



FCC RADIO TEST REPORT

FCC ID : TVE-121101A
Equipment : Wireless Network Extender
Brand Name : FORTINET
Model Name : FortiExtender 211Exxxxxx,
FORTIEXTENDER-211Exxxxxx, FEX-211Exxxxxx
(Please refer to section 1.1.5 for detail information.)
Applicant : Fortinet, Inc.
899 Kifer Road, Sunnyvale, CA 94086 USA
Manufacturer : Fortinet, Inc.
899 Kifer Road, Sunnyvale, CA 94086 USA
Standard : 47 CFR FCC Part 15.247

The product was received on May 13, 2020, and testing was started from May 19, 2020 and completed on May 25, 2020. 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: Sam Chen

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.....	4
Summary of Test Result.....	5
1 General Description	6
1.1 Information.....	6
1.2 Applicable Standards	8
1.3 Testing Location Information	8
1.4 Measurement Uncertainty	8
2 Test Configuration of EUT.....	9
2.1 Test Channel Mode	9
2.2 The Worst Case Measurement Configuration.....	10
2.3 EUT Operation during Test	11
2.4 Accessories	11
2.5 Support Equipment.....	12
2.6 Test Setup Diagram	13
3 Transmitter Test Result	16
3.1 AC Power-line Conducted Emissions	16
3.2 20dB Bandwidth and Carrier Frequency Separation.....	18
3.3 Maximum Conducted Output Power	19
3.4 Number of Hopping Frequencies and Hopping Bandedge	20
3.5 Time of Occupancy (Dwell Time)	21
3.6 Emissions in Non-restricted Frequency Bands	22
3.7 Emissions in Restricted Frequency Bands.....	23
4 Test Equipment and Calibration Data	26
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



TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A10_5 Ver1.2



Summary of Test Result

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

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:

1. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.
2. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Vicky Huang

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
2.4G	BT-BR	1	1
2.4G	BT-EDR	1	1

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.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	-	RF11C02360S	Printing Antenna	N/A	4

Note1: The above information was declared by manufacturer.

Note2: The EUT has one antenna.

For BT function:

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

Port 1 can be used as transmitting/receiving antenna.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) $\geq 1/T$
BT-BR(1Mbps)	0.738	1.32	2.878m	1k
BT-EDR(2Mbps)	0.74	1.31	2.883m	1k
BT-EDR(3Mbps)	0.784	1.06	2.885m	1k

Note:

- ♦ DC is Duty Cycle.
- ♦ DCF is Duty Cycle Factor.

**1.1.4 EUT Operational Condition**

EUT Power Type	From AC Adapter or PoE
Test Software Version	TeraTerm(v4.75) 、 WCN_Combol_Tool(v2.1916.00)

1.1.5 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	LTE Module	BT	PCBA	Description
FortiExtender 211Exxxxxx	LTE module chip: EM7565*1	BT*1	Same PCBA	All the models are identical, the difference model for difference brand served as marketing strategy.
FORTIEXTENDER-211Exxxxxx	LTE module chip: EM7565*1	BT*1	Same PCBA	
FEX-211Exxxxxx	LTE module chip: EM7565*1	BT*1	Same PCBA	
(where “x” can be “0-9”, or “A-Z”, or “-“, or blank for marketing purposes or software changes only and no HW related changes.)				

From the above models, model: FEX-211E was selected as representative model for the test and its data was recorded in this report.



1.2 Applicable Standards

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

- ♦ 47 CFR FCC Part 15

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ FCC KDB 558074 D01 v05r02
- ♦ FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location			
<input type="checkbox"/>	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
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.	TEL : 886-3-656-9065 FAX : 886-3-656-9085

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Owen Hsu	22.4~23.6°C / 59~60%	May 20, 2020
Radiated (Below 1GHz)	03CH04-CB	Stim Sung	23.9~24.7°C / 65~67%	May 21, 2020
Radiated (Above 1GHz)	03CH04-CB	Cola Fan	22.9~24°C / 51~63%	May 19, 2020
AC Conduction	CO01-CB	Ryo Fan	22~24°C / 59~60%	May 25, 2020

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

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)	2.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	5.1 dB	Confidence levels of 95%
Conducted Emission	2.4 dB	Confidence levels of 95%
Output Power Measurement	1.5 dB	Confidence levels of 95%
Bandwidth Measurement	2%	Confidence levels of 95%



2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
BT-BR(1Mbps)	-
2402MHz	7
2440MHz	7
2480MHz	7
BT-EDR(2Mbps)	-
2402MHz	7
2440MHz	7
2480MHz	7
BT-EDR(3Mbps)	-
2402MHz	7
2440MHz	7
2480MHz	7



2.2 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	Normal Link
1	EUT + GPS + Bluetooth + LTE Band 2(SIM Slot 1) + Adapter
2	EUT + GPS + Bluetooth + WCDMA Band 2(SIM Slot 1) + Adapter
Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 will follow this same test mode.	
3	EUT + GPS + Bluetooth + LTE Band 2(SIM Slot 2) + PoE
For operating mode 1 is the worst case and it was record in this test report.	

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	Normal Link
1	EUT at Z-axis + GPS + Bluetooth + LTE Band 2(SIM Slot 1) + Adapter
2	EUT at Y-axis + GPS + Bluetooth + LTE Band 2(SIM Slot 1) + Adapter
Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 will follow this same test mode.	
3	EUT at Z-axis + GPS + Bluetooth + WCDMA Band 2(SIM Slot 1) + Adapter
Mode 1 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4 will follow this same test mode.	
4	EUT at Z-axis + GPS + Bluetooth + LTE Band 2(SIM Slot 2) + PoE
For operating mode 4 is the worst case and it was record in this test report.	



Operating Mode > 1GHz	CTX
The EUT was performed at Z axis and Y axis position. The worst case was found at Y axis, so it was selected to perform test and its test result was written in the report.	
1	EUT at Y-axis

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
Operating Mode	
1	Bluetooth+WWAN(LTE)
2	Bluetooth+WWAN(WCDMA)
Refer to Sporton Test Report No.: FA903129 for Co-location RF Exposure Evaluation.	

Note:

1. The EUT contains a certified WWAN module (FCC ID: N7NEM75)
2. The EUT was powered by Adapter or PoE, and the Adapter and PoE was for measurement only, would not be marketed.

The Adapter and PoE information as below:

Support Unit	Brand Name	Model Name
Adapter	APD	WA-30J12R
PoE	Fortinet	Fortiswitch 224E

2.3 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.4 Accessories

N/A



2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	SIM Card	N/A	N/A	N/A
B	LAN1 NB	DELL	E6430	N/A
C	LAN4 NB	DELL	E6430	N/A
D	Flash disk3.0	Transcend	JetFlash-700	N/A
E	iPad	Apple	A1430	N/A
F	LTE Base station	Anritsu	MT8820C	N/A
G	GPS Simulator	WELNAVIGATE	GS-100	N/A
H	WAN NB	DELL	E6430	N/A
I	Adapter	APD	WA-30J12R	N/A

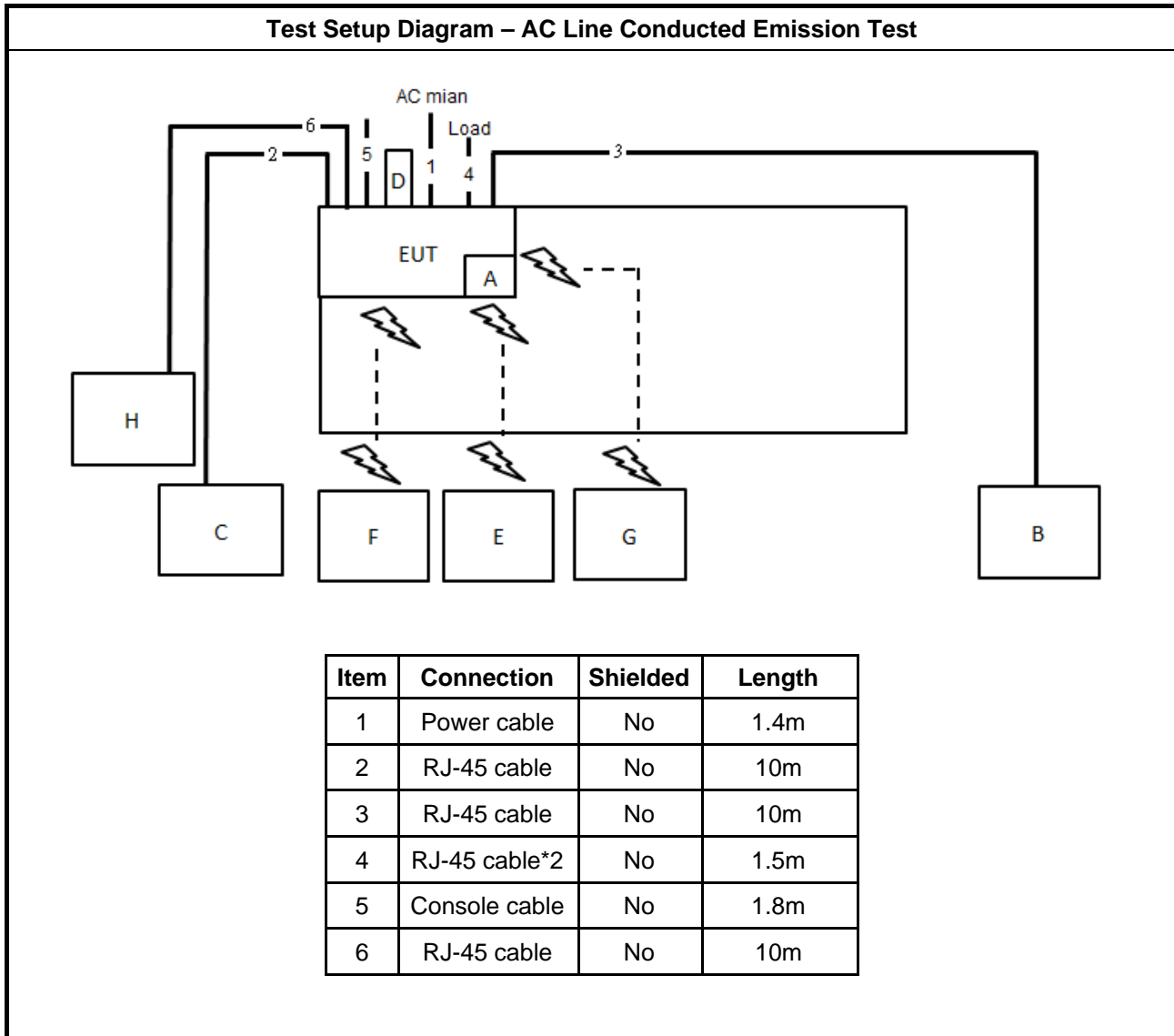
For Radiated (below 1GHz):

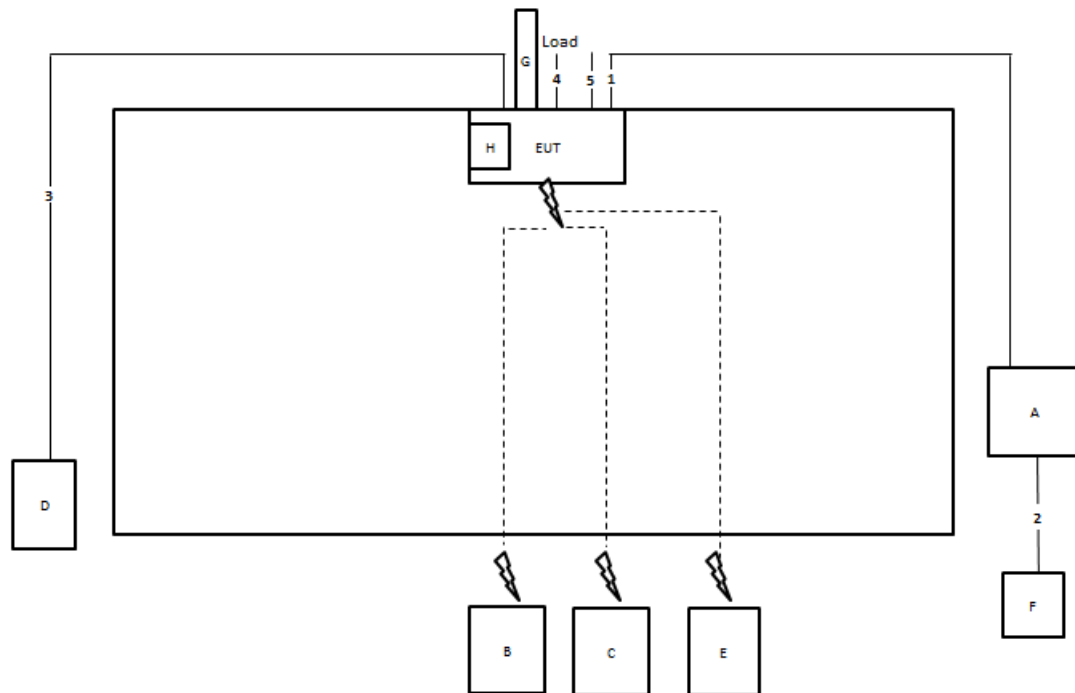
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	PoE	Fortinet	Fortiswitch 224E	N/A
B	iPad	Apple	A1430	N/A
C	LTE base station	Anritsu	MT8820C	N/A
D	WAN NB	DELL	E4300	N/A
E	GPS Simulator	WELNAVIGATE	GS-100	N/A
F	LAN NB	DELL	E4300	N/A
G	Flash disk3.0	Silicon Power	B06	N/A
H	SIM Card	N/A	N/A	N/A

For Radiated (above 1GHz) and RF Conducted:

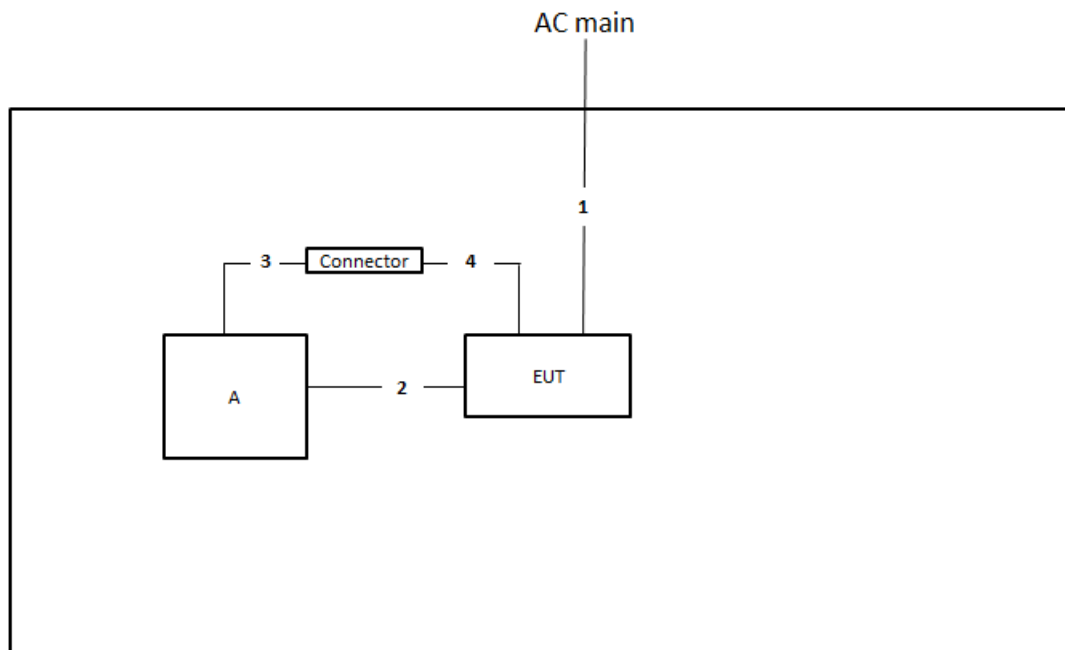
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	NB	DELL	E4300	N/A
B	Adapter	APD	WA-30J12R	N/A

2.6 Test Setup Diagram



Test Setup Diagram - Radiated Test < 1GHz


Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable*3	No	1.5m
5	Console cable	No	1.8m

Test Setup Diagram - Radiated Test > 1GHz


Item	Connection	Shielded	Length
1	Power cable	No	1.4m
2	RJ-45 cable	No	1.5m
3	USB to RS-232 cable	Yes	0.4m
4	RS-232 to RJ-45 cable	No	1.5m



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.		

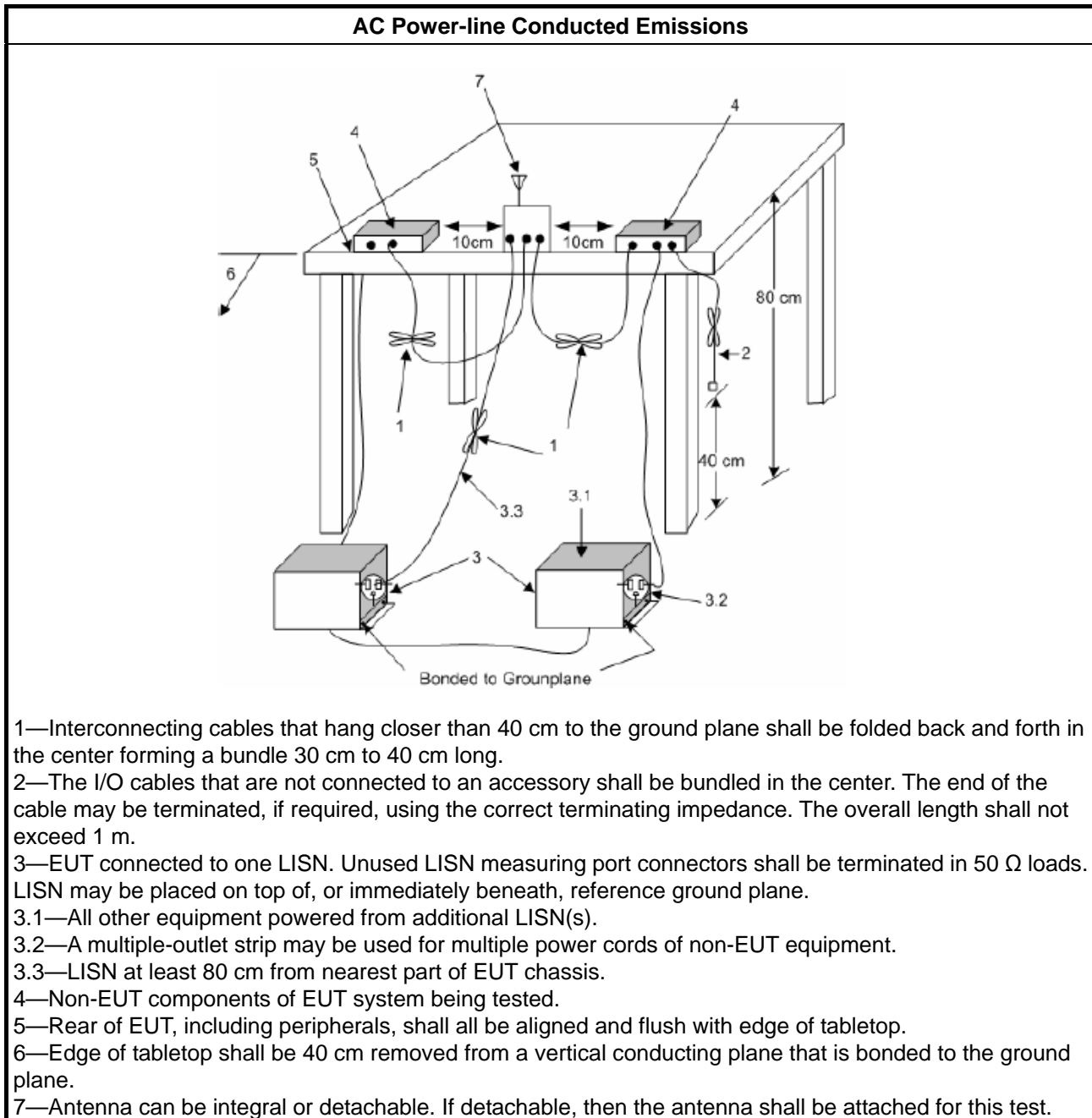
3.1.2 Measuring Instruments

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



3.1.5 Measurement Results Calculation

The measured Level is calculated using:

- Corrected Reading (dBUV) = LISN Factor + Cable Loss + Read Level = Level
- Margin = - Limit + (Read Level + LISN Factor + Cable Loss)

3.1.6 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	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth \leq 250 kHz.
	▪ $50 > N \geq 25$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth $>$ 250 kHz.
▪ 2400-2483.5 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz).
	▪ $75 > N \geq 15$ and $ChS \geq \text{MAX}$ (20 dB bandwidth 2/3, 25 kHz).
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth \leq 1 MHz.
N: Number of Hopping Frequencies; ChS: Hopping Channel Separation	

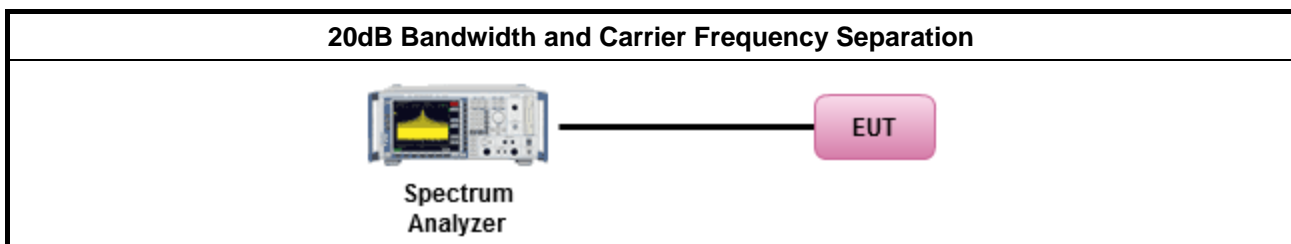
3.2.2 Measuring Instruments

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 6.9.1 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	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$; Power 30dBm; EIRP 36dBm
	▪ $50 > N \geq 25$; Power 24dBm; EIRP 30dBm
▪ 2400-2483.5 MHz Band:	
	▪ $N \geq 75$; Power 30dBm; EIRP 36dBm
	▪ $75 > N \geq 15$; Power 21dBm; EIRP 27dBm
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$; Power 30dBm; EIRP 36dBm
N: Number of Hopping Frequencies	

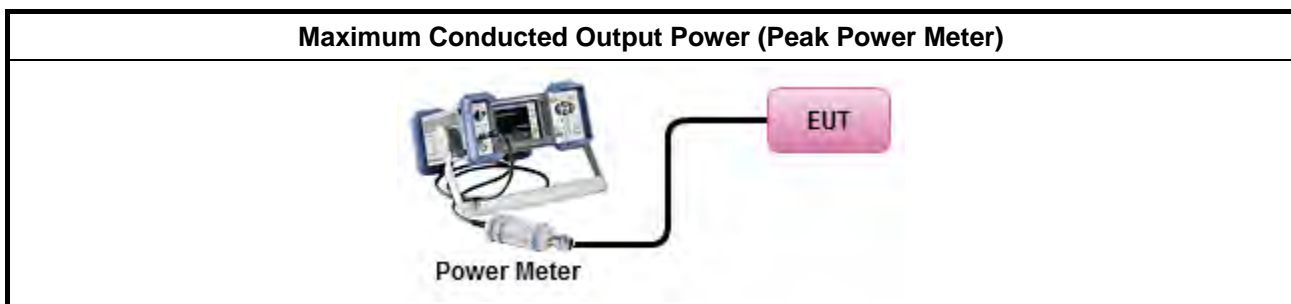
3.3.2 Measuring Instruments

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	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth \leq 250 kHz.
	▪ $50 > N \geq 25$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth $>$ 250 kHz.
▪ 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).
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth \leq 1 MHz.
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

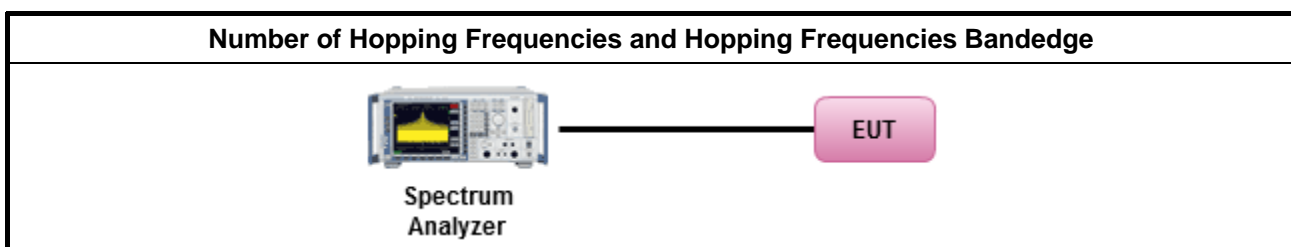
3.4.3 Measuring Instruments

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

20dB Bandwidth and Carrier Frequency Separation Limit for Frequency Hopping Systems	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$; 0.4s in 20s period
	▪ $50 > N \geq 25$; 0.4s in 10s period
▪ 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
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$; 0.4s in 30s period
N: Number of Hopping Frequencies	

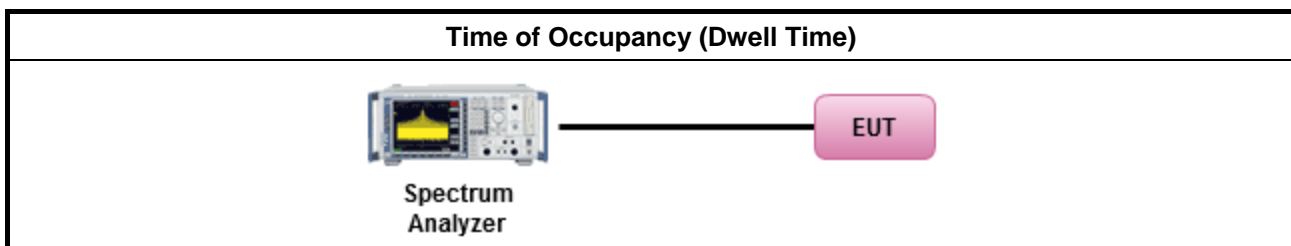
3.5.2 Measuring Instruments

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 (dBc)
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.	

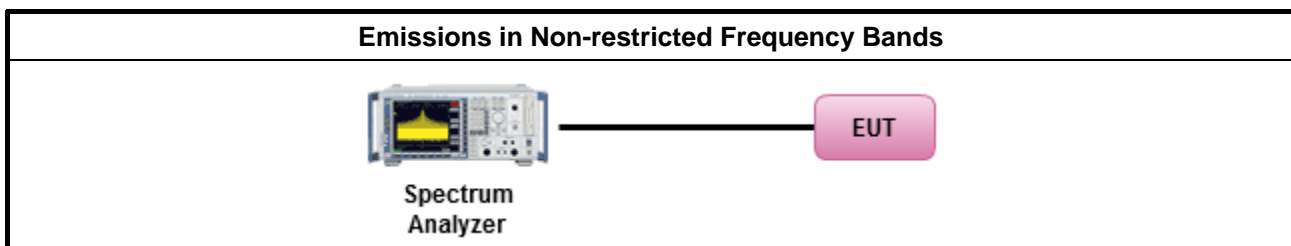
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

Test Method
<ul style="list-style-type: none"> 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.

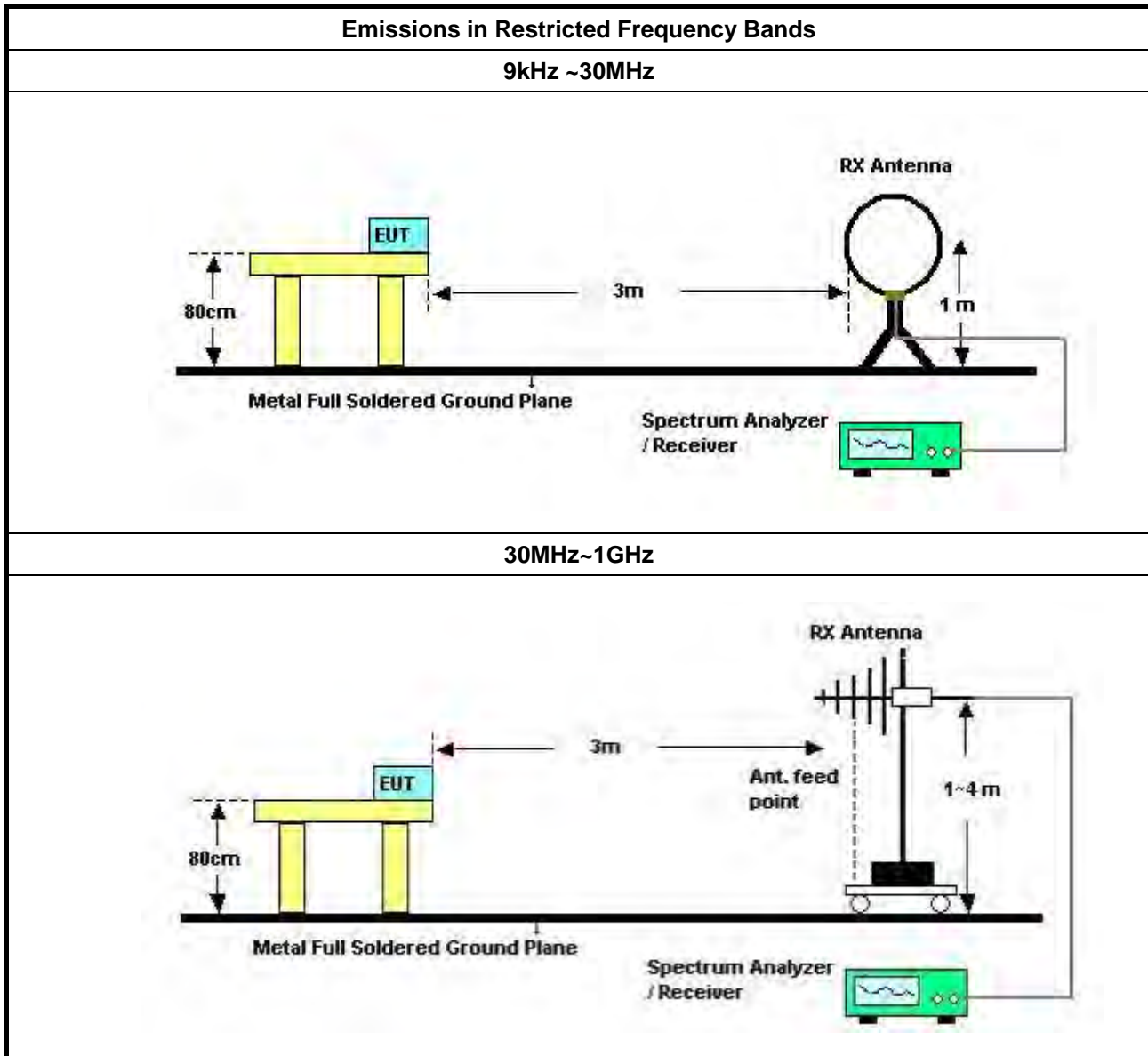
3.7.2 Measuring Instruments

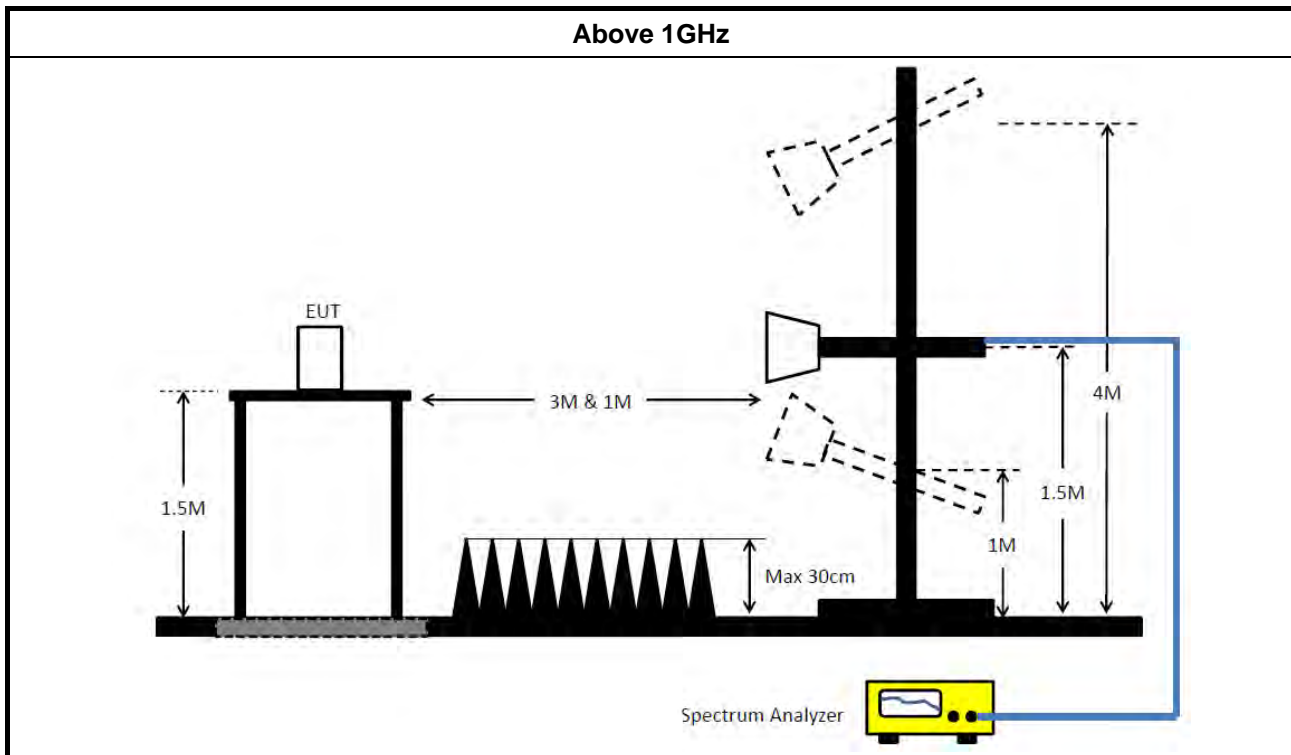
Refer a test equipment and calibration data table in this test report.

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 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor (if applicable) = Level.

3.7.6 Emissions in Restricted Frequency Bands (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

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

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

3.7.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix G



4 Test Equipment and Calibration Data

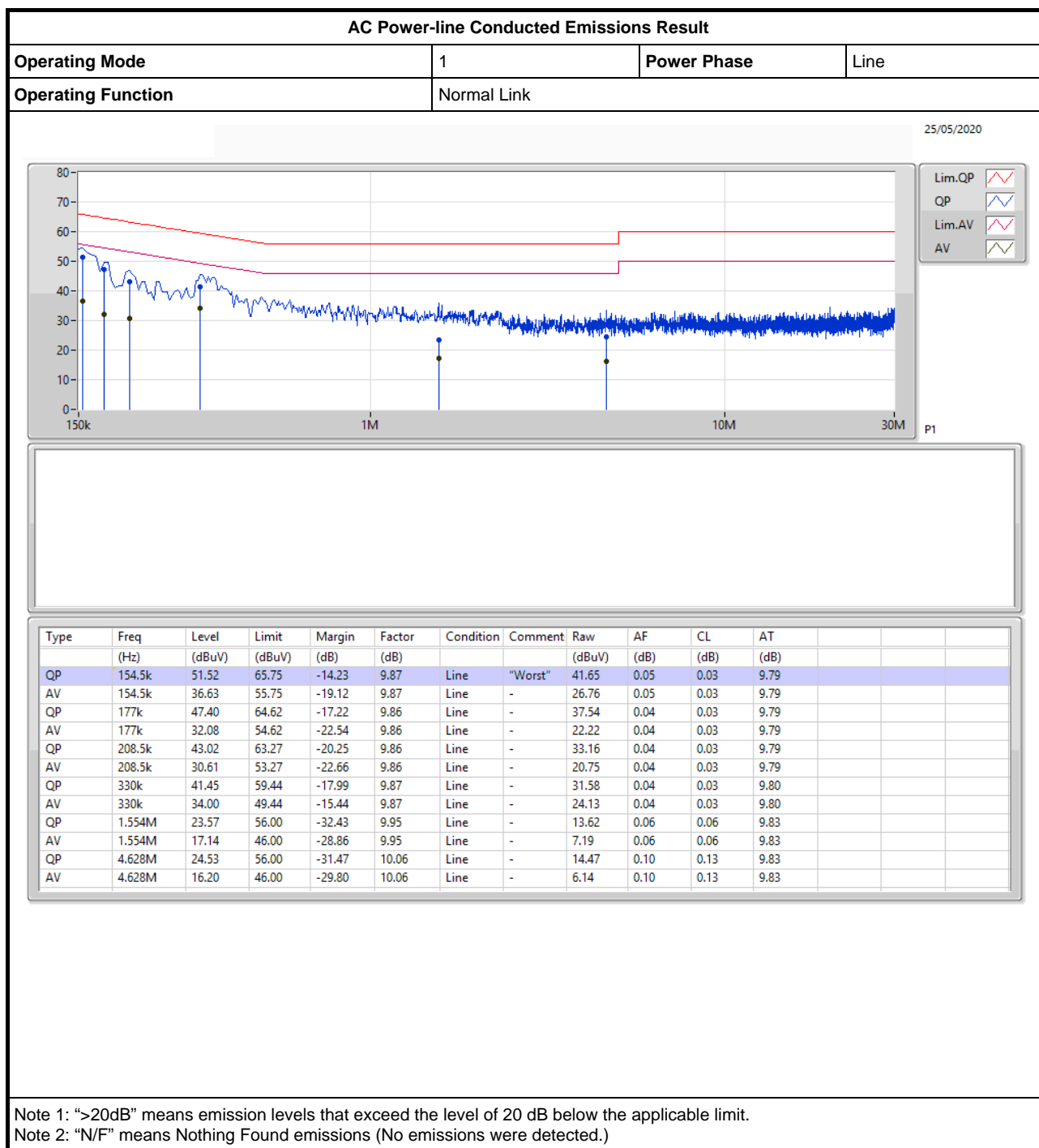
Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Feb. 26, 2020	Feb. 25, 2021	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 25, 2019	Dec. 24, 2020	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Feb. 25, 2020	Feb. 24, 2021	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 20, 2020	May 19, 2021	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA with 6 dB attenuator	Schaffner & EMC	CBL6112B & N-6-06	22021&AT-N06 07	30MHz ~ 1GHz	Oct. 12, 2019	Oct. 11, 2020	Radiation (03CH04-CB)
Horn Antenna	ETS • Lindgren	3115	00143147	750MHz~ 18GHz	Oct. 22, 2019	Oct. 21, 2020	Radiation (03CH04-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 12, 2019	Jun. 11, 2020	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	310N	187291	0.1MHz ~ 1GHz	Mar. 19, 2020	Mar. 18, 2021	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	83017A	MY53270063	0.5GHz ~ 26.5GHz	Mar. 11, 2020	Mar. 10, 2021	Radiation (03CH04-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH04-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Dec. 18, 2019	Dec. 17, 2020	Radiation (03CH04-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH04-CB)
RF Cable-low	Woken	RG402	Low Cable-03+22	30MHz ~ 1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21	1GHz - 18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21+22	1GHz - 18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH04-CB)

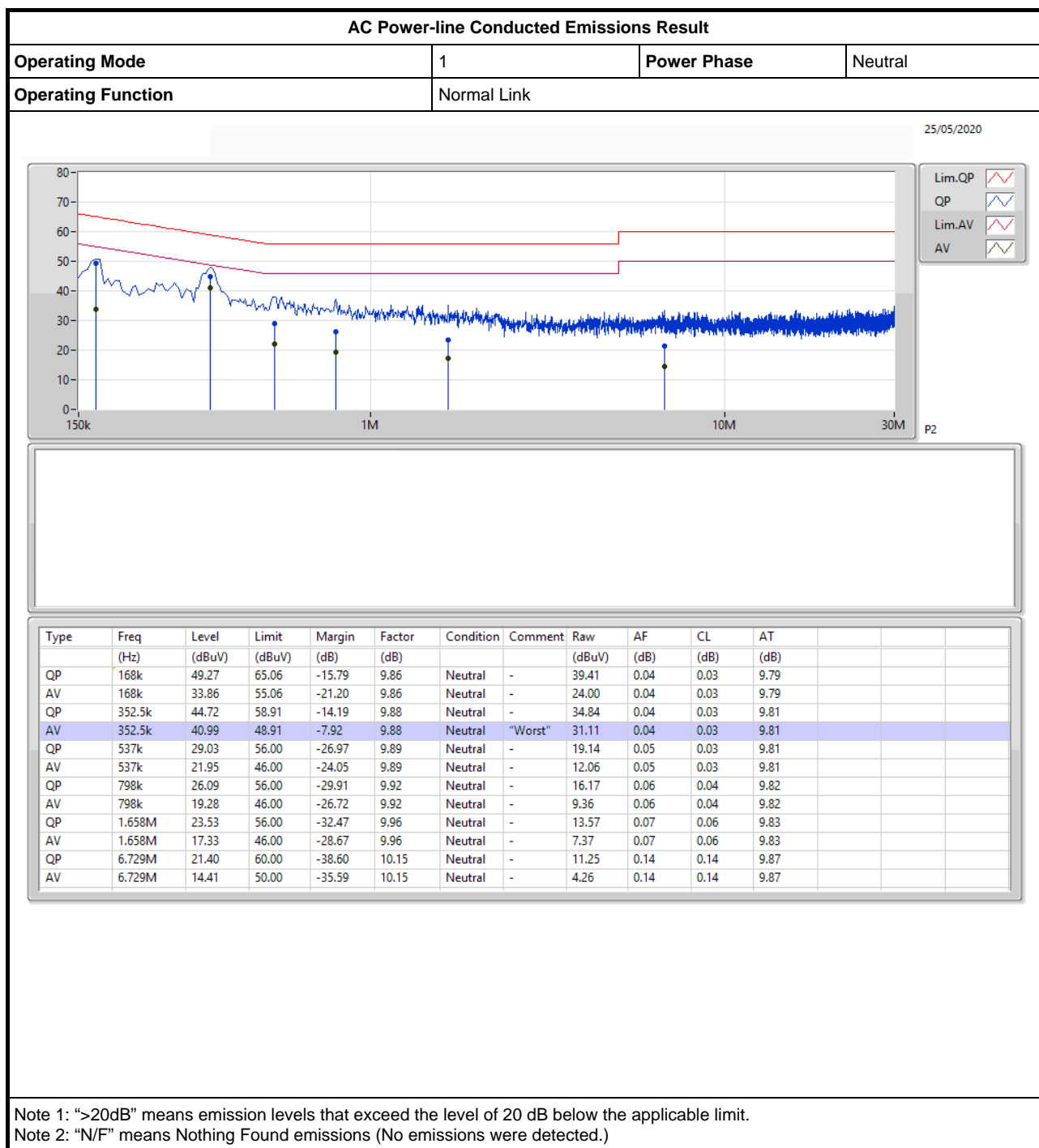


Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH04-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 05, 2020	May 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-28	1 GHz –26.5 GHz	Nov. 18, 2019	Nov. 17, 2020	Conducted (TH01-CB)
Cable	Marvelous Microwave	n/a	Cable-REF-1	9k-1GHz	Oct. 31, 2019	Oct. 30, 2020	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Feb. 07, 2020	Feb. 06, 2021	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Feb. 07, 2020	Feb. 06, 2021	Conducted (TH01-CB)

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

NCR means Non-Calibration required.





**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)	920k	875.812k	876KF1D	920k	873.313k
BT-EDR(2Mbps)	1.22M	1.169M	1M17G1D	1.216M	1.167M
BT-EDR(3Mbps)	1.25M	1.183M	1M18G1D	1.248M	1.179M

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

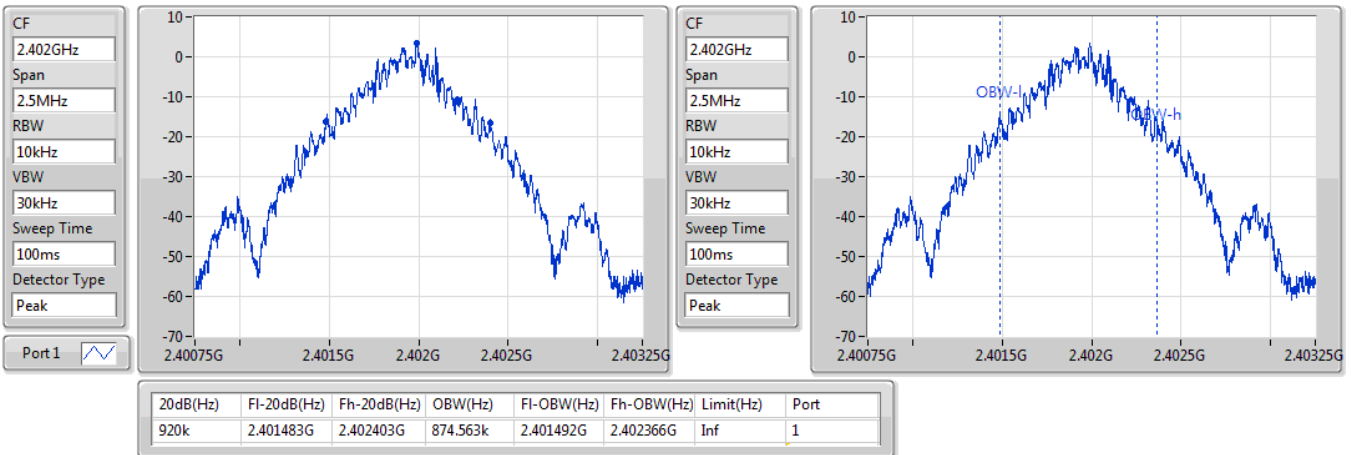
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	Inf	920k	874.563k
2440MHz	Pass	Inf	920k	875.812k
2480MHz	Pass	Inf	920k	873.313k
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	Inf	1.216M	1.168M
2440MHz	Pass	Inf	1.218M	1.169M
2480MHz	Pass	Inf	1.22M	1.167M
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	Inf	1.248M	1.183M
2440MHz	Pass	Inf	1.248M	1.179M
2480MHz	Pass	Inf	1.25M	1.179M

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

BT-BR(1Mbps)

2402MHz

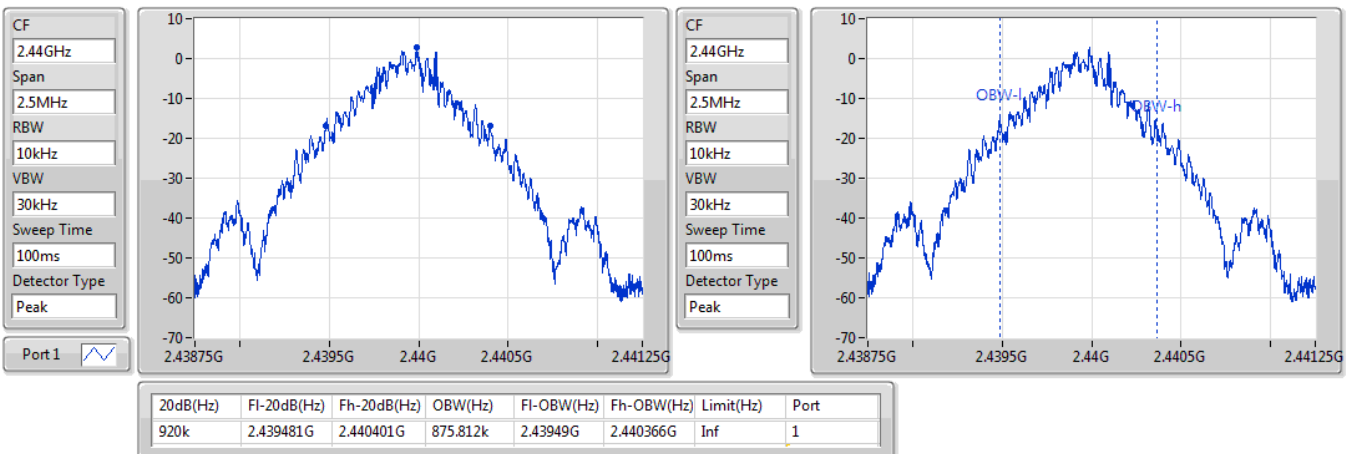
20/05/2020



BT-BR(1Mbps)

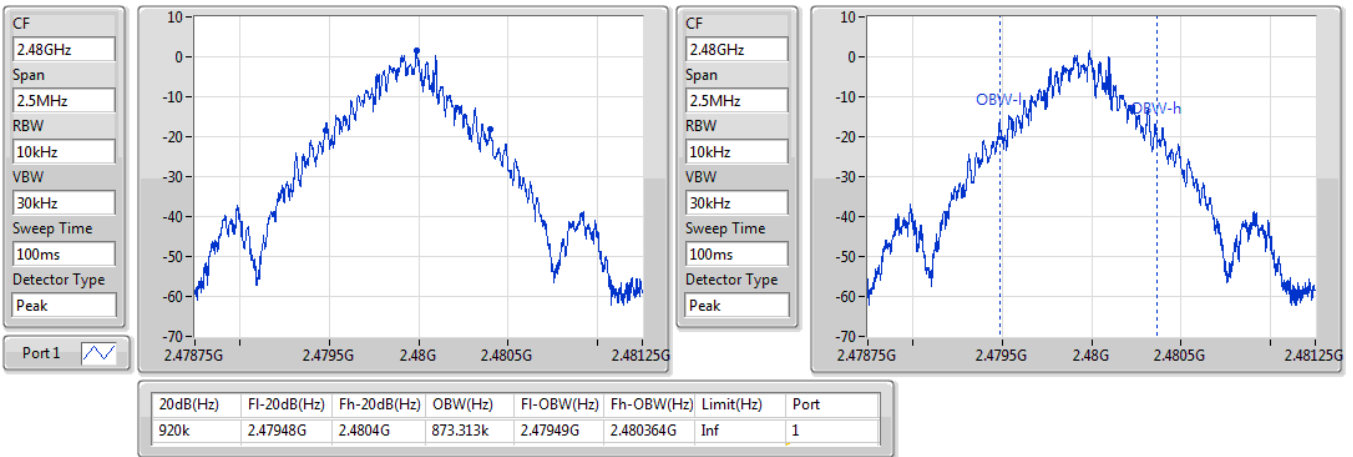
2440MHz

20/05/2020

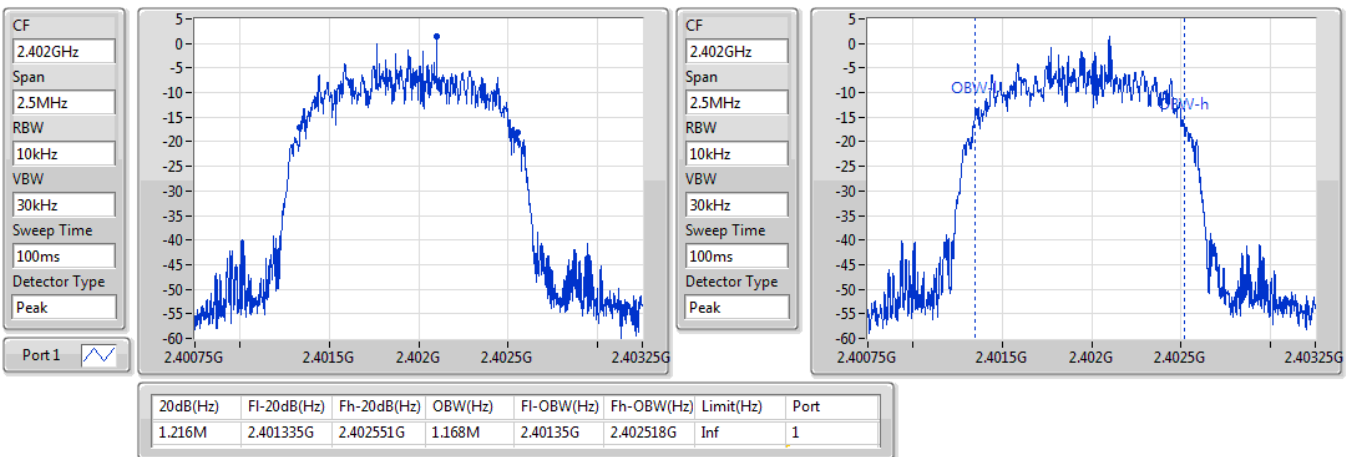


BT-BR(1Mbps)
2480MHz

20/05/2020

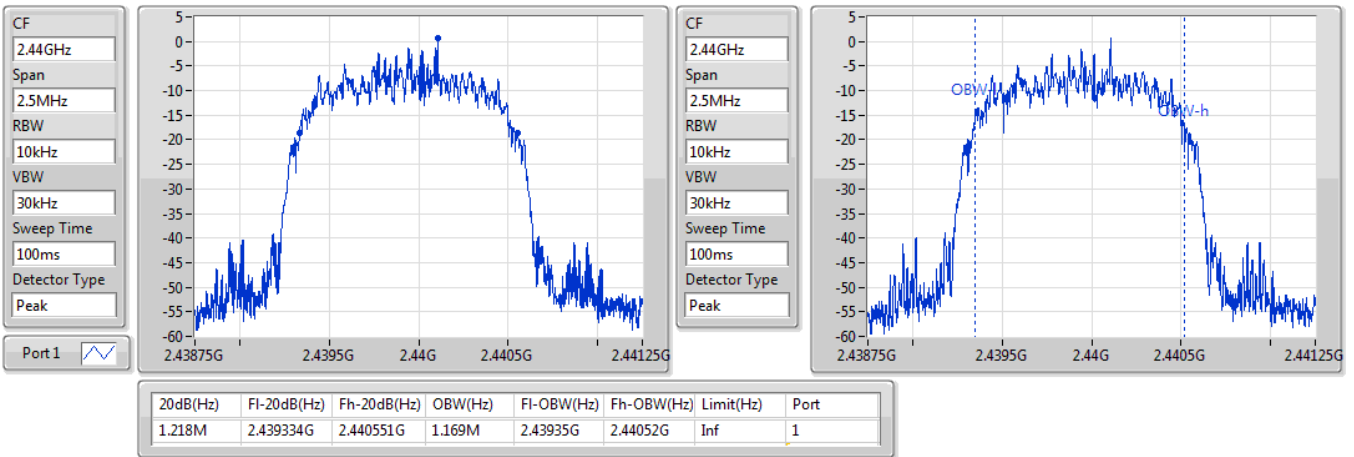

BT-EDR(2Mbps)
2402MHz

20/05/2020

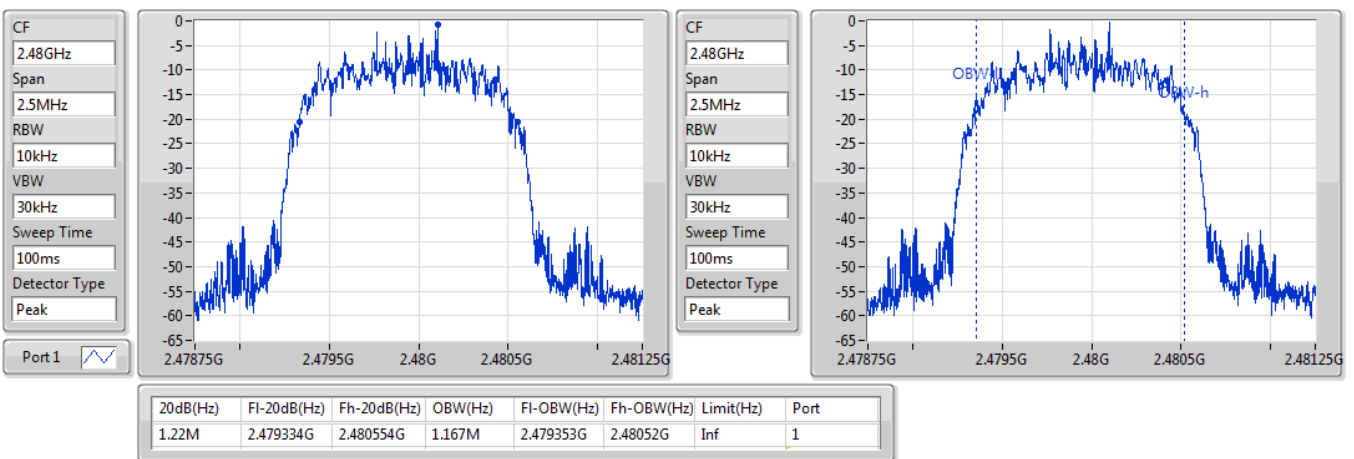


BT-EDR(2Mbps)
EBW
2440MHz

20/05/2020

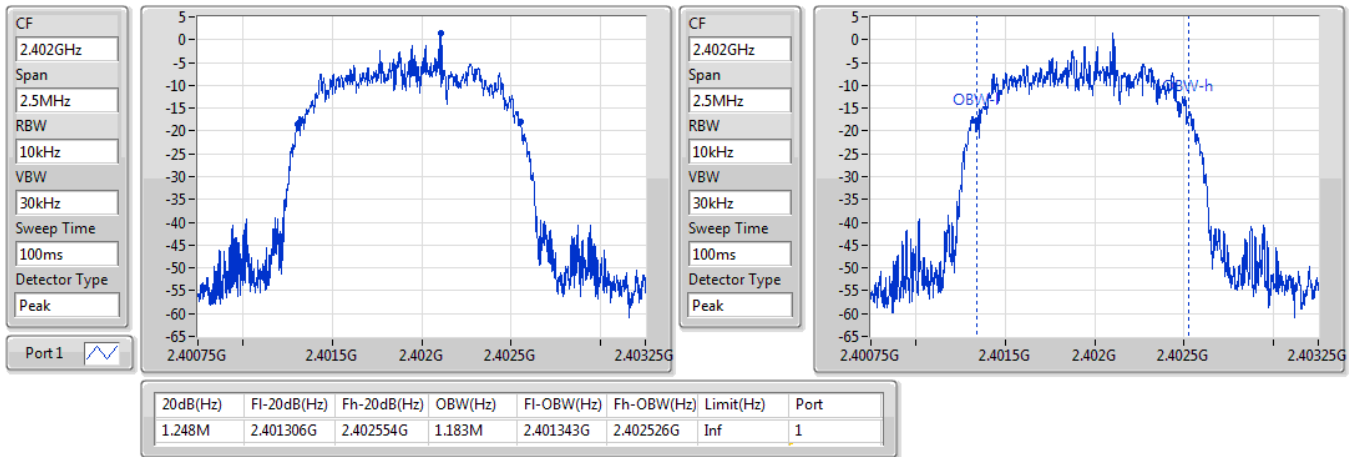

BT-EDR(2Mbps)
EBW
2480MHz

20/05/2020

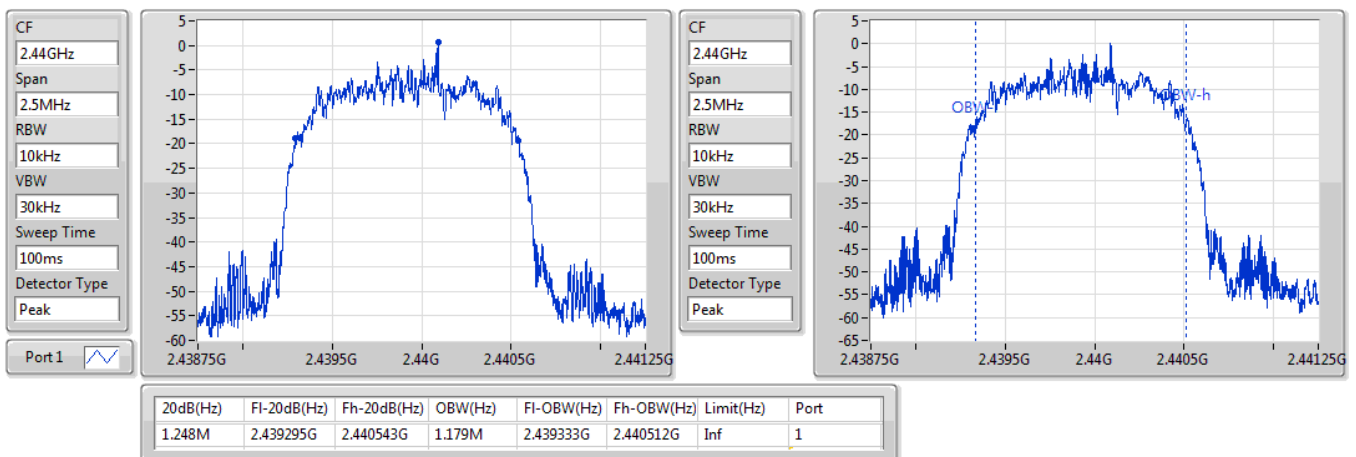


BT-EDR(3Mbps)
EBW
2402MHz

20/05/2020


BT-EDR(3Mbps)
EBW
2440MHz

20/05/2020

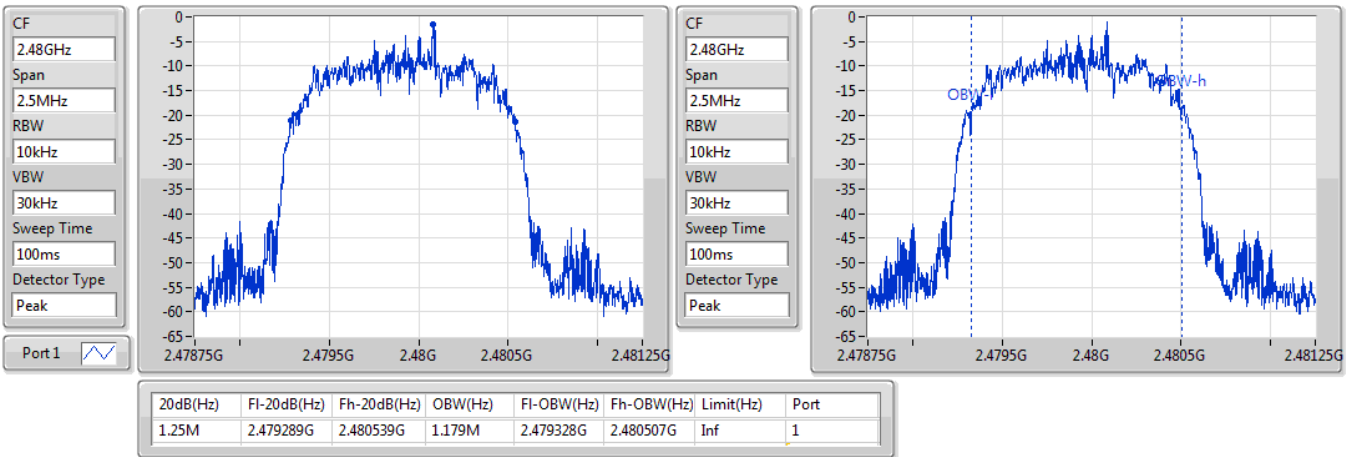


BT-EDR(3Mbps)

2480MHz

EBW

20/05/2020





Summary

Mode	Max-Space (Hz)	Min-Space (Hz)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	1.0005M	997.5k
BT-EDR(2Mbps)	1.0005M	999k
BT-EDR(3Mbps)	1.002M	999k

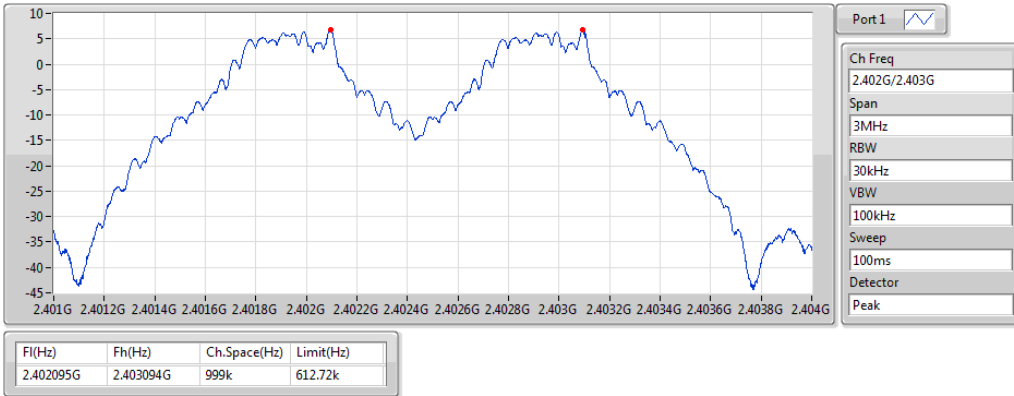
Result

Mode	Result	Fl (Hz)	Fh (Hz)	Ch.Space (Hz)	Limit (Hz)
BT-BR(1Mbps)	-	-	-	-	-
2402MHz	Pass	2.402095G	2.403094G	999k	612.72k
2440MHz	Pass	2.440095G	2.441093G	997.5k	612.72k
2480MHz	Pass	2.479092G	2.480093G	1.0005M	612.72k
BT-EDR(2Mbps)	-	-	-	-	-
2402MHz	Pass	2.4021G	2.4031G	1.0005M	809.856k
2440MHz	Pass	2.440103G	2.441102G	999k	811.188k
2480MHz	Pass	2.479101G	2.480102G	1.0005M	812.52k
BT-EDR(3Mbps)	-	-	-	-	-
2402MHz	Pass	2.402097G	2.403096G	999k	831.168k
2440MHz	Pass	2.440083G	2.441084G	1.0005M	831.168k
2480MHz	Pass	2.47908G	2.480082G	1.002M	832.5k

BT-BR(1Mbps)

2.402G/2.403GHz

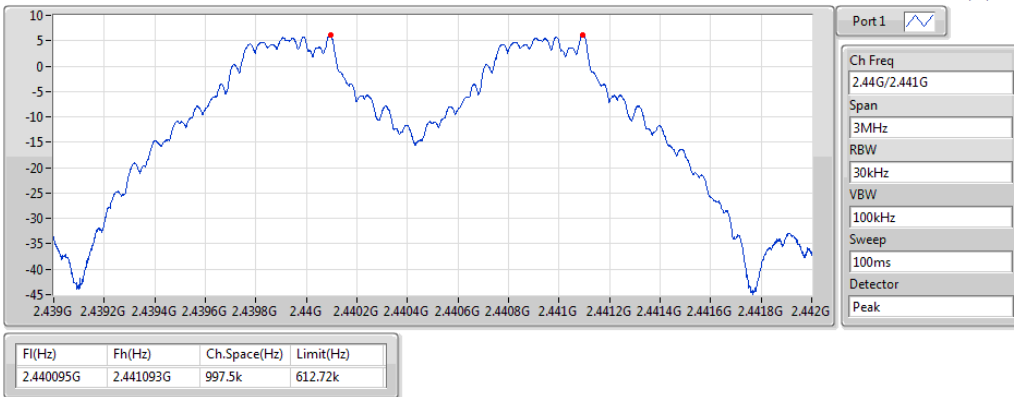
Channel Separation



BT-BR(1Mbps)

2.44G/2.441GHz

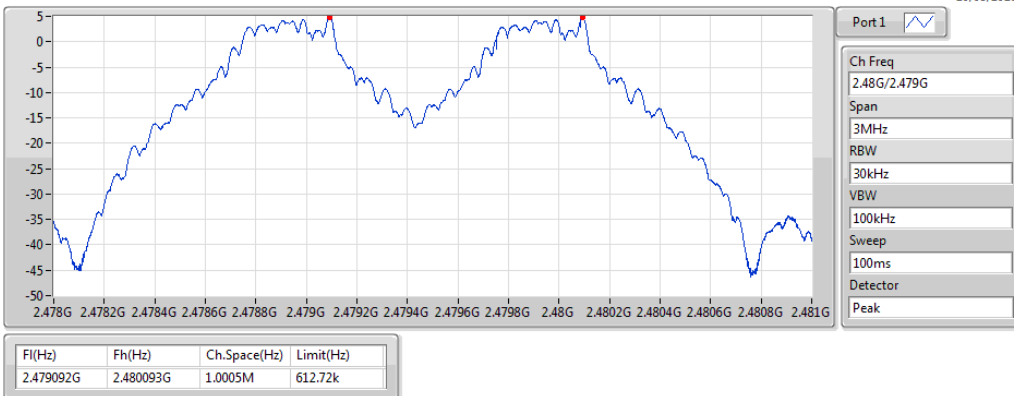
Channel Separation



BT-BR(1Mbps)

2.48G/2.479GHz

Channel Separation

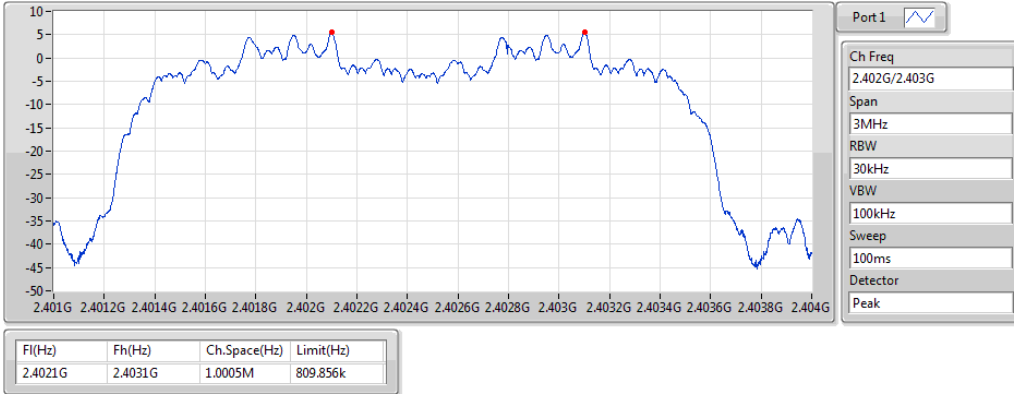


BT-EDR(2Mbps)

2.402G/2.403GHz

Channel Separation

20/05/2020

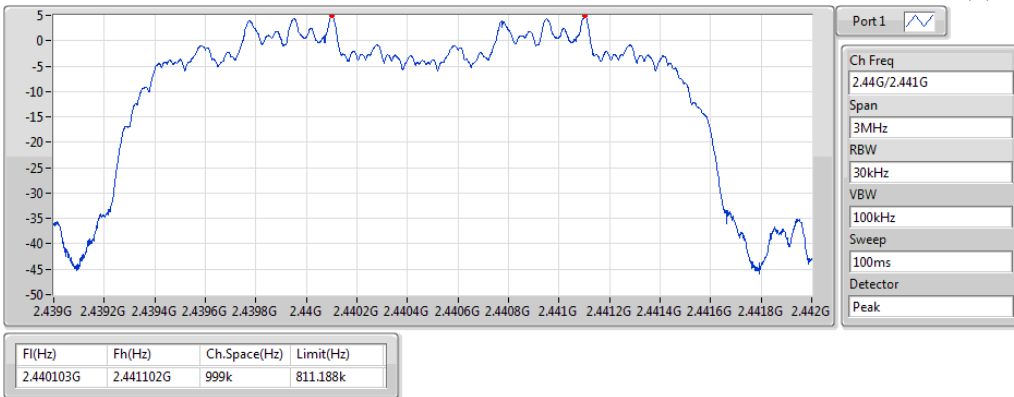


BT-EDR(2Mbps)

2.44G/2.441GHz

Channel Separation

20/05/2020

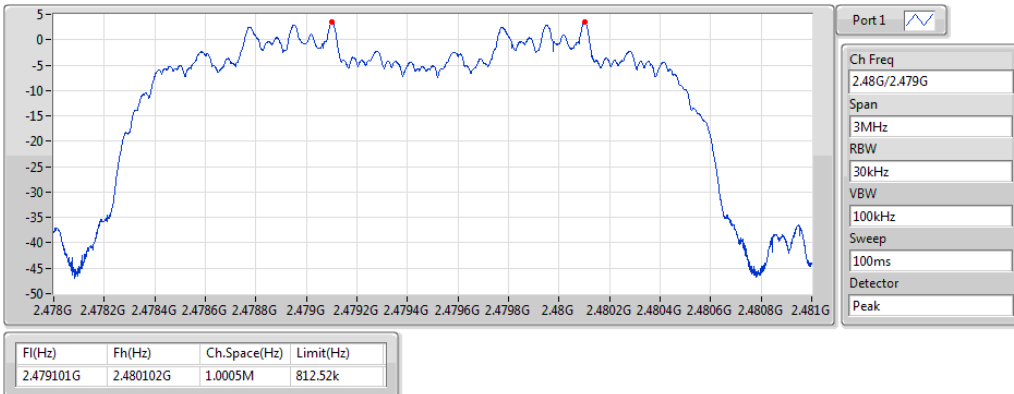


BT-EDR(2Mbps)

2.48G/2.479GHz

Channel Separation

20/05/2020

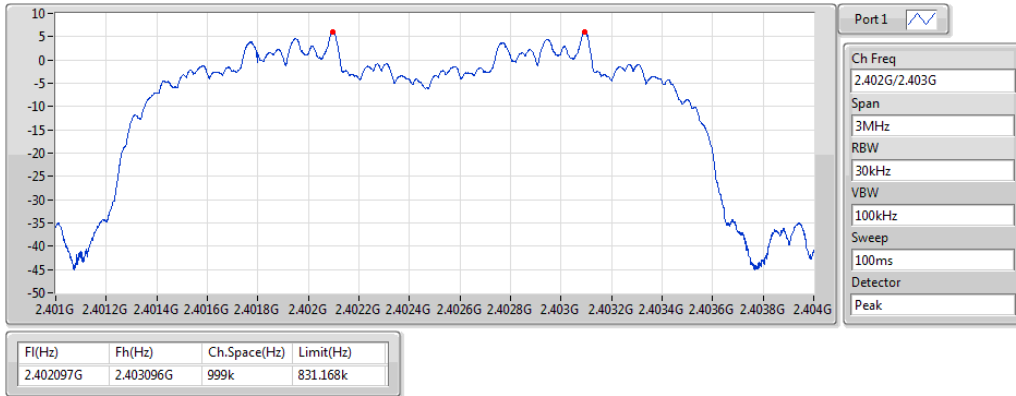


BT-EDR(3Mbps)

2.402G/2.403GHz

Channel Separation

20/05/2020

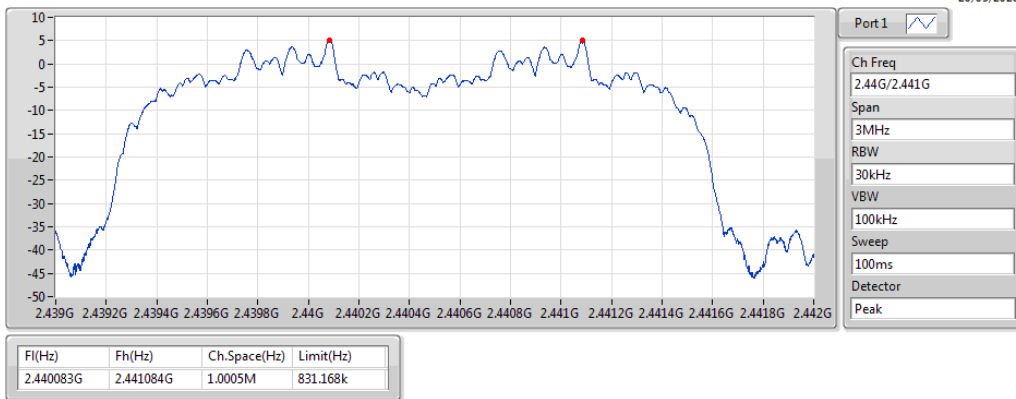


BT-EDR(3Mbps)

2.44G/2.441GHz

Channel Separation

20/05/2020

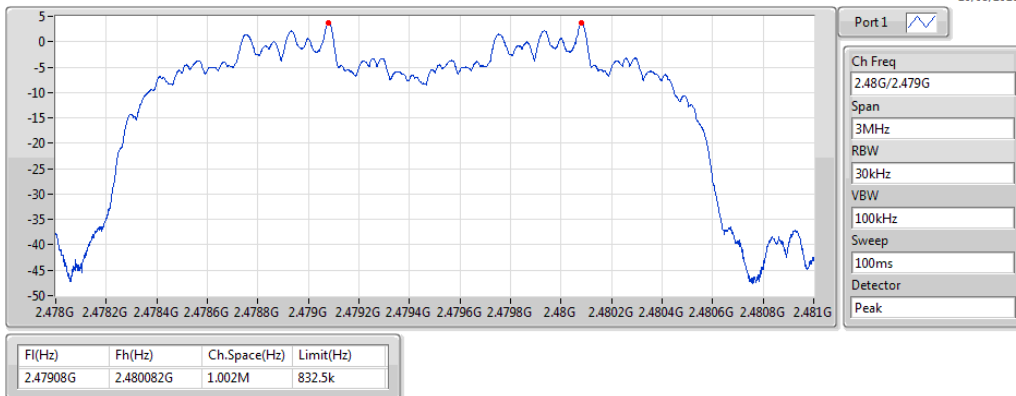


BT-EDR(3Mbps)

2.48G/2.479GHz

Channel Separation

20/05/2020





Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	9.00	0.00794
BT-EDR(2Mbps)	6.55	0.00452
BT-EDR(3Mbps)	6.28	0.00425

**Result**

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	4.00	9.00	21.00
2440MHz	Pass	4.00	8.51	21.00
2480MHz	Pass	4.00	7.07	21.00
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	4.00	6.55	21.00
2440MHz	Pass	4.00	6.09	21.00
2480MHz	Pass	4.00	4.60	21.00
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	4.00	6.28	21.00
2440MHz	Pass	4.00	6.06	21.00
2480MHz	Pass	4.00	4.22	21.00

DG = Directional Gain; **Port X** = Port X output power



Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	9.28	0.00847
BT-EDR(2Mbps)	9.53	0.00897
BT-EDR(3Mbps)	9.79	0.00953

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	4.00	9.28	21.00
2440MHz	Pass	4.00	8.80	21.00
2480MHz	Pass	4.00	7.38	21.00
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	4.00	9.53	21.00
2440MHz	Pass	4.00	9.01	21.00
2480MHz	Pass	4.00	7.57	21.00
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	4.00	9.79	21.00
2440MHz	Pass	4.00	9.17	21.00
2480MHz	Pass	4.00	7.67	21.00

DG = Directional Gain; **Port X** = Port X output power

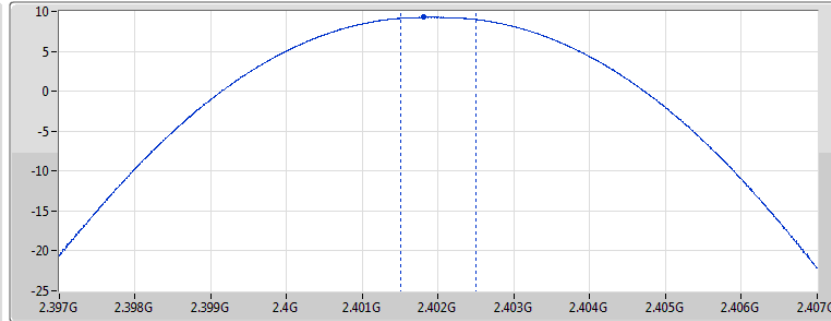
BT-BR(1Mbps)

PK Power

2402MHz

20/05/2020

CF
2.402GHz
Span
10MHz
RBW
3MHz
VBW
10MHz
Sweep Time
20ms
Detector Type
Peak
CP BW
NaNHz



Port1

Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)
9.28	9.28

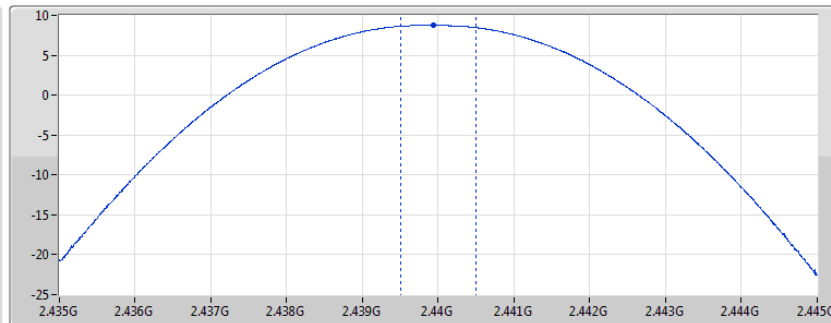
BT-BR(1Mbps)

PK Power

2440MHz

20/05/2020

CF
2.44GHz
Span
10MHz
RBW
3MHz
VBW
10MHz
Sweep Time
20ms
Detector Type
Peak
CP BW
NaNHz



Port1

Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)
8.80	8.80

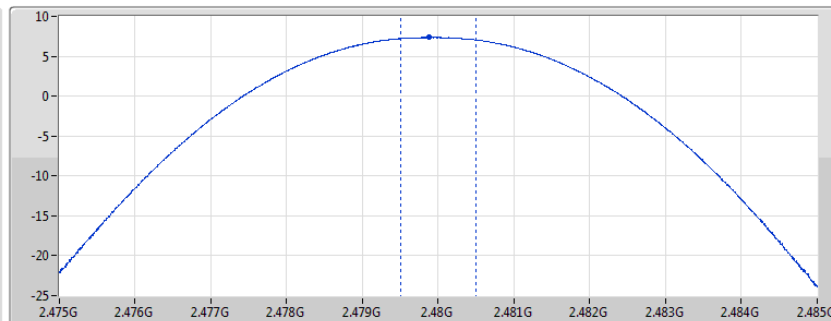
BT-BR(1Mbps)

PK Power

2480MHz

20/05/2020

CF
2.48GHz
Span
10MHz
RBW
3MHz
VBW
10MHz
Sweep Time
20ms
Detector Type
Peak
CP BW
NaNHz



Port1

Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)
7.38	7.38

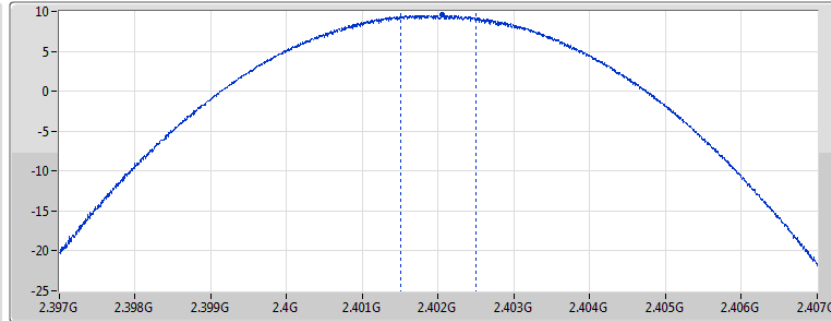
BT-EDR(2Mbps)

PK Power

2402MHz

20/05/2020

CF
2.402GHz
Span
10MHz
RBW
3MHz
VBW
10MHz
Sweep Time
20ms
Detector Type
Peak
CP BW
NaNHz



Port1

Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)
9.53	9.53

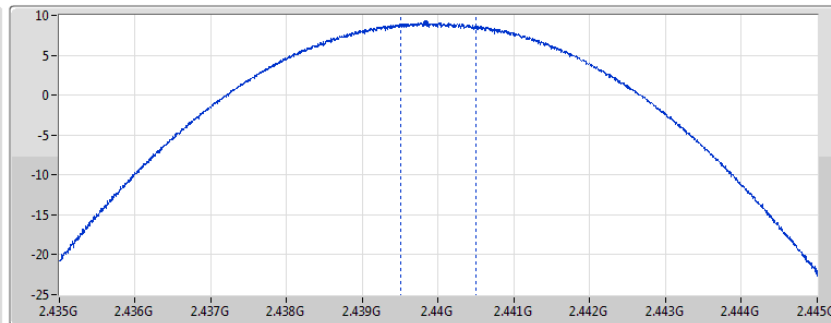
BT-EDR(2Mbps)

PK Power

2440MHz

20/05/2020

CF
2.44GHz
Span
10MHz
RBW
3MHz
VBW
10MHz
Sweep Time
20ms
Detector Type
Peak
CP BW
NaNHz



Port1

Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)
9.01	9.01

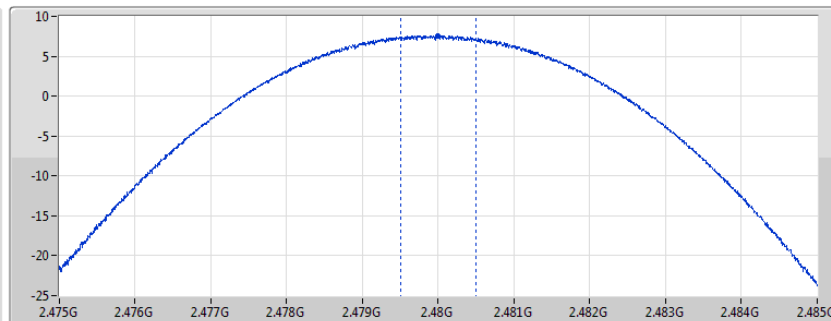
BT-EDR(2Mbps)

PK Power

2480MHz

20/05/2020

CF
2.48GHz
Span
10MHz
RBW
3MHz
VBW
10MHz
Sweep Time
20ms
Detector Type
Peak
CP BW
NaNHz



Port1

Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)
7.57	7.57

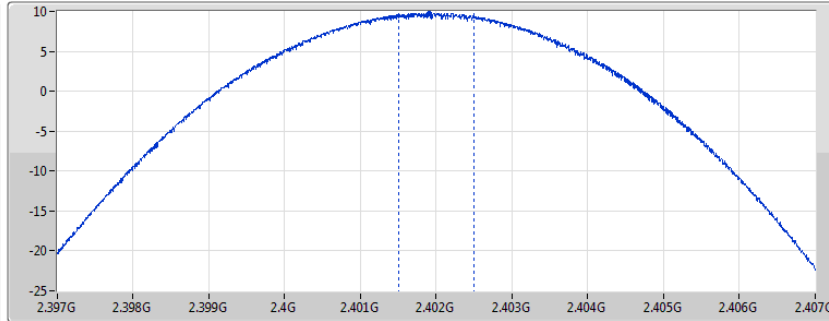
BT-EDR(3Mbps)

PK Power

2402MHz

20/05/2020

CF
2.402GHz
Span
10MHz
RBW
3MHz
VBW
10MHz
Sweep Time
20ms
Detector Type
Peak
CP BW
NaNHz



Port1

Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)
9.79	9.79

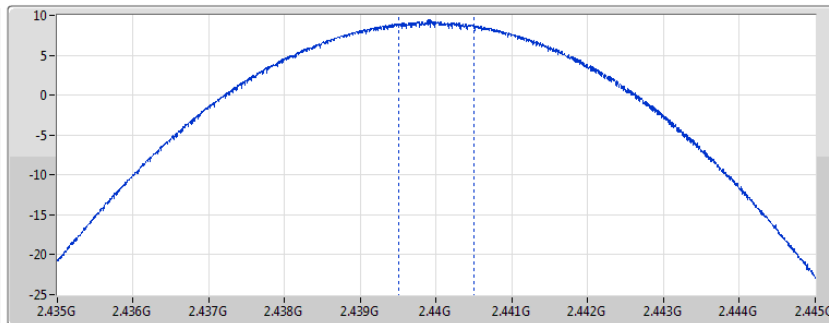
BT-EDR(3Mbps)

PK Power

2440MHz

20/05/2020

CF
2.44GHz
Span
10MHz
RBW
3MHz
VBW
10MHz
Sweep Time
20ms
Detector Type
Peak
CP BW
NaNHz



Port1

Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)
9.17	9.17

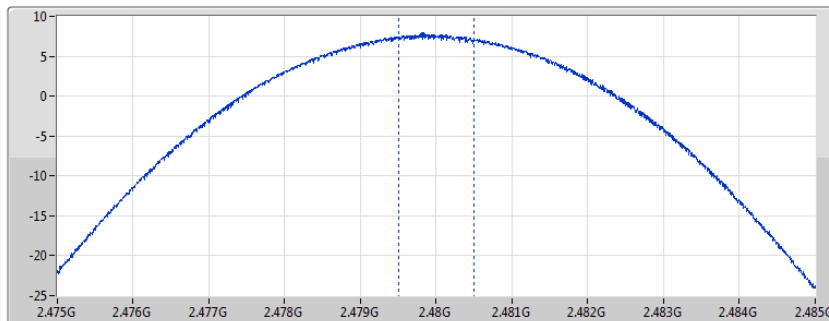
BT-EDR(3Mbps)

PK Power

2480MHz

20/05/2020

CF
2.48GHz
Span
10MHz
RBW
3MHz
VBW
10MHz
Sweep Time
20ms
Detector Type
Peak
CP BW
NaNHz



Port1

Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)
7.67	7.67



Summary

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

Result

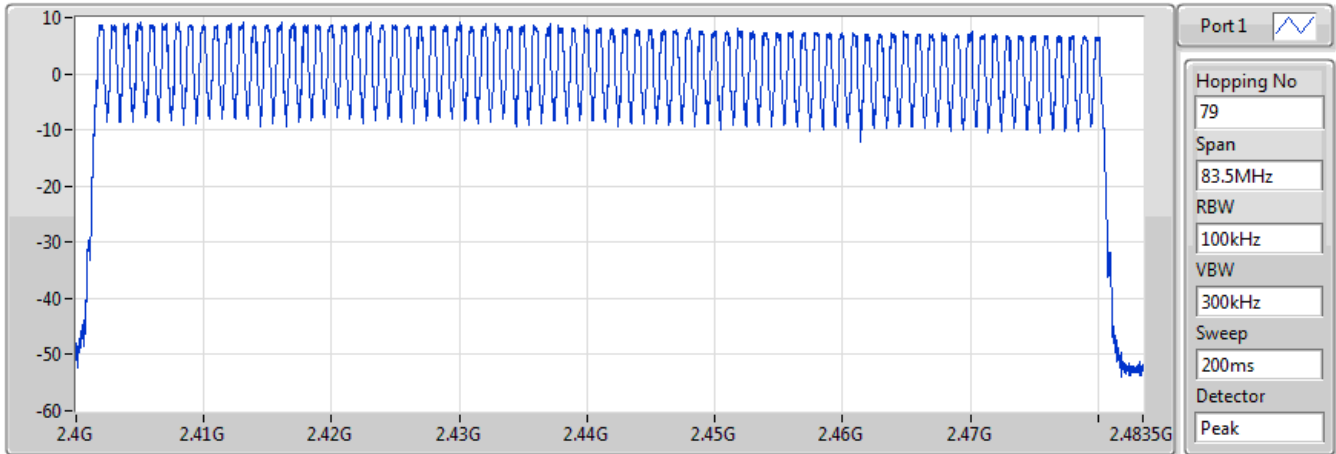
Mode	Result	Hopping No	Limit
BT-BR(1Mbps)	-	-	-
2440MHz	Pass	79	15
BT-EDR(2Mbps)	-	-	-
2440MHz	Pass	79	15
BT-EDR(3Mbps)	-	-	-
2440MHz	Pass	79	15

BT-BR(1Mbps)

2440MHz

Hopping Ch

20/05/2020



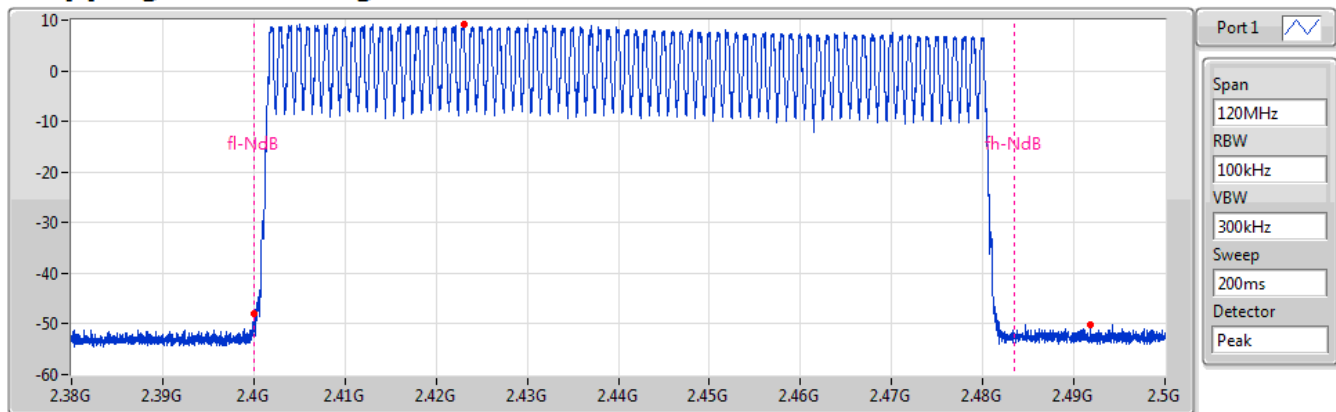
Hopping No	Limit
79	15

BT-BR(1Mbps)

2440MHz

Hopping Ch Bandedge (Non-restricted Band)

20/05/2020



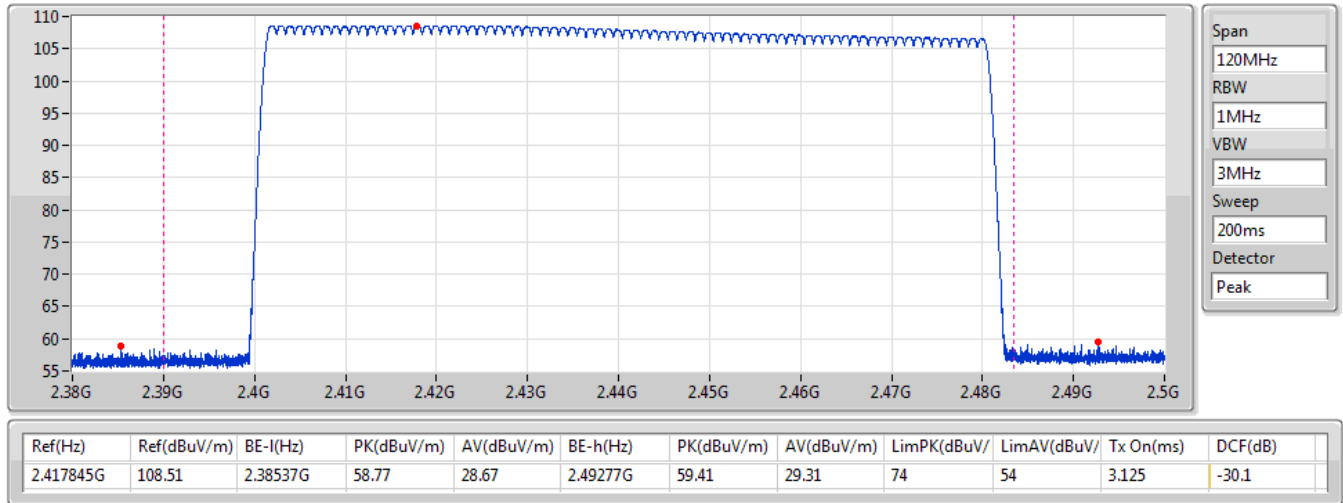
Limit(dBm)	Ref(Hz)	Ref(dBm)	BE-l(Hz)	BE-l(dBm)	BE-h(Hz)	BE-h(dBm)
-10.8	2.42308G	9.2	2.399995G	-48.01	2.49175G	-50.03

BT-BR(1Mbps)

2440MHz

Hopping Ch Bandedge (Restricted Band)

20/05/2020

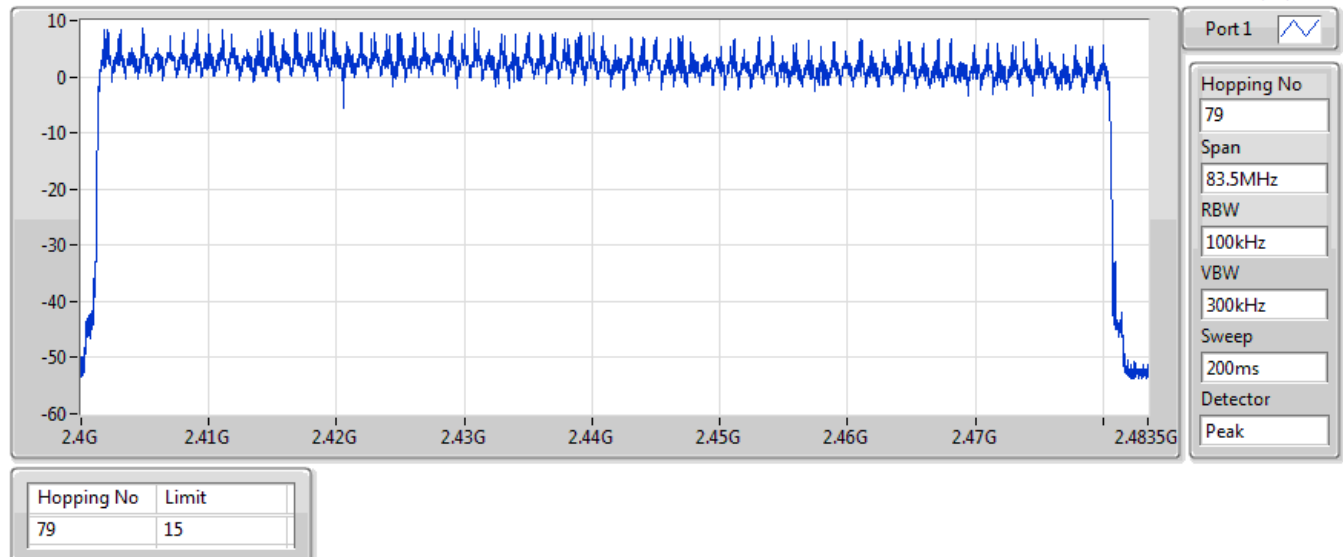


BT-EDR(2Mbps)

2440MHz

Hopping Ch

20/05/2020

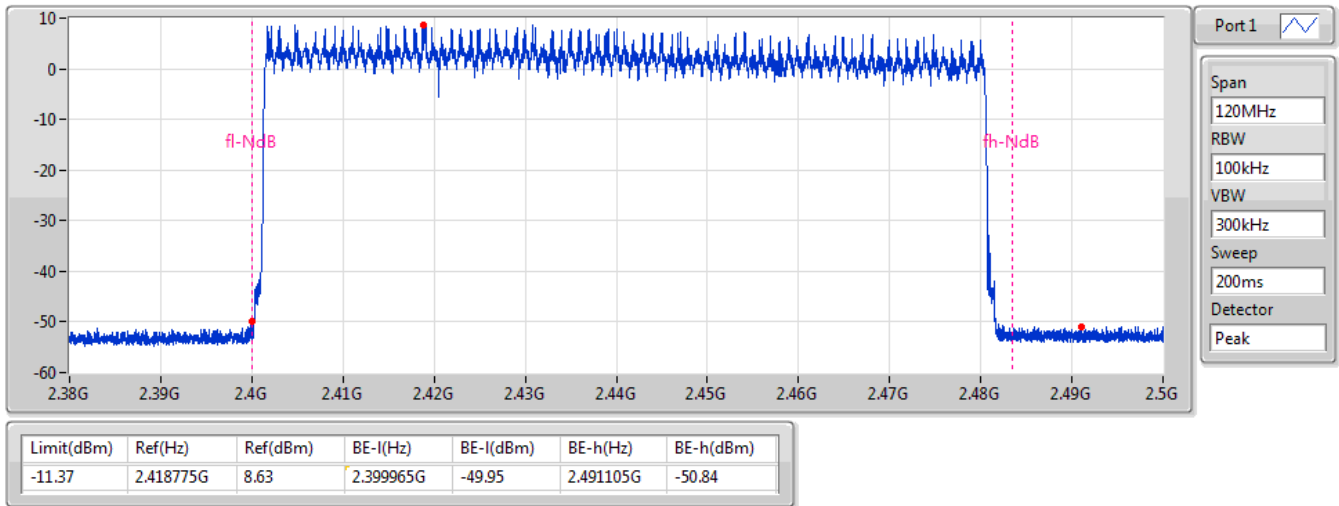


BT-EDR(2Mbps)

2440MHz

Hopping Ch Bandedge (Non-restricted Band)

20/05/2020

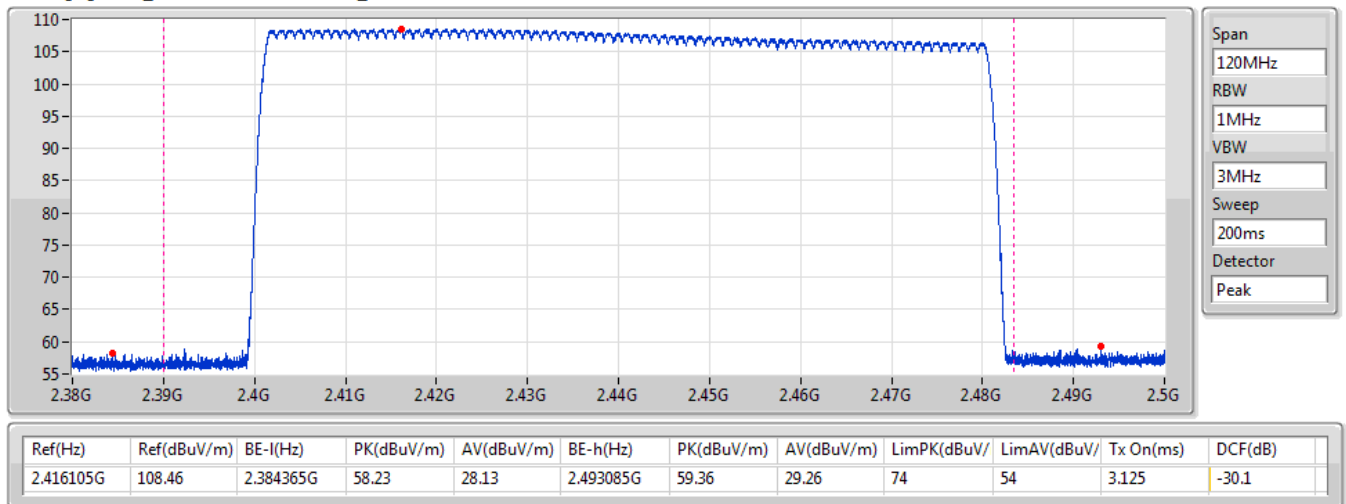


BT-EDR(2Mbps)

2440MHz

Hopping Ch Bandedge (Restricted Band)

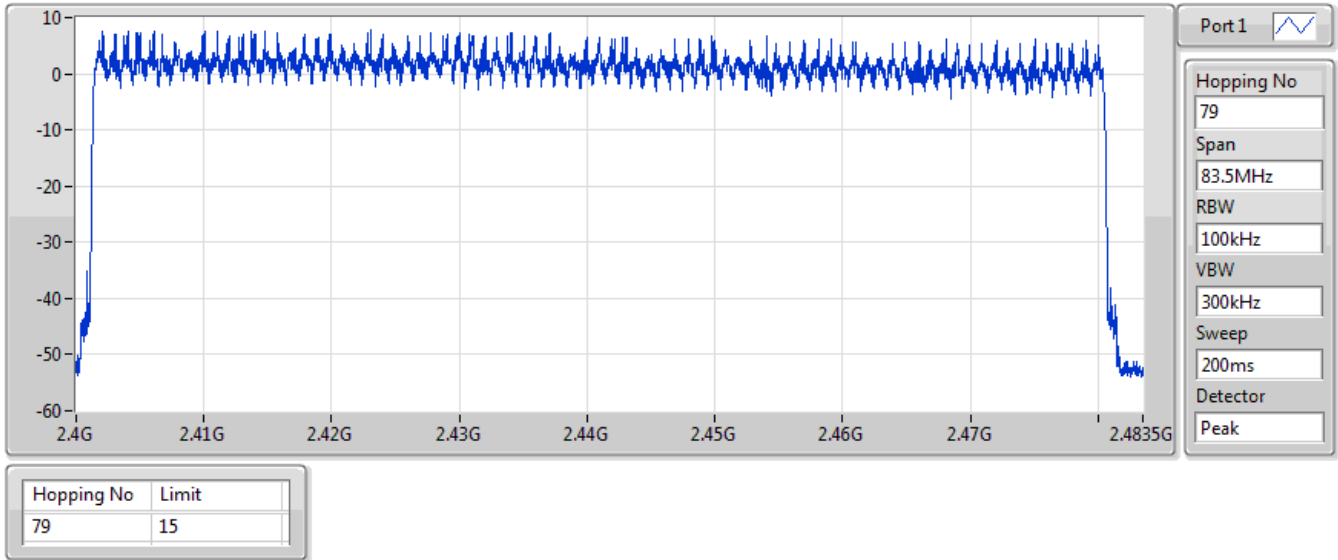
20/05/2020



BT-EDR(3Mbps) 2440MHz

Hopping Ch

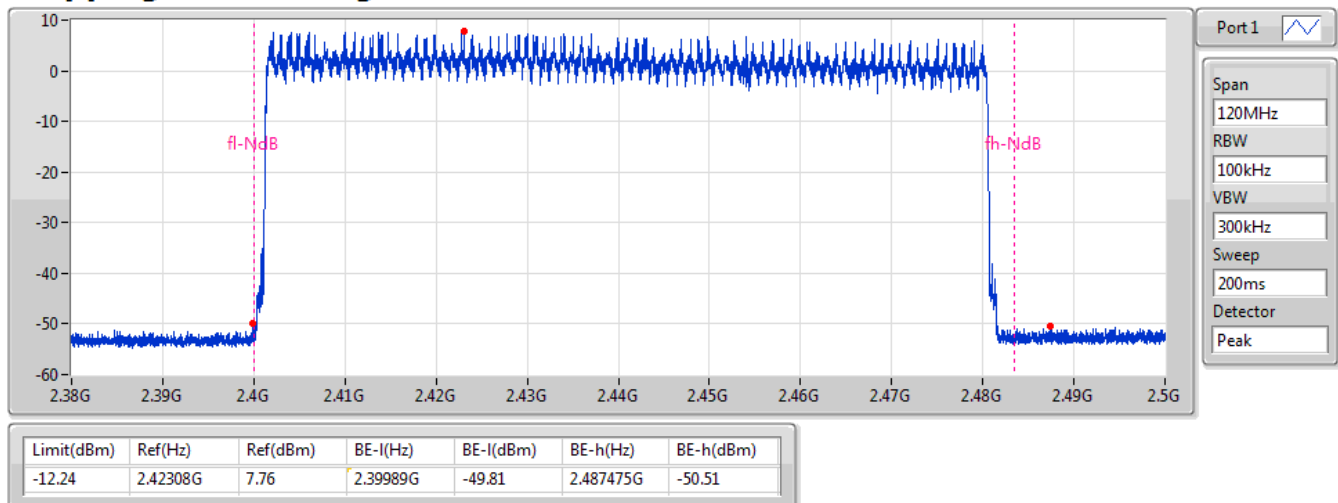
20/05/2020



BT-EDR(3Mbps) 2440MHz

Hopping Ch Bandedge (Non-restricted Band)

20/05/2020

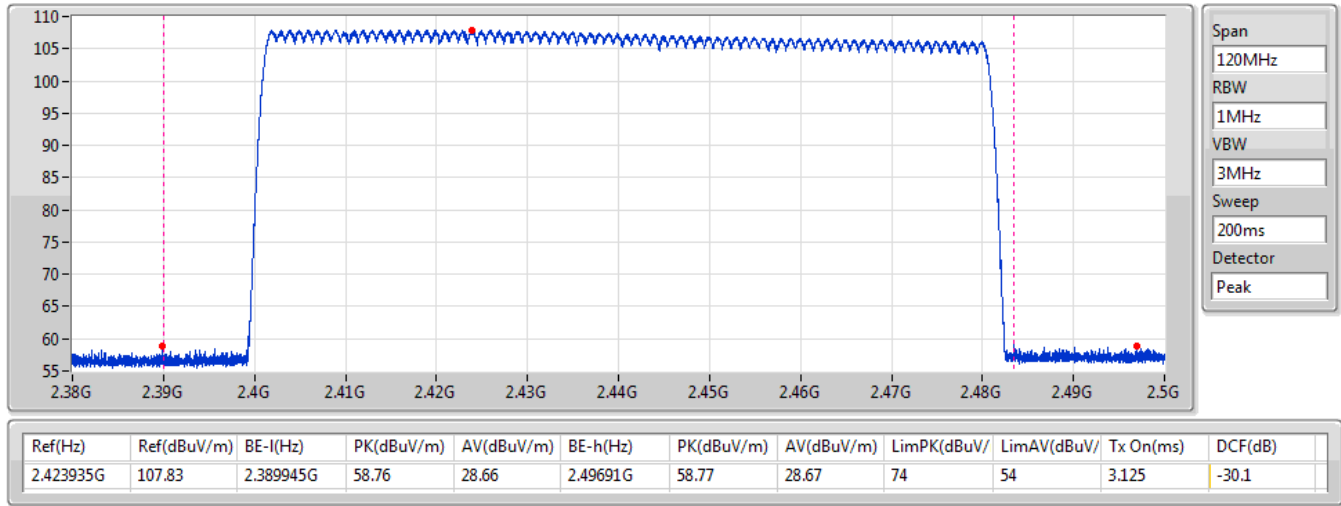


BT-EDR(3Mbps)

2440MHz

Hopping Ch Bandedge (Restricted Band)

20/05/2020





Summary

Mode	Max-Dwell (s)
2.4-2.4835GHz	-
BT-BR(1Mbps)	306.9014m
BT-EDR(2Mbps)	307.2212m
BT-EDR(3Mbps)	307.4344m

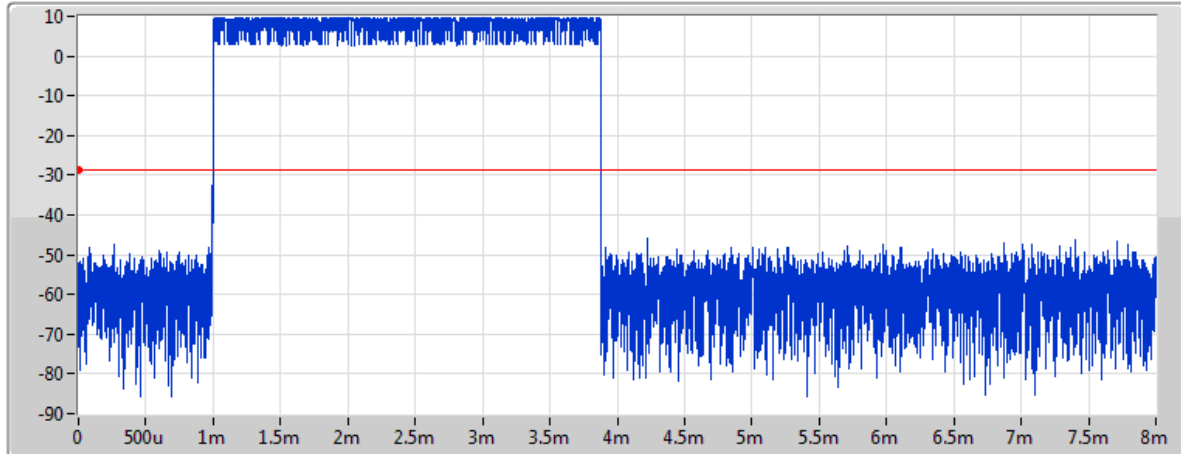
Result

Mode	Result	Period (s)	Dwell (s)	Limit (s)	Tx On (s)
BT-BR(1Mbps)	-	-	-	-	-
2440MHz	Pass	31.6	306.9014m	400m	2.879m
BT-EDR(2Mbps)	-	-	-	-	-
2440MHz	Pass	31.6	307.2212m	400m	2.882m
BT-EDR(3Mbps)	-	-	-	-	-
2440MHz	Pass	31.6	307.4344m	400m	2.884m

BT-BR(1Mbps)

2440MHz

20/05/2020



Port1

Ch Freq

2.44GHz

RBW

300kHz

VBW

1MHz

Sweep Time

8ms

TX Time

2.879ms

non AFH Mode

Period(s)	Dwell(s)	Limit(s)	Tx On(s)
31.6	306.9014m	400m	2.879m

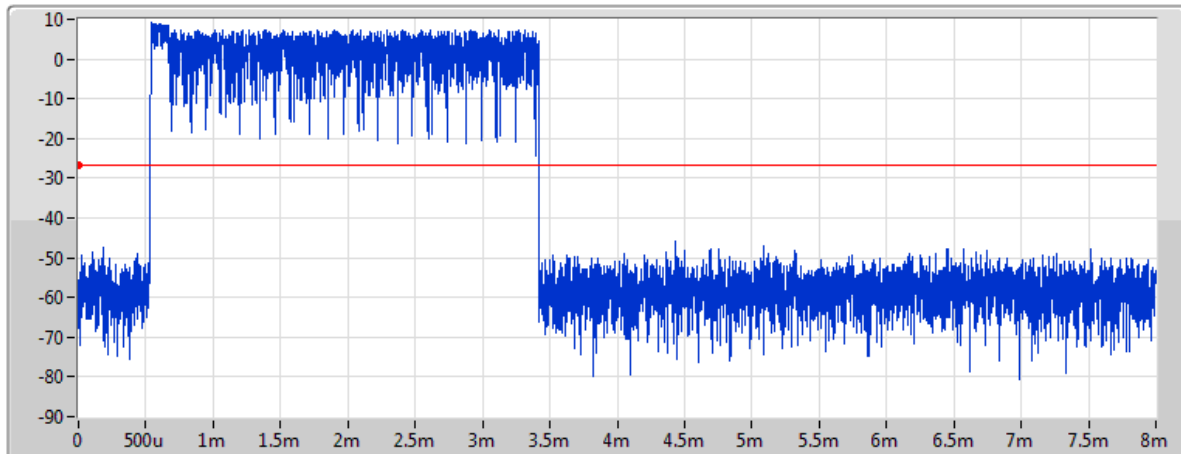
AFH Mode

Period(s)	Dwell(s)	Limit(s)	Tx On(s)
8	153.4507m	400m	2.879m

BT-EDR(2Mbps)

2440MHz

20/05/2020



Port1

Ch Freq

2.44GHz

RBW

300kHz

VBW

1MHz

Sweep Time

8ms

TX Time

2.882ms

non AFH Mode

Period(s)	Dwell(s)	Limit(s)	Tx On(s)
31.6	307.2212m	400m	2.882m

AFH Mode

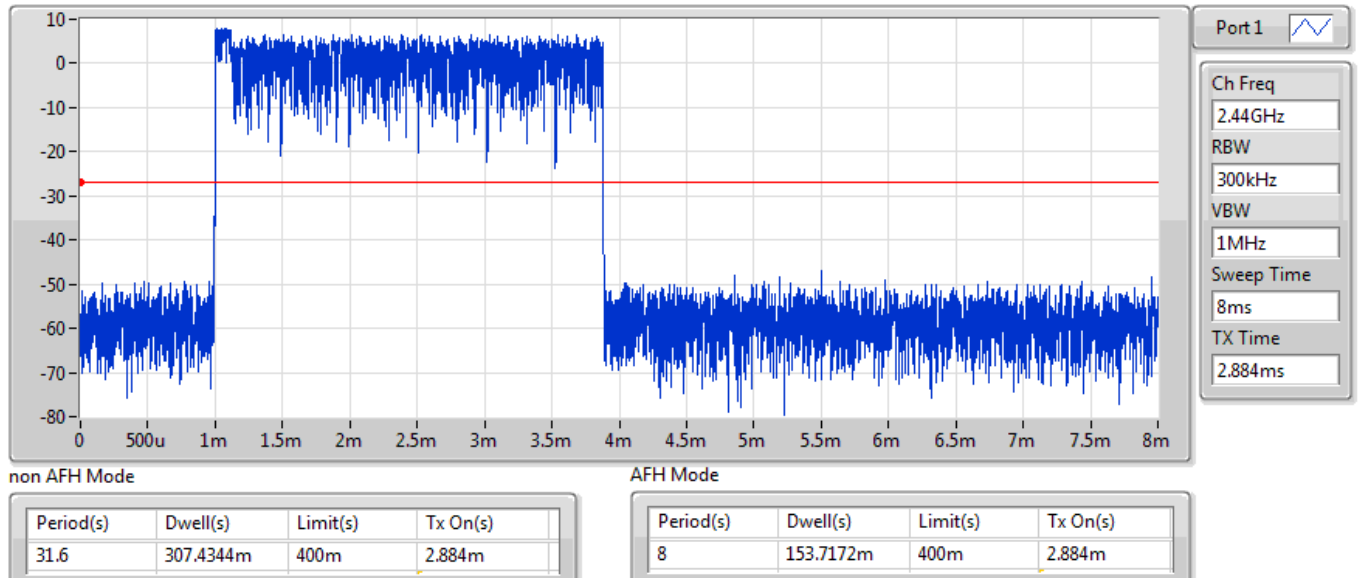
Period(s)	Dwell(s)	Limit(s)	Tx On(s)
8	153.6106m	400m	2.882m

BT-EDR(3Mbps)

2440MHz

20/05/2020

Dwell



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)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-BR(1Mbps)	Pass	2.40209G	8.83	-11.17	1.65179G	-52.84	2.39985G	-49.17	2.4G	-51.29	2.48693G	-51.54	24.57538G	-42.42	1
BT-EDR(2Mbps)	Pass	2.40175G	8.13	-11.87	2.01164G	-52.91	2.4G	-49.84	2.4G	-48.46	2.49167G	-51.27	16.29667G	-42.76	1
BT-EDR(3Mbps)	Pass	2.48003G	5.01	-14.99	749.69M	-52.72	2.39171G	-51.85	2.4835G	-53.76	2.49382G	-50.87	23.58834G	-42.37	1

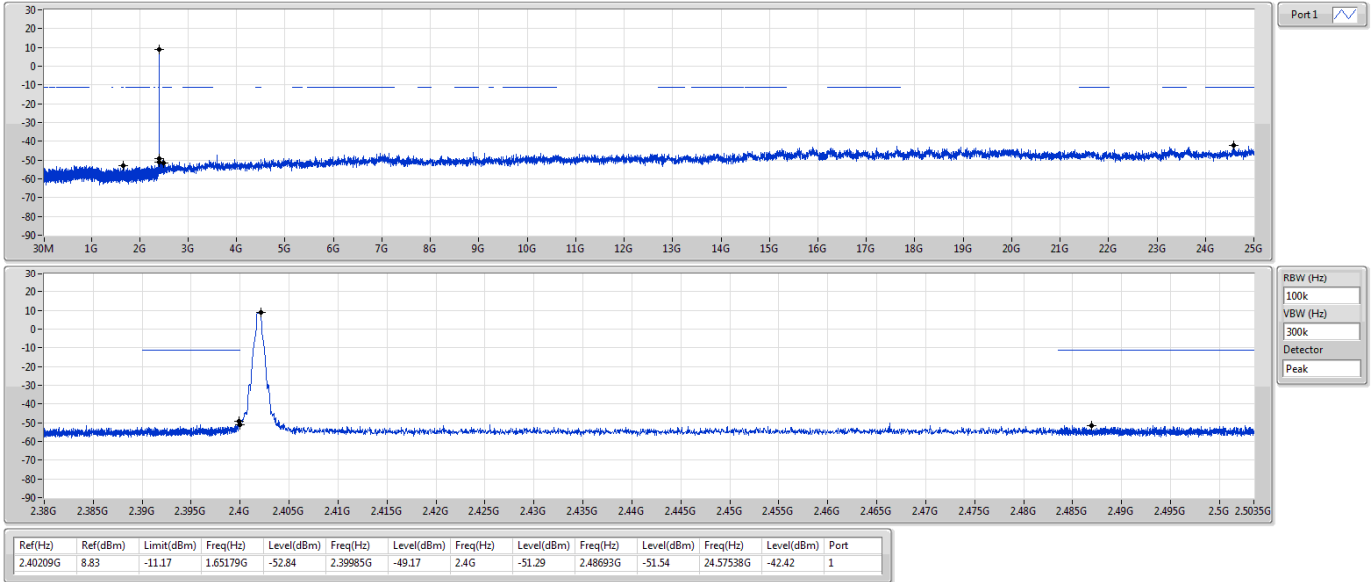
Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
BT-BR(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.40209G	8.83	-11.17	1.65179G	-52.84	2.39985G	-49.17	2.4G	-51.29	2.48693G	-51.54	24.57538G	-42.42	1
2440MHz	Pass	2.44G	8.05	-11.95	892.45M	-51.95	2.39701G	-51.62	2.4835G	-55.00	2.50255G	-51.32	24.68786G	-42.81	1
2480MHz	Pass	2.48012G	7.14	-12.86	789.05M	-52.27	2.39169G	-51.94	2.4835G	-53.67	2.48651G	-51.03	23.32963G	-42.89	1
BT-EDR(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.40175G	8.13	-11.87	2.01164G	-52.91	2.4G	-49.84	2.4G	-48.46	2.49167G	-51.27	16.29667G	-42.76	1
2440MHz	Pass	2.44G	7.14	-12.86	712.09M	-52.15	2.39375G	-52.12	2.4G	-53.70	2.49244G	-51.55	17.61834G	-42.05	1
2480MHz	Pass	2.48012G	6.04	-13.96	711.21M	-52.23	2.39751G	-52.37	2.4835G	-53.80	2.49277G	-50.68	17.67739G	-43.04	1
BT-EDR(3Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.40196G	7.67	-12.33	2.30833G	-52.51	2.39987G	-49.14	2.4G	-51.14	2.48592G	-50.87	23.35776G	-42.82	1
2440MHz	Pass	2.44008G	7.41	-12.59	665.97M	-52.53	2.39895G	-52.04	2.4835G	-54.03	2.49067G	-51.47	16.28823G	-41.75	1
2480MHz	Pass	2.48003G	5.01	-14.99	749.69M	-52.72	2.39171G	-51.85	2.4835G	-53.76	2.49382G	-50.87	23.58834G	-42.37	1

BT-BR(1Mbps)

CSE NdB

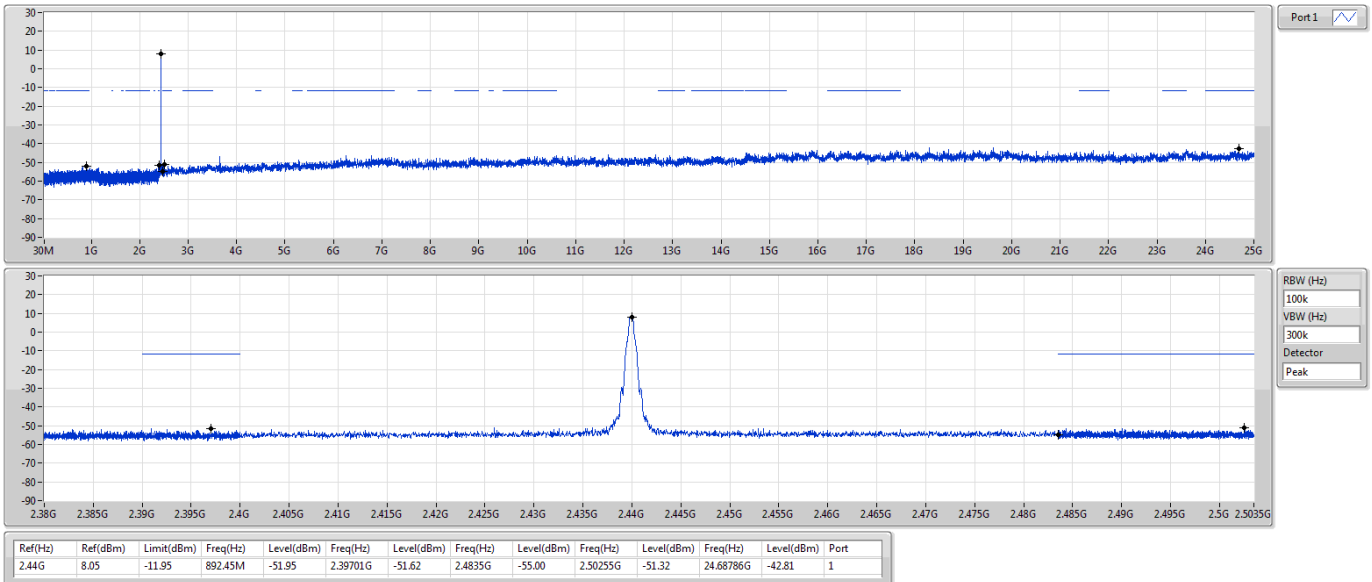
2402MHz



BT-BR(1Mbps)

CSE NdB

2440MHz

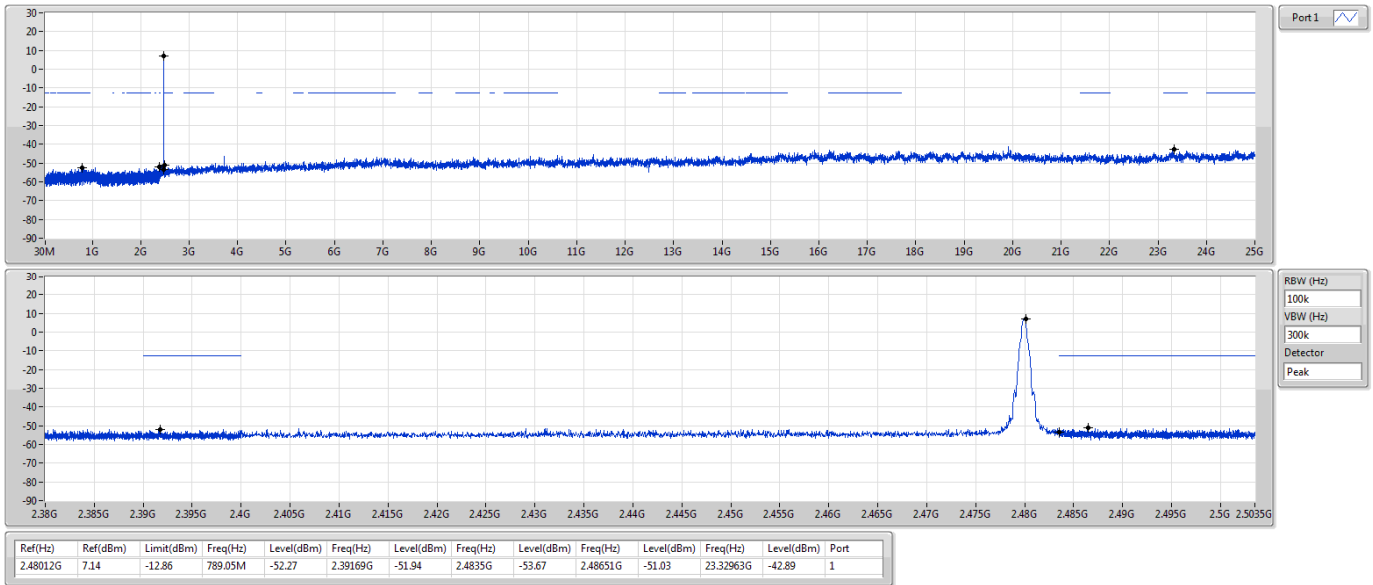


BT-BR(1Mbps)

2480MHz

CSE NdB

20/05/2020

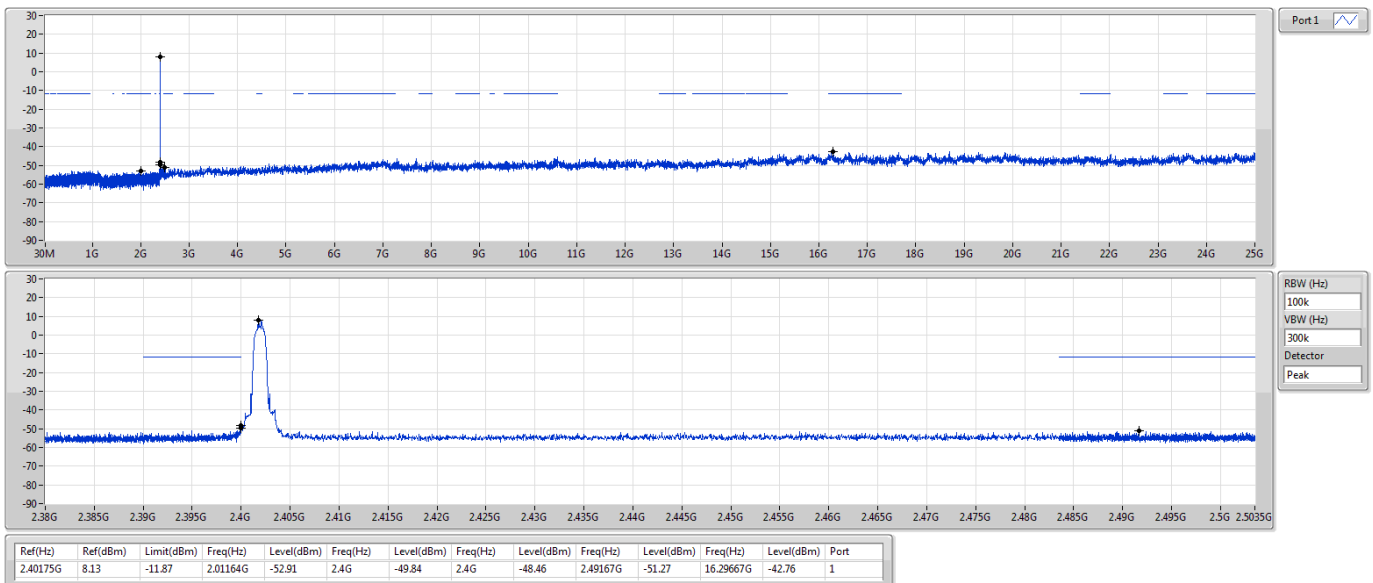


BT-EDR(2Mbps)

2402MHz

CSE NdB

20/05/2020

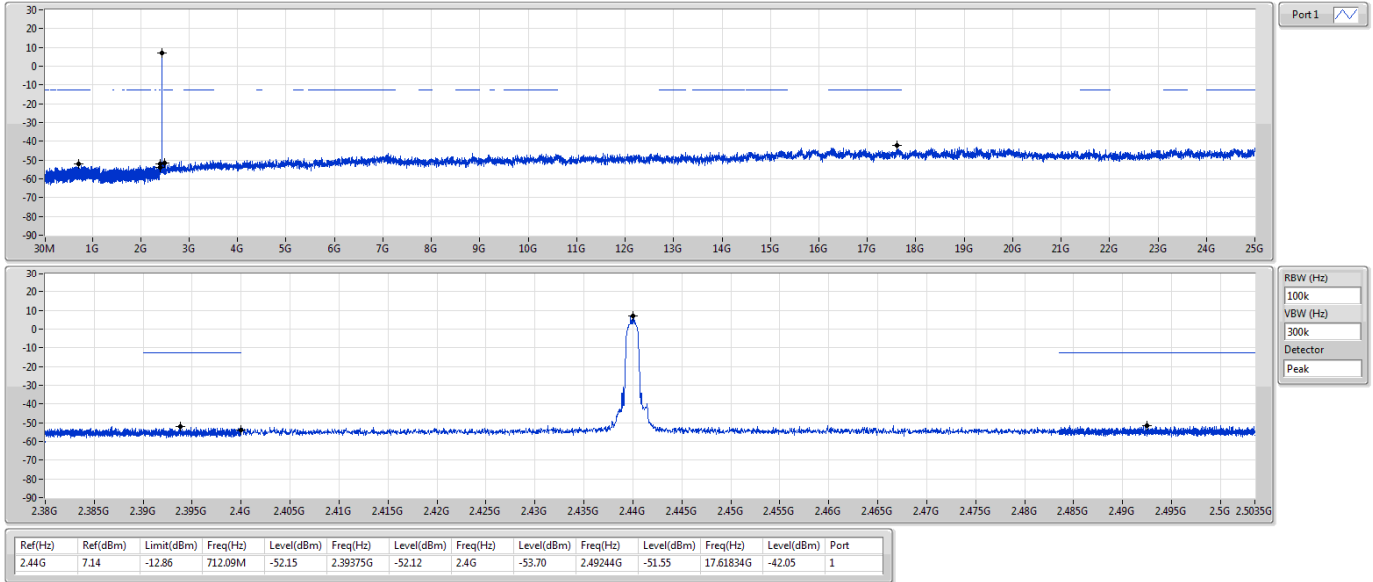


BT-EDR(2Mbps)

2440MHz

CSE NdB

20/05/2020

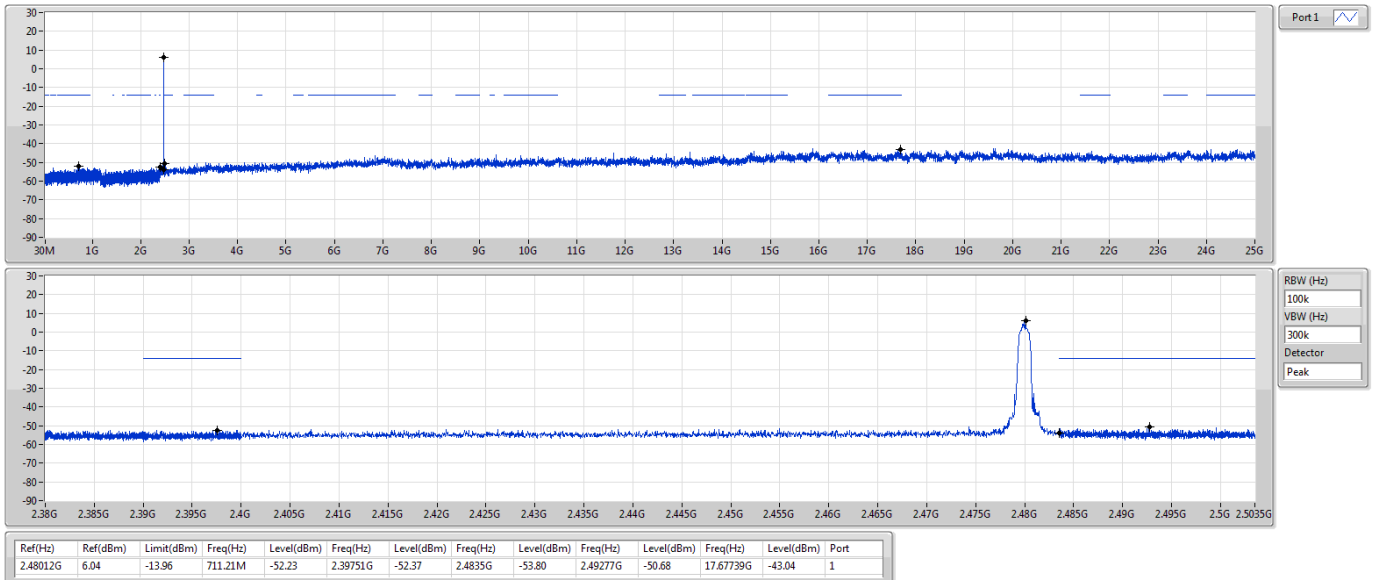


BT-EDR(2Mbps)

2480MHz

CSE NdB

20/05/2020

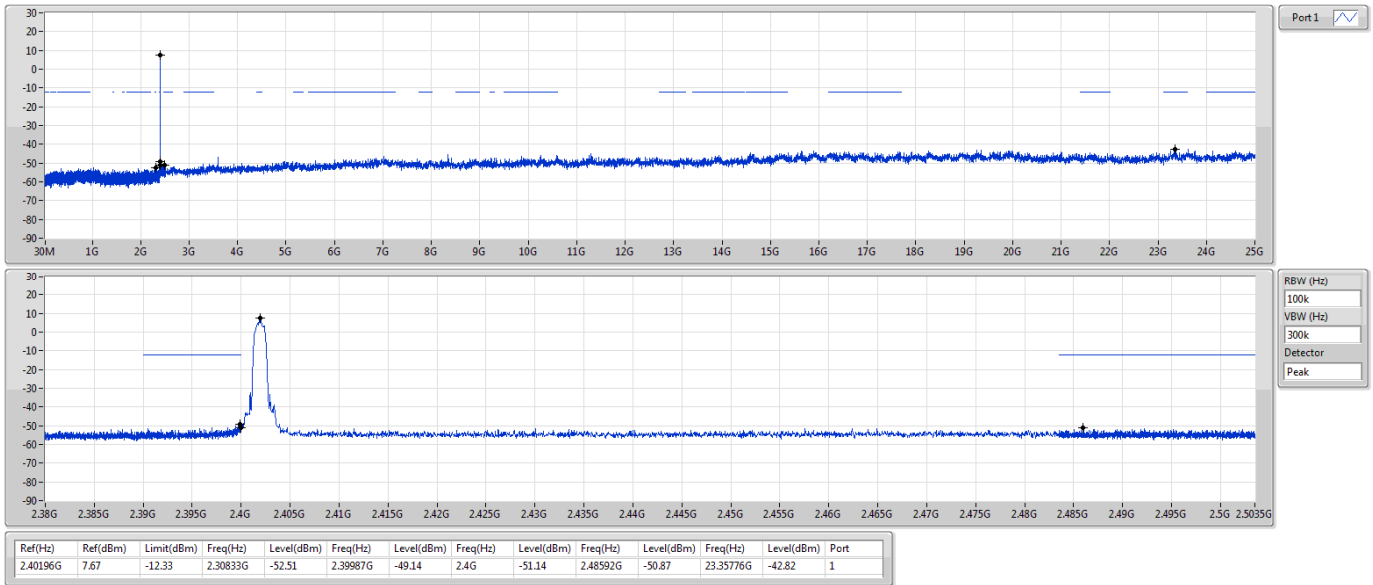


BT-EDR(3Mbps)

2402MHz

CSE NdB

20/05/2020

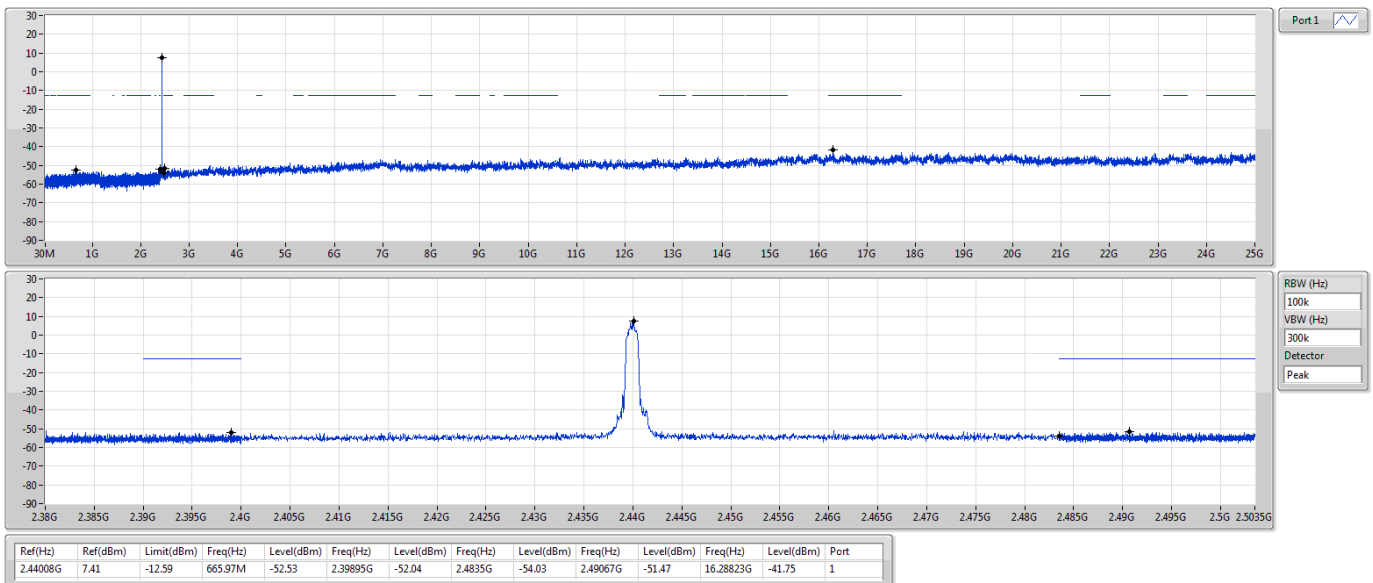


BT-EDR(3Mbps)

2440MHz

CSE NdB

20/05/2020



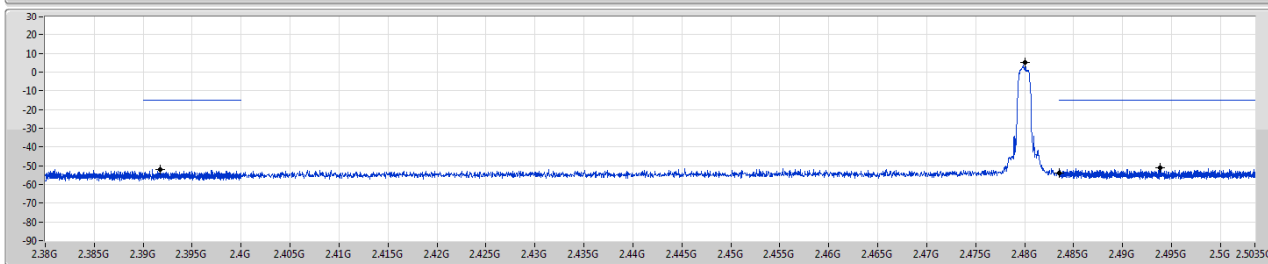
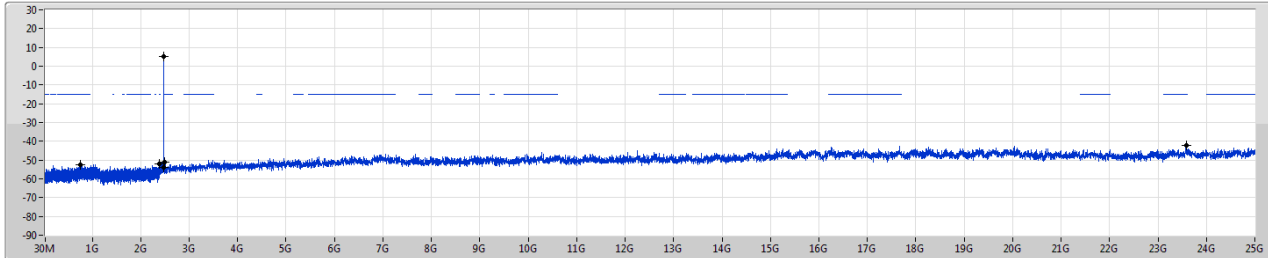
BT-EDR(3Mbps)

2480MHz

CSE NdB

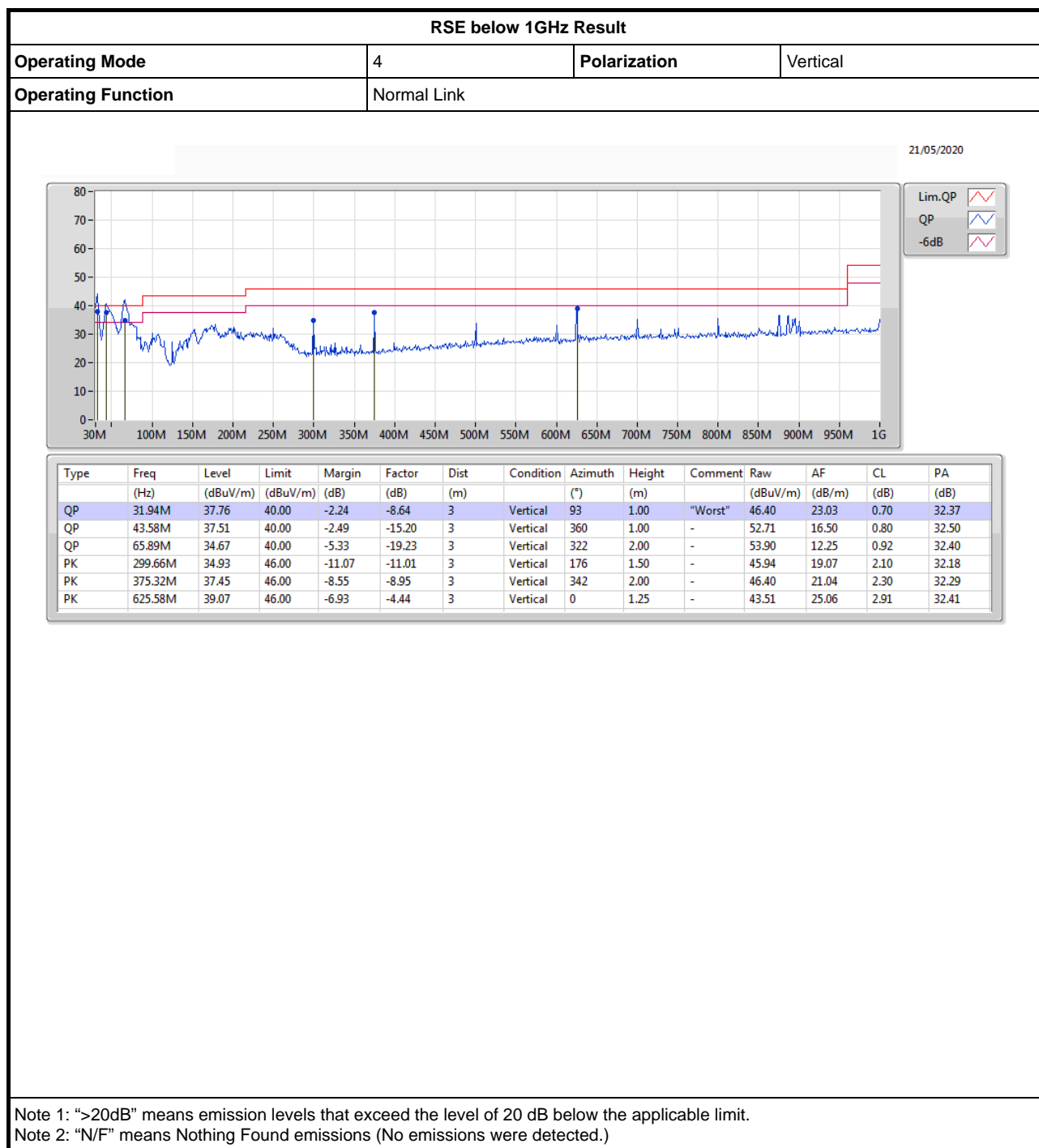
20/05/2020

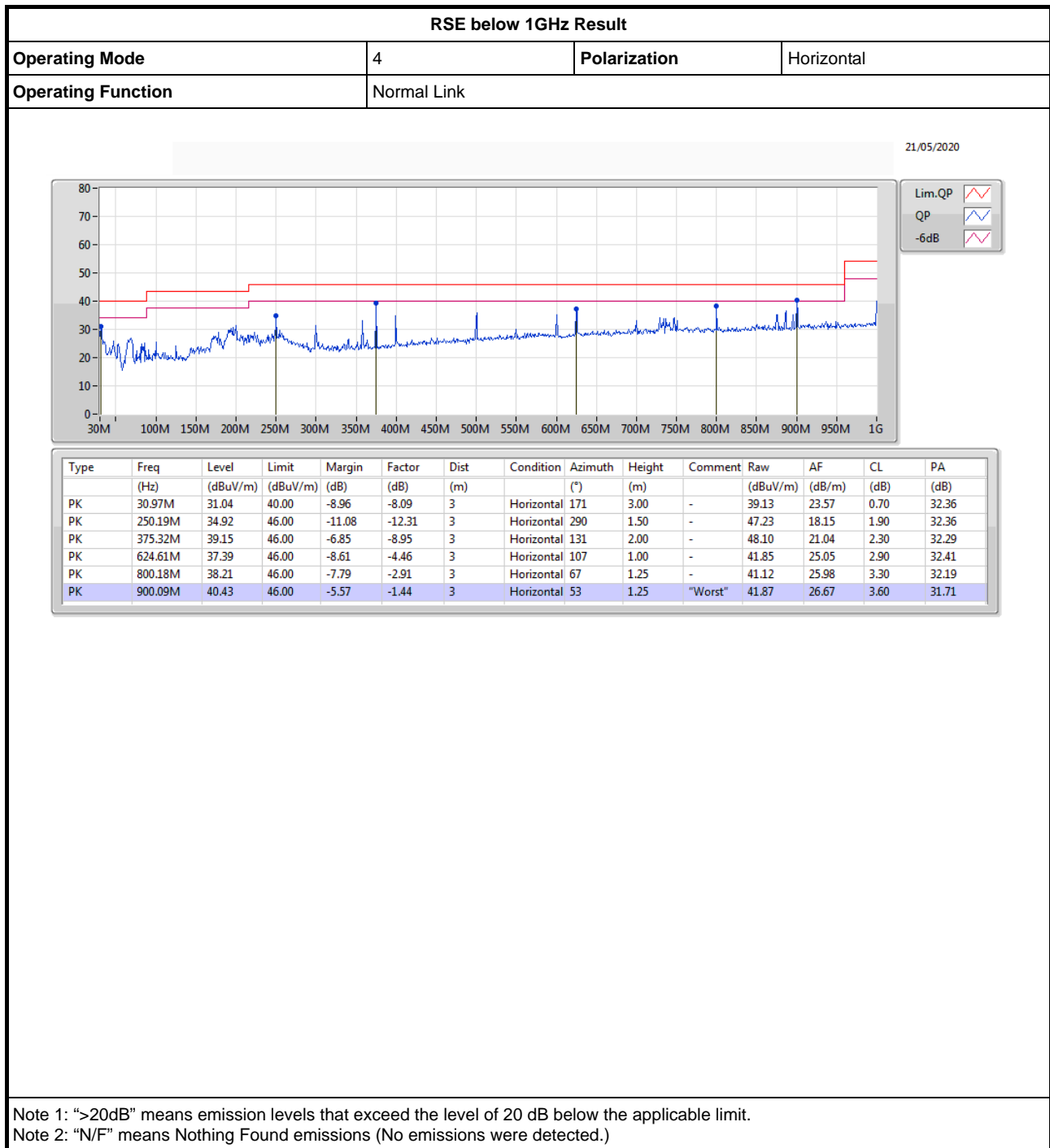
Port 1



RBW (Hz)
100k
VBW (Hz)
300k
Detector
Peak

Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.48003G	5.01	-14.99	749.69M	-52.72	2.39171G	-51.85	2.4835G	-53.76	2.49382G	-50.87	23.58834G	-42.37	1







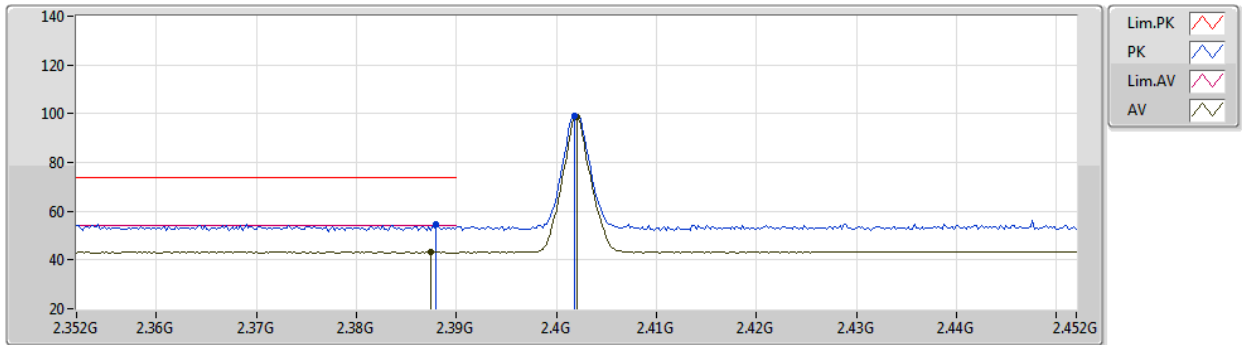
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-BR(1Mbps)	Pass	AV	7.43973G	48.87	54.00	-5.13	3	Horizontal	126	1.53	-

BT-BR(1Mbps)

2402MHz_TX

19/05/2020



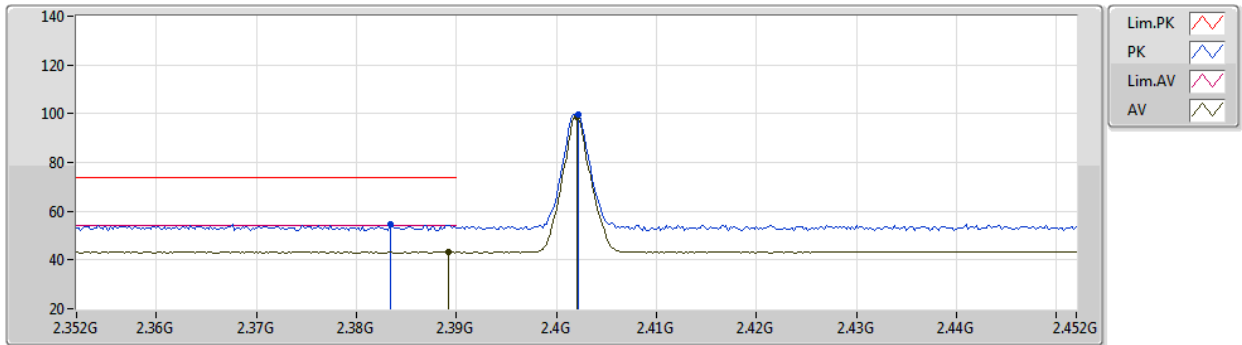
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.388G	54.70	74.00	-19.30	24.49	3	Vertical	136	1.89	-	27.51	2.70	-
AV	2.3874G	43.22	54.00	-10.78	13.01	3	Vertical	136	1.89	-	27.51	2.70	-
PK	2.4018G	99.36	Inf	-Inf	69.15	3	Vertical	136	1.89	-	27.51	2.70	-
AV	2.402G	98.44	Inf	-Inf	68.23	3	Vertical	136	1.89	-	27.51	2.70	-

BT-BR(1Mbps)

2402MHz_TX

19/05/2020



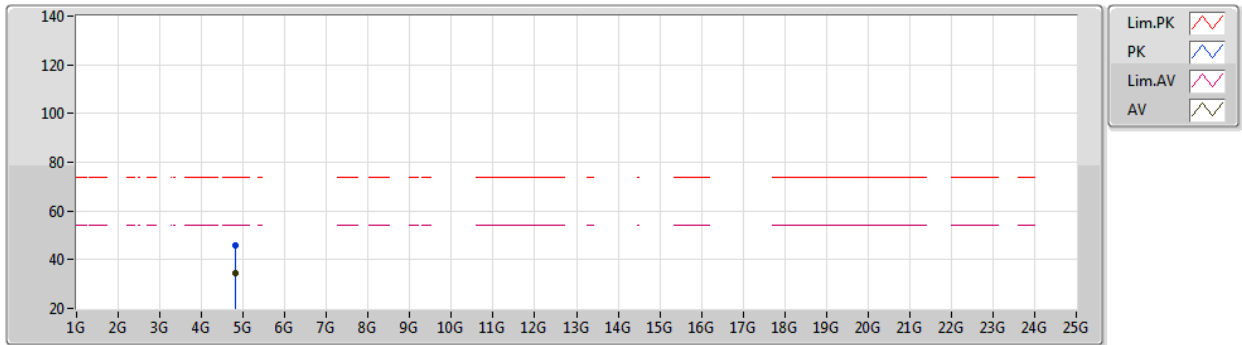
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3834G	54.47	74.00	-19.53	24.25	3	Horizontal	64	2.01	-	27.52	2.70	-
AV	2.3892G	43.24	54.00	-10.76	13.03	3	Horizontal	64	2.01	-	27.51	2.70	-
PK	2.4022G	99.62	Inf	-Inf	69.41	3	Horizontal	64	2.01	-	27.51	2.70	-
AV	2.402G	98.68	Inf	-Inf	68.47	3	Horizontal	64	2.01	-	27.51	2.70	-

BT-BR(1Mbps)

2402MHz_TX

19/05/2020



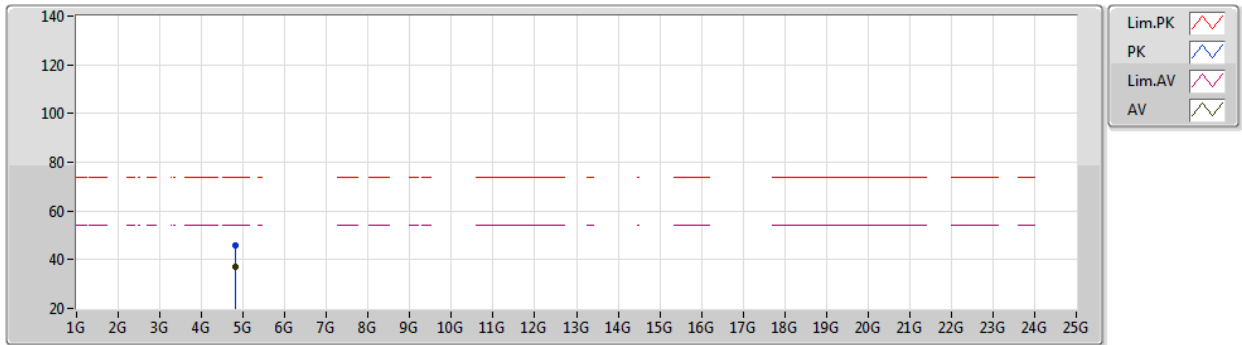
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.804G	46.05	74.00	-27.95	42.52	3	Vertical	360	2.53	-	32.52	4.51	33.50
AV	4.80383G	34.55	54.00	-19.45	31.02	3	Vertical	360	2.53	-	32.52	4.51	33.50

BT-BR(1Mbps)

2402MHz_TX

19/05/2020



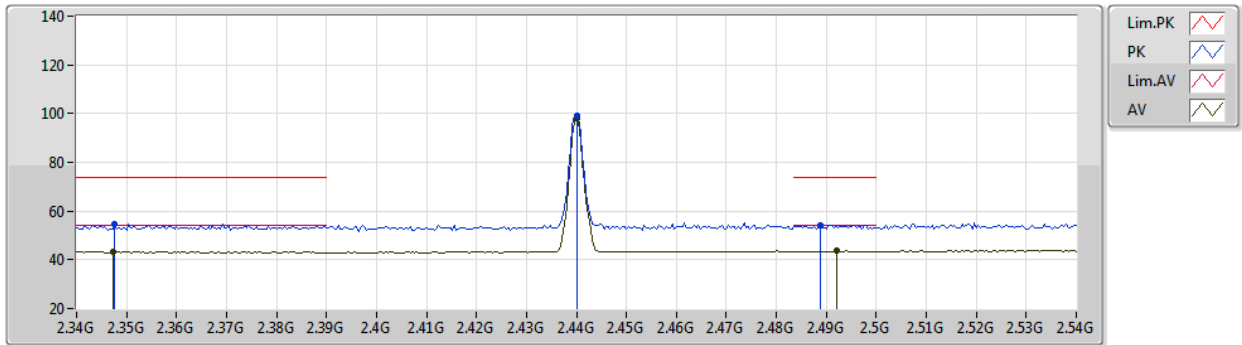
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.80412G	46.10	74.00	-27.90	42.57	3	Horizontal	234	1.80	-	32.52	4.51	33.50
AV	4.80383G	37.21	54.00	-16.79	33.68	3	Horizontal	234	1.80	-	32.52	4.51	33.50

BT-BR(1Mbps)

2440MHz_TX

19/05/2020



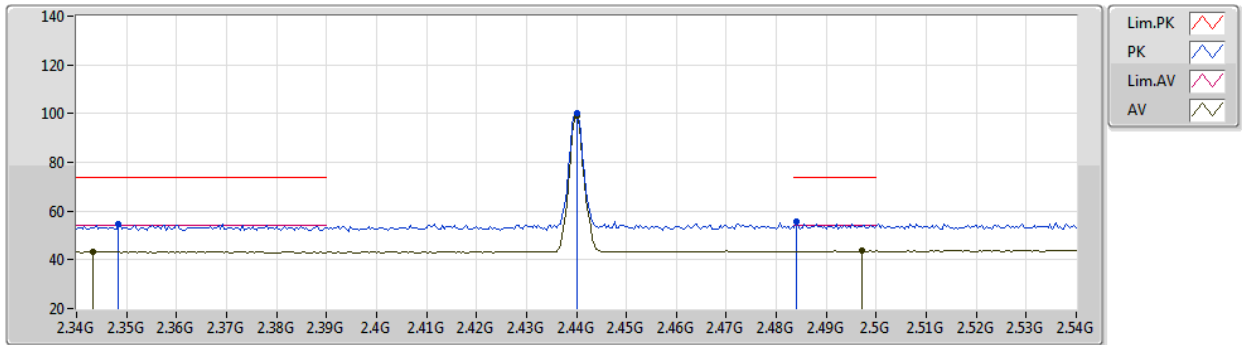
EUT_Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3476G	54.89	74.00	-19.11	24.64	3	Vertical	127	1.89	-	27.55	2.70	-
AV	2.3472G	43.19	54.00	-10.81	12.94	3	Vertical	127	1.89	-	27.55	2.70	-
PK	2.44G	99.03	Inf	-Inf	68.67	3	Vertical	127	1.89	-	27.66	2.70	-
AV	2.44G	97.88	Inf	-Inf	67.52	3	Vertical	127	1.89	-	27.66	2.70	-
PK	2.4888G	54.39	74.00	-19.61	23.83	3	Vertical	127	1.89	-	27.86	2.70	-
AV	2.492G	43.55	54.00	-10.45	12.98	3	Vertical	127	1.89	-	27.87	2.70	-

BT-BR(1Mbps)

2440MHz_TX

19/05/2020



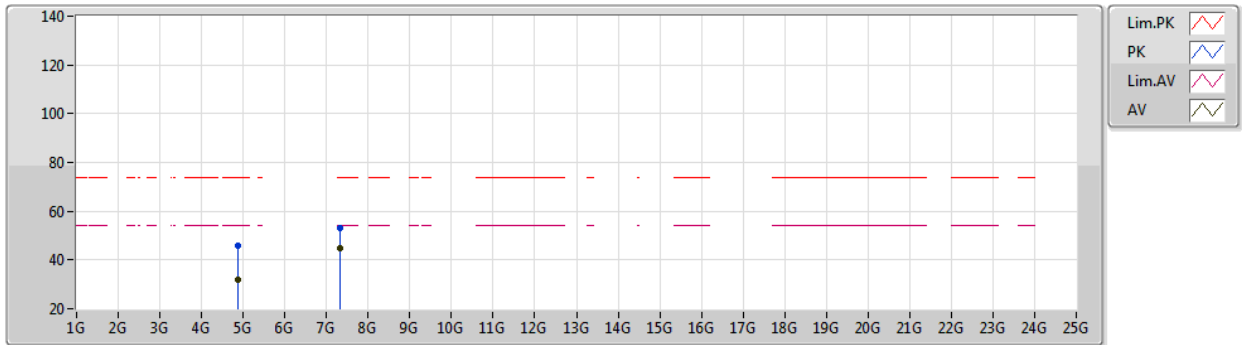
EUT_Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3484G	54.79	74.00	-19.21	24.54	3	Horizontal	66	1.75	-	27.55	2.70	-
AV	2.3432G	43.38	54.00	-10.62	13.12	3	Horizontal	66	1.75	-	27.56	2.70	-
PK	2.44G	99.92	Inf	-Inf	69.56	3	Horizontal	66	1.75	-	27.66	2.70	-
AV	2.44G	99.02	Inf	-Inf	68.66	3	Horizontal	66	1.75	-	27.66	2.70	-
PK	2.484G	55.63	74.00	-18.37	25.09	3	Horizontal	66	1.75	-	27.84	2.70	-
AV	2.4972G	43.72	54.00	-10.28	13.13	3	Horizontal	66	1.75	-	27.89	2.70	-

BT-BR(1Mbps)

2440MHz_TX

19/05/2020



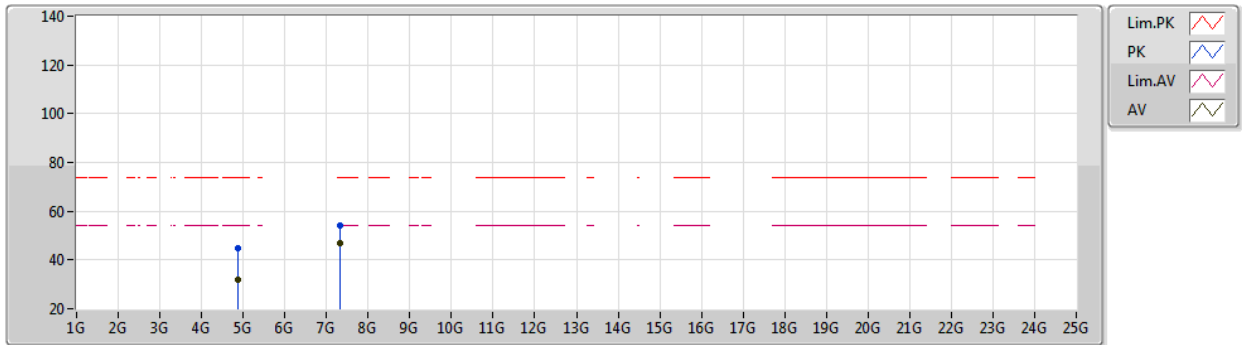
EUT_Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.88069G	46.11	74.00	-27.89	42.11	3	Vertical	65	1.38	-	32.82	4.62	33.44
AV	4.88009G	31.96	54.00	-22.04	27.96	3	Vertical	65	1.38	-	32.82	4.62	33.44
PK	7.3197G	53.20	74.00	-20.80	44.13	3	Vertical	250	1.50	-	37.52	5.52	33.97
AV	7.31974G	44.99	54.00	-9.01	35.92	3	Vertical	250	1.50	-	37.52	5.52	33.97

BT-BR(1Mbps)

2440MHz_TX

19/05/2020



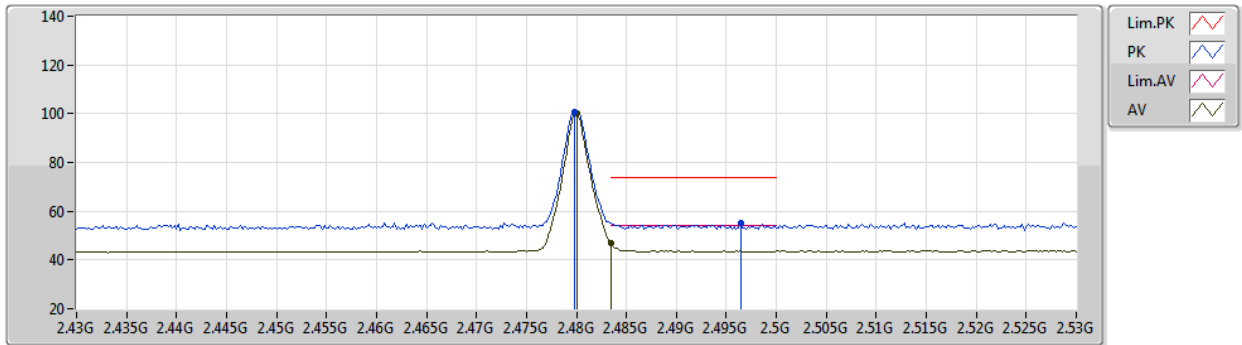
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.87847G	45.08	74.00	-28.92	41.10	3	Horizontal	96	2.19	-	32.81	4.62	33.45
AV	4.88033G	31.91	54.00	-22.09	27.91	3	Horizontal	96	2.19	-	32.82	4.62	33.44
PK	7.31978G	54.00	74.00	-20.00	44.93	3	Horizontal	140	1.60	-	37.52	5.52	33.97
AV	7.3198G	46.69	54.00	-7.31	37.62	3	Horizontal	140	1.60	-	37.52	5.52	33.97

BT-BR(1Mbps)

2480MHz_TX

19/05/2020



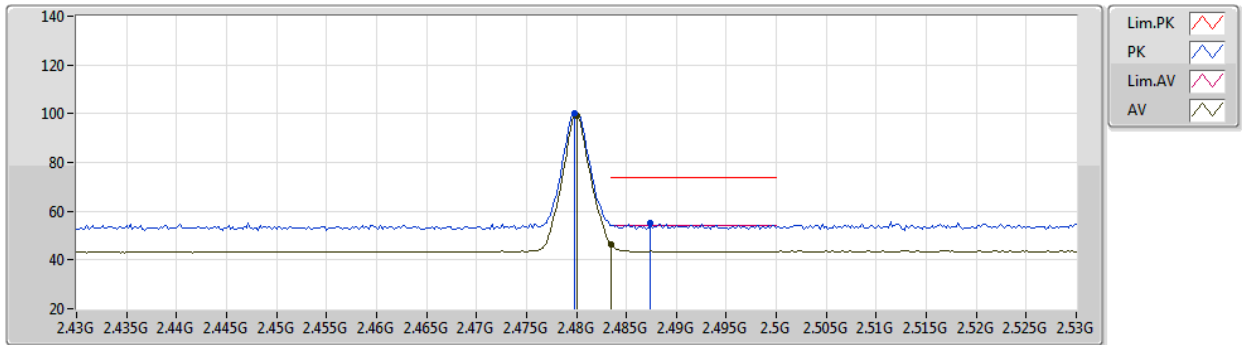
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.4798G	100.61	Inf	-Inf	70.09	3	Vertical	134	2.11	-	27.82	2.70	-
AV	2.48G	99.98	Inf	-Inf	69.46	3	Vertical	134	2.11	-	27.82	2.70	-
PK	2.4964G	55.27	74.00	-18.73	24.68	3	Vertical	134	2.11	-	27.89	2.70	-
AV	2.4835G	46.69	54.00	-7.31	16.16	3	Vertical	134	2.11	-	27.83	2.70	-

BT-BR(1Mbps)

2480MHz_TX

19/05/2020



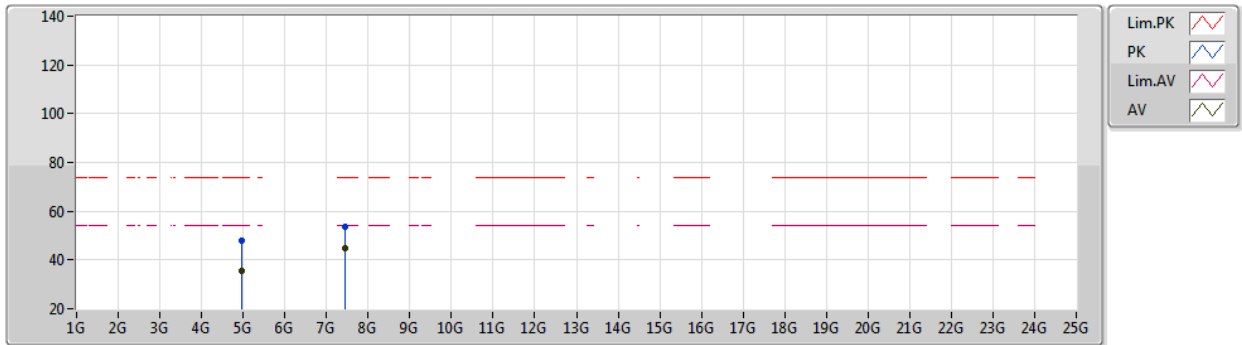
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.4798G	100.23	Inf	-Inf	69.71	3	Horizontal	69	1.80	-	27.82	2.70	-
AV	2.48G	99.36	Inf	-Inf	68.84	3	Horizontal	69	1.80	-	27.82	2.70	-
PK	2.4874G	54.94	74.00	-19.06	24.39	3	Horizontal	69	1.80	-	27.85	2.70	-
AV	2.4835G	46.56	54.00	-7.44	16.03	3	Horizontal	69	1.80	-	27.83	2.70	-

BT-BR(1Mbps)

2480MHz_TX

19/05/2020



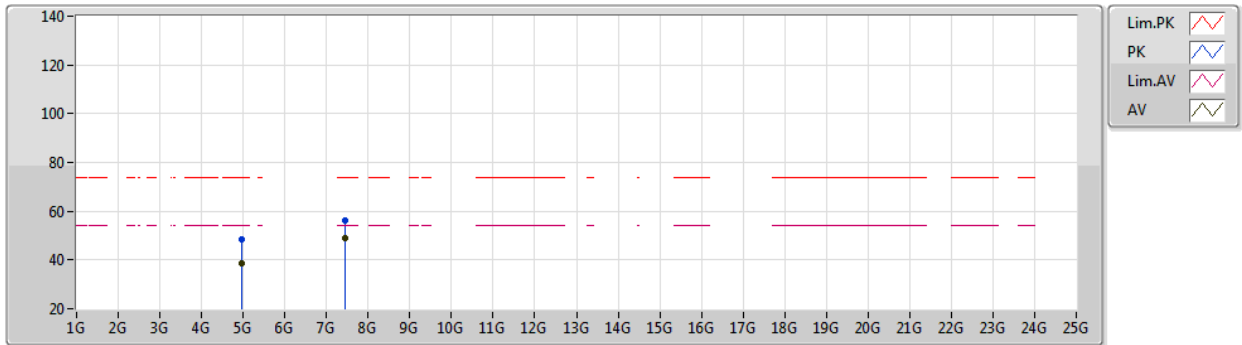
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.95987G	48.06	74.00	-25.94	43.69	3	Vertical	315	1.00	-	33.02	4.74	33.39
AV	4.95981G	35.53	54.00	-18.47	31.16	3	Vertical	315	1.00	-	33.02	4.74	33.39
PK	7.4397G	53.56	74.00	-20.44	44.32	3	Vertical	247	1.55	-	37.60	5.70	34.06
AV	7.43973G	44.62	54.00	-9.38	35.38	3	Vertical	247	1.55	-	37.60	5.70	34.06

BT-BR(1Mbps)

2480MHz_TX

19/05/2020



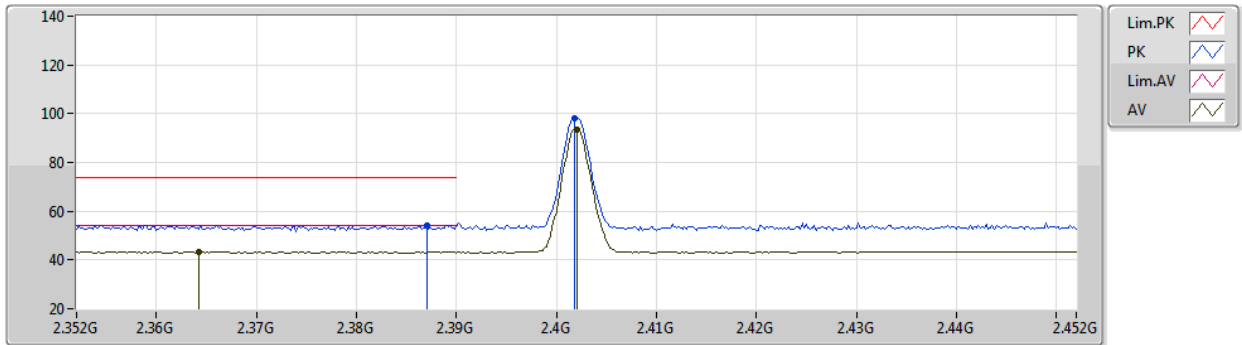
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.9601G	48.58	74.00	-25.42	44.21	3	Horizontal	39	1.80	-	33.02	4.74	33.39
AV	4.95981G	38.74	54.00	-15.26	34.37	3	Horizontal	39	1.80	-	33.02	4.74	33.39
PK	7.43976G	56.18	74.00	-17.82	46.94	3	Horizontal	126	1.53	-	37.60	5.70	34.06
AV	7.43973G	48.87	54.00	-5.13	39.63	3	Horizontal	126	1.53	-	37.60	5.70	34.06

BT-EDR(3Mbps)

19/05/2020

2402MHz_TX



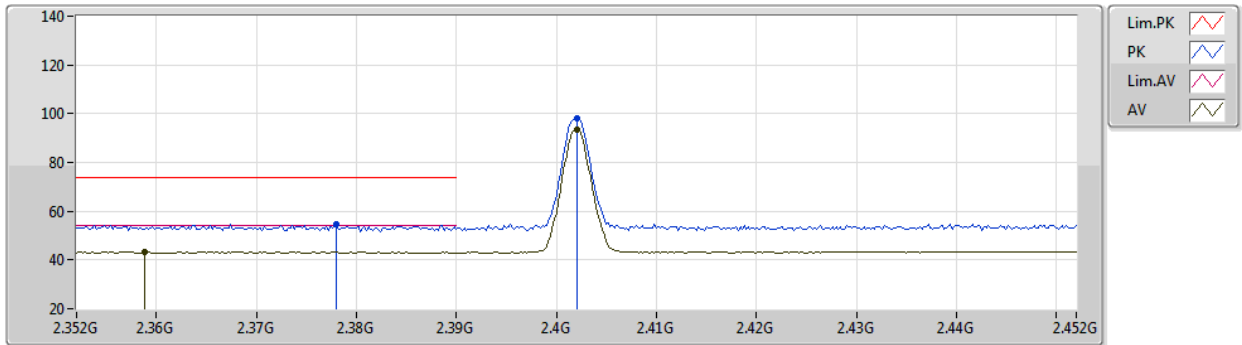
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.387G	54.28	74.00	-19.72	24.07	3	Vertical	120	1.82	-	27.51	2.70	-
AV	2.3642G	43.22	54.00	-10.78	12.98	3	Vertical	120	1.82	-	27.54	2.70	-
PK	2.4018G	98.32	Inf	-Inf	68.11	3	Vertical	120	1.82	-	27.51	2.70	-
AV	2.402G	93.41	Inf	-Inf	63.20	3	Vertical	120	1.82	-	27.51	2.70	-

BT-EDR(3Mbps)

2402MHz_TX

19/05/2020



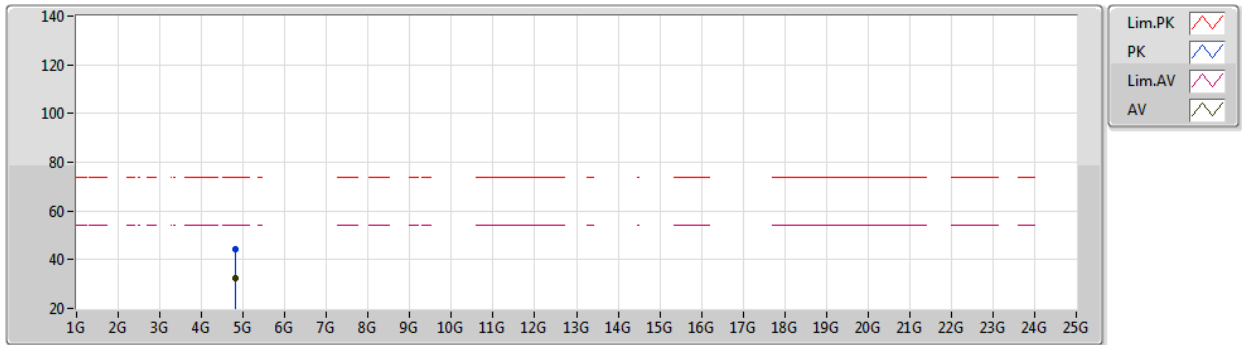
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.378G	54.59	74.00	-19.41	24.37	3	Horizontal	66	1.95	-	27.52	2.70	-
AV	2.3588G	43.26	54.00	-10.74	13.02	3	Horizontal	66	1.95	-	27.54	2.70	-
PK	2.402G	98.23	Inf	-Inf	68.02	3	Horizontal	66	1.95	-	27.51	2.70	-
AV	2.402G	93.32	Inf	-Inf	63.11	3	Horizontal	66	1.95	-	27.51	2.70	-

BT-EDR(3Mbps)

2402MHz_TX

19/05/2020



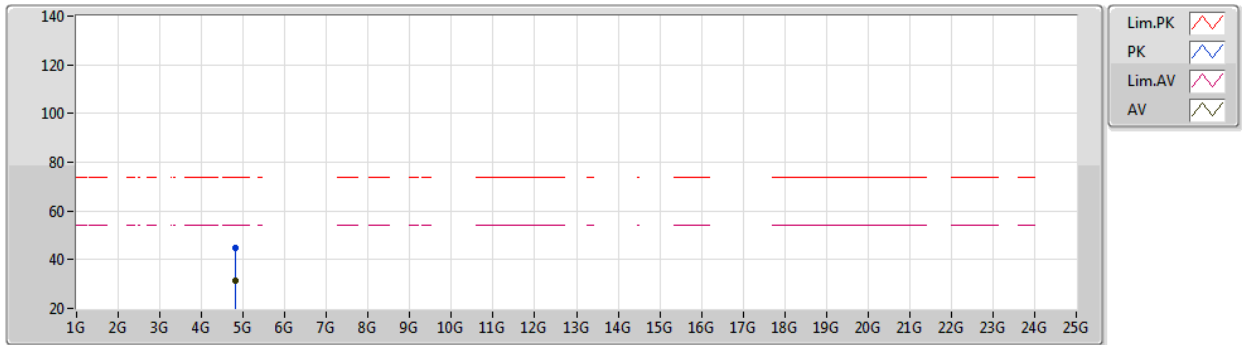
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.80298G	44.39	74.00	-29.61	40.88	3	Vertical	93	1.79	-	32.51	4.50	33.50
AV	4.80376G	32.41	54.00	-21.59	28.88	3	Vertical	93	1.79	-	32.52	4.51	33.50

BT-EDR(3Mbps)

19/05/2020

2402MHz_TX



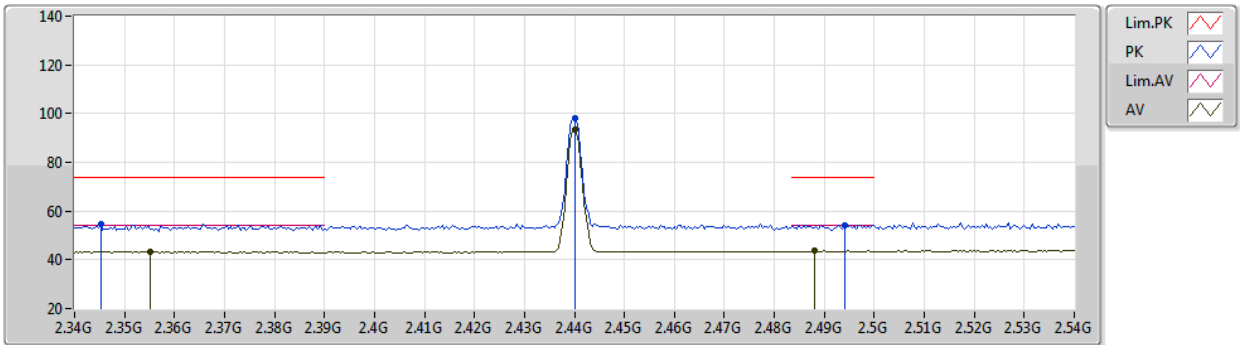
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.80541G	45.00	74.00	-29.00	41.47	3	Horizontal	140	1.56	-	32.52	4.51	33.50
AV	4.80471G	31.45	54.00	-22.55	27.92	3	Horizontal	140	1.56	-	32.52	4.51	33.50

BT-EDR(3Mbps)

2440MHz_TX

19/05/2020



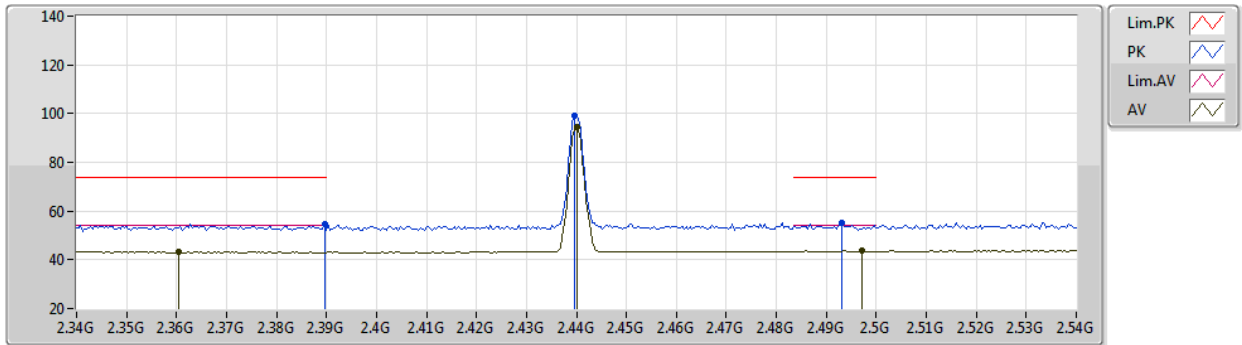
EUT_Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3452G	54.75	74.00	-19.25	24.50	3	Vertical	127	1.90	-	27.55	2.70	-
AV	2.3552G	43.33	54.00	-10.67	13.09	3	Vertical	127	1.90	-	27.54	2.70	-
PK	2.44G	98.19	Inf	-Inf	67.83	3	Vertical	127	1.90	-	27.66	2.70	-
AV	2.44G	93.23	Inf	-Inf	62.87	3	Vertical	127	1.90	-	27.66	2.70	-
PK	2.494G	54.39	74.00	-19.61	23.81	3	Vertical	127	1.90	-	27.88	2.70	-
AV	2.488G	43.61	54.00	-10.39	13.06	3	Vertical	127	1.90	-	27.85	2.70	-

BT-EDR(3Mbps)

2440MHz_TX

19/05/2020



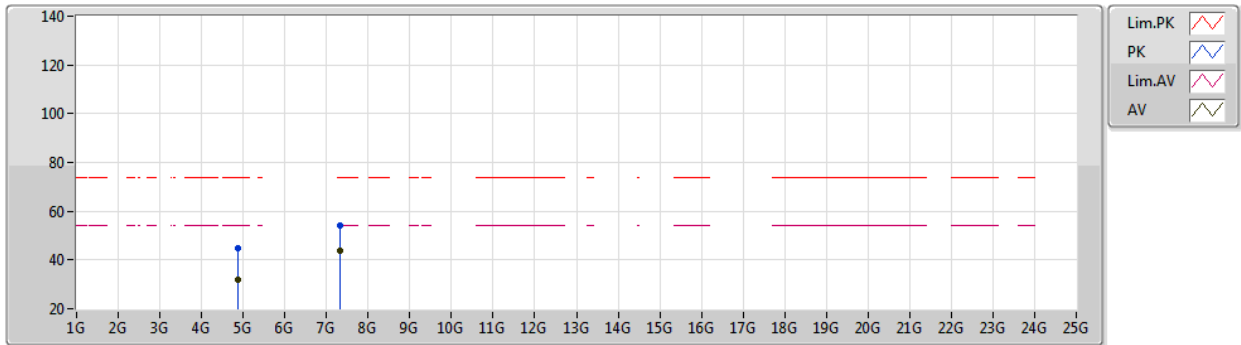
EUT_Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3896G	54.70	74.00	-19.30	24.49	3	Horizontal	63	1.75	-	27.51	2.70	-
AV	2.3604G	43.30	54.00	-10.70	13.06	3	Horizontal	63	1.75	-	27.54	2.70	-
PK	2.4396G	99.11	Inf	-Inf	68.75	3	Horizontal	63	1.75	-	27.66	2.70	-
AV	2.44G	94.23	Inf	-Inf	63.87	3	Horizontal	63	1.75	-	27.66	2.70	-
PK	2.4932G	54.96	74.00	-19.04	24.39	3	Horizontal	63	1.75	-	27.87	2.70	-
AV	2.4972G	43.67	54.00	-10.33	13.08	3	Horizontal	63	1.75	-	27.89	2.70	-

BT-EDR(3Mbps)

19/05/2020

2440MHz_TX



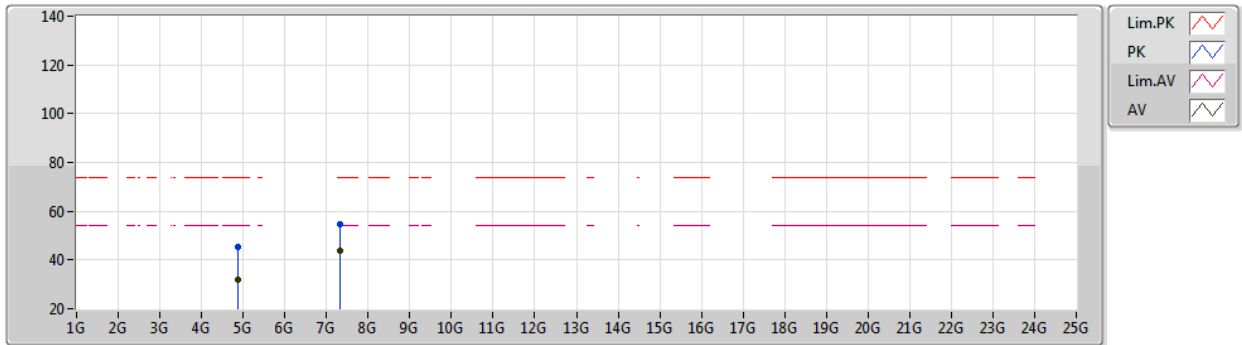
EUT_Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.87934G	45.00	74.00	-29.00	41.00	3	Vertical	135	2.55	-	32.82	4.62	33.44
AV	4.88104G	31.86	54.00	-22.14	27.86	3	Vertical	135	2.55	-	32.82	4.62	33.44
PK	7.31949G	53.90	74.00	-20.10	44.83	3	Vertical	247	1.49	-	37.52	5.52	33.97
AV	7.31973G	43.58	54.00	-10.42	34.51	3	Vertical	247	1.49	-	37.52	5.52	33.97

BT-EDR(3Mbps)

19/05/2020

2440MHz_TX



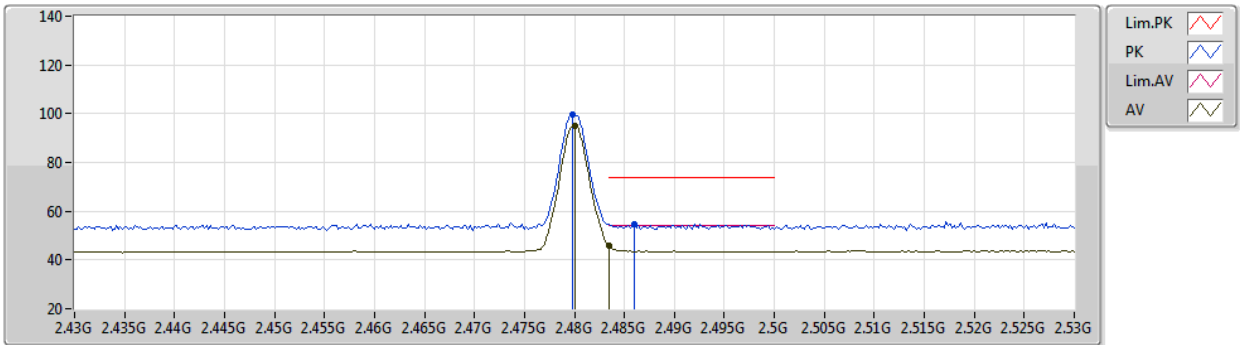
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.88211G	45.15	74.00	-28.85	41.14	3	Horizontal	317	1.95	-	32.83	4.62	33.44
AV	4.87926G	31.88	54.00	-22.12	27.88	3	Horizontal	317	1.95	-	32.82	4.62	33.44
PK	7.31996G	54.43	74.00	-19.57	45.36	3	Horizontal	124	1.49	-	37.52	5.52	33.97
AV	7.3198G	43.55	54.00	-10.45	34.48	3	Horizontal	124	1.49	-	37.52	5.52	33.97

BT-EDR(3Mbps)

2480MHz_TX

19/05/2020



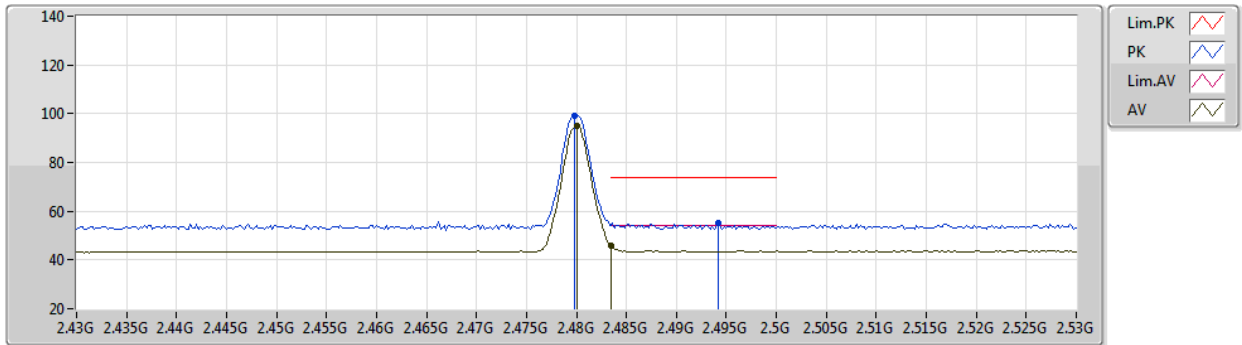
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.4798G	99.63	Inf	-Inf	69.11	3	Vertical	133	2.11	-	27.82	2.70	-
AV	2.48G	94.83	Inf	-Inf	64.31	3	Vertical	133	2.11	-	27.82	2.70	-
PK	2.486G	54.64	74.00	-19.36	24.10	3	Vertical	133	2.11	-	27.84	2.70	-
AV	2.4835G	45.81	54.00	-8.19	15.28	3	Vertical	133	2.11	-	27.83	2.70	-

BT-EDR(3Mbps)

19/05/2020

2480MHz_TX



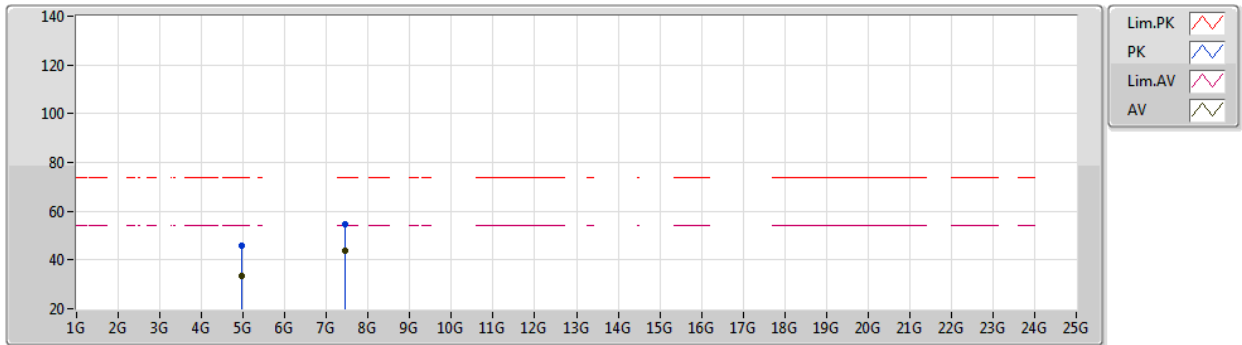
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.4798G	99.22	Inf	-Inf	68.70	3	Horizontal	67	1.80	-	27.82	2.70	-
AV	2.48G	94.77	Inf	-Inf	64.25	3	Horizontal	67	1.80	-	27.82	2.70	-
PK	2.4942G	55.19	74.00	-18.81	24.61	3	Horizontal	67	1.80	-	27.88	2.70	-
AV	2.4835G	45.79	54.00	-8.21	15.26	3	Horizontal	67	1.80	-	27.83	2.70	-

BT-EDR(3Mbps)

19/05/2020

2480MHz_TX



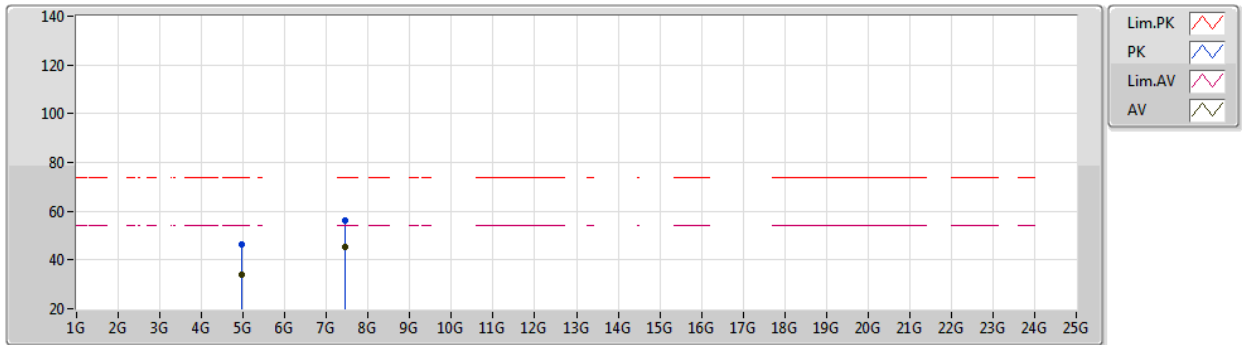
EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.95823G	45.69	74.00	-28.31	41.33	3	Vertical	199	1.55	-	33.02	4.74	33.40
AV	4.95987G	33.32	54.00	-20.68	28.95	3	Vertical	199	1.55	-	33.02	4.74	33.39
PK	7.4397G	54.40	74.00	-19.60	45.16	3	Vertical	244	1.58	-	37.60	5.70	34.06
AV	7.43973G	44.03	54.00	-9.97	34.79	3	Vertical	244	1.58	-	37.60	5.70	34.06

BT-EDR(3Mbps)

19/05/2020

2480MHz_TX



EUT Y_1TX
Setting 7
04-F-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.95991G	46.39	74.00	-27.61	42.02	3	Horizontal	72	1.77	-	33.02	4.74	33.39
AV	4.96027G	33.96	54.00	-20.04	29.59	3	Horizontal	72	1.77	-	33.02	4.74	33.39
PK	7.43959G	56.21	74.00	-17.79	46.97	3	Horizontal	124	1.60	-	37.60	5.70	34.06
AV	7.43982G	45.57	54.00	-8.43	36.33	3	Horizontal	124	1.60	-	37.60	5.70	34.06