

FCC Test Report

FCC ID : COF-MS01
Equipment : WiFi SOM Module
Brand Name : USI
Model Name : MS-01
Applicant : Universal Global Scientific Industrial Co., Ltd
141, Lane 351, Sec. 1, Taiping Road, Tsao-tuen,
Nantou 54261, Taiwan
Manufacturer : Universal Global Scientific Industrial Co., Ltd
141, Lane 351, Sec. 1, Taiping Road, Tsao-tuen,
Nantou 54261, Taiwan
Standard : 47 CFR FCC Part 15.247

The product was received on Mar. 04, 2019, and testing was started from Mar. 12, 2019 and completed on Mar. 15, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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



Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

Table of Contents

HISTORY OF THIS TEST REPORT	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Information.....	5
1.2 Testing Applied Standards	7
1.3 Testing Location Information	7
1.4 Measurement Uncertainty	7
2 TEST CONFIGURATION OF EUT.....	8
2.1 Test Condition	8
2.2 Test Channel Mode	8
2.3 The Worst Case Measurement Configuration.....	9
2.4 Support Equipment.....	10
2.5 Test Setup Diagram	11
3 TRANSMITTER TEST RESULT	13
3.1 AC Power-line Conducted Emissions	13
3.2 20dB Bandwidth and Carrier Frequency Separation.....	14
3.3 Maximum Conducted Output Power	15
3.4 Number of Hopping Frequencies and Hopping Bandedge	16
3.5 Time of Occupancy (Dwell Time)	17
3.6 Emissions in Non-restricted Frequency Bands	18
3.7 Emissions in Restricted Frequency Bands.....	19
4 TEST EQUIPMENT AND CALIBRATION DATA.....	22
APPENDIX A. TEST RESULTS OF AC POWER-LINE CONDUCTED EMISSIONS	
APPENDIX B. TEST RESULTS OF 20DB BANDWIDTH AND CARRIER FREQUENCY SEPARATION	
APPENDIX C. TEST RESULTS OF MAXIMUM CONDUCTED OUTPUT POWER	
APPENDIX D. TEST RESULTS OF NUMBER OF HOPPING FREQUENCIES AND HOPPING BANDEDGE	
APPENDIX E. TEST RESULTS OF TIME OF OCCUPANCY (DWELL TIME)	
APPENDIX F. TEST RESULTS OF EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS	
APPENDIX G. TEST RESULTS OF EMISSIONS IN RESTRICTED FREQUENCY BANDS	
APPENDIX H. TEST PHOTOS	
PHOTOGRAPHS OF EUT V01	

[illegible]

Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	FCC 15.203
3.1	15.207	AC Power-line Conducted Emissions	PASS	FCC 15.207
3.2	15.247(a)	20dB Bandwidth	PASS	15.247(a)
3.2	15.247(a)	Carrier Frequency Separation	PASS	15.247(a)
3.3	15.247(b)	Maximum Conducted Output Power	PASS	15.247(b)
3.4	15.247(a)	Number of Hopping Frequencies and Hopping Bandedge	PASS	15.247(a)
3.5	15.247(a)	Time of Occupancy (Dwell Time)	PASS	15.247(a)
3.6	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	15.247(d)
3.7	15.247(d)	Emissions in Restricted Frequency Bands	PASS	Restricted Bands: FCC 15.209

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and explanations:

None

Reviewed by: Jackson Tsai

Report Producer: Jenny Yang

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Version	Ch. Frequency (MHz)	Channel Number
2400-2483.5	BR / EDR	2402-2480	0-78 [79]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	BT-BR(1Mbps)	1	1TX
2.4-2.4835GHz	BT-EDR(2Mbps)	1.3	1TX
2.4-2.4835GHz	BT-EDR(3Mbps)	1.3	1TX

Note:

- ♦ Bluetooth BR uses a GFSK (1Mbps).
- ♦ Bluetooth EDR uses a combination of $\pi/4$ -DQPSK (2Mbps) and 8DPSK (3Mbps).
- ♦ Bluetooth BR/EDR uses as a system using FHSS modulation.
- ♦ BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector
1	Aristotle	RFA-25-C2H1-70-250A1	Dipole antenna	I-pex
2	Aristotle	RFA-25-C2H1-70-250A1	Dipole antenna	I-pex

Ant.	Port	Gain (dBi)		
		2.4G	5G	BT
1	1	1.44	2.16	1.44
2	2	1.44	2.16	-

Note 1: The EUT has two antennas.

Note 2: The antenna mentioned above will not be sold with the EUT in the market.

For 2.4GHz function:

For IEEE 802.11 b/g/n mode (2TX/2RX)

Ant. 1 (port 1) and Ant. 2 (port 2) could transmit/receive simultaneously.

For BT function:

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Only Ant. 1 (port 1) can be used as transmitting/receiving antenna.

For 5GHz function:

For IEEE 802.11 a/n/ac mode (2TX/2RX)

Ant. 1 (port 1) and Ant. 2 (port 2) could transmit/receive simultaneously.

1.1.3 EUT Information

Operational Condition			
EUT Power Type	From AC Adapter		
EUT Function	☒ Point-to-multipoint	☐ Point-to-point	
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 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) $\geq 1/T$
BT-BR(1Mbps)	0.764	1.169	2.888m	1k
BT-EDR(2Mbps)	0.777	1.096	2.891m	1k
BT-EDR(3Mbps)	0.777	1.096	2.892m	1k

Note. If DC < 0.98, the DCF was added while measuring Output power and PSD.

1.2 Testing Applied Standards

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

- ♦ 47 CFR FCC Part 15
- ♦ KDB 558074 D01 v05r02
- ♦ ANSI C63.10-2013

1.3 Testing Location Information

Testing Location			
☒	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)	
		TEL : 886-3-327-3456	FAX : 886-3-327-0973
Test site Designation No. TW1190 with FCC.			
☐	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)	
		TEL : 886-3-656-9065	FAX : 886-3-656-9085
Test site Designation No. TW0006 with FCC.			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Lego	22.1~23.6°C / 57.6~58.4%	13/Mar/2019
RF Conducted	TH06-HY	Clara	20.8~22.6°C / 59.5~61.7%	13/Mar/2019~ 15/Mar/2019
Radiated	03CH02-HY	Lego	20.3~22.8°C / 60.1~65.3%	12/Mar/2019~ 14/Mar/2019

1.4 Measurement Uncertainty

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

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.54 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	1.6 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.9 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.3 dB	Confidence levels of 95%
Temperature	0.7 °C	Confidence levels of 95%
Humidity	4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Condition

RF Conducted	Abbreviation	Remark
TnomVnom	Tnom	20°C
-	Vnom	120V

2.2 Test Channel Mode

Test Software Version	QRCT v3.0.297.0
-----------------------	-----------------

Mode	Power Setting
BT-BR(1Mbps)	-
2402MHz	8
2441MHz	8
2480MHz	8
BT-EDR(2Mbps)	-
2402MHz	8
2441MHz	8
2480MHz	8
BT-EDR(3Mbps)	-
2402MHz	8
2441MHz	8
2480MHz	8

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
Operating Mode	CTX
1	Adapter mode

The Worst Case Mode for Following Conformance Tests	
Tests Item	20dB Bandwidth Carrier Frequency Separation Maximum Conducted Output Power Number of Hopping Frequencies Hopping Bandedge Time of Occupancy (Dwell Time) Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Restricted Frequency Bands
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.
Operating Mode < 1GHz	CTX
1	Adapter mode
Operating Mode > 1GHz	CTX
Orthogonal Planes of EUT	Z Plane
	
Worst Planes of EUT	V

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Operating Mode	CTX
1	Bluetooth+WLAN 2.4GHz
2	Bluetooth+WLAN 5GHz
Refer to Sporton Test Report No.: FA922713 for Co-location RF Exposure Evaluation.	

2.4 Support Equipment

Support Equipment – AC Conduction				
No.	Equipment	Brand Name	Model Name	FCC ID
1	AC Adapter	FUJITSU	US-05	-
2	Test Fixture	-	-	-

Note: Support equipment No.1 & 2 were provided by customer.

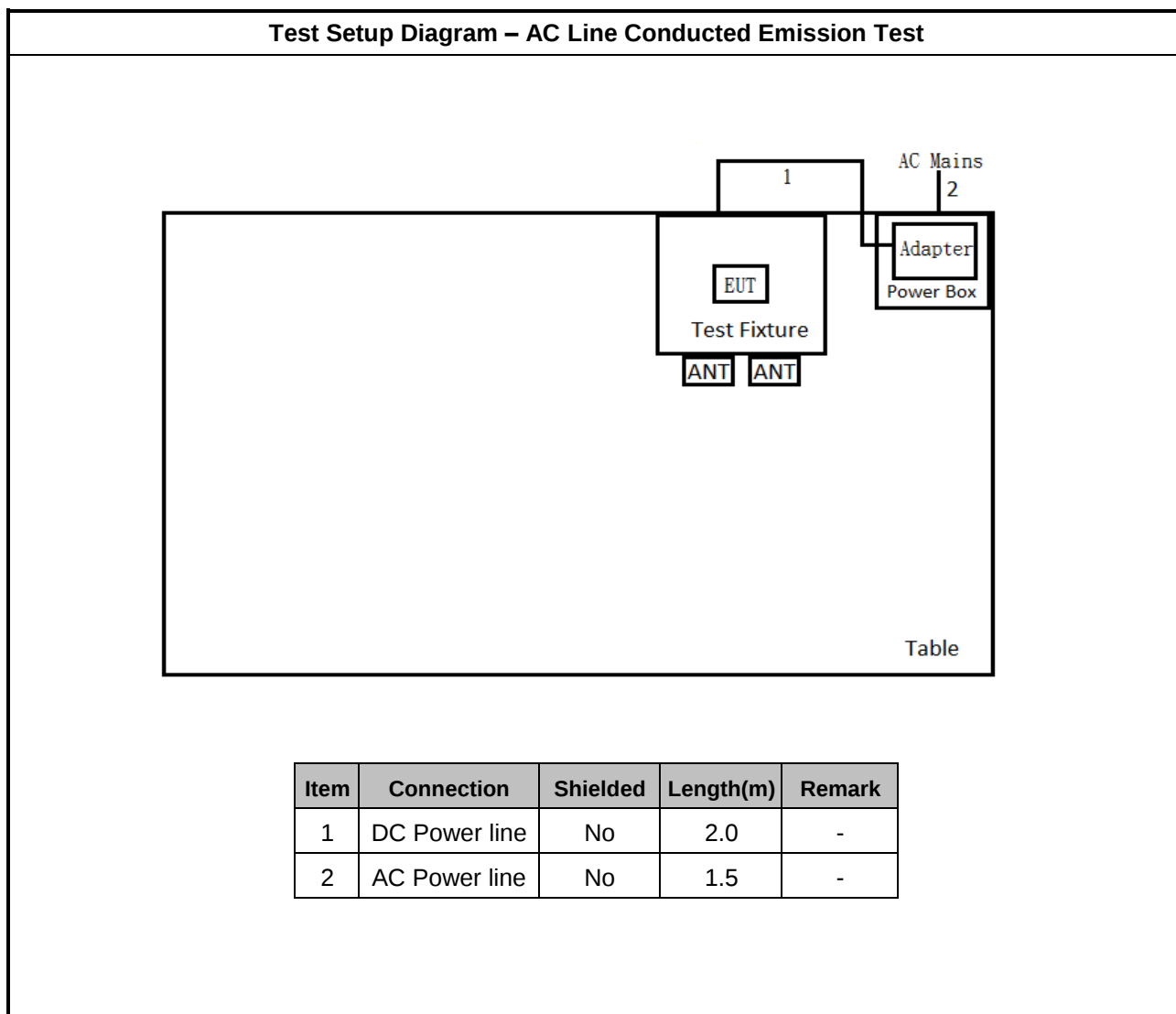
Support Equipment – RF Conducted				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5410	DoC
2	Adapter for NB	DELL	HA65NM130	DoC
3	AC Power Source	GW	APS-9102	-
4	Test Fixture	-	-	-

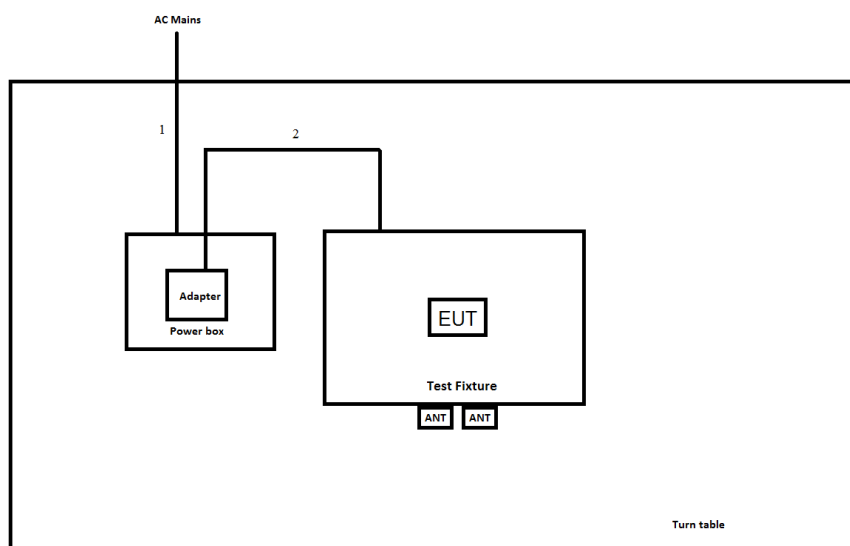
Note: Support equipment No.4 was provided by customer.

Support Equipment – Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	AC Adapter	FUJITSU	US-05	-
2	Test Fixture	-	-	-

Note: Support equipment No.1 & 2 were provided by customer.

2.5 Test Setup Diagram



Test Setup Diagram - Radiated Test


Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.5	-
2	DC Power line	No	2.0	-

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.

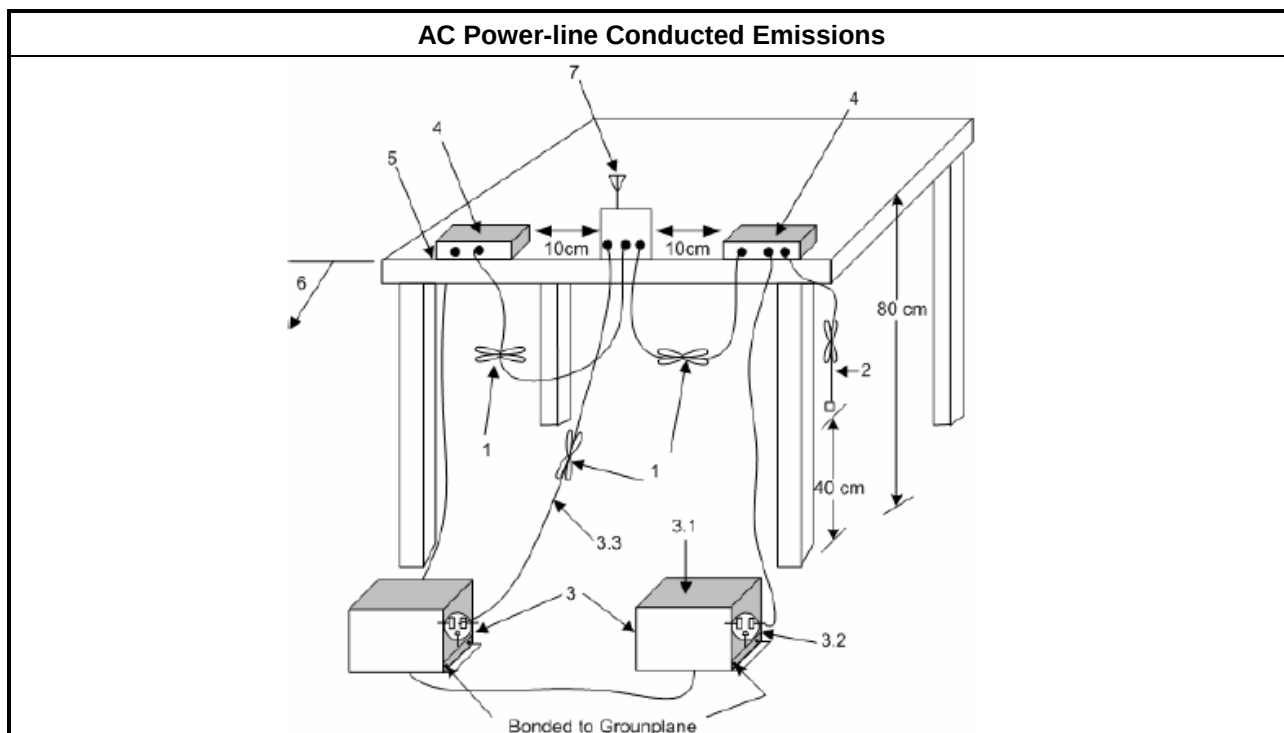
3.1.2 Measuring Instruments

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 foray power-line conducted emissions.

3.1.4 Test Setup



3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

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:	
	$N \geq 75$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz).
	$75 > N \geq 15$ and $ChS \geq MAX$ (20 dB bandwidth 2/3, 25 kHz).
N: Number of Hopping Frequencies; ChS: Hopping Channel Separation	

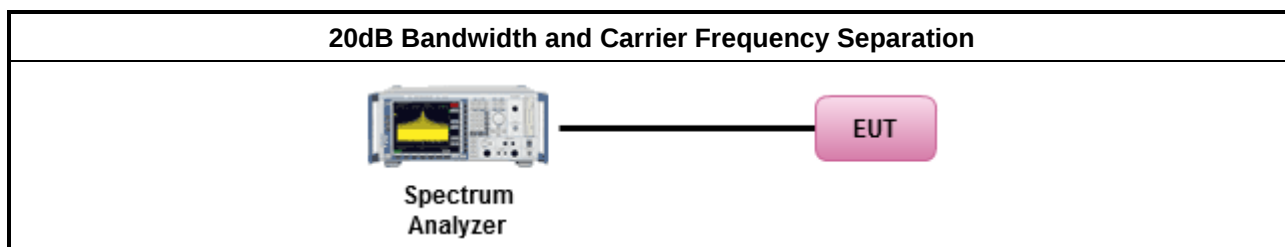
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method
Refer as ANSI C63.10-2013, clause 6.9.2 for 20 dB bandwidth measurement.
Refer as ANSI C63.10-2013, clause 7.8.2 for carrier frequency separation measurement.

3.2.4 Test Setup



3.2.5 Test Result of 20dB Bandwidth

Refer as Appendix B

3.2.6 Test Result of Carrier Frequency Separation

Refer as Appendix B

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
2400-2483.5 MHz Band:	
	$N \geq 75$; Power 30dBm; EIRP 36dBm
	$75 > N \geq 15$; Power 21dBm; EIRP 27dBm
N: Number of Hopping Frequencies	

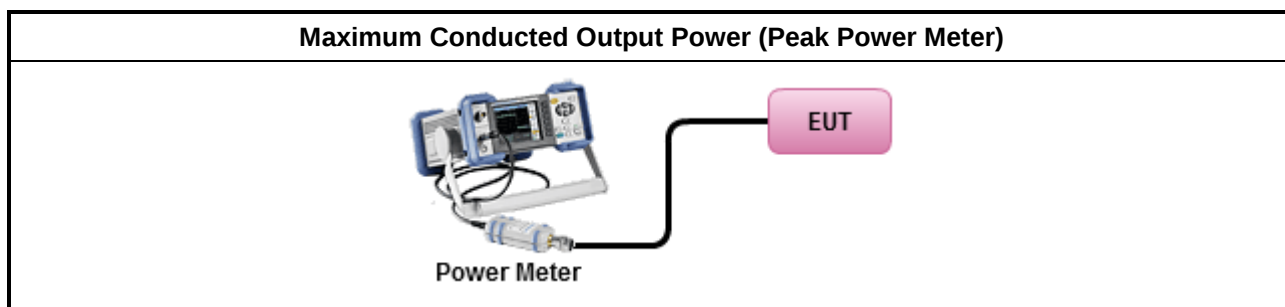
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method
Refer as ANSI C63.10-2013, clause 7.8.5 for output power measurement.

3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

3.4 Number of Hopping Frequencies and Hopping Bandedge

3.4.1 Number of Hopping Frequencies Limit

Number of Hopping Frequencies Limit	
2400-2483.5 MHz Band:	
	$N \geq 75$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz).
	$75 > N \geq 15$ and $ChS \geq MAX$ (20 dB bandwidth 2/3, 25 kHz).
N: Number of Hopping Frequencies; ChS : Hopping Channel Separation	

3.4.2 Hopping Bandedge Limit

Refer clause 3.6.1 and clause 3.7.1

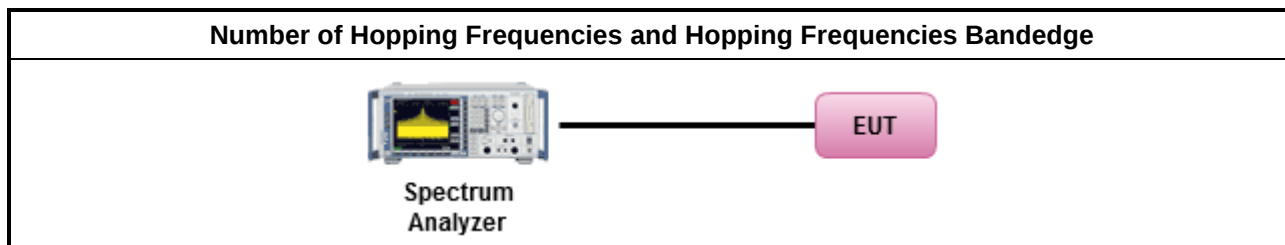
3.4.3 Measuring Instruments

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

3.4.4 Test Procedures

Test Method
Refer as ANSI C63.10-2013, clause 7.8.3 for number of hopping frequencies measurement.
Refer as ANSI C63.10-2013, clause 7.8.6 for hopping frequencies Bandedge measurement.

3.4.5 Test Setup



3.4.6 Test Result of Number of Hopping Frequencies

Refer as Appendix D

3.4.7 Test Result of Number of Hopping Frequencies Bandedge

Refer as Appendix D

3.5 Time of Occupancy (Dwell Time)

3.5.1 Time of Occupancy (Dwell Time) Limit

Time of Occupancy (Dwell Time) Limit for Frequency Hopping Systems	
2400-2483.5 MHz Band:	
	$N \geq 75$; 0.4s in $N \times 0.4$ period
	$75 > N \geq 15$; 0.4s in $N \times 0.4$ period
N: Number of Hopping Frequencies	

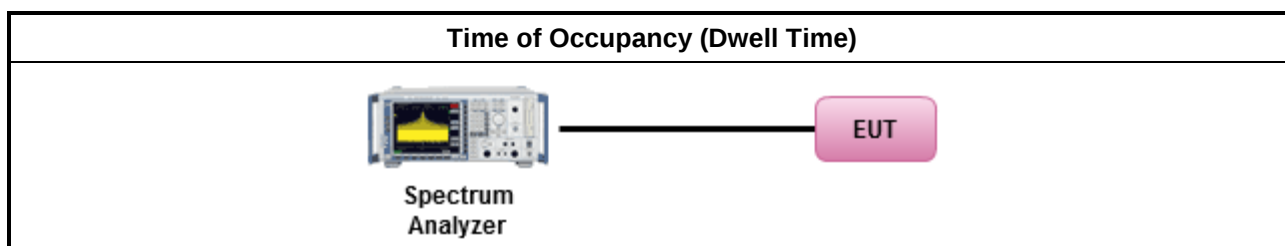
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

3.5.4 Test Setup



3.5.5 Test Result of Time of Occupancy (Dwell Time)

Refer as Appendix E

3.6 Emissions in Non-restricted Frequency Bands

3.6.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
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.	

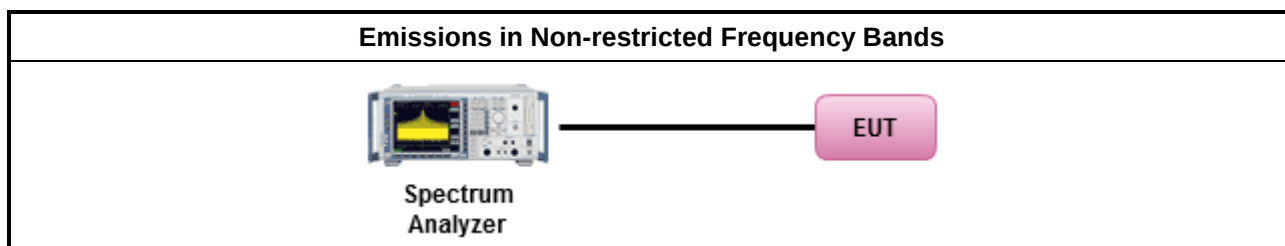
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

Test Method
Refer as ANSI C63.10-2013, clause 7.8.8 for unwanted emissions into non-restricted bands.

3.6.4 Test Setup



3.6.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix F

3.7 Emissions in Restricted Frequency Bands

3.7.1 Emissions in Restricted Frequency Bands 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.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

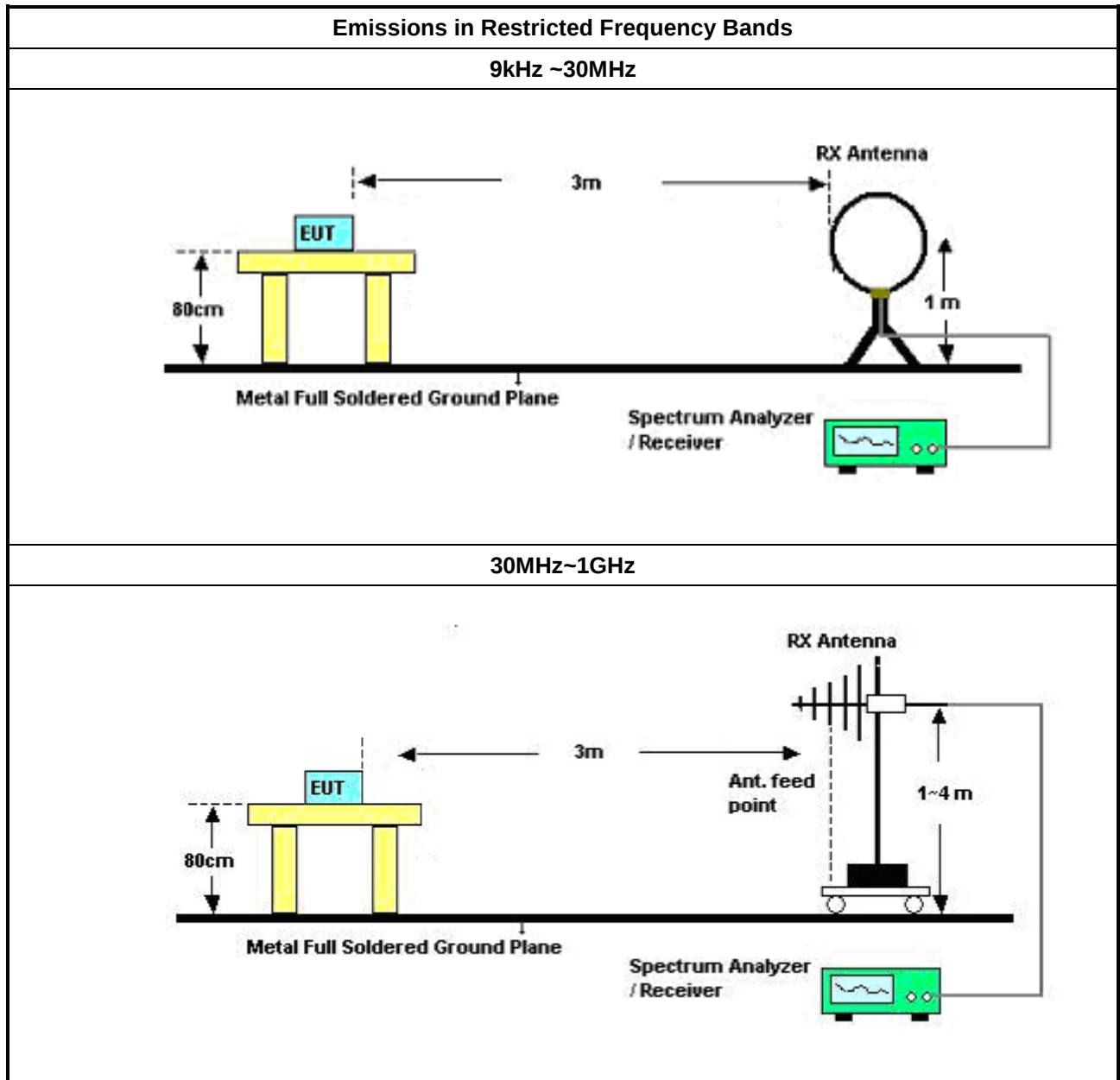
3.7.2 Measuring Instruments

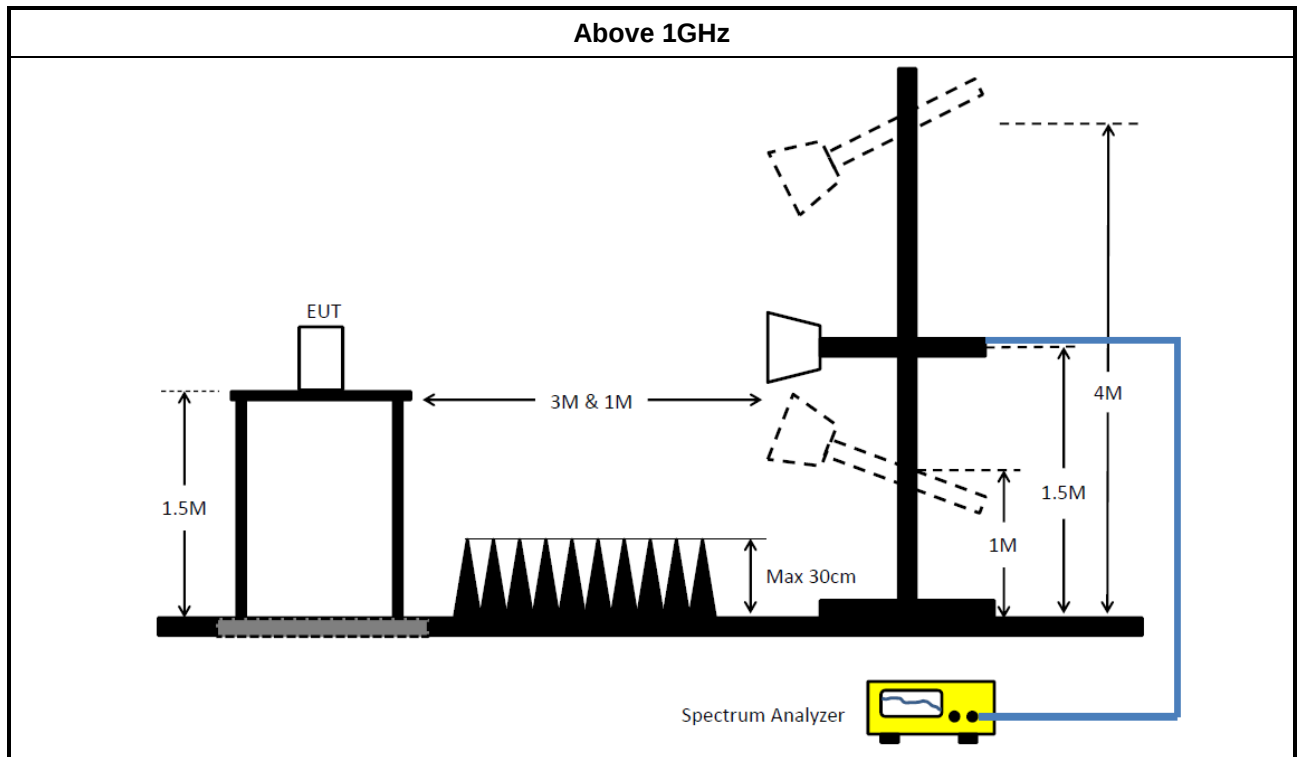
Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

Test Method	
▪ The average emission levels shall be measured in [hopping duty factor].	
▪ Refer as ANSI C63.10; clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.	
▪ For the transmitter unwanted emissions shall be measured using following options below:	
	▪ Refer as ANSI C63.10, clause 4.1.4.2.1 QP value.
	▪ Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak.
	▪ Refer as ANSI C63.10, clause 4.1.4.2.4 average value of hopping pulsed emissions.

3.7.4 Test Setup





3.7.5 Test Result of Emissions in Restricted Frequency Bands (Below 30MHz)

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

3.7.6 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix G

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
EMC Receiver	R&S	ESR	102051	9KHz ~ 3.6GHz	03/May/2018	02/May/2019
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	08/Nov/2018	07/Nov/2019
RF Cable-CON	MTJ	RG142	CB002-CO	9kHz ~ 200MHz	17/Sep/2018	16/Sep/2019
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9 kHz ~ 30 MHz	12/Oct/2018	11/Oct/2019

NCR : Non-Calibration Require

Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101500	10Hz~40GHz	18/Jul/2018	17/Jul/2019
Power Sensor	Anritsu	MA2411B	1339407	300MHz ~ 40GHz	17/Nov/2018	16/Nov/2019
Power Meter	Anritsu	ML2495A	1517010	300MHz ~ 40GHz	17/Nov/2018	16/Nov/2019
Cable 0.2m	HUBER	MY10710/4	RF Cable - 01	30MHz ~18G	10/Jan/2019	09/Jan/2020
Cable 0.2m	HUBER	MY10711/4	RF Cable - 02	30MHz ~18G	10/Jan/2019	09/Jan/2020
Cable 0.5m	HUBER	MY39470/4	RF Cable - 29	30MHz ~18G	10/Jan/2019	09/Jan/2020
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	12/Nov/2018	10/Nov/2020

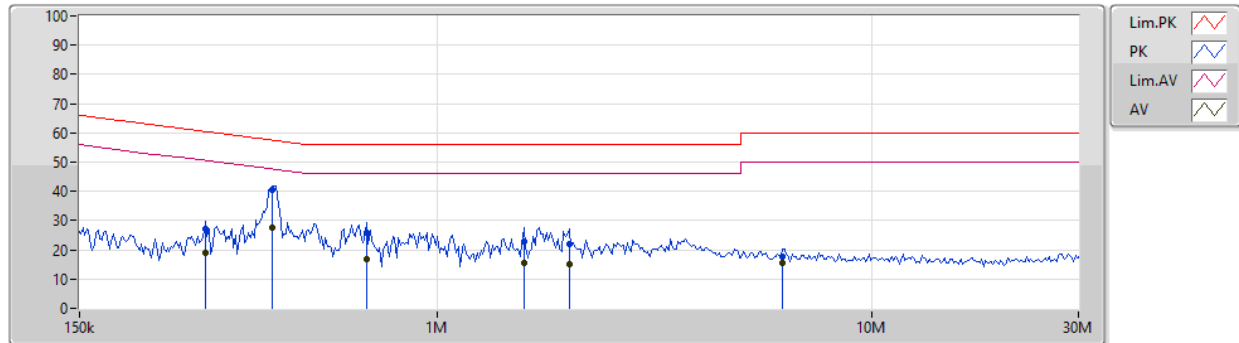
Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	19/Oct/2018	18/Oct/2019
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz ~ 18GHz 3m	17/Oct/2018	16/Oct/2019
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	27Jul/2018	02/Jul/2019
Microwave Preamplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	23/Oct/2018	22/Oct/2019
Signal Analyzer	R&S	FSV40	101500	10Hz ~ 40GHz	18/Jul/2018	17/Jul/2019
RF Cable-R03m	Jye Bao	RG142	CB017	9kHz ~ 1GHz	18/Jan/2019	17/Jan/2020
RF Cable-high	SUHNER	SUCOFLEX104	MY34918/4	1GHz ~ 40GHz	18/Jan/2019	17/Jan/2020
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112B / MTJ6102-05	2723 / 2	30MHz ~ 1GHz	08/Sep/2018	07/Sep/2019
Preamplifier	MITEQ	TTA1840-35-HG	1864481	18GHz ~ 40GHz	24/Aug/2018	23/Aug/2019
EMI Test Receiver	R&S	ESR3	102052	9kHz ~ 3.6GHz	10/Apr/2018	09/Apr/2019
Loop Antenna	TESEQ	HLA 6120	31244	9k-30MHz	29/Mar/2018	28/Mar/2019
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170339	18GHz ~ 40GHz	11/Apr/2018	10/Apr/2019
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 01543	1GHz ~ 18GHz	11/May/2018	10/May/2019

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	Adapter mode		

13/03/2019

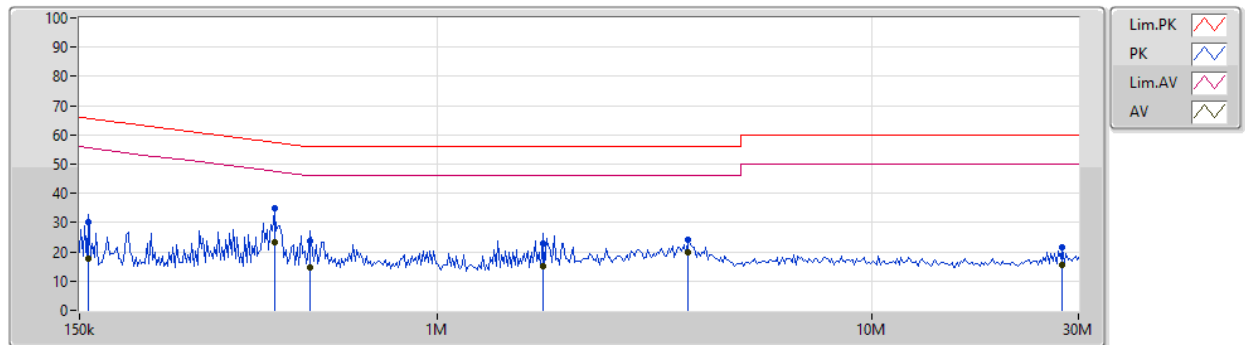


Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
AV	292.162k	19.10	50.46	-31.36	19.48	Neutral	-	-0.38	9.59	0.01	9.88			
AV	418.016k	27.57	47.49	-19.92	19.48	Neutral	-	8.09	9.59	0.01	9.88			
AV	687.482k	16.72	46.00	-29.28	19.48	Neutral	-	-2.76	9.59	0.01	9.88			
AV	1.586M	15.68	46.00	-30.32	19.52	Neutral	-	-3.84	9.60	0.03	9.89			
AV	2.014M	14.94	46.00	-31.06	19.53	Neutral	-	-4.59	9.61	0.03	9.89			
AV	6.26M	15.36	50.00	-34.64	19.59	Neutral	-	-4.23	9.64	0.06	9.89			
QP	292.162k	27.12	60.46	-33.34	19.48	Neutral	-	7.64	9.59	0.01	9.88			
QP	418.016k	40.38	57.49	-17.11	19.48	Neutral	"Worst"	20.90	9.59	0.01	9.88			
QP	687.482k	25.72	56.00	-30.28	19.48	Neutral	-	6.24	9.59	0.01	9.88			
QP	1.586M	23.03	56.00	-32.97	19.52	Neutral	-	3.51	9.60	0.03	9.89			
QP	2.014M	21.81	56.00	-34.19	19.53	Neutral	-	2.28	9.61	0.03	9.89			
QP	6.26M	17.74	60.00	-42.26	19.59	Neutral	-	-1.85	9.64	0.06	9.89			

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Adapter mode		

13/03/2019



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	157.652k	30.05	65.58	-35.53	19.48	Line	-	10.57	9.60	0.01	9.87			
AV	157.652k	17.69	55.58	-37.89	19.48	Line	-	-1.79	9.60	0.01	9.87			
QP	422.196k	34.98	57.40	-22.42	19.48	Line	"Worst"	15.50	9.59	0.01	9.88			
AV	422.196k	23.12	47.40	-24.28	19.48	Line	-	3.64	9.59	0.01	9.88			
QP	510.059k	23.92	56.00	-32.08	19.48	Line	-	4.44	9.59	0.01	9.88			
AV	510.059k	14.80	46.00	-31.20	19.48	Line	-	-4.68	9.59	0.01	9.88			
QP	1.752M	22.85	56.00	-33.15	19.54	Line	-	3.31	9.62	0.03	9.89			
AV	1.752M	15.10	46.00	-30.90	19.54	Line	-	-4.44	9.62	0.03	9.89			
QP	3.769M	24.03	56.00	-31.97	19.56	Line	-	4.47	9.63	0.04	9.89			
AV	3.769M	19.95	46.00	-26.05	19.56	Line	-	0.39	9.63	0.04	9.89			
QP	27.573M	21.60	60.00	-38.40	19.58	Line	-	2.02	9.55	0.13	9.90			
AV	27.573M	15.72	50.00	-34.28	19.58	Line	-	-3.86	9.55	0.13	9.90			

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-BR(1Mbps)	916.25k	862.069k	862KF1D	875k	849.575k
BT-EDR(2Mbps)	1.28M	1.183M	1M18G1D	1.254M	1.182M
BT-EDR(3Mbps)	1.256M	1.194M	1M19G1D	1.248M	1.188M

Max-N dB = Maximum 20dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;

Min-N dB = Minimum 20dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-BR(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	Inf	875k	849.575k
2441MHz_TnomVnom	Pass	Inf	916.25k	850.825k
2480MHz_TnomVnom	Pass	Inf	876.25k	862.069k
BT-EDR(2Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	Inf	1.254M	1.183M
2441MHz_TnomVnom	Pass	Inf	1.256M	1.183M
2480MHz_TnomVnom	Pass	Inf	1.28M	1.182M
BT-EDR(3Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	Inf	1.251M	1.192M
2441MHz_TnomVnom	Pass	Inf	1.256M	1.188M
2480MHz_TnomVnom	Pass	Inf	1.248M	1.194M

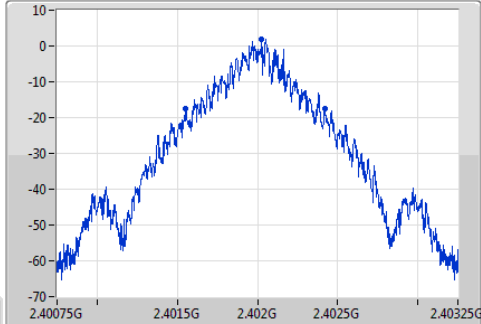
Port X-N dB = Port X 20dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;

BT-BR(1Mbps)
2402MHz

13/03/2019

CF
2.402GHz
Span
2.5MHz
RBW
10kHz
VBW
30kHz
Sweep Time
100ms
Detector Type
Peak

Port 1

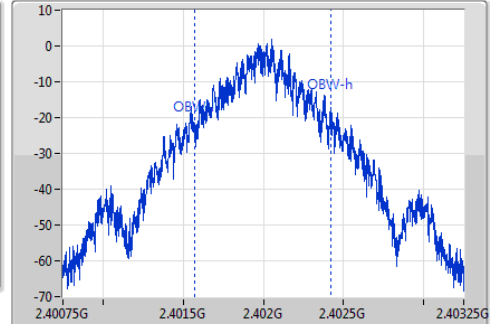


20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
875k	2.401549G	2.402424G	849.575k	2.401569G	2.402419G	Inf	1

EBW

CF
2.402GHz
Span
2.5MHz
RBW
10kHz
VBW
30kHz
Sweep Time
100ms
Detector Type
Sample

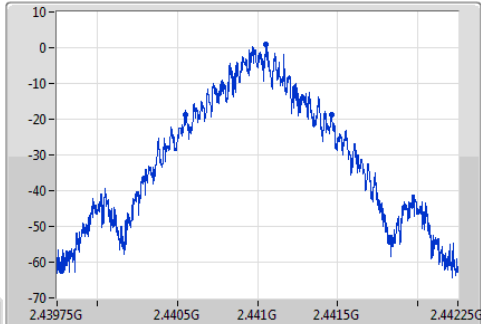
Port 1


BT-BR(1Mbps)
2441MHz

13/03/2019

CF
2.441GHz
Span
2.5MHz
RBW
10kHz
VBW
30kHz
Sweep Time
100ms
Detector Type
Peak

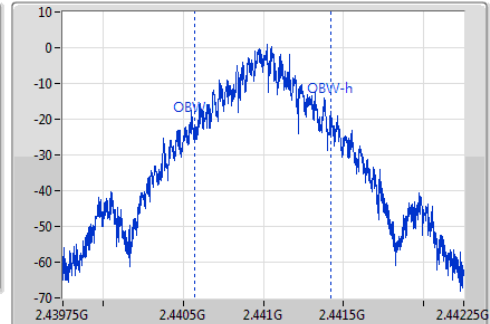
Port 1



20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
916.25k	2.440548G	2.441464G	850.825k	2.440569G	2.44142G	Inf	1

CF
2.441GHz
Span
2.5MHz
RBW
10kHz
VBW
30kHz
Sweep Time
100ms
Detector Type
Sample

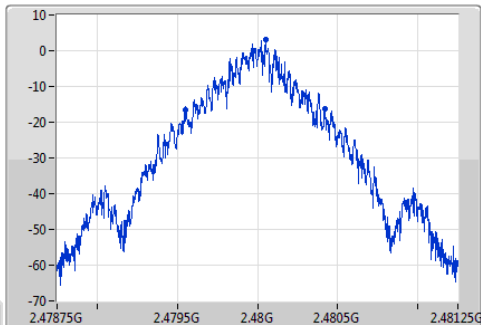
Port 1


BT-BR(1Mbps)
2480MHz

13/03/2019

CF
2.48GHz
Span
2.5MHz
RBW
10kHz
VBW
30kHz
Sweep Time
100ms
Detector Type
Peak

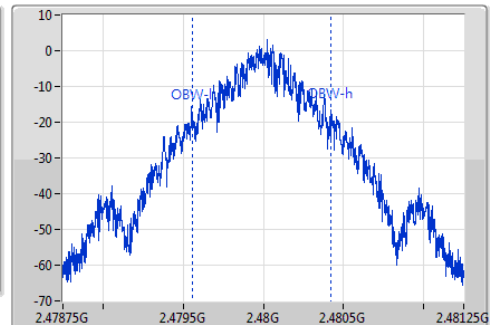
Port 1



20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
876.25k	2.479548G	2.480424G	862.069k	2.47956G	2.480422G	Inf	1

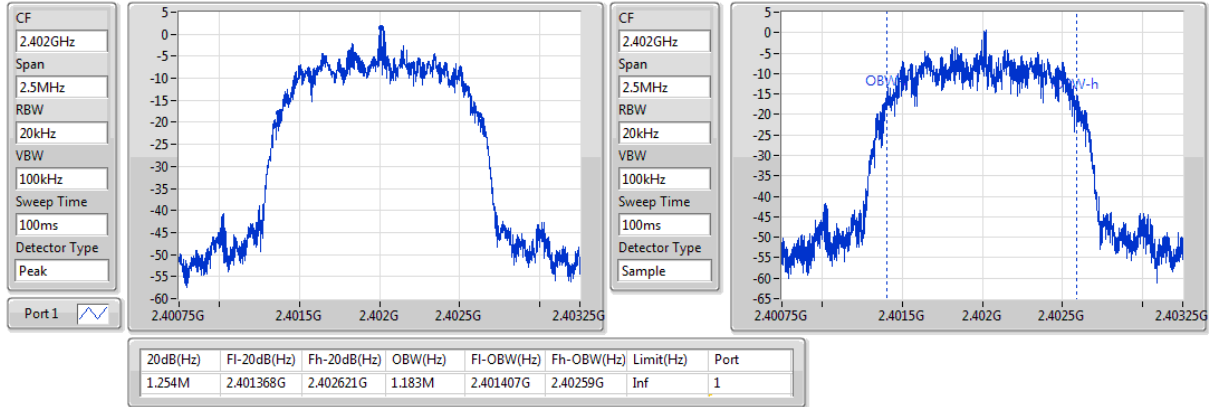
CF
2.48GHz
Span
2.5MHz
RBW
10kHz
VBW
30kHz
Sweep Time
100ms
Detector Type
Sample

Port 1

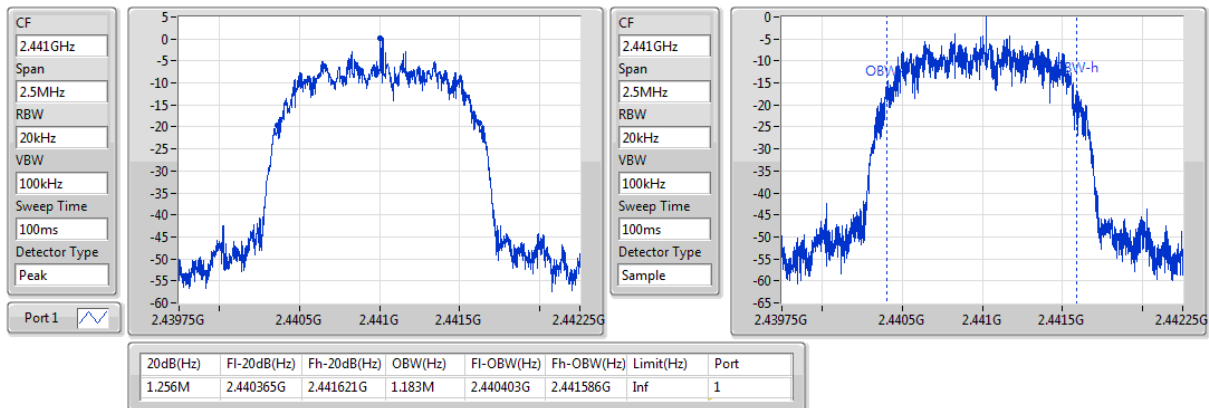


BT-EDR(2Mbps)
EBW
2402MHz

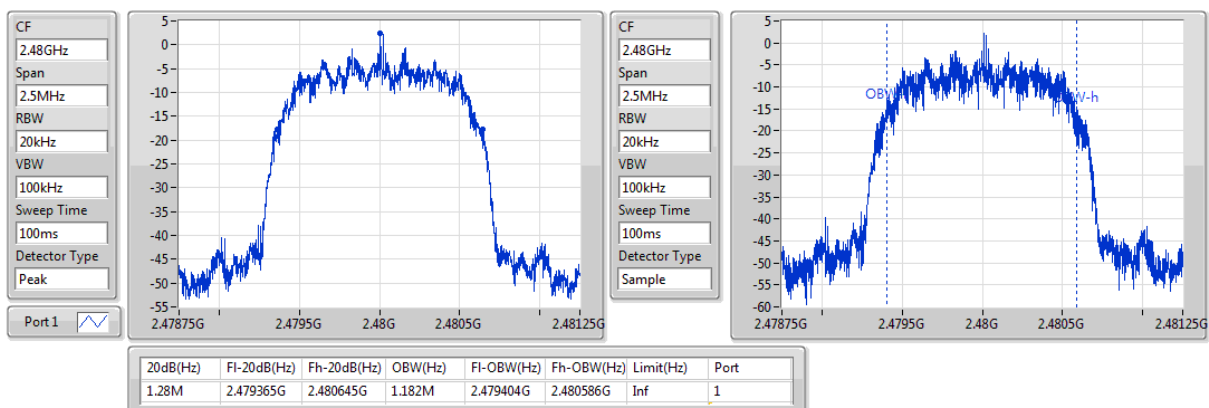
13/03/2019


BT-EDR(2Mbps)
EBW
2441MHz

13/03/2019

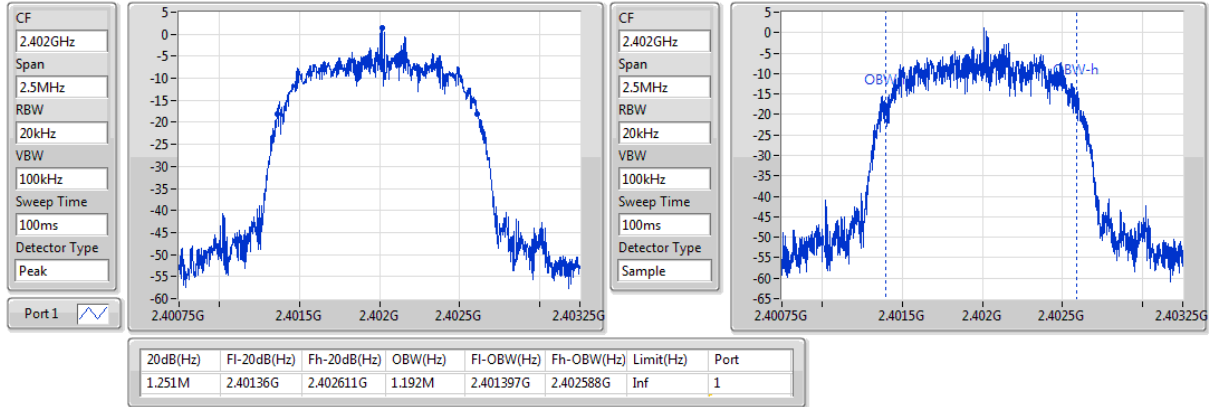

BT-EDR(2Mbps)
EBW
2480MHz

13/03/2019

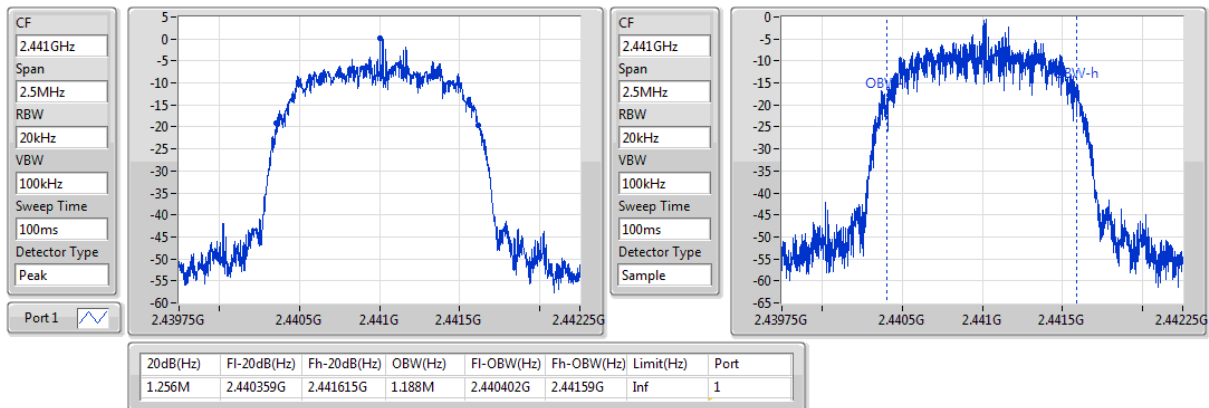


BT-EDR(3Mbps)
EBW
2402MHz

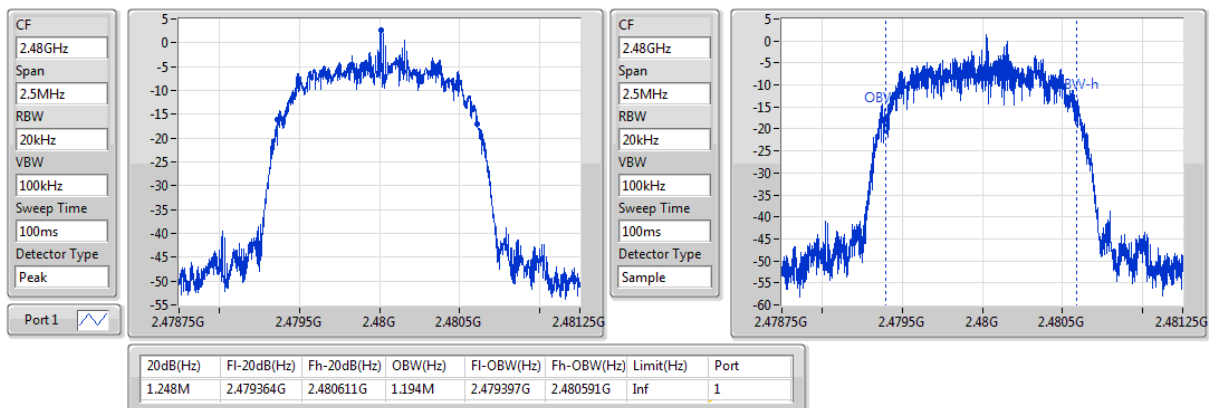
13/03/2019


BT-EDR(3Mbps)
EBW
2441MHz

13/03/2019


BT-EDR(3Mbps)
EBW
2480MHz

13/03/2019



Summary

Mode	Max-Space (Hz)	Min-Space (Hz)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	1.0005M	1.0005M
BT-EDR(2Mbps)	1.002M	1.0005M
BT-EDR(3Mbps)	1.0005M	1.0005M

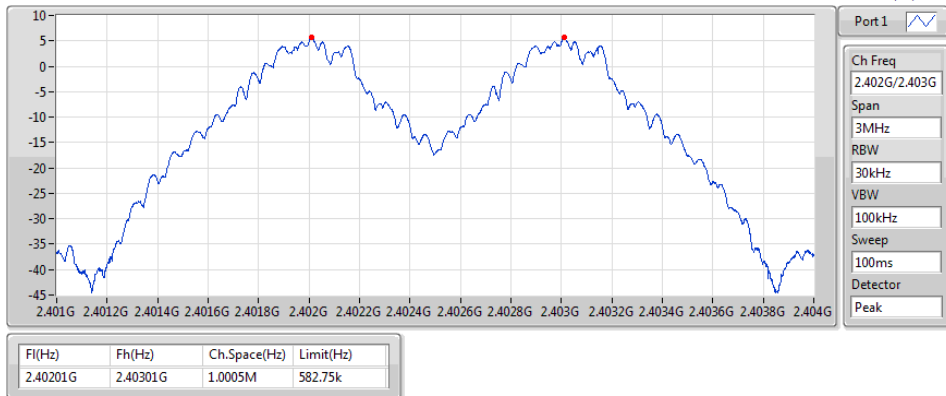
Result

Mode	Result	Fl (Hz)	Fh (Hz)	Ch.Space (Hz)	Limit (Hz)
BT-BR(1Mbps)	-	-	-	-	-
2402MHz_TnomVnom	Pass	2.40201G	2.40301G	1.0005M	582.75k
2441MHz_TnomVnom	Pass	2.441011G	2.442012G	1.0005M	610.2225k
2480MHz_TnomVnom	Pass	2.47901G	2.48001G	1.0005M	583.5825k
BT-EDR(2Mbps)	-	-	-	-	-
2402MHz_TnomVnom	Pass	2.402011G	2.403012G	1.0005M	835.164k
2441MHz_TnomVnom	Pass	2.44101G	2.442012G	1.002M	836.496k
2480MHz_TnomVnom	Pass	2.47901G	2.480012G	1.002M	852.48k
BT-EDR(3Mbps)	-	-	-	-	-
2402MHz_TnomVnom	Pass	2.40201G	2.40301G	1.0005M	833.166k
2441MHz_TnomVnom	Pass	2.441011G	2.442012G	1.0005M	836.496k
2480MHz_TnomVnom	Pass	2.479011G	2.480012G	1.0005M	831.168k

BT-BR(1Mbps)

Channel Separation

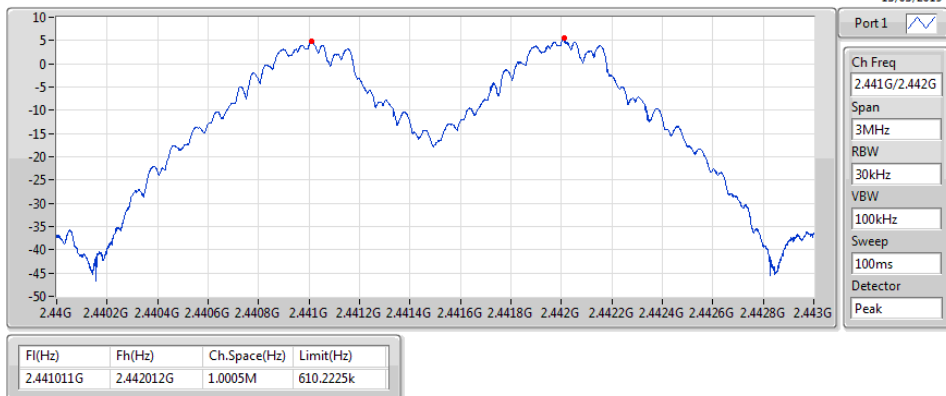
2.402G/2.403GHz



BT-BR(1Mbps)

Channel Separation

2.441G/2.442GHz



BT-BR(1Mbps)

Channel Separation

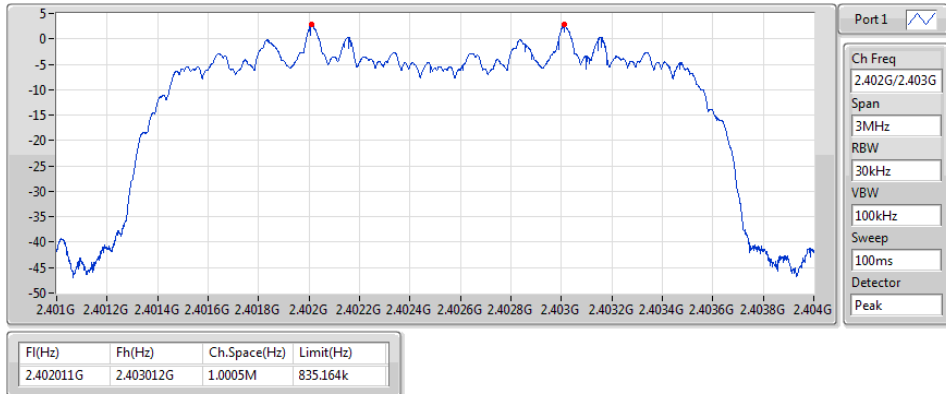
2.48G/2.479GHz



BT-EDR(2Mbps)

Channel Separation

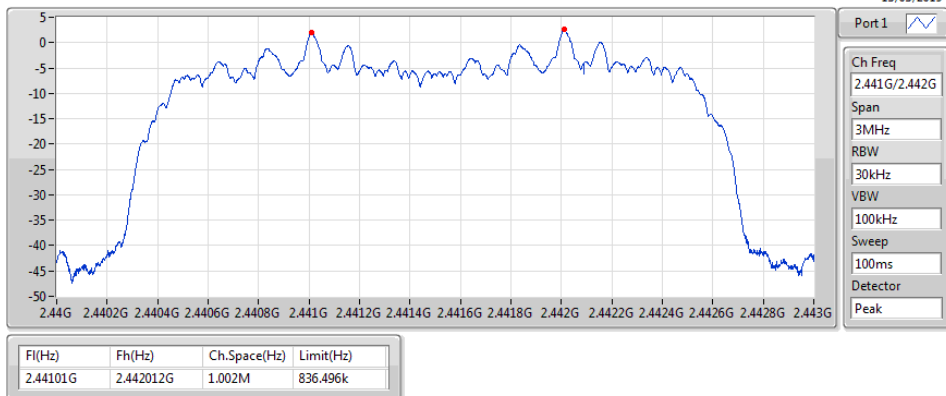
2.402G/2.403GHz



BT-EDR(2Mbps)

Channel Separation

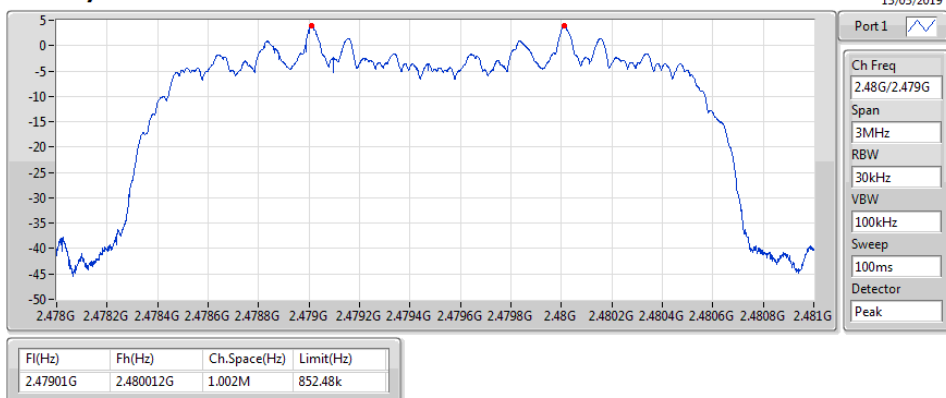
2.441G/2.442GHz



BT-EDR(2Mbps)

Channel Separation

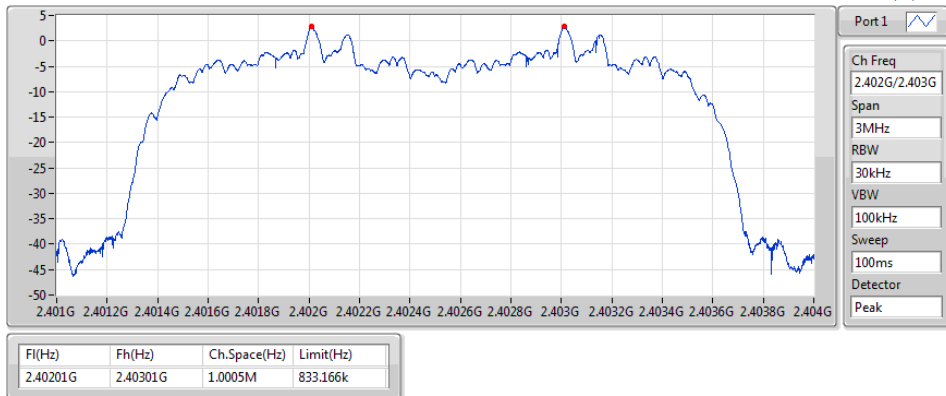
2.48G/2.479GHz



BT-EDR(3Mbps)

Channel Separation

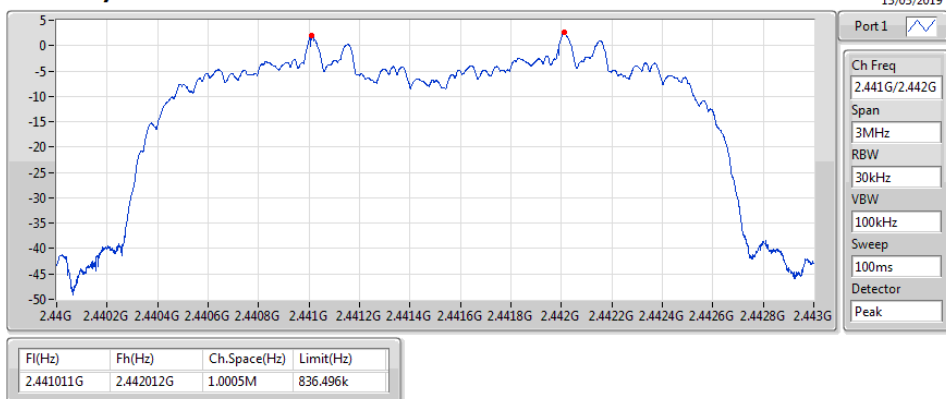
2.402G/2.403GHz



BT-EDR(3Mbps)

Channel Separation

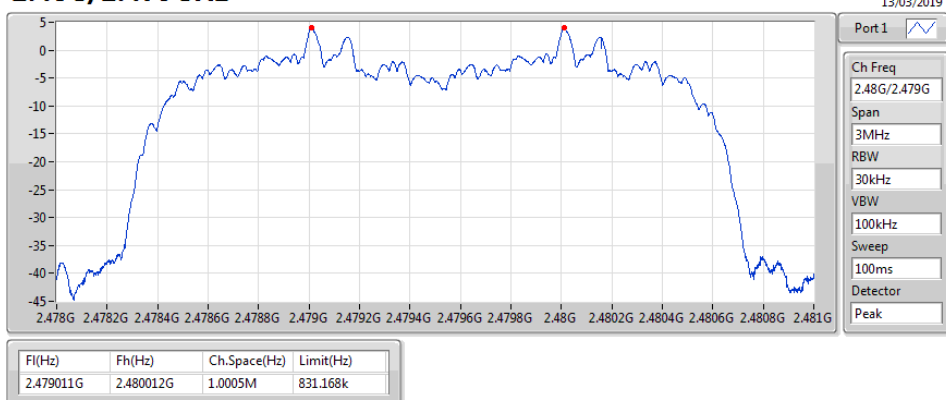
2.441G/2.442GHz



BT-EDR(3Mbps)

Channel Separation

2.48G/2.479GHz



Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	8.53	0.00713
BT-EDR(2Mbps)	7.63	0.00579
BT-EDR(3Mbps)	8.11	0.00647

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-BR(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.44	7.21	21.00
2441MHz_TnomVnom	Pass	1.44	6.55	21.00
2480MHz_TnomVnom	Pass	1.44	8.53	21.00
BT-EDR(2Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.44	6.52	21.00
2441MHz_TnomVnom	Pass	1.44	5.70	21.00
2480MHz_TnomVnom	Pass	1.44	7.63	21.00
BT-EDR(3Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.44	6.96	21.00
2441MHz_TnomVnom	Pass	1.44	6.08	21.00
2480MHz_TnomVnom	Pass	1.44	8.11	21.00

Summary

Mode	Power	Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	8.20	0.00661
BT-EDR(2Mbps)	4.88	0.00308
BT-EDR(3Mbps)	4.97	0.00314

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-BR(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.44	7.03	21.00
2441MHz_TnomVnom	Pass	1.44	6.24	21.00
2480MHz_TnomVnom	Pass	1.44	8.20	21.00
BT-EDR(2Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.44	3.73	21.00
2441MHz_TnomVnom	Pass	1.44	2.80	21.00
2480MHz_TnomVnom	Pass	1.44	4.88	21.00
BT-EDR(3Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.44	3.75	21.00
2441MHz_TnomVnom	Pass	1.44	2.84	21.00
2480MHz_TnomVnom	Pass	1.44	4.97	21.00

Summary

Mode	Max-Hop No
2.4-2.4835GHz	-
BT-BR(1Mbps)	79
BT-EDR(2Mbps)	79
BT-EDR(3Mbps)	79

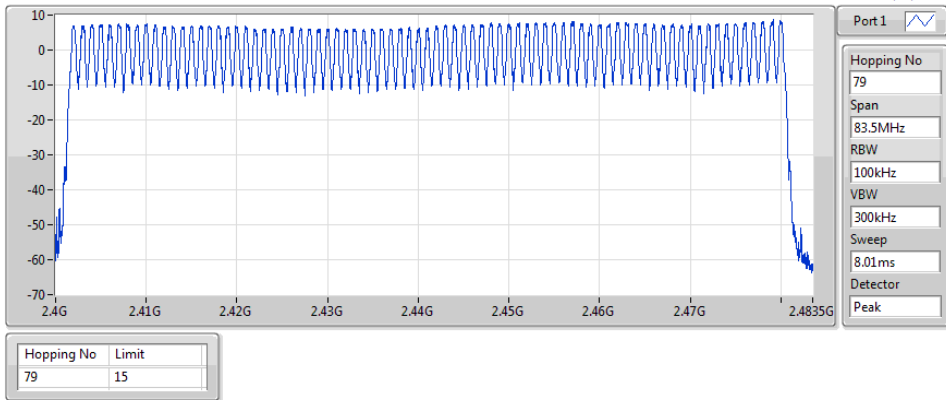
Result

Mode	Result	Hopping No	Limit
BT-BR(1Mbps)	-	-	-
2441MHz_TnomVnom	Pass	79	15
BT-EDR(2Mbps)	-	-	-
2441MHz_TnomVnom	Pass	79	15
BT-EDR(3Mbps)	-	-	-
2441MHz_TnomVnom	Pass	79	15

BT-BR(1Mbps)

2441MHz

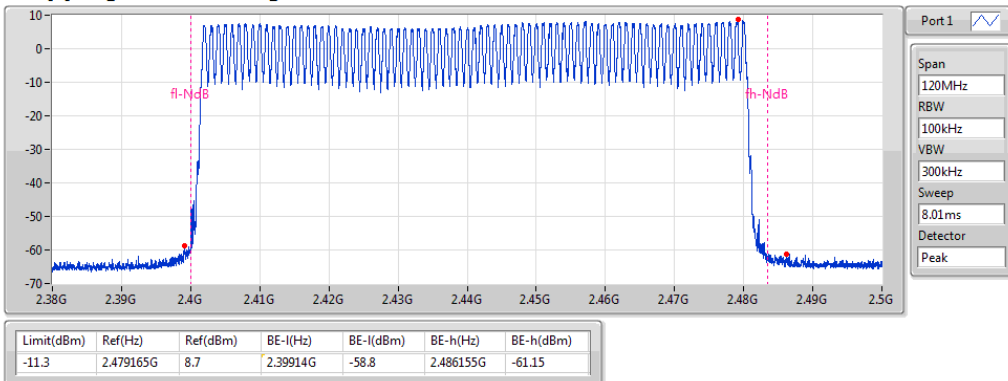
Hopping Ch



BT-BR(1Mbps)

2441MHz

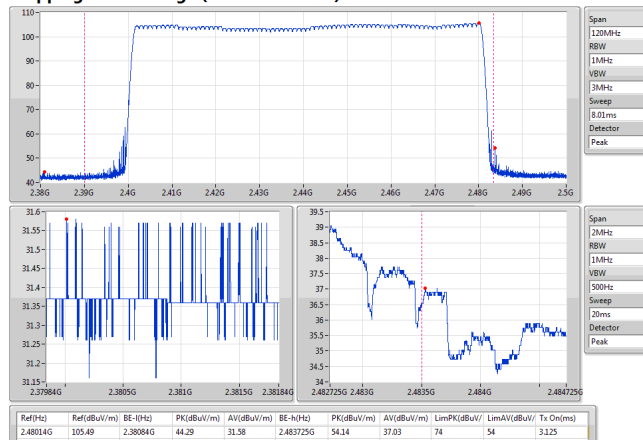
Hopping Ch Bandedge (Non-restricted Band)



BT-BR(1Mbps)

2441MHz

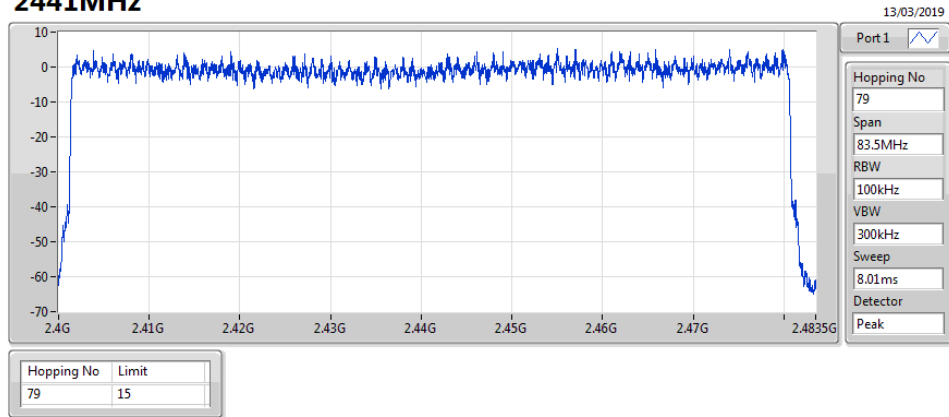
Hopping Ch Bandedge (Restricted Band)



BT-EDR(2Mbps)

2441MHz

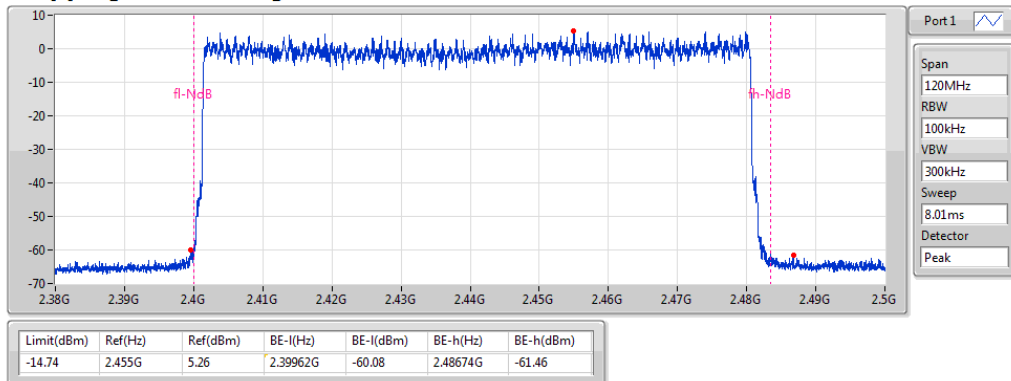
Hopping Ch



BT-EDR(2Mbps)

2441MHz

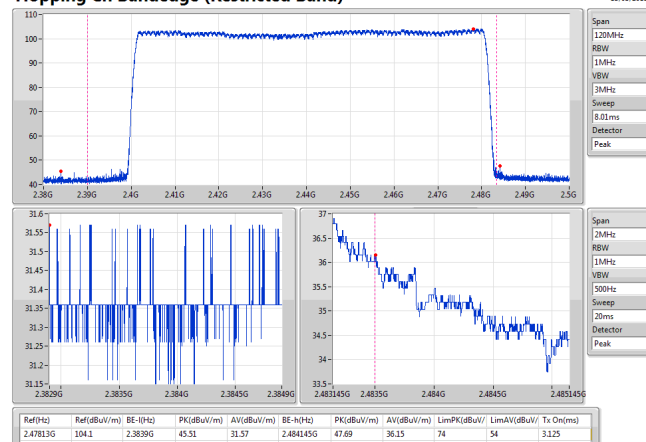
Hopping Ch Bandedge (Non-restricted Band)



BT-EDR(2Mbps)

2441MHz

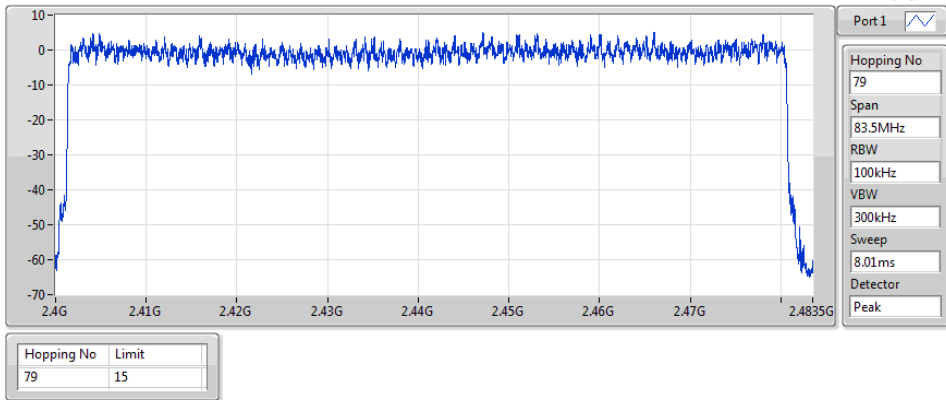
Hopping Ch Bandedge (Restricted Band)



BT-EDR(3Mbps)

2441MHz

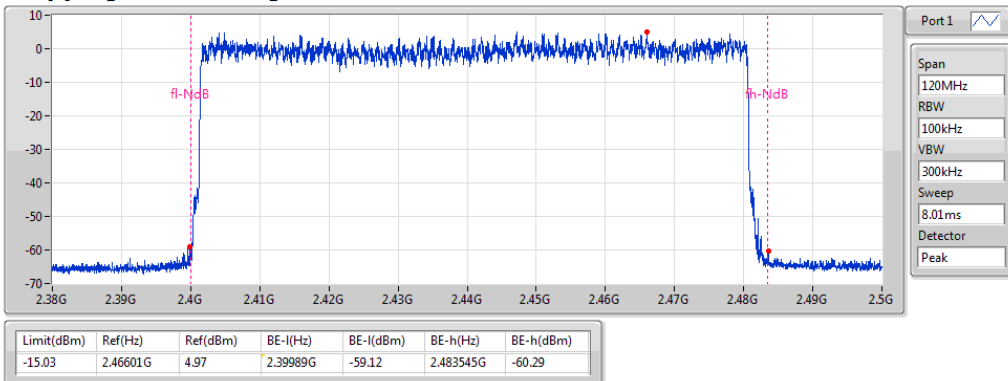
Hopping Ch



BT-EDR(3Mbps)

2441MHz

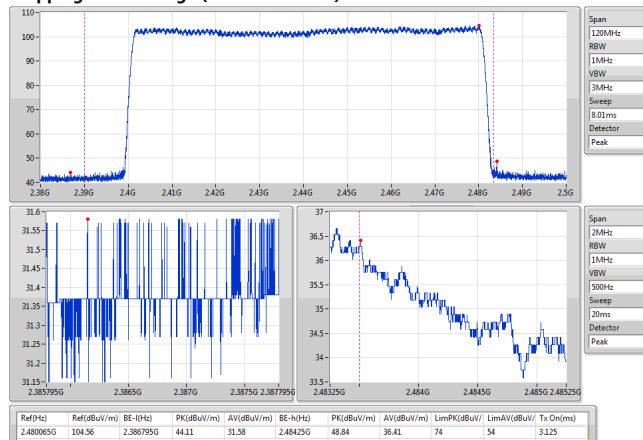
Hopping Ch Bandedge (Non-restricted Band)



BT-EDR(3Mbps)

2441MHz

Hopping Ch Bandedge (Restricted Band)



Summary

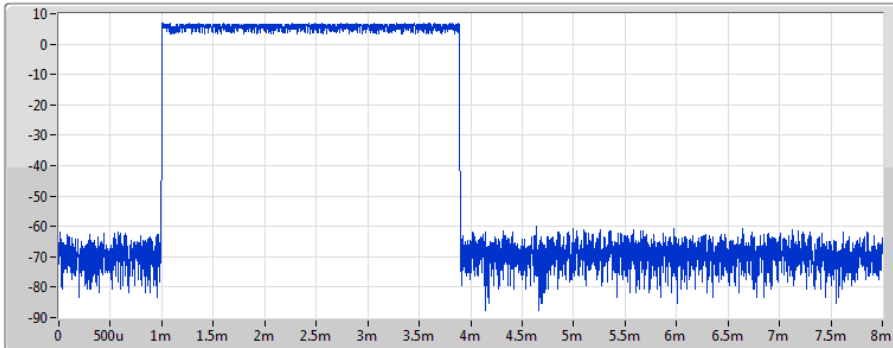
Mode	Max-Dwell (s)
2.4-2.4835GHz	-
BT-BR(1Mbps)	308.1806m
BT-EDR(2Mbps)	308.3938m
BT-EDR(3Mbps)	308.5004m

Result

Mode	Result	Period (s)	Dwell (s)	Limit (s)	Tx On (s)
BT-BR(1Mbps)	-	-	-	-	-
2441MHz_TnomVnom	Pass	31.6	308.1806m	400m	2.891m
BT-EDR(2Mbps)	-	-	-	-	-
2441MHz_TnomVnom	Pass	31.6	308.3938m	400m	2.893m
BT-EDR(3Mbps)	-	-	-	-	-
2441MHz_TnomVnom	Pass	31.6	308.5004m	400m	2.894m

BT-BR(1Mbps)

2441MHz



Period(s)	Dwell(s)	Limit(s)	Tx On(s)
31.6	308.1806m	400m	2.891m

Dwell

13/03/2019

Port 1 

Ch Freq
2.441GHz

RBW
300kHz

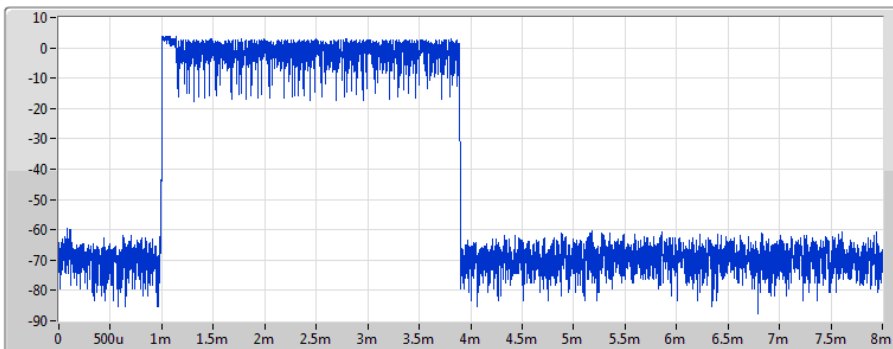
VBW
1MHz

Sweep Time
8ms

TX Time
2.891ms

BT-EDR(2Mbps)

2441MHz



Period(s)	Dwell(s)	Limit(s)	Tx On(s)
31.6	308.3938m	400m	2.893m

Dwell

13/03/2019

Port 1 

Ch Freq
2.441GHz

RBW
300kHz

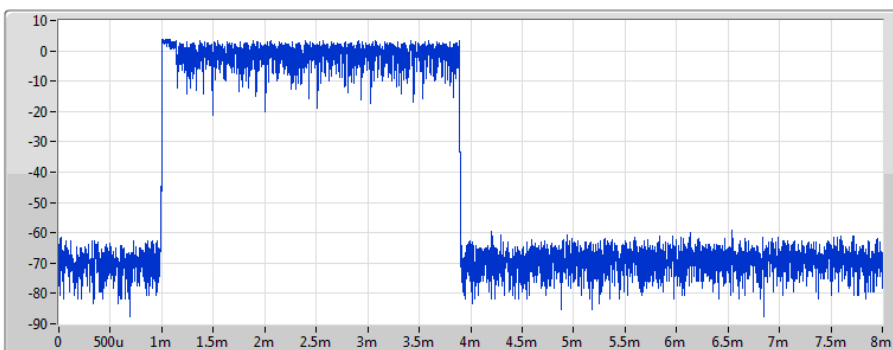
VBW
1MHz

Sweep Time
8ms

TX Time
2.893ms

BT-EDR(3Mbps)

2441MHz



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

Dwell

13/03/2019

Port 1 

Ch Freq
2.441GHz

RBW
300kHz

VBW
1MHz

Sweep Time
8ms

TX Time
2.894ms

Summary

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-BR(1Mbps)	Pass	2.44083G	6.07	-13.93	2.19317G	-45.40	2.39916G	-44.43	2.48446G	-44.16	23.35363G	-32.00	1
BT-EDR(2Mbps)	Pass	2.40217G	1.06	-18.94	1.78646G	-44.84	2.39997G	-44.12	2.48371G	-44.01	24.03188G	-32.25	1
BT-EDR(3Mbps)	Pass	2.44087G	0.75	-19.25	2.14374G	-45.28	2.39808G	-43.80	2.48444G	-43.27	16.56269G	-30.97	1

Result

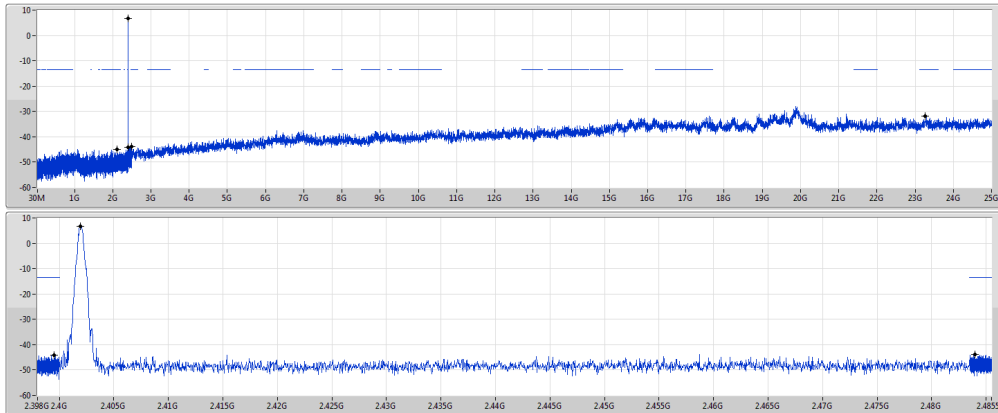
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
BT-BR(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz_TnomVnom	Pass	2.40196G	6.61	-13.39	2.11769G	-44.84	2.3995G	-44.23	2.48396G	-43.96	23.25513G	-31.90	1
2441MHz_TnomVnom	Pass	2.44083G	6.07	-13.93	2.19317G	-45.40	2.39916G	-44.43	2.48446G	-44.16	23.35363G	-32.00	1
2480MHz_TnomVnom	Pass	2.47995G	7.49	-12.51	959.14M	-45.05	2.39929G	-43.01	2.48473G	-42.95	24.5863G	-31.20	1
BT-EDR(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz_TnomVnom	Pass	2.40217G	1.06	-18.94	1.78646G	-44.84	2.39997G	-44.12	2.48371G	-44.01	24.03188G	-32.25	1
2441MHz_TnomVnom	Pass	2.441G	2.76	-17.24	2.15469G	-45.37	2.39823G	-44.06	2.48535G	-43.65	23.59847G	-31.60	1
2480MHz_TnomVnom	Pass	2.47995G	2.32	-17.68	878.04M	-44.63	2.39998G	-44.15	2.48427G	-43.40	24.28235G	-31.16	1
BT-EDR(3Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz_TnomVnom	Pass	2.40175G	1.75	-18.25	2.10111G	-44.64	2.39956G	-43.92	2.48446G	-41.71	23.31423G	-30.53	1
2441MHz_TnomVnom	Pass	2.44087G	0.75	-19.25	2.14374G	-45.28	2.39808G	-43.80	2.48444G	-43.27	16.56269G	-30.97	1
2480MHz_TnomVnom	Pass	2.47995G	3.94	-16.06	935.46M	-45.19	2.39818G	-44.32	2.4853G	-43.83	24.91557G	-31.67	1

BT-BR(1Mbps) 2402MHz

CSE NdB

13/03/2019

Port 1



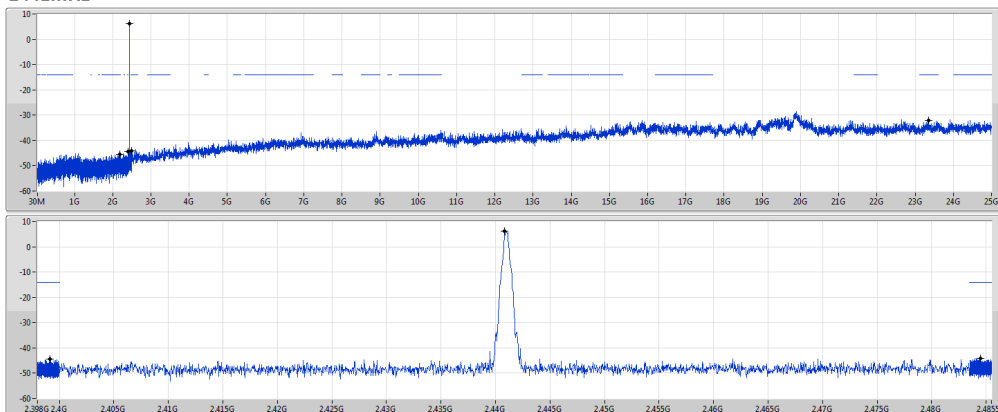
Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
240296G	6.61	-13.39	211769G	-44.84	23995G	-44.23	248396G	-43.96	2325513G	-31.90	1

BT-BR(1Mbps) 2441MHz

CSE NdB

13/03/2019

Port 1



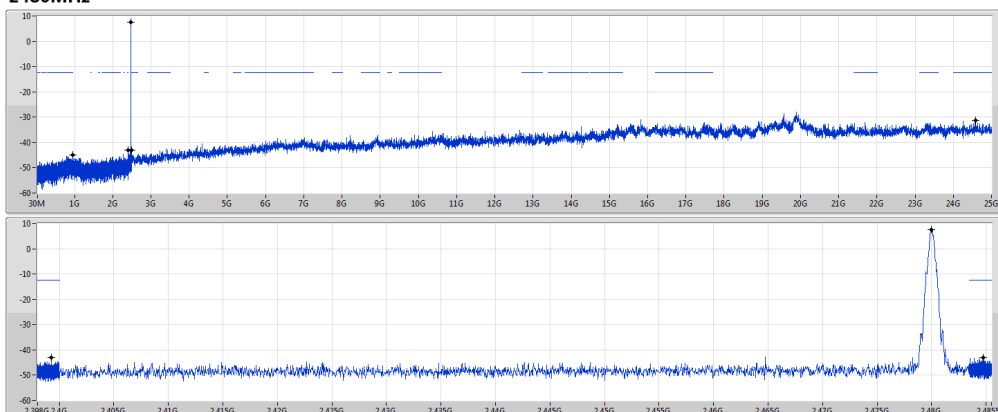
Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
244083G	6.07	-13.93	219317G	-45.40	239916G	-44.43	248446G	-44.16	2335363G	-32.00	1

BT-BR(1Mbps) 2480MHz

CSE NdB

13/03/2019

Port 1

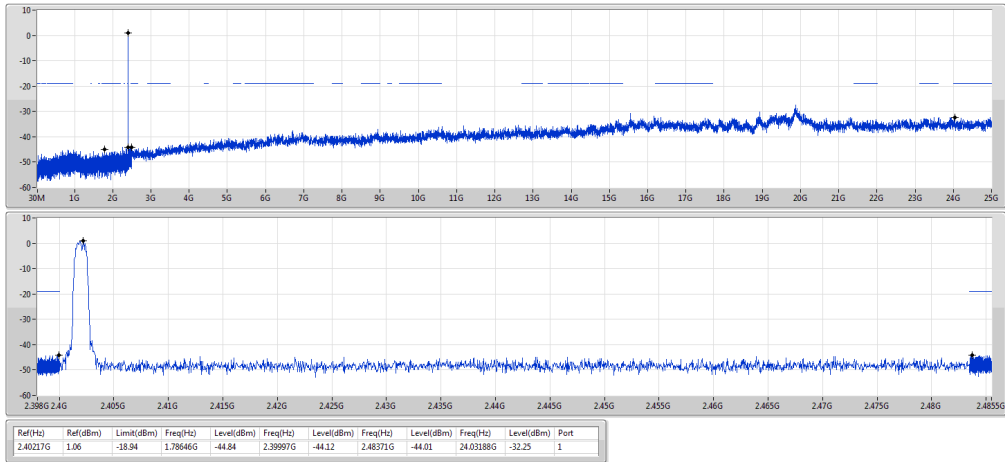


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
247995G	7.40	-12.51	959.14M	-45.05	239929G	-43.01	248473G	-42.85	245863G	-31.20	1

BT-EDR(2Mbps) 2402MHz

CSE NdB

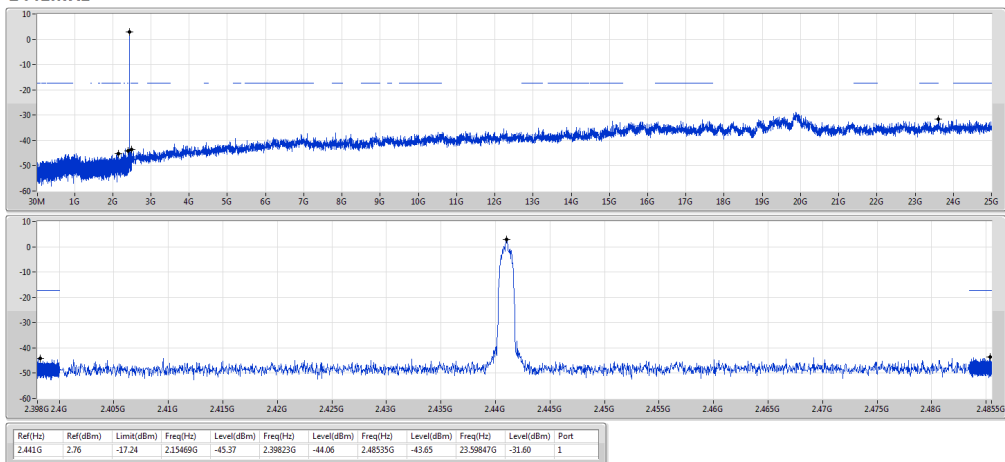
13/03/2019



BT-EDR(2Mbps) 2441MHz

CSE NdB

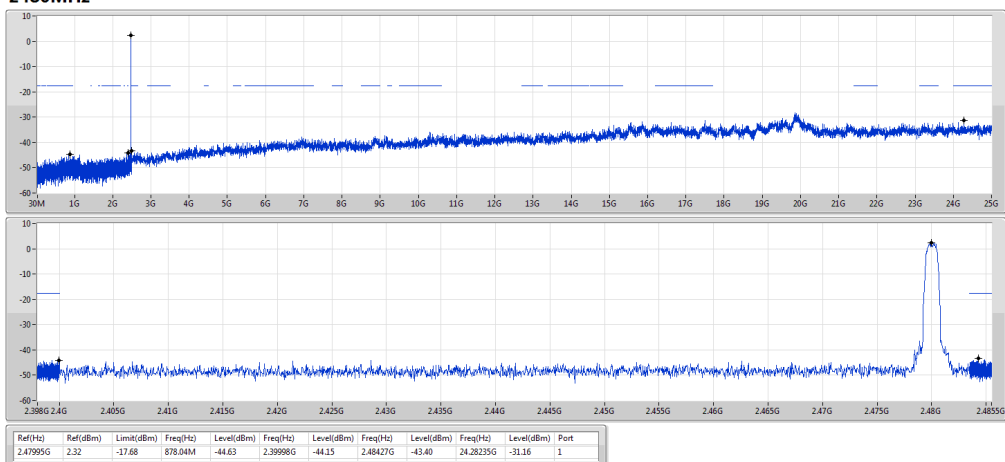
13/03/2019



BT-EDR(2Mbps) 2480MHz

CSE NdB

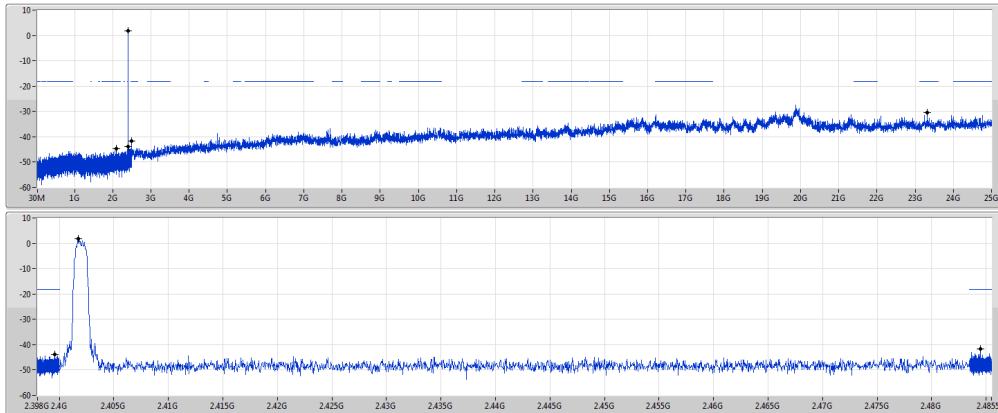
13/03/2019



BT-EDR(3Mbps) 2402MHz

CSE NdB

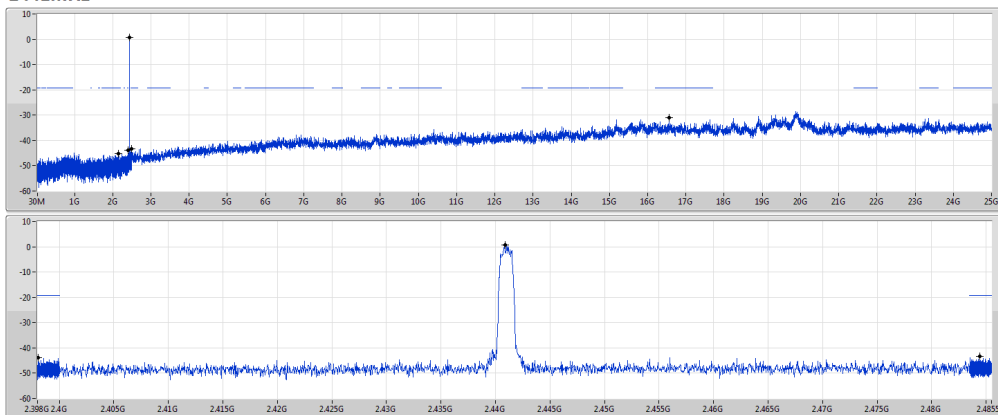
13/03/2019



BT-EDR(3Mbps) 2441MHz

CSE NdB

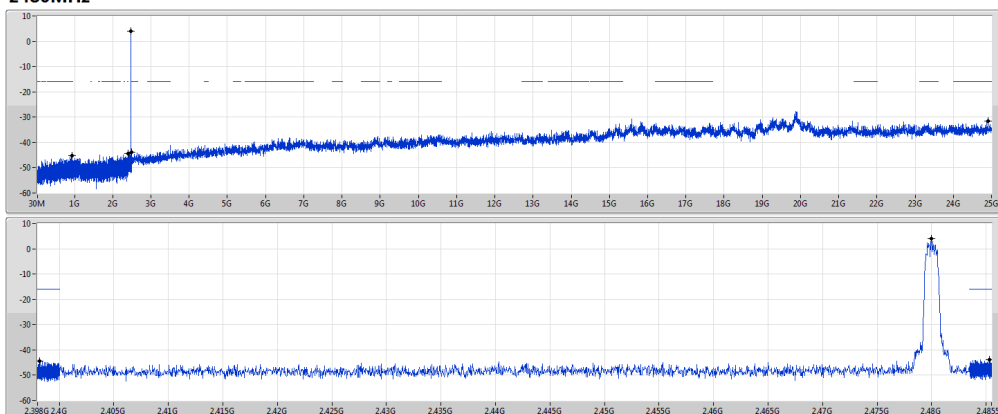
13/03/2019



BT-EDR(3Mbps) 2480MHz

CSE NdB

13/03/2019





RSE TX below 1GHz Result

Appendix G.1

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-EDR(3Mbps)	Pass	PK	932.1M	34.78	46.00	-11.22	3.10	3	Vertical	360	1.00	-

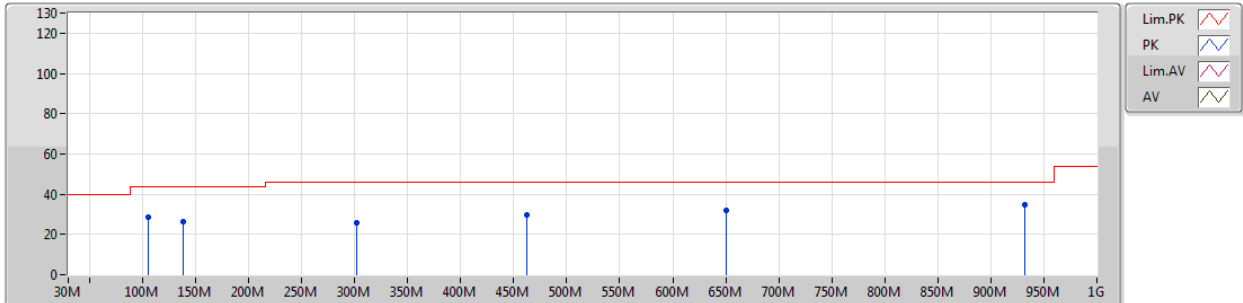
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-EDR(3Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2441MHz	Pass	PK	105.66M	28.48	43.50	-15.02	-9.66	3	Vertical	360	1.00	-
2441MHz	Pass	PK	138.64M	26.34	43.50	-17.16	-9.58	3	Vertical	360	1.00	-
2441MHz	Pass	PK	301.6M	25.77	46.00	-20.23	-5.82	3	Vertical	360	1.00	-
2441MHz	Pass	PK	462.62M	29.49	46.00	-16.51	-2.71	3	Vertical	360	1.00	-
2441MHz	Pass	PK	650.8M	32.07	46.00	-13.93	-0.33	3	Vertical	360	1.00	-
2441MHz	Pass	PK	932.1M	34.78	46.00	-11.22	3.10	3	Vertical	360	1.00	-
2441MHz	Pass	PK	130.88M	25.89	43.50	-17.61	-9.09	3	Horizontal	0	2.00	-
2441MHz	Pass	PK	175.5M	25.53	43.50	-17.97	-10.90	3	Horizontal	0	2.00	-
2441MHz	Pass	PK	260.86M	24.62	46.00	-21.38	-5.80	3	Horizontal	0	2.00	-
2441MHz	Pass	PK	408.3M	27.42	46.00	-18.58	-3.39	3	Horizontal	0	2.00	-
2441MHz	Pass	PK	559.62M	29.93	46.00	-16.07	-0.91	3	Horizontal	0	2.00	-
2441MHz	Pass	PK	743.92M	31.77	46.00	-14.23	0.82	3	Horizontal	0	2.00	-

BT-EDR(3Mbps)

2441MHz_Adapter

14/03/2019

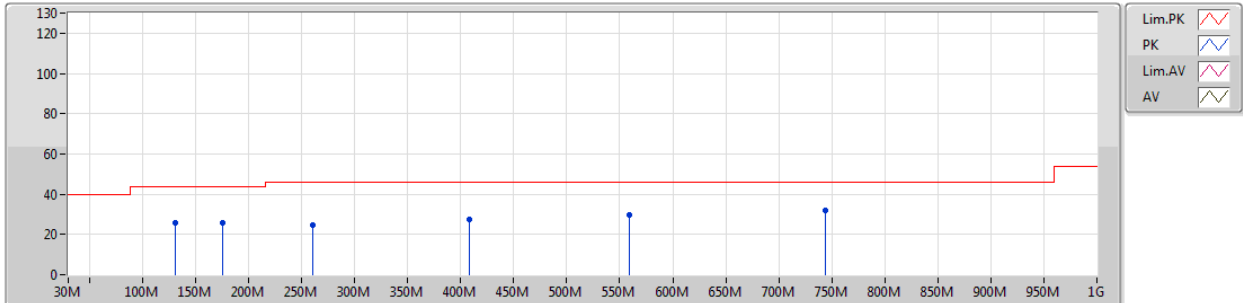


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	105.66M	28.48	43.50	-15.02	-9.66	3	Vertical	360	1.00	-
PK	138.64M	26.34	43.50	-17.16	-9.58	3	Vertical	360	1.00	-
PK	301.6M	25.77	46.00	-20.23	-5.82	3	Vertical	360	1.00	-
PK	462.62M	29.49	46.00	-16.51	-2.71	3	Vertical	360	1.00	-
PK	650.8M	32.07	46.00	-13.93	-0.33	3	Vertical	360	1.00	-
PK	932.1M	34.78	46.00	-11.22	3.10	3	Vertical	360	1.00	-

BT-EDR(3Mbps)

2441MHz_Adapter

14/03/2019



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	130.88M	25.89	43.50	-17.61	-9.09	3	Horizontal	0	2.00	-
PK	175.5M	25.53	43.50	-17.97	-10.90	3	Horizontal	0	2.00	-
PK	260.86M	24.62	46.00	-21.38	-5.80	3	Horizontal	0	2.00	-
PK	408.3M	27.42	46.00	-18.58	-3.39	3	Horizontal	0	2.00	-
PK	559.62M	29.93	46.00	-16.07	-0.91	3	Horizontal	0	2.00	-
PK	743.92M	31.77	46.00	-14.23	0.82	3	Horizontal	0	2.00	-

**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-BR(1Mbps)	Pass	AV	2.4835G	50.36	54.00	-3.64	32.29	3	Vertical	171	1.50	-
BT-EDR(3Mbps)	Pass	AV	2.4835G	48.52	54.00	-5.48	32.29	3	Vertical	171	1.49	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-BR(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.3764G	44.86	54.00	-9.14	31.96	3	Vertical	170	1.50	-
2402MHz	Pass	AV	2.402G	103.73	Inf	-Inf	32.04	3	Vertical	170	1.50	-
2402MHz	Pass	PK	2.3626G	56.18	74.00	-17.82	31.91	3	Vertical	170	1.50	-
2402MHz	Pass	PK	2.4018G	104.49	Inf	-Inf	32.04	3	Vertical	170	1.50	-
2402MHz	Pass	AV	4.80418G	31.15	54.00	-22.85	3.44	3	Vertical	241	2.99	-
2402MHz	Pass	PK	4.80171G	45.19	74.00	-28.81	3.43	3	Vertical	241	2.99	-
2402MHz	Pass	AV	4.80244G	31.24	54.00	-22.76	3.43	3	Horizontal	59	1.37	-
2402MHz	Pass	PK	4.8059G	44.54	74.00	-29.46	3.44	3	Horizontal	59	1.37	-
2441MHz	Pass	AV	2.343G	44.83	54.00	-9.17	31.84	3	Vertical	171	1.50	-
2441MHz	Pass	AV	2.441G	102.58	Inf	-Inf	32.16	3	Vertical	171	1.50	-
2441MHz	Pass	AV	2.4835G	45.22	54.00	-8.78	32.29	3	Vertical	171	1.50	-
2441MHz	Pass	PK	2.3898G	56.34	74.00	-17.66	32.01	3	Vertical	171	1.50	-
2441MHz	Pass	PK	2.441G	103.41	Inf	-Inf	32.16	3	Vertical	171	1.50	-
2441MHz	Pass	PK	2.4938G	56.13	74.00	-17.87	32.33	3	Vertical	171	1.50	-
2441MHz	Pass	AV	4.88218G	31.49	54.00	-22.51	3.63	3	Vertical	205	1.99	-
2441MHz	Pass	PK	4.88296G	44.94	74.00	-29.06	3.63	3	Vertical	205	1.99	-
2441MHz	Pass	AV	4.88039G	31.49	54.00	-22.51	3.62	3	Horizontal	89	1.50	-
2441MHz	Pass	PK	4.88152G	44.62	74.00	-29.38	3.63	3	Horizontal	89	1.50	-
2480MHz	Pass	AV	2.48G	99.84	Inf	-Inf	32.28	3	Vertical	171	1.50	-
2480MHz	Pass	AV	2.4835G	50.36	54.00	-3.64	32.29	3	Vertical	171	1.50	-
2480MHz	Pass	PK	2.4802G	100.74	Inf	-Inf	32.28	3	Vertical	171	1.50	-
2480MHz	Pass	PK	2.4835G	57.56	74.00	-16.44	32.29	3	Vertical	171	1.50	-
2480MHz	Pass	AV	4.96007G	31.74	54.00	-22.26	3.83	3	Vertical	233	1.50	-
2480MHz	Pass	PK	4.96127G	45.38	74.00	-28.62	3.83	3	Vertical	233	1.50	-
2480MHz	Pass	AV	4.95889G	31.79	54.00	-22.21	3.83	3	Horizontal	42	1.02	-
2480MHz	Pass	PK	4.96027G	45.04	74.00	-28.96	3.83	3	Horizontal	42	1.02	-
BT-EDR(3Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.3824G	44.83	54.00	-9.17	31.98	3	Vertical	171	1.49	-
2402MHz	Pass	AV	2.402G	99.59	Inf	-Inf	32.04	3	Vertical	171	1.49	-
2402MHz	Pass	PK	2.3704G	55.93	74.00	-18.07	31.94	3	Vertical	171	1.49	-
2402MHz	Pass	PK	2.4022G	103.47	Inf	-Inf	32.05	3	Vertical	171	1.49	-
2402MHz	Pass	AV	4.80545G	31.06	54.00	-22.94	3.44	3	Vertical	190	1.50	-
2402MHz	Pass	PK	4.80492G	44.83	74.00	-29.17	3.44	3	Vertical	190	1.50	-
2402MHz	Pass	AV	4.80422G	31.06	54.00	-22.94	3.44	3	Horizontal	3	2.65	-
2402MHz	Pass	PK	4.80339G	45.06	74.00	-28.94	3.44	3	Horizontal	3	2.65	-
2441MHz	Pass	AV	2.3514G	44.78	54.00	-9.22	31.87	3	Vertical	14	2.78	-
2441MHz	Pass	AV	2.441G	98.82	Inf	-Inf	32.16	3	Vertical	14	2.78	-
2441MHz	Pass	AV	2.4958G	45.24	54.00	-8.76	32.33	3	Vertical	14	2.78	-
2441MHz	Pass	PK	2.3766G	56.14	74.00	-17.86	31.96	3	Vertical	14	2.78	-
2441MHz	Pass	PK	2.441G	103.00	Inf	-Inf	32.16	3	Vertical	14	2.78	-
2441MHz	Pass	PK	2.4882G	56.73	74.00	-17.27	32.30	3	Vertical	14	2.78	-
2441MHz	Pass	AV	4.8827G	31.40	54.00	-22.60	3.63	3	Vertical	360	1.14	-
2441MHz	Pass	PK	4.87967G	44.28	74.00	-29.72	3.62	3	Vertical	360	1.14	-
2441MHz	Pass	AV	4.88282G	31.48	54.00	-22.52	3.63	3	Horizontal	190	1.54	-
2441MHz	Pass	PK	4.88334G	45.50	74.00	-28.50	3.64	3	Horizontal	190	1.54	-
2480MHz	Pass	AV	2.48G	94.06	Inf	-Inf	32.28	3	Vertical	171	1.49	-
2480MHz	Pass	AV	2.4835G	48.52	54.00	-5.48	32.29	3	Vertical	171	1.49	-



RSE TX above 1GHz Result

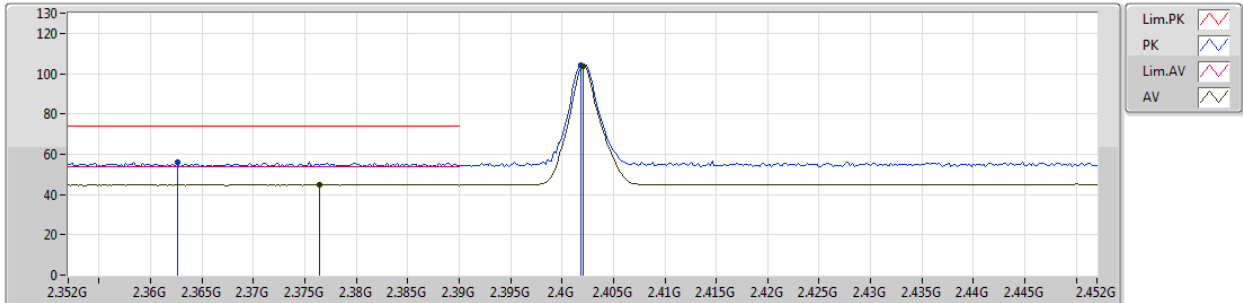
Appendix G.2

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2480MHz	Pass	PK	2.4798G	98.32	Inf	-Inf	32.28	3	Vertical	171	1.49	-
2480MHz	Pass	PK	2.4836G	56.74	74.00	-17.26	32.29	3	Vertical	171	1.49	-
2480MHz	Pass	AV	4.95771G	31.64	54.00	-22.36	3.82	3	Vertical	17	1.03	-
2480MHz	Pass	PK	4.95896G	44.76	74.00	-29.24	3.83	3	Vertical	17	1.03	-
2480MHz	Pass	AV	4.96039G	31.68	54.00	-22.32	3.83	3	Horizontal	334	1.14	-
2480MHz	Pass	PK	4.9592G	45.30	74.00	-28.70	3.83	3	Horizontal	334	1.14	-

BT-BR(1Mbps)

2402MHz_TX

14/03/2019

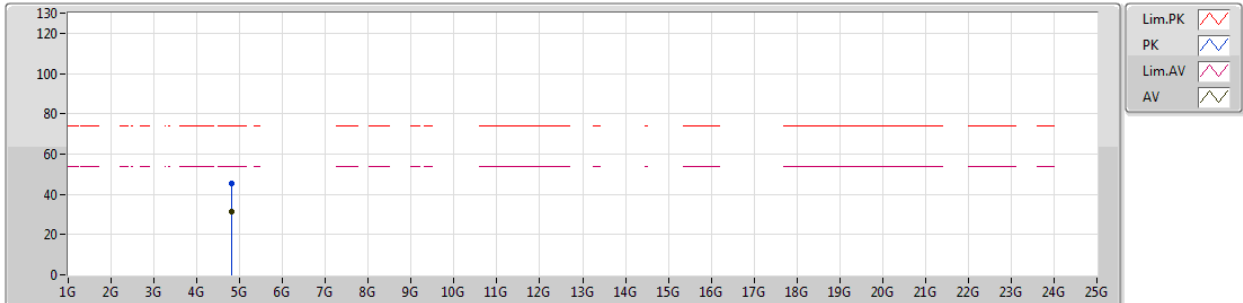


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments								
AV	2.3764G	44.86	54.00	-9.14	31.96	3	Vertical	170	1.50	-								
AV	2.402G	103.73	Inf	-Inf	32.04	3	Vertical	170	1.50	-								
PK	2.3626G	56.18	74.00	-17.82	31.91	3	Vertical	170	1.50	-								
PK	2.4018G	104.49	Inf	-Inf	32.04	3	Vertical	170	1.50	-								

BT-BR(1Mbps)

2402MHz_TX

14/03/2019

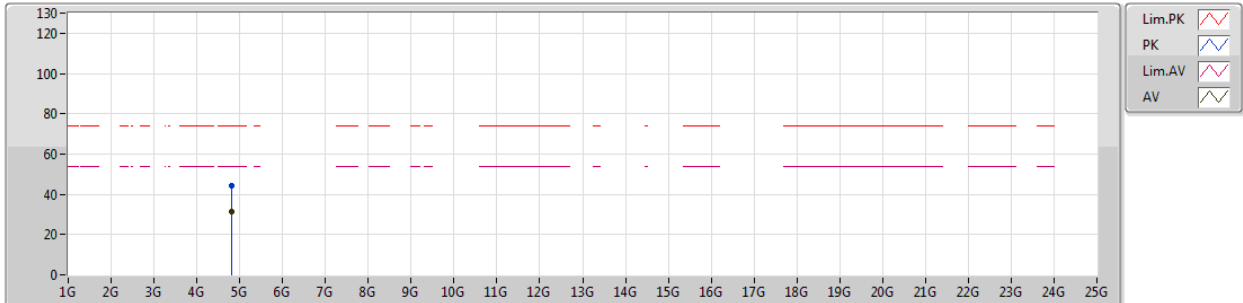


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.80418 G	31.15	54.00	-22.85	3.44	3	Vertical	241	2.99	-
PK	4.80171 G	45.19	74.00	-28.81	3.43	3	Vertical	241	2.99	-

BT-BR(1Mbps)

2402MHz_TX

14/03/2019

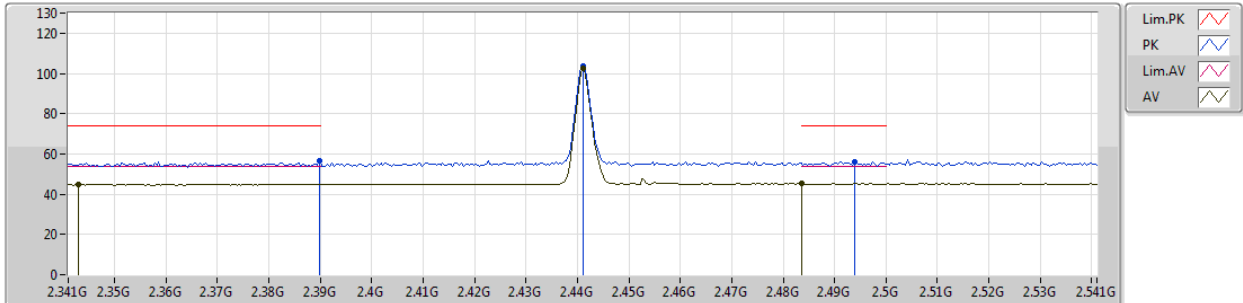


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.80244G	31.24	54.00	-22.76	3.43	3	Horizontal	59	1.37	-
PK	4.8059G	44.54	74.00	-29.46	3.44	3	Horizontal	59	1.37	-

BT-BR(1Mbps)

2441MHz_TX

14/03/2019

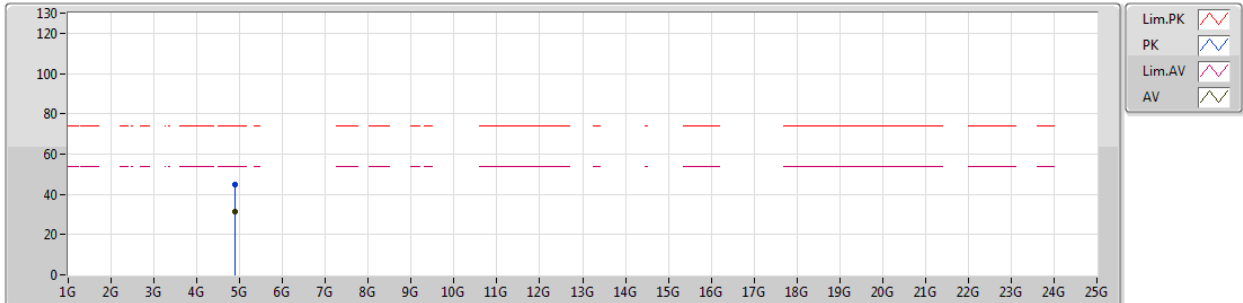


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.343G	44.83	54.00	-9.17	31.84	3	Vertical	171	1.50	-
AV	2.441G	102.58	Inf	-Inf	32.16	3	Vertical	171	1.50	-
AV	2.4835G	45.22	54.00	-8.78	32.29	3	Vertical	171	1.50	-
PK	2.3898G	56.34	74.00	-17.66	32.01	3	Vertical	171	1.50	-
PK	2.441G	103.41	Inf	-Inf	32.16	3	Vertical	171	1.50	-
PK	2.4938G	56.13	74.00	-17.87	32.33	3	Vertical	171	1.50	-

BT-BR(1Mbps)

2441MHz_TX

14/03/2019

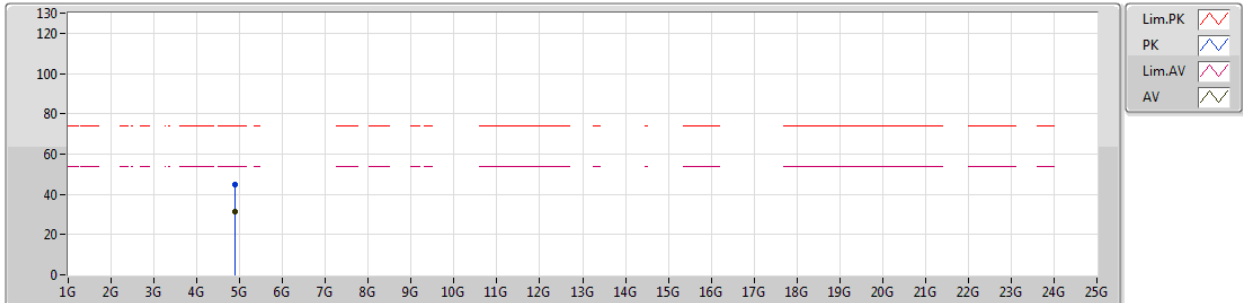


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.88218G	31.49	54.00	-22.51	3.63	3	Vertical	205	1.99	-
PK	4.88296G	44.94	74.00	-29.06	3.63	3	Vertical	205	1.99	-

BT-BR(1Mbps)

2441MHz_TX

14/03/2019

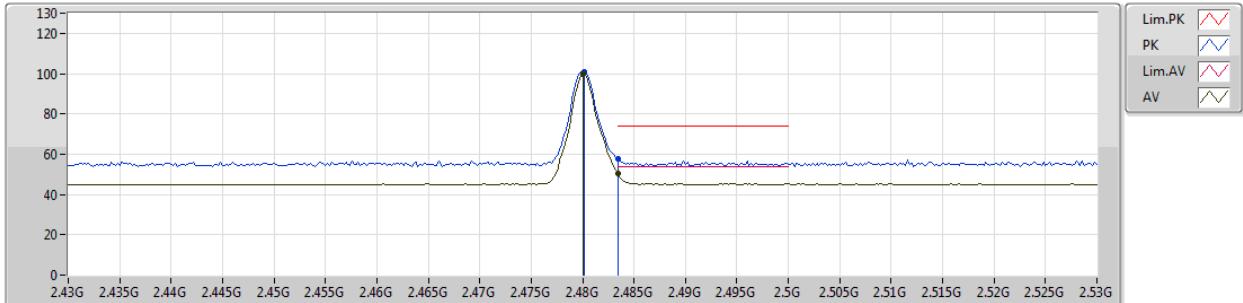


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.88039G	31.49	54.00	-22.51	3.62	3	Horizontal	89	1.50	-
PK	4.88152G	44.62	74.00	-29.38	3.63	3	Horizontal	89	1.50	-

BT-BR(1Mbps)

2480MHz_TX

14/03/2019

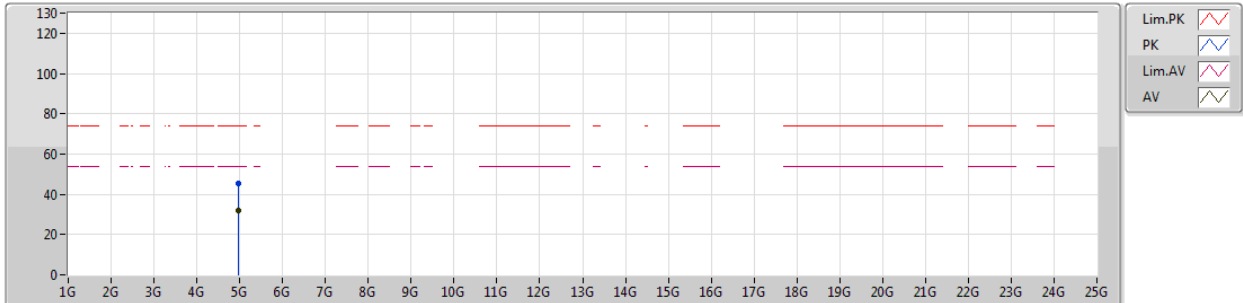


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.48G	99.84	Inf	-Inf	32.28	3	Vertical	171	1.50	-
AV	2.4835G	50.36	54.00	-3.64	32.29	3	Vertical	171	1.50	-
PK	2.4802G	100.74	Inf	-Inf	32.28	3	Vertical	171	1.50	-
PK	2.4835G	57.56	74.00	-16.44	32.29	3	Vertical	171	1.50	-

BT-BR(1Mbps)

2480MHz_TX

14/03/2019

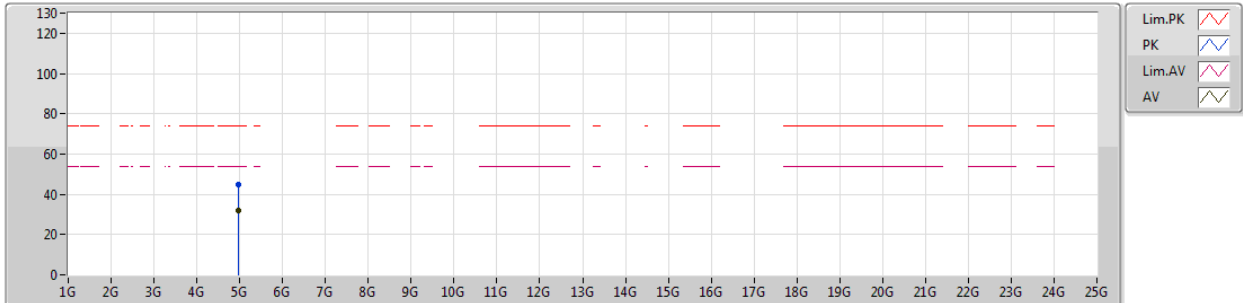


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.96007G	31.74	54.00	-22.26	3.83	3	Vertical	233	1.50	-
PK	4.96127G	45.38	74.00	-28.62	3.83	3	Vertical	233	1.50	-

BT-BR(1Mbps)

2480MHz_TX

14/03/2019

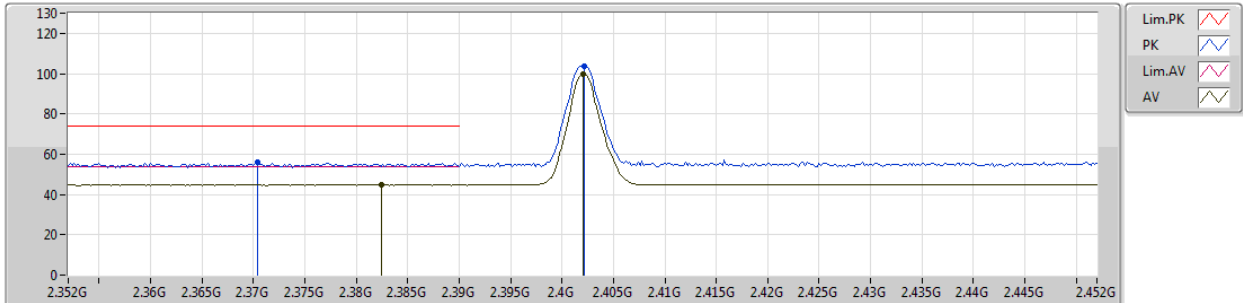


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments								
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)									
AV	4.95889G	31.79	54.00	-22.21	3.83	3	Horizontal	42	1.02	-								
PK	4.96027G	45.04	74.00	-28.96	3.83	3	Horizontal	42	1.02	-								

BT-EDR(3Mbps)

2402MHz_TX

14/03/2019

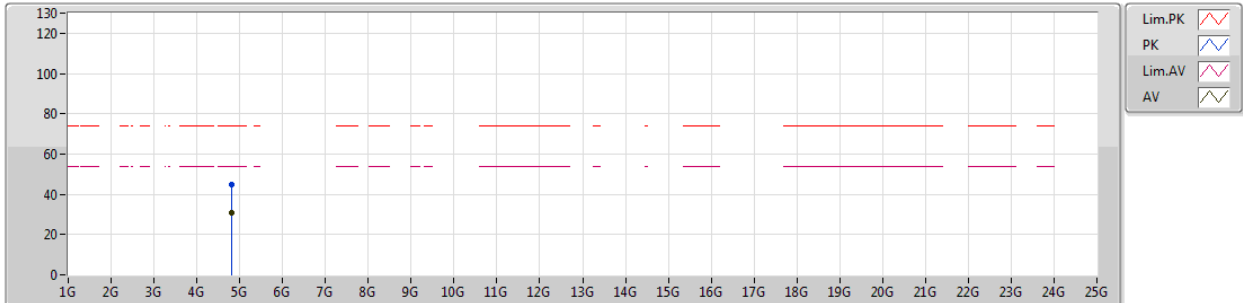


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments							
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)								
AV	2.3824G	44.83	54.00	-9.17	31.98	3	Vertical	171	1.49	-							
AV	2.402G	99.59	Inf	-Inf	32.04	3	Vertical	171	1.49	-							
PK	2.3704G	55.93	74.00	-18.07	31.94	3	Vertical	171	1.49	-							
PK	2.4022G	103.47	Inf	-Inf	32.05	3	Vertical	171	1.49	-							

BT-EDR(3Mbps)

2402MHz_TX

14/03/2019

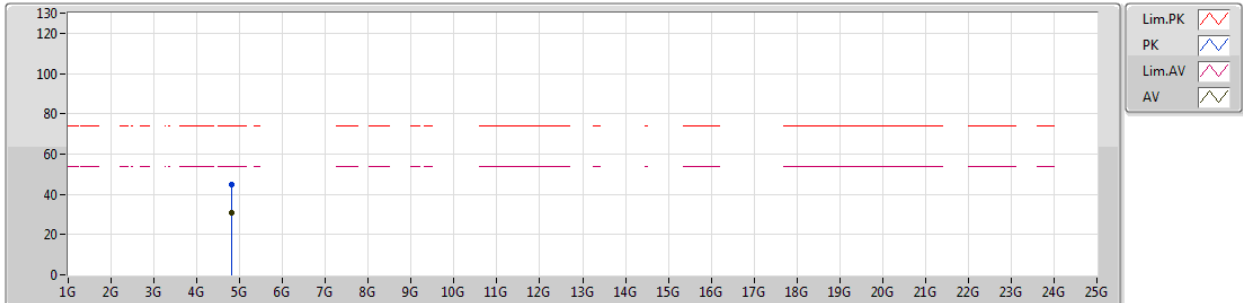


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments								
AV	4.80545G	31.06	54.00	-22.94	3.44	3	Vertical	190	1.50	-								
PK	4.80492G	44.83	74.00	-29.17	3.44	3	Vertical	190	1.50	-								

BT-EDR(3Mbps)

2402MHz_TX

14/03/2019

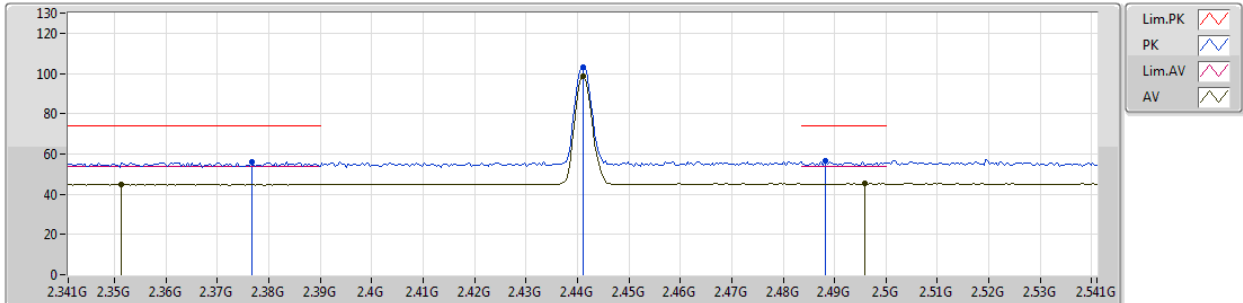


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.80422G	31.06	54.00	-22.94	3.44	3	Horizontal	3	2.65	-
PK	4.80339G	45.06	74.00	-28.94	3.44	3	Horizontal	3	2.65	-

BT-EDR(3Mbps)

14/03/2019

2441MHz_TX

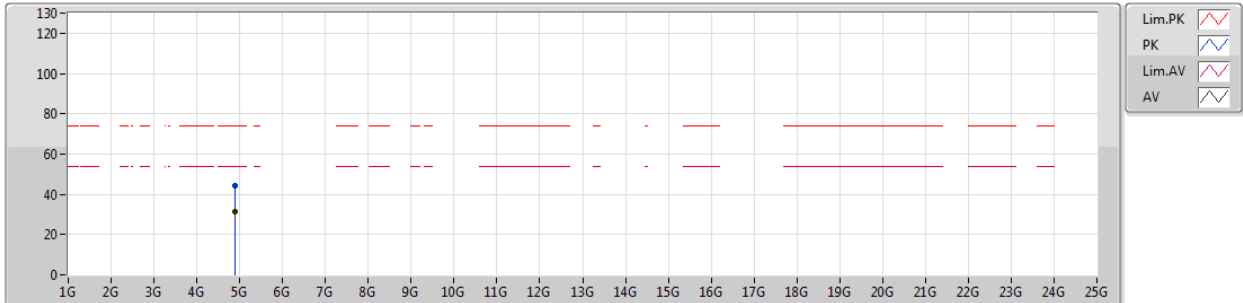


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3514G	44.78	54.00	-9.22	31.87	3	Vertical	14	2.78	-
AV	2.441G	98.82	Inf	-Inf	32.16	3	Vertical	14	2.78	-
AV	2.4958G	45.24	54.00	-8.76	32.33	3	Vertical	14	2.78	-
PK	2.3766G	56.14	74.00	-17.86	31.96	3	Vertical	14	2.78	-
PK	2.441G	103.00	Inf	-Inf	32.16	3	Vertical	14	2.78	-
PK	2.4882G	56.73	74.00	-17.27	32.30	3	Vertical	14	2.78	-

BT-EDR(3Mbps)

2441MHz_TX

14/03/2019

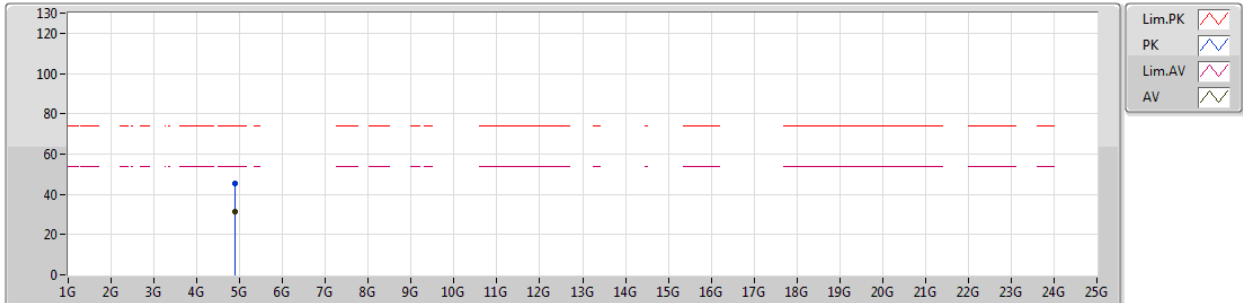


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments								
AV	4.8827G	31.40	54.00	-22.60	3.63	3	Vertical	360	1.14	-								
PK	4.87967G	44.28	74.00	-29.72	3.62	3	Vertical	360	1.14	-								

BT-EDR(3Mbps)

2441MHz_TX

14/03/2019

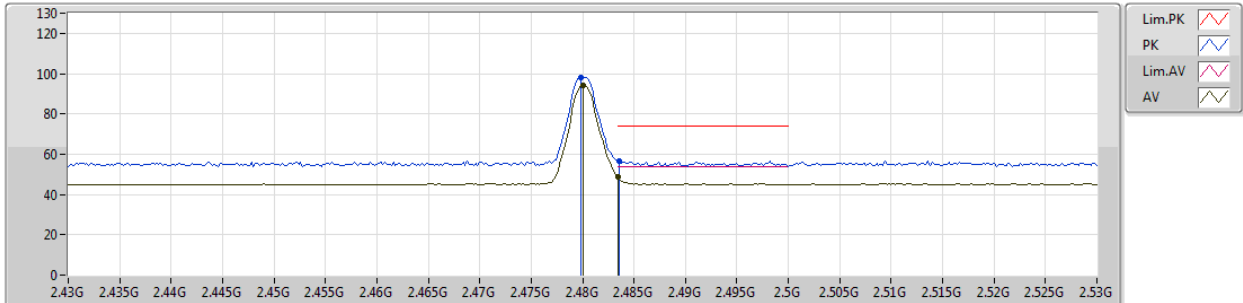


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.88282G	31.48	54.00	-22.52	3.63	3	Horizontal	190	1.54	-
PK	4.88334G	45.50	74.00	-28.50	3.64	3	Horizontal	190	1.54	-

BT-EDR(3Mbps)

2480MHz_TX

14/03/2019

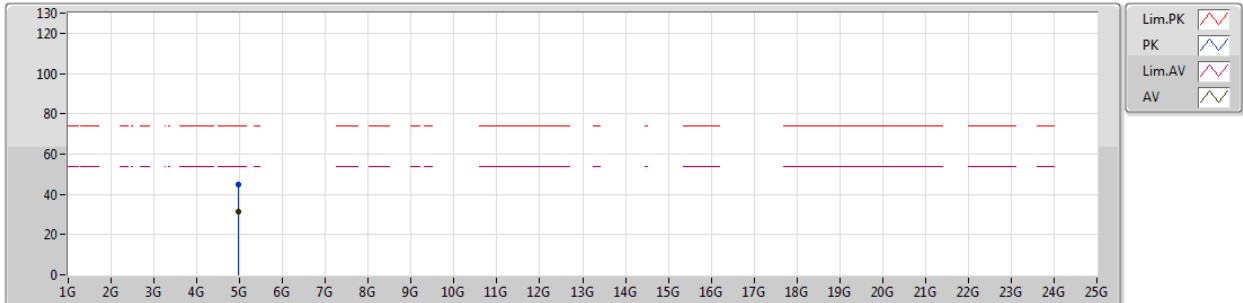


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.48G	94.06	Inf	-Inf	32.28	3	Vertical	171	1.49	-
AV	2.4835G	48.52	54.00	-5.48	32.29	3	Vertical	171	1.49	-
PK	2.4798G	98.32	Inf	-Inf	32.28	3	Vertical	171	1.49	-
PK	2.4836G	56.74	74.00	-17.26	32.29	3	Vertical	171	1.49	-

BT-EDR(3Mbps)

2480MHz_TX

14/03/2019

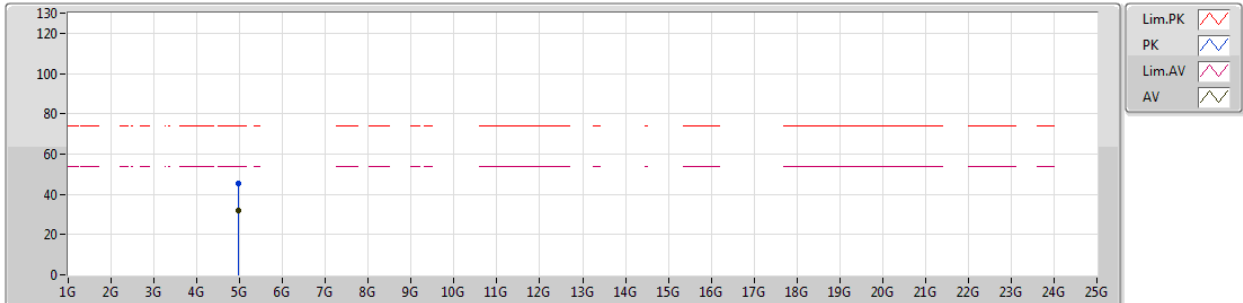


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments								
AV	4.95771G	31.64	54.00	-22.36	3.82	3	Vertical	17	1.03	-								
PK	4.95896G	44.76	74.00	-29.24	3.83	3	Vertical	17	1.03	-								

BT-EDR(3Mbps)

2480MHz_TX

14/03/2019



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.96039G	31.68	54.00	-22.32	3.83	3	Horizontal	334	1.14	-
PK	4.9592G	45.30	74.00	-28.70	3.83	3	Horizontal	334	1.14	-