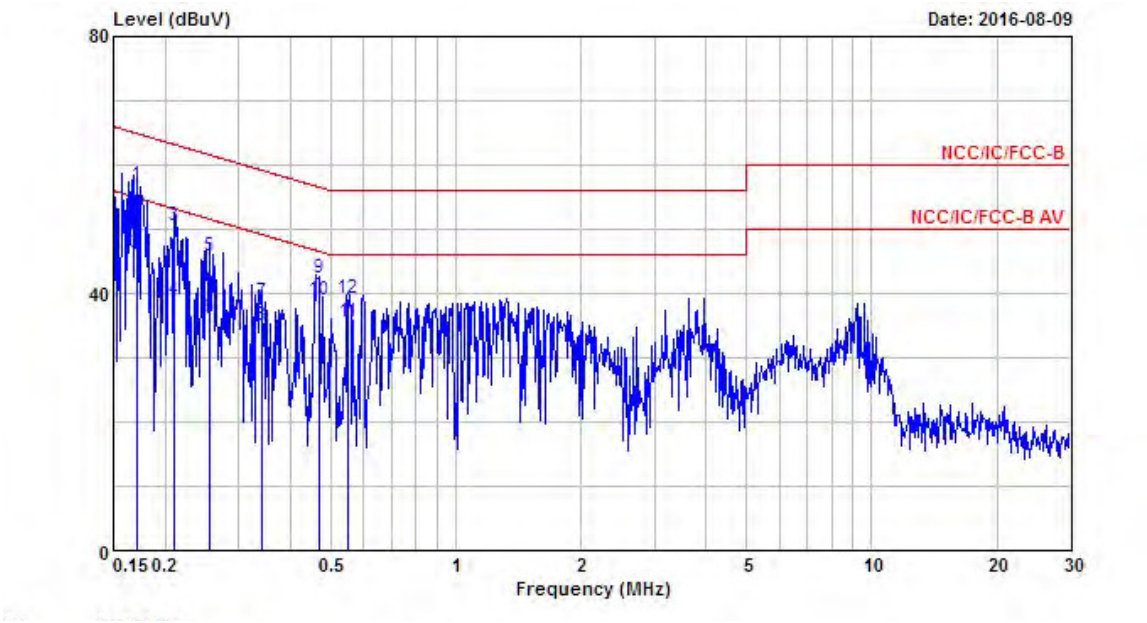
AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Neutral
Operating Function	2M 2441MHz, Adapter with charging mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1712450	56.42	-8.48	64.90	56.05	0.11	0.26	QP
2	0.1712450	44.56	-10.34	54.90	44.19	0.11	0.26	Average
3	0.2139240	48.76	-14.29	63.05	48.37	0.11	0.28	QP
4	0.2139240	40.89	-12.16	53.05	40.50	0.11	0.28	Average
5	0.2561510	39.17	-12.39	51.56	38.83	0.11	0.23	Average
6	0.2561510	43.61	-17.95	61.56	43.27	0.11	0.23	QP
7	0.2986930	41.79	-18.49	60.28	41.49	0.12	0.18	QP
8	0.2986930	34.61	-15.67	50.28	34.31	0.12	0.18	Average
9	0.4259850	34.96	-12.37	47.33	34.74	0.12	0.10	Average
10	0.4259850	40.12	-17.21	57.33	39.90	0.12	0.10	QP
11	0.5100690	41.59	-14.41	56.00	41.37	0.12	0.10	QP
12	0.5100690	37.02	-8.98	46.00	36.80	0.12	0.10	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	1	**Power Phase**	Line
Operating Function	2M 2441MHz, Adapter with charging mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1712450	56.84	-8.06	64.90	56.48	0.10	0.26	QP
2	0.1712450	46.29	-8.61	54.90	45.93	0.10	0.26	Average
3	0.2094380	50.44	-12.79	63.23	50.04	0.11	0.29	QP
4	0.2094380	38.87	-14.36	53.23	38.47	0.11	0.29	Average
5	0.2561510	45.84	-15.72	61.56	45.50	0.11	0.23	QP
6	0.2561510	36.23	-15.33	51.56	35.89	0.11	0.23	Average
7	0.3409970	38.79	-20.39	59.18	38.52	0.12	0.15	QP
8	0.3409970	34.89	-14.29	49.18	34.62	0.12	0.15	Average
9	0.4672220	42.35	-14.21	56.56	42.13	0.12	0.10	QP
10	0.4672220	38.88	-7.68	46.56	38.66	0.12	0.10	Average
11	0.5522610	35.40	-10.60	46.00	35.18	0.12	0.10	Average
12	0.5522610	39.20	-16.80	56.00	38.98	0.12	0.10	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.)

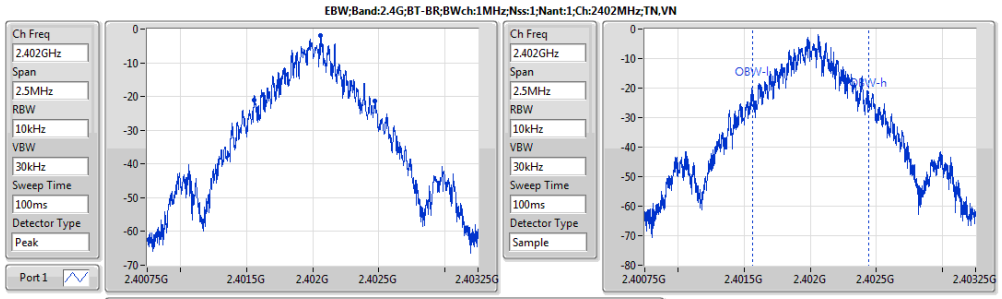
Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4G;BT-BR;1;1;1	921.25k	893.303k	893kF1D	913.75k	875.812k
2.4G;BT-EDR2;1;1;1	1.506M	1.373M	1M37G1D	1.43M	1.371M
2.4G;BT-EDR3;1;1;1	1.469M	1.368M	1M37G1D	1.416M	1.367M

Result

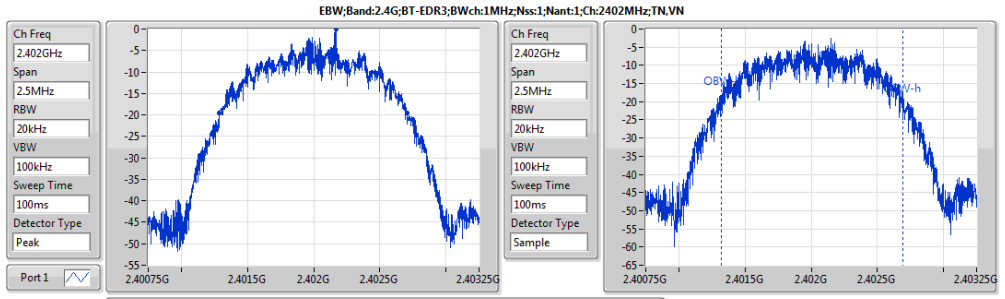
Mode	Result	Limit	P1-N dB (Hz)	P1-OBW (Hz)
2.4G;BT-BR;1;1;1;2402;L;TN,VN	Pass	Inf	913.75k	882.059k
2.4G;BT-BR;1;1;1;2440;M;TN,VN	Pass	Inf	918.75k	875.812k
2.4G;BT-BR;1;1;1;2480;H;TN,VN	Pass	Inf	921.25k	893.303k
2.4G;BT-EDR2;1;1;1;2402;L;TN,VN	Pass	Inf	1.434M	1.371M
2.4G;BT-EDR2;1;1;1;2440;M;TN,VN	Pass	Inf	1.506M	1.372M
2.4G;BT-EDR2;1;1;1;2480;H;TN,VN	Pass	Inf	1.43M	1.373M
2.4G;BT-EDR3;1;1;1;2402;L;TN,VN	Pass	Inf	1.416M	1.368M
2.4G;BT-EDR3;1;1;1;2440;M;TN,VN	Pass	Inf	1.419M	1.368M
2.4G;BT-EDR3;1;1;1;2480;H;TN,VN	Pass	Inf	1.469M	1.367M

EBW;Band:2.4G;BT-BR;BWch:1MHz;Nss:1;Nant:1;Ch:2402MHz;TN,VN



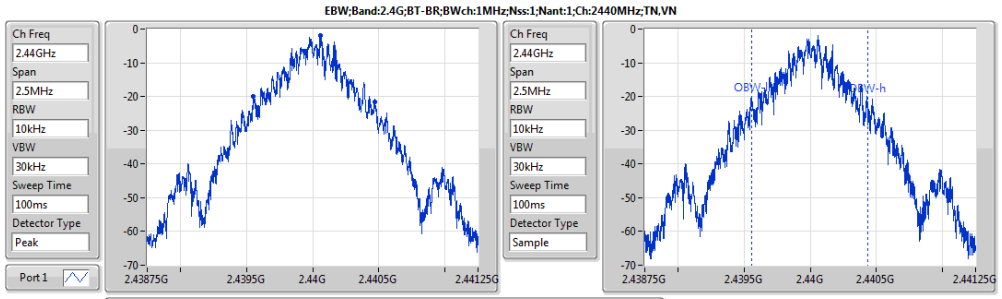
20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
913.75k	2.401556G	2.40247G	882.059k	2.401563G	2.402445G	Inf	1

EBW;Band:2.4G;BT-EDR3;BWch:1MHz;Nss:1;Nant:1;Ch:2402MHz;TN,VN



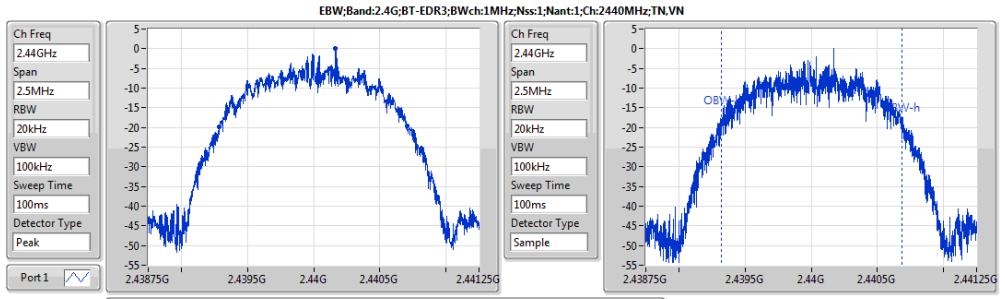
20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.416M	2.401289G	2.402705G	1.368M	2.401322G	2.40269G	Inf	1

EBW;Band:2.4G;BT-BR;BWch:1MHz;Nss:1;Nant:1;Ch:2440MHz;TN,VN



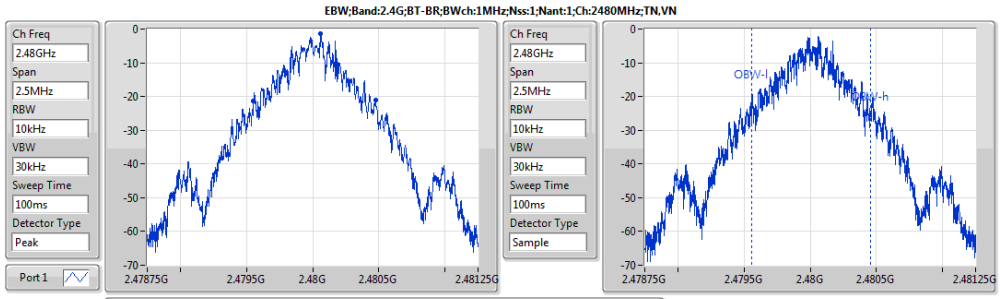
20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
918.75k	2.439554G	2.440473G	875.812k	2.43956G	2.440436G	Inf	1

EBW;Band:2.4G;BT-EDR3;BWch:1MHz;Nss:1;Nant:1;Ch:2440MHz;TN,VN



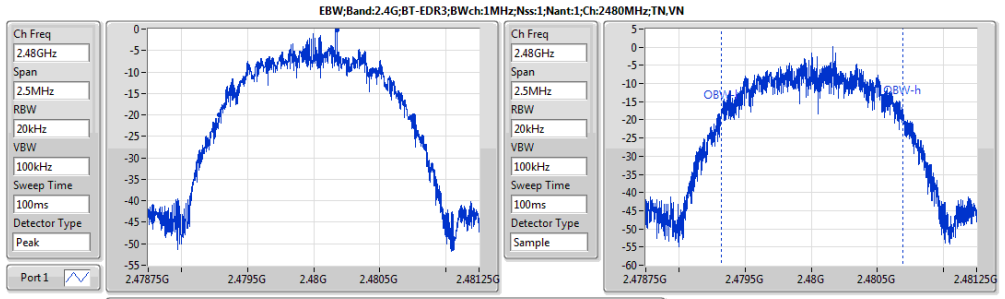
20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.419M	2.439286G	2.440705G	1.368M	2.439319G	2.440687G	Inf	1

EBW;Band:2.4G;BT-BR;BWch:1MHz;Nss:1;Nant:1;Ch:2480MHz;TN,VN



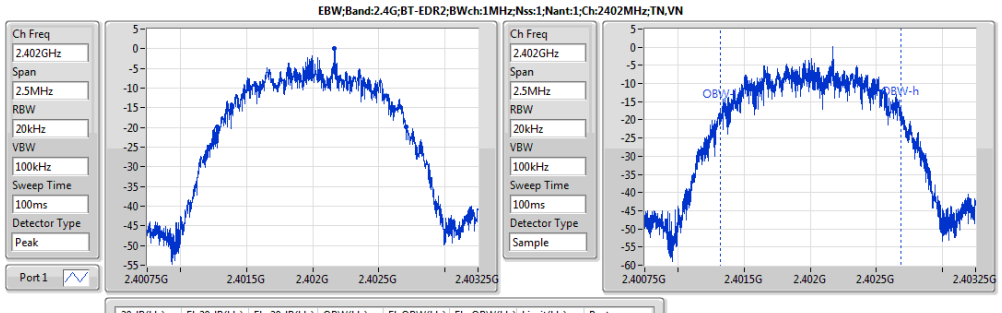
20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
921.25k	2.479554G	2.480475G	893.303k	2.47956G	2.480454G	Inf	1

EBW;Band:2.4G;BT-EDR3;BWch:1MHz;Nss:1;Nant:1;Ch:2480MHz;TN,VN



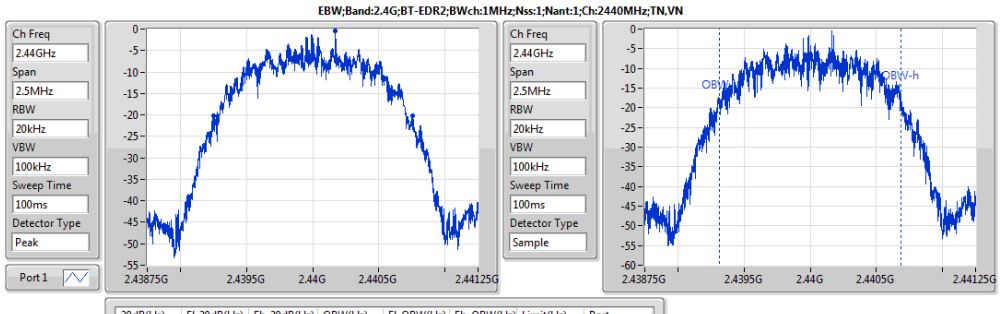
20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.469M	2.479288G	2.480756G	1.367M	2.479324G	2.480691G	Inf	1

EBW;Band:2.4G;BT-EDR2;BWch:1MHz;Nss:1;Nant:1;Ch:2402MHz;TN,VN



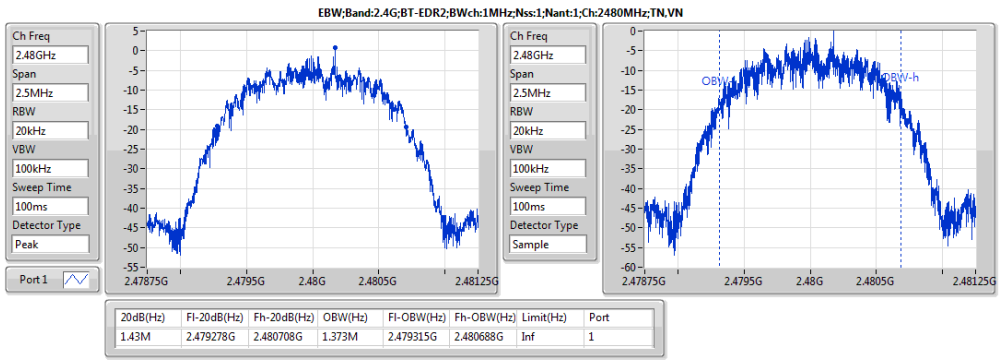
20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.434M	2.401276G	2.40271G	1.371M	2.401318G	2.402688G	Inf	1

EBW;Band:2.4G;BT-EDR2;BWch:1MHz;Nss:1;Nant:1;Ch:2440MHz;TN,VN



20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.506M	2.439249G	2.440755G	1.372M	2.439312G	2.440683G	Inf	1

EBW;Band:2.4G;BT-EDR2;BWch:1MHz;Nss:1;Nant:1;Ch:2480MHz;TN,VN



20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.43M	2.479278G	2.480708G	1.373M	2.479315G	2.480688G	Inf	1

Summary

Mode	Max-Space (Hz)	Min-Space (Hz)
2.4G;BT-BR;1;1;1	1.002M	1.0005M
2.4G;BT-EDR2;1;1;1	1.0065M	999k
2.4G;BT-EDR3;1;1;1	1.005M	1.0005M

Result

Mode	Result	Fl (Hz)	Fh (Hz)	Ch.Space (Hz)	Limit (Hz)
2.4G;BT-BR;1;1;1;2402;L;TN,VN	Pass	2.402164G	2.403165G	1.0005M	608.5575k
2.4G;BT-BR;1;1;1;2440;M;TN,VN	Pass	2.440164G	2.441166G	1.002M	611.8875k
2.4G;BT-BR;1;1;1;2480;H;TN,VN	Pass	2.479166G	2.480168G	1.002M	613.5525k
2.4G;BT-EDR2;1;1;1;2402;L;TN,VN	Pass	2.402167G	2.403166G	999k	955.044k
2.4G;BT-EDR2;1;1;1;2440;M;TN,VN	Pass	2.440164G	2.441168G	1.0035M	1.002996M
2.4G;BT-EDR2;1;1;1;2480;H;TN,VN	Pass	2.479166G	2.480172G	1.0065M	952.38k
2.4G;BT-EDR3;1;1;1;2402;L;TN,VN	Pass	2.402164G	2.403165G	1.0005M	943.056k
2.4G;BT-EDR3;1;1;1;2440;M;TN,VN	Pass	2.440167G	2.441168G	1.0005M	945.054k
2.4G;BT-EDR3;1;1;1;2480;H;TN,VN	Pass	2.479167G	2.480172G	1.005M	978.354k

Channel Separation;Band:2.4G;BT-BR;BWch:1MHz;Nss:1;Nant:1;Ch:2.402G/2.403GHz;TN,VN

Fl(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.402164G	2.403165G	1.0005M	608.5575k

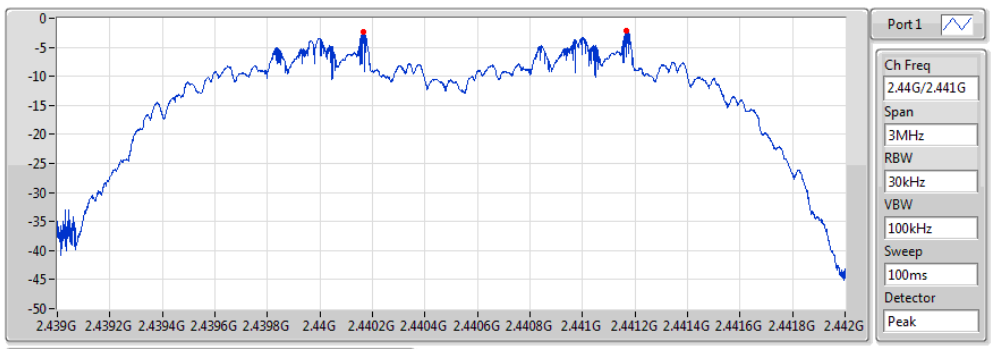
Channel Separation;Band:2.4G;BT-EDR3;BWch:1MHz;Nss:1;Nant:1;Ch:2.402G/2.403GHz;TN,VN

Fl(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.402164G	2.403165G	1.0005M	943.056k

Channel Separation;Band:2.4G;BT-BR;BWch:1MHz;Nss:1;Nant:1;Ch:2.44G/2.441GHz;TN,VN

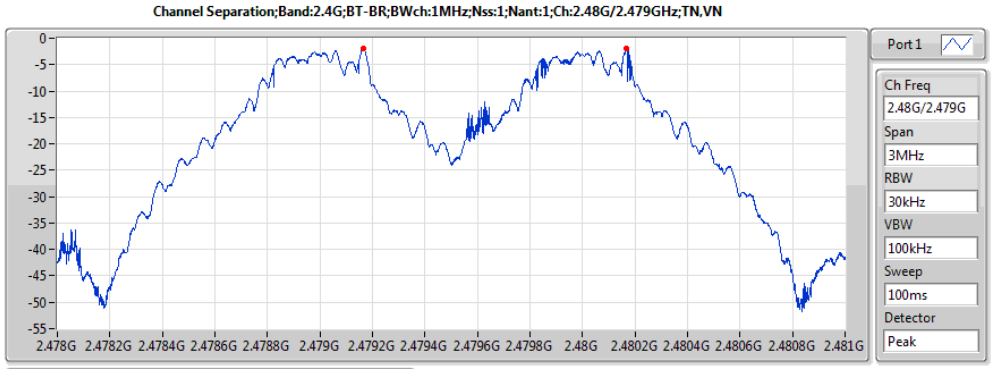
Fl(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.440164G	2.441166G	1.002M	611.8875k

Channel Separation;Band:2.4G;BT-EDR3;BWch:1MHz;Nss:1;Nant:1;Ch:2.44G/2.441GHz;TN,VN



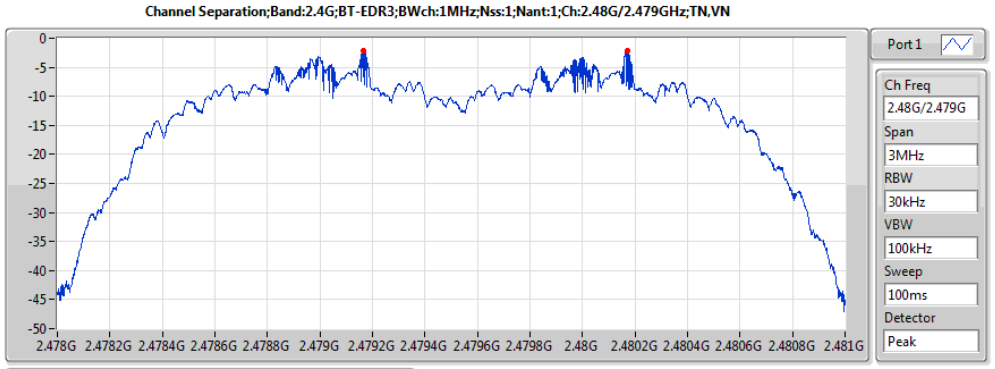
Fl(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.440167G	2.441168G	1.0005M	945.054k

Channel Separation;Band:2.4G;BT-BR;BWch:1MHz;Nss:1;Nant:1;Ch:2.48G/2.479GHz;TN,VN



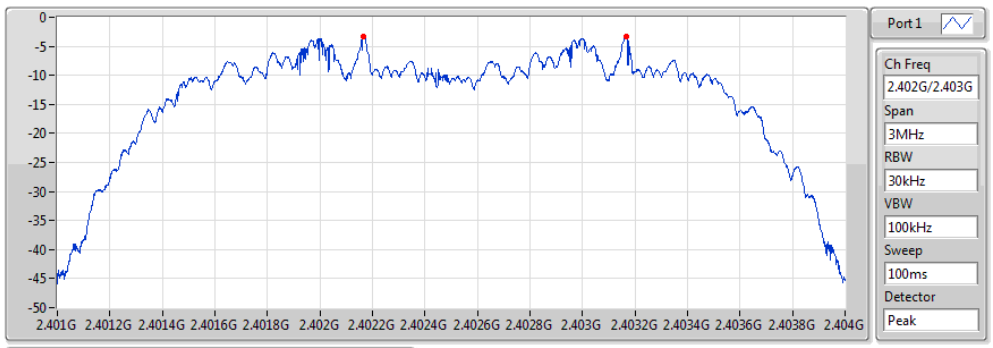
Fl(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.479166G	2.480168G	1.002M	613.5525k

Channel Separation;Band:2.4G;BT-EDR3;BWch:1MHz;Nss:1;Nant:1;Ch:2.48G/2.479GHz;TN,VN



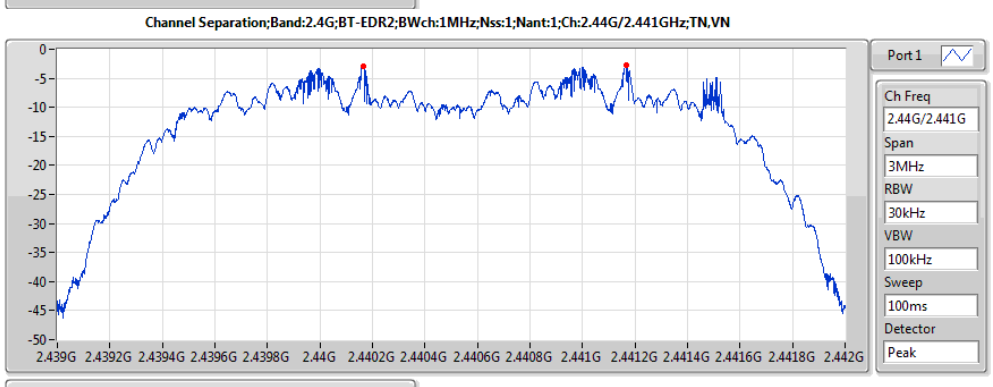
Fl(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.479167G	2.480172G	1.005M	978.354k

Channel Separation;Band:2.4G;BT-EDR2;BWch:1MHz;Nss:1;Nant:1;Ch:2.402G/2.403GHz;TN,VN



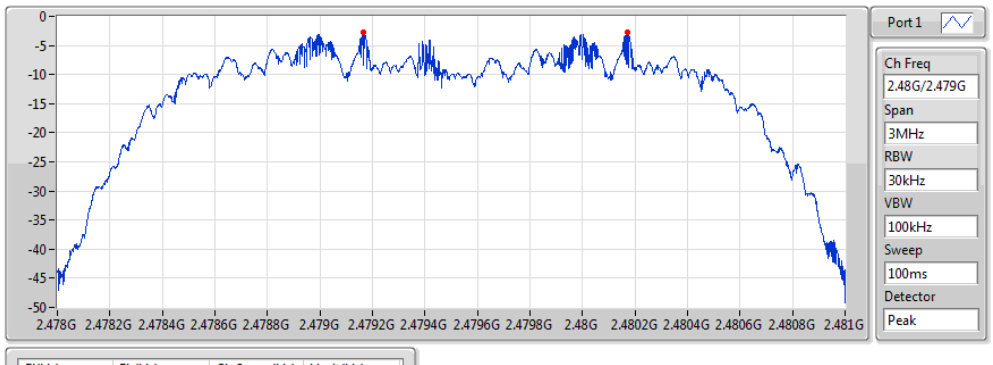
Fl(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.402167G	2.403166G	999k	955.044k

Channel Separation;Band:2.4G;BT-EDR2;BWch:1MHz;Nss:1;Nant:1;Ch:2.44G/2.441GHz;TN,VN



Fl(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.440164G	2.441168G	1.0035M	1.002996M

Channel Separation;Band:2.4G;BT-EDR2;BWch:1MHz;Nss:1;Nant:1;Ch:2.48G/2.479GHz;TN,VN



Fl(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.479166G	2.480172G	1.0065M	952.38k

Summary

Mode	Sum (dBm)	Sum (W)	EIRP (dBm)	EIRP (W)
2.4G;BT-BR;1;1;1	4.90	0.00309	5.80	0.0038
2.4G;BT-EDR2;1;1;1	5.53	0.00357	6.43	0.0044
2.4G;BT-EDR3;1;1;1	5.71	0.00372	6.61	0.00458

Result

Mode	Result	DG (dBi)	Sum (dBm)	Sum Lim. (dBm)	EIRP (dBm)	EIRP Lim. (dBm)	P1 (dBm)
2.4G;BT-BR;1;1;1;2402;L;TN,VN	Pass	0.90	4.68	30.00	5.58	36.00	4.68
2.4G;BT-BR;1;1;1;2440;M;TN,VN	Pass	0.90	4.78	30.00	5.68	36.00	4.78
2.4G;BT-BR;1;1;1;2480;H;TN,VN	Pass	0.90	4.90	30.00	5.80	36.00	4.90
2.4G;BT-EDR2;1;1;1;2402;L;TN,VN	Pass	0.90	4.97	30.00	5.87	36.00	4.97
2.4G;BT-EDR2;1;1;1;2440;M;TN,VN	Pass	0.90	4.81	30.00	5.71	36.00	4.81
2.4G;BT-EDR2;1;1;1;2480;H;TN,VN	Pass	0.90	5.53	30.00	6.43	36.00	5.53
2.4G;BT-EDR3;1;1;1;2402;L;TN,VN	Pass	0.90	5.02	30.00	5.92	36.00	5.02
2.4G;BT-EDR3;1;1;1;2440;M;TN,VN	Pass	0.90	5.61	30.00	6.51	36.00	5.61
2.4G;BT-EDR3;1;1;1;2480;H;TN,VN	Pass	0.90	5.71	30.00	6.61	36.00	5.71

Summary

Mode	Sum (dBm)	Sum (W)	EIRP (dBm)	EIRP (W)
2.4G;BT-BR;1;1;1	4.87	0.00307	5.77	0.00378
2.4G;BT-EDR2;1;1;1	4.93	0.00311	5.83	0.00383
2.4G;BT-EDR3;1;1;1	5.01	0.00317	5.91	0.0039

Result

Mode	Result	DG (dBi)	Sum (dBm)	Sum Lim. (dBm)	EIRP (dBm)	EIRP Lim. (dBm)	P1 (dBm)
2.4G;BT-BR;1;1;1;2402;L;TN,VN	Pass	0.90	4.65	30.00	5.55	36.00	4.65
2.4G;BT-BR;1;1;1;2440;M;TN,VN	Pass	0.90	4.75	30.00	5.65	36.00	4.75
2.4G;BT-BR;1;1;1;2480;H;TN,VN	Pass	0.90	4.87	30.00	5.77	36.00	4.87
2.4G;BT-EDR2;1;1;1;2402;L;TN,VN	Pass	0.90	4.67	30.00	5.57	36.00	4.67
2.4G;BT-EDR2;1;1;1;2440;M;TN,VN	Pass	0.90	4.81	30.00	5.71	36.00	4.81
2.4G;BT-EDR2;1;1;1;2480;H;TN,VN	Pass	0.90	4.93	30.00	5.83	36.00	4.93
2.4G;BT-EDR3;1;1;1;2402;L;TN,VN	Pass	0.90	4.74	30.00	5.64	36.00	4.74
2.4G;BT-EDR3;1;1;1;2440;M;TN,VN	Pass	0.90	4.87	30.00	5.77	36.00	4.87
2.4G;BT-EDR3;1;1;1;2480;H;TN,VN	Pass	0.90	5.01	30.00	5.91	36.00	5.01

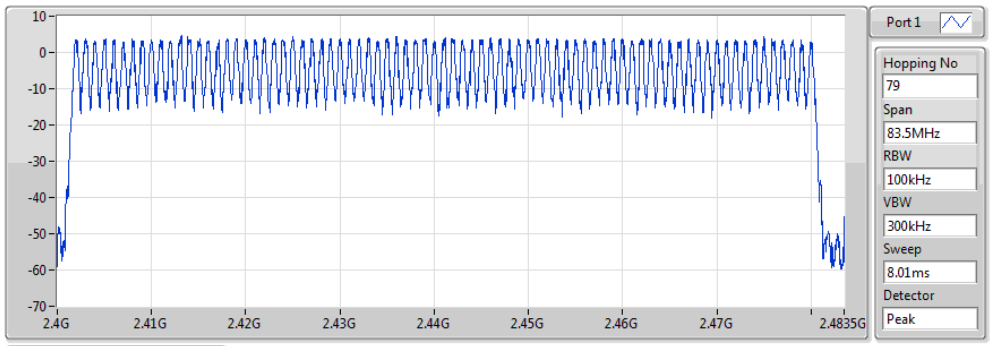
Summary

Mode	Max-Hop No
2.4G;BT-BR;1;1;1	79
2.4G;BT-EDR2;1;1;1	79
2.4G;BT-EDR3;1;1;1	79

Result

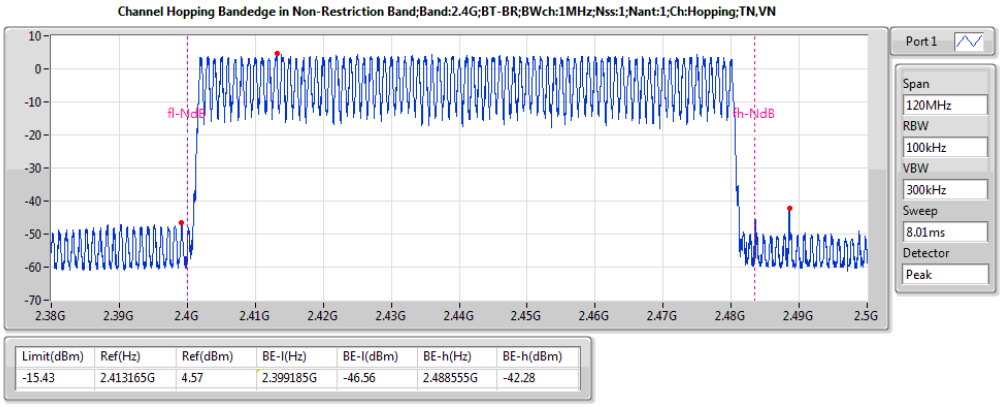
Mode	Result	Hopping No	Limit
2.4G;BT-BR;1;1;1;2440;M;TN,VN	Pass	79	15
2.4G;BT-EDR2;1;1;1;2440;M;TN,VN	Pass	79	15
2.4G;BT-EDR3;1;1;1;2440;M;TN,VN	Pass	79	15

Hopping Channel Number;Band:2.4G;BT-BR;BWch:1MHz;Nss:1;Nant:1;Ch:Hopping;TN,VN



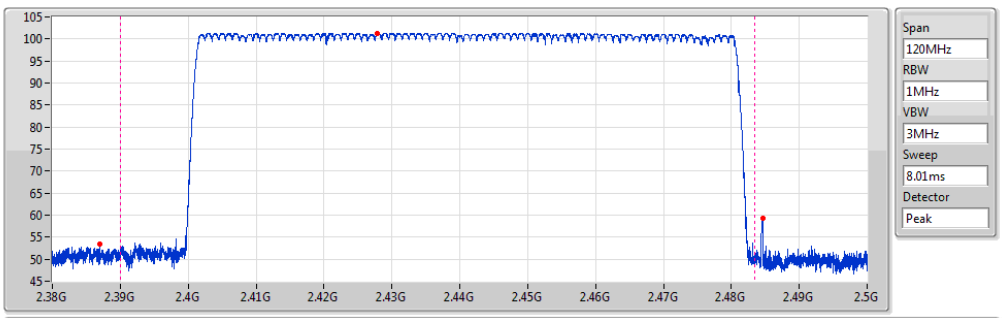
Hopping No	Limit
79	15

Channel Hopping Bandedge in Non-Restriction Band;Band:2.4G;BT-BR;BWch:1MHz;Nss:1;Nant:1;Ch:Hopping;TN,VN



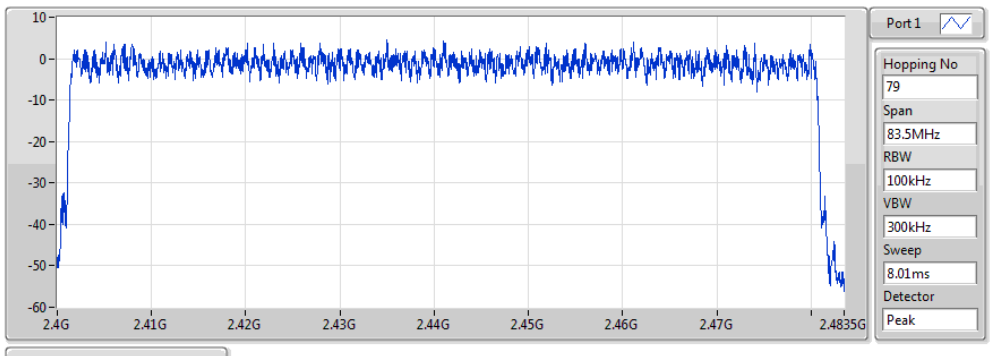
Limit(dBm)	Ref(Hz)	Ref(dBm)	BE-l(Hz)	BE-l(dBm)	BE-h(Hz)	BE-h(dBm)
-15.43	2.413165G	4.57	2.399185G	-46.56	2.488555G	-42.28

Channel Hopping Bandedge in Restriction Band;Band:2.4G;BT-BR;BWch:1MHz;Nss:1;Nant:1;Ch:Hopping;TN,VN



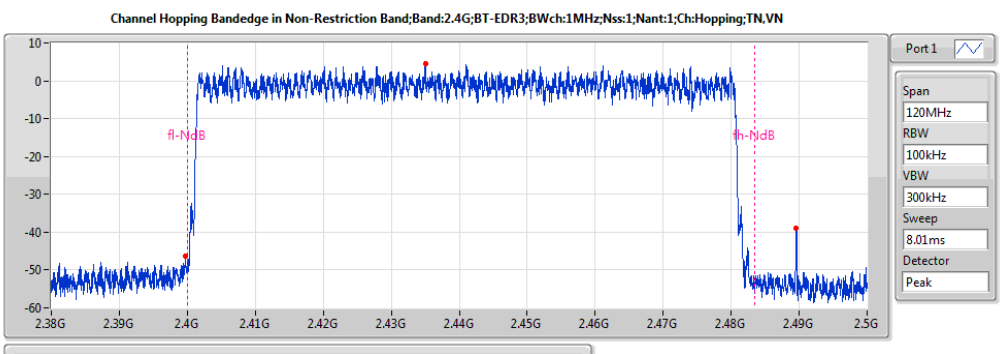
Ref(Hz)	Ref(dBuV/m)	BE-l(Hz)	PK(dBuV/m)	AV(dBuV/m)	BE-h(Hz)	PK(dBuV/m)	AV(dBuV/m)	LimPK(dBuV/	LimAV(dBuV/	Tx On(ms)	DCF(dB)
2.42785G	101.3	2.38702G	53.48	22.7	2.484595G	59.34	28.56	74	54	2.889	-30.79

Hopping Channel Number;Band:2.4G;BT-EDR3;BWch:1MHz;Nss:1;Nant:1;Ch:Hopping;TN,VN



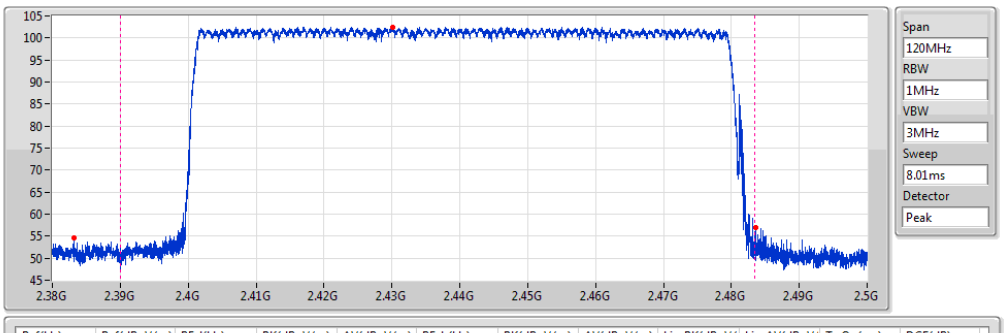
Hopping No	Limit
79	15

Channel Hopping Bandedge in Non-Restriction Band;Band:2.4G;BT-EDR3;BWch:1MHz;Nss:1;Nant:1;Ch:Hopping;TN,VN



Limit(dBm)	Ref(Hz)	Ref(dBm)	BE-l(Hz)	BE-l(dBm)	BE-h(Hz)	BE-h(dBm)
-15.6	2.435005G	4.4	2.39968G	-46.35	2.48959G	-38.88

Channel Hopping Bandedge in Restriction Band;Band:2.4G;BT-EDR3;BWch:1MHz;Nss:1;Nant:1;Ch:Hopping;TN,VN



Ref(Hz)	Ref(dBuV/m)	BE-l(Hz)	PK(dBuV/m)	AV(dBuV/m)	BE-h(Hz)	PK(dBuV/m)	AV(dBuV/m)	LimPK(dBuV/	LimAV(dBuV/	Tx On(ms)	DCF(dB)
2.4301G	102.42	2.38321G	54.53	23.77	2.48353G	57.03	26.26	74	54	2.896	-30.76

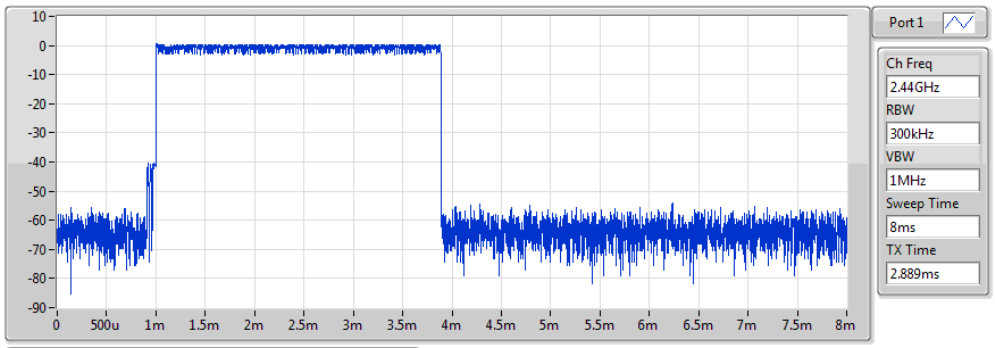
Summary

Mode	Max-Dwell (s)
2.4G;BT-BR;1;1;1	307.9674m
2.4G;BT-EDR2;1;1;1	308.5004m
2.4G;BT-EDR3;1;1;1	308.7136m

Result

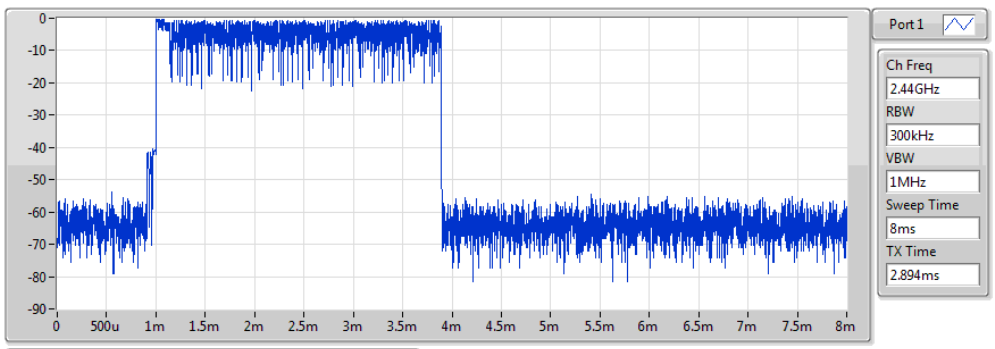
Mode	Result	Period (s)	Dwell (s)	Limit (s)	Tx On (s)
2.4G;BT-BR;1;1;1;2440;M;TN,VN	Pass	31.6	307.9674m	400m	2.889m
2.4G;BT-EDR2;1;1;1;2440;M;TN,VN	Pass	31.6	308.5004m	400m	2.894m
2.4G;BT-EDR3;1;1;1;2440;M;TN,VN	Pass	31.6	308.7136m	400m	2.896m

Dwell Time;Band:2.4G;BT-BR;BWch:1MHz;Nss:1;Nant:1;Ch:2440MHz;TN,VN



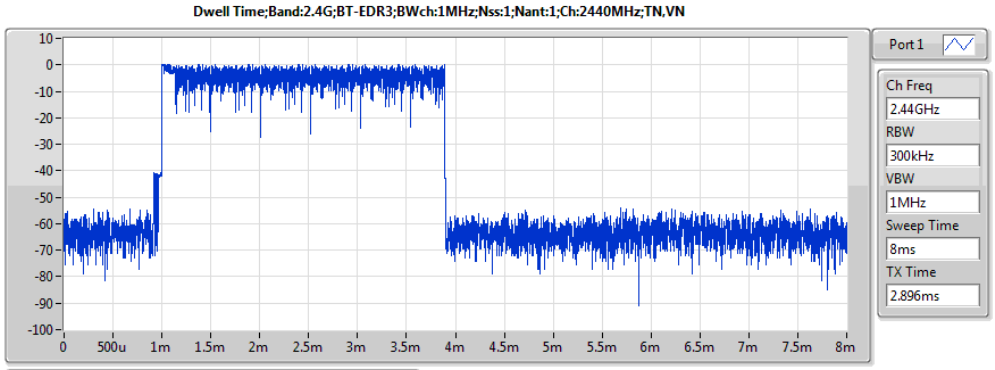
Period(s)	Dwell(s)	Limit(s)	Tx On(s)
31.6	307.9674m	400m	2.889m

Dwell Time;Band:2.4G;BT-EDR2;BWch:1MHz;Nss:1;Nant:1;Ch:2440MHz;TN,VN



Period(s)	Dwell(s)	Limit(s)	Tx On(s)
31.6	308.5004m	400m	2.894m

Dwell Time;Band:2.4G;BT-EDR3;BWch:1MHz;Nss:1;Nant:1;Ch:2440MHz;TN,VN



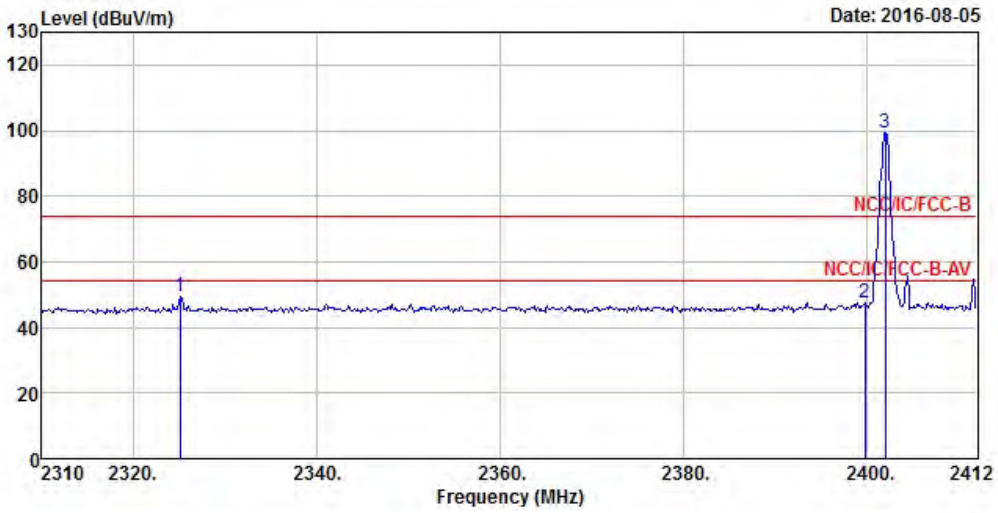
Period(s)	Dwell(s)	Limit(s)	Tx On(s)
31.6	308.7136m	400m	2.896m

Transmitter Radiated Bandedge Emissions (Non-restricted Band)							
Modulation	Test Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Pol.
BR-1Mbps	2402	99.52	2399.760	47.48	52.04	20	V
BR -1Mbps	2480	99.40	2543.040	48.42	50.98	20	V
EDR-2Mbps	2402	99.19	2399.760	50.42	48.77	20	V
EDR-2Mbps	2480	99.36	2507.360	48.10	51.26	20	V
EDR-3Mbps	2402	99.17	2399.964	51.77	47.40	20	V
EDR-3Mbps	2480	100.02	2543.520	48.45	51.57	20	V
Note 1: Measurement worst emissions of receive antenna polarization							

Transmitter Radiated Bandedge Emissions (Restricted Band)									
Modulation Mode	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
BR-1Mbps	2402	3	2356.716	58.21	74	2356.716	28.11	54	V
BR -1Mbps	2480	3	2489.600	60.17	74	2489.600	30.07	54	V
EDR-2Mbps	2402	3	2380.992	58.05	74	2380.992	27.95	54	V
EDR-2Mbps	2480	3	2490.080	60.29	74	2490.080	30.19	54	V
EDR-3Mbps	2402	3	2378.952	58.36	74	2378.952	28.26	54	V
EDR-3Mbps	2480	3	2483.520	60.08	74	2483.520	29.98	54	V
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									

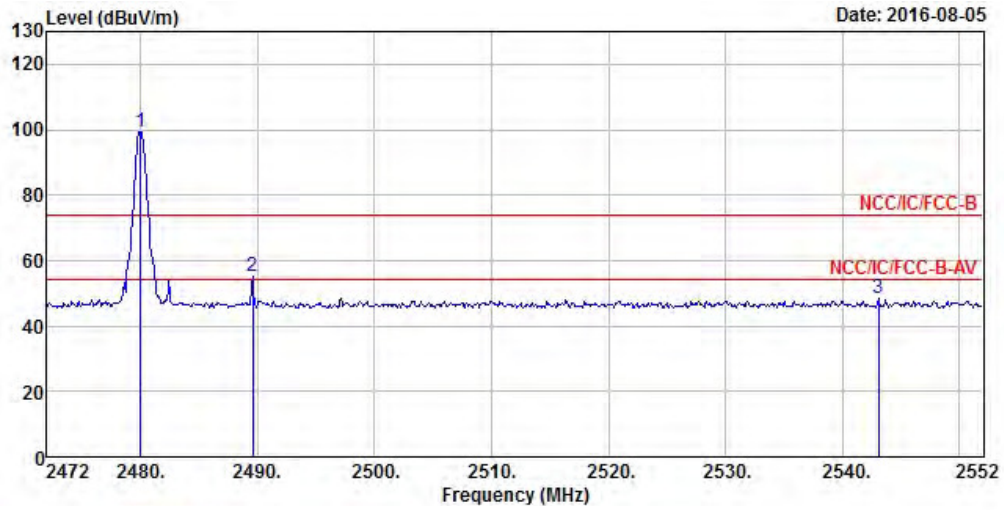
Transmitter Radiated Bandedge Emissions (Non-restricted Band)

Transmitter Radiated Bandedge Emissions			
Modulation Mode	BR-1Mbps	**Test Freq. (MHz)**	2402
N_{TX}	1	**Polarization**	H



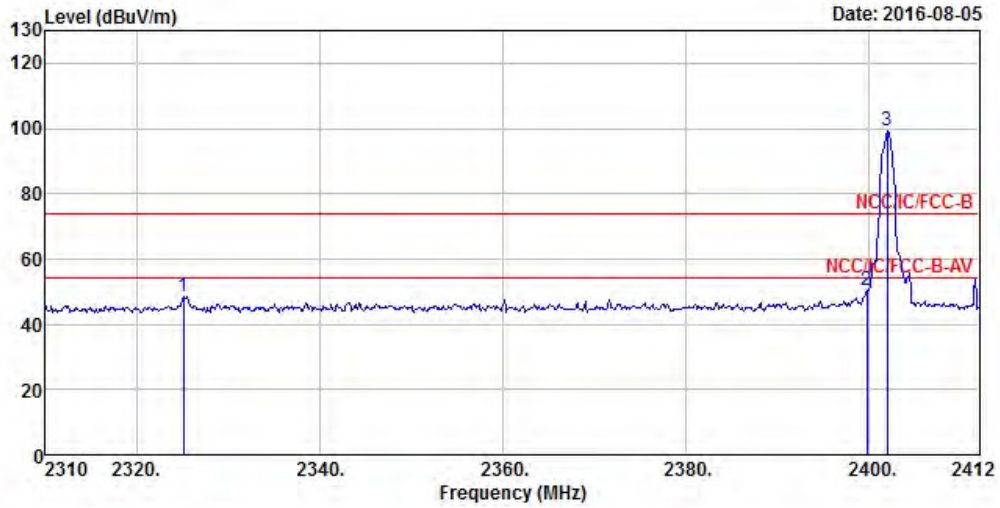
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2325.096	49.52			18.46	26.85	4.21	0.00	Peak
2	2399.760	47.48			16.16	27.04	4.28	0.00	Peak
3	2402.004	99.52			68.19	27.05	4.28	0.00	Peak

Transmitter Radiated Bandedge Emissions			
Modulation Mode	BR-1Mbps	**Test Freq. (MHz)**	2480
N_{TX}	1	**Polarization**	H



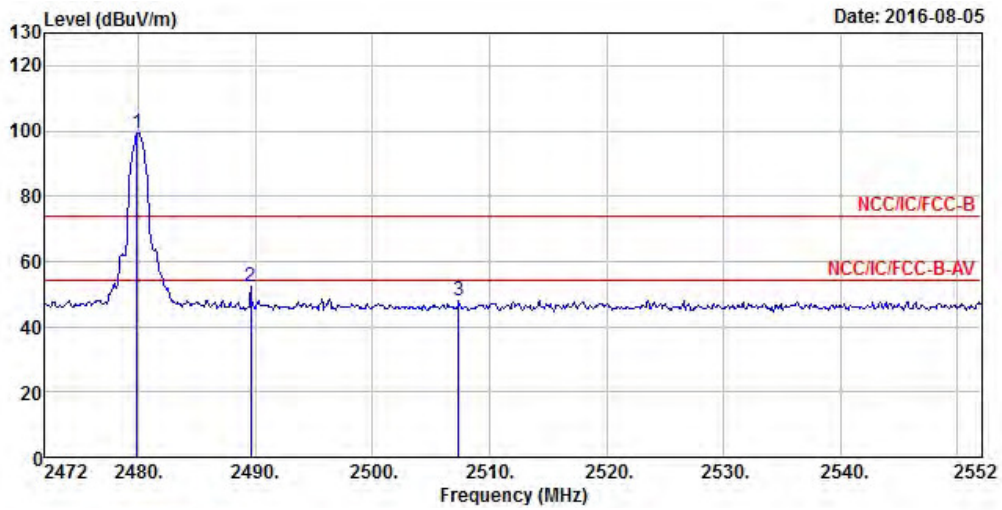
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2480.000	99.40			67.80	27.25	4.35	0.00	Peak
2	2489.600	55.03			23.41	27.27	4.35	0.00	Peak
3	2543.040	48.42			16.60	27.40	4.42	0.00	Peak

Transmitter Radiated Bandedge Emissions			
Modulation Mode	EDR-2Mbps	**Test Freq. (MHz)**	2402
N_{TX}	1	**Polarization**	H



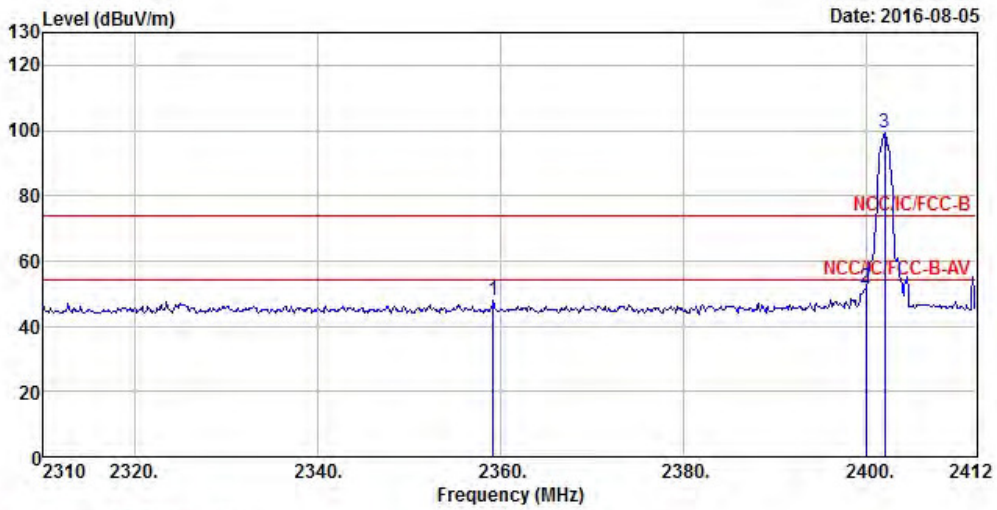
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2325.096	48.39			17.33	26.85	4.21	0.00	Peak
2	2399.760	50.42			19.10	27.04	4.28	0.00	Peak
3	2402.004	99.19			67.86	27.05	4.28	0.00	Peak

Transmitter Radiated Bandedge Emissions			
Modulation Mode	EDR-2Mbps	**Test Freq. (MHz)**	2480
N_{TX}	1	**Polarization**	H



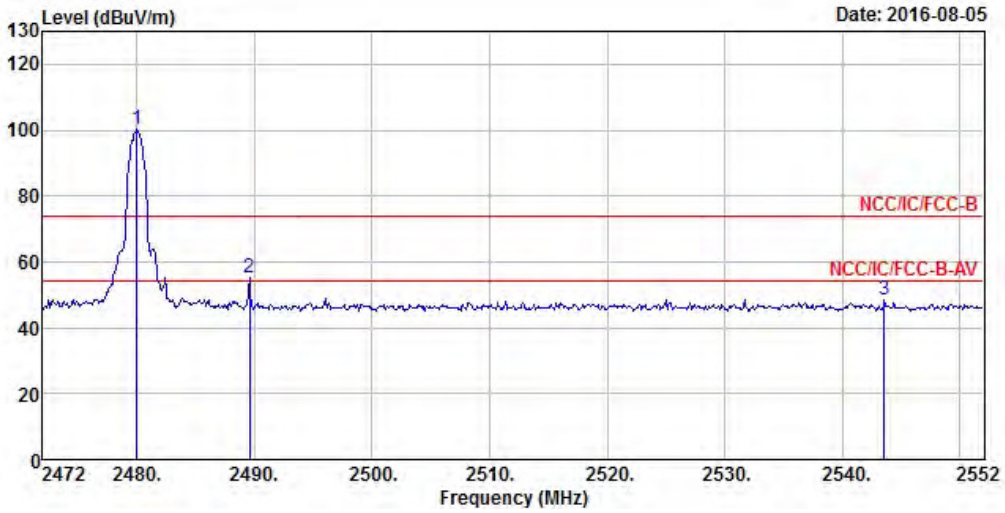
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2479.840	99.36			67.76	27.25	4.35	0.00	Peak
2	2489.600	52.16			20.54	27.27	4.35	0.00	Peak
3	2507.360	48.10			16.40	27.32	4.38	0.00	Peak

Transmitter Radiated Bandedge Emissions			
Modulation Mode	EDR-3Mbps	**Test Freq. (MHz)**	2402
N_{TX}	1	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2359.164	47.86			16.68	26.93	4.25	0.00	Peak
2	2399.964	51.77			20.45	27.04	4.28	0.00	Peak
3	2402.004	99.17			67.84	27.05	4.28	0.00	Peak

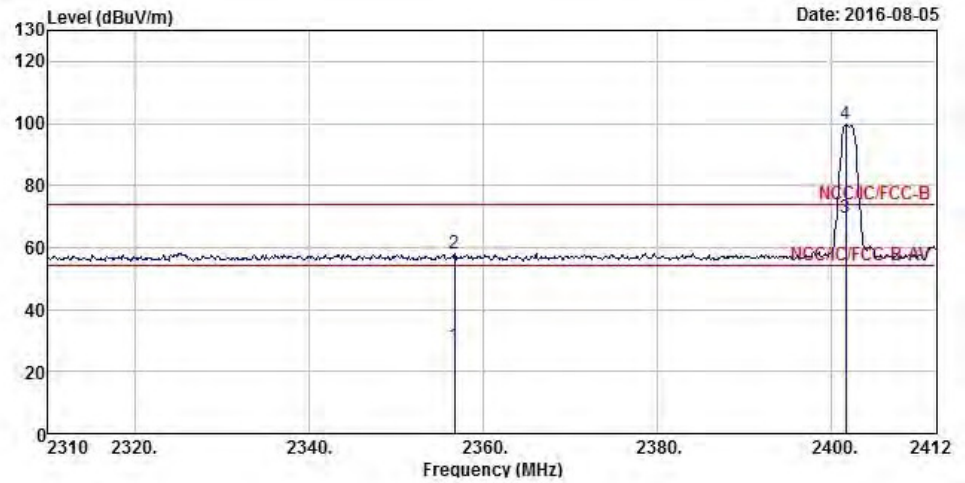
Transmitter Radiated Bandedge Emissions			
Modulation Mode	EDR-3Mbps	**Test Freq. (MHz)**	2480
N_{TX}	1	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBu		V/m	dBuV	dB/m	dB	dB	
1	2480.000	100.02			68.42	27.25	4.35	0.00	Peak
2	2489.600	55.09			23.47	27.27	4.35	0.00	Peak
3	2543.520	48.45			16.63	27.40	4.42	0.00	Peak

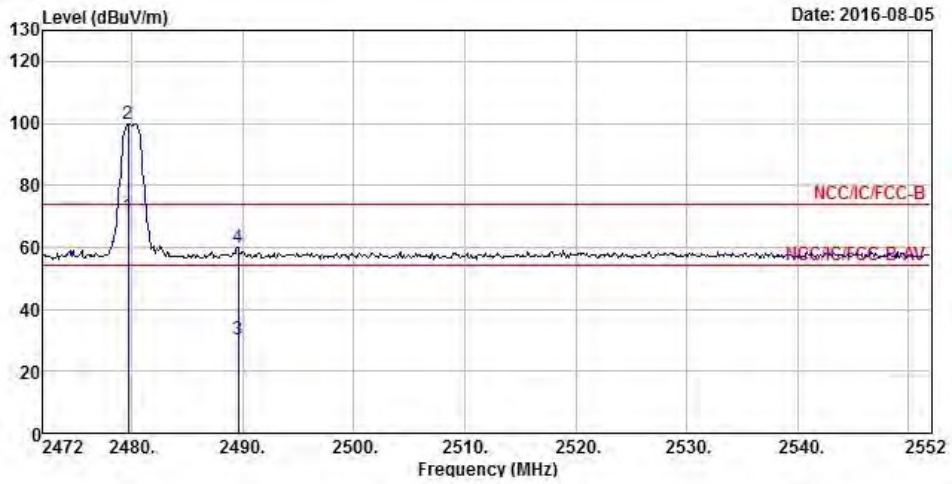
Transmitter Radiated Bandedge Emissions (Restricted Band)

Transmitter Radiated Bandedge Emissions			
Modulation Mode	BR-1Mbps	**Test Freq. (MHz)**	2402
N_{TX}	1	**Polarization**	H



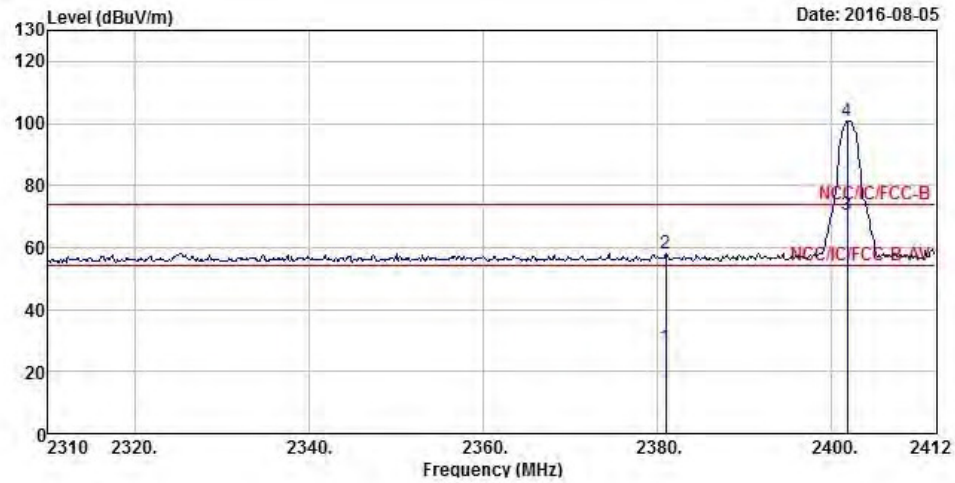
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2356.716	28.11	-25.89	54.00	-3.07	26.93	4.25	0.00	Average
2	2356.716	58.21	-15.79	74.00	27.03	26.93	4.25	0.00	Peak
3	2401.596	69.48			38.16	27.04	4.28	0.00	Average
4	2401.596	99.58			68.26	27.04	4.28	0.00	Peak

Transmitter Radiated Bandedge Emissions			
Modulation Mode	BR-1Mbps	**Test Freq. (MHz)**	2480
N_{TX}	1	**Polarization**	H



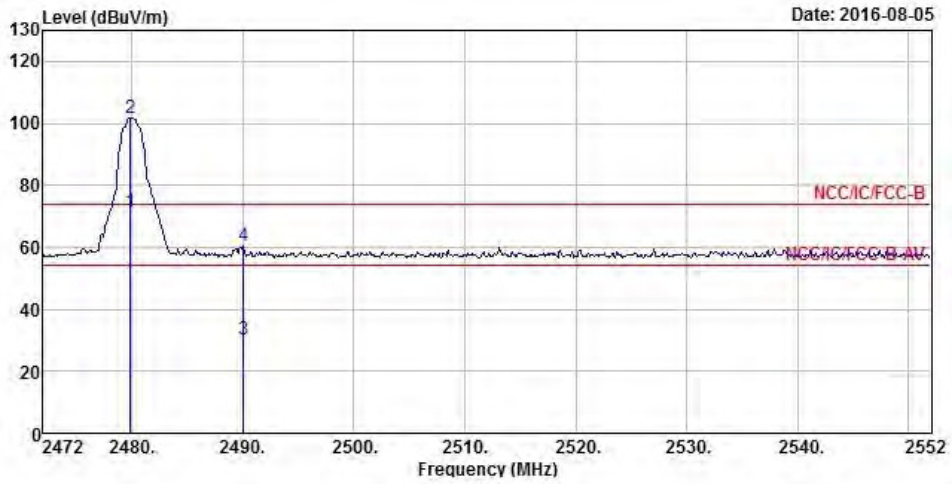
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2479.680	69.81			38.21	27.25	4.35	0.00	Average
2	2479.680	99.91			68.31	27.25	4.35	0.00	Peak
3	2489.600	30.07	-23.93	54.00	-1.55	27.27	4.35	0.00	Average
4	2489.600	60.17	-13.83	74.00	28.55	27.27	4.35	0.00	Peak

Transmitter Radiated Bandedge Emissions			
Modulation Mode	EDR-2Mbps	**Test Freq. (MHz)**	2402
N_{TX}	1	**Polarization**	H



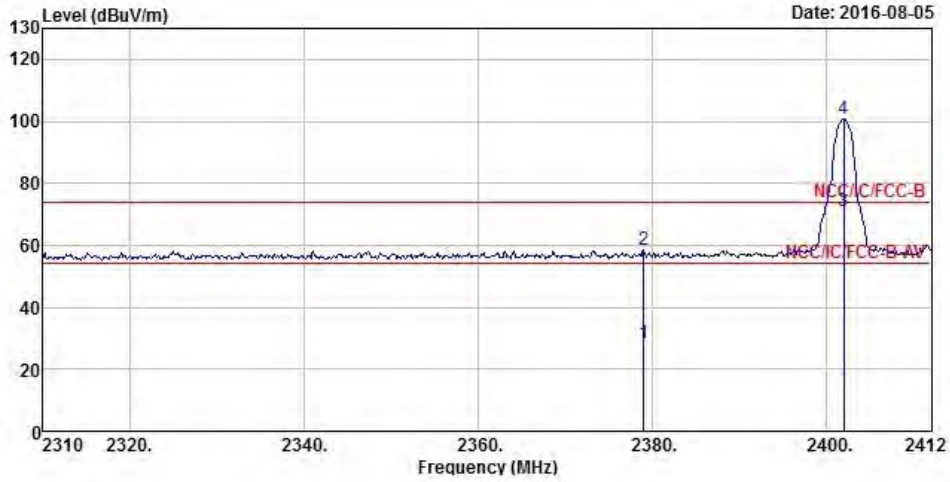
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2380.992	27.95	-26.05	54.00	-3.29	26.99	4.25	0.00	Average
2	2380.992	58.05	-15.95	74.00	26.81	26.99	4.25	0.00	Peak
3	2401.800	70.65			39.33	27.04	4.28	0.00	Average
4	2401.800	100.75			69.43	27.04	4.28	0.00	Peak

Transmitter Radiated Bandedge Emissions			
Modulation Mode	EDR-2Mbps	**Test Freq. (MHz)**	2480
N_{TX}	1	**Polarization**	H



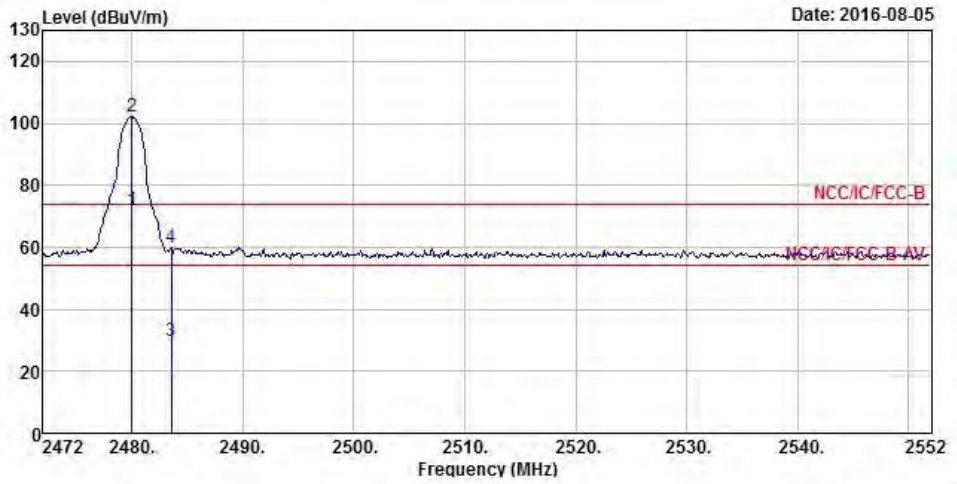
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2479.840	71.58			39.98	27.25	4.35	0.00	Average
2	2479.840	101.68			70.08	27.25	4.35	0.00	Peak
3	2490.080	30.19	-23.81	54.00	-1.43	27.27	4.35	0.00	Average
4	2490.080	60.29	-13.71	74.00	28.67	27.27	4.35	0.00	Peak

Transmitter Radiated Bandedge Emissions			
Modulation Mode	EDR-3Mbps	**Test Freq. (MHz)**	2402
N_{TX}	1	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2378.952	28.26	-25.74	54.00	-2.98	26.99	4.25	0.00	Average
2	2378.952	58.36	-15.64	74.00	27.12	26.99	4.25	0.00	Peak
3	2402.004	70.79			39.46	27.05	4.28	0.00	Average
4	2402.004	100.89			69.56	27.05	4.28	0.00	Peak

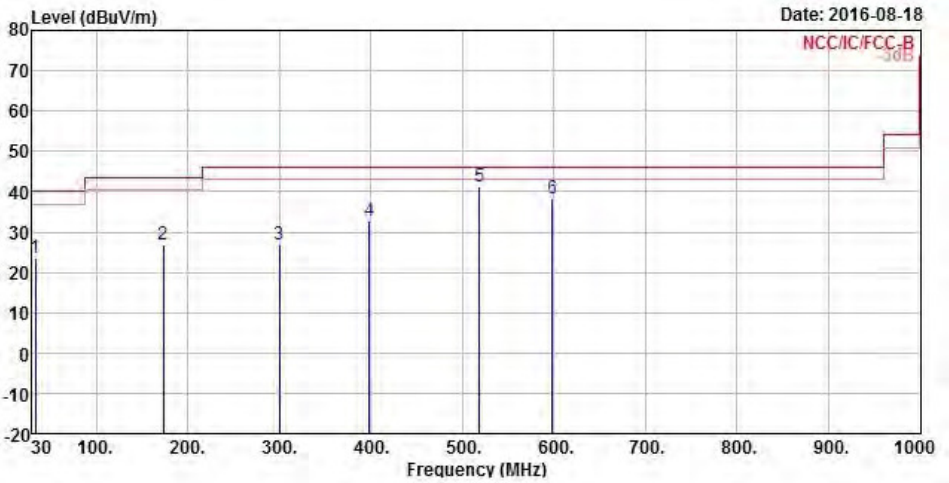
Transmitter Radiated Bandedge Emissions			
Modulation Mode	EDR-3Mbps	**Test Freq. (MHz)**	2480
N_{TX}	1	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2480.000	72.06			40.46	27.25	4.35	0.00	Average
2	2480.000	102.16			70.56	27.25	4.35	0.00	Peak
3	2483.520	29.98	-24.02	54.00	-1.63	27.26	4.35	0.00	Average
4	2483.520	60.08	-13.92	74.00	28.47	27.26	4.35	0.00	Peak

Transmitter Radiated Unwanted Emissions (Below 1GHz)

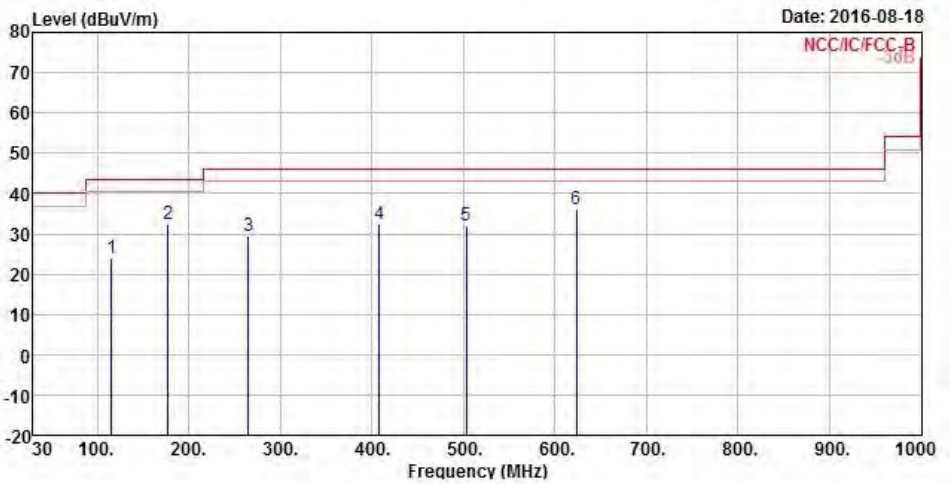
Radiated Unwanted Emissions (Below 1GHz)			
Operating Mode	1	**Polarization**	V
Operating Function	2M 2441MHz, Adapter with charging mode		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	33.880	23.47	-16.53	40.00	37.70	22.80	0.34	37.37	Peak
2	173.560	27.03	-16.47	43.50	47.92	14.89	0.73	36.51	Peak
3	299.660	26.96	-19.04	46.00	43.60	18.79	0.97	36.40	Peak
4	398.600	32.65	-13.35	46.00	46.72	21.47	1.12	36.66	Peak
5	518.880	41.31	-4.69	46.00	53.51	23.53	1.31	37.04	Peak
6	598.420	38.20	-7.80	46.00	49.47	24.58	1.41	37.26	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)

Radiated Unwanted Emissions (Below 1GHz)			
Operating Mode	1	**Polarization**	H
Operating Function	2M 2441MHz, Adapter with charging mode		

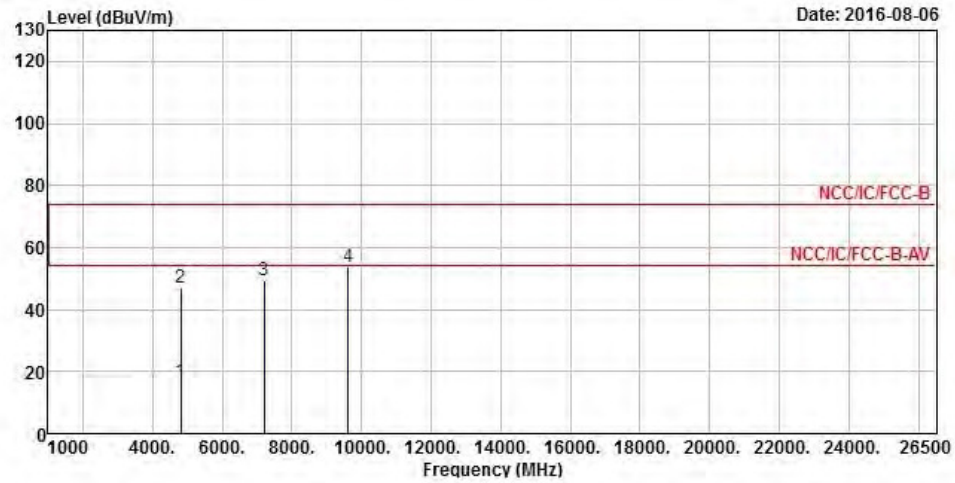


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	115.360	23.81	-19.69	43.50	43.36	16.62	0.59	36.76	Peak
2	177.440	32.27	-11.23	43.50	53.37	14.65	0.74	36.49	Peak
3	264.740	29.62	-16.38	46.00	46.30	18.81	0.91	36.40	Peak
4	408.300	32.42	-13.58	46.00	46.33	21.65	1.13	36.69	Peak
5	503.360	31.87	-14.13	46.00	44.23	23.34	1.29	36.99	Peak
6	623.640	36.24	-9.76	46.00	47.14	24.98	1.44	37.32	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 (Above 1GHz)

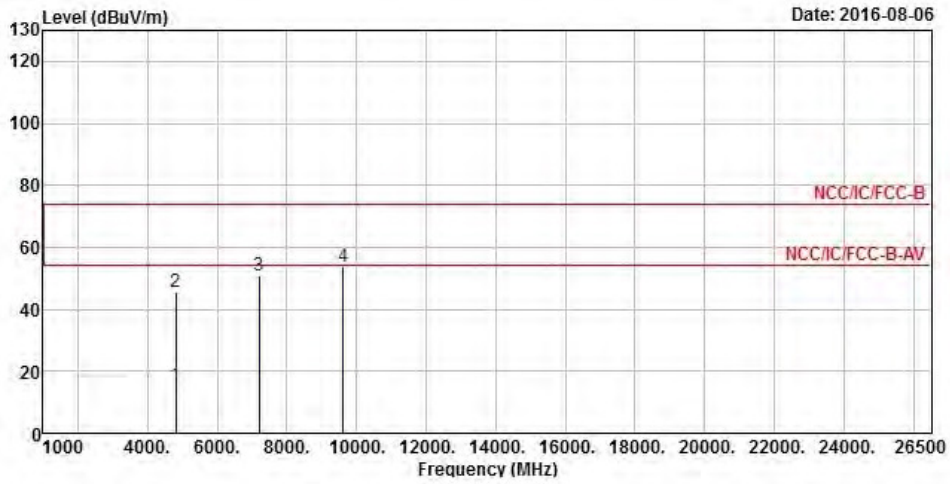
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR/EDR	**Test Freq. (MHz)**	2402
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4804.000	16.87	-37.13	54.00	14.79	31.13	6.11	35.16	Average
2	4804.000	46.97	-27.03	74.00	44.89	31.13	6.11	35.16	Peak
3	7206.000	49.18			41.19	35.84	7.56	35.41	Peak
4	9608.000	53.58			42.12	38.66	8.75	35.95	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)
Note 4: 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 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.58 dBuV/m).
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

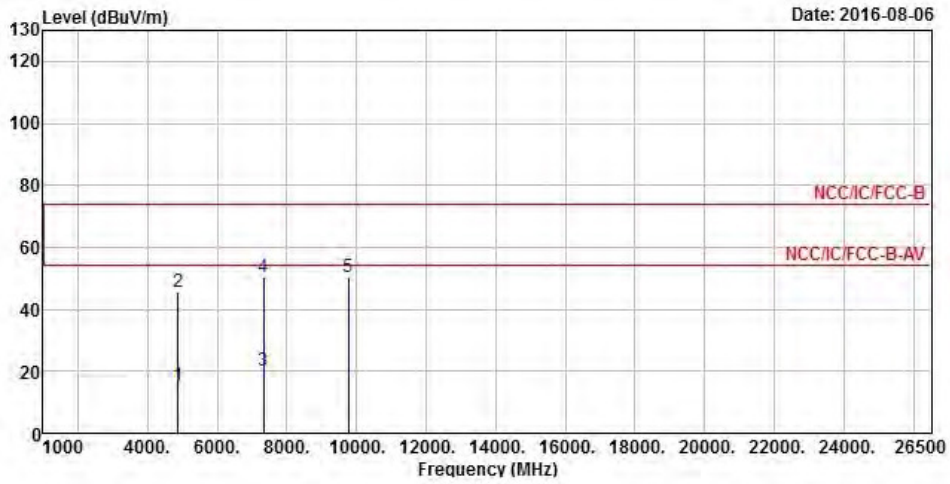
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR/EDR	**Test Freq. (MHz)**	2402
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4804.000	15.57	-38.43	54.00	13.49	31.13	6.11	35.16	Average
2	4804.000	45.67	-28.33	74.00	43.59	31.13	6.11	35.16	Peak
3	7206.000	50.82			42.83	35.84	7.56	35.41	Peak
4	9608.000	53.64			42.18	38.66	8.75	35.95	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)
Note 4: 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 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.58dBuV/m).
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

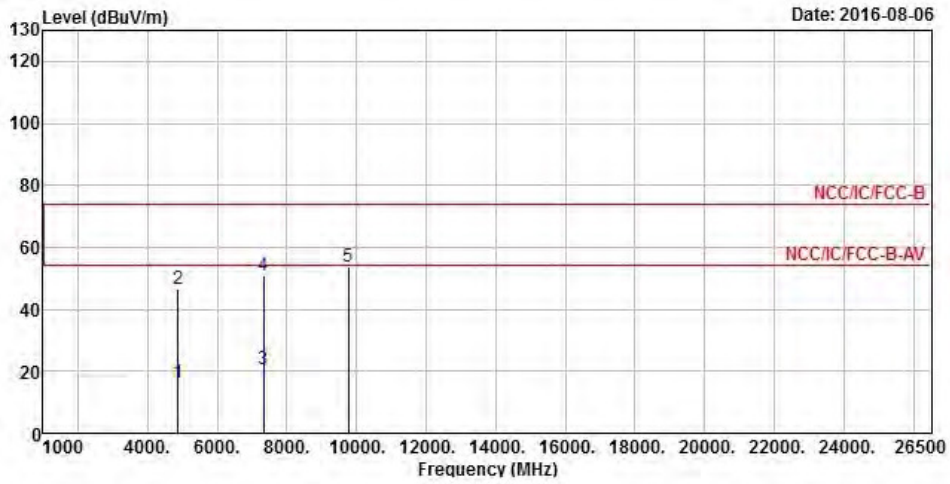
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR/EDR	**Test Freq. (MHz)**	2441
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4882.000	15.29	-38.71	54.00	13.06	31.23	6.15	35.15	Average
2	4882.000	45.39	-28.61	74.00	43.16	31.23	6.15	35.15	Peak
3	7323.000	20.09	-33.91	54.00	11.77	36.14	7.60	35.42	Average
4	7323.000	50.19	-23.81	74.00	41.87	36.14	7.60	35.42	Peak
5	9764.000	50.19			38.45	38.76	8.94	35.96	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)
Note 4: 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 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.56 dBuV/m).
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

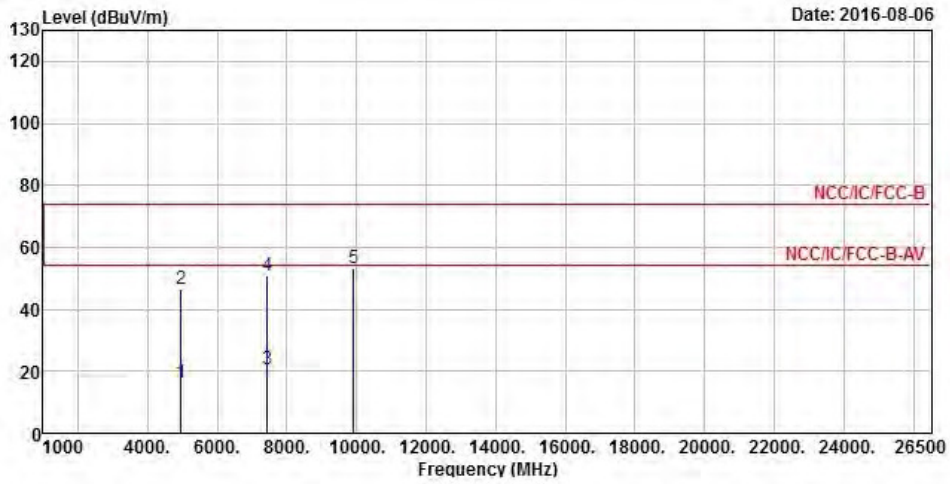
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR/EDR	**Test Freq. (MHz)**	2441
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4882.000	16.44	-37.56	54.00	14.21	31.23	6.15	35.15	Average
2	4882.000	46.54	-27.46	74.00	44.31	31.23	6.15	35.15	Peak
3	7323.000	20.75	-33.25	54.00	12.43	36.14	7.60	35.42	Average
4	7323.000	50.85	-23.15	74.00	42.53	36.14	7.60	35.42	Peak
5	9764.000	53.50			41.76	38.76	8.94	35.96	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)
Note 4: 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 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.56 dBuV/m).
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

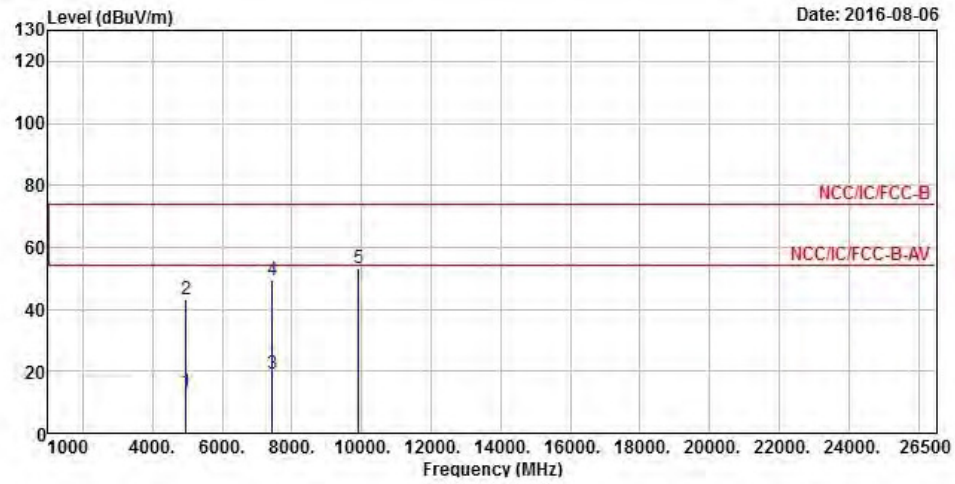
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	BR/EDR	**Test Freq. (MHz)**	2480
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4960.000	16.53	-37.47	54.00	14.15	31.34	6.19	35.15	Average
2	4960.000	46.63	-27.37	74.00	44.25	31.34	6.19	35.15	Peak
3	7440.000	20.82	-33.18	54.00	12.17	36.44	7.64	35.43	Average
4	7440.000	50.92	-23.08	74.00	42.27	36.44	7.64	35.43	Peak
5	9920.000	53.28			41.26	38.85	9.13	35.96	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)
Note 4: 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 5: For un-restricted bands, unwanted emissions shall be attenuated by at least **20** dB relative to the maximum measured in-band level (99.91 dBuV/m).
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

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



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4960.000	13.21	-40.79	54.00	10.83	31.34	6.19	35.15	Average
2	4960.000	43.31	-30.69	74.00	40.93	31.34	6.19	35.15	Peak
3	7440.000	19.36	-34.64	54.00	10.71	36.44	7.64	35.43	Average
4	7440.000	49.46	-24.54	74.00	40.81	36.44	7.64	35.43	Peak
5	9920.000	53.40			41.38	38.85	9.13	35.96	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)
Note 4: 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 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.91dBuV/m).
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.